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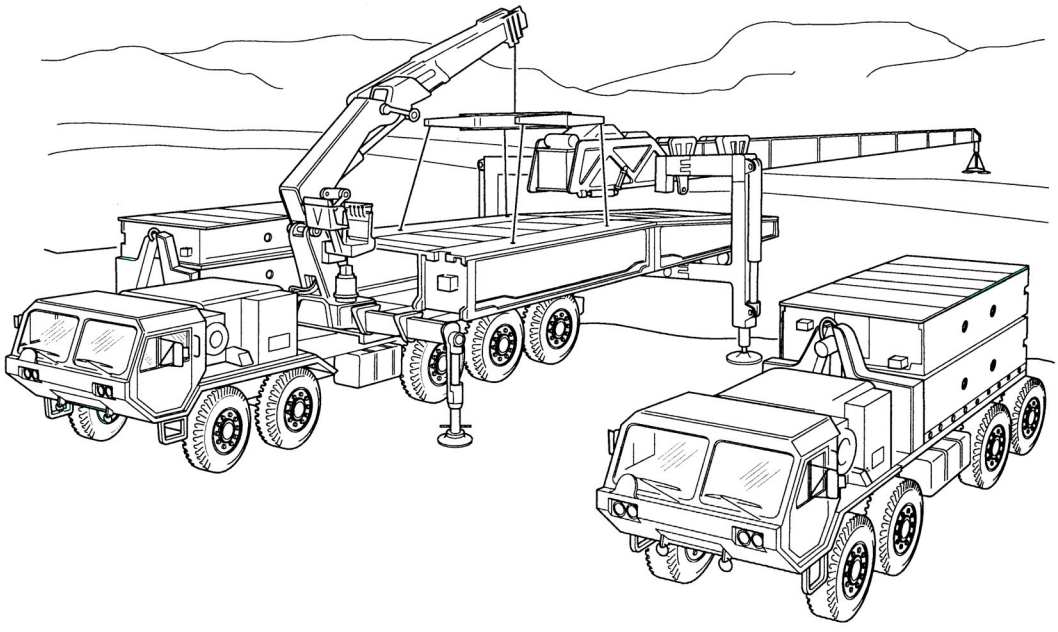
Supersedes copy TM 5-5420-279-24 dated 8 April 2003. See i page for details.

MAINTENANCE MANUAL

FOR

DRY SUPPORT BRIDGE (DSB)

(NSN 5420-01-469-7479)



Approved for public release: distribution is unlimited

May 2004 **HEADQUARTERS, DEPARTMENT OF THE ARMY**

WARNING SUMMARY

LOSS OF HEARING. PERSONNEL MUST WEAR HEARING PROTECTIVE DEVICES WHEN OPERATING THE CRANE DURING LAUNCH AND RECOVERY OPERATIONS OR WHEN WORKING WITHIN 10FT (3M) OF A DSB LAUNCH VEHICLE AT HIGH ENGINE IDLE.

GREAT CARE IS TO BE EXERCISED WHEN OPERATING SV10 - THIS VALVE RELEASES THE WINCH BRAKES IN CONJUNCTION WITH SV5 & SV6. IT IS IMPERATIVE THAT THE CHEST PACK RH JOYSTICK IS IN THE NEUTRAL (CENTER) POSITION.

PERSONAL INJURY OR DEATH. IT IS POTENTIALLY VERY DANGEROUS TO OPERATE THE E-STOP OVERRIDE. DOING SO WILL DEFEAT ALL E-STOP FUNCTIONALITY. IT IS ONLY TO BE USED AS A TEMPORARY MEASURE TO ASSESS THE LEVEL OF DAMAGE TO THE SYSTEM.

TO ENSURE THE SAFETY OF PERSONNEL, ALL TOOLS AND EQUIPMENT MUST BE KEPT CLEAN AND DRY TO PREVENT THE OPERATOR FROM SLIPPING AND CAUSING INJURY TO PERSONNEL.

CRUSH INJURY. THE CROSS CONNECTION PUMP IS HEAVY.

DEATH OR SERIOUS INJURY CAN OCCUR IF PMCS ARE NOT CARRIED OUT BY AUTHORIZED PERSONNEL, AT THE FREQUENCIES STATED IN THIS SECTION.

CRUSH INJURY. THE DAMPER WEIGHS APPROXIMATELY 54LBS (25KG).

CRUSH INJURY. THE FOLDING CYLINDER IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE FOLDING CYLINDER.

CRUSH INJURY. THE RAISE CYLINDER IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE RAISE CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE GUIDE ROLLERS HYDRAULIC MOTOR.

DANGER FROM MOVING PARTS. OPERATION OF EQUIPMENT POWERED BY HYDRAULIC PRESSURE IS HAZARDOUS. KEEP CLEAR OF MOVING PARTS.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE BACK-UP MODE OPERATION CONTROLS.

CRUSH INJURY. THE PINCH ROLLER ASSEMBLY WEIGHS APPROXIMATELY 80LB (36KG).

CRUSH INJURY. THE FORWARD LAUNCH BEAM WILL MOVE WHEN RESIDUAL HYDRAULIC PRESSURE IS RELEASED FROM THE REAR PINCH ROLLER. ENSURE THAT THE FORWARD LAUNCH BEAMTRANSPORTATION PIN IS FITTED BEFORE CARRYING OUT THIS PROCEDURE.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE FORWARD ROLLER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE FORWARD ROLLER ASSEMBLY IS SUPPORTED.

DEATH OR SEVERE INJURY MAY OCCUR IF HEIGHT OF 3/16 INCH IS EXCEEDED.

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BEDE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE MANIFOLD.

BURN INJURY. HOT OIL. PERSONNEL MUST WEAR PERSONAL PROTECTIVE EQUIPMENT WHEN HANDLING HOT OIL.

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT A SIDE ROLLER ASSEMBLY REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SUITABLE POINT ON THE LAUNCH FRAME.

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL WHEN CHANGING UPPER WINCH GEARBOX OIL REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SHACKLE ON THE LAUNCH BEAM DRIVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LOWER WINCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE UPPER WINCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC SYSTEM.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT THE EMERGENCY WINCH DRUM RELEASE PROCEDURE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC FILTERS.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE ARTICULATOR CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE ARTICULATOR CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR CYLINDERS.

CRUSH INJURY. THE ARTICULATOR CROSS MEMBER IS HEAVY. BEFORE REMOVING THE ARTICULATOR CROSS MEMBER SHOOT BOLTS ENSURE THAT THE WEIGHT OF THE LAUNCH FRAME ASSEMBLY IS SUPPORTED.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE STOW CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE STOW CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STOW CYLINDERS.

PERSONAL INJURY. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING WINCH CABLES.

CRUSH INJURY. PULLEY ASSEMBLIES ARE HEAVY.

CRUSH INJURY. THE HOME BANK CARRIAGE UPPER PULLEY BLOCK IS HEAVY.

DANGER TO PERSONNEL. SHARP METAL SURFACES. THE ROPE PULLEYS MAY HAVE SHARP METAL SURFACES. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING ROPES AND ROPE PULLEYS.

CRUSH INJURY. THE HOME BANK CARRIAGE LOWER PULLEY BLOCK IS HEAVY.

CRUSH INJURY. THE FAR BANK CARRIAGE UPPER PULLEY BLOCK IS HEAVY.

CRUSH INJURY. THE FAR BANK CARRIAGE LOWER PULLEY BLOCK IS HEAVY.

CRUSH INJURY. THE FAR BANK AND HOME BANK CARRIAGES ARE VERY HEAVY, SUITABLE LIFTING EQUIPMENT IS TO BE USED WHEN REMOVING THE CARRIAGES FROM THE LAUNCH BEAM.

CRUSH INJURY. THE SUPPORT BEARING PAD WEIGHS 56 LB (25.4KG).

CRUSH INJURY. DANGER OF PERSONNEL SLIPPING. THE TAIL LIFT PLATFORM IS AT AN ANGLE WHEN SUPPORTING THE WEIGHT OF THE FAR BANK SUPPORT.

CRUSH INJURY. THE FAR BANK SUPPORT IS HEAVY 436 LBS (198 KG).

DANGER OF FLUID SPLASH. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (SAFETY GLASSES) WHEN LOOKING INTO THE RESERVOIR DURING THE BLEEDING PROCEDURE.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE ROTATE CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE ROTATE CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE CYLINDERS.

CRUSH INJURY. THE TILT ROLLER ASSEMBLY IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TILT ROLLER ASSEMBLY.

CRUSH INJURY. THE TILT ROLLER ASSEMBLY AND TILT ROLLER SUPPORT ARE VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME TILT ROLLER CYLINDER.

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. THE WORKING PRESSURE OF THE HYDRAULIC SYSTEM IS 4423 PSI (30495 kPa) AND THERE MAY BE RESIDUAL PRESSURE IN THE HOSES.

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. SHUT DOWN VEHICLE PRIOR TO CARRYING OUT THIS PROCEDURE. ENSURE THAT THE BATTERY SHUTOFF SWITCH IS IN THE OFF POSITION.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON ANY CYLINDER.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. WHEN DE-PRESSURIZING CYLINDERS IT IS IMPORTANT TO MAKE SURE NO HYDRAULIC OIL CAN BE SPRAYED. MAKE SURE THAT NO PERSONNEL ARE STANDING NEAR THE CYLINDER BEING DE-PRESSURIZED.

CRUSH INJURY. THE TAIL LIFT PLATFORM IS HEAVY 1213 LB (550 KG).

BURN INJURY. COMPONENTS ARE HEATED IN WATER TO 158^{O}F (70^{O}C) PERSONNEL MUST WEAR PROTECTIVE CLOTHING WHEN HANDLING HOT COMPONENTS.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER MANIFOLD ASSEMBLY.

CRUSH INJURY. THE STABILIZER LEG IS HEAVY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER CYLINDER.

CRUSH INJURY. THE STABILIZER LEG AND STABILIZER LEG CYLINDER ARE HEAVY.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LOWER CENTER BEAM ALWAYS ENSURE THAT THE WEIGHT OF THE UPPER CENTER BEAM IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC SYSTEM ON THE A-FRAME ASSEMBLY.

FALL INJURY WHEN WORKING AT HEIGHT. THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 20FT (6M) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED.

CRUSH INJURY. THE A-FRAME IS HEAVY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME STABILIZER LEG ASSEMBLY.

CRUSH INJURY. THE A-FRAME STABILIZER LEG IS HEAVY.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LAUNCH BEAM DRIVE, ALWAYS ENSURE THAT THE WEIGHT OF THE LAUNCH BEAM DRIVE IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR CYLINDERS.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE WINCH MANIFOLD ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE MOTOR.

CRUSH INJURY. THE LAUNCH-FRAME IS HEAVY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE DISCONNECTING ANY HYDRAULIC LINES.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR MANIFOLD ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PINCH ROLL/STOW MANIFOLD ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PINCH ROLL CYLINDER.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PILOT MANIFOLD ASSEMBLY.

CRUSH INJURY. THE FAR BANK AND HOME BANK CARRIAGES ARE VERY HEAVY. SUITABLE LIFTING EQUIPMENT IS TO BE USED WHEN REMOVING THE CARRIAGES FROM THE LAUNCH BEAM.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME ROTATE MANIFOLD ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE INTERFACE MANIFOLD ASSEMBLY.

CRUSH INJURY. THE INTERFACE MANIFOLD IS HEAVY.

DANGER OF INJURY TO PERSONNEL. ROTATING PARTS; DO NOT ATTEMPT TO WORK ON THE HYDRAULIC PUMP WITH THE ENGINE RUNNING.

CRUSH INJURY. THE HYDRAULIC PUMP IS HEAVY 132 LBS (60 KG).

DANGER OF INJURY TO PERSONNEL. ROTATING PARTS; DO NOT ATTEMPT TO WORK ON THE POWER TAKE OFF WITH THE ENGINE RUNNING.

CRUSH INJURY. THE CRANE WEIGHS 10800 POUNDS. PERSONNEL MUST BE CLEAR OF THE LIFTING AREA WHEN THE CRANE IS REMOVED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE COUPLING.

CRUSH INJURY. THE STABILIZER LEG IS HEAVY TO AVOID INJURY ENSURE THAT THE WEIGHT OF THE CRANE STABILIZER LEG IS SUPPORTED.

CRUSH INJURY. THE ROTATE GEAR IS HEAVY TO AVOID INJURY ENSURE THAT THE WEIGHT OF THE ROTATE GEAR IS SUPPORTED.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE STABILIZER ARM CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE STABILIZER ARM IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER ARM CYLINDER.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LIFTING CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE LIFTING CYLINDER IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFTING CYLINDER.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE LIFTING CYLINDER REPLACEMENT PROCEDURE.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE JIB CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE JIB CYLINDER IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE JIB CYLINDER REPLACEMENT PROCEDURE.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER ASSEMBLY IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE EXTENSION CYLINDER ASSEMBLY.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER ASSEMBLY IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE EXTENSION CYLINDER ASSEMBLY MUST BE DE-PRESSURIZED.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE EXTENSION CYLINDER ASSEMBLY REPLACEMENT PROCEDURE.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER UNDER REPAIR IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE EXTENSION CYLINDERS.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE EXTENSION CYLINDERS REPLACEMENT PROCEDURE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE BOOM EMERGENCY LOWERING SWITCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE CRANE MUST BE IN THE STOWED POSITION BEFORE REMOVING ANY OF THE HYDRAULIC PIPES CONNECTED TO THE BOOM EMERGENCY LOWERING SWITCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE HYDRAULIC SYSTEM.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER EXTENSION LEG PRESSURE SWITCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. DO NOT REMOVE THE STABILIZER EXTENSION LEG PRESSURE SWITCH WHEN THE STABILIZER LEG IS DEPLOYED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK PRESSURE RELEASE VALVE.

INJURY TO PERSONNEL. THE INTERNAL PARTS OF THE PRESSURE RELIEF VALVE ARE UNDER SPRING TENSION. CARE MUST BE TAKEN WHEN DISASSEMBLING THE PRESSURE RELIEF VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK DUMP VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER VALVE CONTROL BLOCK.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER BRAKE VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER LOAD HOLDING VALVES.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER BRAKE VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER LOAD HOLDING VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER PILOT OPERATED CHECK VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB EXTENSION CYLINDER ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE EXTENSION CYLINDER ASSEMBLY MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB EXTENSION CYLINDERS LOAD HOLDING VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PRESSURE TRANSDUCER.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE MOTOR LOAD HOLDING VALVE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT MANIFOLD ASSEMBLY.

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT CYLINDERS.

FALLING OBJECT HAZARD. KEEP WEIGHT ON FAR BANK SUPPORT WHEN RELEASING STRAPS TO CONTROL SWINGING.

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

CRUSH INJURY. ENSURE ALL SHOOT BOLTS ARE FULLY INSERTED AND LOCKED BEFORE LIFTING.

INJURY TO PERSONNEL. ENSURE HYDRAULIC AND ELECTRICAL SYSTEMS ARE SWITCHED OFF WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS.

ENSURE HYDRAULIC AND ELECTRICAL SYSTEMS ARE NOT RUNNING WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS. SERIOUS PERSONAL INJURY MAY OCCUR IF THIS INSTRUCTION IS NOT OBSERVED.

INJURY TO PERSONNEL. STAND WELL CLEAR OF EQUIPMENT WHEN FIRST UNFOLDING A-FRAME. SERIOUS PERSONAL INJURY OR DEATH COULD RESULT IF EQUIPMENT FAILS.

CRUSH INJURY. BEFORE CARRYING OUT TROUBLESHOOTING INVOLVING SV10, A SUSPENDED OR PART BUILT BRIDGE MUST BE MADE SAFE EITHER BY COMPLETING THE BUILD OPERATIONS IN BACK-UP MODE OR BY RETRIEVING THE BRIDGE.

CRUSH INJURY. A SUSPENDED BRIDGE WILL MOVE IF SV10 IS MANUALLY OPERATED AND THE CHEST PACK RIGHT-HAND JOYSTICK IS MOVED FROM THE CENTRAL POSITION CAUSING ACTIVATION OF OTHER SOLENOID VALVES.

FALL INJURY WHEN WORKING AT HEIGHT, THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 6M (20FT) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT THIS TASK.

BURN INJURY. THE HYDRAULIC BUTTERFLY VALVE IS POSITIONED CLOSE TO THE VEHICLE EXHAUST. CARE MUST BE TAKEN WHEN OPERATING THE BUTTERFLY VALVE IF THE EXHAUST OR THE ENGINE IS HOT.

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT A FRONT ROLLER ASSEMBLY REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SUITABLE POINT ON THE LAUNCH FRAME.

CRUSH INJURY. THE FORWARD LAUNCH BEAM IS HEAVY 1323 LB (600 KG).

CAUTION SUMMARY

Do not remove the socket head screws. The socket head screws only need to be undone by 1/8 inch (3mm). This will release the brake to the winch drum motor.

The electrical enclosure assembly contains sensitive electronic equipment. Handle with care.

Damage to roller shaft. Do not hammer on the roller assembly.

Do not lift the far bank support with the tail lift.

Rotabolts with no plastic sleeving should not be used.

Protect rope from contamination during the installation process.

Avoid applying rotary tension to the rope.

Protect open coupling and plugs against the ingress of dirt during transport, contamination or damage to plugs and systems may result.

Check couplings and plugs against the ingress of dirt during transport, contamination or damage to plugs and systems may result.

Before operating check equipment for signs of damage or hydraulic leaks due to the handling or transportation.

Do not undo all 19 rotabolts at the same time. Tighten / change each bolt individually.

When checking function of winches by paying out rope allow ONLY SUFFICIENT SLACK to demonstrate correct functioning. DO NOT ALLOW SLACK rope to become caught on other parts of the equipment or become incorrectly positioned on sheave blocks etc.

Ensure A-Frame Rotate Deploy button is held depressed or manual operation of SV16 is carried out while SV19b is operated. Damage to Stowing Rams or Articulation Rams may arise if this is not carried out.

The Launch Beam can be lowered by stepping to the Beam Angle function on the chest pack. In this mode only small movements of the joystick are permitted and care must be taken to ensure the beam is not forced down onto the far bank.

The slide frame will not fit on the twist lock mountings if the upper twist lock mountings are not assembled correctly, causing damage to the slide frame. Ensure that the upper twist lock flat washers and belleville washers are assembled correctly.

LIST OF EFFECTIVE PAGES

Insert latest changed pages.
Destroy superseded pages.

NOTE

The portion of the text effected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by a shadowed or screened areas, or by miniature pointing hands.

Dates of issue for original and changed pages are:

Original ..0 10 May 2004

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1299, CONSISTING OF THE FOLLOWING:

Page No	*Change No	Page No	*Change No	Page No	*Change no
Title	0	App D 1	0	App G Annex 4 1-35	0
Blank	0	Blank	0	Blank	0
a - k	0	App D 3-21	0	App H 1-30	0
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TECHNICAL MANUAL
***TM 5-5420-279-23**

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC., 10 May 2004

MAINTENANCE MANUAL

FOR

DRY SUPPORT BRIDGE (DSB)

(NSN 5420-01-469-7479)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 *(Recommended Changes to Equipment Technical Publication*s), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter, DA Form 2028 direct to: AMSTA-LC-CI/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is: TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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HOW TO USE THIS MANUAL

This manual is designed to help you maintain the Dry Support Bridge (DSB). A table of contents is provided at the beginning of this manual.

It should be noted by the reader, that this manual is in a commercial format.

FEATURES OF THIS MANUAL

- A table of contents is provided at the beginning of this manual.
- WARNINGS, CAUTIONS NOTES, subject headings, and other important information are highlighted in **BOLD** print as a visual aid.

WARNING

A WARNING indicates a hazard, which can result in death or serious injury.

CAUTION

A CAUTION is a reminder of safety practices or directs attention to usage practices that may result in damage to equipment.

NOTE

A NOTE is a statement containing information that will assist in making the procedures easier to perform.

- Technical instructions include metric units as well as standard unit: metric units are shown in brackets. A metric conversion chart is provided

DESCRIPTION OF CHAPTERS

This manual is divided into 6 chapters. There are also 10 appendices which contain information to support the content of the chapters. Unit and Direct Support maintenance procedures are covered in this manual.

Chapter 1 **INTRODUCTION**, Contains a general description and function of the Dry Support Bridge (DSB) and explains briefly how the main bridge components interface.

Chapter 2 **DSB SYSTEM HYDRAULIC TROUBLE SHOOTING**, contains a brief overview of the hydraulic system and details the steps necessary to recognize, locate and rectify faults that may occur. The trouble shooting charts should be used with the relevant maintenance procedures in chapters 5 and 6 and the appropriate appendix.

Chapter 3 **DSB SYSTEM ELECTRICAL TROUBLE SHOOTING**, contains a brief overview of the hydraulic system and details the steps necessary to recognize, locate and rectify faults that may occur. The trouble shooting charts should be used with the relevant maintenance procedures in chapters 5 and 6 and the appropriate appendix. Cable route tables are also provided to guide the maintainer along a cable route for specific circuits.

Chapter 4 **CRANE SYSTEM HYDRAULIC AND ELECTRICAL TROUBLE SHOOTING**, contains a brief overview of the hydraulic system and details the steps necessary to recognize, locate and rectify faults that may occur. The trouble shooting charts should be used with the relevant maintenance procedures in chapters 5 and 6 and the appropriate appendix.

Chapter 5 **UNIT MAINTENANCE PROCEDURES**, oils and lubrication materials, tools and test equipment and a PMCS are listed in this chapter. A list of procedures that can be carried out at unit level are detailed.

Chapter 6 **DIRECT SUPPORT MAINTENANCE PROCEDURES**, a list of procedures that can be carried out at direct support level are detailed in this chapter.

Appendix A **REFERENCES**, a list of publications that are referenced to in the DSB maintenance manual.

Appendix B **MAINTENANCE ALLOCATION CHART**, detailing the completion times for tasks and the tools required to carry out a maintenance procedure.

Appendix C **TORQUE LIMITS**, a table containing the torque specifications for all bolts on the DSB.

Appendix D **LAUNCHER HYDRAULIC AND ELECTRIC ASSEMBLY LOCATION DRAWINGS**, provides a top level quick reference guide to finding the name and location of a hydraulic or electrical assembly on the DSB. Cable runs are also included in this appendix.

Appendix E **LAUNCHER HYDRAULIC SYSTEM DRAWINGS**, a set of hydraulic circuit diagram which can be used to trace hydraulic circuits. A top level over view of the hydraulic system is also provided.

Appendix F **LAUNCHER HYDRAULIC MANIFOLD ASSEMBLY DRAWINGS**, a top level quick reference guide to identifying an individual hydraulic manifold, the solenoid valves and test points fitted to each manifold are also detailed.

Appendix G **LAUNCHER ELECTRICAL SYSTEM DRAWINGS**, a set of electrical circuit diagram which can be used to trace electrical circuits form a consumer unit to the power source. A series of tables provides a quick reference guide as to which solenoid valve is operated when a particular operation is being performed, this is a synopsis of the solenoid energisation chart.

Appendix H **LAUNCHER ELECTRICAL COMPONENT DRAWINGS**, this chapter details the cables used throughout the DSB less the crane. Each cable is clearly identified, which junction boxes or electrical components the cable is connected to is detailed. The physical make up and a circuit diagram of the cable is also shown.

Appendix J **CRANE HYDRAULIC AND ELECTRICAL SYSTEM CIRCUIT DIAGRAM**, a quick reference of where the crane electrical components can be found is detailed in this chapter. Hydraulic and electrical circuit diagram are also provided to assist with trouble shooting.

Appendix K **DSB WELD REPAIRABLE ITEMS PROCEDURES AND DESCRIPTIONS**, details the weld procedures that should be used when repairing specific components. Items considered repairable, in-process inspections and welding parameters are also covered by this appendix.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1 SCOPE

This is a maintenance manual for the use of Unit and Direct Support maintenance functions. The manual covers the Bridge, Launcher, A-Frame, slide frame and associated components as allocated by the Maintenance Allocation Chart in Appendix B of this manual. Further maintenance instructions can be found in TM 5-5420-279-10 Operator's Manual.

1-2 MAINTENANCE FORMS, RECORDS AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS) (Maintenance Management UPDATE).

1-3 DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Command decision, according to tactical situation, will determine when the destruction of the truck will be accomplished. A destruction plan will be prepared by the using organization unless one has been prepared by a higher authority.

For general destruction procedures for this, refer to TM 750-244-3.

1-4 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

a. If your DSB needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance.

b. Put it on an SF368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, Rock Island, Illinois 61299-7630. We'll send you a reply.

1-5 CORROSION PREVENTION CONTROL (CPC)

a. The DSB System has a total service life of twenty years which allows for extended periods of operation in a corrosive environment. A corrosive environment includes exposure to high humidity, salt spray, road-deicing chemicals, gravel, and atmospheric contamination. No action beyond normal washing and repair of damaged areas is necessary to control corrosion. However, it is recommended that to prevent moisture accumulation during periods of low use, the launcher should be periodically exercised to allow water to drain and hinge joints and cylinders to be exercised.

b. Strong detergents should not be used on the bridge or the launch beam modules as these can be corrosive to aluminum. Particular care should be taken to ensure that all traces of salt spray and deicing chemicals are removed from exposed areas of aluminum, particularly in the jaw bores of the launch beam modules.

1-6 WARRANTY INFORMATION

The DSB is covered under warranty by Williams Fairey Engineering Ltd for a period of 12 months. For information covering this warranty refer to (Warranty Technical Bulletin No. TB 5-5420-279-14) Warranty Procedures for Dry Support Bridge (NSN: 5420-01-469-7479) DSB.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-9 GENERAL DESCRIPTION

a. The DSB system consists of a launcher, launch beam and bridging modules including end beams and approach ramps. It is compatible with the pallet loading system and is transported on four PLS flatracks. It is lightweight in construction and easy to construct by a crew of only eight personnel. It provides a bridging span of 131 ft 2 in (40 m) and 14 ft 1 in (4.3 m) width.

b. A launcher attached to the transport vehicle consists of a crane, a slide frame, a launch frame and a fold out A-Frame for leveling and stabilization.

c. The crane is operated separately while the launcher is operated via hydraulic circuits controlled from a chest pack. The chest pack includes a joystick and illuminated panels to indicate the current action being or about to be executed. Leads from a control cabinet on the vehicle terminate at either end of the vehicle to facilitate connection of the chest pack lead.

d. The launch frame also carries the first section of the launch beam upon which the forward and rear carriages, used to support the bridge sections during assembly and placement, are already in place. The launch frame features a launch beam drive unit to move the launch beam forward or rearward as required and winches, attached to the launch frame, control the movement of the carriages and the raising or lowering of the bridge.

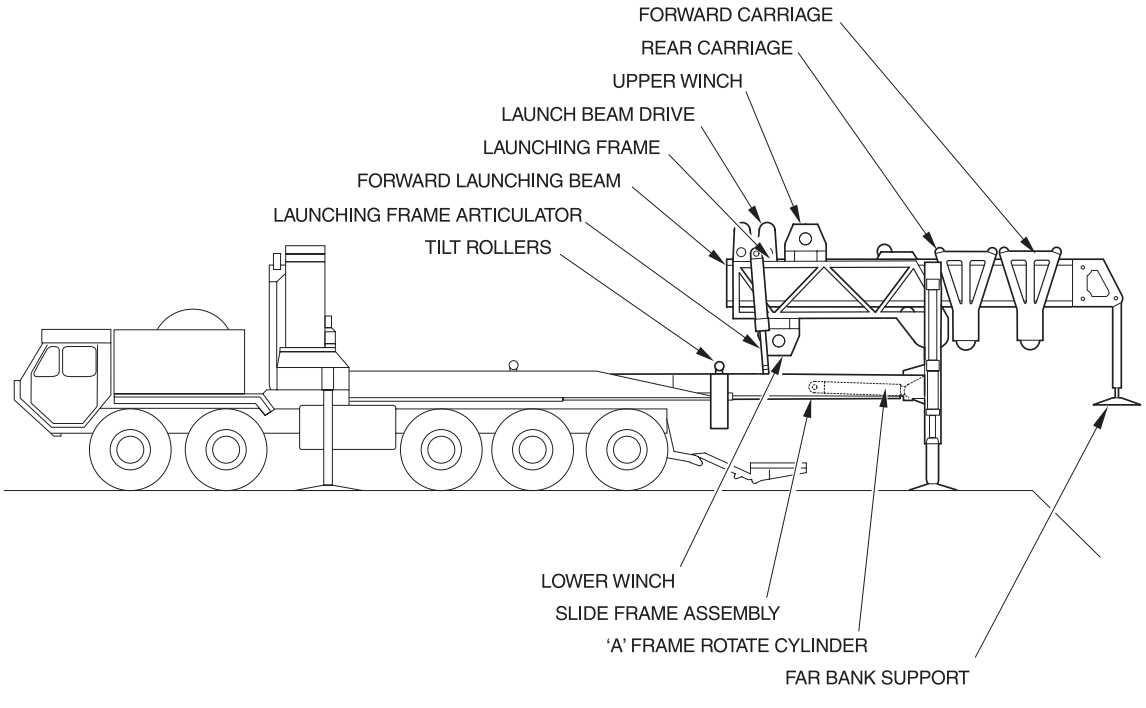


Fig 1.1 Launcher Vehicle

e. The A-Frame assembly consists of foldout support legs that allow the vehicle to be leveled and stabilized for bridge deployment and an upper beam that supports the launch frame. This upper beam is used in its lower position for launch beam deployment and is raised to provide clearance for the modular bridge sections during bridge deployment.

f. The operation of the drive mechanism, winches and hydraulic cylinders is controlled via the chest pack. The operator of the chest pack controls the whole bridge deployment operation, which relies on coordinated actions of the 8-man crew in order to achieve minimum deployment times.

1-10 DETAILED DESCRIPTIONS

1-10-1 Power Take Off (PTO) and Hydraulic Pump

a. A pump provides the hydraulic power to operate the equipment services. The pump powers the bridging hydraulic circuits and the crane services from a power take-off on the vehicle transmission.

b. The pump is a Standard A11VO75 variable displacement swash plate piston pump driven via a power take-off (PTO) and drive shaft from the vehicle transmission.

c. The pump weighs approximately 132 lb. (60 kg) and can produce a flow of 26.4 to 31.68 US gallons (100 to 120 liters) per minute at a pressure of 4423 Psi (30495.51 kPa). It contains pressure cut-off and load sensing control facilities, which match the flow and pressure outputs of the pump to the service required. When no services are being selected, the pump reverts to an idling pressure of 294 Psi (2027.05 kPa) which reduces pump and other hydraulic component wear and extends their working life.

d. Cross connection is provided to allow another suitable hydraulic system to be connected to the DSB Launcher system in the event of a pump failure due to pump or prime mover failure. This allows the Launcher to complete its mission at a lower speed.

e. The cross connection system is designed to use the donor vehicle hydraulic system to drive the DSB without interchanging fluid and the risk of overfilling one or the other reservoirs due to cylinder motion. It also intensifies the pressure to allow the crane to lift the maximum even if the donor vehicle does not give sufficient pressure.

f. It works by having a hydraulic motor driven by the hydraulic system of the donor vehicle driving a hydraulic pump that works off the DSB hydraulic reservoir.

1-10-2 Crane System

The crane system is used to transfer the launch beam and bridging modules from their transportation vehicles to the launcher vehicle during bridging operations. The system comprises an Atlas 390.1 LM Plus crane, a launch beam lifter for the launch beam modules and a two-position bridge module lifter for use with the bridging modules.

1-10-3 Crane

a. The crane is hydraulically powered and controlled and installed on the vehicle, the use of a knuckle boom system enables the boom of the crane to be folded hydraulically within the limited mounting space for transit. When folded, the crane occupies an area approximately 7 ft 10 in (2.4 m) high by 4 ft 3 in (1.3 m) at the front end of the launcher vehicle.

b. The crane usage is restricted to bridge deployment or retrieval activities.

c. The crane base is a welded fabrication and incorporates a stabilizer beam and a pivot beam for three-point crane support. The supporting framework extends rearwards from the crane itself along the length of the vehicle and attaches to the vehicle chassis at four positions to distribute the weight of the crane and any load suspended from it during operation.

d. Incorporated into each side of the crane base is a stabilizer leg, deployed and operated by stabilizer hydraulic cylinders, which is attached to a load-spreading pad at a knuckle joint and lowered to the ground to level and support the crane and the forward end of the vehicle. Lock valves are flanged to the hydraulic cylinders to prevent cylinder retraction in the event of hose or hydraulic system failure. The crane cannot be operated unless both its stabilizer legs are deployed and down. A level is provided for each stabilizer leg and, with both stabilizer legs grounded, horizontal setting is achieved by adjustment of one stabilizer leg only.

e. The crane column is supported and rotates on a low-friction ball bearing rotate ring, which is protected by lip seals from dirt and foreign body ingress. The rotate system is driven from a hydraulic piston motor with a hydraulically-operated, spring-loaded, multi-disc brake via a planetary gear reduction.

f. The knuckle boom system consists of a main boom and a three-part telescopic jib. Mounted on the jib is a rotatable load hook with a safety catch. The boom and jib are welded fabrications and the jib is of hexagonal section. The telescopic sections of the extendible jib slide on wear resistant guide pads. The boom and jib are actuated by the lift, the jib and the three telescopic extension hydraulic cylinders.

g. The crane hydraulic system is comprised of the hydraulic lift cylinder, jib hydraulic cylinder, rotate motor, three jib-extension hydraulic cylinders and two stabilizer-leg hydraulic cylinders.

h. Hydraulic power is supplied to the crane hydraulic system from the transmission-driven pump and controlled by an operator seated at the main control valve bank at the side of the crane column. The operator seat is stowed for transportation and released to the operating position by shoot bolt. A ladder, with non-slip rungs and extending above the operator seat, provides safe access to the control station and seat.

i. The main control valve bank is a four-‘slice’ selector valve and a load-sensing system is incorporated. A further control valve, for the operation of each stabilizer leg, is fitted at each side of the crane base. All controls are spring loaded to return to the ‘off’ position when released.

j. Multi-function, pilot-valve-controlled load, hold valves are fitted to every hydraulic cylinder as protection against hose rupture, system overload, cavitation, overspeed under load and uncontrolled movement in the direction of load movement.

k. The crane incorporates an overload protection shut-off system. In the event of any overload situation, however caused, the system prevents any further movement of the crane boom, which will increase the load moment. This system allows movements, which reduce the load moment and continued operation within the rated capacity of the crane.

l. An emergency stop button is located at the control position on the crane. In the event of electrical failure, operation of two valves stops all functions except manual emergency control to safely recover the load and stow the crane.

m. For further information on the operation and maintenance of the crane, refer to the manufacturer's literature supplied.

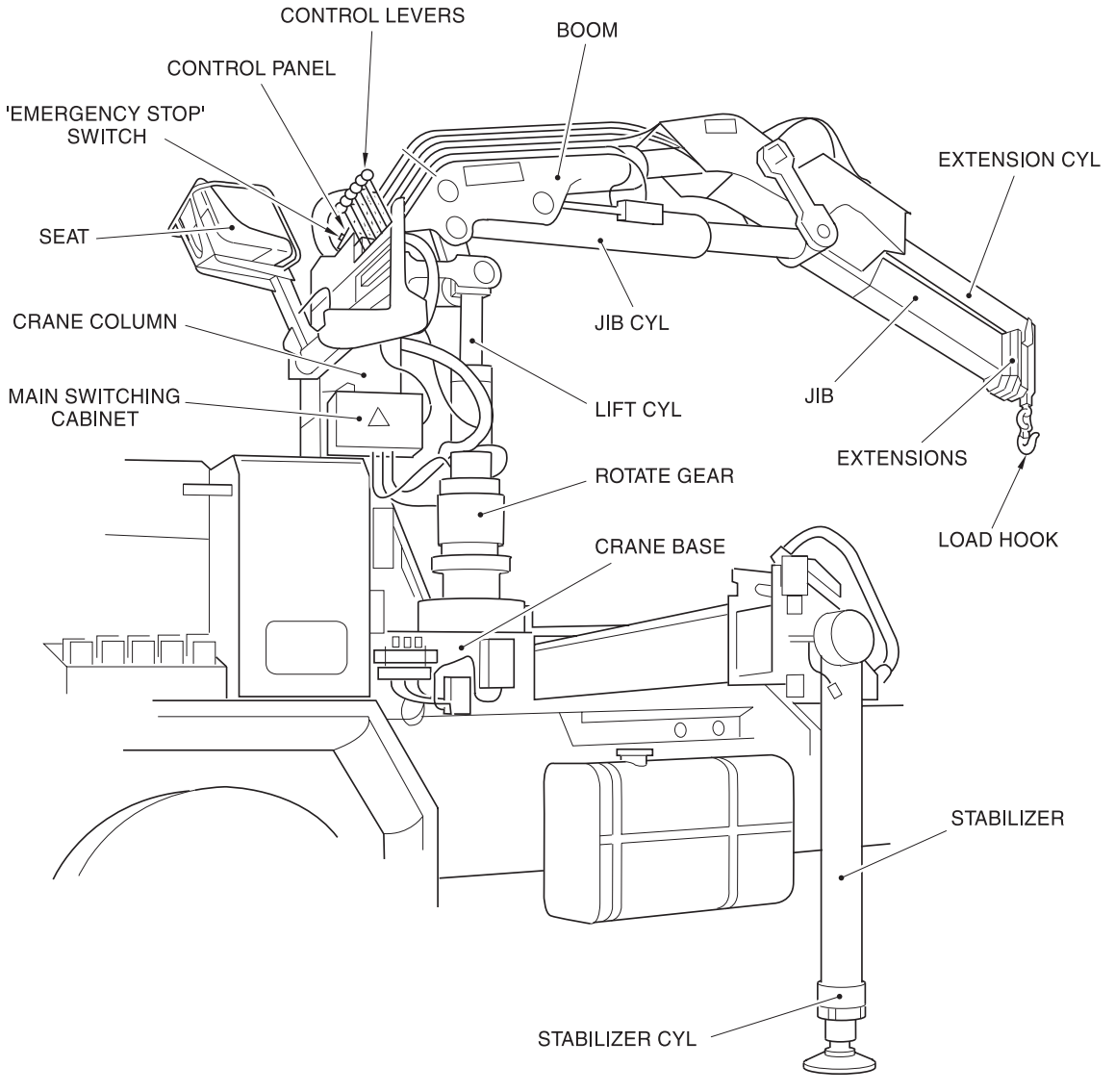


Fig 1.2 Crane

1-10-4 Launch Beam Lifter and Bridge Module Lifter

a. The lifting beams are dedicated to their particular function (either launch beam or bridge module transfer) and are not interchangeable. The smaller launch beam lifter, used for the launch beam modules, is of fixed geometry and is suspended from the crane hook via a 6 ft 6 in (2 m) extension sling during operation.

b. The larger bridge module lifter, used for the bridging modules, also attaches to the crane hook via a 6 ft 6 in (2 m) extension sling and has a two-position configuration. Two arms at each end of a central beam are held in one of two lifting positions by quick-release shoot bolts. The positions of the arms is dependent on use for bridge module deployment or retrieval.

1-10-5 Tail Lift

a. When deployed, the tail lift provides a work platform for crew members designated as module pinners during bridging operations. Platform position can be adjusted to allow pinners of varying height comfortable, safe access to bridging modules for pin insertion and shoot bolt operation. It comprises a foldout framework, which accommodates folding walkway sections. The lift is attached to mounting brackets on the vehicle chassis by swing arms, which are connected to the platform via lifting arms. It is deployed using lift and swing hydraulic cylinders together with their associated controls. The tail lift platform is deployed to a horizontal position, using the tilt hydraulic cylinders, regardless of the slope of the bridge site approach.

b. When the tail lift is initially deployed and lowered from its stowed position, access is afforded to the far bank support. After removal of the restraining ratchet straps from the far bank support, the tail lift is raised to take the weight of the far bank support until it has been unlocked, deployed and re-locked.

1-10-6 Tail Lift Framework

a. The framework is located at the rear of the vehicle and deployed from its stowed position to ground level when the vehicle is aligned on the bridge centerline at the start of operations.

b. The deployed framework unfolds and extends to form a platform 19 ft 4 in (5.9 m) wide (across the rear of the vehicle) and 2 ft 7 in (0.8 m) in length. Safety handrails 3 ft 6 in (1.07 m) high are inserted around the perimeter of the platform but leave minimum clearance gaps of 6 in (0.15 m) to allow passage of bridging modules over and through the platform during operations.

c. Toe boards 3 in (0.075 m) high are attached to the hand rail sections to provide additional safety.

d. The framework provides mounting for vehicle rear and reversing light clusters.

1-10-7 Hydraulic Cylinders and Controls

a. Hydraulic swing, lift and tilt cylinders are operated remotely from the tail lift handset. Movement of the hydraulic cylinders deploys the tail lift from the rear of the vehicle and initially position it at ground level. Once the launch frame and A-Frame are positioned, ‘tail lift raise’ is selected on the tail lift handset controls and the hydraulic cylinders move the platform upwards, to position it at the most convenient level for the height of the crew members. In special

circumstances, such as loss of electrical power, direct manual operation is possible from the selector valve located at the rear of the chassis in conjunction with manual operation of the cylinder solenoids.

b. An emergency stop button is located adjacent to the selector switches and on the tail lift handset. The maximum height of the platform above ground level is 4 ft 10 in (1.47 m).

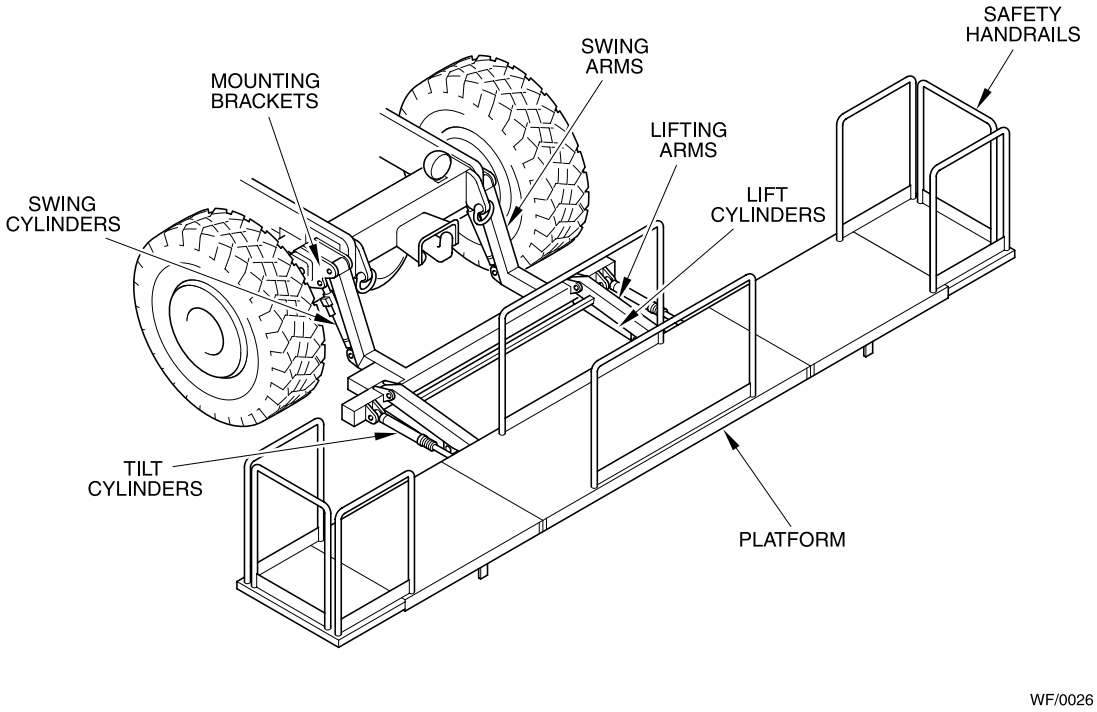


Fig 1.3 Tail Lift

1-10-8 A-Frame

The A-Frame is of steel construction and when deployed, stabilizes the rear of the vehicle and provides a level home bank platform for the launch frame, launch beam and bridging modules. It comprises upper and lower transverse beams, foldout stabilizer legs, hydraulic cylinders and hydraulic control valves.

1-10-9 Upper A-Frame Transverse Beam

a. The upper A-Frame transverse beam spans the rear of the vehicle, supports the launch frame with its associated equipment and provides the upper hinge points for the outer A-Frame legs.

b. When the A-Frame is deployed, the beam is pinned at its hinge position to the outer legs during erection of the launch beam and bridge modules.

c. The launch beam and the launch frame, together with its associated equipment, move vertically on the outer A-Frame legs by the operation of hydraulic cylinders on the upper section

of the outer A-Frame legs. The beam is pinned in its upper position for deployment of the bridging modules.

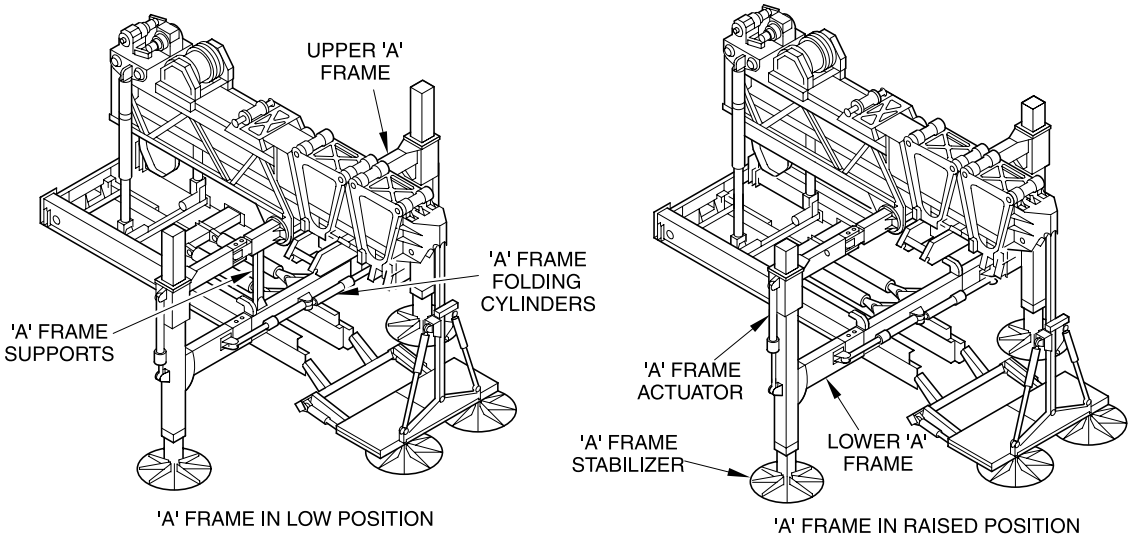


Fig 1.4 A-Frame

1-10-10 Lower A-Frame Transverse Beam

The lower A-Frame transverse beam spans the rear of the vehicle and attaches to the rear of the slide frame at a hinged arrangement and to the outer A-Frame legs at their hinge points. It provides mounting for the A-Frame folding hydraulic cylinders and for one end of the A-Frame rotate hydraulic cylinders. A level installed on the beam accurately positions the horizontal axis of the A-Frame (and thus the home bank platform) by adjustment of the vertical extension of either of the A-Frame stabilizer legs.

1-10-11 Outer A-Frame Legs

a. A foldout A-Frame leg is attached at upper and lower hinge points to each end of the upper and lower A-Frame transverse beams. Each leg has a circular baseplate and provides mounting for a stabilizer hydraulic cylinder, an A-Frame raise hydraulic cylinder and one end of an A-Frame folding cylinder.

b. The control valve for manual operation of the A-Frame raise/lower hydraulic cylinder is mounted on the right leg. The stabilizer legs are also used to lift the slide frame clear of the chassis to allow its deployment.

1-10-12 Hydraulic Cylinders

a. Two A-Frame rotate hydraulic cylinders are attached to a cross member on the outer section of the slide frame and to the A-Frame. Retraction of the cylinders pivots the A-Frame from its stowed position about its hinged attachment to the slide frame to its deployed vertical position. Articulator cylinders hold the A-Frame in this position until the A-Frame is secured in position with

shoot bolts. An A-Frame folding cylinder is attached to the lower A-Frame transverse beam and to each outer A-Frame leg.

b. Extension of the cylinders rotates the outer A-Frame legs from their stowed position about their upper and lower hinge points. When fully deployed, counterbalance valves hold the A-Frame folding cylinders in this position until the outer A-Frame legs are pinned securely in position.

c. To allow the launching vehicle to be leveled laterally on the bridge build site a hydraulic cylinder is incorporated within the outer A-Frame leg. The cylinder is attached to the outer leg and to an inner sliding stabilizer leg. Once both stabilizer cylinders have been extended and the ground bearing pads are in contact with the ground, only the stabilizer on the low side of the vehicle needs to be further extended to level the vehicle. A level is incorporated on the lower A-Frame transverse beam to indicate when the vehicle is level. Once level counterbalance valves hold the stabilizer cylinders in their respective positions until the stabilizer legs are pinned securely in position.

d. An A-Frame raise hydraulic cylinder is attached to the upper sliding section of each outer leg and supports and moves the upper A-Frame transverse beam for bridging module deployment. Counterbalance valves hold the raise cylinders in the raised position until the upper A-Frame transverse beam is pinned securely in position.

e. Two articulating cylinders are connected to the launch beam drive pivot pin and the articulating cylinder cross member. They are used to articulate the launch beam to accommodate varying bank heights and to lower the far bank support to the ground once the launch beam is fully deployed. To allow bridge build to continue the articulating cylinders have to be detached from the cross member and raised. To facilitate stowing of the articulating cylinders a stowing cylinder is used. When retracted they rotate the articulating cylinders clear of the bridge surface during building.

1-10-13 Hydraulic Controls

a. The hydraulic operation of the A-Frame is controlled from two locations on the vehicle. The A-Frame fold and rotate functions are operated from the interface cabinet located above the tool chest on the side of the launching vehicle. The A-Frame fold pushbutton is pressed first and its associated light will indicate when the operation is complete. The A-Frame rotate function is operated in a similar manner but can not be commenced until the A-Frame fold sequence is complete. Limit switches are incorporated into the circuit to guard against incorrect sequencing of operations.

b. The A-Frame stabilizer legs are operated by two manual levers mounted on the rear face of the lower A-Frame transverse beam. The levers have a spring loaded central ‘off’ position and must be manually held against the spring in the appropriate direction for the required function to operate.

c. Once the launcher has been deployed, hydraulic control is carried out via the launch chest pack. Should electrical failure occur all cylinders and motors can be operated manually.

d. The A-Frame raise/lower control is an electro-proportional valve mounted on the stabilizer leg and weighs 44 lb. (20 kg). It is a two-‘slice’ valve similar to the above and can be operated

locally by its integral lever or remotely using integral proportional control valves. One slice is used to operate the raise and lower of the upper A-Frame transverse beam when changing between launch beam and bridging module sequences and the other controls the inclination of the rollers during initial bridge deployment. The slices of the control valves are operated by button switch selection on the interface cabinet or by valve handles.

1-10-14 Launch Frame

a. The launch frame is a steel framework through which the launch beam passes during launch beam deployment. It is attached at its forward end to the upper A-Frame transverse beam via a pivot. When the upper A-Frame transverse beam is in its lower position, the rear end of the framework is supported by the launch frame articulating hydraulic cylinders. Once beam deployment is complete, the lower end of the articulating hydraulic cylinders are disconnected and moved by retraction of the articulator stowing cylinders to a stowed position to give clearance for the bridging modules.

b. The forward launch beam is retained in the launch frame after beam retrieval, ready for the next beam deployment.

c. Mounted on the framework are various roller assemblies, two drum winches, the launch beam drive unit and launch valves.

d. At the upper part of the launch frame is a cam-operated launch beam stop to prevent over deployment of a launch beam if no following beam is attached. The launch beam stop is lifted by a roller on the following beam, which raises the stop and allows forward motion of the launch beam.

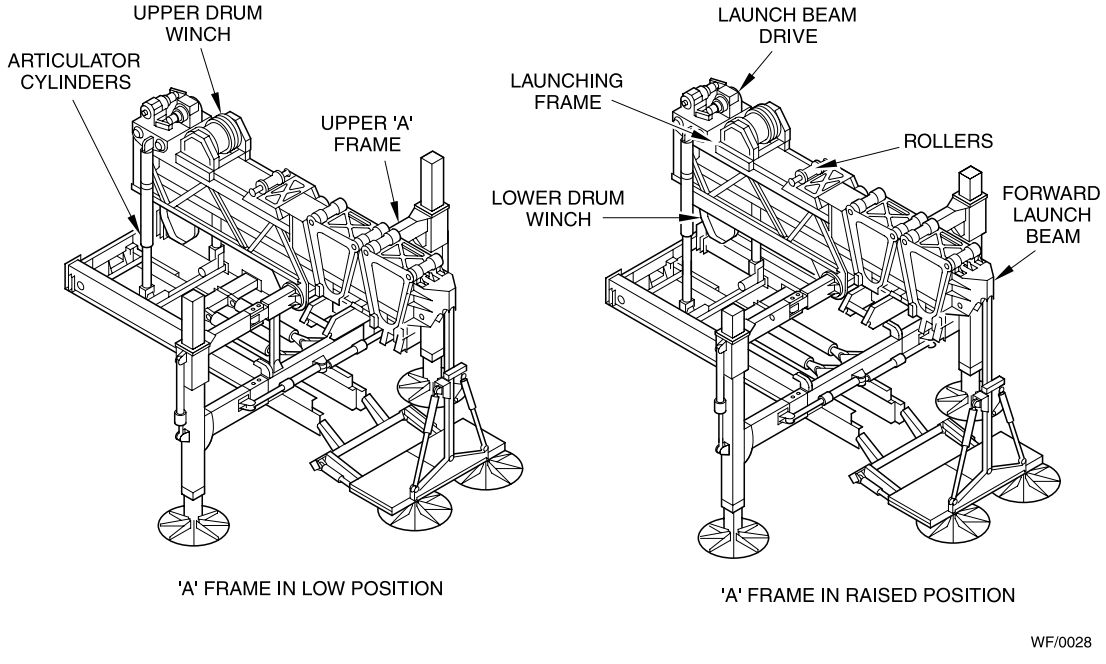


Fig 1.5 Launch Frame

1-10-15 Roller Assemblies

a. Several roller assemblies are mounted on the launch frame to guide and assist the passage of the launch beam through the launch frame. At the bottom rear of the launch frame is a pinch roller, which ensures that the launch beam is in contact with the launch beam drive during the early stages of the launch beam deployment and the latter stages of the launch beam retrieval.

b. At the bottom front of the launch frame is a twin set of rollers mounted on a common pivot which support the launch beam during deployment. The pivoted arrangement ensures that both sets of rollers remain in contact with the launch beam during deployment.

c. Six vertical side rollers mounted on the launch frame ensure that the beam is guided centrally through the launch frame.

d. A roller assembly mounted on the top of the launch frame ensures that the winch rope fleet angle is kept within limitations.

1-10-16 Drum Winches

a. A drum winch is installed on the upper and lower surfaces of the launch frame. Attached to the winches are the wire cables used to control and operate the forward and rear carriages. The winches each weigh approximately 1180 lb. (535 kg) with no wire rope reeved onto the drum.

b. Each winch comprises hydraulic motor-driven planetary reduction gearboxes inside a cast aluminum drum. Although the gearboxes and the drums are identical, the hydraulic motor for the forward carriage winch is of variable displacement. This minimizes back-tension during drive-out, when the winch has to allow its wire rope to reel out quickly under low tension. A solenoid valve with pressure limitation control selects the variable displacement.

c. Two additional solenoid valves, each with a reducing valve for brake pressure limitation, independently control the brakes on both winches.

d. A winch rope tension device is fitted to each winch. This device ensures that the winch rope is recovered onto the winch with the correct amount of tension, it helps to prevent incorrect winch rope layering on the winch drum.

1-10-17 Launch Beam Drive Unit

a. The launch beam drive unit is mounted on top of the launch frame and is controlled from the launch chest pack. The launch beam drive unit is comprised of two hydraulic motors, which incorporate disc brake assemblies, that drive two shafts each of which has two urethane tired rollers. Drive to the shafts is achieved through a duplex chain and sprocket arrangement.

b. The hydraulic motor weighs approximately 44 lb. (20 kg) and the whole beam drive unit weighs approximately 220 lb. (100 kg).

1-10-18 Launch Valve

a. The hydraulic control of the launch beam drive unit is provided by one ‘slice’ of a three-‘slice’ load-sensing valve controlled electrically from the chest pack. The valve, which weighs

110 lb. (50 kg), is mounted on the right side of the launch frame and incorporates manual operation for each slice, allowing local control in the event of an electrical failure.

b. The beam drive control valve slice is directly connected to the beam drive hydraulic motor with an external counterbalance valve to prevent overrun and a spring on, hydraulically-released brake.

c. The remaining two ‘slices’ control the beam angle and the carriage winch functions. The articulator valve ‘slice’ sets the beam angle by controlling the position of the articulating hydraulic cylinders. The cylinders are connected to the articulator valve ‘slice’ via counterbalance valves to hold the angled position of the beam. The carriage winch ‘slice’ controls the speed of all carriage winch functions, but functions are selected on the carriage manifold.

1-10-19 Slide Frame

After deployment of the tail lift, A-Frame and launch frame, the slide frame is used to create the work area required (between the crane and the A-Frame) to position the launch beam and bridging modules for loading. It comprises a telescopic frame, relax mechanism and tilt rollers.

1-10-20 Telescopic Frame

a. The frame comprises of three pairs of telescopic steel box sections. The inner (forward) box sections attach to the vehicle chassis via the relax mechanism and the outer (rear) box sections connect to the A-Frame by a hinged arrangement on the transverse beam of the lower A-Frame. The center sub-frame attaching the inner and outer sub-frames.

b. The center sub-frame has removable rollers on each longitudinal beam, which must be installed on to the slide frame prior to bridge deployment and removed prior to slide frame retraction. The outer sub-frame has adjustable tilt rollers attached which ensure that the carriage slings remain taut and that varying bank heights can be accommodated during bridge construction.

c. The outer box sections are cross connected by two cross members, one incorporates attachments for the A-Frame rotate cylinders, the second attachment for the articulating cylinders. All slide frame sections are fitted with rubbing pads to ease the extension and retraction of the slide frame. Twist-lock blocks mounted on a bracket at either side of the outer sub-frame; retain the slide frame in the transportation position until released for deployment. Release of the twist-lock fasteners allows the deployment of the slide frame by driving the vehicle forwards. The twist-lock fasteners are reset when the vehicle is reversed to retract the slide frame on completion of bridge build.

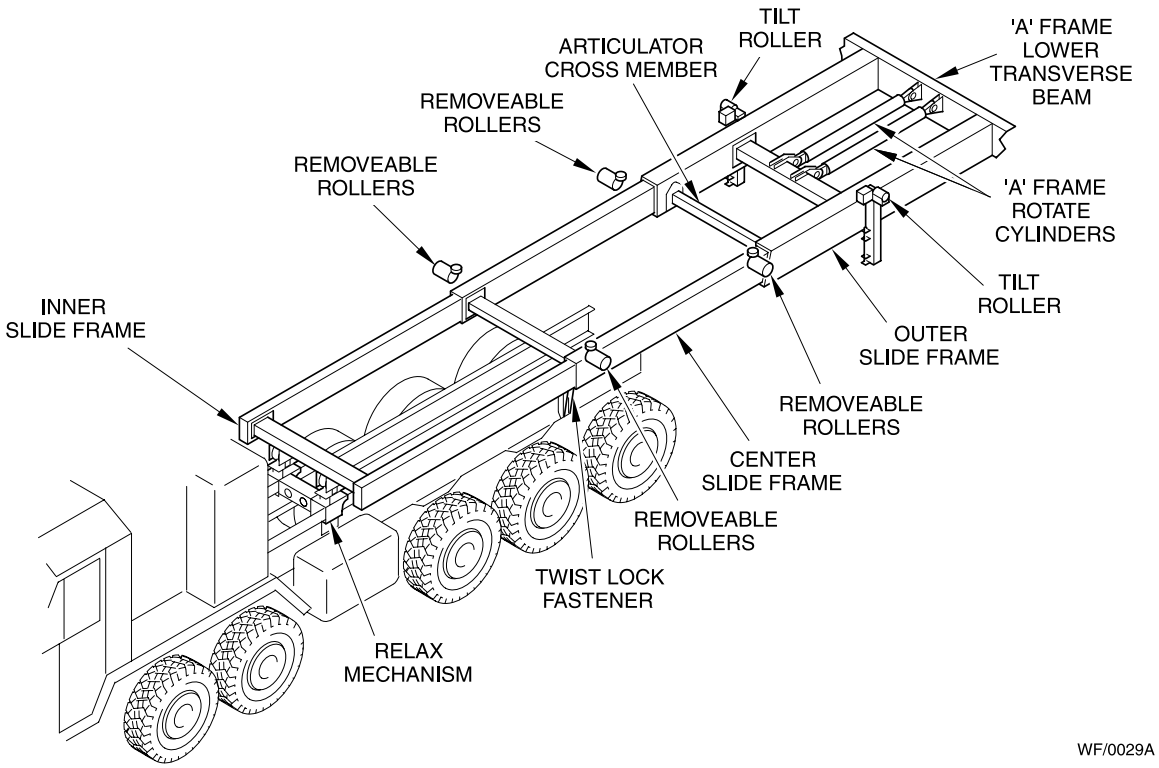


Fig 1.6 Slide Frame

1-10-21 Relax Mechanism

a. The relax mechanism forms part of the attachment of the inner slide frame to the vehicle chassis. It isolates movement of the slide frame during launch beam and bridge construction, which tend to cant the A-Frame forward or rearward out of vertical. Isolation of the slide frame movement prevents a rearward pull on the vehicle towards the gap and possible damage to the crane stabilizer legs. The mechanism is unlocked by manual operation of shoot bolts and allows a controlled sliding movement of 3 in (80 mm) if the A-Frame tends to cant towards the gap and 1 in (25 mm) if it tends to cant away from the gap, dependent on site and build conditions.

b. Four hydraulic cylinders are used to re-set the relax mechanism to its neutral position on completion of bridging operations. The cylinders, acting in pairs (each pair controlling 3 in (80 mm) and 1 in (25 mm) movement), are actuated from the control box on the right side of the launcher vehicle to the rear of the crane. Movement of the cylinders re-aligns the holes to install the shoot bolts, locking the relax mechanism back in its neutral setting ready for the next deployment. Limit switches, operated by the shoot bolts, prevent operation of the launch chest pack controls until the relax mechanism is unlocked for operation.

1-10-22 Tilt Rollers

The two tilt rollers maintain tension on the carriage slings during bridging operations. They are operated by hydraulic cylinders fitted to the slide frame and adjust the bridge angle to compensate for the launch beam angle created by varying bank heights.

1-10-23 Launch Beam

a. The launch beam, when deployed, provides support for the bridging modules and accommodates the forward and rear carriages during bridge construction. It comprises eight beam modules which connect together to form the launch beam. Seven modules are transported to the bridging site on a PLS flatrack carried on an M1076 PLS trailer and a forward launch beam carried in the launch frame of the launcher vehicle.

b. The modules are of traditional web chord construction in aluminum alloy 232B and feature identical top and bottom extrusions, which terminate with welded-in jaw arrangements. A series of diaphragms to absorb torsional loads are built in along the length of the beam. The side webs have stiffeners to prevent buckling and the top chord of each beam incorporates lifting points.

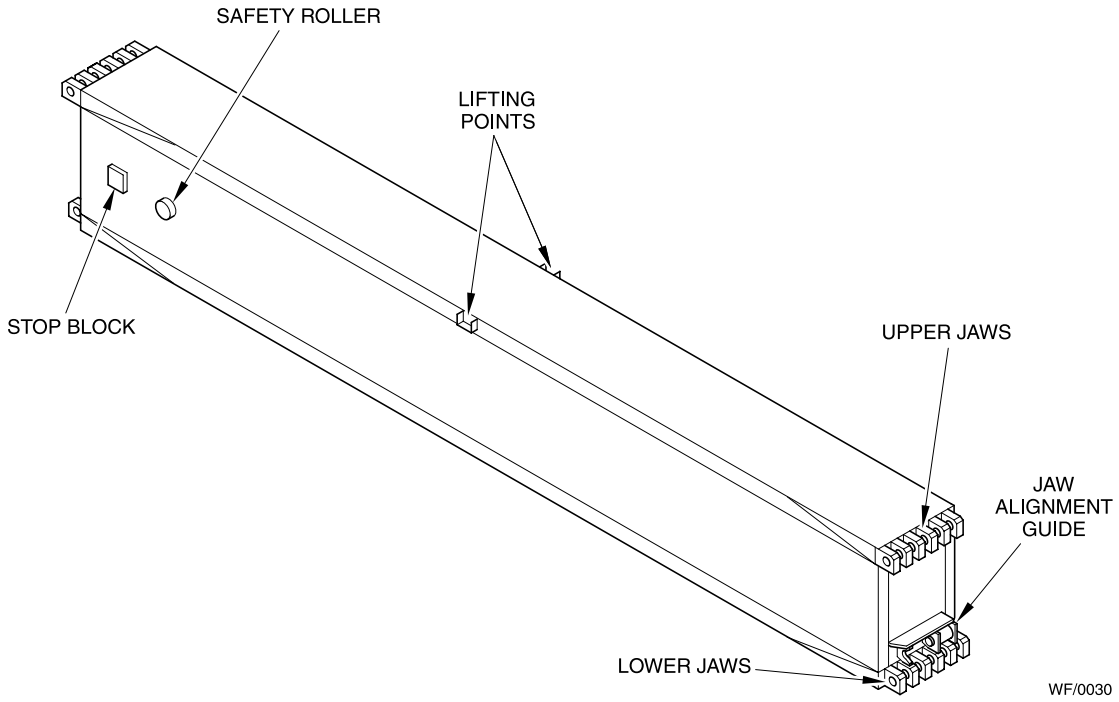


Fig 1.7 Launch Beam

c. The welded-in jaw arrangements at the top and bottom of each module end are identical and multi-lugged. The forward jaws of each module are aligned to contact the jaw lugs of the beam module already positioned in the launch frame and then pinned in position; upper jaws first and then the lower jaws. The lower jaws being aligned by a mount resilient jaw guide system.

d. The launch beam connecting pins incorporate a flat on the head of the pin, which allows insertion into the lugs in one position only. This allows insertion of the pin locking clips also in one position only and prevents them causing damage to the rollers during beam deployment. The forward launch beam module provides a frame mounting for the far bank support.

e. The launch beams incorporate safety rollers and stop blocks. The safety rollers raise the launch beam stop on the launch frame during booming so that the stop block on the proceeding

beam passes the safety stop without hitting it. If no new beam is attached, and the launch beam is boomed forward the stop block would foul the safety stop and restrain the launch beam.

1-10-24 Forward and Rear Carriages

a. The forward and rear carriages are similar assemblies manufactured from aluminum alloy 232B. They consist of upper frames and lower bridge lifting beam assemblies pinned together by shoot bolts. They are operated and moved by the drum winches on the launch frame.

b. Two roller assemblies are mounted on the top of each upper frame assembly and support the carriages on the launch beam. The roller assemblies consist of two rollers which roll on the launch beam and a free running central roller which allows the winch rope to run under the carriage rollers. Grooved pulleys are installed on both the upper assembly and on the lower assembly to allow separation of the two halves to lower the bridge.

c. The lower bridge lifting beams also incorporate attachment points for the bridge lifting slings. The upper and lower assemblies are fitted with attachment lugs to enable the assemblies to be manually pinned together. When the pins are removed from the upper and lower assemblies, the lower drum winch can be operated to raise or lower the bridge.

d. Steel wire ropes from the drum winches on the launch frame are routed around the launch beam modules to the forward and rear carriages. When the rope from the upper drum winch is tensioned and the rope from the lower drum winch is paid out, the forward carriage is moved along the launch beam.

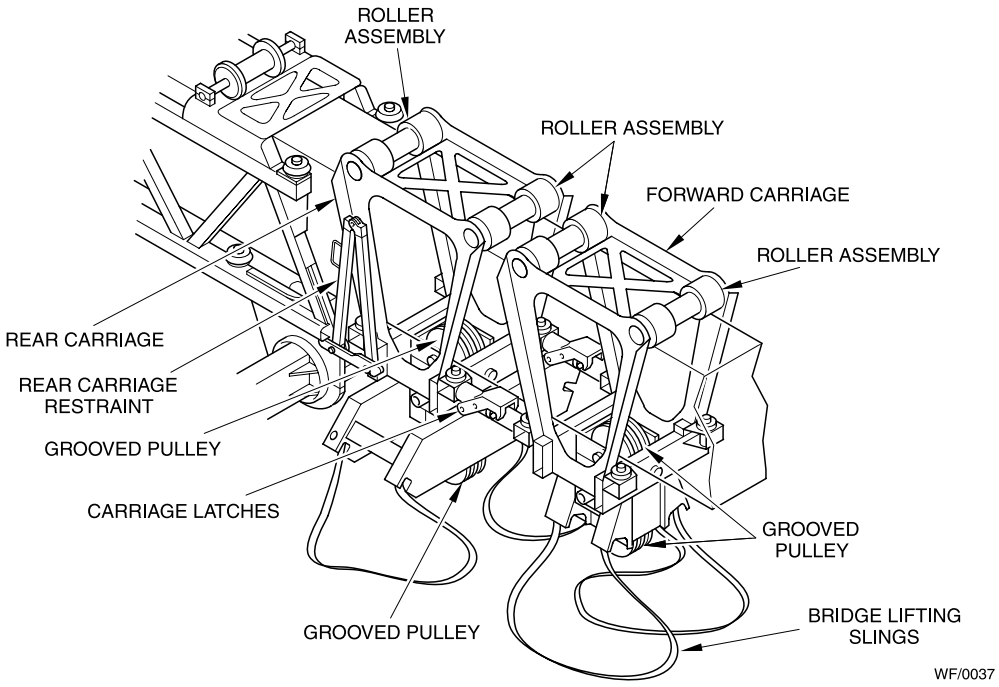


Fig 1.8 Forward and Rear Carriages

e. When the bridge is attached to both forward and rear carriages, this action moves both carriages along the launch beam. Hydraulic control of the drum winches is achieved through the

carriage manifold from the launch chest pack, which allows independent control of the forward carriage to inspect or renew the steel wire ropes.

1-10-25 Carriage Manifold

The carriage manifold is a multi-slice solenoid valve block weighing approximately 110 lb. (50 kg). The carriage winch ‘slice’ directs hydraulic fluid flow to the forward or rear carriage drum winch and directs a selected reduced pressure to the other drum winch to maintain the tension in the steel wire ropes of the drum winches. The ‘slice’ incorporates crossline relief valves to protect the drum winches. The individual solenoid valves of the carriage manifold are equipped with ‘mushroom button’ manual overrides, complete with securing clips, to select the required carriage function should electrical failure occur.

1-10-26 Far Bank Support

a. When the launch beam is fully deployed and reaches the far bank, it is lowered as necessary to accommodate the height difference between the two banks. The launch beam is supported at its deployed end (opposite end to the launcher vehicle) by the far bank support before launching of the bridging modules commences.

b. The far bank support comprises a central telescopic column, bottom pivot beam and two 30 in. (0.75 m) diameter ground bearing pads supported at the ends of the 5 ft (1.5 m) long pivot beam. The ground support pads are carried separately from the beam and are installed prior to deployment of the launch beam.

c. The beam pivots about the bottom of the telescopic column which is connected to the forward launch beam. As the far bank support lands on the far bank the pivot beam rotates about the end of the telescopic column to accommodate any cross slope of the bank.

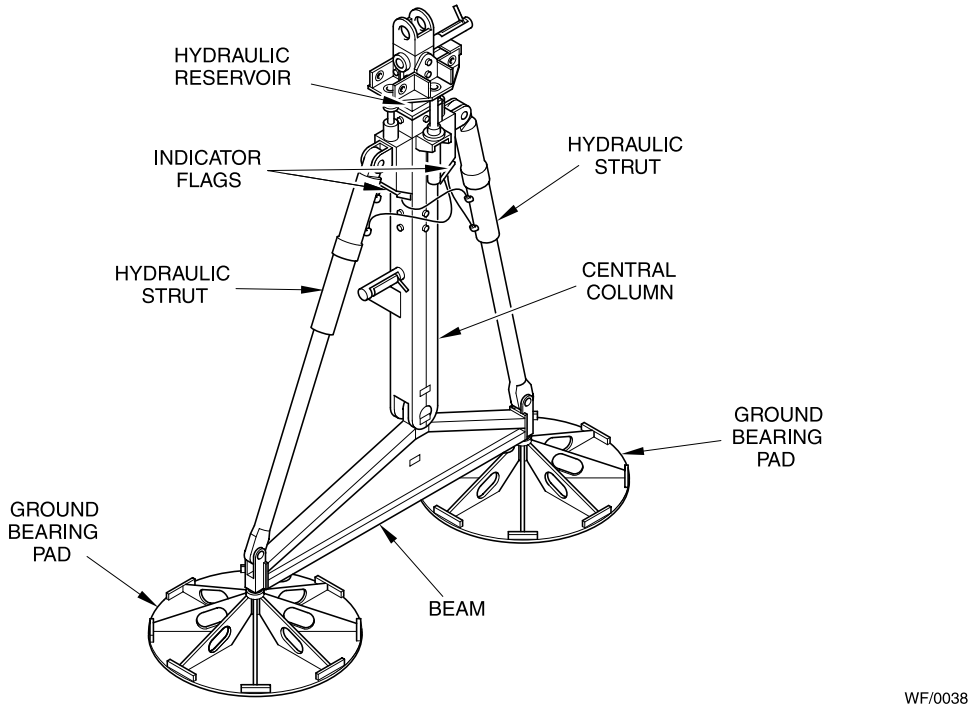


Fig 1.9 Far Bank Support

d. The beam is then stabilized by diagonal telescopic hydraulic cylinders which incorporate a closed loop hydraulic system actuated by a pressure-sensitive valve in the column. Lowering of the launch beam operates the pressure-sensitive valve and closes the hydraulic line, which has been allowing free operation of the hydraulic cylinders. The hydraulic pressure generated by two self-contained hydraulic pumps is diverted to the locking mechanism in each of the struts and secures them in position. This locks the far bank support assembly in this lateral setting and creates a stable support for the launch beam.

e. Indicator flags, attached to the two pumps confirm the far bank support is locked in position. There is no need for an operator to cross the launch beam to manually adjust the far bank support prior to commencement of the bridging module deployment.

f. For safety the far bank support has been designed so that failure of either of the two pumps or cylinders can be accommodated. Pump failure being indicated by only one indicator flag being visible.

1-10-27 Electrical Control Cabinet

a. The electrical control cabinet is mounted on the left side of the launch frame and interfaces between the chest pack controls and the system hydraulics. The cabinet is constructed of aluminum alloy sheet with an internal spring sub-frame to provide environmental and shock protection. It provides the power and logic circuitry to control the solenoid valves, which operate the various system functions on the vehicle.

b. A power supply-regulating feature is incorporated into the cabinet to correct the power supply for the variations, which occur in the vehicle, supply voltage. The cabinet also contains a heating circuit to ensure reliable operation of the logic and power circuitry and components during

cold environment operation and an hour meter to record the equipment time in use for reliability purposes.

c. Mounted externally on the control cabinet are five multi-pin military style bayonet connectors, which are routed via electrical cables to the valves, manifolds and indicators as required by their vehicular position. The connectors are utilized for the circuitry of electrical power in the umbilical control cable, the chassis components (filters, indicators), A-Frame equipment (four proportional solenoids) and the launching equipment (six proportional solenoids and 11 switching solenoids).

d. Monitoring and fault finding of the electrical system and fault determination, whether hydraulic or electrical, is provided within the cabinet from a mimic front panel. The panel is only visible with the cabinet lid removed and displays the solenoids energized, chest pack lights energized and the inputs from the chest pack. Electrical test points are provided to monitor voltages and currents as an aid to problem identification.

1-10-28 Launch Chest Pack Umbilical Cable

The umbilical cable is a 50 ft (15 m) length of multi-core cable with military connectors at each end, which links the launch chest pack to the electrical control cabinet. It can be connected directly to one of two remote connectors fitted to the stabilizer legs. The wiring is reversible enabling either end connector to be used at the electrical control cabinet or the chest pack.

1-10-29 Launch Chest Pack

a. The chest pack interfaces between the crew and the hydraulic system during launch beam and bridge deployment and recovery. The pack is of aluminum alloy or RFI compatible plastic construction and is attached to a breast plate carried by the crew member. It is supported on the crew member by shoulder straps and linked to the electrical control cabinet via the umbilical cable.

b. It contains a control joystick, a tilt roller/stow articulator control switch, a display screen, an emergency stop button and voltage control circuitry. The joystick, switch and display screen are protected from inadvertent operation and damage by a guard.

c. Movement of the joystick to the right or left selects the function and up and down movement controls the direction and speed of the function selected. The joystick has cross (+) function which permits only one action to take place at a time (i.e. select a new function or carry out the previously selected function).

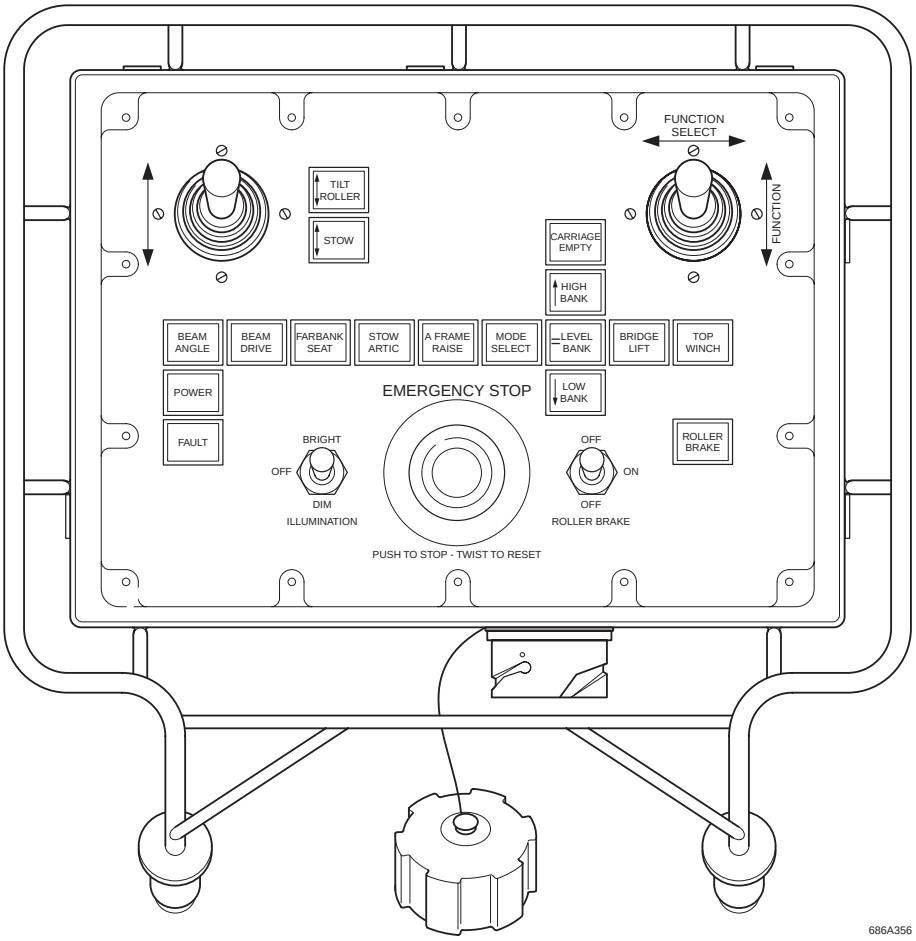


Fig 1.10 Launch Chest Pack

d. The display screen shows a series of illuminated captions with text legends to indicate which function is in operation at the time and previously selected options (e.g. High Beam/Level/Low Beam option). The screen is sunlight readable and contains a dimming facility for night deployments.

e. Warning lights in the form of monitored indicators, showing critical and non-critical faults, are also displayed on the screen to prompt the operator to further investigate malfunctions on the mimic panel within the electrical control cabinet.

f. The voltage control circuitry provides +/- 10 V dc to the joystick. All other functions are 24 V dc directly powered from the electrical control cabinet.

1-10-30 Bridging Modules

Two ramp modules and end beams, five parallel modules and 20 approach ramps are pinned and shoot bolted together to form the bridge span. Two extra ramp modules, two end beams and 20 approach ramps are located on an additional trailer to deploy two 65 ft 6 in (20 m) bridges instead of one 131 ft (40 m) bridge if required.

1-10-31 Ramp Modules

a. The ramp modules have an overall length of 20 ft (6.114 m) and each consists of six transverse deck units attached at 24 hinge points to two longitudinal ramp panels.

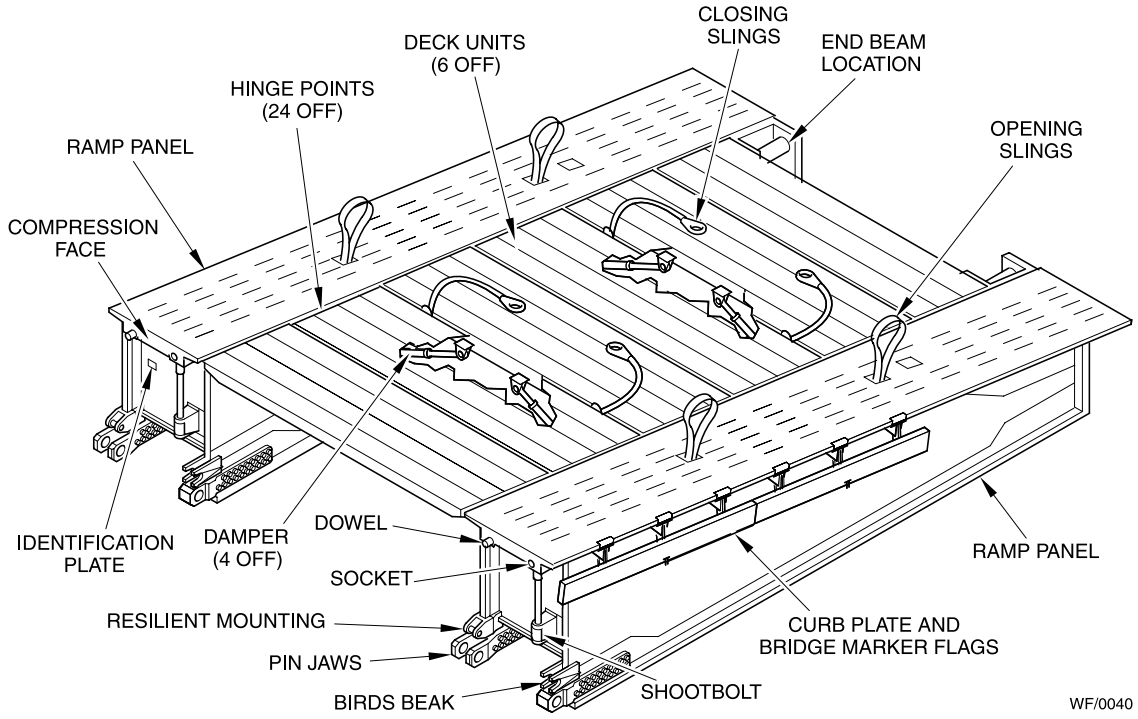


Fig 1.11 Ramp Module

b. The modules are hoisted from one of two sets of slinging points on the outboard side of each ramp panel during deployment (dependent on whether the ramp end beam is connected) and from similar slinging points on the inboard side for retrieval. Two dampers are attached to each ramp panel and the transverse deck units to control the rate of folding/unfolding during bridging operations.

c. Two curb plates are hinged on each side of the module and are lifted and dropped into position during bridge deployment.

d. When in the folded condition, the modules are 8 ft (2.447 m) wide (over the nibs) and 14 ft (4.302 m) wide when deployed, but without the two curb plates deployed. One end of the ramp module incorporates a dowel and shoot bolt arrangement along with a jaw configuration. This connection system is common with the parallel modules. The jaws are fixed to the module with friction grip bolts, which include torque caps, which are used to indicate that the bolts are correctly fastened.

e. The toe end of the ramp incorporates an aperture in which the end beam locates, it is held by an upper fixed and a lower removable pin which is locked by a twisting action. Guide pads located within the aperture are used to align the lower holes of the end beam and the ramp module.

1-10-32 Ramp End Beam

The ramp end beam is a rectangular welded box section, which is positioned in an aperture at the tapered end of each ramp module. It includes bridge lifting points through which the forward carriage straps are routed and it also provides mounting for the bridge approach ramps. Fixed pins within the aperture of the ramp module locate on the end beam as the ramp module is lowered down onto it and side guide pads aid alignment of the lower holes. The end beam is secured to the ramp module at its lower edge by insertion of twist-to-lock pins.

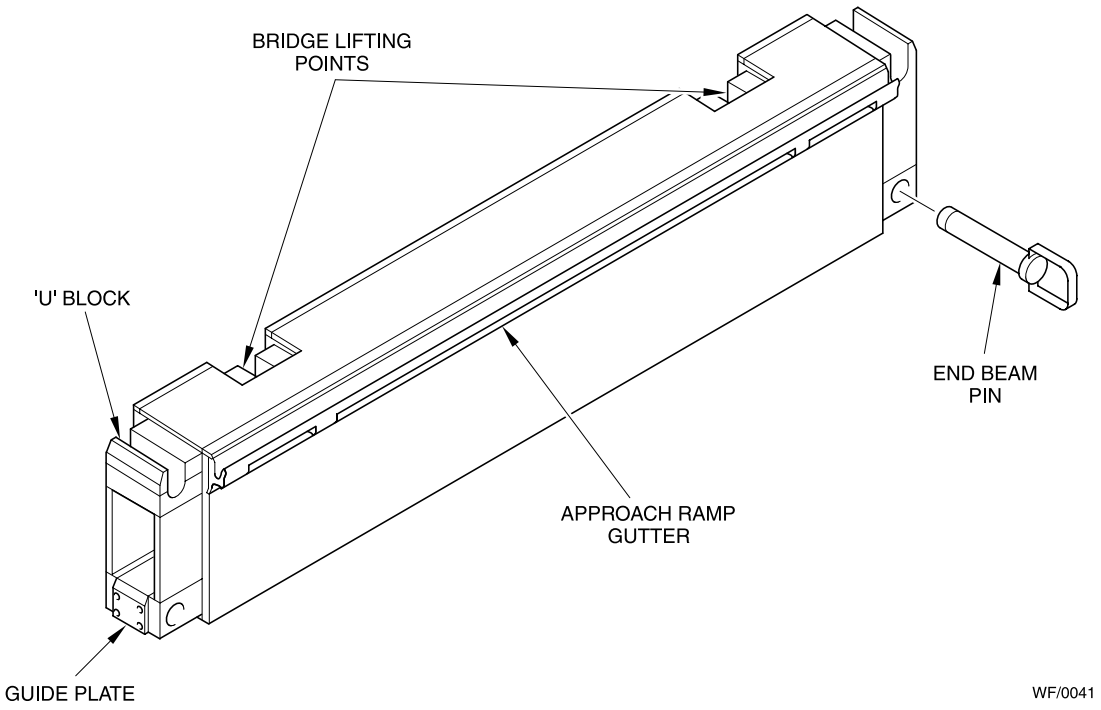


Fig 1.12 Ramp End Beam

1-10-33 Parallel Modules

a. The parallel modules are individually identified by a serial plate on one compression face of the parallel panels and have an overall length of 20 ft (6.132 m) and each consists of six transverse deck units attached at 24 hinge points to two longitudinal parallel panels.

b. The modules are hoisted from two slinging points on the outboard side of each parallel panel during deployment and from similar slinging points on the inboard side for retrieval. Two dampers are attached to each parallel panel and the transverse deck units to control the rate of folding/unfolding during bridging operations.

c. Three curb plates are hinged on each side of the module and are lifted and dropped into position during bridge deployment. Each center curb plate houses a bridge marker flag which is raised into the vertical position for traffic guidance after bridge deployment.

d. When in the folded condition, the modules are 8 ft (2.447 m) wide (over the nibs) and 14 ft (4.298 m) wide when deployed, but without the three curb plates deployed. The compression

faces of the parallel panels incorporate a dowel and shoot bolt arrangement along with a jaw configuration, which is common to both ends of the module. The jaws are fixed to the module with friction grip bolts which include torque caps which are used to indicate that the bolts are correctly fastened.

e. A fatigue monitor is fitted to each module to monitor the accumulative stresses and strain incurred in the module during repetitive bridging operations. The monitor consists of a thin aluminum shim which has two holes drilled through it. As trafficking loads are applied to the bridge the initial cracks placed in the monitor will start to grow. The monitor will fail in two stages, the first failure occurs when the crack has spanned between the two holes and the final failure when the monitor has separated into two pieces. The first failure is an indicator that the bridge module to which it is attached is within 1000 full load crossings of its design life. Once the monitor has cracked across its whole length the module must be taken out of service.

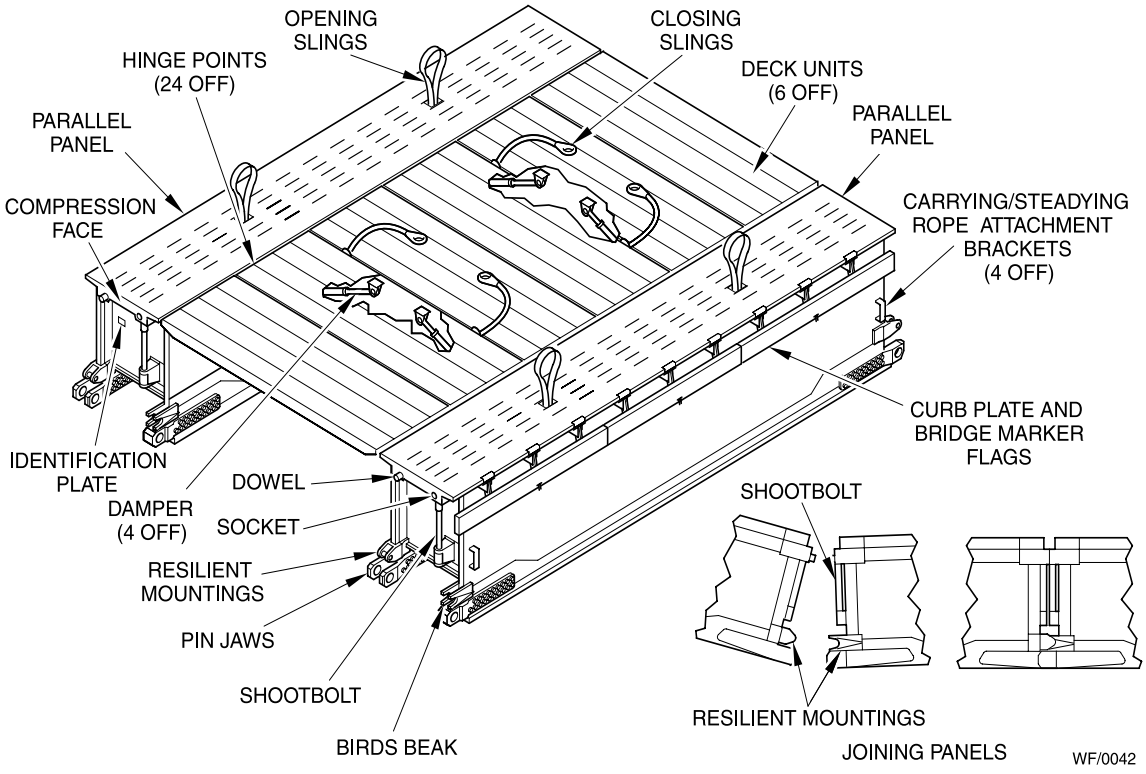


Fig 1.13 Parallel Module

1-10-34 Approach Ramps

Ten approach ramps, each 16 in (0.421 m) wide and 13 ft 5 in (4.089 m) long are positioned at each end of the bridge to complete the bridge approach angle. The approach ramp is constructed from a single piece extrusion, which tapers at one end to form the ramp toe and at the opposite end a second extrusion is used to allow attachment to both the end beam and the ramp module. Anti-lift brackets are incorporated on the ramp connection end to stop lifting of the ramps during trafficking.

1-10-35 Electrical System

a. The electrical supply is provided from the launcher vehicle and regulated to 24 V dc by a voltage regulator installed in the electrical control cabinet. The regulator also provides RFI filtration for the system. The electrical system incorporates a voltage overload protection device to cater for an EMP spike in the launcher vehicle electrical system.

b. The system is fail safe with controls spring-loaded to the ‘Off’ position. Interruption to the electrical power supply returns the control logic program to its start point with only the ‘Power On’ light illuminated and no function available to be operated. This safety feature applies to switching off of the chest pack or disconnection of either end of the umbilical cable. Non-operation of the controls for approximately five minutes returns the control logic to the start position.

1-10-36 Hydraulic System

The hydraulic system is separated into three circuits, which are used to operate the services of the chassis, the A-Frame and the launching equipment. Hydraulic fluid is drawn from a reservoir to the transmission-driven pump and directed through a pressure filter to the control valves, which operate the various hydraulic functions of the circuits. Four types of flexible hose are used to carry the fluid around the circuits and include pressure hoses, capable of a working pressure of 4423 Psi (30495.51kPa), and return hoses rated at 235 Psi (1620.26 kPa). Smaller diameter drain and load-sensing hoses are provided for each circuit.

1-10-37 Hydraulic Reservoir

a. The hydraulic reservoir provides bulk storage of hydraulic fluid for operation of the hydraulic circuits. Internal baffles ensure heat dissipation, contamination settling and the escape of trapped air from the hydraulic fluid. A suction isolation valve prevents fluid loss during pump maintenance. Air is allowed into and out of the reservoir during hydraulic cylinder operation via a breather, which filters incoming air to a finer level than the hydraulic fluid.

b. A low-level warning switch is fitted to coincide with the minimum fluid level (operational) and a further low-level warning switch, coinciding with the minimum fluid level (pump damage), stops the equipment functions if this level is reached.

c. Temperature of the hydraulic fluid in the center of the reservoir is sensed by a gauge thermometer probe device.

1-10-38 Built-In Test Equipment (BITE)

The launcher vehicle is equipped with various items of built-in test equipment to monitor, test and fault find on the electrical and hydraulic systems.

1-10-39 Hydraulic Test Points

Test points are fitted at strategic locations to assist monitoring and fault finding of the hydraulic system. All test points can be used for hydraulic fluid sampling.

1-10-40 Monitoring Block

A monitoring block is installed in the pressure line from the hydraulic pump to give hydraulic pressure, flow and temperature indications to assist monitoring and fault finding of the hydraulic system.

1-10-41 Filter Indicators

All hydraulic filters are equipped with an electrical indicator which signals filter restrictions to the launch chest pack and electrical control cabinet.

1-10-42 Hydraulic Fluid Level Switches

The hydraulic reservoir is fitted with two fluid level warning switches, which produce warning signals to the launch chest pack and the electrical control cabinet. One provides fluid low-level warning indication and the other a warning of an unsafe fluid level with the potential to cause damage to the hydraulic pump.

1-10-43 Hydraulic Reservoir Sampling Point

At the top of the hydraulic reservoir, a valved port is provided to permit hydraulic fluid sampling from the center of the reservoir.

1-10-44 Interface Cabinet

a. The interface cabinet is installed at the right side of the launcher vehicle LV to the rear of the crane stabilizer leg, and incorporates an internal mimic panel, which indicates the functioning of the electrical controls and sensors of the hydraulic system. The cabinet also provides electrical switches to deploy the A-Frame and test points to monitor the voltages and currents to the solenoid control valves and the voltages in the control circuitry.

b. An hour meter, built into the cabinet, is connected to a pressure switch in each hydraulic circuit to monitor and record the hydraulic system usage at pressures in excess of 440 Psi (3033.69 kPa), i.e. when a selected function is operating. This record is used to assist collation of failure data and the planning of routine maintenance.

1-10-45 Emergency Stop System

a. Emergency stop buttons are fitted at strategic locations where crew members are working which stop all operating functions and disconnect the power take off in the event of an emergency.

b. Eight emergency stop buttons are used, some of which are illuminated. Their quantities and locations are:

1 - Crane	1 - Tail Lift
1 - Operator Panel	2 - Launch Frame
1 - Launch Chest Pack	2 - A-Frame Legs

c. Pressing any button will cause operation to cease and the PTO to disengage; the operator panel of the interface cabinet identifying which button has been activated will illuminate. The reason for emergency shut down should be ascertained and that it is safe to proceed before

resetting the emergency stop system. The activated button must be reset by pulling out the button (or twisting) and then pressing the ‘reset’ button on the operator panel.

1-10-46 Walkways

a. Fixed and removable walkways are positioned on the Launcher vehicle to allow safe and easy access for tasks to be carried out. The walkways are of an expanded aluminum construction and offer good drainage for mud and ice while affording grip to foot traffic.

b. The fixed walkways are located underneath the launch frame and are attached to section three of the slide frame. These walkways can be removed by releasing the screw clamps, which hold them in position.

c. Additional fixed walkways are attached to the crane sub frame and allow access down the center of the vehicle.

d. Removable walkways are stored between the vehicle chassis rails and on top of the fixed walkways. These walkways are deployed on the launcher once it has been fully deployed.

1-10-47 Bridge Markers

Bridge markers are bolted to bridge module curbs; the purpose of the bridge markers is to indicate the outer edge of the bridge to drivers and marshals.

1-10-48 Lanyards

Lanyards are ropes, which can be attached to a bridge module to steady its position during bridge building when lifting bridge modules onto the launcher.

1-11 EQUIPMENT DATA

1-11-1 Hydraulic Pump

Manufacturer	Rexroth
Model	Standard A11V075
Type	Variable displacement, swash plate piston
Weight	132 lb. (60 kg)
Flow at 3674 Psi (25331kPa)	26.4 to 31.68 US galls (100 to 120 liters)

1-11-2 Crane

Manufacturer	Atlas
Model	390.1 LM+
Weight (inc. stabilizers)	10780 lb. (4890 kg)
Max. Operating Pressure	4556 Psi (31412.5 kPa)

1-11-3 Tail Lift

Manufacturer	Focolift
Platform Area	19 ft 4 in (5.9 m) x 2 ft 7 in (0.8 m)
Handrail Height	3 ft 6 in (1.07 m)
Max. Height above Ground	4 ft 10 in (1.47 m)
Weight	1213 lb. (550 kg)

1-11-4 Drum Winch

Rated Line Pull	12569 lb. (5700 kg)
Weight (no rope)	904 lb. (410 kg)

1-11-5 Launch Beam Drive Unit

Motor Drive Unit	142 lb. (65 kg)

1-11-6 Launching Valve

Weight	110 lb. (50 kg)

1-11-7 Launch Beam

Overall Length	234 in (5.944 m)
Width	22 in (0.56 m)
Depth	34.5 in (0.875 m)
Estimated Weight	1246 lb. (565 kg)

1-11-8 Carriage Manifold

Valve Block Weight	110 lb. (50 kg)

1-11-9 Ramp Module

Overall Length	241.4 in (6.131 m)
Effective Length	235 in (5.968 m)
Roadway Width	169.4 in (4.032 m)
Max. Depth	47.4 in (1.205 m)
Min. Depth	20.8 in (0.529 m)
Folded Depth	44.6 in (1.132 m)
Top Chord Slope	1:9
Estimated Weight	8996 lb. (4080 kg)

1-11-10 Approach Ramp

Overall Length	161 in (4.090 m)
Width	16.6 in (0.19 m)
Depth	7.5 in (0.42 m)
Estimated Weight	190 lb. (86 kg)

1-11-11 Parallel Module

Overall Length	241.4 in (6.131 m)
Effective Length	234.4 in (5.955 m)
Roadway Width	169.4 in (4.302 m)
Girder Depth	47.4 in (1.205 m)
Folded Depth	44.6 in (1.132 m)
Estimated Weight	9740 lb. (4417 kg)

Section III. PRINCIPLES OF OPERATION

1-12 INTERFACE OF COMPONENTS

a. This section describes how the major DSB components work and interface with each other.

b. The deployment of the DSB works on a cantilever principle. A launch beam is constructed and deployed through the launch frame to span the area to be bridged; a far bank support provides stability and support for the end of the launch beam on the far bank of the launch site.

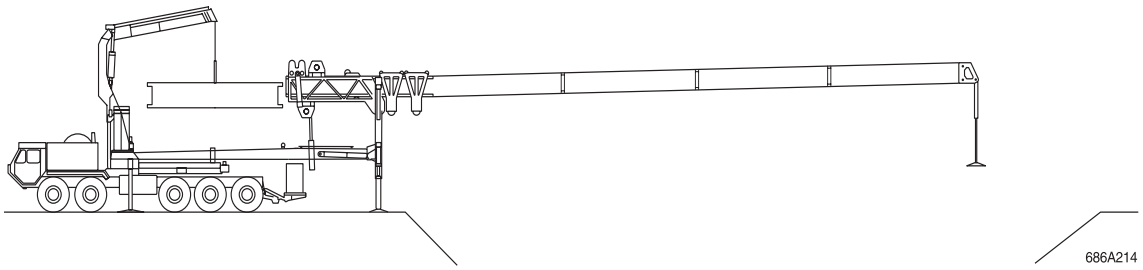


Fig 1.14 Launch Beam Deployment

c. A bridge is then constructed and deployed through the A-Frame, the bridge is suspended from the launch beam by slings from the forward and rear carriages.

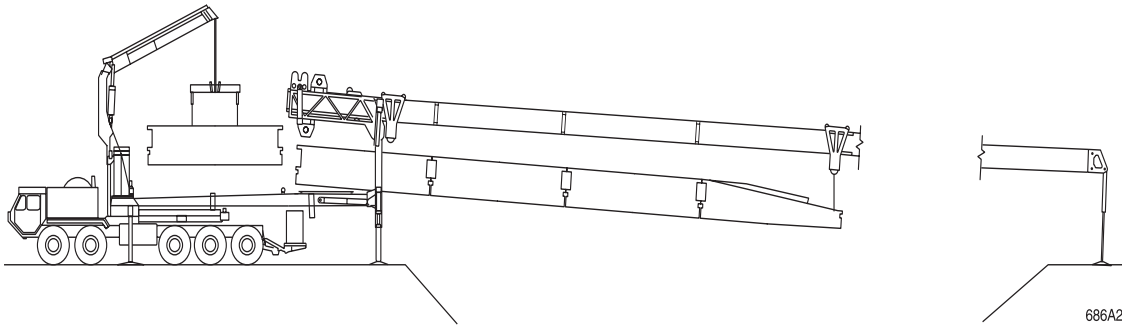


Fig 1.15 Bridge Module Deployment

d. When the bridge construction is complete the bridge is lowered to the ground across the gap, the launch beam recovered and approach ramps positioned to allow access to traffic. The launcher vehicle stowed and then removed.

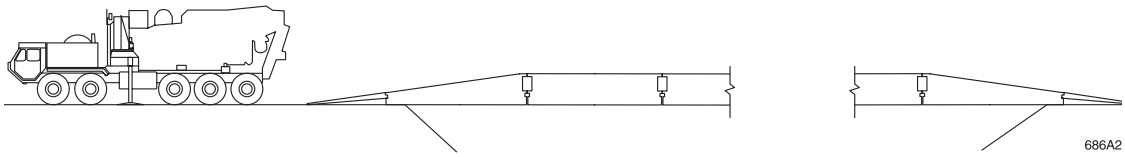


Fig 1.16 Bridge Construction Complete

1-12-1 Crane

The crane stabilizer legs provide a stable platform for crane operations during bridge construction and also assist in maintaining a level platform for bridge construction.

1-12-2 Slide Frame

A relax mechanism connects the slide frame to the launcher vehicle to allow for torsional movement between the vehicle chassis and the launching platform during bridge construction. The slide frame also provides the framework of the launch platform.

1-12-3 A-Frame

The A-Frame provides the pivot point for the launch beam. It houses the launch frame, stabilizer legs and two emergency stop mechanisms. One electrical and one mechanical.

1-12-4 Launch Frame

Launch beam construction is carried out at the rear end of the launch frame. The drive motor, upper winch and lower winch are mounted on the launch frame.

1-12-5 Drive Motor

The drive motor propels the launch beam forward under control.

1-12-6 Winches

Upper and lower winches mounted to the launch frame control the forward and rear carriages. The carriages are used to suspend the constructed bridge from the launch beam and allow the bridge to be pulled through the A-Frame.

1-12-7 Forward Launch Beam

The forward launch beam is housed in the launch frame until the launch beam is constructed and deployed. The far bank support is attached permanently to the forward launch beam by a pivot pin.

1-12-8 Far Bank Support

Stability of the launch beam when deployed is maintained by the far bank support. The far bank support is self-leveling.

1-12-9 Launch Beam

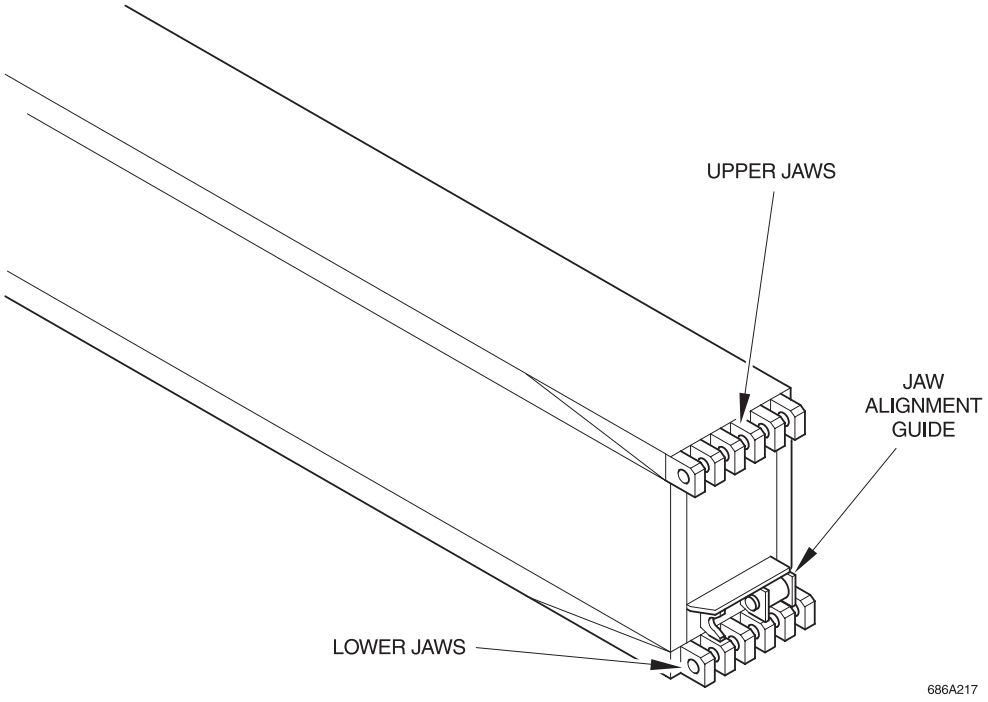


Fig 1.17 Launch Beam

The launch beam is made up with the required number of launch beam sections, which interconnect through a jaw alignment guide, upper and lower jaws and connecting pins.

1-12-10 Ramp Module

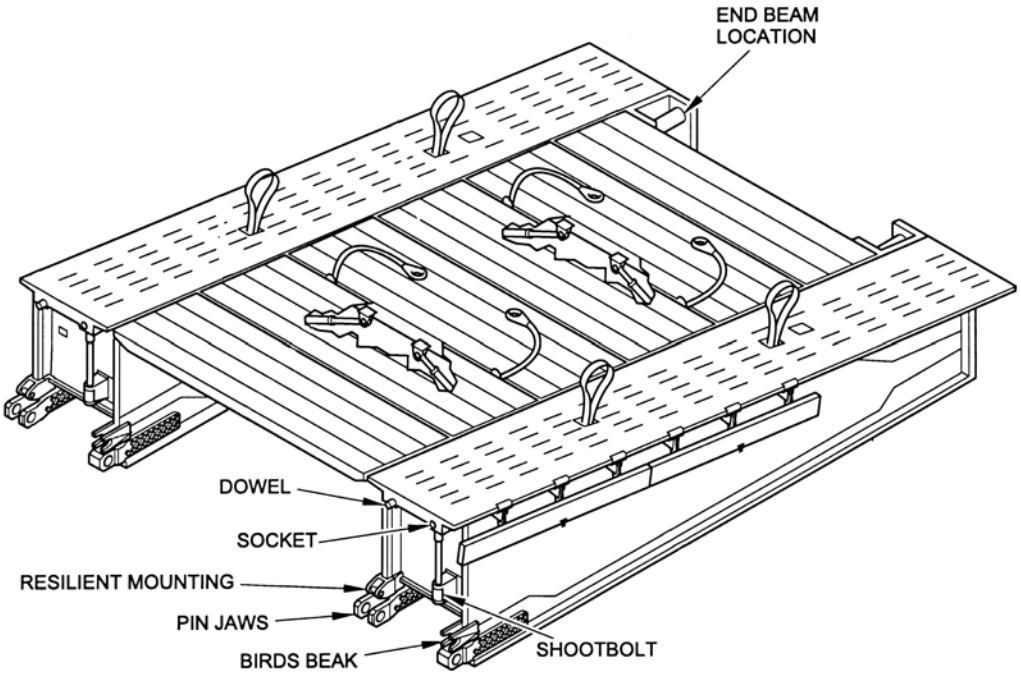


Fig 1.18 Ramp Module

A ramp module is connected to each end of the bridge. Each is connected to a bridge module and an end beam. Connection to the bridge module is pin jaws, resilient mounting, a dowel and socket, bird's beak, shoot bolts and connecting pins. The ramp module sits in an end beam located by guide plates and 'U' blocks. The end beam is locked in place by end beam pins.

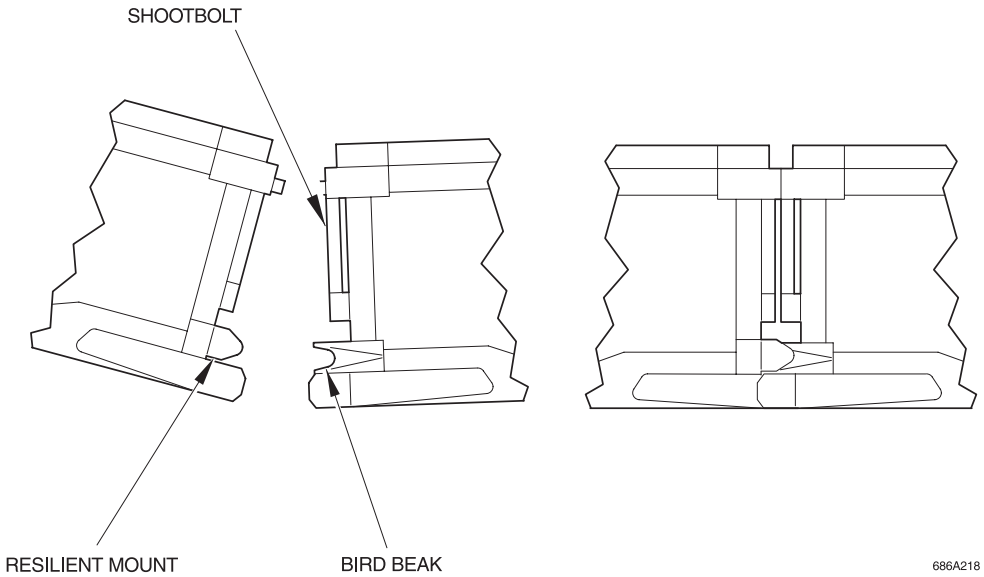


Fig 1.19 Ramp Module Connection

1-12-11 End Beam

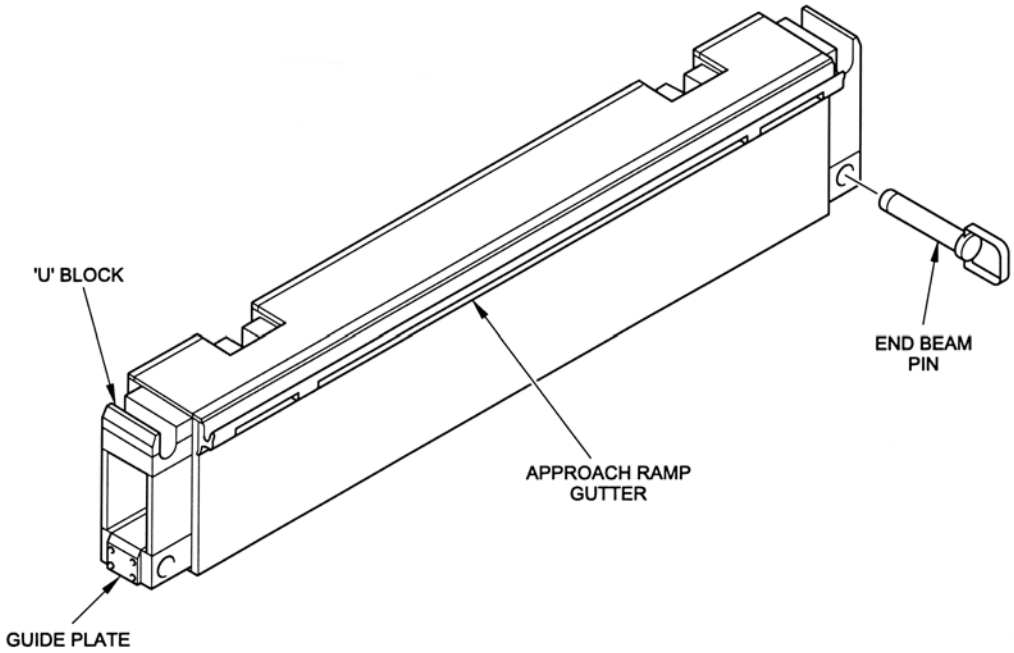


Fig 1.20 End Beam

Fitted to the ramp module the end beam provides spacing between the bridge girders and supports the bridge on the banks. An approach ramp gutter facilitates the fitting of ramps for traffic access.

1-12-12 Bridge Module (Center bay)

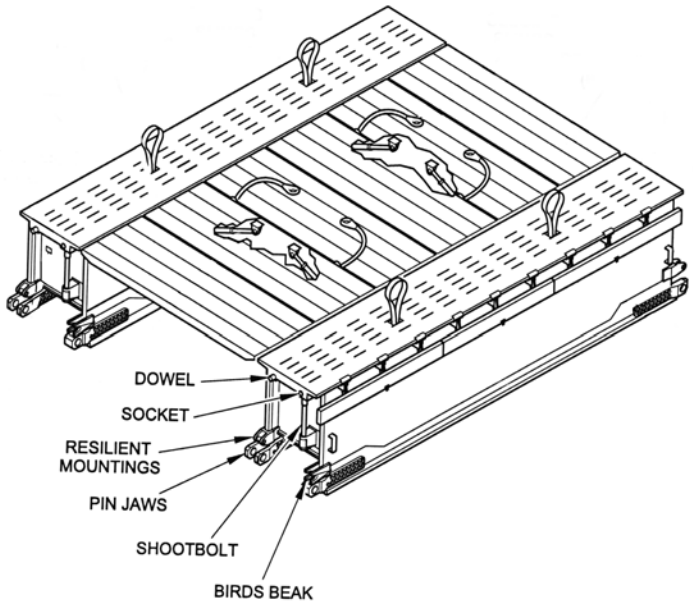


Fig 1.21 Bridge Module

Main bridge construction consists of the required number of bridge modules, which are connected to each other and the ramp modules by pin jaws, resilient mountings, birds beak, a dowel and socket, shoot bolts and connecting pins.

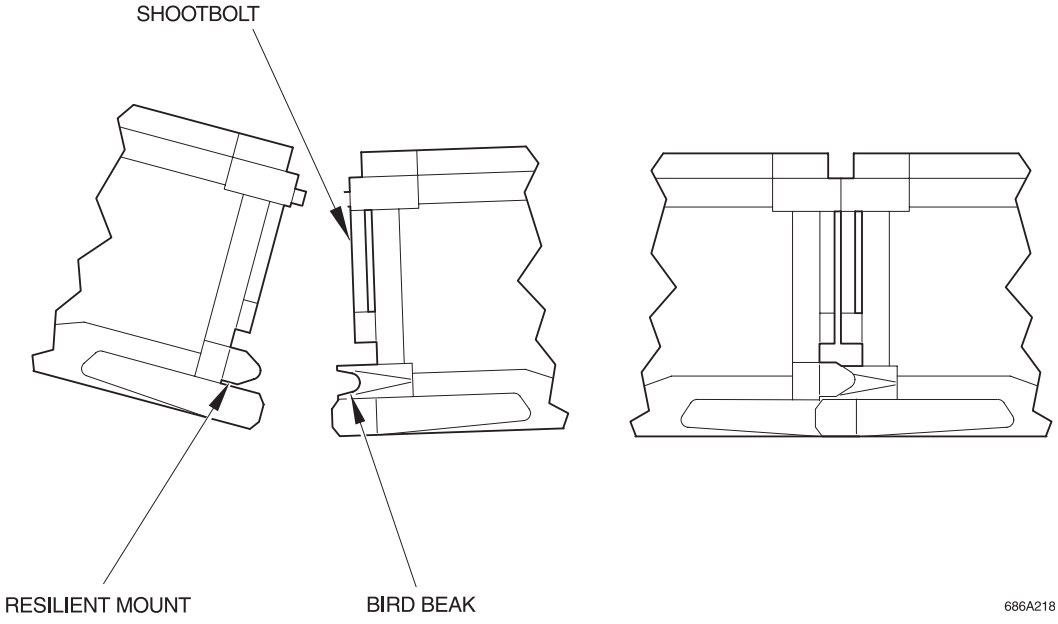


Fig 1.22 Bridge Module Connection

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DSB HYDRAULIC TROUBLE SHOOTING

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CHAPTER 2

Section I. DSB HYDRAULIC TROUBLE SHOOTING

2-1 INTRODUCTION

a. Trouble shooting flow charts are provided to guide the Unit Maintenance personnel through a procedure for rectifying specific faults.

b. This section is to be used to recognize, diagnose and rectify faults that may occur with the DSB Launcher.

c. Overviews of the hydraulic and electrical systems are provided at Appendices E and G.

d. To give the Unit Maintenance personnel familiarity and quick reference Appendix D provides a hydraulic and electrical assembly location lists and drawings and Appendix F contains details of the hydraulic manifolds.

e. Operator mechanical trouble shooting is provided in Chapter 9 of the operator's manual TM 5-5420-279-10.

2-2 LAUNCHER HYDRAULIC SYSTEM OVERVIEW

a. A hydraulic pump, driven by a Power Take Off (PTO) from by the engine transmission, provides the hydraulic pressure necessary to operate the equipment services.

b. Hydraulic oil under pressure is delivered to the hydraulic circuits through manifold blocks containing solenoid valves which are electrically activated by remote or direct controls.

c. The major assemblies that make up the hydraulic circuits are:

(1) **PTO -** A mechanical connection, to the engine transmission system and hydraulic pump, drives the hydraulic pump.

(2) **Hydraulic Pump -** A variable displacement swash plate pump draws hydraulic oil from a reservoir and delivers hydraulic oil under pressure to the hydraulic circuits.

(3) **Cross Connection -** Mounted on the left-hand side of the vehicle behind the cab. Allows the connection of a donor vehicle to provide hydraulic power should the hydraulic pump fail on the host vehicle.

(4) **Hydraulic Circuit Interface Manifold Assembly -** Located on the right hand chassis behind the vehicle cab. Houses the hydraulic filtration system and solenoid valves. The Crane system, Relax Cylinder circuit and launcher circuits are fed through this manifold. Hydraulic oil is also fed back to the hydraulic reservoir through Tank and Drain lines.

(5) **Tail Lift Manifold -** Located on the right hand rear chassis. Tail Lift Cylinders are activated electrically by remote control through solenoid valves. The solenoid valves allow hydraulic oil under pressure to operate the Cylinders. A manual method of operating the Tail Lift is provided should there be a loss of electrical power.

(6) **A-Frame Rotate Manifold -** Located on the left-hand side of the Slide Frame. The A-Frame Rotate Manifold houses solenoid valves, which when activated allow hydraulic oil under pressure to operate the A-Frame Rotate Cylinders and the Tilt Roller Cylinders.

(7) **Stabilizer Manifold Assembly -** Located on the A-Frame. Solenoid valves housed in the Stabilizer Manifold Assembly when activated allow hydraulic fluid to operate the A-Frame Folding Cylinders and the A-Frame Stabilizer Cylinders.

(8) **Roller Brakes and Back-up Mode Operation -** The Roller Brakes and Back-up Mode Operation control are mounted on the A-Frame Assembly. A constant hydraulic oil pressure is felt at the Roller Brakes. The Back-up Mode Operation controls are mounted on the A-Frame allows the A-Frame hydraulics to be operated in the event of remote control failure.

(9) **Launch Frame Pilot Manifold Assembly -** Located on the right hand side of the Launch Frame. A series of solenoid valves, when activated, allow hydraulic pressure to assist in the operation of the Articulator Cylinders. Hydraulic pressure is also delivered to the Pinch Roll/Stowing Manifold Assembly.

(10) **Pinch Roll/Stowing Manifold Assembly -** Located on the right hand side of the Launch Frame. The Pinch Roll/Stowing Manifold Assembly allows hydraulic pressure through solenoid valves to operate the Stowing Cylinders.

(11) **Launch Frame Articulator Manifold And Synchronization Manifold -** Located on the left-hand side of the Launch Frame. Solenoid valves, when activated, allow the Articulator Cylinders and the A-Frame Rotate Cylinders to be operated. Hydraulic pressure is also delivered to the Launch Frame Winch Control.

(12) **Launch Frame Winch Control Manifold -** Located on the left-hand side of the Launch Frame. The Launch Frame Winch Control Manifold houses a series of solenoid valves which, when activated, allow the Upper and Lower winches to be operated. Hydraulic pressure is also delivered to the Beam Drive Structure to allow operation of the Beam Drive Motors.

2-3 LAUNCHER HYDRAULIC SCHEMATIC DRAWINGS

a. The hydraulic circuits are made up of four major service lines:

P -	Pressure	Hydraulic fluid at either working or a nominated pressure
T -	Tank	Hydraulic fluid fed back to the tank under pressure
D -	Drain	Hydraulic fluid returned to the Tank or a drain point
LS -	Load Sensing	Hydraulic fluid signals the hydraulic pump to either increase or decrease pump pressure out put during operation of the launcher

2-4 LAUNCHER ELECTRICAL SYSTEM OVERVIEW

a. **General Description -** An electrical system provides power to switches and solenoids which, when activated, allow the operator to control the function of the launcher components.

b. Electrical power is supplied from the host vehicle. Harnesses connect junction boxes, switches and solenoids in the electrical system. Junction boxes redirect electrical supplies to specific sub-systems.

c. Limit switches and indicators are fitted in the circuit to provide a signal, a visual indication at the control panel, of the state of a component.

d. Solenoid valves, when activated electrically, will allow or stop the flow of hydraulic fluid in the hydraulic circuits.

e. Emergency Stop (E-Stop) switches are fitted in the circuit which, when activated, will shut down the electrical power to the launcher, halting operations.

f. A Chest Pack remote control can be plugged into the electrical system.

g. For a detailed overview of the electrical system see Chapter 3 Electrical Trouble shooting.

2-5 TROUBLE SHOOTING FLOW CHARTS

a. The trouble shooting flow charts are designed to assist the Unit Maintenance personnel in systematically diagnosing a fault and providing a solution for the rectification of that fault.

b. The title of the trouble shooting flow chart is constructed with the TSUM number, subject title and reference number (where applicable) to a step in the build sequence of a 40m bridge in Chapter 6 of the operator's manual TM 5-5420-279-10. For example (TSUM - 3-001 A-Frame Fold (Deploy) (13)).

c. All trouble shooting flow charts start at the top of a page. The boxes used in the flow charts depict the following information.

(1) A circle, rounded rectangle or square shows the start or end of a flow chart sequence.

(2) A square or rectangle displays information intended as an instruction or statement.

(3) A diamond box displays a question or requires the reader to make a decision.

(4) **TSO** stands for Trouble Shooting Operator, these can be found in the operator's manual TM 5-5420-279-10.

(5) **TSUM** stands for Trouble Shooting Unit Maintenance.

2-6 TROUBLE SHOOTING FLOW CHART LIST

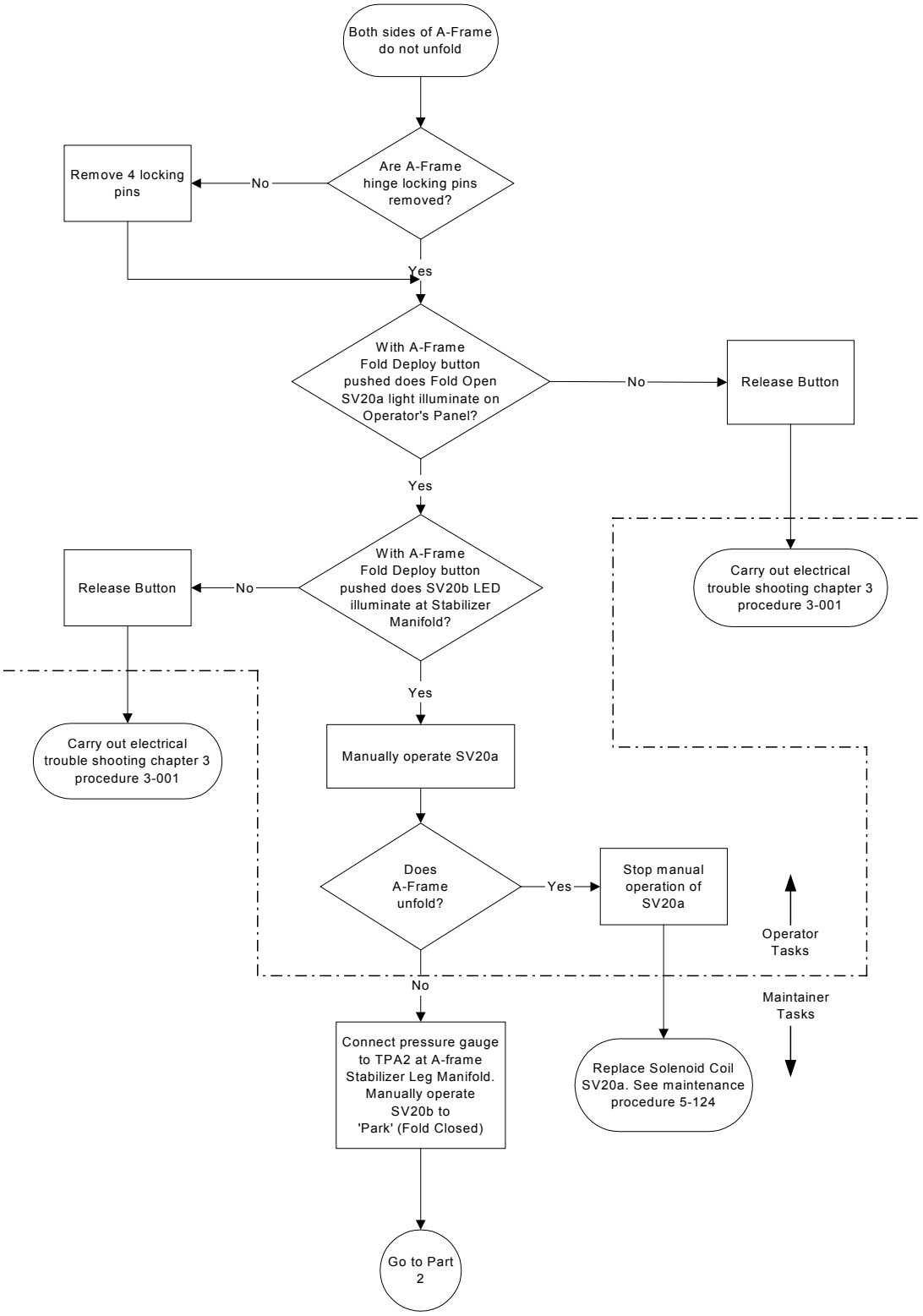
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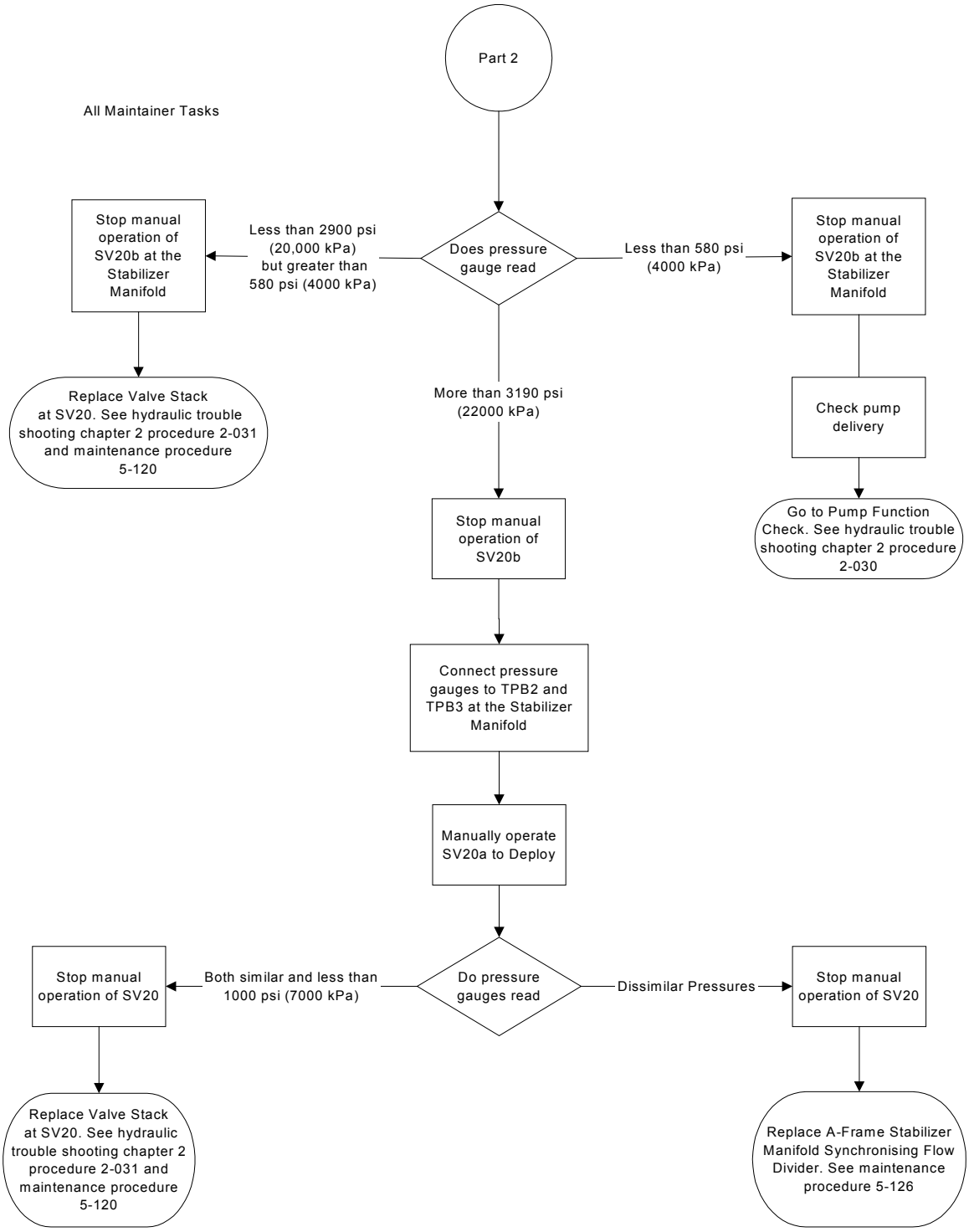
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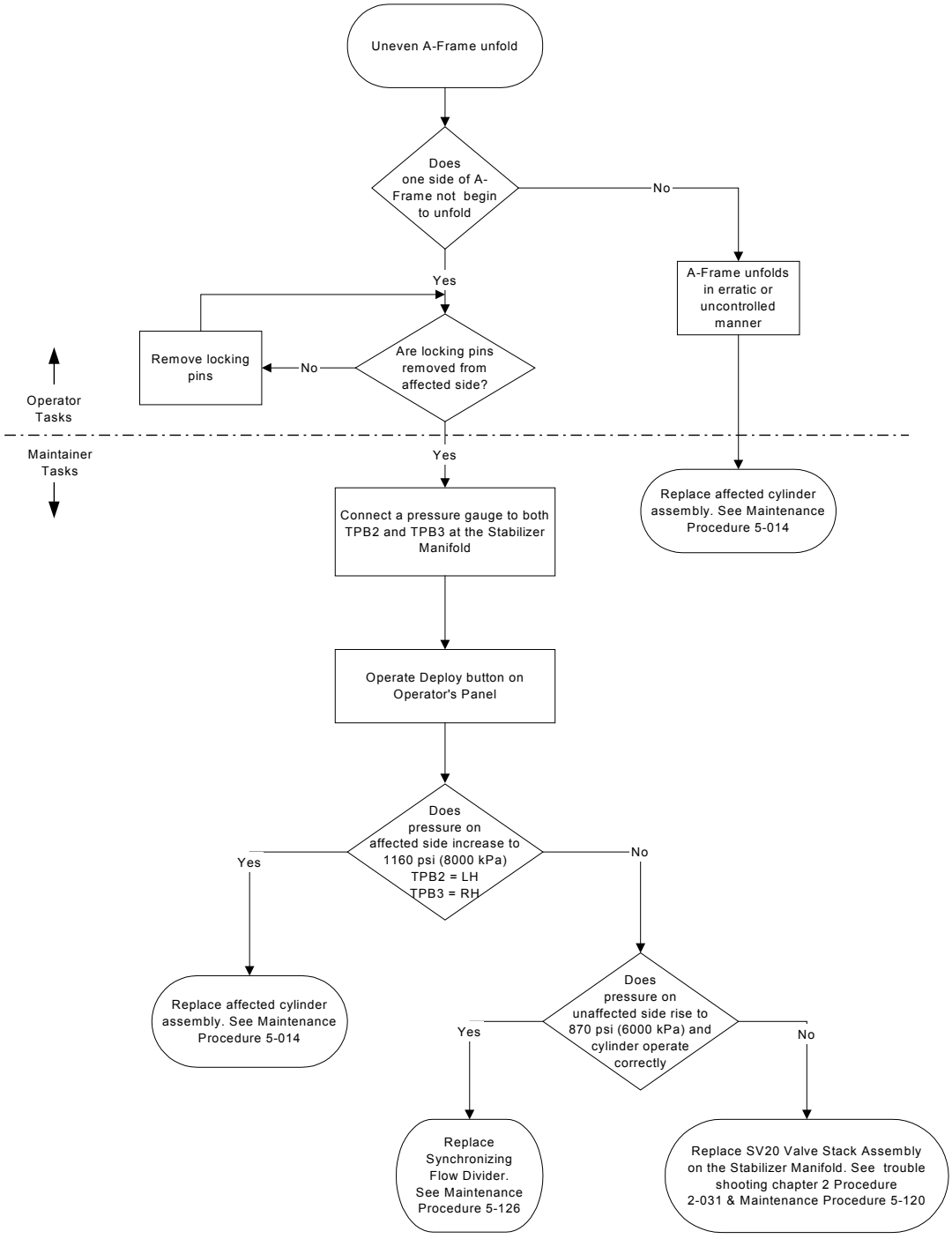
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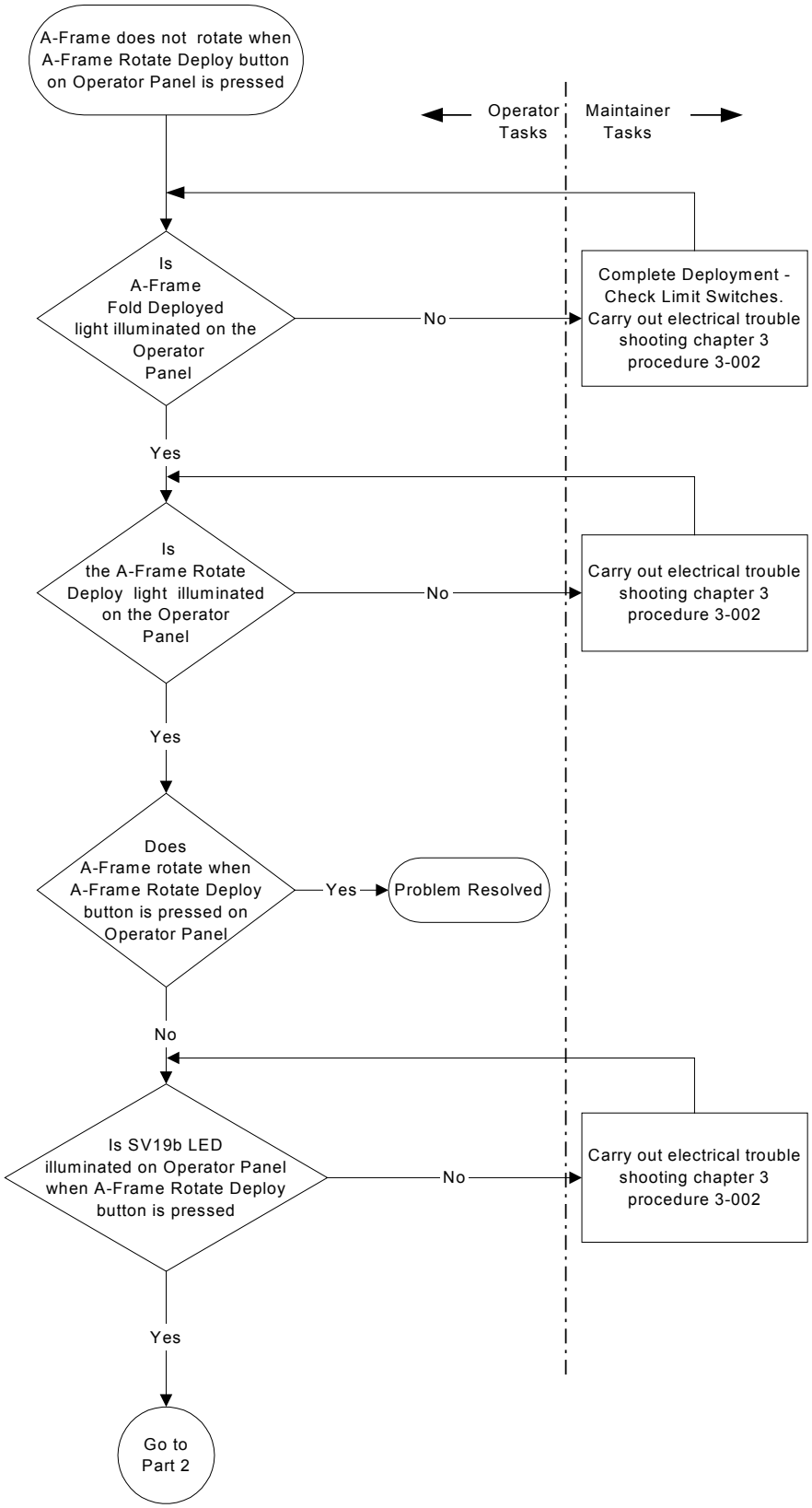
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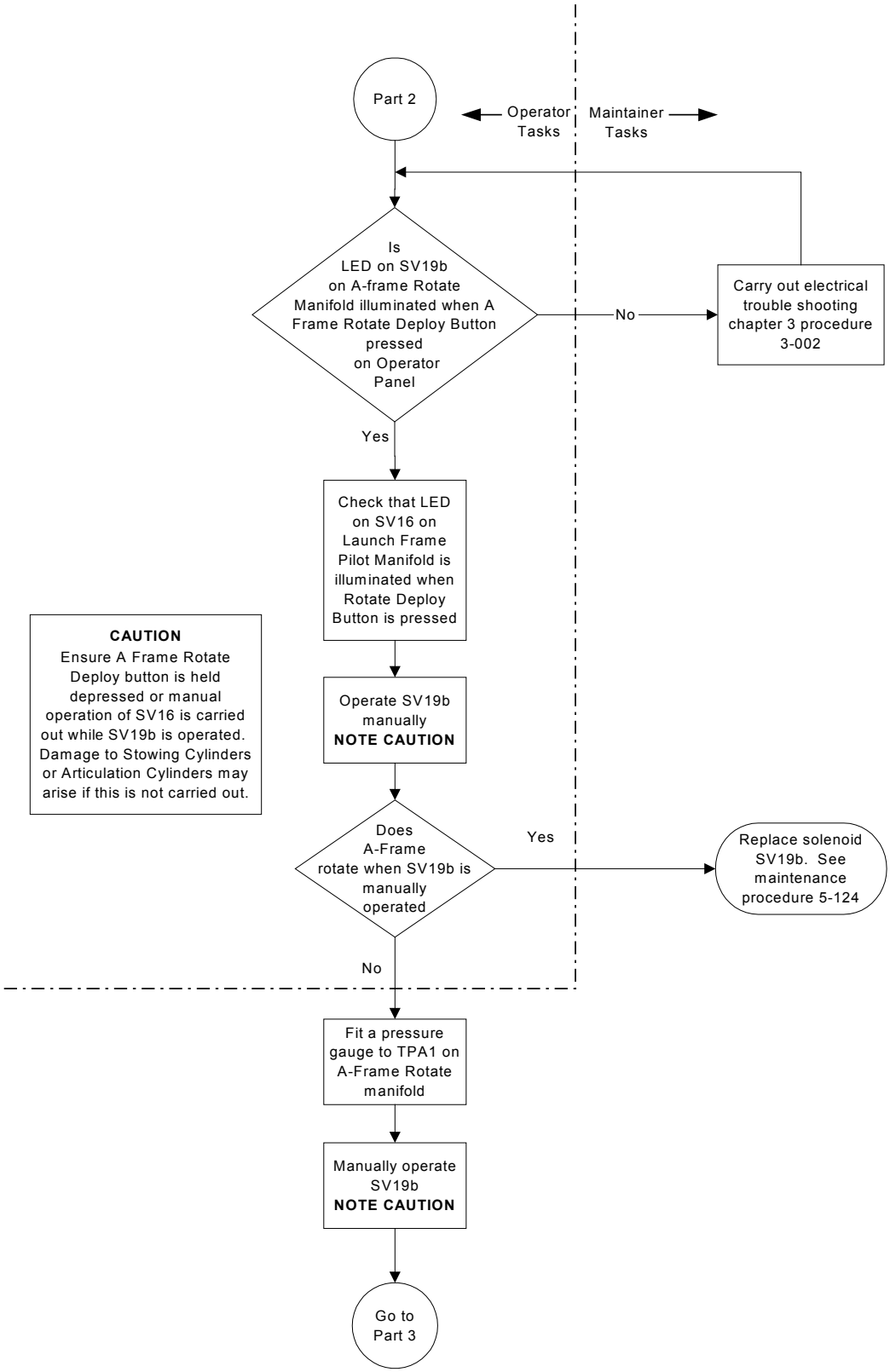
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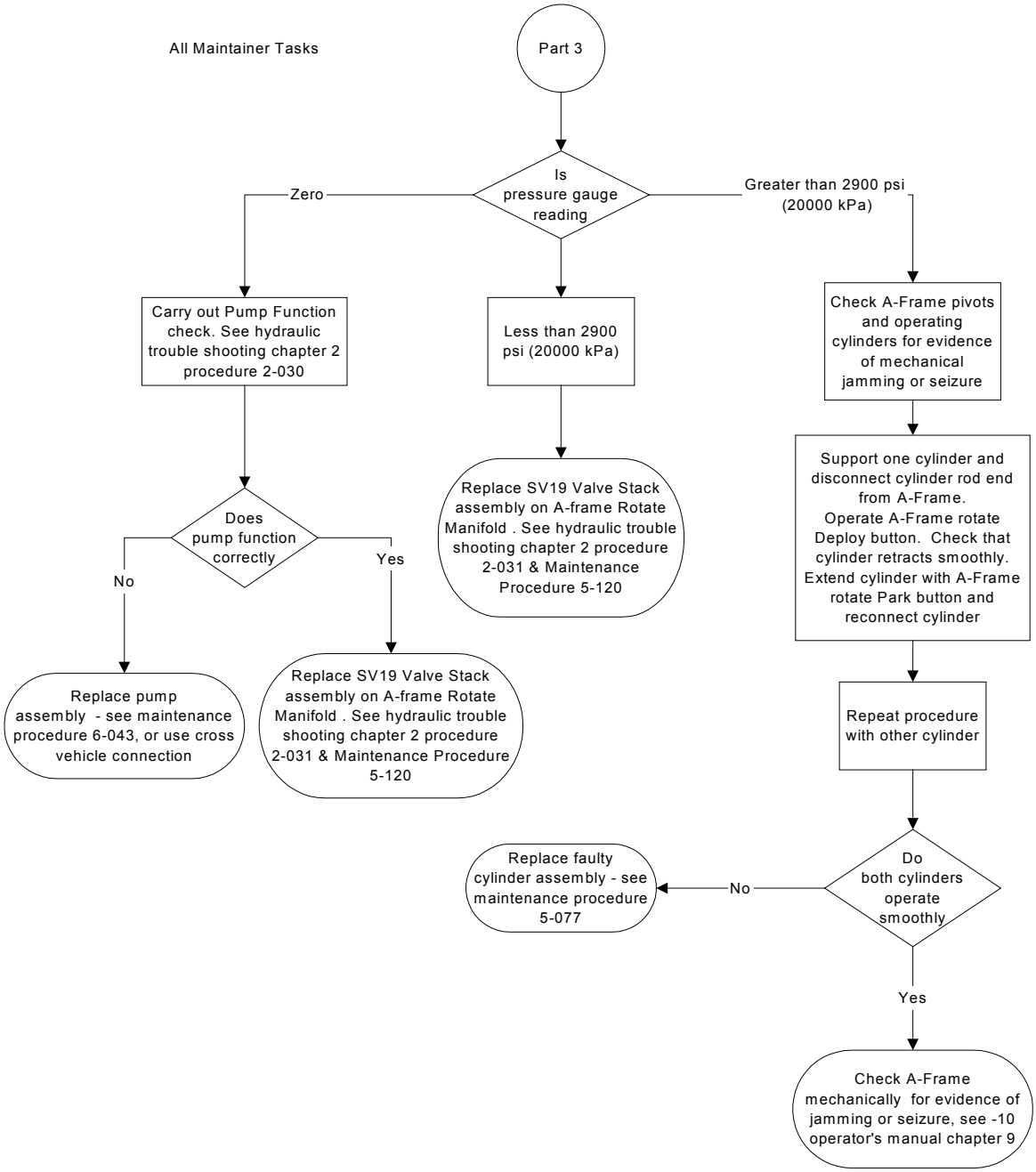
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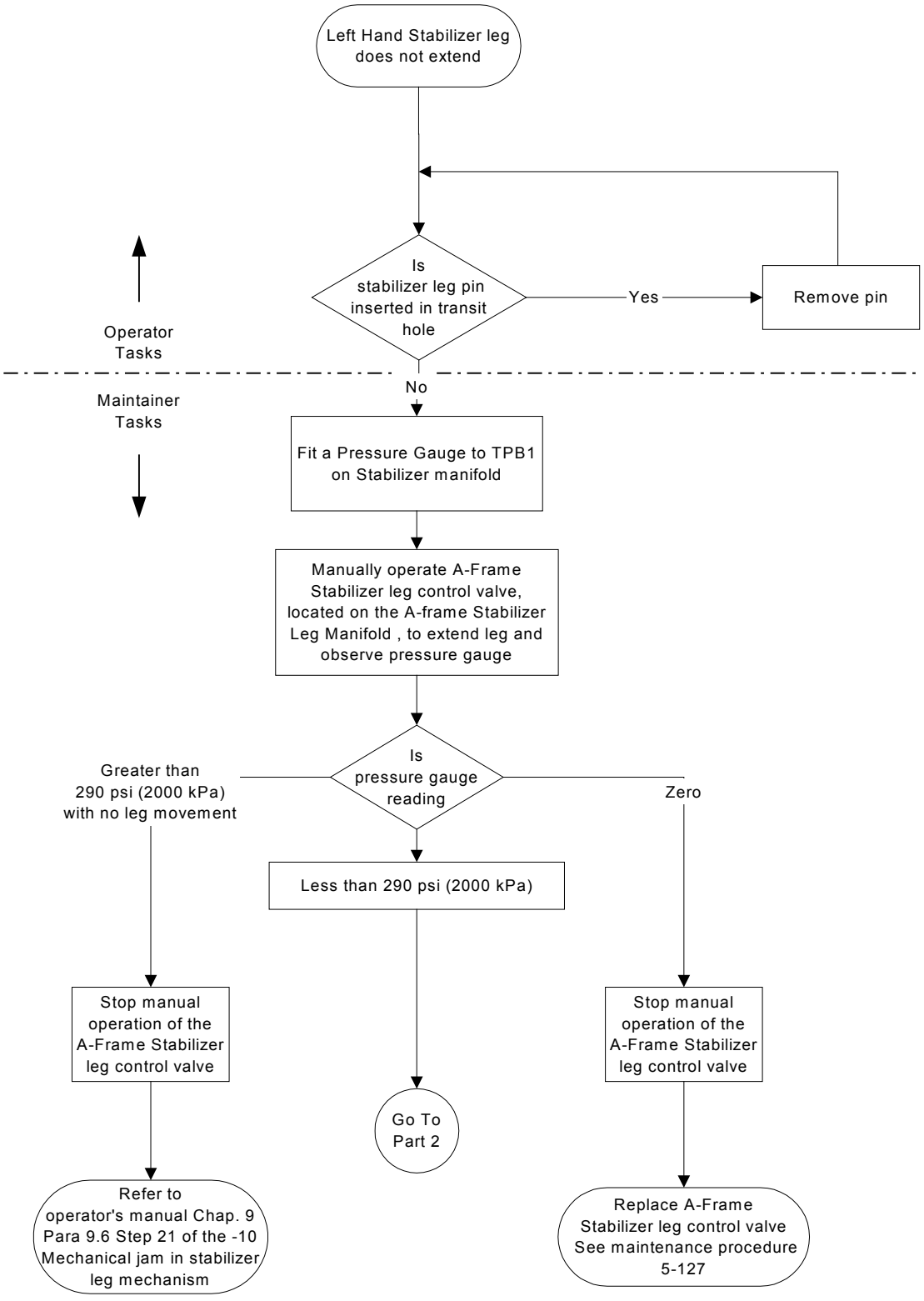
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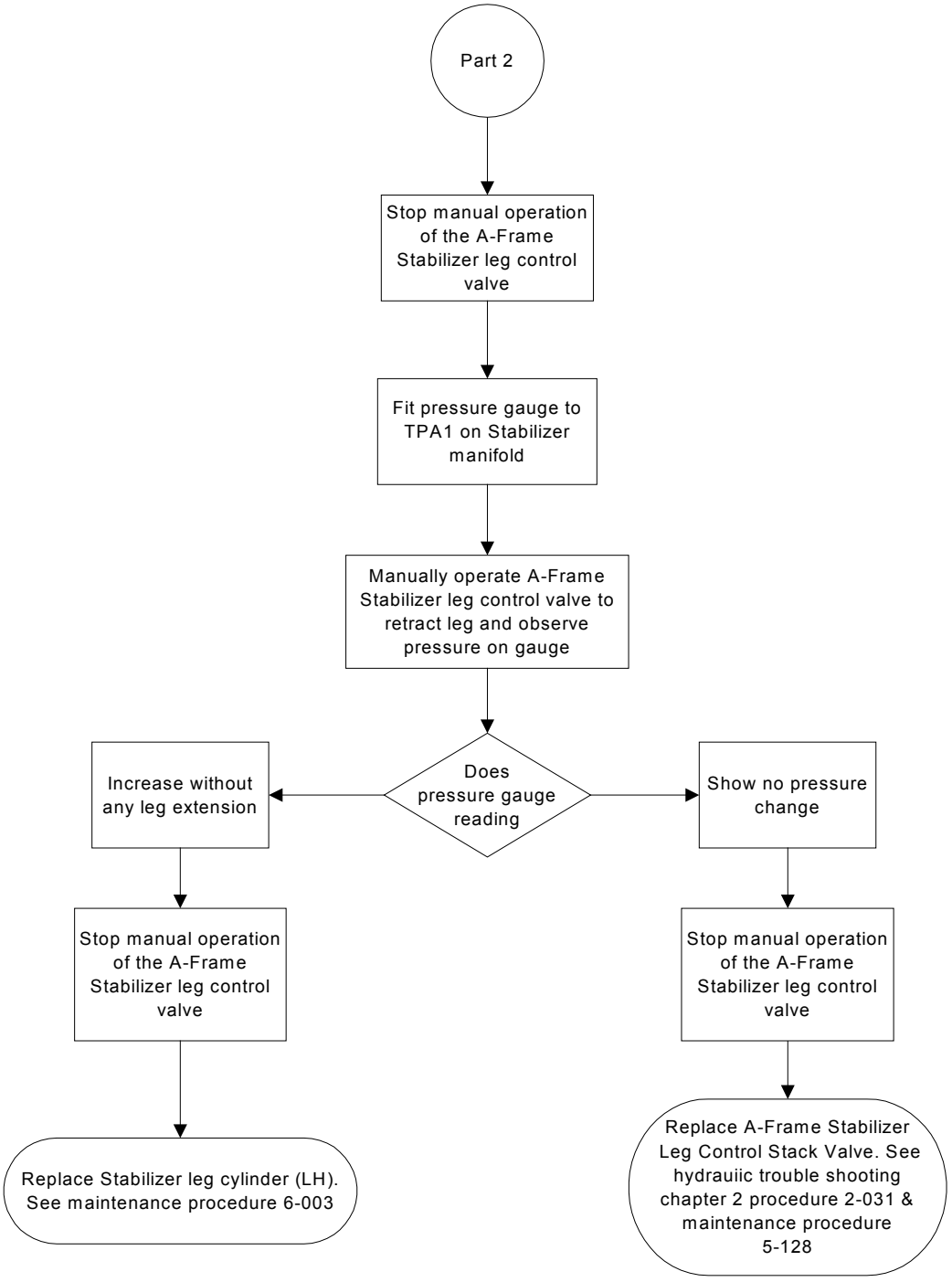
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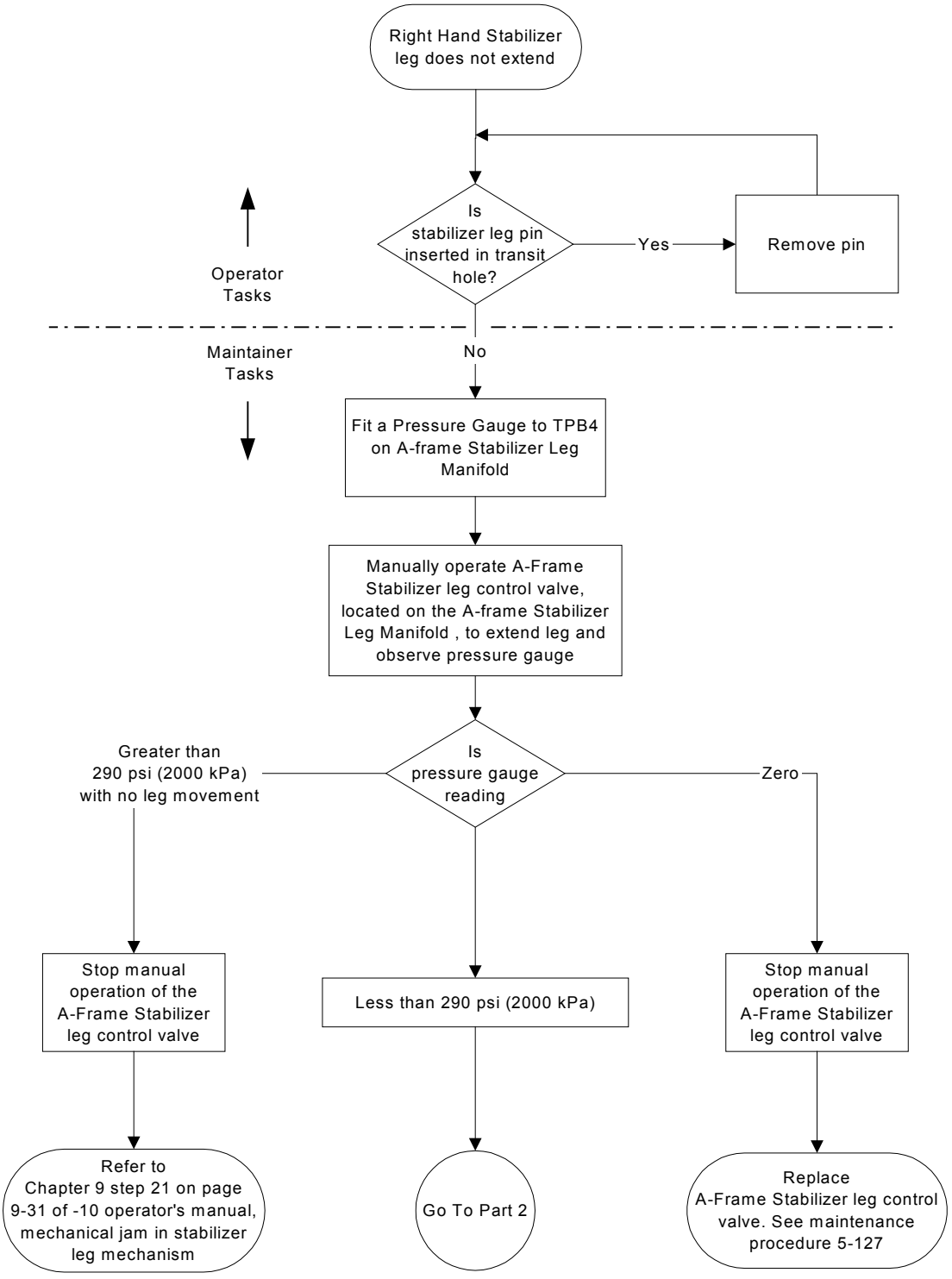
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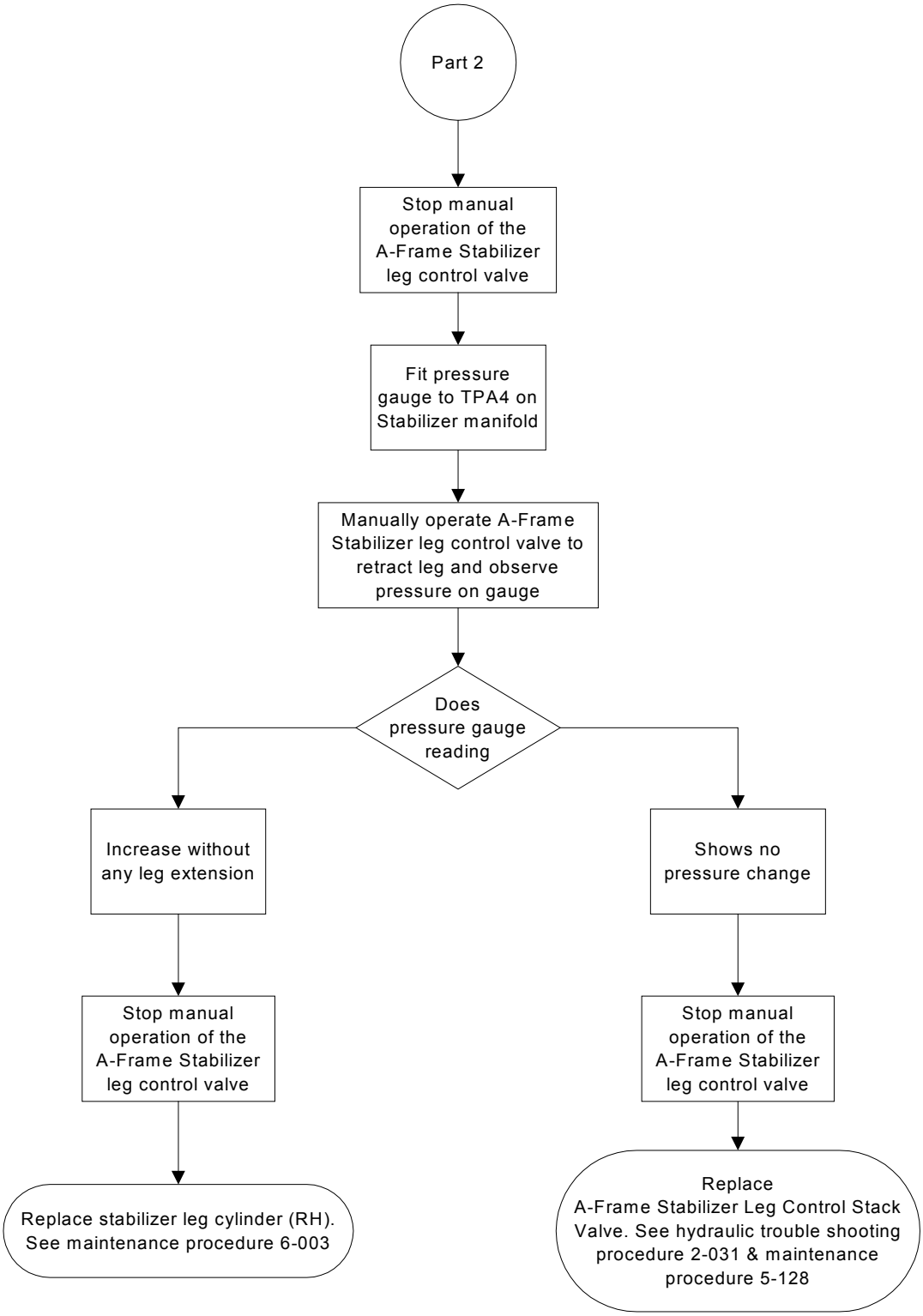
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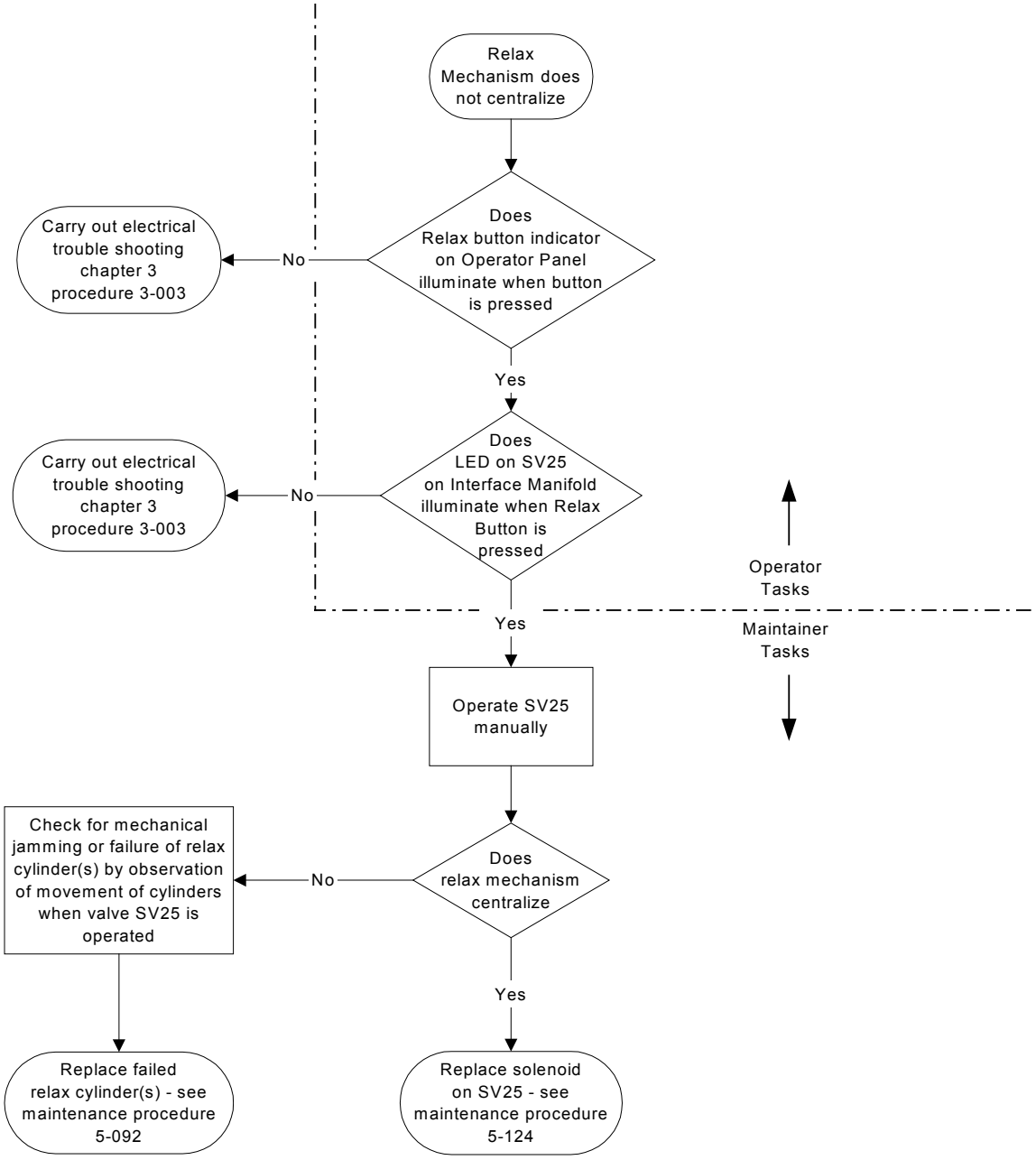
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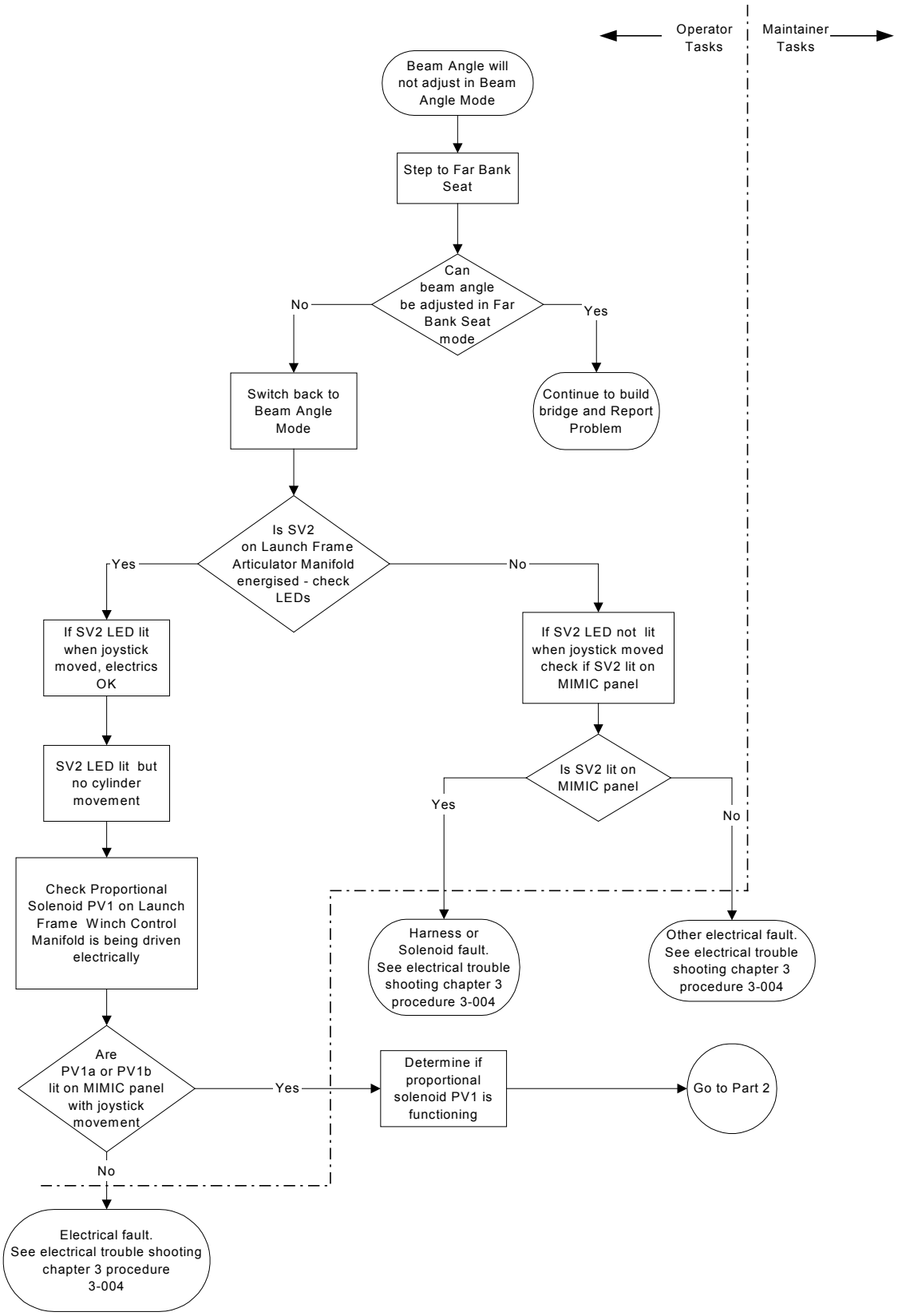
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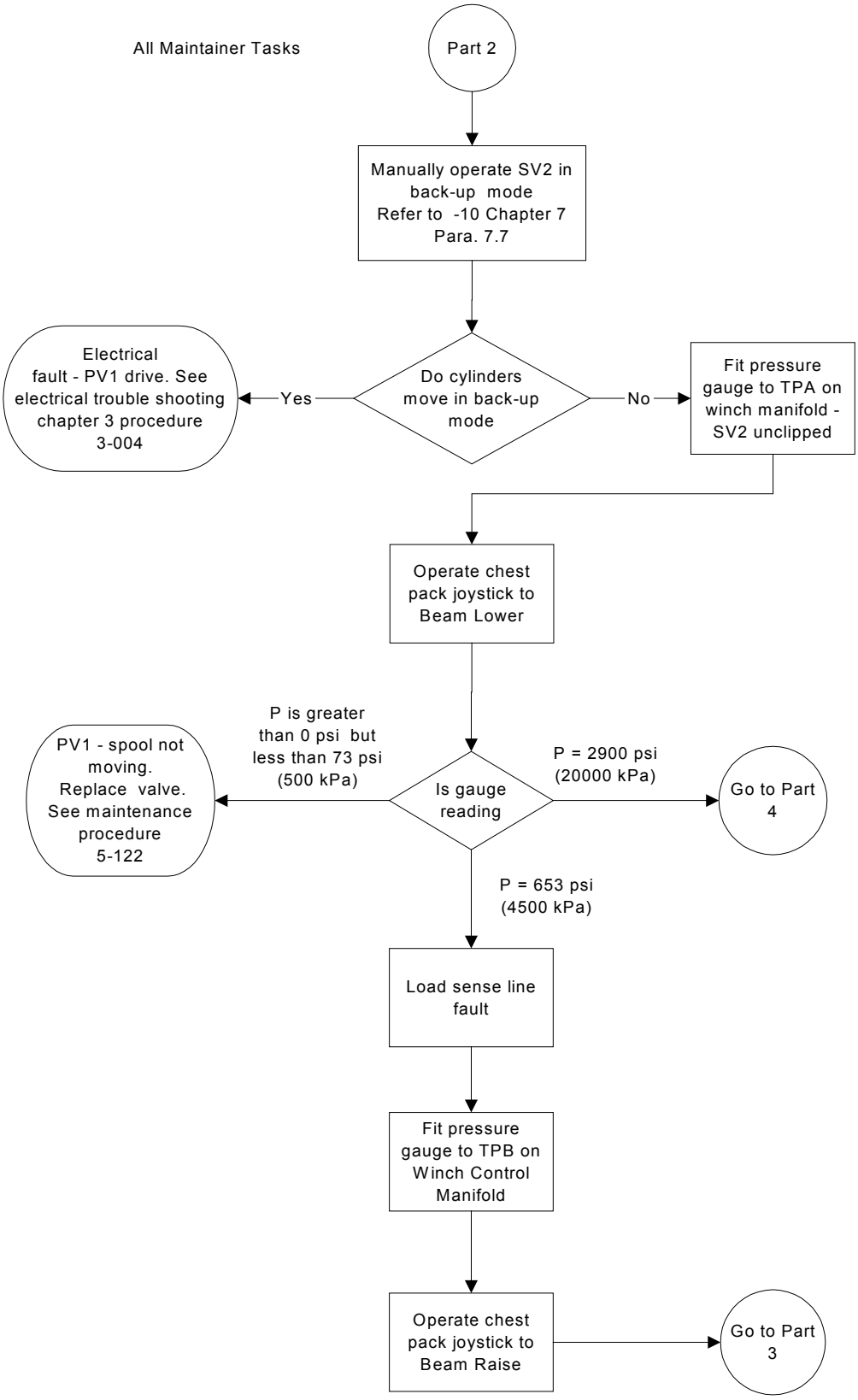
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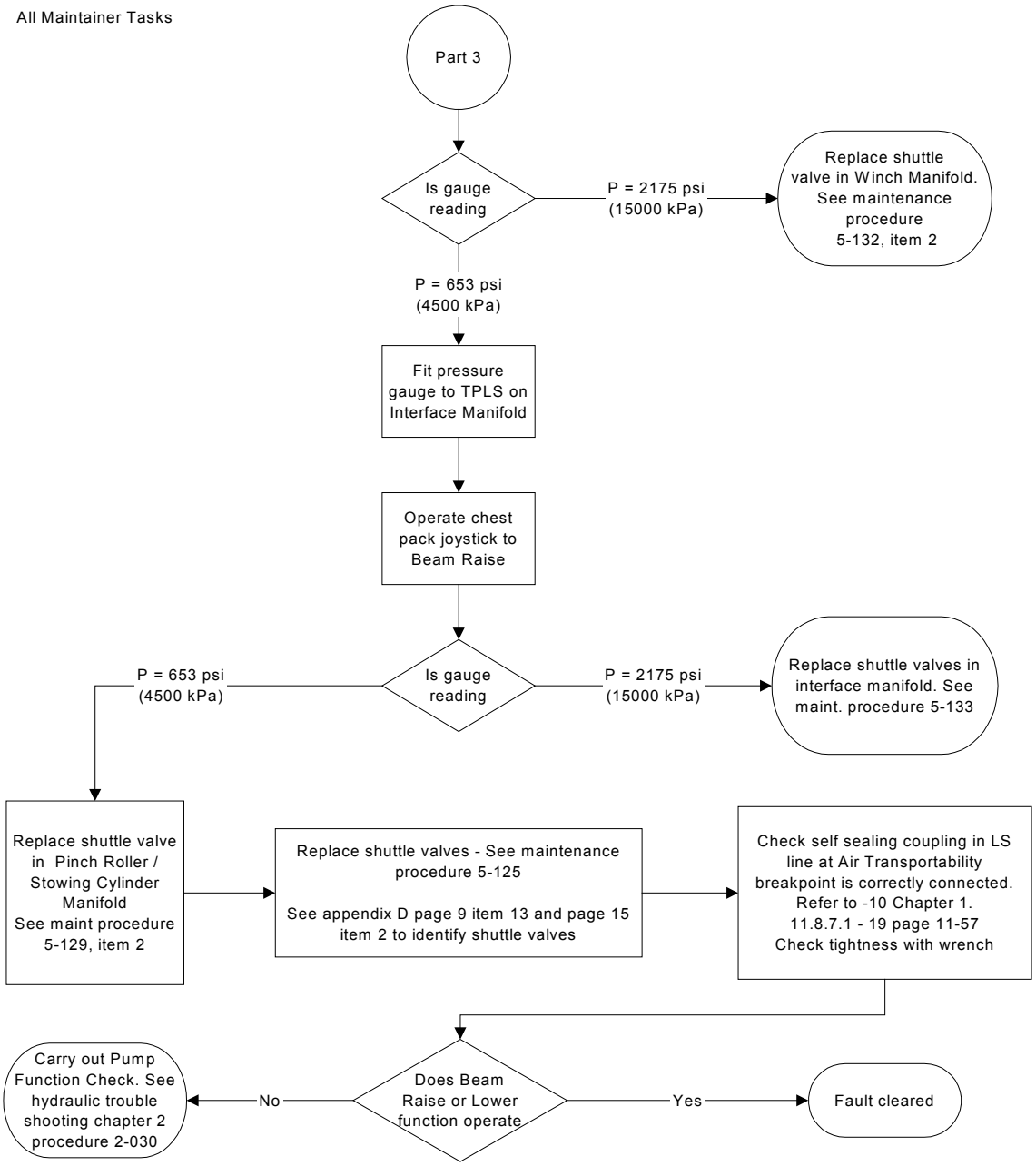
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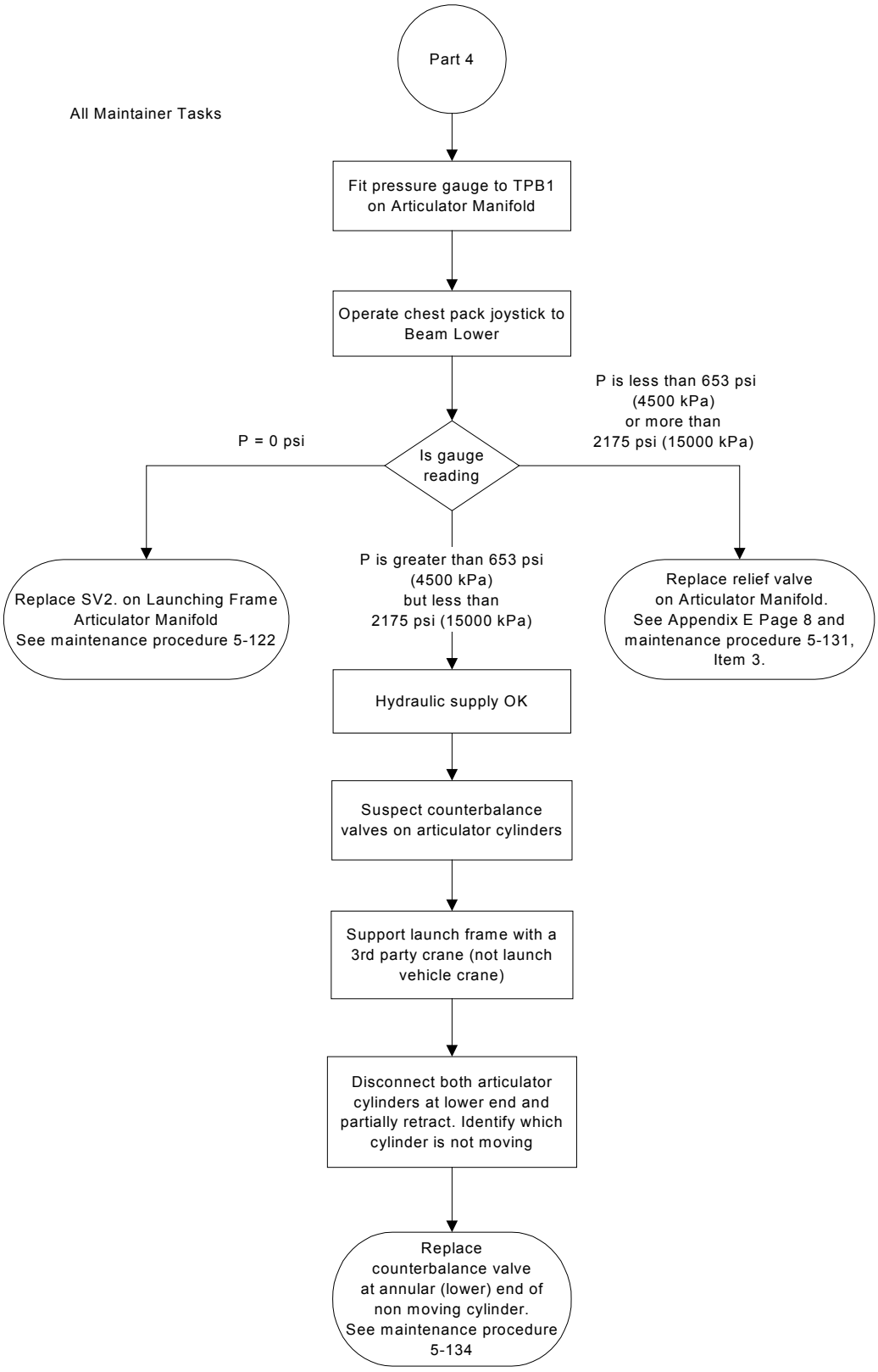
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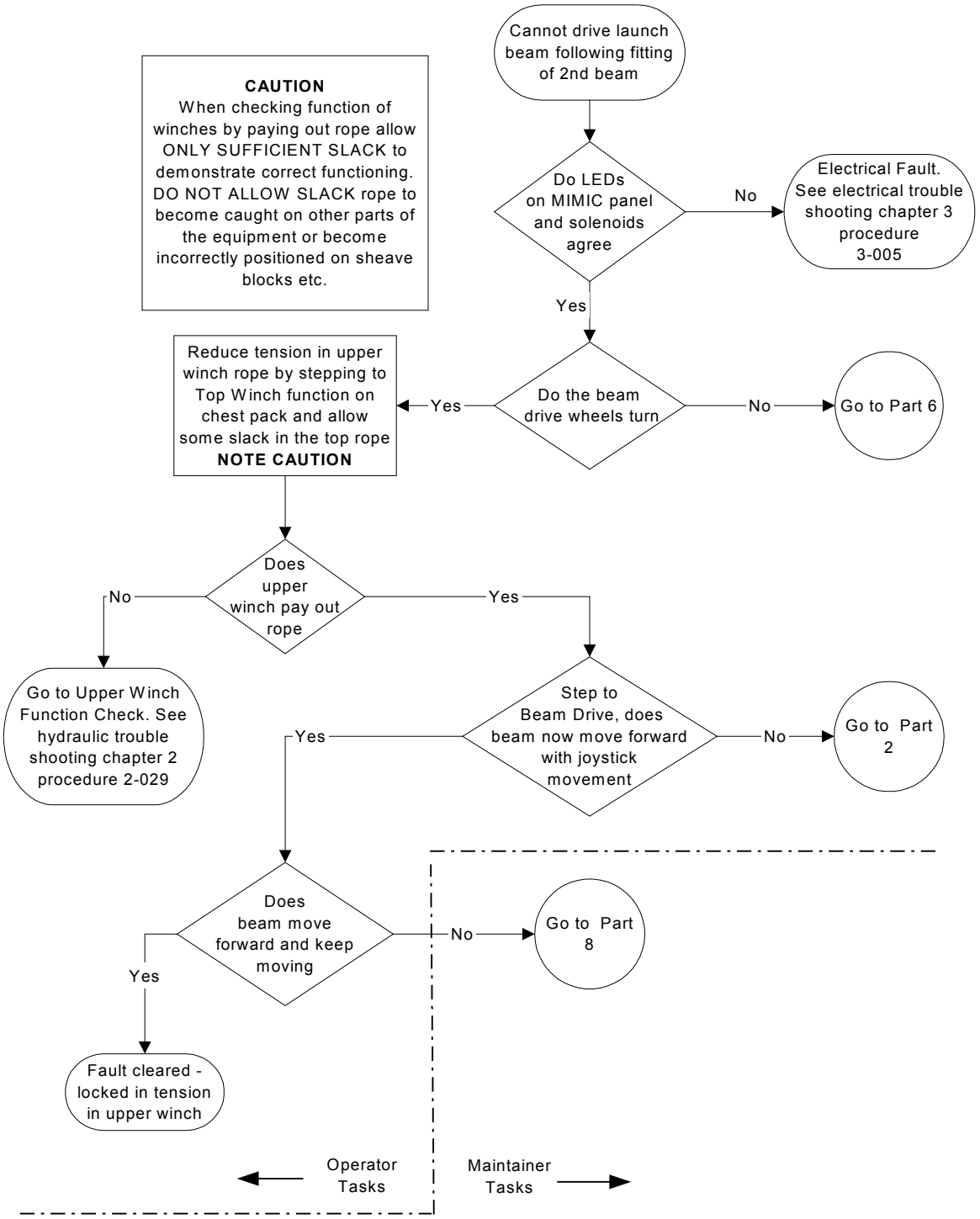
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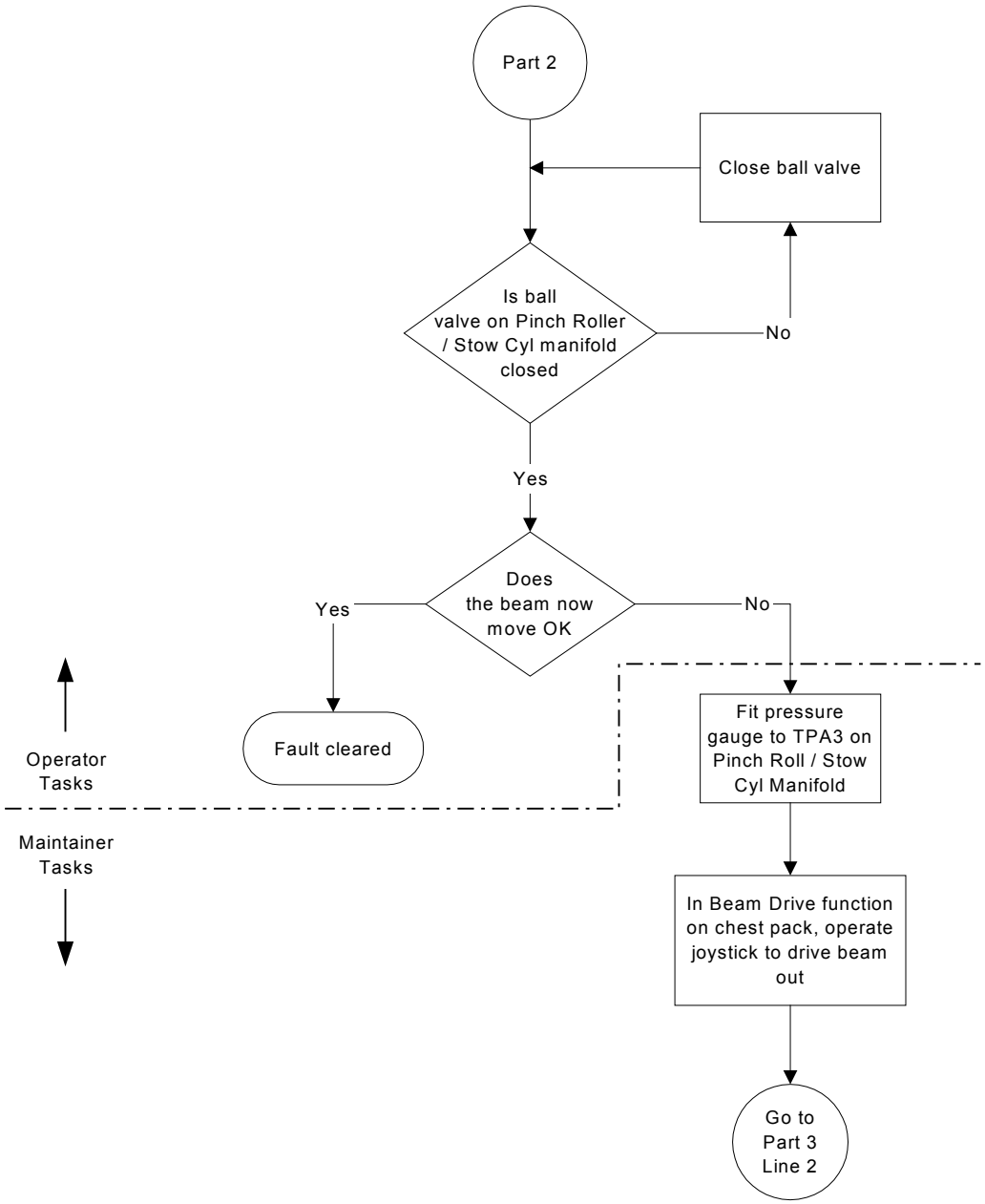
TSUM - 2-007 Beam Angle (31) Part 4



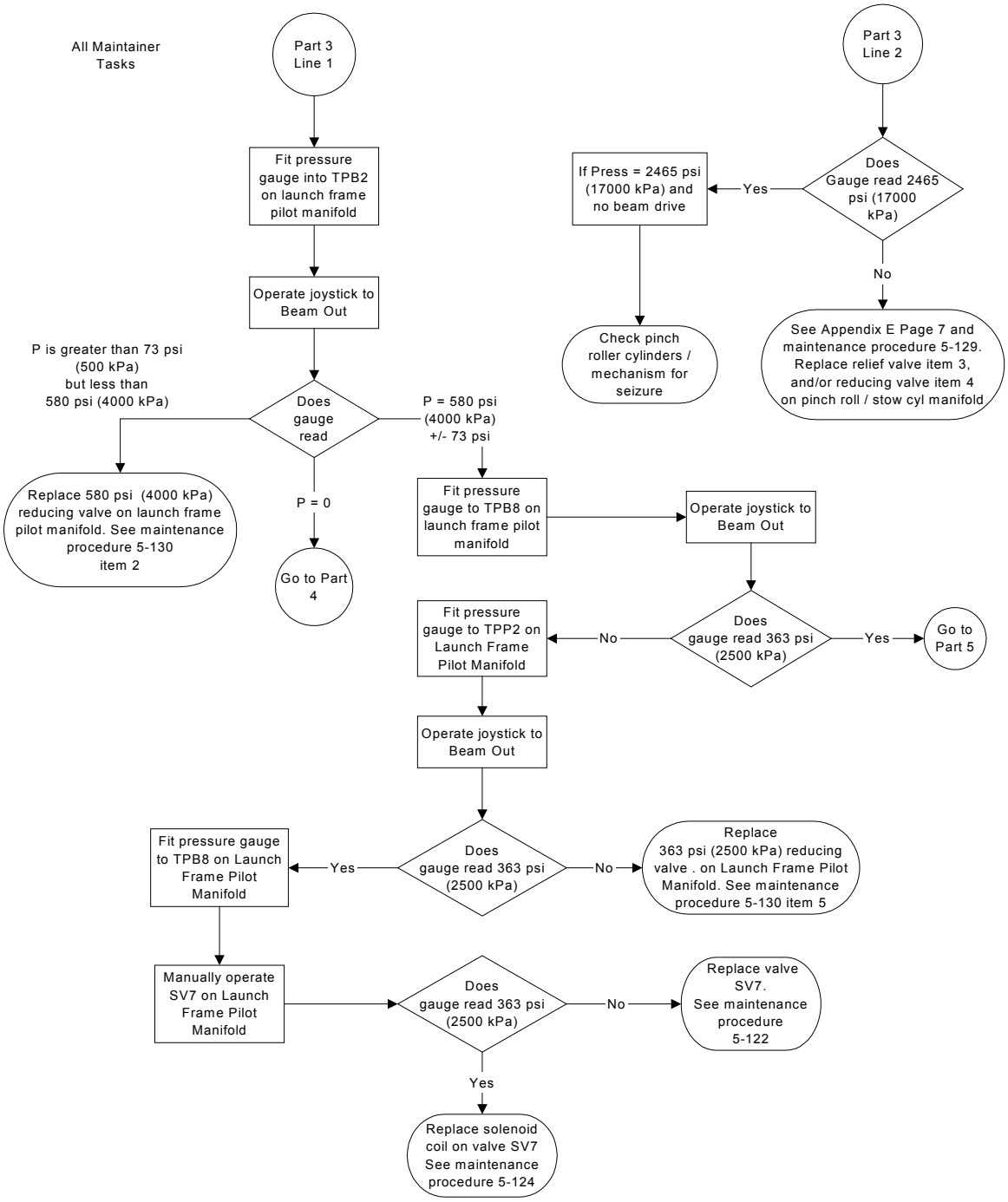
TSUM - 2-008 Build Launch Beam (33) Part 1



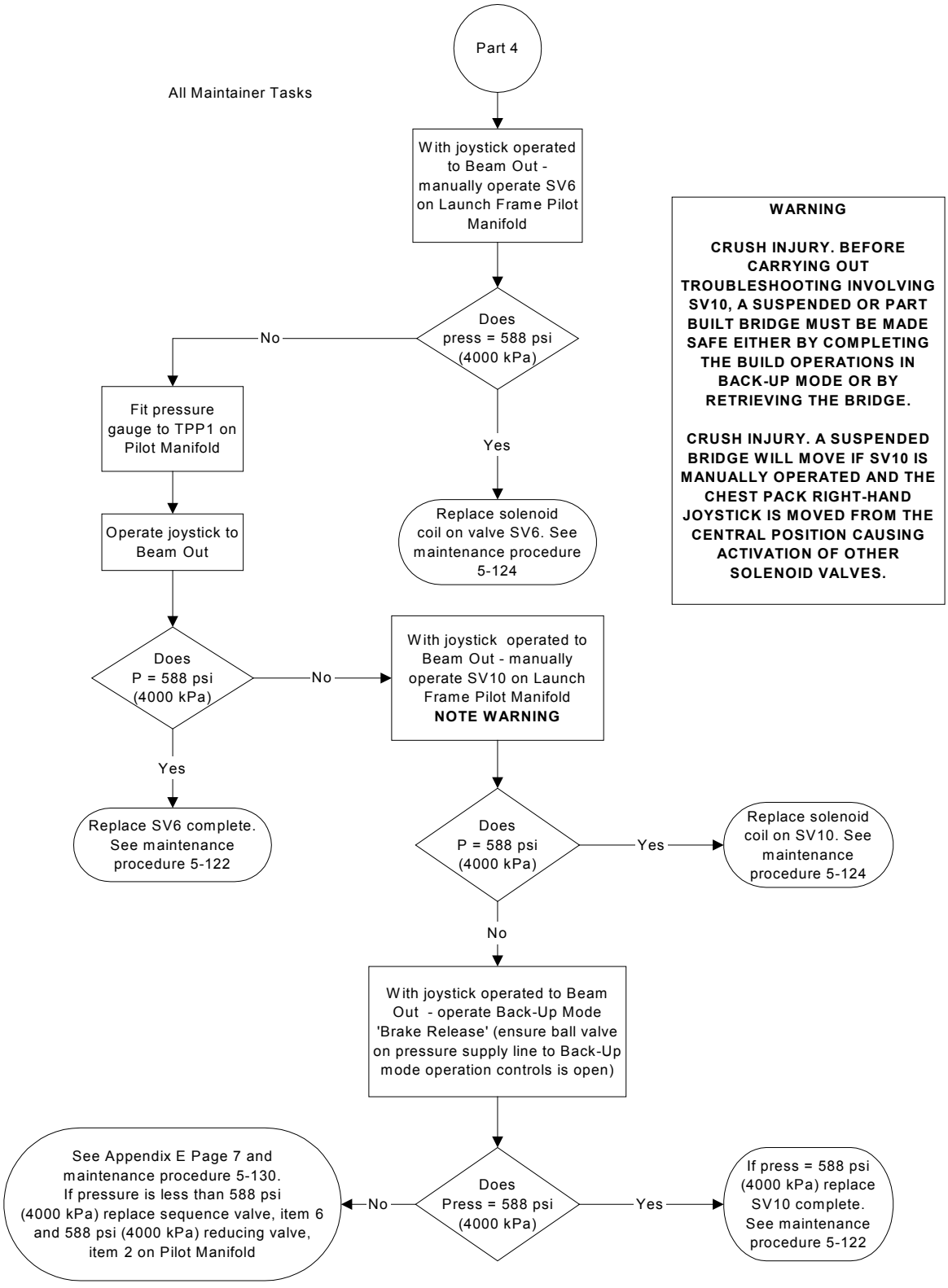
TSUM - 2-008 Build Launch Beam (33) Part 2



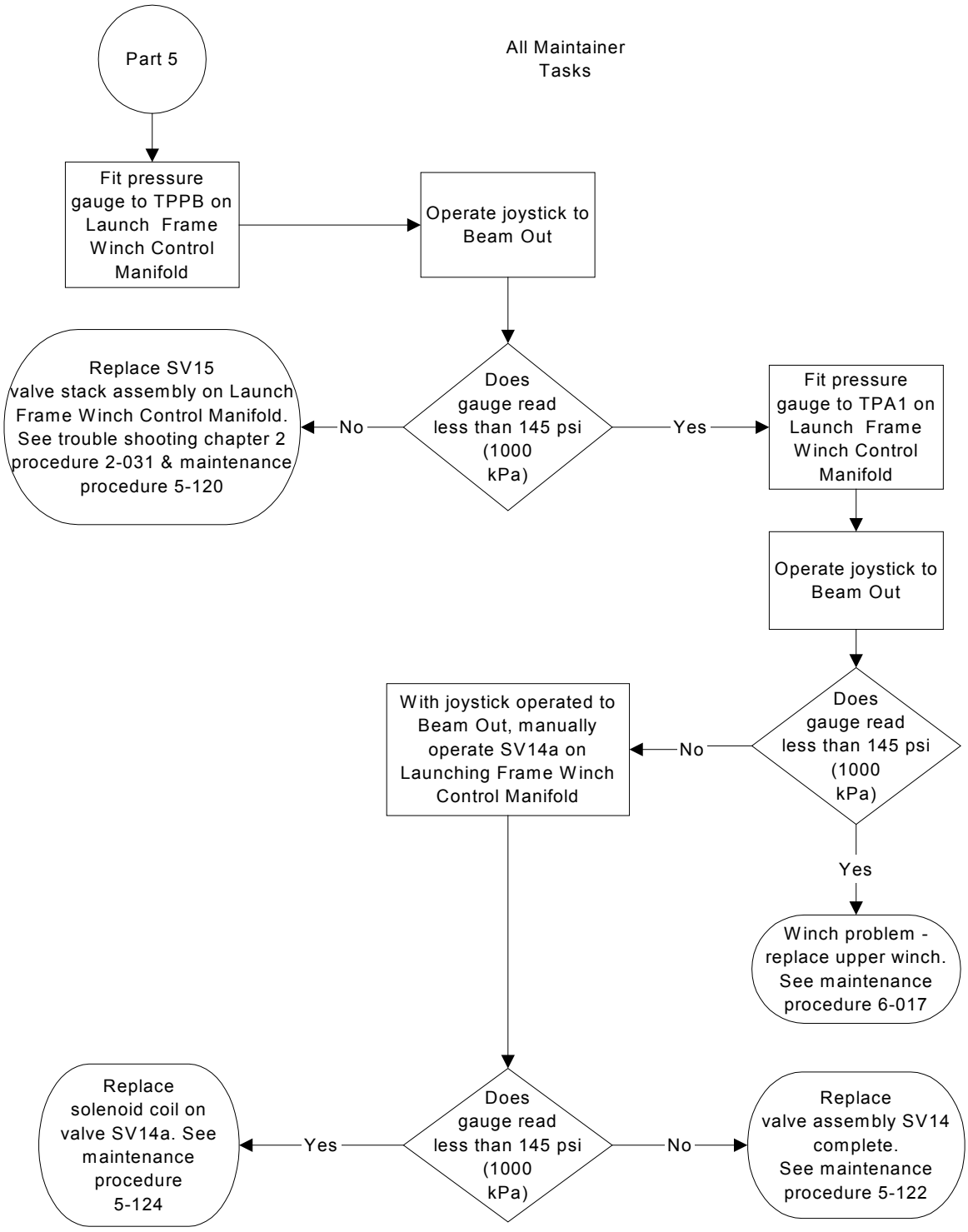
TSUM - 2-008 Build Launch Beam (33) Part 3



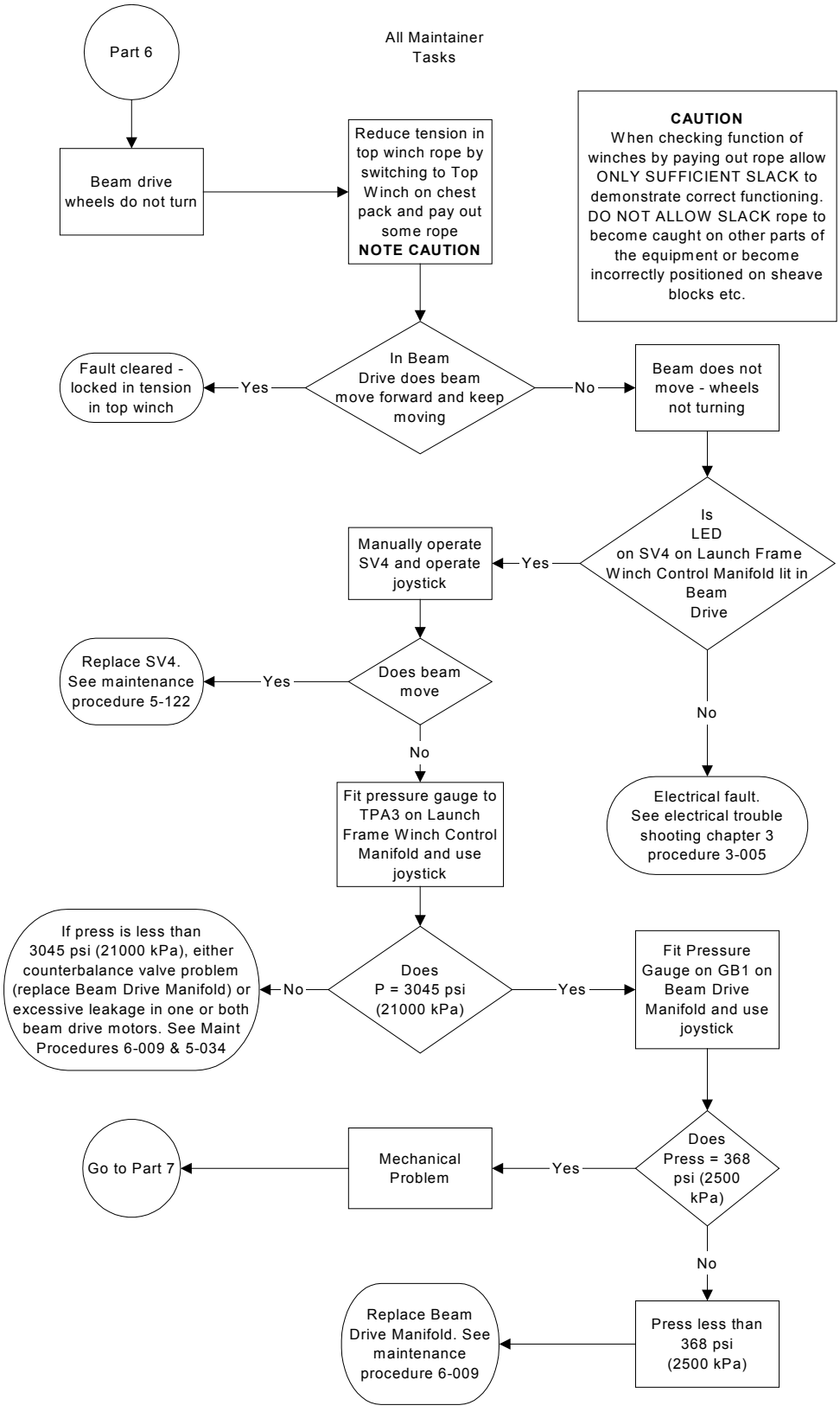
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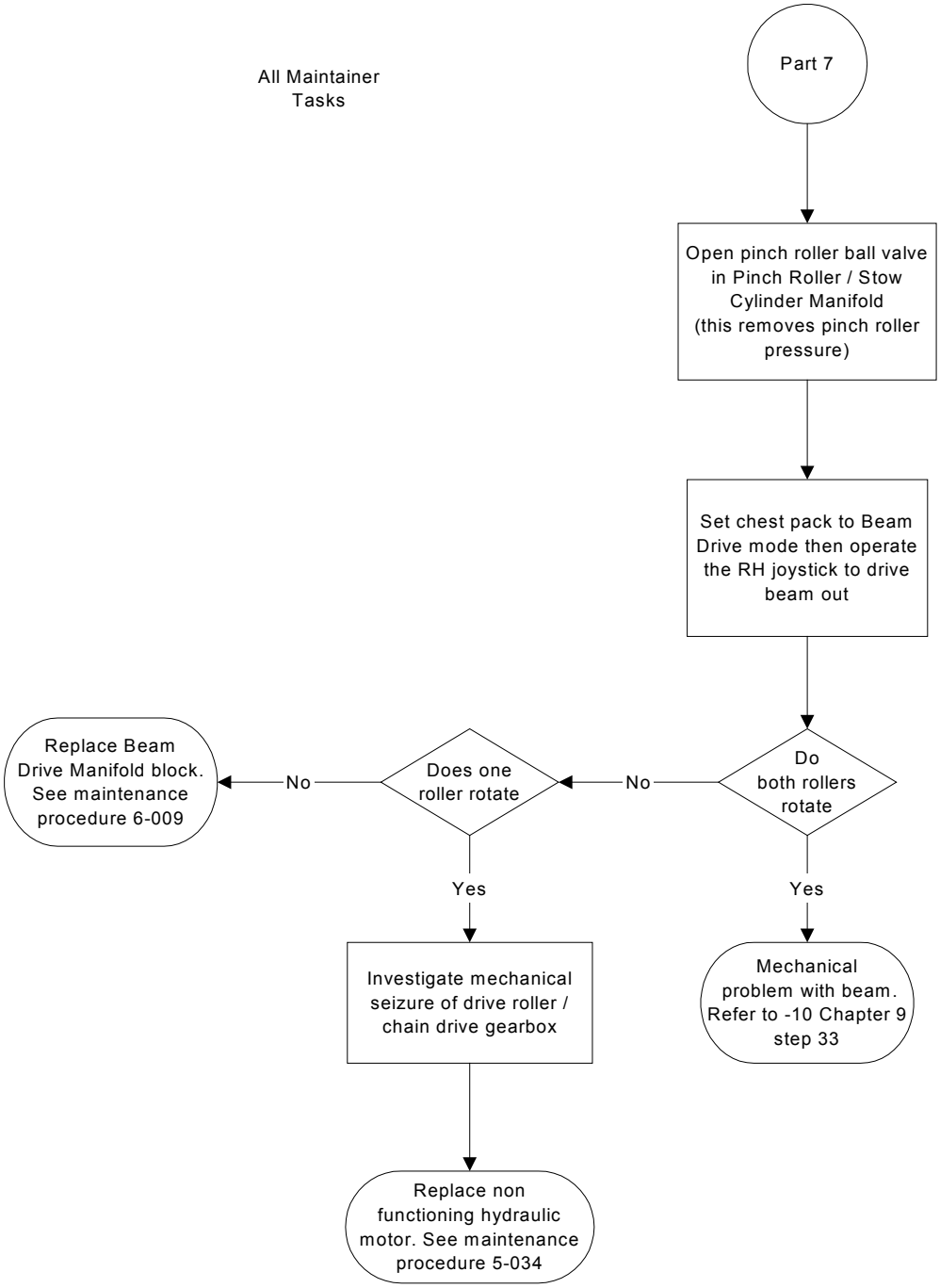
TSUM - 2-008 Build Launch Beam (33) Part 5



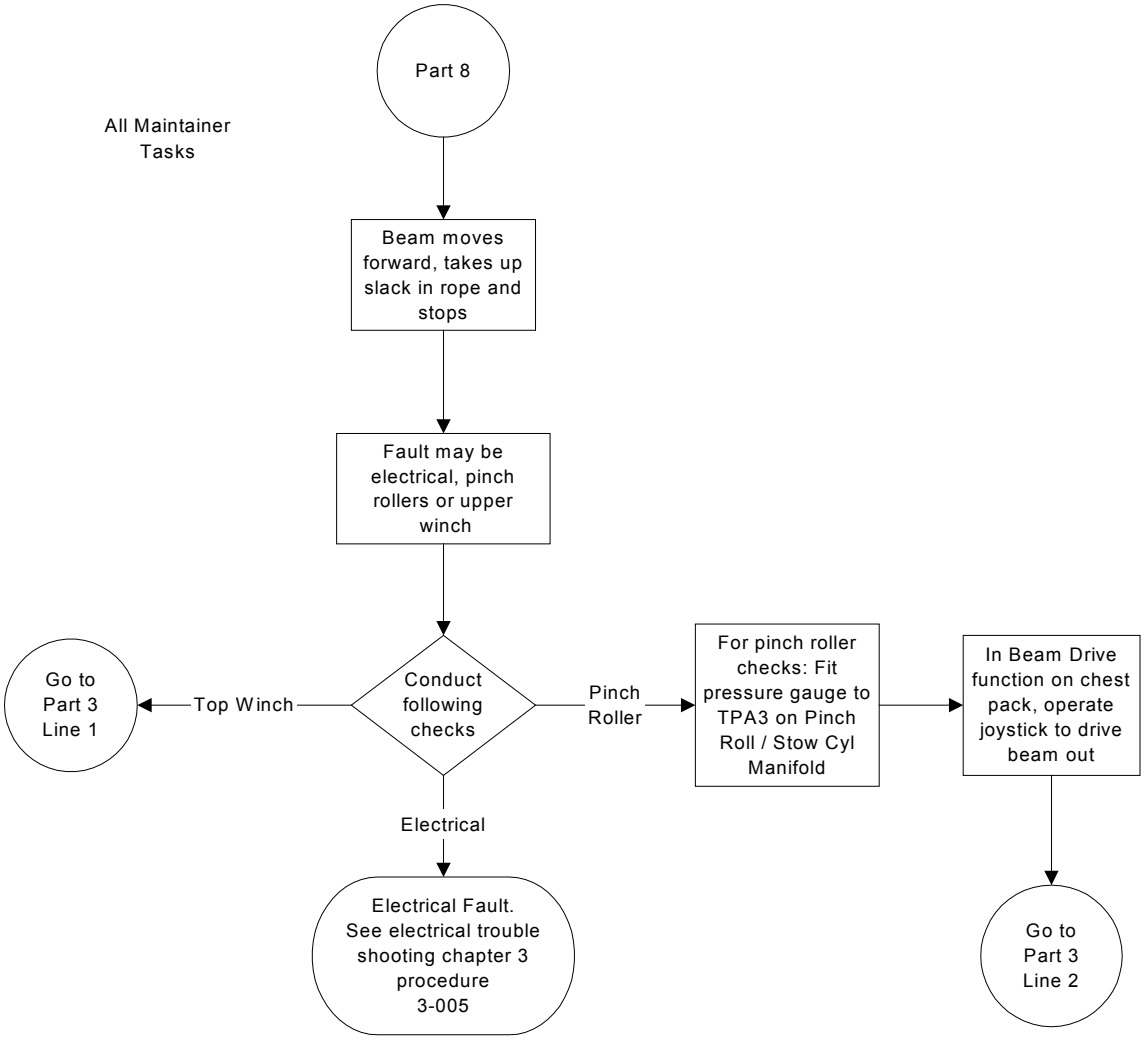
TSUM - 2-008 Build Launch Beam (33) Part 6



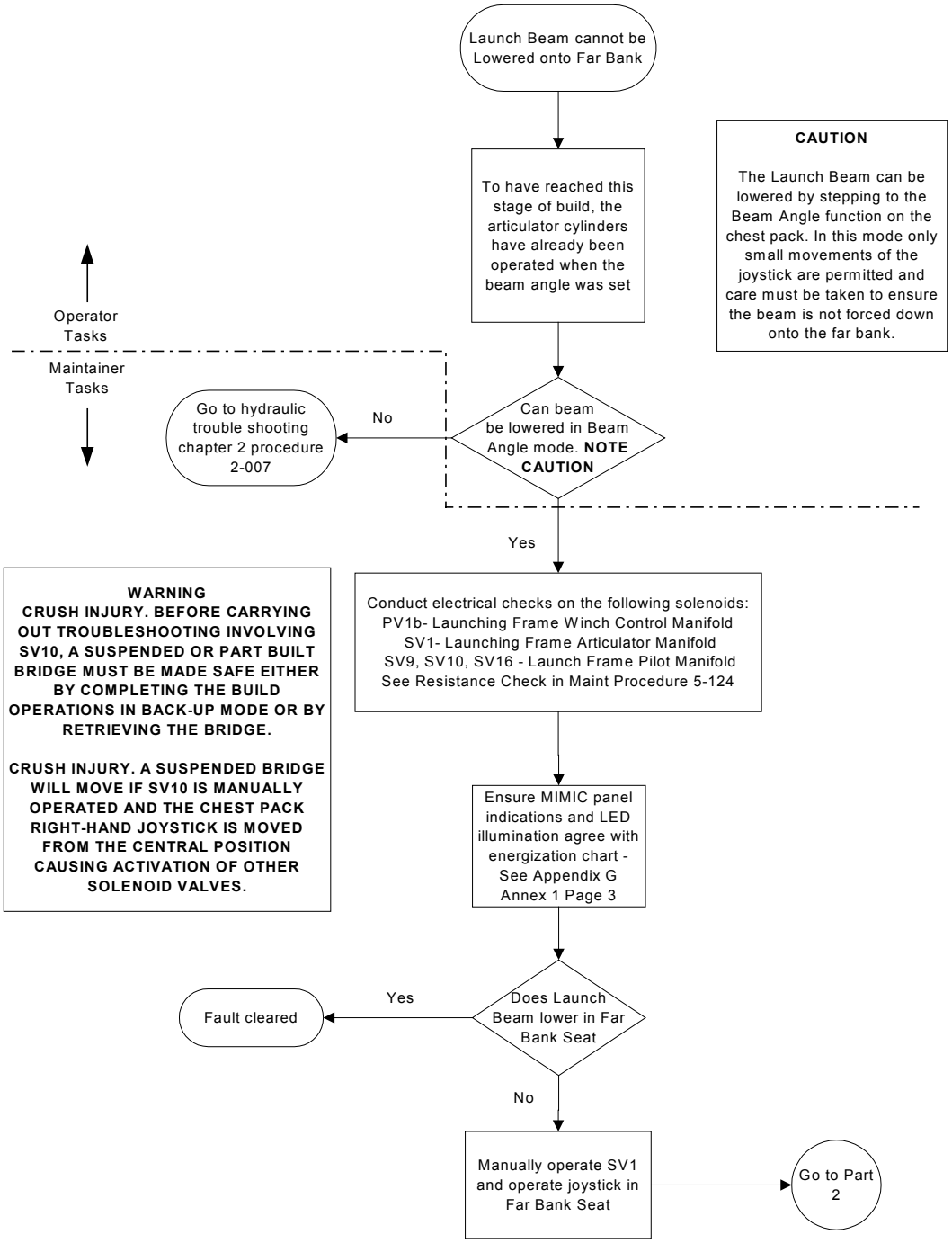
TSUM - 2-008 Build Launch Beam (33) Part 7



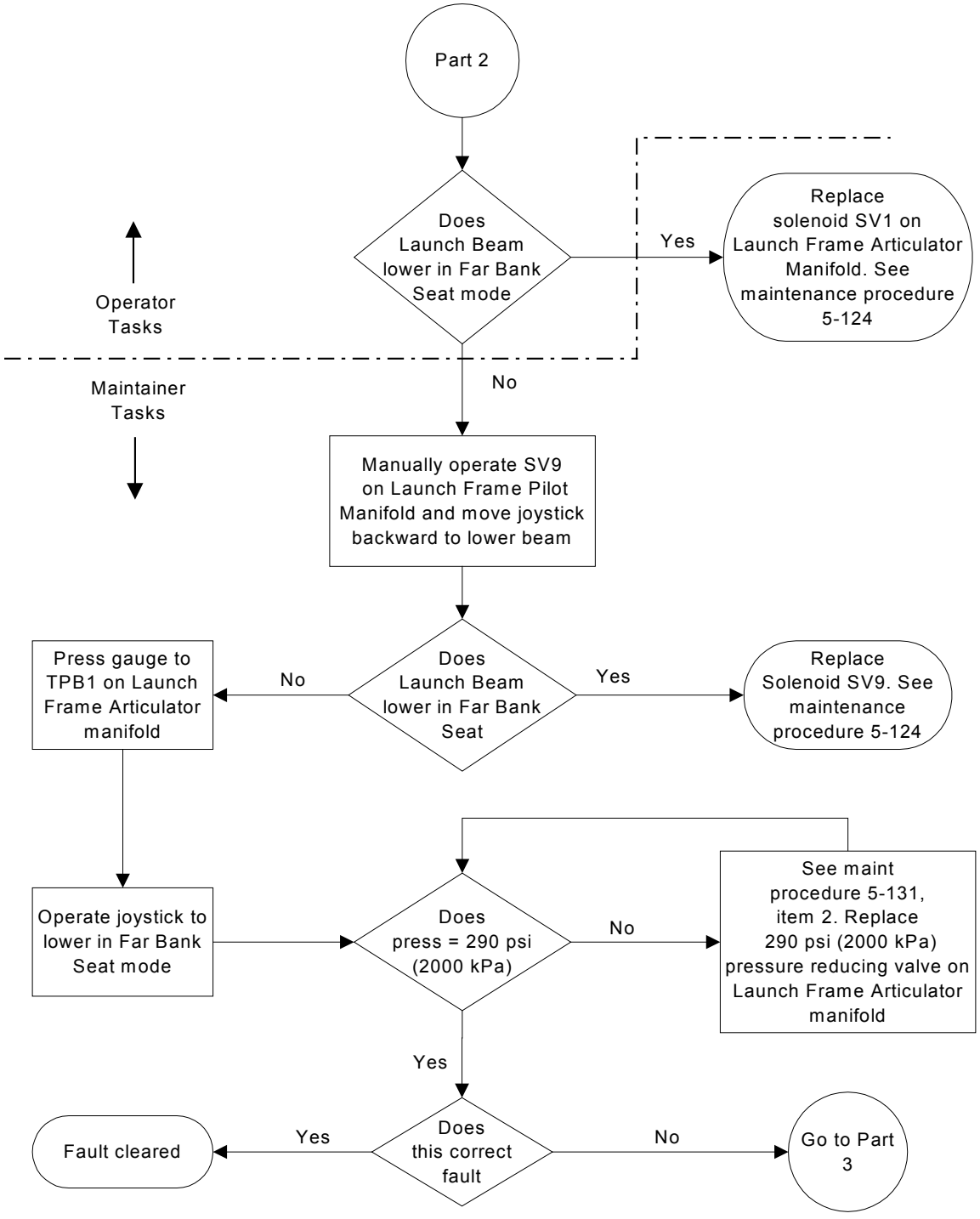
TSUM - 2-008 Build Launch Beam (33) Part 8



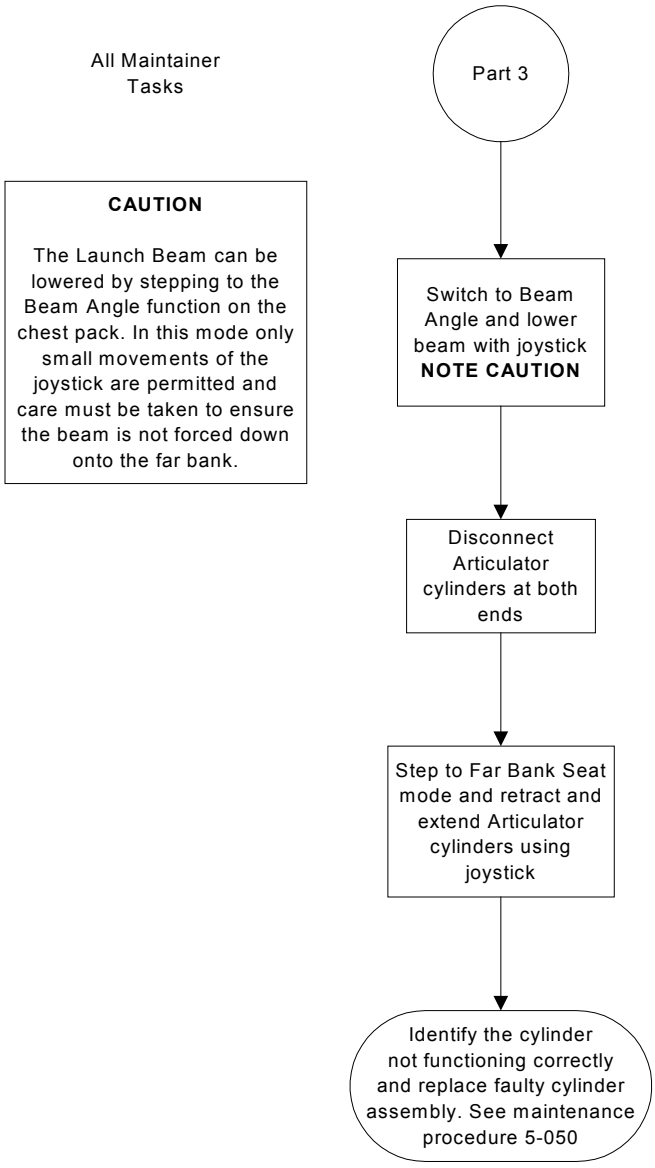
TSUM - 2-009 Lower Launch Beam onto Far Bank Seat (35) Part 1



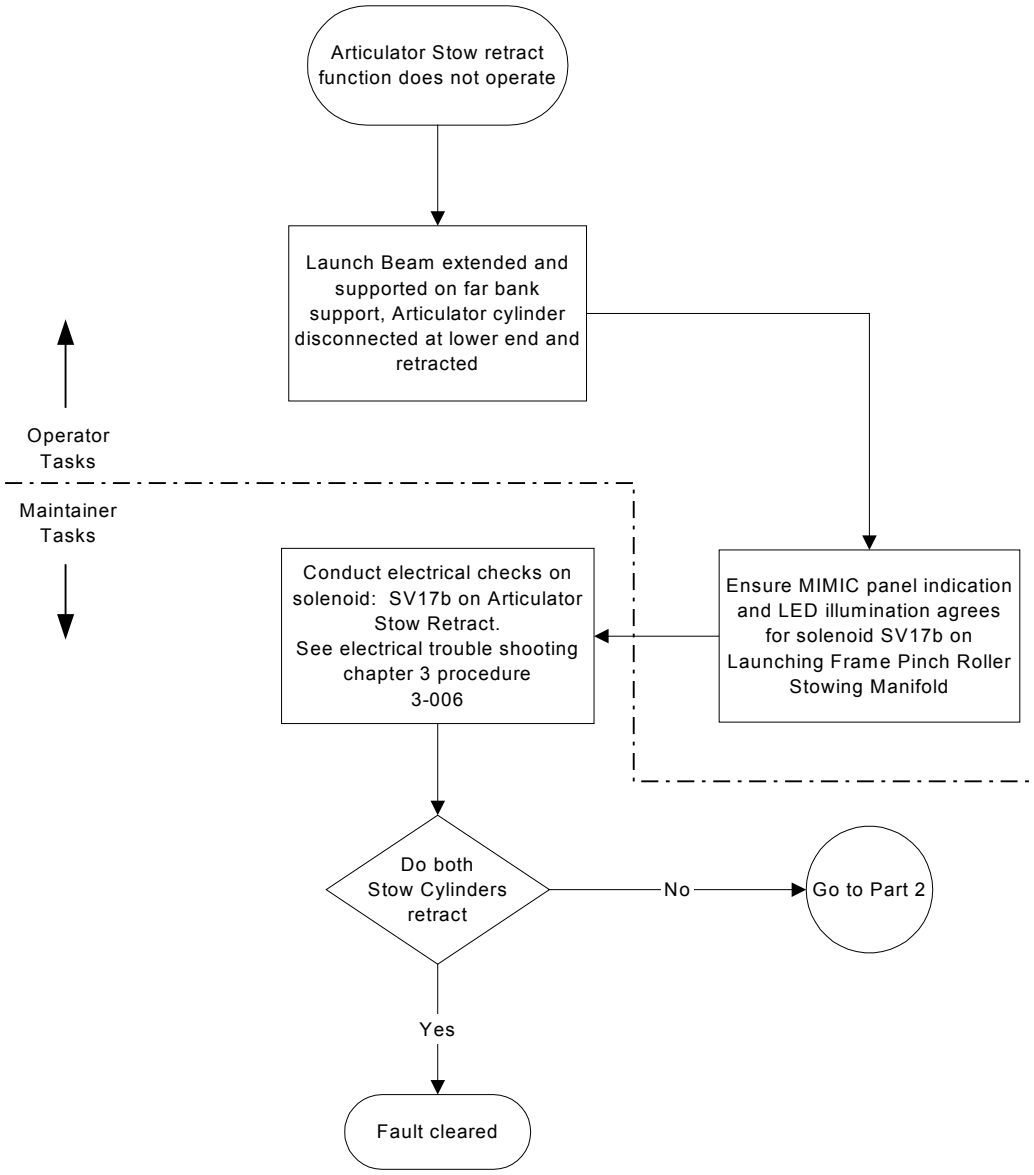
TSUM - 2-009 Lower Launch Beam onto Far Bank Seat (35) Part 2



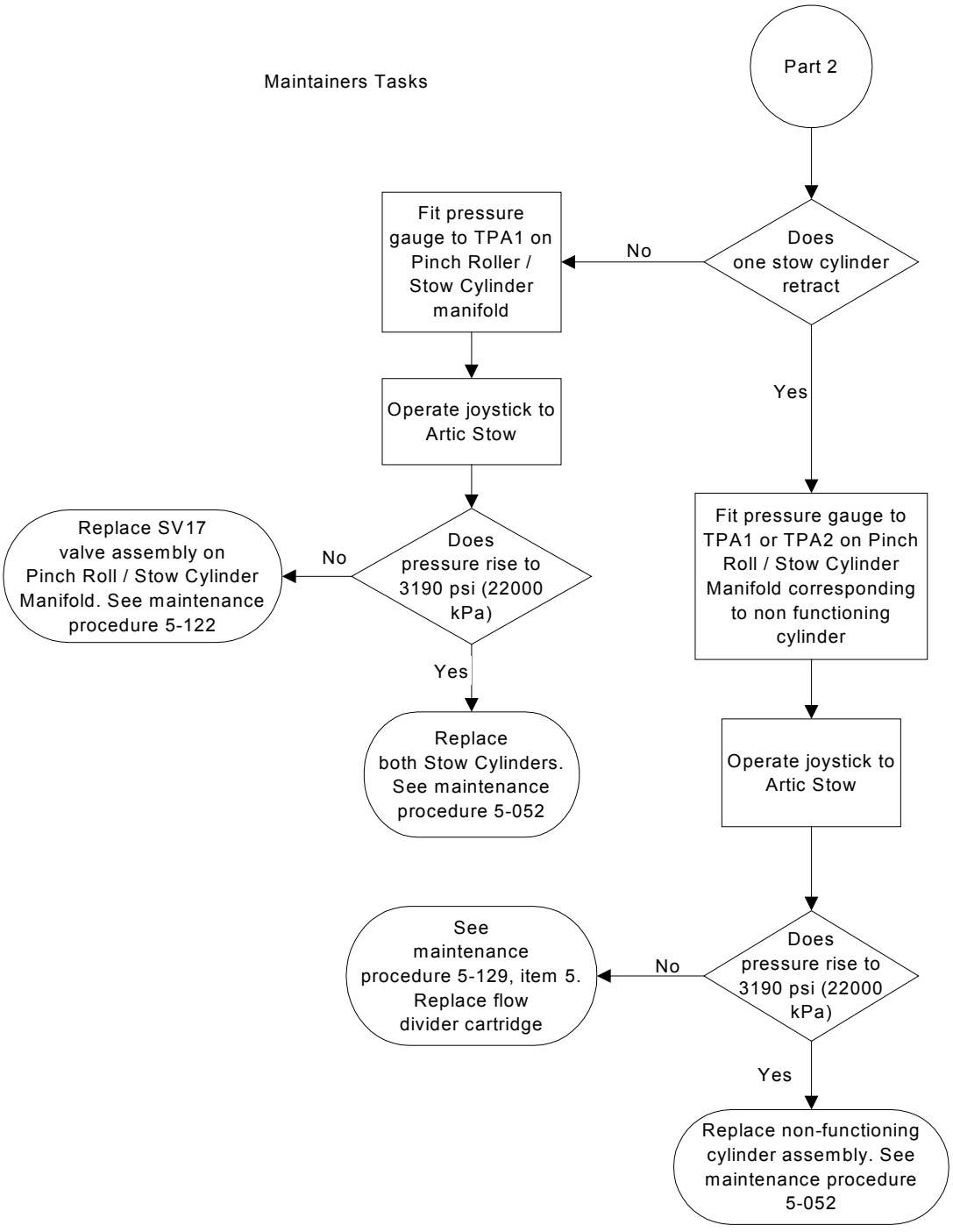
TSUM - 2-009 Lower Launch Beam onto Far Bank Seat (35) Part 3



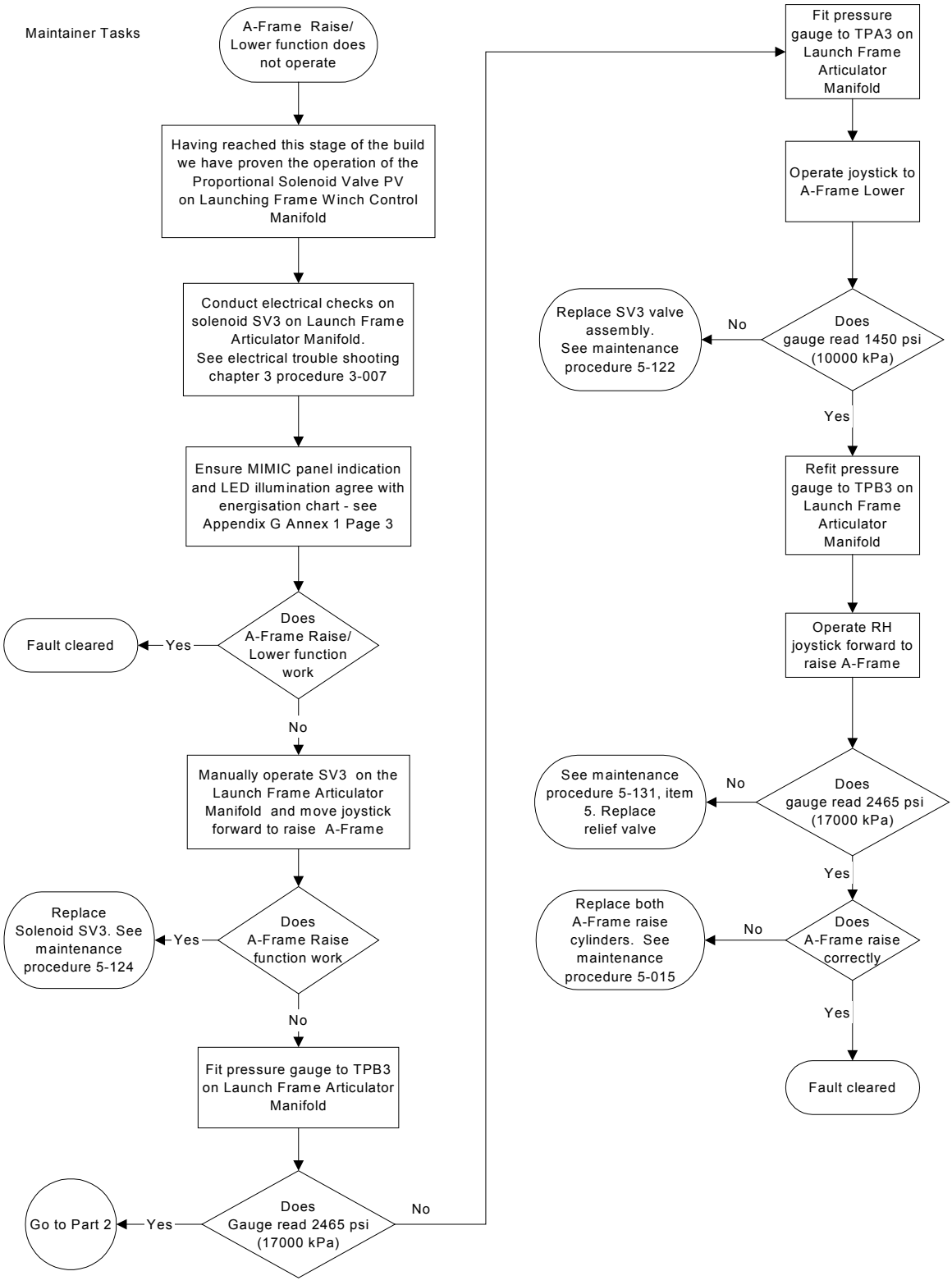
TSUM - 2-010 Stow Articulator Cylinders (38) Part 1



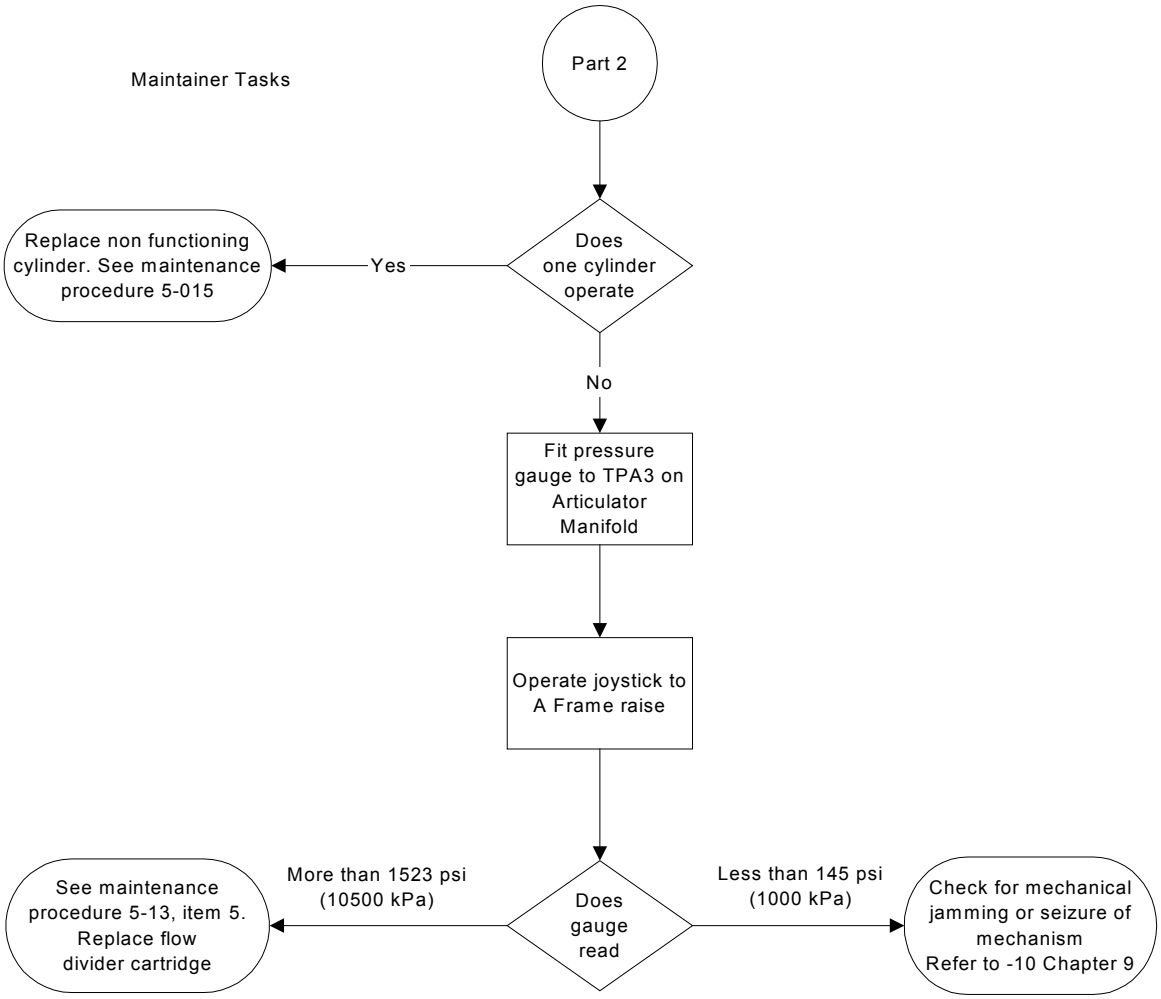
TSUM - 2-010 Stow Articulator Cylinders (38) Part 2



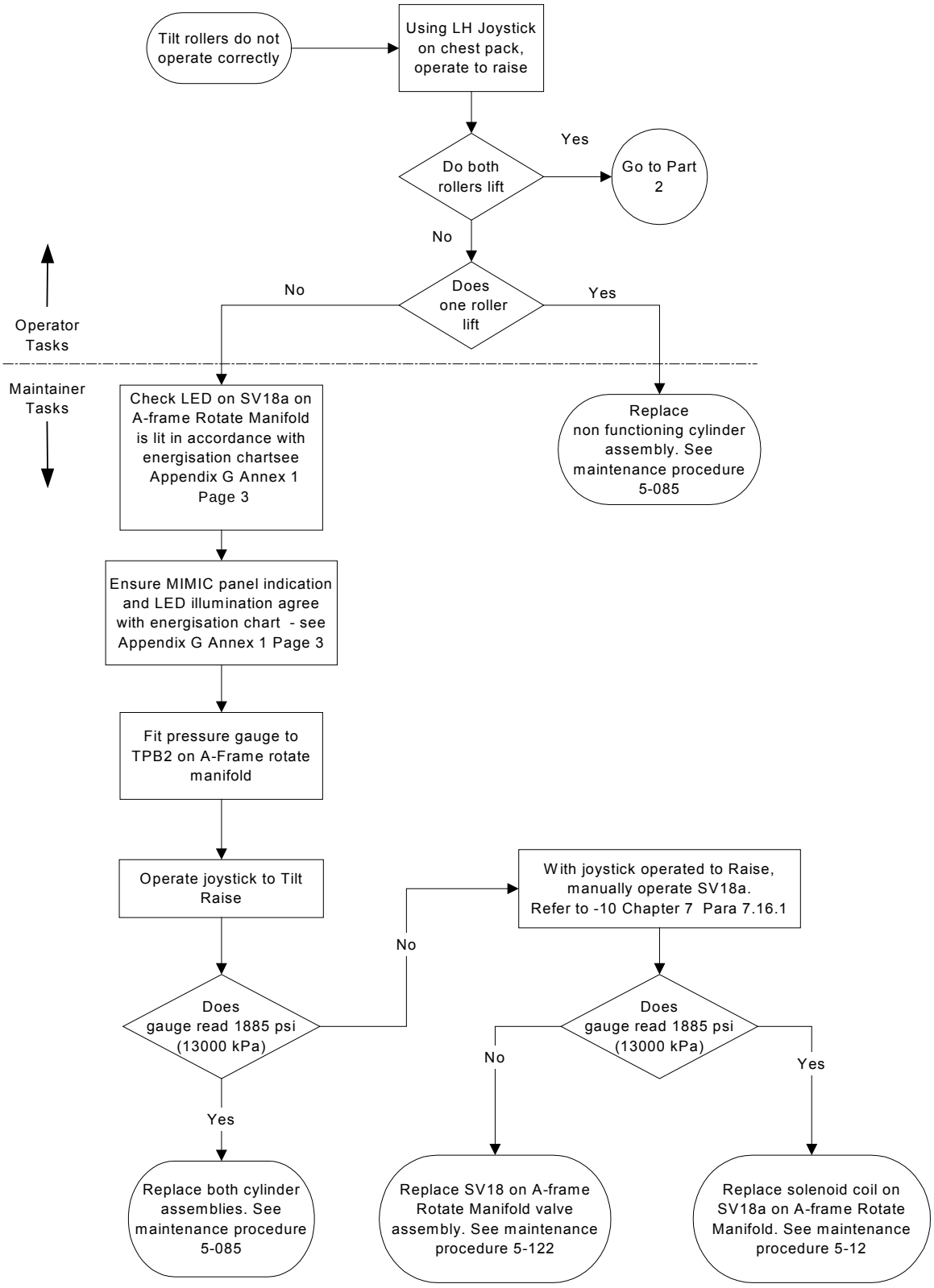
TSUM - 2-011 A-Frame Raise / Lower (39 / 91) Part 1



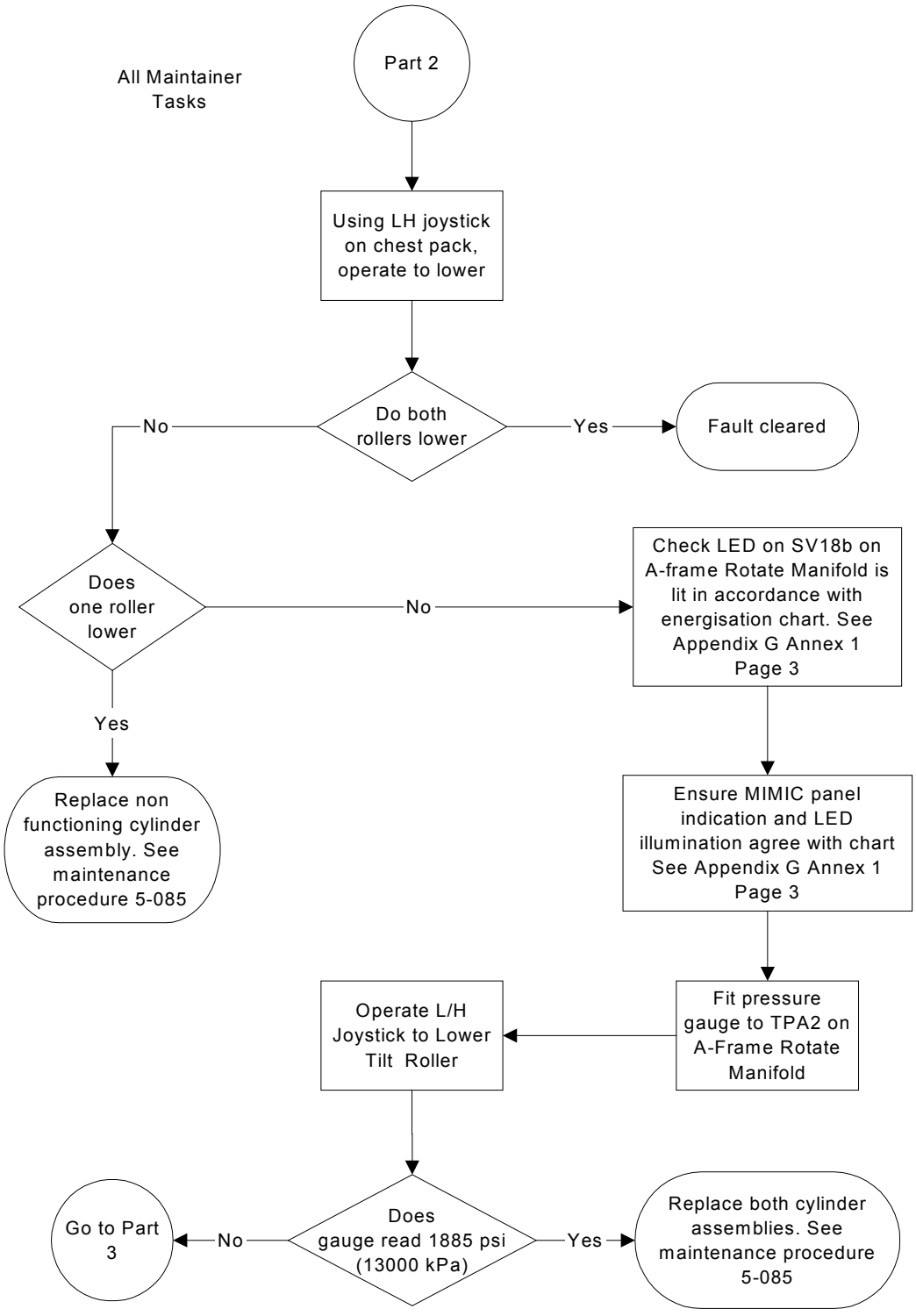
TSUM - 2-011 A-Frame Raise / Lower (39 / 91) Part 2



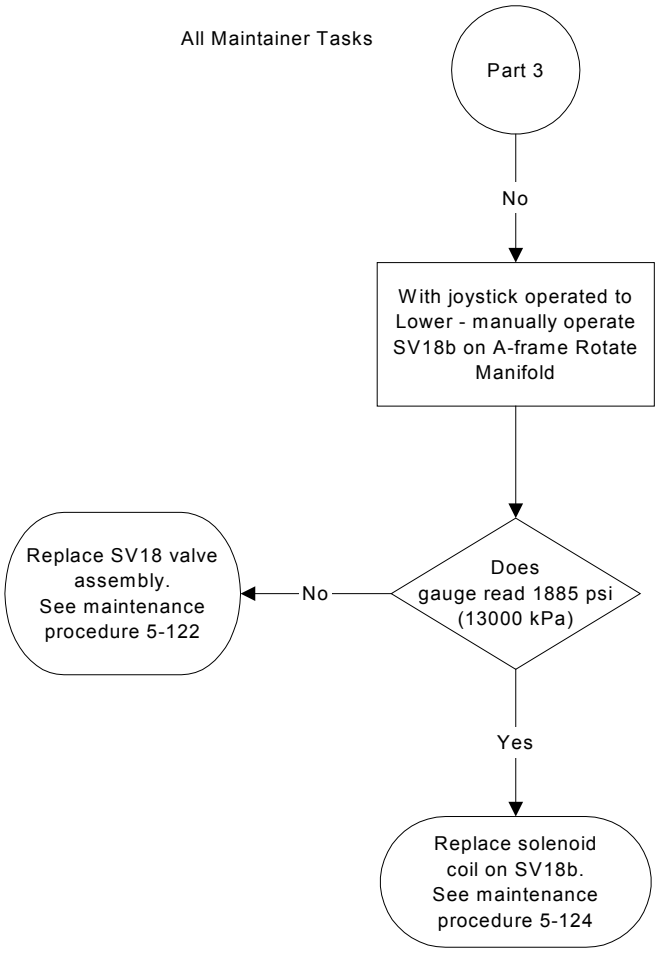
TSUM - 2-012 Tilt Rollers (56 / 61) Part 1



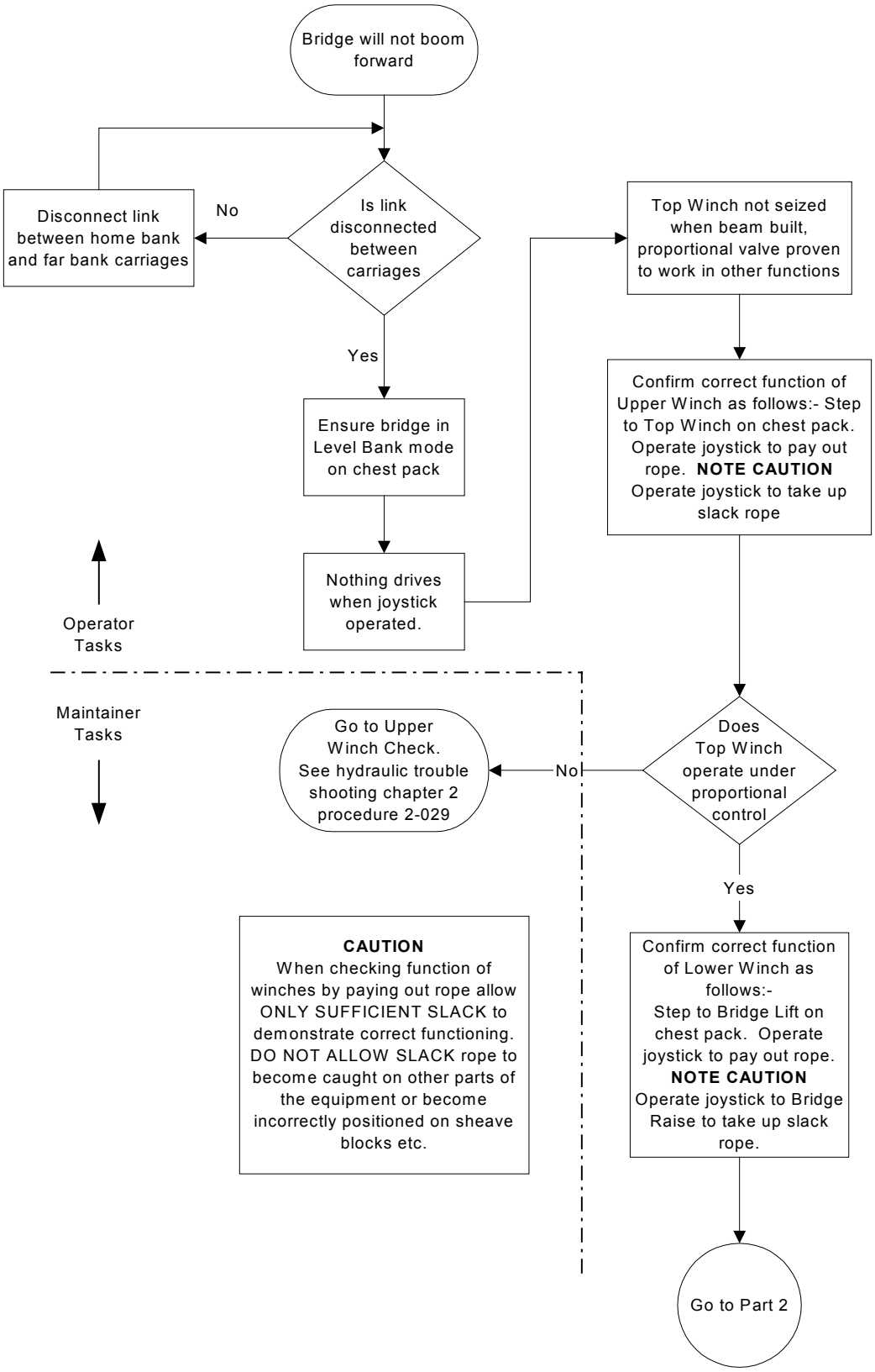
TSUM - 2-012 Tilt Rollers (56 / 61) Part 2



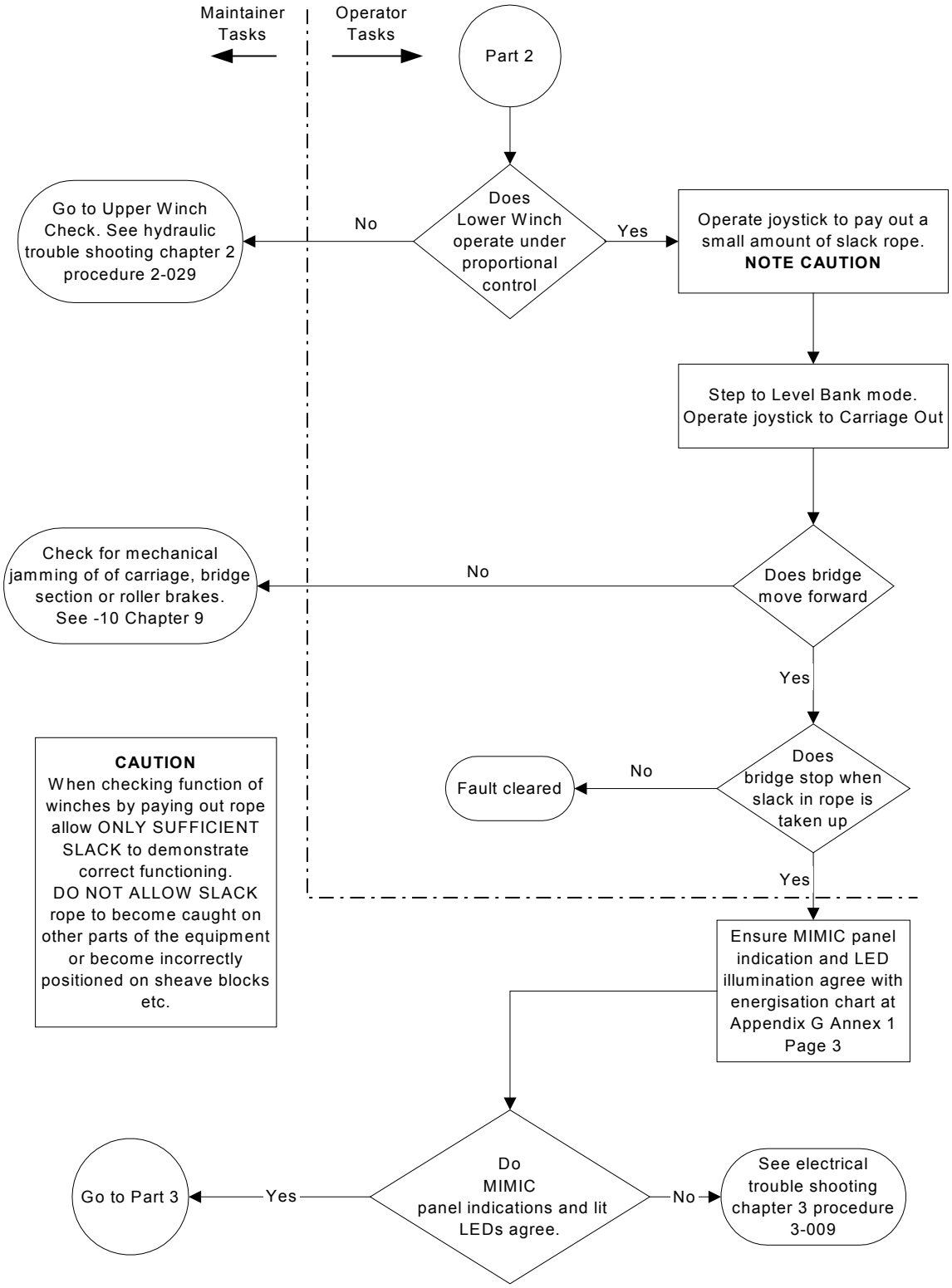
TSUM - 2-012 Tilt Rollers (56 / 61) Part 3



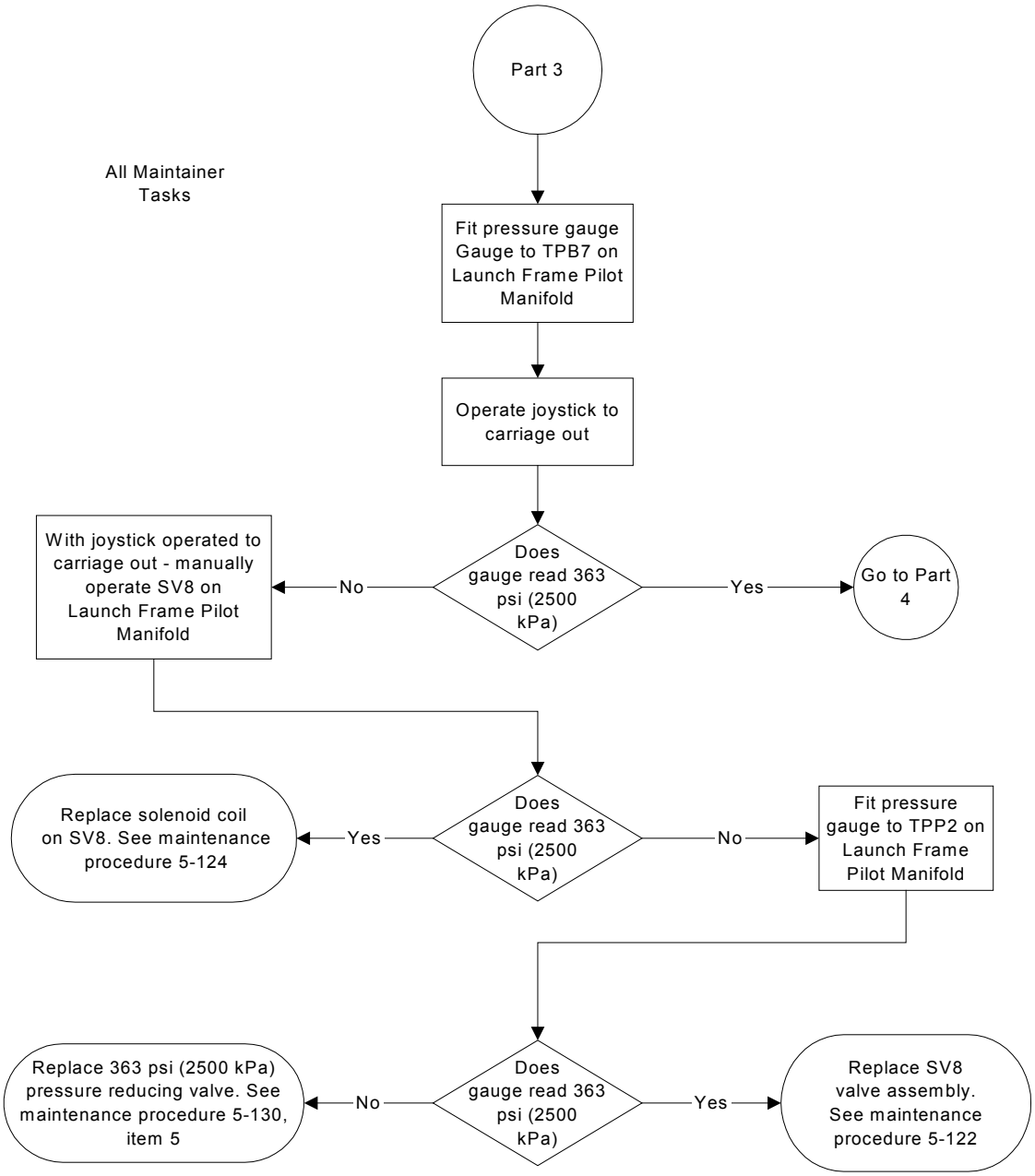
TSUM - 2-013 Boom Bridge Forward Level Bank (56) Part 1



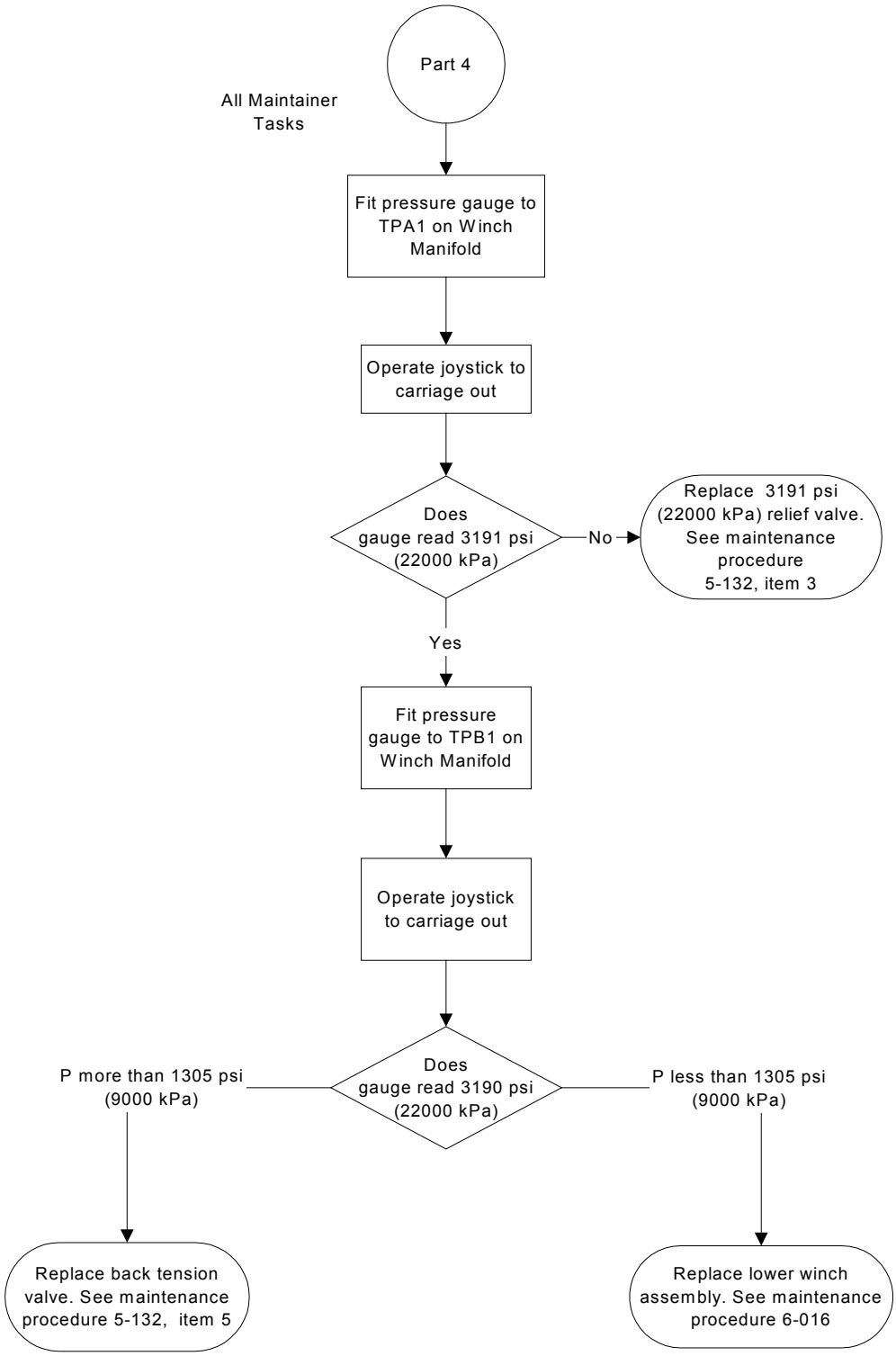
TSUM - 2-013 Boom Bridge Forward Level Bank (56) Part 2



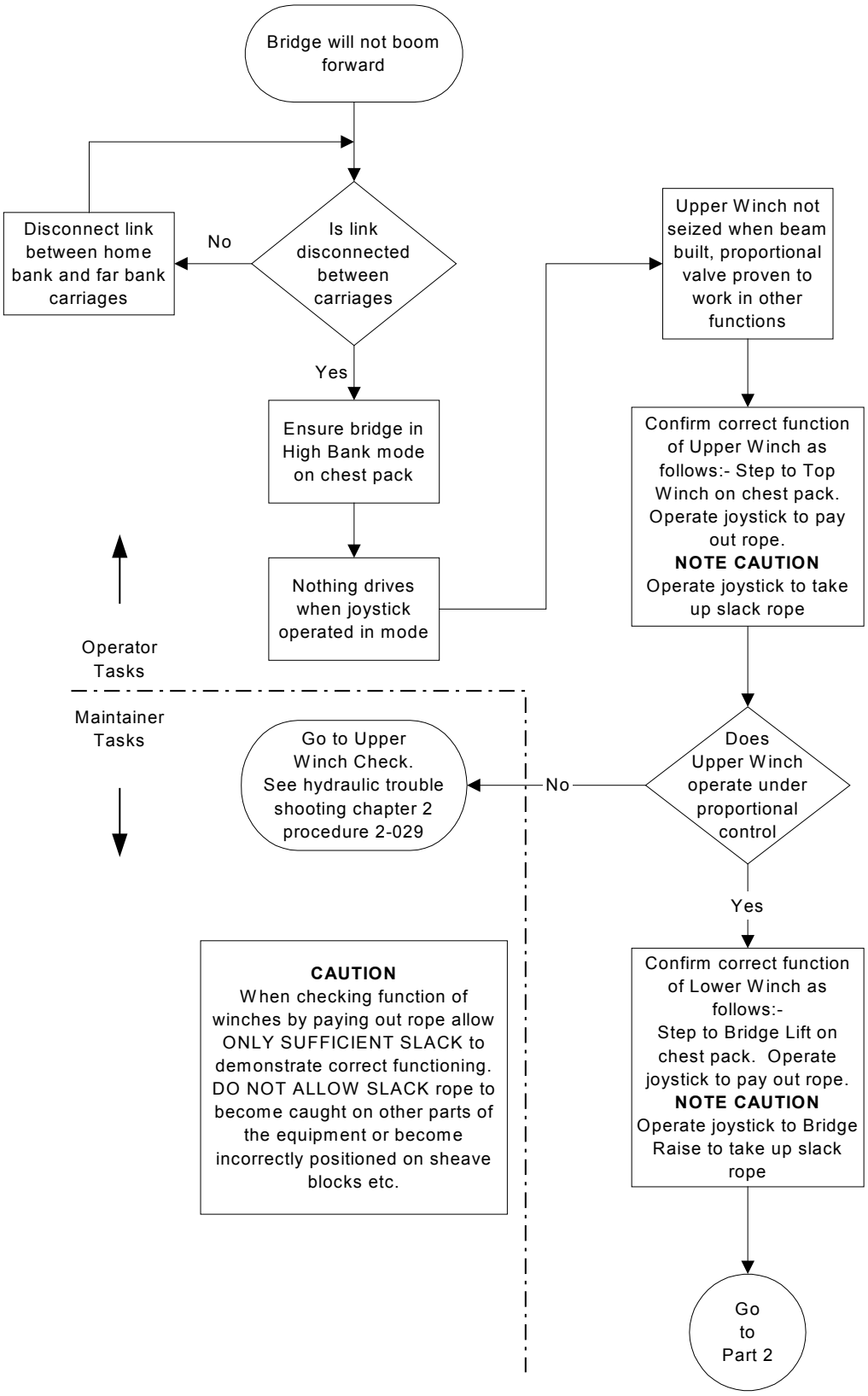
TSUM - 2-013 Boom Bridge Forward Level Bank (56) Part 3



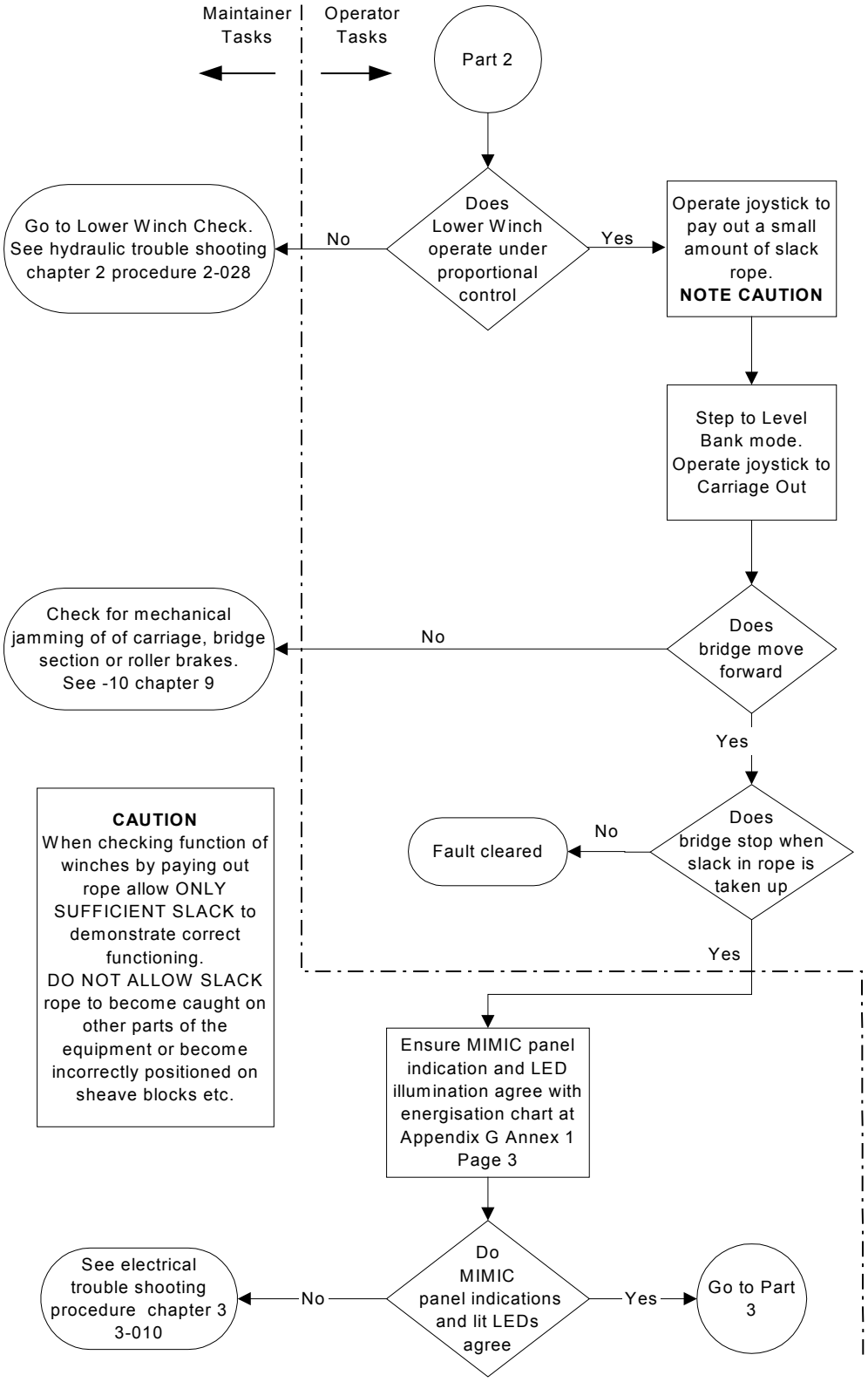
TSUM - 2-013 Boom Bridge Forward Level Bank (56) Part 4



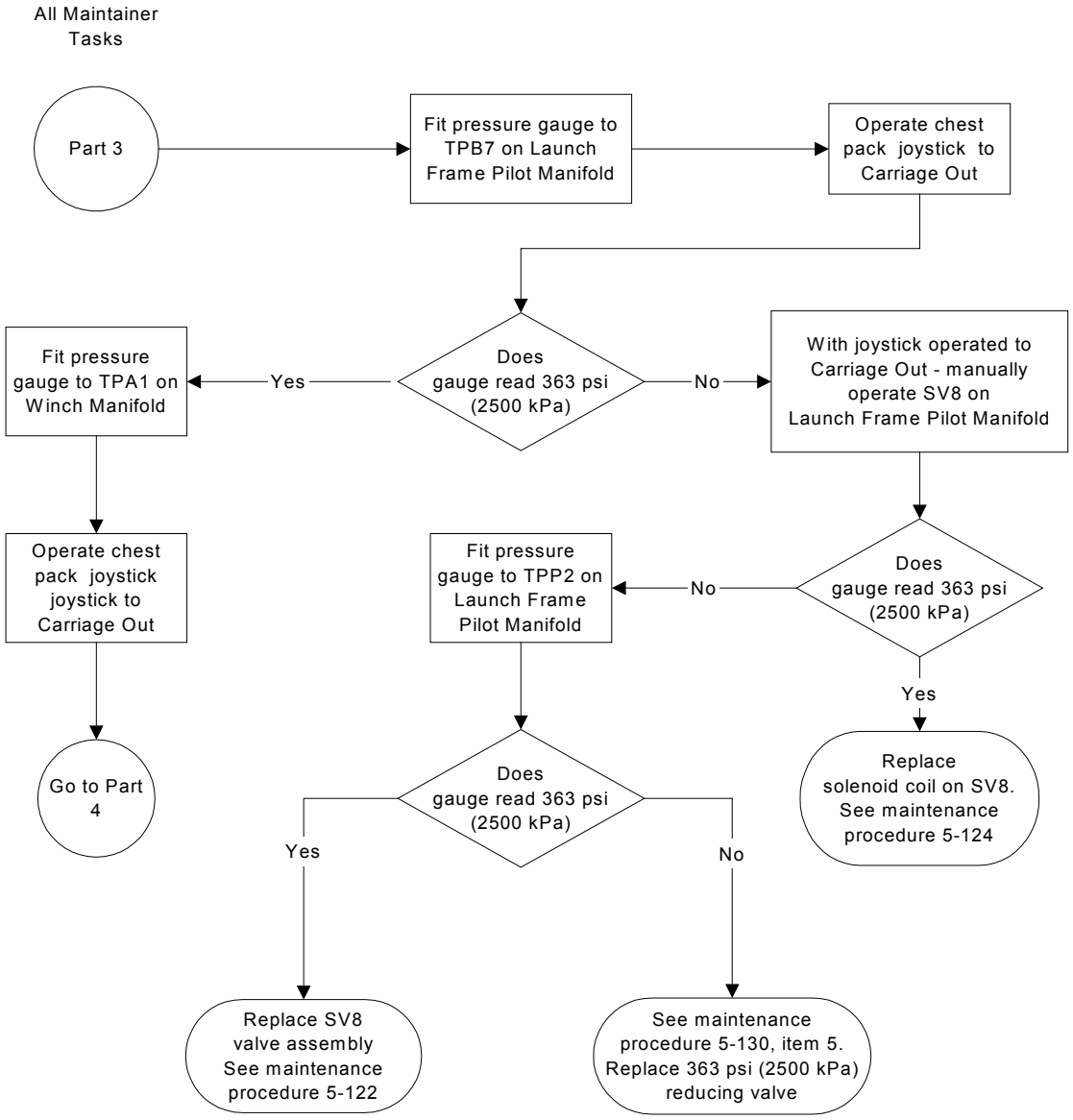
TSUM - 2-014 Boom Bridge Forward High Bank (56) Part 1



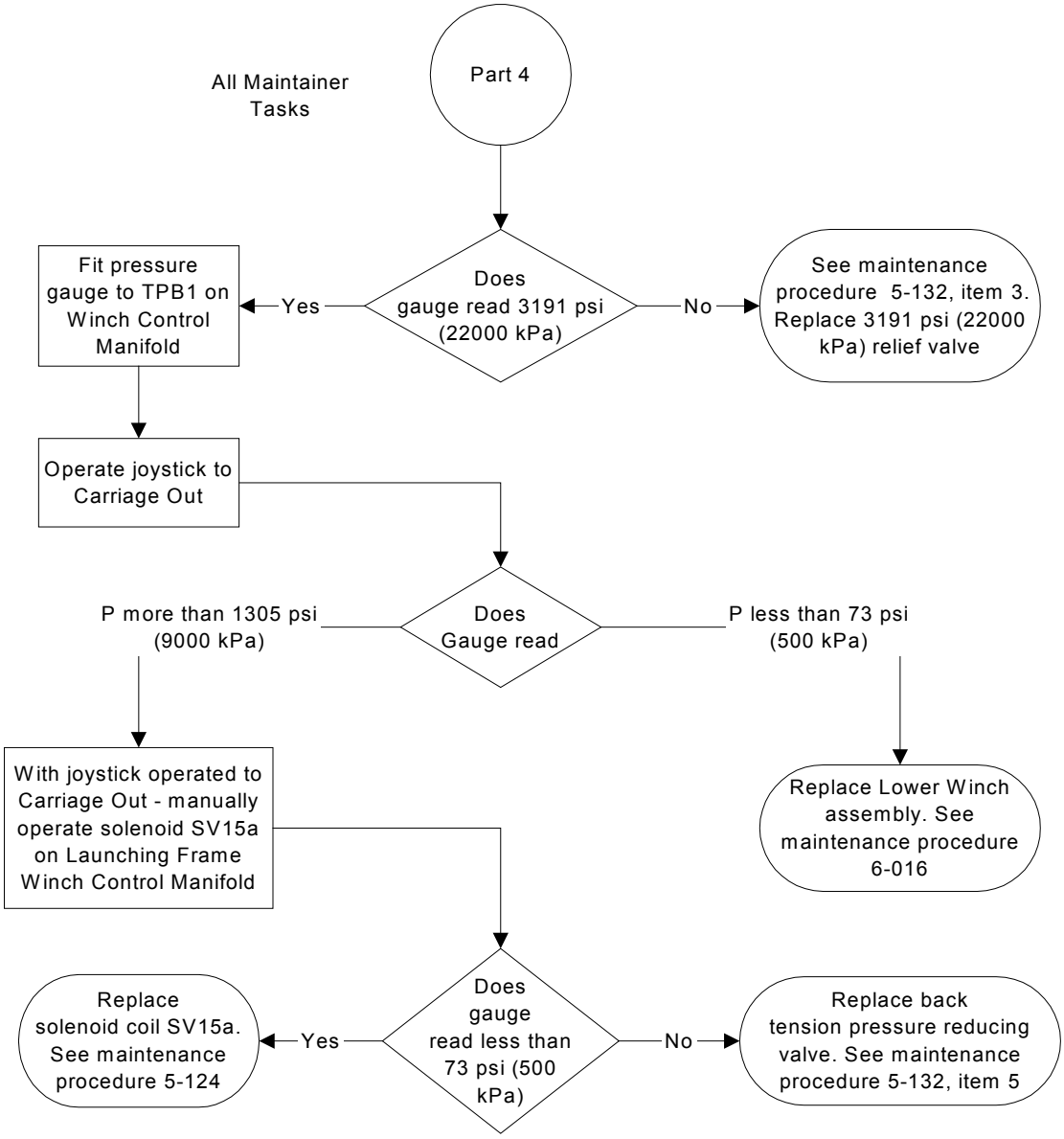
TSUM - 2-014 Boom Bridge Forward High Bank (56) Part 2



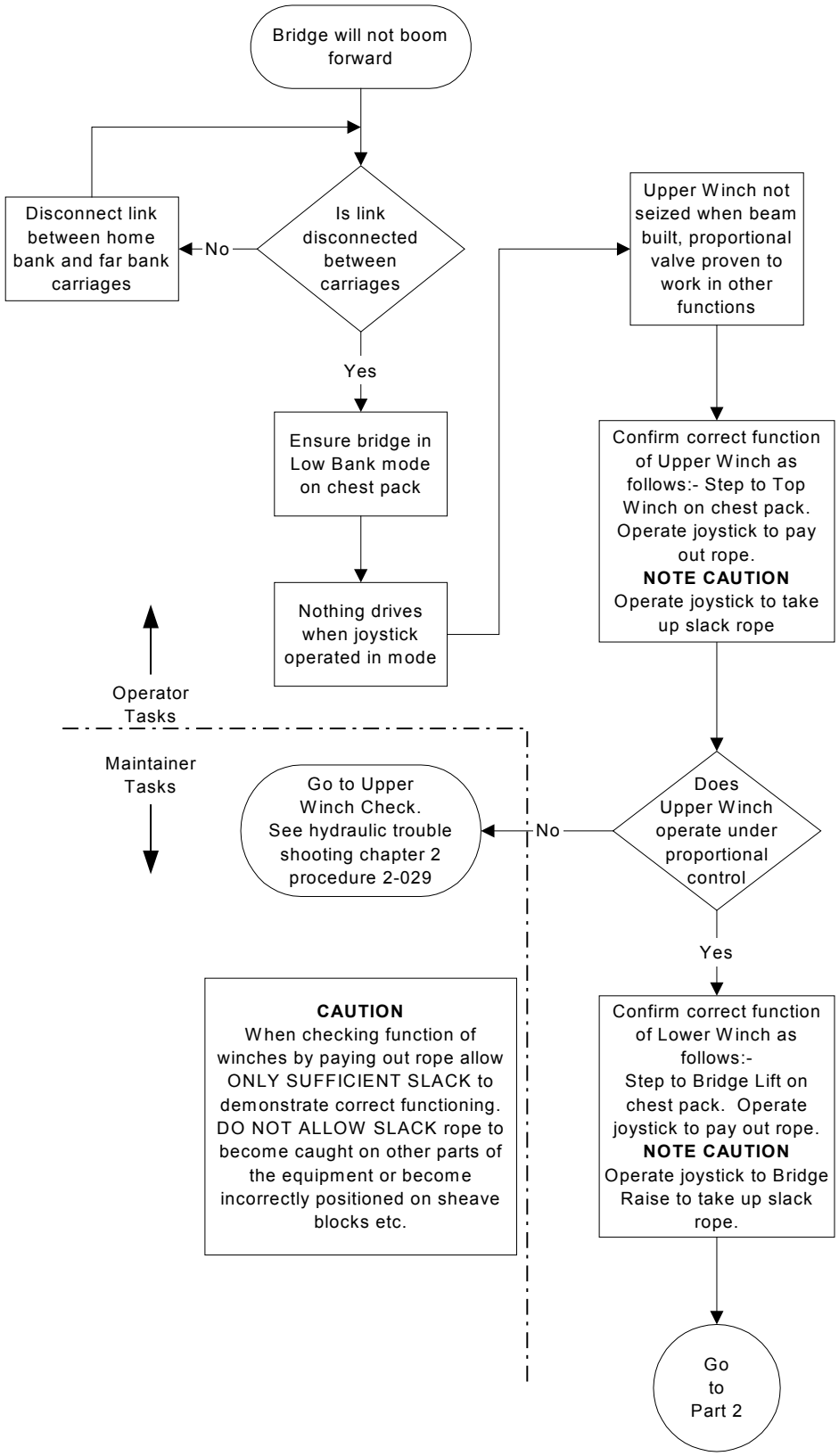
TSUM - 2-014 Boom Bridge Forward High Bank (56) Part 3



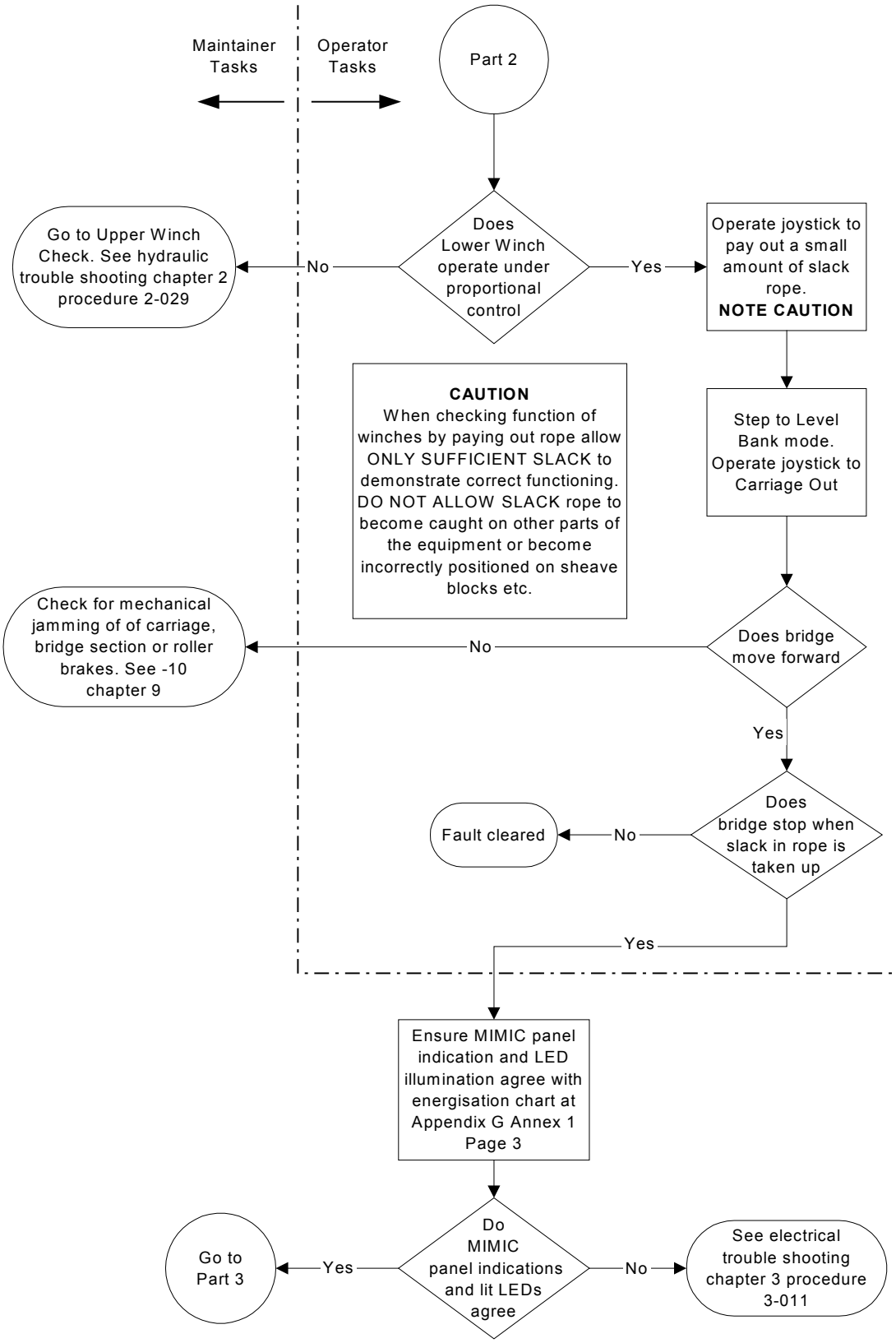
TSUM - 2-014 Boom Bridge Forward High Bank (56) Part 4



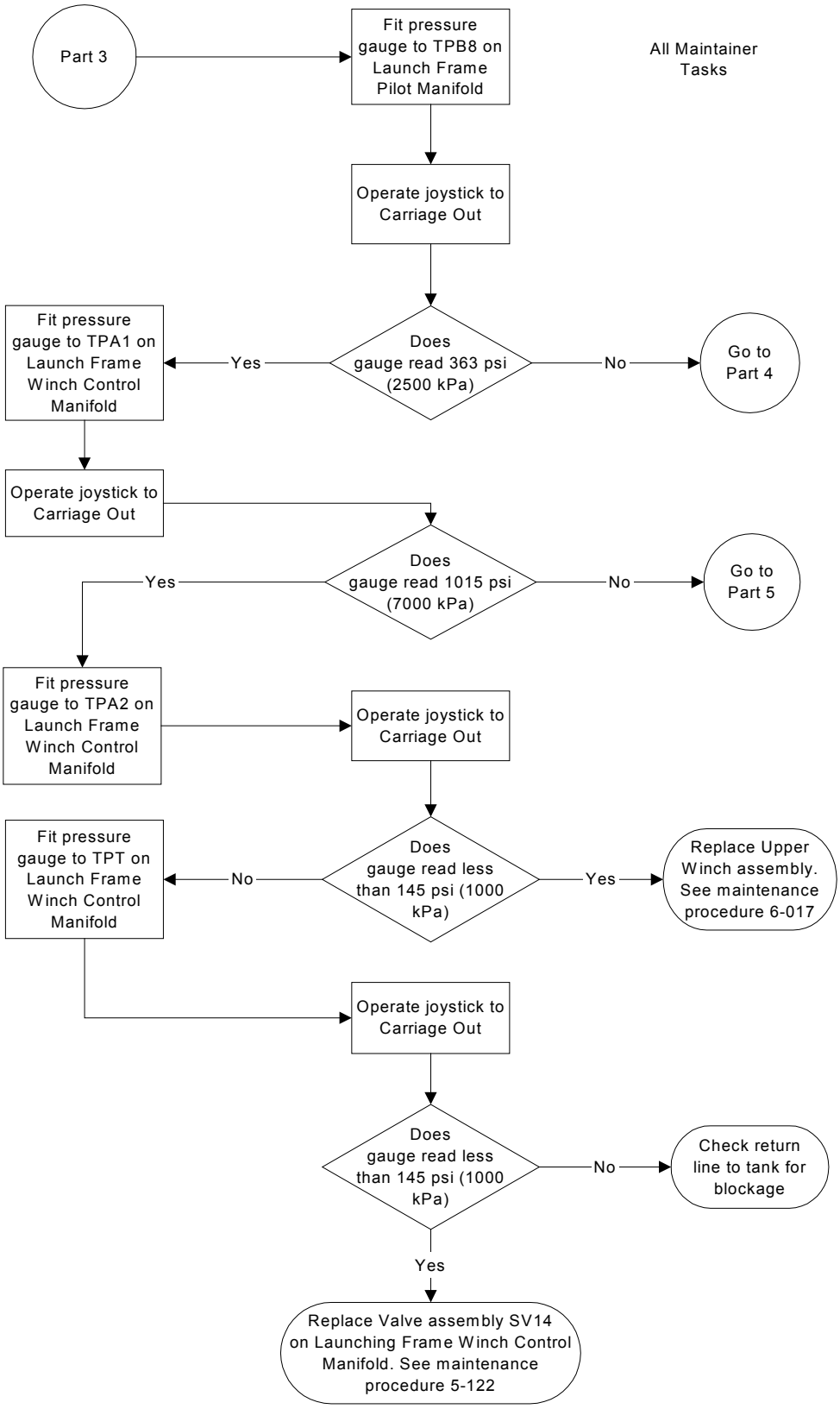
TSUM - 2-015 Boom Bridge Forward Low Bank (56) Part 1



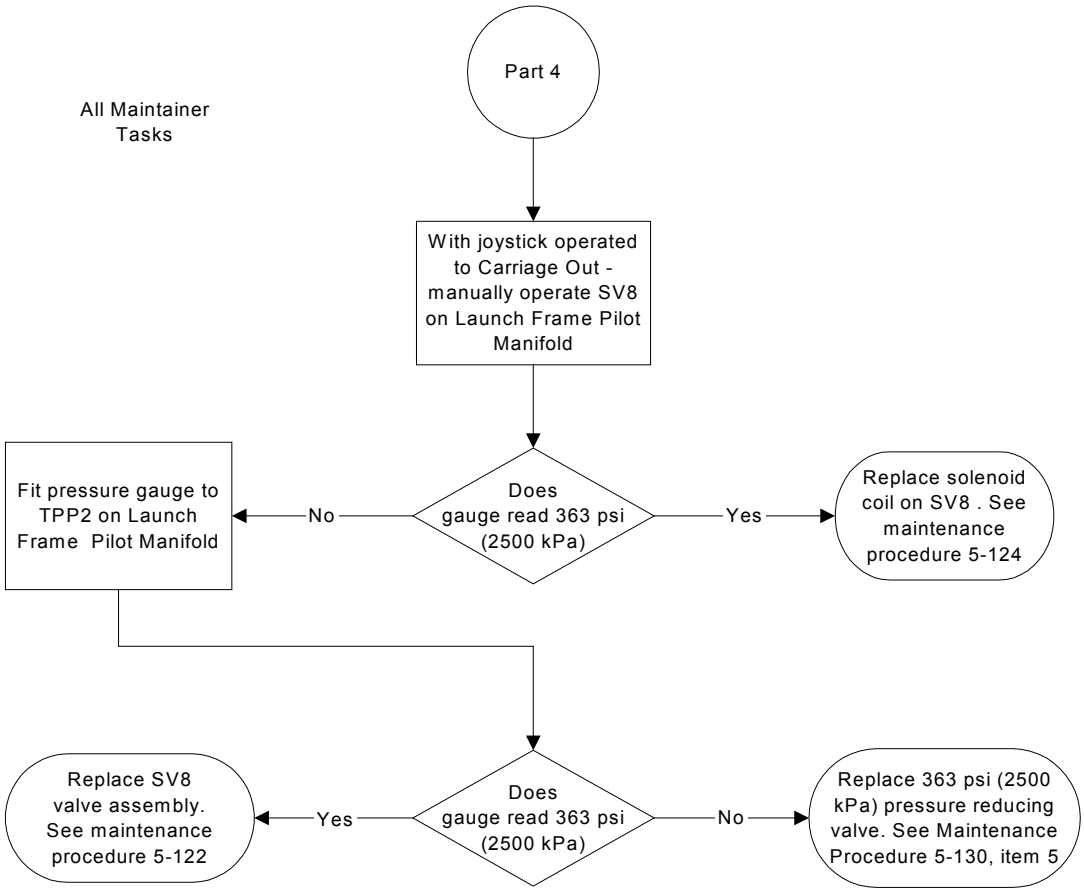
TSUM - 2-015 Boom Bridge Forward Low Bank (56) Part 2



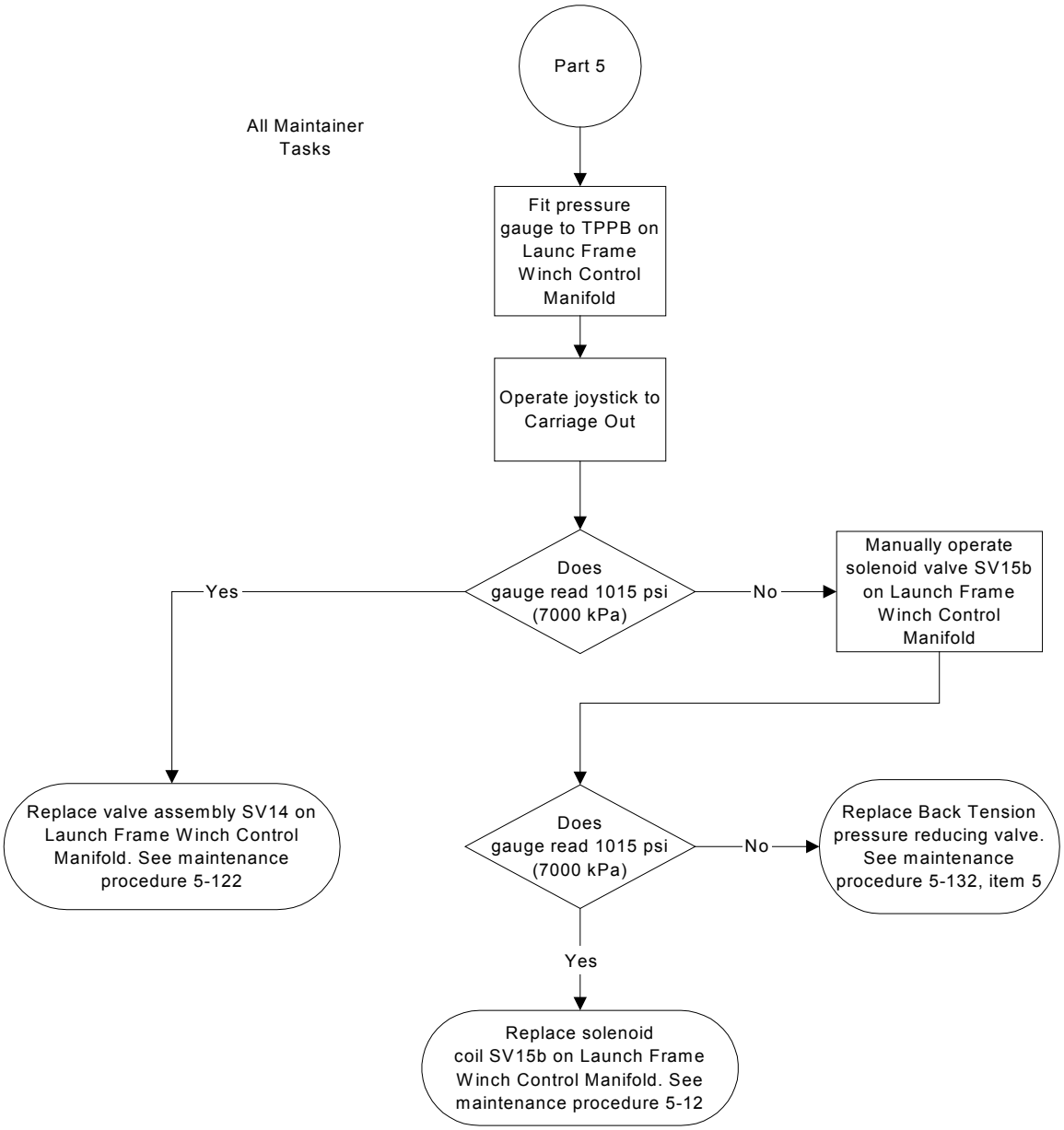
TSUM - 2-015 Boom Bridge Forward Low Bank (56) Part 3



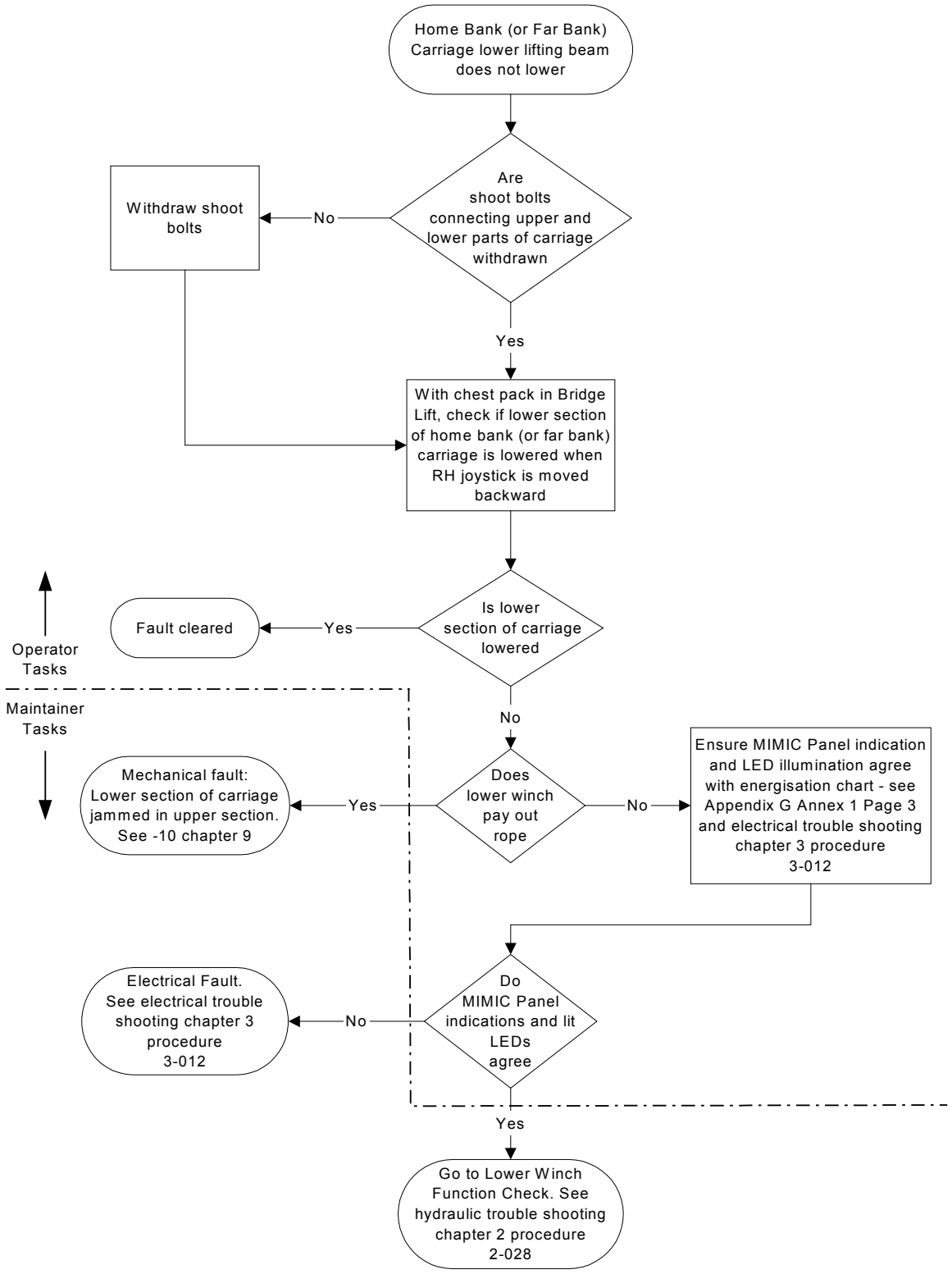
TSUM - 2-015 Boom Bridge Forward Low Bank (56) Part 4



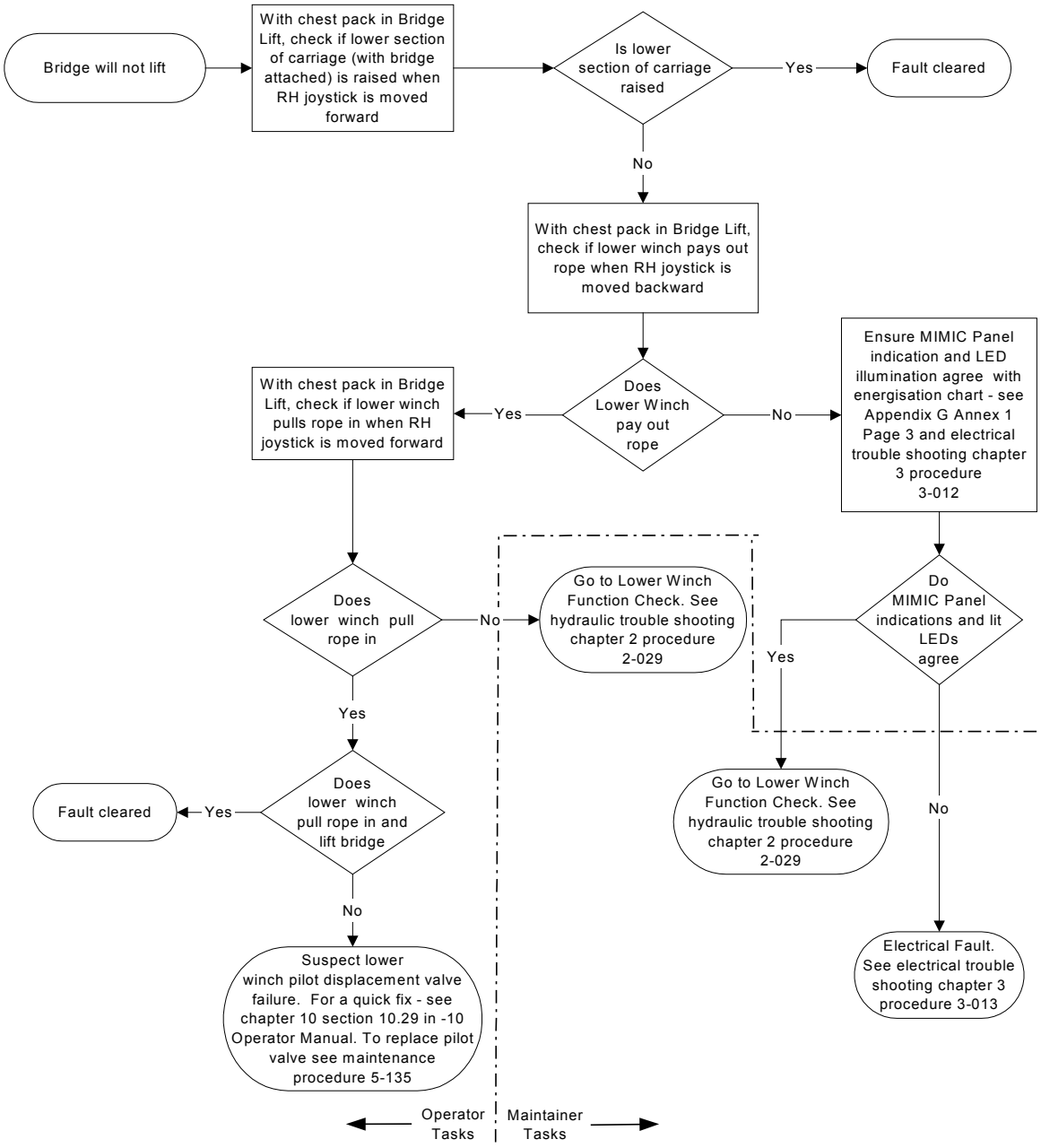
TSUM - 2-015 Boom Bridge Forward Low Bank (56) Part 5



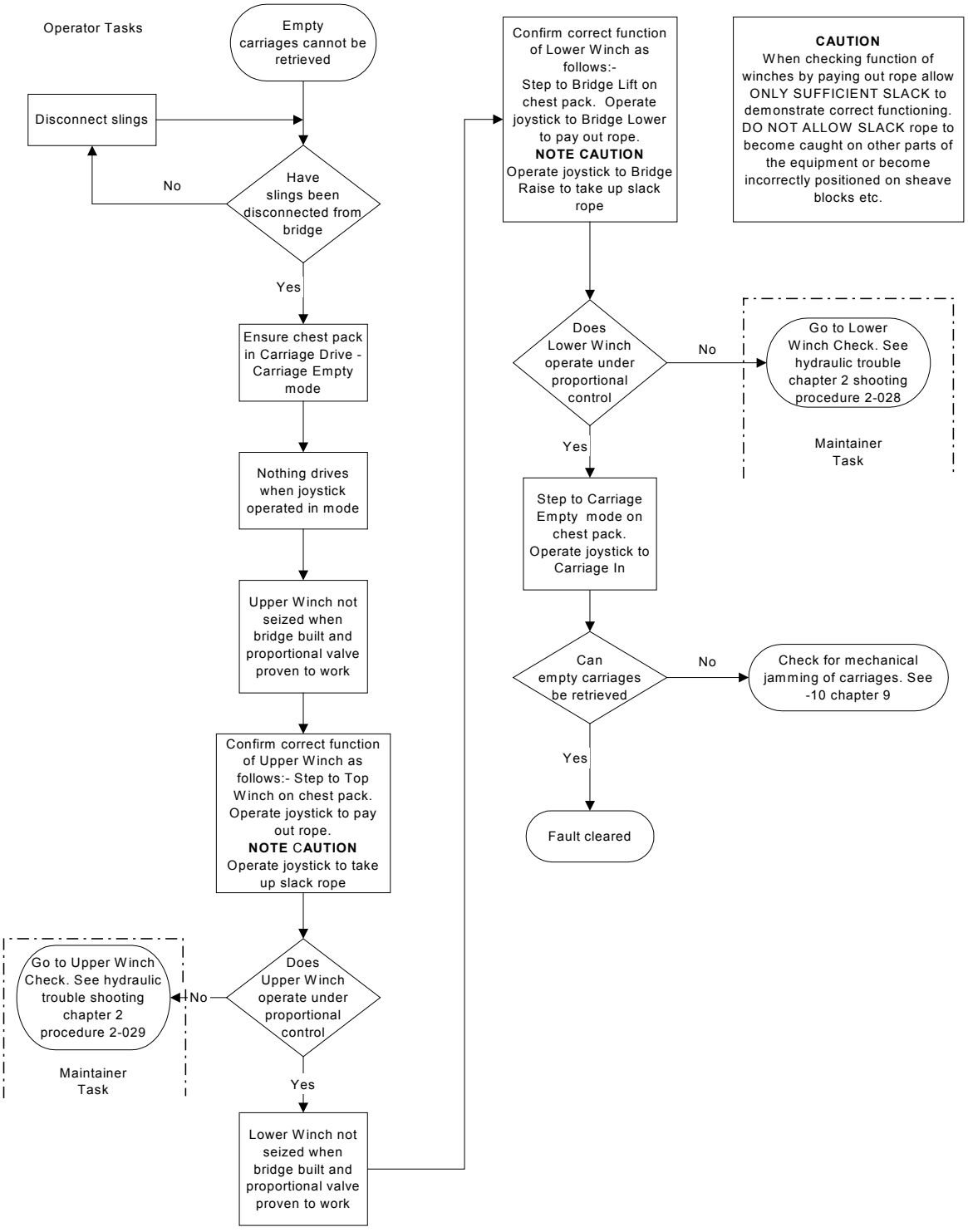
TSUM - 2-016 Bridge Lower (75)



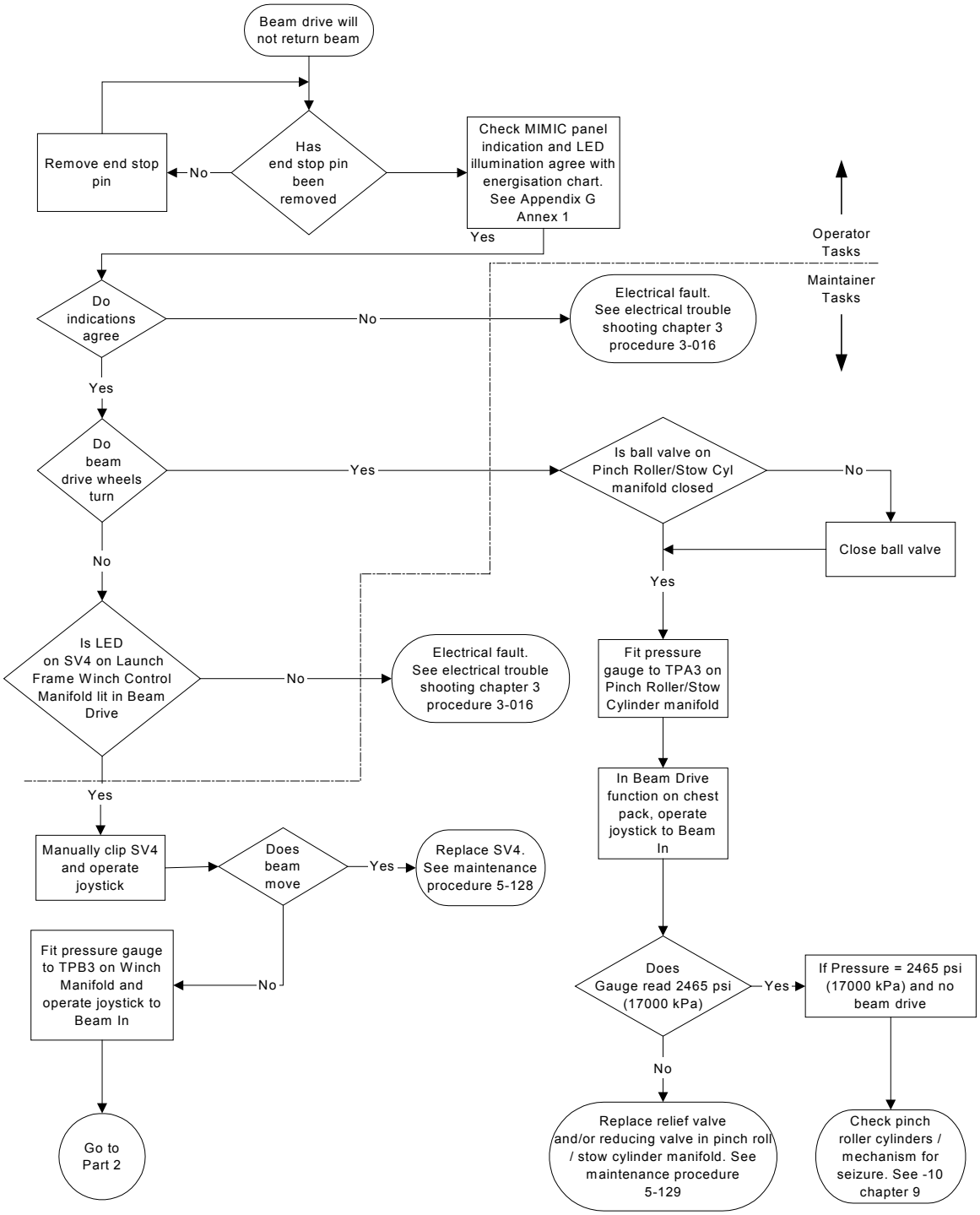
TSUM - 2-017 Bridge Lift (77)



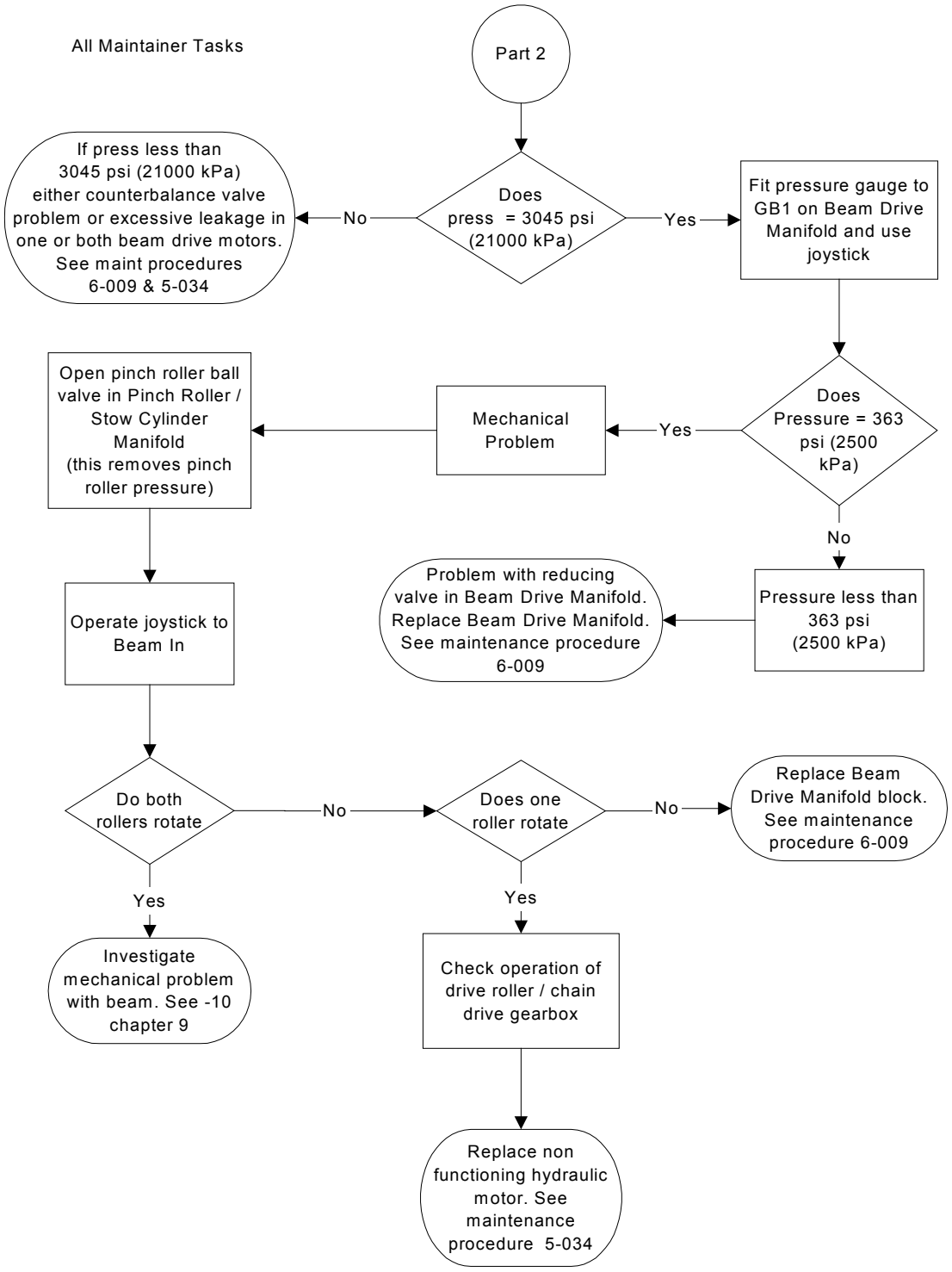
TSUM - 2-018 Retrieve Empty Carriages (89)



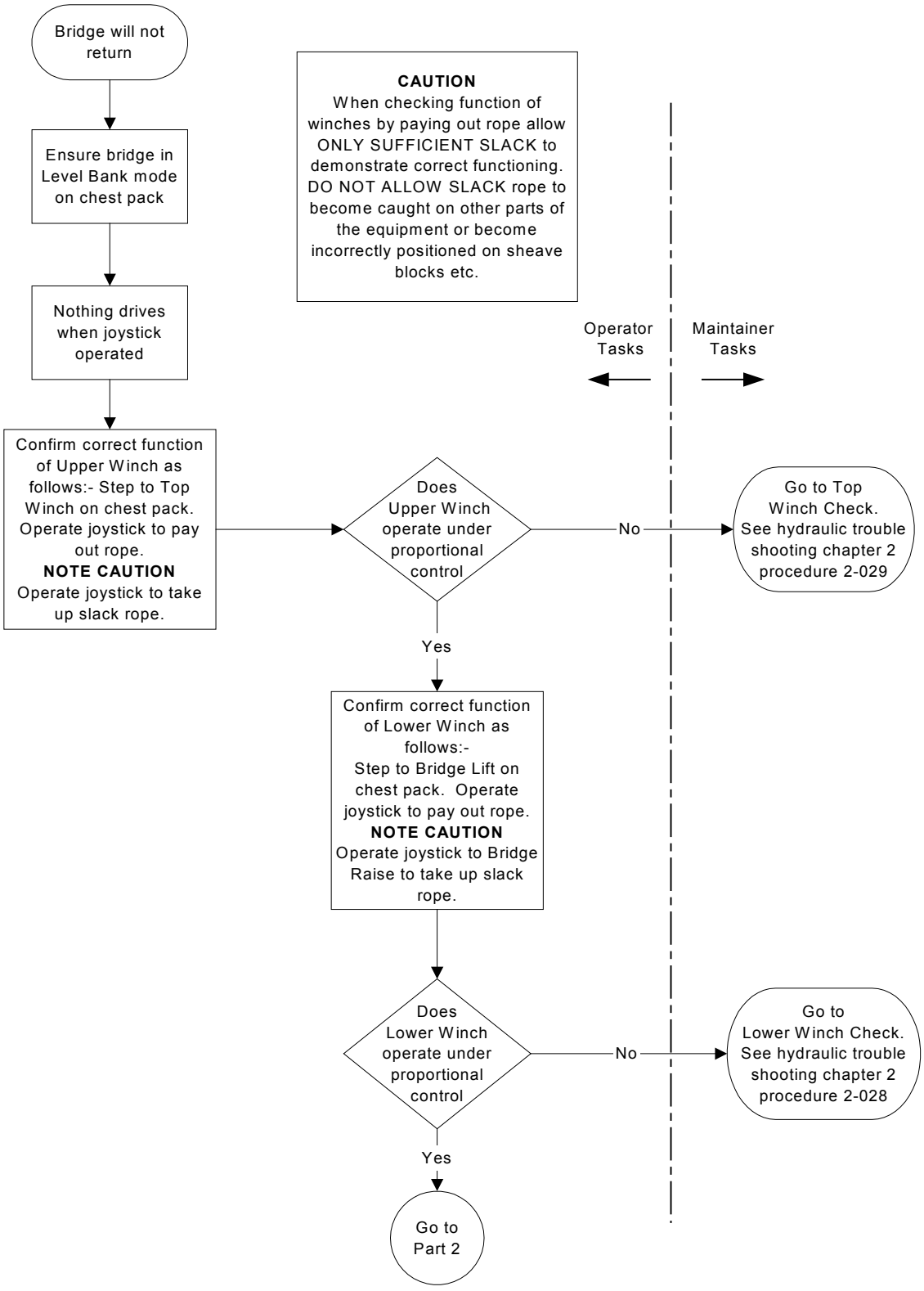
TSUM - 2-019 Beam Recovery (99) Part 1



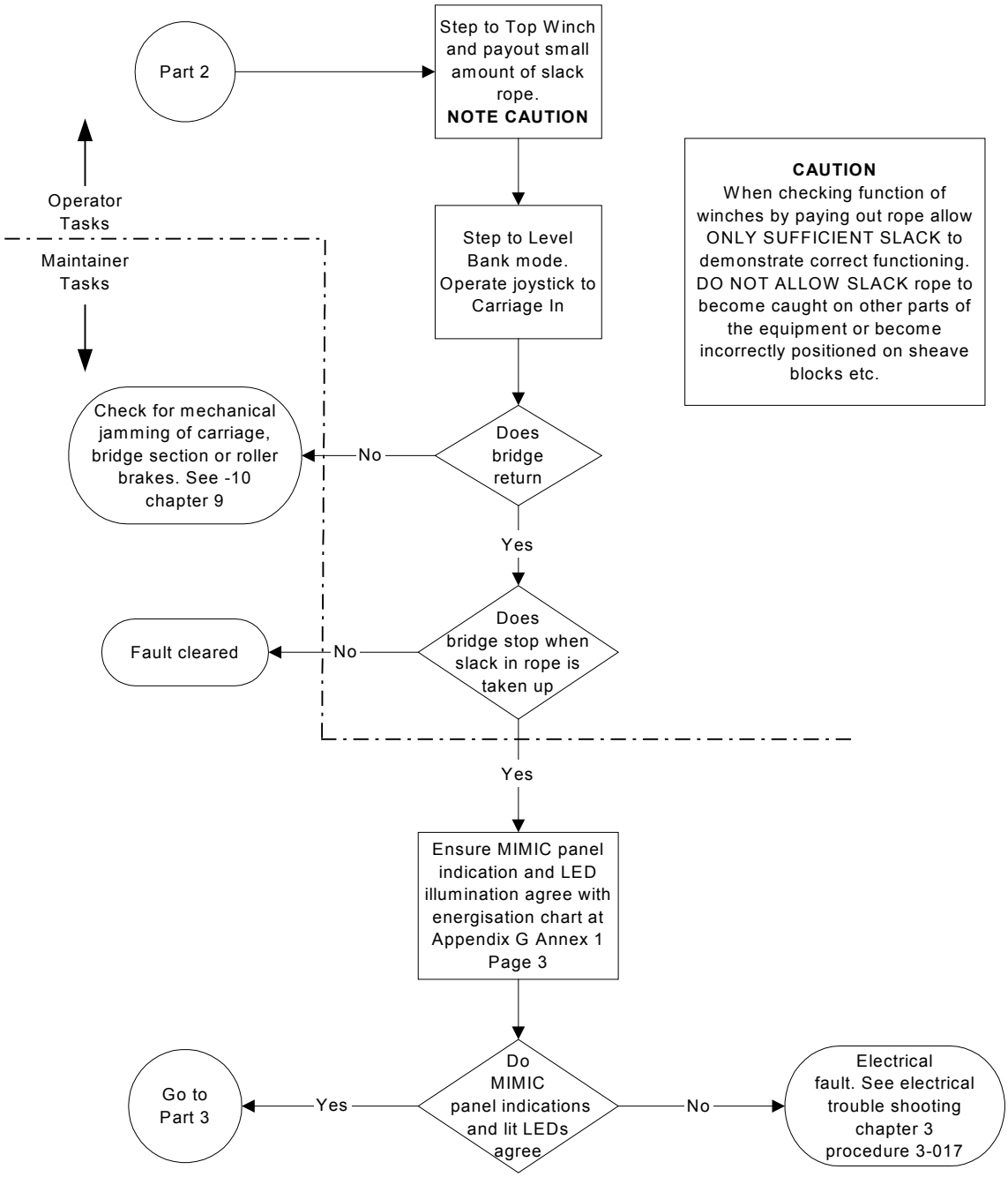
TSUM - 2-019 Beam Recovery (99) Part 2



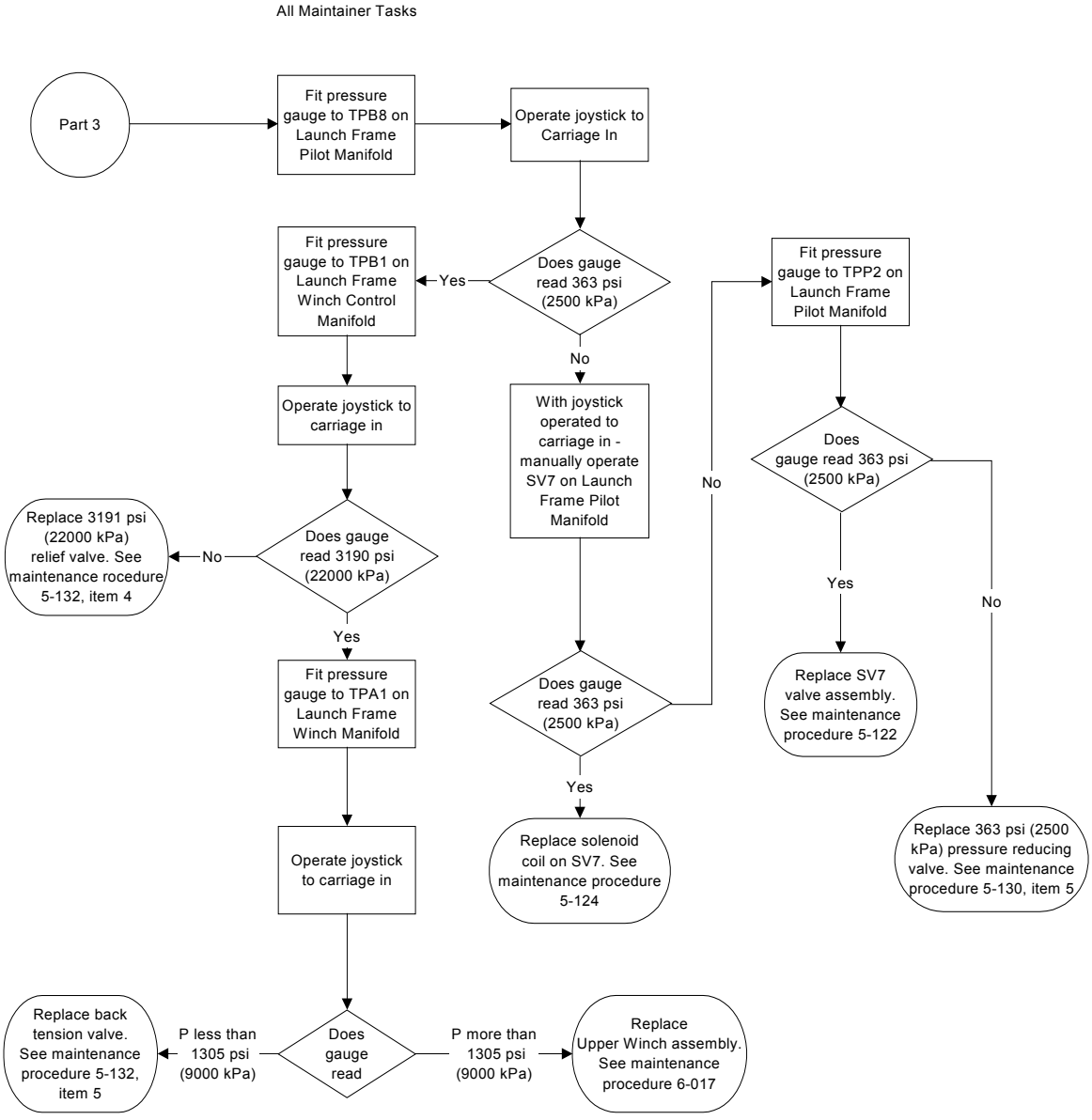
TSUM - 2-020 Bridge Return Level Bank Part 1



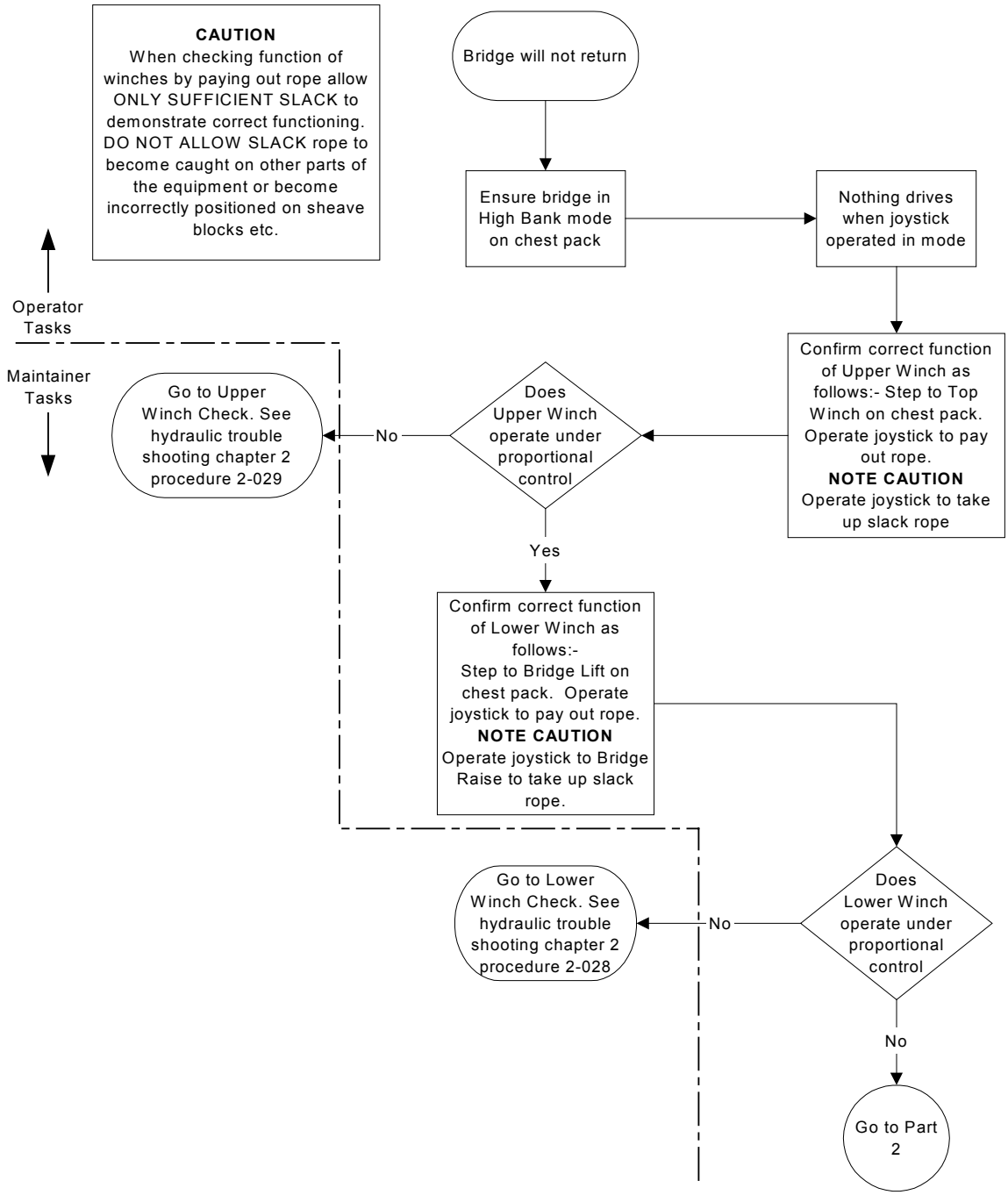
TSUM - 2-020 Bridge Return Level Bank Part 2



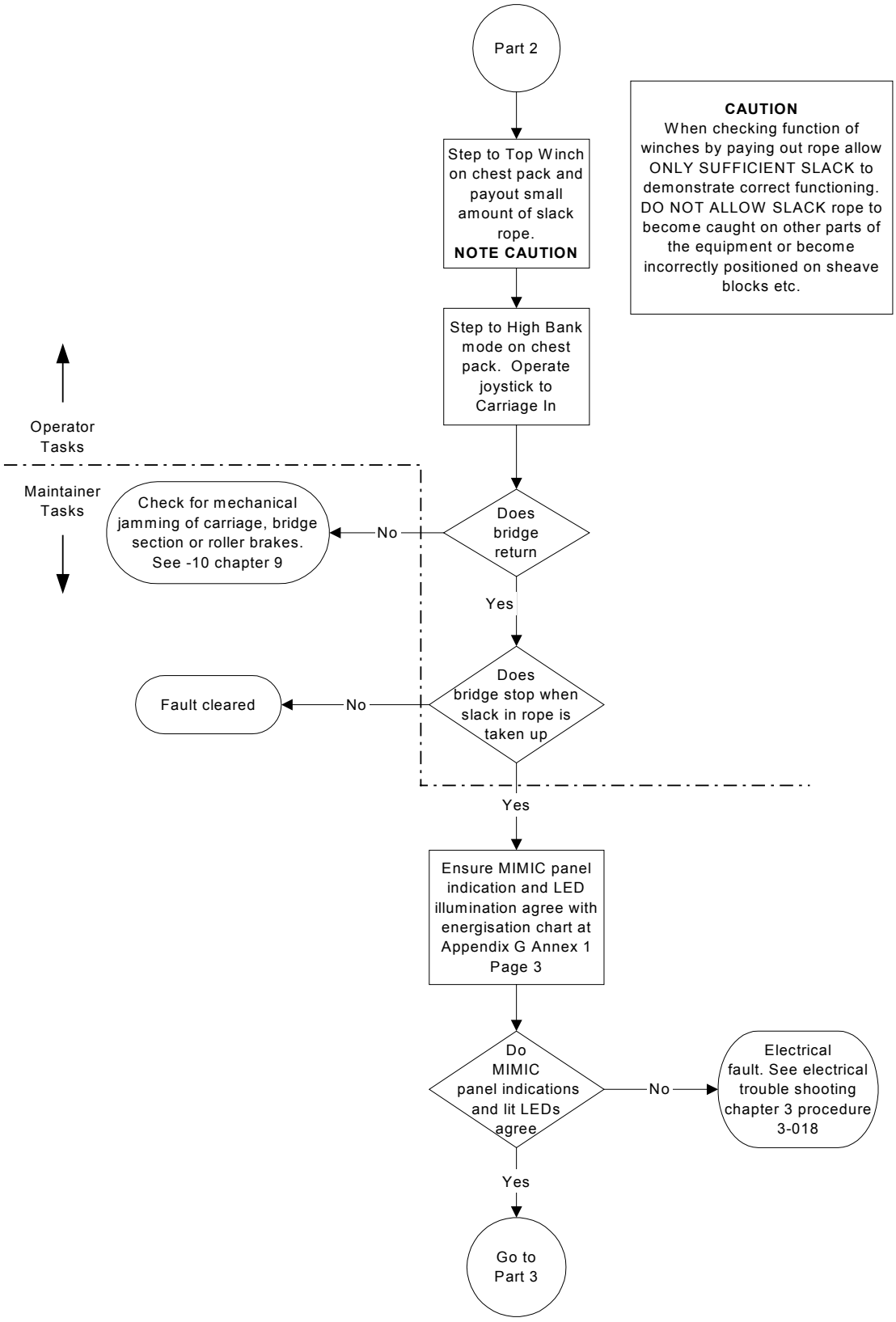
TSUM - 2-020 Bridge Return Level Bank Part 3



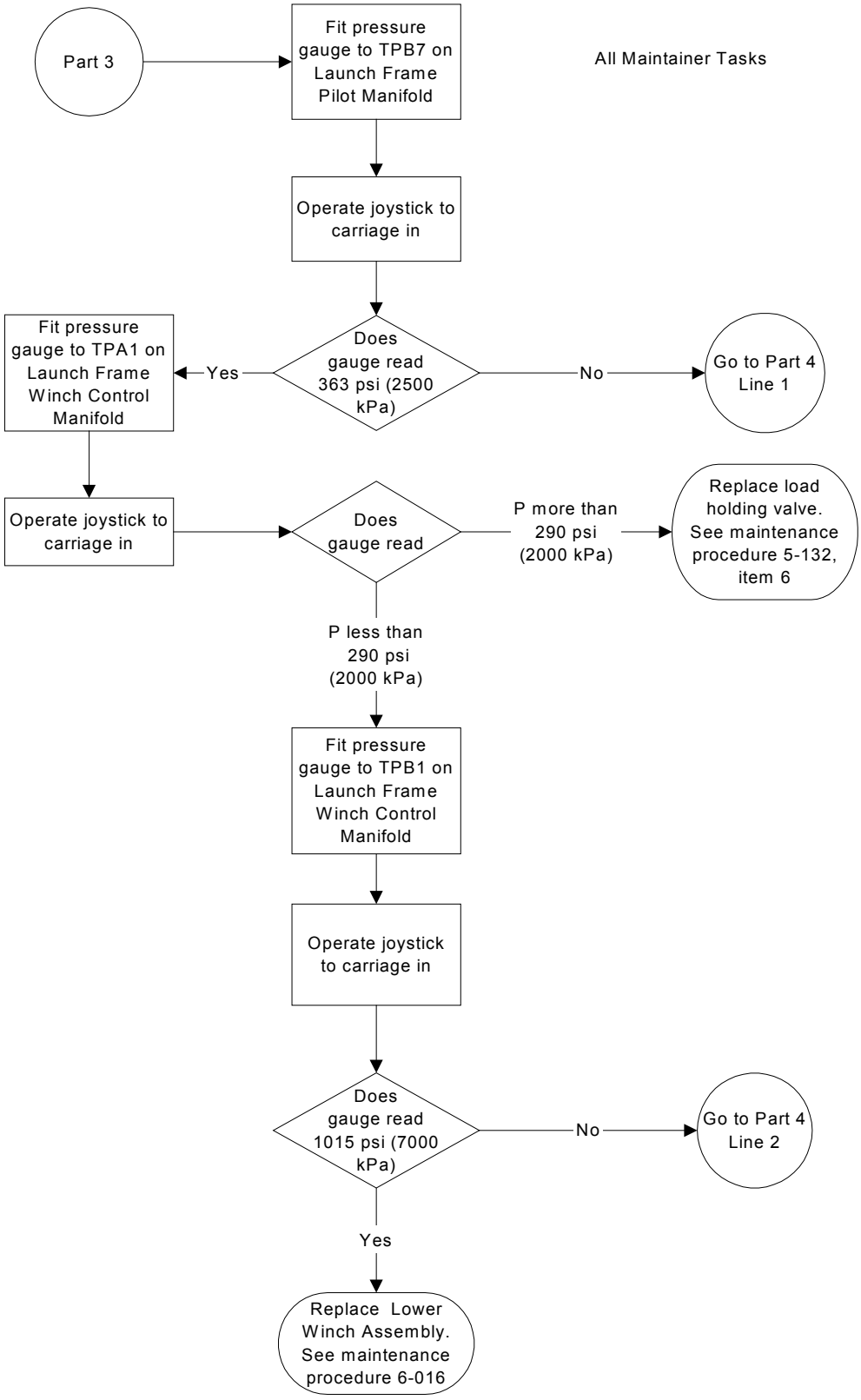
TSUM - 2-021 Bridge Return High Bank Part 1



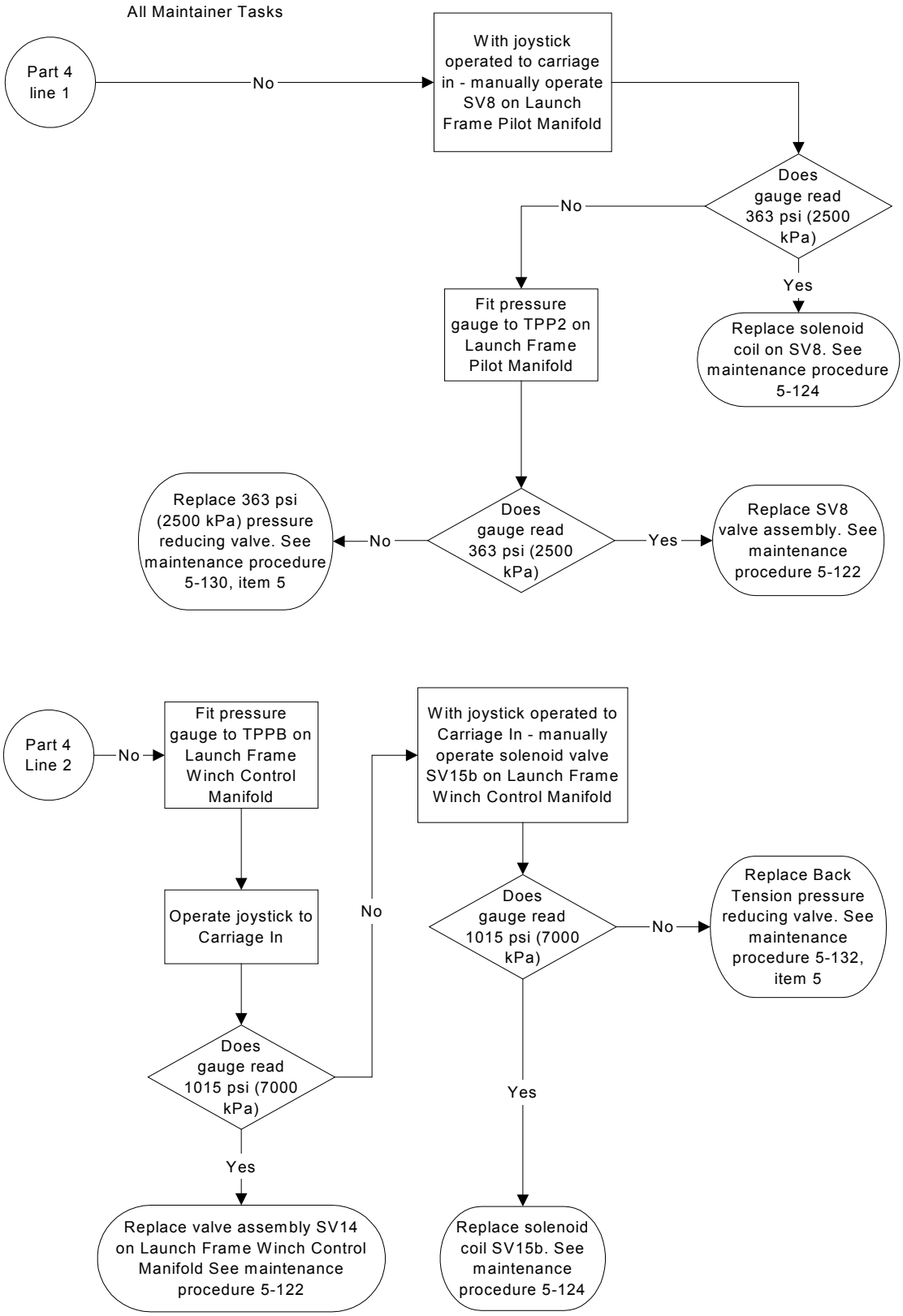
TSUM - 2-021 Bridge Return High Bank Part 2



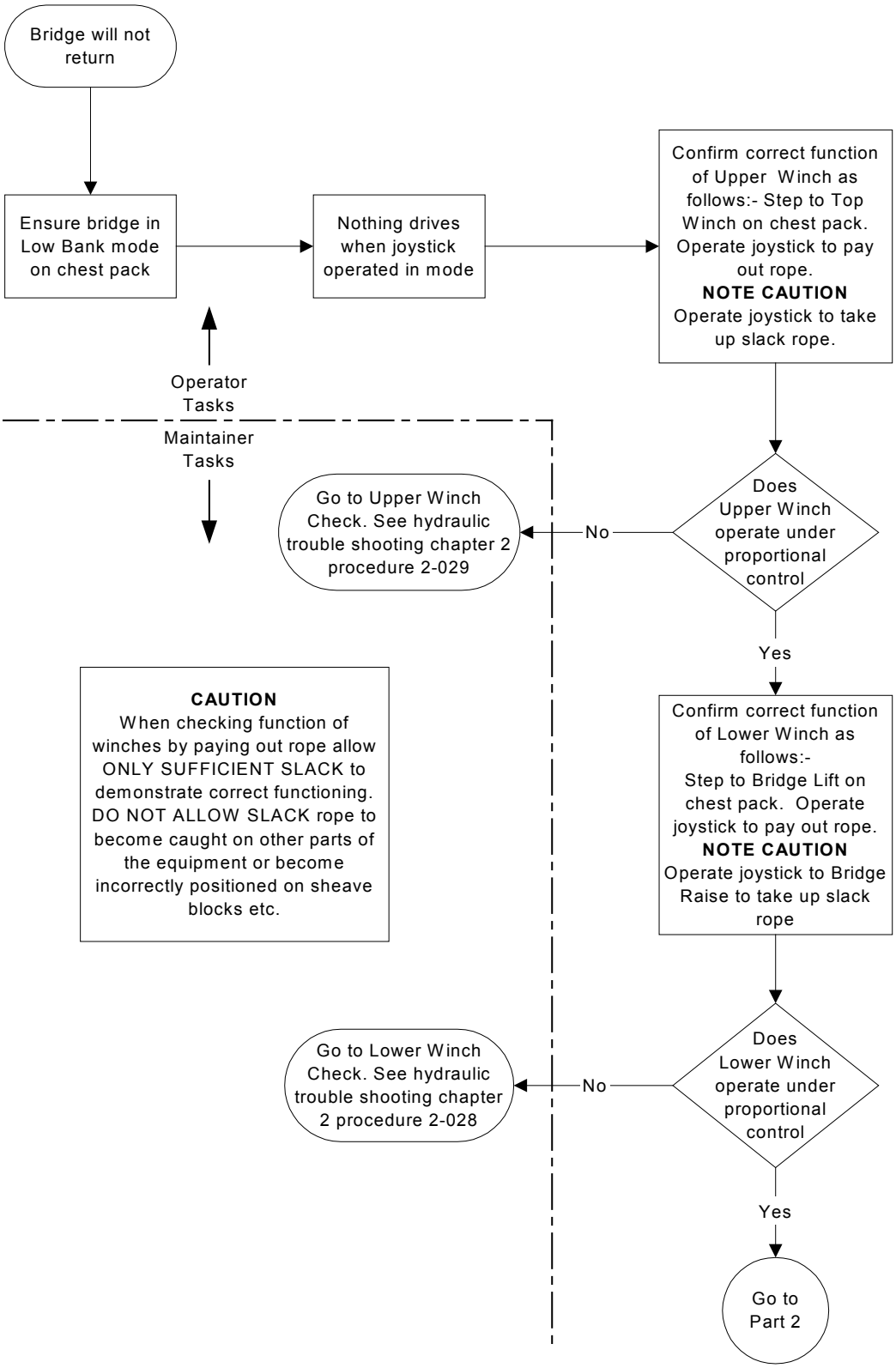
TSUM - 2-021 Bridge Return High Bank Part 3



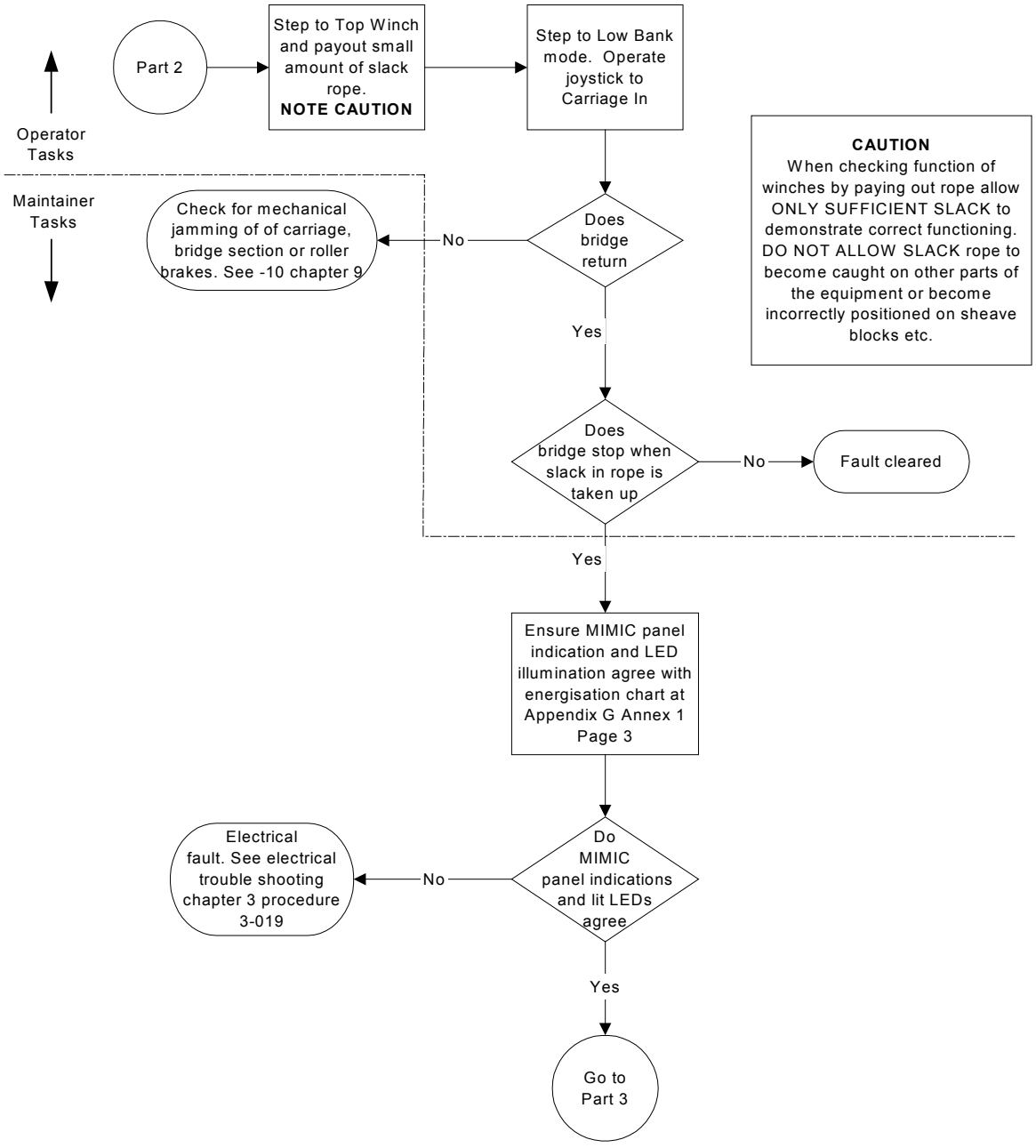
TSUM - 2-021 Bridge Return High Bank Part 4



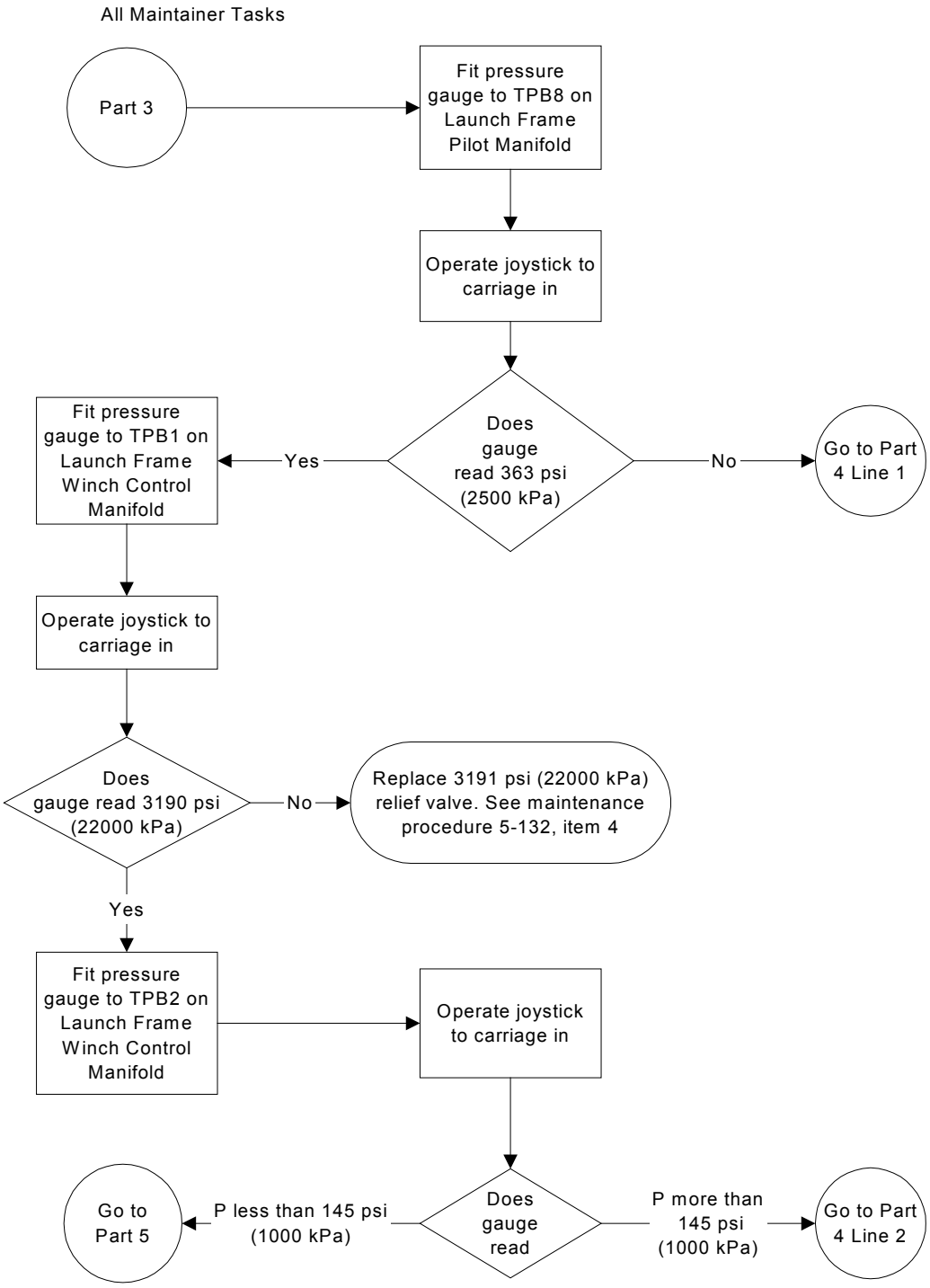
TSUM - 2-022 Bridge Return Low Bank Part 1



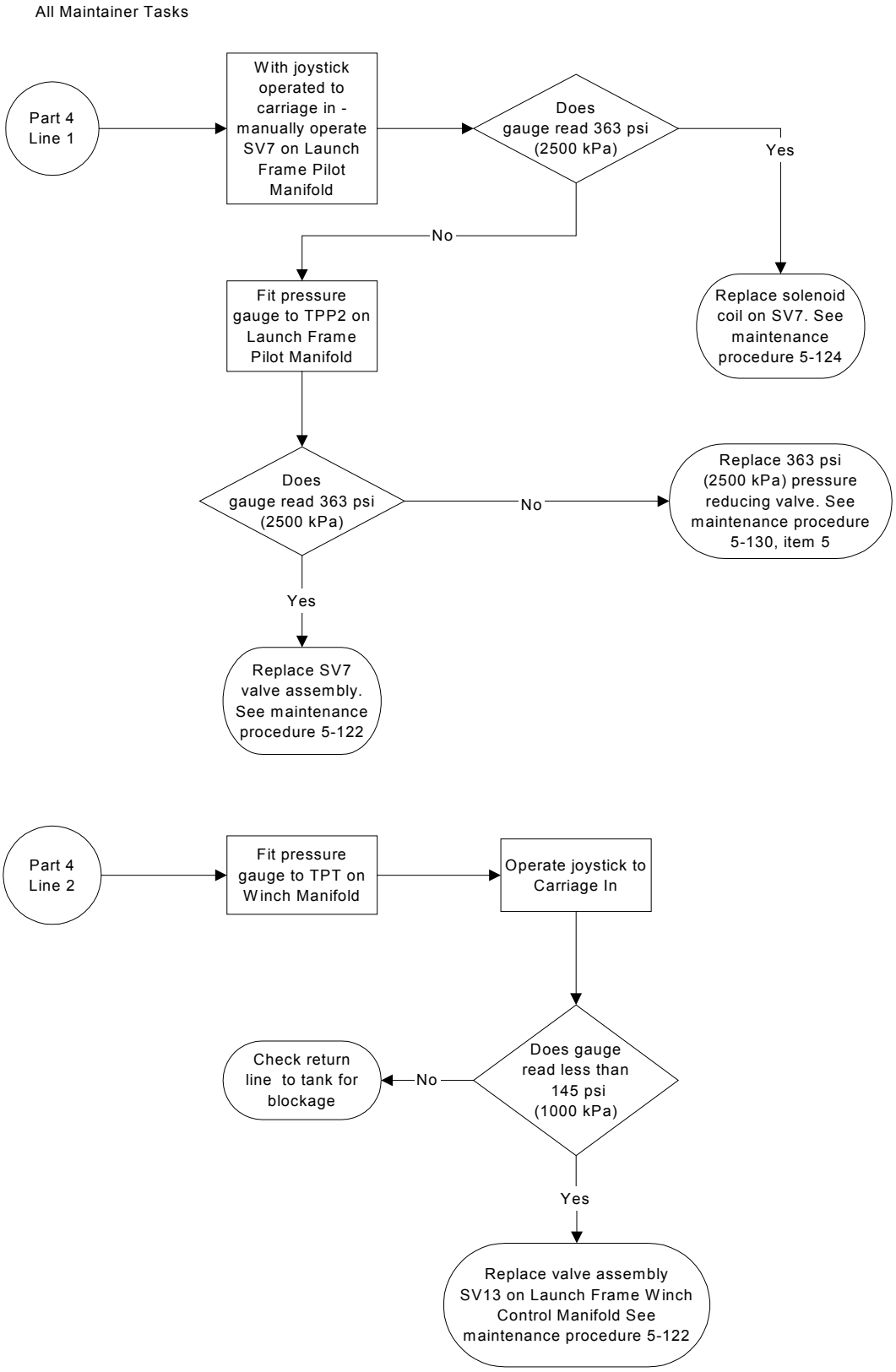
TSUM - 2-022 Bridge Return Low Bank Part 2



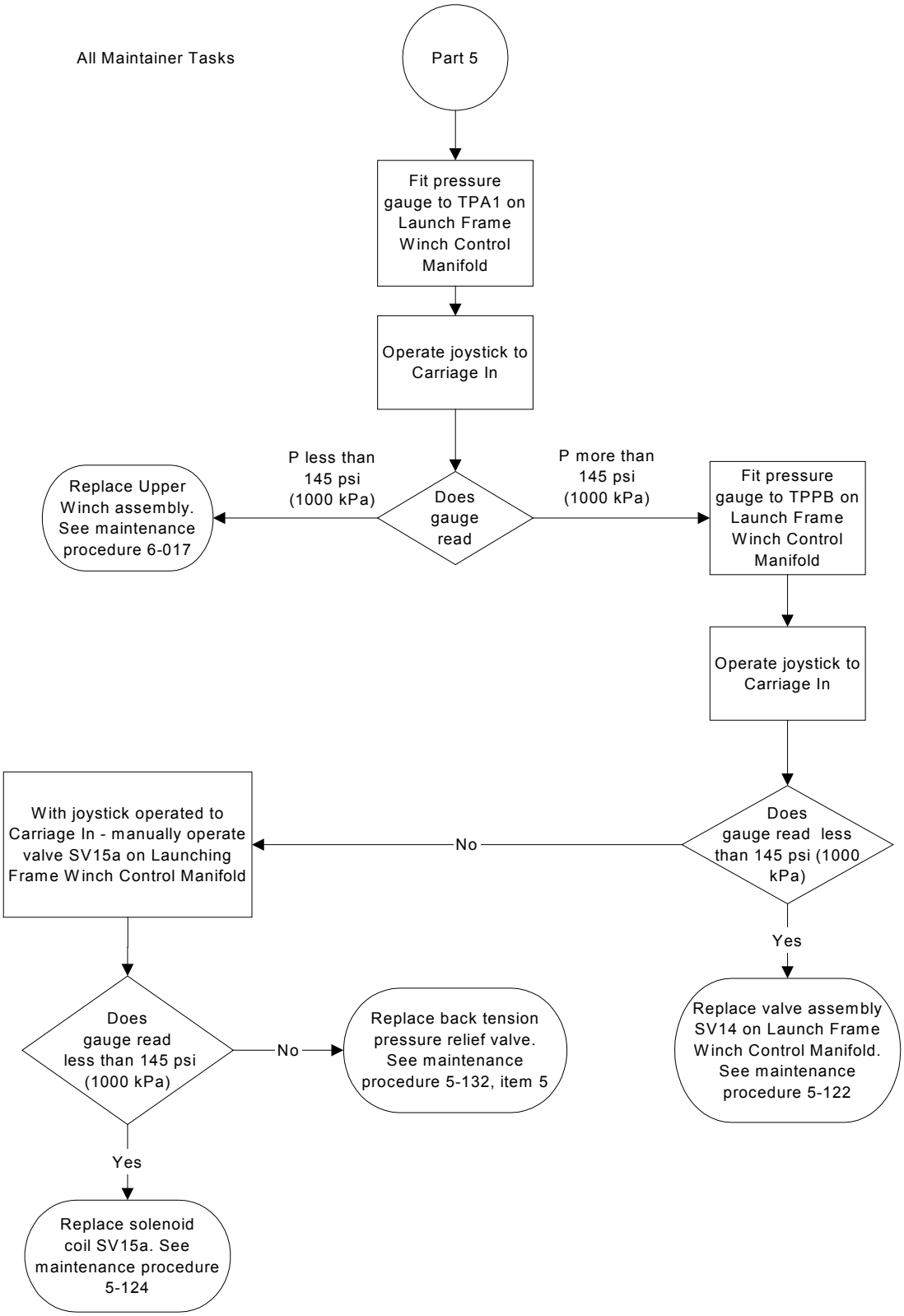
TSUM - 2-022 Bridge Return Low Bank Part 3



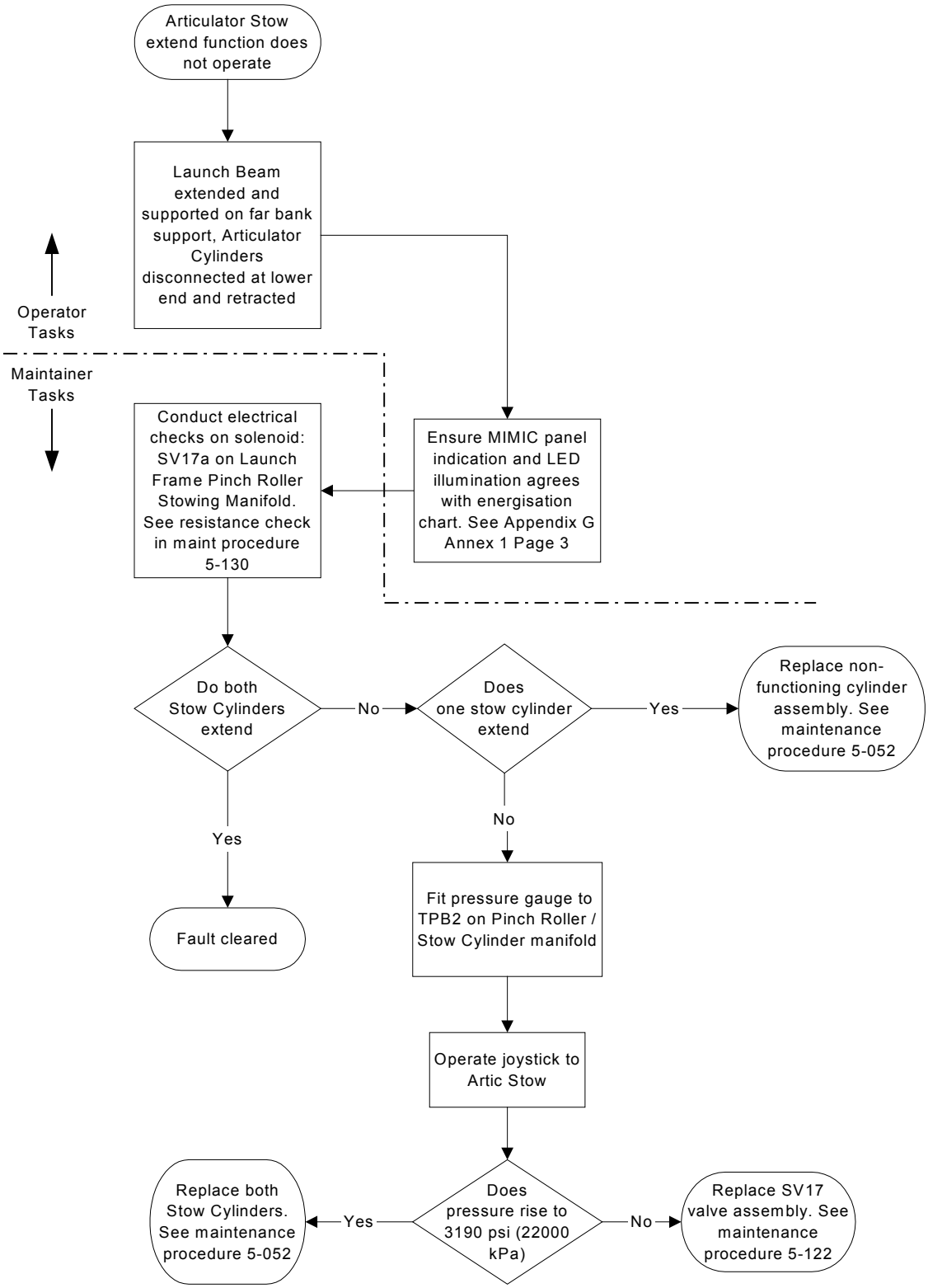
TSUM - 2-022 Bridge Return Low Bank Part 4



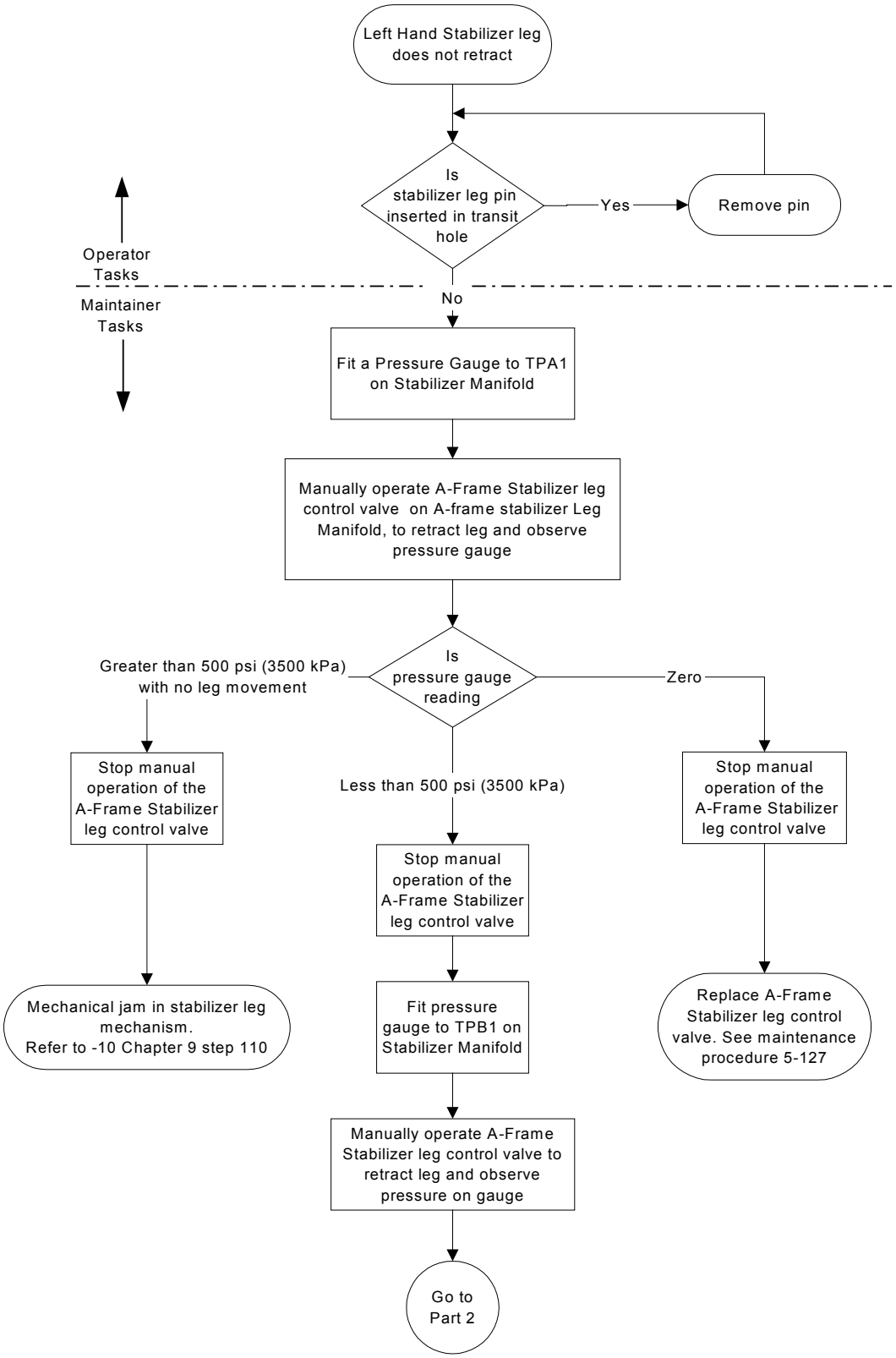
TSUM - 2-022 Bridge Return Low Bank Part 5



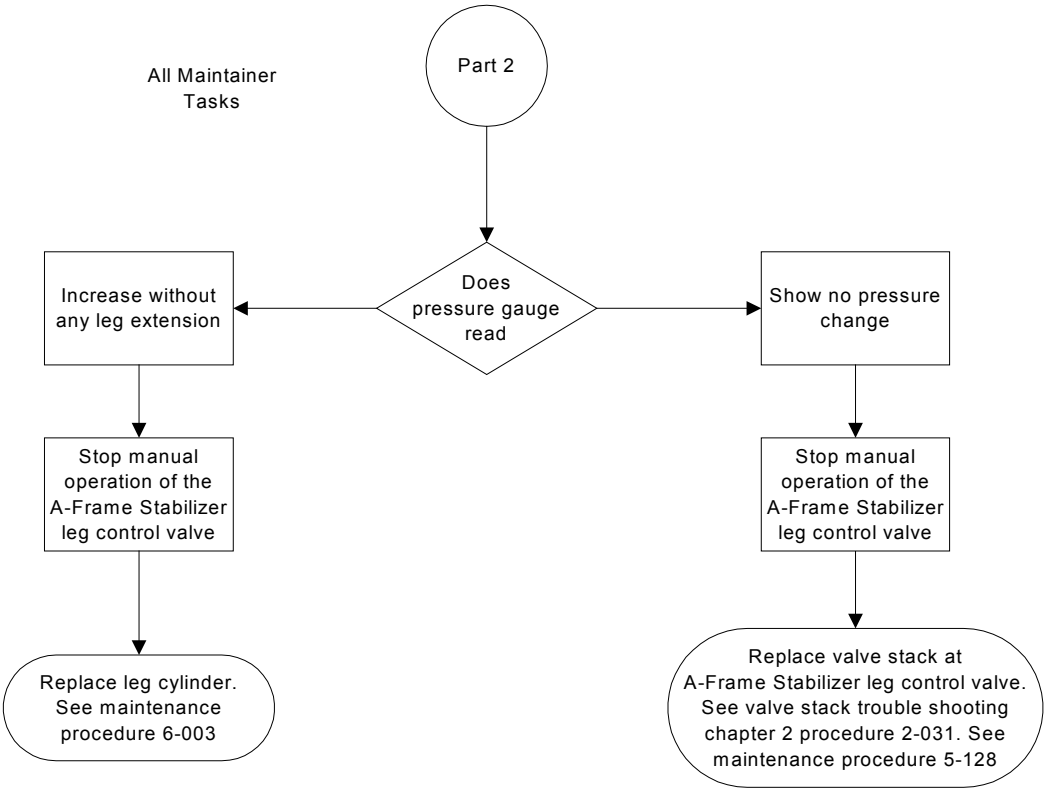
TSUM - 2-023 Re-attach Articulator Cylinders (Opposite of Stow) (92)



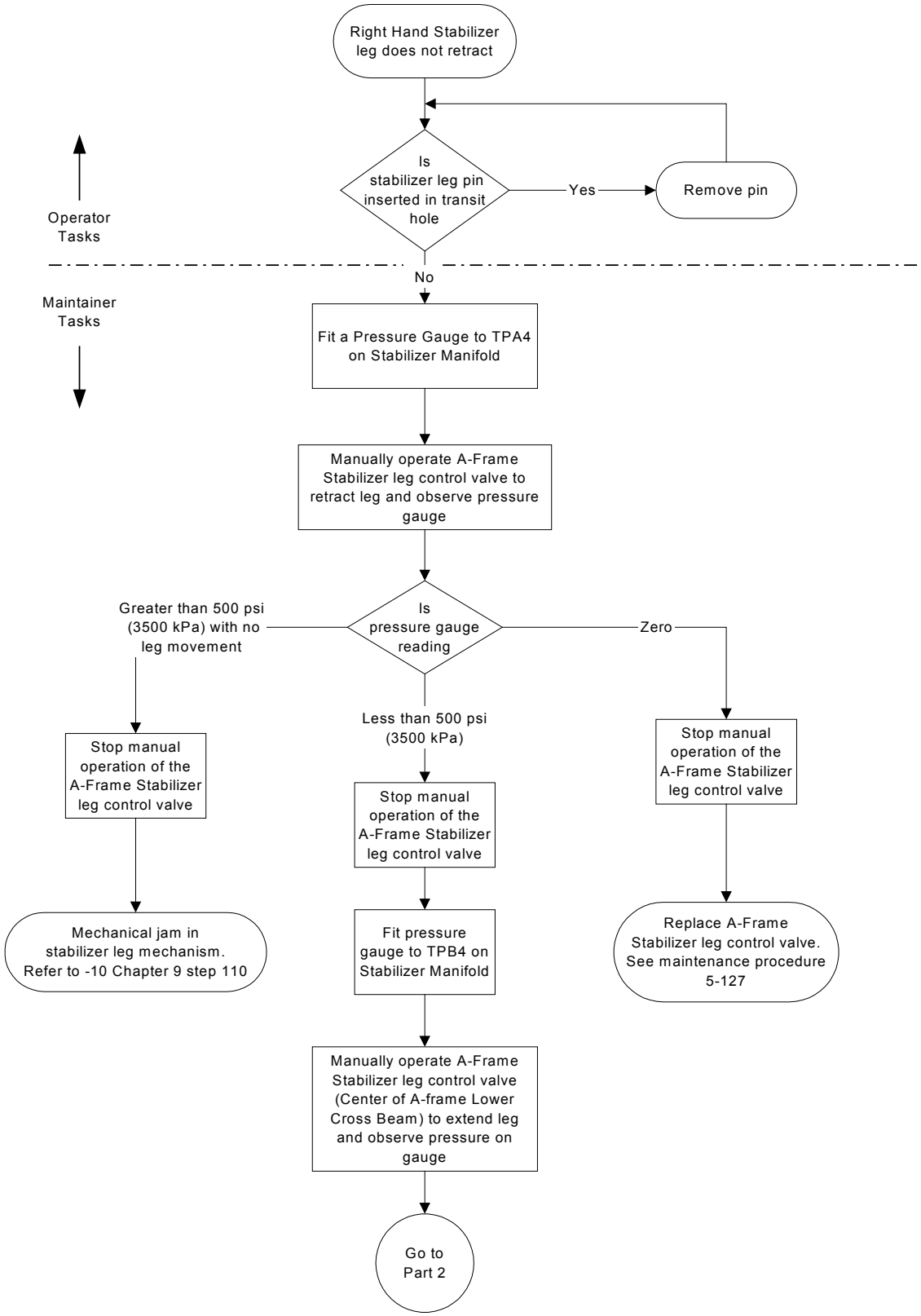
TSUM - 2-024 Retract LH Stabilizer Leg (111) Part 1



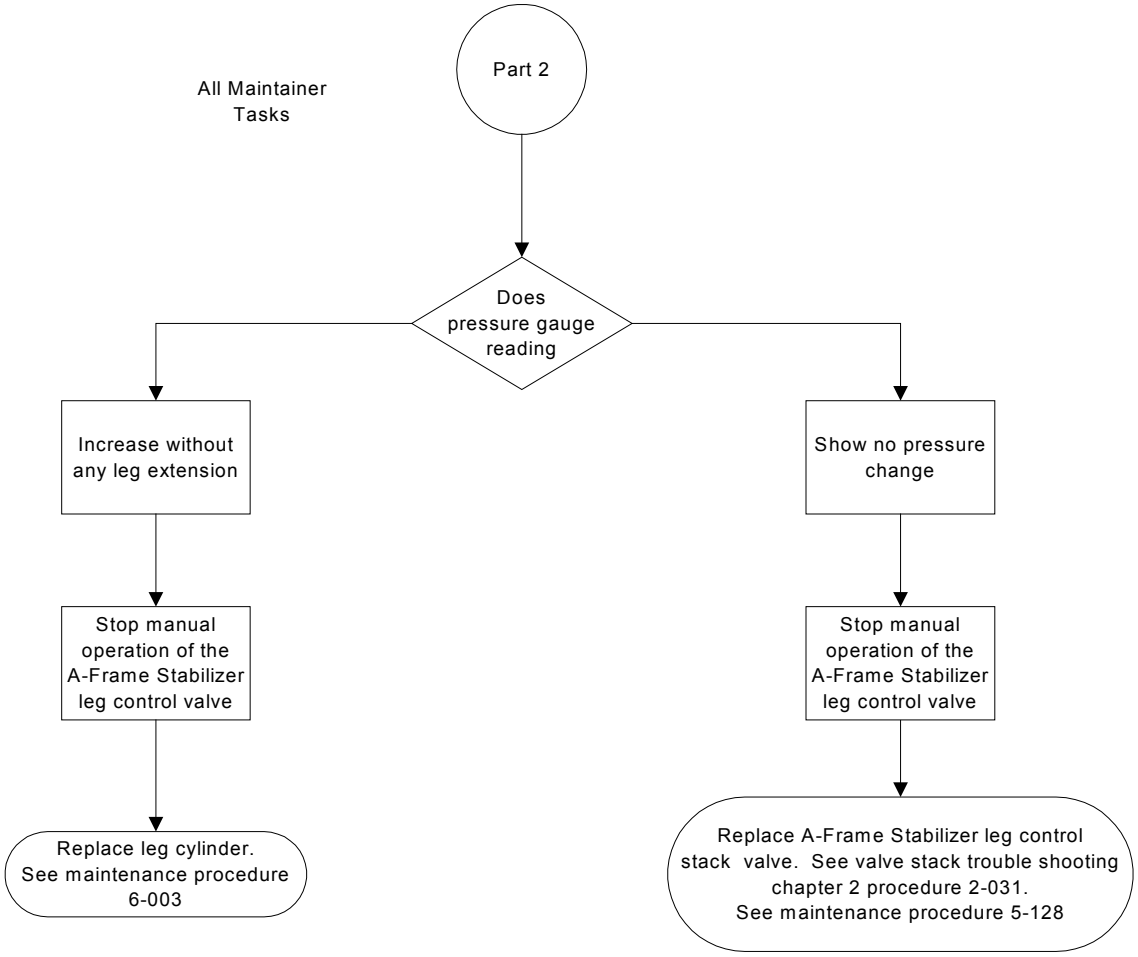
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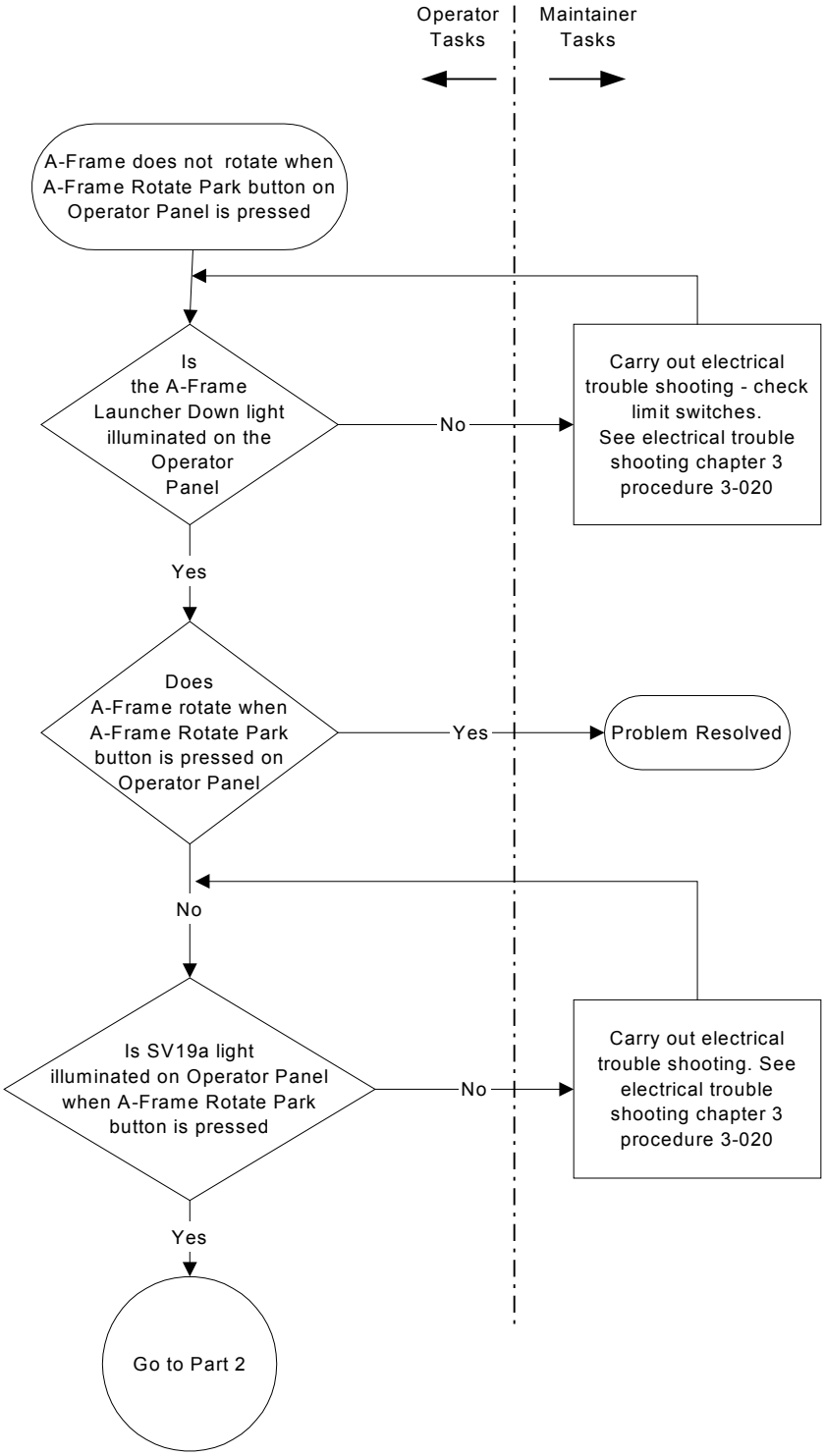
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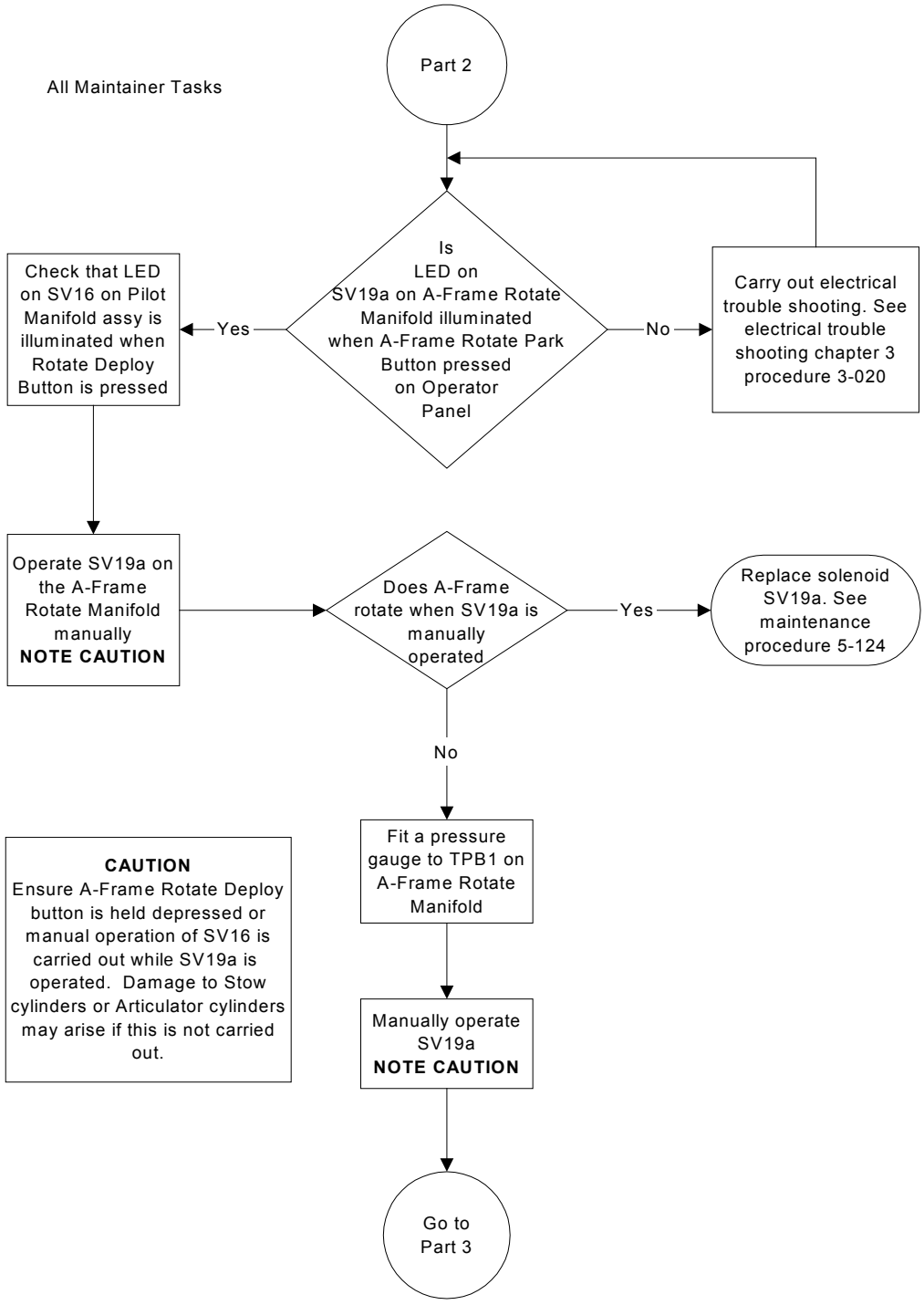
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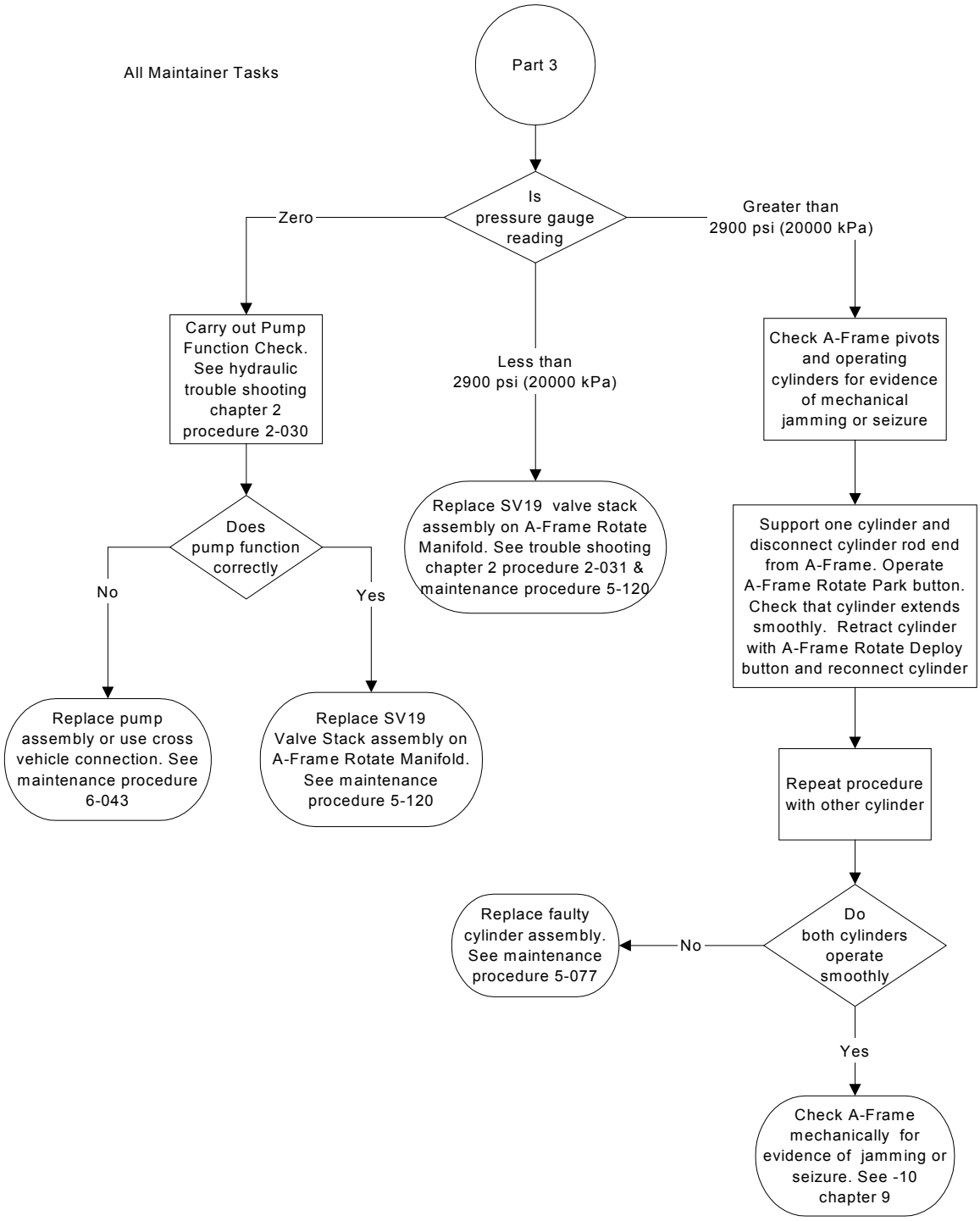
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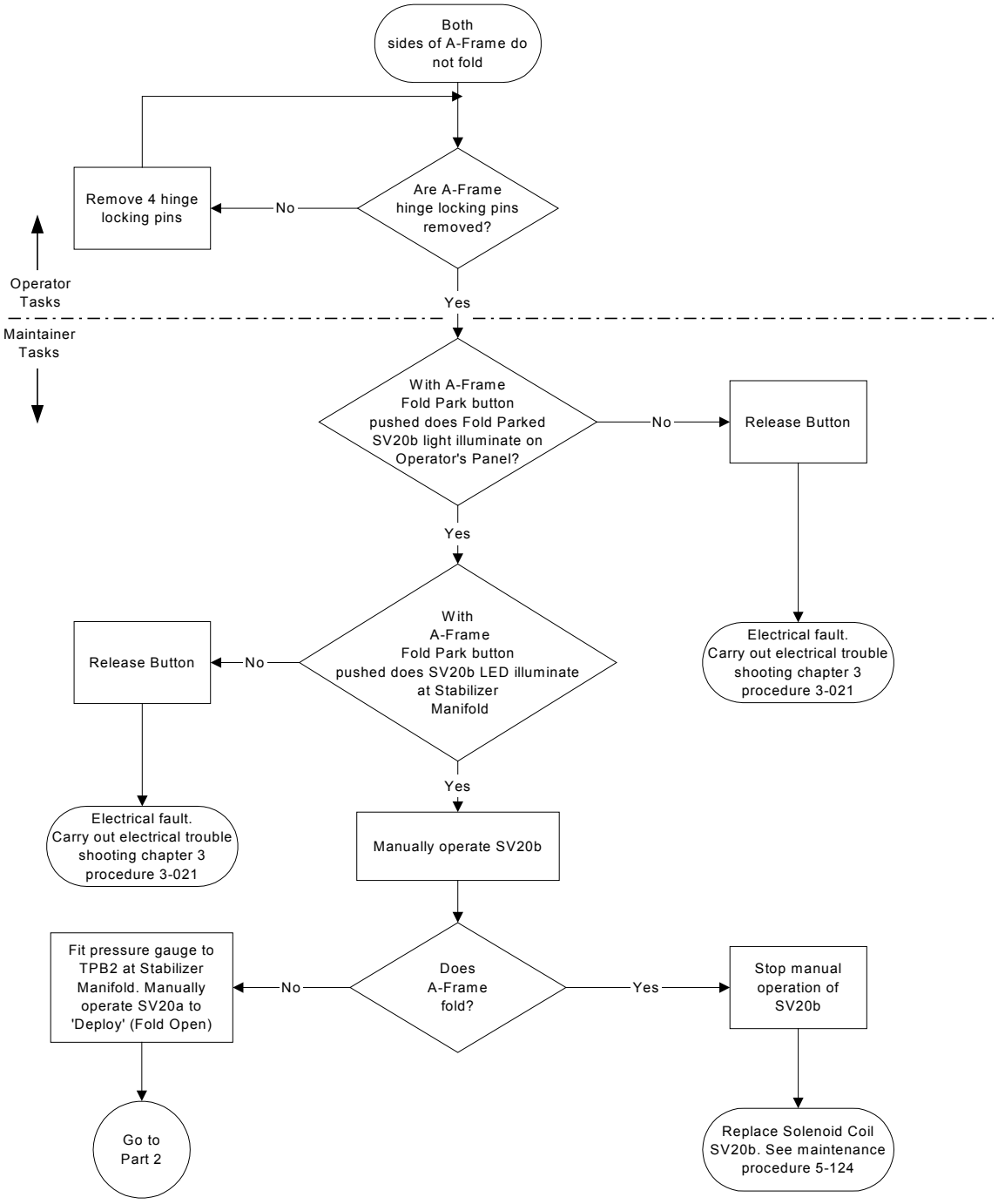
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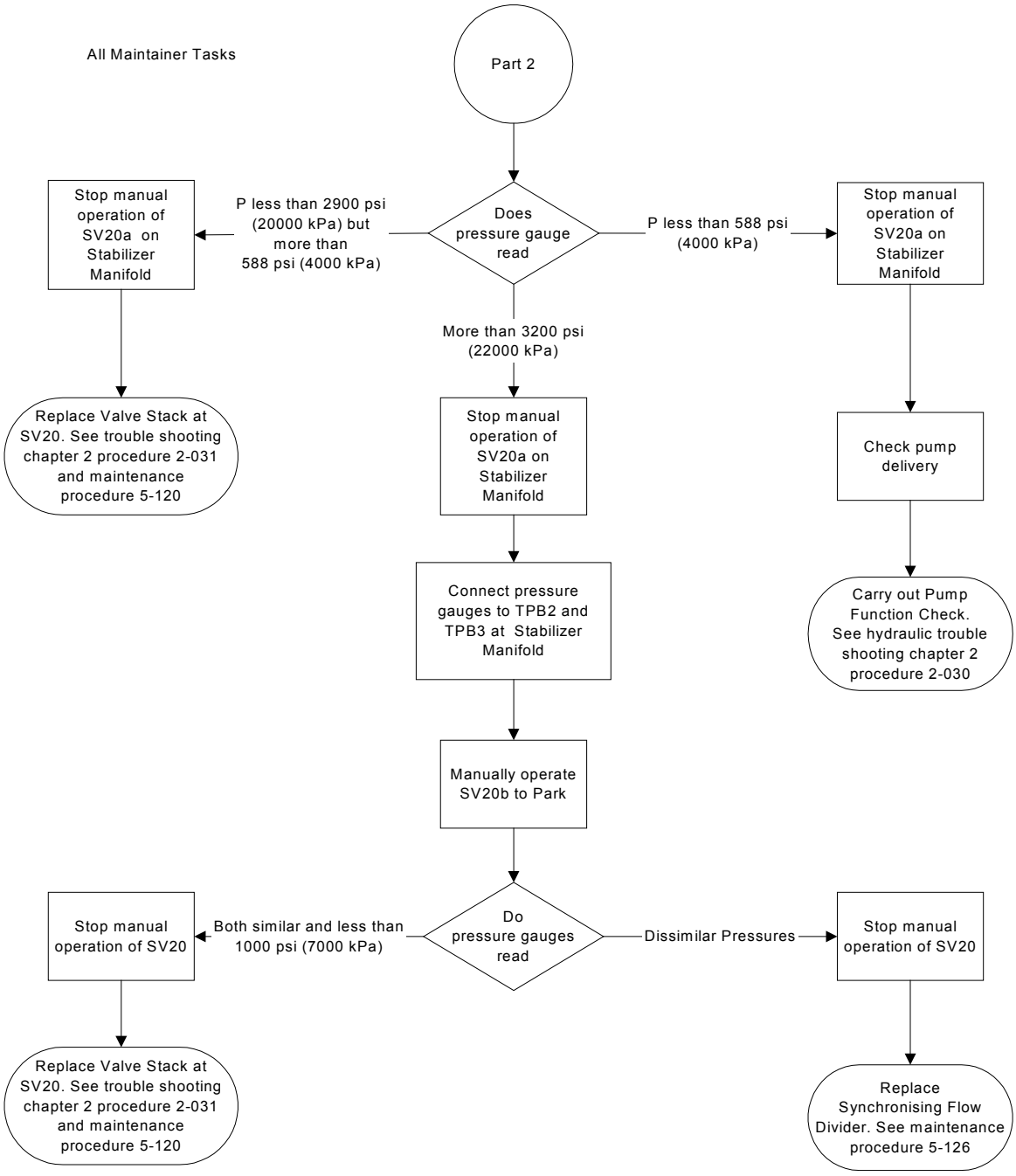
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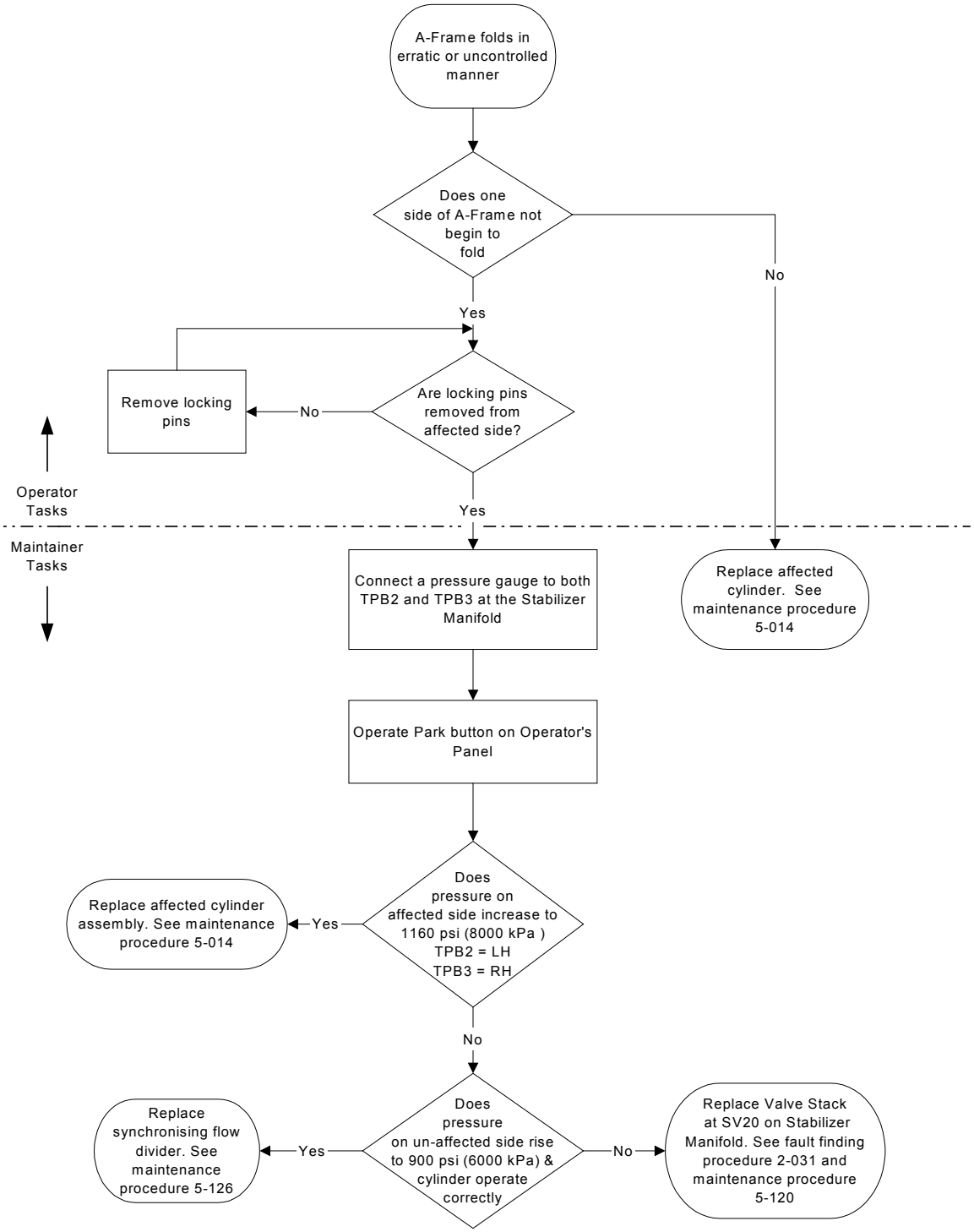
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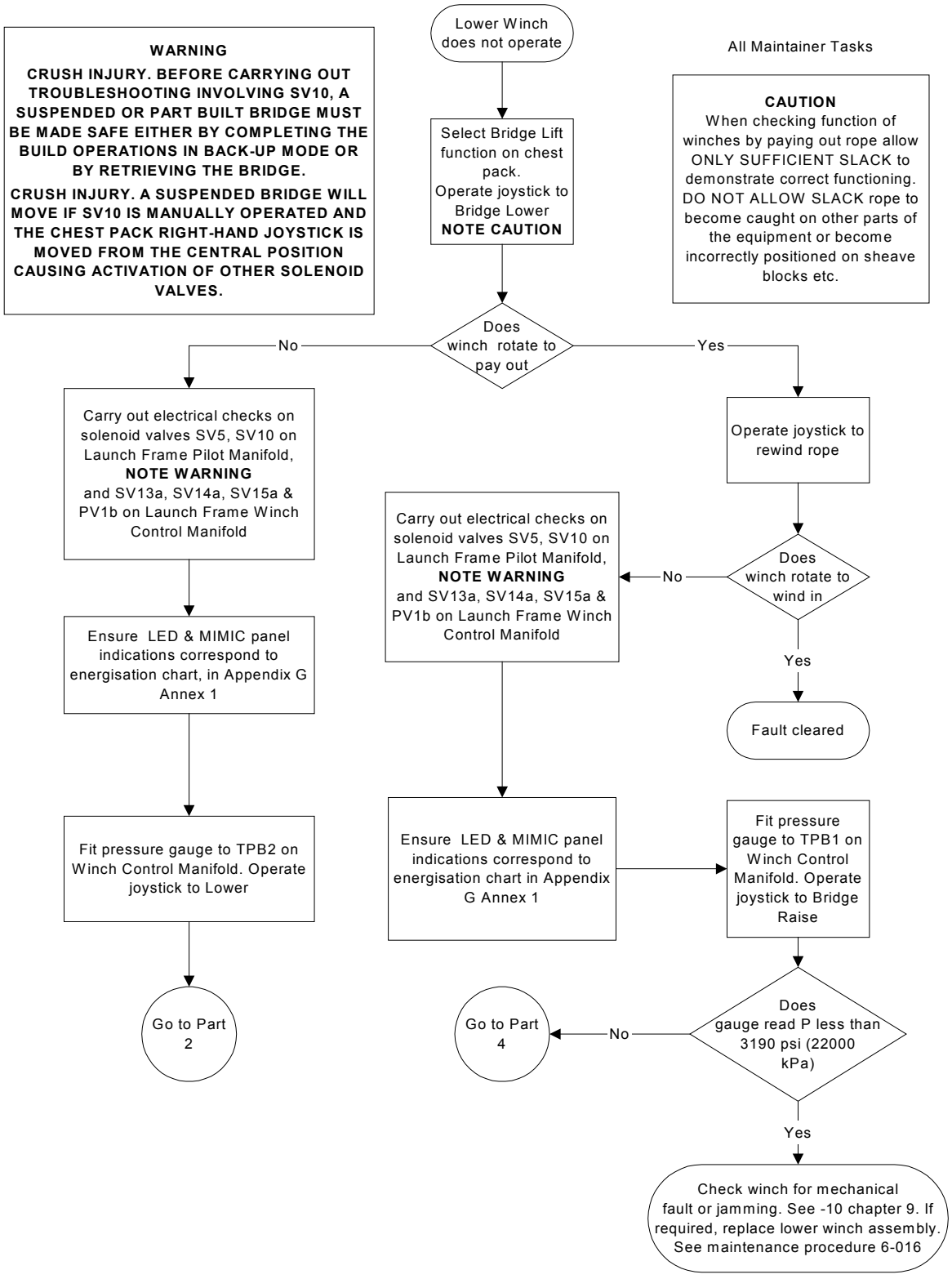
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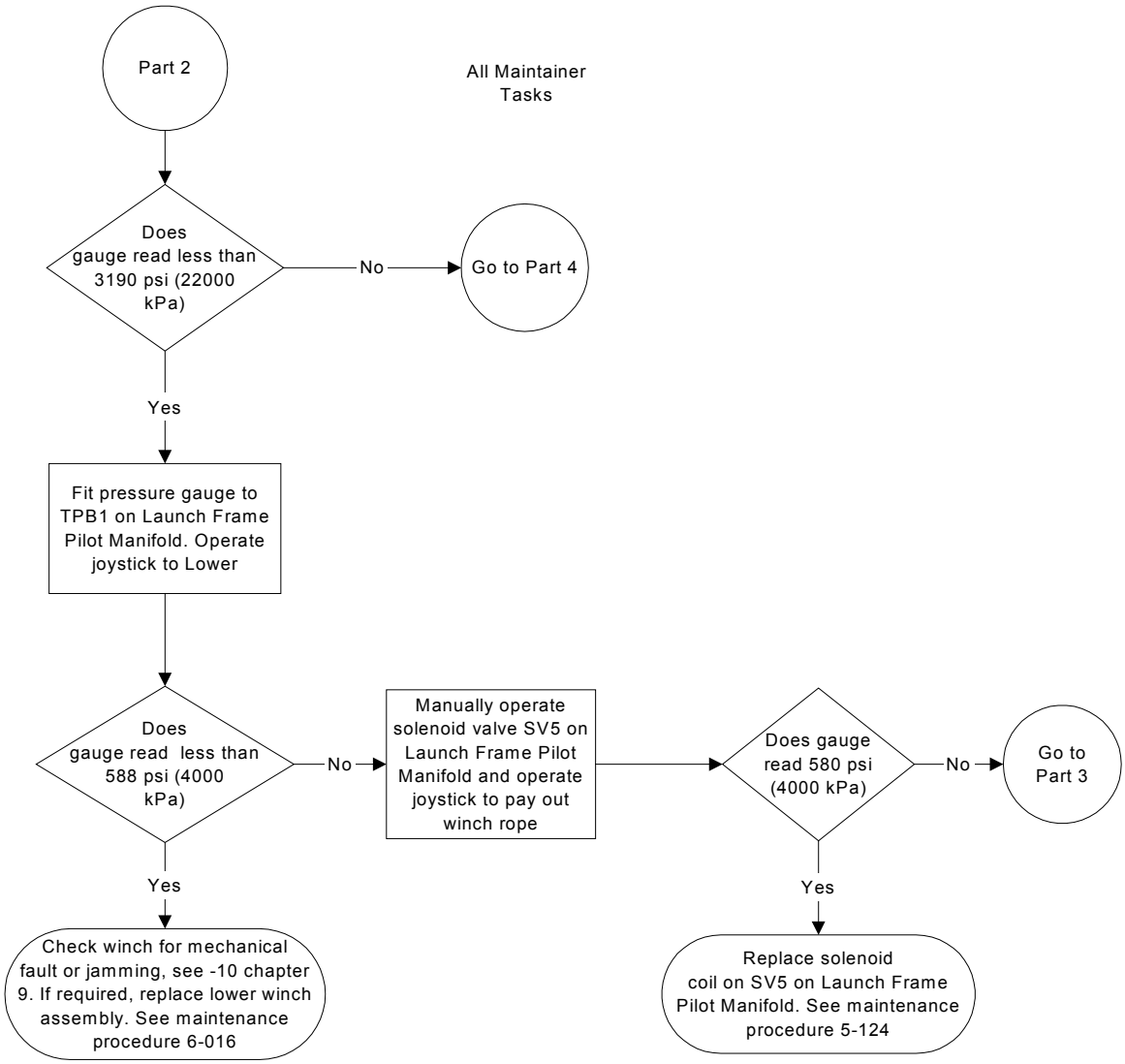
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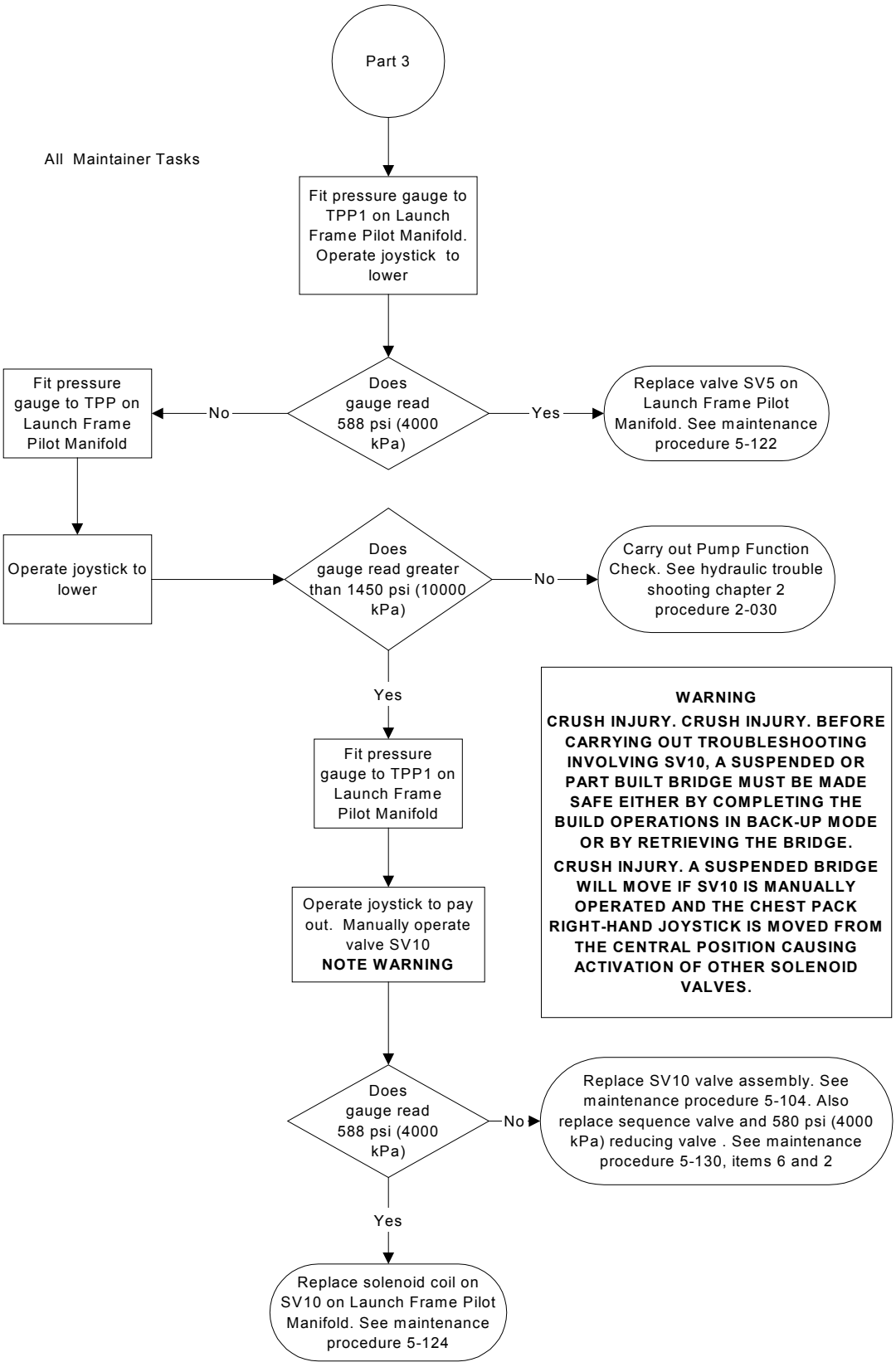
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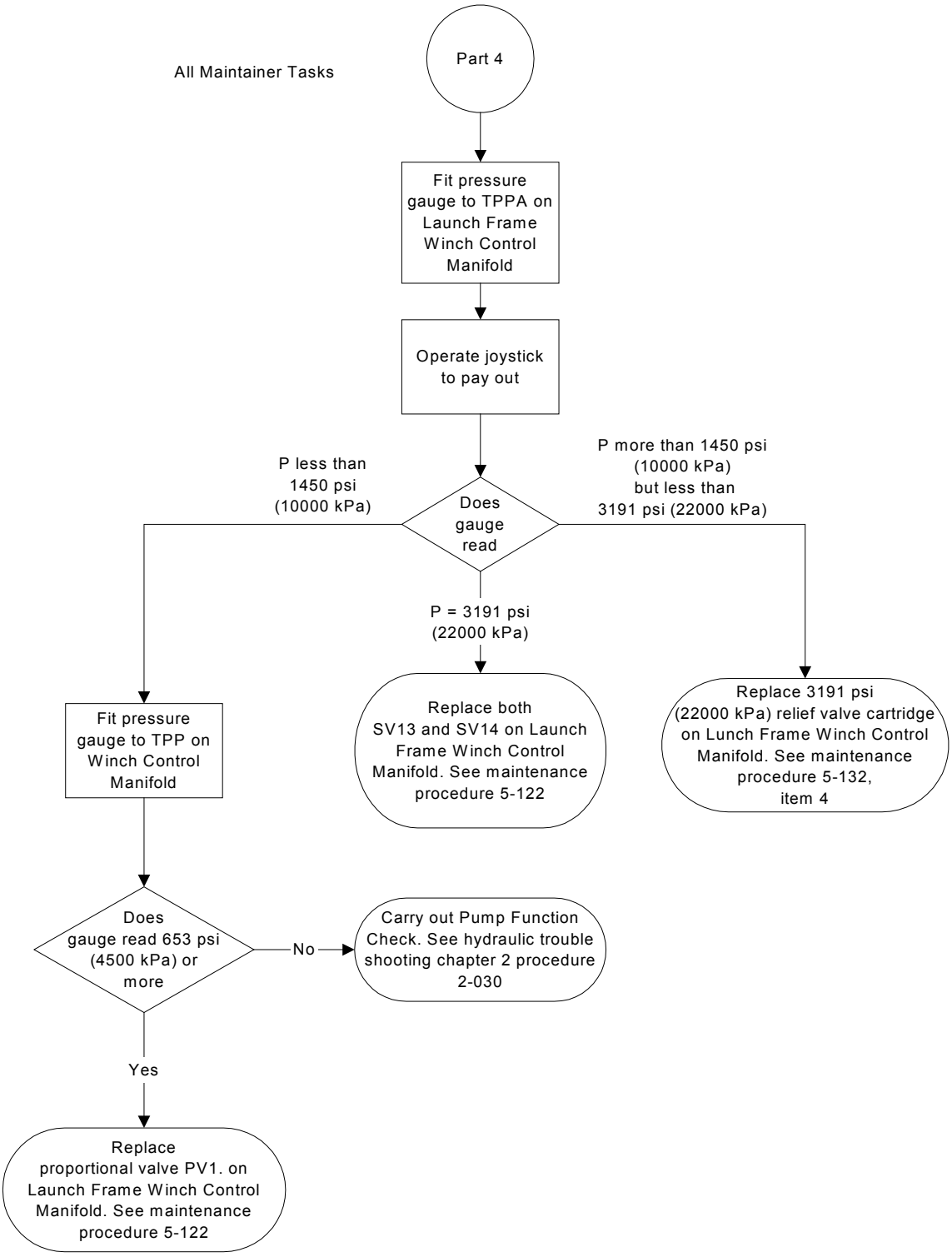
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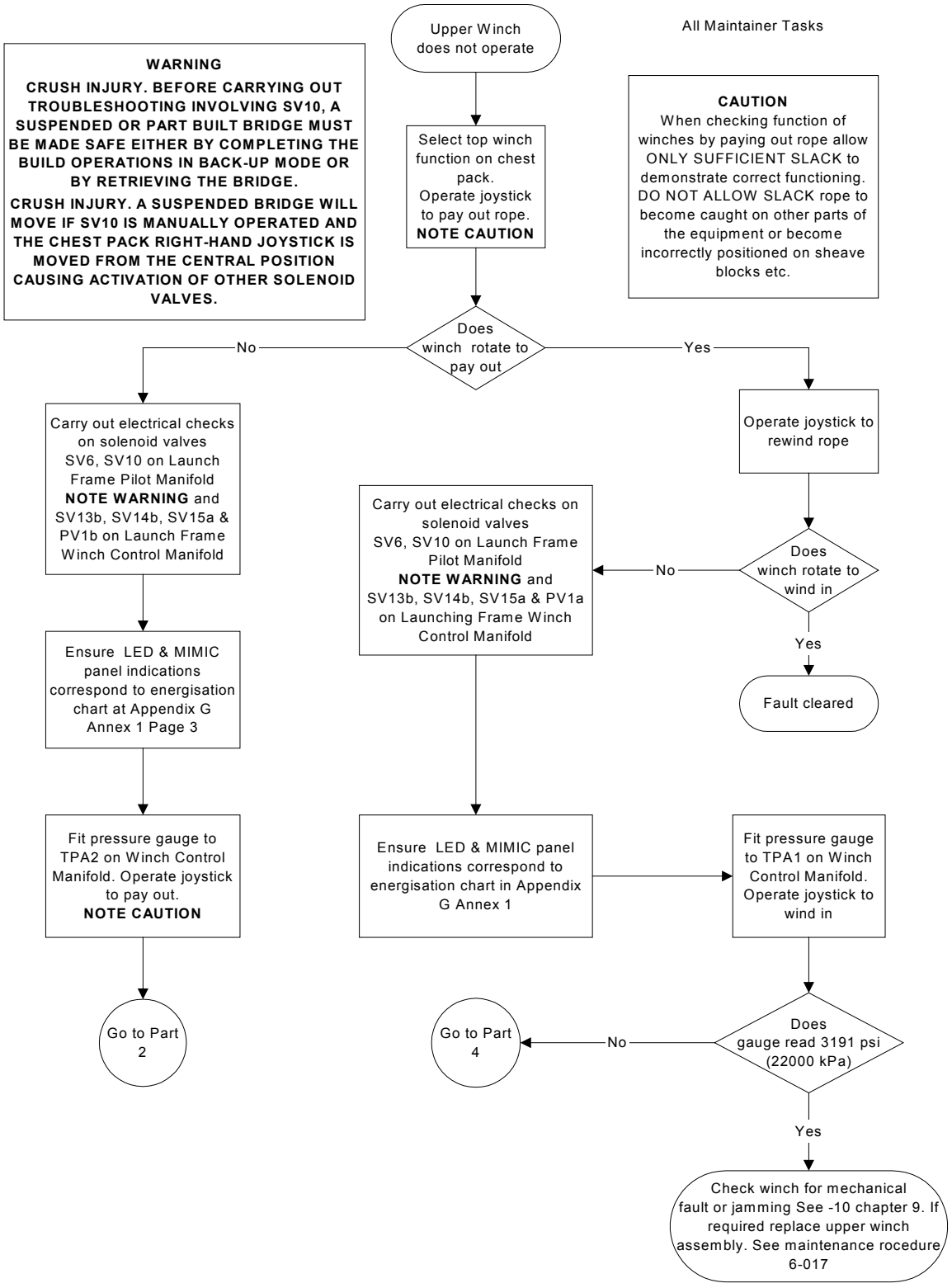
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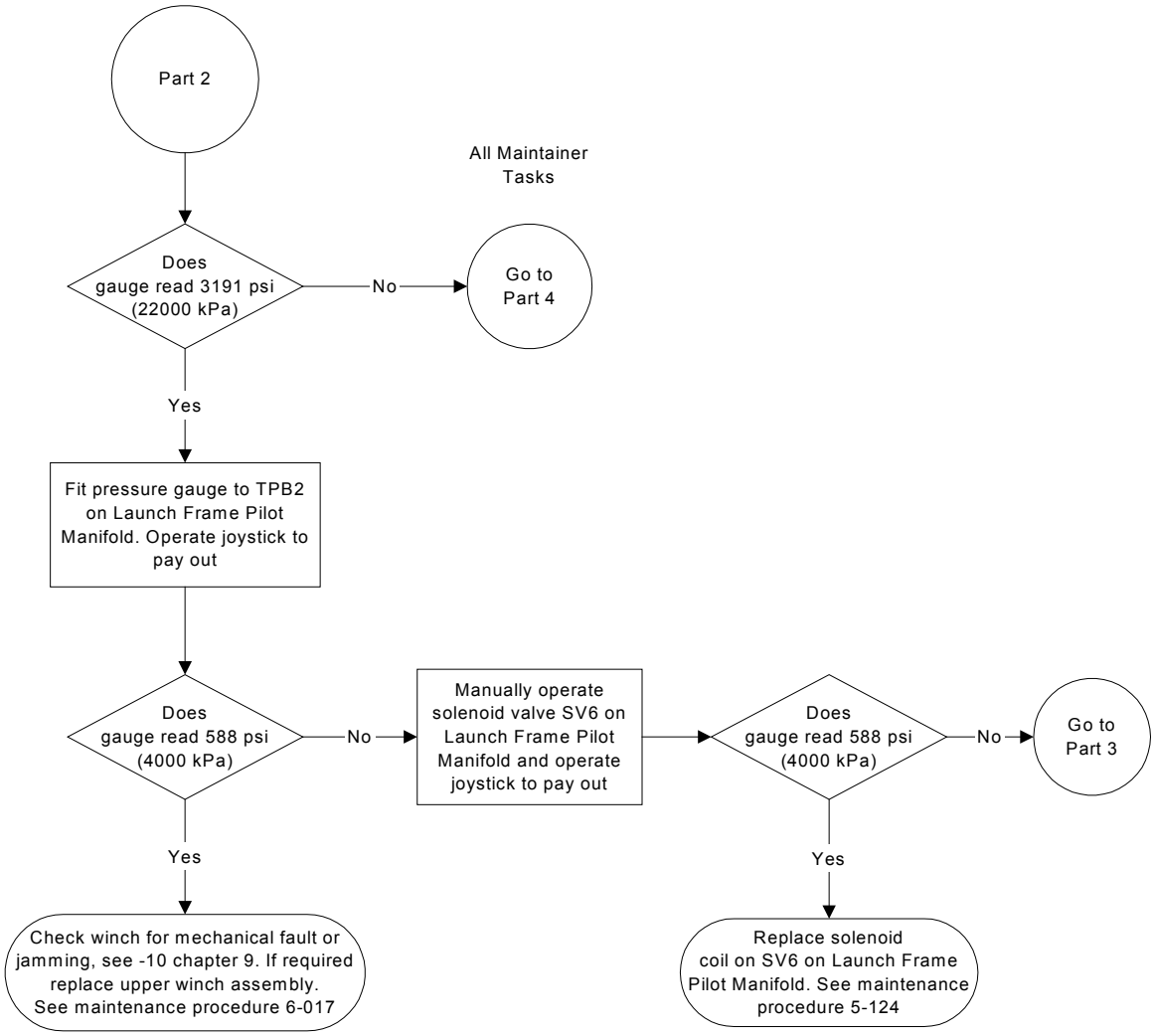
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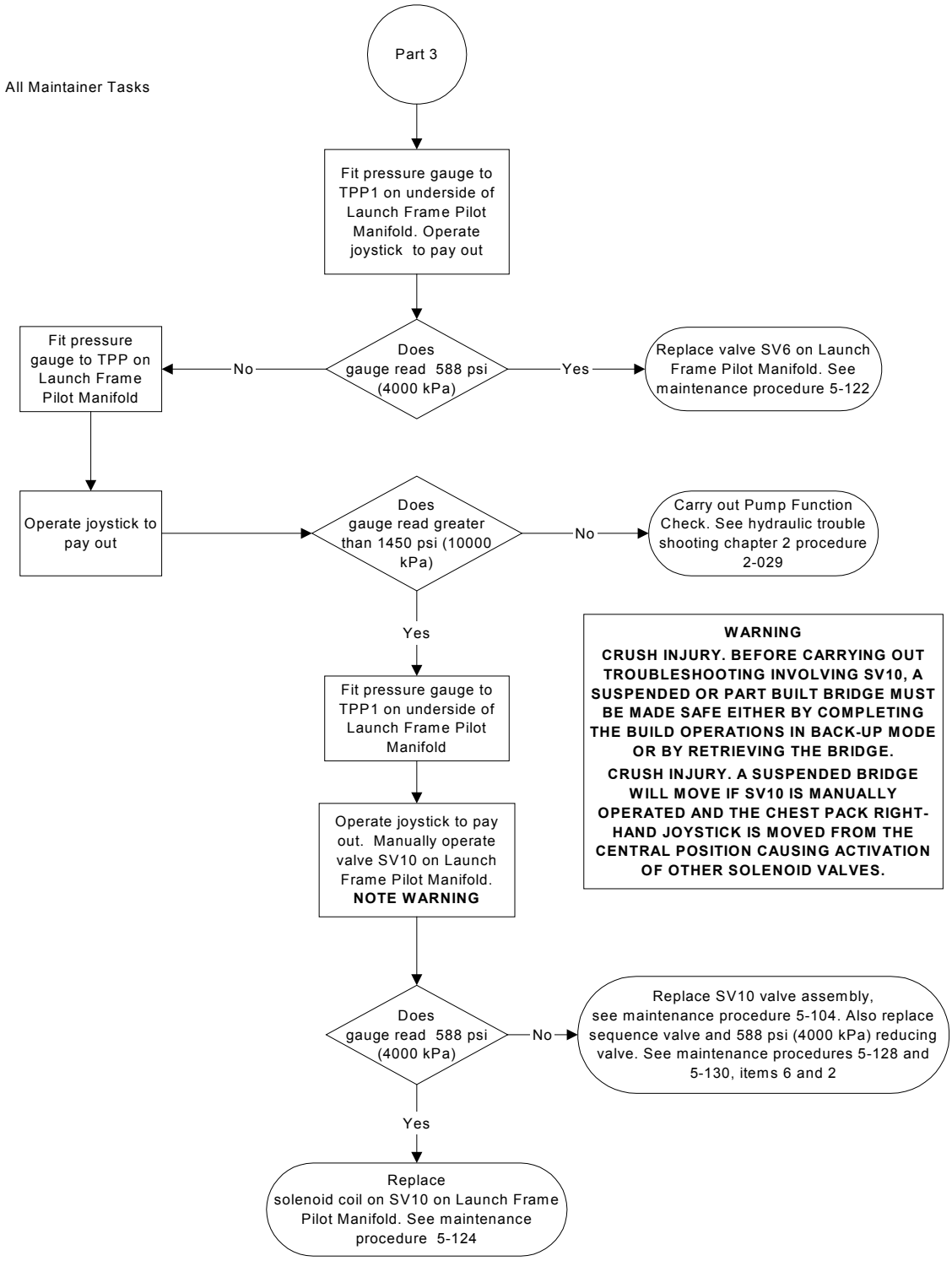
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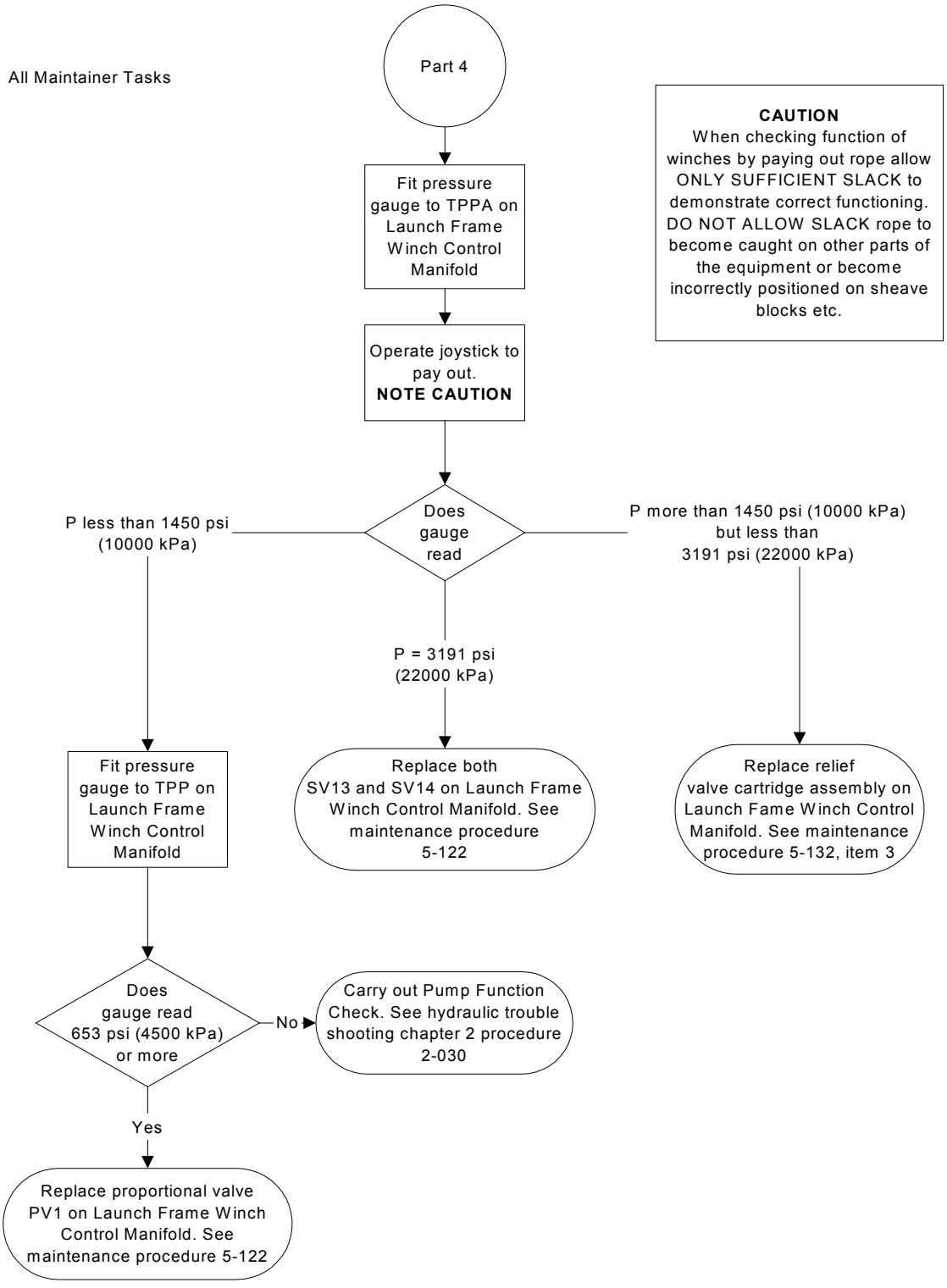
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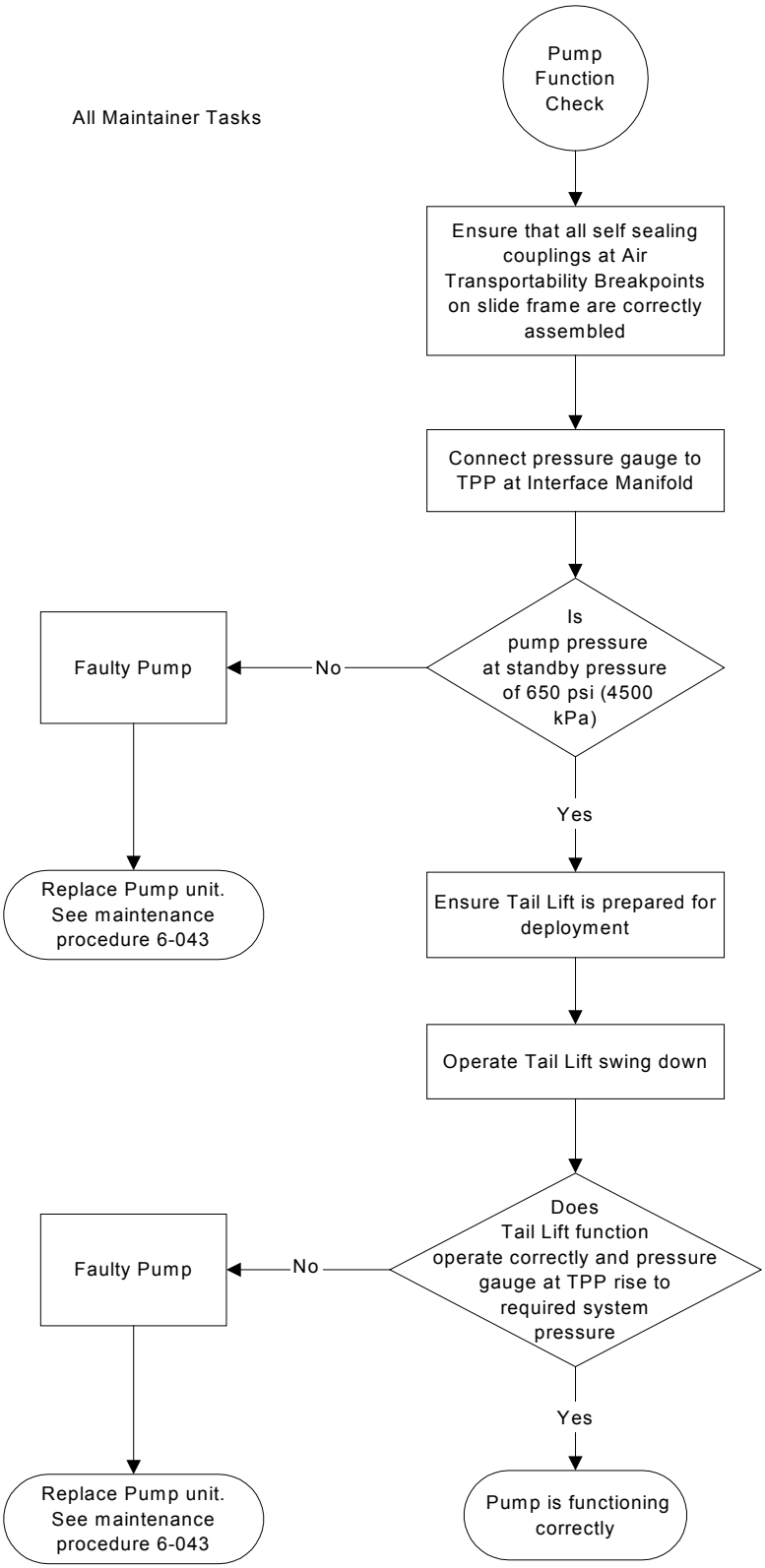
TSUM - 2-029 Upper Winch Function Check Part 3



TSUM - 2-029 Upper Winch Function Check Part 4



TSUM - 2-030 Pump Function Check



TSUM - 2-031 Valve Stack Fault Finding Guide

Introduction

This procedure enables the maintainer to determine which component or components of a valve stack are faulty and require replacement. It must be used in conjunction with the DSB Hydraulic Circuit drawings G401/8001 Sheets 1 to 7 in Appendix E.

Typical Failures

Compensator valve not opening.
Shuttle Valve leaking.
Back to back check valve leaking.
Load sense system not operating.

Compensator Failure

Check the appropriate sheet of drawing G406/8001- DSB Hydraulic Circuit.
Connect pressure gauges to pressure line **P** and load sensing line **LS**.
Connect pressure gauges in service lines **A** and **B**.

Gauge	Nothing Operated	Operate Valve to put Pressure to 'A' Port		Operate Valve to put Pressure to 'B' Port	
P	653 psi (4500 kPa)	3480 psi (24000 kPa)		3480 psi (24000 kPa)	
A	0 bar	2900 psi (20000 kPa)	Unless limited by relief or reducing valve	0 bar	
B	0 bar	0 bar		2900 psi (20000 kPa)	Unless limited by relief or reducing valve
LS	0 bar	2900 psi (20000 kPa)		2900 psi (20000 kPa)	

The above table shows the pressures that can be expected at the four pressure gauges when the valves in the valve stack are operating normally. See the tables below for reference to specific fault finding flow charts.

a. If no pressure is seen at **A** and **B** when the valve is operated to put pressure to those ports, replace the Compensator and Shuttle valve.

b. If Zero pressure is seen at **LS** replace the back to back check valve.

c. If 200 psi (1400 kPa) is seen at **A** and **B** then the Solenoid or Manual Valve is OK and the Compensator is OK, the problem is with the **LS** (load sense) shuttle valve.

d. If 650 psi (4500 kPa) is seen at the **LS** (load sense) port on the manifold, check the **LS** (load sense) pressure at the interface manifold. If still only 650 psi at the Interface Manifold, then the pump is at fault.

NOTE

650 psi (4500 kPa) is the pump standby (off load) pressure.

e. If there is no **LS** (load sense) pressure at the Interface Manifold then the shuttle valve(s) in the pipe work are at fault.

f. If you get 650 psi (4500 kPa) at **A** and **B** this means solenoid valve is OK.

g. If pressure at **LS** pressure gauge is Zero, the Compensator is open so the back to back check valves are at fault.

TSUM 2-001 A-Frame Unfold (13)(Part2),
TSUM 2-002 Uneven A-Frame Unfold (13)
TSUM 2-027 A-Frame Fold (Park)(122)(Part 2) and
TSUM 2-027 Uneven A-Frame Fold (Park)(122)

Gauge points TPA2 & TPB2 and/or TPB3 on the Stabilizer Manifold, TPPL & TPLS on the Interface Manifold.

Gauge	Nothing Operated	Operate Valve SV20to put Pressure to 'A' Port (A-Frame Fold Park button depressed on Operator Panel)		Operate Valve SV20 to put Pressure to 'B' Port (A-Frame Fold Deploy button depressed on Operator Panel)	
P	653 psi (4500 kPa)	3480 psi (24000 kPa)		3480 psi (24000 kPa)	
TPA2	0 psi	2900 psi (20000 kPa)	Unless limited by relief or reducing valve	0 psi	
TPB2 and/or **TPB3**	0 psi	0 psi		2900 psi (20000 kPa)	Unless limited by relief or reducing valve
TPLS	0 psi	2900 psi (20000 kPa)		2900 psi (20000 kPa)	

TSUM 2-003 A-Frame Rotate (Deploy)(17)(Part 3) and
TSUM 2-026 A-Frame Rotate (Park)(119)(Part 3)

Gauge points TPA1 & TPB1 on the A-Frame Rotate Manifold, TPPL & TPLS on the Interface Manifold.

Gauge	Nothing Operated	Operate Valve SV19 to put Pressure to 'A' Port (A-Frame Rotate Deploy button depressed on Operator Panel)		Operate Valve SV19 to put Pressure to 'B' Port (A-Frame Rotate Park button depressed on Operator Panel)	
P	653 psi (4500 kPa)	3480 psi (24000 kPa)		3480 psi (24000 kPa)	
TPA1	0 psi	2900 psi (20000 kPa)	Unless limited by relief or reducing valve	0 psi	
TPB1	0 psi	0 psi		2900 psi (20000 kPa)	Unless limited by relief or reducing valve
TPLS	0 psi	2900 psi (20000 kPa)		2900 psi (20000 kPa)	

TSUM 2-004 Extend LH Stabilizer Leg (21) and
TSUM 2-024 Retract LH Stabilizer Leg (111)

Gauge points TPA1 & TPB1 on the Stabilizer Manifold, TPPL & TPLS on the Interface Manifold.

Gauge	Nothing Operated	Operate Manual Valve to put Pressure to 'A' Port (Retract Stabilizer Leg)		Operate Manual Valve to put Pressure to 'B' Port (Extend Stabilizer Leg)	
P	653 psi (4500 kPa)	3480 psi (24000 kPa)		3480 psi (24000 kPa)	
TPA1	0 psi	2900 psi (20000 kPa)	Unless limited by relief or reducing valve	0 psi	
TPB1	0 psi	0 psi		2900 psi (20000 kPa)	Unless limited by relief or reducing valve
TPLS	0 psi	2900 psi (20000 kPa)		2900 psi (20000 kPa)	

TSUM 2-005 Extend RH Stabilizer Leg (21) and
TSUM 2-025 Retract RH Stabilizer Leg (111)

Gauge points TPA4 & TPB4 on the Stabilizer Manifold, TPPL & TPLS on the Interface Manifold.

Gauge	Nothing Operated	Operate Manual Valve to put Pressure to 'A' Port (Retract Stabilizer Leg)		Operate Manual Valve to put Pressure to 'B' Port (Extend Stabilizer Leg)	
P	653 psi (4500 kPa)	3480 psi (24000 kPa)		3480 psi (24000 kPa)	
TPA1	0 psi	2900 psi (20000 kPa)	Unless limited by relief or reducing valve	0 psi	
TPB1	0 psi	0 psi		2900 psi (20000 kPa)	Unless limited by relief or reducing valve
TPLS	0 psi	2900 psi (20000 kPa)		2900 psi (20000 kPa)	

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CHAPTER 3

DSB ELECTRICAL TROUBLE SHOOTING

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CHAPTER 3

Section I. DSB ELECTRICAL TROUBLE SHOOTING

3-1 INTRODUCTION

a. The trouble-shooting flow charts are provided to assist the Unit Maintenance personnel in systematically diagnosing a fault and providing a solution for the rectification of that fault. The trouble shooting flow chart indicates faults to LRU level, a qualified electrician can carry out trouble shooting to component level with the aid of the Launcher Electrical System Drawings at Appendix G of this manual.

b. This section is to be used to recognize, diagnose and rectify faults that may occur with the DSB Launcher.

c. Overviews of the electrical system are provided to give the Unit Maintenance personnel familiarity and quick reference. Manufacturer's schematic drawings are provided to present a detailed picture of the system.

d. Mechanical trouble shooting associated with the Bridge Modules is provided in the operator's manual TM 5-5420-279-10.

e. Hydraulic trouble shooting can be found in Chapter 2 of this manual.

f. Harness routing tables have been provided at paragraph 3-6 to assist in finding an electrical fault in a harness run from the power source to the consumer unit.

g. Hydraulic and electrical assembly location drawings are provided at Appendix D.

h. Circuit diagrams are provided at Appendix G Annex 4 for electrical trouble shooting and are referenced, where applicable, throughout the trouble shooting flow charts.

i. All joystick operations refer to the operation of the chest pack to achieve specified equipment conditions.

3-2 LAUNCHER ELECTRICAL SYSTEM OVERVIEW

a. **General Description -** An electrical system provides power to switches and solenoids which when activated allow the operator to control the function of the launcher components.

b. Electrical power is supplied from the host vehicle. Harnesses connect junction boxes, switches and solenoids in the electrical system. Junction boxes redirect electrical supplies to specific sub-systems.

c. Limit switches and indicators are fitted in the circuit to provide a signal, a visual indication at the control panel, of the state of a component.

d. Solenoid Valves when activated electrically will allow or stop the flow of hydraulic fluid in the hydraulic circuits.

e. Emergency Stop (E-Stop) switches are fitted in the circuit which, when activated, will shut down the electrical power to the launcher, halting operations.

f. A Chest Pack remote control can be plugged into the electrical system.

g. **Interface Enclosure -** The interface enclosure is situated on the right hand side of the vehicle. An operator panel receives electrical signals from the various limit switches and solenoids, and provides a visual display of the following systems:

(1) Emergency Stop
(2) Supplies Status
(3) Oil Status
(4) Launcher Deployment Controls
(5) PTO Override
(6) Pump Running
(7) Panel Illumination
(8) Lamp Test
(9) Vehicle Status
(10) Controller Status
(11) Bridge Build Select
(12) Breaker Resets

h. **Chassis Junction Box -** The chassis junction box is situated on the rear left hand side of the vehicle chassis between the top plates of the cross member. Harnesses distribute power to the Moving Slide Frame Junction Box via a connector and through an energy chain.

i. The Tail Lift Junction Box also receives its electrical supply from the Chassis Junction Box.

j. **Tail Lift Junction Box -** The Tail Lift Junction Box is situated on the left hand Tail Lift Lifting Arm. Electrical circuits distribute electrical supplies to the Tail Lift solenoids and the socket for the Tail Lift remote control.

k. **Slide Frame Junction Box -** The Slide Frame Junction Box is situated on the left-hand side of section 3 of the Slide Frame. Electrical supplies are distributed to the Tilt Roller Solenoids, A-Frame Rotate Solenoids and the Lower A-Frame Junction Box.

l. **Lower A-Frame Junction Box -** The Lower A-Frame Junction Box is situated on the left-hand rear side of the A-Frame Assembly. The lower left and right hand E-Stops are connected to the Lower A-Frame Junction Box, as are the left and right hand sockets for the Chest Pack remote control.

m. The Launcher Main Control Enclosure is also connected to the lower A-Frame Junction Box.

n. **Launcher Main Control Enclosure -** The Launcher Main Control Enclosure is situated on the left-hand side of the Launch Frame Assembly. The following components are connected to the Launcher Main Control Enclosure:

(1) Left and Right Hand Upper E-Stops.
(2) Launch Frame Articulator Manifold.
(3) Launch Frame Winch Control Manifold.
(4) Launch Frame Pinch Roll/Stowing Manifold.

o. The Launcher Main Control Enclosure receives electrical signals from solenoid valves in the Launcher Manifolds. These signals are displayed as lights on the Built In Test Equipment (BITE) panel.

p. The Chest Pack remote control can be plugged into the Launcher Main Control Enclosure.

q. **Pneumatic Suspension Cut-Off -** Located on the vehicle chassis the Pneumatic Suspension Cut-off disables the vehicle suspension correction system when the Slide Frame is deployed.

r. **Plug and Socket Break Points -** Plug and Socket Break Points in the Harnesses between the Chassis Junction Box, Lower A-Frame Junction Box and the Moving Slide Frame Junction Box allow the DSB to be disconnected electrically when preparation for air transportation is required.

3-3 LAUNCHER ELECTRICAL SCHEMATIC DRAWINGS

A set of drawings showing the electrical system, in detail, are shown in Appendix G.

3-4 TROUBLE SHOOTING FLOW CHARTS

a. The trouble-shooting flow charts are designed to assist the Unit Maintenance personnel in systematically diagnosing a fault and providing a solution for the rectification of that fault. The trouble shooting flow chart indicates faults to LRU level, a qualified electrician can carry out trouble shooting to component level with the aid of the Launcher Electrical System Drawings at Appendix G of this manual.

b. The title of the trouble shooting flow chart is constructed with the TSUM number, subject title and reference number (where applicable) to a step in the build sequence of a 40m bridge in Chapter 6 of the operator's manual TM 5-5420-279-10, for example; TSUM - 3-001 A-Frame Fold (Deploy) (13).

c. All trouble shooting flow charts start at the top of a page. The boxes used in the flow charts depict the following information.

(1) A circle or rounded rectangle shows the start or end of a flow chart sequence.

(2) A rectangle or square displays information intended as an instruction or statement.

(3) A diamond box displays a question or requires the reader to make a decision.

(4) **TSO** stands for Trouble Shooting Operator, these can be found in the operator's manual TM 5-5420-279-10.

(5) **TSUM** stands for Trouble Shooting Unit Maintenance.

d. The following abbreviations are used throughout the trouble shooting flow charts and refer to main electrical enclosure or junction boxes in the electrical system:

(1) IE Interface Enclosure.

(2) CB Chassis Junction Box.

(3) MF Moving Slide Frame Junction Box.

(4) LF Lower A-Frame Junction Box.

(5) ESLL Left Side Lower E-Stop and Remote Chest Pack Junction Box.

(6) ESRL Right Side Lower E-Stop and Remote Chest Pack Junction Box.

(7) ESLU Upper Left Side E-Stop.

(8) ESRU Upper Right Side E-Stop.

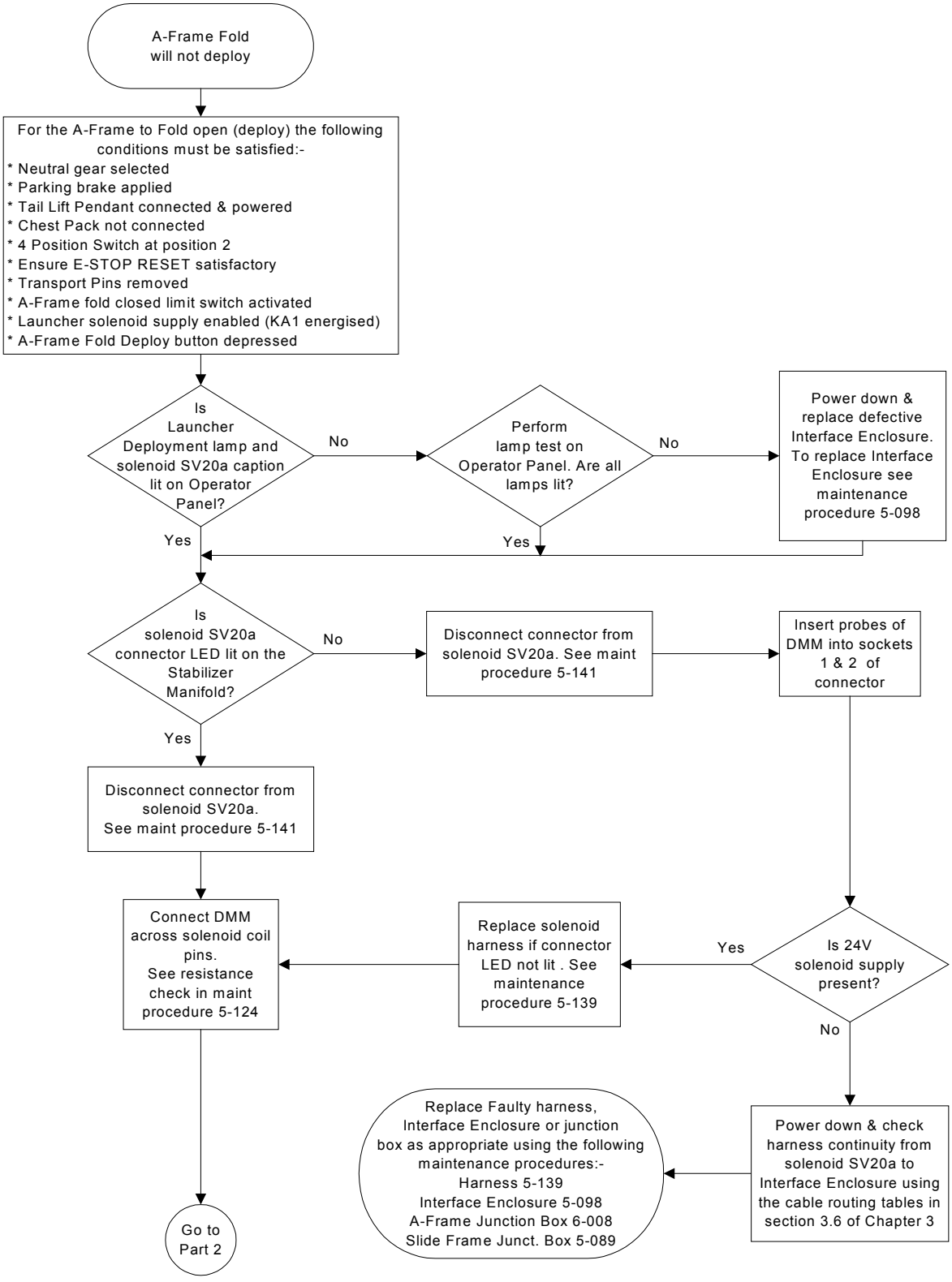
(9) DMM Digital Multimeter.

3-5 TROUBLE SHOOTING FLOW CHART LIST

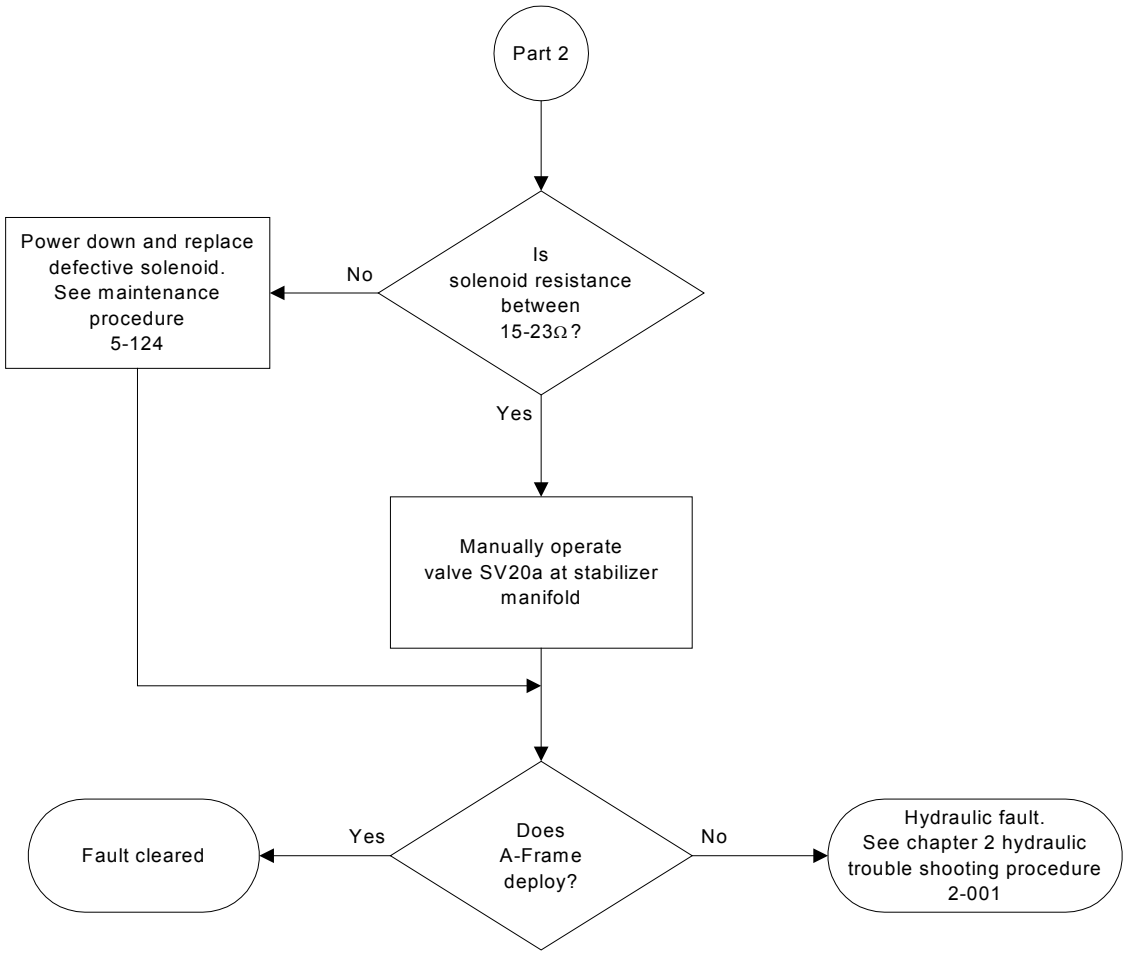
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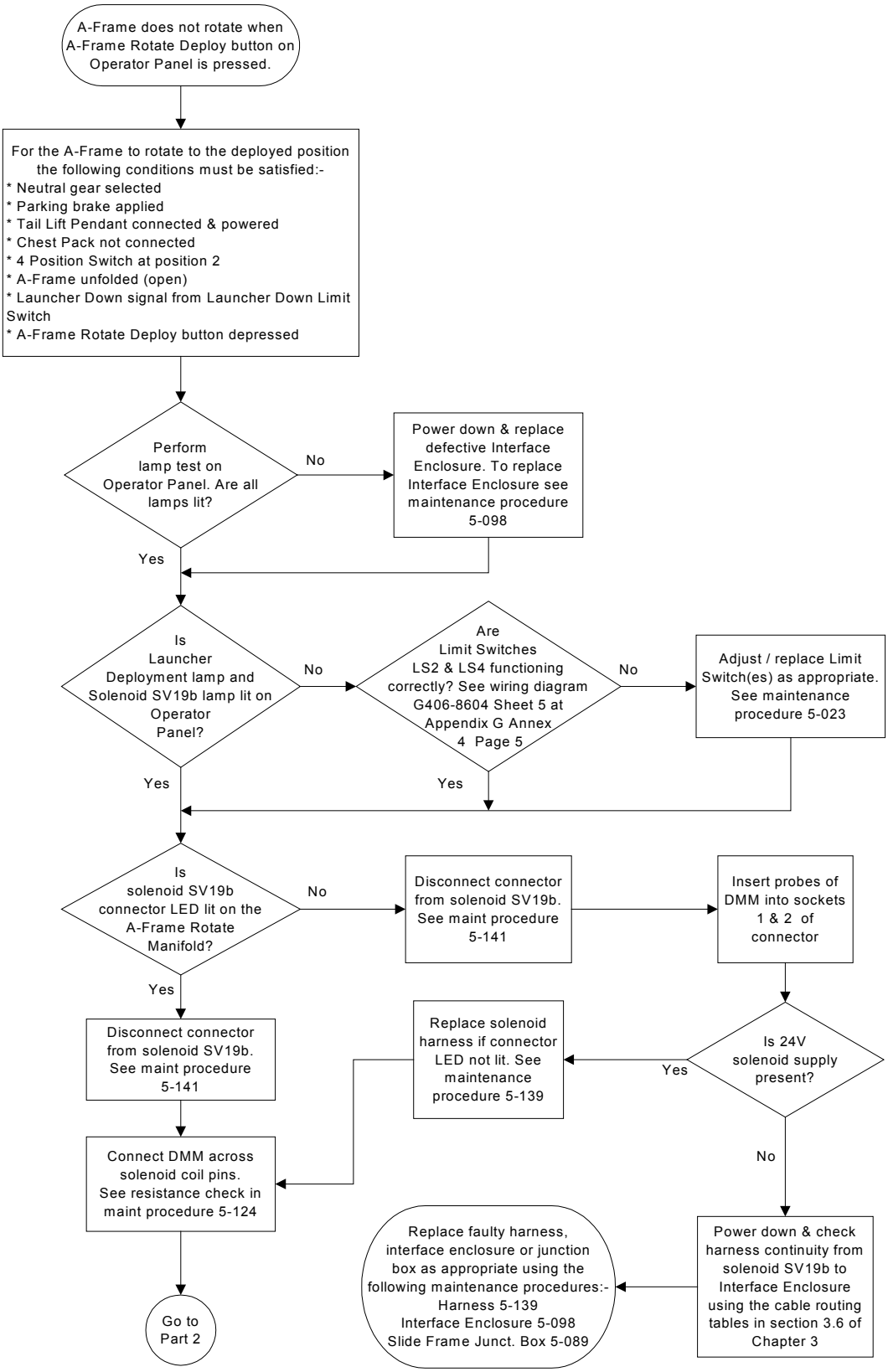
TSUM - 3-001 A-Frame Fold (Deploy) (13) Part 1



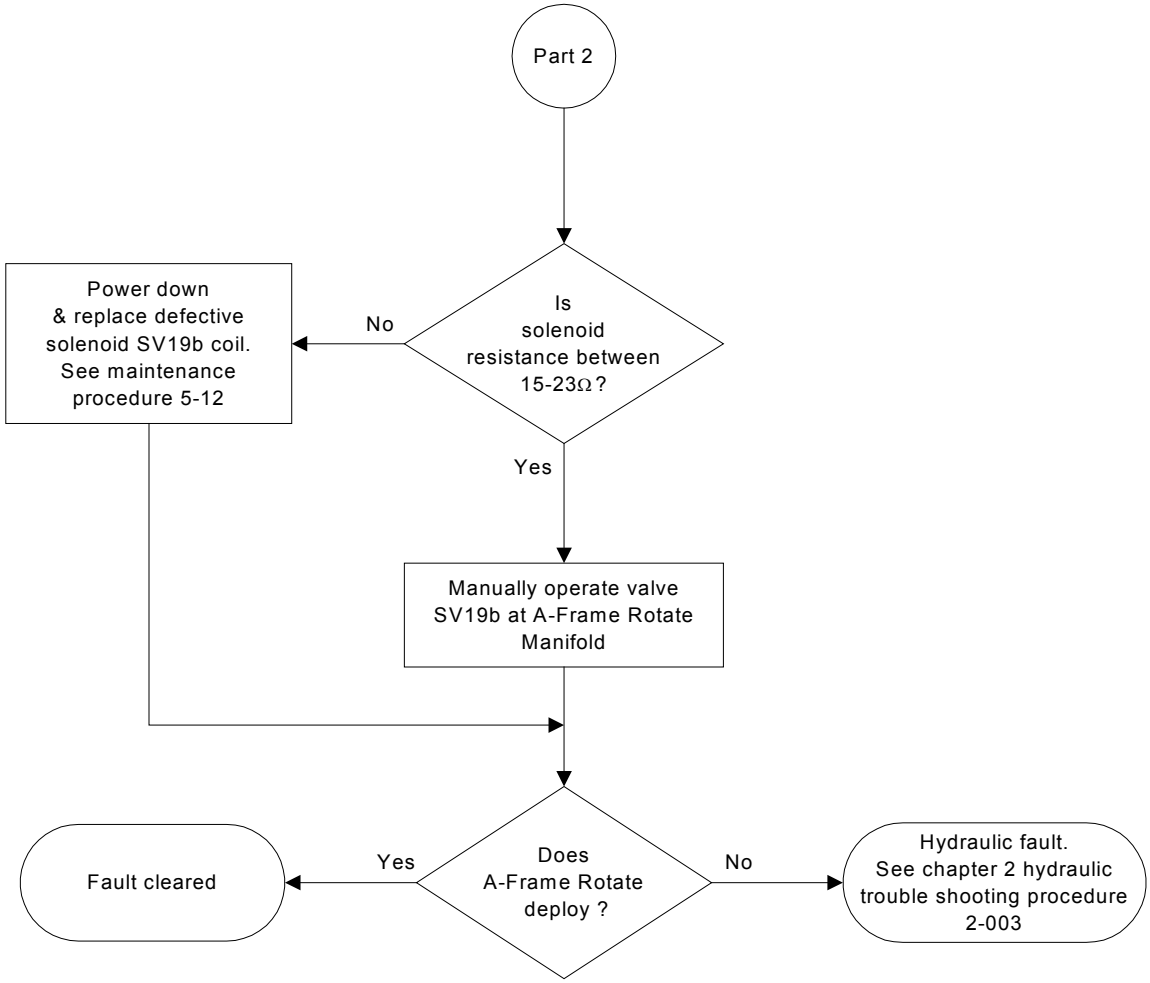
TSUM - 3-001 A-Frame Fold (Deploy) (13) Part 2



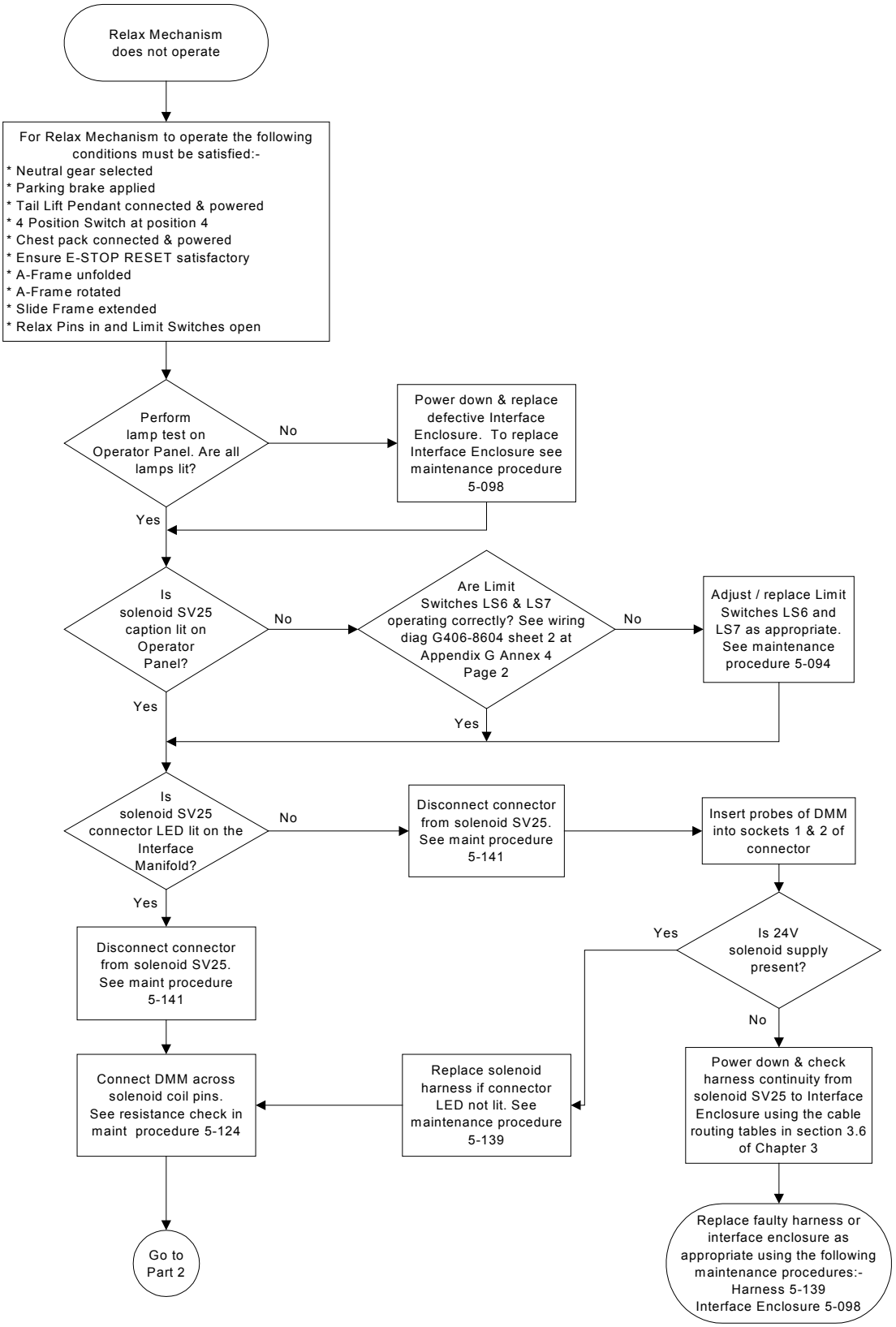
TSUM - 3-002 A-Frame Rotate (Deploy) (17) Part 1



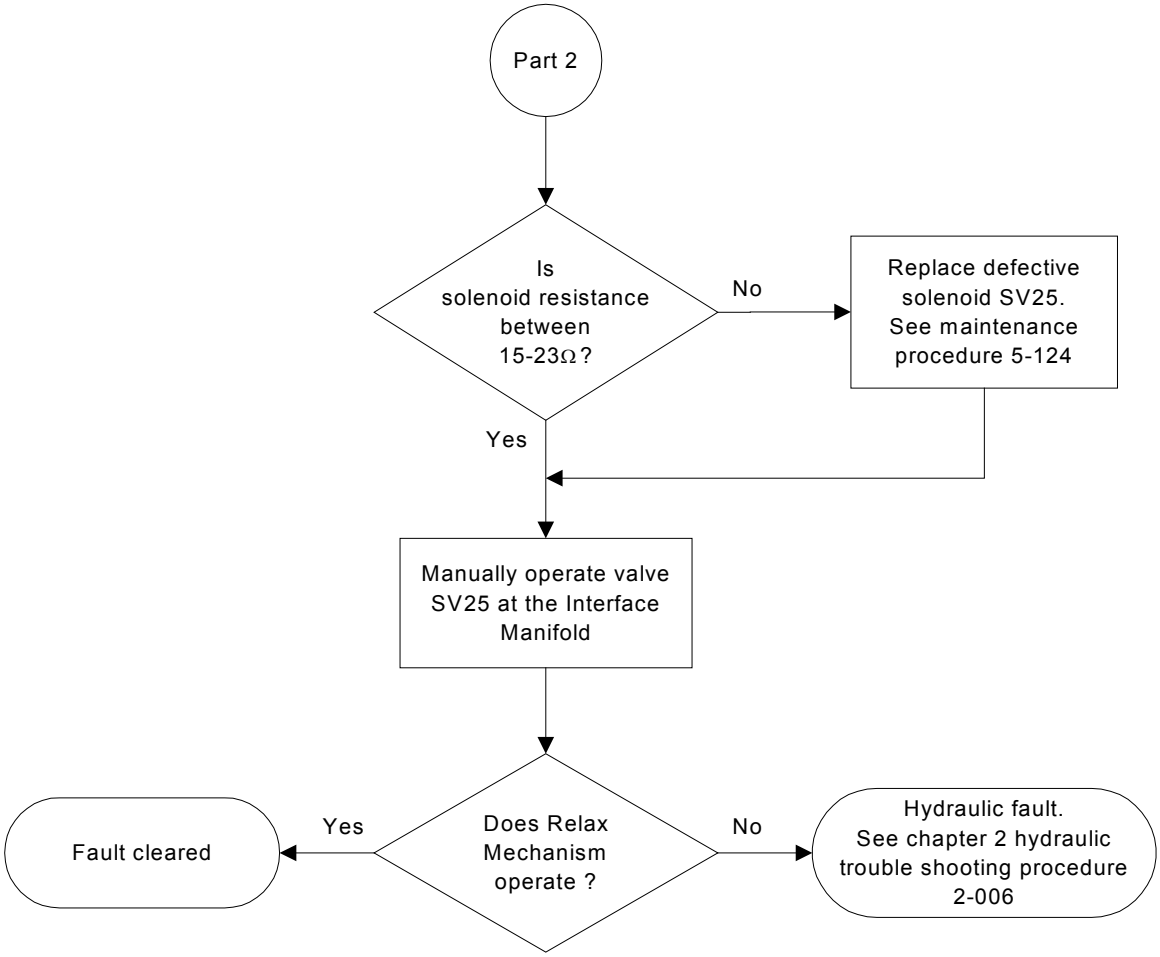
TSUM - 3-002 A-Frame Rotate (Deploy) (17) Part 2



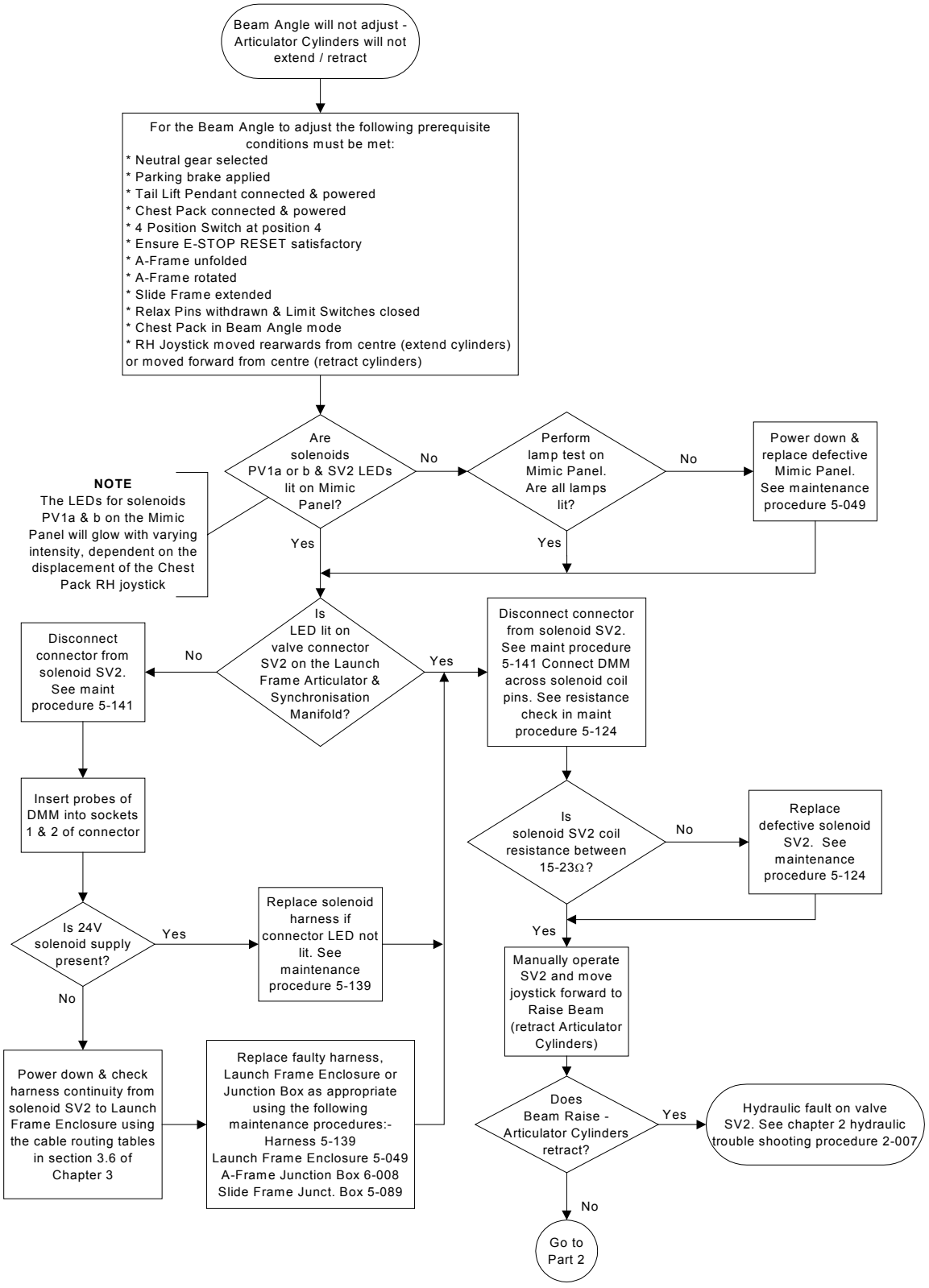
TSUM - 3-003 Relax (26) Part 1



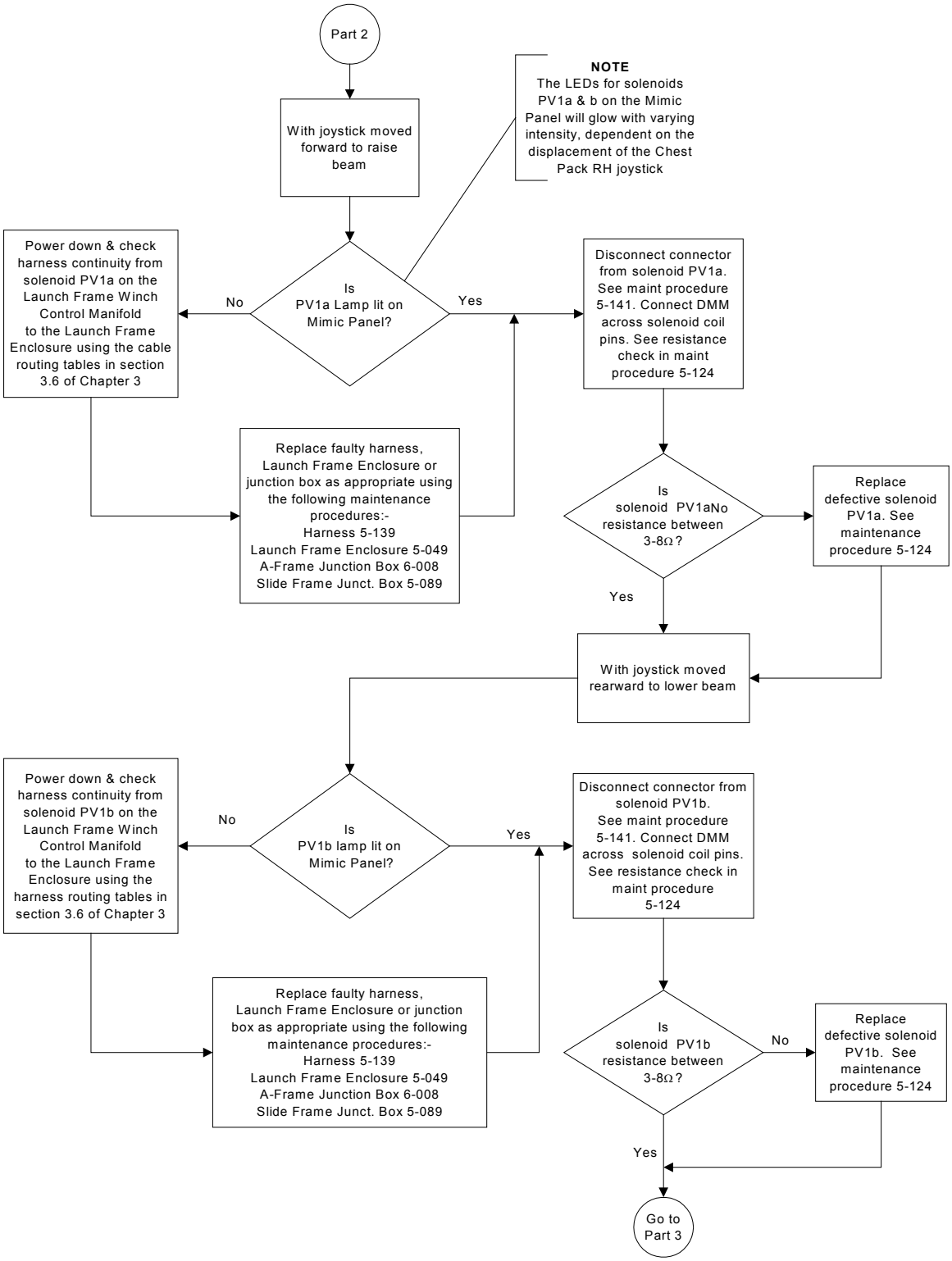
TSUM - 3-003 Relax (26) Part 2



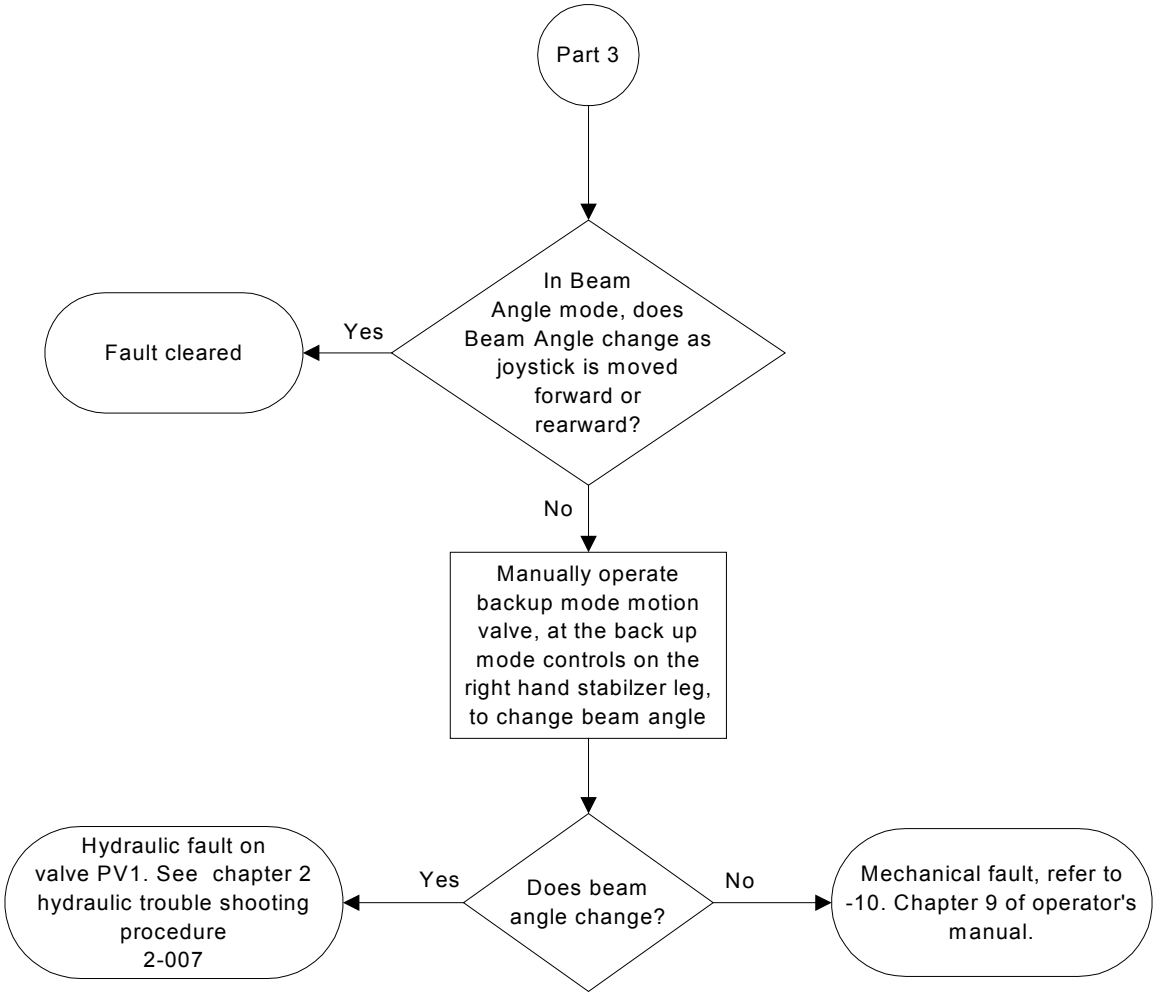
TSUM - 3-004 Articulator (Extend & Retract) (31 / 94) Part 1



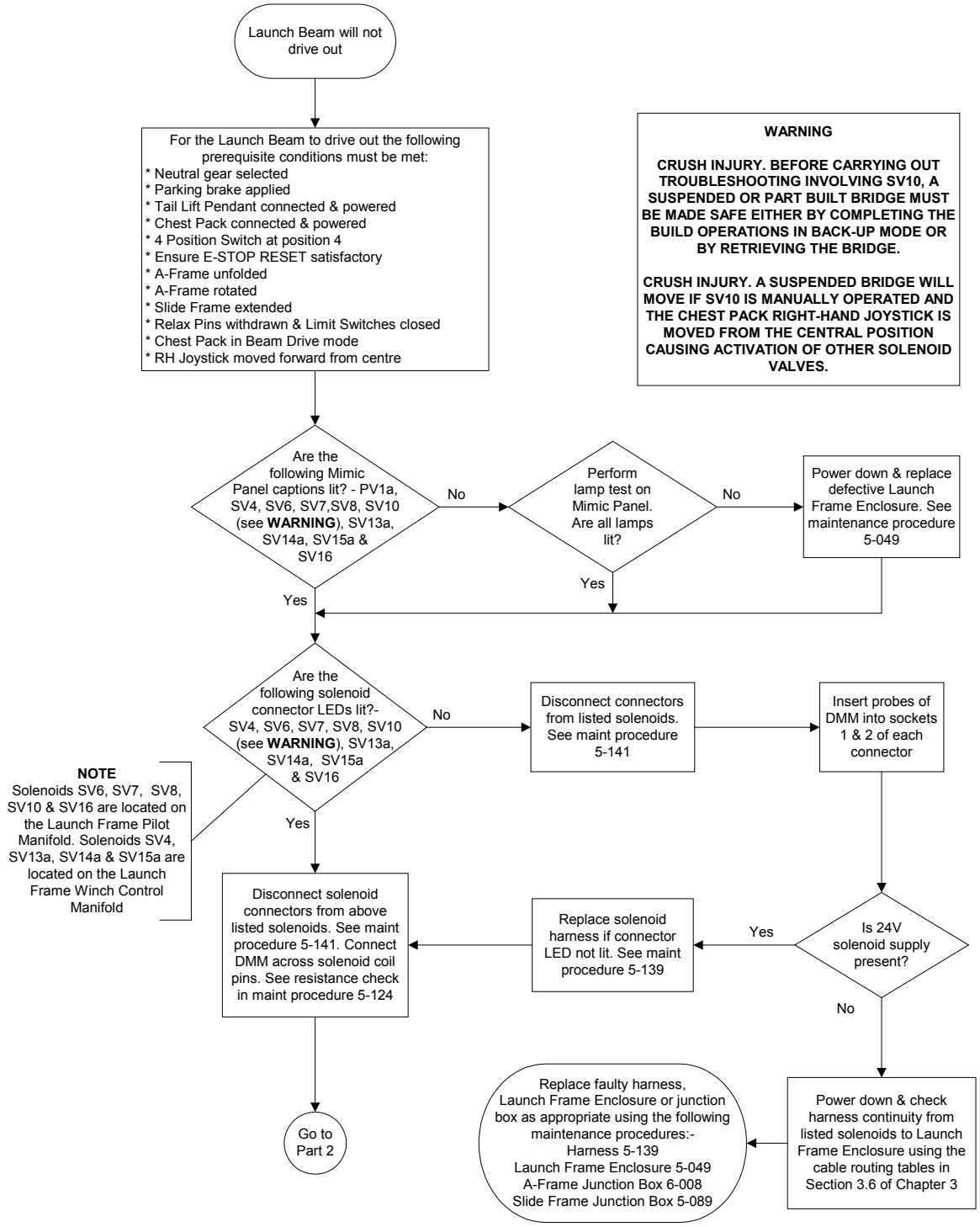
TSUM - 3-004 Articulator (Extend & Retract) (31 / 94) Part 2



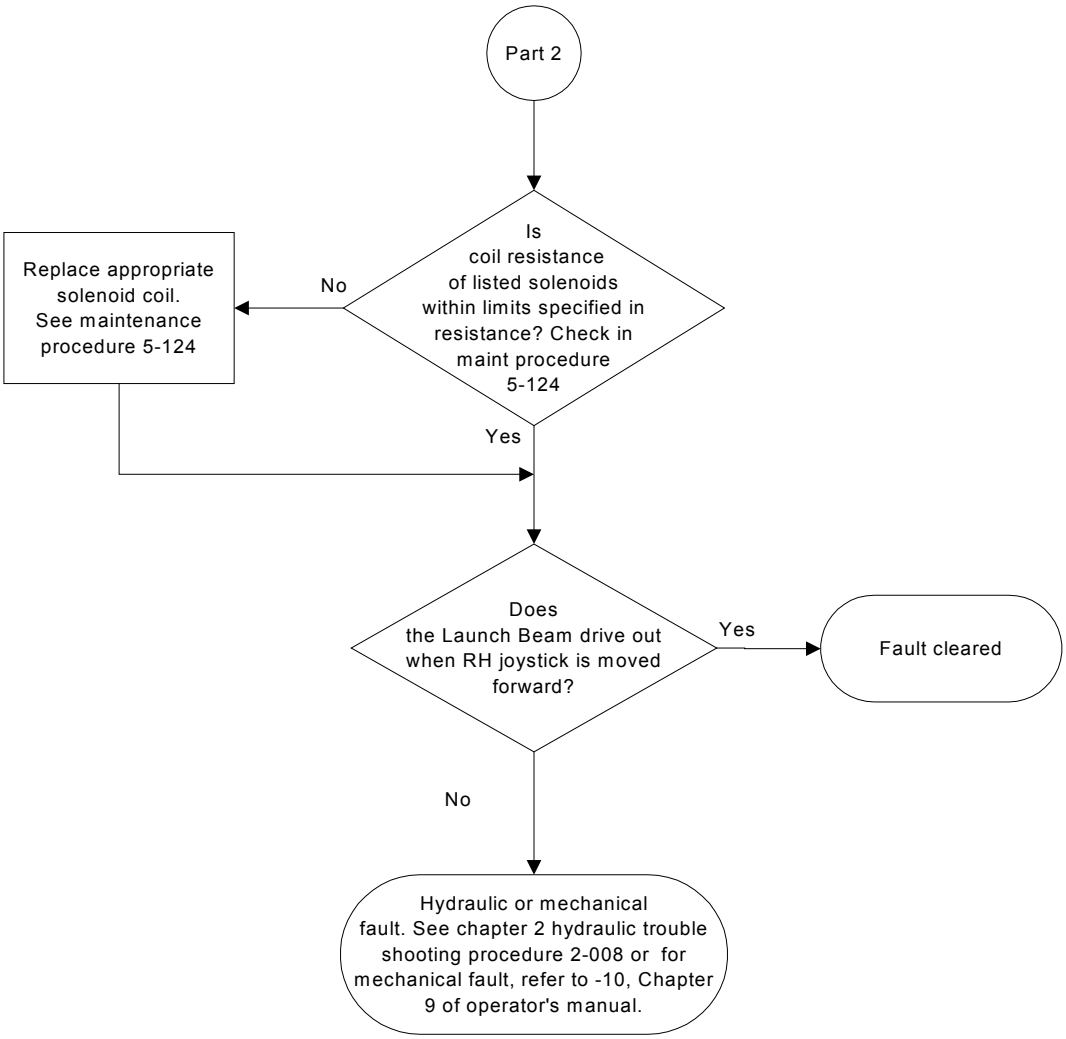
TSUM - 3-004 Articulator (Extend & Retract) (31 / 94) Part 3



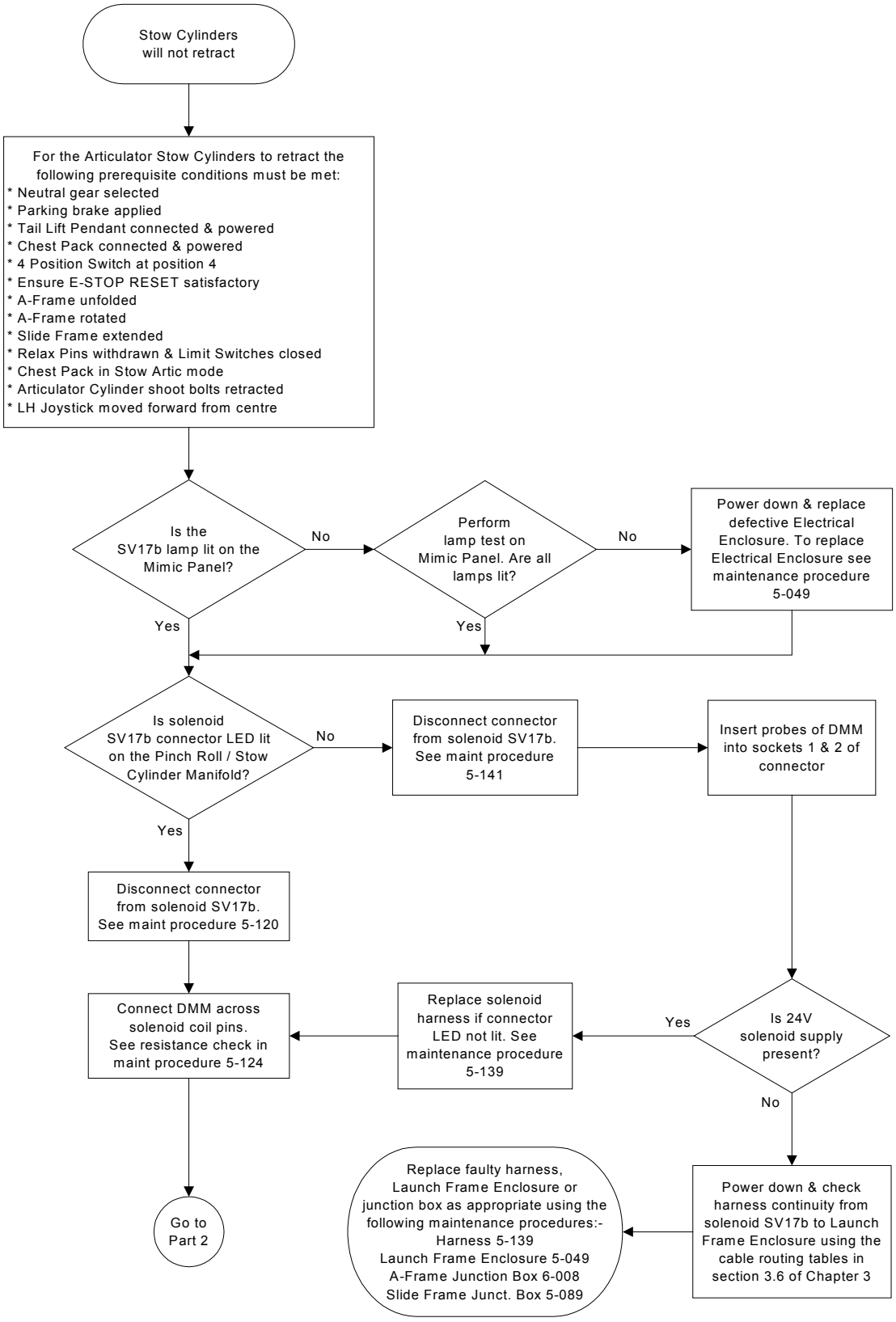
TSUM - 3-005 Beam Drive (Drive Out) (33) Part 1



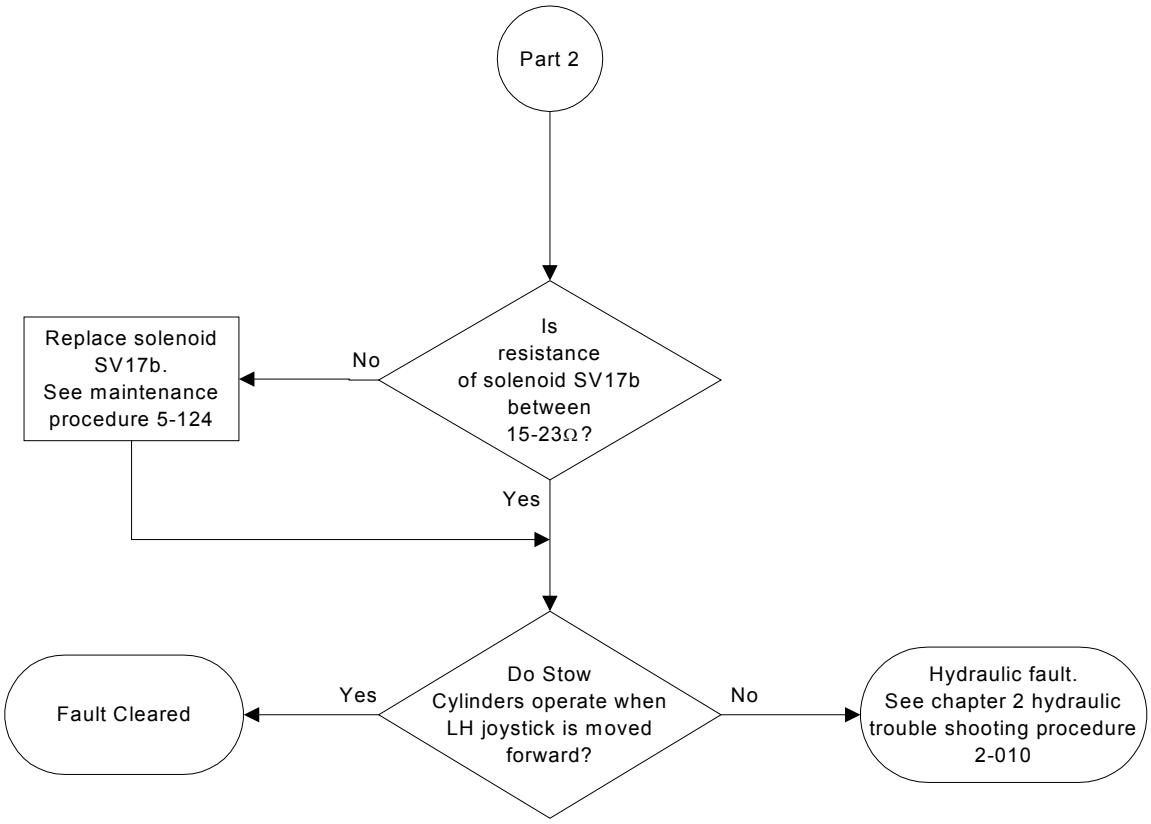
TSUM - 3-005 Beam Drive (Drive Out) (33) Part 2



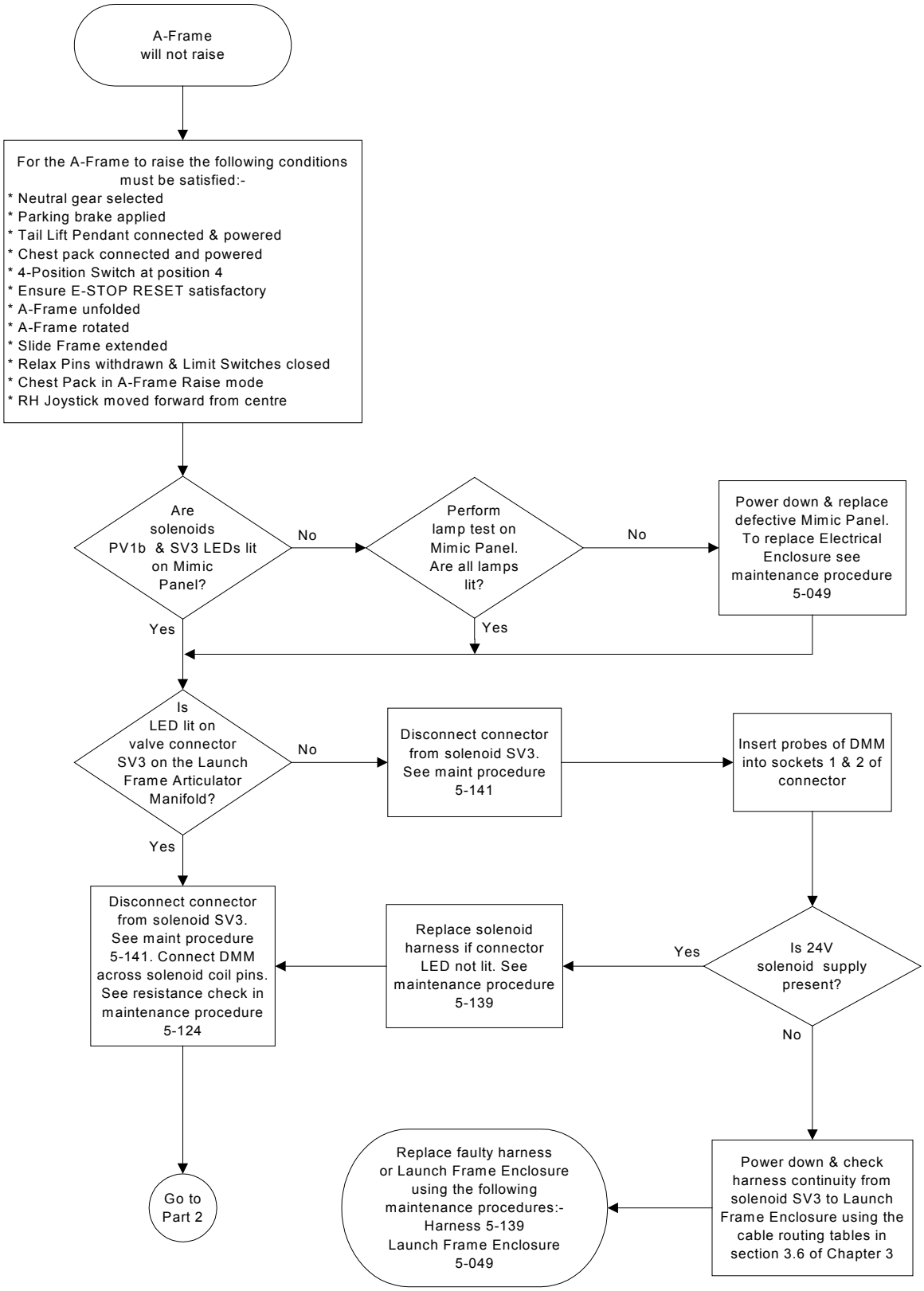
TSUM - 3-006 Stow Cylinder (38) Part 1



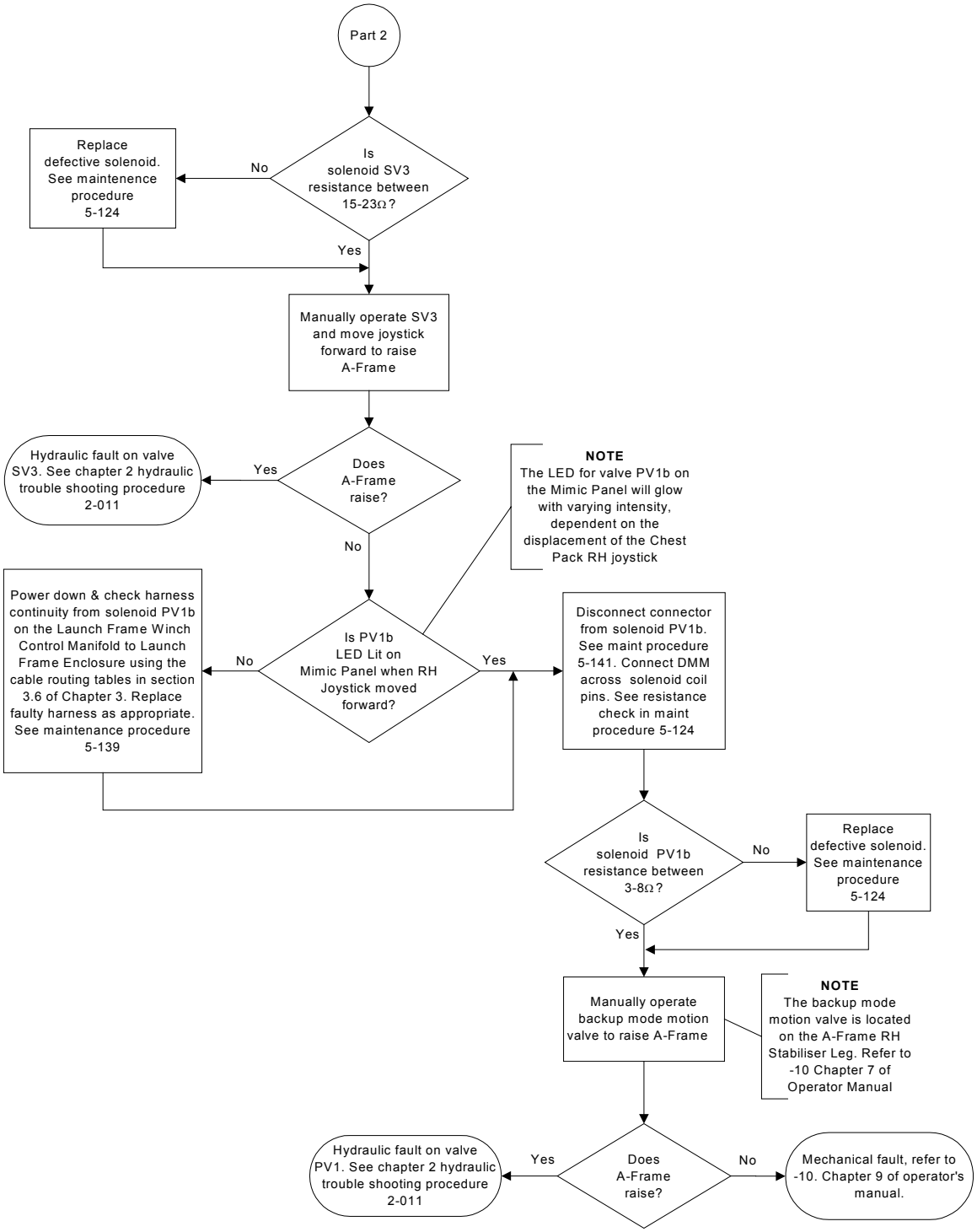
TSUM - 3-006 Stow Cylinder (38) Part 2



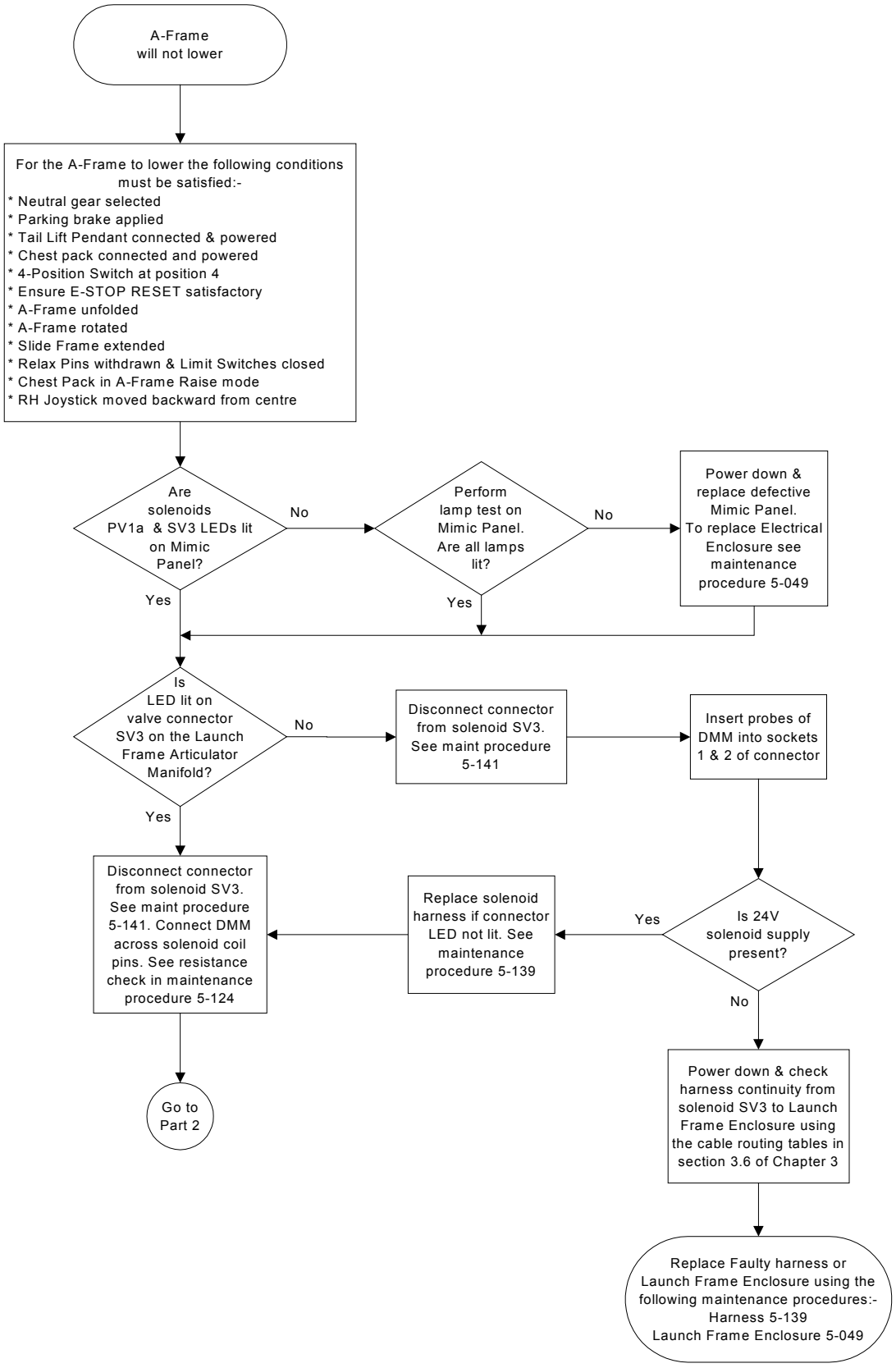
TSUM - 3-007 A-Frame Raise (39) Part 1



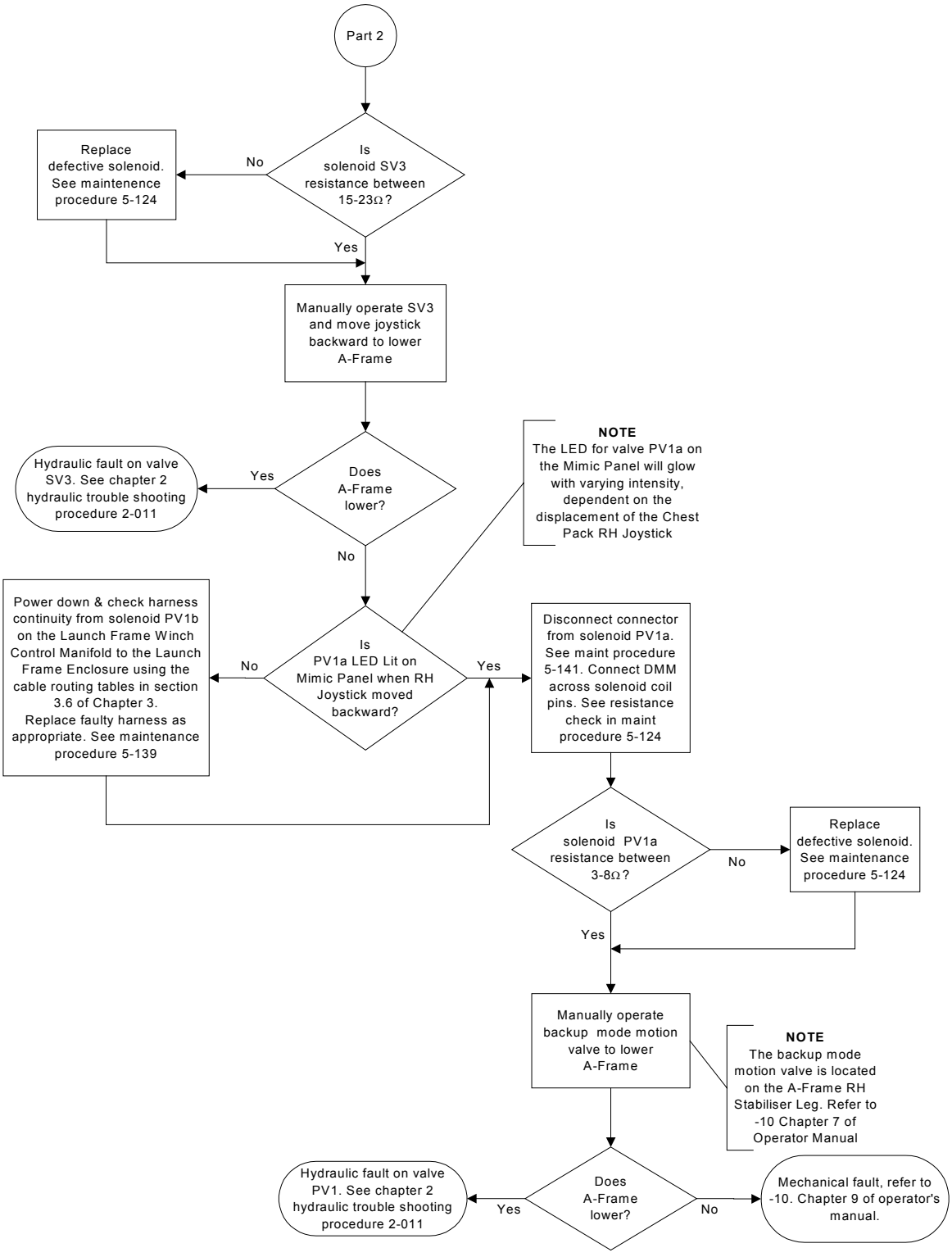
TSUM - 3-007 A-Frame Raise (39) Part 2



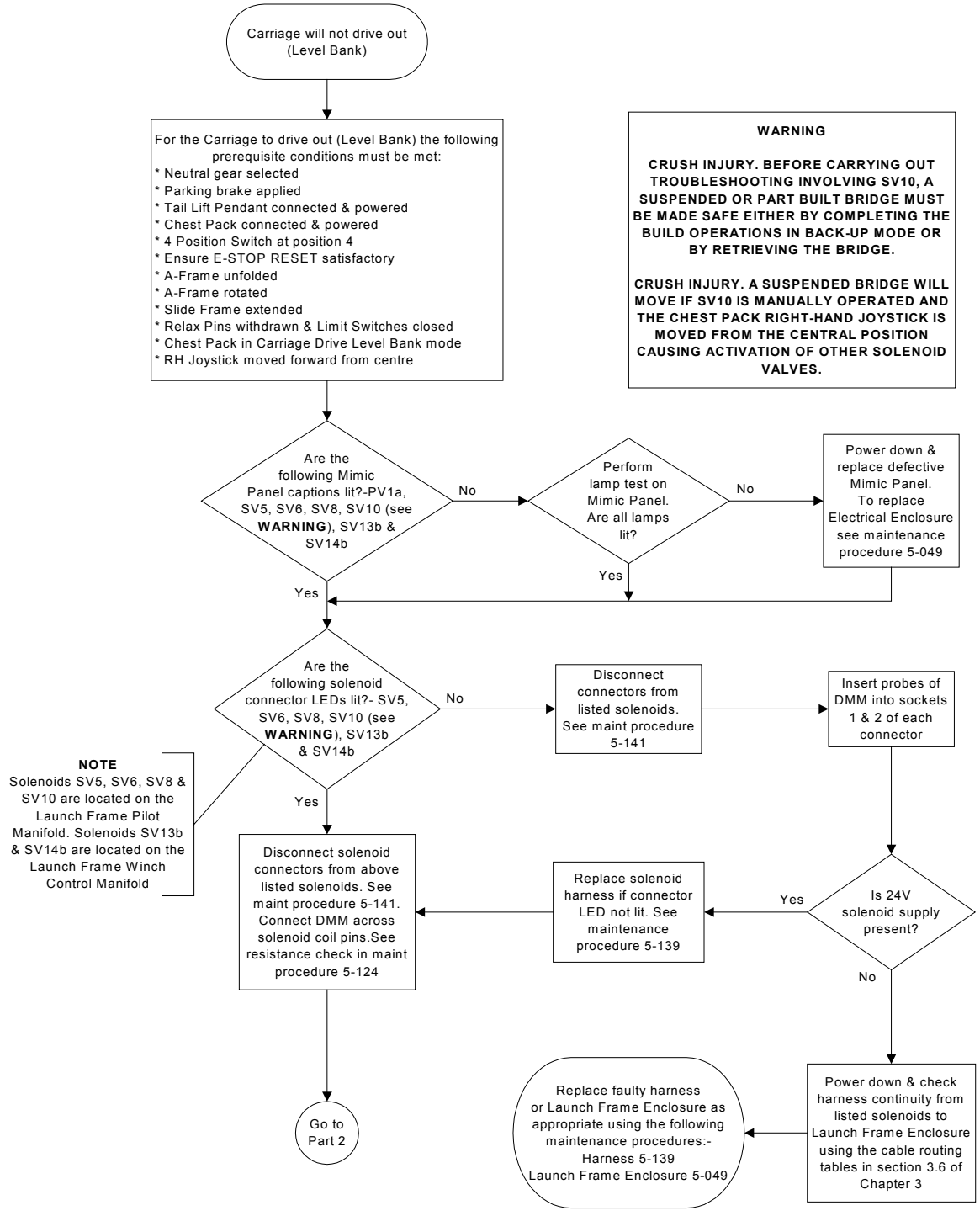
TSUM - 3-008 A-Frame Lower (91) Part 1



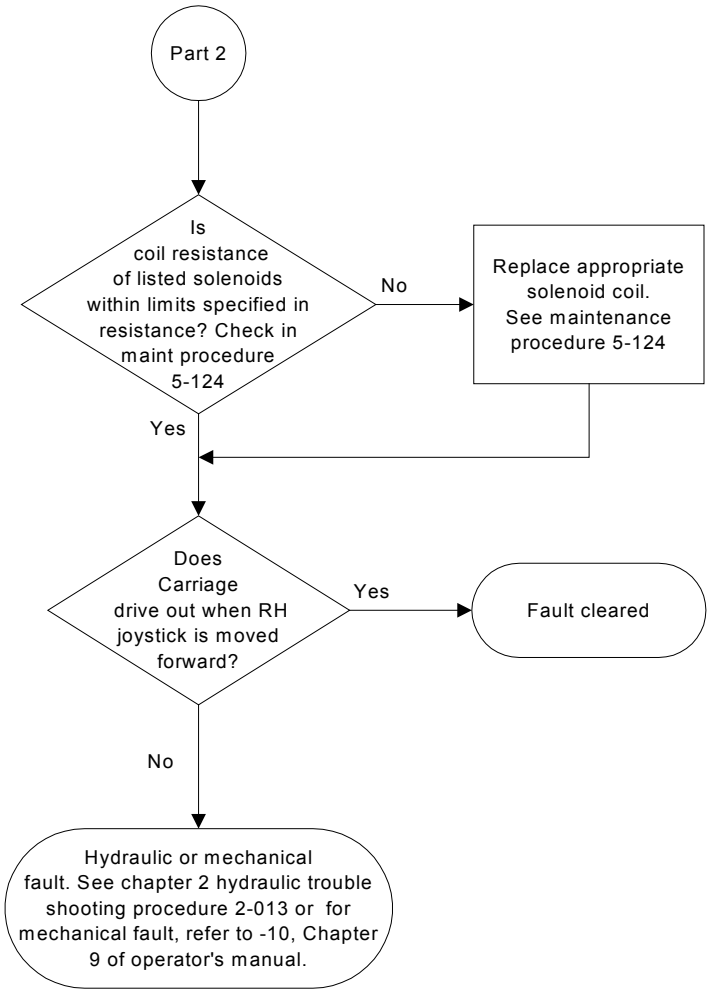
TSUM - 3-008 A-Frame Lower (91) Part 2



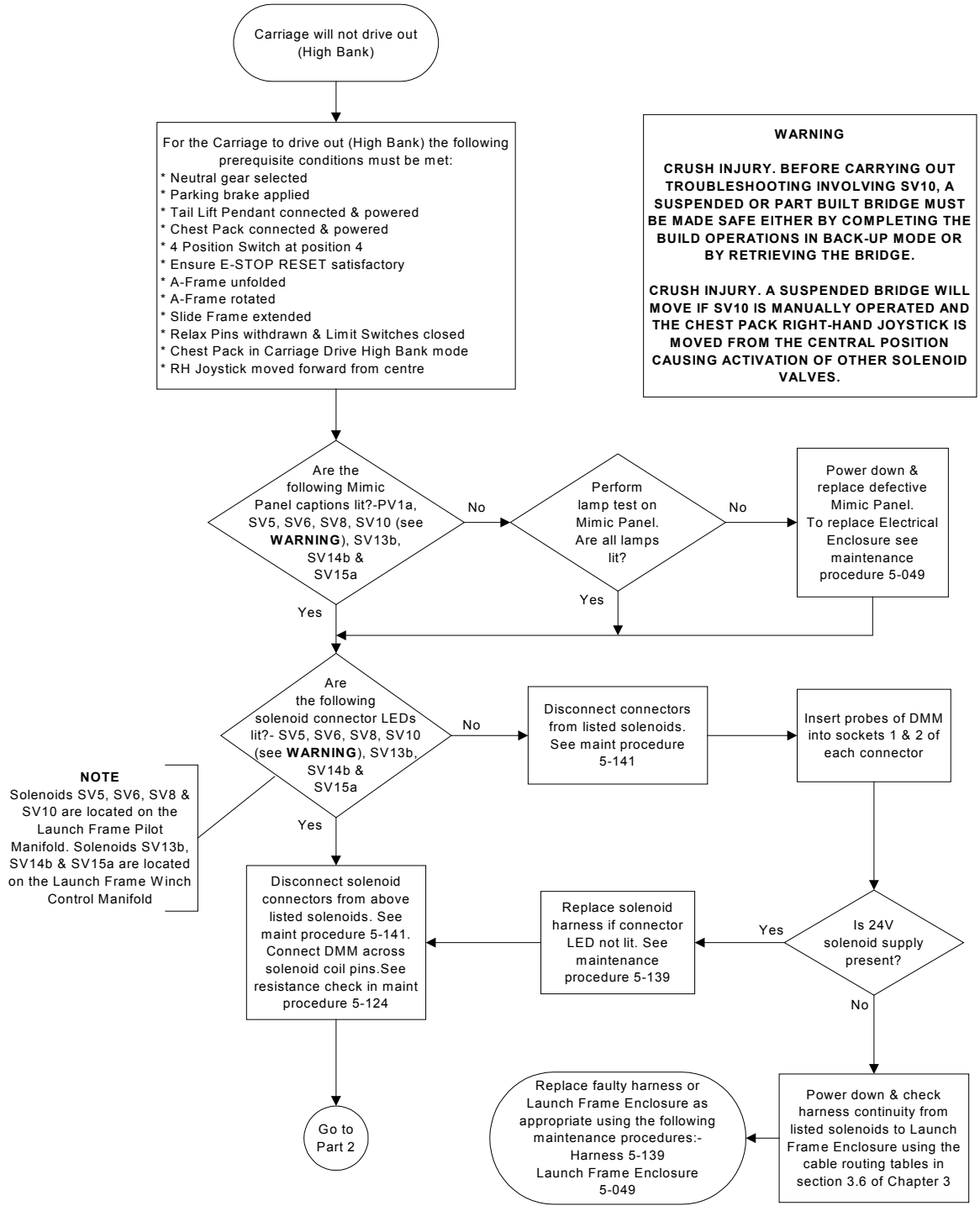
TSUM - 3-009 Carriage Drive Failure (Level Bank – Drive Out) (55) Part 1



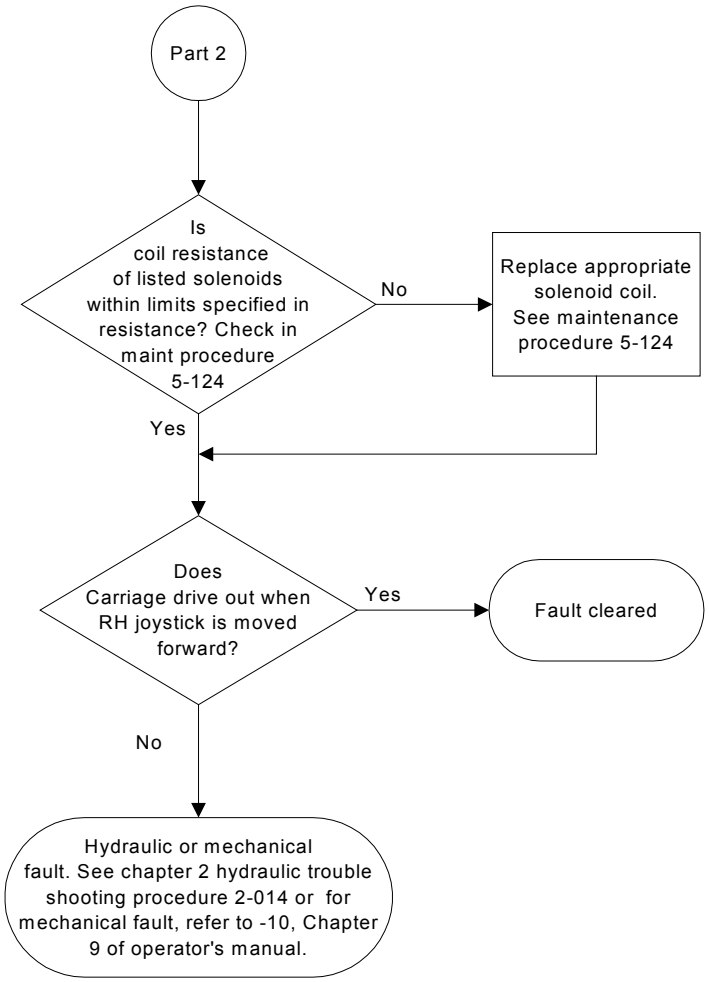
TSUM - 3-009 Carriage Drive Failure (Level Bank – Drive Out) (55) Part 2



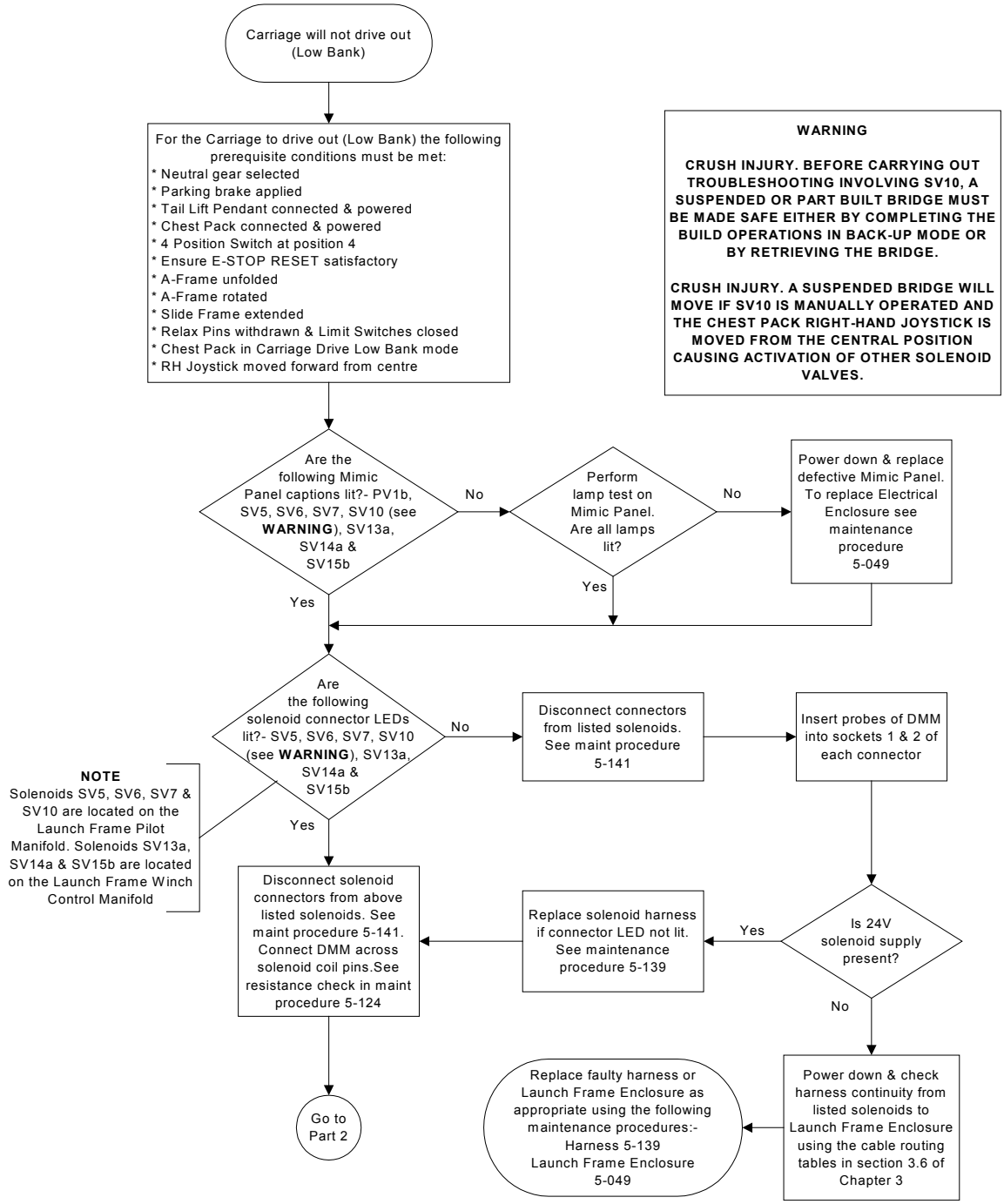
TSUM - 3-010 Carriage Drive Failure (High Bank – Drive Out) (55) Part 1



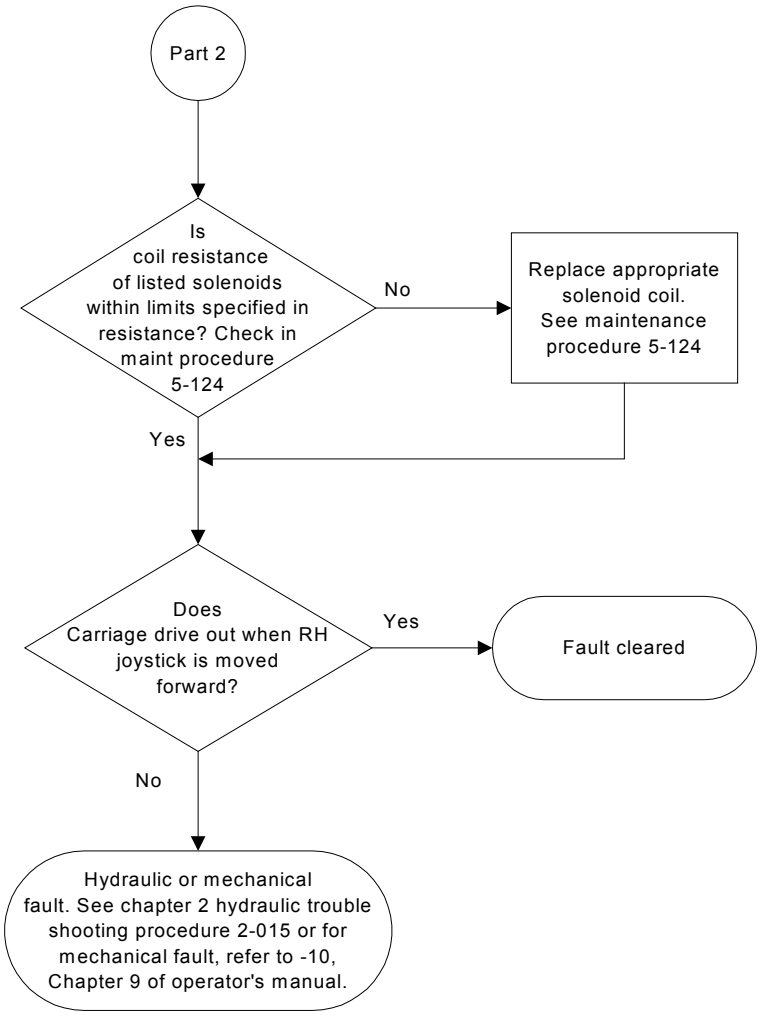
TSUM - 3-010 Carriage Drive Failure (High Bank – Drive Out) (55) Part 2



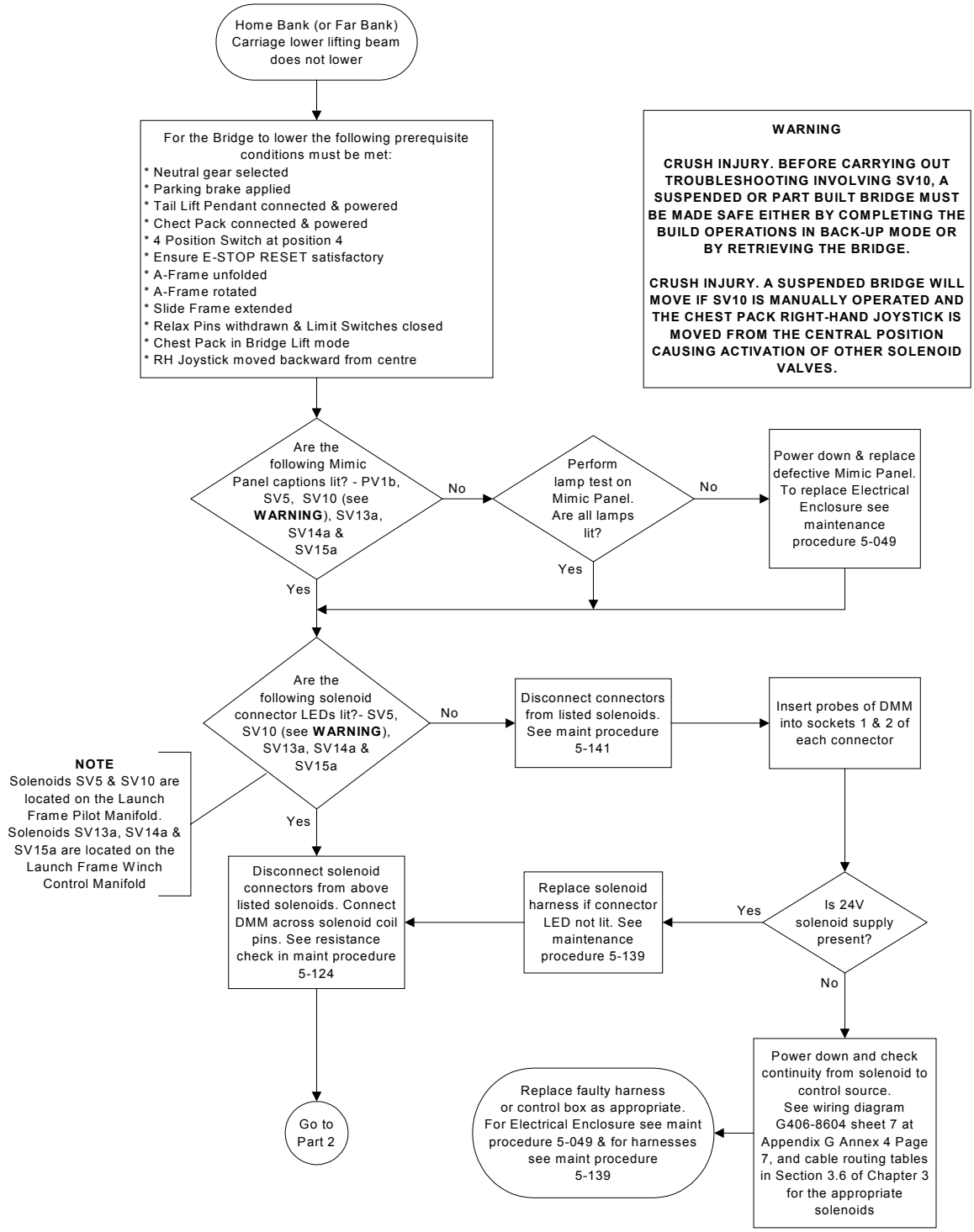
TSUM - 3-011 Carriage Drive Failure (Low Bank – Drive Out) (55) Part 1



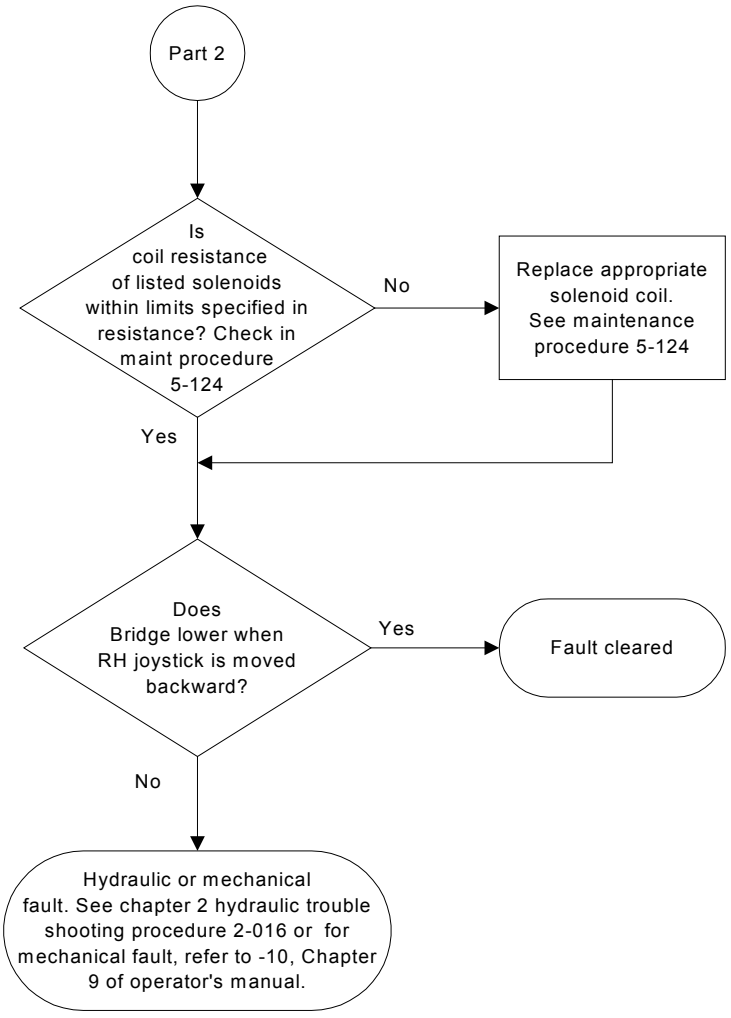
TSUM - 3-011 Carriage Drive Failure (Low Bank – Drive Out) (55) Part 2



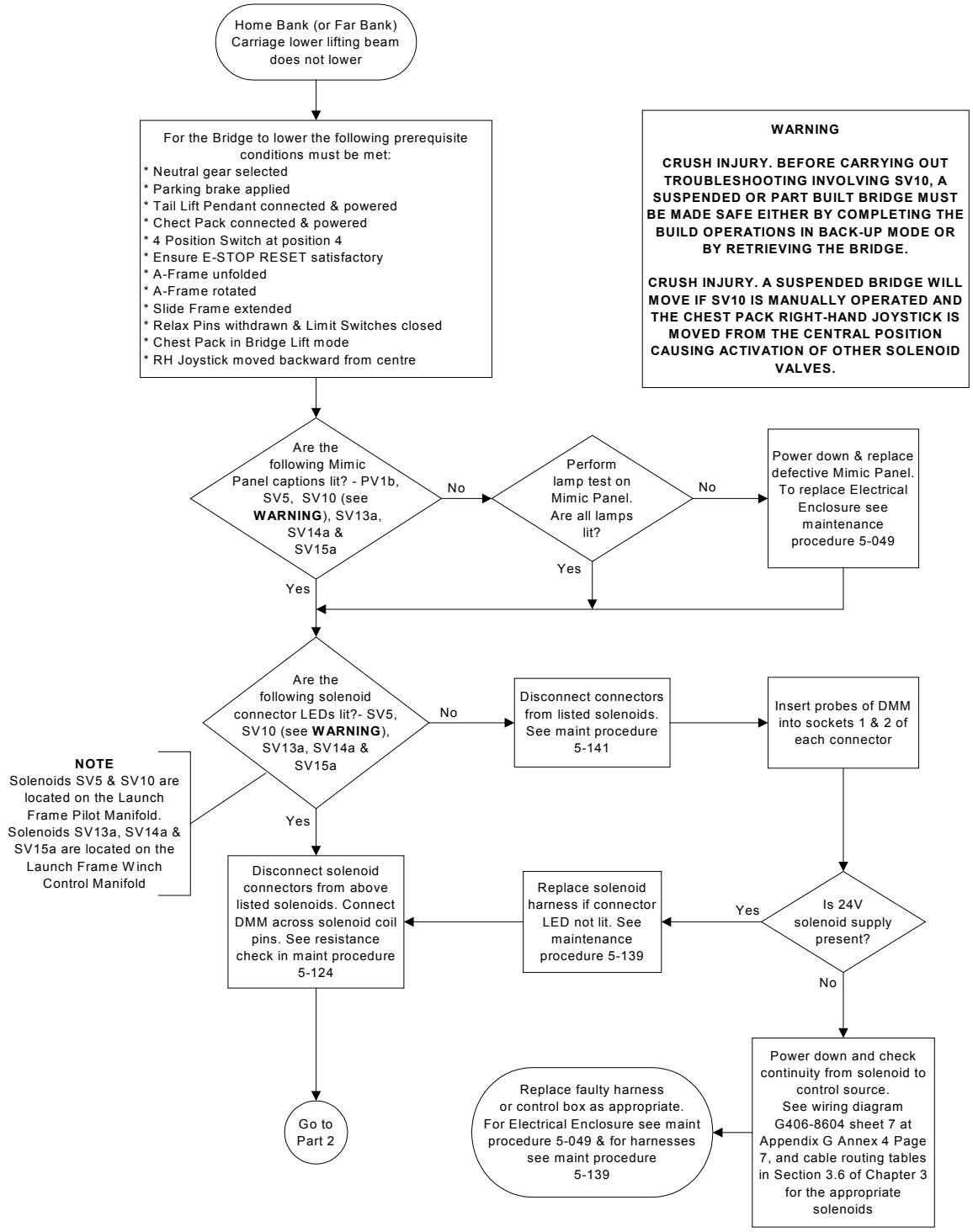
TSUM - 3-012 Bridge Lower (75) Part 1



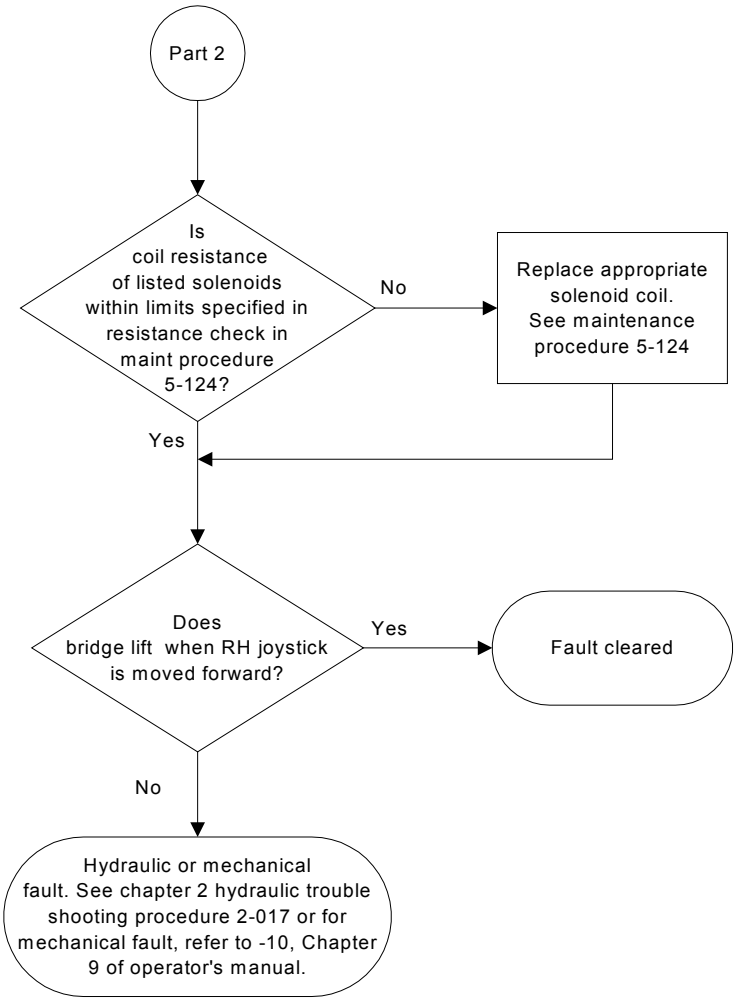
TSUM - 3-012 Bridge Lower (75) Part 2



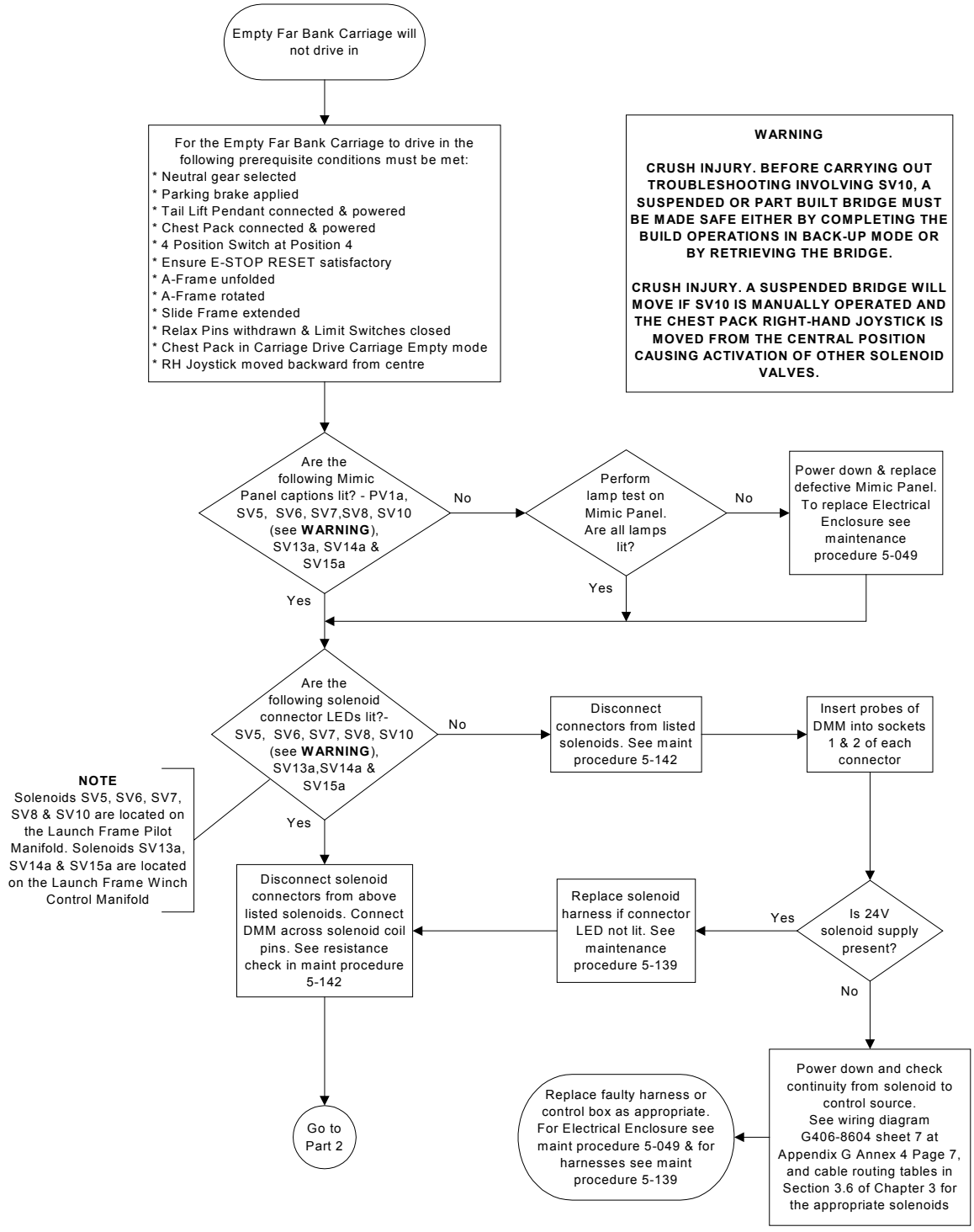
TSUM - 3-013 Bridge Lift (77) Part 1



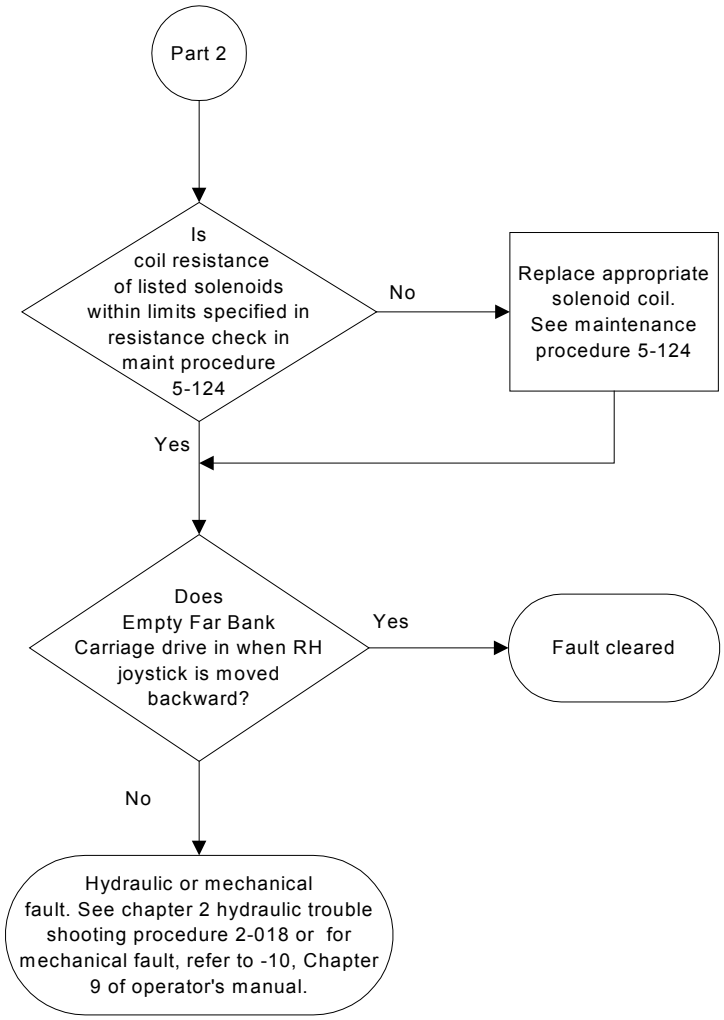
TSUM - 3-013 Bridge Lift (77) Part 2



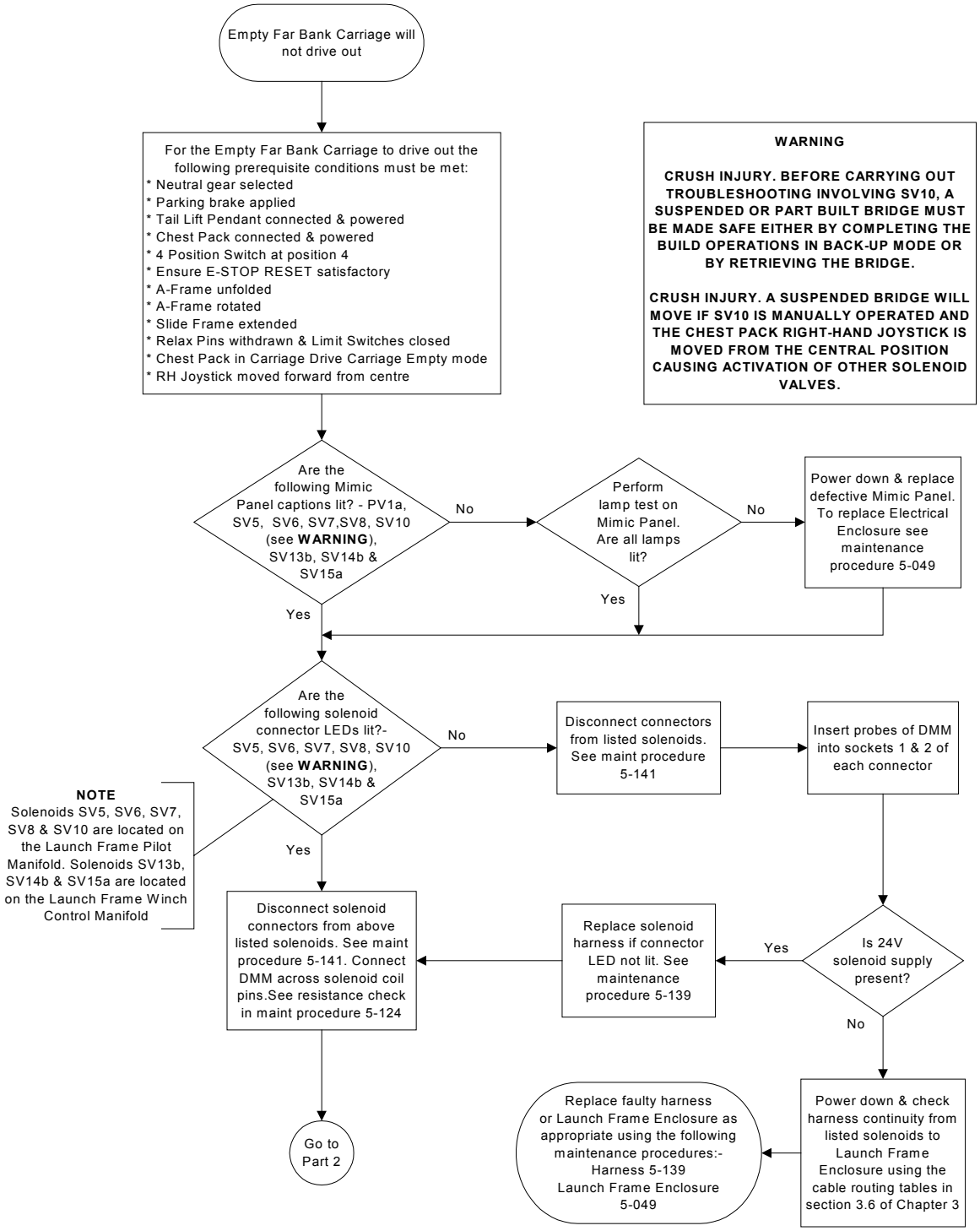
TSUM - 3-014 Carriage Empty Drive Failure (Drive In) (89) Part 1



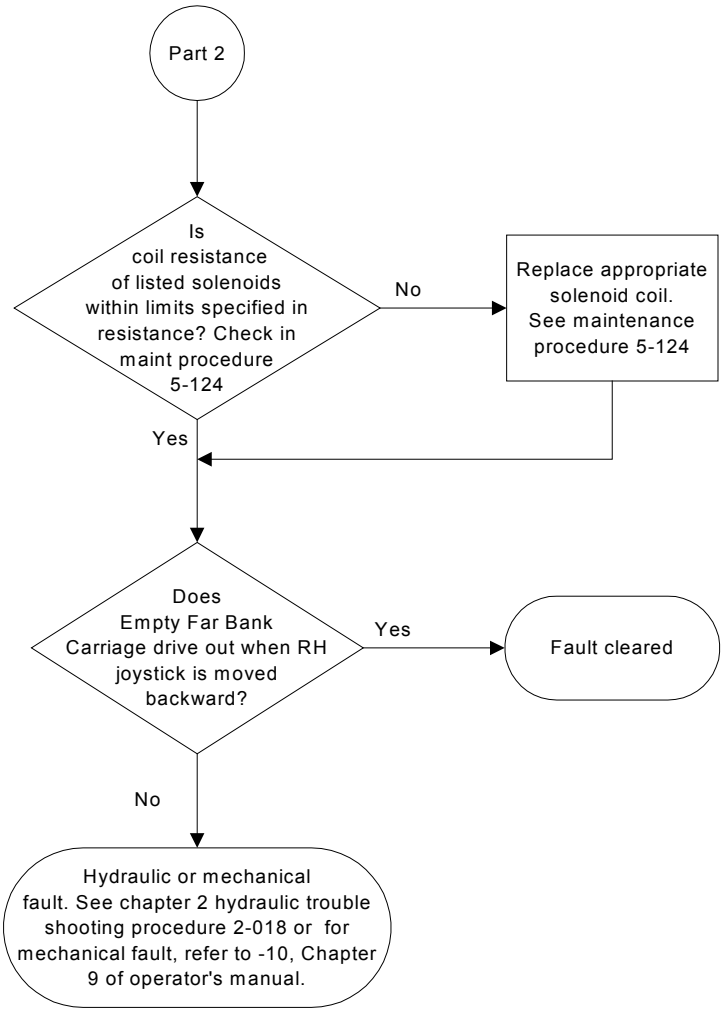
TSUM - 3-014 Carriage Empty Drive Failure (Drive In) (89) Part 2



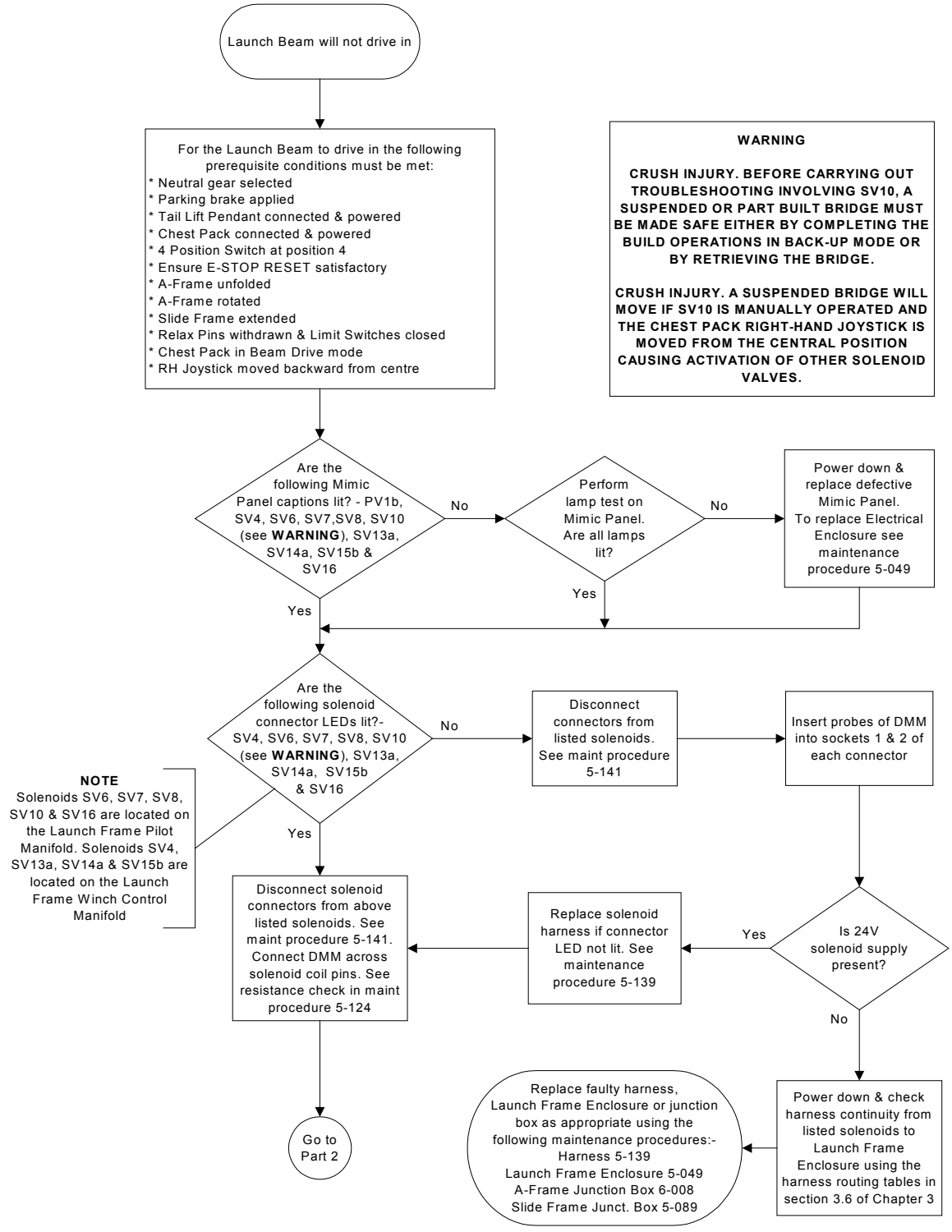
TSUM - 3-015 Carriage Empty Drive Failure (Drive Out) Part 1



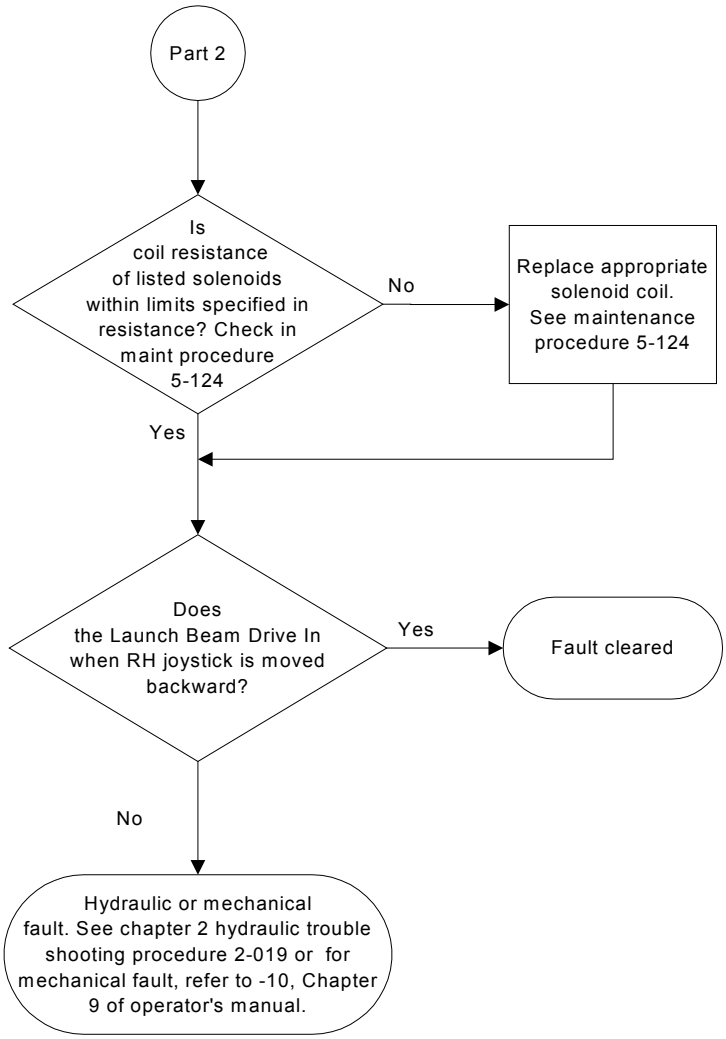
TSUM - 3-015 Carriage Empty Drive Failure (Drive Out) Part 2



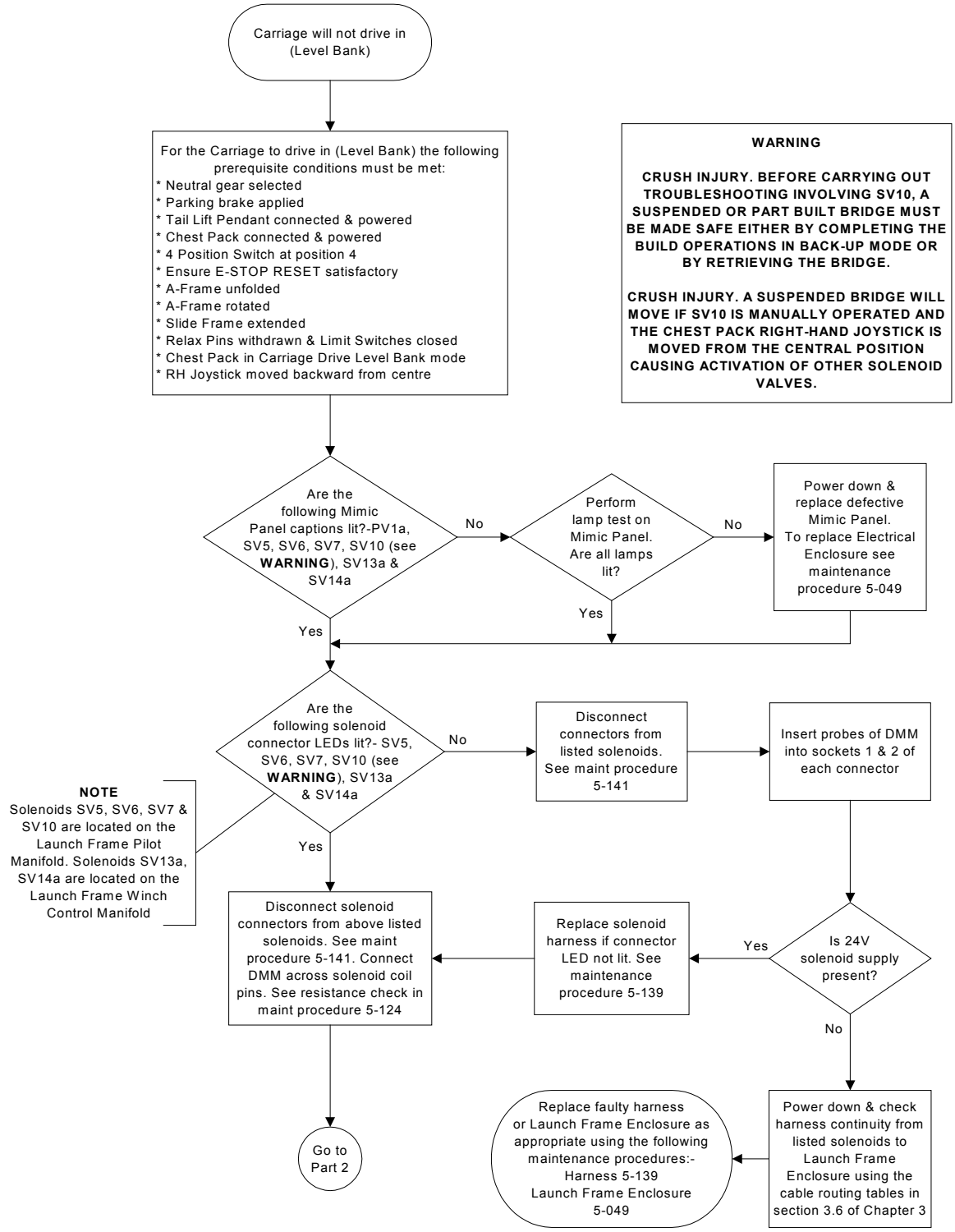
TSUM - 3-016 Beam Drive (Drive In) (99) Part 1



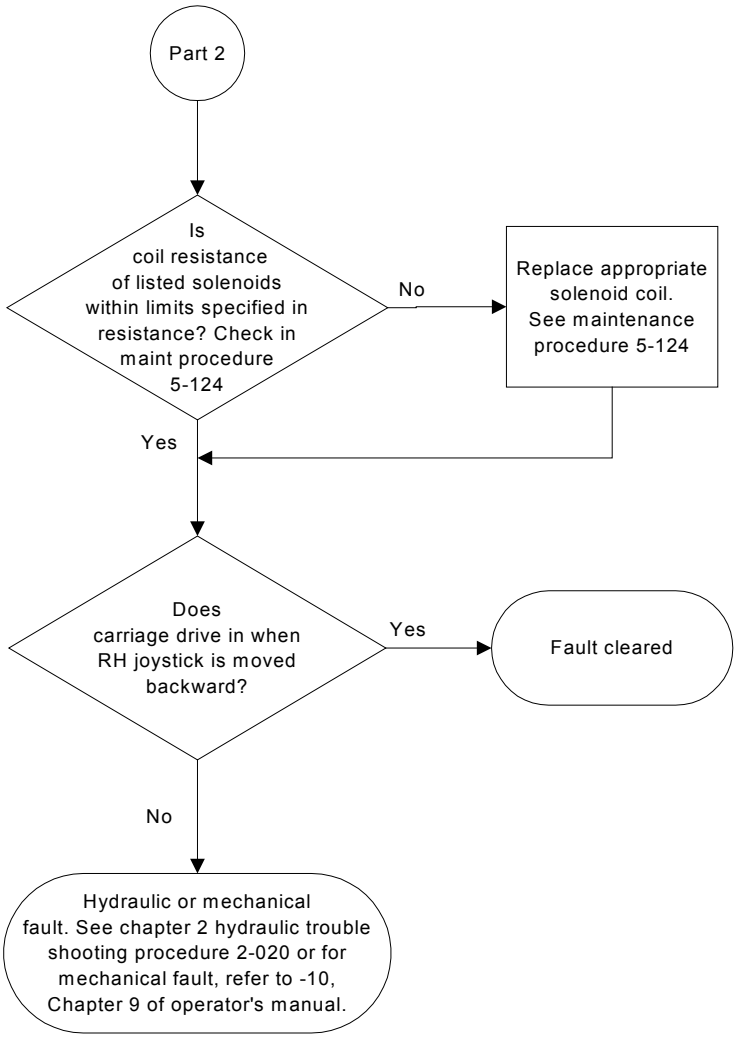
TSUM - 3-016 Beam Drive (Drive In) (99) Part 2



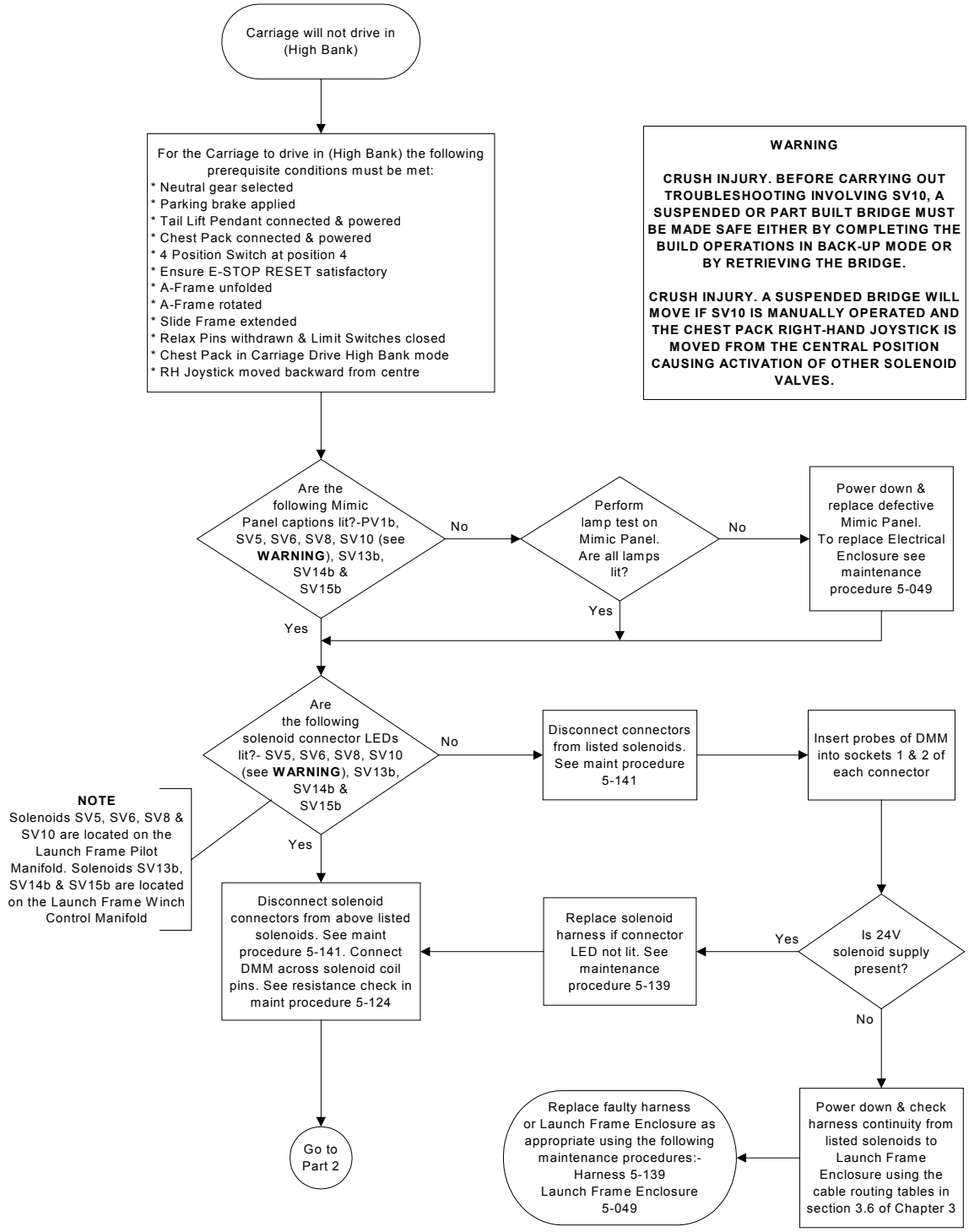
TSUM - 3-017 Carriage Drive Failure (Level Bank – Drive In) Part 1



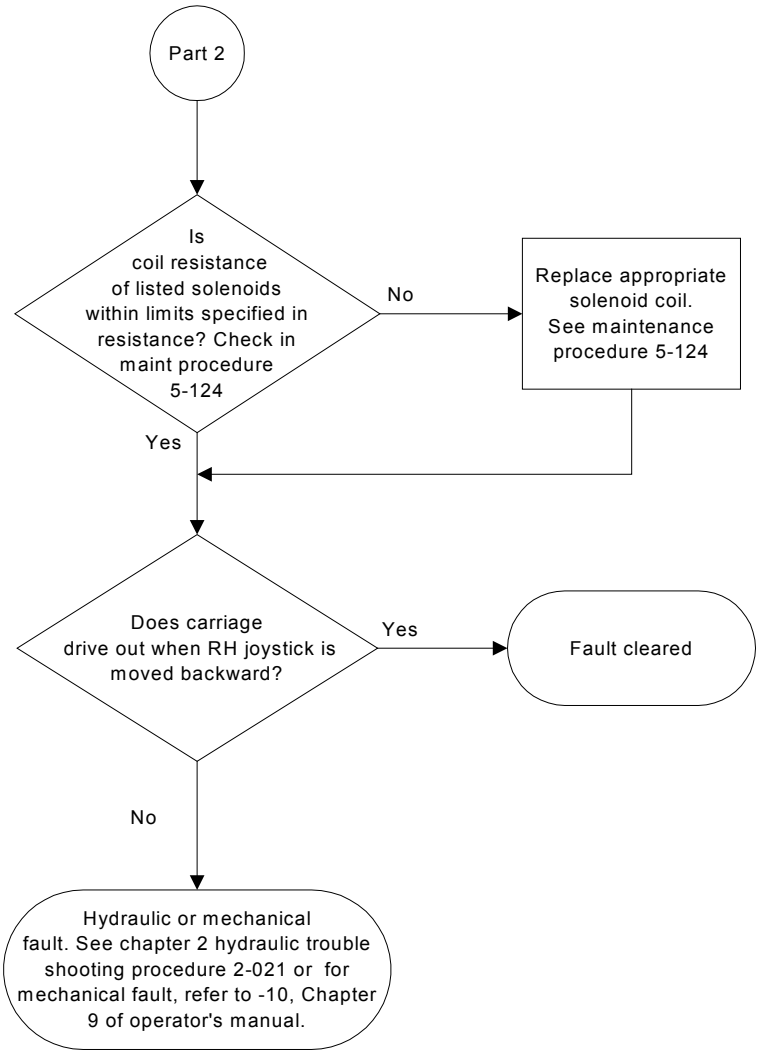
TSUM - 3-017 Carriage Drive Failure (Level Bank – Drive In) Part 2



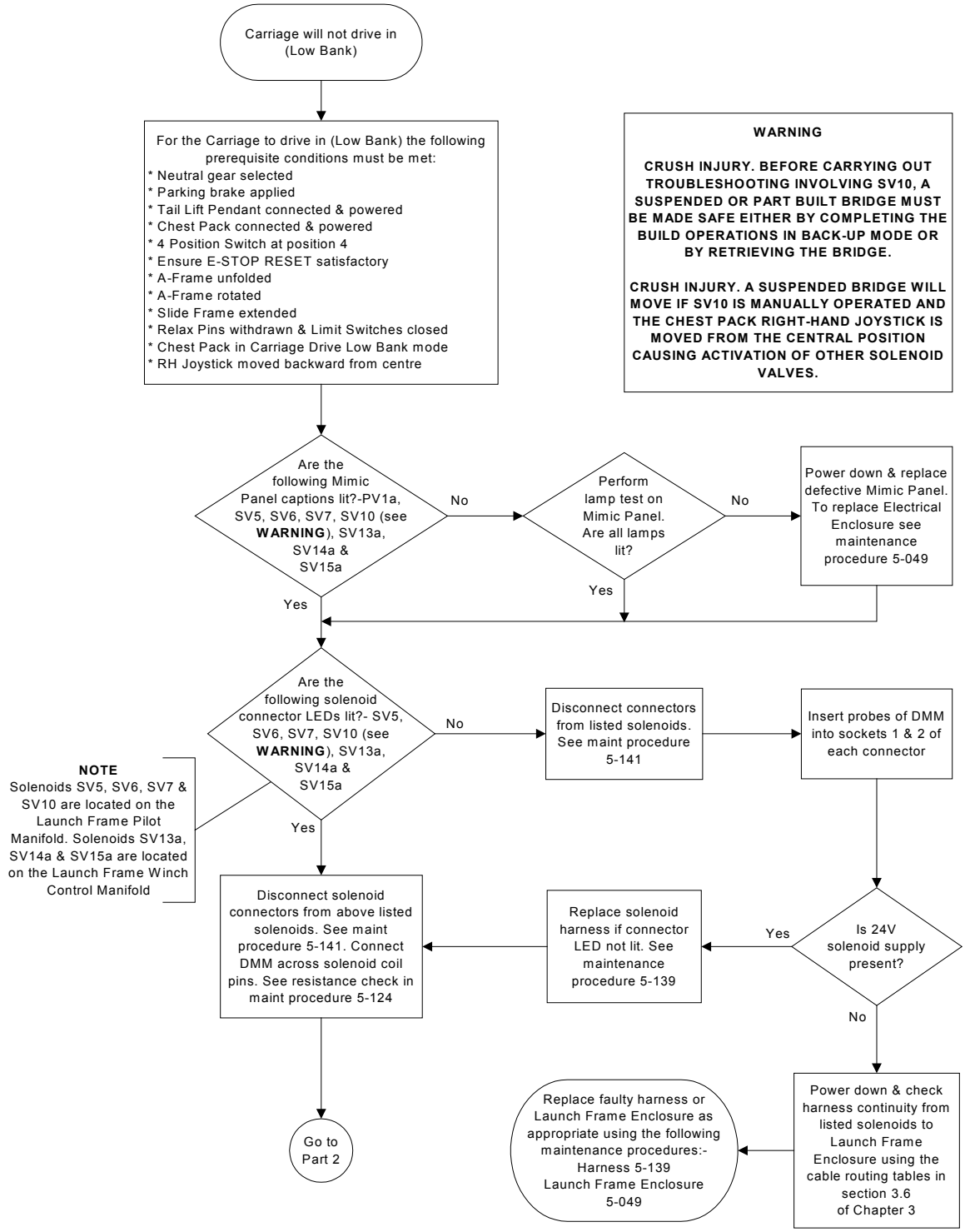
TSUM - 3-018 Carriage Drive Failure (High Bank – Drive In) Part 1



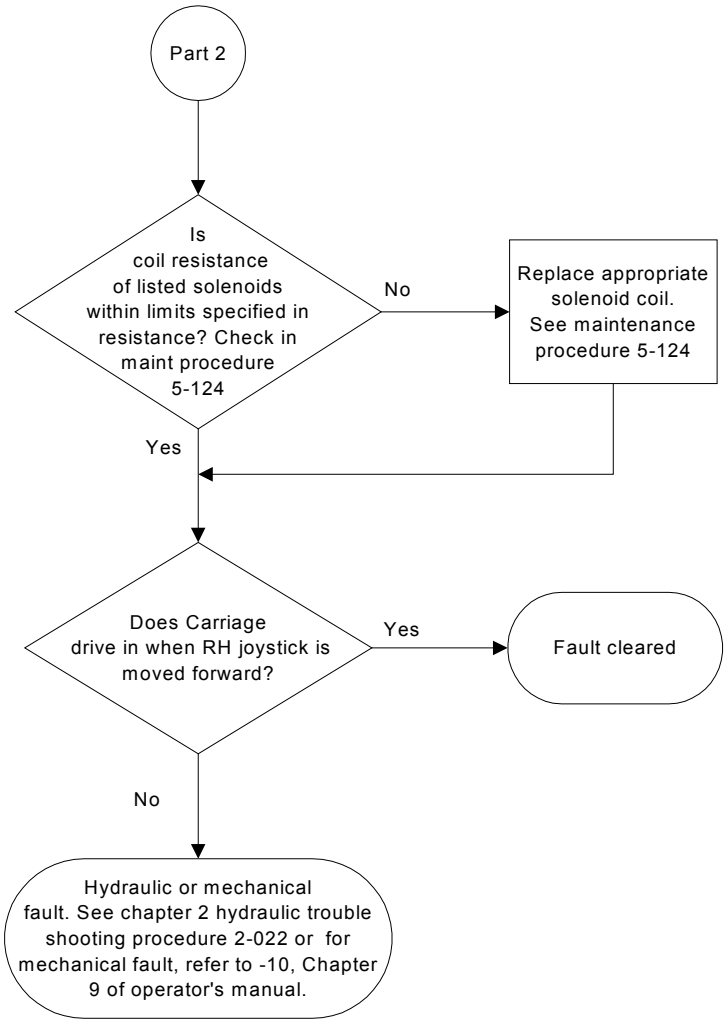
TSUM - 3-018 Carriage Drive Failure (High Bank – Drive In) Part 2



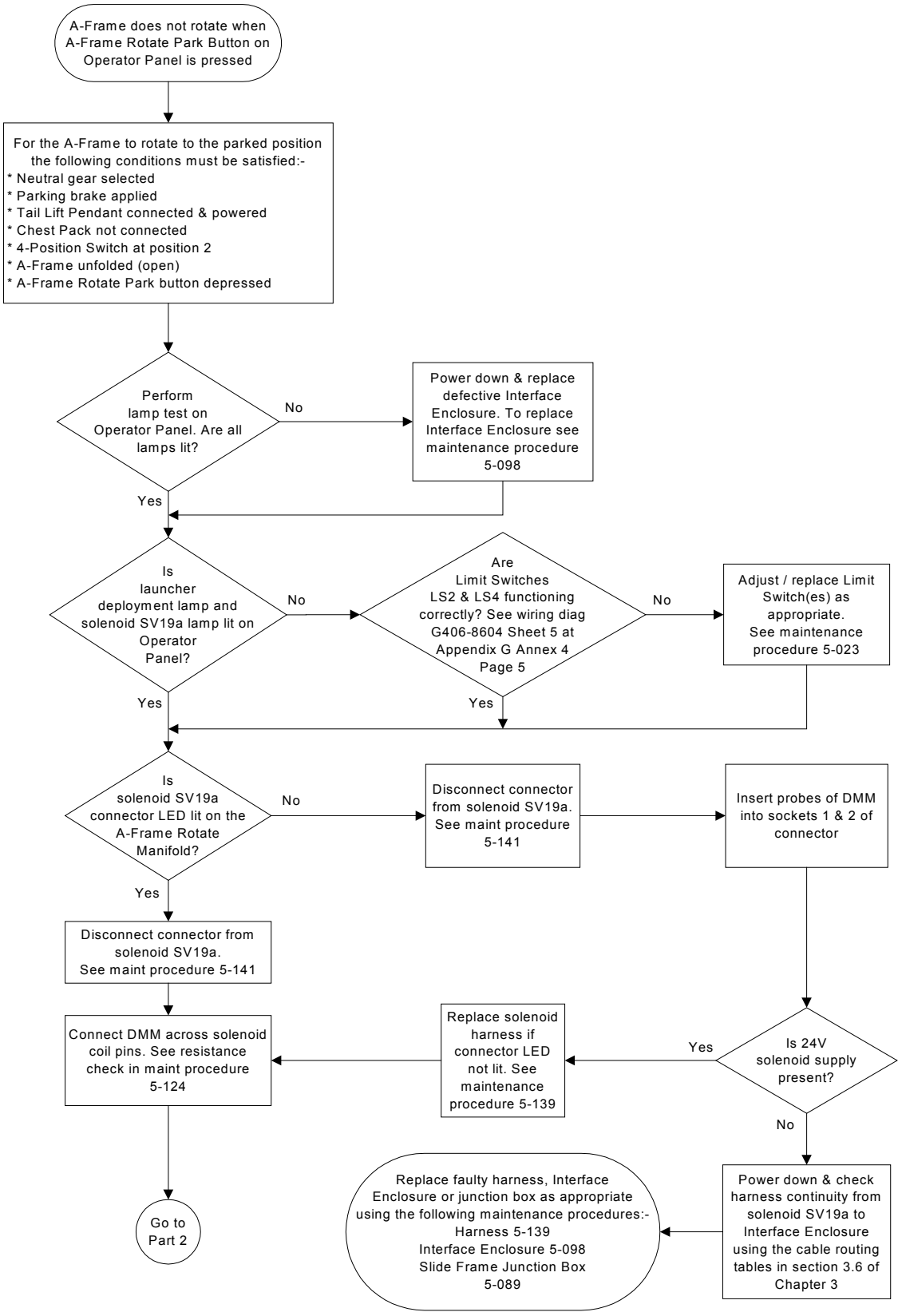
TSUM - 3-019 Carriage Drive Failure (Low Bank – Drive In) Part 1



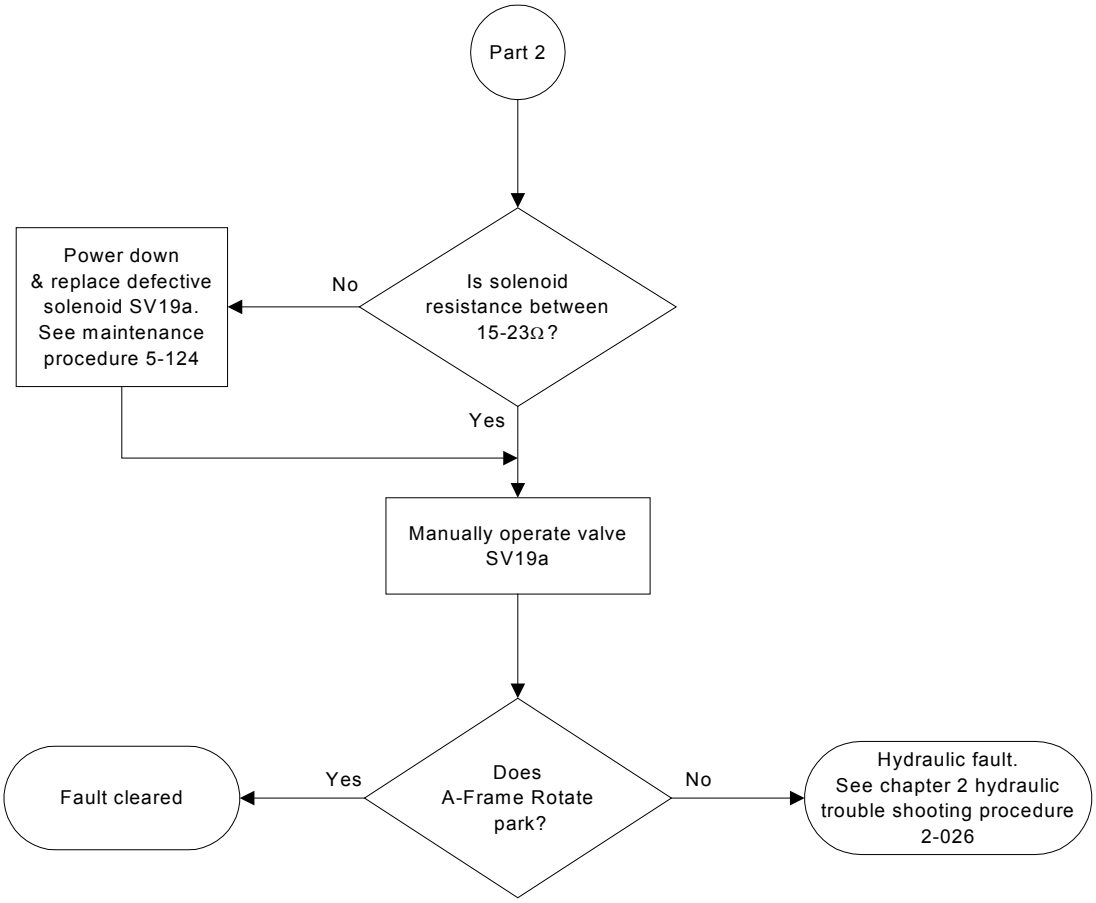
TSUM - 3-019 Carriage Drive Failure (Low Bank – Drive In) Part 2



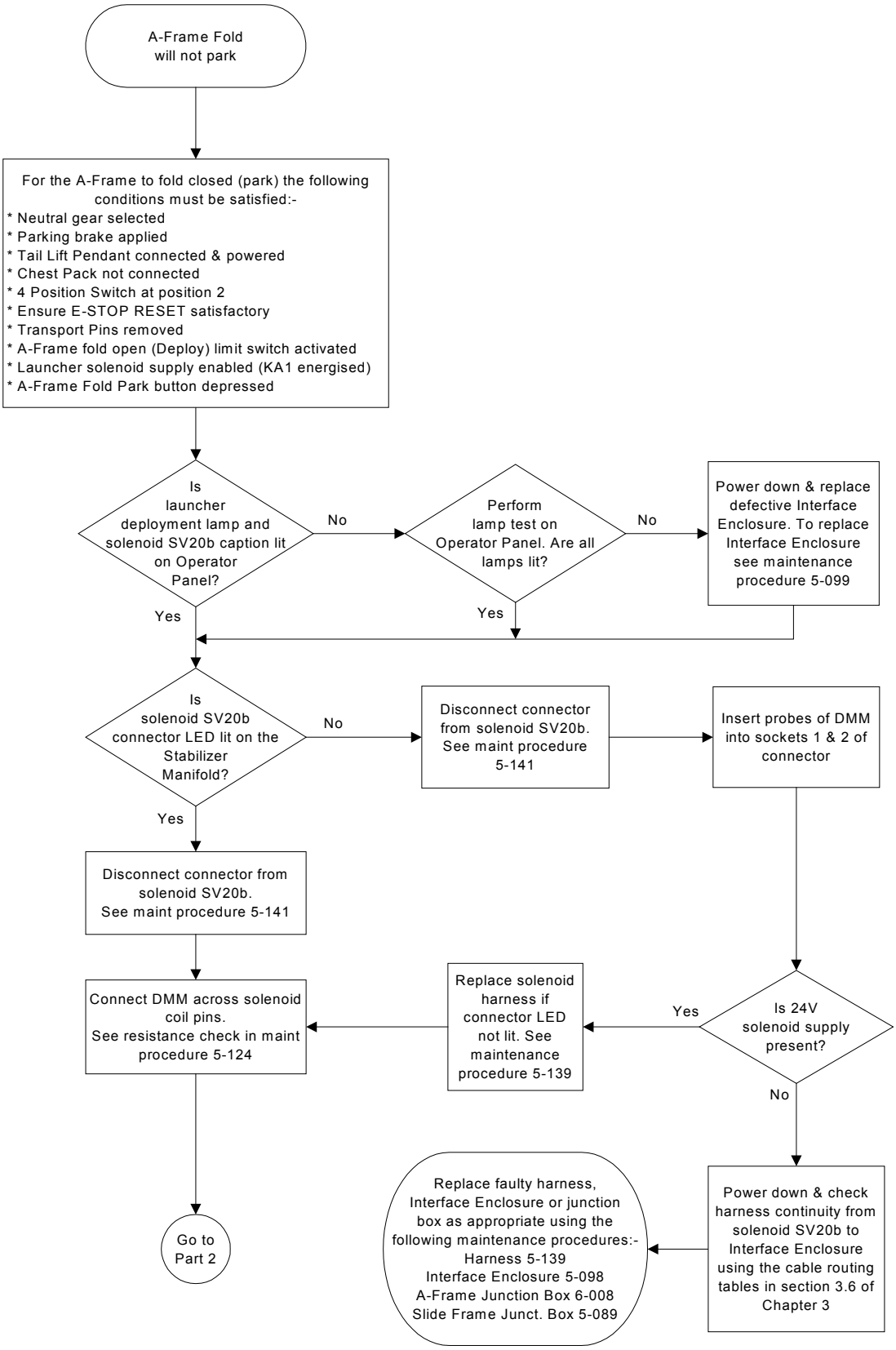
TSUM - 3-020 A-Frame Rotate (Park) (119) Part 1



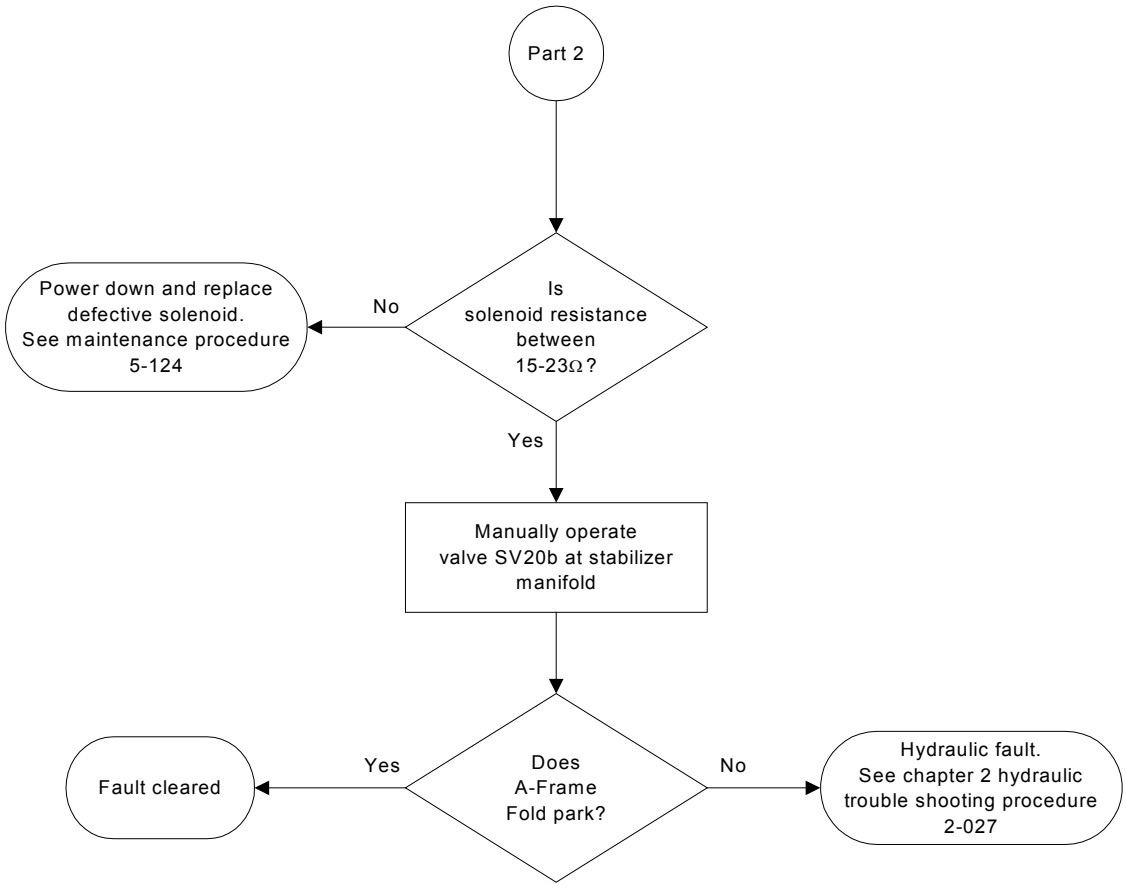
TSUM - 3-020 A-Frame Rotate (Park) (119) Part 2



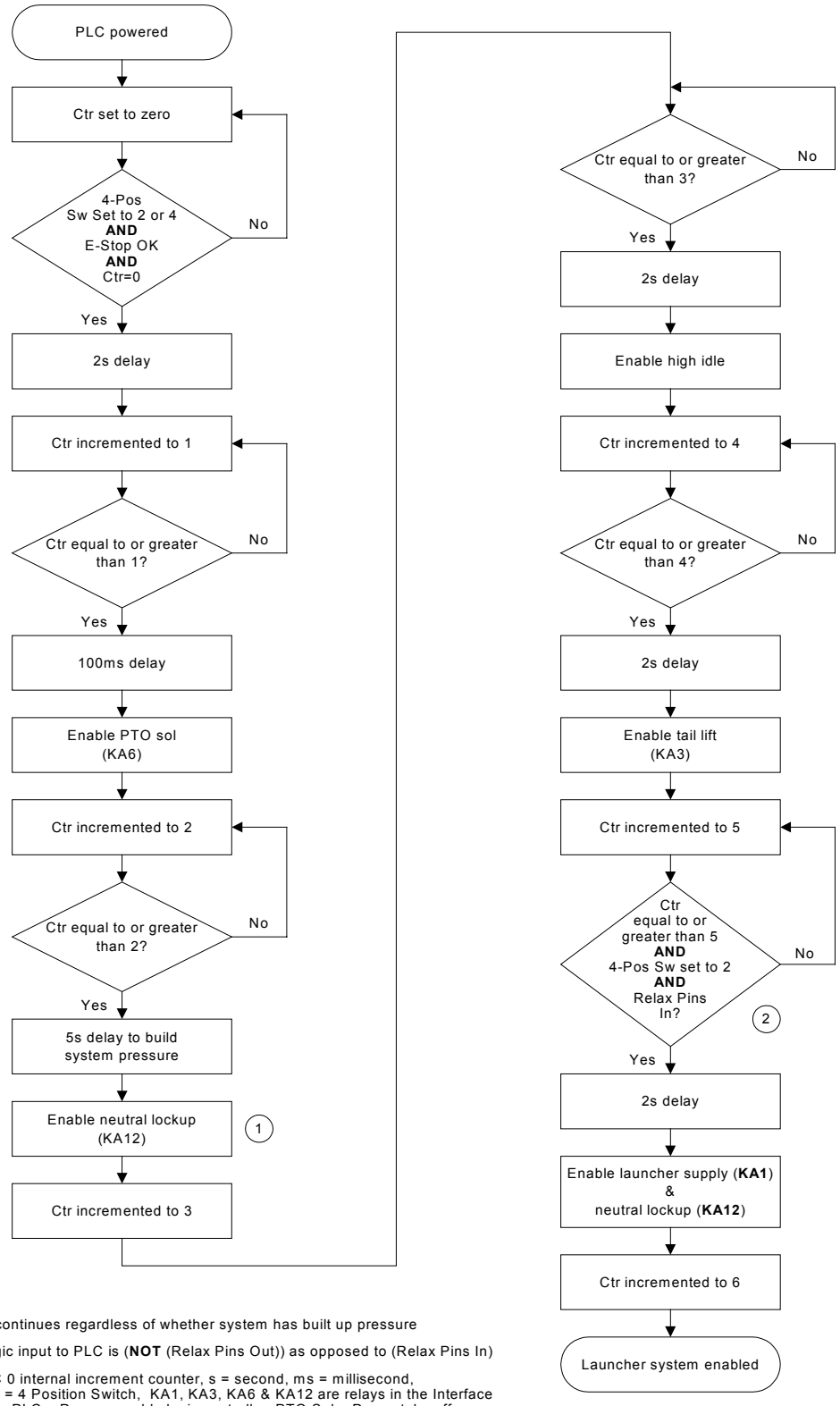
TSUM - 3-021 A-Frame Fold (Park) (122) Part 1



TSUM - 3-021 A-Frame Fold (Park) (122) Part 2



TSUM - 3-022 PLC Startup Conditions



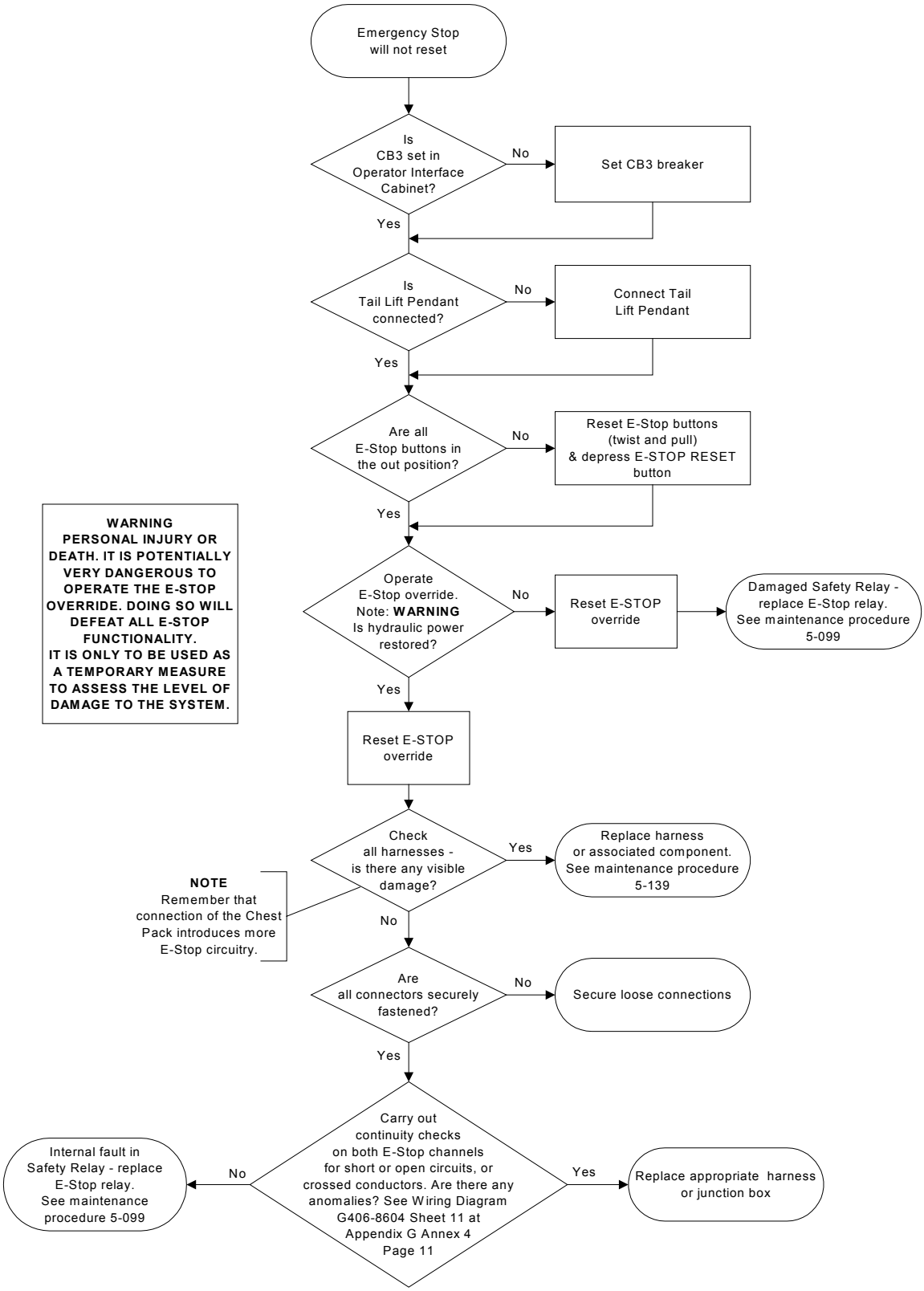
Notes

① Process continues regardless of whether system has built up pressure

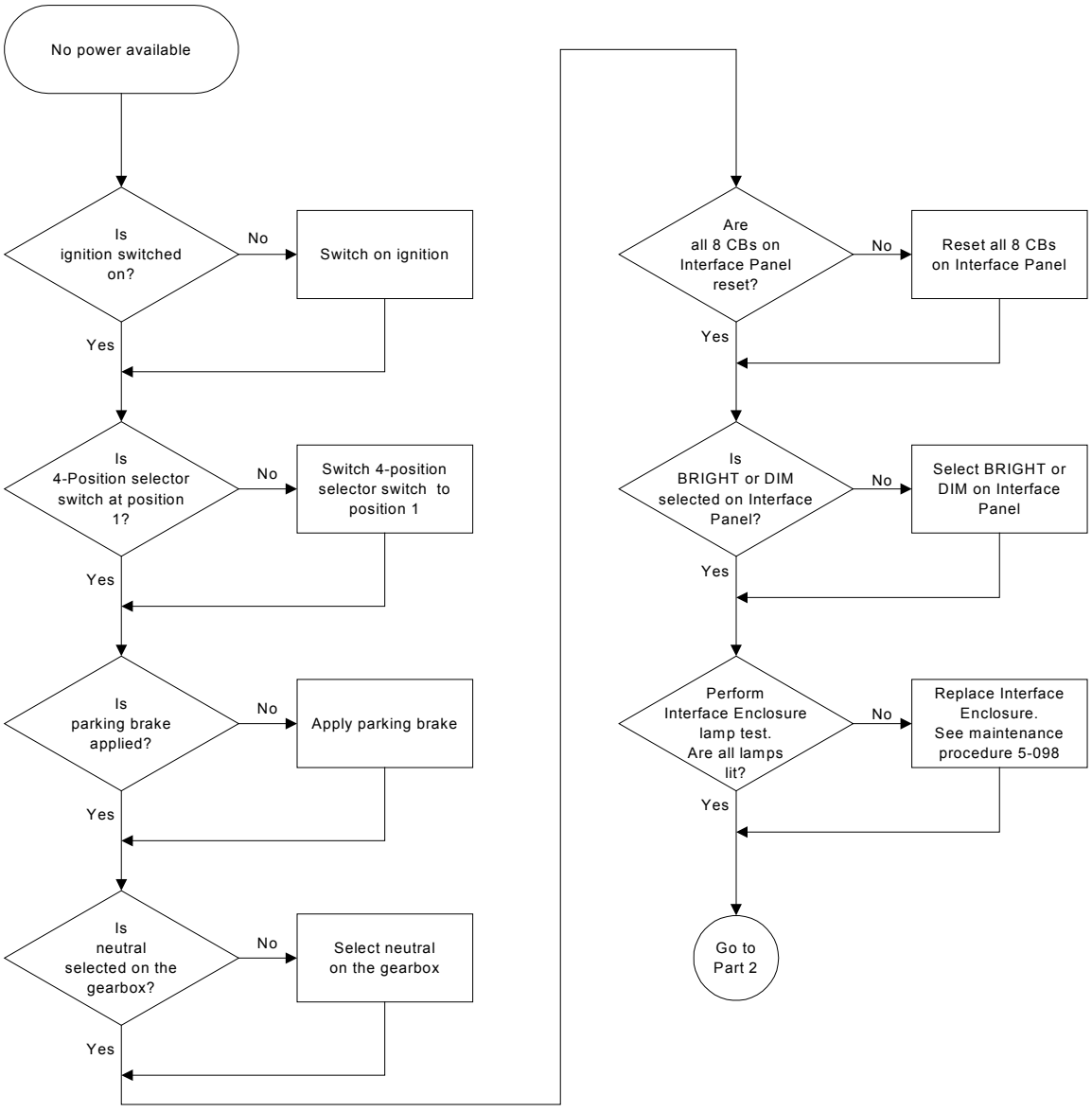
② Actual logic input to PLC is (**NOT** (Relax Pins Out)) as opposed to (Relax Pins In)

Abbreviations: Ctr = PLC 0 internal increment counter, s = second, ms = millisecond, 4-Pos Sw = 4 Position Switch, KA1, KA3, KA6 & KA12 are relays in the Interface Enclosure. PLC = Programmable logic controller. PTO Sol = Power take off Solenoid.

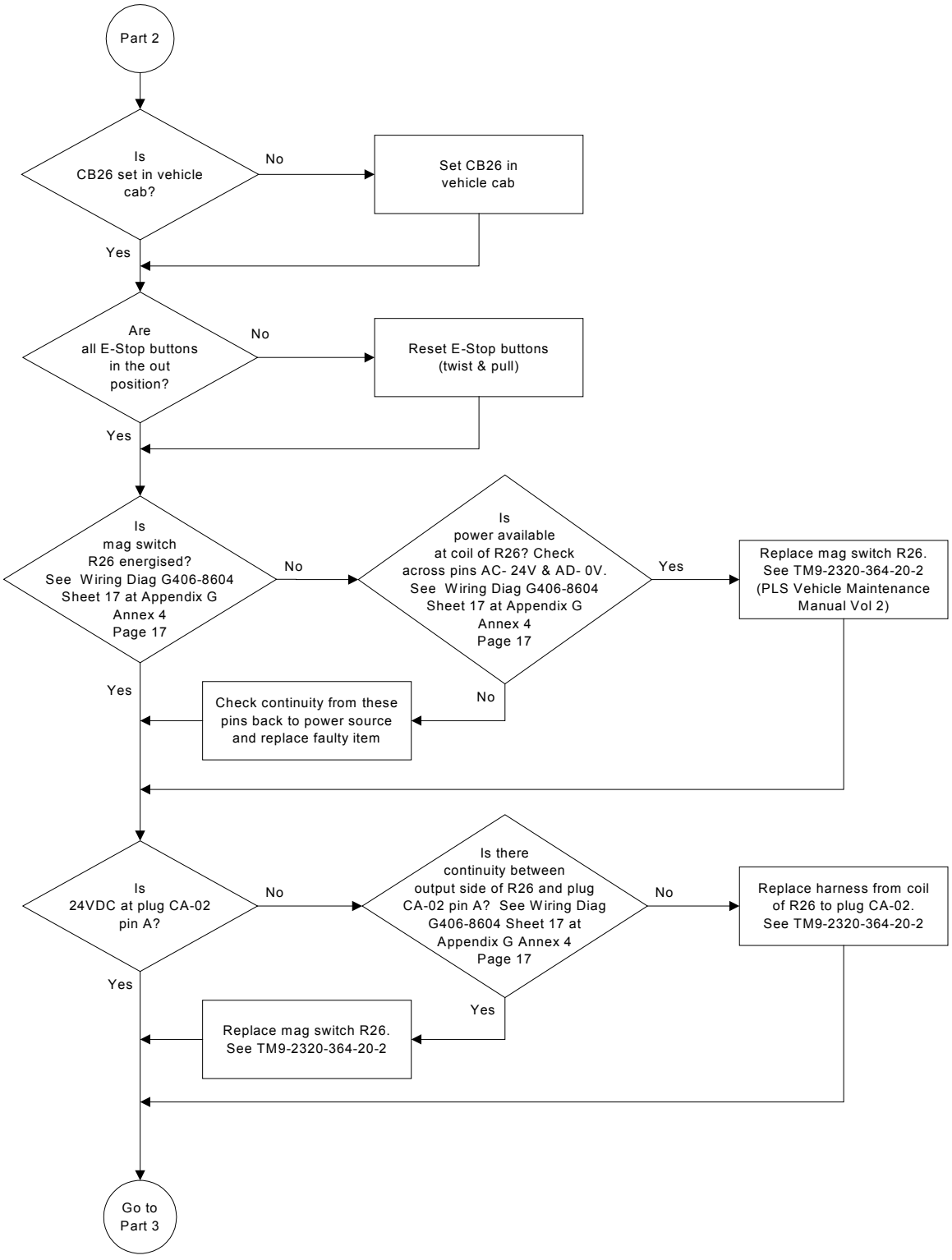
TSUM - 3-023 Emergency Stop Failure



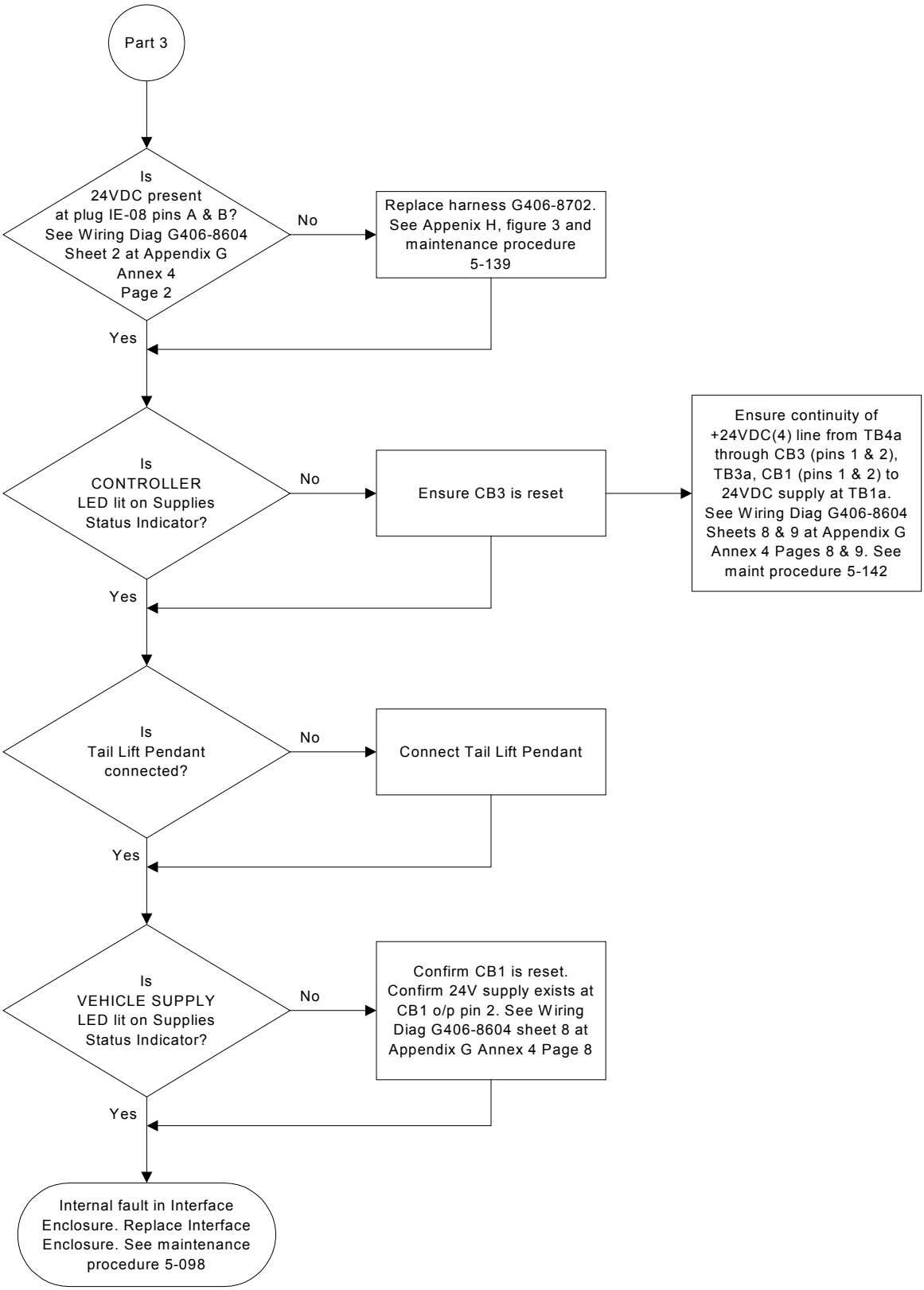
TSUM - 3-024 Power Failure Part 1



TSUM - 3-024 Power Failure Part 2



TSUM - 3-024 Power Failure Part 3



3-6 HARNESS ROUTING TABLES

The harness routing tables have been compiled from the electrical circuit diagrams as an aid to fault finding. They list, in easy to follow form, the routing of electrical cables from the output of the control box to the consumer unit at the end of the circuit.

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Table 11	Solenoid Valves SV13a to SV14b	3-70
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Table 15	Solenoid Valve SV20a	3-74
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Table 18	Solenoid Valves SV21c to SV21d	3-77
Table 19	Solenoid Valve PV1a to PV1b	3-78

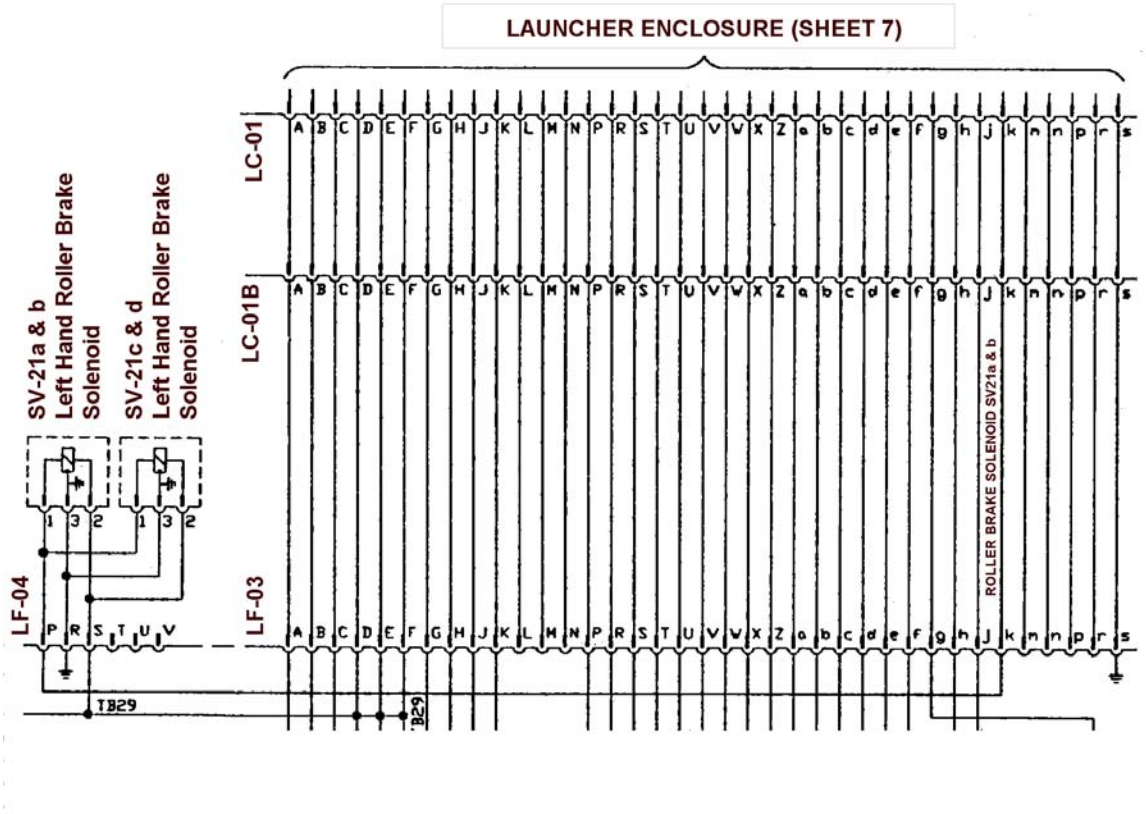


Figure 1 Example of route through an electrical junction box
(Extract from Appendix G, Annex 4, Page 5, Figure 5)

SV21d 24 Volts

START **G406-8604** Sheet 5* Appendix G Annex 4 Page 5	From	To	To	To	To	END
	LC-01 k	LC-01b k	LF-03 k	LF-04 P	SV21d 1	

In the example in Figure 1 the power starts at the Launcher Controller plug LC-01 pin k (lower case letter) runs through a harness via bulkhead at LC-01B pin k and connects to the Lower A-Frame junction Box at plug LF-03 pin k, goes through the Lower A-Frame junction Box and exits at plug LF-04 pin P (upper case letter). It terminates at the consumer unit SV21d at pin 1.

A typical example of the layout of a connector receptacle is shown in Figure 2, it shows the lettering convention used. Upper case letters are used to label pins, with lower case letters used if more than 26 pin labels are required.

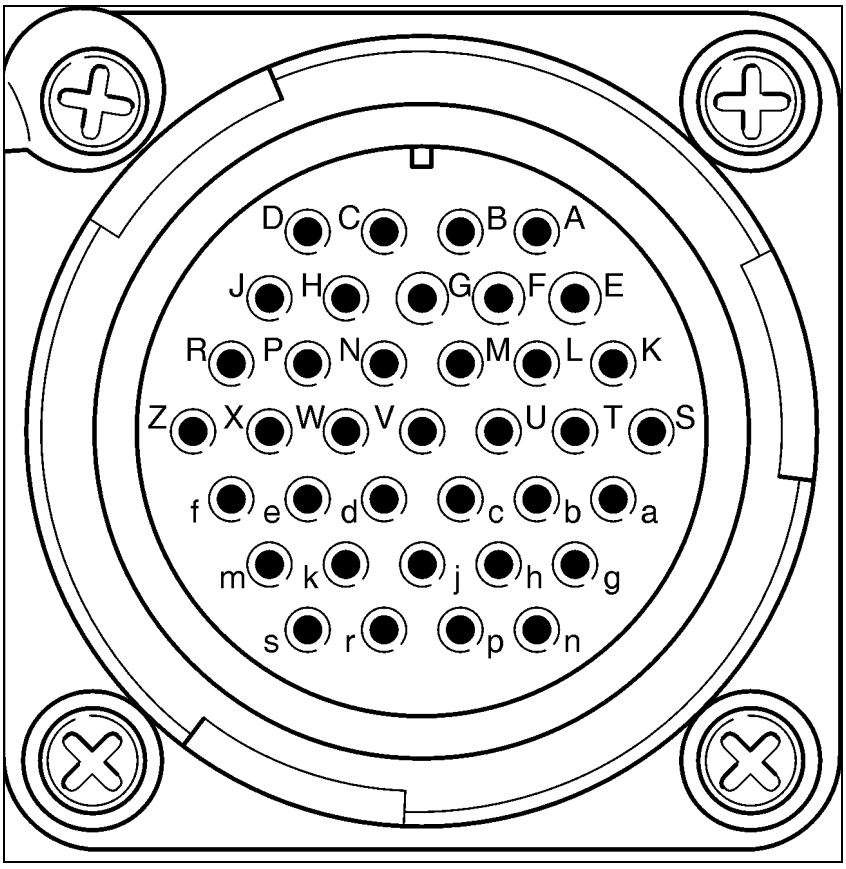


Figure 2 Typical connector layout

Table 1 Emergency Stop Channel 2

Emergency Stop Channel 2 - Four Position Switch in Position 2

START Fig 1 Appendix G Annex 2 Page 1	From	To	To	To	To	To	To	To
	IE-01 G	Crane G	Crane H	IE-01 F	IE-05 P	CB-02 P	CB-03 E	Tail Lift E

To	To	To	To	To	To	To	To
Tail Lift H	CB-03 H	CB-04 P	MF-01 P	MF-03 P	LF-01 P	LF-02 e	ESLL-01 e

To	To	To	To	To	To	To	To
ESSL-01 h	LF-02 h	LF-05 e	ESRL-01 e	ESRL-01 h	LF-05 h	LF-03 R	LC-01 R

To	To	To	To	To	To	To	To
LC-02 A	ESLU-01 A	ESLU-01 B	LC-02 B	LC-03 A	ESRU-01 A	ESRU-01 B	LC-03 B

To	To	To	To	To	To	To	To	
LC-01 W	LF-03 W	LF-01 V	MF-03 V	MF-01 V	CB-04 V	CB-02 V	IE-05 V	END

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
ESLL	Left Side Lower E-Stop and Remote Chest Pack Junction Box
ESRL	Right Side Lower E-Stop and Remote Chest Pack Junction Box
ESLU	Upper Left Side E-Stop
ESRU	Upper Right Side E-Stop

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 2 Emergency Stop Channel 1

Emergency Stop Channel 1 - Four Position Switch in Position 2

START Fig 1 Appendix G Annex 2 Page 1	From	To	To	To	To	To	To	To
	IE-01 E	Crane E	Crane F	IE-01 H	IE-05 O	CB-02 O	CB-03 O	Tail Lift D

To	To	To	To	To	To	To	To
Tail Lift J	CB-03 K	CB-04 O	MF-01 O	MF-03 O	LF-01 O	LF-02 d	ESLL-01 d

To	To	To	To	To	To	To	To
ESSL-01 j	LF-02 j	LF-05 d	ESRL-01 d	ESRL-01 j	LF-05 j	LF-03 P	LC-01 P

To	To	To	To	To	To	To	To
LC-02 C	ESLU-01 C	ESLU-01 D	LC-02 D	LC-03 C	ESRU-01 C	ESRU-01 D	LC-03 D

To	To	To	To	To	To	To	To	END
LC-01 V	LF-03 V	LF-01 U	MF-03 U	MF-01 U	CB-04 U	CB-02 U	IE-05 U	

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box **G406-8636**
LF	Lower A-Frame Junction Box
ESLL	Left Side Lower E-Stop and Remote Chest Pack Junction Box
ESRL	Right Side Lower E-Stop and Remote Chest Pack Junction Box
ESLU	Upper Left Side E-Stop
ESRU	Upper Right Side E-Stop

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 3 Emergency Stop Channel 2

Emergency Stop Channel 2 - Four Position Switch in Position 4

START Fig 1 Appendix G Annex 2 Page 1	From	To	To	To	To	To	To	To
	IE-01 G	Crane G	Crane H	IE-01 F	IE-05 P	CB-02 P	CB-03 E	Tail Lift E

To	To	To	To	To	To	To	To
Tail Lift H	CB-03 H	CB-04 P	MF-01 P	MF-03 P	LF-01 P	LF-02 e	ESLL-01 e

To	To	To	To	To	To	To	To
ESSL-01 h	LF-02 h	LF-05 e	ESRL-01 e	ESRL-01 h	LF-05 h	LF-03 R	LC-01 R

To	To	To	To	To	To	To	To
LC-02 A	ESLU-01 A	ESLU-01 B	LC-02 B	LC-03 A	ESRU-01 A	ESRU-01 B	LC-03 B

To	To	To	To	To	To	To	To	To
			LF-05 F	ESRL-01 F	ESRL-02 F	CP-01 F (if fitted)	CP-01 G (if fitted)	ESRL-02 G	ESRL-01 G
LC-08 F	LC-06 F								
			To	To	To	To	To	To	To
			LF-02 F	ESLL-01 F	ESLL-02 F	CP-01 F (if fitted)	CP-01 G (if fitted)	ESLL-02 G	ESLL-01 G

To	To	To	To	To	To	To	To	To
LF-05 G								
	LF-06 G	LC-08 G	LC-01 U	LF-03 U	LF-01 T	MF-03 T	MF-01 T	CB-04 T
LF-02 G								

To	To	END
CB-02 T	IE-05 T	

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
ESLL	Left Side Lower E-Stop and Remote Chest Pack Junction Box
ESRL	Right Side Lower E-Stop and Remote Chest Pack Junction Box
ESLU	Upper Left Side E-Stop
ESRU	Upper Right Side E-Stop

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 4 Emergency Stop Channel 1

Emergency Stop Channel 1 - Four Position Switch in Position 4

START Fig 1 Appendix G Annex 2 Page 1	From	To	To	To	To	To	To	To
	IE-01 E	Crane E	Crane F	IE-01 H	IE-05 O	CB-02 O	CB-03 D	Tail Lift D

To	To	To	To	To	To	To	To
Tail Lift J	CB-03 K	CB-04 O	MF-01 O	MF-03 O	LF-01 O	LF-02 d	ESLL-01 d

To	To	To	To	To	To	To	To
ESSL-01 j	LF-02 j	LF-05 d	ESRL-01 d	ESRL-01 j	LF-05 j	LF-03 P	LC-01 P

To	To	To	To	To	To	To	To
LC-02 C	ESLU-01 C	ESLU-01 D	LC-02 D	LC-03 C	ESRU-01 C	ESRU-01 D	LC-03 D

To	To	To	To	To	To	To	To
LF-05 E	ESRL-01 E	ESRL-02 E	CP-01 E (if fitted)	CP-01 H (if fitted)	ESRL-02 H	ESRL-01 H

To	To
LC-08 E	LF-06 E

To

To	To	To	To	To	To	To
LF-02 E	ESLL-01 E	ESLL-02 E	CP-01 E (if fitted)	CP-01 H (if fitted)	ESLL-02 G	ESLL-01 G

To
LF-05 H

To	To	To	To	To	To	To	To
LF-06 H	LC-08 H	LC-01 T	LF-03 T	LF-01 S	MF-03 S	MF-01 S	CB-04 S

LF-02 G

To	To	END
CB-02 S	IE-05 S	

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
ESLL	Left Side Lower E-Stop and Remote Chest Pack Junction Box
ESRL	Right Side Lower E-Stop and Remote Chest Pack Junction Box
ESLU	Upper Left Side E-Stop
ESRU	Upper Right Side E-Stop

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 5 Launcher Down Limit Switch

Launcher Down Limit Switch – Switched 24 Volts (Return Signal)

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	To	To	To	To	To
	IE-05 q	CB-02 q	CB-04 q	MF-01 q	MF-03 q	MF-03A q	LF-01 q	LF-04 E

To	
LS-05 B	**END**

Launcher Down Limit Switch 24 Volts

START G406-8604 Sheet 2 Appendix G Annex 4 Page 2	To	To	To	To	To	To	To	To
	IE-05 G/H	CB-02 G/H	CB-04 G/H	MF-01 G/H	MF-03 G/H	MF-03A G/H	LF-01 G/H	LF-04 A

To	
LS-05 A	**END**

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
LS	Limit Switch

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 6 Launcher Fold Open Limit Switch

Launcher Fold Open Limit Switch - Switched 24 Volts (Return Signal)

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	To	To	To	To	To
	IE-05 f	CB-02 f	CB-04 f	MF-01 f	MF-03 f	MF-03A f	LF-01 f	LF-04 G

To	
LS-04 B	**END**

Launcher Fold Open Limit Switch 24 Volts

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	To	To	To	To	To	To
	IE-05 G/H	CB-02 G/H	CB-04 G/H	MF-01 G/H	MF-03 G/H	MF-03A G/H	LF-01 G/H	LF-04 A	LS-02 A

To	To	To	To	
LS-02 B	LF-04 D	LS-04 H	LS-04 A	**END**

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
LS	Limit Switch

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 7 Launcher Fold Closed Limit Switch

Launcher Fold Closed Limit Switch - Switched 24 Volts (Return Signal)

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	To	To	To	To	To
	IE-05 g	CB-02 g	CB-04 g	MF-01 g	MF-03 g	MF-03A g	LF-01 g	LF-04 J

To	END
LS-03 B	

Launcher Fold Closed Limit Switch 24 Volts

START Fig 2 Appendix G Annex 4 Page 2	To	To	To	To	To	To	To	To	To
	IE-05 G/H	CB-02 G/H	CB-04 G/H	MF-01 G/H	MF-03 G/H	MF-03A G/H	LF-01 G/H	LF-04 A	LS-01 A

To	To	To	To	END
LS-01 B	LF-04 C	LF-04 F	LS-03 A	

KEY

To	Example
Plug Pin Number	IE-05 U

IE	Interface Enclosure
CB	Chassis Junction Box
MF	Moving Slide Frame Junction Box
LF	Lower A-Frame Junction Box
LS	Limit Switch

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 8 Relax Mechanism

Relax Pin Out Micro Switches - Switched 24 Volts (Return Signal)

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	END
	LS-06 B	LS-06 A	IE-03 A	

Relax Pin Out Micro Switches 24 Volts

START Fig 2 Appendix G Annex 4 Page 2	From	To	To	END
	IE-03 B	LS-07 B	LS-07 A	

KEY

To	Example
Plug Pin Number	IE-05 U

IE Interface Enclosure

LS Limit Switch

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 9 Solenoid Valves SV1 to SV5

SV1 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 A	SV1 1	SV1 2	LC-04 U	

SV2 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 B	SV2 1	SV2 2	LC-04 U	

SV3 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 C	SV3 1	SV3 2	LC-04 U	

SV4 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 D	SV4 1	SV4 2	LC-04 U	

SV5 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 D	SV5 1	SV5 2	LC-06 N	

KEY

To	Example
Plug Pin Number	IE-05 U

LC Launcher Enclosure

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 10 Solenoid Valves SV6 to SV10

SV6 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 E	SV6 1	SV6 2	LC-06 N	

SV7 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 F	SV7 1	SV7 2	LC-06 N	

SV8 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 G	SV8 1	SV8 2	LC-06 N	

SV9 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 H	SV9 1	SV9 2	LC-06 N	

SV10 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 J	SV10 1	SV10 2	LC-06 N	

KEY

To	Example
Plug Pin Number	IE-05 U

LC Launcher Enclosure

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 11 Solenoid Valves SV13a to SV14b

SV13a Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 E	SV13a 1	SV13a 2	LC-04 U	

SV13b Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 F	SV13b 1	SV13b 2	LC-04 U	

SV14a Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 G	SV14a 1	SV14a 2	LC-04 S	

SV14b Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 H	SV14b 1	SV14b 2	LC-04 S	

KEY

To	Example
Plug Pin Number	IE-05 U

LC Launcher Enclosure

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 12 Solenoid Valves SV15a to SV17b

SV15a Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 J	SV15a 1	SV15a 2	LC-04 S	

SV15b Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-04 K	SV15b 1	SV15b 2	LC-04 S	

SV16 Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 C	SV16 1	SV16 2	LC-06 M	

SV17a Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 A	SV17a 1	SV17a 2	LC-06 V	

SV17b Power

START Fig 7 Appendix G Annex 4 Page 7	From	To	To	To	END
	LC-06 B	SV17b 1	SV17b 2	LC-06 V	

KEY

To	Example
Plug Pin Number	IE-05 U

LC Launcher Enclosure

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 13 Solenoid Valve SV18a

SV18a 24 Volts

START Fig 4 Appendix G Annex 4 Page 4	From	To	To	To	To	To	To	END
	LC-01 b	LF-03 b	LF-01 b	MF-03 b	MF-03A b	MF-02 A	SV18a 1	

SV18a 0 Volts

START Fig 4 Appendix G Annex 4 Page 4	From	To	To	To	To	To	To	END
	LC-01 c	LF-03 c	LF-01 c	MF-03 c	MF-03A c	MF-02 B	SV18a 2	

KEY

To	Example
Plug Pin Number	IE-05 U

MF Moving Slide Frame Junction Box

LF Lower A-Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 14 Solenoid Valves SV19a to SV19b

SV19a Power

START Fig 4 Appendix G Annex 4 Page 4	From	To	To	To	To	To	END
	IE-05 b	CB-02 b	CB-04 b	MF-01 b	MF-02 C	SV-19a 1	

SV19b Power

START Fig 4 Appendix G Annex 4 Page 4	From	To	To	To	To	To	END
	IE-05 c	CB-02 c	CB-04 c	MF-01 c	MF-02 D	SV-19a 1	

KEY

To	Example
Plug Pin Number	IE-05 U

IE Interface Enclosure

CB Chassis Junction Box

MF Moving Slide Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 15 Solenoid Valve SV20a

SV20a 24 Volts Power

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	To	To	To
	IE-05 d	CB-02 d	CB-04 d	MF-01 d	MF-03 d	MF-03A d	LF-01 d	LF-04 K

To	END
SV-20a 1	

SV20a 0 Volts Power

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	To	To	To
	IE-05 D-F	CB-02 D-F	CB-04 D-F	MF-01 D-F	MF-03 D-F	MF-03A D-F	LF-01 D-F	LF-04 M

To	END
SV-20a 2	

KEY

To	Example
Plug Pin Number	IE-05 U

IE Interface Enclosure

CB Chassis Junction Box

MF Moving Slide Frame Junction Box

LF Lower A-Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 16 Solenoid Valve SV20b

SV20b 24 Volts Power

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	To	To	To
	IE-05 e	CB-02 e	CB-04 e	MF-01 e	MF-03 e	MF-03A e	LF-01 e	LF-04 N

To	END
SV-20b 1	

SV20b 0 Volts Power

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	To	To	To
	IE-05 D-F	CB-02 D-F	CB-04 D-F	MF-01 D-F	MF-03 D-F	MF-03A D-F	LF-01 D-F	LF-04 M

To	END
SV-20b 2	

KEY

To	Example
Plug Pin Number	IE-05 U

IE Interface Enclosure

CB Chassis Junction Box

MF Moving Slide Frame Junction Box

LF Lower A-Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 17 Solenoid Valves SV21a to SV21b

SV21a 24 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	END
	LC-01 k	LC-01b k	LF-03 k	LF-04 P	SV21a 1	

SV21a 0 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	END
	LC-01 D-F	LF-01 D-F	LF-04 S	SV21a 2	

SV21b 24 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	END
	LC-01 k	LC-01b k	LF-03 k	LF-04 P	SV21b 1	

SV21b 0 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	END
	LC-01 D-F	LF-03 D-F	LF-04 S	SV21b 2	

KEY

To	Example
Plug Pin Number	IE-05 U

MF Moving Slide Frame Junction Box

LF Lower A-Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 18 Solenoid Valves SV21c to SV21d

SV21c 24 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	END
	LC-01 k	LC-01b k	LF-03 k	LF-04 P	SV21c 1	

SV21c 0 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	END
	LC-01 D-F	LF-01 D-F	LF-04 S	SV21c 2	

SV21d 24 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	To	END
	LC-01 k	LC-01b k	LF-03 k	LF-04 P	SV21d 1	

SV21d 0 Volts

START Fig 5 Appendix G Annex 4 Page 5	From	To	To	To	END
	LC-01 D-F	LF-03 D-F	LF-04 S	SV21d 2	

KEY

To	Example
Plug Pin Number	IE-05 U

MF Moving Slide Frame Junction Box

LF Lower A-Frame Junction Box

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

Table 19 Solenoid Valve PV1a to PV1b

PV1a 24 Volts

START Fig 7 Appendix G Annex 4 Page 7	From	To	END
	LC-04 L	PV-1a 1	

PV1a 0 Volts

START Fig 7 Appendix G Annex 4 Page 7	From	To	END
	LC-04 M	PV-1a 2	

PV1b 24 Volts

START Fig 7 Appendix G Annex 4 Page 7	From	To	END
	LC-04 N	PV-1b 1	

PV1b 0 Volts

START Fig 7 Appendix G Annex 4 Page 7	From	To	END
	LC-04 P	PV-1b 2	

KEY

To	Example
Plug Pin Number	IE-05 U

LC Launcher Enclosure

SV Solenoid Valve

NOTE:

Upper case letter indicates upper case pin out on plug, lower case letter indicates lower case pin out on plug.

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CHAPTER 4

CRANE HYDRAULIC AND ELECTRICAL TROUBLE SHOOTING

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CHAPTER 4

Section I. CRANE TROUBLE SHOOTING

4-1 INTRODUCTION

a. Trouble shooting flow charts are provided to guide the Unit Maintenance personnel through to a procedure for rectifying specific faults.

b. This section is to be used to recognize, diagnose and rectify faults that may occur with the DSB crane.

4-2 CRANE ELECTRICAL SYSTEM OVERVIEW

a. **General Description -** An electrical system provides power to switches and solenoids which when activated allow the operator to control the function of the crane and launcher components.

b. Electrical power is supplied from the host vehicle via the interface enclosure. Harnesses connect junction boxes, switches and solenoids in the electrical system. Junction boxes redirect electrical supplies to specific sub-systems.

c. Limit switches and indicators are fitted in the circuit to provide a signal, a visual indication at the control panel, of the state of a component.

d. Solenoid Valves when activated electrically will allow or stop the flow of hydraulic fluid in the hydraulic circuits.

4-3 CRANE ELECTRICAL AND HYDRAULIC SCHEMATIC DRAWINGS

a. A set of drawings showing the electrical and hydraulic systems, in detail, are shown in Appendix J. Appendix J also provides a quick reference guide to the location of the main electrical components of the crane.

4-4 TROUBLE SHOOTING FLOW CHARTS

a. The trouble-shooting flow charts are designed to assist the Unit Maintenance personnel in systematically diagnosing a fault and providing a solution for the rectification of that fault.

b. The title of the trouble shooting flow chart is constructed with the TSUM number, subject title.

c. All trouble-shooting flow charts start at the top of a page. The boxes used in the flow charts depict the following information.

(1) A circle or rounded rectangle shows the start or end of a flow chart sequence.

(2) A rectangle or square displays information intended as an instruction or statement.

(3) A diamond box displays a question or requires the reader to make a decision.

(4) **TSO** stands for Trouble Shooting Operator, these can be found in the operator's manual TM 5-5420-279-10.

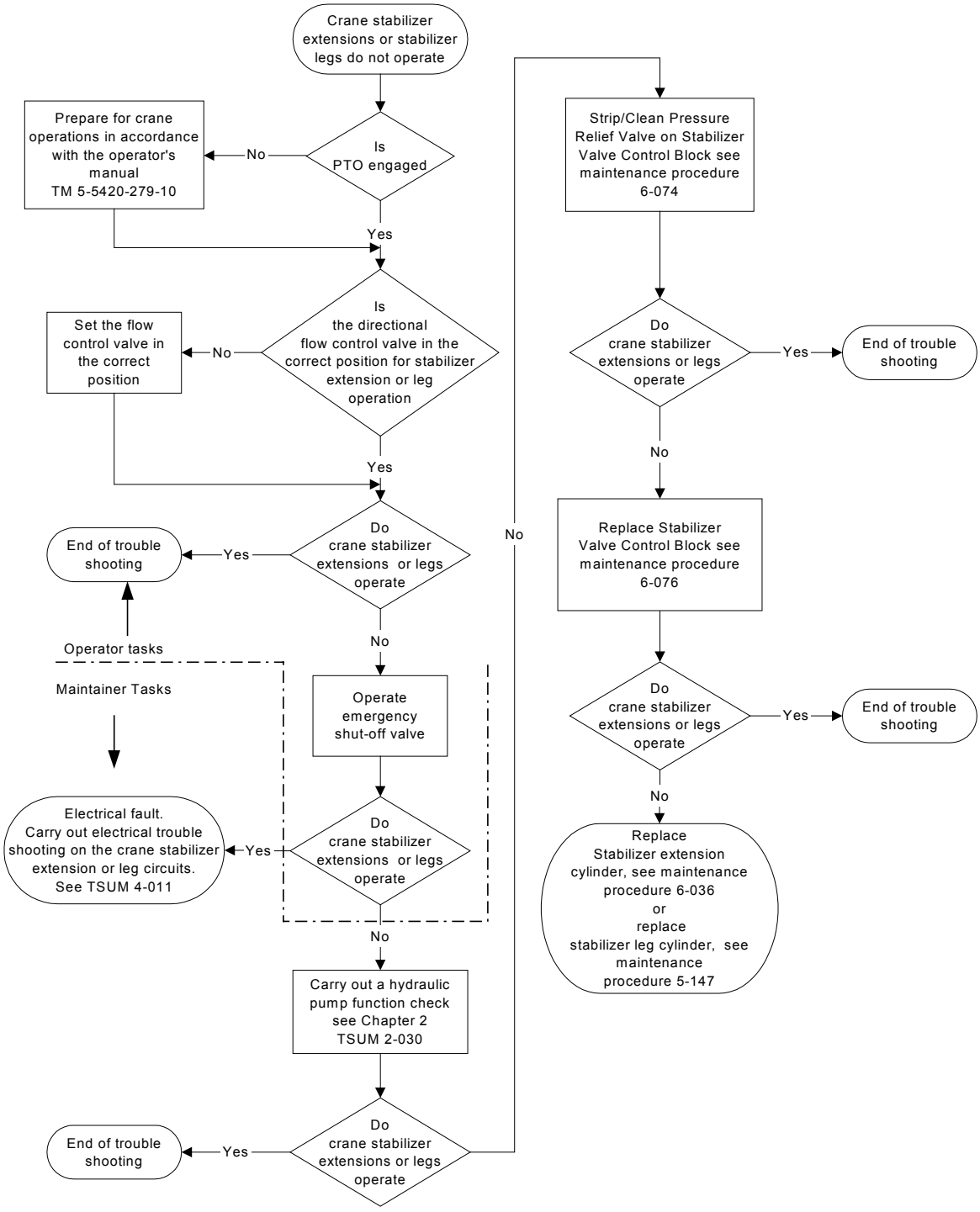
(5) **TSUM** stands for Trouble Shooting Unit Maintenance.

(6) A dividing line, where applicable, in a trouble shooting chart details who is responsible for carrying out the trouble shooting.

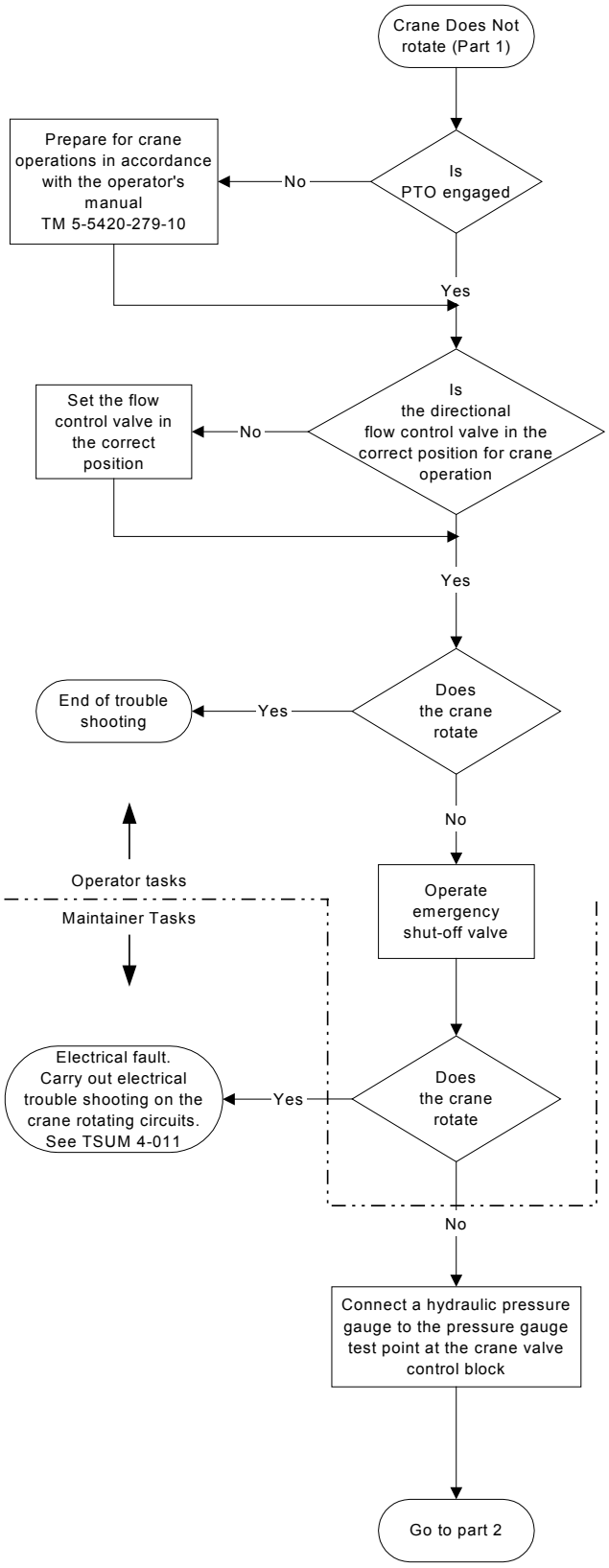
4-5 TROUBLE SHOOTING FLOW CHART LIST

Flow Chart Number, Subject		Page
TSUM - 4-001	Crane Stabilizer Extensions Or Stabilizer Legs Do Not Operate	4-4
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TSUM - 4-011	Electrical Trouble Shooting (Part 3)	4-22

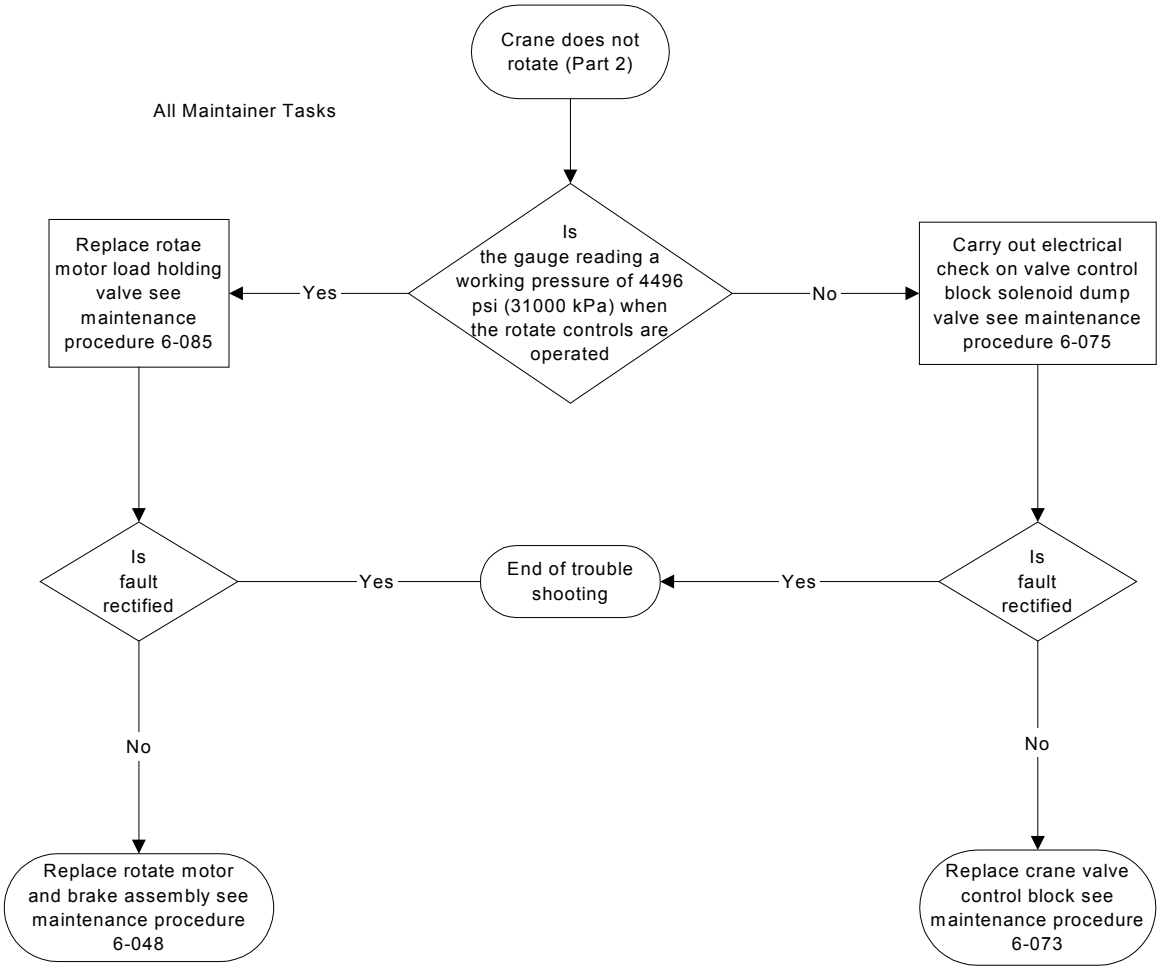
TSUM - 4-001 Crane Stabilizer Extensions Or Stabilizer Legs Do Not Operate



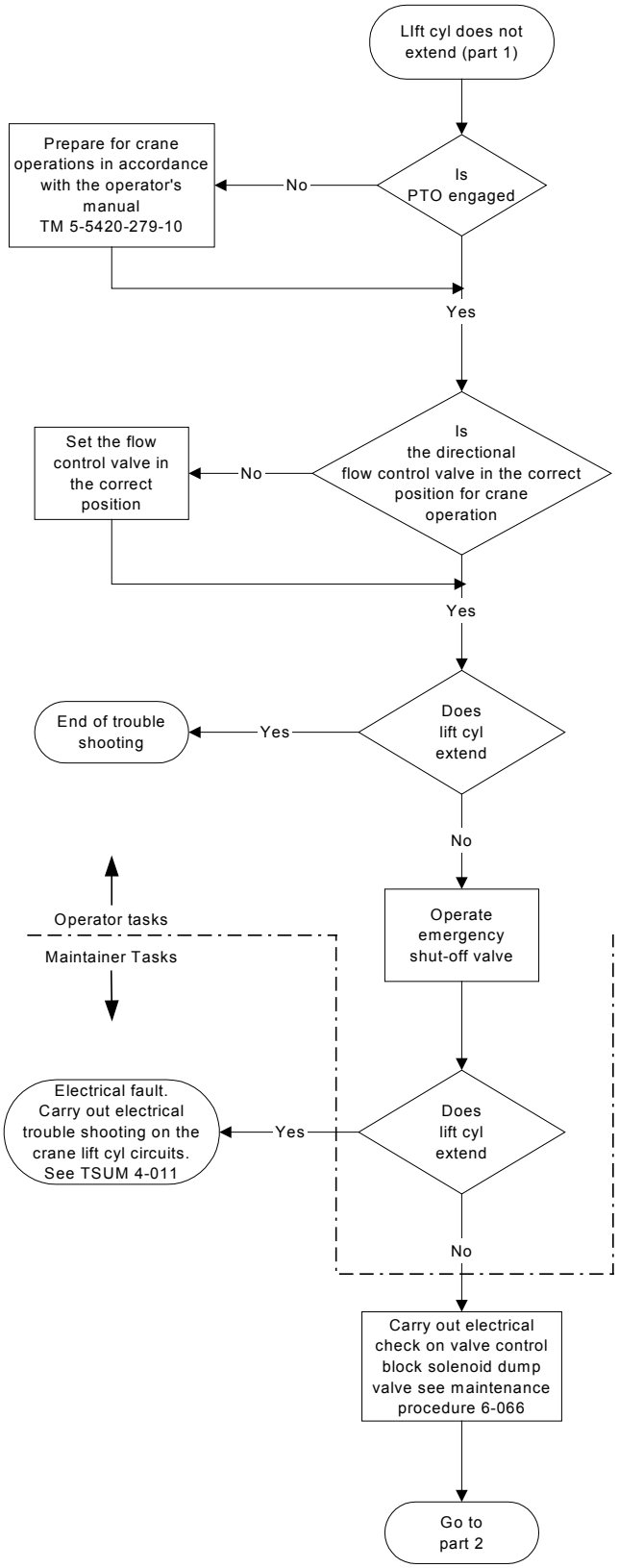
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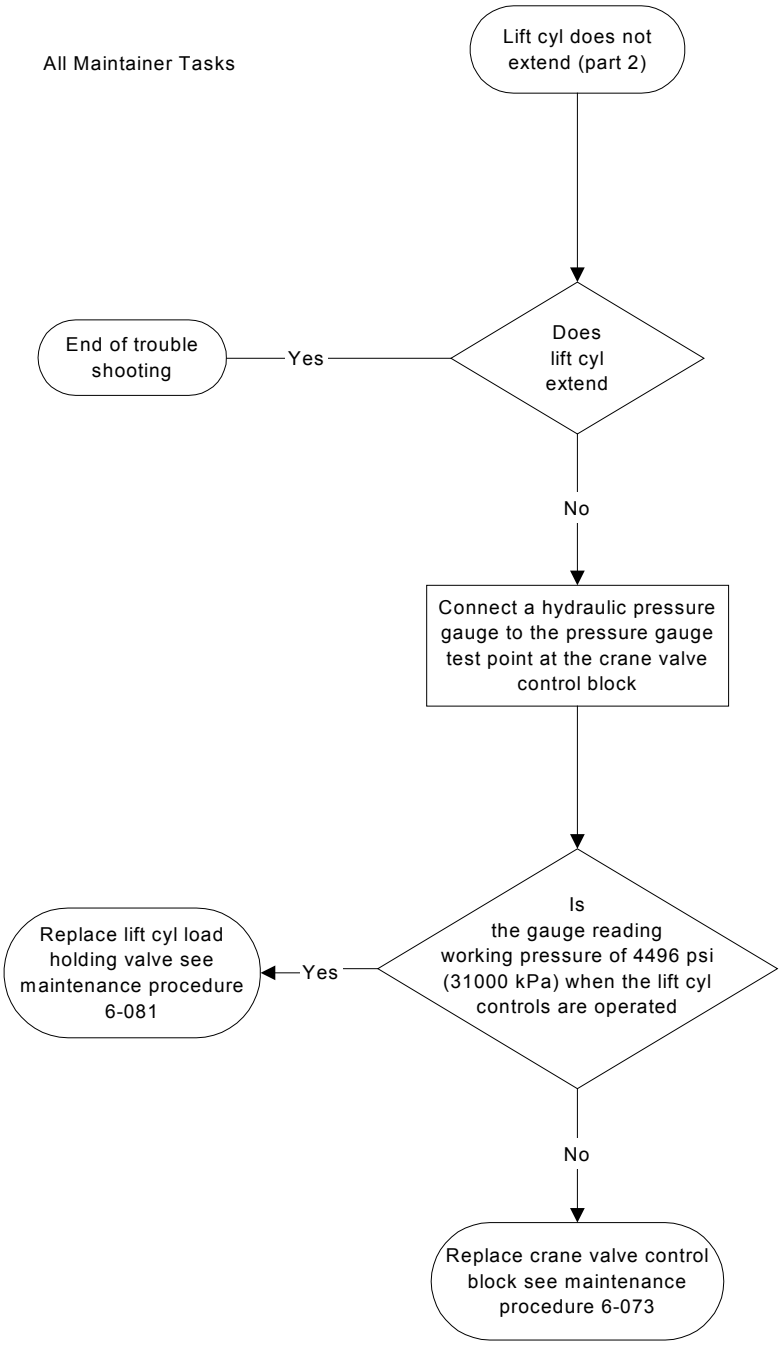
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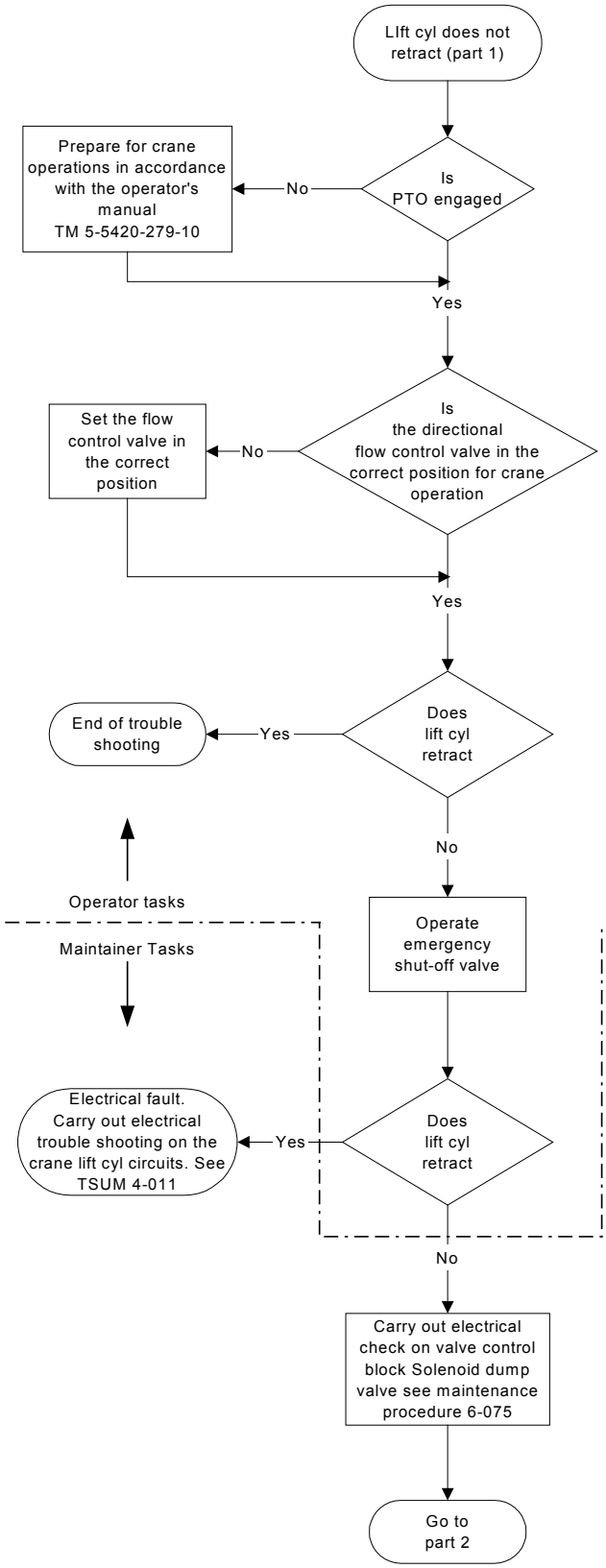
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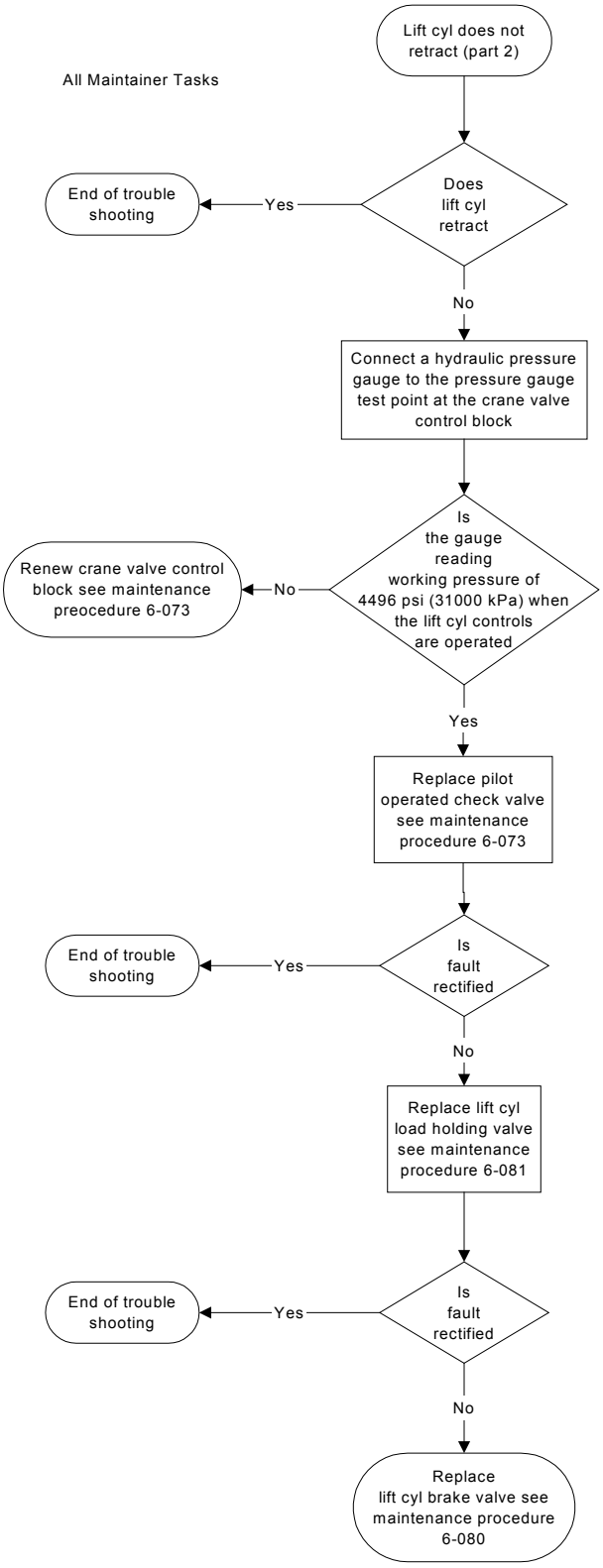
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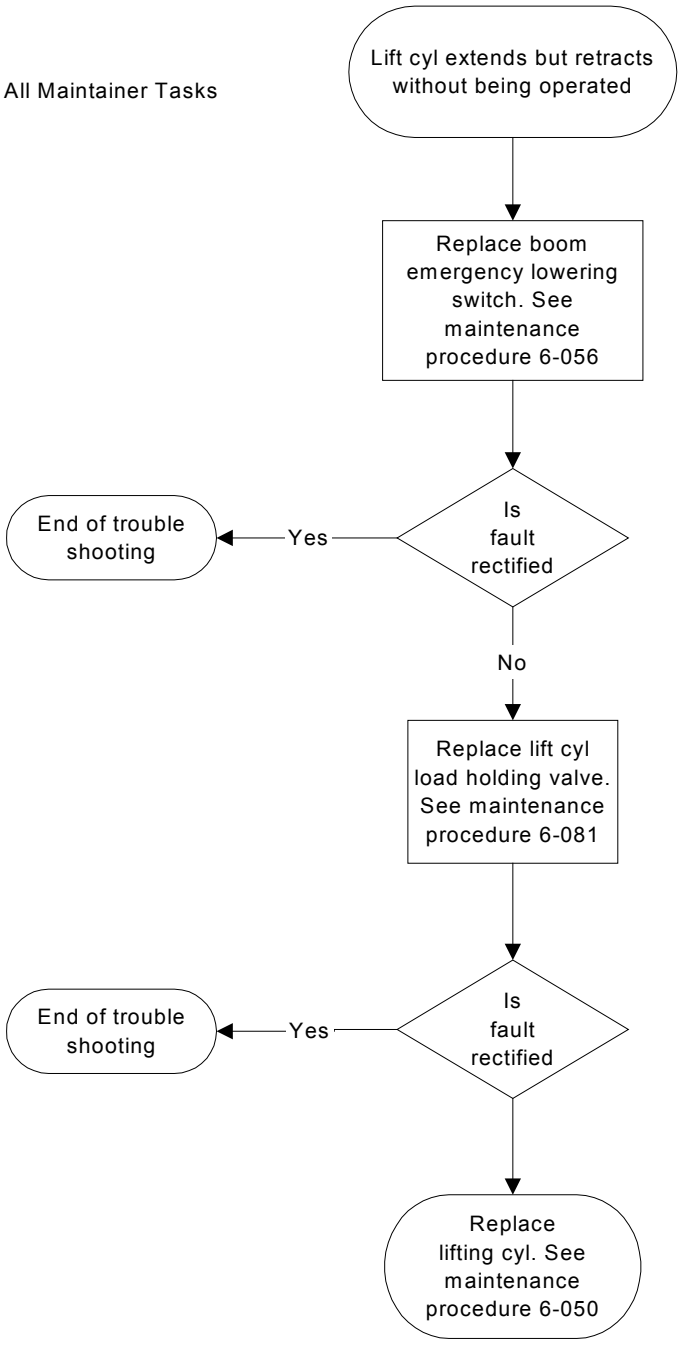
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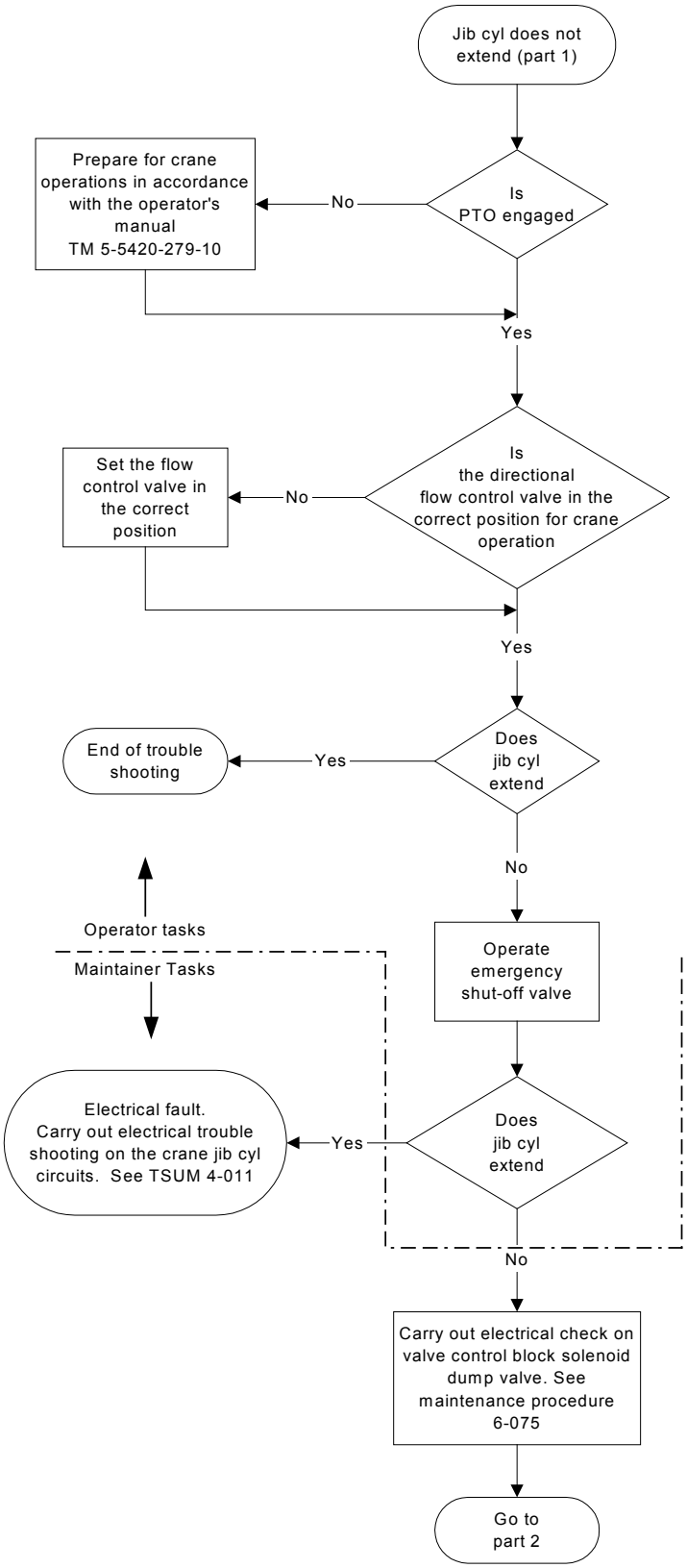
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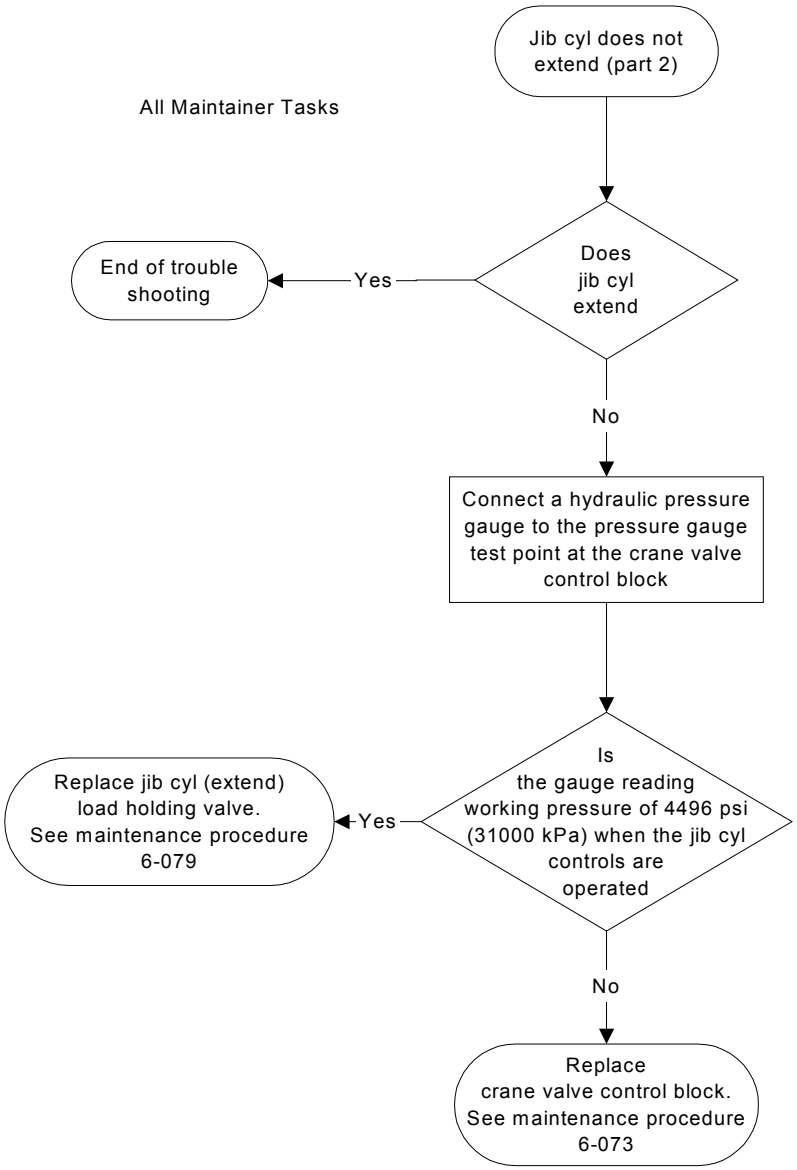
TSUM - 4-005 Lift Cylinder Extends But Retracts Without Being Operated



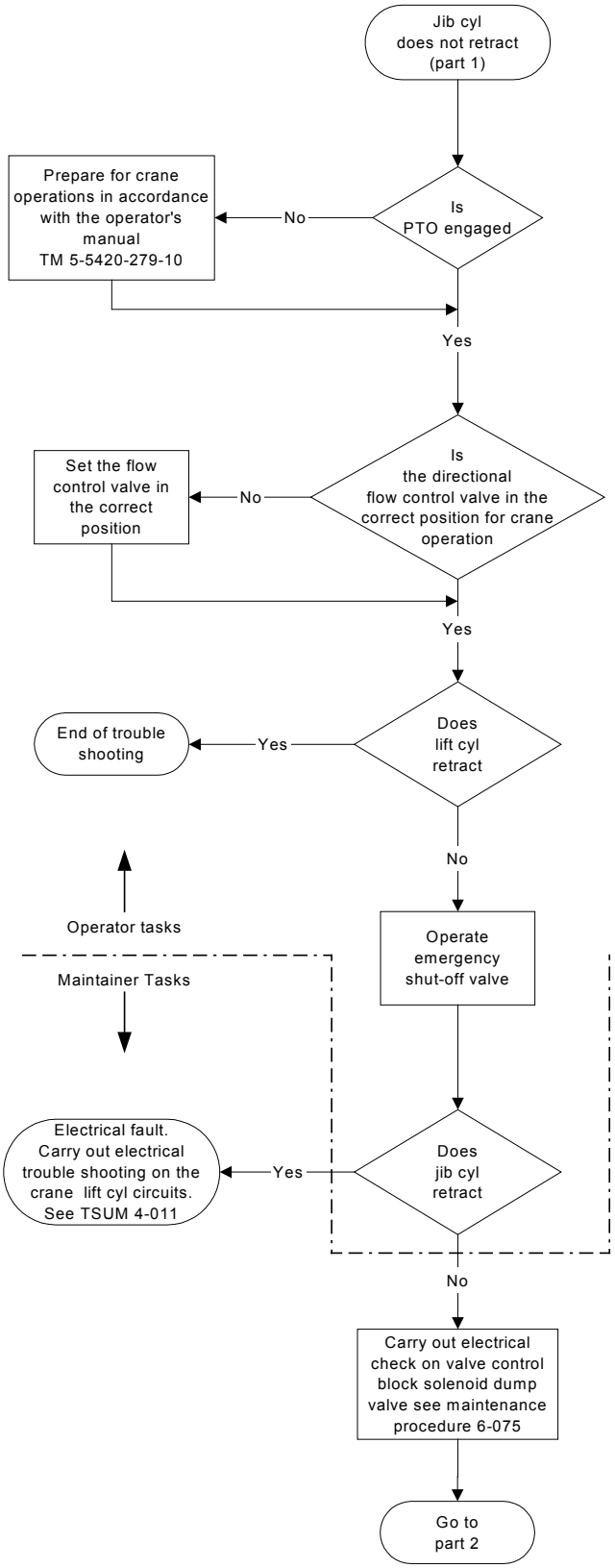
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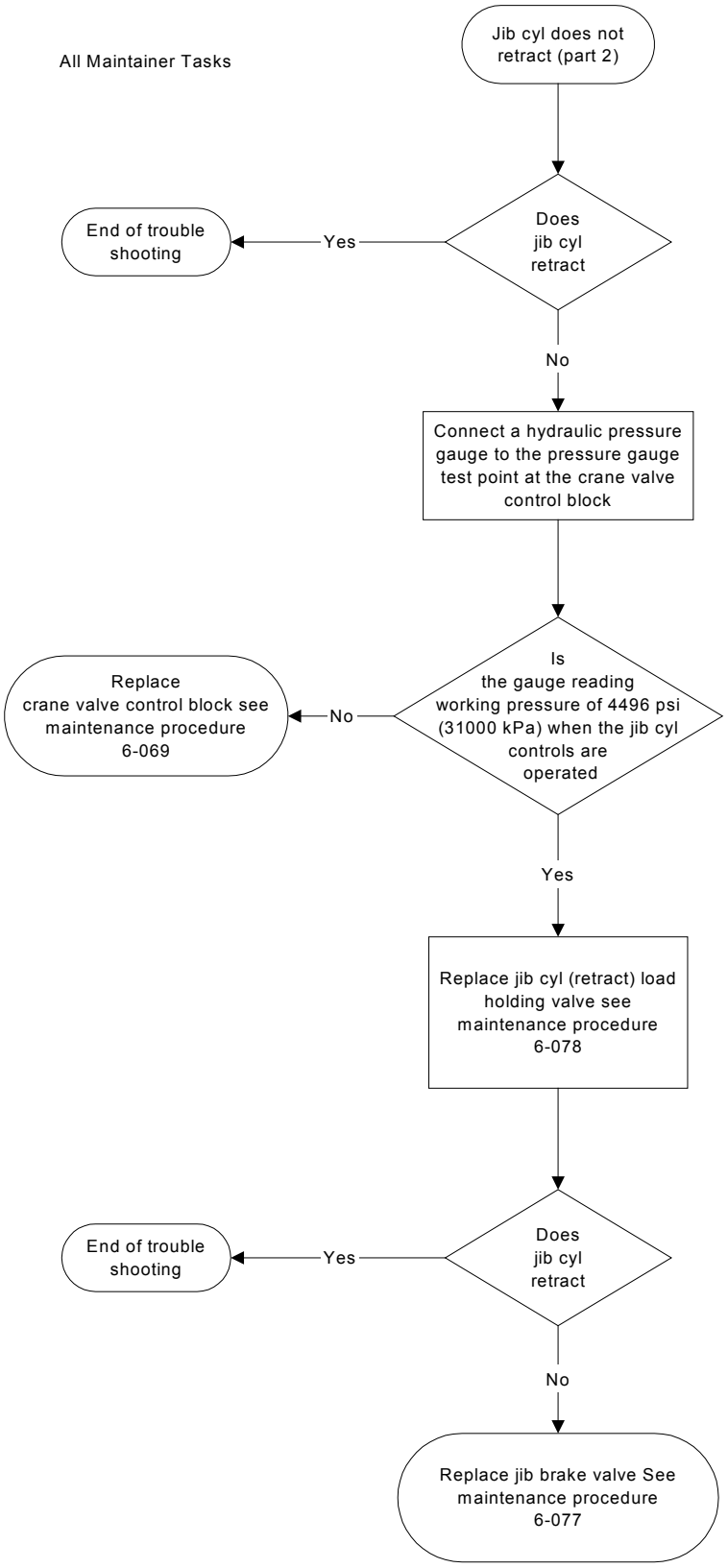
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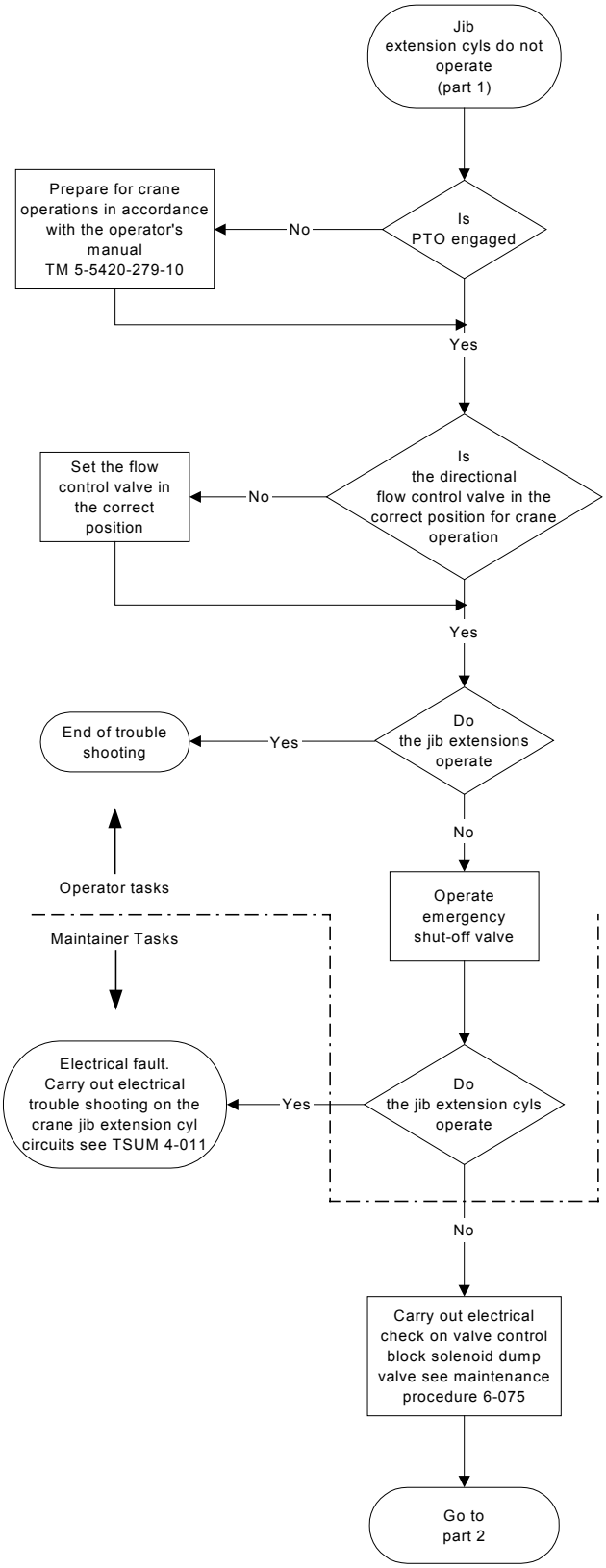
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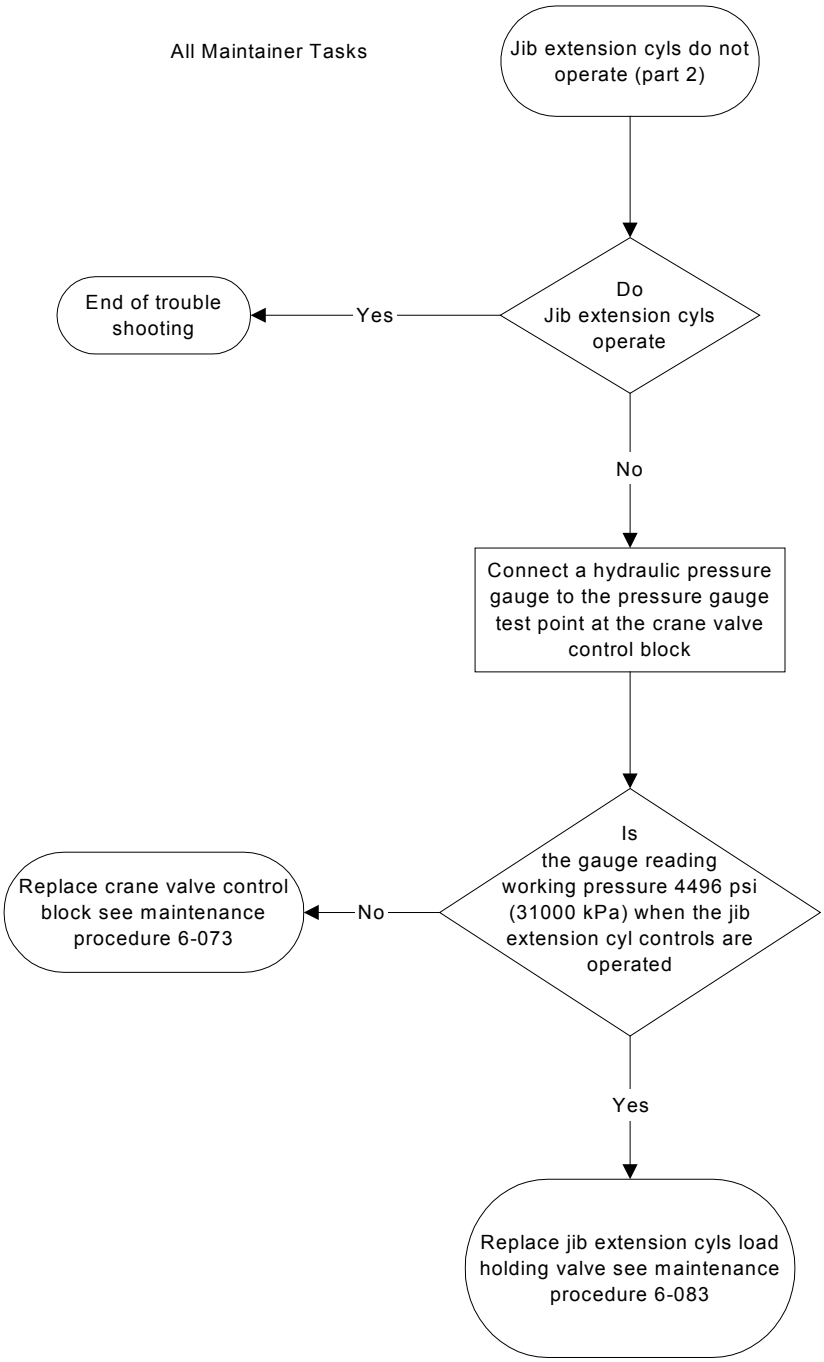
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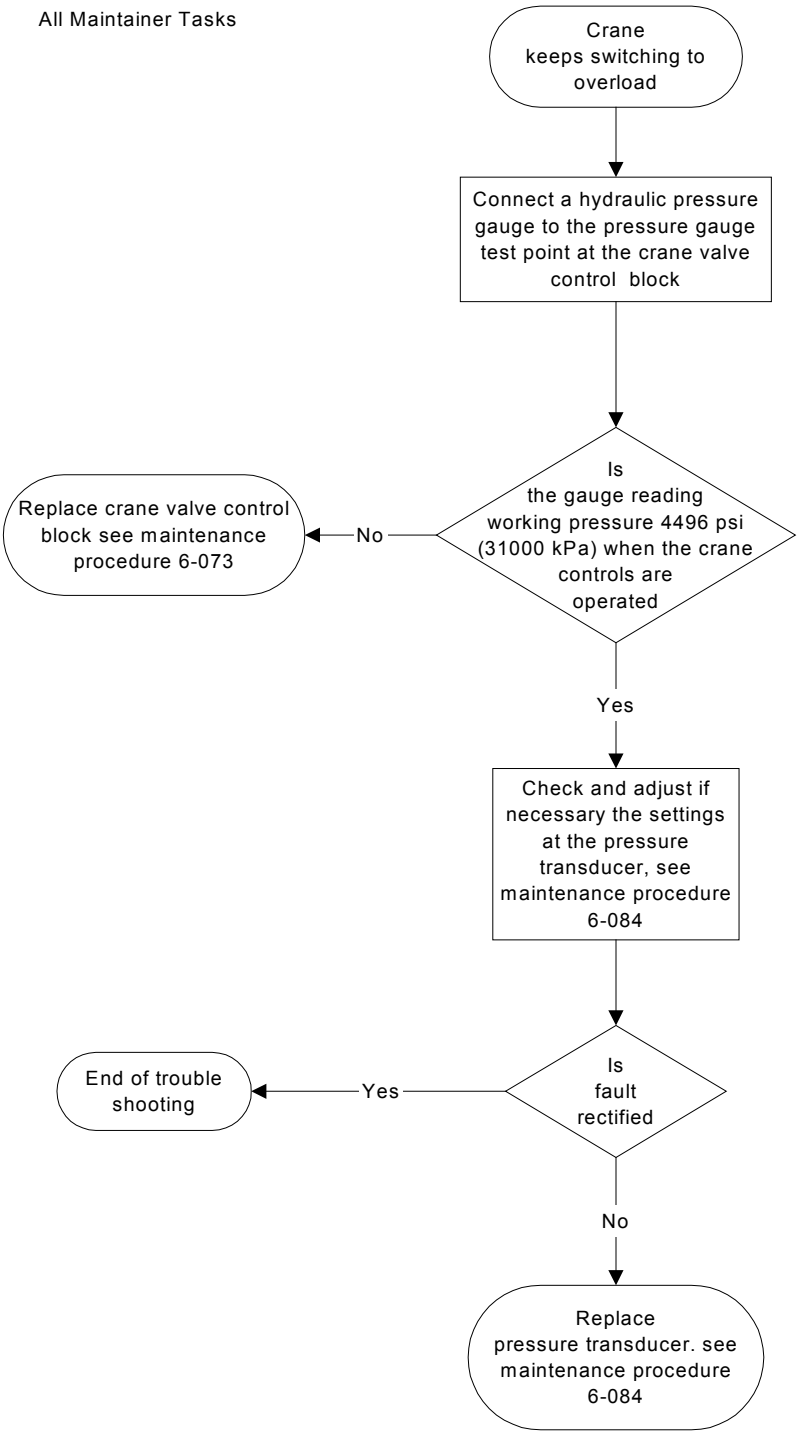
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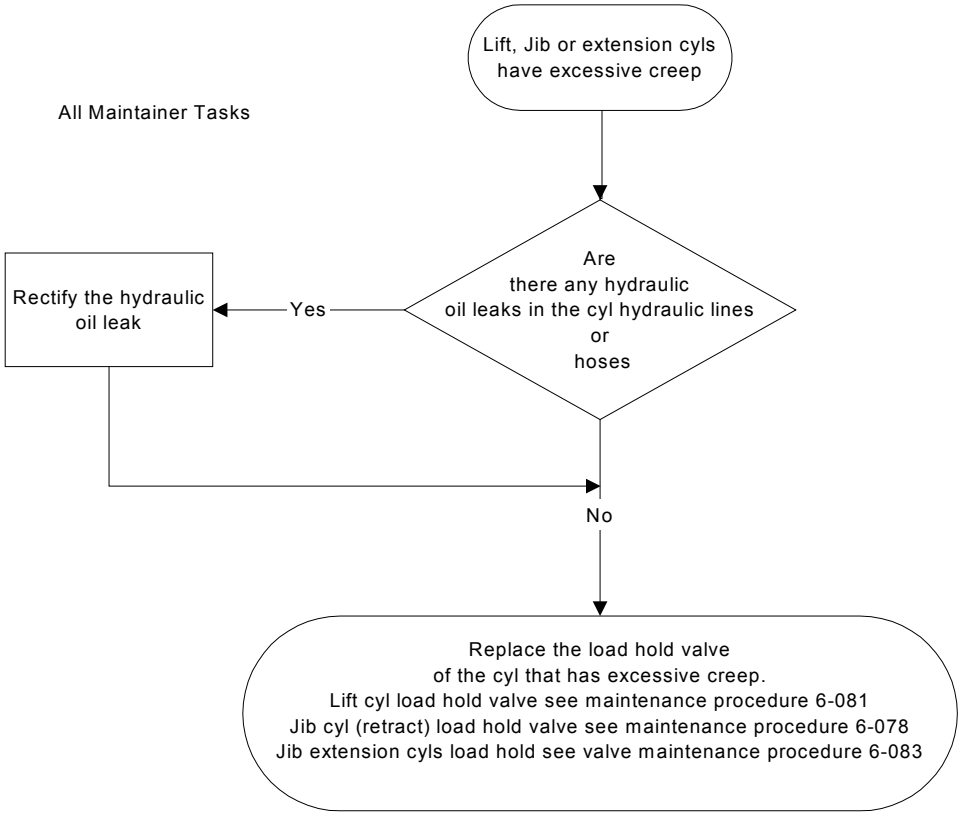
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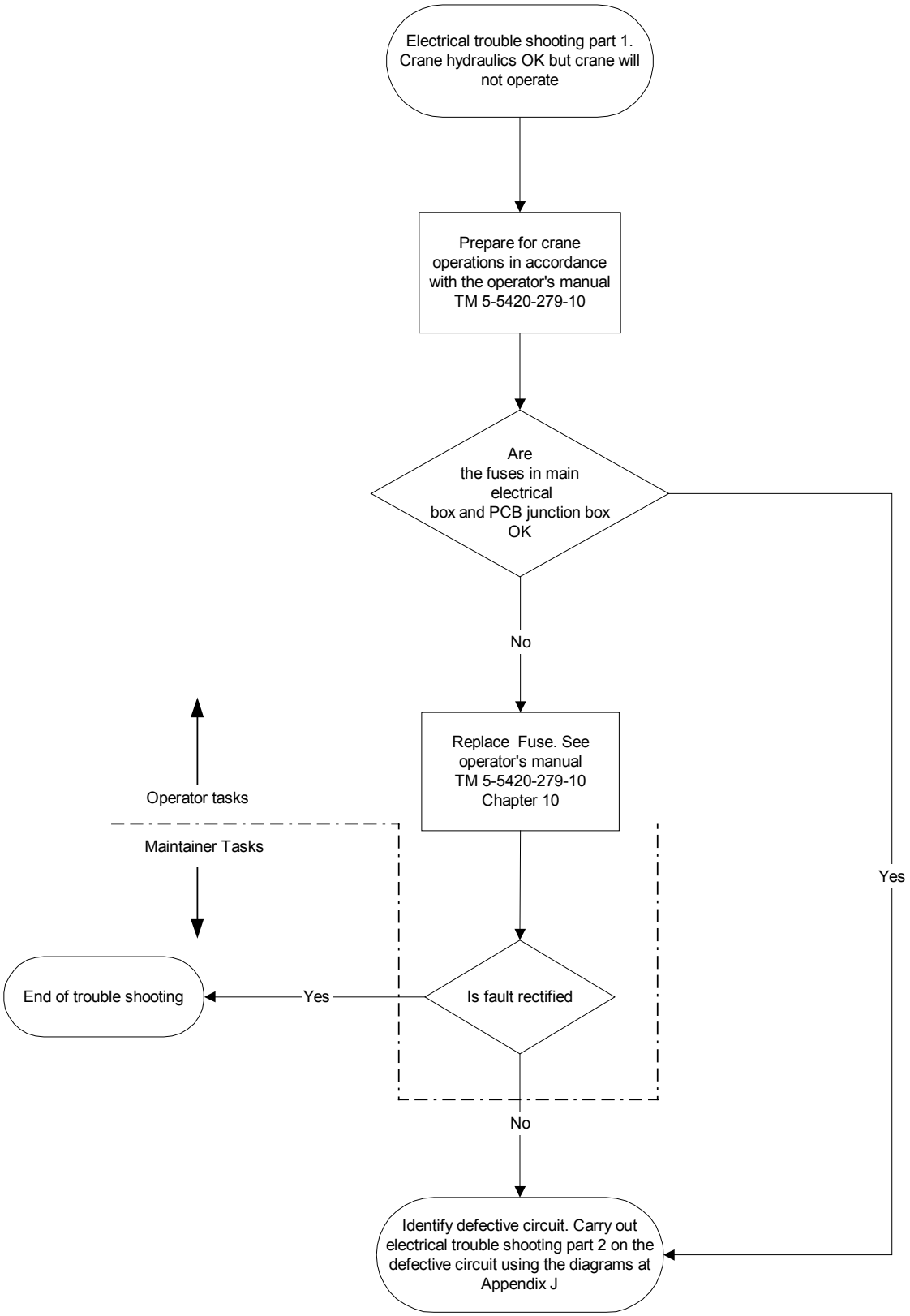
TSUM - 4-009 Crane Keeps Switching To Overload



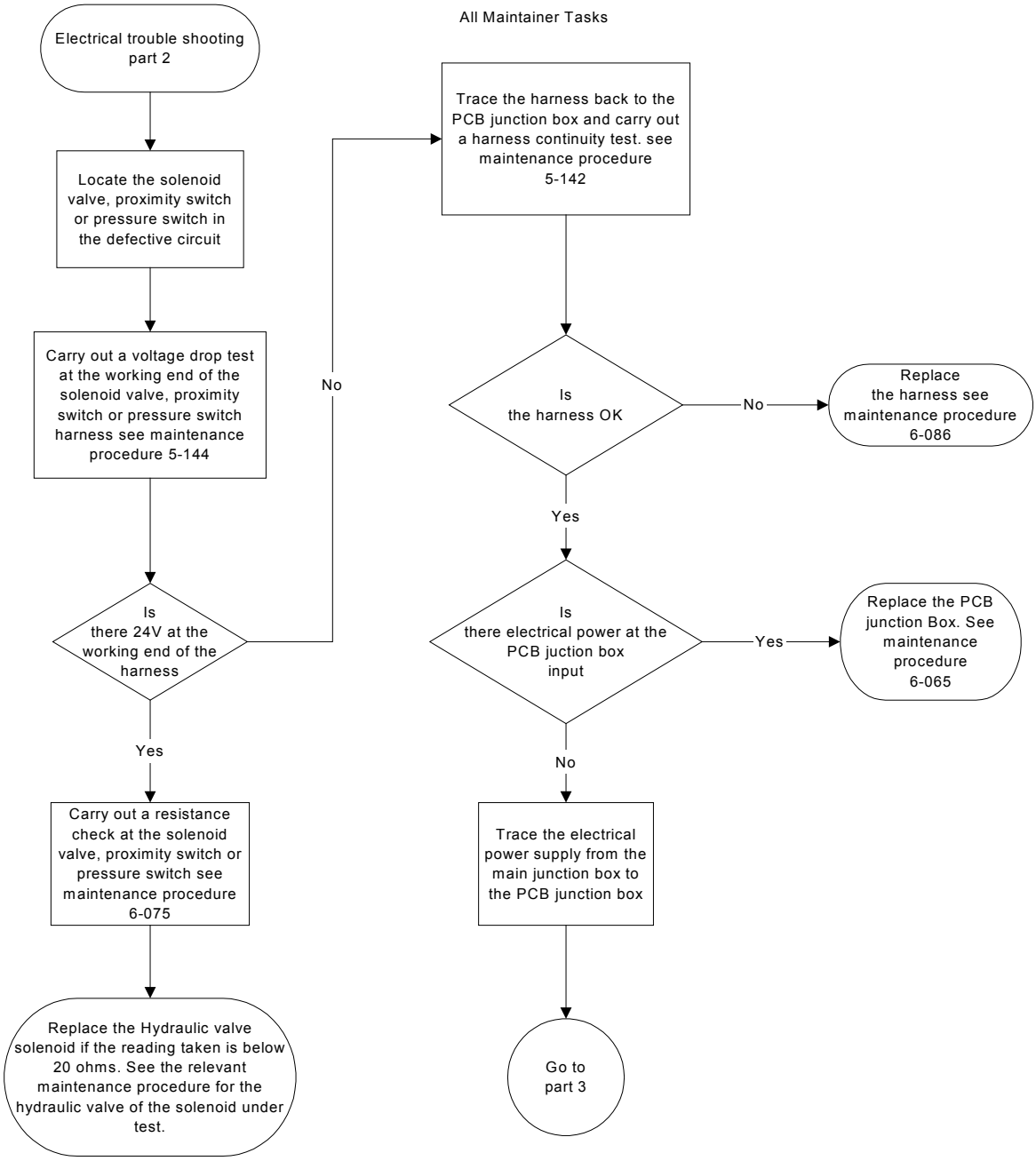
TSUM - 4-010 Lift, Jib Or Extension Cylinders Have Excessive Creep



TSUM - 4-011 Electrical Trouble Shooting (Part 1)



TSUM - 4-011 Electrical Trouble Shooting (Part 2)



TSUM - 4-011 Electrical Trouble Shooting (Part 3)

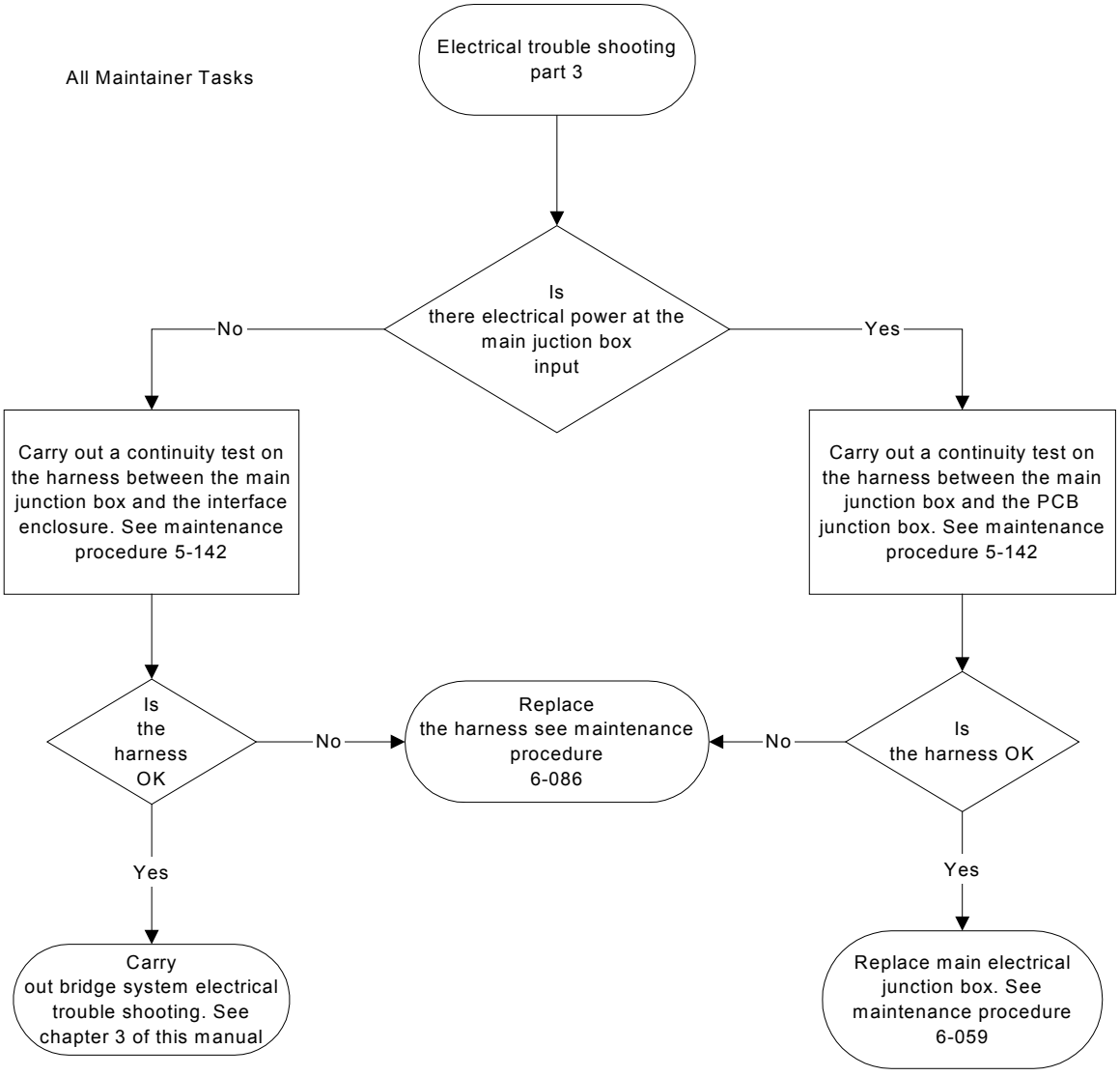


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CHAPTER 5

UNIT MAINTENANCE

Section I. LUBRICATION INSTRUCTIONS

WARNING

TO ENSURE THE SAFETY OF PERSONNEL, ALL TOOLS AND EQUIPMENT MUST BE KEPT CLEAN AND DRY TO PREVENT THE OPERATOR FROM SLIPPING AND CAUSING INJURY TO PERSONNEL.

5-1 GENERAL

a. Keep all lubricants in closed containers and store in a clear dry place away from heat. Allow no dust, dirt, or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready to use.

b. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating, to prevent accumulation of foreign matter.

c. All periodic lubrication is carried out at Operator level. Table 1 contains the necessary information to lubricate components after repair. Detailed drawings of lubrication points can be found in the Operator's manual TM 5-5420-279-10 Chapter 8 Section III.

5-2 EXPENDABLE AND DURABLE ITEMS

A list of expendable and durable items is shown in table 4 of the Maintenance Allocation Chart at Appendix B.

Section II. REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

5-3 COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-4 SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Refer to Maintenance Allocation Chart, Appendix B, for tool reference usage.

5-5 REPAIR PARTS

Repair parts are listed and illustrated in TM 5-5420-279-23P.

Section III. PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

5-6 INTRODUCTION

This section details the preventative maintenance checks and services (PMCS) which are carried out at unit level to prevent failure of components.

WARNING

DEATH OR SERIOUS INJURY CAN OCCUR IF PMCS ARE NOT CARRIED OUT BY AUTHORIZED PERSONNEL, AT THE FREQUENCIES STATED IN THIS SECTION.

NOTE

Before any inspection is carried out, all components must be cleaned using a high-pressure water hose.

Prior to the use of lifting equipment, the operator must ensure that all lifting equipment (crane, jacks, tail lift, shackles, lifting beams, lifting slings, etc.) is serviceable.

5-7 CORROSION AND CRACKING

a. Early detection of cracks in highly stressed components is essential. Any delay may result in the complete failure of a component. Visual inspection of dismantled components is therefore to be carried out thoroughly and the inspector should in particular, look for stress corrosion cracks.

b. Stress corrosion cracks are a form of inter-crystalline corrosion, which occur under the influence of static stress and which may also occur within heat affected zones of welded components. Stress corrosion cracks lead to mechanical failure.

c. Any cracks less than 3/8in (10mm) long must be clearly marked and observed. Cracks over 3/8in (10mm) long must be repaired. Any cracks or damage to the paint and/or aluminum protective coating must be reported immediately and the necessary repair action taken.

d. If bituminous black material is oozing from a component, with the exception of around seal plates, the component must be closely examined. This may indicate a serious crack, which would require repair at Depot Maintenance.

e. The inspection of dismantled components should be carried out visually in great detail and the designated inspector should, in particular, look for the following defects:

(1) Stress Corrosion Cracks. This form of corrosion, inter-crystalline in nature, occurs under the influence of static stress and may occur within the heat-affected zones of welded components. It leads to mechanical failure generally in the form of cracking (Fig 5.1).

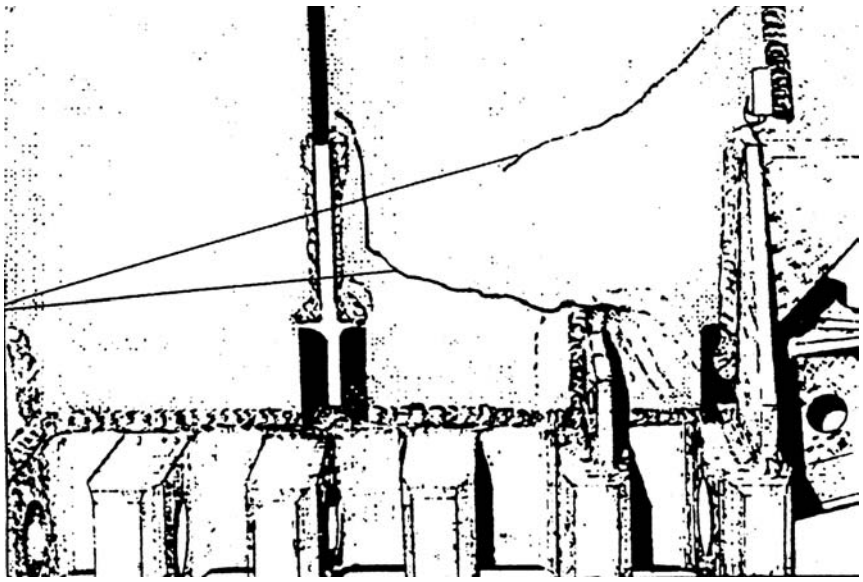


Fig 5.1 Stress Corrosion Cracking

(2) Bi-metallic Corrosion. This generally occurs on aluminum alloy components in contact with steel fastenings where the protective finish has been damaged (Fig 5.2).



Fig 5.2 Bi-Metallic Corrosion

(3) Exfoliation (or layer) Corrosion. This is a less common form of corrosion occurring in alloys with copper or magnesium content. It is often the cause of flaking paintwork (Fig 5.3).

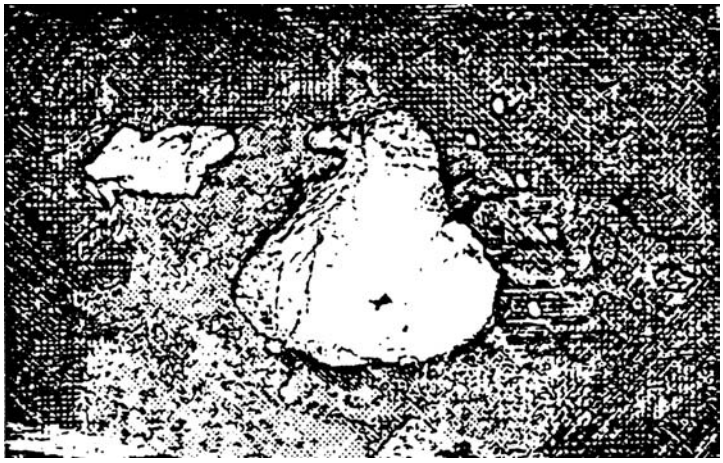


Fig 5.3 Exfoliation Corrosion

(4) Fatigue Cracking. This type of cracking is unlikely to appear, but may occur in indicator outer jaws where a highly stressed component is approaching the end of its useful life.

(5) Impact Fractures. Careless handling and bad stacking generally causes these.

(6) Rusting. This occurs where the protective coating on pins has broken down or worn; it can also contribute to bi-metallic corrosion.

(7) Pin Hole Wear. This is the result of frequent building with dirty panel pins. In extreme cases fatigue cracking may occur through excessively loose pins.

(8) Distortion. This is evident especially as elongation of components, this may occur during the later stages of bridge life. Excessive loads or accident damage can also cause distortion. All these may result in the loss of interchangeability of parts.

(9) Weld Cracking. This is usually caused by weld defects and internal stresses. The incidence of cracking is likely to decrease with component usage or aging.

5-8 PROTECTIVE FINISHES

a. Protective finishes are not indestructible, but they are replaceable. Even when properly applied on well-prepared surfaces they will gradually deteriorate and eventually fail, although the rate of deterioration is slowed when the right procedures are carried out. The life of a paint system depends on the correct use of appropriate materials skillfully applied and dried under controlled conditions. Inspectors and persons responsible for the condition of protective finishes must be familiar with the signs of various stages and types of deterioration and be able to determine the time and extent of replacement.

b. It is important to avoid delay in repairing paint over protective metal coatings. A broken down paint film retains water and can cause rapid and serious corrosion of a metal coating beneath it. In most cases the most economical policy is to make regular inspections of the structure and to start re-painting as soon as the first signs of paint breakdown become evident. This breakdown, in order of increasing seriousness, generally takes the form of chalking, cracking, blistering and rust staining. As a rule breakdown should not be allowed to proceed beyond the chalking stage because at this point the only preparation required before painting is washing down and drying off.

c. The materials used to replace the protective finish are listed in the Expendable and Durable Supplies and Materials List (in RPSTL TM 5-5420-279-23P), and must be applied in accordance with TM 43-0139, Painting Instructions for Army Materiel.

d. The more typical faults to look for are listed below.

(1) Chalking. This is the formation of a powdery coating on the surface of the paint film and is an indication that the finish coating has begun to break down. In severe cases of chalking the powdery coating will be transferred to the hand when rubbed.

(2) Cracking. Generally this is the splitting of a dry paint film as a result of aging. Several terms are used under this heading to indicate the extent of the fault.

(3) Hair Cracking. These cracks normally occur in isolated patches and do not penetrate the topcoat. At this stage only slight preparation is required before painting.

(4) Checking. This is the extension of hair cracking and covers the whole surface with a small pattern (Fig 5.4).



Fig 5.4 Paint Checking

(5) Cracking. This term is specifically used when at least one paint coat is affected and the complete paint system is likely to fail (Fig 5.5).



Fig 5-5 Paint Cracking

(6) Crocodiling or Alligatoring. A drastic type of chalking producing a pattern resembling the crocodile or alligator hide (Fig 5.6). This kind of fault requires considerable preparation to remove the pattern down to a suitable substrate for re-painting.



Fig 5.6 Paint Crocodiling

(7) Severe Cissing. Fig 5.7 shows this effect which is caused by painting over grease or oil contamination. This may affect the base or undercoat or only the finish coat. In any event the whole of the area affected must be cleaned down to the coating below the cissing. Fig 5.8 shows the same effect caused by applying incompatible types of paint - in this case a red oxide primer and polyurethane based finish coat. This fault should be cleaned down to the substrate and the correct paint specification applied.



Fig 5.7 Paint Cissing - Contaminated Surface

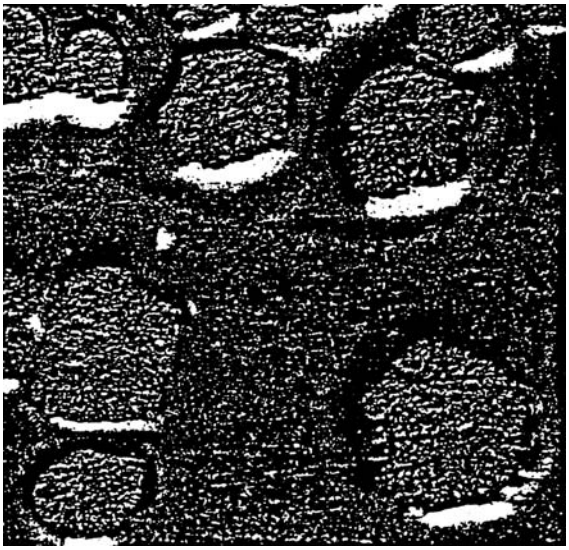


Fig 5.8 Paint Cissing - Incompatible Coatings

(8) Blistering. Although this fault is obvious in appearance, (i.e., dome shaped projections or blisters) the cause may not readily be noticed. In any event the blisters will most certainly be retaining harmful agents, such as water vapor or gases, against the substrate. For this reason alone blistered paint should be cleaned down to the substrate and the cause eliminated. Fig 5.9 shows blisters caused by aging of the paint system and corrosion of the substrate.

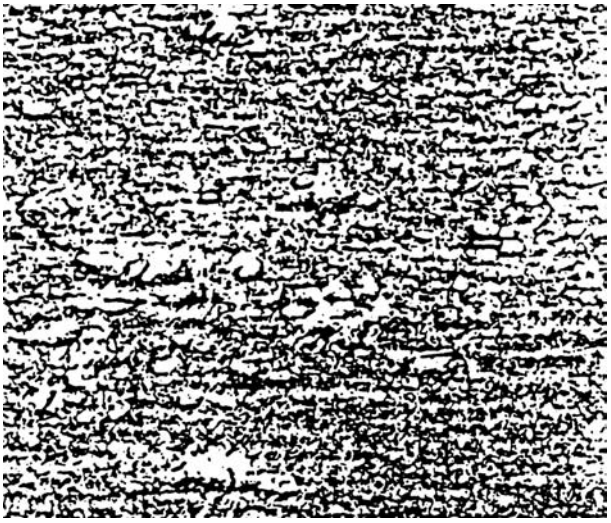


Fig 5.9 Paint Blistering

(9) Rust Staining. Red and yellow oxides produced from ferrous metals show as rust stains on what appears to be a reasonable paint surface. In fact they indicate that small fissures have developed and the metal substrate has begun to corrode. This fault should be cleaned down to the substrate.

(10) Flaking or Peeling. This fault is the most easily confused condition. Paint is caused to flake by numerous conditions, some of which are avoidable mistakes in application or pretreatment, and not, as commonly thought, by deterioration in the paint film. In all cases where the paint film adhesion has deteriorated so that the paint is lifting and flaking, the extent of the damage and the general condition of the entire component must be considered before a repair decision is made. If the damage is very localized, the affected area only should be repaired in the form of patch painting. But in the event of a general deterioration, for example upwards of 10% in patches of the total surface area, localized repair would be false economy and a complete re-treatment should be authorized.

(11) Fig 5.10 shows the underside of a paint flake contaminated with rust, oil and chalk.

(12) Fig 5.11 shows a flaking paint system caused by the omission of primer pretreatment.

(13) Fig 5.12 shows a badly flaking paint system that requires cleaning to a suitable substrate and renewal of the paint system. This illustration is a direct extension of Fig 5.9 where the paint was blistered.



Fig 5.10 Paint Flake

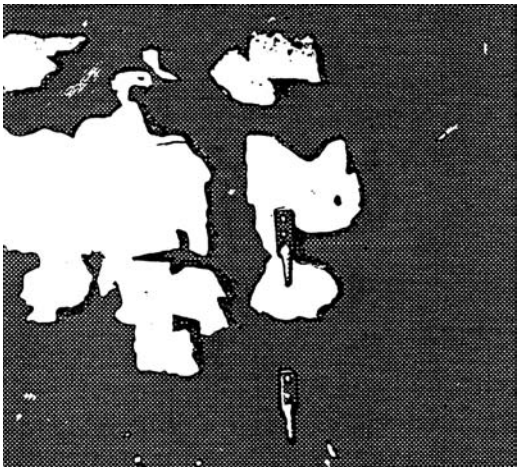


Fig 5.11 Omission of Paint Primer



Fig 5.12 Severe Flaking

5-9 FREQUENCY OF PMCS

e. PMCS are carried out on the Bridge, annually or after 500 load crossings, whichever comes first.

f. PMCS are carried out on the Launcher, annually.

g. PMCS are carried out on the Crane annually.

h. PMCS are carried out on the Tail Lift annually.

5-10 DEFECTIVE COMPONENTS

Any components found to be defective must be clearly marked with MARKAL PAINTSTIK. Where the defect renders the component unserviceable, mark the effected area and write clearly DO NOT USE, on an exposed face of the component. Where the defect does not render the component unserviceable, the effected area must still be marked with MARKAL PAINTSTIK, for future repair.

5-11 BRIDGE COMPONENTS PMCS

The PMCS to be carried out on the Bridge Components are shown in Tables 5.1 to 5.5.

5-12 LAUNCHER COMPONENTS PMCS

The PMCS to be carried out on the Launcher Components are shown in Tables 5.6 to 5.24.

5-13 CRANE COMPONENTS PMCS

The PMCS to be carried out on the Launcher Components are shown in Table 5.25.

5-14 TAIL LIFT COMPONENTS PMCS

The PMCS to be carried out on the Launcher Components are shown in Table 5.26 to 5.27.

5-15 PMCS REPORTING

The loose-leaf illustrations Fig 5.13 to 5.39 are to be copied and used to report component damage. When damage is observed the inspector is to mark the damaged area on a copy of the illustration. For cross-reference, the condition and the grid reference is to be recorded. Full details of the damage, such as lengths and widths of cracks and degree of distortion etc. must be recorded. The completed illustration is to accompany DA form 2404. Equipment Inspection and Maintenance Worksheet.

Table 5.1 Bridge Components PMCS - Parallel Module

Fig No	PROCEDURES	REMARKS
Fig 5.13	a. Check the closing sling pulleys (A) for free rotation and bent shafts. b. Check the closing slings (B) for frayed or broken strands and the end eyes for deformity. c. Inspect the opening slings (C) for cuts and abrasions in the outer sleeve. d. Check that the opening sling securing pins (D) and their roll pins are secure. e. Examine the resilient mounts (E) for free rotation on their shaft, and that they are secure and not damaged. f. Examine the birds beak jaws (F) for cracks and corrosion. g. Check the torque setting caps on the jaw connection system (G), to ensure that the Rotabolt torque settings are at 880 lb/ft. h. Check that the shoot bolts (H) are not bent or damaged and that they are free to operate. i. Check the hydraulic dampers (K) for leakage and ensure that their mountings are secure. j. Inspect for corrosion and cracking around all weld areas. k. Examine the curbs (L) for cracks, corrosion and distortion. Check that the curbs are free to deploy and that their locking catches (M) operate correctly. l. Check the fatigue monitors for crack growth. m. Check the bottom chords for impact or bearing damage (lateral notches on bottom greater than 1/4 inch (6mm). n. Check the roadway surfaces for signs of damage. o. Check all components for damage to protective paint film.	

Table 5.2 Bridge Components PMCS - Ramp Module

Fig No	PROCEDURES	REMARKS
Fig 5.14	a. Check the closing sling pulleys (A) for free rotation and bent shafts. b. Check the closing slings (B) for frayed or broken strands and the end eyes for deformity. c. Inspect the opening slings (C) for cuts and abrasions in the outer sleeve. d. Check that the opening sling securing pins (D) and their roll pins are secure. e. Examine the resilient mounts (E) for free rotation on their shaft, and that they are secure and not damaged. f. Examine the birds beak jaws for cracks and corrosion. g. Check the torque setting caps on the jaw connection system (F), to ensure that the rotabolt torque settings are at 880 lb/ft. h. Check that the shoot bolts are not bent or damaged and are free to operate. i. Check the hydraulic dampers (G) for leakage and that their mountings are secure. j. Inspect for corrosion and cracking around all weld areas. k. Examine the curbs (H) for cracks, corrosion and distortion. Check that the curbs are free to deploy and that their locking catches (J) operate correctly. l. Check the fatigue monitors for crack growth. m. Check the end beam fixed pins (K) for wear and the locking brackets for damage. n. Check the bottom chords for impact or bearing damage (lateral notches on bottom greater than 1/4 inch (6mm)). o. Check the roadway surfaces for signs of damage. p. Check the approach ramp hooks (L) for cracks and corrosion. q. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to q.

Table 5.3 Bridge Components PMCS - End Beam

Fig No	PROCEDURES	REMARKS
Fig 5.15	a. Inspect the areas around all welds for corrosion, cracking and distortion. b. Examine the ramp hooks (A) for damage. c. Examine the pin location points (B) for cracks and corrosion. d. Examine the fixed pin location (C) for damage. e. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to d.

Table 5.4 Bridge Components PMCS - Approach Ramps

Fig No	PROCEDURES	REMARKS
Fig 5.16	a. Examine for cracks and corrosion. b. Examine location hooks (A) for damage. c. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. or b.

Table 5.5 Bridge Components PMCS - All Pins

Fig No	PROCEDURES	REMARKS
Fig 5.17	a. Examine pins for distortion, corrosion or heavy scoring.	Equipment is not ready/available if pins are bent or heavily scored.

Table 5.6 Launcher Components PMCS - A-Frame

Fig No	PROCEDURES	REMARKS
Fig 5.18	a. Check that the hydraulic system rigid and flexible pipes are undamaged and that their clipping is secure. b. Check that the folding cylinders (A) and the raising cylinders (B) are secure and not leaking. c. Check that the guide support rollers and hydraulic motor (C) are undamaged and that they are free to rotate. Check for excessive wear on bridge bearing pads (D). d. Check that the upper and lower center beam joints (E) are clear of debris and are not damaged. Check the thrust washer thickness at the hinge points. e. Examine the faces of the upper slide (F) for scoring. f. Examine the faces of the stabilizer legs (G) for scoring. g. Examine the slide frame mountings (H) for damage and security. h. Check that the bridge emergency stop (K) returns to its stop position, when its handle is pressed and released. i. Check that the spring has not set or become distorted. Check for free rotation of the rollers and roller arm on the bridge emergency stop. j. Check the stabilizer feet (L) for damage and free movement on the stabilizer leg foot pivot plate. k. Check all shot bolts and locking pins for wear and distortion. l. Check limit switches for operation and setting (M). m. Check all components for damage to protective paint film. o. Check the lower emergency stops for damage.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to j.

Table 5.7 Launcher Components PMCS - Launch Frame

Fig No	PROCEDURES	REMARKS
Fig 5.19	a. Check that the launch frame is correctly located in its open and stowed positions. b. Check that the 4 upper guide rollers (A), the 4 lower guide rollers (A) and the rear pinch roller (B) are undamaged and that they are free to rotate. c. Check that the rope roller (C) is free to rotate. d. Examine the structure around the A-Frame center pivot (D) for damage. e. Examine the launch beam stop (E) for damage to the striker face and that the snap ring is secure. f. Examine the cables (F) for kinks, fraying and broken strands. g. Check for nesting of rope on the rope drum (G). h. Check all weld areas for cracks and corrosion. i. Check the chain tension of the launch beam drive (H). j. Check the launch beam drive sprockets (J) for excessive wear. k. Check the tired wheels on the launch beam drive for damage and excessive wear (K). l. Check for hydraulic fluid leakage at the launch beam drive. m. Check the security of the launch beam drive gearbox mountings (L). n. Check the oil level in the launch beam drive motor (M). o. Check all pipes and hoses for leakage. p. Check all manifold blocks for damage and leakage. q. Check that all button switches have retaining clips. r. Check and confirm operation of both limit switches (N). s. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to q.

Table 5.8 Launcher Components PMCS - Upper and Lower Winches

Fig No	PROCEDURES	REMARKS
Fig 5.20	a. Check the condition of hydraulic hoses (A). b. Examine for leakage of hydraulic fluid. c. Check the security of all fixings (B). d. Check for nesting of rope (C) on the drum.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to d.

Table 5.9 Launcher Components PMCS - Launch Beam

Fig No	PROCEDURES	REMARKS
Fig 5.21	a. Check the jaws (A) for damage or distortion which would make joining of the beam sections and pin location difficult. b. Check the bores (B) for excessive wear and scoring. c. Check for free rotation of the resilient mount (C). d. Check all welded areas especially around the jaw area (D), for cracks and corrosion. e. Check the central lifting point (E) for wear, damage or distortion. f. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to e.

Table 5.10 Launcher Components PMCS - Forward Launch Beam

Fig No	PROCEDURES	REMARKS
Fig 5.22	a. Check the bores (A) for excessive wear and scoring. b. Check the lugs (B) for signs of cracking. c. Check for free rotation of the resilient mount (C). d. Check for free rotation of the fail safe roller (D). e. Check for tightness and the condition of the location block (E). f. Check all welded areas, especially around jaw area (F), for signs of cracking. g. Check the pulleys (G) for wear and that they are free to rotate. h. Check that the carriage stops (H) are secure and are not damaged. i. Check the security of the far bank support (J) and its freedom of movement. j. Check the central lifting point for wear, damage or distortion. k. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to k.

Table 5.11 Launcher Components PMCS - Far Bank Support

Fig No	PROCEDURES	REMARKS
Fig 5.23	a. Examine for weld cracks and impact damage. b. Examine the slide pads (A) on the center post (wear not to exceed 1mm). c. Check the operation and alignment of the shoot bolts (B). d. Check for free movement of the support bearing pads (C). e. Check the hydraulic system for leaks. f. Check the hydraulic fluid level in the reservoir. g. Examine the hydraulic-micro bore pipes (D) for damage, and check that their clipping is secure. h. Check the hydraulic clamp (E) operation. i. Check the cylinders (F) for scoring and distortion. j. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to j.

Table 5.12 Launcher Components PMCS - Forward and Rear Carriage

Fig No	PROCEDURES	REMARKS
Fig 5.24	a. Examine the rear carriage locking mechanism (A) for damage. b. Check the carriage support rollers (B) for signs of damage and for freedom to rotate. c. Check the top roller rope guides (C) for independent movement from the outer rollers. d. Check the side rollers (D) for damage and for freedom to rotate. e. Check that the pulley blocks (E) are free to rotate and that they are not damaged. f. Check the operation of the shoot bolts (F). g. Check that the top pulley carrier (G) is free to rotate. h. Examine the bridge lifting slings (H) for small cuts to the outer sleeve. i. Check the security of the sling retaining pins (J). j. Check the security and free movement of the carriage latch. k. Check the security of the winch rope termination pin. l. Check the frame for damage and cracks. m. Check all components for damage to protective paint film. n. Check carriage rope wear pads.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to m.

Table 5.13 Launcher Components PMCS - Slide Frame

Fig No	PROCEDURES	REMARKS
Fig 5.25	a. Examine the hydraulic cylinders (A) for leaks. b. Examine the hydraulic hoses (B) for damage and check the security of the clipping. c. Check all cylinder and pivot locking plate fasteners for tightness. d. Check all cross beam fasteners (C) for tightness. e. Check upper slide frame mounts for tightness and washer stack damage. f. Examine the shoot bolt (D) operation and the condition of the pin. Check brackets for damage and corrosion. g. Examine the twist locks (E) for security. h. Check the tilt roller shoot bolt (F) for wear and operation in stowed and deployed position. i. Check the tilt roller pivot for free movement and wear. j. Check the tilt roller support (G) for free movement. k. Check the tilt roller cylinders and hoses for leaks and damage to hoses. l. Check the tilt roller assembly slide pads for wear. If the gap between the inner slide and the outer post welded back plate is more than 1/20 inch (1.25 mm) replace all wear pads. m. Examine the wear pads and stop plugs (J), on the slide frame sections 2 and 3. n. Check the lifting and lashing points for damage and weld cracks. o. Check the operation and setting of the limit switch (H). p. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to n.

Table 5.14 Launcher Components PMCS - Relax Mechanism

Fig No	PROCEDURES	REMARKS
Fig 5.26	a. Check the cylinders (A) for hydraulic leaks. b. Check the packing pads (B) for wear or damage. c. Check the limit switches (C) for damage. d. Operate the shoot bolt (D) and check that the cam actuates the limit switch (C). e. Check all mounting and support brackets for cracks, corrosion or other damage. f. Check the security of all fixings. g. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to f.

Table 2.15 Launcher Components PMCS - Bridge Module Lifting Beam

Fig No	PROCEDURES	REMARKS
Fig 5.27	a. Check that the shoot bolts (A) are secure and not damaged. b. Check the locking pin holes for elongation and wear. c. Check that the pivot bolts (B) are secure and that the split pins are in place. d. Check the lifting arm pivots for vertical free play on bolt of the spacer tubes. e. Check that the support arms (C) have free movement and that they are not damaged. f. Check that the shackles (D) and lifting hooks (E) are secure and free from damage and wear.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to f.

Table 5.16 Launcher Components PMCS - Power Take-Off and Hydraulic Pump

Fig No	PROCEDURES	REMARKS
Fig 5.28	a. Examine the hydraulic hoses for damage. b. Check for fluid leaks at the hydraulic pump (A). c. Check the security of and for debris around the drive shaft (B). d. Check the security of the hydraulic pump mounting (C). e. Check the security of and for oil leaks at the PTO (D).	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to d.

Table 5.17 Launcher Components PMCS - Launch Beam Lifter

Fig No	PROCEDURES	REMARKS
Fig 5.29	a. Check for damage and corrosion. b. Check the general operation. c. Check all components for damage to protective paint film.	Equipment is not available for use, if damage or defects are found at steps a. and b.

Table 5.18 Launcher Components PMCS - Pallet Adapter

Fig No	PROCEDURES	REMARKS
Fig 5.30	a. Check for damage and corrosion. b. Check all components for damage to protective paint film.	Equipment is not available for use, if found defective at step a.

Table 5.19 Launcher Components PMCS - Launch Beam Spacer

Fig No	PROCEDURES	REMARKS
Fig 5.31	a. Check for damage and corrosion. b. Check all components for damage to protective paint film.	Equipment is not available for use, if found defective at step a.

Table 5.20 Launcher Components PMCS - Removable Rollers

Fig No	PROCEDURES	REMARKS
Fig 5.32	a. Check for free rotation of the support (A) and side rollers (B). b. Check for damage, corrosion and distortion. c. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. and b.

Table 5.21 Launcher Components PMCS - End Beam Adapter

Fig No	PROCEDURES	REMARKS
Fig 5.33	a. Check the operation of the locking arms (A). b. Check for damage and distortion. c. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. and b.

Table 5.22 Launcher Components PMCS - Walkways and Gantries

Fig No	PROCEDURES	REMARKS
Fig 5.34	a. Check the security of all gantry retaining clips. b. Check the folding A-Frame folding walkway pins (A) for wear and security. c. Check all the loose walkways (B) for distortion and damage. d. Check the location holes and the dowel on the slide frame and the removable walkways, for damage and wear. e. Check all components for damage to protective paint film.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. to d.

Table 5.23 Launcher Components PMCS - Chest Pack

Fig No	PROCEDURES	REMARKS
Fig 5.35	a. Check for external damage that could effect the operation of the chest pack. b. Examine the umbilical cable and connectors for damage.	Equipment is not ready/available for use, if damage or defects are found while carrying out steps a. and b.

Table 5.24 Launcher Components PMCS - Hydraulics

Fig No	PROCEDURES	REMARKS
Fig 5.36	a. At the interface cabinet, press the test button and check that all the warning lights illuminate. b. Check the hydraulic fluid level in the reservoir.	Equipment is not available for use, if defects are found while carrying out steps a. and b.

Table 5.25 Crane Components PMCS

Fig No	PROCEDURES	REMARKS
Fig 5.37	a. Check all hydraulic hoses for leaks, chaffing, distortion and damage. b. Check the security of the crane sub-frame (B). Check for cracks and corrosion c. Check the stabilizer legs (C) for damage and corrosion, the wire cable for damage and fraying, pins for security. d. Check the control lever valve block (D) for damage and leaks, the lever decals for legibility, the pivot pins for excessive wear. e. Check the emergency stop (F) mountings for corrosion, cracking and damage. f. Check the control panel lights (E) for damage and security. g. Check the operator's ladder (G) and seat mountings for security, corrosion, cracking and damage. h. Check the crane column (H) for corrosion and cracking, security of all hoses and electrical harnesses. i. Check the lift cylinder (I) or security, leaks, corrosion and cracking. j. Check the jib cylinder (J) for security, leaks, corrosion and cracking. k. Check the extension cylinders (K) for security, leaks, corrosion and cracking. l. Check the crane hook (L) for security, cracks and corrosion. m. Check all electrical panels, harnesses and switches for security and damage. n. Check the security of the rotate gear (N), check for cracks, corrosion and oil leaks. o. Check the auto lube system pipe work and grease fittings for damage. p. Check the hydraulic quick release couplings (P) for correct operation, damage and leaks.	

Table 5.26 Tail Lift Components PMCS - Tail Lift Assembly

Fig No	PROCEDURES	REMARKS
Fig 5.38	a. Check all hydraulic hoses for crush damage or fraying. b. Check the swing cylinders (C), lift cylinders (E) and tilt cylinders (F) for leaks. c. Check all hydraulic hose connections for security. d. Check the security of all hydraulic cylinder pivot pin locking plates. e. Check the mounting brackets (A), swing arms (B) and lifting arms (D) for corrosion and cracking. f. Check the tail lift platform (G) and hand rails (H) for corrosion and cracking. g. Check the remote control casing, buttons and cable for damage see table 5.27. h. Check all electrical cables and solenoid valves for damage and security. i. Check all cylinder bellows for damage.	

Table 5.27 Tail Lift Pendant PMCS - Tail Lift Pendant

Fig No	PROCEDURES	REMARKS
Fig 5.39	a. Check the tail lift pendant casing (A) for damage. b. Check the tail lift pendant operation buttons (B) for damage. c. Check the emergency stop button (C) for damage. d. Check the harness military plug (D) for damage. e. Check the harness (E) for damage. f. Check the harness clamp (F) for damage and security.	

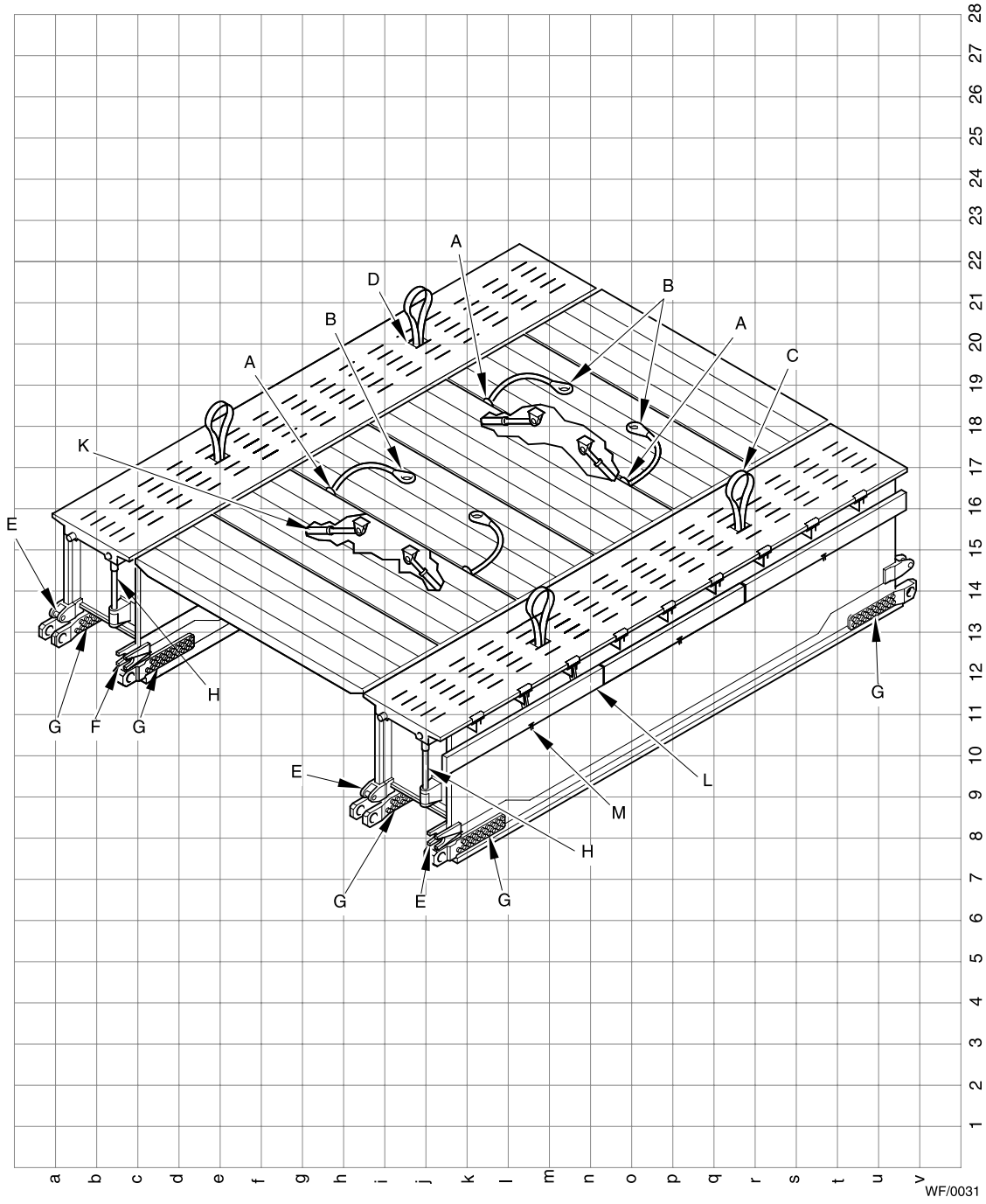


Fig 5.13 Parallel Modules

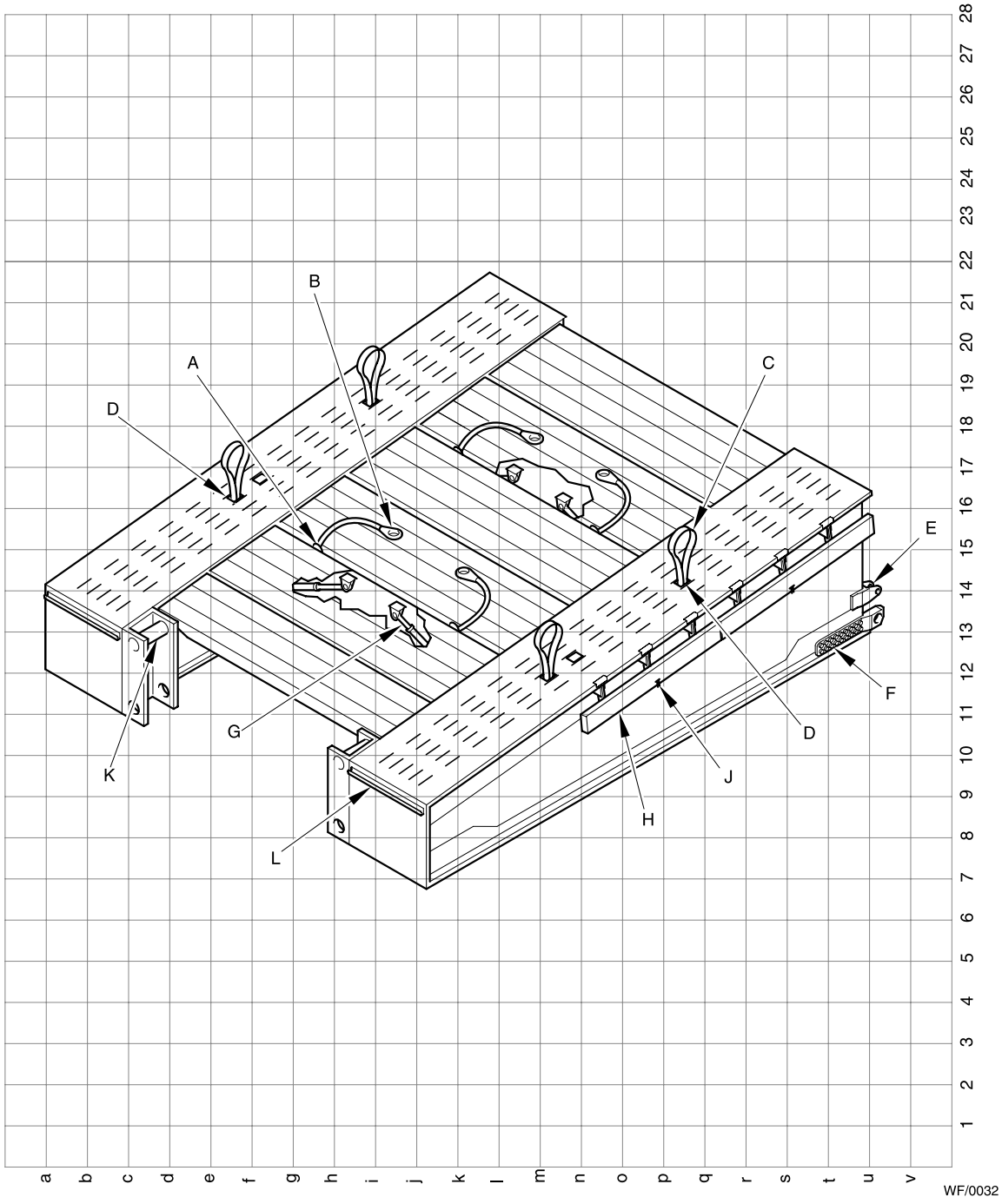


Fig 5.14 Ramp Module

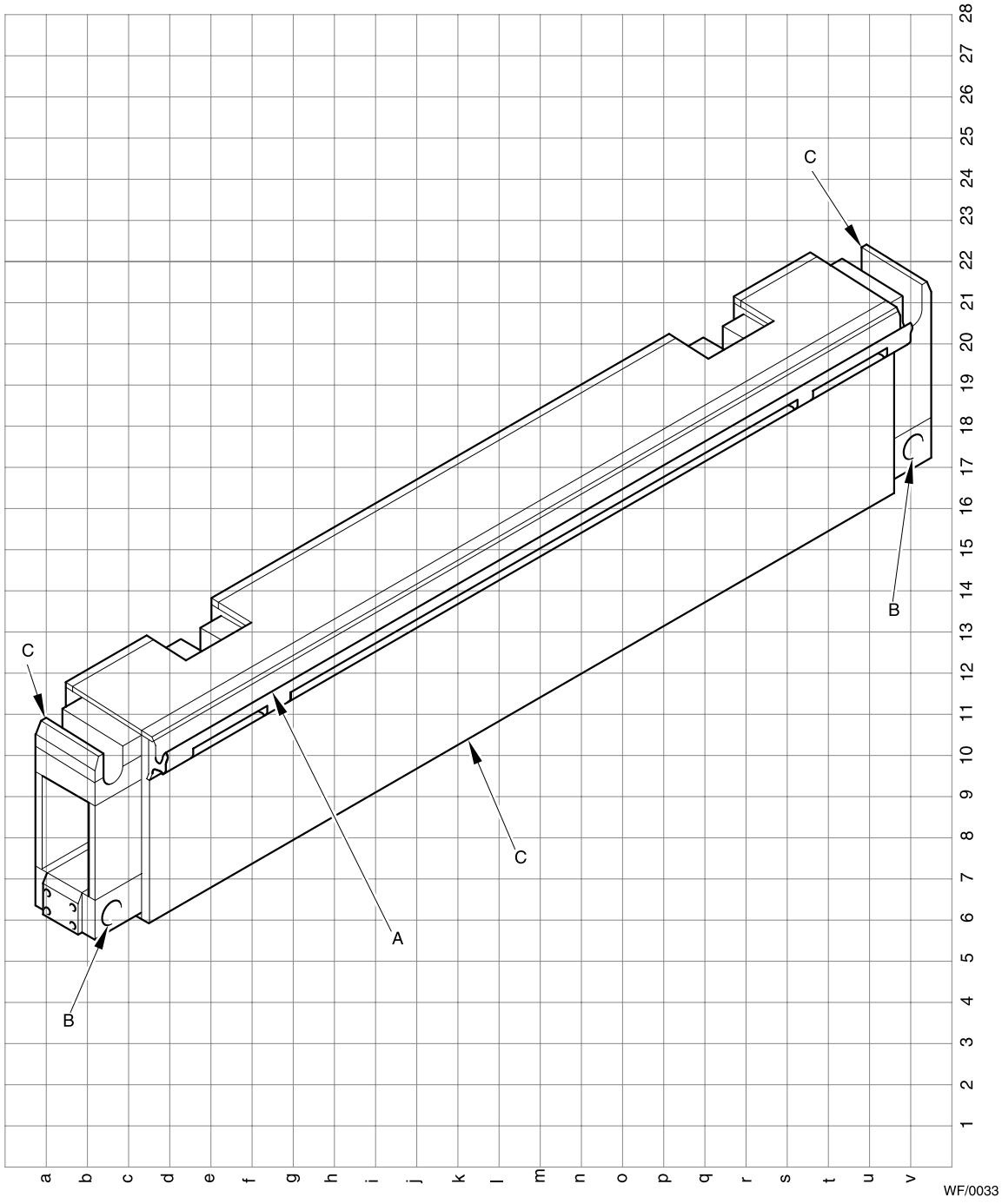


Fig 5.15 End Beam

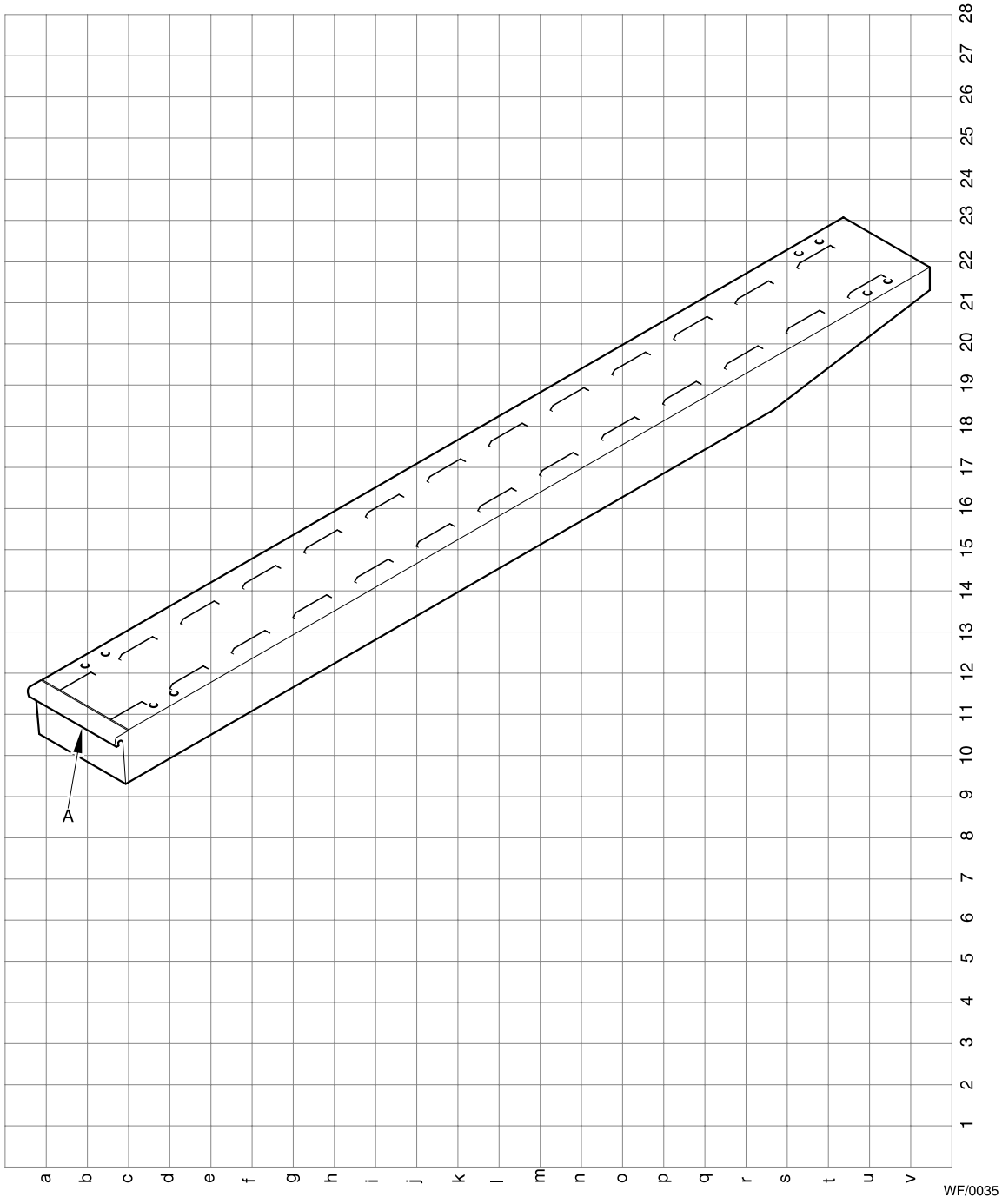


Fig 5.16 Approach Ramps

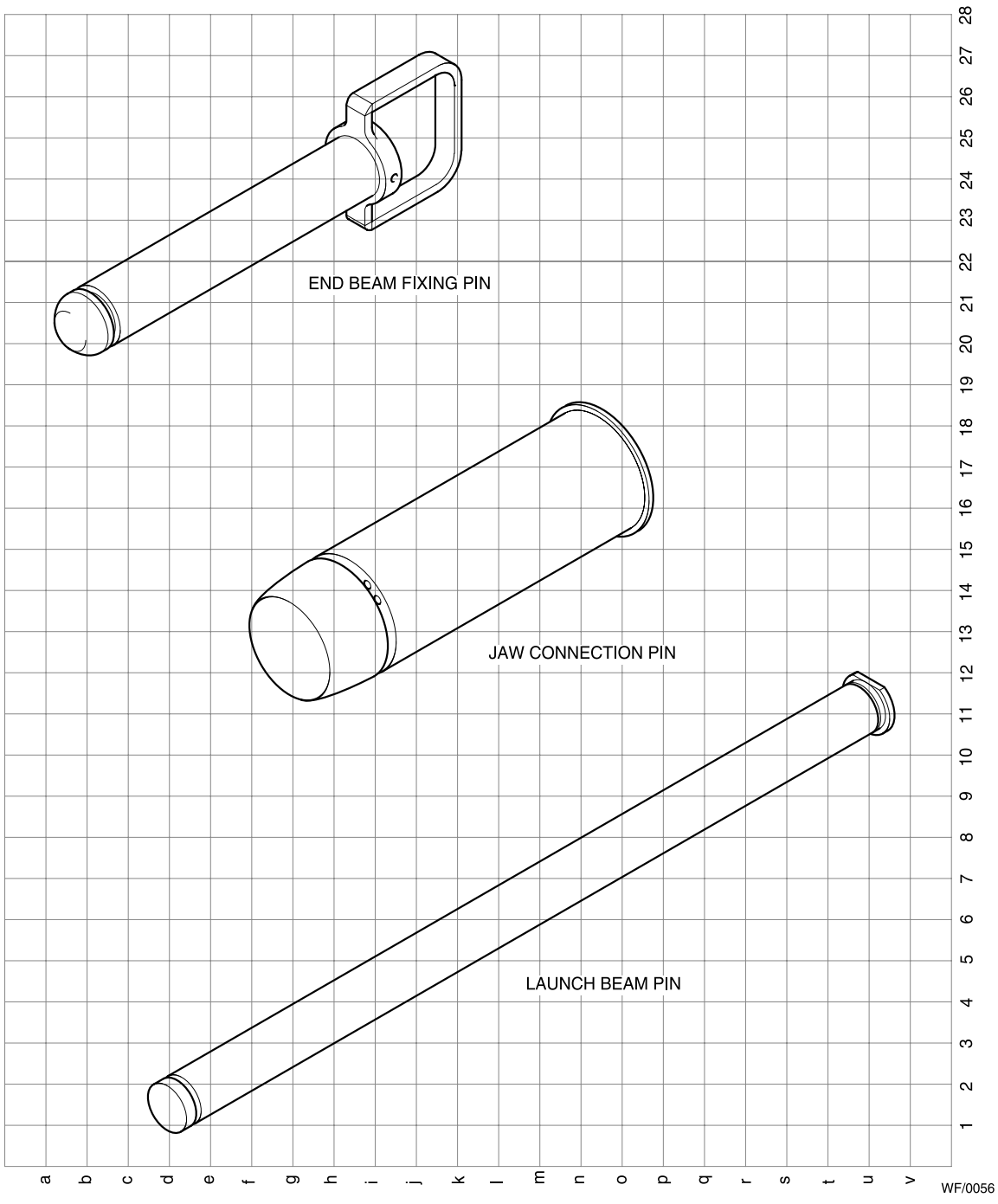


Fig 5.17 All Pins

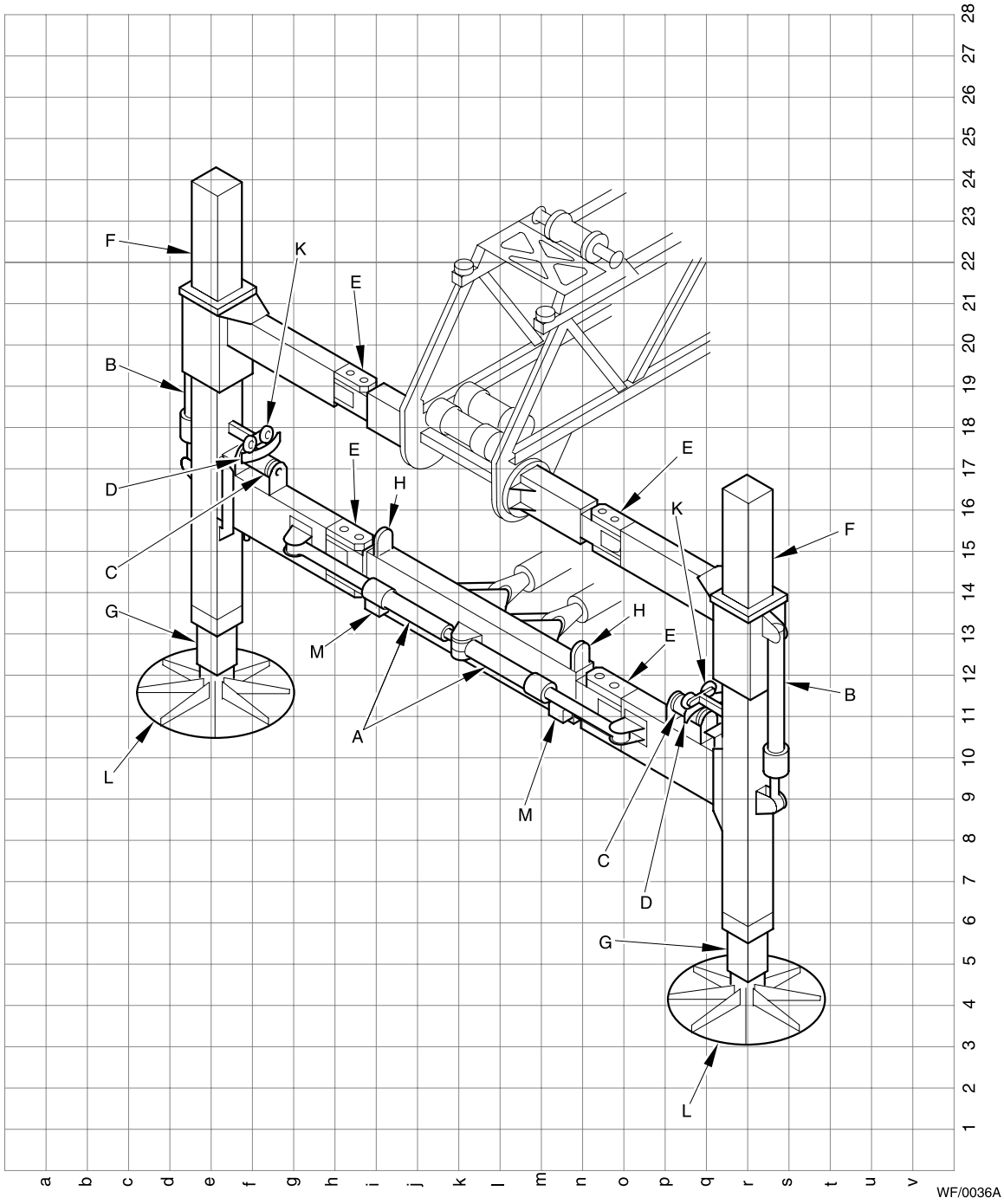


Fig 5.18 A-Frame

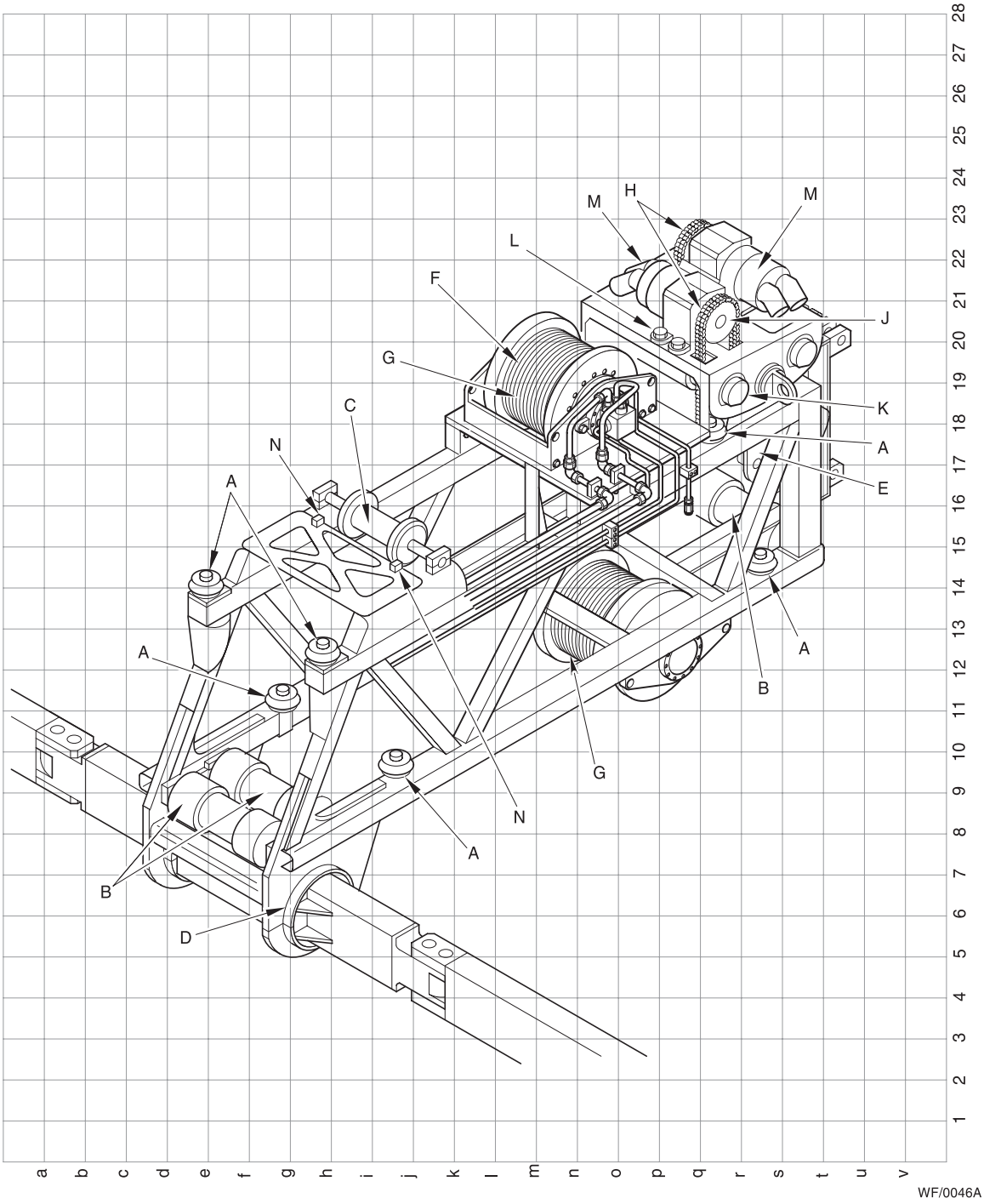


Fig 5.19 Launch Frame

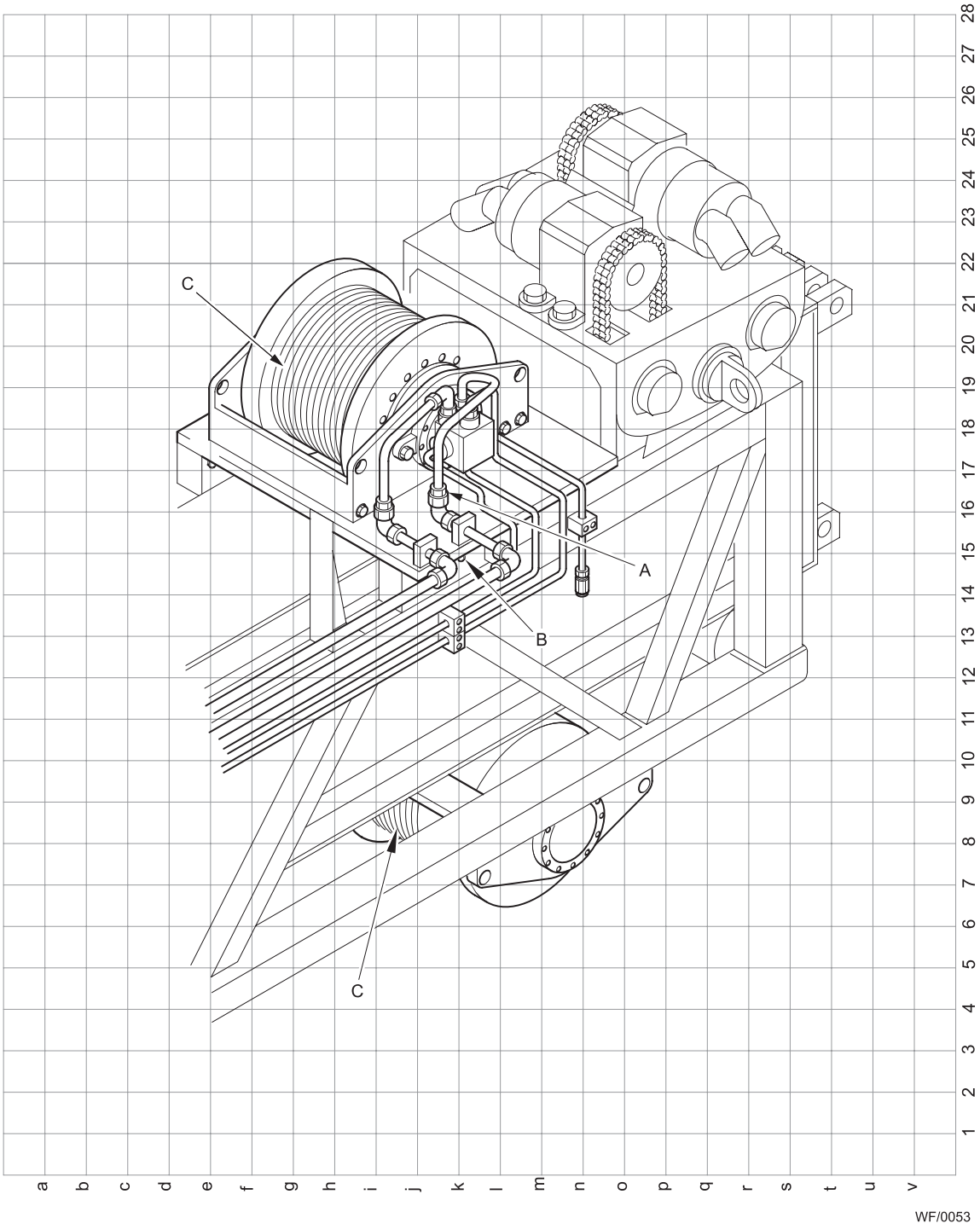


Fig 5.20 Upper and Lower Winches

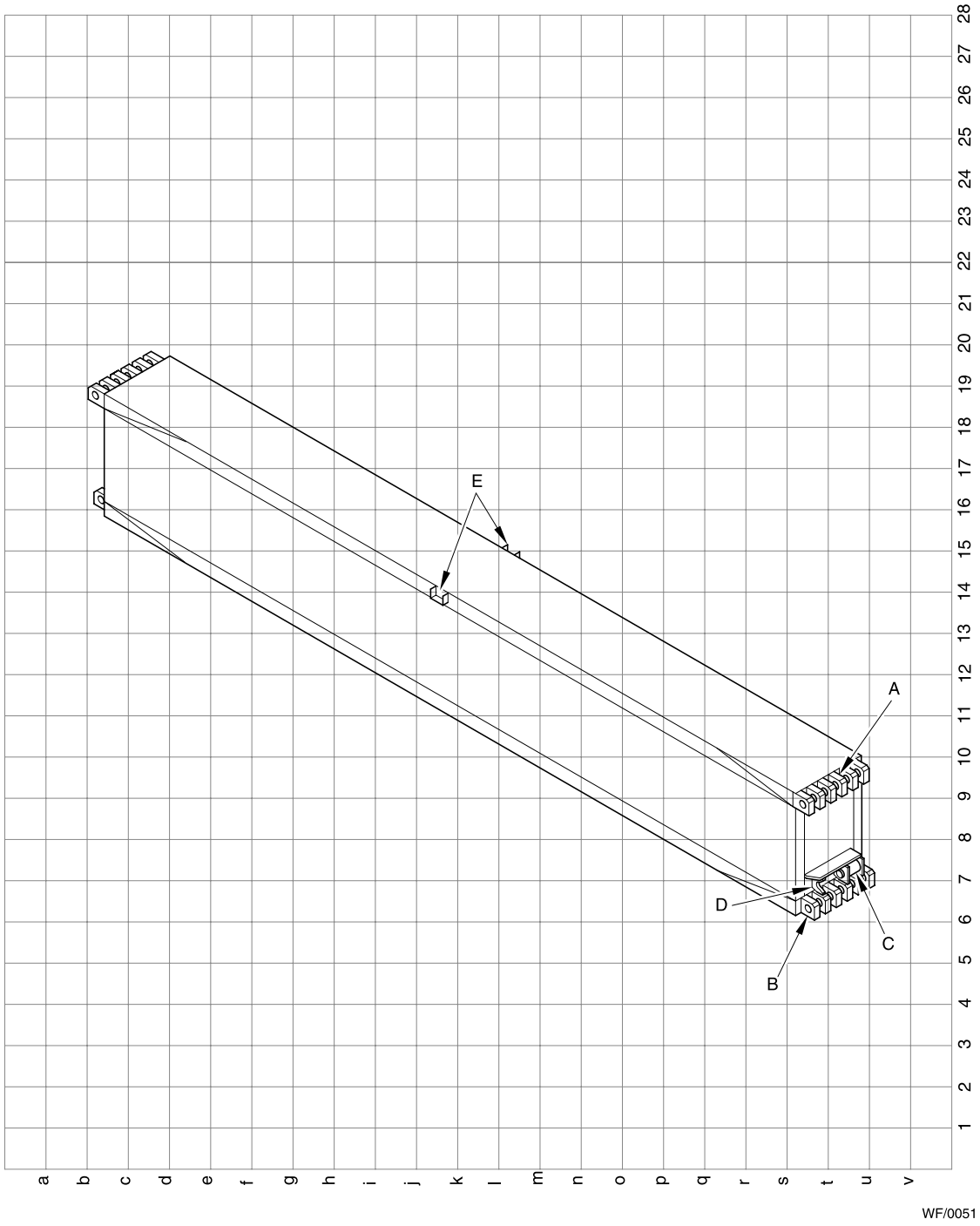


Fig 5.21 Launch Beam

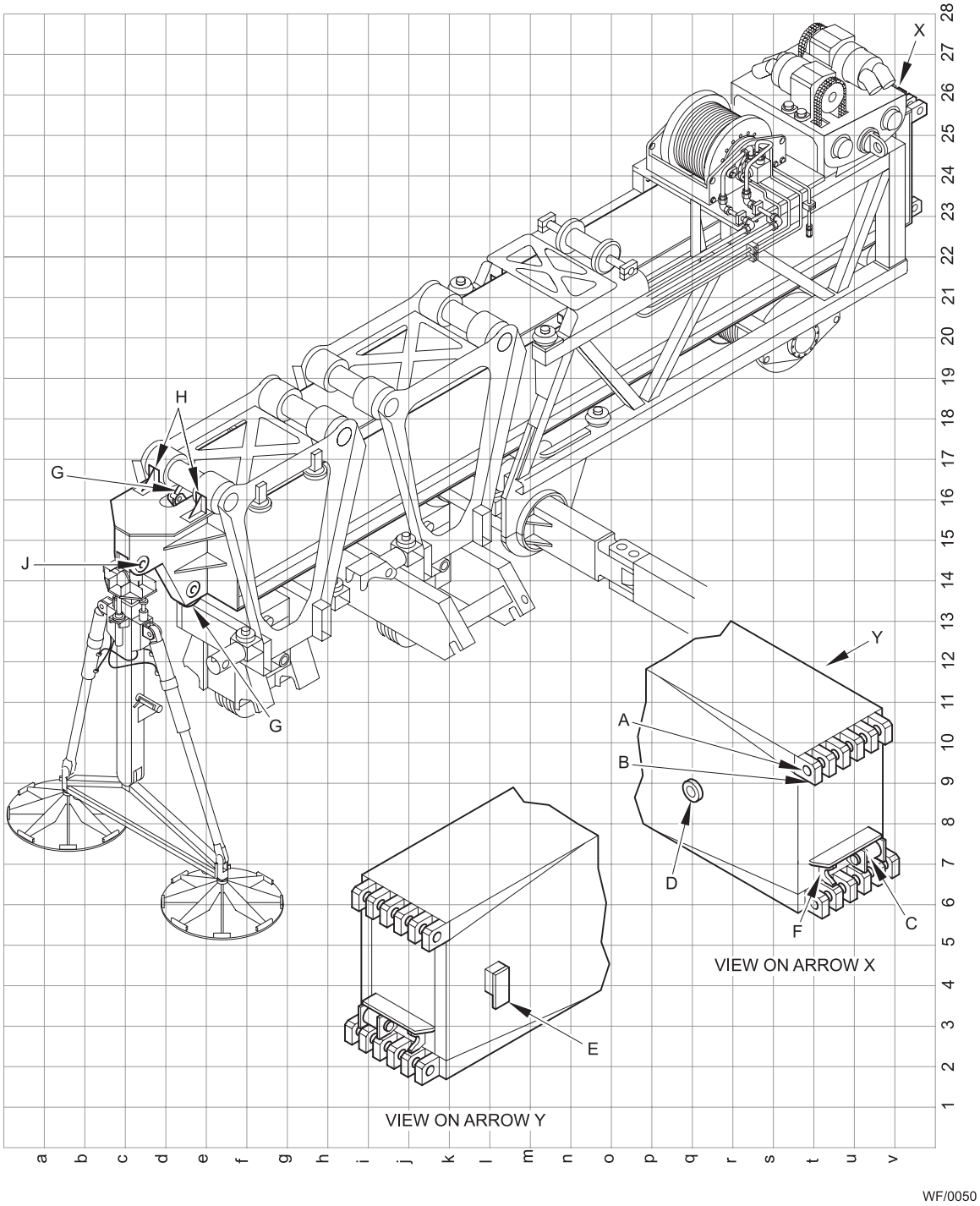


Fig 5.22 Forward Launch Beam

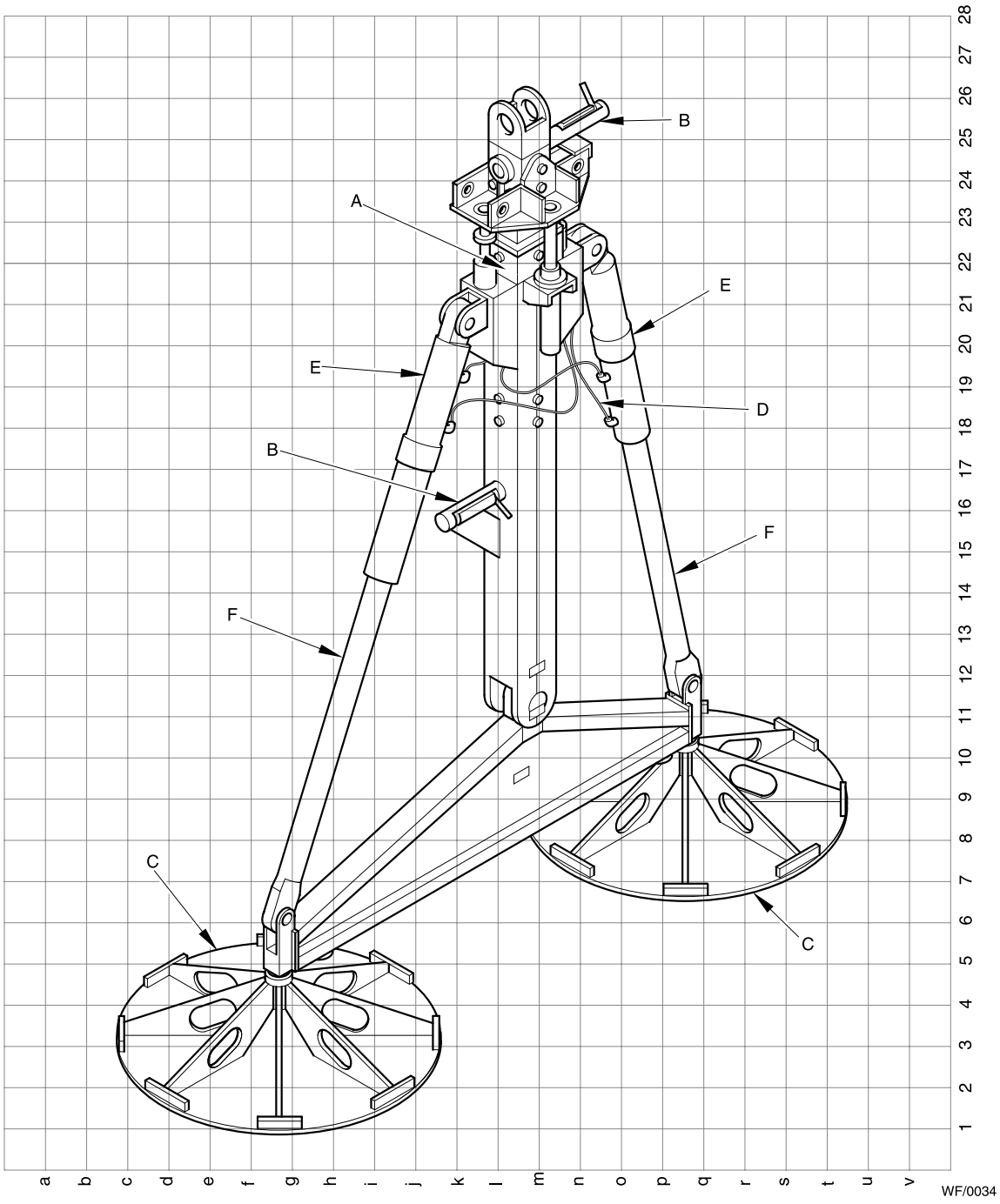


Fig 5.23 Far Bank Support

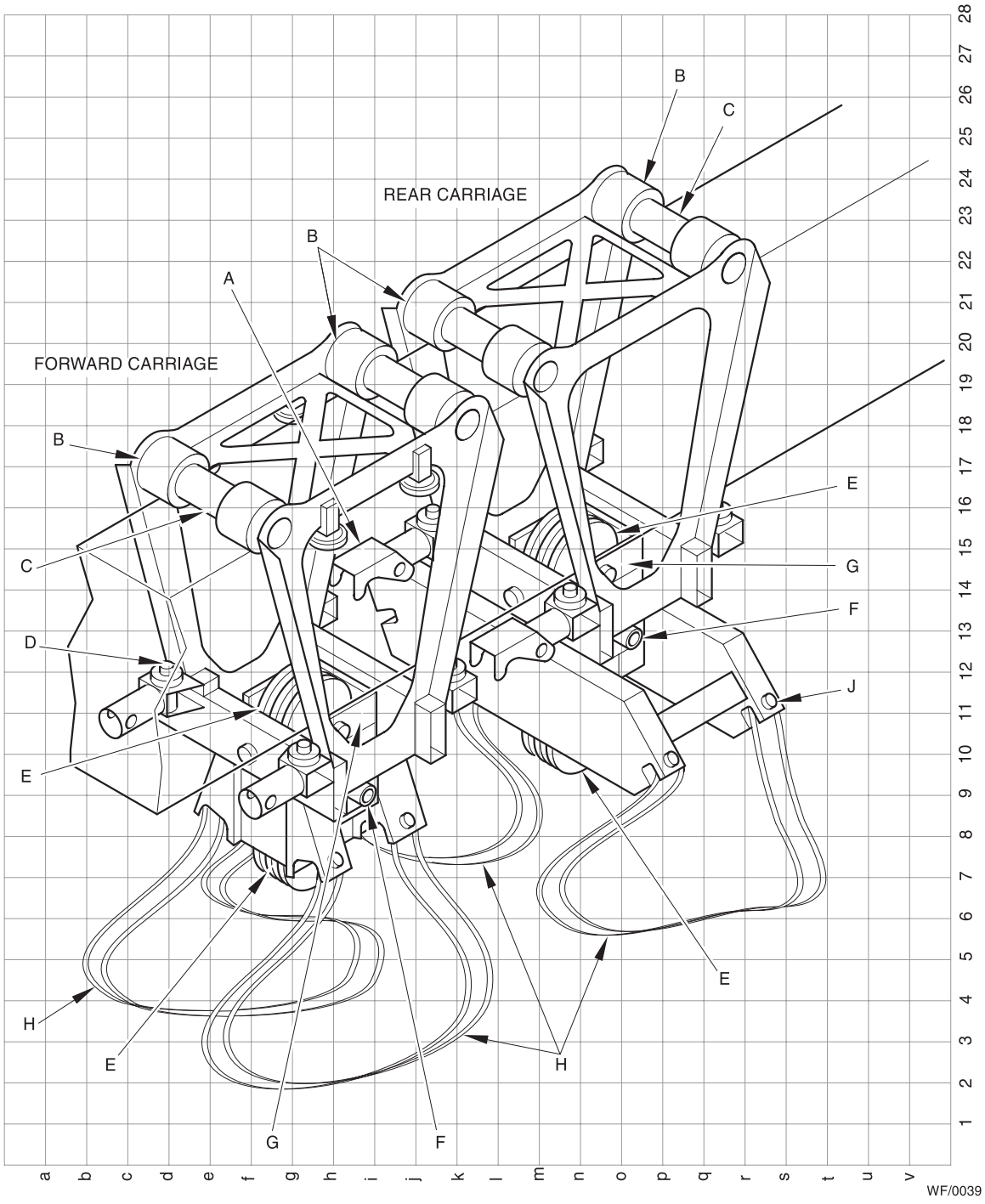


Fig 5.24 Far and Home Bank Carriage

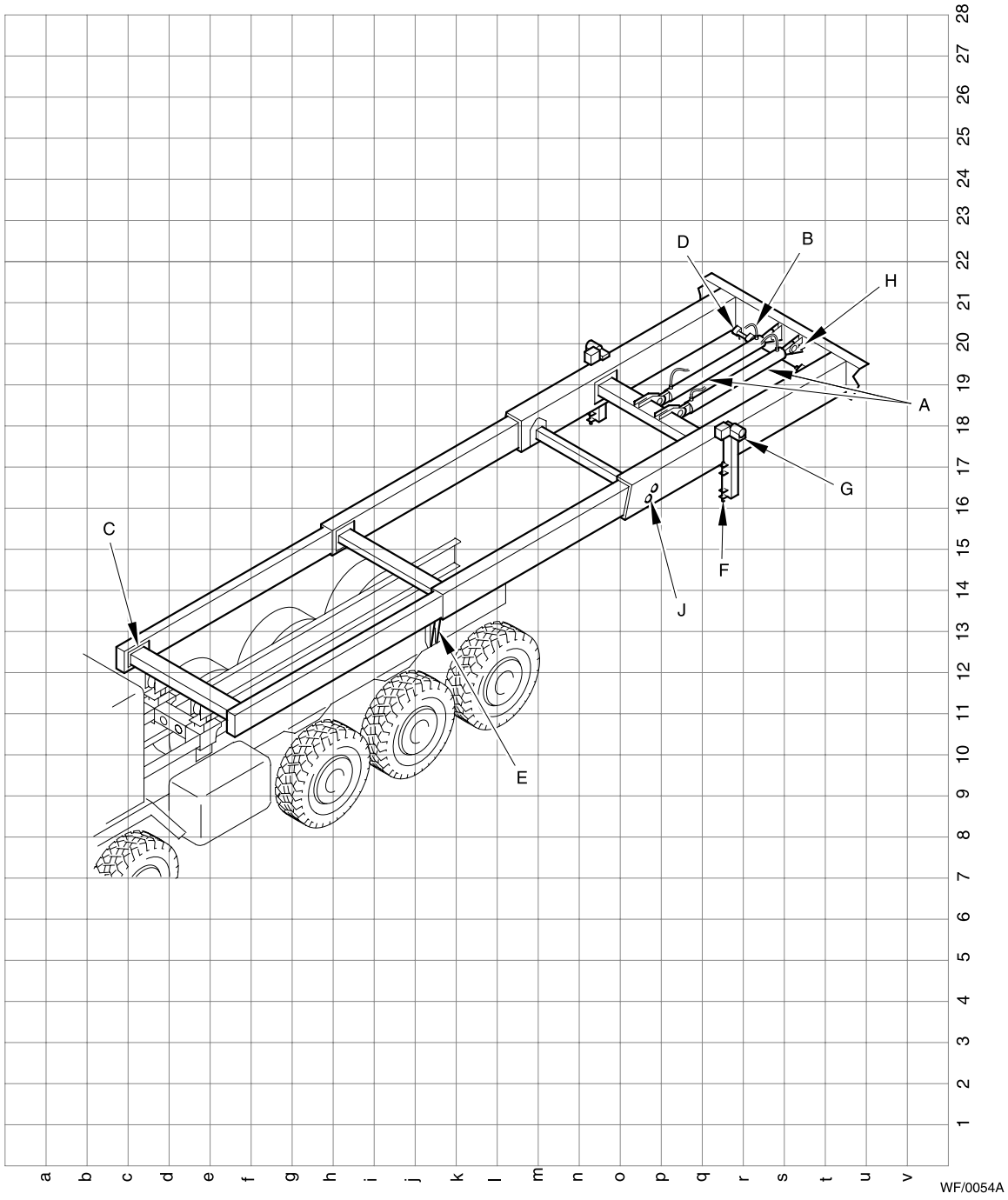


Fig 5.25 Slide Frame

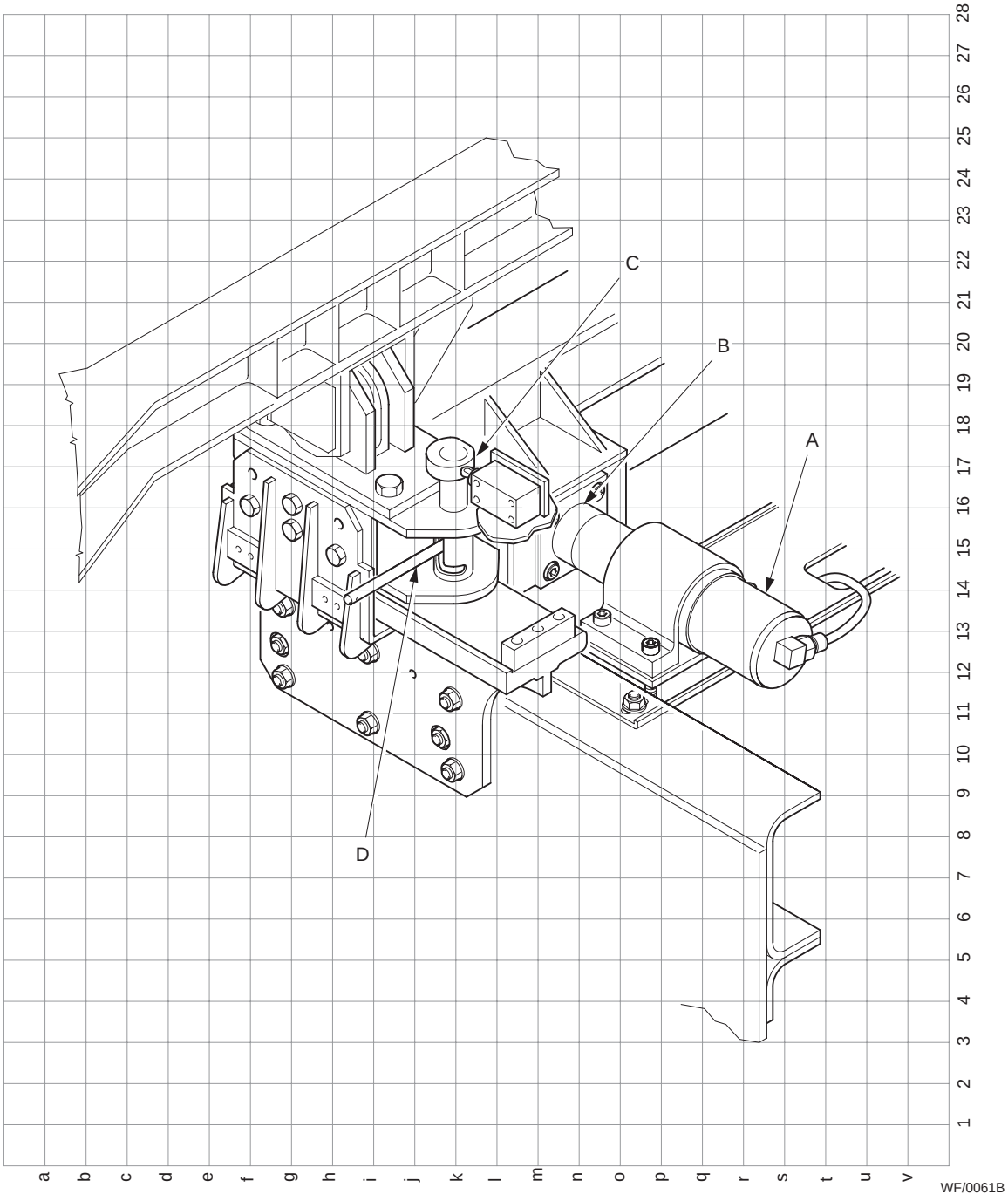


Fig 5.26 Relax Mechanism

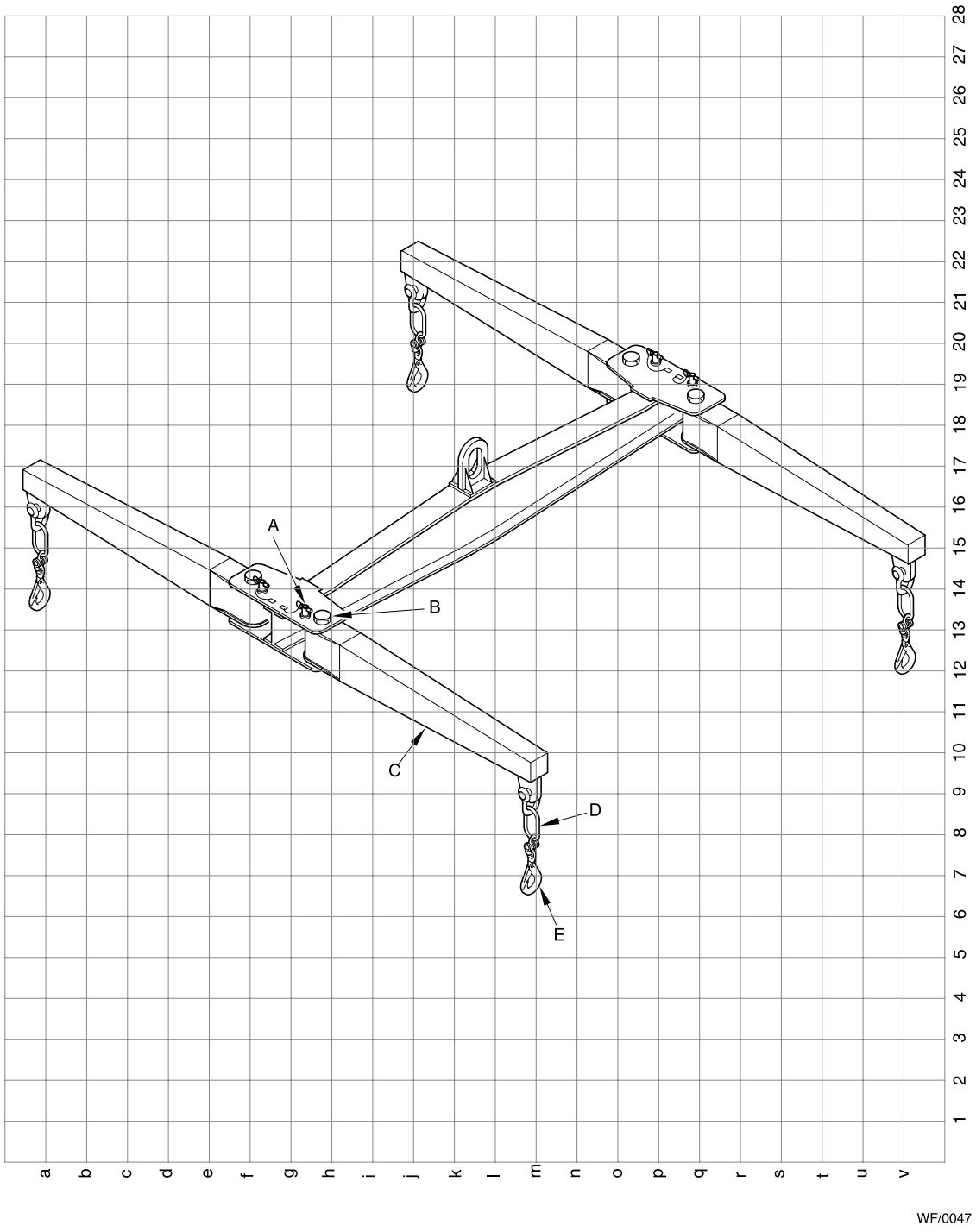


Fig 5.27 Bridge Module Lifting Beam

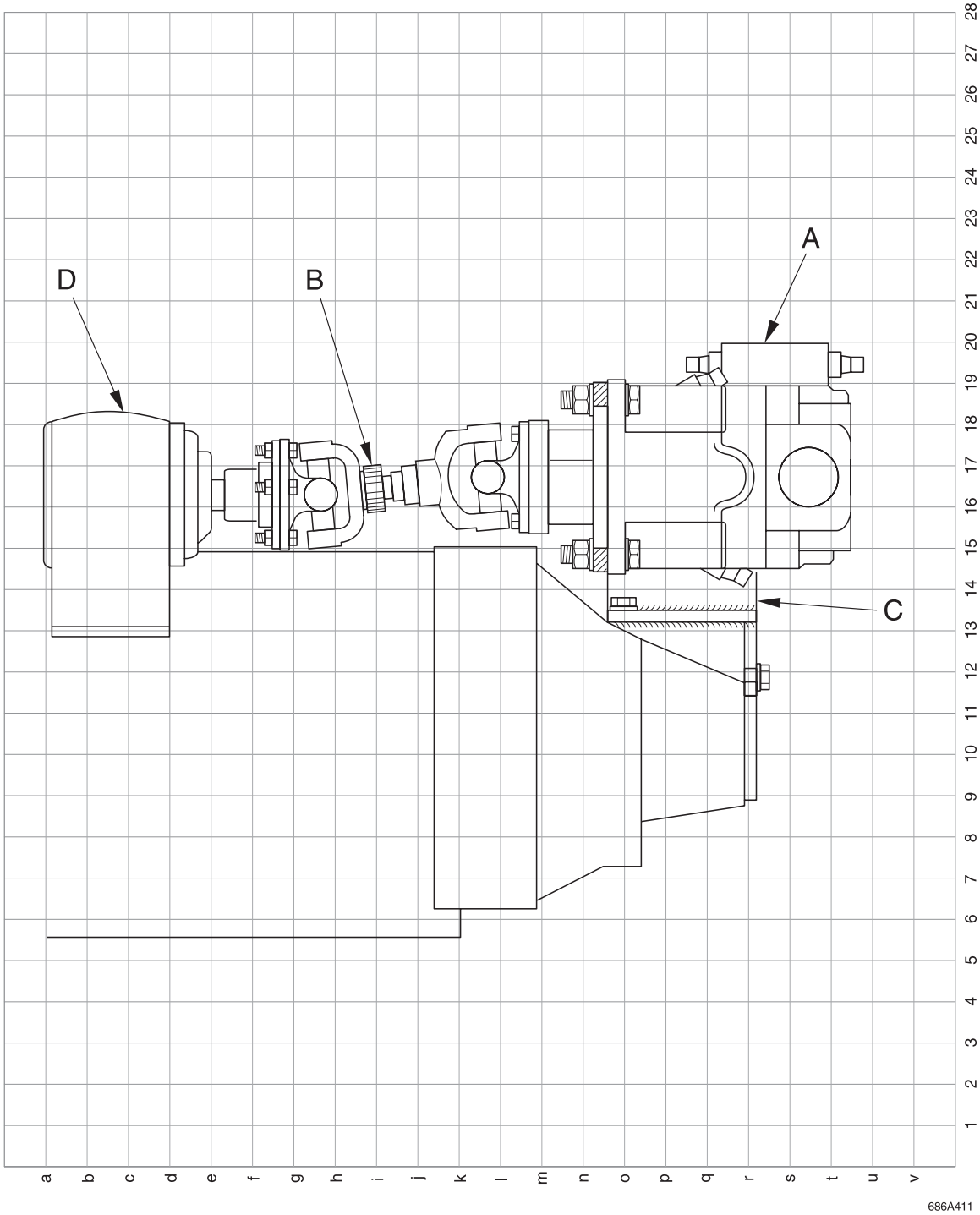


Fig 5.28 Power Take-off and Hydraulic Pump

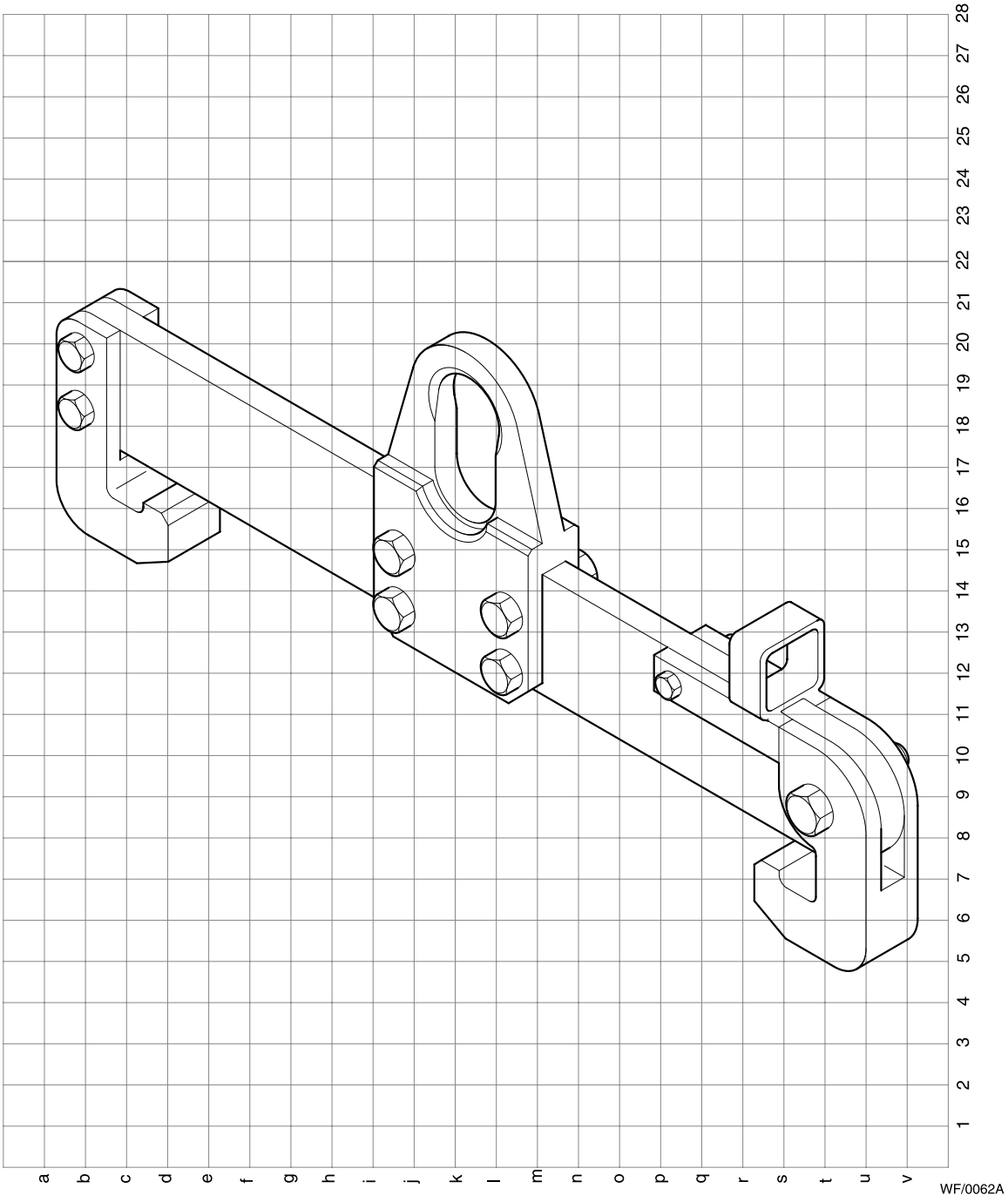


Fig 5.29 Launch Beam Lifter

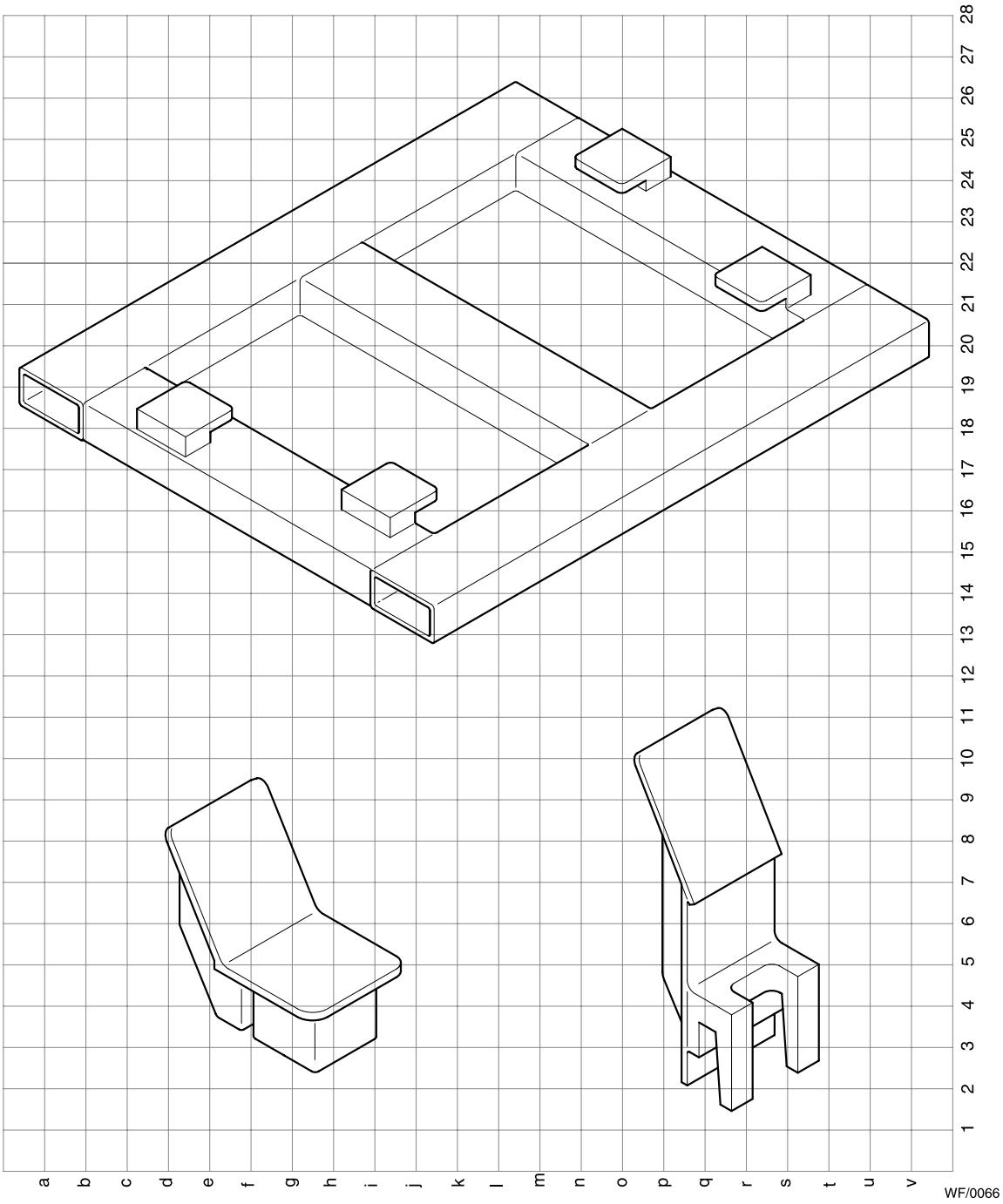


Fig 5.30 Pallet Adapter

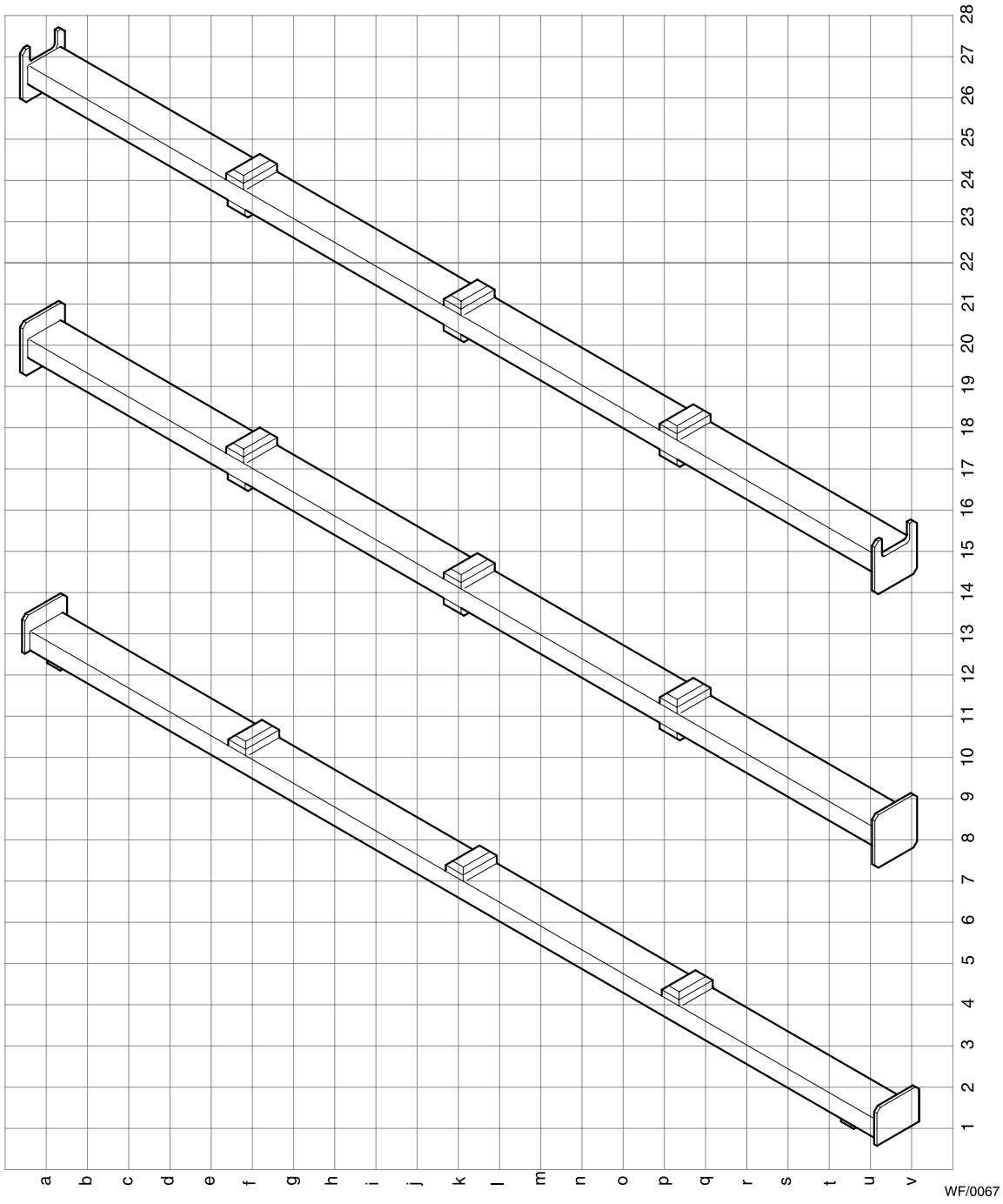


Fig 5.31 Launch Beam Spacer

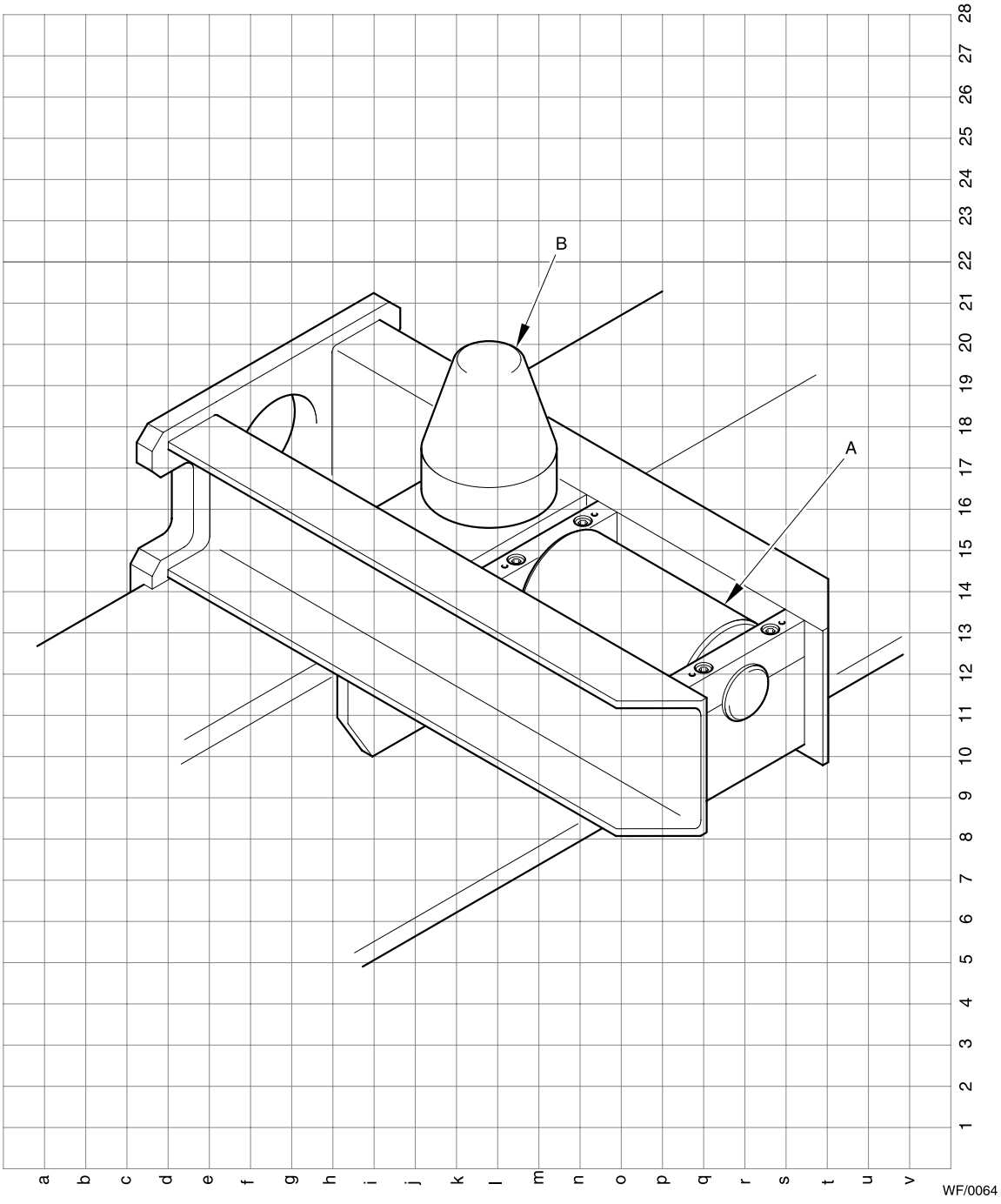


Fig 5.32 Removable Rollers

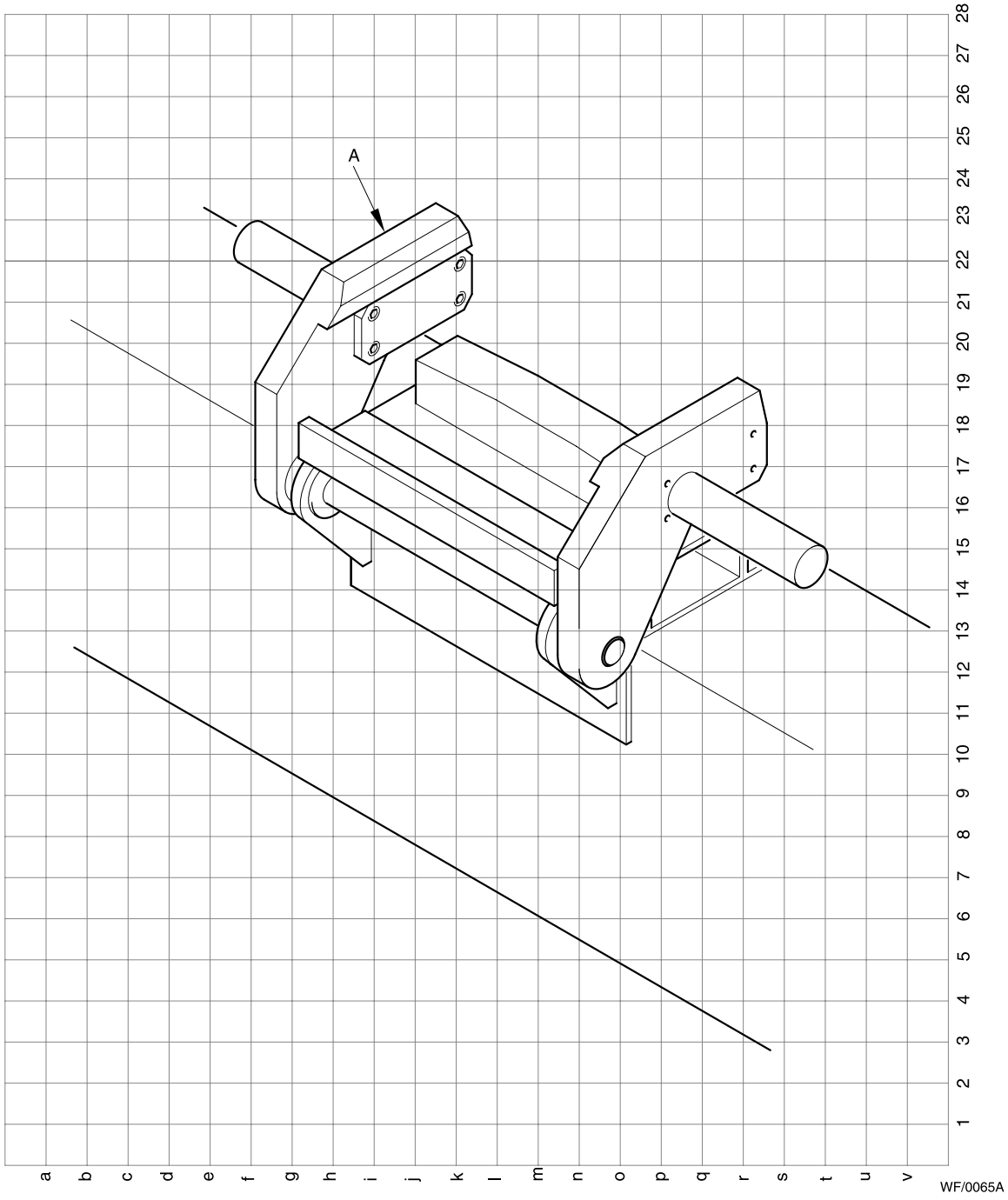


Fig 5.33 End Beam Adapters

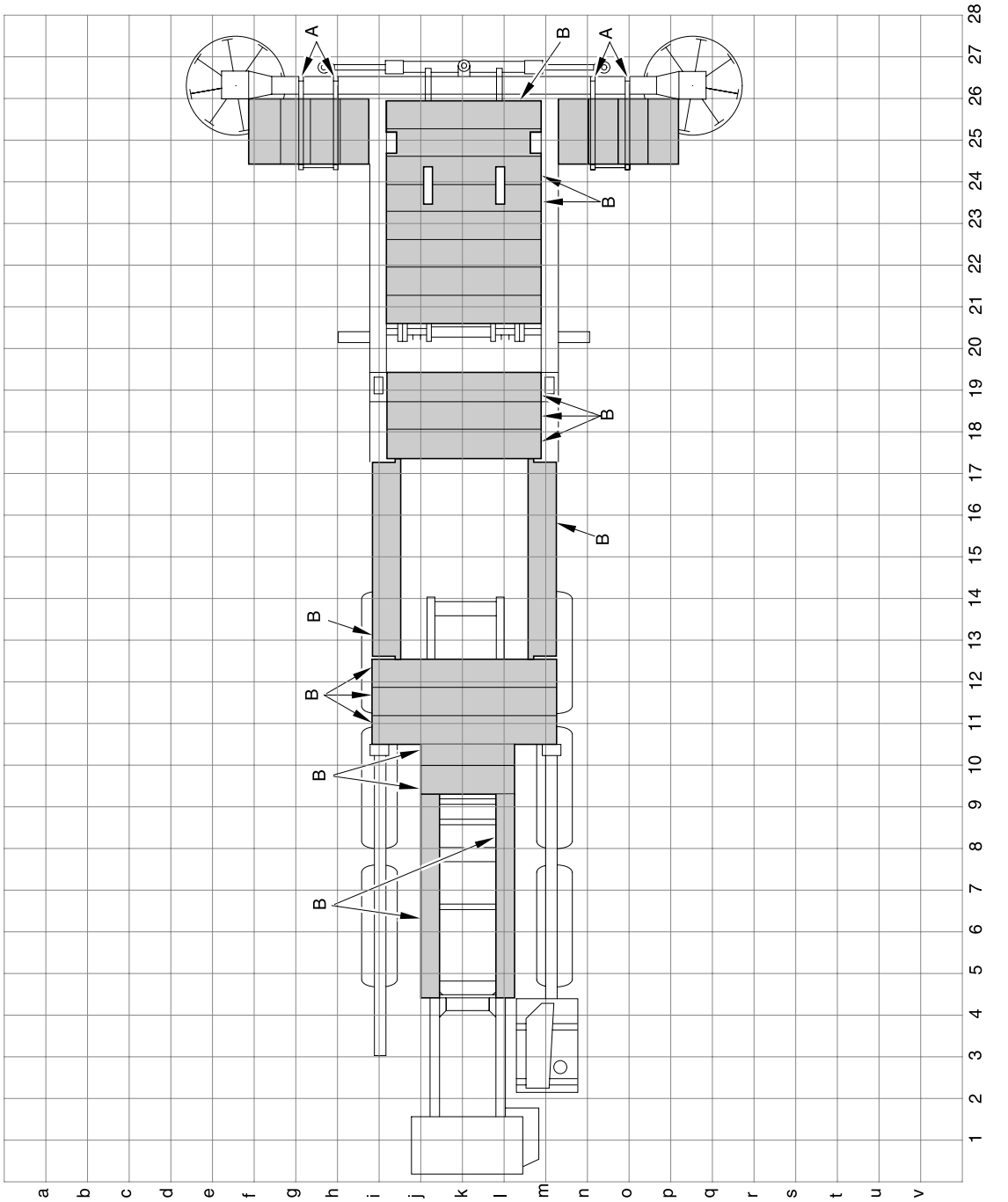


Fig 5.34 Walkways and Gantries

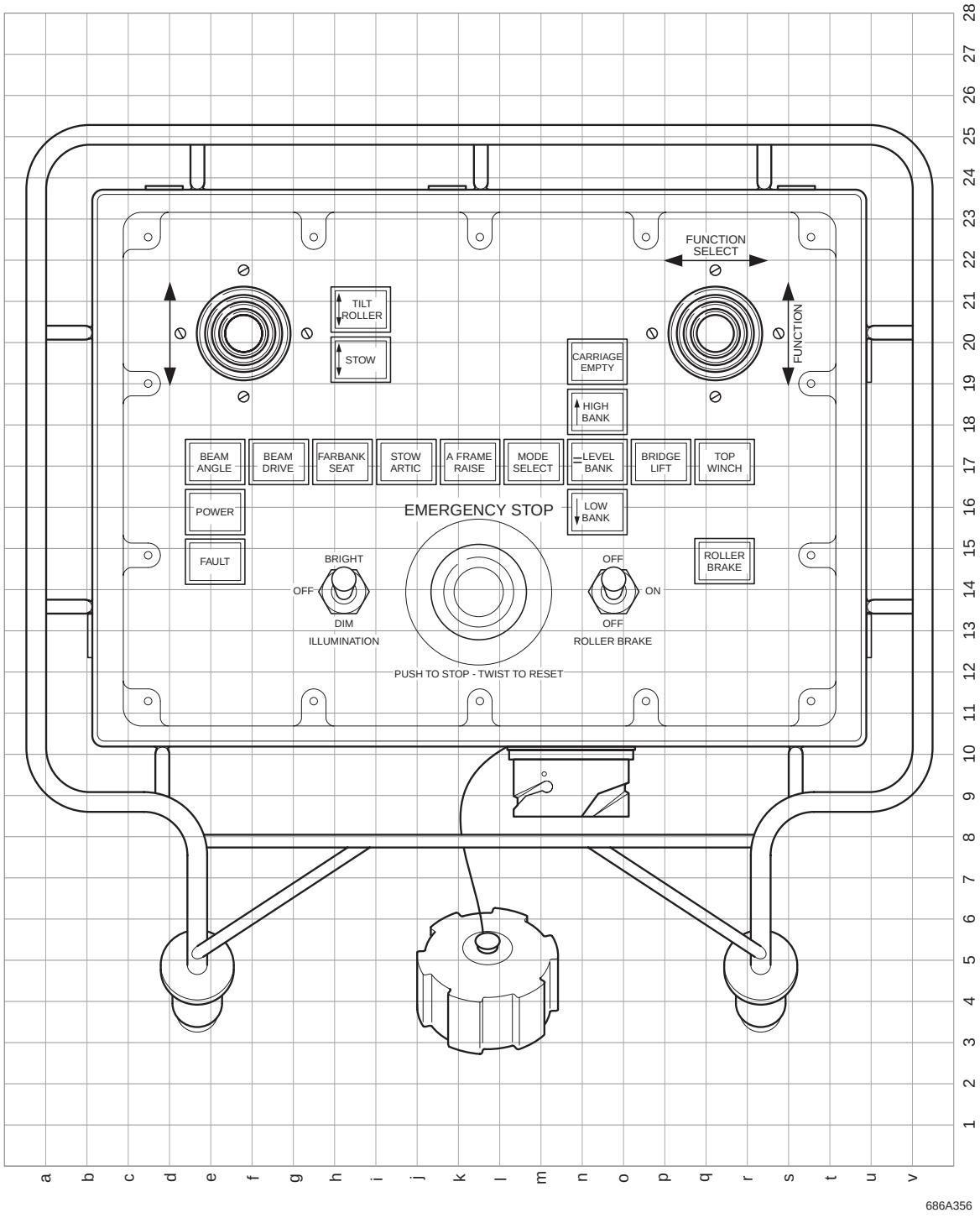


Fig 5.35 Chest Pack

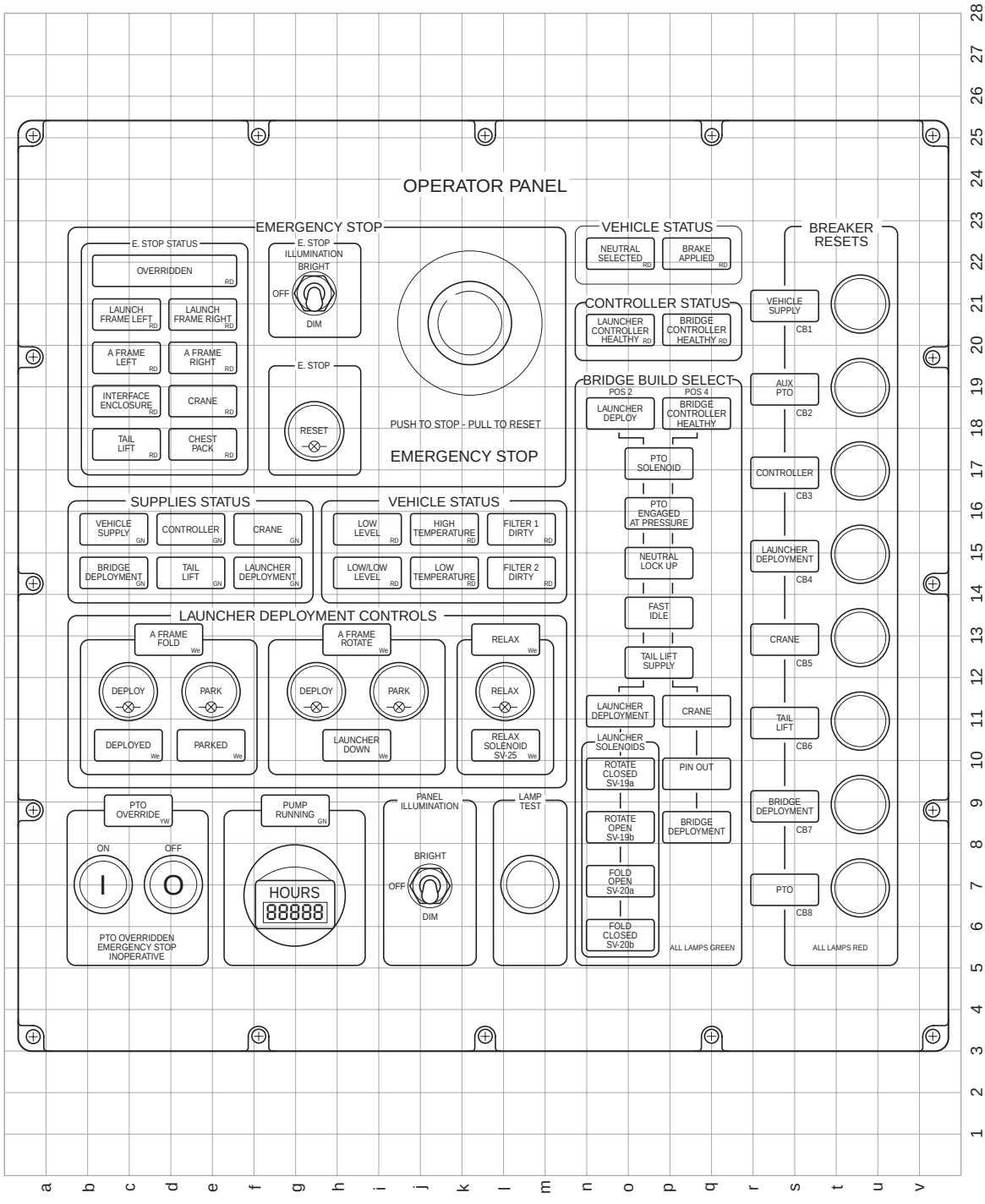


Fig 5.36 Hydraulics

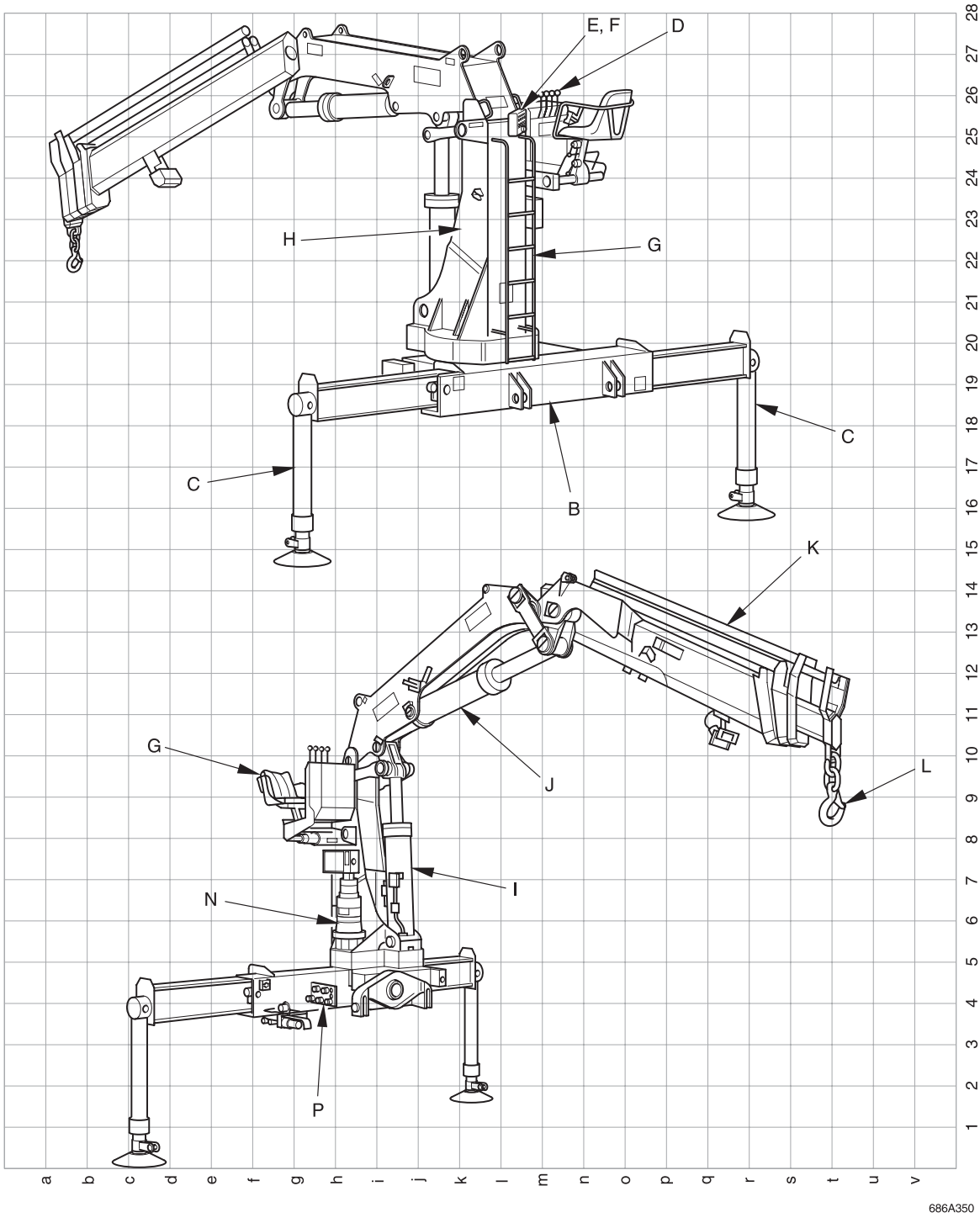


Fig 5.37 Crane

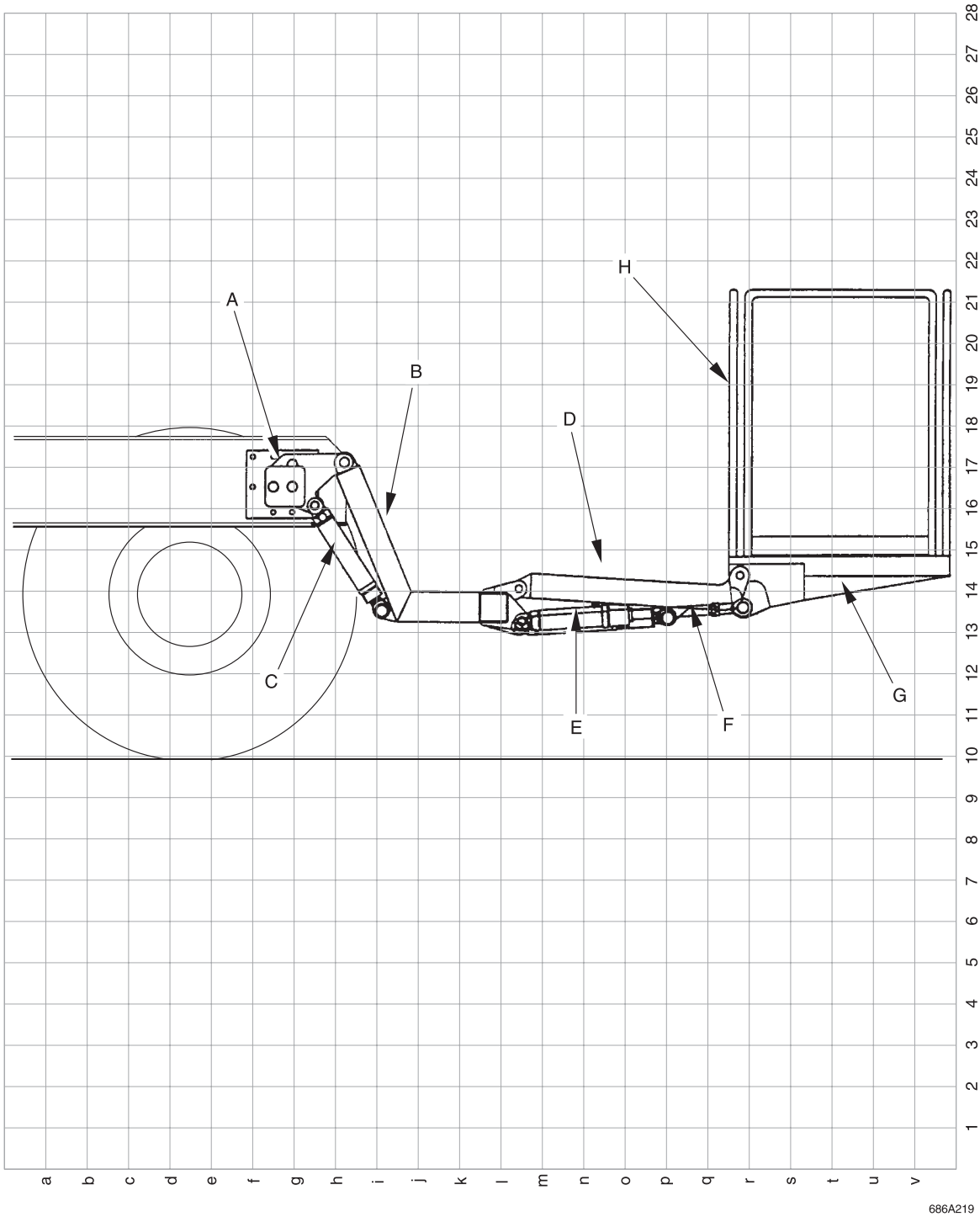


Fig 5.38 Tail Lift Assembly

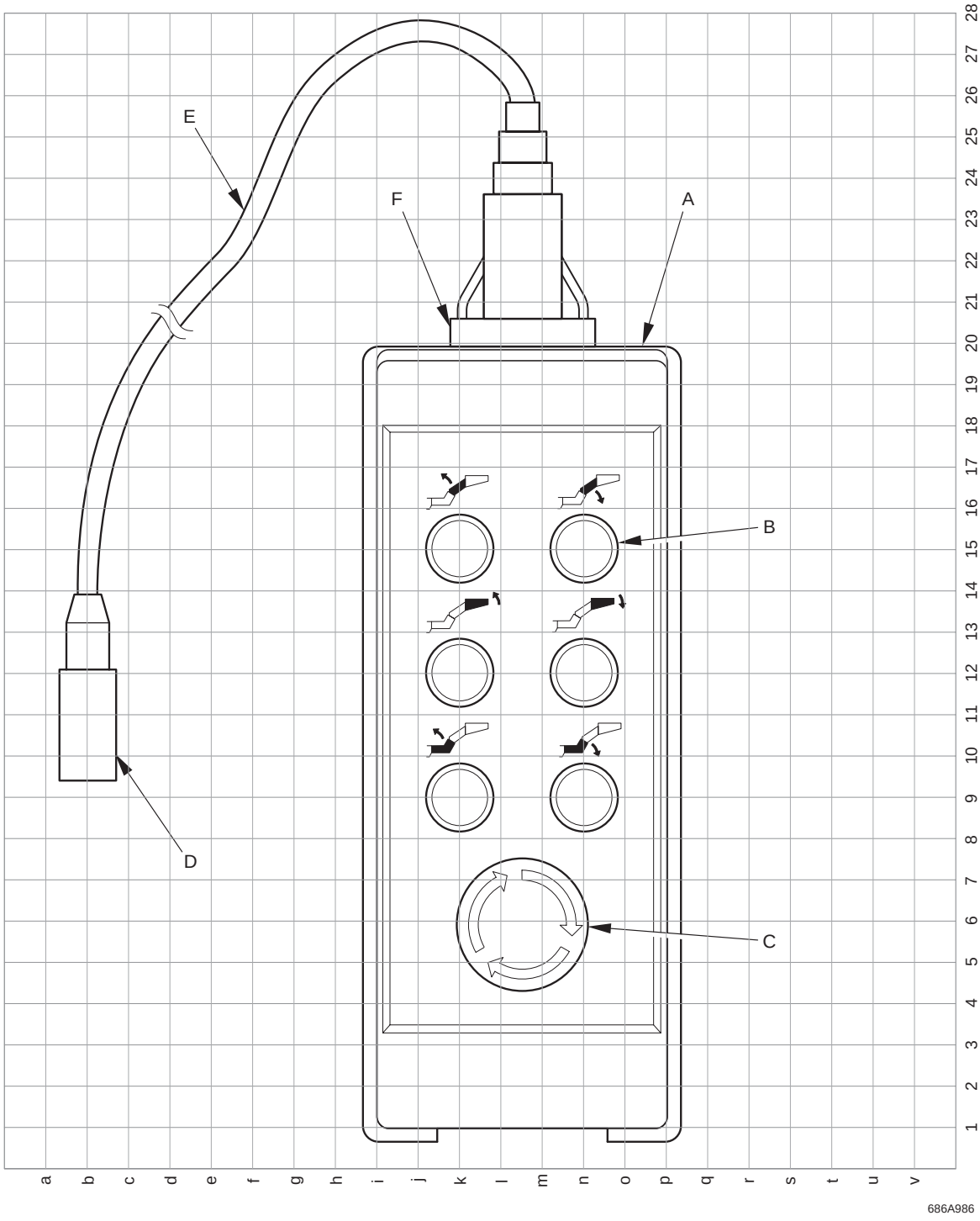


Fig 5.39 Tail Lift Pendant

Section IV. UNIT MAINTENANCE PROCEDURES

5-16 INTRODUCTION

a. All components must be cleaned and inspected at regular intervals. If any cracks or damage are noted, items must be repaired at the authorized level of maintenance.

b. Periodic inspection by an authorized inspector will be carried out at regular intervals. Visual inspection of all bridge and launching components will be made following each bridge mission.

c. Refer to Unit Preventative Maintenance Checks and Services (Section 3) for inspection procedures.

d. Refer to Appendix C to determine the torque limits for all fixings unless the torque limits are otherwise stated in the maintenance procedures.

e. To meet the equipment conditions stated in the maintenance procedures it might be necessary to refer to the Operator's manual TM 5-5420-279-10.

f. It is good engineering practice to cover the open ends of hydraulic hoses and unions, when they are disconnected, to prevent contamination of the hydraulic oil.

g. Before carrying out any work involving the disconnection of the electrical system ensure the vehicle is switched off and battery shutoff switch in the off position.

h. When climbing on the DSB system three points of contact should be maintained at all times.

i. When changing out assemblies and parts the correct part must be identified from the RPSTL TM 5-5420-279-23P.

j. Electrical fault finding is only to be carried out by qualified electricians, wiring diagrams are provided at Annex G.

k. The location of hydraulic and electrical components used on the DSB are provided in Appendix D for the launcher and Appendix J for the crane.

l. Safety inspection and testing of lifting devices should be carried out in accordance with TB 43-0142.

WARNING

LOSS OF HEARING. PERSONNEL MUST WEAR HEARING PROTECTIVE DEVICES WHEN OPERATING THE CRANE DURING LAUNCH AND RECOVERY OPERATIONS OR WHEN WORKING WITHIN 10FT (3M) OF A DSB LAUNCH VEHICLE AT HIGH ENGINE IDLE.

NOTE

During inspections, pay particular attention to all welds, of highly stressed components and all connectors and lugs.

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5 - 001 BRIDGE MODULE - END BEAM PIN LOCATING BRACKET

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

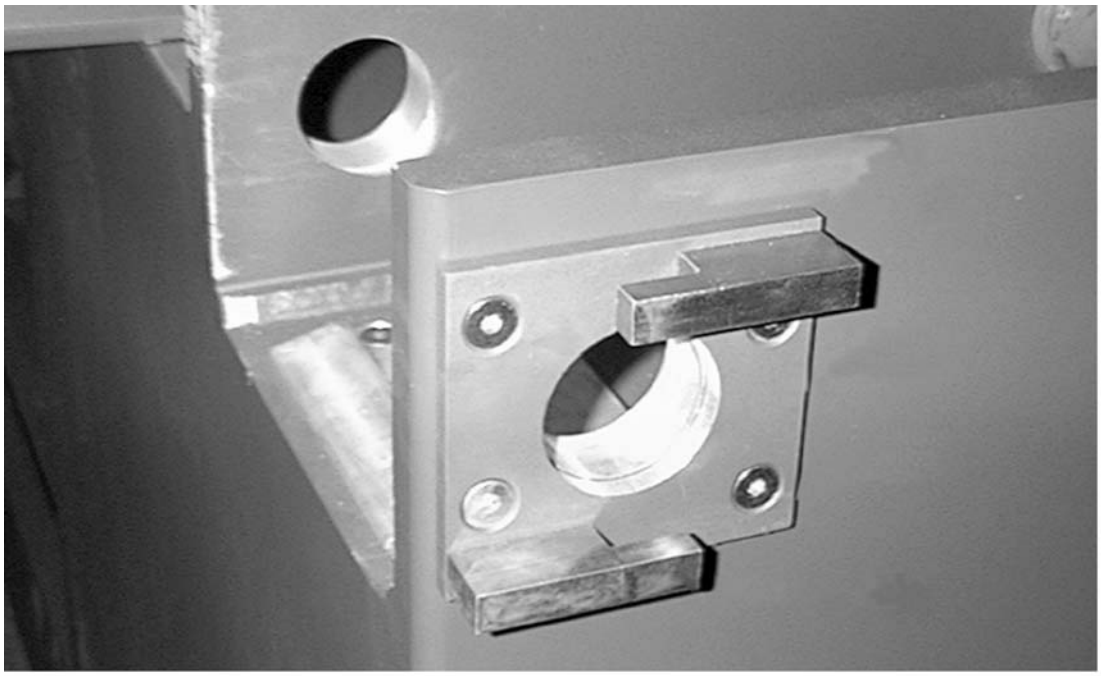
Key set, socket head (metric) - GMTK

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Bridge Ramp Module open and on flat surface



NOTE

This procedure is only applicable to the Ramp Module.

a. Remove

(1) Remove four screws (1) and remove location plate assembly (2).

(2) Remove two screws (3) at each lug (4) and remove lugs.

(3) Examine component parts for damage and corrosion.

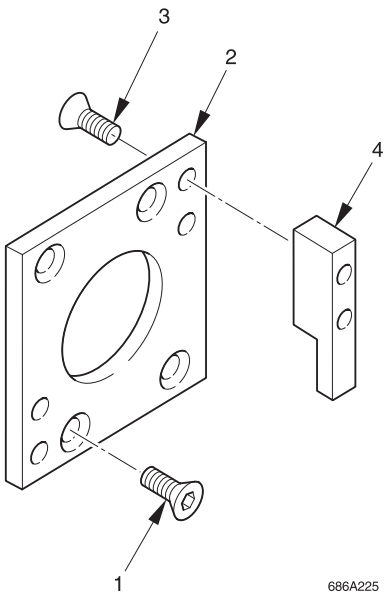
(4) Examine bolt heads and threads of screws for damage.

(5) Replace components as required.

b. Install

(1) Mount lugs (4) on location plate assembly (2) and secure with screws (3) using thread-locking compound.

(2) Position location plate assembly (2) on ramp module and secure with four screws (1) using thread locking compound.



5 - 002 BRIDGE MODULE - CURB CLAMP ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

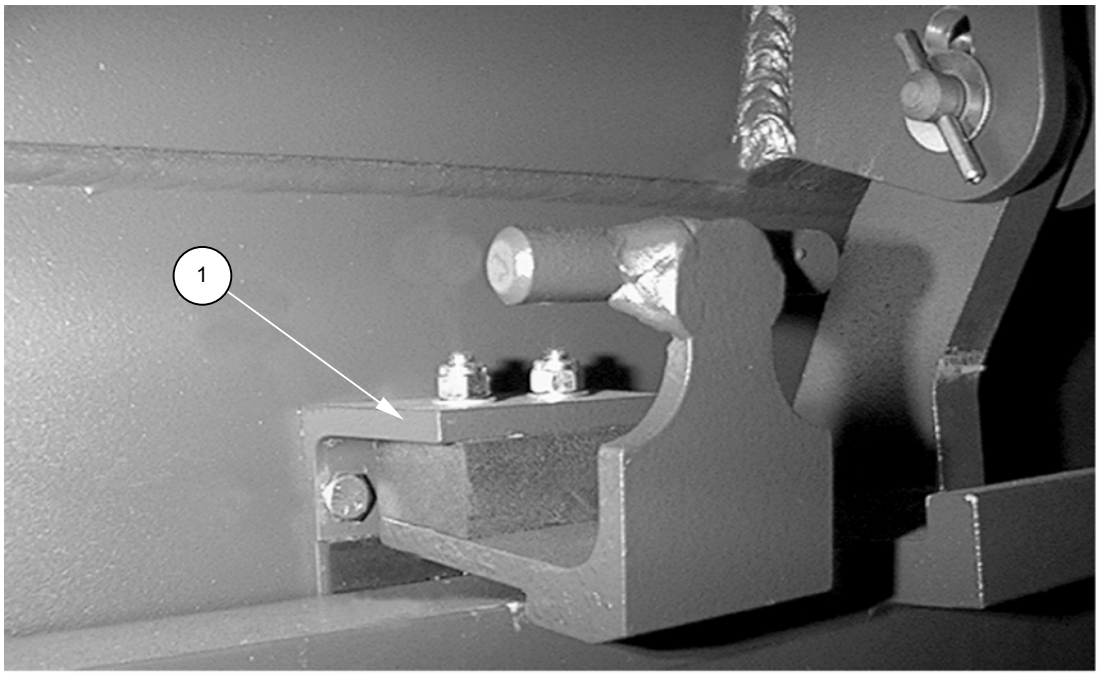
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 5)
Shims (As required)

Equipment Conditions

Module open on a secure flat surface



a. Remove

(1) Each curb is locked in the stowed position by a curb clamp assembly (1).

(2) Remove two nyloc nuts (7), washers (8) and screws (6). Discard nyloc nuts.

(3) Remove operating lever (5), rubber block (3) and shims (11) and (10).

(4) Remove nyloc nuts (12), washers (13) and screws (9) and remove support bracket (2). Discard nyloc nuts.

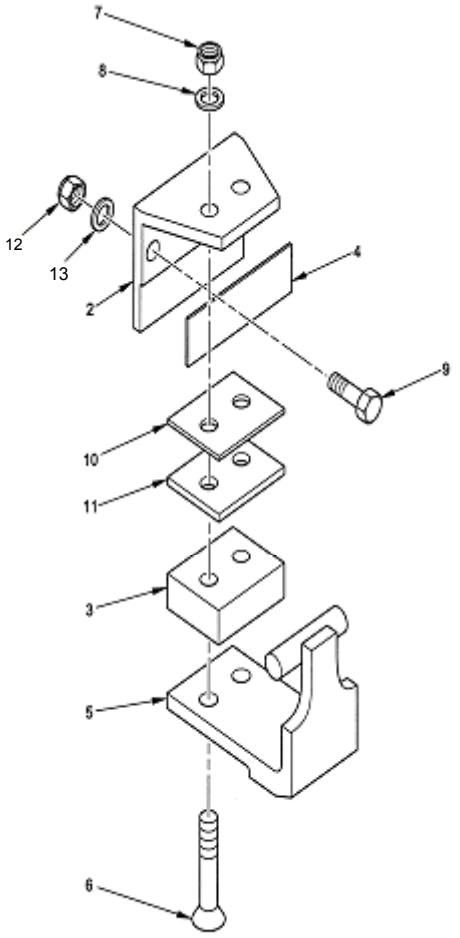
(5) Inspect components for damage and corrosion.

(6) Check condition of rubber block (3) and rubber strip (4) attached to support bracket (2).

(7) Examine screws for damage heads and threads.

(8) Replace components as required.

(9) If required remove the nyloc nut (16) washer (15) and buffer (14). Discard the nyloc nut (16).



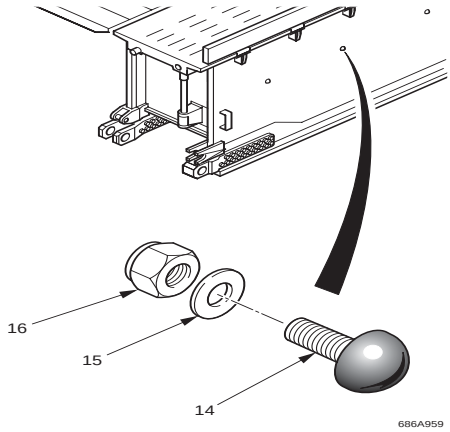
b. Install

(1) Position support bracket (2) on bridge module and secure with screws (9), washers (13) and new nyloc nuts (12).

(2) Position operating lever (5) rubber block (3) and shims (10) and (11) and secure with screws (6), washers (8) and new nyloc nuts (7).

(3) Check that the operating lever (5) will hold the curb securely. If the lever will not secure the curb, or is a loose fit, adjust by removing or adding shims (10) and (11) until the lever operation is correct.

(4) If removed earlier, fit the buffer (14), flat washer (15) and new nyloc nut (16).



5 - 003 BRIDGE MODULE - BIRDS BEAK

This task covers:

a. Remove

INITIAL SETUP:

Tools Required

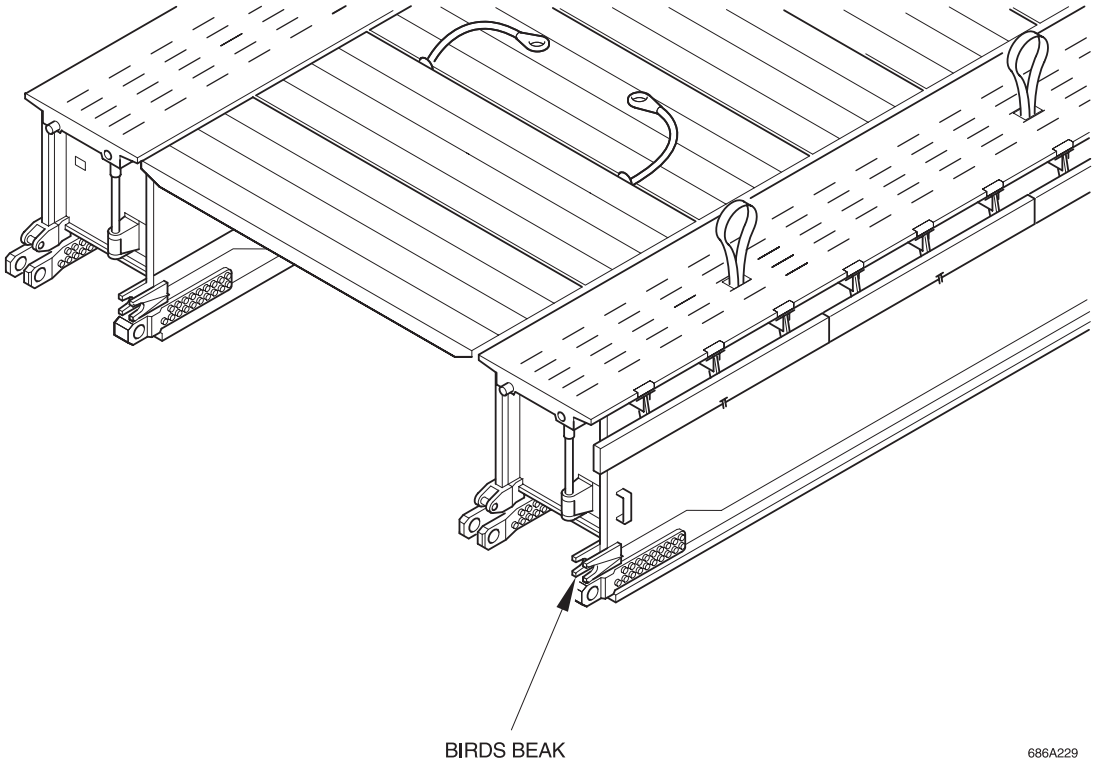
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Bridge Module open on a flat surface.



NOTE

Should the Birds Beak Bracket be damaged in transit or during the construction phase it is acceptable to remove it and continue the build. It is not permissible to fit a replacement bracket at this stage.

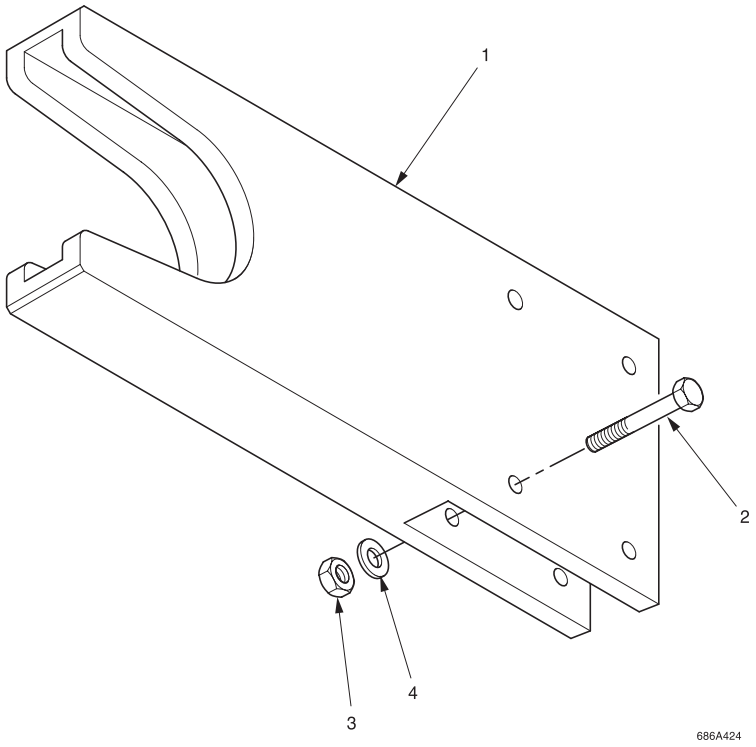
A new Birds Beak can only be fitted at General Support/CLS. Return the damaged Birds Beak to WFEL.

a. Remove

(1) Remove the four nyloc nuts (3), washers (4) and bolts (2). Discard the nyloc nuts (3).

(2) Remove the birds beak bracket (1).

(3) Repeat steps 1 and 2 for each birds beak bracket (1).



5 - 004 BRIDGE MODULE - DOWEL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

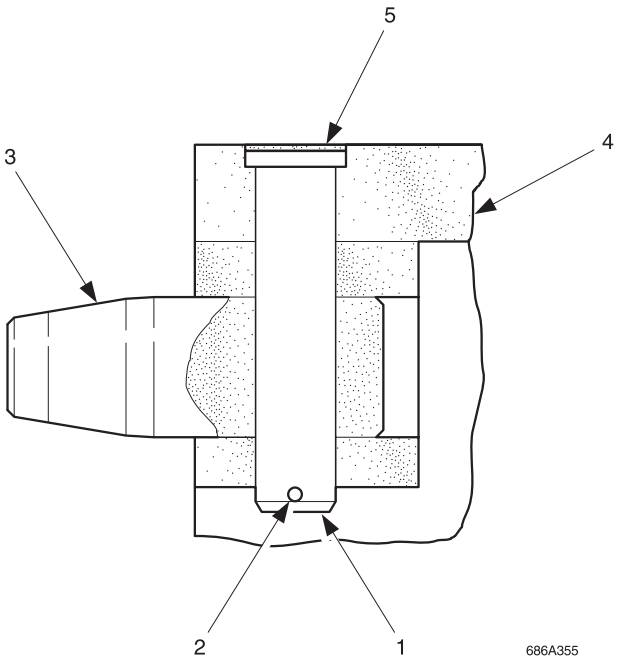
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Black CARC paint
Cleaning solution loctite activator 7471

Equipment Conditions

None



a. Remove

(1) Remove the split cotter pin (2) securing the location pin (1).

(2) Punch the location pin (1) out of the bridge module (4) upward through the deck.

(3) Mark the center of the dowel (3) shoot bolt hole on the bridge module (4).

(4) Remove the dowel (3).

(5) Inspect components for damage.

(6) Change components as required.

b. Install

(1) Clean all parts with the cleaning solution.

(2) Align the dowel (3) shoot bolt hole with the mark on the bridge module (4) made during removal.

(3) Fit the dowel (3) to the bridge module (4).

(4) Fit the location pin (1) down through the bridge module (4) deck.

(5) Fit the split cotter pin (2) into the location pin (1).

(6) Apply black CARC paint (5) to the head on the location pin (1).

5 - 005 BRIDGE MODULE - DAMPER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

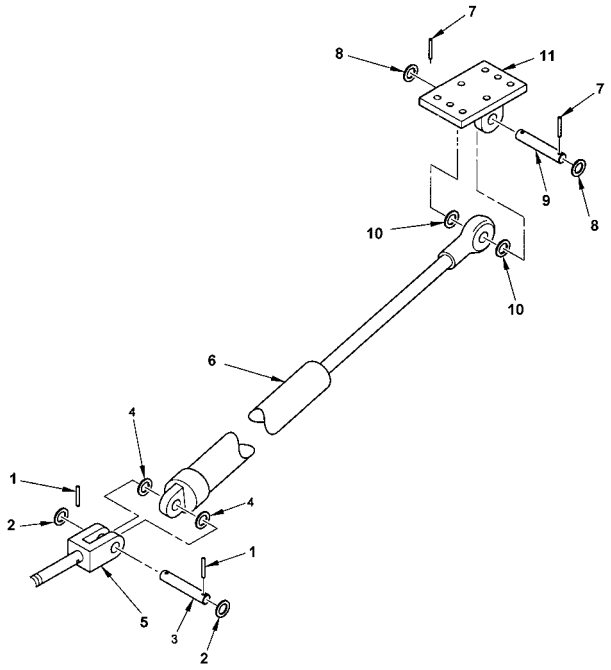
Tool Kit, General Mechanic's, Automotive (GMTK)
Metric Pin Punch Set (BII)

Materials Required

Spring pins (Qty 4)

Equipment Conditions

Bridge module open on a secure raised surface



WARNING

CRUSH INJURY. THE DAMPER WEIGHS APPROXIMATELY 54lbs (25KG).

NOTE

This procedure is applicable to both Ramp and Parallel Modules. Check that the correct damper is fitted to the relevant module.

a. Remove

(1) At the damper side panel mounting remove the spring pin (1) and washer (2). Discard spring pins.

(2) Support the damper and remove the pin (3). Remove the washers (4) from the inner faces of the eye bolt (5).

(3) Lower the damper (6) to the vertical position and place a support under its lower mount.

(4) Remove the spring pins (7) and washers (8) from the upper mount (11). Discard spring pins (7).

(5) Support the damper (6) and remove pin (9). Remove the washers (10) from the inner faces of eyebolt (5) and remove damper (6).

(6) Examine damper (6) for damage and leaks.

(7) Examine component parts including upper mount (11) and eyebolt (5) for damage and corrosion. If upper mount requires replacement refer to unit maintenance task 5-006 If eyebolt requires replacement, refer to unit maintenance task 5-007.

(8) Replace components as required.

b. Install

(1) Support the damper (6) in the vertical position and locate in the upper mount (11).

(2) Partly insert pin (9) into the upper mount (11), locate washers (10) between inner faces of upper mount (11) and damper (6). Fully insert pin (9).

(3) Fit washers (8) and secure with new spring pins (8).

(4) Raise the damper (6) and locate on side panel eyebolt (5).

(5) Partly insert pin (3). Position washers (4) on inner faces of eyebolt (5) and fully insert pin (3).

(6) Fit washers (2) and secure with new spring pins (1).

5 - 006 BRIDGE MODULE - DAMPER UPPER MOUNTING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Metric Pin Punch Set (BII)

Materials Required

Nyloc nuts (Qty 8)
Spring pins (Qty 2)

Equipment Conditions

Bridge module open and on a raised flat surface



WARNING

CRUSH INJURY. THE DAMPER WEIGHS APPROXIMATELY 54lbs (25KG).

a. Remove

(1) Support the damper (1) and remove spring pins (2) and washers (3). Discard the spring pins (2).

(2) Remove pin (4) and remove the washers (5) from the inner faces of the mounting (6).

(3) Remove eight nyloc nuts (7), washers (8) and screws (9) and remove the mounting (6). Discard the nyloc nuts (7).

(4) Examine all components for damage and corrosion.

(5) Examine screws (9) for damage to bolt heads and threads.

(6) Replace components as required.

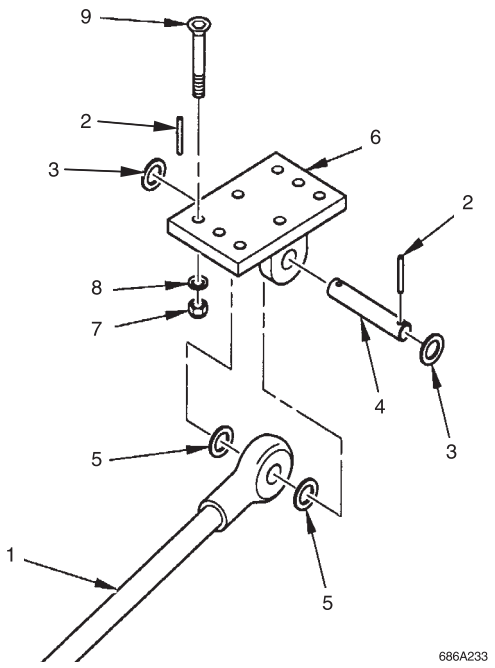
b. Install

(1) Locate mounting (6) on underside of deck panel and secure with screws (9), washers (8) and new nyloc nuts (7).

(2) Locate the damper (1) in the mounting (6).

(3) Partially insert pin (4) and insert washers (5) between the mounting (6) and the damper (1). Fully insert pin (4).

(4) Fit the washers (3) and new spring pins (2).



5 - 007 BRIDGE MODULE - DAMPER LOWER MOUNTING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

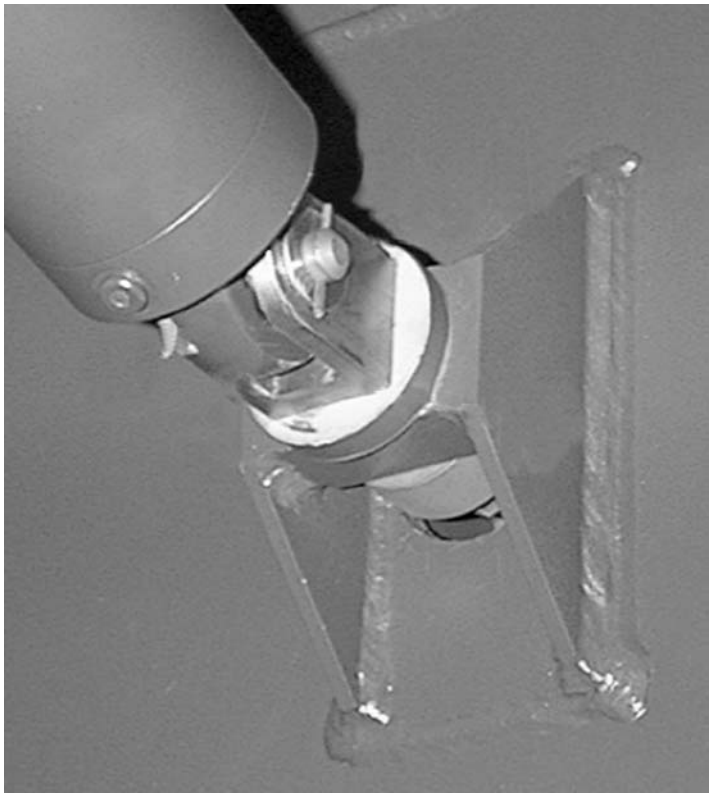
Tool Kit, General Mechanic's, Automotive (GMTK)
Metric Pin Punch Set (BII)

Materials Required

Nyloc nut (Qty 1)
Spring pins (Qty 2)

Equipment Conditions

Bridge Module open on a raised flat surface



WARNING

CRUSH INJURY. THE DAMPER WEIGHS APPROXIMATELY 54lbs (25KG).

a. Remove

(1) Support the damper (1) and remove spring pin (2) and washer (3). Discard spring pin (2).

(2) Remove pin (4) and the washers (5) from the inner faces of the eye bolt (6) and lower the damper (1).

(3) Remove the nyloc nut (7) special washer (8) and remove the eye bolt (6) and spacer (9). Discard nyloc nut (7).

(4) Examine all components for damage and corrosion.

(5) Examine threads on eyebolt (6) for damage.

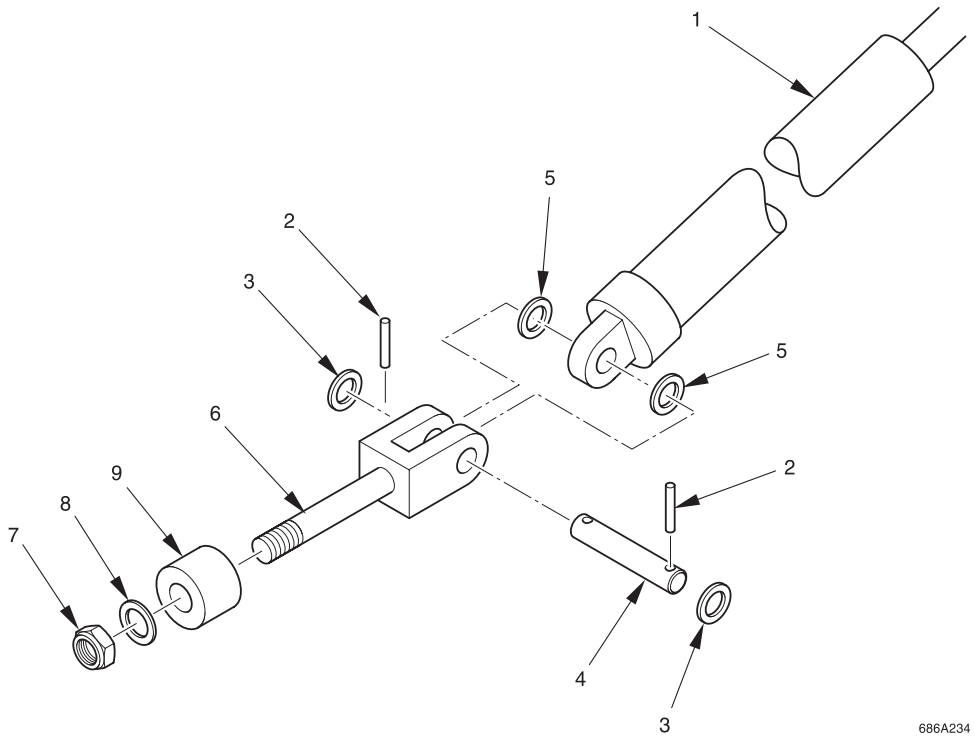
(6) Replace components as required.

b. Install

(1) Fit spacer (9) to eye bolt (6).

(2) Locate eyebolt (6) and secure with special washer (8) and new nyloc nut (7).

(3) Locate the damper (1) in the eyebolt (6), position washers (5) and fit pin (4). Secure with plain washer (3) and new spring pin (2).



5 - 008 BRIDGE MODULE - FATIGUE MONITOR

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Bridge Module open on a raised flat surface

NOTE

The fatigue monitor is located on the inside of the parallel module panel, only one fatigue monitor is fitted per module.

a. Service

(1) Gain access to the fatigue monitor (2).

(2) Remove the four screws (3) and washers (4).

(3) Remove the cover (1).

(4) Inspect the fatigue monitor (2) in accordance with the fracture control plan in the operator's manual TM 5-5420-279-10 Appendix A Fracture Control Plan - A2 Inspection and Action Requirements Table A.1 page A-3.

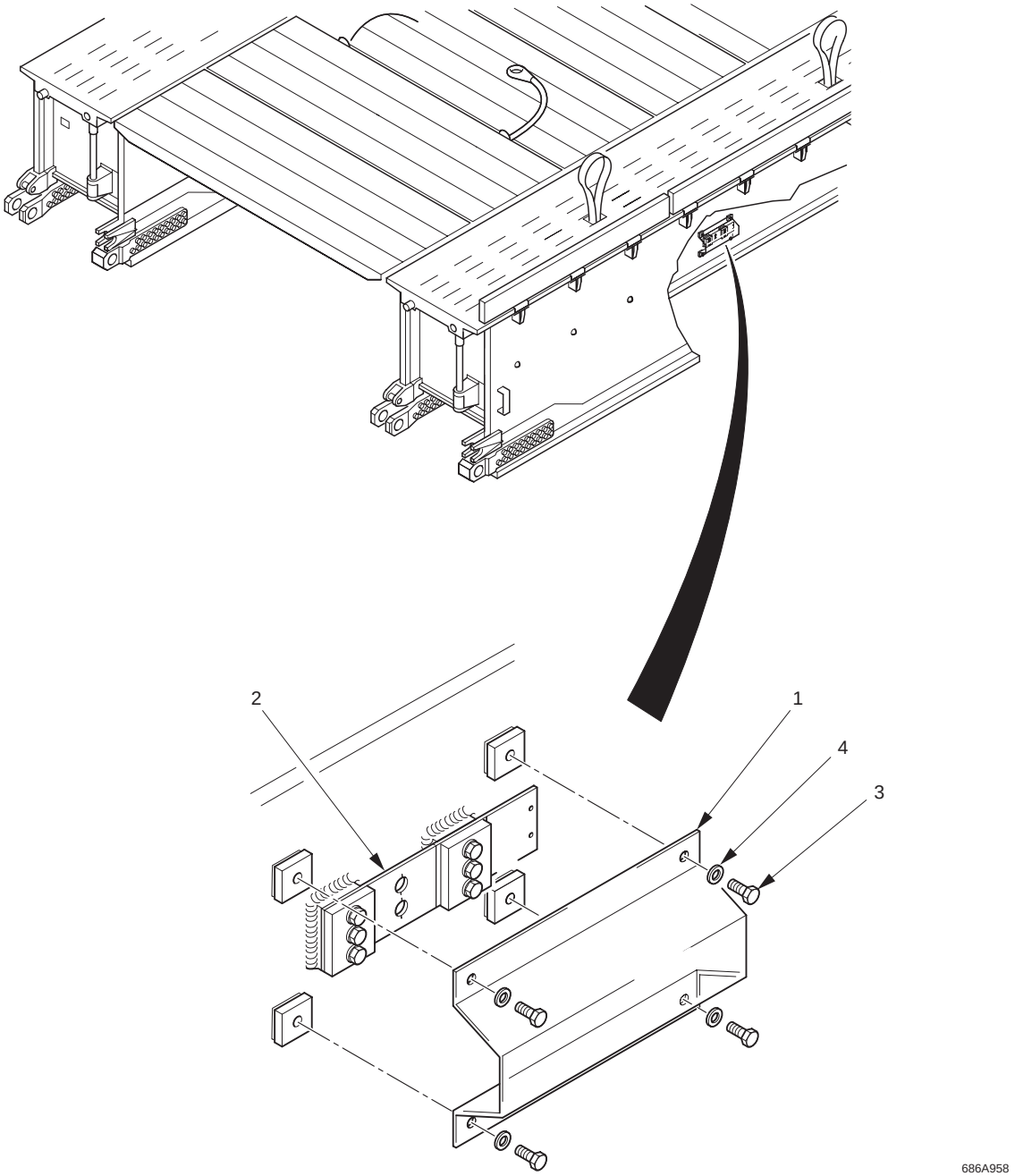
(5) Clean any dirt or debris from the cover (1).

(6) Apply thread locking compound to the four screws (3).

(7) Position the cover (1) on the parallel module panel, and secure in place with the four washers (4) and screws (3).

(8) Fold and stow the parallel module.

(9) Report inspection findings to your supervisor.


2
1
4
3
686A958

5 - 009 BRIDGE MODULE - END BEAM LIFTING PIN

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

End beam placed on a suitable working surface

---

a. Remove

(1) Remove the screws (3) securing the caps (2) to the end beam.

(2) Remove the caps (2).

(3) Remove the lifting pin (1).

(4) Check all threaded components for wear and damage.

(5) Check the lifting pin (1) for wear and damage.

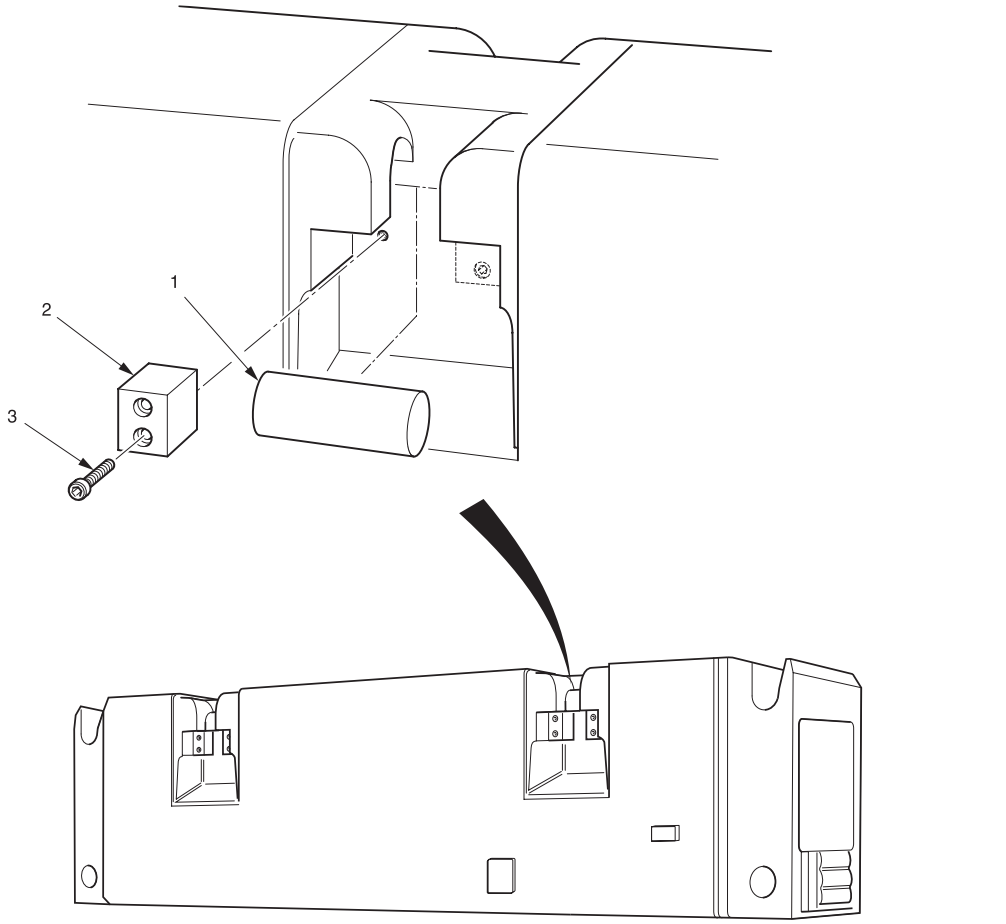
(6) Replace components as necessary.

b. Install

(1) Fit the lifting pin (1) to the end beam.

(2) Apply thread locking compound to the screws (3).

(3) Fit the caps (2) and secure in place with the screws (3).


1
2
3
686A496

5 - 010 BRIDGE MODULE - RAMP MODULE LIFTING PIN

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 4)

Equipment Conditions

Ramp module open and placed on a suitable working surface

NOTE

The lifting blocks are welded to the underside of the ramp module during manufacture.

a. Remove

(1) Remove the screws (8) and lock washers (7) securing the guide bar (6) to the lifting block (1). Discard the lock washers (7).

(2) Remove the guide bar (6).

(3) Remove the locating cap (4) securing screws (5).

(4) Remove the locating caps (4).

(5) Remove the guide ring (3) and lifting pin (2).

(6) Check all threaded components for wear and damage.

(7) Check the guide ring (3) and lifting pin (2) for wear and damage.

(8) Check the locating caps (4) for wear and damage.

(9) Replace components as necessary.

b. Install

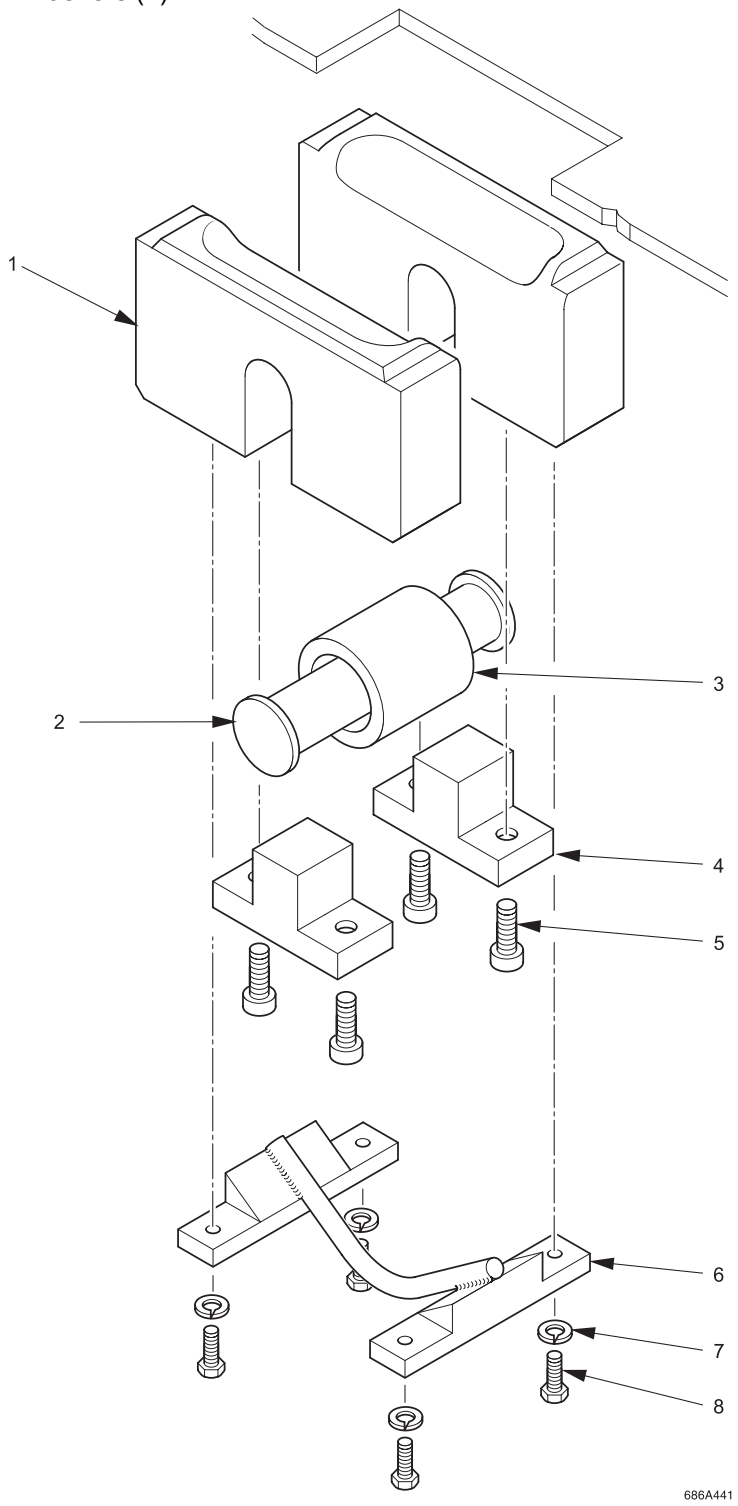
(1) Fit the guide ring (3) to the lifting pin (2).

(2) Fit the lifting pin (2) to the lifting blocks (1).

(3) Apply thread locking compound to the locating cap screws (5).

(4) Fit the locating caps (4) to the lifting blocks (1) and secure in place with the screws (5).

(5) Fit the guide bar (6) to the lifting blocks (1) and secure in place with the screws (8) and lock washers (7).



5 - 011 BRIDGE MODULE - LAUNCH BEAM LIFTER

This task covers:

a. Test

INITIAL SETUP:

Tools Required

None

Materials Required

None

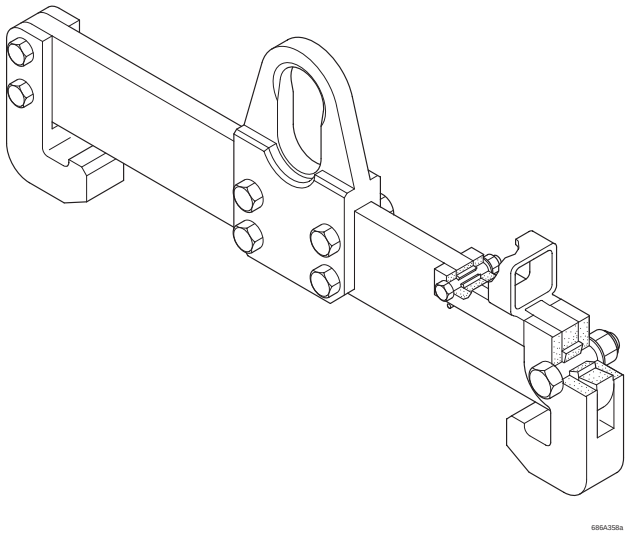
Equipment Conditions

None

---

a. Test

(1) Refer to technical bulletin TB 43-0142 safety inspection and testing of lifting devices (hoisting beam slings).



5 - 012 BRIDGE MODULE - LIFTING BEAM LINKS AND SHACKLE

This task covers:

a. Remove b. Install c. Test

INITIAL SETUP:

Tools Required

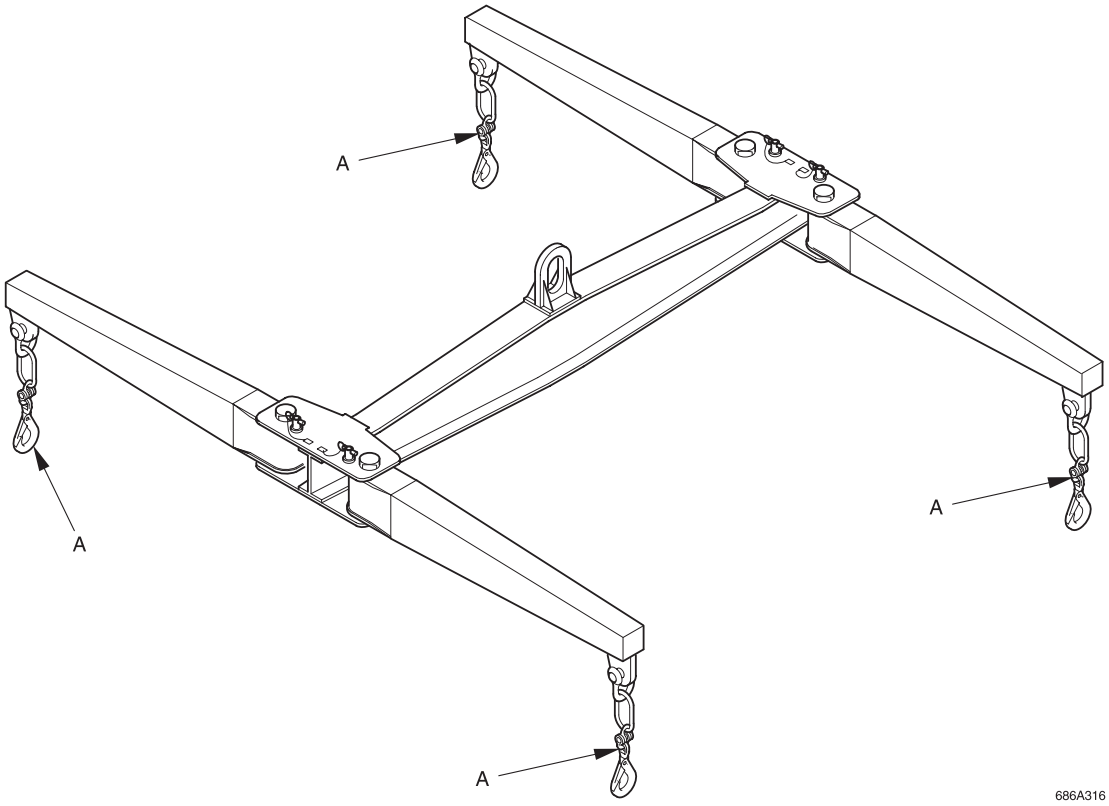
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Lifting Beam on a raised flat surface



a. Remove

(1) Disconnect the coupling link (1) and remove the swivel safety hook (2).

(2) Unscrew the eyebolt (3) and remove the shackle (4) and master link (5).

(3) Examine all components for damage and corrosion.

(4) Replace components as required.

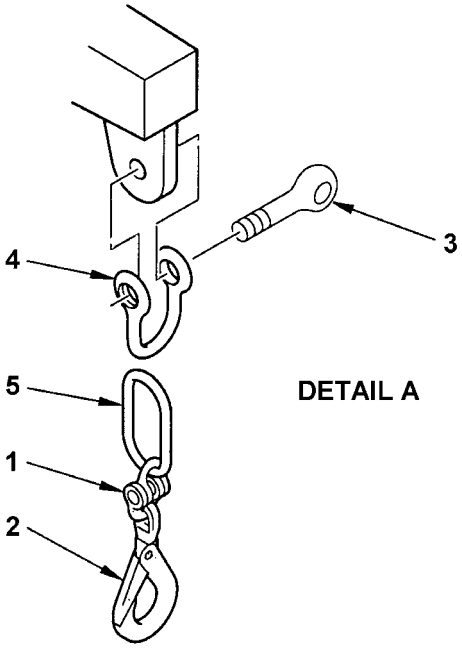
b. Install

(1) Place the master link (5) on the shackle (4) and secure to the lifting beam with the eyebolt.

(2) Attach the swivel safety hook (2) to the master link (5) with the coupling link (1).

c. Install

(1) Refer to technical bulletin TB 43-0142 safety inspection and testing of lifting devices.



DETAIL A

5 - 013 BRIDGE MODULE - LIFTING BEAM SUPPORT ARM

This task covers:

a. Test

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

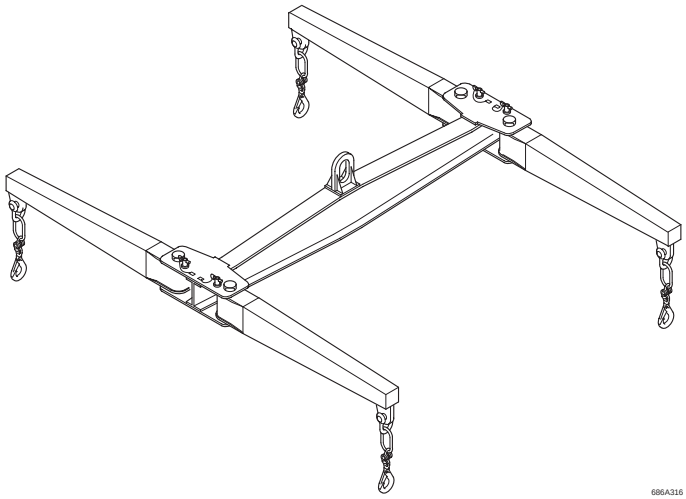
Equipment Conditions

Lifting Beam on a raised flat surface

---

a. Test

(1) Refer to technical bulletin TB 43-0142 safety inspection and testing of lifting devices (hoisting beam slings).



5 - 014 A-FRAME - FOLDING CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

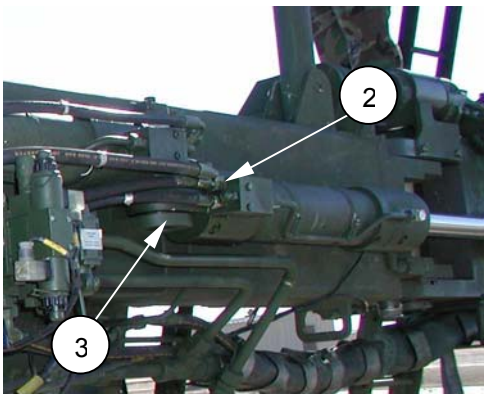
Materials Required

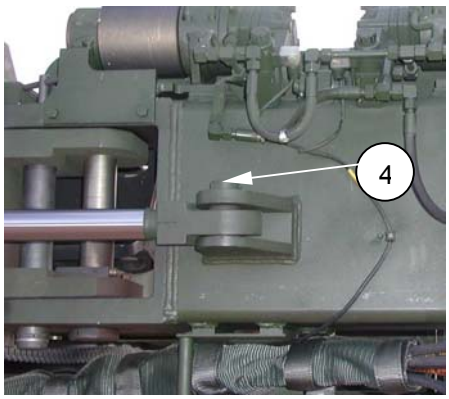
None

Equipment Conditions

A-Frame deployed







WARNING

CRUSH INJURY. THE FOLDING CYLINDER IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE FOLDING CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate and identify the folding cylinders (1). They are located centrally on the A-Frame lower cross member.

(3) Place a suitable container under the folding cylinder (1) to catch any spilled hydraulic fluid.

(4) Release the hydraulic pressure in the folding cylinder (1) refer to unit maintenance procedure 5-123.

(5) Note the position of and undo the connections of the two flexible hydraulic hoses (2) attached to the folding cylinder (1).

(6) Remove the flexible hoses and fit plugs and caps to the flexible hoses and the connection block on the folding cylinder (1).

(7) Support the weight of the folding cylinder (1).

(8) Remove and retain the folding cylinder base pin (3) by removing two screws and the locking plate.

(9) Remove and retain the piston pivot pin (4) by removing two screws and the locking plate.

(10) Remove the folding cylinder (1) from the mounting brackets on the A-Frame assembly.

(11) Check the flexible hoses for chaffing or damage.

(12) Examine bolt heads and threads on screws for damage.

(13) Replace components as required.

b. Install

(1) Place a folding cylinder (1) into the center-mounting bracket on the A-Frame.

(2) Fit the base pin (3) and spacers. Secure in place with the locking plates and screws.

(3) Fit the piston pivot pin (4) and spacers. Secure in place with the locking plate and screws.

NOTE

It may be necessary to release the bleed fitting on the cylinder to allow the piston to move.

(4) Remove the plugs and caps and fit the flexible hoses (2) to the positions noted during removal.

c. Follow on tasks

(1) Operate the A-Frame in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

(3) Check the hydraulic fluid level in the hydraulic fluid reservoir when the launch system is stowed.

5 - 015 A-FRAME - RAISE CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

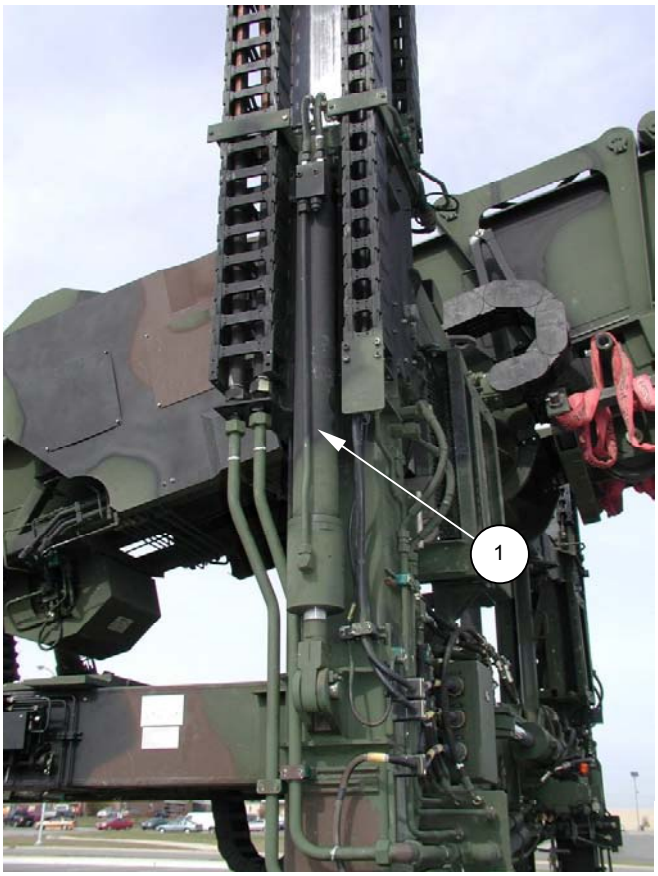
Tool Kit, General Mechanic's, Automotive (GMTK)

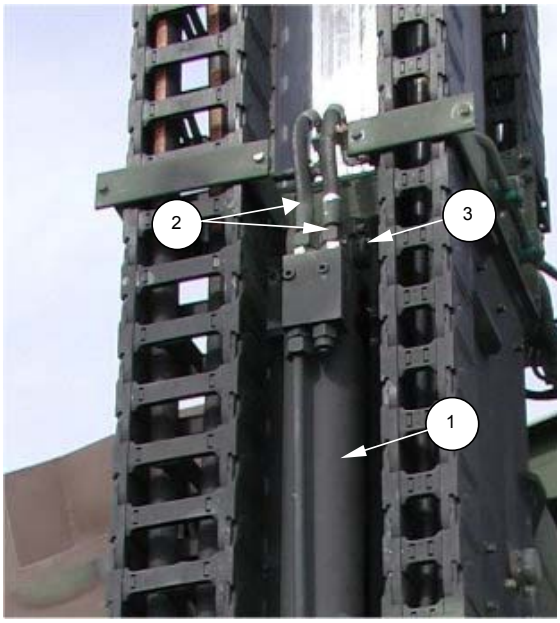
Materials Required

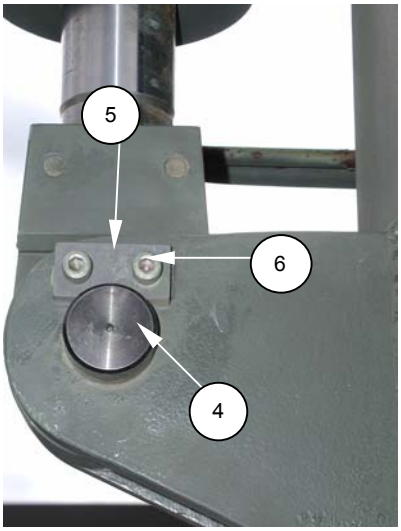
Thread locking compound, loctite 242

Equipment Conditions

A-Frame deployed







WARNING

CRUSH INJURY. THE RAISE CYLINDER IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE RAISE CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The raise cylinders are located on the A-Frame assembly (1), one on each leg.

a. Remove

(1) De-pressurize hydraulic system. Refer to procedure 5-118.

(2) Place a suitable container under the raise cylinder to catch any spilled hydraulic fluid.

(3) Release the hydraulic pressure in the cylinder (1) refer to unit maintenance procedure 5-123.

(4) Note the position of and undo the connections of the two flexible hydraulic hoses (2) attached to the raise cylinder (1).

(5) Remove the flexible hoses and fit blanking plugs and caps to the flexible hydraulic hoses (2) and the connection block on the raise cylinder (1).

(6) Support the weight of the raise cylinder (1).

(7) Remove and retain the raise cylinder base pin (3) by removing two screws and the locking plate.

(8) Remove and retain the piston pivot pin (4) by removing two screws (6) and the locking plate (5).

WARNING

CRUSH INJURY. THE RAISE CYLINDER IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

(9) Remove the raise cylinder (1) from the mounting brackets on the A-Frame assembly.

(10) Check the flexible hoses for chaffing or damage.

(11) Examine bolt heads and threads on screws for damage.

(12) Replace components as required.

b. Install

(1) Place a raise cylinder (1) into the mounting brackets on the A-Frame.

(2) Fit the base pin (3) and piston pivot pin (4).

(3) Apply thread locking compound to screws and secure locking plates and pins with screws.

(4) Remove the blanking plugs and caps and fit the flexible hoses.

c. Follow on task

(1) Operate the raise cylinders to charge the cylinders with hydraulic fluid.

(2) Inspect the raise cylinders for hydraulic leaks at the piston seals and the flexible hoses.

5 - 016 A-FRAME - CYLINDER LOCKING PLATE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

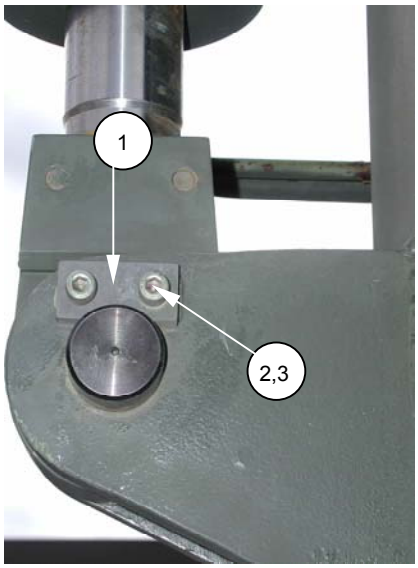
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 2)

Equipment Conditions

Deployment of assembly to allow access to cylinder



NOTE

This maintenance procedure is a general instruction for removing a cylinder locking plate.

a. Remove

(1) Prepare the cylinder as detailed in the individual cylinder replacement maintenance procedures.

(2) Remove two socket head screws (2), lock washers (3) and remove the locking plate (1). Discard the lock washers (3).

(3) Inspect locking plate for damage and corrosion.

(4) Examine bolt heads and screw threads for damage.

(5) Replace components as required.

b. Install

(1) Position locking plate (1). Using thread locking compound on the screw threads, secure locking plate (1) with two lock washers (3) and screws (2).

5 - 017 A-FRAME - GUIDE ROLLER HYDRAULIC MOTOR

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Silicone compound
Lock washers (Qty 2)

Equipment Conditions

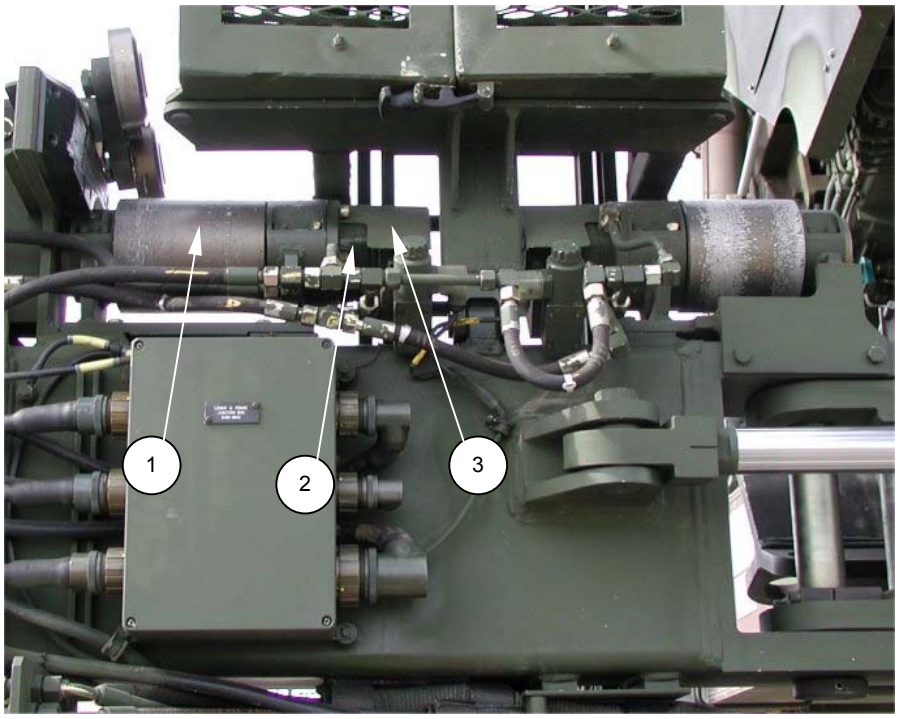
A-Frame deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE GUIDE ROLLERS HYDRAULIC MOTOR.

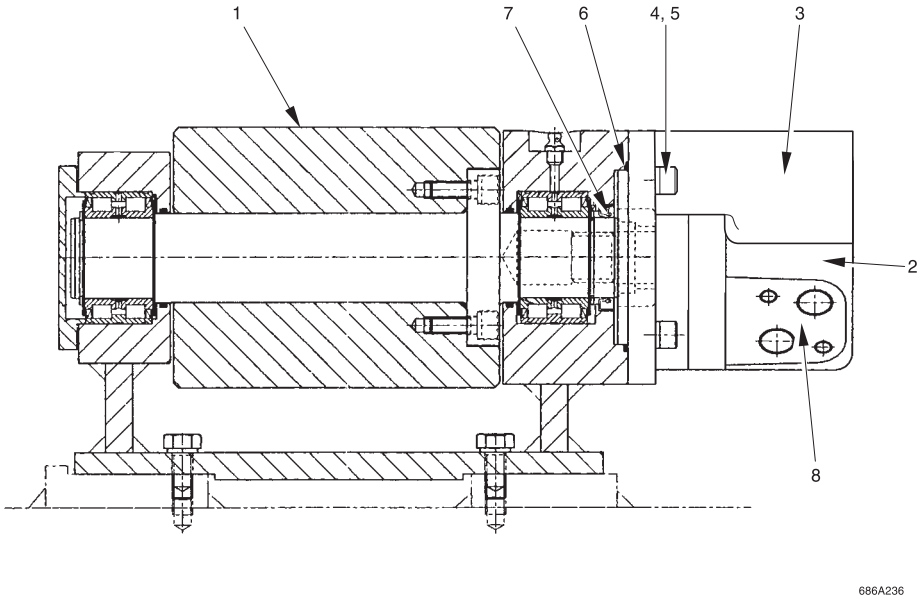
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



Right Hand A-Frame Guide Rollers and Hydraulic Motors

NOTE

Two Guide Roller Assemblies are fitted to each side of the A-Frame. The Guide Roller Assembly consists of a Hydraulic Motor (2) and a Support Roller Assembly (1) and a roller motor guard (3).



a. Remove

(1) De-pressurize hydraulic system. Refer to procedure 5-118.

(2) Place a suitable container under the raise cylinder to catch any spilled hydraulic fluid.

(3) Remove the two upper bolts (4) and washers (5) securing the roller motor guard (3) in place.

(4) Remove the roller motor guard (3).

(5) Note the position of and undo the connections of the hydraulic pipes attached at point (8) on the guide roller assembly hydraulic motor (2).

(6) Note the position of the electrical connections to the hydraulic motor solenoid valve.

(7) Refer to maintenance procedure 5-141 and remove the electrical connection.

(8) Remove the two lower socket head screws (4) and lock washers (5) securing the hydraulic motor (2) to the guide roller assembly (1). Discard the lock washers (5).

NOTE

It may be necessary to remove the solenoid valve block connected to the Hydraulic Motor to gain access to one of the four socket head screws.

(9) Remove the hydraulic motor (2) from the guide roller assembly (1).

(10) Remove and discard the hydraulic motor seal (6).

(11) Check the threads of the socket head screws for damage.

(12) Check the mating surfaces of the guide roller assembly (1) and the hydraulic motor (2) for damage.

(13) Check that the support roller shaft seal (7) is not damaged.

(14) Replace as necessary.

b. Install

(1) Fit a new seal (6) to the hydraulic motor (2).

(2) Apply thread-locking compound to the socket head screws (4).

(3) Fit the hydraulic motor (2) and the roller motor guard (3) to the guide roller assembly (1) with the socket head screws (4) and lock washers (5).

NOTE

Fit the solenoid valve block to the Hydraulic Motor if removed.

(4) Connect the hydraulic pipes to the hydraulic motor (2) in the positions noted during removal.

(5) Fit the electrical connection to the solenoid valve.

(6) Cover the electrical connection securing screw head with silicone.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the guide roller assembly in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for hydraulic fluid leaks.

5 - 018 A-FRAME - GUIDE SUPPORT ROLLER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

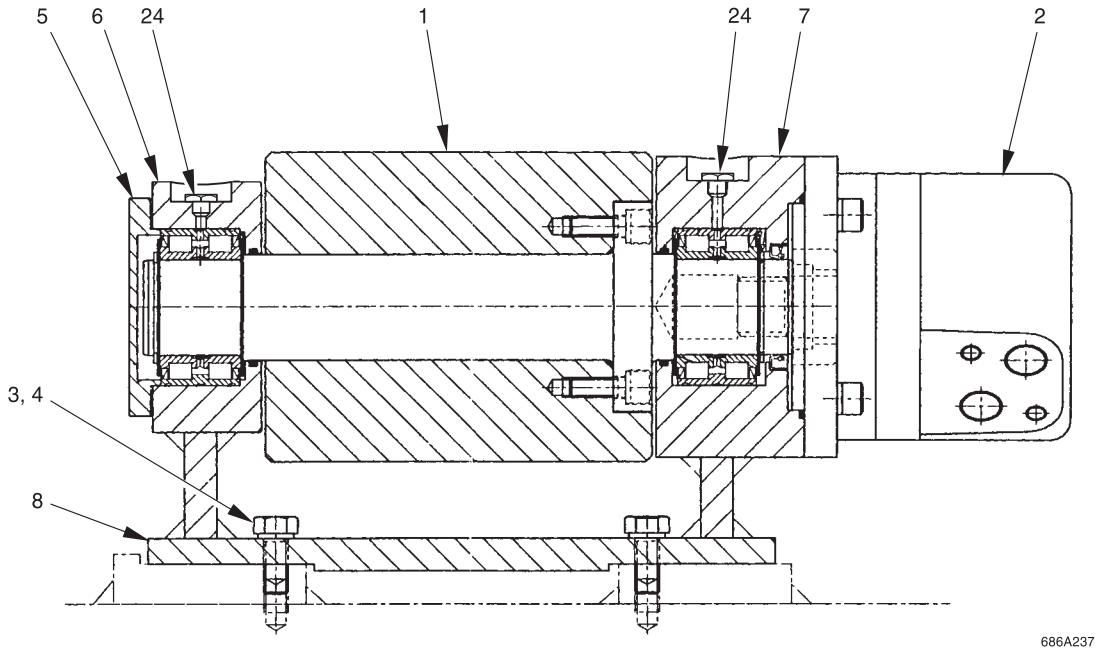
Materials Required

Joint sealing compound, loctite 574
Thread locking compound, loctite 243
Grease (As required)
Lock washers (As required)

Equipment Conditions

A-Frame deployed
Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Remove the hydraulic motor (2) in accordance with unit maintenance procedure 5-017.

NOTE

The inner and outer Guide Roller Assembly Base mountings are different. The inner A-Frame Guide Roller assembly has six mounting bolts and the outer Guide Roller assembly has four mounting bolts.

(2) Remove the four or six mounting bolts (3) and lock washers (4) securing the guide roller assembly (1) to the A-Frame. Discard the lock washers (4).

NOTE

The Guide Roller Assembly is additionally located on the A-Frame with roll pin(s) and may need to be pried away from the A-Frame.

(3) Remove the guide roller assembly (1) and place on a suitable working surface.

(4) Remove and retain the locating roll pin(s).

(5) Remove the four end cap screws and remove the end cap (5) from the small housing (6).

(6) Remove the four screws securing the small housing (6) to the base (8).

NOTE

The Small Housing (6) is additionally located on the Base (8) by two roll pins.

(7) Remove the small housing (6).

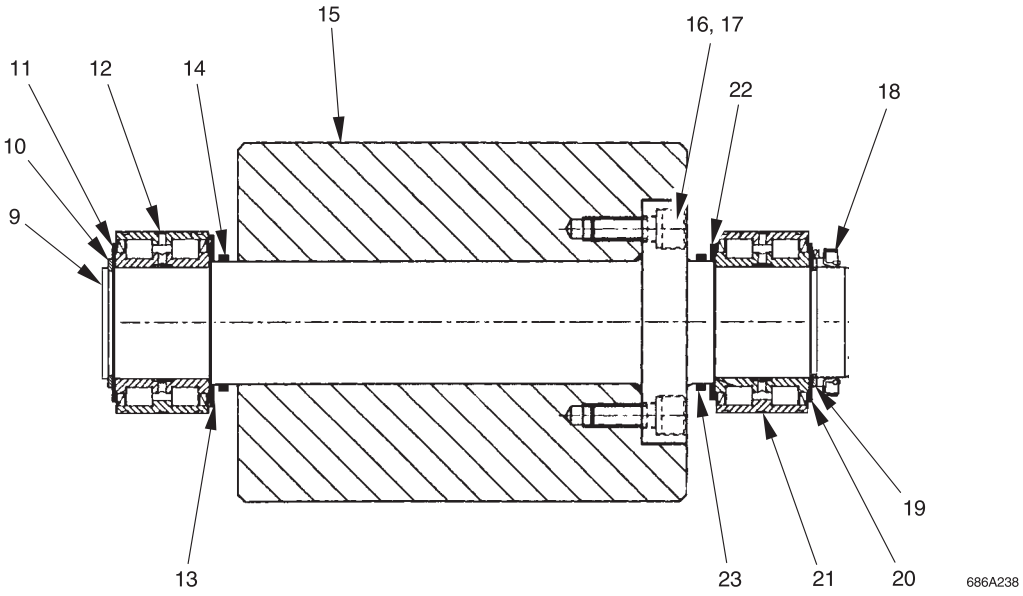
(8) Remove the four screws securing the large housing (7) to the base (8).

NOTE

The Large Housing (7) is additionally located on the Base (8) by two roll pins.

(9) Remove the large housing (7).

(10) Lift the support roller assembly complete with shaft and bearings from the base (8).



(11) Remove the snap ring (10) from the support roller shaft (9).

(12) Remove the bearing washer (11), bearing (12) and bearing washer (13).

(13) Remove the laminar ring seal (14).

(14) Note the way in which the seal retaining ring and seal (18) is fitted to the shaft (9) and remove the retaining ring and seal (18).

(15) Remove the snap ring (19).

(16) Remove the bearing washer (20), bearing (21) and bearing washer (22).

(17) Remove the laminar ring seal (23).

(18) Remove the four screws (16) and washers (17).

(19) Remove the support roller (15) from the shaft (9).

(20) Check all components for wear and damage and replace as necessary.

(21) Clean all components.

b. Install

(1) Apply thread-locking compound to the screws (16).

(2) Place a support roller (15) over the support roller shaft (9) and secure with washers (17) and screws (16).

(3) Fit laminar ring seals (14) and (23) to the support roller shaft (9).

(4) Fit bearing washers (13) and (22).

(5) Fit bearings (12) and (21).

(6) Fit bearing washers (11) and (20).

(7) Fit snap ring (10) and (19).

(8) Place the support roller assembly into the base (8). Ensure that the laminar ring seals (14) and (23) locate correctly in the base (8).

(9) Apply a thin layer of joint sealing compound to the small and large housings (6 and 7).

(10) Fit the small housing (6) and the large housing (7) over the support roller assembly. Ensure that the housings locate on their respective roll pins.

(11) Apply thread-locking compound to the small and large housing screws.

(12) Secure the large housing (7) with four washers and screws. Remove any excess sealing compound.

(13) Secure the small housing (6) with four washers and screws. Remove any excess sealing compound.

(14) Allow time for the joint sealing compound to cure. See the makers instructions on the bottle.

(15) Remove the plugs (24) from the top of the small and large housings (6 and 7) and replace with a grease fittings.

(16) Grease the bearings (12) and (21) through the grease fittings provided on the small and large housings.

(17) Remove any grease inside the large housing.

(18) Fit a new seal and seal retaining ring (18), Ensure that the seal lip is facing outwards.

(19) Remove the grease fittings from the top of the small and large housings (6 and 7).

(20) Apply thread locking compound to the plugs (24) and fit the plugs (24) to the small and large housings (6 and 7).

(21) Apply thread-locking compound to the end cap screws.

(22) Apply joint sealing compound to the face of the cap (5),

(23) Fit the end cap (5) and secure with the four end cap screws.

(24) Fit the guide roller assembly (1) to the A-Frame.

(25) Fit the locating roll pins retained during removal.

(26) Apply thread locking compound to the bolts (4).

(27) Secure the guide roller assembly (1) with four or six washers (5) and bolts (4).

(28) Fit the hydraulic motor (2) in accordance with unit maintenance procedure 5-017.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the guide roller assemblies in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for leaks.

5 - 019 A-FRAME - BRIDGE BEARING PADS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

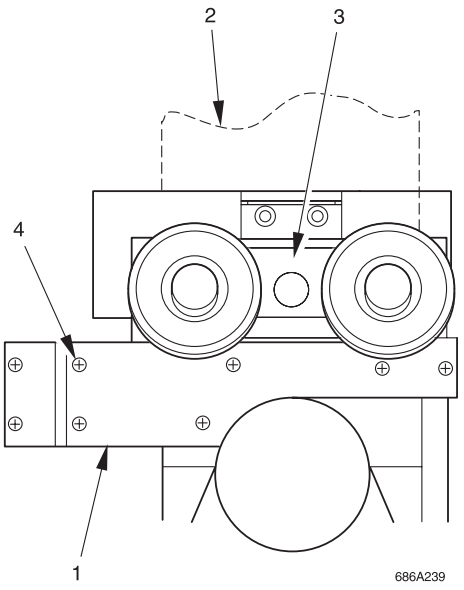
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Bridge bearing pad

Equipment Conditions

A-Frame deployed



NOTE

The Bridge Bearing Pad (1) is fitted to the Bridge Emergency Stop bracket (3). There is a Bridge Bearing Pad fitted to each of the A-Frame Stabilizer Leg assemblies (2).

a. Remove

(1) Remove the eight screws (4) securing the bridge bearing pad (1) to the bridge emergency stop bracket (3).

(2) Remove the bridge bearing pad (1).

(3) Inspect components for damage and corrosion.

(4) Examine for damage to bolt heads and threads.

(5) Replace components as required.

b. Install

(1) Place a new bridge bearing pad (1) on the bridge emergency stop bracket (3).

(2) Apply thread-locking compound to the eight screws.

(3) Secure the new bridge bearing pad (1) in place with the eight screws (4).

5 - 020 A-FRAME - UPPER SLIDING SECTION BEARING PADS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Bearing pads
Lock washers (Qty 6 for each pad)

Equipment Conditions

A-Frame deployed for access to top bearing pads
A-Frame deployed and raised, three launch beams deployed resting on far bank support for access to bottom bearing pads

---



NOTE

The top bearing pads can be changed with the A-Frame deployed.

It is necessary to deploy the A-Frame, three launch beams and the far bank support. The articulator cylinders must be disconnected from the slide frame and stowed. The A-Frame must then be raised to allow access to the bottom wear pads on the upper sliding section.

a. Remove

(1) The left and right A-Frame upper sliding section (1) each have eight bearing pads.

(2) Note the position of each bearing pad before removing it. The bearing pads must be fitted in the same position during installation.

(3) Remove the socket head screws (2), lock washers (3) and plain washers (4). Discard the lock washers (3).

(4) Slide the bearing pad holder (5) out of the upper sliding section (1).

NOTE

The bearing pad (7) must be replaced when the distance between the head of screws (6) and the surface of the bearing pad (7) is 1/16 inch (1.5mm).

(5) Remove the screws (6) securing the bearing pad (7) to the bearing pad holder (5) and retain the shim(s).

NOTE

The shims are matched to the bearing pad holders, keep them together for installation.

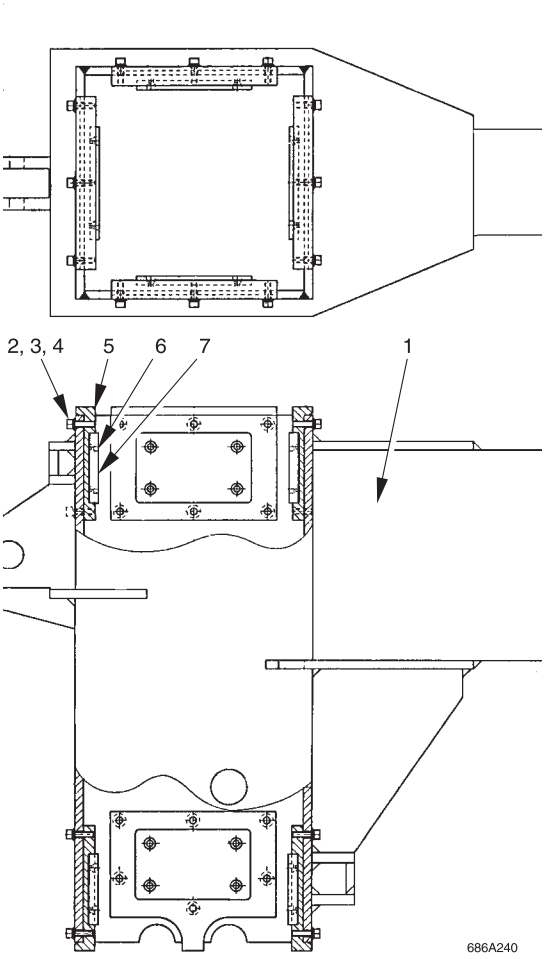
(6) Remove the bearing pad (7).

(7) Inspect components for wear, damage and corrosion.

(8) Examine bolt heads and threads for damage.

(9) Replace components as required.

Top view



b. Install

(1) Fit the shim(s) to the bearing pad holder (5).

(2) Secure a new bearing pad (7) to the bearing pad holder (5) with four screws (6), use thread locking compound on the screw threads.

(3) Place the bearing pad holder (5) to the position noted during removal in the upper slide frame (1) and secure with washers (4), lock washers (3) and socket head screws (2).

c. Follow on tasks

(1) Check the operation of the stabilizer legs ensuring that the bearing pads allow free movement of the stabilizer legs.

5 - 021 A-FRAME - STABILIZER FOOT ASSEMBLY

This task covers:

a. Remove b. Repair c. Install

INITIAL SETUP:

Tools Required

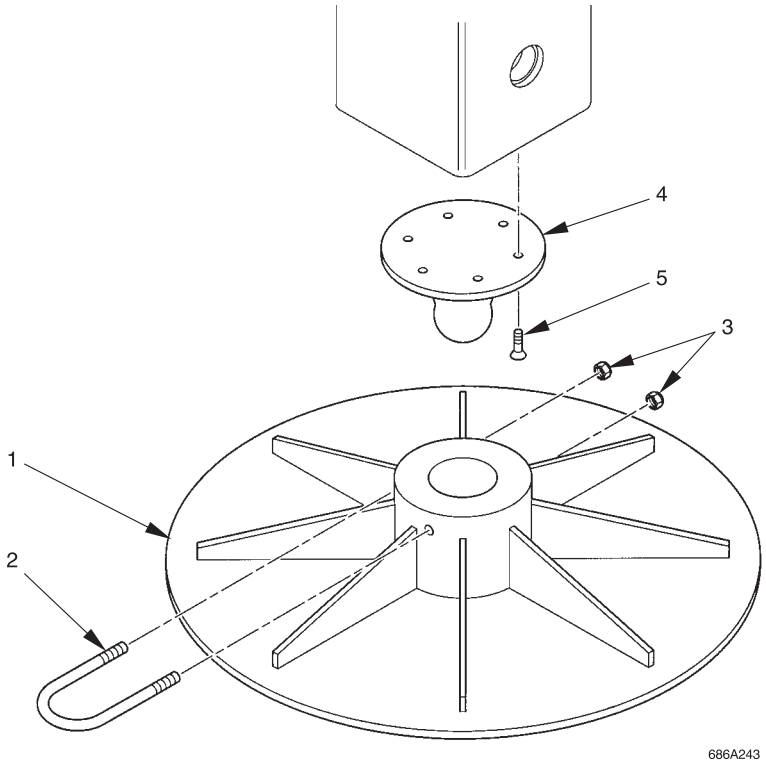
Tool Kit, General Mechanic's, Automotive (GMTK)
Welding equipment (As required)

Materials Required

Thread locking compound, loctite 242
Nyloc nuts (Qty 2)

Equipment Conditions

A-Frame deployed with feet raised



a. Remove

(1) Remove the two nyloc nuts (3) securing the u-bolt (2). Discard the nyloc nuts (3).

(2) Support the weight of the stabilizer foot (1) and remove the u-bolt (2).

(3) Lift-off the stabilizer foot (1).

(4) Remove the six screws (5) and remove foot pivot plate (4).

(5) Check the stabilizer foot (1) and u-bolt (2) for damage and corrosion.

(6) Check the foot pivot plate (4) in the A-Frame stabilizer leg for damage and corrosion.

(7) Replace components as required.

b. Repair

(1) Refer to Appendix K for welding procedures as required.

c. Install

(1) Place foot pivot plate (4) in position on stabilizer leg. Using thread locking compound on the screw threads (5), secure foot pivot plate (4).

(2) Supporting the weight, refit the stabilizer foot (1) and secure with u-bolt (2) and new nyloc nuts (3).

5 - 022 A-FRAME - BRIDGE STOP EMERGENCY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
BSE peg wrench

Materials Required

Thread locking compound, loctite 243
Lock washer (As required)
Thread inserts (As required)

Equipment Conditions

A-Frame deployed





NOTE

There are two bridge stop emergency. They are located one on each side of the A-Frame assembly. For the purposes of this procedure, the bridge stop emergency is split into three assemblies; the handle assembly, the slide block assembly and the roller assembly.

a. Remove

(1) Refer to handle assembly illustration.

(2) Remove spring pin (19).

(3) Remove two screws (6).

(4) Remove shaft (1) complete with items (11 through 18) downward.

(5) Remove and retain items (11, 12 and 13).

(6) Remove the quick release pin (16) complete with handle (18), wire rope (17) screw (14) and washer (15).

(7) Refer to the slide block assembly illustration.

(8) Remove the two bolts (23) and lock washers (22) securing the bumper and spacer (21) to the A-Frame stabilizer leg. Discard the lock washers (22).

NOTE

Mark the position of each slide pad (20 and 24) for correct installation later.

(9) Remove four screws (25) and four screws (26).

(10) Remove slide pads (20 and 24) from the A-Frame stabilizer leg.

(11) Check the condition of the slide block assembly components (20 though 26).

(12) Replace components as required.

(13) Refer to the handle assembly illustration.

(14) Remove items (2 through 5) and (7 through 10).

NOTE

Items (2 through 5) and (7 through 10) are removed as a complete assembly.

(15) Remove two screws (3) and two screws (5).

NOTE

Mark the position of wear pad (10) for correct installation later.

(16) Remove wear pad (10).

(17) Remove four screws (8) and stop track (2) from slide block (4).

(18) Check the condition of the handle assembly components (1 though 19).

(19) If required replace the thread inserts (7 and 9).

(20) Refer to the roller assembly illustration.

(21) Remove two bolts (32) and lock washers (31) securing the keep plate (33) to the A-Frame support bracket. Discard the lock washers (31).

(22) Remove the pin (45).

(23) Remove the roller assembly (30 and 34 trough 43) from the A-Frame assembly.

(24) Remove the pin (27).

(25) Remove the lever arm (28).

(26) Remove the spring pin (29).

(27) Hold the nut (34) with a wrench and remove the shouldered shaft (38) with the aid of the BSE peg wrench.

(28) Remove the nut (34) and lock washer (35). Discard the lock washer (35).

(29) Remove the roller (37), bushing (36) and shouldered shaft (38).

(30) Remove the snap ring (39), washer (40), spacer (41), roller arm (42) and bushing (43) from the pivot shaft (30).

(31) If required remove bushing (44) from pivot shaft (30).

(32) Check the condition of the roller assembly components (27 through 45).

(33) Replace components as required.

b. Install

(1) Refer to the roller assembly illustration.

(2) If removed fit the bushing (44) to the pivot shaft (30).

(3) Fit the spring pin (29) to the pivot shaft (30).

(4) Fit the bushing (43), roller arm (42), spacer (41), washer (40) and snap ring (39), to the pivot shaft (30).

(5) Fit the bushing (36) to the roller (37) and place on to the shouldered shaft (38).

(6) Fit the shouldered shaft (38) and roller (37) to the roller arm (42), with a new lock washer (35) and nut (34).

(7) Hold the shouldered shaft (38) with the aid of the BSE Peg wrench and tighten the nut (34) with a wrench.

(8) Fit the lever arm (28) to the A-Frame assembly with the pin (27).

(9) Fit the roller assembly (30 and 34 through 44) to the A-Frame assembly with the pin (45).

(10) Fit the keep plate (33) to the A-Frame support bracket with the lock washers (31) and bolts (32).

(11) Refer to the handle assembly illustration.

(12) If removed fit the thread insert (9) to the stop track (2).

(13) Apply thread locking compound to the screws (8) and fit the slide block (4) to the stop track (2).

(14) Apply thread locking compound to the screws (3 and 5) and fit the wear pad (10) to the stop track (2) in the position noted during removal.

(15) Fit the stop track (2) complete with items (3, 4, 5 and 10) to the A-Frame stabilizer leg.

NOTE

The stop track (2) complete with items (3, 4, 5 and 10) is fitted with slide block (4) located behind the slide pads (20 and 24) on the A-Frame stabilizer leg assembly.

(16) Refer to the slide block assembly illustration.

(17) Apply thread locking compound to the screws (25 and 26).

(18) Secure wear pads (20 and 24) to the A-Frame stabilizer leg in the position noted during removal.

(19) Fit bumper and spacer (21) to the A-Frame stabilizer leg with lock washers (22) and screws (23).

(20) Refer to the handle assembly illustration.

(21) If removed fit the thread insert (7) to the stop track (2).

(22) Place the bushing (13), spring (12) and spacer (11) on the A-Frame bracket.

(23) Feed shaft (1) upward through items (11 through 13).

(24) Apply thread locking compound to the screws (6)

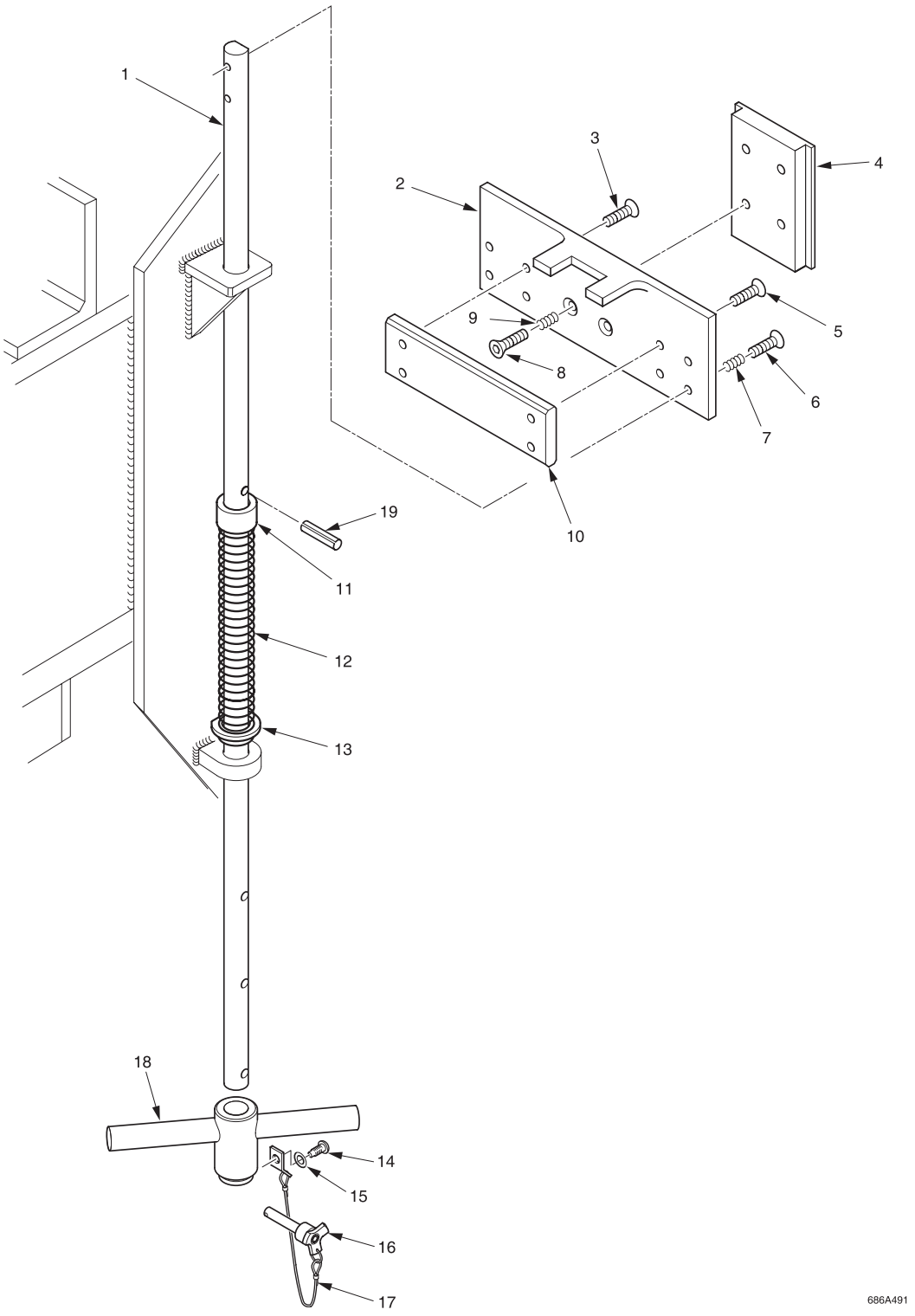
(25) Secure shaft (1) to stop track (2) with screws (6).

(26) Fit spring pin (19) through shaft (1).

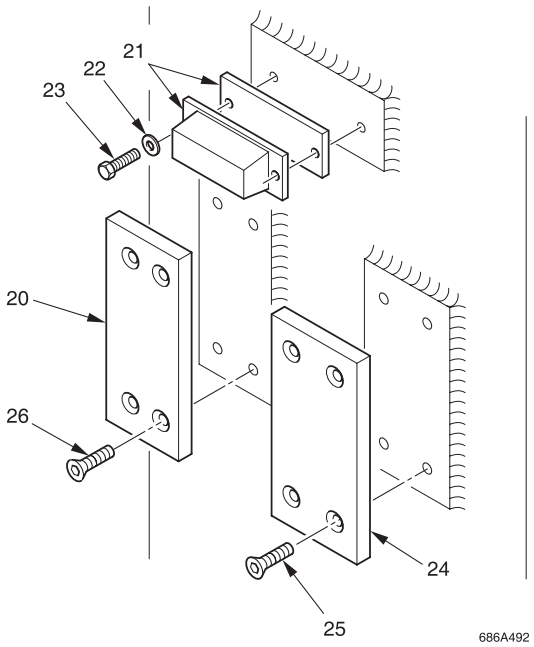
(27) Fit handle (18) complete with items (14, 15 and 17) to shaft (1) and secure in place with quick release pin (16).

c. Follow on tasks

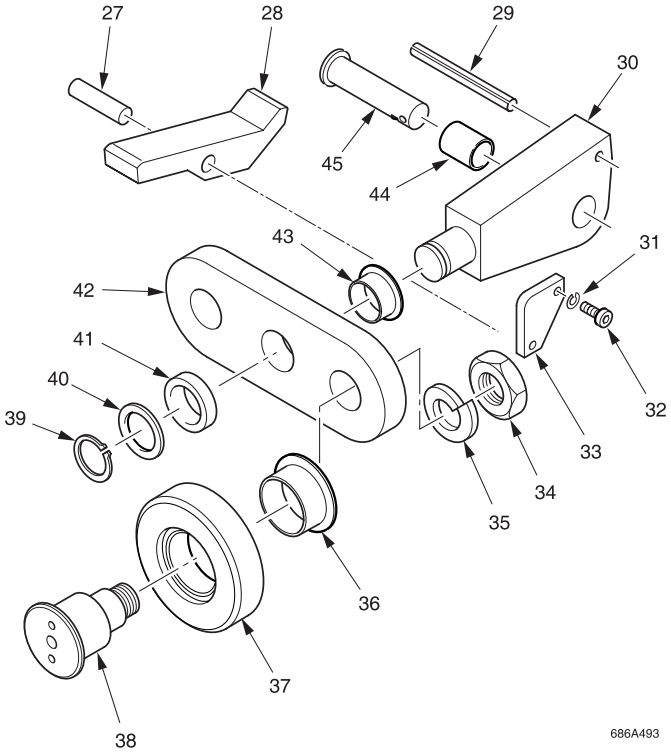
(1) Check the operation of the bridge stop emergency.



Handle Assembly



Slide Block Assembly



Roller assembly

5 - 023 A-FRAME - LIMIT SWITCHES

This task covers:

a. Remove b. Install c. Adjust

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Limit switch (As required)
Lock washers (Qty 4 each)

Equipment Conditions

A-Frame deployed
Vehicle switched off and battery shutoff switch in the off position

a. Remove

(1) Unscrew the electrical plug (1) attached to the limit switch (2).

(2) Remove the four mounting bolts (3) and lock washers (4). Discard the lock washers (4).

b. Install

(1) Locate limit switch (2) on the A-Frame.

(2) Secure in place using four lock washers (4) and four mounting bolts (3).

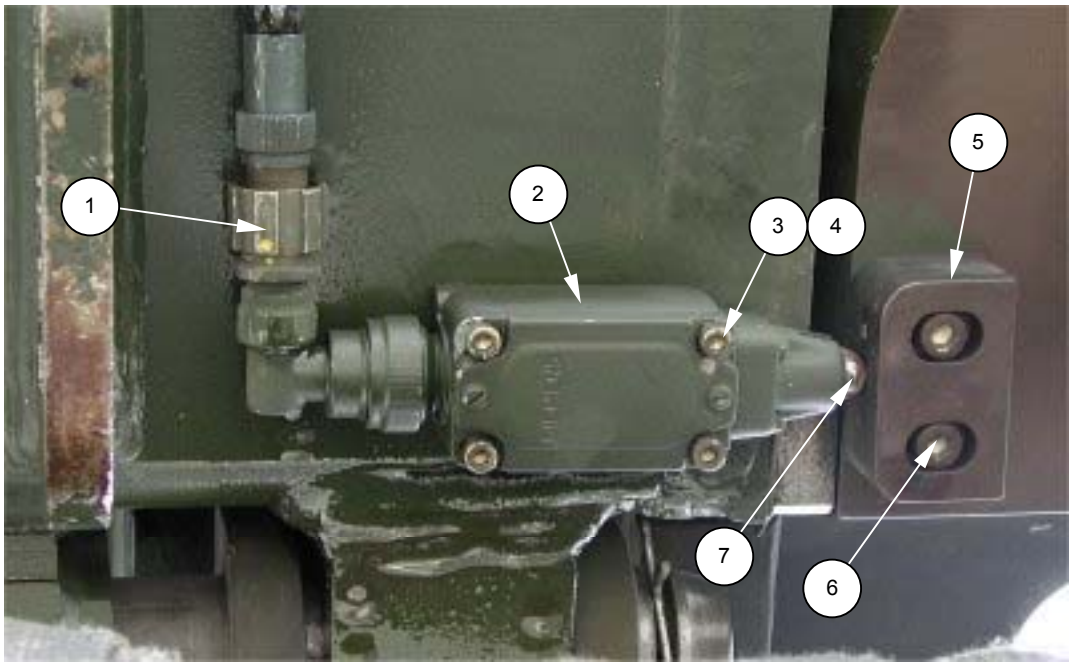
(3) Connect the electrical plug (1) to the limit switch (2).

(4) Switch the battery shutoff switch to the on position.

c. Adjust

(1) With the A-Frame fully deployed, loosen the block screws (6) and ease the block (5) towards the position switch plunger (7).

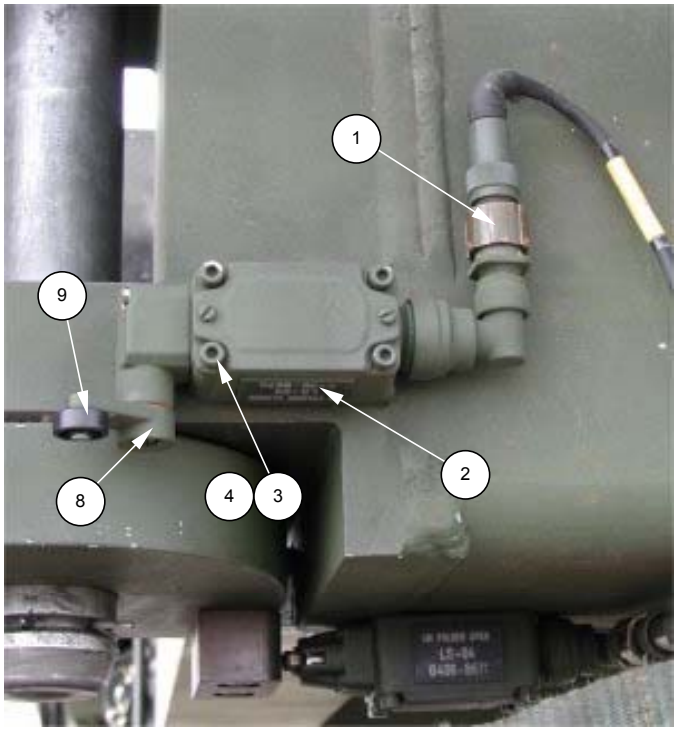
(2) When the A-Frame Fold (deployed) light, in the interface cabinet, illuminates tighten the block screws (6).



A-Frame Deployed - Limit Switch

(3) With the A-Frame fully deployed, loosen the adjuster screw (8) on the A-Frame parked limit switch (2).

(4) Set the operating arm (9) to an angle of 30 degrees from the A-Frame cross beam. Tighten the adjuster screw (8).



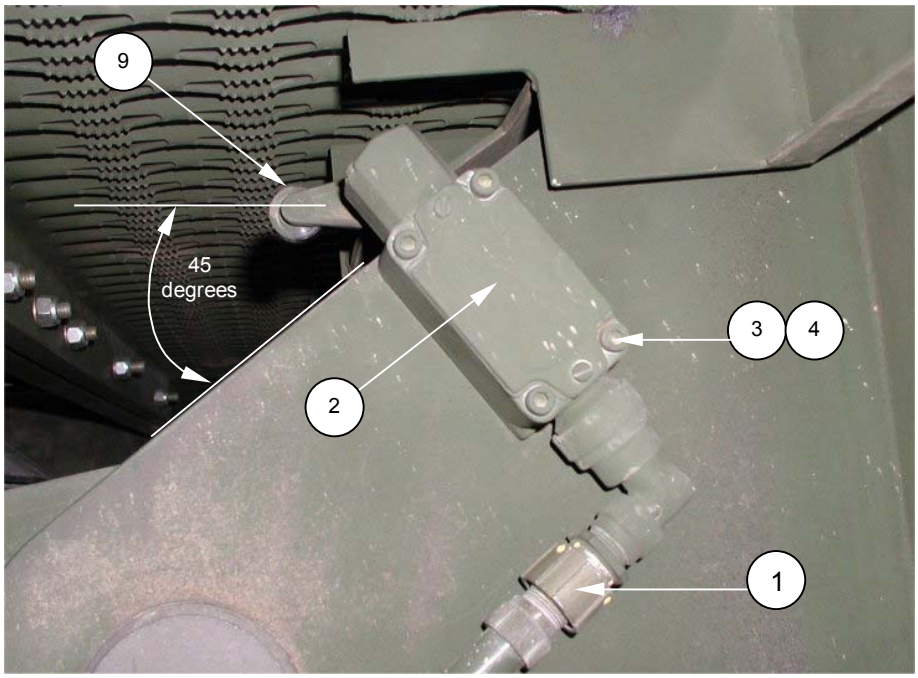
A-Frame Parked - Limit Switch

NOTE

The operating arm (9) on the A-Frame rotate limit switch can be adjusted by releasing the adjuster screw (not shown) in the same way the A-Frame parked limit switch is adjusted.

(5) Release the adjuster screw (not shown) on the A-Frame rotate limit switch (2).

(6) Set the operating arm (9) to an angle of 45 degrees from the rotate cylinder mounting and tighten the adjuster screw.



A-Frame Rotate – Limit Switch

d. Follow on task

WARNING

DANGER FROM MOVING PARTS. OPERATION OF EQUIPMENT POWERED BY HYDRAULIC PRESSURE IS HAZARDOUS. KEEP CLEAR OF MOVING PARTS.

(1) Check that the A-Frame rotates, folds and unfolds in accordance with the operator's manual TM 5-5420-279-10.

5 - 024 A-FRAME - BACK-UP MODE OPERATION CONTROLS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Nyloc nuts (Qty 4)

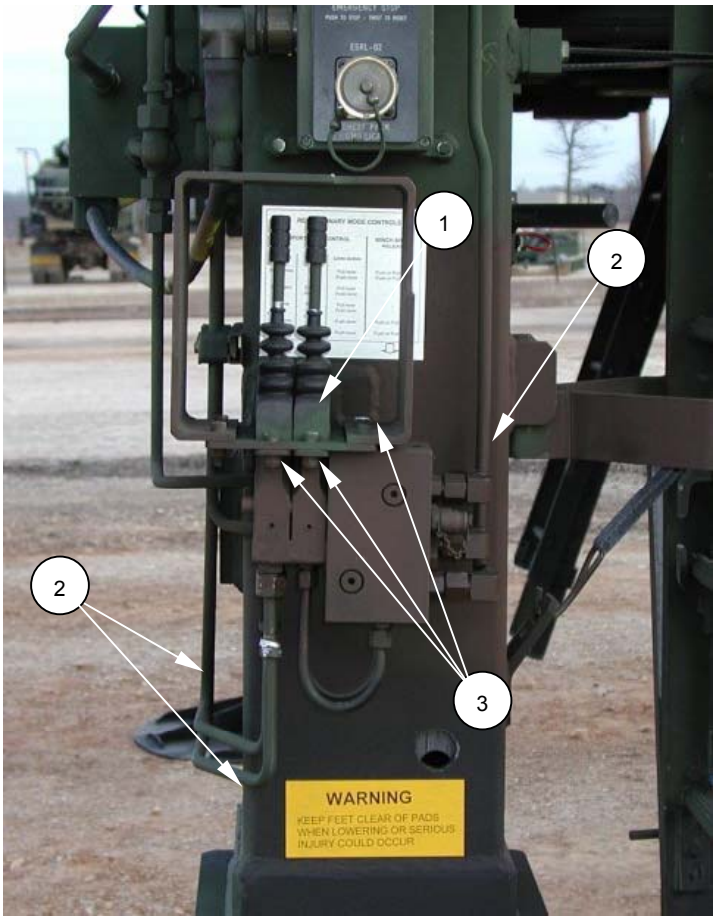
Equipment Conditions

A-Frame deployed

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE BACK-UP MODE OPERATION CONTROLS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Disconnect the hydraulic pipes (2) connected to the back-up mode operation controls (1).

(3) Remove the four nyloc nuts, six bolts and six washers (3) mounting the back-up mode operation controls to the A-Frame. Discard the nyloc nuts.

(4) Remove the back-up mode operation controls (1).

(5) Examine all threaded components for wear and damage.

(6) Change components as required.

b. Install

(1) Apply thread-locking compound to the six mounting bolts.

(2) Fit the back-up mode operation controls (1) to the mounting bracket on the A-Frame with the four nyloc nuts, six bolts and six washers (3).

(3) Fit the hydraulic pipes (2) to the back-up mode operation controls (1).

c. Follow on task

(1) Operate the system and check for correct operation and hydraulic fluid leaks.

5 - 025 A-FRAME - FOLDING WALKWAY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

A-Frame deployed

WARNING

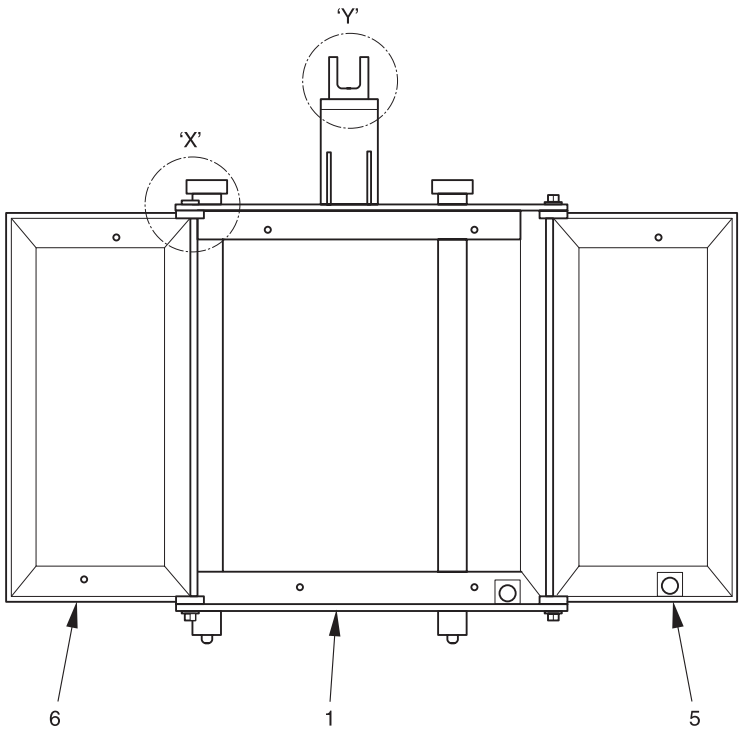
CRUSH INJURY. THE A-FRAME FOLDING WALKWAY ASSEMBLY IS HEAVY.

NOTE

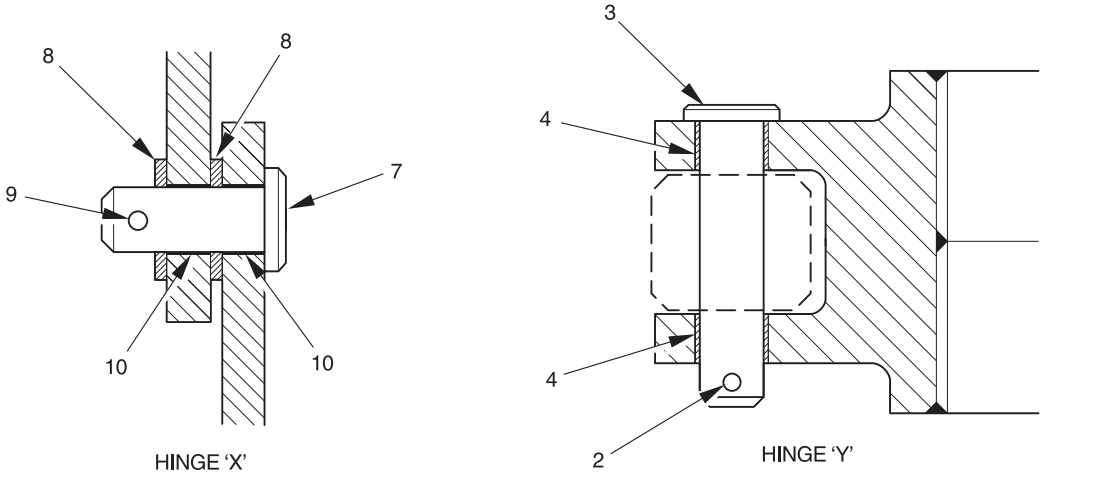
There are two folding walkways one on each side of the A-Frame.

The A-Frame Folding walkway is attached to the A-Frame by Hinge Type 'Y'.

The inner and outer folding walkways are attached to the A-Frame Folding Walkway by two Hinges each, Hinge Type 'X'.



Left Hand A-Frame Folding Walkway



a. Remove

(1) Remove outer guide roller hydraulic motor to gain access to the pin (3). See maintenance procedure 5-017.

(2) Support the weight of the A-Frame folding walkway (1).

(3) Remove the spring pin (2) from hinge 'y'.

(4) Remove the pin (3).

(5) Remove the A-Frame folding walkway from the A-Frame.

(6) Unfold the outer (5) and inner (6) walkways.

(7) Remove the spring pin (9) from hinge 'x'.

(8) Remove the pin (7) and retain the washers (8) if required.

(9) Remove the bushing (10).

(10) Remove the outer (5) and inner (6) walkways.

(11) Check the bushing (4) in hinge 'y' for wear and damage.

(12) Check the washers from hinge 'x' for wear damage.

(13) Check the bushing (10) in hinge 'x' for wear and damage.

(14) Check the pins from both hinges for wear and damage.

(15) Replace components as necessary.

b. Install

(1) Apply grease to the bushing (4) and (10)

(2) Fit the bushing (4) and (10) to their respective hinges if removed earlier.

(3) Fit the outer (5) and inner (6) walkways to the A-Frame walkway (1).

(4) Insert the pin (3) through hinge 'y'.

(5) Insert the spring pin (2) through pin (3).

(6) Insert pin (7) through hinge 'x', ensure that the washers (8) are in position.

(7) Fit the spring pin (9) through the pin (7).

(8) Fit the outer guide roller hydraulic motor. See maintenance procedure 5-017.

5 - 026 A-FRAME - SHOOT BOLT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

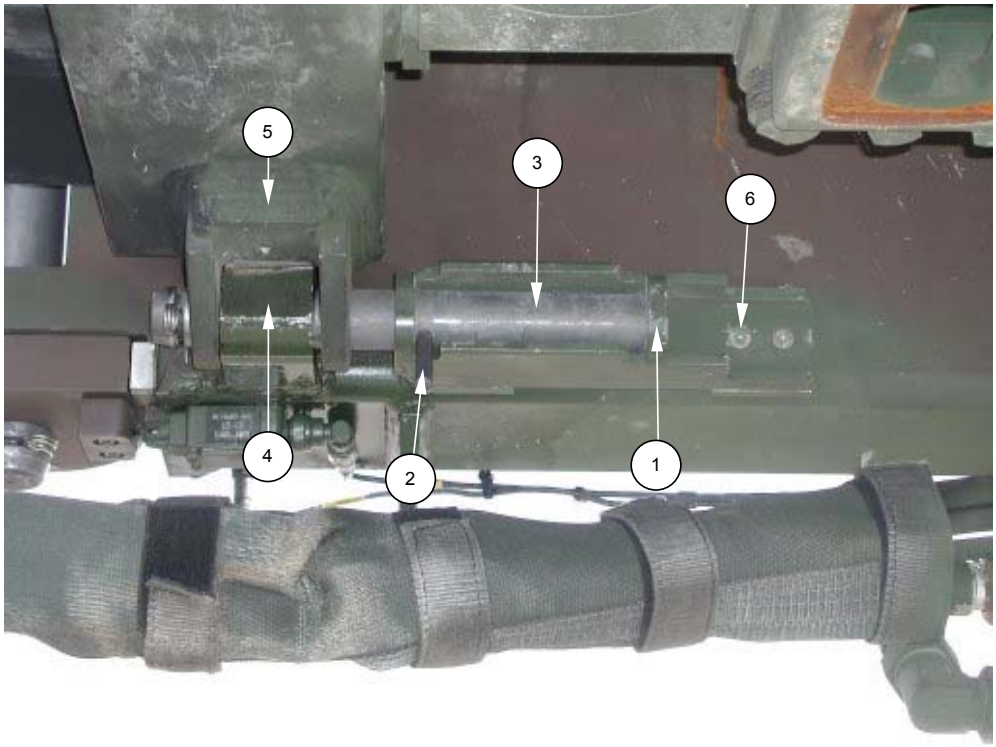
Thread locking compound, loctite 242

Equipment Conditions

None

NOTE

The procedure for replacing the left and right hand shoot bolt is identical.



a. Remove

NOTE

With the A-Frame deployed and leveled the shoot bolt (3) should slide easily through the slide frame web (5) and the A-Frame boss (4).

(1) With the shoot bolt (3) fully retracted, unscrew the shoot bolt handle (2).

(2) Slide the shoot bolt (3) out of the shoot bolt housing (1).

(3) Remove the four screws (6) holding the shoot bolt housing (1) to the A-Frame (4).

(4) Lift the shoot bolt housing (1) clear of the slide frame.

(5) Examine all components for damage and corrosion.

(6) Examine bolt heads and threads for damage.

(7) Replace components as required.

b. Install

(1) Apply thread locking compound to the four screws (6).

(2) Fit the shoot bolt housing (1) to the A-Frame and secure with the four screws (6).

(3) Replace the shoot bolt (3) into the shoot bolt housing (1).

(4) Use thread-locking compound on the screw threads, refit and tighten the shoot bolt handle (2).

(5) Engage the shoot bolt (3) with the slide frame web (5) and the A-Frame boss (4).

c. Follow on tasks

(1) Check operation of shoot bolt (3).

5 - 027 A-FRAME - SUPPORT STRUT ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

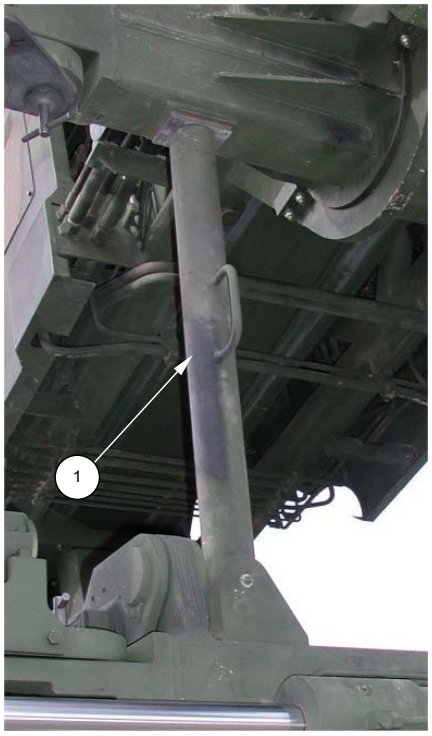
Tool Kit, General Mechanic's, Automotive (GMTK)

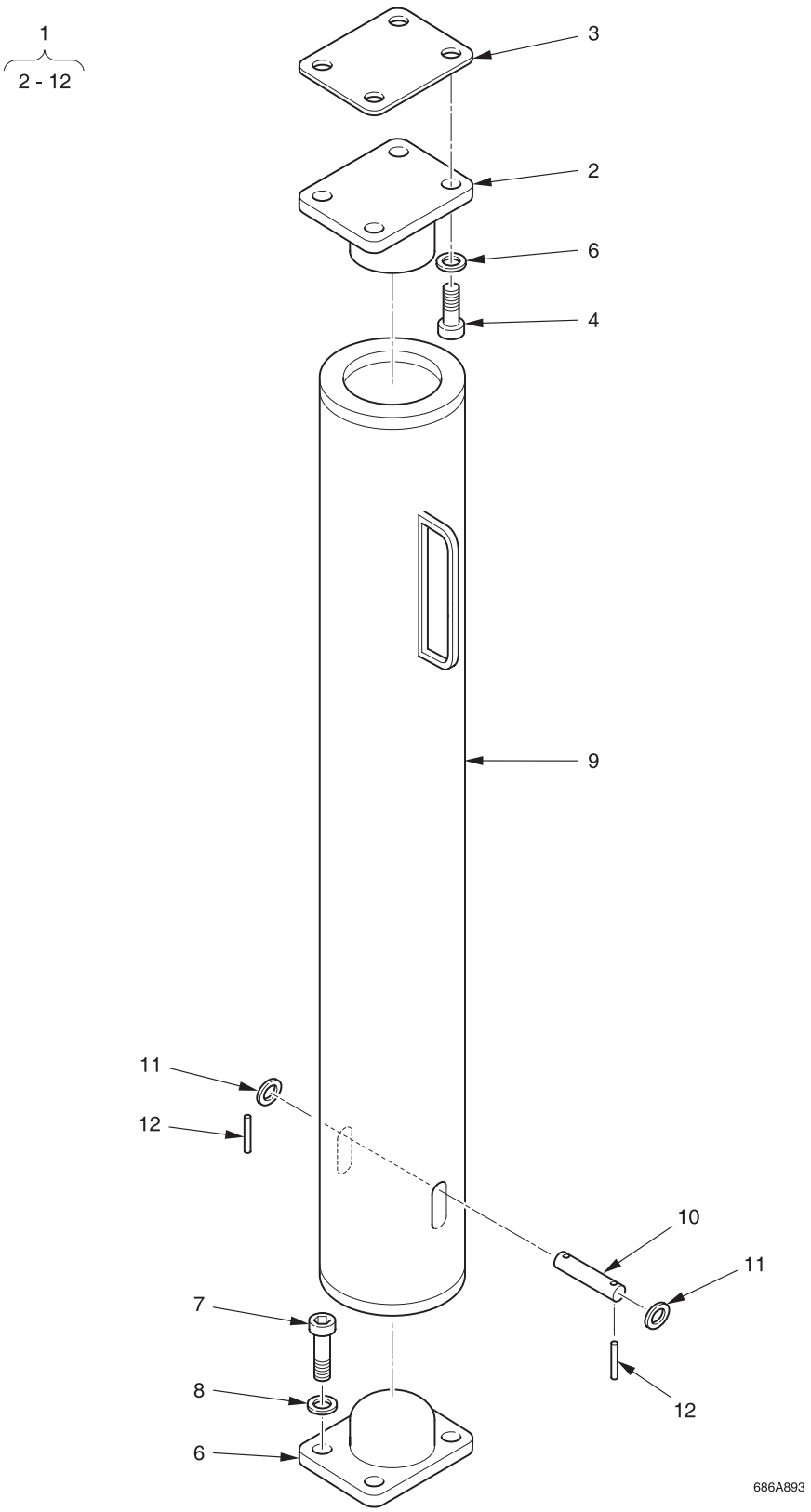
Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 8)

Equipment Conditions

A-Frame deployed and raise upper A-Frame center section. Support struts (1) lowered.




1
2 - 12
3
2
6
4
9
11
12
10
11
7
8
6
12
686A893

a. Remove

(1) Remove spring pin (12) and washer (11) from guide pin (10).

(2) Remove guide pin (10) and lift out support strut (9).

(3) Remove four screws (7), lock washers (8) and remove bottom location bracket (6). Discard the lock washers (8).

(4) Remove the four screws (4) and the lock washers (5). Remove top location bracket (2) and shim plate (3). Discard the lock washers (5).

(5) Inspect all components for damage and corrosion.

(6) Examine bolt heads and threads on screws for damage.

(7) Replace components as required.

b. Install

(1) Apply thread locking compound to the four screws (7).

(2) Locate bottom location bracket (6) and secure with four screws (7) and lock washers (8).

(3) Locate support strut (9) and insert guide pin (10). Secure using washer (11) and spring pin (12).

(4) With the support strut in the vertical position, lower the upper A-Frame center section to its lowest position.

(5) Apply thread locking compound to the four screws (4).

(6) Fit shim plate (3) and top location bracket (2) to the upper A-frame center section and secure with four screws (4) and lock washers (5).

5 - 028 A-FRAME - LOWER EMERGENCY STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

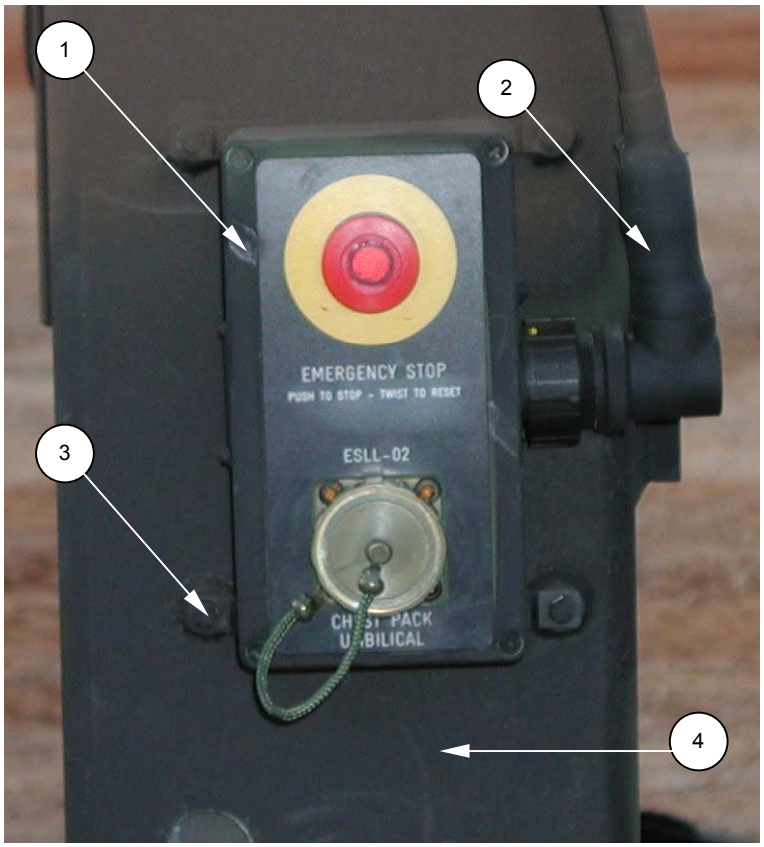
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 4)
Nyloc nuts (Qty 8)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position



NOTE

A Lower Emergency Stop is fitted to each A-Frame Stabilizer Leg.

a. Remove

(1) Remove the electrical cable (2) fitted to the A-Frame lower emergency stop (1).

(2) Remove the four screws and washers (3) securing the A-Frame lower emergency stop (1) to the A-Frame stabilizer leg (4).

(3) Remove the A-Frame lower emergency stop (1).

(4) Examine all threaded components for wear and damage.

(5) Check the electrical cable for damage.

(6) If required remove the four screws (5) securing the cover (6) to the emergency stop body (14).

(7) Remove the cover (6) and seal (7).

(8) Note the positions of the ground cables (11) and remove the screws (8).

(9) Remove the screws (12 and 23) and nyloc nuts (13 and 10).

(10) Note the position of and remove the cables (15) from the contactors (16).

(11) Remove the internal harness complete with the military connectors and seals (9).

(12) Remove the contactors (16) from the carrier (18) by pressing down on the catch (17).

(13) Remove the carrier (18).

(14) Remove the locking plate (20) from the emergency stop switch (22) by turning the locking screw (19) counter-clockwise.

(15) Remove the emergency stop switch (22) complete with seal (21) from the cover (6).

b. Install

(1) Fit the emergency stop switch (22) complete with seal (21) to the cover (6).

(2) Fit the locking plate (20) to the emergency stop switch (22), turn the locking screw (19) clockwise and tighten.

(3) Fit the carrier (18) to the emergency stop switch (22).

(4) Fit the contactors (16) to the carrier (18).

(5) Fit the seal (7) to the cover (6).

(6) Fit the internal harness complete with the military connectors and seals (9) to the cover (6) and emergency stop body (14) and secure in place with the screws (23 and 12) and new nyloc nuts (10 and 13).

(7) Fit the cables (15) to the contactors (16) in the positions noted during removal.

(8) Fit the ground cables (11) to the positions noted during removal and secure in place with the screws (8).

(9) Fit the cover (6) to the emergency stop body (14) with the screws (5).

(10) Apply thread-locking compound to the screws (3).

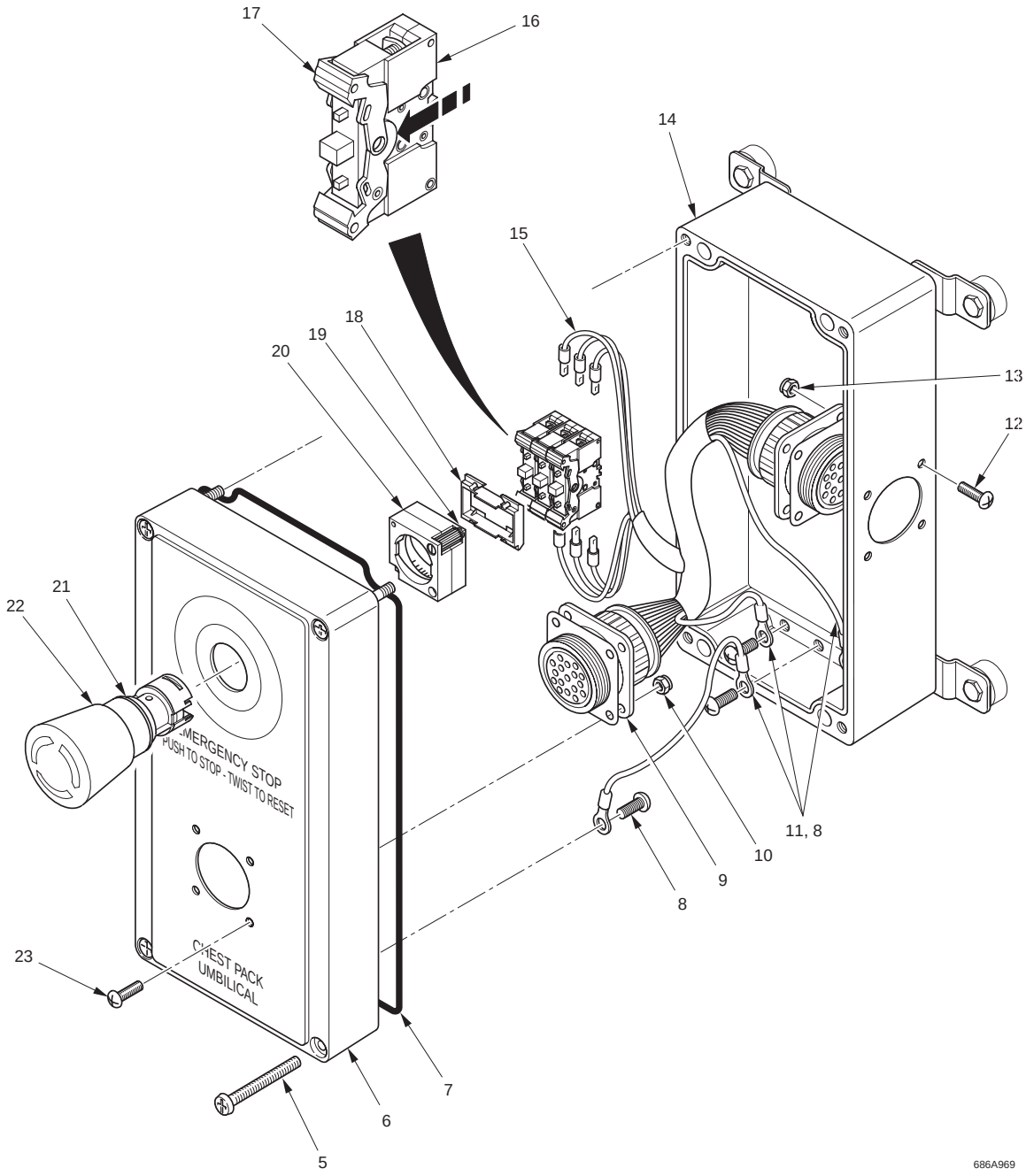
(11) Secure the A-Frame lower emergency stop (1) with the four washers and screws (3).

(12) Connect the electrical cable (2) to the A-Frame lower emergency stop (1).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the A-Frame lower emergency stop (1).



5 - 029 LAUNCH FRAME - REAR PINCH ROLLER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 4)

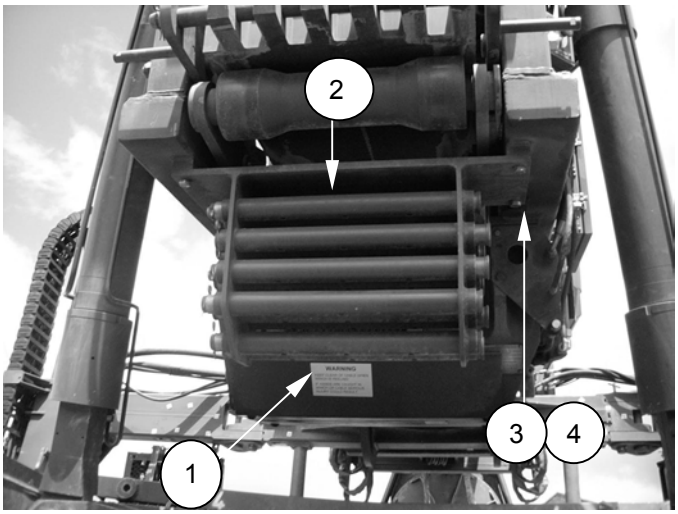
Equipment Conditions

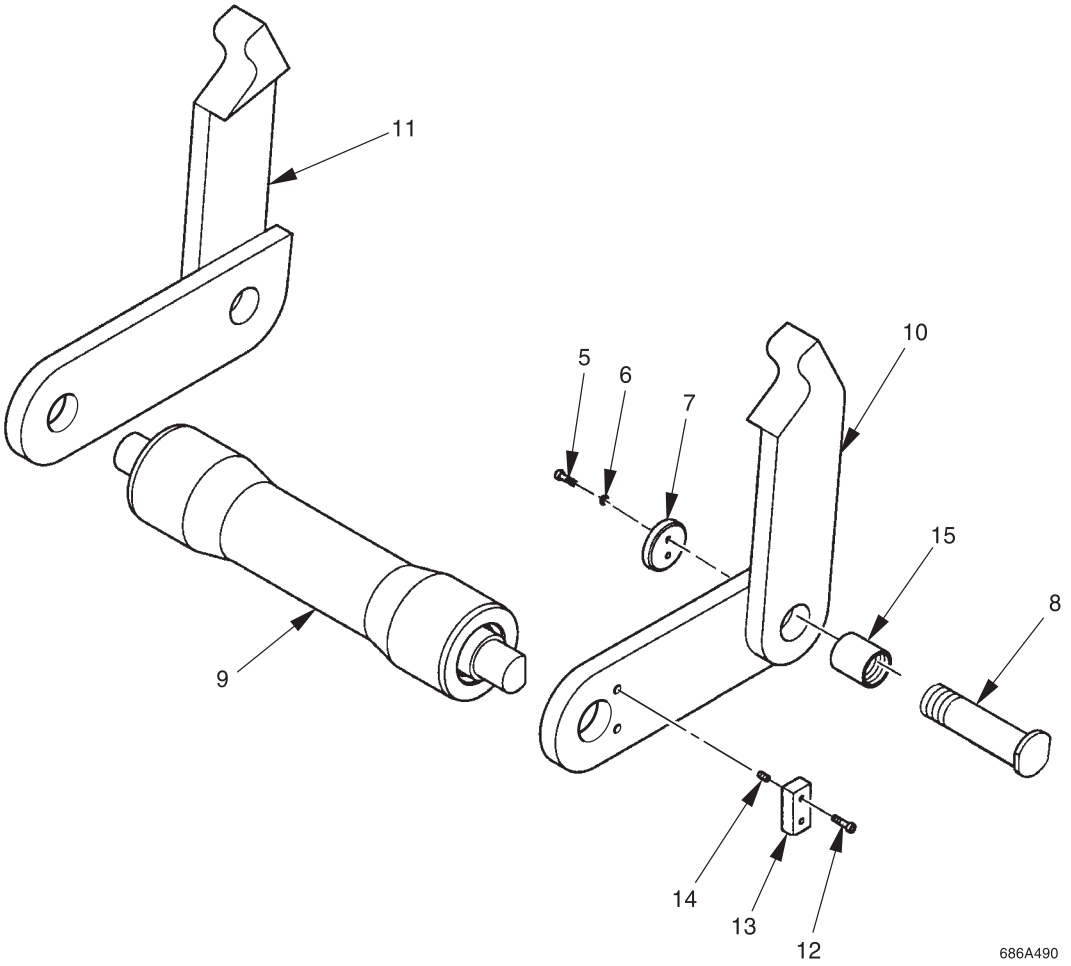
A-Frame deployed

WARNING

CRUSH INJURY. THE PINCH ROLLER ASSEMBLY WEIGHS APPROXIMATELY 80LB (36KG).

CRUSH INJURY. THE FORWARD LAUNCH BEAM WILL MOVE WHEN RESIDUAL HYDRAULIC PRESSURE IS RELEASED FROM THE REAR PINCH ROLLER. ENSURE THAT THE FORWARD LAUNCH BEAM TRANSPORTATION PIN IS FITTED BEFORE CARRYING OUT THIS PROCEDURE.





a. Remove

(1) Remove the left hand launch frame guard access cover, to gain access to the pinch roll/stowing manifold.

NOTE

The pinch roller ball valve must be operated to release residual hydraulic pressure acting on the rear pinch roller.

(2) Turn the rear pinch roller ball valve lever through 90 degrees. See Appendix F page 19 figure 9.

(3) Remove the launch beam pins (1) from the launch beam pin storage rack (2).

(4) Remove the four bolts (3) and lock washers (4) securing the launch beam pin storage rack (2) to the launch frame, then remove the launch beam pin storage rack (2).

NOTE

An empty launch beam pin storage rack (2) can be lifted by one person.

(5) Remove the screws (5) and washers (6) securing the pivot pin end caps (7) and remove the pivot pin end caps (7).

(6) Support the weight of the pinch roller assembly.

(7) Remove the pivot pins (8).

(8) Remove the pinch roller assembly.

(9) Remove the screws (12) securing the pinch roller locking plates (13).

(10) Remove the locking plates (13).

(11) Remove the pinch roller (9), left hand lever arm (11) and right hand lever arm (10).

(12) Inspect all components for damage and wear.

(13) Examine bolt heads and threads on screws (5 and 12) and heli-coil inserts (14) for damage.

(14) Examine threads on pivot pins (8) for damage.

(15) Check the lever arm bearing (15) for wear or damage.

(16) Replace components as required.

b. Install

(1) Locate the left and right hand lever arms (10 and 11) on the pinch roller (9).

(2) Position and secure the pinch roller locking plates (13) with the screws (12). Use thread-locking compound on the screw threads.

(3) Place pinch roller assembly in the launch frame.

(4) Align the pivot points with the launch frame and insert the pivot pins (8) from the outside of the launch frame.

(5) Place the pivot pin end cap (7) on the pivot pin (8) and secure with washers (6) and screws (5). Use thread-locking compound on the screw threads.

(6) Re-fit the launch beam pin storage rack (2) and secure with four bolts (3) and lock washers (4).

(7) Fit the launch beam pins (1) to the launch beam pin storage rack (2).

5 - 030 LAUNCH FRAME - REAR PINCH ROLLER BEARINGS

This task covers:

a. Remove b. Install c. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Hook Wrench HN15

Materials Required

Thread locking compound, loctite 243
Grease (As required)
Seal (Qty 2)

Equipment Conditions

Rear pinch roller assembly removed from launch frame, see maintenance procedure 5-029, and placed on a suitable working surface

---

a. Remove

(1) Remove the bolts (18) and keep plates (17) from the lever remote controls (13 and 14).

(2) Remove the lever remote controls (13 and 14) from the roller assembly.

(3) Remove the plain nuts (2).

(4) Remove the spacers (15) and seals (8). Discard the seals.

(5) Remove the retaining rings (11) and flat washers (5).

(6) Remove the roller bearings (6).

(7) Remove the spacer sleeve (12) and shaft (16) from the roller (10).

(8) Check all threaded components, bolts (18 and 21) and inserts (3), for wear and damage.

(9) Check the condition of the lever remote controls (13 and 14).

(10) Check the bearings (1) for wear and damage.

(11) Check the pins (19) keep plate (20), bolts (21) and washers (22).

(12) Replace the seals (8).

(13) Check the roller bearings (6), washers (5), retaining rings (11) and spacers (15) for wear and damage.

(14) Check the grease fittings (9) for damage.

(15) Check the spacer sleeve (12), shaft (16) and roller (10) for wear and damage.

b. Install

(1) Refer to general unit maintenance procedure 5-158 before assembling the rear pinch roller.

(2) Fit the spacer sleeve (12) to the shaft (16).

(3) Fit the shaft to the roller (10).

(4) Fit the roller bearing (6) and washer (5) to the shaft (16).

(5) Fit the retaining ring (11) to the shaft (16).

(6) Fit a new seal (8) to the shaft (16).

(7) Fit the spacer (15) and plain round nut (2) to the shaft (16).

(8) Fit the grease fitting (9) to the Roller (10).

(9) Apply thread locking compound to bolts (18).

(10) Fit the lever remote controls (13 and 14) to the roller assembly and secure in place with keep plates (17) and bolts (18).

c. Service

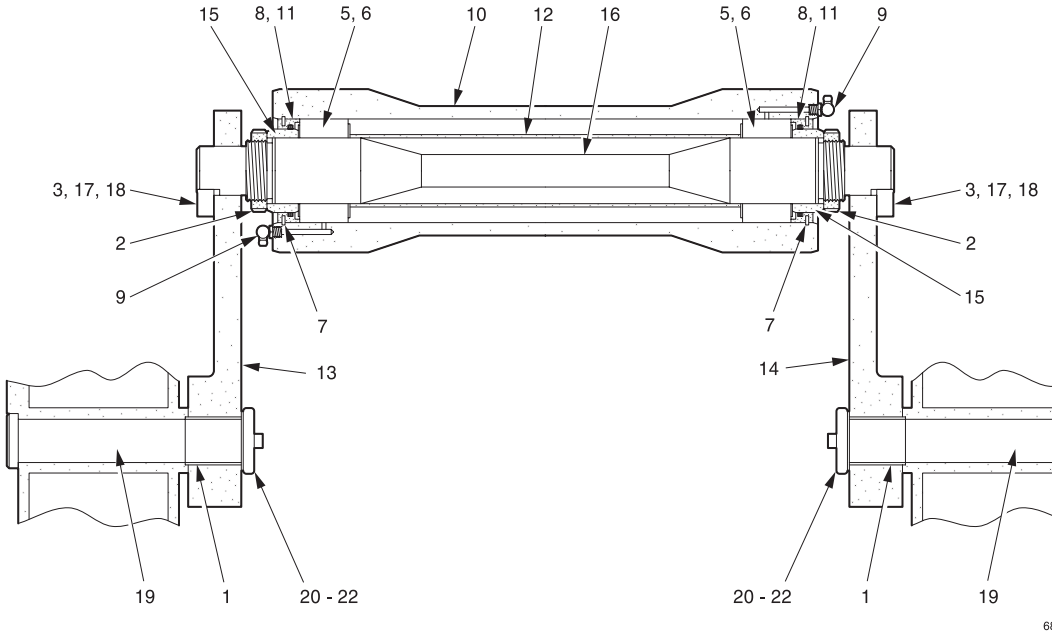
(1) Grease the bearings through the grease fitting (9).

d. Follow on tasks

(1) Ensure that the roller rotates freely on the bearings.

(2) Fit the Rear pinch roller assembly to the launch frame. See unit maintenance procedure 5-029.

(3) Check the operation of the rear pinch roller.



5 - 031 LAUNCH FRAME - ROPE ROLLER UPPER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

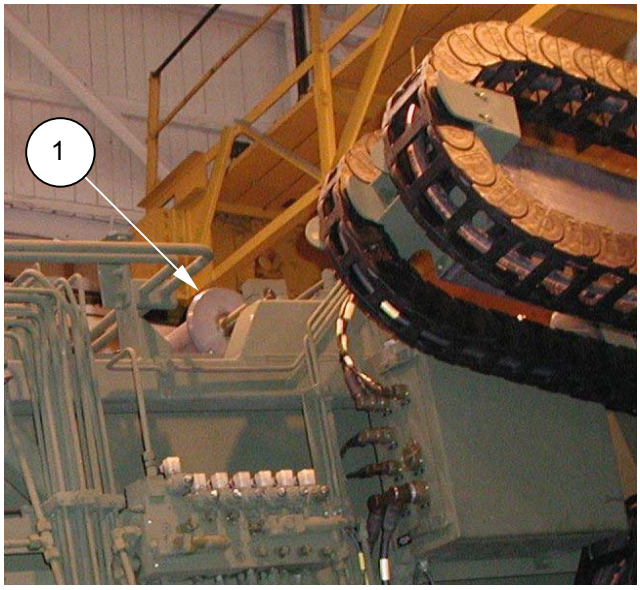
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

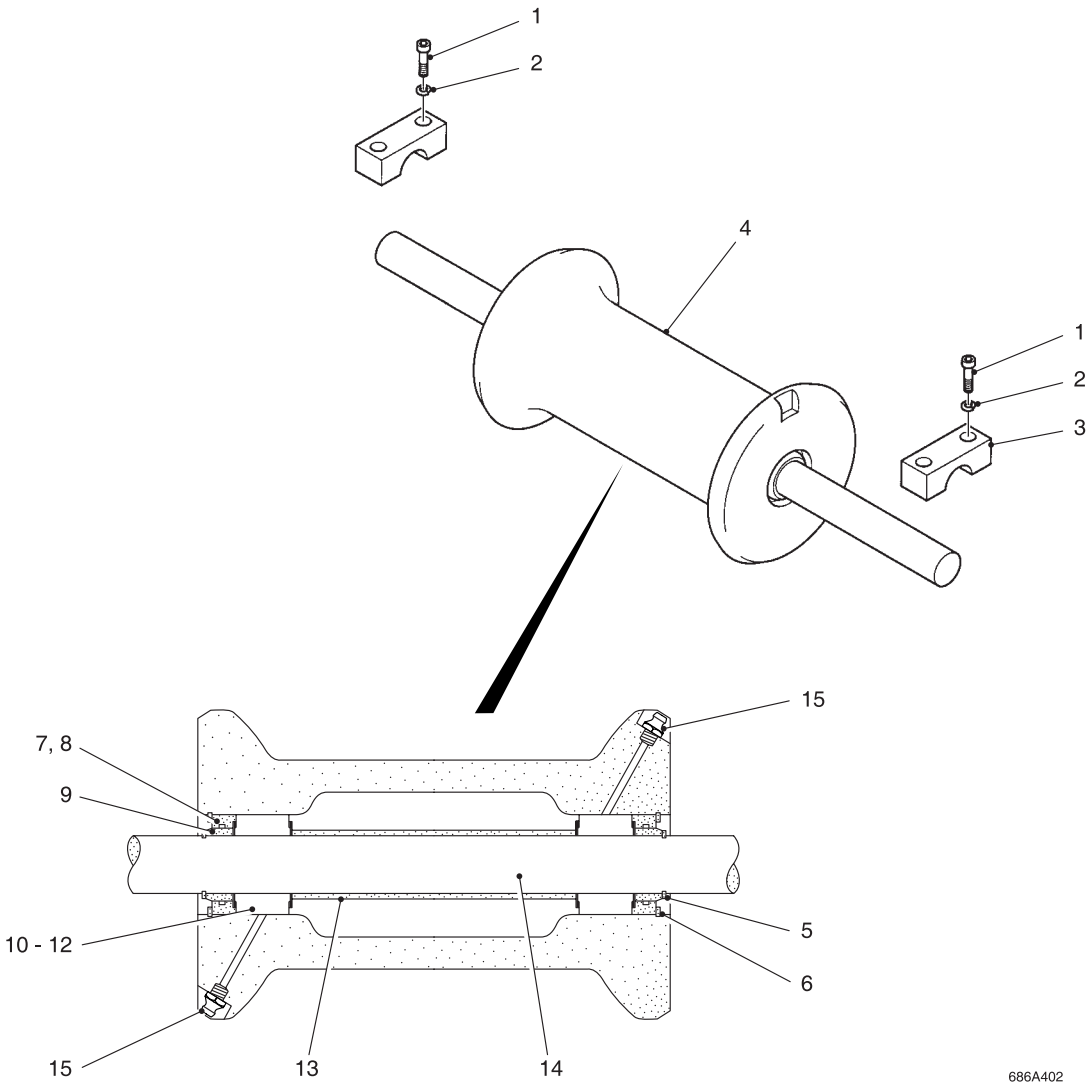
Thread Locking Compound, loctite 242
Grease (As required)
Lock washer (Qty 4)

Equipment Conditions

Top launch frame guard removed. See Chapter 10 paragraph 10.8 of operator's manual TM 5-5420-279-10.






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a. Remove

(1) Remove the four screws (1) and lock washers (2) securing the clamp blocks (3). Discard the lock washers (2).

(2) Remove the clamp blocks (3).

(3) Lift the roller (4) clear of the launch frame.

(4) Remove the retaining rings (5 and 6) from both ends of the shaft (14).

(5) Remove the seal retainer (7), seal (8), spacer (9) from both ends of the shaft (14).

(6) Remove the bearing, washer and seal (10 through 12) from both ends of the shaft (14).

(7) Remove the spacer sleeve (13) and shaft (14) from the roller (3).

(8) Examine all components for damage and corrosion.

(9) Check the roller for wear and damage.

(10) Check the bearings for wear, damage and corrosion.

(11) Examine bolts (1) for damage to heads and threads.

(12) Replace components as required.

b. Install

(1) Fit the spacer sleeve (13) to the shaft (14).

(2) Fit the spacer sleeve (13) and shaft (14) to the roller (3).

NOTE

Install one bearing at a time. Ensure that the bearing, washer and seal (10 through 12) are fitted against the sleeve (13).

(3) Fit the bearing, washer and seal (10 through 12) to the shaft (14).

(4) Fit the spacer (9) seal retainer (7) seal (8) to the shaft (14).

(5) Fit the retaining rings (5 and 6) to the shaft (14).

(6) Locate the roller assembly (4) on its mounting blocks and place the clamp blocks (3) in position.

(7) Apply thread locking compound to the four screws (1).

(8) Secure the clamp blocks (4) with lock washers (2) and four screws (1).

c. Follow on tasks

(1) Lubricate bearings through grease fittings (15). Remove any excess grease.

5 - 032 LAUNCH FRAME - CENTER PIVOT BUSHINGS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Tool Kit, Common No 1

Materials Required

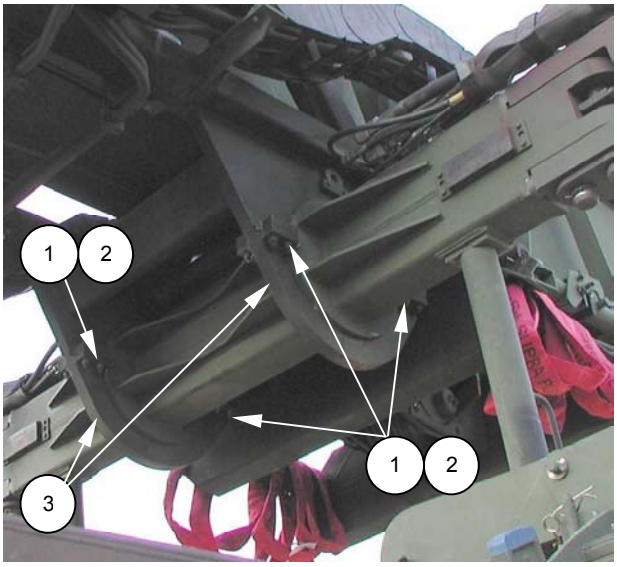
Thread locking compound, loctite 243
Grease (As required)
Nyloc nuts (Qty 16)
Bearing strip (Qty 4)

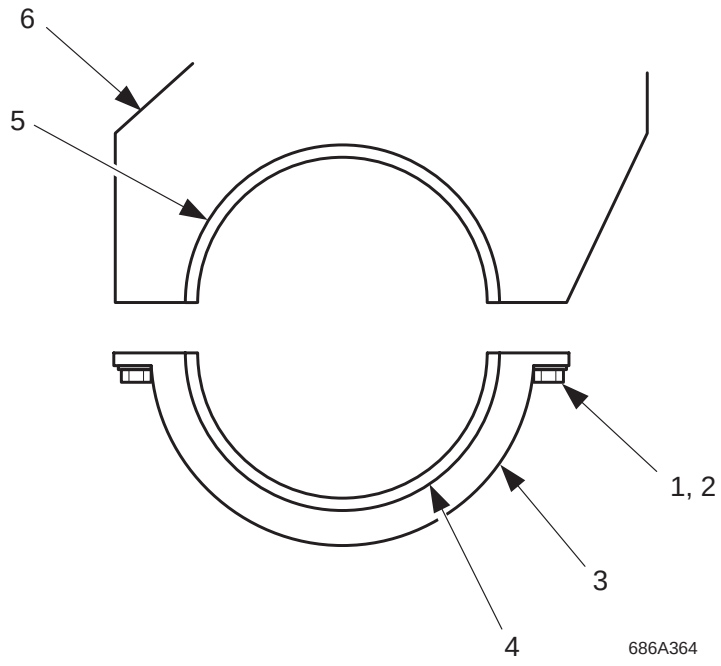
Equipment Conditions

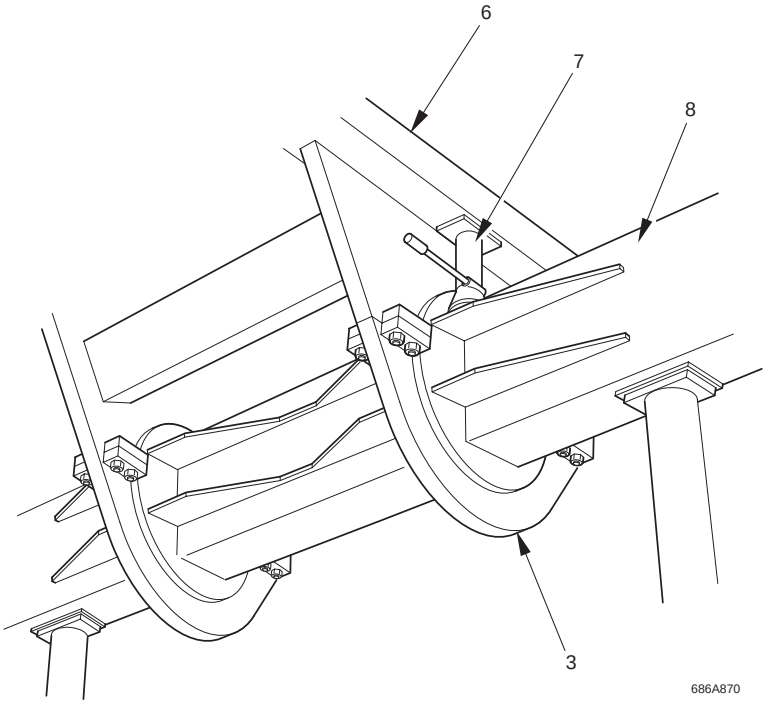
A-Frame deployed

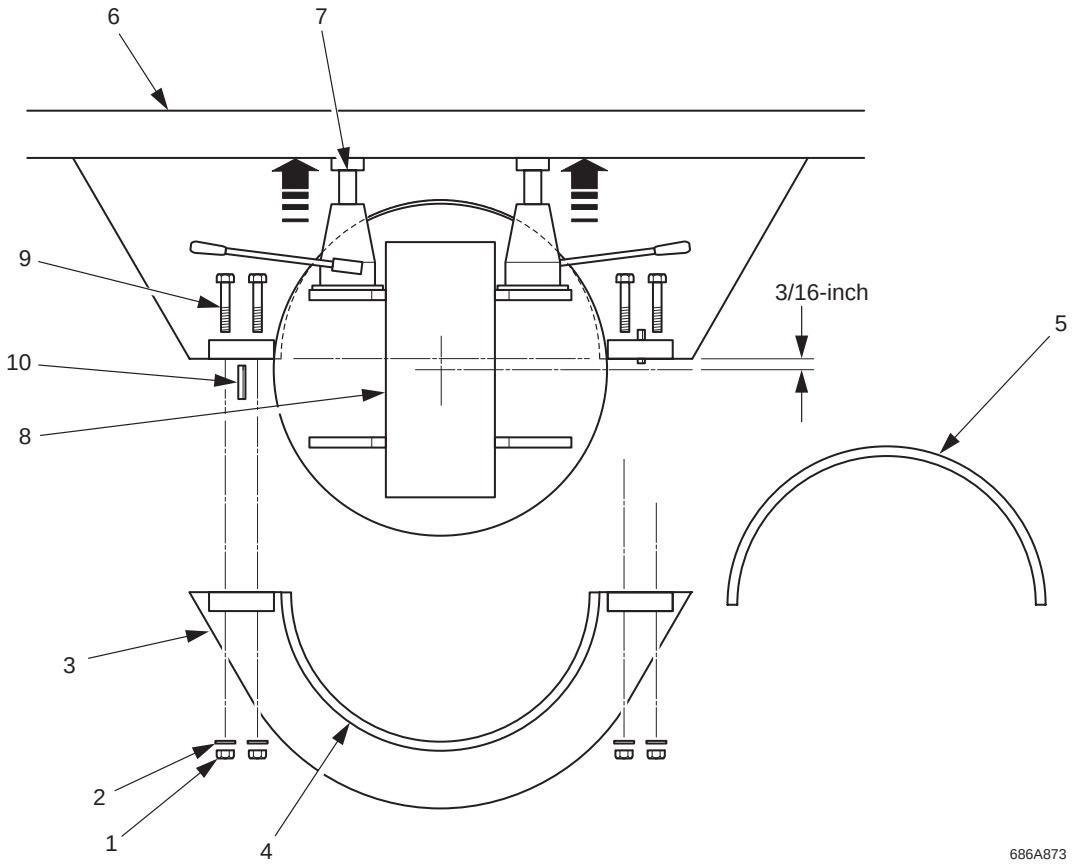
NOTE

The A-Frame Center Pivot has a split bushing arrangement. The bushings are not bonded to the A-Frame assembly or the lower clamp.




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a. Remove

(1) Remove the eight roll pins (10).

(2) Remove the nyloc nuts (1), and washers (2), withdraw the bolt (9) securing the center pivot clamps (3). Leave one nut and bolt in opposite corners front and back. Discard the nyloc nuts (1).

(3) Using a second person to support the lower clamp, remove the two remaining nuts and bolts and lower the pivot clamp (3). Discard the nyloc nuts (1).

(4) Remove the bearing strips (4) on the lower center pivot clamp (3).

(5) To remove the upper bearing strips (5) on the launch frame (6), ensure that the launch frame is level horizontally.

WARNING

DEATH OR SERIOUS INJURY MAY OCCUR IF HEIGHT OF 3/16 INCH IS EXCEEDED.

(6) Using two bottle jacks (7) front and back with both lower pivot clamps (3) removed. Operate both jacks (7) at the same time, keeping the launch frame (6) level, to give a clearance of approximately 3/16 inch.

(7) The old bearing strip (5) is removed by using the new bearing strip, see installation step 1.

(8) Examine all threaded components for wear and damage.

(9) Check that the upper and lower bush seats are clean.

(10) Change components as required.

b. Install

NOTE

There is to be a 1/8-inch gap between the machined faces of the bush housing and the edge of the Bush.

(1) Apply grease to the outside of the new upper bearing strip and push out the old bearing strip (5) with the new bearing strip by feeding the new bearing strip over the seat on the A-Frame center beam (8).

(2) Lower the launch frame (6) onto the A-Frame center beam (8) and check that the bearing strip (5) engages with the A-Frame center beam (8).

(3) Apply grease to and fit the lower bearing strips (4) to the lower center pivot clamps (3).

(4) Fit the lower center pivot clamps (3) to the launch frame (6) with new nyloc nuts (1), bolts (9) and washers (2). Torque each bolt to 128 lb/ft.

(5) Insert eight new roll pins (10).

c. Follow on tasks

(1) Grease the launch frame center pivots through the lubrication points provided.

5 - 033 LAUNCH FRAME - UPPER AND LOWER WINCH ROPES

This task covers:

a. Inspect b. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Fall arrest (safety) harness

Materials Required

Cleaning pads/cloths
Cleaning fluid
Leather gloves/gauntlets
Ladder/access platform

Equipment Conditions

Launcher prepared for bridge deployment

WARNING

FALL INJURY WHEN WORKING AT HEIGHT. THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 6M (20FT) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT THIS TASK.

NOTE

This procedure should be carried out in conjunction with a 40m bridge deployment.

a. Inspect

(1) Using a suitable and safe means of access and observing all relevant safety precautions check the upper winch rope from the winch to the anchor point on the far bank carriage for the following :

a. Flattening of the strands.

b. Broken strands.

c. Corrosion.

d. Distortion of eyes and thimbles.

e. Rope pulling out of termination crimp. (talurite crimp).

f. Kinking.

g. Correct reeving.

(2) Check that no foreign objects have lodged under the carriage rope guides or the forward beam pulleys and rope guides during transit.

b. Service

(1) Using cleaning fluid and a cleaning pad/cloth clean the rope as necessary. A wire brush can be used to remove heavy soiling or accumulation of dirt.

(2) Use a wire brush to remove any surface corrosion, check that the corrosion is not internal. Report all corrosion to the supervisor.

(3) Using a safe means of access and observing all the relevant safety precautions and repeat step 1 of inspect and steps 1, and 2 of service on the lower winch rope. Part of this operation can be carried out while working from the gantry.

(4) Using a safe means of access and observing all the relevant safety precautions check that the rope is reeved correctly around the pulley blocks on the far and home bank carriages and that the pulleys are free to rotate.

(5) As the second section of the launch beam is deployed carry out step 1 of inspect on the top rope.

(6) Repeat step 1 of inspect as the remaining six sections of beam are deployed.

(7) Carry out step 1 of inspect on the upper winch rope remaining on the upper winch drum.

(8) Check that there are at least 5 Wraps of rope on the upper winch drum.

(9) Release the rear carriage restraint.

(10) Working from the folding gantry; carry out step 1 of inspect on the lower winch rope as the rear carriage is deployed until the rear carriage restraint is fully extended.

(11) Release the rear carriage locking arms to release the far bank carriage.

(12) Using a safe means of access or working from the folding gantry repeat step 1 of inspect on the lower winch rope, as the far bank carriage is slowly fully deployed to the far bank position.

(13) When the far bank carriage is fully deployed; carry out step 1 of inspect on the lower winch rope remaining on the lower winch drum.

(14) Check that there are at least 5 Wraps of cable on the lower winch drum.

(15) Examine all components for damage and corrosion.

(16) Report all signs of damage, broken strands or corrosion to the supervisor.

5 - 034 LAUNCH FRAME - DRIVE MOTOR AND GEARBOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Gasket Sealing Compound
Lock washers (Qty 4)

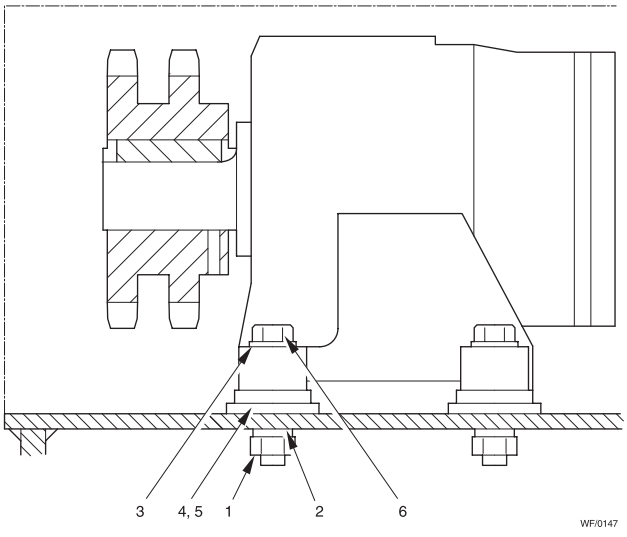
Equipment Conditions

None

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE MOTOR.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Remove launch beam drive cover. See unit maintenance procedure 5-035.

(3) Remove launch beam drive rear guard see operator's maintenance TM 5-5420-279-10 chapter 10.

(4) Release rear pinch roller pressure.

(5) Remove the drive chain (9). See unit maintenance procedure 5-037.

(6) Note the position of and remove the hydraulic pipes connected to the motor (7).

(7) Note the position of and remove the pipe connected to the back of the brake unit (10).

(8) Remove the four nuts (1), bolts (6), flat washers (3), lock washers (2), shim pack (5) and packer (4), securing the motor and gearbox assembly to the launch beam drive. Discard the lock washers (2).

(9) Remove the motor and gearbox assembly to a suitable working surface.

(10) Drain the gearbox oil. See unit maintenance procedure 5-038.

(11) Remove and retain the ring of bolts (11) attaching the motor (7) to the gearbox (8).

(12) If the gearbox is being replaced it will be necessary to remove the drive sprocket. See unit maintenance procedure 5-040.

(13) Check the hydraulic pipes for damage.

(14) Check the drive sprocket for damage.

(15) Check the motor and gearbox body casing for damage.

(16) Check all threaded components for damage.

(17) Change components as required.

b. Install

(1) If the gearbox (8) is being replaced fit the drive sprocket. See unit maintenance procedure 5-040.

(2) Cover the mating face of the motor (7) with gasket sealing compound.

(3) Fit the gearbox (8) to the motor (7) and secure in place with the ring of bolts.

(4) Fit the motor and gearbox assembly to the launch beam drive with nuts (1), bolts (6), flat washers (3), lock washers (2), shim pack (5) and packer (4).

(5) Torque bolts (6) to 339 lb/ft (460Nm).

(6) Fit the drive chain (9). See unit maintenance procedure 5-037.

(7) Adjust the drive chain. See unit maintenance procedure 5-039.

(8) Fit the hydraulic pipes to the motor (7) at the positions noted during removal.

(9) Fit the pipe to the brake unit (10) at the position noted during removal.

(10) Fill the gearbox with oil. See unit maintenance procedure 5-038.

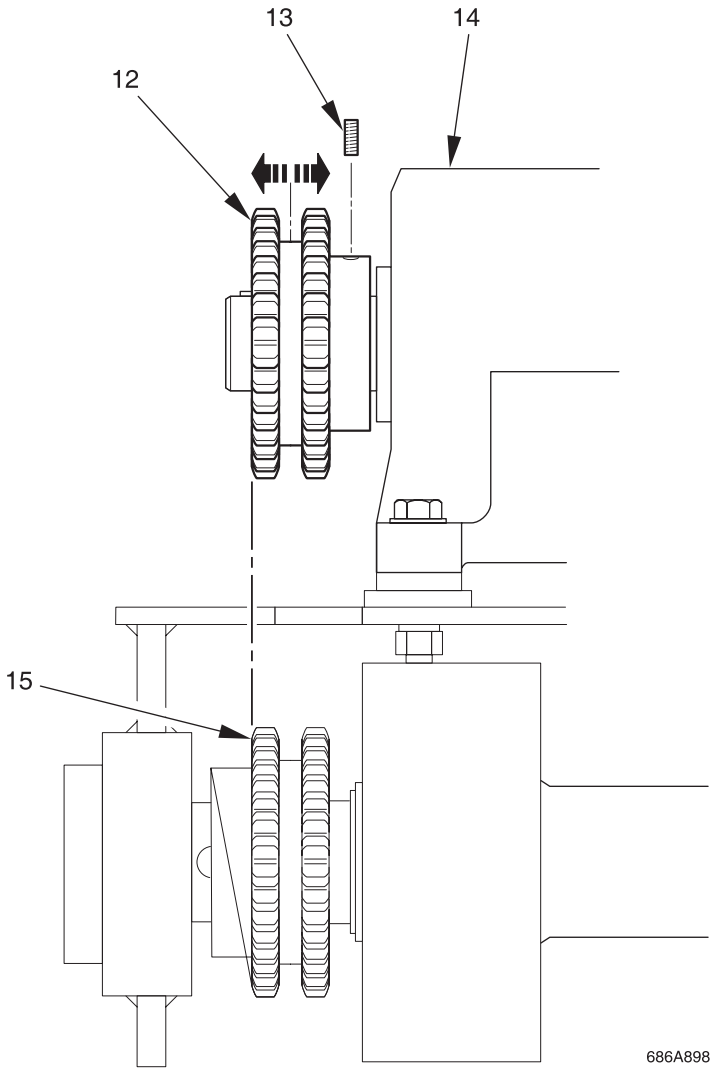
c. Follow on tasks

(1) Check that the drive sprocket (12) is in alignment with the sprocket (15) on the drive roller shaft.

(2) If required the drive sprocket can be aligned by undoing the socket head screws (13) and adjusting the position of the sprocket on the shaft (14).

(3) When the drive sprocket (12) is in the correct position, tighten the socket head screws (13).

(4) Carry out functional checks on the launch beam drive. Operate the launch beam drive in accordance with the operator's manual TM 5-5420-279-10.


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5 - 035 LAUNCH FRAME - LAUNCH BEAM DRIVE TOP COVER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread Locking Compound, loctite 243

Equipment Conditions

None

WARNING

FALL INJURY WHEN WORKING AT HEIGHT. THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 6M (20FT) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT THIS TASK.

a. Remove

(1) Remove the seven socket head screws, spacers and washers (2) securing the top cover (4) to the launch bean drive.

(2) Remove the remaining three socket head screws and washers (3) securing the front of the top cover (4) to the launch bean drive (1), note the position of and retain the spacers (5).

(3) Remove the remaining three socket head screws and washers (3) securing the rear panel of the top cover (4) and the rear guard (6) to the launch beam drive (1), retain the spacer (7). Spacer 8 is part of the rear guard (6).

(4) Examine all components for damage and wear.

(5) Replace damaged or worn components as required.

b. Install

(1) Apply thread-locking compound to the threads on all socket head screws.

(2) Position the top cover (4) on the launch beam drive.

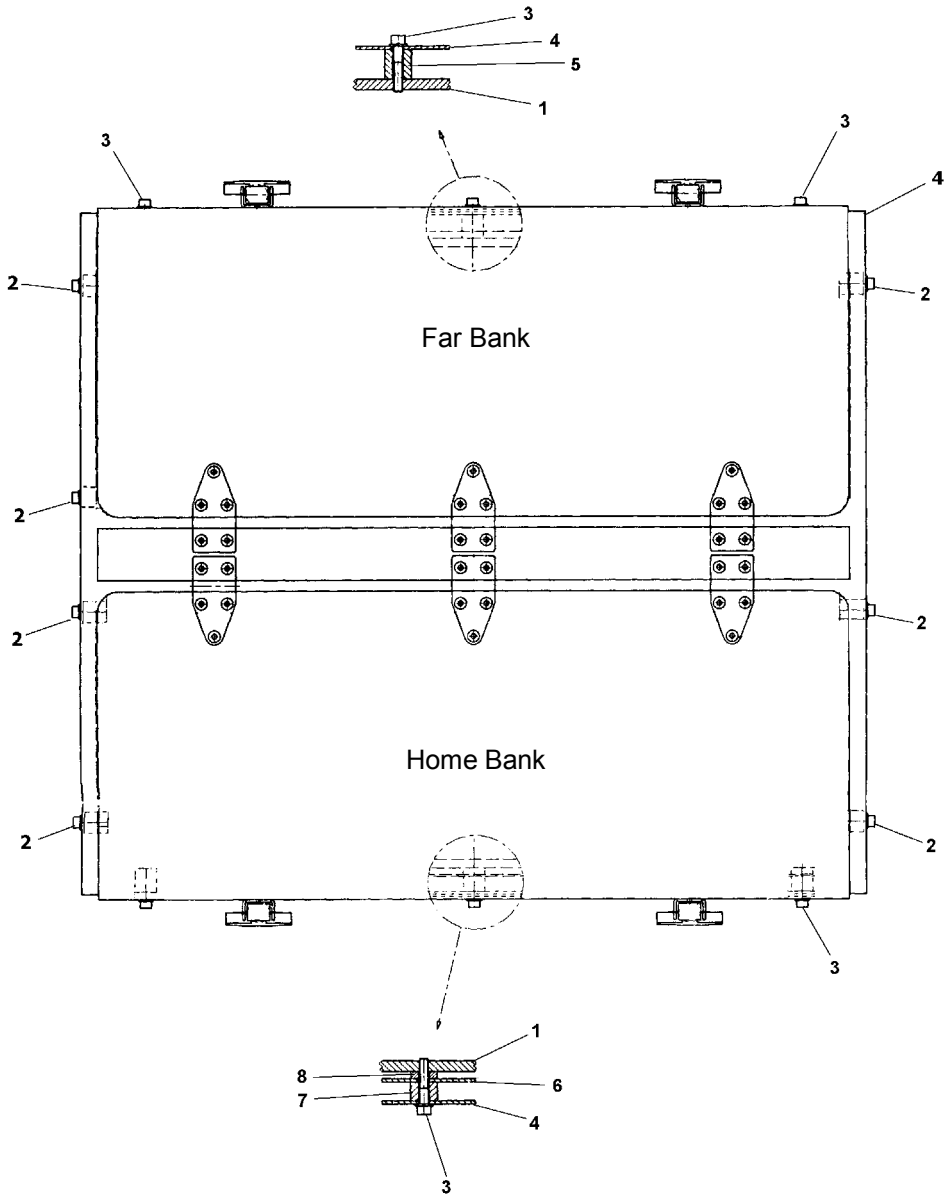
(3) Align all mounting holes and fit the seven socket head screws, spacers and washers (2). Do not tighten.

(4) Align the rear guard (6) with the top cover (4) and insert the spacers (7).

(5) Fit the socket head screws, spacers (5) and washers (3), do not tighten.

(6) Fit the remaining three socket head screws, spacers (5) and washers (3) to secure the front of the top cover (4) to the launch bean drive (1).

(7) Tighten all the socket head screws (2 and 3).



5 - 036 LAUNCH FRAME - SWIVEL LOAD RING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set Contact Maintenance Truck HMMWV

Materials Required

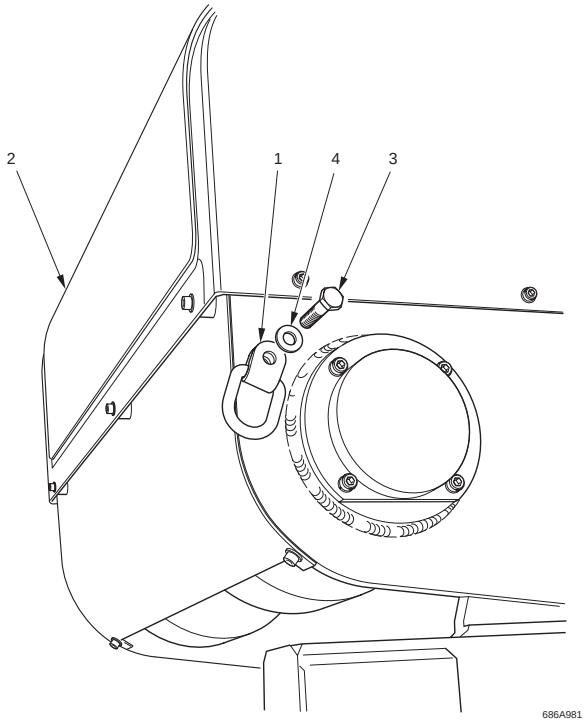
Thread Locking Compound, loctite 243

Equipment Conditions

None

WARNING

FALL INJURY WHEN WORKING AT HEIGHT. THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 6M (20FT) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT THIS TASK.



NOTE

Four threaded holes, two on either side on the launch beam drive, allow for the swivel load ring (1) to be fitted in the best position for attaching a fall arrest harness when carrying out maintenance on the DSB.

a. Remove

(1) Remove the bolt (3) and washer (4) securing the swivel load ring (1) to the launch beam drive (2).

(2) Remove the swivel load ring (1).

b. Install

(1) Ensure the threaded hole is clean.

(2) Apply thread locking compound to the bolt (3).

(3) Secure the swivel load ring (1) to the launch beam drive (2) with the washer (4) and bolt (3).

(4) Torque tighten the bolt (3) to 74 lb/ft (100 Nm).

5 - 037 LAUNCH FRAME - DRIVE CHAIN

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

A-Frame deployed
Vehicle switched off and battery shutoff switch in the off position

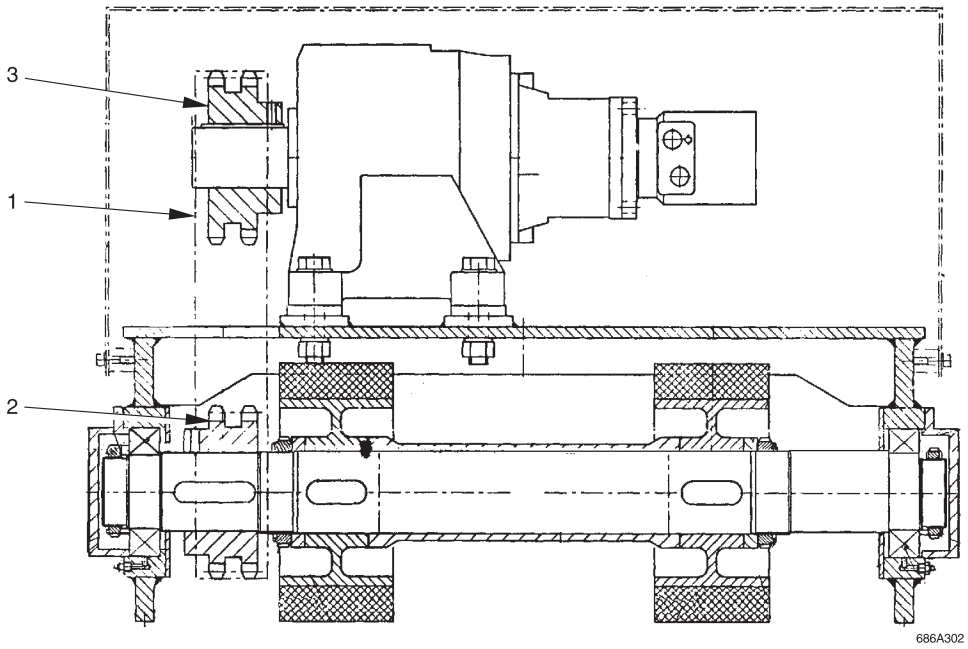
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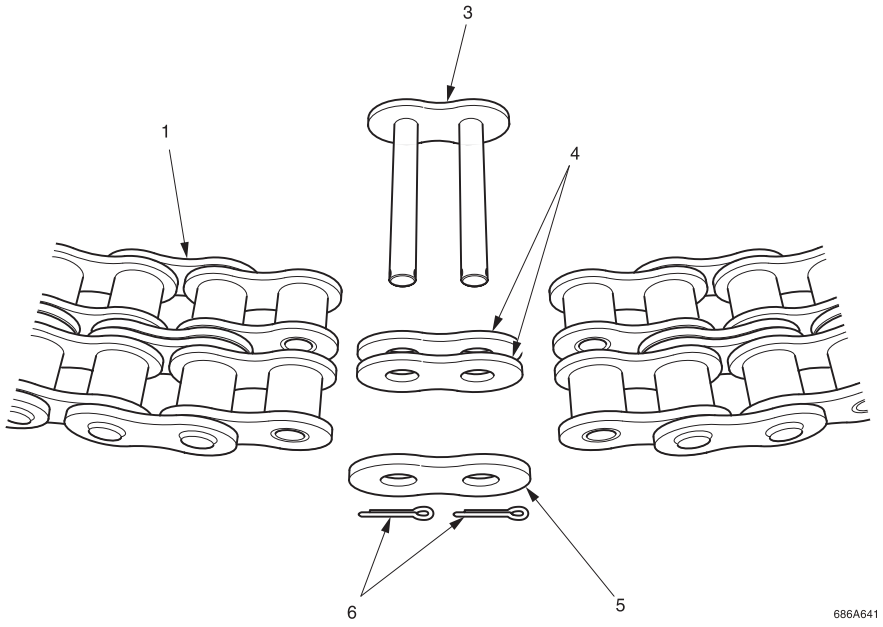
WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

FALL INJURY WHEN WORKING AT HEIGHT. THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 6M (20FT) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT THIS TASK.







a. Remove

(1) Remove the launch beam drive cover. See unit maintenance procedure 5-035.

(2) Remove the launch beam drive motor. See unit maintenance procedure 5-034.

(3) Locate the drive chain split link on the drive chain (1).

(4) Note the fitting arrangement of the split link (3).

(5) Using a rope or lock wire, tie one end of the chain to a suitable point on the launch beam drive to ensure that the chain does not drop when the split link is removed.

(6) Remove the split pins (6) and split link retaining plate (5).

(7) Remove the split link (3) and retain the split link spacers (4).

(8) Remove the drive chain (1).

(9) Check each chain link for wear or damage.

(10) Grease the drive chain (1) before installation.

b. Install

(1) Fit the launch beam drive motor. See unit maintenance procedure 5-034.

(2) Fit the drive chain (1) to the drive shaft sprocket (2).

(3) Fit the chain to the drive motor sprocket (3).

(4) Fit the drive chain split link from the inside of the chain as noted during removal.

(5) Fit the drive chain split link (3).

(6) Fit the split link spacers (4).

(7) Fit the split link retaining plate (5) and split pins (6).

NOTE

It may be necessary to adjust the Drive Chain tension when fitting the Drive chain. See unit maintenance procedure 5-039.

(8) Check the drive chain (1) tension and adjust if necessary, see unit maintenance procedure 5-039.

c. Follow on tasks

(1) Fit the launch beam drive cover. See unit maintenance procedure 5-035.

(2) Switch the battery shutoff switch to the on position.

(3) Check the operation of the launch beam drive motor and chain.

5 - 038 LAUNCH FRAME - BEAM DRIVE GEARBOX OIL

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Container (waste oil)
Oil; see Appendix B Table 4

Equipment Conditions

A-Frame deployed and level

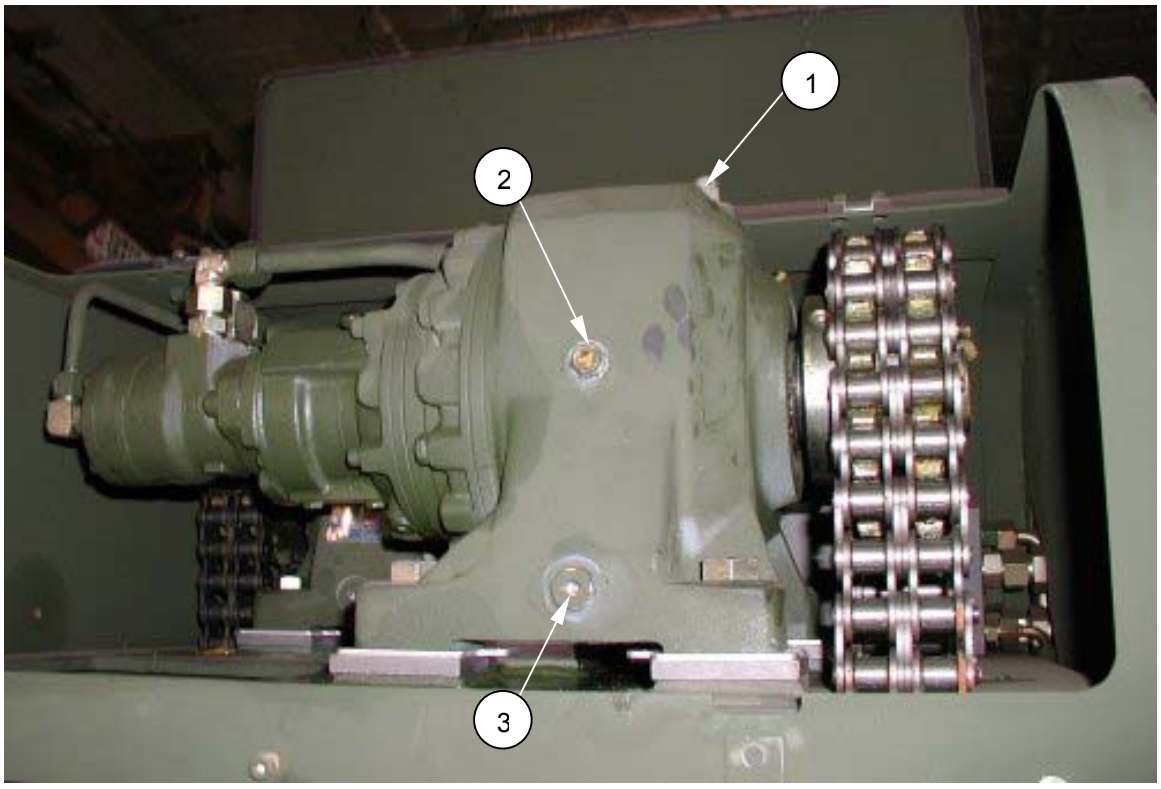
WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

BURN INJURY. HOT OIL. PERSONNEL MUST WEAR PERSONAL PROTECTIVE EQUIPMENT WHEN HANDLING HOT OIL.



NOTE

When checking the oil levels and it is found that the levels have risen, it could mean that oil is penetrating either from the gearbox seals or the motor rotary seal. Report any instances of this to Engineering Control.

This operation should be carried out while the oil is hot.

a. Service

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) On the gearbox remove the oil filler plug (1) and the oil level plug (2).

(3) Unscrew the drain plug (3) and allow the oil to drain into a suitable container.

(4) Check the drain plug magnetic insert for metal particles. Report any findings.

(5) Refit the drain plug (3) and fill to the level plug (2) with oil.

(6) Refit the level plug (2) and the filler plug (1).

(7) Operate the gearbox unit to circulate the oil.

(8) Drain the oil by repeating operations steps 1 thru 3.

(9) Refit the drain plug (3) and fill to the level plug (2) with oil.

(10) Refit the level plug (2) and the filler plug (1).

(11) Briefly operate the gearbox unit to eliminate any air pockets.

(12) Repeat operations 1 thru 12 on second gearbox unit.

(13) Check the oil level and replenish as necessary.

(14) Dispose of waste hydraulic fluid in accordance with local regulations.

b. Follow on tasks

(1) Check the operation of the launch beam drive units.

(2) Check for leaks.

5 - 039 LAUNCH FRAME - DRIVE CHAIN ADJUSTMENT

This task covers:

a. Adjust

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Shims (As required)

Equipment Conditions

A-Frame deployed and level
Vehicle switched off and battery shutoff switch in the off position

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WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.



a. Adjustment

(1) Remove the launch beam drive top cover. See maintenance procedure 5-035.

(2) Lay a straight edge across the sprockets of the launch beam drive and measure the sag in the duplex chain. The dimension should not be greater than 3.5mm. If the dimension is greater than this, the gearbox will require shimming to achieve a figure of between 1.5mm and 3.5mm.

(3) Calculate the thickness of shims required to achieve the correct chain tension.

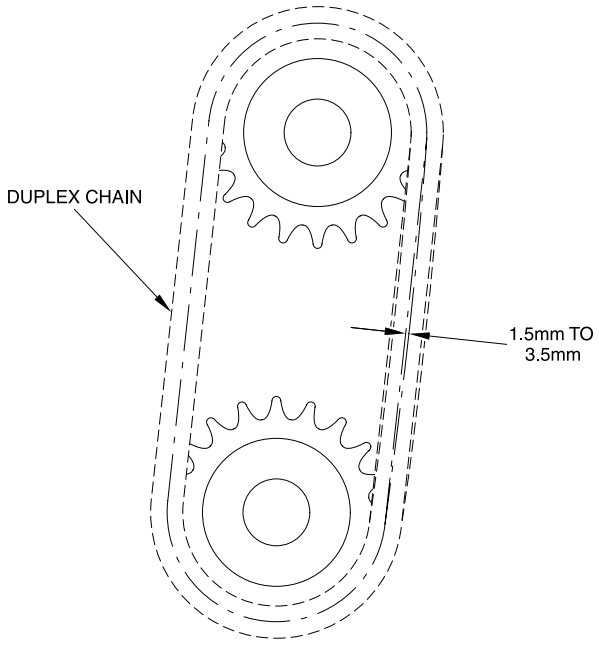
(4) Loosen the four nuts (1), lock washers (2), plain washers (3), packer (4), shim pack (5) and bolt (6).

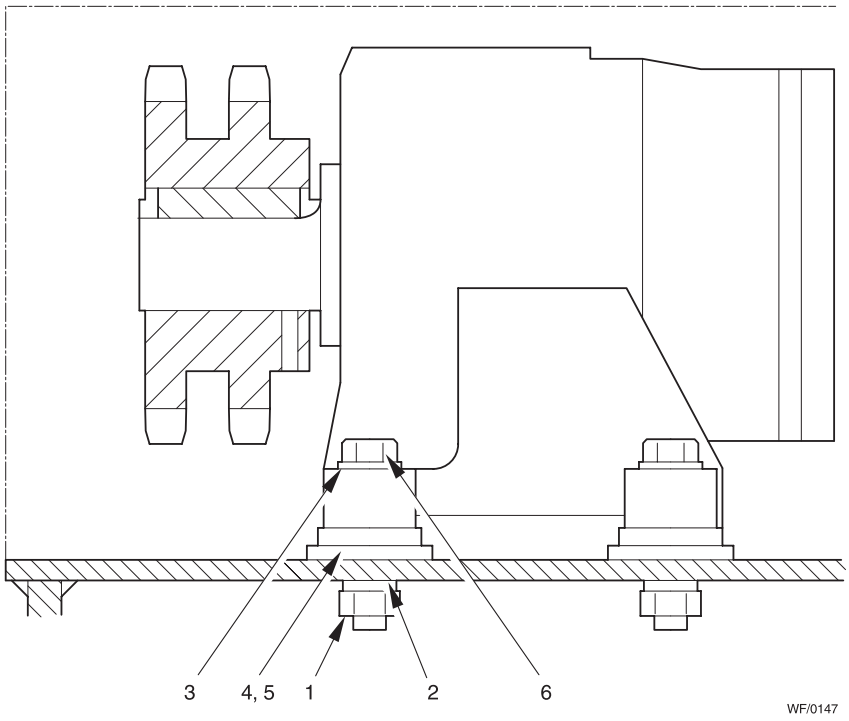
(5) Lift launch beam drive motor and insert appropriate shims.

(6) Torque bolt (6) to 339 lb/ft (460Nm).

b. Follow on Tasks

(1) Switch the battery shutoff switch to the on position.




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5 - 040 LAUNCH FRAME - DRIVE SPROCKETS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Puller (Shop Set Contact Maintenance Truck HMMWV)

Materials Required

Thread locking compound, loctite 242
Loctite adhesive 641

Equipment Conditions

A-Frame deployed
Remove the launch beam drive motor, see maintenance procedure 5-034 and place on a suitable working surface

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WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

a. Remove

(1) Remove two socket head screws (1) from sprocket (2).

(2) Using a puller remove sprocket (2).

(3) If required remove key (3) from shaft.

(4) Inspect components for damage and corrosion.

(5) Examine socket head screws for damage to bolt heads and threads.

(6) Replace components as required.

b. Install

(1) Fit key (3) into shaft using key way retaining adhesive, (Loctite 641 or equivalent).

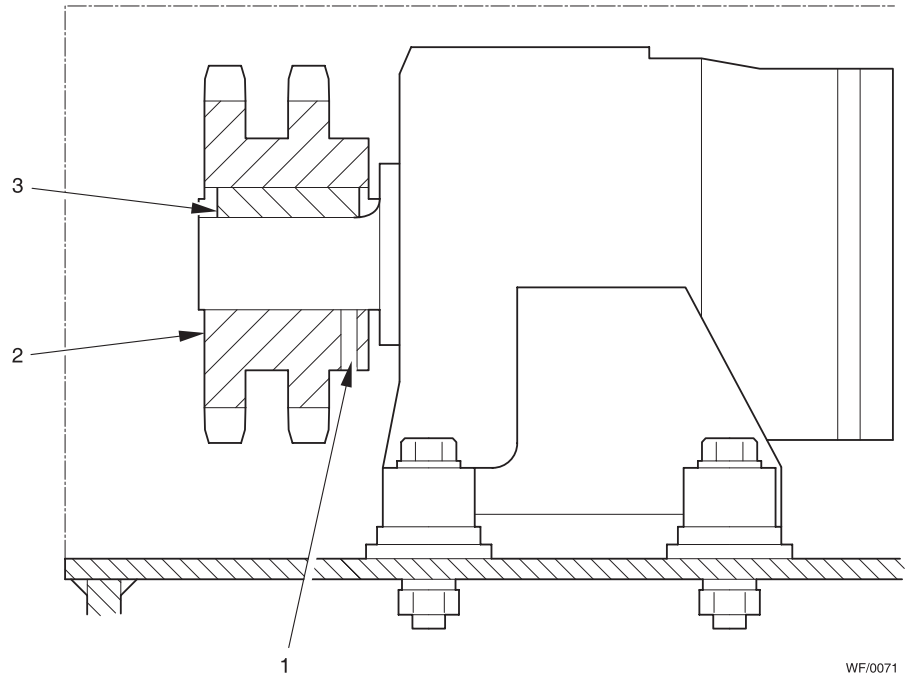
(2) Fit sprocket (2) to shaft.

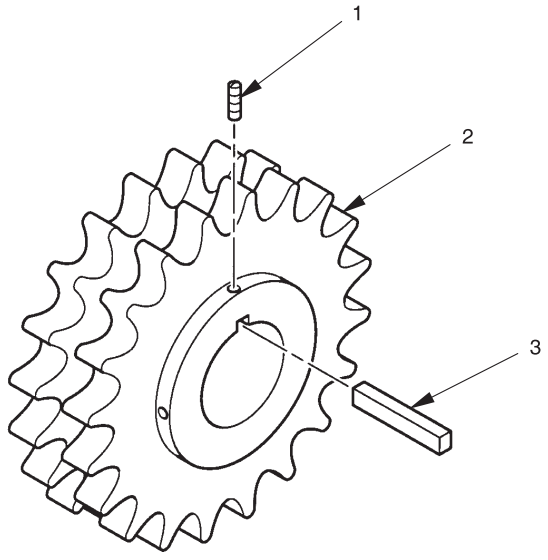
(3) Apply thread locking compound to the socket head screws (1).

(4) Secure sprocket (2) with socket head screws (1).

c. Follow on tasks

(1) Fit the launch beam drive motor, see maintenance procedure 5-034.





5 - 041 LAUNCH FRAME - LAUNCH BEAM DRIVE BRAKE OIL

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Container (waste oil)
Oil; see Appendix B Table 4

Equipment Conditions

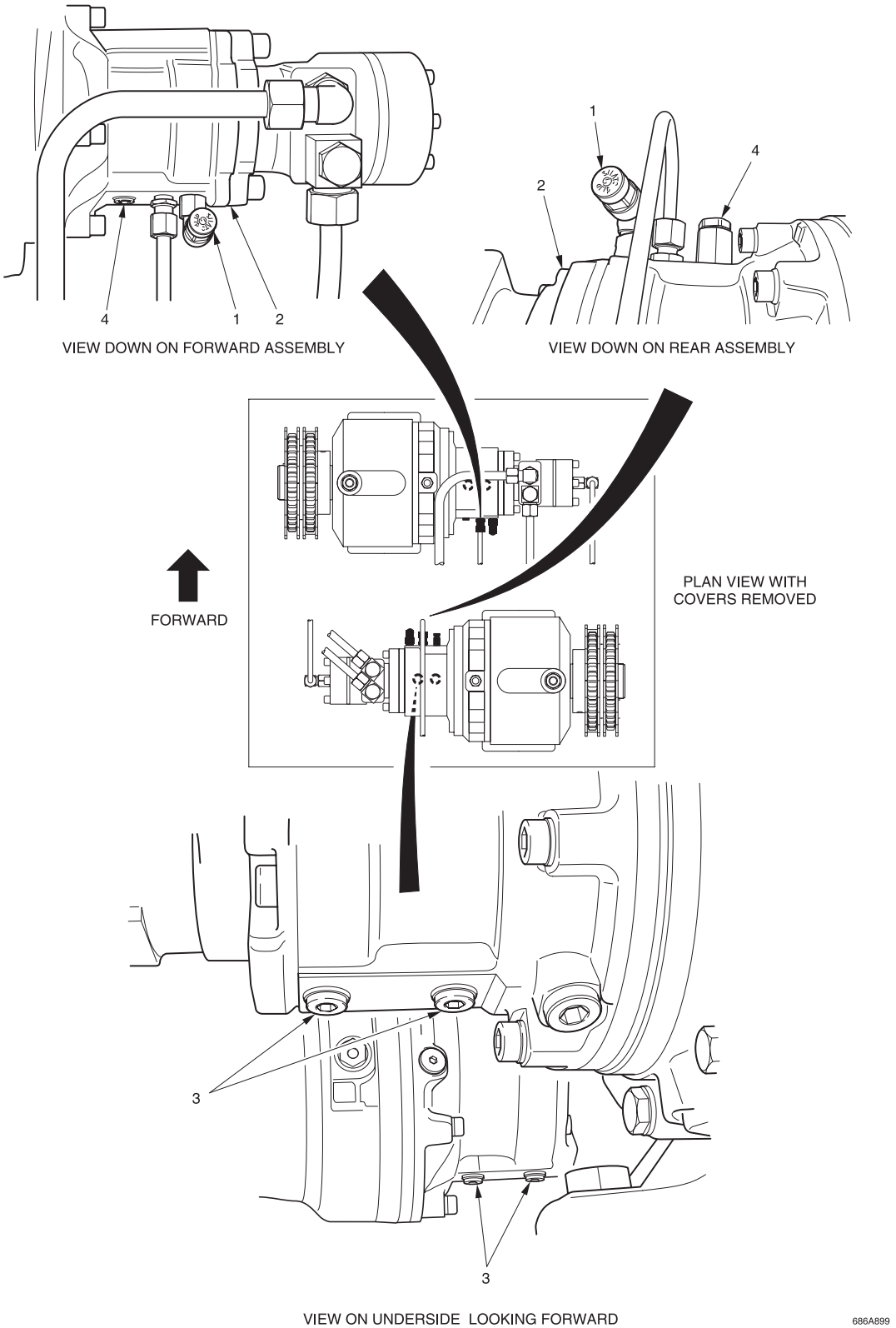
A-Frame deployed and level

WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.




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VIEW DOWN ON FORWARD ASSEMBLY
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VIEW DOWN ON REAR ASSEMBLY
FORWARD
PLAN VIEW WITH
COVERS REMOVED
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3
VIEW ON UNDERSIDE LOOKING FORWARD
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a. Service

(1) Release the breather/filler cap (1) at top of launch beam drive brake (2).

(2) Remove the drain plug (3) from the launch beam drive brake, and allow oil to drain into a suitable container.

(3) If required, fit a new sealing washer to the drain plug (3)

(4) Fit the drain plug (3).

(5) Remove breather/filler cap (1).

(6) Remove oil level plug (4).

(7) Fill the launch beam drive brake (2) with the approved oil until oil seeps from the oil level plug orifice.

(8) Fit the oil level plug (4) and breather/filler cap (1).

5 - 042 LAUNCH FRAME - FRONT ROLLER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Two point arrester harness (BII)

Materials Required

Thread locking compound, loctite 242
Nyloc nut (Qty 1)

Equipment Conditions

A-Frame deployed
Guards removed

WARNING

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT A FRONT ROLLER ASSEMBLY REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SUITABLE POINT ON THE LAUNCH FRAME.

NOTE

The front rollers are located on the Launch Frame. It may be necessary to remove the Launch Frame guards to gain access to them.

a. Remove

(1) Remove the launch frame guards if required. Refer to operator's TM 5-5420-279-10 Chapter 10.

(2) Remove nut (1), washer (2) and retainer (3). Discard nut (1).

(3) Lift off roller (1).

(4) Remove the bolts (12) securing the shaft (11) to the launch frame.

(5) If necessary remove the retaining ring (5), washer (6) and remove the bearing (7) and seal (8) from the wheel (9).

(9) Inspect components for damage and corrosion.

(10) Examine bolt head and threads for damage.

(11) Replace components as required.

b. Install

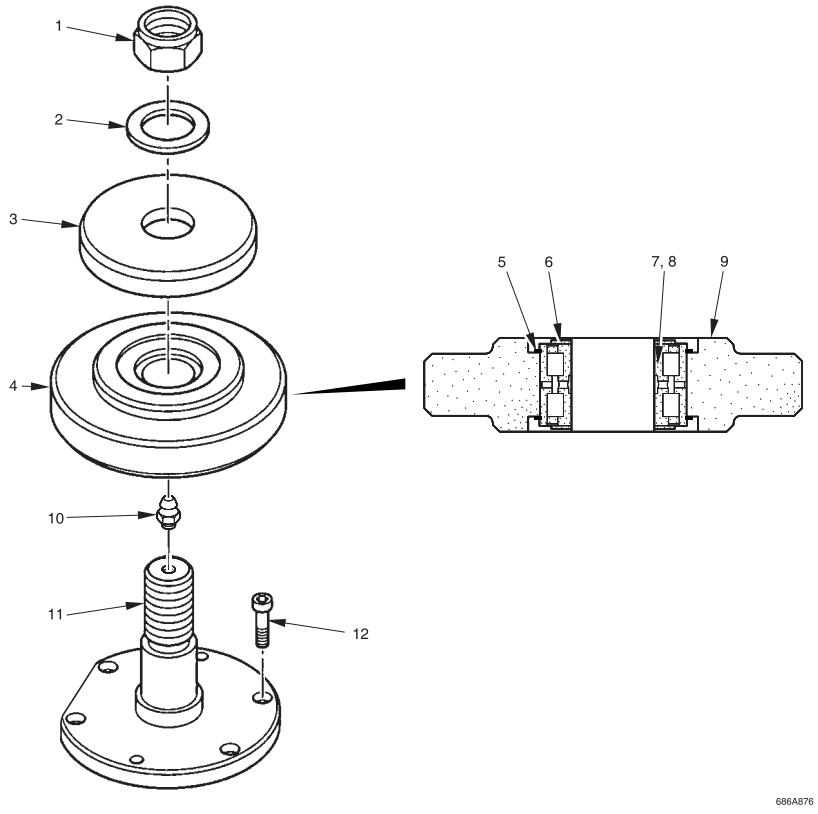
(1) Apply thread locking compound to the bolts (12).

(2) Locate shaft (11) and secure with bolts (12).

(3) Fit the roller (1) complete with bearing (7), seal (8) washer (6) and retaining ring (5) to the shaft (11).

(4) Fit the retainer (3), washer (2) and a new nut (1) to the shaft (11).

(5) Grease the roller through the grease fitting (10).



5 - 043 LAUNCH FRAME - SIDE ROLLER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Rubber hammer (Common No 1)
Two point arrester harness (BII)

Materials Required

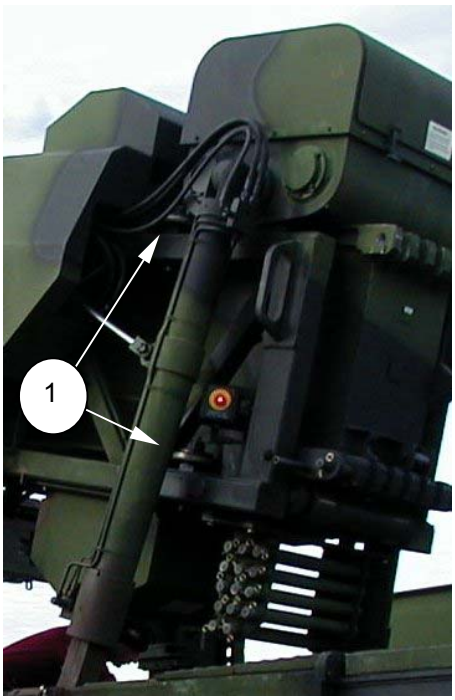
Thread locking compound, loctite 242
Nyloc nut (Qty 1)

Equipment Conditions

A-Frame deployed

WARNING

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT A SIDE ROLLER ASSEMBLY REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SUITABLE POINT ON THE LAUNCH FRAME.



a. Remove

(1) Remove nyloc nut (1), washer (2) and retainer (3). Discard nyloc nut (1).

(2) Remove grease fitting (11).

(3) Lift out roller (4) and bearing seat (10).

(4) Remove two bolts (14) and locking plate (13) and withdraw shaft (12).

(5) If necessary remove the retaining ring (5), washer (6) and remove the bearing (7) and seal (8) from the wheel (9).

(6) Inspect components for wear, damage and corrosion.

(7) Examine bolt head and threads for damage.

(8) Replace components as required.

b. Install

(1) Apply thread locking compound to the two bolts (14).

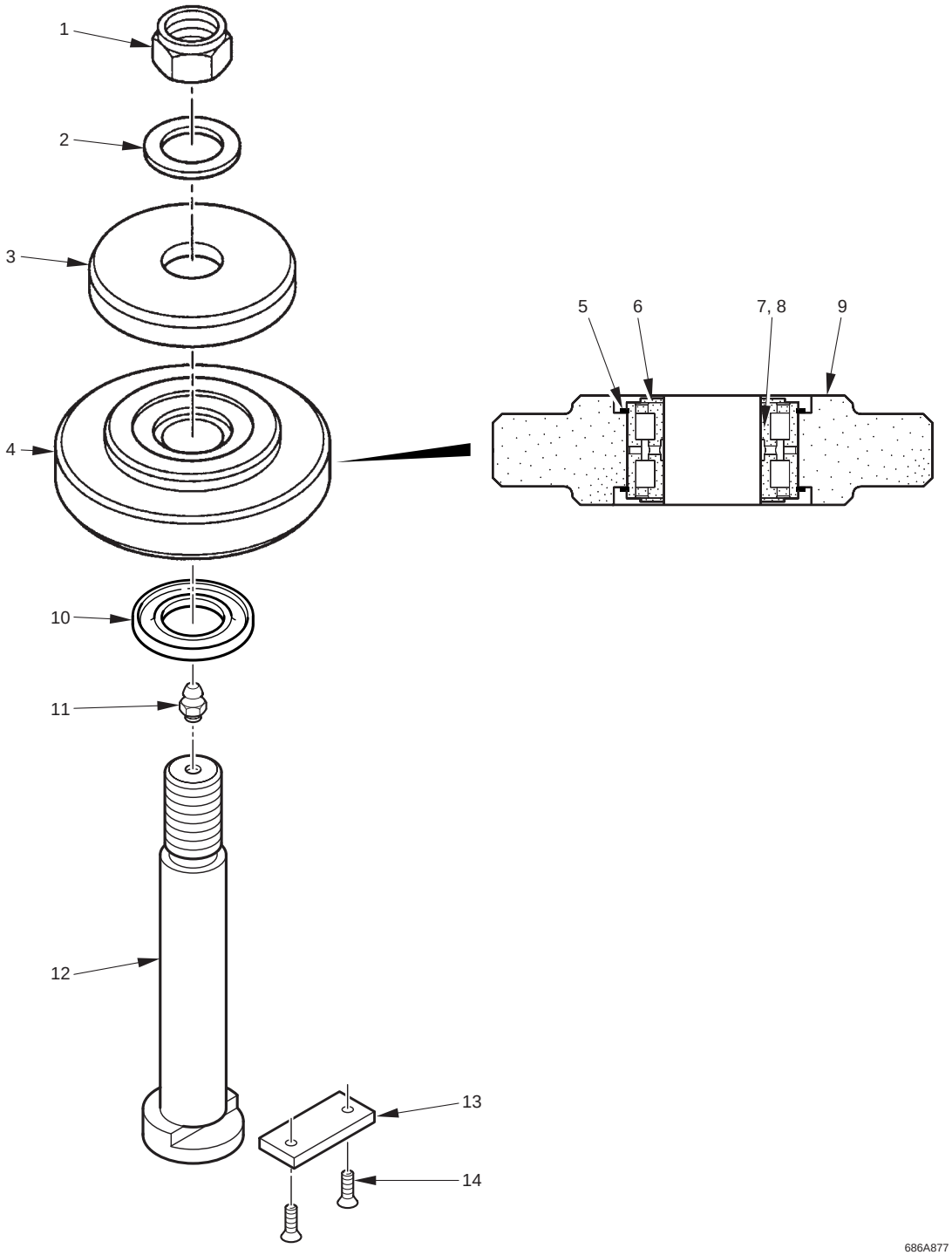
(2) Fit shaft (12) into launch frame and secure with locking plate (13) and two bolts (14).

(3) Fit the roller (4) complete with bearing seat (10), bearing (7), seal (8) washer (6) and retaining ring (5) to the shaft (12).

(4) Fit the retainer (3), washer (2) and a new nyloc nut (1) to the shaft (12).

(5) Fit the grease fitting (11) to the shaft (12).

(6) Grease the roller (4) through the grease fitting (11).


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5 - 044 LAUNCH FRAME - WINCH GEARBOX OIL

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Oil; see Appendix B Table 4
Container

Equipment Conditions

A-Frame deployed
Remove the winch guard. Refer to TM 5-5420-279-10 Chapter 10

WARNING

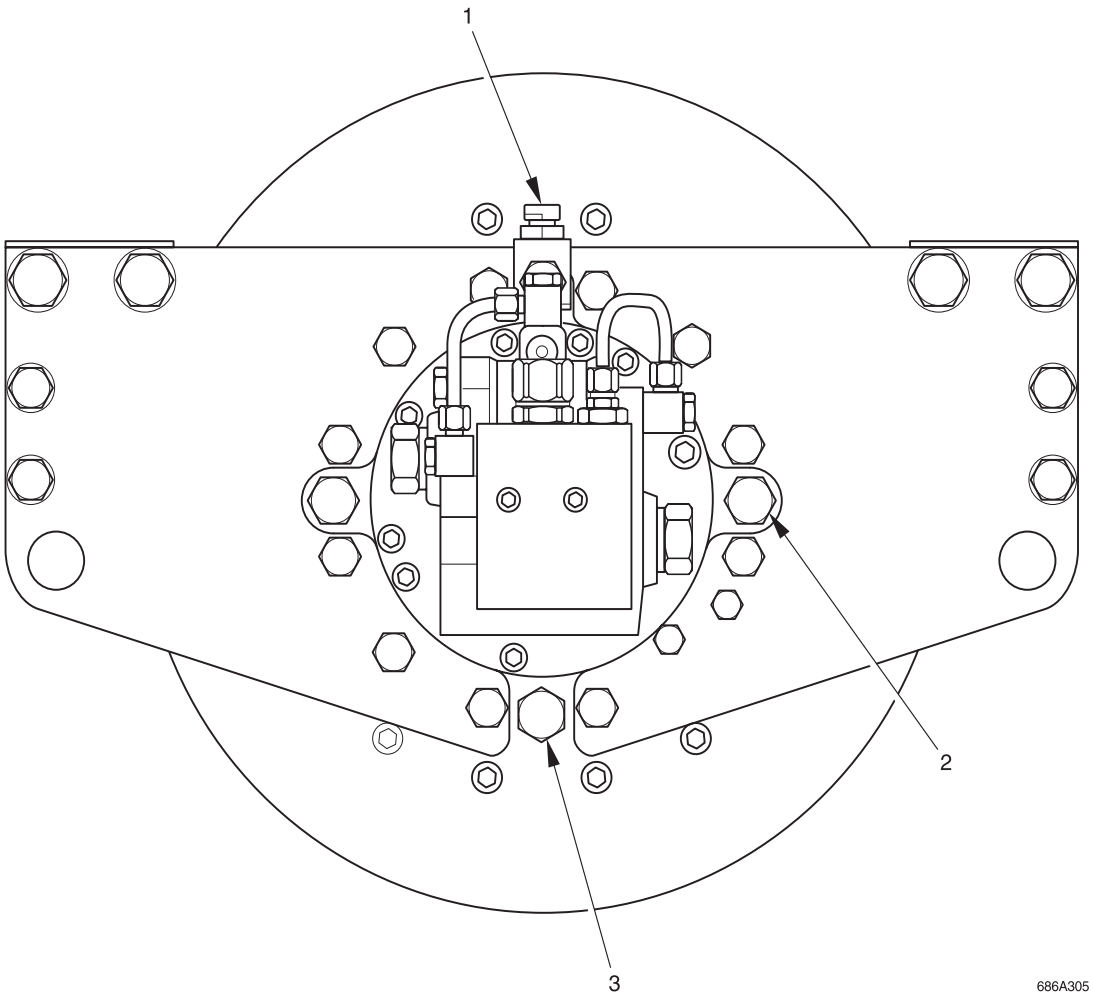
DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

FALL INJURY WHEN WORKING AT HEIGHT. THE FALL ARREST (SAFETY) HARNESS MUST BE USED BY PERSONNEL CARRYING OUT UPPER WINCH GEARBOX OIL REPLACEMENT. THE FALL ARREST (SAFETY) HARNESS IS TO BE ATTACHED TO A SHACKLE ON THE LAUNCH BEAM DRIVE.

NOTE

The drawing below shows the lower winch. The procedure for draining and filling the upper winch is the same taking into account the position of the winch.



a. Service

(1) Remove the drain plug (3) and allow oil to drain into a suitable container.

(2) Check that the drain plug (3) sealing washer is not damaged.

(3) Fit the drain plug (3) with a serviceable sealing washer.

(4) Remove the level plug (2).

(5) Remove the filler/breather plug (1).

(6) Top off the winch gearbox with the approved oil until oil seeps out of the level plug aperture.

(7) Check that the level plug (2), sealing washer is not damaged.

(8) Fit the level plug (2) with a serviceable sealing washer.

(9) Check that the filler/breather plug (1) sealing washer is not damaged.

(10) Fit the filler/breather plug (1) with a serviceable sealing washer.

b. Follow on tasks

(1) Operate the winch and check for leaks.

5 - 045 LAUNCH FRAME - LOWER WINCH ROPE TENSIONER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

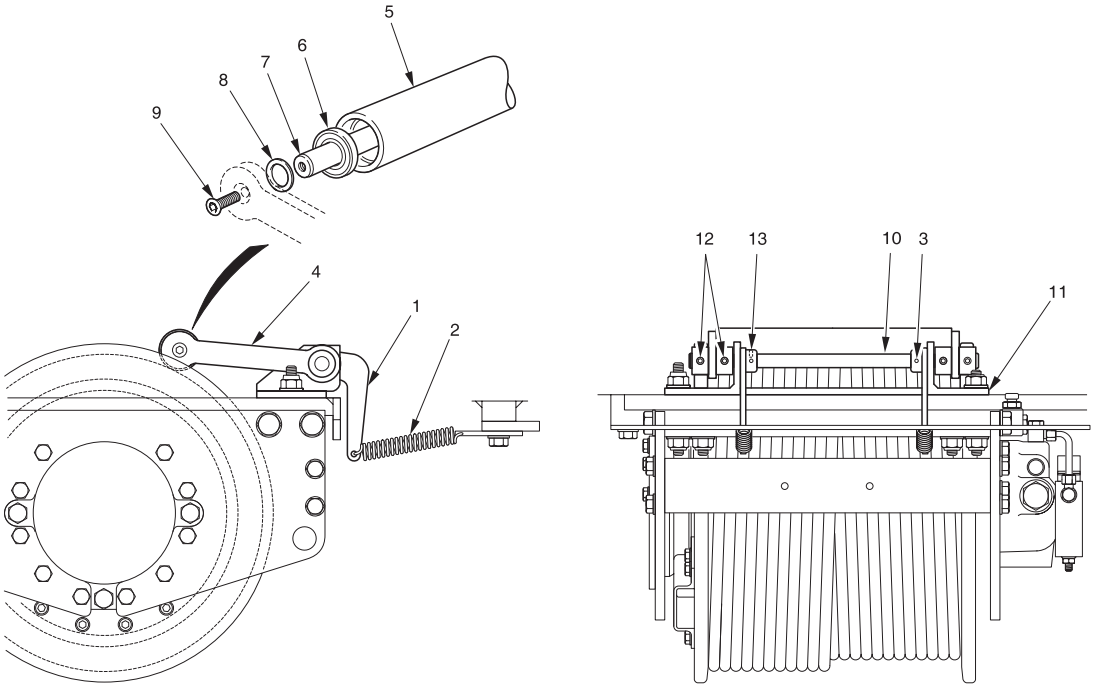
Tool Kit, General Mechanic's Automotive (GMTK)

Material Required

Thread locking compound, loctite 243.
Grease (As required)
Spring pins (Qty 2)

Equipment Conditions

A-Frame Unfolded



a. Remove

(1) Make a note of the location and orientation of all components in the lower winch rope tensioner assembly.

(2) Disconnect the two tension springs (2) from the tension arms (1).

(3) Remove the four screws (12) that secure the pivot arm assembly (4) to the pivot shaft (10).

(4) Remove the two spring pins (3) and the grub screw (13) from the left hand tension arm, that hold the tension arms (1) to the pivot shaft (10).

(5) Ensure there are no burrs around any of the holes in the pivot shaft (10) that could damage the bushings in the base plate (11).

(6) Carefully withdraw the pivot shaft (10) from the lugs of the base plate (11) to free the pivot arm assembly (4) and tension arms (1).

(7) Discard the two spring pins (3).

(8) Examine all components for damage and corrosion.

(9) Check for free rotation of the roller (5) on the pivot arm assembly (4). If the roller (5) does not rotate freely and the bearings (6) are not rotating freely, remove the two setscrews (9) from the pivot arm assembly (4).

(10) Remove the roller (5), roller shaft (7), washers (8) and bearings (6).

b. Install

(1) Apply thread locking compound to the two setscrews (9).

(2) Replace the two bearings (6) in the roller (5) and reassemble the roller shaft (7), roller (5), washers (8), and bearings (6) to the pivot arm assembly (4) with the setscrews (9).

(3) Pack the area between the exterior end faces of the bearings (6) and the inside faces of the pivot arms (4) with grease.

(4) Carefully feed the pivot shaft (10) through the pivot arm assembly (4), base plates (11) and both tension arms (1).

(5) Fit the two tension arms (1) to the pivot shaft (10) with two new spring pins (3) and the grub screw (13).

(6) Apply thread locking compound to the screws (12).

(7) Ensure the tension arms (1) are fitted to the pivot shaft (10) so the depressions in the pivot shaft (10) align with the four pivot arm assembly screws (12).

(8) Fit the screws (12) and tighten.

(9) Fit the two tension springs (2) to the tension arms (1).

5 - 046 LAUNCH FRAME - UPPER WINCH ROPE TENSIONER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

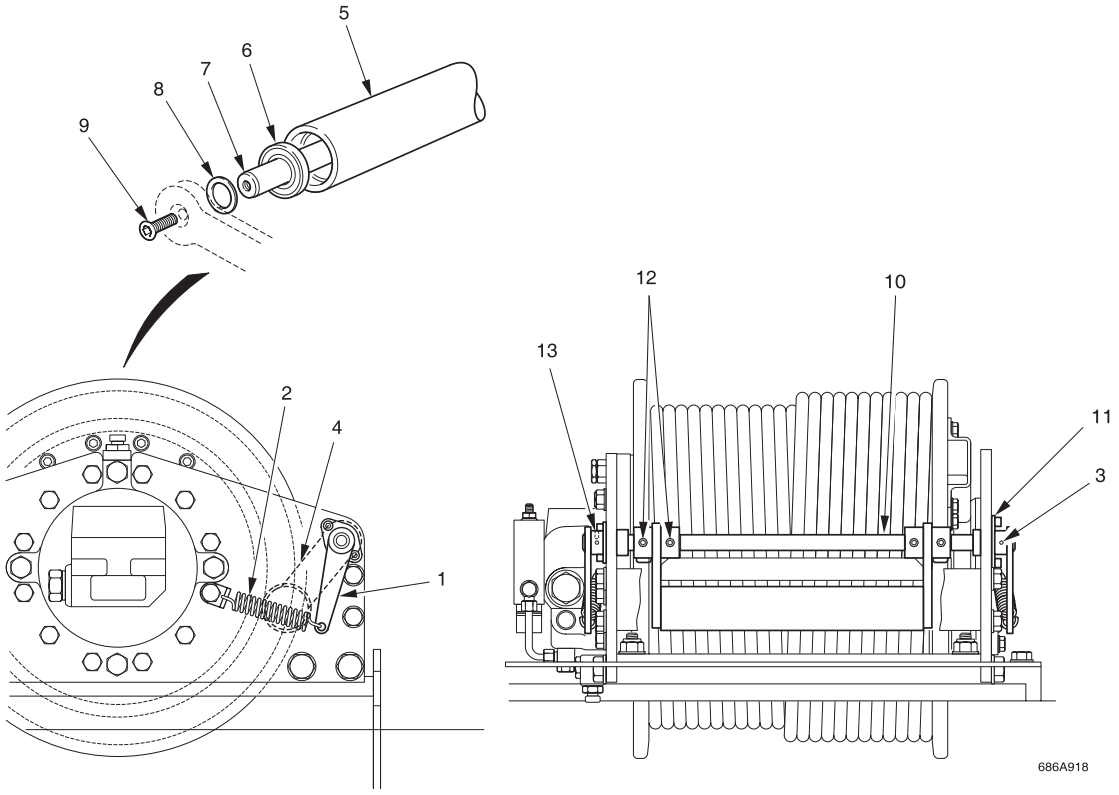
Tool kit, General Mechanic's Automotive (GMTK)

Material Required

Thread locking compound, loctite 243.
Grease (As required)
Spring Pins (Qty 2)

Equipment Conditions

A-Frame Unfolded



a. Remove

(1) Make a note of the location and orientation of all components in the upper winch rope tensioner assembly.

(2) Disconnect the two tension springs (2) from the tension arms (1).

(3) Remove the four screws (12) that secure the pivot arm assembly (4) to the pivot shaft (10).

(4) Remove the two spring pins (3) and the single screw (13) that hold the tension arms (1) to the pivot shaft (10).

(5) Ensure that there are no burrs around any of the holes in the pivot shaft (10) that could damage the bushings in the two mounting collars (11) bolted to the winch frame.

(6) Carefully withdraw the pivot shaft (10) from the mounting collars (11) and remove the pivot arm assembly (4) and tension arms (1).

(7) Discard the two spring pins (3).

(8) Examine all components for damage and corrosion.

(9) Check for free rotation of the roller (5) on the pivot arm assembly (4). If the roller (5) does not rotate freely and the bearings (6) do not rotate, remove the two setscrews (9) from the pivot arm assembly (4).

(10) Remove the roller (5), roller shaft (7), washers (8) and bearings (6).

b. Install

(1) Apply thread locking compound to the setscrews (9).

(2) Replace the two bearings (6) in the roller (5) and reassemble the roller shaft (7), roller (5), washers (8) and bearings (6) to the pivot arm assembly (4) using the two setscrews (9).

(3) Pack the area between the exterior end faces of the bearings (6) and the inside faces of the pivot arms (4) with grease.

(4) Carefully feed the pivot shaft (10) through the tension arms (1) and the mounting collars (11).

(5) Fit the two tension arms (1) to the pivot shaft (10) with two new spring pins (3) and the screw (13).

(6) Apply thread locking compound to the screws (12).

(7) Ensure the tension arms (1) are fitted to the pivot shaft (10) so the depressions in the pivot shaft (10) align with the four pivot arm assembly screws (12).

(8) Align the screws (12) with the depressions in the pivot shaft (10) and tighten.

(9) Attach the tension springs (2) to the tension arms (1).

5 - 047 LAUNCH FRAME - UPPER WINCH ROPE TENSION INDICATOR

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

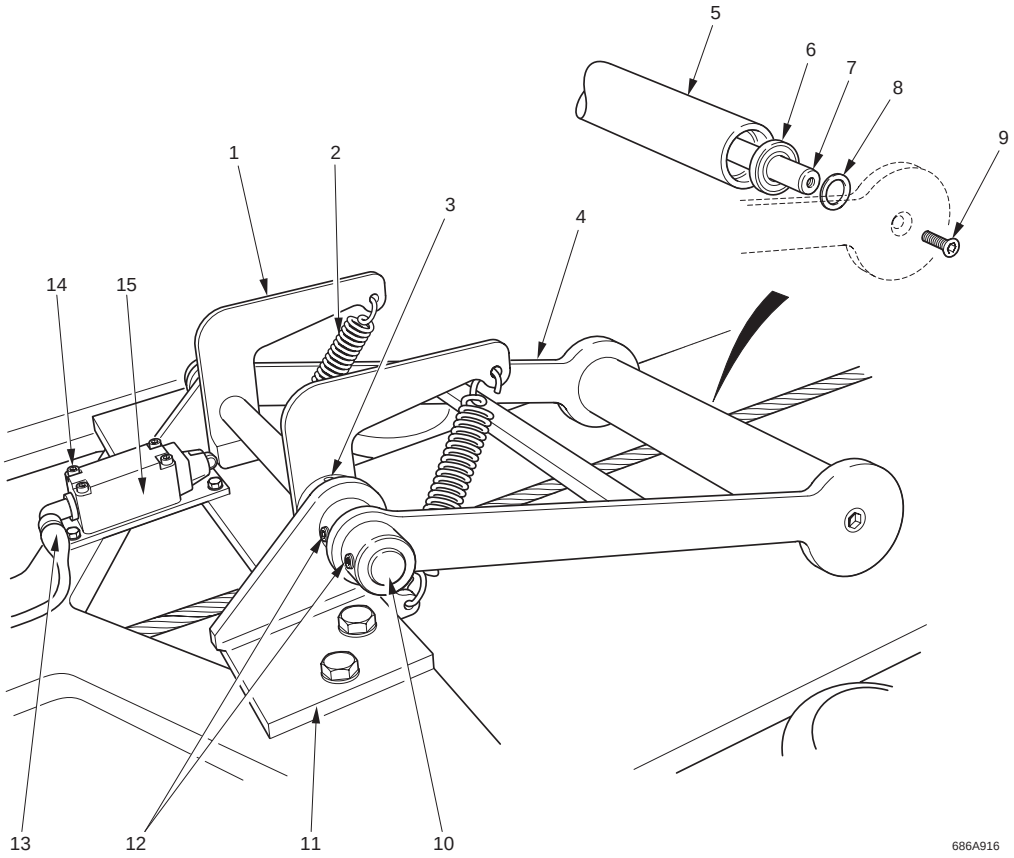
Tool kit, General Mechanic's Automotive (GMTK)

Material Required

Grease (As required)
Thread locking compound, loctite 243
Spring pins (Qty 2)
Nyloc nuts (Qty 4)

Equipment Conditions

A-Frame Unfolded



a. Remove

(1) Make a note of the location and orientation of all components in the upper winch rope tension indicator assembly.

(2) Disconnect the two tension springs (2) from the tension arms (1).

(3) Remove the four screws (12) that secure the pivot arm assembly (4) to the pivot shaft (10).

(4) Remove the two spring pins (3) that hold the tension arms (1) to the pivot shaft (10).

(5) Carefully withdraw the pivot shaft (10) to free the pivot arm assembly (4) and tension arms (1) from the base plate assembly (11).

(6) Discard the two spring pins (3).

(7) Examine all components for damage and corrosion.

(8) Check for free rotation of the roller (5) on the pivot arm assembly (4). If the roller (5) does not rotate freely and the bearings (6) do not rotate freely, remove the two setscrews (9) from the pivot arm assembly (4).

(9) Remove the roller (5), roller shaft (8), washers (7) and bearings (6).

(10) If required, remove the cable (13) from the limit switch (15).

(11) Remove the four screws, washers and nyloc nuts (14) securing the limit switch (15) to the launch frame. Discard the nyloc nuts (14).

b. Install

(1) Fit the limit switch (15) to the launch frame and secure in place with the four screws, washers and new nyloc nuts (14).

(2) Fit the cable (13) to the limit switch (15).

(3) Apply thread locking compound to the two setscrews (9).

(4) Replace the two bearings (6) in the roller (5) and reassemble the roller shaft (8), roller (5), washers (7) and bearings (6) to the pivot arm assembly (4) with the screws (9).

(5) Pack the area between the exterior end faces of the bearings (6) and the inside faces of the pivot arms (4) with grease.

(6) Carefully feed the pivot shaft (10) through the pivot arm assembly (4), base plate assembly (11) and both tension arms (1). Ensure the right hand tension arm (1) engages with the limit switch (13).

(7) Fit the two tension arms (1) to the pivot shaft (10) with two new spring pins (3). Align the tension arms (4) to the pivot shaft (10) so the original four depressions in the pivot shaft (10) align with the four screws (12).

(8) Apply thread locking compound to the screws (12) and tighten.

(9) With the roller (5) resting on the slack rope on top of the launch beam, ensure that the limit switch (13) is closed. When tension is applied to the winch rope the limit switch (13) should open.

(10) Fit the two tension springs (2) to the tension arms (1).

(11) Check the operation of the winch rope tension indicator in accordance with the operator's manual TM 5-5420-279-10.

5 - 048 LAUNCH FRAME - EMERGENCY WINCH DRUM RELEASE

This task covers:

a. Align

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

A-Frame deployed

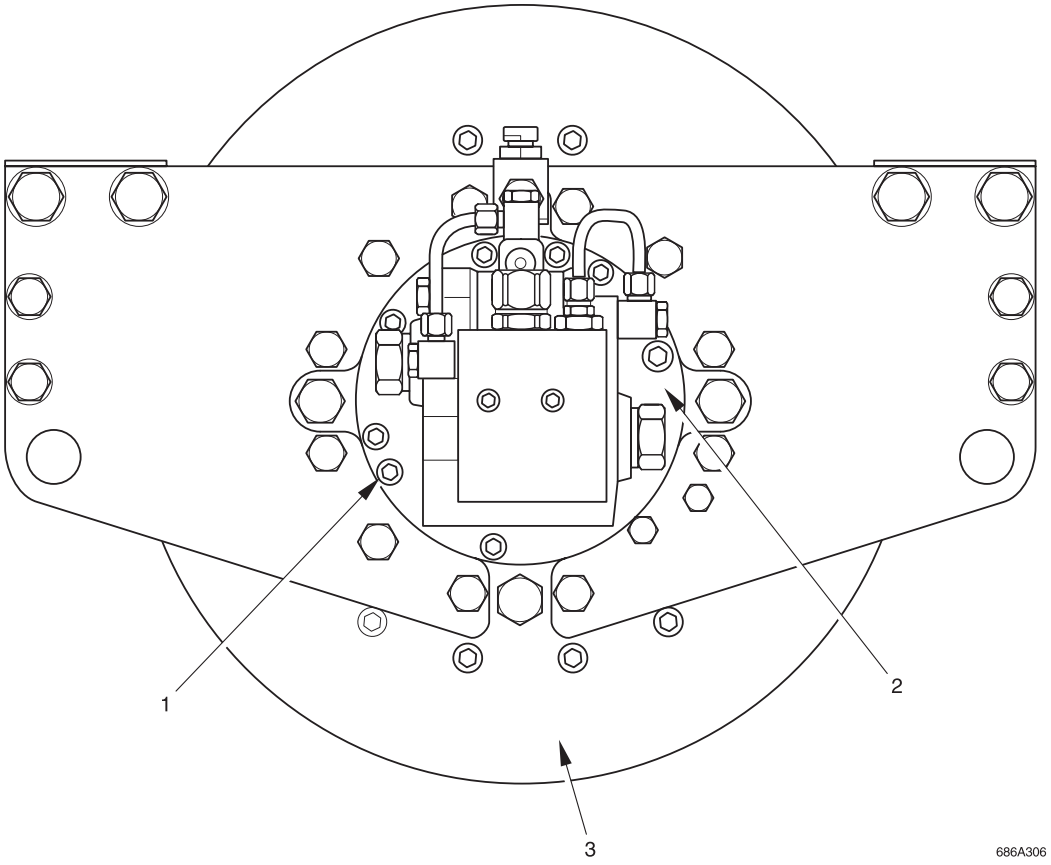
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT THE EMERGENCY WINCH DRUM RELEASE PROCEDURE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

In the event of a power failure the drum brake will be applied and the drum will not rotate. This procedure details the actions necessary to release the drum in an emergency.



a. Align

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Disconnect the Hydraulic pipes fitted to the Winch Drum Motor (2).

(3) Undo the ring of Socket Head Screws (1) securing the Winch Drum Motor (2) to the Winch Drum (3).

CAUTION

Do not remove the socket head screws. The socket head screws only need to be undone by 3mm. This will release the brake to the winch drum motor.

(4) The Winch Drum (3), may now be turned by hand by pulling on the winch rope.

(5) Ensure that the Winch Motor Seals have not been displaced.

(6) Tighten the Winch Motor Socket Head Screws (1).

(7) Re-connect the hydraulic pipes to the winch motor.

(8) When power is restored check the operation of the Winch and check for leaks.

5 - 049 LAUNCH FRAME - ELECTRICAL ENCLOSURE ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

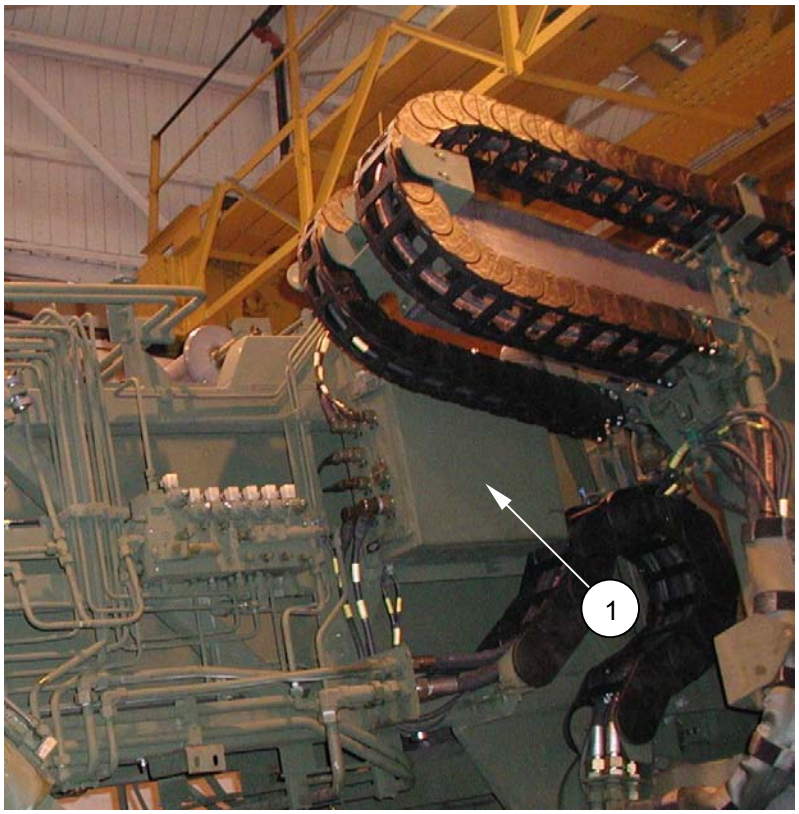
Materials Required

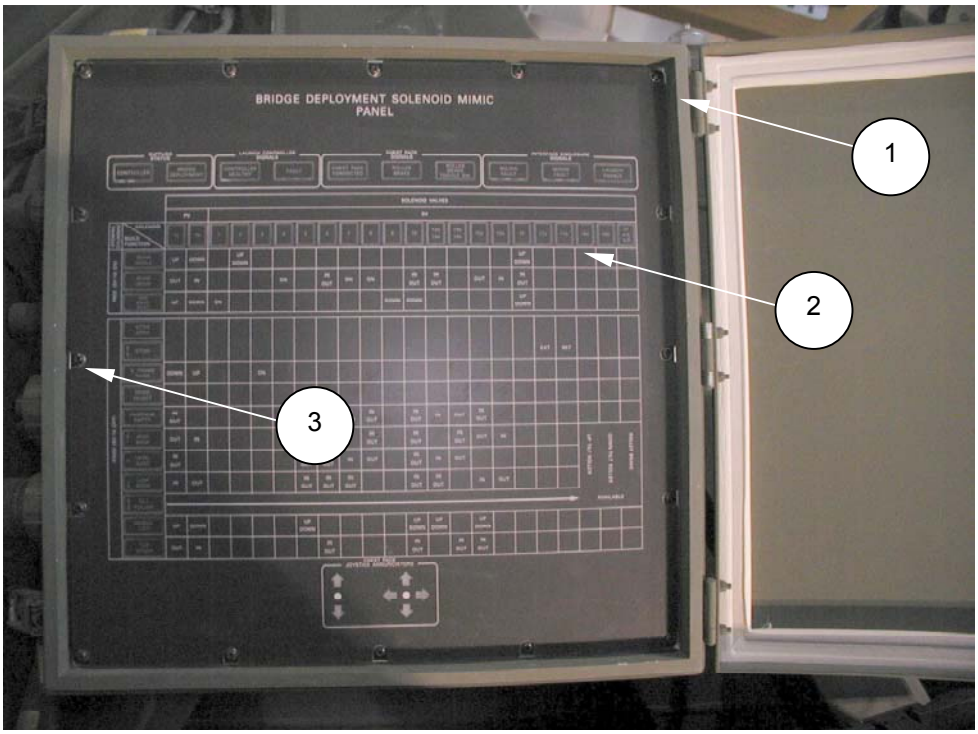
Thread locking compound, loctite 243

Equipment Conditions

A-Frame Unfolded
Vehicle switched off and battery shutoff switch in the off position

---





a. Remove

CAUTION

The electrical enclosure assembly contains sensitive electronic equipment. Handle with care.

(1) Note the positions of and remove the electrical harnesses connected to the left-hand side of the electrical enclosure assembly (1).

(2) Disconnect the ground cables connected to the electrical enclosure assembly (1).

(3) Support the weight of the electrical enclosure assembly (1) and remove the four mounting bolts and washers.

(4) Remove the electrical enclosure assembly (1).

(5) Examine all threaded components for wear and damage.

(6) If required the front panel (2) can be removed.

(7) Remove the 16 screws and washers (3) securing the front panel (2) to the electrical enclosure (1).

(8) Note the positions of and remove the cable ties and cable plugs connected to the back of the front panel (2).

(9) Remove the front panel (2).

b. Install

(1) Fit the cable plugs and cable ties to the back of the front panel (2) in the positions noted during removal.

(2) Check that the seal on electrical enclosure is clean and seated correctly.

(3) Fit the front panel (2) to the electrical enclosure assembly (1) with the 16 screws and washers (3).

(4) Position the electrical enclosure assembly (1) on the launch frame aligning the mounting brackets.

(5) Apply thread-locking compound to the mounting bolts.

(6) Secure the electrical enclosure assembly (1) on the launch frame with the mounting bolts and washers.

(7) Fit the ground cables connected to the electrical enclosure assembly (1).

(8) Fit the electrical harnesses in the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Carry out a functional test of the electrical enclosure assembly (1) by deploying the launcher and operating the launch beam drive and winches. Refer to the operator’s manual TM 5-5420-279-10.

5 - 050 LAUNCH FRAME - ARTICULATOR CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
2 lifting devices and 2 lifting slings

Materials Required

None

Equipment Conditions

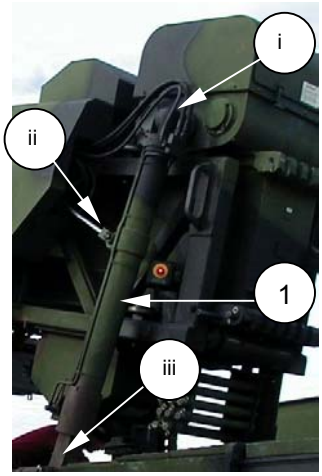
A-Frame deployed

WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE ARTICULATOR CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE ARTICULATOR CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



i, ii, iii refer to stabilizer mounting points. See Remove, step 7.

a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Remove the left hand launch frame guard, to gain access the pinch roll/stowing manifold. Refer to operator's TM 5-5420-279-10 Chapter 10.

NOTE

The pinch roller ball valve must be operated to release residual hydraulic pressure acting on the rear pinch roller.

(3) Turn the rear pinch roller ball valve lever through 90 degrees. See Appendix F page 19 figure 9. Once the pressure has been released turn the lever back through 90 degrees.

(4) Remove the launch frame guards. Refer to operator's TM 5-5420-279-10 Chapter 10.

(5) Release the hydraulic pressure in the articulator cylinder and the stow cylinder, refer to unit maintenance procedure 5-123.

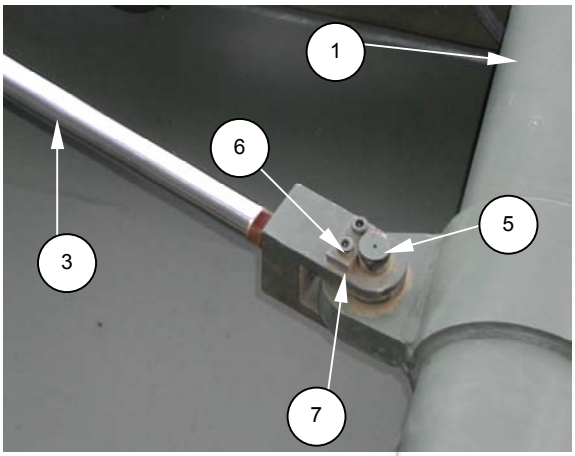
(6) The articulator cylinder (1) is located on the launch frame.

(7) There are three points at which the articulator cylinder is mounted to the launch frame assembly.

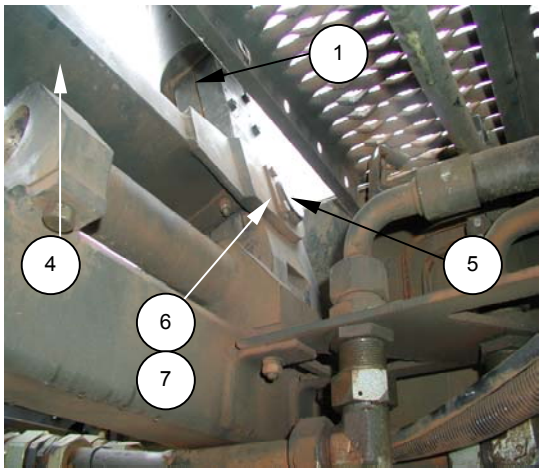
i) At the top to the beam drive assembly.

ii) In the middle to the stow cylinder.

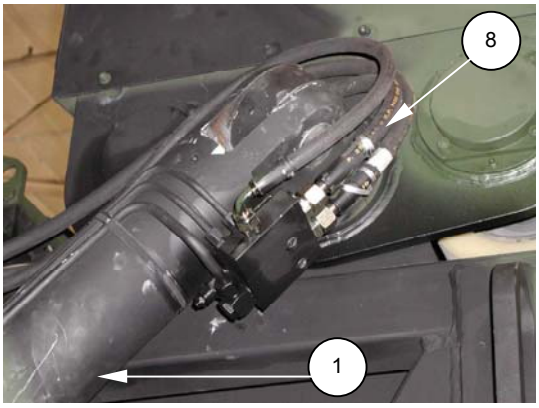
iii) At the bottom to the cross member assembly.



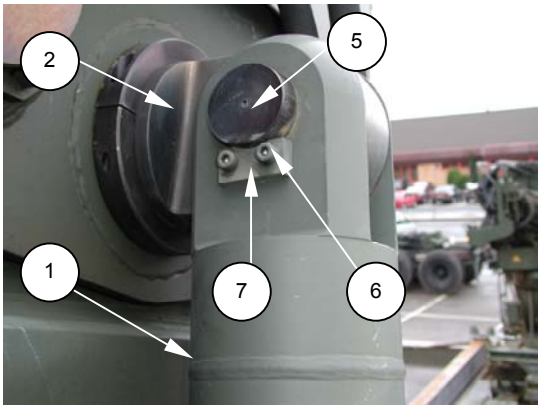
Middle Mounting



Bottom Mounting



Hydraulic Hoses



Top Mounting

(7) Each mounting consists of a cylinder pin (5), locking plate (7) secured with two screws (6).

(8) Two spacers (9) are also fitted between the cylinder and the mounting point.

(9) The process of removing the cylinder pins is the same for all mounting points.

(10) Support the weight of the stow cylinder (3) and remove the locking plate screws (6).

(11) Remove the locking plate (7).

(12) Remove the cylinder pin (5) in the direction of the locking plate mounting holes and retain the spacers.

(13) Remove the first section of the fixed walkway. Refer to procedure 5-090.

(14) Support the weight of the launch frame with a lifting device and sling.

(15) Support the weight of the cross member (4) and remove the bottom cylinder pin locking plate screws (6).

(16) Remove the locking plate (7).

(17) Remove the cylinder pin (5) in the direction of the locking plate mounting holes and retain the spacers.

(18) Note the position of and remove the hydraulic hoses (8) connected to the articulator cylinder.

(19) Support the weight of the articulator cylinder (1) with a second lifting device and sling.

(20) Remove the top cylinder pin locking plate screws (6).

(21) Remove the locking plate (7).

(22) Remove the cylinder pin (5) in the direction of the locking plate mounting holes and retain the spacers.

(23) Remove the articulator cylinder (1).

(24) Check all cylinder pins, screws, locking plates and spacers for damage or wear.

(25) Check the cross member and top mounting points for damage or wear.

(26) Replace components as necessary.

b. Install

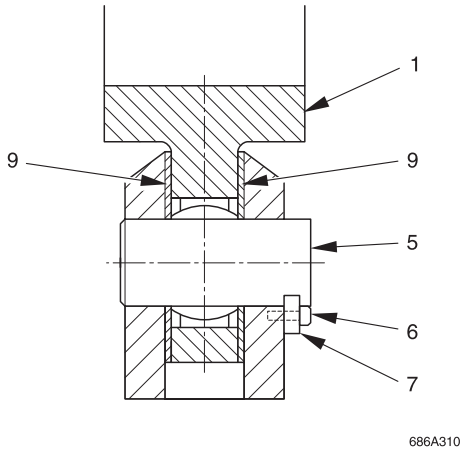
(1) Position the articulator cylinder (1) on the bottom mounting on the cross member assembly (4).

(2) Place the spacers (9) in between the mounting and the articulator cylinder (1).

(3) Fit the cylinder pin (5) through the articulator cylinder (1), spacer (9) and mounting.

(4) Fit the locking plate (7) and secure in place with the two screws (6).

(5) Position the articulator cylinder (1) on the top mounting on the launch beam drive assembly (2).



(6) Place the spacers (9) in between the mounting and the articulator cylinder (1).

(7) Fit the cylinder pin (5) through the articulator cylinder (1), spacer (9) and mounting.

(8) Fit the locking plate (7) and secure in place with the two screws (6).

(9) Position the stow cylinder (3) on the middle mounting on the articulator cylinder (1).

NOTE

It may be necessary to release the bleed fitting on the cylinder to allow the cylinder piston to be moved. Always tighten the bleed fitting when the cylinder has been fitted.

(10) Place the spacers (9) in between the mounting and the stow cylinder (3).

(11) Fit the cylinder pin (5) through the stow cylinder (3), spacer (9) and mounting.

(12) Fit the locking plate (7) and secure in place with the two screws (6).

(13) Fit the hydraulic hoses (8) to the articulator cylinder (1) in the positions noted during removal.

(14) Remove the lifting devices and slings.

(15) Operate the articulator cylinder in accordance with the operator's manual TM 5-5420-279-10.

(16) Check for hydraulic oil leaks.

(17) Replace the first section of the fixed walkway refer to unit maintenance procedure 5-090.

5 - 051 LAUNCH FRAME - ARTICULATOR CYLINDER CROSS MEMBER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lifting device

Equipment Conditions

A-Frame deployed

WARNING

CRUSH INJURY. THE ARTICULATOR CROSS MEMBER IS HEAVY. BEFORE REMOVING THE ARTICULATOR CROSS MEMBER SHOOT BOLTS ENSURE THAT THE WEIGHT OF THE LAUNCH FRAME ASSEMBLY IS SUPPORTED.

NOTE

The Articulator Cross Member is attached to the Slide Frame with two shoot bolts. Before releasing the shoot bolts ensure that the weight of the Launch Frame is supported. Attach a crane with two 3 Ton slings, one sling should be attached to each of the grab handles (7) on the launch frame, use a suitable device to prevent the slings compressing into the Launch Beam Drive (6).

a. Remove

(1) Support the weight of the launch frame assembly using a lifting device and sling.

(2) Support the weight of the articulator cross member (1).

(3) Release the shoot bolt assemblies (2) securing the articulator assembly to the slide frame (3).

(4) Disconnect the articulator cylinders (5) at the articulator cross member. See unit maintenance procedure 5-050.

(5) Remove the articulator cross member (1).

(6) Check the articulator cross member for damage.

(7) If required the shoot bolt (8) can be removed by turning the shoot bolt handle (9) counter-clockwise. and withdrawing the shoot bolt (8).

b. Install

(1) Position and align the cross member assembly with the articulator cylinders (5).

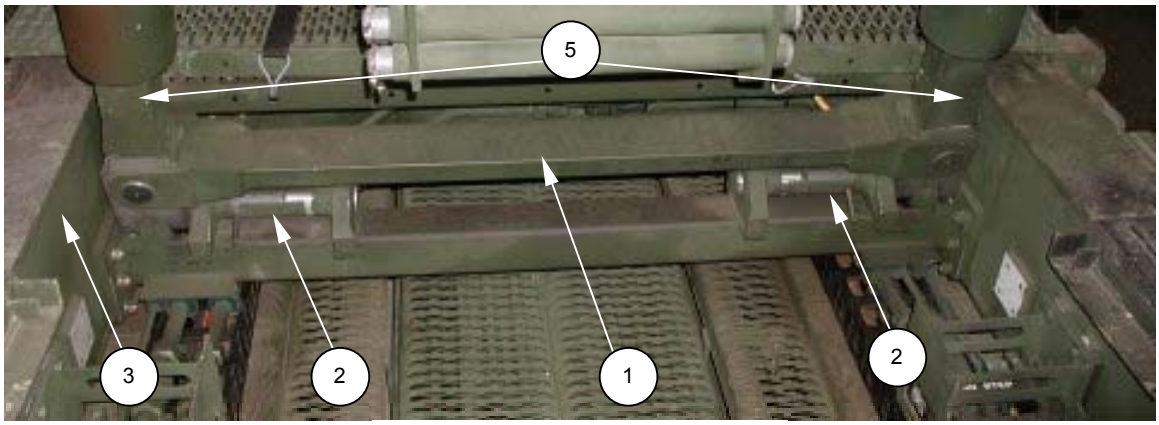
(2) Support the weight of the cross member (1).

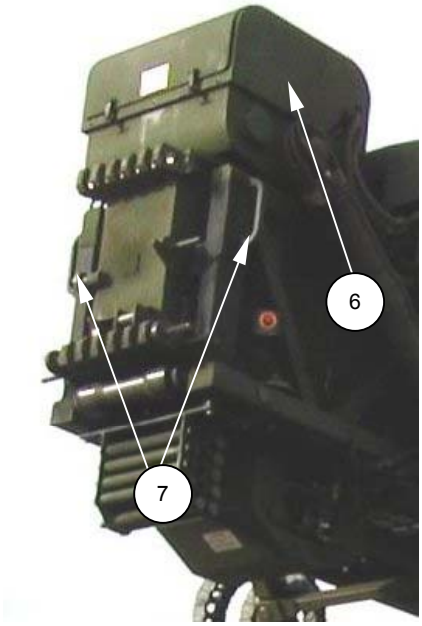
(3) Fit the articulator cylinders to the articulator cross member. See unit maintenance procedure 5-050.

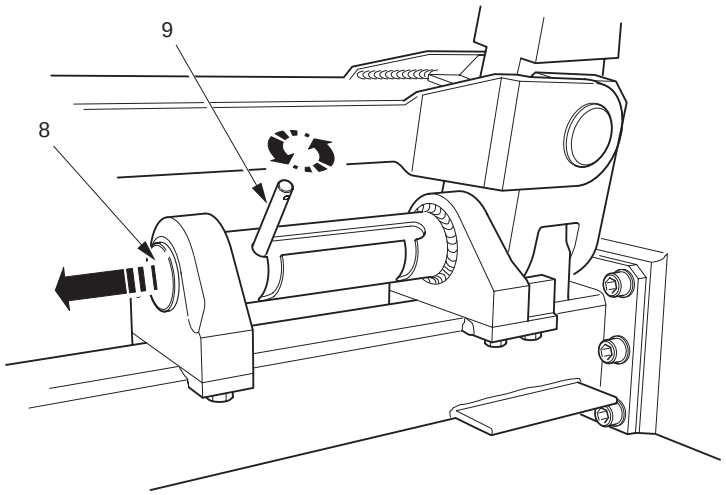
(4) If removed earlier, fit the shoot bolt pin (8) to the shoot bolt assembly (2).

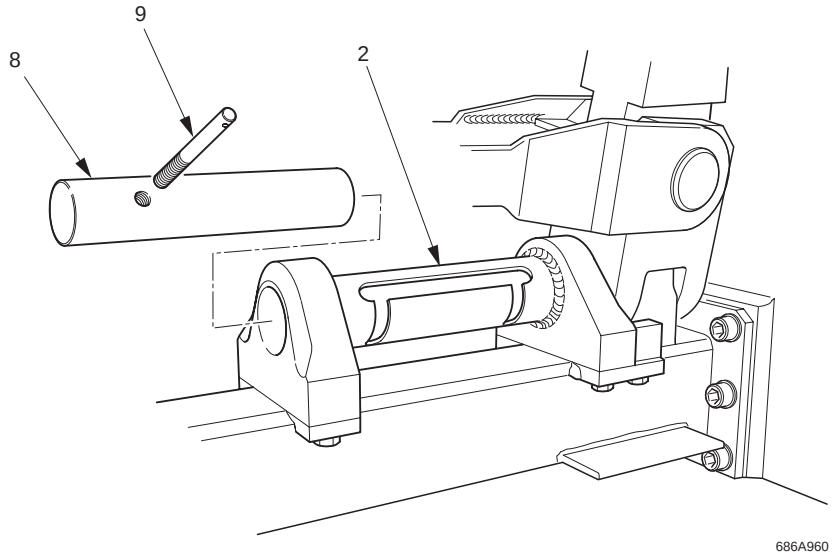
(5) Fit the shoot bolt handle (9) to the shoot bolt (8).

(6) Align the articulator cross member with the slide frame and engage the shoot bolt assemblies (2).






9
8


9
8
2
686A960

5 - 052 LAUNCH FRAME - STOW CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
O-rings (As required)

Equipment Conditions

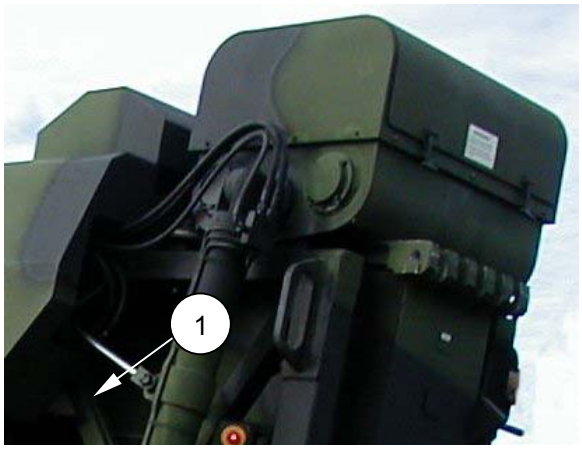
A-Frame deployed

WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE STOW CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE STOW CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STOW CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) The stowing cylinders (1) are located on the side of the launch frame and are connected to the articulator cylinder (2).

(2) Remove the launch frame guards as required. Refer to operator's TM 5-5420-279-10 Chapter 10.

(3) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(4) If required de-pressurize stow cylinder refer to unit maintenance procedure 5-123.

(5) Note the position of and remove the three hydraulic hoses (3) connected to the stow cylinder (1).

(6) Remove the bolts (4) securing the cylinder locking plate (5)

(7) Remove the stow cylinder pivot pin (6) and retain the two spacers.

(8) Support the weight of the stow cylinder (1).

(9) Remove the snap ring (7) from the stow cylinder pivot pin (8) on the launch frame mounting.

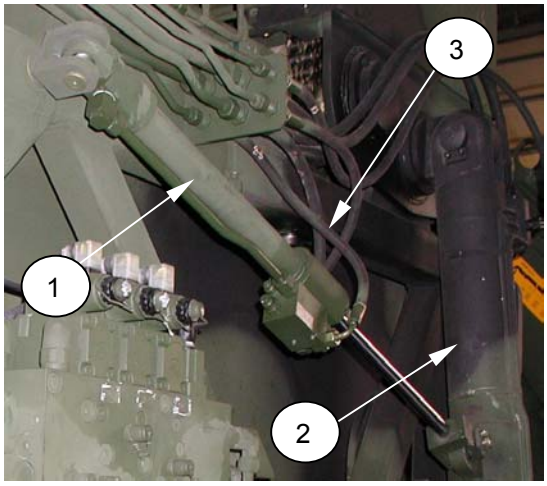
(10) Remove the stow cylinder pivot pin (8) and retain the two spacers.

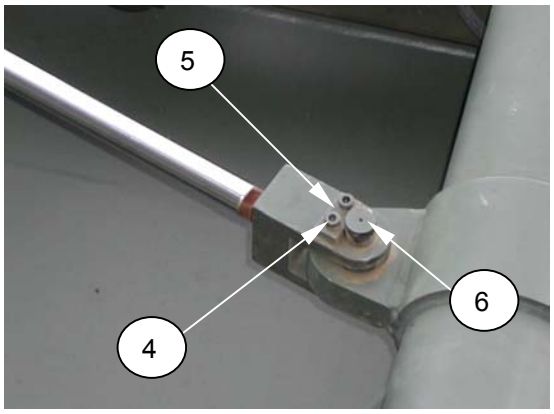
(11) Remove the stow cylinder (1).

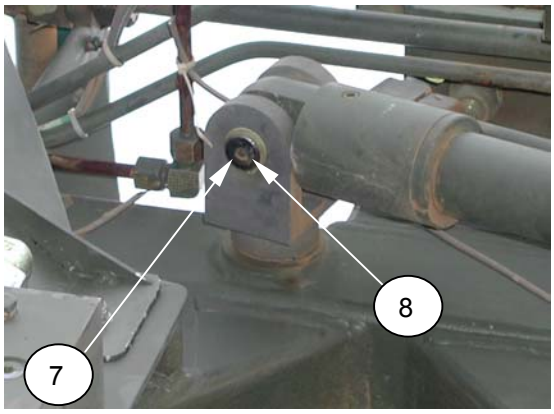
(12) Inspect components for damage and corrosion.

(13) Examine bolt heads and threads for damage.

(14) Replace components as required.







b. Install

(1) Position and support the weight of the stow cylinder (1) on the launch frame mounting.

(2) Partially insert the pivot pin (8) through the stow cylinder and fit the spacers.

(3) Insert the pivot pin (8) and secure in place with the snap ring (7).

(4) Position and support the weight of the stow cylinder (1) on the articulator cylinder mounting.

(5) Partially insert the pivot pin (6) through the stow cylinder (1) and fit the spacers.

NOTE

It may be necessary to release the Stow Cylinder bleed fitting to allow movement of the piston.

(6) Insert the pivot pin (6) and secure in place with the locking plate (5).

(7) Secure the locking plate with the two bolts (4).

(8) Fit new O-rings to hydraulic hoses and coat them with clean hydraulic fluid.

(9) Refit the three hydraulic hoses (3) in the positions noted during removal.

c. Follow on tasks

(1) Operate the stow cylinder (1) in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

5 - 053 LAUNCH FRAME - STOW CYLINDER TOP MOUNTING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

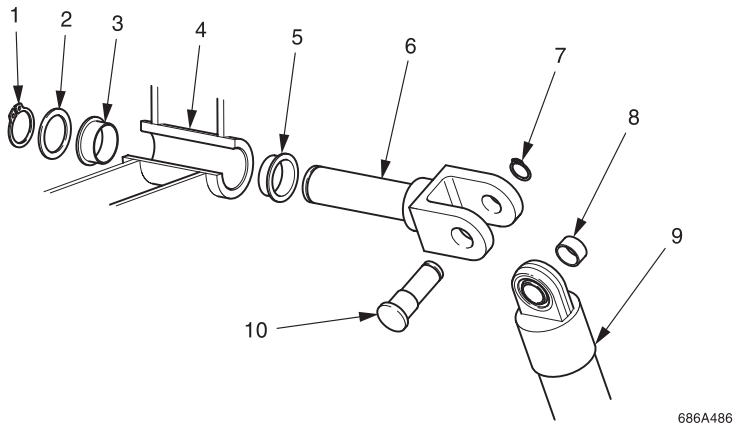
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Launch frame guards removed for access to the stow cylinder top mounting

---



a. Remove

(1) Remove the launch frame guards as necessary to gain access to the stow cylinder top mounting. See operator's manual TM 5-5420-279-10.

(2) Depressurize the hydraulic system. See unit maintenance procedure 5-118.

(3) Release the hydraulic pressure in the stow cylinder. See unit maintenance procedure 5-123.

(4) Remove the retaining ring (7) from the stow cylinder (9) top mounting.

(5) Remove the cylinder pin (10), note the positions of and retain the two spacers (8).

(6) Move the stow cylinder clear of the clevis rod (6).

(7) Remove the retaining ring (1) and washer (2).

(8) Remove the clevis rod (6) from the launch frame (4).

(9) If necessary remove the two bushings (3 and 5) from the launch frame (4).

(10) Check all components for wear and damage.

(11) Replace components as necessary.

b. Install

(1) Fit the bushings (3 and 5) to the launch frame (4).

(2) Fit the clevis rod (6) to the launch frame (4).

(3) Fit the washer (2) and the retaining ring (1) to the clevis rod (6).

(4) Position the stow cylinder (9) in the clevis rod (6).

(5) Fit the spacers (8) and the cylinder pin (10).

(6) Secure the cylinder pin (10) with the retaining ring (7).

c. Follow on tasks

(1) Fit the launch frame guards. See operator's manual TM 5-5420-279-10.

5 - 054 LAUNCH FRAME - EMERGENCY STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 8)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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NOTE

A launch frame emergency stop is fitted to each side of the launch frame.

a. Remove

(1) Remove the harness fitted to the emergency stop body (5).

(2) Remove the four screws (1) securing the cover (2) to the emergency stop body (5).

(3) Remove the cover (2) and retain the seal (3).

(4) Remove the four nyloc nuts (8), washers (7) and bolts (4) securing the emergency stop body (5) to the launch frame (6).

(5) Remove the emergency stop body (5).

(6) Examine all threaded components for wear and damage.

(7) Check the electrical cable (15) for damage.

(8) If required remove the four screws (12) and nyloc nuts (13) to remove the military connector (14).

(9) Remove the screws (11 and 9) securing the ground cable (10) to the emergency stop body (5) and cover (2).

(10) Remove the ground cable (10).

(11) Note the position of and remove the cables (15) from the contactors (16).

(12) Remove the contactors (16) by pressing down on the catch (17).

(13) Remove the carrier (18) from the emergency stop switch (22).

(14) Remove the locking plate (20) from the emergency stop switch (22) by turning the locking screw (19) counter-clockwise.

(15) Remove the emergency stop switch (22) complete with seal (21) from the cover (2).

b. Install

(1) If removed earlier, fit the emergency stop switch (22) complete with seal (21) to the cover (2).

(2) Fit the locking plate (20) to the emergency stop switch (22).

(3) Turn the locking screw (19) clockwise and tighten.

(4) Fit the carrier (18) to the emergency stop switch (22).

(5) Fit the contactors (16) to the carrier (18).

(6) Fit the cables (15) to the contactors (16) in the positions noted during removal.

(7) Fit the military connector (14) to the emergency stop body (5) with the screws (12) and new nyloc nuts (13).

(8) Fit the ground cable (10) to the cover (2) and emergency stop body (5) with the screws (9 and 11).

(9) Fit the emergency stop body (5) to the launch frame (6) with the four bolts (4), washers (7) and nyloc nuts (8).

(10) Fit the seal (3) and cover (2) to the emergency stop body (5). Check that the seal (3) is fitted correctly.

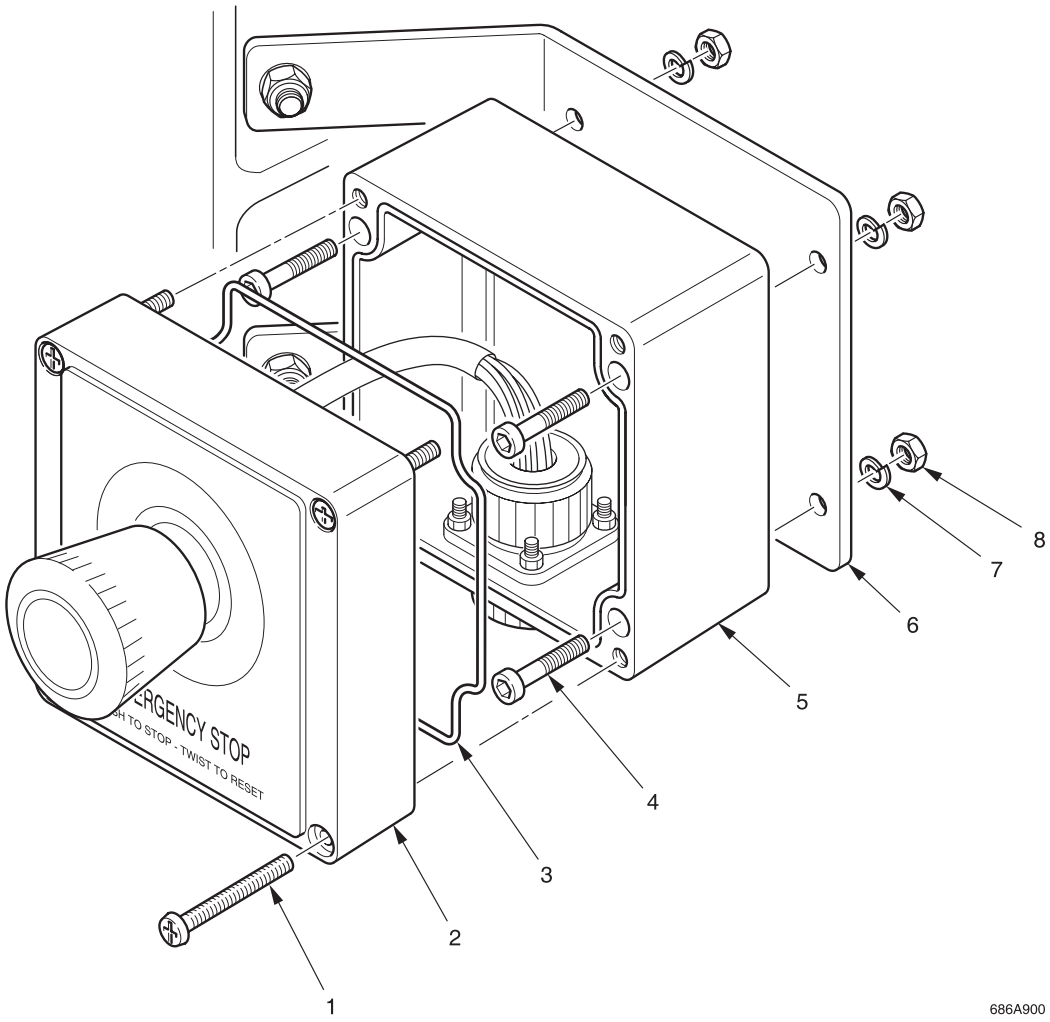
(11) Secure the cover (2) with the four screws (1).

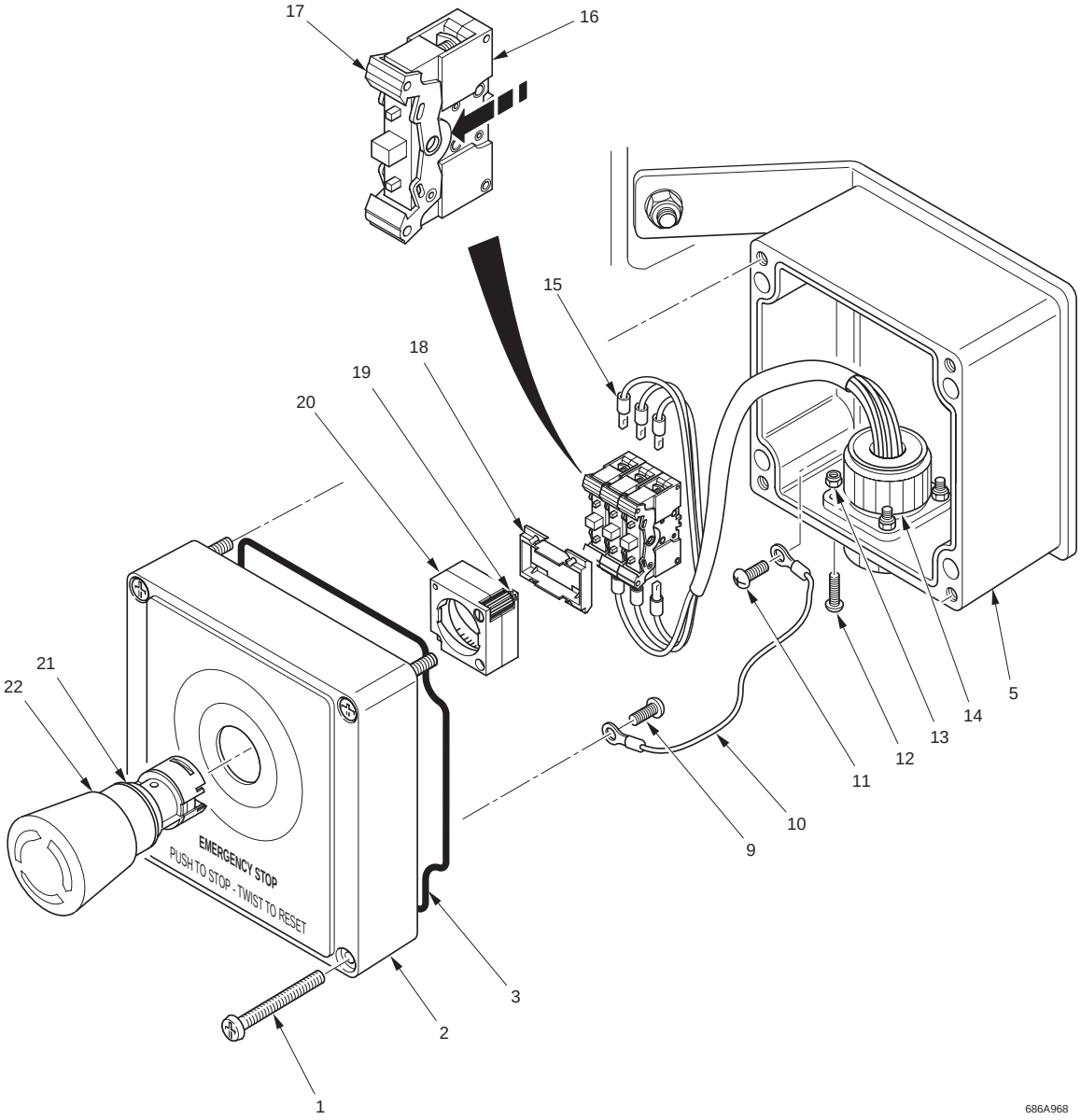
(12) Fit the harness to the emergency stop body (5).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the emergency stop.




17
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EMERGENCY STOP
PUSH TO STOP - TWIST TO RESET
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686A968

5 - 055 LAUNCH FRAME - PIN STORAGE RACK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

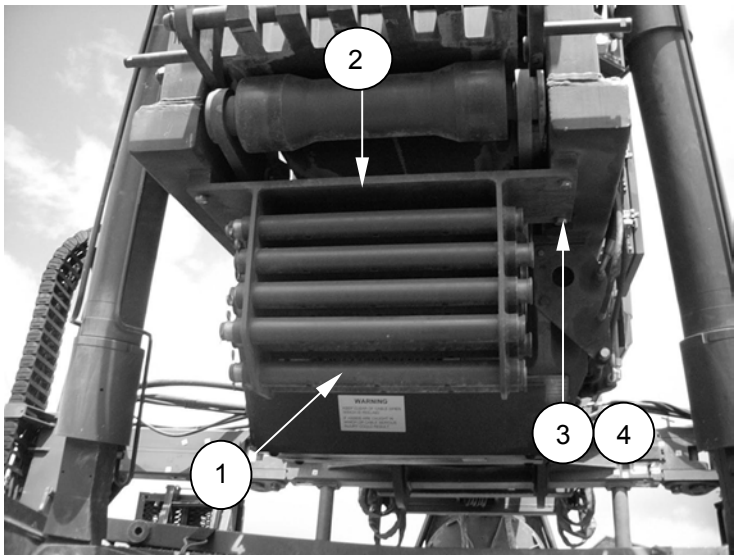
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 4)

Equipment Conditions

A-Frame deployed



a. Remove

(1) Remove the launch beam pins (1) from the launch beam pin storage rack (2).

NOTE

An empty launch beam pin storage rack (2) can be lifted by one person.

(2) Remove the four bolts (3) and lock washers (4) securing the launch beam pin storage rack (2) to the launch frame, then remove the launch beam pin storage rack (2).

(3) Check the pin storage rack for damage and corrosion.

(4) Check the bolt threads for damage.

b. Install

(1) Apply thread-locking compound to the bolts (3).

(2) Fit the pin storage rack (2) to the launch frame and secure in place with the four bolts (3) and lock washers (4).

(3) Fit the launch beam pins (1).

5 - 056 LAUNCH BEAM - FAIL SAFE ROLLER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Launch beam peg socket

Materials Required

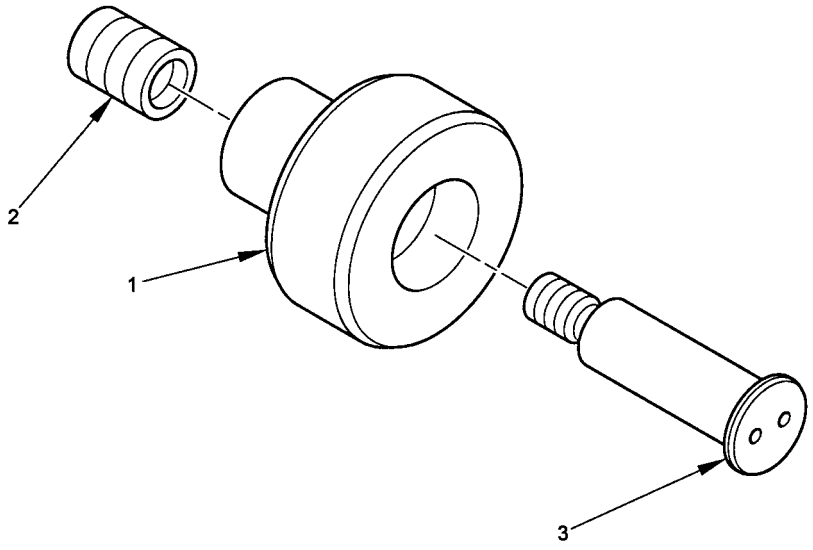
Thread locking compound, loctite 242
Antiseize compound (As required)

Equipment Conditions

Forward launch beam deployed

NOTE

This procedure is also applicable to the forward launch beam.



a. Remove

(1) Using a launch beam peg socket remove pin (3) and fail-safe roller (1).

(2) Examine condition of roller and pin

(3) Examine condition of Heli-Coil insert (2) in launch beam.

(4) Replace components as required.

b. Install

(1) Apply antiseize compound to the shaft of pin (3). Insert pin through roller (1).

(2) Apply thread-locking compound to thread of pin and secure to launch beam.

5 - 057 LAUNCH BEAM - LOCATION BLOCK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

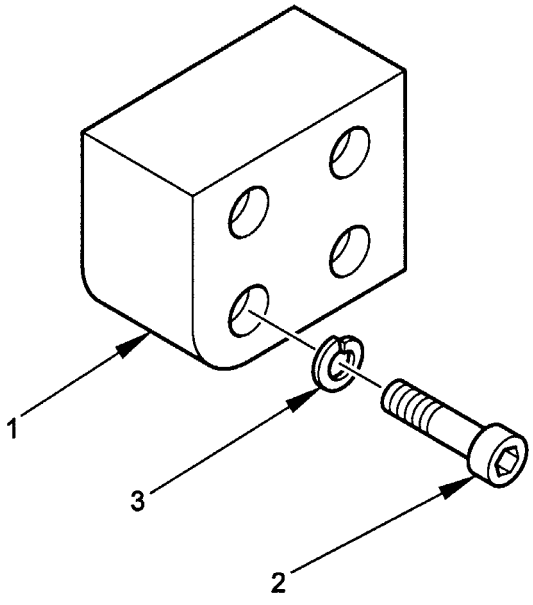
Thread locking compound, loctite 242
Lock washers (Qty 4)

Equipment Conditions

None

NOTE

This procedure is also applicable to the forward launch beam.



a. Remove

(1) Remove four screws (2) lock washers (3) and remove location block (1). Discard the lock washers (3).

(2) Examine components for damage and corrosion.

(3) Examine bolt heads and threads on screws for damage.

(4) Replace components as required.

b. Install

(1) Position location block (1) on launch beam.

(2) Apply thread locking compound to the screw threads.

(3) Secure the location block (1) with the four screws (2) and lock washers (3). Torque tighten to 41 lb/ft (55 Nm).

5 - 058 LAUNCH BEAM - CARRIAGE STOPS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

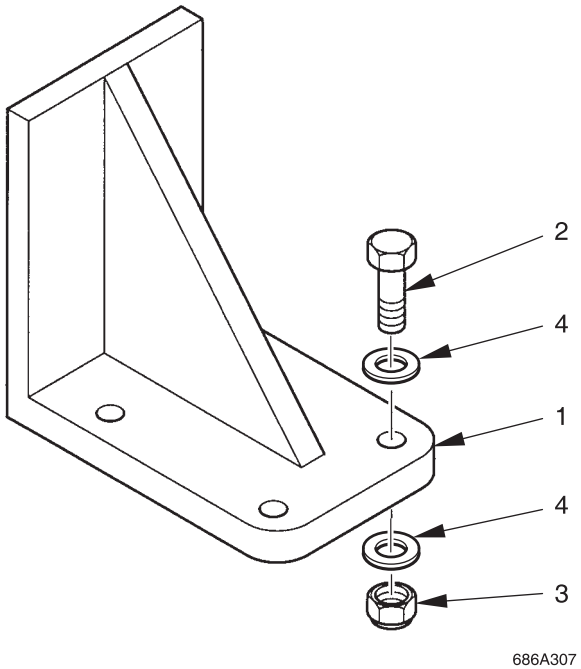
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Nyloc nuts (Qty 4)

Equipment Conditions

A-Frame deployed



NOTE

There are two carriage stops mounted to the top front of the Forward Launch Beam. These stops are only fitted to the Forward Launch Beam.

a. Remove

(1) Remove four nyloc nuts (3), washers (4) and bolts (2). Discard the nyloc nuts.

(2) Remove the stop bracket (1).

(3) Inspect stop bracket for damage and corrosion.

(4) Examine bolts for damage to bolt heads and threads.

(5) Replace components as required.

b. Install

(1) Locate stop bracket (1) on forward launch beam.

(2) Apply thread locking compound to the screw threads.

(3) Secure stop bracket using four bolts (2), washers (4) and new nyloc nuts (3).

5 - 059 LAUNCH BEAM - BUSHING RESILIENT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

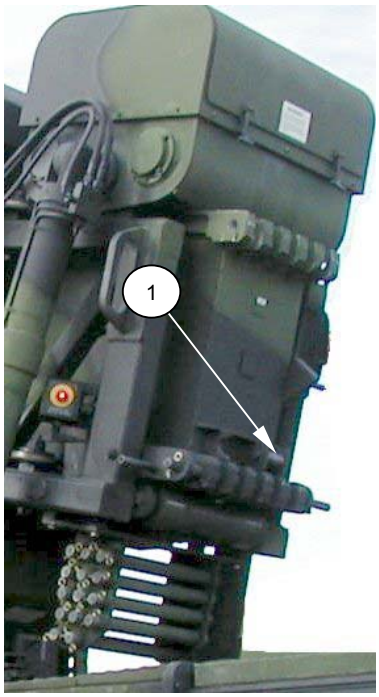
Sping pin (Qty 1)
Bushing resilient (Qty 1)

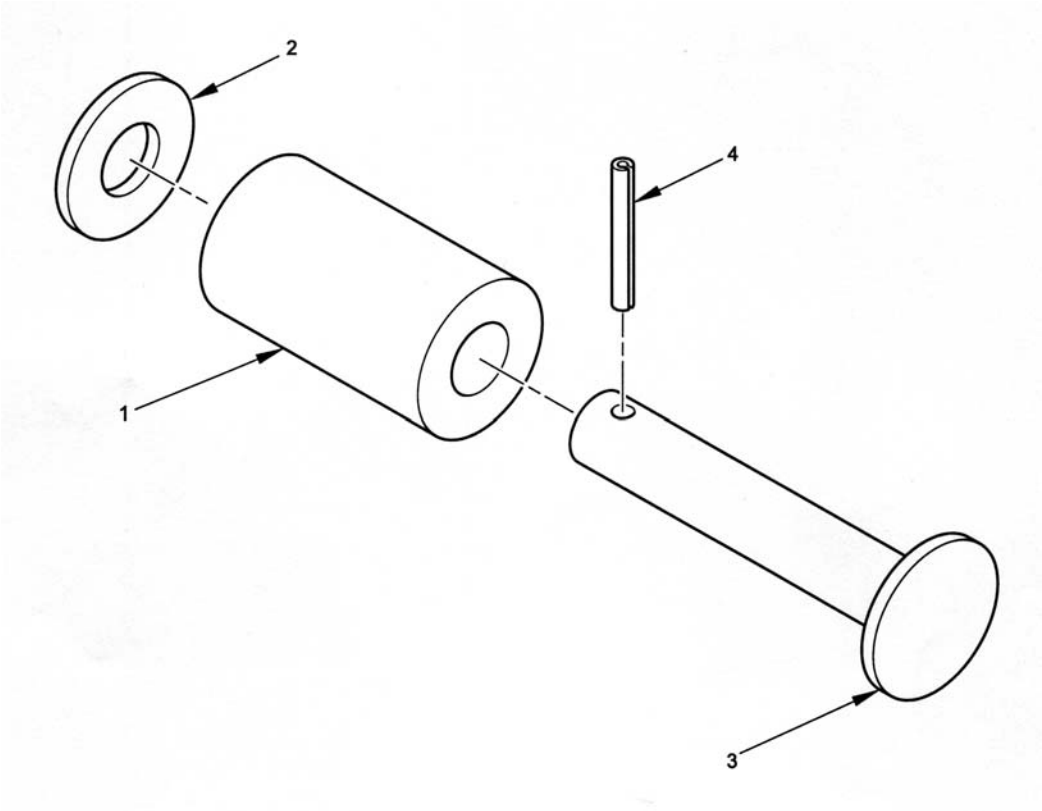
Equipment Conditions

Forward Launch Beam - A-Frame deployed
Launch Beam - On raised flat surface

NOTE

This procedure is also applicable to the forward launch beam.





NOTE

A bushing resilient is fitted to the Forward Launch Beam and to each of the Launch Beams.

a. Remove

(1) Remove spring pin (4) and washer (2). Discard spring pin.

(2) Withdraw pin (3) and remove bushing resilient (1).

(3) Examine bushing resilient (1) and pin (3) for damage and wear.

(4) Replace components as required.

b. Install

(1) Position bushing resilient (1) between its mounting brackets.

(2) Insert pin (3) with head of pin facing outwards.

(3) Fit washer (2) and secure with new spring pin (1).

5 - 060 LAUNCH BEAM - PULLEYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Material Required

Thread locking compound, loctite 243

Equipment Conditions

A-Frame deployed
Launch Beam - Partially deployed

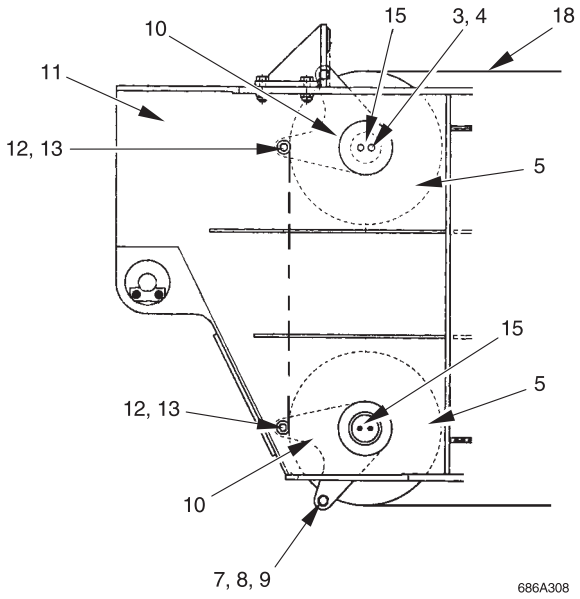
WARNING

PERSONAL INJURY. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING CABLES.

CRUSH INJURY. PULLEY ASSEMBLIES ARE HEAVY.

NOTE

This procedure details the remove and install of the upper pulley mounted in the Forward Launch Beam. The lower pulley can be removed and installed using the same procedure taking into account the positional difference. Theses pulleys are fitted to the Forward Launch Beam only.



a. Remove

(1) Disconnect the upper winch rope (18) at the termination point on the far bank carriage.

(2) Remove the spring pin (12) from the rope guide pin (13).

(3) Remove the rope guide pin (13).

(4) Remove the screws (9) and washers (8) from the space bar (7).

(5) Remove the space bar (7).

(6) Remove the screws (4) and washers (3) from the pulley pin (15).

(7) Support the weight of the pulley (5) and remove the pulley pin (15).

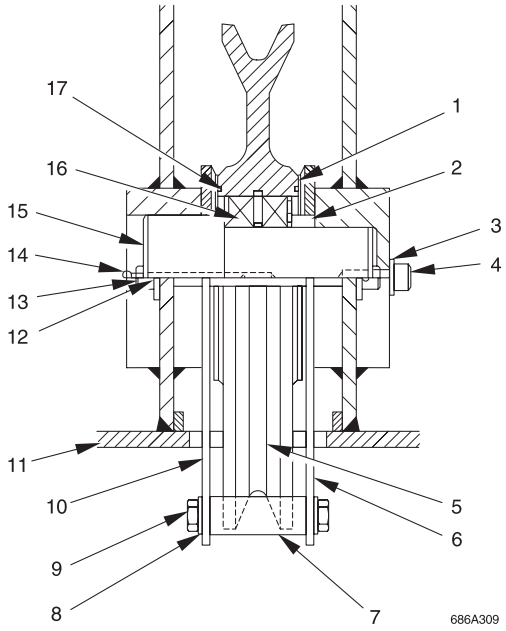
(8) Remove the pulley (5) from the forward launch beam (11).

(9) Remove the rope guide plates (6, 10).

(10) Note the position of and remove the sealing caps (1, 17), spacer (2) and bearing (16).

(11) Check all components for wear and damage.

(12) Replace components as necessary.



b. Install

(1) Fit bearing (16) to the pulley (5).

(2) Fit spacer (2) and sealing caps (1, 17).

(3) Position rope guide plates (6, 10) on pulley (5).

(4) Place and align pulley (5) with guide rope plates (6, 10) into forward launch beam (11).

(5) Insert pulley pin (15) through forward launch beam (11), guide rope plates (6, 10) and pulley (5).

(6) Apply thread-locking compound to screws (4) and secure pulley pin (15) with washers (3) and screws (4).

(7) Ensure that the winch rope is located on the pulley (5).

(8) Locate spacer bar (7) between rope guide plates (6, 10) and over the winch rope (18).

(9) Apply thread-locking compound to screws (9) and secure spacer bar (7) with washers (8) and screws (9).

(10) Insert rope guide pin (13) through forward launch beam (11) and rope guide plates (6, 10) and over the winch rope (18).

(11) Fit spring pins (12) to rope guide pin (13).

(12) Grease the bearing through the grease fitting (14) until grease seeps past the sealing caps (1, 17). Rotate the pulley (5) to ensure even distribution of grease in the bearing (16).

(13) Connect the winch rope (18) to the termination point on the far bank carriage.

c. Follow on task

(1) Check the operation of the upper winch, forward launch beam, and far bank carriage ensuring that the pulley (5) and winch rope run freely.

5 - 061 FAR AND HOME BANK CARRIAGE - RESTRAINT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

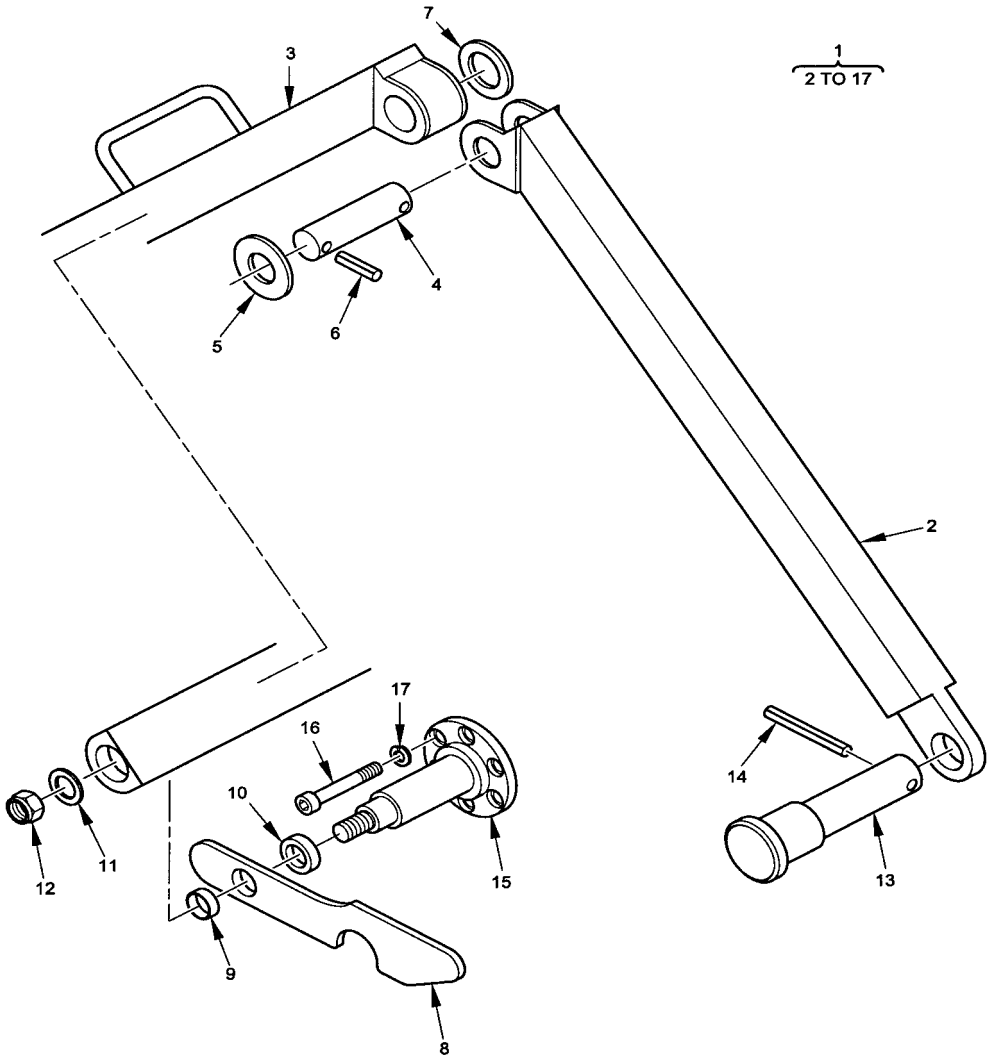
Materials Required

Thread locking compound, loctite 242
Nyloc nuts (Qty 1)
Lock washers (Qty 6)

Equipment Conditions

A-Frame deployed
A-Frame in lowered position





NOTE

The Carriage restraint can be changed in either the closed or open position.

The procedure for changing the left and right hand Carriage Restraint is identical.

The left and right hand Carriage Restraint Arms are identical.

It may be necessary to relax the tension on the winches to carry out this operation.

a. Remove

(1) There is a carriage restraint (1) on either side of the launch frame. They are fitted between the launch frame and the rear carriage.

(2) Remove the nyloc nut (12) and the plain washer (11) which hold the carriage latch arm (3) onto the stub shaft (15) and discard the nyloc nut (12).

(3) If the carriage restraint (1) is in the closed position rotate the carriage latch (8) upwards until the hooked end is clear of the latch pin (13).

(4) Slide the carriage latch (8) off the stub shaft (15).

(5) Remove the spacer (10) from the stub shaft (15).

(6) Remove and discard the split dowel tension pin (14) that locks the latch pin (13) to the rear carriage.

(7) Remove the latch pin (13).

(8) Remove the carriage restraint arms (2) and (3).

(9) Replace the carriage restraint with a new item.

(10) If required the carriage restraint arms (2) and (3) can be separated by removing the split dowel pins (6), washers (5), wear washer (7) and hinge pin (4).

(11) Examine the latch pin (13) for wear and distortion.

(12) Examine the latch pin housing in the rear carriage for wear and distortion; report any excessive wear or distortion to the engineering supervisor.

(13) Examine the stub shaft (15) for wear and distortion.

(14) To replace the stub shaft (15) unscrew the six capscrews (16) and the lock washers (17), remove the stub shaft (15). Discard the lock washers (17). Fit the replacement item; fit the six lock washers (17) and capscrews (16) then tighten using thread locking compound on the screw threads.

(15) Examine the spacer (10) for wear.

(16) Check the bush (9) in the carriage latch (8) for wear.

(17) Examine all components for damage, corrosion and wear, replace as necessary.

b. Install

(1) Slide the latch pin (13) through the carriage restraint arm (2) and insert the latch pin (13) into the latch pin housing on the rear carriage.

(2) Ensure that the hole in the latch pin (13) is lined up with the access hole in the latch pin housing then fit a new split dowel tension pin (14).

(3) Slide carriage restraint arm (3) onto the stub shaft (15).

(4) Fit the spacer (10) onto the stub shaft (15).

(5) Fit the rear carriage restraint latch (8) onto the stub shaft (15)

(6) If the carriage restraint is in the closed position lower the hooked end of the carriage latch (8) onto the latch pin (13).

(7) Fit the plain washer (11) and nyloc nut (12) and tighten.

(8) Check the operation of the carriage latch to ensure smooth operation, over-tightening will prevent this.

(9) Check the operation of the carriage restraint.

5 - 062 FAR AND HOME BANK CARRIAGE - TOP ROLLER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

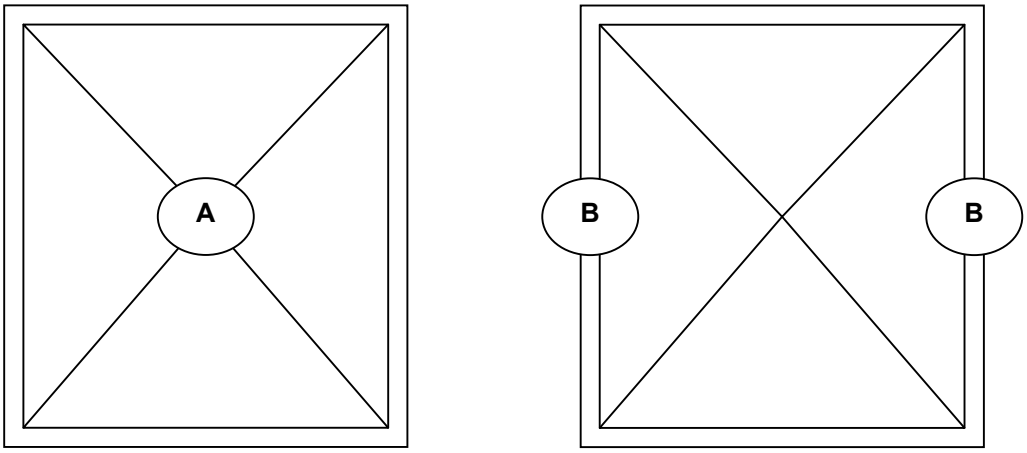
Tool Kit, General Mechanic's, Automotive (GMTK)

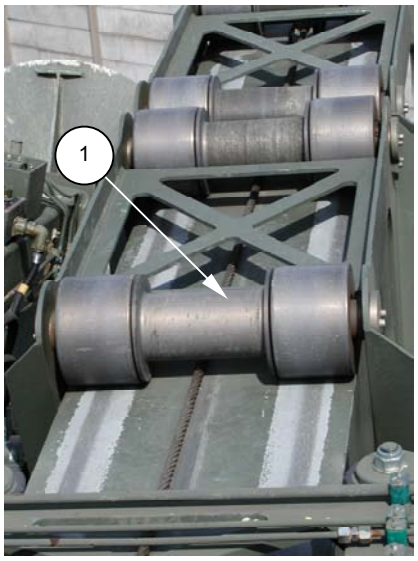
Materials Required

Anti-Seize Compound
Thread Locking compound, loctite 242
Lock washers (Qty 4)

Equipment Conditions

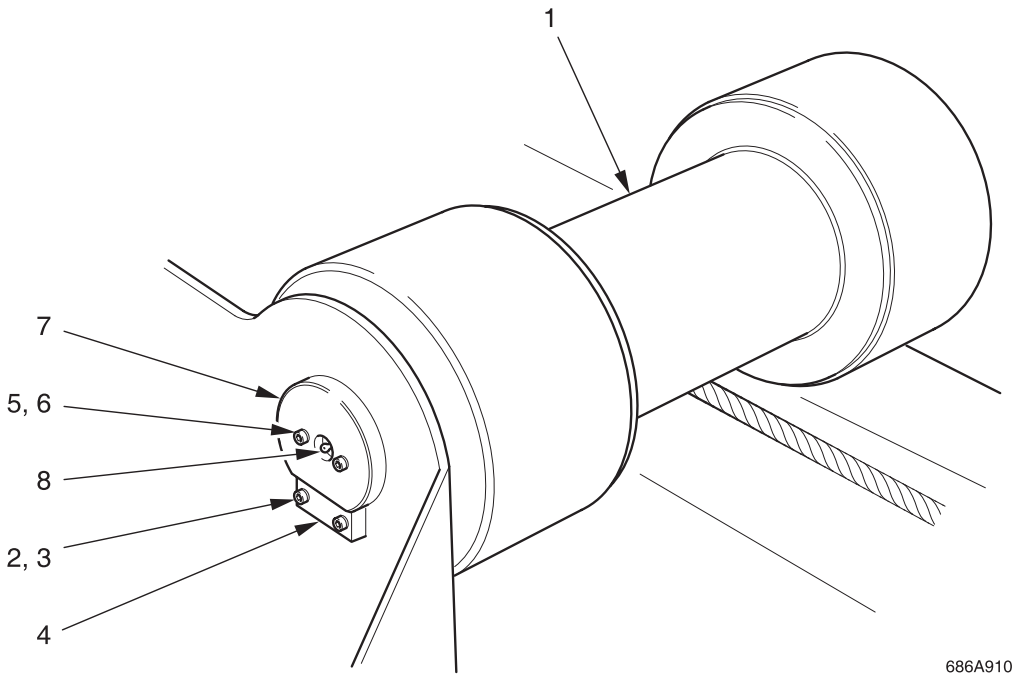
A-Frame Unfolded





NOTE

The procedure for changing the front and rear Carriage Top Roller assemblies is identical.



a. Remove

(1) Support the weight of the carriage using a sling and a lifting device, in sling position A.

(2) Remove the two screws (2) and lock washers (3), which hold the locking plate (4) in place, remove the locking plate (4). Discard the lock washers (3).

(3) Remove and retain the grease fittings at each end of the roller shaft (8).

(4) Remove the two screws (5) and the lock washers (6) which lock the end cap (7) to the roller shaft (8), remove the end cap (7), mark the end cap to ensure correct orientation and position when refitting. Retain the end cap spacers. Discard the lock washers (6).

(5) Repeat operations 2, 3 and 4 at the opposite end of the top roller assembly (1).

(6) Support the carriage by placing a block of wood under the carriage cross member and remove the sling.

(7) Attach the sling to the roller.

(8) Move the roller assembly (1) to one side and then lift the top roller assembly (1) clear using the sling and crane.

(9) Examine the end caps (7) for wear and distortion.

(10) Examine the roller shaft (8) for wear and distortion.

(11) Examine bolt heads and threads on screws for damage.

(12) Examine all components for damage and corrosion.

(13) Replace as necessary.

b. Install

(1) Lift the top roller assembly (1) into position using the sling and lifting device.

(2) Fit the top roller assembly (1) into the carriage.

(3) Remove the sling.

(4) Support the weight of the carriage with the sling in position B and remove the wooden block.

(5) Apply anti-seize compound to the roller shaft.

(6) Fit the two spacers and end caps (7), ensure that they are correctly fitted and orientated.

NOTE

It may be necessary to release tension and allow for the alignment of the Roller Assembly in the Carriage.

(7) Fit the two screws (5) the lock washers (6) and lock the end cap (7) to the shaft (8) using thread-locking compound on the screw threads.

(8) Repeat step 7 at the opposite end of the top roller assembly (1).

(9) Align the flat on the end cap (7) to allow the fitting of the locking plate (4).

(10) Fit the locking plate (4) and secure with the screws (2) and lock washers (3) using thread-locking compound on the screw threads.

(11) Repeat operations 9 and 10 at the opposite end of the top roller assembly (1).

(12) Fit the grease fittings at each end of the top roller assembly.

(13) Grease the top roller assembly through the grease fittings.

(14) Check the top roller assembly (1) for free rotation.

(15) Remove the sling.

5 - 063 FAR AND HOME BANK CARRIAGE - TOP ROLLER BEARINGS

This task covers:

a. Remove b. Inspect c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

Top roller removed from Home or Far bank carriage

---

a. Remove

(1) Remove the top roller from the far or home bank carriage. See unit maintenance procedure 5-062.

(2) Remove the retaining ring (1).

(3) Remove the spacers (2 and 3) and washer (15).

(4) Remove the roller (4) complete with bearings (13), seals (14), washer (15), spacer (5) and retaining ring (6) from the shaft (11).

(5) Remove the spacer sleeve (7).

(6) Remove the roller rope guide (10) complete with bearings (8) and spacer tube (9) from the shaft (11).

(7) Carry out steps 2, 3, 4 and 6 to the opposite roller.

(8) If required note the position of and remove retaining ring (6), spacer (5), bearings (13), seals (14) and washer (12) from the roller (4).

b. Inspect

(1) Check all components for wear and damage.

(2) Ensure that all grease ports are clean.

c. Install

(1) Refer to general unit maintenance procedure 5-158 to assemble the top roller bearings.

(2) Fit sleeve tube (9) to the shaft (11).

(3) Place shaft (11) inside rope roller guide (10).

(4) Fit bearings (8) to each end of the rope roller guide (10).

(5) Fit the spacer sleeves (7) to the shaft (11).

(6) Fit the bearings (13) and seals (14) to the roller (4).

(7) Fit the washers (12) and (15) to the roller (4).

(8) Fit the spacer (5) and retaining ring (6) to the roller (4).

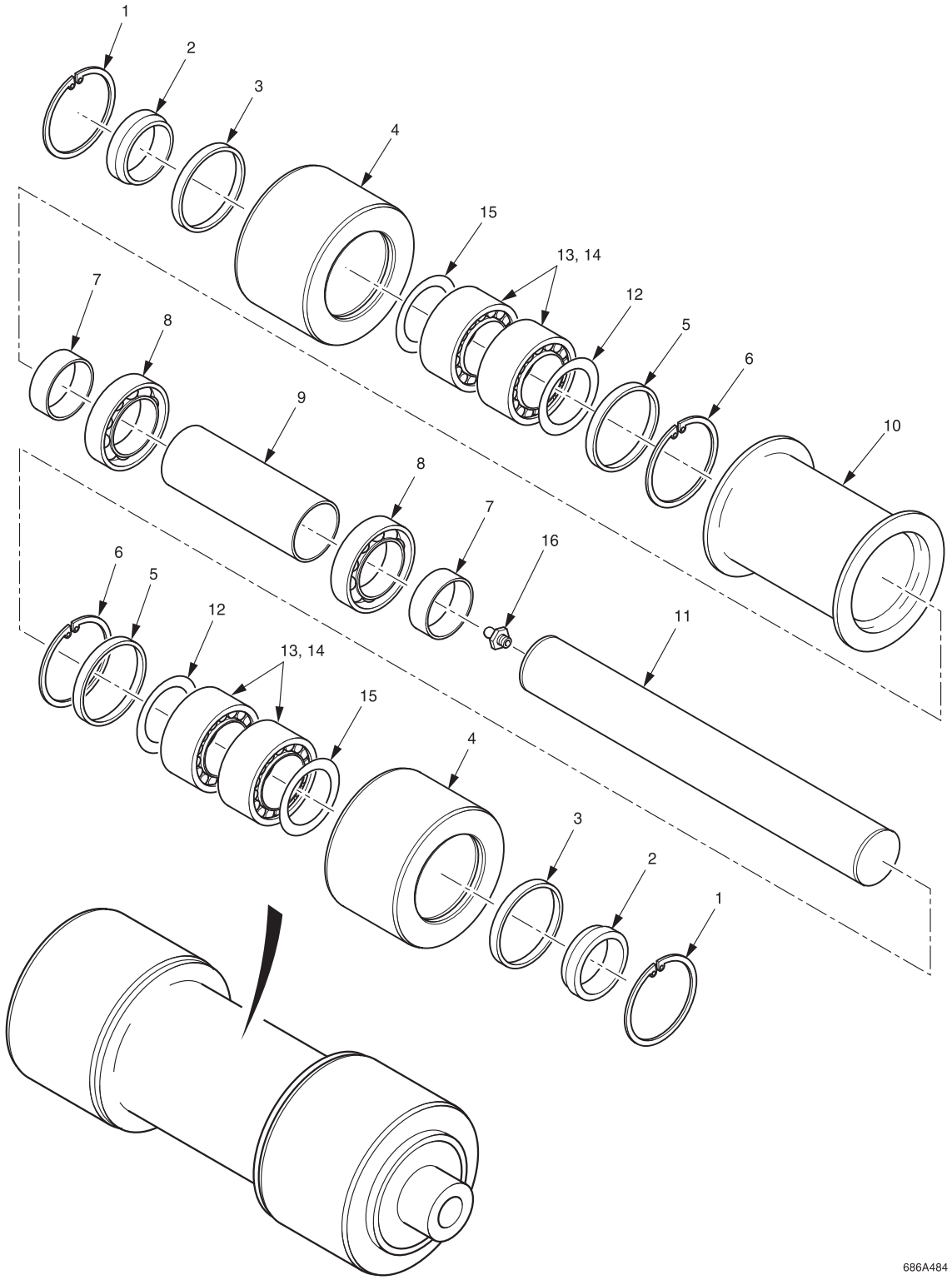
(9) Fit the roller to the shaft (11).

(10) Fit the spacers (3 and 2) to the shaft (11).

(11) Fit the retaining ring (1) to the roller (4).

(12) Carry out steps 5 to 11 for the opposite roller.

(13) Grease the assembly through the grease fittings (16) at each end of the shaft (11).


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686A484

5 - 064 FAR AND HOME BANK CARRIAGE - SIDE ROLLERS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

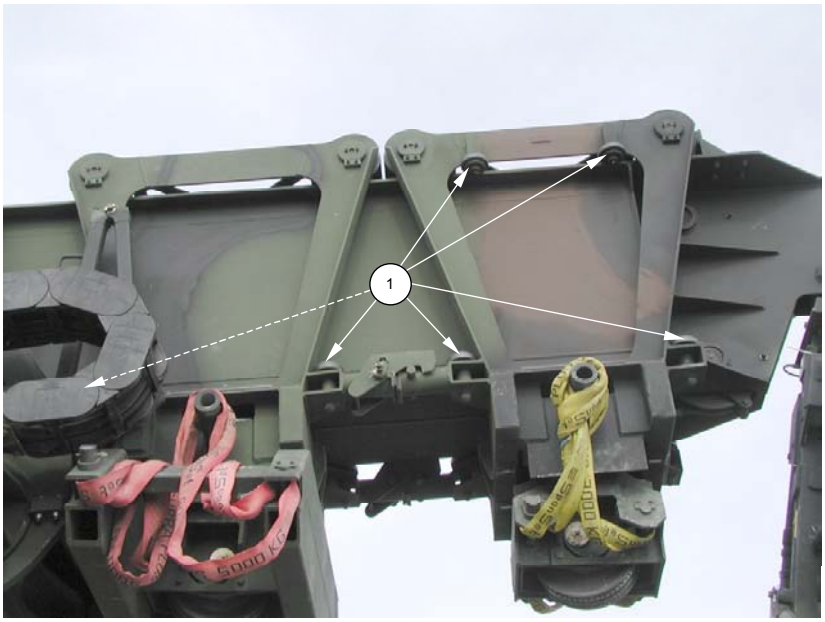
Tool Kit, General Mechanic's, Automotive (GMTK)
Brass bar, Rubber hammer (Common No 1)

Materials Required

Antiseize compound
Nyloc nut (Qty 1)
Roller assembly (Qty 1)

Equipment Conditions

A-Frame Unfolded



NOTE

There are four upper and lower side rollers fitted to the Far Bank Carriage.

There are four lower side rollers fitted to the Home Bank Carriage

The procedure for changing the left and right hand roller assemblies is identical.

a. Remove

(1) Remove the nyloc nut (7) and washer (8), discard the nut (7).

(2) Drive the roller shaft (2) upward from its housing on the carriage and from the roller (4) using a hammer and a brass drift.

CAUTION

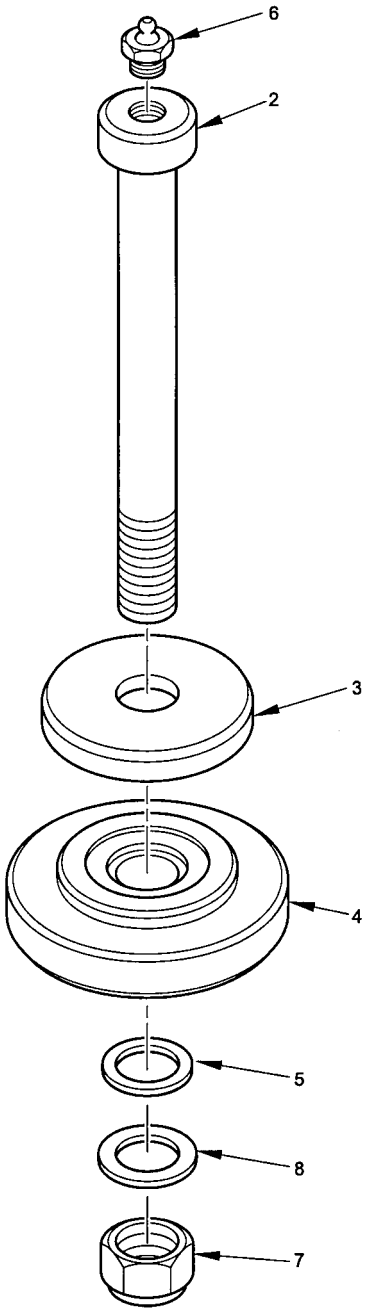
Damage to roller shaft. Do not hammer on the roller assembly.

(3) Remove the top cap (3) and roller assembly (4) and thrust washer (5).

(4) Examine all components for damage and corrosion.

(5) Examine the roller shaft (2) housing on the carriage frame for distortion and corrosion.

(6) Examine the grease fitting (6) on the end of the roller shaft (2) for damage, replace if necessary.



b. Install

(1) Position the top cap (3), thrust washer (5) and a new roller assembly (4) on the carriage.

(2) Remove the grease fitting (6) from the roller shaft (2).

(3) Coat the roller shaft (2) with anti-seize compound then insert the roller shaft (2) through the top cap (3) and roller (4).

(4) Refit the grease fitting (6) to the roller shaft (2).

(5) Fit the plain washer (8) and nyloc nut (7) then tighten.

c. Follow on tasks

(1) Grease the roller shaft (2) through the grease fitting (6).

(2) Check the roller assembly (4) for free rotation.

5 - 065 FAR AND HOME BANK CARRIAGE - HOME BANK LATCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

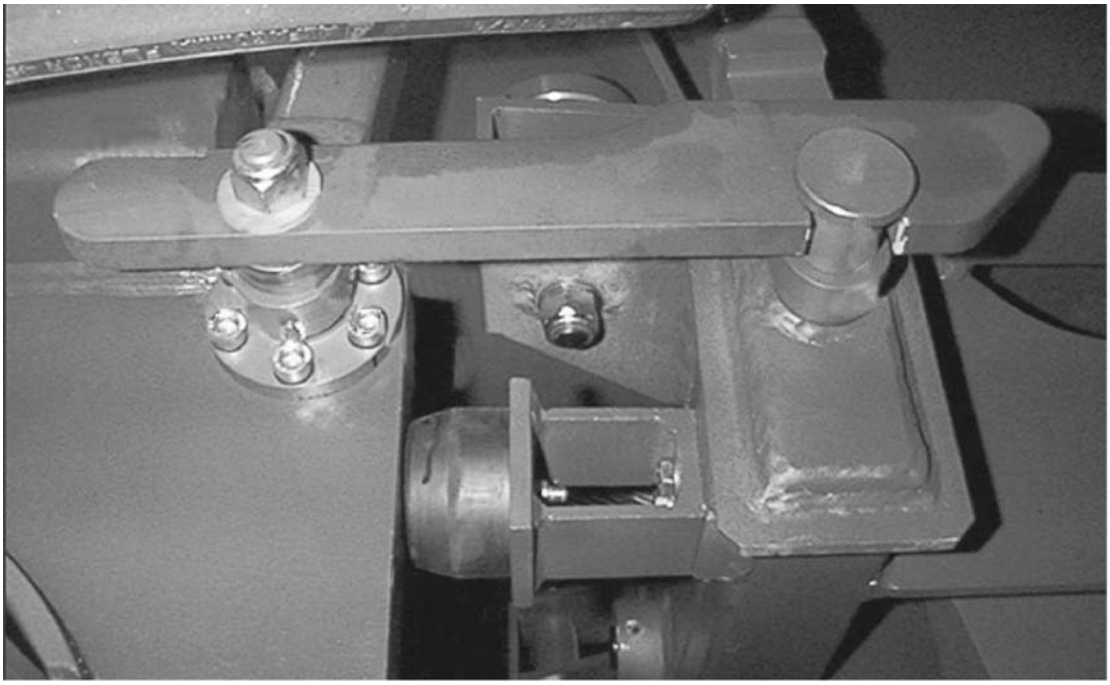
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials

Nyloc Nut (Qty 1)

Equipment Conditions

A-Frame deployed



NOTE

It may be necessary to relax the tension on the winches to carry out this operation.

The procedure for changing the left and right hand Rear Carriage Restraint Latches is identical.

The left and right hand Rear Carriage Restraint Latches are identical.

a. Remove

(1) There is a rear carriage restraint latch (1) fitted to the lower frame member on either side of the launch frame.

(2) Remove the nyloc nut (2) and the plain washer (3), which hold the carriage latch (1) onto the hinge, pin (4).

(3) Rotate the carriage latch (1) upwards until the hooked end is clear of the latch pin (5).

(4) Slide the carriage latch (1) off the hinge pin (4).

(5) Replace the rear carriage latch (1) with a new item.

(6) Check the bushing (6) in the new carriage latch.

(7) Examine the hinge pin (4) for wear and distortion.

(8) Examine the latch pin (5) for wear and distortion.

(9) Examine the spacer (7) for wear.

(10) Replace the nyloc nut (2) with a new item.

(11) Examine all components for damage and corrosion.

(12) Replace as necessary.

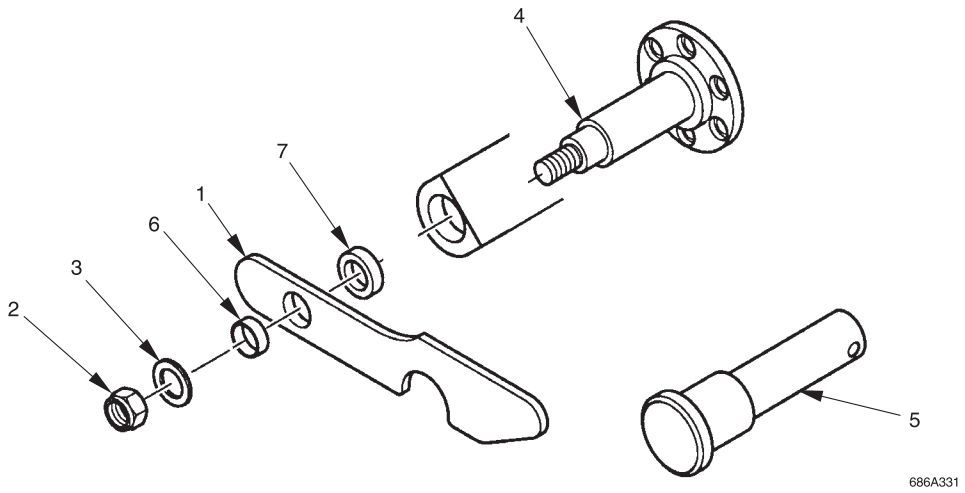
b. Install

(1) Fit the rear carriage restraint latch (1) onto the hinge pin (4).

(2) Lower the hooked end of the carriage latch (1) onto the latch pin (5).

(3) Fit the new plain washer (3) and nyloc nut (2) and tighten.

(4) Check the operation of the carriage latch (1) to ensure smooth operation.



5 - 066 FAR AND HOME BANK CARRIAGE - BUFFER STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

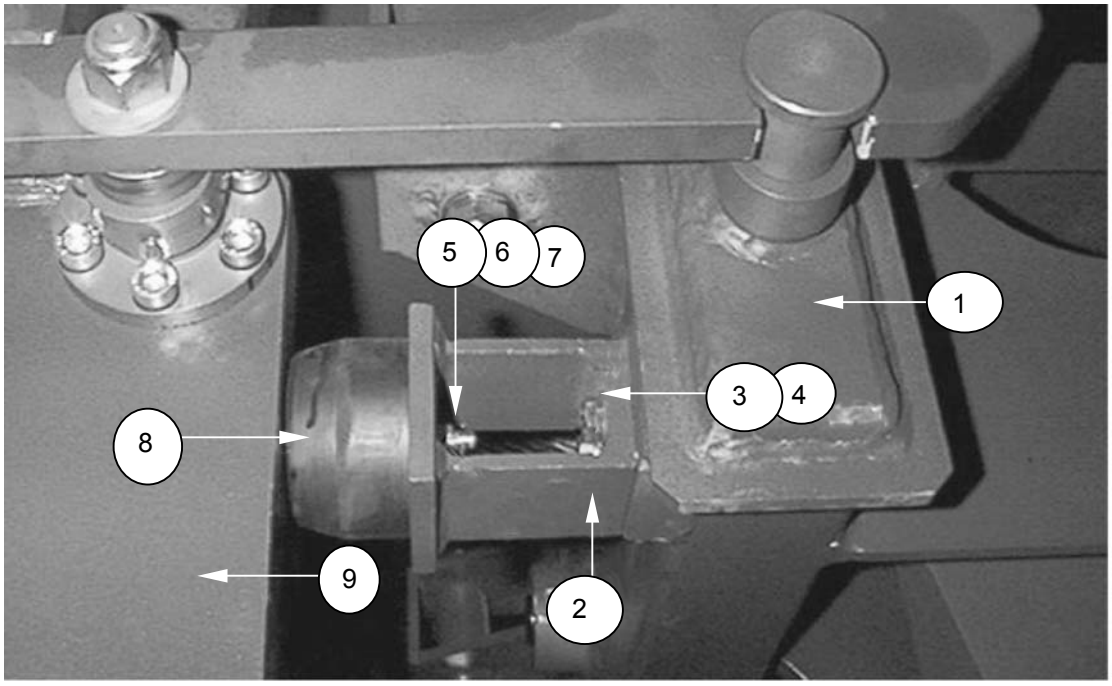
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nut (Qty 1)
Buffer
Lock washers (Qty 2)

Equipment Conditions

A-Frame deployed.
A-Frame in Lowered Position



NOTE

This procedure is only applicable to the home bank carriage.

It may be necessary to relax the tension on the winches to carry out this operation.

The left and right hand Carriage Buffers are identical.

a. Remove

(1) The two carriage buffers are located one on either side of the rear carriage (1) where it meets the launch frame (9).

(2) Remove the carriage buffer mount (2) by removing the two set screws (3) and the lock washers (4). Discard the lock washers (4).

(3) Slide the carriage buffer mount (2) from between the rear carriage (1) and the launch frame (9).

(4) Remove the nyloc nut (5), plain washer (6) and bolt (7) holding the buffer (8) to the carriage buffer mount (2).

(5) Discard the buffer (8) and the nyloc nut (5).

(6) Examine all components for damage and corrosion.

b. Install

(1) Fit a new buffer (8) to the carriage buffer mount and using a new nyloc nut (5) the plain washer (6) and bolt (7).

(2) Slide the carriage buffer mount (2) between the rear carriage (1) and the launcher frame (9).

(3) Apply thread locking compound to the two set screws(3).

(4) Refit the two set screws (3) and new lock washers (4) and tighten.

5 - 067 FAR AND HOME BANK CARRIAGE - WEAR PAD

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Material Required

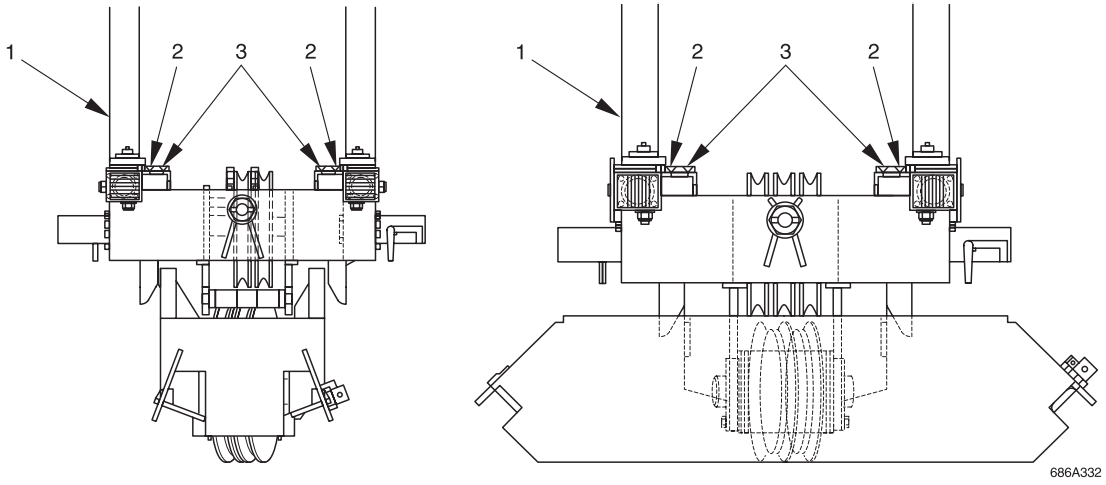
Thread locking compound, loctite 243
Wear pads (As required)

Equipment Conditions

A-Frame unfolded

WARNING

CRUSH INJURY. THE FAR BANK AND HOME BANK CARRIAGES ARE VERY HEAVY SUITABLE LIFTING EQUIPMENT IS TO BE USED WHEN REMOVING THE CARRIAGES FROM THE LAUNCH BEAM.



NOTE

Each carriage has four wear pads (3). This procedure applies to the removal of all wear pads fitted to the carriages.

a. Remove

(1) Remove the top rollers of the carriage under repair. See unit maintenance procedure 5-062.

(2) Lower the carriage onto the launch beam, this will give enough clearance at the underside of the carriage to gain access to the wear pads.

(3) Remove the screws (2).

(4) Remove the wear pads (3)

(5) Check the screws (2) for wear and damage.

b. Install

(1) Fit new wear pads (3) to the carriage.

(2) Apply thread-locking compound to the screws (2).

(3) Secure the wear pads (3) to the carriage with the screws (2).

(4) Raise the carriage and fit the top rollers. See unit maintenance procedure 5-062.

5 - 068 FAR AND HOME BANK CARRIAGE - ROPE GUIDE ROLLER

This task covers:

a. Service b. Remove c. Install

INITIAL SETUP:

Tools Required

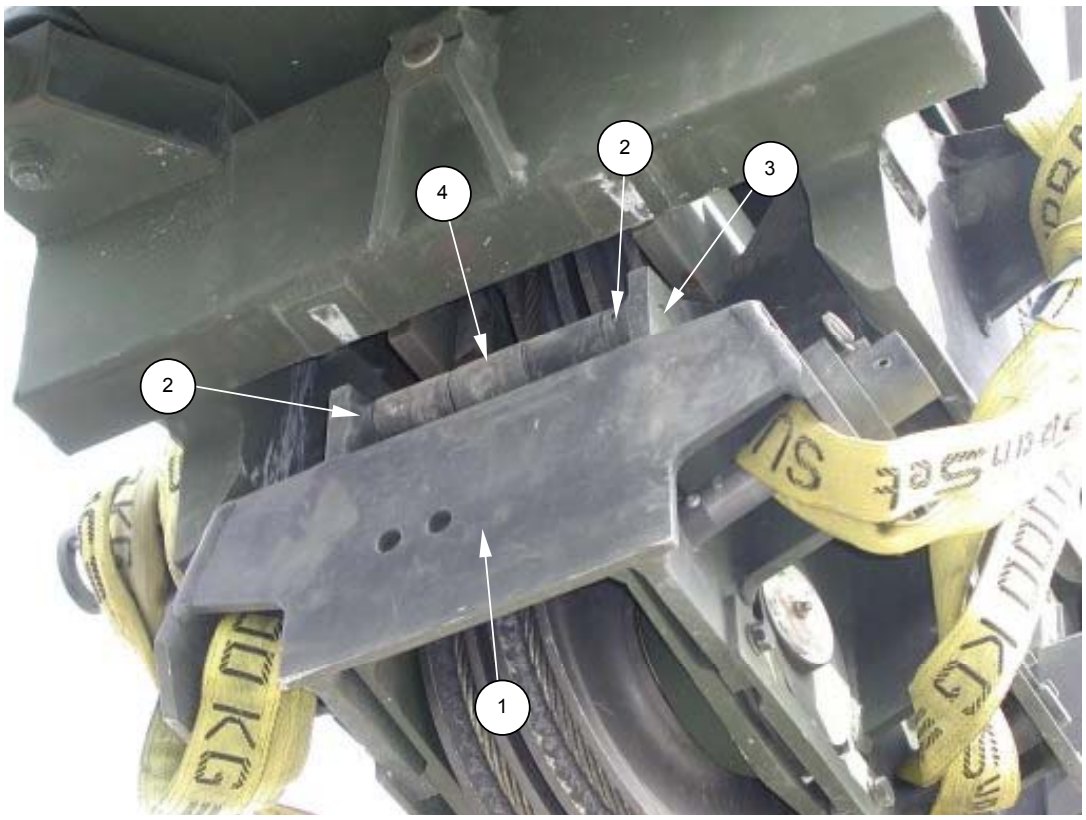
Tool Kit, General Mechanic's, Automotive (GMTK)

Material Required

None

Equipment Conditions

Far Bank Carriage Lower Pulley Block deployed



a. Service

(1) The rope guide roller (4) is made up of three sections. If the one section has excessive wear or damage from the winch rope, one of the outer sections may be swapped with the worn or damaged section. This may only be carried out once, then the rope guide roller (4) must be completely replaced.

b. Remove

(1) Deploy the far bank carriage lower pulley block (1) to gain access to the rope guide roller (4).

(2) Remove the spring pins (2).

(3) Remove the roller shaft (3).

(4) Remove the rope guide roller (4).

(5) Check the spring pin and roller shaft for damage and wear.

(6) Change components as required.

c. Install

(1) Place the rope guide roller in the lower pulley block (1).

(2) Fit the roller shaft (3) through the lower pulley block (1) and the rope guide roller (4).

(3) Fit the spring pins (2).

(4) Check that the rope guide roller is free to rotate.

(5) Stow the lower pulley block (1).

5 - 069 FAR AND HOME BANK CARRIAGE - RELEASE LOCK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Far bank carriage deployed to gain access

NOTE

This procedure is only applicable to the home bank carriage.

a. Remove

(1) Remove the spring pin (7), washer (6) and R clip (4).

(2) Remove carriage latch cam (3).

(3) Remove spring pin (15).

(4) Remove shaft (2) and retain spacers (12).

(5) Remove latch assembly (1) from the buffer assembly (13).

(6) If required remove the adjusting screw (8), nut (9) and washer (10) from the latch assembly (1).

(7) Check all components for wear and damage.

(8) Check the condition of the thread insert (11) in the latch assembly (1).

(9) Check all components for corrosion.

(10) Clean or replace components as necessary.

b. Install

(1) Locate the latch assembly (1) on the buffer assembly (13).

(2) Position the spacers (12) between the latch assembly (1) and the buffer assembly (13).

(3) Insert the shaft (2) from the outside through the latch assembly (1), spacer (12), buffer assembly (13), spacer (12) and latch assembly (1).

(4) Fit the spring pin (15) through the latch assembly (1) and buffer assembly (13) into the shaft (2).

(5) Fit the cam (3) on the shaft (2) with the cam facing up and the spring pin (5) in the shaft recess.

(6) Fit the R clip (4) through the cam (3) and shaft (2).

(7) If previously removed, fit the nut (9) and washer (10) to the adjusting screw (8) and fit the adjusting screw (8) to the latch assembly (1).

(8) Recover the far bank carriage so that the latch assembly (1) engages with the far bank carriage buffer post.

(9) Adjust the adjusting screw (8) until the latch assembly (1) has a gap of 1/8 inch (2.1 mm) at the center line of the far bank carriage buffer post.

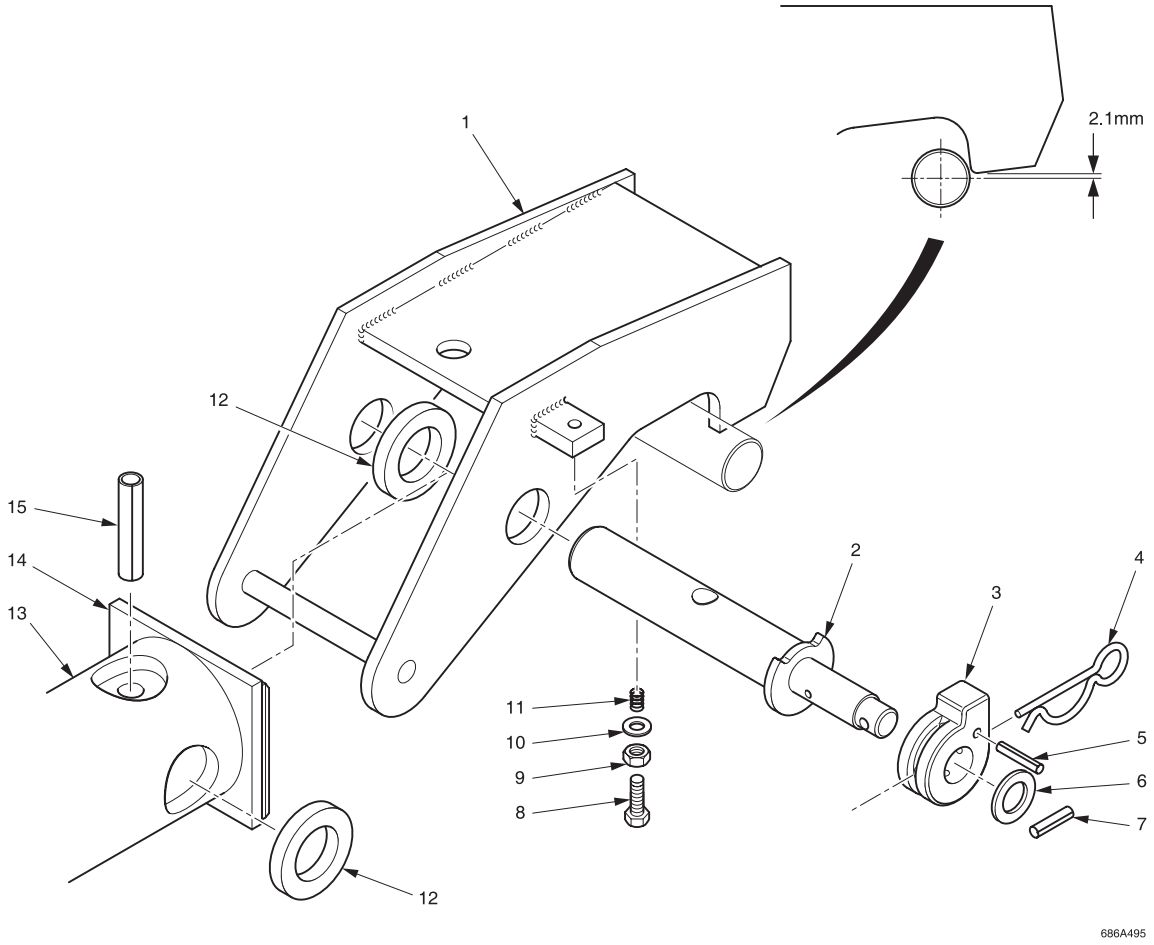
(10) Tighten the lock nut (9).

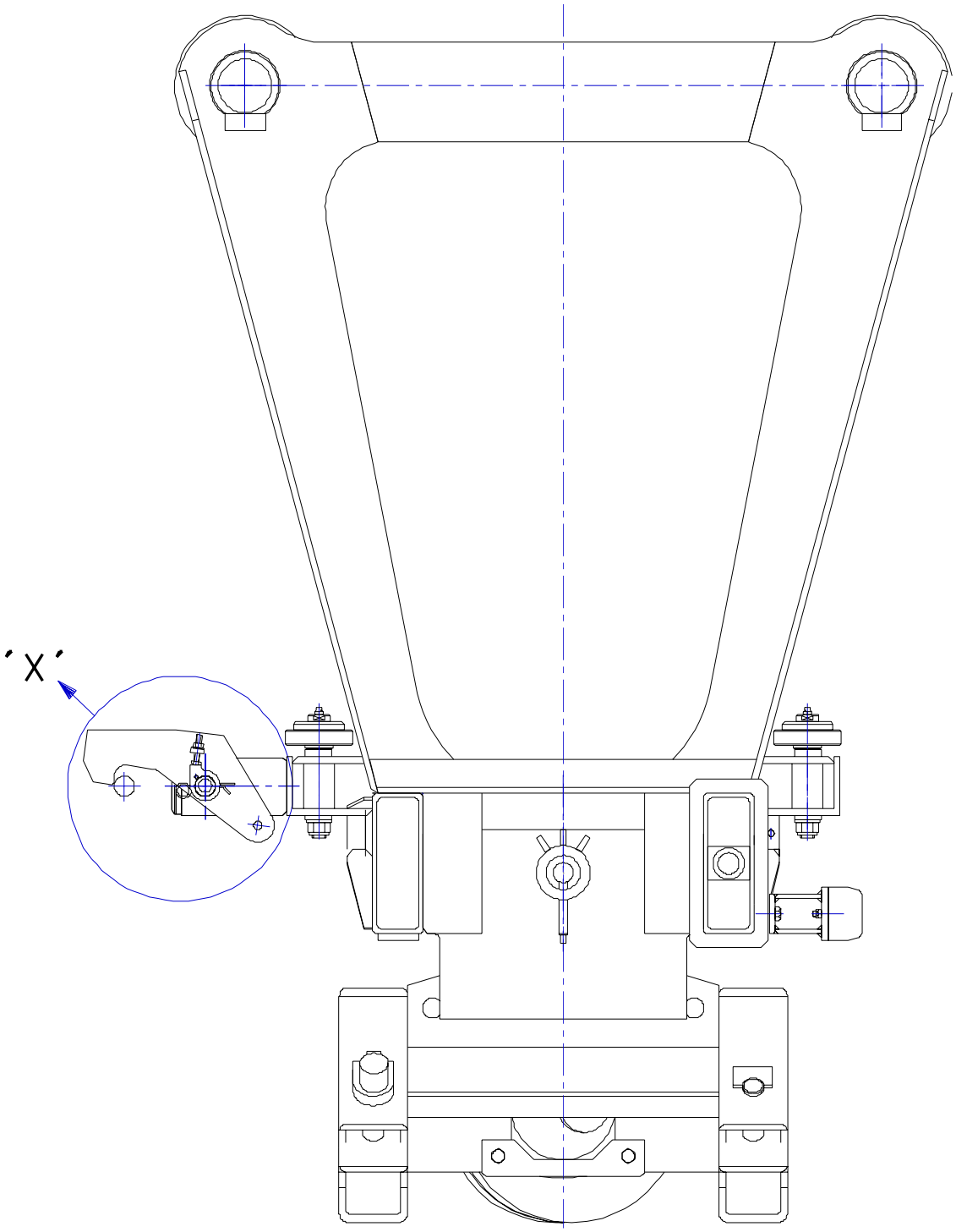
(11) Remove the R clip and turn the cam (3) through 90^0 towards the front of the vehicle.

(12) Fit the R clip (4).

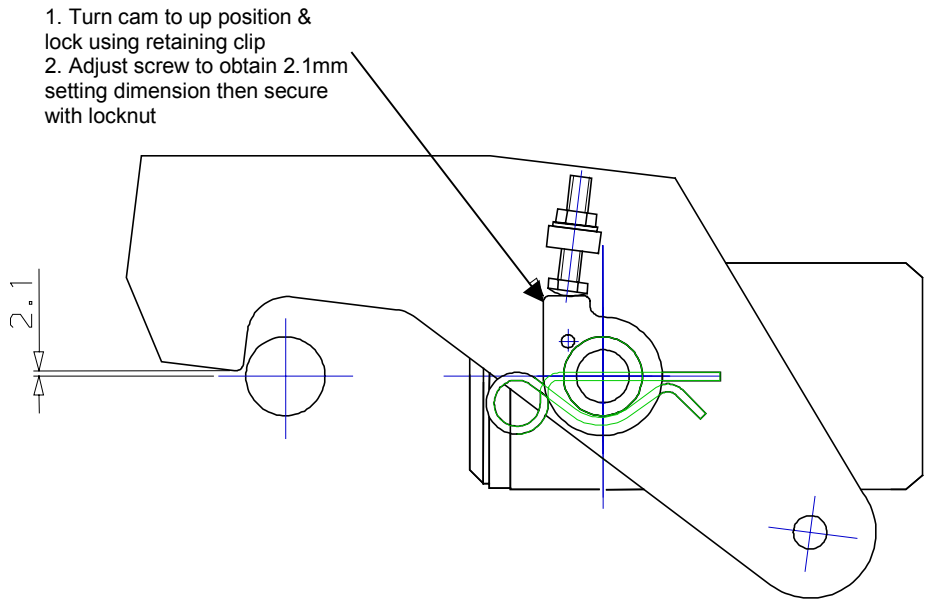
c. Follow on task

(1) Check the operation of the latch assembly in accordance with the operator's manual TM 5-5420-279-10.





HOME BANK CARRIAGE



VIEW WITHIN CIRCLE 'X'
LATCH IS SHOWN IN CARRIAGE RELEASE POSITION

5 - 070 FAR BANK SUPPORT - SLIDE PAD

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

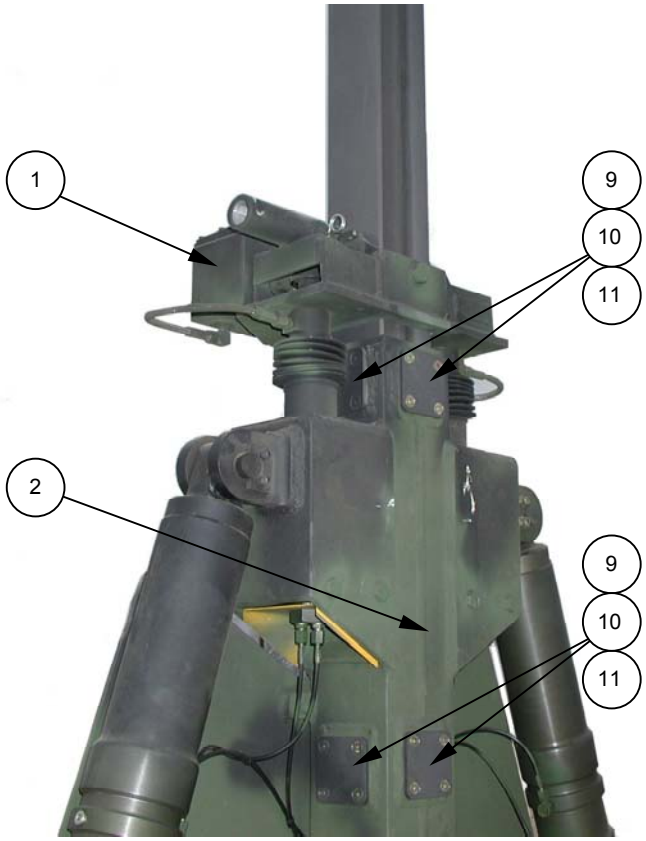
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

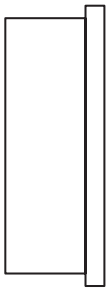
Far Bank Support deployed



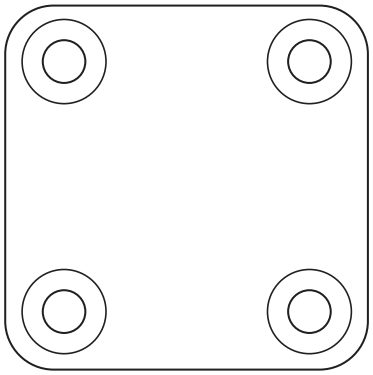
NOTE

There are three types of slide pads fitted to the far bank support. The upper slide pads (5 and 8) are hidden by the reservoir bracket and are retained with slide retention blocks and screws.

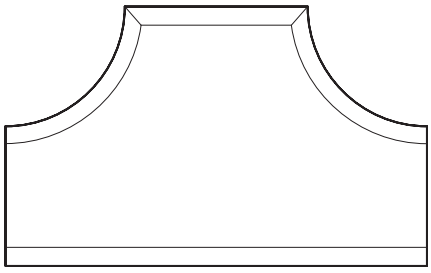
There are eight slide pads (11) in the lower post and are retained using a cover plate (10) and screws (11). Only the middle and lower pads are shown in the following drawings.



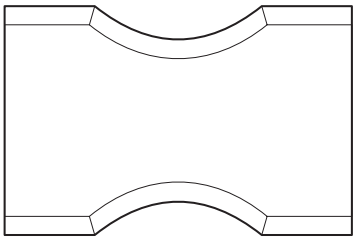
SLIDE PAD (11)



COVER PLATE (10)

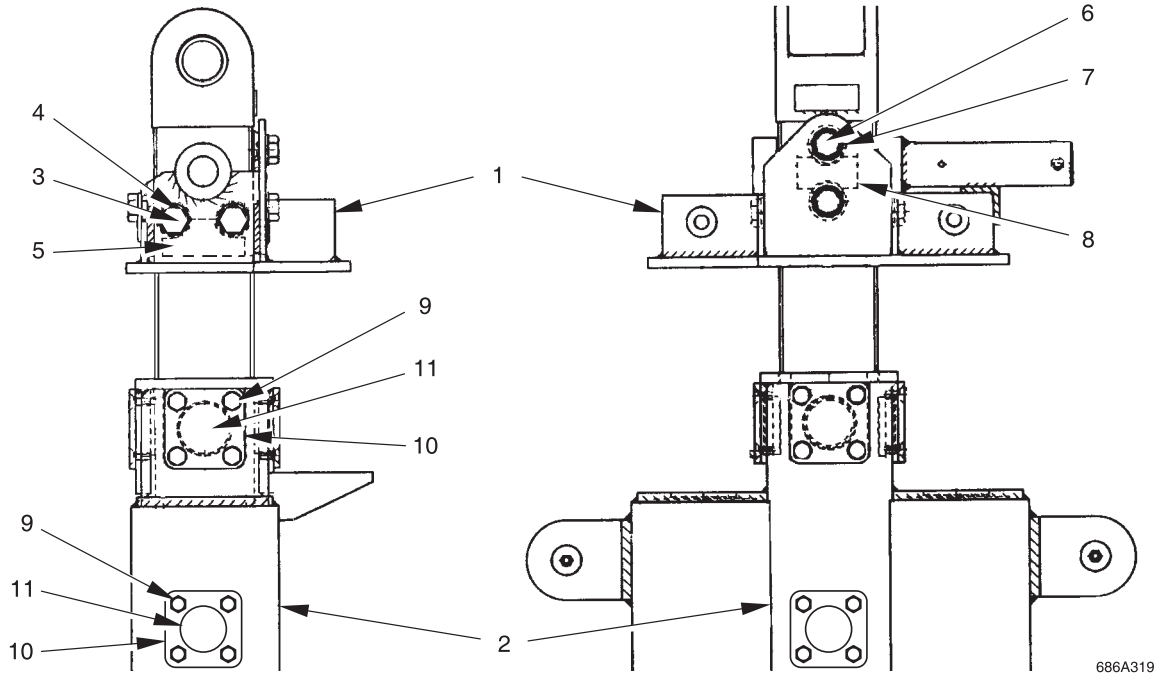


SLIDE PAD (5)



SLIDE PAD (8)

686A913



a. Remove

(1) Remove reservoir mounting bolts, from back side of reservoir. Slide reservoir forward to gain access to the slide retention upper bolt (6).

(2) Loosen lower slide retention bolt (6).

(3) Remove slide pad (8).

(4) Remove screws (3) and slide retention block (4).

(5) Remove slide pad (5).

(6) Remove screws (6) and slide retention block (7).

(7) Remove screws (9) and cover plate (10).

(8) Remove slide pad (11).

(9) Measure the thickness of the slide pad (11), if the thickness is 7/10 inch (18.1mm) or less, replace all slide pads (5, 8 and 11).

(10) Check all components for wear and damage.

(11) Change components as necessary.

b. Install

(1) Apply thread-locking compound to all screws before installation.

(2) Insert slide pad (5) under reservoir bracket (1).

(3) Fit slide retention block (4) and screws (3).

(4) Secure slide pad (5) in position with slide retention block (4) and screws (3).

(5) Insert slide pad (8) under reservoir bracket (1).

(6) Fit slide retention blocks (7) and screws (6).

(7) Fit reservoir and secure in place with mounting bolts.

(8) Secure slide pad (8) in position with slide retention block (7) and screws (6).

(9) Insert slide pad (11) on lower post (2).

(10) Fit cover plate (10) and screws (9).

(11) Secure slide pad (11) in position with cover plate (10) and screws (9).

5 - 071 FAR BANK SUPPORT - CENTER POST

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

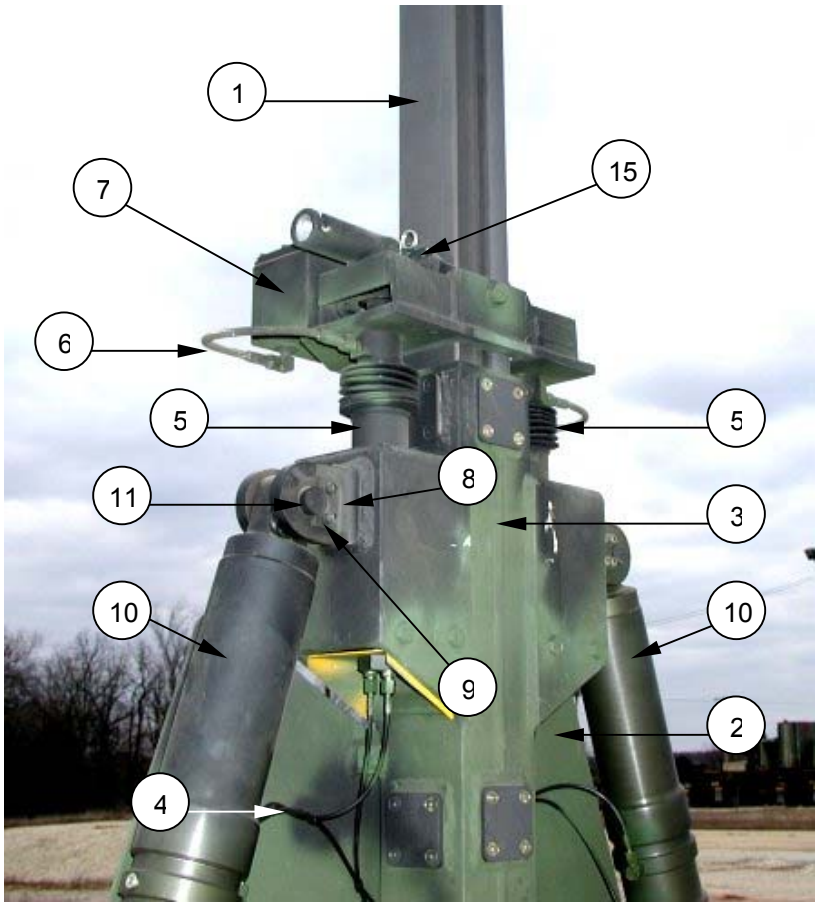
Tool Kit, General Mechanic's, Automotive (GMTK)

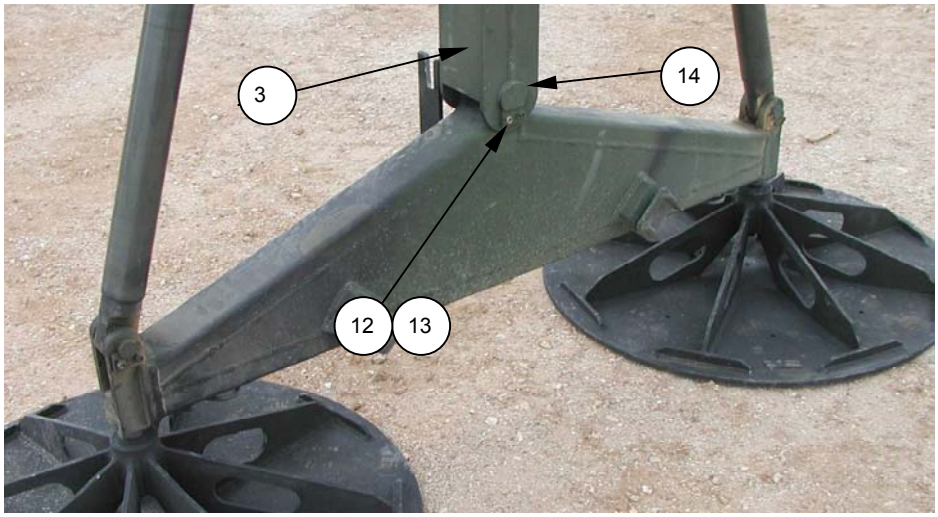
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Far Bank Support lowered and bearing pads removed





WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Remove the bearing pads, refer to unit maintenance procedure 5-073.

(2) Disconnect the far bank support from the forward launch beam refer to unit maintenance procedure 5-074.

(3) Place the far bank support on a suitable working surface.

(4) Release the shoot bolts and remove the upper sliding section (1) of the center post (3).

(5) Remove the four nuts, bolts and washers securing the micro-bore guard (2) to the center post (3).

(6) Note the position of and remove the four micro-bore pipes (4) connected to the pumps (5) on the center post (3).

(7) Disconnect the hydraulic pipes (6) from the hydraulic reservoir (7) to the pumps (5).

(8) Remove the hydraulic reservoir (7).

(9) Remove the screws and washers (9) securing the upper pin keep plates (8) on the two telescopic tubes (10).

(10) Remove the keep plates (8).

(11) Remove the two telescopic tubes upper pins (11).

(12) Remove the screws and washers (12) securing the lower center post pin keep plate (13).

(13) Remove the keep plate (13).

(14) Remove the lower center post pin (14).

(15) Remove the center post (3).

(16) See the relevant maintenance procedure for components fitted to the center post.

(17) Examine all threaded components for wear and damage.

(18) Change components as required.

(19) If required, to remove the shoot bolt turn the shoot bolt handle (15) counter-clockwise and slide the shoot bolt from its housing.

b. Install

(1) Apply thread-locking compound to all screws.

(2) Fit the center post (3) to the crossbeam.

(3) Fit the center post lower pin (14).

(4) Fit the lower pin keep plate (13) and secure with two washers and screws (12).

(5) Fit the telescopic tubes (10) to the center post (3).

(6) Fit the telescopic tubes upper pins (11).

(7) Fit the telescopic tubes upper pins keep plates (8).

(8) Secure the keep plates with screws and washers (9).

(9) Fit the micro-bore pipes (4) to the pumps (5) in the positions noted during removal.

(10) Fit the micro-bore guard (2) with four nuts, bolts and washers.

(11) Fit the hydraulic pipes (6) from the hydraulic reservoir (7) to the pumps (5).

(12) Fit the hydraulic reservoir (7).

(13) Fit the upper sliding section of the center post (1).

(14) If the shoot bolt was removed earlier, place the shoot bolt in its housing and fit the shoot bolt handle (15) to the shoot bolt.

(15) Engage the shoot bolts.

(16) Ensure that the far bank support is vertical.

(17) Top up the far bank support hydraulic reservoir (7) and bleed the system; refer to unit maintenance procedure 5-075.

(18) Fit the far bank support to the forward launch beam; refer to unit maintenance procedure 5-074.

(19) Fit the bearing pads, refer to unit maintenance procedure 5-073.

c. Follow on task

(1) Check the operation of the far bank support.

5 - 072 FAR BANK SUPPORT - TELESCOPIC TUBE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

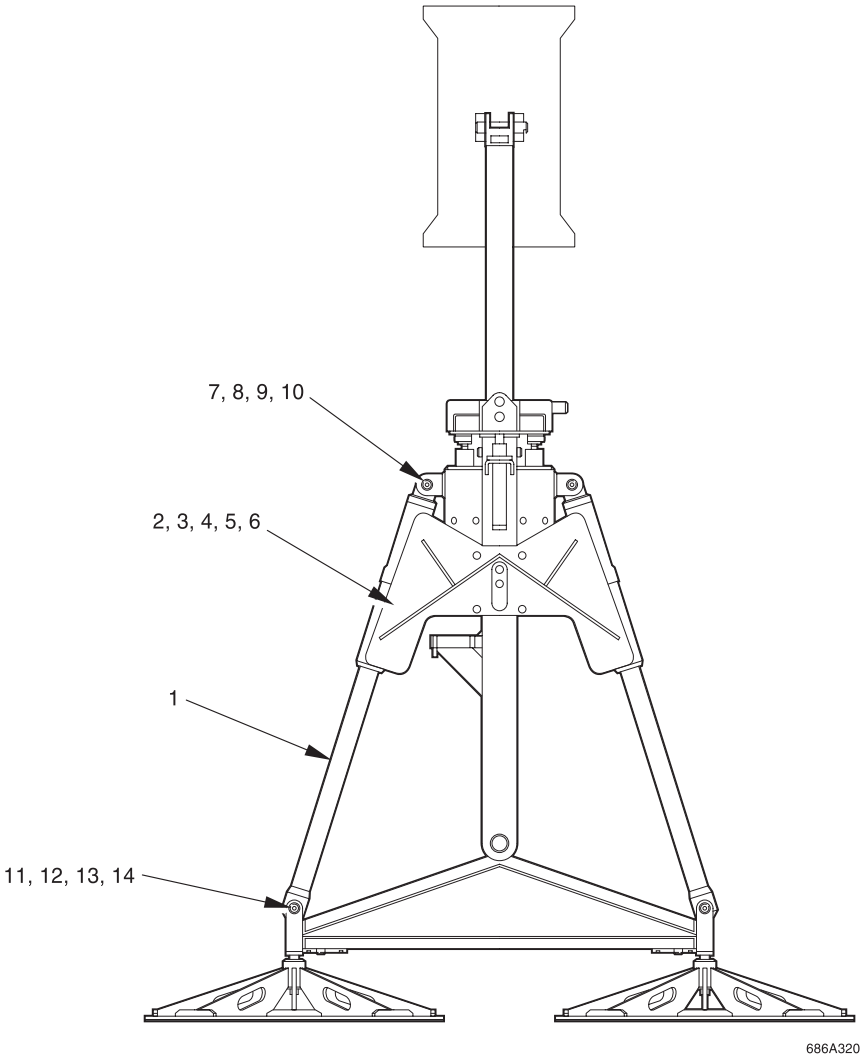
Thread locking compound, loctite 243
Nyloc nuts (Qty 4)

Equipment Conditions

Far Bank Support deployed

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) Remove the screws (3), washers (4) and nyloc nuts (5). Discard the nyloc nuts (5).

(2) Remove the guard plate (2).

(3) Place a suitable container under the micro-bore pipes to catch any hydraulic fluid.

(4) Note the position of and remove the micro-bore pipes from the telescopic tube (1).

(5) Remove the upper screws (8), washers (9), locking plate (7) and pin (10).

(6) Remove the lower screws (12), washers (13) locking plate (11) and pin (14).

(7) Remove the telescopic tube (1).

(8) Check the micro-bore pipes for damage.

(9) Check all components for wear and damage.

(10) Replace components as necessary.

b. Install

(1) Fit the telescopic tube (1) to the far bank support.

(2) Fit the lower pin (14) and locking plate (11).

(3) Apply thread-locking compound to the screws (13).

(4) Secure the locking plate (11) with the washers (12) and screws (13).

(5) Fit the upper pin (10) and locking plate (7).

(6) Apply thread-locking compound to the screws (8).

(7) Secure the locking plate (7) with the washers (9) and screws (8).

(8) Fit the micro-bore pipes to the telescopic tube (1) in the positions noted during removal.

(9) Bleed the far bank support system in accordance with unit maintenance procedure 5-075.

c. Follow on task

(1) Check the operation of the far bank support in accordance with the operator's manual TM 5-5420-279-10.

5 - 073 FAR BANK SUPPORT - SUPPORT BEARING PAD & RETAINING CLIP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

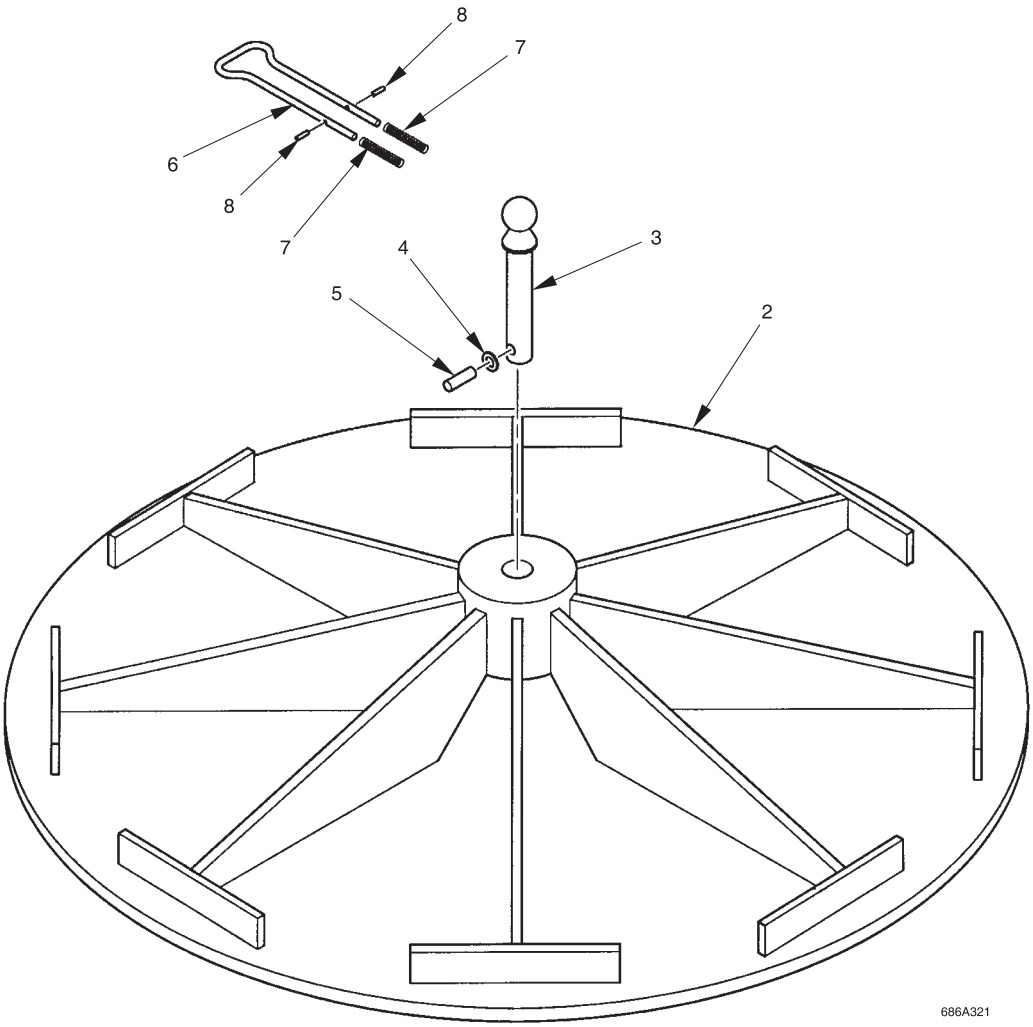
Equipment Conditions

Far Bank Support clear of the ground



WARNING

CRUSH INJURY. THE SUPPORT BEARING PAD WEIGHS 56LB (25.4KG).



a. Remove

(1) Disengage retaining clip (6) and remove support bearing pad (2) complete with ball joint (3), washer (4) and pin (5).

(2) Remove two spring pins (8) from bearing pad retaining clip (6), on the far bank support.

(3) Remove retaining clip (6) and the two compression springs (7) from the far bank support.

(4) Remove the pin (5) and washer (4).

(5) Remove the ball joint (3) from the support bearing pad (2).

(6) Examine components for damage and corrosion.

(7) Check springs are of comparable length.

(8) Replace components as required.

b. Install

(1) Partly insert retaining clip (6) into far bank support and fit compression springs (7).

(2) Partly compress springs (7) and insert spring pins (8). Ensure spring pins (8) protrude equally each side of retaining clip.

(3) Make sure retaining clip operates smoothly.

(4) Insert the ball joint (3) into the support bearing pad.

(5) Locate the washer (4) and insert the pin (5) through the washer, support bearing pad (2) and ball joint (3).

(6) Refit support bearing pad (2) to the far bank support.

(7) Ensure that the support bearing pad moves freely on the ball joint.

5 - 074 FAR BANK SUPPORT - MOUNTING PIN

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Crane and slings

Materials Required

Thread locking compound, loctite 243

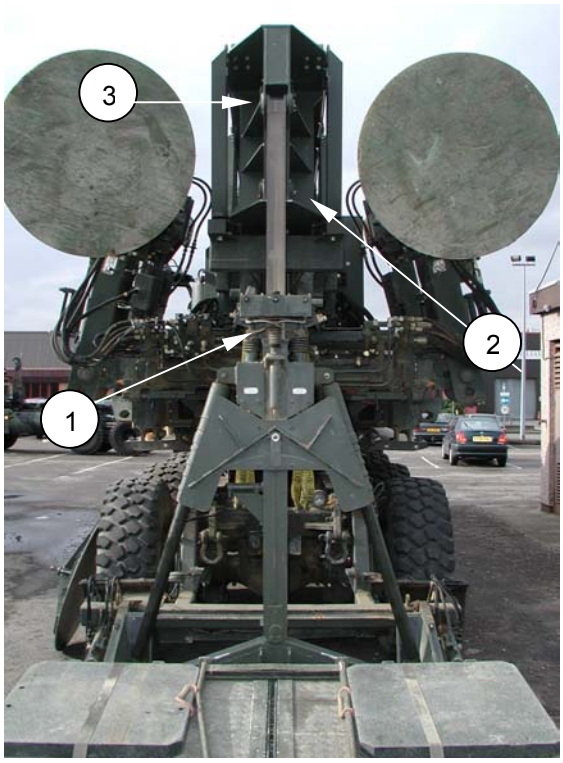
Equipment Conditions

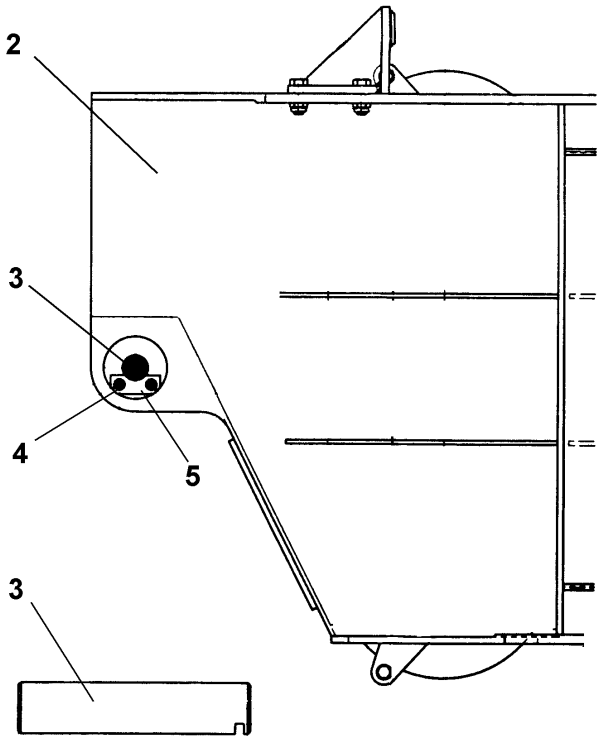
Tail Lift deployed

WARNING

DANGER OF PERSONNEL SLIPPING. THE TAIL LIFT PLATFORM IS AT AN ANGLE WHEN SUPPORTING THE WEIGHT OF THE FAR BANK SUPPORT.

CRUSH INJURY. THE FAR BANK SUPPORT IS HEAVY 436 LBS (198 KG).





a. Remove

(1) The far bank support (1) is mounted to the forward launching beam (2) by a pin (3).

(2) Remove the far bank support retaining straps.

(3) Remove the two support bearing pads from their stowed positions on the far bank support.

(4) Two personnel are required to be on the tail lift to remove the far bank support pin and one extra person is required to operate the tail lift.

WARNING

DANGER OF PERSONNEL SLIPPING. THE TAIL LIFT PLATFORM IS AT AN ANGLE WHEN SUPPORTING THE WEIGHT OF THE FAR BANK SUPPORT.

(5) Raise the tail lift until the far bank support is resting in the tail lift cradle.

CAUTION

Do not lift the far bank support with the tail lift.

(6) Attach a crane with slings to the far bank support.

(7) Support the weight of the far bank support with the crane.

NOTE

When carrying out maintenance on the Far Bank Support ensure that it remains in the upright position, this will prevent oil spillage from the hydraulic reservoir.

(8) Remove the two socket head screws (4) and washers from the pin keep plate (5).

(9) Remove the pin keep plate (5).

(10) Remove the pin (3).

(11) The two personnel on the tail lift are to ensure the far bank support remains upright.

(12) Lower the tail lift to the ground and also lower the far bank support to the ground with the crane.

(13) Move the far bank support to a suitable working surface.

(14) Remove the crane and slings.

(15) Examine all threaded components for wear and damage.

(16) Examine the pin for wear and damage.

(17) Change components as required.

b. Install

(1) Attach the crane and slings.

(2) Place the far bank support in the tail lift cradle with two personnel to hold the far bank support upright.

(3) Lift the far bank support up and align it with the forward launch beam.

(4) At the same time raise the tail lift.

(5) Align the far bank support (1) with the forward launch beam (2).

(6) Insert the pin (3) through the forward launch beam (2) and the far bank support (1).

NOTE

Ensure that the slot on the Pin is on the Keep Plate Mounting side of the Forward Launch Beam.

(7) Align the slot on the pin (3) with the keep plate (5) mounting.

(8) Apply thread-locking compound to the socket head screws (4).

(9) Fit and secure the pin keep plate (5) with the two socket head screws (4) and washers.

(10) Lower the tail lift.

5 - 075 FAR BANK SUPPORT - HYDRAULIC SYSTEM

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Tool Kit, Common No 1
Test Hose Gauge Adapter

Materials Required

Hydraulic Oil (As required)

Equipment Conditions

Far Bank Support deployed and clear of the ground

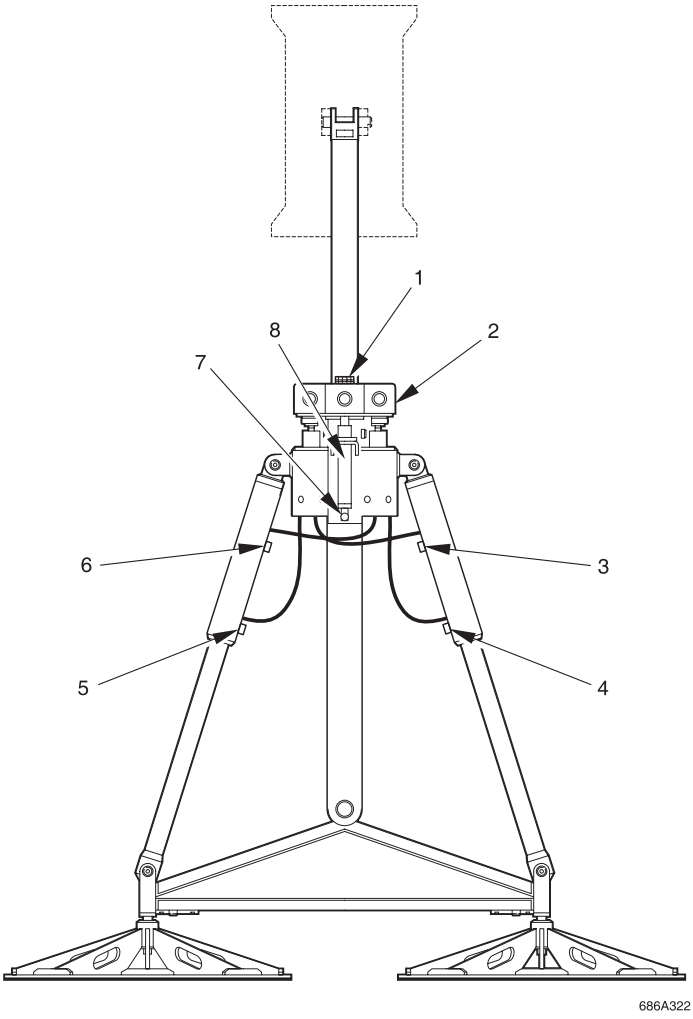
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

DANGER OF FLUID SPLASH. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (SAFETY GLASSES) WHEN LOOKING INTO THE RESERVOIR DURING THE BLEEDING PROCEDURE.

NOTE

This procedure is to be used for changing the hydraulic oil for use in climatic or cold conditions, and when replacing one or both of the cylinders.



a. Service

NOTE

There are three sight glasses on the reservoir for checking the hydraulic fluid level.

(1) Remove the reservoir filler cap (1).

(2) Using a suction pump, remove the hydraulic oil in the reservoir (2).

(3) Connect a pump to the hydraulic connection point (5).

(4) Pump hydraulic fluid into the reservoir (2) until the relevant section of the reservoir is half full.

(5) Remove the pump and connect to the hydraulic connection point (3).

(6) Pump hydraulic fluid into the reservoir (2) until the relevant section of the reservoir is full.

(7) Remove the pump and connect to the hydraulic connection point (4).

(8) Repeat step 3.

(9) Remove the pump and connect to the hydraulic connection point (6).

(10) Repeat step 5.

(11) Remove the pump and connect to the hydraulic connection point (7) on the pre-loaded valve (8).

(12) Pump hydraulic fluid into the reservoir (2) until the center section of the reservoir is full.

NOTE

Step 13 is only required when changing the hydraulic oil for climatic or cold conditions.

(13) Using a suction pump, remove the hydraulic oil in the reservoir (2).

(14) Fill up the reservoir (2) until oil just covers the filter.

NOTE

A baffle plate separates the three compartments and oil can transfer between compartments should one compartment overfill.

(15) Replace the reservoir filler cap (1).

b. Follow on task

(1) Check the operation of the far bank support in accordance with the operator's manual TM 5-5420-279-10.

5 - 076 FAR BANK SUPPORT - CROSS BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

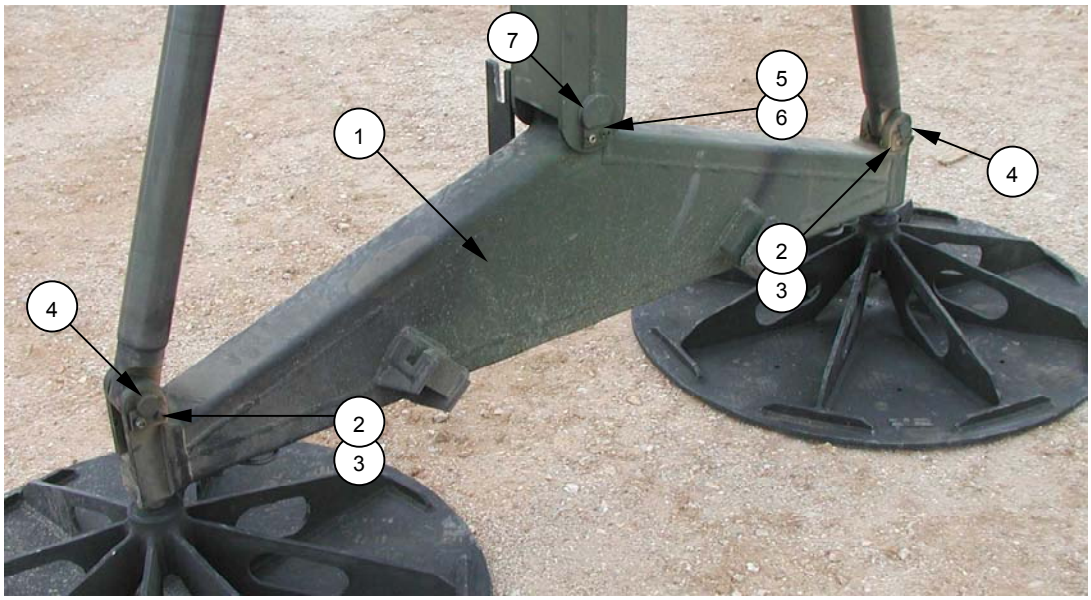
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Far Bank Support Lowered with feet removed



a. Remove

(1) One person is required to hold the crossbeam to prevent it from falling over when it is disconnected.

(2) Remove the keep plate retaining screws and washers (2) on each of the telescopic tube lower pins (4).

(3) Remove the keep plates (3).

(4) Remove the telescopic tube lower pins (4).

(5) Remove the keep plate retaining screws and washers (5) on the lower center post pin (7).
(6) Remove the keep plate (6).
(7) Remove the lower center post pin (7).
(8) Remove the crossbeam (1).
(9) Remove the bearing pad retaining clips; refer to unit maintenance procedure 5-073.
(10) Examine all threaded components for wear and damage.
(11) Change components as required.

b. Install

(1) Fit bearing pad retaining clips refer to unit maintenance procedure 5-073.
(2) Position the crossbeam (1) under the center post and telescopic tubes.
(3) Fit the lower center post pin (7).
(4) Fit the lower center post pin keep plate (6).
(5) Apply thread-locking compound to all screws.
(6) Secure the lower center post pin keep plate (6) with two washers and screws (5).
(7) Align the telescopic tubes and fit the pins (4).
(8) Fit the telescopic tube pin keep plates (3).
(9) Secure each keep plate with two screws and washers (2).

5 - 077 SLIDE FRAME - ROTATE CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

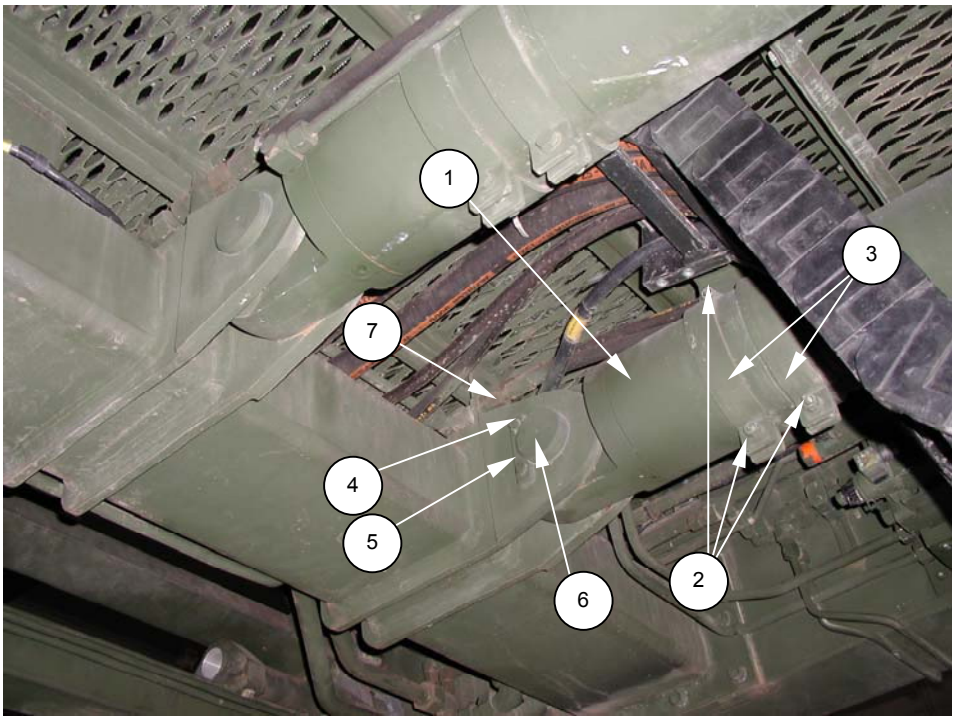
Slide Frame deployed
A-Frame deployed
Lock washers (Qty 4)

WARNING

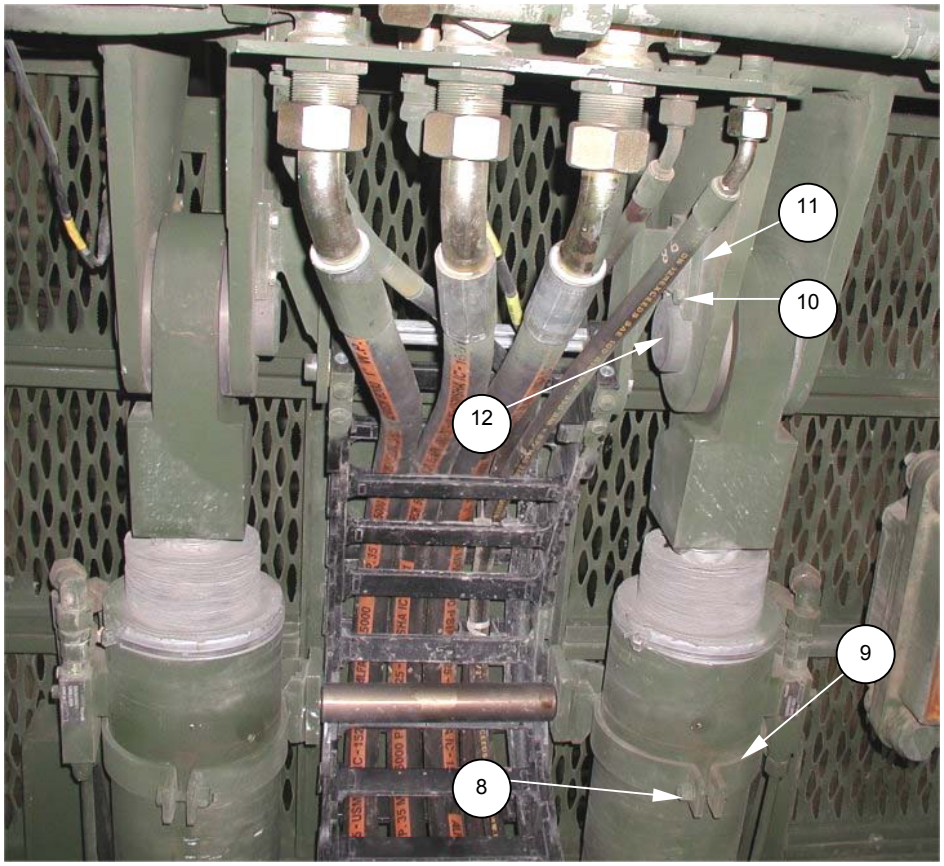
CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE ROTATE CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE ROTATE CYLINDERS ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



Cross member end of rotate cylinder



A-Frame end of rotate cylinder

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Release the hydraulic pressure in the cylinder refer to unit maintenance procedure 5-123.

(3) Starting at the cross member end of the rotate cylinder (1).

(4) Remove the nuts and bolts (2) securing the energy chain brackets (3) to the rotate cylinder (1).

(5) Remove one half of the energy chain bracket (3).

(6) Remove the two bolts and lock washers (4) and remove the locking plate (5). Discard the lock washers.

(7) Note the position of and remove the two hydraulic hoses (7) connected to the rotate cylinder (1).

(8) Move to the A-Frame end of the rotate cylinder (1).

(9) Remove the nuts and bolts (8) securing the energy chain brackets (9) to the rotate cylinder (1).

(10) Remove one half of the energy chain bracket (9).

NOTE

The pivot pin locking plate is part of the energy chain bracket (11).

(11) Remove the two bolts and lock washers (10) and remove the pivot pin locking plate/energy chain bracket (11). Discard the lock washers.

(12) Support the weight of the rotate cylinder (1).

(13) Remove the rotate cylinder pivot pins (6 and 12).

(14) Remove the rotate cylinder (1).

(15) Inspect components for damage and corrosion.

(16) Examine flats and threads for damage.

(17) Replace components as required.

b. Install

NOTE

The following install procedures contain the call outs for both the cross member and A-Frame ends of the rotate cylinder, use the call outs as applicable.

(1) Position the rotate cylinder (1) and insert the rotate cylinder pivot pins (6 and 12).

(2) Fit the rotate cylinder locking plates (11 and 5).

(3) Apply thread locking compound to the bolts (10 and 4).

(4) Secure the pivot pin locking plates (11 and 5) with the washers and bolts (10 and 4).

(5) Fit the energy chain brackets (3 and 9) and secure in place with bolts and nuts (8 and 2).

(6) Fit the two hydraulic hoses (7) to the positions noted during removal.

c. Follow on task

(1) Operate the rotate cylinders in accordance with the operator's manual TM 5-5420-279-10.

5 - 078 SLIDE FRAME - HOME BANK END BEAM ADAPTER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Slide Frame deployed

---

a. Remove

(1) Remove the R-clip (2).

(2) Remove the spring pin (3), and washer (4).

(3) Remove the hinge pin (5).

(4) Remove the home bank end beam adaptor (1).

(5) Remove the four screws and washers (6).

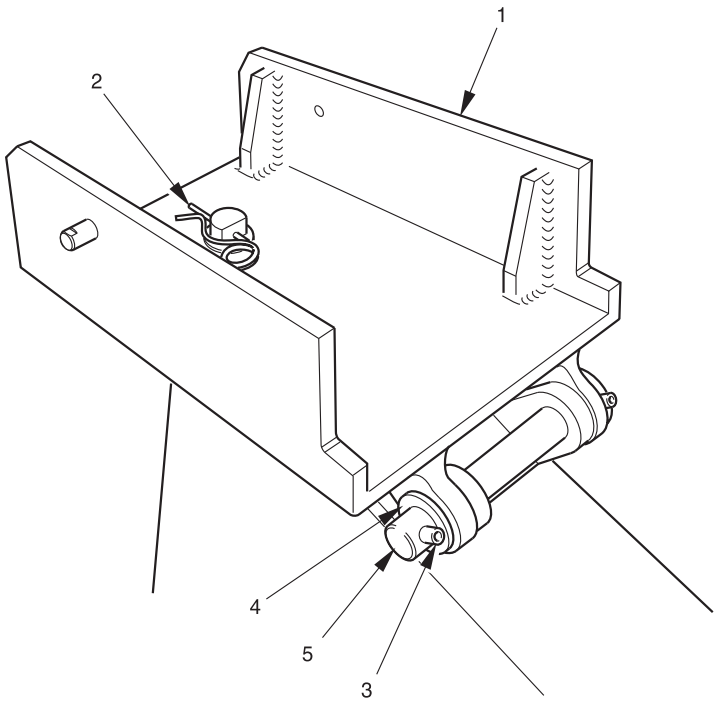
(6) Remove the hinge (7).

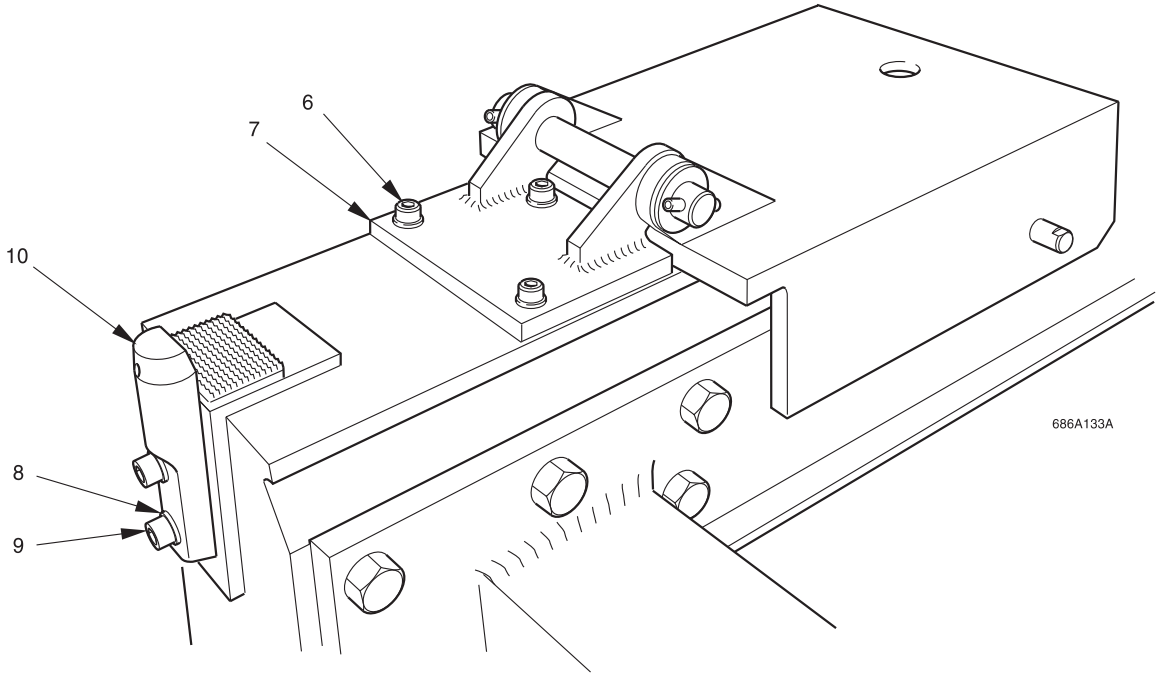
(7) Remove the screws (8) and washers (9).

(8) Remove the post (10).

(9) Check all components for wear and damage.

(10) Replace components as required.





b. Install

(1) Fit the post (10) to the slide frame.

(2) Apply thread-locking compound to all screws.

(3) Secure the post (10) with the washers (9) and screws (8).

(4) Fit hinge (7) to the slide frame.

(5) Secure the hinge with four washers and screws (6).

(6) Locate home bank end beam adapter (1) on hinge (7).

(7) Fit hinge pin (5).

(8) Fit washer (4).

(9) Fit spring pin (3).

(10) Check that the home bank end beam adapter (1) operates correctly.

(11) Grease hinge pin (5).

(12) Fit R-clip (2).

5 - 079 SLIDE FRAME - TWIST LOCK ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 14)

Equipment Conditions

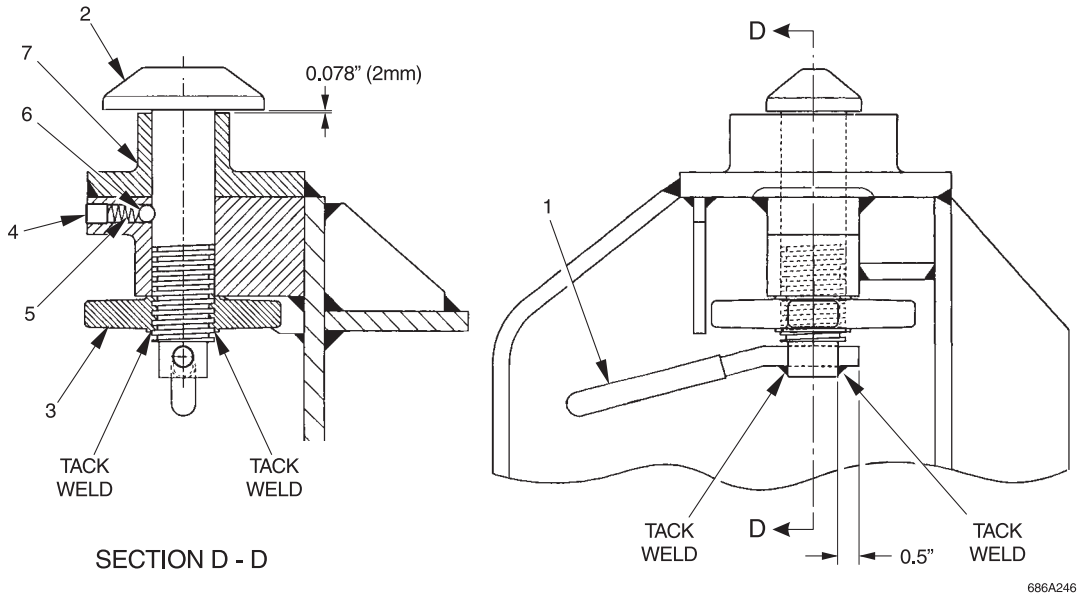
A-Frame deployed
Slide Frame deployed

NOTE

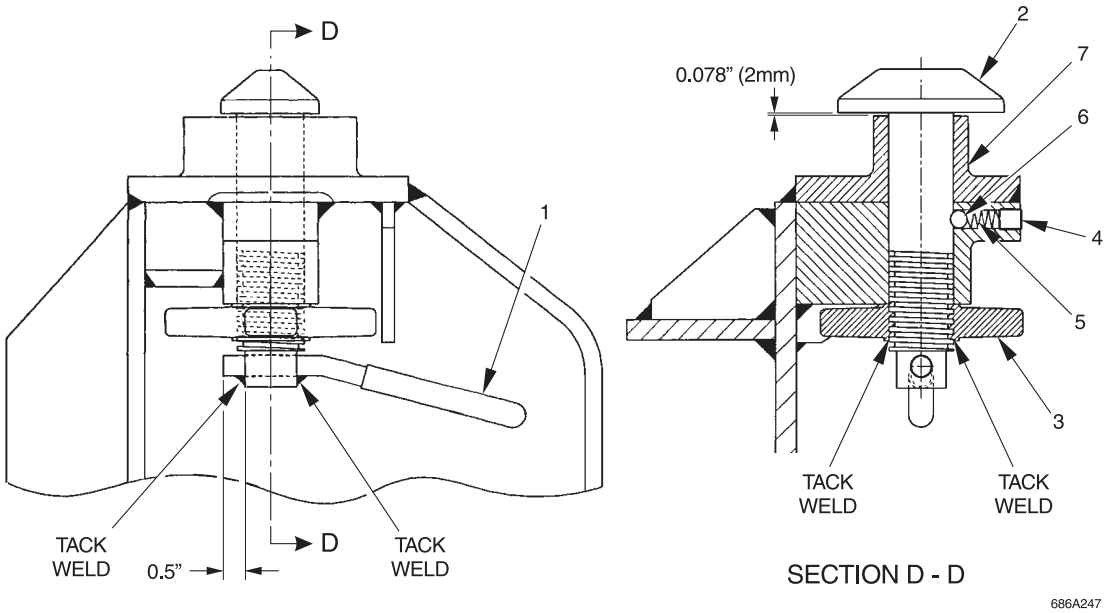
The slide frame lower twist lock assemblies are mounted on the left and right sides of the vehicle chassis between the two rear axles.

If required, the twist lock assembly and mounting bracket can be removed as a complete assembly; by removing the fourteen bolts, eighteen washers and fourteen nyloc nuts securing the bracket to the vehicle chassis. Discard the nyloc nuts and replace with new nyloc nuts.





Right Hand Lower Twistlock Assembly



Left Hand Lower Twistlock Assembly

a. Remove

(1) Remove the tack welds securing the handle (1) to the stem (2) and remove the handle (1).

(2) Remove the tack welds securing the handnut (3) to the stem (2) and remove the handnut (3).

(3) Remove the grub screw (4), spring (5) and steel ball (6).

(4) Withdraw the stem (2) from the twistlock block (7).

(5) Check the twistlock block (7) for wear and damage.

(6) Examine the grub screw threads (4) for damage.

(7) Examine the steel ball (6) for wear and damage.

b. Install

(1) Insert the stem (2) in the twistlock block (7). Ensure that the orientation of the stem head (2) is as shown in the respective drawing.

(2) Fit the handnut (3) to the stem (2).

(3) Adjust the height of the stem (2), by turning the handnut (3), ensuring that there is a 0.078 inch (2mm) gap between the stem head (2) and the twistlock block (7).

(4) Tack weld the handnut (3) in position in two places.

(5) Fit the steel ball (6), spring (5) and grub screw (4).

(6) Fit the handle (1) to the stem (2) in the position shown in the respective drawing and ensure that the handle (1) protrudes by 1/2 inch.

(7) Tack weld the handle (2) in position in two places.

(8) Stow the A-Frame and the slide frame and check the operation of the twist lock assembly.

5 - 080 SLIDE FRAME - SECTION 2 WEAR PADS AND STOP PLUGS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

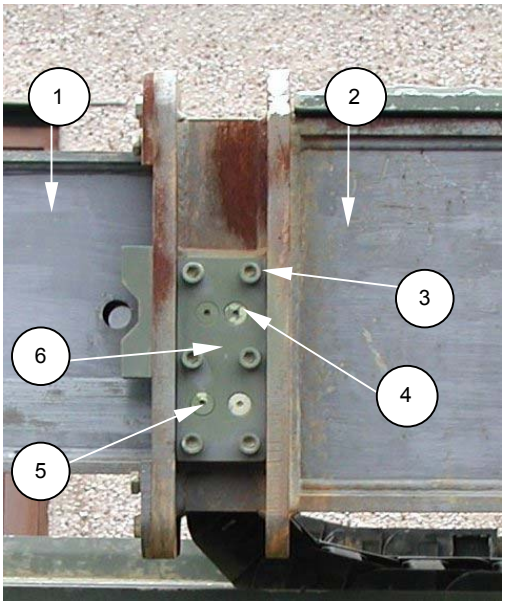
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 6)

Equipment Conditions

None



NOTE

The slide frame, side wear and stop pads are located on section two (2) of the slide frame assembly, at the joint to section 1, (1).

Side wear pads and stop plugs are fitted on the outside and inside of the frame, and on each side of the vehicle.

The stop plugs are to be removed and checked for wear. If the combined side wear pad and its spacer thickness is less than 1 5/8 inch (42mm) the side wear pad must be replaced. For removal of the side wear pad see the procedure below.

a. Remove

(1) On number two section (2) of the slide frame locate and identify the side wear pad and stop plug retaining plate (6).

(2) Remove the six screws and lock washers (3), two screws (4) and two screws (5). Discard the lock washers.

(3) Remove the retaining plate (6).

(4) If required, fit the screws (4 and 5) to the wear pad and stop pad for leverage.

(5) Remove the wear and stop pads.

(6) Measure the thickness of the spacer and side wear pad, if the combined measurement is less than 1 5/8 inch (42 mm) replace the side wear pad. If required remove the internal screw securing the wear pad to the spacer.

(7) Measure the thickness of the stop plug. If the measurement is less than 1 5/8 inch (42mm) replace the stop plug.

b. Install

(1) To replace the spacer and side wear pad, apply thread locking compound to the screws (5) and secure the spacer and side wear pad to the retaining plate (6).

(2) If required a new wear pad can be fitted by; applying a layer of thread locking compound to the side wear pad internal securing screw and fitting the wear pad to the spacer.

(3) Apply thread locking compound to the screws (4) and if required fit a new stop plug to the retaining plate (6).

(4) Fit the retaining plate (6) to the slide frame section two (2).

NOTE

The retaining plate, wear pad and stop plug can only be fitted one way. The stop plug must be at the top.

(5) Apply a layer of thread locking compound to the six screws (3).

(6) Secure the retaining plate to the slide frame assembly using the lock washers and screws (3).

(7) Repeat this procedure for the side wear pads and side stop plugs on the inside and opposite side of the slide frame assembly.

5 - 081 SLIDE FRAME - SECTION 3 WEAR PADS AND STOP PLUGS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

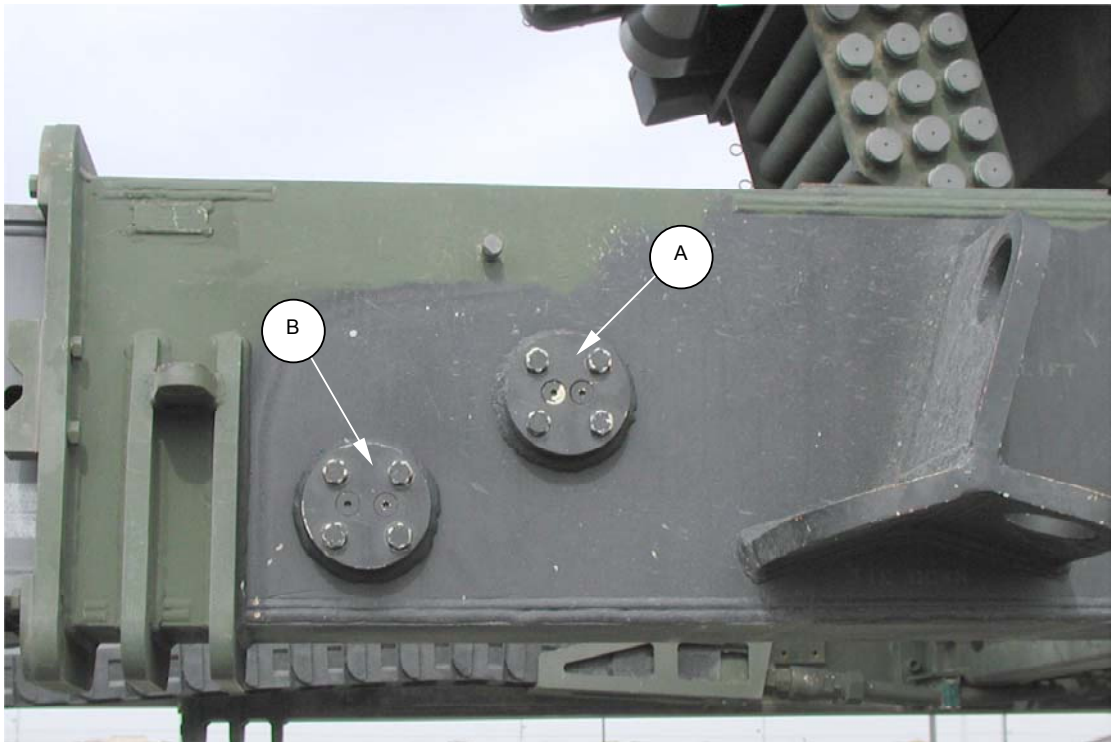
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 8)

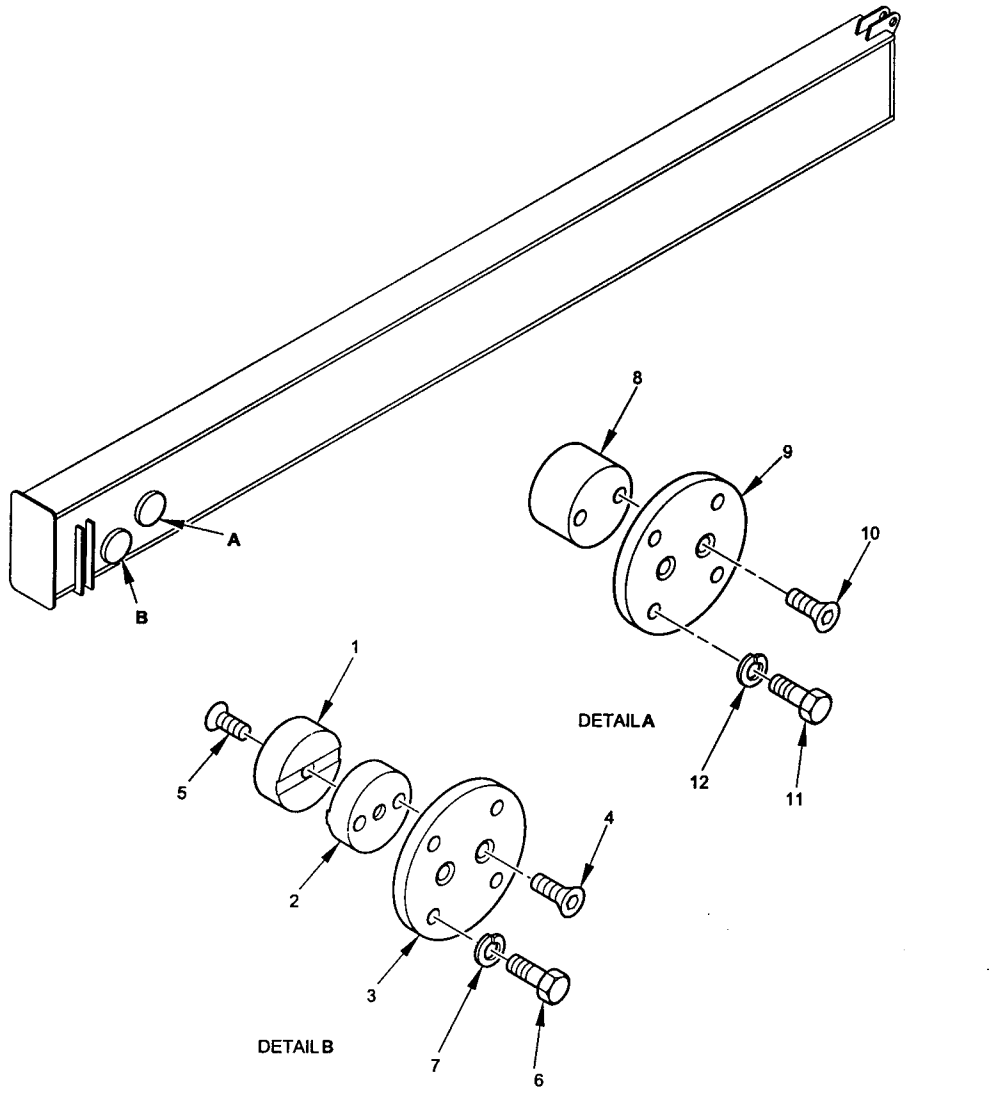
Equipment Conditions

None



NOTE

The slide frame, side wear and stop pads are located on section three of the slide frame assembly and on each side of the vehicle.



Detail A

a. Remove (Side Stop Pad)

(1) On number three section of the slide frame locate and identify the side stop plug.

(2) Remove the four screws (11) and lock washers (12). Discard the lock washers.

(3) Extract the retaining plate (9) complete with the side stop plug (8).

(4) Check the screws and washers for damage.

(5) Measure the thickness of the side stop plug (8). If the measurement is less than 1 5/8 inch (42mm), replace the side stop plug (8) by removing the stop plug securing screws (10).

b. Install (Side Stop Pad)

(1) If required apply thread locking compound to the screws (10) and fit a new stop plug (8) to the retaining plate (9).

(2) Apply locking compound to the four screws (11).

(3) Secure the retaining plate (9) complete with stop plug (8) to the slide frame assembly using the new lock washers (12) and screws (11).

(4) Repeat this procedure for the stop plug on the opposite side of the slide frame assembly.

Detail B

a. Remove (Side wear pad)

(1) On number three section of the slide frame locate and identify the side wear pads.

(2) Remove the four screws (6) and lock washers (7).

(3) Extract the retaining plate (3) complete with the side wear pad spacer (2) and side wear pad (1).

(4) Measure the thickness of the spacer (2) and side wear pad (1), if the combined measurement is less than 1 5/8 inch (42mm), replace the side wear pad (1) by removing the side wear pad securing screw (5).

b. Install (Side wear pad)

(1) If required, apply thread locking compound to the side wear pad securing screws (5), and secure a new side wear pad (1) to the retaining plate (3) with the screws (5).

(2) Fit the retaining plate (3) complete with the side wear pad spacer (2) and if required, new side wear pad (1).

(3) Apply thread locking compound to the four screws (6).

(4) Secure the retaining plate to the slide frame assembly using the lock washers (7) and screws (6).

(5) Repeat this procedure for the side wear pad on the opposite side of the slide frame assembly.

5 - 082 SLIDE FRAME - UPPER SLIDE TWIST LOCK MOUNTS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

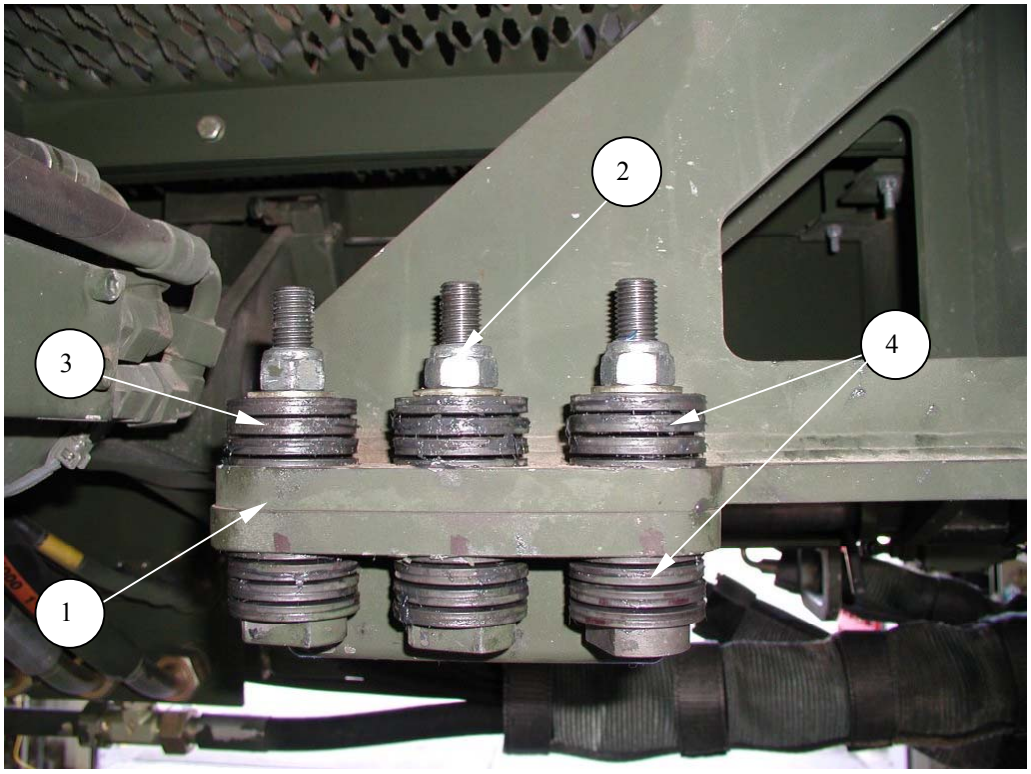
Tool Kit, General Mechanic's, Automotive (GMTK)

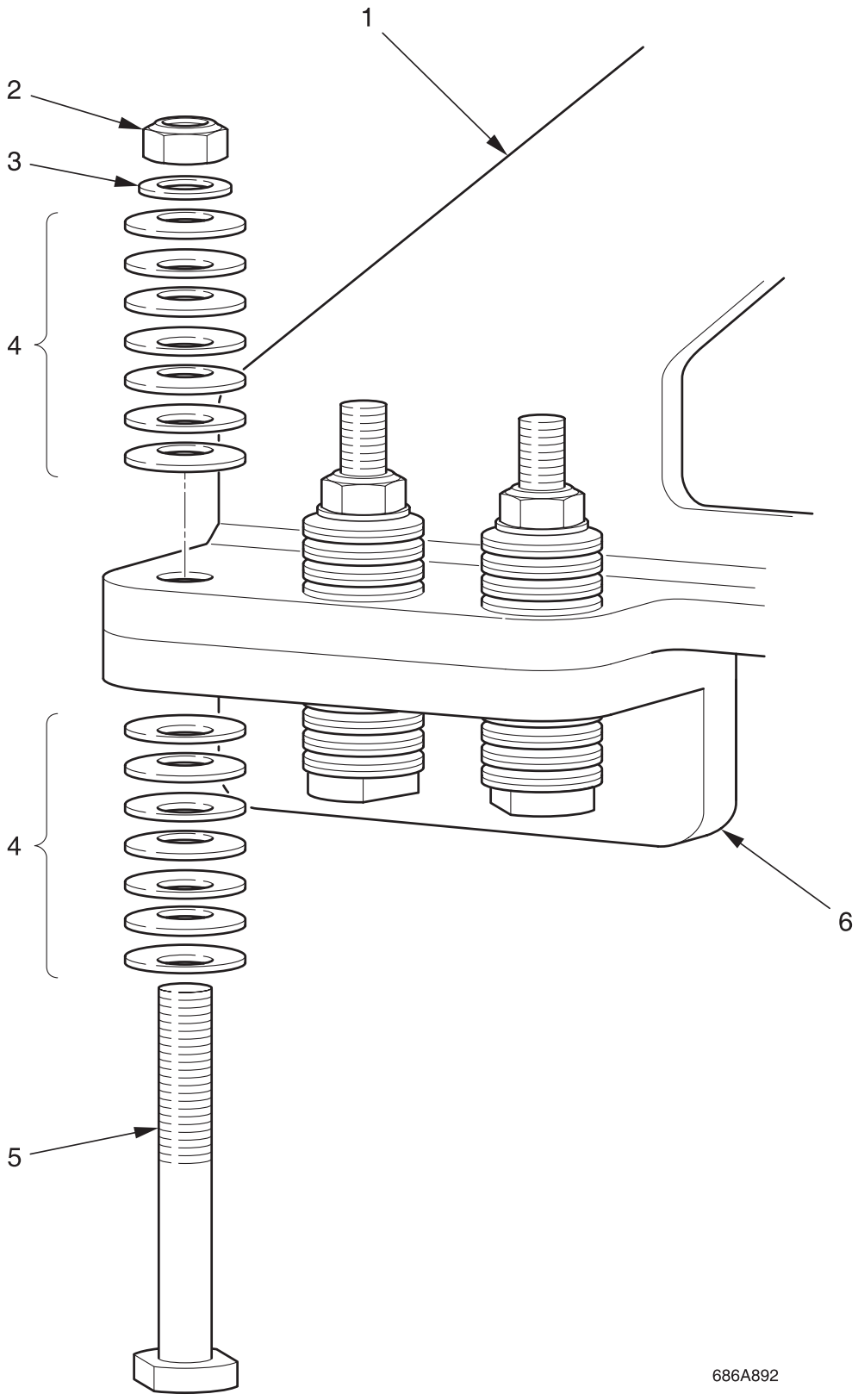
Materials Required

Nyloc nuts (Qty 6)

Equipment Conditions

A-Frame deployed
Slide Frame deployed




1
2
3
4
4
5
6
686A892

a. Remove

(1) The upper slide frame mounts (1) are mounted under the rear section of section 3 of the slide frame. The lower section (6), of the twist lock mounts, and are secured by six bolts (5). The procedure for changing the left and right hand lower section (6) is identical.

(2) Remove the six nyloc nuts (2). Discard the nyloc nuts.

NOTE

Note the position and orientation of the upper twist lock flat washers and belleville washers when disassembling the upper twist lock mounts.

(3) Remove the washer (3) and upper stack of belleville washers (4).

(4) Remove the bolt (5) and lower stack of belleville washers (4) on each bolt.

(5) Remove the upper slide frame lower section (6).

(6) Examine all components for damage and corrosion.

(7) Replace components as required.

b. Install

CAUTION

The slide frame will not fit on the twist lock mountings if the upper twist lock mountings are not assembled correctly, causing damage to the slide frame. Ensure that the upper twist lock flat washers and belleville washers are assembled correctly.

(1) Lightly grease the belleville washers (4) and slide the lower stack of belleville washers (4) onto the bolts (3).

(2) Fit the lower section (6) to the upper mount (1).

(3) Insert the bolt (3) through the lower section (6) and upper slide frame mount (1).

(4) Slide the upper stack of 7 belleville washers (4) onto the bolt (5).

(5) Fit the washer (3) on top of the upper stack of belleville washers (4).

(6) Fit new nyloc nuts (2) and tighten.

5 - 083 SLIDE FRAME - TILT ROLLER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

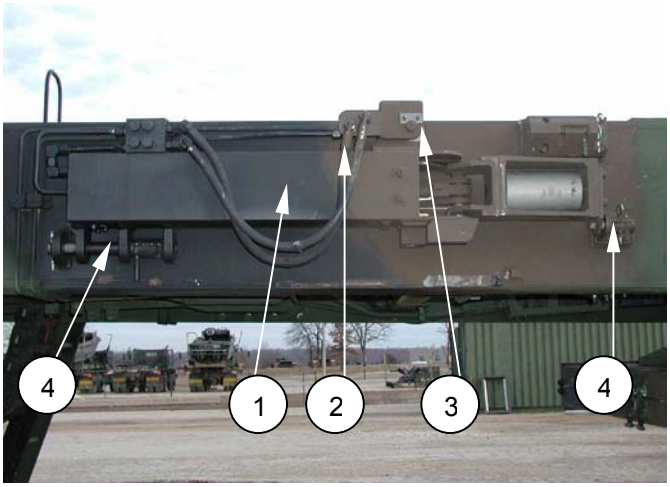
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Hydraulic hose plugs and caps
Hydraulic fluid drain vessel
Absorbent materials
Grease (As required)

Equipment Conditions

A-Frame deployed



WARNING

CRUSH INJURY. THE TILT ROLLER ASSEMBLY IS VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TILT ROLLER ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate and identify the tilt roller assemblies (1). They are located; one on each side of the vehicle on section three of the slide frame.

(3) Place a suitable container under the tilt roller assembly to catch any spilled hydraulic fluid.

(4) Undo the connections of the two flexible hydraulic hoses (2).

(5) Note the position of and remove the flexible hoses from the tilt roller assembly and fit plugs and caps to the flexible hoses and the connection block on the tilt roller assembly.

(6) Remove the pivot pin locking plate bolts and washers.

(7) Remove the locking plate.

(8) Remove the pivot pin (3).

(9) Take the weight of the tilt roller assembly and release the two shoot bolts (4).

(10) Lower the tilt roller (1) onto the fender.

(11) Attach a sling and crane to the tilt roller and lower the tilt roller to the ground or other suitable working surface.

(12) Examine all components for damage and corrosion.

(13) Examine bolt heads and threads for damage.

(14) Examine hydraulic hoses (2) for damage.

(15) Replace the O-ring in the hydraulic hose fittings and coat the O-ring with clean hydraulic fluid.

(16) Replace components as necessary.

b. Install

(1) Using a sling and crane lift the tilt roller (1) onto the fender.

(2) Support the tilt roller assembly, and remove the sling and crane.

(3) Apply grease to the pivot pin (3).

(4) Lift the tilt roller and locate and fit the pivot pin (3) in the pivot pin bracket.

(5) Engage the shoot bolts (4).

(6) Fit the pivot pin locking plate.

(7) Apply thread-locking compound to the bolts and secure the locking plate with the washers and bolts.

(8) Remove any plugs or caps and fit new O-rings to the hydraulic hoses, coat the new O-ring with clean hydraulic oil.

(9) Fit the hydraulic hoses (2) to the positions noted during removal.

c. Follow on tasks

(1) Operate the hydraulic system in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks and rectify as necessary.

5 - 084 SLIDE FRAME - TILT ROLLER SUPPORT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

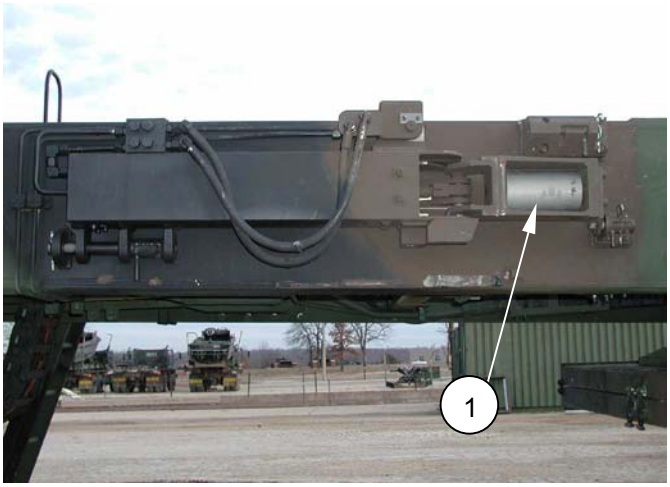
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 2)

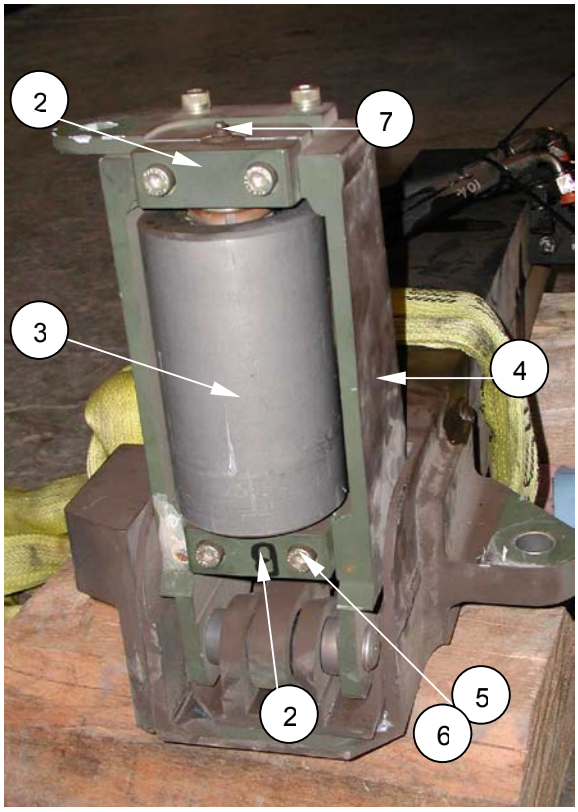
Equipment Conditions

A-Frame deployed
Slide Frame deployed



WARNING

CRUSH INJURY. THE TILT ROLLER ASSEMBLY AND TILT ROLLER SUPPORT ARE VERY HEAVY. SUITABLE SUPPORT IS REQUIRED TO PREVENT INJURY TO PERSONNEL.



NOTE

This procedure may be carried out with the tilt roller assembly fitted to the vehicle or when the tilt roller assembly is removed from the vehicle.

a. Remove

(1) Locate and identify the tilt roller support assembly (1). One is fitted to each side of section three of the slide frame.

(2) Locate the roller caps (2), screws (5) and lock washers (6), which secure the roller (3) to the roller support bracket (4). Discard the lock washers.

(3) Note the position of the two roller caps.

(4) Remove the screws (5) and washers (6) securing the roller caps (2).

(5) Remove the roller caps (2).

(6) Lift the roller (3) from the roller support bracket (4).

(7) Examine components for damage and corrosion.

(8) Examine bolt heads and threads on screws (5) for damage. Check coils of lock washers are not flattened.

(9) Replace components as required.

b. Install

(1) Fit the roller (3) in the roller support bracket (4).

(2) Fit the roller caps (2) in the positions noted during removal.

(3) Apply thread-locking compound to the screws (5).

(4) Secure the roller caps (2) to the roller support bracket (4) with the screws (5) and washers (6).

NOTE

When fitting the roller caps make sure that the securing screws are tightened down evenly and that the roller caps are fitted square to the roller support bracket.

(5) Check that the roller (3) rotates freely.

(6) Grease the roller (3) through the grease fitting (7).

5 - 085 SLIDE FRAME - TILT ROLLER CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Brass bar, Rubber hammer, Snap ring pliers (Common No 1)

Materials Required

Thread locking compound, loctite 243

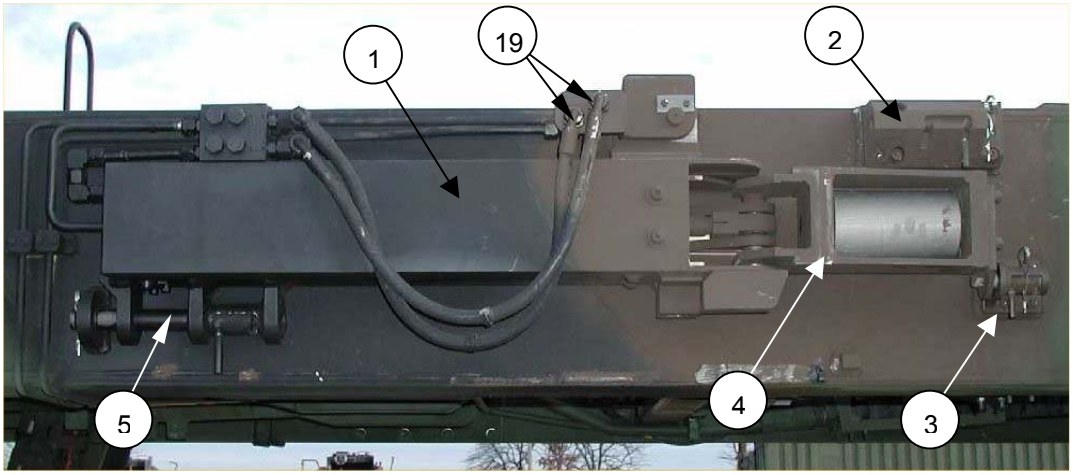
Equipment Conditions

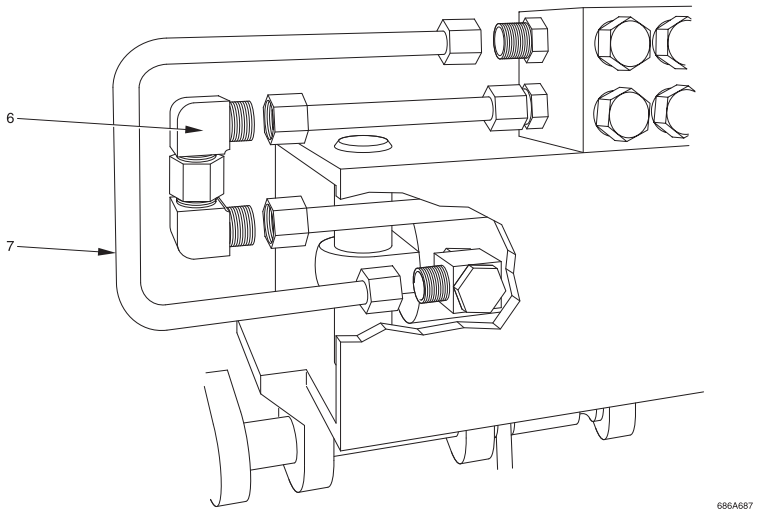
None

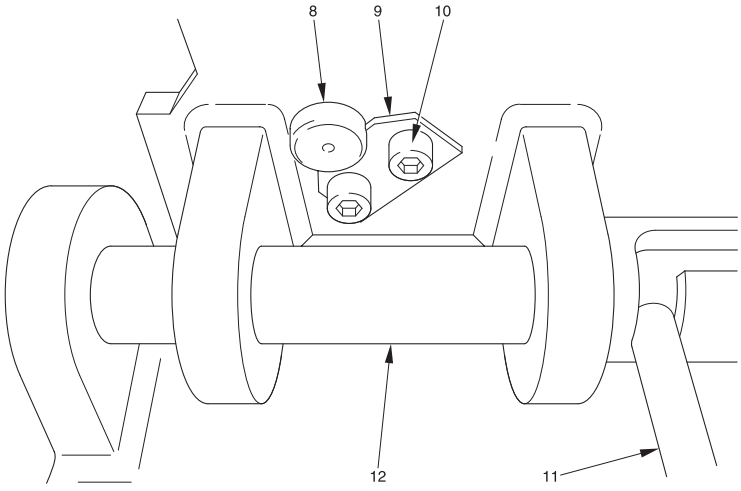
WARNING

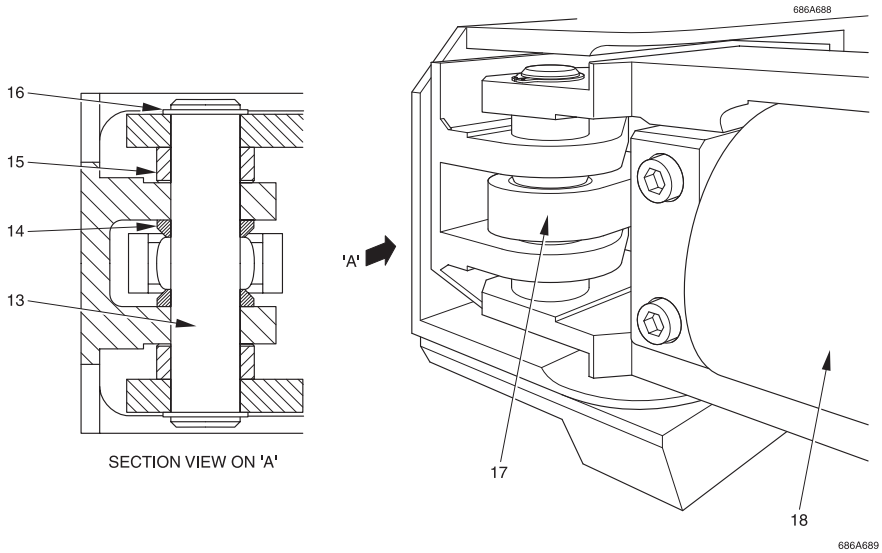
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME TILT ROLLER CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.




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SECTION VIEW ON 'A'
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a. Remove

(1) Depressurize the system in accordance with unit maintenance procedure 5-118.

(2) Remove the shoot bolt handle (11).

(3) Disengage the tilt roller support shoot bolts (2 and 3).

(4) Note the position of and remove the hydraulic connections (6 and 7) to the tilt roller cylinder. Fit protective caps to the hydraulic connections.

(5) Note the position of and remove the flexible hoses (19) to the tilt roller assembly. Fit protective caps to the flexible hoses.

(6) Remove the bolts and washers (10) securing the keep plate (9) on the tilt roller cylinder base pin (8).

(7) Remove the keep plate (9).

(8) Support the weight of the tilt roller assembly (1).

(9) Remove the shoot bolt (12).

(10) Remove the pin (8). With draw the pin (8) from the same side as the keep plate (9).

(11) Slide the tilt roller cylinder (17) towards the front of the vehicle by three inches.

(12) Support the weight of the tilt roller support roller (18).

(13) Remove the top snap ring (16) on the tilt roller cylinder piston pin (13).

(14) Remove the pin (13).

(15) Fit the spacers (15 and 14) in the positions noted during removal.

(16) Remove the tilt roller cylinder (17) from the tilt roller assembly (1) towards the rear of the vehicle.

(17) Check all bolt head and threads for damage.

(18) Check the pins and mountings for damage and wear.

(19) Replace as necessary.

b. Install

(1) Fit the tilt roller cylinder (17) in the tilt roller assembly (1).

(2) Align the tilt roller support (18) with the tilt roller cylinder piston (17).

(3) Fit the spacers (14 and 15) in the positions noted during removal.

(4) Fit the tilt roller cylinder piston pin (13) and fit the snap ring (16).

(5) Align the tilt roller cylinder in the tilt roller assembly (1).

(6) Fit the tilt roller cylinder base pin (8).

(7) Apply thread-locking compound to the bolts (10).

(8) Fit the keep plate (9) and secure in place with the bolts and washers (10).

(9) Apply thread-locking compound to the shoot bolt handle (11).

(10) Fit the shoot bolt (12).

(11) Fit the shoot bolt handle (11) to the shoot bolt (12).

(12) Remove the protective caps on the flexible hoses. Fit the flexible hoses (19) to the tilt roller assembly in the positions noted during removal.

(13) Remove the protective caps on the hydraulic connections. Fit the hydraulic connections (6 and 7) to the positions noted during removal.

(14) Secure the tilt roller support (18) by engaging the shoot bolt (3).

c. Follow on tasks

(1) Operate the system in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

5 - 086 SLIDE FRAME - TILT ROLLER SHOOT BOLT HOUSING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

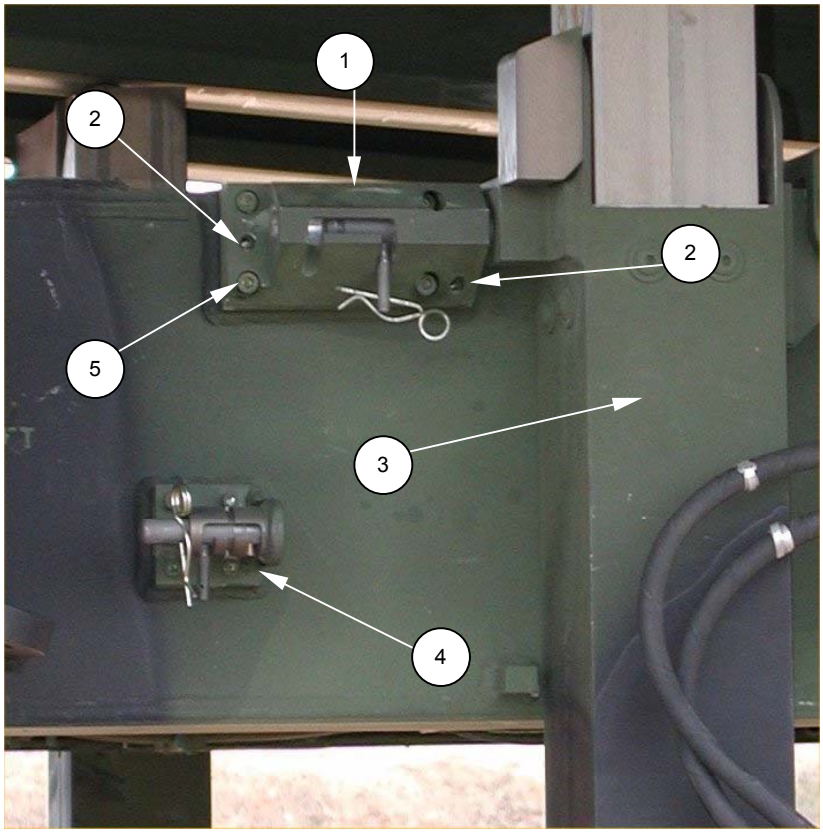
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Tilt roller assembly placed in a position to gain access to the upper or lower shoot bolt

---



a. Remove

(1) Position the tilt roller assembly (3) to gain access to the shoot bolt under repair.

(2) Remove the four bolts and washers (5) securing the upper shoot bolt to the slide frame.

(3) Remove the upper shoot bolt housing (1). It may be necessary to pry it over the two spring pins (2).

(4) The lower shoot bolt housing (4) is removed in the same way but it does not have spring pins fitted.

(5) Check all threaded components for damage.

(6) Check the spring pins for damage.

(7) Replace components as necessary.

b. Install

(1) Place the upper shoot bolt housing (1) on the slide frame.

(2) Loosely fit the washers and bolts (5).

(3) Fit the spring pins (2).

(4) Tighten the bolts (5).

(5) The lower shoot bolt housing (4) is installed in the same way but it does not have spring pins fitted.

5 - 087 SLIDE FRAME - END WEAR PADS

This task covers:

a. Remove b. Inspect c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

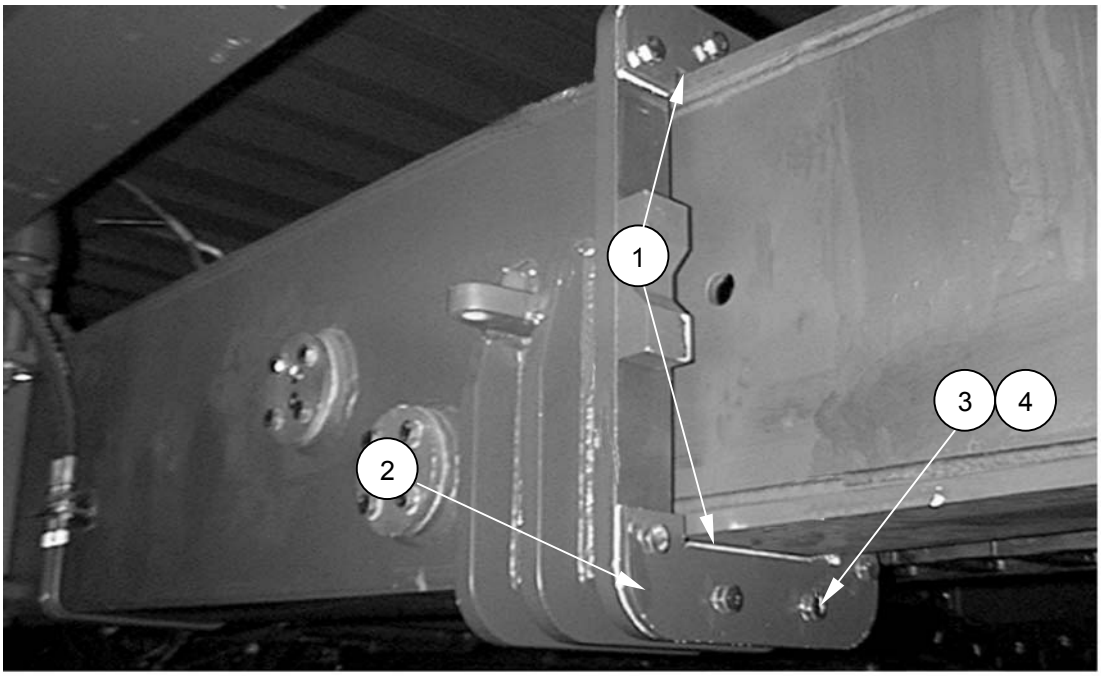
Thread locking compound, loctite 242
Lock washers (Qty 8)

Equipment Conditions

A-Frame deployed
Slide Frame deployed

NOTE

The procedure for changing all slide frame end wear pads is identical.



a. Remove

(1) Locate and identify the upper and lower end wear pads (1) in both sections two and three of the slide frame.

(2) Remove the upper and lower end wear pad locking plates (2) by removing the four retaining bolts (3) and lock washers (4) securing them to the slide frame. Discard lock washers.

(3) Repeat operations 2 & 3 on the remaining three sets of end wear pads.

b. Inspect

(1) Check each end wear pad (1) and if they are less than 6mm thick replace wear pad.

(2) Examine all components for damage and corrosion.

(3) Examine bolt heads and threads for damage.

(4) Replace components as required.

c. Install

(1) Insert the end wear pad (1) into the slide frame.

(2) Apply thread locking compound to the retaining bolts (3)

(3) Replace the locking plate (2) and secure with the retaining bolts (3) and lock washers (4).

5 - 088 SLIDE FRAME - REMOVABLE ROLLER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

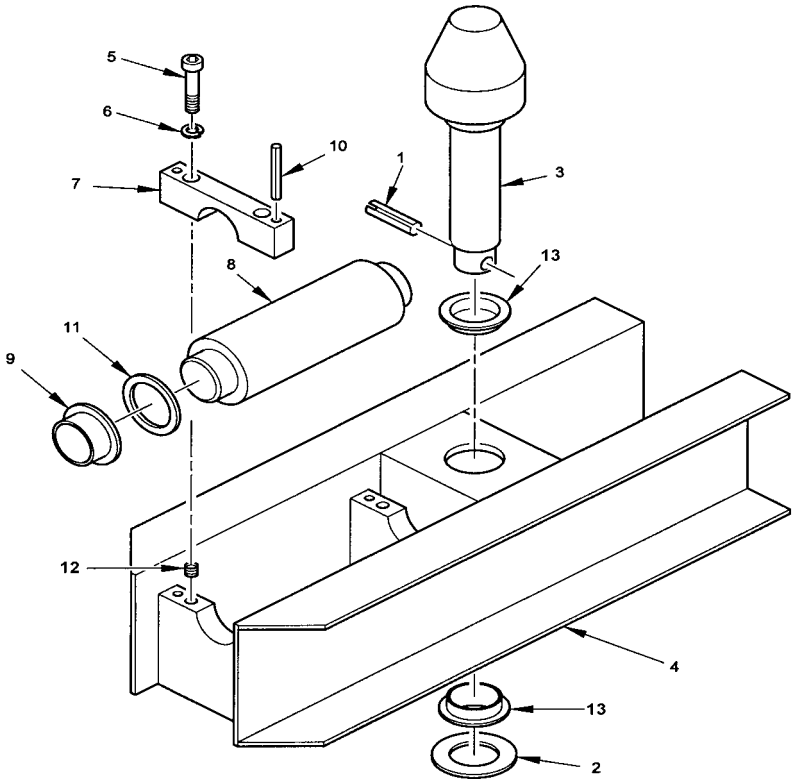
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 4)

Equipment Conditions

Place removable rollers on a clean flat surface



a. Remove

(1) Remove spring pin (1), plain washer (2) and lift guide roller (3) out of roller frame (4).

(2) Remove four screws (5), lock washers (6) and pry off bearing caps (7) from roller frame (4) which are located by split pins (10). Discard lock washers.

(3) Lift out support roller (8), bushing (9) and thrust washer (11).

(4) Examine all components for damage and corrosion.

(5) Examine bushings (13) in support bracket for scoring.

(6) Examine bolt heads and threads for damage.

(7) Check heli-coil inserts (8) for damage.

(8) Replace components as required. Items (4) and (7) cannot be replaced individually. Replace as a machined assembly, complete with screws (5) lock washers (6) and split pins (10).

b. Install

(1) Fit support roller (7), bushings (8) and thrust washers (11) into roller frame (4).

(2) The bearing caps (7) are marked **A** and **B**, a corresponding mark can be found on the support bracket (4). Ensure the bearing caps are fitted at the correct location **A** to **A** and **B** to **B**.

(3) Apply thread locking compound to the screw threads (5).

(4) Locate the bearing caps (7) on their split pins and secure with screws (5) and lock washers (6).

(5) Fit the guide roller (3) into the roller frame (4) and secure using plain washer (2) and spring pin (1).

5 - 089 SLIDE FRAME - ELECTRICAL JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

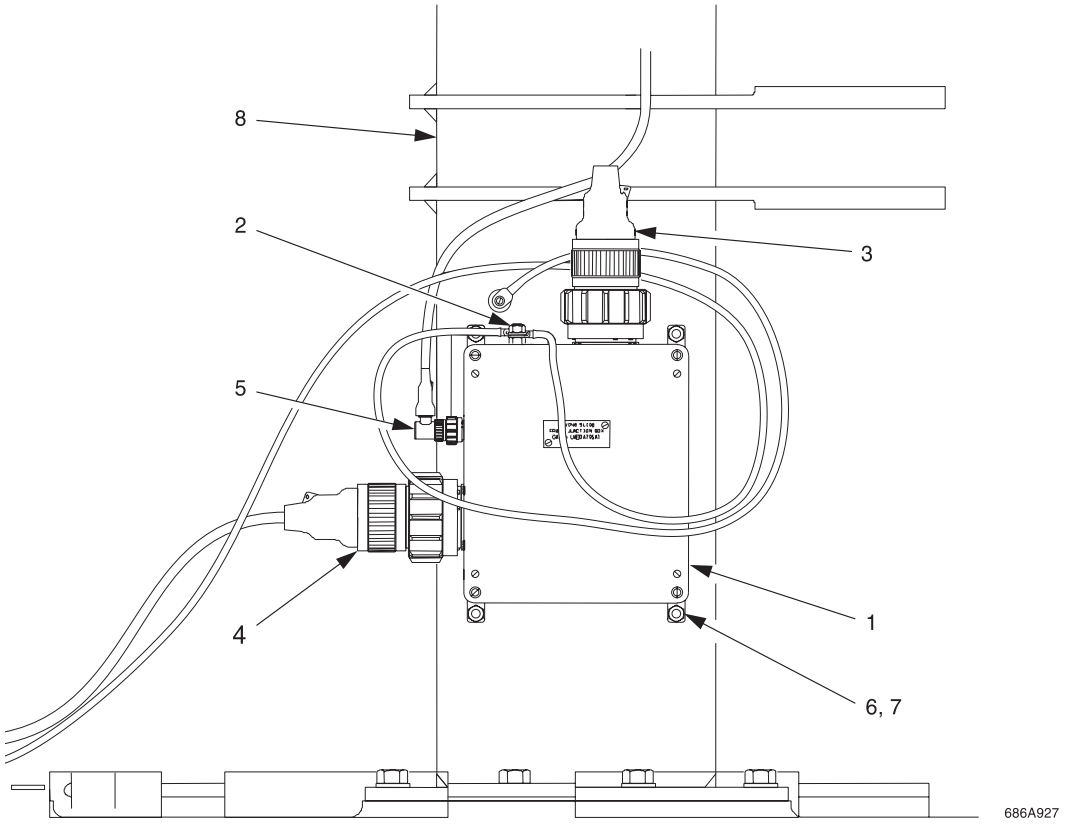
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

A-Frame deployed
Vehicle switched off and battery shutoff switch in the off position

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NOTE

The slide frame junction box is mounted on the top of a slide frame cross member underneath walkways.

a. Remove

(1) Remove the ground cable (2) connected to the junction box (1).

(2) Note the position of and remove all electrical connections (3, 4 and 5) to the junction box (1).

(3) Remove the four socket head screws (6) and washers (7) securing the junction box (1) to the cross-member (8).

(4) Remove the junction box (1).

(5) Examine all threaded components for wear and damage.

(6) Change components as required.

b. Install

(1) Fit the junction box (1) to the cross-member (8).

(2) Apply thread-locking compound to the socket head screws (6).

(3) Secure the junction box (1) to the cross-member (8) with the washers (7) and socket head screws (6).

(4) Fit the electrical connections (3, 4 and 5) to the junction box (1) at the positions noted during removal.

(5) Fit the ground cable (2) to the junction box (1).

5 - 090 SLIDE FRAME - WALKWAYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

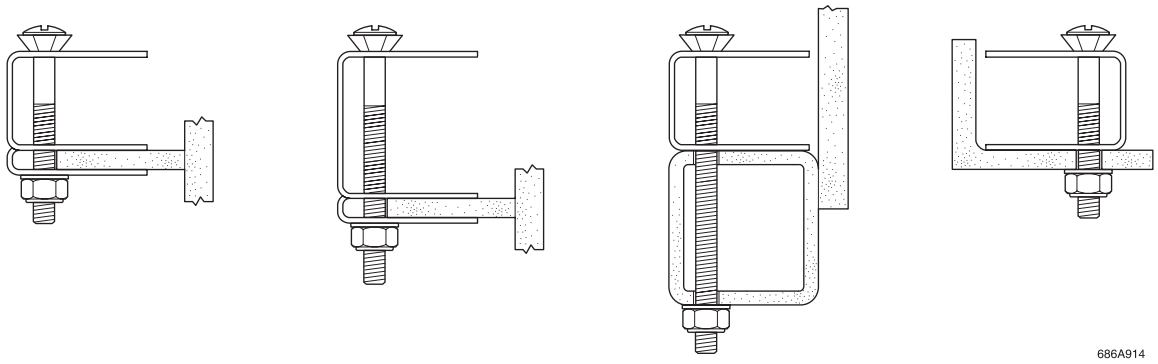
None

Equipment Conditions

A-Frame deployed

NOTE

The fixed walkway is bolted to the sliding frame with one or more of the following fixing arrangements. Each piece of the fixed walkway is also bolted to the next piece.



A section of the fixed walkway has quick release fixings to enable the operator or maintainer to gain access to the A-Frame rotate manifold for fault finding purposes.

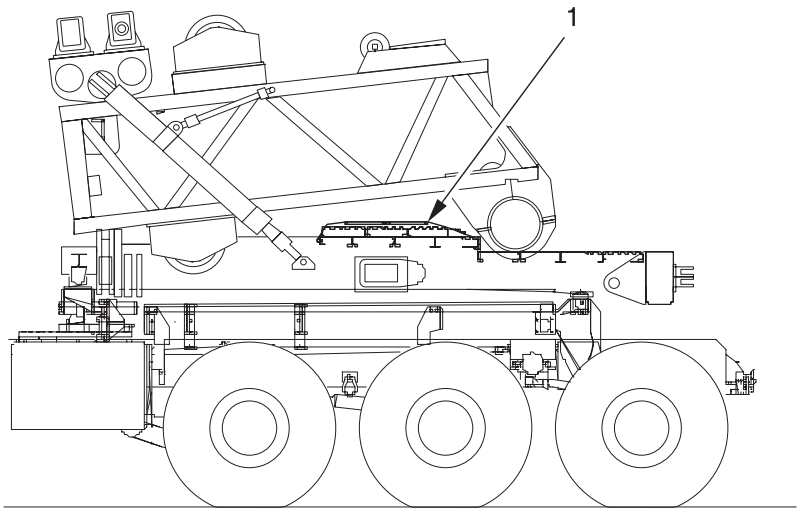
a. Remove

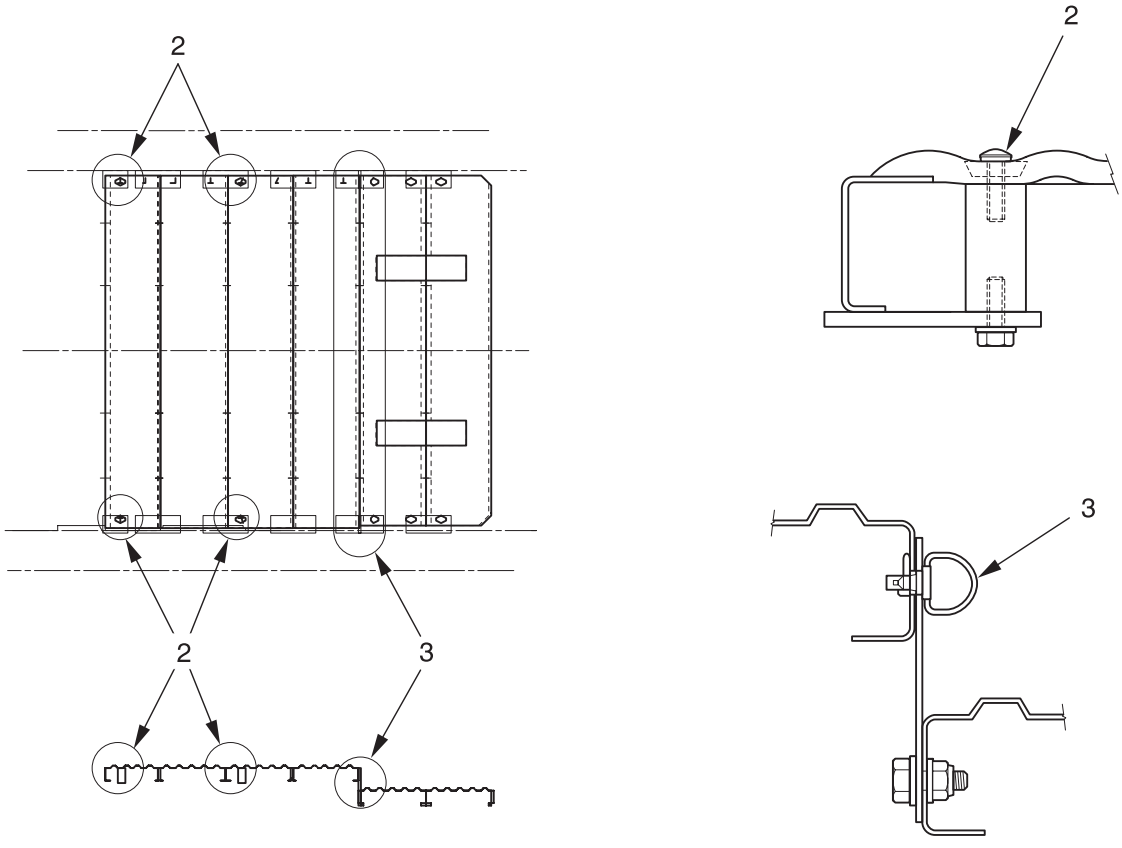
(1) Remove the stowed removable walkways and handrails from the DSB (1).

(2) Remove four hexagon button headed screws and washers (2).

(3) Remove the five quick release fasteners (3).

(4) Remove the fixed walkway from sliding section 3, to gain access to the A-Frame rotate manifold.





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b. Install

(1) Fit the walkway to the slide frame 3.

(2) Fit the five quick release fasteners (3).

(5) Fit the four hexagon button headed screws and washers (2).

(6) Fit the stowed removable walkways and handrails to the DSB (1).

5 - 091 SLIDE FRAME - END BEAM GUIDE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

---

a. Remove

(1) Place the end beam guide (1) on a suitable working surface.

(2) Remove the split dowels (9).

(3) Remove the hinge rod (7).

(4) Retain the flat washers (8) and spacer sleeves (3).

(5) Remove the locking arm (4).

(6) Remove the screws (12) securing the slide pads (11) to the locking arm (4).

(7) Remove the slide pads (11).

(8) Remove the handle pins (10).

(9) Remove the pivot pin (15).

(10) Remove the latch bar (14).

(11) If required remove the split dowel (16).

(12) Check all threaded components for wear and damage.

(13) Check the threaded inserts (5,6 and 13) for wear and damage.

(14) Check the mounting bracket (2), locking arm (4) and slide pads (11) for wear and damage.

(15) Change components as necessary.

b. Install

(1) Apply thread locking compound to all threaded components.

(2) Fit the split dowel (16) to the mounting bracket (2).

(3) Align the latch bar (14) on the mounting bracket (2) and fit the pivot pin (15) through the latch bar (14) to the mounting bracket (2).

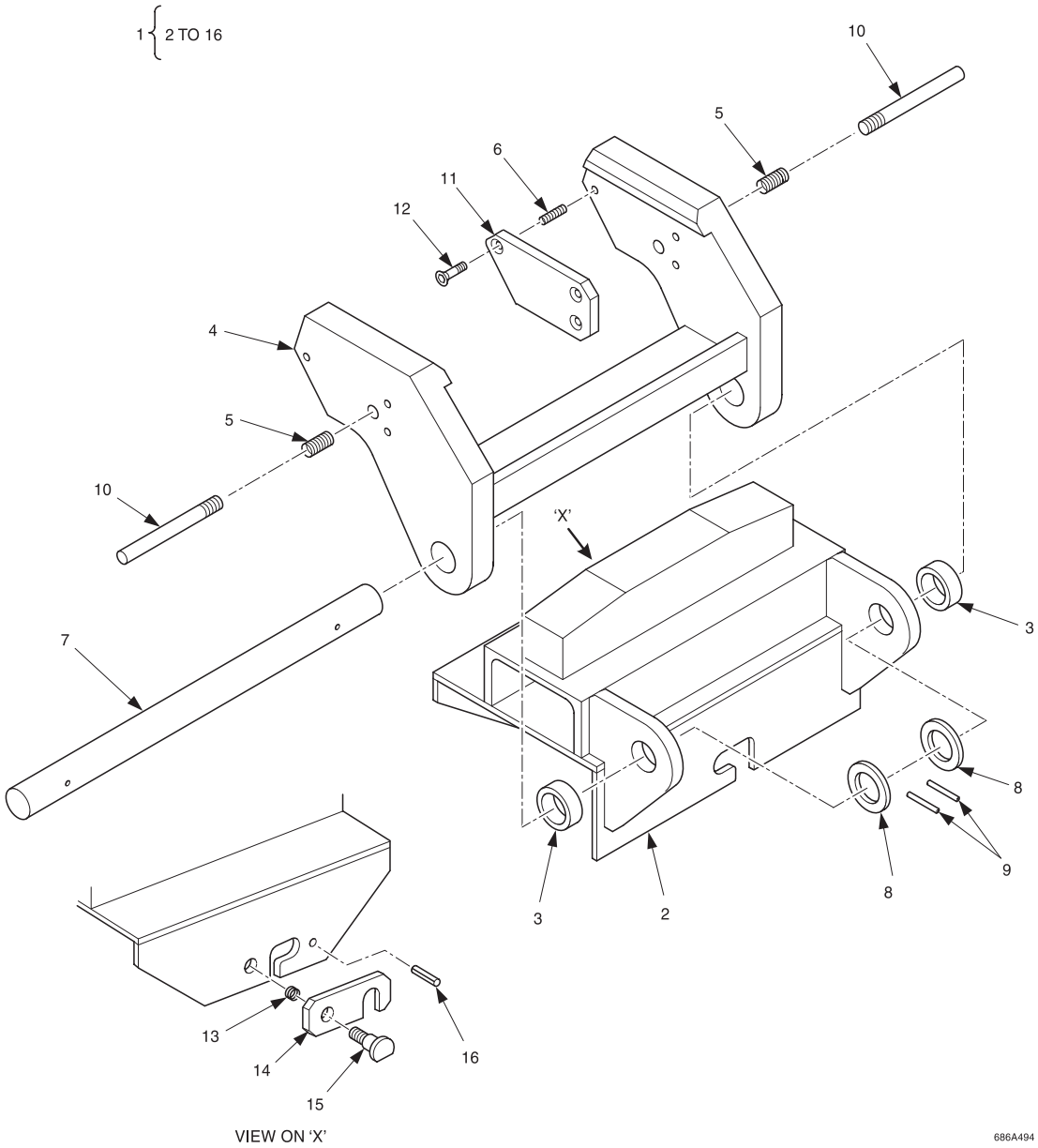
(4) Fit the slide pads (11) to the locking arm (4) with screws (12).

(5) Fit the handle pins (10) to the locking arm (4).

(6) Align the locking arm (4), spacer sleeves (3) and flat washers (8) on the mounting bracket (2).

(7) Fit the hinge rod (7).

(8) Fit the split dowels (9).



5 - 092 RELAX MECHANISM - CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

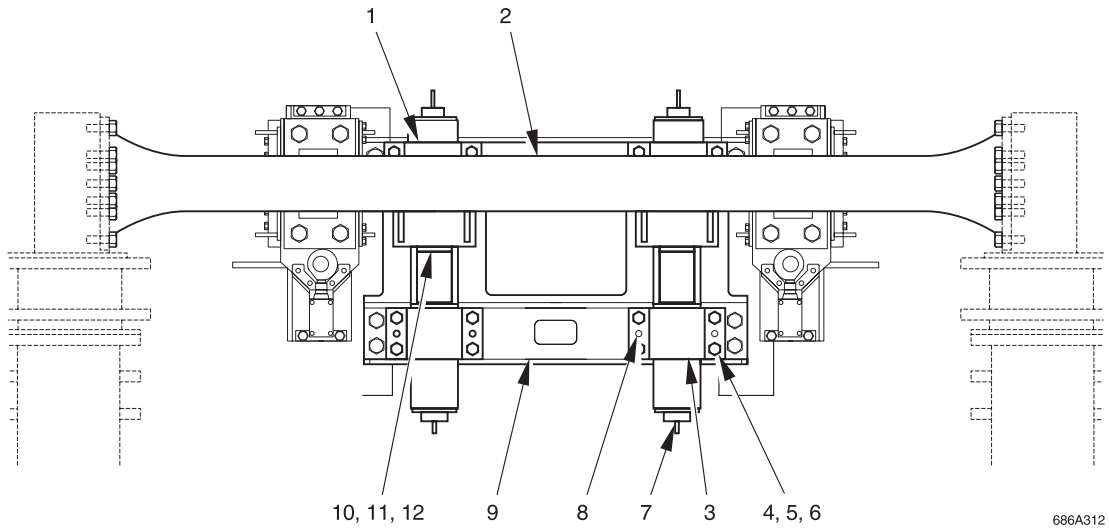
Tool Kit, General Mechanic's, Automotive (GMTK)

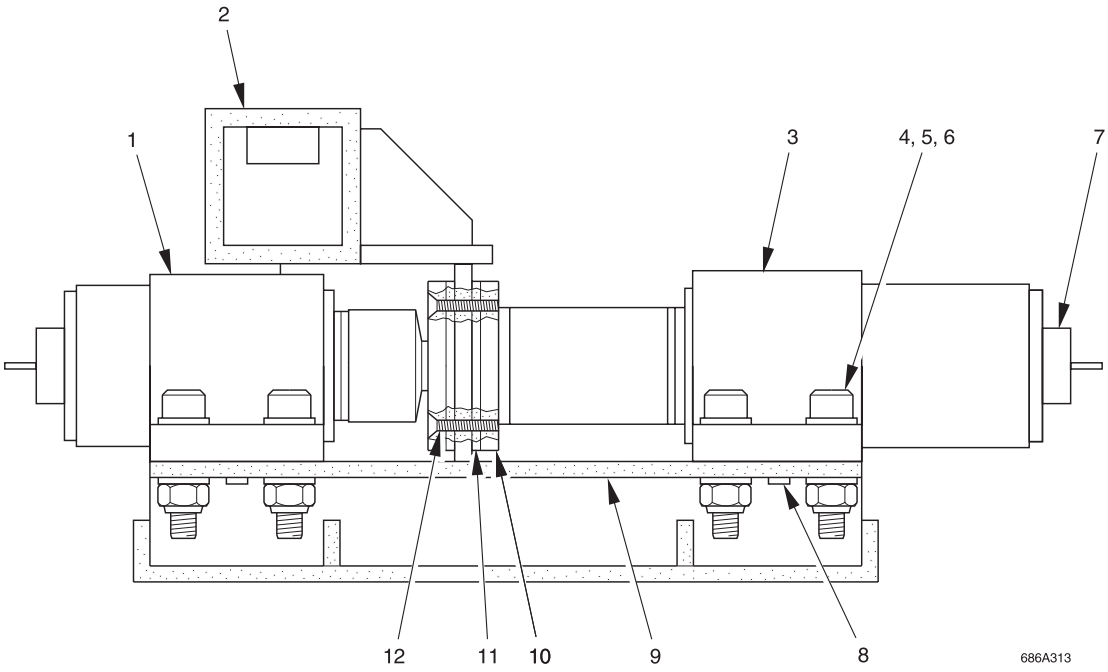
Materials Required

Nyloc nuts (Qty 4)

Equipment Conditions

A-Frame deployed
Slide Frame deployed





NOTE

The crane has to be removed before access to the two front 1-inch (25mm) reach relax cylinders is possible.

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate and identify the four relax mechanism cylinders (1 and 3). The two rear cylinders (3) have 3 inch (80mm) travel and the two forward cylinders (1) have 1 inch (25mm) travel. Both sets of cylinders are mounted on the cylinder support bracket (9).

WARNING

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. THE WORKING PRESSURE OF THE HYDRAULIC SYSTEM IS 4423 PSI (30495 kPa) AND THERE MAY BE RESIDUAL PRESSURE IN THE HOSES.

NOTE

The following steps describe the typical removal of a 3-inch (80mm) cylinder and can be applied to the removal of any cylinder.

(3) Remove the flexible hydraulic hose (7) connected to the cylinder (3).

(4) Remove the four screws (4), washers (5) and nyloc nuts (6). Discard the nyloc nuts.

(5) Remove the cylinder (3).

(6) Remove and retain the spring pins (8), which locate the cylinder (3) on the cylinder support bracket (9).

(7) If required, the cylinder pads (11) can be removed by removing the screws (12).

(8) Retain the shim pack (10).

NOTE

To change the two front 1 inch (25mm) reach Cylinders (1) follow operations 1 to 9 above once access is gained.

(9) Check all threaded components for wear and damage.

(10) Check the hydraulic hoses for damage.

(11) Replace components as necessary.

b. Install

(1) If the cylinder pad (11) was removed fit the shim pack (10), cylinder pad (11).

(2) Apply thread-locking compound to the screws (12) and secure the cylinder pad (11) and shim pack (10) to the upper cross beam (2).

(3) Fit the spring pin (8) to the cylinder (3).

(4) Locate the cylinder (3) on the cylinder support bracket (9) and drive the spring pin (8) into the cylinder support bracket (9).

(5) Fit the four screws (4), washers (5) fit new nyloc nuts (5) and torque tighten to 152 lb/ft (206Nm).

WARNING

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. THE WORKING PRESSURE OF THE HYDRAULIC SYSTEM IS 4423 PSI (30495 kPa) AND THERE MAY BE RESIDUAL PRESSURE IN THE HOSES.

(6) Fit the flexible hydraulic hose (7) to the cylinder (3).

(7) Operate the hydraulic circuit to self purge any trapped air. Check for leaks, rectify as necessary.

(8) Check hydraulic oil level and replenish as necessary.

(9) Clean up any spilled hydraulic fluid.

5 - 093 RELAX MECHANISM - SLIDE PAD

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

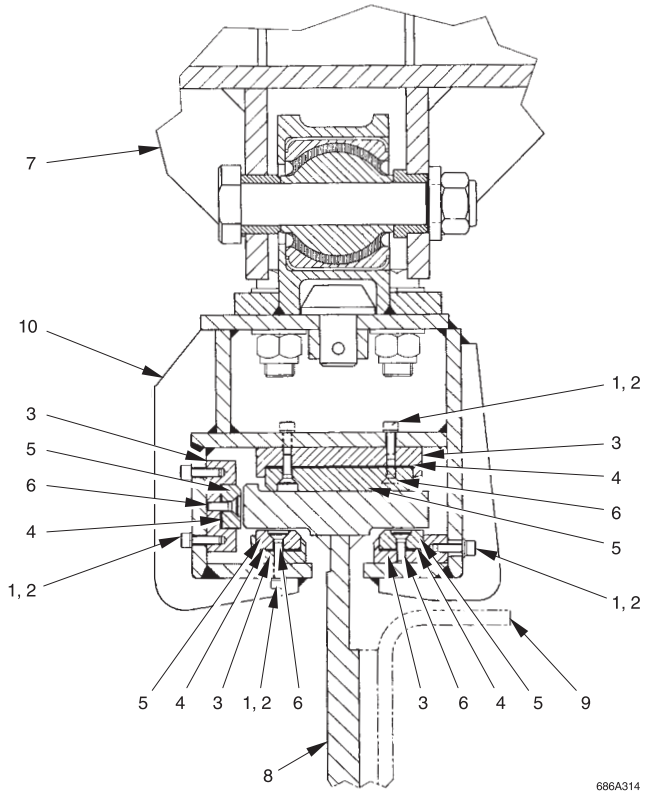
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

A-Frame deployed
Slide Frame deployed



NOTE

The relax mechanism mountings (10) are connected to the slide frame by the cross member (7). The left and right hand mountings (10) are free to move on the slide supports (8), which are connected to the crane sub-frame and vehicle chassis (9).

There are four slide pads (5) fitted to the left hand and right hand relax mechanism mountings (10).

This procedure details a typical slide pad (5) renewal and is applicable to all slide pads (5) on the relax mechanism.

a. Remove

(1) Remove the pad holder (3) retaining screws (1) and washers (2).

(2) Remove the pad holder (3) complete with screws (6) and shims (4).

(3) Remove the screws (6).

(4) Remove the slide pad (5) and retain the shims (4).

(5) Check all threaded components for wear and damage.

(6) Check that the slide pads thickness is 1/4 inch (6mm). If a slide pad is less than 1/4 inch (6mm) thick fit a new slide pad.

(7) Replace components as required.

b. Install

(1) Apply thread-locking compound to screws (6).

(2) Fit shims (4) retained during removal to pad holder (3).

(3) Fit slide pad (5) to pad holder (3).

(4) Secure slide pad (5) with screws (6).

(5) Apply thread-locking compound to screws (2).

(6) Locate pad holder (3) complete with slide pad (5) and shims (4) on relax mechanism mounting (10).

(7) Secure pad holder (3) with washers (2) and screws (1).

(8) Check the operation of the relax mechanism.

5 - 094 RELAX MECHANISM - LIMIT SWITCH AND SHOOT BOLT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

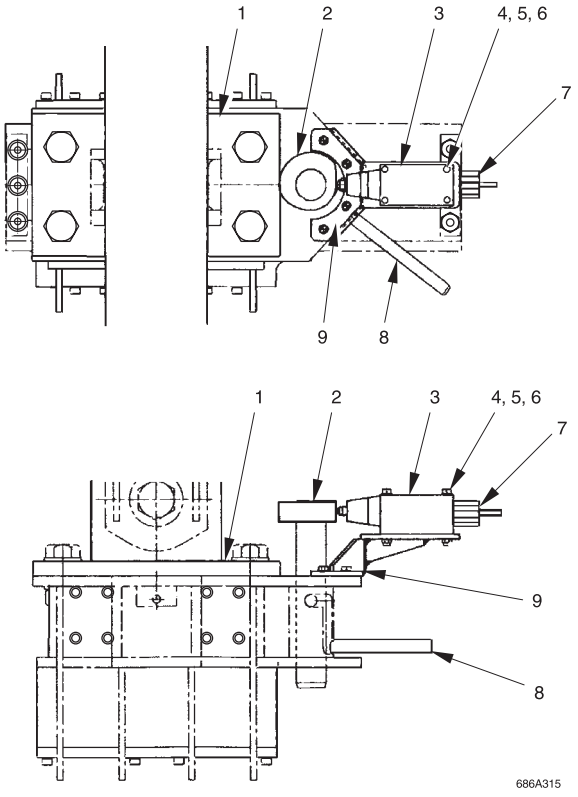
Materials Required

Nyloc nuts (Qty 4)

Equipment Conditions

A-Frame deployed
Slide Frame deployed
Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Remove the electrical cables (7) connected to the limit switches (3).

(2) Check that the shoot bolt handle (8) is in its lowest position as shown.

(3) Remove the bolts (4), nyloc nuts (5) and washers (6) securing the limit switch (3) to the limit switch mounting (9). Discard the nyloc nuts.

(4) Remove the limit switch (3).

(5) If required the limit switch cam/shoot bolt (2) can be removed by unscrewing the shoot bolt handle (8).

(6) Check all threaded components for wear and damage.

(7) Check the electrical cable (7) and plug for damage.

(8) Replace components as necessary.

b. Install

(1) If previously removed, fit the limit switch cam/shoot bolt (2) to the relax mechanism (1).

(2) Fit the shoot bolt handle (8) to the limit switch cam/shoot bolt (2). Ensure that the shoot bolt handle (8) is in its lowest position.

(3) Fit the limit switch (3) to the mounting bracket (9).

(4) Secure the limit switch (3) with the bolt (4), washer (6) and new nyloc nuts (5).

(5) Fit the electrical cable (7) to the limit switch (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the limit switch cam/shoot bolt (2) and limit switch (3).

5 - 095 RELAX MECHANISM - BALL JOINT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

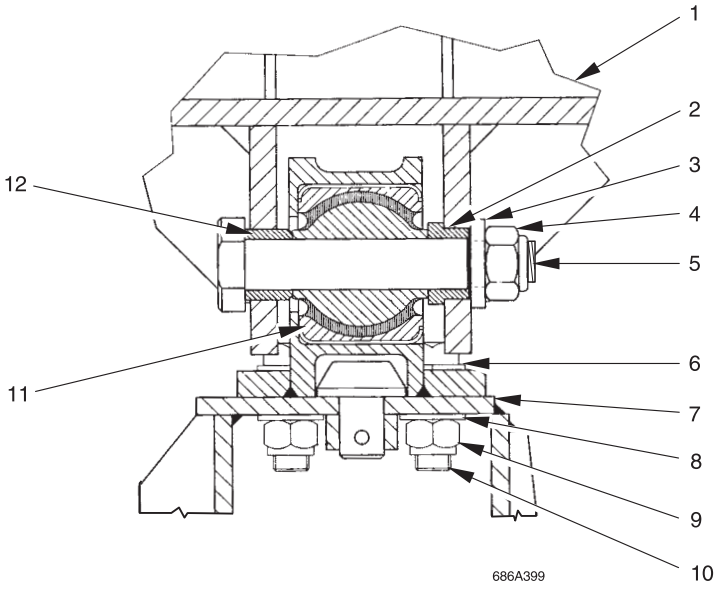
Tool Kit, General Mechanic's, Automotive (GMTK)

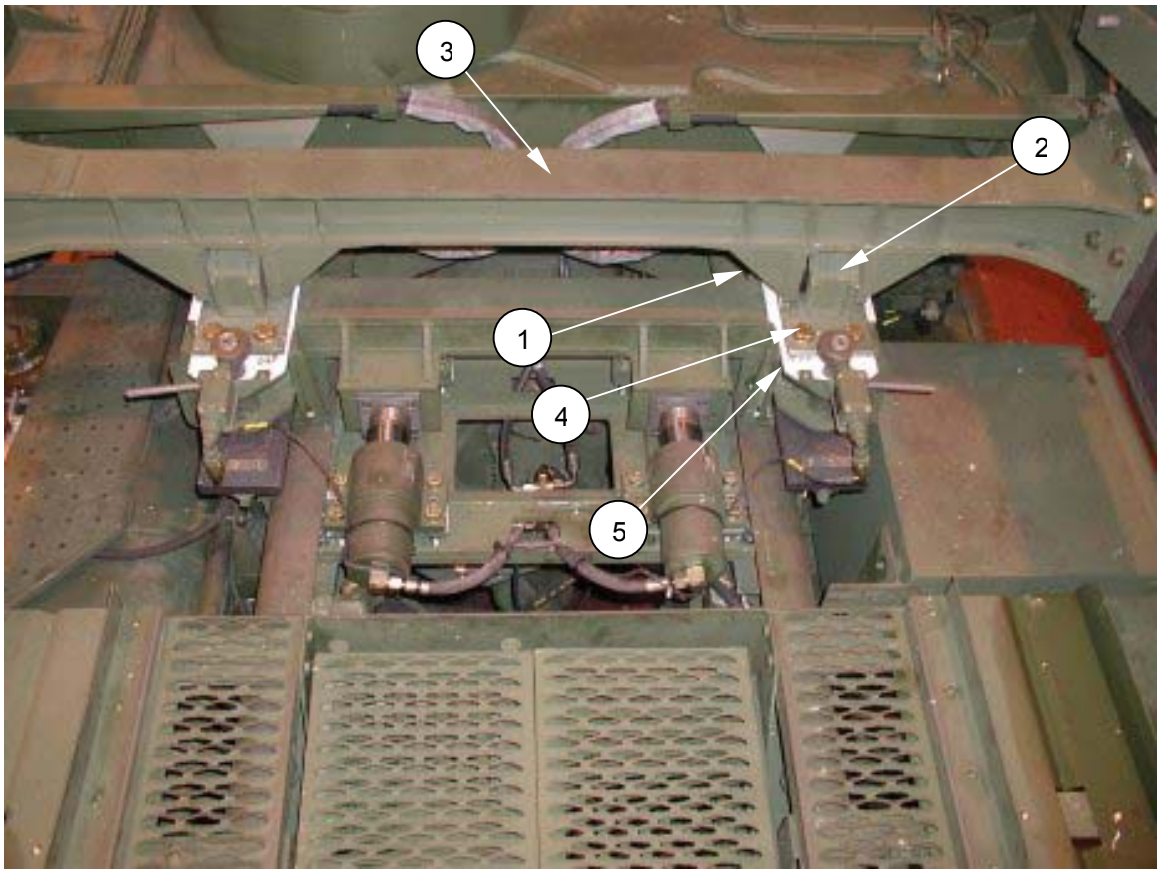
Materials Required

Nyloc nut M24 (Qty 1)
Nyloc nut M16 (Qty 4)

Equipment Conditions

A-Frame deployed
Slide Frame deployed





a. Remove

(1) Support the weight of the relax mechanism cross member (1).

(2) Remove the nyloc nut (5), washer (3) and bolt (5) securing the ball joint assembly (11) to the upper relax mechanism cross member (1). Discard the nyloc nut (5).

(3) Note the orientation and position of the ball joint assembly (11).

(4) Remove the four nyloc nuts (9), washers (6 & 8) and bolts (10) securing the ball joint assembly (11) to the relax mechanism slide housing (7). Discard the nyloc nuts (9).

NOTE

Note the position of and retain the spacers (2) and (12).

b. Install

(1) Fit the spacers (2) and (12) to the relax mechanism cross member (1).

(2) Fit the ball joint assembly (11) in the position noted during removal.

(3) Fit the bolt (5), washer (3) and new nyloc nut (4) securing the ball joint assembly (11) to the upper relax mechanism cross member (1).

(4) Fit the four bolts (10), washers (6 and 8) and new nyloc nuts (9) securing the ball joint assembly (11) to the relax mechanism slide housing (7).

5 - 096 ENERGY CHAIN - LINK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

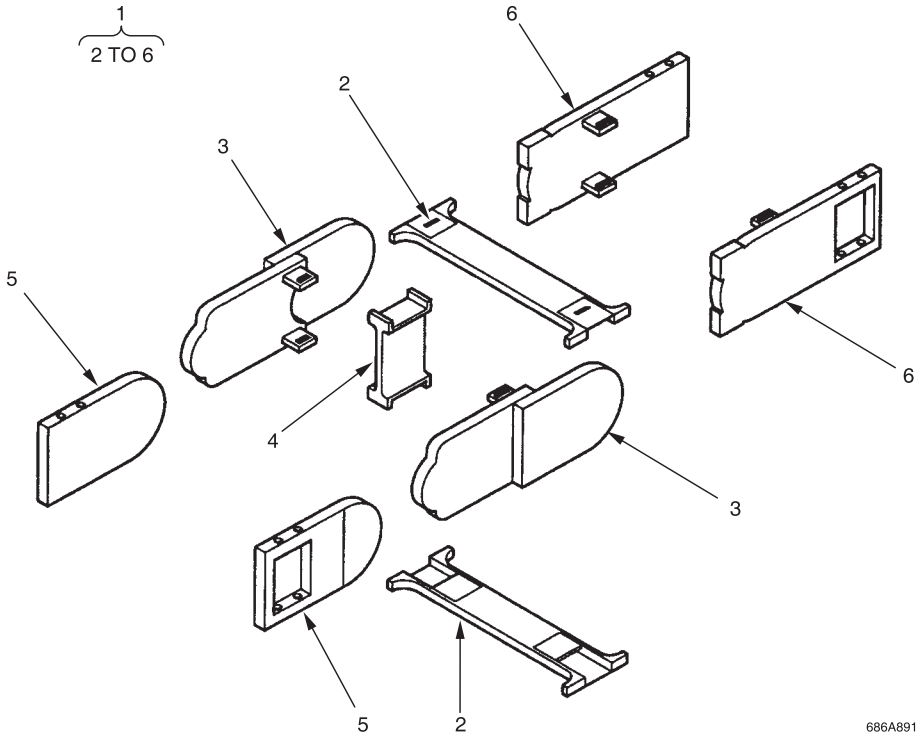
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

None



a. Remove

(1) Insert a suitable small screwdriver under either slot on the link plate (2) and lever downwards.

(2) The link plate (2) will unlock and can be removed.

(3) The side plates (3) and separator (4) can be removed and replaced as required.

(4) Replace damaged link plates (2), side plates (3) and separators (4) with new items.

b. Install

NOTE

It may be necessary to release one end of the energy chain being repaired to allow enough slack in the chain when installing a link. Trace the energy chain to its last link (5 or 6) and remove its mounting bolts.

(1) Position the side plates (3) with the lugs facing inwards.

(2) Place the first link plate (2) on the side plate (3) lugs. Press the link plate (2) downwards until it snaps into the locked position.

(3) Position a separator (4) in the center of the link plate (2).

(4) Place the second link plate (2) on the side plate (3) lugs; ensure that the separator (4) is correctly located.

(5) Press the link plate (2) downwards until it snaps into the locked position.

(6) The end plate (6) is used to attach one end of the energy chain to a static point such as the vehicle chassis.

(7) The end plate (5) is used to attach one end of the energy chain to a mobile assembly.

(8) The end plates (5) and (6) are attached to their mounting points with nuts and bolts.

(9) Fit the energy chain to its mountings if it was removed earlier.

5 - 097 ENERGY CHAIN - ENERGY CHAIN ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

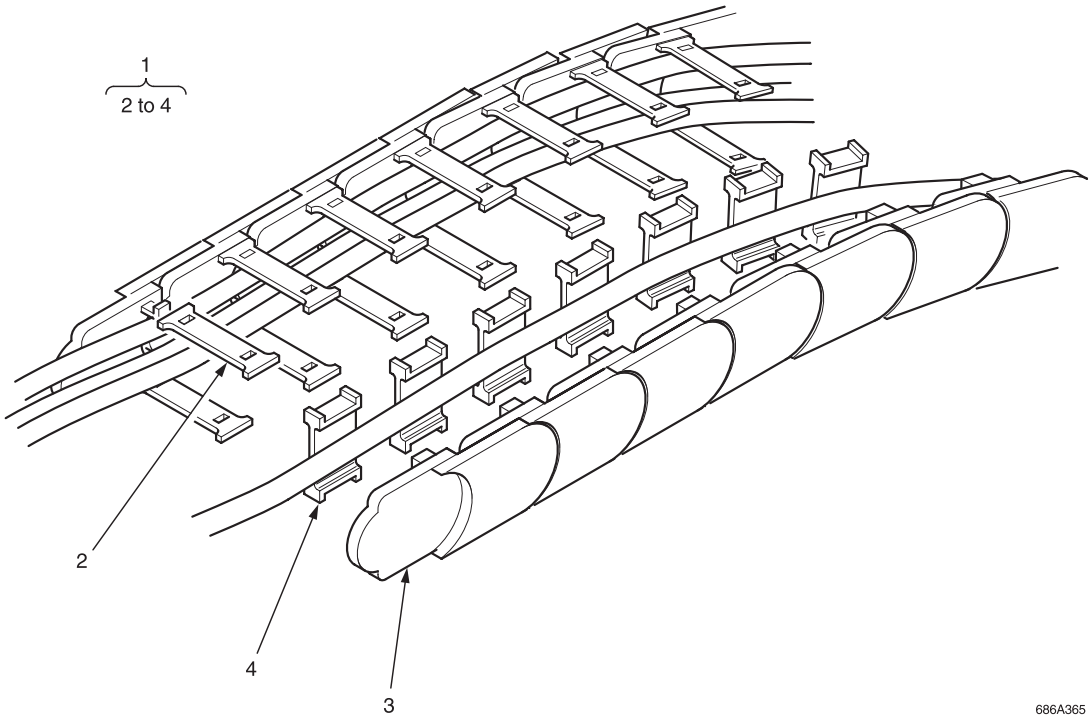
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

A-Frame deployed (for changing energy chains on A-Frame and launch frame)
A-Frame and slide frame deployed; (for changing energy chains on chassis and between rotate cylinders)



NOTE

There are nine energy chains fitted to the DSB. The energy chain guides and protects hydraulic hoses that service the component parts of the hydraulic circuits:

Two from the chassis to the slide frame.

One between the rotate cylinders.

Two from the A-Frame to the launch frame.

Four from the A-Frame routed over the stabilizer leg

The energy chains are different in size according to where they are fitted, ensure that the correct energy chain is ordered from the RSPTL TM 5-5420-279-23P when changing them.

This principle of this maintenance procedure can be applied to any energy chain.

This procedure should be read in conjunction with unit maintenance procedure 5-096; energy chain link replacement.

a. Remove

(1) Remove the mounting nuts, bolts and washers securing both fixed ends of the energy chain.

(2) Insert a suitable small screwdriver under one slot on the link plates (2) and lever downwards.

(3) The link plates (2) will unlock and the one of side plates (3) can be removed. Repeat this process for each link in the energy chain.

(4) Remove the separator (4), where fitted, from each link.

(5) Remove the energy chain by sliding it off the hydraulic hoses.

NOTE

It may be necessary to completely dismantle some links to allow for removal. Refer to unit maintenance procedure 5-096 for link replacement.

b. Install

(1) When fitting a new energy chain; carry out steps 2, 3 and 4 of the removal on the new energy chain.

(2) Fit the energy chain over the hydraulic hoses.

(3) Fit one end of the energy chain and secure it in place with nuts, bolts and washers.

(4) Fit the separator (4), where fitted, to each link.

(5) Fit the side plate (3) and link plate (2) to each link.

(6) Fit the other end of the energy chain and secure it in place with nuts, bolts and washers.

(7) Check that the energy chain works correctly by deploying the system under repair.

5 - 098 CHASSIS - INTERFACE ENCLOSURE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

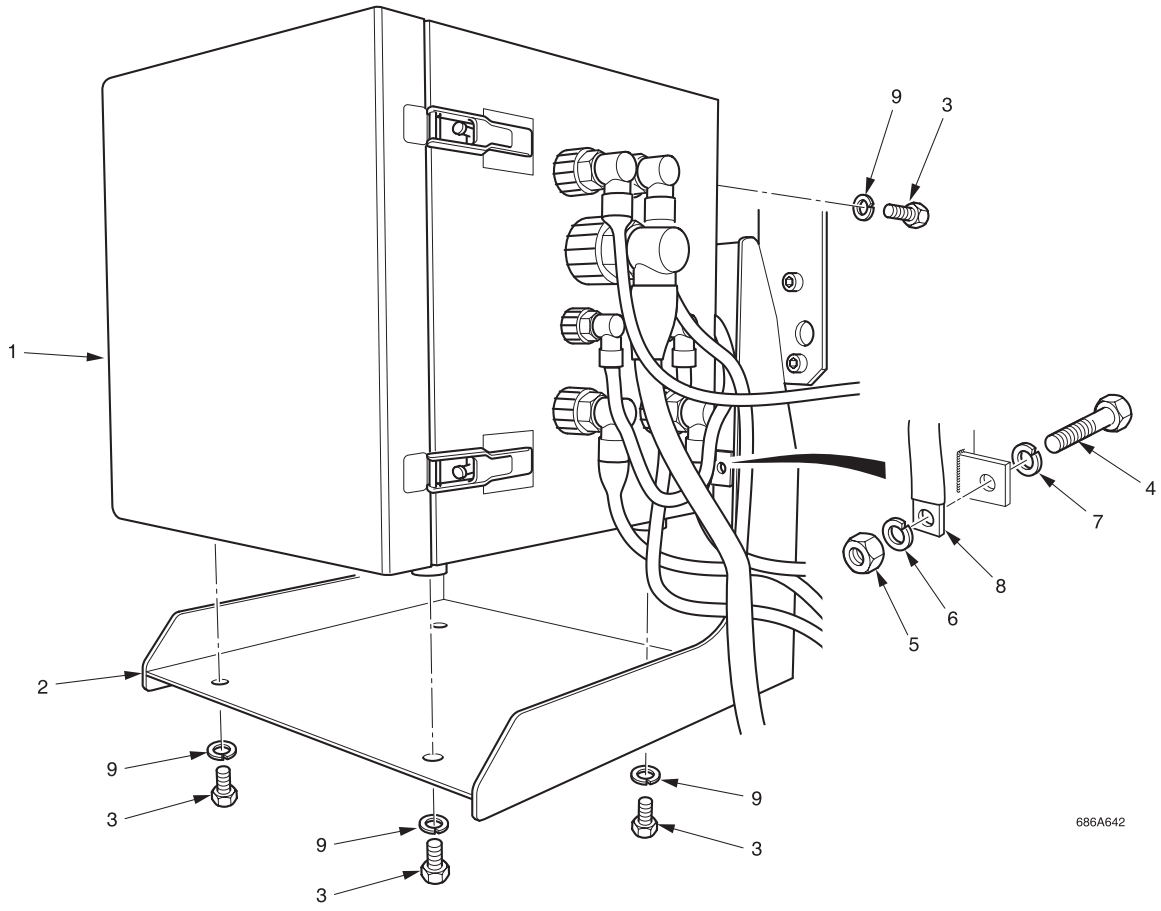
Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 7)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position.





a. Remove

(1) Note the position of and remove the electrical harnesses to the interface enclosure (1).

(2) Remove the nut (5) and lock washer (6), ground lead (8), washer (7) and bolt (4) at the interface enclosure (1). Discard the lock washer.

(3) Remove the six bolts (3) and lock washers (9) securing the interface enclosure (1) to the chassis-mounting bracket (2). Discard the lock washers.

(4) Remove the interface enclosure (1).

(5) Examine all threaded components for wear and damage.

(6) Check the electrical harnesses for damage.

(7) Change components as required.

b. Install

(1) Apply thread-locking compound to the bolts (3).

(2) Fit the interface enclosure (1) to the chassis-mounting bracket (2) with the six bolts (3) and new lock washers (9).

(3) Fit the bolt (4), washer (7), ground lead (8) new lock washer (6) and nut (5) at the interface enclosure (1).

(4) Fit the electrical harnesses to interface enclosure (1) to the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the interface enclosure in accordance with the operator's manual, TM 5-5420-279-10.

5 - 099 CHASSIS - INTERFACE ENCLOSURE - E-STOP RELAY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set, Contact Maintenance Truck HMMWV

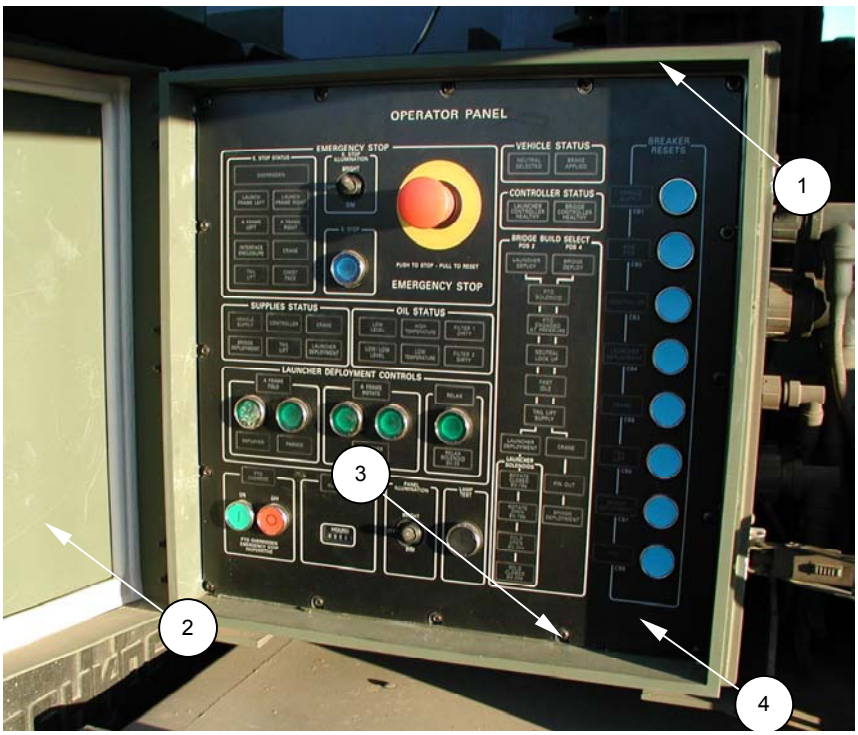
Materials Required

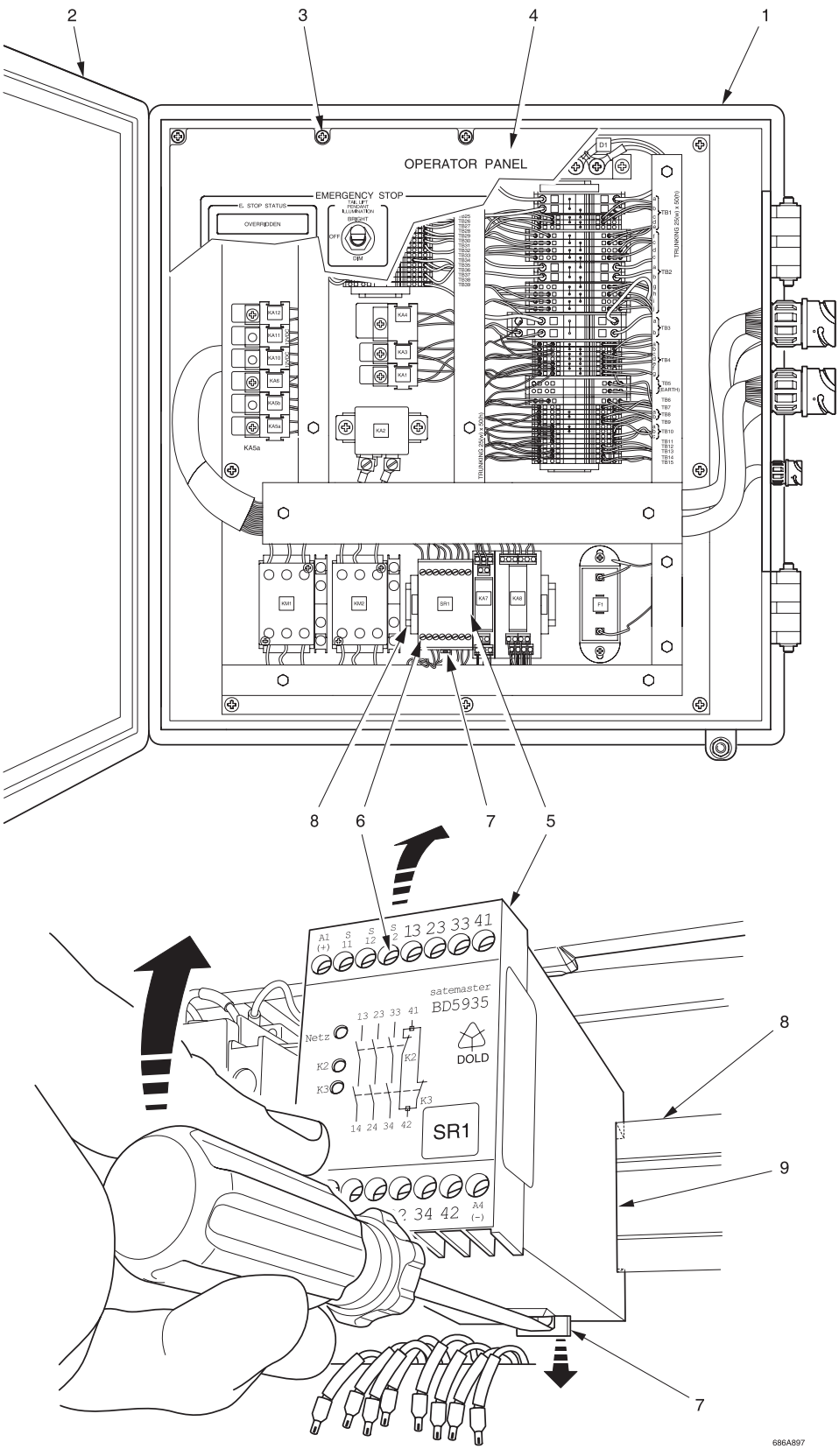
Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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OPERATOR PANEL
EMERGENCY STOP
E. STOP STATUS
OVERRIDDEN
TAIL LIFT REMOVE ILLUMINATION
BRIGHT
OFF
DIM
KA12
KA11
KA10
KA9
KA8
KA5a
KA5
KA4
KA3
KA2
KA1
KA5a
TB1
TB2
TB3
TB4
TB5
TB6
TB7
TB8
TB9
TB10
TB11
TB12
TB13
TB14
TB15
KM1
KM5
SR1
KA7
KA6
F1
8
6
7
5
satemaster
BD5935
13 23 33 41
Netz
K2
K3
DOLD
14 24 34 42
SR1
A1 (+)
S 11
S 12
S 21
A4 (-)
8
9
7
686A897

a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (2).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel.

(6) Remove the operator’s panel.

(7) Locate the E-Stop relay (5).

(8) Note the positions of the sixteen wires connected to the E-Stop relay (5).

(9) Remove the screws (6) securing the wires to the E-Stop relay (5).

(10) Carefully insert a suitable screw driver into the slot in the clip (7), located on the underside of the E-Stop relay (5). Lever the screwdriver upwards, the clip (7) will move downwards approximately 1/8 inch releasing the E-Stop relay (5) from the rail (8).

(11) Remove the E-Stop relay (5).

(12) Check all threaded components for wear and damage.

(13) Replace components as necessary.

b. Install

(1) Locate the upper edge of the E-Stop relay (5), cut away (9) on the top of the rail (8) and pivot the relay downwards.

(2) Ensure that the clip (7) locates securely on the rail (8).

(3) Fit the sixteen wires to the E-Stop relay (5) in the positions noted during removal and secure in place with screws (6).

NOTE

Each wire has an identification tag, which corresponds to the identification number printed on the E-Stop relay.

(4) Tighten the screws (6).

(5) Fit new cable ties to the operator’s panel (4).

(6) Fit the harnesses to the operator’s panel in the positions noted during removal.

(7) Fit the twelve plugs in the positions marked during removal.

(8) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check all emergency stops for correct operation.

5 - 100 CHASSIS - INTERFACE ENCLOSURE - FRONT PANEL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

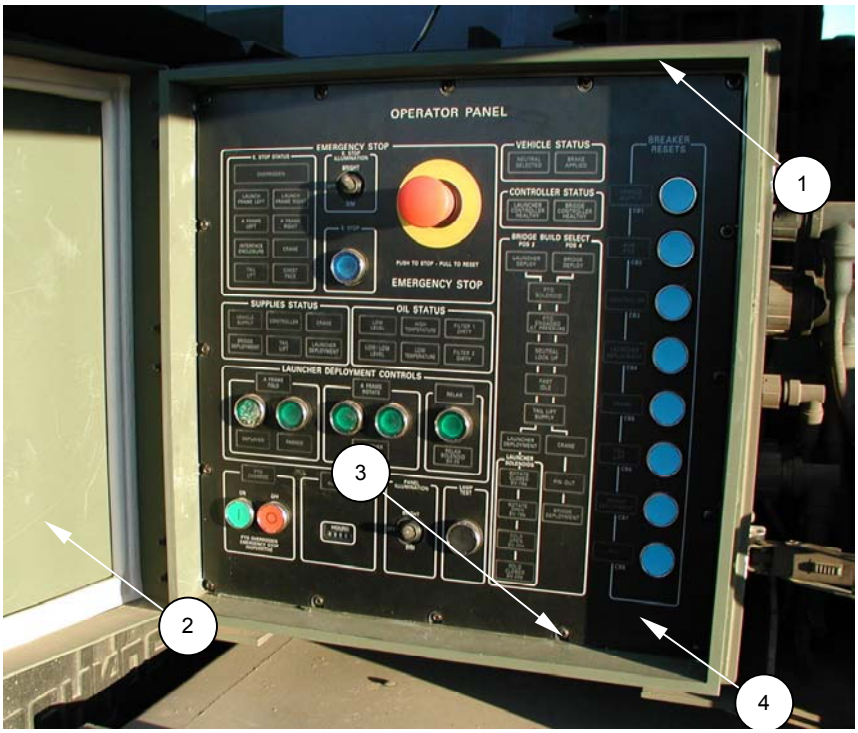
Materials Required

Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

b. Install

(1) Fit new cable ties to the operator’s panel (4).

(2) Fit the harnesses to the operator’s panel (4) in the positions noted during removal.

(3) Fit the twelve plugs in the positions marked during removal.

(4) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check the bridge for correct operation.

5 - 101 CHASSIS - INTERFACE ENCLOSURE - HOURS RUN METER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

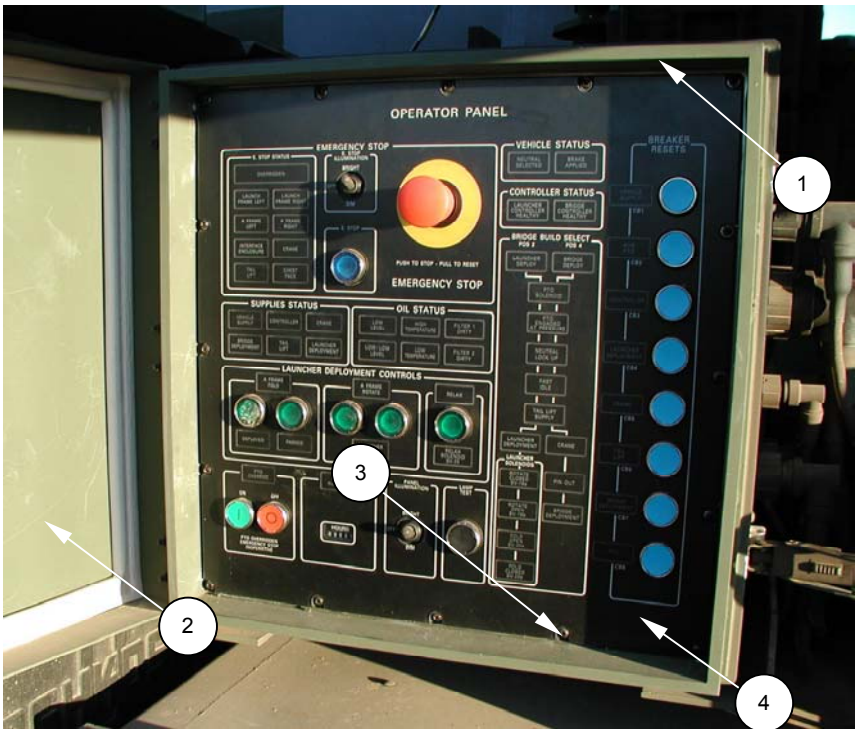
Materials Required

Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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NOTE

It is necessary to disassemble the operator's front panel to gain access to the hours run meter.

a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

(7) Note the position of and remove any quick release plugs connected to the printed circuit board (10).

(8) Note the positions of any cable ties and remove the protective cover (7) from the back of the operator's panel (4) by removing 21 screws (5) and washers (6).

(9) Remove the 21 brass screws (8) and rubber washers (9).

(10) Remove the printed circuit board (10).

(11) Remove the spacer board (11).

(12) Note the position of and remove the two cables (12) connected to the rear of the hours run meter (17) by removing the two screws (13).

(13) Note the position of the hours run meter for correct alignment when fitting.

(14) Remove the four screws (14), washers (15) and clamps (16).

(15) Remove the hours run meter (17) from the operator's panel (4).

b. Install

(1) Fit the hours run meter (17) to the operator's panel (4) in the position noted during removal.

(2) Fit the four clamps (16), washers (15) and screws (14).

(3) Fit the two cables (12) with the two screws (13) in the positions noted during removal.

(4) Fit the spacer board (11) to the front panel.

(5) Fit the printed circuit board (10) to the spacer board (11).

(6) Fit the 21 brass screws (8) and rubber washers (9) to secure the printed circuit board (10) and spacer board (11) to the operator's panel (4).

(7) Fit the quick release plugs to the printed circuit board (10) to the positions noted during removal.

(8) Fit the cover (7) to the brass screws (8) with the 21 washers (6) and screws (5). Any cable ties should be fitted to the positions noted during removal.

(9) Fit new cable ties to the operator’s panel (4).

(10) Fit the harnesses to the operator’s panel in the positions noted during removal.

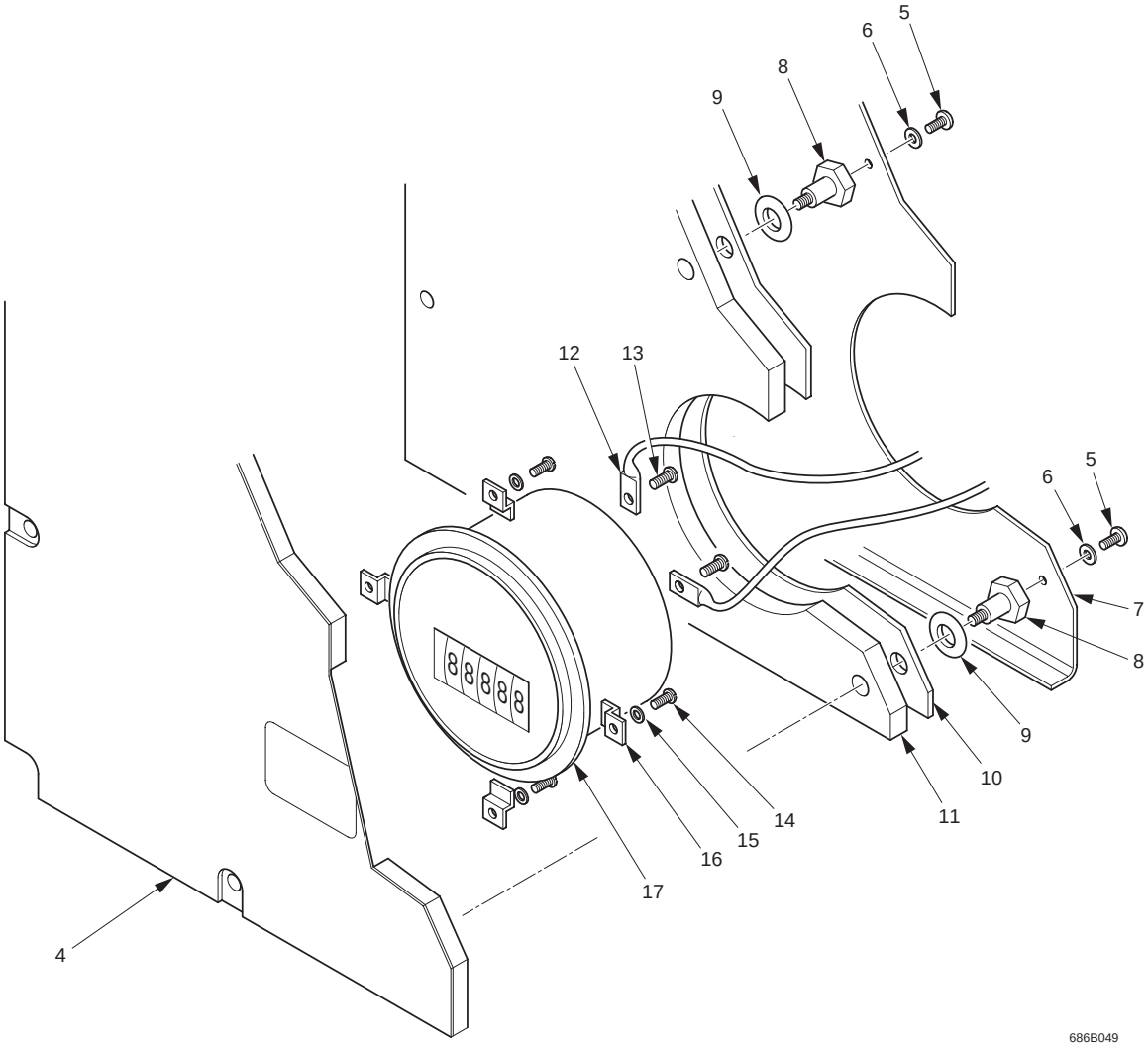
(11) Fit the twelve plugs in the positions marked during removal.

(12) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check the bridge for correct operation.



5 - 102 CHASSIS - INTERFACE ENCLOSURE - EMERGENCY STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

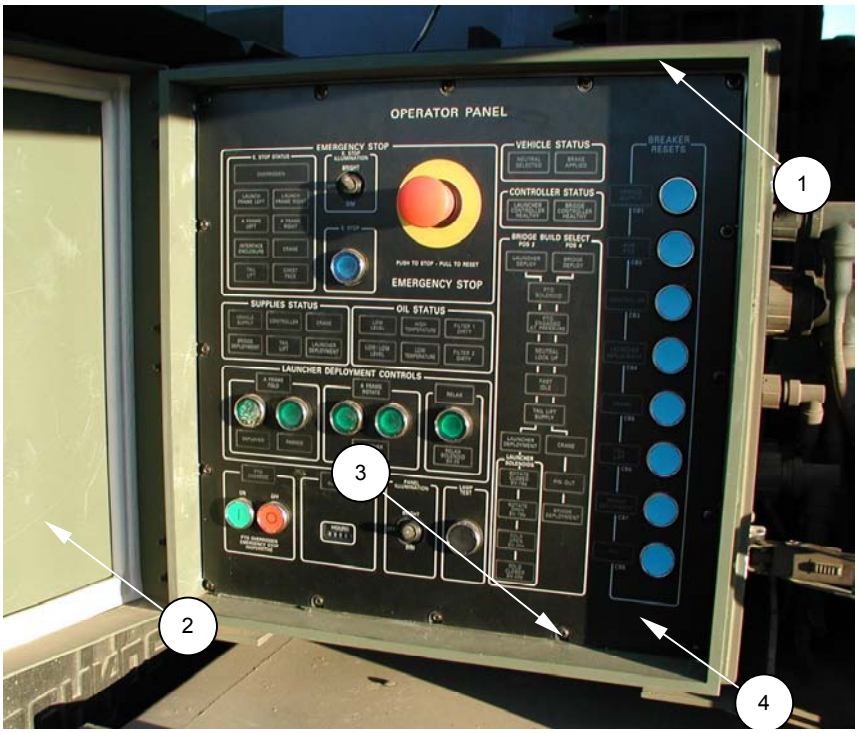
Materials Required

Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

(1) Locate the emergency stop switch (5).

(2) Note the position of and remove the quick release plug (12) from the printed circuit board.

(3) If required, note the positions of the cables (13) and remove them from the contactor (10) by turning the securing screws (14) counter-clockwise until the cables (13) are released.

(4) Press down on the contactor release lever (11) and remove the two contactors (10 and 15) from the carrier (9).

(5) Remove the carrier (9) from the emergency stop switch (5).

(6) Turn the lock screw (8) counter-clockwise to release the lock plate (7).

(7) Remove the lock plate (7) from the emergency stop switch (5).

(8) Remove the emergency stop switch (5) complete with seal (6).

b. Install

(1) Fit the emergency stop switch (5) complete with seal (6) to the operator's panel (4).

(2) Fit the lock plate (7) to the emergency stop switch (5).

(3) Turn the lock screw (8) clockwise and tighten.

(4) Fit the carrier (9) to the emergency stop switch (5).

(5) Fit the two contactors (10 and 15) to the carrier (9).

(1) Fit the cables (13) to the contactor (10) and secure in pace with the securing screws (14) in the positions noted during removal.

(2) Fit new cable ties to the operator’s panel (4).

(3) Fit the harnesses to the operator’s panel in the positions noted during removal.

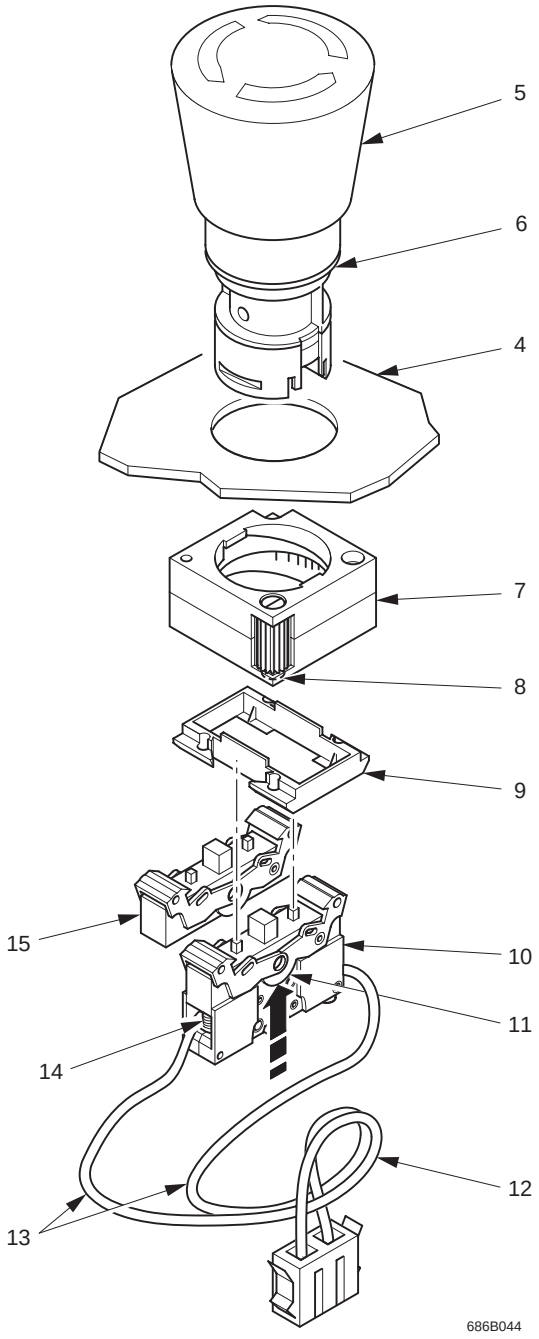
(4) Fit the twelve plugs in the positions marked during removal.

(5) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check the bridge for correct operation.


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5 - 103 CHASSIS - INTERFACE ENCLOSURE - TOGGLE AND BUTTON SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Soldering iron
Heat gun

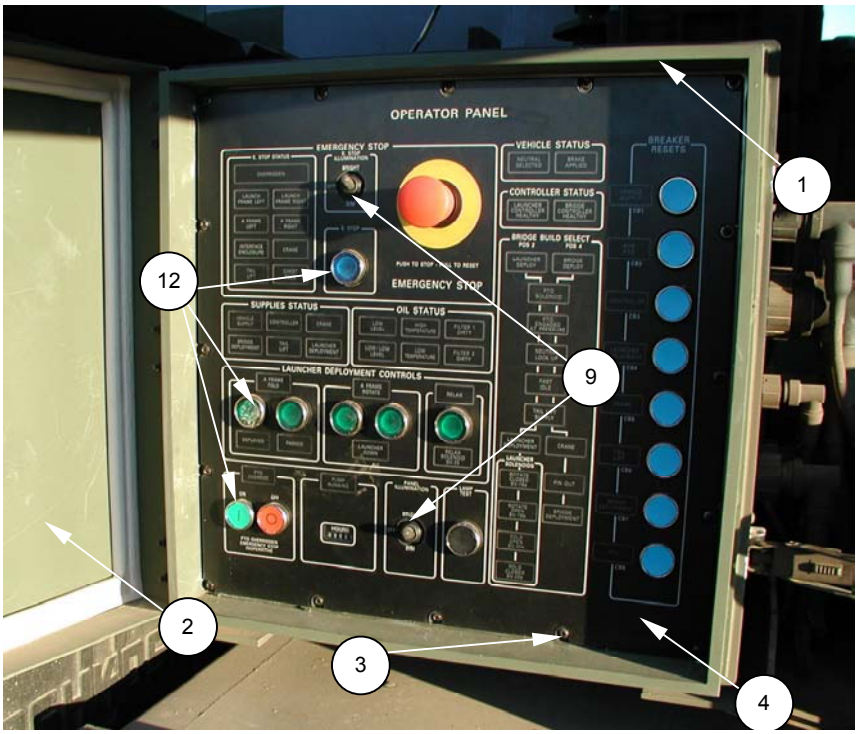
Materials Required

Cable ties (As required)
Solder
20mm Heat shrink (Qty as required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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NOTE

This procedure is applicable to the toggle switches for the E-Stop illumination light switch and the panel illumination light switch on the operator's panel. It is also applicable to the following button switches:

A-Frame Fold - DEPLOY and PARK
A-Frame Rotate - DEPLOY and PARK
Relax - RELAX
PTO Override - ON and OFF
Lamp Test
E-Stop - RESET

The procedure to remove / install the eight breaker reset button switches can be found in unit maintenance procedure 5-105.

a. Remove

Operator's Panel (4)

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

Button Switch (12)

(7) Locate the button switch (12) to be removed.

(8) Note the position of and remove the quick release plug (18) from the printed circuit board.

(9) Remove the contactor (16) by pressing on the catch (17).

NOTE

The contactor may be fitted directly to the button switch (12) or to a carrier (not shown).

(10) Turn the locking screw (15) counter -clockwise and remove the locking plate (14).

(11) Remove the button switch (12) complete with seal (13) from the operator's panel (4).

(12) If required the quick release plug (18) and cables (19) can be removed from the contactor (16) by turning the screws (20) counter-clockwise.

Toggle Switch (9)

(13) Locate the toggle switch (9) to be removed.

(14) Note the position of and remove the quick release plug (11) from the printed circuit board.

(15) Remove the cover (5) and washer (6) from the toggle switch (9).

(16) Remove the toggle switch (9) complete with seal (8) from the operator's panel (4).

(17) If required note the position of, de-solder and remove the two cables (10) connected to the toggle switch (9).

b. Install

Toggle Switch (9)

(1) If removed earlier, place a 1/2 inch length of heat shrink over the cables (10).

(2) Solder the cables (10) to the toggle switch (9) in the positions noted during removal.

(3) Position the heat shrink over the soldered joint. Using the heat gun, gently apply heat to the heat shrink until it forms a seal over the soldered joint.

(4) Fit the toggle switch (9), complete with seal (8) to the operator's panel (4). The toggle switch (9) has a flat edge on one side to aid correct alignment.

(5) Fit the washer (6) and cover (5) to the toggle switch (9) in the recess (7).

(6) Fit the quick release plug (11) to the printed circuit board in the position noted during removal.

Button Switch (12)

(7) If removed earlier, fit the quick release plug (18) and cables (19) to the contactor (16) and tighten the screws (20).

(8) Fit the button switch (12) complete with seal (13) to the operator's panel (4).

(9) Fit the locking plate (14) to the button switch (12).

(10) Turn the locking screw (15) clockwise and tighten.

NOTE

If a carrier was removed from the button switch earlier, fit it to the button switch before the next step.

(11) Fit the contactor (16) to the button switch (12).

(12) Fit the quick release plug (18) to the printed circuit board in the position noted during removal.

Operator's Panel (4)

(13) Fit new cable ties to the operator’s panel (4).

(14) Fit the harnesses to the operator’s panel in the positions noted during removal.

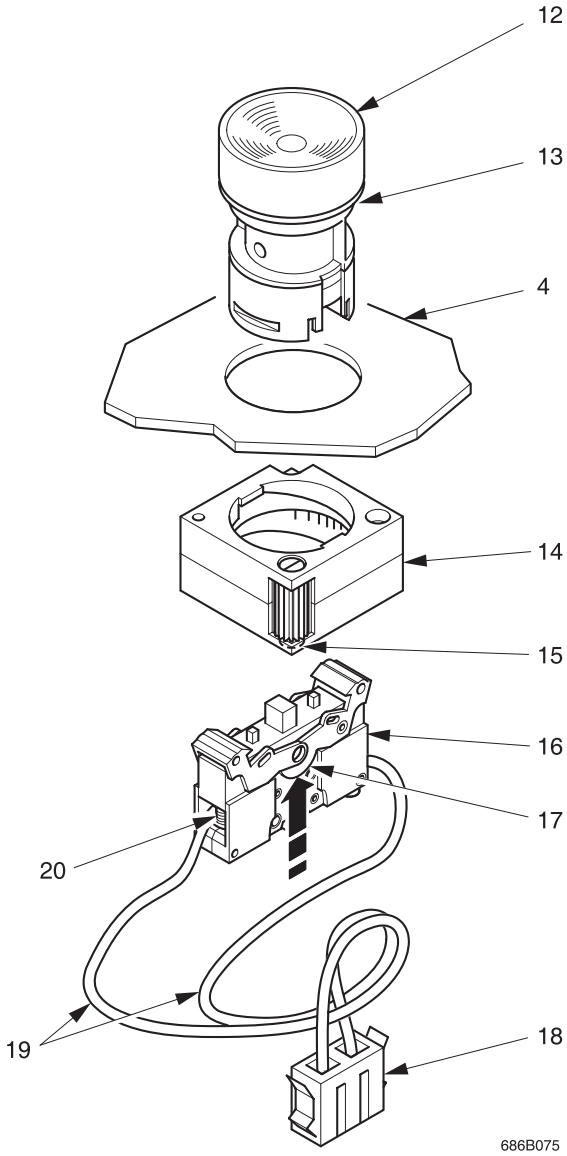
(15) Fit the twelve plugs in the positions marked during removal.

(16) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

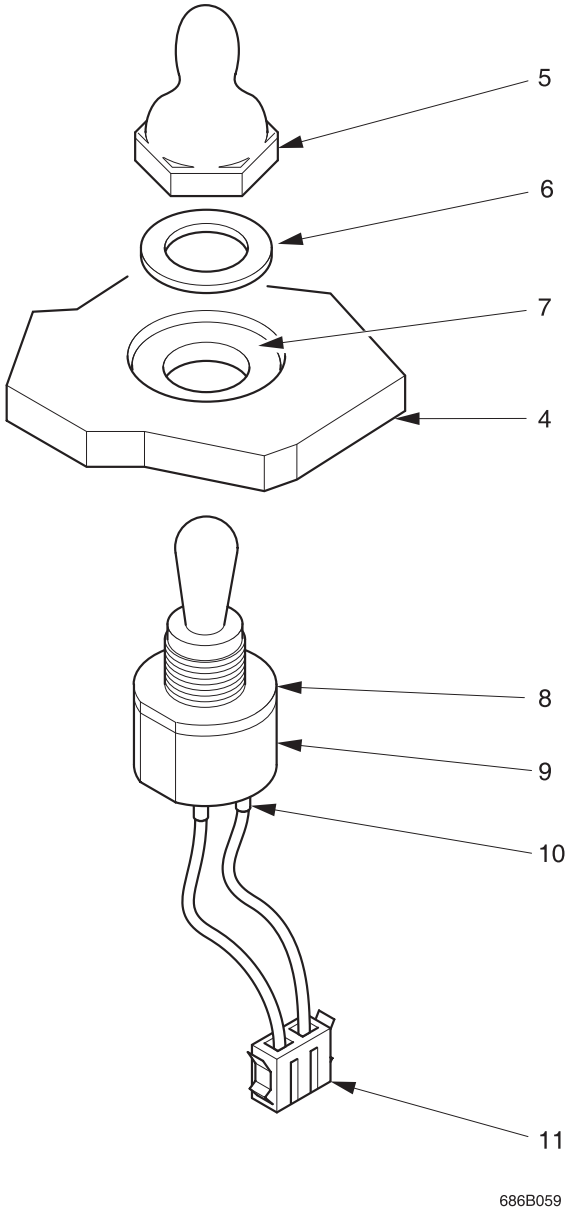
c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check all switches for correct operation.



Button Switch



Toggle Switch

5 - 104 CHASSIS - INTERFACE ENCLOSURE - ELECTRICAL RELAYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

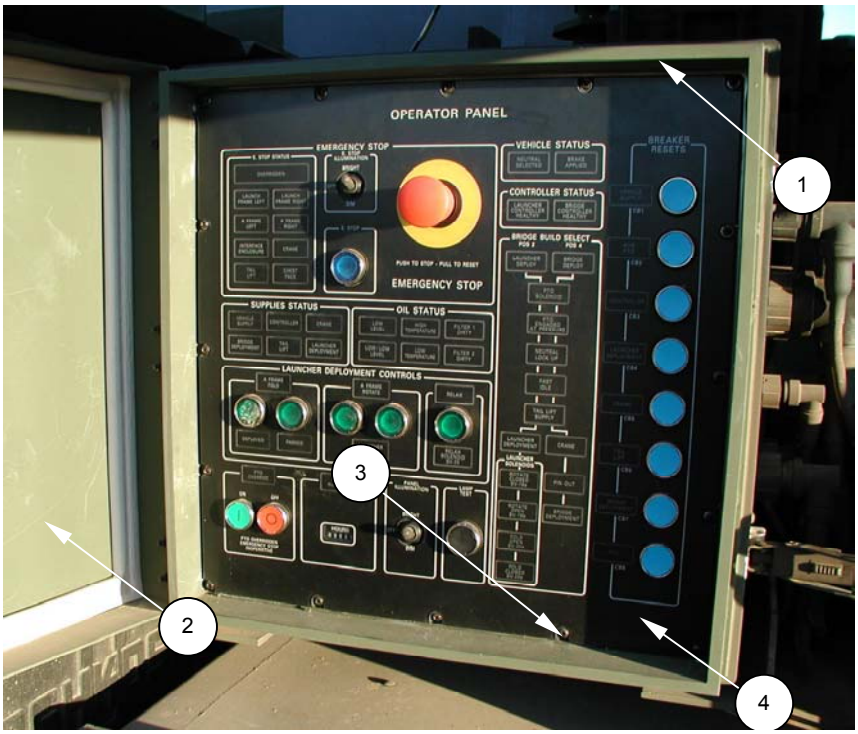
Materials Required

Cable ties (As required)

Equipment Conditions

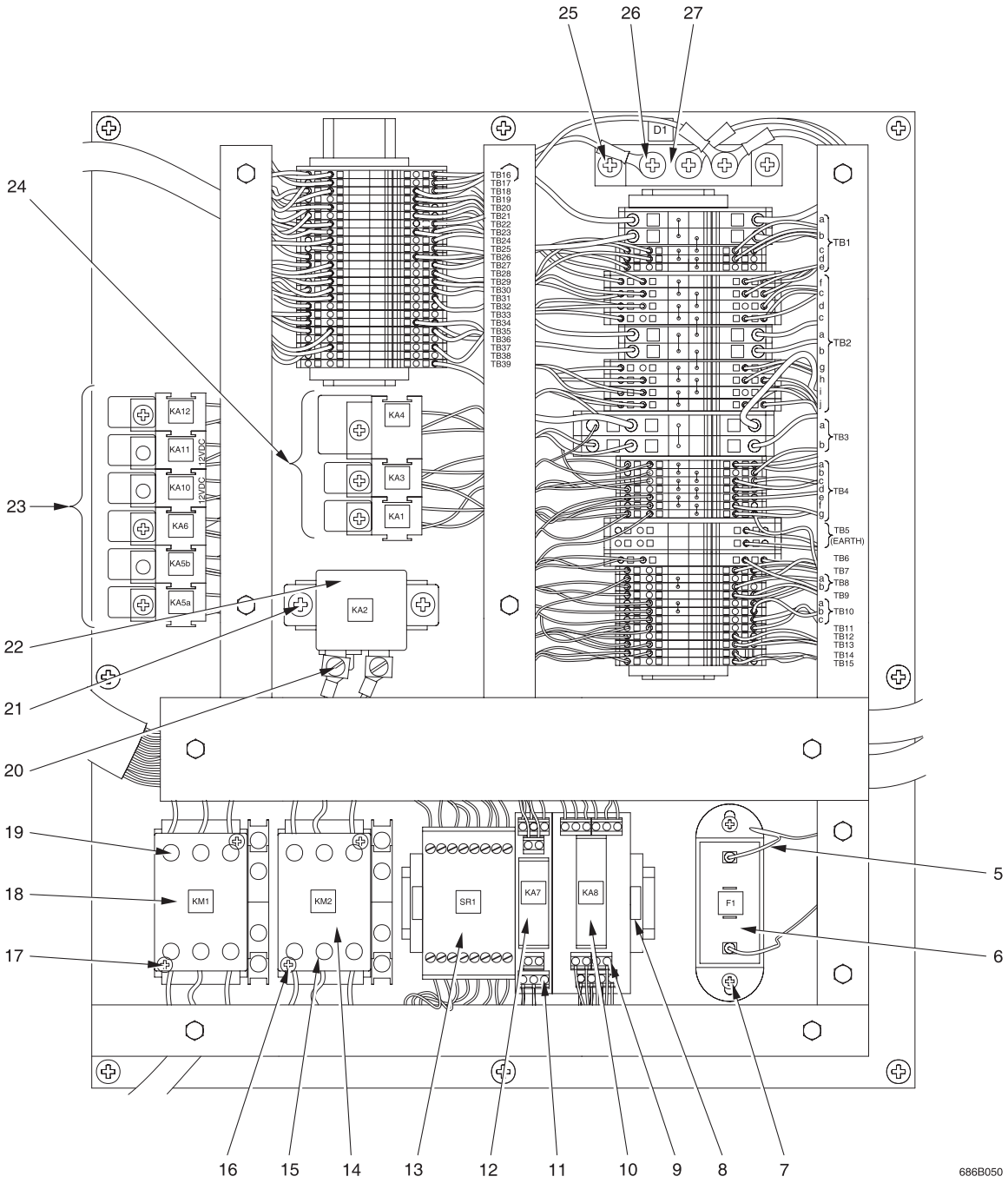
Vehicle switched off and battery shutoff switch in off position

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NOTE

This procedure covers all the electrical relays in the operator's panel less the emergency stop relay which is covered in unit maintenance procedure 5-099.


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Item #	Relay	Circuit
24	KA 1	Launcher solenoid supply 5A
22	KA 2	Crane power supply 20A
24	KA 3	Tail lift supply 7.5A
24	KA 4	Bridge deployment solenoid supply 15A
23	KA 5a	PTO manual override 5A
23	KA 5b	PTO manual override latch
23	KA 6	PTO select 5A
12	KA 7	E-Stop override relay
10	KA 8	Chest pack E-Stop override relay
23	KA 10	Neutral applied 12V from cab
23	KA 11	Brake applied 12V from cab
23	KA 12	Neutral lockup enable
18	KM 1	Safety relay supply contactor
14	KM 2	Safety relay supply contactor
13	SR 1	E-Stop safety relay
27	D1	Diode
6	F1	Surge supressor

a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

NOTE

Relays KA1, KA3, KA4, KA5a, KA5b, KA6, KA10, KA11,AND KA12 are a plug in type relay.

(7) Note the position of the relay to be removed (23 or 24) and pull it from its holder.

(8) KA2 (22). Note the position of and release the two cables (20) by turning the two screws counter-clockwise.

(9) Remove the two screws and washers (21) securing relay KA2 (22) to the interface enclosure (1).

(10) Remove relay KA2 (22).

(11) KA8 (10) and KA7 (12). Note the position of and release the cables (9 and 11) connected to relays KA8 (10) and KA7 (12).

(12) Press to release the catch (8) and remove relays KA8 (10) and KA7 (12).

(13) SR1 (13). Relay SR1 (13) is covered in unit maintenance procedure 5-099.

(14) KM1 (18) and KM2 (14). Note the position of and release the cables (15 and 19) connected to KM1 (18) and KM2 (14).

(15) Remove the two mounting screws (16 and 17) securing KM1 (18) and KM2 (14) to the interface enclosure (1).

(16) Remove KM1 (18) and KM2 (14).

(17) D1 (27). Note the position of and remove the cables (26) connected to diode D1 (27) by removing the three securing screws and washers.

(18) Remove the securing screws and washers (25) and remove D1 (27) from the interface enclosure (1).

(19) F1 (6). Note the position of and remove the cables (5) connected to diode F1 (6).

(20) Remove the screws and washers (7).

(21) Remove F1 (6).

b. Install

(1) F1 (6). Fit diode F1 (6) to the interface enclosure (1) and secure in place with the securing screws and washers (7).

(2) Fit the cables (5) to the positions noted during removal.

(3) D1 (27). Fit diode D1 (27) to the interface enclosure (1) and secure in place with the securing screws and washers (25).

(4) Fit the cables (26) to diode D1 (27) in the positions noted during removal with the three screws and washers.

(5) KM1 (18) and KM2 (14). Fit KM1 (18) and KM2 (14) to the interface enclosure (1) and secure in place with the two screws and washers (16 and 17).

(6) Fit the cables (15 and 19) to KM1 (18) and KM2 (14) in the positions noted during removal.

(7) KA8 (10) and KA7 (12). Fit relays KA7 (12) and KA8 (10) to the interface enclosure (1), ensure catch (8) engages with the rail.

(8) Fit the cables (9 and 11) in the positions noted during removal.

(9) KA2 (22). Fit KA2 (22) to the interface enclosure (1) and secure in place with two screws and washers (21).

(10) Fit the cables (20) to KA2 (22) in the positions noted during removal.

(11) Plug-in relays. Fit relays KA1, KA3 and KA4 (24), KA5a, KA5b, KA6, KA10, KA11, and KA12 (23) in the positions noted during removal.

(12) Fit new cable ties to the operator’s panel (4).

(13) Fit the harnesses to the operator’s panel (4) in the positions noted during removal.

(14) Fit the twelve plugs in the positions marked during removal.

(15) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check all systems for correct operation.

5 - 105 CHASSIS - INTERFACE ENCLOSURE - CIRCUIT BREAKERS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

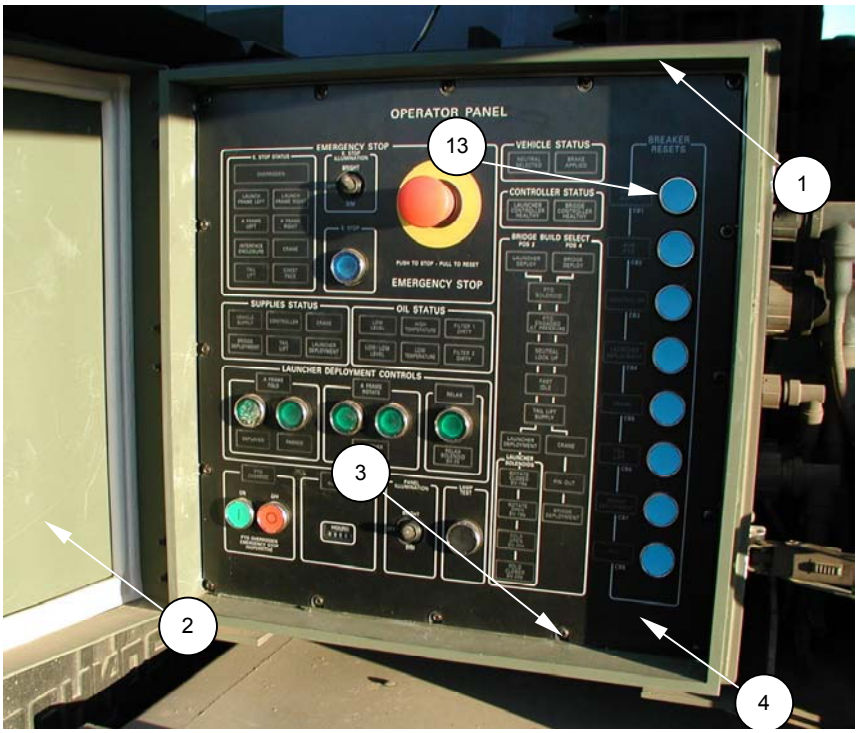
Materials Required

Cable ties (As required)

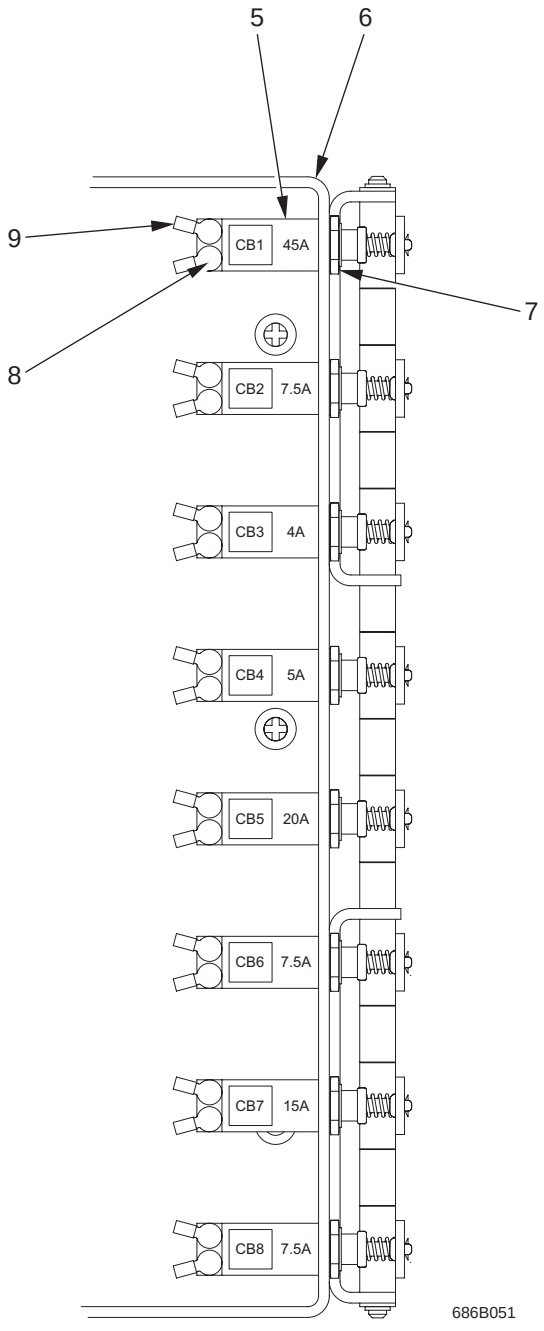
Equipment Conditions

Vehicle switched off and battery shutoff switch in off position

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Circuit Breaker #	Circuit
1	Main supply
2	PTO auxiliary
3	Controller
4	Launch deployment solenoid
5	Crane
6	Tail lift
7	Bridge deployment solenoid
8	PTO main supply



Circuit Breakers

a. Remove

(1) Open the cover (2) of the interface enclosure (1).

(2) Remove the sixteen screws and washers (3) securing the operator's panel (4) to the interface enclosure (1).

(3) Remove to one side, and support, the operator's panel (4).

(4) Remove the cable ties securing the two harnesses and twelve plugs to the operator’s panel (4).

(5) Using a suitable marker, mark the twelve plugs and their positions on the operator’s panel (4).

(6) Remove the operator’s front panel (4).

(7) Note the position of and remove the cables (9) by removing the screws (8).

(8) Remove the nut and washer (7) securing the circuit breaker (5) to the front of the interface enclosure bracket (6).

(9) Remove the circuit breaker (5).

NOTE

The circuit breaker reset button is located on the operator's panel.

(10) To remove the circuit breaker reset button (13), turn the locking screw (10) counter-clockwise.

(11) Remove the Locking plate (11). Remove the circuit breaker reset button (13) complete with seal (12).

b. Install

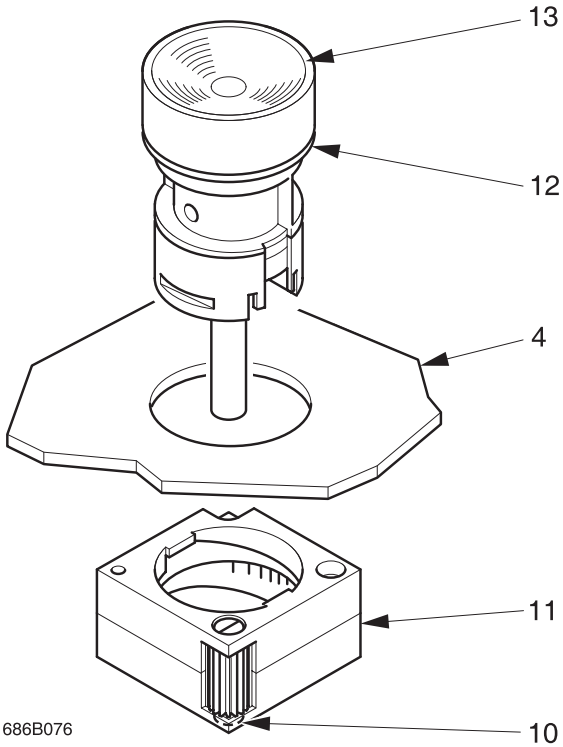
(1) Fit the circuit breaker reset button (13) complete with seal (12) to the operator's panel (4).

(2) Fit the locking plate (11) to the circuit breaker reset button (13).

(3) Turn the locking screw (10) clockwise and tighten.

(4) Fit the circuit breaker (5) to the interface enclosure bracket (6) and secure in place with the nut and washer (7).

(5) Fit the two cables (9) with the screws (8) in the positions noted during removal.



Circuit Breaker Reset Button

(6) Fit new cable ties to the operator’s panel (4).

(7) Fit the harnesses to the operator’s panel in the positions noted during removal.

(8) Fit the twelve plugs in the positions marked during removal.

(9) Fit the operator's panel (4) to the interface enclosure (1) and secure in place with the sixteen screws and washers (3).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the launcher and check all systems for correct operation.

5 - 106 CHASSIS - CROSS CONNECTION ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc Nuts (Qty 4)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

WARNING

CRUSH INJURY. THE CROSS CONNECTION PUMP IS HEAVY.

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. SHUT DOWN VEHICLE PRIOR TO CARRYING OUT THIS PROCEDURE. ENSURE THAT THE BATTERY SHUTOFF SWITCH IS OFF.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Remove the cotter pin and stabilizer pin from the cross connection assembly top mounting (1) and break loose the hydraulic hoses.

(3) Remove the four mounting bolts, nyloc nuts and washers (5). Discard the nyloc nuts.

(4) Note the position of and remove the electrical connections attached to the electrical unit (4) on the back of the cross connection assembly (2).

(5) Note the position of and remove the three hydraulic hoses (3) connected to the cross connection assembly (2).

(6) Remove the cross connection assembly (2).

(7) Check all bolts for damage.

(8) Check the hydraulic hoses for chaffing and damage.

(9) Check the electrical connections for damage.

(10) Replace components as necessary.

b. Install

(1) Fit the cross connection assembly (2) to the vehicle.

(2) Fit the three hydraulic hoses (3) in the positions noted during removal.

(3) Fit the electrical connections to the electrical unit (4) in the positions noted during removal.

(4) Fit the four mounting nuts, bolts and washers (5).

(5) Fit the stabilizer pin to the top mounting (1) and secure in place with a cotter pin.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the cross connection assembly (2) in accordance with the operator’s manual TM 5-5420-279-10.

5 - 107 CHASSIS - CROSS CONNECTION ASSEMBLY - PUMP AND MOTOR

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc Nuts (Qty 4)
Lock washers (Qty 16)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

WARNING

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. SHUT DOWN VEHICLE PRIOR TO CARRYING OUT THIS PROCEDURE. ENSURE THAT THE BATTERY SHUTOFF SWITCH IS OFF.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and remove the hydraulic pipes (3) connected to the motor (6) with the screws (4) and lock washers (5).

(3) Remove the hydraulic pipe (2).

(4) Remove the four screws (19) and lock washers (18) securing the motor (6) to the coupling (17). Discard the lock washers (18).

(5) Remove the motor (6).

(6) Note the position of and remove the hydraulic pipes (11, 12 and 13) connected to the pump (14).

(7) Remove the screws (15) and lock washers (16) securing the pump (14) to the coupling (17). Discard the lock washers (16).

(8) Remove the pump (14).

(9) If required remove the eight screws (18) and remove the front cover from the coupling (17).

(10) Remove the four screws (10) washers (9) and nyloc nuts (8) securing the coupling to the cross connection pump bracket (7). Discard the nyloc nuts (8).

b. Install

(1) If removed earlier, fit he coupling (17) to the cross connection pump bracket (7) and secure in place with the screws (10), washers (9) and new nyloc nuts (8).

(2) Fit the coupling cover to the coupling (17) with the eight screws (18).

(3) Fit the pump (14) to the coupling (17), ensure that the pump drive engages correctly with the coupling (17).

(4) Fit the four new lock washers (16) and screws (15) to secure the pump (14) to the coupling (17).

(5) Fit the hydraulic pipes (11, 12 and 13) to the pump (14) in the positions noted during removal.

(6) Fit the motor (6) to the coupling (17), ensure that the pump drive engages correctly with the coupling (17).

(7) Fit the four new lock washers (18) and screws (19) to secure the motor (6) to the coupling (17).

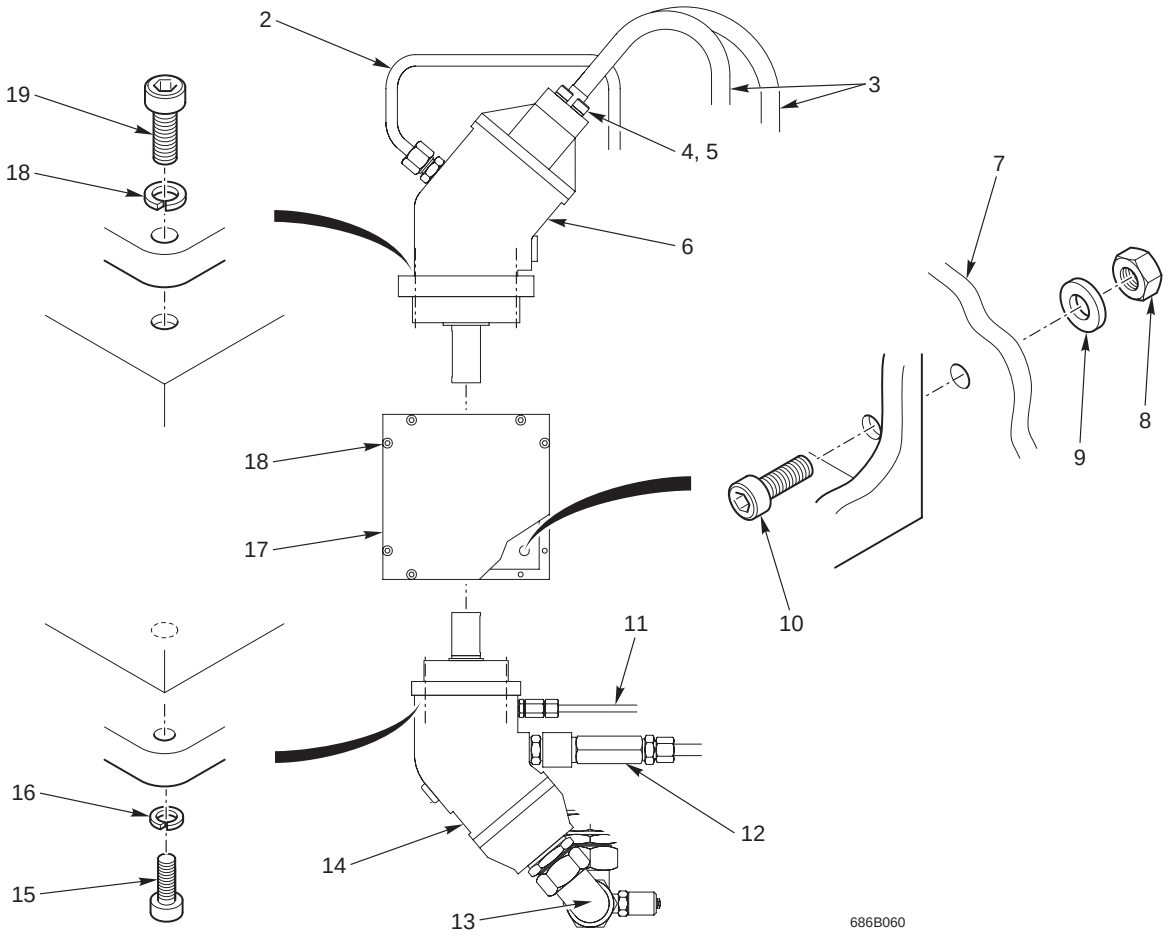
(8) Fit the hydraulic pipes (3) to the motor (6) in the positions noted during removal and secure in place with the screws (4) and new lock washers (5).

(9) Fit the hydraulic pipe (2) in the position noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the cross connection assembly (1) in accordance with the operator’s manual TM 5-5420-279-10.


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686B060

5 - 108 CHASSIS - ELECTRICAL JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

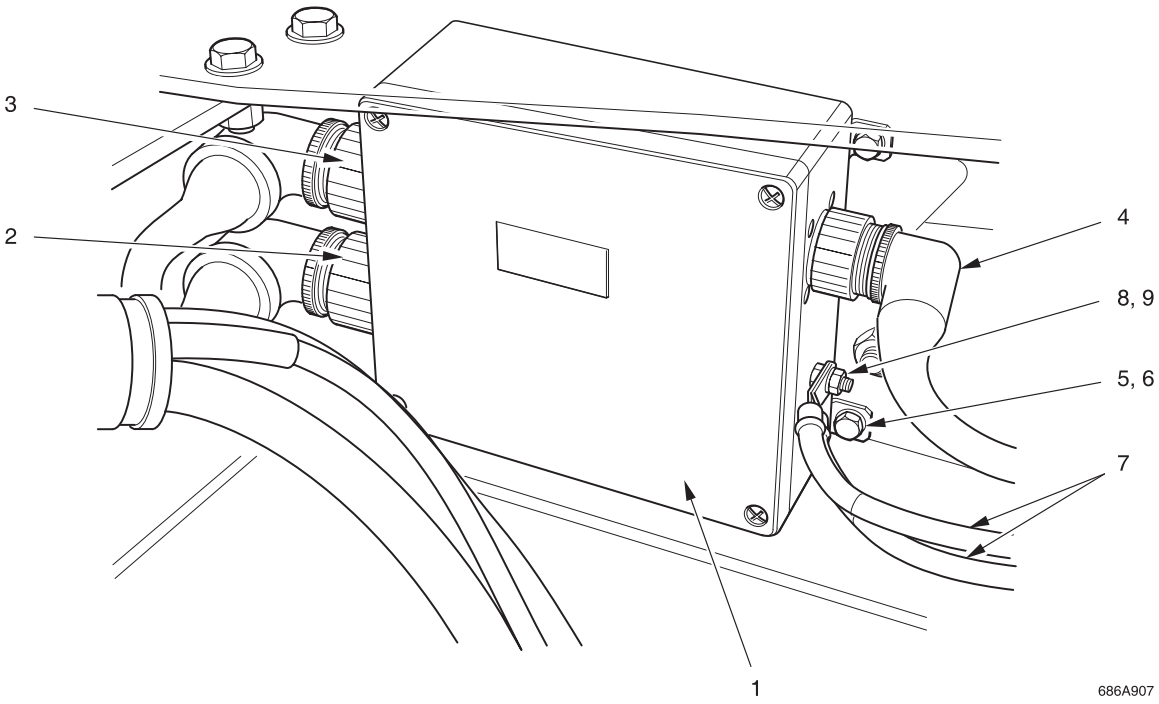
Materials Required

Lock washers (Qty 5)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Remove the harnesses (2, 3 and 4) from the chassis electrical junction box (1).

(2) Remove the nut (8) and lock washer (9). Discard the lock washer.

(3) Remove the two ground cables (7).

(4) Remove the four mounting bolts (5) and lock washers (6). Discard the lock washers.

(5) Remove the chassis electrical junction box (1).

b. Install

(1) Fit the chassis electrical junction box (1) to the chassis and secure in place with the four lock washers (6) and mounting bolts (5).

(2) Fit the two ground cables (7) to the chassis electrical junction box (1) and secure with the lock washer (9) and nut (8).

(3) Fit the harnesses (2, 3 and 4) to the chassis electrical junction box (1).

5 - 109 CHASSIS - CHEST PACK EMERGENCY STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Chest pack removed from the vehicle

---

a. Remove

(1) Remove the 14 screws and washers securing the chest pack panel (2) to the chest pack.

(2) Locate the emergency stop switch (1).

(3) Note the position of and remove the quick release plug (8) from the printed circuit board.

(4) If required, note the positions of the cables (7) and remove them from the contactor (6) by turning the securing screws (10) counter-clockwise until the cables (7) are released.

(5) Press down on the contactor release lever (9) and remove the three contactors (6) from the carrier (5).

(6) Remove the carrier (5) from the emergency stop switch (1).

(7) Turn the lock screw (4) counter-clockwise to release the lock plate (3).

(8) Remove the lock plate (3) from the emergency stop switch (1).

(9) Remove the emergency stop switch (1) complete with seal (11).

b. Install

(1) Fit the emergency stop switch (1) complete with seal (11) to the chest pack panel (2).

(2) Fit the lock plate (3) to the emergency stop switch (1).

(3) Turn the lock screw (4) clockwise and tighten.

(4) Fit the carrier (5) to the emergency stop switch (1).

(5) Fit the three contactors (6) to the carrier (5).

(6) Fit the cables (7) to the contactors (6) and secure in place with the securing screws (10) in the positions noted during removal.

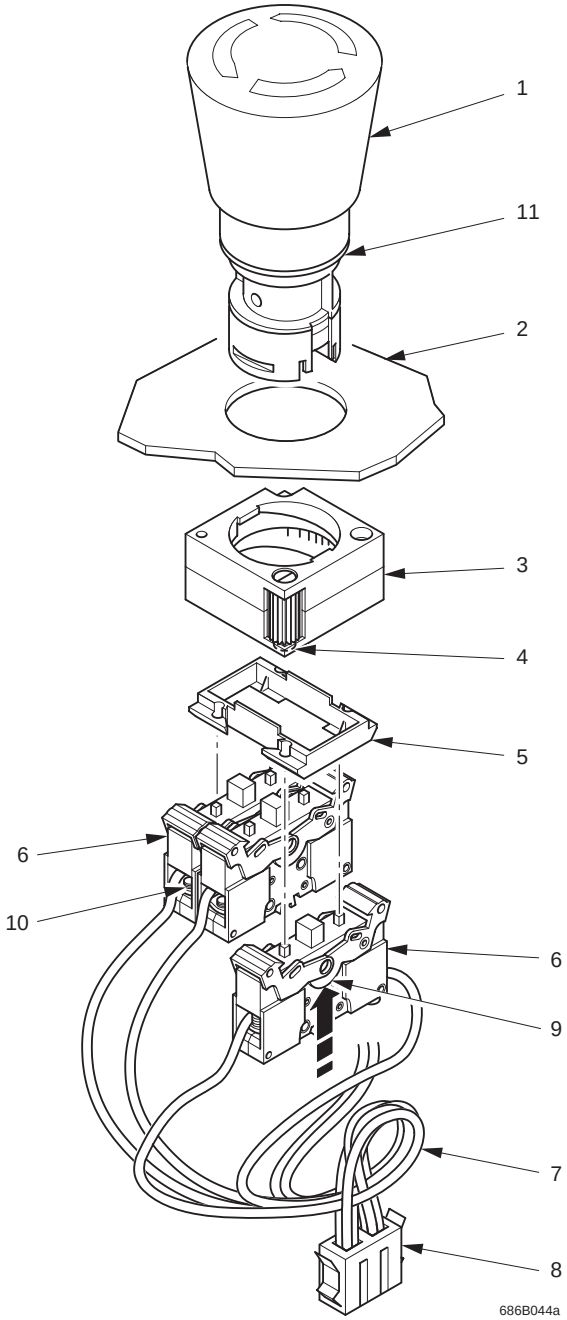
(7) Fit the quick release plug (8) to the printed circuit board in the position noted during removal.

(8) Check that the chest pack body seal is clean and not damaged.

(9) Fit the chest pack panel (2) to the chest pack with 14 screws and washers.

c. Follow on tasks

(1) Connect the chest pack to the DSB and check the operation of the chest pack in accordance with he operator's manual TM 5-5420-279-10.



5 - 110 CHASSIS - CHEST PACK TOGGLE SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Soldering iron
Heat gun

Materials Required

Solder
20mm Heat Shrink (Qty as required)

Equipment Conditions

Chest pack removed from the vehicle

---

a. Remove

(1) Remove the 14 screws and washers securing the chest pack panel (4) to the chest pack.

(2) Locate the toggle switch (6).

(3) Note the position of and remove the quick release plug (8) from the printed circuit board.

(4) If required, note the positions of the two cables (7) and remove them from the switch (6) by de-soldering the connections.

(5) Remove the lock nut/cover (1) and washer (2).

(6) Remove the toggle switch (6) complete with its built in seal (5).

b. Install

(1) If removed earlier, place a ½ inch length of heat shrink over the cables (7).

(2) Solder the cables (7) to the toggle switch (6) in the positions noted during removal.

(3) Position the heat shrink over the soldered joint. Gently apply heat to the heat shrink until it forms a seal over the soldered joint.

(4) Fit the toggle switch (6) with its built in seal (5) to the recess (3) in the chest pack panel (4). The toggle switch (6) has a flat edge on one side to aid correct alignment.

(5) Fit the washer (2) and lock nut/cover (1).

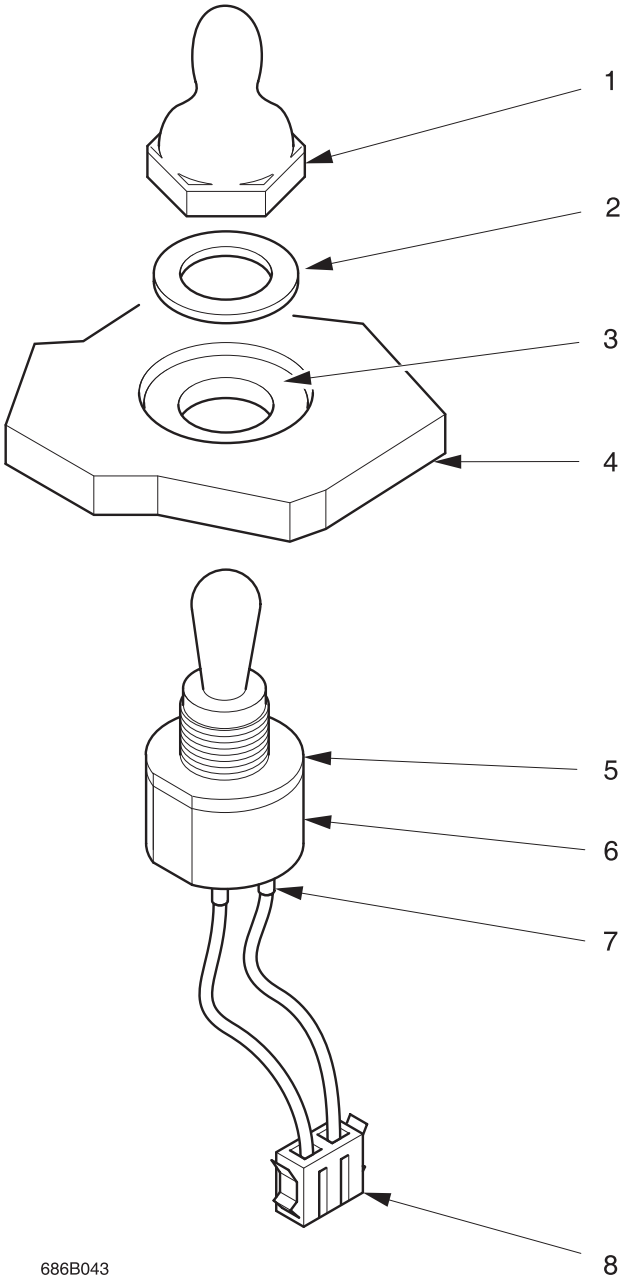
(6) Fit the quick release plug (8) to the printed circuit board at the position noted during removal.

(7) Check that the chest pack body seal is clean and not damaged.

(8) Fit the chest pack panel (4) to the chest pack with 14 screws and washers.

c. Follow on tasks

(1) Connect the chest pack to the DSB and check the operation of the chest pack in accordance with he operator's manual TM 5-5420-279-10.



5 - 111 CHASSIS - CHEST PACK JOY STICK CONTROL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 4)

Equipment Conditions

Chest pack removed from the vehicle

---

a. Remove

(1) Remove the 14 screws and washers securing the chest pack panel (1) to the chest pack.

(2) Locate the joy stick control switch (5).

(3) Note the position of and remove the quick release plug (2) from the printed circuit board.

(4) If required, note the positions of the two cables (8) and remove them from the switch (5) by turning the two screws (7) counter-clockwise.

(5) Remove the four nyloc nuts (3) and cover plate (4).

(6) Remove the joy stick control switch (5) complete with grommet (6).

b. Install

(1) Fit the joy stick control switch (5) to the chest pack panel (1), complete with grommet (6).

(2) Ensure that the flange of the grommet (6) is flat against the chest pack panel (1).

(3) Fit the cover plate (4) and secure in place with four new nyloc nuts (3).

(4) If required fit the two cables (8) to the joy stick control switch (5) and secure in place with the two screws (7).

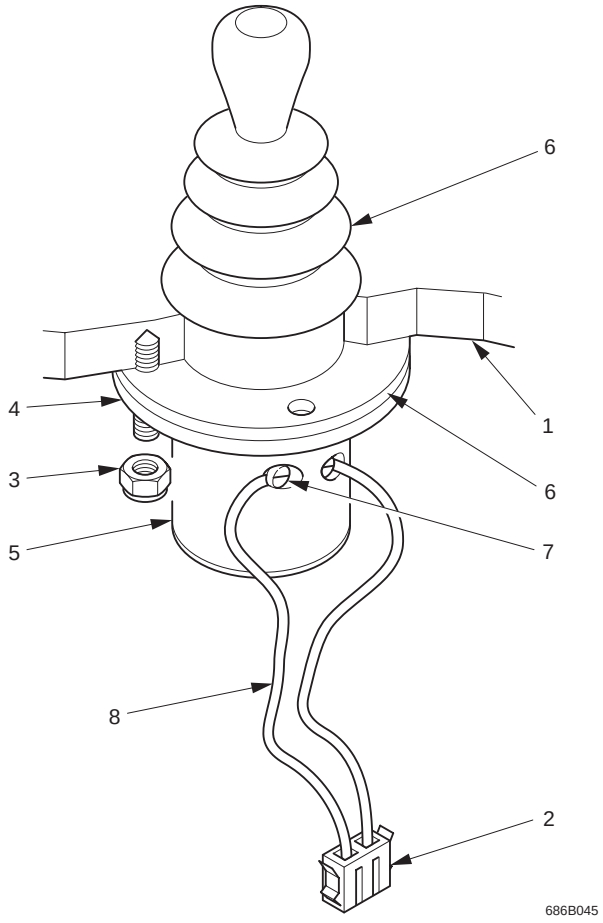
(5) Fit the quick release plug (2) to the printed circuit board at the position noted during removal.

(6) Check that the chest pack body seal is clean and not damaged.

(7) Fit the chest pack panel (1) to the chest pack with 14 screws and washers.

c. Follow on tasks

(1) Connect the chest pack to the DSB and check the operation of the chest pack in accordance with the operator's manual TM 5-5420-279-10.



5 - 112 CHASSIS - CHEST PACK HARNESS

This task covers:

a. Remove b. Install c. Test

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Chest pack removed from the vehicle

---

a. Remove

(1) The chest pack electrical harness is a harness with a military plug connector at each end.

(2) Twist the military plug counter-clockwise to remove the from the chest pack.

b. Install

(1) Fit the chest pack electrical harness to the chest pack by aligning the military plug on the chest pack socket and turning it clockwise.

c. Test

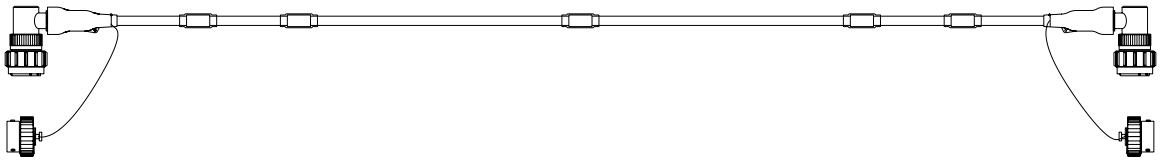
(1) Carry out cable continuity test (see unit maintenance procedure 5-142).

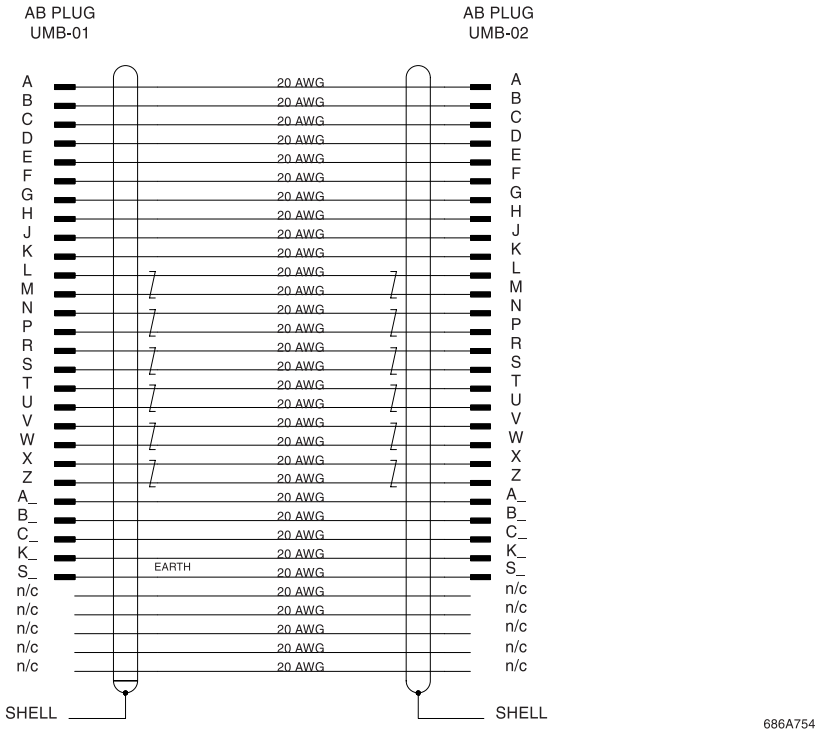
(2) Carry out cable shorting test (see unit maintenance procedure 5-143).

(3) If the harness fails either test, return it to Special Repair Activity.

d. Follow on task

(1) Fit the chest pack electrical harness to the DSB and check the operation of the chest pack in accordance with the Operator's manual TM 5-5420-279-10.




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UMB-01
AB PLUG
UMB-02
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5 - 113 CHASSIS - BUTTERFLY VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 5)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Spare wheel and engine side cover removed, see PLS TM 9-2320-364 series

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NOTE

The butterfly valve is located on the bottom of the hydraulic tank.

a. Remove

(1) Drain all hydraulic fluid form the hydraulic tank (7).

(2) Remove the four bolts (2) securing the hydraulic pipe (6) to the butterfly valve (1).

(3) Remove the o-ring (4).

(4) Remove the four bolts (3) securing the butterfly valve (1) to the hydraulic tank (7).

NOTE

The four bolts (3) are located inside the butterfly valve casing.

(5) Remove the butterfly valve (1).

(6) Remove the o-ring (5).

b. Install

(1) Check that the surfaces of the butterfly valve (1), hydraulic pipe (6) and hydraulic tank (7) are clean and not damaged.

(2) Apply thread locking compound to the bolts (3) and (2).

(3) Apply a thin coating of clean hydraulic oil to the o-rings (5 and 4).

(4) Fit the o-ring (5) to the butterfly valve (1).

(5) Fit the butterfly valve (1) to the hydraulic tank (7) and secure in place with the four bolts (3).

(6) Fit the o-ring (4) to the butterfly valve (1).

(7) Fit the hydraulic pipe (6) to the butterfly valve (1) and secure in place with the four bolts (2).

c. Follow on tasks

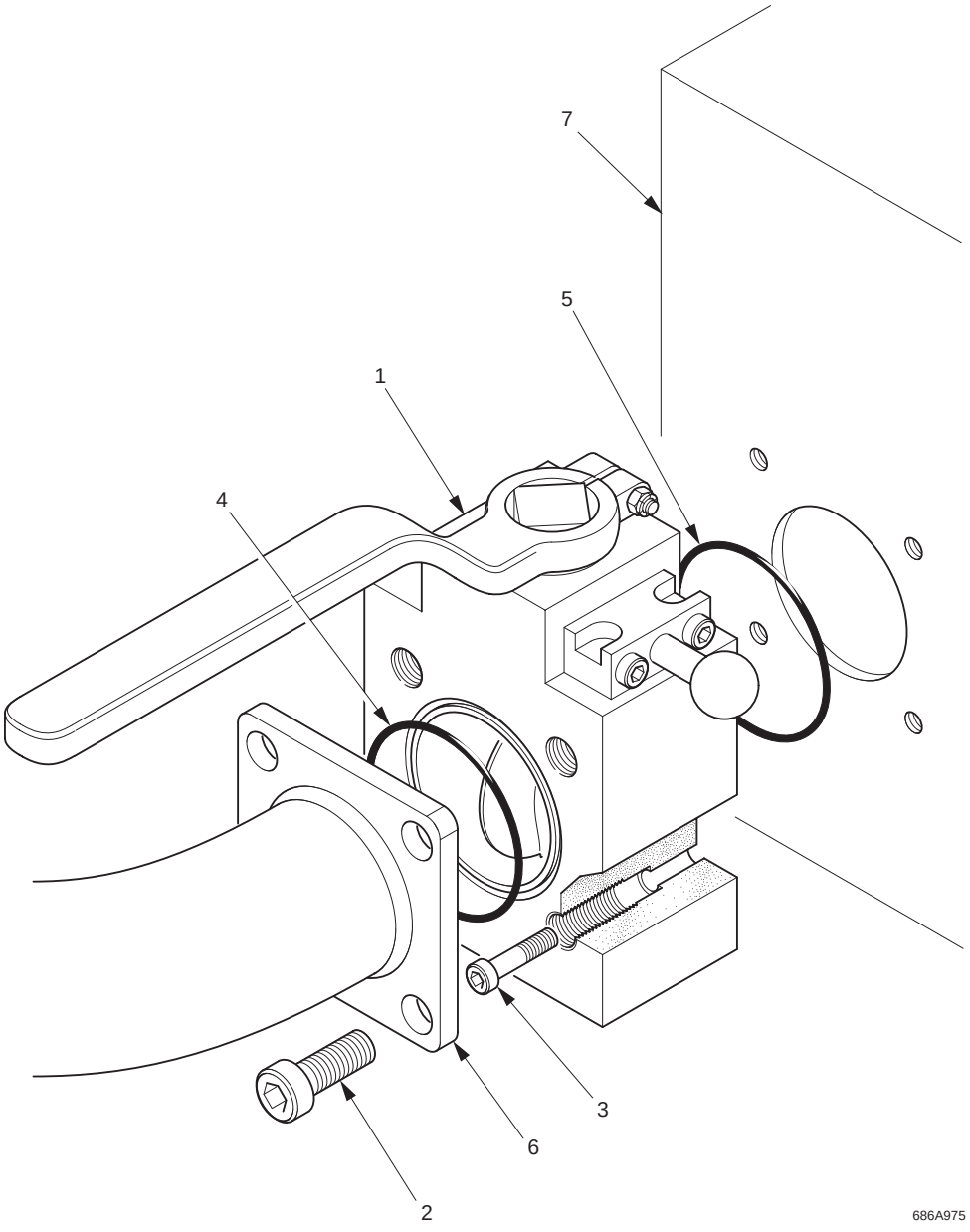
(1) Fill the hydraulic tank (7) with clean hydraulic fluid and check for leaks.

(2) Ensure the butterfly valve (1) is in the open position.

(3) Switch the battery shutoff switch to the on position.

(4) Operate the DSB system and check for leaks.

(5) Fit the engine side cover and spare wheel in accordance with PLS TM 9-2320-364 series.



5 - 114 CHASSIS - CAB ROTARY SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 4)
Lock washers (Qty 6)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

a. Remove

(1) Remove the six screws (2) and lock washers (3) securing the panel (4) to the center console in the vehicle cab.

(2) Tilt the panel (4) forward.

(3) Remove the screw (5) securing the lever (6) to the rotary selector switch (1).

(4) Remove the lever (6).

(5) Note the positions of and remove the three electrical cables (9) on the rear of the rotary selector switch (1).

(6) Remove the four nyloc nuts (8) and star washers (7) securing the rotary selector switch (1) to the panel (4).

(7) Remove the rotary selector switch (1) from the panel (4).

b. Install

(1) Position the two halves of the rotary selector switch (1) on the panel (4).

(2) Secure the rotary selector switch (1) in place with the four star washers (7) and new nyloc nuts (8).

(3) Fit the lever (6) to the rotary selector switch (1) and secure in place with the screw (5).

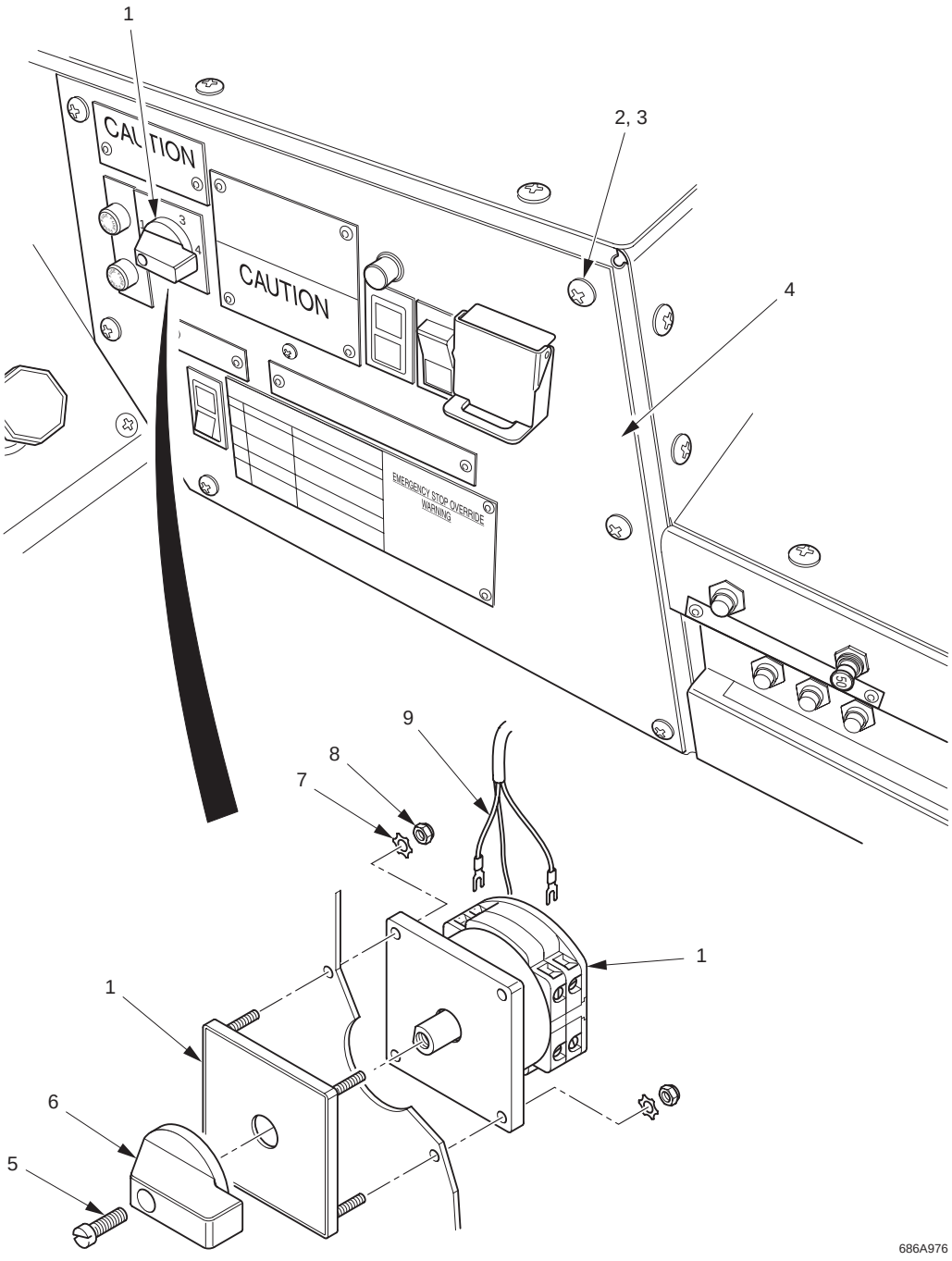
(4) Fit the three electrical cables (9) to the rotary selector switch (1) in the positions noted during removal.

(5) Fit the panel (4) to the center console and secure in place with the six lock washers (3) and screws (2).

c. Follow on Task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the DSB in accordance with the operator's manual TM 5-5420-279-10.



5 - 115 CHASSIS - CAB EMERGENCY OVERRIDE SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Lock washers (Qty 6)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

a. Remove

(1) Remove the six screws (2) and lock washers (3) securing the panel (1) to the center console in the vehicle cab.

(2) Tilt the panel (1) forward.

(3) Note the positions of the two electrical cables (5) on each end of the contactor (6).

(4) Turn the cable securing screws counter-clockwise and remove the electrical cables (5).

(5) Remove the contactor (6) from the emergency override switch (11) by pressing down on the catch (12) on the side of the contactor (6).

(6) Remove the locking plate (10) by turning the locking screw (9) counter-clockwise.

(7) Remove the screws (8) and star washers (7) securing the emergency override switch (11) and cover (4) to the panel (1).

(8) Remove the emergency override switch (11) and cover (4) from the panel (1).

b. Install

(1) Fit the emergency override switch (11) and cover (4) to the panel (4).

(2) Fit the screws (8) and star washers (7) securing the emergency override switch (11) and cover (4) to the panel (1).

(3) Fit the locking plate (10) to the emergency override switch (11).

(4) Turn the locking screw (9) clockwise and tighten.

(5) Fit the contactor (6) to the emergency override switch (11).

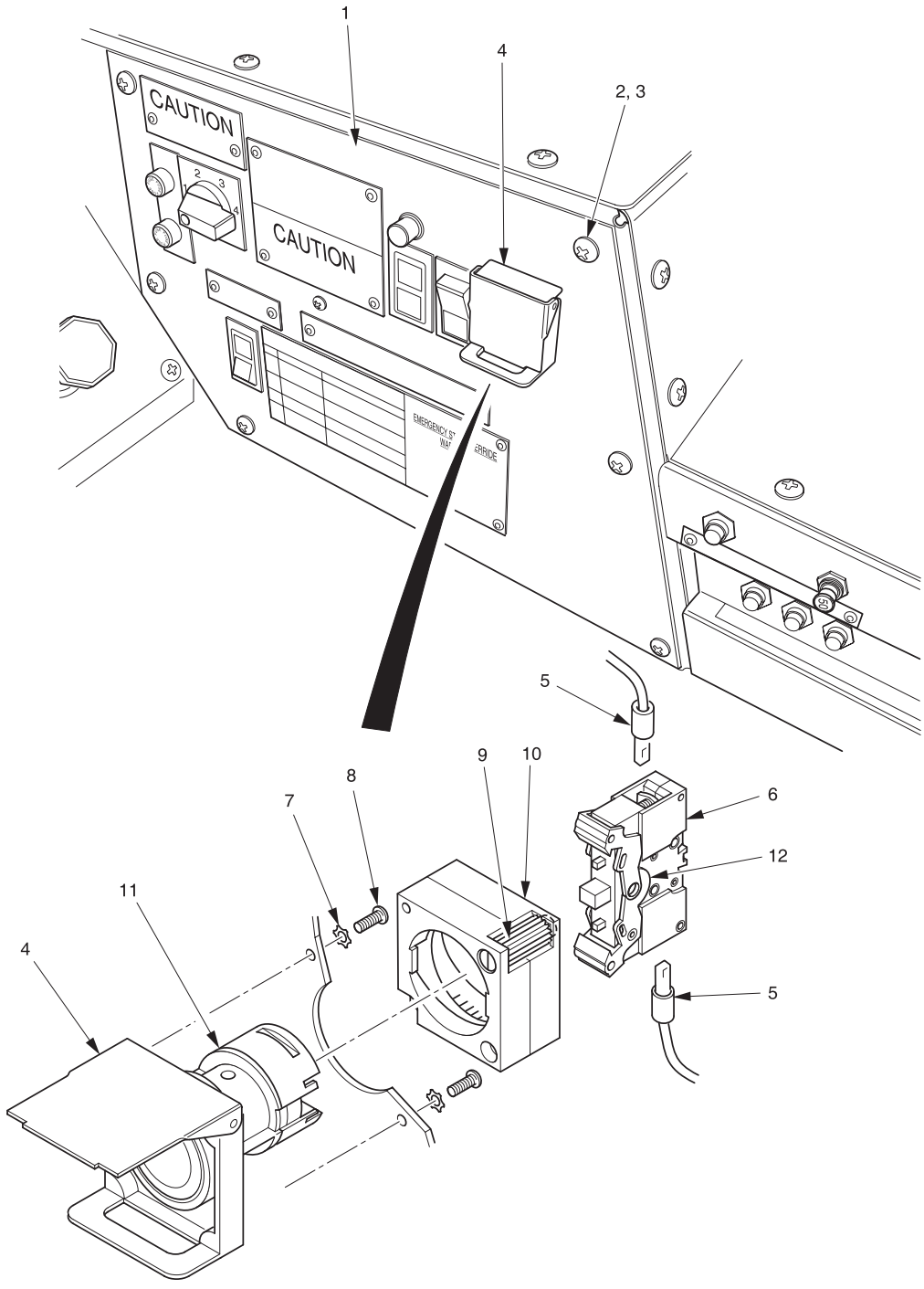
(6) Fit the cables (5) to the contactor (6) at the positions noted during removal, secure in place with the cable securing screws.

(7) Fit the panel (1) to the center console with the six screws (2) and lock washers (3).

c. Follow on Task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the DSB and the override switch (11) in accordance with the operator's manual TM 5-5420-279-10.



5 - 116 CHASSIS - CAB CIRCUIT BREAKER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Lock washers (Qty 8)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

a. Remove

(1) Remove the eight screws (1) and lock washers (2) securing the panel (4) to the center console in the vehicle cab.

(2) Remove the panel (4).

(3) Note the positions of the three electrical cables (5).

(4) Remove the screws (6) and the electrical cables (5).

(5) Remove the nut (9) and washer (8).

(6) Remove the 24V circuit breaker (7), from the panel (10).

b. Install

(1) Fit the 24V circuit breaker (7) to the panel (10) and secure in place with the washer (8) and nut (9).

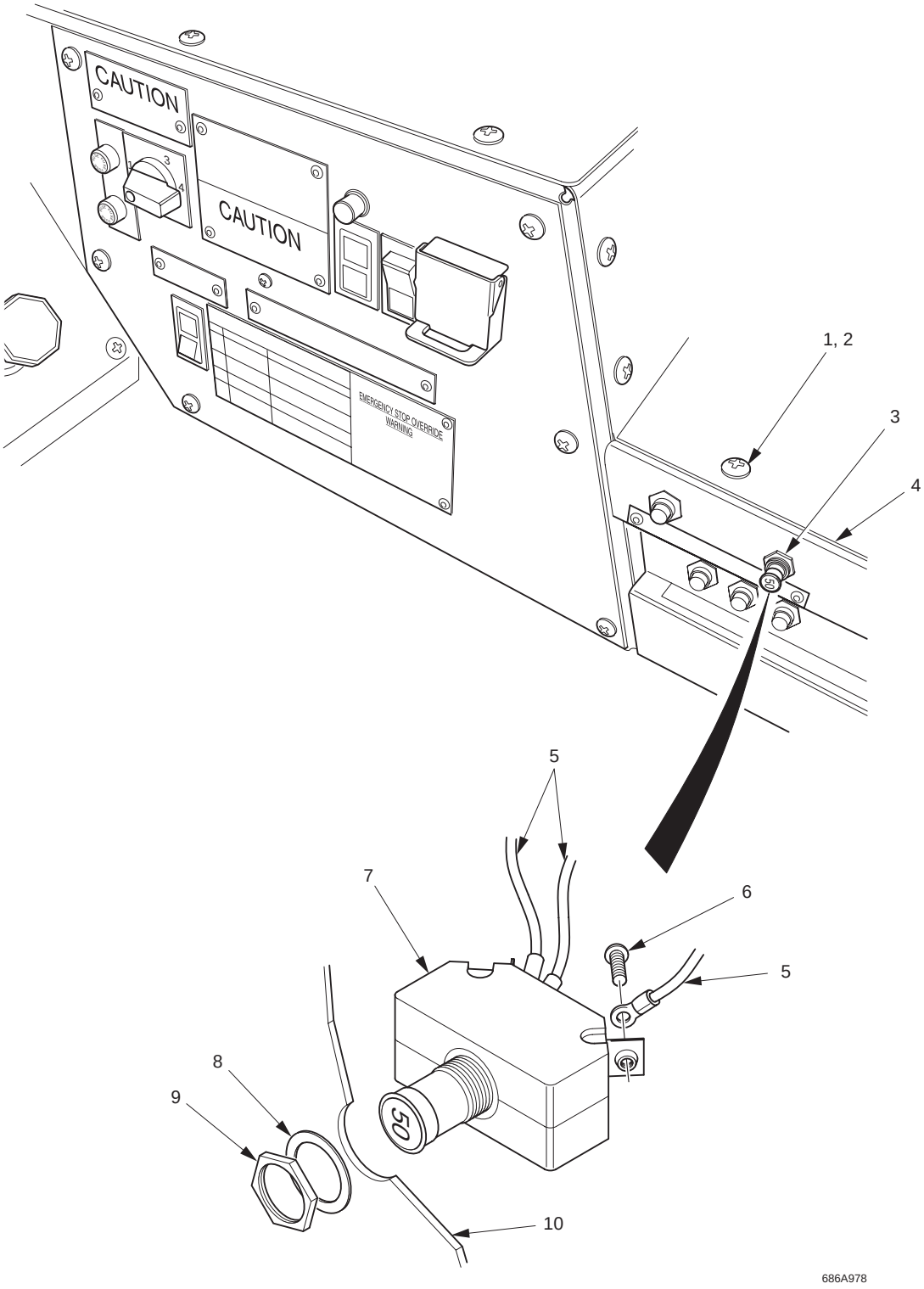
(2) Fit the three electrical cables (5) to the 24V circuit breaker (7) in the positions noted during removal and secure in place with the screws (6).

(3) Fit the panel (4) and secure in place with the eight lock washers (2) and screws (1).

c. Follow on Task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the DSB and the 24V circuit breaker (7) in accordance with the operator's manual TM 5-5420-279-10.


CAUTION
CAUTION
EMERGENCY STOP OVERRIDE
WARNING
1, 2
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686A978

5 - 117 CHASSIS - HYDRAULIC TANK FLUID LEVEL FLOAT SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Top and right hand side engine covers removed in accordance with PLS TM 9-2320-364 series

---

a. Remove

(1) Gain access to the fluid level float switch by removing engine covers (1, 2 and 3). See PLS TM 9-2320-364 series.

(2) Note the position of and remove the two hydraulic pipes (4 and 5) fitted to the return line filter (6).

(3) Lift the hydraulic pipe (5) clear of the fluid level float switch (7).

(4) Remove the electrical connection (8) on the top of the fluid level float switch (7).

(5) Remove the fluid level float switch (7) by turning it counter-clockwise.

b. Install

(1) Fit the fluid level float switch (7) to the hydraulic oil tank.

(2) Fit the electrical connection (8) to the top of the fluid level float switch (7).

(3) Fit the hydraulic pipes (4 and 5) to the return line filter (6) in the positions noted during removal.

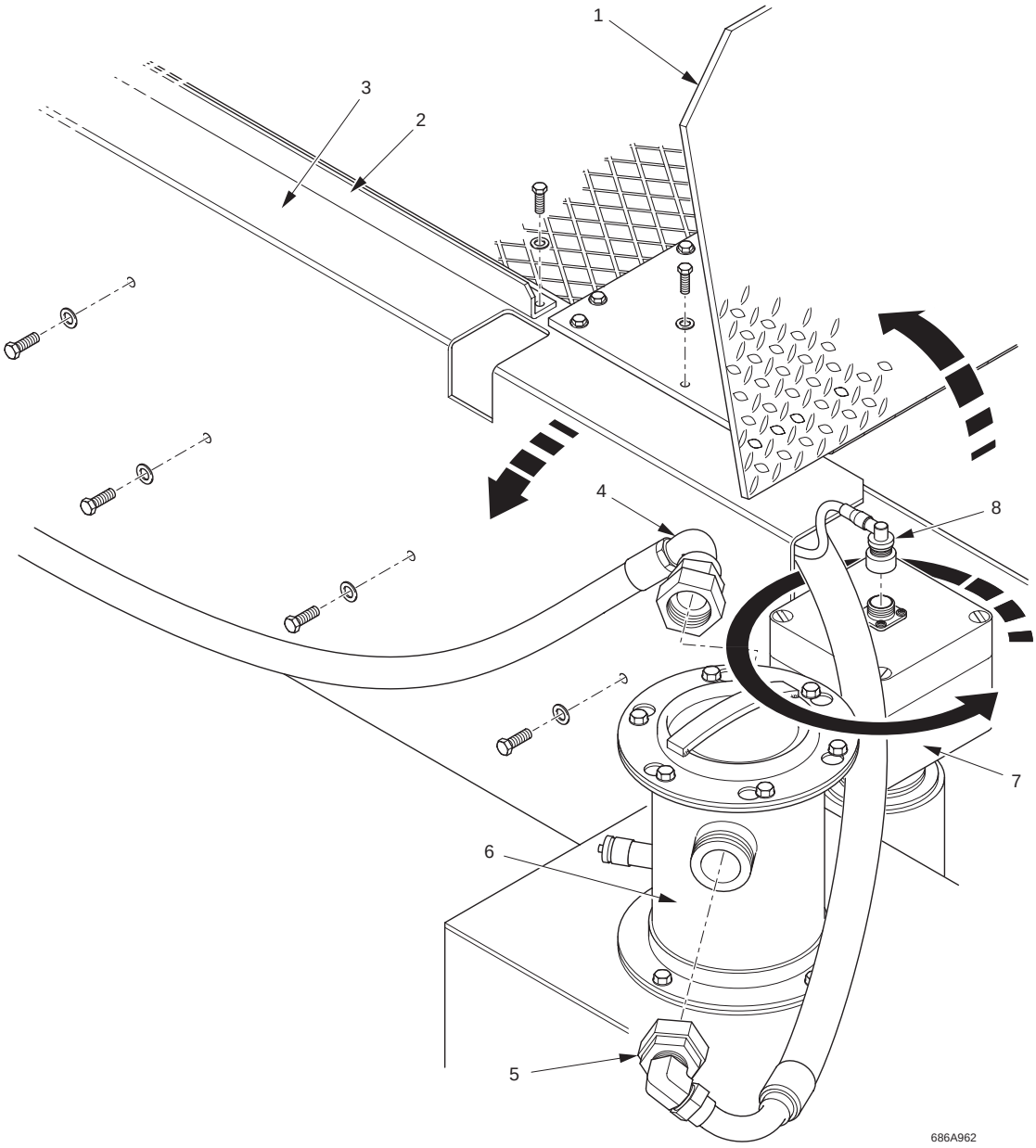
c. Follow on tasks

(1) Check and fill the hydraulic tank if required.

(2) Switch the battery shutoff switch to the on position.

(3) Check the operation of the DSB in accordance with the operator's manual TM 5-5420-279-10 and check for hydraulic oil leaks.

(4) Fit the engine top and right hand side covers (1, 2 and 3) in accordance with the PLS TM 9-2320-364 series.



5 - 118 HYDRAULIC SYSTEM - DE-PRESSURIZE

This task covers:

a. Service

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Test hose gauge adapter

Materials Required

Container for hydraulic oil
Absorbent Cloths

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

WARNING

INJURY FROM HYDRAULIC FLUID UNDER PRESSURE. SHUT DOWN VEHICLE PRIOR TO CARRYING OUT THIS PROCEDURE. ENSURE THAT THE BATTERY SHUTOFF SWITCH IS OFF.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

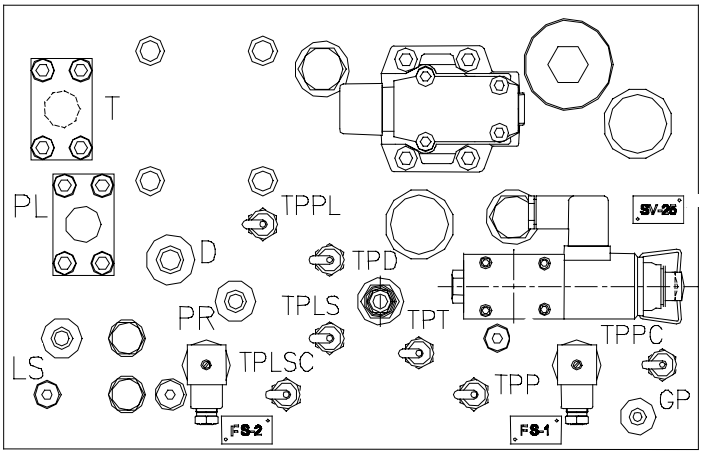
NOTE

This procedure covers de-pressurizing the hydraulic system.

All of the test points mentioned in this procedure are situated on the Interface Manifold Assembly.

The Interface Manifold Assembly is situated on the right hand side of the vehicle mounted to the chassis next to the Operator's Interface Enclosure.





a. Service

(1) Attach test gauge hose adapter to Test Point Pressure Crane (TPPC), and other end of hose into container. Open test point and allow to vent. Close test point.

(2) Attach test hose gauge adapter to Test Point Load Sensing (TPLS), and other end of hose into container. Open test point and allow to vent. Close test point.

(3) Attach test hose gauge adapter to Test Point Load Sensing Crane (TPLSC), and other end of hose into container. Open test point and allow to vent. Close test point.

(4) Attach test hose gauge adapter to Test Point Tank (TPT), and other end of hose into container. Open test point and allow to vent. Close test point.

(5) Attach test hose gauge adapter to Test Point Drain (TPD), and other end of hose into container. Open test point and allow to vent. Close test point.

(6) Attach test hose gauge adapter to Test Point Pressure Load (TPPL), and other end of hose into container. Open test point and allow to vent. Close test point.

(7) Attach test hose gauge adapter to Test Point Pump (TPP), and other end of hose into container. Open test point and allow to vent. Close test point.

5 - 119 HYDRAULIC SYSTEM - FILTERS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Container for hydraulic oil
Absorbent Cloths

Equipment Conditions

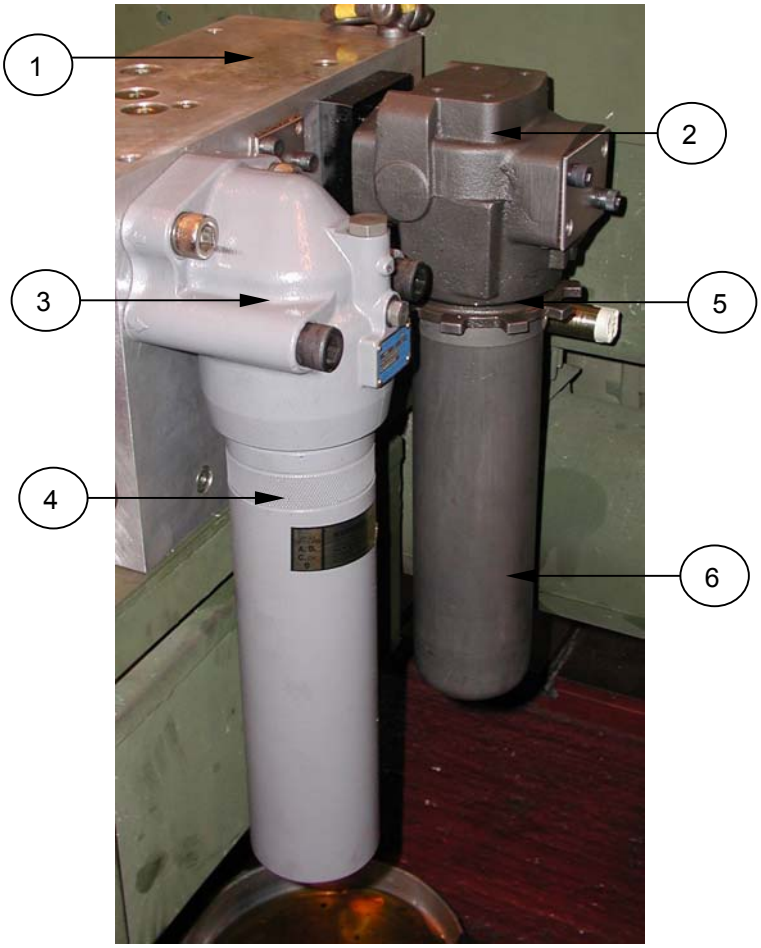
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC FILTERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

Both filters must be changed as a pair.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate the interface manifold (1) and identify the pressure filter (3) and the return filter (2).

(3) Hold a drain vessel under the filters and slacken the drain plug located in the base of the pressure filter (3).

(4) Allow the pressure filter bowl (4) contents to drain into the vessel.

(5) Use the hexagon headed nut built into the base of the pressure filter bowl (4) to unscrew the bowl from the filter housing.

(6) Remove the filter cartridge from the filter bowl and discard.

(7) Remove the O-ring from the filter housing and discard.

(8) The return filter (2) can be removed by releasing the lock nut (5) on the return filter bowl (6).

(9) Undo and remove the return filter bowl.

(10) Remove the O-ring from the filter housing and discard.

(11) Inspect components for wear, damage and corrosion.

(12) Examine bolt heads and threads on screws for damage.

(13) Check filter bowl lip and O-ring seal groove in filter housing for damage or distortion.

(14) Replace components as required.

b. Install

(1) Ensure mounting surfaces are clean. Fit a new O-ring to each filter housing. Coating each O-ring with hydraulic oil.

(2) Place a new filter cartridge into the return filter bowl (6) then screw the filter bowl (6) back into the filter housing and tighten.

(3) Tighten the return filter lock nut (5).

(4) Place a new filter cartridge into the pressure filter bowl (4) then screw the filter bowl back into the filter housing and tighten.

(5) Fit the filter drain plug and tighten.

(6) Operate the hydraulic circuit to self-purge and check for leaks. Rectify as necessary.

c. Follow on task

(1) Check hydraulic oil level and replenish as necessary.

(2) Clean up all oil spillage.

5 - 120 HYDRAULIC SYSTEM - STACK VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Seals (As required)

Equipment Conditions

Access to valve manifold
Vehicle switched off and battery shutoff switch in the off position

---

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure details a typical removal and installation procedure for a stack valve fitted to the A-Frame Rotate Manifold.

The procedure may be applied to any stack valve, however the individual stack valve arrangements are shown, in detail, in the manufacturers drawings (Appendix F) for each hydraulic manifold block.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate the manifold block (4) and identify the stack valve, which requires maintenance.

(3) Place a drain vessel under the manifold (4) to catch any spilled fluid.

(4) Note the position of and disconnect the electrical connections to the directional control valve (9).

(5) Draw a line across the side of the valve body to be used when installing the stack valve.

(6) Remove and retain the four screws (11) securing the directional control valve (9) and the pressure reducing valve (8) to the check valve body (7).

(7) Ensure that the eight seals (5) are removed from the directional control valve (9) and pressure reducing valve (8) and the check valve body (7).

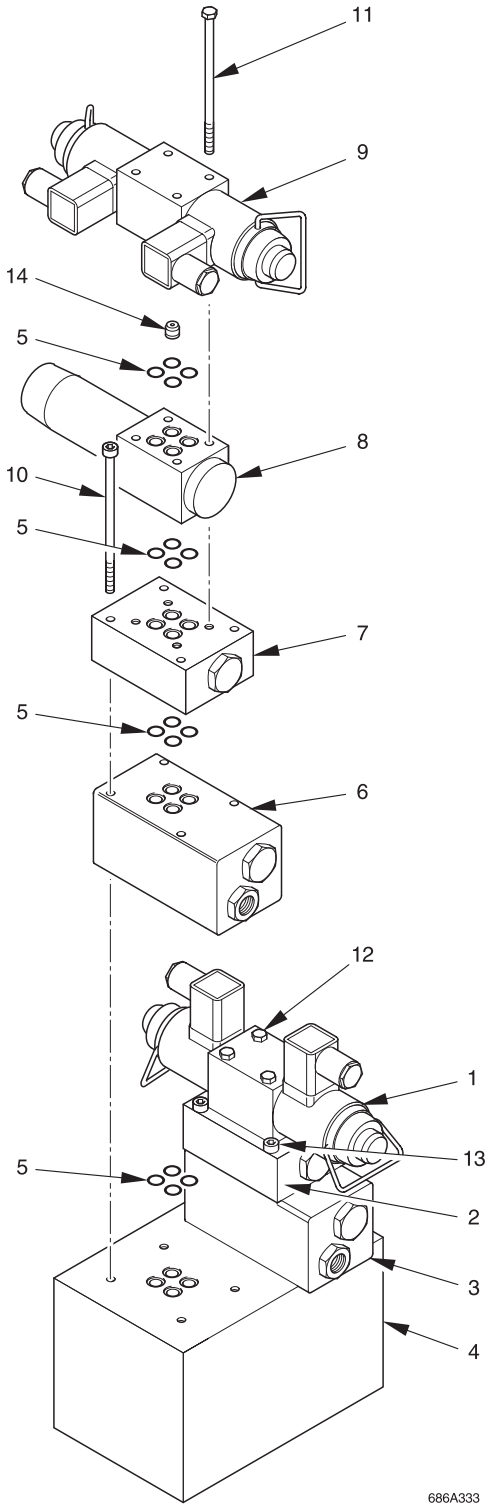
(8) Cover exposed ports to prevent the ingress of dirt and moisture.

(9) If a cartridge throttle (14) is fitted to the pressure port, 'P' channel of the directional control valve (9) remove and clean it.

(10) Remove and retain the four screws (10) securing the check valve body (7) and pressure compensating valve (6) to the manifold (4).

(11) Ensure that the eight seals (5) are removed from the check valve body (7) and pressure compensating valve (6) and manifold (4).

(12) Cover exposed ports to prevent the ingress of dirt and moisture.



NOTE

The directional control valve (1), check valve body (2), pressure compensating valve (3) and screws (12 and 13) can be removed following the same procedure.

b. Install

(1) Check that all mating surfaces and ports are clean.

(2) Apply thread-locking compound to all screws.

(3) Apply a thin layer of clean hydraulic fluid to all new seals.

(4) Ensure that the line drawn on the valve body during removal is aligned.

(5) Fit the pressure compensating valve (6) with four seals (5) to the manifold block (4). Check that the seals (5) are fitted correctly.

(6) Fit the check valve body (7) with four seals (5) to the pressure compensating valve (6). Check that the seals (5) are fitted correctly.

(7) Secure the check valve body (7) and pressure compensating valve (6) to the manifold block (4) with four screws (10).

(8) Fit the pressure reducing valve (8) with four seals (5) to the check valve body (7). Check that the seals (5) are fitted correctly.

NOTE

If a cartridge throttle (14) was fitted to the pressure port, 'P' channel of the directional control valve (9) fit it to the directional control valve (9).

(9) Fit the directional control valve (9) with four seals (5) to pressure reducing valve (8). Check that the seals (5) are fitted correctly.

(10) Secure the directional control valve (9) and pressure reducing valve (8) to the check valve body (7) with four screws (11).

c. Follow on tasks

(1) Fit the electrical connections to the directional control valve (9) in the positions noted during removal.

(2) Switch the battery shutoff switch to the on position.

(3) Check the operation of all applicable hydraulic circuits.

(4) Check for leaks.

5 - 121 HYDRAULIC SYSTEM - CARTRIDGE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Access to valve manifold

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure details a typical removal and installation procedure for a cartridge valve and may be applied to any cartridge valve.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the cartridge valve (1) by applying a wrench to the body (2).

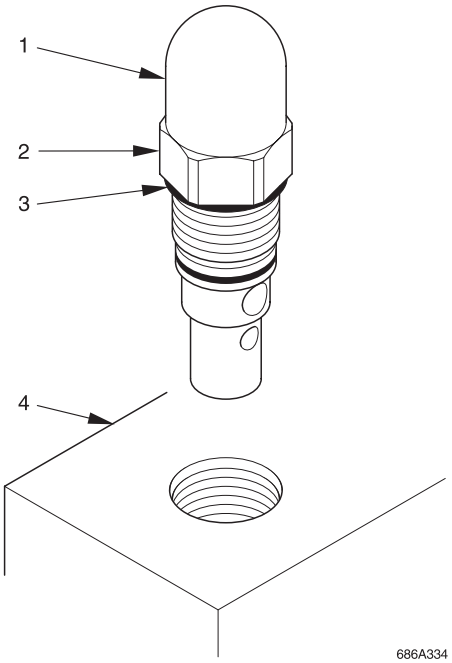
(3) Inspect components for wear, damage and corrosion.

(4) Replace components as required.

b. Install

(1) Fit cartridge valve (1) to manifold block (4). Take care that O-ring (3) is not dislodged when inserting valve.

(2) Apply system pressure and check for leaks.



5 - 122 HYDRAULIC SYSTEM - DIRECTIONAL CONTROL VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

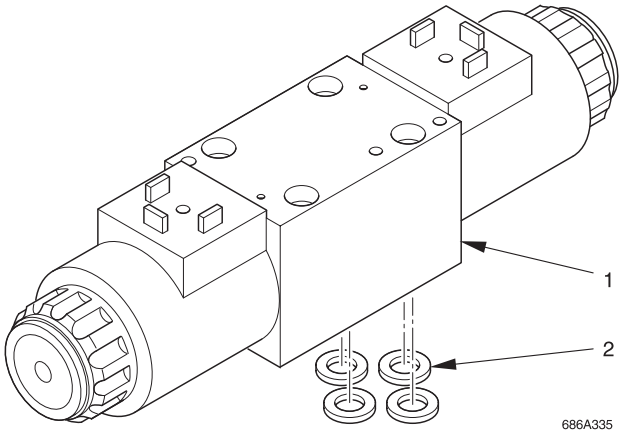
Access to valve under repair
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

This procedure is a general procedure for changing all Directional Control Valves.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

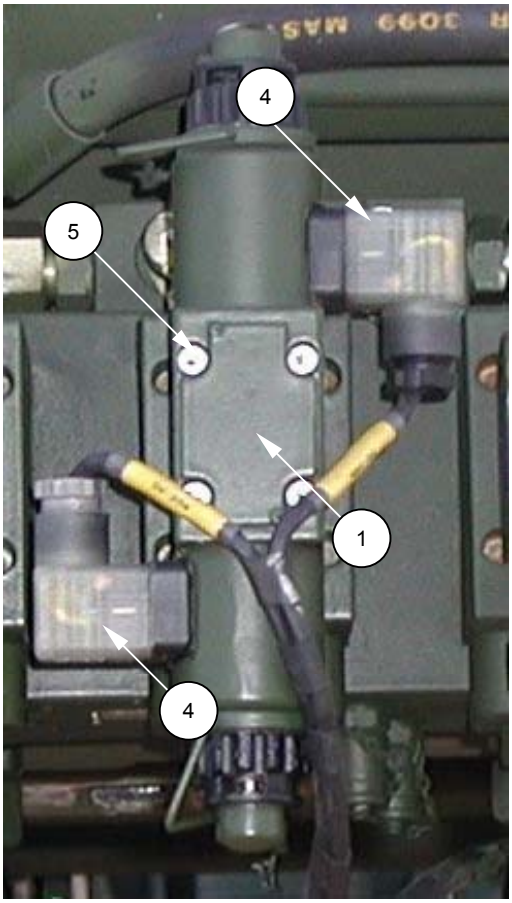
(2) Disconnect the electrical connections (4) to the directional control valve (1). Refer to unit maintenance procedure 5-141.

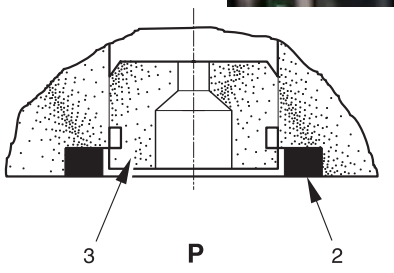
(3) Remove and retain the four screws (5) securing the directional control valve (1) to the manifold assembly.

(4) Ensure that the four seals (2) are removed from the manifold assembly when the directional control valve (1) is removed.

(5) Cover exposed ports to exclude the ingress of dirt and moisture. Replace valve as soon as possible.

(6) If a cartridge throttle (3) is fitted to the pressure port, 'P' channel of the directional control valve (1) remove and clean it.





b. Install

(1) Ensure mounting surfaces are clean.

(2) If required, fit the cartridge throttle (3) to the pressure, 'P' channel in the new directional control valve (1).

(3) Ensure that the four seals (2) are fitted to the directional control valve (1).

(4) Fit the directional control valve (1) to the manifold assembly and insert the four screws (5) retained during removal. Use thread-locking compound on the screw threads.

(5) Tighten the four screws (5) evenly to ensure a good seal between the directional control valve (1) and the manifold assembly.

(6) Fit the electrical connections (4) to the directional control valve (1). Refer to unit maintenance procedure 5-141.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Apply system pressure and check for leaks.

5 - 123 HYDRAULIC SYSTEM - CYLINDER PRESSURE RELEASE

This task covers:

a. Cylinder Pressure Release

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Clean Cloth
Container to catch hydraulic fluid

Equipment Conditions

As detailed for removing the cylinder under repair.

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON ANY CYLINDER.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. WHEN DE-PRESSURIZING CYLINDERS IT IS IMPORTANT TO MAKE SURE NO HYDRAULIC OIL CAN BE SPRAYED. MAKE SURE THAT NO PERSONNEL ARE STANDING NEAR THE CYLINDER BEING DE-PRSSURIZED.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This is a general procedure to be used on any cylinder when required. The steps detailed in this procedure are applicable to all hydraulic cylinders.

It may be necessary to release the residual pressure in a hydraulic cylinder to assist in its removal or replacement. Releasing the hydraulic pressure from the cylinder relieves force acting on the cylinder pins and allows the cylinder piston to be moved.

The cylinder pressure release fitting (2), one at each end of the cylinder (1), are always located at 90° to the cylinder valve block (3) or line connection (4). The following pictures shown typical locations.

a. Cylinder Pressure Release

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Locate the cylinder pressure release fitting (2).

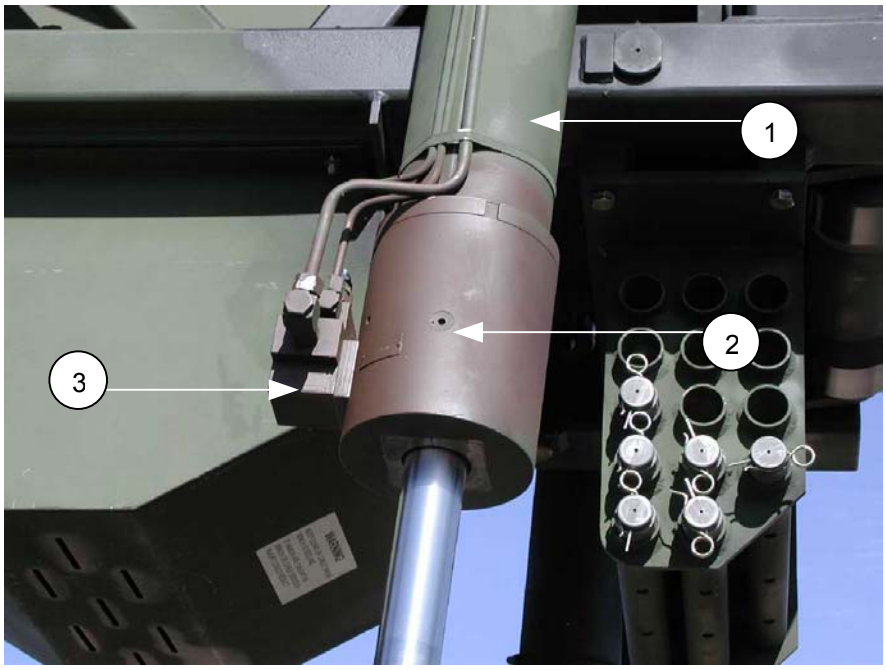
(3) Fit an allen key wrench to the cylinder pressure release fitting (2) and then place a clean cloth over the allen key wrench. Hold the cloth in place with one hand and turn the allen key wrench with the other hand until the pressure is released. This will prevent hydraulic oil from being sprayed.

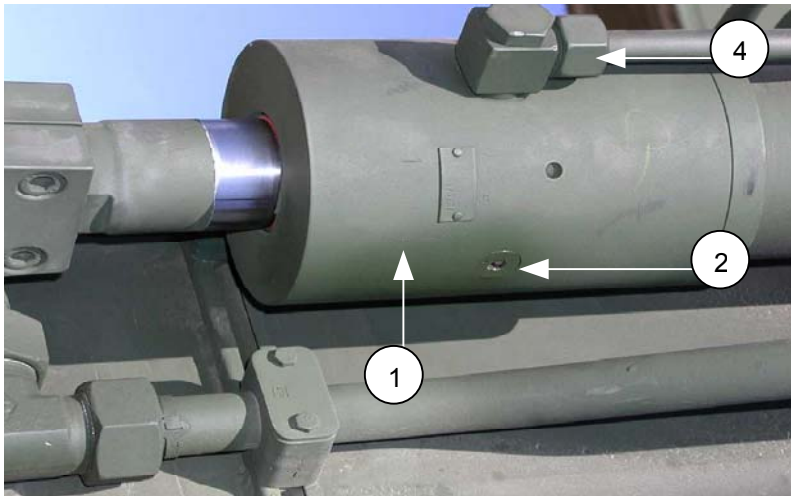
(4) Place a suitable container under the wrench to catch any excess hydraulic fluid.

(5) Turn the allen wrench 180 degrees counter clockwise.

(6) When the pressure is released tighten the cylinder pressure release fitting by turning the allen wrench clockwise.

(7) Clean up any spilled hydraulic fluid.




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5 - 124 HYDRAULIC SYSTEM - SOLENOID

This task covers:

a. Remove b. Test c. Install

INITIAL SETUP:

Tools Required

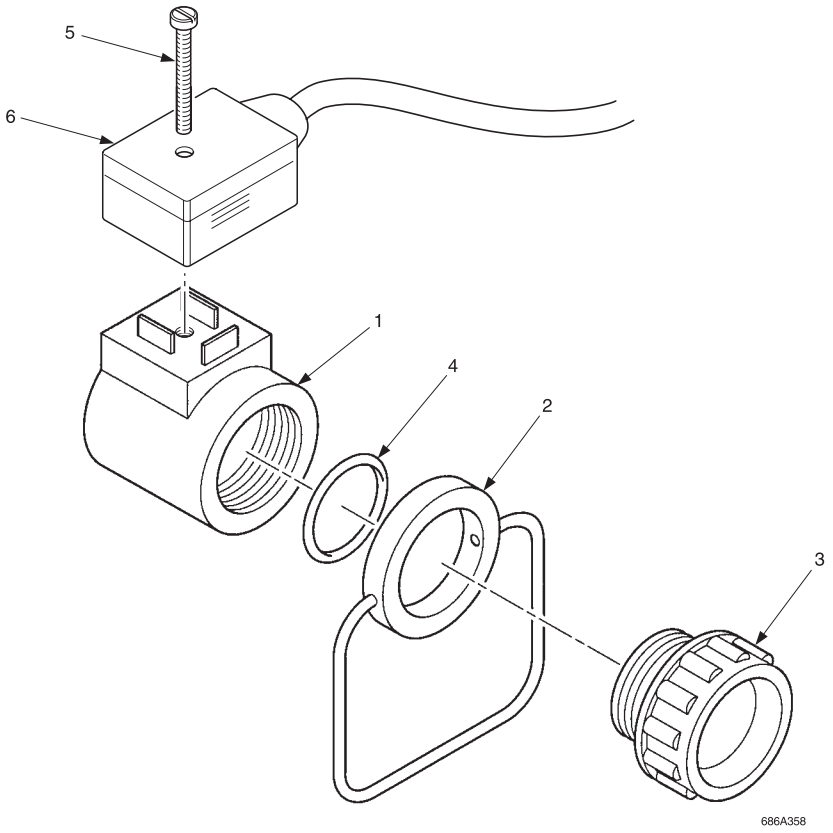
Tool Kit, General Mechanic's, Automotive (GMTK)
Tool Kit Common No 1

Materials Required

Silicone Compound

Equipment Conditions

Access to Solenoid
Vehicle switched off and battery shutoff switch in the off position



a. Remove

(1) Remove the silicone compound covering the head of the securing screw (5) on the electrical connection (6).

(2) Remove the securing screw (5).

(3) Remove the electrical connection (6).

NOTE

The test may be carried out at this point

(4) Note the position of the solenoid (1) and remove the solenoid retaining nut (3).

(5) Remove the locking clip (2).

(6) Remove the O-ring (4).

(7) Remove the solenoid (1).

(8) Clean the solenoid (1).

(9) Check the electrical connection (6) for damage.

b. Test

(1) Remove the rubber seal on the solenoid to identify the pin numbers.

(2) Carry out a resistance check across the supply and return pins (pins 1 and 2) on the solenoid (1).

(3) Take a reading and compare it with the limits detailed in Table 1.

(4) If the reading taken is above or below the specified limits go to step 5 of remove and replace the solenoid valve (1).

c. Install

(1) Place the solenoid (1) on the solenoid valve in the position noted during removal.

(2) Fit O-ring (4) on the solenoid (1).

(3) Fit the locking clip (2).

(4) Fit the solenoid retaining nut (3), check that the O-ring (4) is not damaged when fitting the solenoid retaining nut (3).

(5) Fit the electrical connection (6).

(6) Secure the electrical connection (6) with the securing screw (5).

(7) Cover the head of the electrical connection securing screw (5) with silicone compound.

d. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the system under repair in accordance with the operator's manual TM 5-5420-279-10.

Table 1 Solenoid Resistance Limits

Solenoid No	Pin Refs.	Resistance	Wiring Diag. Ref.
PV1a	LC-04(L) & LC-04(M)	3 - 8Ω	Appendix G Annex 4 Fig 7 Page 7
PV1b	LC-04(N) & LC-04(P	3 - 8Ω	Appendix G Annex 4 Fig 7 Page 7
SV1	LC-04(A) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV2	LC-04(B) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV3	LC-04(C) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV4	LC-04(D) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV5	LC-06(D) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV6	LC-06(E) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV7	LC-06(F) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV8	LC-06(G) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV9	LC-06(H) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV10	LC-06(J) & LC-06(N)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV13a	LC-04(E) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV13b	LC-04(F) & LC-04(U)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV14a	LC-04(G) & LC-04(S)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV14b	LC-04(H) & LC-04(S)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV15a	LC-04(J) & LC-04(S)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV15b	LC-04(K) & LC-04(S)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV16	LC-06(C) & LC-06(M)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV17a	LC-06(A) & LC-06(V)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV17b	LC-06(B) & LC-06(V)	15 - 23Ω	Appendix G Annex 4 Fig 7 Page 7
SV18a	MF-02(A) & MF-02(E)	15 - 23Ω	Appendix G Annex 4 Fig 4 Page 4
SV18b	MF-02(B) & MF-02(E)	15 - 23Ω	Appendix G Annex 4 Fig 4 Page 4
SV19a	MF-02(C) & MF-02(E)	15 - 23Ω	Appendix G Annex 4 Fig 4 Page 4
SV19b	MF-02(D) & MF-02(E)	15 - 23Ω	Appendix G Annex 4 Fig 4 Page 4
SV20a	LF-04(K) & LF-04(M)	15 - 23Ω	Appendix G Annex 4 Fig 5 Page 5
SV20b	LF-04(N) & LF-04(M)	15 - 23Ω	Appendix G Annex 4 Fig 5 Page 5
SV21abcd	LF-04(P) & LF-04(S)	15 - 23Ω	Appendix G Annex 4 Fig 5 Page 5
SV24	IE-02(H) & IE-02(J)	15 - 23Ω	Appendix G Annex 4 Fig 2 Page 2
SV25	IE-04(D) & IE-04 (E)	15 - 23Ω	Appendix G Annex 4 Fig 2 Page 2

NOTE

The wiring diagrams in Table 1 can be found at Appendix G Annex 4.

5 - 125 HYDRAULIC SYSTEM - SHUTTLE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

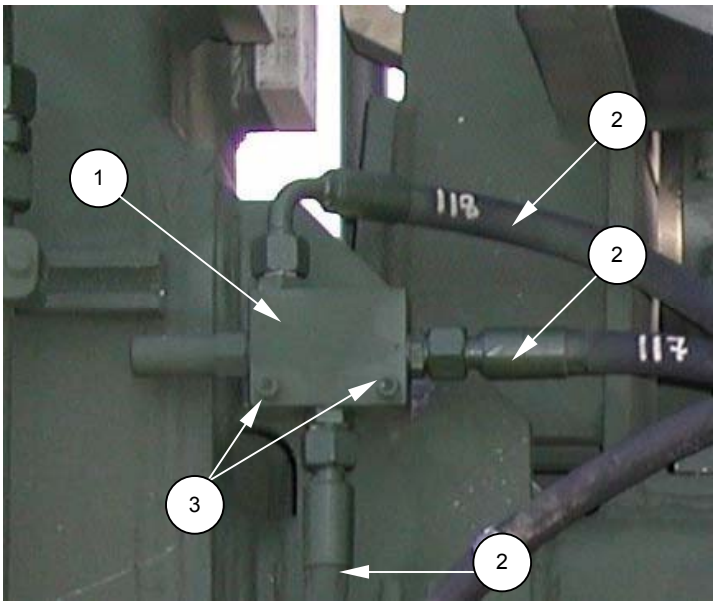
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Access to Shuttle Valve



NOTE

There are several shuttle valves fitted to the hydraulic system. The principle of this procedure is applicable to all shuttle valves.

The picture above shows the shuttle valve fitted to the A-Frame.

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and remove the hydraulic hoses (2) connected to the shuttle valve (1).

NOTE

There may be two or more hydraulic hoses connected to the shuttle valve under repair.

(3) Remove the two bolts and washers (3) securing the shuttle valve (1) to its mounting.

b. Install

(1) Apply thread locking compound to the bolts.

(2) Secure the shuttle valve (1) to its mounting with the bolts and washers (3).

(3) Fit the hydraulic hoses (2) to the shuttle valve (1) in the positions noted during removal.

(4) Check the operation of the system under repair.

5 - 126 HYDRAULIC SYSTEM - SYNCHRONIZING FLOW DIVIDER VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 4)
Seal (As required)

Equipment Conditions

A-Frame deployed

WARNING

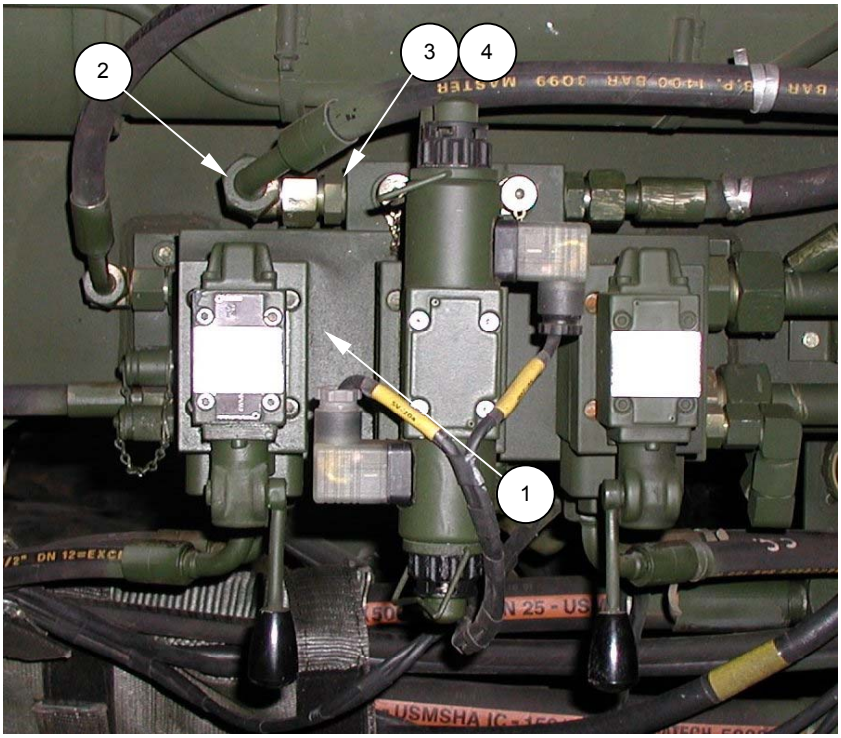
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The syncronizing flow divider is fitted to the A-Fame stablizer manifold assembly (1).

The stabilizer manifold is protected by a cover which is held in position by eight screws and lock washers (Not shown). This must be removed to gain access to the stabilizer manifold.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the four screws and lock washers securing the stabilizer manifold cover (not shown). Discard the lock washers.

(3) Remove the cover.

(4) Remove hydraulic hose (2) connected to the synchronizing flow divider (3).

(5) Remove the synchronizing flow divider (3) and seal (4).

(6) Check the condition of the hydraulic oil seal (4) and replace as necessary.

b. Install

(1) Fit the synchronizing flow divider (3) and seal (4) to the stabilizer manifold assembly (1).

(2) Fit the hydraulic hose (2) to the synchronizing flow divider (3).

c. Follow on tasks

(1) Check the operation of the stabilizer manifold assembly (1) and check for leaks.

(2) Apply thread locking compound to the eight screws for the stabilizer manifold cover.

(3) Fit the stabilizer manifold cover and secure in place with the four screws and lock washers.

5 - 127 HYDRAULIC SYSTEM - STABILIZER MANUAL CONTROL VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 4)
Seal (As required)

Equipment Conditions

A-Frame deployed

WARNING

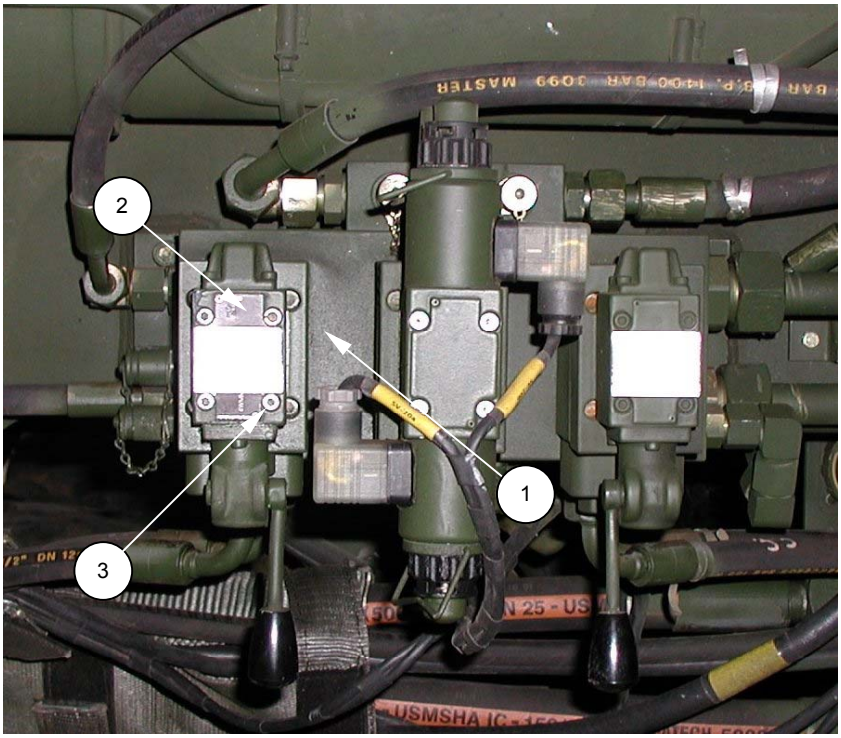
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The stabilizer manual controls are fitted to the A-Fame stablizer manifold assembly (1).

The stabilizer manifold is protected by a cover which is held in position by eight screws and lock washers. (Not shown). This must be removed to gain access to the stabilizer manifold.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the four screws and lock washers securing the stabilizer manifold cover (not shown). Discard the lock washers.

(3) Remove the cover.

(4) Remove the four screws (3) securing the stabilizer manual control valve (2) to the stabilizer manifold (1).

(5) Remove and discard the four seals fitted between the stabilizer manual control valve (2) and the stabilizer manifold (1).

b. Install

(1) Fit four new seals to the stabilizer manifold control valve (2).

(2) Fit the stabilizer manual control valve (2) to the stabilizer manifold (1) and secure in place with the four screws (3).

(3) Check the operation of the stabilizer manifold assembly (1) and check for leaks.

(4) Apply thread locking compound to the eight screws for the stabilizer manifold cover.

(5) Fit the stabilizer manifold cover and secure in place with the four screws and lock washers.

5 - 128 HYDRAULIC SYSTEM - STABILIZER MANUAL CONTROL STACK VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 4)
Seal (As required)

Equipment Conditions

A-Frame deployed

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

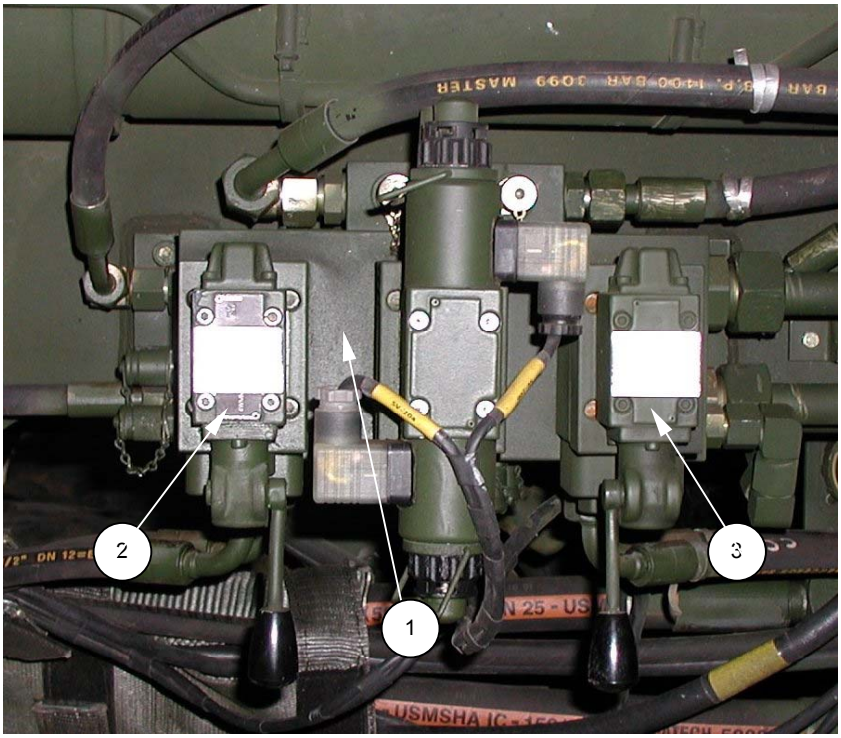
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The stabilizer manual controls stack valves are fitted to the A-Fame stablizer manifold assembly (1). The left hand valve stack (2) operates the left hand stabilizer leg, the right hand valve stack (3) operates the right hand stabilizer leg.

This procedure is applicable to the left and right hand stabilizer manual controls.

The stabilizer manifold is protected by a cover which is held in position by eight screws and lock washers. (Not shown). This must be removed to gain access to the stabilizer manifold.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the four screws and lock washers securing the stabilizer manifold cover (not shown). Discard the lock washers.

(3) Remove the cover.

(4) Remove the four screws (9) securing the stabilizer manual control valve (8) to the valve adapter plate (5).

(5) Remove and the four seals (6) fitted between the stabilizer manual control valve (8) and the valve adapter plate (5).

(6) Remove the four screws (7) securing the valve adapter plate (5) and sandwich body (3) to the stabilizer manifold assembly (1).

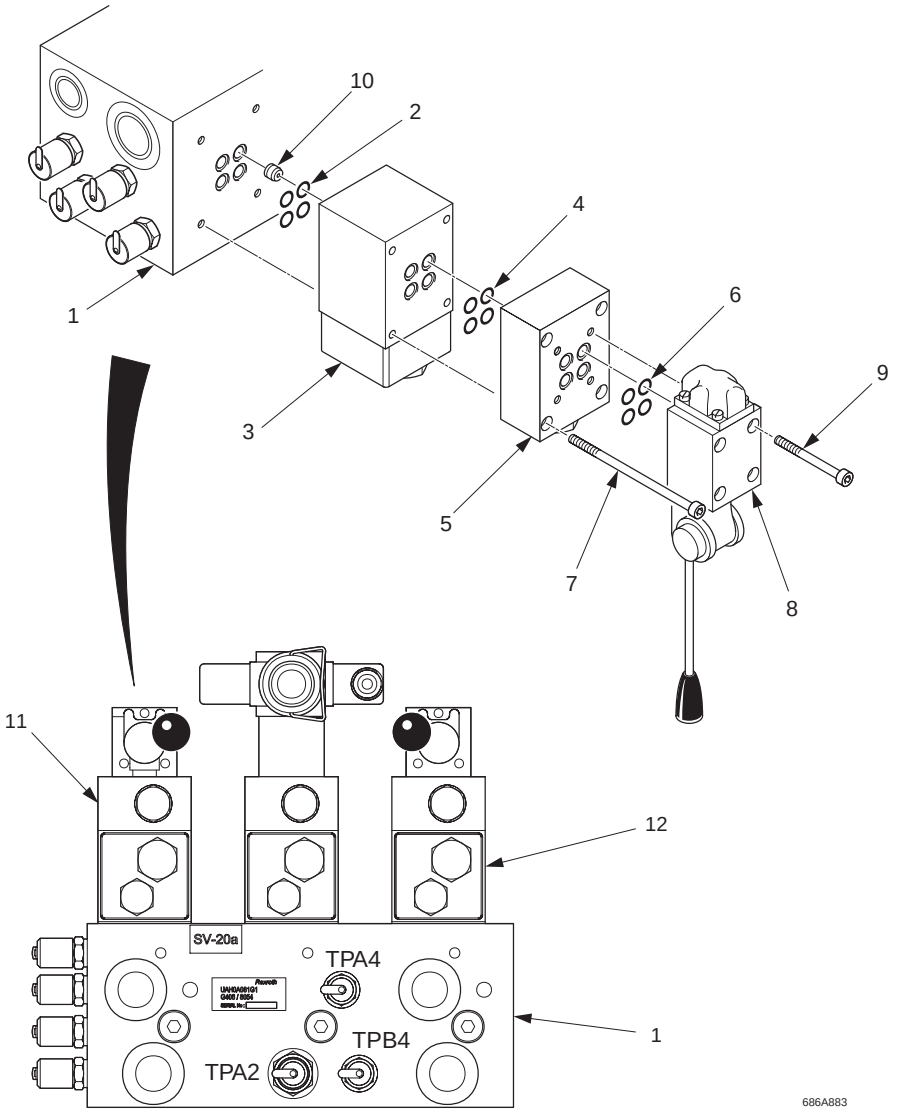
(7) Remove the seals (4 and 2).

(8) Note the position of and remove the cartridge throttle valve (10) from the sandwich body (3) **P** (pressure) port.

(9) Check all threaded components for damage and wear.

(10) Clean the cartridge throttle valve (10).

(11) Replace components as necessary.



View on bottom

b. Install

(1) Fit the cartridge throttle valve (10) and seals (2) to the sandwich plate (3) in the position noted during removal.

(2) Fit the seals (4) to the valve adapter plate (5).

(3) Fit the sandwich plate (3) and valve adapter plate (5) to the stabilizer manifold assembly (1) and secure in place with the four screws (7).

(4) Fit the seals (6) to the stabilizer manual control valve (8).

(5) Fit the stabilizer manual control valve (8) to the valve adapter plate (5) and secure in place with the four screws (9).

c. Follow on tasks

(1) Check the operation of the stabilizer legs and check for leaks.

(2) Apply thread locking compound to the four screws for the stabilizer manifold cover.

(3) Fit the stabilizer manifold cover and secure in place with the eight screws and lock washers.

5 - 129 HYDRAULIC SYSTEM - PINCH/ROLL STOW MANIFOLD VALVES

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (As required)

Equipment Conditions

A-Frame deployed and launch frame guards removed; see operator's manual TM 5420-2789-10

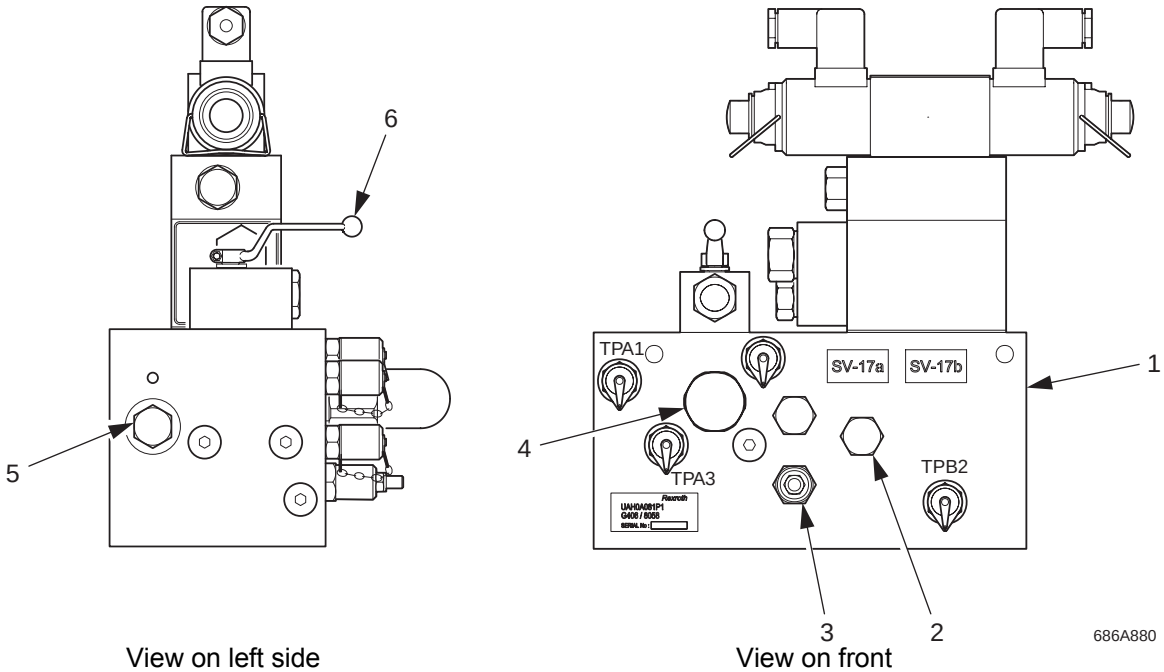
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure is applicable for removing and installing the shuttle valve (2), pressure relief valve (3), pressure reducing valve (4) and synchronizing flow divider (5).



View on left side

View on front

a. Remove

(1) Turn the pinch/roll stow cylinder lever (6) through 90 degrees to release hydraulic oil pressure to the rear pinch rollers.

(2) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(3) Identify and locate the valve (2, 3, 4 or 5) to be replaced on the pinch/roll stow manifold assembly (1).

(4) Unscrew the valve (2, 3, 4 or 5) to be replaced, counter-clockwise.

(5) Remove the valve (2, 3, 4 or 5) and its seal.

b. Install

(1) Fit a new seal to the valve (2, 3, 4 or 5).

(2) Fit the valve (2, 3, 4 or 5) to the pinch/roll stow manifold assembly (1).

(3) Turn the pinch/roll stow cylinder lever (6) back through 90 degrees.

c. Follow on task

(1) Check the operation of the launcher and check for leaks.

5 - 130 HYDRAULIC SYSTEM - LAUNCH FRAME PILOT MANIFOLD VALVES

This task covers:

a. Remove sequence valve
b. Install sequence valve
c. Remove pressure reducing valve
d. Install pressure reducing valve

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Allen Key Set

Materials Required

Thread locking compound, loctite 243
Seals (As required)

Equipment Conditions

A-Frame deployed and launch frame guards removed; see operator's manual TM 5420-2789-10

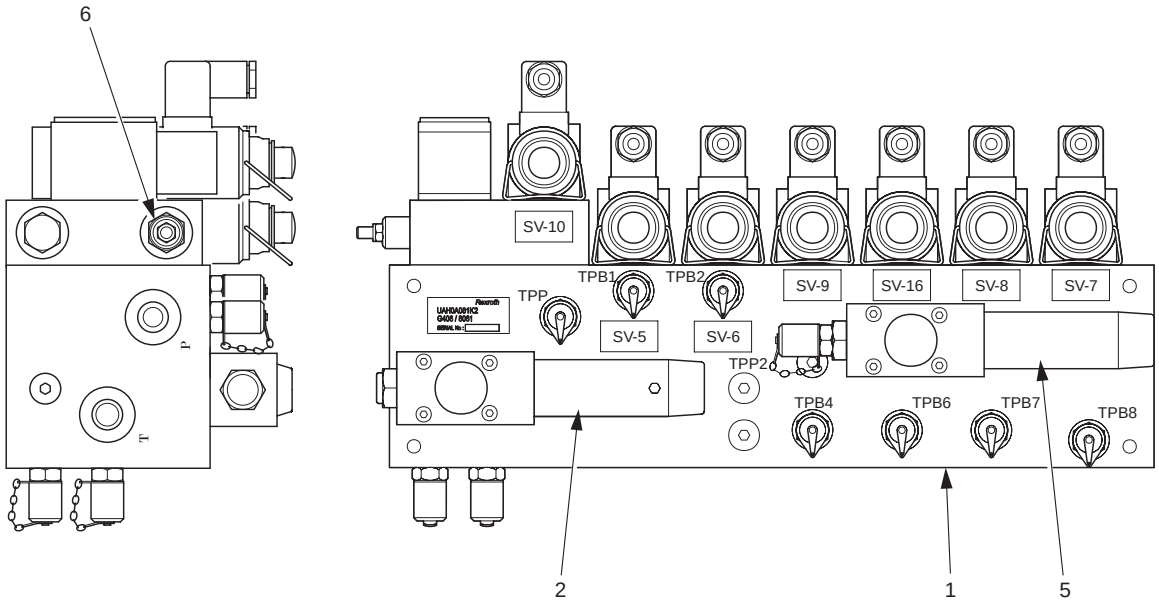
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure is applicable for removing and installing the 580 PSI (4000 kPa) pressure reducing valve (2), 363 PSI (2500 kPa) pressure reducing valve (5), and sequencing valve (6) fitted to the launch frame pilot manifold assembly (1).



View on left side View on front

a. Remove Sequence Valve

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Identify and locate the sequence valve (6) on the launch frame pilot manifold assembly (1).

(3) Unscrew the sequence valve (6), counter-clockwise.

(4) Remove the sequence valve (6) and its seal.

b. Install Sequence Valve

(1) Fit a new seal to the sequence valve (6).

(2) Fit the sequence valve (6) to the launch frame pilot manifold assembly (1).

(3) Check the operation of the launcher and check for leaks.

c. Remove Pressure Reducing Valve

NOTE

This removal and replacement is applicable to both pressure reducing valves (2 and 5) fitted to the launch frame pilot manifold assembly (1).

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Identify and locate the pressure-reducing valve (2 or 5) on the launch frame pilot manifold assembly (1).

(3) Remove the four screws (3).

(4) Remove the pressure reducing valve (2 or 5).

(5) Remove the four seals (4).

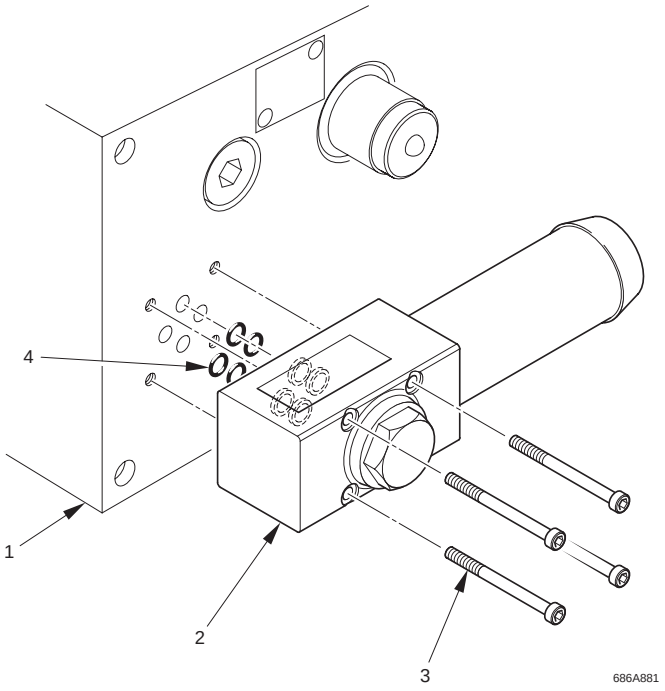
d. Install Pressure Reducing Valve

(1) Fit the four seals (4) to the pressure reducing valve (2 or 5).

(2) Fit the pressure reducing valve (2 or 5) to the launch frame pilot manifold assembly (1) and secure in place with the four screws (3).

e. Follow on task

(1) Check the operation of the launch frame pilot manifold assembly and check for leaks.



5 - 131 HYDRAULIC SYSTEM - ARTICULATOR MANIFOLD VALVES

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (As required)

Equipment Conditions

A-Frame deployed and launch frame guards removed; see operator's manual TM 5420-2789-10

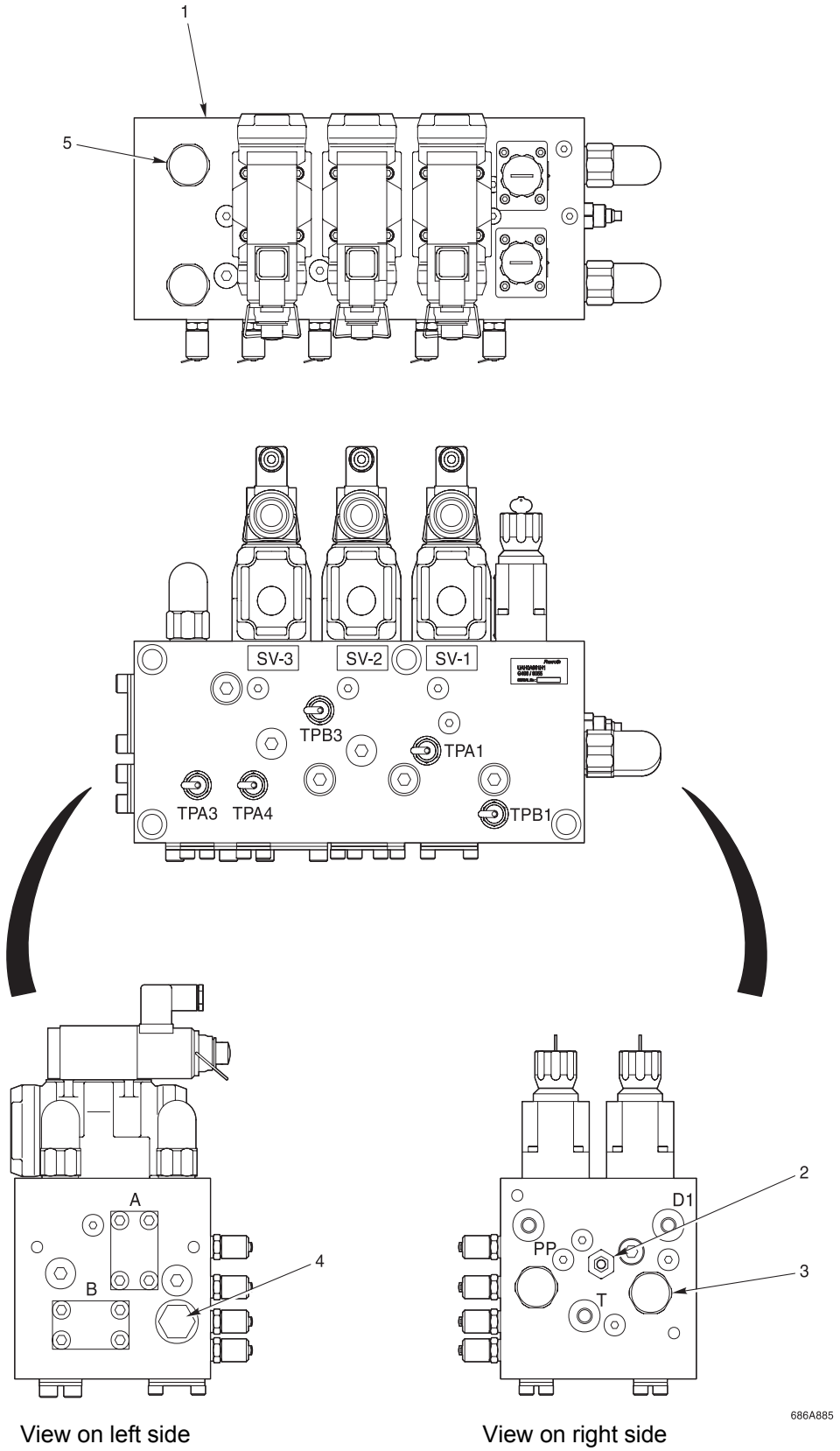
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure is applicable for removing and installing the 20 PSI (2000kPa) pressure reducing valve (2), 725 PSI (5000 kPa) pressure relief valve (3), synchronizing flow divider (4) and pressure relief valve (5) on the articulator manifold.


1
5
View on top
SV-3
SV-2
SV-1
TPB3
TPA1
TPA3
TPA4
TPB1
View on front
A
B
4
2
D1
PP
3
T
686A885
View on left side
View on right side

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Identify and locate the valve (2, 3, 4 or 5) to be replaced, on the articulator manifold assembly (1).

(3) Unscrew the valve (2, 3, 4 or 5), counter-clockwise.

(4) Remove the valve (2, 3, 4 or 5) and its seal.

b. Install

(1) Fit a new seal to the valve (2, 3, 4 or 5).

(2) Fit the valve (2, 3, 4 or 5) to the articulator manifold assembly (1).

c. Follow on task

(1) Check the operation of the launcher and check for leaks.

5 - 132 HYDRAULIC SYSTEM - WINCH CONTROL MANIFOLD VALVES

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (As required)

Equipment Conditions

A-Frame deployed and launch frame guards removed; see operator's manual TM 5420-2789-10

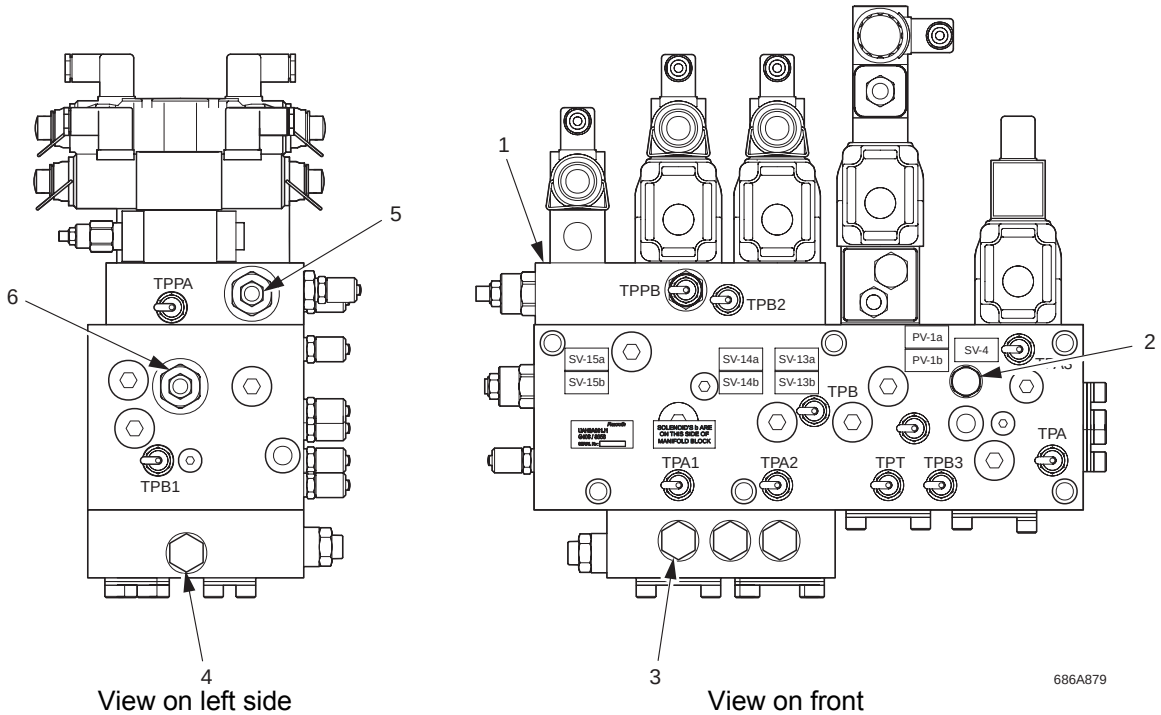
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure is applicable for removing and installing the 3191 PSI (22000 kPa) pressure relief valves (3 and 4), back tension valve (5), load holding valve (6) and shuttle valve (2) on the winch control manifold (1).



View on left side View on front

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Identify and locate the valve (2, 3, 4, 5 or 6) to be replaced, on the winch control manifold assembly (1).

(3) Unscrew the valve (2, 3, 4, 5 or 6), counter-clockwise.

(4) Remove the valve (2, 3, 4, 5 or 6) and its seal.

b. Install

(1) Fit a new seal to the valve (2, 3, 4, 5 or 6).

(2) Fit the valve (2, 3, 4, 5 or 6) to the winch control manifold assembly (1).

c. Follow on task

(1) Check the operation of the launcher and check for leaks.

5 - 133 HYDRAULIC SYSTEM - INTERFACE MANIFOLD SHUTTLE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (As required)

Equipment Conditions

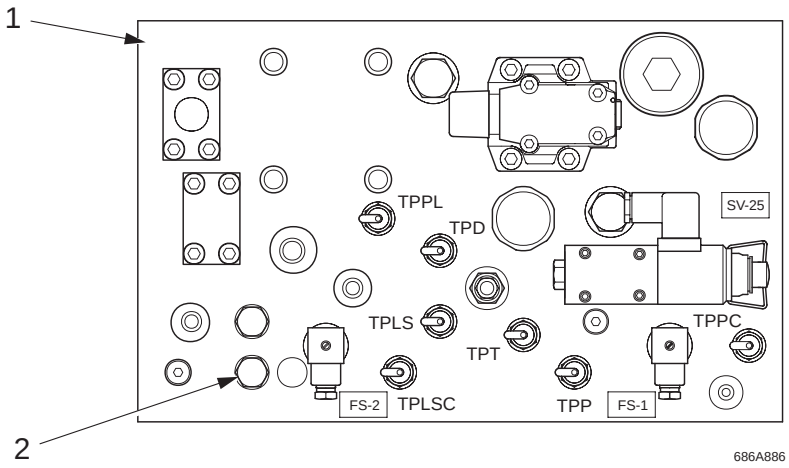
None

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





View on left side

a. Remove

(5) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(1) Identify and locate the shuttle valve (2), on the interface manifold assembly (1).

(2) Unscrew the shuttle valve (2), counter-clockwise.

(3) Remove the shuttle valve (2) and its seal.

b. Install

(1) Fit a new seal to the shuttle valve (2).

(2) Fit the shuttle valve (2) to the interface manifold assembly (1).

c. Follow on task

(1) Check the operation of the launcher and check for leaks.

5 - 134 HYDRAULIC SYSTEM - ARTICULATOR COUNTERBALANCE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (Qty 1)

Equipment Conditions

None

WARNING

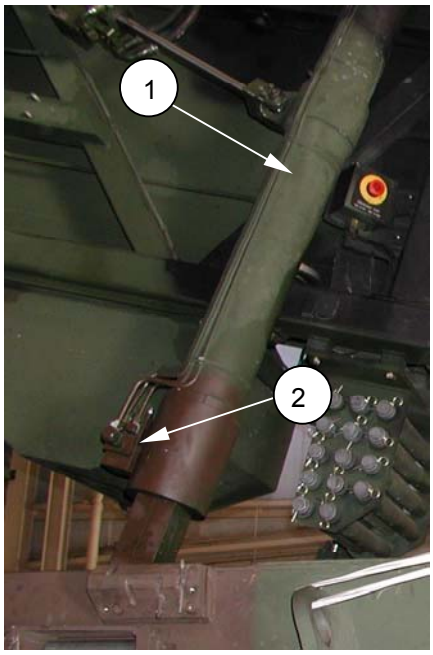
PERSONAL INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE ARTICULATOR CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE ARTICULATOR CYLINDERS ARE SUPPORTED.

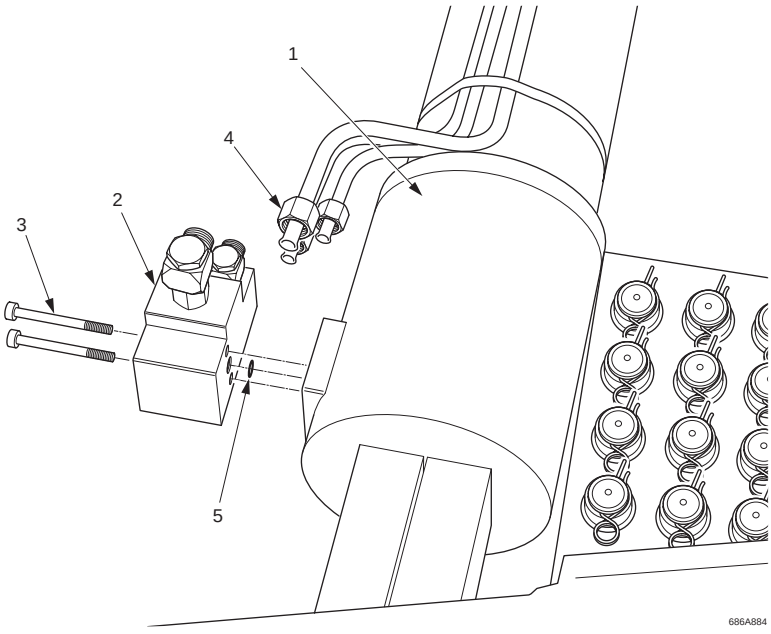
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The counterbalance valve (2) is situated at the lower end of the articulator cylinder (1). This procedure shows the right hand articulator cylinder but is applicable to the counterbalance valve fitted to the left hand articulator cylinder.


1
2


1
4
2
3
5
686A884

a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Release the hydraulic pressure in the articulator cylinder (1), refer to unit maintenance procedure 5-123.

(3) Note the positions of and remove the three hydraulic pipes (4) connected to the counterbalance valve (2).

(4) Remove the two screws (3) securing the counterbalance valve (2) to the articulator cylinder (1).

(5) Remove the counterbalance valve (2).

(6) Remove the seal (5).

b. Install

(1) Fit a new seal (5) to the counterbalance valve (2).

(2) Fit the counterbalance valve (2) to the articulator cylinder (1) and secure in place with the two screws (3).

(3) Fit the three hydraulic pipes (4) to the counterbalance valve (2).

c. Follow on task

(1) Check the operation of the articulator cylinder (1) and check for leaks.

5 - 135 HYDRAULIC SYSTEM - WINCH PILOT VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (Qty 1)

Equipment Conditions

Launch frame winch guards removed. See operator's maintenance TM 5-5420-2789-10

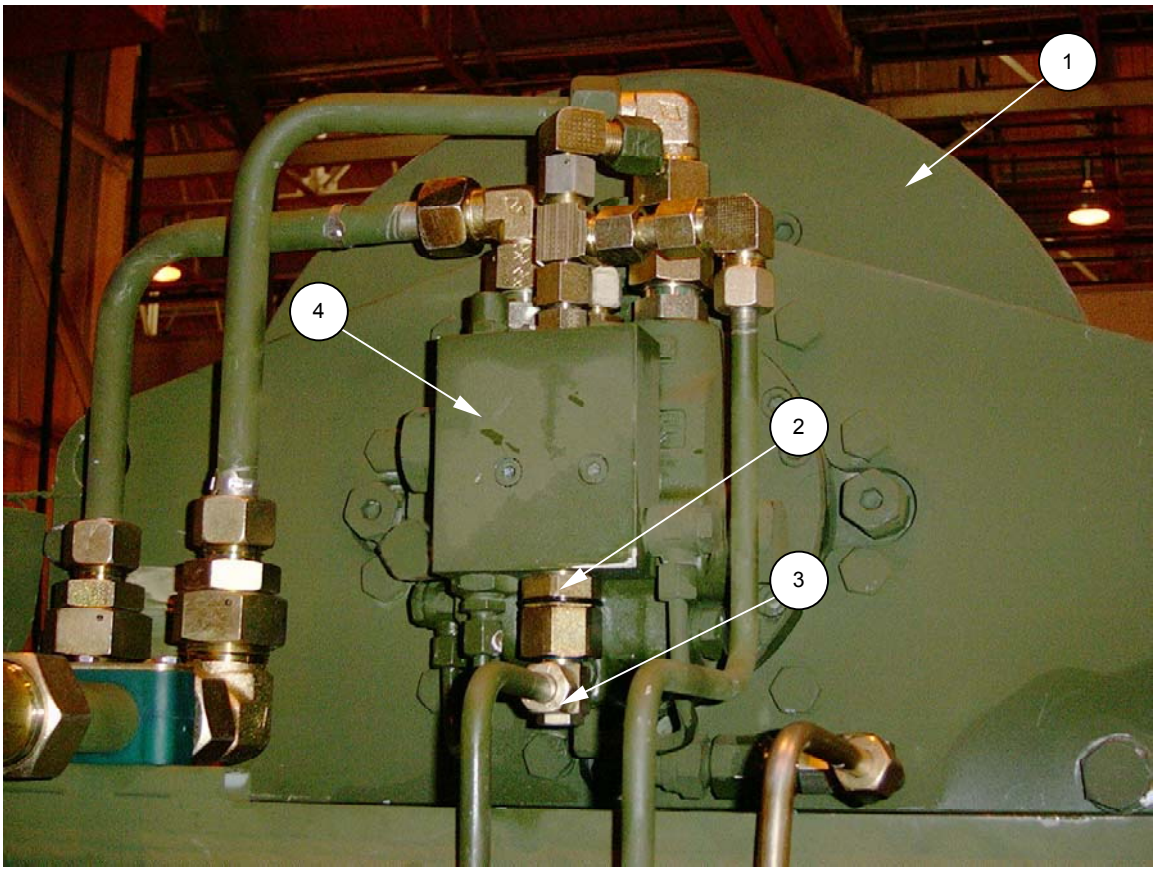
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK THE HYDRAULIC SYSTEM.

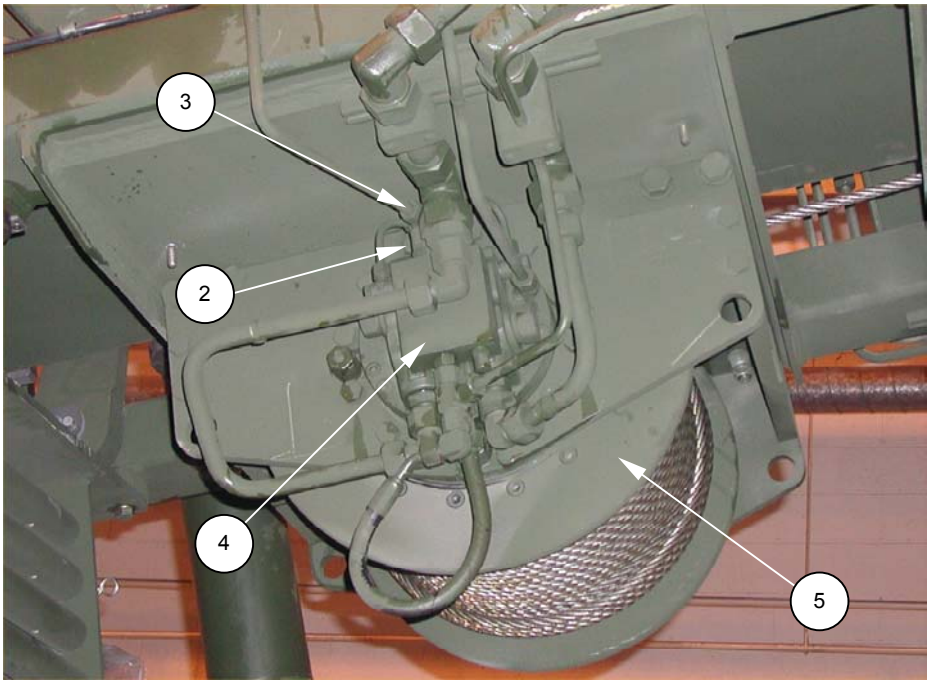
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure can be used to replace the winch pilot valve (2) on the upper winch (1) and lower winch (5).



Upper winch



Lower winch

a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Locate the winch pilot valve (2) to be replaced on the winch motor block (4).

(3) Remove the hydraulic pipe (3) connected to the winch pilot valve (2).

(4) Unscrew the winch pilot valve (2) and seal.

NOTE

Unscrew the winch pilot valve (2) using a wrench on the flats closest to the winch motor block (4).

b. Install

(1) Fit a new seal to the winch pilot valve (2).

(2) Fit the winch pilot valve (2) to the winch motor block (4).

(3) Fit the hydraulic pipe (3) to the winch pilot valve (2).

c. Follow on task

(1) Check the operation the winch and check for leaks.

NOTE

The winch pilot valve should be supplied pre-set, however, the operator's maintenance in TM 5-5420-279-10 details the procedure for adjusting the winch pilot valve if required.

5 - 136 HYDRAULIC SYSTEM - CYLINDER COUNTERBALANCE MANIFOLDS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Seal (Qty As required)
Lock washers (Qty As required)

Equipment Conditions

Access to relevant cylinder. Any load bearing on the cylinders is to be supported.

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON ANY CYLINDER.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. WHEN DE-PRESSURIZING CYLINDERS IT IS IMPORTANT TO MAKE SURE NO HYDRAULIC OIL CAN BE SPRAYED. MAKE SURE THAT NO PERSONNEL ARE STANDING NEAR THE CYLINDER BEING DE-PRSSURIZED.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This is a general procedure to be used on any cylinder when required. The steps detailed in this procedure are applicable to all hydraulic cylinders. The differences in counterbalance manifolds is detailed in table 1.

Not all manifolds are mounted on manifold blocks and the number of o-rings required can be determined when the counterbalance manifold is removed.

Table 1 Cylinder Counterbalance Manifolds

CYLINDER	# OF HYDRAULIC PIPES	# OF COUNTERBALANCE VALVES
Raise Cylinder	3	1
Folding Cylinder	3	2
Tilt Roller Cylinder	4	2
Rotate Cylinder	3	1
Stabilizer Cylinder	3	2
Articulator Cylinder	3	1
Stow Cylinder	3	1 (+ 1 pilot valve)

a. Remove

(1) De-pressurize the system. Refer to unit maintenance procedure 5-118.

(2) Release the hydraulic pressure in the cylinder, refer to unit maintenance procedure 5-123.

(3) Note the positions of and remove the hydraulic pipes (1 and or 3) connected to the counterbalance manifold (2).

(4) Remove the screws (5) and lock washers (6) securing the counterbalance manifold (2) to the cylinder.

(5) Remove the counterbalance manifold (2) and seal/s (7).

(6) Remove, if fitted, the counterbalance manifold block (8) and seal/s (7).

(7) Remove the seal/s (7).

(8) If required remove the counterbalance valve or pilot vale (4).

b. Install

(1) If removed earlier, fit the counterbalance valve or pilot valve (4) to the counterbalance manifold (2).

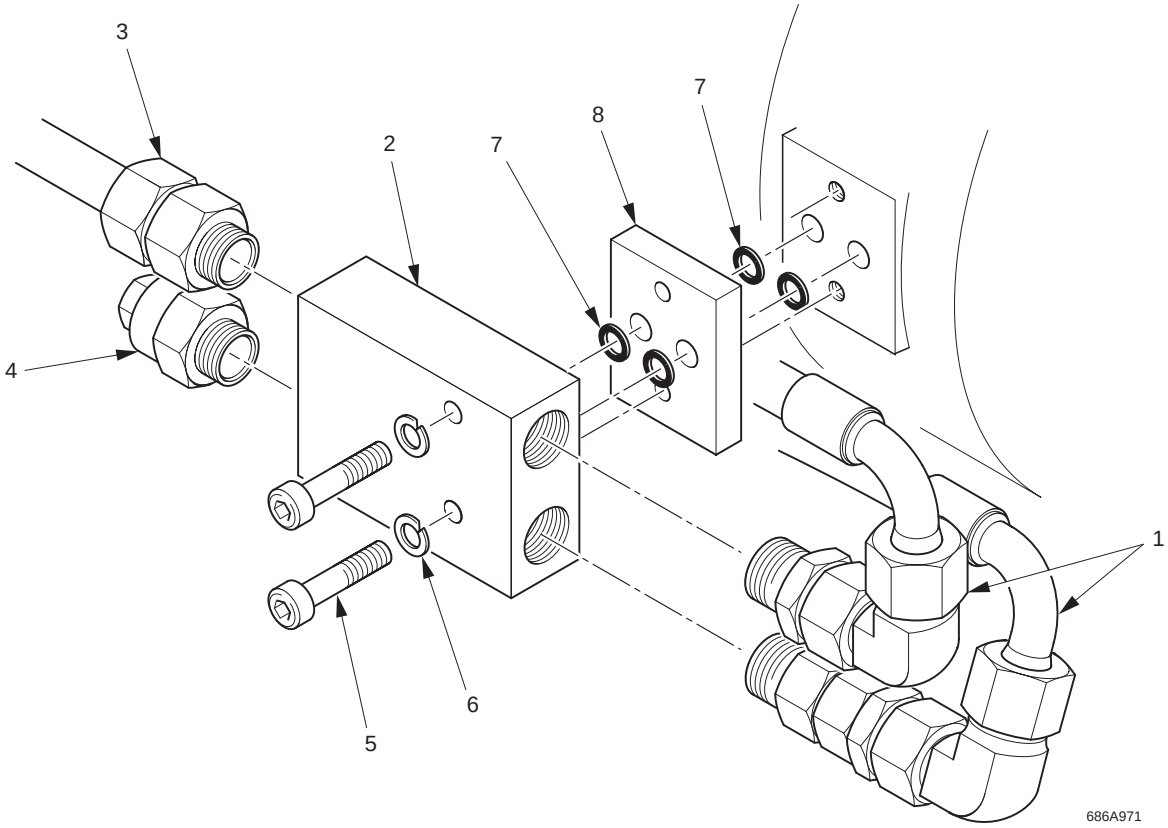
(2) Fit new seal/s (7) to the counterbalance valve (2) and counterbalance valve block (8), if fitted.

(3) Fit the counterbalance valve (2) and counterbalance valve block (8) to the cylinder and secure in place with the new lock washers (6) and screws (5).

(4) Fit the hydraulic pipes (1 and or 3) to the counterbalance manifold (2).

c. Follow on task

(1) Check the operation of the cylinder and check for leaks.


3
2
7
8
7
4
1
6
5
686A971

5 - 137 HYDRAULIC SYSTEM - PTO SOLENOID

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Lock washers (Qty 2)
Thread locking compound, loctite 243

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Right hand engine side panels removed for access, see PLS TM 9-2320-364 series

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Remove the military connector and cable (7) attached to the PTO solenoid (1).

(2) Note the position of and remove the three oil pipes (6, 8 and 9) connected to the PTO solenoid (1).

(3) Remove the two screws (2) securing the bracket (5) to the chassis.

(4) Remove the PTO solenoid (1).

(5) If required remove the two screws (3) and lock washers (4) securing the PTO solenoid (1) to the bracket (5). Discard the lock washers (4).

b. Install

(1) If removed earlier, fit the bracket (5) to the PTO solenoid (1) with the two new lock washers (4) and screws (3).

(2) Apply thread locking compound to the two screws (2).

(3) Fit the bracket (5) and solenoid (1) to the chassis with the two screws (2).

(4) Fit the hydraulic pipes (6, 8 and 9) to the positions noted during removal.

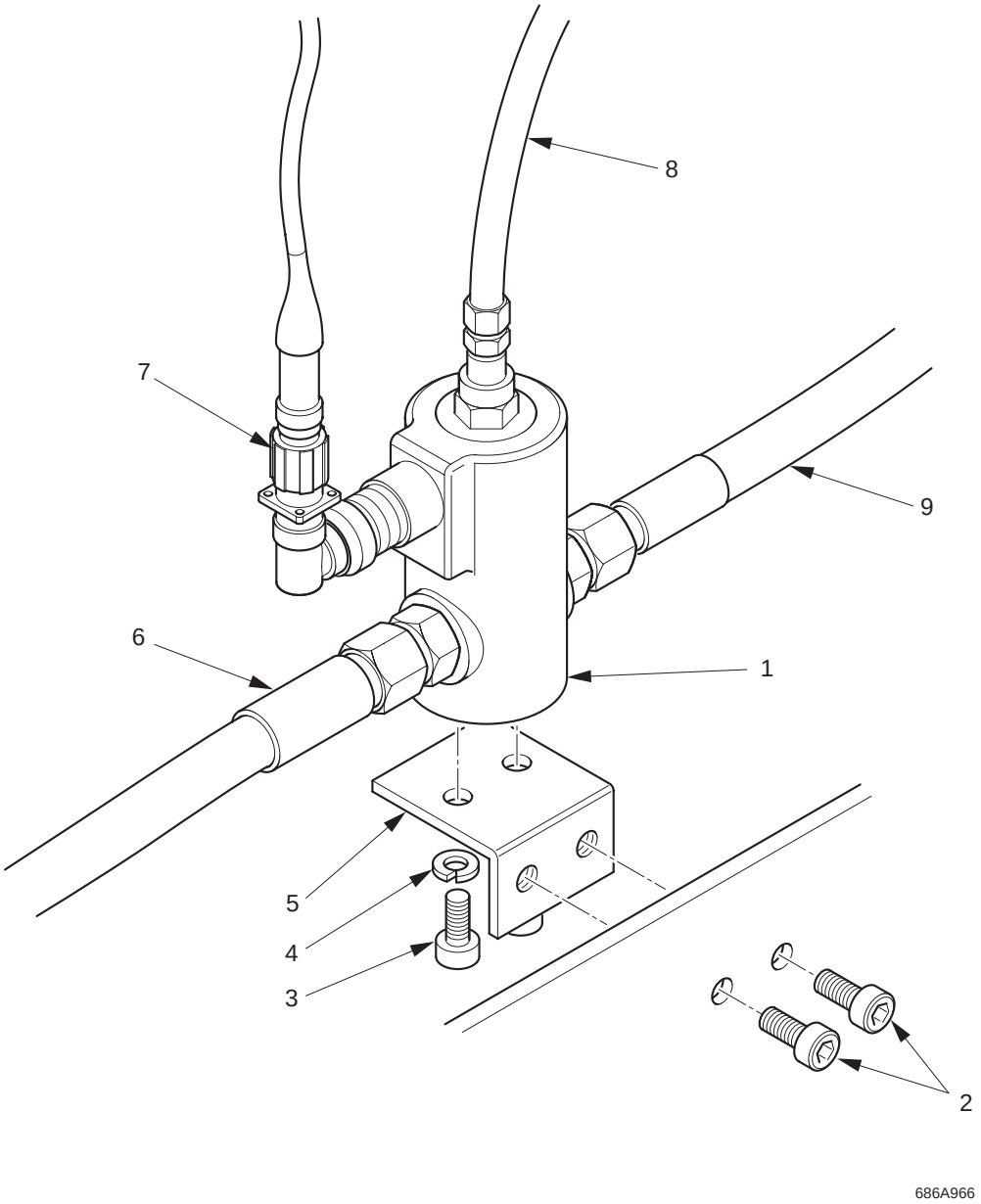
(5) Fit the military connector and cable (7) to the PTO solenoid (1).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the DSB in accordance with the operator's manual TM 5-5420-279-10 and check for leaks.

(3) Fit the engine side panels removed earlier. See PLS TM 9-2320-364 series



5 - 138 HYDRAULIC SYSTEM - PTO PRESSURE SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Right hand engine side panels removed for access, see PLS TM 9-2320-364 series

---

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Note the positions of and remove the two cables (3) connected to the PTO pressure switch (1) by turning the two screws (4) counter-clockwise.

(2) Remove the PTO pressure switch (1) from the PTO (2).

b. Install

(1) Fit the PTO pressure switch (1) to the PTO (2).

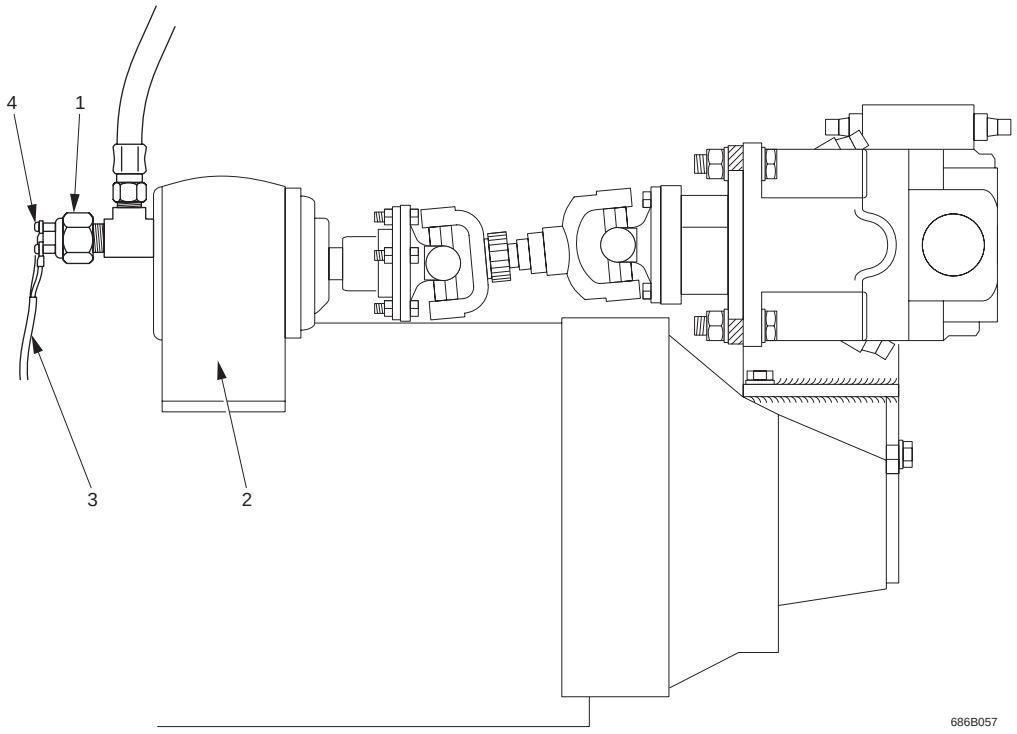
(2) Fit the two cables (3) to the PTO pressure switch (1) in the positions noted during removal using the two screws (4).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the DSB in accordance with the operator's manual TM 5-5420-279-10 and check for leaks.

(3) Fit the engine side panels removed earlier.



5 - 139 ELECTRICAL SYSTEM - HARNESS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Cable ties (As required)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---

NOTE

Harnesses supply electrical power to the electrical components in the launch system. Each harness has one or more of the following connectors:

Military plug and socket; (harness to harness, harness to junction box, harness to interface cabinet, harness to bite panel, harness to emergency stop, harness to proximity switch).

Spade Connection/plug; (Harness to solenoid valve).

Ground cable; (Harness to ground, Junction box to ground, interface cabinet to ground, bite panel to ground).

The harnesses are routed between the electrical components along the frame of the launch system sub-assemblies. The harnesses are secured along their routes with clips and ties.

This procedure can be applied to any harness. Drawings detailing the routing of a harness can be found at Appendix D. Harness identification and drawings can be found at Appendix H.

Each connector is marked with an identification number, the electrical component to which the connector is attached is also marked with a corresponding identification number.

a. Remove

(3) Refer to the routing drawing at Appendix D for the harness under repair.

(4) Note the position and location of the harness connection being removed.

(5) To remove the mil plug connections see unit maintenance procedure 5-140.

(6) To remove the spade connections see unit maintenance procedure 5-141.

(7) Remove the nut and bolt to release the ground cable connection.

(8) Note the positions of and remove all clips and ties securing the harness to the frame of the launch system.

(9) Remove the harness.

(10) Check the harness for damage due to chaffing or crushing.

(11) Check the plugs for damage to the pins, sockets or spade connectors.

(12) Carry out a continuity check on each cable in the harness. See unit maintenance procedure 5-142.

(13) Carry out a shorting check on each cable in the harness. See unit maintenance procedure 5-143.

b. Install

(3) Fit the harness along its route on the frame of the launch system.

(4) Secure the harness using the clips and ties at the positions noted during removal.

(5) Fit the harness connections to the electrical components at the positions and locations noted during removal.

c. Follow on tasks

(4) Switch the battery shutoff switch to the on position.

(5) Check the operation of the launch system under repair.

5 - 140 ELECTRICAL SYSTEM - MILITARY PLUG

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

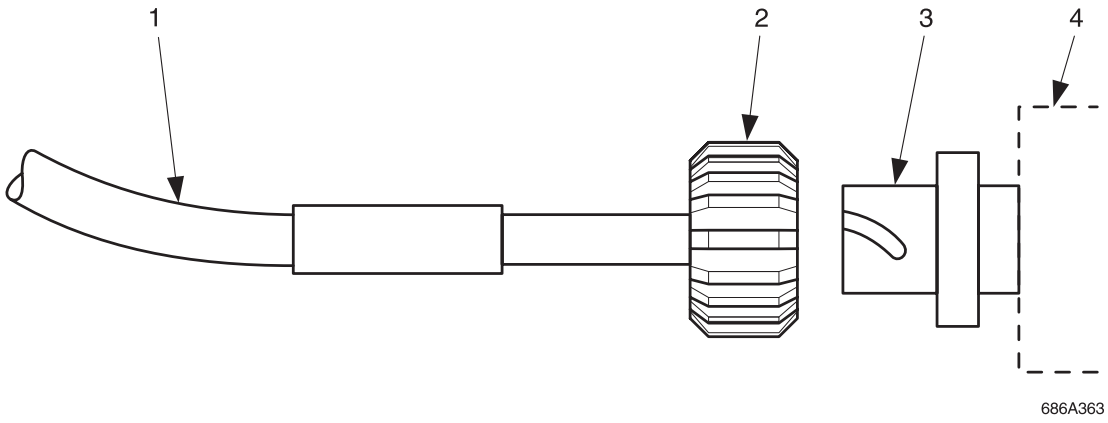
Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Locate and identify the harness (1) and the military plug connection to be removed. See Appendix H for harness identification and routing.

(2) Unscrew the military plug (2) counter clockwise.

(3) Remove the plug (2) from the socket (3) on the electrical component (4).

(4) Check the harness for chaffing or crush damage.

(5) Check that the pins on the plug are not damaged.

(6) Check that the socket of the electrical component (4) is not damaged.

b. Install

(1) Align the key of the plug (2) with the key way in the socket (3).

(2) Screw the military plug (2) clockwise on to the socket (3).

(3) Switch the battery shutoff switch to the on position.

5 - 141 ELECTRICAL SYSTEM - SPADE PLUG CONNECTION

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

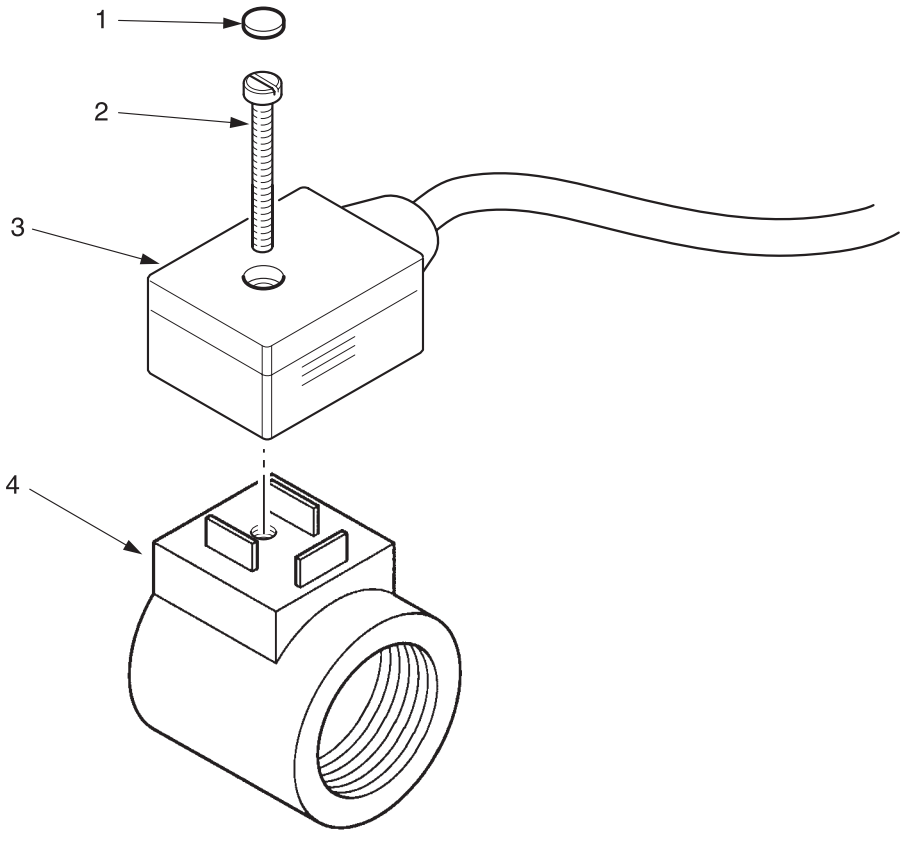
Tool Kit, General Mechanic's, Automotive (GMTK)

Material Required

Silicone Compound

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position



a. Remove

(1) Note the location and position of the electrical connection to be removed.

(2) Remove the silicone compound (1) covering the head of the securing screw (2) on the electrical component (4).

(3) Remove the securing screw (2).

(4) Remove the electrical connection (3).

(5) Check the electrical connection (3) and cable for damage.

(6) Check that the spade connections on the electrical component (4) are not damaged.

b. Install

(1) Fit the electrical connection (3) to the location and position noted during removal.

(2) Fit the securing screw (2) to the electrical component.

(3) Cover the head of the securing screw (2) with silicone compound (1).

(4) Switch the vehicle battery shutoff switch to the on position.

5 - 142 ELECTRICAL SYSTEM - CABLE CONTINUITY TEST

This task covers:

a. Test

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Multi-Meter (Shop Set Contact Maintenance Truck HMMWV)

Material Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Multi-Meter set to ohms

---

a. Test

(1) Disconnect the cable from the component (switch, solenoid, junction box, etc) at the working end of the circuit and at the power end.

(2) Check continuity from the power end of the cable to the working end of the cable.

a. If continuity is not measured go to step 4.

b. If continuity is measured, the fault has not been isolated. Continue with the fault isolation tests or notify supervisor.

(3) Disconnect the first connector from the working end of the cable in line to the power source.

(4) Check continuity.

a. If continuity is not measured go to step 6.

b. If continuity is measured, a fault is in the section of the cable most recently disconnected. Repair or replace the cable and perform the continuity test again.

(5) Repeat steps 3 and 4 until all sections of the suspect cable are tested.

(6) Replace faulty cable as required.

(7) Switch the battery shutoff switch to the on position.

5 - 143 ELECTRICAL SYSTEM - CABLE SHORTING TEST

This task covers:

a. Test

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Multimeter (Shop Set Contact Maintenance Truck HMMWV)

Material Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Multimeter set to ohms

---

a. Test

(1) Disconnect the harness connector with the wire suspected of damage.

(2) Set the multimeter to ohms.

(3) Connect (+) positive multimeter lead to harness connector terminal of the suspected cable.

(4) Connect (-) positive multimeter lead to each of the other terminals in the harness connector.

a. If there is continuity, the suspected cable and the cable where continuity is measured are shorting together; repair the cable.

b. If there is no continuity, all wires are OK.

(5) Switch the battery shutoff switch to the on position.

5 - 144 ELECTRICAL SYSTEM - VOLTAGE DROP TEST

This task covers:

a. Test

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Multimeter (Shop Set Contact Maintenance Truck HMMWV)

Material Required

None

Equipment Conditions

Multimeter Set to Volts

---

a. Test

(1) Disconnect connector from the component (switch, solenoid, junction box, etc) at the working end of the circuit.

(2) Check connector terminal(s) for damage; repair or replace connector as necessary.

(3) Set launch system conditions that will create voltage at the working end of the cable.

(4) Check the required voltage at the working end of the cable.

a. If the required voltage is not measured at the working end of the cable, go to step (5).

b. If the required voltage is measured at the working end of the cable, the fault has not been isolated. Continue with the fault isolation tests or notify supervisor.

(5) Disconnect the first connector in line from the working end of the cable to the power source.

(6) Check for the required voltage at the working end of the cable.

c. If the required voltage is not measured at the working end of the cable, go to step (7).

d. If the required voltage is measured at the working end of the cable, a fault is in the section of the cable most recently disconnected. Repair or replace the cable and perform the continuity test again.

(7) Repeat steps 4 and 5 until all sections of the suspect cable are tested.

5 - 145 CRANE - SEAT

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Nyloc nuts (Qty 4 small Qty 2 large)

Equipment Conditions

Crane seat deployed

---

a. Remove

(1) Release the crane seat adjuster (10) and remove the crane seat (4) complete with mounting bracket (1) and place on a suitable working surface.

(2) Remove the nyloc nuts (15), bolts (2 and 14) and washers (3) securing the seat (4) to the adjusters (6). Discard the nyloc nuts.

(3) Remove the seat (4).

(4) Remove the nyloc nuts (12), bolts (5) and washers (7 and 13) securing the adjusters (6) to the bracket (1). Discard the nyloc nuts.

(5) Note the position of and remove the adjusters (6).

(6) Remove the nyloc nuts (16), bolts (8) and washers (17) securing the belt and belt buckle (9) to the bracket (1). Discard the nyloc nuts.

(7) Remove the belt (9).

(8) Check all threaded components for wear and damage.

(9) Check the bracket and adjusters for damage.

(10) Check the belt for wear, fraying or damage.

(11) Check the seat adjuster is operating correctly.

(12) Replace components as required.

b. Install

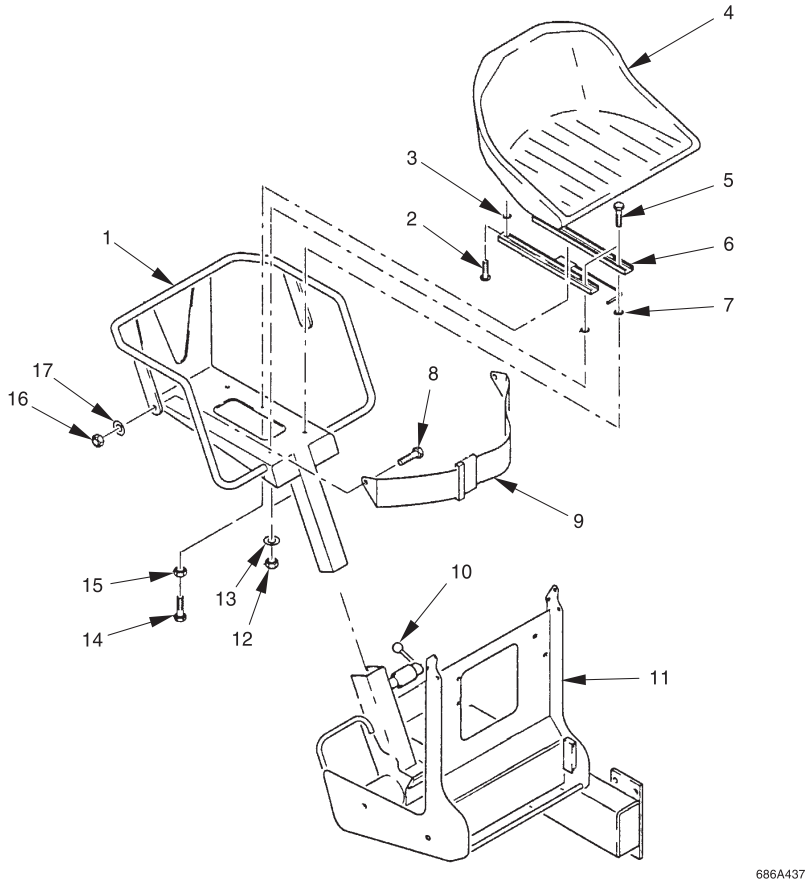
(1) Fit the belt and belt buckle (9) to the bracket (1) and secure in place with the nyloc nuts (16), bolts (8) and washers (17).

(2) Fit the adjusters (6), in the positions noted during removal, to the bracket (1) with the nyloc nuts (12), bolts (5) and washers (7 and 13).

(3) Fit the seat (4) to the adjusters (6) with the nyloc nuts (15), bolts (2 and 14) and washers (3).

(4) Fit the seat assembly to the seat bracket (11) and engage the adjuster (10).

(5) Check the operation of the seat and the seat belt.



5 - 146 CRANE - SEAT BASE AND FOOT PLATE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Seat deployed

---

a. Remove

(1) Disengage adjuster (6) and deploy the seat.

(2) Disengage the seat assembly adjuster (5) and remove the seat assembly (1).

(3) Remove the hydraulic controls and light (not shown) fitted to the seat base bracket (9).

(4) Support the seat base bracket (9) and remove the bolts (8) securing the seat base bracket (9) to the crane column (7).

(5) Place the seat base bracket (9) on a suitable working surface.

(6) Remove the bolts (10), nuts (3) and washers (2) securing the foot plate (4) to the seat base bracket (9).

(7) Remove the foot plate (4).

(8) Check all components for damage and wear.

(9) Replace components as necessary.

b. Install

(1) Fit the foot plate (4) to the seat base bracket (9) with the bolts (10), nuts (3) and washers (2).

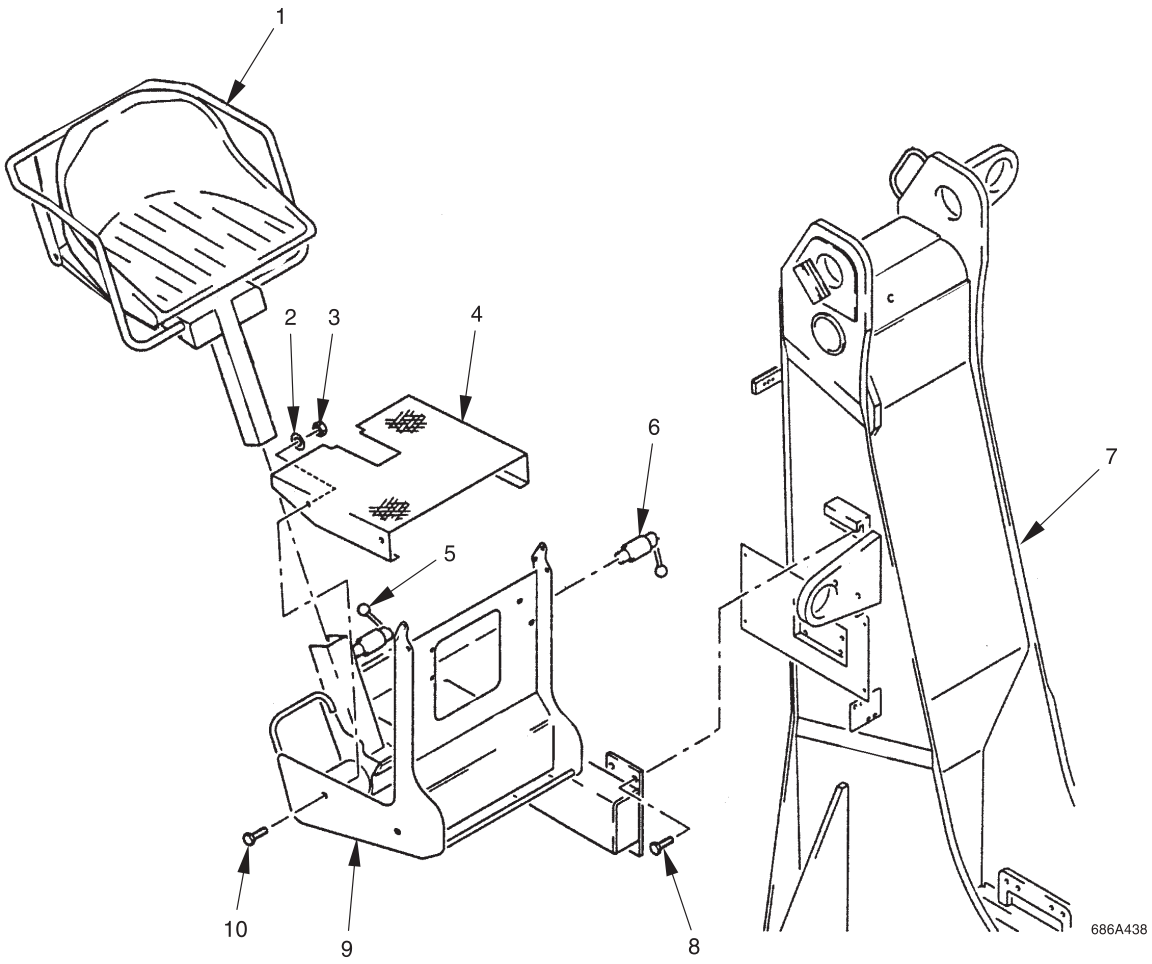
(2) Apply thread locking compound to the bolts (8).

(3) Fit the seat base bracket (9) to the crane column (7) with the bolts (8).

(4) Fit the seat assembly (1) to the seat base bracket (9) and engage the seat adjuster (5).

c. Follow on task

(1) Check the operation of the seat base bracket adjuster (6).


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686A438

5 - 147 CRANE - STABILIZER LEG

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Crane and slings

Materials Required

None

Equipment Conditions

Crane Stabilizer Leg Deployed in the vertical position.
Vehicle switched off and battery shutoff switch in the off position

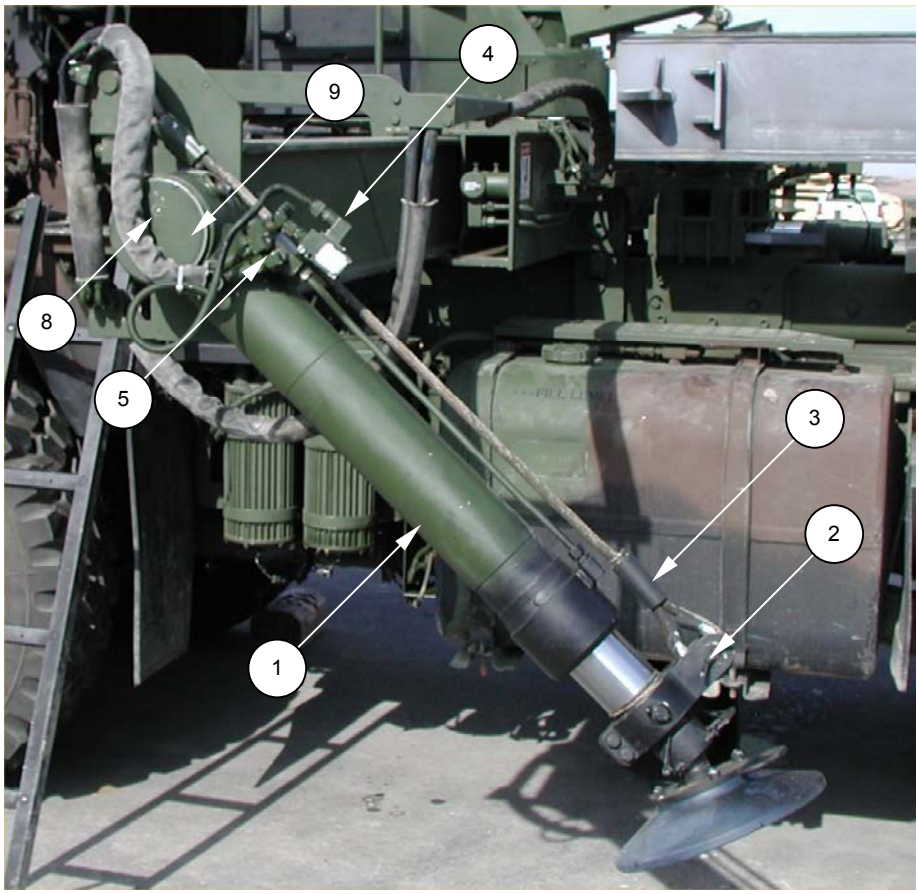
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WARNING

CRUSH INJURY. THE STABILIZER LEG IS HEAVY TO AVOID INJURY ENSURE THAT THE WEIGHT OF THE CRANE STABILIZER LEG IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) When the stabilizer leg (1) is deployed in the vertical position, remove the pin (2) that secures the retention cable (3).

(2) Place a suitable container under the stabilizer leg to catch any spilled hydraulic fluid.

(3) De-pressurize hydraulic system. See unit maintenance procedure 5-118.

(4) Remove the electrical cable (4) at the micro switch.

(5) Note the position of and remove the two hydraulic hoses (5) at the valve block on the stabilizer leg (1).

(6) Support the weight of the stabilizer leg (1) and remove the pin retaining clip (7) and the pin (6)

(7) Remove the two screws (8).

(8) Remove the disk (9).

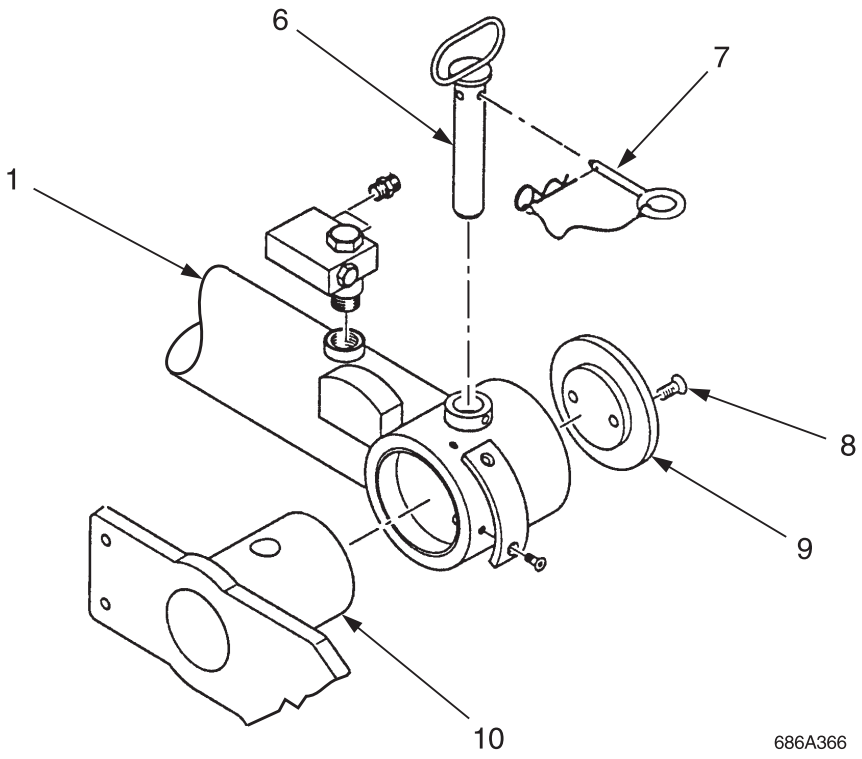
(9) Remove the stabilizer leg (1).

(10) Check all screw and coupling threads for damage.

(11) Check the pipe support (10) for wear.

(12) Check the hydraulic hoses for chaffing and crush damage.

(13) Check the electrical cable and plug for damage.



b. Install

(1) Locate the stabilizer leg (1) on the pipe support (10).

(2) Insert the pin (6) and the pin retaining clip (7).

(3) Position and secure the disk (9) with the two screws (8).

(4) Fit the two hydraulic pipes (5) in the positions noted during removal.

(5) Fit the electrical cable (4) at the micro switch.

(6) Fit the retention cable (3) to the stabilizer leg (10) with the pin (2).

(7) Grease the pipe support (10) through the grease fitting mounted on the stabilizer leg.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the stabilizer leg in accordance with the operator's manual TM 5-5420-279-10.

5 - 148 TAIL LIFT - CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Hydraulic Oil
Silicone Compound

Equipment Conditions

Tail lift deployed platform level and raised 2 ft off the ground supported with 4 jack stands, one is each corner
Vehicle switched off and battery shutoff switch in the off position

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WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

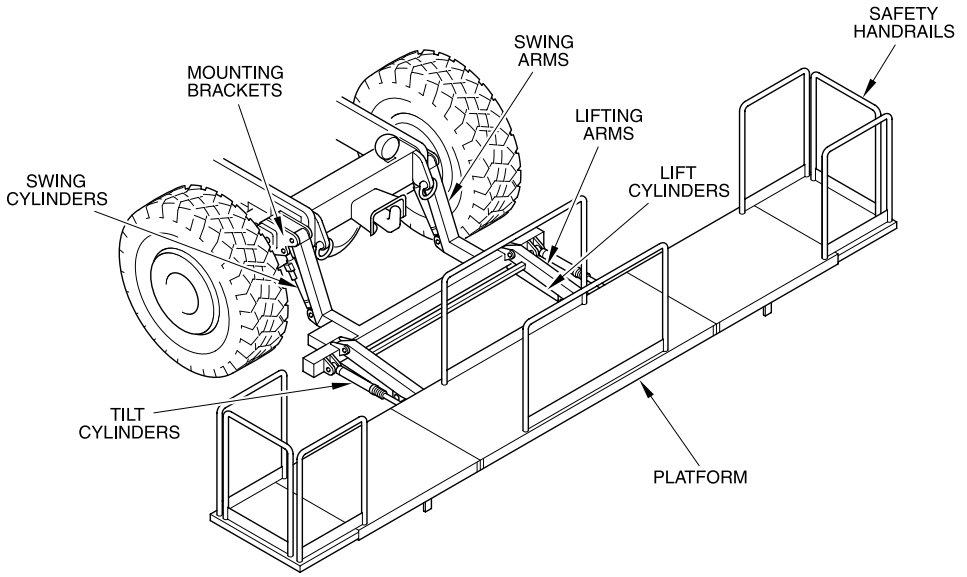
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

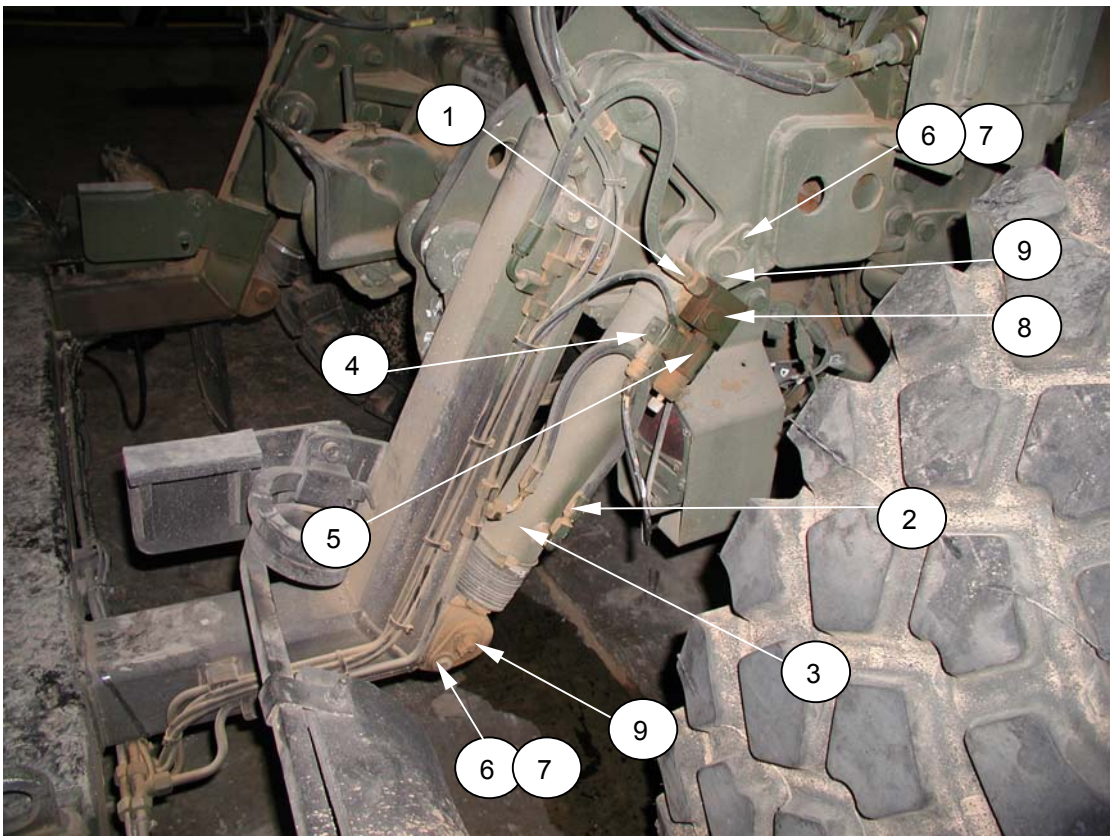
NOTE

This procedure can be used to change the Swing, Lift or Tilt Hydraulic Cylinders.

Pivot Pin lengths vary according to the Cylinder being changed. See the Illustrated parts list to identify the Cylinder being replaced and obtain the correct sized Pivot Pins.



Tail Lift Assembly



Swing Cylinder Arrangement

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Support the weight of the cylinder to be removed.

(3) Position a suitable container to catch any hydraulic fluid spillage.

(4) Remove the hydraulic hose (1) on the solenoid valve block (8).

(5) Remove the hydraulic hose (2) on the cylinder (3).

(6) Remove the silicone compound covering the screw securing the electrical connection (4) to the solenoid valve (5).

(7) Remove the screw securing the electrical connection (4) to the solenoid valve (5).

(8) Remove the electrical connection (4) from the solenoid valve (5).

NOTE

If the Valve block (8) is obstructing the removal of the Pivot Pin loosen the Valve Block Bolt and move the Valve Block to one side.

(9) Remove the bolts (6), washers (7) and snap ring (where fitted), securing the pivot pins (9) in the pivot housings.

(10) Remove the pivot pins (9).

(11) Check the bushes in mounting bracket, swing arms, lift arms, or platform (which ever is applicable) for damage and scoring.

(12) Check the flexible hoses for chaffing or damage.

(13) Examine bolt heads and threads on screws for damage.

(14) Check the electrical cable for chaffing or damage to the cable or the cable plug.

(15) Replace components as required.

(16) Clean all bushes and mounting points.

b. Install

(1) Locate the hydraulic cylinder in the mounting bracket or arm.

(2) Lubricate the pivot pins with a coating of grease.

(3) Insert a pivot pin (9).

(4) Locate the hydraulic cylinder piston.

(5) Insert a pivot pin.

(6) Apply thread-locking compound to the bolt threads.

(7) Secure the pivot pins (9) with a washer (7) and a bolt (6).

(8) Fit the snap ring to the pivot pin it was removed from.

NOTE

Tighten the Valve Block Bolt if it was loosened during removal.

(9) Attach the two hydraulic hoses (1) and (2) to the cylinder (3) and tighten.

(10) Attach the electrical connection (4) to the solenoid valve (5) with the screw.

(11) Grease the pivot pins through the grease fittings where fitted.

(12) Check the hydraulic oil level in the hydraulic tank and top up if required.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the tail lift in accordance with the operator's manual TM 5-5420-279-10 to bleed any air in the system.

(3) Check for leaks.

(4) Seal the screw head on the electrical connection (4) with silicone compound.

5 - 149 TAIL LIFT - CYLINDER BELLOWS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set Contact Maintenance Truck HMMWV

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Access to the tail lift cylinders

WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

NOTE

The following procedure is applicable for changing the tail lift cylinder bellows on the tail lift cylinders. The illustration below shows the tilt cylinder (9) and lift cylinder (19). This procedure can be applied to the swing cylinder (not shown) also.

a. Remove

Tilt cylinder

(1) Remove the bolt (3) and washer (2) securing the tilt cylinder (9) pivot pin (1) to the tail lift.

(2) Remove the pivot pin (1).

(3) Pull the cylinder (9) clear of the tail lift.

(4) Note the position of the bellows (6) and slacken off the adjustable clamp (5 and 7).

(5) Pull the bellows (6) away from the cylinder (9) to expose the piston (8).

(6) Note and mark the position of the piston pivot (4) on the piston (8).

(7) Hold the piston (8) with a suitable wrench and remove the piston pivot (4).

(8) Remove the jubilee clip (5) and bellows (6).

Lift cylinder

(9) Remove the bolt (12) and washer (11) securing the lift cylinder (19) pivot pin (10) to the tail lift.

(10) Remove snap ring (13).

(11) Remove the pivot pin (10).

(12) Pull the lift cylinder (19) clear of the tail lift.

(13) Note the position of the bellows (17) and slacken off the adjustable clamp (16 and 18).

(14) Pull the bellows (17) away from the lift cylinder (19) to expose the piston (15).

(15) Note and mark the position of the piston pivot (14) on the piston (15).

(16) Hold the piston (15) with a suitable wrench and remove the piston pivot (14).

(17) Remove the jubilee clip (16) and bellows (17).

b. Install

Tilt Cylinder

(1) Fit the bellows (6) and jubilee clip (5) to the tilt cylinder (9).

(2) Hold the piston (8) with a suitable wrench and fit the piston pivot (4) to the tilt cylinder (9) in the position noted during removal.

(3) Fit the bellows (6) to the tilt cylinder (9) and piston pivot (4) in the position noted during removal.

(4) Fit the adjustable clamp (7 and 5) to the bellows (6) and tighten.

(5) Fit the tilt cylinder (9) to the tail lift and secure in place with the pivot pin (1).

(6) Apply thread locking compound to the bolt (3).

(7) Secure the pivot pin (1) in place with the washer (2) and bolt (3).

Lift cylinder

(8) Fit the bellows (17) and jubilee clip (16) to the lift cylinder (19).

(9) Hold the piston (15) with a suitable wrench and fit the piston pivot (14) to the lift cylinder (19) in the position noted during removal.

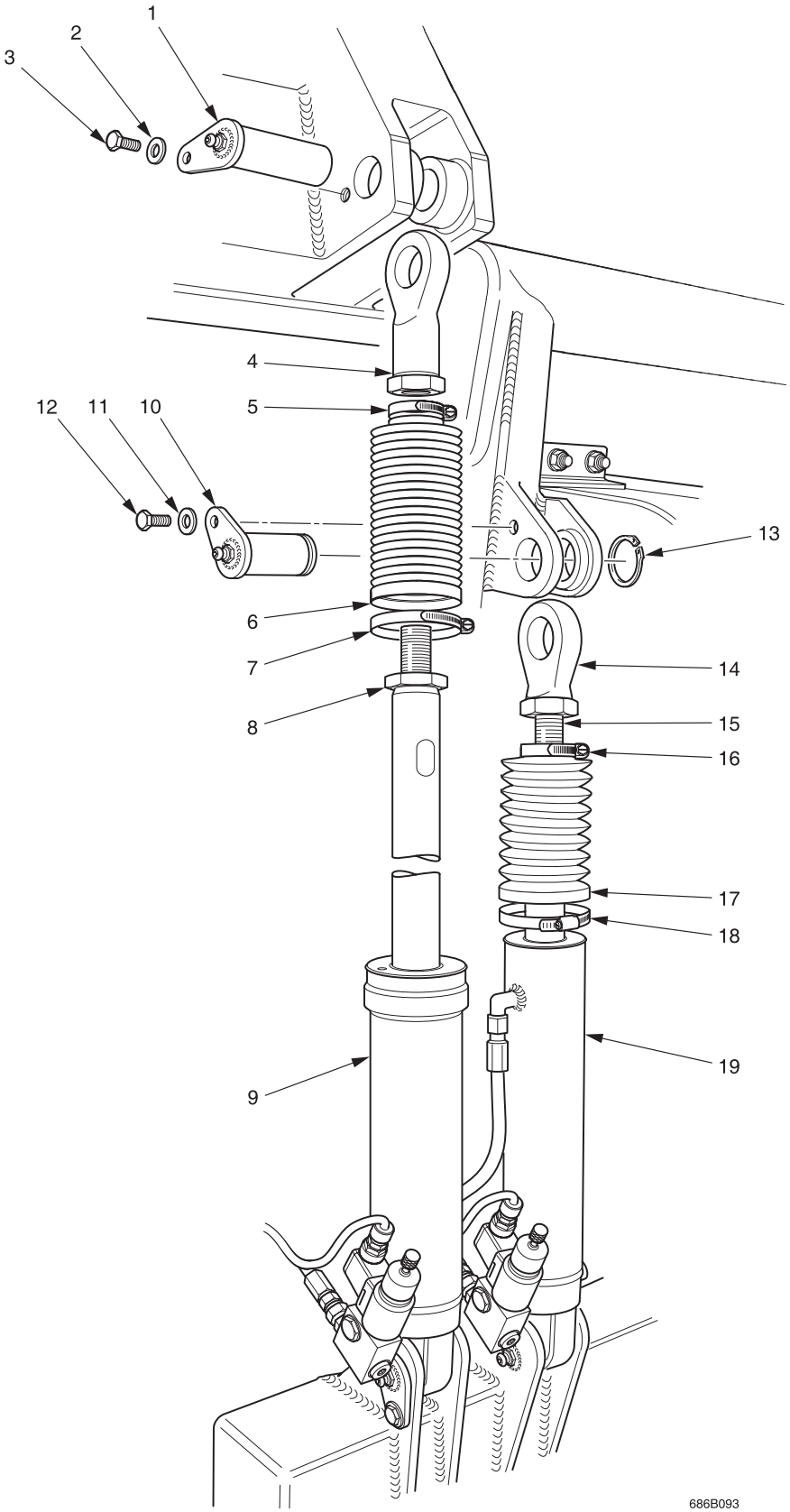
(10) Fit the bellows (17) to the lift cylinder (19) and piston pivot (14) in the position noted during removal.

(11) Fit the adjustable clamp (18 and 16) to the bellows (17) and tighten.

(12) Fit the tilt cylinder (19) to the tail lift and secure in place with the pivot pin (10).

(13) Apply thread locking compound to the bolt (12).

(14) Secure the pivot pin (10) in place with the washer (11) and bolt (12) and snap ring (13).


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5 - 150 TAIL LIFT - PLATFORM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Thread locking compound, loctite 242

Equipment Conditions

Tail Lift deployed Platform level and raised 2 ft off the ground supported with 4 jack stands, one is each corner

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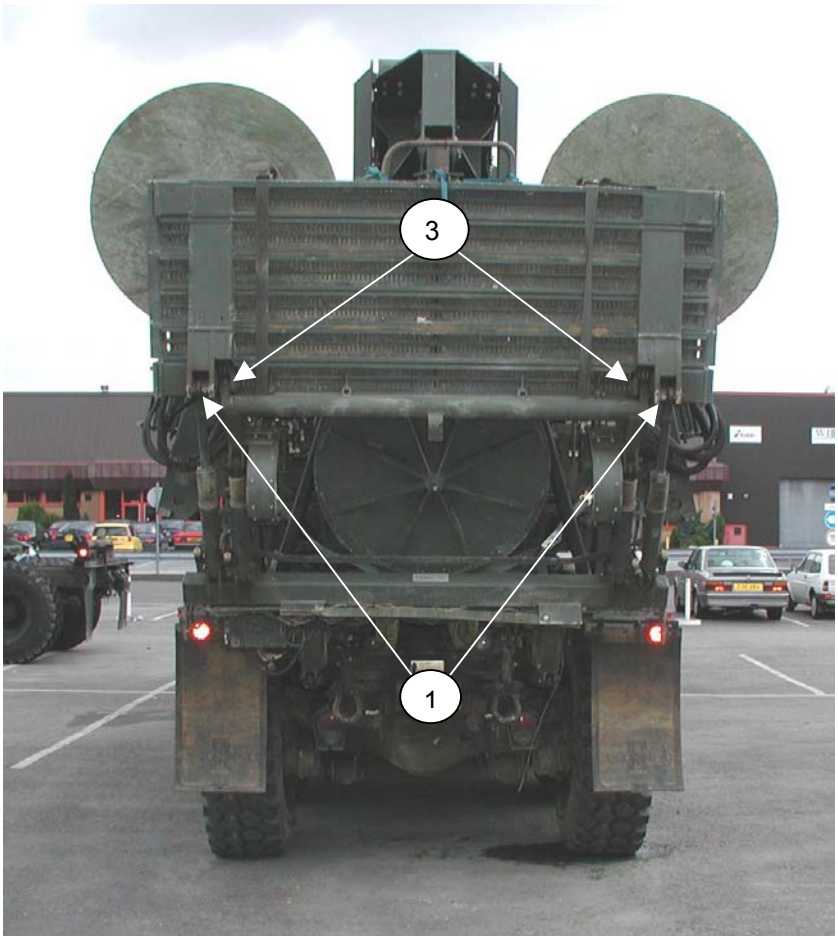
WARNING

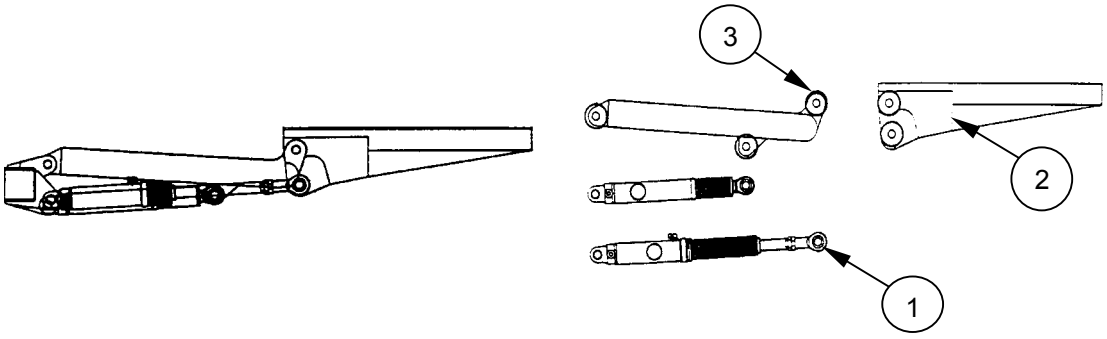
PERSONAL INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

CRUSH INJURY. THE TAIL LIFT PLATFORM IS HEAVY 1213 LB (550 KG).

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) Depressurize the hydraulic system refer to unit maintenance procedure 5-118.

(2) Position the tail lift platform to allow access to the pivot pins securing the lifting arm (3) and the tilt cylinder (1) to the platform (2).

(3) Support the weight of the tail lift and the tail lift platform (2).

(4) Remove the bolt and washer securing the pivot pins.

(5) Remove the pivot pins securing the tilt cylinder (1) to the platform (2).

(6) Remove the pivot pins securing the lifting arm (3) to the platform (2).

(7) Remove the platform.

(8) Check the bushes in the lifting arms for damage and scoring.

(9) Examine bolt heads and threads on screws for damage.

(10) Replace components as required.

(11) Clean all bushes and mounting points.

b. Install

(1) Position the tail lift (2) and align with the lifting arms (3).

(2) Apply grease to the pivot pins before assembly.

(3) Apply thread-locking compound to the bolts.

(4) Insert a pivot pin and secure in place with a washer and a bolt. Align the tilt cylinder (1) with the mounting bracket on the platform (2).

(5) Insert a pivot pin and secure in place with a washer and a bolt.

(6) Grease the pivot pins.

5 - 151 TAIL LIFT - ELECTRICAL HARNESS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Cable ties (As required)

Equipment Conditions

Tail Lift deployed
Vehicle switched off and battery shutoff switch in the off position

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NOTE

There are eight electrical harnesses fitted to the Tail Lift. Each harness can be identified by an attached identification tag. Table 1 identifies the cable and describes its function. Each cable is connected from the Tail Lift junction box to a solenoid valve.

Table 1

Harness From Tail Lift Junction Box To:	Identification Tag Number
Swing Valve Left Hand - SV31	G424/5208/1
Swing Valve Right Hand - SV32	G424/5208/2
Tilt Valve Left Hand - SV35	G424/5208/3
Tilt Valve Right Hand - SV36	G424/5208/4
Lift Valve Left Hand - SV33	G424/5208/5
Lift Valve Right Hand - SV34	G424/5208/6
Raise Valve - SV30B	G424/5208/7
Lower Valve - SV30A	G424/5208/8

a. Remove

(1) Disconnect the harness plugs at all the cylinder solenoid valves. See unit maintenance procedure 5-141.

(2) Remove any cable ties holding the harness to the tail lift assembly and vehicle chassis.

(3) Remove the four screws securing the cover of the tail lift junction box (12).

(4) Identify the individual cables for the harness being changed.

(5) Disconnect the cable from the chassis junction box (11) to the tail lift junction box (12).

(6) Remove the harness (1).

(7) Check the solenoid valve plug socket for damage and cleanliness.

(8) Check the main junction box for security, cleanliness and damage.

(9) Clean and replace components as required.

b. Install

(1) Connect the cable from the chassis junction box (11) to the tail lift junction box (12).

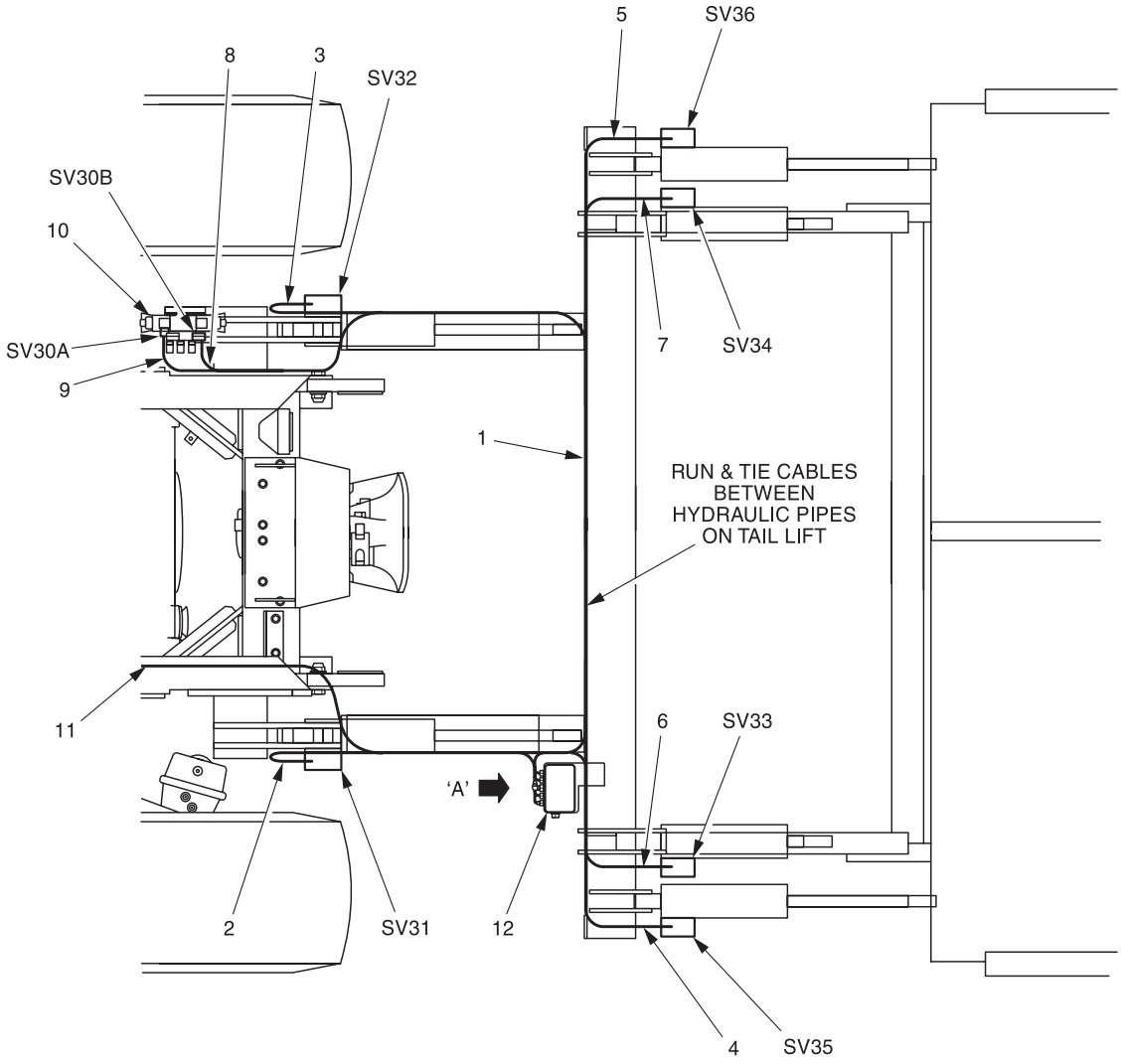
(2) Connect the harness plugs to the solenoid valves on the respective cylinders. See unit maintenance procedure 5-141.

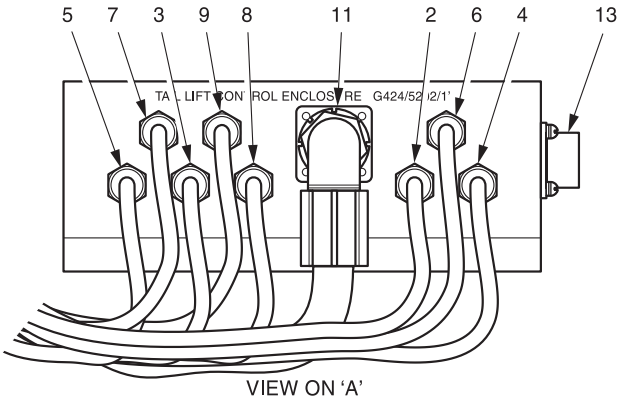
(3) Route the cable on the tail lift assembly and chassis and secure in place with cable ties.

(4) Switch the battery shutoff switch to the on position.

c. Follow on tasks

(1) Check the operation of the tail lift in accordance with the operator's manual TM 5-5420-279-10.





VIEW ON 'A'

KEY

1. TAIL LIFT HARNESS
2. LEFT HAND SWING SOLENOID SV31
3. RIGHT HAND SWING SOLENOID SV32
4. LEFT HAND TILT SOLENOID SV35
5. RIGHT HAND TILT SOLENOID SV36
6. LEFT HAND LIFT SOLENOID SV33
7. RIGHT HAND LIFT SOLENOID SV34
8. RAISE SOLENOID SV30B
9. LOWER SOLENOID SV30A
10. TAIL LIFT MANIFOLD BLOCK
11. SUPPLY FROM CHASSIS JUNCTION BOX
12. TAIL LIFT JUNCTION BOX
13. PENDANT CONNECTION

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5 - 152 TAIL LIFT - ELECTRICAL RELAYS AND DIODE BLOCK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Tail Lift deployed
Vehicle switched off and battery shutoff switch in the off position

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Relay # from left to right	Circuit
1	Swing Circuit
2	Tilt Circuit
3	Lift Circuit
4	Raise Circuit
5	Lower Circuit

a. Remove

(1) Remove the four screws (2) and lower the electrical junction box cover (1) on the hinges (4).

NOTE

The electrical relays are plug-in type relays.

(2) Note the position of the relays (6) and remove the relay (6) as required by un-plugging it from its base.

(3) To remove a diode from the diode block (5), note the position of the cables and disconnect them by turning the screws on the diode block (5) counter-clockwise.

(4) Press down on the catch (8) to remove the diode block (5).

b. Install

(1) Fit the diode block (5) to the electrical junction box (3), ensure that the catch (8) connects correctly.

(2) Fit the cables to the diode block (5) and secure in place with the screws, to the positions noted during removal.

(3) Fit the relays (6) to the position noted during removal.

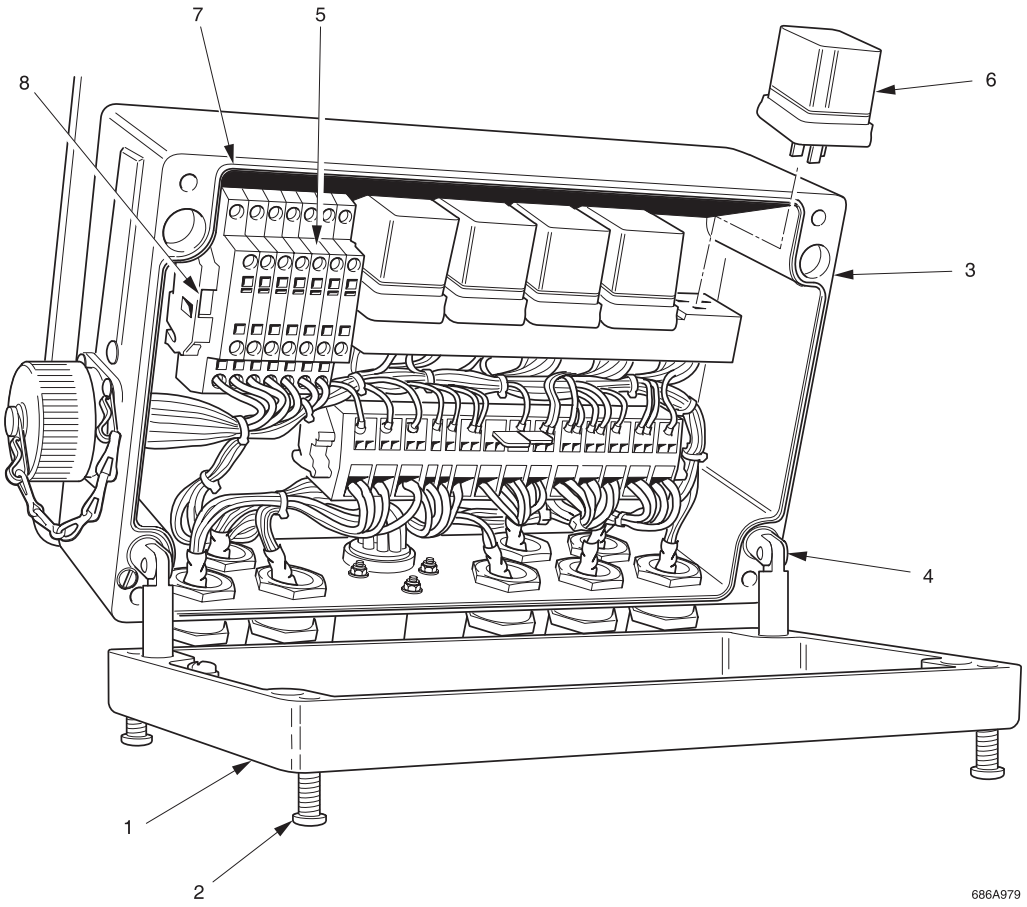
(4) Check the seal (7) is clean and not damaged.

(5) Fit the cover (1) to the electrical junction box (3) and secure in place with the four screws (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the tail lift in accordance with the operator's manual TM 5-5420-279-10.



5 - 153 TAIL LIFT - SOLENOID VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Tail Lift deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

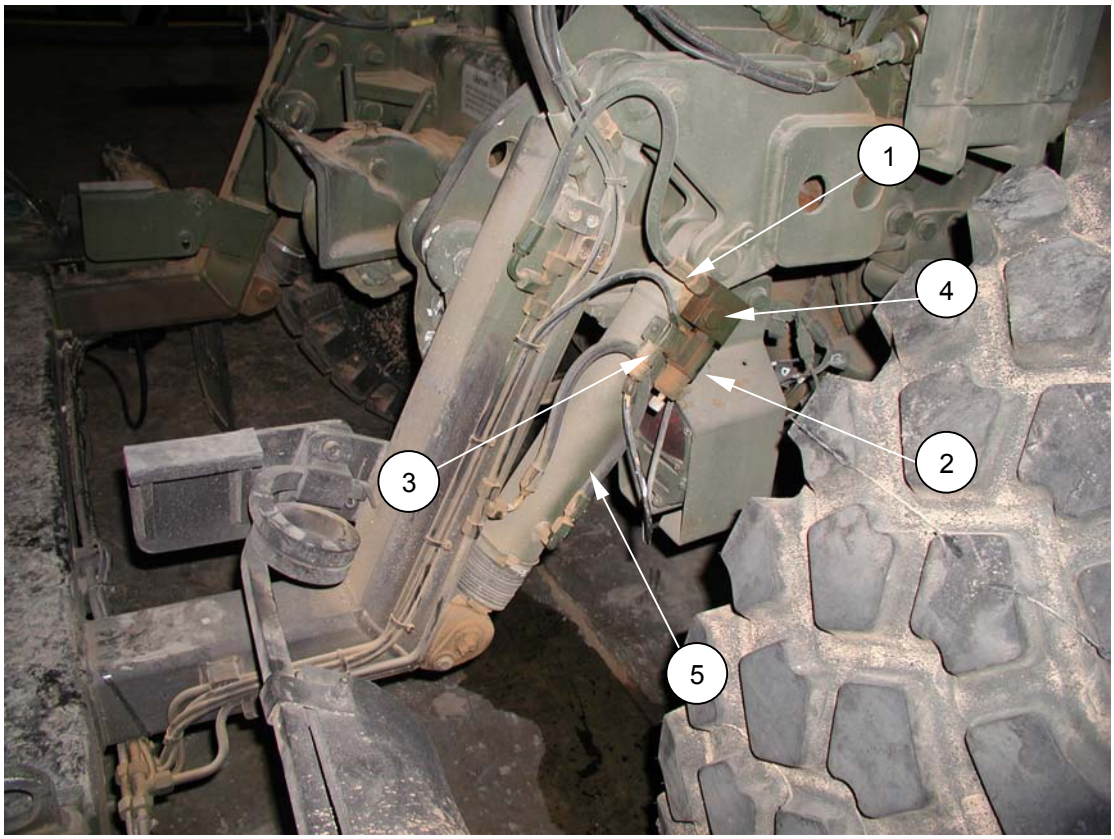
PERSONAL INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure is applicable for the replacement of all solenoid valves fitted to the Tail Lift.



a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Position a suitable container to catch any hydraulic fluid spillage.

(3) Remove the hydraulic hose (1) on the solenoid valve (2).

(4) Remove the electrical cable plug (3) attached to the solenoid valve (2).

(5) Remove the solenoid valve retaining bolt (4).

(6) Check the electrical cable plug (3) for damage and cleanliness.

b. Install

(1) Position a new solenoid valve (2) on the cylinder (5).

(2) Secure the solenoid valve (2) with a retaining bolt (4).

(3) Fit the hydraulic hose (1) to the solenoid valve (2).

(4) Fit the electrical cable plug (3) to the solenoid valve (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the tail lift in accordance with the operator's manual TM 5-5420-279-10, section 13 to expel any air in the hydraulic system.

(3) Check that there are no hydraulic oil leaks and that the tail lift operates correctly.

5 - 154 TAIL LIFT - LIGHT INSTALLATION

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

a. Remove

(1) Disconnect the light installation (1) harness at the chassis junction box.

(2) Remove the ground cables connected to the side lights (2).

(3) Note the position of and remove any clips or ties connecting the harness to the tail lift or chassis.

(4) If required remove the nuts (3), bolts (4) and washers (5) securing the light installation (1) to the tail lift cross member (6).

NOTE

The fitting arrangement for all lights on the light installation (1) is the same as the side lights (2).

(5) If required remove the nuts (7), bolts (9) and washers (8) securing the side lights (2) to the tail lift cross member (6).

(6) Check the light installation (1) for damage and corrosion.

(7) Check each tail light and side light (2) for damage.

(8) Check the harness for damage.

(9) Replace components as necessary.

b. Install

(1) Fit the light installation (1) to the tail lift cross member (6).

(2) Apply thread locking compound to the bolts (4 and 9).

(3) Secure the light installation with the nuts (3), bolts (4) and washers (5).

(4) Fit the side lights and seal (2) to the tail lift cross member (6) with the nuts (7), bolts (9) and washers (8).

(5) Fit the harness to the chassis junction box.

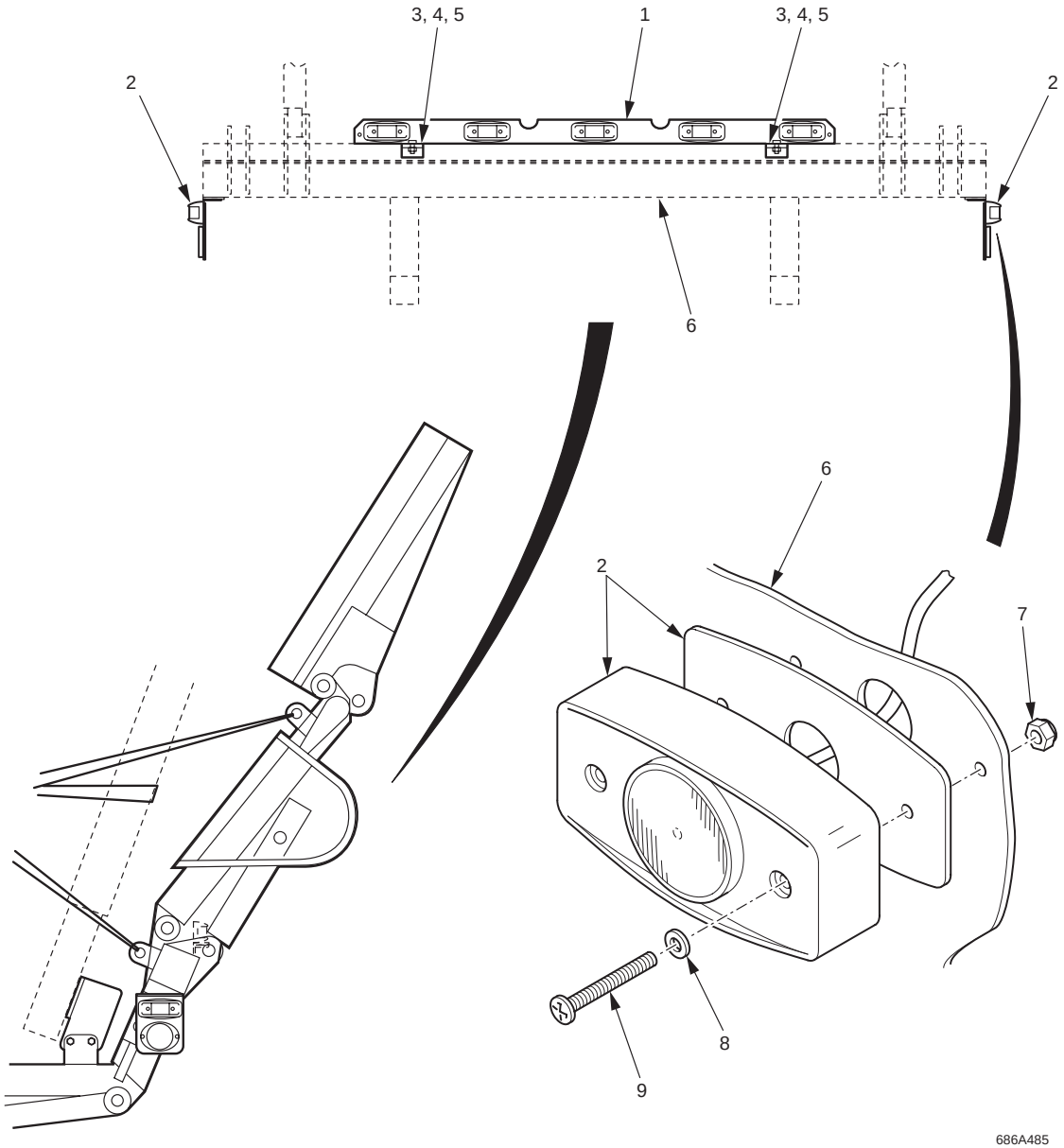
(6) Fit the ground cables to the side lights (2).

(7) Fit any clips or ties in the positions noted during removal.

c. Follow on Task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the lights.



5 - 155 TAIL LIFT - PENDANT HARNESS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Soldering iron
Heat gun

Materials Required

Solder
Heat shrink (Qty as required)

Equipment Conditions

Tail lift pendant disconnected from the vehicle



a. Remove

(1) Remove the six screws and washers (3) securing the bottom cover (2) to the tail lift pendant body (1).

(2) Note the positions of all the cables on the control switches and emergency stop that make up the harness (5).

(3) Remove the cables from the emergency stop and control switches, see unit maintenance procedures 5-156 and 5-157.

(4) Remove the screws (6) and (7).

(5) Remove the clamp (8) from the tail lift pendant body (1).

(6) Remove the harness (5) from the tail lift pendant body (1).

b. Install

(1) Fit the harness (5) to the tail lift body (1).

(2) Fit the clamp (8) to the tail lift harness (5) and tail lift pendant body (1).

(3) Fit the screws (7 and 6).

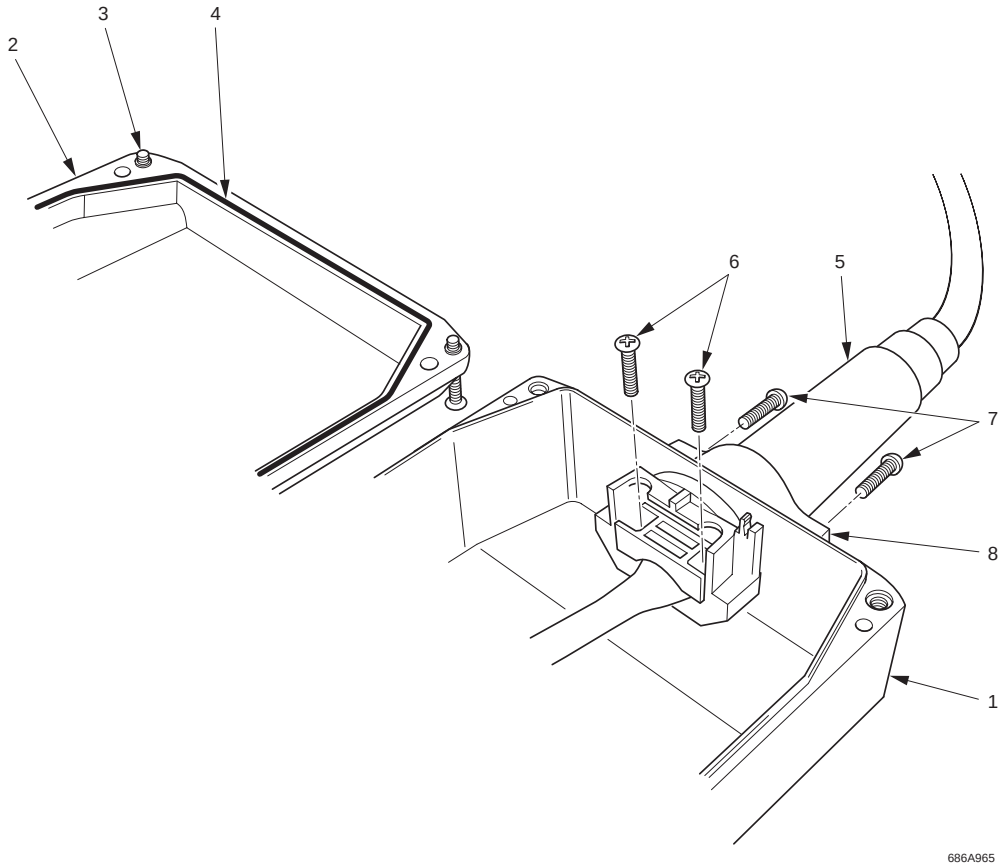
(4) Fit the harness cables to the emergency stop and control switches in the positions noted during removal. See unit maintenance procedures 5-156 and 5-157.

(5) Check the tail lift pendant cover seal (4) is clean and not damaged.

(6) Fit the tail lift cover (2) to the tail lift pendant body (1) with 6 screws and washers (3).

c. Follow on tasks

(1) Connect the tail lift pendant to the DSB and check the operation of the tail lift in accordance with the operator's manual TM 5-5420-279-10.



5 - 156 TAIL LIFT - PENDANT EMERGENCY STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Tail lift pendant disconnected from the vehicle



a. Remove

(1) Remove the tail lift pendant cover from the tail lift pendant body. See unit maintenance procedure 5-155.

(2) Note the positions of and remove the cables (7) from the contactor (6) by turning the screws (9) counter-clockwise.

(3) Remove the contactor (6) from the carrier (5) by pressing down on the catch (8).

(4) Remove the carrier (5).

(5) Remove the locking plate (3) by turning the screw (4) counter clockwise.

(6) Remove the emergency stop switch (1) complete with seal (10) from the tail lift pendant body (2).

b. Install

(1) Fit the emergency stop switch (1) complete with seal (10) to the tail lift pendant body (2).

(2) Fit the locking plate (3) to the emergency stop switch (1), turn the screw (4) clockwise and tighten.

(3) Fit the carrier (5) to the emergency stop switch (1).

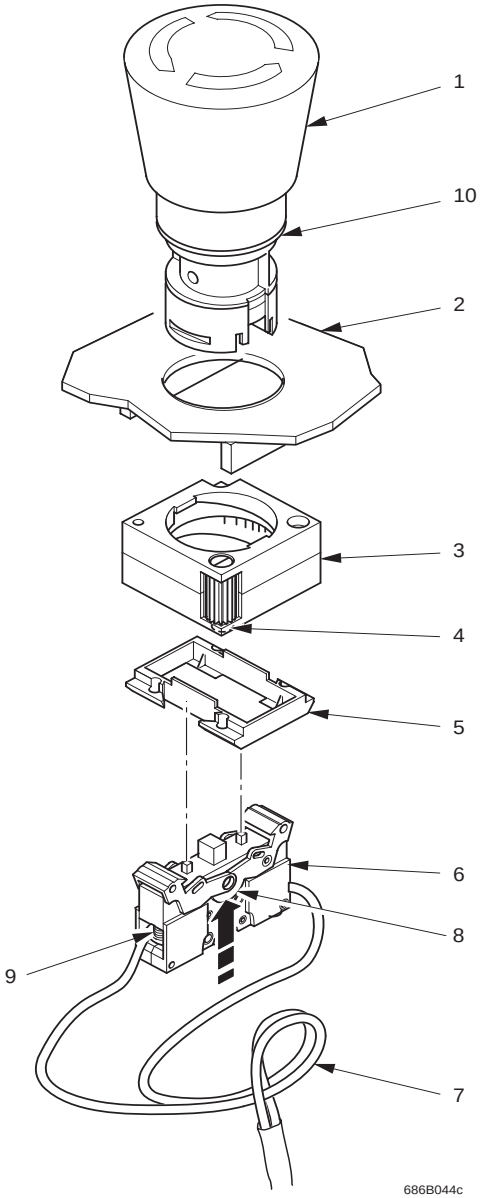
(4) Fit the contactor (6) to the carrier (5).

(5) Fit the cables (7) to the contactor (6) in the positions noted during removal and secure in place with the screws (9).

(6) Fit the tail lift cover to the tail lift pendant body (1) with 6 screws and washers. See unit maintenance procedure 5-155.

c. Follow on tasks

(1) Connect the tail lift pendant to the DSB and check the operation of the tail lift in accordance with he operator’s manual TM 5-5420-279-10.


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5 - 157 TAIL LIFT - PENDANT CONTROL SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Soldering iron
Heat gun

Materials Required

Solder
Heat shrink (Qty as required)

Equipment Conditions

Tail lift pendant disconnected from the vehicle



a. Remove

(1) Remove the 6 screws and washers securing the tail lift pendant cover to the tail lift pendant body (1). See unit maintenance procedure 5-155.

(2) Locate the control switch (5) to be removed.

(3) Note the positions of the six cables (2) soldered to the control switch (5).

(4) Remove the heat shrink protective sleeve and de-solder the six cables (2) and remove them from the switch (5).

(5) Remove the two lock screws (3) from the lock nut (4).

(6) Remove the lock nut (4).

(7) Remove the control switch (5) complete with seal (6).

b. Install

(1) Fit the switch (5) complete with seal (6) to the tail lift pendant body (1).

(2) Secure the control switch (5) to the tail lift pendant body (1) with the lock nut (4).

(3) Fit the two lock screws (3).

(4) Fit a ½ inch piece of heat shrink over the cable ends.

(5) Solder the cables (2) to the control switch (5) in the positions noted during removal.

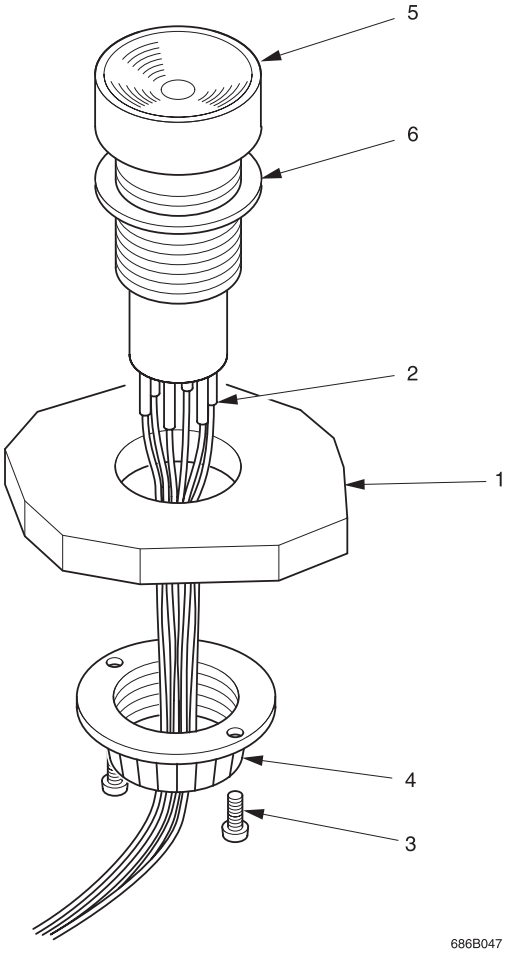
(6) Position the heat shrink protective sleeve over the cable ends (2) and gently apply heat until the sleeve is protecting the cables.

(7) Check the tail lift pendant cover seal is clean and not damaged.

(8) Fit the tail lift cover to the tail lift pendant body (1) with 6 screws and washers. See unit maintenance procedure 5-155.

c. Follow on tasks

(1) Connect the tail lift pendant to the tail lift and check the operation of the tail lift in accordance with he operator's manual TM 5-5420-279-10.



5 - 158 GENERAL - ASSEMBLING ROLLER BEARINGS

This task covers:

a. Assembly

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Personal Protective Equipment, heat resistant gloves.

Equipment Conditions

As dictated by the roller bearings under repair

WARNING

BURN INJURY. COMPONENTS ARE HEATED IN WATER TO 158^{O}F (70^{O}C) PERSONNEL MUST WEAR PROTECTIVE CLOTHING WHEN HANDLING HOT COMPONENTS.

NOTE

This instruction defines the procedure to be adopted when assembling DSB roller bearings. The following equipment is covered by this procedure.

Far and Home bank carriages - Pulleys unit maintenance procedures 6-028 to 6-029.

Far and Home bank carriages - Side rollers unit maintenance procedure 5-064.

Far and Home bank carriages - Top rollers unit maintenance procedure 5-063.

Launch Frame - Forward rollers unit maintenance procedure 6-024.

Launch Frame - Rear pinch rollers unit maintenance procedure 5-029.

The following roller assembles require the use of a dummy shaft to position the spacer sleeves and tubes within the roller bodies:

Launch Frame - Forward rollers unit maintenance procedure 6-025.

Launch Frame - Rear pinch rollers unit maintenance procedure 5-029.

The instructions within this procedure are general and should be applied where applicable to the roller under repair.

a. Assembly

(1) Heat the aluminum roller bodies in a hot water at 158^{o}F (70^{o}C) for approximately 30 minutes.

(2) Assemble the roller in accordance with the relevant maintenance procedure.

NOTE

The roller must be assembled quickly, in approximately 60 seconds following the removal of the roller body from the hot water.

(3) Commence assembly from one end of the roller body, generally:

a. Fit retaining ring at one end of the roller body.

b. With the roller body in the vertical position, fit spacers and bearings as detailed in the respective maintenance procedure.

NOTE

When fitting bearing seals, where applicable, ensure that the seal groove faces outwards.

c. Fit final retaining ring.

d. Lay roller body on its side and pull the bearings back up to the retaining rings at both ends.

5 - 159 GENERAL - SECTIONALIZATION OF THE LAUNCHER

This task covers:

a. Introduction
b. DSB far bank support removal
c. DSB far bank support re-fitting
d. Tail lift removal
e. Tail lift re-fitting
f. Launch equipment removal
g. Launch equipment re-fitting
h. Crane removal and replacement

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

None

---

a. Introduction

(1) To reduce the overall weight and dimensional envelope of the launcher, it has been designed for easy and rapid sectionalization. The crane, Tail lift and slide frame based launcher and A-Frame stabilizer feet are all removable. This is achieved through the use of quick disconnect hydraulic hoses, plug and socket electrical connections and wide use of simple pinned mechanical attachments. Lifting and tie-down points are provided on the crane and launcher to aid lifting.

(2) Sectionalization of the launcher can be achieved within 1 hour and should be performed as outlined in the section below.

b. DSB Far Bank Support Removal

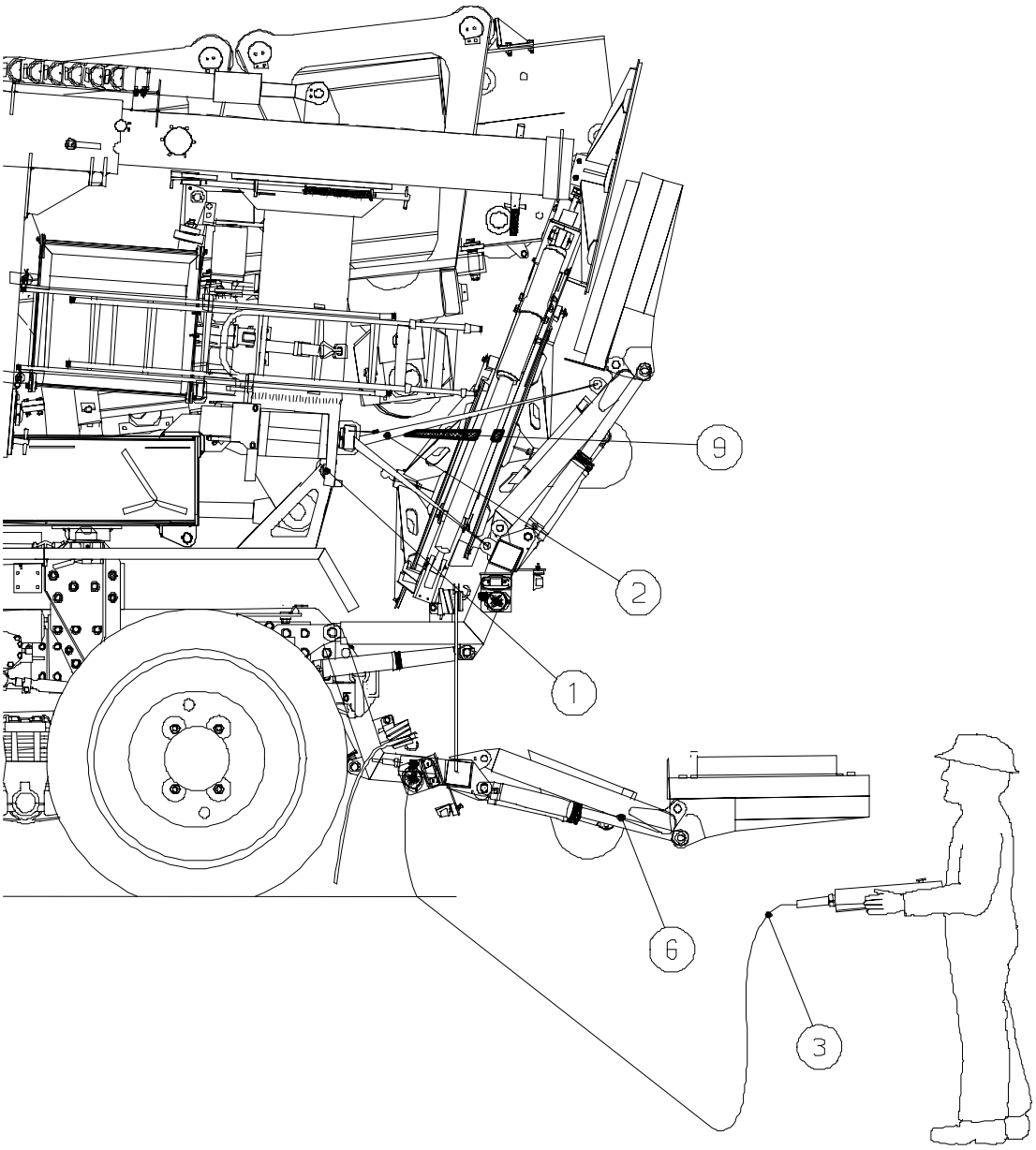
To remove the far bank support follow the procedure below:

NOTE

The Numbers on the diagrams refer to the Paragraph Numbers of the Text.

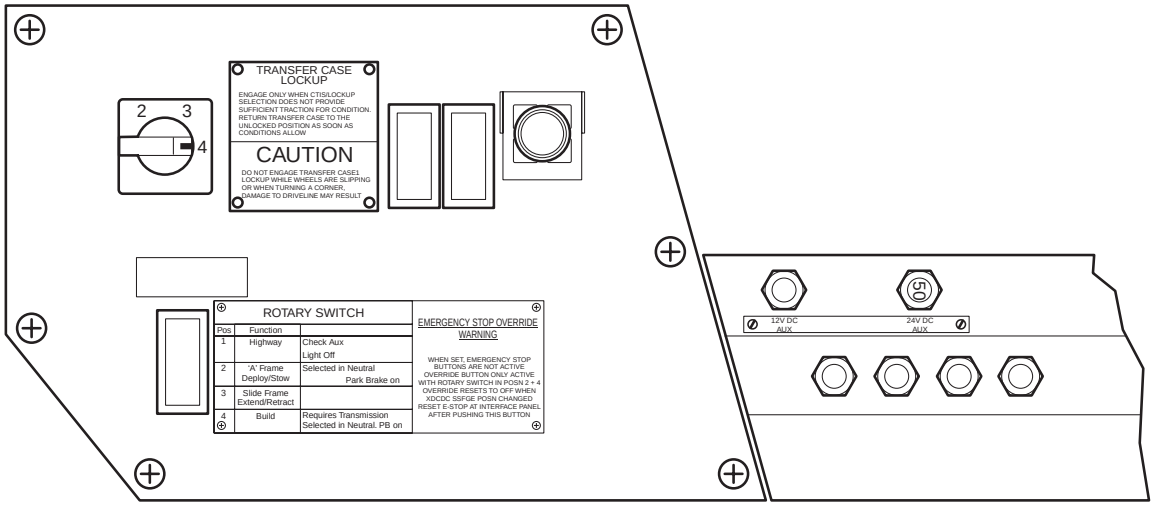
(1) Release A-Frame shoot bolts and remove left and right hand mudguards

(2) Remove both Tail lift transport straps.



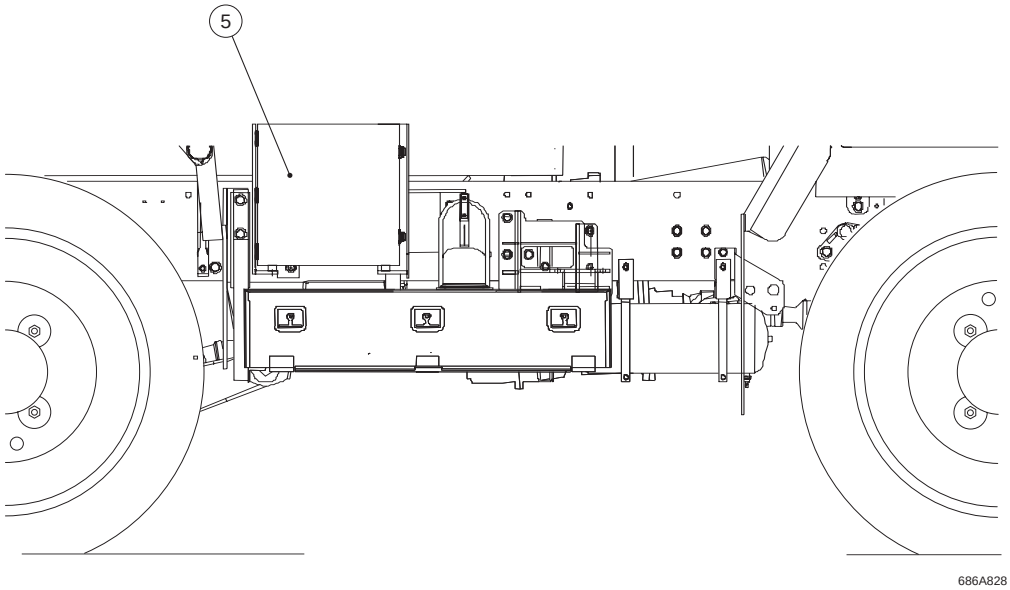
(3) Attach Tail lift handset.

(4) With launcher engine running, turn 4 position rotary selector switch to position 2.



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(5) Re-set emergency stops in interface panel.

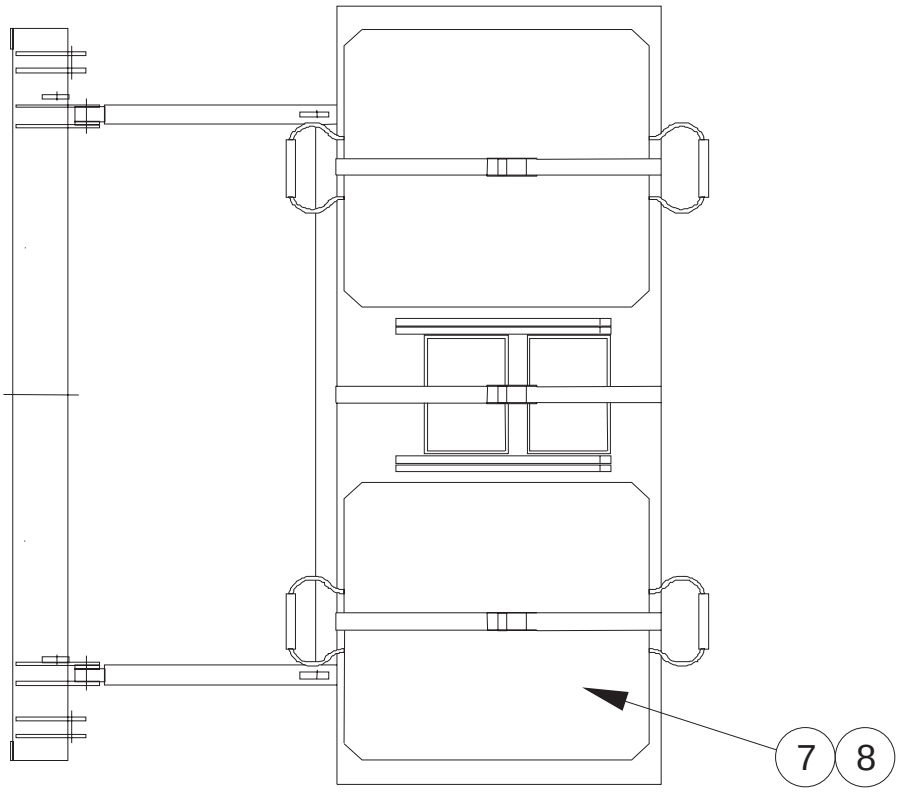


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(6) Lower tail lift.

(7) Remove tail lift straps.

(8) Remove crane feet pads and steps from tail lift platform.



VIEW ON TAIL LIFT

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WARNING

FALLING OBJECT HAZARD. KEEP WEIGHT ON FAR BANK SUPPORT WHEN RELEASING STRAPS TO CONTROL SWINGING.

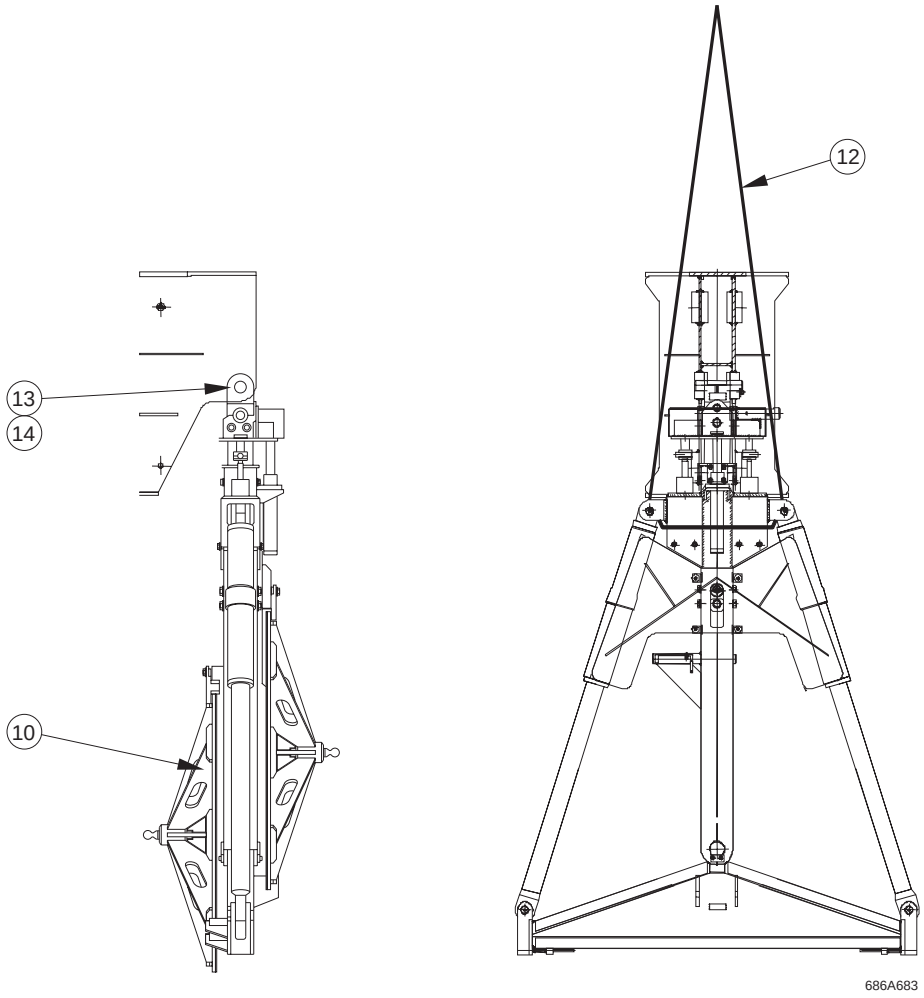
(9) Remove far bank support transport straps and slowly allow far bank support to swing vertical.

(10) Remove far bank support feet.

(11) Using the tail lift lift/ lower the far bank support, with 2 average sized personnel supporting the far bank support in the upright position.

(12) Use a crane with lifting slings to support weight (436lbs (198kg)) of the far bank support.

(13) Remove two 8 mm screws and pivot pin retaining plate.



Supporting Far Bank support During Disconnection from Front Beam

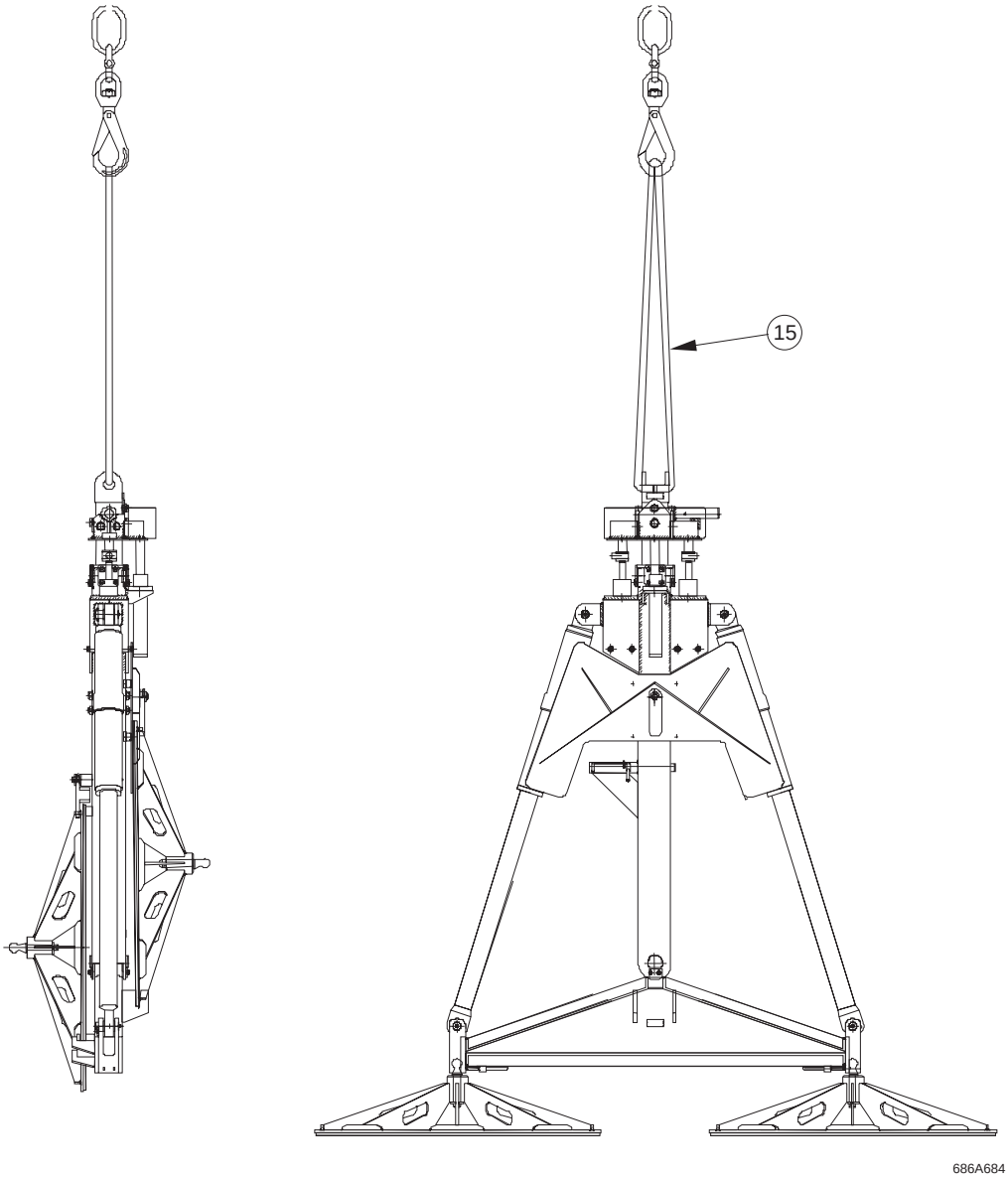
WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(14) Remove pivot pin.

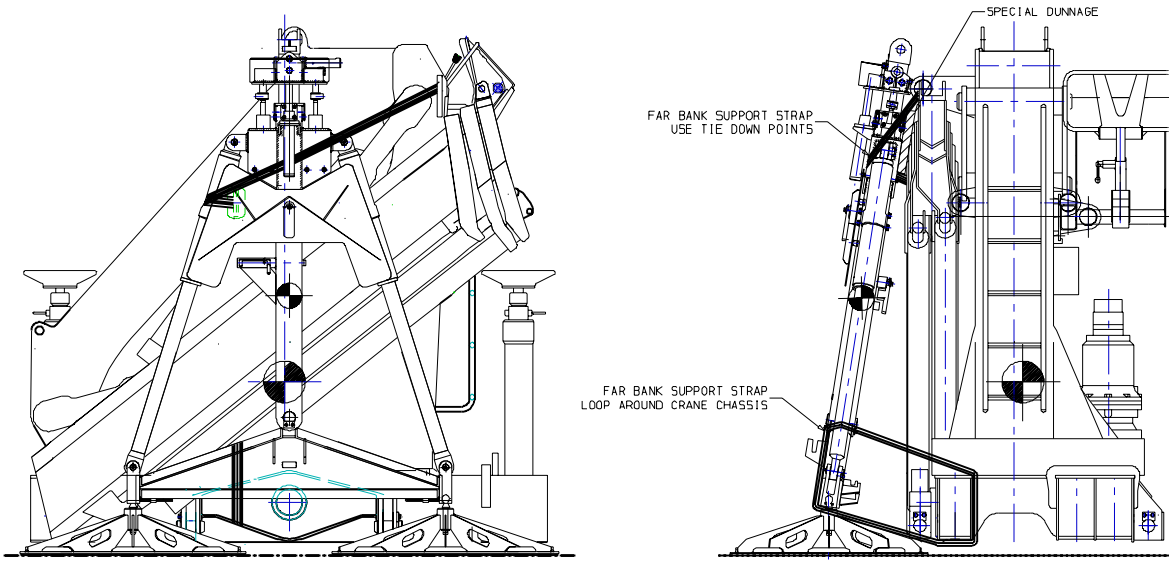
WARNING

CRUSH INJURY. ENSURE ALL SHOOT BOLTS ARE FULLY INSERTED AND LOCKED BEFORE LIFTING.



Method of Slinging Far Bank Support

(15) Using a crane lift the far bank support clear, and remove spreader pads from their stored position on the far bank support. Connect the two spreader pads to the far bank support in their deployed position. Pack as shown in the next figure "Method Of Packing Far Bank Support And Crane".



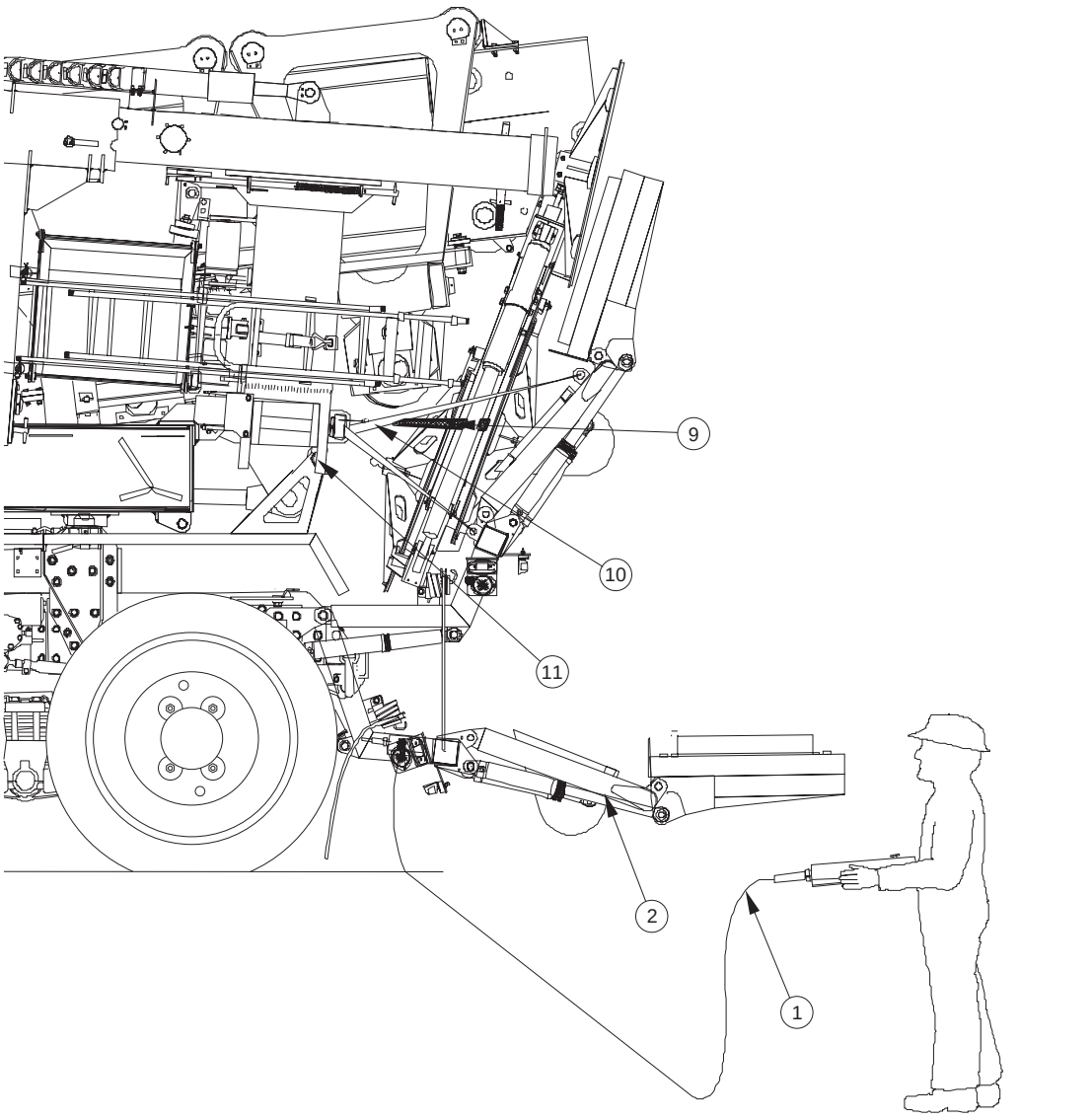
Method of Packing Far Bank Support and Crane

c. DSB Far Bank Support Re-Fitting

With the launcher engine running and 4-position rotary selector switch in position 2:

(1) Attach tail lift handset.

(2) Lower tail lift

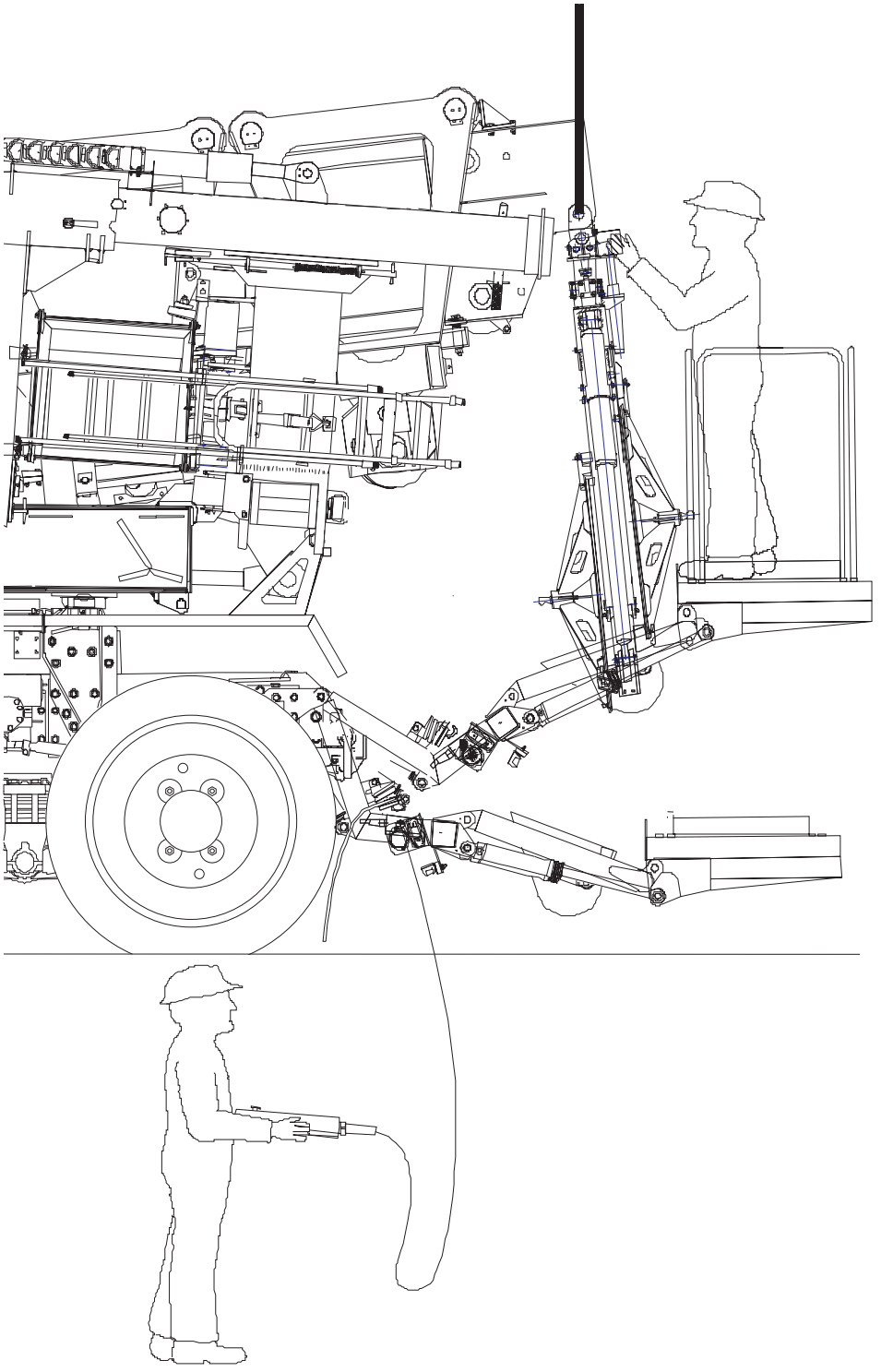


WARNING

CRUSH INJURY. ENSURE ALL SHOOT BOLTS ARE FULLY INSERTED AND LOCKED BEFORE LIFTING.

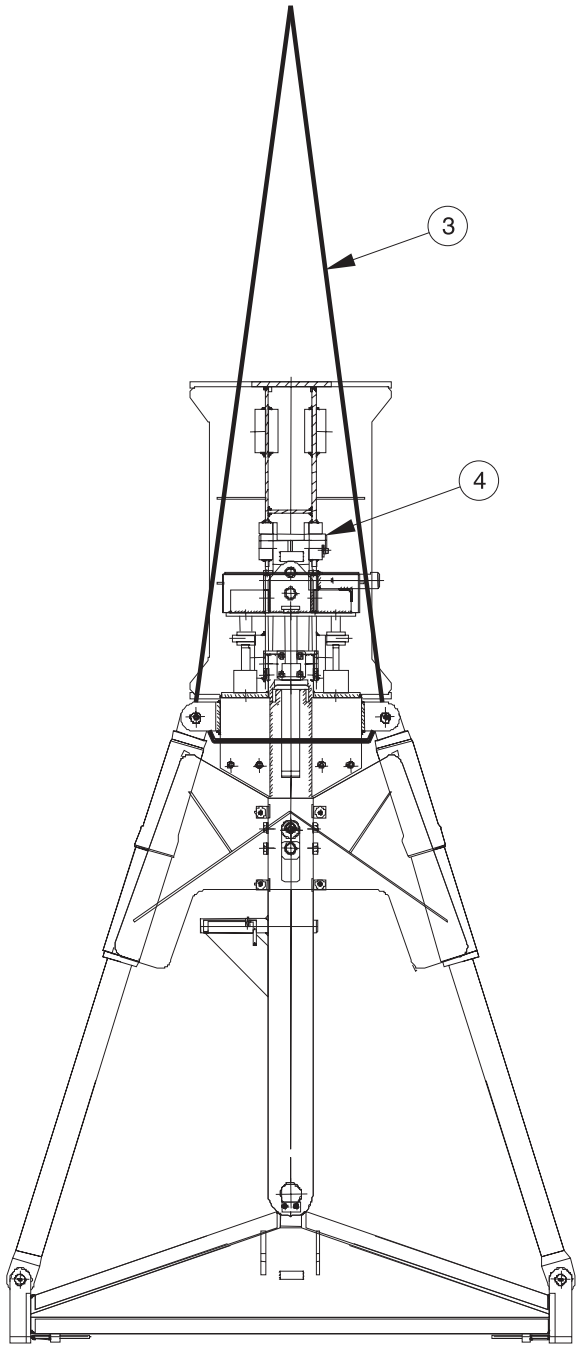
(3) Use crane with lifting slings to support weight (436lbs (198 kg)).

(4) Remove spreader pads from far bank support and put to one side. Reposition far bank support and align holes.

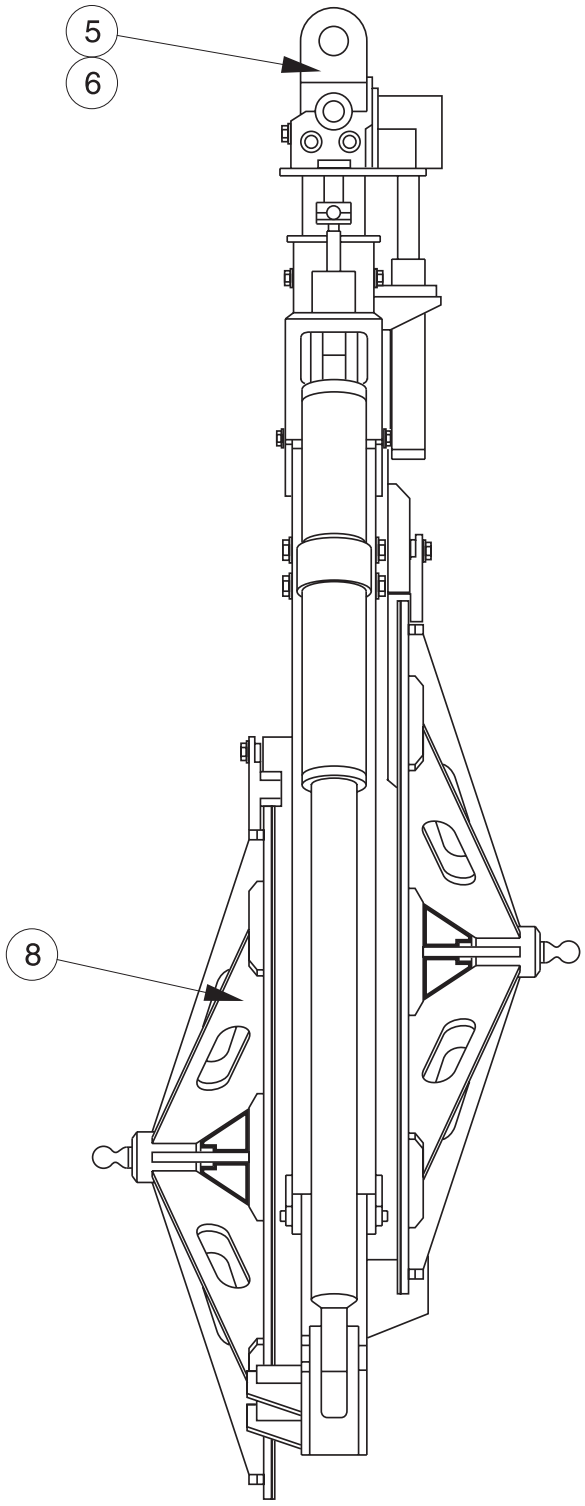


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Method of supporting the Far Bank Support



Method of supporting Far Bank Support


5
6
8
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WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(5) Replace pivot pin (5).

(6) Replace two 8 mm screws and pivot pin retaining plate (6).

(7) Release crane slings.

(8) Replace far bank support feet in transportation position (8).

(9) Replace far bank support transport strap.

(10) Stow far bank support, re-fit crane pads and step ladder with straps and prepare launcher for transport.

d. Tail Lift Removal

To remove the tail lift for transport proceed as follows:

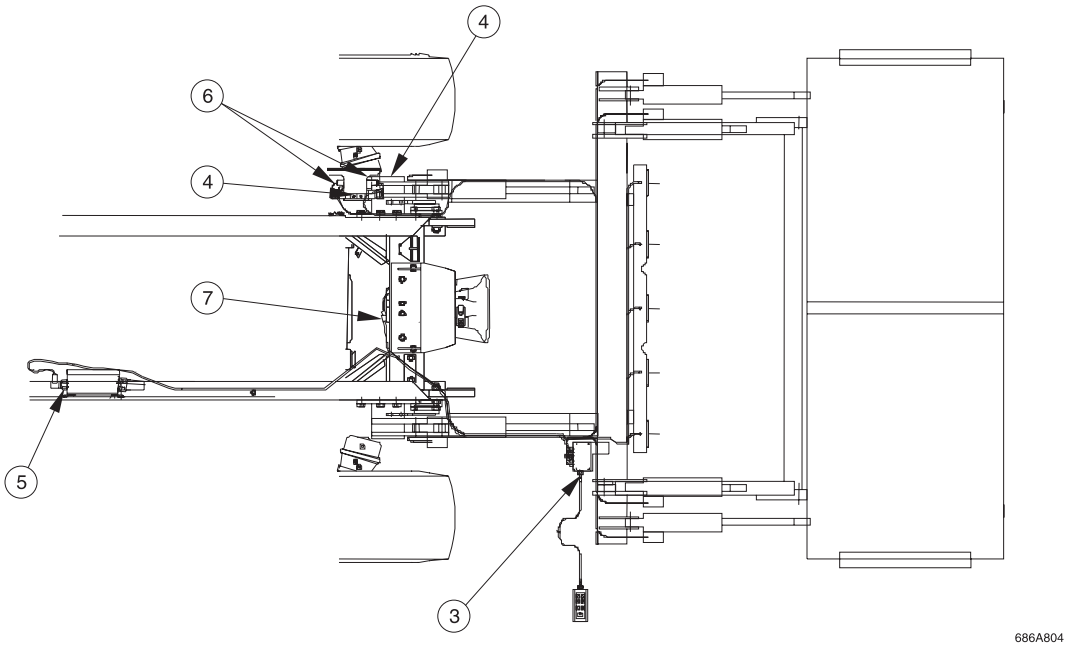
NOTE

The numbers on the figures refer to the paragraph numbers in the procedure.

(1) Rotate tail lift to a horizontal position and remove crane pads and step ladders

(2) Using a fork lift truck support tail lift.

(3) Disconnect handset and replaces cap on socket. Stow handset.



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WARNING

INJURY TO PERSONNEL. ENSURE HYDRAULIC AND ELECTRICAL SYSTEMS ARE SWITCHED OFF WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS.

NOTE

Protect open coupling and plugs against the ingress of dirt during transport, contamination or damage to plugs and systems may result

(4) Disconnect hydraulic plug-in couplings.

(5) Disconnect electrical harness from vehicle main junction box, remove any cable ties to truck chassis and roll back and secure to tail lift.

(6) Disconnect electrical harness from both solenoid valves, remove any cable ties to truck chassis and roll back and secure to tail lift.

(7) Disconnect electrical harness from rear light cluster, remove any cable ties to truck chassis and roll back and secure to tail lift.

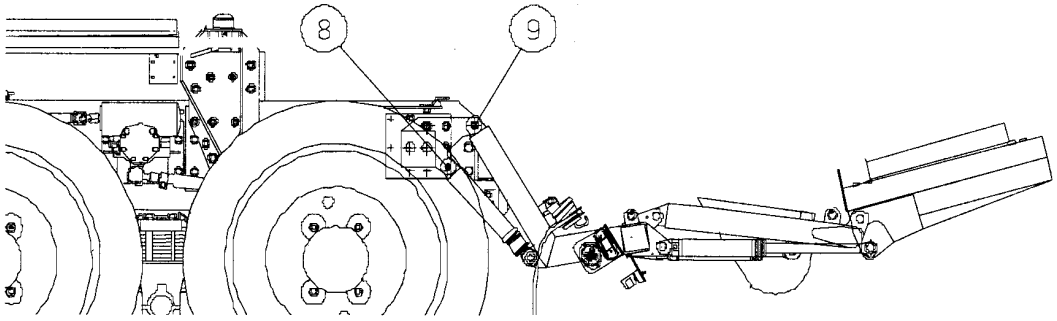
WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(8) Using the forks of the fork lift truck support the tail lift.

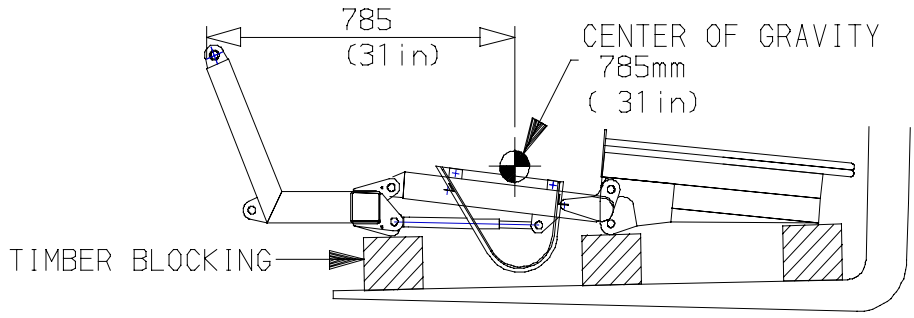
(9) Remove swing cylinder pivot pins on both sides. Secure cylinders to tail lift to avoid damage during lifting or stowing for transport.

(10) Remove swing arm pivot pins on both sides.



(11) Tail lift can now be lifted clear with fork lift truck, and packed as described on shipping data plate.

SHIPPING DATA PLATE
TAIL LIFT



SUPPORT TAIL LIFT ON FORKS UNDER BLOCKING

OVERALL LENGTH	2650mm	(104.3in)
OVERALL WIDTH	2240mm	(88.2in)
OVERALL HEIGHT	867mm	(34.2in)
TOTAL WEIGHT	550kg	(1213lb)

e. Tail Lift Re-Fitting

To refit the tail lift after transport proceed as follows:

NOTE

The numbers on the figures refer to the paragraph numbers in the procedure.

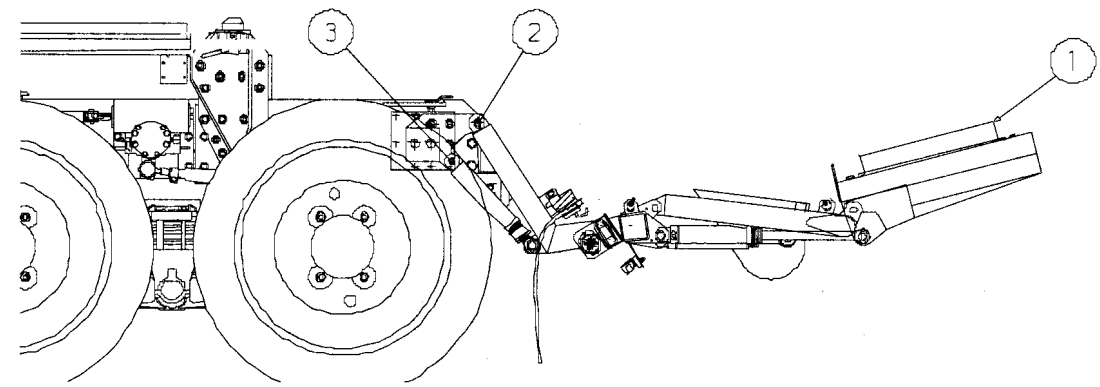
(1) Move tail lift into position using fork lift and align pivot holes.

WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(2) Insert swing arm pivot pins on both sides.

(3) Insert swing cylinder pivot pins on both sides.



WARNING

INJURY TO PERSONNEL. ENSURE HYDRAULIC AND ELECTRICAL SYSTEMS ARE SWITCHED OFF WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS.

CAUTION

Protect open coupling and plugs against the ingress of dirt during transport, contamination or damage to plugs and systems may result.

(4) Connect electrical harness to rear light cluster.

(5) Re-attach to chassis where appropriate.

(6) Connect electrical harness to both solenoid valves. Re-tighten center screws in plugs. Re-attach to chassis where appropriate.

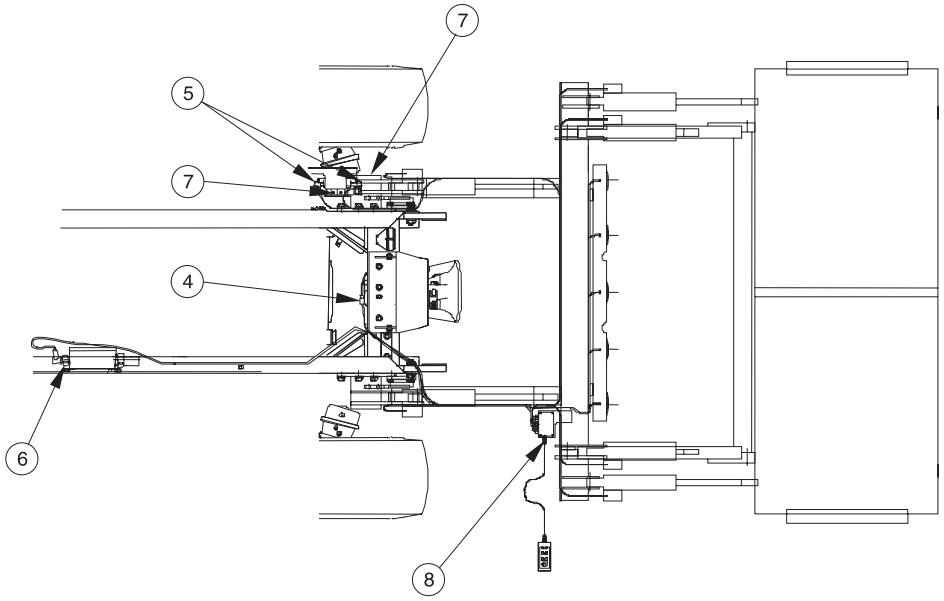
(7) Connect electrical harness to vehicle main junction box. Re-attach to chassis where appropriate.

(8) Connect hydraulic plug-in couplings.

(9) Connect handset. Re-start launcher electric and hydraulic systems

(10) Rotate tail lift to an upward position until slings slacken.

(11) Disconnect lifting slings.



(12) Exercise tail lift hydraulics and check all functions are working safely and correctly.

(13) Stow tail lift and prepare launcher for transport.

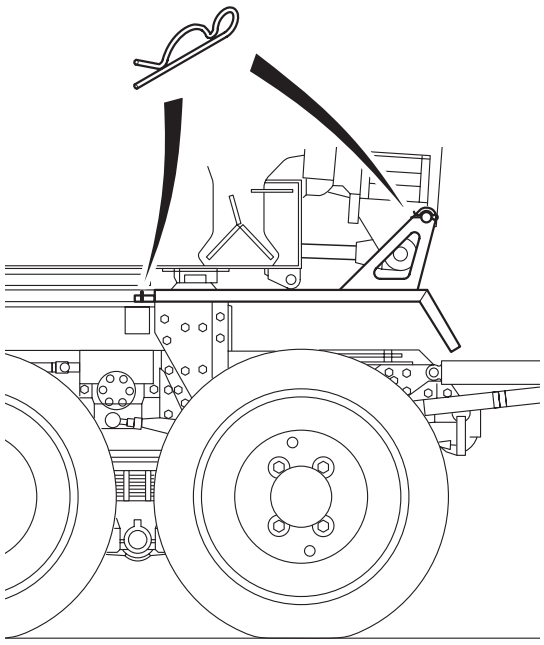
f. Launch Equipment Removal

To remove the launch frame from the launch vehicle for rail or air transport proceed as follows:

NOTE

The numbers on the figures refer to the Sub Paragraph numbers of the text.

(1) Remove the R clips securing the removable mudguards, release the shootbolts and remove mudguards.



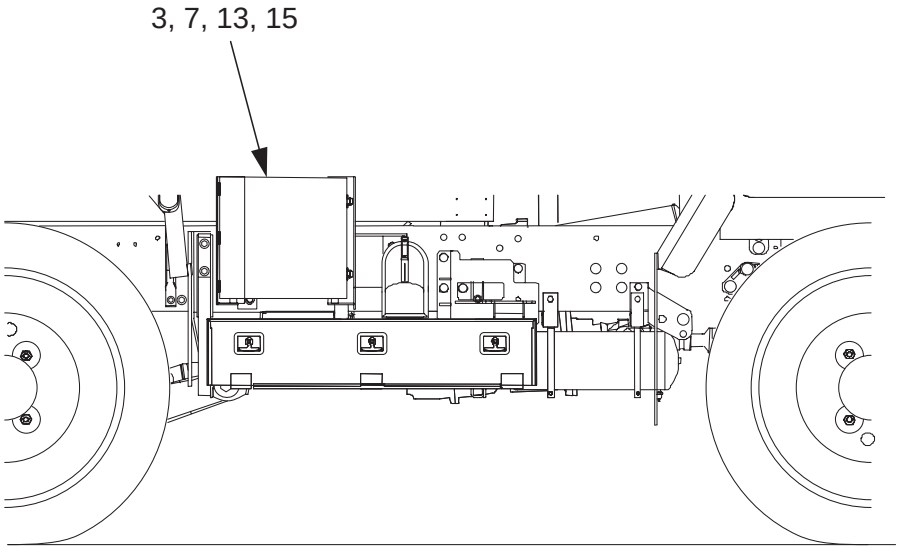
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WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(2) Remove the two A-Frame hinge locking pins and R clips from each side-leg.

(3) Unfold the A-Frame by pressing the A-Frame fold deploy button on interface panel.



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(4) Insert the two A-Frame hinge locking pins and R clips on each side.

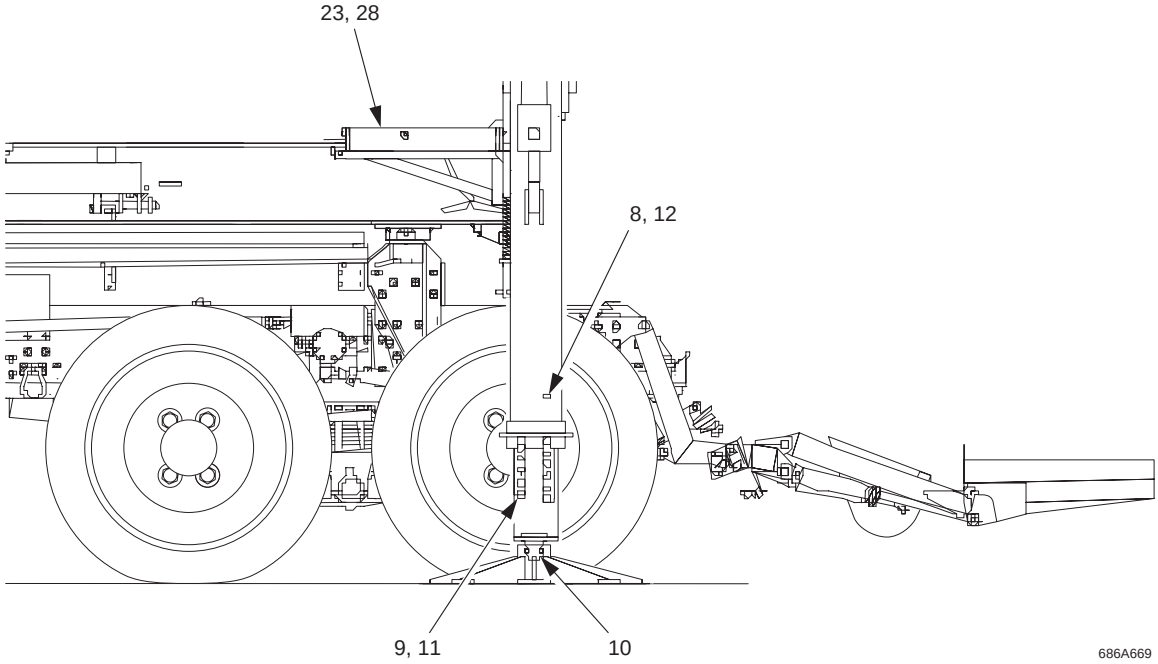
(5) Remove the A-Frame upper ladder by removing the R clip in the pivot pin, support the weight of the ladder, undo and release retaining strap remove the pivot pin lift ladder clear replace pivot pin in the ladder replace R- clip in pivot.

(6) Remove both folding walkway ladders, remove the R-clip in the pivot pin, support the weight of the ladder, undo and release retaining strap, remove pivot pin, lift ladder clear replace pivot pin in the ladder replace R-clip in pivot pin. Repeat for other side.

(7) Rotate the A-Frame leg: Press A-Frame rotate deploy button on the interface panel, insert shoot bolts at position used to hold mudguards on the vehicle.

(8) Remove A-Frame stabilizer leg R clips and pins.

(9) Lower stabilizer legs to the ground using controls at center of A-Frame lower cross-member, **do not apply load** to legs.



(10) Remove stabilizer feet, by removing the nyloc nuts and the securing U-bolts.

(11) Raise stabilizer legs using controls at center of A-Frame lower cross-member. Re-insert U-bolt and nyloc nuts in the feet for safekeeping.

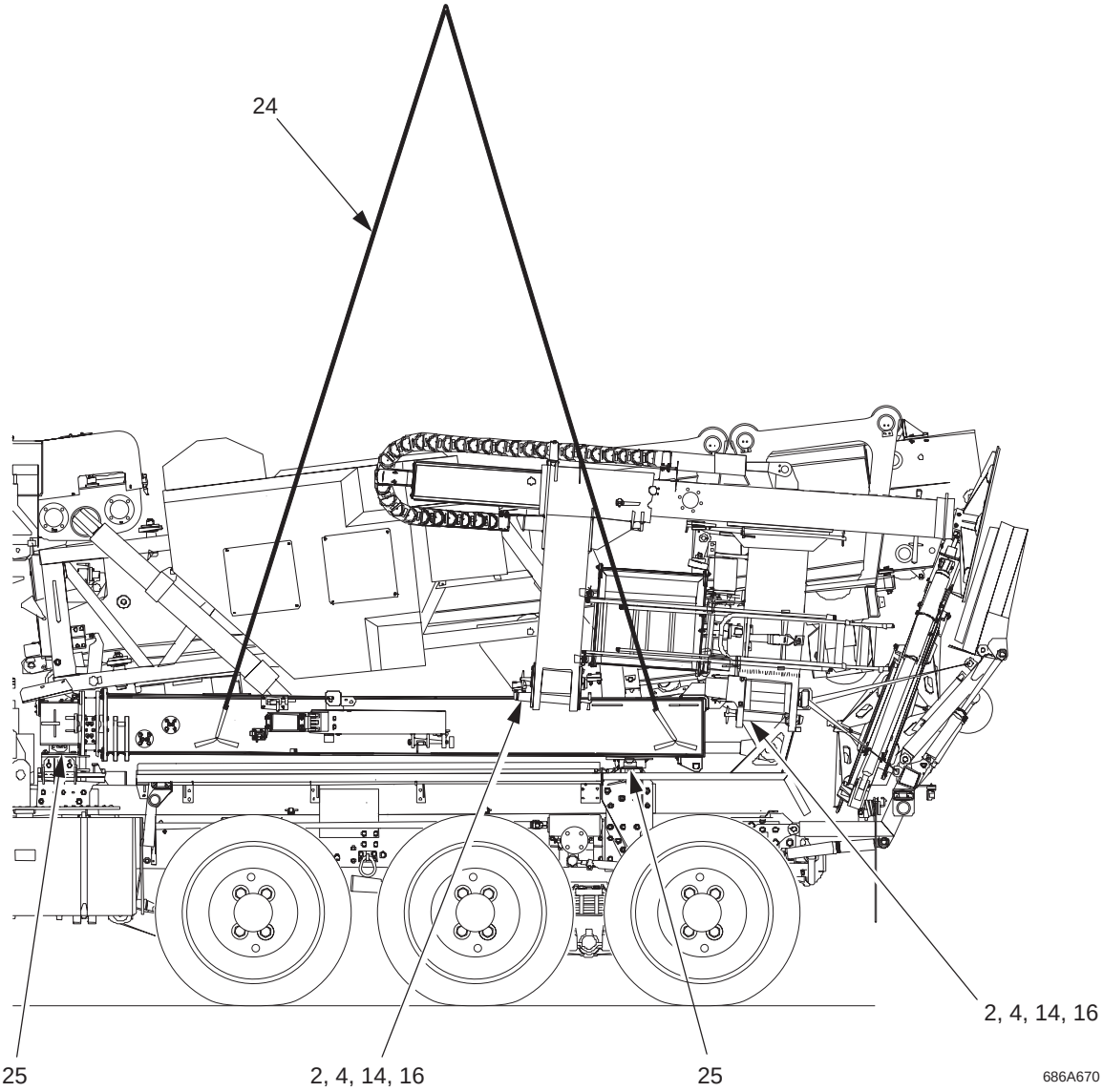
(12) Replace A-Frame stabilizer pins and R-clips.

(13) Rotate the A-Frame down. Remove the shoot bolts, at position used to hold mudguards on the vehicle, press A-Frame Park button on the interface panel until parked light comes on.

(14) Remove the two A-Frame hinge-locking pins from each side.

(15) Fold the A-Frame legs. Press A-Frame fold park button on interface panel, until parked light comes on.

(16) Insert the two A-Frame hinge locking pins and R clips on each side.



(17) Fit the two rigging screws to the forward end of the slide frame with the pins and R clips.

WARNING

INJURY TO PERSONNEL. ENSURE HYDRAULIC AND ELECTRICAL SYSTEMS ARE NOT RUNNING WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS. SERIOUS PERSONAL INJURY MAY OCCUR IF THIS INSTRUCTION IS NOT OBSERVED.

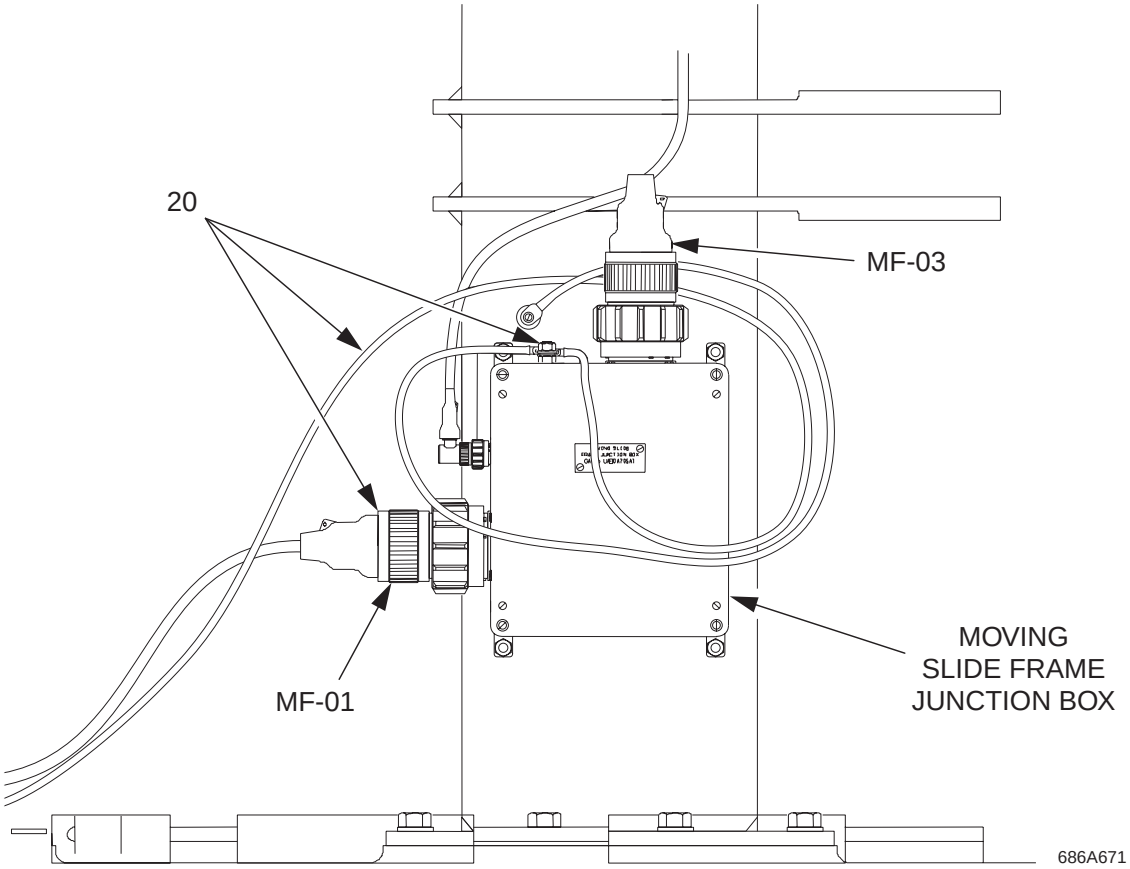
CAUTION

Protect open couplings and plugs against the ingress of dirt during transport contamination or damage to plugs and systems may result.

(18) Using a small screwdriver remove some of the energy chain spreader bars on the radius to allow the hydraulic pipe to be pulled back when disconnecting.

(19) Disconnect hydraulic quick release couplings inside both sides of slide frame.

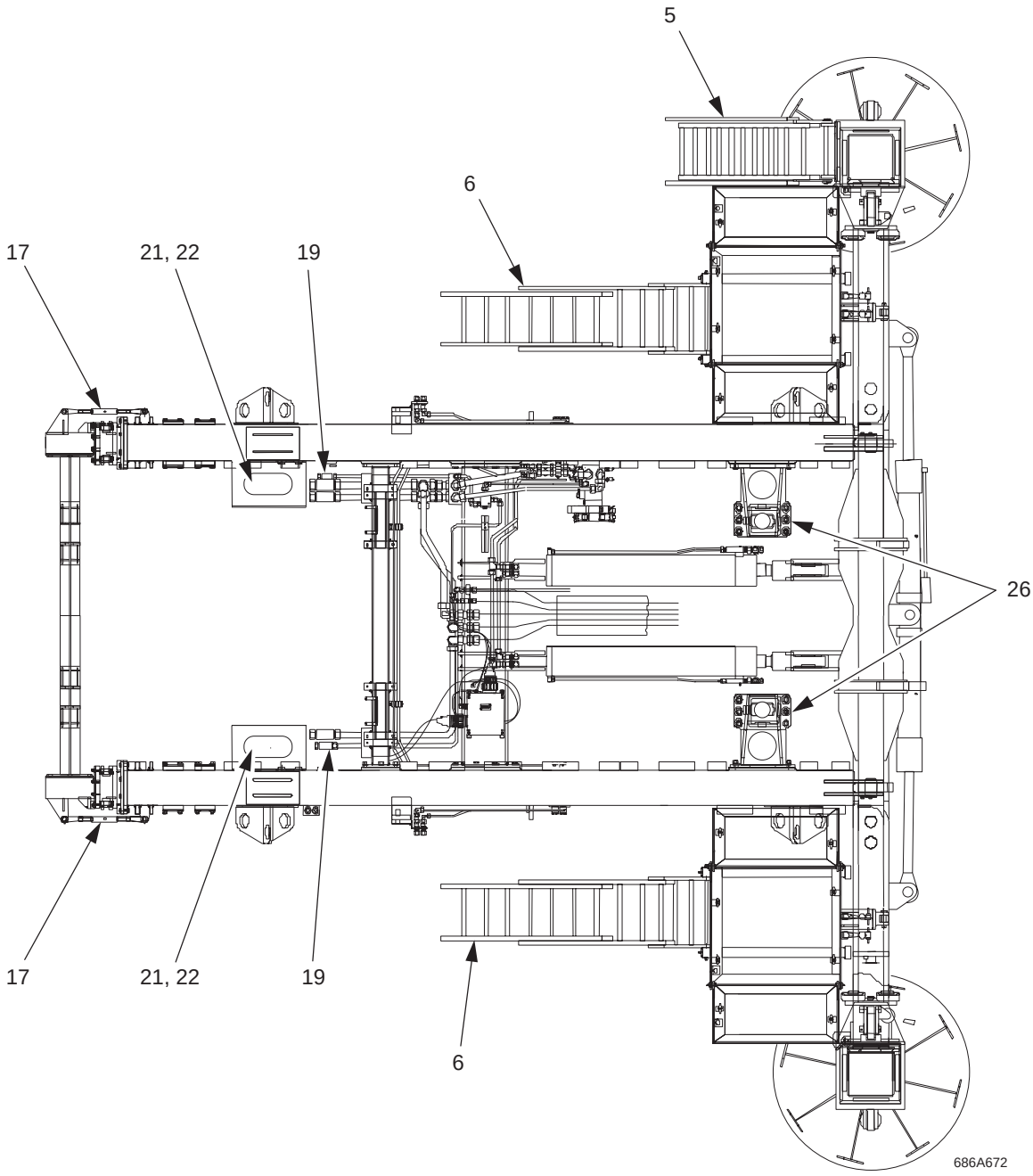
(20) Disconnect the mil-coupling on the moving slide frame junction Box. Disconnect the earth cable on the moving slide frame junction box, remove any cable ties to slide frame and roll back cable to dove tail bracket and secure.



(21) Remove two bolts holding the dovetail brackets to slide frame.

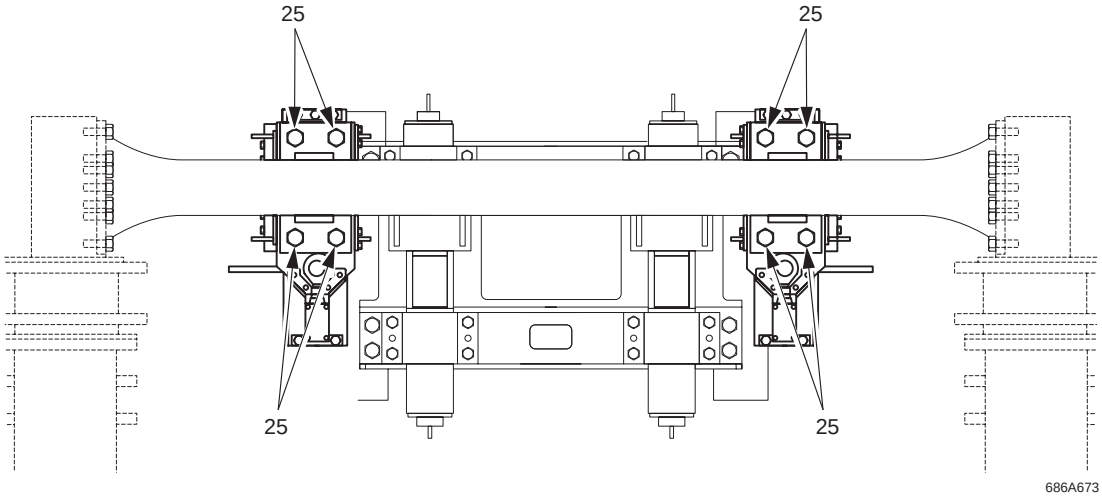
(22) Lift to disconnect dovetail brackets from the slide frame to disconnect energy chain from slide frame.

(23) Unclip A-Frame folded walkways and swing, out hold in place with ladder retaining straps this is to stop it being compressed by the lifting slings.



(24) Connect 30-ton (9' spreader beams) sling assembly to slide frame lifting points.

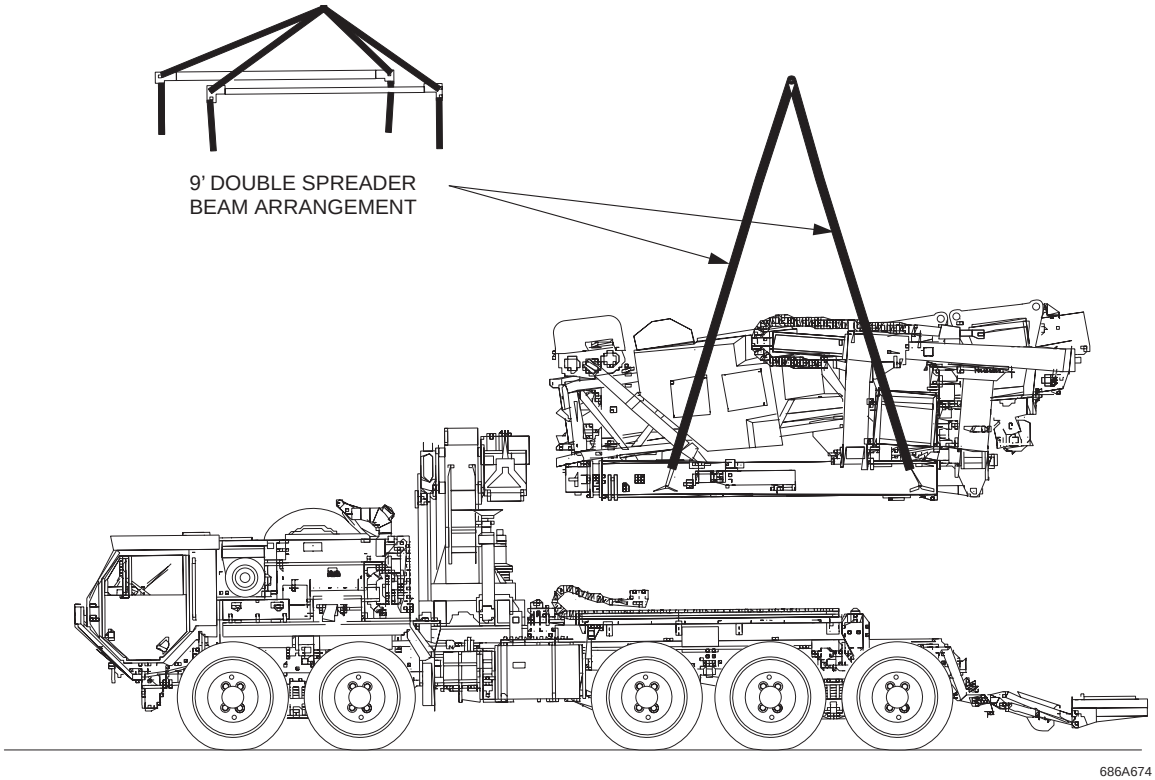
(25) Disconnect relax mechanism by removing the eight M-20 bearing housing bolts.



(26) Unlock (ISO) twist locks on both sides of the slide frame.

(27) Lift launch equipment clear of vehicle and place on support blocks of at least 5 in (127mm) thick. The A-Frame and launching frame weigh 34833lbs (15800 kg) (17.5 ton).

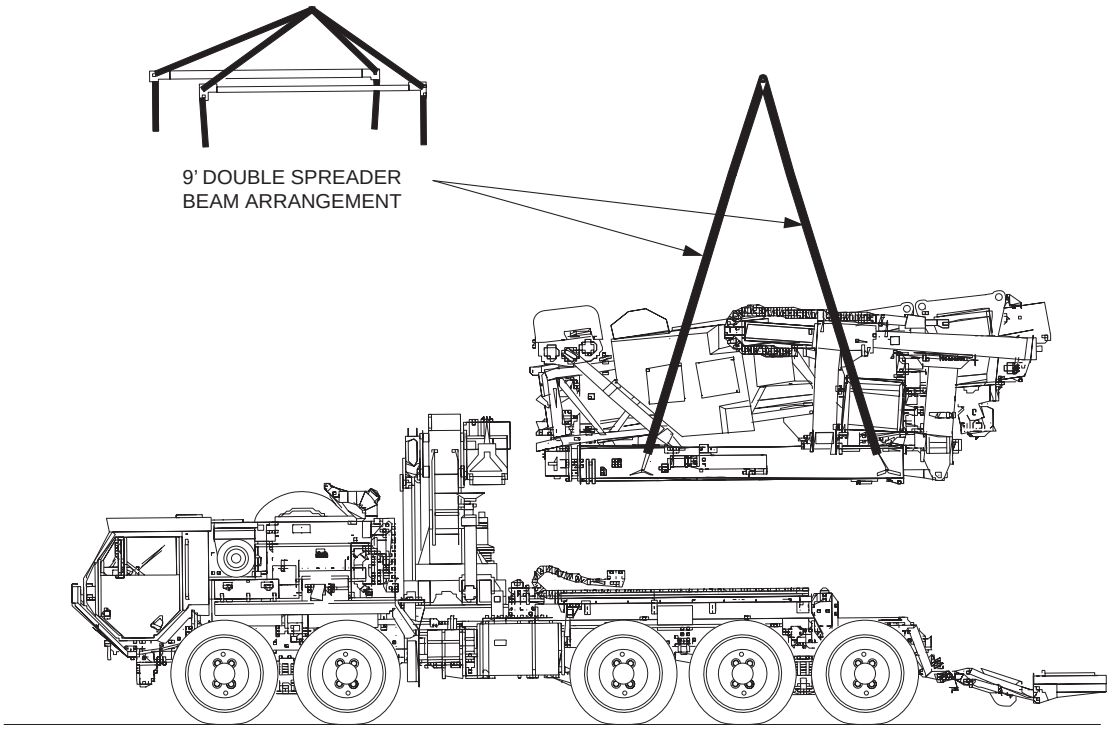
(28) Disconnect lifting slings, close A-Frame folding walkways and re-clip.



g. Launch Equipment Re-Fitting

To reconnect the launch frame to the launch vehicle proceed as follows:

(1) Unclip A-Frame folding walkway and swing out- hold in place with ladder retaining strap, to clear lifting slings.



(2) Connect 30-ton (9' spreader beams) slings assembly to slide frame lifting points.

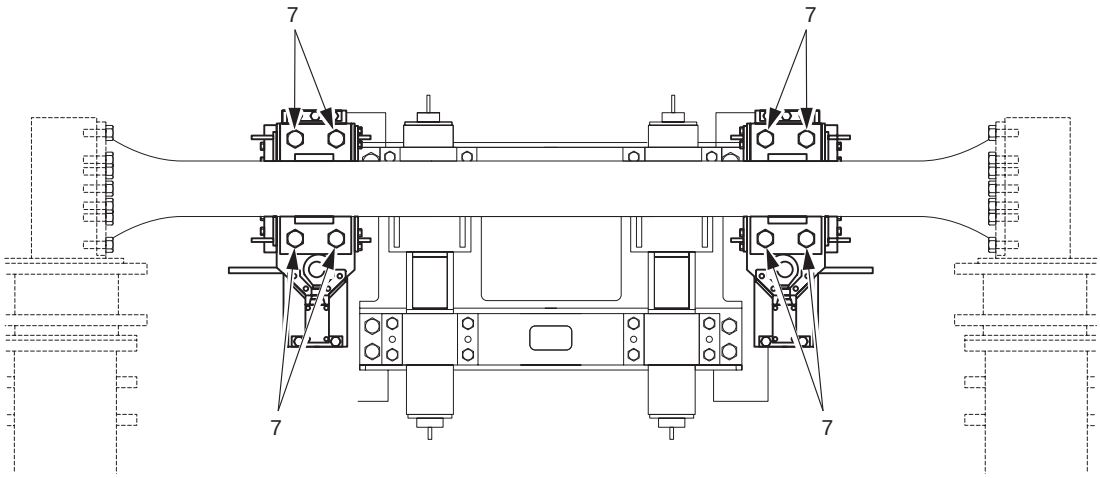
(3) Lift launch equipment clears of packers and place on vehicle (15800 kg, 34833 lbs.) Making sure that the front, ball joint mounting assembly sits on the location studs on the slide housings of the relax mechanism and the twist locks at the rear end of the slide frame.

(4) Lock twist locks on both sides of slide frame.

(5) Disconnect 30-ton (9' spreader beams) sling assembly from the slide fame lifting points.

(6) Close folding walkways and re-clip.

(7) Re-connect, relax mechanism by re-fitting the eight M-20 ball joint housing bolts using new nyloc nuts, tighten to a torque of (550 Nm 406 llbs ft).



WARNING

INJURY TO PERSONNEL. ENSURE HYDRAULIC AND ELECTORAL SYSTEMS ARE SWITCHED OFF WHEN CONNECTING OR DISCONNECTING HYDRAULIC COUPLINGS AND ELECTRICAL CONNECTORS.

CAUTION

Check couplings and plugs against the ingress of dirt during transport, contamination or damage to plugs and systems may result.

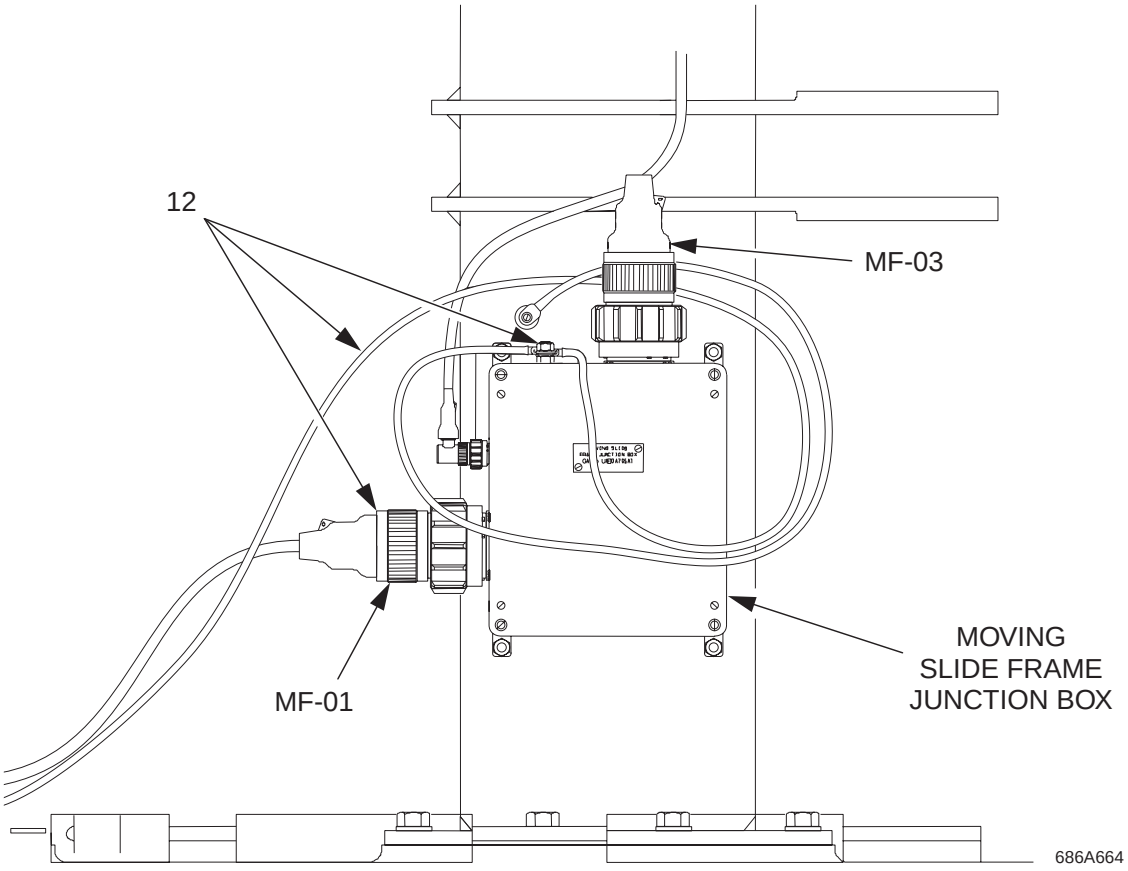
(8) Re-connect both dove tail brackets to connect energy chains to slide frame.

(9) Refit two bolts holding, dove tail brackets to slide frame.

(10) Re-connect hydraulic quick release couplings inside both sides of the slide frame

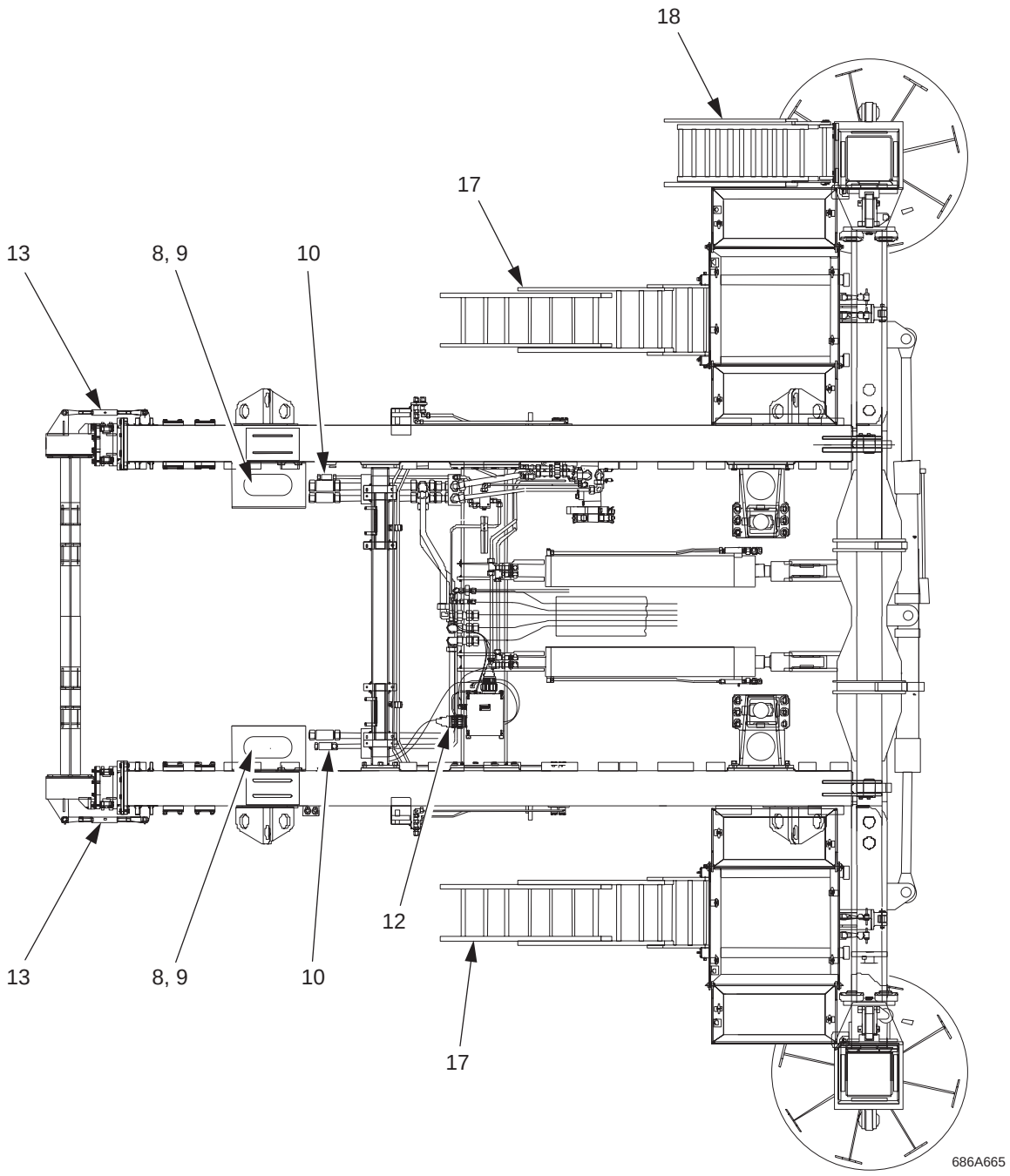
(11) Replace the spreader bars on the energy chains.

(12) Re-connect electrical supply to moving slide frame junction box, earth cable at mil connector and replace any cable ties to secure cables to slide frame pipe work.



(13) Remove the two rigging screws holding the slide frame together.

(14) Remove the two A-Frame hinge locking pins and clips from each side.



WARNING

INJURY TO PERSONNEL. STAND WELL CLEAR OF EQUIPMENT WHEN FIRST UNFOLDING A-FRAME. SERIOUS PERSONAL INJURY OR DEATH COULD RESULT IF EQUIPMENT FAILS.

CAUTION

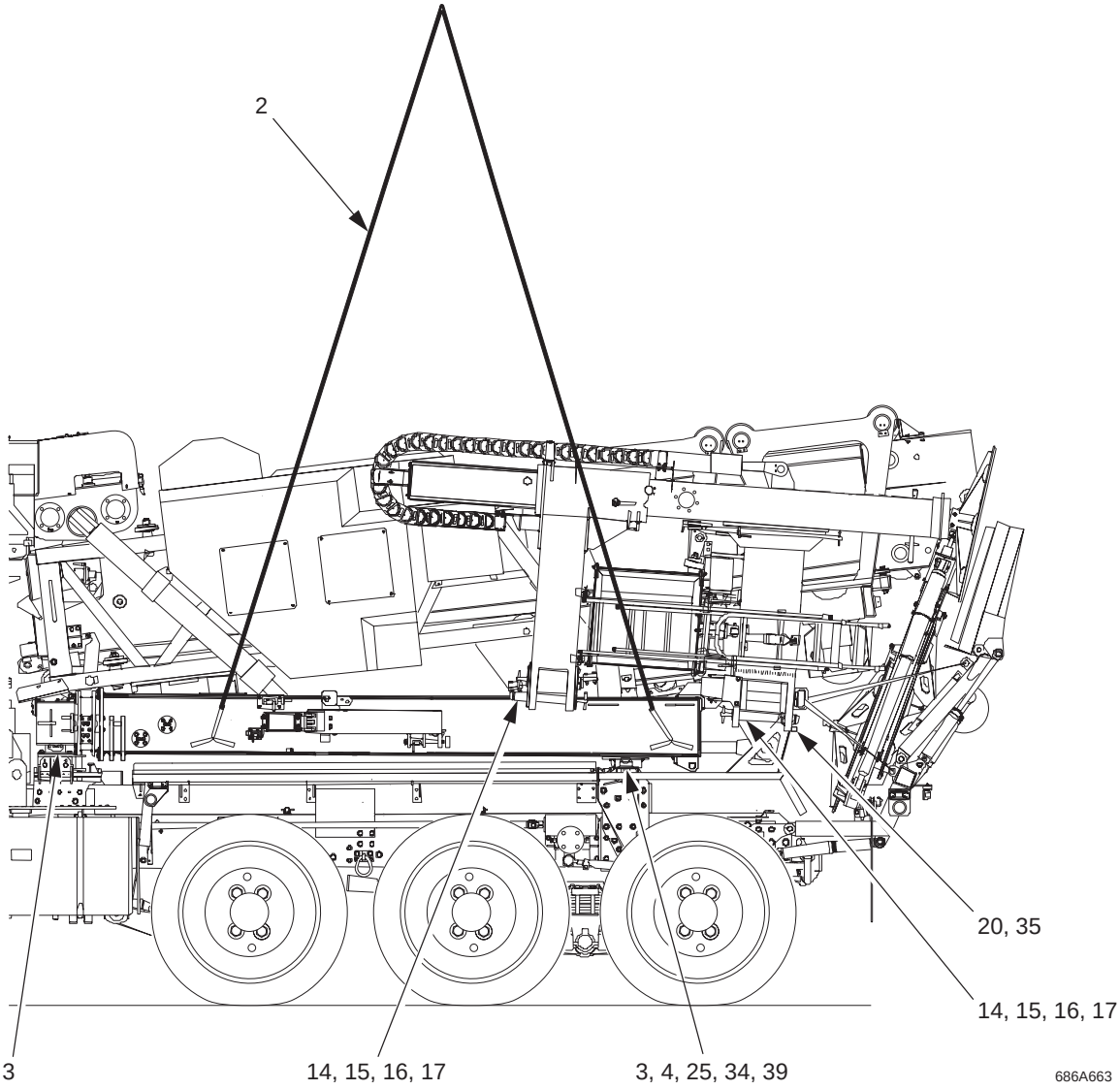
Before operating check equipment for signs of damage or hydraulic leaks due to the handling or transportation.

(15) Unfold the A-Fame legs. Press A-Frame folds deploy button on the interface panel, until deployed light comes on.

WARNING

INJURY TO PERSONNEL. NEVER USE FINGERS TO PUSH PINS IN OR OUT OF HOLES. SERIOUS PERSONAL INJURY WILL RESULT IF THIS INSTRUCTION IS NOT OBSERVED.

(16) Insert the two A-Frame hinge locking pins and clips on each side.



(17) Replace both folding walk-way ladders by remove R-clip from pivot pin remove pivot pin from ladder. Hold ladder in place replace pivot pin and R-clip, secure in stowed position with retaining strap.

(18) Replace A-Frame upper ladder by removing R-clip from pivot pin remove pivot pin from ladder hold ladder in place replace pivot pin and R-clip, secure in stowed position with retaining strap.

(19) Rotate the A-Frame legs, by pressing A-Frame rotate deploy button on the interface panel until the deployed light comes on.

(20) Insert A-Frame rotate shoot bolts.

(21) Position stabiliser feet under stabiliser legs.

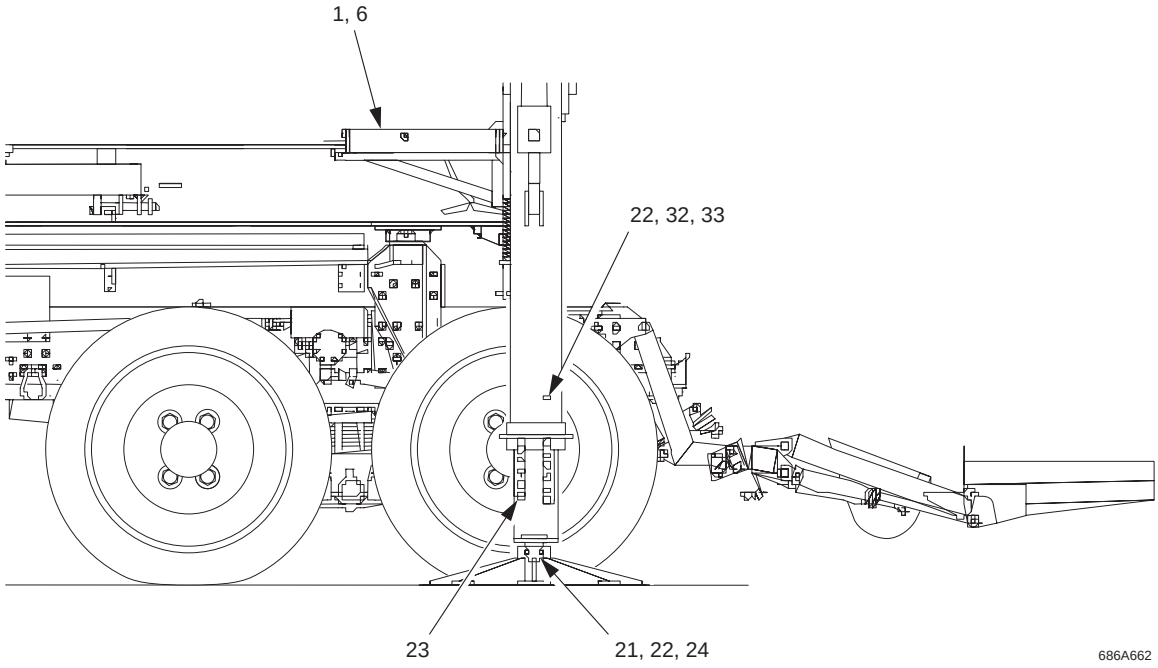
(22) Remove stabiliser leg pins and r clips.

(23) Lower stabiliser legs onto the feet.

NOTE

Only just rest the feet on the ground DO NOT start to lift the A-Frame.

(24) Refit stabiliser feet by fitting the securing u-bolt and new nyloc nuts.



(25) Release twist locks on both sides, raise stabiliser legs to pin hole number eleven, replace pins and clips.

(26) Drive vehicle forward to extend launch frame.

(27) Plug launcher chest pack controller in, remove shoot bolts on relax mechanism.

(28) Go to position four on four position rotary switch in the vehicle cab.

(29) Go to beam angle on the chest pack. Operate the right hand joystick to exercise articulator cylinders up and down to check for correct operation.

(30) Insert shoot bolts on relax mechanism, unplug launcher chest pack controller.

(31) Turn rotary switch to position three reverse vehicle to close slide frame.

(32) Remove pin and clip from a- frame stabiliser leg.

(33) Retract stabiliser legs replace pins and r clips.

(34) Rotate twist lock handles to the lock position.

(35) Remove shoot bolts where the mudguards are fitted to the A-Frame.

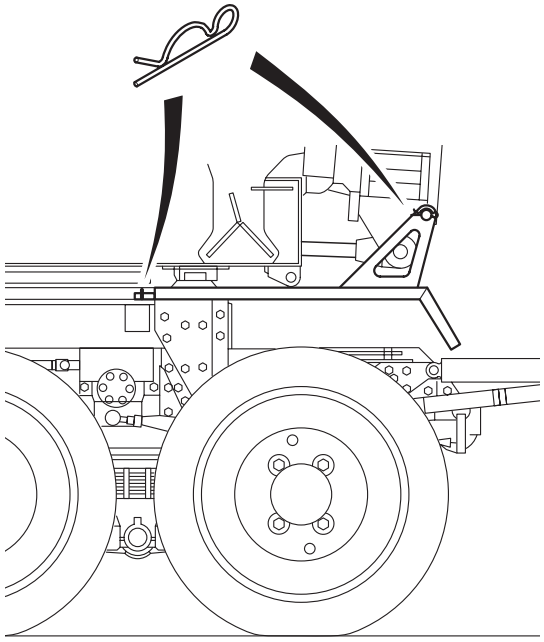
(36) Rotate the A-Frame legs. Press A-Frame rotate park button on the interface panel until the parked light comes on.

(37) Remove the two A-Frame hinge locking pins from each side.

(38) Fold the A-Frame legs by pressing A-Frame fold park button on the interface panel until the park light is on.

(39) Insert the two A-Frame hinge locking pins and clips on each side.

(40) Replace the two removable mudguards, and secure with R clips.



(41) Fit transport strap to far bank support.

(42) Close tail lift to transport position and fit transport straps.

(43) Replace launcher chest pack and tail lift pendent in their storage box.

h. Crane Removal And Replacement

For crane removal refer to direct support maintenance procedure 6-045.

5 - 160 GENERAL - THREAD INSERTS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set Contact Maintenance Truck HMMWV

Materials Required

Thread insert (As required)

Equipment Conditions

Access to assembly

NOTE

The following general procedure is applicable for changing damaged thread inserts.

a. Remove

(1) Using the extracting tool, apply the blade to the top of the threaded insert (View A-A).

(2) Apply pressure in the direction of arrow 'B' and turn extracting tool counter-clockwise.

(3) Extract the threaded insert and discard.

(4) Clean out the tapped hole with a suitable sized bottoming tap.

b. Install

(1) Using the inserting tool, withdraw the mandrel and place the new insert in the chamber, the tang must be towards the nozzle.

(2) Rotate the mandrel clockwise thru the insert until it engages with the tang.

(3) Continue to rotate the mandrel clockwise until the thread insert is engaged and flush with the face of the nozzle.

(4) Place the inserting tool squarely over the tapped hole and continue to rotate the mandrel clockwise until the threaded insert is transferred in to the tapped hole. Do not apply pressure to the tool.

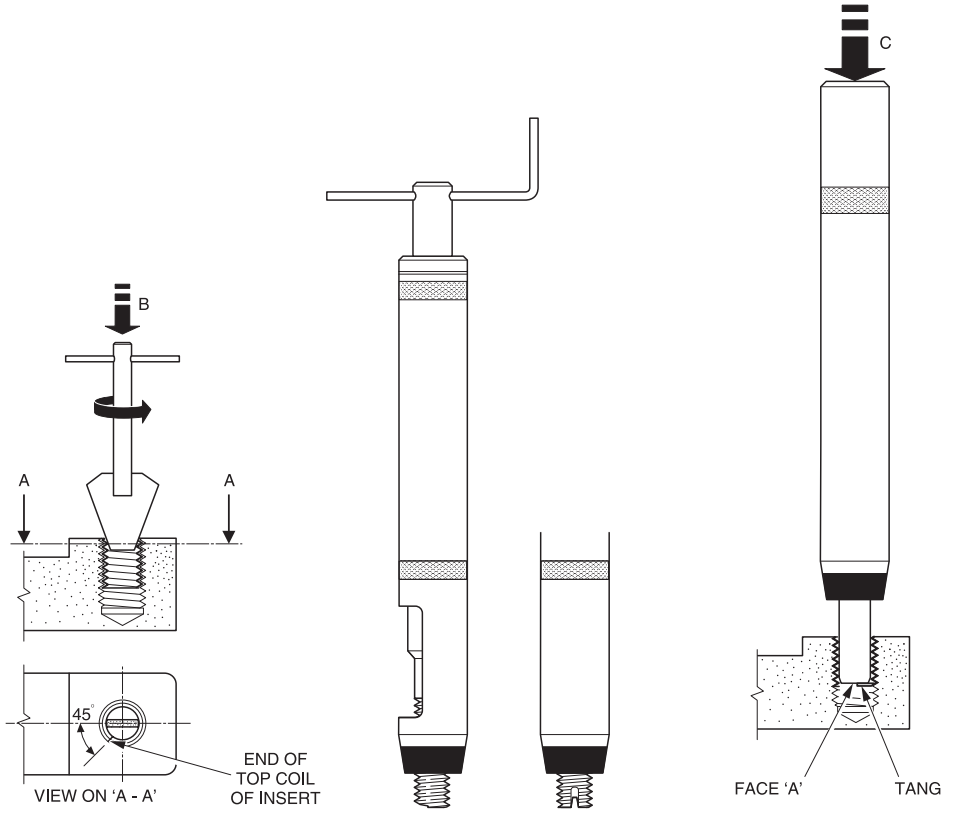
(5) Remove the inserting tool.

(6) Using the tang break off tool, place the tool inside the threaded insert against the tang at face 'A'.

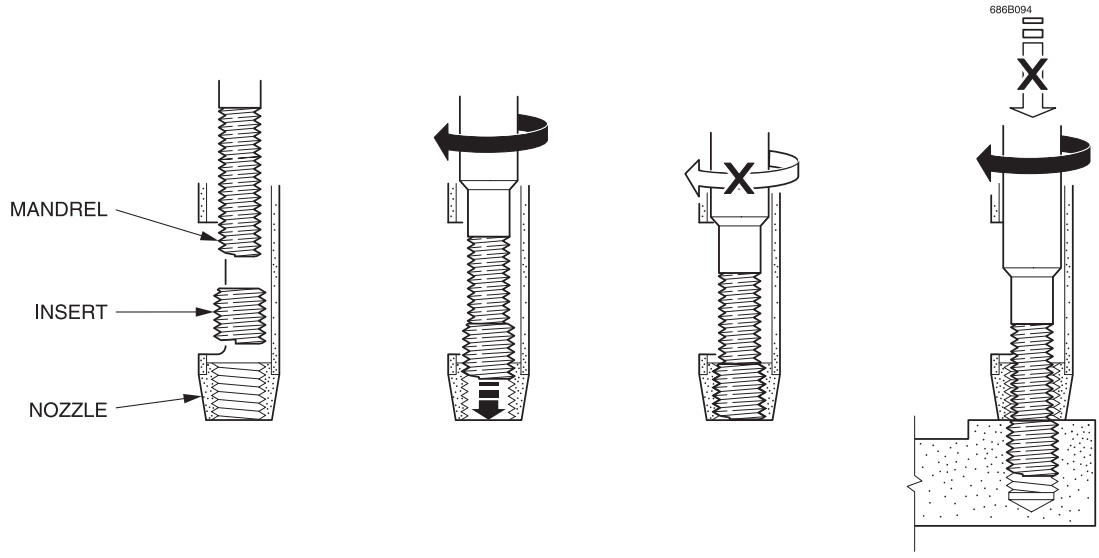
(7) Holding the tool with the left hand strike the head of the tool 'C' and break off the tang.

c. Follow on tasks

(1) Clean out the hole with the new threaded insert installed.



EXTRACTING TOOL INSERTING TOOL TANG BREAK-OFF TOOL



Install (1) Install (2) Install (3) Install (4)

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CHAPTER 6

DIRECT SUPPORT MAINTENANCE PROCEDURES

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Chapter 6

Section I. DIRECT SUPPORT MAINTENANCE PROCEDURES

6-1 INTRODUCTION

a. All components must be cleaned and inspected at regular intervals. If any cracks or damage are noted, items must be repaired at the authorised level of maintenance.

b. Periodic inspection by an authorised inspector will be carried out at regular intervals. Visual inspection of all bridge and launching components will be made following each bridge mission.

a. Refer to Unit Preventative Maintenance Checks and Services (Chapter 5 Section III) for inspection procedures.

b. Refer to Appendix C to determine the torque limits for all fixings unless the torque limits are otherwise stated in the maintenance procedures.

c. To meet the equipment conditions stated in the maintenance procedures it might be necessary to refer to the operator's manual TM 5-5420-279-10.

d. It is good engineering practice to cover the open ends of hydraulic hoses and unions, when they are disconnected, to prevent contamination of the hydraulic oil.

e. Before carrying out any work involving the disconnection of the electrical system ensure that the vehicle is switched off and the battery shutoff switch is in the off position.

f. When climbing on the DSB system three points of contact should be maintained at all times.

g. When changing out assemblies and parts the correct part must be identified from the RPSTL TM 5-5420-279-23P.

h. Electrical fault finding is only to be carried out by qualified electricians, wiring diagrams for the launcher are provided at Appendix G. Wiring diagrams for the crane are provided at Appendix J.

i. Unit maintenance procedures can be found in Chapter 5 Section IV of this manual.

j. To disconnect the launch system from the vehicle see unit maintenance procedure 5-159.

k. The location of hydraulic and electrical components used on the DSB are provided in Appendix D for the launcher and Appendix J for the crane.

l. Safety inspection and testing of lifting devices should be carried out in accordance with TB 43-0142.

WARNING

LOSS OF HEARING. PERSONNEL MUST WEAR HEARING PROTECTIVE DEVICES WHEN OPERATING THE CRANE DURING LAUNCH AND RECOVERY OPERATIONS OR WHEN WORKING WITHIN 10FT (3M) OF A DSB LAUNCH VEHICLE AT HIGH ENGINE IDLE.

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6 - 001 BRIDGE MODULE - PIN JAW CONNECTION SYSTEM

This task covers:

a. Inspection b. Remove c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

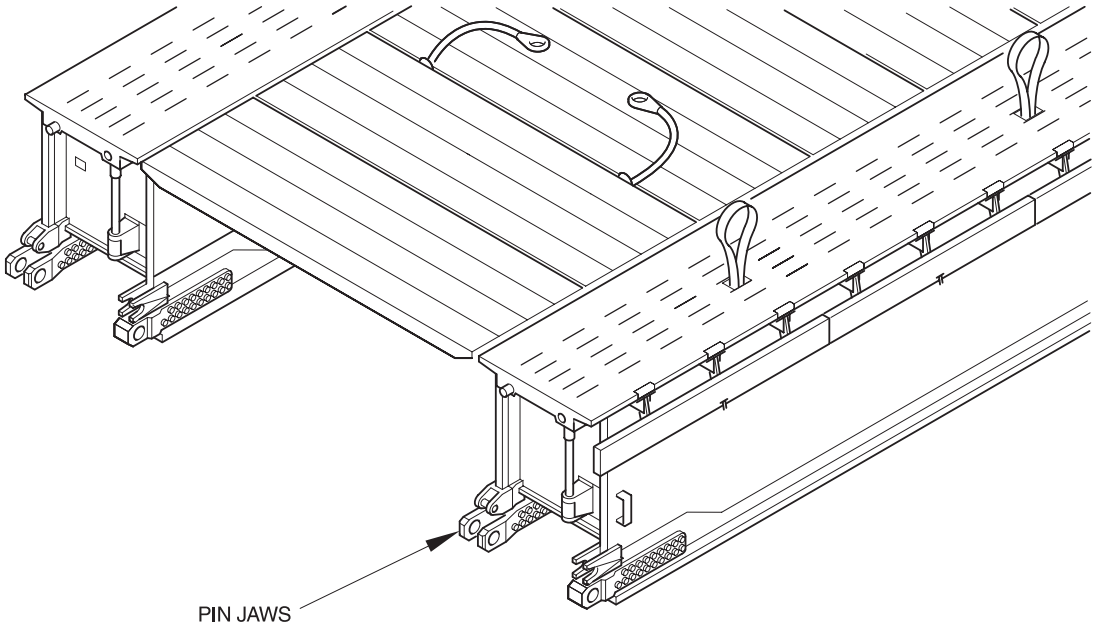
Thread locking compound, loctite 242

Equipment Conditions

Bridge Module open and on raised flat surface

CAUTION

Do not undo all 19 rotabolts at the same time. Tighten / change each bolt individually

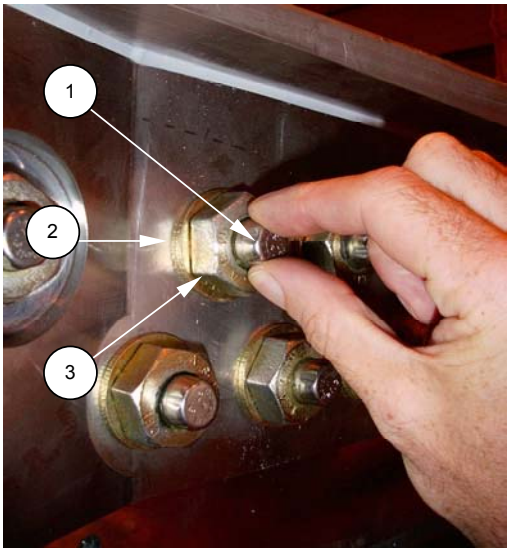


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a. Inspection

(1) Check rotabolt cap locks for obvious signs of damage. Replace if necessary.

(2) If it is possible to turn the caps with the fingers, tighten the friction grip nuts as described in Install, or replace defective bolts.



NOTES

Bolts should only be gripped as tight as a pen.

When a slight drag can be felt on the cap lock, the bolt is at 95% of its required torque.

For each configuration of 19 bolts the following minimum cap tightness is required for a module to be operational.

At least 15 bolts should be at 100% of the correct torque setting, that is no rotation when held like a pen.

Should a number of low tension bolts be concentrated in a particular area them something significant may have occurred – re-tightening and subsequent close monitoring would be prudent.

b. Remove

(1) Remove friction grip nut (1) washer (2) and rotabolt (3).

(2) Replace any defective friction grip nuts (1) and rotabolts (3) as required.

NOTE

The friction grip bolts are supplied with plastic sleeving fitted around the shank. Do not remove the sleeving, the sleeving is used to centralize the bolt in its mating hole.

CAUTION

Rotabolts with no plastic sleeving should not be used.

(3) If bolts require tightening, firstly back off the nut before re-tightening commences. This procedure helps to break the initial stiction which may be greater than the required torque.

c. Install

(1) Fit new rotabolts (3) washers (2) and friction grip nuts (1).

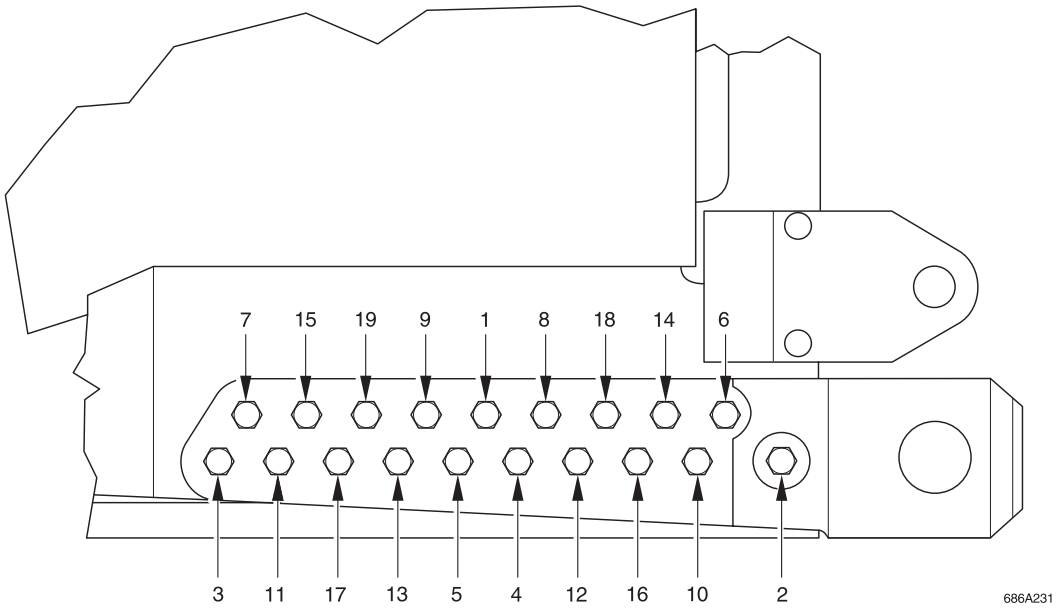
(2) Ensure the bolts are positioned centrally in the holes.

(3) Tighten nuts in numerical order, as shown in the rotabolt tightening sequence, to a torque of 500 lb/ft (678 Nm).

(4) Repeat tightening sequence until the rotabolt control cap locks. Indicating achievement of the pre-load of 880 lb/ft (1193 Nm).

NOTE

The cap is tight when it will not rotate when gripped as tightly as a pen.



Rotabolt Tightening Sequence

6 - 002 A-FRAME - STABILIZER MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

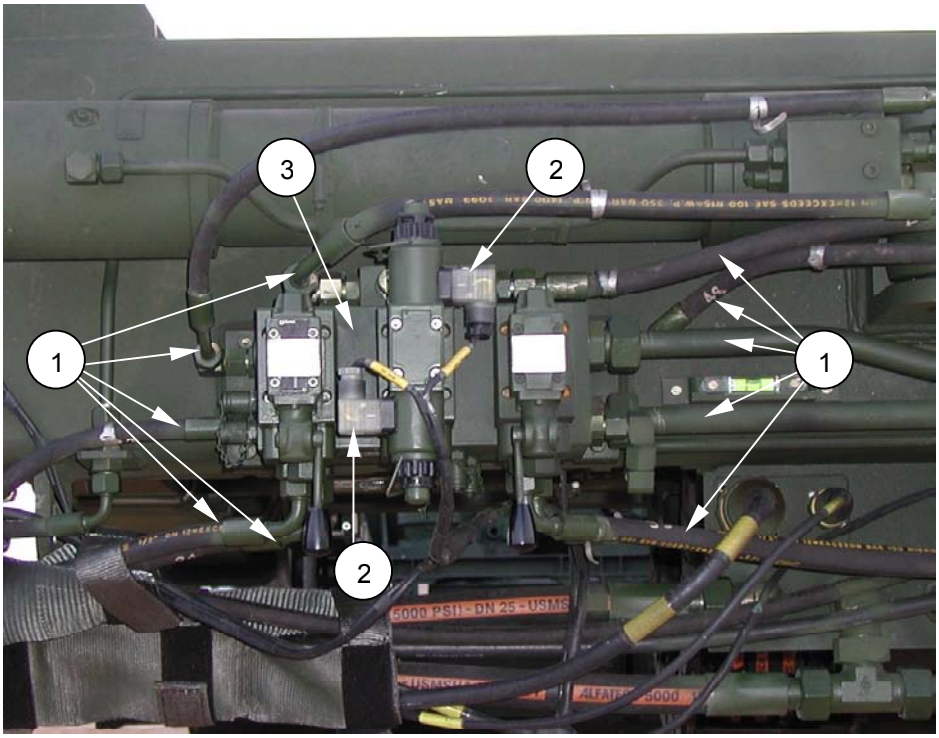
A Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

---

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and remove hydraulic pipes (1) connected to the stabilizer manifold assembly (3).

(3) Note the position of and remove the electrical connections (2) to the solenoid valves.

(4) Remove the nuts, bolts and washers mounting the stabilizer manifold to the A-Frame.

(5) Remove the stabilizer manifold (3).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Apply thread-locking compound to the mounting bolts.

(2) Fit the stabilizer manifold (3) to the A-Frame with the nuts, bolts and washers.

(3) Fit the hydraulic pipes (1) to the positions noted during removal.

(4) Fit the electrical connections (2) to the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the system and check for correct operation and hydraulic fluid leaks.

6 - 003 A-FRAME - STABILIZER LEG AND STABILIZER CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Grease (As required)

Equipment Conditions

A-Frame Unfolded and Rotated to 60 degrees

WARNING

CRUSH INJURY. THE STABILIZER LEG IS HEAVY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

This procedure details the Remove of the Stabilizer Leg and the Stabilizer Cylinder. The A-Frame Stabilizer Outer Leg Lower Bearing Pads may also be accessed during this procedure.

a. Remove

(1) Remove stabilizer foot (1) in accordance with unit maintenance procedure 5-021.

(2) Lower stabilizer leg (2) until the cylinder location pin (3) is visible.

(3) Remove the snap ring (4) from the cylinder location pin (3).

(4) Support the weight of the stabilizer leg (2).

(5) Remove the cylinder location pin (3) and retain the spacer (4).

(6) De-pressurize hydraulic system. Refer to unit maintenance 5-118.

(7) Note the position of and disconnect the hydraulic pipes (6) connected to the stabilizer leg cylinder.

(8) Remove the hydraulic extension unions (7).

(9) Remove the stabilizer leg cylinder pin locking plate bolts (8) and remove the locking plates (9).

(10) Remove the boss bolts (10) securing the stabilizer leg cylinder pin boss (11) and remove the boss (11).

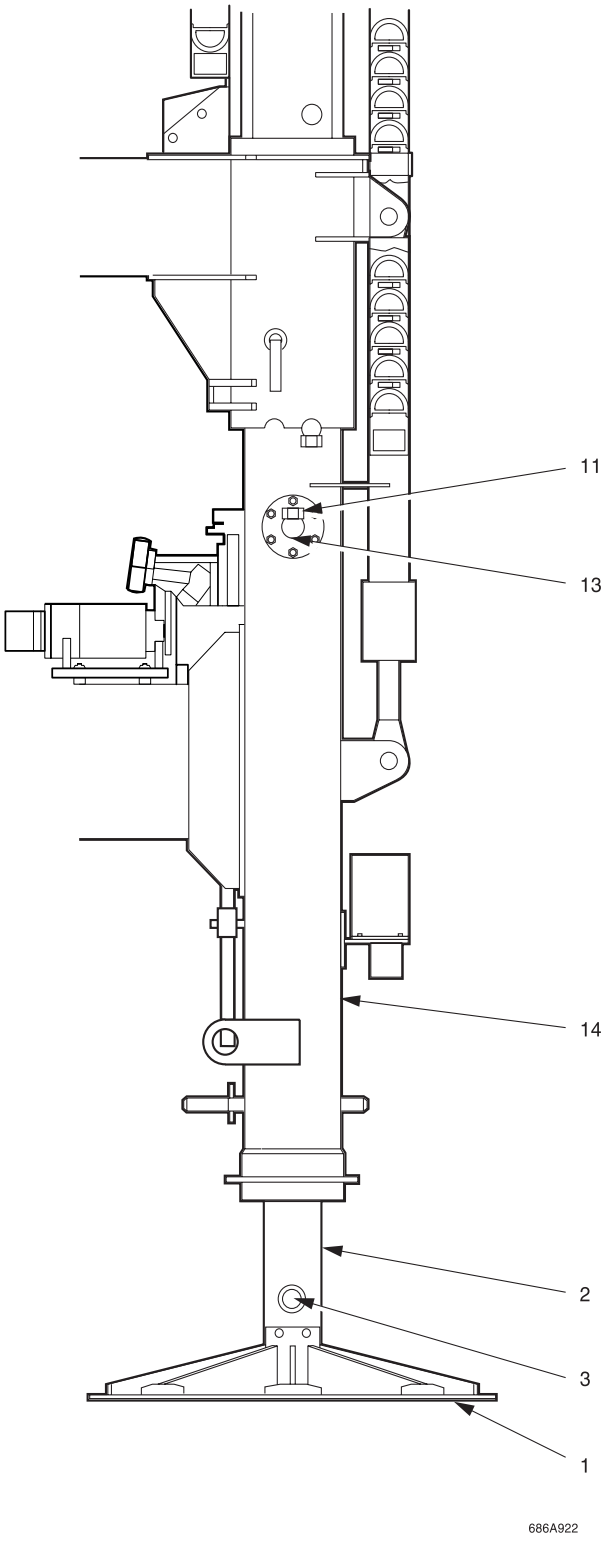
(11) Remove the spacers (12) on the stabilizer leg cylinder pin (13) and remove the stabilizer leg cylinder pin (13).

(12) Push the stabilizer leg (2) up through the outer leg section (14) until the lower bearing pads mounted in the outer leg section (14) are accessible.

(13) Remove the screws retaining the lower bearing pads and remove the bearing pads.

WARNING

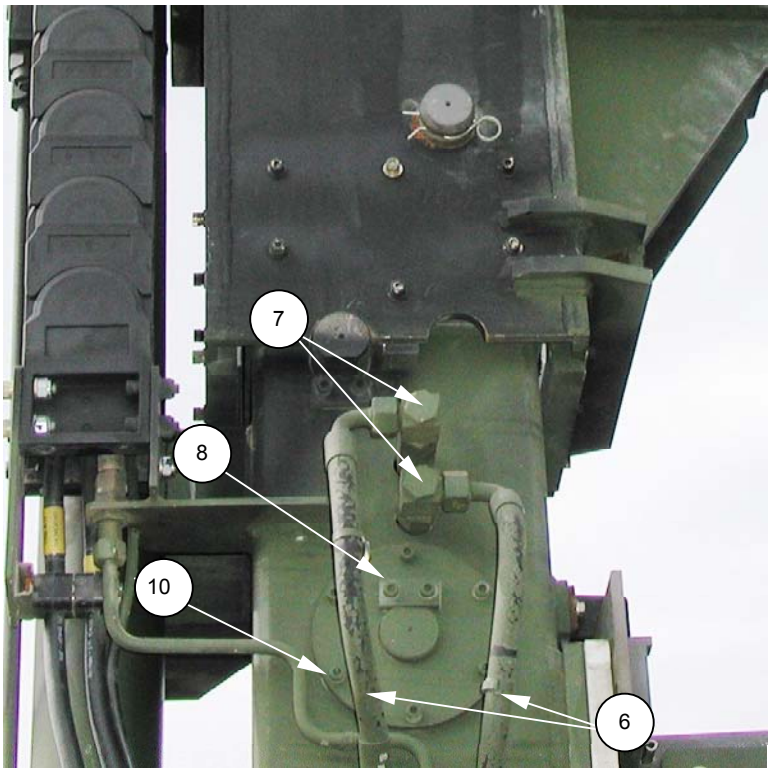
CRUSH INJURY. THE STABILIZER LEG AND STABILIZER LEG CYLINDER ARE HEAVY.

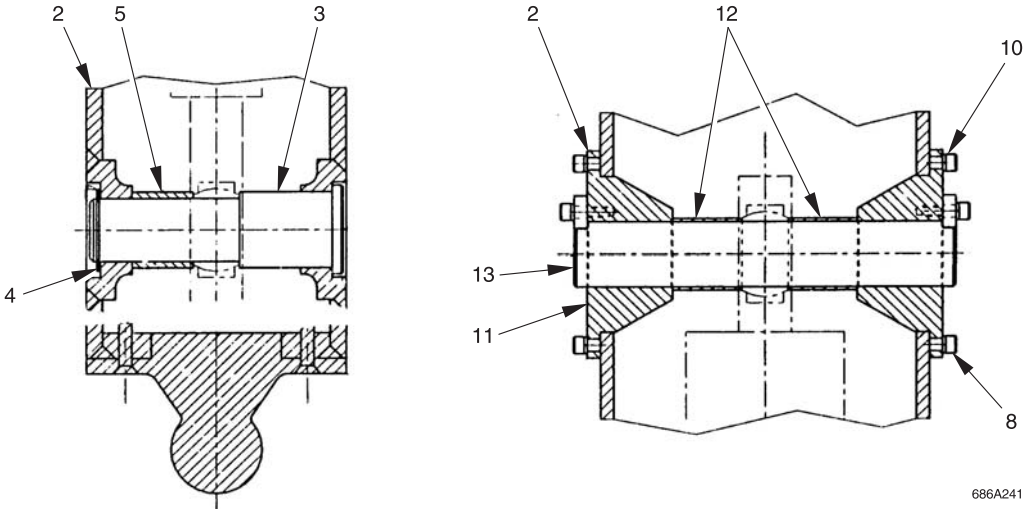


NOTE

When the Stabilizer Leg is removed the Stabilizer Leg Cylinder will also be removed.

(14) Remove the stabilizer leg (2) complete with stabilizer leg cylinder.





(15) Remove the four screws (15) on each of the stabilizer leg bearing pads (16) and remove the bearing pads.

(16) Measure the bearing pad thickness. If the bearing pad thickness is 6mm or less then replace the bearing pads.

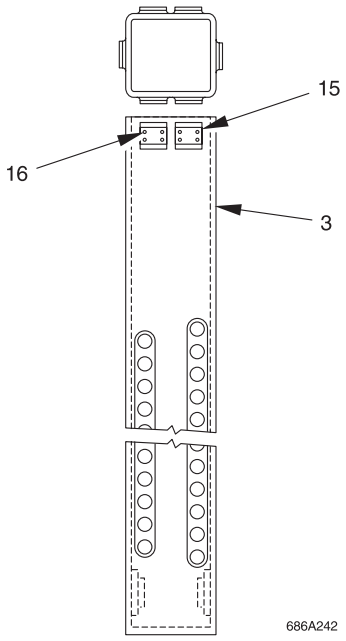
(17) Check the condition of the outer leg bearing pads and renew if necessary.

(18) Check all welds for corrosion and cracking.

(19) Check the stabilizer leg locking pin drillings (17) for wear or damage.

(20) Check the spacers (5) and (12) from the cylinder location pins (3) and (13) for wear or damage.

(21) Replace components as necessary.



b. Install

(1) Install new bearing pads (16) to the stabilizer leg (2) if necessary and secure in position with screws (15). Use thread-locking compound on the screw threads.

(2) Insert the stabilizer leg (2) complete with stabilizer leg cylinder into the outer leg section (14).

(3) Push the stabilizer leg (2) up through the outer leg section (14) until the mountings for the outer leg section bearing pads are accessible.

(4) Install new outer leg section bearing pads as necessary and secure in place with screws, use locking compound on the threads.

(5) Extract the stabilizer leg (2) until the top stabilizer cylinder mounting is aligned.

(6) Insert the cylinder pin (13) and spacers (12).

(7) Fit and secure the stabilizer cylinder pin boss (11).

(8) Fit and secure the stabilizer cylinder pin locking plate (9).

(9) Fit the hydraulic extension unions (7).

(10) Fit the hydraulic hoses (6) in the positions noted during Remove.

(11) Operate the stabilizer leg cylinder until the lower cylinder pin location hole is accessible.

(12) Align the stabilizer leg cylinder with the location pinhole in the stabilizer leg.

(13) Insert the location pin (3) and fit the spacer (5).

(14) Fit the snap ring (4) to the location pin (3).

c. Follow on tasks

(1) Operate the stabilizer leg in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

6 - 004 A-FRAME - UPPER CENTER BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

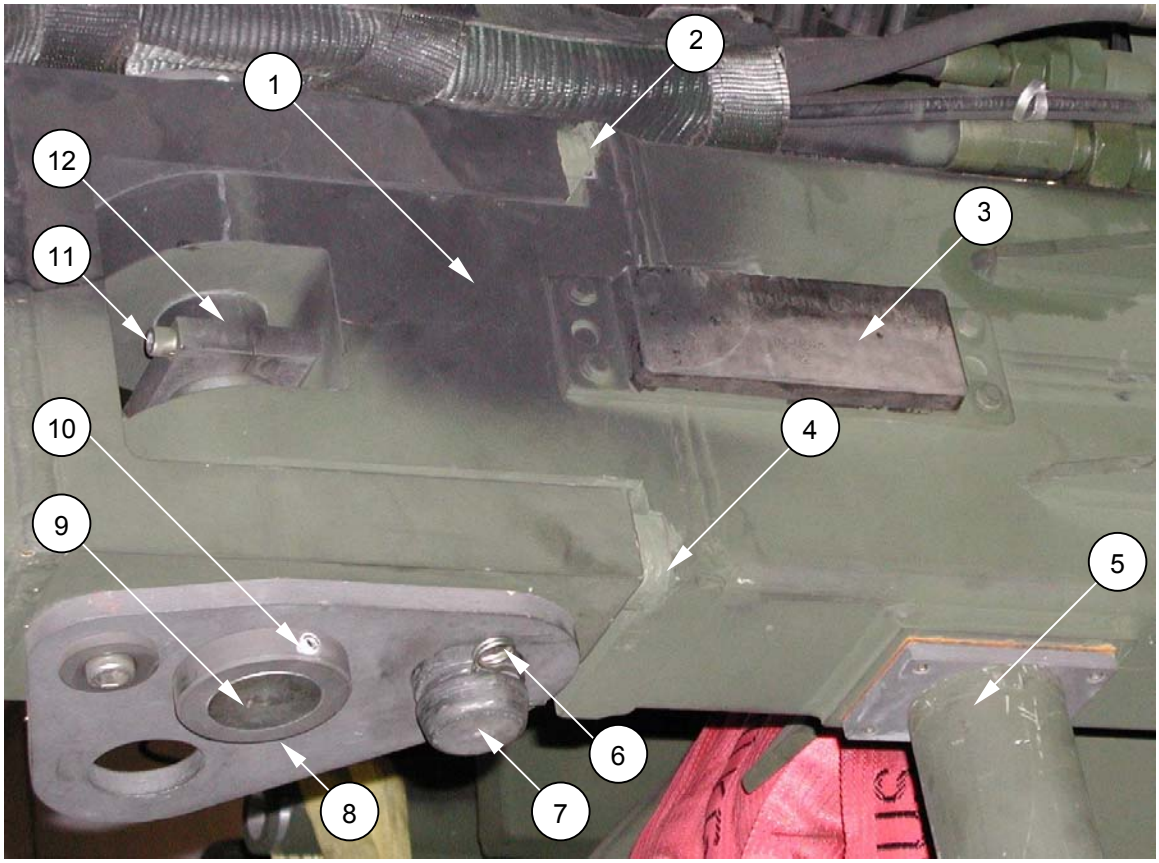
A-Frame removed from launch vehicle and placed on a suitable working surface

---

WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE UPPER CENTER BEAM ALWAYS ENSURE THAT THE WEIGHT OF THE UPPER CENTER BEAM IS SUPPORTED.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

Steps 3 through 9 will have to be done to each hinge of the upper center beam.

a. Remove

(1) Remove the A-Frame from the launch vehicle. See direct support maintenance procedure 6-006.

(2) Remove the support struts (5). See unit maintenance procedure 5-027.

(3) Remove the upper locking pin 'R' clip (6).

(4) Remove the upper locking pin (7).

(5) Remove the spring pin (10).

(6) Remove the locking collar (8).

(7) Remove the two bolts and washers (11) securing the clamp block (12).

(8) Note the position of and remove the clamp block (12).

(9) Remove the hinge pin (9) complete with thrust washer.

(10) Disconnect any brackets that retain hydraulic pipes or electrical cables to the upper center beam.

(11) Remove the upper center beam (1) from the A-Frame.

(12) Check all threaded components for wear and damage.

(13) Check the bumper for wear and damage (3).

(14) Check the top and bottom friction linings (2) and (4) for wear and damage.

(15) Check all welds for cracking and corrosion.

(16) Replace components as necessary.

b. Install

NOTE

Steps 2 through 8 will have to be done to each hinge of the upper center beam.

(1) Position the upper center beam (1) on the A-Frame.

(2) Fit the hinge pin (9) and thrust washer.

(3) Apply thread locking compound to all bolts.

(4) Fit the clamp block (12) in the position noted during Remove and secure with bolts and washers (11).

(5) Fit the locking collar (8) to the hinge pin (9).

(6) Secure the locking collar (8) with the spring pin (10).

(7) Fit the upper locking pin (7).

(8) Fit the upper locking pin 'R' clip (6).

(9) Fit the support struts (5). See unit maintenance procedure 5-027.

(10) Fit the A-Frame to the launch vehicle. See direct support maintenance procedure 6-006.

6 - 005 A-FRAME - LOWER CENTER BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

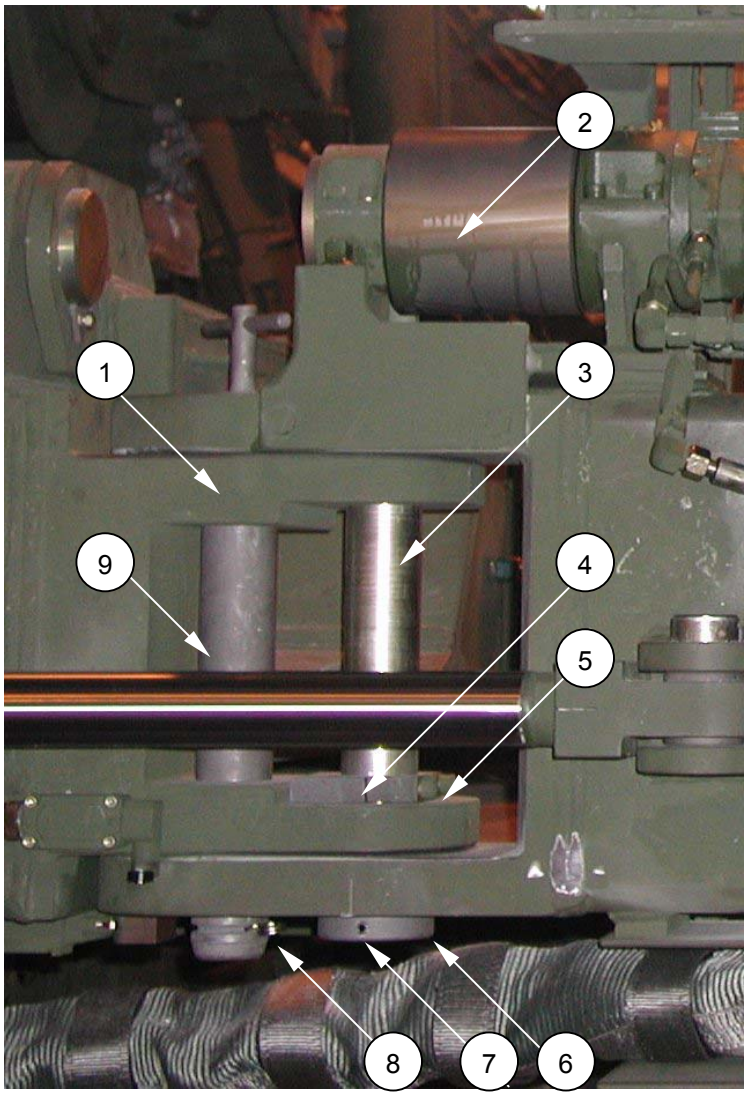
A-Frame removed from launch vehicle and placed on a suitable working surface

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WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LOWER CENTER BEAM ALWAYS ENSURE THAT THE WEIGHT OF THE LOWER CENTER BEAM IS SUPPORTED.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

Steps 8 through 14 will have to be done to each hinge of the lower center beam.

a. Remove

(1) Remove the A-Frame from the launch vehicle. See direct support maintenance procedure 6-006.

(2) Remove the support struts. See unit maintenance procedure 5-027.

(3) Remove the folding cylinders. See unit maintenance procedure 5-014.

(4) Remove the shoot bolt assemblies. See unit maintenance procedure 5-026.

(5) Remove the limit switches. See unit maintenance procedure 5-023.

(6) Remove the stabilizer manifold. See direct support maintenance procedure 6-002.

(7) Disconnect any brackets that retain hydraulic pipes or electrical cables to the lower center beam.

(8) Remove the inner guide support roller (2). See unit maintenance procedure 5-018.

(9) Remove the lower locking pin 'R' clip (8).

(10) Remove the lower locking pin (9).

(11) Remove the spring pin (7).

(12) Remove the locking collar (6).

(13) Remove the two bolts and washers (5) securing the clamp block (4).

(14) Note the position of and remove the clamp block (4).

(15) Remove the hinge pin (3) complete with thrust washer.

(16) Check all threaded components for wear and damage.

(17) Check the levels for damage.

(18) Check the top and bottom friction linings and for wear and damage.

(19) Check all welds for cracking and corrosion.

(20) Replace components as necessary.

(21) Remove the lower center beam (1) from the A-Frame.

b. Install

NOTE

Steps 2 through 9 will have to be done to each hinge of the lower center beam.

(1) Position the upper center beam (1) on the A-Frame.

(2) Fit the hinge pin (3) and thrust washer.

(3) Apply thread locking compound to all bolts.

(4) Fit the clamp block (4) in the position noted during Remove and secure with bolts and washers (5).

(5) Fit the locking collar (6) to the hinge pin (3).

(6) Secure the locking collar (6) with the spring pin (7).

(7) Fit the lower locking pin (9).

(8) Fit the lower locking pin 'R' clip (8).

(9) Fit the inner guide support roller (2). See unit maintenance procedure 5-018.

(10) Connect any brackets that retain hydraulic pipes or electrical cables to the lower center beam.

(11) Fit the support struts. See unit maintenance procedure 5-027.

(12) Fit the folding cylinders. See unit maintenance procedure 5-014.

(13) Fit the shoot bolt assemblies. See unit maintenance procedure 5-026.

(14) Fit the limit switches. See unit maintenance procedure 5-023.

(15) Fit the stabilizer manifold. See direct support maintenance procedure 6-002.

(16) Fit the A-Frame to the launch vehicle. See direct support maintenance procedure 6-006.

6 - 006 A-FRAME - A-FRAME ASSEMBLY REMOVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Ladder/access platform
Fall arrest (safety) equipment
Leather Gloves/Gauntlets
Crane and slings to lift A-Frame
Supports for A-Frame when removed from Launch Frame

Materials Required

None

Equipment Conditions

A-Frame deployed, stabilizer legs retracted
Launch frame removed from A-Frame
Slide frame not deployed, ISO locks locked
Vehicle switched off and battery shutoff switch in the off position

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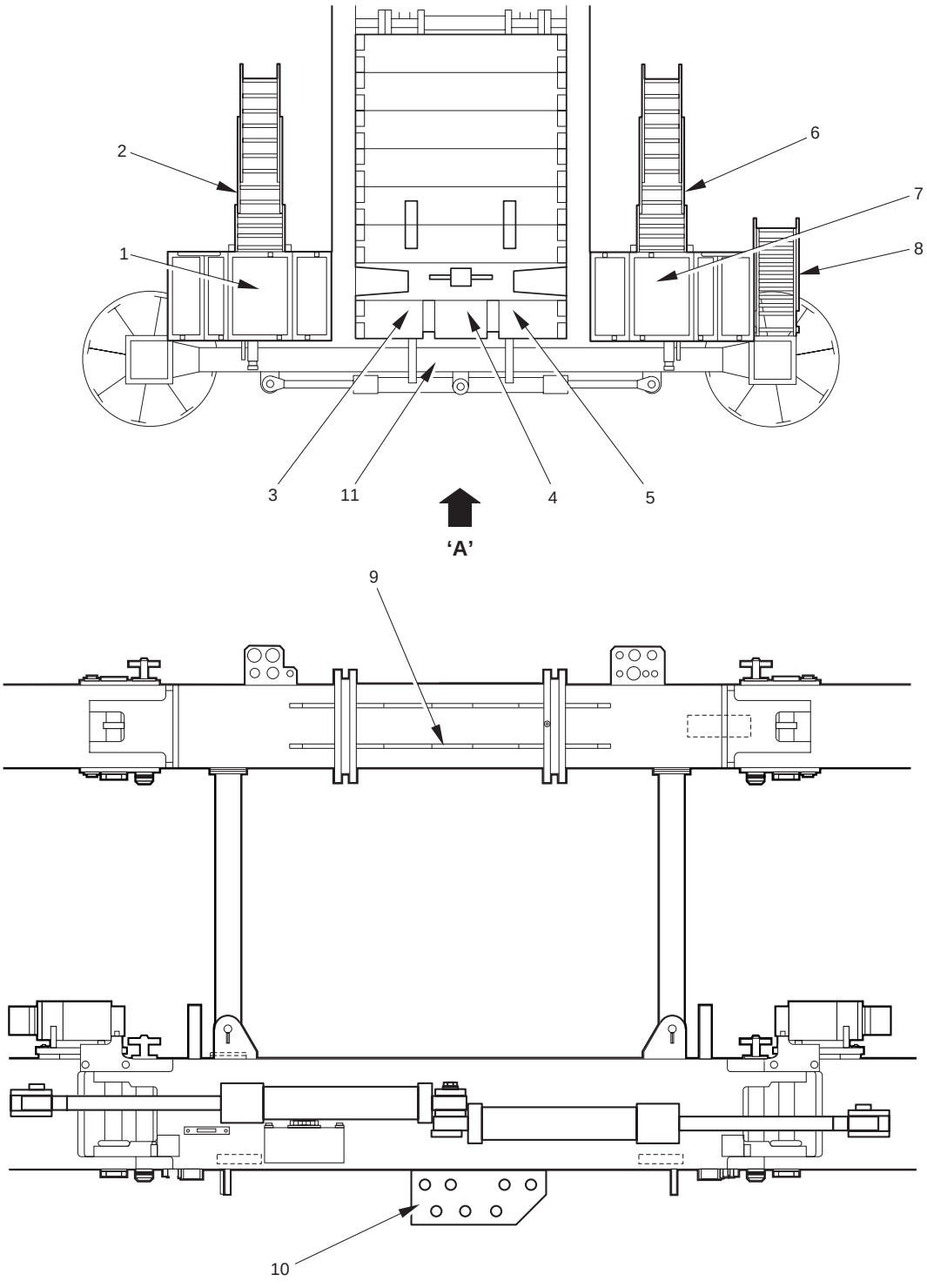
WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE HYDRAULICS ON THE A-FRAME ASSEMBLY.

FALL INJURY WHEN WORKING AT HEIGHT, THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 20FT (6M). THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED.

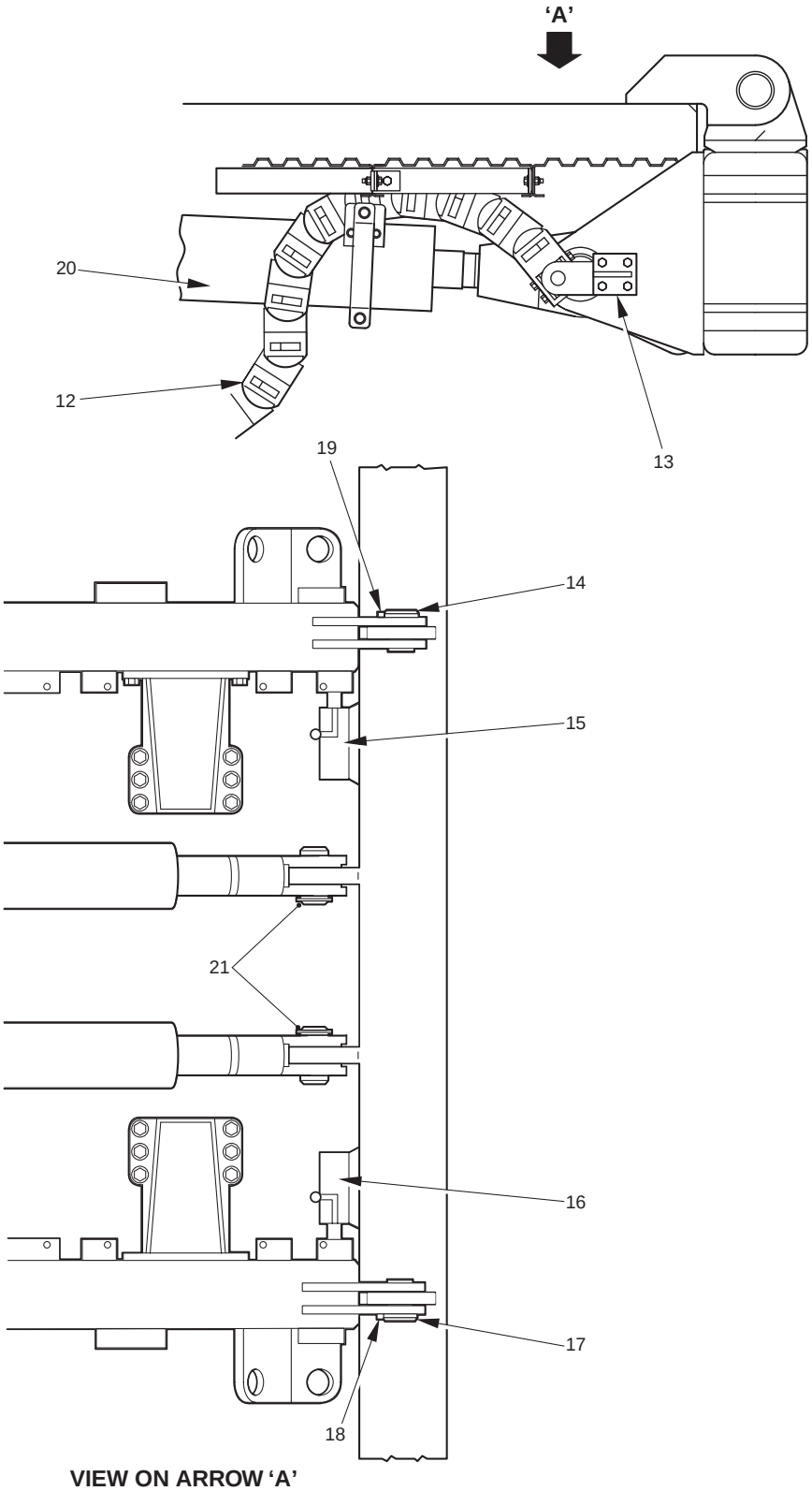
CRUSH INJURY. THE A-FRAME IS HEAVY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



VIEW ON ARROW 'A'

686A648



VIEW ON ARROW 'A'

686A643

a. Remove

(1) Remove the launch frame see direct support maintenance procedure 6-018.

(2) Remove the access ladders (2, 6 and 8) from the A-Frame.

(3) Remove the stabilizer feet from the A-Frame stabilizer legs. See unit maintenance procedure 5-021.

(4) Remove the fixed walkway (3, 4 and 5) from the rear of the sliding frame, adjacent to the A-Frame.

(5) Remove the top layer of the energy chain (12) mounted centrally between the rotate cylinders (20) under the rear of the launch frame. See unit maintenance procedure 5-097.

(6) De-pressurize the hydraulic system see unit maintenance procedure 5-118.

(7) De-pressurize the rotate cylinders (20) see unit maintenance procedure 5-123.

(8) Note the position of and disconnect the 5 hydraulic and 2 electrical connectors at the A-Frame lower cross member (10). Fit protective caps to the exposed ends of the hydraulic and electrical connectors.

(9) Attach slings and a crane to the A-Frame upper cross member (9) and take the weight with the crane.

(10) Disconnect the energy chain mounting brackets (13), which act as the A-Frame rotate cylinder pin (21) locking plates.

(11) Fold the energy chain (12) away from the A-Frame and out of the way.

(12) Support the A-Frame rotate cylinders (20) and remove the cylinder pins (21) that attach them to the A-Frame see unit maintenance procedure 5-077.

(13) Withdraw the shoot bolts (15 and 16) that lock the A-Frame to the sliding frame, on the lower A-Frame cross member.

(14) Remove the locking plate and pin (14, 19, 17 and 18) from each of the 2 bearings that attach the A-Frame to the slide frame.

(15) Lift the A-Frame away from the slide frame with the crane and lay it carefully on suitable supports with the hydraulic pipes uppermost. Ensure the A-Frame is supported so no damage will result to the hydraulic pipe work and the electrical harnesses.

(16) Refer to the relevant maintenance procedure, for carrying out maintenance to the component parts of the A-Frame assembly.

b. Install

(1) Attach slings and a crane to the A-Frame upper cross member (9) and take the weight with the crane.

(2) Lift the A-Frame into position on the slide frame.

(3) Fit the locking plate and pin (14, 19, 17 and 18) for each of the 2 bearings that attach the A-Frame to the slide frame.

(4) Engage the shoot bolts (15 and 16) that lock the A-Frame to the slide frame, on the lower A-Frame cross member.

(5) Fit the rotate cylinders (20) to the A-Frame see unit maintenance procedure 5-077.

(6) Fit the energy chain (12) see unit maintenance procedure 5-095.

(7) Fit the hydraulic and electrical connections (10) at the positions noted during removal.

(8) Fit the top layer of the energy chain (12). See unit maintenance procedure 5-097.

(9) Fit the fixed walkway (3, 4 and 5) to the rear of the sliding frame, adjacent to the A-Frame.

(10) Fit the stabilizer feet to the A-Frame stabilizer legs. See unit maintenance procedure 5-021.

(11) Fit the access ladders (2, 6 and 8) to the A-Frame.

(12) Fit the launch frame see direct support maintenance procedure 6-018.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Carry out a full operation check of the of the A-Frame assembly in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for hydraulic oil leaks.

6 - 007 A-FRAME - STABILIZER LEG ASSEMBLY REMOVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

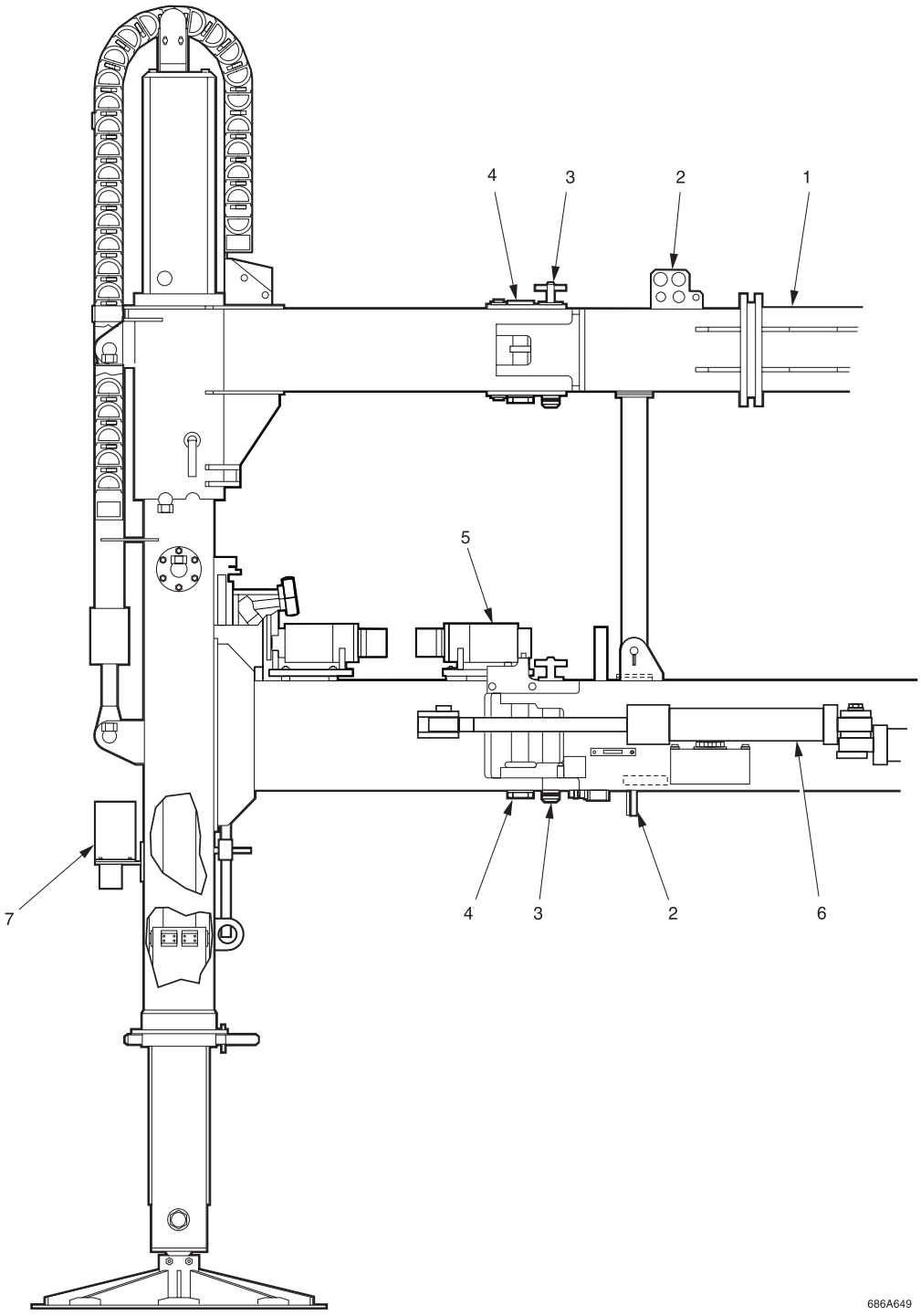
Launch frame removed from A-Frame
A-Frame removed from the Slide Frame and laid on ground, suitably supported with hydraulic pipes uppermost.

WARNING

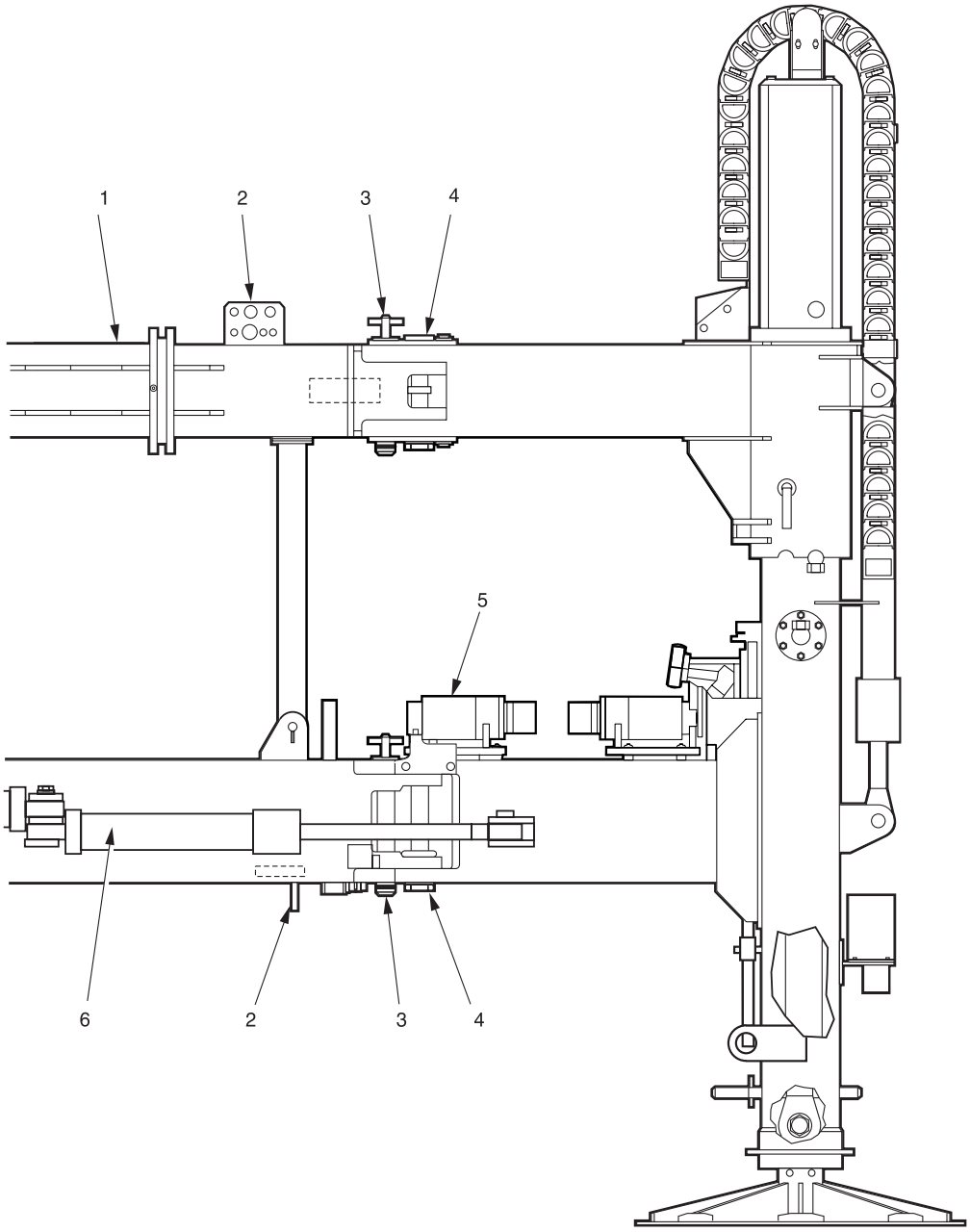
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME STABILIZER LEG ASSEMBLY.

CRUSH INJURY. THE A-FRAME STABILIZER LEG IS HEAVY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



Left hand stabilizer leg



686A650

Right hand stabilizer leg

a. Remove

(1) Remove the launch frame see direct support maintenance procedure 6-018.

(2) Remove the A-Frame (1) from the launch vehicle see direct support maintenance procedure 6-006.

(3) Determine which leg of the A-Frame is to be removed, this procedure applies to either leg.

(4) De-pressurize the folding cylinders (4) see unit maintenance procedure 5-123.

(5) Note the position of, and disconnect the flexible hydraulic hoses at the bulkheads (2) adjacent to the hinge points in the upper and lower A-Frame cross members. Fit protective caps to the exposed ends of the hydraulic connectors.

(6) Remove the inner braked support roller (5) on the lower A-Frame cross member. See unit maintenance procedure 5-018.

(7) Disconnect electrical harnesses at the A-Frame junction box as required. Refer to unit maintenance procedure 5-139.

(8) Disconnect electrical harness mounting brackets to the lower leg cross member as required.

(9) If removing the left-hand stabilizer leg, disconnect the electrical connection to the lower emergency stop (7).

(10) Disconnect the relevant A-Frame folding cylinder (6) from the stabilizer leg being removed see unit maintenance procedure 5-014.

(11) Remove the upper and lower pivot pins (4) (one in each A-Frame cross member) by first removing the clamp plate then withdrawing the pin.

(12) Remove the upper and lower pivot lock pins (3) (one in each A-Frame cross member adjacent to the pivot pin).

(13) The A-Frame stabilizer leg can now be lifted clear of the A-Frame (1).

(14) Refer to the relevant maintenance procedure for the sub assemblies of the A-Frame Stabilizer Leg.

b. Install

(1) Fit the A-Frame stabilizer leg to the A-Frame (1) with the crane and slings.

(2) Fit the upper and lower pivot lock pins (3) (one in each A-Frame cross member adjacent to the pivot pin).

(3) Fit the upper and lower pivot pins (4) (one in each A-Frame cross member).

(4) Fit the relevant A-Frame folding cylinder (6) to the stabilizer leg see unit maintenance procedure 5-014.

(5) Fit the electrical connection to the lower emergency stop (7) on the left-hand stabilizer leg if applicable.

(6) Fit the electrical harness mounting brackets to the lower leg cross member as required.

(7) Fit the electrical harnesses at the A-Frame junction box as required.

(8) Fit the inner braked support roller (5) on the lower A-Frame cross member. See unit maintenance procedure 5-018.

(9) Remove the protective caps to the exposed ends of the hydraulic connectors and fit the flexible hydraulic hoses at the bulkheads (2) adjacent to the hinge points in the upper and lower A-Frame cross members in the positions noted during removal.

(10) Fit the A-Frame assembly to the slide frame see direct support maintenance procedure 6-006.

(11) Fit the launch frame to the A-Frame see direct support maintenance procedure 6-018.

c. Follow on task

(1) Carry out a full functional check of the launch system and check for leaks.

6 - 008 A-FRAME - ELECTRICAL JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

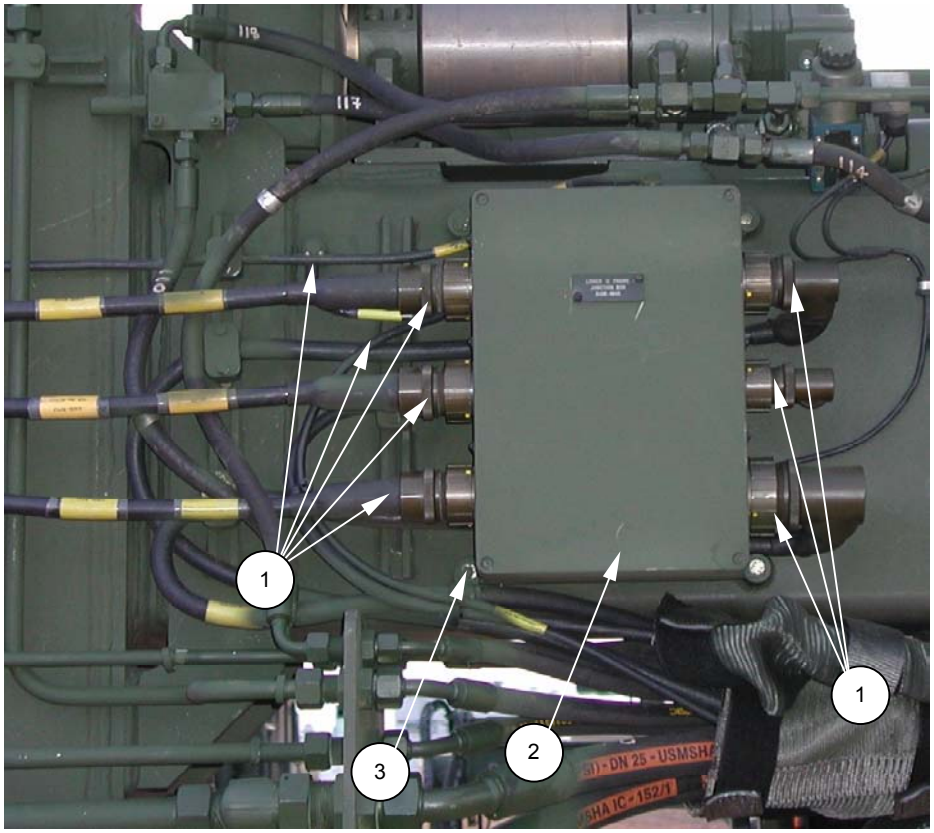
Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 4)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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a. Remove

(1) Note the position of and remove the electrical cables (1) to the A-Frame Junction Box (2).

(2) Remove the four screws and lock washers (3) securing the Junction Box (2) to the A-Frame. Discard the lock washers.

(3) Remove the Junction Box (2).

(4) Examine all threaded components for wear and damage.

(5) Check the electrical harnesses for damage.

(6) Change components as required.

b. Install

(1) Apply thread-locking compound to the screws.

(2) Fit the Junction Box (2) to the A-Frame with the four lock washers and screws (3).

(3) Fit the electrical cables (1) to the positions noted during removal.

6 - 009 LAUNCH FRAME - LAUNCH BEAM DRIVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

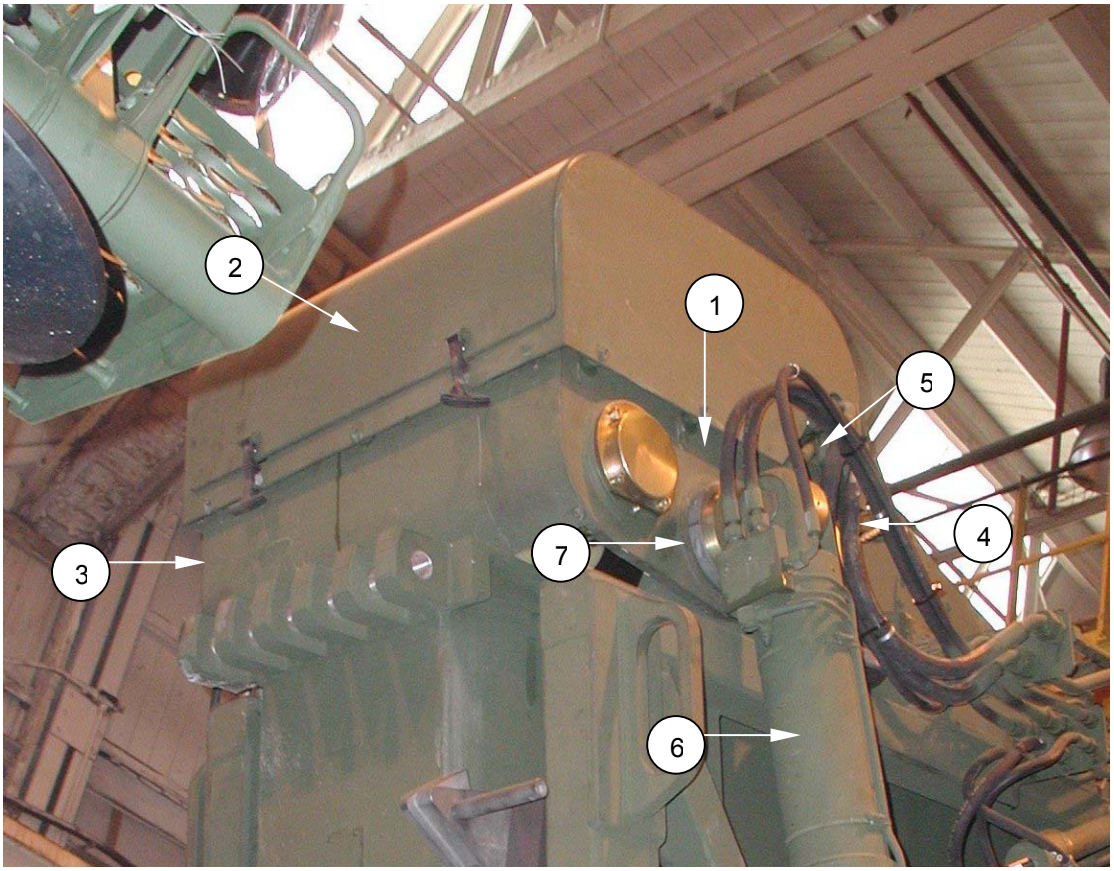
A-Frame Unfolded
Launch Frame Rear Resting on Dunnage

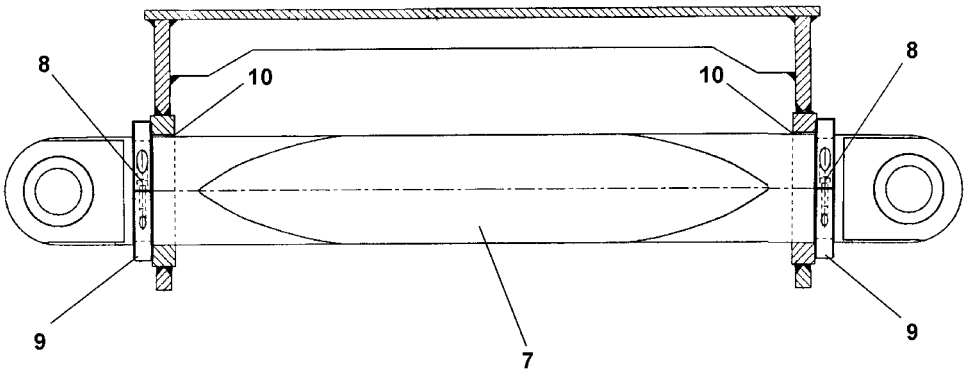
WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LAUNCH BEAN DRIVE ALWAYS ENSURE THAT THE WEIGHT OF THE LAUNCH BEAM DRIVE IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) Unfold the A-Frame stabilizer legs.

(2) Position and rest the rear of the launch frame on suitable dunnage to support the weight of the launch frame when the articulator legs have been disconnected.

(3) De-pressurize hydraulic system - refer to unit maintenance procedure 5-118.

(4) Place suitable dunnage under the launch beam drive (LBD) to keep it level.

(5) Remove the LBD top cover (2). Refer to unit maintenance procedure 5-035.

(6) Remove the socket head screws securing the rear guard (3) to the LBD.

(7) Remove the rear guard (3).

(8) Support the weight of the LBD (1) using a crane and lifting slings.

(9) Note the position of the hydraulic hoses (4) attached to the LBD manifold assembly (5) and disconnect them.

(10) Disconnect the articulator cylinders (6) upper mounting from the LBD pivot shaft (7). Refer to unit maintenance procedure 5-050.

(11) Release the rear pinch roller by turning the rear pinch roller pressure release tap through 90 degrees.

(12) Remove and retain the socket head screws (8) securing the LBD locking collars (9) to the pivot shaft (7).

(13) Remove the locking collars (9).

(14) Remove the pivot shaft (7).

(15) Remove the LBD and place on a suitable level working surface.

(16) Examine all components for damage and wear.

(17) Examine the LBD frame pivot shaft bearings (10) for damage and wear.

(18) Replace damaged or worn components as required.

b. Install

(1) Position the LBD assembly on the launch frame. Support the weight of the LBD using the crane and lifting slings.

(2) Fit suitable dunnage to keep the LBD level.

(3) Fit the pivot shaft (7) through the launch frame and the LBD (1).

(4) Fit the locking collars (9).

(5) Apply thread-locking compound to the threads of the locking collar socket head screws (8).

(6) Secure the locking collars (9) with the locking collar socket head screws (8).

(7) Fit the articulator cylinders (6) as detailed in unit maintenance procedure 5-050.

(8) Re-connect the hydraulic hoses (4) to the LBD manifold assembly (5) in the positions noted during Remove.

(9) Remove the lifting slings and crane.

(10) Fit the rear guard (3) to the LBD (1).

(11) Fit the LBD top cover (2). Refer to unit maintenance procedure 5-035.

(12) Remove the dunnage.

(13) Turn the rear pinch roller pressure release tap through 90 degrees.

c. Follow on task

(1) Operate the LBD, check for correct operation and hydraulic oil leaks.

6 - 010 LAUNCH FRAME - LAUNCH BEAM DRIVE MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

A-Frame Deployed
Launch beam drive top cover removed. Refer to unit maintenance procedure 5-035.
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LAUNCH BEAM DRIVE MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The launch beam drive manifold assembly is located under the left hand rear corner launch beam drive top cover (1).

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and disconnect the hydraulic pipe work (2, 3, 4, 5, 6 and 7) connected to the launch beam drive manifold assembly (10).

(3) Remove the mounting four bolts (8), and washers (9) securing the launch beam drive manifold assembly (10) to the launch beam drive.

(4) Remove the launch beam drive manifold assembly (10).

(5) Note the position of and remove all hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges.

(6) Fit the hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges to the new manifold assembly using new gaskets and O-rings where applicable.

b. Install

(1) Fit the launch beam drive manifold assembly (10) to the launch beam drive.

(2) Apply thread locking compound to the four bolts (8).

(3) Secure the launch beam drive manifold assembly (10) using the four bolts (8) and washers (9).

(4) Fit the hydraulic pipe work (2, 3, 4, 5, 6 and 7) to the positions noted during removal.

(5) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

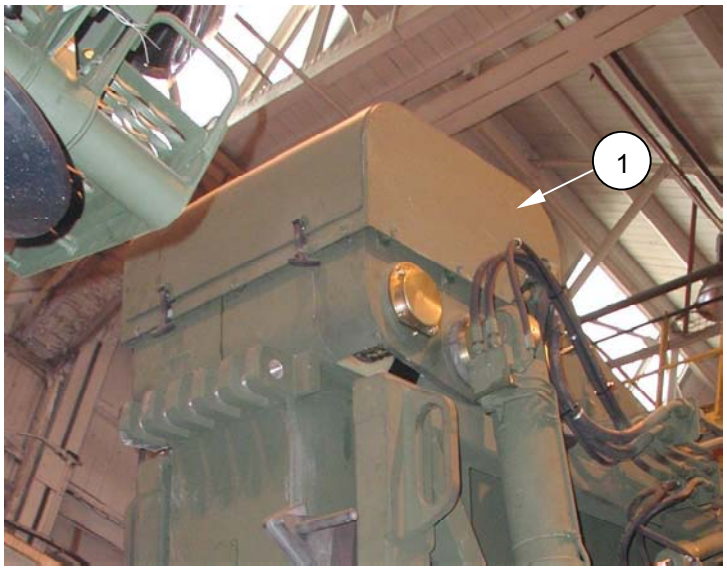
c. Follow on tasks

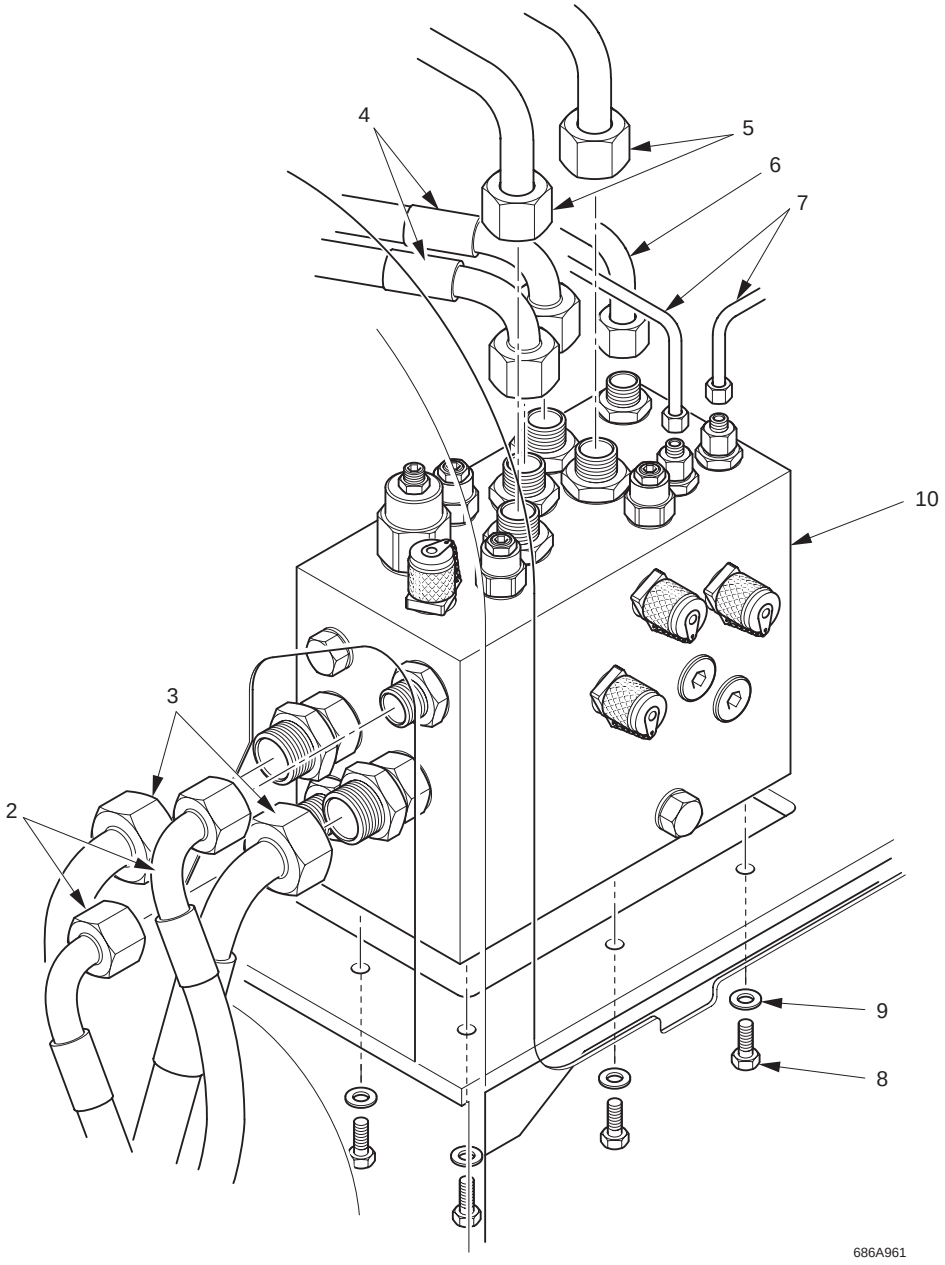
(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the launch beam drive.

(3) Check for hydraulic oil leaks.

(4) Fit the launch beam drive top cover. Refer to unit maintenance procedure 5-035.




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6 - 011 LAUNCH FRAME - WINCH MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

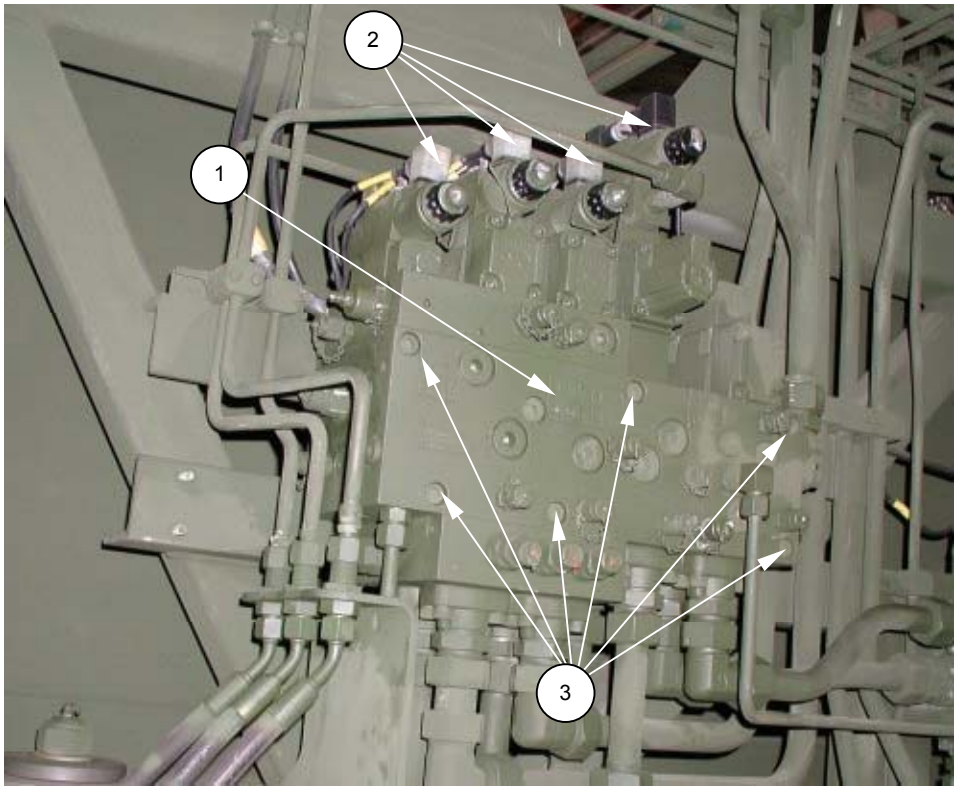
A-Frame Deployed
Slide Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE WINCH MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



b. Remove

(7) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(8) Remove the left-hand launch frame guard to gain access to the winch manifold assembly (1).

(9) Note the position of and disconnect all the hydraulic pipe work connected to the winch manifold assembly (1).

(10) Note the position of and remove the electrical connections (2) on the winch manifold solenoid valves.

(11) Support the weight of the winch manifold assembly(1).

(12) Remove the mounting six bolts, nuts and washers (3) securing the winch manifold assembly (1) to the launch frame.

(13) Remove the winch manifold assembly (1).

(14) Note the position of and remove all hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges.

(15) Fit the hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges to the new manifold assembly using new gaskets and O-rings where applicable.

b. Install

(6) Fit the winch manifold assembly (1) to the launch frame.

(7) Secure the winch manifold assembly (1) using the six bolts, nuts and washers (3).

(8) Fit the electrical connections (2) in the positions noted during removal.

(9) Fit the hydraulic connections to the positions noted during removal.

(10) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

c. Follow on tasks

(5) Switch the battery shutoff switch to the on position.

(6) Check the operation of the winches.

(7) Check for hydraulic oil leaks.

6 - 012 LAUNCH FRAME - LAUNCH BEAM DRIVE WHEELS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

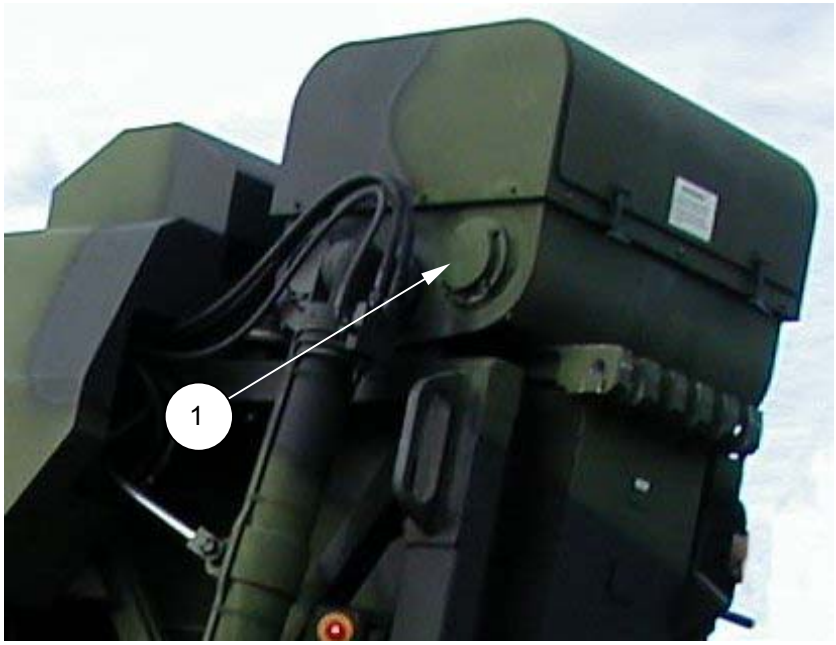
Adhesive loctite 641
Thread locking compound, loctite 242
Grease (As required)

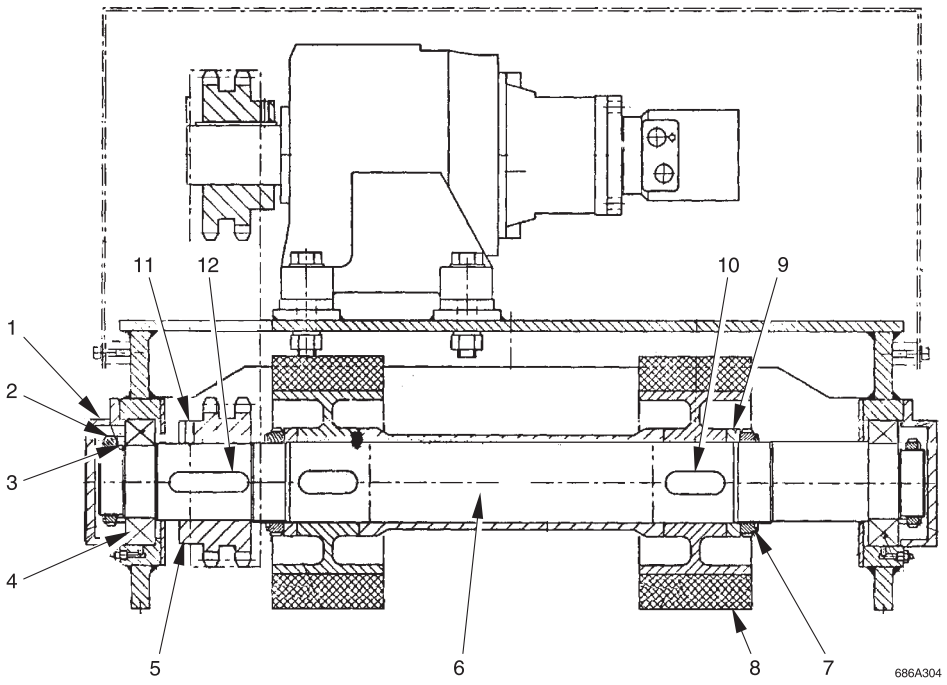
Equipment Conditions

A-Frame Deployed, Launch Frame level

WARNING

DANGER TO PERSONNEL FROM MOVING PARTS. ENSURE THAT THE LAUNCHER IS NOT OPERATED DURING THIS PROCEDURE.





a. Remove

(1) Release tension on duplex chain (4). See unit maintenance procedure 5-039.

(2) Note the fitting arrangement of and remove the duplex chain split link.

(3) Remove the cover and gain access to the beam drive wheel assembly

(4) Disengage the duplex chain from the sprocket (5).

(5) Remove the four bolts and washers securing the bearing end cap (1).

(6) Remove the bearing end cap (1).

(7) Remove the bearing lock nut (2) and washer (3).

(8) Remove the bearing (4).

(9) Carry out steps 5 through 8 on the opposite side of the drive shaft (6).

(10) Remove the drive shaft (6) complete with wheels (8) and sprocket (5).

(11) To remove the sprocket (5), remove the socket head screws (11).

(12) Remove the sprocket (5) complete with key (12).

(13) To remove the wheels (8), remove the wheel bearing lock nut (7) and spacer (9).

(14) Remove the wheel (8) complete with key (10).

(15) Inspect components for damage and corrosion.

(16) Examine for damage to bolt heads and threads.

(17) Examine bearings for wear or damage.

(18) Replace components as required.

b. Install

(1) Fit the key (10) to the drive shaft (6) using loctite 641.

(2) Locate the wheel (8) over the key (10) and fit the wheel (8) to the drive shaft (6).

(3) Secure the wheel (8) with a spacer (9) and bearing lock nut (7).

(4) Fit the sprocket key (12) to the drive shaft (6) using loctite 641.

(5) Locate the sprocket (5) over the key (12).

(6) Secure the sprocket (5) in place with the socket head screws (11).

(7) Place the drive shaft (6) complete with sprocket (12) and wheels (8) in the drive beam assembly.

(8) Fit the bearings (4) at each end of the drive shaft (6).

(9) Secure the drive shaft (6) with a washer (3) and bearing lock nut (2) at each end.

(10) Fit the bearing end cap (1) and secure in place with washers and bolts.

(11) Grease the drive shaft bearings.

(12) Refit the duplex chain and check chain adjustment in accordance with unit maintenance procedures 5-037 and 5-039.

(13) Refit any covers removed to gain access.

c. Follow on task

(1) Check operation of the beam drive assembly in accordance with the operator's manual TM 5-5420-279-10.

6 - 013 LAUNCH FRAME - LAUNCH BEAM FINAL STOP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

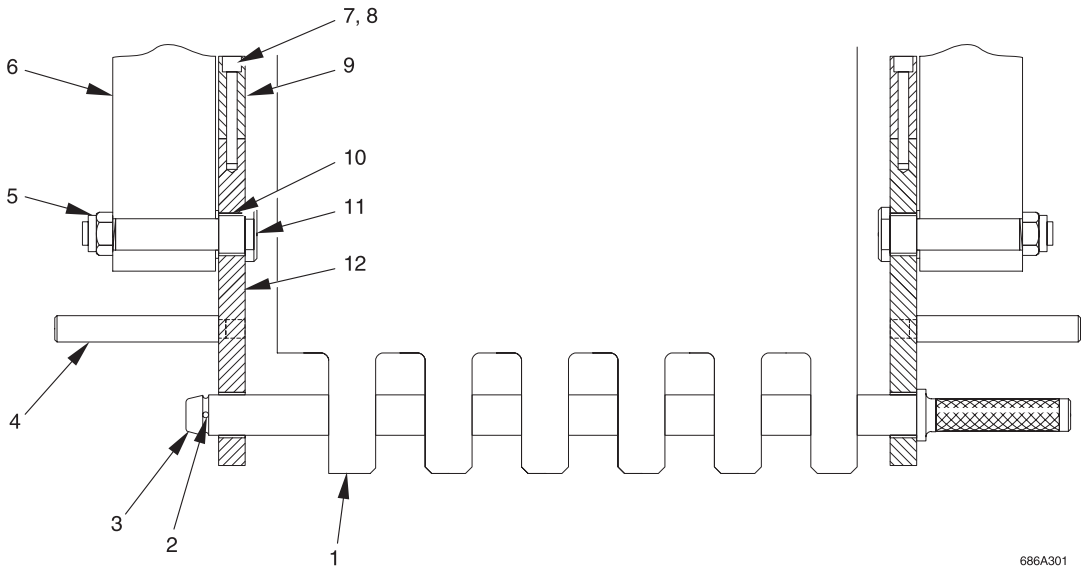
Thread locking compound, loctite 243
Nyloc Nuts (Qty 2)

Equipment Conditions

A-Frame deployed
Forward launch beam removed, see maintenance procedure 6-026

NOTE

It will be necessary to move the Launch Beam in order to gain access to the Launch Beam Final Stop pivot pins.



a. Remove

(1) Remove the R-clip (2) and remove the locking pin (3).

(2) Gain access to the pivot pin (11) by moving the launch beam (1).

(3) Remove nyloc nut (5) and discard.

(4) Remove the pivot pin (11) and arm (12).

(5) If required, remove the screws (7) and washers (8) and remove the counter balance (9).

(6) Remove the bearing (10).

(7) Remove the handle (4).

(8) Check all threaded components for damage.

(9) Check the bearing (10) for wear and damage.

(10) Check the locking pin (3) for wear and damage.

(11) Check the arm (12) for wear or damage.

b. Install

(1) Apply thread-locking compound to the counter balance screws (7).

(2) Fit the counter balance (9) to the arm (12) using two washers (8) and two screws (7).

(3) Fit a bearing (10) to the arm (12).

(4) Apply thread-locking compound to the handle (4).

(5) Fit the handle (4) to the arm (12).

(6) Position the arm (12) on the launch frame (6).

(7) Insert the pivot pin (11); ensure that the flat head of the pivot pin (11) is horizontal.

(8) Secure the pivot pin (11) using the nyloc nut (5).

(9) Check that the arm (12) is free to rotate about the pivot pin (11).

(10) Align the launch beam (1) and insert the locking pin (3).

(11) Secure the locking pin (3) in place with the R-clip (2).

6 - 014 LAUNCH FRAME - UPPER WINCH ROPE

This task covers:

a. Inspect b. Remove c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Ladder/access platform
Fall arrest (safety) harness
Leather Gloves/Gauntlets
Snatch block

Materials Required

None

Equipment Conditions

A-Frame deployed in the lowered position
Forward Launch Beam in launcher
Far and Home Bank Carriages locked to Launcher Frame

WARNING

FALL INJURY WHEN WORKING AT HEIGHT, THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 20FT (6M) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED.

PERSONAL INJURY. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING CABLES.

a. Inspect

(1) For inspection of the winch rope see maintenance procedure 5-033.

b. Remove

(1) Disconnect the rope (2) at the far bank carriage, rope termination point (4), by removing the spring pin (7), washer (6) and pin (5).

(2) Apply tension to the rope (2) and operate the upper winch (1) and deploy the rope (2).

NOTE

The winch rope (2) should be routed through a snatch block to aid removal and fitting.

(3) Route the rope (2) through a snatch block.

(4) When the rope (2) is fully deployed release the rope end from the winch din wedge (3).

(5) Pull the rope (2) through the forward beam pulley mechanism (11 and 13).

(6) Check the top rope roller (8) for damage and wear.

(7) Check the forward beam pulleys (11 and 13) for damage and wear.

(8) Replace damaged or worn parts as required.

c. Install

(1) Uncoil the new rope and lay out in-line with the winch (1) and through a snatch block.

CAUTION

Protect Rope From Contamination During The Install Process.

(2) Thread the seized end of the rope (2) through a snatch block and the pulley mechanism (13 and 11) of the forward launch beam (12).

CAUTION

Avoid Applying Rotary Tension To The Rope.

(3) Thread the rope (2) under the far and home bank carriages (10 and 9) and under the top rope roller (8).

(4) Thread the rope (2) under the upper winch drum (1).

(5) Locate and secure the rope (2) in the winch drum, din wedge block (3).

NOTE

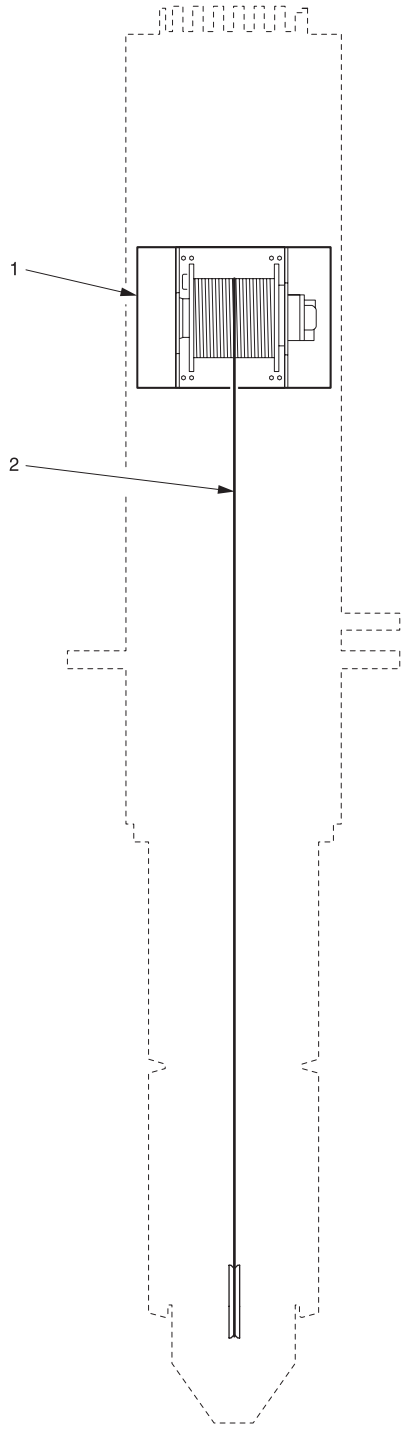
To ensure that the Rope is tensioned from the Din Wedge for layering, attach the Rope end to a mobile load.

To avoid rotary tension, connect the Rope end to the mobile load using a swivel connection.

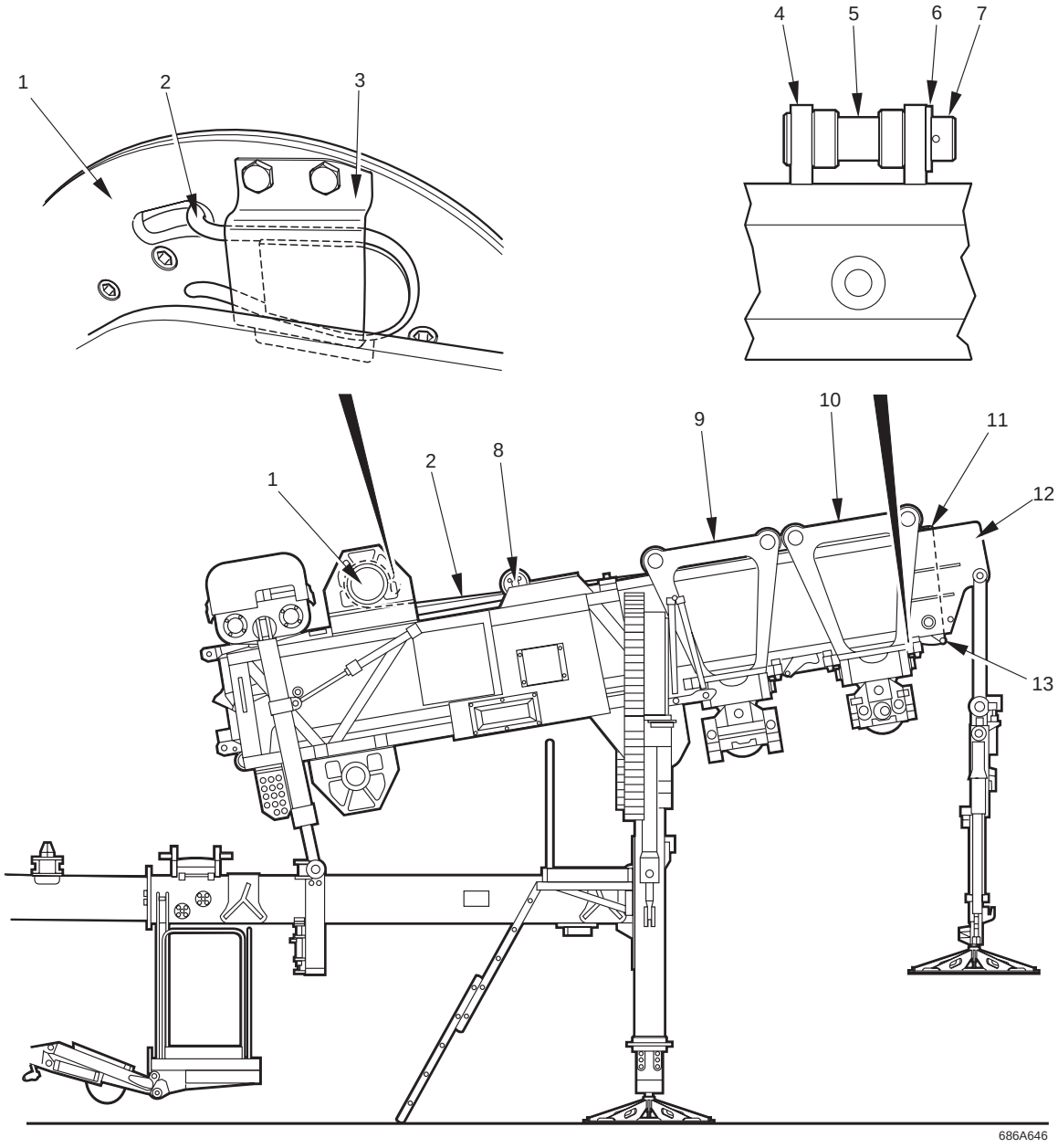
(6) Operate the winch slowly and ensure that the rope (2) is fed onto the winch drum neatly in layers.

(7) Attach the free end of the rope to the rope termination point (4) on the far bank carriage.

(8) Take up any slack in the rope (2) by operating the upper winch (1).



PLAN VIEW OF UPPER
WINCH ROPE ASSEMBLY 686A644


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6 - 015 LAUNCH FRAME - LOWER WINCH ROPE

This task covers:

a. Inspect b. Remove c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Ladder/access platform
Fall arrest (safety) harness
Leather Gloves/Gauntlets
Pulley fixed to heavy object (e.g. vehicle tow hook)
Lightweight fiber rope 8mm to 10mm diameter
Roll of 3-inch wide duct tape

Materials Required

None

Equipment Conditions

A-Frame deployed in the lowered position
Forward Launch Beam in launcher
Far and Home Bank Carriages locked to Launcher Frame

WARNING

FALL INJURY WHEN WORKING AT HEIGHT, THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 20FT (6M) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED.

PERSONAL INJURY. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING CABLES.

a. Inspect

(1) For inspection of the winch rope see maintenance procedure 5-033.

b. Remove

(1) Following withdrawal of the forward carriage lower pulley block shoot bolts (4), operate the lower winch (10) to lower the far bank carriage lower pulley block (5).

(2) Support the weight of the lower pulley block (5) on a suitable cradle.

(3) Remove the rope guide in the far bank carriage lower pulley block, closest to the home bank carriage, by removing 2 cap head screws. See unit maintenance procedure 5-068. This permits the eye end on the rope (2) to pass through.

(4) Disconnect the rope (2) at the far bank carriage, rope termination point (6) by removing two cap head screws (7) to release the locking plate (8) and pin (9).

(5) Feed the eye end of the rope through the lower pulley block (5) and refit the rope guide.

(6) Manually pull on the eye end of the rope to raise the lower pulley block (5) and reconnect it to the far bank carriage with the shoot bolts (4).

(7) Feed the eye end of the rope through a fixed pulley so the rope leaves the far bank carriage lower pulley block vertically.

(8) Apply and maintain tension to the rope and operate the lower winch to slowly deploy the rope.

(9) When the rope (2) is fully deployed release the rope end from the din wedge (3) on the winch drum (1).

(10) Attach the lightweight fiber rope to the end of the rope with the duct tape by laying the two ends parallel with a 5 foot (1.5 meters approximately) overlap, then over wrap with the duct tape for the full length of the overlap. Ensure the duct tape covers the rope ends.

(11) Carefully pull the rope (2) through the far and home bank carriages and upper and lower pulley blocks while feeding through the attached lightweight fiber rope.

(12) When the rope is clear of the far bank carriage, it can be detached from the lightweight fiber rope, which remains in position in the launch frame to aid the refitting of the rope.

(13) Check all pulleys for damage and wear.

(14) Replace damaged or worn parts as required.

c. Install

(1) Uncoil the new rope and lay out in-line with the winch (1) on level ground, the fitted eye end furthest from the launch vehicle and the sealed, tapered end nearest the launch vehicle. Feed the sealed, tapered end through the fixed pulley.

CAUTION

Protect Rope From Contamination During The Install Process.

Avoid Applying Rotary Tension To The Rope.

(2) Attach the lightweight fiber rope to the sealed, tapered end of the rope with the duct tape by laying the two ends parallel with a 1.5 meter (approx.) Overlap then over wrap with the duct tape for the full length of the overlap. Ensure the duct tape covers the rope ends.

(3) By pulling carefully on the lightweight fiber rope, thread the rope through the pulley blocks in the far bank and home bank carriages. Continue feeding the rope through the pulley blocks until the rope reaches the lower winch drum.

(4) Detach the lightweight fiber rope from the rope by removing the duct tape.

(5) Secure the sealed, tapered end of the rope to the winch drum (1) in the din wedge block (3).

NOTE

To ensure that the Rope is tensioned from the Din Wedge for layering, attach the Rope end to a mobile load.

To avoid rotary tension, connect the Rope end to the mobile load using a swivel connection.

(6) Operate the winch slowly and ensure that the rope (2) is fed onto the winch drum (1) neatly in layers.

(7) When the fitted eye end of the rope (2) approaches the fixed pulley, disconnect the eye end from the mobile load.

(8) Manually tension the rope at the free eye end and withdraw the shoot bolts (4) that connect the lower pulley block (5) to the far bank carriage.

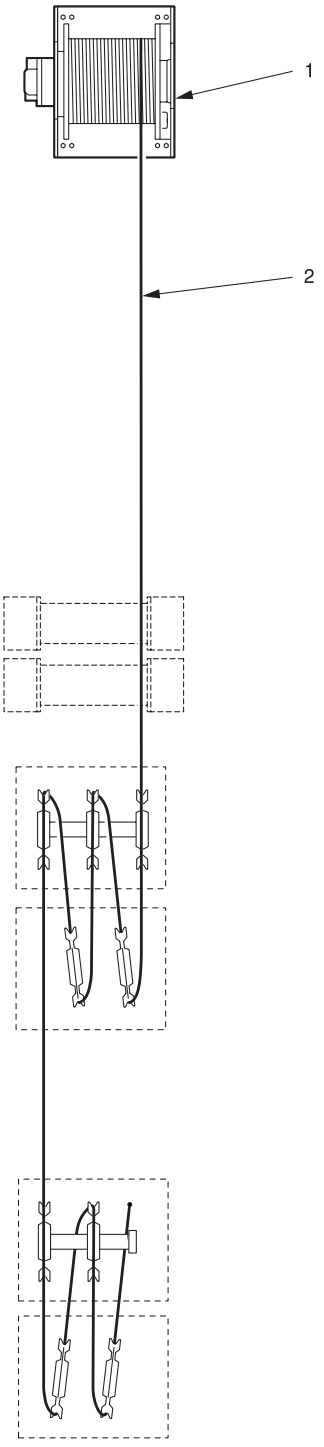
(9) Lower the far bank carriage lower pulley block (5) and support it on a suitable cradle.

(10) Remove the rope guide nearest the home bank carriage in the far bank carriage lower pulley block by removing 2-cap head screws. See unit maintenance procedure 5-068. This permits the eye end on the rope to pass through.

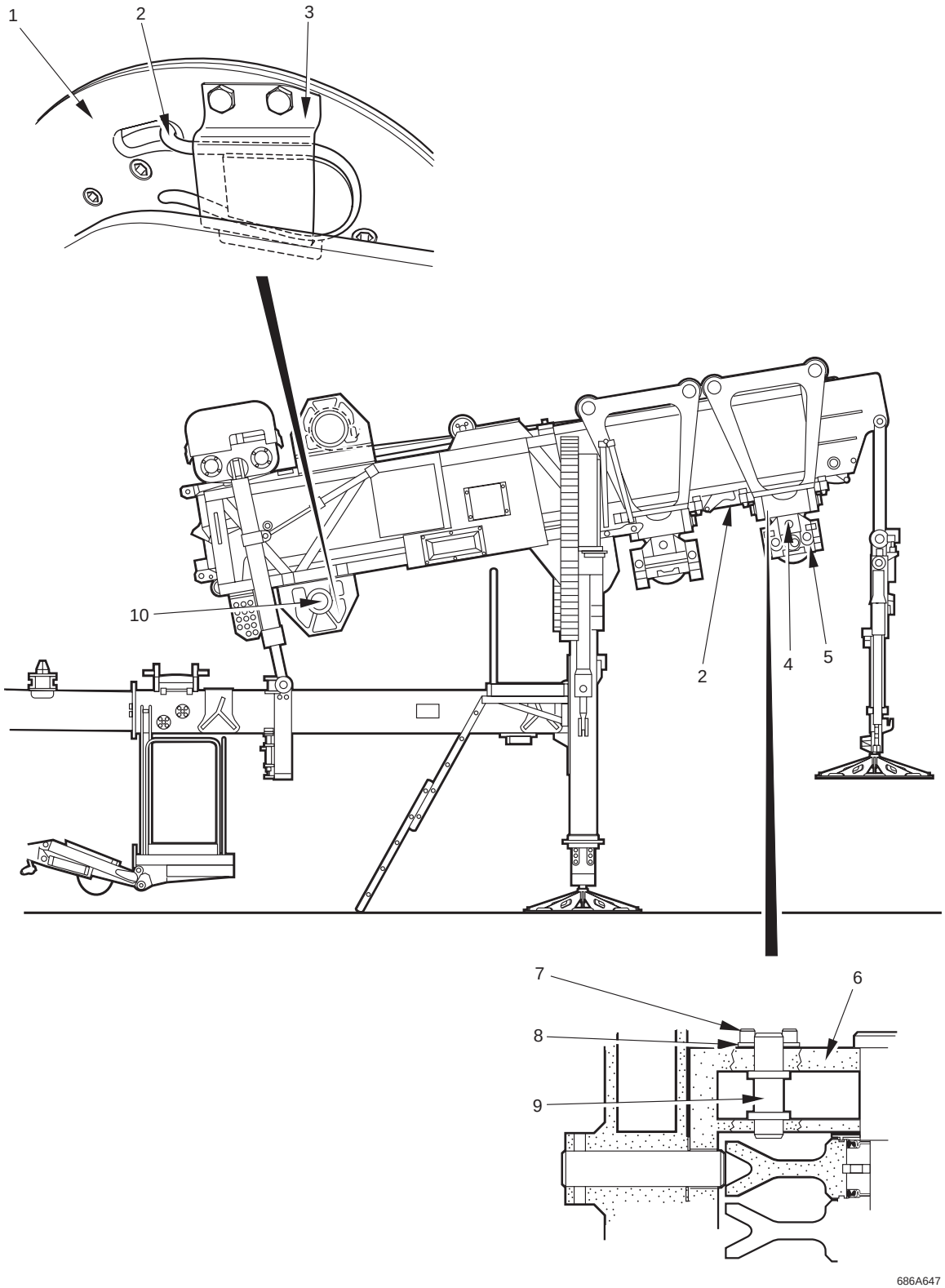
(11) Feed the eye end of the rope (2) up through the lower pulley block (5), taking care the rope does not become tangled with the slings, and refit the rope guide.

(12) Secure the rope (2) to the rope termination point (6) on the far bank carriage using the pin (9), locking plate (8) and cap head screws (7).

(13) Raise the lower pulley block (5) by operating the winch (10) and attach the lower pulley block (5) to the far bank carriage using the shoot bolts (4).



PLAN VIEW OF LOWER
WINCH ROPE ASSEMBLY 686A645


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6 - 016 LAUNCH FRAME - LOWER WINCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 8)

Equipment Conditions

A-Frame deployed
Remove the lower winch guard. Refer to operator's TM 5-5420-279-10 Chapter 10
Remove lower winch rope tensioner in accordance with unit maintenance procedure 5-045
Remove the lower winch rope in accordance with direct support maintenance procedure 6-015

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LOWER WINCH.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and disconnect the hydraulic pipes (5) connected to the lower winch motor (6).

(3) Attach a crane with slings to the lower winch (1).

(4) Remove the eight lower winch, nyloc nuts (2) and washers (3). Discard the nyloc nuts.

(5) Using available equipment support the lower winch (1).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Position the lower winch on the mounting studs (4) on the launch frame.

(2) Secure the lower winch with the eight washers (3) and new nyloc nuts (2).

(3) Fit the hydraulic hoses (5) to the lower winch motor (6) in the positions noted during removal.

c. Follow on tasks

(1) Fit the lower winch rope in accordance with direct support maintenance procedure 6-015.

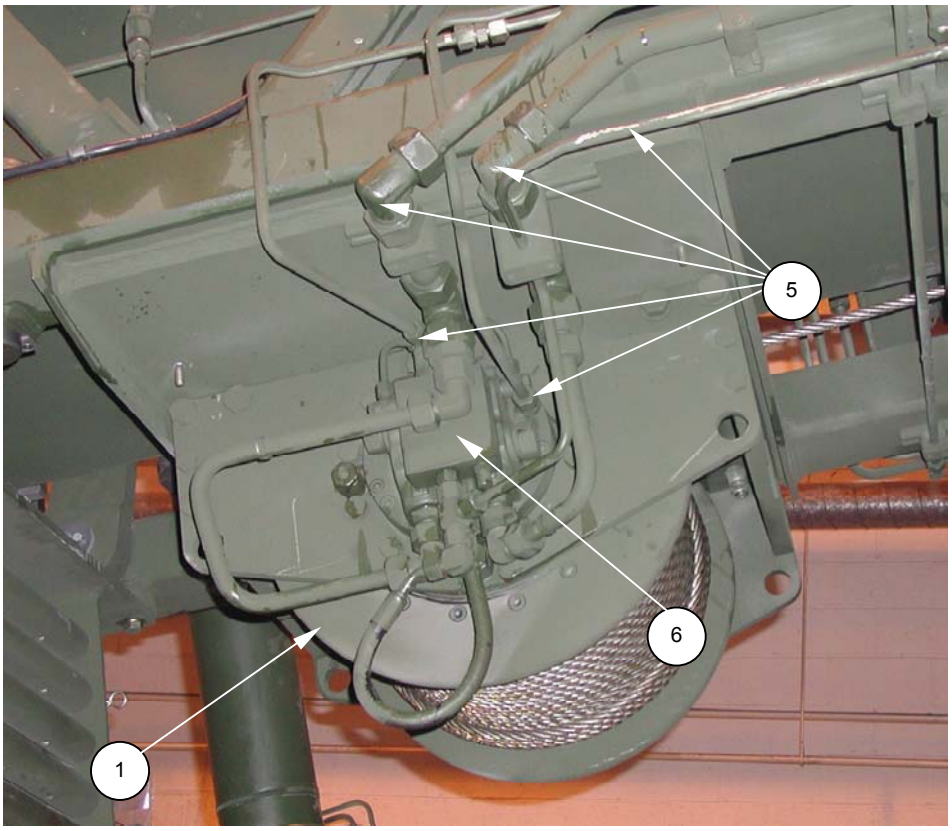
(2) Fit the lower winch rope tensioner in accordance with unit maintenance procedure 5-045.

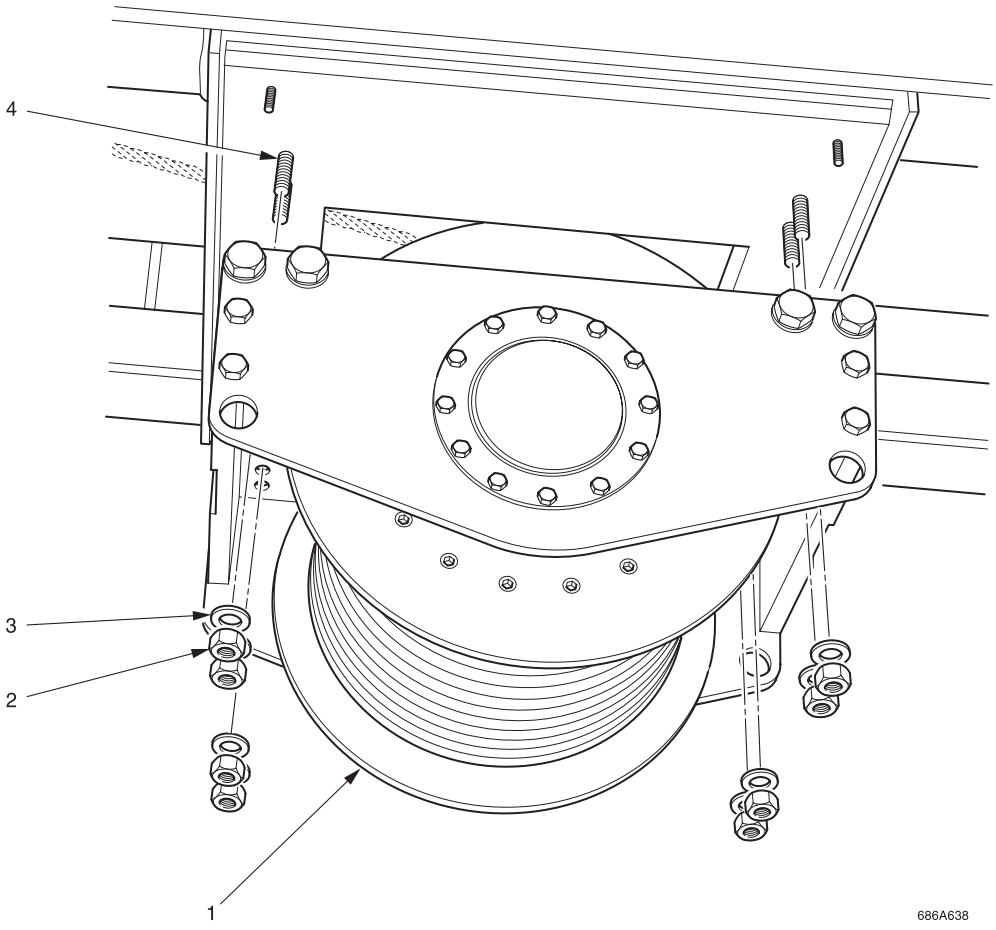
(3) Check the lower winch gearbox oil in accordance with unit maintenance procedure 5-044.

(4) Check the operation of the lower winch (1).

(5) Check for leaks.

(6) Fit the lower winch guard. Refer to operator's TM 5-5420-279-10 Chapter 10.




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6 - 017 LAUNCH FRAME - UPPER WINCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Nylock nuts (Qty 8)

Equipment Conditions

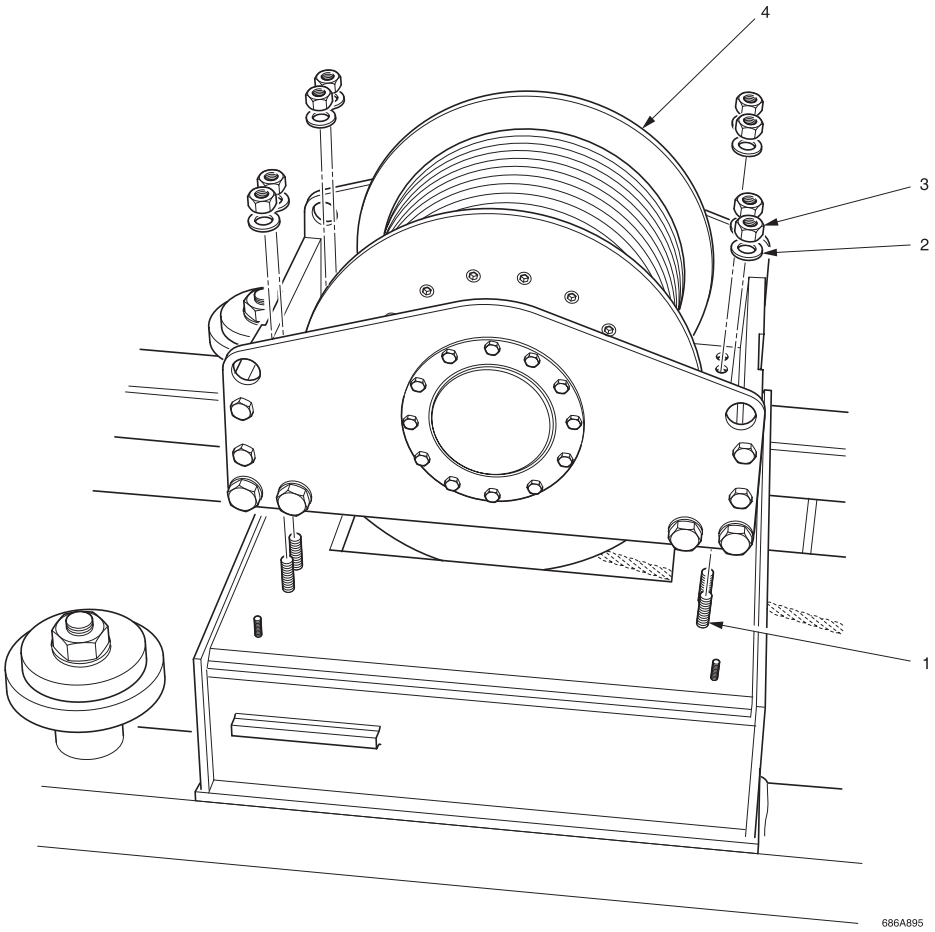
A-Frame deployed
Remove the upper winch guard. See operator's maintenance TM 5-5420-279-10 Chapter 10
Remove upper winch rope tensioner in accordance with unit maintenance procedure 5-046
Remove the upper winch rope in accordance with direct support maintenance procedure 6-014

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE UPPER WINCH.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and disconnect the hydraulic pipes connected to the upper winch.

(3) Attach a crane with slings to the upper winch (4).

(4) Remove the upper winch mounting nyloc nuts (3) and washers (2). Discard the nyloc nuts.

(5) Remove upper winch (4).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Position the upper winch (4) on the launch frame.

(2) Apply thread-locking compound to the mounting bolts (1).

(3) Secure the upper winch (4) on the mounting bolts (1) and secure with washers (2) and new nyloc nuts (3).

(4) Fit the hydraulic hoses in the positions noted during removal.

c. Follow on tasks

(1) Fit the upper winch rope in accordance with direct support maintenance procedure 6-014.

(2) Fit the upper winch rope tensioner in accordance with unit maintenance procedure 5-046.

(3) Check the upper winch gearbox oil in accordance with unit maintenance procedure 5-044.

(4) Check the operation of the upper winch (4).

(5) Check for leaks.

(6) Fit the upper winch guard. Refer to operator's TM 5-5420-279-10 Chapter 10.

6 - 018 LAUNCH FRAME - REMOVAL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Ladder/access platform
Fall arrest (safety) equipment
Leather Gloves/Gauntlets
Crane and slings to lift launch frame
Supports for launch frame when removed from A-frame

Materials Required

None

Equipment Conditions

A-Frame deployed, stabilizer legs retracted
Slide frame not deployed, ISO locks locked
Forward Launch Beam in launcher
Far and Home Bank Carriages on Launch Beam

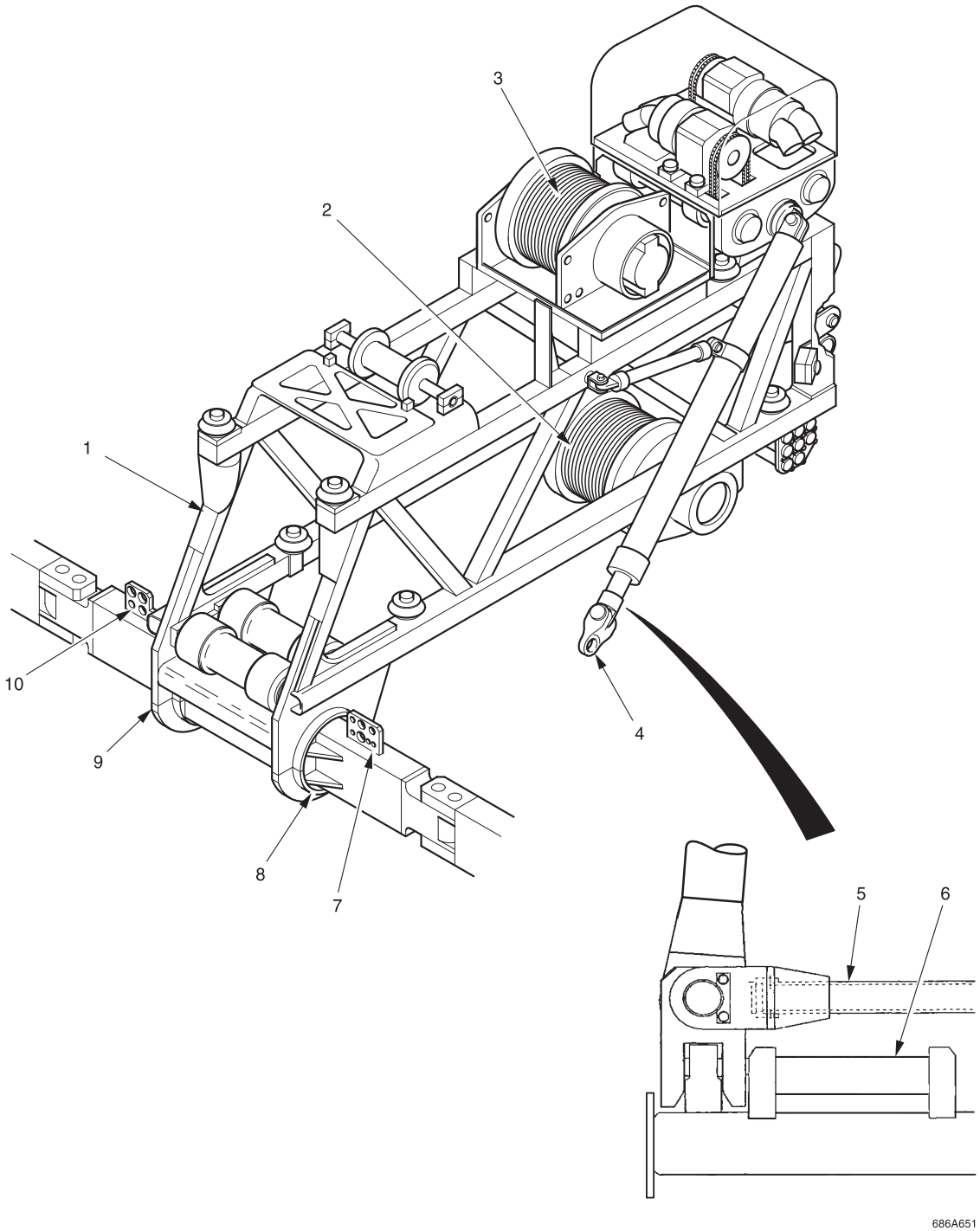
WARNING

FALL INJURY WHEN WORKING AT HEIGHT, THIS OPERATION IS CARRIED OUT AT HEIGHTS UP TO 20FT (6M) THE RELEVANT SAFETY PRECAUTIONS MUST BE OBSERVED.

CRUSH INJURY. THE LAUNCH-FRAME IS HEAVY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE DISCONNECTING ANY HYDRAULIC LINES.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.


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a. Remove

(1) Remove the far bank support see unit maintenance procedure 5-074.

(2) Remove launch frame guards. See operator's manual TM 5-5420-279-10 Chapter 10.

(3) Remove winch cables from upper (3) and lower (2) winch drums completely see direct support maintenance procedures 6-014 and 6-015.

(4) Remove the far bank carriage see direct support maintenance procedure 6-027.

(5) Remove the home bank carriage see direct support maintenance procedure 6-027.

(6) Remove the forward launch beam from the launch frame.

(7) Attach slings to launch frame (1) and support weight of the launch frame with a crane and the slings.

(8) Withdraw the shoot bolts (6) that attach the articulator cylinder cross member (5) to the slide frame.

(9) Retract and stow the articulator cylinders (4).

(10) Depressurize the hydraulic system see unit maintenance procedure 5-118.

(11) Note the position of and disconnect the launch frame energy chain flexible hydraulic pipes and electrical cables at the two bulkheads (7 and 10) on the A-Frame upper cross member, one on each side of the launch frame. Fit protective caps to the exposed ends of the hydraulic and electrical connectors.

(12) Remove the two semi-circular lower bearing caps (8 and 9) that attach the launch frame to the A-Frame upper cross member see unit maintenance procedure 5-032.

(13) Lift the launch frame vertically off the A-Frame then carefully lower it onto suitable supports. Ensure the launch frame is supported to avoid damage to hydraulic pipes and electrical cables.

NOTE

The launch frame lower (fiber) bearing elements are attached to the lower (semi circular) bearing caps with adhesive. The upper (fiber) bearing elements are loose, ensure they are retrieved when the Launch Frame is removed from the A-Frame.

(14) Refer to the relevant maintenance procedure when changing assemblies associated with the Launch Frame.

b. Install

(1) Fit the upper launch frame bearing caps (8 and 9) to the upper center A-Frame beam.

(2) Lift the launch frame (1) on to the A-Frame.

(3) Fit the semi-circular lower bearing caps see unit maintenance procedure 5-032.

(4) Remove the protective caps to the exposed ends of the hydraulic and electrical connectors.

(5) Fit the launch frame energy chain flexible hydraulic pipes and electrical cables at the two bulkheads (7 and 10) on the A-Frame upper cross member, one on each side of the launch frame in the positions noted during removal.

(6) Extend the stow cylinders until the articulator cylinders (4) are vertical.

(7) Attach the articulator cylinder cross member (5) to the slide frame with the shoot bolts (6).

(8) Remove the slings and crane.

(9) Fit the launch beam to the launch frame see direct support maintenance procedure 6-026.

(10) Fit the home bank carriage to the forward launch beam see direct support maintenance procedure 6-027.

(11) Fit the far bank carriage to the forward launch beam see direct support maintenance procedure 6-027.

(12) Fit the upper winch rope see direct support maintenance procedure 6-014.

(13) Fit the lower winch rope see direct support maintenance procedure 6-015.

(14) Fit the far bank support see unit maintenance procedure 5-074.

c. Follow on tasks

(1) Fit the launch frame guards see operator's maintenance TM 5-5420-279-10 chapter 10.

(2) Carry out a full functional test on the launch frame.

(3) Check for leaks.

6 - 019 LAUNCH FRAME - ARTICULATOR MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

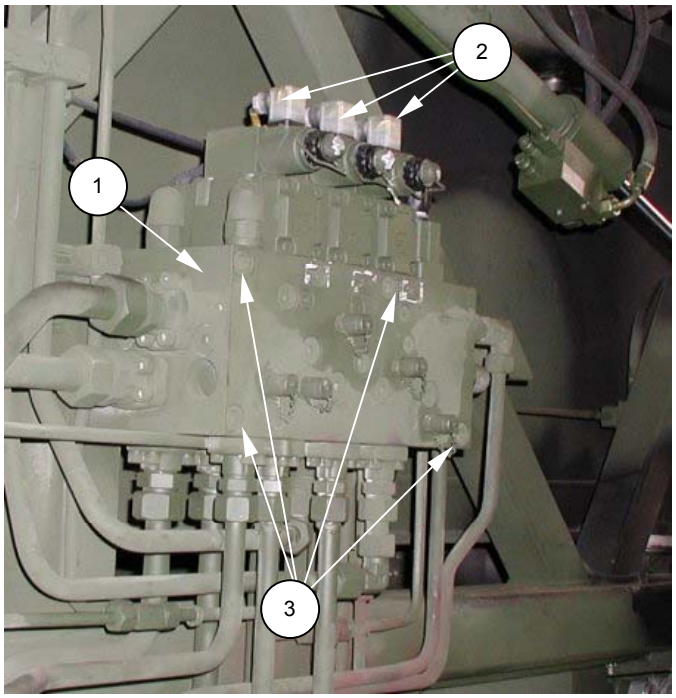
A-Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ARTICULATOR MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the left-hand launch frame guard to gain access to the articulator manifold assembly.

(3) Note the position of and disconnect the hydraulic pipe work connected to the articulator manifold assembly (1).

(4) Note the position of and remove the electrical connections (2) on the articulator manifold solenoid valves.

(5) Support the weight of the articulator manifold assembly (1).

(6) Remove the four mounting bolts, nuts and washers (3) securing the articulator manifold assembly to the launch frame.

(7) Remove the articulator manifold assembly (1).

(8) Note the position of and remove all hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges.

(9) Fit the hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges to the new manifold assembly using new gaskets and o-rings where applicable.

b. Install

(1) Fit the articulator manifold assembly (1) to the launch frame.

(2) Secure the articulator manifold assembly using the four mounting bolts, nuts and washers (3).

(3) Fit the electrical connections (2) in the positions noted during removal.

(4) Fit the hydraulic connections to the positions noted during removal.

(5) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the winches.

(3) Check for hydraulic oil leaks.

6 - 020 LAUNCH FRAME - PINCH ROLL/STOW MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

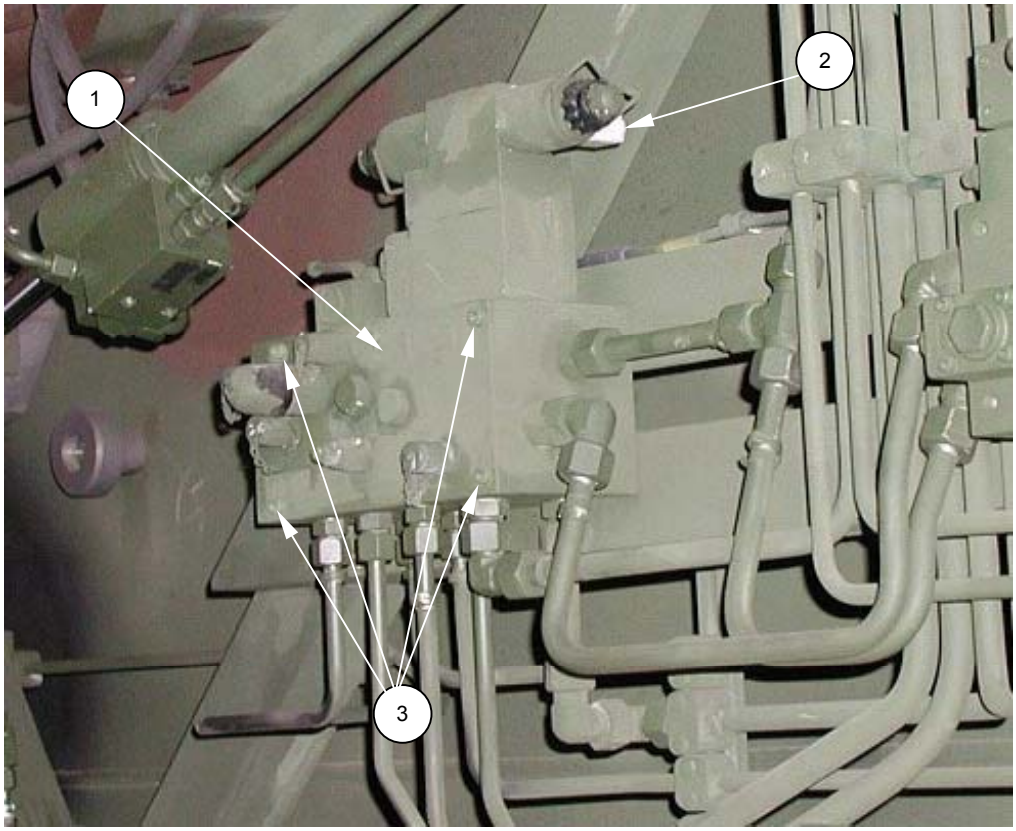
A-Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PINCH ROLL/STOW MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the left-hand launch frame guard to gain access to the pinch roll/stow manifold assembly (1).

(3) Note the position of and disconnect the hydraulic pipe work connected to the pinch roll/stow manifold assembly (1).

(4) Note the position of and remove the electrical connections (2) on the pinch roll/stow manifold solenoid valves.

(5) Support the weight of the pinch roll/stow manifold assembly (1).

(6) Remove the four mounting bolts, nuts and washers (3) securing the pinch roll/stow manifold assembly (1) to the launch frame.

(7) Remove the pinch roll/stow manifold assembly (1).

(8) Note the position of and remove all hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges.

(9) Fit the hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges to the new manifold assembly using new gaskets and O-rings where applicable.

b. Install

(1) Fit the pinch roll/stow manifold assembly (1) to the launch frame.

(2) Secure the pinch roll/stow manifold assembly using the four bolts, nuts and washers (3).

(3) Fit the electrical connections (2) in the positions noted during removal.

(4) Fit the hydraulic connections to the positions noted during removal.

(5) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the winches.

(3) Check for hydraulic oil leaks.

6 - 021 LAUNCH FRAME - PINCH ROLL CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 2)
Lock washers (Qty 4)

Equipment Conditions

A-Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PINCH ROLL CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Gain access through the left hand launch beam front access panel, to the pinch roller manifold ball valve and turn it through 90^0. See Appendix F page 19 figure 9 for location.

(3) Remove the hydraulic pipe (2) by removing the bolt (12) and sealing washer (13).

(4) Remove the two screws (3), nyloc nuts (5) and washers (4) securing the pinch roller cylinder bracket (6) the launch frame (7).

(5) Remove the four screws (8) and lock washers (9) securing the pinch roller cylinder (1) to the pinch roller cylinder bracket (6).

(6) Remove the pinch roller cylinder (1).

b. Install

(1) Fit the pinch roller cylinder (1) to the pinch roller cylinder bracket (6) and secure in place with the four lock washers (9) and screws (8).

(2) Fit the pinch roller bracket (6) complete with pinch roller cylinder (1) to the launch frame (7) and secure in place with the two screws (3), washers (4) and new nyloc nuts (5).

(3) Fit the hydraulic pipe (2) to the pinch roller cylinder (1) with the sealing washer (13) and bolt (12).

c. Follow on tasks

(1) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

(2) Switch the battery shutoff switch to the on position.

(3) Turn the pinch roller manifold ball valve through 90^0. See Appendix F, page 19, figure 9 for location.

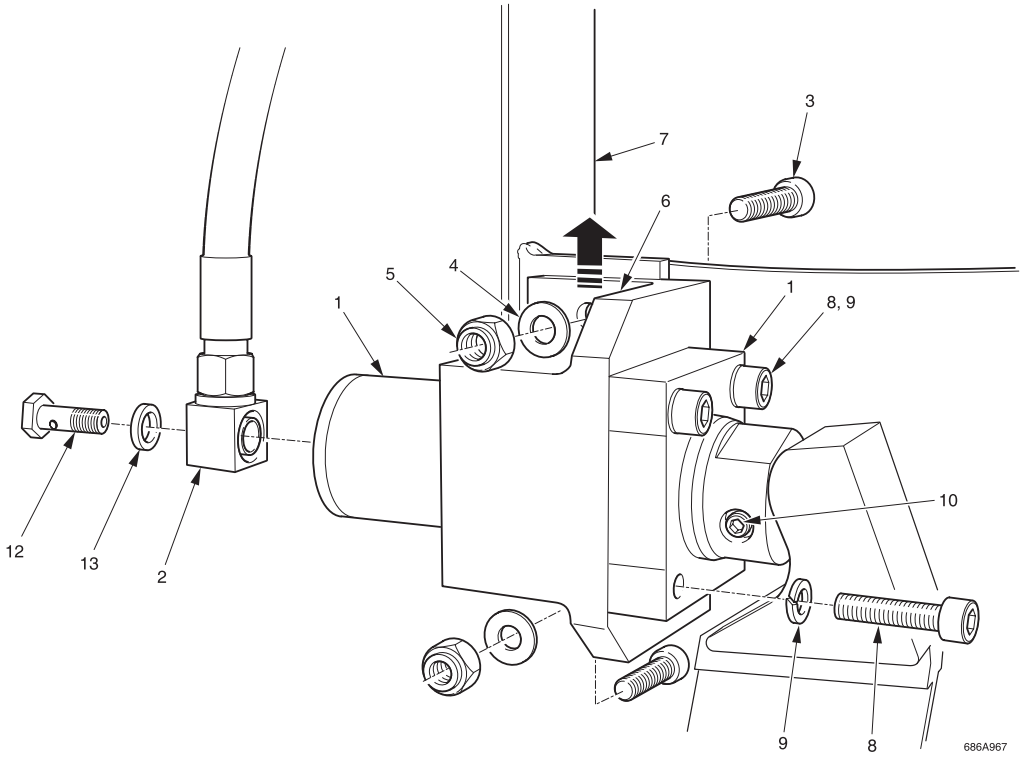
(4) Cover the bleed screw (10) with a clean cloth to catch any fluid and prevent spraying. Open the bleed screw (10) half a turn until any air is released.

(5) Close the bleed screw (10).

(6) Repeat steps 4 and 5 if necessary to ensure that any air is released.

(7) Check the operation of the pinch roller cylinder (1).

(8) Check for hydraulic oil leaks.



6 - 022 LAUNCH FRAME - PILOT MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

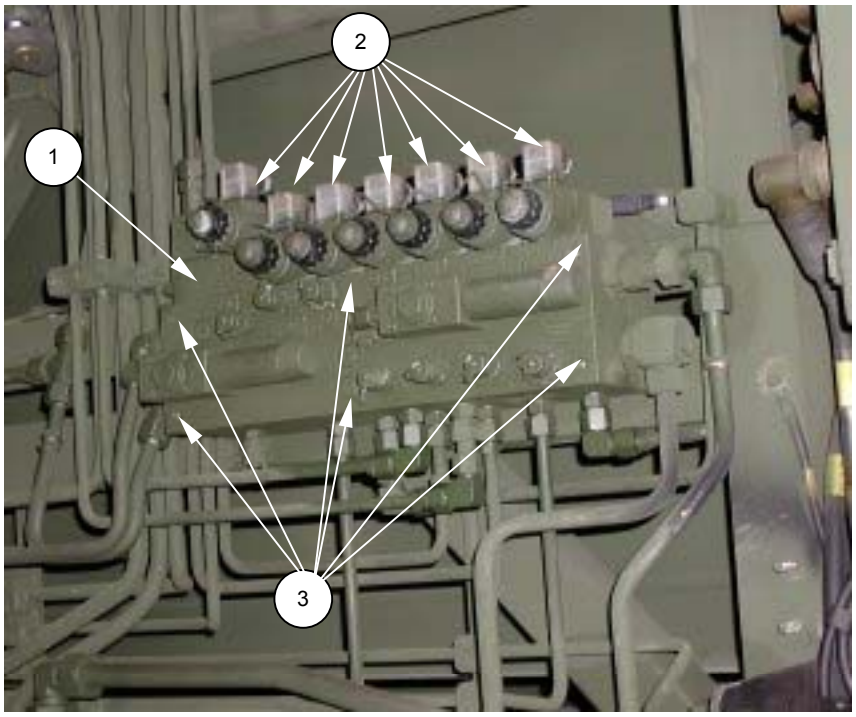
A-Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PILOT MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the right hand launch frame guard to gain access to the pilot manifold assembly (1). See operator's maintenance TM 5-5420-279-10 chapter 10.

(3) Note the position of and disconnect the hydraulic pipe work connected to the pilot manifold assembly.

(4) Note the position of and remove the electrical connections (2) on the pilot manifold solenoid valves.

(5) Support the weight of the pilot manifold assembly (1).

(6) Remove the six mounting bolts, nuts and washers (3) securing the pilot manifold assembly (1) to the launch frame.

(7) Remove the pilot manifold assembly (1).

(8) Note the position of and remove all hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges.

(9) Fit the hydraulic valves, valve blocks, test points, blanking plugs and blanking flanges to the new manifold assembly using new gaskets and O-rings where applicable.

b. Install

(1) Fit the Pilot Manifold Assembly (1) to the Launch Frame.

(2) Secure the Pilot Manifold Assembly using the six bolts, nuts and washers (3).

(3) Fit the electrical connections (2) in the positions noted during removal.

(4) Fit the hydraulic connections to the positions noted during removal.

(5) Check and top up, if necessary, the hydraulic oil level at the hydraulic reservoir.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the winches.

(3) Check for hydraulic oil leaks.

6 - 023 LAUNCH FRAME - SAFETY STOP ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Peg wrench

Materials Required

Thread locking compound, loctite 243
Grease (As required)
Nyloc nuts (Qty 4)

Equipment Conditions

Remove the forward launch beam see maintenance procedure 6-020

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a. Remove

(1) Support the weight of the stop lever (13). Using the peg wrench, remove the pivot pin nut, washer and pivot pin (14).

(2) Remove the stop lever (13).

(3) Remove the retaining ring, washer and striker pin (15).

(4) Remove the strike block (16).

(5) If required, remove the two halves of the pivot pin bushing mounted in the stop lever (13).

(6) Remove the four nyloc nuts (3) and bolts (2) securing the housing (4) to the launch frame (17). Discard the nyloc nuts.

(7) Note the position of the housing (4), with the air hole facing down and remove the housing (4).

(8) Remove the retaining ring (6) and washer (5).

(9) Remove the guide pin (1).

(10) Note the washer arrangement in the housing and remove the eleven washers (9), five washers (8) and spacer (7).

(11) If required remove the screws (12) securing the guide block (10) to the stop lever (13) and remove the guide block (10).

(12) If required remove the handle (11).

(13) Check all threaded components for wear and damage.

(14) Check the washers (9 and 8) for damage.

(15) Check the housing (4) for cracks and corrosion.

(16) Check the stop lever (13) for cracks and corrosion.

(17) Check the pivot pin (14) and pivot pin bushings for wear and damage.

(18) Check the handle (11) for damage.

(19) Replace components as necessary.

b. Install

(1) Apply a thin layer of grease to the inside of the housing (4), to the spacer (7), washers (8), washers (9) and guide pin (1).

(2) Fit the spacer (7), washers (8) and washers (9) to the housing (4) in the same arrangement noted during removal.

(3) Fit the guide pin (1) to the housing (4) and secure in place with the washer (5) and retaining ring (6).

(4) Fit the housing (4) to the launch frame with the new nyloc nuts (3) and bolts (2) in the position noted during removal with the air hole facing down.

(5) If previously removed, fit the pivot pin bushings to the stop lever (13).

(6) Fit the striker block (16) to the stop lever (13) with the striker pin, washer, and retaining ring (15).

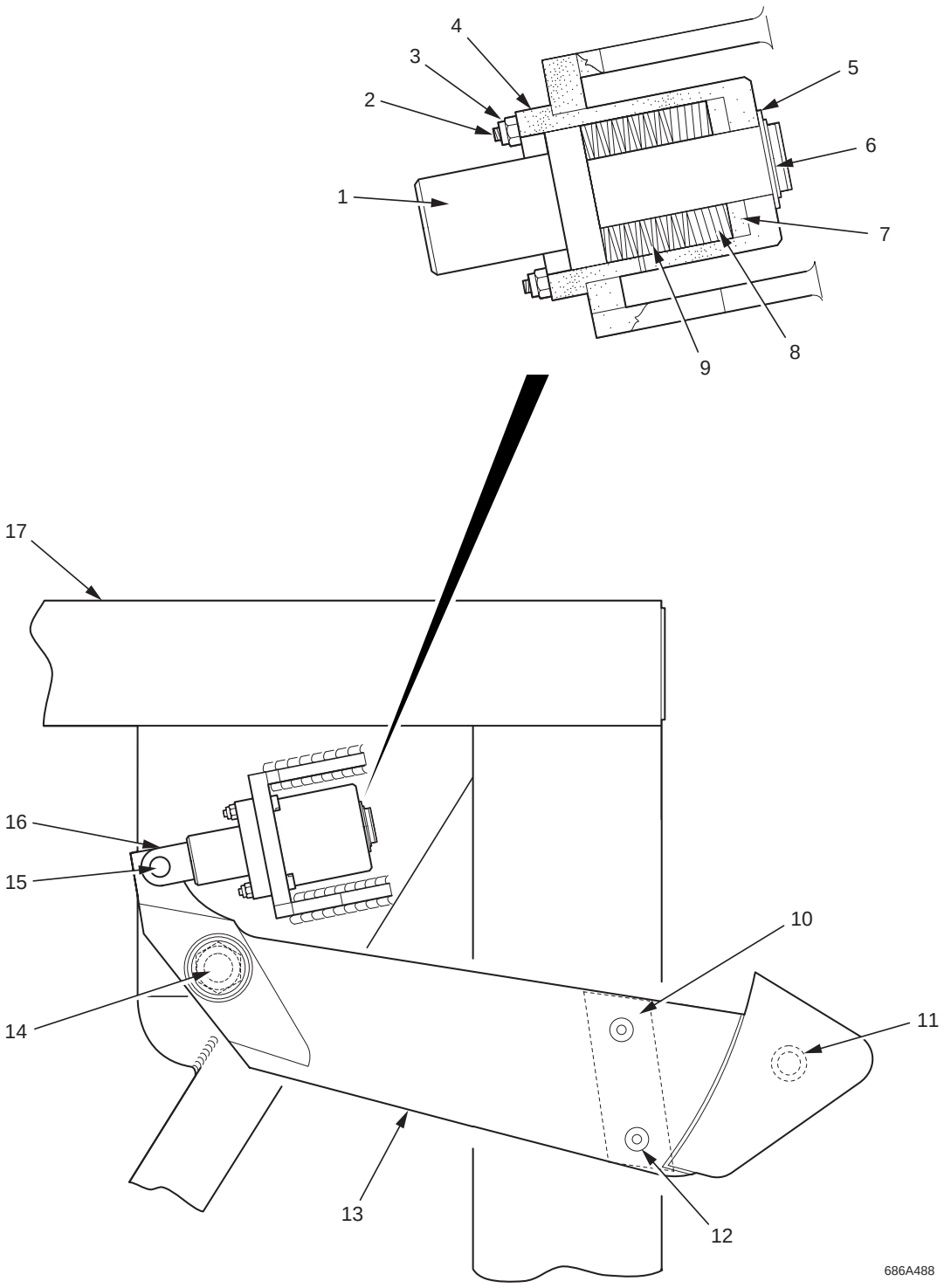
(7) If previously removed apply thread locking compound to the screws (12) and fit the guide block (10) to the stop lever (13).

(8) If previously removed apply thread locking compound to the handle (11) and fit the handle (11) to the stop lever (13).

(9) Fit the stop lever (13) to the launch frame (17) with the pivot pin nut, washer and pivot pin (14).

c. Follow on task

(1) Check the operation of the safety stop assembly.


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6 - 024 LAUNCH FRAME - FORWARD ROLLER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

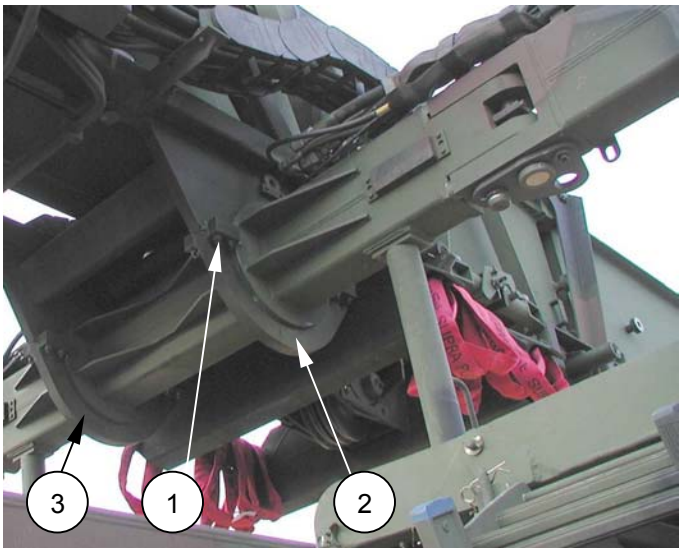
Thread Locking Compound, loctite 242
Grease (As required)

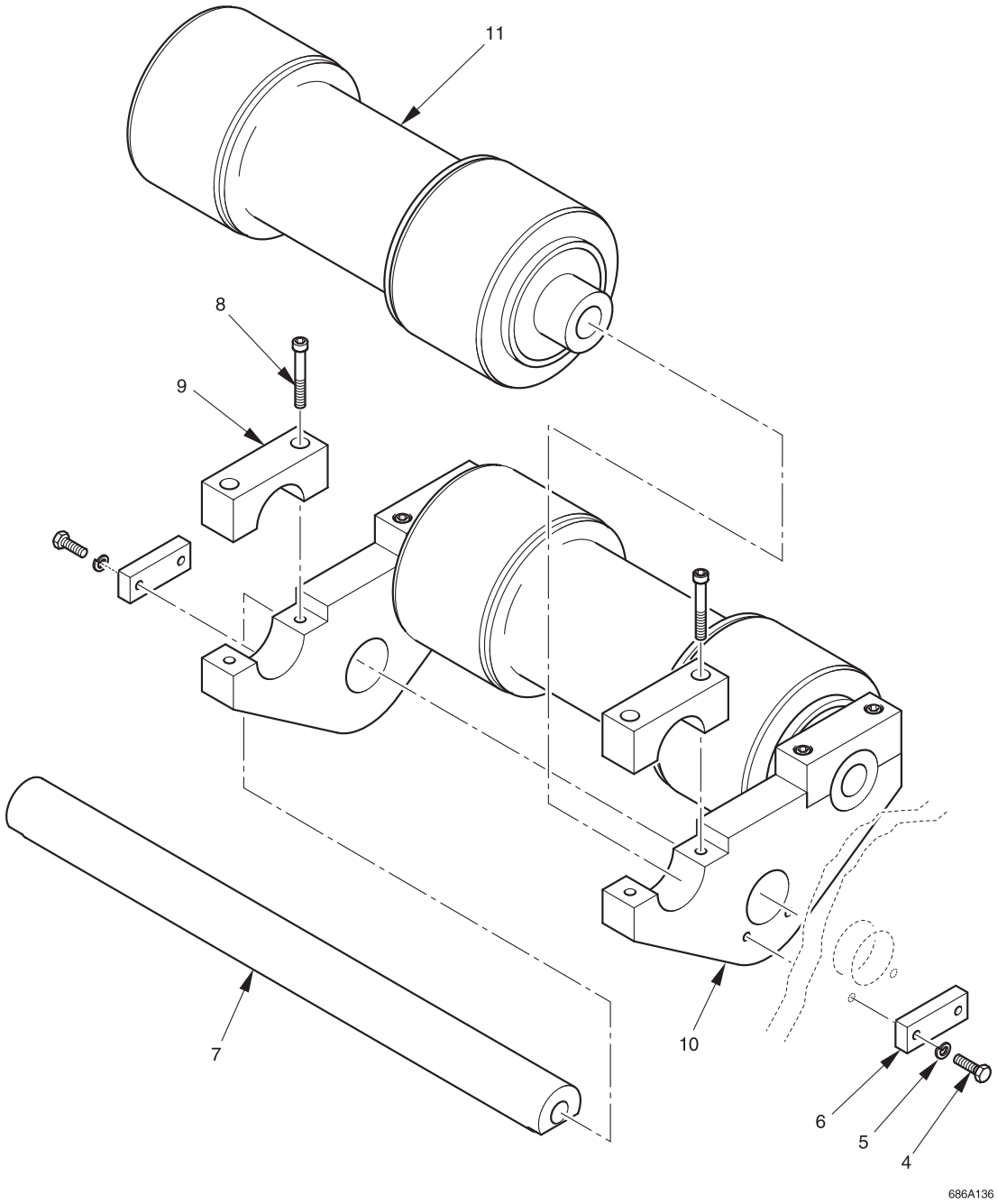
Equipment Conditions

Slide Frame deployed
A-Frame deployed
Forward launch beam removed, see maintenance procedure 6-026

WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE FORWARD ROLLER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE FORWARD ROLLER ASSEMBLY IS SUPPORTED.





a. Remove

(1) Remove the eight nuts and bolts (1) securing the bottom left hand A-Frame center beam bearing (2).

(2) Remove the eight nuts and bolts securing the bottom right hand launch frame center beam bearing (3).

NOTE

The top half of the A-Frame Center Beam Bearing is a loose fit in the Center Beam.

(3) Retain the top half of the A-Frame center beam bearing.

(4) Support the weight of the forward roller assembly.

(5) Remove the bolts (4) and washers (5) securing the pivot locking plate (6) to the launch frame.

(6) Remove the pivot pin (7).

(7) Remove the forward roller assembly (4 through 11).

(8) Remove the screws (8) securing the roller blocks (9) to the forward roller brackets (10).

(9) Remove the rollers (11).

(10) Check all screws and bolts and washers for damage.

(11) Check the pivot pin (7) and pivot locking plates (6) for damage and corrosion.

(12) Check the brackets (10) for damage.

(13) Check the rollers (11) for damage and corrosion.

(14) Replace components as necessary.

b. Install

(1) Fit the rollers (11) to the brackets (10).

(2) Apply thread-locking compound to the screws (8) and secure the rollers (11) with the roller retaining blocks (9) and screws (8).

(3) Grease the rollers.

(4) Position the forward roller assembly in the launch frame.

(5) Fit the pivot pin (7) through the launch frame and the forward roller assembly.

(6) Apply thread-locking compound to the bolts (4) and secure the pivot pin (7) with the locking plates (6), washers (5) and bolts (4).

(7) Grease the pivot.

(8) Replace the top A-Frame center beam bearing.

(9) Fit the bottom left hand A-Frame center beam bearing (2) and secure with eight nuts and bolts (1).

(10) Fit the bottom right hand A-Frame center beam bearing (3) and secure with eight nuts and bolts.

c. Follow on tasks

(1) Fit the forward launch beam, see direct support maintenance procedure 6-026.

(2) Check the operation of the forward launch beam and the forward rollers.

6 - 025 LAUNCH FRAME - FORWARD ROLLER BEARINGS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Hook wrench HN15

Materials Required

Grease (As required)

Equipment Conditions

Forward roller assembly removed from launch frame, see direct support maintenance procedure 6-024

NOTE

A forward roller consists of two rollers (16). This procedure details how to dismantle a forward roller. The disassembly of both forward rollers is identical.

a. Remove

(1) Remove the forward roller (16) from the forward roller assembly. See direct support maintenance procedure 6-024.

(2) Remove the nut (2) and spacer (3) from the shaft (14).

(3) Note the position of and remove the roller (6) from the shaft (14) complete with retaining rings (1) flat washers (7), bearings (8), seal retainer (5), seal (4) and grease fitting (15).

(4) Note the positions of the two spacers (10) and remove them from the shaft (14).

(5) Remove the guide roller (9) complete with retaining rings (11), bearings (12) and spacer sleeve (13) from the shaft (14).

(6) Check all components for wear, damage and corrosion.

(7) Replace components as necessary.

b. Install

(1) Refer to unit maintenance procedure 5-158 before assembling the forward roller (16).

(2) Fit the guide roller (9) complete with retaining rings (11), bearings (12) and spacer sleeve (13) to the shaft (14).

(3) Fit the two spacers (10) to the shaft (14).

(4) Fit the roller (6) to the shaft (14) complete with retaining rings (1), flat washers (7), bearings (8) seal retainer (5), seal (4) and grease fitting (15).

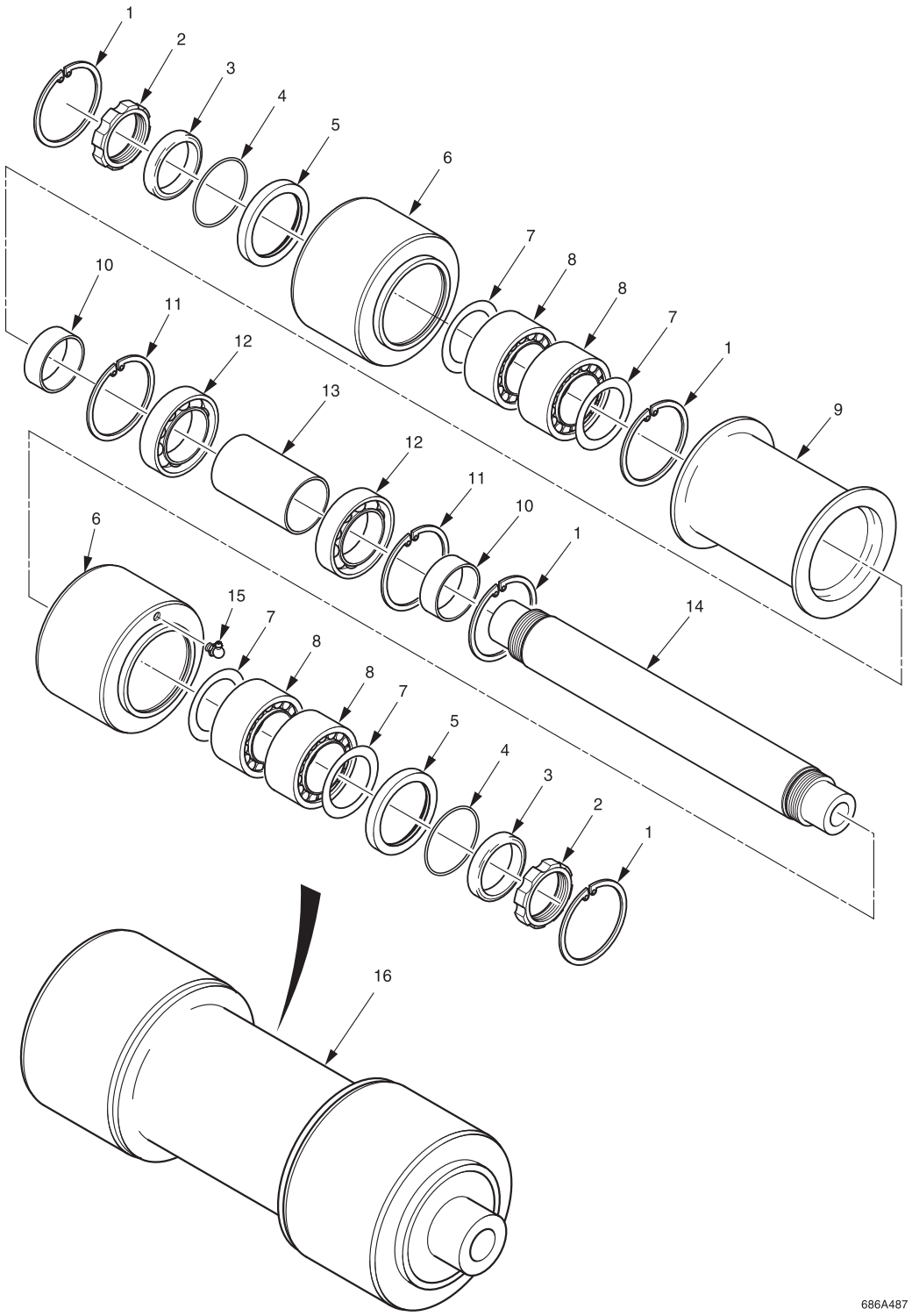
(5) Fit the nut (2) and spacer (3) to the shaft (14).

c. Follow on tasks

(1) Fit the forward roller to the forward roller assembly. See direct support maintenance procedure 6-024.

(2) Fit forward roller assembly to the launch frame. See direct support maintenance procedure 6-024.

(3) Grease the forward roller assembly through the grease fitting (15).


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6 - 026 FORWARD LAUNCH BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

WARNING

CRUSH INJURY. THE FORWARD LAUNCH BEAM IS HEAVY 1323 LB (600 KG).

a. Remove

(1) Remove the far bank support (6). See unit maintenance procedure 5-074.

(2) Remove the upper winch rope (2). See direct support maintenance procedure 6-014.

(3) Remove the lower winch rope (4). See direct support maintenance procedure 6-015.

(4) Remove the far bank and home carriage (1 and 7). See direct support maintenance procedure 6-027.

(5) Release the pressure on the rear pinch roller by turning the rear pinch roller pressure release tap through 90 degrees.

(6) Attach a crane to the forward launch beam (5).

(7) Remove the final stop pin (3) securing the forward launch beam to the final stop.

(8) Remove the forward launch beam (5).

(9) To service and repair the component parts of the forward launch beam refer to unit maintenance procedures 5-056 to 5-060.

(10) Check the welds on the forward launch beam for signs of cracking.

(11) Check for corrosion, damage and wear.

(12) Replace components as necessary.

b. Install

(1) Fit the forward launch beam (5) to the launch frame.

(2) Lock the forward launch beam (5) in position with the final stop pin (3).

(3) Fit the far bank and home carriage (1 and 7). See direct support maintenance procedure 6-027.

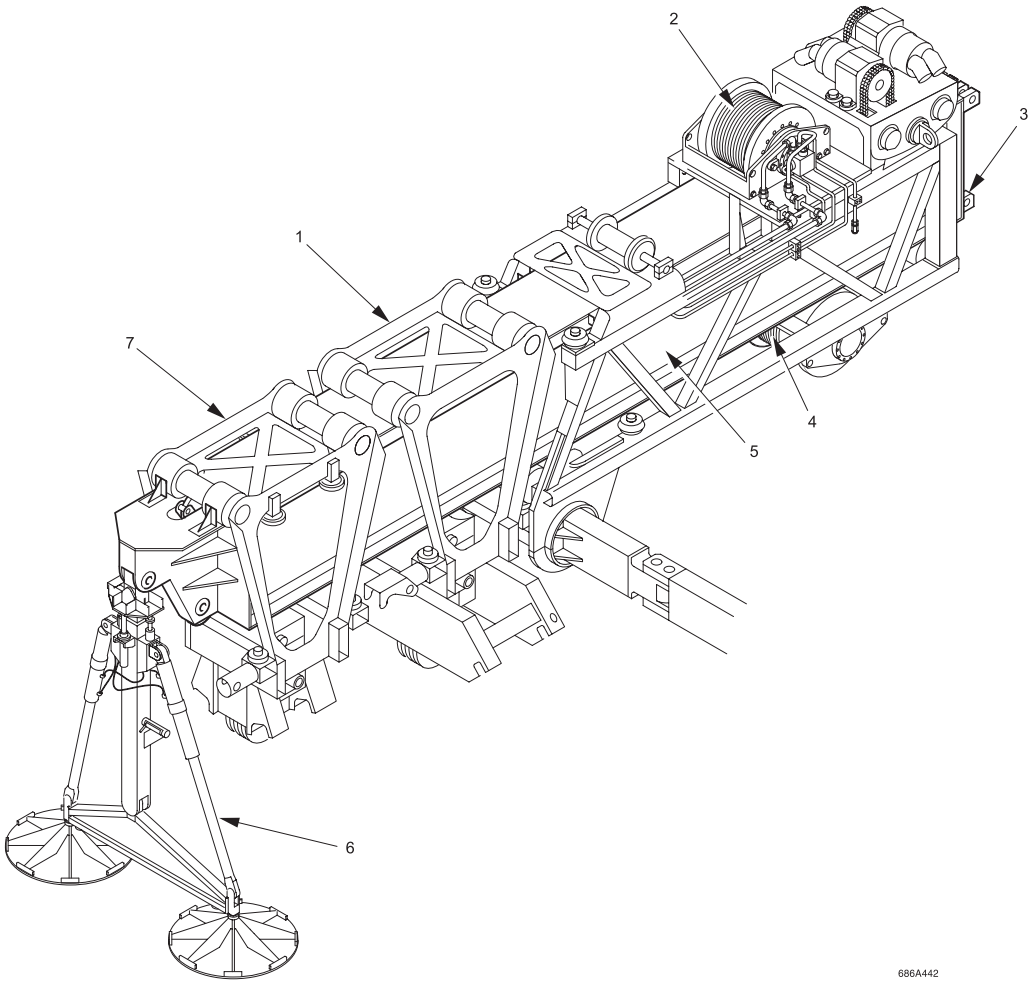
(4) Fit the upper winch rope (2). See direct support maintenance procedure 6-014.

(5) Fit the lower winch rope (7). See direct support maintenance procedure 6-015.

(6) Fit the far bank support (6). See unit maintenance procedure 5-074.

c. Follow on task

(1) Check the operation of the forward launch beam, far and home bank carriages and winches.



6 - 027 FAR AND HOME BANK CARRIAGE - REMOVAL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Material Required

None

Equipment Conditions

A Frame Deployed.
A Frame in Lowered Position.

WARNING

CRUSH INJURY. THE FAR BANK AND HOME BANK CARRIAGES ARE VERY HEAVY SUITABLE LIFTING EQUIPMENT IS TO BE USED WHEN REMOVING THE CARRIAGES FROM THE LAUNCH BEAM.



a. Remove

(1) Remove the upper winch rope in accordance with direct support maintenance procedure 6-014.

(2) Remove the lower winch rope in accordance with direct support maintenance procedure 6-015.

(3) Remove the forward launch beam carriage stops (5). See unit maintenance procedure 5-058.

(4) Release the restraining latch (4) between the far bank carriage and the home bank carriage

(5) Attach suitable lifting equipment to the far bank carriage (1) and remove it from the launch beam.

(6) Place and support the far bank carriage (1) on a suitable working surface.

(7) Release the restraining latch (3) between the launch frame and the home bank carriage.

(8) Attach suitable lifting equipment to the home bank carriage (2) and remove it from the launch beam.

(9) Place and support the home bank carriage (1) on a suitable working surface.

(10) Refer to the relevant maintenance procedures for carrying out any servicing or maintenance on the far and home bank carriages.

b. Install

(1) Attach suitable lifting equipment to the home bank carriage (2) and lift it onto the launch beam.

(2) Engage the restraining latch between the launch frame and the home bank carriage.

(3) Attach suitable lifting equipment to the far bank carriage (1) and lift in onto the launch beam.

(4) Engage the restraining latch between the far and home bank carriages.

(5) Fit the forward launch beam carriage stops. See unit maintenance procedure 5-058.

(6) Fit the upper winch rope. See direct support maintenance procedure 6-014.

(7) Fit the lower winch rope. See direct support maintenance procedure 6-015.

c. Follow on task

(1) Check the operation of the far and home bank carriages.

6 - 028 FAR AND HOME BANK CARRIAGE - HOME BANK UPPER PULLEYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Thread locking compound, loctite 243
Multi-Gasket, loctite 574
Lock washers (Qty 2)

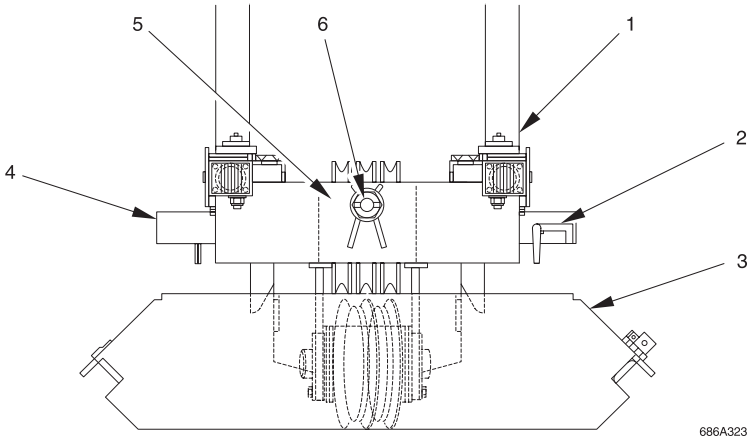
Equipment Conditions

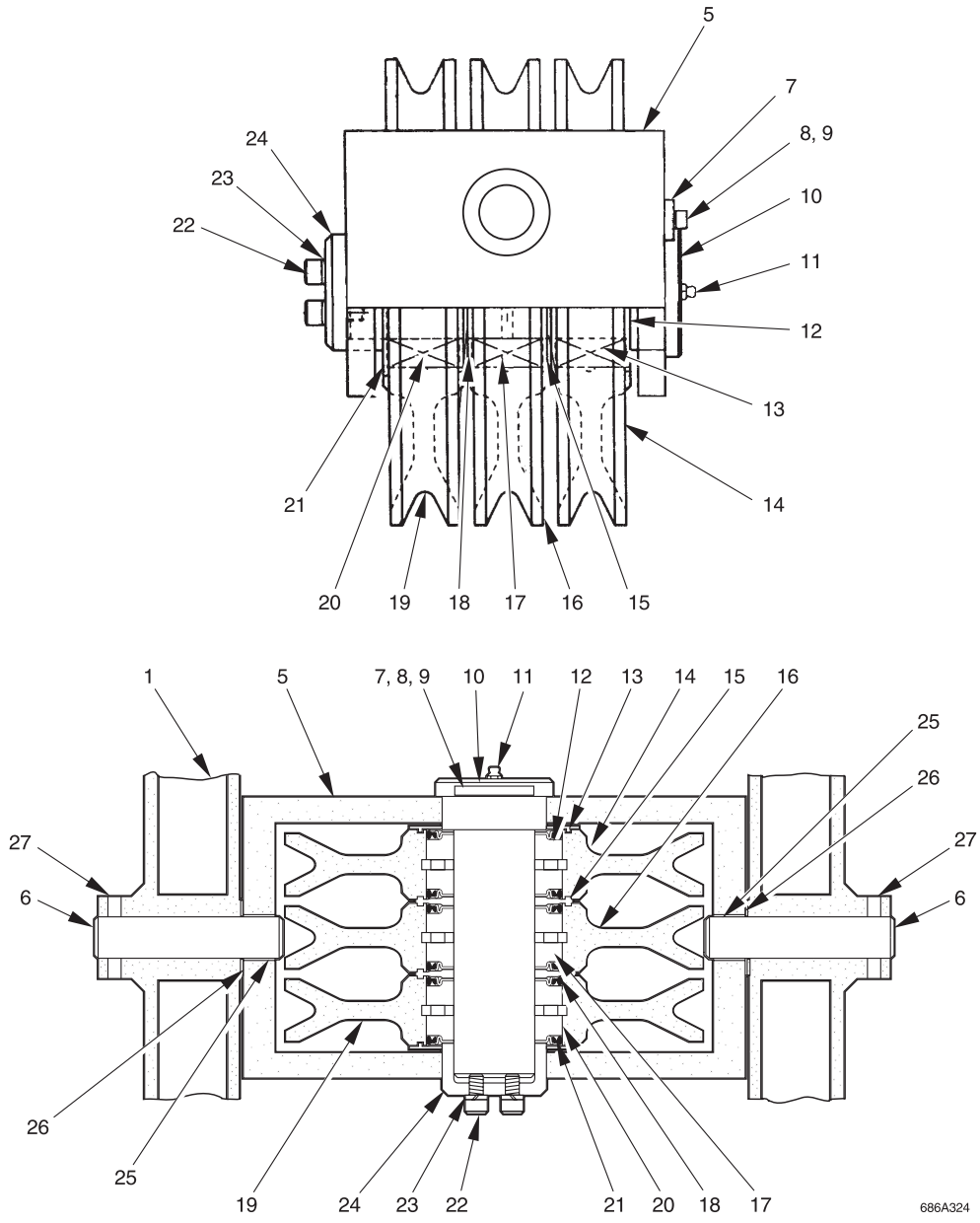
A-Frame deployed

WARNING

CRUSH INJURY. THE HOME BANK CARRIAGE UPPER PULLEY BLOCK IS HEAVY.

DANGER TO PERSONNEL. SHARP METAL SURFACES. THE ROPE PULLEYS MAY HAVE SHARP METAL SURFACES. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING ROPES AND ROPE PULLEYS.





a. Remove

(1) Release the shoot bolts (2 and 4) securing the lower pulley block housing (3) to the home bank carriage (1).

(2) Deploy the lower pulley block housing (3).

(3) Remove the lower winch rope in accordance with unit maintenance procedure 6-015.

(4) Support the weight of the upper pulley block (5).

(5) Remove the spring pins (27) from the pivot pins (6).

(6) Remove the pivot pins (6).

(7) Remove the upper pulley block (5) from the home bank carriage (1).

(8) Remove the screws (22), lock washers (23) and end cap (24). Discard the lock washers.

(9) Remove the screws (9), washers (8) and locking plate (7).

(10) Remove the pulley pin (10).

(11) Remove rope pulleys assembly.

(12) Separate the three rope pulleys (14, 16 and 19) retaining the spacers (15 and 18) and sealing caps (12 and 21).

(13) Remove the bearings (13,17 and 20) from the rope pulleys (14,16 and 19).

(14) Remove the spring pins (not shown) and thrust washers (26).

(15) Remove the bushings (25).

(16) Check the rope pulleys (14,16 and 19) for wear, cracks and damage.

(17) Check the pulley pin (10) for wear and damage.

(18) Check the bearings (13,17 and 20) for wear and damage.

(19) Check the thrust washers (26) and bushings (25) for wear and damage.

(20) Check all threaded components for wear and damage.

(21) Replace components as necessary.

b. Install

(1) Fit the bushings (25) to the upper pulley block (5).

(2) Fit the thrust washers (26) and secure in place with the spring pins (not shown).

(3) Pack the bearings (13,17 and 20) with grease.

(4) Fit the bearings (13,17 and 20) to the rope pulleys (14,16 and 19). Refer to general unit maintenance procedure 5-158 before assembling the rope pulley bearings.

(5) Fit a spacer (15 and 18) between the inner faces of the rope pulleys (14, 16 and 19).

(6) Apply multi-gasket to the sealing caps (12 and 21).

(7) Fit the sealing caps (12 and 21) to the outer faces of the rope pulleys (14 and 19).

(8) Place the rope pulley assembly inside the upper pulley block (5).

(9) Fit the pulley pin (10).

(10) Apply thread-locking compound to the screws (22).

(11) Secure the pulley pin (10) with the end cap (24), washers (23) and screws (22).

(12) Apply thread-locking compound to the screws (9).

(13) Fit the locking plate (7) washers (8) and screws (9).

(14) Check that the rope pulleys assembly runs freely in the upper pulley block (5).

(15) Grease the pulley pin (10) through the grease fitting (11).

(16) Place the upper pulley block (5) in the home bank carriage (1).

(17) Fit the pivot pins (6) through the home bank carriage (1) and the upper pulley block (5).

(18) Secure the pivot pins (6) with the spring pins (27).

(19) Check the upper pulley block (5) is free to pivot in the home bank carriage (1).

c. Follow on tasks

(1) Connect the lower winch rope in accordance with direct support maintenance procedure 6-015.

(2) Check the operation of the home bank carriage.

6 - 029 FAR AND HOME BANK CARRIAGE - HOME BANK LOWER PULLEYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Thread locking compound, loctite 243
Multi-Gasket Loctite 574
Lock washers (Qty 2)

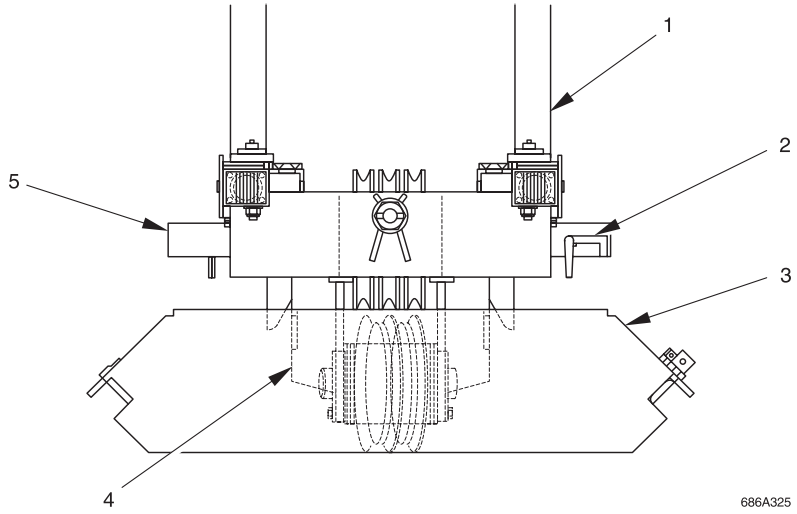
Equipment Conditions

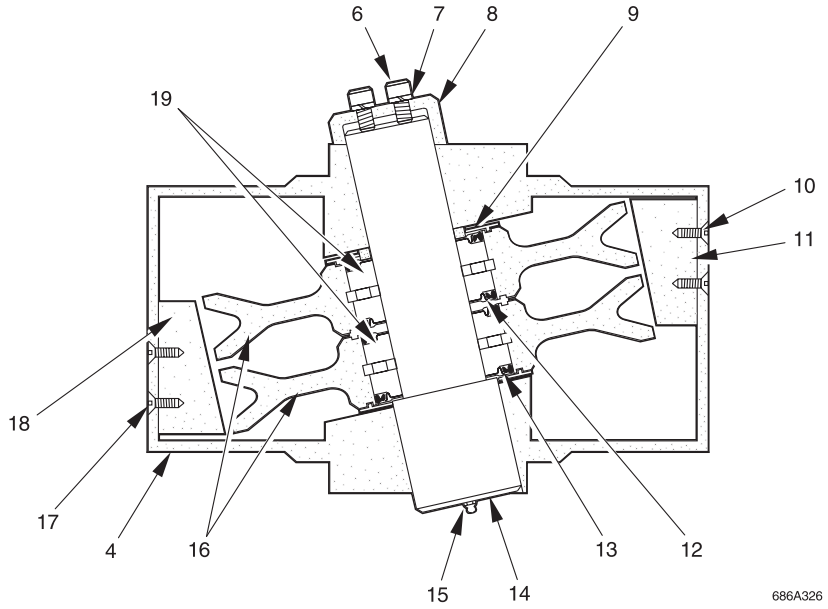
A-Frame deployed

WARNING

CRUSH INJURY. THE HOME BANK CARRIAGE LOWER PULLEY BLOCK IS HEAVY.

DANGER TO PERSONNEL. SHARP METAL SURFACES. THE ROPE PULLEYS MAY HAVE SHARP METAL SURFACES. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING ROPES AND ROPE PULLEYS.





a. Remove

(1) Release the shoot bolts (2 and 5) securing the lower pulley block housing (3) from the home bank carriage (1).

(2) Deploy the lower pulley block housing (3).

(3) Remove the lower winch rope in accordance with direct support maintenance procedure 6-015.

(4) Support the weight of the rope pulleys (16).

(5) Remove the screws (6), lock washers (7) and end cap (8). Discard lock washers.

(6) Remove the pulley pin (14).

(7) Remove rope pulleys (16).

(8) Separate the two rope pulleys (16) retaining the spacer (12) and sealing caps (9 and 13).

(9) Remove the bearings (19) from the rope pulleys (16).

(10) If required remove the screws (10 and 17) and rope guards (11 and 18).

(11) Check the rope pulleys (16) for wear, cracks and damage.

(12) Check the pulley pin (14) for wear and damage.

(13) Check the rope guides (11 and 18) for wear and damage.

(14) Check the bearings (19) for wear and damage.

(15) Check all threaded components for wear and damage.

(16) Replace components as necessary.

b. Install

(1) Pack the bearings (19) with grease.

(2) Fit the bearings (19) to the rope pulleys (16). Refer to general unit maintenance procedure 5-158 before assembling the rope pulley bearings.

(3) Fit the spacer (12) between the inner faces of the rope pulleys (16).

(4) Apply multi-gasket to the sealing caps (9 and 13).

(5) Fit the sealing caps (9 and 13) to the outer faces of the rope pulleys (16).

(6) Position the rope pulleys (16) in the lower pulley block (4).

(7) Fit the pulley pin (14) through the lower pulley block (4) and the rope pulleys (16).

(8) Apply thread-locking compound to the screws (6).

(9) Secure the pulley pin (14) with the end cap (8), lock washers (7) and screws (6).

(10) Grease the pulley pin (14) through the grease fitting (15).

(11) If previously removed, apply thread-locking compound to the screws (10 and 17).

(12) Fit the rope guards (11 and 18) and secure with screws (10 and 17).

(13) Check that the rope pulleys (16) rotate freely.

c. Follow on tasks

(1) Fit the lower winch rope in accordance with direct support maintenance procedure 6-015.

(2) Check the operation of the lower pulley block assembly.

6 - 030 FAR AND HOME BANK CARRIAGE - FAR BANK UPPER PULLEYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Thread locking compound, loctite 243
Multi-Gasket, loctite 574
Lock washers (Qty 4)

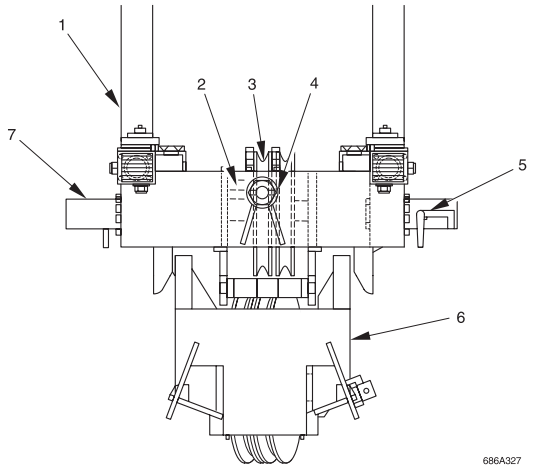
Equipment Conditions

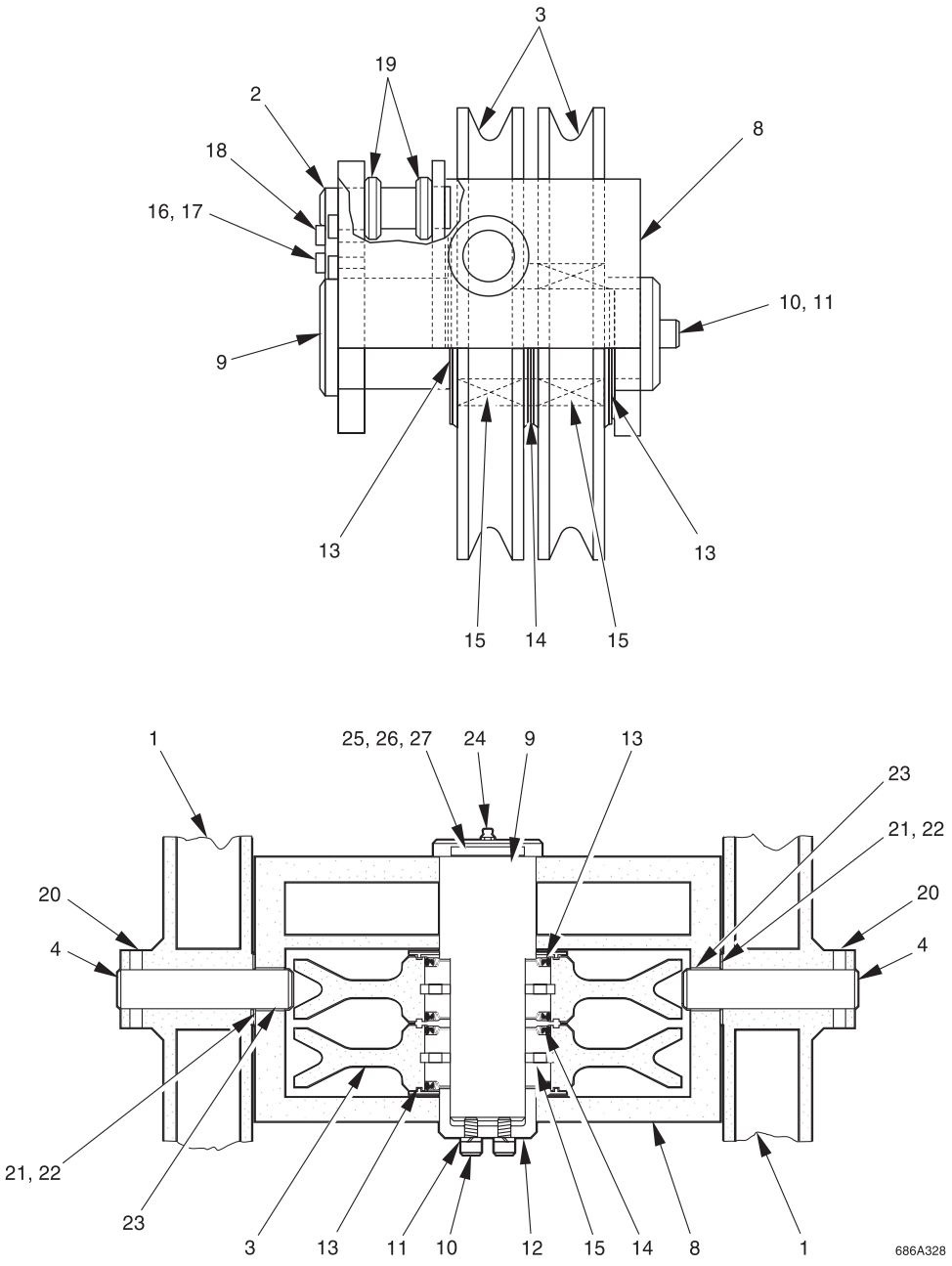
A-Frame deployed.

WARNING

CRUSH INJURY. THE FAR BANK CARRIAGE UPPER PULLEY BLOCK IS HEAVY.

DANGER TO PERSONNEL. SHARP METAL SURFACES. THE ROPE PULLEYS MAY HAVE SHARP METAL SURFACES. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING ROPES AND ROPE PULLEYS.





a. Remove

(1) Release the shoot bolts (5 and 7) securing the lower pulley block (6) to the far bank carriage (1).

(2) Deploy the lower pulley block (6).

(3) Remove the lower winch rope in accordance with direct support maintenance procedure 6-015.

NOTE

The Lower Winch Rope is terminated at the Rope Termination Pin (2) located on the Upper Pulley block (8). The Rope Termination Pin (2) is secured with Screws (17), Washers (16) and a Retaining Plate (18).

(4) Support the weight of the upper pulley block (8).

(5) Remove the spring pins (20) from the pivot pins (4).

(6) Remove the pivot pins (4).

(7) Remove the upper pulley block (8) from the far bank carriage (1).

(8) Remove the screws (10), lock washers (11) and end cap (12). Discard the lock washers.

(9) Remove the screws (25), lock washers (26) and locking plate (27). Discard the lock washers.

(10) Remove the pulley pin (9).

(11) Remove rope pulleys (3).

(12) Separate the two rope pulleys (3) retaining the spacer (14) and sealing caps (13).

(13) Remove the bearings (15) from the rope pulleys (3).

(14) Remove the spring pins (22) and thrust washers (21).

(15) Remove the bushings (23).

(16) Check the rope pulleys (3) for wear, cracks and damage.

(17) Check the pulley pin (9) for wear and damage.

(18) Check the bearings (15) for wear and damage.

(19) Check the thrust washers (21) and bushings (23) for wear and damage.

(20) Check all threaded components for wear and damage.

(21) Replace components as necessary.

b. Install

(1) Fit the bushings (23) to the upper pulley block (8).

(2) Fit the thrust washers (21) and secure in place with the spring pins (22).

(3) Pack the bearings (15) with grease.

(4) Fit the bearings (15) to the pulleys (3). Refer to general unit maintenance procedure 5-158 before assembling the rope pulley bearings.

(5) Fit a spacer (14) between the inner faces of the pulleys (3).

(6) Apply multi-gasket to the sealing caps (13).

(7) Fit the sealing caps (13) to the outer faces of the pulleys (3).

(8) Place the pulleys (3) inside the upper pulley block (8).

(9) Fit the pulley pin (9).

(10) Apply thread locking compound to the screws (10).

(11) Secure the pulley pin (9) with the end cap (12), lock washers (11) and screws (10).

(12) Apply thread-locking compound to the screws (25).

(13) Fit the locking plate (27), lock washers (26) and screws (25).

(14) Check that the pulleys (3) run freely in the upper pulley block (8).

(15) Grease the pulley pin (9) through the grease fitting (24).

(16) Place the upper pulley block (8) in the far bank carriage (1).

(17) Fit the pivot pins (4) through the far bank carriage (1) and the upper pulley block (8).

(18) Secure the pivot pins (4) with the spring pins (20).

(19) Check that the upper pulley block (8) is free to pivot in the far bank carriage (1).

c. Follow on tasks

(1) Connect the lower winch rope in accordance with direct support maintenance procedure 6-015.

(2) Check the operation of the far bank carriage.

6 - 031 FAR AND HOME BANK CARRIAGE - FAR BANK LOWER PULLEYS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)
Thread locking compound, loctite 243
Multi-Gasket loctite 574
Lock washers (Qty 2)

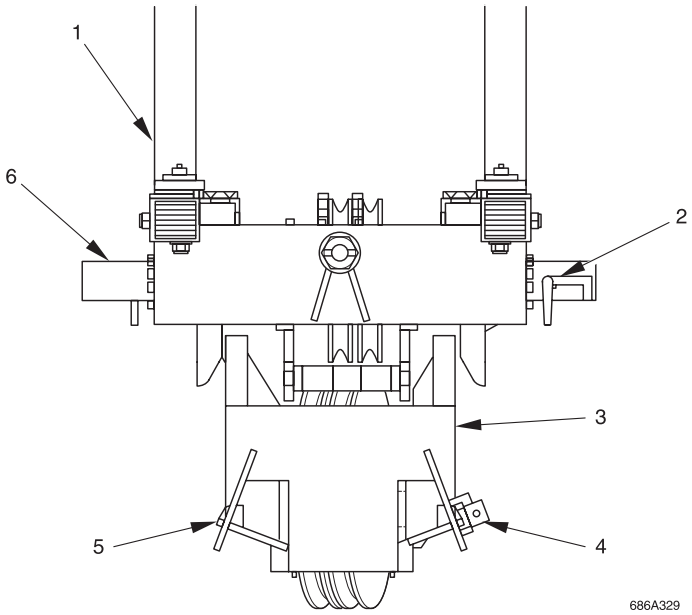
Equipment Conditions

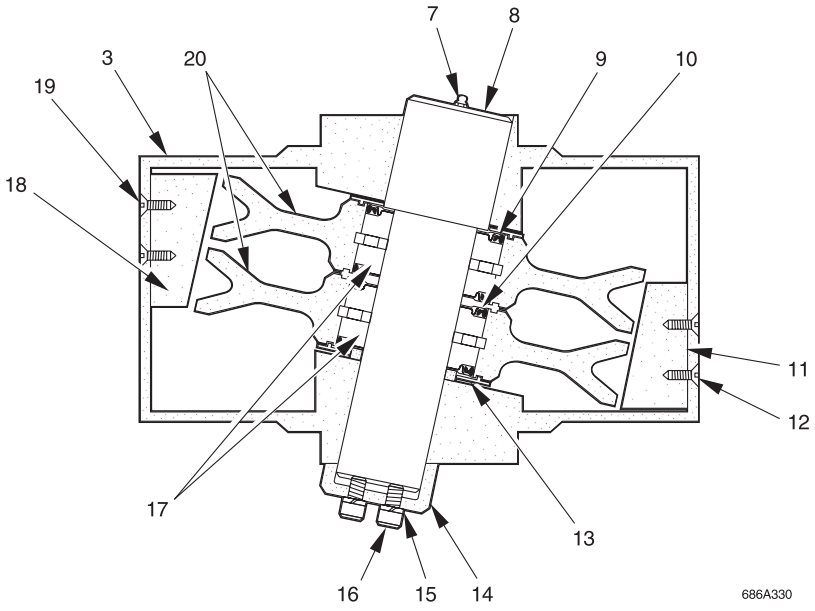
A-Frame deployed.

WARNING

CRUSH INJURY. THE FAR BANK CARRIAGE LOWER PULLEY BLOCK IS HEAVY.

DANGER TO PERSONNEL. SHARP METAL SURFACES. THE ROPE PULLEYS MAY HAVE SHARP METAL SURFACES. PERSONNEL ARE TO WEAR PERSONAL PROTECTIVE EQUIPMENT (GLOVES) WHEN HANDLING ROPES AND ROPE PULLEYS.





a. Remove

(1) Release the shoot bolts (2 and 6) securing the lower pulley block (3) from the far bank carriage (1).

(2) Deploy the lower pulley block (3).

(3) Remove the lower winch rope in accordance with direct support maintenance procedure 6-015.

(4) Remove the bridge sling pins (4 and 5).

(5) Remove the bridge slings attached to the lower pulley block (3).

(6) Support the weight of the rope pulleys (20).

(7) Remove the screws (16), lock washers (15) and end cap (14). Discard lock washers.

(8) Remove the pulley pin (8).

(9) Remove rope pulleys (20).

(10) Separate the two rope pulleys (20) retaining the spacer (10) and sealing caps (9 and 13).

(11) Remove the bearings (17) from the rope pulleys (20).

(12) If required remove the screws (12 and 19) and rope guards (11 and 18).

(13) Check the rope pulleys (20) for wear, cracks and damage.

(14) Check the pulley pin (8) for wear and damage.

(15) Check the rope guides (11 and 18) for wear and damage.

(16) Check the bearings (17) for wear and damage.

(17) Check all threaded components for wear and damage.

(18) Replace components as necessary.

b. Install

(1) Pack the bearings (17) with grease.

(2) Fit the bearings (17) to the rope pulleys (20). Refer to general unit maintenance procedure 5-158 before assembling the rope pulley bearings.

(3) Fit the spacer (10) between the inner faces of the rope pulleys (20).

(4) Apply multi-gasket to the sealing caps (9 and 13).

(5) Fit the sealing caps (9 and 13) to the outer faces of the rope pulleys (20).

(6) Position the rope pulleys (20) in the lower pulley block (3).

(7) Fit the pulley pin (8) through the lower pulley block (3) and the rope pulleys (20).

(8) Apply thread-locking compound to the screws (16).

(9) Secure the pulley pin (8) with the end cap (14), lock washers (15) and screws (16).

(10) Grease the pulley pin (8) through the grease fitting (7).

(11) If previously removed, apply thread-locking compound to the screws (12 and 19).

(12) Fit the rope guards (11 and 18) and secure with screws (12 and 19).

(13) Check that the rope pulleys (20) rotate freely.

c. Follow on tasks

(1) Fit the lower winch rope in accordance with direct support maintenance procedure 6-015.

(2) Fit the bridge slings.

(3) Check the operation of the lower pulley block assembly.

6 - 032 SLIDE FRAME - SECTION 1 REMOVAL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

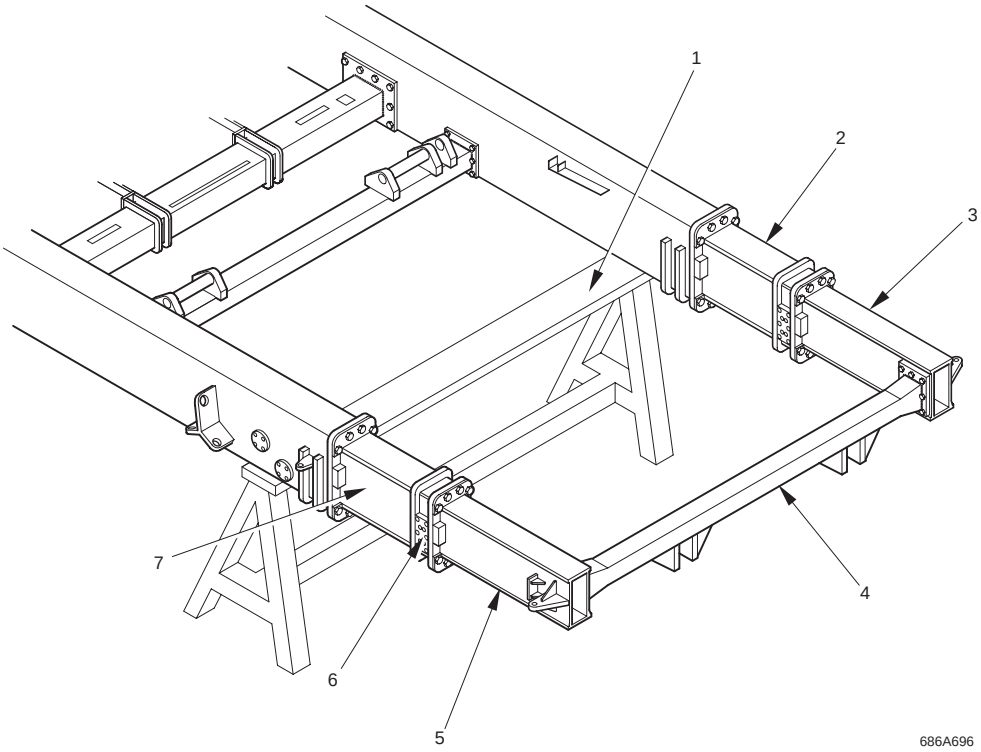
Thread locking compound, loctite 243

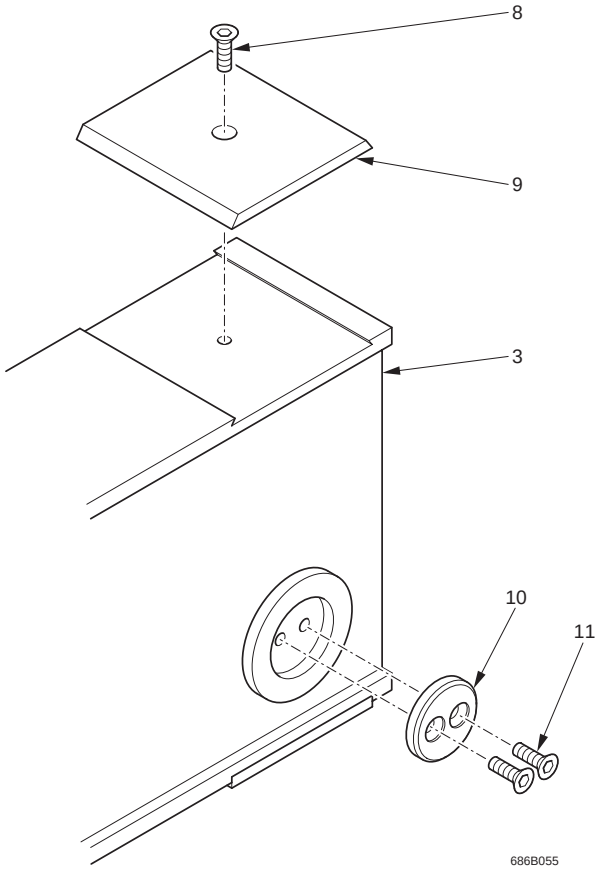
Equipment Conditions

A-Frame deployed - Slide frame supported
Launcher disconnected from the vehicle

NOTE

Carry out maintenance on one side of the slide frame at a time.





a. Remove

(1) Deploy the A-Frame and stabilizer legs.

(2) Support the weight of the slide frame at section three (1).

(3) Disconnect the launch system from the vehicle. See operator's manual TM 5-5420-279-10.

(4) Remove the relax mechanism upper cross member (4). See direct support maintenance procedure 6-039.

(5) Remove the stop pads (6) of section two (7 and 2). See unit maintenance procedure 5-080.

(6) Remove section one (5) of the slide frame and then remove section one (3).

(7) Check the component parts of Section one.

(8) Replace parts as required.

(9) If required remove the screw (8) and remove the wear pad (9), there is another wear pad fitted to the bottom of section 1 (3).

(10) Remove the two screws (11) and side wear pad (10), there is another side wear pad fitted on the opposite side of section 1 (3).

b. Install

(1) If removed earlier, apply thread locking compound to the screws (8 and 11).

(2) Fit the side wear pad to section 1 (3) and align the screw holes.

(3) Secure the side wear pad (10) in position with the screws (11).

(4) Fit the wear pads (9) to section 1 (3 and 5) and secure with the screws (8).

(5) Align and insert Slide Frame Section one (5) into Section two (7).

(6) Align and insert Slide Frame Section one (3) into Section two (2).

(7) When Section one (5 and 3) has been inserted, six feet, fit the Stop Pads (6) to Section two (7 and 2). See unit maintenance procedure 5-080.

(8) Fully insert Section one (5 and 3).

(9) Install the relax mechanism upper cross member (4). See direct support maintenance procedure 6-039.

(10) Connect the Slide Frame to the vehicle. See operator's manual TM 5-5420-279-10.

(11) Remove the Slide Frame Support (1).

c. Follow on task

(1) Carry out a full operation check of the Slide Frame in accordance with the Operator's Manual.

6 - 033 SLIDE FRAME - SECTION 2 REMOVAL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

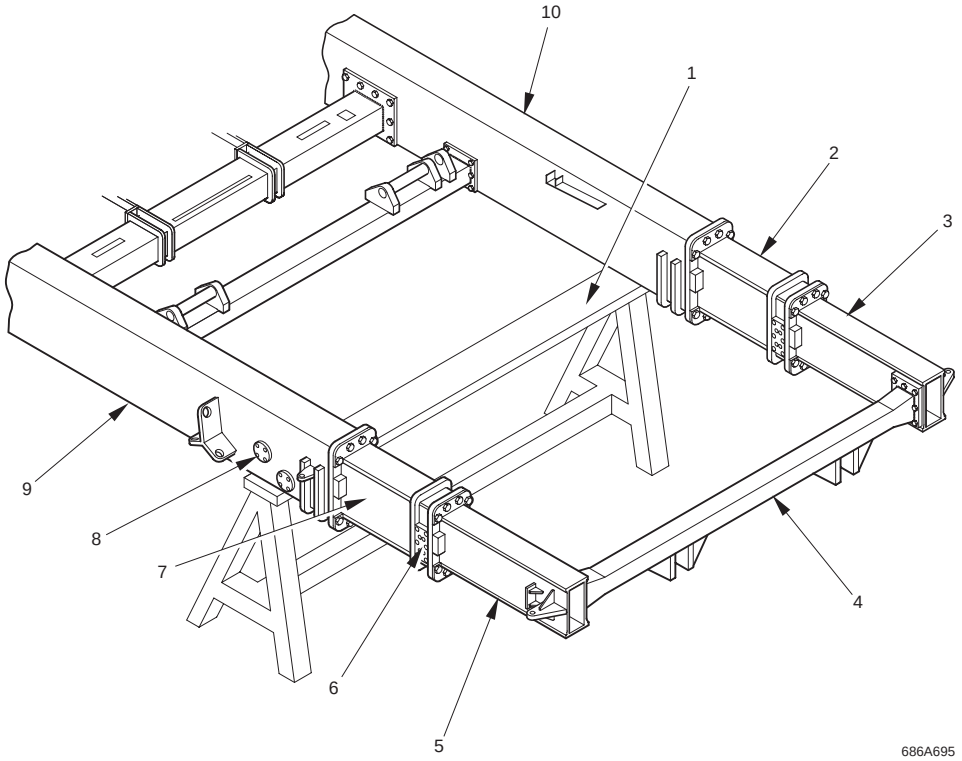
Thread locking compound, loctite 243

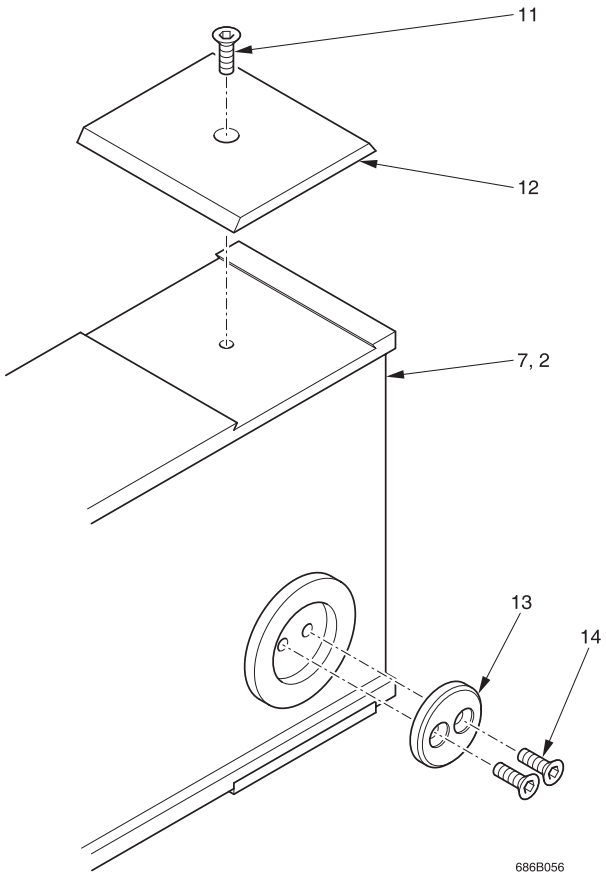
Equipment Conditions

A-Frame Deployed - Slide frame supported
Launcher Disconnected from the vehicle

NOTE

Carry out maintenance on one side of the slide frame at a time.





a. Remove

(1) Deploy the A-Frame and stabilizer legs.

(2) Support the weight of the slide frame at section three (1).

(3) Disconnect the launch system from the vehicle. See operator's manual TM 5-5420-279-10.

(4) Remove the stop pads (6) of section two (7 and 2). See unit maintenance procedure 5-080.

(5) Remove section one (5 and 3) of the slide frame. See direct support maintenance procedure 6-032.

(6) Remove the stop pads (8) of section three (9 and 10). See unit maintenance procedure 5-081.

(7) Remove section two (7 and 2) of the slide frame.

(8) Check the component parts of section two.

(9) Replace parts as required.

(11) If required remove the screw (11) and remove the wear pad (12), there is another wear pad fitted to the bottom of section 2 (7 and 2).

(10) Remove the two screws (14) and side wear pad (13), there is another side wear pad fitted on the opposite side of section 2 (7 and 2).

b. Install

(1) If removed earlier, apply thread locking compound to the screws (11 and 14).

(2) Fit the side wear pad to section 2 (7 and 2) and align the screw holes.

(3) Secure the side wear pad (13) in position with the screws (14).

(4) Fit the wear pad (12) to section 2 (7 and 2) and secure with the screw (11).

(5) Align and insert slide frame section two (7 and 2) into section three (9 and 10).

(6) When section two (7 and 2) has been inserted, three feet, fit the stop pads (8) to section three (9 and 10). See unit maintenance procedure 5-081.

(7) Align and insert slide frame section one (3 and 5) into section two (7 and 2).

(8) When section one has been inserted, six feet, fit the stop pads (6) to section two (3 and 5). See unit maintenance procedure 5-080.

(9) Fully insert sections one (3 and 5) and sections two (7 and 3).

(10) Connect the slide frame to the vehicle. See operator's manual TM 5-5420-279-10.

(11) Remove the slide frame support (1).

c. Follow on task

(1) Carry out a full operation check of the slide frame in accordance with the operator's manual TM 5-5420-279-10.

6 - 034 SLIDE FRAME - SECTION 3 REMOVAL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

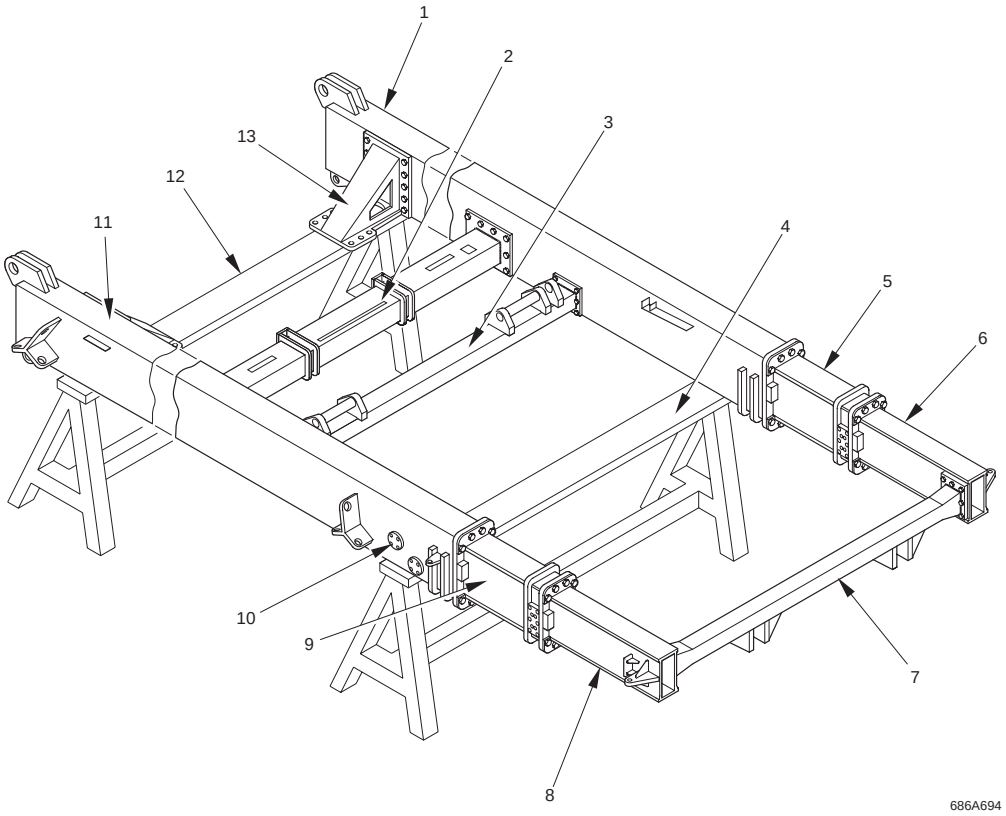
Tool Kit, General Mechanic's, Automotive (GMTK)
Crane and Slings

Materials Required

None

Equipment Conditions

Launcher disconnected from the vehicle
Launch Frame Removed
A-Frame Removed



a. Remove

(1) Disconnect the launcher from the vehicle. See operator's manual TM 5-5420-279-10.

(2) Remove the launch frame. See direct support maintenance procedure 6-018.

(3) Remove the A-Frame from section 3 of the slide frame. See direct support maintenance procedure 6-006.

(4) Remove the stop pads (10) from section 3. See unit maintenance procedure 5-081.

(5) Remove the rotate cylinders. See unit maintenance procedure 5-078.

(6) Disconnect the hydraulic pipes, electrical harnesses and energy chain connecting section 3 to the vehicle.

(7) Support the weight of section three with suitable supports (4 and 12).

(8) Remove section 1 of the slide frame (6, 7 and 8). See maintenance procedure 6-032.

(9) Remove section 2 of the slide frame (5 and 9). See direct support maintenance procedure 6-033.

(10) Remove the articulator cross beam (3). See direct support maintenance procedure 6-035.

(11) Remove the rotate cylinder cross beam (2). See direct support maintenance procedure 6-036.

(12) Remove the ISO twist lock brackets (13).

(13) Check the component parts of section three (1 and 11).

(14) Replace parts as required.

b. Install

(1) Fit the ISO twist lock brackets (13) to the slide frame section 3 (1 and 11).

(2) Fit the rotate cylinder cross beam (2). See direct support maintenance procedure 6-036.

(3) Fit the articulator cross beam (3). See direct support maintenance procedure 6-035.

(4) Fit section 2 of the slide frame (5 and 9) to slide frame section 3. See direct support maintenance procedure 6-033.

(5) Fit section 1 of the slide frame (6, 7 and 8) to slide frame section 2. See direct support maintenance procedure 6-032.

(6) Fit the stop pads (10) to section 3. See unit maintenance procedure 5-081.

(7) Connect the hydraulic pipes, electrical harnesses and energy chain.

(8) Fit the rotate cylinders. See unit maintenance procedure 5-077.

(9) Fit the A-Frame to the slide frame section 3. See direct support maintenance procedure 6-006.

(10) Fit the launch frame see direct support maintenance procedure 6-018.

(11) Connect launcher to launch vehicle. See operator's manual TM 5-5420-279-10.

(12) Remove supports (4 and 12).

c. Follow on task

(1) Carry out a full functional check of the launch system is accordance with the operator's manual TM 5-5420-279-10.

6 - 035 SLIDE FRAME - ARTICULATOR CROSS BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

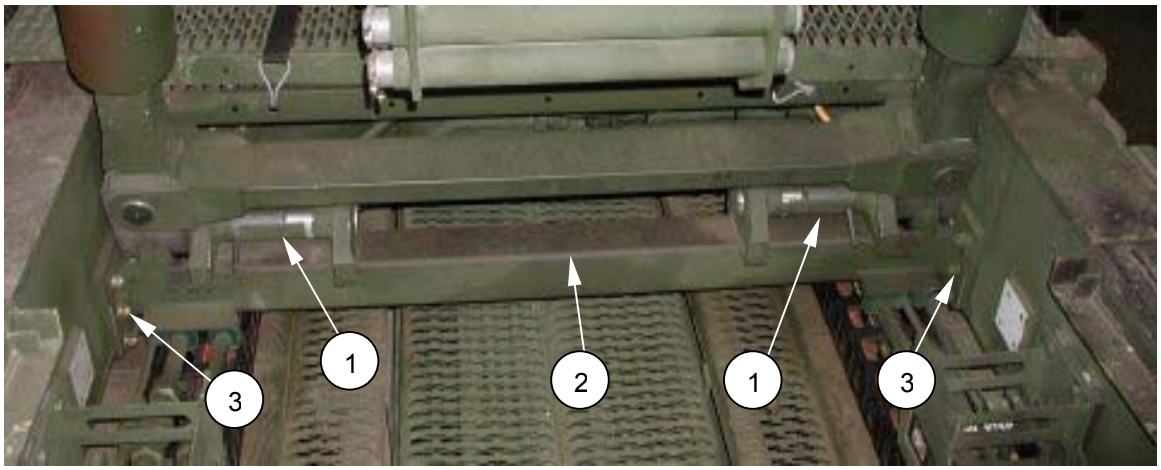
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Lock washers (Qty 14)

Equipment Conditions

A-Frame Deployed
Launch Frame supported
Articulator Cylinders Stowed



a. Remove

(1) Support the weight of the launch frame with a lifting device.

(2) Release the articulator shoot bolts (1) and stow the articulator cylinders.

(3) Support the weight of the slide frame articulator cross beam (2).

(4) Remove the 14 bolts and lock washers (3) (7 on each bracket) securing the crossbeam to slide frame three. Discard the lock washers.

(5) Remove the crossbeam (2).

(6) Check the bolts and washers for damage.

(7) Check the slide frame mounting holes for damage.

(8) Check the shoot bolt housings for damage.

(9) Change components as required.

b. Install

(1) Fit the crossbeam (2) to slide frame 3 and secure in place with 14 lock washers and bolts (3).

(2) Deploy the articulator cylinders.

(3) Lower the launch frame and fit the articulator cylinders cross member to the crossbeam (2) with the articulator shoot bolts (1).

6 - 036 SLIDE FRAME - ROTATE CYLINDER CROSS BEAM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

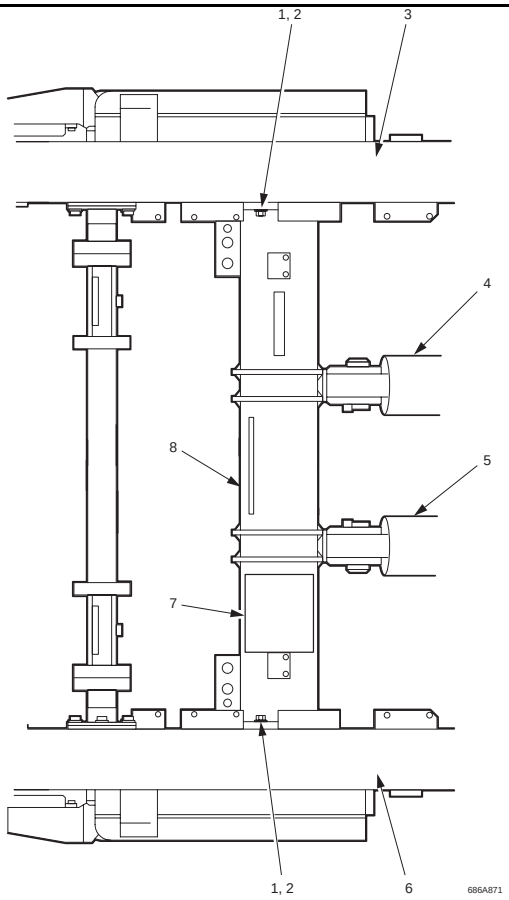
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

A-Frame Deployed
Slide Frame Deployed



a. Remove

(1) Deploy the A-Frame.

(2) Deploy the slide frame.

(3) Remove the fixed walkway; see unit maintenance procedure 5-090, to gain access to the crossbeam mounting bolts (1,2).

(4) Support the rotate cylinders (4 and 5) and disconnect them from the crossbeam (8). See unit maintenance procedure 5-077.

(5) Note the position of and remove the hydraulic hoses connected to the crossbeam (8).

(6) Note the position of and remove the electrical harnesses connected slide frame junction box (7) on the crossbeam (8).

(7) Support the weight of the crossbeam (8).

(8) Remove the 20 bolts and washers (1 and 2), 10 on each bracket, securing the crossbeam to slide frame section three (3 and 6).

(9) Remove the crossbeam (8).

(10) Check the crossbeam for damage.

(11) Check all threaded components for damage.

(12) Check the electrical harnesses and hydraulic hoses for damage.

(13) Change components as required.

b. Install

(1) Fit the crossbeam (8) to the slide frame section three (3 and 6).

(2) Secure in place with the 20 washers and bolts.

(3) Fit the electrical harnesses in the positions noted during removal.

(4) Fit the hydraulic hoses in the positions noted during removal.

(5) Fit the rotate cylinders (4 and 5). See unit maintenance procedure 5-077.

(6) Fit the fixed walkway. See unit maintenance procedure 5-090.

c. Follow on task

(1) Carry out a functional check on the launch system.

6 - 037 SLIDE FRAME - A-FRAME ROTATE MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

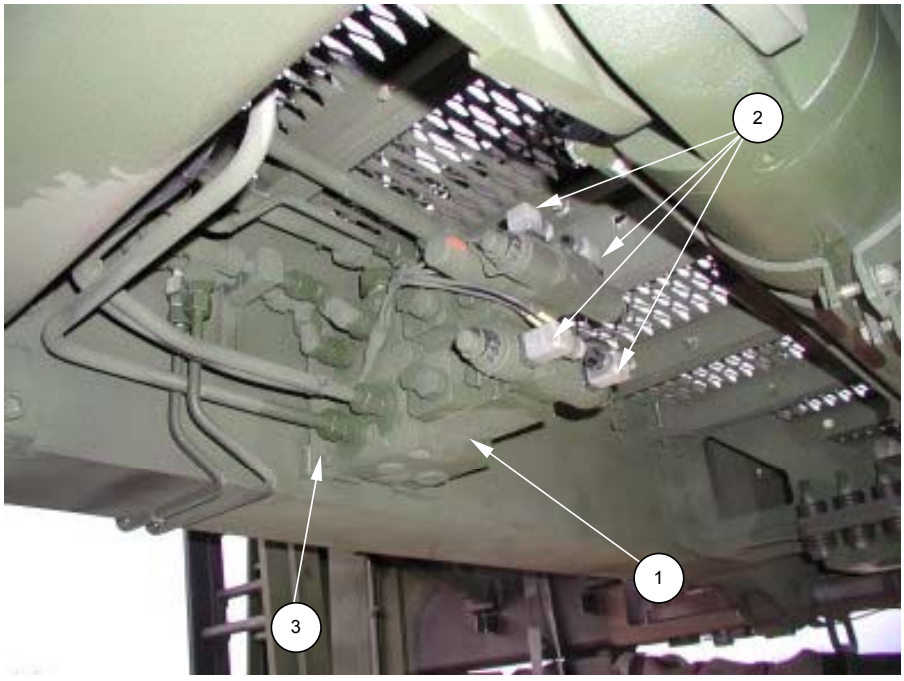
A Frame Deployed
Slide Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

---

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE A-FRAME ROTATE MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

The rotate manifold assembly is mounted to the right-hand side of Slide Frame Section 3.

a. Remove

(1) De-pressurize the hydraulic system in accordance with unit maintenance procedure 5-118.

(2) Note the position of and remove hydraulic pipes connected to the rotate manifold assembly (1).

(3) Note the position of and remove the electrical connections (2) to the solenoid valves.

(4) Remove the four bolts and washers (3) mounting the rotate manifold assembly (1) to the slide frame.

(5) Remove the rotate manifold (1).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Apply thread-locking compound to the mounting bolts.

(2) Fit the rotate manifold assembly (1) to the sliding frame with the four bolts and washers (3).

(3) Fit the hydraulic pipes to the positions noted during removal.

(4) Fit the electrical connections (2) to the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the system and check for correct operation and hydraulic fluid leaks.

6 - 038 SLIDE FRAME - TILT ROLLER SLIDE PADS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Tilt roller assembly removed from slide frame see maintenance procedure 5-083
Tilt roller cylinder removed from tilt roller assembly see maintenance procedure 5-085

NOTE

The tilt roller assembly has four slide pads, one upper, one lower and two side. Each pad is retained in position by two screws, washers and a retaining plate. The upper and lower slide pad retention blocks are different sizes to the side pad retention blocks so care must be taken to fit the correct retention block during installation.

a. Remove

(1) Remove the inner slide (1) from the outer post (2).

(2) Remove the upper and lower slide pad screws (5), washers (6) and retaining blocks (7).

(3) Remove the upper and lower slide pads (3 and 4).

(4) Remove the side pad screws (5), washers (6) and retaining blocks (8).

(5) Remove the side pads (10).

b. Install

(1) Measure the thickness 'X' of the outer post welded back plate (9), see detail 'C'.

(2) Machine the lower slide pad (4) to the same thickness as the outer post plate welded back plate (9).

(3) Machine the lower slide pad (4) in accordance with detail B.

(4) Apply thread locking compound to two of the screws (5).

(5) Fit the lower slide pad (4) to the outer post (2) and secure in place with two screws (5), washers (6) and lower slide pad retention blocks (7).

(6) Place the inner slide (1) inside the outer post (2) and allow to rest on the welded back plate (9) and the lower slide pad (4).

(7) Set the inner slide 0.25 mm clear of the welded back plate (9) and lower slide pad (4).

(8) Measure the gap 'Z' between the opposite face of the inner slide (1) and the internal face of the outer post (2).

(9) Subtract 0.25 mm for clearance from measurement 'Z'. Machine upper slide pad (3) thickness to this measurement.

(10) Machine the upper slide pad (3) in accordance with detail 'B'.

(11) Remove the inner slide (1) from the outer post (2).

(12) Apply thread locking compound to two of the screws (5).

(13) Fit the upper slide pad (3) to the outer post (2) and secure in place with two screws (5), washers (6) and upper slide pad retention blocks (7).

(14) Place and centralise the inner slide (1) inside the outer post (2).

(15) Measure the gaps 'Y' between the inner slide (1) and the outer post (2).

(16) Add the two measurements together, divide the result by two and subtract 0.25 mm for clearance.

NOTE

Example of measurement and calculation of side pad thickness:

Left side **Y = 3**

Right Side **Y = 4**

Therefore:- **C = [(3 + 4) / 2] - 0.25]**

C = [7 / 2] - 0.25

C = 3.5 - 0.25

C = 3.25 mm

(17) Machine the side pads (10) to this measurement 'C', see detail 'A'.

(18) Remove the inner slide (1) from the outer post (2).

(19) Apply thread locking compound to the screws (5).

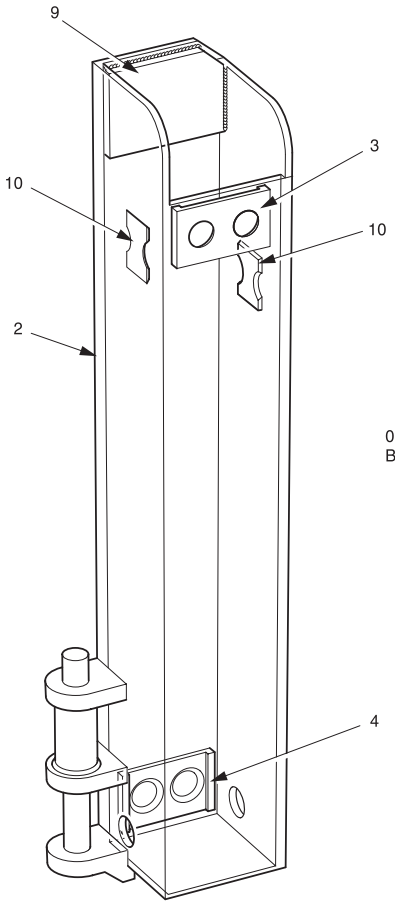
(20) Fit the side wear pads (10) to the outer post (2) and secure in place with the screws (5), washers (6) and retaining blocks (8).

c. Follow on tasks

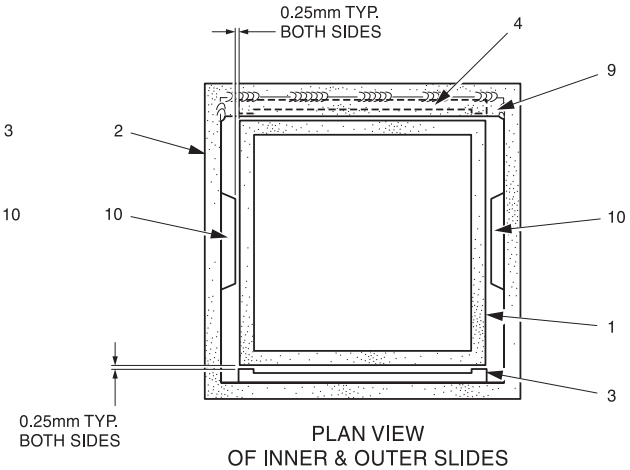
(1) Fit tilt roller cylinder to tilt roller assembly, see maintenance procedure 5-085.

(2) Fit tilt roller assembly to slide frame, see maintenance procedure 5-083.

(3) Check operation of tilt roller assembly in accordance with TM 5-5420-279-10 operator's manual.

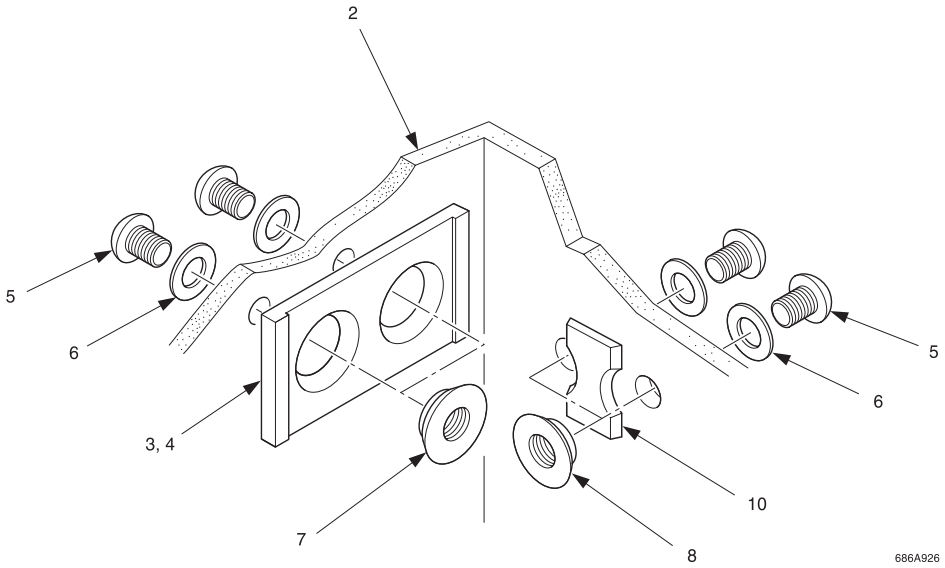


VIEW OF OUTER SLIDE
WITH SLIDEPADS

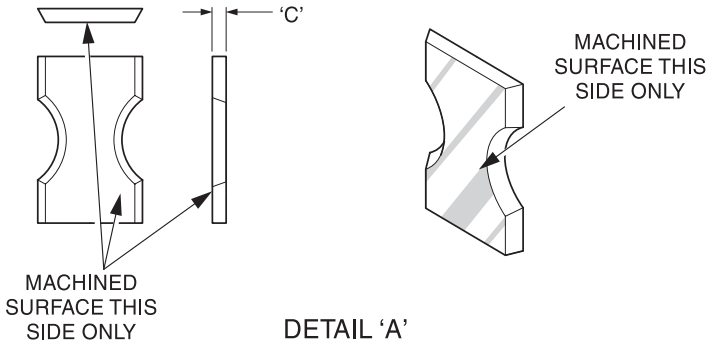


PLAN VIEW
OF INNER & OUTER SLIDES
WITH SLIDEPADS

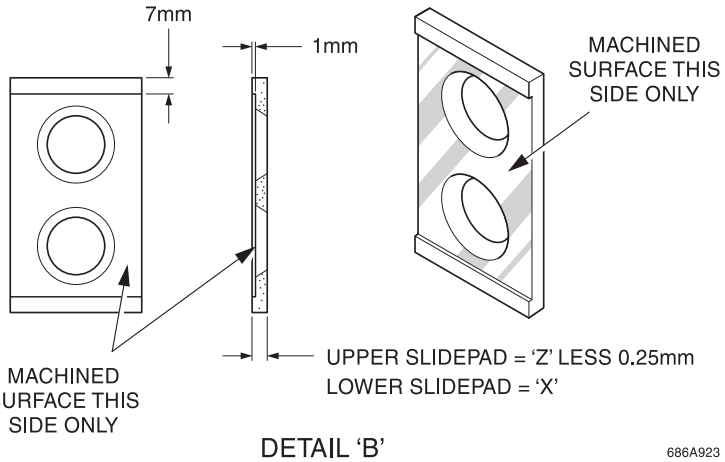
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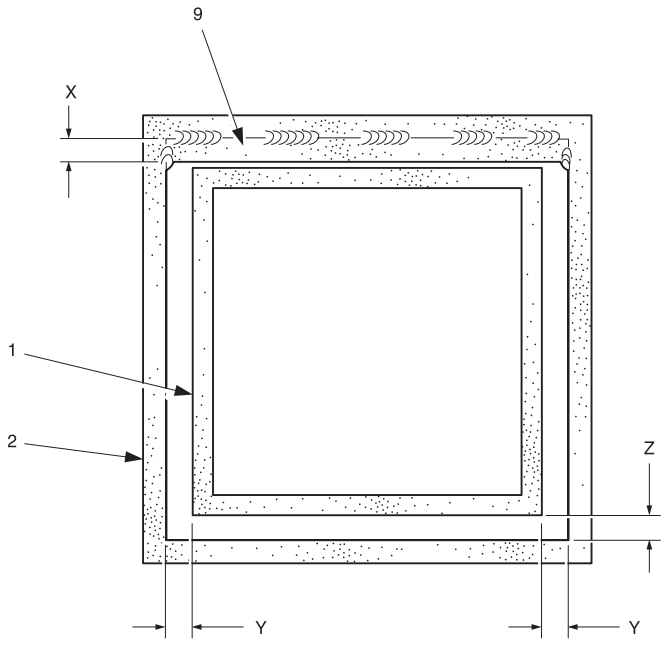


DETAIL 'A'



DETAIL 'B'

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DETAIL 'C'

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6 - 039 RELAX MECHANISM - CROSS MEMBER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

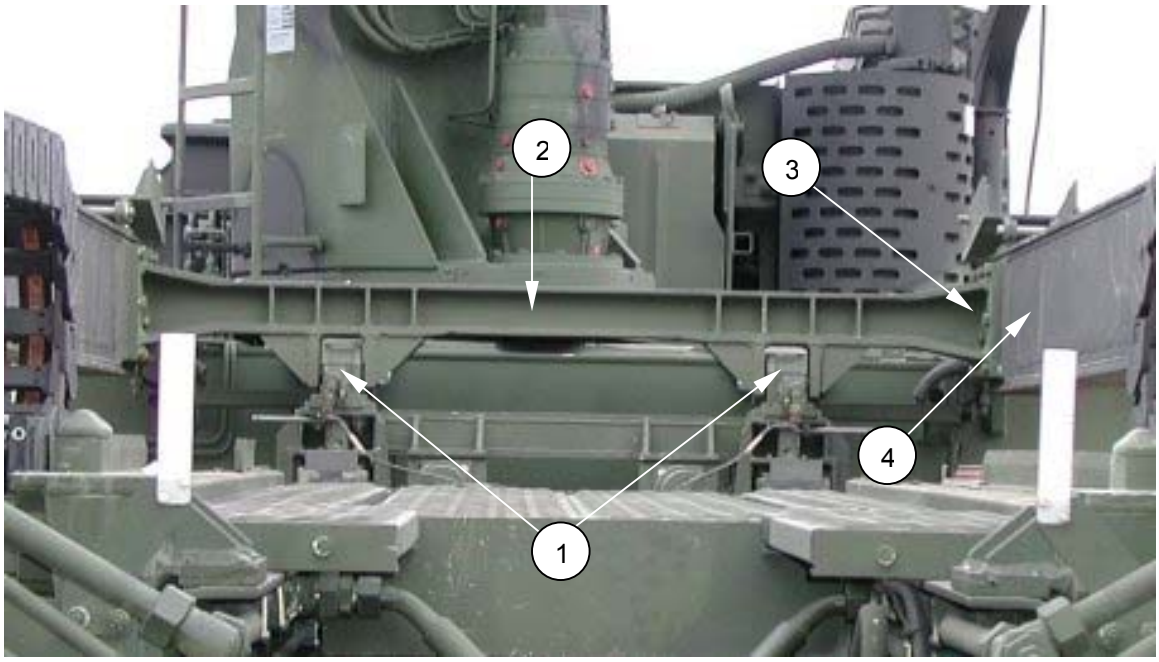
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

A-Frame deployed
Slide Frame deployed



a. Remove

(1) Support the weight of the slide frame on both sides.

(2) Remove the nuts, bolts and washers securing the ball joints (1) to the cross member (2).

(3) Remove the bolts and washers (3) securing each end of the cross member (2) to the slide frame (4).

(4) Remove the cross member (2). Retain the spring pins that locate the cross member (2) on the slide frame (4).

(5) Check all threaded components for damage.

(6) Check the ball joints for damage and wear.

(7) Replace components as required.

b. Install

(1) Apply thread-locking compound to the cross member bolts.

(2) Align the cross member (2) with the slide frame (4) and the ball joints (1).

(3) Fit the ball joint bolts (1), washers and nuts.

(4) Fit the cross member (2) to the slide frame (4) with the mounting bolts and washers (4).

(5) Fit the spring pins retained during removal.

6 - 040 RELAX MECHANISM - CYLINDER SUPPORT BRACKET

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

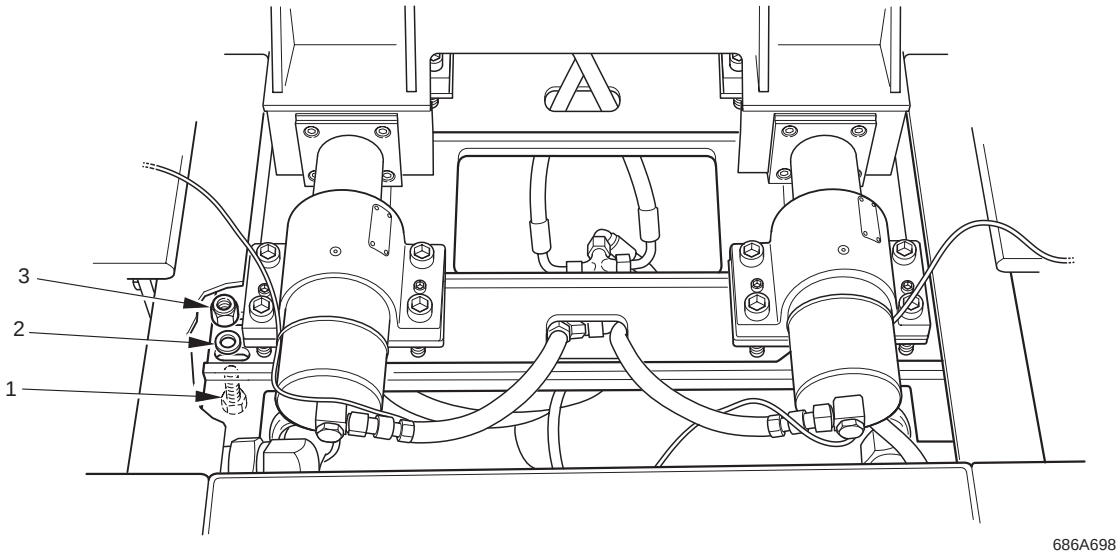
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nuts (Qty 8)

Equipment Conditions

A-Frame deployed
Slide Frame deployed



a. Remove

(1) Remove the relax mechanism cylinders. See unit maintenance procedure 5-092.

(2) Remove the electrical cables to the relax mechanism limit switches. See unit maintenance procedure 5-094.

(3) Remove the eight nyloc nuts (3) bolts (1) and washers (2) securing the cylinder support bracket to the chassis mounting brackets. Discard the nyloc nuts.

(4) Check all threaded components for damage.

(5) Check the cylinder support bracket for damage.

(6) Replace components as necessary.

b. Install

(1) Fit the cylinder support bracket to the chassis mounting brackets and secure in place with eight bolts (1), washers (2) and new nyloc nuts (3).

(2) Fit the relax mechanism cylinders to the cylinder support bracket. See unit maintenance procedure 5-092.

(3) Fit the electrical cables to the limit switches.

c. Follow on task

(1) Check the operation of the relax mechanism.

6 - 041 RELAX MECHANISM - STRUCTURAL ARM (SLIDE FRAME)

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Launcher disconnected from vehicle.
Vehicle switched off and battery shutoff switch in the off position

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a. Remove

(1) Disconnect launcher from vehicle. See operator's manual TM 5-5420-279-10.

(2) Depressurize hydraulic system. See unit maintenance procedure 5-118.

(3) Remove two rear relax cylinders (10). See unit maintenance 5-092.

(4) Disconnect the electrical cables to the relax mechanism limit switches (3).

(5) Remove the two relax mechanism shoot bolts (4). See unit maintenance procedure 5-094.

(6) Remove the bolts securing the mechanical stops (5) on the slide support (6).

(7) Remove the mechanical stops (5).

(8) Attach a crane to the structural arm (slide frame) (1) and support it's weight.

(9) Slide the structural arm (slide frame) (1) towards the rear of the vehicle over the slide support.

(10) Remove the arm structural (slide frame) (1).

(11) Remove the bolts (8) securing the slide support to the vehicle chassis.

(12) Remove the slide support complete with spring pins (7).

(13) Check all threaded components for wear and damage.

(14) Check the slide wear pads. See unit maintenance procedure 5-093.

(15) Check the limit switches (3). See unit maintenance procedure 5-094.

(16) Check the ball joint assembly (2). See unit maintenance procedure 5-095.

(17) Check the structural arm (1) for wear and damage.

(18) Check the slide support (6) for wear and damage.

(19) Check all welds for cracking or corrosion.

b. Install

(1) Apply thread locking compound to all threaded components less fasteners using nyloc nuts.

(2) Fit the slide supports (6) to the chassis (9) and secure with bolts (8) and spring pins (7).

(3) Align the structural arm (slide frame) (1) with the slide supports (6).

(4) Slide the structural arm (slide frame) (1) over the slide supports (6).

(5) Fit the mechanical stops (5) and secure in place with bolts on the slide support (6).

(6) Fit the two relax mechanism shoot bolts (4). See unit maintenance procedure 5-094.

(7) Connect the electrical cables to the relax mechanism limit switches (3).

(8) Fit the two rear relax cylinders (10). See unit maintenance 5-092.

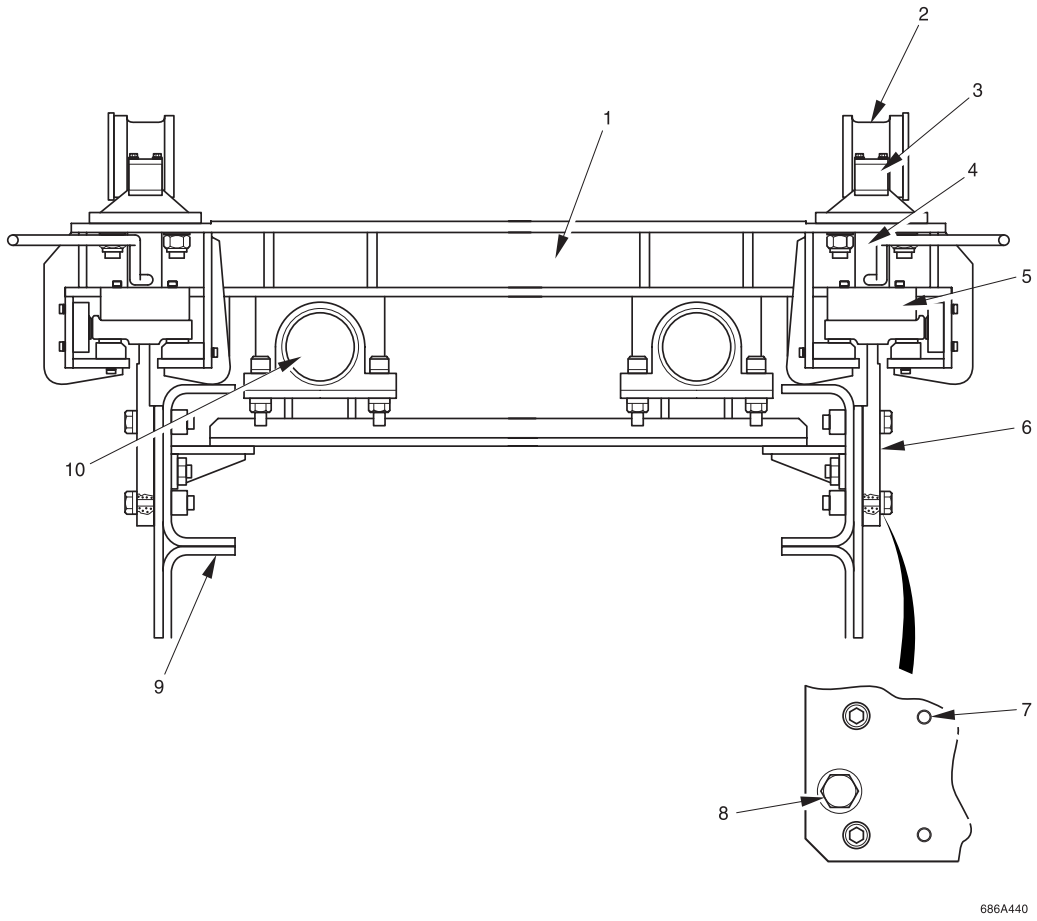
c. Follow on tasks

(1) Connect the launcher to the vehicle. See operator's manual TM 5-5420-279-10.

(2) Switch the battery shutoff switch to the on position.

(3) Check the operation of the relax mechanism.

(4) Check for leaks.


2
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686A440

6 - 042 CHASSIS - INTERFACE MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

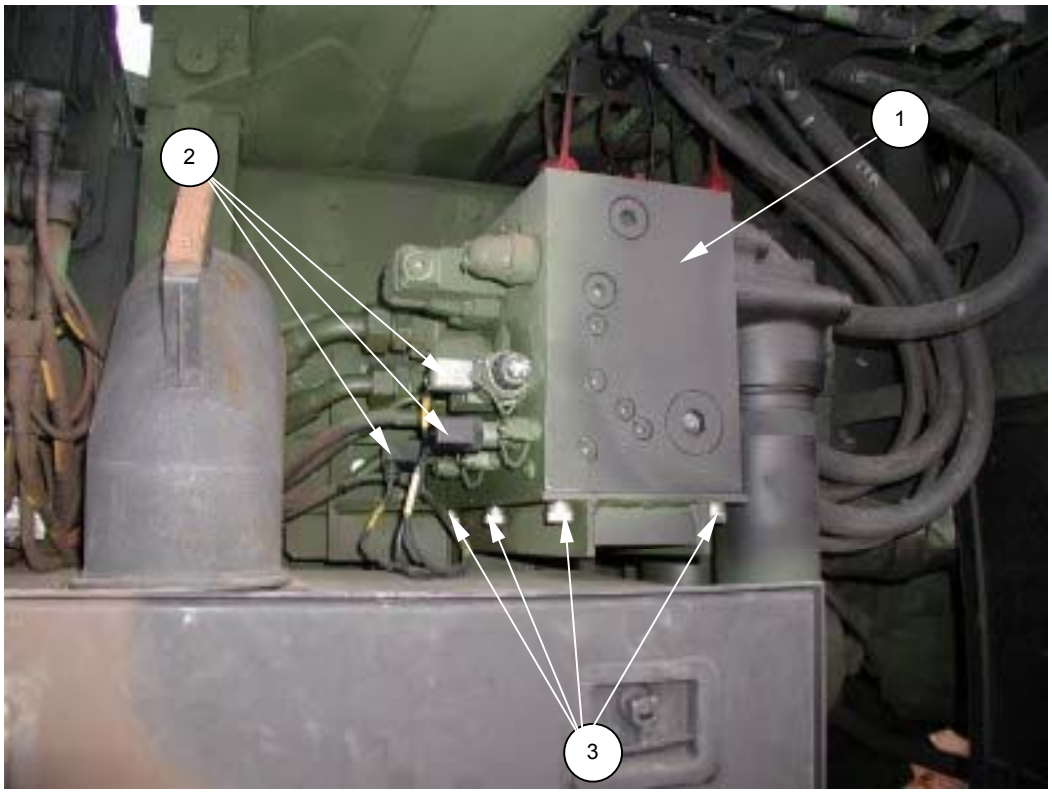
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE INTERFACE MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE INTERFACE MANIFOLD IS HEAVY.

a. Remove

(1) De-pressurize the hydraulic system in accordance with unit maintenance procedure 5-118.

(2) Note the position of and remove hydraulic pipes connected to the interface manifold assembly (1).

(3) Note the position of and remove the electrical connections (2) to the solenoid valves.

(4) Remove the six bolts and washers (3) mounting the interface manifold assembly (1) to the chassis-mounting bracket.

(5) Remove the interface manifold (1).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Apply thread-locking compound to the mounting bolts.

(2) Fit the interface manifold assembly (1) to the chassis-mounting bracket with the six bolts and washers (3).

(3) Fit the hydraulic pipes to the positions noted during removal.

(4) Fit the electrical connections (2) to the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the system and check for correct operation and hydraulic fluid leaks.

6 - 043 HYDRAULIC SYSTEM - HYDRAULIC PUMP

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Tool Kit, Common No 1

Materials Required

Thread locking compound, loctite 243
Nyloc nuts (Qty 4)

Equipment Conditions

Cross connect a second vehicle to provide hydraulic power, see operator's manual chapter 7
Crane in the preferred position for crane maintenance, see 6-069
Vehicle switched off and battery shutoff switch in the off position
Left side noise panel removed. See TM 9-2320-364-20-5 Chapter 17 paragraph 17-28
Remove the spare tire. See TM 9-2320-364-10

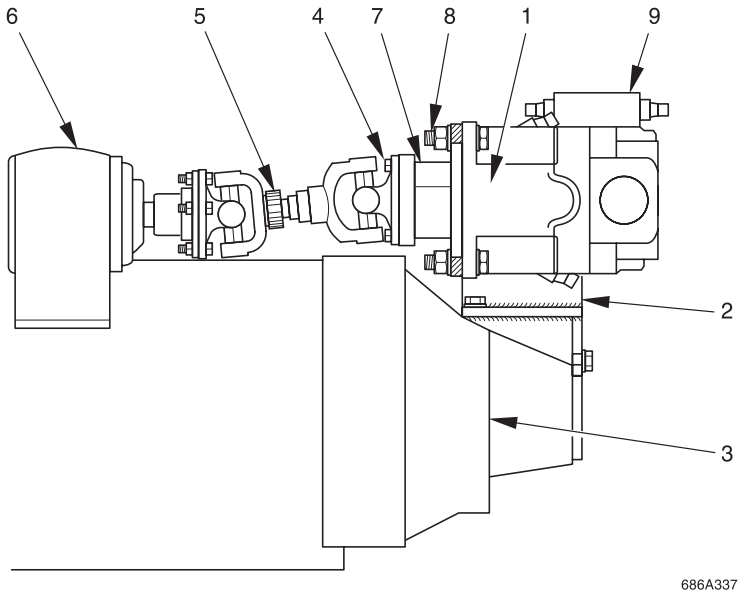
WARNING

DANGER OF INJURY TO PERSONNEL. ROTATING PARTS; DO NOT ATTEMPT TO WORK ON THE HYDRAULIC PUMP WITH THE ENGINE RUNNING.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE HYDRAULIC PUMP IS HEAVY, 132 LBS (60 KG).

BURN INJURY. THE HYDRAULIC BUTTERFLY VALVE IS POSITIONED CLOSE TO THE VEHICLE EXHAUST. CARE MUST BE TAKEN WHEN OPERATING THE BUTTERFLY VALVE IF THE EXHAUST OR THE ENGINE IS HOT.



NOTE

The Hydraulic Pump (1) is attached to the vehicle Transmission (3) with a Mounting Bracket (2). A Propshaft (5) connects the Power Take Off (6) to the hydraulic Pump (1).

a. Remove

(1) Remove the bolts (4) securing the propshaft (5) to the hydraulic pump (1).

(2) Place a suitable container underneath the hydraulic pump (1) to catch any spilled hydraulic oil.

(3) Close the butterfly valve (15) on the suction side of the pump located at the bottom left hand corner of the hydraulic reservoir.

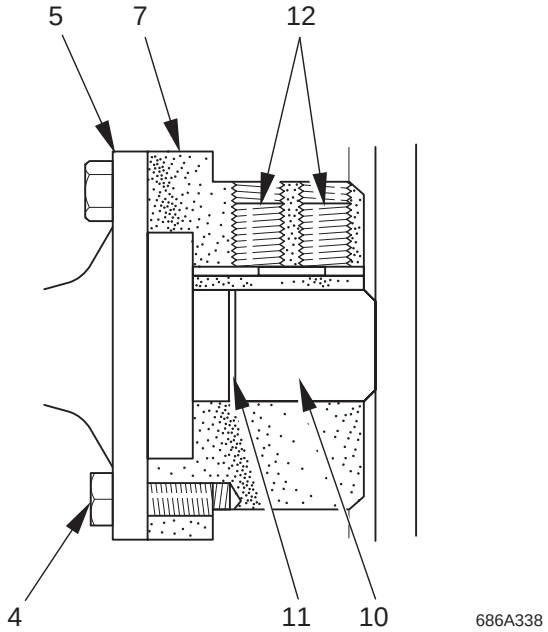
NOTE

To close the butterfly valve (12) pull on the button (14) and turn lever (13).

(4) Note the position of and remove the hydraulic hoses connected to the manifold (9) on the hydraulic pump (1).

(5) Remove the nyloc nuts (8), washers and bolts, securing the hydraulic pump (1) to the mounting bracket (2). Discard the nyloc nuts (8).

(6) Place the hydraulic pump (1) on a suitable working surface.



(7) Remove the two setscrews (12) and internal snap ring (11) securing the splined companion flange (7) to the hydraulic pump drive shaft (10).

(8) Check all threaded components for wear and damage.

(9) Check the splines on the splined companion flange (7) for wear and damage.

(10) Check the condition of the hydraulic hoses and their connections.

(11) Replace components as necessary.

b. Install

(1) Fit the splined companion flange (7) to the hydraulic pump drive shaft (10).

(2) Fit the internal snap ring (11) to the hydraulic pump drive shaft (10).

(3) Fit the setscrews (12) hydraulic pump drive shaft (10) and torque tighten to 89 lb/ft (120 Nm).

(4) Fit the hydraulic pump (1) to the mounting bracket (2).

(5) Secure the hydraulic pump (1) with the bolts, washers and new nyloc nuts (8). Torque tighten to 351 lb/ft (476 Nm).

(6) Fit the propshaft (5) to the splined companion flange (7).

(7) Apply thread-locking compound to the bolts (4).

(8) Secure the propshaft (5) to the splined companion flange (7) with the bolts (4) and torque tighten to 73 lb/ft (100 Nm).

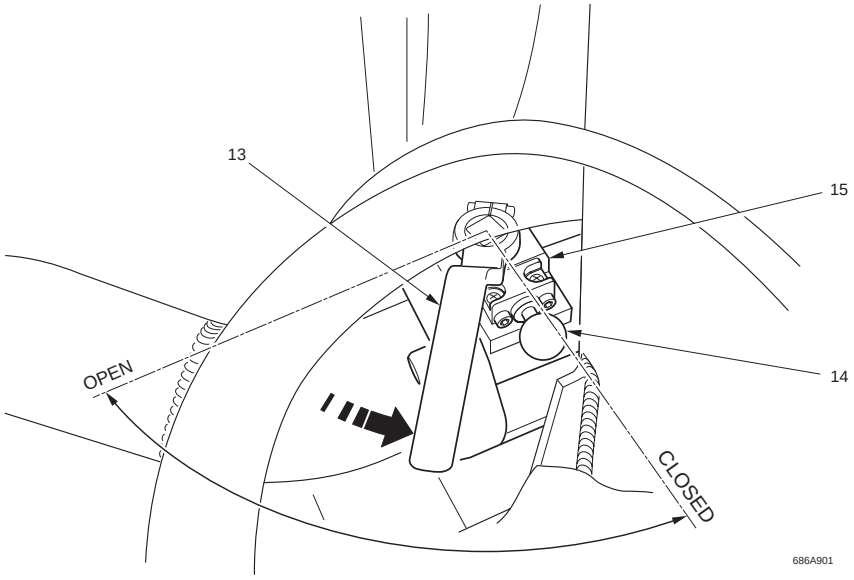
(9) Fit the hydraulic hoses to the positions noted during removal.

c. Follow on tasks

(1) Open the butterfly valve (15).

(2) Switch the battery shutoff switch to the on position.

(3) Operate the system and check for leaks.



6 - 044 HYDRAULIC SYSTEM - POWER TAKE OFF

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243
Lock washers (Qty 6)
Nyloc nuts (Qty 4)
PTO Gasket

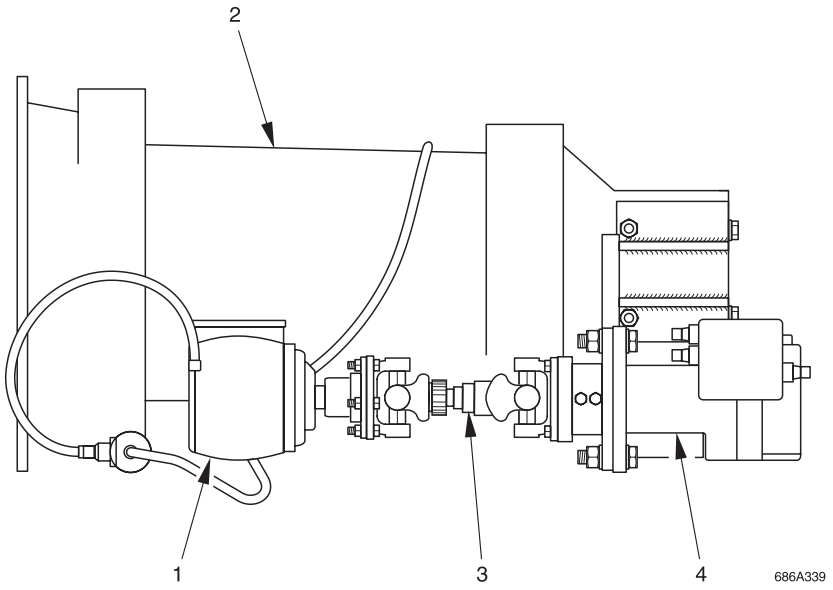
Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Left side noise panel removed. See TM 9-2320-364-20-5 Chapter 17 paragraph 17-28.

WARNING

DANGER OF INJURY TO PERSONNEL. ROTATING PARTS DO NOT ATTEMPT TO WORK ON THE POWER TAKE OFF WITH THE ENGINE RUNNING.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



NOTE

The Power Take Off (1) (PTO) is attached to the vehicle Transmission (2) and drives the Hydraulic Pump (4) via a Propshaft (3).

a. Remove

(1) Gain access to the PTO (1) through the left side noise panel opening.

(2) Remove the four nyloc nuts and bolts securing the propshaft (3) to the PTO (1). Discard the nyloc nuts.

(3) Place a suitable container underneath the PTO (1) to catch any spilled transmission oil.

(4) Note the position of and remove the two hoses connected to the PTO (1).

(5) Remove the nuts and lock washers securing the PTO (1) to the transmission (2). Discard the lock washers.

(6) Remove the PTO (1).

(7) Remove the PTO gasket and discard it.

(8) Check the hoses for wear or damage.

(9) Check all threaded components for wear and damage.

(10) Check that the mating faces of the Transmission and the PTO are clean and free from dirt and/or gasket.

b. Install

(1) Fit a new gasket to the mating face of the transmission (2).

(2) Fit the PTO (1) to the transmission (2).

(3) Apply thread-locking compound to the mounting bolts for the PTO (1).

(4) Secure the PTO (1) to the transmission (2) using six washers and nuts.

(5) Torque tighten the nuts to 99 - 104 lb/ft (134 - 142 Nm).

(6) Fit the two hoses to the PTO (1) in the positions noted during removal.

(7) Apply thread-locking compound to the propshaft bolts.

(8) Fit the propshaft (3) to the PTO (1).

(9) Secure the propshaft (1) with new nyloc nuts and bolts and torque tighten to 73 lb/ft (100 Nm).

(10) Grease the propshaft.

(11) Top up the transmission oil as required.

(12) Switch the battery shutoff switch to the on position.

(13) Check the operation of the PTO and check for oil leaks.

c. Follow on task

(1) Fit the left side noise panel. See TM 9-2320-364-20-5 Chapter 17 paragraph 17-28.

6 - 045 CRANE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Lifting Facilities
Pin Extraction Tool
Wooden Blocks (To place Crane on when removed)

Materials Required

None

Equipment Conditions

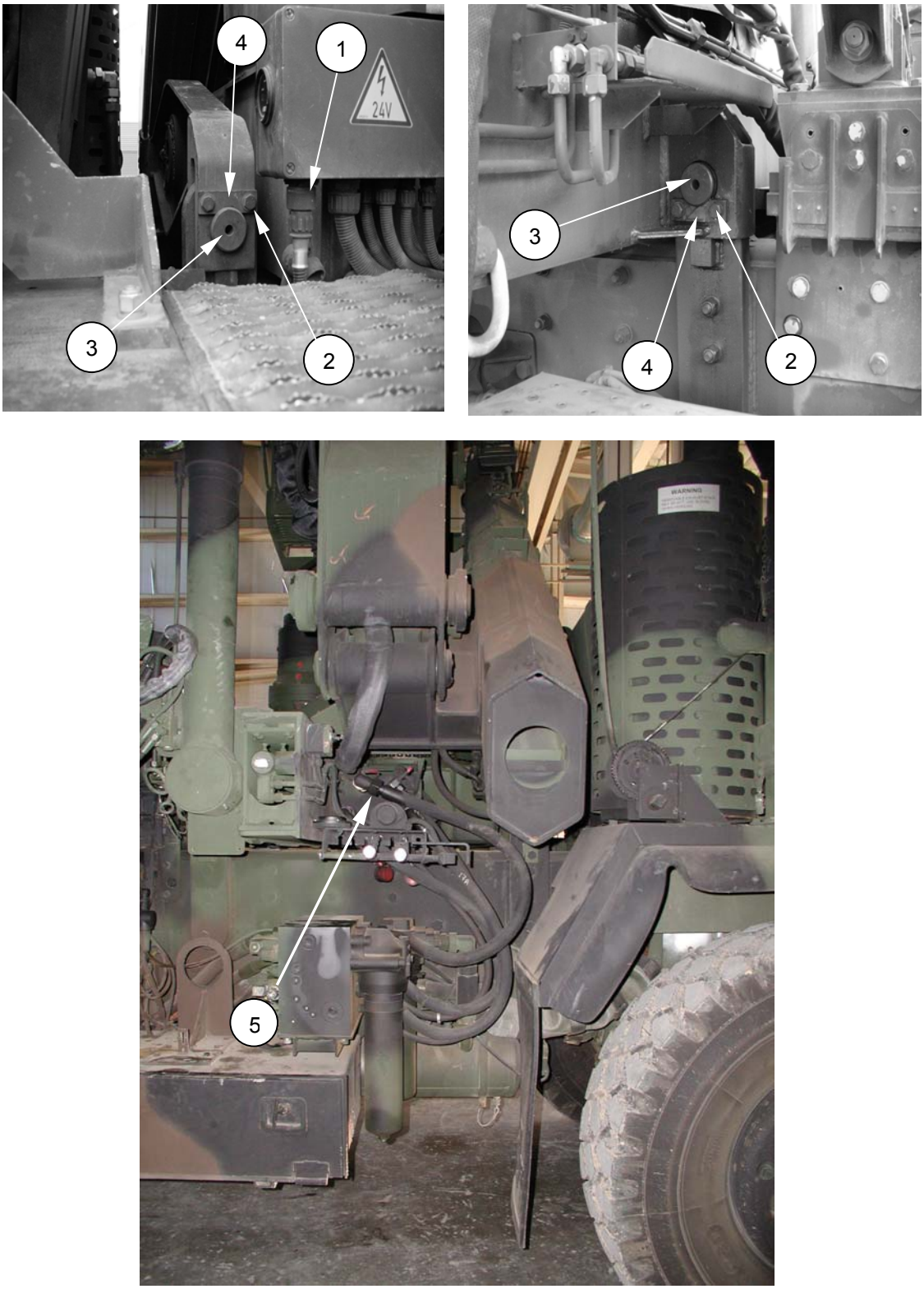
Vehicle parked on a level surface
Crane Stowed
Vehicle switched off and battery shutoff switch in the off position

WARNING

CRUSH INJURY. THE CRANE WEIGHS 10800 POUNDS. PERSONNEL MUST BE CLEAR OF THE LIFTING AREA WHEN THE CRANE IS REMOVED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



Crane Hydraulic Couplings

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Disconnect the electrical supply cable (1) to the crane.

(3) Note the positions of the five hydraulic couplings (5).

(4) Unscrew, counter clockwise, the five crane hydraulic couplings (5) and fit the plugs and caps. These are situated under the crane on the right hand side of the vehicle.

(5) Connect the lifting facility to the crane lifting point.





(6) Release the home bank end beam adapters and tie them out of the way of the crane.

(7) Remove the bolts (2) bolts and washers retaining the crane mounting pin locking plates (4).

NOTE

There are four mounting points, two forward of the Crane and two to the rear of the Crane.

(8) Take the weight of the crane with the lifting device.

(9) Remove the four crane mounting pins (3) using the pin extraction tool.

(10) Lift the crane clear of the vehicle.

(11) Place the crane on wooden blocks.

(12) Inspect components for damage and corrosion.

(13) Examine bolt heads and threads for damage.

(14) Replace components as required.

b. Install

(1) Lift crane and align with the crane mounting points.

(2) It may be necessary to adjust one or all of the crane mounting cams (9) if the mounting points cannot be aligned with the brackets on the chassis (8).

(3) Release the cam mounting bolt (11) by knocking back the lock washer tab (10).

(4) Turn the cam mounting bolt (11) counter clockwise until the cam can be rotated clear of the crane mounting (7).

(5) Align the crane (6) with the crane mounting points (7).

(6) Insert the crane mounting pins (3).

(7) Fit the crane mounting pin locking plates (4).

(8) Secure the locking plates with bolts (2) and washers. Use thread-locking compound on the bolts (2).

(9) Align the cam (9) with the crane (6).

(10) Tighten the cam mounting bolts (11) and lock in place with the lock washer (10).

(11) Reconnect the five crane hydraulic couplings (5), in the positions noted during removal, screw on clockwise.

(12) Reconnect the electrical supply cable (1) to the crane.

(13) Reposition and secure the home bank end beam adapters.

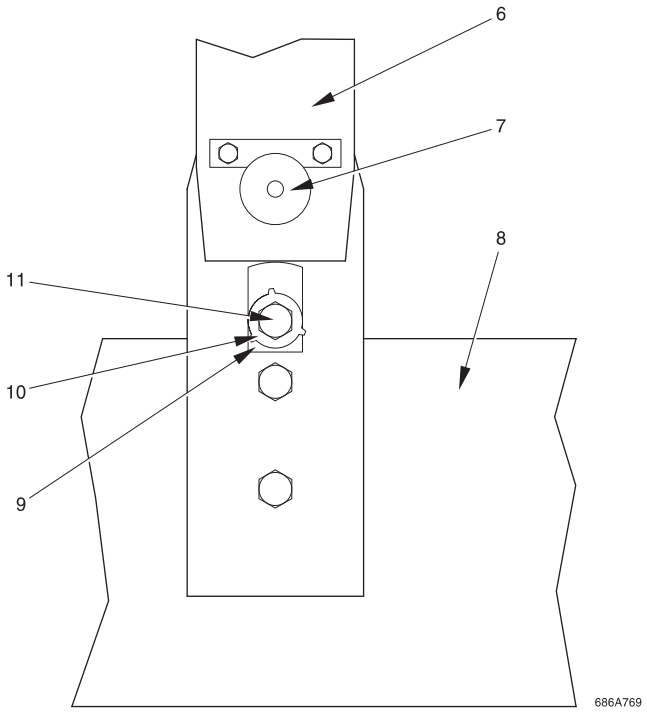
(14) Disconnect the lifting device and sling.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for leaks.


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6 - 046 CRANE - ROTATE COUPLING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

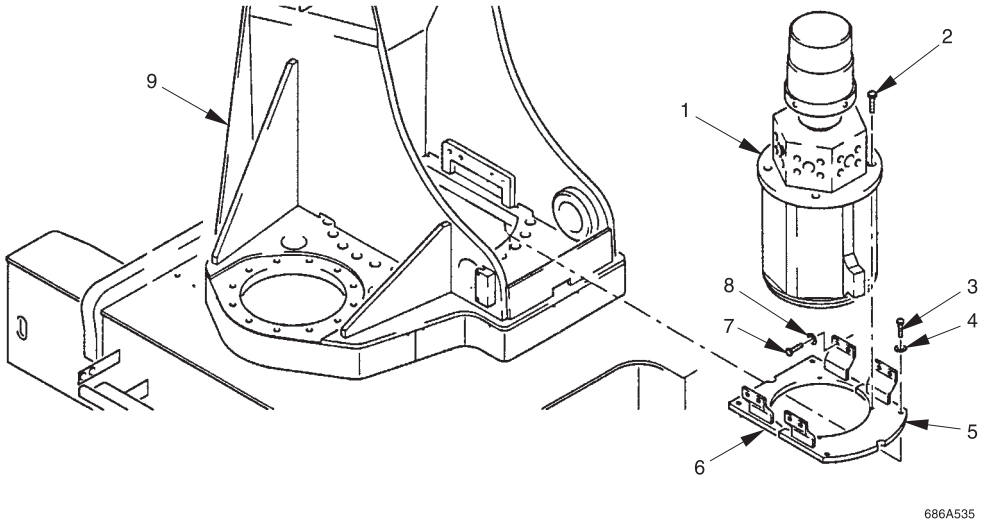
Equipment Conditions

Set crane in preferred position for maintenance
See maintenance procedure 6-069

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE COUPLING.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Remove the lift cylinder. See direct support maintenance procedure 6-050.

(3) Note the position of and remove all hydraulic hoses connected to the rotate coupling (1).

(4) Remove the eight bolts (7) and washers (8) securing the plates (5 and 6) to the crane Column (9).

(5) Remove the four bolts (3) and washers (4) securing the plates (5 and 6) to the crane Column (9).

(6) Remove the four bolts (2) securing the rotate coupling (1) to the plates (5 and 6).

(7) Note the position of and remove the rotate coupling (1).

(8) Remove the plates (5 and 6).

(9) Check all threaded components for wear and damage.

b. Install

(1) Fit the plates (5 and 6) to the crane base (9).

(2) Fit the rotate coupling (1) to the crane base (9) in the position noted during removal.

(3) Secure the rotate coupling (1) to the plates (5 and 6) with the bolts (2).

(4) Secure the plates (5 and 6) to the crane base (9) with four bolts (3) and washers (4).

(5) Secure the plates (5 and 6) to the crane base (9) with eight bolts (7) and washers (8).

(6) Fit all the hydraulic hoses to the positions noted during removal.

(7) Fit the lift cylinder. See direct support maintenance procedure 6-050.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic fluid leaks.

6 - 047 CRANE - ROTATE GEAR ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set Contact Maintenance Truck HMMWV

Materials Required

None

Equipment Conditions

Slide Frame deployed

WARNING

CRUSH INJURY. THE ROTATE GEAR IS HEAVY TO AVOID INJURY ENSURE THAT THE WEIGHT OF THE ROTATE GEAR IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Drain the brake oil through the brake oil drain (3).

(3) Drain the rotate gear oil through the rotate gear drain (2).

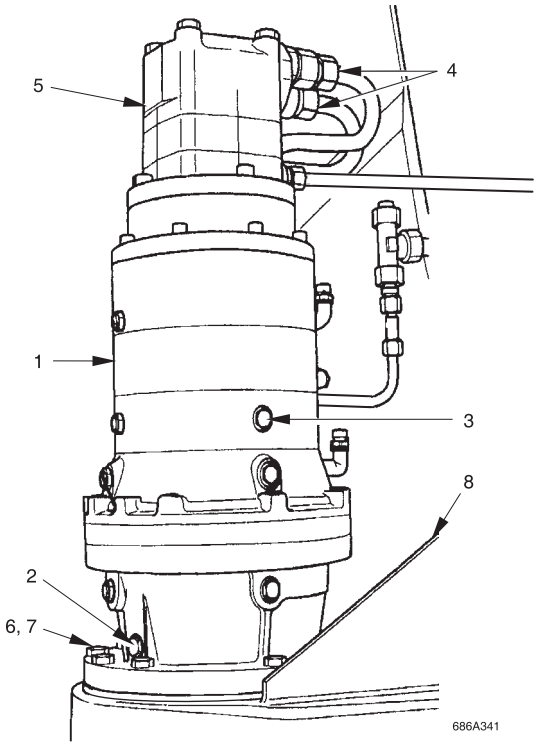
(4) Remove the hydraulic pipes (4) connected to the pump (5).

(5) Remove the twelve bolts (6) and washers (7) securing the rotate gear assembly (1) to the crane housing (8).

(6) Lift the rotate gear assembly (1) clear of the crane housing (8).

(7) Check the bolts (6) and washers (7) for damage.

(8) Renew components as necessary.



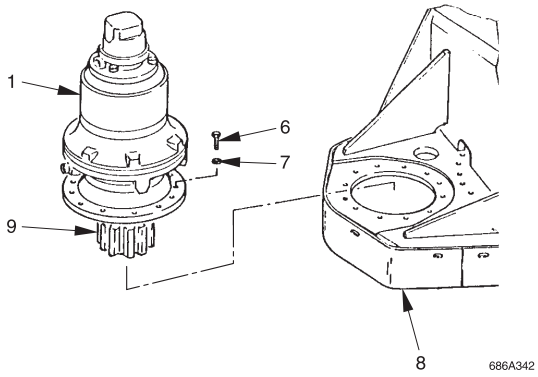
b. Install

(1) Align the pinion (9) with the rotate gear ring in the crane housing (8).

(2) Secure the rotate gear assembly (1) with the twelve bolts (6) and washers (7). Torque to 130 lb/ft.

(3) Connect the hydraulic pipes (4) to the pump (5).

(4) Fill the rotate gear oil and the brake gear oil in accordance with operator's maintenance procedure in TM 5-5420-279-10.



c. Follow on task

(1) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

6 - 048 CRANE - ROTATE GEAR MOTOR, BRAKE AND TRANSMISSION

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Set Contact Maintenance Truck HMMWV

Materials Required

Thread locking compound, loctite 242
Lock washers (Qty 4)
O-ring (Qty 1)

Equipment Conditions

Slide frame deployed

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Drain the brake assembly (5). See operator's maintenance TM 5-5420-279-10.

(3) Note the position of and disconnect the hydraulic pipes connected to the hydraulic motor (1).

(4) Remove the four bolts (2) and lock washers (3) securing the motor (1) to the brake assembly (5). Discard the lock washers.

(5) Note the orientation of and remove the motor (1).

(6) Remove and discard the o-ring (4).

(7) Note the position of and remove the hydraulic pipes connected to the rear of the brake assembly (5).

(8) Remove the eight bolts (6) securing the brake assembly (5) to the transmission (8).

(9) Note the orientation of and remove the brake assembly (5).

(10) Remove the twelve bolts (7) securing the transmission (8) to the crane column.

(11) Note the orientation of and remove the transmission (8), place on a suitable working surface.

(12) Remove the two bolts (12) and lock washers (11) securing the retaining plate (10) to the shaft of the transmission.

(13) Remove the retaining plate (10) and the gear (9).

(14) Check all threaded components for wear and damage.

(15) Check that the mating faces of the motor, brake assembly and transmission are clean.

(16) Check that the gear (9) is not damaged or worn.

b. Install

(1) Fit the gear (9) to the transmission (8).

(2) Fit the retaining plate (10) to the gear (9) and secure in place with the two lock washers (11) and bolts (12).

(3) Fit the transmission (8) to the crane column in the position noted during removal.

(4) Apply thread locking compound to the twelve bolts (7).

(5) Secure the transmission (8) to the crane column with the twelve bolts (7). Torque to 130 lb/ft.

(6) Fit the brake assembly (5) to the transmission (8) in the position noted during removal.

(7) Apply thread locking compound to the eight bolts (6).

(8) Secure the brake assembly (5) to the transmission (8) with the eight bolts (6).

(9) Fit the hydraulic pipes to the rear of the brake assembly (5) in the positions noted during removal.

(10) Coat the o-ring (4) with clean hydraulic oil.

(11) Fit the o-ring to the motor (1).

(12) Fit the motor (1) to the brake assembly (5), ensure that the o-ring is seated correctly and secure in place with the four washers (3) and bolts (2).

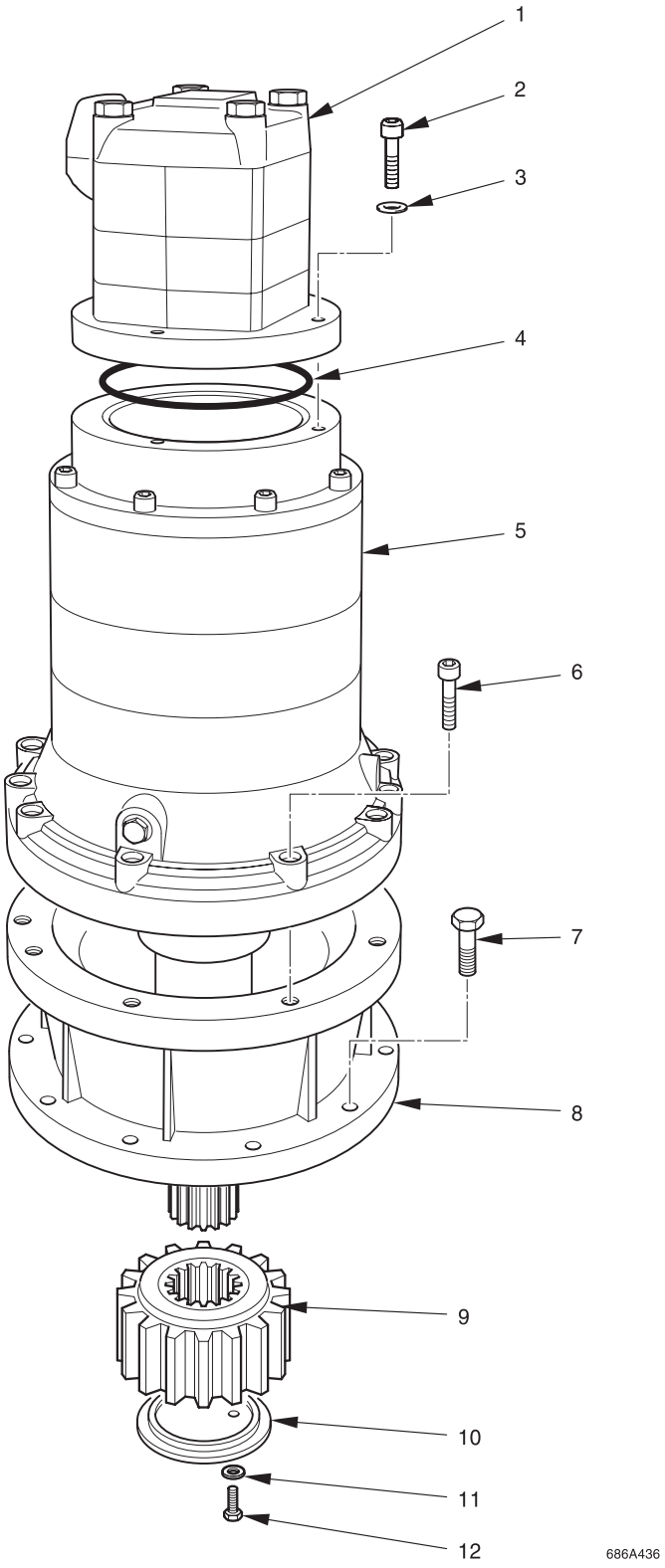
(13) Fit the hydraulic hoses to the motor (1) and break assembly (5) in the positions noted during removal.

(14) Fill the brake assembly with oil. See. See operator's maintenance TM 5-5420-279-10.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic oil leaks and for oil leaks at the brake assembly.


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6 - 049 CRANE - STABILIZER ARM

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

Slide Frame Deployed
Vehicle switched off and battery shutoff switch in the off position

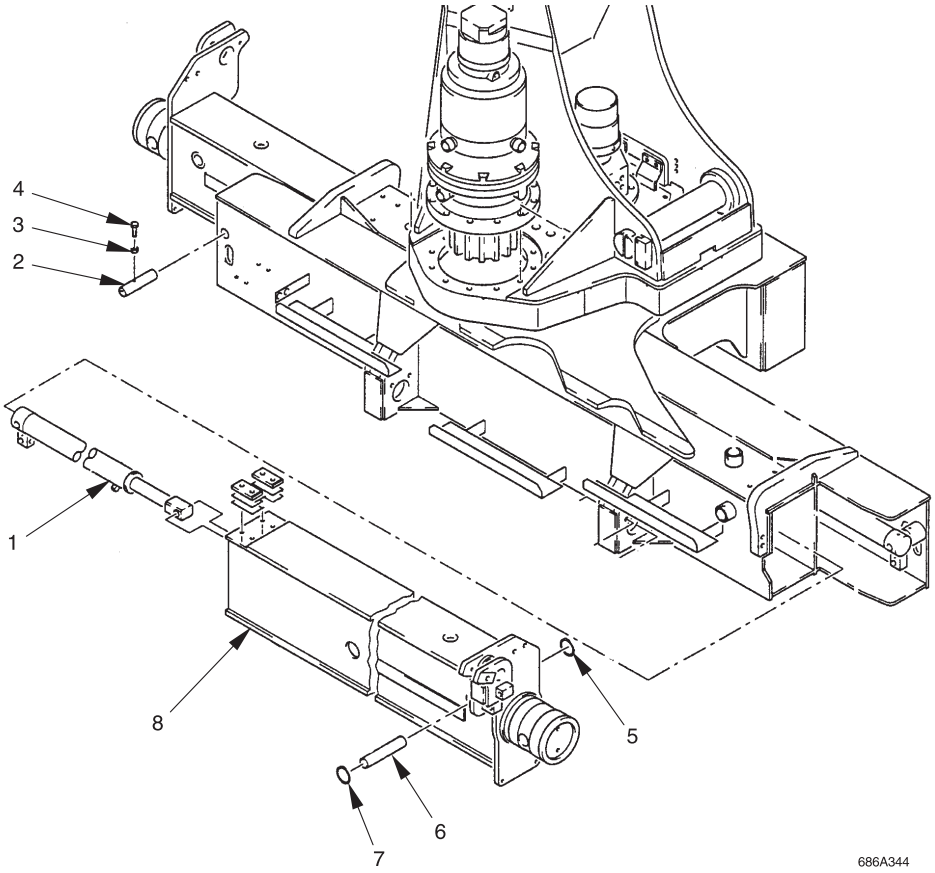
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WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE STABILIZER ARM CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE STABILIZER ARM IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER ARM CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Note the position of and remove the hydraulic pipes connected to the stabilizer cylinder (1).

(3) Remove the snap rings (5 and 7) and remove pin (6) securing stabilizer cylinder (1) to stabilizer extension (8).

(4) Remove nut (3), bolt (4) and pin (2).

(5) Remove stabilizer cylinder (1).

(6) Check all threaded components for wear and damage.

(7) Check hydraulic hoses for damage.

(8) Check Pins (2 and 6) for wear and damage.

b. Install

(1) Fit the piston of the stabilizer cylinder (1) to the stabilizer extension (8) with pin (6) and snap rings (5 and 7).

(2) Fit the body of the stabilizer cylinder (1) to the stabilizer extension (8) with pin (2), bolt (4) and nut (3).

(3) Connect the hydraulic hoses to the stabilizer cylinder (1) at the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the stabilizer cylinders in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for leaks and correct operation.

6 - 050 CRANE - LIFTING CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

Set crane in preferred position for maintenance
see maintenance procedure 6-069
Vehicle switched off and battery shutoff switch in the off position

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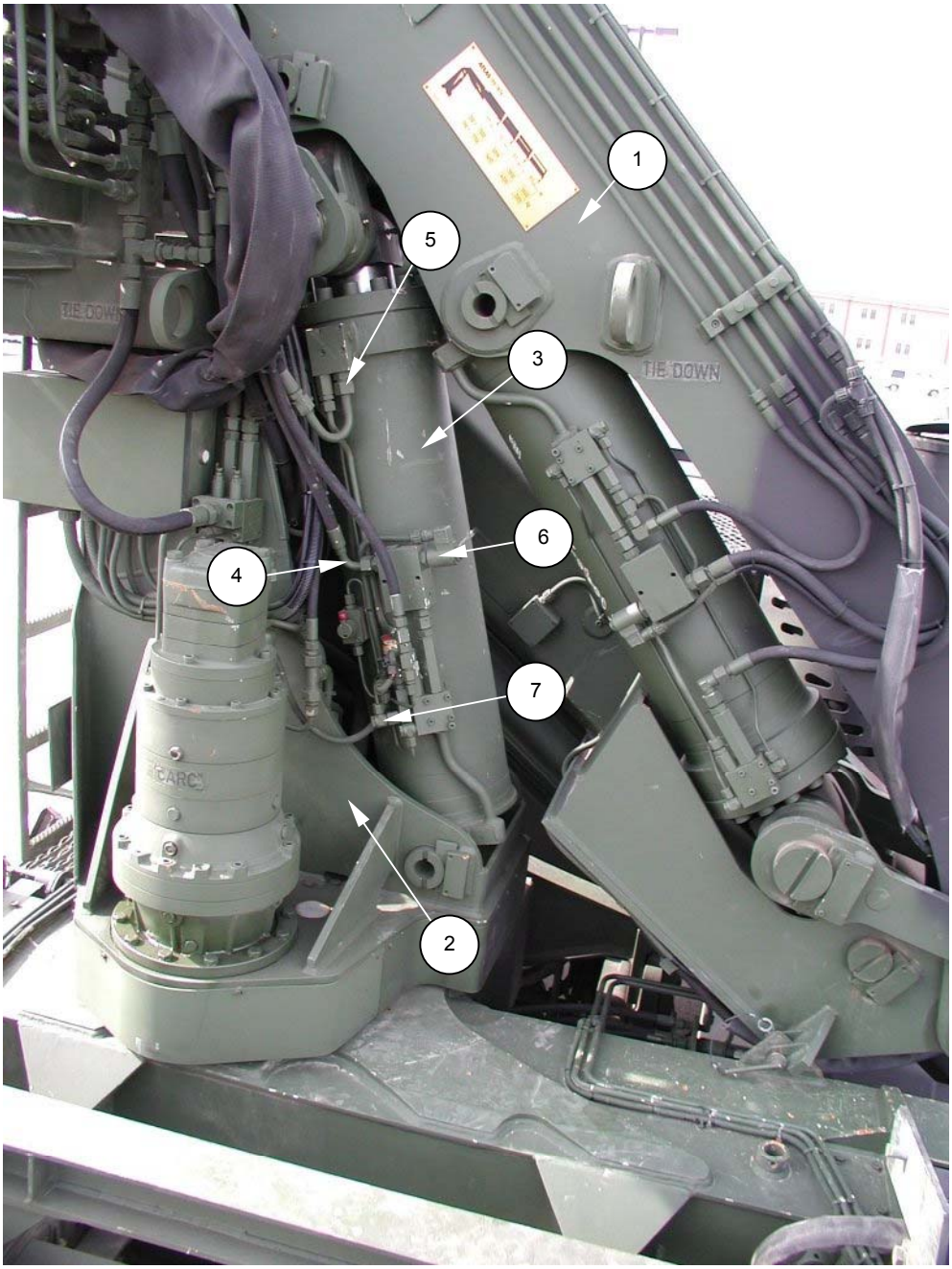
WARNING

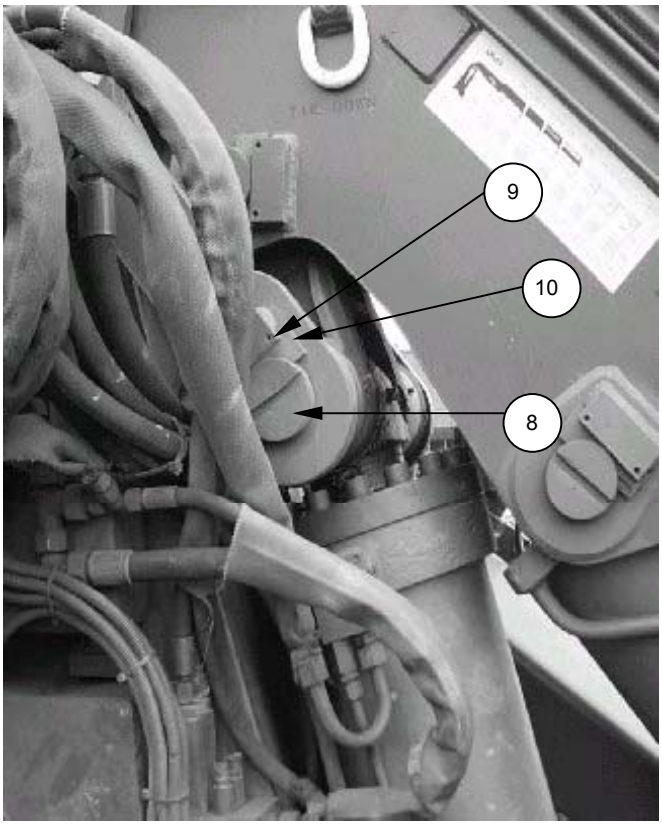
CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE LIFTING CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE LIFTING CYLINDER IS SUPPORTED.

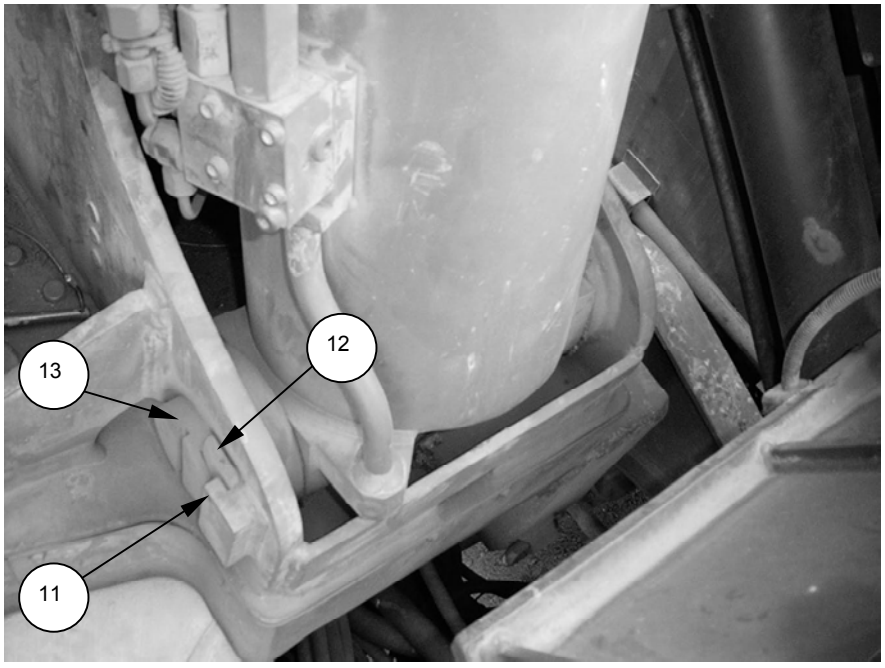
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFTING CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE LIFTING CYLINDER REPLACEMENT PROCEDURE.


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TIE DOWN
TIE DOWN


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NOTE

The Boom must be lifted away from the Crane Base to allow access to the Lifting Cylinder. The boom must then be supported throughout the lifting Cylinder replacement procedure.

a. Remove

(1) De-pressurize hydraulic system. Refer to procedure 5-118.

(2) Remove the hydraulic pipes (4) and (5) connected to the lifting cylinder (3).

(3) Remove the electrical harness (6) and (7) connected to the lifting cylinder.

(4) Remove the upper cylinder pin (8) snap ring (not shown).

(5) Remove the set screws (9).

(6) Note the orientation of the stop mechanical (10) and remove.

(7) Support the weight of the lifting cylinder (3) and remove the upper cylinder pin (8). Note the position of and retain the linkage and cylinder spacers that are fitted between the linkage the lifting cylinder (3).

(8) Remove the lower cylinder pin snap ring (not shown).

(9) Remove the set screws (11).

(10) Note the orientation of the stop mechanical (12) and remove.

(11) Remove the lower cylinder pin (13). Note the position of and retain the spacers that are fitted between the crane base (2) and the lifting cylinder (3).

(12) Remove the lifting cylinder (3).

(13) Check the set screws, stops mechanical and spacers for damage and wear.

(14) Check hydraulic hoses for chaffing or crush damage.

(15) Replace components as necessary.

b. Install

(1) Locate the lifting cylinder (3) in the crane base (2).

(2) Locate the lower pin spacers in the positions noted during removal and insert the lower cylinder pin (13).

(3) Align the slot in the lower cylinder pin (13).

(4) Insert the stop mechanical (12) as noted during removal.

(5) Secure the stop mechanical in place with the set screws (11).

(6) Fit the snap ring to the opposite end of the lower cylinder pin (13).

(7) Locate the upper pin spacers in the positions noted during removal and insert the upper cylinder pin (8).

(8) Align the slot in the upper cylinder pin (8).

(9) Insert the stop mechanical (10) as noted during removal.

(10) Secure the stop mechanical in place with the set screws (9).

(11) Fit the snap ring to the opposite end of the upper cylinder pin (8).

(12) Connect the hydraulic pipes (4) and (5) to the lifting cylinder (3).

(13) Connect the electrical harness (6) and (7) to the lifting cylinder (3).

(14) Grease the upper and lower pins through the grease fittings.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for leaks.

6 - 051 CRANE - JIB CYLINDER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment conditions

Set crane in preferred position for maintenance
see maintenance procedure 6-069
Vehicle switched off and battery shutoff switch in the off position

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WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE JIB CYLINDER ALWAYS ENSURE THAT THE WEIGHT OF THE JIB CYLINDER IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE JIB CYLINDER REPLACEMENT PROCEDURE.



NOTE

The Boom must be lifted away from the Crane Base to allow access to the Jib Cylinder. The boom must then be supported throughout the Jib Cylinder replacement procedure.

a. Remove

(1) De-pressurize hydraulic system. Refer to unit maintenance procedure 5-118.

(2) Remove the hydraulic pipes (4), (5) and (6) connected to the jib cylinder (3).

(3) Remove the electrical harness (7) connected to the jib cylinder.

(4) Remove the upper cylinder pin snap ring (not shown).

(5) Remove the set screws (9).

(6) Note the orientation of and remove the stop mechanical (10).

(7) Support the weight of the jib cylinder (3) and remove the upper cylinder pin (8). Note the position of and retain the spacers that are fitted between the jib cylinder (3) and the boom (1).

(8) Remove the lower cylinder pin snap ring (not shown).

(9) Remove the set screws (11).

(10) Note the orientation of the stop mechanical (12) and remove.

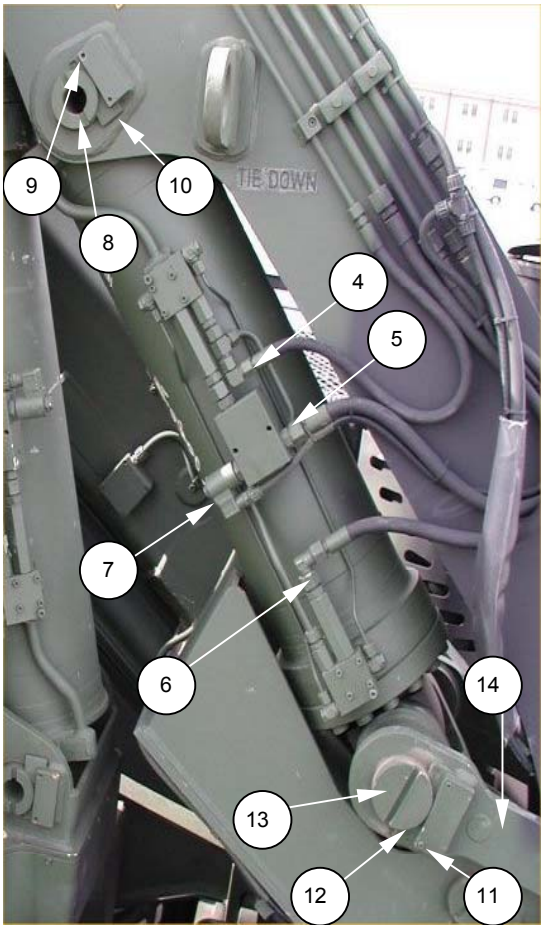
(11) Remove the lower cylinder pin (13). Note the position of and retain the spacers that are fitted between the jib cylinder (3) and the linkage (14).

(12) Remove the jib cylinder (3).

(13) Check the set screws, stops mechanical and spacers for damage and wear.

(14) Check hydraulic hoses for chaffing or crush damage.

(15) Replace components as necessary.



b. Install

(1) Locate the Jib Cylinder (3) in the Crane Base (2).

(2) Locate the Lower Pin Spacers in the positions noted during removal and insert the Lower Cylinder Pin (13).

(3) Align the slot in the lower cylinder pin (13).

(4) Insert the stop mechanical (12) as noted during removal.

(5) Secure the stop mechanical in place with the set screws (11).

(6) Fit the snap ring to the opposite end of the lower cylinder pin (13).

(7) Locate the upper pin spacers in the positions noted during removal and insert the upper cylinder pin (8).

(8) Align the slot in the upper cylinder pin (8).

(9) Insert the stop mechanical (10) as noted during removal.

(10) Secure the stop mechanical in place with the set screws (9).

(11) Fit the snap ring to the opposite end of the upper cylinder pin (8).

(12) Connect the hydraulic pipes (4) and (5) to the jib cylinder (3).

(13) Connect the electrical harness (6) and (7) to the jib cylinder (3).

(14) Grease the upper and lower pins through the grease fittings.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

6 - 052 CRANE - EXTENSION CYLINDER ASSEMBLY DEPRESSURIZE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

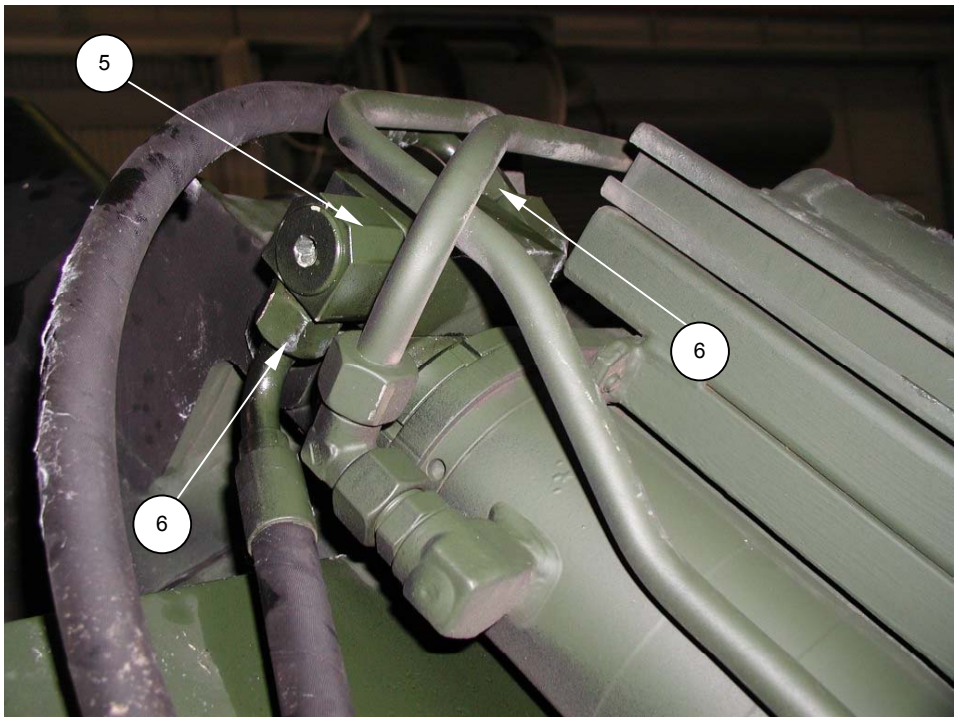
Set crane in preferred position for maintenance;
see maintenance procedure 6-069

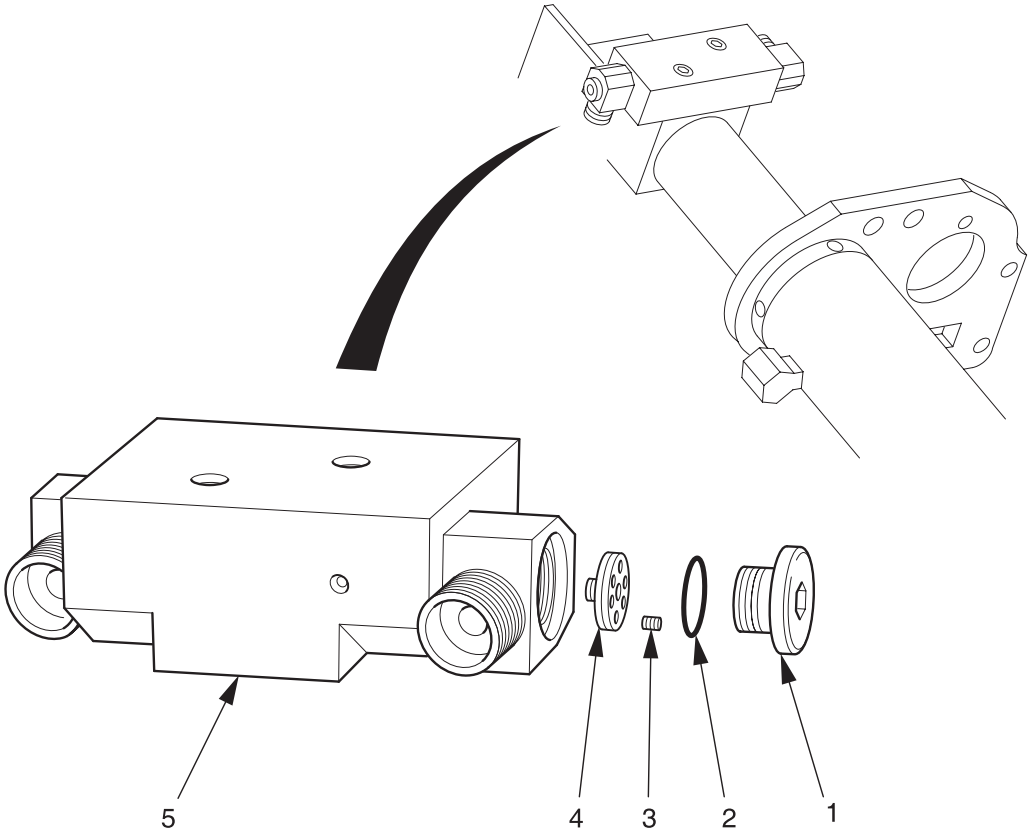
WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER ASSEMBLY IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE EXTENSION CYLINDER ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.


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6


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a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Remove the two hydraulic hoses (6) attached to the extension cylinder assembly load holding valve (5).

(3) Locate and remove the cover (1) from the extension cylinder assembly load holding valve (5).

(4) Retain the seal (2).

(5) Using a 2.5 mm allen key locate and turn the locking set screw (3) counter clockwise one full turn.

(6) Place a clean cloth over the extension cylinder assembly load holding valve (5) to catch any split fluid and to protect the maintainer.

(7) Using a 4 mm allen key locate and slowly turn the spool valve adjuster (4) counter clockwise until the hydraulic pressure in the extension cylinders is released. Note the number of turns it takes to release the pressure.

(8) Check the condition of the sealing ring (2).

(9) Check the condition of the cover (1).

(10) Replace components as required.

b. Install

(1) Using a 4 mm allen key locate and turn the spool valve adjuster (4) clockwise the number of turns noted during removal.

(2) Using a 2.5 mm allen key locate and turn the locking grub screw (3) clockwise to lock the spool valve adjuster (4) in position.

(3) Fit the seal (2) to the cover (1).

(4) Fit the cover (1) to the extension cylinder assembly (5).

6 - 053 CRANE - EXTENSION CYLINDER ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Shop Equipment Automotive maintenance and Repair Common No 1

Materials Required

Grease (As required)
Lock washer (Qty 1)

Equipment Conditions

Set crane in preferred position for maintenance;
see maintenance procedure 6-069

WARNING

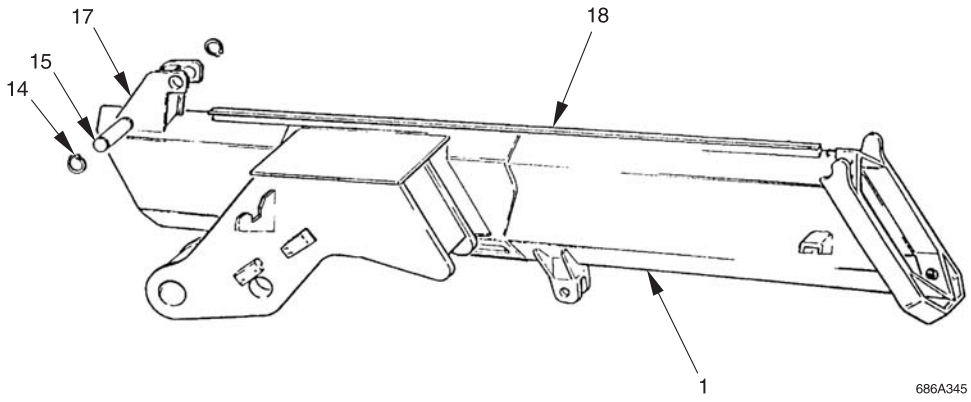
CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDER ASSEMBLY ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER ASSEMBLY IS SUPPORTED.

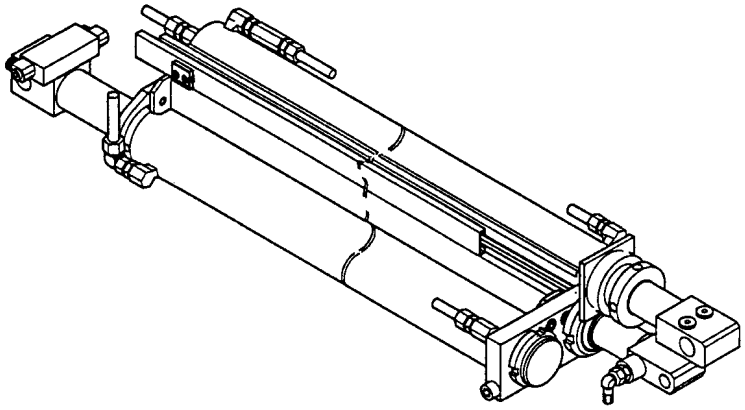
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE EXTENSION CYLINDER ASSEMBLY.

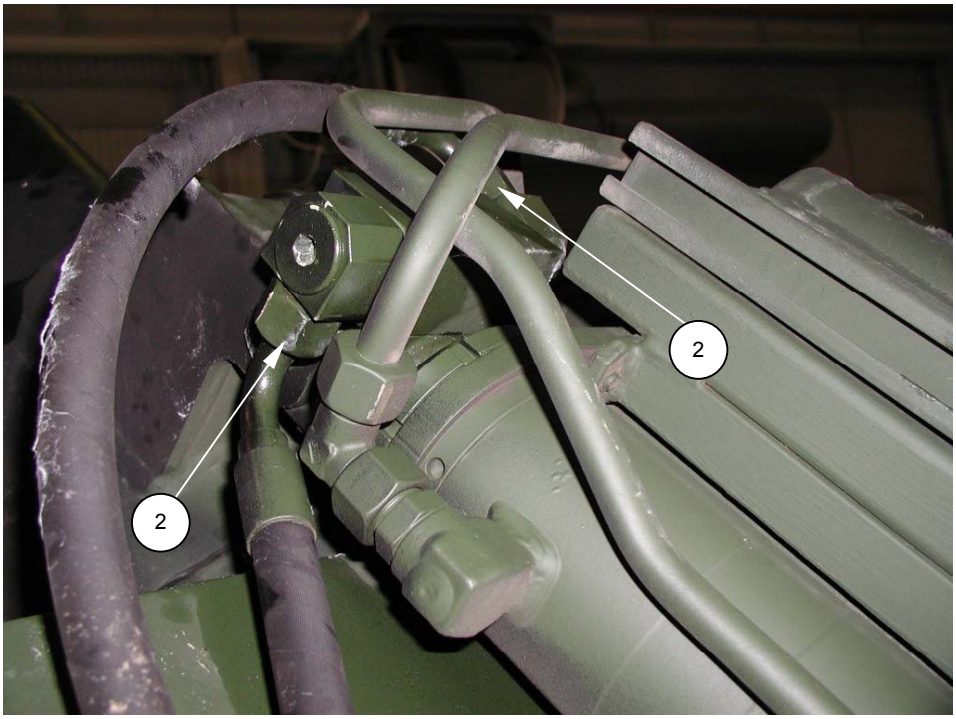
INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE EXTENSION CYLINDER ASSEMBLY MUST BE DE-PRESSURIZED.

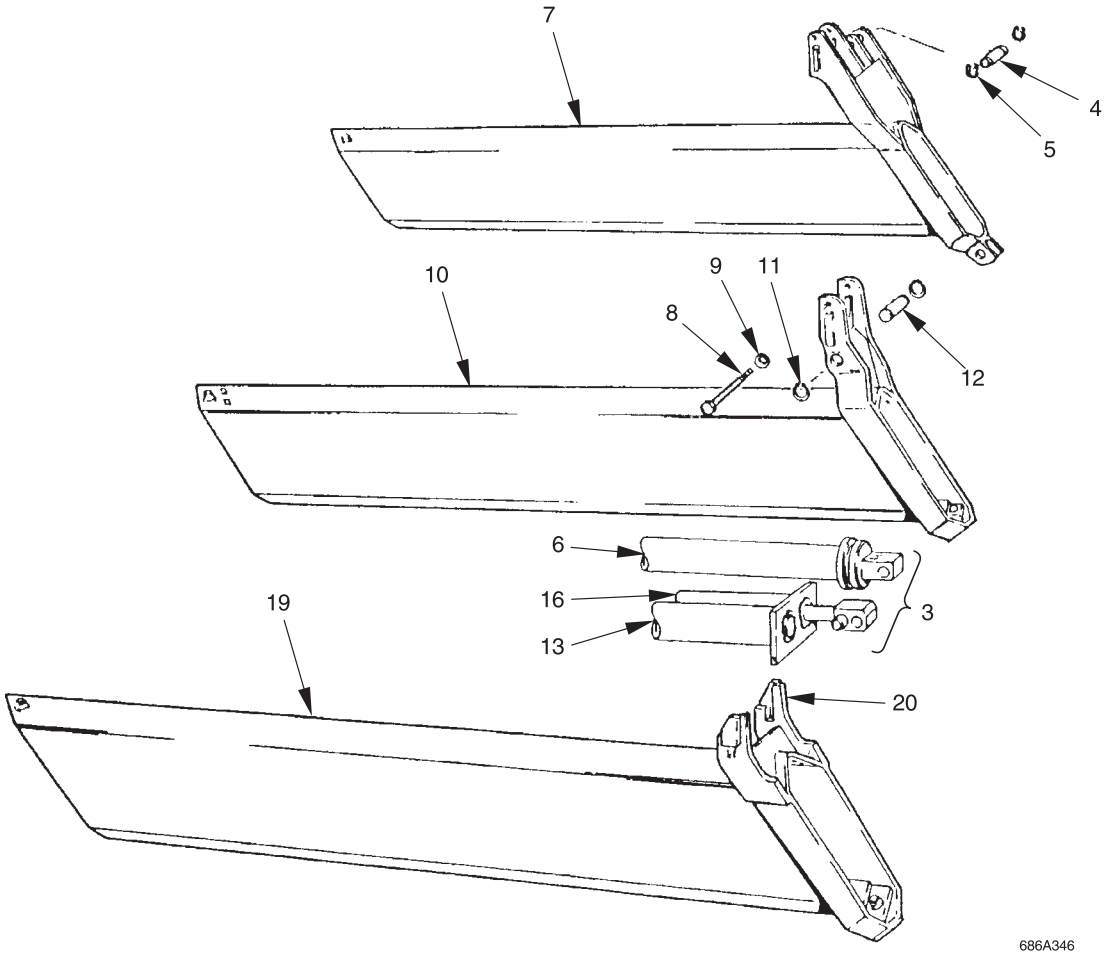
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE EXTENSION CYLINDER ASSEMBLY REPLACEMENT PROCEDURE.


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686A345




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2



NOTE

Raise and support the Jib Box in the vertical position to gain access to the Jib Box and Jib Extensions.

a. Remove

(1) Raise the jib box (1) to the vertical position.

(2) Support the weight of the jib box and extensions.

(3) De-pressurize the hydraulic system. Refer to unit maintenance procedure 5-118.

(4) Disconnect the hydraulic pipes (2) connected to the extension cylinder assembly (3).

(5) De-pressurize the extension cylinder assembly. Refer to unit maintenance procedure 6-052.

(6) Remove the snap ring (5) securing the pivot pin (4) of cylinder three (6) to extension piece three (7).

(7) Remove the bolt (8) and lock washer (9) from extension piece two (10). Discard the lock washer.

(8) Remove the snap ring (11) securing the pivot pin (12) of cylinder two (16) to extension piece two (10).

(9) Remove the snap ring (14) securing the pivot pin (15) of cylinder one (13) to the jib box bracket (17).

(10) Disengage the extension cylinder assembly (3) from the slide (18) on the jib box (1).

(11) Lift the extension cylinder assembly (3) off the jib box (1) and clear of the grooves (20) in extension piece one (19).

(12) Check all pins and snap rings for damage and wear.

(13) Check the jib box slide for damage.

(14) Check the threads on the bolt and in extension piece two (10).

b. Install

(1) Position and engage the extension cylinder assembly (3) on the jib box slide (18).

(2) Place the extension cylinder assembly in the groove (20) on extension piece one (19).

(3) Connect cylinder one (13) to the jib box bracket (17) and insert the pivot pin (15).

(4) Fit the snap ring (14) to pivot pin (15).

(5) Connect cylinder two (16) to extension piece two (10) and insert the pivot pin (12).

(6) Fit the snap ring (11) to pivot pin (12).

(7) Replace the lock washer (9) and bolt (8) in extension piece two (10).

(8) Connect cylinder three (6) to extension piece three (7) and insert the pivot pin (5).

(9) Fit the snap ring (5) to pivot pin (4).

(10) Connect the three hydraulic hoses (2) to the extension cylinder assembly (3).

(11) Grease all pivot points and slides.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

6 - 054 CRANE - EXTENSION CYLINDERS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Grease (As required)

Equipment Conditions

Extension cylinders depressurized
Set crane in preferred position for maintenance;
see maintenance procedure 6-069

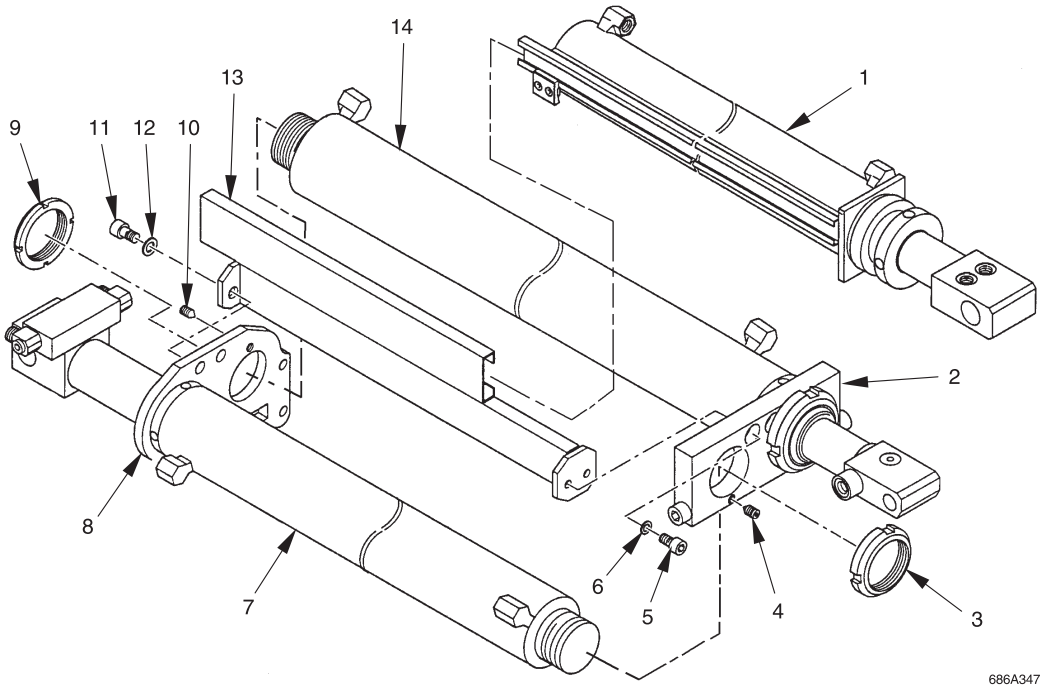
WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE EXTENSION CYLINDERS ALWAYS ENSURE THAT THE WEIGHT OF THE EXTENSION CYLINDER UNDER REPAIR IS SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE EXTENSION CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

CRUSH INJURY. THE CRANE BOOM MUST BE SUPPORTED THROUGHOUT THE EXTENSION CYLINDERS REPLACEMENT PROCEDURE.



NOTE

The jib extension cylinder assembly consists of three extension cylinders. When replacing any of the extension cylinders refer to the TM 5-5420-279-23P to obtain the correct extension cylinder.

a. Remove

(1) Remove the extension cylinder assembly in accordance with direct support maintenance procedure 6-053.

(2) Remove extension cylinder (1) from the guide rail (13).

(3) Remove bolts (5 and 11) and washers (6 and 12).

(4) Remove guide rail (13).

(5) Remove set screw (4 and 10).

(6) Remove cylinder nuts (3 and 9).

(7) Remove extension cylinder (14) from plate (8).

(8) Remove extension cylinder (7) from plate (2).

NOTE

Individual Extension Cylinders may now be changed or serviced as required.

(9) Check all threaded components for wear and damage.

(10) Check the guide rail for wear and damage.

(11) Grease the guide rail (13).

b. Install

(1) Fit extension cylinder (7) to plate (2).

(2) Fit extension cylinder (14) to plate (8).

(3) Secure extension cylinder (7) to plate (2) with nut (3).

(4) Lock, nut (3) to plate (2) with set screw (4).

(5) Secure extension cylinder (14) to plate (8) with nut (9).

(6) Lock, nut (9) to plate (8) with set screw (10).

(7) Fit guide plate (13) to plates (2 and 8).

(8) Secure guide plate (13) with washers (6 and 12) and bolts (5 and 11).

(9) Fit extension cylinder (1) to guide rail (13).

c. Follow on task

(1) Fit extension cylinder assembly to crane jib in accordance with direct support maintenance procedure 6-053.

6 - 055 CRANE - SUPPORT ASSEMBLY CRANE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Seat deployed

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a. Remove

(1) Remove the crane form the vehicle and place on a suitable working surface. See direct support maintenance procedure 6-045.

(2) Remove the lift cylinder. See direct support maintenance procedure 6-050.

(3) Remove the rotate hydraulic coupling assembly. See direct support maintenance procedure 6-046.

(4) Remove the rotate gear. See direct support maintenance procedure 6-047.

(5) Disconnect the pipes for the rotate lubrication system (2) at the crane column (1).

(6) Remove the crane stabilizer legs. See unit maintenance procedure 5-147.

(7) Remove the crane stabilizer extensions. See direct support maintenance procedure 6-049.

(8) Remove the bolts (4) and washers (3) securing the crane column (9) to the support assembly crane (6).

(9) Remove the crane column (9) complete with the jib cylinder and crane extension cylinders.

(10) Remove the bolts (8) and washers (7) securing the bearing rotate ring (5) to the support assembly crane (6).

(11) Remove the bearing rotate ring (5) complete with rotate lubrication system (2) from the support assembly crane (6).

(12) Check all treaded components for damage and wear.

(13) Check the rotate lubrication grease fittings, pipes and unions for damage.

(14) Check the bearing rotate gear for damage and wear.

b. Install

(1) Fit the bearing rotate gear (5) complete with rotate lubrication system (2) to the support assembly crane (6) and secure in place with the washers (7) and bolts (8).

(2) Fit the crane column complete with the jib cylinder and crane extension cylinders to the support assembly crane (6) and secure in place with the bolts (4) and washers (3).

(3) Fit the crane stabilizer extensions. See direct support maintenance procedure 6-049.

(4) Fit the crane stabilizer legs. See unit maintenance procedure 5-147.

(5) Connect the rotate lubrication system to the crane column.

(6) Fit the rotate gear. See direct support maintenance procedure 6-047.

(7) Fit the rotate hydraulic coupling. See direct support maintenance procedure 6-046.

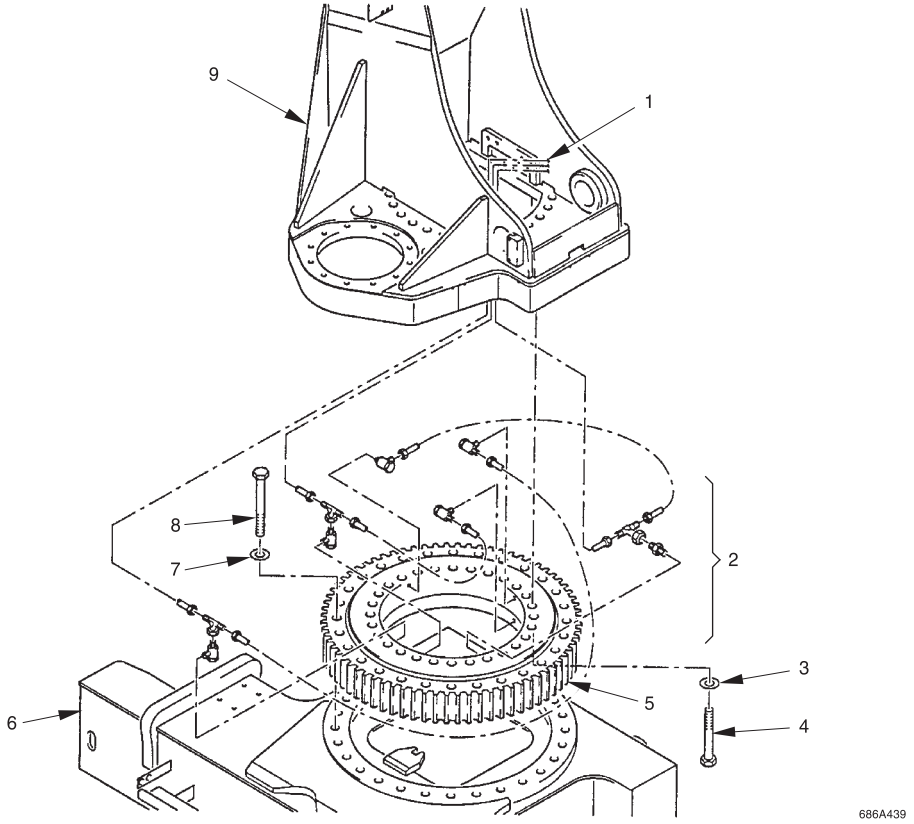
(8) Fit the lift cylinder. See direct support maintenance procedure 6-050.

(9) Fit the crane to the vehicle. See direct support maintenance procedure 6-045.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for correct operation and hydraulic oil leaks.


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686A439

6 - 056 CRANE - BOOM EMERGENCY LOWERING SWITCH

This task covers:

a. Remove b. Service c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242
Hydraulic fluid

Equipment Conditions

Crane in the stowed position.

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE BOOM EMERGENCY LOWERING SWITCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE CRANE MUST BE IN THE STOWED POSITION BEFORE REMOVING ANY OF THE HYDRAULIC PIPES CONNECTED TO THE BOOM EMERGENCY LOWERING SWITCH.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The Boom emergency lowering switch is located on the lifting cylinder. If the lift cylinder is fully extended and the overload protection device switches off crane operations, the boom can be enabled by operating the boom emergency lowering switch. See operator's manual TM 5-5420-279-10.


TIE DOWN
TIE DOWN
1

a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Ensure the crane is in the stowed position. Note the position of and remove the two hydraulic pipes connected to the valve.

(3) Remove the two socket head screws securing the valve to the lift cylinder.

b. Service

(1) If the valve is being removed for cleaning remove the set screw (2).

(2) Remove the control head mechanism (1).

(3) Remove the actuator assembly (3) noting the position of it's component parts (4), (5), (6) and (7).

(4) Remove strainer (9) and nozzle (8).

(5) Clean all components in clean hydraulic fluid.

c. Install

(1) Fit nozzle (8) and strainer (9).

(2) Fit the actuator assembly (3) noting the position of it's component parts (4), (5), (6) and (7).

(3) Fit the control head mechanism (1).

(4) Fit the set screw (2).

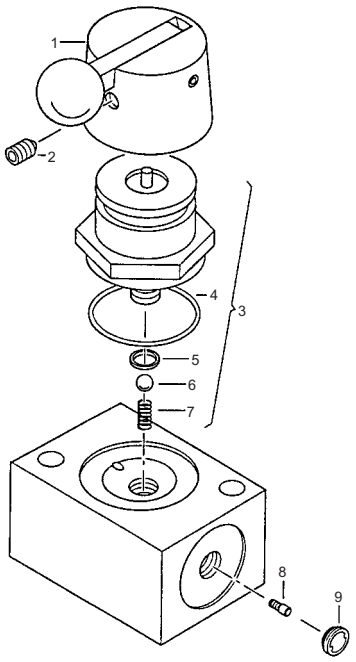
(5) Apply thread locking compound to the socket head screws.

(6) Fit the valve to the lift cylinder with the two socket head screws.

(7) Fit the two hydraulic pipes in the positions noted during removal.

d. Follow on task

(1) Check the operation of the crane and check for leaks.


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6 - 057 CRANE - BOOM CRANE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Remove the jib cylinder lever remote control assembly. See direct support maintenance procedure 6-062.

(2) Retain front bushes (7) and spacer (8).

(3) Remove bolts (4), plate retaining (3) and spacer (2).

(4) Remove shaft (1).

(5) Remove the jib boom extension assembly. See direct support maintenance procedure 6-062.

(6) Remove the set screws (12) and stops mechanical (11).

(7) Support the weight of the jib cylinder.

(8) Remove rod (10).

(9) Remove the jib cylinder. See direct support maintenance procedure 6-051.

(10) Remove rod (9).

NOTE

The lift cylinder lever remote control is attached to the boom by rod (9)

(11) Remove the lift cylinder lever remote control assembly. See direct support maintenance procedure 6-063.

(12) Release the hydraulic lines (18 through 22) and electrical cables from the boom by removing bolts (15, 17 and 25).

(13) Remove the rod that connects the crane column to the boom. See direct support maintenance procedure 6-058. Retain the bushes (7) and spacer (8).

(14) Remove the boom.

(15) Check al threaded components for wear and damage.

(16) Check rods (1,9 and 10) for wear and damage.

(17) Check hydraulic lines (18 through 22) and (26 through 34) for damage.

(18) Check fittings (2 through 4), (11 through 16) and (23 through 25) for damage.

(19) Check bushes (7) and spacer (8) for damage and wear.

(20) Check the boom assembly for cracks corrosion and damage.

b. Install

(1) Position the boom assembly on the crane column.

(2) Fit the rod that connects the crane column to the boom. See direct support maintenance procedure 6-058. Ensure that bushes (7) and spacer (8) are fitted.

(3) Fit the hydraulic lines (18 through 22) and electrical cables to the boom with bolts (15, 17 and 25).

(4) Fit the lift cylinder lever remote control assembly. See direct support maintenance procedure 6-063.

(5) Fit rod (9).

(6) Fit set screw (12) and stop mechanical (11) to rod (9).

(7) Fit the jib cylinder. See direct support maintenance procedure 6-051.

(8) Fit the jib boom extension assembly. See direct support maintenance procedure 6-062.

(9) Fit rod (10).

(10) Fit shaft (1) with bushes (7) and spacer (8).

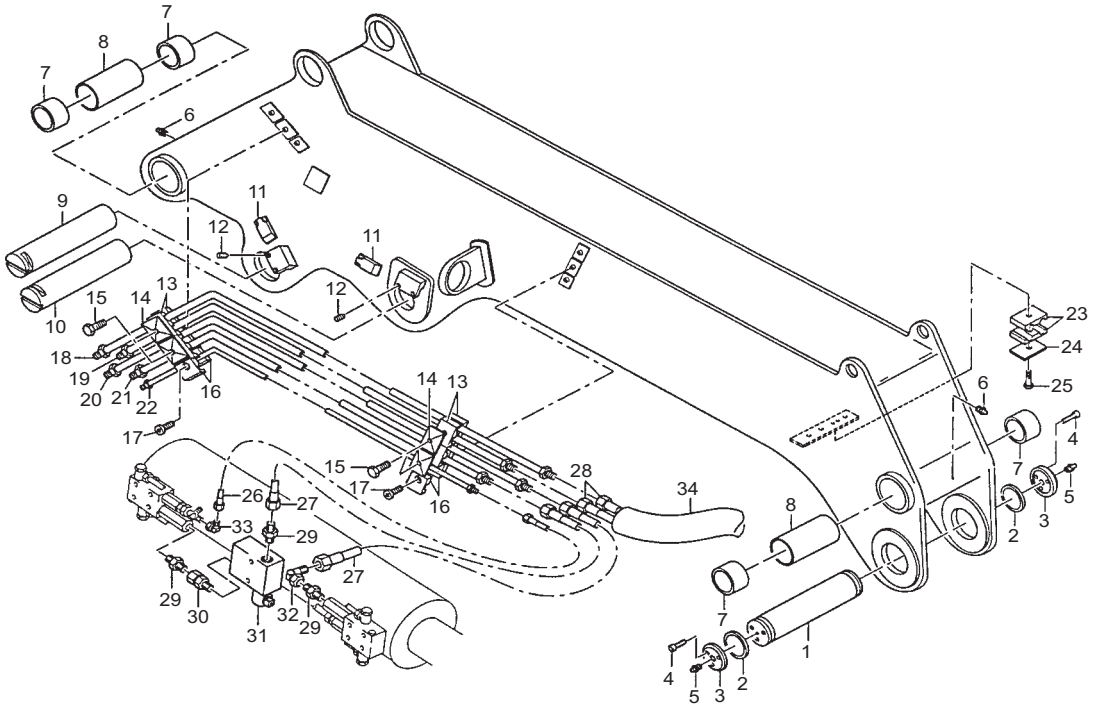
(11) Fit bolts (4), plate retaining (3) and spacer (2).

(12) Fit the jib cylinder lever remote control assembly. See direct support maintenance procedure 6-063.

(13) Fit set screw (12) and stop mechanical (11) to rod (10).

c. Follow on task

(1) Check the operation of the crane and check for leaks.


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6 - 058 CRANE - CRANE BASE ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Remove the jib extension cylinders. See direct support maintenance procedure 6-053.

(2) Remove the jib extension assembly. See direct support maintenance procedure 6-062.

(3) Remove the boom jib. See direct support maintenance procedure 6-061.

(4) Remove the jib cylinder. See direct support maintenance procedure 6-051.

(5) Remove the boom. See direct support maintenance procedure 6-057.

(6) Remove the lift cylinder. See direct support maintenance procedure 6-050.

(7) Remove the seat assembly. See unit maintenance procedure 5-145.

(8) Not the positions of remove all electrical and hydraulic lines connected to the crane base.

(9) Remove the rotate hydraulic coupling. See direct support maintenance procedure 6-046.

(10) Remove the rotate gear. See direct support maintenance procedure 6-047.

(11) Remove the support assembly crane. See direct support maintenance procedure 6-055.

(12) Check the crane base assembly (1) for cracks, corrosion or damage.

(13) Check all fittings (2 through 31 for damage or wear.

(14) Replace components as necessary.

b. Install

(1) Fit the support assembly crane. See direct support maintenance procedure 6-055.

(2) Fit the rotate gear. See direct support maintenance procedure 6-047.

(3) Fit the rotate hydraulic coupling. See direct support maintenance procedure 6-046.

(4) Fit all electrical and hydraulic lines to the crane base in the positions noted during removal.

(5) Fit the seat assembly. See unit maintenance procedure 5-145.

(6) Fit the lift cylinder. See direct support maintenance procedure 6-050.

(7) Fit the boom. See direct support maintenance procedure 6-057.

(8) Fit the jib cylinder. See direct support maintenance procedure 6-051.

(9) Fit the boom jib. See direct support maintenance procedure 6-061.

(10) Fit the jib extension assembly. See direct support maintenance procedure 6-062.

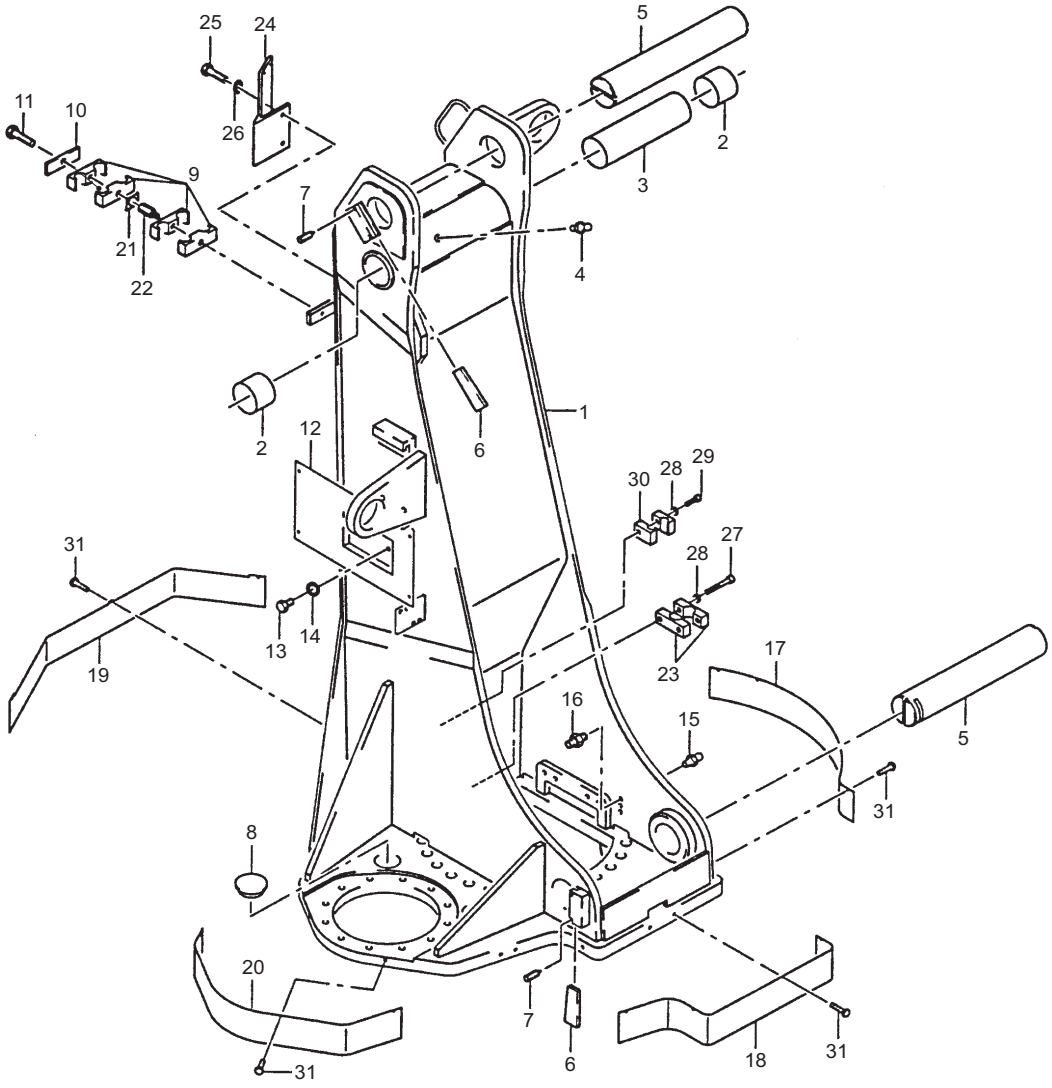
(11) Fit the jib extension cylinders. See direct support maintenance procedure 6-053.

(12) Lubricate all parts of the crane that have grease fittings (4, 15 and 16).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane and check for leaks.


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6 - 059 CRANE - ELECTRICAL JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

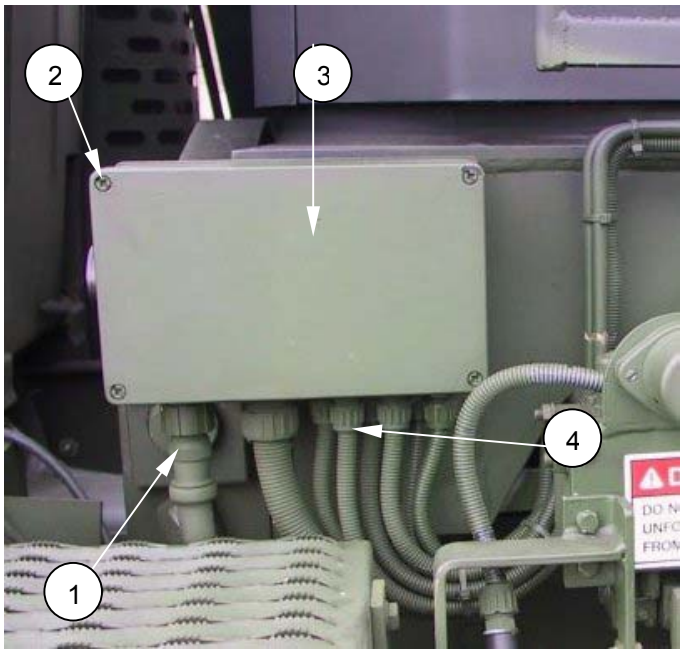
Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Crane stowed



a. Remove

(1) Remove the quick release military plug connection (1).

(2) Remove the four screws (2) securing the electrical junction box cover (3).

(3) Using the wiring diagram provided at appendix J, note the positions of the wiring at the termination block.

(4) Note the positions of and disconnect the cables at the termination block.

(5) Remove the seven electrical cables (4) from the electrical junction box.

(6) Remove the two screws and washers securing the electrical junction box to the crane base.

(7) Check all electrical cables for chafing and damage.

(8) Check all threaded components for wear and damage.

(9) Replace components as required.

b. Install

(1) Fit the electrical junction box to the crane base with two screws and washers.

(2) Fit the seven electrical cables (4) to the electrical junction box in the positions noted during removal.

(3) Connect the cables to the termination block in the positions noted during removal.

(4) Connect the quick release military plug (1) at the electrical junction box.

(5) Fit the electrical junction box cover (3) with four screws (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane and crane control lights.

6 - 060 CRANE - EMERGENCY OPERATION ROTARY CONTROL VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Nyloc nut (Qty 1)

Equipment Conditions

None

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The emergency rotary control valve is located on the right hand side of the operator's crane control block. This valve has two settings, 'normal operation' and 'emergency operation'. The control valve should only be set for 'emergency operation' if the crane's electrical system has failed, so that in the event of such a failure the crane boom and extensions can be folded. The valve should always be in the 'OFF' up position (vertical) and wire locked in place.



a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Remove the locking wire securing the handle in the 'OFF' position.

(3) Note the position of and remove the two hydraulic pipes connected to the rotary control valve.

(4) Remove the rotary control valve.

(5) Remove the socket head screw (2), nyloc nut (3) and washer (5) securing the handle (4) to the rotary control valve (1). Discard the nyloc nut.

(6) Note the position of and remove the handle (4).

(7) Check the hydraulic pipes for damage.

(8) Check all threaded components for wear and damage.

b. Install

(1) Fit the handle (4) in the position noted during removal.

(2) Secure the handle (4) with the washer (5), nyloc nut (3) and socket head screw (2).

(3) Align the valve with the hydraulic pipes.

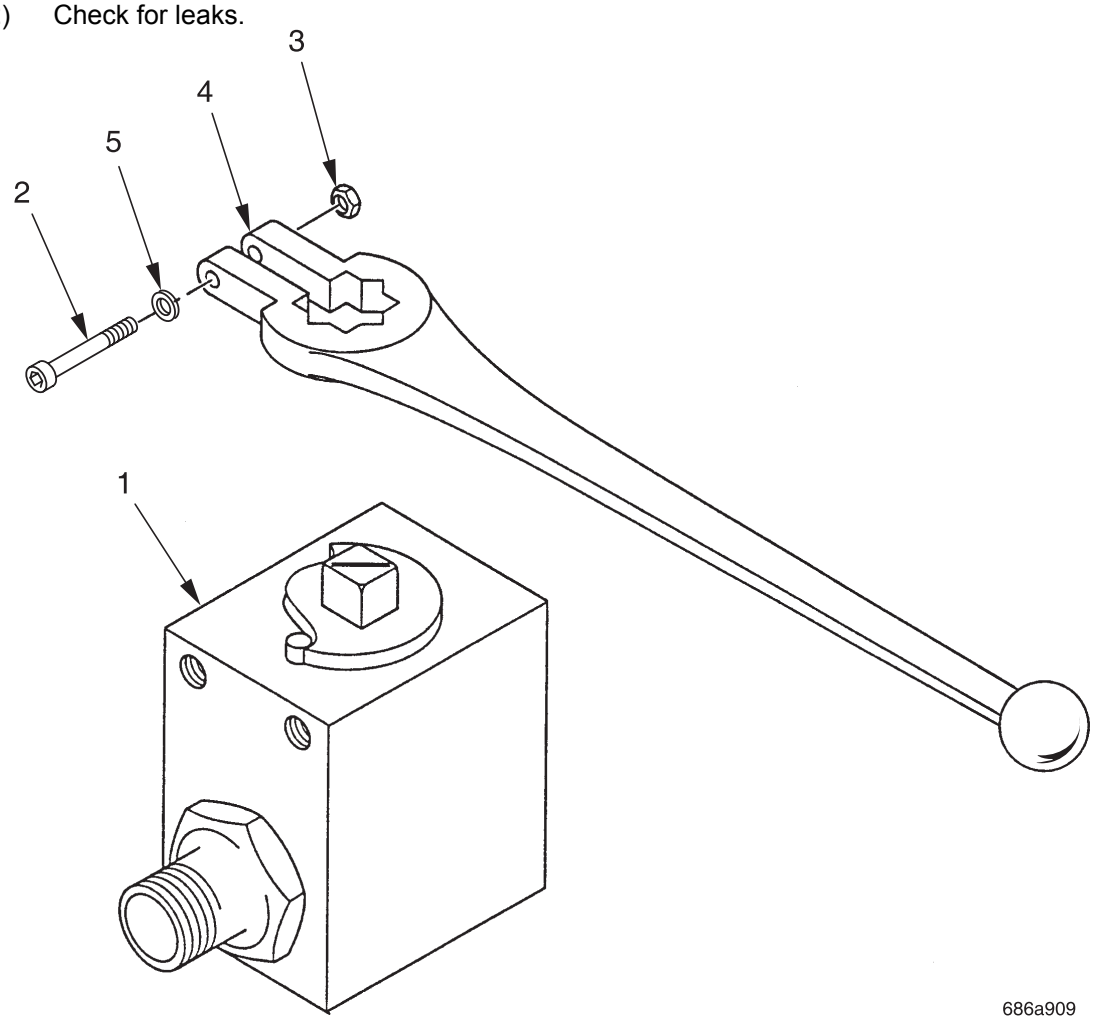
(4) Fit the hydraulic pipes in the positions noted during removal.

(5) Wire lock the valve handle in the 'OFF' position up (vertical).

c. Follow on tasks

(1) Check the operation of the crane.

(2) Check for leaks.



6 - 061 CRANE - JIB HOUSING

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

a. Remove

(1) Remove the jib extension cylinder assembly. See direct support maintenance procedure 6-053.

(2) Remove the bolts (8) and washers (9).

(3) Remove the spacer plates (6) and plate mountings (7).

(4) Remove the jib extension assembly.

(5) Disconnect the hydraulic hose mountings and electrical cable mountings on the side of the boom jib.

(6) Disconnect the jib cylinder assembly. See direct support maintenance procedure 6-051.

(7) Remove the lever remote control. See direct support maintenance procedure 6-063.

(8) Remove the pivot pin between the boom and the boom jib assembly. See direct support maintenance procedure 6-057. Retain bushes (2), spacer (3) and grease fitting (4).

(9) Remove the jib housing.

(10) Check all threaded components for wear and damage.

(11) Check the bushes (2) and spacer (3) for wear and damage.

(12) Check the boom jib for cracking, corrosion and damage.

(13) Check the spacer plates (5 and 6) and plate mountings (7) for wear and damage.

(14) Replace components as necessary.

b. Install

(1) Fit the jib housing to the boom.

(2) Fit the pivot pin between the boom and the jib housing assembly ensure that bushes (2) and spacer (3) are fitted. See direct support maintenance procedure 6-058.

(3) Fit the lever remote control. See direct support maintenance procedure 6-063.

(4) Fit the jib cylinder assembly. See direct support maintenance procedure 6-051.

(5) Connect the hydraulic hose mountings and electrical cable mountings on the side of the jib housing.

(6) Fit the jib extension assembly.

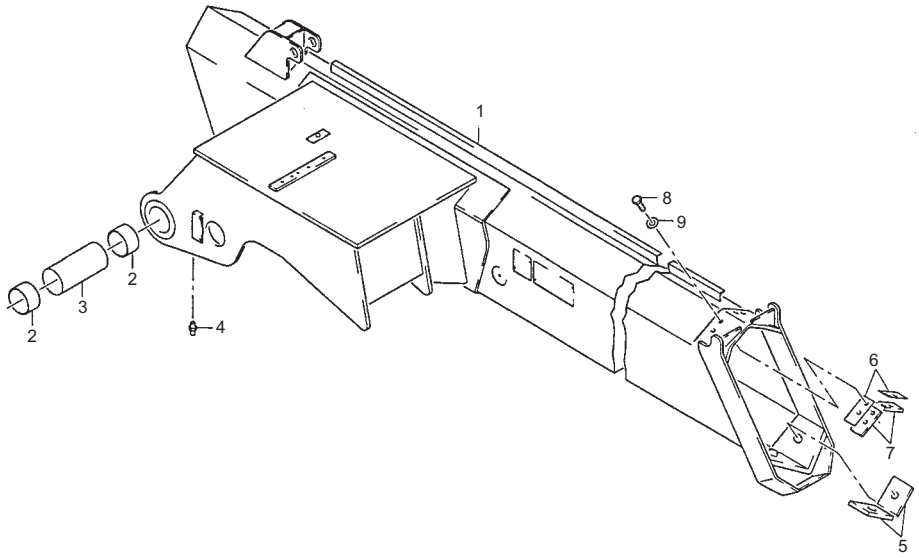
(7) Apply thread locking compound to the bolts (8).

(8) Fit the spacer plates (6) and plate mountings (7) and secure with the bolts (8) and washers (9).

(9) Fit the jib extension cylinder assembly. See direct support maintenance procedure 6-052.

c. Follow on task

(1) Check the operation of the crane and check for hydraulic leaks.


1
2
3
2
4
8
9
6
7
5

6 - 062 CRANE - JIB EXTENSIONS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Crane unfolded
Remove the extension cylinder assembly. See direct support maintenance procedure 6-053.
Remove the jib box bolts and washers securing the spacer and plate mounting. See direct support maintenance procedure 6-061.

NOTE

There are three boom jib extensions, which fit inside each other.

a. Remove

(1) Remove the jib extension cylinder assembly (1, 8 and 14) and place on a suitable working surface.

(2) Remove bolts (12) and washers (13).

(3) Remove the plate mountings (11) and spacer plates (10) from jib extension number two (8).

(4) Remove jib extension number three (14).

(5) Remove bolts (6) and washers (7).

(6) Remove the plate mountings (4) and spacer plates (5) from jib extension number one (1).

(7) Remove jib extension number two (8).

(8) Check the spacer plates (2, 9 and 15) on each of the boom jib extensions for wear.

(9) Check the spacer plates (3,5,9 and 11) on each of the boom jib extensions for wear.

(10) Check all threaded components for damage and wear.

(11) Check the jib extensions for cracking, damage and wear.

(12) Replace components as necessary.

b. Install

(1) Apply thread locking compound to all bolts.

(2) Fit spacer plates (2 and 3) to jib extension number one (1).

(3) Fit spacer plates (9) to jib extension number two (8).

(4) Insert jib extension number two (8), into jib extension number one (1).

(5) Fit plate mounting (4) and spacer plate (5) to jib extension number one (1) and secure with bolts (6) and washers (7).

(6) Fit spacer plates (15) to jib extension number three (14).

(7) Insert jib extension number three (14), into jib extension number two (8).

(8) Fit spacer plates (10) and plate mountings (11) to jib extension number two (8) and secure with bolts (12) and washers (13).

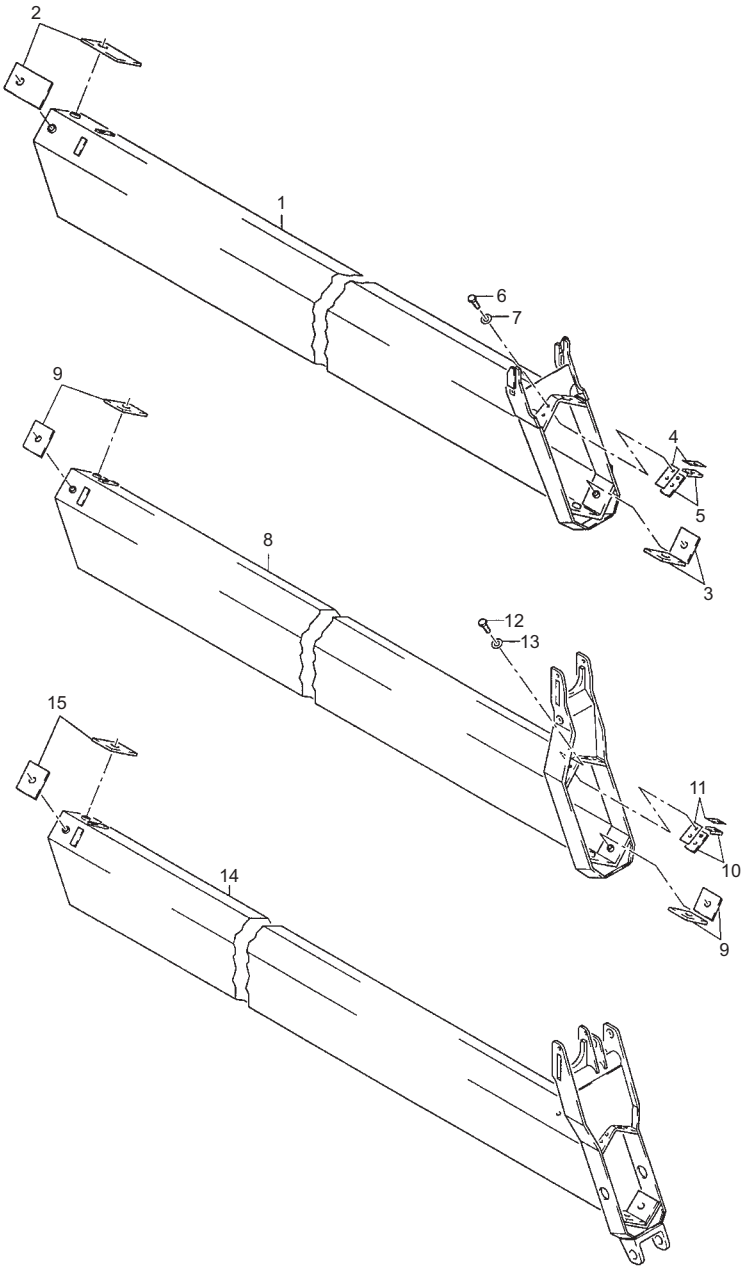
c. Follow on tasks

(1) Fit the jib extensions to the jib housing.

(2) Fit the jib box bolts and washers securing the spacer and plate mounting. See direct support maintenance procedure 6-061.

(3) Fit the extension cylinder assembly. See direct support maintenance procedure 6-053.

(4) Check the operation of the crane in accordance with the operator’s manual TM 5-5420-279-10.


2
1
6
7
9
4
5
8
3
12
13
15
11
10
14
9

6 - 063 CRANE - LEVER REMOTE CONTROL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

NOTE

There are two lever remote controls. This procedure can be applied to each one. One lever remote control is connected to the lift cylinder, crane column and the boom assembly.

The other lever remote control is connected to the jib cylinder, boom and jib boom.

a. Remove

(1) Support the weight of the jib boom or jib extension housing when disconnecting the lever remote control associated with either assembly.

(2) Support the weight of the lift cylinder or jib cylinder when removing the lever remote control associated with either assembly.

(3) Remove the set screws (8 and 12).

(4) Note the orientation of and remove the stop mechanical (7 and 11).

(5) Remove ring retaining (6 and 10).

(6) Remove rods (5 and 9).

(7) Remove connecting links (1 and 2).

(8) Remove the rod attaching the connecting link (3) to the boom or boom jib by repeating steps 3 through 6.

(9) Remove the connecting link (3).

(10) Check the bushes and spacers in the connecting link (3) for wear and damage.

(11) Check all threaded components for damage.

(12) Replace components as required.

b. Install

(1) Fit the rod attaching the connecting link (3) to the boom or jib extension housing.

(2) Apply thread locking compound to all set screws.

(3) Fit the stop mechanical and set screws to the rod attaching the connecting link (3) to the boom or boom jib.

(4) Fit connecting links (1 and 2).

(5) Fit rods (5 and 9).

(6) Fit ring retaining (6 and 10).

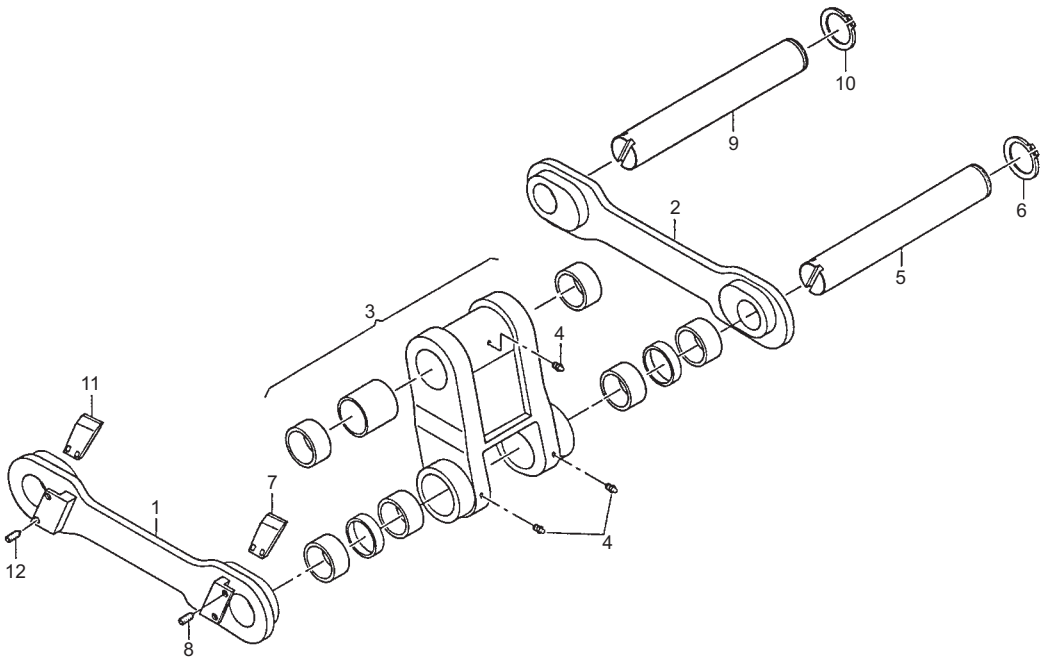
(7) Fit the stop mechanical (7 and 11) as noted during removal.

(8) Fit the set screws (8 and 12).

(9) Apply grease to the lever remote control through the grease fittings (4).

c. Follow on task

(1) Check the operation of the crane.


10
9
2
6
5
3
4
11
7
1
4
12
8

6 - 064 CRANE - OPERATOR'S CONTROL PANEL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

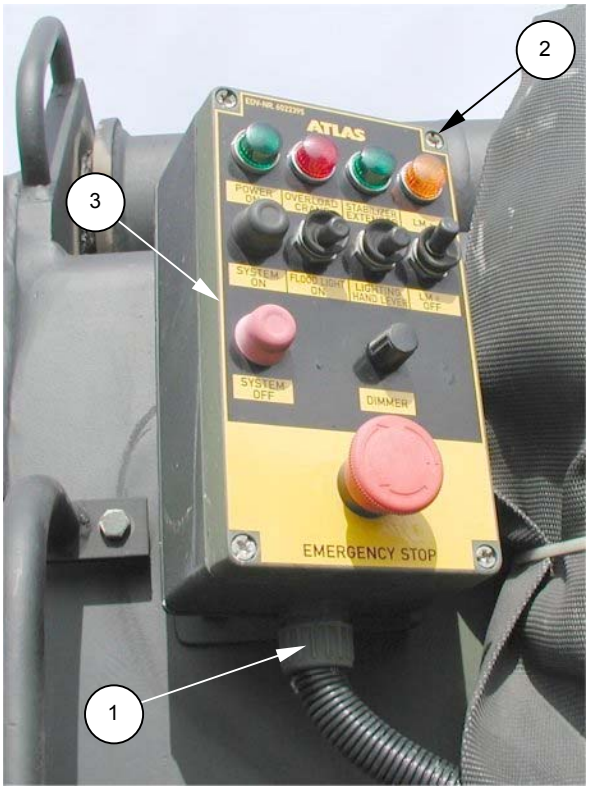
Materials Required

None

Equipment Conditions

Crane stowed
Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Remove the four screws (2) securing the operator's control panel cover (3).

(2) Using the wiring diagram provided at appendix J, note the positions of the wiring to the control panel cover.

(3) Remove the electrical cable (1) from the control panel.

(4) Remove the four nuts screws and washers securing the control panel to the crane column.

(5) Check all electrical cables for chafing and damage.

(6) Check all threaded components for wear and damage.

(7) Replace components as required.

b. Install

(1) Fit the control panel to the crane column with four nuts screws and washers.

(2) Fit the electrical cable (1) to the control panel.

(3) Connect the wiring to the control panel cover (2) in the positions noted during removal.

(4) Fit the control panel cover (3) with four screws (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane.

(3) Check the operation of all lights and switches on the operator's control panel.

6 - 065 CRANE - PCB JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

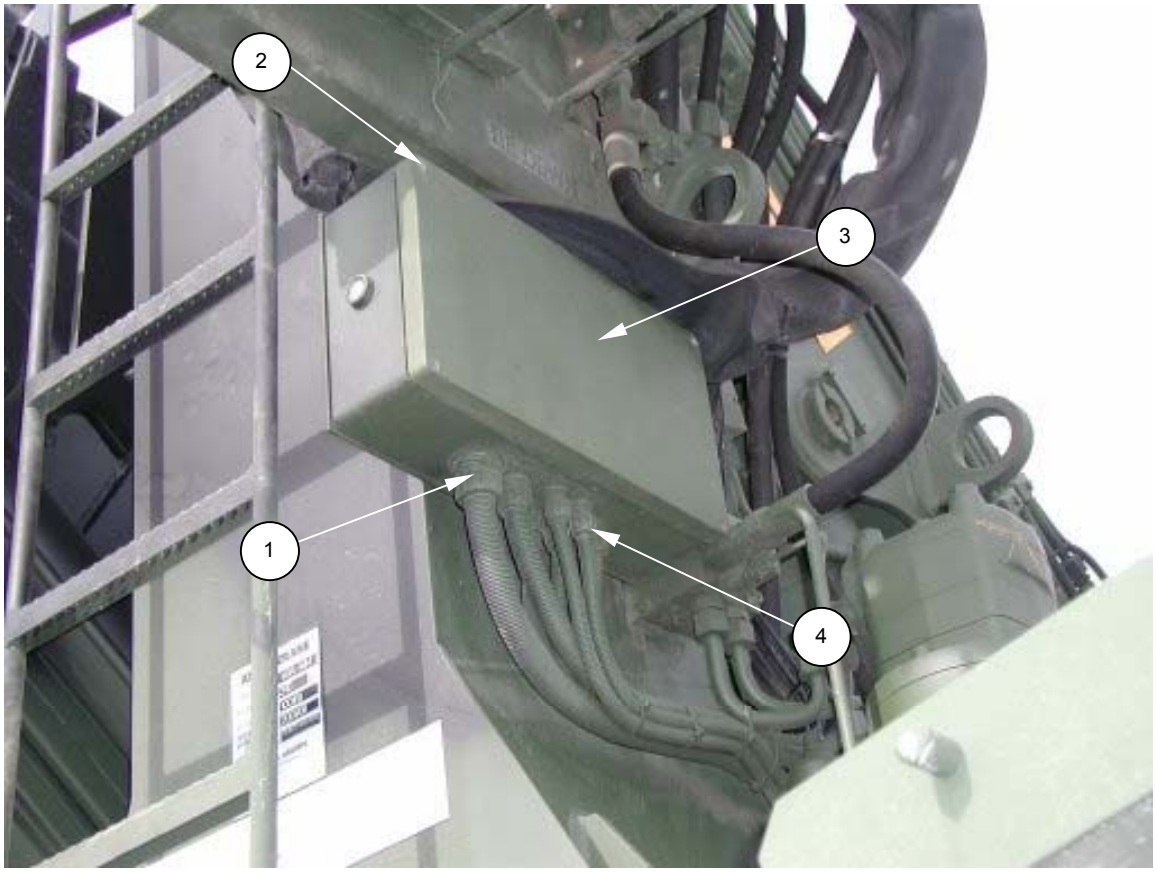
Materials Required

None

Equipment Conditions

Crane stowed
Vehicle switched off and battery shutoff switch in the off position

---



a. Remove

(1) Remove the quick release military plug connection (1).

(2) Remove the four screws (2) securing the PCB junction box cover (3).

(3) Using the wiring diagram provided at appendix J, note the positions of the wiring at the termination block.

(4) Note the positions of and disconnect the cables at the termination block.

(5) Remove the four electrical cables (4) from the PCB junction box.

(6) Remove the four nuts screws and washers securing the PCB junction box to the crane column.

(7) Check all electrical cables for chafing and damage.

(8) Check all threaded components for wear and damage.

(9) Replace components as required.

b. Install

(1) Fit the PCB junction box to the crane column with four nuts screws and washers.

(2) Fit the four electrical cables (4) to the PCB junction box in the positions noted during removal.

(3) Connect the cables to the termination block in the positions noted during removal.

(4) Connect the quick release military plug (1) at the PCB junction box.

(5) Fit the PCB junction box cover (3) with four screws (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane.

6 - 066 CRANE - STABILIZER CONTROL PANEL

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Lock washers (Qty 4)

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

---



NOTE

There are two stabilizer control panels one on each side of the vehicle. This procedure can be used to replace either stabilizer control panel.

a. Remove

(1) Remove the four screws (2) securing the stabilizer control panel cover (3).

(2) Using the wiring diagram provided at appendix G, note the positions of the wiring to the stabilizer control panel cover.

(3) Remove the two electrical cables (1) from the stabilizer control panel.

(4) Remove the four nuts screws and lock washers securing the stabilizer control panel to the mounting bracket. Discard the lock washers.

(5) Check all electrical cables for chafing and damage.

(6) Check all threaded components for wear and damage.

(7) Replace components as required.

b. Install

(1) Fit the stabilizer control panel to the mounting bracket with four nuts screws and lock washers.

(2) Fit the two electrical cables (1) to the stabilizer control panel.

(3) Connect the wiring to the stabilizer control panel cover (2) in the positions noted during removal.

(4) Fit the stabilizer control panel cover (3) with four screws (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane.

(3) Check the operation of the light and switch on the stabilizer control panel.

6 - 067 CRANE - CRANE/STABILIZER FLOW CONTROL VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
41 mm Wrench (BII)
46 mm Wrench (BII)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

Remove the crane see maintenance procedure 6-045. Position the crane to allow access to the stabilizer flow control valve from underneath.

WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE CRANE HYDRAULIC SYSTEM.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

NOTE

The crane/stabilizer change over valve is located on the under side of the left hand stabilizer control block. This valve directs hydraulic fluid to either the stabilizer legs or the crane.



a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Note the position of and remove the three hydraulic pipes connected to the flow control valve (1).

(3) Remove the flow control valve (1).

(4) Remove the bolt (2), star washer (3) and washer (4), securing the handle (5) to the flow control valve (1).

(5) Note the position of and remove the handle (5).

(6) Check the hydraulic pipes for damage.

(7) Check all threaded components for wear and damage.

b. Install

(1) Fit the handle (5) in the position noted during removal.

(2) Apply thread locking compound to the bolt (2).

(3) Secure the handle (5), with washer (4), star washer (3) and bolt (2).

(4) Align the flow control valve (1) with the hydraulic pipes.

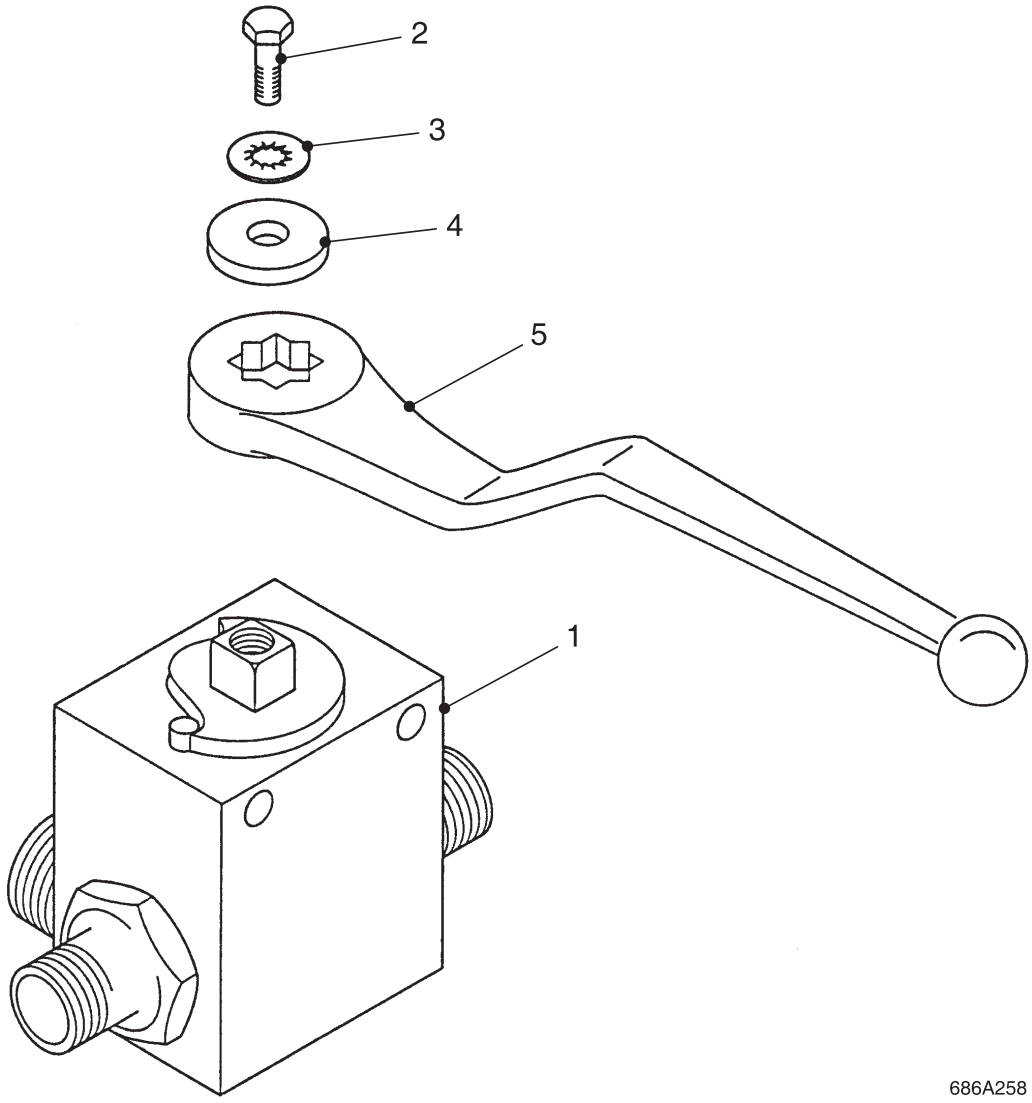
(5) Fit the hydraulic pipes in the positions noted during removal.

c. Follow on tasks

(1) Check the operation of the stabilizer extensions and stabilizer legs.

(2) Check the operation of the crane.

(3) Check for leaks.


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1
686A258

6 - 068 CRANE - STABILIZER EXTENSION AND LEG CONTROLS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 242

Equipment Conditions

None

NOTE

The crane stabilizer extension cylinders and stabilizer leg cylinders are controlled by levers situated on each side of the crane. There is one lever for extension in/out and one lever for leg up/down.

a. Remove

(1) To replace levers (15 and 16), turn the lever nut (17) one half turn counter clockwise.

(2) Remove the lever by turning it counter clockwise.

(3) To replace lever (8), remove pin quick release (13).

(4) Remove pin cotter (11) and washer (10) and remove shaft (9).

(5) Retain spacer (12).

(6) Remove lever (8).

(7) If cable is to be replaced, remove ring retaining (7) and pin (6) and disconnect cable (4) from clevis (5).

(8) Note cable run and remove cable.

(9) Check the cable (4) for damage and wear.

(10) Check mounting brackets (1, 14, 22, 27, 28), cover plate (30) and fixings for damage.

(11) Check levers (8, 15 and 16) for damage.

(12) Replace components as necessary.

b. Install

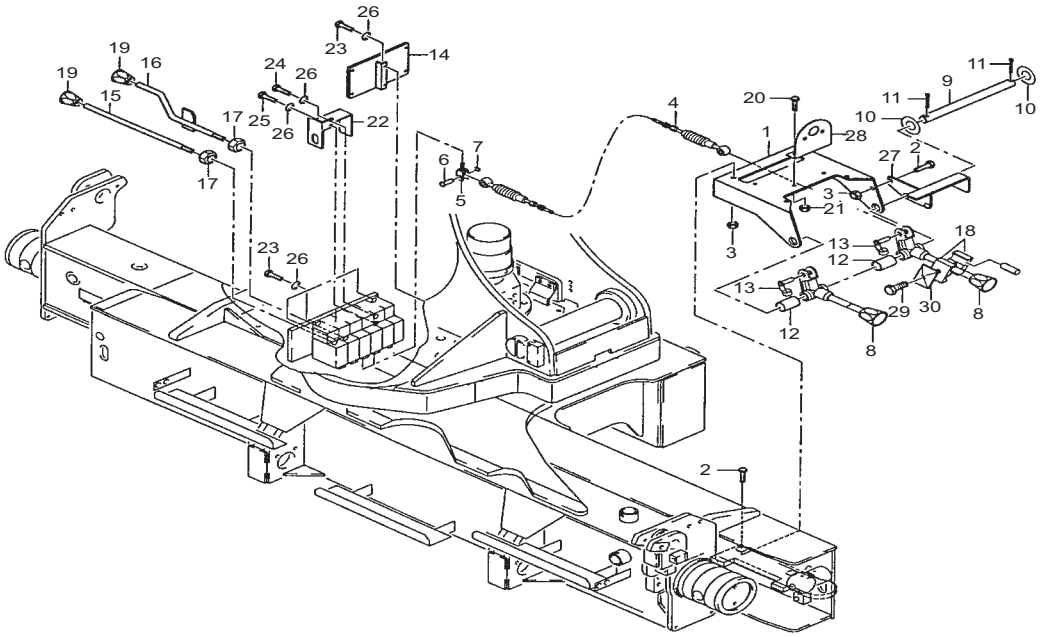
(1) Fit lever (15 and 16) to valve block and lock in position with lock-nut (17).

(2) Fit two levers (8) to bracket (1) by inserting the shaft (9) and re-fitting the two spacers (12).

(3) Secure shaft (9) with washers (10) and pin cotter (11).

(4) Fit cables to levers (8) and secure in place with quick release pins (13).

(5) Fit cables (4) to the clevis (5) on valve block and secure with pins (6) and ring retainers (7).



6 - 069 CRANE - PREFERRED POSITION FOR MAINTENANCE

This task covers:

a. Align

INITIAL SETUP:

Tools Required

None

Materials Required

None

Equipment Conditions

None

NOTE

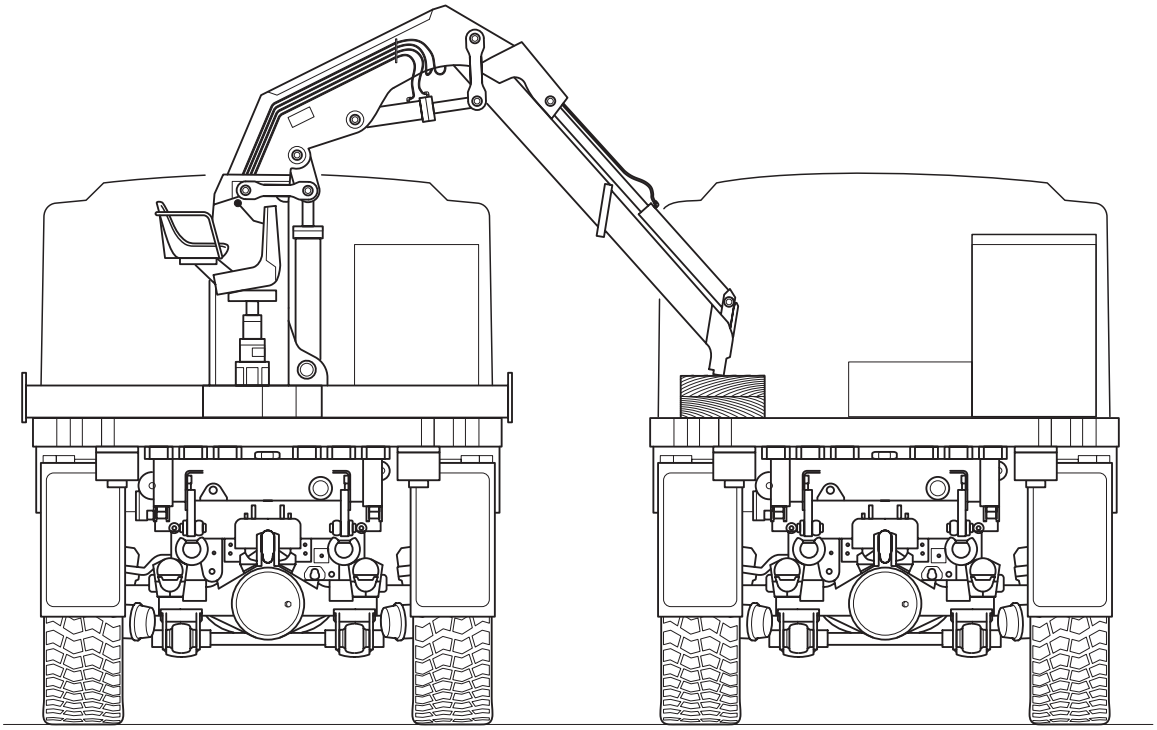
The following procedure can be used for positioning the crane in a preferred position for carrying out maintenance on the rotate coupling, lifting cylinder, jib cylinder and extension cylinders.

a. Align

(1) Position a flat platform vehicle alongside the right hand side of the DSB.

(2) Unfold the DSB crane and rest the jib extensions on a suitable surface in the position shown in the following drawing.

(3) Follow the relevant maintenance procedure for the assembly under repair.



686A640

6 - 070 CRANE - STABILIZER EXTENSION PROXIMITY SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

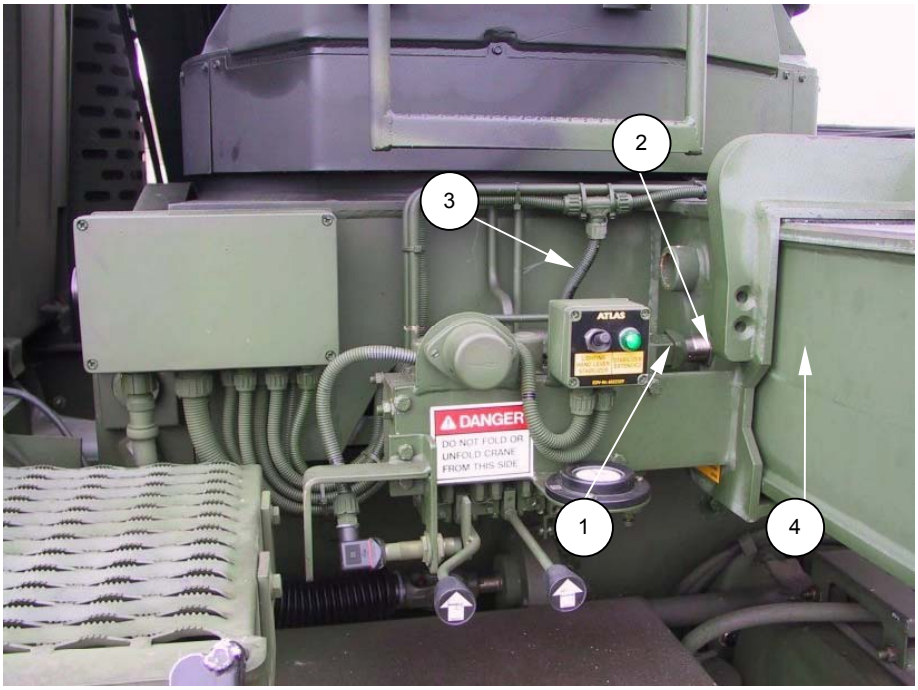
None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position.

NOTE

There are two stabilizer extension proximity switches, one on each stabilizer extension. This procedure is applicable to either of the proximity switches. The following picture shows the left hand stabilizer extension (4) and proximity switch (1).



a. Remove

(1) Deploy the stabilizer extension (4) to gain access to the stabilizer proximity switch (1).

(2) Measure the exposed thread of the proximity switch at the crane base.

(3) Locate and remove the electrical cable (3) connected to the proximity switch (1).

(4) Turn the proximity switch lock nut (2) one full turn counter clockwise.

(5) Remove the proximity switch (1).

(6) Check the electric cable for damage.

(7) Replace components as required.

b. Install

(1) Fit the proximity switch (1) to the crane base.

(2) Adjust the proximity switch (1) so that the exposed thread showing is equal to the measurement taken during removal.

(3) Tighten the lock nut (2).

(4) Fit the electrical cable to (3) the proximity switch (1).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Test the operation of the proximity switch in accordance with the operator's manual TM 5-5420-279-10.

6 - 071 CRANE - STABILIZER EXTENSION CONTROLS PROXIMITY SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

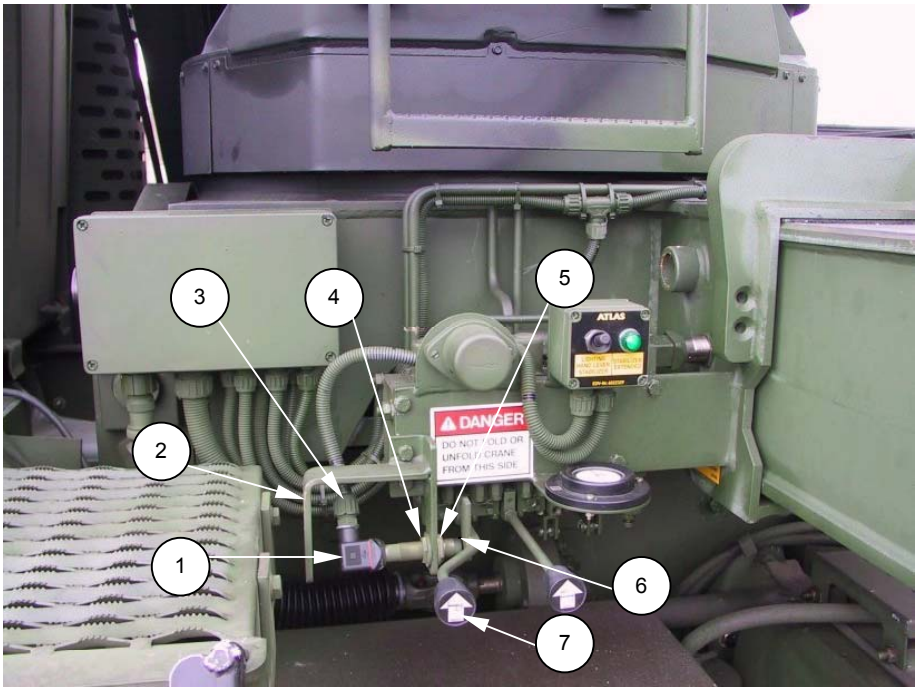
Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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NOTE

There are two stabilizer extension controls proximity switches, one on each stabilizer extension control block. This procedure is applicable to either of the proximity switches. The following picture shows the left hand stabilizer extension control block and proximity switch (1).



a. Remove

(1) Locate and remove the electrical cable (3) connected to the proximity switch (1).

(2) Remove the proximity switch lock nut (5).

(3) Remove the proximity switch (1).

(4) Check the electric cable for damage.

(5) Replace components as required.

b. Install

(1) Fit the proximity switch (1) to the bracket (2).

(2) Adjust the proximity switch (1) using the lock nuts (4 and 5).so that the gap (6) between the end of the proximity switch (1) and the extension control lever (7) is no more than 9/16" (15mm).

(3) Tighten the lock nut (5).

(4) Fit the electrical cable to (3) the proximity switch (1).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Test the operation of the proximity switch in accordance with the operator's manual TM 5-5420-279-10.

6 - 072 CRANE - STABILIZER EXTENSION LEG PRESSURE SWITCH

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Extension Leg in the down position but do not deploy to the ground
Vehicle switched off and battery shutoff switch in the off position

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WARNING

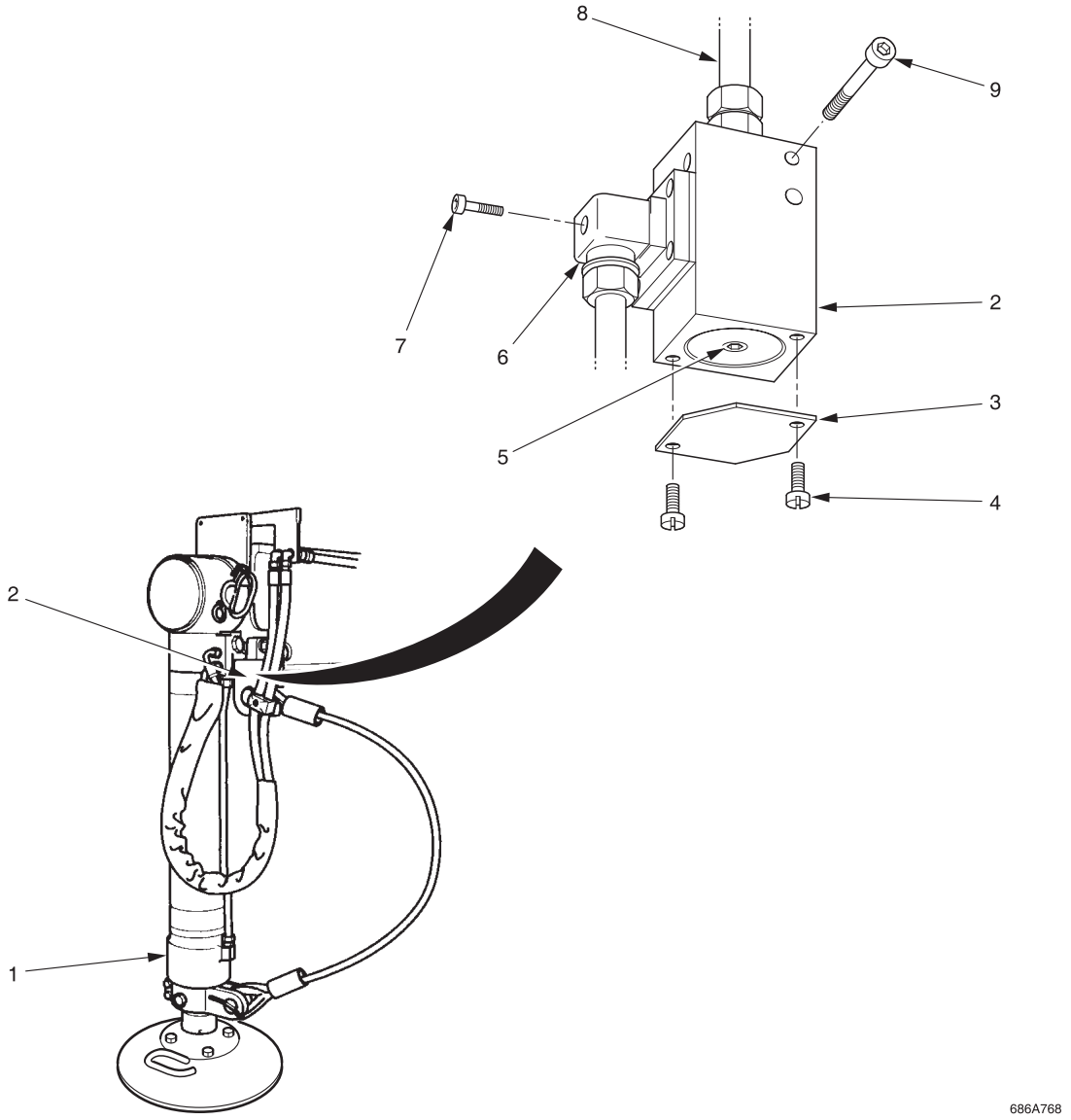
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER EXTENSION LEG PRESSURE SWITCH.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. DO NOT REMOVE THE STABILIZER EXTENSION LEG PRESSURE SWITCH WHEN THE STABILIZER LEG IS DEPLOYED.

NOTE

Each stabilizer leg has a pressure switch. This procedure is applicable to either stabilizer leg pressure switch.





Left hand stabilizer control panel



Right hand stabilizer control panel

a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Operate the stabilizer extension leg controls (leg up and leg down) twice to relieve any residual pressure in the leg cylinder.

(3) Place a clean cloth over the hydraulic pipe (8) to the stabilizer extension leg pressure switch (2) to prevent splash from the hydraulic oil in the pipe.

(4) Remove the hydraulic pipe (8).

(5) Remove the electrical cable plug screw (7).

(6) Remove the electrical plug (5) from the pressure switch (2).

(7) Remove the pressure switch mounting screw (9).

(8) Remove the Pressure Switch (2).

(9) Check all threaded components for damage.

(10) Check the electrical cable for damage.

(11) Replace components as necessary.

b. Install

(1) Fit pressure switch (2) to the stabilizer leg (1) with the screw (9).

(2) Fit the hydraulic pipe (8) to the pressure switch (2).

(3) Fit the electrical cable (6) to the pressure switch (2) and secure in place with the screw (7).

(4) Remove the pressure switch cover (3) by removing the two screws (4).

(5) Switch the battery shutoff switch to the on position.

(6) Fully deploy the crane stabilizer leg in accordance with the operator's manual TM 5-5420-279-10.

(7) Adjust the pressure switch until the green light on the stabilizer leg control panel is illuminated.

(8) Fit the pressure switch cover (3) and secure in place with the two screws (4).

6 - 073 CRANE - VALVE CONTROL BLOCK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

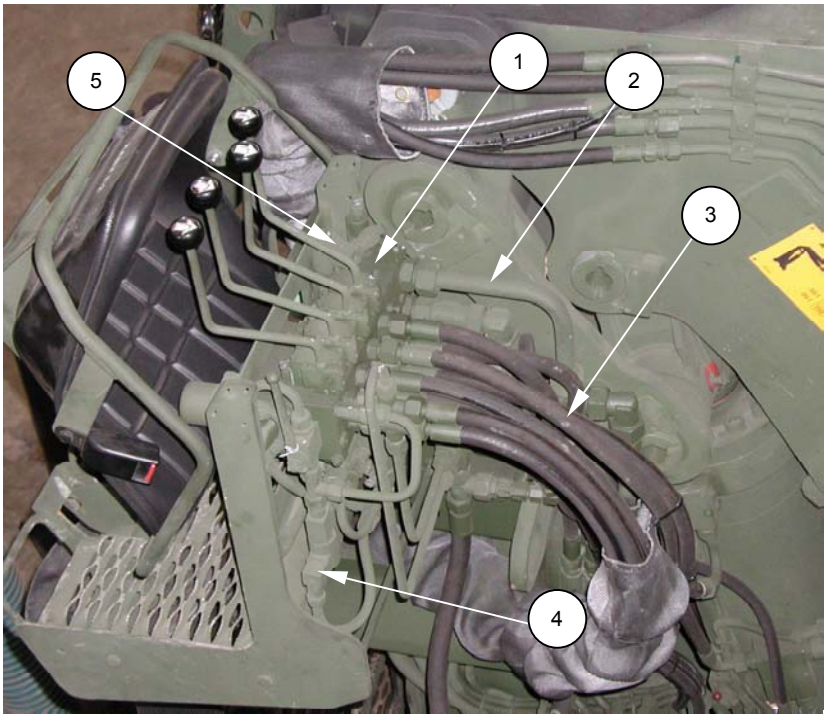
Vehicle switched off and battery shutoff switch in the off position

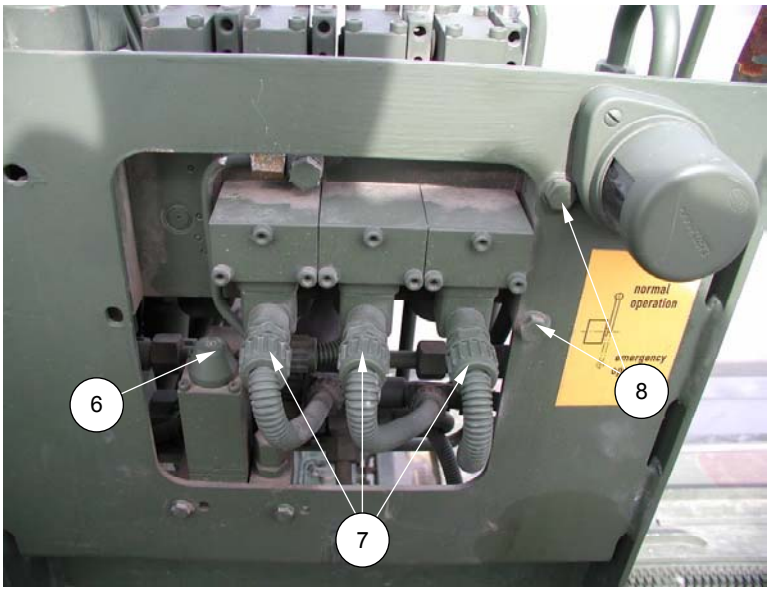
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WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK.





a. Remove

(1) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(2) Note the position of and remove the hydraulic pipes (2) and hoses (3).

(3) Note the positions of and remove the electrical cables to the solenoid valves (4, 5, 6 and 7).

(4) Remove the crane valve control block mounting bolts (8).

(5) Remove the crane valve control block (1).

(6) Check all threaded components for damage.

(7) Check all hydraulic pipes and hoses for damage.

(8) Check all electrical cables for damage.

(9) Replace components as necessary.

b. Install

(1) Fit the crane solenoid valve block (1) and secure in place with the mounting bolts (8).

(2) Fit the electrical cables to the solenoid valves (4, 5, 6 and 7).

(3) Fit the hydraulic pipes (2) and hoses (3) in the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

6 - 074 CRANE - VALVE CONTROL BLOCK PRESSURE RELEASE VALVE

This task covers:

a. Remove b. Service c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

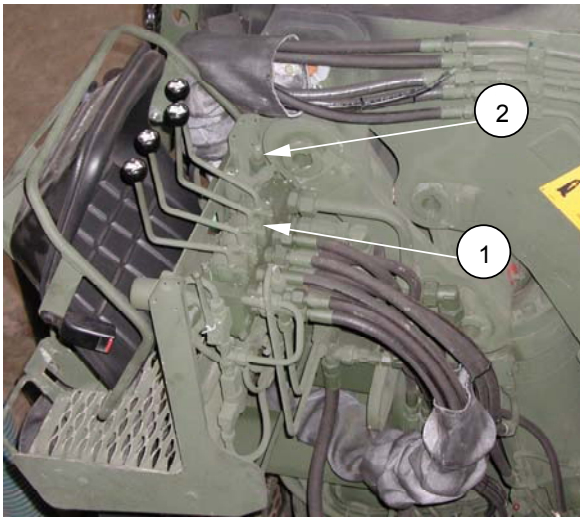
None

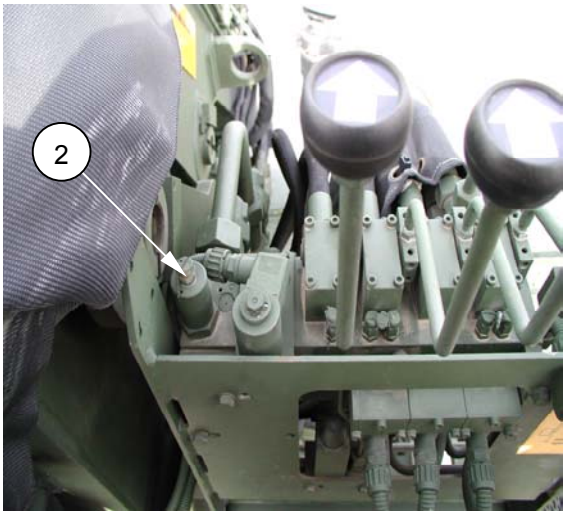
WARNING

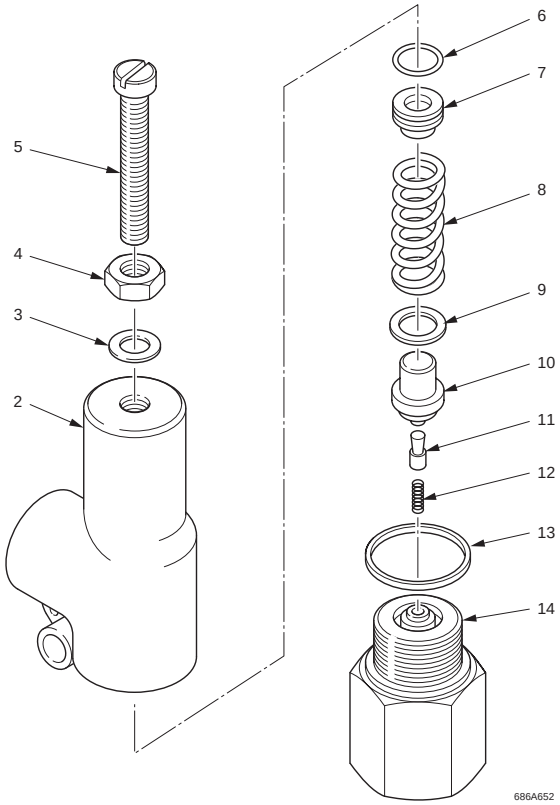
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK PRESSURE RELEASE VALVE.

INJURY TO PERSONNEL. THE INTERNAL PARTS OF THE PRESSURE RELIEF VALVE ARE UNDER SPRING TENSION. CARE MUST BE TAKEN WHEN DISASSEMBLING THE PRESSURE RELIEF VALVE.







a. Remove

(1) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(2) Unscrew the pressure relief valve complete (2) from the crane valve control block (1).

b. Service

(1) Hold the pressure relief valve (2) in a suitable vice.

WARNING

INJURY TO PERSONNEL. THE INTERNAL PARTS OF THE PRESSURE RELIEF VALVE ARE UNDER SPRING TENSION. CARE MUST BE TAKEN WHEN DISASSEMBLING THE PRESSURE RELIEF VALVE.

(2) Slowly screw the valve bolt (14) counter clockwise.

(3) Remove the valve bolt (14) and retain the seal (13).

(4) Remove and retain the internal parts (6 - 12) of the pressure relief valve.

(5) Clean the pressure relief valve body (2), valve bolt (14) and internal parts (6 - 12) in clean hydraulic fluid).

(6) Check all parts for wear and damage.

(7) Replace the pressure relief valve complete if any parts are damaged.

c. Install

(1) Assemble the pressure relief valve internal parts (6-12) in the correct order.

(2) Fit the valve bolt (14) with the seal (13).

(3) Fit the pressure relief valve (2) to the crane valve control block (1).

(4) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10 and check for hydraulic leaks at the pressure relief valve.

6 - 075 CRANE - VALVE CONTROL BLOCK SOLENOID DUMP VALVE

This task covers:

a. Remove b. Test c. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)
Tool Kit, Common No 1

Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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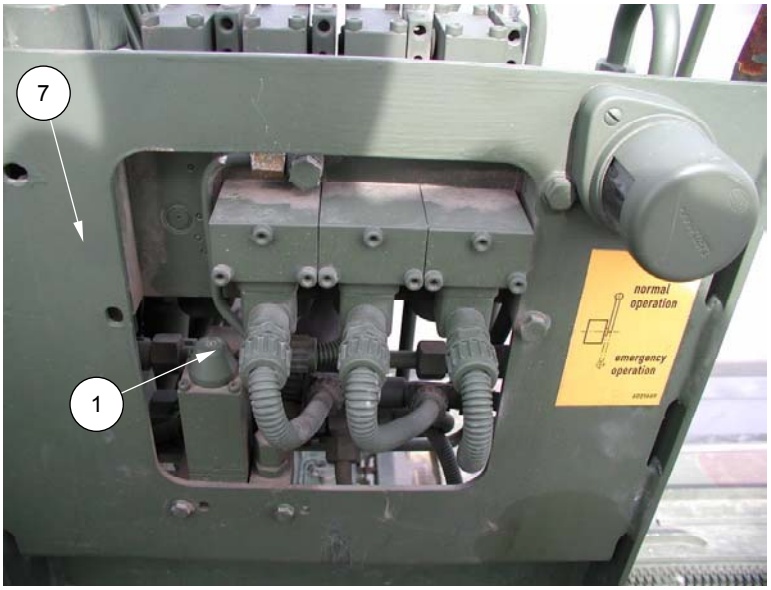
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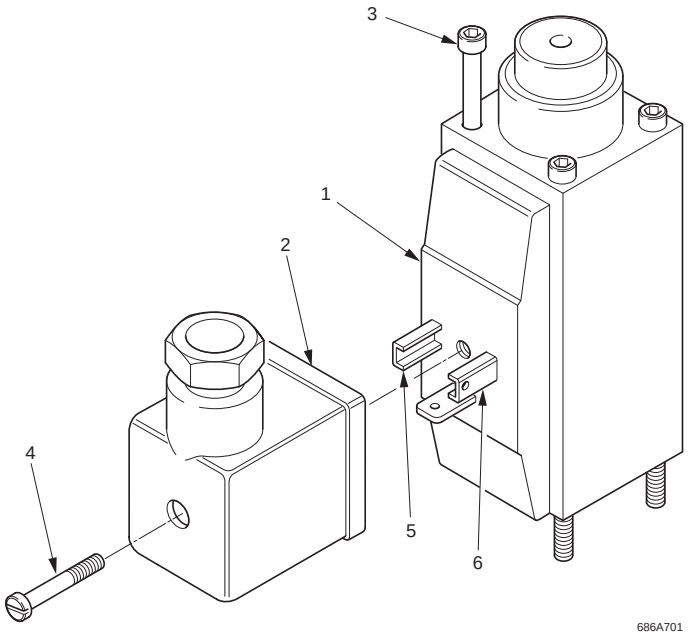
SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE VALVE CONTROL BLOCK DUMP VALVE.

NOTE

The solenoid dump valve when activated returns all hydraulic oil to the tank. The solenoid dump valve can affect all the crane hydraulic circuits apart from the crane stabilizer hydraulic circuit.





a. Remove

(1) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(2) Remove the screw (4) and cable plug (2) from the solenoid dump valve (1).

(3) Remove the four bolts (3) securing the solenoid dump valve (1) to the crane valve control block mounting (7).

(4) Check all threaded components for damage.

b. Test

(1) Carry out a resistance check on across pins (5) and (6) of the solenoid dump valve (1).

(2) The reading should be between 19 - 23 ohms.

(3) If the reading taken is below 19 ohms change the solenoid dump valve (1).

c. Install

(1) Fit the solenoid dump valve (1) to the crane valve control block mounting (7).

(2) Secure the solenoid dump valve (1) with the four bolts (3).

(3) Fit the cable plug (2) to the solenoid dump valve (1) and secure in place with the screw (4).

d. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10 and check for hydraulic oil leaks.

6 - 076 CRANE - STABILIZER VALVE CONTROL BLOCK

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

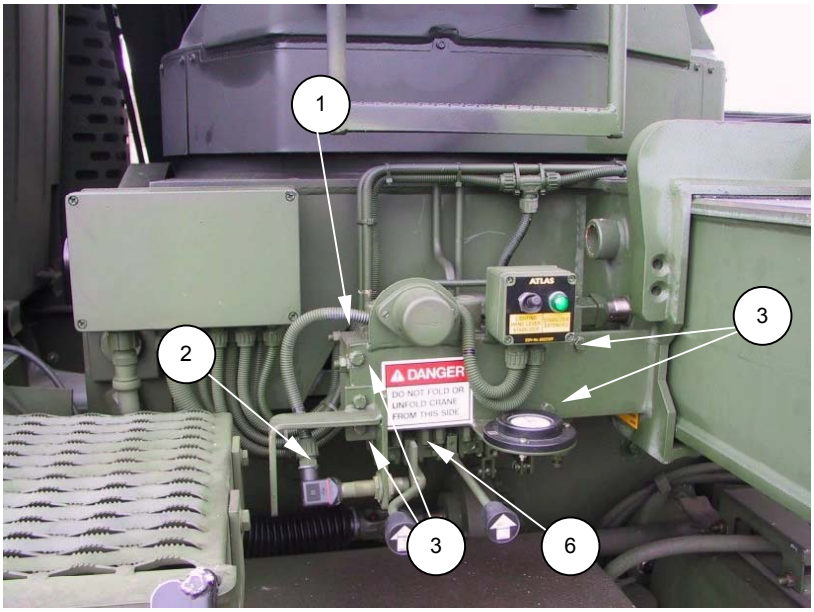
Vehicle switched off and battery shutoff switch in the off position

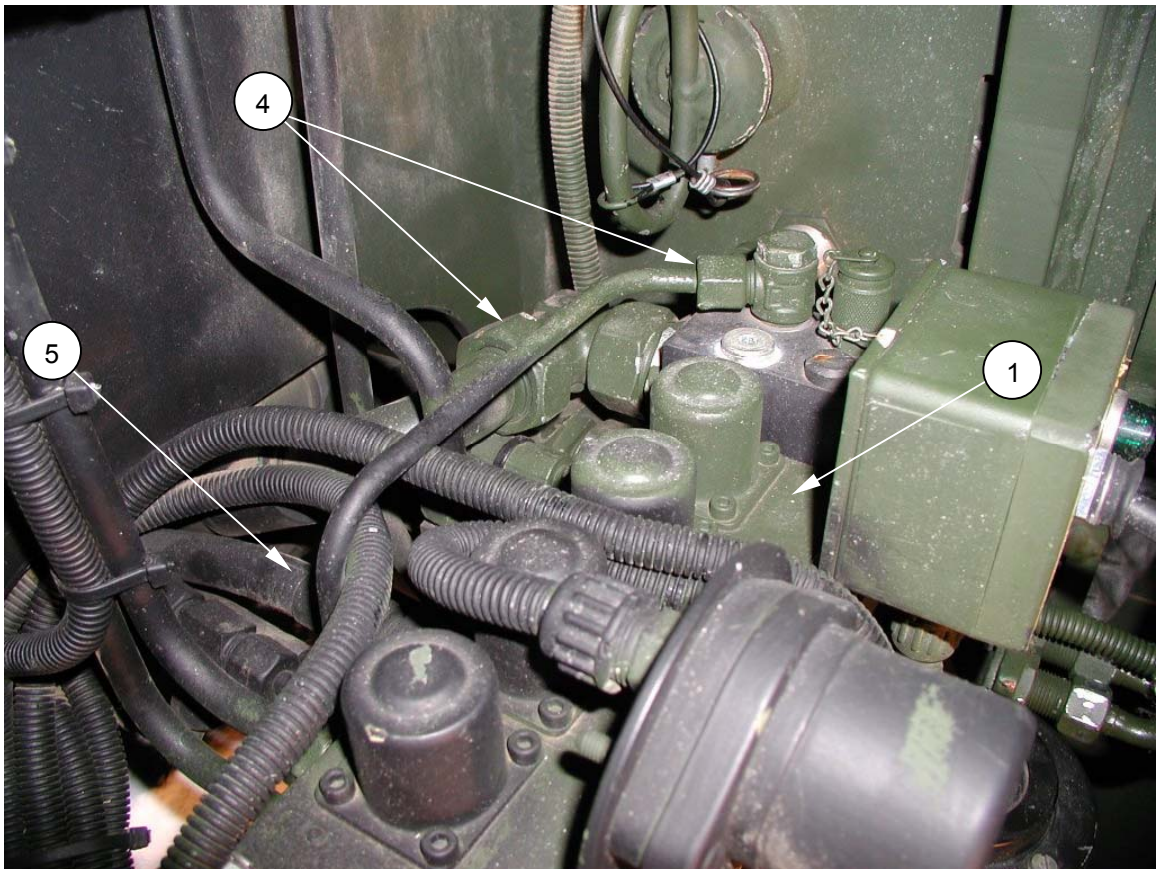
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WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE STABILIZER VALVE CONTROL BLOCK.





a. Remove

(1) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(2) Note the position of and remove all the hydraulic pipes (4) connected to the stabiliser valve control block (1).

(3) Note the position of and remove all the hydraulic hoses (5) connected to the stabiliser valve control block (1).

(4) Remove the two operating cables by removing the split pins and cotter pins (not shown) at the control levers (6).

(5) Remove the electrical cable to the proximity switch (2).

(6) Remove the four mounting bolts (3).

(7) Remove the stabilizer control panel (1).

(8) Check all threaded components for wear or damage.

(9) Check the proximity switch electrical cable for wear or damage.

(10) Replace components as necessary.

b. Install

(1) Fit the stabilizer valve control block (1) to its mounting bracket and secure in place with the four mounting bolts (3).

(2) Fit the electrical cable to the proximity switch (2).

(3) Fit the hydraulic hoses (5) to the stabilizer control valve block (1) at the positions noted during removal.

(4) Fit the hydraulic pipes (4) to the stabilizer control valve block (1) at the positions noted during removal.

(5) Fit the two operating cables at the control levers (6) and secure in place with the split pins and cotter pins (not shown).

(6) Remove the two operating cables by removing the split pins and cotter pins (not shown) at the control levers (6).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane stabilizers in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for hydraulic oil leaks.

6 - 077 CRANE - JIB CYLINDER BRAKE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Ensure that the crane is in the folded position
Vehicle switched off and battery shutoff switch in the off position

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WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER BRAKE VALVE.

a. Remove

(1) Ensure that the crane is in the folded position.

(2) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(3) Remove the solenoid valve electrical cable (5) from the brake valve (3).

(4) Remove the hydraulic hose (4) from the brake valve (3).

(5) Undo the connection (6) between the brake valve (5) and the load holding valve (7).

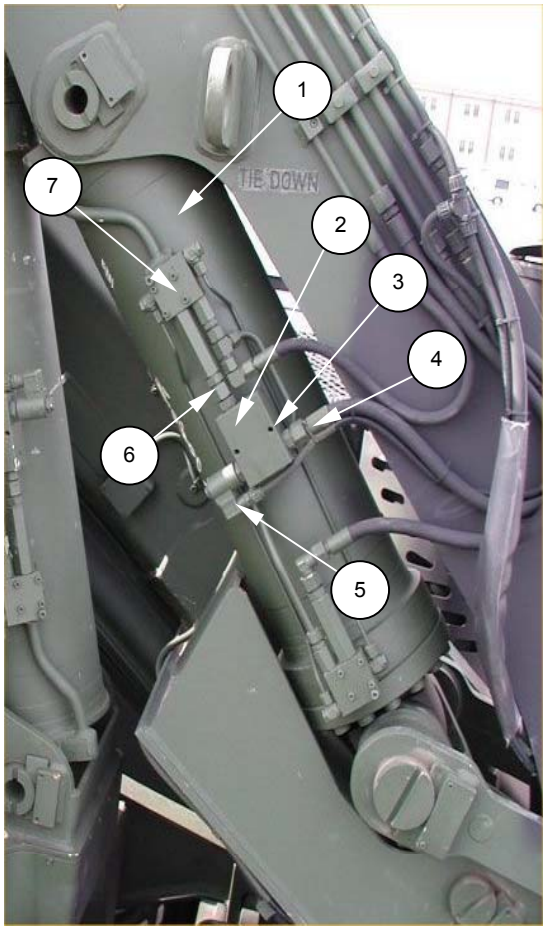
(6) Remove the two bolts (3) securing the brake valve (2) to the jib cylinder (1).

(7) Remove the brake valve (2).

(8) Check all threaded components for damage or wear.

(9) Check the electrical cable for damage.

(10) Replace components as necessary.



b. Install

(1) Fit the brake valve (2) to the jib cylinder (1) and secure in place with the two bolts (3).

(2) Fit the connection (6) between the brake valve (5) and the load holding valve (7).

(3) Fit the hydraulic hose (4) to the brake valve (3).

(4) Fit the solenoid valve electrical cable (5) to the brake valve (3).

c. Follow on task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for hydraulic oil leaks.

6 - 078 CRANE - JIB CYLINDER (RETRACT) LOAD HOLDING VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Ensure that the crane is in the folded position

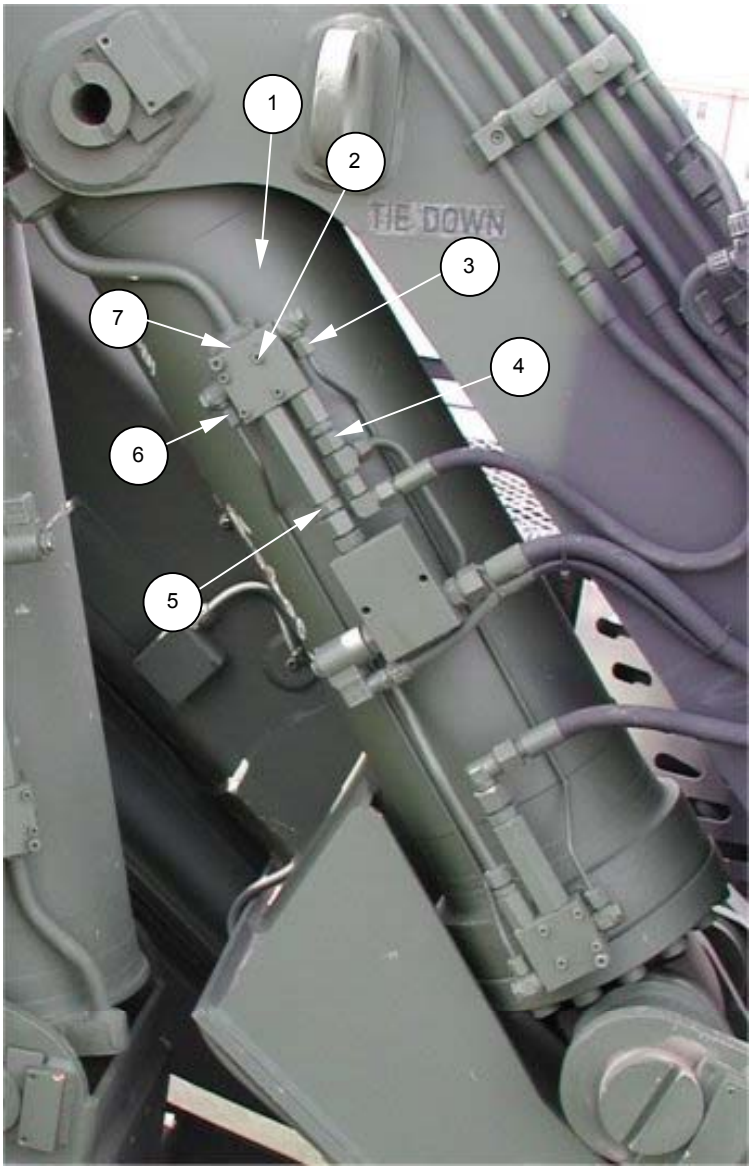
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER LOAD HOLDING VALVES.

NOTE

The jib cylinder has two load holding valves. One for cylinder retract and one for cylinder extend.



a. Remove

(1) Locate and identify which load holding valve is to be replaced. Item (7) is the load holding valve for the jib cylinder (1) retract.

(2) Ensure that the crane is in the folded position.

(3) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(4) Disconnect hydraulic pipes (3, 4 5 and 6).

(5) Remove the four mounting bolts (2) securing the load holding valve to the jib cylinder (1).

(6) Remove the load holding valve (7).

(7) Check all threaded components for wear or damage.

(8) Replace components as necessary.

b. Install

(1) Fit the load holding valve (7) to the jib cylinder (1) with the four mounting bolts (2).

(2) Fit the hydraulic pipes (3,4,5 and 6).

c. Follow on tasks

(1) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic leaks.

6 - 079 CRANE - JIB CYLINDER (EXTEND) LOAD HOLDING VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Ensure that the crane is in the folded position

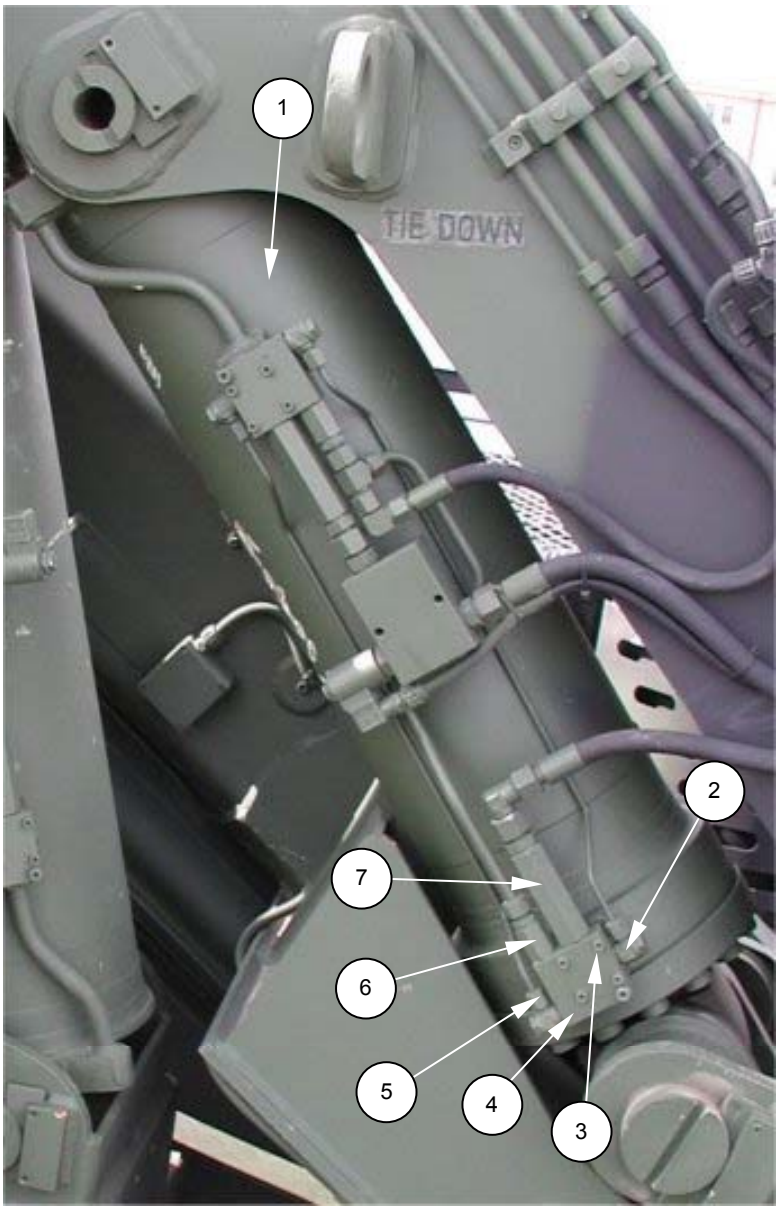
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB CYLINDER LOAD HOLDING VALVES.

NOTE

The jib cylinder has two load holding valves. One for cylinder retract and one for cylinder extend.



a. Remove

(1) Locate and identify which load holding valve is to be replaced. Item (4) is the load holding valve for the jib cylinder (1) extend.

(2) Ensure that the crane is in the folded position.

(3) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(4) Disconnect hydraulic pipes (2, 5, 6 and 7).

(5) Remove the four mounting bolts (3) securing the load holding valve to the jib cylinder (1).

(6) Remove the load holding valve (4).

(7) Check all threaded components for wear or damage.

(8) Replace components as necessary.

b. Install

(1) Fit the load holding valve (4) to the jib cylinder (1) with the four mounting bolts (3).

(2) Fit the hydraulic pipes (2, 5, 6 and 7).

c. Follow on tasks

(1) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic leaks.

6 - 080 CRANE - LIFT CYLINDER BRAKE VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Ensure that the crane is in the folded position
Vehicle switched off and battery shutoff switch in the off position

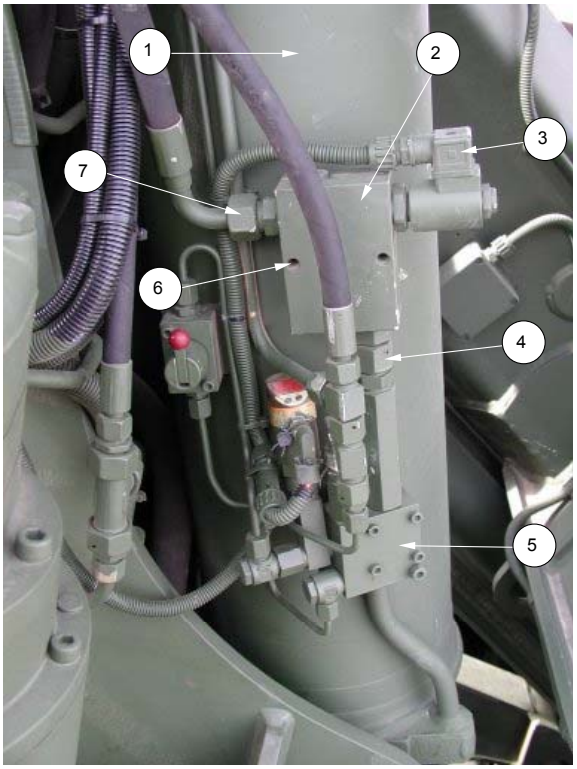
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WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER BRAKE VALVE.

a. Remove



(1) Ensure that the crane is in the folded position.

(2) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(3) Remove the solenoid valve electrical cable (3) from the brake valve (2).

(4) Remove the hydraulic hose (7) from the brake valve (2).

(5) Undo the connection (4) between the brake valve (2) and the load holding valve (5).

(6) Remove the two bolts (6) securing the brake valve (2) to the lift cylinder (1).

(7) Remove the brake valve (2).

(8) Check all threaded components for damage or wear.

(9) Check the electrical cable for damage.

(10) Replace components as necessary.

b. Install

(1) Fit the brake valve (2) to the jib cylinder (1) and secure in place with the two bolts (6).

(2) Fit the connection (4) between the brake valve (2) and the load holding valve (5).

(3) Fit the hydraulic hose (7) to the brake valve (2).

(4) Fit the solenoid valve electrical cable (3) to the brake valve (2).

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(3) Check for hydraulic oil leaks.

6 - 081 CRANE - LIFT CYLINDER LOAD HOLDING VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Ensure that the crane is in the folded position

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER LOAD HOLDING VALVE.

a. Remove

(1) Ensure that the crane is in the folded position.

(2) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(3) Remove the hydraulic hose (6) from the load holding valve (3).

(4) Remove the hydraulic pipe (5) from the load holding valve (3).

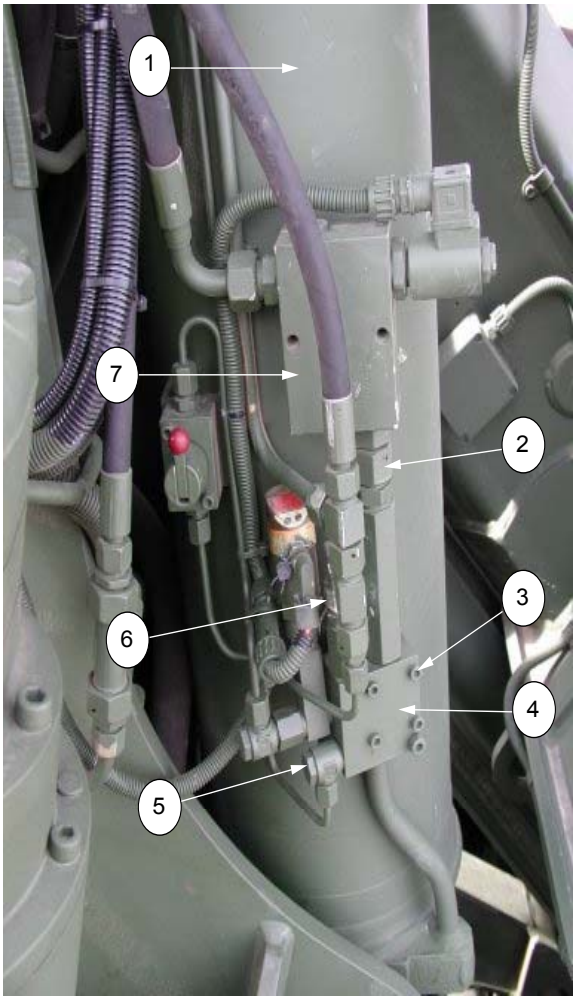
(5) Undo the connection (2) between the brake valve (7) and the load holding valve (3).

(6) Remove the four bolts (4) securing the load holding valve (3) to the lift cylinder (1).

(7) Remove the load holding valve (3).

(8) Check all threaded components for damage or wear.

(9) Replace components as necessary.



b. Install

(1) Fit the load holding valve (3) to the jib cylinder (1) and secure in place with the four bolts (4).

(2) Fit the connection (2) between the brake valve (7) and the load holding valve (3).

(3) Fit the hydraulic hose (6) to the load holding valve (3).

(4) Fit the hydraulic pipe (5) to the load holding valve (3).

c. Follow on tasks

(1) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic oil leaks.

6 - 082 CRANE - LIFT CYLINDER PILOT OPERATED CHECK VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

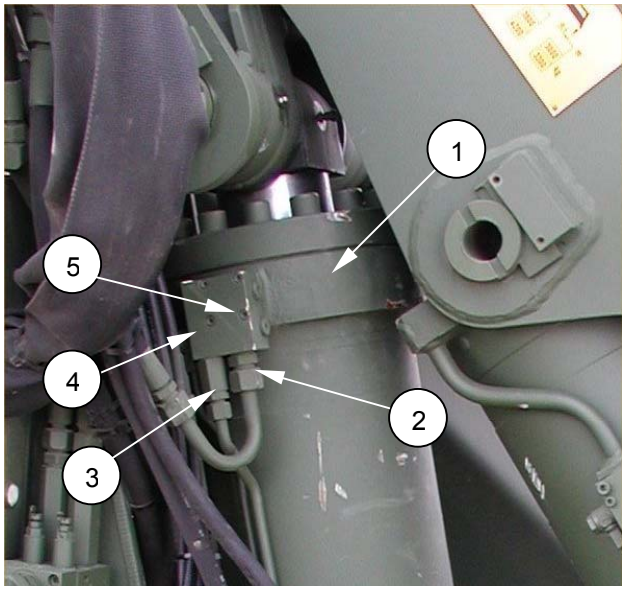
Equipment Conditions

Ensure that the crane is in the folded position

WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE LIFT CYLINDER PILOT OPERATED CHECK VALVE.



a. Remove

(1) Ensure that the crane is in the folded position.

(2) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(3) Remove the hydraulic pipes (2 and 3) from the pilot operated check valve (4).

(4) Remove the four bolts (5) securing the pilot operated check valve to the lift cylinder (1).

(5) Remove the pilot operated check valve (4).

(6) Check all threaded components for damage or wear.

(7) Replace components as necessary.

b. Install

(1) Fit the pilot operated check valve (4) to the lift cylinder (1) with the four bolts (5).

(2) Fit the hydraulic pipes (2 and 3) to the pilot operated check valve (4).

c. Follow on task

(1) Check the operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic oil leaks.

6 - 083 CRANE - JIB EXTENSION CYLINDERS LOAD HOLDING VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

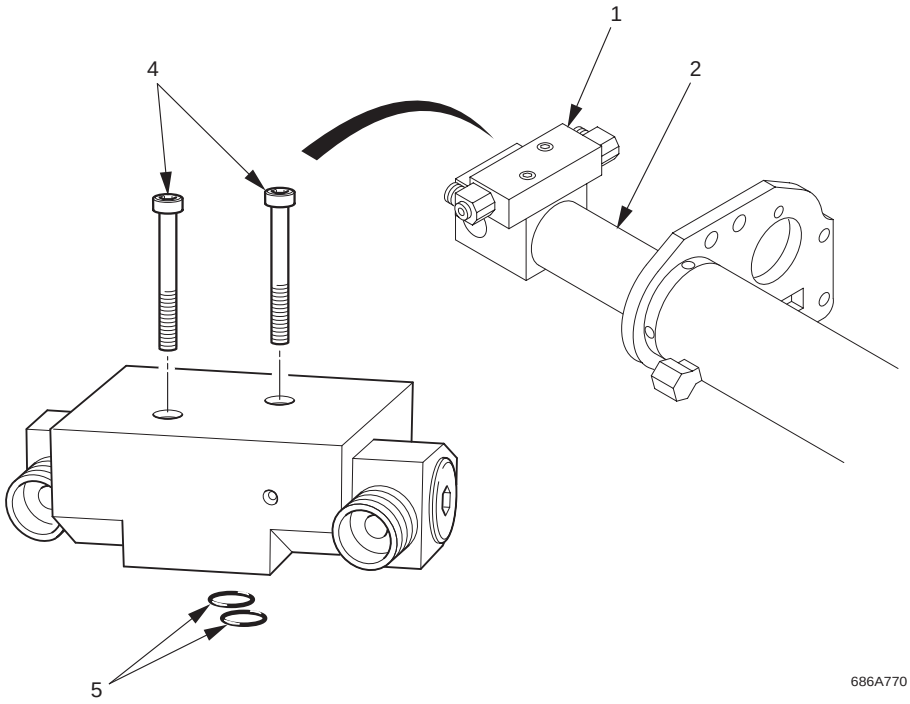
Set crane in preferred position for maintenance;
see maintenance procedure 6-069

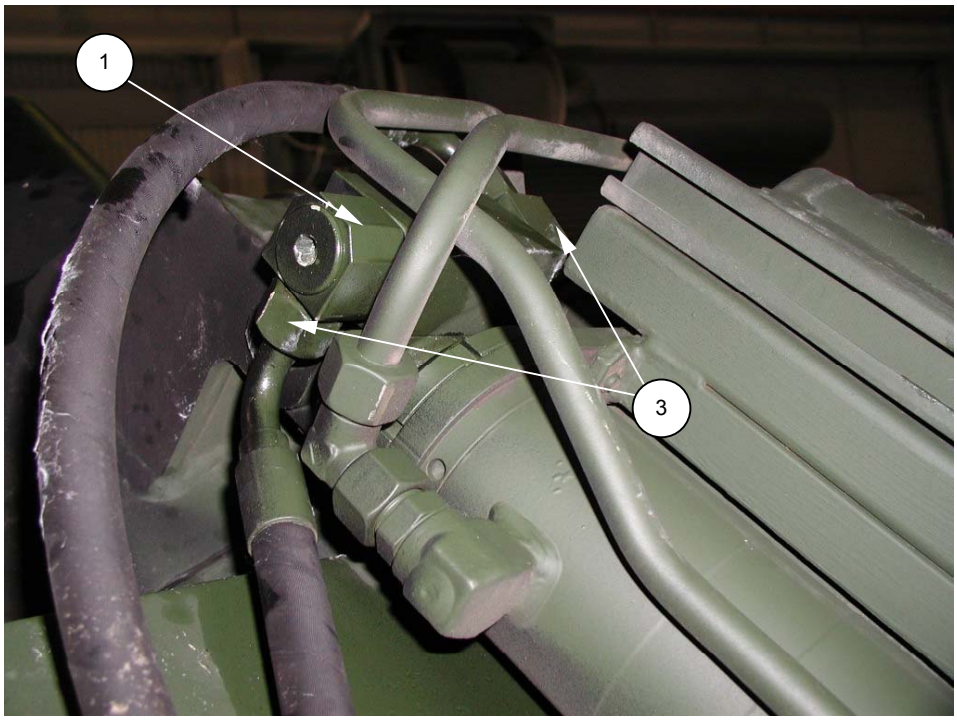
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB EXTENSION CYLINDER ASSEMBLY.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE EXTENSION CYLINDER ASSEMBLY DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE JIB EXTENSION CYLINDERS LOAD HOLDING VALVE.





a. Remove

(1) De-pressurise the hydraulic system. See unit maintenance procedure 5-118.

(2) De-pressurise the jib extension cylinder assembly. See unit maintenance procedure 6-052.

(3) Note the position of and remove the two hydraulic pipes (3) connected to the load holding valve (1).

(4) Remove the two bolts (4) securing the load holding valve (1) to the jib extension cylinder assembly (2).

(5) Retain the two seals (5) between the load holding valve (1) and the jib extension cylinder assembly (2).

(6) Check all threaded components for wear and damage.

(7) Check the two seals for damage.

(8) Replace components as necessary.

b. Install

(1) Fit two seals (5) to the jib extension cylinder assembly (2).

(2) Ensure that the two seals (5) are seated correctly.

(3) Fit the load holding valve (1) to the jib extension cylinder assembly (2) with the bolts (4).

(4) Fit the hydraulic pipes (3) to the load holding valve (1) in the positions noted during removal.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for leaks.

6 - 084 CRANE - PRESSURE TRANSDUCER

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position
Crane in stowed position.

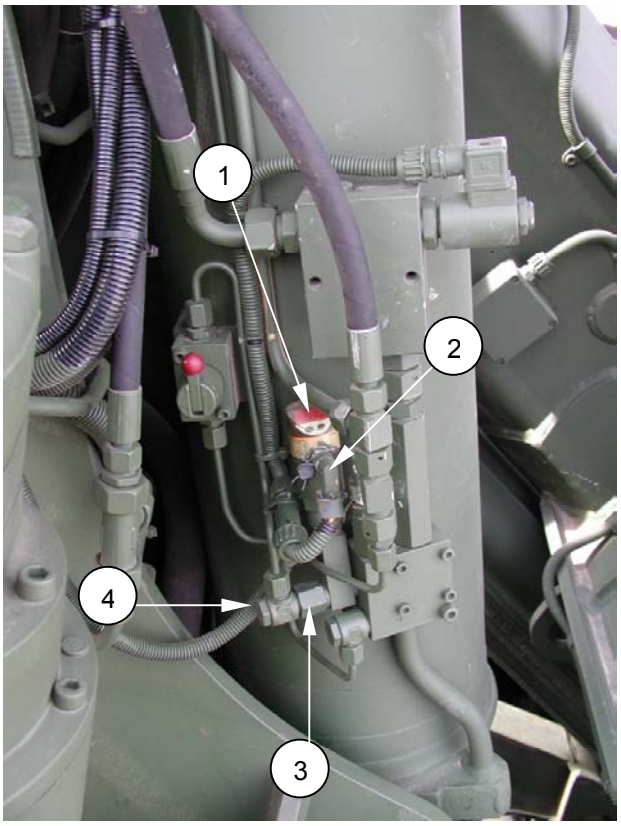
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE PRESSURE TRANSDUCER.

NOTE

The pressure transducer is located on the lift cylinder. The crane must be in the stowed position when changing the pressure transducer.



a. Remove

(1) Ensure that he crane is in the stowed position.

(2) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(3) Remove the electrical cable (2) to the pressure transducer (1).

(4) Remove the hydraulic connections (3 and 4).

(5) Remove the pressure transducer (1).

(6) Check all threaded components for damage.

(7) Check the electrical cable for damage.

(8) Replace components as necessary.

b. Install

(1) Fit the pressure transducer (1) to the lift cylinder.

(2) Fit the hydraulic connections (3 and 4) to the pressure transducer (1).

(3) Fit the electrical cable (2) to the pressure transducer (1).

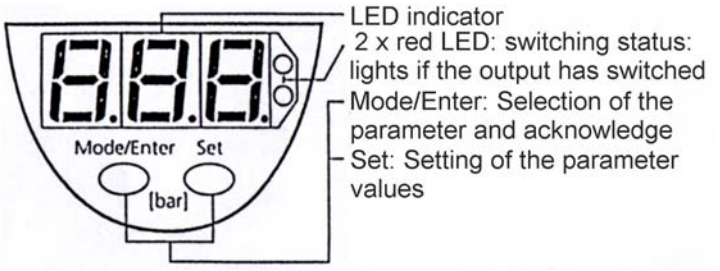
(4) Switch the battery shutoff switch to the on position.

(5) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(6) Run the crane to overload on full extension with maximum load plus 5-8%.

NOTE

Setting the pressure transducer should only be carried out when a new pressure transducer is being fitted to the crane. The pressure transducer can be set by pressing the following buttons.



(7) Press **Mode/Enter and Set.** After 10 seconds the LED display will go out and a new setting can be input.

(8) Press **Mode** until **SP2** is displayed.

(9) Press **Set** until the desired pressure is displayed **276** bar.

(10) Press **Mode** until **rP2** is displayed.

(11) Press **Set** until the desired pressure is displayed **264** bar.

(12) Press **Mode** until **SP1** is displayed.

(13) Press **Set** until the desired pressure is displayed **252** bar.

(14) Press **Mode** until **rP1** is displayed.

(15) Press **Set** until the desired pressure is displayed **240** bar.

(16) Press **Mode** until **dr2** is displayed.

(17) Press **Set** until **1** second is displayed.

(18) Press **Mode** until **OU1** is displayed.

(19) Press **Set** until **Hno** is displayed.

(20) Press **Mode** until **OU2** is displayed.

(21) Press **Set** until **Hno** is displayed.

(22) Settings are not required for modes **dS1**, **dr1** and **dAP**.

(23) Lock the system by pressing **Mode/Enter and Set** for approximately 10 seconds. The display will go out briefly.

(24) Unload the crane.

(25) Check the normal operation of the crane in accordance with the operator's manual TM 5-5420-279-10.

6 - 085 CRANE - ROTATE MOTOR LOAD HOLDING VALVE

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Set crane in preferred position for maintenance;
see maintenance procedure 6-069

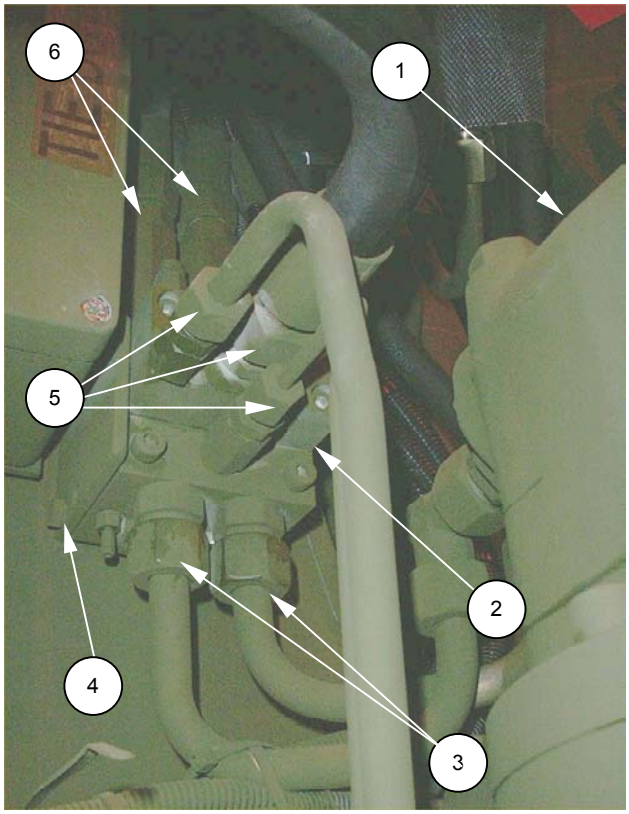
WARNING

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE ROTATE MOTOR LOAD HOLDING VALVE.

NOTE

The rotate motor load holding valve (2) is located on the crane column behind the rotate motor (1).



a. Remove

(1) De-pressurize the hydraulic system. See unit maintenance procedure 5-118.

(2) Note the position of and remove the two hydraulic hoses (6) connected to the top of the load holding valve (2).

(3) Note the positions of and remove the two hydraulic pipes (3) connected to the bottom of the load holding valve (2).

(4) Note the positions of and remove the three hydraulic pipes (5) connected to the front of the load holding valve (2).

(5) Remove the two bolts securing the load holding valve (2) to the crane base bracket.

(6) Remove the load holding valve (2).

(7) Check all threaded components for damage and wear.

(8) Check all hydraulic hoses and pipes for damage.

(9) Replace components as necessary.

b. Install

(1) Fit the load holding valve (2) and secure in place with the two bolts (4) to the crane base bracket.

(2) Fit the three hydraulic pipes (5) to the front of the load holding valve (2) in the positions noted during removal.

(3) Fit the two hydraulic pipes (3) to the bottom of the load holding valve (2) in the positions noted during removal.

(4) Fit the two hydraulic hoses (6) to the top of the load holding valve (2) in the positions noted during removal.

c. Follow on tasks

(1) Operate the crane in accordance with the operator's manual TM 5-5420-279-10.

(2) Check for hydraulic oil leaks.

6 - 086 CRANE - ELECTRICAL HARNESS

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position

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NOTE

Harnesses supply electrical power to the electrical components in the crane system. Each harness has one or more of the following types of connectors:

Military plug and socket; (harness to harness, harness to junction box, harness to interface cabinet, harness to emergency stop, harness to proximity switch).

Spade Connection/plug; (Harness to solenoid valve).

Ground cable; (Harness to ground, Junction box to ground, interface cabinet to ground).

The harnesses are routed between the electrical components along the frame of the crane system sub-assemblies. The harnesses are secured along their routes with clips and ties.

This procedure can be applied to any harness.

a. Remove

(1) Note the position and location of the harness connection being removed.

(2) To remove the mil plug connections see unit maintenance procedure 5-140.

(3) To remove the spade connections see unit maintenance procedure 5-141.

(4) Remove the nuts and bolts to release the ground cable connections where applicable.

(5) Note the positions of and remove all clips and ties securing the harness to the frame of the system.

(6) Remove the harness.

(7) Check the harness for damage due to chaffing or crushing.

(8) Check the plugs for damage to the pins, sockets or spade connectors.

(9) Carry out a continuity check on each cable in the harness. See unit maintenance procedure 5-142.

(10) Carry out a shorting check on each cable in the harness. See unit maintenance procedure 5-143.

b. Install

(1) Fit the harness along its route on the frame of the crane system.

(2) Secure the harness using the clips and ties at the positions noted during removal.

(3) Fit the harness connections to the electrical components at the positions and locations noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the system under repair.

6 - 087 TAIL LIFT - MANIFOLD ASSEMBLY

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

Thread locking compound, loctite 243

Equipment Conditions

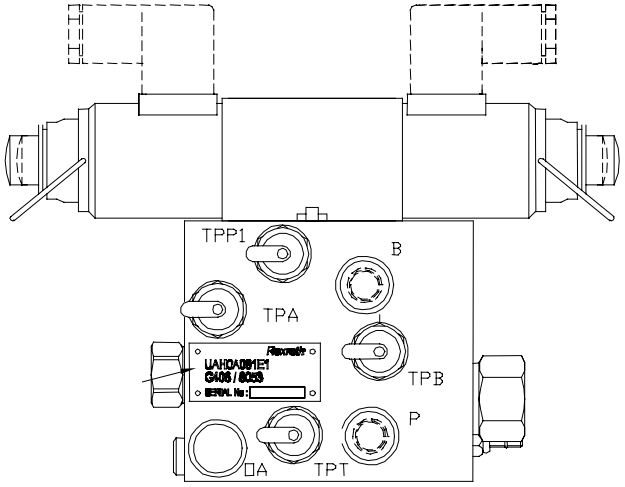
Vehicle switched off and battery shutoff switch in the off position

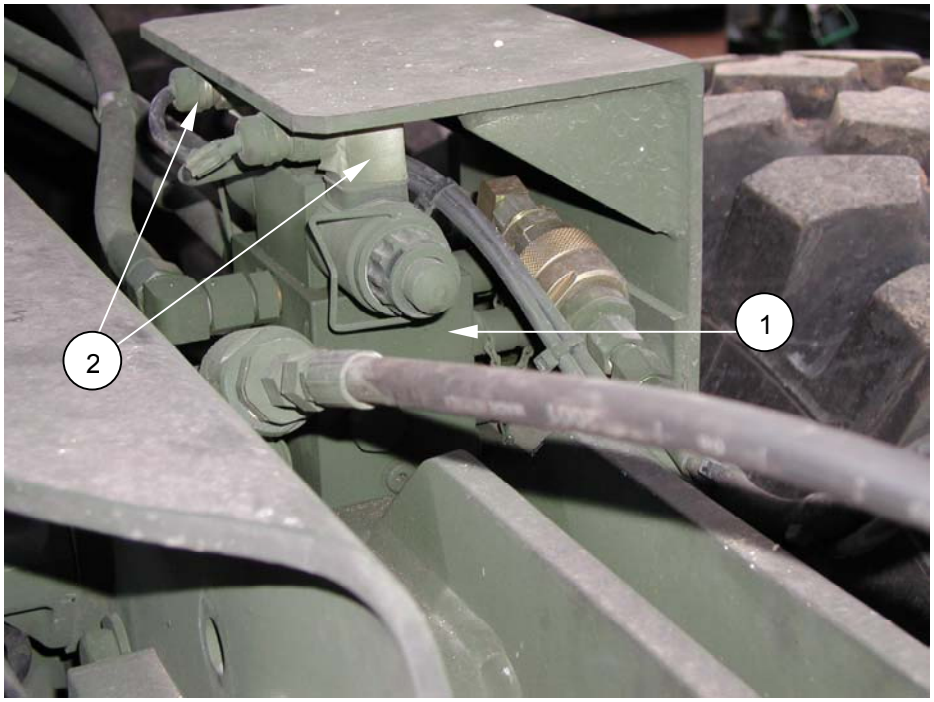
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WARNING

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT MANIFOLD ASSEMBLY.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.





a. Remove

(1) De-pressurize the hydraulic system in accordance with unit maintenance procedure 5-118.

(2) Note the position of and remove hydraulic pipes connected to the tail lift manifold assembly (1).

(3) Note the position of and remove the electrical connections to the solenoid valves (2).

(4) Remove the bolts and washers mounting the tail lift manifold assembly to the sliding frame.

(5) Remove the tail lift manifold (1).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Apply thread-locking compound to the mounting bolts.

(2) Fit the tail lift manifold assembly to the sliding frame with the bolts and washers.

(3) Fit the hydraulic pipes to the positions noted during removal.

(4) Fit the electrical connections (2) to the positions noted during removal.

c. Follow on tasks

(1) Switch the battery shutoff switch to the on position.

(2) Operate the system and check for correct operation and hydraulic fluid leaks.

6 - 088 TAIL LIFT - ELECTRICAL JUNCTION BOX

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

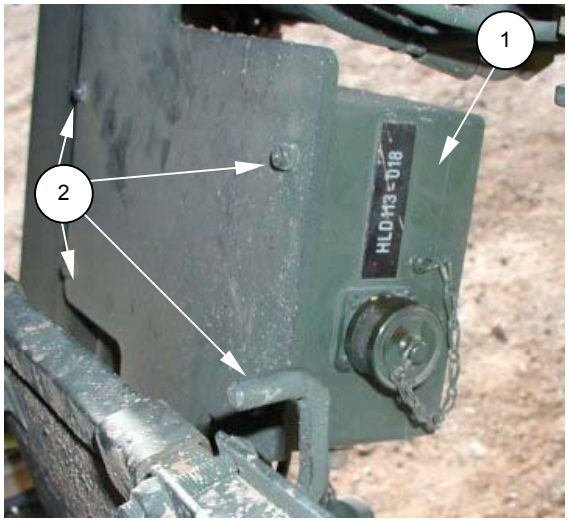
Tool Kit, General Mechanic's, Automotive (GMTK)

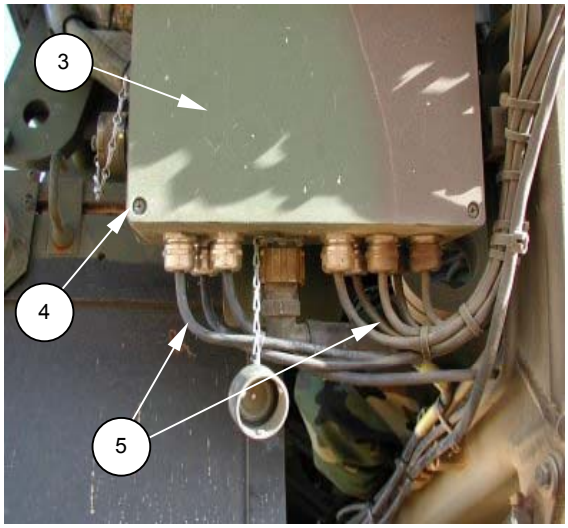
Materials Required

Thread locking compound, loctite 243

Equipment Conditions

Vehicle switched off and battery shutoff switch in the off position





a. Remove

(1) Remove the four screws (4) securing the tail lift junction box cover (3).

(2) Remove the tail lift junction box cover (3).

(3) Locate each tail lift harness (5), note the positions of and disconnect their electrical connections in the junction box (1). See harness replacement unit maintenance procedure 5-139.

(4) Remove the four mounting nuts and washers (2) from the junction box mountings.

(5) Remove the junction box (1).

(6) Examine all threaded components for wear and damage.

(7) Change components as required.

b. Install

(1) Fit the junction box (1) to the tail lift.

(2) Apply thread-locking compound to the tail lift mounting bolts.

(3) Fit the washers and nuts (2) to the tail lift mounting bolts.

(4) Fit the tail lift harnesses (5) to their electrical connections to the positions noted during removal.

(5) Fit the tail lift junction box cover (3).

(6) Secure the tail lift junction box cover (3).with the four screws (4). Ensure that the cover seal is fitted correctly.

c. Follow on task

(1) Switch the battery shutoff switch to the on position.

(2) Check the operation of the tail lift in accordance with the operator's manual TM 5-5420-279-10.

6 - 089 TAIL LIFT - MOUNTING BRACKET

This task covers:

a. Remove b. Install

INITIAL SETUP:

Tools Required

Tool Kit, General Mechanic's, Automotive (GMTK)

Materials Required

None

Equipment Conditions

Tail Lift deployed Platform level and raised 2 ft off the ground supported with 4 jack stands, one in each corner

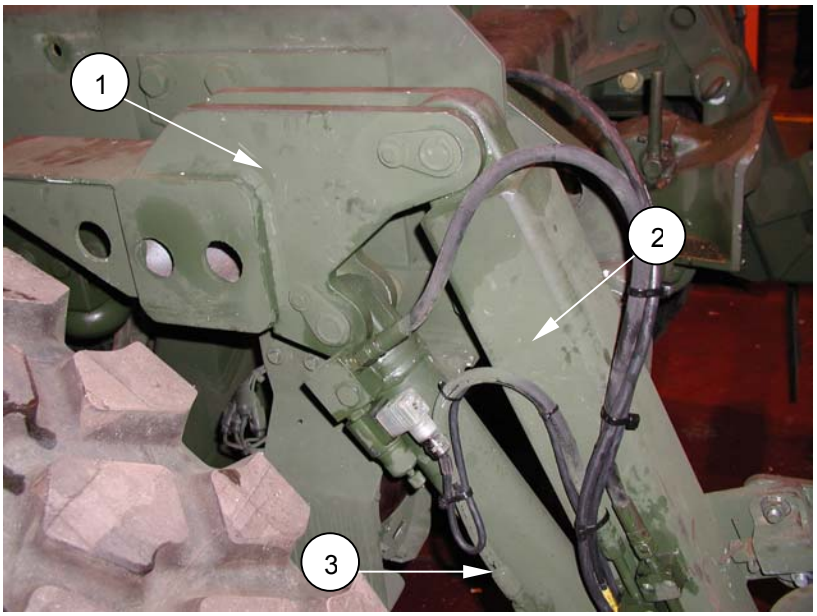
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WARNING

CRUSH INJURY. TO AVOID INJURY TO PERSONNEL WHEN WORKING ON THE TAIL LIFT ALWAYS ENSURE THAT THE WEIGHT OF THE TAIL LIFT LIFTING ARM AND PLATFORM ARE SUPPORTED.

INJURY FROM EXTREME HYDRAULIC OIL PRESSURE. THE SYSTEM MUST BE DE-PRESSURIZED BEFORE CARRYING OUT ANY WORK ON THE TAIL LIFT CYLINDERS.

SLIP AND FALL INJURY. PERSONNEL MAY SLIP ON SPILLED HYDRAULIC FLUID. SUITABLE CONTAINERS AND FLUID ABSORBENT MATERIALS ARE TO BE USED TO CONTAIN SPILLAGE.



a. Remove

(1) Disconnect the tail lift swing cylinder (3) at the mounting bracket (1) by removing and retaining the pivot pin and bush.

(2) Disconnect the tail lift lifting arm (2) at the mounting bracket (1) by removing and retaining the pivot pin and bush..

(3) Note the position, orientation and size of the nine tail lift mounting bracket bolts.

(4) Remove the nine, mounting bracket nuts, bolts and washers.

(5) Remove the mounting bracket (1).

(6) Check all threaded components for wear and damage.

(7) Check the mounting bracket of wear and damage.

(8) Check the chassis mounting holes for wear.

(9) Replace components as necessary.

(10) Clean the contact faces of the mounting bracket and the chassis.

(11) Discard the nyloc nuts.

b. Install

(1) Fit the mounting bracket (1) to the chassis and secure with the nine, bolts, washers and new nyloc nuts.

(2) Torque tighten the bolts to 346 lbs/ft (470Nm).

(3) Fit the tail lift lifting arm (2) using the pivot pin and bush retained during removal.

(4) Fit the tail lift swing cylinder (3) using the pivot pin and bush retained during removal.

c. Follow on task

(1) Check the operation of the tail lift.

APPENDIX A

References

The references in Table 1 are applicable to the DSB.

Table 1 Associated Publications

TITLE	PUBLICATION NUMBER
Operator's Manual	TM 5-5420-279-10
RPSTL	TM 5-5420-279-23P
TAMMS	DA PAM 738-750
Destruction Procedures	TM 750-244 Series
International Standard (Fluid power systems and components - Graphic symbols and circuit diagrams)	ISO 1219-1
Technical Manuals for PLS	TM 9-2320-364 Series
Operation and Maintenance Technical Manuals for PLS Trailers	TM 9-2330-385-14
Operation and Maintenance and Parts Technical Manual for PLS Flatrack	TM 9-3990-206-14 & P
Operation and Maintenance and Parts Technical Manuals for CBT	TM 5-5420-234-14 & P
Expendable and Durable Items	CTA 50-870
Army Medical Expendable and Durable Items	CTA 8-100
Military Specification Chemical Agent Resistance Coating (CARC) System Application Procedures And Quality Control Inspection	MIL-C-53072B (ME)
Operators Circular Welding, Theory and Application (http://www.adtdl.army.mil/cgi-bin/atdl.dll/tc/9-237/toc.htm)	TC9-237
Painting Instructions for Army Material	TM 43-0139
Safety Inspection and Testing of Lifting Devices	TB 43-0142

APPENDIX B

Maintenance Allocation Chart (M.A.C.)

1 Introduction

This section provides an explanation of maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept. The Maintenance Allocation Chart (MAC), shown in Table 1, designates overall authority and responsibility for the performance of maintenance functions on the identified items. (For the purposes of this section, "item" refers to module, component or assembly.) The application of the maintenance functions to the item is consistent with the capacities and capabilities of the designated maintenance level, detailed in column 4 of the MAC, as follows:

Unit - two sub-columns, C (operator/crew) and O (unit) maintenance.

Direct Support - one sub-column, F.

General Support / Specialized Repair Activity - one sub-column, H.

Depot / Specialized Repair Activity - has one sub-column, D.

Paragraph 4 and Table 2 detail the tool sets, special tools, common test equipment and special test equipment, required for each maintenance function, as referenced from the maintenance levels in column 4 of the MAC.

Paragraph 5 contains supplemental instructions and explanatory notes for particular maintenance functions.

2 Maintenance Functions

Maintenance functions are limited to and defined as:

- **Adjust**. To maintain or regulate within prescribed limits, by bringing into proper position or by setting the operating characteristics to specified parameters.

- **Align**. To adjust specified variable elements of an item, to bring about optimum or desired performance.

- **Calibrate**. To determine and cause corrections to be made or to be adjusted on instruments or Test Measurement and Diagnostic Equipment (TMDE), used in precision measurement. Calibration is the comparison of two instruments (one of which is to a certified standard of known accuracy), to detect and adjust any discrepancy in the accuracy of the instrument being compared.

- **Inspect**. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards, through examination (e.g., by sight, sound or feel).

- **Overhaul**. The maintenance effort (service[1]/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in

[1] Services. - Inspect, test, service, adjust, align, calibrate and/or replace.

appropriate technical publications (e.g., depot maintenance work requirement). Overhaul is normally the highest degree of maintenance performed by the army. (Overhaul does not normally return an item to a like-new condition).

- **Rebuild**. Those services[1]/actions necessary for the restoration of unserviceable equipment to a like-new condition, in accordance with the original manufacturing standards. Rebuild is the highest degree of material maintenance applied to army equipment. The rebuild operation includes the act of returning to zero, those age measurements (e.g., hours/miles), considered in classifying Army equipment/components.

- **Remove/Install**. To remove and install the same item when required to perform service[1] or other maintenance functions. Install may be the act of replacing, seating or fixing into position, a spare, repair part or item, in a manner that allows the proper functioning of an equipment or a system.

- **Repair**. The application of maintenance services, including fault location/trouble shooting[2], removal/installation and disassembly/assembly[3], procedures and maintenance actions[4]; to identify troubles and restore serviceability to an item, by correcting specific damage, faults, malfunctions or failures.

- **Replace**. To remove an unserviceable item and install a serviceable counterpart in its place. The MAC authorizes replacement and the assigned maintenance level is shown as the reference code in Table 3.

- **Service**. Operations required periodically to keep an item in proper operating condition: e.g., to clean (including decontaminate), preserve, drain and paint. Service also includes replenishment of fuel, lubricants, chemical fluids and gases.

- **Test**. To verify serviceability by measuring the mechanical, pneumatic, hydraulic or electrical characteristics of an item and comparing those characteristics with prescribed standards. The Test function is also used in the location of faults.

3 Maintenance Allocation Chart (MAC)

The MAC, in Table 1, designates overall authority and responsibility for the performance of maintenance functions on the identified items. The MAC is divided into six columns and the function of each column is explained as follows:

- Column 1, **Group No**. The purpose of the Group No. is to identify maintenance-significant items with their next higher assembly.

- Column 2, **Component/Assembly**. Column 2 contains the names of items for which maintenance is authorized.

---

1 Services. - Inspect, test, service, adjust, align, calibrate and/or replace.

2 Fault location/troubleshooting. - The process of investigating and detecting the cause of equipment malfunctioning: the act of isolating a fault within a system or item under test.

3 Disassembly/assembly. - The step-by-step breakdown (taking apart) of a spare/functional group-coded item, to the level of its least component that is identified as maintenance significant, (i.e. assigned a reference code in Table 1.

4 Actions. - welding, grinding, riveting, straightening, facing, machining and/or resurfacing.

- Column 3, **Maintenance Function**. This column lists the functions (explained in paragraph 2) that can be performed on the items listed in Column 2.

- Column 4, **Maintenance Level**. Column 4 specifies each level of maintenance, authorized by the listing in Column 3, and indicates, in the appropriate sub-column, the man-hours required to perform the task. The man-hours shown represents the average time required to restore an item to a serviceable condition, under typical field operating conditions and includes preparation time, fault location time and quality assurance time. The symbols for the various maintenance levels, shown at the top of the Column 4 sub-columns, are as follows:

    - **C** Operator or Crew maintenance
    - **O** Unit Maintenance
    - **F** Direct Support Maintenance
    - **H** General Support Maintenance / SRA
    - **D** Depot Maintenance / SRA

- Column 5, **Tool or Test Equipment Reference Code**. Column 5 specifies, by code, common tool sets (not individual tools), special tools, common and special TDME and special support equipment, required to support the maintenance functions. The code numbers refer to the list of tools and test equipment in Table 2.

- Column 6, **Remarks**. Where applicable, this column contains a code letter, defined in Table 3, which refers to a maintenance note or instruction.

Table 1 Maintenance Allocation Chart

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
100	**Bridge**	Inspect Service Repair	1.3 1.0	1.0				1	P W
10010	Launch Beam Lifter	Inspect Remove / Install Test		0.1 1.0			0.5	2	P F
10020	Lifting Beam Support Arm	Inspect Remove / Install Test		0.1 1.0			0.3	2	P F
10030	Lifting Beam Links and Shackle	Inspect Remove / Install Test		0.1 0.2 1.0				2	P
10040	End Beam Lifting Pin	Remove / Install		0.5				2	
10050	End Beam and Ramp Module Slide Plates	Remove / Install	0.5					1	
1010	**Parallel Module**	Inspect Service Remove / Install Repair	0.5	1.0			8.0	1, 8	P W, F
101010	Deck Units	Remove / Install	1.5					8	
101020	Bridge Marker Assembly	Remove / Install	0.5					1	
101030	Curb	Remove / Install	1.0					1	
101040	Curb Clamp Assembly	Inspect Remove / Install		0.1 0.5				2	P
101050	Pin Jaw Connection System	Inspect Adjust Remove Install		0.2	0.2 1.0 2.0		4.0	2	P F
101060	Birds Beak	Inspect Remove Install		0.1 0.3			2.0	2	P F
101070	Dowel	Remove / Install		0.5				2	
101080	Damper	Inspect Remove / Install		0.1 1.0				2	P
101090	Damper Upper Mounting	Remove / Install		1.0				2	

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
101100	Damper Lower Mounting	Remove / Install		1.0				2	
101110	Fatigue Monitor	Inspect Service		0.1 0.2				2	P
101120	Closing Sling	Remove / Install	1.0					1	
101130	Closing Sling Pulley	Remove / Install	1.0					1	
101140	Opening Sling	Remove / Install	1.0					1	
101150	Shoot Bolt	Remove / Install	0.5					1	
101160	Bush Resilient	Remove / Install	0.5					8	
1020	**Ramp Module**	Inspect Service Remove / Install Repair	 0.5 0.1	1.0			 8.0	 7, 8	P W, F
102010	Deck Units	Remove / Install	1.5					7, 8	
102020	End Beam Pin Locating Bracket	Inspect Remove / Install		0.1 0.5				2	P
102030	Push/Pull Sling	Remove / Install	0.5					7	
102040	Ramp Skid Mounting Bolt	Inspect Remove / Install	 0.5	0.1				1	P
102050	Level	Remove / Install	0.5					7	
102060	Ramp Module Lifting Pin	Remove / Install		1.0				2	
102070	Curb	Remove / Install	1.0					1	
102080	Curb Clamp Assembly	Inspect Remove / Install		0.1 0.5				2	P
102090	Pin Jaw Connection System	Inspect Adjust Remove Install		0.2	0.2 1.0 2.0		 4.0	2	P F
102100	Birds Beak	Inspect Remove Install		0.1 0.3			 2.0	2	P F
102110	Dowel	Remove / Install		0.5				2	
102120	Damper	Inspect Remove / Install		0.1 1.0				2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
102130	Damper Upper Mounting	Remove / Install		1.0				2	
102140	Damper Lower Mounting	Remove / Install		1.0				2	
102150	Closing Sling	Remove / Install	1.0					1	
102160	Closing Sling Pulley	Remove / Install	1.0					1	
102170	Opening Sling	Remove / Install	1.0					1	
102180	Shoot Bolt	Remove / Install	0.5					1	
102190	Bush Resilient	Remove / Install	0.5					8	
102200	Bridge Marker Assembly	Remove / Install	0.5					1	
1030	**Approach Ramp**	Remove / Install Repair	0.1						W
200	**A-Frame Assembly**	Inspect Service Remove / Install Repair	2.9 0.2	0.2	80.0			1 2, 10, 11, 12	P W
2010	Folding Cylinder	Inspect Remove / Install Repair		0.2 3.0			5.0	2, 24	P CA
2020	Raise Cylinder	Inspect Remove / Install Repair		0.2 3.0			5.0	2, 24	P CA
2030	Cylinder Locking Plate	Remove / Install		0.2				2	
2040	Guide Roller Hydraulic Motor	Inspect Remove / Install		0.1 2.0				2	P
2050	Guide Support Roller	Inspect Remove / Install		0.1 2.5				2	P
2060	Bridge Bearing Pads	Inspect Remove / Install		0.1 0.5				2	P
2070	Upper Sliding Section Bearing Pads	Inspect Remove / Install		1.0 0.7				2	P
2080	Stabilizer Foot Assembly	Inspect Remove / Install		0.2 0.5				2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
2090	Bridge Stop Emergency	Inspect Remove / Install		0.2 4.0				2, 5	P
2100	Limit Switches	Inspect Remove / Install Adjust		0.7 0.5 0.5				2	P
2110	Back-up Mode Operation Controls	Remove / Install		0.5				2	
2120	Folding Walkway	Inspect Remove / Install		0.1 1.0				2	P
2130	Shoot Bolt	Inspect Remove / Install		0.1 0.3				2	P
2140	Support Strut Assembly	Remove / Install		0.5				2	
2150	Lower Emergency Stop	Remove / Install		0.7				2	
2160	Stabilizer Manifold Assembly	Inspect Remove / Install Repair		0.2	4.0		2.0	2	P F
2170	Stabilizer Leg and Stabilizer Cylinder	Inspect Remove / Install Repair		0.2	12.0		5.0	2, 24	P CA
2180	Upper Center Beam	Inspect Remove / Install Repair		0.2	16.0		1.0	2	P F
2190	Lower Center Beam	Inspect Remove / Install Repair		0.2	60.0		1.0	2	P F
2200	Stabilizer Leg Assembly	Inspect Remove / Install Repair		0.2	40.0		1.0	2	P F
2210	Electrical Junction Box	Remove / Install			0.5			2	
2220	Stop Pad	Remove / Install	0.5					2	
2230	Electrical Harness	Inspect Remove / Install		0.2	10.0			2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
2240	Upper Access Ladder	Remove / Install Repair	0.5					1	 W
300	**Launcher Assembly**	Inspect Service Remove / Install Repair	 2.0	12.0	 8.0			 7, 8 2, 3, 4, 5, 6,	P W
3010	Sectionalization	Remove / Install		8.0				2	
3020	**Launch Frame**	Inspect Service Remove / Install Repair	1.1 0.5	1.0	 40.0			 7, 8 2	P W
302010	Rear Pinch Roller Assembly	Inspect Remove / Install Repair		0.1 0.7			 1.0	 2	P F
302020	Rear Pinch Roller Bearings	Inspect Remove / Install Service		0.3 3.0 0.2				 2, 14 2	P
302030	Rope Roller Upper	Inspect Remove / Install		0.1 1.0				 2	P
302040	Forward Roller Assembly	Inspect Remove / Install			0.2 8.0			 2	P
302050	Forward Roller Bearings	Remove / Install			2.0			2, 14	
302060	Center Pivot Bushings	Inspect Remove / Install		0.1 4.0				 2, 20	P
302070	Launch Beam Final Stop	Remove / Install Repair			0.5		 1.0	2	 F
302080	Launch Beam Drive Top Cover	Remove / Install		0.5				2	
30208010	Swivel Load Ring	Remove / Install		0.5				2, 22	
302090	Drive Chain	Inspect Remove / Install Adjust		0.3 0.5 1.5				 2	P
302100	Beam Drive Gearbox Oil	Service		0.3				2	
302110	Drive Sprocket	Remove / Install		0.5				2, 22	

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
302120	Beam Drive Brake Oil	Service		0.3				2	
302130	Front Roller Assembly	Inspect Service Remove / Install	 0.5	0.1 0.3				 1 2	P
302140	Side Roller Assembly	Inspect Service Remove / Install	 0.5	0.1 0.3				 1 2	P
302150	Winch Gearbox Oil	Service	0.2	0.5				1, 2	
302160	Lower Winch	Inspect Remove / Install		0.1	 2.0			 2	P
302170	Lower Winch Rope Tensioner	Remove / Install		1.0				2	
302180	Upper Winch	Inspect Remove / Install		0.1	 2.0			 2	P
302190	Upper Winch Rope Tensioner	Remove / Install		1.5				2	
302200	Upper Winch Rope Tension Indicator	Remove / Install		0.5				2	
302210	Emergency Winch Drum Release	Align		1.0				2	
302220	Electrical Enclosure Assembly	Remove / Install		0.5				2	
302230	Articulator Cylinder	Remove / Install Repair		3.0			 5.0	2, 24	 CA
302240	Articulator Cylinder Cross Member	Remove / Install		2.0				2	
302250	Stow Cylinder	Remove / Install Repair		1.5			 5.0	2, 24	 CA
302260	Stow Cylinder Top Mounting	Remove / Install		1.0				2	
302270	Emergency Stop	Remove / Install Repair		0.7			 0.5	2	 F
302280	Pin Storage Rack	Remove / Install		0.5				2	
302290	Safety Stop Assembly	Remove / Install Repair			1.0		 1.0	2, 3	 F

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
302300	Launch Beam Drive	Inspect Service Remove / Install	0.5	0.2	 16.0			 1 2, 7, 8, 9, 14	P
30230010	Launch Beam Drive Manifold	Inspect Remove / Install Repair		0.3	0.5 4.0		 2.0	 2	P F
302310	Winch Manifold Assembly	Inspect Remove / Install Repair		0.3	0.5 4.0		 2.0	 2	P F
302320	Launch Beam Drive Wheels	Inspect Remove / Install			0.3 8.0			 2, 7, 9, 14	P
302330	Drive Motor and Gearbox Assembly	Inspect Remove / Install		0.3 3.0				 2	P
302340	Upper Winch Rope	Inspect Service Remove / Install		1.0 1.0	 6.0			 2, 23	P
302350	Lower Winch Rope	Inspect Service Remove / Install		1.0 1.0	 8.0			 2	P
302360	Articulator Manifold Assembly	Inspect Remove / Install Repair		0.1	 10.0		 2.0	 2	P F
302370	Pinch/Roll Stow Manifold Assembly	Inspect Remove / Install Repair		0.3	 4.0		 2.0	 2	P F
30237010	Pinch/Roll Cylinder	Remove / Install Repair			2.0		 2.0	 2	 F
302380	Pilot Manifold Assembly	Inspect Remove / Install Repair		0.3	 8.0		 2.0	 2	P F
302390	Launch Frame Guards	Remove / Install	1.5					1	
302400	Electrical Harness	Inspect Remove / Install		0.2	 8.0			 2	P
302410	Lower Winch Pilot Valve	Adjust	1.0					1	

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
3030	**Forward Launch Beam**	Inspect Service Remove / Install Repair	0.7 0.3	0.3	 16.0 			 2 	P W
303010	Fail Safe Roller	Inspect Remove / Install		0.1 0.5				2, 3	LB
303020	Location Block	Inspect Remove / Install		0.1 0.3				2	LB
303030	Carriage Stops	Inspect Remove / Install		0.1 0.5				2	P
303040	Bushing Resilient	Inspect Remove / Install		0.2 0.2				2	LB
303050	Pulleys	Inspect Remove / Install		0.2 2.0				2	P
3040	**Launch Beam**	Inspect Remove / Install Repair	0.5 0.1	0.1				2, 3, 7, 8	P W
304010	Fail Safe Roller	Inspect Remove / Install		0.1 0.5				2, 3	P
304020	Location Block	Inspect Remove / Install		0.1 0.3				2	P
304030	Bushing Resilient	Inspect Remove / Install		0.2 0.2				2	P
3050	**Far and Home Bank Carriage**								
305010	**Far Bank Carriage**	Inspect Service Remove / Install Repair	1.1 0.5	1.0	 16.0 			 1 2, 7, 8 	P W
30501010	Top Roller	Inspect Remove / Install		0.3 2.0				2	P
30501020	Top Roller Bearings	Inspect Remove / Install		0.3 2.0				2	P
30501030	Side Roller	Inspect Remove / Install		0.1 1.0				2, 20	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
30501040	Upper Pulleys	Inspect Remove / Install		1.0	 8.0			 2	P
30501050	Lower Pulleys	Inspect Remove / Install		1.0	 6.0			 2	P
30501060	Sling and Retaining Pin	Remove / Install	0.5					1	
30501070	Wear Pad	Remove / Install		1.5				2	
30501080	Rope Guide Roller	Service Remove / Install		0.1 0.5				 2	
30501090	Restraint	Inspect Remove / Install		0.1 1.0				 2	P
305020	**Home Bank Carriage**	Inspect Service Remove / Install Repair	1.1 0.5	1.0	16.0			2, 7, 8	P W
30502010	Top Roller	Inspect Remove / Install		0.3 2.0				2	P
30502020	Top Roller Bearings	Inspect Remove / Install		0.3 2.0				2	P
30502030	Side Roller	Inspect Remove / Install		0.1 1.0				2, 20	P
30502040	Upper Pulleys	Inspect Remove / Install		1.0	 8.0			 2	P
30502050	Lower Pulleys	Inspect Remove / Install		1.0	 6.0			 2	P
30502060	Sling and Retaining Pin	Remove / Install	0.5					1	
30502070	Latch	Remove / Install		0.3				2	
30502080	Wear Pad	Remove / Install		1.5				2	
30502090	Rope Guide Roller	Service Remove / Install		0.1 0.5				 2	
30502100	Release Lock	Inspect Adjust Remove / Install	 1.0	0.1 1.5				 1 2	P
30502110	Buffer Stop	Remove / Install		0.5				2	

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
3060	**Far Bank Support**	Inspect Service Remove / Install Repair	1.4 0.3	1.0 1.0			 10.0	 7 2	P W, F
306010	Slide Pad	Inspect Remove / Install		1.0 1.0				 2	P
306020	Center Post	Inspect Remove / Install		0.1 4.0				 2, 7	P
306030	Telescopic Tube	Inspect Remove / Install		0.1 1.5				 2,9	P
306040	Support Bearing Pad and Retaining clip	Inspect Remove / Install		0.1 0.5				 2	P
306050	Mounting Pin	Inspect Remove / Install		0.1 0.5				2	P
306060	Hydraulic System	Inspect Service		0.2 1.0				 2, 19, 20	P
306070	Cross Beam	Remove / Install		1.0				2	
306080	Bearing Pad Latch	Remove / Install	0.5					2	
306090	Stowing Pad Adjustment	Remove / Install	0.5					2	
3070	**Slide Frame Assembly**	Inspect Service Remove / Install Repair	2.9	0.3 0.5	 80.0			 2 2	P W
307010	Rotate Cylinder	Inspect Remove / Install Repair		0.2 2.0			 5.0	2, 24	P F
307020	Home Bank End Beam Adapter	Remove / Install		0.5				2	
307030	Twist Lock Assembly	Inspect Remove / Install		0.1 1.7				2	P
307040	Section 1	Inspect Service Remove / Install		0.3 0.5	 20.0			 2 2	P
307050	Section 2	Inspect Service Remove / Install		0.3 0.5	 40.0			 2 2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
307060	Section 2 Wear Pads and Stop Plugs	Inspect Remove / Install		0.3 0.5				2	P
307070	Section 3	Inspect Service Remove / Install		0.3 0.5	 60.0			 2 2	P
307080	Section 3 Wear Pads and Stop Plugs	Inspect Remove / Install		0.3 0.5				 2	P
307090	Upper Slide Twistlock Mounts	Inspect Remove / Install		0.1 1.5				 2	P
307100	Tilt Roller Assembly	Inspect Remove / Install		0.1 1.5	 2.0			 2	P
307101	Tilt Roller Slide Pads	Inspect Remove / Install		0.1	 2.0			 2	P
307110	Tilt Roller Support	Inspect Remove / Install		0.1 1.0				 2	P
307120	Tilt Roller Cylinder	Inspect Remove / Install Repair		0.2 2.5			 5.0	 2, 20	P CA
307130	Tilt Roller Shoot Bolt Housing	Inspect Remove / Install		0.1 0.2				 2	P
307140	End Wear Pads	Inspect Remove / Install		0.1 0.5				 2	P
307150	Removable Roller	Inspect Remove / Install		0.1 0.5				 2	P
307160	Electrical Junction Box	Remove / Install		1.0				2	
307170	Walkways	Inspect Remove / Install		0.1 0.5				 2	P
307180	End Beam Guide	Inspect Remove / Install		0.1 1.0				 2	P
307190	Articulator Cross Beam	Inspect Remove / Install		0.3	 2.0			 2	P
307200	Rotate Cylinder Cross Beam	Inspect Remove / Install		0.3	 5.0			 2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
307210	Rotate Manifold Assembly	Inspect Remove / Install Repair		0.2	4.0		2.0	2	P F
307220	Electrical Harness	Inspect Remove / Install		0.2	4.0			2	P
3080	**Relax Mechanism**	Inspect Remove / Install	1.5	0.7	20.0			2	P
308010	Cylinder	Inspect Remove / Install		0.2 4.0				2	P
308020	Slide Pad	Inspect Remove / Install		0.1 1.0				2	P
308030	Limit Switch and Shoot Bolt	Inspect Remove / Install		0.1 0.5				2	P
308040	Ball Joint	Inspect Remove / Install		0.1 2.0				2	P
308050	Cross Member	Inspect Remove / Install		0.1	4.0			2	P
308060	Cylinder Support Bracket	Inspect Remove / Install		0.1	4.0			2	P
308070	Structural Arm (Slide Frame)	Inspect Remove / Install		0.1	8.0			2	P
3090	**Energy Chain**								
309010	Link	Inspect Remove / Install	0.1	0.5				2	P
309020	Energy Chain Assembly	Inspect Remove / Install	0.1	3.0				2	P
400	**Chassis**	Inspect Repair	0.9						P W
40010	Interface Enclosure	Inspect Remove / Install		0.2 0.5				2	P
40020	Interface Enclosure E-Stop Relay	Remove / Install		0.5				2, 22	
4002010	Interface Enclosure Front Panel	Remove / Install		0.5				2	

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			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
4002020	Interface Enclosure Hours Run Meter	Remove / Install		0.5				2	
4002030	Interface Enclosure Electrical Relays	Remove / Install		0.5				2	
4002040	Interface Enclosure Emergency Stop	Remove / Install		0.5				2	
4002050	Interface Enclosure Toggle and Button Switch	Remove / Install		1.0				2, 22	A
4002060	Interface Enclosure Circuit Breakers	Remove / Install		1.0				2	
40030	Cross Connection Assembly	Remove / Install		2.0				2	P
4003010	Cross Connection Assembly Pump and Motor	Remove / Install		2.0				2	P
40040	Interface Manifold Assembly	Inspect Remove / Install Repair		0.2	6.0		2.0	2	P F
40050	Positioning Aid	Inspect Remove / Install	0.5	0.2				2	P
40060	Electrical Junction Box	Remove / Install		1.0				2	
40070	Electrical Harness	Inspect Remove / Install		0.1	8.0			2	P
40080	Hydraulic Tank Fluid Level Float Switch	Remove / Install		1.0				2	
40090	Chest Pack	Inspect Remove / Install		0.1 1.0				2, 22	P
4009010	Chest Pack Emergency Stop	Inspect Remove / Install		0.1 1.0				2	P
4009020	Chest Pack Toggle Switch	Inspect Remove / Install		0.1 1.0				2	P A
4009030	Chest Pack Joy Stick Control	Inspect Remove / Install		0.1 1.0				2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
4009040	Chest Pack Harness	Inspect Remove / Install Test Repair		0.1 0.5 1.0			 1.0	 2	P F
40100	Butterfly Valve	Remove / Install		1.0				2	
40110	Cab Rotary Switch	Remove / Install		1.0				2	
40120	Cab Emergency Override Switch	Remove / Install		1.0				2	
40130	Cab Circuit Breaker	Remove / Install		1.0				2	
500	**General Hydraulic System**	Inspect	2.0						P
50010	De-pressurize	Service		0.5				2, 19	
50020	Filters	Inspect Remove / Install		0.1 1.0				 2	P
50030	Stack Valve	Remove / Install		2.0				2	
50040	Cartridge Valve	Remove / Install		0.5				2	
50050	Directional Control Valve	Remove / Install		1.0				2	
50060	Cylinder Pressure Release	Service		0.5				2	
50070	Solenoid	Remove / Install Test		0.5 0.1				2 20	
50080	Shuttle Valve	Remove / Install		0.5				2	
50090	Synchronizing Flow Divider Valve	Remove / Install		0.5				2	
50100	Stabilizer Manual Control Valve	Remove / Install		0.3				2	
50110	Stabilizer Manual Control Stack Valve	Remove / Install		2.0				2	
50120	Pinch/Roll Stow Manifold Valves	Remove / Install		0.5				2	
50130	Launch Frame Pilot Manifold Valves	Remove / Install		0.5				2	
50140	Articulator Manifold Valves	Remove / Install		0.5				2	
50150	Winch Control Manifold Valves	Remove / Install		0.5				2	

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
50160	Interface Manifold Shuttle Valve	Remove / Install		0.5				2	
50170	Articulator Counterbalance Valve	Remove / Install		1.0				2	
50180	Winch pilot valve	Adjust Remove / Install	0.5	 3.0				1 2	
50190	Pump	Inspect Remove / Install		0.2	 8.0			 2	P
50200	Power Take Off	Inspect Remove / Install		0.5	 6.0			 2	P
50210	PTO Solenoid	Remove / Install		2.0				2	
50220	PTO Pressure Switch	Remove / Install		2.0				2	
50230	Cylinder Counterbalance Manifolds	Remove / Install		1.5				2	
600	**General Electrical System**	Inspect	2.0						P
60010	Harness	Remove / Install							V
60020	Military Plug	Remove / Install		0.2				2	
60030	Spade Plug Connection	Remove / Install		0.1				2	
60040	Cable Continuity Test	Test		1.5				2	
60050	Cable Shorting Test	Test		0.5				2	
60060	Voltage Drop Test	Test		0.5				2	
700	**Crane**	Inspect Remove / Install Repair	6.3	3.0	2.0			2, 6, 16, 17, 18, 19	P W
70010	Seat	Inspect Remove / Install		0.1 0.4				 2	P
70020	Seat Base and Foot Plate	Inspect Remove / Install		0.1 2.0				 2	P
70030	Rotate Coupling	Remove / Install			8.0			2	
70040	Stabilizer Leg	Inspect Remove / Install		0.2 1.5				 2	P

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			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
70050	Rotate Gear Assembly	Inspect Remove / Install		0.2	2.0			2, 22	P
70060	Rotate Gear, Brake Motor and Transmission	Remove / Install Repair			3.0		3.0	2, 22	F
70070	Stabilizer Arm	Inspect Remove / Install		0.2	16.0			2	P
70080	Lifting Cylinder	Inspect Remove / Install Repair		0.2	6.0		5.0	2	P CA
70090	Jib Cylinder	Inspect Remove / Install Repair		0.2	6.0		5.0	2	P CA
70100	Extension Cylinder De-pressurize	Remove / Install			0.3			2	
70110	Extension Cylinder Assembly	Inspect Remove / Install Repair		0.2	1.2		2.0	2, 20	P CA
70120	Extension Cylinders	Remove / Install Repair			0.5		5.0	2	CA
70130	Support Assembly Crane	Remove / Install			20.0			2	
70140	Boom Emergency Lowering Switch	Remove / Install Service			0.5 0.5			2	
70150	Boom Crane	Inspect Remove / Install Repair		0.2	16.0		5.0	2	P F
70160	Crane Base Assembly	Remove / Install			24.0			2	
70170	Electrical Junction Box	Inspect Remove / Install		0.1	8.0			2	P
70180	Emergency Operation Rotary Control Valve	Remove / Install			0.3			2	P
70190	Jib Housing	Inspect Remove / Install Repair		0.2	4.0		1.0	2	P F

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D	Code	
70200	Jib Extensions	Remove / Install Repair			2.3		 2.0	2	 F
70210	Lever Remote Control	Inspect Remove / Install		0.2	 3.0			 2	P
70220	Operator's Control Panel	Inspect Remove / Install Repair		0.1	 2.0		 2.0	 2	P F
70230	PCB Junction Box	Inspect Remove / Install		0.1	 5.0			 2	P
70240	Stabilizer Control Panel	Inspect Remove / Install		0.1	 0.3			 2	P
70250	Crane/Stabilizer Flow Control Valve	Remove / Install			0.5			2, 11, 12	
70260	Stabilizer Extension and Leg Controls	Inspect Remove / Install		0.2	 4.0			2	P
70270	Preferred Position for Maintenance	Align			0.5				
70280	Stabilizer Extension Proximity Switch	Inspect Remove / Install		0.1	 1.0			2	
70290	Stabilizer Extension Controls (Proximity Switch)	Inspect Remove / Install		0.1	 0.1			 2	
70300	Stabilizer Leg Pressure Switch	Remove / Install			0.2			2	
70310	Valve Control Block	Inspect Remove / Install		0.2	 8.0			 2, 16, 17, 18, 19	
70320	Valve Control Block Pressure Release Valve	Inspect Remove / Install		0.2	 0.5			 2, 16, 17, 18, 19	
70330	Valve Control Block Solenoid Dump Valve	Remove / Install Test			0.2 0.1			2, 22	
70340	Stabilizer Valve Control Block	Inspect Remove / Install		0.2	 3.0			 2, 16, 17, 18, 19	P
70350	Jib Cylinder Brake Valve	Inspect Remove / Install		0.2	 3.0			 2	P

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			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
70360	Jib Cylinder (Retract) Load Holding Valve	Inspect Remove / Install		0.2	3.0			2	P
70370	Jib Cylinder (Extend) Load Holding Valve	Inspect Remove / Install		0.2	3.0			2	P
70380	Lifting Cylinder Brake Valve	Inspect Remove / Install		0.2	3.0			2	P
70390	Lifting Cylinder Load Holding Valve	Inspect Remove / Install		0.2	3.0			2	P
70400	Lifting Cylinder Pilot Operated Check Valve	Inspect Remove / Install		0.2	3.0			2	P
70410	Jib Extension Cylinders Load Holding Valve	Inspect Remove / Install		0.2	0.5			2	P
70420	Pressure Transducer	Inspect Remove / Install		0.2	1.5			2	P
70430	Rotate Motor Load Holding Valve	Remove / Install			3.0			2	P
70440	Electrical Harness	Inspect Remove / Install		0.2	0.5			2	P
70450	Rotate Gear Oil Change	Remove / Install	1.0					2	
70460	Load Hook	Remove / Install	0.5					2	
70470	Fuses	Remove / Install	0.5					1	
70480	Indicator Filament	Remove / Install	0.5					1	
70490	Hand Lever Filament	Remove / Install	0.5					1	
800	**Tail Lift**	Inspect Service Remove / Install Repair	1.3 0.5	1.8	6.0			2	P W
80010	Cylinder	Inspect Remove / Install Repair		0.1 1.5			3.0	2	P CA
8001010	Cylinder Bellows	Remove / Install	1.0					2	
80020	Platform	Inspect Remove / Install		0.1 1.5				2	P

(1) Group Number	(2) Component/ Assembly	(3) Maint. Function	(4) Maintenance Level					(5) Tool or Test Equipment Reference Code	(6) Remarks
			Field			Sustainment			
			Unit		Direct Support	General Support / SRA	Depot / SRA		
			C	O	F	H	D		
80030	Electrical Harness	Inspect Remove / Install		0.2 2.0				2	P
80040	Solenoid Valve	Inspect Remove / Install		0.2 0.5				2	P
80050	Swing arm	Inspect Remove / Install		0.1			1.0		P F
80060	Lifting arm	Inspect Remove / Install		0.1			1.0		P F
80070	Light Installation	Remove / Install		0.5				2	P
80080	Tail Lift Manifold Assembly	Inspect Remove / Install Repair		0.2	1.0		2.0	2	P F
80090	Electrical Junction Box	Inspect Remove / Install		0.2	1.5			2	P
8009010	Electrical Relays and Diode Block	Remove / Install			1.5			2	
80100	Mounting bracket	Remove / Install			4.0			2	
80110	Cradle Buffer Pad	Remove / Install	1.0					1,7	
80120	Tail Lift Pendant	Inspect Remove / Install		0.2	1.5			2	P
8012010	Tail Lift Pendant Harness	Remove / Install		1.5				2,22	P A
8012020	Tail Lift Pendant Emergency Stop	Remove / Install		1.0				2	P
8012030	Tail Lift Pendant Control Switch	Remove / Install		1.0				2, 22	P A
900	**General Mechanical**								
90010	Flat Rack Wooden Buffer	Remove / Install	1.0					1	
90020	Tirfor Winch	Inspect Service	0.4 0.5					1	P
90030	Thread Inserts	Remove / Install		1.0				2, 22	
990	**Special Tools**								
99010	Pneumatic Hammer	Inspect Service	0.2 0.2					1	P

4 Tools and Test Equipment Chart

Table 2 lists the tool sets, special tools, common test equipment and special test equipment, required for each maintenance function, as referenced from the maintenance levels in column 4 of the MAC.

Table 2 Tools and Test Equipment Chart

Tool or Test Equipment Reference Code	Maintenance Level	Nomenclature	National Stock Number	Tool Number
1	C	Basic Issue Items	TBA	TBA
2	O, F	Tool Kit, General Mechanic's: Automotive	5180-00-177-7033	SC 5180-90-N26
3	O, F	Launch Beam Peg Socket	5120-99-582-5640	G416/4773/1
4	O, F	Adjustable Wrench	TBA	G419/5012/59
5	O, F	BSE Peg Wrench	5120-99-833-2481	G416/4773/4
6	C, O, F	Crane Mounting Pin Extractor	5120-99-186-9110	G418/4615/8
7	C, O, F	Allen Keys Metric	TBA	G419/5012/58
8	C, O, F	Pin Punch Set	TBA	G419/5012/57
9	O, F	Bearing Locknut Socket	5120-99-243-2280	G816/4969/4
10	O, F	Wrench 36mm	TBA	G816/4969/12
11	O, F	Wrench 41mm	TBA	G816/4969/13
12	O, F	Wrench 46mm	TBA	G816/4969/14
13	O, F	Hook Wrench HN17	5120-99-984-7875	G816/4969/3
14	O, F	Hook Wrench HN15	5120-99-549-5514	G816/4969/2
15	O, F	Hook Wrench HN11	5120-99-856-3850	G816/4969/1
16	O, F	Pressure Gauge, 63mm, 400 BAR (4424 psi), (30495 kPa)	TBA	SMD20-G1/4-400
17	O, F	Gauge Adapter	TBA	SMK20 - G 1/8 - PC
18	O, F	Test Coupling With Cap	TBA	SMK20 - G 1/8 - PC
19	O, F	Test Hose Gauge Adapter	TBA	SMS 20/M - 400A
20	O, F	Shop Equipment Automotive maintenance and Repair: OM Common #1 (SC 4910-95-CL-A74)	4910-00-754-0654	W32593
21	O, F	Shop Equipment Automotive maintenance and Repair: OM Common #2 (SC 4910-95-A72)	4910-00-754-0650	W32730
22	O, F	Shop Set Contact Maintenance Truck HMMWV	4940-01-333-8470	SC4940-95-B25
23	C, O, F	Snatch Block	TBA	G816/4969/9
24	C, O, F	3 Tonne Soft Sling	TBA	G816/4969/10

5 Instructions and Notes

The **Remarks** column of Table 3 contains supplemental instructions and explanatory notes for particular maintenance functions. The letters in the **Reference Code** column, refer to corresponding letters in the **Remarks** column [column (6)] of the MAC.

Table 3 Instructions and Notes

Reference Code	Remarks
P	See PMCS in Chapter 5 Unit Maintenance for inspection details.
W	Only welding authorized in appendix K should be carried out on the DSB system. All other welding should only be carried out at the contractor's premises under a Contractor Logistic Support contract, by WFEL, Stockport England.
F	All General Support and Depot Support procedures are to be carried out under a Specialized Repair Activity (SRA) contract at WFEL Stockport England.
T	Time not specified, a general procedure applicable to more than one assembly or component.
LB	See launch beam entries for specific procedure timings.
V	Variable times see the specific MAC component.
CA	Cylinder Assemblies should be returned to WFEL, Stockport England complete with any associated Hydraulic and Pipe Assemblies for SRA.
A	Refer to AAL for Heat Gun designation and part number.

6 Expendable and durable items

Table 4 lists expendable and durable supplies and materials needed to operate and maintain the DSB.

EXPLANATION OF COLUMNS.

a. Column (1) - National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisitely the item.

b. Column (2) - Description. Indicates the item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.

c. Column (3) - Unit of Measure. Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in. or pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

d. Column (4) – Remarks. Gives a brief description of where the item is to be used.

Table 4 Expendable and durable items

NSN (1)	Description (2)	U/M (3)	Remarks (4)
	Grease, Automotive And Artillery (70878) 5542P (81349) MIL-G-10924		All grease fittings
9150-01-197-7688	2.25 oz tube	OZ	
9150-01-197-7690	1.75 lb can	LB	
9150-01-197-7689	6.5 lb can	LB	

NSN (1)	Description (2)	U/M (3)	Remarks (4)
	Lubricating Oil, Gear GO 80W/90 (81349) MIL-L-2105		Normal use: Main reservoir, Beam drive gearbox, Crane rotate gear, winches
9150-01-035-5392	1 quart can	Qt	
9150-01-313-2191	1 gallon can	GAL	
9150-00-001-9395	5 gallon can	GAL	
	Lubricating Oil, Gear GO 75W (81349) MIL-L-2105		Arctic use: Main reservoir, Beam drive gearbox, Crane rotate gear, winches
9150-01-035-5390	1 quart can	Qt	
9150-01-048-4593	1 gallon can	GAL	
9150-01-035-5391	5 gallon can	GAL	
	Lubricating Oil, Engine OE/HDO 40 (81349) MIL-L-2104		Normal use: Beam drive brake, Crane oil can points, Twist locks, Pneumatic hammer
9150-00-189-6730	1 quart can	Qt	
9150-00-188-9862	55 gallon drum	GAL	
9150-00-405-2987	Bulk	GAL	
	Lubricating Oil, Engine OEA (81349) MIL-L-46167		Arctic use: Beam drive brake, Crane oil can points, Twist locks, Pneumatic hammer
9150-00-402-4478	1 quart can	Qt	
9150-00-402-2372	5 gallon can	GAL	
9150-00-491-7197	55 gallon can	GAL	
	Hydraulic Fluid Fire Resistant		MIL-H-46170B
9150-00-111-6256	MIL-H-46170B AM Type 1	Qt	
	Lubricating Oil, Engine OE/HDO 15W/40 (81349) MIL-L-2104		MIL-L-2104
9150-01-152-4117	1 quart can	Qt	
9150-01-178-4725	12 quart box	Qt	
9150-01-152-4118	5 gallon can	GAL	
9150-01-152-4119	55 gallon drum	GAL	
	Lubricating Oil, Engine OEA (81349) MIL-L-46167		MIL-L-46167
9150-00-402-4478	1 quart can	Qt	
9150-00-402-2372	5 gallon can	GAL	
9150-00-491-7197	55 gallon can	GAL	
	Antiseize Compound (81349) MIL-A-907		Antiseize Compound
8030-00-155-6444	16 oz aerosol can	Oz	
	Antiseize Compound (81349) MIL-A-907		Antiseize Compound
8030-00-251-3980	1 lb can	LB	
	Antiseize Compound, High Temperature (81349) MIL-A-907		Antiseize Compound
8030-00-597-5367	2-1/2 lb can	LB	

NSN (1)	Description (2)	U/M (3)	Remarks (4)
	Sealing Compound (05972) Loctite #242 (80244) MIL-S-46163A Type 2 Grade N		Loctite 242
8030-01-104-5392	10 ml bottle	Ml	
8030-01-014-5869	50 ml bottle	Ml	
8030-01-025-1692	250 ml bottle	Ml	
8030-01-475-2444	250 cc bottle Thread Locking Compound Loctite 243		Loctite 243
8030-01-475-2007	250 cc bottle Multi-gasket Loctite 574		Loctite 574
8030-01-488-4272	50 cc Adhesive Loctite 641		Loctite 641
8030-01-388-5604	1.75 fl oz Primer - activator Loctite T7471		Loctite T7471
3439-00-555-4629	Solder lead-Tin Alloy, Rosin Core 1lb Spool (15434) 3823494	LB	
4710-01175-2368	Tube Heat Shrink (75078) 003708 0.250 x 0750 inches	As Req'd	
5970-00-812-2969	Insulation sleeving RNF100-1/8-0-20mm (Raychem)	As Req'd	
3439-01-074-9983	Solder Rosen Core (QQ-S-571)	SP	

APPENDIX C

Torque Limits

The following table shows the torque limits applicable to the DSB. The bolt sizes are metric and the torque settings are in pounds/feet (lbs/ft).

Table 1 Torque Limits

STEEL HEXAGON BOLTS TO BS 3692 AND CAP SCREWS TO BS 4168					STAINLESS STEEL HEX HD BOLTS TO BS 3692	
BOLT SIZE	ZINC PLATE AND PASSIVATE		SELF COLOR UNLUBRICATED		UNLUBRICATED	
GRADE	8.8	12.9	8.8	12.9	A270	A280
M6	9	15	8	13	6	8
M8	22	37	20	33	14	19
M10	44	74	40	68	29	39
M12	76	128	69	116	49	66
M16	185	313	169	286	122	163
M20	280	641	346	585	248	331
M24	650	1097	590	997	-	-

NOTE

Tapped holes in steel. The torque values in the table only apply when the fully engaged thread length is 1.5 X the thread diameter or greater.

Tapped holes in aluminium. The torque values in table only apply when the fully engaged thread length is 3 X the thread diameter or greater in conjunction with a thread insert.

APPENDIX D

Launcher Hydraulic and Electric Assembly Location Drawings

The following drawings are relevant to the Launcher Hydraulic and Electrical System:

Figure Number	FIGURE TITLE	Page Number
1	Launcher Hydraulic and Electrical Assembly Locations Left Hand Side	5
2	Launcher Hydraulic and Electrical Assembly Locations Right Hand Side	7
3	A-Frame Hydraulic Assembly Locations	9
4	A-Frame Electrical Assembly Locations	11
5	Launch Frame Hydraulic and Electrical Assembly Locations	13
6	Slide Frame Hydraulic Assembly Locations	15
7	Slide Frame Electric Assembly Locations Slide Frame	17
8	Chassis Hydraulic and Electric Assembly Locations	19
9	Tail Lift Hydraulic and Electric Assembly Locations	21

Introduction

(1) The following figures show the locations of the hydraulic and electrical assemblies of the Dry Support Bridge.

(2) Each figure item is annotated with an item number. The item name is detailed in a table and cross referenced in the table by the item number.

(3) The table shows:

a. The item number for cross-referencing to and from the figure.

b. The item name.

c. The major assembly the hydraulic or electrical component is attached to.

d. A remarks column for special instructions or comments.

Table 1 LAUNCHER HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS LEFT HAND SIDE

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Cross Connection Pump	Vehicle Chassis	
2	DSB Crane	Vehicle Chassis	
3	Emergency Stop	Launch Frame	
4	Articulator Cylinder	Launch Frame and Slide Frame	
5	Launch Beam Drive Manifold Assembly	Launch Beam Drive	
6	Articulator Stow Cylinder	Launch Frame and Articulator Cylinder	
7	Pinch / Roll Stow Manifold Assembly	Launch Frame	
8	Upper Winch Rope Tensioner and Limit Switch	Launch Frame	
9	Pilot Manifold Assembly	Launch Frame	
10	Launcher Main Control Enclosure	Launch Frame	
11	Raise Cylinder	A-Frame	
12	Emergency Stop and Connection Point for Chest Pack	A-Frame Lower Leg	
13	Lower Winch and Winch Rope Tensioner	Launch Frame	

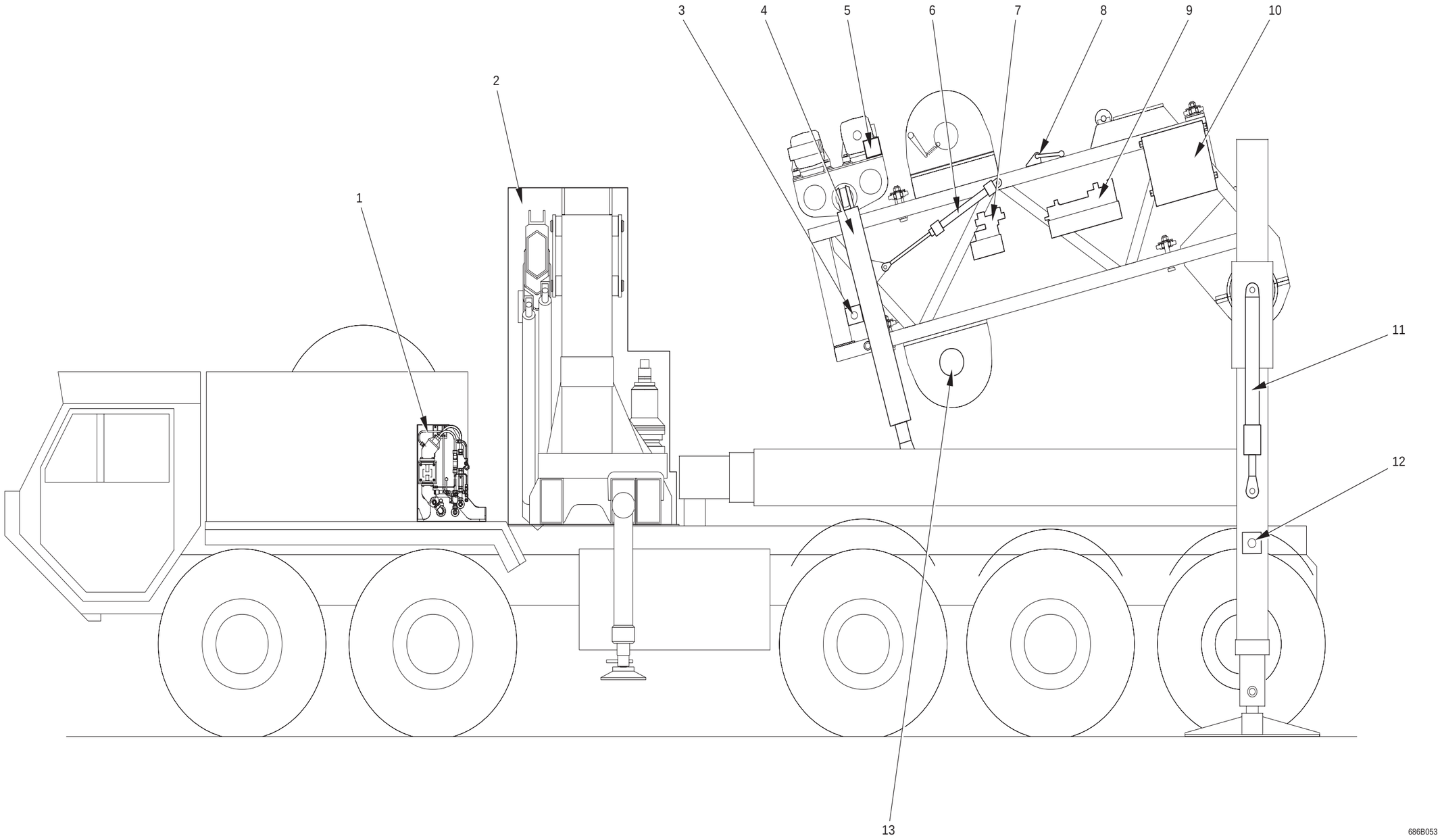


Figure 1 LAUNCHER HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS LEFT HAND SIDE

Table 2 LAUNCHER HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS RIGHT HAND SIDE

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Winch Manifold Assembly	Launch Frame	
2	Articulator Manifold Assembly	Launch Frame	
3	Articulator Stow Cylinder	Launch Frame and Articulator Cylinder	
4	Upper Winch and Winch Rope Tensioner	Launch Frame	
5	Launch Beam Drive Gearbox	Launch Frame	
6	Launch Beam Drive Motor	Launch Frame	
7	Articulator Cylinder	Launch Frame and Slide Frame	
8	Emergency Stop	Launch Frame	
9	Hydraulic Fluid Level Sensor	Vehicle Hydraulic Reservoir	
10	Hydraulic Fluid Shut Off Tap (Butterfly Valve)	Vehicle Hydraulic Reservoir	Shut-Off Tap for hydraulic fluid supply to hydraulic pump.
11	Power Take Off	Vehicle Gearbox	
12	Hydraulic Pump	Vehicle Gearbox	
13	Hydraulic Interface Manifold Assembly and Hydraulic Filters	Chassis	
14	Operator's Interface Cabinet	Chassis	
15	Back-up Mode Operation Controls	A-Frame Lower Leg	
16	Emergency Stop and Connection Point for Chest Pack	A-Frame Lower Leg	
17	Raise Cylinder	A-Frame	

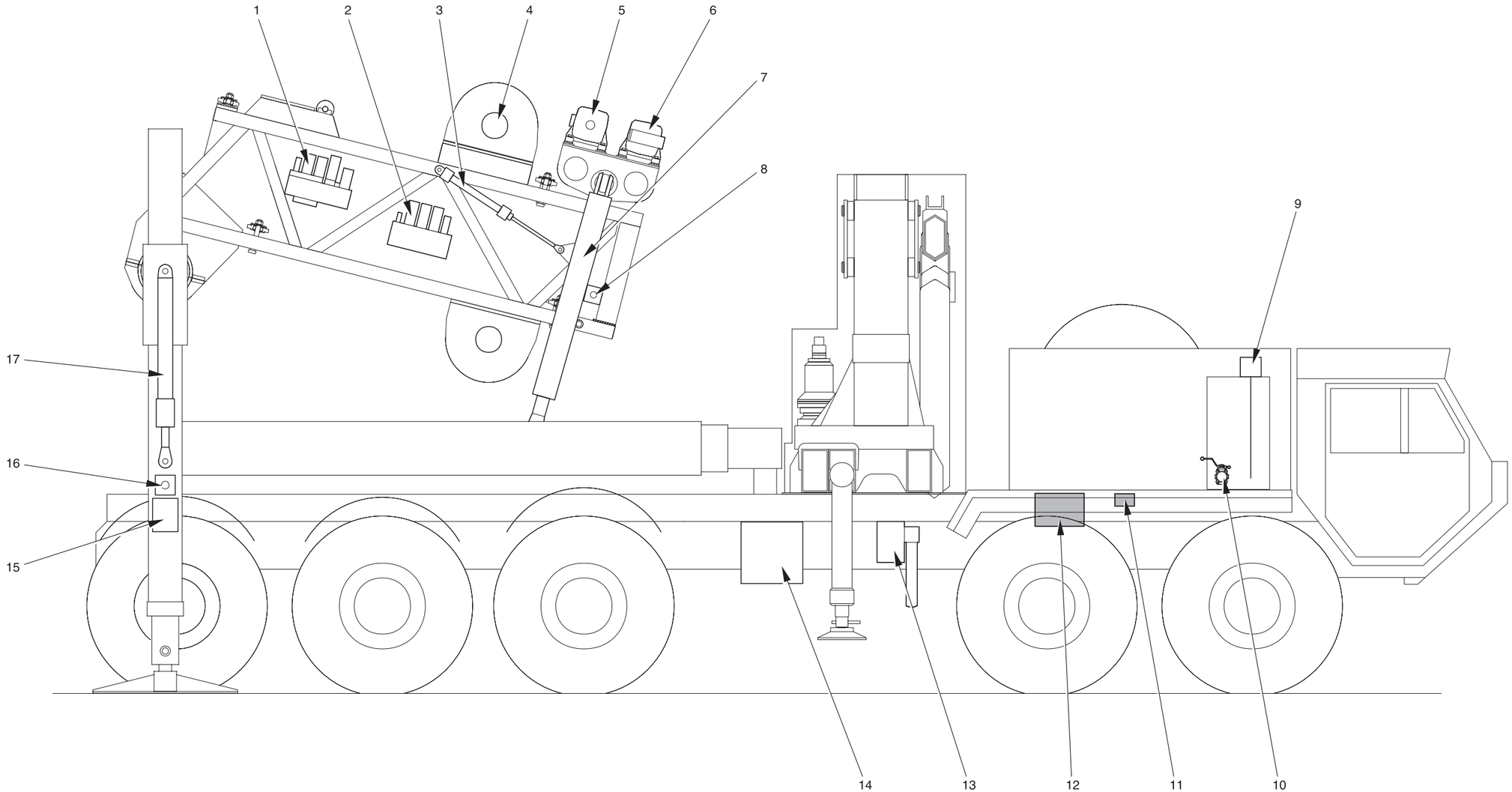


Figure 2 LAUNCHER HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS RIGHT HAND SIDE

Table 3 A-FRAME HYDRAULIC ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Left Hand Outer Roller Brake Motor	A-Frame	
2	Left Hand Inner Roller Brake Motor	A-Frame	
3	Right Hand Outer Roller Brake Motor	A-Frame	
4	Right Hand Inner Roller Brake Motor	A-Frame	
5	Raise Cylinder	A-Frame	
6	Back-up Mode Operation Controls	A-Frame	
7	Stabilizer Cylinder	A-Frame	
8	Folding Cylinder	A-Frame	
9	Folding Cylinder	A-Frame	
10	Stabilizer Manifold	A-Frame	Operator's controls for stabilizer legs
11	Stabilizer Cylinder	A-Frame	
12	Raise Cylinder	A-Frame	
13	Shuttle Valve	A-Frame	

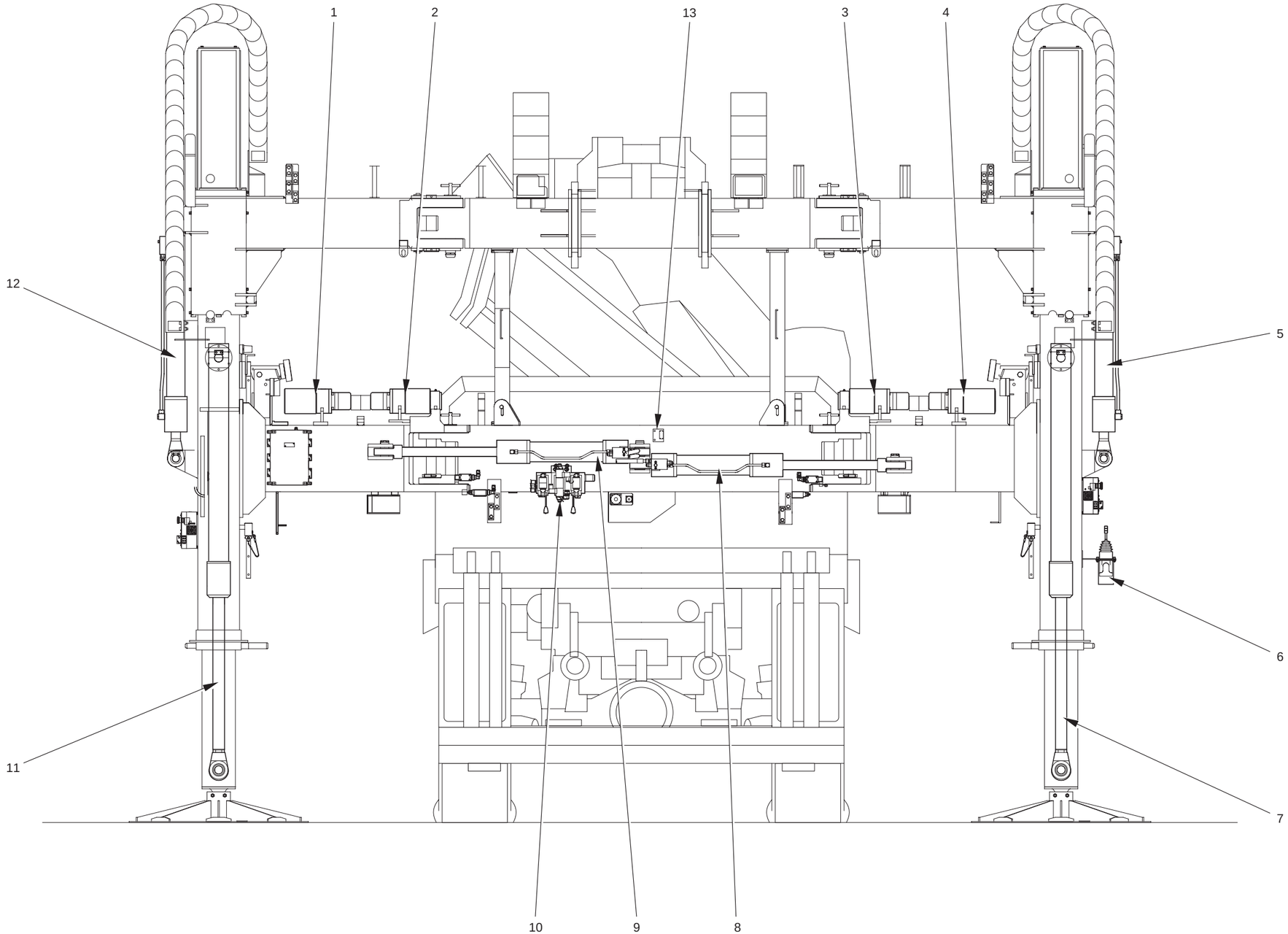


Figure 3 A-FRAME HYDRAULIC ASSEMBLY LOCATIONS

Table 4 A-FRAME ELECTRICAL ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Electrical Harness	From Launch Main Control Enclosure to A-Frame break point	Appendix H Figure 21
2	Electrical Harness	From Launch Main Control Enclosure to A-Frame break point	Appendix H Figure 23
3	Stabilizer Manifold Solenoid Valve	Stabilizer Manifold	SV20b
4	Right Hand Inner Roller Brake Motor Solenoid	A-Frame	SV21c
5	Right Hand Outer Roller Brake Motor Solenoid	A-Frame	SV21d
6	Emergency Stop and Connection Point for Chest Pack	A-Frame Lower Leg	
7	Micro Switch A-Frame Unfold	A-Frame	
8	Micro Switch A-Frame Rotate	A-Frame	
9	Stabilizer Manifold Solenoid Valve	Stabilizer Manifold	SV20a
10	Micro Switch A-Frame Fold Open	A-Frame	
11	Micro Switch A-Frame Fold Closed	A-Frame	
12	Electrical Harness	From A-Frame Junction Box to A-Frame limit switches	Appendix H Figure 19
13	Electrical Harness	From A-Frame Junction Box to A-Frame lower bulkhead	Appendix H Figure 17
14	Electrical Harness	From A-Frame Junction Box to A-Frame upper break point	Appendix H Figure 20
15	Electrical Harness	From A-Frame Junction Box to A-Frame upper break point	Appendix H Figure 22
16	Electrical Harness	From A-Frame Junction Box to A-Frame Left Hand Emergency Stop	Appendix H Figure 28
17	Emergency Stop and Connection Point for Chest Pack	A-Frame Lower Leg	
18	Electrical Harness	From A-Frame Junction Box to A-Frame upper break point	Appendix H Figure 14
19	Electrical Harness	From A-Frame Junction Box to A-Frame upper break point	Appendix H Figure 15 (Ground strap)
20	A-Frame Electrical Junction Box	A-Frame	
21	Electrical Harness	From launch frame enclosure to A-Frame break point	
22	Left Hand Outer Roller Brake Motor Solenoid	A-Frame	SV21a
23	Left Hand Inner Roller Brake Motor Solenoid	A-Frame	SV21b

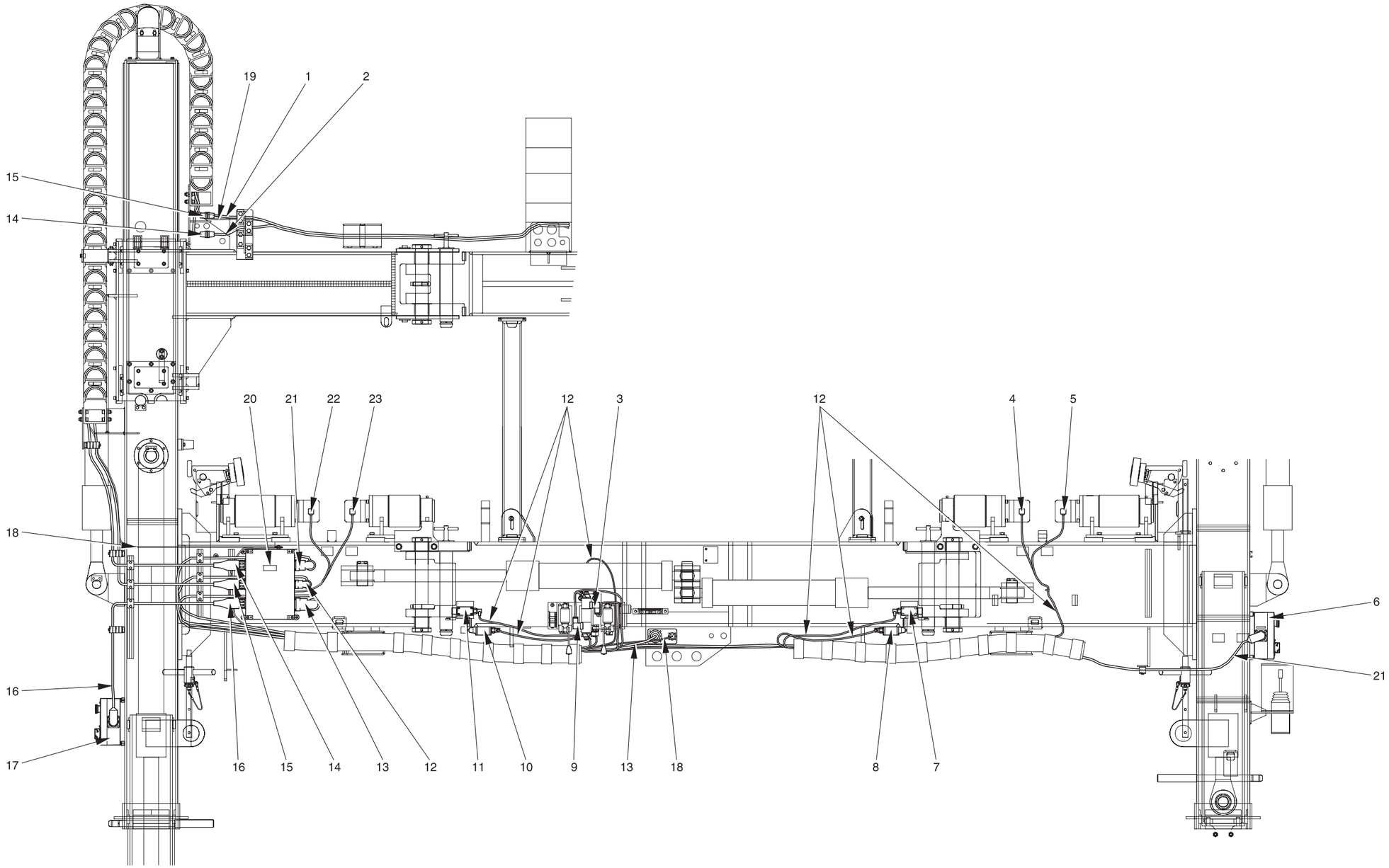


Figure 4 A-FRAME ELECTRICAL ASSEMBLY LOCATIONS

Table 5 LAUNCH FRAME HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Right hand Upper Emergency Stop	Launch Frame	
2	Electrical Harness	From Launch Main Control Enclosure to Right Hand Upper Emergency Stop and Upper winch rope tension switch	Appendix H Figure 27
3	Articulator Manifold Assembly	Launch Frame	
4	Winch Manifold Assembly	Launch Frame	
5	Electrical Harness	From Launch Main Control Enclosure to Articulator Manifold and Winch Manifold	Appendix H Figure 25
6	Upper winch rope tension limit switch	Launch Frame	
7	Launcher Interface Enclosure	Launch Frame	
8	Electrical Harness	From Launch Main Control Enclosure to Ground	Appendix H Figure 15
9	Electrical Harness	From Launch Main Control Enclosure to Lower A-Frame Junction Box via break point	Appendix H Figure 23
10	Electrical Harness	From Launch Main Control Enclosure to Lower A-Frame Junction Box via break point	Appendix H Figure 21
11	Launch Frame Pilot Manifold Assembly	Launch Frame	
12	Electrical Harness	From Launch Main Control Enclosure to Pilot Manifold and Pinch / Roll Stow Manifold	Appendix H Figure 24
13	Pinch / Roll Stow Manifold Assembly	Launch Frame	
14	Electrical Harness	From Launch Main Control to Left Hand Upper Emergency Stop	Appendix H Figure 26
15	Left hand Upper Emergency Stop	Launch Frame	
16	Connection Point for Chest Pack	From Launch Main Control Enclosure	

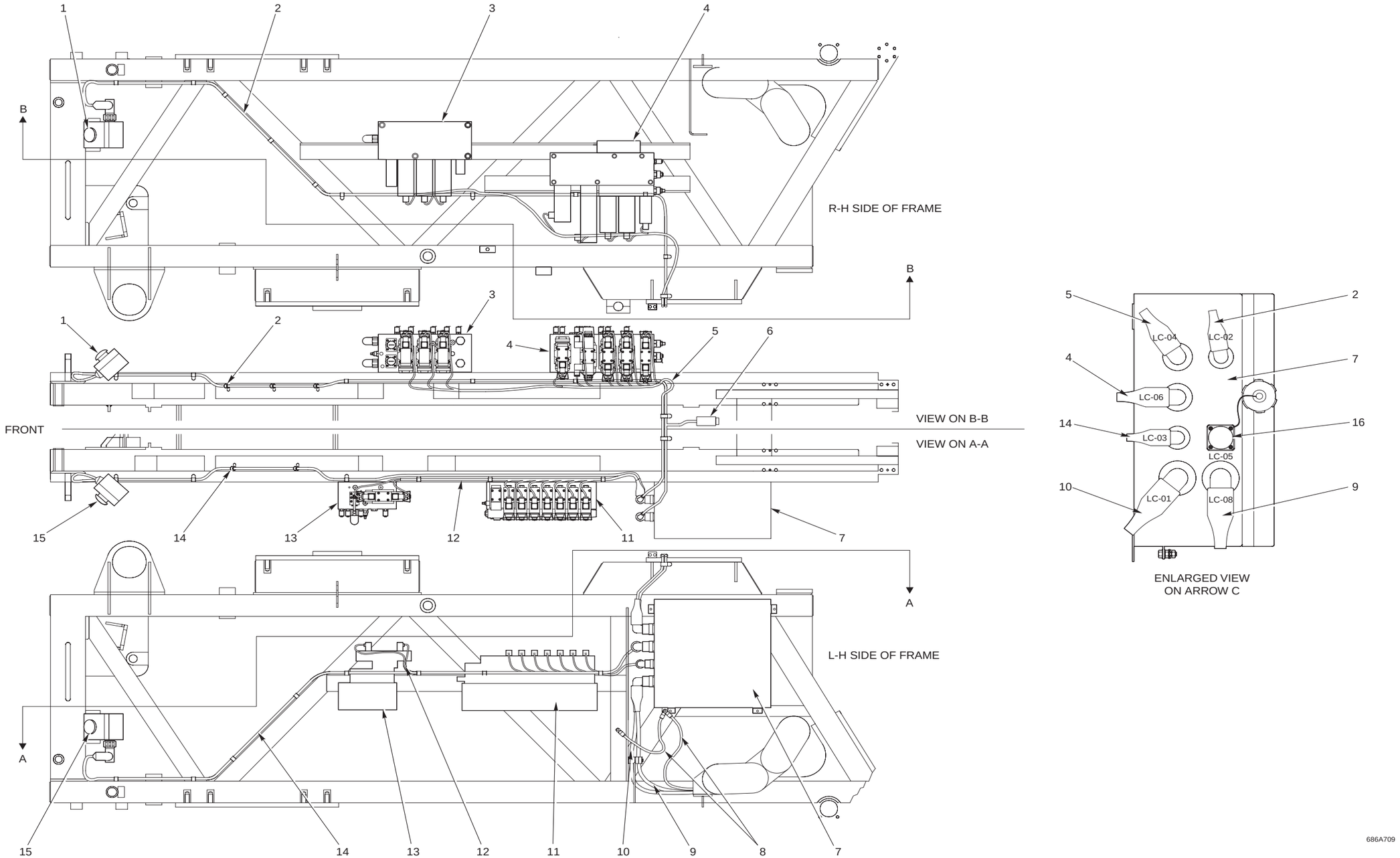
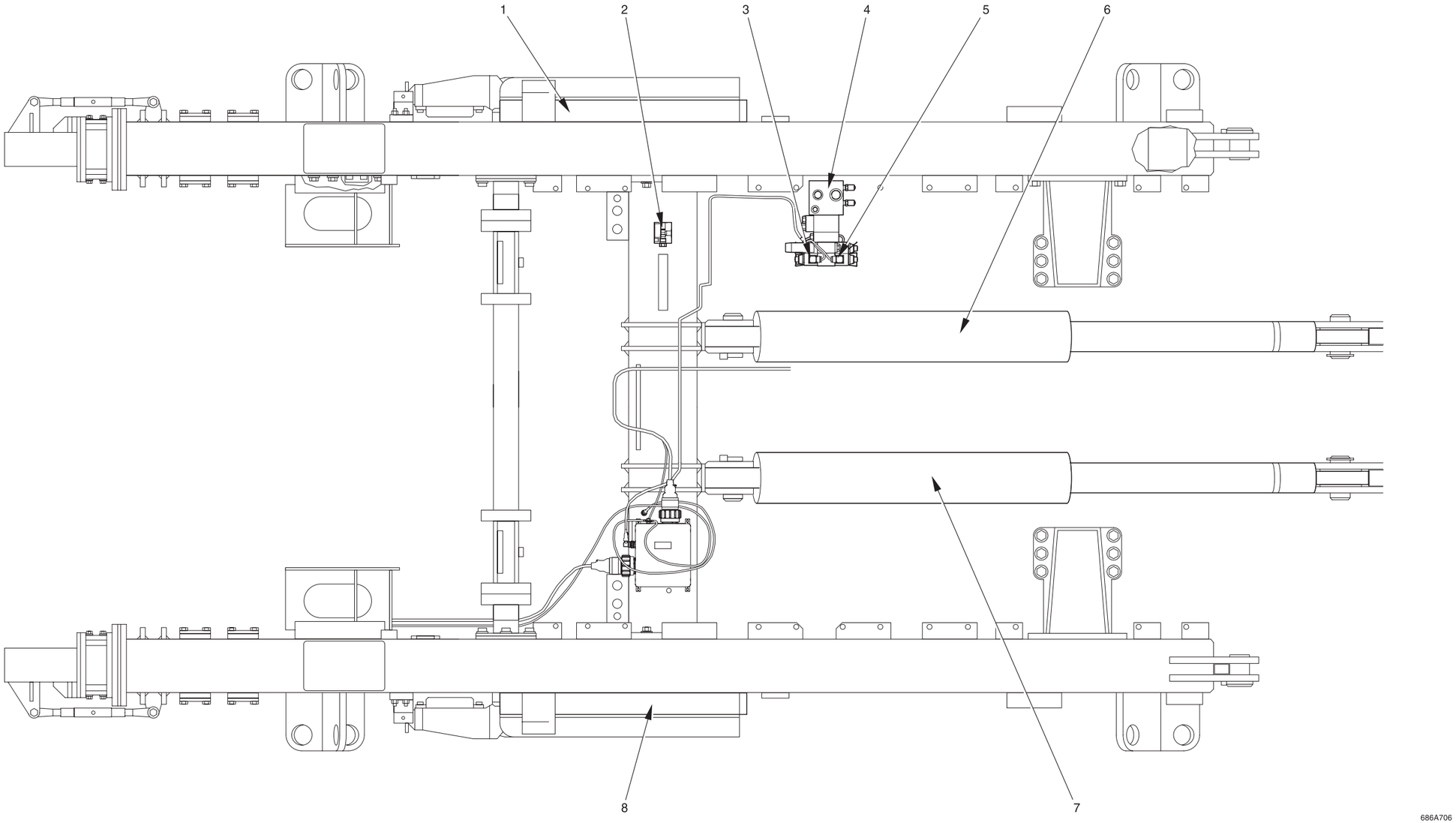


Figure 5 LAUNCH FRAME HYDRAULIC AND ELECTRICAL ASSEMBLY LOCATIONS

Table 6 SLIDE FRAME HYDRAULIC ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Right Hand Tilt Roller Assembly	Slide Frame	
2	Shuttle Valve	Rotate Cylinder Cross Member	
3	A-Frame Rotate Manifold Solenoid Valve	A-Frame Rotate Manifold Assembly	SV18a and SV19a
4	A-Frame Rotate Manifold Assembly	Slide Frame	
5	A-Frame Rotate Manifold Solenoid Valve	A-Frame Rotate Manifold Assembly	SV18b and SV19b
6	A-Frame Rotate Cylinder	Rotate Cylinder Cross Member and A-Frame	
7	A-Frame Rotate Cylinder	Rotate Cylinder Cross Member and A-Frame	
8	Left Hand Tilt Roller Assembly	Slide Frame	



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Figure 6 SLIDE FRAME HYDRAULIC ASSEMBLY LOCATIONS

Table 7 SLIDE FRAME ELECTRIC ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Electrical Harness	From Slide Frame Junction Box to A-Frame	Appendix H Figure 16
2	Electrical Harness	From Slide Frame Junction Box to A-Frame Rotate Manifold Assembly	Appendix H Figure 11
3	A-Frame Rotate Manifold Solenoid Valve	A-Frame Rotate Manifold Assembly	SV18a and SV19a
4	A-Frame Rotate Manifold Solenoid Valve	A-Frame Rotate Manifold Assembly	SV18b and SV19b
5	Slide Frame Junction Box	Rotate Cylinder Cross Member	
6	Electrical Harness	From Slide Frame Junction Box to Ground	Appendix H Figure 12
7	Electrical Harness	From Chassis Junction Box to Slide Frame Junction Box	Appendix H Figure 7
8	Electrical Harness	From Slide Frame Junction Box to Ground	Appendix H Figure 10

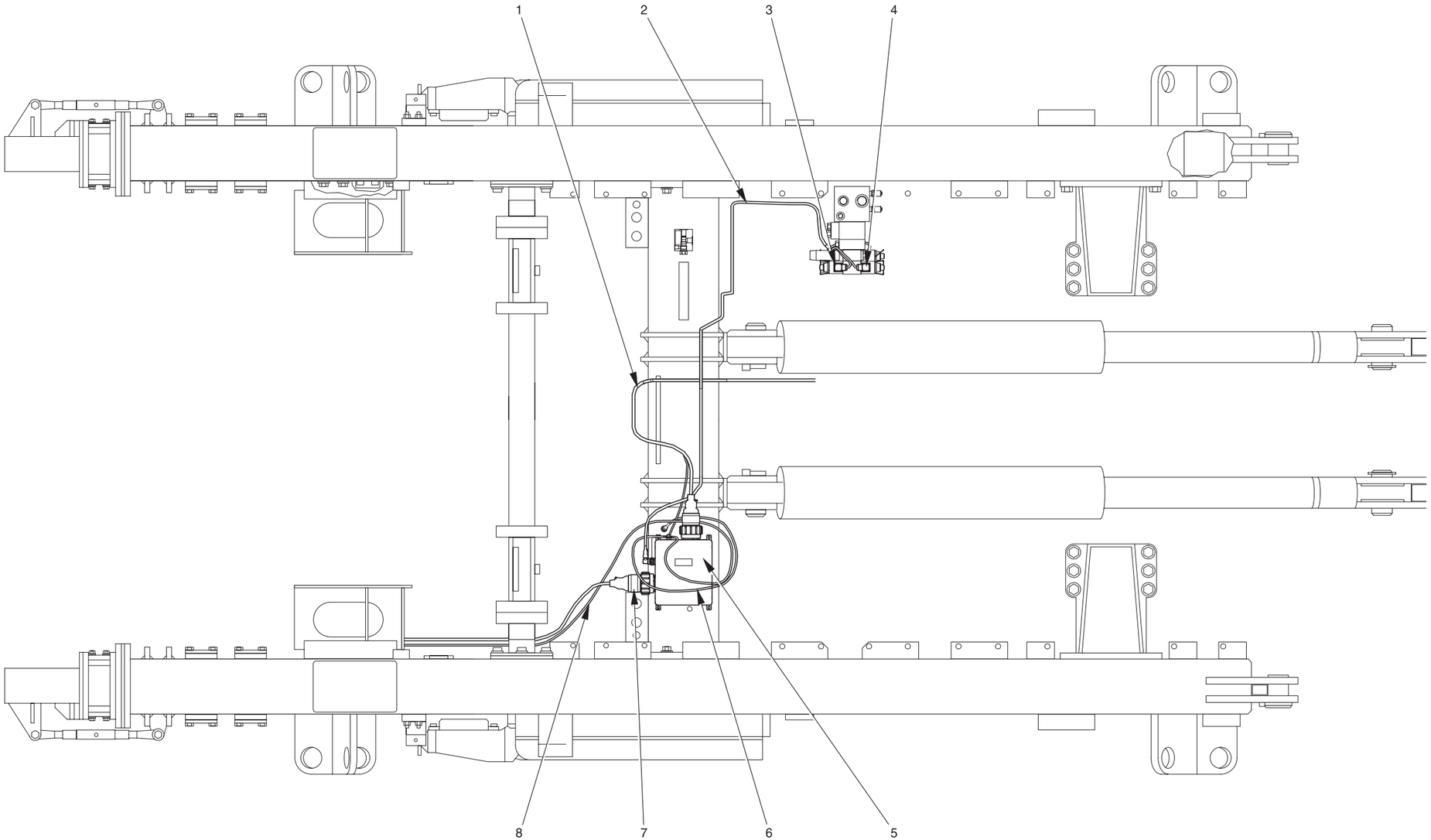


Figure 7 SLIDE FRAME ELECTRIC ASSEMBLY LOCATIONS

Table 8 CHASSIS HYDRAULIC AND ELECTRIC ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	4 Position Switch	Vehicle Drivers Cab	
2	Hydraulic Fluid Reservoir	Vehicle	
3	Power Take Off Pressure Switch	Power Take Off	
4	Hydraulic Interface Manifold Assembly and Hydraulic Filters	Chassis	
5	Electric Harness	Interface Enclosure to Oil Filters and Relax Solenoid	Appendix H Figure 5
6	Operator's Interface Cabinet	Chassis	
7	Electric Harness	From Interface Enclosure to Vehicle Chassis	Appendix H Figure 32
8	Electric Harness	From Interface Enclosure to Chassis Junction Box	Appendix H Figure 6
9	Tail Lift Manifold	Chassis	Fitted With Solenoid Valves SV30a and SV30b
10	Tail Lift Junction Box	Tail Lift	
11	Chassis Junction Box	Chassis	
12	Electric Harness	Suspension Load Up Solenoid to Chassis Junction Box and Tail Lift	Appendix H Figure 7
13	Suspend Load Up Solenoid	Chassis	
14	Relax Mechanism Micro Switches	Relax Mechanism	
15	Electric Harness	From Interface Enclosure to Relax Mechanism Limit Switches	Appendix H Figure 4
16	Electric Harness	From Interface Enclosure to Crane	Appendix H Figure 1
17	Crane Junction Box	Crane Base	
18	Electric Harness	From Interface Enclosure to Hydraulic Tank and Power Take Off Pressure Switch and Power Take Off Solenoid	Appendix H Figure 2
19	Power Take Off Solenoid	Power Take Off	
20	Electric Harness	From Interface Enclosure to Vehicle Cab	Appendix H Figure 3
21	Electric Harness	Chassis Junction Box to Slide Frame Junction Box	Appendix H Figure 8
22	Electric Harness	Chassis Junction Box to Tail Lift	Appendix H Figure 7
23	Electric Harness	Chassis Junction Box and Slide Frame Junction Box to Ground	Appendix H Figure 9

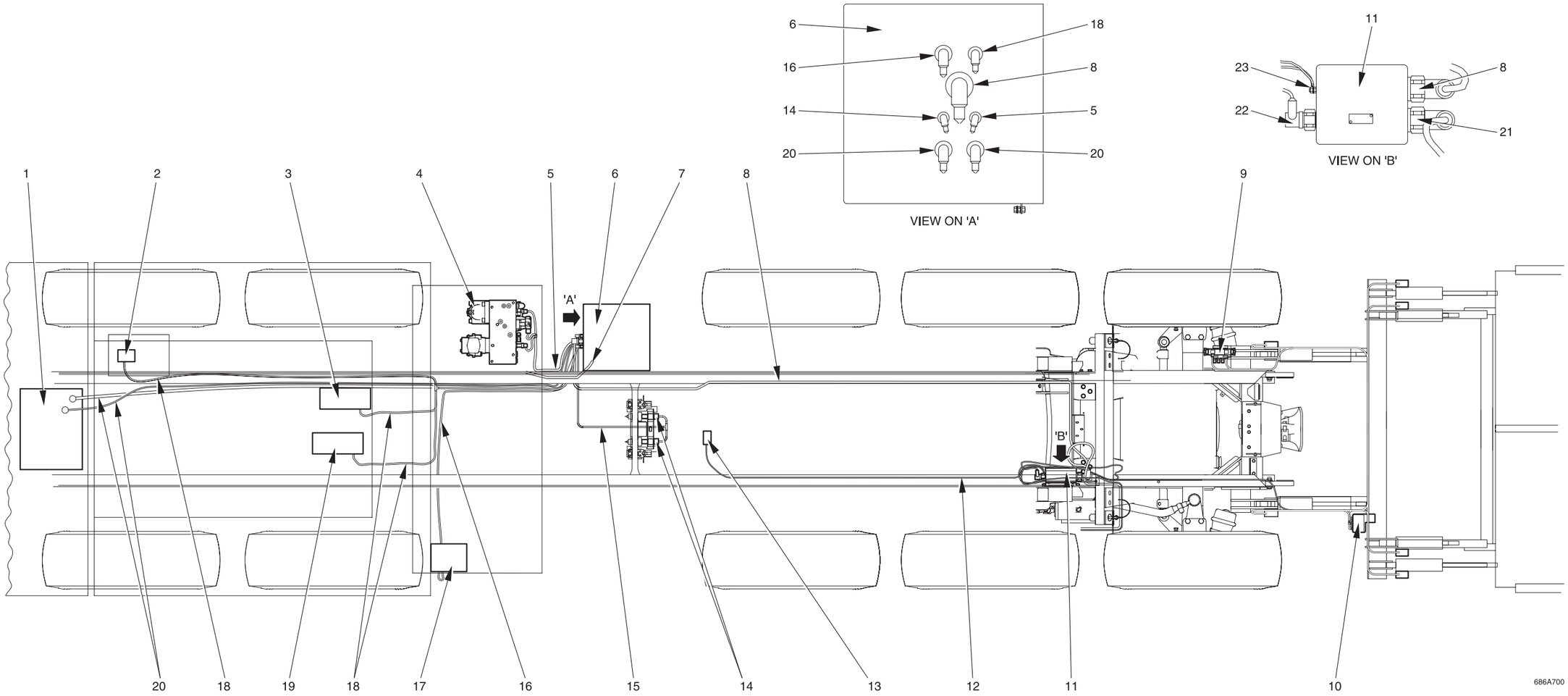
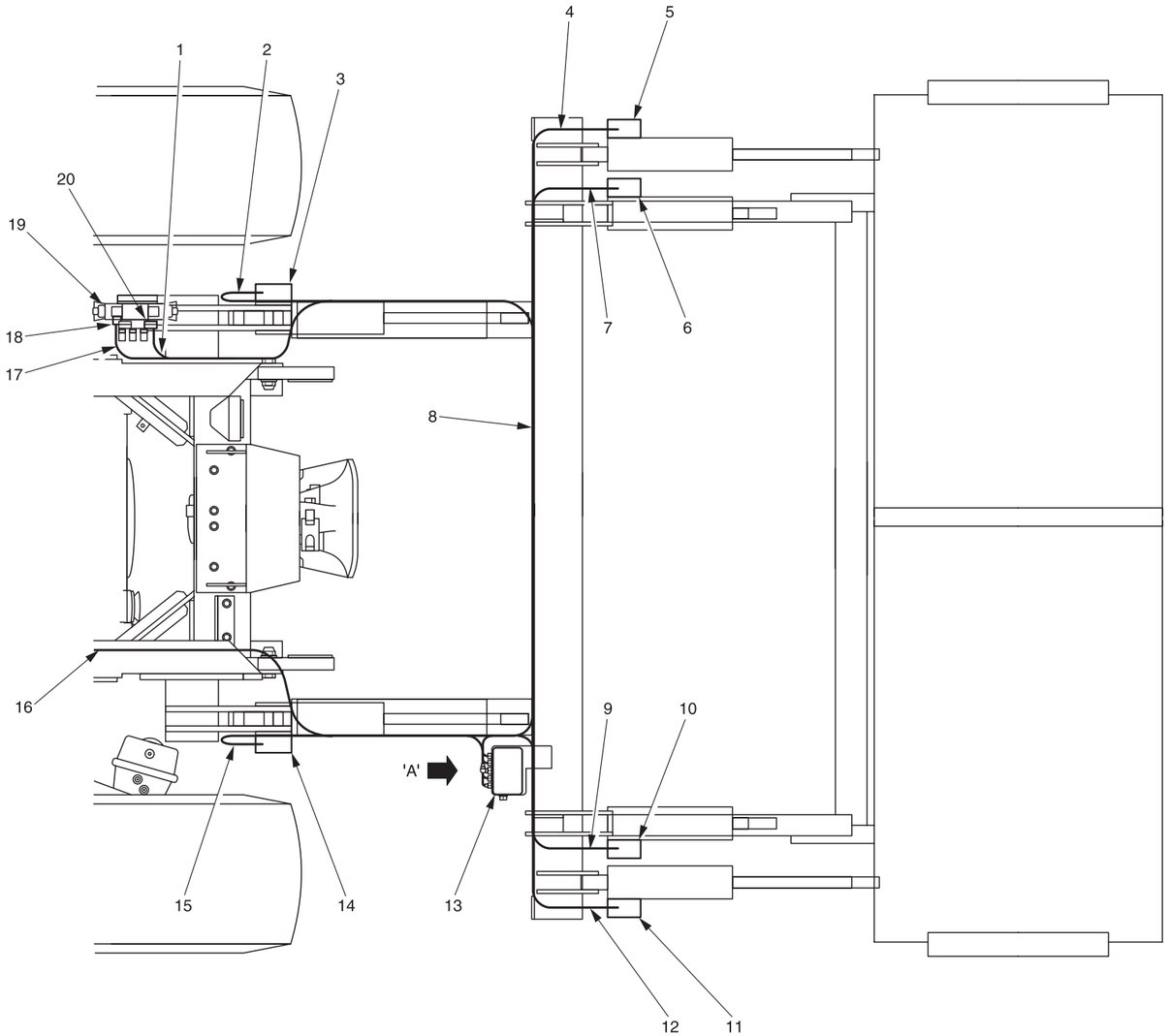
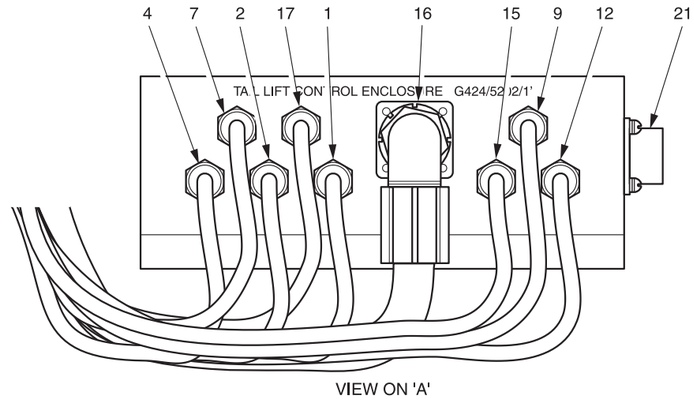


Figure 8 CHASSIS HYDRAULIC AND ELECTRIC ASSEMBLY LOCATIONS

Table 9 TAIL LIFT HYDRAULIC AND ELECTRIC ASSEMBLY LOCATIONS

ITEM NUMBER	ITEM NAME	ATTACHED TO MAJOR ASSEMBLY	REMARKS
1	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Right Hand Raise Cylinder Solenoid SV30b
2	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Right Hand Swing Cylinder Solenoid SV32
3	Right Hand Swing Cylinder and Solenoid Valve SV32	Tail Lift	
4	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Right Hand Tilt Cylinder Solenoid SV36
5	Right Hand Tilt Cylinder and Solenoid Valve SV36	Tail Lift	
6	Right Hand Lift Cylinder and Solenoid Valve SV34	Tail Lift	
7	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Right Hand Lift Cylinder Solenoid SV34
8	Electrical Harness	Tail Lift	Tail Lift Harness Run
9	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Left Hand Lift Cylinder Solenoid SV33
10	Left Hand Lift Cylinder and Solenoid Valve SV33	Tail Lift	
11	Left Hand Tilt Cylinder and Solenoid Valve SV35	Tail Lift	
12	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Leftt Hand Tilt Cylinder Solenoid SV35
13	Tail Lift Junction Box	Tail Lift	
14	Left Hand Swing Cylinder and Solenoid Valve SV31	Tail Lift	
15	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Left Hand Swing Cylinder Solenoid SV31
16	Electrical Harness	Tail Lift and Chassis	From Chassis Junction Box to Tail Lift Junction Box
17	Electrical Harness	Tail Lift	From Tail Lift Junction Box to Tail Lift Manifold Solenoid SV30a
18	Solenoid Valve SV30a	Tail Lift Manifold	
19	Tail Lift Manifold	Chassis	
20	Solenoid Valve SV30b	Tail Lift Manifold	
21	Tail Lift Pendant Connection Point	Tail Lift Junction Box	





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Figure 9 TAIL LIFT HYDRAULIC AND ELECTRIC ASSEMBLY LOCATIONS

APPENDIX E

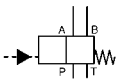
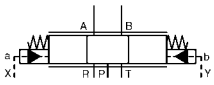
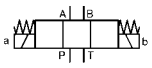
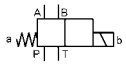
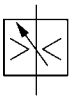
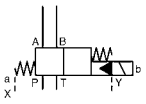
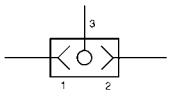
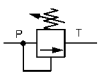
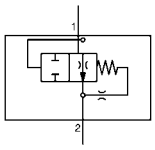
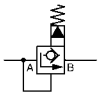
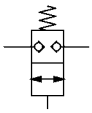
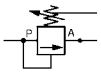
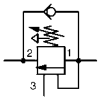
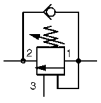
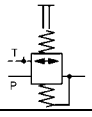
Launcher Hydraulic System Drawings

The following drawings are relevant to the Launcher Hydraulic System:

Figure Number	FIGURE TITLE	WFEL NUMBER	SHEET	ISSUE	Page Number
1	Launcher Hydraulic System Overview	686A002	1	1	5
2	Chassis Equipment	G406-8001	1 of 7	8	6
3	Slide Frame	G406/8001	2 of 7	8	7
4	A-Frame	G406/8001	3 of 7	8	8
5	Launch Frame Winches	G406/8001	4 of 7	8	9
6	Launch Frame Winches	G406/8001	5 of 7	8	10
7	Launch Frame Equipment	G406/8001	6 of 7	8	11
8	Launch Frame Equipment	G406/8001	7 of 7	8	12
9	Tail Lift Hydraulic Schematic	Not Provided	1	1	13

A guide to the component parts of the hydraulic system is provided over the page. The guide consists of the relevant hydraulic symbol, used in the hydraulic circuit diagrams, and a brief description. A hydraulic valve may be made up of one or more of the symbols shown.

Hydraulic Symbols and their description

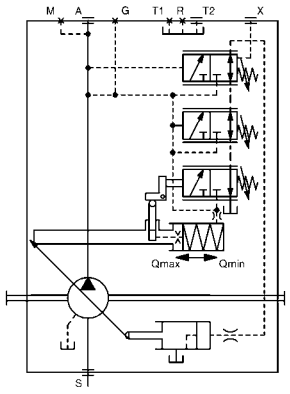
HYDRAULIC SYMBOL	DESCRIPTION	HYDRAULIC SYMBOL	DESCRIPTION
	REMOTE PILOT OPERATED DIRECTIONAL VALVE		SHUT-OFF VALVE
	REMOTE PILOT OPERATED PROPORTIONAL VALVE		TEST POINT
	DIRECT OPERATED DIRECTIONAL VALVE (2 SOL'S)		CHECK VALVE
	DIRECT OPERATED DIRECTIONAL VALVE (1 SOL)		FLOW CONTROL VALVE
	PILOT OPERATED DIRECTIONAL VALVE (1 SOL)		SHUTTLE VALVE
	BACK TO BACK CHECK VALVE		RELIEF VALVE - DIRECT OPERATED
	AIR BLEED & START-UP VALVE		PILOT OPERATED RELIEF VALVE AND ANTI-CAVITATION CHECK VALVE
	PILOT OPERATED ISOLATION VALVE		SEQUENCE VALVE
	REDUCING VALVE (ADJUSTABLE)		COUNTERBALANCE VALVE (VENT TO ATMOSPHERE)
	REDUCING/RELIEVING VALVE ADJUSTABLE)		COUNTERBALANCE VALVE
	REDUCING/RELIEVING VALVE (SET)		COMPENSATING VALVE (SET)
	MANUAL REDUCING/RELIEVING VALVE (MANUAL PILOT FOR REMOTE OPERATING PROPORTIONIAL VALVE)		PROPORTIONAL REDUCING/ RELIEVING VALVE

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Hydraulic Symbols and their description (continued)

HYDRAULIC SYMBOL	DESCRIPTION	HYDRAULIC SYMBOL	DESCRIPTION
	ORIFICE		FIXED DISPLACEMENT PUMP
	AIR BREATHER		FIXED HYDRAULIC MOTOR SINGLE DIRECTION
	DIFFERENTIAL PRESSURE SWITCH		FIXED HYDRAULIC MOTOR BI-DIRECTIONAL
	HYDRAULIC HOSE		VARIABLE DISPLACEMENT MOTOR BI-DIRECTIONAL
	QUICK RELEASE COUPLING		HYDRAULIC FILTER WITH BYPASS VALVE
	HYDRAULIC CYLINDER		FLOAT LEVEL SWITCH

VARIABLE DISPLACEMENT PUMP
HP CONTROL
LOAD SENSING PRESSURE CUT-OFF



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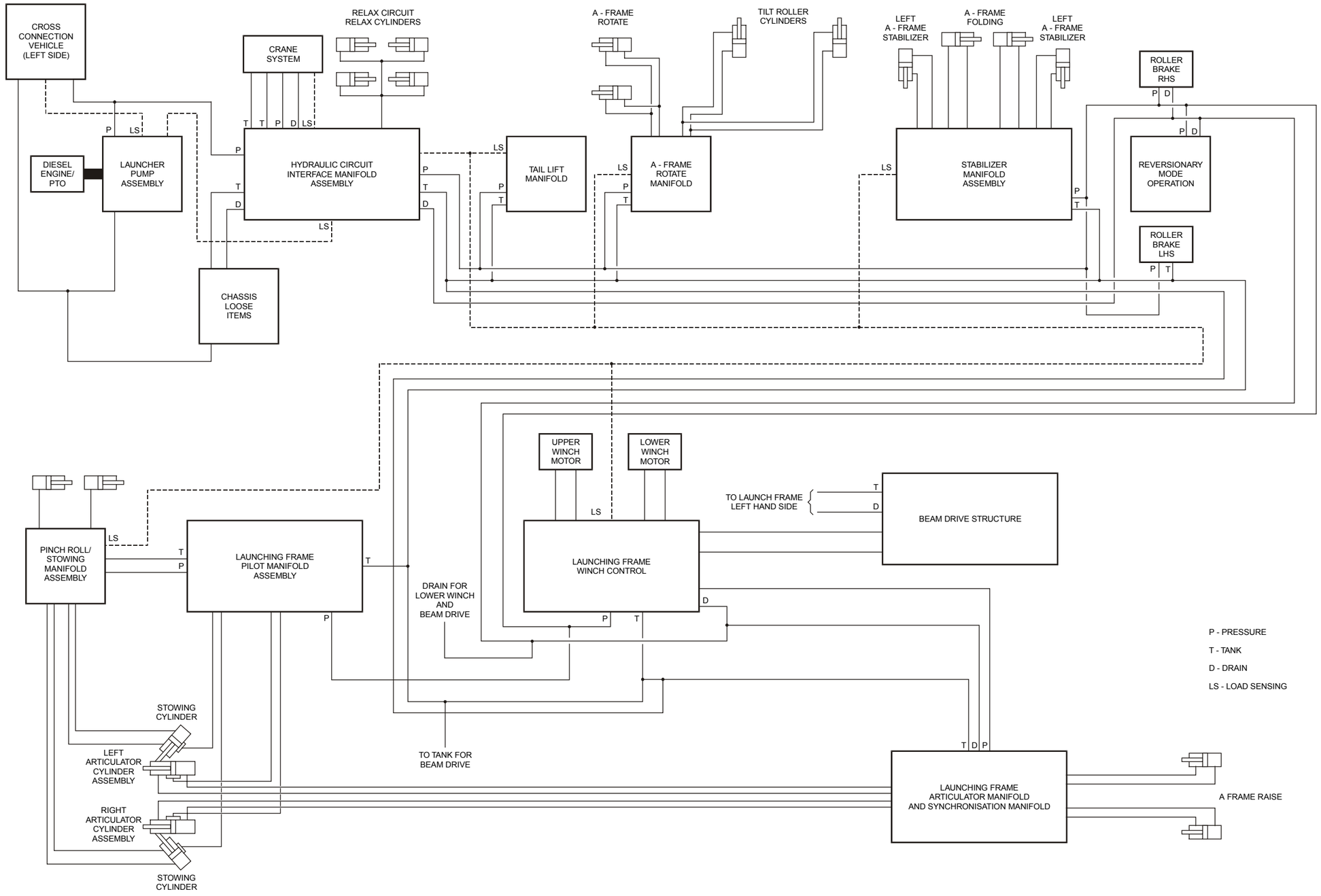


Figure 1 LAUNCHER HYDRAULIC SYSTEM OVERVIEW

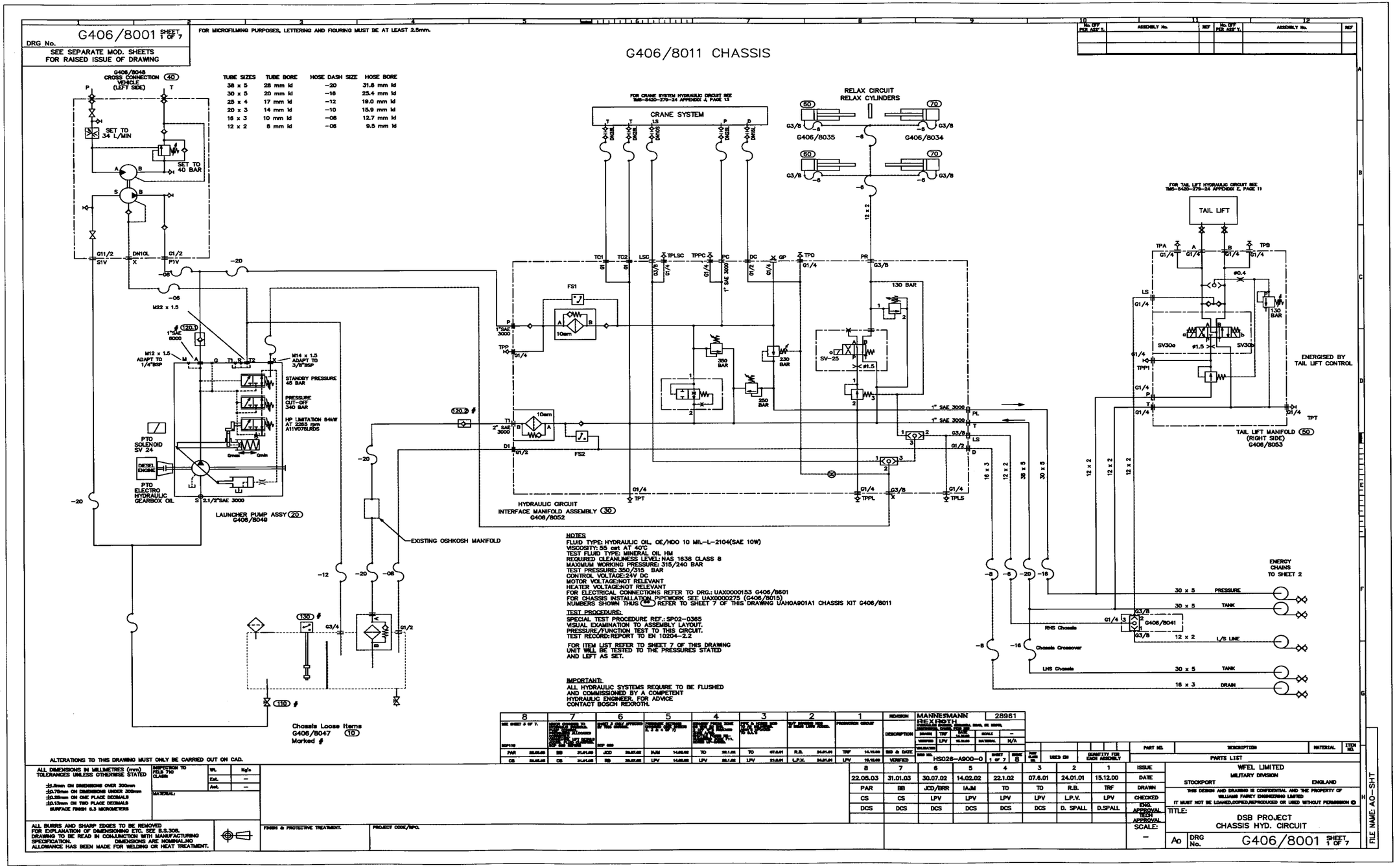


Figure 2 CHASSIS EQUIPMENT

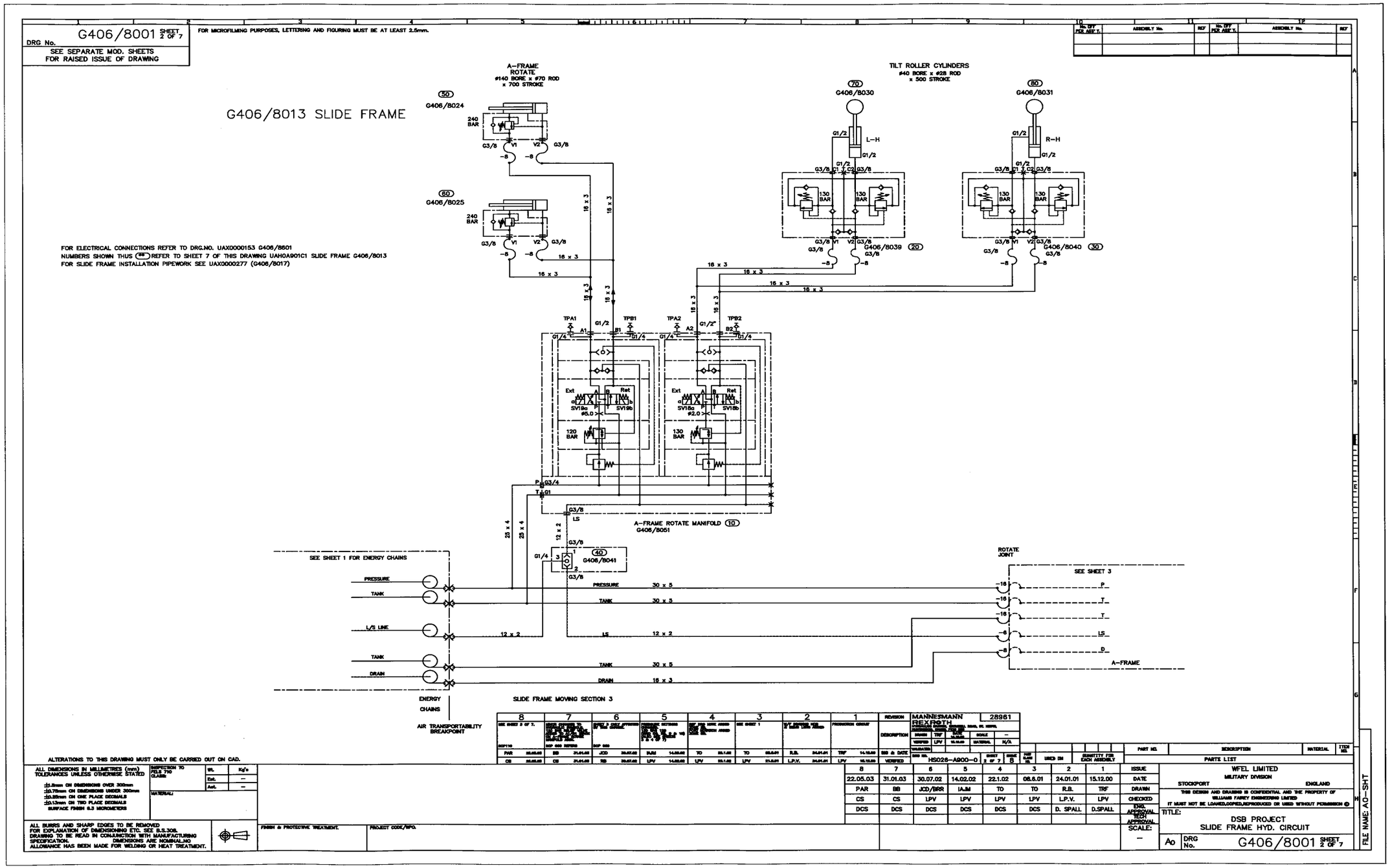


Figure 3 SLIDE FRAME

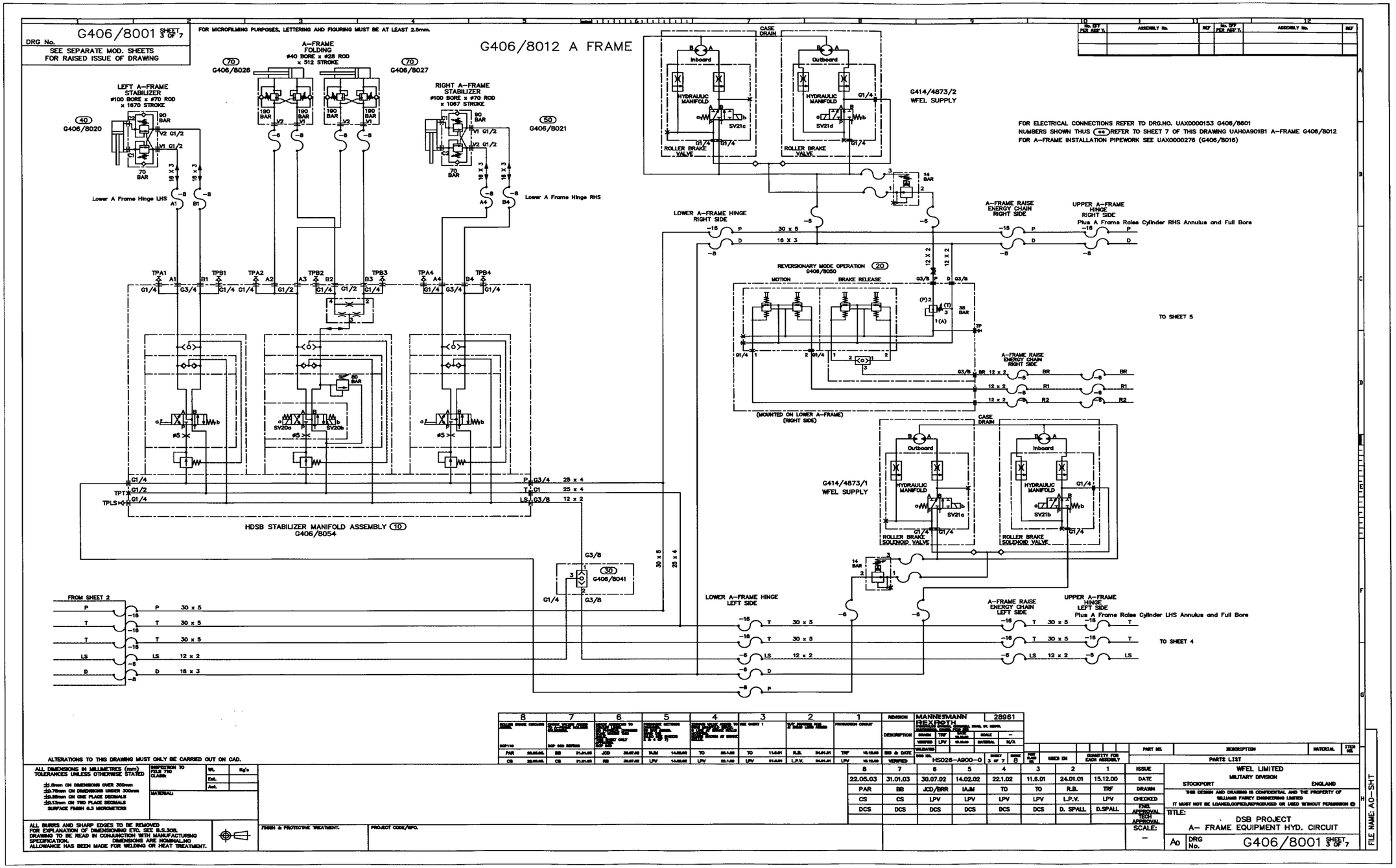


Figure 4 A-FRAME

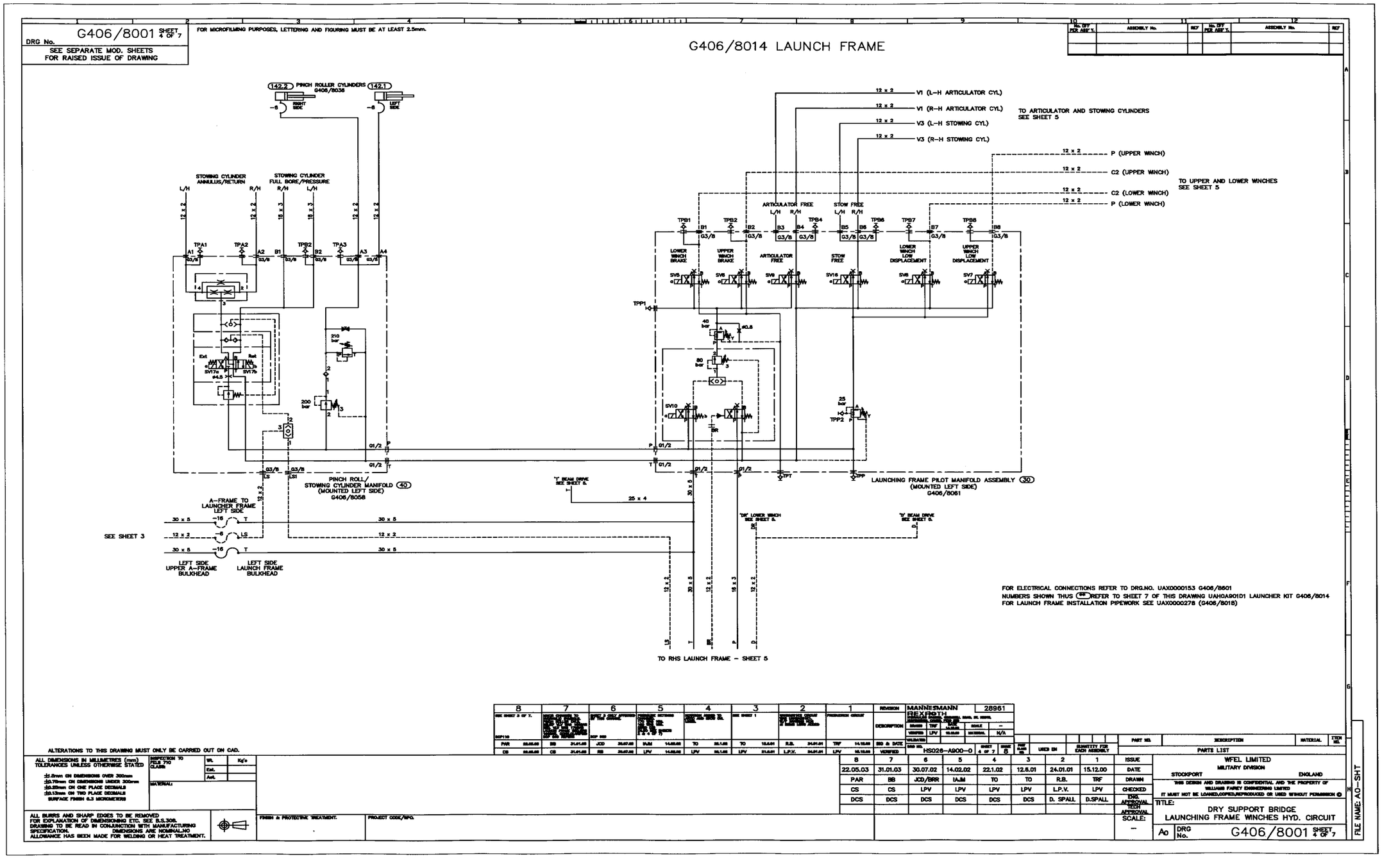


Figure 5 LAUNCH FRAME WINCHES

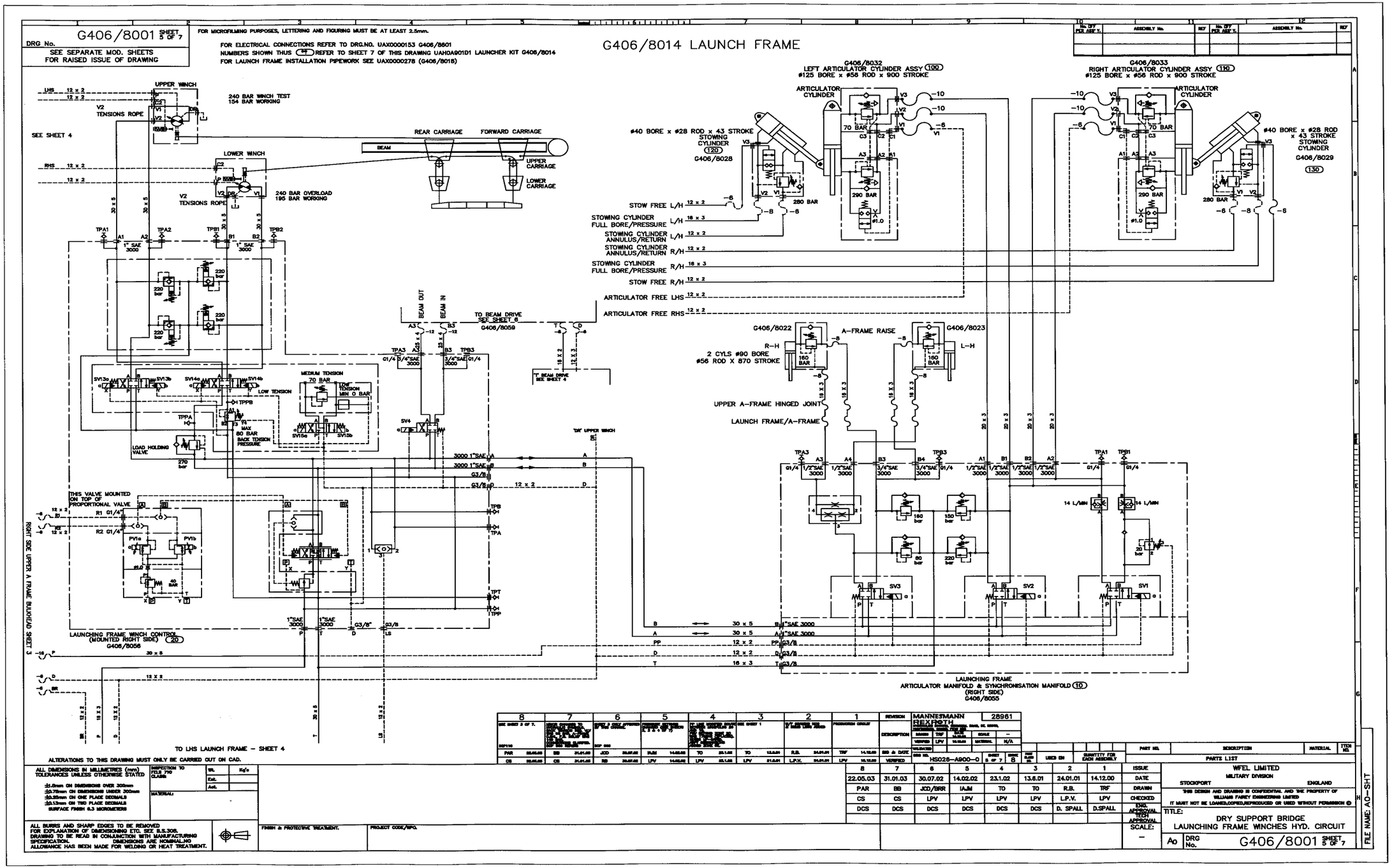


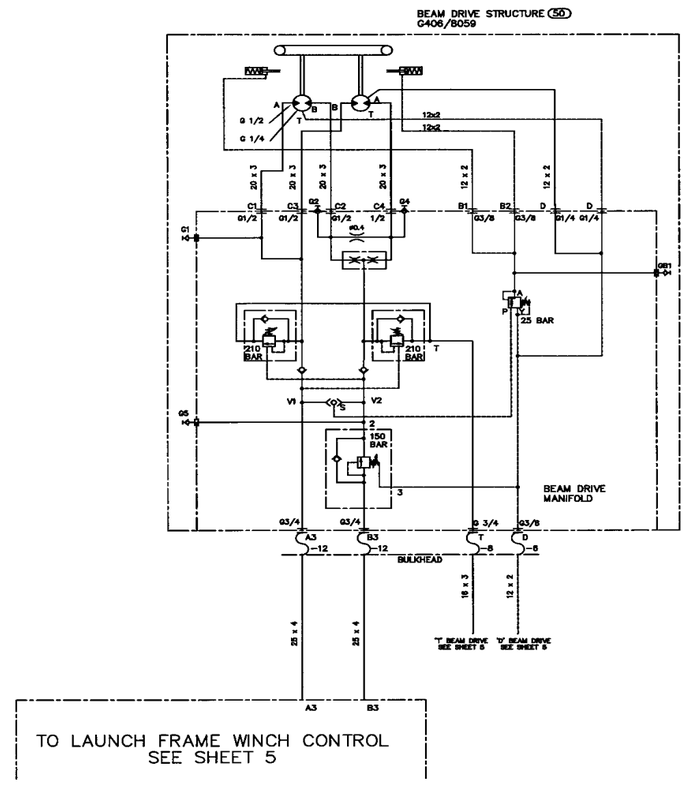
Figure 6 LAUNCH FRAME WINCHES

DRG No. G406/8001 SHEET 6 OF 7

SEE SEPARATE MOD. SHEETS FOR RAISED ISSUE OF DRAWING

FOR MICROFILMING PURPOSES, LETTERING AND FIGURING MUST BE AT LEAST 2.5mm.

G406/8014 LAUNCH FRAME



No. OFF PER ASS'Y.	ASSEMBLY No.	REF	No. OFF PER ASS'Y.	ASSEMBLY No.	REF

FOR ELECTRICAL CONNECTIONS REFER TO DRG.NO. UAX0000153 G406/8801
NUMBERS SHOWN THUS (69) REFER TO SHEET 7 OF THIS DRAWING UAH0A901D1 LAUNCHER KIT G406/8014
FOR LAUNCH FRAME INSTALLATION PIPEWORK SEE UAX0000278 (G406/8018)

8	7	6	5	4	3	2	1
SEE SHEET 2 OF 7.	ISSUED DURING 1st CONSTRUCTION CLASS.	ISSUED FOR CONSTRUCTION CLASS.	CHANGED SECTION AS PER SHEET 3 OF 7	SEE SHEET 1-2 FOR DETAILS	SEE SHEET 1	1st ISSUE FOR TENDER CLASS.	PRODUCTION CIRCUIT
DCP139	DCP 000 REVISED	DCP 000					
PAR 22.05.03	BB 31.01.03	JCD 30.07.02	IAJM 14.02.02	TO 25.1.02	TO 13.6.01	R.B. 24.01.01	TRF 15.12.00
CS 22.05.03	CS 31.01.03	RB 30.07.02	LPV 14.02.02	LPV 25.1.02	LPV 21.6.01	L.P.V. 24.01.01	LPV 15.12.00

REVISION	DESCRIPTION	DRG No. / VERIFIED
	MANNESMANN REXROTH (AUSTRALIA) PTY. LTD.	28961
	ISSUED	SCALE: –
	VERIFIED	MATERIAL: N/A
	DRG No.	HS026-A900-0 SHEET 6 OF 7 ISSUE 8

PART No.	DESCRIPTION	MATERIAL	ITEM No.
	PARTS LIST		

USED ON	QUANTITY PER EACH ASSEMBLY

ALTERATIONS TO THIS DRAWING MUST ONLY BE CARRIED OUT ON CAD.

ALL DIMENSIONS IN MILLIMETRES (mm) TOLERANCES UNLESS OTHERWISE STATED
±1.0mm ON DIMENSIONS OVER 300mm
±0.75mm ON DIMENSIONS UNDER 300mm
±0.25mm ON ONE PLACE DECIMALS
±0.13mm ON TWO PLACE DECIMALS
SURFACE FINISH 6.3 MICROMETERS

INSPECTION TO FELD 710 CLASS2

	Kg's
Wt.	
Est.	
Act.	

MATERIAL:

ALL BURRS AND SHARP EDGES TO BE REMOVED
FOR EXPLANATION OF DIMENSIONING ETC. SEE S.S.308.
DRAWING TO BE READ IN CONJUNCTION WITH MANUFACTURING SPECIFICATIONS.
DIMENSIONS ARE NOMINAL AS ALLOWANCE HAS BEEN MADE FOR WELDING OR HEAT TREATMENT.

FINISH & PROTECTIVE TREATMENT.

PROJECT CODE/SPEC.

8	7	6	5	4	3	2	1	ISSUE
22.05.03	31.01.03	30.07.02	14.02.02	25.1.02	13.6.01	24.01.01	15.12.00	DATE
PAR	BB	JCD/BRR	IA.M	TO	TO	R.B.	TRF	DRAWN
CS	CS	LPV	LPV	LPV	LPV	L.P.V.	LPV	CHECKED
DCS	DCS	DCS	DCS	25.1.02	DCS	D. SPALL	D.SPALL	ENG. APPROVAL
								TECH APPROVAL

SCALE: –

WFEL LIMITED
MILITARY DIVISION
STOCKPORT ENGLAND

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TITLE:
DSB PROJECT
LAUNCHING FRAME EQUIPMENT HYD. CIRCUIT

Ao DRG No. G406/8001 SHEET 6 OF 7

FILE NAME: A0-SHT

Figure 7 LAUNCH FRAME EQUIPMENT

DRG No. G406/8001 SHEET 7 OF 7

SEE SEPARATE MOD. SHEETS FOR RAISED ISSUE OF DRAWING

FOR MICROFILMING PURPOSES, LETTERING AND FIGURING MUST BE AT LEAST 2.5mm.

No. OFF PER ASS'Y.	ASSEMBLY No.	REF	No. OFF PER ASS'Y.	ASSEMBLY No.	REF

ITEM	QTY	IDENT NO.	DESCRIPTION	PART NO.	SUPPLIER	W/F DRG NO.
UAH0A80001		HDSB MAIN VEHICLE		—	—	G406/8010
10	1	UAH0A801A1	HDSB CHASSIS KIT	—	REXROTH	G406/8011
20	1	UAH0A80181	HDSB A-FRAME KIT	—	REXROTH	G406/8012
30	1	UAH0A801C1	HDSB SLIDE FRAME KIT	—	REXROTH	G406/8013
40	1	UAH0A80101	HDSB LAUNCHER FRAME KIT	—	REXROTH	G406/8014

ITEM	QTY	IDENT NO.	DESCRIPTION	PART NO.	SUPPLIER	W/F DRG NO.
UAH0A80101		HDSB LAUNCHER KIT		—	—	G406/8014
10	1	UAH0A081H1	HDSB LAUNCH FRAME ARTICULATOR ASSY	—	REXROTH	G406/8055
20	1	UAH0A081J1	HDSB LAUNCH FRAME WINCH ASSEMBLY	—	REXROTH	G406/8058
30	1	UAH0A081K2	HDSB LAUNCH FRAME PILOT MANIFOLD ASSY R2	—	REXROTH	G406/8061
40	1	UAH0A081P1	HDSB PINCH ROLL ARTICULATOR STORING ASSY	—	REXROTH	G406/8068
50	1	UAH0A081W1	HDSB BEAM DRIVE ASSEMBLY	—	REXROTH	G406/8088
100	1	UAH0A084K1	HDSB ARTICULATOR CYL ASSY LEFT HAND	—	REXROTH	G406/8032
110	1	UAH0A084L1	HDSB ARTICULATOR CYL ASSY RIGHT HAND	—	REXROTH	G406/8033
120	1	UAH0A084M1	HDSB STOWING CYL ASSY LEFT HAND	—	REXROTH	G406/8028
130	1	UAH0A084N1	HDSB STOWING CYL ASSY RIGHT HAND	—	REXROTH	G406/8029
142	1	UK00833008	PINCH ROLL CYLINDERS 50-40-ERASS-0080	—	REXROTH	G406/8038
169	1	UAE0A701A1	HDSB LAUNCHER MAIN ENCLOSURE	—	REXROTH	G406/8880
180	1	UAE0A702A1	HDSB CHEST PACK	—	REXROTH	G406/8880
190	1	UK00833810	ELECTRICAL CABLE HARNESS FOR LAUNCHFRAME	—	REXROTH	G406/8738
200	1	UK00833894	ELECTRICAL JUNCTION BOXES LAUNCH FRAME	—	REXROTH	G406/8767
210	1	UA0D000276	LAUNCH FRAME INSTALLATION	—	WFEL	G406/8015
220	1	UA0D000388	LAUNCH FRAME CABLE FASTENING POSITIONS	—	WFEL	G406/8886

ITEM	QTY	IDENT NO.	DESCRIPTION	PART NO.	SUPPLIER	W/F DRG NO.
UAH0A80101		HDSB SLIDE FRAME KIT		—	—	G406/8013
10	1	UAH0A084F1	HDSB A-FRAME ROTATE MANIFOLD ASSY	—	REXROTH	G406/8031
20	1	UAH0A084A1	HDSB COUNTERBALANCE ASSY LEFT HAND	—	REXROTH	G406/8039
30	1	UAH0A084B1	HDSB COUNTERBALANCE ASSY RIGHT HAND	—	REXROTH	G406/8040
40	1	UAH0A084C1	HDSB SHUTTLE VALVE ASSY	—	REXROTH	G406/8041
50	1	UAH0A084P1	HDSB A-FRAME ROTATE CYL ASSY LEFT HAND	—	REXROTH	G406/8034
60	1	UAH0A084R1	HDSB A-FRAME ROTATE CYL ASSY RIGHT HAND	—	REXROTH	G406/8035
70	1	UAH0A084V1	HDSB TILT ROLLER CYL ASSY LEFT HAND	—	REXROTH	G406/8030
80	1	UAH0A084W1	HDSB TILT ROLLER CYL ASSY RIGHT HAND	—	REXROTH	G406/8031
100	1	UK00833808	ELECTRICAL CABLE HARNESS FOR SLIDE FRAME	—	REXROTH	G406/8782
110	1	UK00833281	ELECTRICAL JUNCTION BOXES SLIDEFRAME KIT	—	REXROTH	G406/8783
120	1	UA0D000277	SLIDE FRAME INSTALLATION	—	WFEL	G406/8017
130	1	UA0D000380	SLIDE FRAME CABLE FASTENING POSITIONS	—	WFEL	G406/8887

ITEM	QTY	IDENT NO.	DESCRIPTION	PART NO.	SUPPLIER	W/F DRG NO.
UAH0A80181		HDSB A-FRAME KIT		—	—	G406/8012
10	1	UAH0A08101	HDSB STABILIZER MANIFOLD ASSEMBLY	—	REXROTH	G406/8084
20	1	UAH0A08NJ	HDSB REVERSIONARY MODE ASSEMBLY	—	REXROTH	G406/8080
30	1	UAH0A084C1	HDSB SHUTTLE VALVE ASSY	—	REXROTH	G406/8041
40	1	UAH0A084D1	HDSB STABILIZER CYLINDER ASSY LEFT HAND	—	REXROTH	G406/8082
50	1	UAH0A084E1	HDSB STABILIZER CYLINDER ASSY RIGHT HAND	—	REXROTH	G406/8081
60	1	UAH0A084R1	HDSB A-FRAME FOLD CYL ASSY LEFT HAND	—	REXROTH	G406/8038
70	1	UAH0A084T1	HDSB A-FRAME FOLD CYL ASSY RIGHT HAND	—	REXROTH	G406/8037
120	1	UAH0A084F1	HDSB A-FRAME RAISE CYL ASSY LEFT HAND	—	REXROTH	G406/8032
130	1	UAH0A084H1	HDSB A-FRAME RAISE CYL ASSY RIGHT HAND	—	REXROTH	G406/8033
170	1	UK00833808	ELECTRICAL CABLE HARNESS FOR A-FRAME KIT	—	REXROTH	G406/8784
180	1	UK00833382	ELECTRICAL JUNCTION BOXES 'A' FRAME KIT	—	REXROTH	G406/8785
190	1	UA0D000278	A-FRAME INSTALLATION	—	WFEL	G406/8016
200	1	UA0D000389	A-FRAME CABLE FASTENING POSITIONS	—	WFEL	G406/8885

ITEM	QTY	IDENT NO.	DESCRIPTION	PART NO.	SUPPLIER	W/F DRG NO.
UAH0A801A1		HDSB CHASSIS KIT		—	—	G406/8011
10	1	UAH0A081A1	HDSB RESERVOR ASSEMBLY COMPONENTS	—	REXROTH	G406/8047
20	1	UAH0A08181	HDSB LAUNCHER PUMP ASSEMBLY	—	REXROTH	G406/8049
30	1	UAH0A081C1	HDSB INTERFACE MANIFOLD ASSEMBLY	—	REXROTH	G406/8052
40	1	UAH0A08101	HDSB CROSS CONNECTION PUMP ASSEMBLY	—	REXROTH	G406/8048
50	1	UAH0A08HC1	HDSB TAIL LIFT MANIFOLD ASSEMBLY	—	REXROTH	G406/8053
60	2	UAD0000521	CYLINDER RELAX HDSB LONG 75MM RAM POWER	—	REXROTH	G406/8035
70	2	UAD0000582	CYLINDER RELAX HDSB SHORT 35MM RAM POWER	—	REXROTH	G406/8034
80	1	UAEDA703A1	HDSB INTERFACE ENCLOSURE	—	REXROTH	G406/8808
100	1	UK00833807	ELECTRICAL CABLE HARNESS FOR CHASSIS KIT	—	REXROTH	G406/8759
110	1	UK00833386	ELECTRICAL JUNCTION BOXES CHASSIS KIT	—	REXROTH	G406/8791
140	1	UAH0A084C1	HDSB SHUTTLE VALVE ASSY	—	REXROTH	G406/8041
150	1	UA0D000276	CHASSIS INSTALLATION	—	WFEL	G406/8015
160	1	UA0D000391	CHASSIS CABLE FASTENING POSITIONS	—	WFEL	G406/8888

ALTERATIONS TO THIS DRAWING MUST ONLY BE CARRIED OUT ON CAD.

ALL DIMENSIONS IN MILLIMETRES (mm) TOLERANCES UNLESS OTHERWISE STATED
±0.5mm ON DIMENSIONS OVER 300mm
±0.75mm ON DIMENSIONS UNDER 300mm
±0.25mm ON ONE PLACE DECIMALS
±0.13mm ON TWO PLACE DECIMALS
SURFACE FINISH 6.3 MICROMETRES

INSPECTION TO FELS 710 CLASS:

Wt. Kg's Est. Act.

MATERIAL:

ALL BURRS AND SHARP EDGES TO BE REMOVED
FOR EXPLANATION OF DIMENSIONING ETC. SEE B.S.308.
DRAWING TO BE READ IN CONJUNCTION WITH MANUFACTURING SPECIFICATION. DIMENSIONS ARE NOMINAL.NO ALLOWANCE HAS BEEN MADE FOR WELDING OR HEAT TREATMENT.

FINISH & PROTECTIVE TREATMENT.

PROJECT CODE/SPEC.

REVISION	DESCRIPTION	8	7	6	5	4	3	2	1
		SEE SHEET 3 OF 7.					SEE SHEET 1		PROMOTION CIRCUIT
		DCP110	DCP 109 REFER	DCP 889					
	DES & DATE	PAR 22.05.03	BB 31.01.03	JCD 30.07.02	IAJM 14.02.02	TO 25.1.02	TO 15.8.01	R.B. 24.01.01	TRF 14.12.00
	VERIFIED	CS	CS	LPV	LPV	LPV	LPV	L.P.V.	LPV

MANNESMANN REXROTH 28981

SCALE	--
SIZE	A4/A3
MATERIAL	N/A

PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
PARTS LIST			

DRG NO. HS025-A900-0 SHEET 7 OF 7 ISSUE 8

PROJ CODE NO.	USED ON	QUANTITY PER EACH ASSEMBLY		
		3	2	1
		15.8.01	24.01.01	15.12.00
		TO	R.B.	TRF
		LPV	L.P.V.	LPV
		21.8.01	D. SPALL	D.SPALL

	8	7	6	5	4	3	2	1
ISSUE	8	7	6	5	4	3	2	1
DATE	22.05.03	31.01.03	30.07.02	14.02.02	25.1.02	15.8.01	24.01.01	15.12.00
DRAWN	PAR	BB	JCD/BRR	IAJM	TO	TO	R.B.	TRF
CHECKED	CS	CS	LPV	LPV	LPV	LPV	L.P.V.	LPV
ENG. APPROVAL	DCS	DCS	DCS	DCS	DCS	21.8.01	D. SPALL	D.SPALL
TECH APPROVAL								

WFEL LIMITED
MILITARY DIVISION
STOCKPORT ENGLAND

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TITLE: DSB PROJECT
LAUNCHING FRAME EQUIPMENT HYD. CIRCUIT

SCALE: —

Ao DRG No. G406/8001 SHEET 7 OF 7

FILE NAME: A0-SHT

Figure 8 LAUNCH FRAME EQUIPMENT

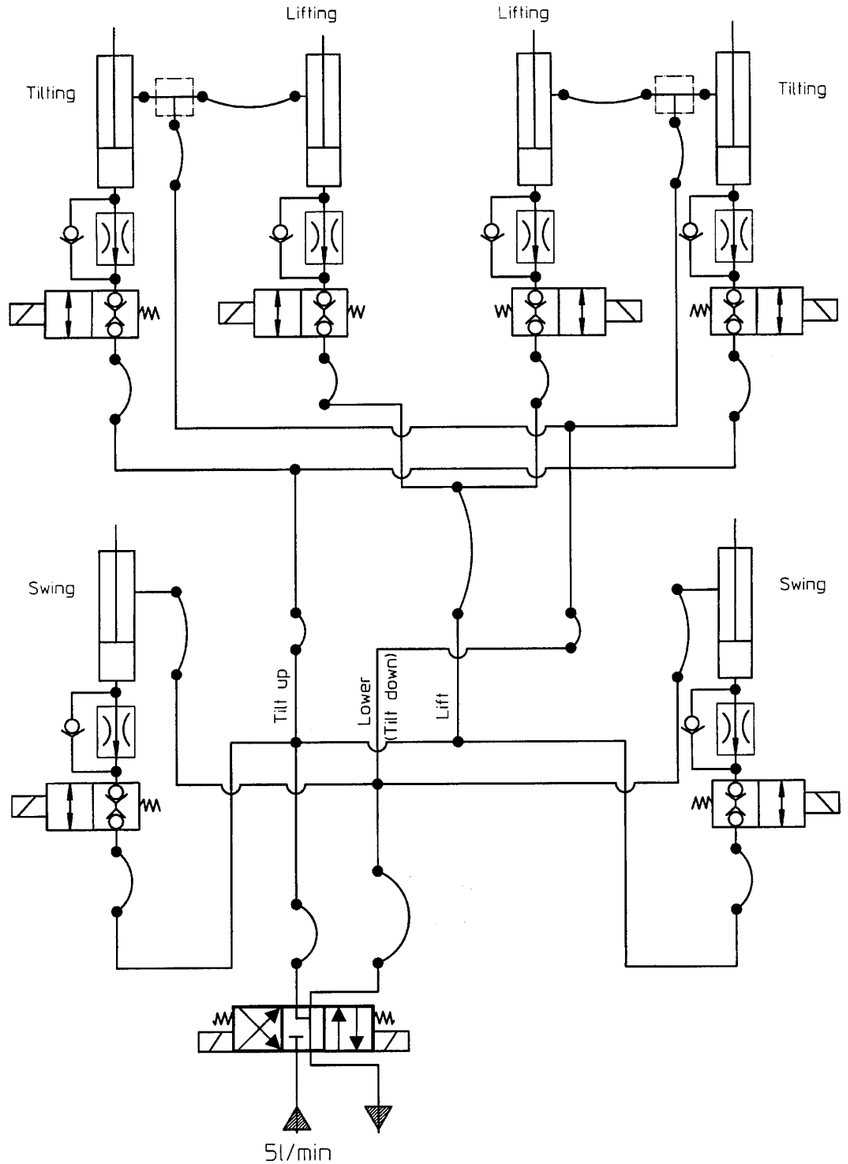


Figure 9 TAIL LIFT HYDRAULIC SCHEMATIC

APPENDIX F

Launcher Hydraulic Manifold Assembly Drawings

Figure No.	Figure Title	Page
Figure 1	Cross Connection Pump Assembly	3
Figure 2	Back-up Mode Manifold Assembly	5
Figure 3	A-Frame Rotate Manifold Assembly	7
Figure 4	Interface Manifold Assembly	9
Figure 5	Tail Lift Manifold Assembly	11
Figure 6	Stabilizer Manifold Assembly	13
Figure 7	Launch Frame Articulator Manifold	15
Figure 8	Launch Frame Winch Control Manifold	17
Figure 9	Pinch Roll/Stowing Manifold	19
Figure 10	Beam Drive Manifold Assembly	21
Figure 11	Launch Frame Pilot Manifold Assembly	23

Introduction

a. This appendix shows the hydraulic manifolds in detail.

b. The locations of the hydraulic manifold assemblies in this appendix, in relation to their position on the DSB launcher can be found in Appendix D.

c. Some manifolds have hydraulic test points, they are clearly labeled and are normally identified with a **TP** prefix.

Table 1 Cross Connection Pump Assembly

Item No.	Description	Remarks
1	Cross Connection Pump Assembly	Fitted to left hand side of vehicle
2	Cross Connection Coupling (Flow Out)	Front view
3	Cross Connection Coupling (Flow In)	Front view
4	Ball Valve	
5	Stabilizer Mounting	
6	Suction Isolation Valve	
7	Cross Connection Coupling (Flow In)	Side view of item 2
8	Cross Connection Coupling (Flow Out)	Side view of item 3

NOTE

See the operator's manual TM 5-5420-279-10 Chapter 7 of or the operation of this manifold assembly.

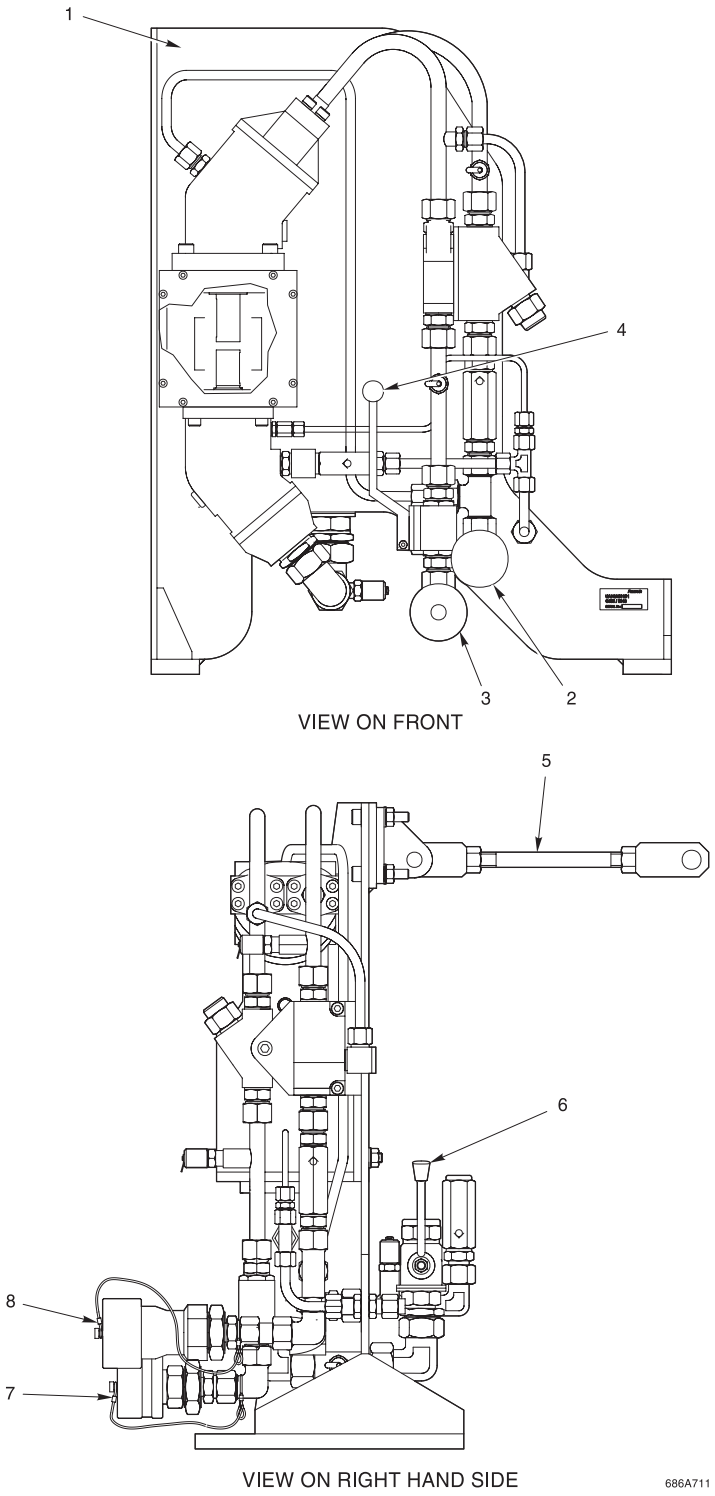


Figure 1 Cross Connection Pump Assembly

Table 2 Back-up Mode Manifold Assembly

Item No.	Description	Remarks
1	Operating Levers	Brake release and back up motion valve
2	A-Frame Rotate Manifold Assembly	
3	Hydraulic Test Point	
4	Flow Control Valve	
5	Mounting	To A-Frame right hand stabilizer lower leg
6	Mounting	Manifold to bracket

NOTES

1. **See the operator's manual TM 5-5420-279-10 Chapter 7 of or the operation of this manifold assembly.**

2. **This manifold has a hydraulic test point, which is clearly labeled and identified with a TP prefix.**

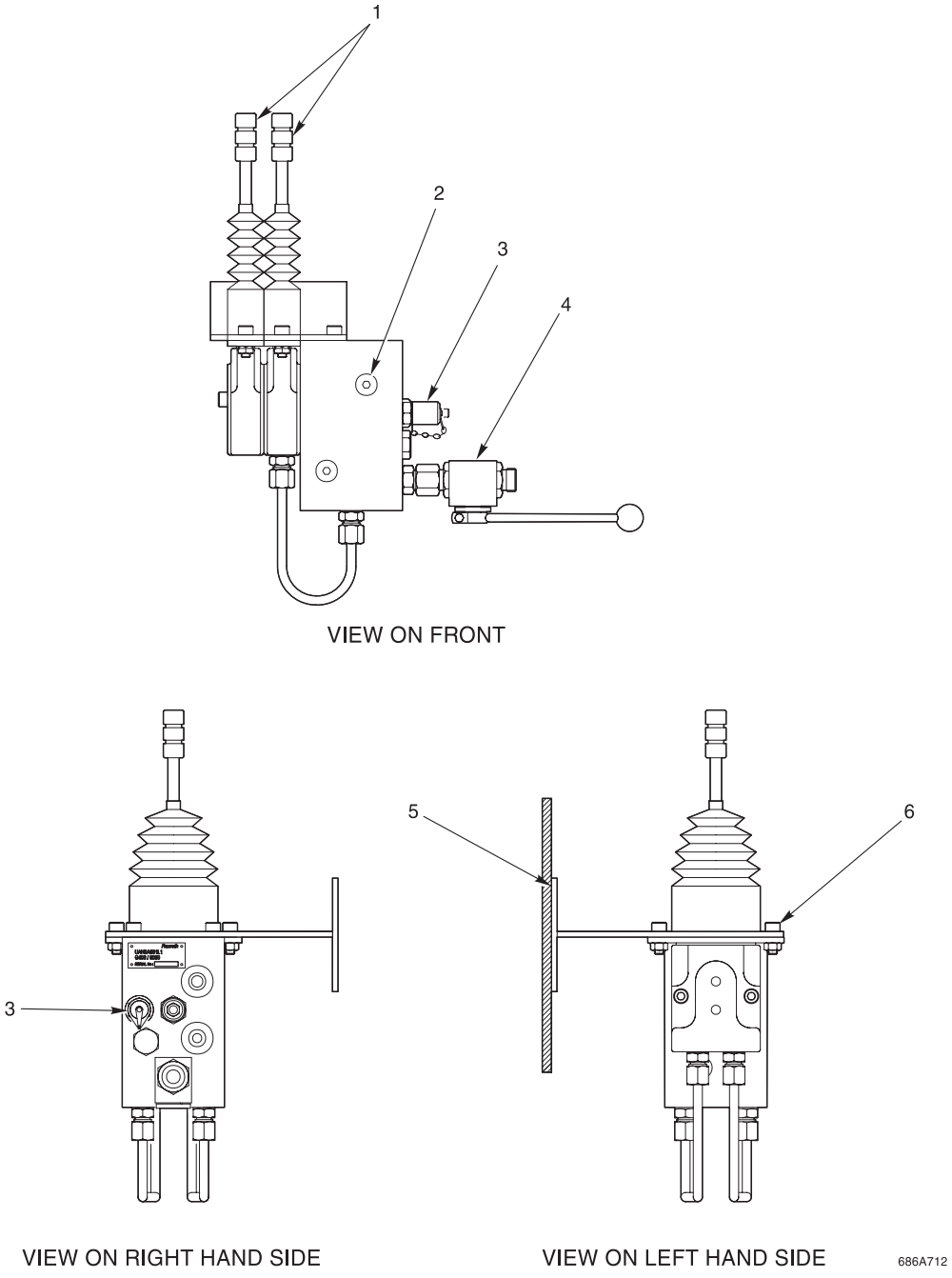


Figure 2 Back-up Mode Manifold Assembly

Table 3 A-Frame Rotate Manifold Assembly

Item No.	Description	Remarks
1	A-Frame Rotate Manifold Assembly	Fitted inside section three of the right hand side on the slide frame
2	Directional Control Valve	A-Frame rotate
3	Solenoid Valve SV19a	
4	Solenoid Valve SV18a	
5	Directional Control Valve	Tilt roller
6	Solenoid Valve SV18b	
7	Solenoid Valve SV19b	
8	Stack Valve	A-Frame rotate
9	Stack Valve	Tilt roller

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

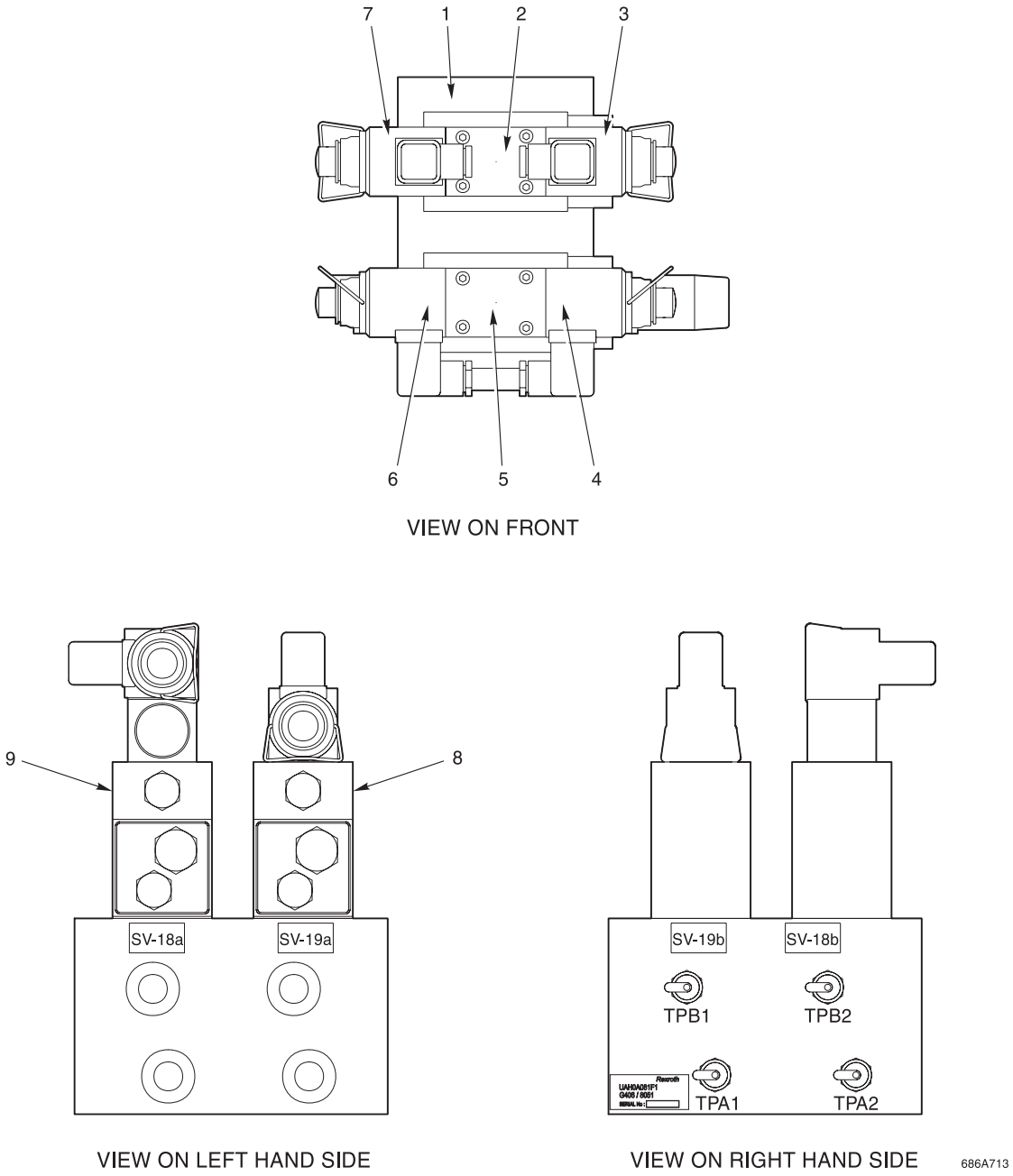


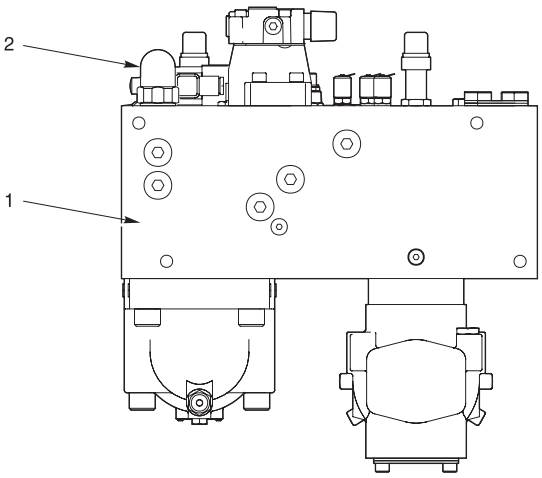
Figure 3 A-Frame Rotate Manifold Assembly

Table 4 Interface Manifold Assembly

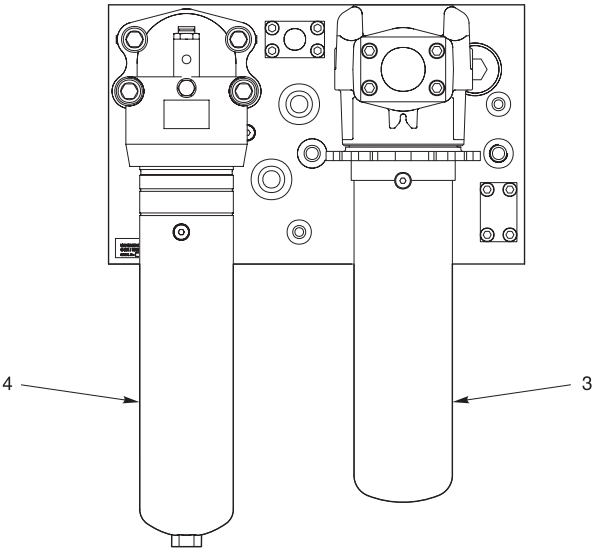
Item No.	Description	Remarks
1	Interface Manifold Assembly	Fitted to the right hand side chassis
2	Cartridge Valve	
3	Return Filter	
4	Pressure Filter	
5	Pressure Reducing Valve	
6	Directional Control Valve	Solenoid valve SV25
7	Filter Indicator	
8	Filter Indicator	

NOTES

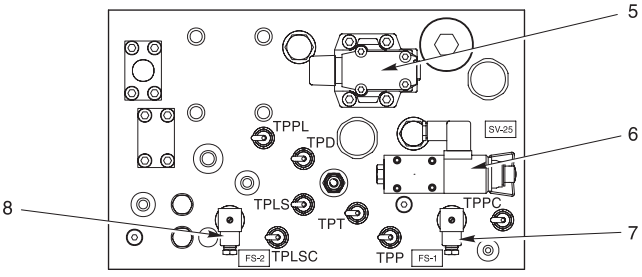
This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.



VIEW ON TOP



VIEW ON RIGHT HAND SIDE



VIEW ON LEFT HAND SIDE

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Figure 4 Interface Manifold Assembly

Table 5 Tail Lift Manifold Assembly

Item No.	Description	Remarks
1	Tail Lift Manifold Assembly	
2	Solenoid Valve SV30a	
3	Directional Control Valve	
4	Solenoid Valve SV30b	
5	Hydraulic Test Point	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

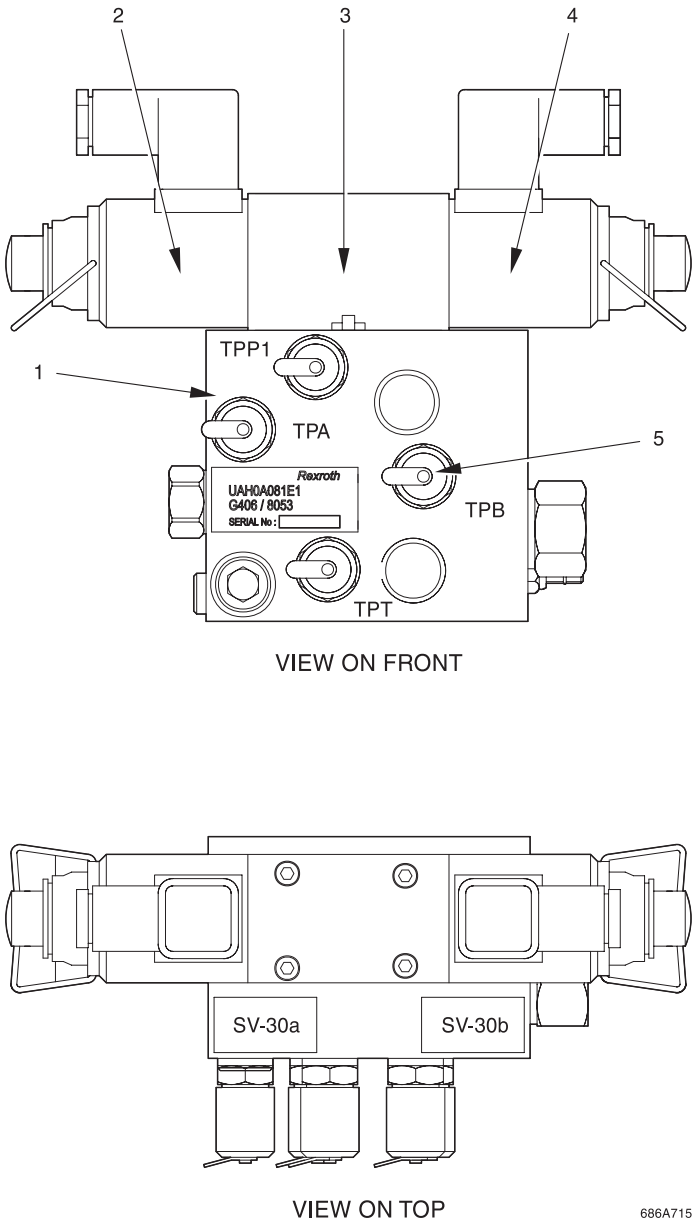


Figure 5 Tail Lift Manifold Assembly

Table 6 Stabilizer Manifold Assembly

Item No.	Description	Remarks
1	Stabilizer Manifold Assembly	Fitted to the rear of the A-Frame
2	Synchronizing Flow Divider	
3	Hydraulic Test Point	TPB2
4	Solenoid Valve SV20b	
5	Hydraulic Test Point	TPB3
6	Directional Control Valve	Stack valve
7	Directional Control Valve	Stack valve
8	Solenoid Valve SV20a	
9	Directional Control Valve	Stack valve
10	Hydraulic Test Point	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

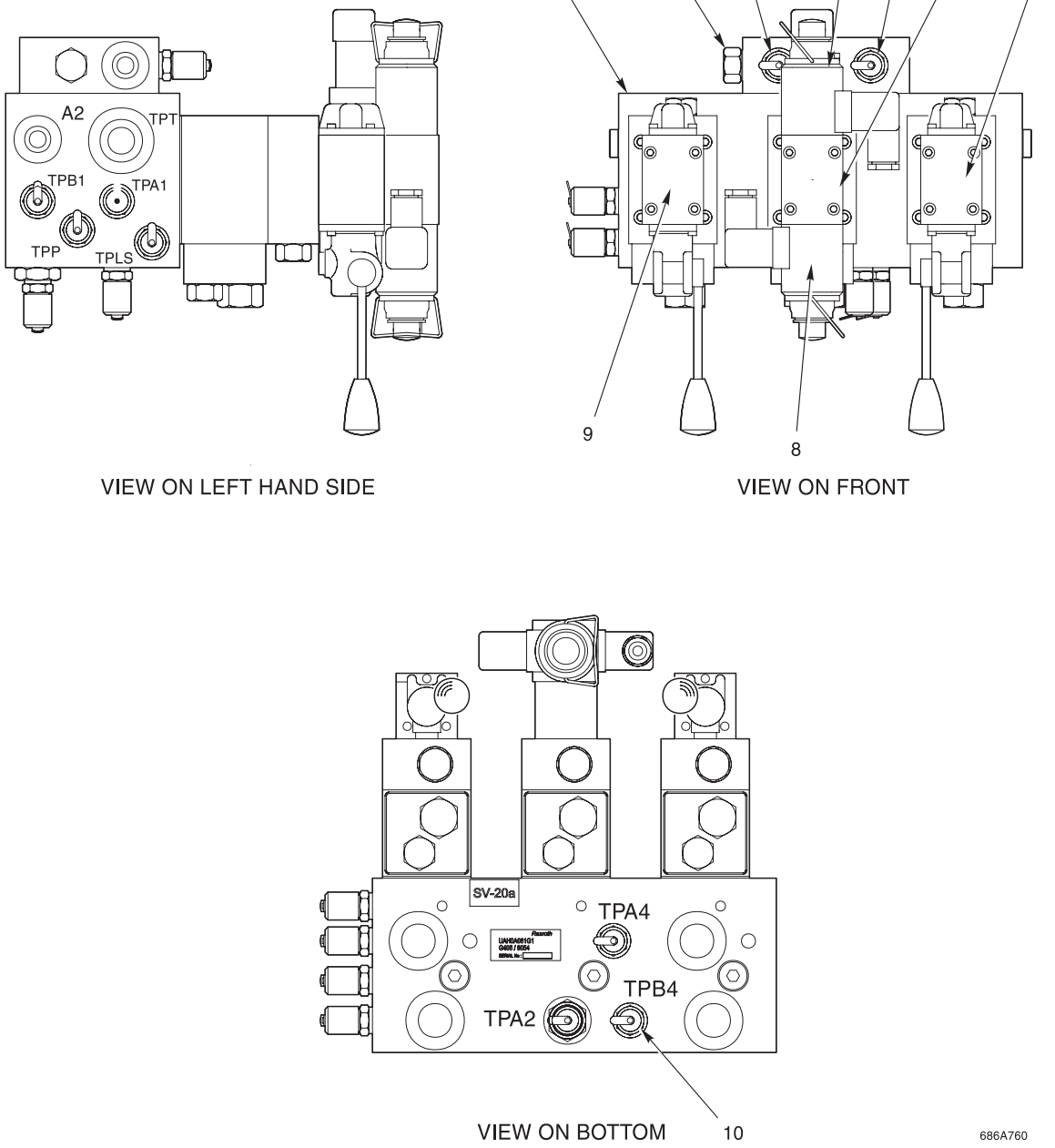


Figure 6 Stabilizer Manifold Assembly

Table 7 Launch Frame Articulator Manifold

Item No.	Description	Remarks
1	Launch Frame Articulator Manifold	Fitted to right hand side of launch frame
2	Directional Control Valve	Solenoid valve SV3
3	Directional Control Valve	Solenoid valve SV2
4	Directional Control Valve	Solenoid valve SV1
5	Cartridge Valve	
6	Flow Control Valve	
7	Hydraulic Test Points	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

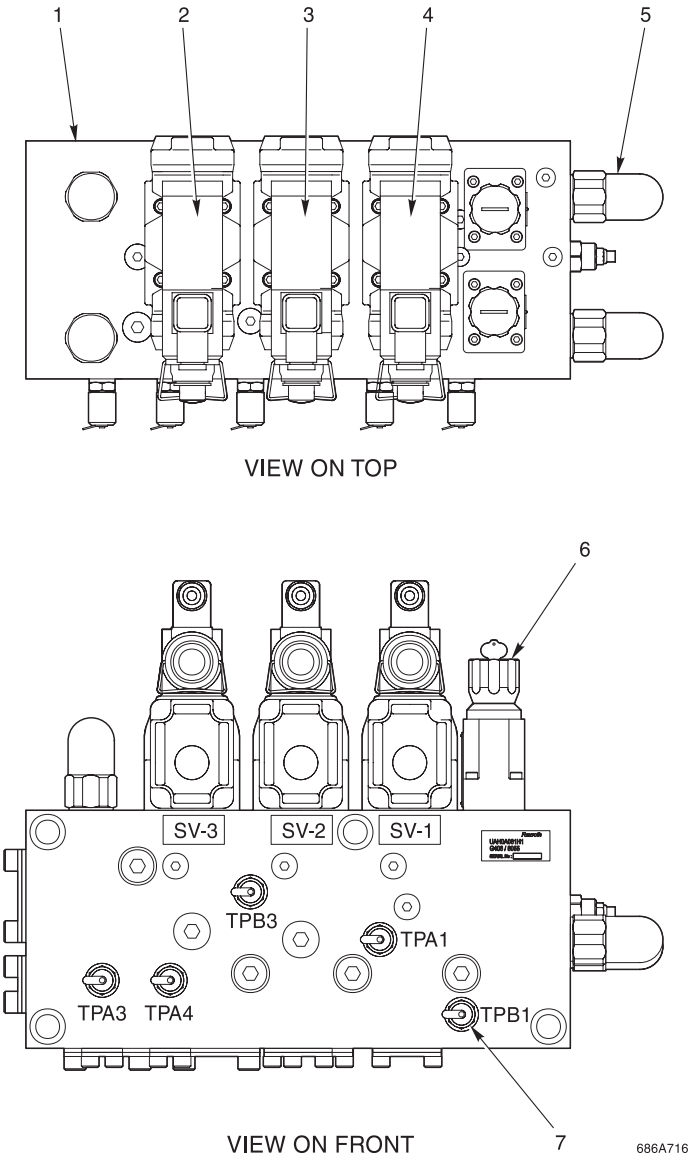


Figure 7 Launch Frame Articulator Manifold

Table 8 Launch Frame Winch Control Manifold

Item No.	Description	Remarks
1	Launch Frame Winch Control Manifold	
2	Directional Control Valve	Solenoid valves SV15a and SV15b
3	Directional Control Valve	Solenoid valves SV14a and SV14b
4	Directional Control Valve	Solenoid valves SV13a and SV13b
5	Directional Control Valve	Solenoid valves PV1a and PV1b
6	Directional Control Valve	Solenoid valves SV4
7	Hydraulic Test Points	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

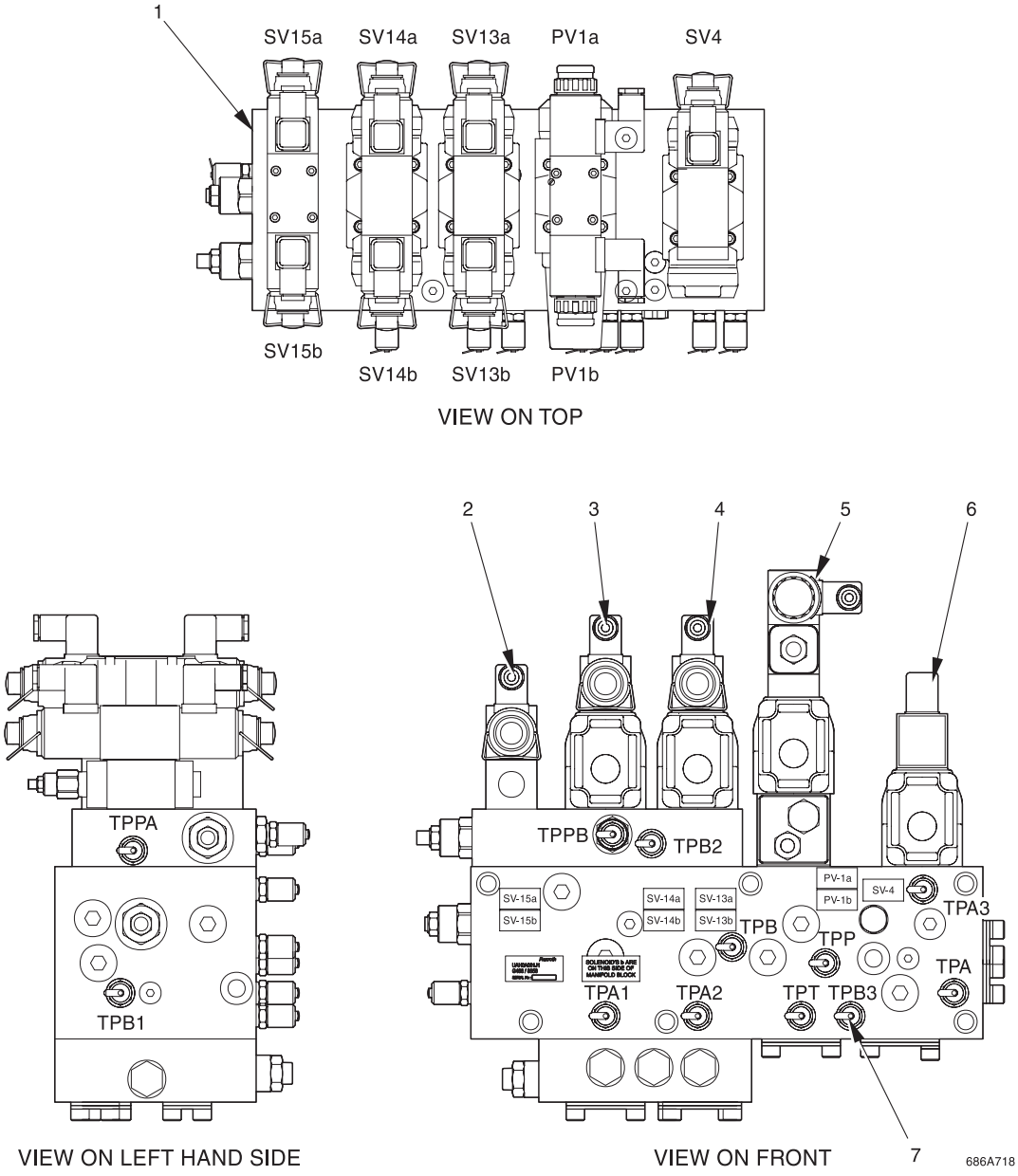


Figure 8 Launch Frame Winch Control Manifold

Table 9 Pinch Roll/Stowing Manifold

Item No.	Description	Remarks
1	Pinch Roll/Stowing Manifold	
2	Directional Control Valve	
3	Hydraulic Test Points	
4	Cartridge Valve	
5	Rear Pinch Roller Ball Valve	
6	Solenoid valves SV17a	
7	Solenoid valves SV17b	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.

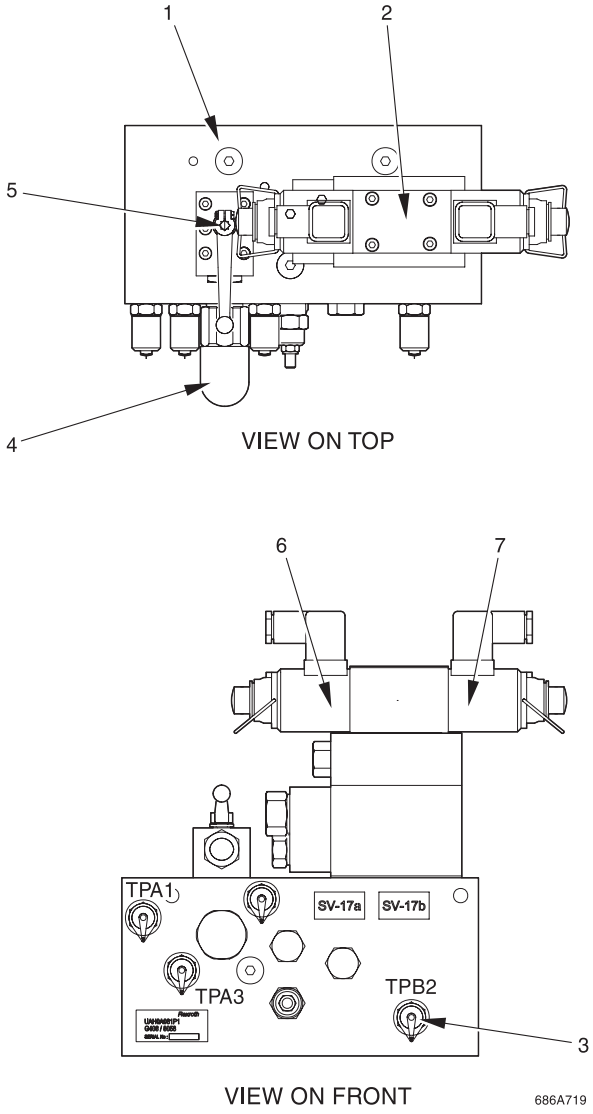


Figure 9 Pinch Roll/Stowing Manifold

Table 10 Beam Drive Manifold Assembly

Item No.	Description	Remarks
1	Beam Drive Manifold Assembly	
2	Hydraulic Test Points	

NOTES

This manifold has hydraulic test points, which are clearly labeled and are identified with a G prefix.

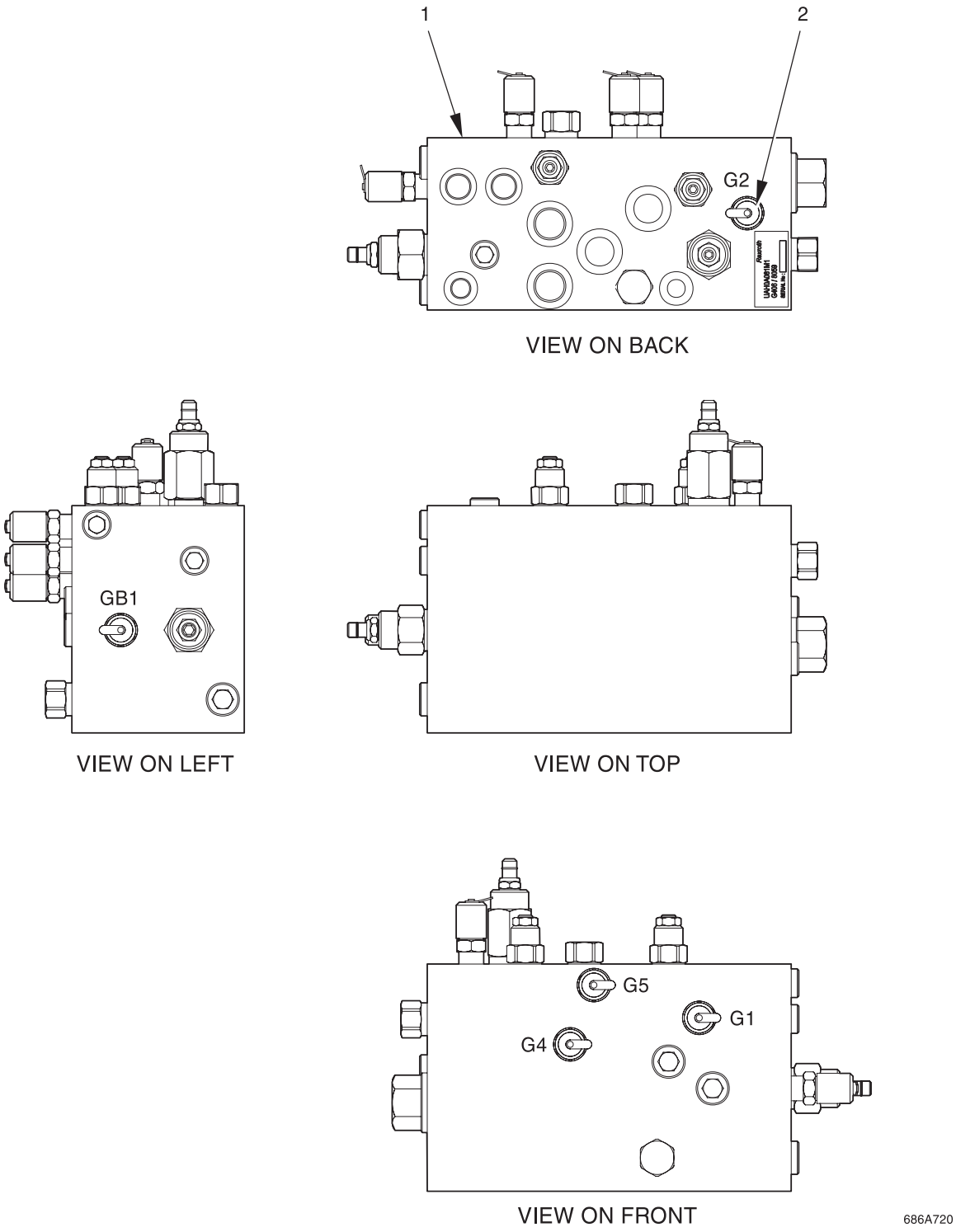


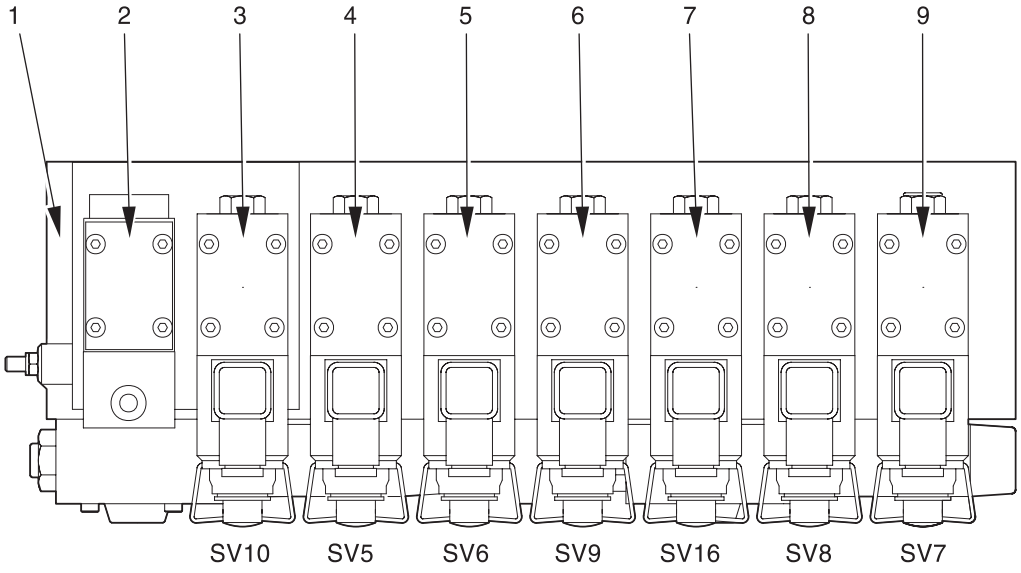
Figure 10 Beam Drive Manifold Assembly

Table 11 Launch Frame Pilot Manifold Assembly

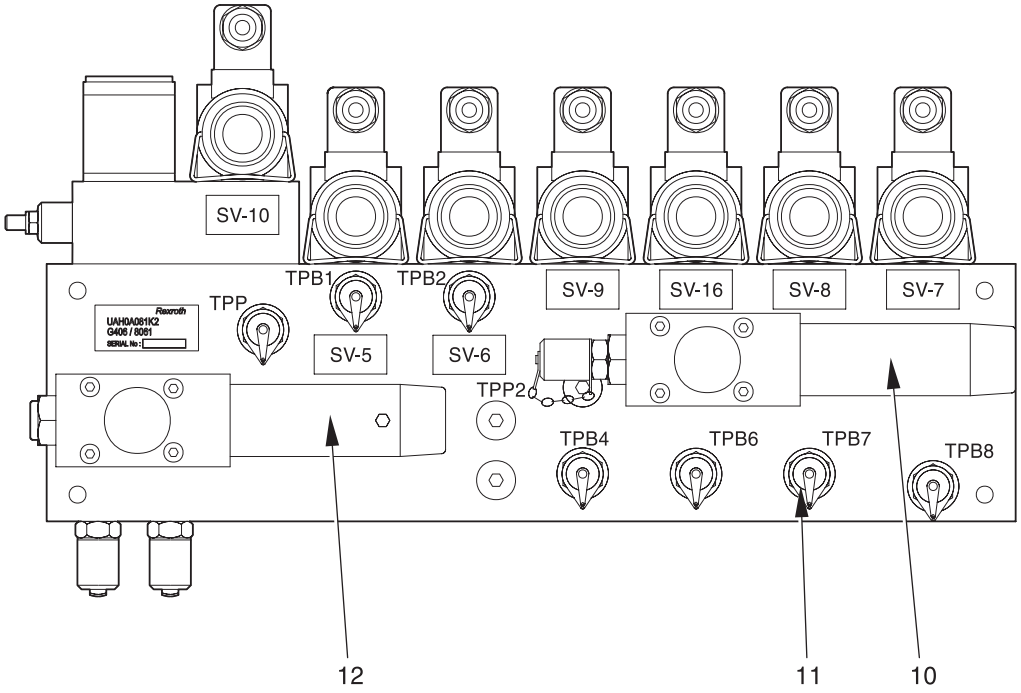
Item No.	Description	Remarks
1	Launch Frame Pilot Manifold Assembly	
2	Directional Valve	
3	Directional Control Valve	Solenoid valve SV10
4	Directional Control Valve	Solenoid valve SV5
5	Directional Control Valve	Solenoid valve SV6
6	Directional Control Valve	Solenoid valve SV9
7	Directional Control Valve	Solenoid valve SV16
8	Directional Control Valve	Solenoid valve SV8
9	Directional Control Valve	Solenoid valve SV7
10	Pressure Reducing Valve	
11	Hydraulic Test Point	
12	Pressure Reducing Valve	

NOTES

This manifold has hydraulic test points, which are clearly labeled and identified with a TP prefix.



VIEW ON TOP



VIEW ON FRONT

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Figure 11 Launch Frame Pilot Manifold Assembly

APPENDIX G

Launcher Electrical System Drawings

a. The following drawings are circuit diagrams relevant to the Launcher Electrical System:

Fig No	Drawing Title	WFEL Number	Sheets	Iss.	Page
	Annex 1 General				
1	Electrical System Overview				1
2	General Electrical Layout On Vehicle	G406-8601	1	9	2
3	Solenoid Energisation Chart	G406-8602	1	4	3
	Annex 2 Emergency Stop Power				
1	Emergency Stop and Supply Schematic	G406-8603	1	5	1
	Annex 3 Tail Lift Circuit Diagrams				
1	Electrical Installation Tail Lift Schematic	G424-5200	1	2	1
2	Tail Lift Pendant Electrical Schematic	G424-5201	1	3	2
3	Tail Lift Control Enclosure Electrical Schematic	G424-5202	1	2	3
	Annex 4 Electrical Fault Finding Diagrams				
1	General Electrical Layout on Vehicle	G406-8604	1	2	1
2	Interface Enclosure Interface Diagram	G406-8604	1	2	2
3	Chassis Junction Box Interface Diagram	G406-8604	1	2	3
4	Moving Slide Frame Junction Box Interface Diagram	G406-8604	1	2	4
5	Lower A-Frame Junction Box Interface Diagram	G406-8604	1	2	5
6	Lower E. Stop and Remote Chest Pack Interface Diagram	G406-8604	1	2	6
7	Launcher Enclosure Interface Diagram	G406-8604	1	2	7
8 - 15	Interface Enclosure Wiring Diagram	G406-8604	8	2	8 - 15
16 - 17	Vehicle Cab Wiring Diagram	G406-8604	2	2	16 - 17
18	Chest Pack Wiring Diagram	G406-8604	1	2	18
19 - 26	Launcher Enclosure Wiring Diagram	G406-8604	8	2	19 - 26
27 - 30	Interface Enclosure P.C.B. Diagram	G406-8604	4	2	27 - 30
31	Chest Pack P.C.B. Diagram	G406-8604	1	2	31
32 - 35	Launcher Enclosure P.C.B. Circuit Diagram	G406-8604	4	2	32 - 35

b. The Tables 1 to 17 are to be used as a guide to which solenoids are activated when the title operation is being performed. The table should be used in conjunction with Annex 1 General, Figure 3 Solenoid Energisation Chart. The information in the table does not supersede the information contained within Annex 1 General, Figure 3 Solenoid Energisation Chart. Note; SV = Solenoid Valve and LS = Load Sensing.

c. A guide to some of the component parts of the electrical system is provided in Table 18. The guide consists of the relevant electrical symbol, used in the electrical circuit diagrams, and a brief description. An electrical component may be made up of one or more of the symbols shown.

Table	**Operation**	**Page**
Table 1.	A-Frame Folding	3
Table 2.	A-Frame Rotate	3
Table 3.	Slide Frame Extend	3
Table 4.	Relax	3
Table 5.	Power On	4
Table 6.	Articulator	4
Table 7.	Beam Drive	4
Table 8.	Articulator Slow (Far Bank Seat)	6
Table 9.	Articulator Stowing (Stowing Cylinder)	7
Table 10.	A-Frame Raise	8
Table 11.	Bridge Angle Select	8
Table 12.	Carriage Drive (CARRIAGE EMPTY)	9
Table 13.	Carriage Drive (HIGH_BANK) (Tilt Roller)	10
Table 14.	Carriage Drive (LEVEL_BANK) (Tilt Roller)	11
Table 15.	Carriage Drive (LOW_BANK) (Tilt Roller)	13
Table 16.	Bridge Lift (Bottom Winch Only)	15
Table 17.	Top Winch Only for Maintenance	16
Table 18.	Electrical Symbols	17

Table 1. A-Frame Folding

Manifold	Operation	Valve
Vehicle	PTO Solenoid	SV24
Stabilizer Manifold	A-Frame Fold Open (EXTEND)	SV20a
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Stabilizer Manifold	A-Frame Fold Closed (RETRACT)	SV20b
Vehicle	PTO Solenoid	SV24
Interface Manifold	Relax Pin In	LS

Table 2. A-Frame Rotate

Manifold	Operation	Valve
Vehicle	PTO Solenoid	SV24
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
A-Frame Rotate Manifold	A-Frame Rotate Closed (EXTEND)	SV19a
Vehicle	PTO Solenoid	SV24
Interface Manifold	Relax Pin In	LS
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
A-Frame Rotate Manifold	A-Frame Rotate Open (RETRACT)	SV19b
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 3. Slide Frame Extend

Manifold	Operation	Valve
Interface Manifold	Relax Pin In	LS
Interface Manifold	-	LS

Table 4. Relax

Manifold	Operation	Valve
Vehicle	PTO Solenoid	SV24
Vehicle	PTO Solenoid	SV24
Interface Manifold	Relax	SV25

Table 5. Power On

Manifold	Operation	Valve
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 6. Articulator

Manifold	Operation	Valve
BEAM ANGLE		
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam RAISE at far bank		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Articulator Manifold	Articulator (spool change EA to EB)	SV2
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam LOWER at far bank		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1B
Launching Frame Articulator Manifold	Articulator (spool change EA to EB)	SV2
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 7. Beam Drive

Manifold	Operation	Valve
Launching Frame Winch Control Manifold	Beam Drive Valve	SV4
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Manifold	Operation	Valve
Beam drive OUT		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Winch Control Manifold	Beam Drive Valve	SV4
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam drive IN		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1B
Launching Frame Winch Control Manifold	Beam Drive Valve	SV4
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pull Just Rope)	SV15B
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 8. Articulator Slow (Far Bank Seat)

Manifold	Operation	Valve
FAR BANK SEAT		
Launching Frame Articulator Manifold	Articulator - Low Speed (spool change EA to EB)	SV1
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam RAISE at far bank		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Articulator Manifold	Articulator - Low Speed (spool change EA to EB)	SV1
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam LOWER at far bank		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1B
Launching Frame Articulator Manifold	Articulator - Low Speed (spool change EA to EB)	SV1
Launch Frame Pilot Manifold	Articulator Free	SV9
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launch Frame Pilot Manifold	Stowing Free Valve	SV16
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 9. Articulator Stowing (Stowing Cylinder)

Manifold	Operation	Valve
ARTICULATOR STOW		
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Articulator cylinders RETRACT		
Launching Frame Pinch Roll / Stowing Manifold	Articulator Slow Retract	SV17b
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Articulator cylinders EXTEND		
Launching Frame Pinch Roll / Stowing Manifold	Articulator Slow Extend	SV17a
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 10. A-Frame Raise

Manifold	Operation	Valve
Launching Frame Articulator Manifold	A-Frame Raise Valve (spool change EA to EB)	SV3
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
A-Frame RAISE		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1B
Launching Frame Articulator Manifold	A-Frame Raise Valve (spool change EA to EB)	SV3
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
A-Frame LOWER		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1A
Launching Frame Articulator Manifold	A-Frame Raise Valve (spool change EA to EB)	SV3
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 11. Bridge Angle Select

Manifold	Operation	Valve
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 12. Carriage Drive (CARRIAGE EMPTY)

Manifold	Operation	Valve
CARRIAGE EMPTY		
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Carriage OUT		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Carriage IN		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull Handle)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A

Manifold	Operation	Valve
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 13. Carriage Drive (HIGH_BANK) (Tilt Roller)

Manifold	Operation	Valve
HIGH BANK / TILT ROLLER		
Launcher Main Control Enclosure	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives OUT		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives IN		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1B
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B

Manifold	Operation	Valve
Launching Frame Winch Control Manifold	Tension Low (Pull Just Rope)	SV15B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
A-Frame Rotate Manifold	Tilt Roller Extend	18A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
A-Frame Rotate Manifold	Tilt Roller Retract	18B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24

Table 14. Carriage Drive (LEVEL_BANK) (Tilt Roller)

Manifold	Operation	Valve
LEVEL BANK / TILT ROLLER		
Launcher Main Control Enclosure	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives OUT		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Lower Winch Displacement Low	SV8
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives IN		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5

Manifold	Operation	Valve
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
A-Frame Rotate Manifold	Tilt Roller Extend	18A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
A-Frame Rotate Manifold	Tilt Roller Retract	18B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24

Table 15. Carriage Drive (LOW_BANK) (Tilt Roller)

Manifold	Operation	Valve
LOW BANK / TILT ROLLER		
Launcher Main Control Enclosure	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives OUT		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1B
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pull Just Rope)	SV15B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Beam Drives IN		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Upper Winch Displacement Low	SV7
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24

Manifold	Operation	Valve
Interface Manifold	-	LS
A-Frame Rotate Manifold	Tilt Roller Extend	18A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
A-Frame Rotate Manifold	Tilt Roller Retract	18B
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24

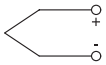
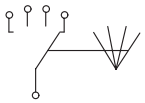
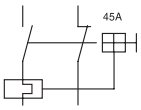
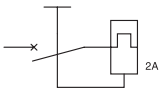
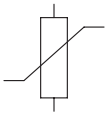
Table 16. Bridge Lift (Bottom Winch Only)

Manifold	Operation	Valve
Bridge Lift		
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Bridge LIFT (up)		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push lever forwards)	PV1A
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS
Bridge LOWER (down)		
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull lever backwards)	PV1B
Launching Frame Pilot Manifold	Lower Winch Brake	SV5
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Lower Winch Prop)	SV13A
Launching Frame Winch Control Manifold	Winch Selection Valve B (Lower Winch Prop)	SV14A
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Interface Manifold	-	LS

Table 17. Top Winch Only for Maintenance

Manifold	Operation	Valve
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Pull Handle)	PV1A
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24
Launching Frame Winch Control Manifold	Launching Frame Proportional Valve (Push Handle)	PV1B
Launch Frame Pilot Manifold	Upper Winch Brake	SV6
Launch Frame Pilot Manifold	Winch and Articulator Free Actuation Valve (Push/Pull)	SV10
Launching Frame Winch Control Manifold	Winch Selection Valve A (Upper Winch Prop)	SV13B
Launching Frame Winch Control Manifold	Winch Selection Valve B (Upper Winch Prop)	SV14B
Launching Frame Winch Control Manifold	Tension Low (Pay Rope Out)	SV15A
N/A	Roller Brake (from chest pack)	SV21ABCD
Vehicle	PTO Solenoid	SV24

Table 18. Electrical Symbols

ELECTRICAL SYMBOL	DESCRIPTION	ELECTRICAL SYMBOL	DESCRIPTION
	PLUG AND SOCKET		LED
	PRESSURE ACTUATOR		ANNUNCIATOR (LED)
	RELAY (COIL)		PANEL EARTH
	PUSHBUTTON		CHASSIS EARTH
	ROTATIONAL SWITCH		PLATINUM RESISTANCE THERMOMETER (PT100)
	FOUR POSITION SWITCH		FILTER SWITCH
	SINGLE POLE CIRCUIT BREAKER WITH AUX CONTACT		SINGLE POLE CIRCUIT BREAKER
	LINK		SOLENOID VALVE
	LEVEL SWITCH		PROPORTIONAL SOLENOID VALVE
	FUSE		LIMIT SWITCH

686A889

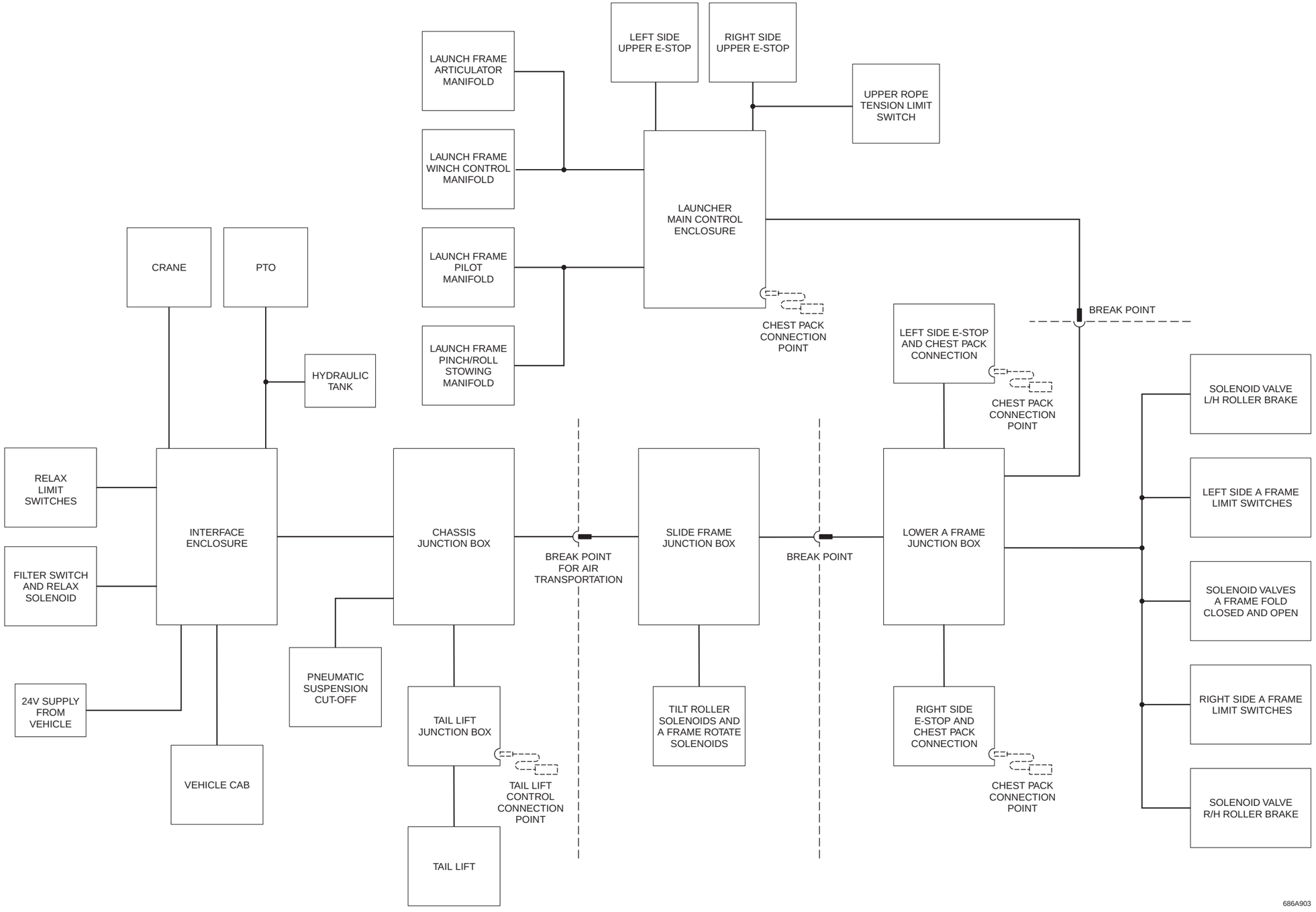
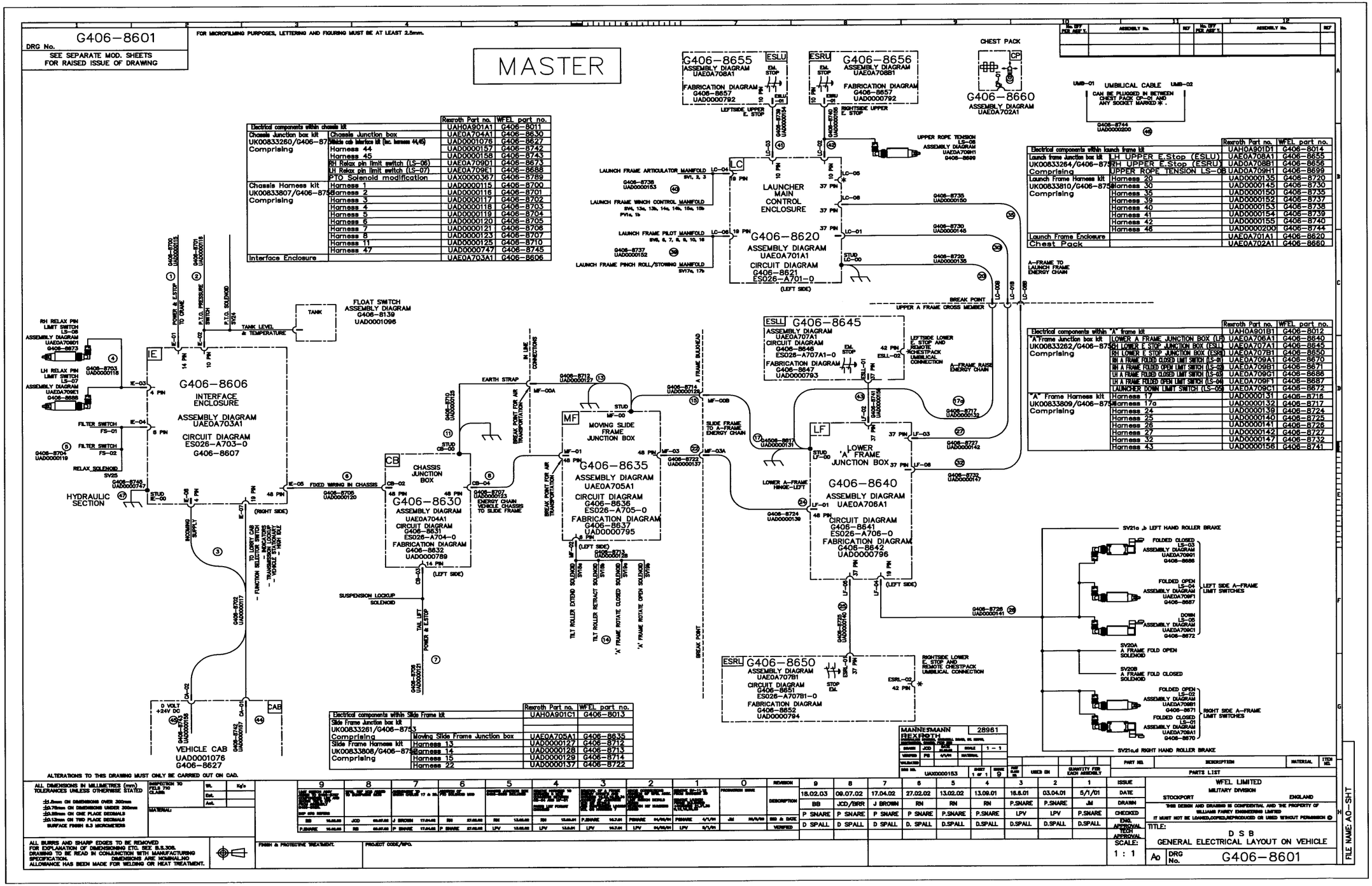


Figure 1 ELECTRICAL SYSTEM OVERVIEW



Electrical components within chassis kit		Rexroth Part no.	WFEL part no.
Chassis Junction box kit	Chassis Junction box	UAH0A901A1	G406-8011
UK00833260/G406-8753	Chassis cab interface kit (inc. harness 44,45)	UAE0A704A1	G406-8630
Comprising	Harness 44	UAD0001076	G406-8627
	Harness 45	UAD0000157	G406-8742
	RH Relax pin limit switch (LS-06)	UAD0000158	G406-8743
	LH Relax pin limit switch (LS-07)	UAE0A709D1	G406-8673
	PTO Solenoid modification	UAE0A709E1	G406-8688
Chassis Harness kit	Harness 1	UAX0000367	G406-8789
UK00833807/G406-8758	Harness 2	UAD0000115	G406-8700
Comprising	Harness 3	UAD0000116	G406-8701
	Harness 4	UAD0000117	G406-8702
	Harness 5	UAD0000118	G406-8703
	Harness 6	UAD0000119	G406-8704
	Harness 7	UAD0000120	G406-8705
	Harness 8	UAD0000121	G406-8706
	Harness 11	UAD0000123	G406-8707
	Harness 47	UAD0000125	G406-8710
Interface Enclosure		UAD0000747	G406-8745
		UAE0A703A1	G406-8606

Electrical components within launch frame kit		Rexroth Part no.	WFEL part no.
Launch frame Junction box kit	LH UPPER E.Stop (ESLU)	UAH0A901D1	G406-8014
UK00833264/G406-8757	RH UPPER E.Stop (ESRU)	UAE0A708A1	G406-8655
Comprising	UPPER ROPE TENSION LS-08	UAE0A708B1	G406-8656
Launch Frame Harness kit	Harness 20	UAD0000135	G406-8720
UK00833810/G406-8759	Harness 30	UAD0000145	G406-8730
Comprising	Harness 35	UAD0000150	G406-8735
	Harness 39	UAD0000152	G406-8737
	Harness 40	UAD0000153	G406-8738
	Harness 41	UAD0000154	G406-8739
	Harness 42	UAD0000155	G406-8740
	Harness 48	UAD0000200	G406-8744
Launch Frame Enclosure		UAE0A709H1	G406-8699
Chest Pack		UAE0A701A1	G406-8620
		UAE0A702A1	G406-8660

Electrical components within "A" frame kit		Rexroth Part no.	WFEL part no.
"A" Frame Junction box kit	LOWER A FRAME JUNCTION BOX (LF)	UAH0A901B1	G406-8012
UK00833262/G406-8756	LH LOWER E STOP JUNCTION BOX (ESLL)	UAE0A707A1	G406-8640
Comprising	RH LOWER E STOP JUNCTION BOX (ESRL)	UAE0A707B1	G406-8645
	RH A FRAME FOLDED CLOSED LIMIT SWITCH (LS-01)	UAE0A709A1	G406-8650
	RH A FRAME FOLDED OPEN LIMIT SWITCH (LS-02)	UAE0A709B1	G406-8670
	LH A FRAME FOLDED CLOSED LIMIT SWITCH (LS-03)	UAE0A709G1	G406-8671
	LH A FRAME FOLDED OPEN LIMIT SWITCH (LS-04)	UAE0A709F1	G406-8686
	LAUNCHER DOWN LIMIT SWITCH (LS-05)	UAE0A709C1	G406-8687
"A" Frame Harness kit	Harness 17	UAD0000131	G406-8672
UK00833809/G406-8754	Harness 17a	UAD0000132	G406-8716
Comprising	Harness 24	UAD0000138	G406-8717
	Harness 25	UAD0000140	G406-8724
	Harness 26	UAD0000141	G406-8725
	Harness 27	UAD0000142	G406-8726
	Harness 32	UAD0000147	G406-8727
	Harness 43	UAD0000156	G406-8732
			G406-8741

Electrical components within Slide Frame kit		Rexroth Part no.	WFEL part no.
Slide Frame Junction box kit		UAH0A901C1	G406-8013
UK00833261/G406-8755			
Comprising	Moving Slide Frame Junction box	UAE0A705A1	G406-8635
Slide Frame Harness kit	Harness 13	UAD0000127	G406-8712
UK00833808/G406-8758	Harness 14	UAD0000128	G406-8713
Comprising	Harness 15	UAD0000129	G406-8714
	Harness 22	UAD0000137	G406-8722

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CHECKED	P SNARE	P SNARE	P SNARE	P SNARE	P.SNARE	P.SNARE	LPV	LPV	P.SNARE	
ENG. APPROVAL	D SPALL	D SPALL	D SPALL	D. SPALL	D.SPALL	D.SPALL	D.SPALL	D.SPALL	D.SPALL	
TECH APPROVAL										
ISS & DATE										
VERIFIED										

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Figure 2 GENERAL ELECTRICAL LAYOUT ON VEHICLE

Build Sequence Step	Cab rotary switch Position	Mode	Control From	Reversionary Mode Valves	Launching Frame Proportional Valve: Pull Handle	Launching Frame Proportional Valve: Push Handle	Launching Frame Winch Control Manifold: Artic-ulator low speed	Launching Frame Winch Control Manifold: Artic-ulator.	Launching Frame Winch Control Manifold: A-Frame Raise Valve	Launch Frame Pilot Manifold: Beam Drive Valve	Launch Frame Pilot Manifold: Lower Winch Brake	Launch Frame Pilot Manifold: Upper Winch Brake	Launch Frame Pilot Manifold: Upper Winch Displace /ment Low	Launch Frame Pilot Manifold: Lower Winch Displace /ment Low	Launch Frame Pilot Manifold: Articulator Free	Launch Frame Pilot Manifold: Winch & Articulator Free Actuation Valve Push/Pull	Launching Frame Winch Control Manifold: Winch Selection Valve A: Lower Winch Prop	Launching Frame Winch Control Manifold: Winch Selection Valve A: Upper Winch Prop	Launching Frame Winch Control Manifold: Winch Selection Valve B: Lower Winch Prop	Launching Frame Winch Control Manifold: Winch Selection Valve B: Upper Winch Prop	Launching Frame Winch Control Manifold: Tension Low PAY ROPE OUT	Launching Frame Winch Control Manifold: Tension Mid PULL JUST ROPE	Launch Frame Pilot Manifold: Stowing Free Valve	Launching Frame Pinch Roll Stowing Manifold: Articulator Stow Extend	Launching Frame Pinch Roll Stowing Manifold: Articulator Stow Retract	A-Frame Rotate Manifold: Tilt Roller Extend	A-Frame Rotate Manifold: Tilt Roller Retract	A-Frame Rotate Manifold: A-Frame Rotate Closed EXTEND	A-Frame Rotate Manifold: A-Frame Rotate Open RETRACT	Stabiliser Manifold: A-Frame Fold Open EXTEND	Stabiliser Manifold: A-Frame Fold Closed RETRACT	N/A: Roller Brake from chest pack	Interface Cabinet: PTO Solenoid	Interface Manifold: Relax	Interface Junction Box: Relax pin In	Interface Junction Box:
				Solenoid Current	1.5	1.5	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24		5	1.24		
				Chest Pack Lights	PV1A	PV1B	SV1	SV2	SV3	SV4	SV5	SV6	SV7	SV8	SV9	SV10	SV13A	SV13B	SV14A	SV14B	SV15A	SV15B	SV16	SV17a	SV17b	SV18A	SV18B	SV19a	SV19b	SV20a	SV20b	SV21ABCD	SV24	SV25	LS	LS
Road Mode	1	A-Frame Folding	Interface Enclosure	N/A																											X			
																													X		X		X
2	2	A-Frame Rotate	Interface Enclosure	N/A																								X			X			
																						X				X				X		X		
3	3	Slide Frame Extend		N/A																													X	
																																		X
4	4	Relax	Interface Enclosure	N/A																											X			
																														X	X			
5	4	Power On	Chest Pack / launcher enclosure.	Power On																											X			X
6	4	Articulator (Referring to Far Bank Support)		BEAM ANGLE																										X	X			X
			JSR Forward	Beam RAISE at far bank	X			X														X								X	X			X
			JSR Backward	Beam LOWER at far bank		X		X														X								X	X			X
7	4	Beam Drive		BEAM DRIVE						X			X	X																X	X			X
			JSR Forward	Beam drive OUT	X					X		X	X	X		X	X		X		X		X							X	X			X
			JSR Backward	Beam drive IN		X				X		X	X	X		X	X		X			X	X							X	X			X
8	4	Articulator Stow For Bank Seat		FAR BANK SEAT			X																							X	X			X
			JSR Forward	Beam RAISE at far bank	X		X																X							X	X			X
			JSR Backward	Beam LOWER at far bank		X	X								X	X							X							X	X			X
9	4	Articulator Stowing Stowing Cylinder		ARTICULATOR STOW																										X	X			X
			JSR Forward	Articulator cylinders RETRACT																				X							X	X			X
			JSR Backward	Articulator cylinders EXTEND																					X						X	X			X
10	4	A-Frame Raise		A-FRAME RAISE					X																					X	X			X
			JSR Forward	A-Frame RAISE		X			X																						X	X			X
			JSR Backward	A-Frame LOWER	X				X																						X	X			X
11	4	Bridge Angle Select		MODE SELECT																											X	X			X
			JSR Forward																												X	X			X
			JSR Backward																												X	X			X
	4	Carriage Drive CARRIGE_EMPTY		CARRIGE EMPTY																											X	X			X
			JSR Forward	Carriage OUT	X						X	X	X	X		X		X		X	X										X	X			X
			JSR Backward	Carriage IN	X						X	X	X	X		X	X		X		X										X	X			X
	4	Carriage Drive HIGH_BANK		HIGH BANK/TILT ROLLER																											X	X			X
			JSR Forward	Beam drive OUT	X						X	X		X		X		X		X	X										X	X			X
			JSR Backward	Beam drive IN		X					X	X		X		X		X		X		X									X	X			
		Tilt Roller	JSR Forward																							X					X				
			JSR Backward																								X					X				
	4	Carriage Drive LEVEL_BANK		LEVEL BANK/TILT ROLLER																											X	X			X
			JSR Forward	Beam drive OUT	X						X	X		X		X		X		X											X	X			X
			JSR Backward	Beam drive IN	X						X	X	X			X	X		X												X	X			X
		Tilt Roller	JSR Forward																							X					X				
			JSR Backward																								X					X				
		Carriage Drive LOW_BANK		LOW BANK/TILT ROLLER																											X	X			X
			JSR Forward	Beam drive OUT		X					X	X	X			X	X		X												X	X			X
			JSR Backward	Beam drive IN	X						X	X	X			X	X		X		X										X	X			X
		Tilt Roller	JSR Forward																							X					X				
			JSR Backward																								X					X				
12	4	Bridge Lift		BRIDGE LIFT																											X	X			X
			JSR Forward	Bridge LIFT	X						X					X	X		X		X										X	X			X
		Bottom winch only	JSR Backward	Bridge LOWER		X					X					X	X		X		X										X	X			X
13	4	Top winch.		TOP WINCH																											X	X			
		Top winch,only for Maintainance	JSR Forward		X							X				X		X		X	X										X	X			
			JSR Backward			X						X				X		X		X	X										X	X			

Figure 3 SOLENOID ENERGISATION CHART

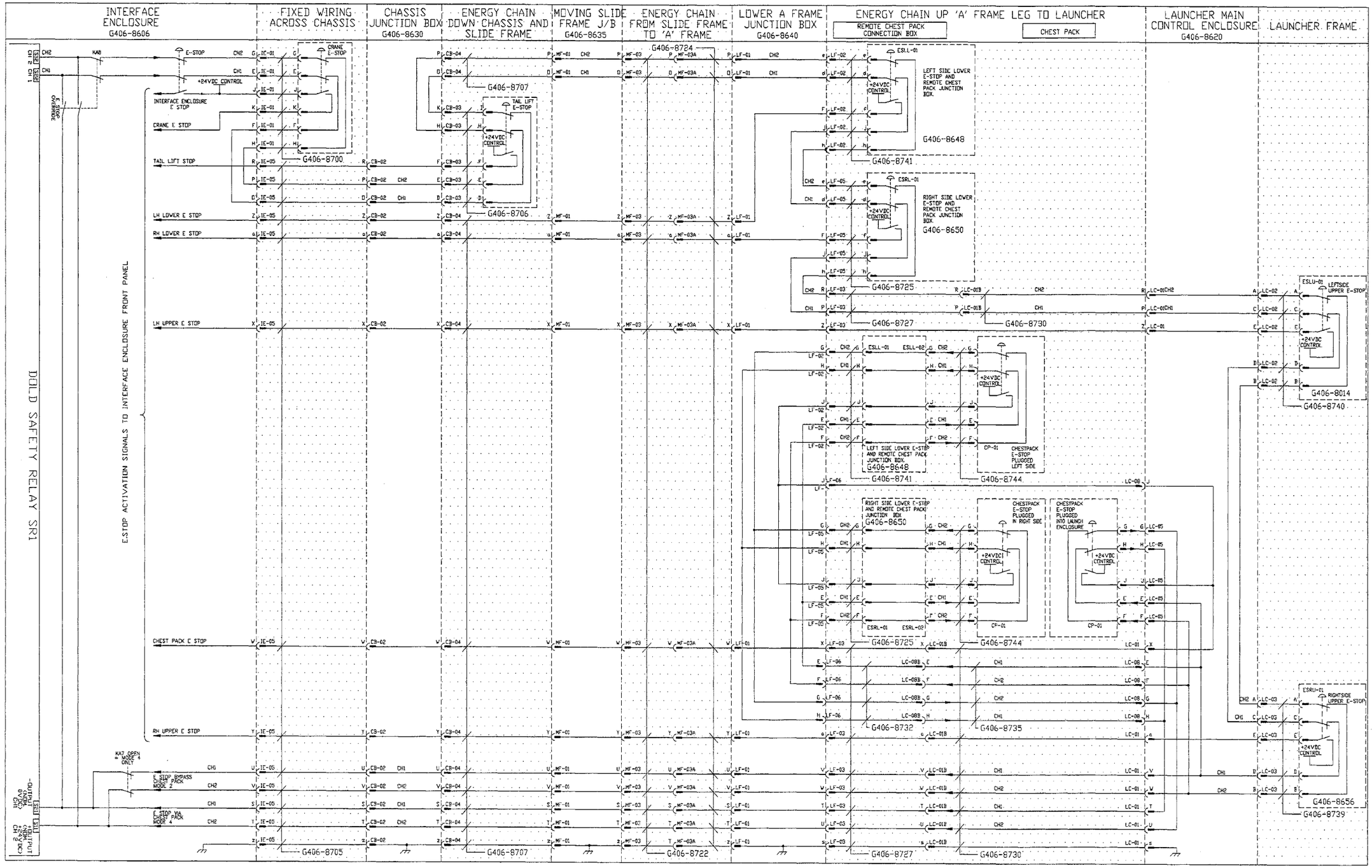


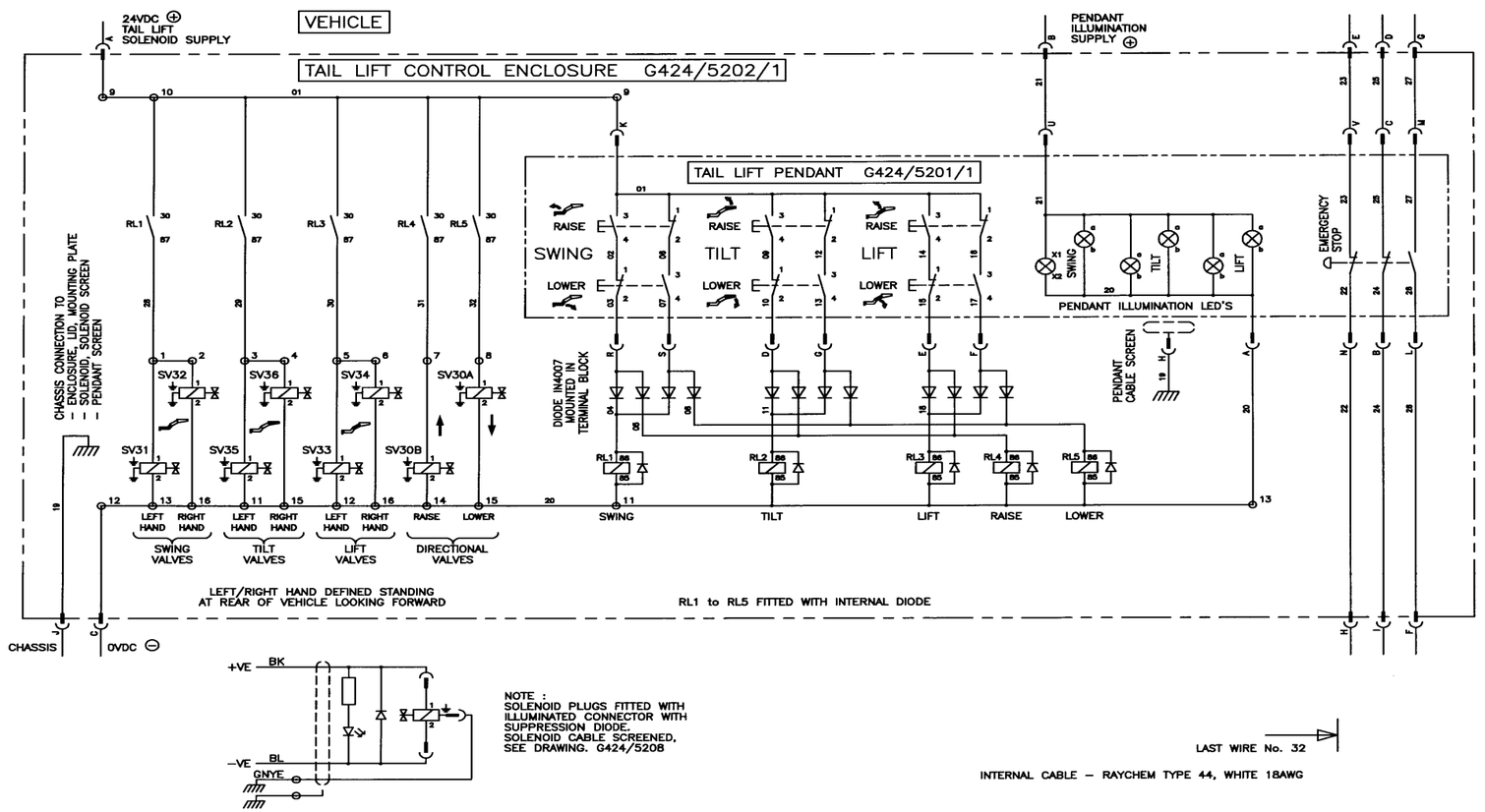
Figure 1 EMERGENCY STOP AND SUPPLY SCHEMATIC

DRG No. G424/5200

SEE SEPARATE MOD. SHEETS FOR RAISED ISSUE OF DRAWING

FOR MICROFILMING PURPOSES, LETTERING AND FIGURING MUST BE AT LEAST 2.5mm.

No. OFF PER ASS'Y.	ASSEMBLY No.	REF	No. OFF PER ASS'Y.	ASSEMBLY No.	REF



ALTERATIONS TO THIS DRAWING MUST ONLY BE CARRIED OUT ON CAD.

ALL DIMENSIONS IN MILLIMETRES (mm)
TOLERANCES UNLESS OTHERWISE STATED
±1.5mm ON DIMENSIONS OVER 300mm
±0.75mm ON DIMENSIONS UNDER 300mm
±0.25mm ON ONE PLACE DECIMALS
±0.13mm ON TWO PLACE DECIMALS
SURFACE FINISH 6.3 MICROMETERS

INSPECTION TO FELS 710 CLASS:
MATERIAL:
Wt. / Est. / Act. — Kg's

ALL BURRS AND SHARP EDGES TO BE REMOVED
FOR EXPLANATION OF DIMENSIONING ETC. SEE B.S. 308.
DRAWING TO BE READ IN CONJUNCTION WITH MANUFACTURING SPECIFICATION. DIMENSIONS ARE NOMINAL. NO ALLOWANCE HAS BEEN MADE FOR WELDING OR HEAT TREATMENT.

FINISH & PROTECTIVE TREATMENT.
PROJECT CODE/WPD.

ISSUE	2	1
DATE	26. 3. 03	24. 01. 02
DRAWN	ECAD	ECAD
CHECKED	GIJ	GIJ
ENG. APPROVAL	GIJ	GIJ
TECH APPROVAL		

SCALE: NTS

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TITLE: ELECTRICAL INSTALLATION TAIL LIFT SCHEMATIC

A1 DRG No. G424/5200 SHEET 2 of 2

FILE NAME: G424-5200-02

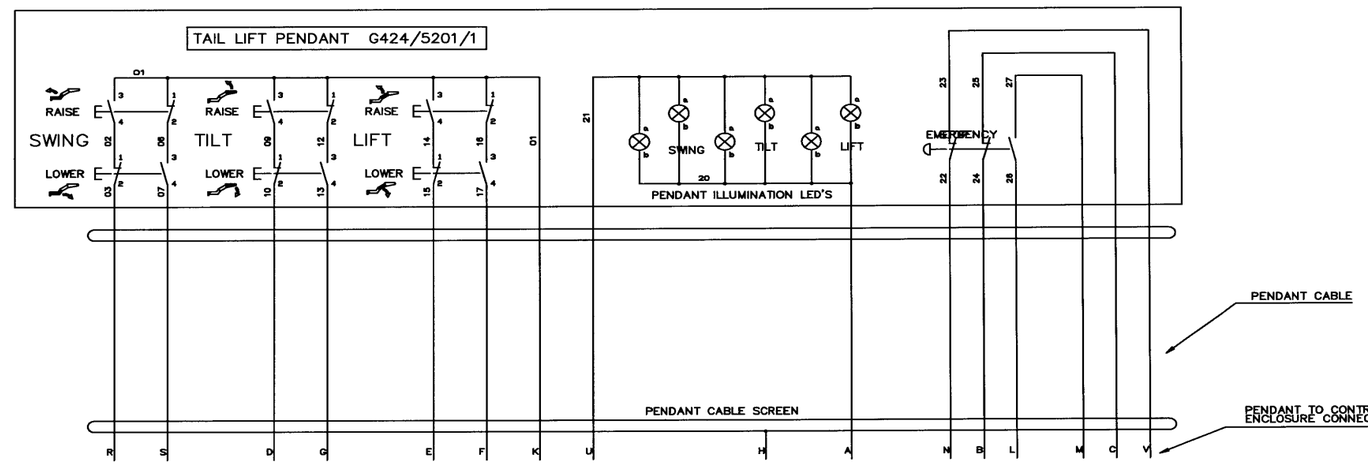
Figure 1 ELECTRICAL INSTALLATION TAIL LIFT SCHEMATIC

DRG No. G424/5201

SEE SEPARATE MOD. SHEETS FOR RAISED ISSUE OF DRAWING

FOR MICROFILMING PURPOSES, LETTERING AND FIGURING MUST BE AT LEAST 2.5mm.

No.OFF. PER ASS'Y.	ASSEMBLY No.	REF	No.OFF. PER ASS'Y.	ASSEMBLY No.	REF



INTERNAL CABLE – RAYCHEM TYPE 44, WHITE 18AWG

ALTERATIONS TO THIS DRAWING MUST ONLY BE CARRIED OUT ON CAD.

ALL DIMENSIONS IN MILLIMETRES (mm) TOLERANCES UNLESS OTHERWISE STATED

±1.5mm ON DIMENSIONS OVER 300mm
±0.75mm ON DIMENSIONS UNDER 300mm
±0.25mm ON ONE PLACE DECIMALS
±0.13mm ON TWO PLACE DECIMALS
SURFACE FINISH 6.3 MICROMETERS

INSPECTION TO FELS 710 CLASS:

MATERIAL:

	Wt.	Kg's
	Est.	
	Act.	

ALL BURRS AND SHARP EDGES TO BE REMOVED
FOR EXPLANATION OF DIMENSIONING ETC. SEE B.S.308.
DRAWING TO BE READ IN CONJUNCTION WITH MANUFACTURING SPECIFICATION. DIMENSIONS ARE NOMINAL.NO ALLOWANCE HAS BEEN MADE FOR WELDING OR HEAT TREATMENT.

FINISH & PROTECTIVE TREATMENT.

PROJECT CODE/WPO.

ISSUE	1	2	3
DATE	24.01.02	19/11/02	26.03.03
DRAWN	ECAD	IB	ECAD
CHECKED	GIJ		GIJ
ENG. APPROVAL	GIJ		GIJ
TECH APPROVAL			

SCALE: NTS

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TITLE: TAIL LIFT PENDANT ELECTRICAL SCHEMATIC

A1 DRG No. G424/5201 SHEET 1 of 4

FILE NAME: G424-5201_SHT1_R3

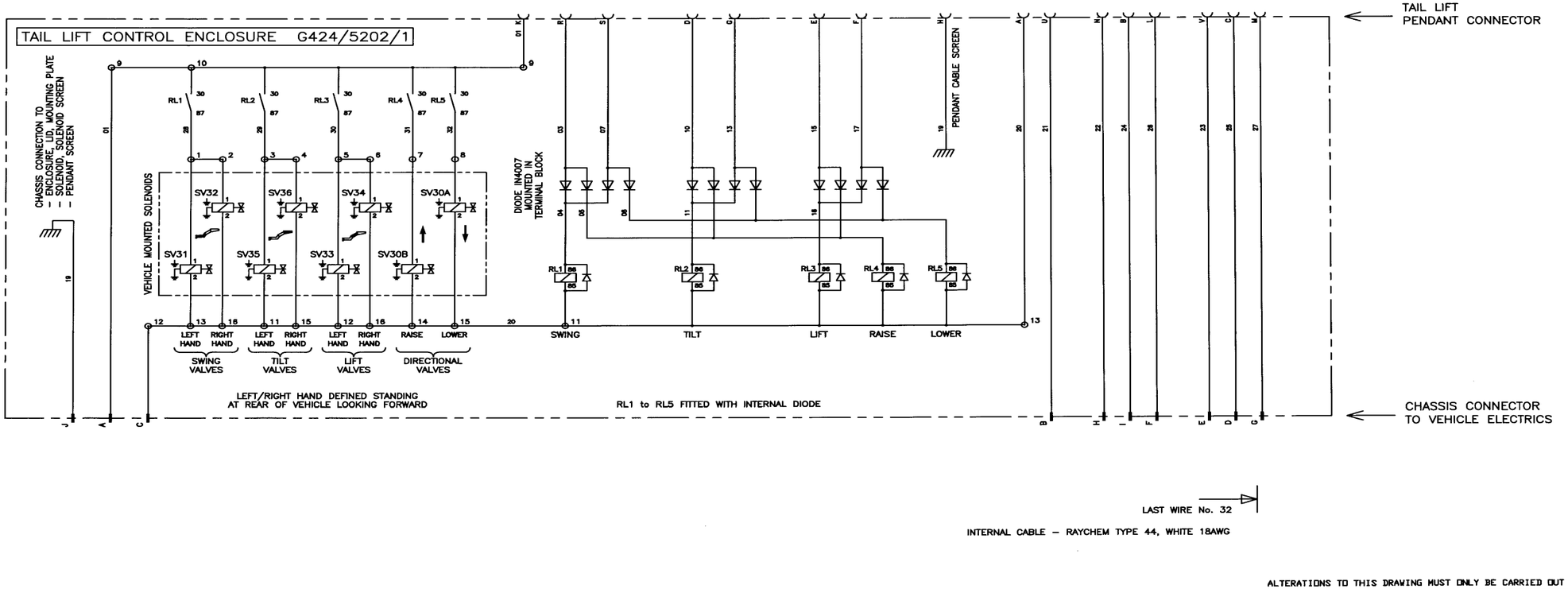
Figure 2 TAIL LIFT PENDANT ELECTRICAL SCHEMATIC

DRG No. G424/5202

SEE SEPARATE MOD. SHEETS FOR RAISED ISSUE OF DRAWING

FOR MICROFILMING PURPOSES, LETTERING AND FIGURING MUST BE AT LEAST 2.5mm.

No. OFF PER ASS'Y.	ASSEMBLY No.	REF	No. OFF PER ASS'Y.	ASSEMBLY No.	REF



ALTERATIONS TO THIS DRAWING MUST ONLY BE CARRIED OUT ON CAD.

ALL DIMENSIONS IN MILLIMETRES (mm)
TOLERANCES UNLESS OTHERWISE STATED
±1.5mm ON DIMENSIONS OVER 300mm
±0.75mm ON DIMENSIONS UNDER 300mm
±0.25mm ON ONE PLACE DECIMALS
±0.12mm ON TWO PLACE DECIMALS
SURFACE FINISH 6.3 MICROMETERS

INSPECTION TO FELS 710 CLASS:
Wt. Kg's
Est.
Act.
MATERIAL:

ALL BURRS AND SHARP EDGES TO BE REMOVED
FOR EXPLANATION OF DIMENSIONING ETC. SEE B.S. 308.
DRAWING TO BE READ IN CONJUNCTION WITH MANUFACTURING SPECIFICATION. DIMENSIONS ARE NOMINAL. NO ALLOWANCE HAS BEEN MADE FOR WELDING OR HEAT TREATMENT.

FINISH & PROTECTIVE TREATMENT.
PROJECT CODE/WPO.

ISSUE	2	1
DATE	26.3.03	24.01.02
DRAWN	ECAD	ECAD
CHECKED	GIJ	GIJ
ENG. APPROVAL	GIJ	GIJ
TECH APPROVAL		

SCALE: NTS

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TITLE: TAIL LIFT CONTROL ENCLOSURE ELECTRICAL SCHEMATIC

A1 DRG No. G424/5202 SHEET 1 of 6

FILE NAME G424-5202-01

Figure 3 TAIL LIFT CONTROL ENCLOSURE ELECTRICAL SCHEMATIC

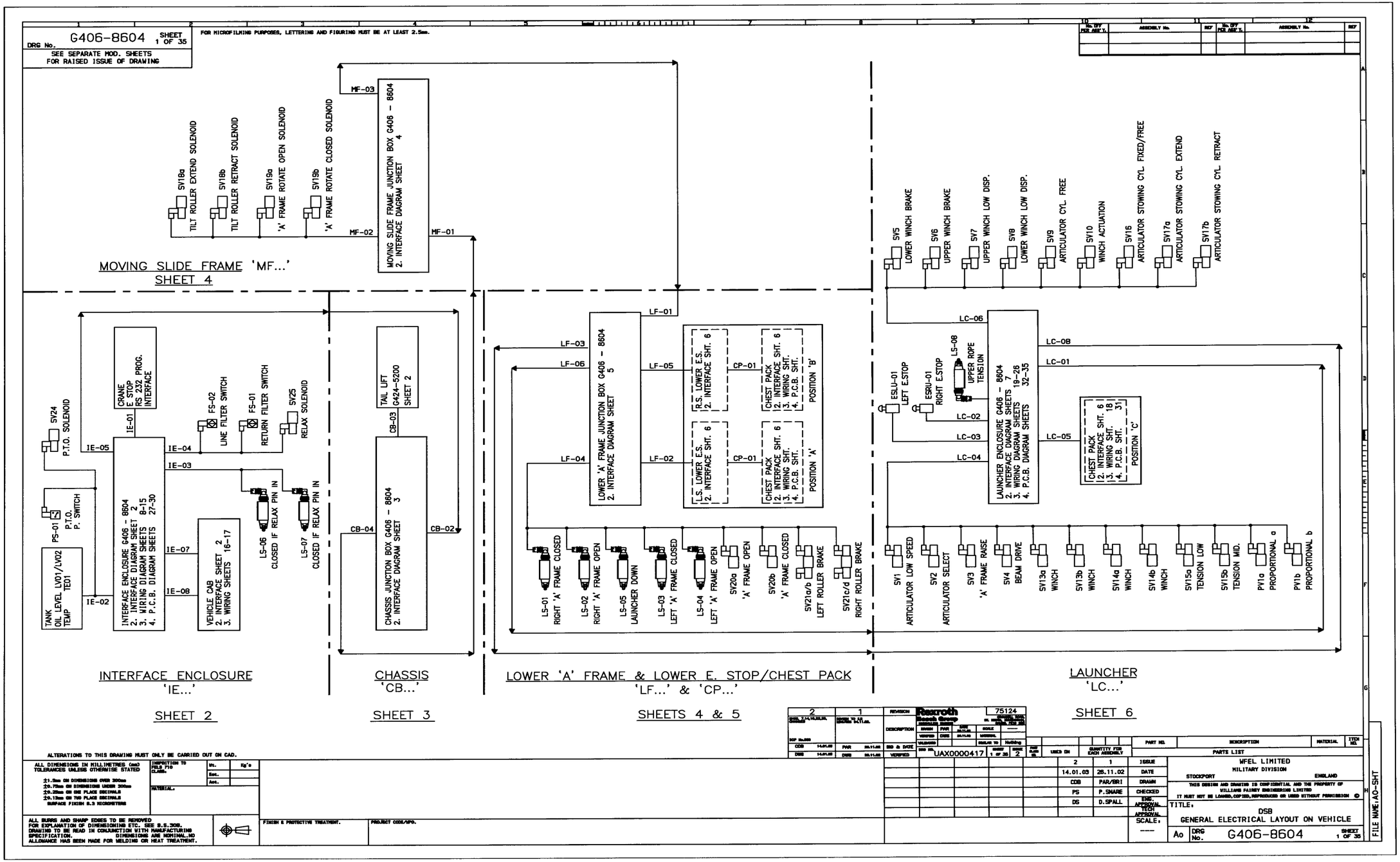


Figure 1 GENERAL ELECTRICAL LAYOUT ON VEHICLE

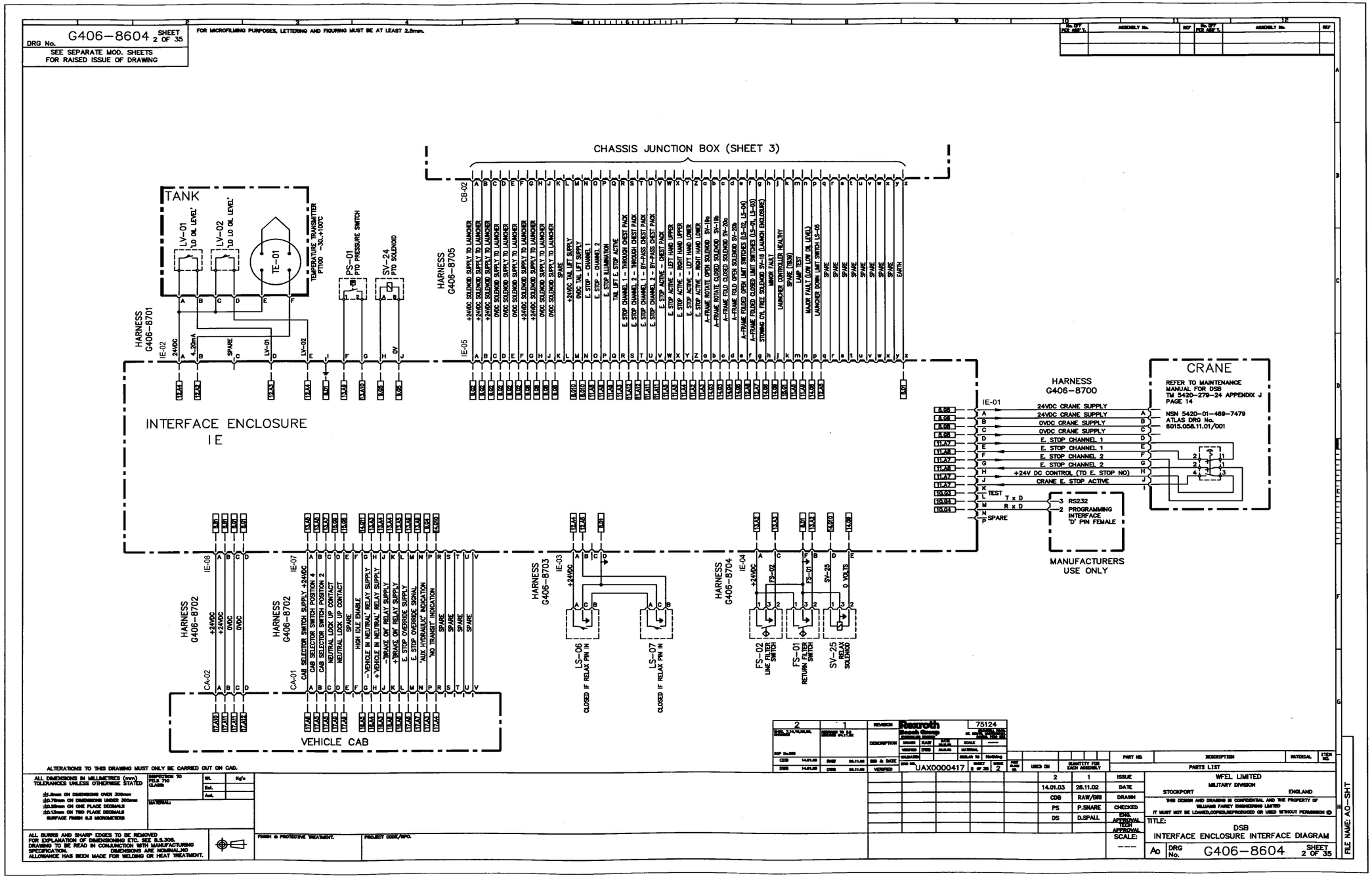


Figure 2 INTERFACE ENCLOSURE INTERFACE DIAGRAM

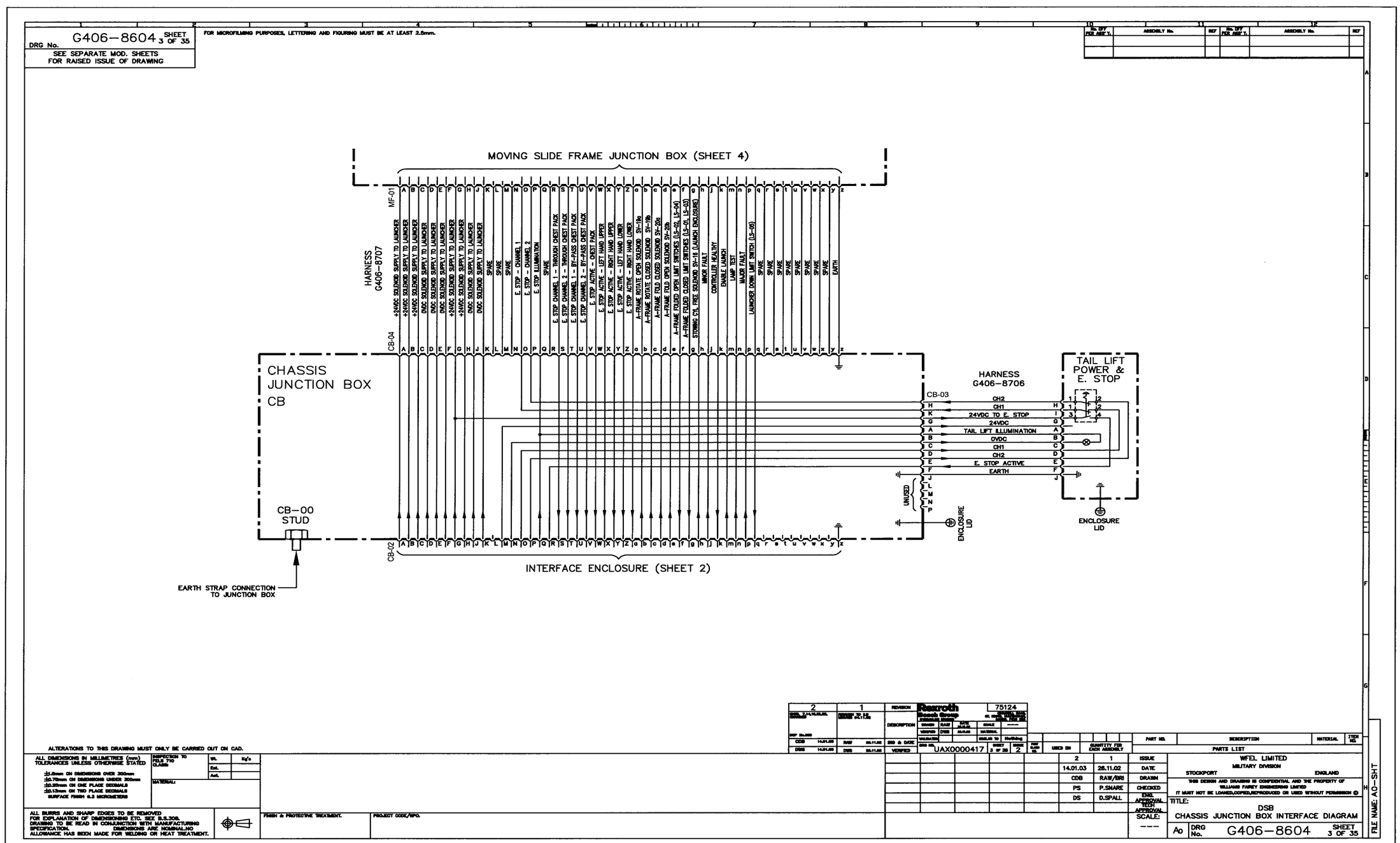


Figure 3 CHASSIS JUNCTION BOX INTERFACE DIAGRAM

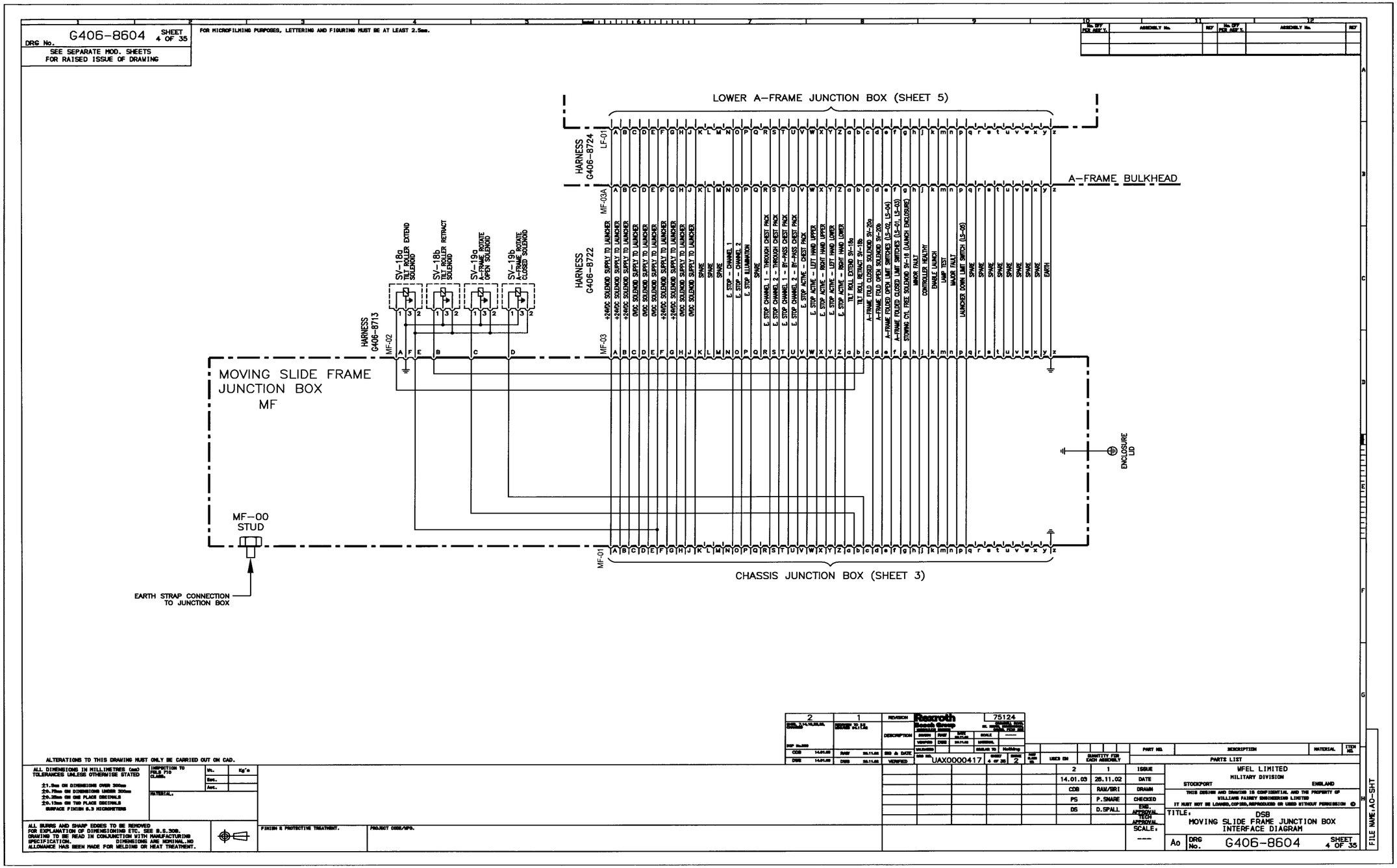


Figure 4 MOVING SLIDE FRAME JUNCTION BOX INTERFACE DIAGRAM

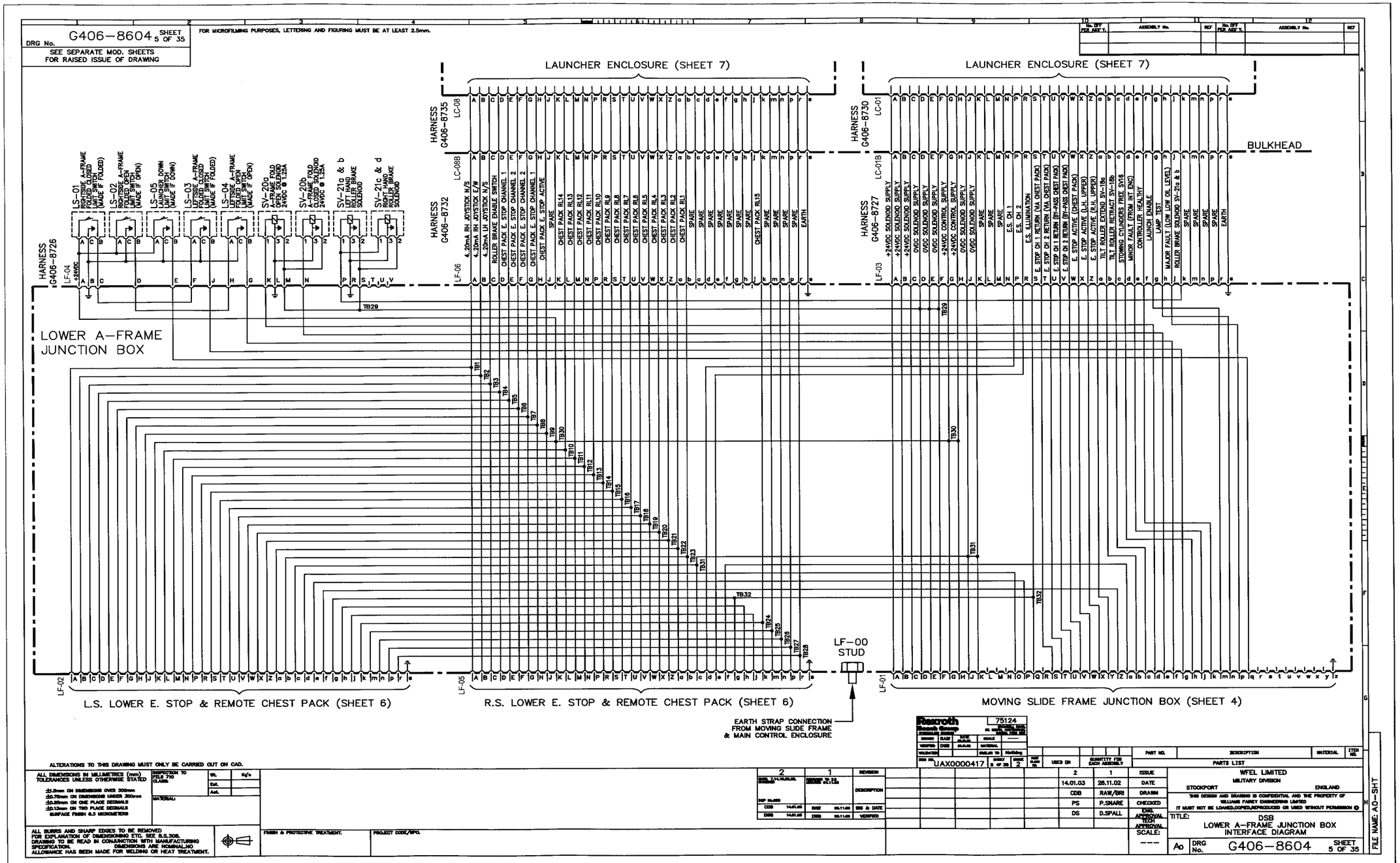


Figure 5 LOWER A-FRAME JUNCTION BOX INTERFACE DIAGRAM

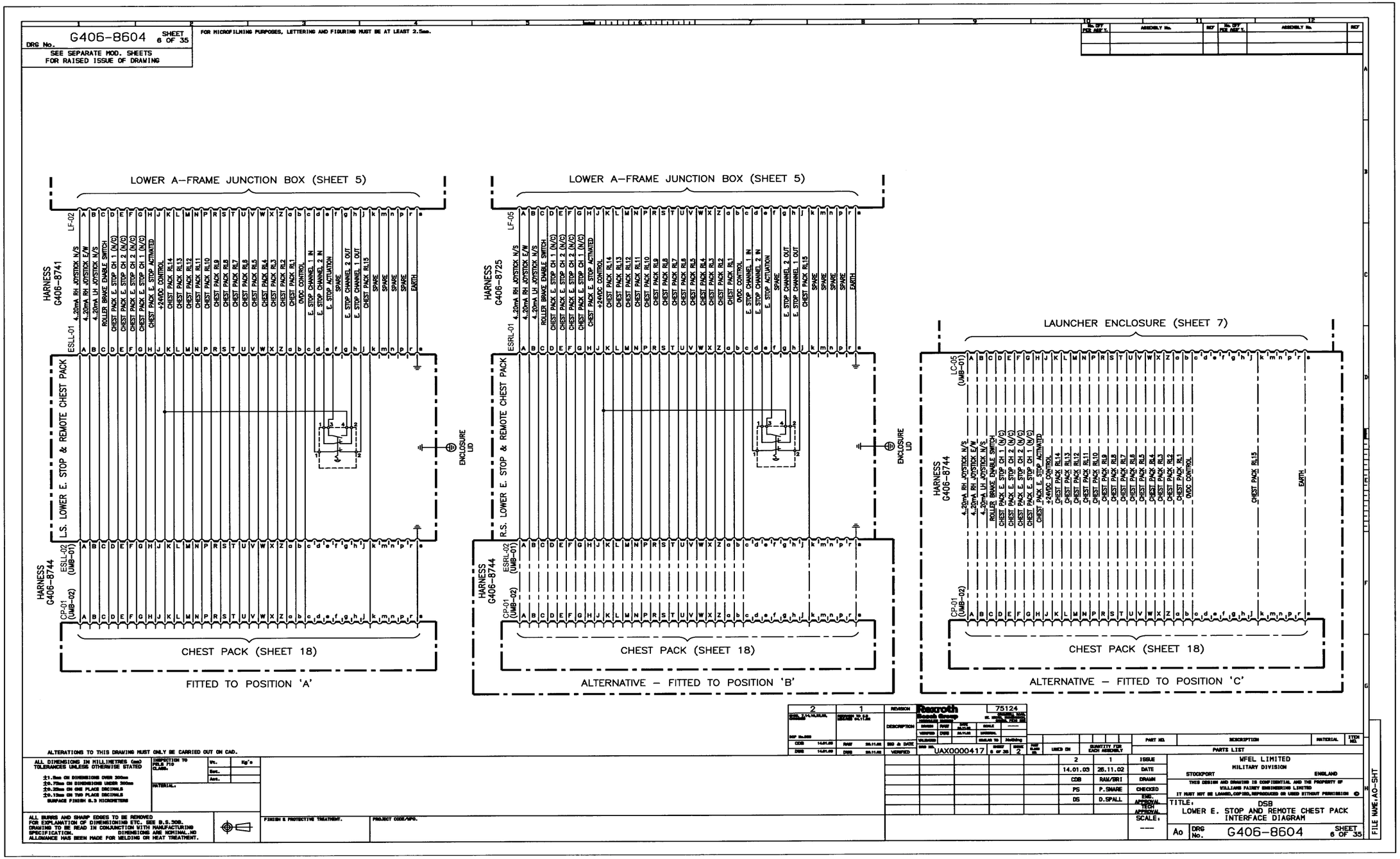


Figure 6 LOWER E. STOP AND REMOTE CHEST PACK INTERFACE DIAGRAM

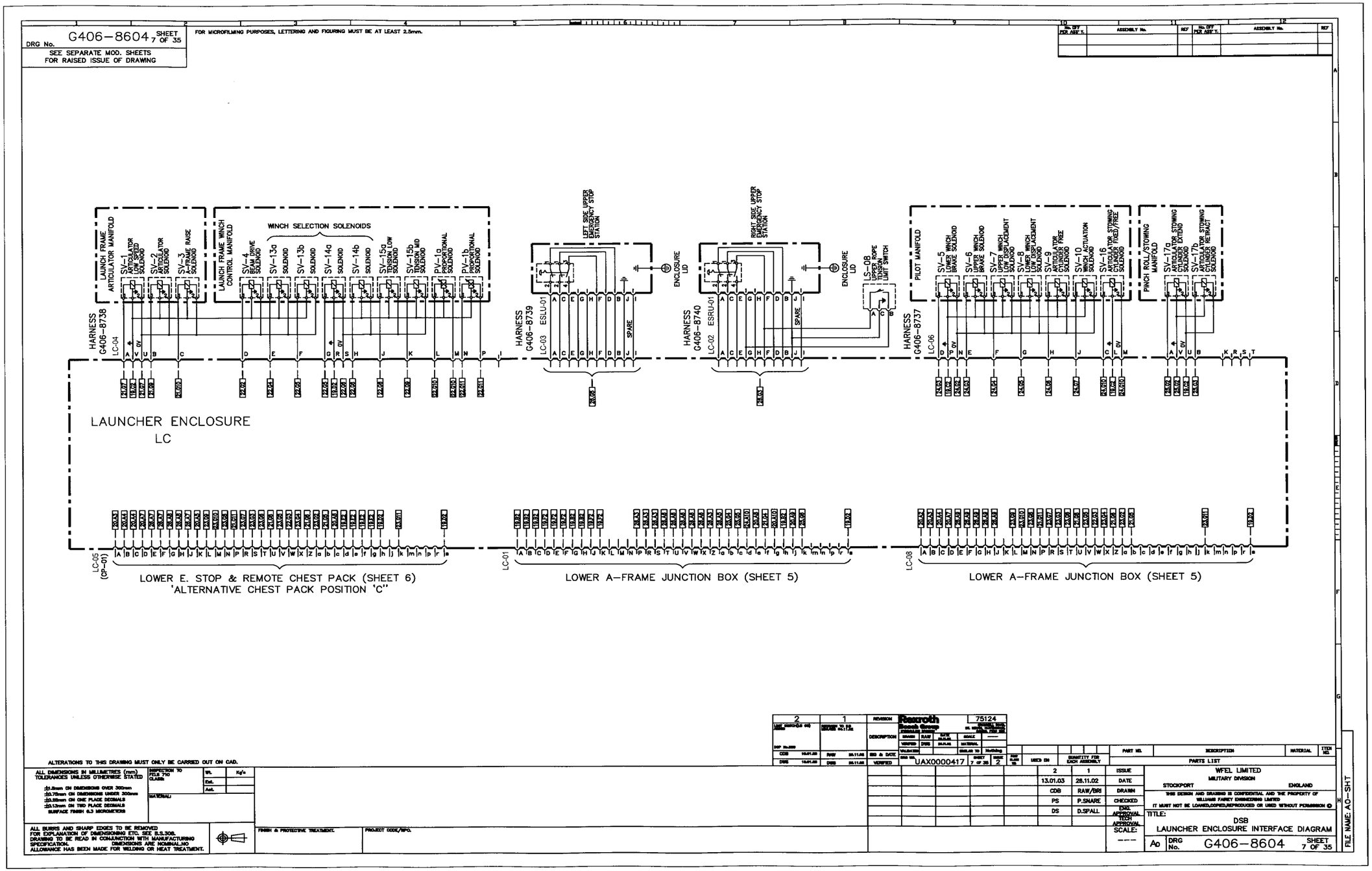


Figure 7 LAUNCHER ENCLOSURE INTERFACE DIAGRAM

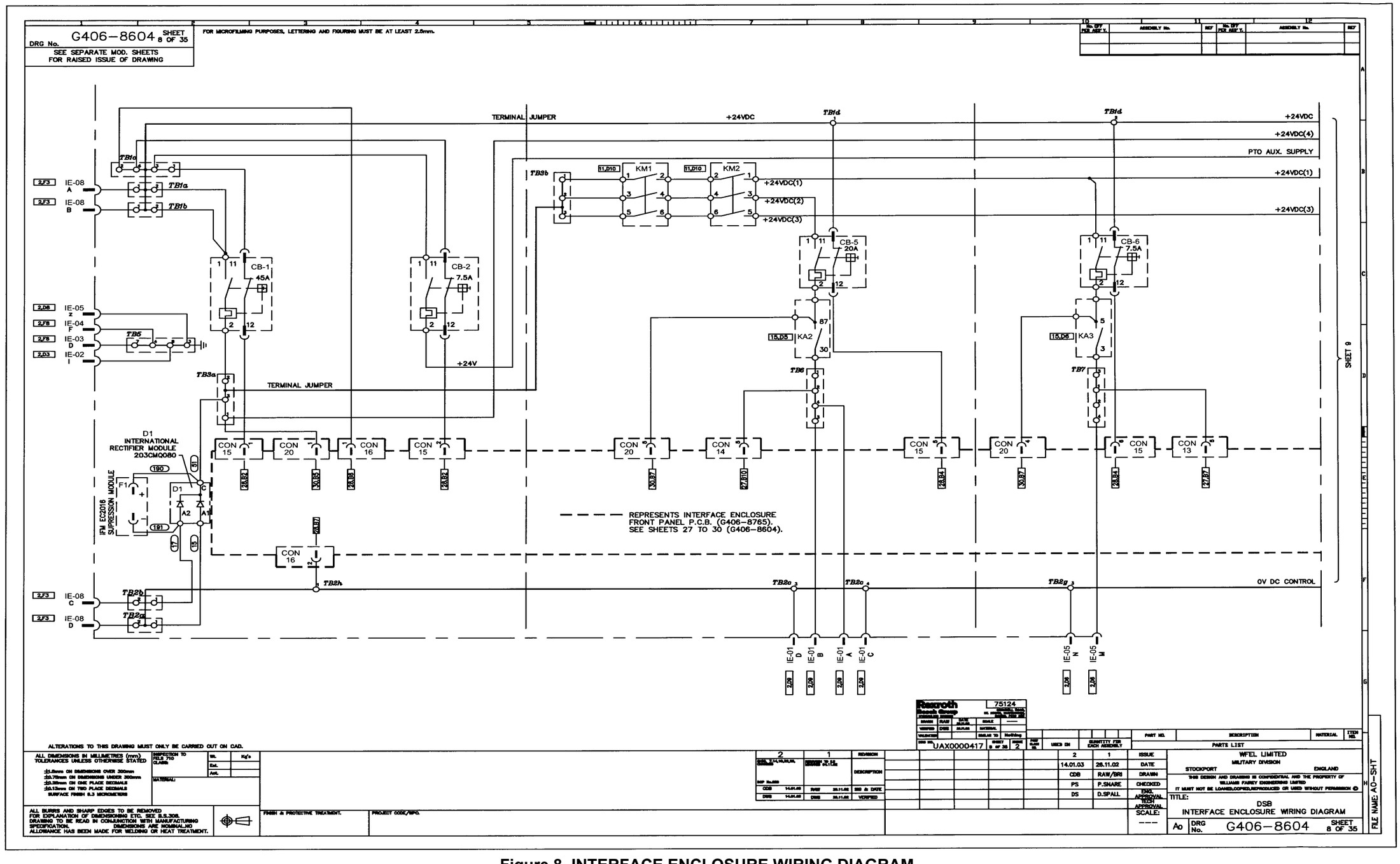


Figure 8 INTERFACE ENCLOSURE WIRING DIAGRAM

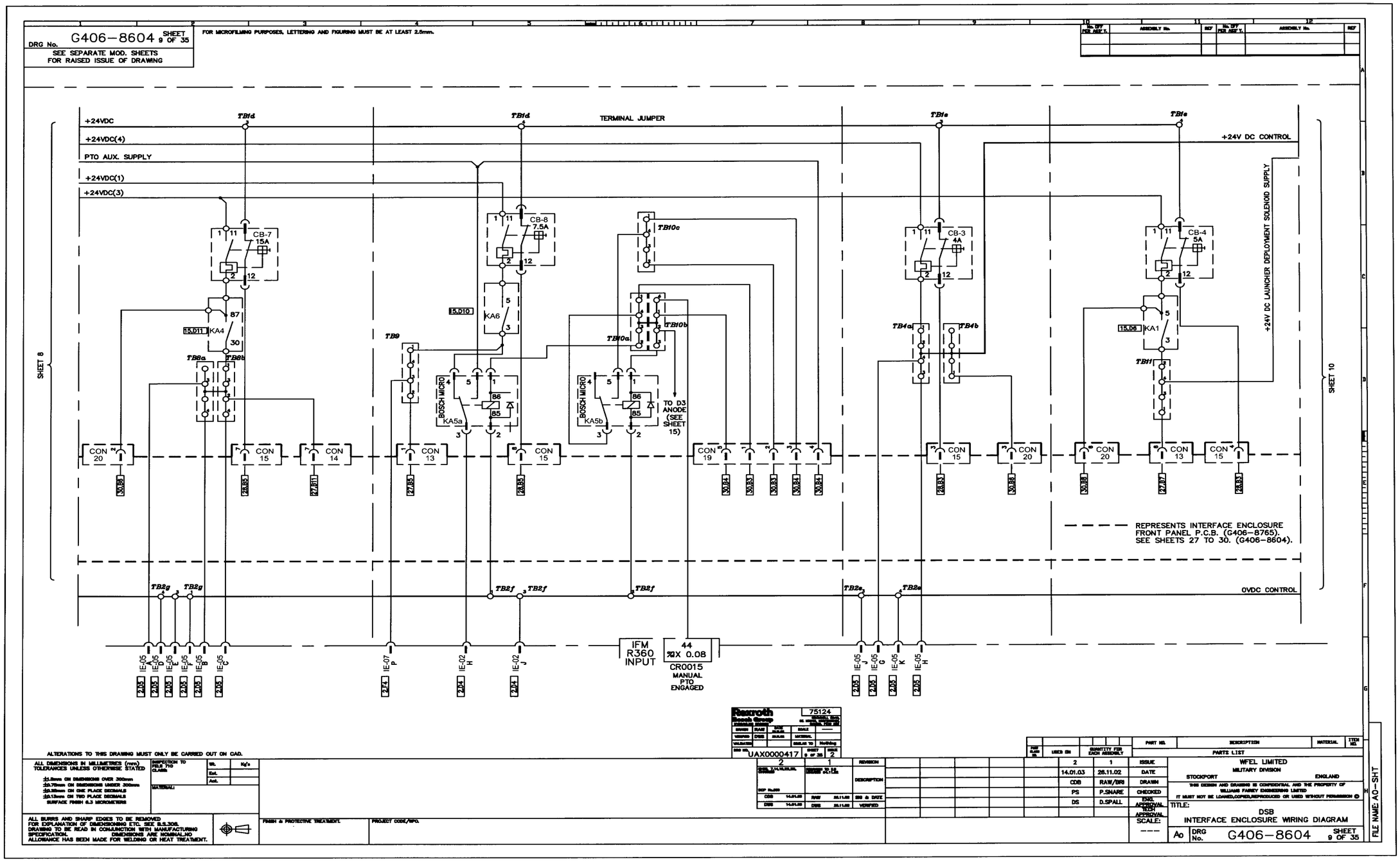


Figure 9 INTERFACE ENCLOSURE WIRING DIAGRAM

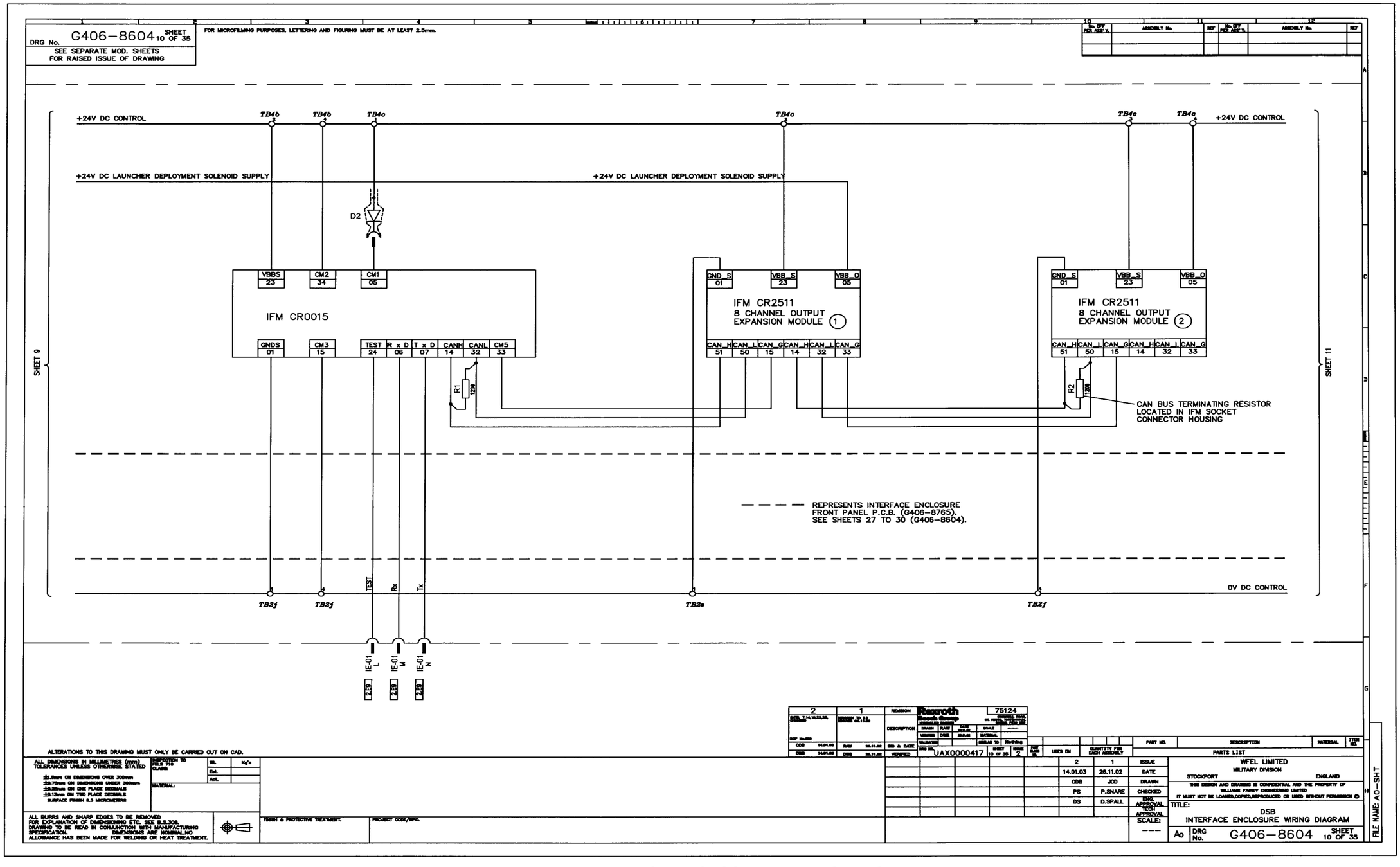


Figure 10 INTERFACE ENCLOSURE WIRING DIAGRAM

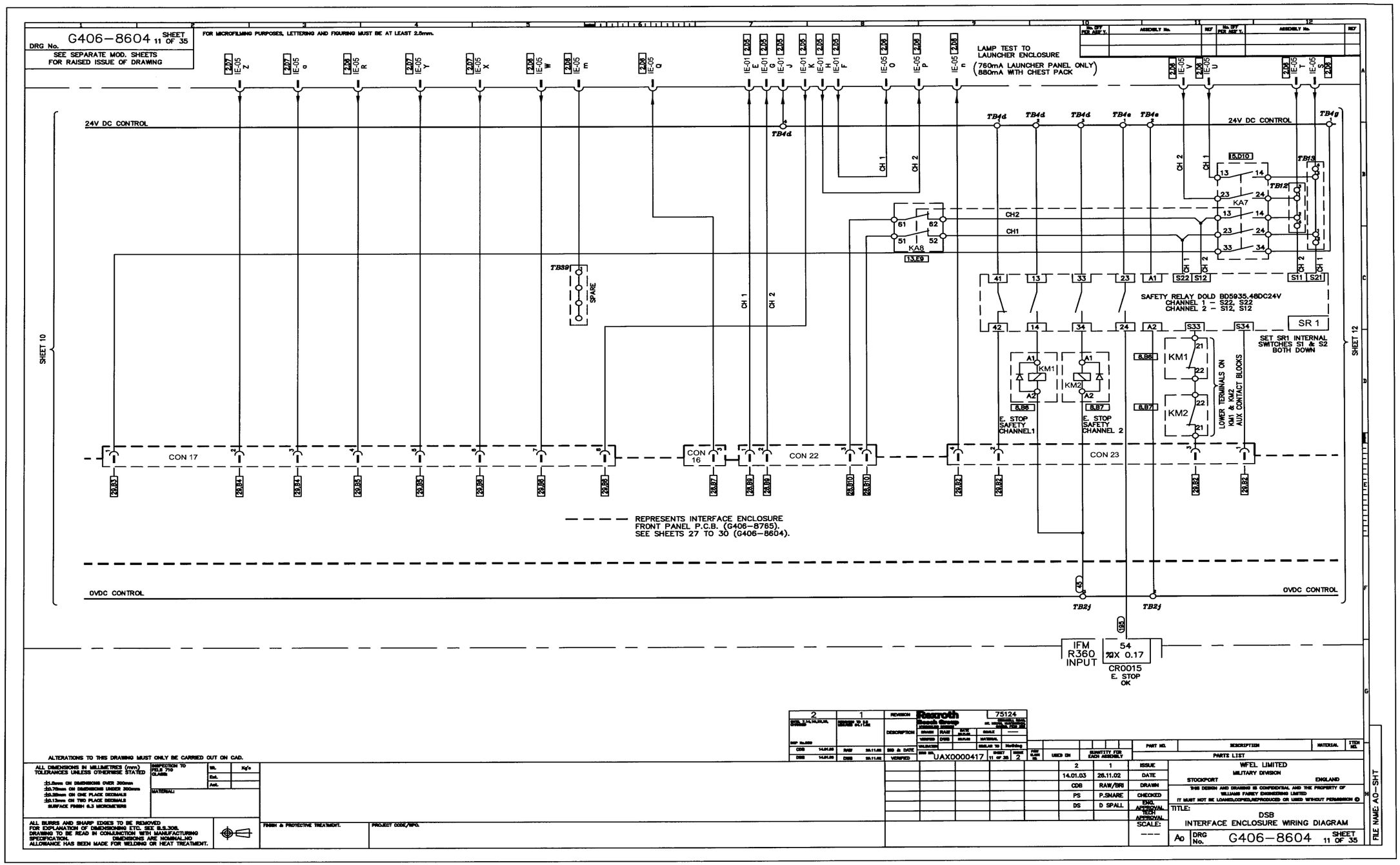


Figure 11 INTERFACE ENCLOSURE WIRING DIAGRAM

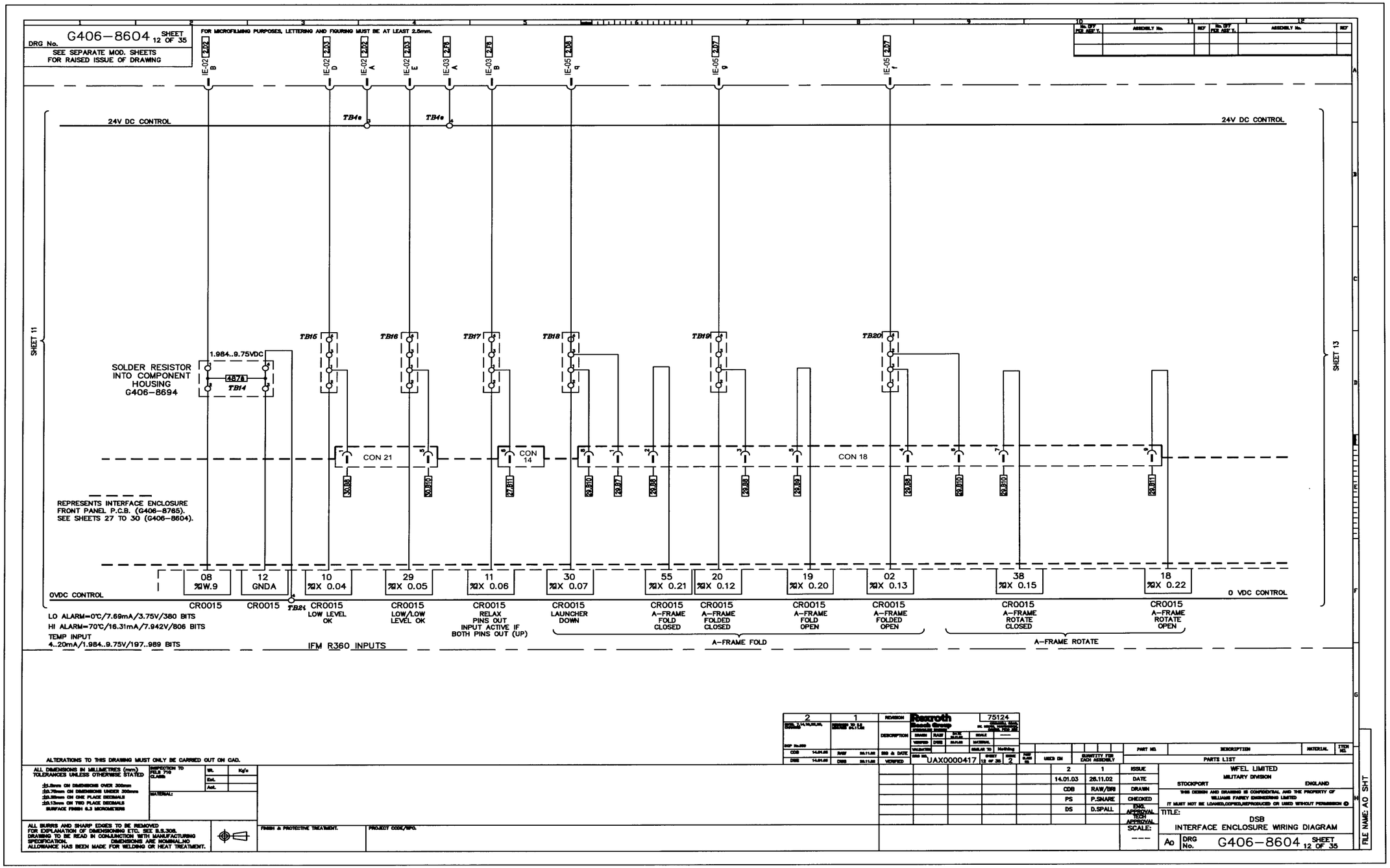


Figure 12 INTERFACE ENCLOSURE WIRING DIAGRAM

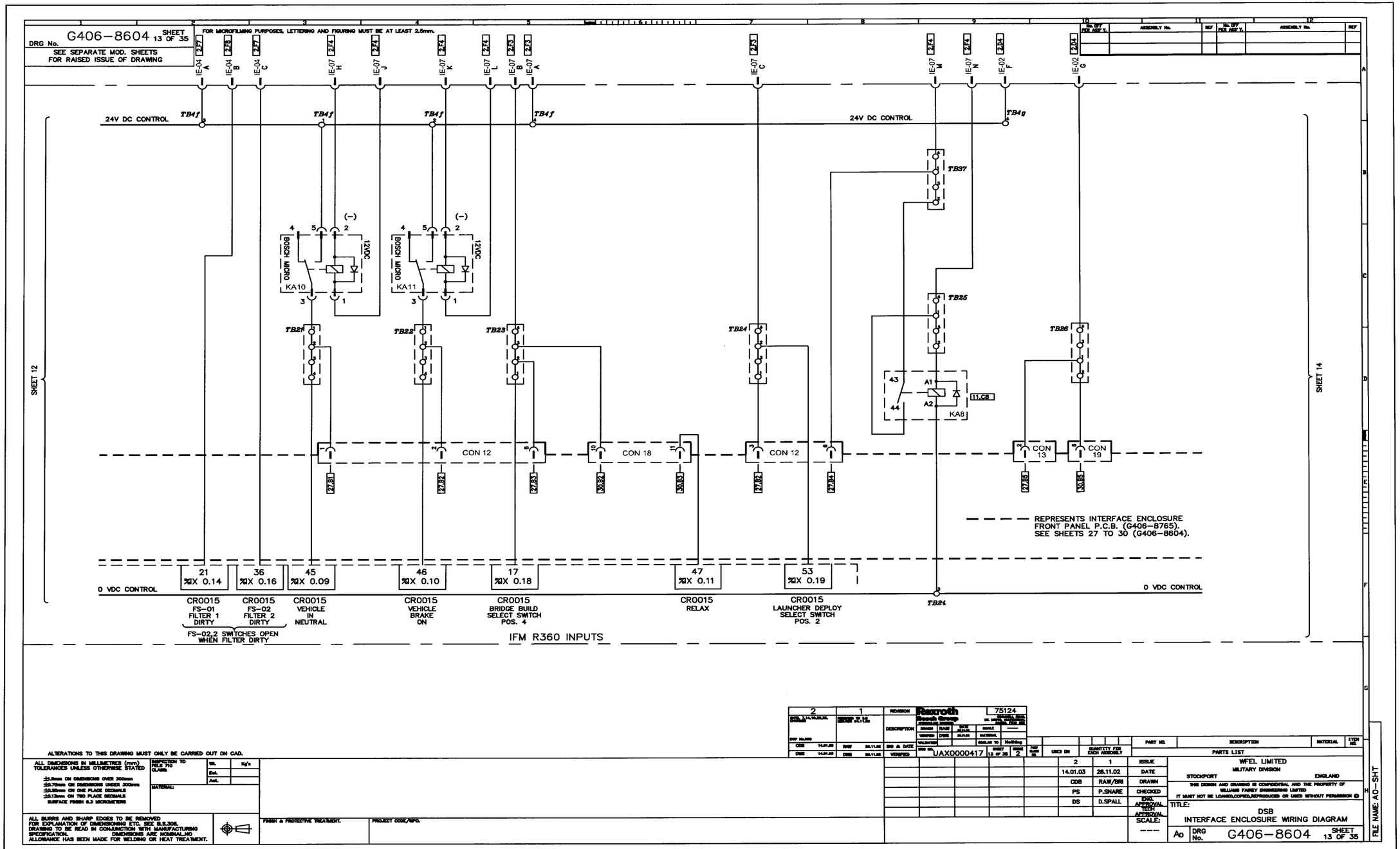


Figure 13 INTERFACE ENCLOSURE WIRING DIAGRAM

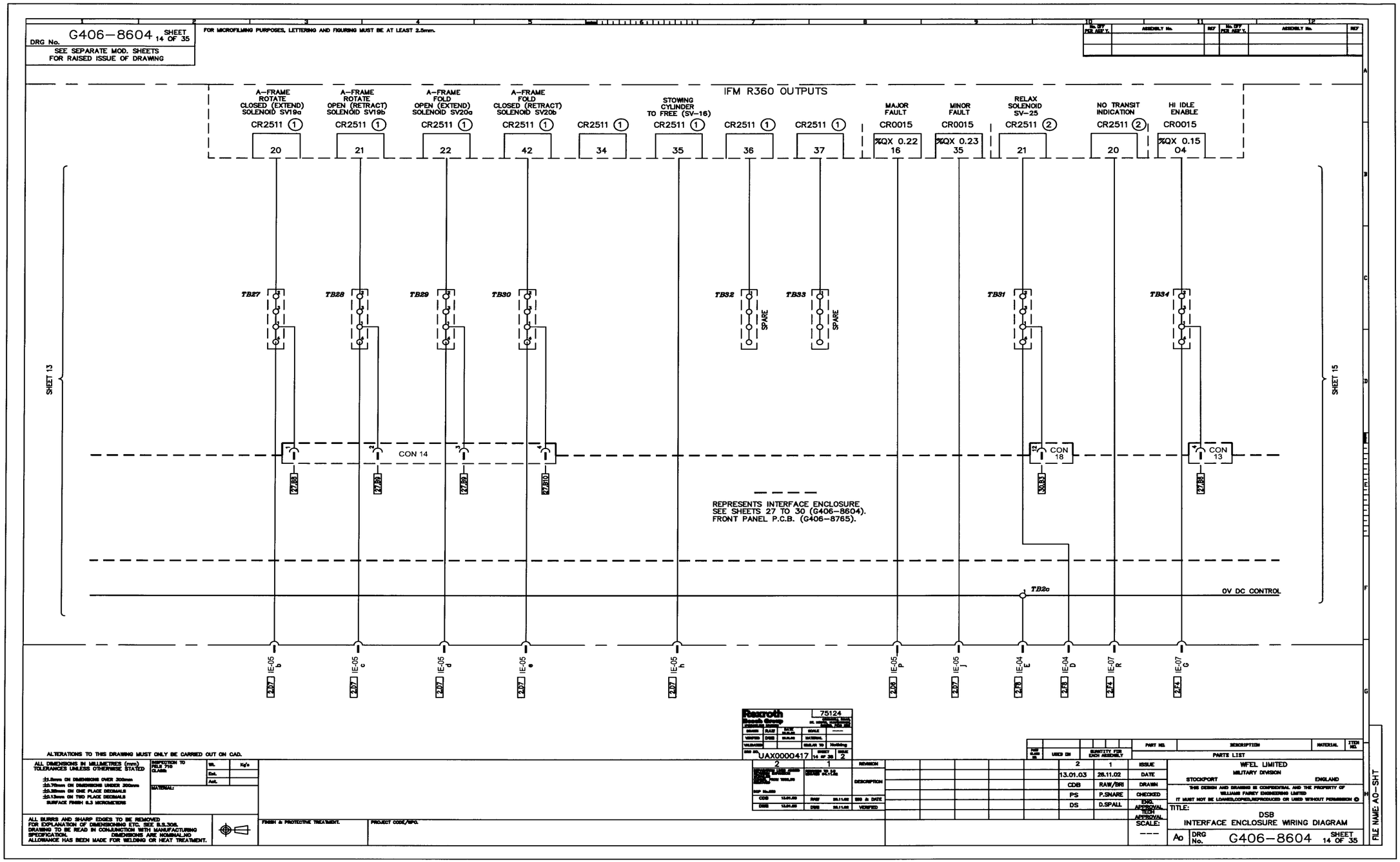


Figure 14 INTERFACE ENCLOSURE WIRING DIAGRAM

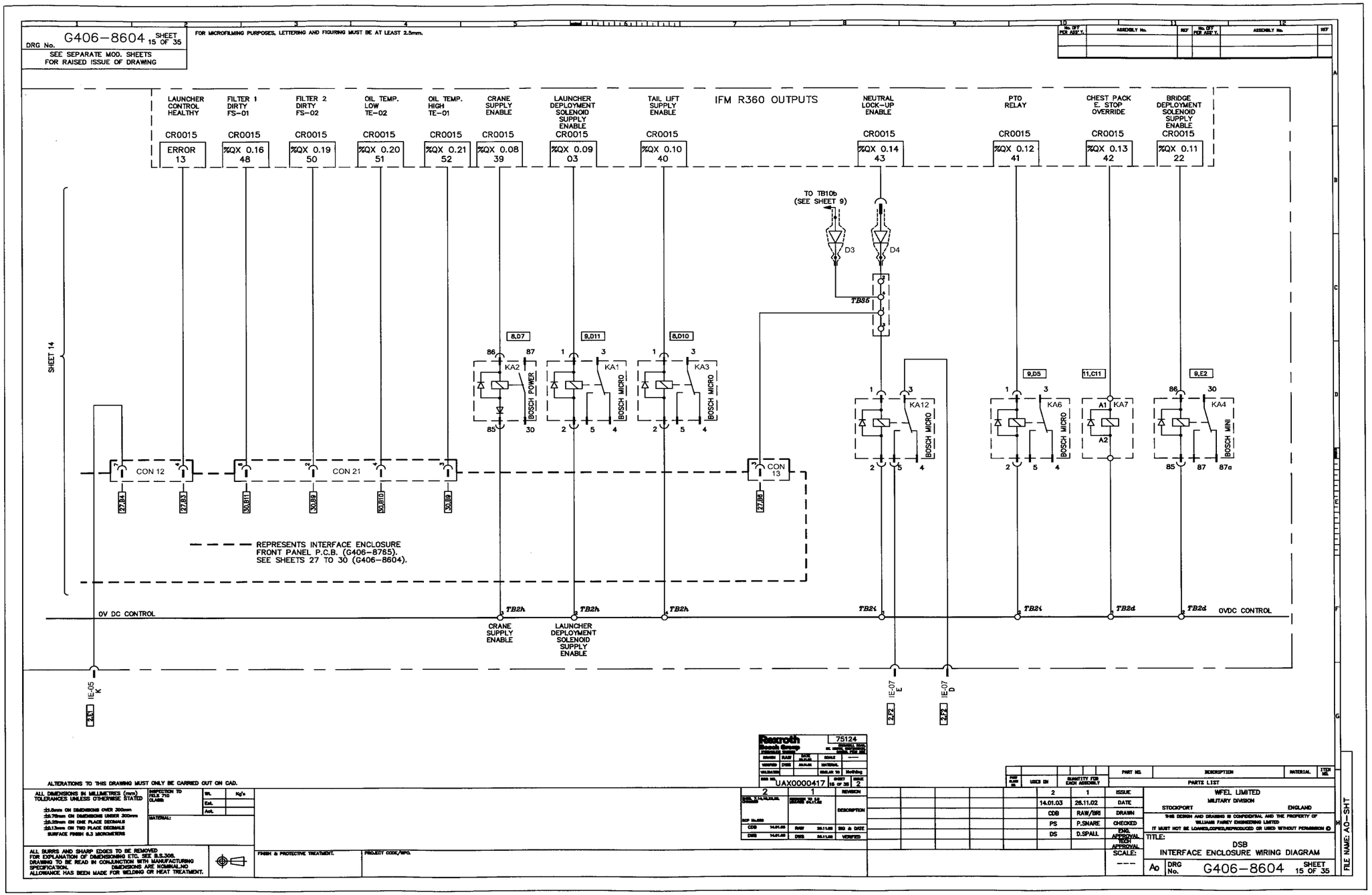


Figure 15 INTERFACE ENCLOSURE WIRING DIAGRAM

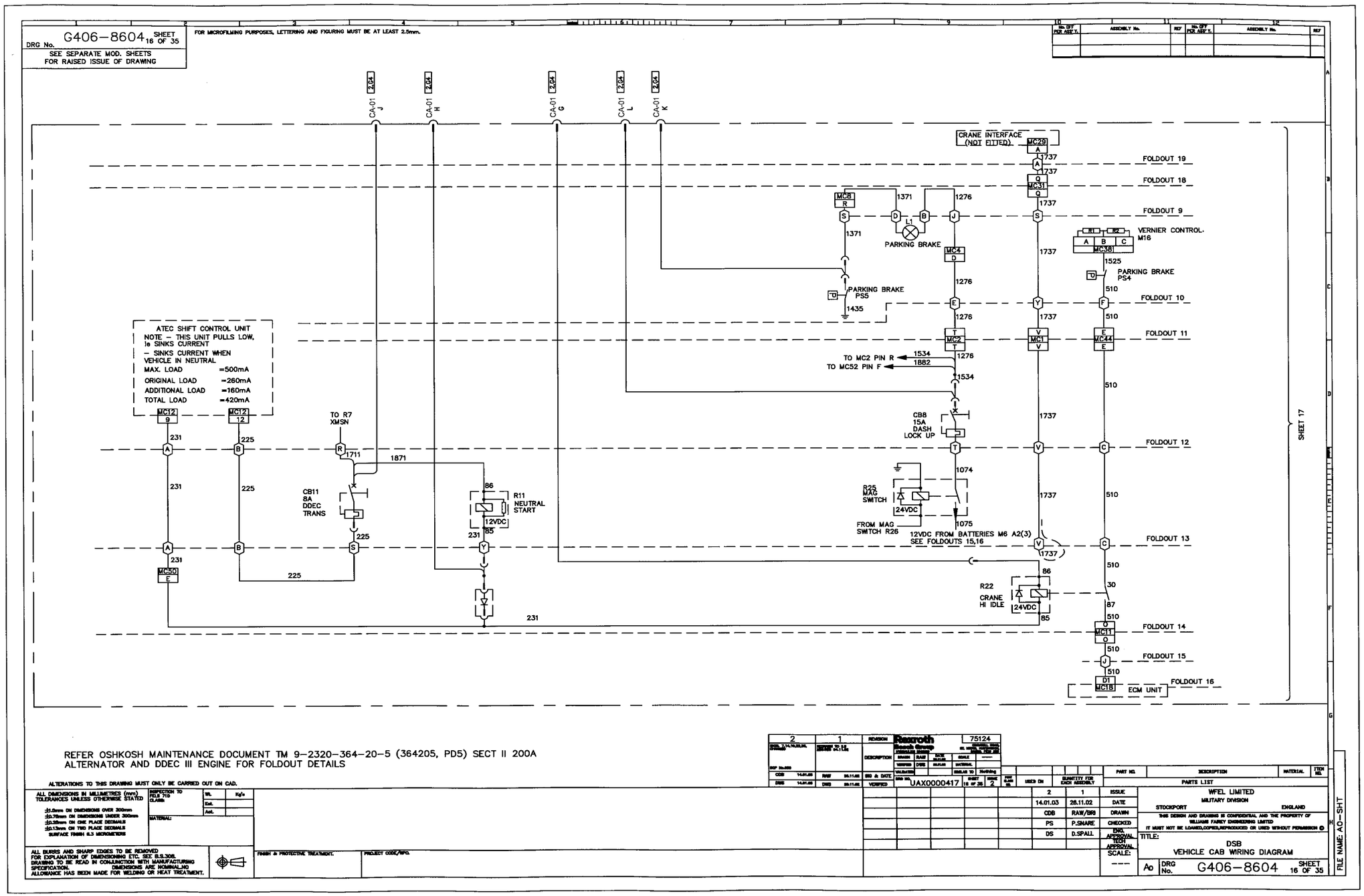


Figure 16 VEHICLE CAB WIRING DIAGRAM

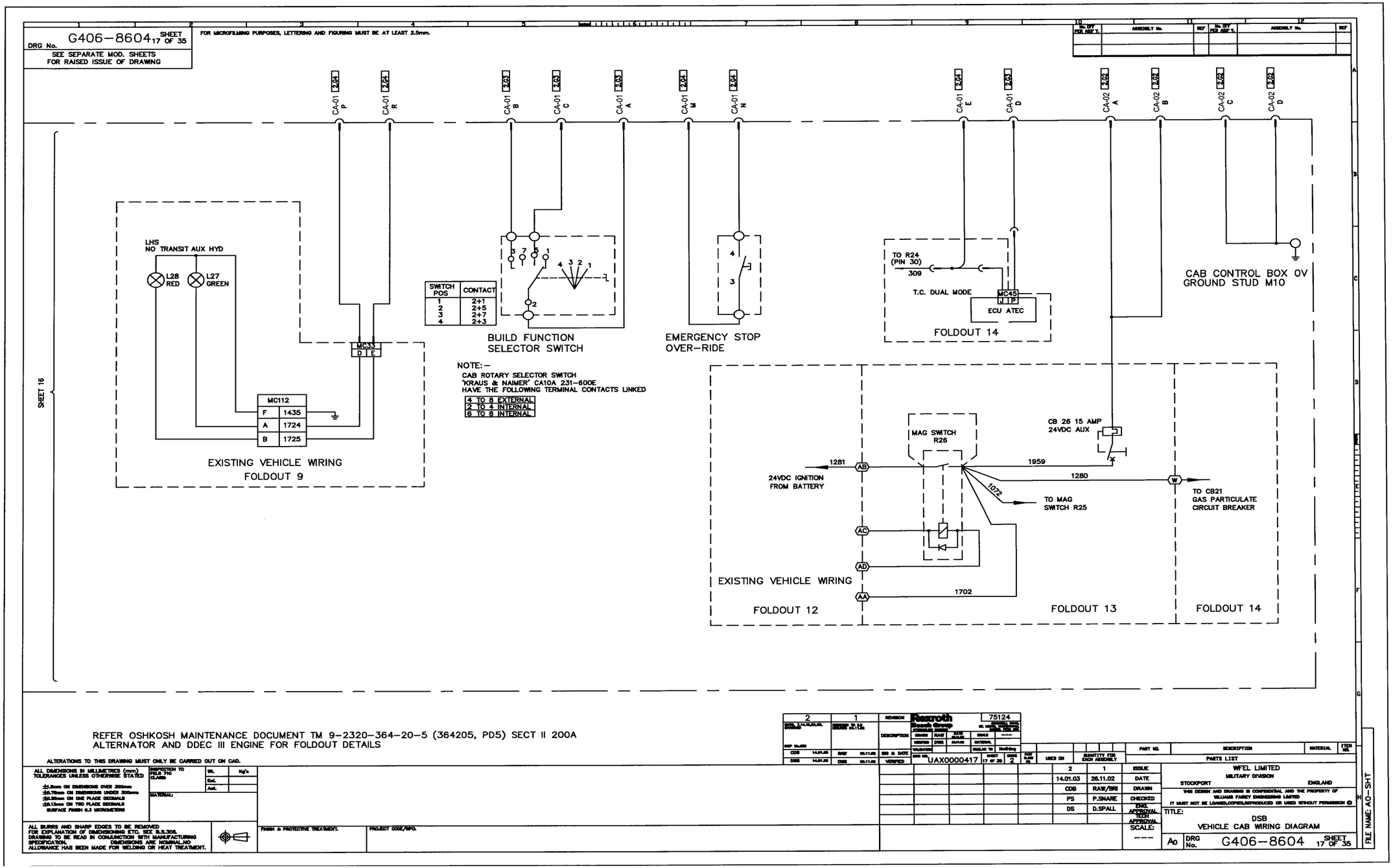


Figure 17 VEHICLE CAB WIRING DIAGRAM

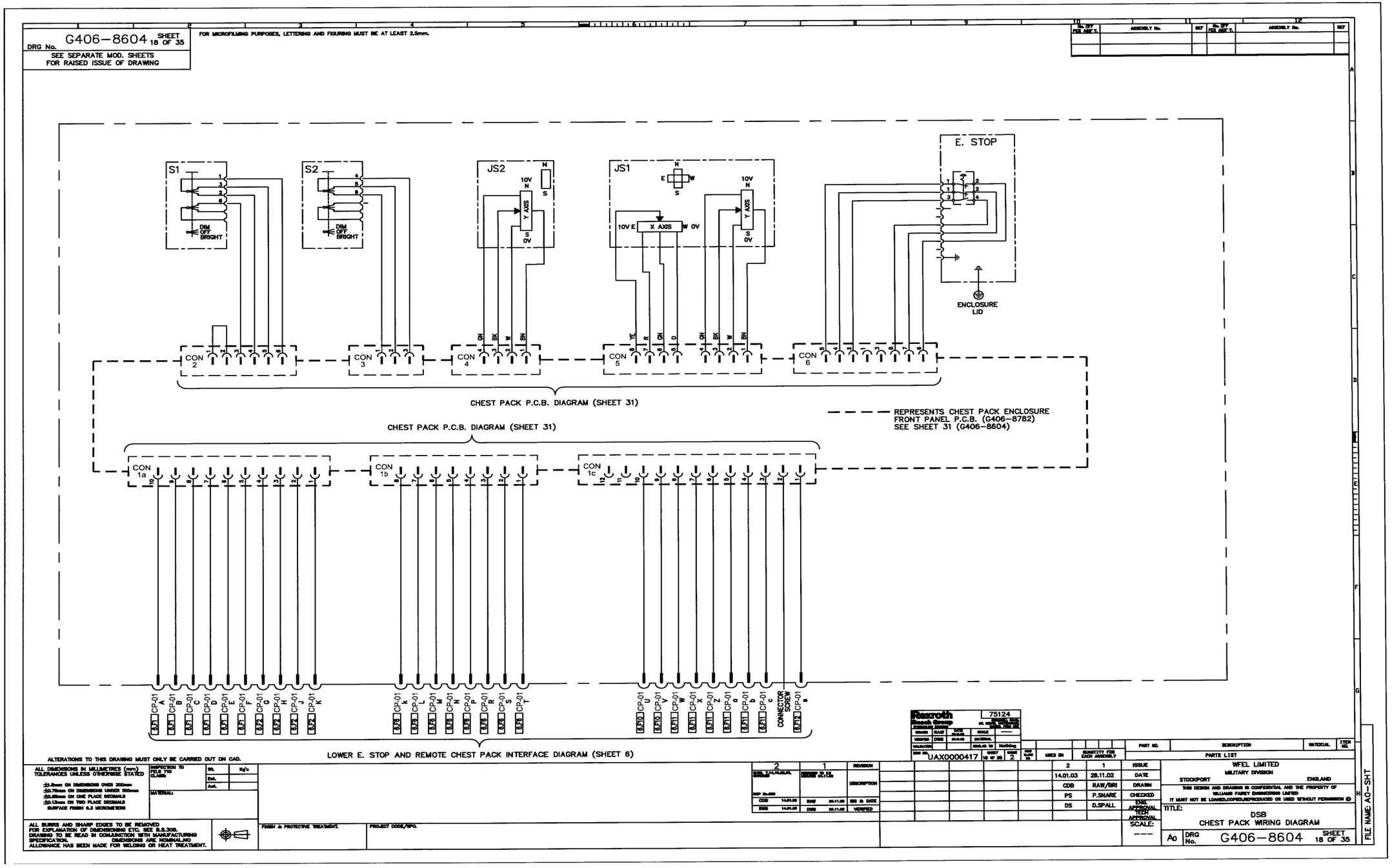


Figure 18 CHEST PACK WIRING DIAGRAM

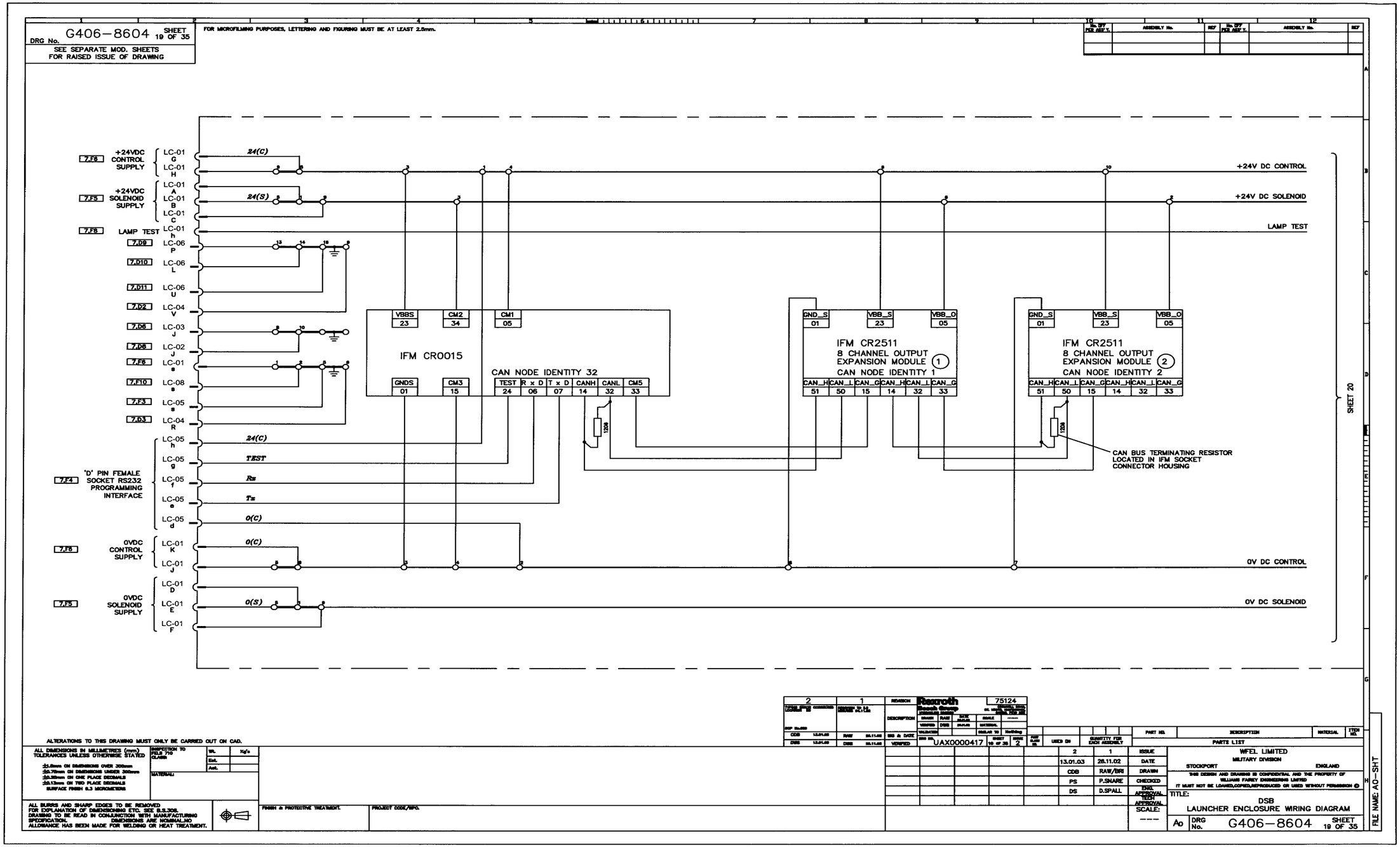


Figure 19 LAUNCHER ENCLOSURE WIRING DIAGRAM

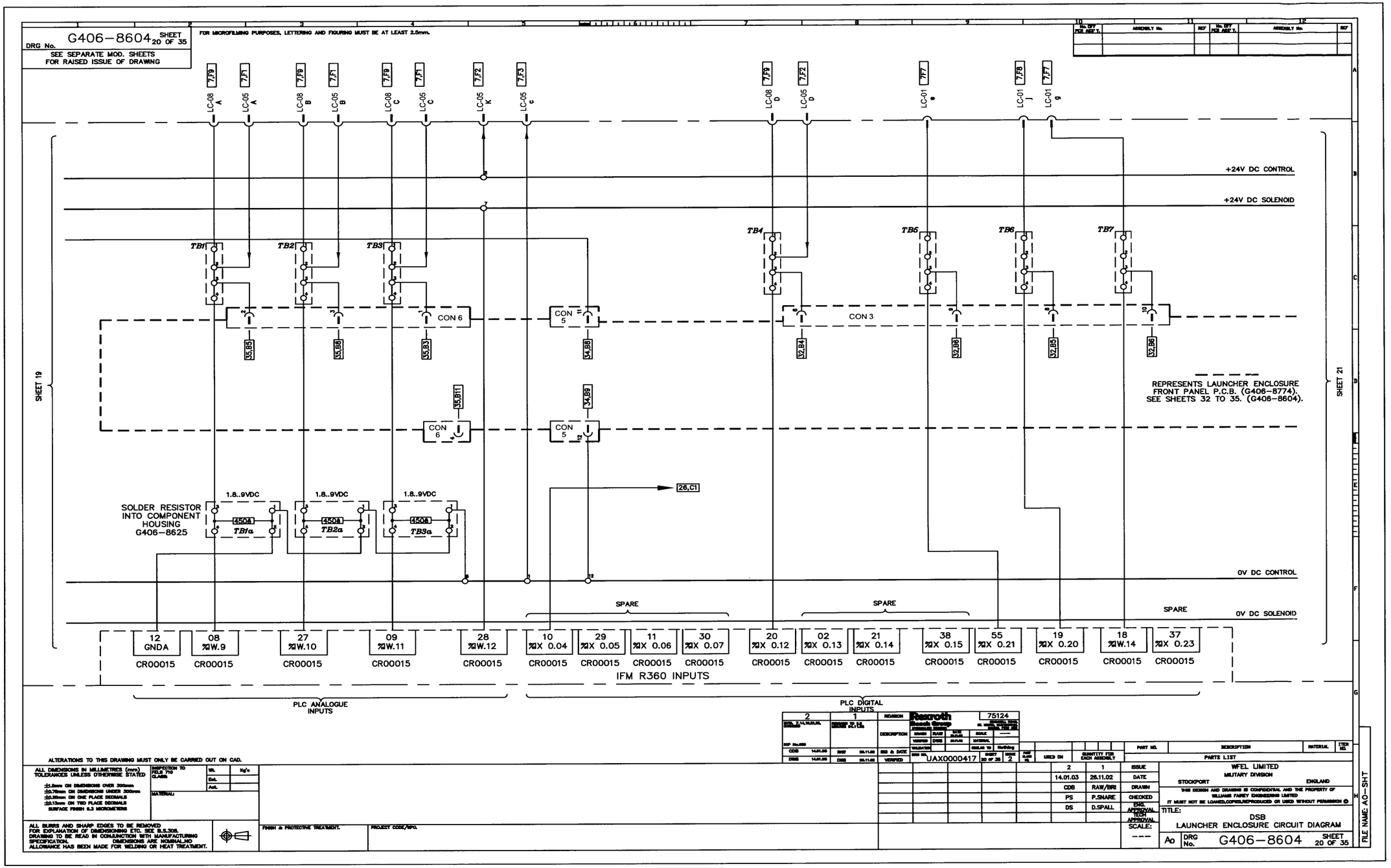


Figure 20 LAUNCHER ENCLOSURE WIRING DIAGRAM

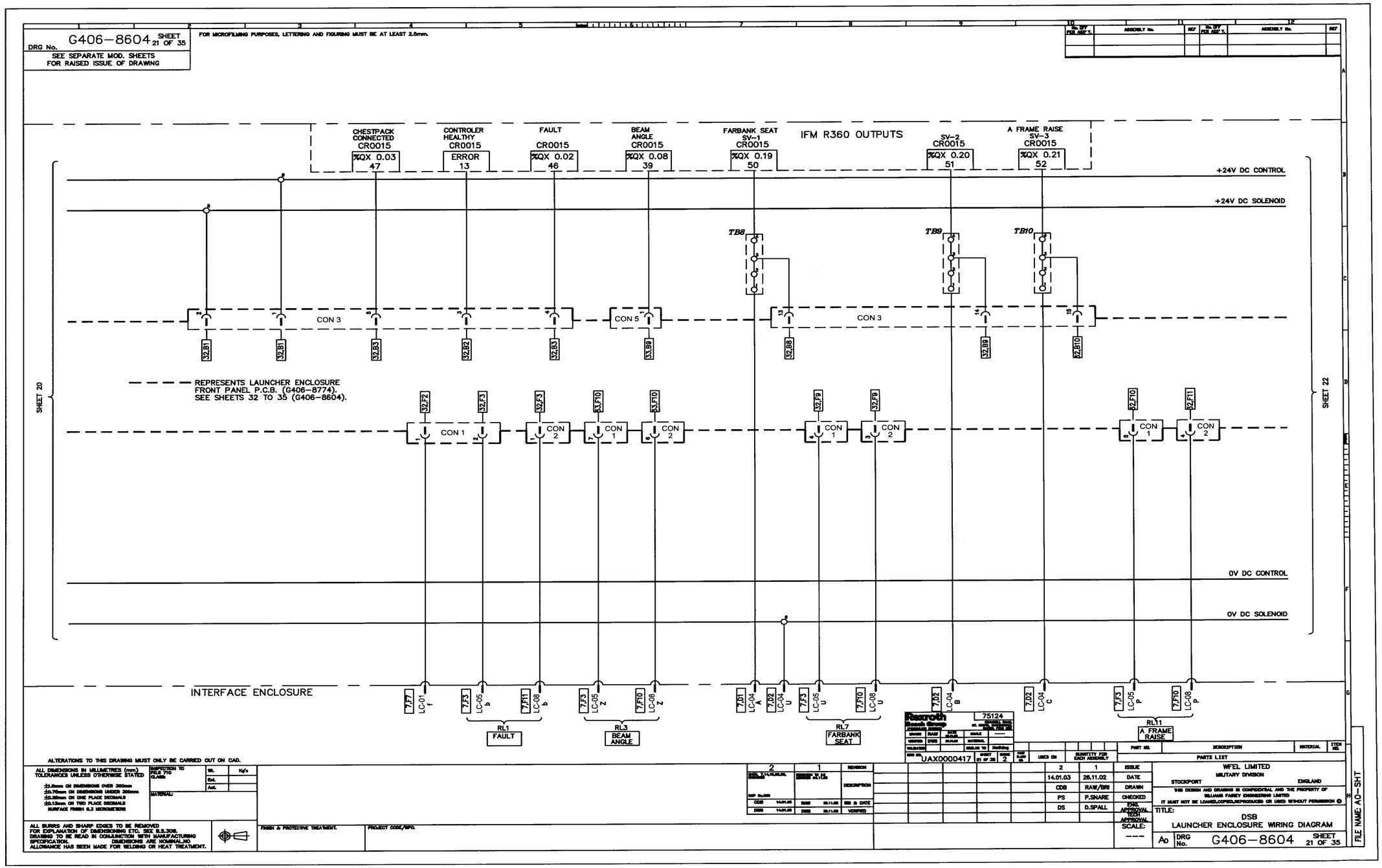


Figure 21 LAUNCHER ENCLOSURE WIRING DIAGRAM

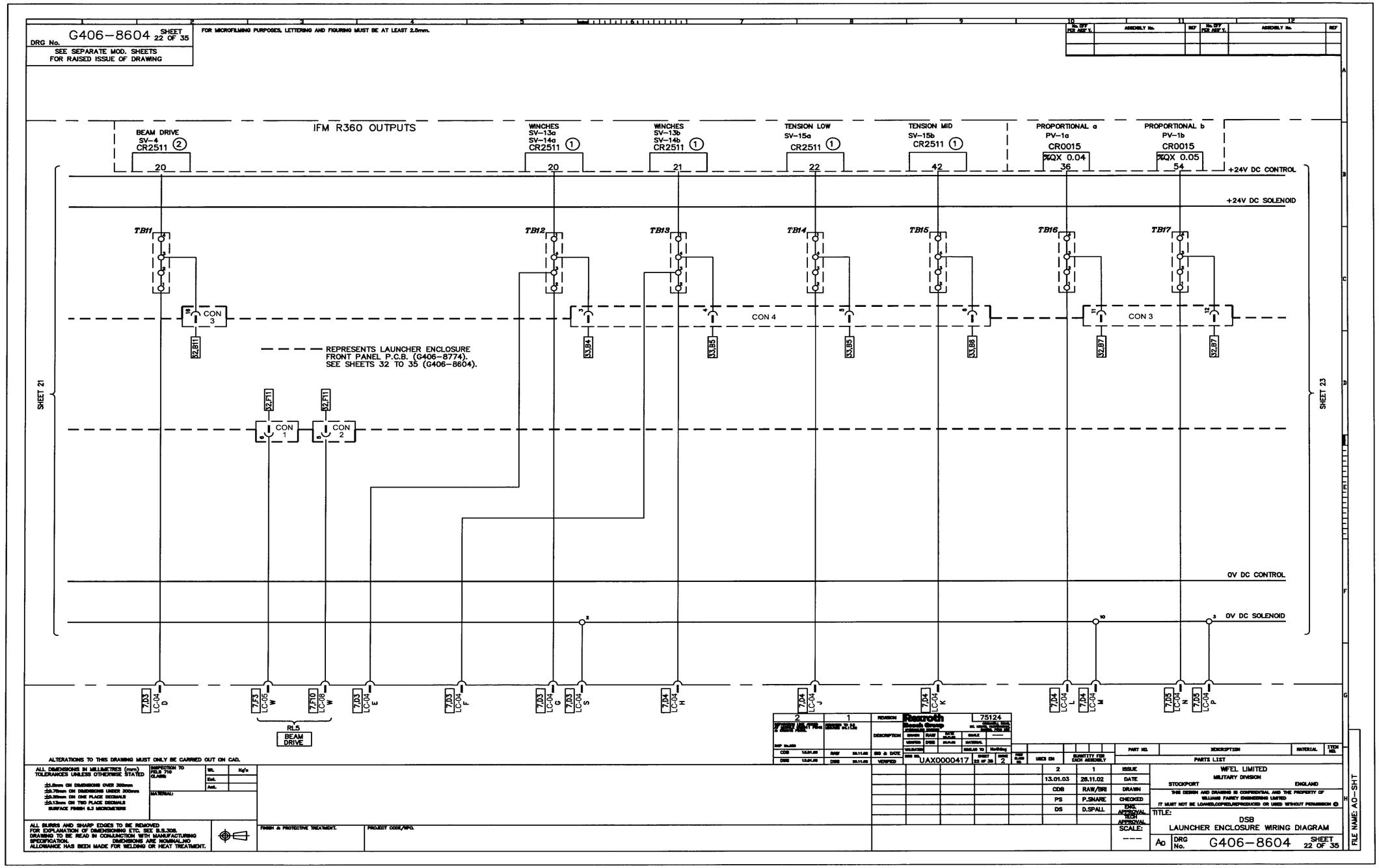


Figure 22 LAUNCHER ENCLOSURE WIRING DIAGRAM

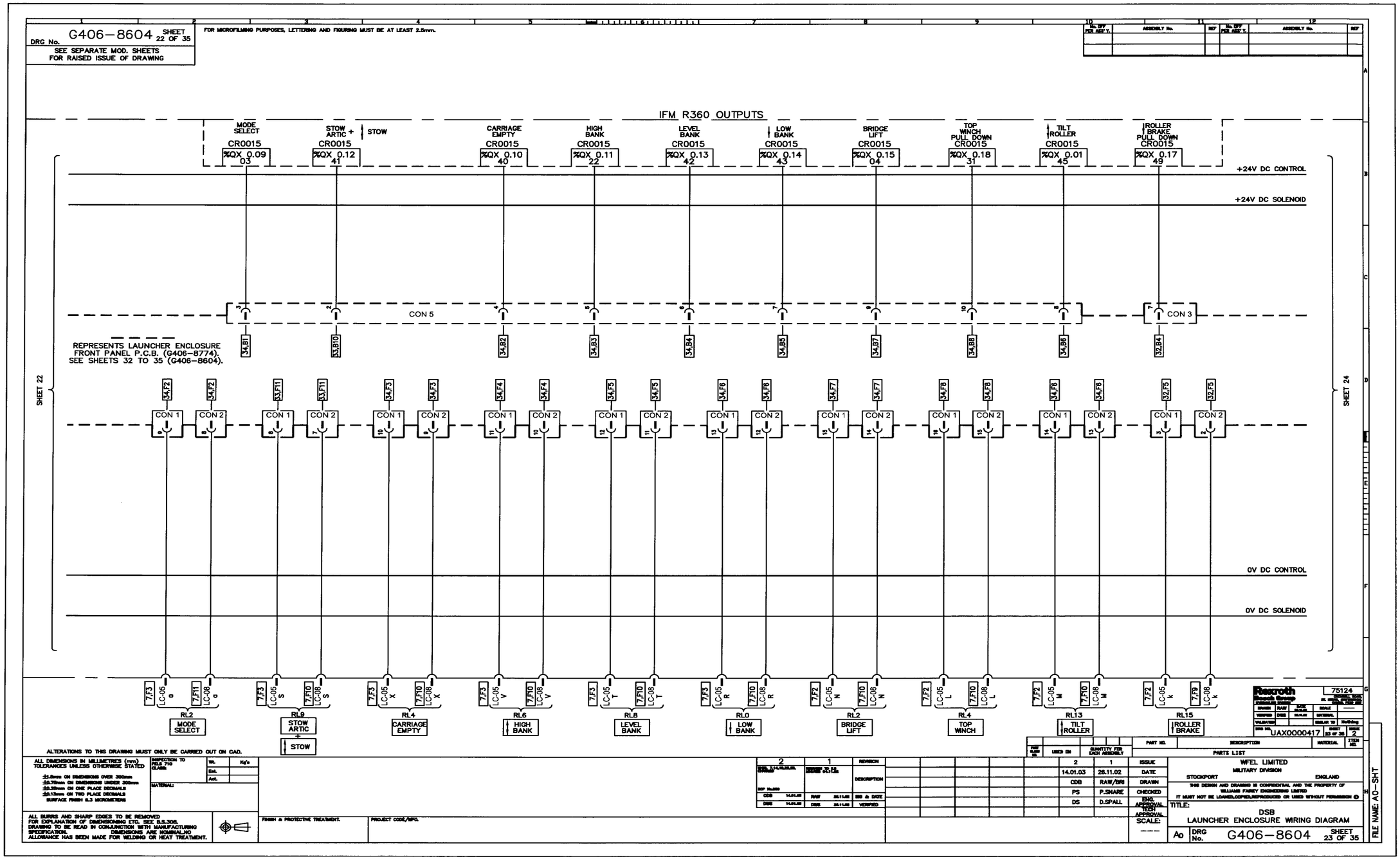


Figure 23 LAUNCHER ENCLOSURE WIRING DIAGRAM

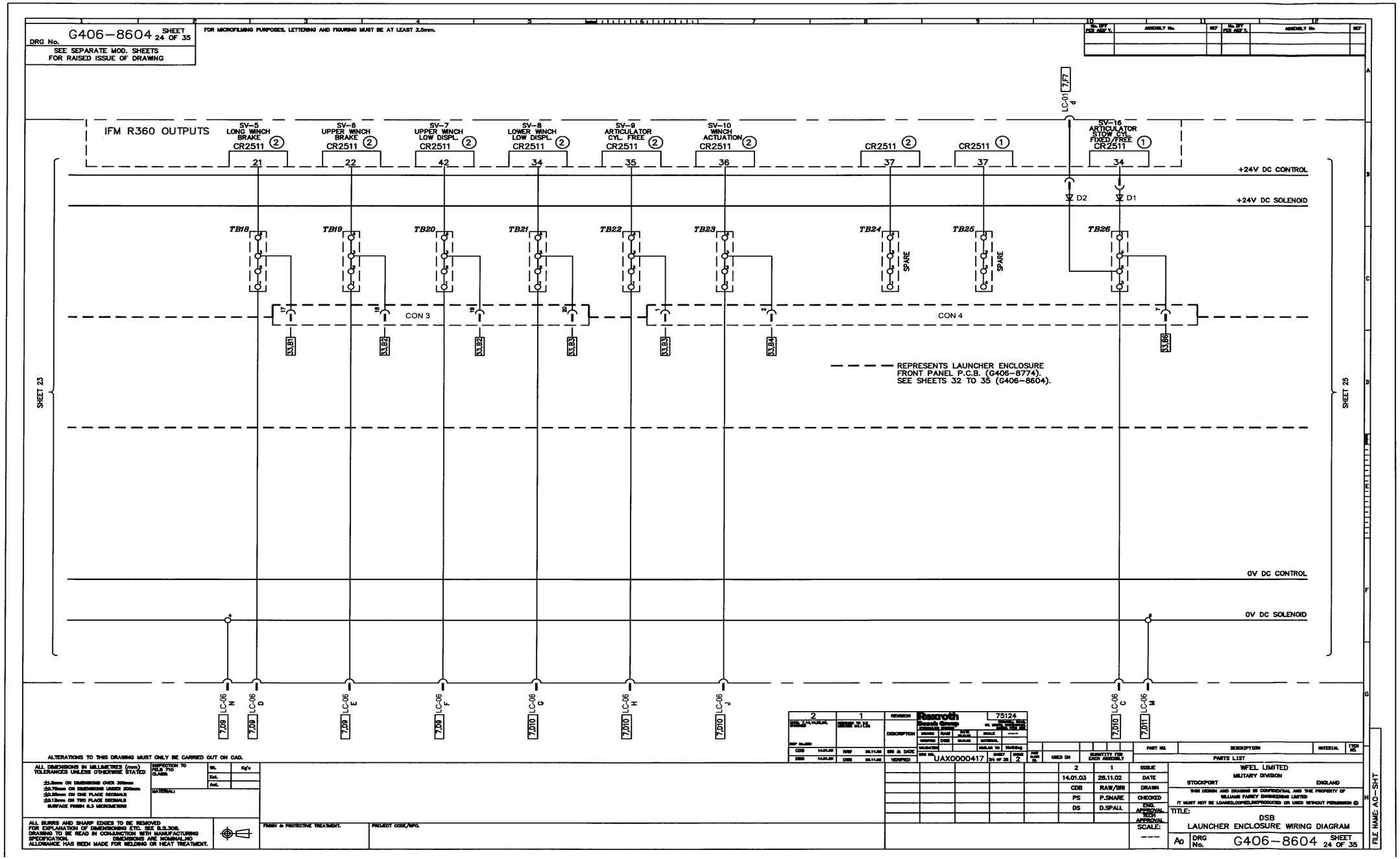


Figure 24 LAUNCHER ENCLOSURE WIRING DIAGRAM

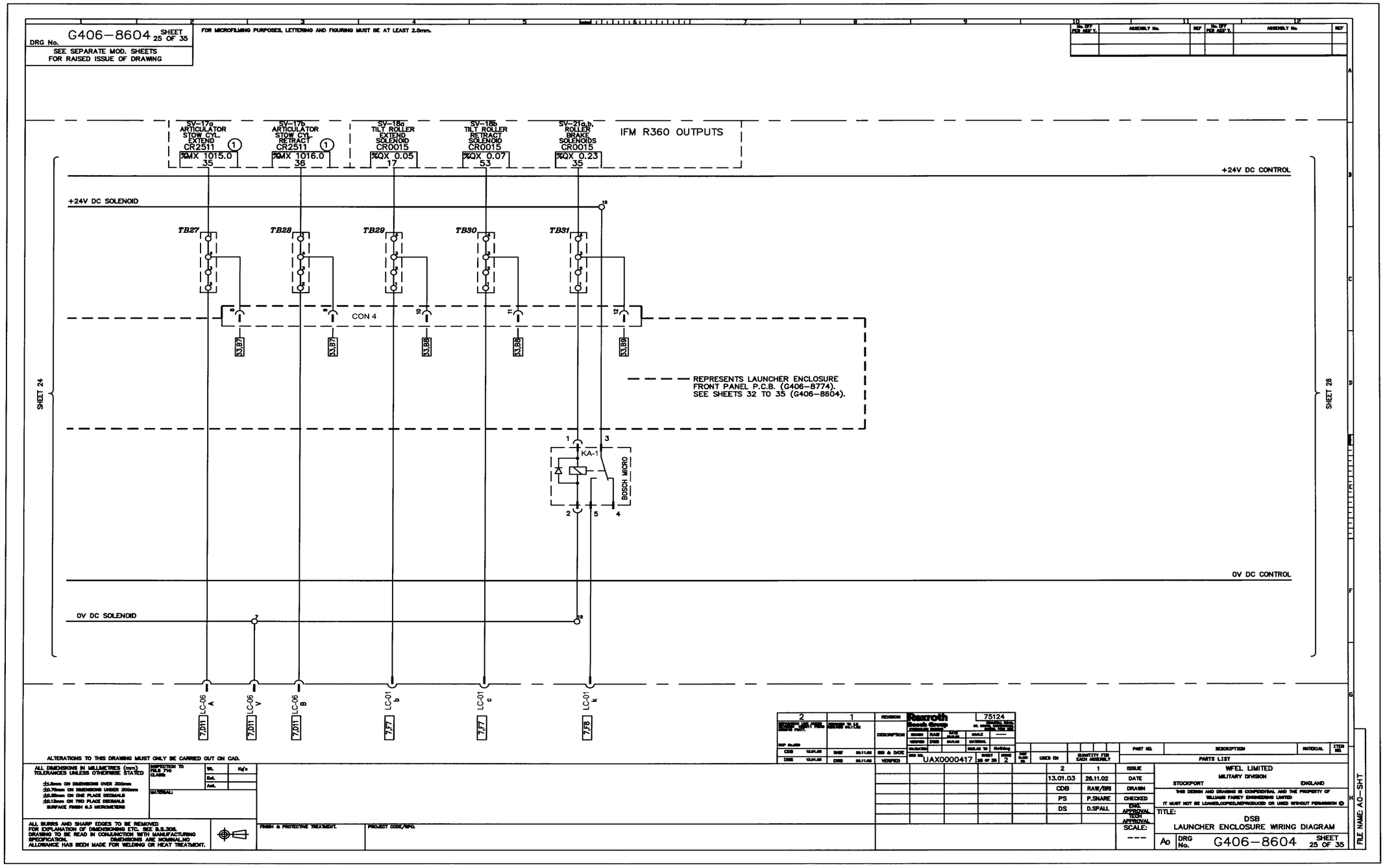


Figure 25 LAUNCHER ENCLOSURE WIRING DIAGRAM

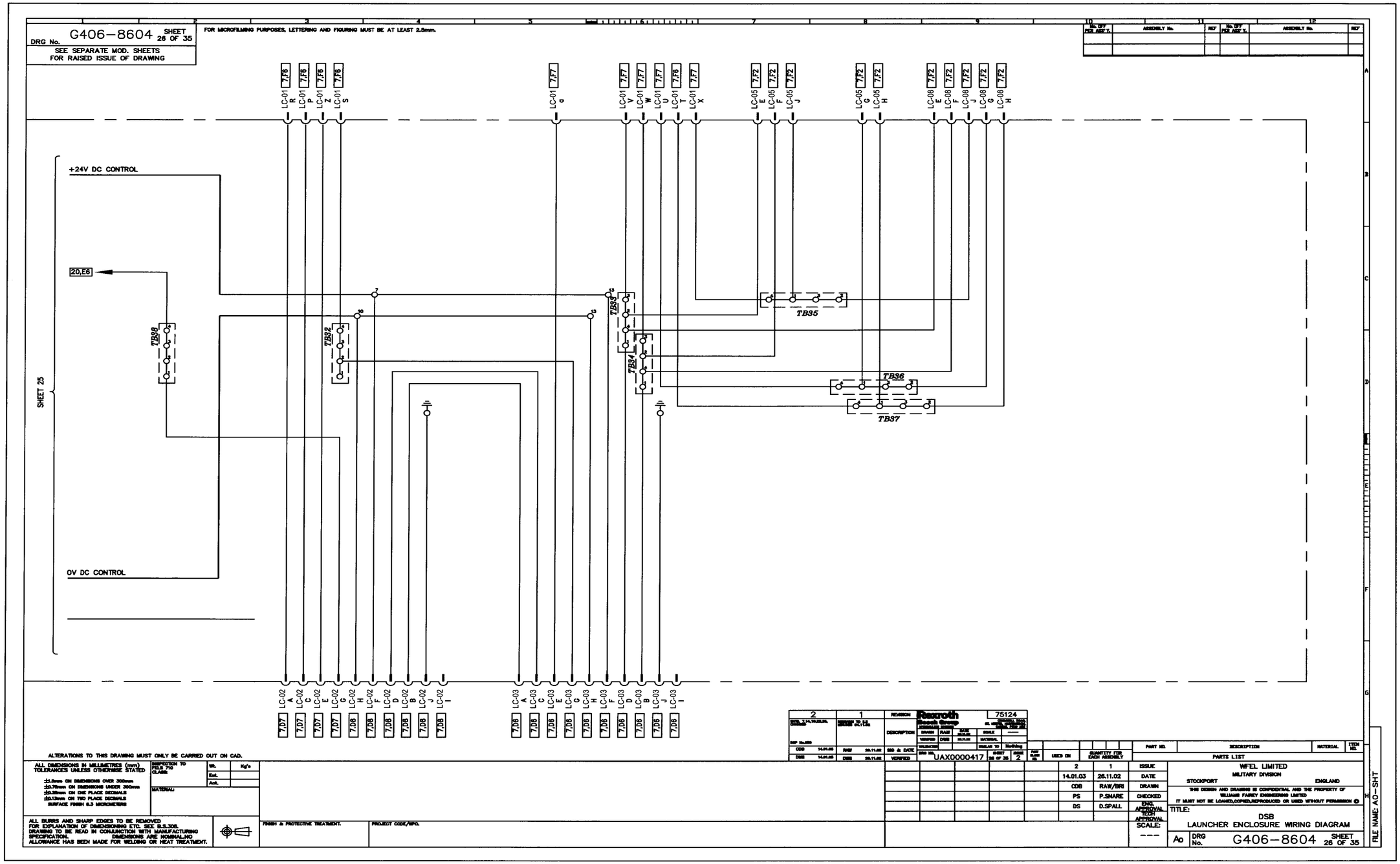


Figure 26 LAUNCHER ENCLOSURE WIRING DIAGRAM

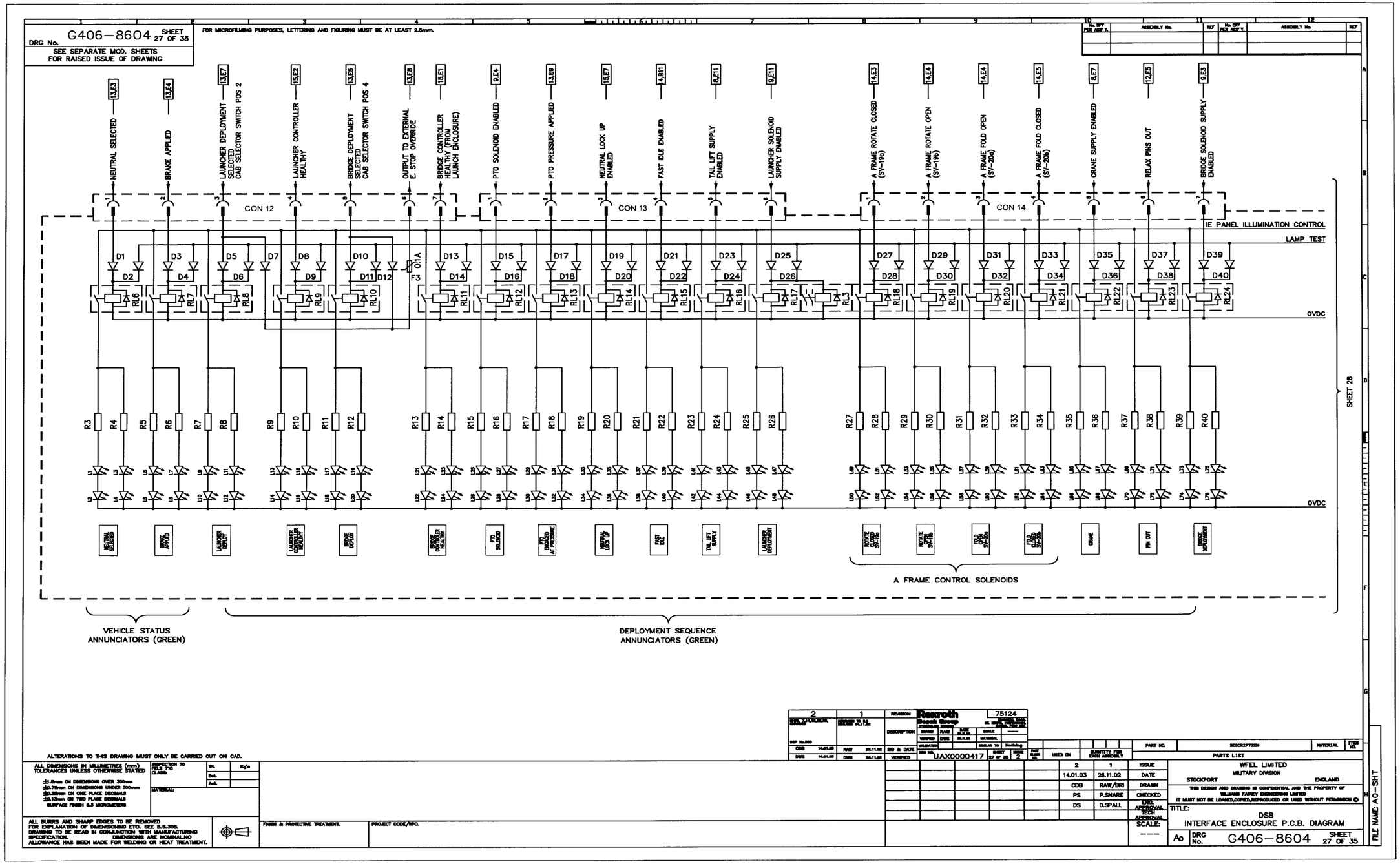


Figure 27 INTERFACE ENCLOSURE P.C.B. DIAGRAM

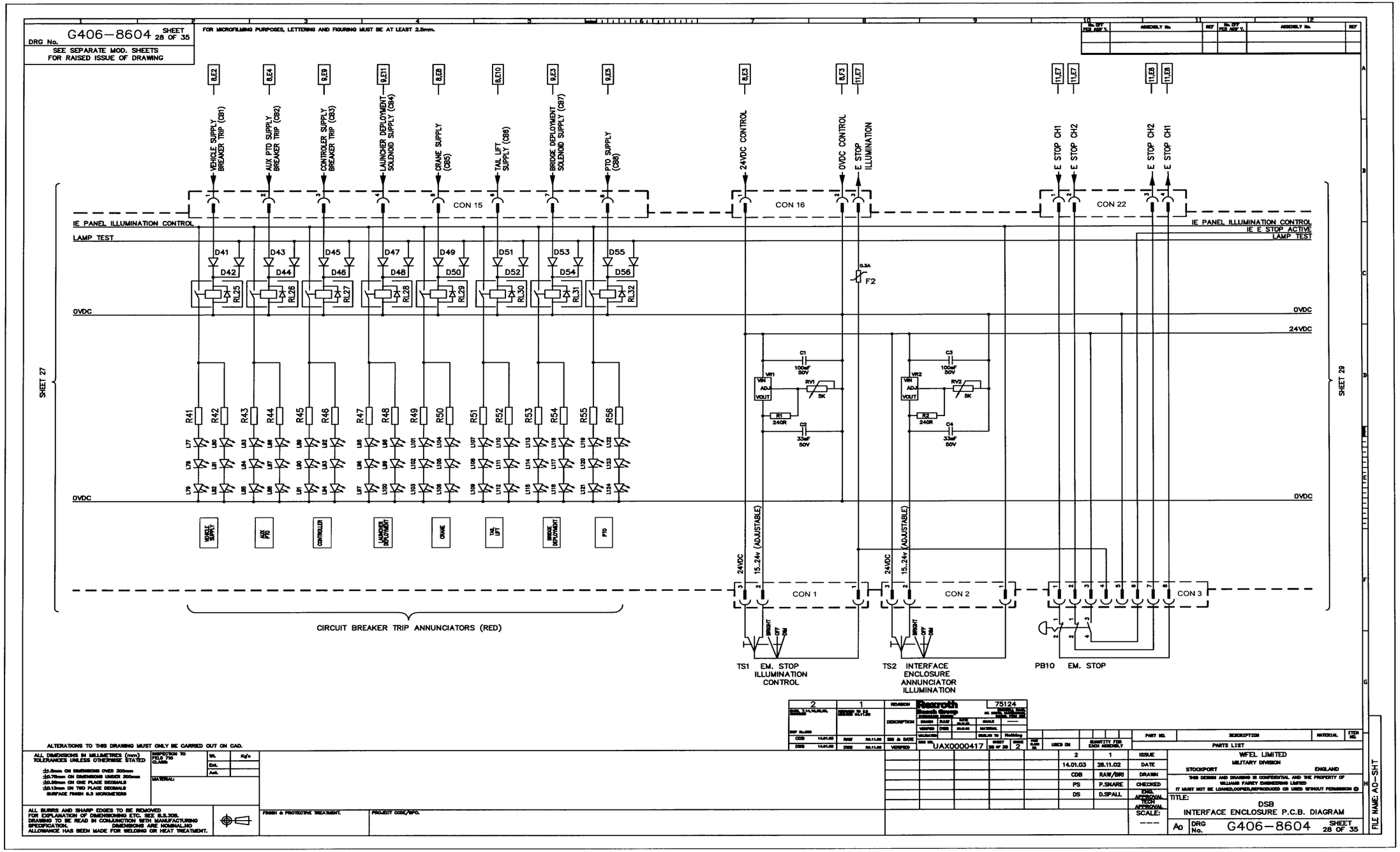


Figure 28 INTERFACE ENCLOSURE P.C.B. DIAGRAM

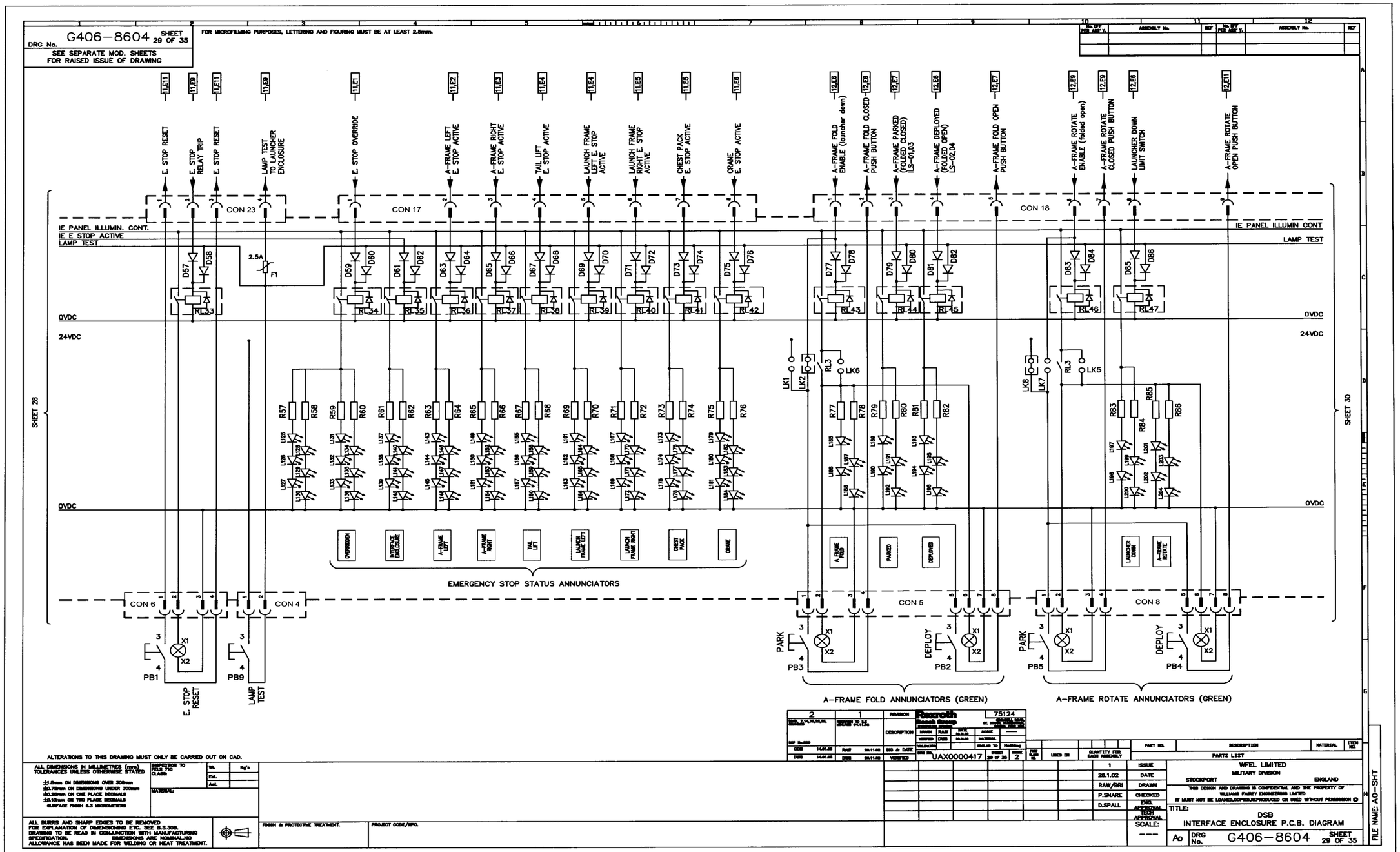


Figure 29 INTERFACE ENCLOSURE P.C.B. DIAGRAM

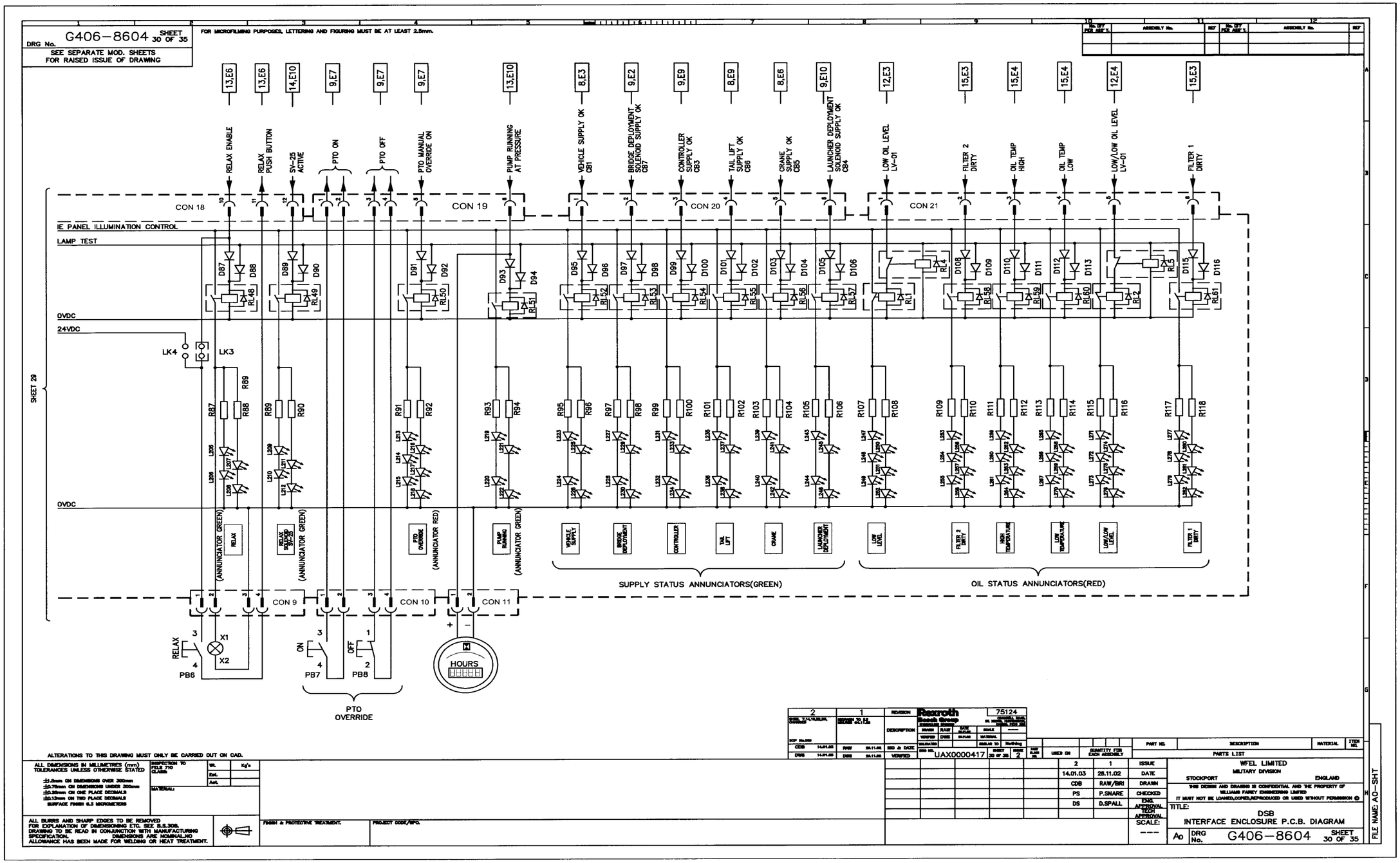


Figure 30 INTERFACE ENCLOSURE P.C.B. DIAGRAM

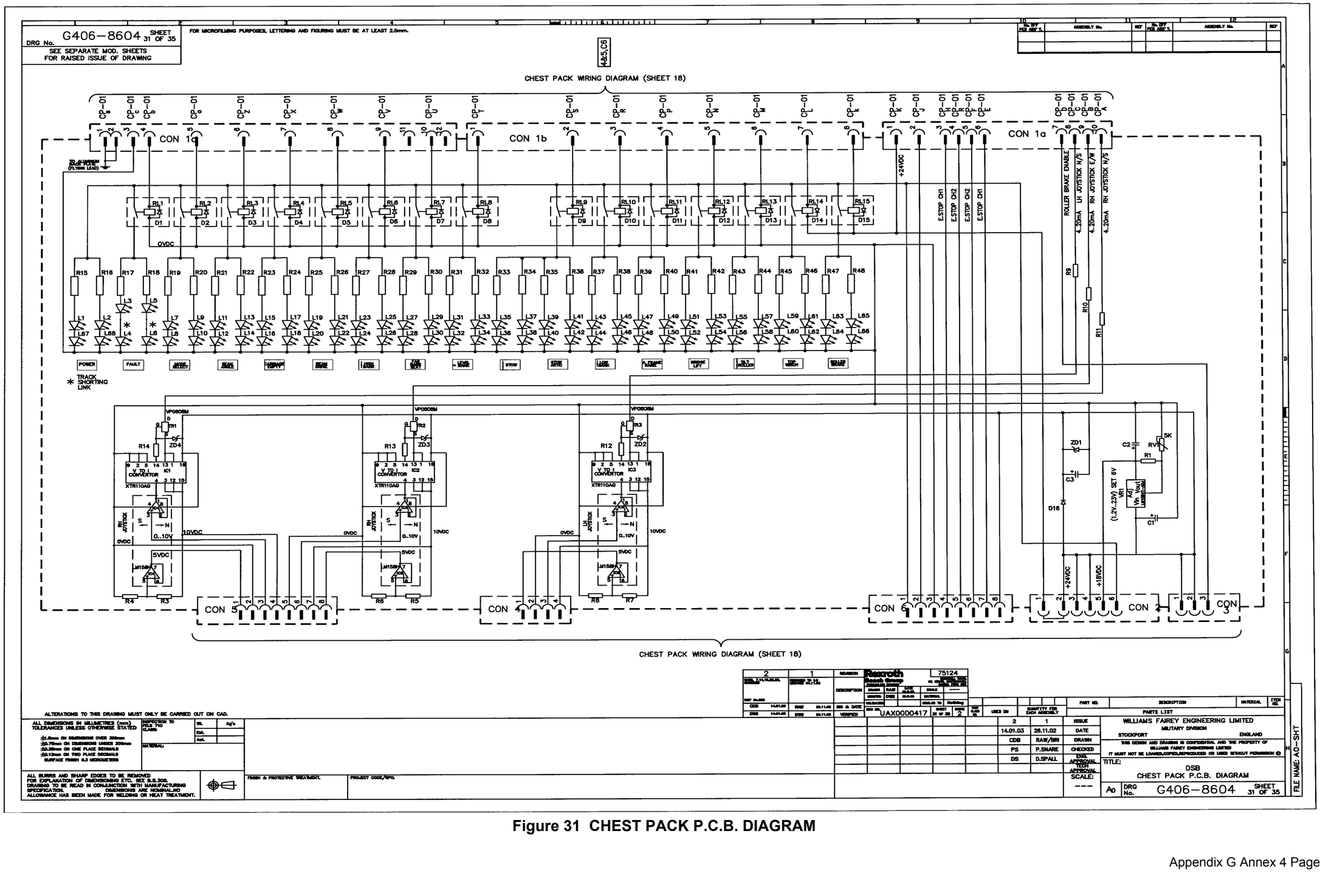


Figure 31 CHEST PACK P.C.B. DIAGRAM

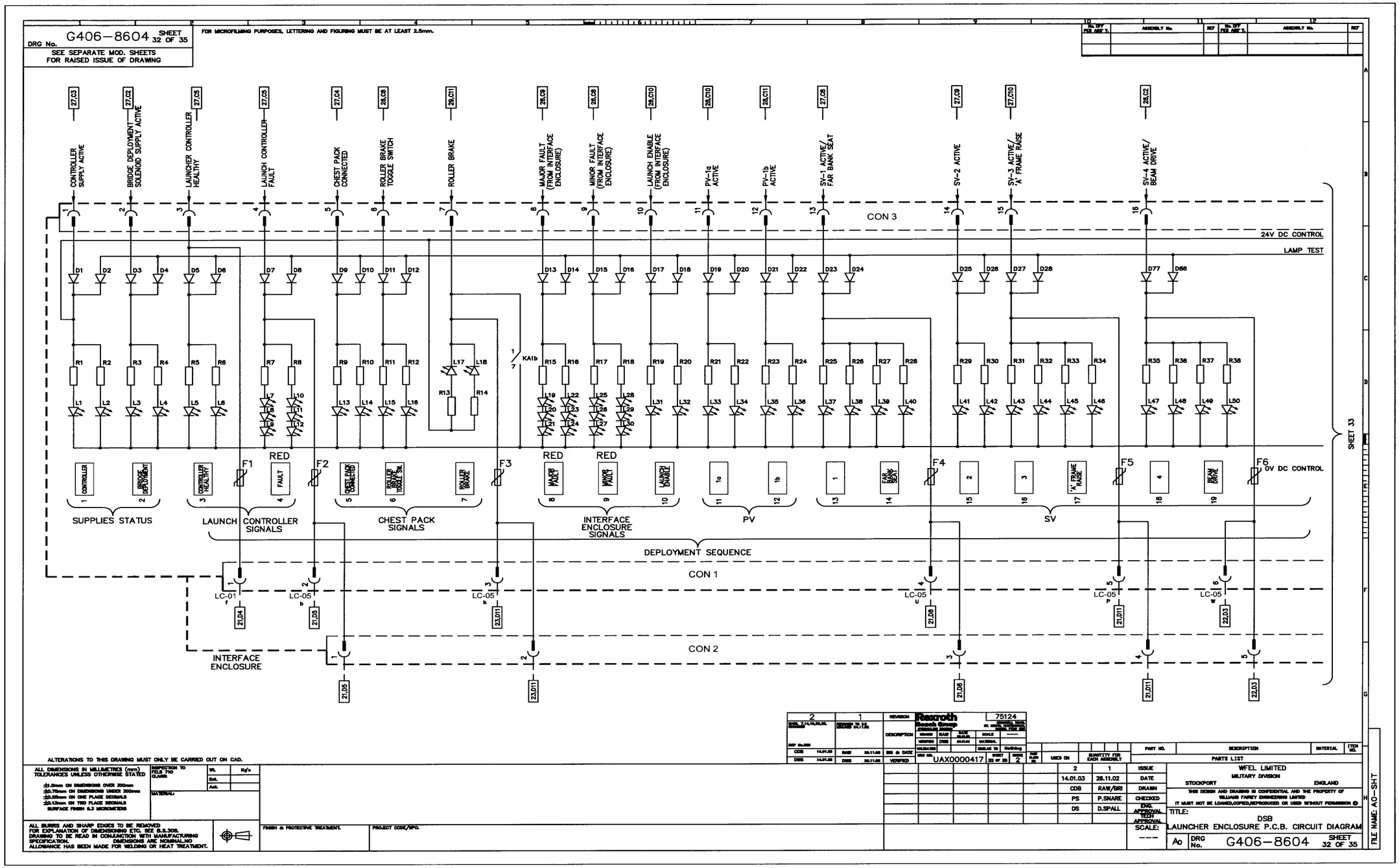


Figure 32 LAUNCHER ENCLOSURE P.C.B. CIRCUIT DIAGRAM

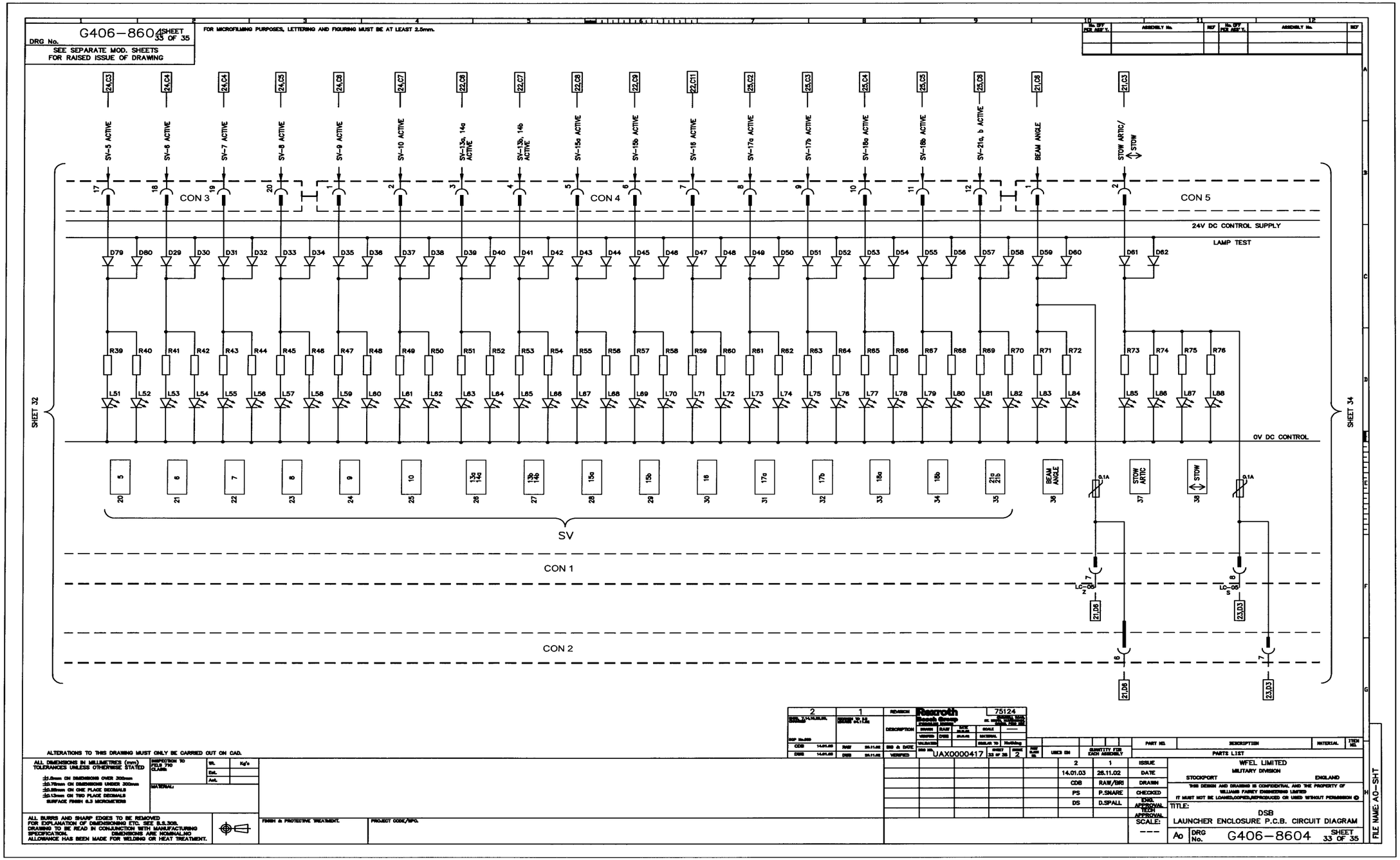


Figure 33 LAUNCHER ENCLOSURE P.C.B. CIRCUIT DIAGRAM

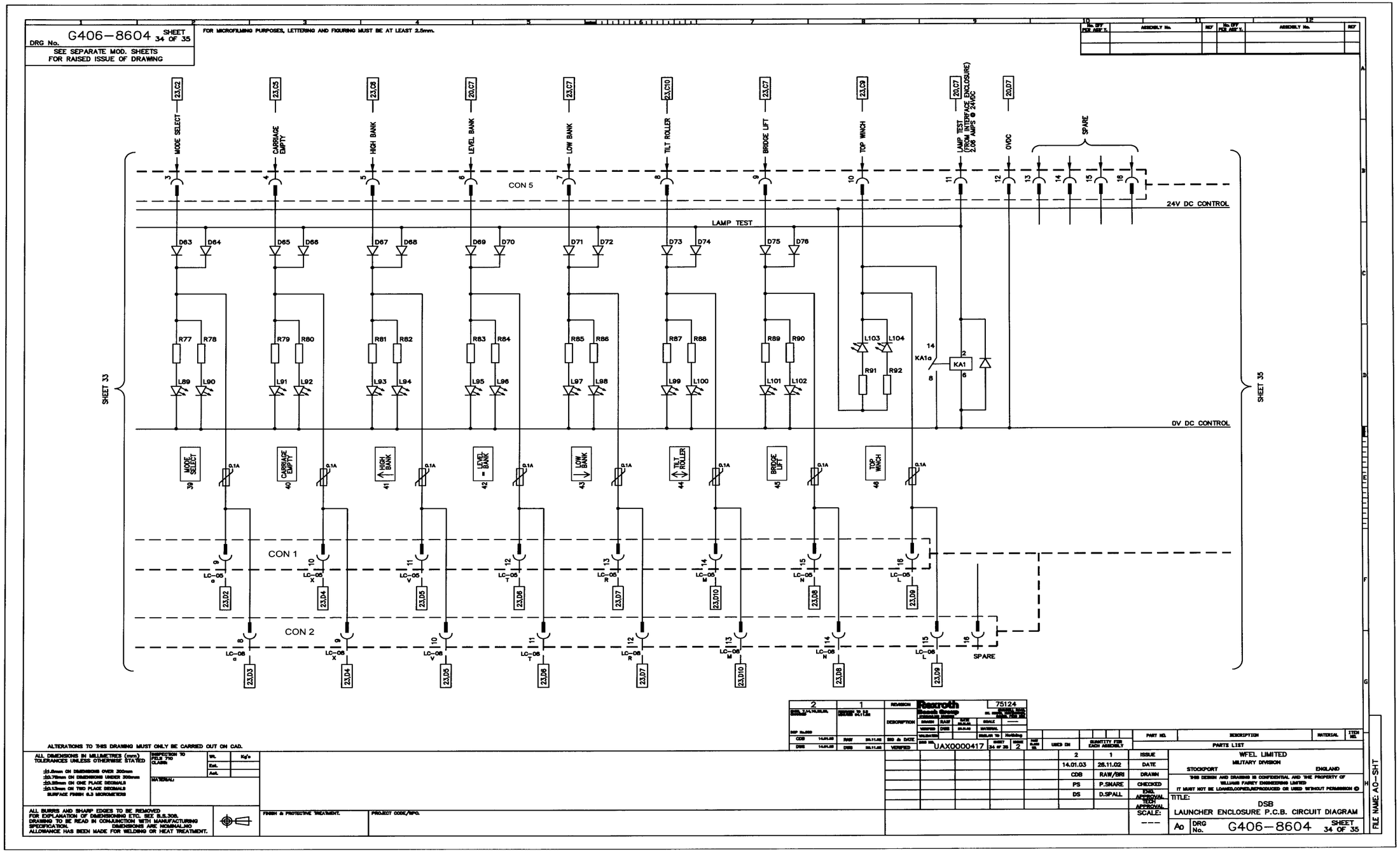


Figure 34 LAUNCHER ENCLOSURE P.C.B. CIRCUIT DIAGRAM

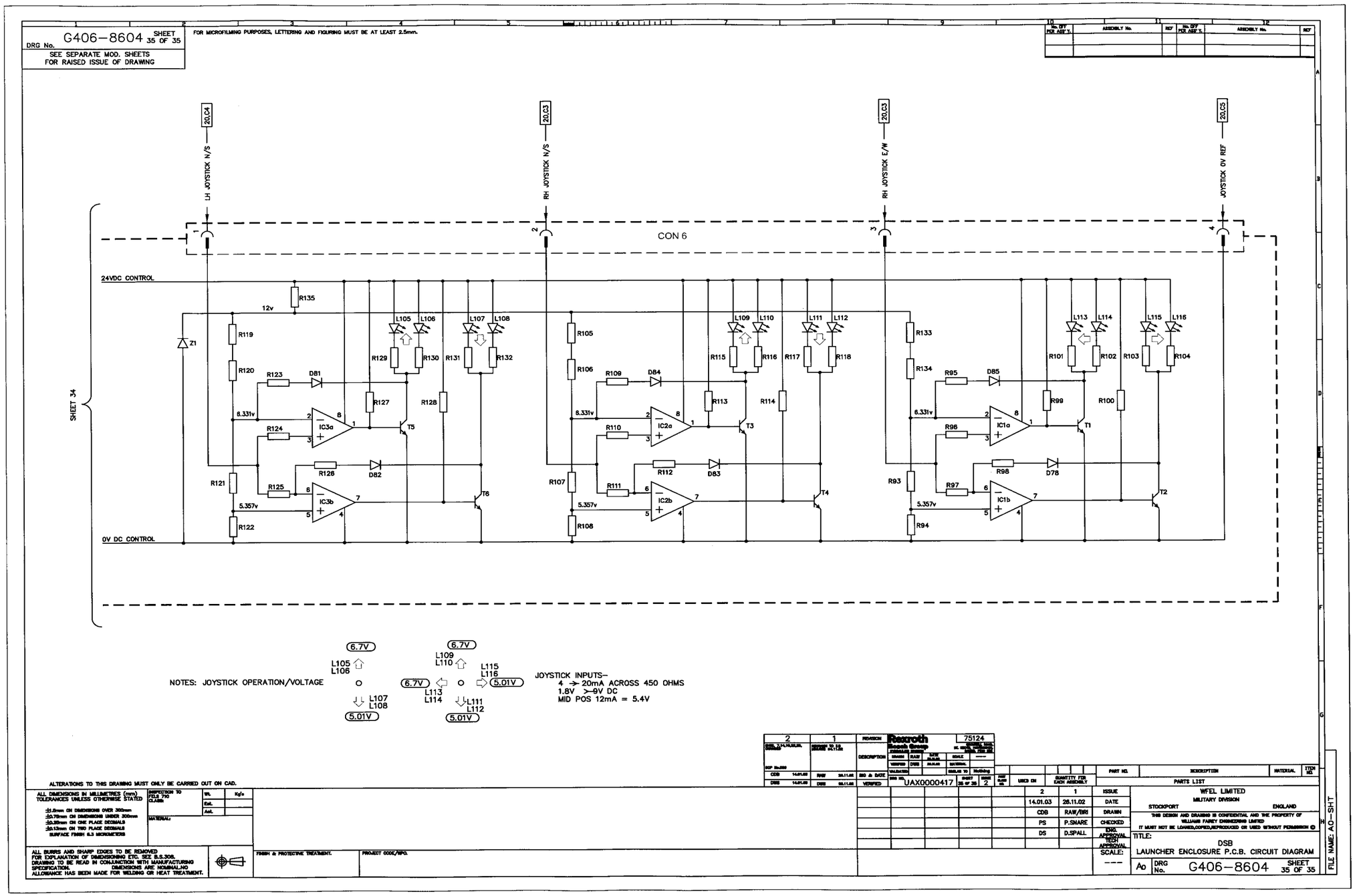


Figure 35 LAUNCHER ENCLOSURE P.C.B. CIRCUIT DIAGRAM

APPENDIX H

Launcher Electrical Component Drawings

Introduction

a. The following drawings are relevant to the launcher electrical system components.

b. Table 1 lists the electrical harnesses used throughout the DSB system less the crane and should be read with reference to Figure 33 General Electrical Layout on the Vehicle G406-8601, at the back of this appendix.

c. Column (a) is the figure number of each harness drawing in this appendix.

d. Column (b) shows the manufacturers drawing number for each harness.

e. The harness number also in column (b) refers to the harness number shown on the drawing; Figure 33 General Electrical Layout on the Vehicle G406-8601, at the back of this appendix.

f. Columns (c) and (d) describe the electrical components that each harness is connected to.

g. Column (e) describes any other information that is important to a harness.

Table 1

(a) Harness Figure No	(b) Drawing No - WFEL - REXROTH - Harness No	(c) From	(d) To	(e) Remarks
1	-G406-8700 -UAD0000115 -1	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	POWER & E. STOP TO CRANE	
2	-G406-8701 -UAD0000116 -2	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	1. P.T.O. PRESSURE SWITCH 2. P.T.O. SOLENOID SV24	SV24 - TANK LEVEL & PRESSURE - TANK
3	-G406-8702 -UAD0000117 -3	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	VEHICLE CAB G406-8627 UAD0001076	CABLE 1. INCOMING SUPPLY. CABLE 2. TO LORRY CAB-FUNCTION SELECTOR SWITCH - INDICATORS - TRANSMISSION LOCKUP - VEHICLE STATIONARY - HIGH IDLE (REFER TO DRW. G406-8702)
4	-G406-8703 -UAD0000118 -4	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	RH RELAX PIN LIMIT SWITCH LS-O6 G406-8673 - UAEOA709D1 LH RELAX PIN LIMIT SWITCH LS-O7 G406-8673 - UAEOA709D1	

(a) Harness Figure No	(b) Drawing No - WFEL - REXROTH - Harness No	(c) From	(d) To	(e) Remarks
5	-G406-8704 -UAD0000119 -5	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	1. FILTER SWITCH FS-01 2. FILTER SWITCH FS-02 3. RELAX SOLENOID SV25	
6	-G406-8705 -UAD0000120 -6	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	CHASSIS JUNCTION BOX G406-8630 UAEOA704A1	FIXED WIRING IN CHASSIS
7	-G406-8706 -UAD0000121 -7	CHASSIS JUNCTION BOX G406-8630 UAEOA704A1	1. TAIL LIFT POWER & E.STOP 2. SUSPENSION LOCKUP SOLENOID	
8	-G406-8707 -UAD0000123 -8	CHASSIS JUNCTION BOX G406-8630 UAEOA704A1	MOVING SLIDE FRAME JUNCTION BOX G406-8635 UAEOA705A1	
9	-G406-8710 -UAD0000125 -11	CHASSIS JUNCTION BOX G406-8630 UAEOA704A1	EARTH STRAP	BREAK POINT FOR AIR TRANSPORTATION - IN LINE CONNECTIONS
10	-G406-8712 -UAD0000127 -13	MOVING SLIDE FRAME JUNCTION BOX G406-8635 UAEOA705A1	EARTH STRAP	BREAK POINT FOR AIR TRANSPORTATION - IN LINE CONNECTIONS
11	-G406-8713 -UAD0000128 -14	MOVING SLIDE FRAME JUNCTION BOX G406-8635 UAEOA705A1	1. TILT ROLLER EXTEND SOLENOID 2. TILT ROLLER RETRACT SOLENOID 3. 'A' FRAME ROTATE CLOSED SOLENOID 4. 'A' FRAME ROTATE CLOSED SOLENOID	
12	-G406-8714 -UAD0000129 -15	MOVING SLIDE FRAME JUNCTION BOX G406-8635 UAEOA705A1	EARTH STRAP. 'A' FRAME BULKHEAD	BREAK POINT
13	-G406-8716 -UAD0000131 -17	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	EARTH STRAP. 'A' FRAME BULKHEAD	SLIDE FRAME TO 'A' FRAME ENERGY CHAIN - BREAK POINT
14	-G406-8717 -UAD0000132 -17a	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	EARTH STRAP. UPPER 'A' FRAME CROSS MEMBER	'A' FRAME RAISE ENERGY CHAIN - BREAK POINT
15	-G406-8720 -UAD0000135 -20	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	EARTH STRAP. UPPER 'A' FRAME CROSS MEMBER	BREAK POINT
16	-G406-8722 -UAD0000137 -22	MOVING SLIDE FRAME JUNCTION BOX G406-8635 UAEOA705A1	'A' FRAME BULKHEAD	BREAK POINT
17	-G406-8724 -UAD0000139 -24	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	'A' FRAME BULKHEAD	BREAK POINT

(a) Harness Figure No	(b) Drawing No - WFEL - REXROTH - Harness No	(c) From	(d) To	(e) Remarks
18	-G406-8725 -UAD0000140 -25	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	ESRL G406-8650 UAEOA707B1 STOP EM	ESRL * - RIGHTSIDE LOWER E.STOP & REMOTE CHEST PACK UMBILICAL CONNECTION
19	-G406-8726 -UAD0000141 -26	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	LEFT SIDE 'A' FRAME LIMIT SWITCHES 1. FOLDED CLOSED G406-8670 UAEOA709A1 2. FOLDED OPEN G406-8671 UAEOA709B1 3. DOWN G406-8672 UAEOA709C1 RIGHT SIDE A FRAME LIMIT SWITCHES 1. FOLDED OPEN G406-8671 UAEOA709B1 2. FOLDED CLOSED G406-8670 UAEOA709A1	SV21a,b LEFT HAND ROLLER BRAKE SV20A 'A' FRAME FOLD OPEN SOLENOID SV20B 'A' FRAME FOLD CLOSED SOLENOID SV21c,d RIGHT HAND ROLLER BRAKE
20	-G406-8727 -UAD0000142 -27	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	UPPER 'A' FRAME CROSS MEMBER - BREAK POINT
21	-G406-8730 -UAD0000145 -30	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	UPPER 'A' FRAME CROSS MEMBER - BREAK POINT
22	-G406-8732 -UAD0000147 -32	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	UPPER 'A' FRAME CROSS MEMBER - BREAK POINT
23	-G406-8735 -UAD0000150 -35	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	UPPER 'A' FRAME CROSS MEMBER - BREAK POINT
24	-G406-8737 -UAD0000152 -39	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	1. LAUNCH FRAME PILOT MANIFOLD 2. LAUNCH FRAME PINCH ROLL/STOWING MANIFOLD	
25	-G406-8738 -UAD0000153 -40	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	1. LAUNCH FRAME ARTICULATOR MANIFOLD 2. LAUNCH FRAME WINCH CONTROL MANIFOLD	
26	-G406-8739 -UAD0000154 -41	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	ESLU G406-8655 UAEOA708A1 EM STOP	LEFTSIDE UPPER E. STOP
27	-G406-8740 -UAD0000155 -42	LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1	ESRU G406-8656 UAEOA708B1 EM STOP	RIGHTSIDE UPPER E. STOP LS08 - WINCH TENSION LIMIT SWITCH
28	-G406-8741 -UAD0000156 -43	LOWER 'A' FRAME JUNCTION BOX G406-8640 UAEOA706A1	ESLL G406-8645 UAEOA707A1 EM STOP	ESLL * - LEFTSIDE LOWER E.STOP & REMOTE CHEST PACK UMBILICAL CONNECTION

(a) Harness Figure No	(b) Drawing No - WFEL - REXROTH - Harness No	(c) From	(d) To	(e) Remarks
29	-G406-8742 -UAD0000157 -44	VEHICLE CAB	TO CAB CONTROL	
30	-G406-8743 -UAD0000158 -45	VEHICLE CAB	TO CAB POWER SUPPLY	
31	-G406-8744 -UAD0000200 -46	CHEST PACK G406-8660 UAEOA702A1	CAN BE PLUGGED IN BETWEEN CHEST PACK CP-01 AND ANY SOCKET MARKED *	PLUG CONNECTION: UMB-01 - UMBILICAL CABLE - UMB-02 1. LAUNCHER MAIN CONTROL ENCLOSURE G406-8620 UAEOA701A1 2. ESLL G406-8645 UAEOA707A1 3. ESRL G406-8650 UAEOA707B1
32	-G406-8745 -UAD0000747 -47	INTERFACE ENCLOSURE G406-8606 UAEOA703A1	EARTH	

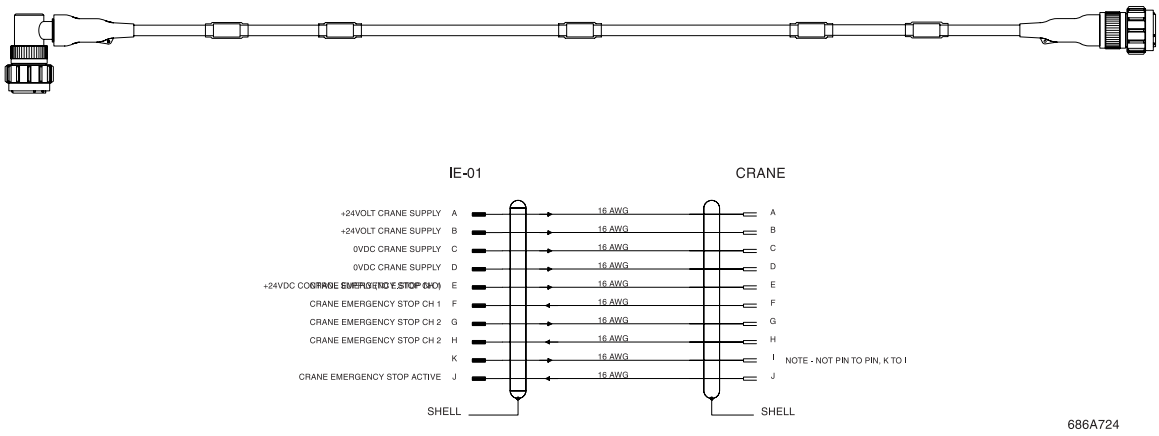


Figure 1

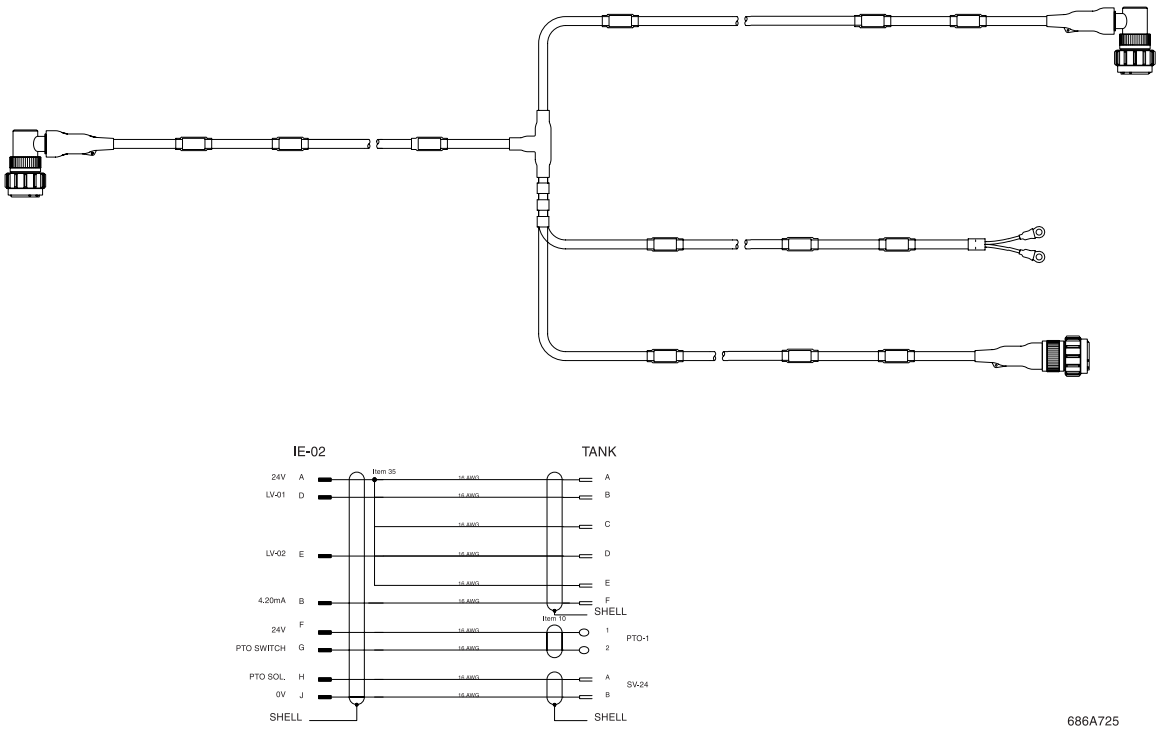


Figure 2

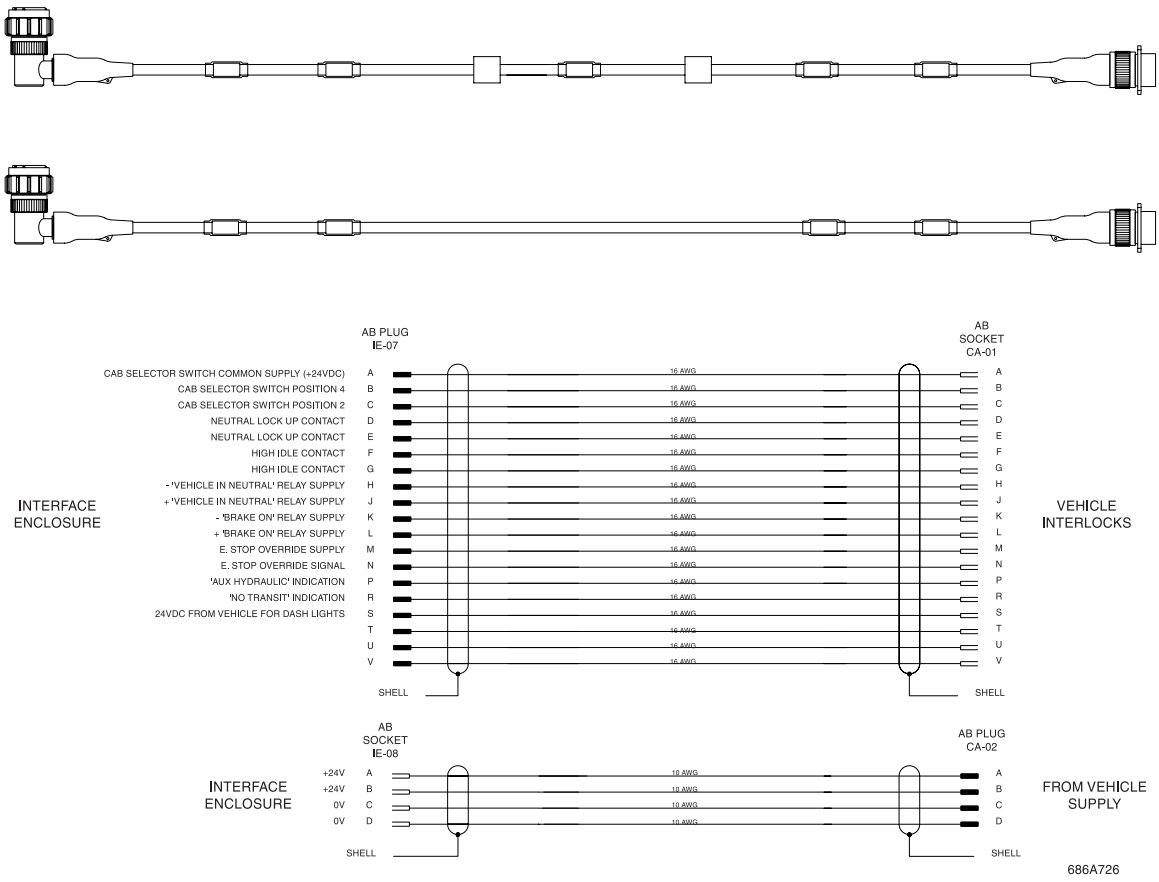

AB PLUG
IE-07
AB
SOCKET
CA-01
CAB SELECTOR SWITCH COMMON SUPPLY (+24VDC)
CAB SELECTOR SWITCH POSITION 4
CAB SELECTOR SWITCH POSITION 2
NEUTRAL LOCK UP CONTACT
NEUTRAL LOCK UP CONTACT
HIGH IDLE CONTACT
HIGH IDLE CONTACT
- 'VEHICLE IN NEUTRAL' RELAY SUPPLY
+ 'VEHICLE IN NEUTRAL' RELAY SUPPLY
- 'BRAKE ON' RELAY SUPPLY
+ 'BRAKE ON' RELAY SUPPLY
E. STOP OVERRIDE SUPPLY
E. STOP OVERRIDE SIGNAL
'AUX HYDRAULIC' INDICATION
'NO TRANSIT' INDICATION
24VDC FROM VEHICLE FOR DASH LIGHTS
A B C D E F G H J K L M N P R S T U V
16 AWG
SHELL
INTERFACE
ENCLOSURE
VEHICLE
INTERLOCKS
AB
SOCKET
IE-08
AB PLUG
CA-02
+24V
+24V
0V
0V
A B C D
10 AWG
SHELL
INTERFACE
ENCLOSURE
FROM VEHICLE
SUPPLY
686A726

Figure 3

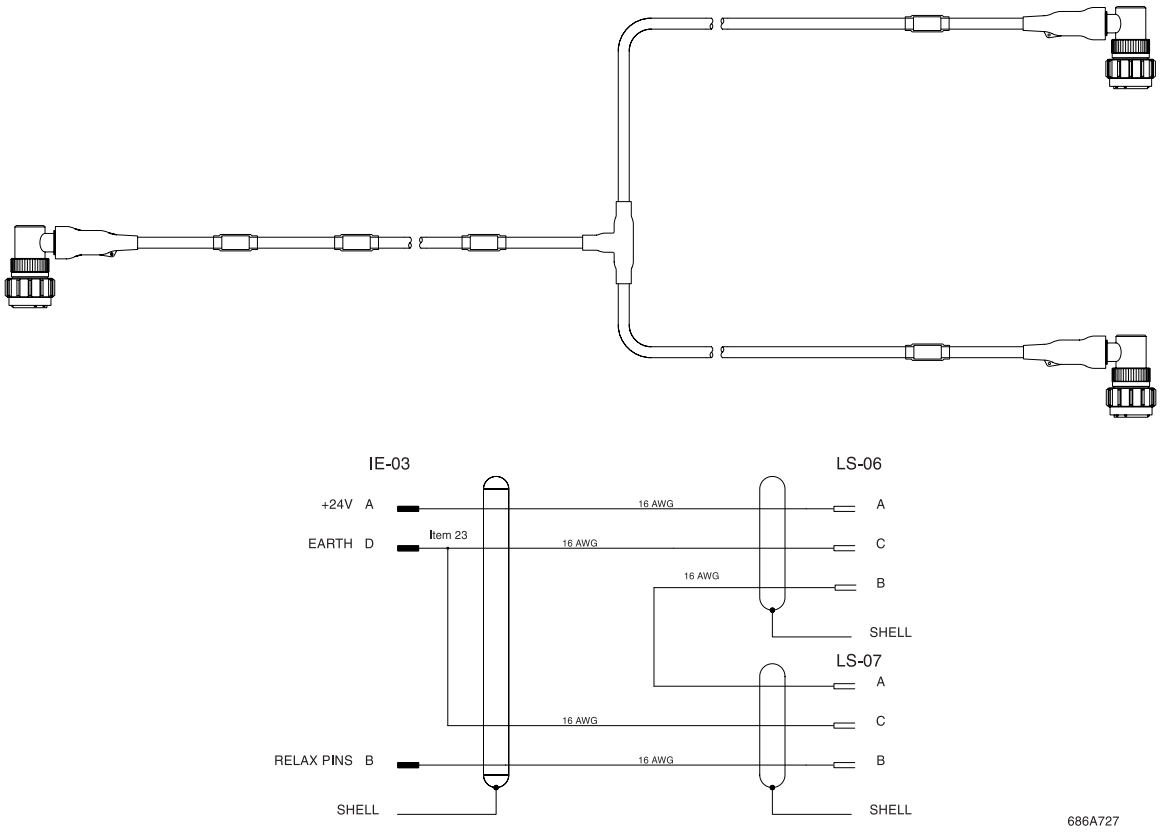

IE-03
LS-06
+24V A
EARTH D
Item 23
16 AWG
16 AWG
16 AWG
A
C
B
SHELL
LS-07
A
C
B
SHELL
16 AWG
RELAX PINS B
16 AWG
SHELL
686A727

Figure 4

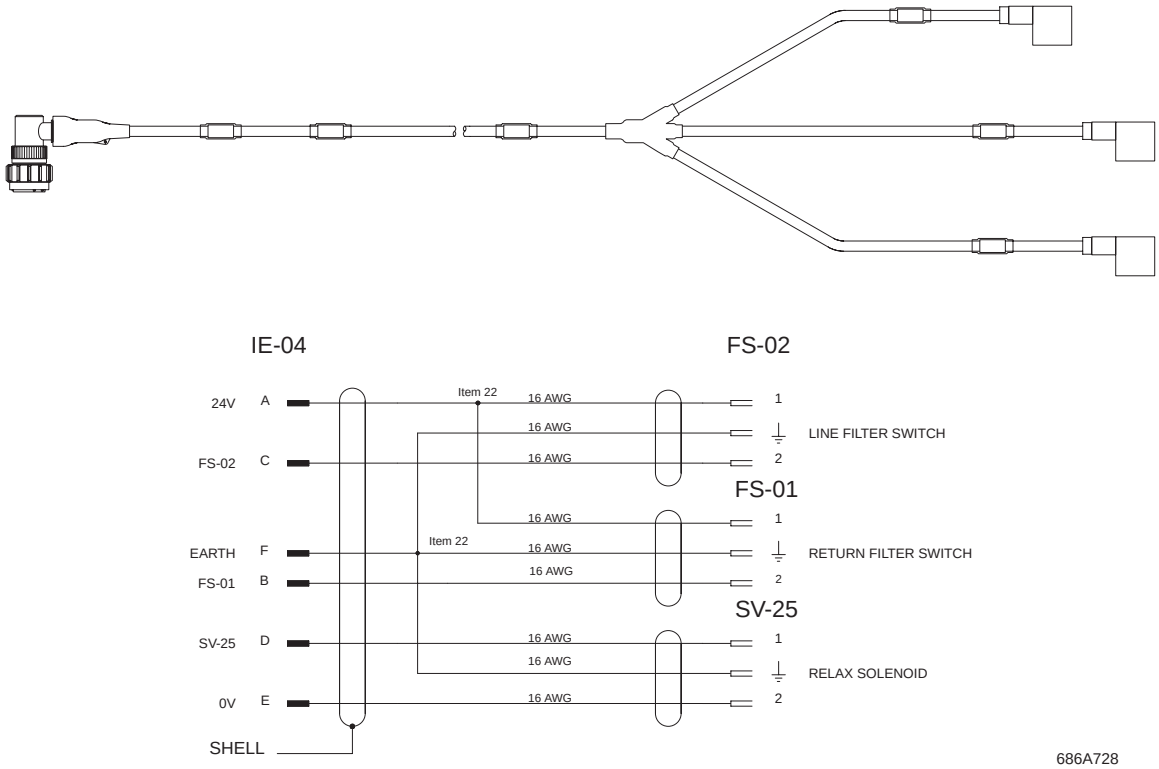

IE-04
FS-02
24V
A
FS-02
C
EARTH
F
FS-01
B
SV-25
D
0V
E
SHELL
Item 22
Item 22
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
FS-01
SV-25
1
2
1
2
1
2
LINE FILTER SWITCH
RETURN FILTER SWITCH
RELAX SOLENOID
686A728

Figure 5

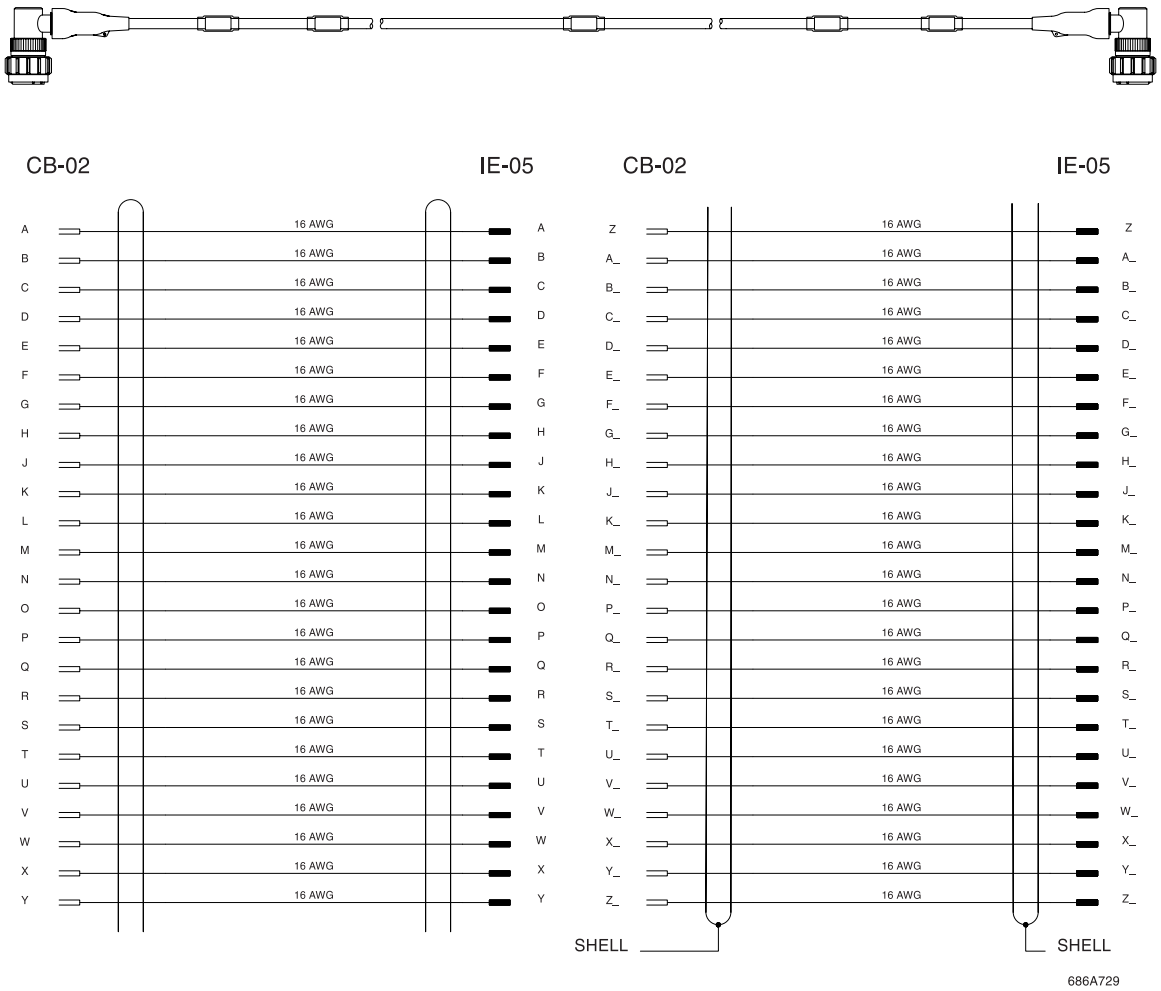

CB-02
IE-05
A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
16 AWG
CB-02
IE-05
Z
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
L_
M_
N_
P_
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S_
T_
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V_
W_
X_
Y_
Z_
SHELL
SHELL
686A729

Figure 6

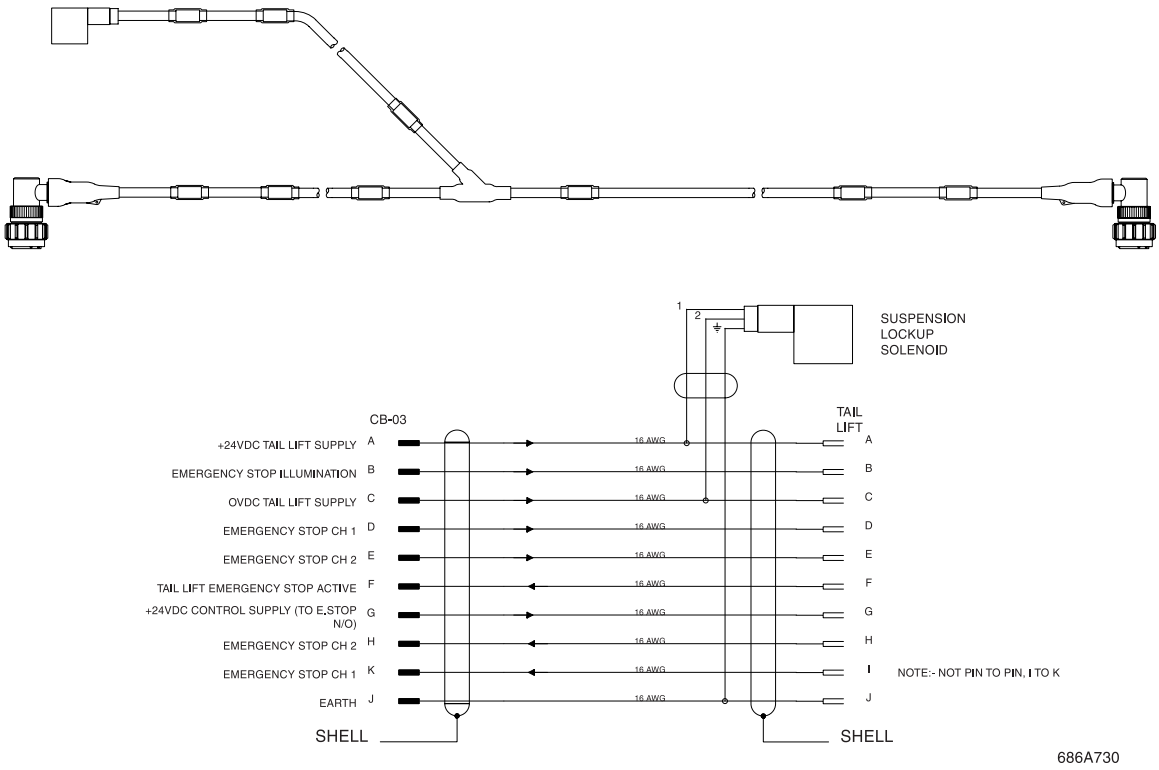

1
2
SUSPENSION
LOCKUP
SOLENOID
CB-03
TAIL
LIFT
+24VDC TAIL LIFT SUPPLY A
EMERGENCY STOP ILLUMINATION B
OVDC TAIL LIFT SUPPLY C
EMERGENCY STOP CH 1 D
EMERGENCY STOP CH 2 E
TAIL LIFT EMERGENCY STOP ACTIVE F
+24VDC CONTROL SUPPLY (TO E.STOP N/O) G
EMERGENCY STOP CH 2 H
EMERGENCY STOP CH 1 K
EARTH J
16 AWG
A
B
C
D
E
F
G
H
I
J
NOTE:- NOT PIN TO PIN, I TO K
SHELL
SHELL
686A730

Figure 7

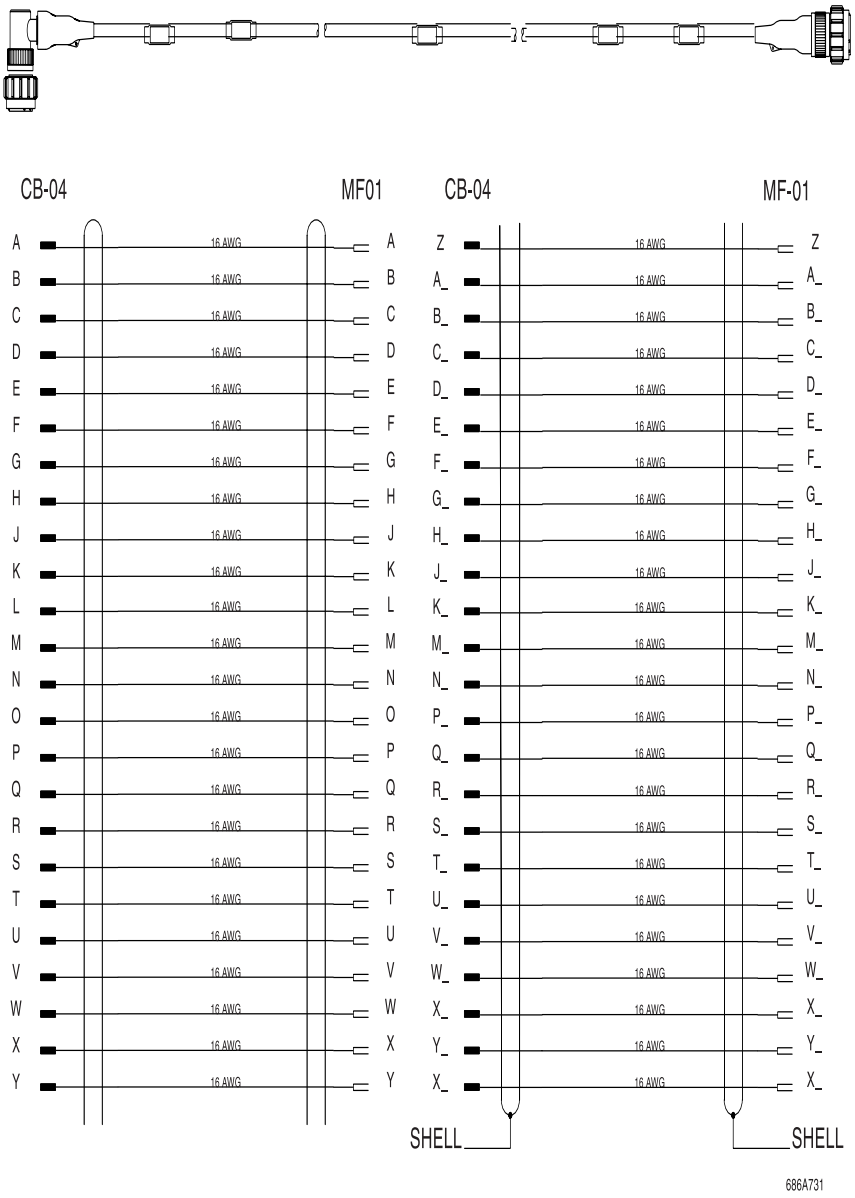


Figure 8

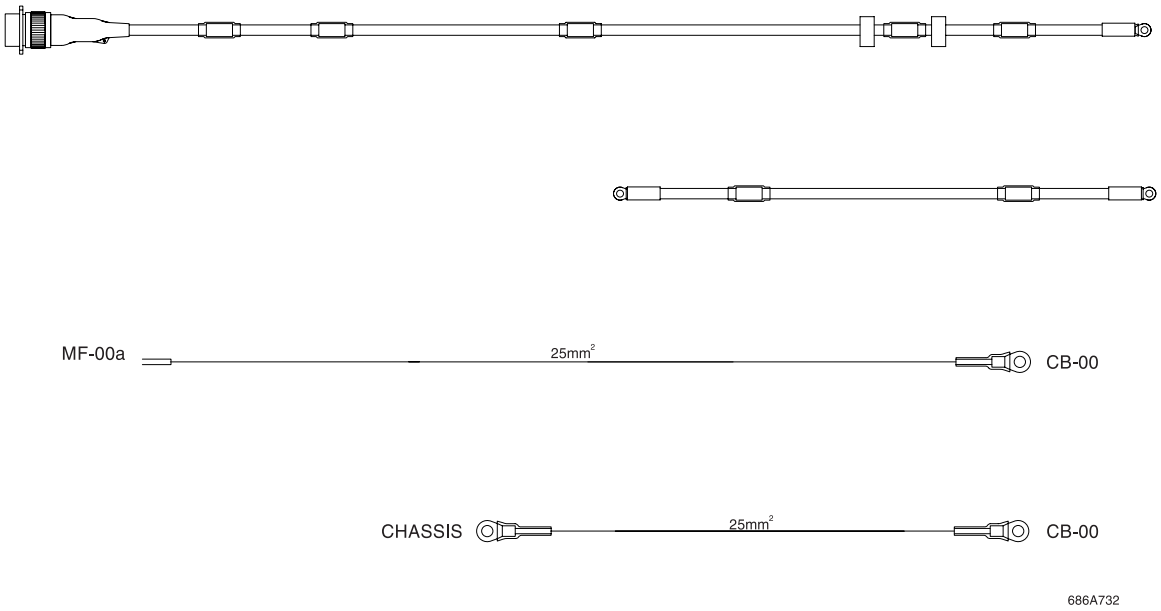


Figure 9

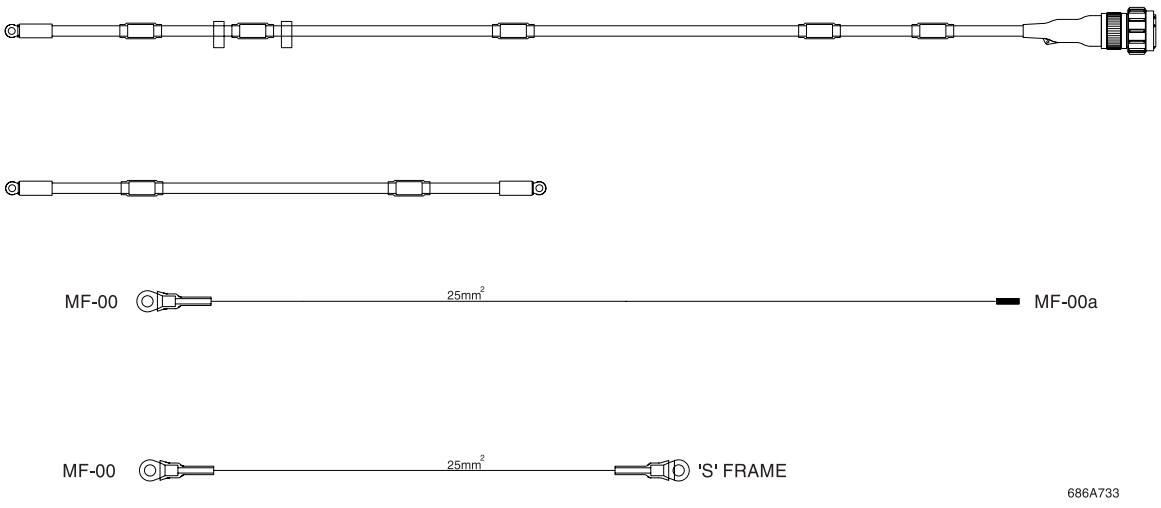


Figure 10

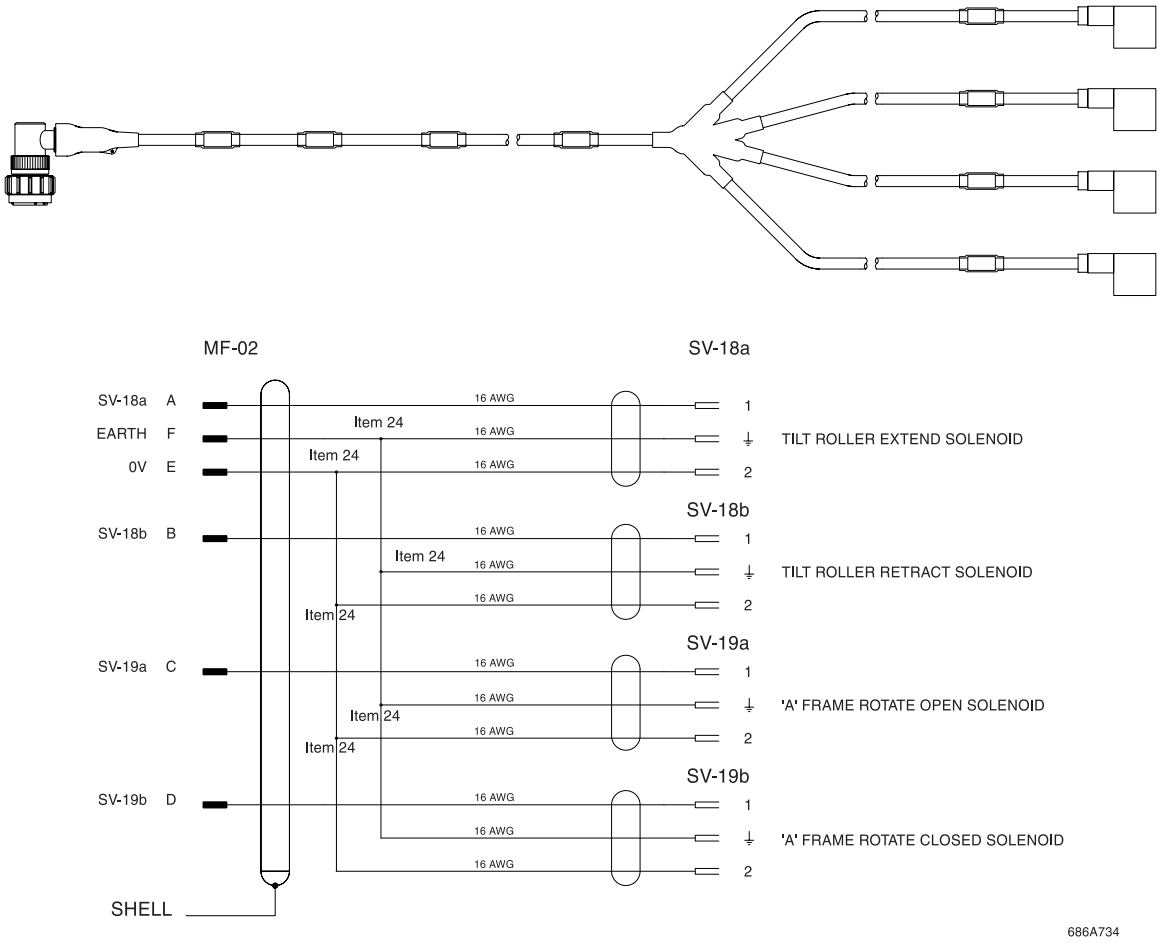


Figure 11

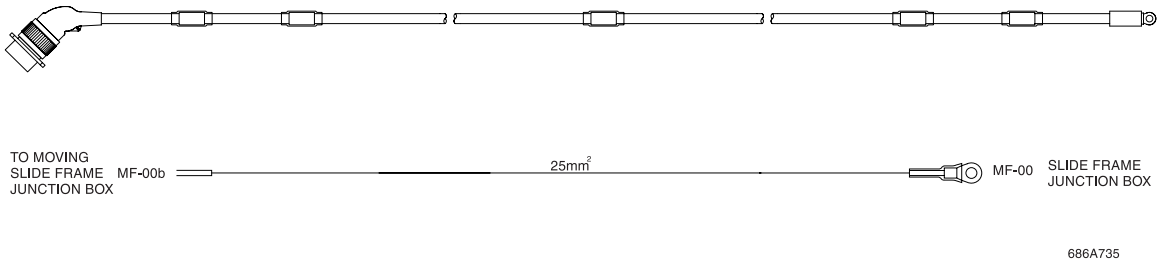


Figure 12

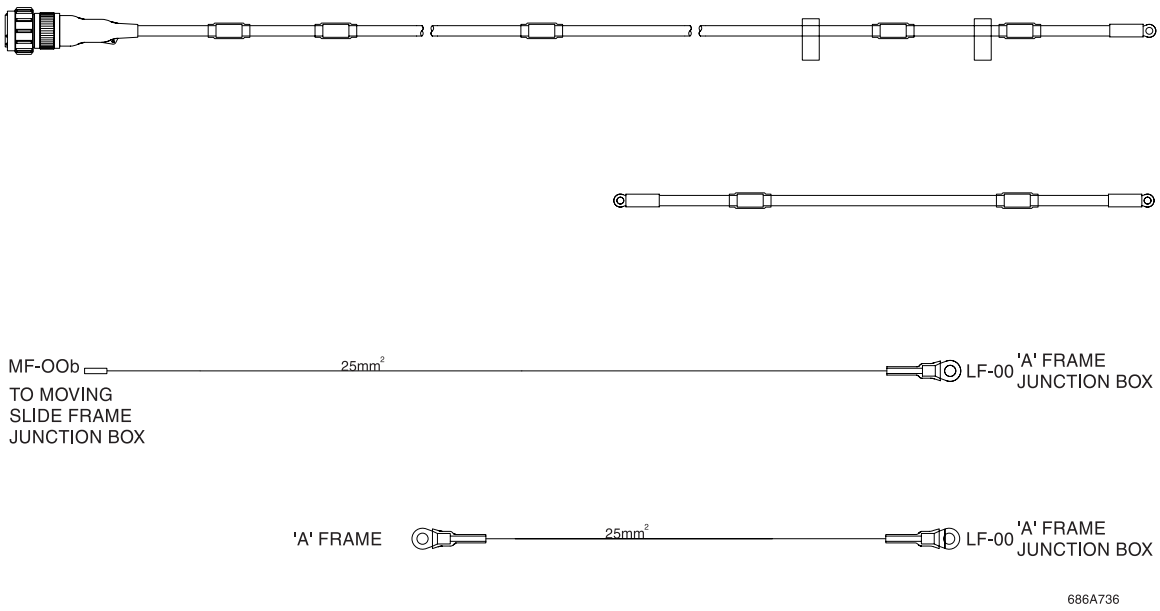


Figure 13

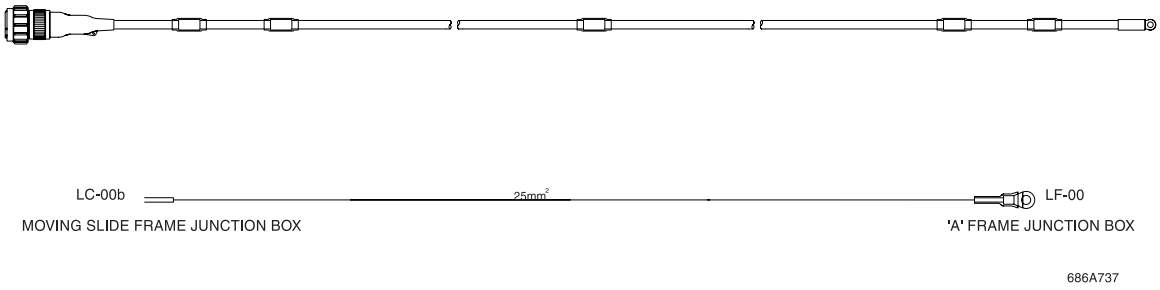


Figure 14

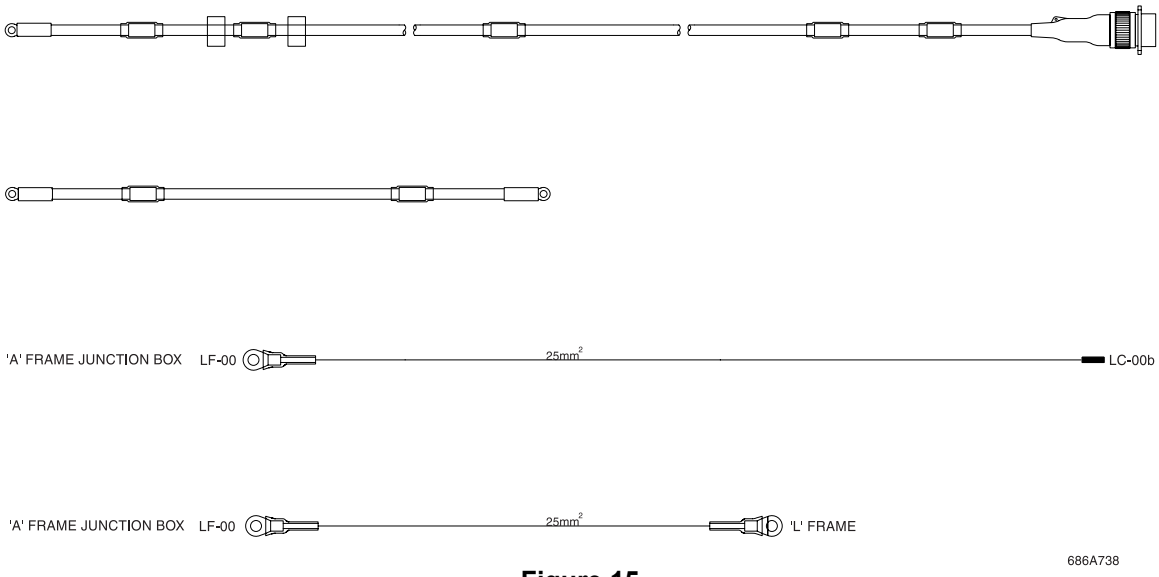


Figure 15

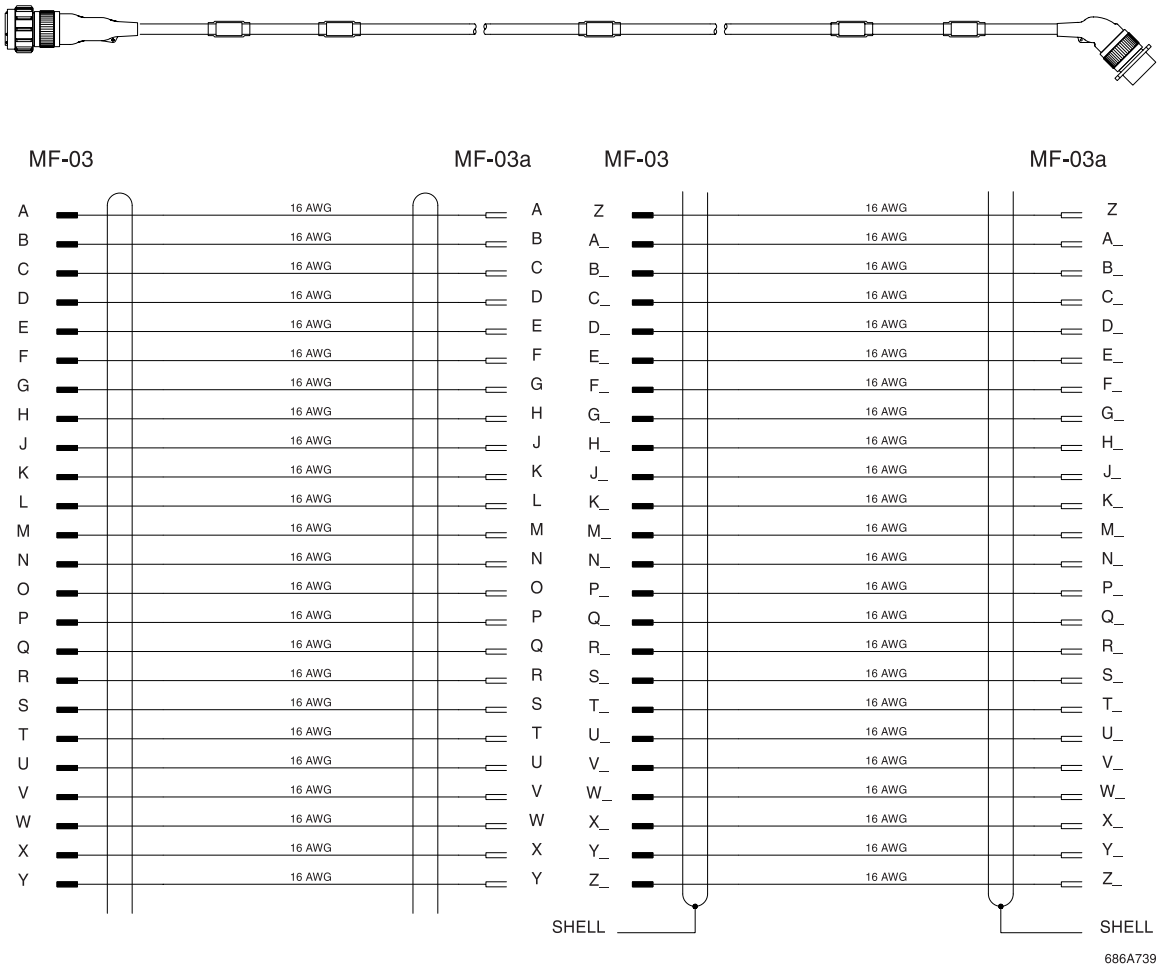


Figure 16

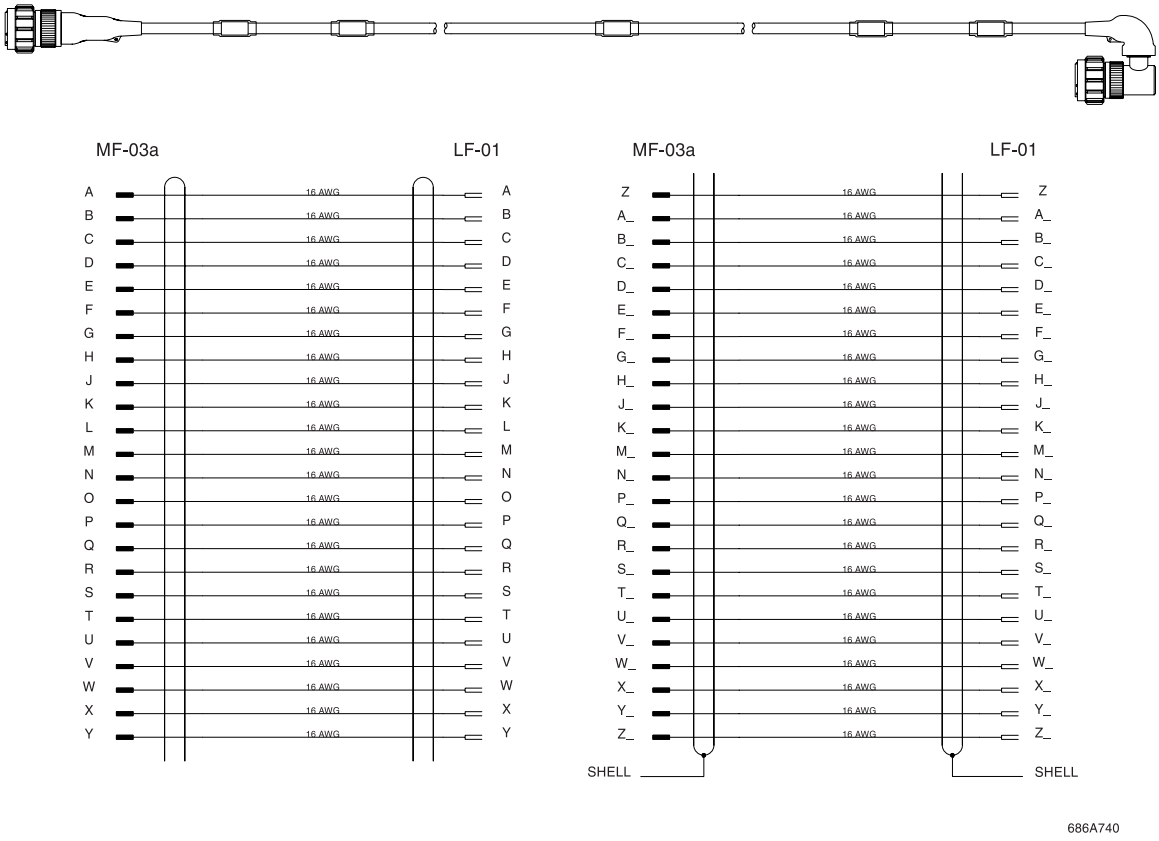

MF-03a
LF-01
A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
16 AWG
MF-03a
LF-01
Z
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
Q_
R_
S_
T_
U_
V_
W_
X_
Y_
Z_
SHELL
SHELL
686A740

Figure 17

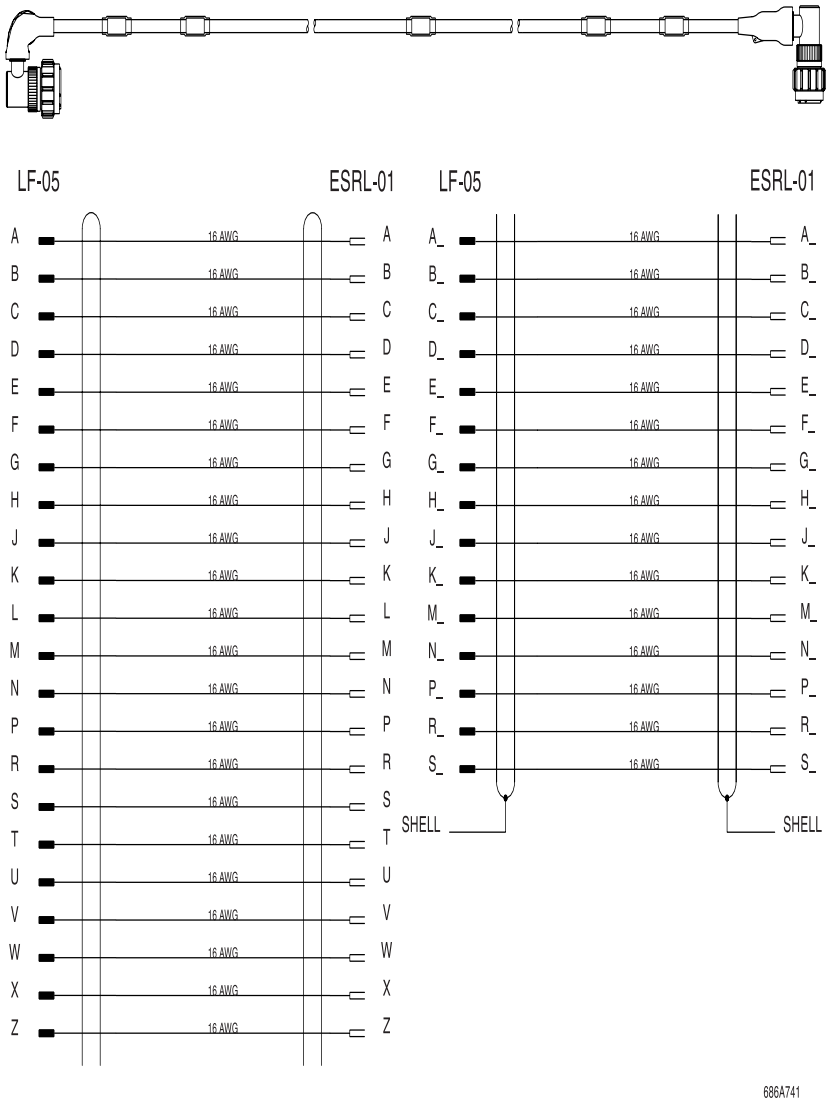

LF-05
ESRL-01
LF-05
ESRL-01
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Z
16 AWG
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
R_
S_
SHELL
SHELL
686A741

Figure 18

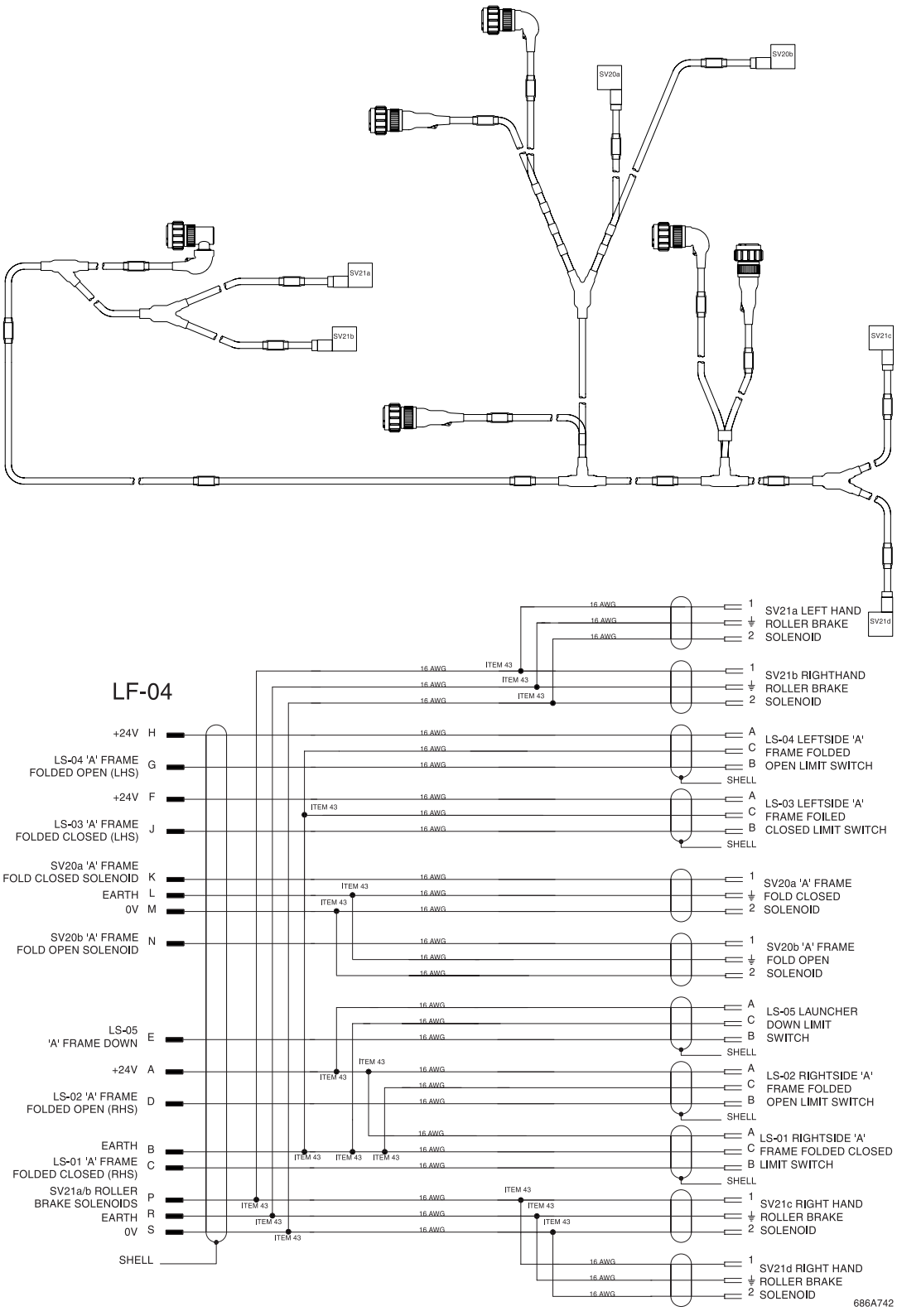
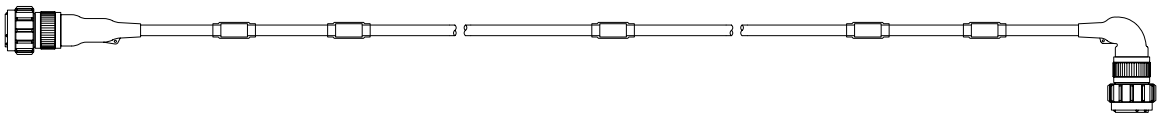

SV20a
SV20b
SV21a
SV21b
SV21c
SV21d
LF-04
+24V H
LS-04 'A' FRAME FOLDED OPEN (LHS) G
+24V F
LS-03 'A' FRAME FOLDED CLOSED (LHS) J
SV20a 'A' FRAME FOLD CLOSED SOLENOID K
EARTH L
0V M
SV20b 'A' FRAME FOLD OPEN SOLENOID N
LS-05 'A' FRAME DOWN E
+24V A
LS-02 'A' FRAME FOLDED OPEN (RHS) D
EARTH B
LS-01 'A' FRAME FOLDED CLOSED (RHS) C
SV21a/b ROLLER BRAKE SOLENOIDS P
EARTH R
0V S
SHELL
16 AWG
ITEM 43
SV21a LEFT HAND ROLLER BRAKE SOLENOID
SV21b RIGHTHAND ROLLER BRAKE SOLENOID
LS-04 LEFTSIDE 'A' FRAME FOLDED OPEN LIMIT SWITCH
LS-03 LEFTSIDE 'A' FRAME FOILED CLOSED LIMIT SWITCH
SV20a 'A' FRAME FOLD CLOSED SOLENOID
SV20b 'A' FRAME FOLD OPEN SOLENOID
LS-05 LAUNCHER DOWN LIMIT SWITCH
LS-02 RIGHTSIDE 'A' FRAME FOLDED OPEN LIMIT SWITCH
LS-01 RIGHTSIDE 'A' FRAME FOLDED CLOSED LIMIT SWITCH
SV21c RIGHT HAND ROLLER BRAKE SOLENOID
SV21d RIGHT HAND ROLLER BRAKE SOLENOID
686A742

Figure 19



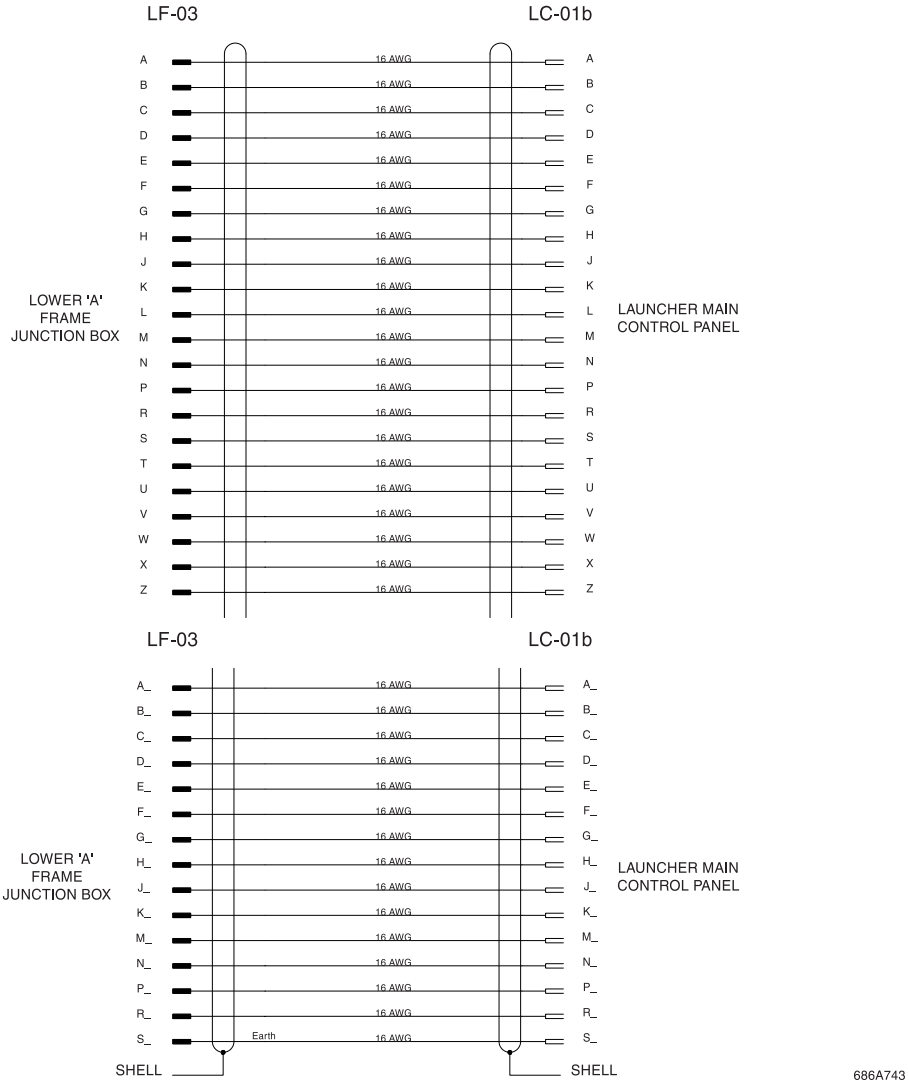

LF-03
LC-01b
LOWER 'A' FRAME JUNCTION BOX
LAUNCHER MAIN CONTROL PANEL
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Z
16 AWG
LF-03
LC-01b
LOWER 'A' FRAME JUNCTION BOX
LAUNCHER MAIN CONTROL PANEL
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
R_
S_
16 AWG
Earth
SHELL
SHELL
686A743

Figure 20


LC-01b
LC-01
LC-01b
LC-01
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Z
16 AWG
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
R_
S_
Earth
SHELL
SHELL
686A744

Figure 21

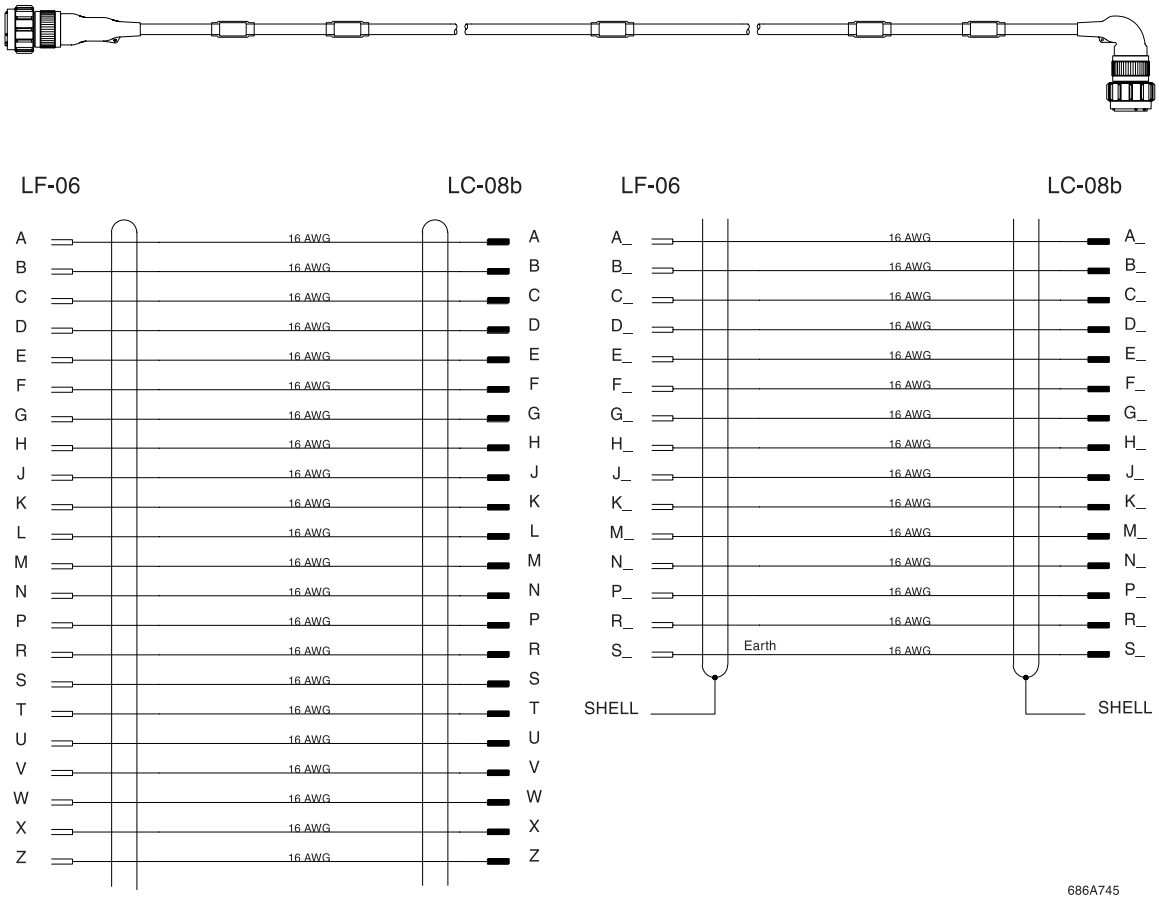

LF-06
LC-08b
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Z
16 AWG
LF-06
LC-08b
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
R_
S_
Earth
SHELL
SHELL
686A745

Figure 22

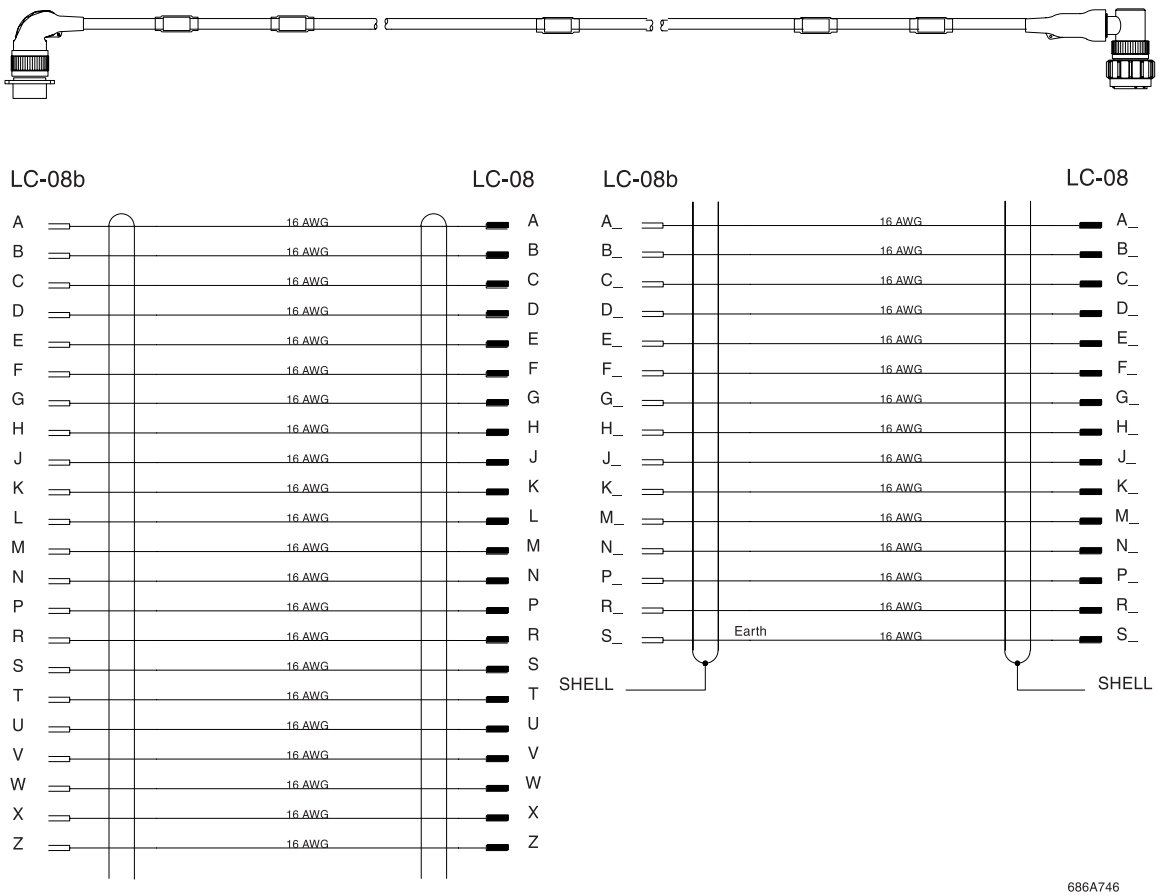
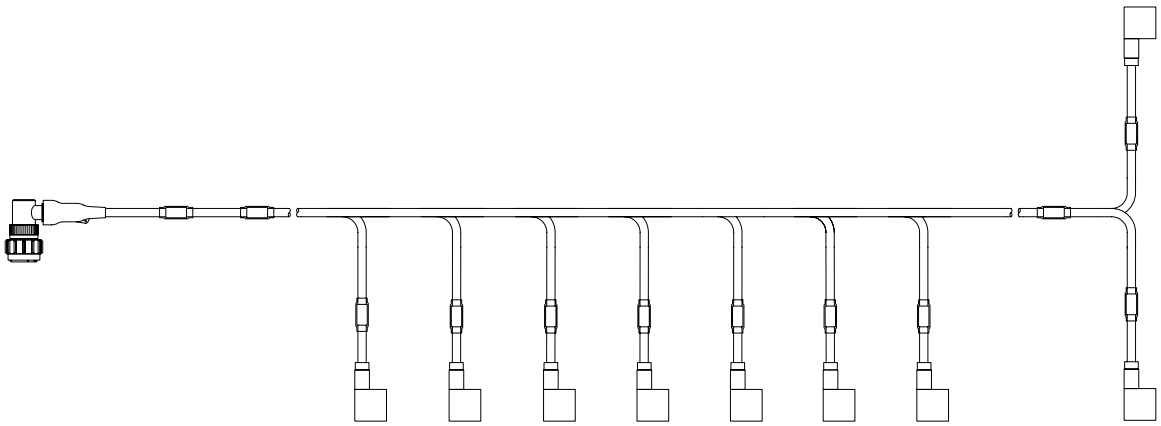

LC-08b
LC-08
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
S
T
U
V
W
X
Z
16 AWG
LC-08b
LC-08
A_
B_
C_
D_
E_
F_
G_
H_
J_
K_
M_
N_
P_
R_
S_
Earth
SHELL
SHELL
686A746

Figure 23



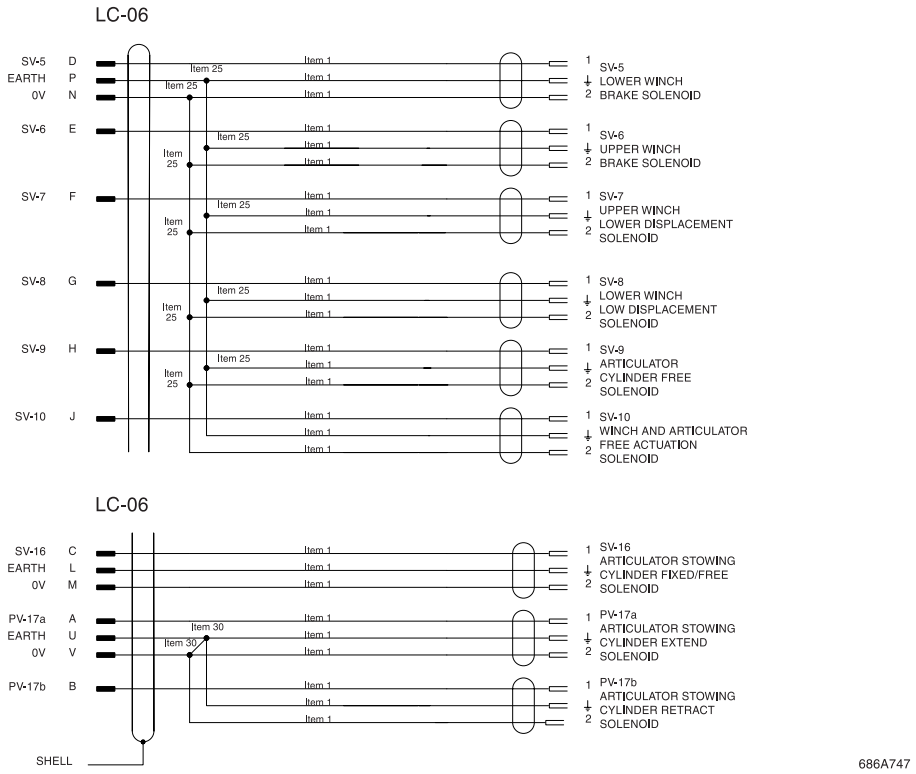
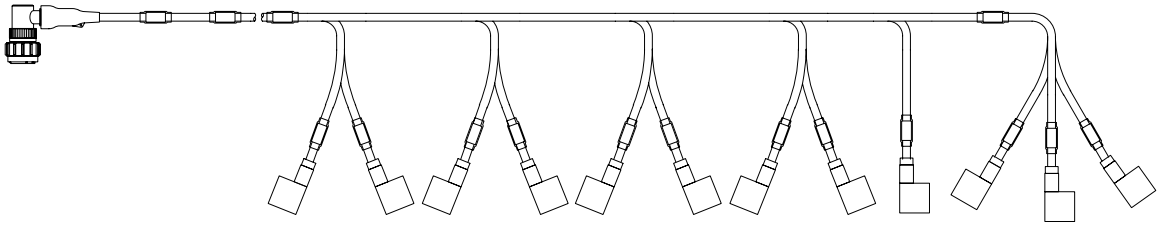
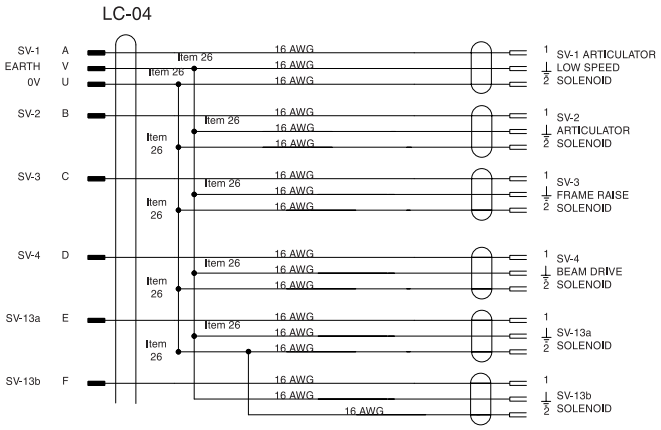
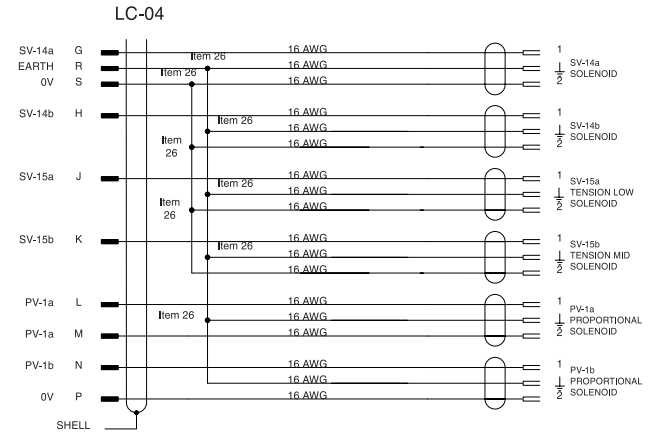

LC-06
SV-5 D
EARTH P
0V N
SV-6 E
SV-7 F
SV-8 G
SV-9 H
SV-10 J
Item 25
Item 1
1
2
SV-5
LOWER WINCH
BRAKE SOLENOID
SV-6
UPPER WINCH
BRAKE SOLENOID
SV-7
UPPER WINCH
LOWER DISPLACEMENT
SOLENOID
SV-8
LOWER WINCH
LOW DISPLACEMENT
SOLENOID
SV-9
ARTICULATOR
CYLINDER FREE
SOLENOID
SV-10
WINCH AND ARTICULATOR
FREE ACTUATION
SOLENOID
LC-06
SV-16 C
EARTH L
0V M
PV-17a A
EARTH U
0V V
PV-17b B
SHELL
Item 30
SV-16
ARTICULATOR STOWING
CYLINDER FIXED/FREE
SOLENOID
PV-17a
ARTICULATOR STOWING
CYLINDER EXTEND
SOLENOID
PV-17b
ARTICULATOR STOWING
CYLINDER RETRACT
SOLENOID
686A747

Figure 24







CONNECTOR REFERENCE	LEG LENGTH (mm)
SV-15a	250
SV-15b	260
SV-13a	310
SV-13b	320
SV-14a	310
SV-14b	320
PV-1a	375
PV-1b	390
SV-4	290
SV-1	300
SV-2	230
SV-3	260

686A748

Figure 25

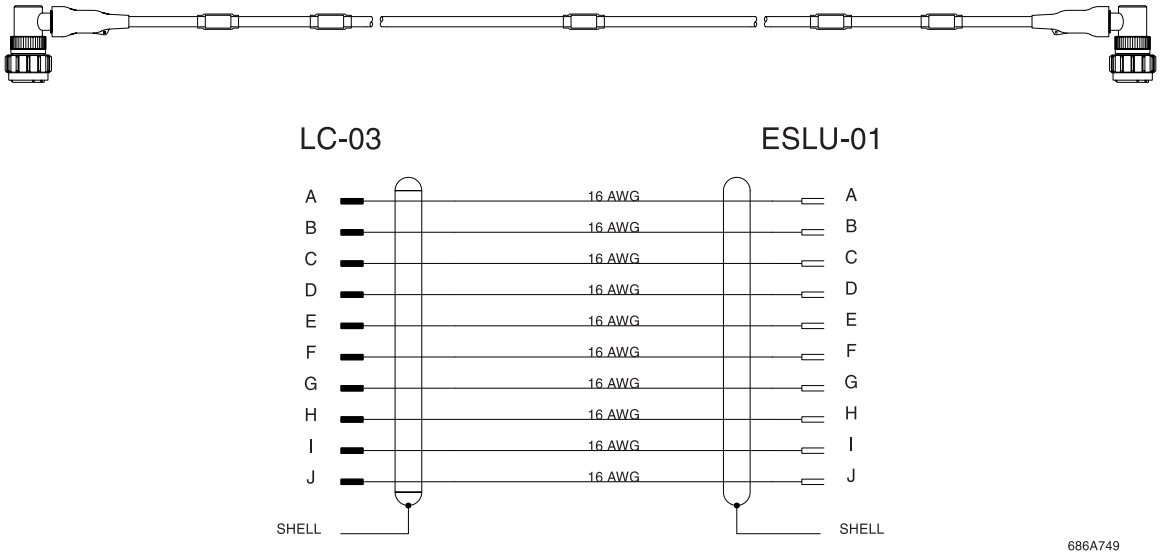
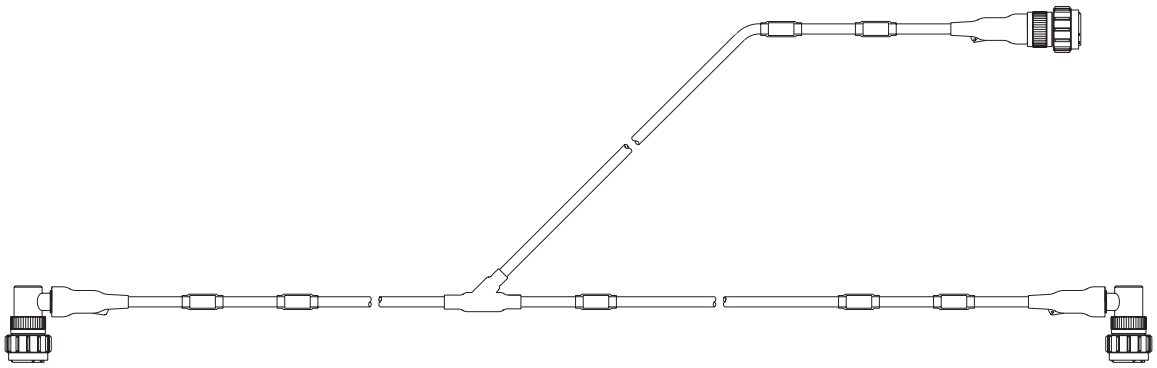

LC-03
ESLU-01
A
B
C
D
E
F
G
H
I
J
SHELL
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
16 AWG
A
B
C
D
E
F
G
H
I
J
SHELL
686A749

Figure 26



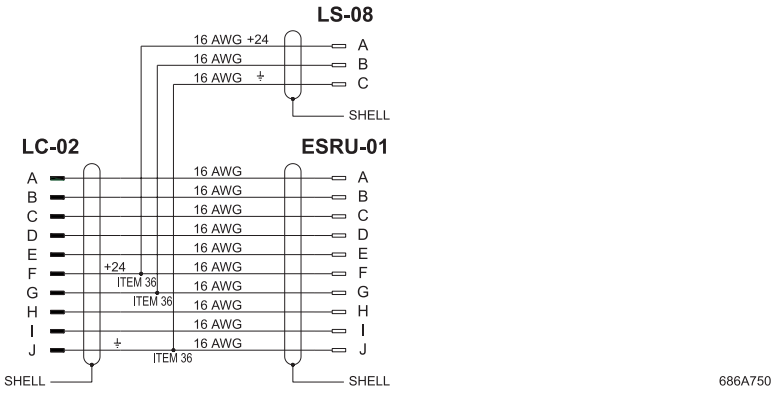

LS-08
16 AWG +24
16 AWG
16 AWG ⏚
A
B
C
SHELL
LC-02
ESRU-01
A
B
C
D
E
F
G
H
I
J
16 AWG
+24
ITEM 36
⏚
SHELL
686A750

Figure 27

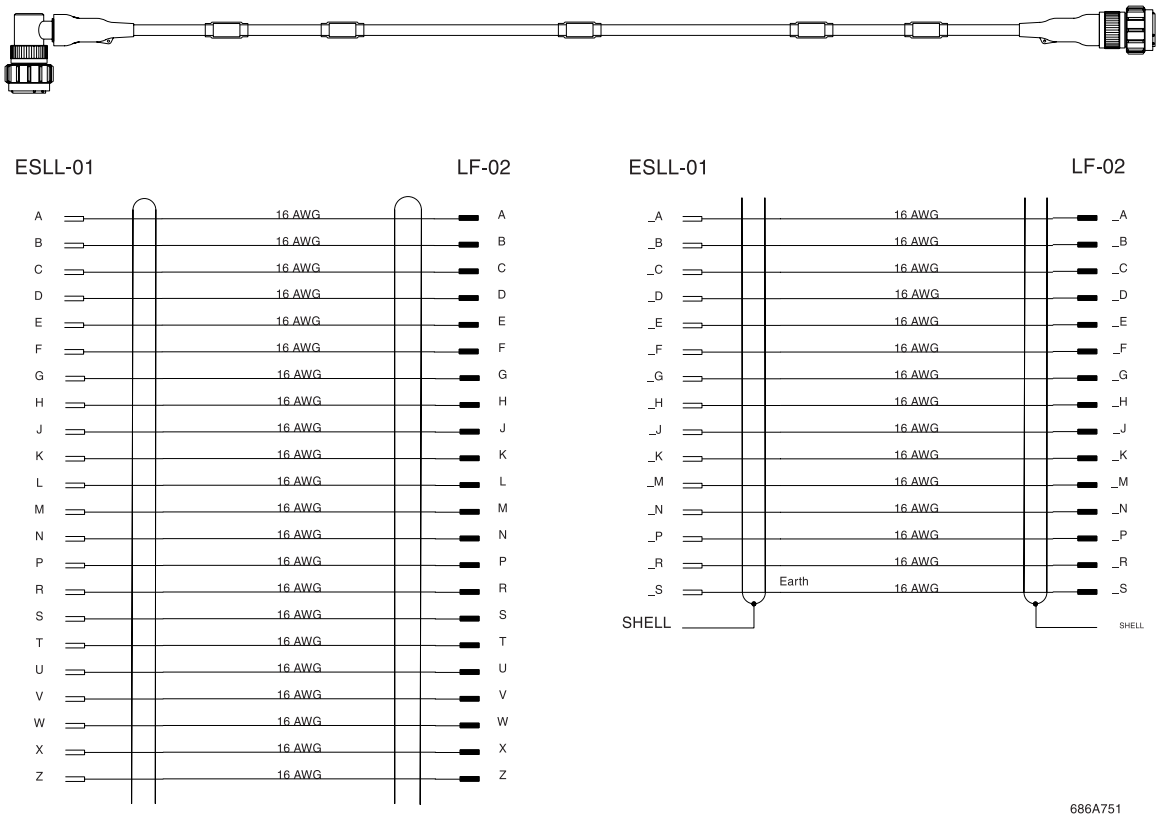

ESLL-01
LF-02
A 16 AWG A
B 16 AWG B
C 16 AWG C
D 16 AWG D
E 16 AWG E
F 16 AWG F
G 16 AWG G
H 16 AWG H
J 16 AWG J
K 16 AWG K
L 16 AWG L
M 16 AWG M
N 16 AWG N
P 16 AWG P
R 16 AWG R
S 16 AWG S
T 16 AWG T
U 16 AWG U
V 16 AWG V
W 16 AWG W
X 16 AWG X
Z 16 AWG Z
ESLL-01
LF-02
_A 16 AWG _A
_B 16 AWG _B
_C 16 AWG _C
_D 16 AWG _D
_E 16 AWG _E
_F 16 AWG _F
_G 16 AWG _G
_H 16 AWG _H
_J 16 AWG _J
_K 16 AWG _K
_M 16 AWG _M
_N 16 AWG _N
_P 16 AWG _P
_R 16 AWG _R
_S Earth 16 AWG _S
SHELL SHELL
686A751

Figure 28

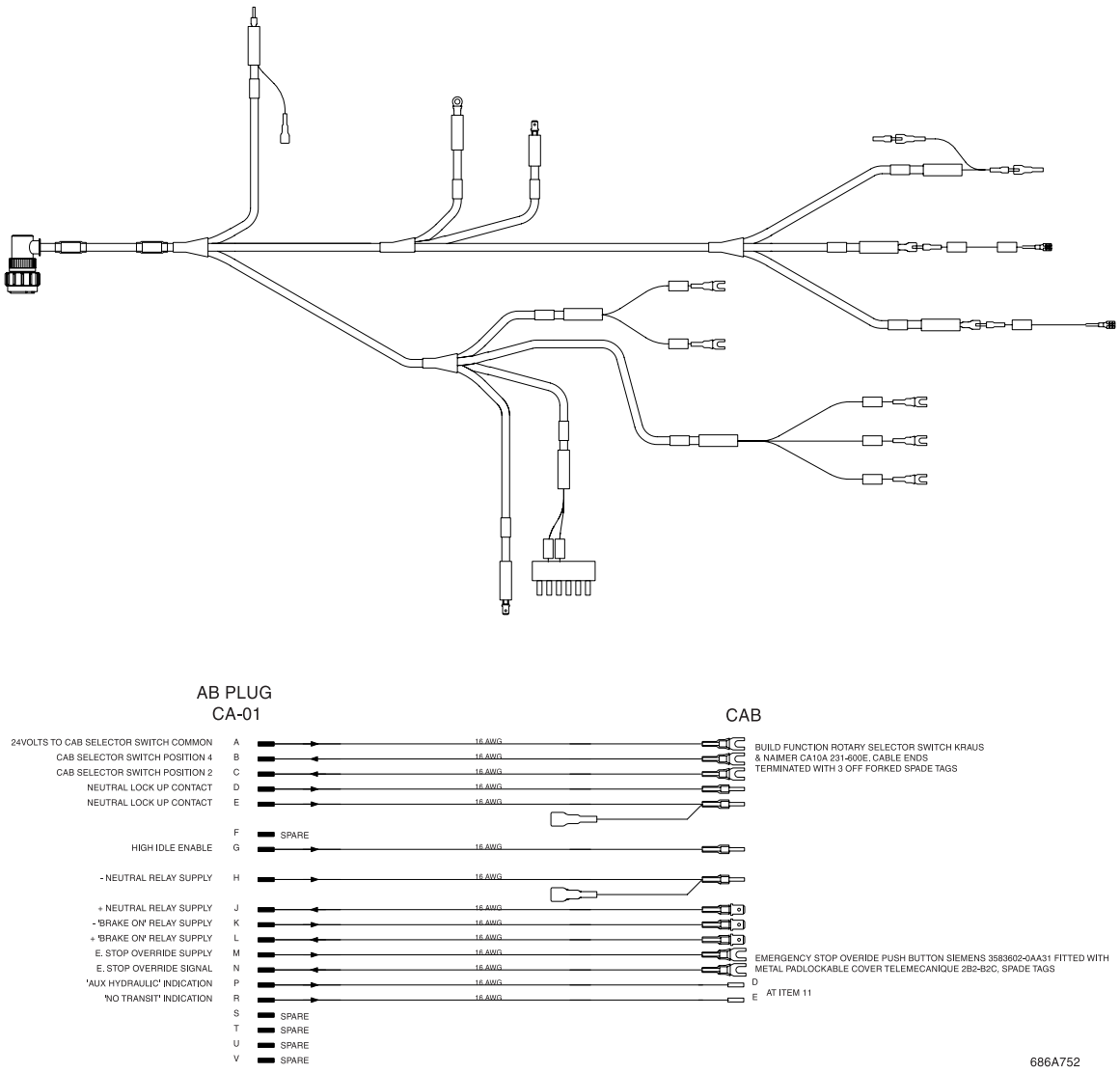

AB PLUG
CA-01
CAB
24VOLTS TO CAB SELECTOR SWITCH COMMON
CAB SELECTOR SWITCH POSITION 4
CAB SELECTOR SWITCH POSITION 2
NEUTRAL LOCK UP CONTACT
NEUTRAL LOCK UP CONTACT
HIGH IDLE ENABLE
- NEUTRAL RELAY SUPPLY
+ NEUTRAL RELAY SUPPLY
- 'BRAKE ON' RELAY SUPPLY
+ 'BRAKE ON' RELAY SUPPLY
E. STOP OVERRIDE SUPPLY
E. STOP OVERRIDE SIGNAL
'AUX HYDRAULIC' INDICATION
'NO TRANSIT' INDICATION
SPARE
16 AWG
BUILD FUNCTION ROTARY SELECTOR SWITCH KRAUS & NAIMER CA10A 231-600E. CABLE ENDS TERMINATED WITH 3 OFF FORKED SPADE TAGS
EMERGENCY STOP OVERIDE PUSH BUTTON SIEMENS 3583602-0AA31 FITTED WITH METAL PADLOCKABLE COVER TELEMECANIQUE 2B2-B2C, SPADE TAGS
AT ITEM 11
686A752

Figure 29

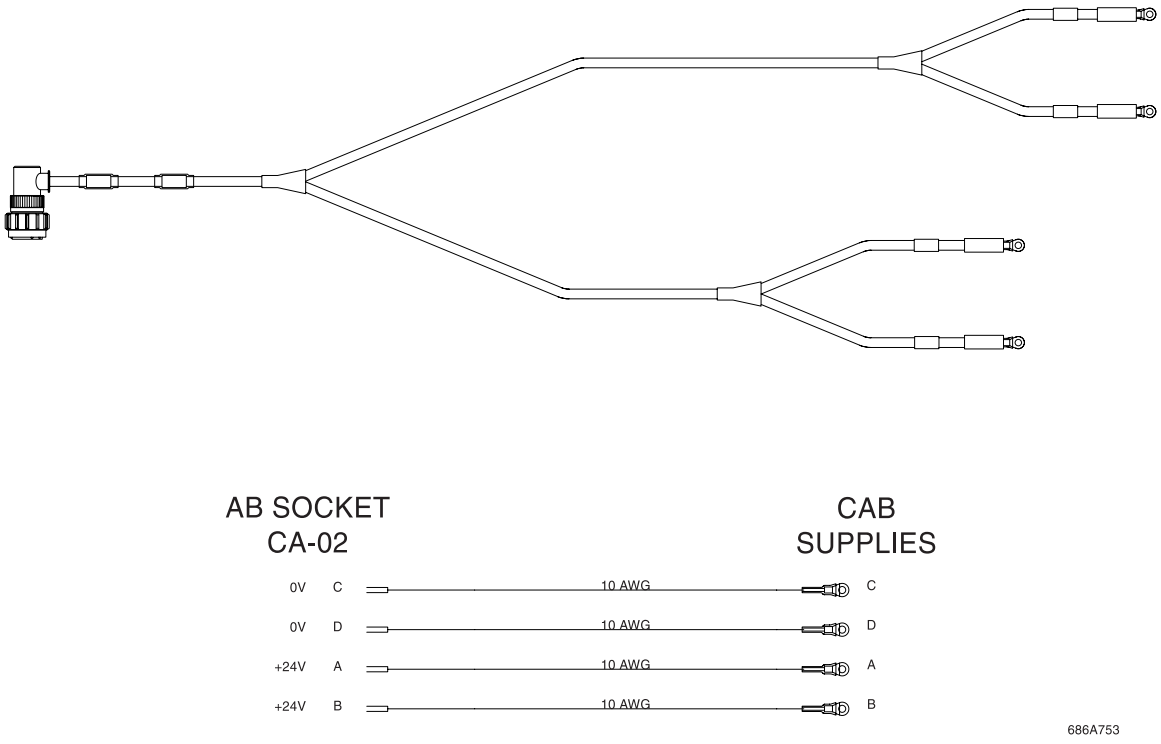

AB SOCKET
CA-02
CAB
SUPPLIES
0V C
10 AWG
C
0V D
10 AWG
D
+24V A
10 AWG
A
+24V B
10 AWG
B
686A753

Figure 30

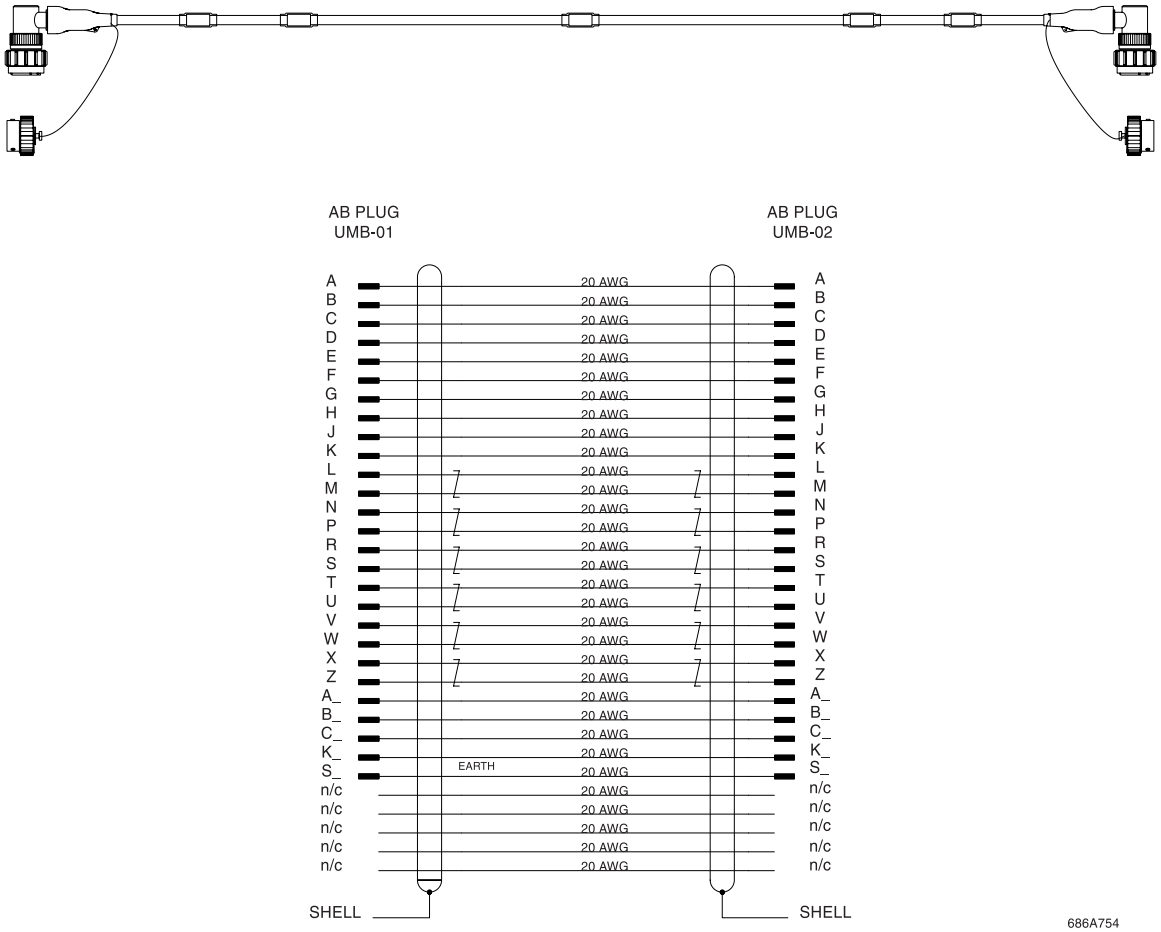


Figure 31

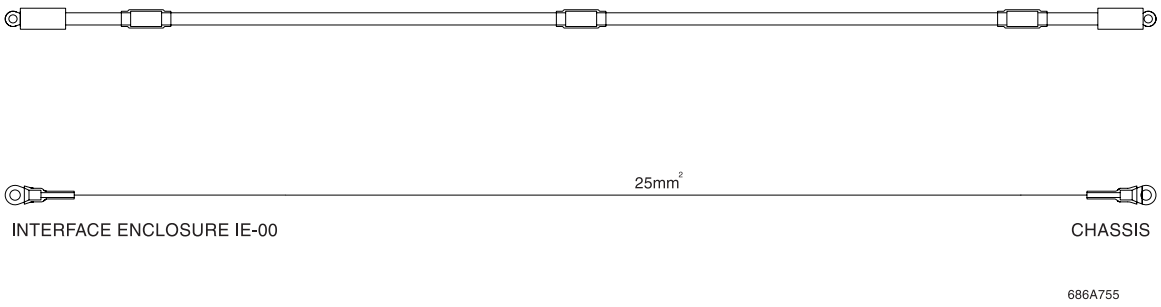
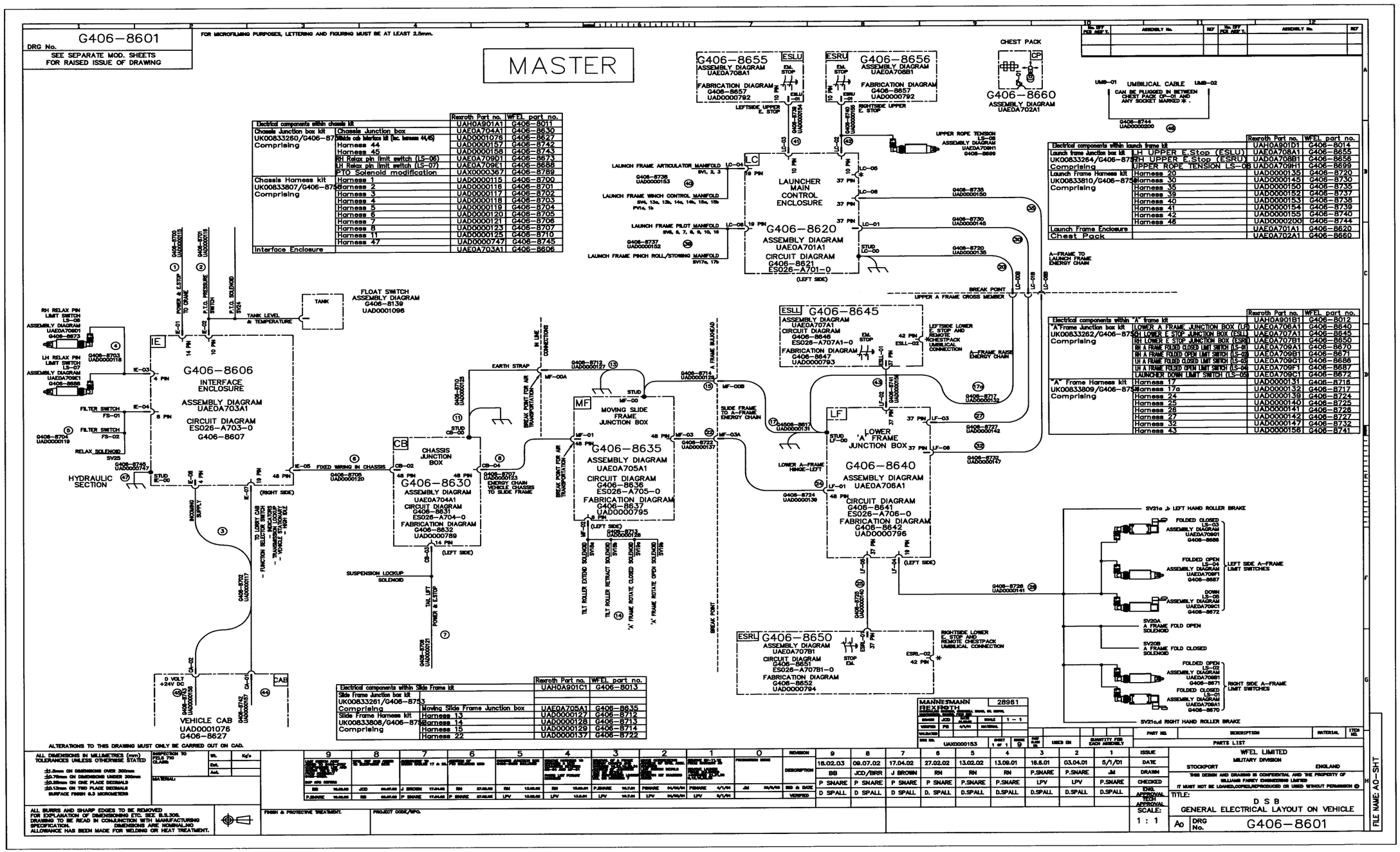


Figure 32



Electrical components within chassis kit		Rexroth Part no.	WFEL part no.
		UAH0A901A1	G406-8011
Chassis Junction box kit	Chassis Junction box	UAE0A704A1	G406-8630
UK00833280/G406-8758	Winch cab interface kit (inc. harness 44,45)	UAD0001076	G406-8627
Comprising	Harness 44	UAD0000157	G406-8742
	Harness 45	UAD0000158	G406-8743
	RH Relax pin limit switch (LS-06)	UAE0A709D1	G406-8673
	LH Relax pin limit switch (LS-07)	UAE0A709E1	G406-8688
	PTO Solenoid modification	UAX0000367	G406-8789
Chassis Harness kit	Harness 1	UAD0000115	G406-8700
UK00833807/G406-8759	Harness 2	UAD0000116	G406-8701
Comprising	Harness 3	UAD0000117	G406-8702
	Harness 4	UAD0000118	G406-8703
	Harness 5	UAD0000119	G406-8704
	Harness 6	UAD0000120	G406-8705
	Harness 7	UAD0000121	G406-8706
	Harness 8	UAD0000123	G406-8707
	Harness 11	UAD0000125	G406-8710
	Harness 47	UAD0000747	G406-8745
Interface Enclosure		UAE0A703A1	G406-8606

Electrical components within launch frame kit		Rexroth Part no.	WFEL part no.
		UAH0A901D1	G406-8014
Launch frame junction box kit	LH UPPER E.Stop (ESLU)	UAE0A708A1	G406-8655
UK00833264/G406-8752	RH UPPER E.Stop (ESRU)	UAD0A708B1	G406-8656
Comprising	UPPER ROPE TENSION LS-08	UAD0A709H1	G406-8699
Launch Frame Harness kit	Harness 29	UAD0000135	G406-8729
UK00833810/G406-8753	Harness 30	UAD0000145	G406-8730
Comprising	Harness 35	UAD0000150	G406-8735
	Harness 39	UAD0000152	G406-8737
	Harness 40	UAD0000153	G406-8738
	Harness 41	UAD0000154	G406-8739
	Harness 42	UAD0000155	G406-8740
	Harness 48	UAD0000200	G406-8744
Launch Frame Enclosure		UAE0A701A1	G406-8620
Chest Pack		UAE0A702A1	G406-8660

Electrical components within "A" frame kit		Rexroth Part no.	WFEL part no.
		UAH0A901B1	G406-8012
"A"Frame Junction box kit	LOWER A FRAME JUNCTION BOX (LF)	UAE0A708A1	G406-8640
UK00833262/G406-8754	LH LOWER E STOP JUNCTION BOX (ESLL)	UAE0A707A1	G406-8645
Comprising	RH LOWER E STOP JUNCTION BOX (ESRL)	UAE0A707B1	G406-8650
	RH A FRAME FOLDED CLOSED LIMIT SWITCH (LS-01)	UAE0A709A1	G406-8670
	RH A FRAME FOLDED OPEN LIMIT SWITCH (LS-02)	UAE0A709B1	G406-8671
	LH A FRAME FOLDED CLOSED LIMIT SWITCH (LS-03)	UAE0A709G1	G406-8686
	LH A FRAME FOLDED OPEN LIMIT SWITCH (LS-04)	UAE0A709F1	G406-8687
	LAUNCHER DOWN LIMIT SWITCH (LS-05)	UAE0A709C1	G406-8672
"A" Frame Harness kit	Harness 17	UAD0000131	G406-8716
UK00833809/G406-8755	Harness 17a	UAD0000132	G406-8717
Comprising	Harness 24	UAD0000139	G406-8724
	Harness 25	UAD0000140	G406-8725
	Harness 26	UAD0000141	G406-8726
	Harness 27	UAD0000142	G406-8727
	Harness 32	UAD0000147	G406-8732
	Harness 43	UAD0000158	G406-8741

Electrical components within Slide Frame kit		Rexroth Part no.	WFEL part no.
		UAH0A901C1	G406-8013
Slide Frame Junction box kit			
UK00833281/G406-8753			
Comprising	Moving Slide Frame Junction box	UAE0A705A1	G406-8635
Slide Frame Harness kit	Harness 13	UAD0000127	G406-8712
UK00833808/G406-8757	Harness 14	UAD0000128	G406-8713
Comprising	Harness 15	UAD0000129	G406-8714
	Harness 22	UAD0000137	G406-8722

| | | |

APPENDIX J

Crane Hydraulic and Electrical System Drawings

Contents **Page**

Crane Electrical Component Locations 2
Standard Hydraulic Symbols 6

The following drawings are relevant to the Crane Hydraulic and Electrical System circuits

Figure Number	Figure Title	ATLAS Number	Sheet	Page
1	Crane Electrical Component Locations	Not Applicable	1	2
2	Crane Electrical Component Locations View A	Not Applicable	1	4
3	Crane Electrical Component Locations View A	Not Applicable	1	4
4	Crane Electrical Component Locations View A	Not Applicable	1	4
5	Hydraulic Schematic	6015.410.10.01/000	1	13
6	Electrical Construction Circuit	6015.058.11.01/001	1 of 2	14
7	Electrical Construction Circuit	6015.058.11.01/001	2 of 2	15
8	Flow Diagram Electrical	6015.058.11.01/002	1 of 5	16
9	Flow Diagram Electrical	6015.058.11.01/002	2 of 5	17
10	Flow Diagram Electrical	6015.058.11.01/002	3 of 5	18
11	Flow Diagram Electrical	6015.058.11.01/002	4 of 5	19
12	Flow Diagram Electrical	6015.058.11.01/002	5 of 5	20
13	Flow Diagram Electrical Index	6015.058.11.01/000	1 of 4	21
14	Flow Diagram Electrical Index	6015.058.11.01/000	2 of 4	22
15	Flow Diagram Electrical Index	6015.058.11.01/000	3 of 4	23
16	Flow Diagram Electrical Index	6015.058.11.01/000	4 of 4	24

Crane Electrical Component Locations

The electrical components of the crane are shown in Figures 1 thru 4. A description of each item is provided in the accompanying Tables 1 thru 4.

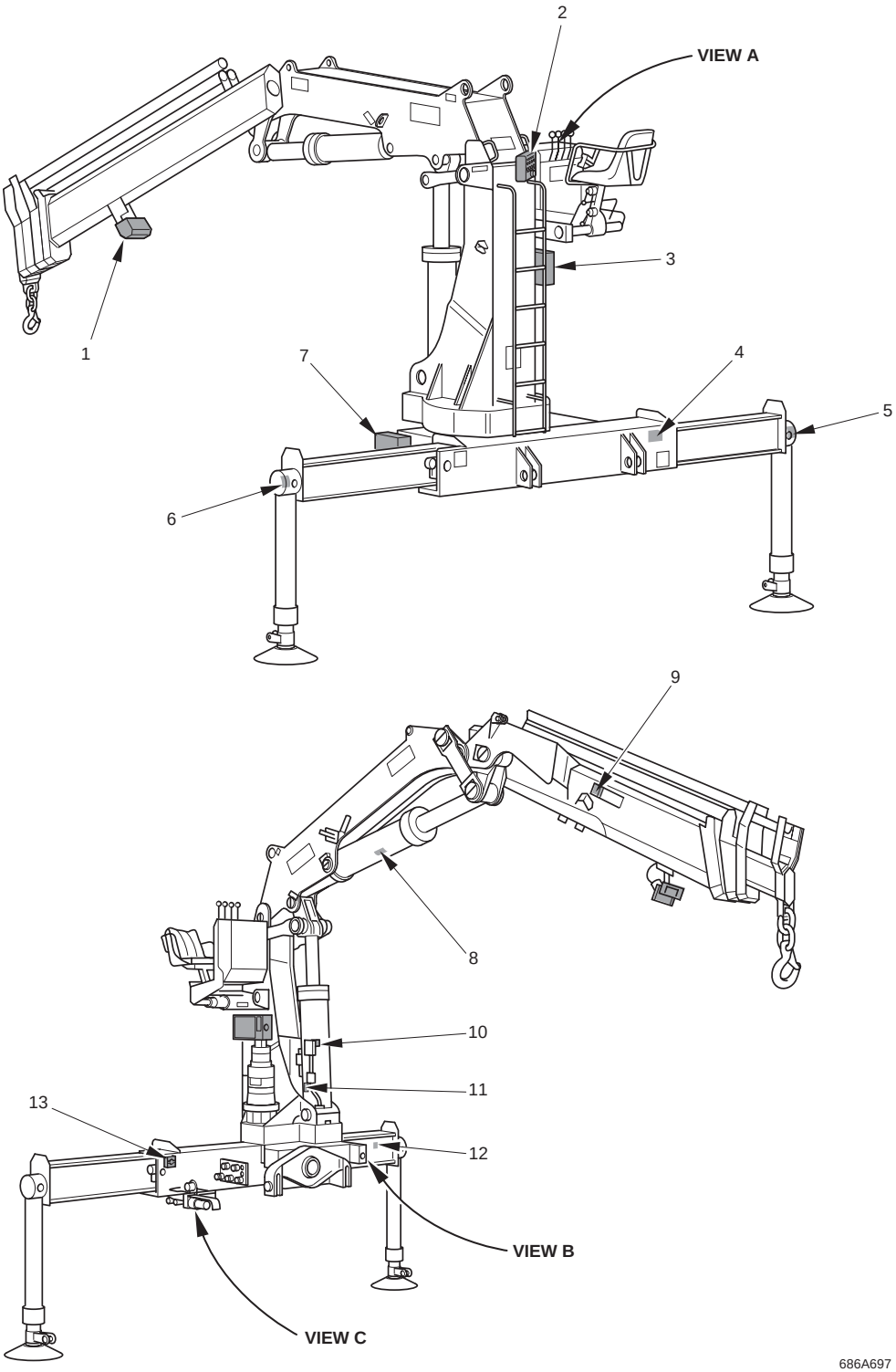


Figure 1 CRANE ELECTRICAL COMPONENT LOCATIONS

Table 1 for Figure 1

Item No.	Description
1	Working light
2	Operator's control panel
3	PCB junction box
4	RH stabilizer extension proximity switch
5	RH stabilizer leg pressure switch
6	LH stabilizer leg pressure switch
7	Main electrical junction box
8	Jib cylinder brake valve solenoid
9	Mercury switch
10	Boom (lift) cylinder brake valve solenoid
11	Pressure transducer
12	LH stabilizer extension proximity switch
13	RH stabilizer leg indicator panel

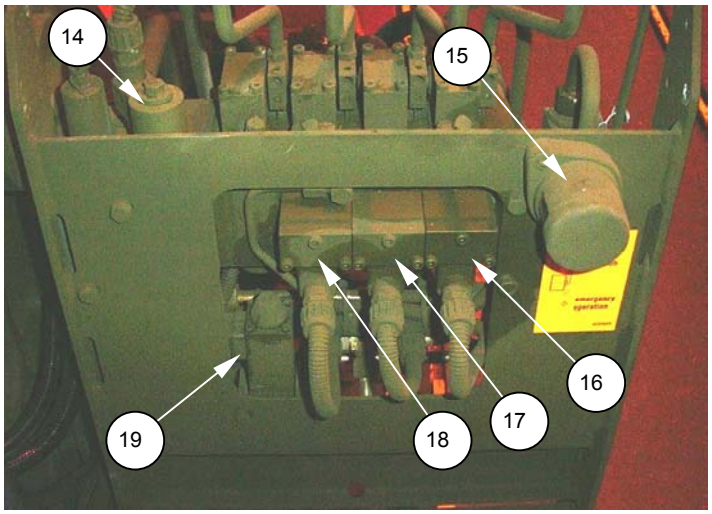


Figure 2 CRANE ELECTRICAL COMPONENT LOCATIONS VIEW A

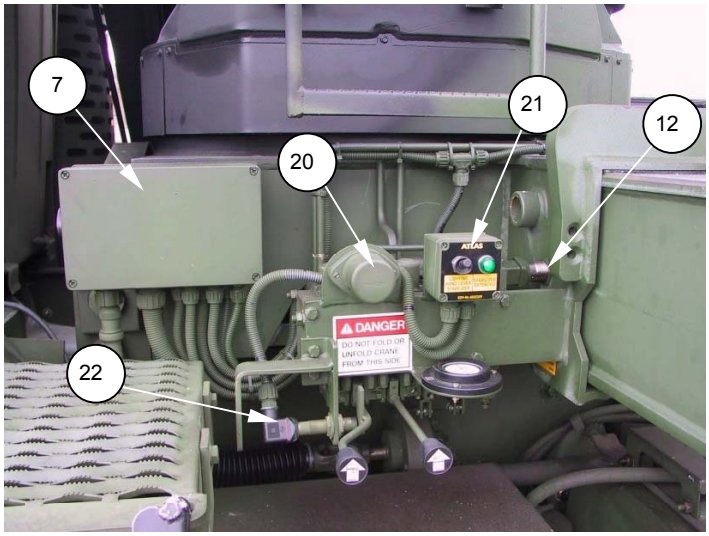


Figure 3 CRANE ELECTRICAL COMPONENT LOCATIONS VIEW B

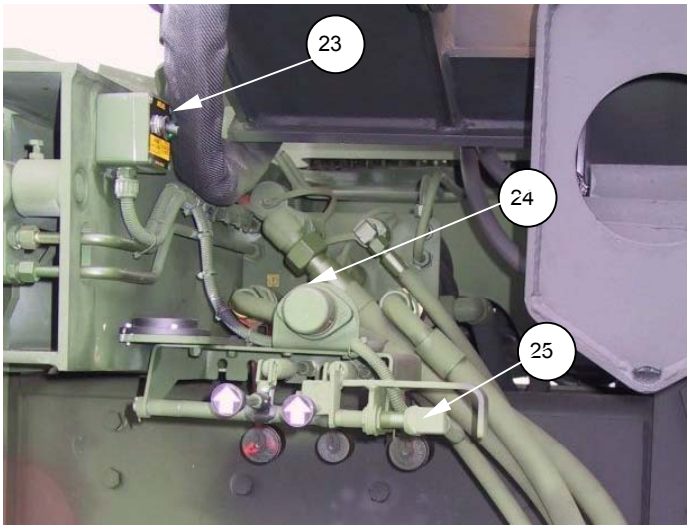


Figure 4 CRANE ELECTRICAL COMPONENT LOCATIONS VIEW C

Table 2 for Figure 2 View A

Item No.	Description
14	TBD (rotate solenoid)
15	Operator's crane controls panel light
16	Jib extension solenoid valve
17	Jib solenoid
18	Boom (lift) solenoid
19	Dump valve solenoid

Table 3 for Figure 3 View B

Item No.	Description
20	Left hand stabilizer control panel light
21	Left hand stabilizer control indicator
22	Proximity switch Left hand stabilizer control levers

Table 4 for Figure 4 View C

Item No.	Description
23	Right hand stabilizer control indicator
24	Right hand stabilizer control panel light
25	Proximity switch right hand stabilizer control levers

Standard Hydraulic Symbols

The hydraulic component symbols used in this manual are in accordance with International Standard ISO 1219-1 (Fluid power systems and components - Graphic symbols and circuit diagrams) to which reference may be made. (An extract from that standard, showing some of those symbols used on DSB schematics is displayed in Table 5).

Table 5 Standard Hydraulic Symbols

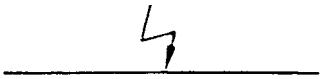
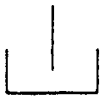
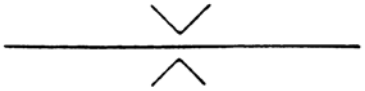
Designation	Description	Symbol
Lines, general	Working and return lines	
	Control line	
	Leak-off line	
	Arrow indicates direction of flow	
	Compressed air line	
	Electrical cable	
	Flexible line	
	Unconnected line junctions	
	Rigid connections: e.g. screwed, soldered	
	Drainage into vessel	
Quick release coupling	Coupled, with check valve	
Diaphragm valve	Flow rate and drop in pressure are largely independent of viscosity	

Table 5 Standard Hydraulic Symbols (continued)

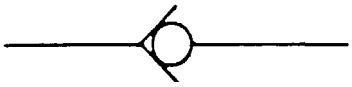
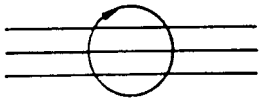
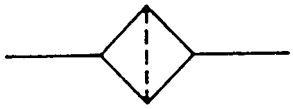
Designation	Description	Symbol
Throttle valve	Restrictor installed in line; non-adjustable	
	Adjustable restrictor	
Shut-off valve	Simplified representation	
Check valve	Without back pressure	
Check valve	With back pressure	
Line rupture protection	Valve closes in event of line rupture	
Rotating connection	Line connection which can be rotated during operation: e.g. three-way connection	
Filter	General	
Cooler	Arrows indicate direction of heat dissipation	
Measuring instrument	Pressure gauge	

Table 5 Standard Hydraulic Symbols (continued)

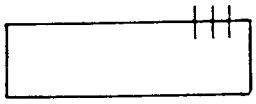
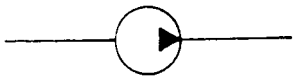
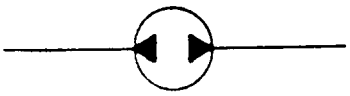
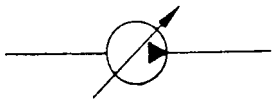
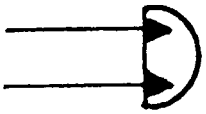
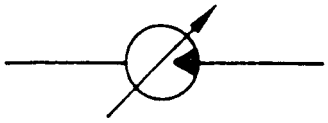
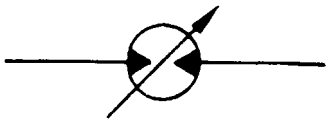
Designation	Description	Symbol
Tank	Pressurized	
Constant-pitch pump	With discharge in one direction	
	With discharge in two directions	
Variable-pitch pump	With discharge in one direction	
Rotary servo	Rotary servo with 2 rotating directions 270 degrees	
Constant-output motor	With one direction of rotation (oil flow)	
	With two directions of rotation (oil flow)	
Variable output motor	With variable displacement volume and one direction of rotation	
	With two directions of rotation (oil flow)	

Table 5 Standard Hydraulic Symbols (continued)

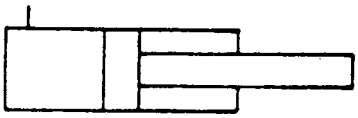
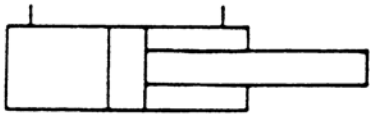
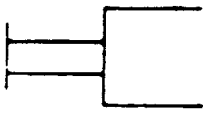
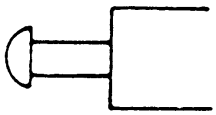
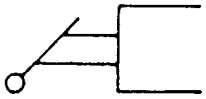
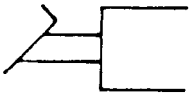
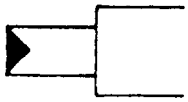
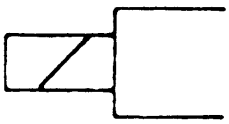
Designation	Description	Symbol
Compressor	One cylinder	
Single-acting cylinder	Fluid pressure acts in one direction only	
Double acting cylinder	Fluid pressure acts in both directions to effect lifting and return movements	
Operation by muscle power	General	
	Pushbutton	
Operation by muscle power	Lever	
	Pedal	
Actuating principle	Hydraulic	
	Solenoid	

Table 5 Standard Hydraulic Symbols (continued)

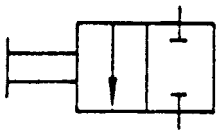
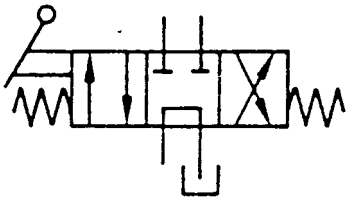
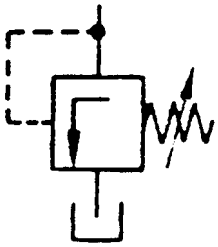
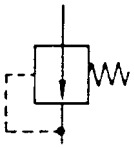
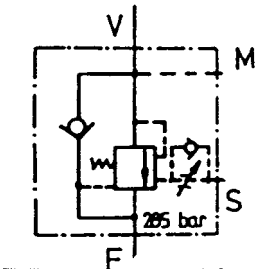
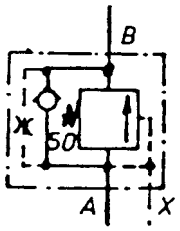
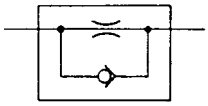
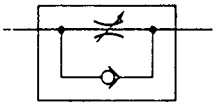
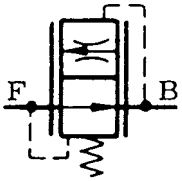
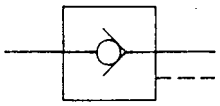
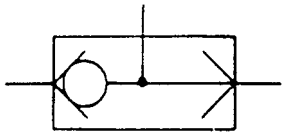
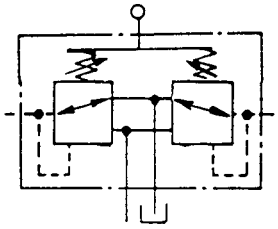
Designation	Description	Symbol
2/2-way valve	Two controlled connections, two switch positions. Example: operation by muscle power	
3/2-way valve	Three controlled connections, three switch positions. Example: operation by oil pressure. Hand operation by oil pressure acting against return spring	
4/3-way valve	Four controlled connections, three switch positions. Example: operation by oil pressure. Hand operation with spring centring in zero position	
Pressure limiting (excess pressure) valve	Supply pressure limiting by opening relief aperture against adjustable return force	
Pressure regulating (reducing) valve	Constant output pressure despite variable, and higher, input pressure	
Load retaining valve	Line break protection - and secondary - valve	

Table 5 Standard Hydraulic Symbols (continued)

Designation	Description	Symbol
Pilot pressure valve	Pressure reducing valve	
Area enclosed by thin dash-dot line	Combination of components forming a single block or element	
Throttle check valve	One-way non-adjustable	
	One-way adjustable	
	One-way adjustable	
Pilot-controlled check valve	Pilot control releases non-return element	
Changeover valve	Valve to shut off two inputs and one output	
Pilot-control device	For continuously-variable control of oil flow	

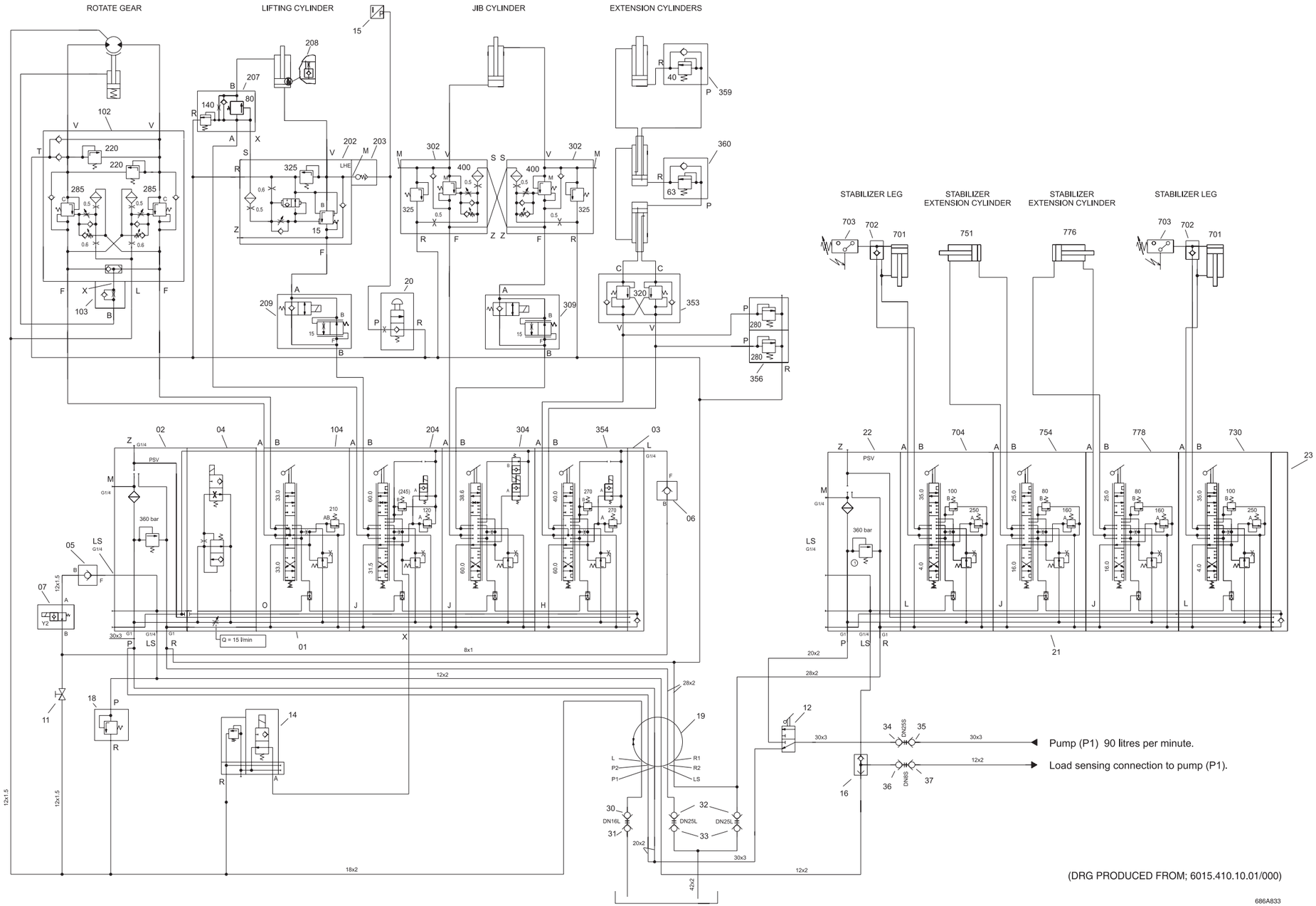


Figure 5 HYDRAULIC SCHEMATIC

ELECTRIC ACCESSORIES : 6015.058.11.01/000

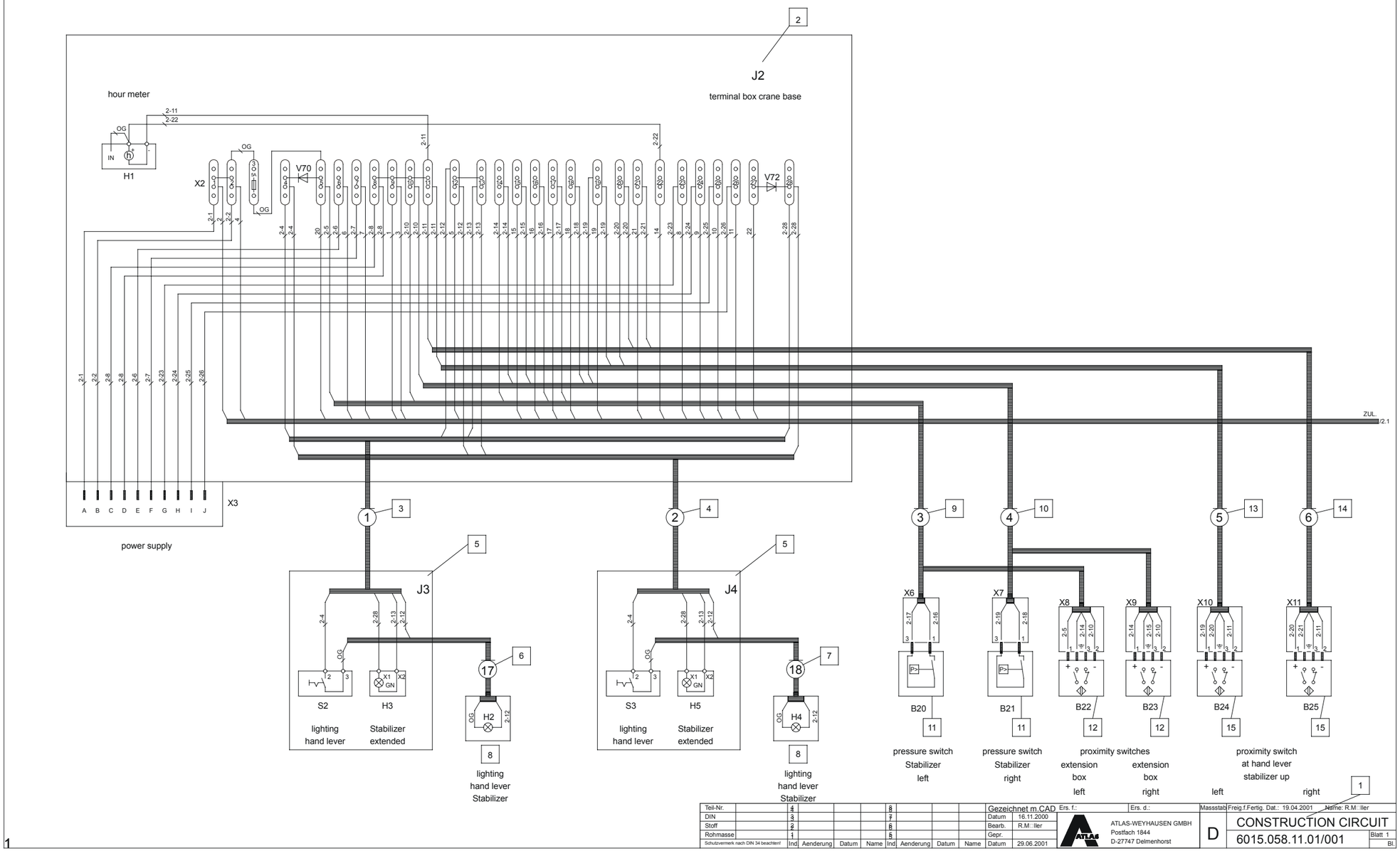


Figure 6 ELECTRICAL CONSTRUCTION CIRCUIT

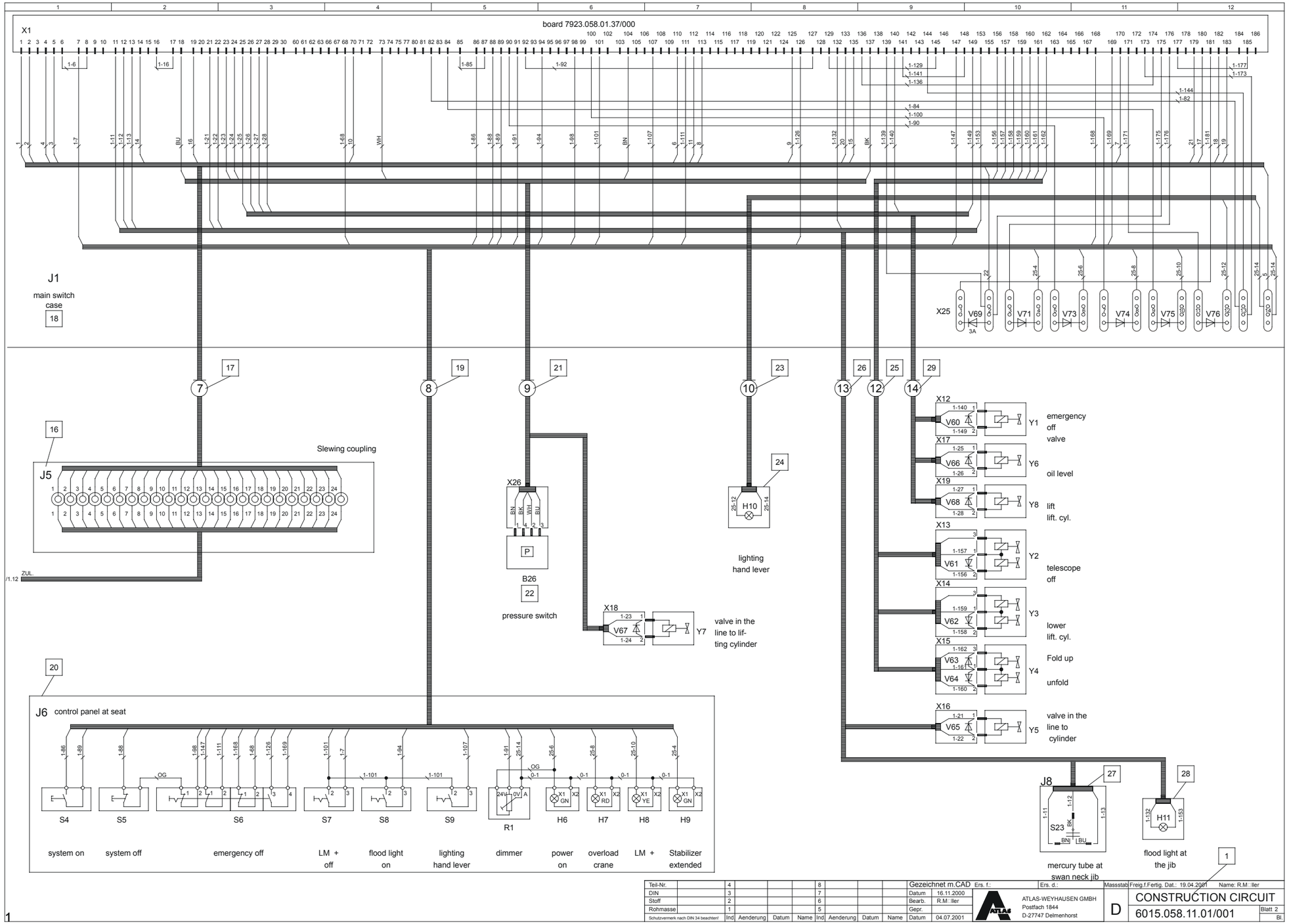


Figure 7 ELECTRICAL CONSTRUCTION CIRCUIT

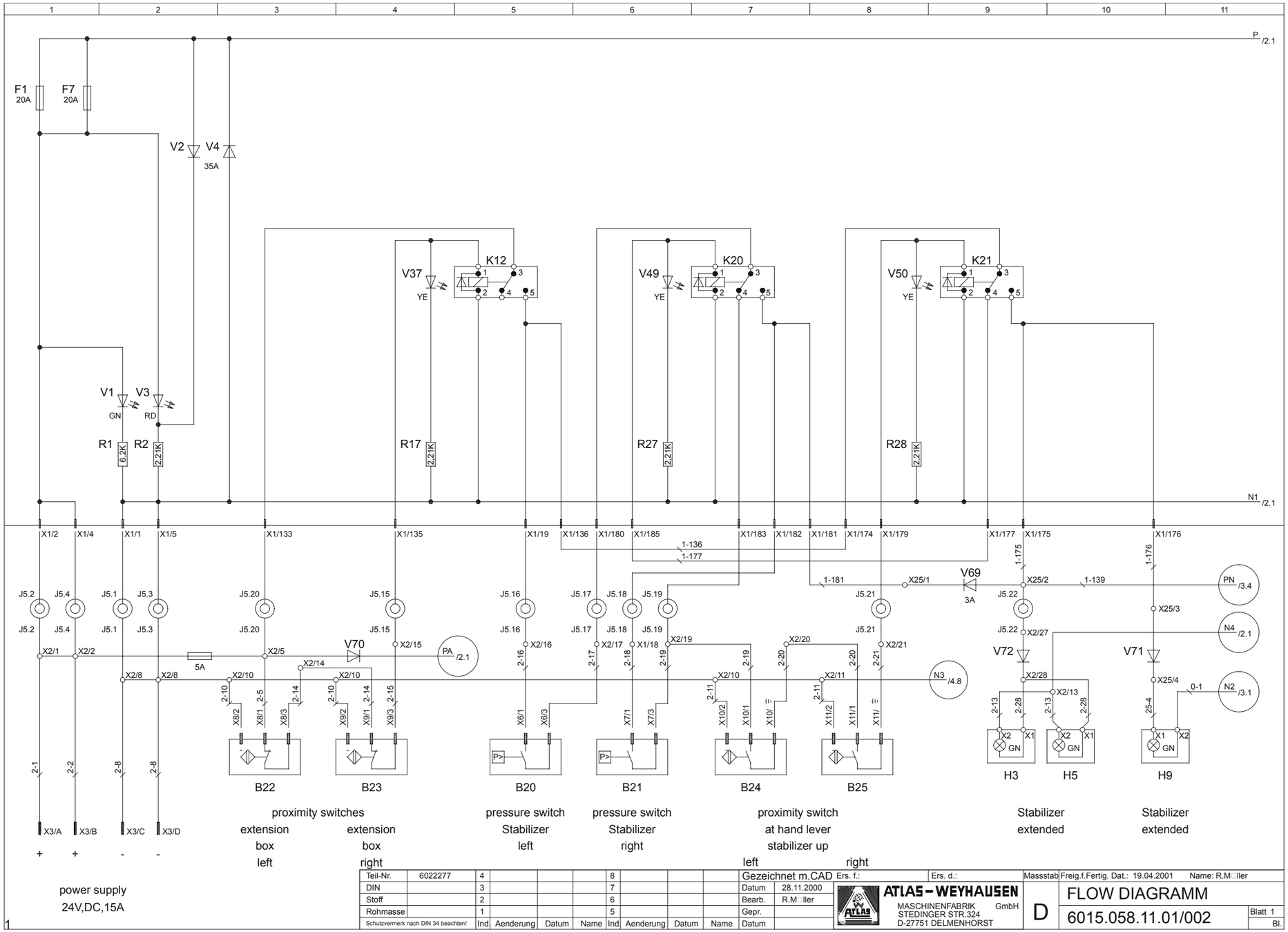
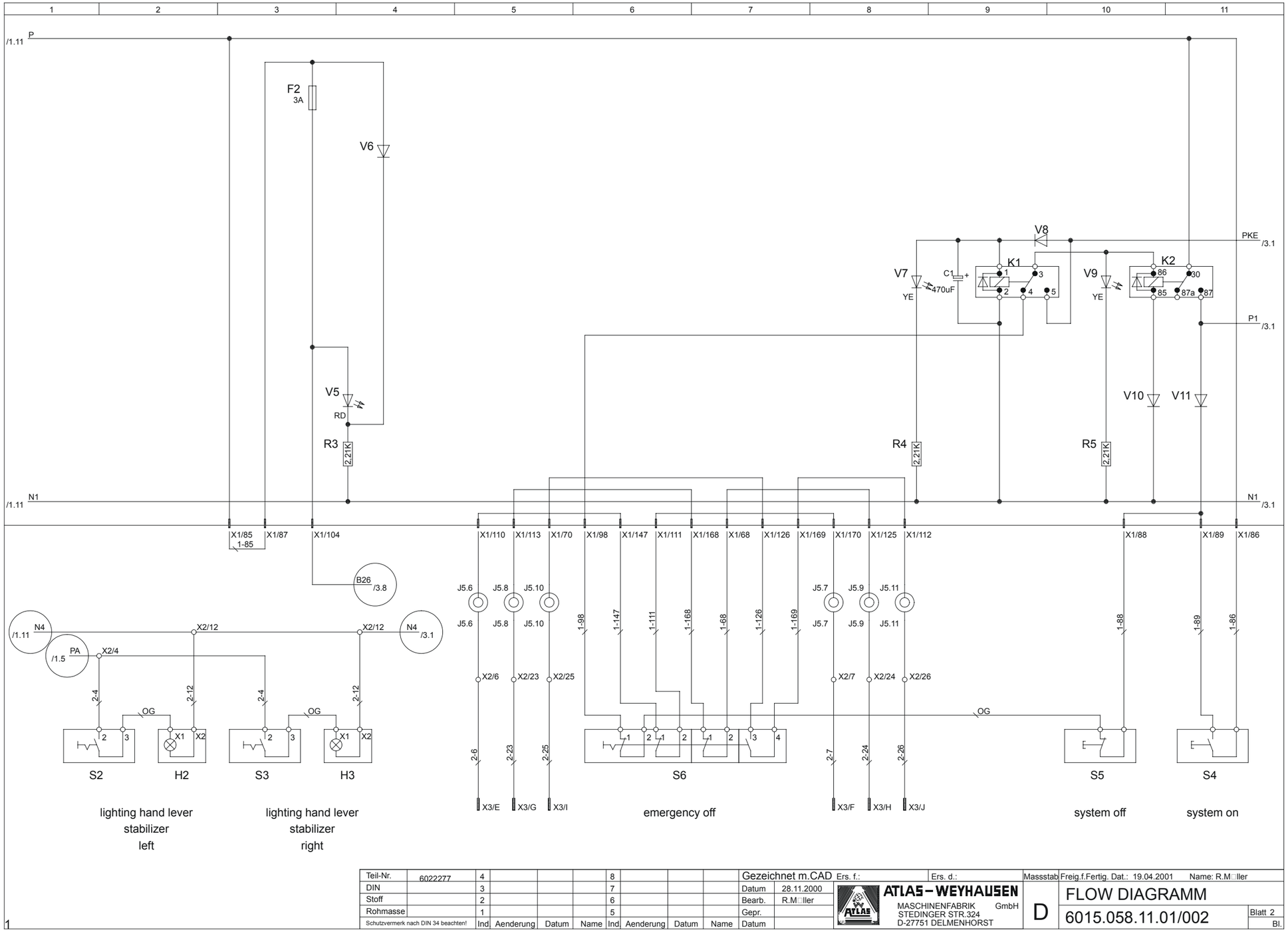


Figure 8 FLOW DIAGRAM ELECTRICAL



Teil-Nr.	6022277	4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab
DIN		3				7				Datum	28.11.2000	ATLAS–WEYHAUSEN	D
Stoff		2				6				Bearb.	R.M□ller	MASCHINENFABRIK GmbH	
Rohmasse		1				5				Gepr.		STEDINGER STR.324	
Schutzvermerk nach DIN 34 beachten!		Ind	Aenderung	Datum	Name	Ind	Aenderung	Datum	Name	Datum		D-27751 DELMENHORST	

Freig.f.Fertig. Dat.: 19.04.2001 Name: R.M□ller

FLOW DIAGRAMM

6015.058.11.01/002 Blatt 2 Bl.

1

Figure 9 FLOW DIAGRAM ELECTRICAL

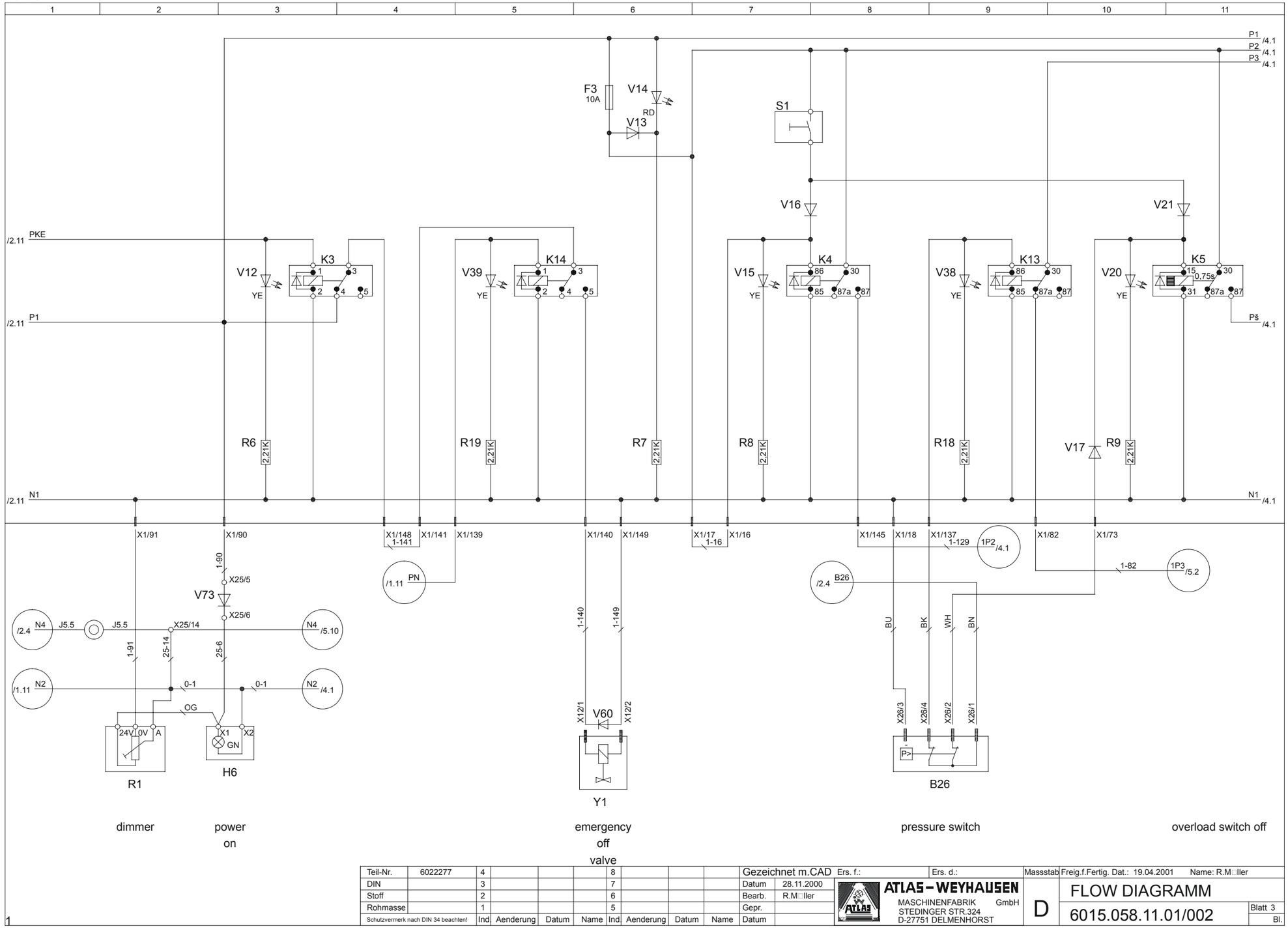
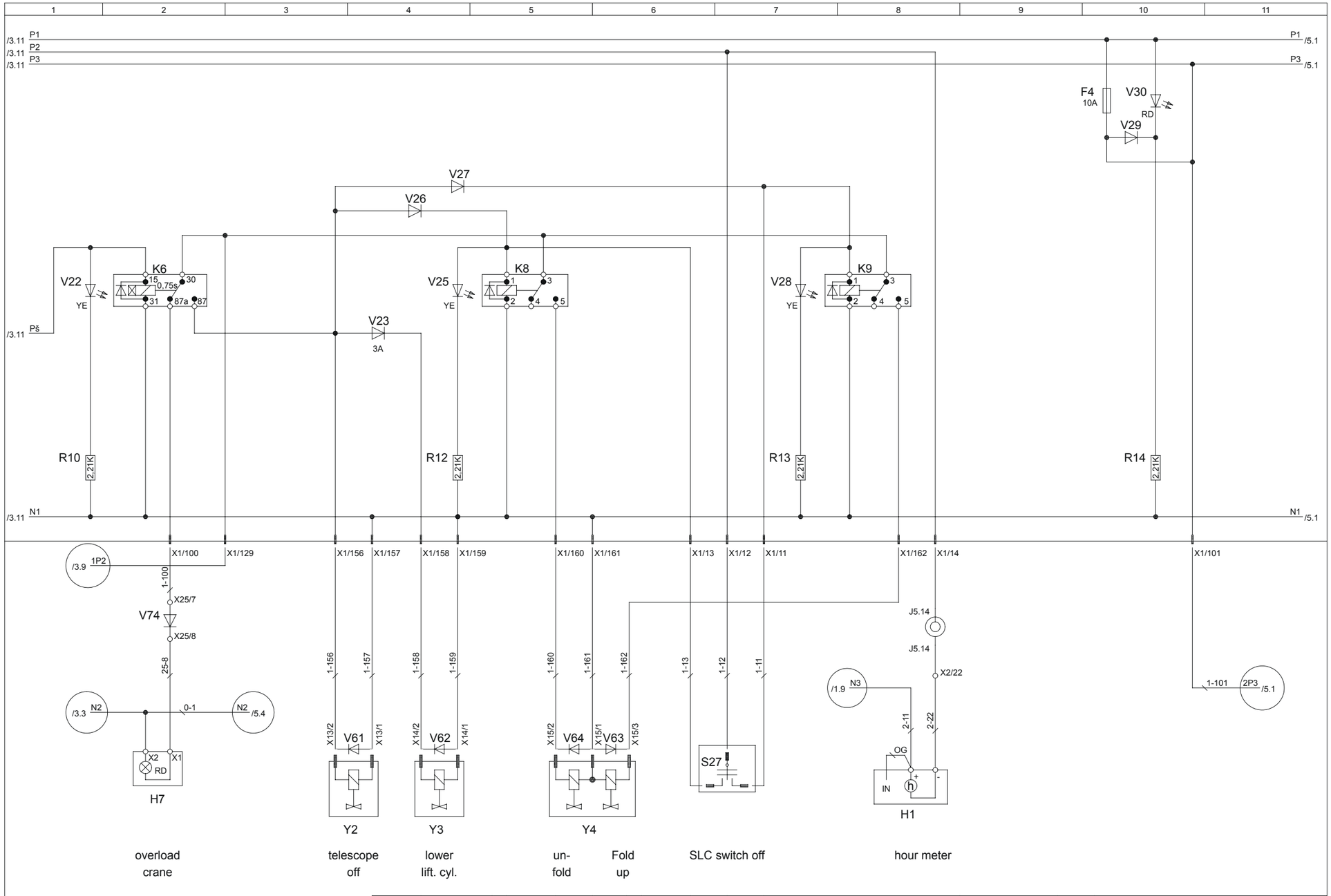


Figure 10 FLOW DIAGRAM ELECTRICAL



Teil-Nr.	6022277	4				8				Gezeichnet m.CAD	Ers. f.:	Ers. d.:	Massstab
DIN		3				7				Datum 28.11.2000			Freig.f.Fertig. Dat.: 19.04.2001 Name: R.Müller
Stoff		2				6				Bearb. R.Müller	ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST		D
Rohmasse		1				5				Gepr.			FLOW DIAGRAMM
Schutzvermerk nach DIN 34 beachten!		Ind	Aenderung	Datum	Name	Ind	Aenderung	Datum	Name	Datum			6015.058.11.01/002 Blatt 4 Bl.

Figure 11 FLOW DIAGRAM ELECTRICAL

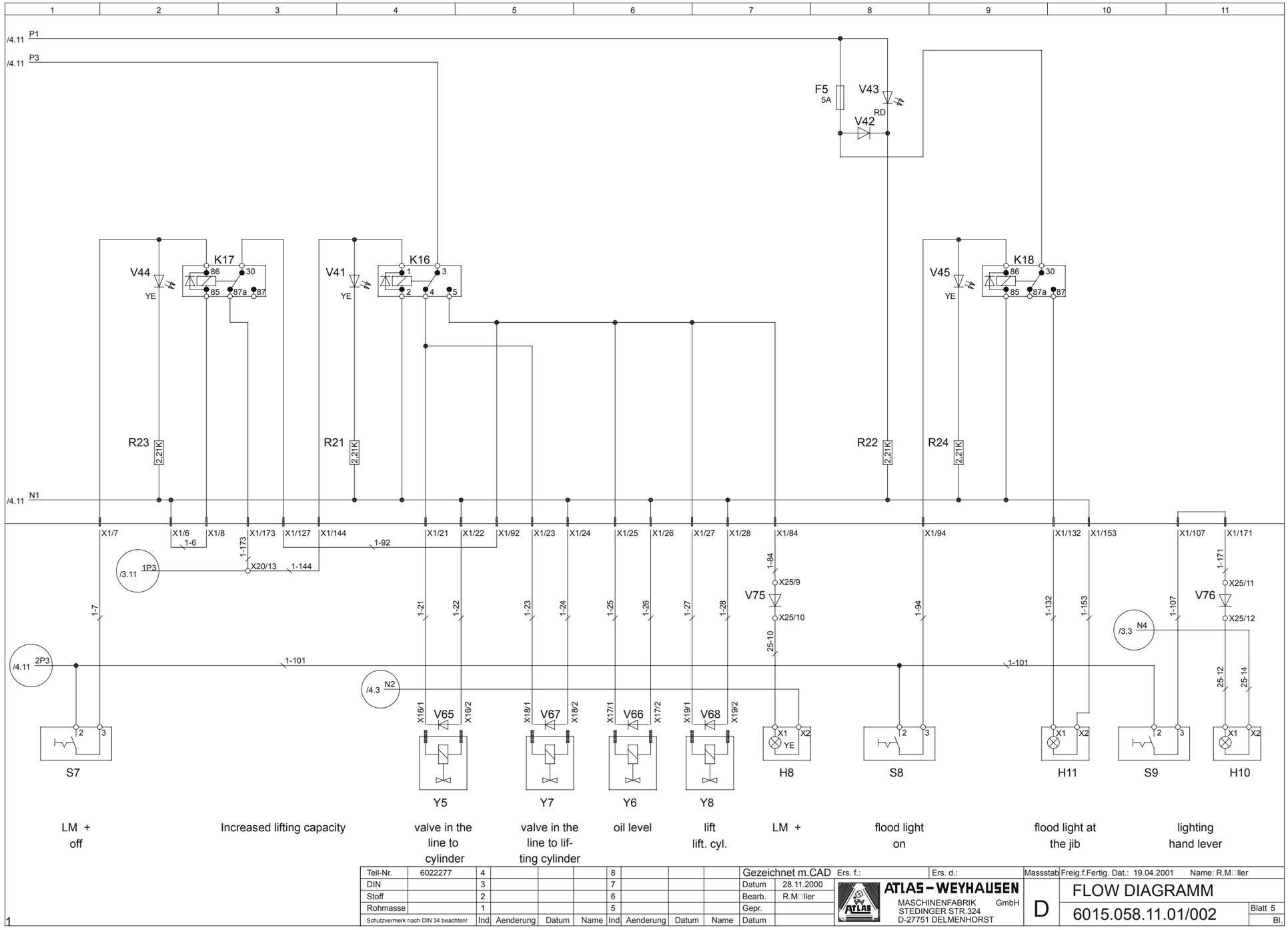


Figure 12 FLOW DIAGRAM ELECTRICAL

electric system	struct comp wir diag			
390.1 M1A	390.1 M1A			
6015.058.11.01/000	7901.058.50.06/000			
EDP-No. 6022428	EDP-No. 6022280			
	cable connection box J2			
	crane base			
	7913.058.50.22/000			
	EDP-No. 6022297			
	harness 1			
	stabilizer left			
	7934.058.50.96/000			
	EDP-No. 6022308			
	control panel J3			
	stabilizer left			
	7915.058.50.30/000			
	EDP-No. 6022321			
	harness 17			
	lighting			
	supporting lever left			
	7934.058.50.97/000			
	EDP-No. 6022315			
	struct compon H2			
	lighting			
	supporting lever left			
	7925.058.50.42/000			
	EDP-No. 5313202			
	harness 2			
	stabilizer right			
	7934.058.50.98/000			
	EDP-No. 6022313			
	control panel J4			
	stabilizer right			
	7915.058.50.30/000			
	EDP-No. 6022321			
	harness 18			
	lighting			
	supporting lever right			
	7934.058.50.99/000			
	EDP-No. 6022316			
	struct compon H4			
	lighting			
	supporting lever right			
	7925.058.50.42/000			
	EDP-No. 5313202			

Teil-Nr. 6022428 | Gezeichnet mit CAD

		Datum	Name
Bearb.		15.05.2001	R.M□ller
Gepr.			
Norm			

Material 06 Format

Freig.f.Fertig. Datum: 15.05.2001 Name: R.M□ller

Benennung electric system 390.1 M1A

Schutzvermerk nach DIN 34 beachten!

ATLAS – WEYHAUSEN
MASCHINENFABRIK GmbH
STEDINGER STR.324
D-27751 DELMENHORST

Zeichn.-Nr. 6015.058.11.01/000

Blatt- Nr. 1 Zahl

Ind	Datum	Aenderg.	Name

(Ers.f.:) (Ers.d.:)

Figure 13 FLOW DIAGRAM ELECTRICAL INDEX

	harness 3			
	stabilizer left			
	7936.058.51.68/000			
	EDP-No. 6030177			
	struct compon B20			
	stabilizer left			
	7926.058.01.48/000			
	EDP-No. 4172754			
	struct compon B22			
	stabilizer left			
	EDP-No. 60271175			
	660.2839.222			
	harness 4			
	stabilizer right			
	7936.058.51.69/000			
	EDP-No. 6030175			
	struct compon B21			
	stabilizer right			
	7926.058.01.48/000			
	EDP-No. 4172754			
	struct compon B23			
	stabilizer right			
	EDP-No. 60271175			
	660.2839.222			
	harness 5			
	supporting lever left			
	7936.058.51.54/000			
	EDP-No. 5313235			
	struct compon B24			
	supporting lever left			
	7926.058.01.52/000			
	EDP-No. 4187411			
	harness 6			
	supporting lever right			
	7936.058.51.70/000			
	EDP-No. 6030174			
	harness B25			
	supporting lever right			
	7926.058.01.52/000			
	EDP-No. 4187411			

Teil-Nr. 6022428				Gezeichnet mit CAD				
7					Datum	Name	Material	Freig.f.Fertig. Datum: 15.05.2001 Name: R.M□ller
6				Bearb.	15.05.2001	R.M□ller	06 Format	Benennung electric system 390.1 M1A
5				Gepr.				
4				Norm				
3				Schutzvermerk nach DIN 34 beachten!				Zeichn.-Nr. 6015.058.11.01/000
2				ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST				Blatt-Nr. 2 Zahl
1								
Ind	Datum	Aenderg.	Name					(Ers.f.:) (Ers.d.:)

Figure 14 FLOW DIAGRAM ELECTRICAL INDEX

	struct compon J5			
	collecting ring			
	7925.058.50.39/000			
	EDP-No. 5313257			
	harness 7			
	collecting ring			
	7933.058.50.19/000			
	EDP-No. 6030173			
	main switch case J1	board ass embled	board ass embled	board w sold parts
	390.1 M1A	390.1 M1A	radio	radio
	7909.058.50.17/000	7921.058.50.19/000	7921.058.01.45/000	7923.058.01.37/000
	EDP-No. 6022332	EDP-No. 6022334	EDP-No. 3089830	EDP-No. 3089841
	harness 8			
	control panel seat			
	7934.058.51.01/000			
	EDP-No. 6022345			
	control panel J6			
	seat			
	7915.058.50.31/000			
	EDP-No. 6022393			
	harness 9			
	lifting arm			
	7936.058.51.71/000			
	EDP-No. 6030172			
	struct compon B26			
	pressure switch			
	7926.058.50.36/000			
	EDP-No. 5313326			
	harness 10			
	hand lever at seat			
	7934.058.51.02/000			
	EDP-No. 6022420			
	struct compon H10			
	hand lever at seat			
	7925.058.50.42/000			
	EDP-No. 5313202			

Teil-Nr. 6022428 | Gezeichnet mit CAD

	Datum	Name
Bearb.	15.05.2001	R.M□ller
Gepr.		
Norm		

Material 06 Format

Freig.f.Fertig. Datum: 15.05.2001 Name: R.M□ller

Benennung electric system 390.1 M1A

Schutzvermerk nach DIN 34 beachten!

ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST

Zeichn.-Nr. 6015.058.11.01/000

Blatt-Nr. 3 Zahl

Ind	Datum	Aenderg.	Name	(Ers.f.:)	(Ers.d.:)

Figure 15 FLOW DIAGRAM ELECTRICAL INDEX

	harness 12			
	cutout valves			
	7936.058.51.72/000			
	EDP-No. 6030171			
	harness 13			
	arm			
	7936.058.51.73/000			
	EDP-No. 6030170			
	cable connection box J8			
	SLC			
	7913.058.01.24/000			
	EDP-No. 2291389			
	struct compon H11			
	work-light arm			
	7925.058.50.40/000			
	EDP-No. 5313360			
	harness 14			
	valves LM +			
	7936.058.51.67/000			
	EDP-No. 6030169			
	attaching parts			
	390 M1A			
	7905.058.50.17/000			
	EDP-No. 6022425			

Teil-Nr. 6022428				Gezeichnet mit CAD				
7					Datum	Name	Material	Freig.f.Fertig. Datum: 15.05.2001 Name: R.M□ller
6				Bearb.	15.05.2001	R.M□ller	06	Benennung electric system 390.1 M1A
5				Gepr.			Format	
4				Norm				
3				Schutzvermerk nach DIN 34 beachten!				Zeichn.-Nr. 6015.058.11.01/000
2				ATLAS-WEYHAUSEN MASCHINENFABRIK GmbH STEDINGER STR.324 D-27751 DELMENHORST				Blatt- Nr. 4 Zahl
1								
Ind	Datum	Aenderg.	Name					(Ers.f.:) (Ers.d.:)

Figure 16 FLOW DIAGRAM ELECTRICAL INDEX

APPENDIX K

DSB WELD REPAIRABLE ITEMS PROCEDURES AND DESCRIPTIONS

CONTENTS

1	INTRODUCTION	1
2	WELDING	2
3	IN-PROCESS INSPECTION	11
4	EXPENDABLE AND DURABLE ITEMS FOR WELDING	19
5	ITEMS CONSIDERED REPAIRABLE	21
6	WELDING PROCEDURES AND PARAMETERS	66

1 INTRODUCTION

a. This section is to be used as a guide to the types of weld joints that maybe used to repair component parts. The weld procedures contained in section 6 describe the techniques employed to manufacture the original components and therefore represent the types of welds and the welding parameters that may be used to repair the components should they become damaged. As it is not possible for all types of damage to be covered by these procedures they are to be used as a guide only. Further welding information maybe gained from TC 9-237, http://www.adtdl.army.mil/cgi-bin/atdl.dll/tc/9-237/toc.htm, however the equipment and processes described within this manual are best suited to the component parts to which they refer.

b. In general weld repairs should only be carried out where damage has caused existing welds to crack or to repair plates bent through impact. If the integrity of the component can not be assured after a repair then the component should be replaced. Weld repairs should only be performed when replacement parts are not available. The defective component should be replaced at the earliest opportunity.

c. The processes involved to produce the repair are described in section 2, followed by the inspection requirements in section 3. Section 4 contains a list of the expendable and durable items required to achieve the repairs. Section 5 includes a list of all the components considered repairable along with a set of component sketches showing weld locations and the weld procedure to use. These weld procedures are detailed in section 6 and these show the weld type, the size range, the welding settings and the consumables required.

d. The weld procedures often refer to various plate thickness and therefore the weld parameters should be adjusted within the specified ranges to suite the welding equipment and the plate thickness to be repaired.

2 WELDING

a. Tools and Equipment

A MIG welding set of 400 amps minimum capacity complete with hard and soft wire rollers of appropriate diameter. The set should be fitted with the recommended Binzel 501D, or equivalent, water cooled welding torch which will require cooling water and argon supplies. A weld table and tools including wire cutters and a stainless steel wire brush will be required. Also a rotary stainless steel wire brush and powered hand tool fitted with milling burrs. An over-head crane. Fume extraction shall be provided at the welding facility, static or mobile systems may be used together with respiratory welding helmets.

b. Safety

Preliminary Precautions

Before beginning any welding or cutting operations on the equipment, the safety precautions listed below must be considered.

(1) Remove all ammunition from, on, or about the vehicle or materiel.

(2) Drain the fuel tank and close the fuel and oil tank shut off valves.

(3) Have a fire extinguisher nearby.

(4) Keep heat away from optical elements.

(5) Be familiar with and observe the safety precautions prescribed in chapter 2 of TC 9-237.

c. Weld Specification

A weld is specified by the type of joint, welding position and the welding conditions. For each repair refer to the drawing requirements (Section 5) and related weld procedure (Section 6). All welding is to conform to ISO 5817 (Steel) and ISO 10042 (Aluminum) at the moderate level for repair.

CAUTION

Artificial ageing of alloy 232B is not permitted. Components repaired by welding will suffer a serious loss of proof strength in the heat affected zone and this can only be restored by natural ageing. Protective coatings such as zinc and paint must be applied as soon as possible after repair. For a component to achieve 75% of its original proof strength it should be stored in accordance with figure 2-1.

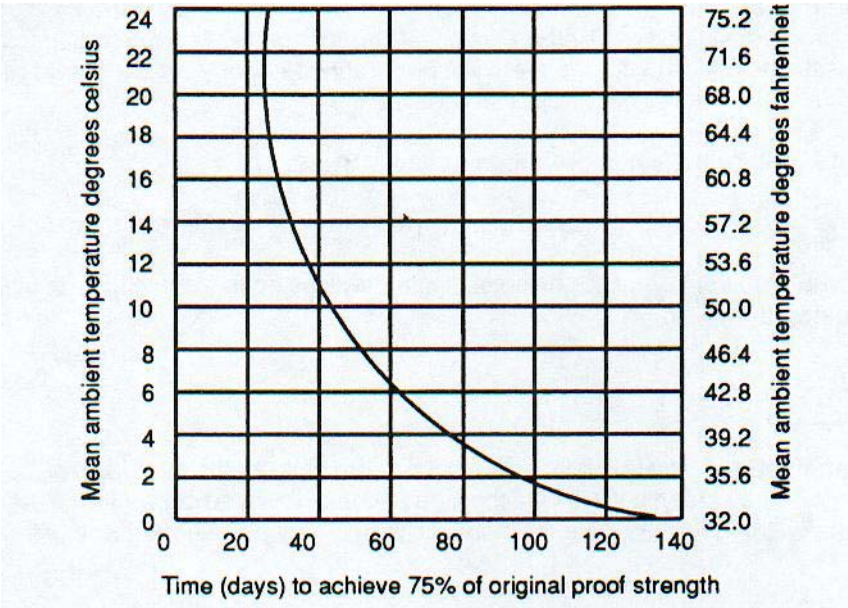


Figure 2-1 Temperature/time curve for strength restoration

d. Preparation Before Welding

Determination of Weldability

Before repairing any damaged materiel, it must be determined whether or not the materiel can be satisfactorily welded. This determination is based upon the factors listed below.

(1) Determine the nature and extent of the damage and the amount of straightening and fitting of the metal that will be required.

(2) Determine the possibility of restoring the structure to a usable condition without the use of welding.

(3) Determine the type of metal used in the damaged part, whether it was heat treated, and if so, if heat treating or other equipment or materials will be required in order to make the repair by welding.

(4) Determine what heat treatment was used.

(5) Determine if the welding heat will distort the shape or in any manner impair the physical properties of the part to be repaired.

Preparation of the Launch Vehicle Prior to Welding

It is preferred that any component to be repaired is removed from the vehicle first. Should welding be carried out on the launch vehicle then procedure 6-39 General Welding Maintenance from TM 9-2320-364-34-2 Chapter 2 must be performed. Additionally, all external connectors and ground straps on both the Operator panel and Launcher cabinets must be removed prior to welding. The chest pack and tail lift pendant must also be removed.

Paint must be removed from the point of earth contact prior to performing a welding repair.

Preparation of material prior to welding

The following conditions apply:

CAUTION

Aluminum and aluminum alloys should not be cleaned with caustic soda or strong cleaner with a pH above 10. The aluminum or aluminum alloy will react chemically with these types of cleaners. Other nonferrous metals and alloys should be investigated prior to using these cleaners to determine their reactivity.

(1) All parts to be repaired and the associated parent metal are to be prepared by removal of paint at least 50 mm around repair, degreasing thoroughly followed by wire brushing before fitting and welding.

(2) Wire brushes must be maintained in a grease free condition, and for aluminum must have stainless steel bristles.

(3) Run on/run off plates must be used wherever possible, unless there is a crater filling facility on the welding set, or a suitable crater filling technique is used.

(4) Any crater cracking (star cracking) should be removed by dressing. Removal of excessive material can be replaced by welding as required.

NOTE

When dressing cracks try to avoid removing too much parent material as the resulting repair by welding will reduce the number of permissible future repairs.

(5) Welding wire must be kept clean, dry and dust free. When using a set that has stood for some time unused, sufficient wire must be removed off the spool before welding to avoid using contaminated wire.

(6) Inter-run wire brushing is mandatory.

(7) Double sided welds must be back chipped or back ground (NOT by any thermal cutting process) as required, and the root run dye penetrant tested (section 3 c.) to ensure all defects have been removed. All welding must be allowed to cool before welding the second side or any subsequent weld runs.

e. Welding Conditions

(1) The gas flow rates for welding should be set at:

(a) 1.6 mm wire 45-55 cu/ft/hr.

(b) 1.2 mm wire 35-45 cu/ft/hr.

These are both relevant for the use of Argon for Aluminum and Argon/CO2 for steel.

(2) Only shaved or chemically cleaned welding wire (Section 4 Table 4-1, Items, 33, 34 and 41 to 49) should be used.

f. Sealing Joints

In order to avoid corrosion there must be no gaps at any of the joints. Occasionally, as indicated on the welding illustration, it is not possible to seal joining edges with weld. In these cases the gaps must be sealed with a sealing compound (Section 4 Table 4-1, Item ,15). Refer to relevant paragraphs within repair manual for sealing of unwelded edges.

g. Repair of Cracked Welds

NOTE

A component may have been returned from service with a cracked weld or a weld may have cracked during the welding of a new item for a repair at the depot. In either case, the general procedure for repair of cracked welds on any component is given below.

(1) Prepare defective weld for inspection

(a) Carry out preliminary visual inspection of cracked weld.

(b) Remove paint coating (MIL-C053072B (ME) para. 3.6) and refer to Section 5 for the particular component.

(2) Inspect defective weld

(a) Inspect weld for extent of crack visually.

(b) Note the type of joint and size of weld.

(c) For a longitudinal crack measure the length of the crack and distances from the ends of the crack to the ends of the weld. Mark up 1 in (25 mm) beyond each end of the crack or at the end of the weld, whichever is nearer.

(d) For a transverse crack measure the distance from the crack to each end of the weld. Mark up 1 in (25 mm) each side of the crack or at the end of the weld, whichever is nearer.

(3) Prepare for weld repair

(a) Hand mill/chip the weld material away from the parent metal between the two marked up positions as described below.

i. **Tools and Equipment.** Assorted sized blocks and wedges will be required for positioning the components. The principle tools required will be a hammer and cold chisel plus straight and angled power tools fitted with solid carbide burrs of various shapes and sizes. Also, other straight power tools fitted with rotary stainless steel wire brushes. Occasionally, a conventional hacksaw will be required. An over-head crane and a local 80 p.s.i. (551 kPa) compressed air supply for power tools may be required.

ii. **Safety.** The normally existing factory health and safety conditions will apply. These include the use of welding screens and protective clothing. Refer to TC 9-237 Chapter 2.

CAUTION

Take care not to damage the parent metal. Ensure that the defective weld has been completely removed.

(b) Hand mill a gradual taper at each end of the cut-out area.

NOTE

Depending upon the component, the type of joint and the length of the weld, it may be permissible to remove the weld on a milling machine.

(c) If applicable, hand mill the original weld preparation on the parent metal. (See Sections 5 and 6).

(d) Wire brush the joint to remove all loose material and oxide film.

(e) Inspect visually for any remaining cracks.

CAUTION

Do not use the dye penetrant technique. The seepage of dye through exposed joint gaps will contaminate the parent metal and cause porosity in the repair weld.

WARNING

PRIOR TO ANY WELDING ON THE LAUNCH VEHICLE PROCEDURE 6-39 GENERAL WELDING MAINTENANCE FROM TM 9-2320-364-34-2 CHAPTER 2 MUST BE PERFORMED ALONG WITH THE DISCONNECTION OF ALL EXTERNAL MIL CONNECTORS FROM BOTH THE LAUNCHER CABINET AND THE OPERATOR CABINET. BOTH THE CHEST PACK AND THE TAIL LIFT PENDANT MUST ALSO BE REMOVED.

(4) Apply new weld

(a) Note the welding conditions for type of joint and weld size. See Section 5.

(b) Finish weld as required.

(c) Dress the weld.

(5) Final Inspection

Inspect the weld using the dye penetrant technique (Section 3 c.).

CAUTION

If the repair is still defective, it may be repeated two more times.

(6) Painting.

(a) Refer to MIL-C-53072B (ME) paragraph 3.6.

h. Repair of bent plates, channel sections etc.

CAUTION

Cold forming of aluminum alloy component plates is not permitted.

NOTE

This procedure is applicable to the straightening of plates where both sides of the plate are accessible.

The steel components described within this section may be cold worked to remove any deformation.

For aluminum, local heat treatment is to be applied to the area of the plate that is required to be straightened, followed by standard panel beating of that area.

If the distortion of either steel or aluminum components is too severe to be beaten out, it is permissible to cut through the center line sufficiently to allow straightening and to rejoin the cut by welding after completion of the heat treatment and panel beating. The following repair procedure (fig. 2-2) applies to a severely distorted plate and should be interpreted appropriately for less severe distortion.

WARNING

THIS TYPE OF REPAIR IS ONLY TO BE CARRIED OUT ON THE COMPONENTS COVERED IN SECTION 5. WELD REPAIRS ON UNAUTHORISED COMPONENTS CAN LEAD TO DEATH OR SEVERE INJURY.

CAUTION

Weld repair should only be performed when replacement parts are not available. The defective component should be replaced at the earliest opportunity.

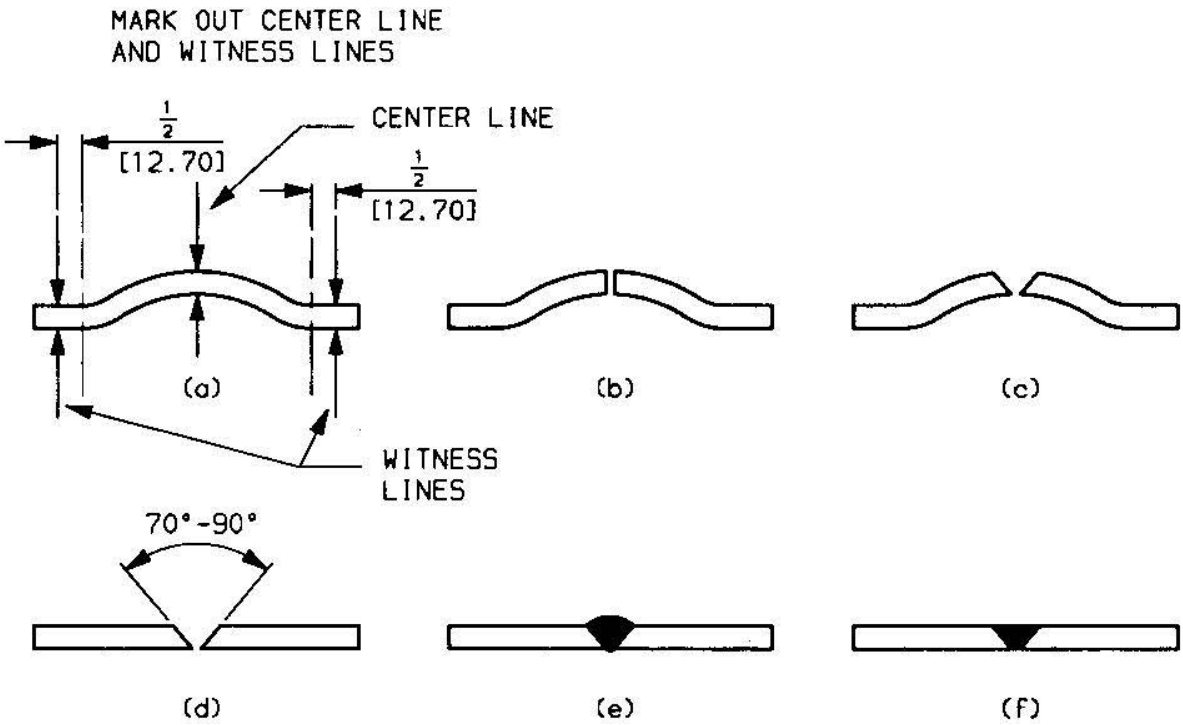


Figure 2-2 Repair steps for severely distorted plates

(1) Preparation for Straightening

(a) Clamp the relevant component onto a steel table.

(b) Mark out position of the centerline through distorted area on both sides of the plate.

(c) Mark out witness lines 1/2 in (12.7 mm) past the extent of the distortion, on both sides of the centerline and on both sides of the plate.

(d) Cut through the centerline leaving a slot of sufficient width to enable straightening of plate (fig.2-2(b)).

(e) Hand grind weld preparation on cut, to achieve the included angle described in the weld procedure (Sections 5 and 6) when the plate has been straightened (figs. 2-2(c) and (d)). Note should also be made of the required toe depth for each weld configuration.

For steel components no heat treatment is required prior to straightening and the repair procedure should be continued at paragraph (2). Straighten the plate.

CAUTION

For Aluminum components, if the temperature is raised above 470°C (878°F), component must be scrapped. (The 450°C - 470°C (842 - 878°F) band is a safety margin). This is specifically for Aluminum alloys.

(f) Witness the temperature in following step and confirm that temperature has not exceeded 470°C (878°F).

(g) Using an oxy-propane torch, apply heat evenly on both sides of the plate along the centerline through the distorted area without dwelling in one position. Make sufficient passes along both sides to achieve a temperature, measured between the witness lines, of 400°C-450°C (842-878°F). Make frequent temperature checks using a suitable measuring device (Section 4 Table 4-1, Item , 14).

(h) Allow the plate to cool naturally.

(2) Straighten the plate.

CAUTION

The aluminum component must be straightened within twelve hours of completion of the heat treatment operation.

(a) Straighten the plate using standard workshop panel beating practices.

WARNING

ENSURE SOLVENT IS DRY BEFORE WELDING.

CAUTION

Aluminum and aluminum alloys should not be cleaned with caustic soda or strong cleaner with a pH above 10. The aluminum or aluminum alloy will react chemically with these types of cleaners. Other non-ferrous metals and alloys should be investigated prior to using these cleaners to determine their reactivity.

(b) Clean along cut on both sides of plate with solvent (Section 4 Table 4-1, Item , 7).

(c) Wire brush along cut on both sides of plate.

WARNING

PRIOR TO ANY WELDING ON THE LAUNCH VEHICLE PROCEDURE 6-39 GENERAL WELDING MAINTENANCE FROM TM 9-2320-364-34-2 CHAPTER 2 MUST BE PERFORMED ALONG WITH THE DISCONNECTION OF ALL EXTERNAL MIL CONNECTORS FROM BOTH THE LAUNCHER CABINET AND THE OPERATOR CABINET. BOTH THE CHEST PACK AND THE TAIL LIFT PENDANT MUST ALSO BE REMOVED.

(d) If the cut runs to the edge of the plate, tack end of the cut.

(e) Weld the cut (fig.2-2 (e) and para. 2) in accordance with the parameters laid down in the weld procedures in Section 6.

(f) Dress welds flush (fig.2-2 (f)).

(3) Inspect welds (Section 3 b).

(4) Check the straightened area for cracks using the dye penetrant technique; refer to (Section 3 c).

CAUTION

It is not permitted to apply further heat treatment after the temperature has been raised once within the specified temperature range.

NOTE

If one or more cracks are detected, refer to repair procedure specified in Section 2 g.

3 IN-PROCESS INSPECTION

a. General

Minimum required in-process inspections are identified throughout this repair section. Additional inspections may be established by the contractor/depot as necessary. These inspections fall into one of three groups as follows:

(1) Quality of welds.

(2) Specified component dimensions after welding.

(3) Specified component dimensions after machining.

(4) The component dimensions will be checked using standard measuring equipment to drawing requirements.

b. Inspection of Welds

Before commencement of welding the joint must be inspected to confirm correct form and dimensions of weld preparation and to ensure it has been cleaned satisfactorily by degreasing and wire brushing.

The following items should be checked after the completion of all welding and again after any repair welding:

(1) Cleaning and dressing: When dressing of the weld face is required, ensure that overheating of the joint due to the dressing action, dressing marks and an uneven finish are avoided. In the case of fillet welds and butt welds that are to be dressed flush, ensure that the joint merges smoothly with the parent metal without under-flushing.

(2) Penetration and root examination (fig. 3-1): In the case of butt welds made from one side only, check that over the whole of the joint the penetration and any root concavity, or shrinkage grooves are within the limits specified in the acceptance criteria, using appropriate measuring devices and optical or other aids if necessary from the access point of view.

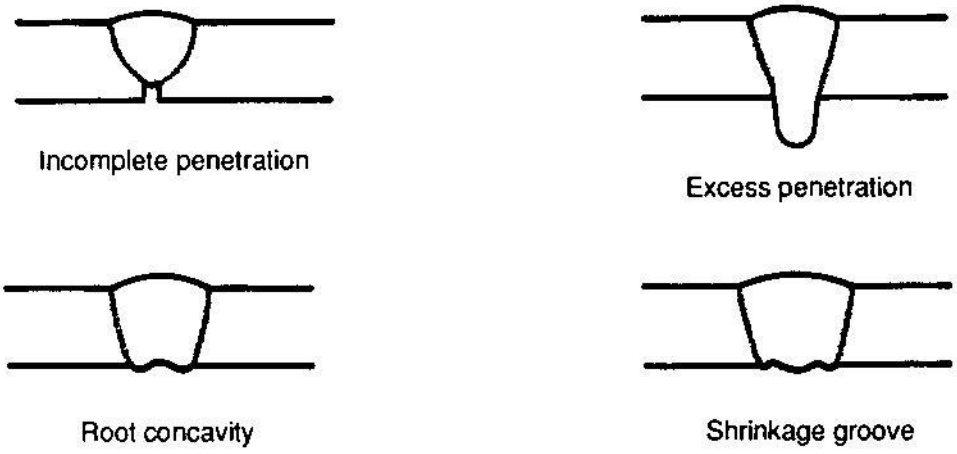


Figure 3-1 Root defects

(3) Contour (fig. 3-2): Check that the contour of the weld face and the height of the excess weld metal, if any, are in accordance with the acceptance criteria, using appropriate measuring devices. Check that the surface of the weld is satisfactory.

NOTE

The contour is governed by the welding technique and the welding position.

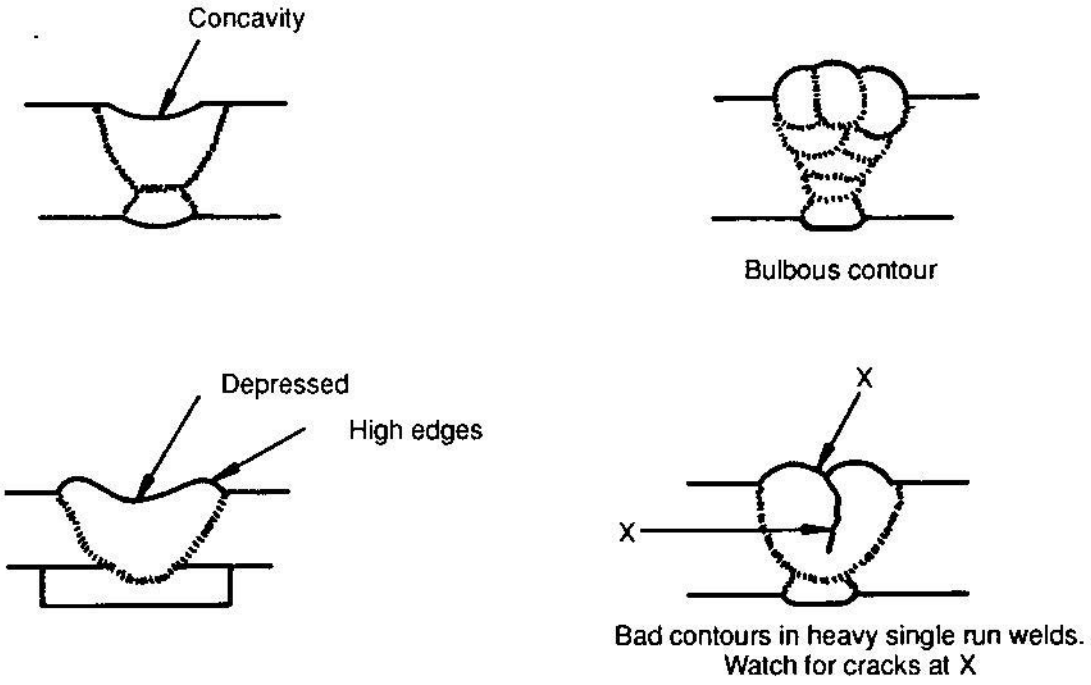


Figure 3-2 Contour defects (sheet 1)

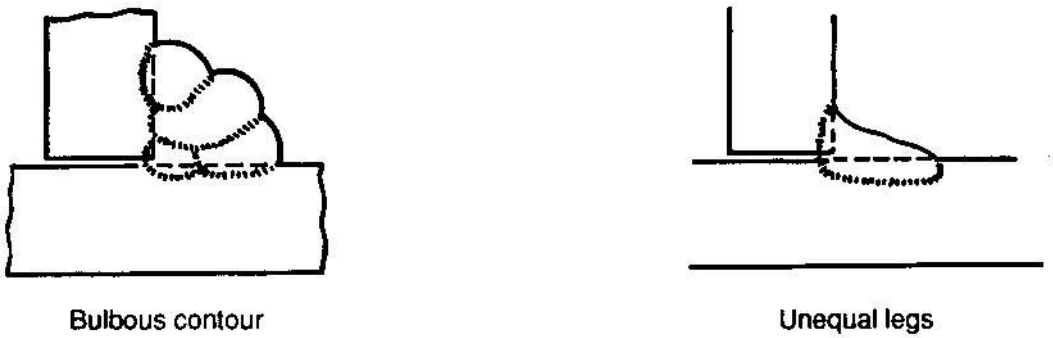


Figure 3-2 Contour defects (sheet 2)

(4) Weld width (fig. 3-3): Check that the weld width is consistent over the whole of the joint and that it satisfies the dimensional requirements given in the text and illustration, using appropriate measuring devices. In the case of fillet welds, the weld width may not have been given on the drawing and a calculation will be required to check that the leg length(s) or throat thickness has been achieved.

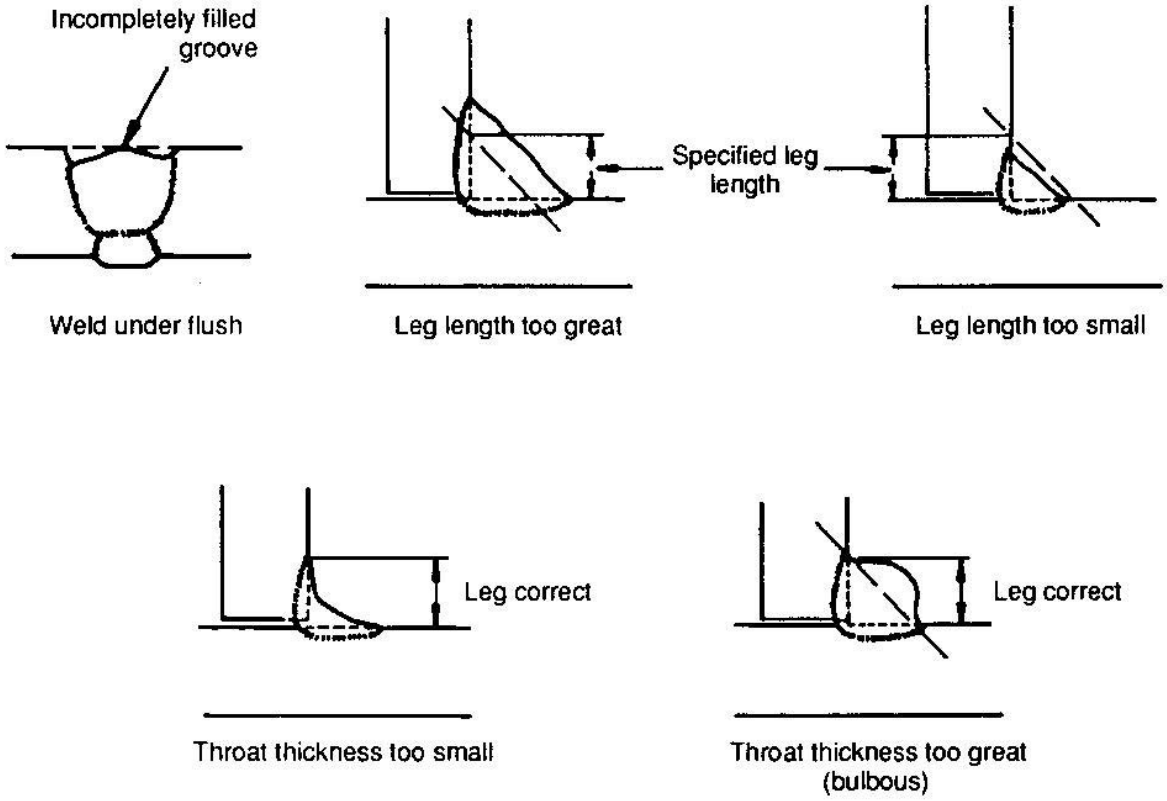


Figure 3-3 Weld dimensions

(5) Undercut (fig. 3-4): Measure any undercut using appropriate measuring devices and check it against the acceptance criteria. The use of modelling clay is particularly convenient for checking undercut.

NOTE

It is impossible to completely eliminate undercutting during welding particularly in the case of fillet welds. Local undercut and continuous undercut of 10% and 5% of the parent metal thickness respectively is acceptable provided that it does not form a sharp notch.

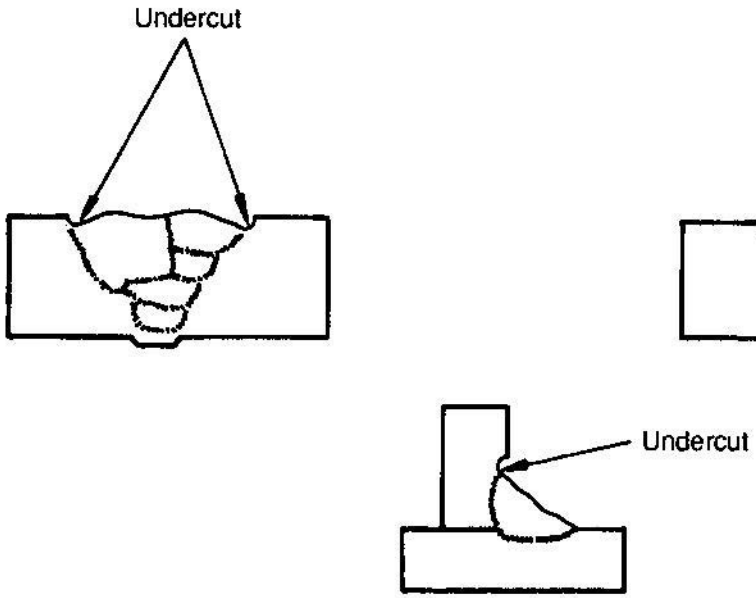


Figure 3-4 Undercut

(6) Overlap (fig. 3-5): Examine carefully the toes of the weld where the weld width is excessive to determine whether the weld metal is fused to the parent metal. If there is no fusion, the weld metal will be built up slightly above the parent metal, thus presenting a notch effect that may be undesirable. Unlike manual welding, overlap with automatic welding is likely to be regular and thus more difficult to detect.

NOTE

Overlap is a form of lack of fusion that cannot be fully assessed or measured by visual inspection.

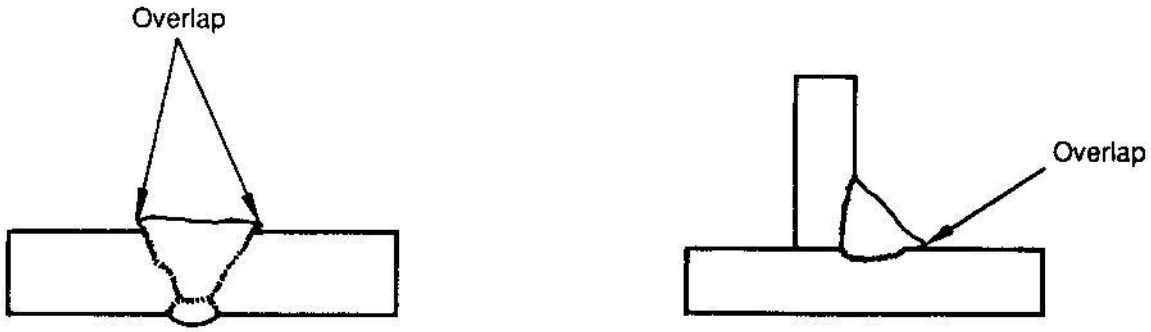


Figure 3-5 Overlap

(7) Weld flaws (fig. 3-6): Using optical aids when necessary, examine the weld and heat-affected zone for weld flaws and if any are found check them against the acceptance criteria. In some cases visual inspection may not be sufficient to determine the full extent of a surface flaw (crack or porosity) and the use of other testing methods may be required before the flaw can be assessed.

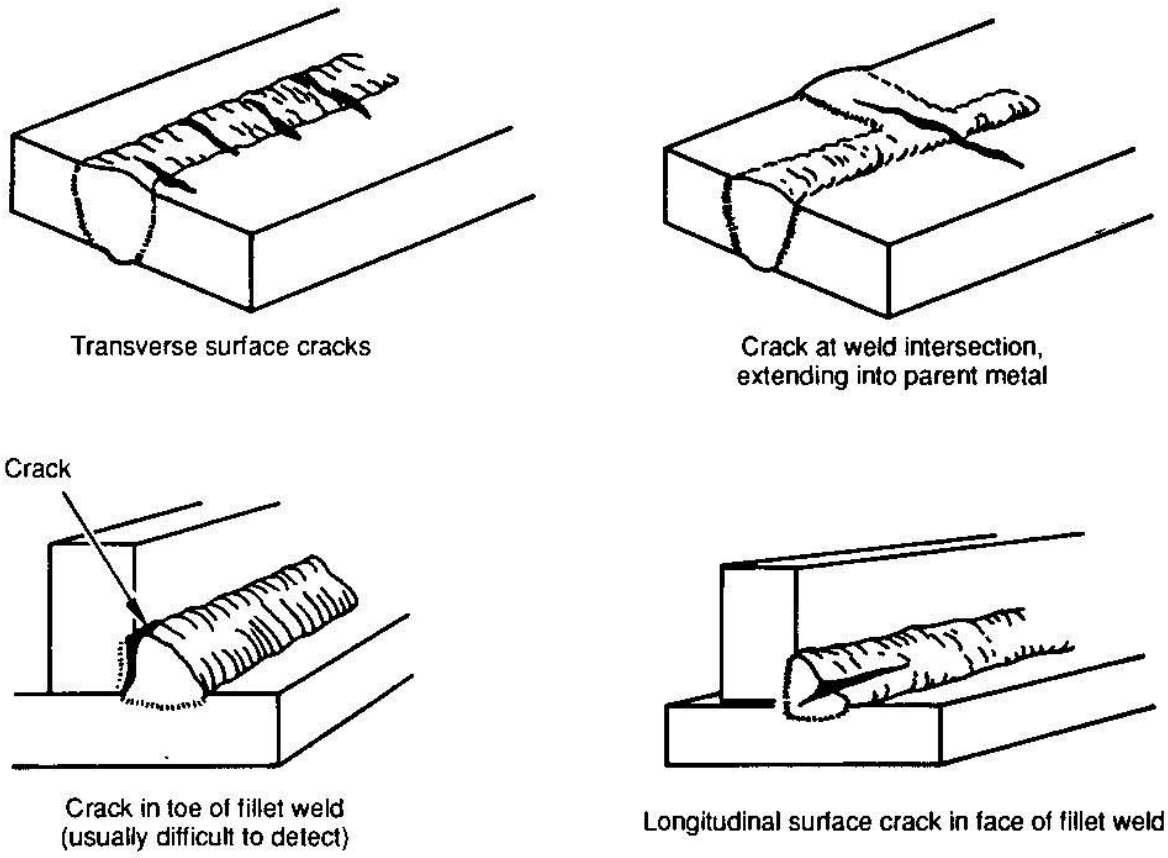


Figure 3-6 Cracking in completed welds

(8) Stray arcing: The welder should ensure that stray arcing does not occur, but the weld and adjacent parent metal should be examined for cracking caused by accidental stray arcing as they may need to be removed by mechanical means.

(9) Inspection of weld repairs: When welds fail to comply wholly or in part with the acceptance criteria and unacceptable defects are to be removed, the following items should be checked during the repair operation.

(a) Removal process: Ensure that the specified means of removing the defect, e.g. chipping, hand milling or machining is used correctly.

(b) Partially removed weld: Check that the cut out portion is sufficiently deep and long to completely remove the defects. Ensure that at the ends and sides of the cut there is a gradual taper from the base of the cut to the surface of the weld metal, the width and profile of the cut being such that there is adequate access for re-welding.

(c) Completely removed weld: When a cut has been made through a faulty weld and there has been no serious loss of material, or when a section of material containing a faulty weld has been removed and a new section is to be inserted, check that each weld preparation is reproduced in accordance with the welding procedure.

(d) Inspection: Apply to the repaired weld the same inspection requirements as the original weld.

(10) Unacceptable welds: The entire length of all welds is to be visually examined and to be free from the following defects:

(a) Cracks - crater, transverse, longitudinal, edge.

(b) Insufficient weld size, (i.e., below 1/32 in (0.79mm) below nominal size quoted)

(c) Continuous/local undercut in a length of weld in excess of 10% of parent metal thickness.

(d) Reinforcement in excess of 40% of the specified profile.

(e) Incomplete penetration of butt welds made from one side.

(f) The depth of any root concavity or shrinkage groove in butt welds shall not exceed 1/4 in (6.35mm) but at no point should the weld be thinner than the parent metal thickness.

(g) Burn through (or melt through).

c. Dye penetrant examination.

Before starting the dye penetrant examination the surface to be inspected must be absolutely clean. Contaminants may be removed by the use of a solvent (Section 4 Table 4-1, Item 7) or wire brushing. The following procedures then apply:

(1) Application of dye penetrant:

WARNING

DANGEROUS CHEMICALS. AVOID CONTACT WITH SKIN AND EYES. DO NOT INHALE AND USE ONLY IN CONDITIONS OF ADEQUATE VENTILATION. PROTECTIVE CLOTHING, INCLUDING IMPERVIOUS GLOVES AND EYESHIELDS SHOULD BE WORN. PENETRANT IS EXTREMELY FLAMMABLE. NO SMOKING, NAKED FLAMES OR SPARKS ARE TO BE PERMITTED. IN CASE OF SKIN CONTACT WASH THOROUGHLY WITH SOAP AND WATER, FOR EYE CONTACT RINSE THOROUGHLY WITH CLEAN WATER AND SEEK MEDICAL ADVICE.

(a) Apply a coat of penetrant (Section 4 Table 4-1, Item 16) by brush or spraying onto the surface to be checked.

NOTE

Ensure that the component temperature is between 0^{o}C and 40^{o}C (32^{o}F and 104^{o}F).

(b) Allow a contact time of 10-30 minutes after penetrant application.

(2) Removal of dye penetrant: Remove excess surface penetrant by applying water from a low pressure hand spray gun and rubbing with lint free cloth.

(3) Drying: Drying takes 5-10 minutes depending on air temperature, it can be assisted by using lint free cloth and the application of compressed air.

(4) Application of developer: Shake the spray can for 2 minutes then spray a thin even coat of developer (Section 4 Table 4-1, Item 16) from a distance of 9 in (228 mm). Avoid thick coats and pools of wet developer which may mask the indications.

(5) Inspection: Examination of surface should begin as soon as developer is dry and should be repeated periodically up to 15 minutes from application. The level of illumination in the area of inspection should not be less than 500 lux.

(6) Rejection criteria:

(a) Linear indications such as surface breaking, lack of fusion and cracks - not acceptable.

(b) Porosity or blow holes in excess of 0.059 in dia. (1.5 mm) - not acceptable.

(c) Porosity in excess of 1% by area - not acceptable. Refer to porosity charts, Table 3-1.

(d) Imperfections found in forging material shall be reported to the inspection authority for further investigation.

(7) Recording: A record of all work carried out shall be logged in a record book. This shall include unique component identity (serial number), date of test, verdict and details of corrective action taken if required.

TABLE 3-1 POROSITY TABLE

The number of gas pores allowed in a 2 in (50 mm) length of weld for different weld widths for 1% by area is as follows:

Pore dia.		Area		Weld widths in (mm)			
in	mm	in	mm	0.39 (10)	0.59 (15)	0.71 (18)	0.98 (25)
.020	0.5	.008	.196	25	38	46	64
.030	0.75	.017	.442	11	17	20	28
.040	1.0	.031	.785	6	10	11	16
.059	1.5	.070	1.767	3	4	5	7

Examples of 1% porosity levels (fig. 3-7) in 0.40 in (10 mm) and 1 in (25 mm) wide welds are as follows:

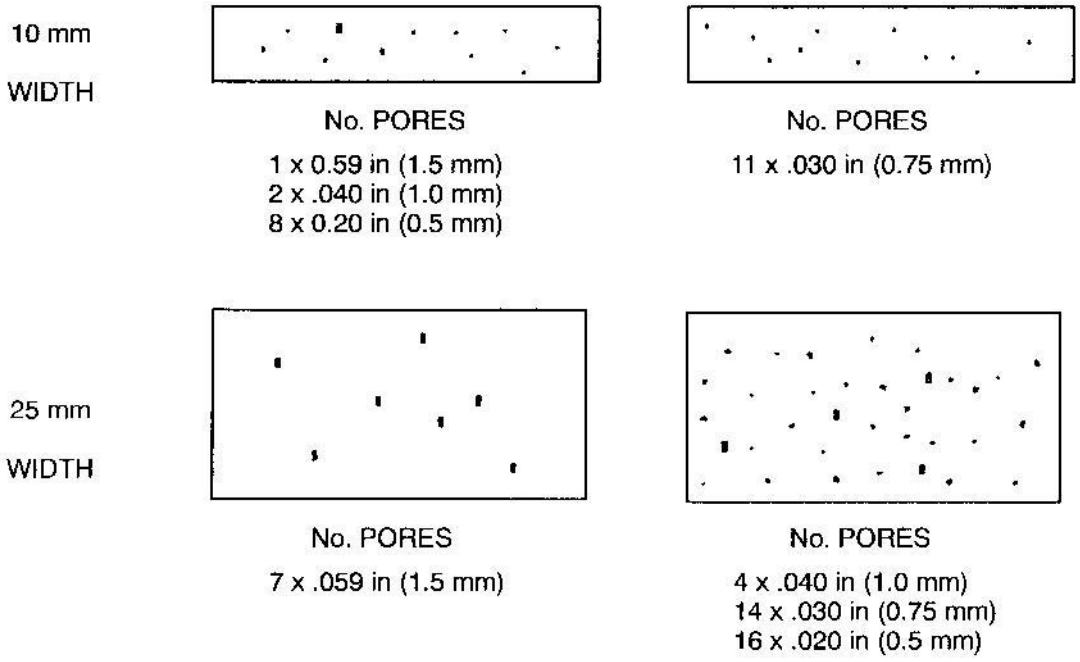


Figure 3-7 Examples of Porosity Levels

4 EXPENDABLE AND DURABLE ITEMS FOR WELDING

a. SCOPE

This appendix lists expendable and durable items you will need to carry out welding on the equipment. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorised to you by CTA 50-870, Expendable and Durable Items (Except: Medical, Class V, Repair parts and Heraldic Item), or CTA 8-100, Army Medical Department Expendable and Durable Item.

b. EXPLANATION OF COLUMNS

(1) COLUMN 1 - ITEM NUMBER. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the item. For example "Use (Section 4 Table 4-1, Item 7)".

(2) COLUMN 2 - NATO STOCK NUMBER. This is the NATO stock number assigned to the item. Use it to request or requisition the item.

(3) COLUMN 3 - DESCRIPTION Indicates the federal item name, and if required, a description to identify the item. The five digit parenthetical number indicate the commercial and government entity codes (CAGEC) and the part number.

(4) COLUMN 4 - UNIT OF ISSUE (UI) Indicates the code that shows the smallest quantity of an item that can be requisitioned and issued.

TABLE 4-1 EXPENDABLE AND DURABLE ITEMS LIST

(1) ITEM NUMBER	(2) STOCK NUMBER	(3) DESCRIPTION	(4) UI
1	8030-00-165-8577	Primer (Wash) pre-treatment, DOD-P-15328, (Formula Number 117 for Metals), 5 gallons	GL
2	8010-00-082-2477	Primer coating, Epoxy Polyamide, Chemical and Solvent Resistant, MIL-P-23377, Type 1, (See Note 1) 10 gallons.	GL
3A	8010-01-160-6743	Coating, Allphatic Polyurethane, Chemical Agent Resistant, MIL-C-46168 (Type 11), Component A (See Note 2), Green 383, Color Number 34094, 55 gallon.	GL
3B	8010-01-132-0205	Coating, Allphatic Polyurethane, Chemical Agent Resistant, MIL-C-46168 (Type 11), Component B (See Note 2), 55 gallon.	GL
7	6850-00-281-1985	Solvent P-D-680	GL
13	Procured by depot	Zinc wire 3/16 dia, MIL-W-6712	RL
14	6685-00-275-9060	Tempil stick, temperature measuring device, 450^{o}F	EA
15	Procured by depot	Sealant, Bostik 2114.	
16	6850-00-826-0981	Kit (dye penetrant) MIL-W-6712	KT
18	8010-01-235-8059	Yellow marking paint, color No. 33538	
20	8010-00-079-3762	Engineers marking out dye, Paint, aerosol white	PT

(1) ITEM NUMBER	(2) STOCK NUMBER	(3) DESCRIPTION	(4) UI
24	8010-00-297-0567	White marking paint, TT-E-527 Enamel Alkyd, lusterless	QT
25	8010-00-285-4917	Stencil paint, lusterless black, type G, MIL-T-704J	QT
29	Procured by depot	Aluminum Oxide Grit	LB
33	3439-99-525-7101	Welding wire, 1.6 mm dia, type 5556A to BS 2901:Part 4:1983	KG
34	3439-99-965-3047	Welding wire, 1.2 mm dia, type 5556A to BS 2901:Part 4 P/N 870-50596.	KG
41		Welding wire, 1.2mm M.A.G. BS 2901: Part 4 Type A18 AWS.A5.18.93	KG
42		Welding wire, 1.6mm T.I.G. BS 2901: Part 4 Type 5356A.	KG
43		Welding wire, 2.4mm T.I.G. BS 2901: Part 4 Type 5356.	KG
44		Welding wire, 1.2mm M.I.G. BS 2901: Part 4 Type 5356A AWS.A5.10-80 ER 5356.	KG
45		Welding wire, 1.2mm M.I.G. BS 2901: Part 4 Type 5356A AWS.A5.10-80 ER 5356.	KG
46		Welding wire, 1.6mm T.I.G. BS 2901: Part 4 Type 4043A AWS.A5.10-80 ER.	KG
47		Welding wire, 2.4mm T.I.G. BS 2901: Part 4 Type 4043A AWS.A5.10-80 ER 4043.	KG
48		Welding wire, 1.2mm M.A.G. AWS.A5.29.80. E80 T5-6. Oerlikon Fluxofil 40.	KG
49		Welding wire, 1.6mm T.I.G. AWS.A5.28-79. ER 90S-6. Oerlikon Carborod So3 Ni1 Mo.5.	KG

NOTES

1. Consult your local environmental co-ordinator before beginning any painting operation; use of some materials may be prohibited locally. Where use of chromate-containing coatings (Section 4 Table 4-1, Item 2) is prohibited, substitute MIL-P-53022 (420 grams/liter VOC), NSN 8010-01-187-9820, for MIL-P-23377.

2. Four parts component A are mixed with one part component B; if you order four drums of component A, one drum of component B will also be shipped. Single component MIL-C-53039, NSN 8010-01-232-8514, may be substituted for two component MIL-C-46168 (Section 4 Table 4-1, Item 3); type IV MIL-C-46168 may also be substituted for type II.

5 ITEMS CONSIDERED REPAIRABLE

The following is a list of DSB components that have been assessed as repairable. The list shows the part or assembly number, a description of the component, the figure number, relevant WPS and the materials that the components are produced from.

TABLE 5-1 ITEMS CONSIDERED REPAIRABLE

PREFIX	MODULE ASSY	ASSY No	POSTFIX	DESCRIPTION	FIGURE No.	WPS No.'s	MATERIAL 1	MATERIAL 2	MATERIAL 3
G	4	16	4674	LAUNCHING BEAM / FLATRACK ADAPTOR BOTTOM	5.2	012, 013, 024, 069	232b		
G	4	16	4675	LAUNCHING BEAM INTERMEDIATE FLATRACK ADAPTOR	5.3		232b		
G	4	16	4676	LAUNCHING BEAM TOP FLATRACK ADAPTOR	5.4		232b		
G	4	16	4680	BUFFER FOR FLATRACK AND MODULE LOCATION PIECES	5.5	012, 013, 024, 069	232b		
G	4	16	4711	FOLDING WALKWAY INNER WELDED ASSEMBLY	5.7	012, 018, 020	232b		
G	4	16	4712	FOLDING WALKWAY OUTER WELDED ASSEMBLY	5.8	012	232b		
G	4	16	4717	FOOT PLATE WELDED ASSEMBLY	5.9	106	232b	Q Grate	
G	4	16	4718	FOOT PLATE WELDED ASSEMBLY	5.10	106	232b	Q Grate	
G	4	16	4719	FOOT PLATE WELDED ASSEMBLY	5.11	106	232b	Q Grate	
G	4	16	4720	FOOT PLATE WELDED ASSEMBLY	5.12	106	232b	6082 T6	Q Grate
G	4	16	4721	FOOT PLATE WELDED ASSEMBLY	5.13	106	232b	Q Grate	
G	4	16	4722	FOOT PLATE WELDED ASSEMBLY	5.14	106	232b	Q Grate	
G	4	16	4723	FOOT PLATE WELDED ASSEMBLY	5.15	106	232b	6082 T6	Q Grate
G	4	16	4724	FOOT PLATE WELDED ASSEMBLY			Assy		
G	4	13	4754	L.B.D TOP COVER ASSEMBLY	5.16	073	232b		
G	4	16	4756	ENERGY CHAIN. LH. GUIDE CHANNEL WELDED ASSEMBLY	5.17	105	5083		
G	4	16	4757	ENERGY CHAIN. RH. GUIDE CHANNEL WELDED ASSEMBLY	5.18	105	5083		
G	4	16	4758	ENERGY CHAIN. LH. GUIDE PLATE WELDED ASSEMBLY	5.19	105	5083		

PREFIX	MODULE ASSY	ASSY No	POSTFIX	DESCRIPTION	FIGURE No.	WPS No.'s	MATERIAL 1	MATERIAL 2	MATERIAL 3
G	4	16	4759	ENERGY CHAIN. RH. GUIDE PLATE WELDED ASSEMBLY	5.20	105	5083		
G	4	16	4760	ENERGY CHAIN SUPPORT & MUDGUARD			Assy		
G	4	16	4776	TRANSPORT AID	5.21	013, 020	232b		
G	4	11	4780	GUARD F.B.S. HOSES	5.22	012, 020	232b		
G	4	16	4792	A - FRAME. LH. ENERGY CHAIN INSTALLATION			Assy		
G	4	16	4793	ENERGY CHAIN. LH. INNER GUIDE BRACKET WELDED ASSEMBLY	5.23	012, 026	232b		
G	4	16	4794	ENERGY CHAIN. LH. OUTER GUIDE BRACKET WELDED ASSEMBLY	5.24	012, 026	232b		
G	4	16	4795	ENERGY CHAIN. LH. CAPPING BRACKET WELDED ASSEMBLY	5.25	073, 102	232b		
G	4	16	4798	MAIN SUPPLY ENERGY CHAIN MOUNTING BRACKET INSTALLATION	5.26	013	232b		
G	4	16	4800	CRANE FOOT PLATE	5.28	073	232b	Q Grate	
G	4	16	4806	RH. ENERGY CHAIN CAPPING BRACKET WELDED ASSEMBLY	5.29	073, 102	232b		
G	4	16	4809	VEHICLE MUDGUARD (FRONT SECTION)	5.30	073	232b		
G	4	16	4815	TRUCK REMOVABLE MUD GUARDS	5.31	102	232b		
G	4	16	4818	GUARD BACK-UP MODE LEVERS	5.32	012	232b or	6082 T6	
G	4	16	4819	GUARD TAIL LIFT MANIFOLD	5.33, 5.34	012	232b or	6082 T6	
G	4	16	4823	F.B.S. STOWING BRACKET	5.35	013	232b		
G	4	16	4824	EXHAUST ELBOW MOUNTING BRACKET INSTALLATION	5.36, 5.37	103	6082 T6		
G	4	16	4826	VEHICLE WALKWAY FOOTPLATE WELDED ASSY	5.38	106	232b	Q Grate	
G	4	16	4856	VEHICLE WALKWAY INNER FOOTPLATE WELDED ASSY	5.39	106	232b	Q Grate	

PREFIX	MODULE ASSY	ASSY No	POSTFIX	DESCRIPTION	FIGURE No.	WPS No.'s	MATERIAL 1	MATERIAL 2	MATERIAL 3
G	4	16	4857	VEHICLE WALKWAY OUTER FOOTPLATE WELDED ASSY	5.40	106	232b	Q Grate	
G	4	16	4858	VEHICLE WALKWAY FOOTPLATE WELDED ASSY	5.41	106	Q Grate		
G	4	16	4859	VEHICLE WALKWAY FOOTPLATE			Q Grate		
G	4	16	4860	VEHICLE WALKWAY FOOTPLATE			Q Grate		
G	4	16	4861	VEHICLE WALKWAY FOOTPLATE			Q Grate		
G	4	16	4903	WALKWAY SUPPORT BRACKET WELDED ASSEMBLY	5.44	012, 018, 020	232b		
G	4	16	4904	WALKWAY STORAGE BRACKET WELDED ASSEMBLY	5.45	012, 020	232b		
G	4	16	4905	WALKWAY STORAGE BRACKET WELDED ASSEMBLY	5.46	102	232b		
G	4	16	4906	WALKWAY SUPPORT BRACKET WELDED ASSEMBLY	5.47	012, 018, 020	232b		
G	4	16	4908	R.H. MUDGUARD & ENERGY CHAIN SUPPORT WELDED ASSEMBLY	5.48	102	232b		
G	4	16	4909	L.H. MUDGUARD & ENERGY CHAIN SUPPORT WELDED ASSEMBLY	5.49	102	232b		
G	4	15	4915	R.H. ENERGY CHAIN BRACKET (SLIDE FRAME END)	5.52	012	232b		
G	4	15	4916	L.H. ENERGY CHAIN BRACKET (SLIDE FRAME END)	5.53	012	232b		
G	4	13	4917	LAUNCHING FRAME ARRANGEMENT OF GUARDS	5.54	106	5251-H22		
G	4	13	4918	LAUNCHING FRAME L.H. GUARD WELDED ASSEMBLY & DETAILS	5.54	106	5251-H22		
G	4	13	4919	LAUNCHING FRAME R.H. GUARD WELDED ASSEMBLY DETAILS	5.55	106	5251-H22		
G	4	13	4920	LAUNCHING FRAME TOP COVER WELDED ASSEMBLY & DETAILS	5.56	106	5251-H22		
G	4	13	4921	LAUNCHING FRAME BRACKETS & DETAILS	5.57	106	5251-H22		

PREFIX	MODULE ASSY	ASSY No	POSTFIX	DESCRIPTION	FIGURE No.	WPS No.'s	MATERIAL 1	MATERIAL 2	MATERIAL 3
G	4	13	4922	LAUNCHING FRAME - UPPER WINCH GUARD WELDED ASSY & DETAILS	5.58	106	5251-H22		
G	4	13	4923	LAUNCHING FRAME - LOWER WINCH GUARD WELDED ASSY & DETAILS	5.59	106	5251-H22		
G	4	16	4934	LAUNCH EQUIPMENT STORAGE BOX WELDED ASSEMBLY	5.62	001	6082 T651		
G	4	16	4935	STORAGE BOX L.H. LID WELDED ASSEMBLY	5.63	001	6082 T651		
G	4	16	4936	LAUNCH EQUIPMENT STORAGE BOX DOOR WELDED ASSEMBLY	5.64	001	6082 T651		
G	4	16	4937	A-FRAME ENERGY CHAIN OUTER GUIDE BRACKET WELDED ASSY	5.65	073	232b		
G	4	16	4938	A-FRAME ENERGY CHAIN INNER GUIDE BRACKET WELDED ASSY	5.66	073	232b		
G	4	16	4946	LAUNCH EQUIPMENT STORAGE BOX R.H. LID WELDED ASSEMBLY	5.68	001	6082 T651		
G	0	16	5016	DEFILE MARKER ASSEMBLY AND DETAIL	5.69	001	6082 T6		
G	4	17	5031	VEHICLE CHASSIS VALVE BRACKET RETROFIT	5.72	012	232b		
G	4	16	4654/ 12	TAIL LIFT ASSEMBLY	5.1	106	Al Alloy		

NOTE

The material that Q GRATE is made from is aluminum alloy 5251

DETAILS OF COMPONENTS AND REFERENCE TO THE RELEVANT WELD PROCEDURES

See Manufacturer's Drawing

Figure 5.1 G416/4654/12 TAIL LIFT

(IF DAMAGED REPAIR USING TABLE 5-1 WPS 106)

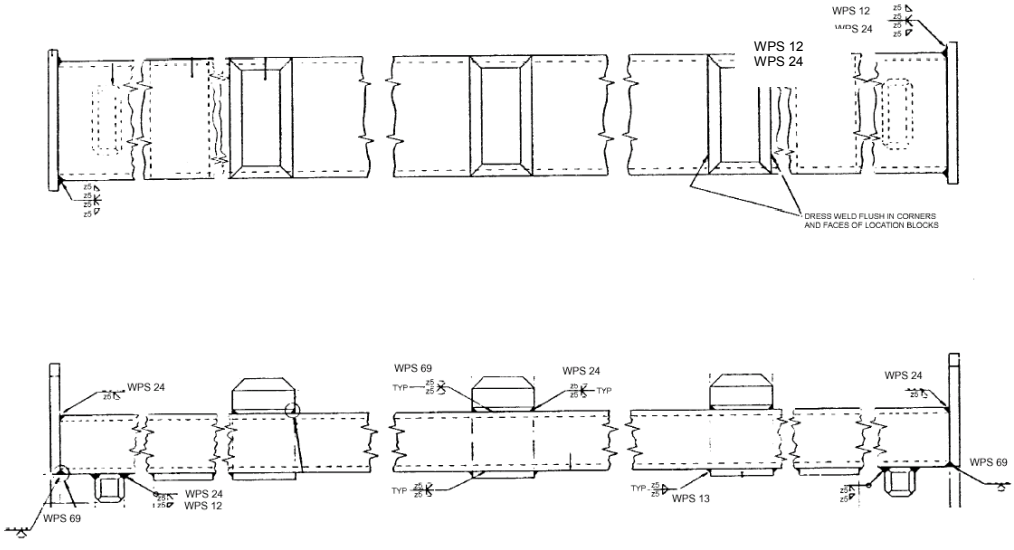


Figure 5.2 G416/4674 ITEM 1

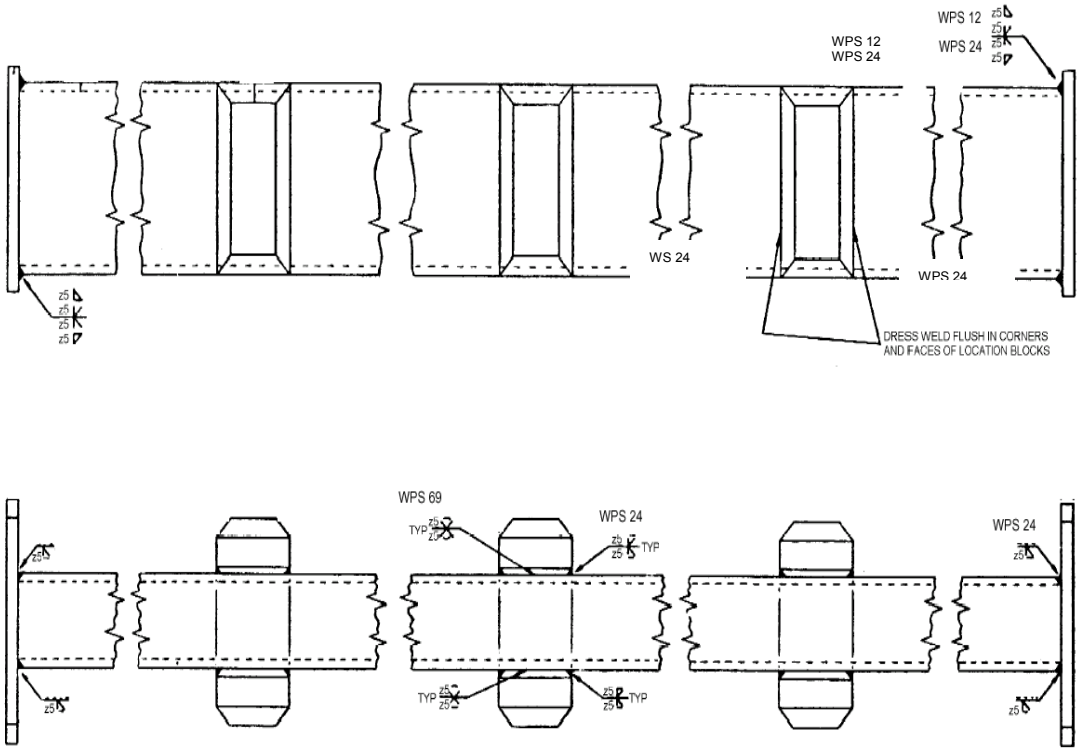


Figure 5.3 G416/4675 ITEM 1

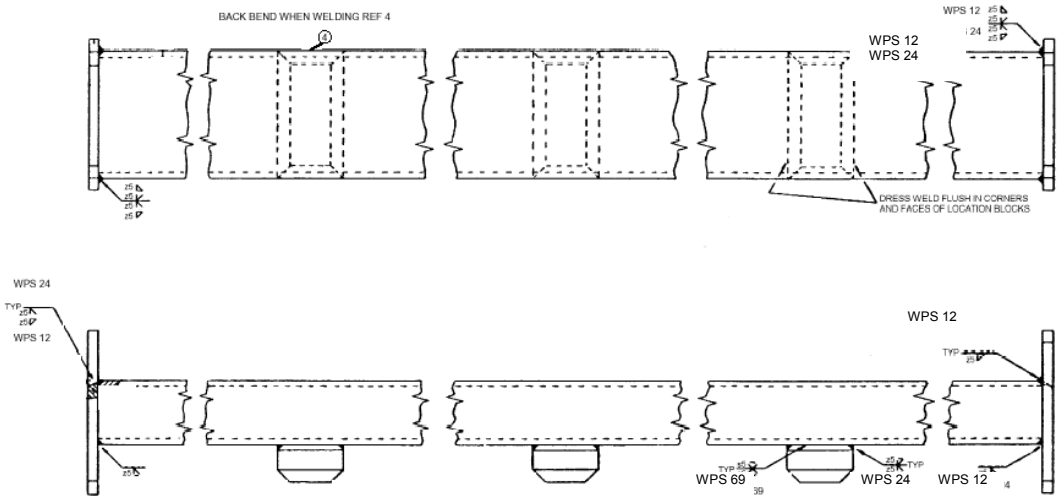
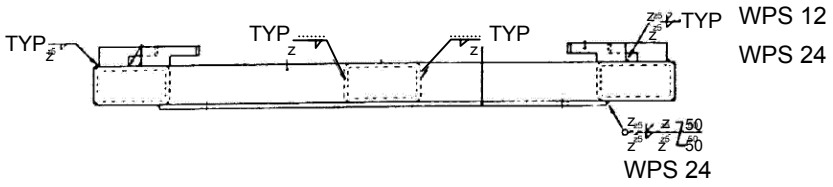


Figure 5.4 G416/4676 ITEM 1



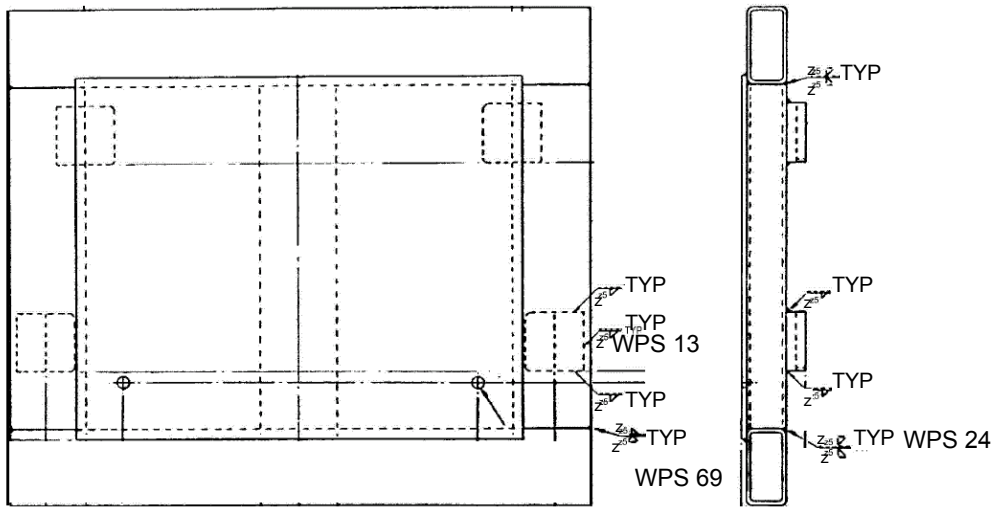


Figure 5.5 G416/4680 ITEM 1

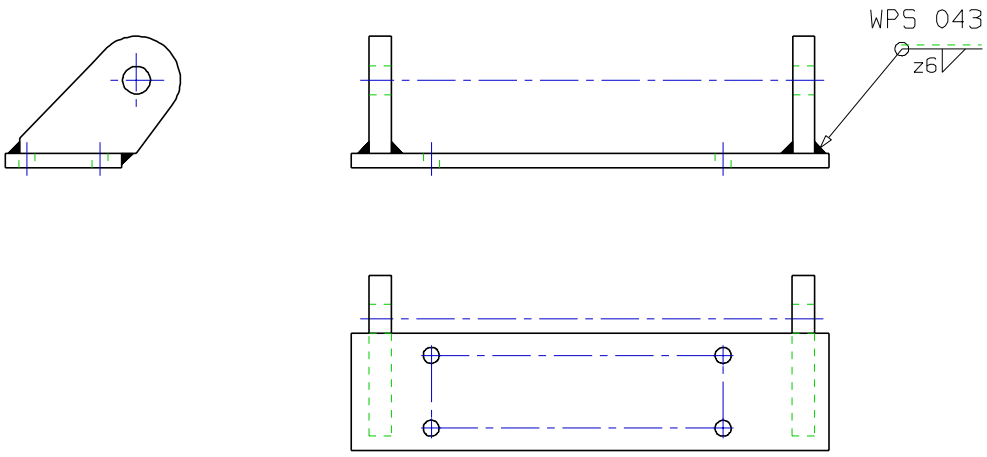


Figure 5.6 G416/4706 ITEM 64

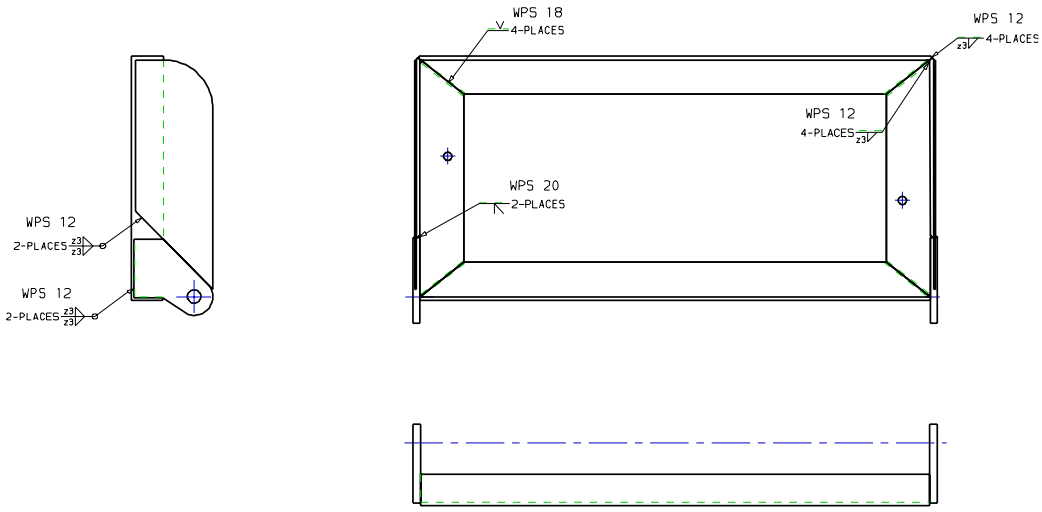


Figure 5.7 G416/4711 ITEM 1

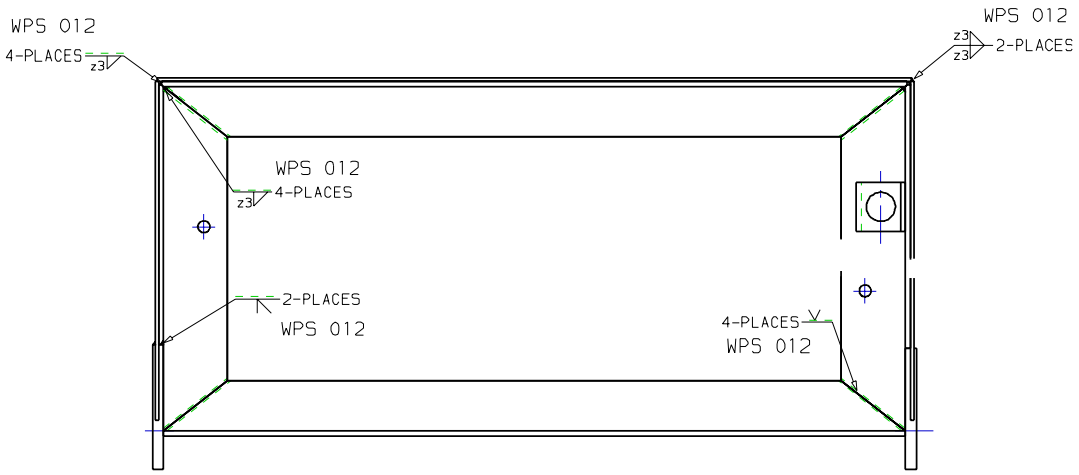


Figure 5.8 G416/4712 ITEM 1 & 10

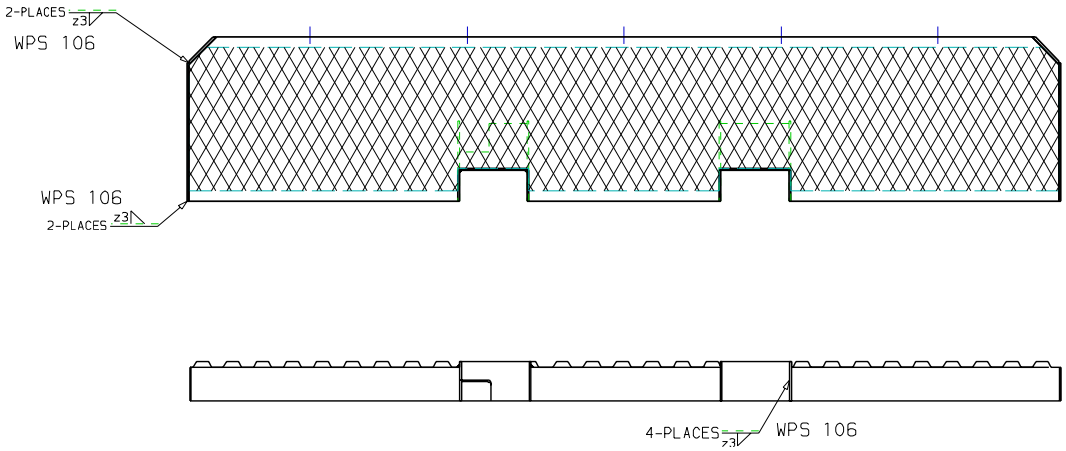


Figure 5.9 G416/4717 ITEM 1

(FOR ALL WELDS ON G416/4717 REFER TO TABLE 5-1 WPS 106)

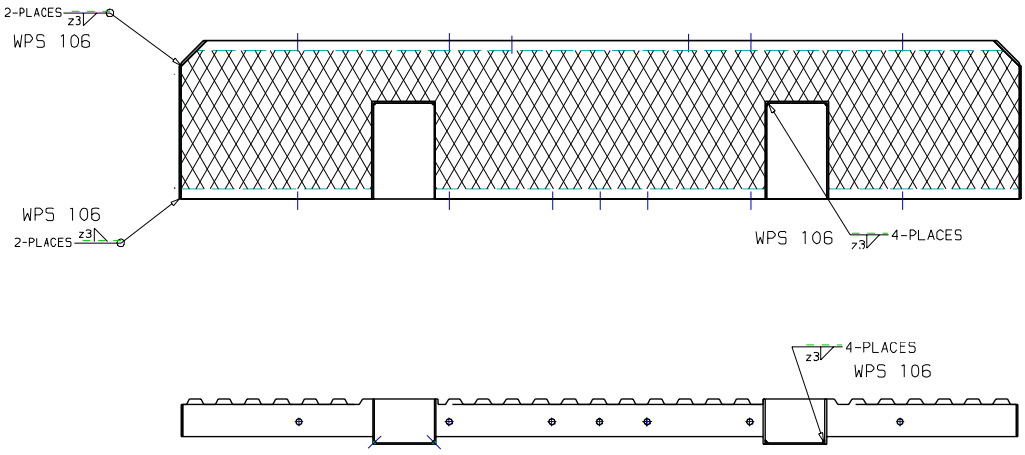


Figure 5.10 G416/4718 ITEM 1

(FOR ALL WELDS ON G416/4718 ITEM 1 REFER TO TABLE 5-1 WPS 106)

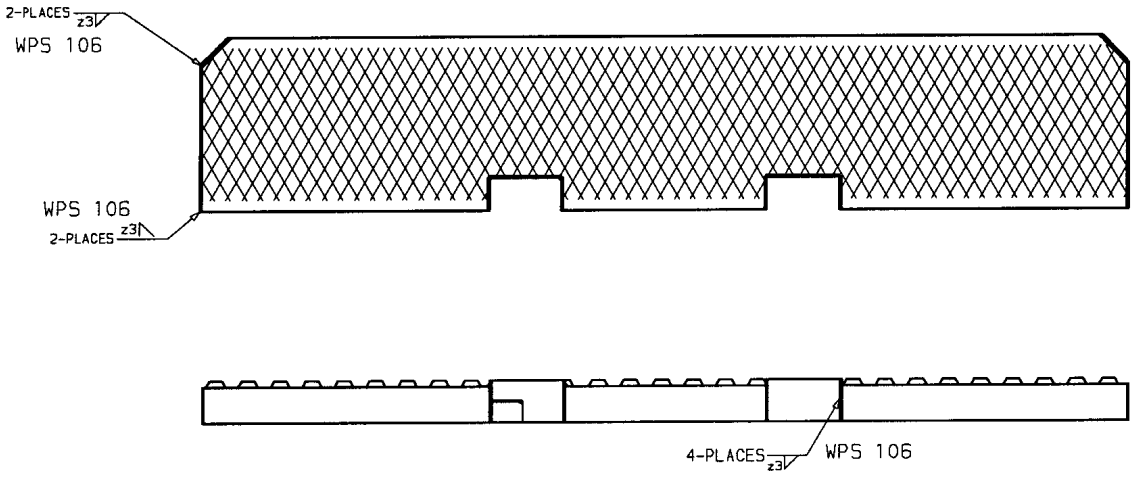


Figure 5.11 G416/4719 ITEM 1

(FOR ALL WELDS ON G416/4719 ITEM 1 REFER TO TABLE 5-1 WPS 106)

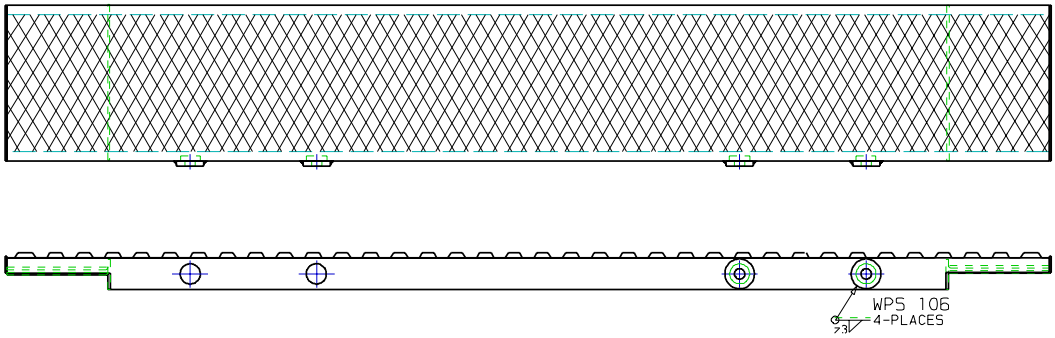


Figure 5.12 G416/4720 ITEM 1

(FOR ALL WELDS ON G416/4720 ITEMS 1 AND 2 REFER TO TABLE 5-1 WPS 106)

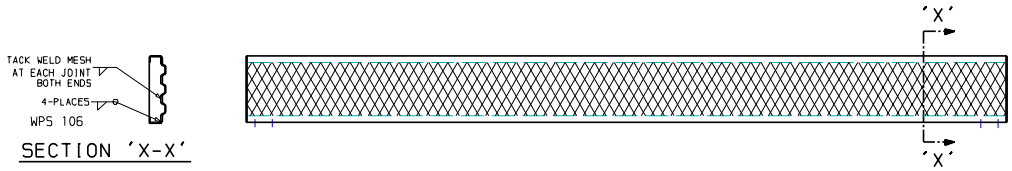


Figure 5.13 G416/4721 ITEM 1

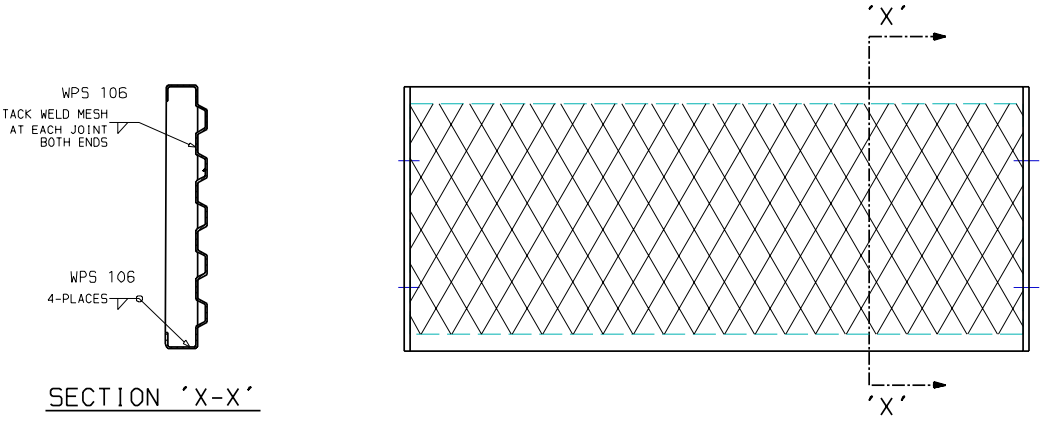


Figure 5.14 G416/4722 ITEM 1

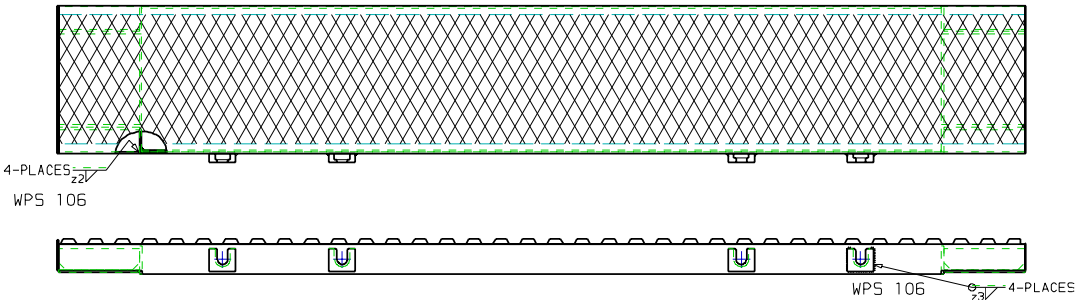


Figure 5.15 G416/4723 ITEM 1

(FOR ALL WELDS ON G416/4723 ITEMS 1, 2 & 3 REFER TO TABLE 5-1 WPS 106)

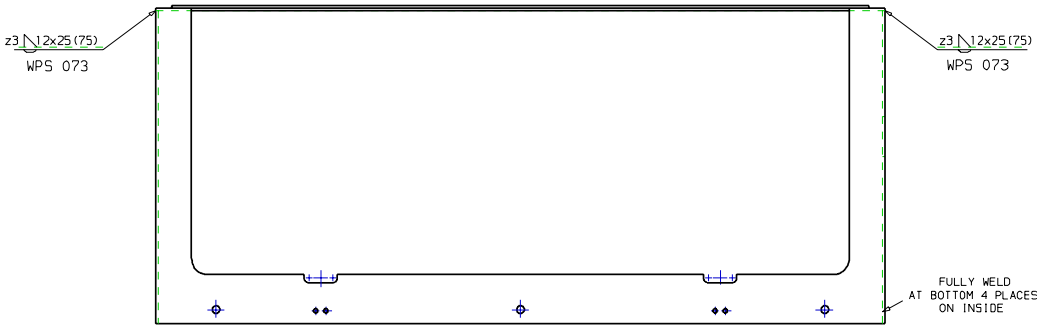


Figure 5.16 G413/4754 ITEM 2

(IF DAMAGED REPAIR USING TABLE 5-1 WPS 073)

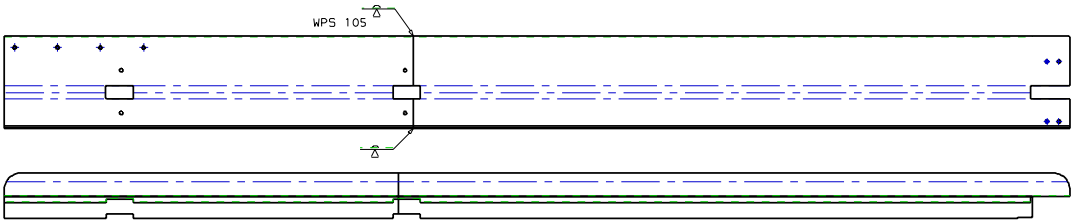


Figure 5.17 G416/4756 ITEM 1 USED ON G416/4760

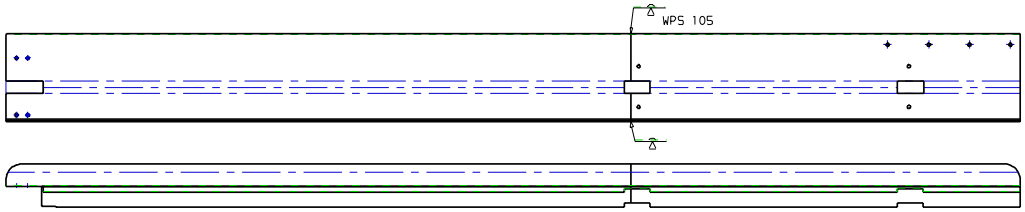


Figure 5.18 G416/4757 ITEM 1 USED ON G416/4760

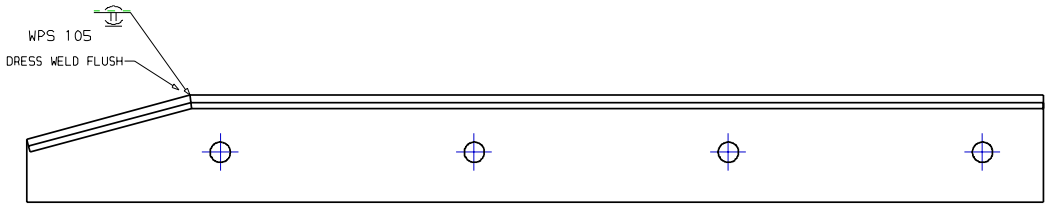


Figure 5.19 G416/4758 ITEM 1 USED ON G416/4760

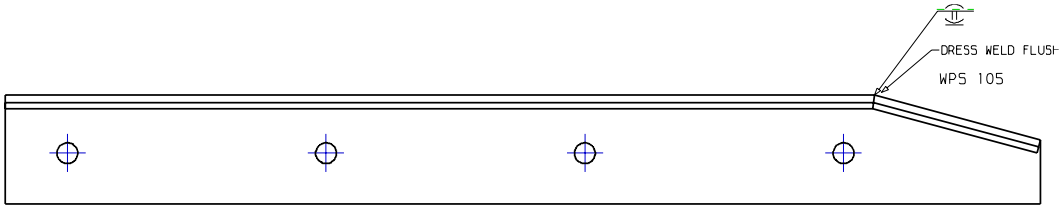


Figure 5.20 G416/4759 ITEM 1 USED ON G416/4760

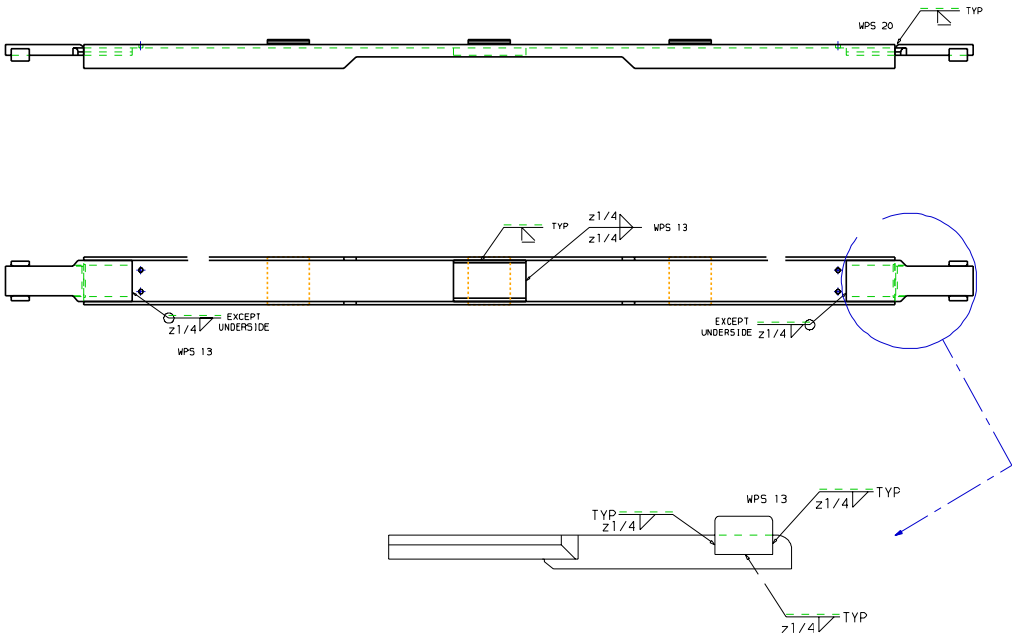


Figure 5.21 G416/4776 ITEM 1

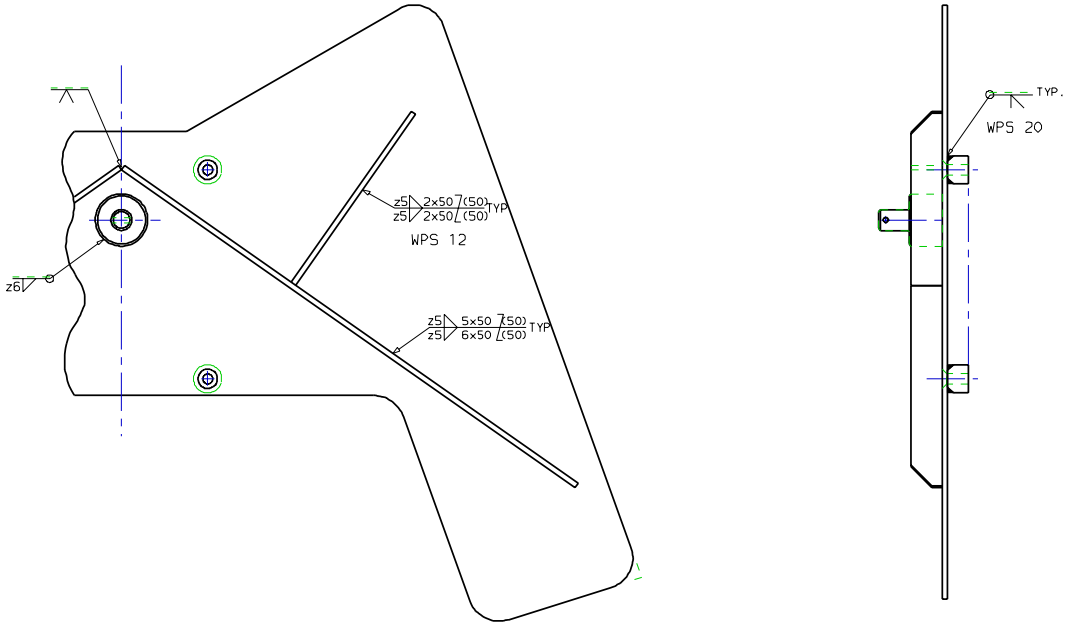


Figure 5.22 G411/4780 ITEM 1

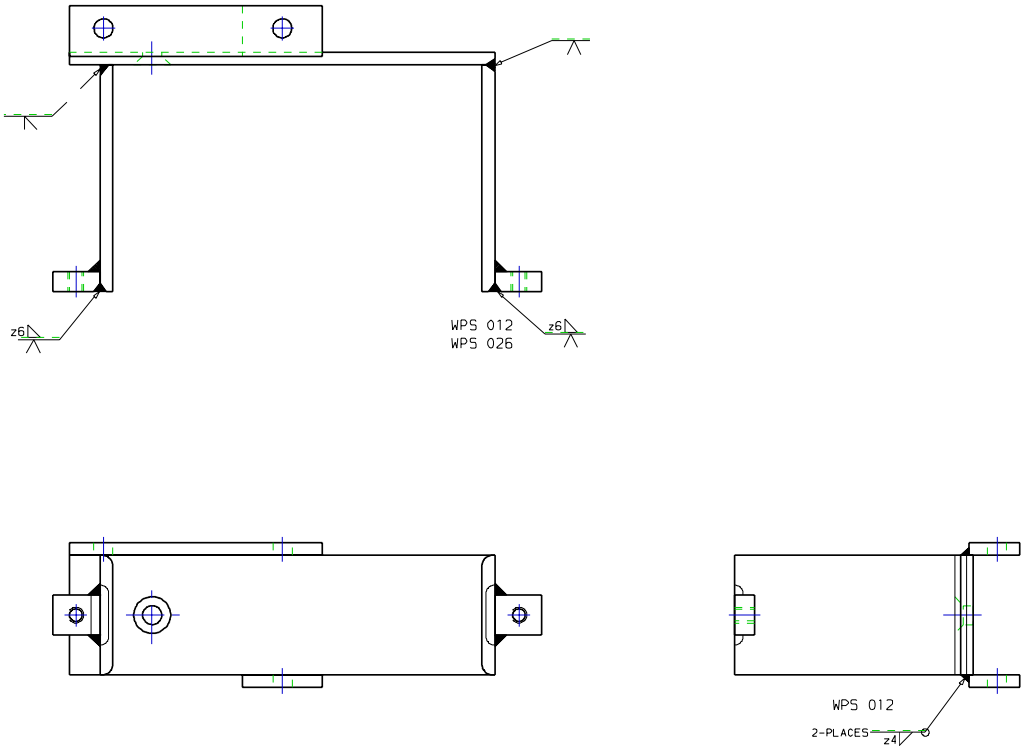


Figure 5.23 G416/4793 ITEM 1

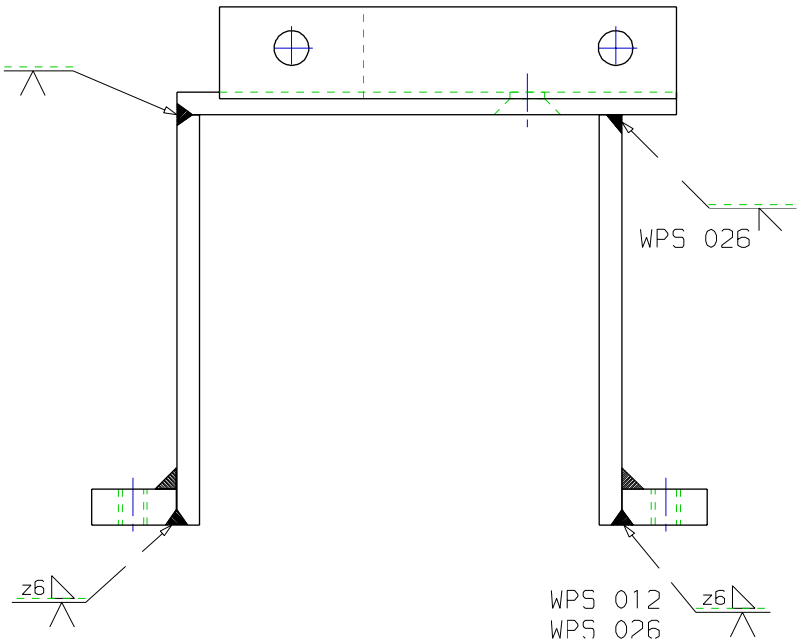
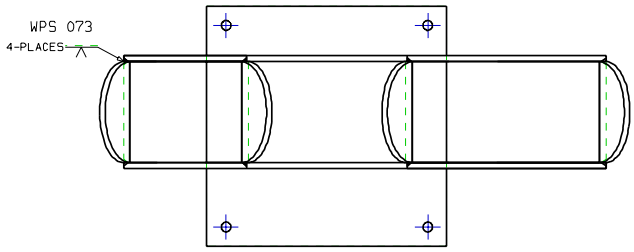


Figure 5.24 G416/4794 ITEM 1



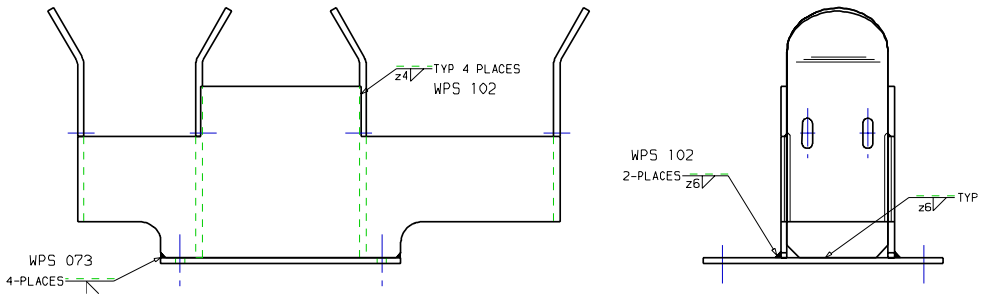


Figure 5.25 G416/4795 ITEM 1

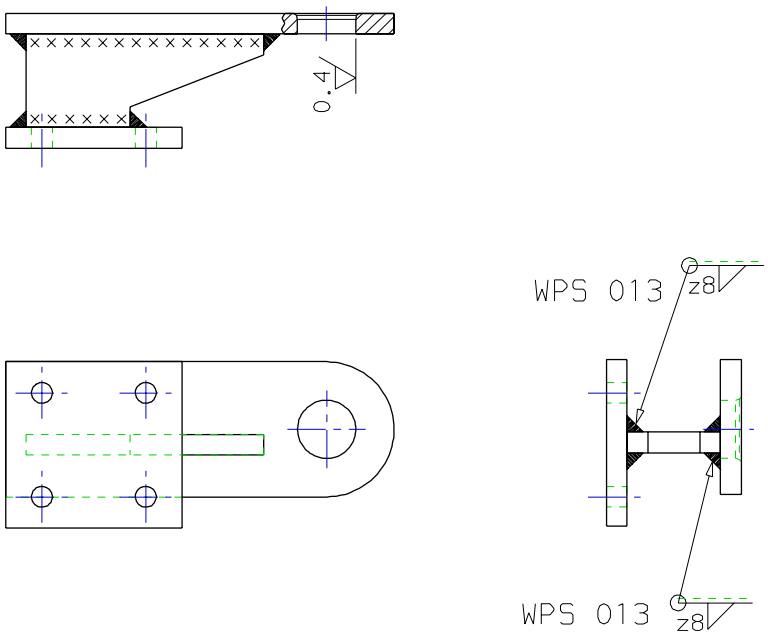


Figure 5.26 G416/4798 ITEM 3

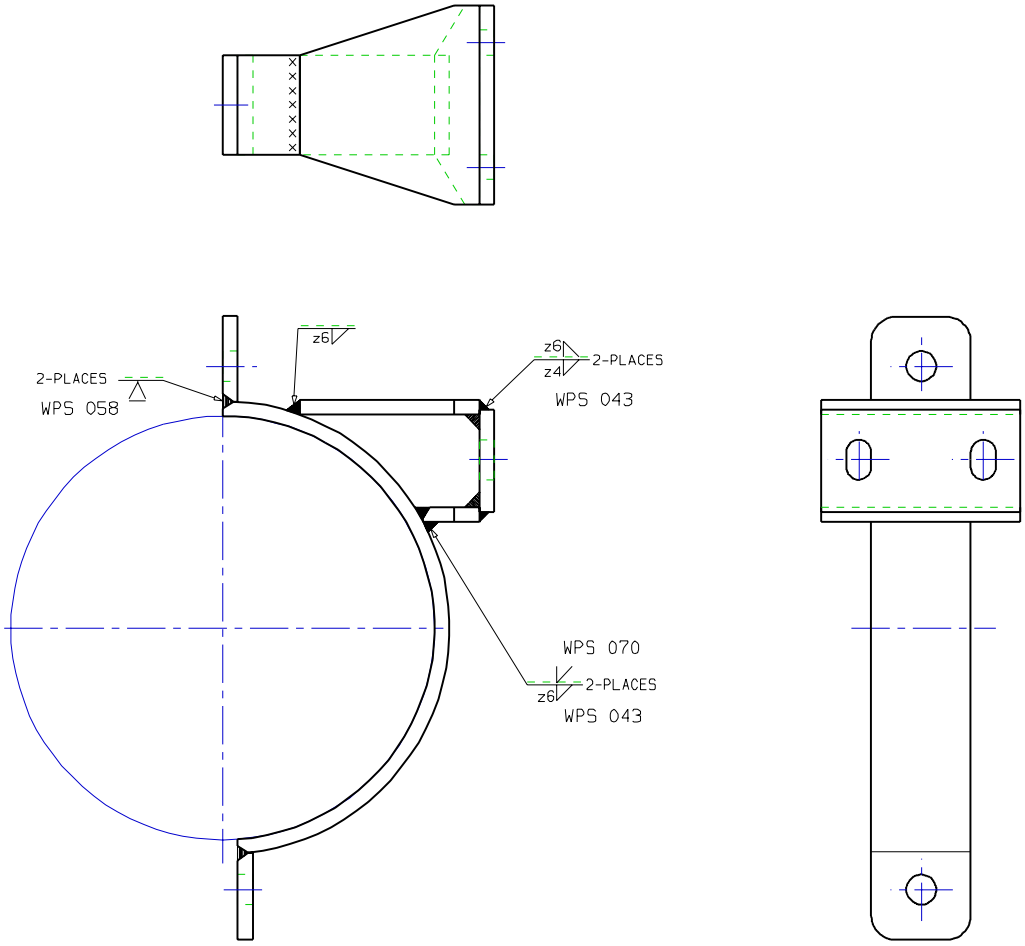


Figure 5.27 G416/4799 ITEM 1

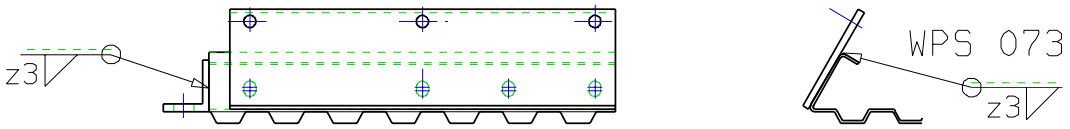
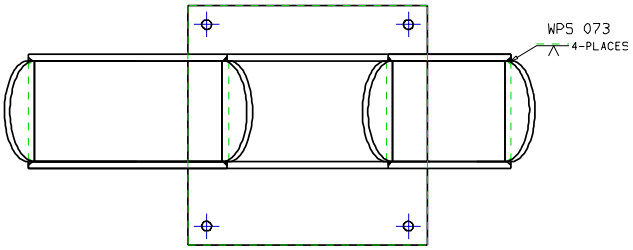


Figure 5.28 G416/4800 ITEM 3



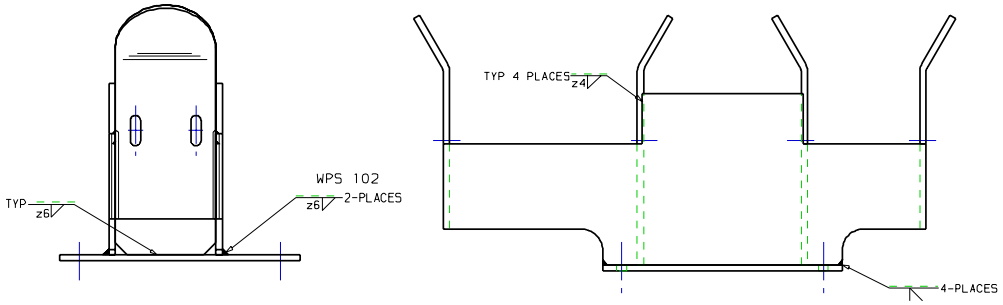


Figure 5.29 G416/4806 ITEM 1

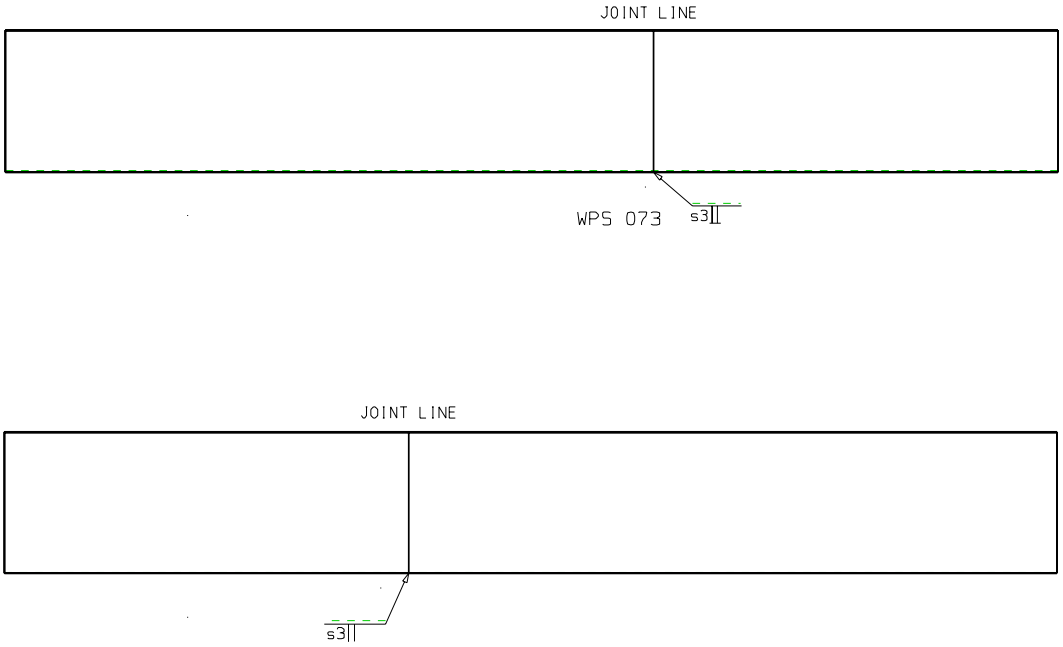


Figure 5.30 G416/4809 ITEM 3 & 4

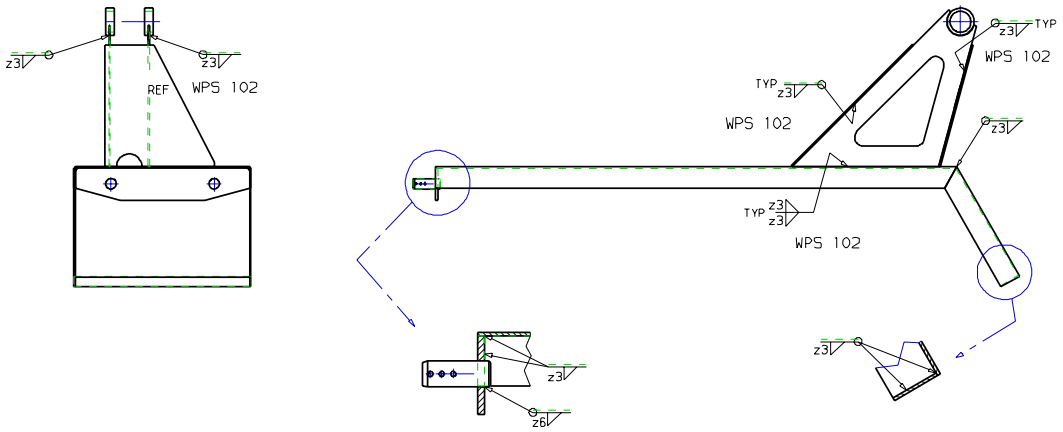


Figure 5.31 G416/4815 ITEM 2 & 3

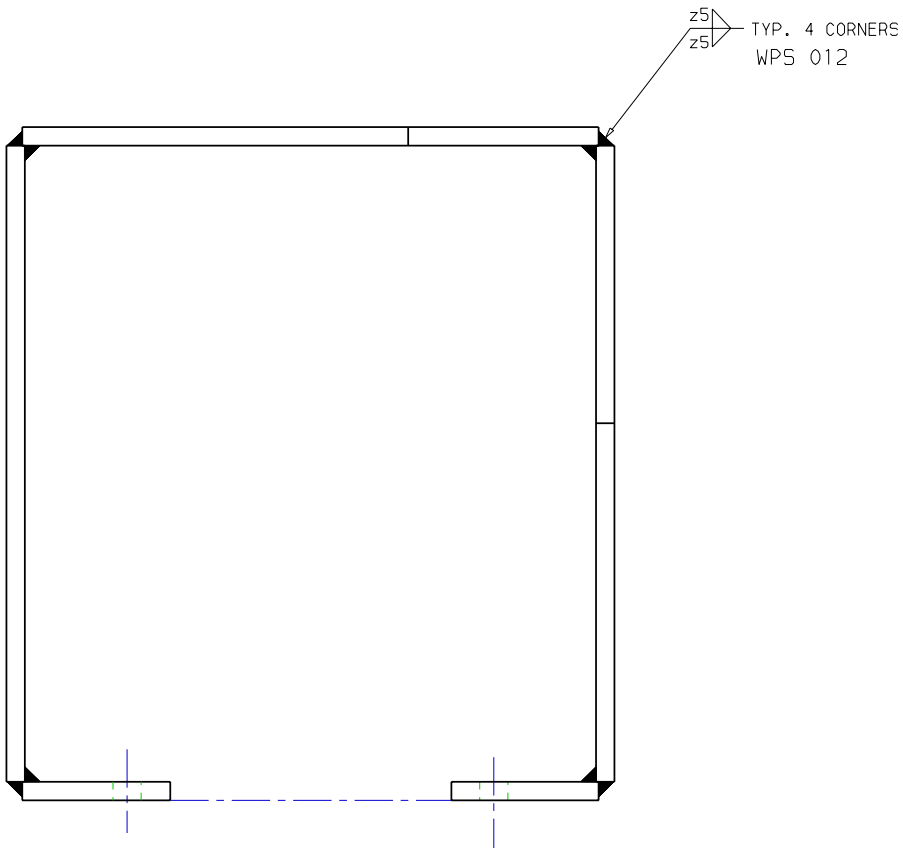


Figure 5.32 G416/4818 ITEM 1

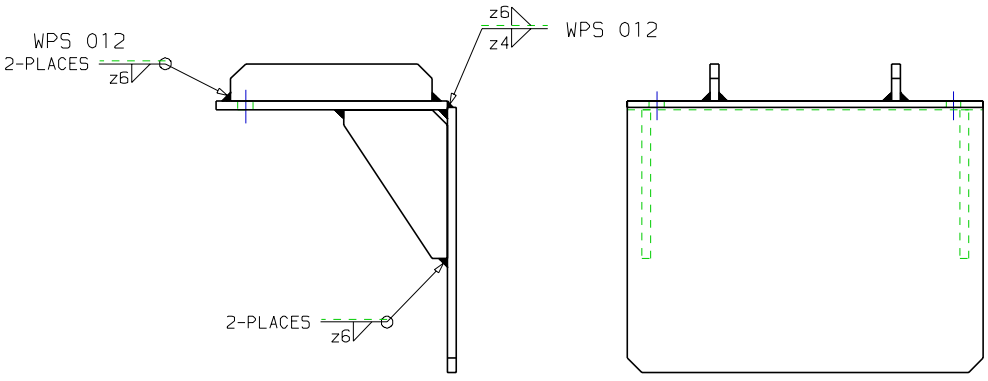


Figure 5.33 G416/4819 ITEM 7

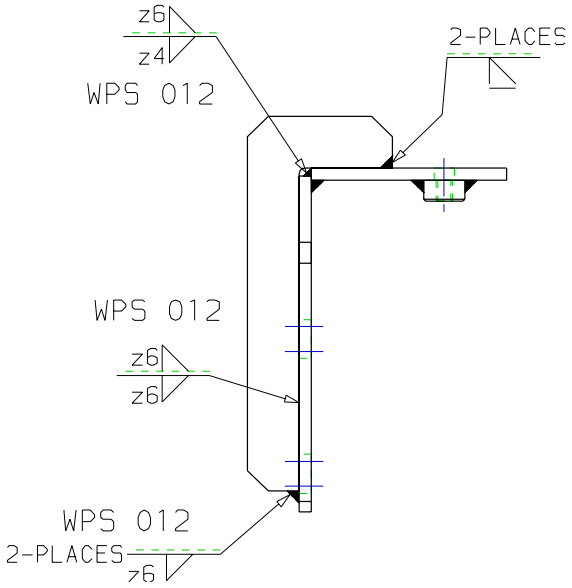


Figure 5.34 G416/4819 ITEM 4

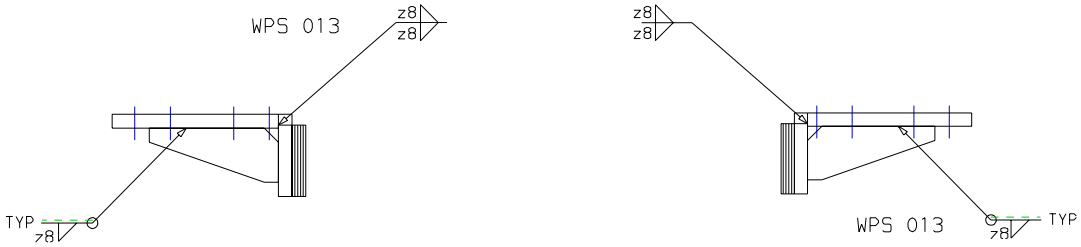


Figure 5.35 G416/4823 ITEM 1 and G416/4823 ITEM 2

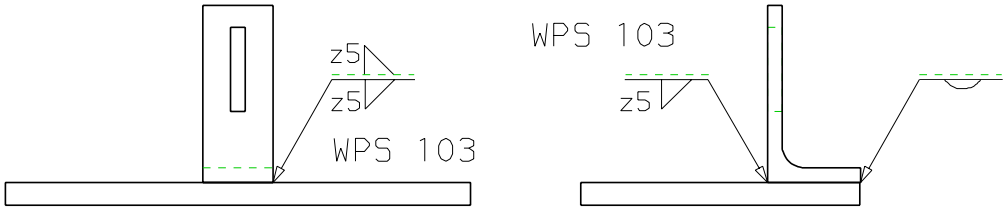


Figure 5.36 G416/4824 ITEM 6

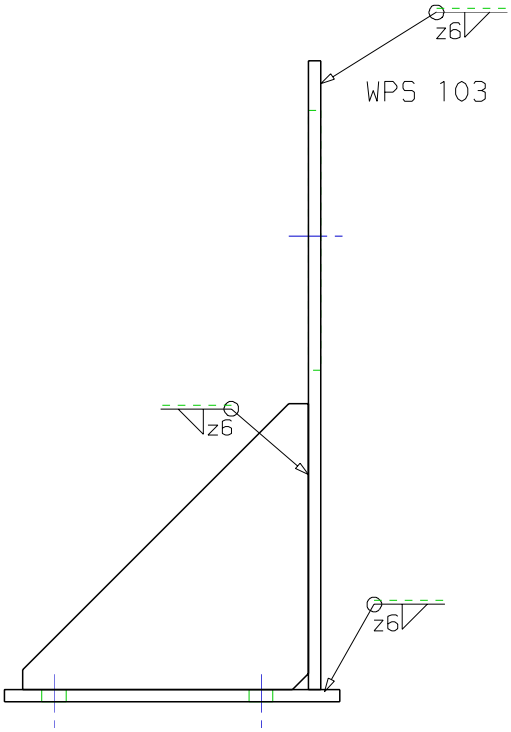


Figure 5.37 G416/4824 ITEM 2

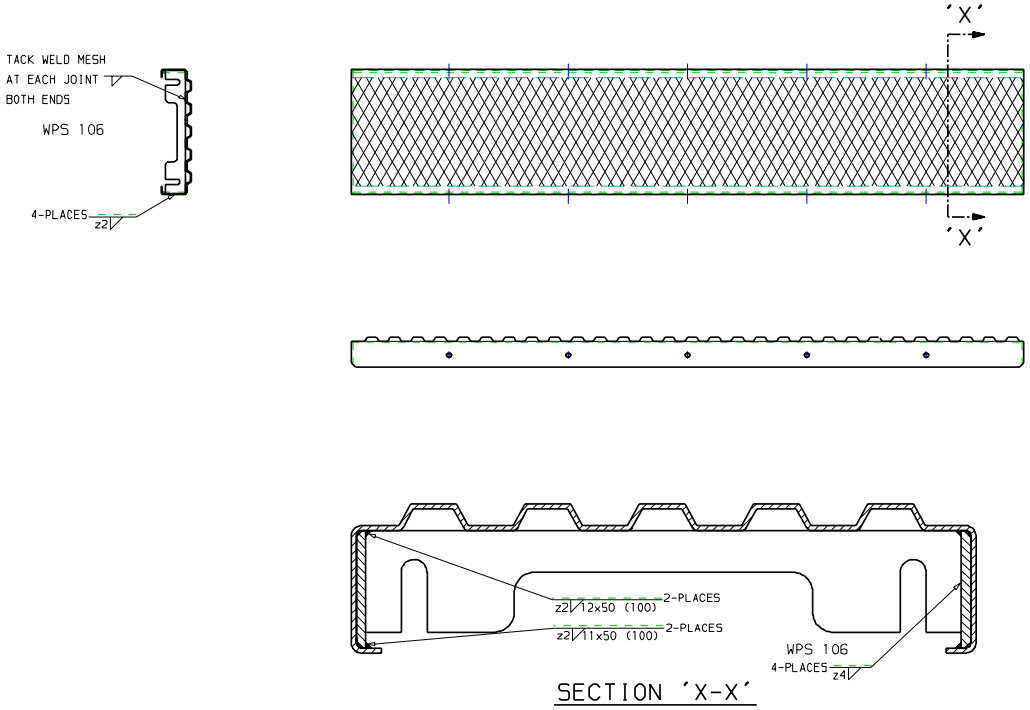


Figure 5.38 G416/4826 ITEM 1

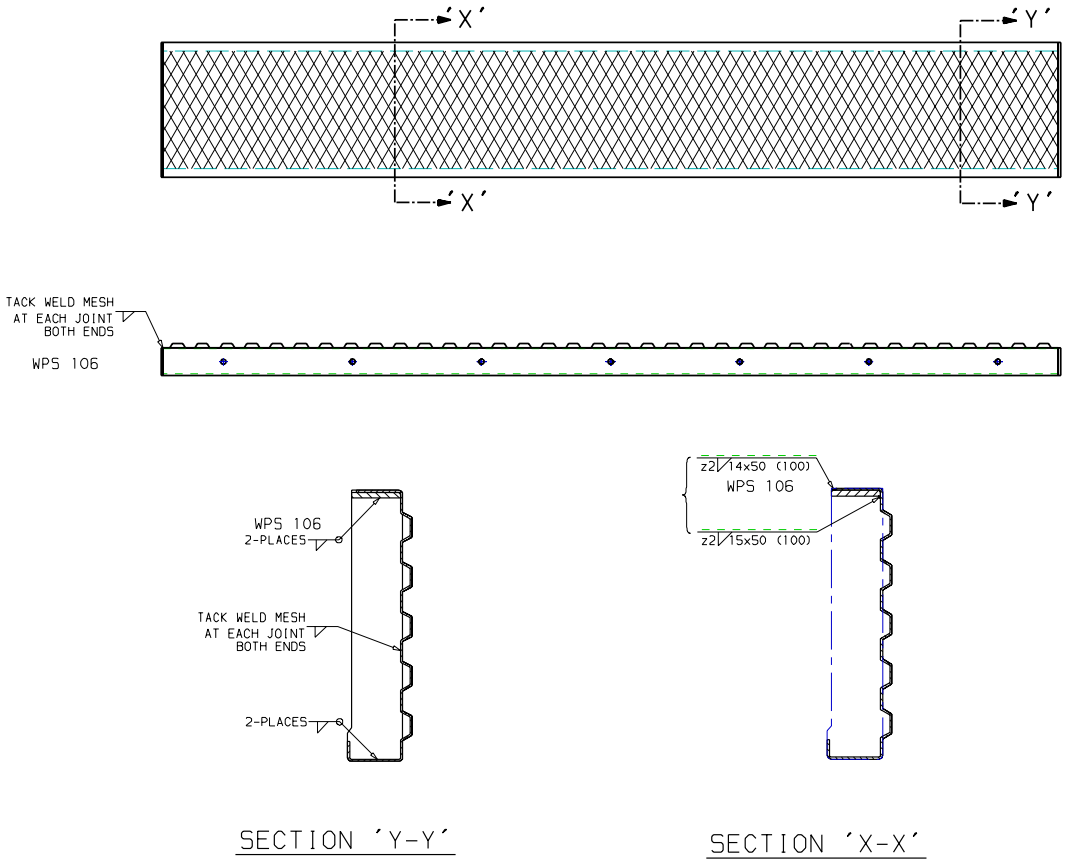


Figure 5.39 G416/4856 ITEM 1

(USED ON G416/4724)

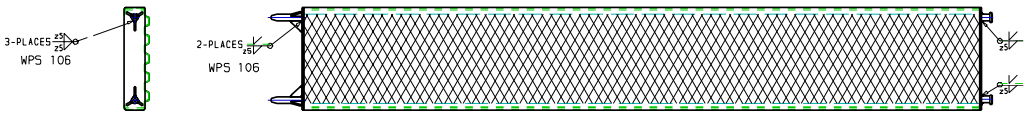


Figure 5.40 G416/4857 ITEM 1

(USED ON G416/4724 FOR ALL WELDS ON G416/4857 REFER TO TABLE 5-1 WPS 106)

See Manufacturer's Drawing	G416/4858	G416/4859	G416/4860	G416/4861

Figure 5.41

(IF DAMAGED REPAIR USING TABLE 5-1 WPS 106)

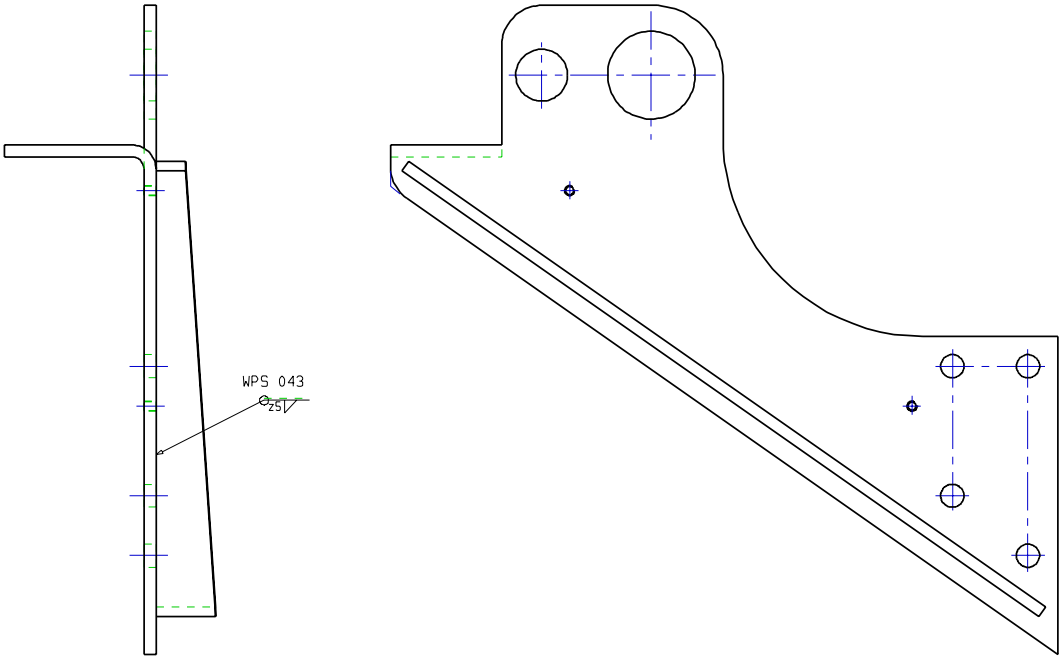


Figure 5.42 G415/4896 ITEM 2

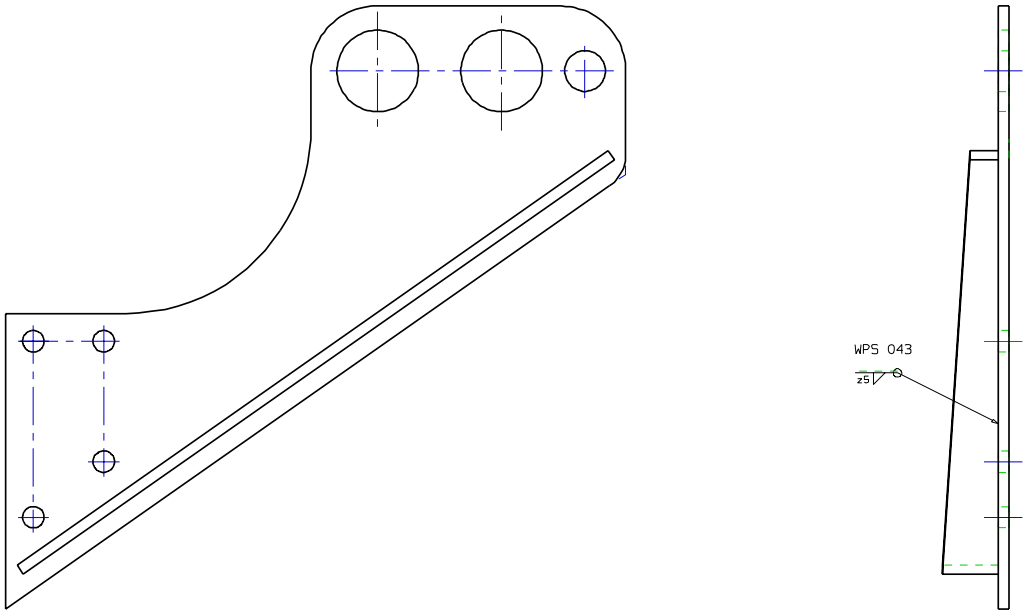


Figure 5.43 G415/4897 ITEM 2

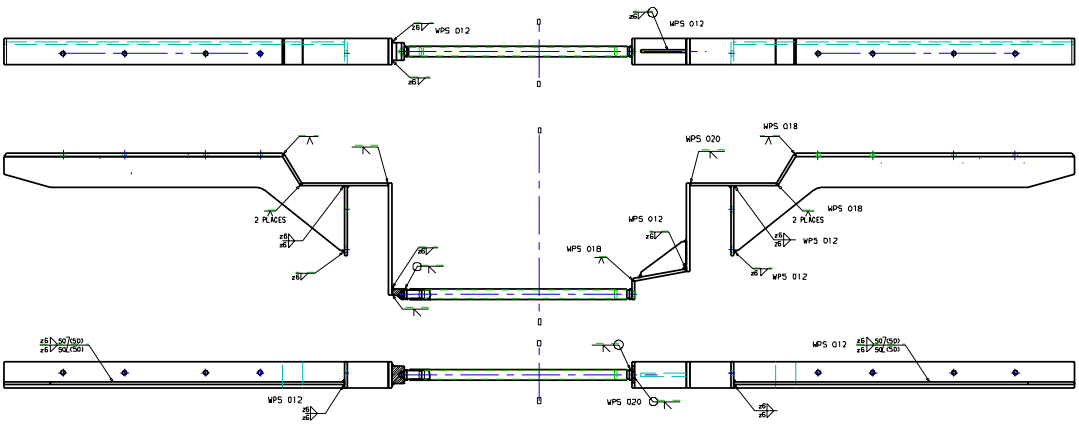


Figure 5.44 G416/4903 ITEM 1

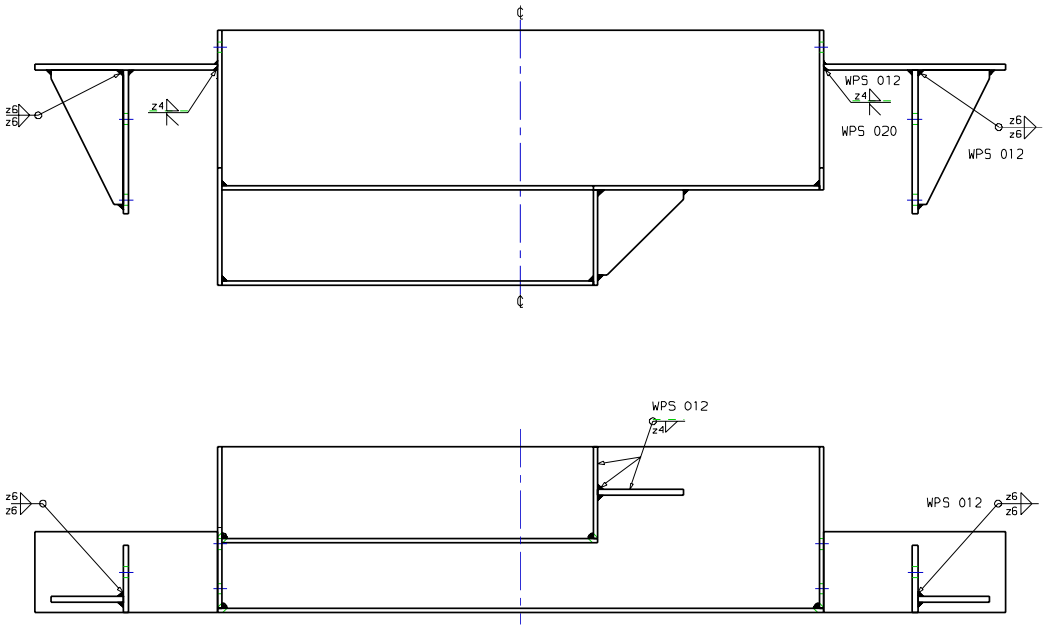


Figure 5.45 G416/4904 ITEM 1

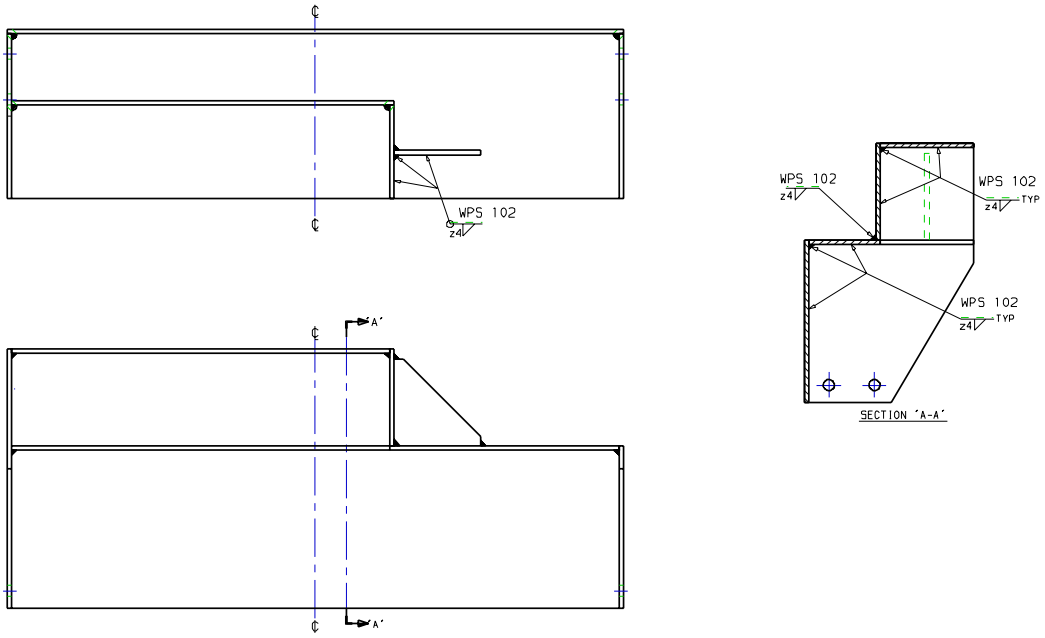


Figure 5.46 G416/4905 ITEM 1

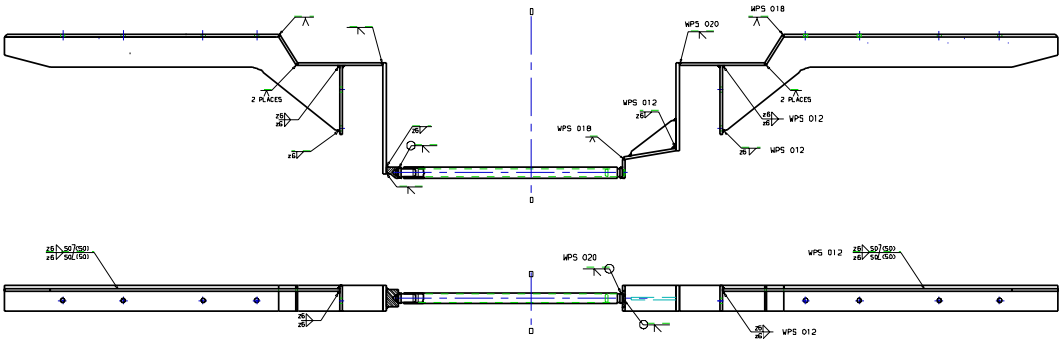


Figure 5.47 G416/4906 ITEM 1

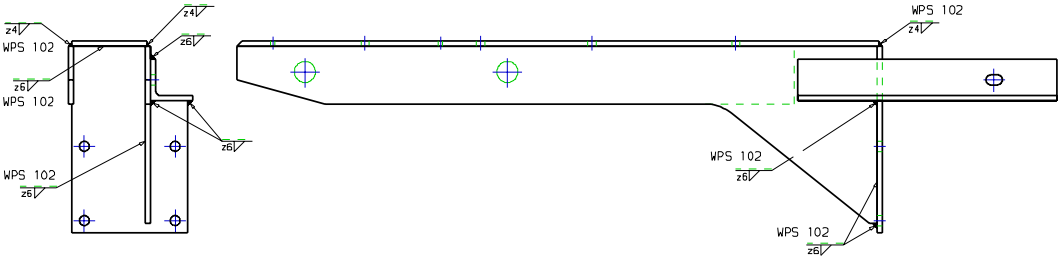


Figure 5.48 G416/4908 ITEM 1

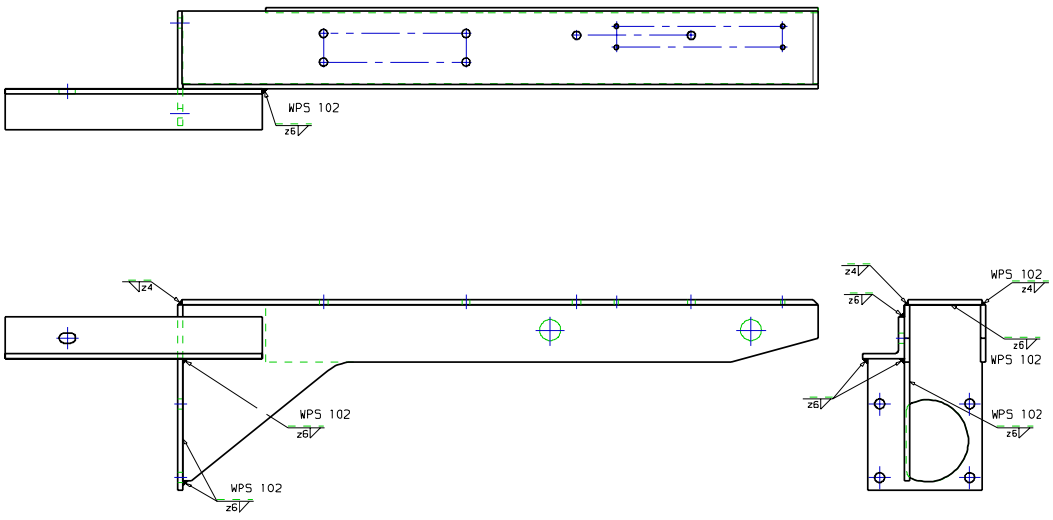


Figure 5.49 G416/4909 ITEM 1

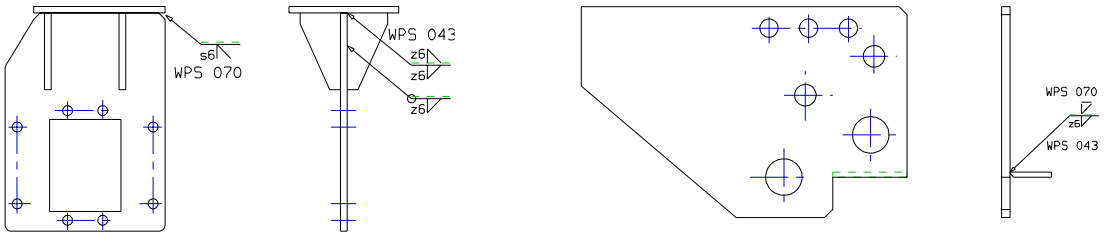


Figure 5.50 G414/4914 ITEM 2 and G414/4914 ITEM 12

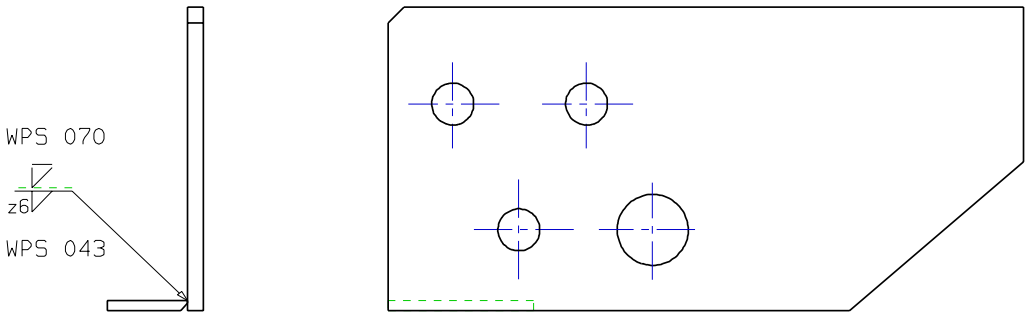


Figure 5.51 G414/4914 ITEM 15

(USED ON G416/4792 FOR ALL WELDS ON G414/4914 ITEMS 18, 22, 26, 30, 35, 38, 42, 45, 55, 71, 75, 79 & 84 SEE TABLE 5-1 WPS 043)

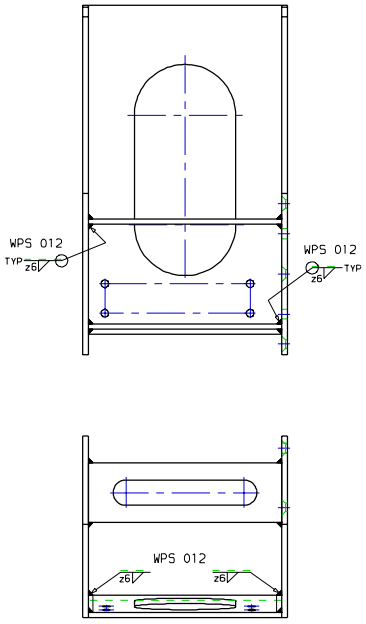


Figure 5.52 G415/4915 ITEM 1

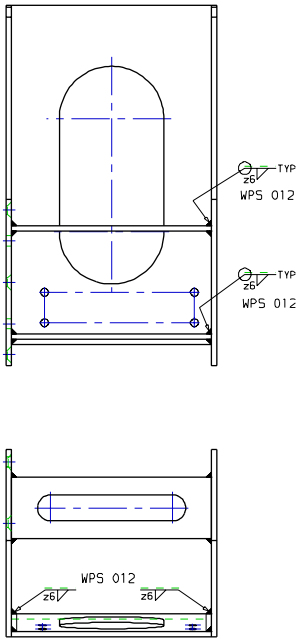


Figure 5.53 G415/4916 ITEM 1

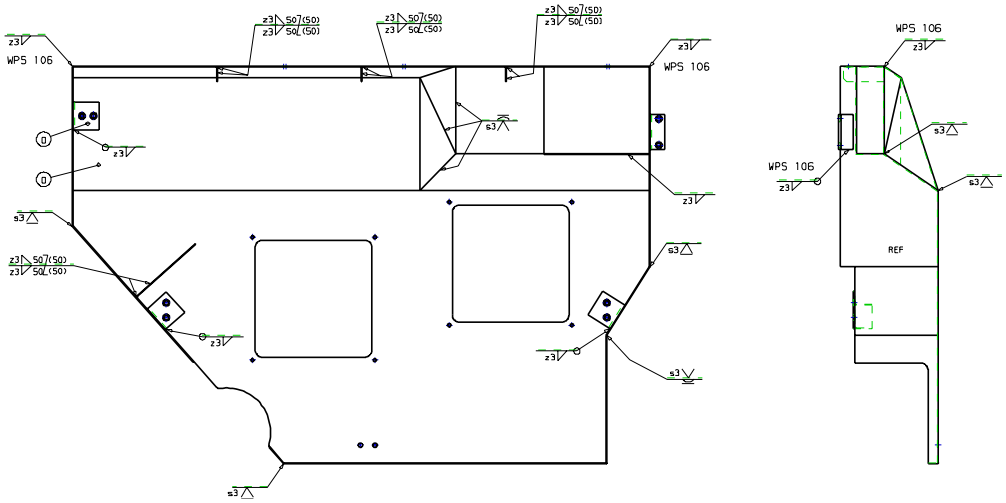


Figure 5.54 G413/4918 ITEM 1

(USED ON G413/4917 FOR ALL WELDS ON G413/4918 REFER TO TABLE 5-1 WPS 106)

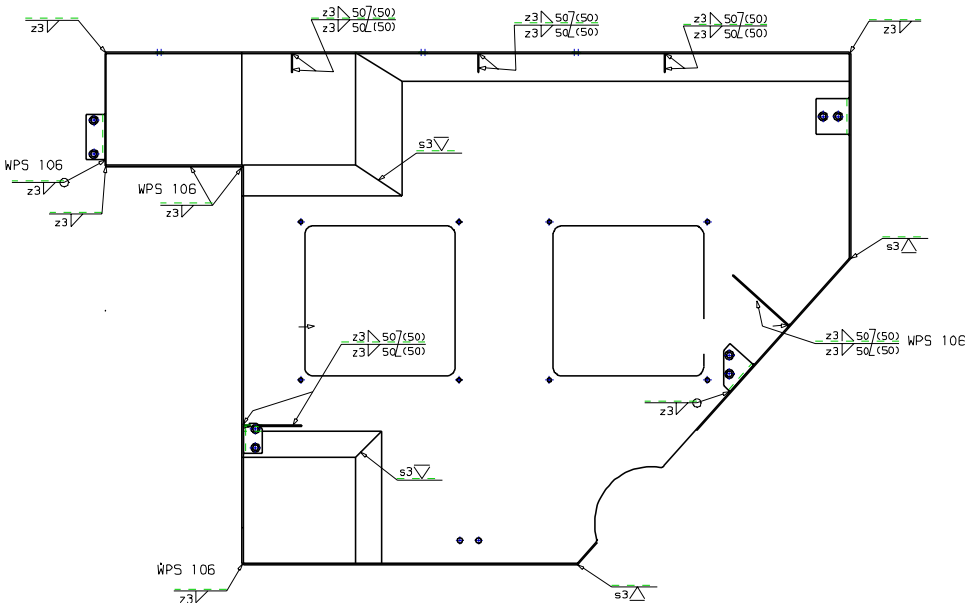


Figure 5.55 G413/4919 ITEM 1

(USED ON G413/4917 FOR ALL WELDS ON G413/4919 REFER TO TABLE 5-1 WPS 106)

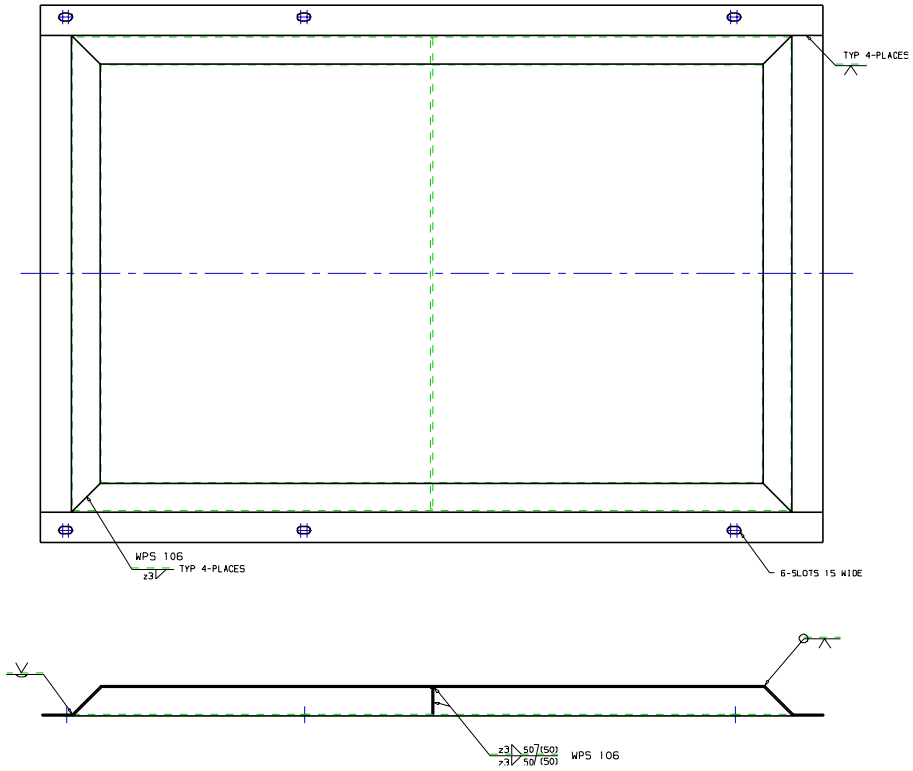


Figure 5.56 G413/4920 ITEM 1

(USED ON G413/4917 FOR ALL WELDS ON G413/4920 REFER TO TABLE 5-1 WPS 106)

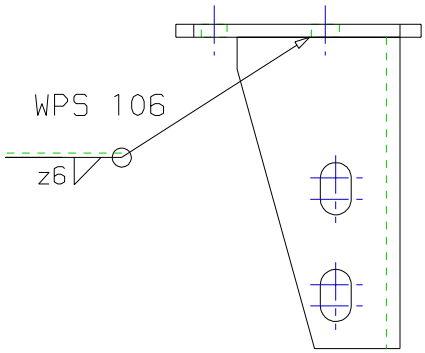


Figure 5.57 G413/4921 ITEM 2

(FOR ALL WELDS ON G413/4921 ITEMS 7, 11, 12, 15, 18 & 20 REFER TO TABLE 5-1 WPS 106)

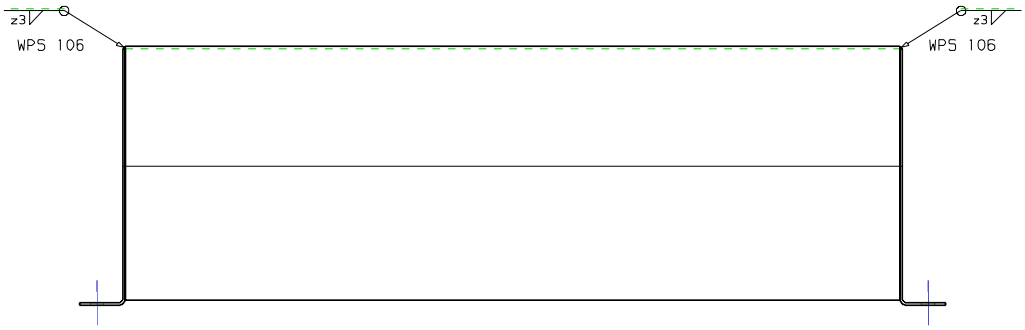


Figure 5.58 G413/4922 ITEM 1

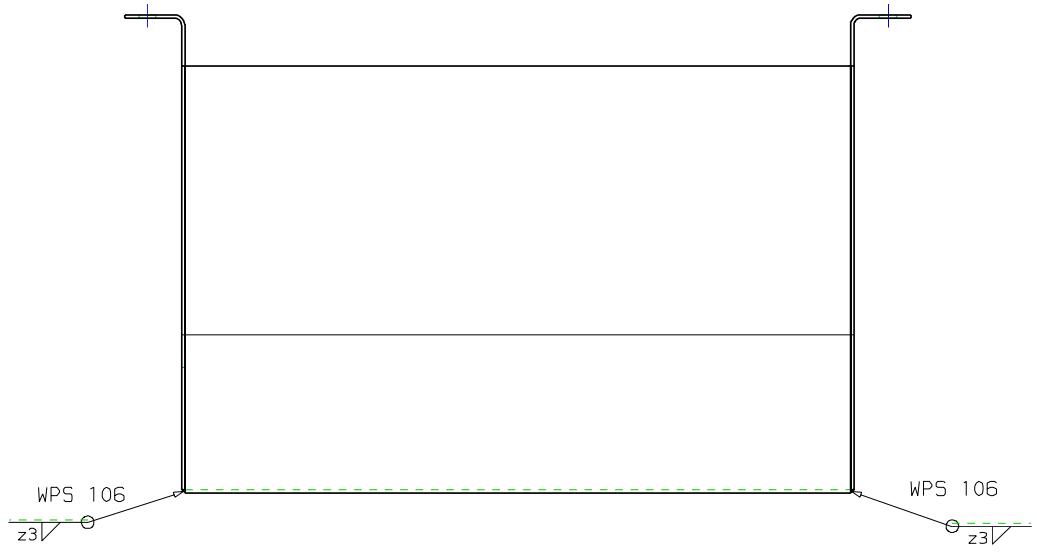


Figure 5.59 G413/4923 ITEM 1

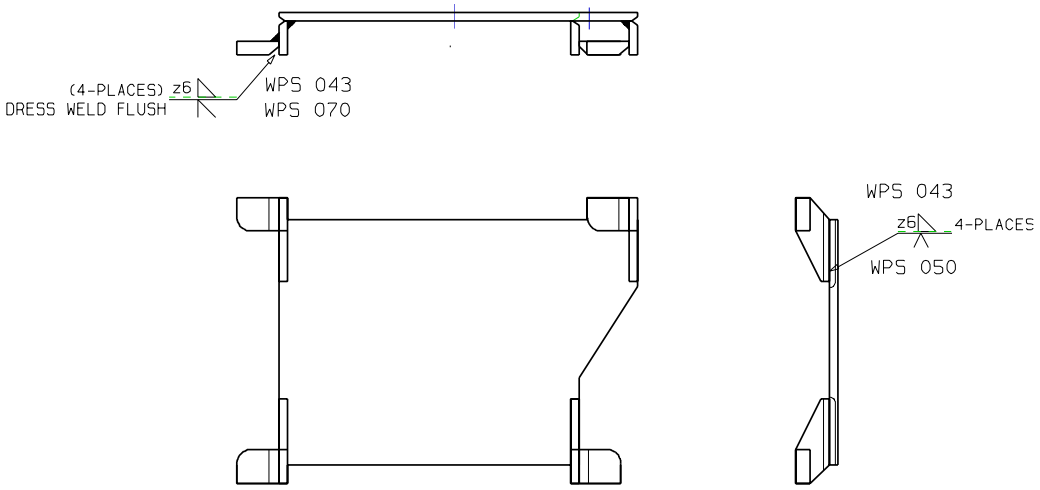


Figure 5.60 G406/4927 ITEM 2

See Manufacturer's Drawing

Figure 5.61 G417/4929 ITEM 1

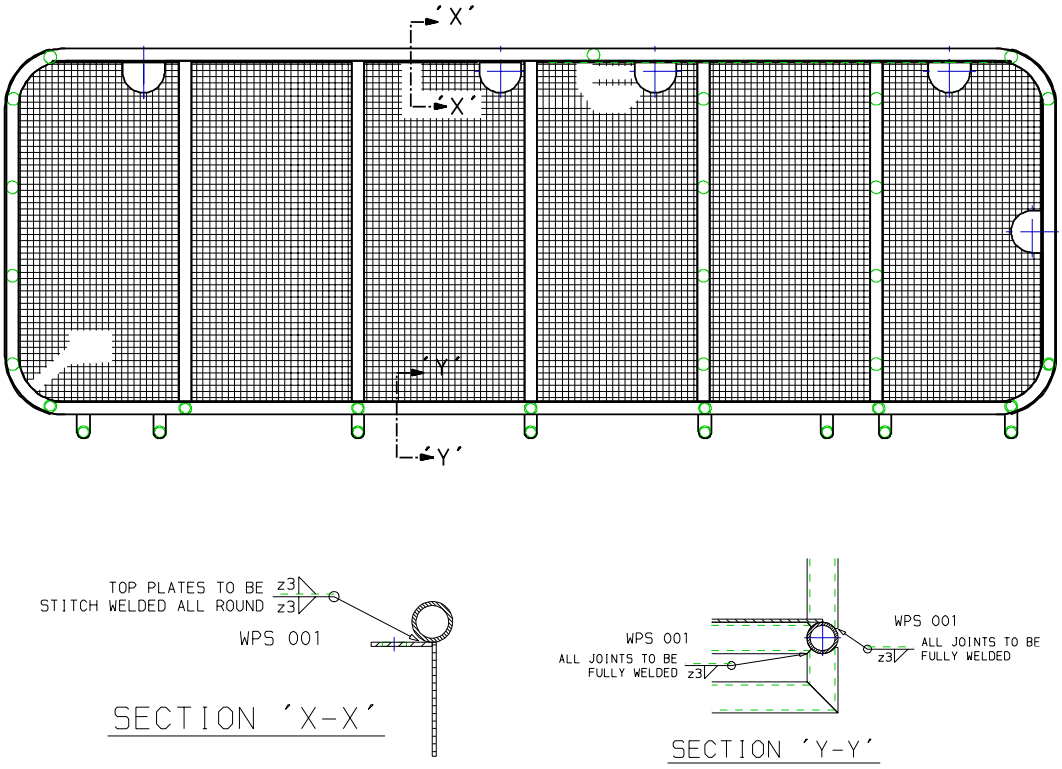


Figure 5.62 G416/4934 ITEM 1

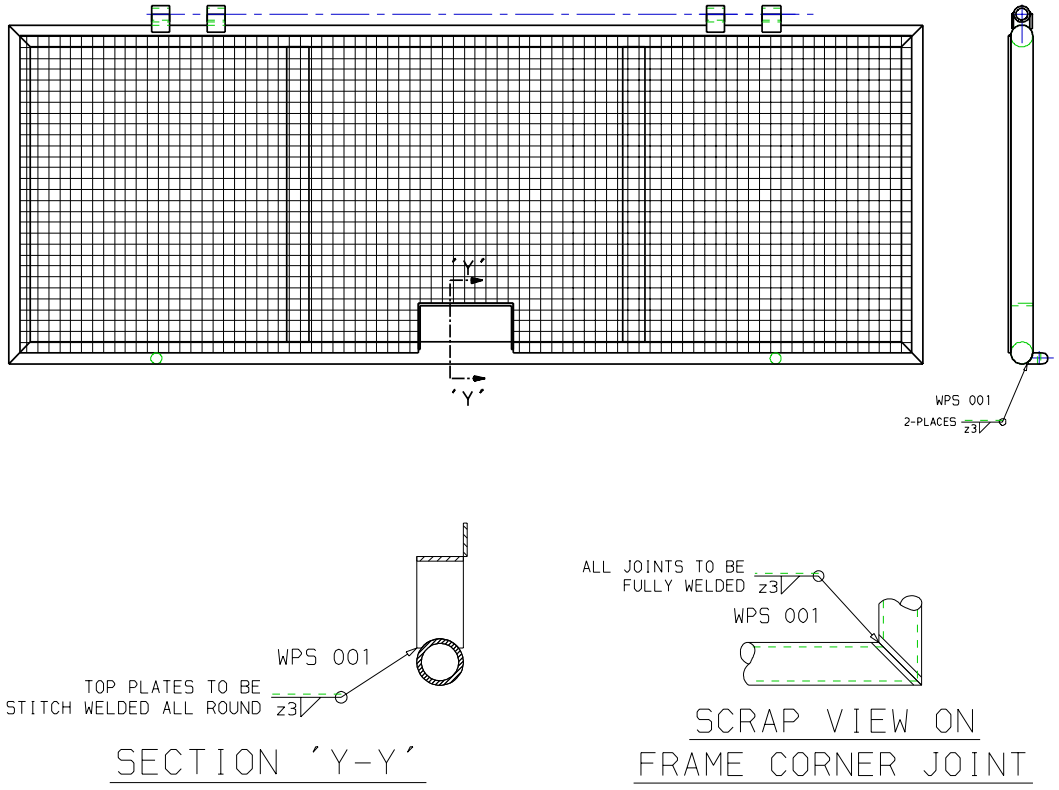


Figure 5.63 G416/4935 ITEM 1

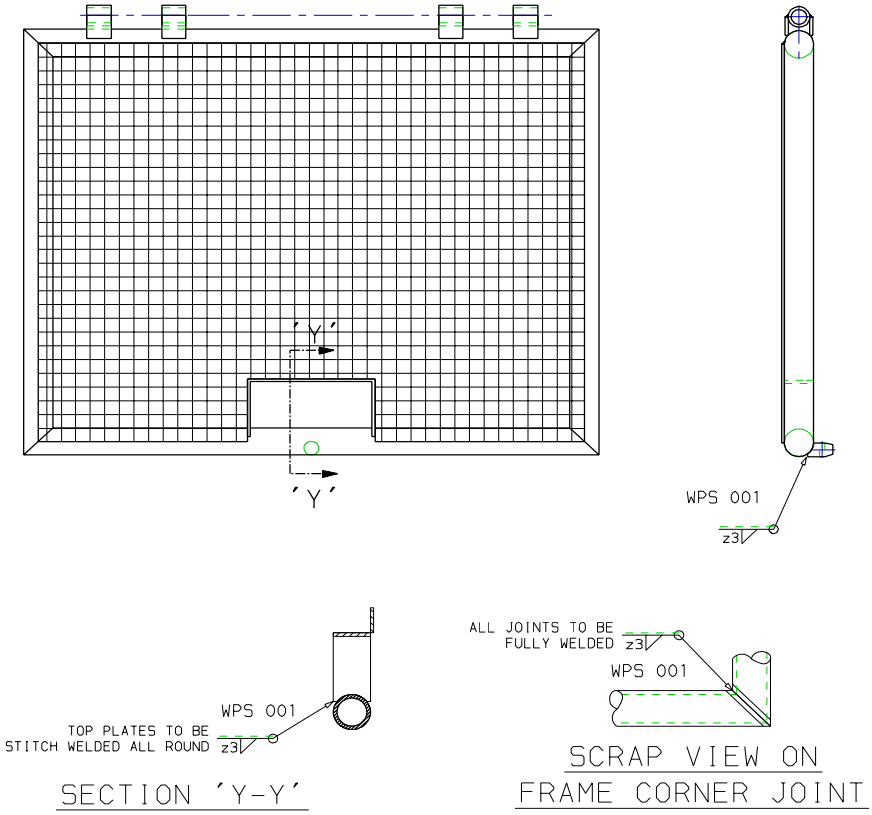
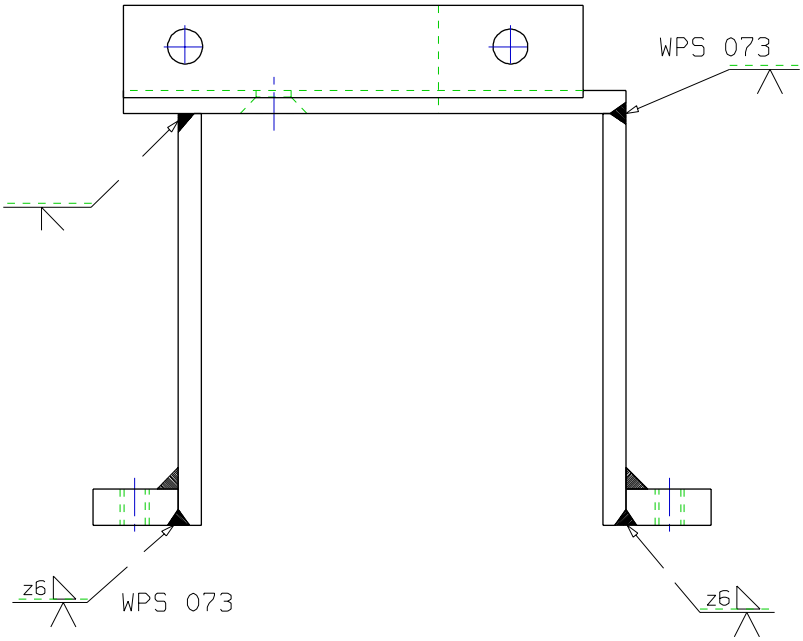


Figure 5.64 G416/4936 ITEM 1



G416/4937 ITEM 1

Figure 5.65 G416/4937 ITEM 1

(USED ON G416/4792 FOR ALL WELDS ON G416/4937 REFER TO TABLE 5-1 WPS 073)

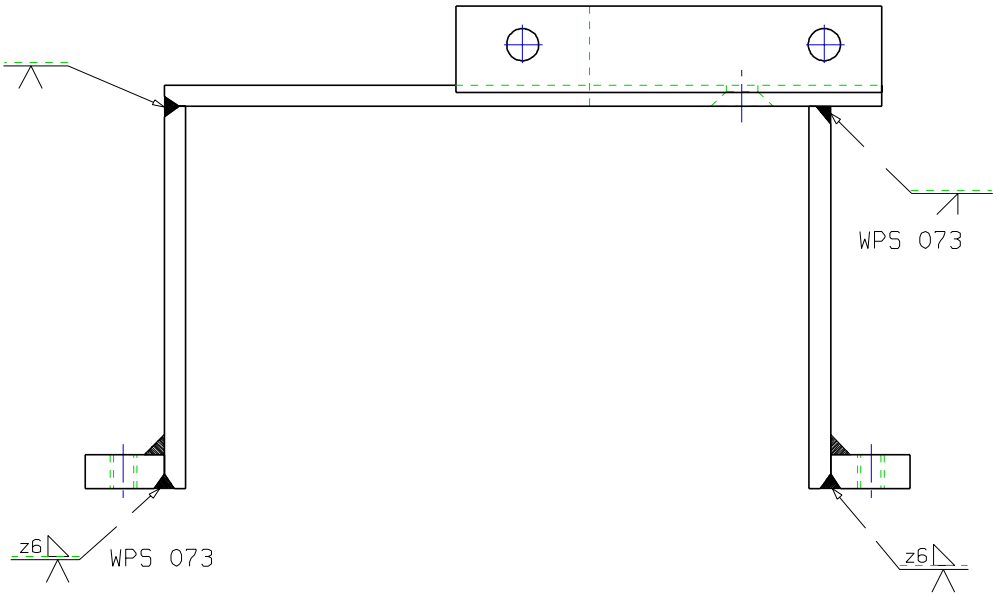


Figure 5.66 G416/4938 ITEM 1

(USED ON G416/4792 FOR ALL WELDS ON G416/4938 REFER TO TABLE 5-1 WPS 073)

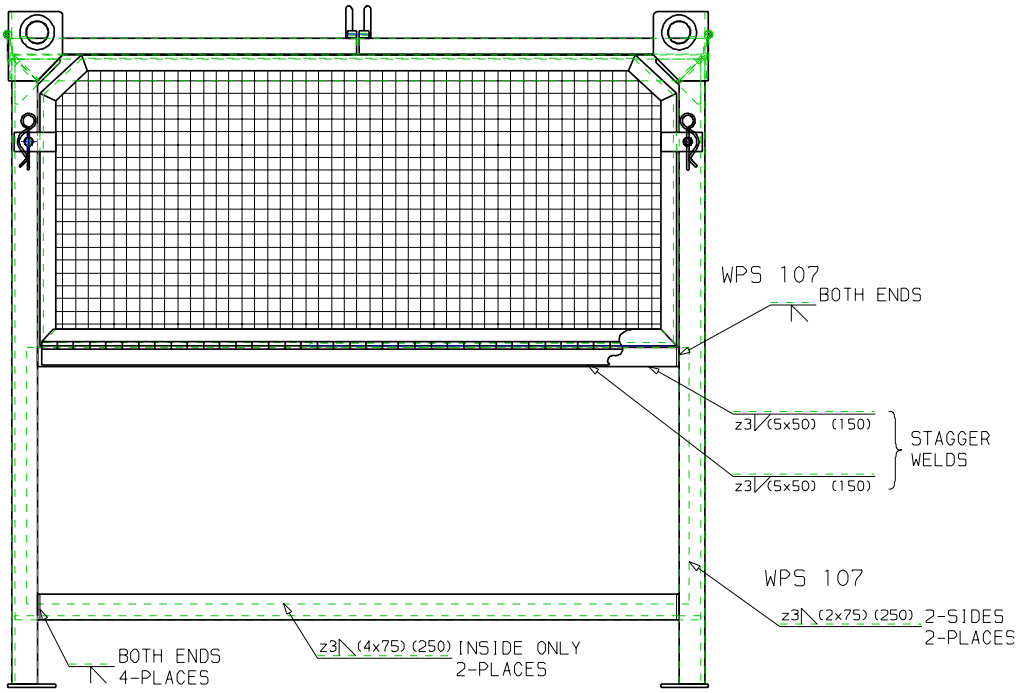


Figure 5.67 G416/4939 ITEM 1

(USED ON G416/4792 FOR ALL WELDS ON G416/49389 REFER TO TABLE 5-1 WPS 107)

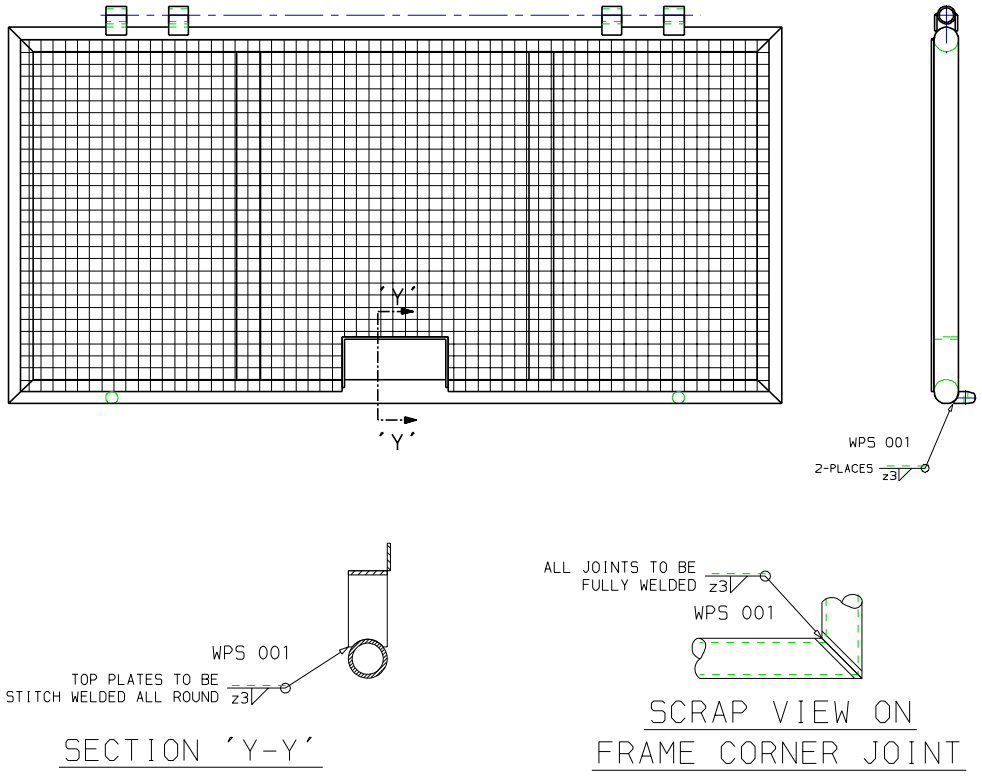


Figure 5.68 G416/4946 ITEM 1

See Manufacturer's Drawing

Figure 5.69 G416/5016

(IF DAMAGED REPAIR USING TABLE 5-1 WPS 001)

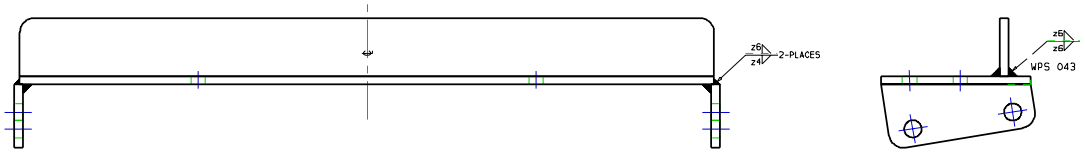


Figure 5.70 G416/5029 ITEM 1

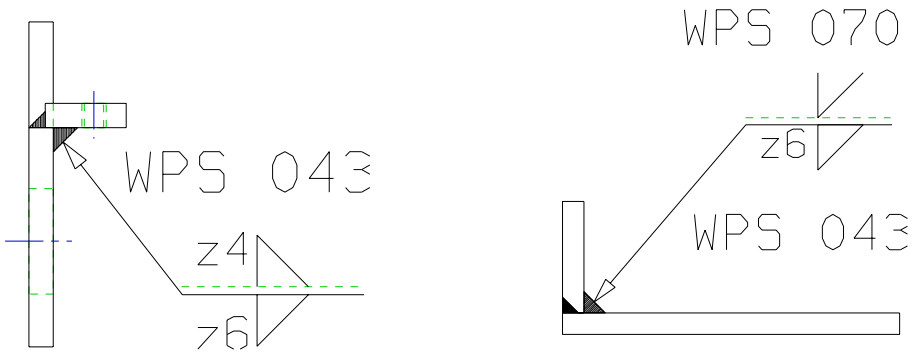


Figure 5.71 G415/5030 ITEM 12 G415/5030 ITEM 15

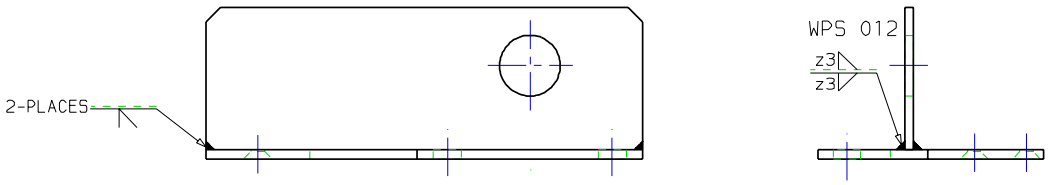


Figure 5.72 G417/5031 ITEM 2

6 WELDING PROCEDURES AND PARAMETERS

WPS No	ISSUE	TYPE OF JOINT	WELDING PROCESS	MATERIAL	THICKNESS RANGE
001	1	Single sided single vee butt and fillet welds	Manual T.I.G.	6082 AND 5083	3 - 6 mm
012	2	Fillet welds	Manual M.I.G.	DGFVE 232B	5 - 7 mm
013	1	Fillet welds	Manual M.I.G.	DGFVE 232B	7 - 20 mm
018	1	Butt welds	Manual M.I.G.	DGFVE 232B	5.5 - 19 mm
020	1	Single bevel butt welds	Manual M.I.G.	DGFVE 232B	3 - 12.5 mm
024	1	Single bevel butt welds - partial penetration	Manual M.I.G.	DGFVE 232B	3 - 24 mm
026	1	Butt welds	Manual M.I.G.	DGFVE 232B	5 - 10 mm
043	1	Fillet welds	Flux cored M.A.G.	BS 7191 1989 355EM	6 - 25 mm
058	1	Butt welds	Flux cored M.I.G.	BS 7191 1989 355EM	6.25 - 25 mm
069	1	Butt welds	Manual M.I.G.	DGFVE 232B	6 - 24 mm
070	1	Single bevel butt welds	Flux cored M.A.G.	BS 7191 1989 355EM	6.25 - 25 mm
073	1	Butt welds	Manual T.I.G.	DGFVE 232B	3 - 6 mm
102	1	Fillet welds	Manual Pulsed M.I.G.	DGFVE 232B	3 - 6 mm
105	1	Butt and fillet welds	Manual T.I.G.	5083	3 - 6 mm
106	1	Butt and fillet welds	Manual T.I.G.	5251 & 5251 to DGFVE 232B	3 - 6 mm
107	1	Butt and fillet welds	Manual M.A.G.	S235 to S275	3 - 8 mm

WELDING TERMINOLOGY

BRITISH	U.S.
M.I.G. (METAL INERT GAS) USING ARGON ON ALUMINUM	G.M.A.W. (GAS METAL ARC WELDING)
M.A.G. (METAL ACTIVE GAS) USING ARGON/CO2 ON STEEL	G.M.A.W. (GAS METAL ARC WELDING)
T.I.G. (TUNGSTEN INERT GAS)	G.T.A.W. (GAS TUNGSTEN ARC WELDING)

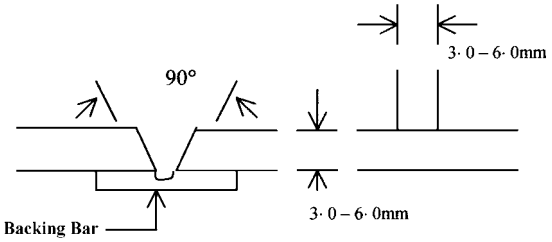
WPS No. 001

WILLIAMS FAIREY ENGINEERING LTD.

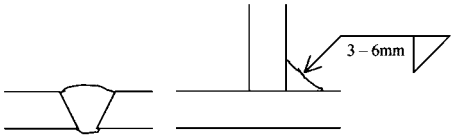
WELDING PROCEDURE SPECIFICATION - WPS NO: 001				APPROVAL REPORT: W.P.A.R. No: 001 K.L. No: 9526
Approved by:	Sheet No: 1	Issue: 1	Date: 01-09-94	

Primary Specifications: BS EN 729	Material Specification: BS 1470 GRADE 6082. (HE30). Aluminium	Material Dimensions. Thickness: 3.0 - 6.0mm Pipe Dia:
Type Of Joint: Single sided single vee butt welds and fillet welds	Welding Process: MANUAL T.I.G.	Welding Position: ALL.

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed with an s/s wire brush before welding

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1. Additional runs	T.I.G. T.I.G.	1.6 - 2.4mm 1.6 - 2.4mm	80 - 220 70 - 220	15 - 22 15 - 22	A/C A/C	N/A N/A	N/A N/A	

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 4043A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 10 - 18 cu/ft/hr Backing:	Tungsten Electrode Type: Zirconiated Size: 2.4mm

Details of Back Cutting / Backing: A copper backing bar to be used on butt welds

Preheat Temperature: Min +5°C	Interpass temperature: 100°C	Transfer Mode: N/A

Other Information: Dress or remove all unsound tack welds

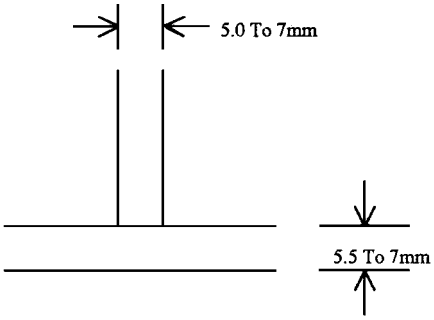
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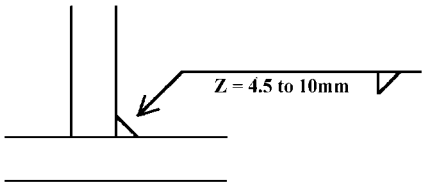
WELDING PROCEDURE SPECIFICATION - WPS NO: 012				APPROVAL REPORT: W.P.A.R. No: 26 K.L. No: 10510
Approved by:	Sheet No: 1	Issue: 2	Date: 20-06-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 5 to 7mm Pipe Dia: All
Type Of Joint: Fillet weld	Welding Process: Manual M.I.G.	Welding Position: PA/PB/PF

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1.	M.I.G.	1.6	230 - 270	22 - 28	DC + VE	7.5 TO 10		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45/55 cu/ft/hr Backing:	Tungsten Electrode Type: N/A Size: mm

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: 50°C	Transfer Mode: Spray

Other Information: Use crater filling settings on PAC 8 as required.
Dress or remove all unsound tack welds.

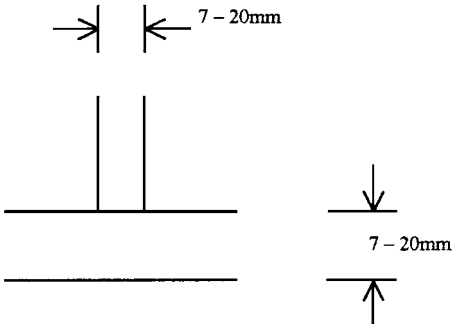
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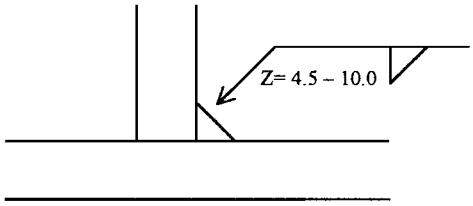
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Approved by:	Sheet No: 1	Issue: 1	Date: 23-06-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 7 to 20mm Pipe Dia: All
Type Of Joint: Fillet weld	Welding Process: Manual M.I.G.	Welding Position: PA/PB/PF

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1.	M.I.G.	1.6	260 - 310	25 - 28	DC + VE	9.6 TO 11	N/A	

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45 - 55 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: 50°C	Transfer Mode: Spray

Other Information: Use crater filling settings on PAC 8 as required.
Dress or remove all unsound tack welds before welding.

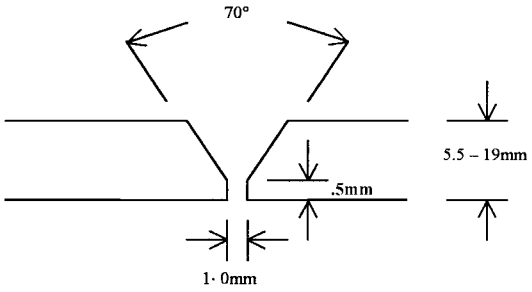
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WILLIAMS FAIREY ENGINEERING LTD.

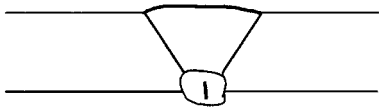
WELDING PROCEDURE SPECIFICATION - WPS NO: 018				APPROVAL REPORT: W.P.A.R. No: 03 K.L. No: 9702
Approved by:	Sheet No: 1	Issue: 1	Date: 26-06-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 5.5 to 19mm Pipe Dia: N/A
Type Of Joint: Butt weld	Welding Process: Manual M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	M.I.G.	1.6mm	250 - 280	23 - 26	DC + VE	7.5 - 9.0		
Additional runs	M.I.G.	1.6mm	230 - 260	23.5 - 25	DC + VE	7.0 - 8.4		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45 - 55 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm

Details of Back Cutting / Backing: Removable backing bar to be used, or a jig with a backing bar built in

Preheat Temperature: Min +5°C	Interpass temperature: Max 50°C	Transfer Mode: Spray

Other Information: Use run on run off plates where possible or use crater filling settings on PAC 8.
Dress or remove all unsound tack welds.

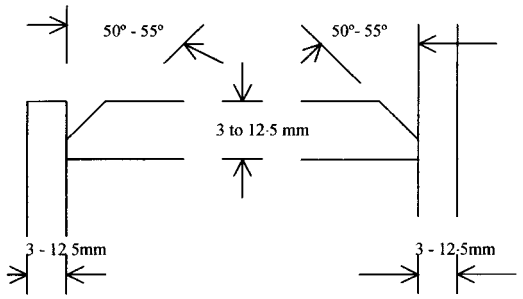
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WILLIAMS FAIREY ENGINEERING LTD.

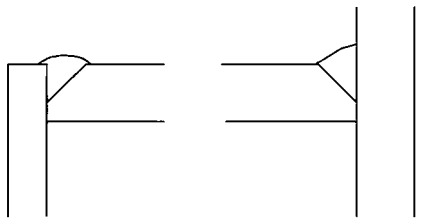
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Approved by:	Sheet No: 1	Issue: 1	Date: 26-06-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 3.0 to 12.5mm Pipe Dia: N/A
Type Of Joint: Single bevel butt weld	Welding Process: Manual M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	M.I.G.	1.6mm	220 - 280	22.5 - 27	DC + VE	7.5 - 9.0		
Additional runs	M.I.G.	1.6mm	260 - 280	23 - 27	DC + VE	7.5 - 9.5		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45 - 55 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 50°C	Transfer Mode: Spray

Other Information: Use run on run off plates and crater filling settings on PAC 8 as required. Dress or remove all unsound tack welds.

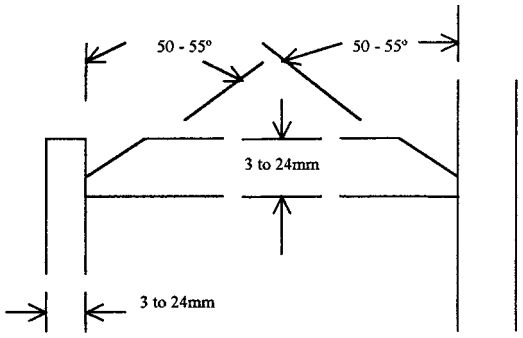
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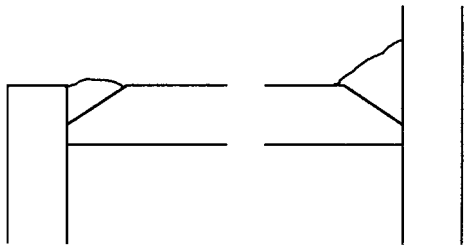
WELDING PROCEDURE SPECIFICATION - WPS NO: 024				APPROVAL REPORT: W.P.A.R. No: 18 K.L. No: 10280
Approved by:	Sheet No: 1	Issue: 1	Date: 20-08-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 3 to 24mm Pipe Dia: N/A
Type Of Joint: Single bevel butt weld. Partial penetration	Welding Process: Manual M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	M.I.G.	1.6mm	260 - 300	23 - 28	DC + VE	7.5 - 9.2		
Additional runs	M.I.G.	1.6mm	260 - 320	23 - 28.5	DC + VE	8.0 - 11.5		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45 - 55 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 50°C	Transfer Mode: Spray

Other Information: Use run on run off plates and crater filling settings on PAC 8 as required. Dress or remove all unsound tack welds.

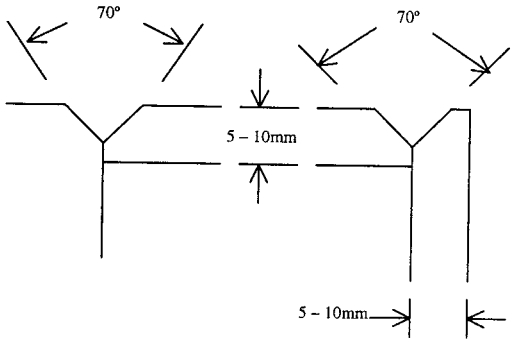
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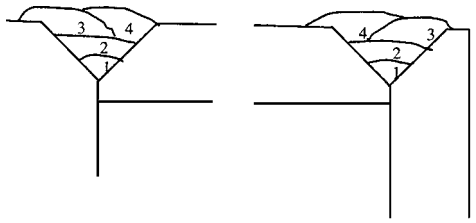
WELDING PROCEDURE SPECIFICATION - WPS NO: 026				APPROVAL REPORT: W.P.A.R. No: 23 K.L. No: 10451
Approved by:	Sheet No: 1	Issue: 1	Date: 23-09-97	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 5 to 10mm Pipe Dia: N/A
Type Of Joint: Butt weld	Welding Process: Manual M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	M.I.G.	1.6mm	230 - 260	26.5 - 32	DC + VE	7.5 - 10		
2 - 4	M.I.G.	1.6mm	240 - 280	32 - 35	DC + VE	8.0 - 11.5		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Helishield 2 Backing: N/A	Gas flow Shielding: 65 - 75 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 50°C	Transfer Mode: Spray

Other Information: Use crater filling settings on PAC 8 as required.
Use run on run off plates as required
Dress or remove all unsound tack welds.

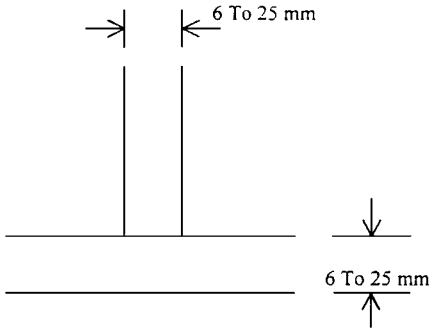
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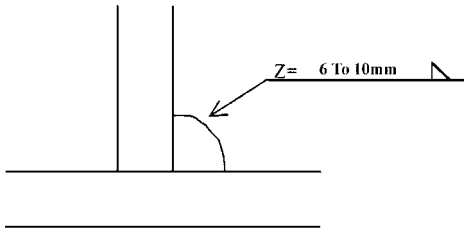
WELDING PROCEDURE SPECIFICATION - WPS NO: 043				APPROVAL REPORT: W.P.A.R. No: 54 K.L. No: 10820
Approved by:	Sheet No: 1	Issue: 1	Date: 16-03-98	

Primary Specifications: BS EN 729	Material Specification: BS 7191 1989 355EM	Material Dimensions. Thickness: 6 to 25mm Pipe Dia: ALL
Type Of Joint: Fillet weld	Welding Process: Flux cored M.A.G.	Welding Position: PA/PB

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Machining/Grinding. Remove paint and scale

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1 - 3	Flux cored M.A.G.	1.2mm	250 - 300	28 - 33	DC + VE	9.5 - 11.5		

Filler Metal Classification & Trade Name: AWS. A5. 29. 80. E80T5 - G OERLIKON FLUXOFILL 40

Gas Type Shielding: Specshield 20% Backing: N/A	Gas flow Shielding: 30 - 40 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 150°C	Transfer Mode: Spray

Other Information: Ensure that the joint is free from surface contamination.
All unsound tack welds to be removed or dressed.
For a combined joint thickness of 36mm to 75mm and plate thickness of 20mm to 75mm a 70°C preheat must be used for tack welding and welding.

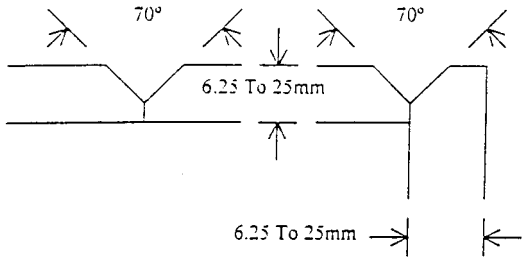
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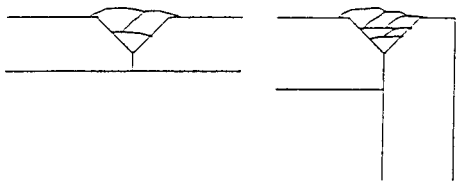
WELDING PROCEDURE SPECIFICATION - WPS NO: 058				APPROVAL REPORT: W.P.A.R. No: 52 K.L. No: 10813
Approved by:	Sheet No: 1	Issue: 1	Date: 02-07-98	

Primary Specifications: BS EN 729	Material Specification: BS EN 101115S 355NL BS 7197 1989 355EM	Material Dimensions. Thickness: 6.25 to 25mm Pipe Dia: ALL
Type Of Joint: Butt weld	Welding Process: Flux cored M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Machining/Grinding

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	Flux cored M.A.G	1.2mm	250 - 300	27 - 32	DC + VE	9.5 - 11.5		
Additional runs	Flux cored M.A.G	1.2mm	250 - 280	27 - 32	DC + VE	9.5 - 11.5		

Filler Metal Classification & Trade Name: AWS. A5. 29. 80. E80T5 - G OERLIKON FLUXOFILL 40

Gas Type Shielding: Specshield 20% Backing: N/A	Gas flow Shielding: 30 - 40 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 150°C	Transfer Mode: Spray

Other Information: Ensure that the joint is free from surface contamination.
All unsound tack welds to be removed or dressed.
For a combined joint thickness of 36mm to 75mm and plate thickness of 20mm to 75mm a 70°C preheat must be used for tack welding and welding.
For plate and combined joint thickness over 75mm a 100°C preheat is to be used for tack welding and welding.

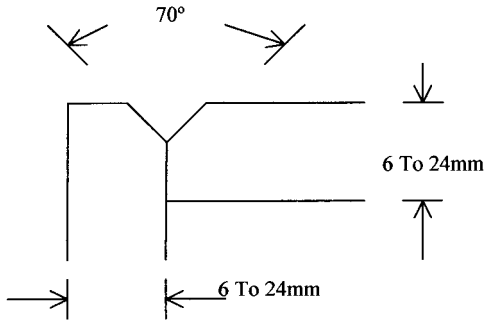
WPS No. 0069

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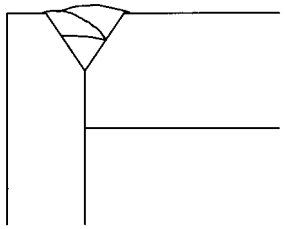
WELDING PROCEDURE SPECIFICATION - WPS NO: 069				APPROVAL REPORT: W.P.A.R. No: 18 K.L. No: 10280
Approved by:	Sheet No: 1	Issue: 1	Date: 09-09-98	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 6 to 24mm Pipe Dia: N/A
Type Of Joint: Butt weld	Welding Process: Manual M.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Machining/Grinding. Degrease and wire brush before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1 Additional runs	M.I.G M.I.G	1.6mm 1.6mm	240 - 300 240 - 280	22.5 - 28 22.5 - 28	DC + VE DC + VE	7.2 - 9.7 7.5 - 9.7		

Filler Metal Classification & Trade Name: BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 45 - 55 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 50°C	Transfer Mode: Spray

Other Information:
Use run on run off plates as required.
Crater filling settings on PAC8 to be used when required.
Dress or remove all unsound tack welds.

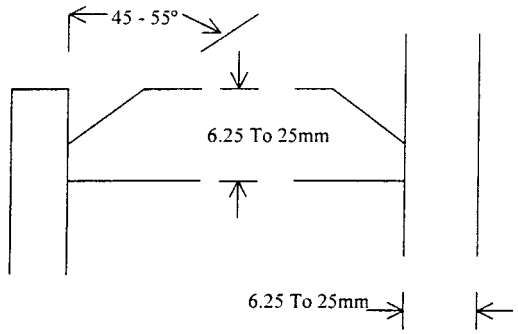
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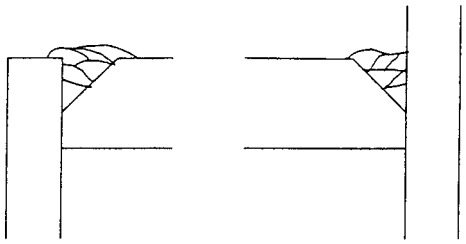
WELDING PROCEDURE SPECIFICATION - WPS NO: 070				APPROVAL REPORT: W.P.A.R. No: 52 K.L. No: 10813
Approved by:	Sheet No: 1	Issue: 1	Date: 16-09-98	

Primary Specifications: BS EN 729	Material Specification: BS EN 10115S 355NL BS 7191 1989 355EM	Material Dimensions. Thickness: 6.25 to 25mm Pipe Dia: N/A
Type Of Joint: Single bevel butt weld	Welding Process: Flux cored M.A.G.	Welding Position: PA/PB

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Machining/Grinding. Remove paint and scale

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	Flux cored M.A.G	1.2mm	270 - 300	27 - 33	DC + VE	9.5 - 12.0		
Additional runs	Flux cored M.A.G	1.2mm	270 - 290	28 - 33	DC + VE	9.5 - 11.5		

Filler Metal Classification & Trade Name: AWA A5. 29. 80. E80T5 - G.
OERLIKON FLUXOFIL 40

Gas Type Shielding: Specshield 20% Backing: N/A	Gas flow Shielding: 30 - 40 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: Max 150°C	Transfer Mode: Spray

Other Information:
Ensure that the joint is free from surface contamination.
All unsound tack welds must be removed or dressed.
For a combined joint thickness of 36mm to 75mm, and plate thickness of 20mm to 75mm a 70°C preheat must be used for tack welding and welding.
For plate and combined joint thickness over 75mm a 100°C preheat is to be used for tack welding and welding

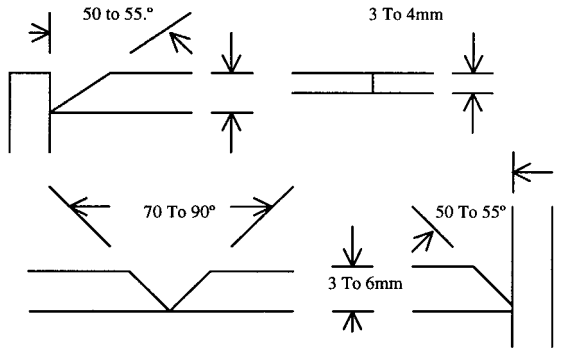
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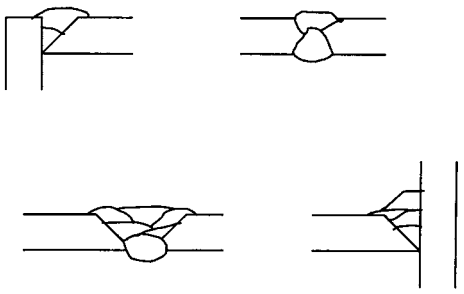
WELDING PROCEDURE SPECIFICATION - WPS NO: 073				APPROVAL REPORT: W.P.A.R. No: 01 K.L. No: 9526
Approved by:	Sheet No: 1	Issue: 1	Date: 06-01-99	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 3 to 6mm Pipe Dia: N/A
Type Of Joint: Butt weld	Welding Process: T.I.G.	Welding Position: PA

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	T.I.G.	2.4mm	110 - 150	14 - 16	A/C	N/A		
Additional runs	T.I.G.	2.4mm	110 - 170	14 - 17	A/C	N/A		

Filler Metal Classification & BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: Argon	Gas flow Shielding: 15 cu/ft/hr Backing: 15 cu/ft/hr	Tungsten Electrode Type: Zirconiated Size: 2.4 to 3.2mm

Details of Back Cutting / Backing: Use argon back purge on full penetration butt welds

Preheat Temperature: Min +5°C	Interpass temperature: Max 150°C	Transfer Mode: N/A

Other Information:

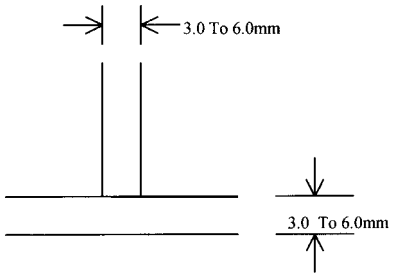
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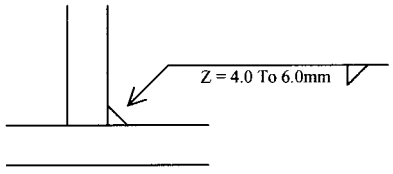
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Approved by:	Sheet No: 1	Issue: 1	Date: 05-08-02	

Primary Specifications: BS EN 729	Material Specification: DGFVE 232B	Material Dimensions. Thickness: 3 to 6mm Pipe Dia: N/A
Type Of Joint: Fillet weld	Welding Process: Manual pulsed M.I.G.	Welding Position: PA/PB

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	Pulsed M.I.G.	1.2mm	150 - 215 100Hz - 110 Hz	22 - 28	DC + VE	9.0 - 12.0		

Filler Metal Classification & BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 35 - 45 cu/ft/hr Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing: N/A

Preheat Temperature: Min +5°C	Interpass temperature: N/A	Transfer Mode: Pulsed/spray

Other Information:
Dress or remove all unsound tack welds

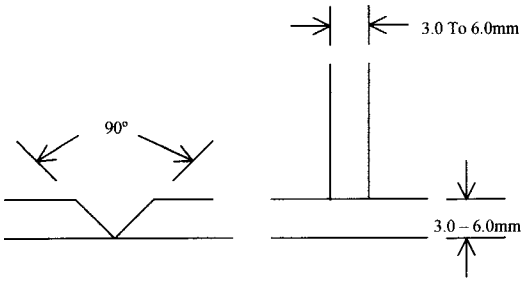
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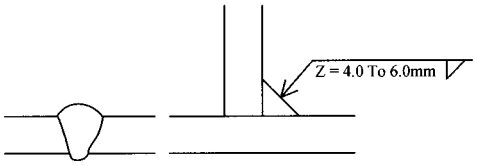
WELDING PROCEDURE SPECIFICATION - WPS NO: 105				APPROVAL REPORT: W.P.A.R. No: 001 K.L. No: 9526
Approved by:	Sheet No: 1	Issue: 1	Date: 06-08-02	

Primary Specifications: BS EN 729	Material Specification: BS 1470 Grade 5083 (N8) Aluminium	Material Dimensions. Thickness: 3 to 6mm Pipe Dia: N/A
Type Of Joint: Butt and fillet weld	Welding Process: Manual T.I.G.	Welding Position: ALL

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	T.I.G.	1.6 - 2.4mm	80 - 220	15 - 22	A/C	N/A	N/A	
Additional runs	T.I.G.	1.6 - 2.4mm	70 - 220	15 - 22	A/C	N/A	N/A	

Filler Metal Classification & BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 10 - 18 cu/ft/hr Backing: N/A	Tungsten Electrode Type: Zirconiated Size: 2.4 - 4mm

Details of Back Cutting / Backing: A copper backing bar to be used on butt welds

Preheat Temperature: Min +5°C	Interpass temperature: 100°c	Transfer Mode: N/A

Other Information:
Dress or remove all unsound tack welds

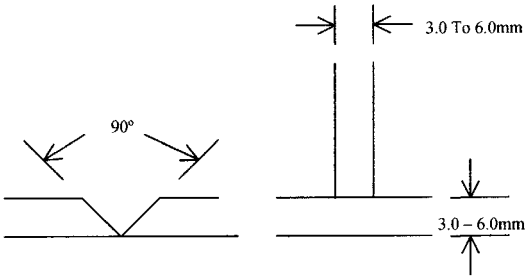
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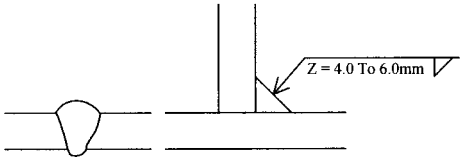
WELDING PROCEDURE SPECIFICATION - WPS NO: 106				APPROVAL REPORT: W.P.A.R. No: 001 K.L. No: 9526
Approved by:	Sheet No: 1	Issue: 1	Date: 08-08-02	

Primary Specifications: BS EN 729	Material Specification: BS 1470 Grade 5251 and 5251 to 232B Aluminium	Material Dimensions. Thickness: 3 to 6mm Pipe Dia: N/A
Type Of Joint: Butt and fillet weld	Welding Process: Manual T.I.G.	Welding Position: ALL

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and wire brushed before assembly

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	T.I.G.	1.6 - 2.4mm	80 - 220	15 - 22	A/C	N/A	N/A	
Additional runs	T.I.G.	1.6 - 2.4mm	70 - 220	15 - 22	A/C	N/A	N/A	

Filler Metal Classification & BS 2901 PT 4 TYPE 5556A

Gas Type Shielding: Argon Backing: N/A	Gas flow Shielding: 10 - 18 cu/ft/hr Backing: N/A	Tungsten Electrode Type: Zirconiated Size: 2.4 - 4mm

Details of Back Cutting / Backing:

Preheat Temperature: Min +5°C	Interpass temperature: 100°c	Transfer Mode: N/A

Other Information:
Dress or remove all unsound tack welds

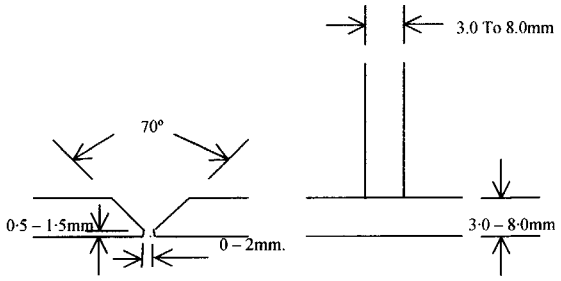
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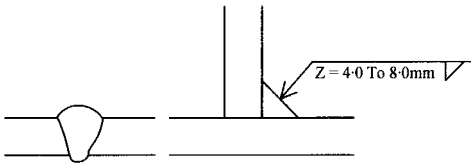
WELDING PROCEDURE SPECIFICATION - WPS NO: 107				APPROVAL REPORT: W.P.A.R. No: 005 K.L. No: 9667
Approved by:	Sheet No: 1	Issue: 1	Date: 08-08-02	

Primary Specifications: BS EN 729	Material Specification: BS EN 10025 Grade S235 to S275	Material Dimensions. Thickness: 3 to 8mm Pipe Dia: N/A
Type Of Joint: Butt and fillet weld	Welding Process: Manual M.A.G.	Welding Position: Butt weld PA. Fillet weld PA/PB

Joint Preparation:



Run Sequence & Weld Dimensions:



Preparation Method: Weld areas to be degreased and scale and paint removed

Welding Details:

Run No.	Process	Size of filler metal	Current A	Voltage	Type of Current	Wire feed Speed M/Min	Travel Speed mm/Min	Heat Input J/mm
1	M.A.G.	1.2mm	120 - 310	17 - 28	DC + VE	3.0 to 8.0	N/A	
Additional runs	M.A.G.	1.2mm	120 - 310	17 - 28	DC + VE	3.0 to 8.0	N/A	

Filler Metal Classification & BS 2901 PT 4 TYPE A18. AWSA5. 18. 93.

Gas Type Shielding: Argon +12% CO_2 Backing: N/A	Gas flow Shielding: 15 - 18 L/MIN Backing: N/A	Tungsten Electrode Type: N/A Size: mm N/A

Details of Back Cutting / Backing:

Preheat Temperature: Min +5°C	Interpass temperature: 200°c	Transfer Mode: Spray

Other Information:
Dress or remove all unsound tack welds

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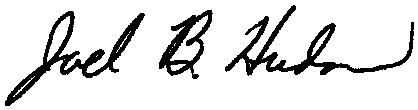
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By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army

0407005

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

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TO: *(Forward to proponent of publication or form) (Include ZIP Code)* AMSTA-LC-CI/TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: *(Activity and location) (Include ZIP Code)* 125th Transportation Company ATTN: Motor SGT (SGT Wilson) Ft. Riley, KA 78665-4000	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9-2320-302-20	28 May 2001	Unit Maintenance Manual for the M915A3 Tractor Truck

ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0035 00-1	Initial Setup				Item number for Oil, Lubricating is not correct.

SAMPLE

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Johnny Wilson, E-5, MOTOR SGT	DSN 867-7967	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is OAASA	Use Part II *(reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE
TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	**FROM:** *(Activity and location) (Include ZIP Code)*	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE

ITEM	PAGE	PARA-GRAPH	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE

PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

USAPA V3.01

THE METRIC SYSTEM AND EQUIVALENTS

Linear Measure

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

Weights

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Pounds
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

Liquid Measure

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

Square Measure

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches
1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet
1 Sq Kilometer = 1,000,000 Sq Meters = 0.0386 Sq Miles

Cubic Measure

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

Temperature

5/9 (°F - 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32 = F°

APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Bar	Pounds per Sq Inch	14.5
Bar	Kilopascals	100
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Pounds per Sq Inch	Bar	0.069
Kilopascals	Bar	0.01
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

PIN: 081355-000