TM 10-3930-675-20-2

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

FOR

ROUGH TERRAIN CONTAINER HANDLER (RTCH): RT 240; 53,000 LB CAPACITY; 4 X 4 (NSN 3930-01-473-3998)



Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 2001

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 1 July 2001

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 47 AND TOTAL NUMBER OF WORK PACKAGES IS 158 CONSISTING OF THE FOLLOWING:

Page/WP No.	*Change No.
VOLUME II	
Cover (Back Blank)	0
A (B Blank)	0
a to h	0
i to viii	0
WP 0048 00 to 0205 00	0
Index-1 thru Index-8	0
Foldouts FO-1 thru FO-19	0

* Zero in this column indicates an original page or work package.

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WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within the technical manual.



BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



EYE PROTECTION - person with goggles shows that the material will injure the eyes.



FIRE - flame shows that a material may ignite and cause burns.



FLYING PARTICLES - arrows bouncing off face with face shield shows that particles flying through the air will harm face.



HEAVY OBJECT - human figure stooping over heavy object shows physical injury potential from improper lifting technique.



HEAVY PARTS - hand with heavy object on top shows that heavy parts can crush and harm.



HEAVY PARTS - heavy object on human figure shows that heavy parts present a danger to life or limb.



HOT AREA - hand over object radiating heat shows that part is hot and can burn.



RADIOACTIVE - identifies a material that emits radioactive energy and can injure human tissue or organs.



VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.



HYDRAULIC FLUID PRESSURE - hydraulic fluid spraying human figure shows that fluid escaping under great pressure can cause injury or death.

FOR INFORMATION ON FIRST AID, REFER TO FM 21-11.



WARNING

CARBON MONOXIDE (EXHAUST GASES) CAN KILL!

- Carbon monoxide is a colorless, odorless, deadly poison which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death can result from severe exposure.
- Carbon monoxide occurs in exhaust fumes of internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure safety of personnel when engine of RTCH is operated.

1. DO NOT operate RTCH engine in enclosed areas.
2. DO NOT idle RTCH engine without adequate ventilation.
3. DO NOT drive RTCH with inspection plates or cover plates removed.
4. BE ALERT for exhaust poisoning symptoms. They are:
   - Headache
   - Dizziness
   - Sleepiness
   - Loss of muscular control
5. If you see another person with exhaust poisoning symptoms:
   - Remove person from area.
   - Expose to fresh air.
   - Keep person warm.
   - Do not permit physical exercise.
   - Administer cardiopulmonary resuscitation (CPR), if necessary.
   - Notify a medic.
6. BE AWARE. The field protective mask for nuclear-biological-chemical (NBC) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation!




WARNING

BATTERIES



- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or serious injury to personnel.

a. **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.

b. **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.

c. **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.

d. **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

WARNING

CLEANING AGENTS

Improper cleaning methods and use of unauthorized cleaning agents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.



WARNING

COMPRESSED AIR

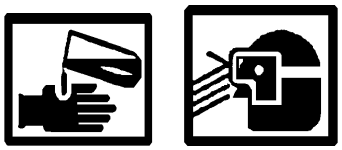
Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.



WARNING

DIESEL FUEL HANDLING

- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel.
- Wear fuel-resistant gloves when handling fuels and promptly wash exposed skin and change fuel-soaked clothing.



WARNING

DRY CLEANING SOLVENT



Dry cleaning solvent P-D-680 type III is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flames or excessive heat. The solvent's flash point is 200°F (94°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If solvent contacts eyes, wash your eyes and get medical aid immediately.



WARNING

ELECTRICAL SYSTEM MAINTENANCE

Remove all jewelry, watches, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may result in personnel injury or death.



WARNING

ETHER COLD START SYSTEM

- Ether is extremely flammable and explosive. DO NOT perform ether cold start system checks, inspections or maintenance while smoking or near fire, flames or sparks. Failure to follow this warning may cause a fire and explosion, causing serious injury or death to personnel.
- Avoid breathing cold start system fluid vapors. Wear goggles and fuel-resistant gloves when handling fluid. Failure to follow this warning may cause serious injury or death to personnel.



WARNING

FIRE EXTINGUISHER

Discharging large quantities of dry chemical fire extinguisher in cab may result in temporary breathing difficulty during and immediately after the discharge event. If at all possible, discharge fire extinguisher from outside the cab. Ventilate cab thoroughly prior to reentry.



WARNING

HAZARDOUS WASTE DISPOSAL

When servicing this vehicle, performing maintenance, or disposing of materials such as engine coolant, hydraulic fluid, lubricants, battery acids or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845.



WARNING

HYDRAULIC SYSTEM

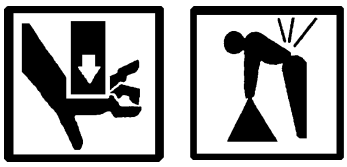


- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

WARNING

IR LIGHTS

DO NOT look directly at IR source without eye protection and maintain a minimum of 12 inches from energized IR lights to prevent possible eye discomfort or damage.



WARNING

LIFTING HEAVY COMPONENTS



- Hydraulic jacks are intended only for lifting RTCH, not for supporting vehicle to perform maintenance. DO NOT get under vehicle after it is raised unless it is properly supported with blocks or other suitable cribbing. Failure to observe this warning may result in death or injury to personnel.
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Improper use of lifting equipment and improper attachment of cables to vehicle can result in serious personnel injury and equipment damage. Observe all standard rules of safety.



WARNING

NBC EXPOSURE



If NBC exposure is suspected, all air cleaner media should be handled by personnel wearing protective equipment. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.



To order this NBC decal use:

National Stock Number (NSN) - 7690-01-114-3702
Part Number (PN) - 12296626
Commercial and Government Entity Code (CAGEC) - 19207



WARNING

PRESSURIZED COOLING SYSTEM



- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury.



WARNING

R-134A REFRIGERANT



- Liquid refrigerant, when exposed to air, quickly evaporates and will freeze skin or eye tissue. Use care to prevent refrigerant from touching your skin or eyes. Serious injury or blindness may result if you come in contact with refrigerant.
- Refrigerant R-134a air conditioning systems should not be pressure tested or leak tested with compressed air. Combustible mixtures of air and R-134a may form, resulting in a fire or explosion, which could cause personnel injury.



WARNING

SLAVE STARTING

- When slave starting RTCH, use NATO slave cable that DOES NOT have loose or missing insulation.
- DO NOT proceed if suitable cable is not available.
- DO NOT use civilian-type jumper cables.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 1 July 2001

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FOR

ROUGH TERRAIN CONTAINER HANDLER (RTCH)
RT 240; 53,000 LB CAPACITY; 4 X 4
(NSN 3930-01-473-3998)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (*Recommended Changes to Equipment Technical Publications*), 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.

Table of Contents

Page Number

VOLUME 2

Warning Summary . . . . . a
How To Use This Manual vii

CHAPTER 3 ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

WP 0048 00 Service Upon Receipt 0048 00-1
WP 0049 00 Preventive Maintenance Checks and Services (PMCS) Introduction 0049 00-1
WP 0050 00 Preventive Maintenance Checks and Services (PMCS) 0050 00-1
WP 0051 00 Rocker Arm Cover and Gasket Replacement 0051 00-1
WP 0052 00 Engine Oil and Oil Filter Replacement 0052 00-1
WP 0053 00 Engine Oil Dipstick Hose and Oil Fill Hose Replacement 0053 00-1
WP 0054 00 Oil Sampling Valves and Hoses Replacement 0054 00-1
WP 0055 00 Fuel Solenoid Shutoff Valve Replacement 0055 00-1
WP 0056 00 Engine Air Cleaner Maintenance 0056 00-1
WP 0057 00 Engine Air Intake Hoses and Tubes Replacement 0057 00-1
WP 0058 00 Fuel Filter/Water Separator Replacement 0058 00-1
WP 0059 00 Fuel Hoses, Lines, and Fittings Replacement 0059 00-1
WP 0060 00 Ether Cold Start System Maintenance 0060 00-1

Table of Contents - Continued

		Page Number
WP 0061 00	Throttle Position Sensor (Accelerator Pedal) Replacement	0061 00-1
WP 0062 00	Muffler and Exhaust Pipe Replacement	0062 00-1
WP 0063 00	Draining and Filling Radiator Assembly	0063 00-1
WP 0064 00	Cooling System Hoses Replacement	0064 00-1
WP 0065 00	Cooling System Expansion Tank Maintenance	0065 00-1
WP 0066 00	Thermostat Replacement	0066 00-1
WP 0067 00	Water Pump Replacement	0067 00-1
WP 0068 00	Coolant Filter Replacement	0068 00-1
WP 0069 00	Alternator Replacement	0069 00-1
WP 0070 00	Alternator Drive Belt Maintenance	0070 00-1
WP 0071 00	Starter Replacement	0071 00-1
WP 0072 00	Instrument Panel Switches, Gages, and Panel Lamps Replacement	0072 00-1
WP 0073 00	Circuit Breakers and Relays Replacement	0073 00-1
WP 0074 00	Tophandler Proximity Switches Replacement	0074 00-1
WP 0075 00	Cab Position Proximity Switches Replacement	0075 00-1
WP 0076 00	Tophandler Junction Box Maintenance	0076 00-1
WP 0077 00	Tophandler Proximity Switch Junction Boxes Replacement	0077 00-1
WP 0078 00	Engine Electronic Control Module (ECM) Replacement	0078 00-1
WP 0079 00	Electronic Control Units (ECU) Replacement	0079 00-1
WP 0080 00	ECS Display Screen Replacement	0080 00-1
WP 0081 00	Electronic Joystick Assembly Replacement	0081 00-1
WP 0082 00	Electronic Joystick Assembly Wiring Harness Replacement	0082 00-1
WP 0083 00	Headlight Maintenance	0083 00-1
WP 0084 00	Backup Light and Work Light Maintenance	0084 00-1
WP 0085 00	Directional and Side Marker Light Maintenance	0085 00-1
WP 0086 00	Blackout Light Maintenance	0086 00-1
WP 0087 00	Twistlock Indicator Lights Maintenance	0087 00-1
WP 0088 00	Cab Interior Light Maintenance	0088 00-1
WP 0089 00	Infrared Lights Replacement	0089 00-1
WP 0090 00	Fording Water Level Sensor Replacement	0090 00-1
WP 0091 00	Ambient Temperature Sensor Replacement	0091 00-1
WP 0092 00	Wheel Temperature Sensor Replacement	0092 00-1
WP 0093 00	Engine Sensors Replacement	0093 00-1
WP 0094 00	Fuel Level Sending Unit Replacement	0094 00-1
WP 0095 00	Transmission Sensors Replacement	0095 00-1
WP 0096 00	Brake Inching Switch Replacement	0096 00-1
WP 0097 00	Brake Light and Pressure Switches Replacement	0097 00-1
WP 0098 00	Boom Angle Sensor Replacement	0098 00-1
WP 0099 00	Boom Extension Sensor Replacement	0099 00-1
WP 0100 00	Tophandler Angle Sensor Replacement	0100 00-1
WP 0101 00	Hydraulic Reservoir and Lift Cylinder Sensors Replacement	0101 00-1
WP 0102 00	Hydraulic Filter Indicator Sensors Replacement	0102 00-1
WP 0103 00	Steering System Wheel Sensor Replacement	0103 00-1
WP 0104 00	Electric Horn Replacement	0104 00-1
WP 0105 00	Backup Alarm Replacement	0105 00-1
WP 0106 00	Seat Warning Buzzer Replacement	0106 00-1
WP 0107 00	Battery Maintenance	0107 00-1
WP 0108 00	Battery Cables Replacement	0108 00-1

Table of Contents - Continued

		Page Number
WP 0109 00	Master Battery Switch Replacement	0109 00-1
WP 0110 00	Slave Starting Receptacle Replacement	0110 00-1
WP 0111 00	Electrical General Maintenance Instructions	0111 00-1
WP 0112 00	Transmission and Accessory Control Levers Replacement	0112 00-1
WP 0113 00	Transmission Oil Filter and Oil Cooler Hoses and Fittings Replacement	0113 00-1
WP 0114 00	Transmission Assembly Hydraulic Hoses and Pipes Replacement	0114 00-1
WP 0115 00	Transmission Oil, Oil Filters, and Oil Filter Head Replacement	0115 00-1
WP 0116 00	Transmission Oil Dipstick Hose and Pipe Replacement	0116 00-1
WP 0117 00	Transmission and Front and Rear Axle Vent Hoses Replacement	0117 00-1
WP 0118 00	Front and Rear Propeller Shafts Replacement	0118 00-1
WP 0119 00	Propeller Shaft Universal Joint Replacement	0119 00-1
WP 0120 00	Parking Brake Pads Maintenance	0120 00-1
WP 0121 00	Caging and Uncaging Parking Brake	0121 00-1
WP 0122 00	Parking Brake Control Valve Replacement	0122 00-1
WP 0123 00	Parking Brake System Hydraulic Hoses and Fittings Replacement	0123 00-1
WP 0124 00	Service Brake Control Valve Replacement	0124 00-1
WP 0125 00	Service Brake System Hydraulic Hoses and Fittings Replacement	0125 00-1
WP 0126 00	Brake Cooling Filter and Filter Head Replacement	0126 00-1
WP 0127 00	Brake System Charging Valve Pressure Adjustment	0127 00-1
WP 0128 00	Dolly Wheel Maintenance	0128 00-1
WP 0129 00	Steering Wheel Replacement	0129 00-1
WP 0130 00	Steering Column Base and Brake Pedal Maintenance	0130 00-1
WP 0131 00	Steering Column Replacement	0131 00-1
WP 0132 00	Steering System Hydraulic Hoses and Fittings Replacement	0132 00-1
WP 0133 00	Front and Rear Axle Steering Cylinders Replacement	0133 00-1
WP 0134 00	Steering Column Sensor Replacement	0134 00-1
WP 0135 00	Transmission Skid Plate and Access Covers Replacement	0135 00-1
WP 0136 00	Radiator Splash Shield Replacement	0136 00-1
WP 0137 00	Radiator Top Grating Replacement	0137 00-1
WP 0138 00	Radiator Fill Cover Plate Replacement	0138 00-1
WP 0139 00	Boom Assembly Wear Plates Replacement	0139 00-1
WP 0140 00	Tophandler Wear Plates Replacement	0140 00-1
WP 0141 00	Tow Pintle Replacement	0141 00-1
WP 0142 00	Cab Transport Lift Maintenance	0142 00-1
WP 0143 00	Engine Cover Maintenance	0143 00-1
WP 0144 00	Right-Side Step Assembly Replacement	0144 00-1
WP 0145 00	Left-Side Stair Assembly Maintenance	0145 00-1
WP 0146 00	Fender Assembly Replacement	0146 00-1
WP 0147 00	Mudguard Replacement	0147 00-1
WP 0148 00	Boom-to-Boom Extension Flexible Conveyer Maintenance	0148 00-1
WP 0149 00	Seat Belt Replacement	0149 00-1
WP 0150 00	Seat Assembly Maintenance	0150 00-1
WP 0151 00	Cab Door Weatherseal Replacement	0151 00-1
WP 0152 00	Storage Compartment Doors and Latches Replacement	0152 00-1
WP 0153 00	Battery and Dolly Wheels Storage Compartment Replacement	0153 00-1
WP 0154 00	Remote Hydraulic Control Compartment Replacement	0154 00-1
WP 0155 00	Rearview Mirrors Replacement	0155 00-1
WP 0156 00	Windshield Wiper Maintenance	0156 00-1

Table of Contents - Continued

		Page Number
WP 0157 00	Windshield Washer Reservoir and Pump Replacement	0157 00-1
WP 0158 00	Heater Hoses Replacement	0158 00-1
WP 0159 00	Cab Heater/Air Conditioning Blower Motor and Fan Replacement	0159 00-1
WP 0160 00	Cab Air Filters Replacement	0160 00-1
WP 0161 00	Cab Auxiliary Fan Replacement	0161 00-1
WP 0162 00	Data Plate Replacement	0162 00-1
WP 0163 00	Fire Extinguisher Bracket Replacement	0163 00-1
WP 0164 00	Relieving Hydraulic System Pressure	0164 00-1
WP 0165 00	Auxiliary Pump Replacement	0165 00-1
WP 0166 00	Tophandler Hydraulic Slewing Motors Replacement	0166 00-1
WP 0167 00	Tophandler Hydraulic Spreader Motor Replacement	0167 00-1
WP 0168 00	Cab Transport Control Valve Replacement	0168 00-1
WP 0169 00	Control Valve Solenoids Replacement	0169 00-1
WP 0170 00	Boom Folding Control Valve Replacement	0170 00-1
WP 0171 00	Cab Lifting Cylinder Replacement	0171 00-1
WP 0172 00	Cab Sliding Cylinder Replacement	0172 00-1
WP 0173 00	Tophandler Twistlock Cylinder Replacement	0173 00-1
WP 0174 00	Hydraulic System Cooling Hoses and Fittings Replacement	0174 00-1
WP 0175 00	Cab Parking and Service Brake Hydraulic Hoses and Fittings Replacement	0175 00-1
WP 0176 00	Main Hydraulic System Hoses and Fittings Replacement	0176 00-1
WP 0177 00	Hydraulic Servo System Hoses and Fittings Replacement	0177 00-1
WP 0178 00	Hydraulic System Test Point Hoses and Fittings Replacement	0178 00-1
WP 0179 00	Cab Transport Hydraulic Hoses and Fittings Replacement	0179 00-1
WP 0180 00	Boom Hydraulic System Hoses and Fittings Replacement	0180 00-1
WP 0181 00	Tophandler Hydraulic System Hoses and Fittings Replacement	0181 00-1
WP 0182 00	Forklift Kit Hydraulic Hoses and Fittings Replacement	0182 00-1
WP 0183 00	Hydraulic System Oil Filters Replacement	0183 00-1
WP 0184 00	Draining and Filling Hydraulic Reservoir	0184 00-1
WP 0185 00	Hydraulic Reservoir Sight Gage Replacement	0185 00-1
WP 0186 00	Hydraulic System Test Point Procedures	0186 00-1
WP 0187 00	Rifle Mounting Bracket Replacement	0187 00-1
WP 0188 00	Air Conditioner Leak Test	0188 00-1
WP 0189 00	Air Conditioning Compressor Drive Belts Replacement	0189 00-1
WP 0190 00	Air Conditioner Fans Maintenance	0190 00-1
WP 0191 00	Tophandler Replacement	0191 00-1
WP 0192 00	Preparation for Arctic Operation	0192 00-1
WP 0193 00	Preparation for Storage or Shipment	0193 00-1
WP 0194 00	General Maintenance Instructions	0194 00-1
WP 0195 00	Transmission Calibration	0195 00-1
WP 0196 00	Steering Calibration	0196 00-1
WP 0197 00	Boom and Tophandler Calibration	0197 00-1
WP 0198 00	Torque Limits	0198 00-1
WP 0199 00	Diagrams	0199 00-1

CHAPTER 4 SUPPORTING INFORMATION

WP 0200 00	References	0200 00-1
WP 0201 00	Maintenance Allocation Chart (MAC) Introduction	0201 00-1
WP 0202 00	Maintenance Allocation Chart (MAC)	0202 00-1

Table of Contents - Continued

		Page Number
WP 0203 00	Expendable and Durable Items List	0203 00-1
WP 0204 00	Tool Identification List	0204 00-1
WP 0205 00	Error Codes	0205 00-1
	Index	Index-1
	Foldouts	FO-1

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HOW TO USE THIS MANUAL

INTRODUCTION

1. This manual is designed to help you perform Organizational Maintenance and Troubleshooting on the RT 240 Rough Terrain Container Handler (RTCH).
2. The *Repair Parts and Special Tools List (RPSTL)*, TM 10-3930-675-24P, is to be used in conjunction with this manual, to locate and obtain the repair parts and special tools needed to maintain this equipment.
3. This manual is written in Work Package format:
    a. Chapters divide the manual into major categories of information (e.g., *Introductory Information with Theory of Operation, Troubleshooting Procedures, Organizational Maintenance Instructions,* and *Supporting Information*).
    b. Each Chapter is divided into Work Packages, which are identified by a 6-digit number (e.g. 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The Work Package page number (e.g. 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
    c. If a Change Package is issued to this manual, added Work Packages use the 5^{th} and 6^{th} digits of their number to indicate new material. For instance, Work Packages inserted between WP 0001 00 and WP 0002 00 are numbered WP 0001 01, WP 0001 02, etc.
4. This manual is published in two volumes: Volume I covers Chapters 1 and 2, Work Packages 0001 00 thru WP 0047 00 and includes all troubleshooting. Volume II includes Chapters 3 and 4, WP 0048 00 thru 0205 00.
5. Scan thru this manual to become familiar with its organization and contents before attempting to maintain the equipment.

CONTENTS OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of each volume of the manual. Become familiar with these warnings before operating or performing troubleshooting or maintenance on the vehicle.
2. A *Table of Contents* in Volume I lists the contents of Volumes I and II. The *Table of Contents* in Volume II lists the contents of Volume II only.
    a. The Table of Contents also provides *Reporting Errors and Recommending Improvements* information and DA Form 2028 addresses, for the submittal of corrections to the manual.
    b. If you cannot find what you are looking for in the Table of Contents, refer to the alphabetical *Index* at the back of the manual. The alphabetical Index for each volume lists only those Work Packages found in that volume.
3. Chapter 1, *Introductory Information with Theory of Information*, provides general information on the manual and the equipment.
4. Chapter 2, *Troubleshooting Procedures*, contains all applicable troubleshooting.
    a. Before attempting to perform troubleshooting, carefully read the information in WP 0004 00, *Troubleshooting Introduction*. It explains how to perform both non-error code and error code-driven troubleshooting. Included at the end of this Work Package are locator diagrams of all electrical and hydraulic components that may be hard to locate.
    b. The *Troubleshooting Symptom Index* in WP 0005 00 is divided into three sections. The first is an alphabetical listing, by system, of non error code-driven malfunctions. The second is a “Numerical Error Code Symptom Index”. The third is an “Alphabetical Error Code Symptom Index”.
    c. The corrective action for certain malfunctions is to notify “SRA”. Refer to Table 3 in the MAC (WP 0202 00) for further information about the Specialized Repair Activity for the RTCH.
5. Chapter 3 covers all *Organizational Maintenance Instructions*. Work Packages are organized in the same Functional Group Code (FGC) sequence as the Maintenance Allocation Chart (MAC) found in TM 10-3930-675-20-2.
6. Chapter 4 includes *Supporting Information: References, Expendable and Durable Items List, Tool Identification List* and a complete listing of *Error Codes* resident on the RTCH.
7. Following the alphabetical *Index* are *Foldouts* of the RTCH hydraulic systems.

FEATURES OF THIS MANUAL

1. 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 may 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 make the procedures easier to perform.

2. Statements and words of particular interest may be printed in CAPITAL LETTERS to create emphasis.
3. Within a procedural step, reference may be made to another Work Package in this manual or to another manual. These references indicate where you should look for more complete information.
   a. If you are told: "Replace engine ECU (WP 0078 00)", go to the first page of Work Package 0078 00 in Volume II of this manual for instructions on replacing the engine ECU. Be sure to read the "Initial Setup" on page 1 of the Work Package, to determine contents of Work Package as well as information regarding tools and equipment, spare parts, and personnel required, etc.
   b. If you are told: "Check coolant level (TM 10-3930-675-10)", go to TM 10-3930-675-10 for complete instructions on checking the coolant level. Use the *Table of Contents* or alphabetical *Index* in TM 10-3930-675-10 to find procedure.
4. Illustrations are placed after, and as close to, the procedural steps to which they apply. Callouts placed on the art may be text or numbers, or both; whichever method is easier for the soldier.
5. Numbers located at lower right corner of art (e.g. 350-001; 350-002, etc.) are art control numbers and are used for tracking purposes. Disregard these numbers.
6. Dashed leader lines used in illustrations indicate that called out items are not visible in the view depicted (i.e. they are located within or behind the structure).
7. Technical instructions include metric units as well as standard units. For your reference, a *Metric Conversion Chart* is located on the inside back cover of the manual.

NOTE

If at any time you are unsure how to use this manual or you cannot locate the information you need, notify your supervisor.

CHAPTER 3
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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SERVICE UPON RECEIPT 0048 00

GENERAL

1. When a new, used or reconditioned RT 240 RTCH is first received, determine whether it has been properly prepared for service and is in condition to perform its mission.
2. Follow the inspection and servicing instructions that follow.

INSPECTION INSTRUCTIONS

1. Read and follow all precautions and instructions on DD Form 1397.
2. Remove all packing and shipping material, such as tape, tie downs, protective covers, and shipping seals.
3. Inspect equipment for any damage incurred during shipment. Check if equipment has been modified.
4. Check equipment against packing slip to ensure that shipment is complete. Report any discrepancies on SF Form 364.
5. Remove all Basic Issue Item (BII), Additional Authorization List (AAL), and Components of End Item (COEI) equipment and stow in accordance with TM 10-3930-675-10.

SERVICING INSTRUCTIONS

1. Service the vehicle in accordance with TM 10-3930-675-10 and Organizational PMCS (WP 0050 00). Schedule the next PMCS on DA Form 5986-E.
2. Refer to TM 10-3930-675-10 and perform functional checks of all major vehicle systems.

END OF WORK PACKAGE

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PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION 0049 00

GENERAL

1. To ensure that the RT 240 RTCH is ready for operation at all times, it must be lubricated and inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure or injury to personnel.
2. Refer to LO 10-3930-675-12 for the types, amounts, and temperature ranges of the lubricants required for specified intervals.
3. Table 1 in WP 0050 00 contains systematic instructions on lubrications, inspections, adjustments, and corrections to be performed by Organizational Maintenance to keep the vehicles in good operating condition and ready for their primary mission.
4. Table 2 in WP 0050 00 lists PMCS mandatory replacement parts, by interval.

EXPLANATION OF TABLE ENTRIES

1. **Item Number (Item No.) Column.** Numbers in this column are for reference. When completing DA Form 5988-E (*Equipment Inspection and Maintenance Worksheet*), include the item number for the check/service indicating a fault. Item numbers also appear in the order you must perform checks and services for the interval listed.

NOTE

Lubrication intervals as indicated in LO 10-3930-675-12 take precedence over intervals indicated in this PMCS. For further information and final authority, refer to LO 10-3930-675-12.

2. **Interval Column.** This column tells you when you must perform the procedure in the procedure column. Intervals are based on calender dates and hours (in parenthesis). Hours in interval column are those required by Lubrication Order (LO 10-3930-675-12).
   a. *Quarterly* procedures must be done every three months.
   b. *Semiannual* procedures must be done once every six months.
   c. *Annual* procedures must be done once each year.
3. **Man-Hours Column.** This column identifies man-hour time required to complete all lubrication services.
4. **Item to Check/Service Column.** This column identifies the item to be checked or serviced.

NOTE

The WARNINGs and CAUTIONs appearing in your PMCS table should always be observed. WARNINGs and CAUTIONs appear before applicable procedures. These WARNINGs and CAUTIONs must be observed to prevent serious injury to yourself and others or to prevent your equipment from being damaged.

5. **Procedure Column.** This column gives the procedure you must perform to check or service the item listed in the Item to Check/Service column to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.
6. **Equipment Not Ready/Available If: Column.** Information in this column tells you what fault will keep your equipment from being capable of performing its primary mission. If you perform check and service procedures that show faults listed in this column, the equipment is not mission-capable. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

GENERAL LUBRICATION PROCEDURES

NOTE

Lubrication instructions contained in this PMCS are mandatory. For further information refer to LO 10-3930-675-12.

GENERAL PMCS PROCEDURES

1. Always perform PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry. If any deficiency is discovered, perform the appropriate troubleshooting task in Chapter 2 of this manual. If any component or system is not serviceable, or if the given service does not correct the deficiency, notify your supervisor.
2. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all tools needed to make all checks. Have several clean rags (Item 22, WP 0203 00) handy. Perform ALL inspections at the applicable interval.
   a. **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use detergent (Item 11, WP 0203 00) and water when you clean.
   b. **Rust and Corrosion.** Check metal parts for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of lubricating oil (Item 19, WP 0203 00). Report it to your supervisor.
   c. **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness, missing, bent or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal or rust around bolt heads. If you find one you think is loose, tighten it.
   d. **Welds.** Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
   e. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and ensure that wires are in good condition.
   f. **Hydraulic Hoses and Lines.** Look for wear, damage, and signs of leaks. Ensure that clamps and fittings are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, correct it if authorized by the Maintenance Allocation Chart (WP 0202 00). If not authorized, notify your supervisor.
   g. **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your truck. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your truck. Learn and be familiar with them, and remember - when in doubt, notify your supervisor.

Leakage Definitions For PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from item being checked/inspected.

CAUTION

Operation is allowable with Class I and Class II leakage. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with Class I or Class II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to vehicle and/or components.

PMCS INITIAL SETUP

1. **General.**
   a. This paragraph lists tools, materials, and personnel required for PMCS and lubrication.
   b. Mandatory replacement parts for PMCS and lubrication are listed after PMCS, in Table 2, WP 0050 00.

PMCS INITIAL SETUP - CONTINUED

2. **Tools.**
   a. General mechanic's tool kit
   b. Common no. 1 shop set
3. **Materials.**
   a. Antifreeze
   b. AOAP sampling kit
   c. Detergent
   d. GAA grease
   e. Lubricating oil, OE/HDO 10
   f. Lubricating oil, OE/HDO 40
   g. Lubricating oil, OE/HDO 15/40
   h. Lubricating oil, OEA
   i. Lubricating oil, GO 85/140
   j. Rags
4. **Personnel.**
   a. Driver/Operator
   b. Organizational Maintenance Mechanic

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Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
				WARNING Perform all lubrication and preventive maintenance checks and services with vehicle on level ground, transmission in N (Neutral), parking brake applied, and engine off. Failure to follow this warning may result in personnel injury. **NOTE** • Lubrication intervals as indicated in LO 10-3930-675-12 take precedence over intervals indicated in this PMCS. For further information and final authority, refer to LO 10-3930-675-12. • After initial 100 hours of operation, Organizational Maintenance must perform 100-hour initial break-in services as indicated in LO 10-3930-675-12. Organizational Maintenance shall also cheque torque of wheel nuts [497 lb-ft (650 Nm)] and torque of boom wear plate mounting hardware (WP 0139 00). • Engine oil and transmission oil must be sampled every 50 hours of operation or 90 days, whichever occurs first, as prescribed by DA Pam 738-750. Hydraulic system oil must be sampled annually. Exceptions are noted in LO 10-3930-675-12. • Do NOT sample engine and transmission oil until 50 hours <u>after</u> 100-hour initial break-in services.	
1	**Quarterly (50 Hours or 90 Days)**		**Engine AOAP Oil Sampling Valve**	Open remote hydraulic control compartment and take sample of engine oil: a. Start engine and bring to operating temperature (TM 10-3930-675-10). b. Remove cap from discharge port. Clean sampling valve port with rag. c. Open and close knob of valve sufficiently to allow approximately 2 oz (60 ml) of oil to be collected into suitable container. Discard oil. d. Open and close knob of valve to allow sample to be collected into clean sample bottle to approximately 1/2 in (1.3 cm) below neck of sample bottle. e. Install cap on discharge port and check for leaks.	

Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH - Continued.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
2	Quarterly (50 Hours or 90 Days)		Transmission AOAP Oil Sampling Valve	Access remote hydraulic control compartment and take sample of transmission oil: a. Ensure transmission is at operating temperature. b. Remove cap from discharge port. Clean sampling valve port with rag. c. Open and close knob of valve sufficiently to allow approximately 2 oz (60 ml) of oil to be collected into suitable container. Discard oil. d. Open and close knob of valve to allow sample to be collected into clean sample bottle approximately 1/2 in (1.3 cm) below neck of sample bottle. e. Install cap on discharge port and check for leaks.	
3	Quarterly (300 Hours)		Engine Oil Filter	Access engine compartment and change engine oil filter: a. Start engine and bring to operating temperature (TM 10-3930-675-10). b. Shut down engine (TM 10-3930-675-10). Drain engine oil and replace filter (LO 10-3930-675-12).	
				 **WARNING** DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flame or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel.	
4	Quarterly (300 Hours)		Engine Fuel Filter/Water Separator	a. Replace fuel filter/water separator (WP 0058 00). b. Inspect fuel lines, fuel tank, and fuel system components for leaks and damage. If authorized, replace damaged components.	

Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH - Continued.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
				 **WARNING** • DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns. • DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Failure to follow this warning may cause serious burns.	
5	Quarterly (300 Hours)		Engine Coolant Filter	a. Replace coolant filter (WP 0068 00). b. Inspect cooling system for leaks and damage. If authorized, replace damaged components.	
6	Quarterly (200 Hours)		Front and Rear Propeller Shafts	Lubricate front and rear propeller shafts (LO 10-3930-675-12).	
7	Quarterly (200 Hours)		Tophandler Pinion and Ring Gear	Lubricate pinion and ring gear (LO 10-3930-675-12).	
8	Semi-annual (1000 Hours)		Transmission Oil Filter	Remove and replace transmission oil filters and oil (WP 0115 00 and LO 10-3930-675-12).	
9	Semi-annual		Transmission Vent Hose	Inspect for plugged hose and valve. Clean if necessary.	
10	Semi-annual (1000 Hours)		Hydraulic System Servo Filter	Replace servo filter and top off hydraulic fluid (WP 0183 00 and LO 10-3930-675-12).	
11	Semi-annual (1000 Hours)		Hydraulic System Pressure Filters	Replace pressure filters and top off hydraulic fluid (WP 0183 00 and LO 10-3930-675-12).	

Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH - Continued.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
12	Semi-annual (1000 Hours)		Hydraulic System Breather Filters	Replace breather filters (WP 0183 00 and LO 10-3930-675-12).	
13	Semi-annual (1000 Hours)		Hydraulic Reservoir Return Filters	Replace return filters and top off hydraulic fluid (WP 0183 00).	
14	Semi-annual		Hydraulic System Ball Valves	Open and close to ensure easy operation.	
15	Semi-annual (1000 Hours)		Front Axle Brake Cooling Filters	Replace front axle brake cooling filters (WP 0126 00 and LO 10-3930-675-12).	
16	Semi-annual (1000 Hours)		Front Axle Differential Housing and Hub End	Drain and refill front axle differential housing and hub end (LO 10-3930-675-12).	
17	Semi-annual (1000 Hours)		Rear Axle Brake Cooling Filters	Replace rear axle brake cooling filters (WP 0126 00 and LO 10-3930-675-12).	
18	Semi-annual (1000 Hours)		Rear Axle Differential Housing and Hub End	Drain and refill rear axle differential housing and hub end (LO 10-3930-675-12).	
19	Semi-annual		Front and Rear Axle Vent Hoses	Inspect for plugged hoses and valves. Clean if necessary.	
20	Semi-annual		Brake and Steering Accumulators	Check pre-charging pressure (WP 0186 00).	
21	Semi-annual		Parking Brakes	Perform parking brake checks (WP 0120 00).	
22	Semi-annual (1000 Hours)		Tophandler Gear Motors	Drain and refill oil (LO 10-3930-675-12).	

Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH - Continued.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
23	Semi-annual (1000 Hours)		Engine Bell Housing	Remove drain plug from bell housing and check for signs of oil or water. If water is noted, investigate source and correct. If oil is noted, notify Direct Support Maintenance.	
24	Semi-annual		Bogie Wheel Assembly	Exercise bogie wheel assembly (TM 10-3960-675-10). Inspect and clean as required.	
25	Semi-annual		Cab Tracks and Locking Bars	Place cab and boom in transport mode (TM 10-3930-675-10) and check for free movement of cab rollers in tracks. Clean and inspect for damage. Replace any damaged component (WP 0142 00).	
26	Semi-annual		Cab Drain Valves	Inspect two drain valves under cab. Press valve with two fingers to drain water.	
27	Semi-annual		Front and Rear Propeller Shafts	Inspect mounting studs and locknuts for looseness and damage.	
28	Semi-annual		Cab Air Filters	Service cab air filters (WP 0160 00).	
29	Semi-annual		Cab Air Conditioner	Remove plug from condenser fan box behind cab. With engine and air conditioner running, inspect sight gage on top of receiver-drier for bubbles. If bubbles are present, notify Direct Support Maintenance to charge air conditioning system.	
30	Annual		Hydraulic System AOAP Oil Sampling Valve	a. Ensure hydraulic system is at operating temperature. b. Remove cap from discharge port. Clean sampling valve port with rag. c. Open and close knob of valve sufficiently to allow approximately 2 oz (60 ml) of oil to be collected into suitable container. Discard oil. d. Open and close knob of valve to allow sample to be collected into clean sample bottle approximately 1/2 in (1.3 cm) below neck of sample bottle.	

Table 1. Preventive Maintenance Checks and Services (PMCS) for the RT 240 RTCH - Continued.

Item No.	Interval	Man-Hours	Item To Check/ Service	Procedure	Equipment Not Ready/ Available If:
30 (Con't)	**Annual**		**Hydraulic System AOAP Oil Sampling Valve**	e. Install cap on discharge port and check for leaks.	
31	**Annual**		**Front and Rear Axle Service Brakes**	Notify Direct Support Maintenance to perform service brake pad wear check.	

Table 2. PMCS Mandatory Replacement Parts List.

ITEM NO.	PART NUMBER	NSN	NOMENCLATURE	QTY
	Quarterly			
1	LF9001		Filter, Engine Oil	1
2	3329289		Filter, Fuel	1
3	WF2075		Filter, Engine Coolant	1
	Semiannual			
4	923828.0610		Filter, Transmission Oil	2
5	923899.0289		Filter, Transmission Oil, Internal, Coarse	1
6	923071.0001		Filter, Servo, Hydraulic System	1
7	923071.0002		Filter, Pressure, Hydraulic System	2
8	921689.0009		Filter, Pressure, Hydraulic System	1
9	920130.009		Filter, Hydraulic Reservoir, Breather	2
10	923110.0668		Filter, Hydraulic Reservoir, Return	2
11	923110.0669		Filter, Brake Cooling, Front Axle	1
12	923110.0669		Filter, Brake Cooling, Rear Axle	1
13	923899.0684		Washer, Copper, Hydraulic Motor Drain Plug	2
14	923899.0685		Washer, Copper, Hydraulic Motor Drain Plug	3

ROCKER ARM COVER AND GASKET REPLACEMENT 0051 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 0-200 lb-in capacity (Item 40, WP 0204 00)

Materials/Parts

Gasket (P/N 3883220)

Isolator, noise (P/N 3883223) (16)

Materials/Parts - Continued

Seal, grommet (P/N 3042401)

Equipment Condition

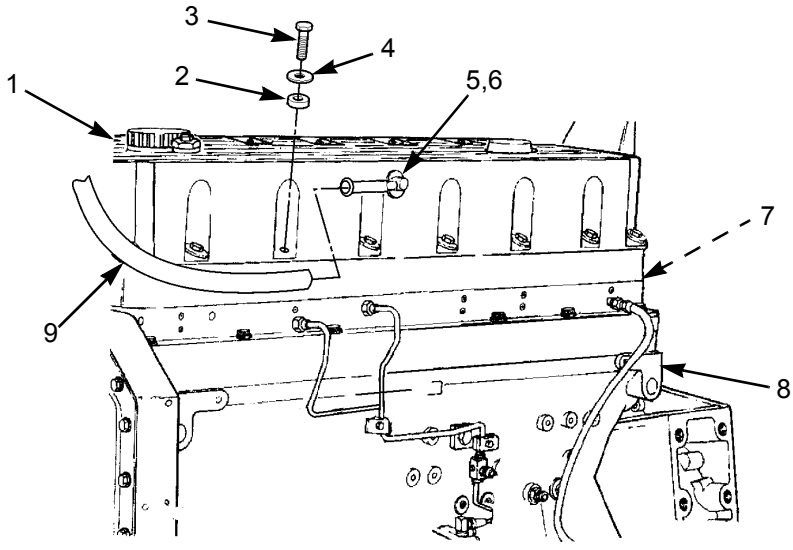
Air intake tubes and hoses removed from intake manifold (WP 0057 00)

REMOVAL

NOTE

For ease in removing rocker arm cover, wiring harness bracket may be removed from left-front of engine and set aside.

1. Disconnect crankcase breather tube (9) from breather tube adapter (5).
2. Remove breather tube adapter (5) and grommet seal (6) from rocker arm cover (1). Discard seal.
3. Remove 16 screws (3), noise isolators (2), and spacers (4) from rocker arm cover (1). Discard noise isolators.
4. Remove rocker arm cover (1) and gasket (7) from engine (8). Discard gasket.



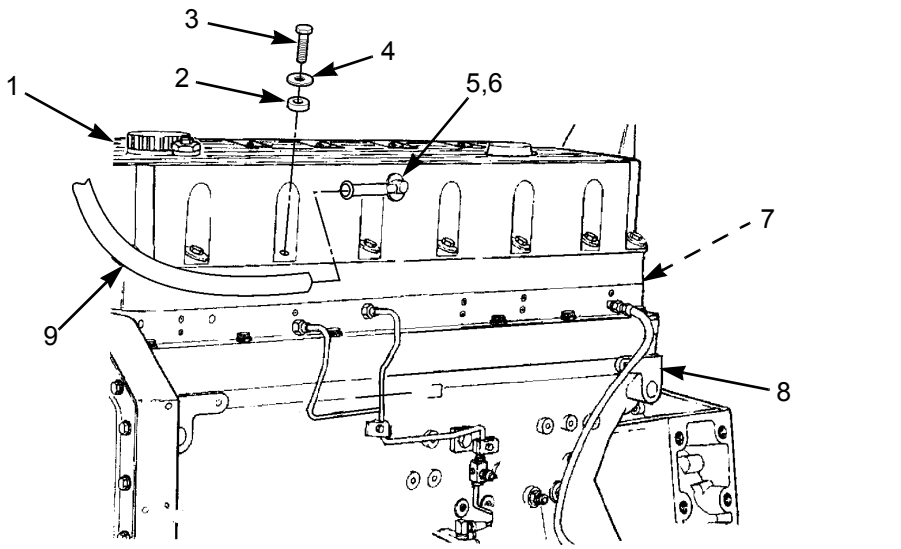
350-115

INSTALLATION

NOTE

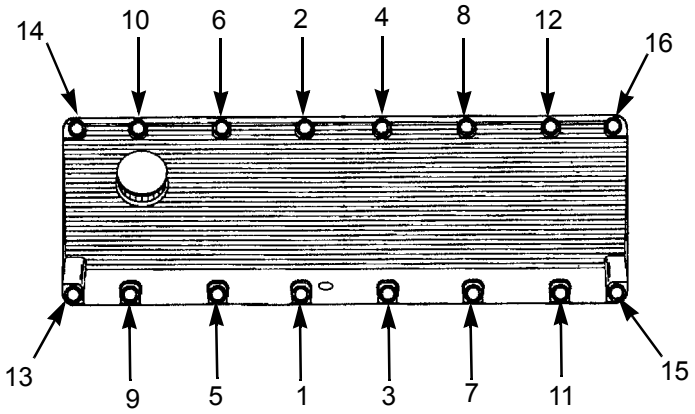
Ensure all gasket material has been removed from rocker arm cover surface and engine block surfaces.

1. Install rocker arm cover (1) and new gasket (7) on engine (8).



350-115

2. Install 16 screws (3), new noise isolators (2), and spacers (4) on rocker arm cover (1). Tighten screws to 130 lb-in (15 Nm) in sequence shown.



350-116

TIGHTENING SEQUENCE

INSTALLATION - CONTINUED

3. Install new grommet seal (6) and breather tube adapter (5) on rocker arm cover (1).
4. Connect crankcase breather hose (9) to breather tube adapter (5).
5. Install air intake tubes and hoses to intake manifold (WP 0057 00).

END OF WORK PACKAGE

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ENGINE OIL AND OIL FILTER REPLACEMENT 0052 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, strap (Item 38, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Filter, lubricating, oil (P/N LF9001)

References

LO 10-3930-675-12

TM 10-3930-675-10

Equipment Condition

Engine cover removed (WP 0143 00)

REMOVAL



WARNING

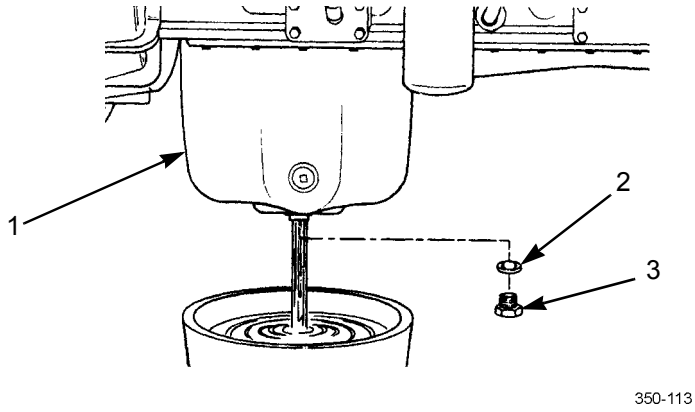
- Hot oil can cause serious burns. Allow engine to cool before draining oil or changing oil filter element.
- Engine oil is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

NOTE

Engine oil change and filter replacement should be performed on a warm engine.

REMOVAL - CONTINUED

1. Place suitable container under engine oil pan (1) to catch draining oil.
2. Remove plug (3) and washer (2) from bottom of engine oil pan (1) and allow oil to drain. Dispose of oil in accordance with standard operating procedures (SOP). Check condition of washer and plug.



350-113

NOTE

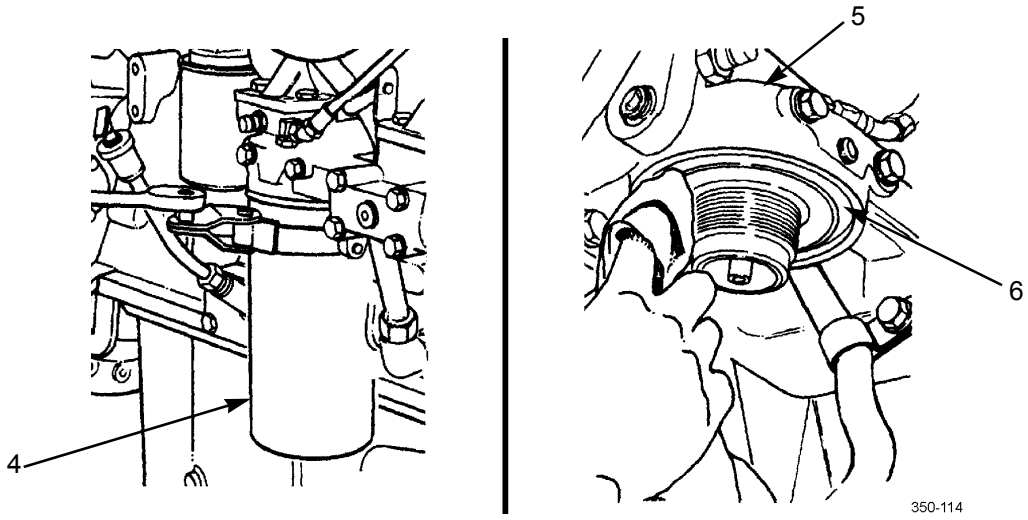
Ensure oil pan plug and oil pan threads are clean and free of deposits.

3. Install washer (2) and plug (3) in oil pan (1). Tighten plug to 65 lb-ft (88 Nm).

NOTE

Position drain pan to catch oil from oil filter head as needed.

4. Remove oil filter (4) and gasket from filter head (5) with strap wrench. Discard filter with gasket.
5. Clean filter head (5) with a rag.



350-114

INSTALLATION

CAUTION

Ensure new oil filter is filled with clean engine oil prior to installation. Lack of lubrication to engine during delay to fill filter when starting engine may cause damage to engine.

1. Apply a light coat of clean engine oil to filter gasket and fill new oil filter (4) with clean engine oil.

NOTE

Ensure old gasket material has been removed from sealing surface on filter head.

2. Install oil filter (4) on filter head (5) and hand tighten until gasket contacts sealing surface (6).

CAUTION

Overtightening of filter can distort threads or damage filter element seal.

3. Tighten oil filter (4) ¼ turn with strap wrench.
4. Add engine oil to required level (LO 10-3930-675-12).
5. Start vehicle (TM 10-3930-675-10) and check for oil leaks.
6. Recheck oil level (LO 10-3930-675-12).
7. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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ENGINE OIL DIPSTICK HOSE AND OIL FILL HOSE REPLACEMENT 0053 00

THIS WORK PACKAGE COVERS

Engine Oil Dipstick Hose: Removal, Installation

Oil Fill Hose: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

Engine cover removed (WP 0143 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Nut, lock (P/N 920076.003)

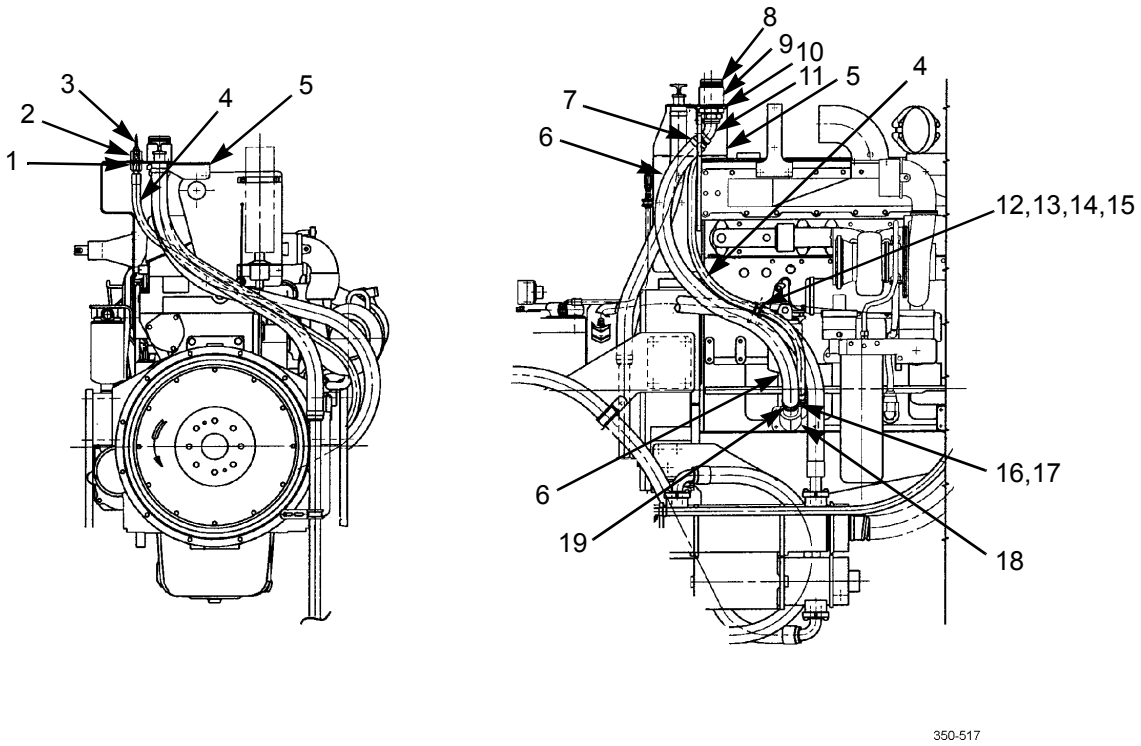
O-ring (P/N 920002.011)

NOTE

Engine oil dipstick hose and transmission oil dipstick hose are at same location. Engine oil dipstick is indicated by a data plate with an engine symbol.

ENGINE OIL DIPSTICK HOSE REMOVAL

1. Remove dipstick (3) from engine oil dipstick hose (4).
2. Remove upper end of dipstick hose (4), nipple (2), and washer (1) from bracket (5).
3. Remove lower end of dipstick hose (4) from adapter (16).
4. Remove locknut (12), screw (13), two washers (14), and release dipstick hose (4) from clamp (15).
5. Remove dipstick hose (4) from vehicle.
6. Remove adapter (16) and o-ring (17) from cover (18). Discard o-ring.



ENGINE OIL DIPSTICK HOSE INSTALLATION

1. Install new o-ring (17) and adapter (16) to cover (18).
2. Position dipstick hose (4) to vehicle.
3. Install lower end of dipstick hose (4) to adapter (16).
4. Install upper end of dipstick hose (4) to bracket (5) with washer (1) and nipple (2).
5. Secure dipstick hose (4) with clamp (15), screw (13), two washers (14), and new locknut (12). Ensure clamp is positioned on hose so that dipstick (3) can be installed into hose.
6. Install dipstick (3) into dipstick hose (4).
7. Install engine cover (WP 0143 00).

OIL FILL HOSE REMOVAL

1. Remove cap (8) from socket (9).
2. Loosen hose clamp (7) and disconnect upper end of oil fill hose (6) from fitting (11).
3. Remove fitting (11), fitting (10), and socket (9) from bracket (5).
4. Loosen hose clamp (19) and disconnect lower end of oil fill hose (6) from cover (18).
5. Remove remaining clamps and remove oil fill hose (6) from vehicle.

OIL FILL HOSE INSTALLATION

1. Position oil fill hose (6) to vehicle.
2. Connect lower end of oil fill hose (6) to cover (18) and tighten hose clamp (19).
3. Install socket (9), fitting (10), and fitting (11) to bracket (5).
4. Connect upper end of oil fill hose (6) to fitting (11) and tighten hose clamp (7).
5. Install cap (8) to socket (9).
6. Install remaining clamps to secure oil fill hose (6).
7. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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OIL SAMPLING VALVES AND HOSES REPLACEMENT 0054 00

THIS WORK PACKAGE COVERS

Oil Sampling Valve: Removal, Installation

Engine Oil Sampling Valve Hose: Removal, Installation

Transmission Oil Sampling Valve Hose: Removal, Installation

Hydraulic System Oil Sampling Valve Hose: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Oil, lubricating (Item 20, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Materials/Parts - Continued

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

WP 0194 00

Equipment Condition

Engine off (TM 10-3930-675-10)

Engine cover removed (WP 0143 00)

NOTE

- Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.
- Ensure controls are in neutral and vehicle engine is off prior to removal of oil sampling valves or hoses.

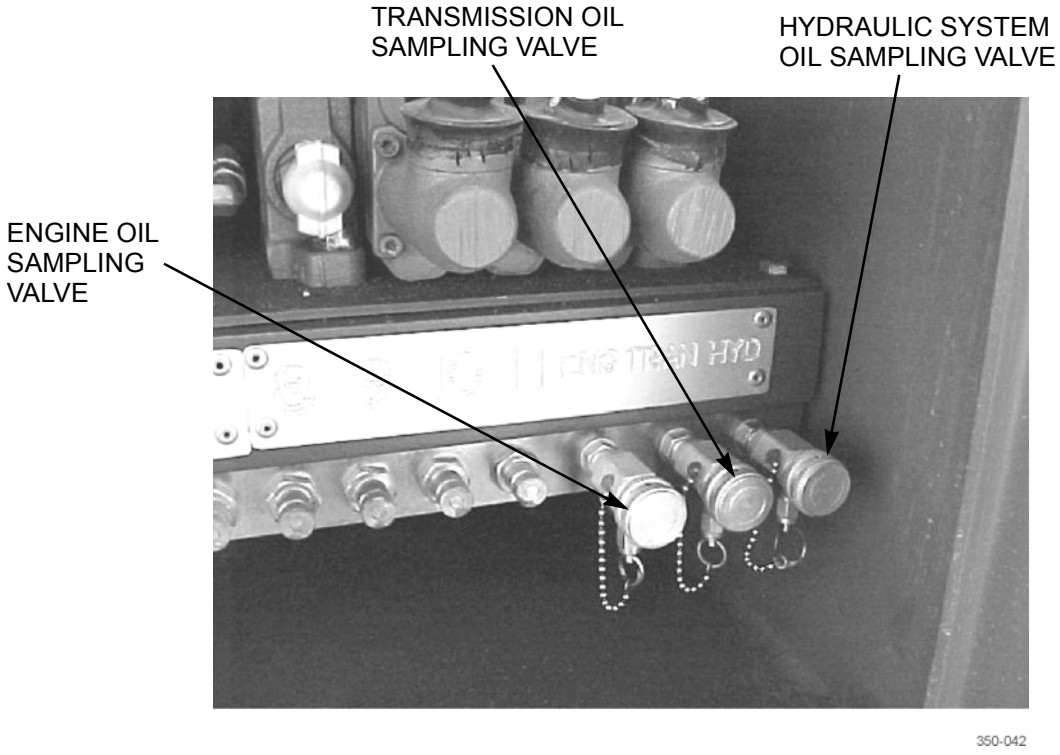
OIL SAMPLING VALVE REMOVAL

NOTE

Oil sampling valves for engine, transmission, and hydraulic system are located in remote hydraulic control compartment. Removal is the same for all three oil sampling valves. Engine oil sampling valve is detailed.

OIL SAMPLING VALVE REMOVAL - CONTINUED

1. Hold fitting jam nut in place and disconnect engine oil sampling valve from fitting.
2. Cap fitting with protective cap.



OIL SAMPLING VALVE INSTALLATION

1. Remove protective cap and install oil sampling valve.
2. Start engine (TM 10-3930-675-10) and check for oil leaks.

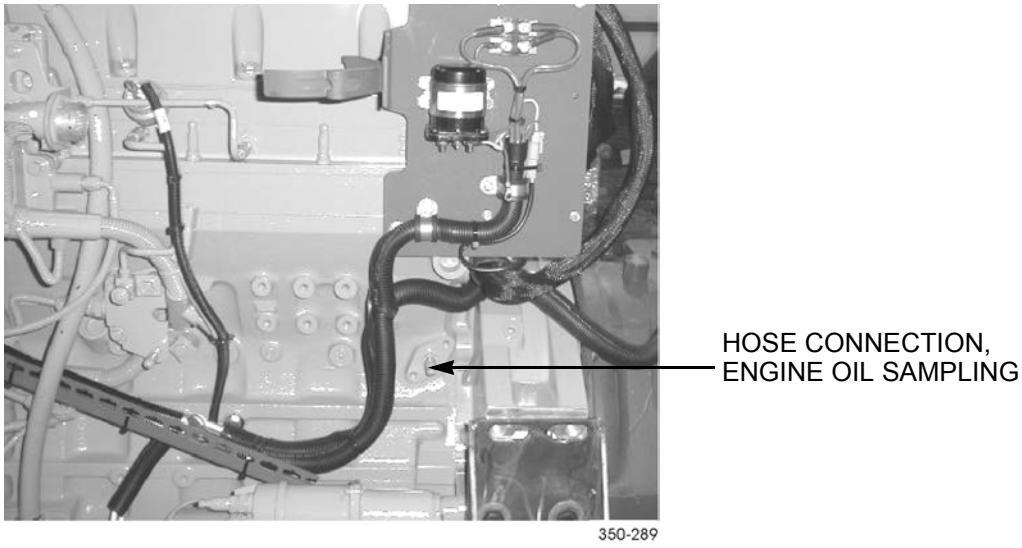
ENGINE OIL SAMPLING VALVE HOSE REMOVAL

NOTE

Tag and trace routing of oil sampling valve hose prior to disconnecting.

1. Remove tiedown straps and clamps as necessary. Discard tiedown straps.
2. Disconnect hose from oil sampling valve fitting and engine fitting. Remove hose.
3. Remove engine fitting.

ENGINE OIL SAMPLING VALVE HOSE REMOVAL - CONTINUED



ENGINE OIL SAMPLING VALVE HOSE INSTALLATION

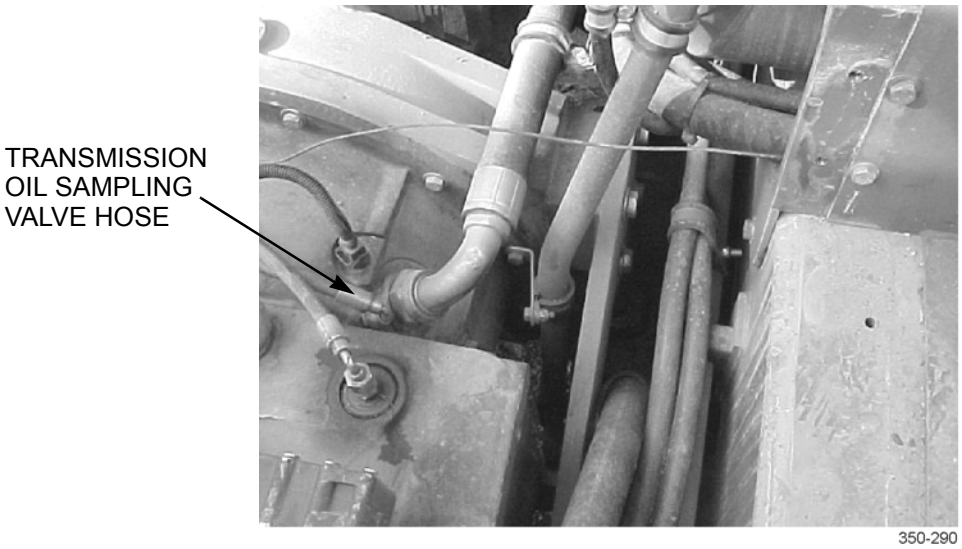
1. Install engine fitting.
2. Connect hose to engine fitting and route to oil sampling valve.
3. Connect hose to oil sampling valve fitting and secure hose with new tiedown straps and clamps as necessary.
4. Start engine (TM 10-3930-675-10) and check hose for oil leaks.
5. Install engine cover (WP 0143 00).

TRANSMISSION OIL SAMPLING VALVE HOSE REMOVAL

NOTE

Tag and trace routing of oil sampling valve hose prior to disconnecting.

1. Move cab to transport position (TM 10-3930-675-10).
2. Remove tiedown straps and clamps as necessary. Discard tiedown straps.
3. Disconnect hose from oil sampling valve fitting and transmission fitting. Remove hose.
4. Remove transmission fitting.



TRANSMISSION OIL SAMPLING VALVE HOSE INSTALLATION

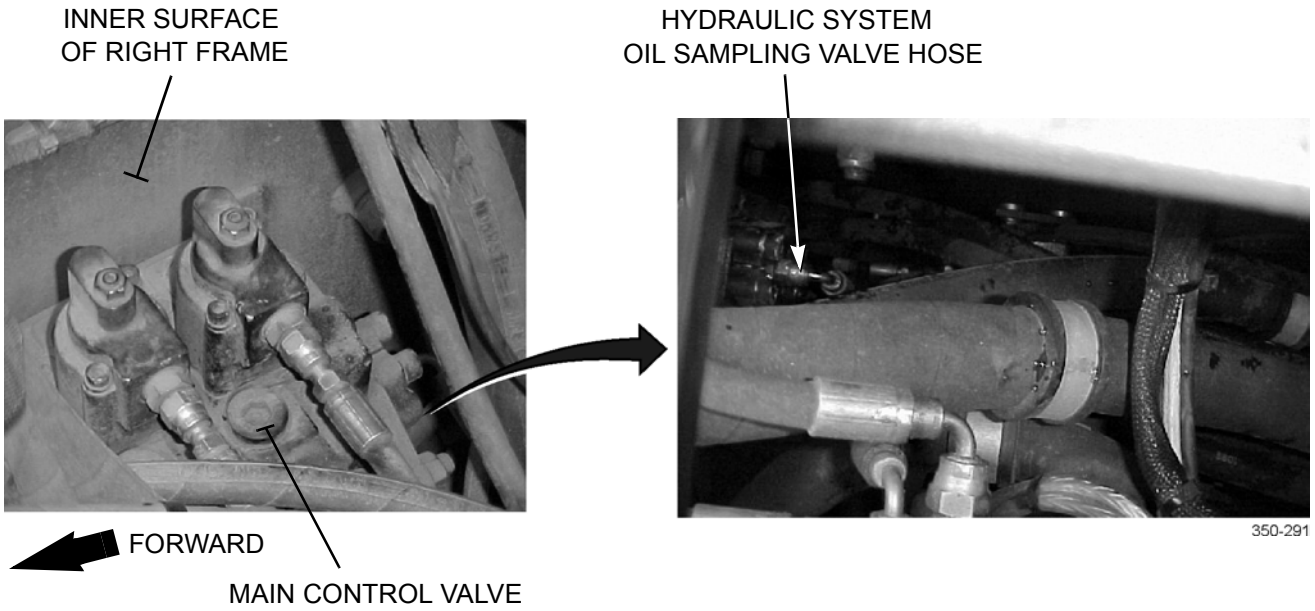
1. Install transmission fitting.
2. Connect hose to transmission fitting and route to oil sampling valve.
3. Connect hose to oil sampling valve fitting and secure hose with new tiedown straps and clamps as necessary.
4. Start engine (TM 10-3930-675-10) and check hose for oil leaks.
5. Return cab to operational position (TM 10-6930-675-10).
6. Install engine cover (WP 0143 00).

HYDRAULIC SYSTEM OIL SAMPLING VALVE HOSE REMOVAL

NOTE

Tag and trace routing of oil sampling valve hose prior to disconnecting.

1. Move cab to transport position (TM 10-3930-675-10).
2. Remove tiedown straps and clamps as necessary. Discard tiedown straps.
3. Disconnect hose from oil sampling valve fitting and hydraulic control valve fitting. Remove hose.
4. Remove hydraulic control valve fitting.



HYDRAULIC SYSTEM OIL SAMPLING VALVE HOSE INSTALLATION

1. Install hydraulic control valve fitting.
2. Connect hose to hydraulic control valve fitting and route to oil sampling valve.
3. Connect hose to oil sampling valve fitting and secure hose with new tiedown straps and clamps as necessary.
4. Start engine (TM 10-3930-675-10) and check hose for oil leaks.
5. Return cab to operation position (TM 10-3930-675-10).
6. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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FUEL SOLENOID SHUTOFF VALVE REPLACEMENT 0055 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 0-200 lb-in capacity (Item 40, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Seal, o-ring (P/N 129888) (2)

Equipment Condition

Engine cover removed (WP 0143 00)

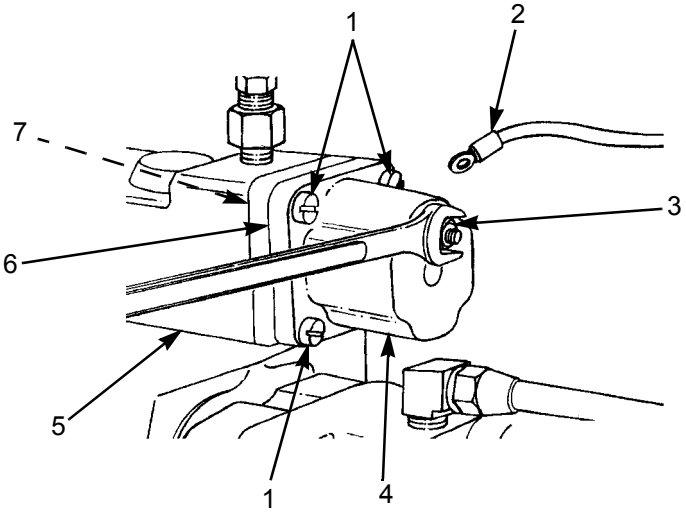


WARNING

DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel.

REMOVAL

1. Remove nut (3) and disconnect wire lead (2) from fuel shutoff valve (4). Replace nut hand tight on terminal.
2. Remove four screws (1) securing fuel shutoff valve (4) to fuel pump (5).
3. Remove fuel shutoff valve (4), spacer (6), and o-ring seal (7). Discard o-ring seal.



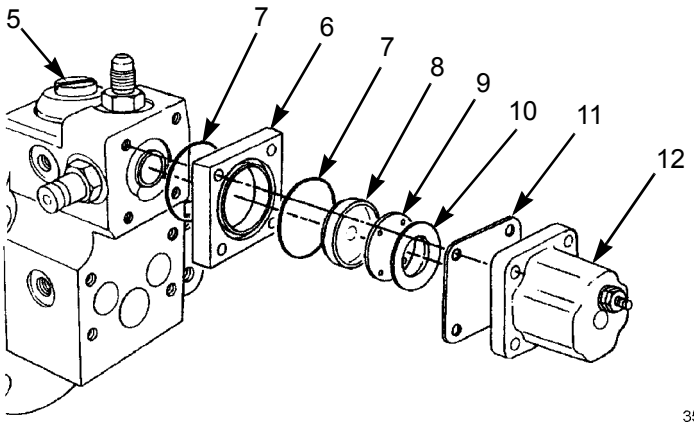
350-137

INSTALLATION

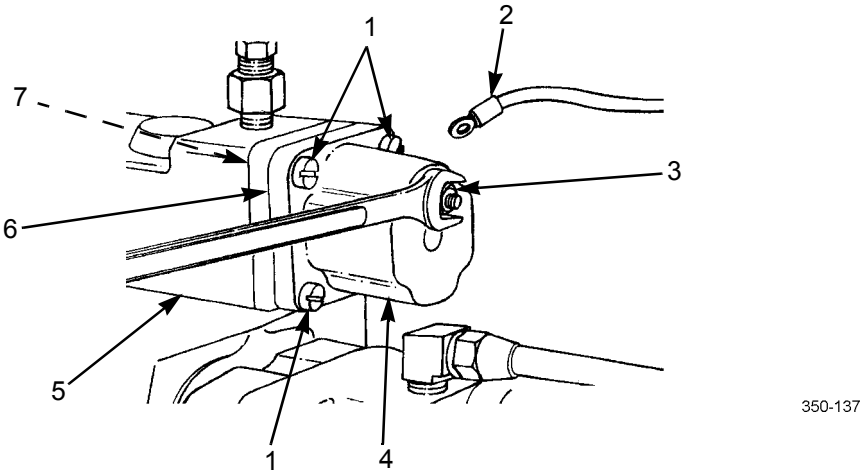
NOTE

- Assemble components of new fuel shutoff valve in following order.
- Ensure coil is a single terminal coil.

1. Place spacer (6) with o-ring groove, coil side up, on clean surface and install new o-ring seal (7).
2. Install actuator disc (8) with cup side toward coil (12).
3. Install valve disc (9) with raised area up.
4. Install spring washer (10) with cup side toward coil (12).
5. Install fuel shield (11) and coil (12).
6. Hold assembly together and install with new o-ring seal (7) on fuel pump (5).



7. Secure fuel shutoff valve (4) to fuel pump (5) with four screws (1). Tighten screws to 30 lb-in (3.4 Nm).
8. Connect wire lead (2) to fuel shutoff valve (4) with nut (3). Tighten nut to 25 lb-in (2.8 Nm).



9. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

ENGINE AIR CLEANER MAINTENANCE 0056 00

THIS WORK PACKAGE COVERS

Filter Elements Replacement

Removal

Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Filter element, primary (P/N 923110.0588)

Filter element, secondary (P/N 923110.0589)



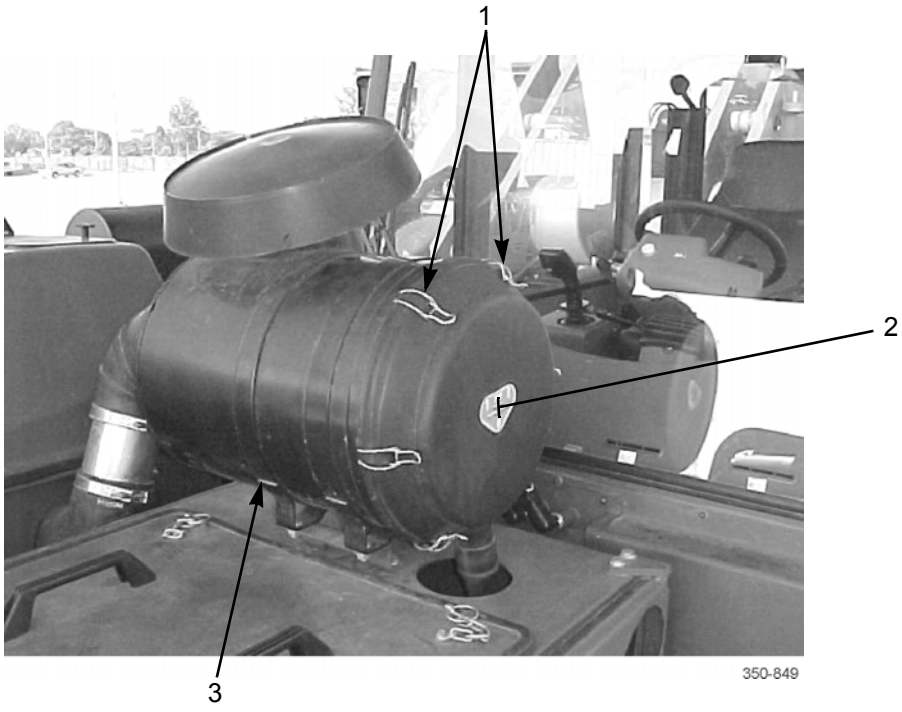
WARNING



If NBC exposure is suspected, all air cleaner media should be handled by personnel wearing protective equipment. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.

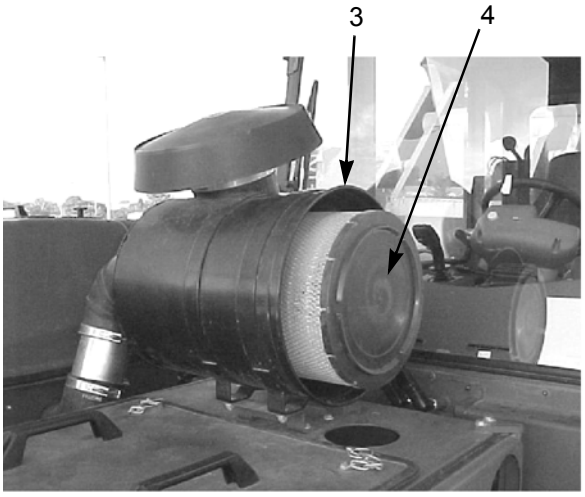
FILTER ELEMENTS REPLACEMENT

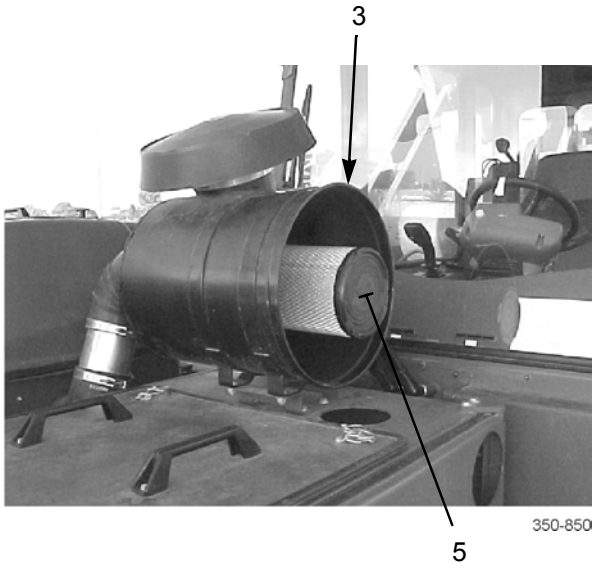
1. Open six spring clips (1) and remove cover (2) from end of engine air cleaner (3).



FILTER ELEMENTS REPLACEMENT - CONTINUED

2. Remove primary filter element (4) and secondary filter element (5) from air cleaner (3). Discard filter elements.
3. Using rags, wipe interior of air cleaner (3) free of dust and dirt.
4. Install new secondary filter element (5) and new primary filter element (4) to air cleaner (3).
5. Install cover (2) and close six spring clips (1).

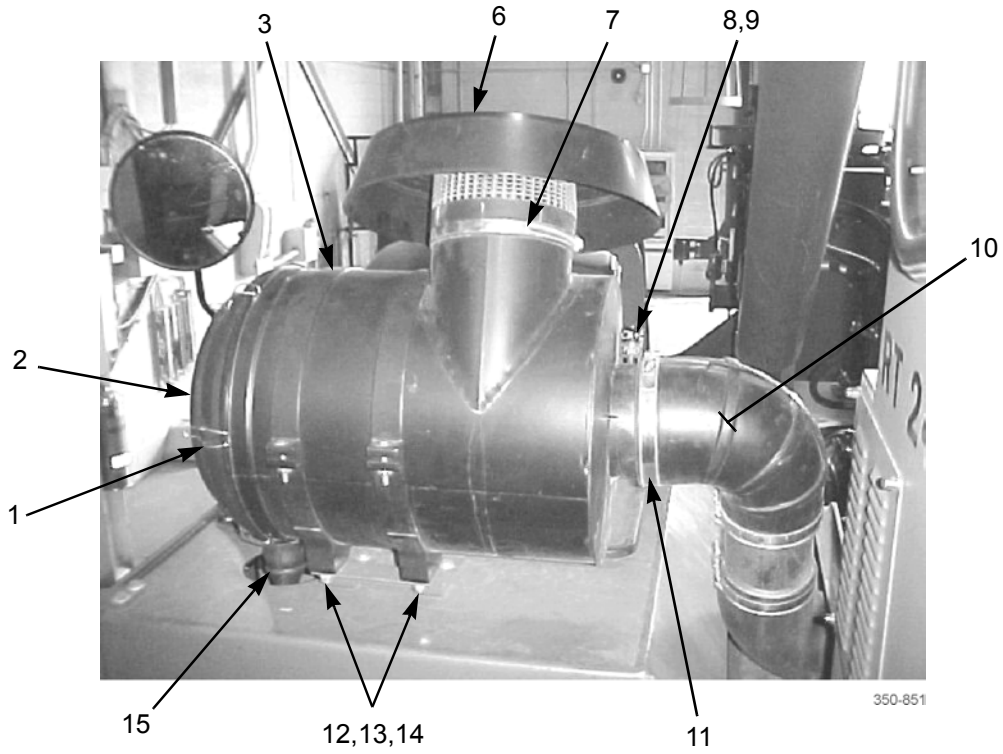




REMOVAL

1. Loosen clamp (7) and remove cap (6) from air cleaner (3).
2. Remove vacuum indicator (8) and nipple (9).
3. Loosen clamp (11) holding elbow (10) to air cleaner (3).
4. Remove four nuts (12), washers (13), screws (14), and air cleaner (3) from elbow (10) and top of vehicle.
5. Remove rubber dust vent (15) from cover (2).

REMOVAL - CONTINUED



INSTALLATION

1. Install rubber dust vent (15) to cover (2) of air cleaner (3).
2. Position air cleaner (3) to top of vehicle and elbow (10) and install four screws (14), washers (13), and nuts (12).
3. Tighten clamp (11) holding elbow (10) to air cleaner (3).
4. Install nipple (9) and vacuum indicator (8).
5. Install cap (6) to air cleaner (3) and tighten clamp (7).

END OF WORK PACKAGE

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ENGINE AIR INTAKE HOSES AND TUBES REPLACEMENT 0057 00

THIS WORK PACKAGE COVERS

Air Cleaner-to-Turbocharger Hoses and Tubes: Removal, Installation

Turbocharger-to-Charge Air Cooler Hoses and Tubes: Removal, Installation

Charge Air Cooler-to-Engine Air Intake Manifold Hoses and Tubes: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Clamp, hose (P/N 920952.0030) (16)

References

WP 0136 00

WP 0137 00

Equipment Condition

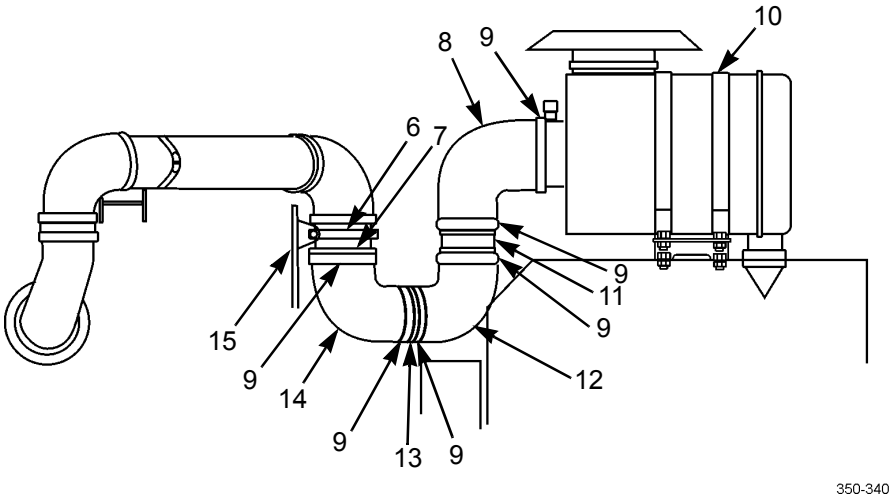
Engine cover removed (WP 0143 00)

NOTE

- Note position of elbows and tubes to aid in installation.
- Remove and discard all hose clamps. Ensure new hose clamps are used on installation.
- Metal rings installed over hoses may be replaced as necessary.

AIR CLEANER-TO-TURBOCHARGER HOSES AND TUBES REMOVAL

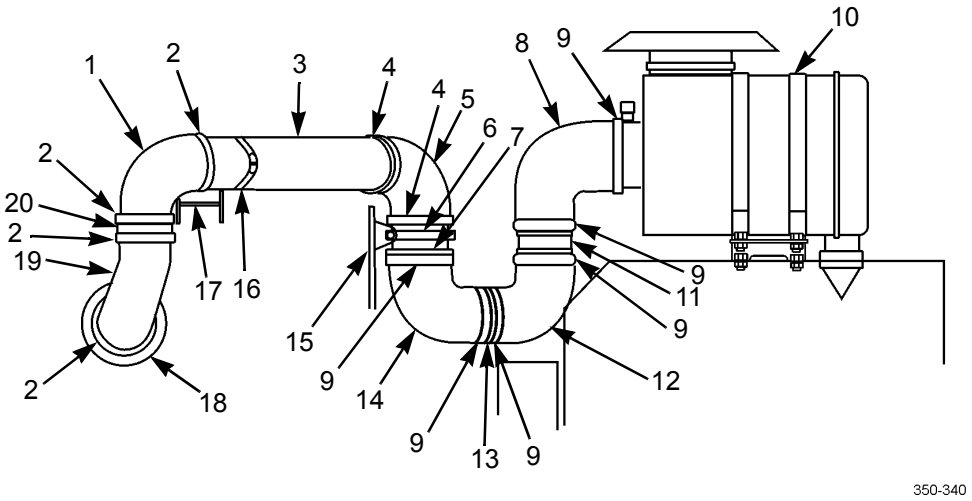
1. Loosen six hose clamps (9) and remove elbow (8), 7 ¼ in tube (11), rubber elbow (12), 4 ½ in tube (13), and rubber elbow (14) from air cleaner (10).
2. Remove clamp (6) holding 7 ¼ in tube (7) to bracket (15).



SIDE VIEW

AIR CLEANER-TO-TURBOCHARGER HOSES AND TUBES REMOVAL - CONTINUED

3. Loosen two hose clamps (4) and remove 7¼ in tube (7) and elbow (5) from 25 in tube (3).
4. Remove clamp (16) holding 25 in tube (3) to bracket (17).
5. Loosen four hose clamps (2) and remove 25 in tube (3), rubber elbow (1), tube (20), and rubber elbow (19) from turbocharger (18).



SIDE VIEW

AIR CLEANER-TO-TURBOCHARGER HOSES AND TUBES INSTALLATION

1. Install rubber elbow (19), tube (20), rubber elbow (1), and 25 in tube (3) to turbocharger (18) and tighten four hose clamps (2).
2. Install 25 in tube (3) to bracket (17) with clamp (16).
3. Install elbow (5) and 7 ¼ in tube (7) to 25 in tube (3) and tighten two hose clamps (4).
4. Install 7 ¼ in tube (7) to bracket (15) with clamp (6).

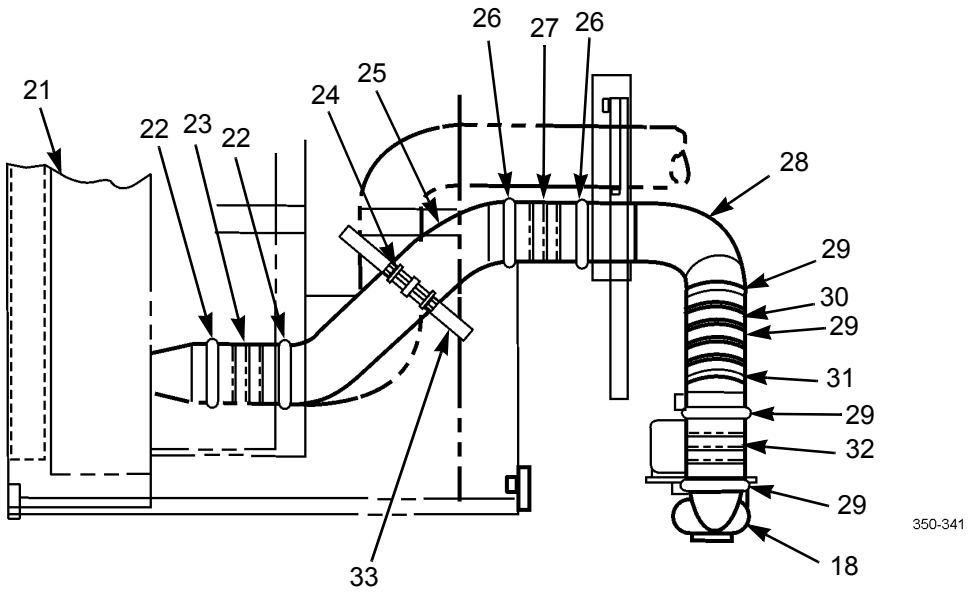
CAUTION

Ensure there is clearance between rubber elbow (12) and sheet metal or a hole will develop in rubber elbow.

5. Install rubber elbow (14), 4 ½ in tube (13), rubber elbow (12), 7 ¼ in tube (11), and elbow (8) to air cleaner (10) and tighten six hose clamps (9).

TURBOCHARGER-TO-CHARGE AIR COOLER HOSES AND TUBES REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen four hose clamps (29) and remove hose (32), tube (31), and hose (30) from turbocharger (18) and tube (28).
3. Loosen two hose clamps (26) and remove hose (27) from tube (25) and tube (28).
4. Remove U-clamp (24) holding tube (25) to bracket (33).
5. Loosen two hose clamps (22) and remove tube (25) and hose (23) from charge air cooler (21).



TOP VIEW

TURBOCHARGER-TO-CHARGE AIR COOLER HOSES AND TUBES INSTALLATION

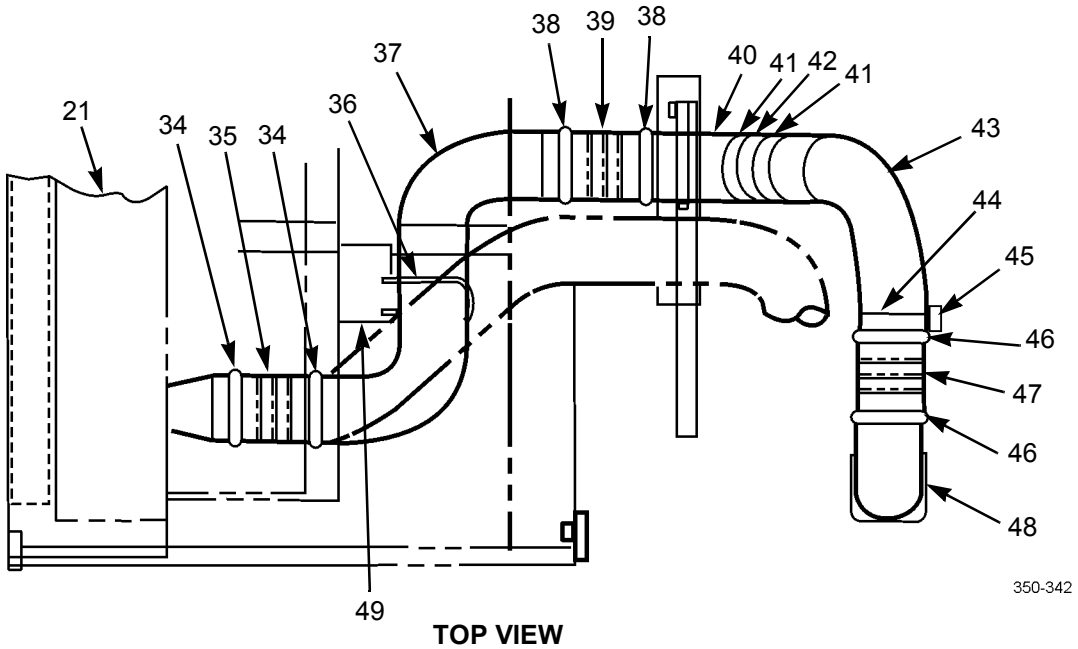
1. Install hose (23) and tube (25) to charge air cooler (21) and tighten two hose clamps (22).
2. Install tube (25) to bracket (33) with U-clamp (24).
3. Install hose (27) to tube (25) and tube (28) and tighten two hose clamps (26).
4. Install hose (30), tube (31), and hose (32) to tube (28) and turbocharger (18) and tighten four clamps (29).
5. Install radiator top grating (WP 0137 00).

CHARGE AIR COOLER-TO-ENGINE AIR INTAKE MANIFOLD HOSES AND TUBES REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Remove radiator splash shield (WP 0136 00).

CHARGE AIR COOLER-TO-ENGINE AIR INTAKE MANIFOLD HOSES AND TUBES REMOVAL - CONTINUED

3. Loosen two hose clamps (34) and remove hose (35) from charge air cooler (21) and tube (37).
4. Remove U-clamp (36) holding tube (37) to bracket (49).
5. Loosen two hose clamps (38) and remove tube (37) and hose (39) from tube (40).
6. Loosen two hose clamps (41) and remove hose (42) from tube (40) and tube (43).
7. Remove U-clamp (44) holding tube (43) to bracket (45).
8. Loosen two hose clamps (46) and remove tube (43) and hose (47) from air intake connector (48) of engine air intake manifold.



TOP VIEW

CHARGE AIR COOLER-TO-ENGINE AIR INTAKE MANIFOLD HOSES AND TUBES INSTALLATION

1. Install hose (47) and tube (43) to air intake connector (48) of engine air intake manifold and tighten two hose clamps (46).
2. Install tube (43) to bracket (45) with U-clamp (44).
3. Install hose (42) to tube (43) and tube (40) and tighten two hose clamps (41).
4. Install hose (39) and tube (37) to tube (40) and tighten two hose clamps (38).
5. Install tube (37) to bracket (49) with U-clamp (36).
6. Install hose (35) to tube (37) and charge air cooler (21) and tighten two hose clamps (34).
7. Install radiator splash shield (WP 0136 00).
8. Install radiator top grating (WP 0137 00).

END OF WORK PACKAGE

FUEL FILTER/WATER SEPARATOR REPLACEMENT 0058 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, strap (Item 37, WP 0204 00)

Materials/Parts

Fuel, diesel (Item 13 or 14, WP 0203 00)

Oil, lubricating (Item 20, WP 0203 00)

Materials/Parts - Continued

Rag, wiping (Item 22, WP 0203 00)

Filter, fuel (P/N 3406889)

References

TM 10-3930-675-10

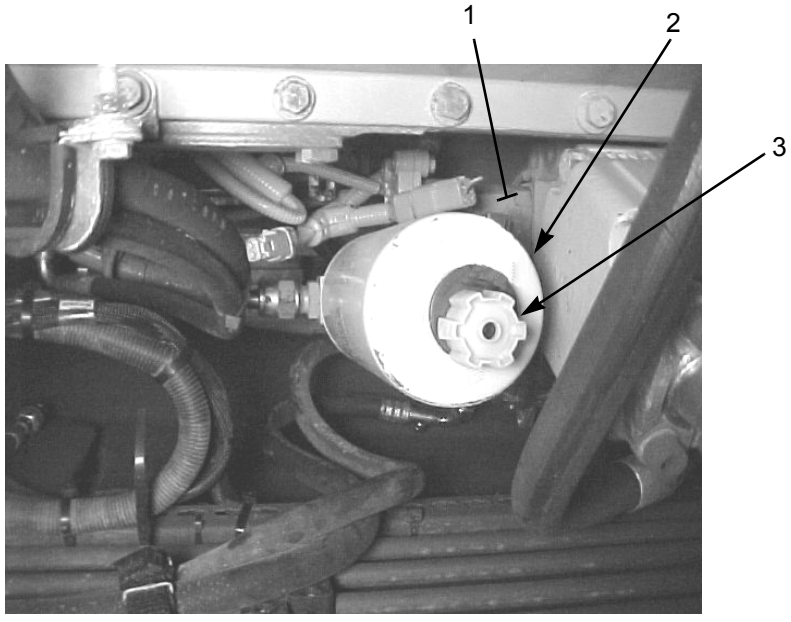


WARNING

DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel.

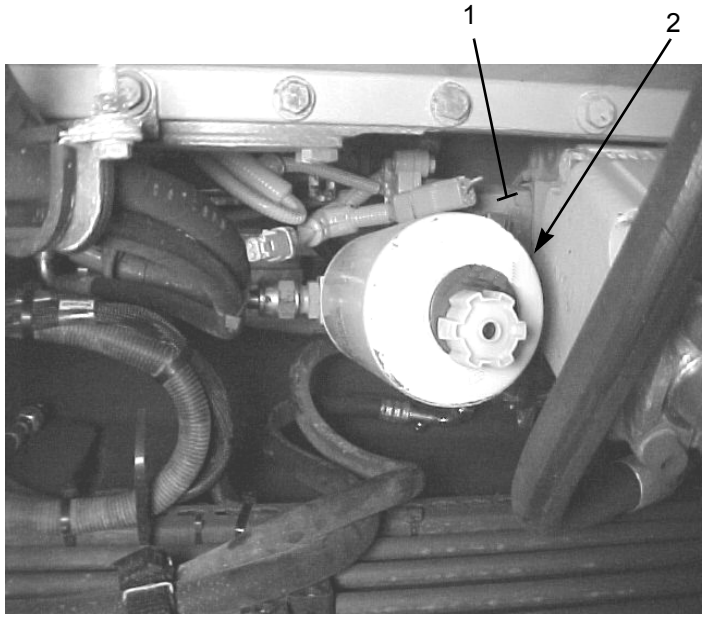
REMOVAL

1. Open drain valve (3) on fuel filter (2) and drain fluid into a suitable container. Dispose of drained fluid in accordance with SOP.
2. Remove fuel filter (2) from fuel pump (1). Discard fuel filter.



REMOVAL - CONTINUED

3. Remove threaded adapter seal ring from fuel pump (1). Discard seal ring.



INSTALLATION

NOTE

Ensure fuel pump sealing surface is clean and free from old gasket material

1. Install new threaded adapter seal ring, provided with new fuel filter, on fuel pump (1).

NOTE

Apply a light coat of lubricating oil to new filter gasket and fill fuel filter with correct fuel.

2. Install new fuel filter (2) on fuel pump (1) and tighten until gasket contacts filter pump surface.

CAUTION

Overtightening of filter can distort threads and damage fuel filter seal.

3. Tighten fuel filter (2) an additional ½ to ¾ turn.
4. Start engine and check for leaks (TM 10-3930-675-10).

END OF WORK PACKAGE

FUEL HOSES, LINES, AND FITTINGS REPLACEMENT 0059 00

THIS WORK PACKAGE COVERS

Cooling Plate-to-Cylinder Head Fuel Line: Removal, Installation

Fuel Pump-to-Cooling Plate Fuel Line: Removal, Installation

Engine Fuel Return Line: Removal, Installation

Fuel Supply Hose: Removal, Installation

Fuel Return Hose: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Compound, sealing, pipe (Item 10, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

TM 10-3930-675-10

Equipment Condition

Engine cover removed (WP 0143 00)



WARNING

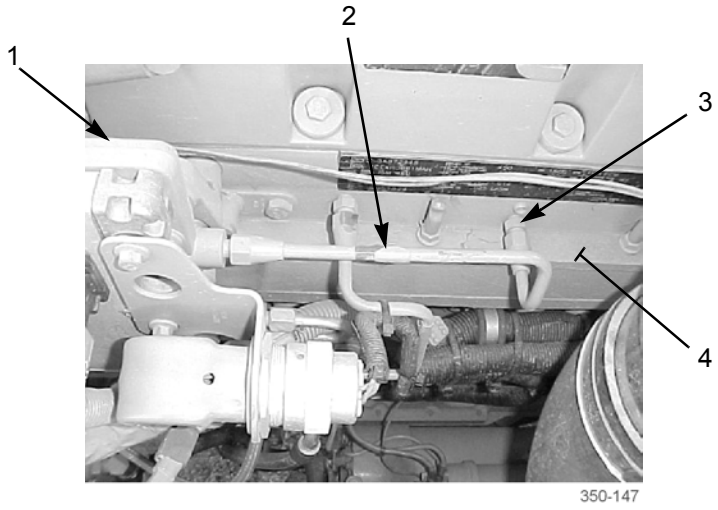
DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing damage to vehicle and injury or death to personnel.

NOTE

- Fuel lines and hoses may contain residual amounts of fuel which may be spilled when replacing fuel lines. Spilled fuel should be cleaned up immediately.
- Ensure all lines and fittings are clear of debris and excess pipe sealing compound does not enter lines or fittings.

COOLING PLATE-TO-CYLINDER HEAD FUEL LINE REMOVAL

1. Disconnect fuel line (2) from cooling plate (1) and cylinder head fitting (3).
2. Remove fitting (3) from cylinder head (4).



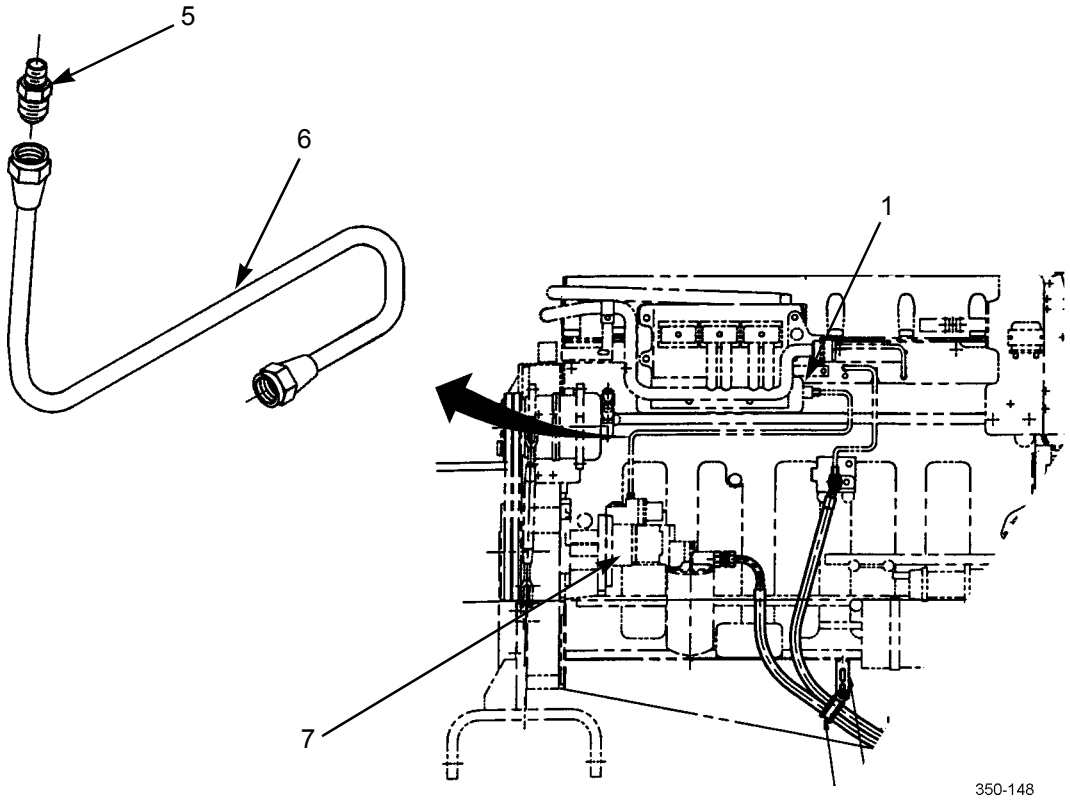
COOLING PLATE-TO-CYLINDER HEAD FUEL LINE INSTALLATION

1. Apply a light coat of sealing compound to fitting (3) and install in cylinder head (4).
2. Connect fuel line (2) to cylinder head fitting (3) and cooling plate (1).
3. Start engine (TM 10-3930-675-10) and check for fuel leaks.
4. Install engine cover (WP 0143 00).

FUEL PUMP-TO-COOLING PLATE FUEL LINE REMOVAL

1. Disconnect fuel line (6) from cooling plate (1) and fuel pump fitting (5).
2. Remove fitting (5) from fuel pump (7).

FUEL PUMP-TO-COOLING PLATE FUEL LINE REMOVAL - CONTINUED

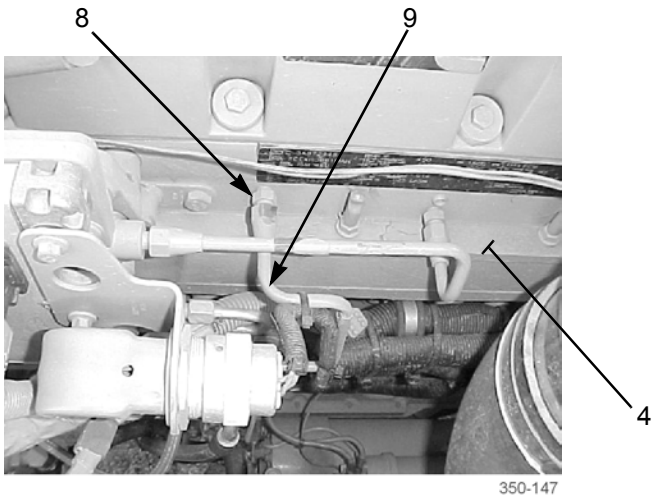


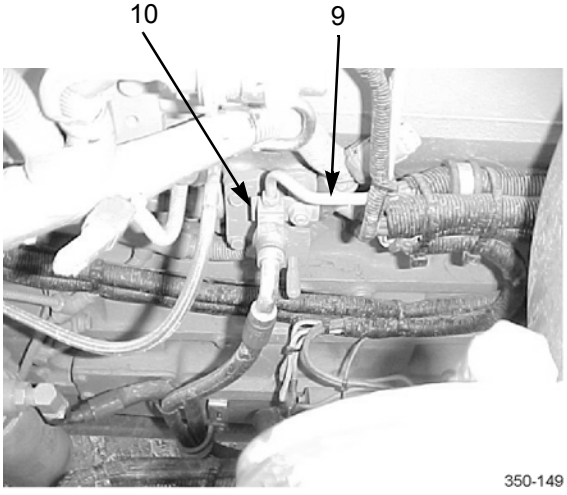
FUEL PUMP-TO-COOLING PLATE FUEL LINE INSTALLATION

1. Apply a light coat of sealing compound to fitting (5) and install in fuel pump (7).
2. Connect fuel line (6) to fuel pump fitting (5) and cooling plate (1).
3. Start engine (TM 10-3930-675-10) and check for fuel leaks.
4. Install engine cover (WP 0143 00).

ENGINE FUEL RETURN LINE REMOVAL

1. Disconnect fuel return line (9) from cylinder head fitting (8). Remove fitting from cylinder head (4).
2. Disconnect fuel return line (9) from elbow adapter fitting (10).





ENGINE FUEL RETURN LINE INSTALLATION

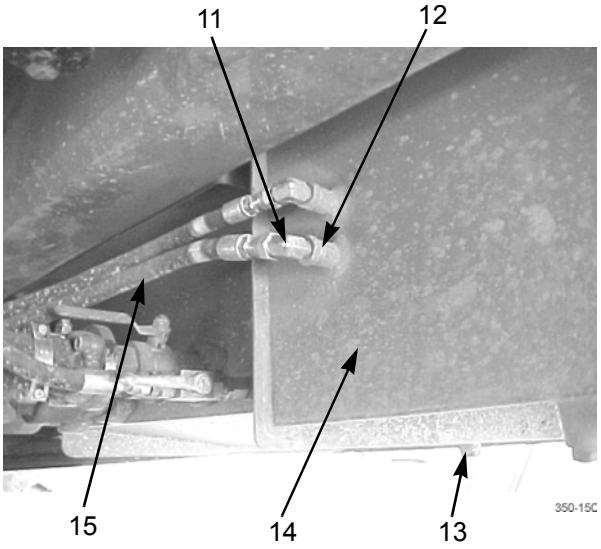
1. Apply a light coat of sealing compound to cylinder head fitting (8) and install fitting in cylinder head (4).
2. Connect fuel return line (9) to cylinder head fitting (8).
3. Connect fuel return line (9) to elbow adapter fitting (10).
4. Start engine (TM 10-3930-675-10) and check for leaks.
5. Install engine cover (WP 0143 00).

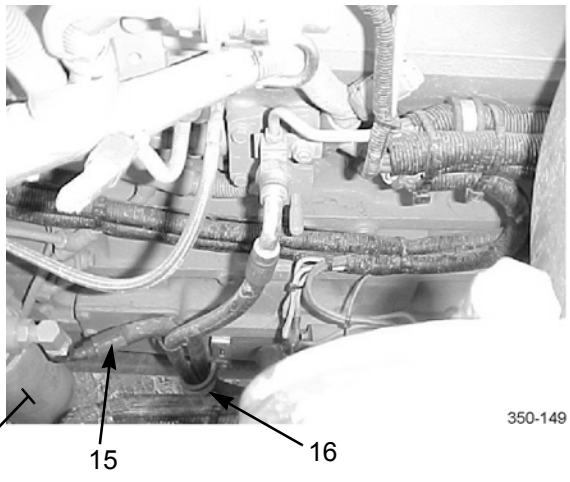
FUEL SUPPLY HOSE REMOVAL

NOTE

Fuel tank must be drained prior to removal of fuel supply hose. Fuel lines may retain small amounts of fuel.

1. Remove fuel tank drain plug (13) and drain fuel into a suitable clean container. Replace plug.
2. Disconnect fuel supply hose (15) and remove elbow (11) and adapter (12).
3. Trace and tag fuel supply hose (15) from fuel tank (14) to fuel filter (17).
4. Remove hose clamps (16) as required and disconnect fuel supply hose (15) from fuel filter (17).





FUEL SUPPLY HOSE INSTALLATION

1. Apply a thin coat of sealing compound to elbow (11) and adapter (12) and install in fuel tank (14).
2. Install fuel supply hose (15) on elbow (11).
3. Route fuel supply hose (15) and connect to fuel filter (17).
4. Secure fuel supply hose (15) in place with hose clamps (16) as needed.
5. Replace fuel in fuel tank, start engine, and check for fuel leaks (TM 10-3930-675-10).
6. Install engine cover (WP 0143 00).

FUEL RETURN HOSE REMOVAL

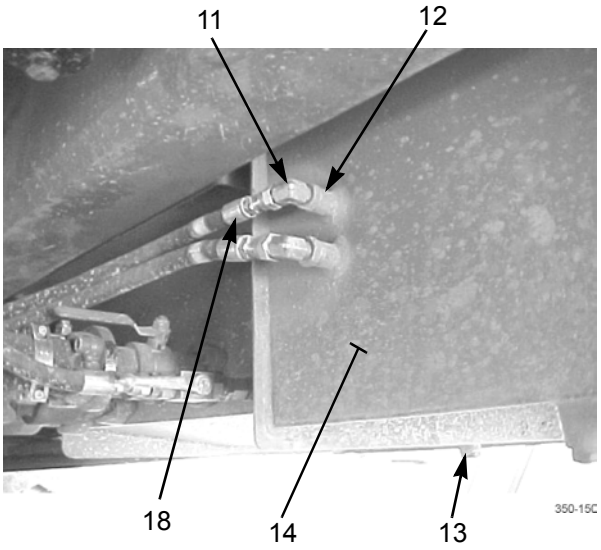
NOTE

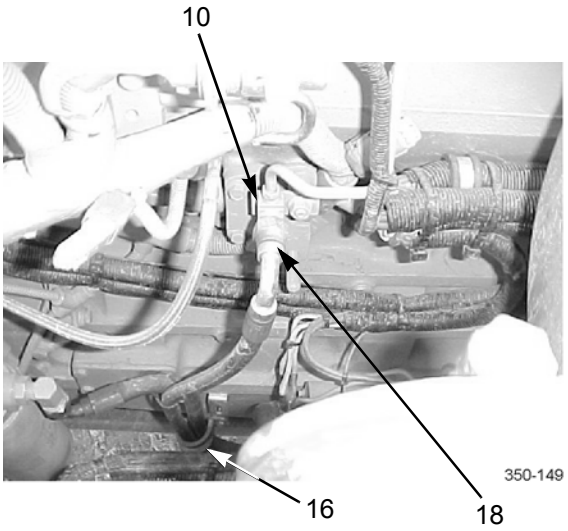
Fuel tank must be drained prior to removal of fuel return hose. Fuel lines may retain small amounts of fuel.

1. Remove fuel tank drain plug (13) and drain fuel into a suitable clean container. Replace plug.
2. Disconnect fuel return hose (18) and remove elbow (11) and adapter (12).
3. Trace and tag fuel return hose (18) from fuel tank (14) to elbow adapter fitting (10).
4. Remove hose clamps (16) as required and disconnect fuel return hose (18) from elbow adapter fitting (10).

FUEL RETURN HOSE INSTALLATION

1. Apply a thin coat of sealing compound to elbow (11) and adapter (12) and install in fuel tank (14).
2. Install fuel return hose (18) on elbow (11).
3. Route fuel return hose (18) and connect to elbow adapter fitting (10).
4. Secure fuel return hose (18) in place with hose clamps (16) as needed.





5. Replace fuel in fuel tank, start engine, and check for fuel leaks (TM 10-3930-675-10).
6. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

ETHER COLD START SYSTEM MAINTENANCE 0060 00

THIS WORK PACKAGE COVERS

Ether Canister: Removal, Installation

Cold Start Activation Solenoid: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Equipment Condition

Master battery switch in OFF position

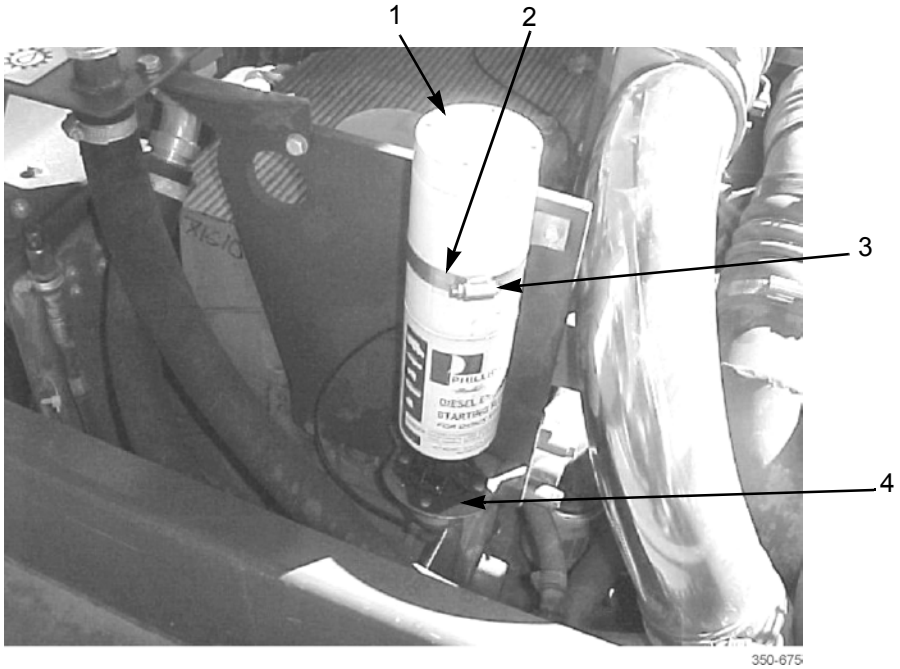
Engine cover removed (WP 0143 00)

WARNING

Ether is extremely flammable and explosive. DO NOT perform ether cold start system checks, inspections or maintenance while smoking or near fire, flames or sparks. Failure to follow this warning may cause a fire and explosion, causing serious injury or death to personnel.

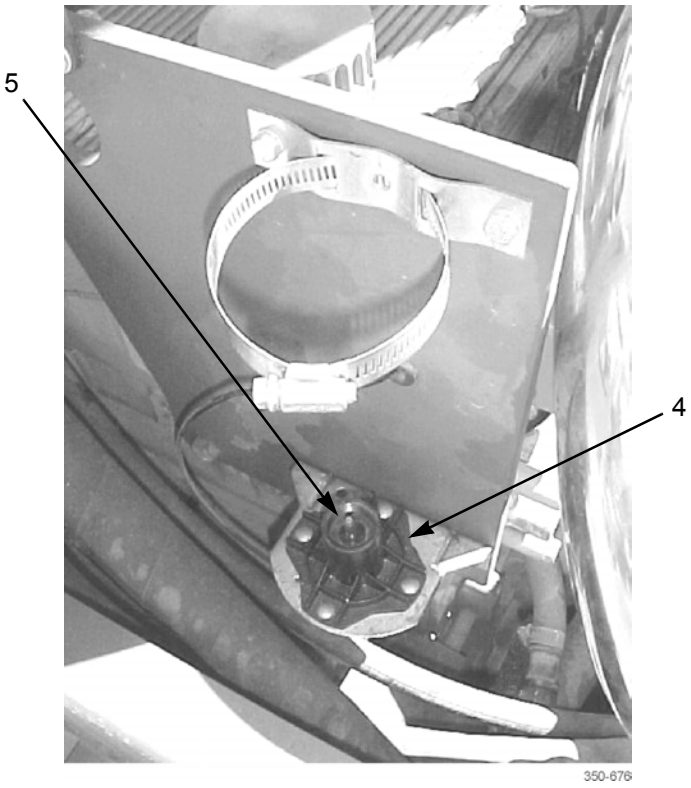
ETHER CANISTER REMOVAL

1. Loosen clamp screw (3) and turn canister (1) counterclockwise to remove from clamp (2) and solenoid (4).



ETHER CANISTER REMOVAL - CONTINUED

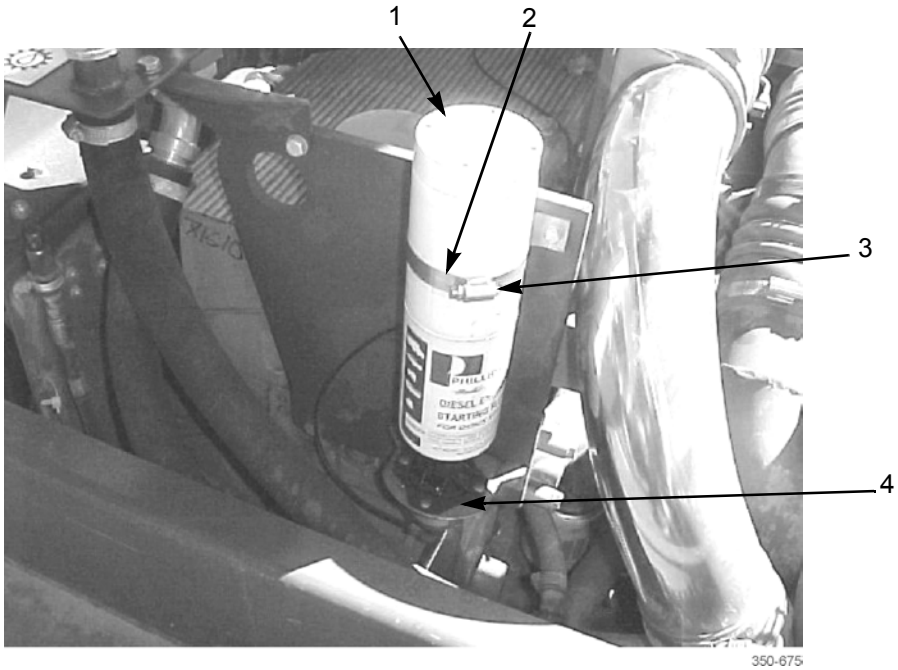
2. Inspect gasket (5) for damage. Remove and discard only if damaged.



ETHER CANISTER INSTALLATION

1. Ensure gasket (5) is positioned inside top of solenoid (4).
2. Position canister (1) inside clamp (2). Install to solenoid (4) by turning canister clockwise.
3. Tighten clamp screw (3).

ETHER CANISTER INSTALLATION - CONTINUED



4. Install engine cover (WP 0143 00).

COLD START ACTIVATION SOLENOID REMOVAL

NOTE

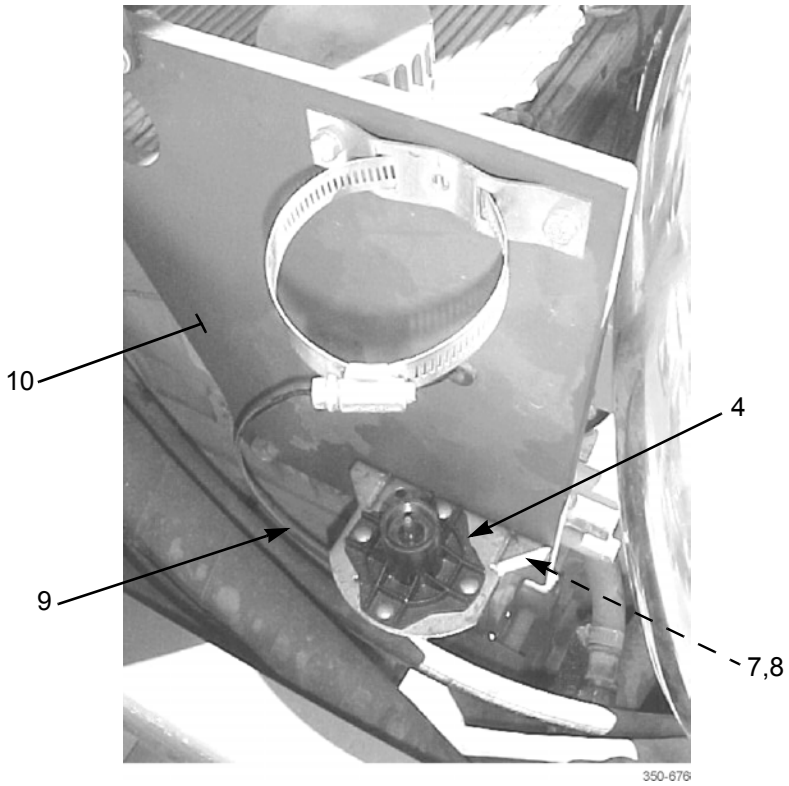
Remove and discard tiedown straps.

1. Remove canister (refer to *Ether Canister Removal*).
2. Disconnect connector (12) of solenoid harness from wiring harness connector (11).

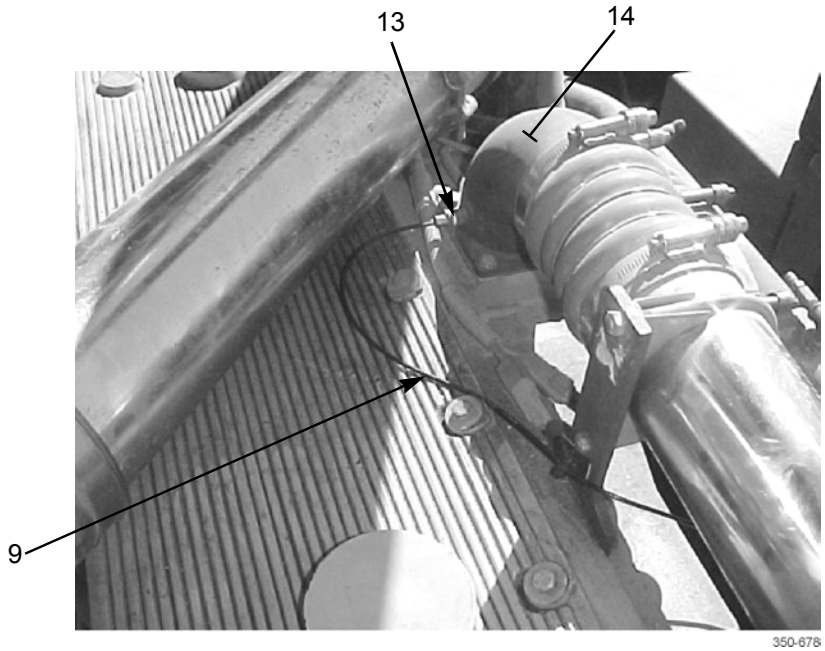


3. Disconnect ether supply tube (9) from elbow on underside of solenoid (4).
4. Remove two screws (7), washers (8), and solenoid (4) from mounting bracket (10).
5. Remove elbow from bottom of solenoid (4).

COLD START ACTIVATION SOLENOID REMOVAL - CONTINUED

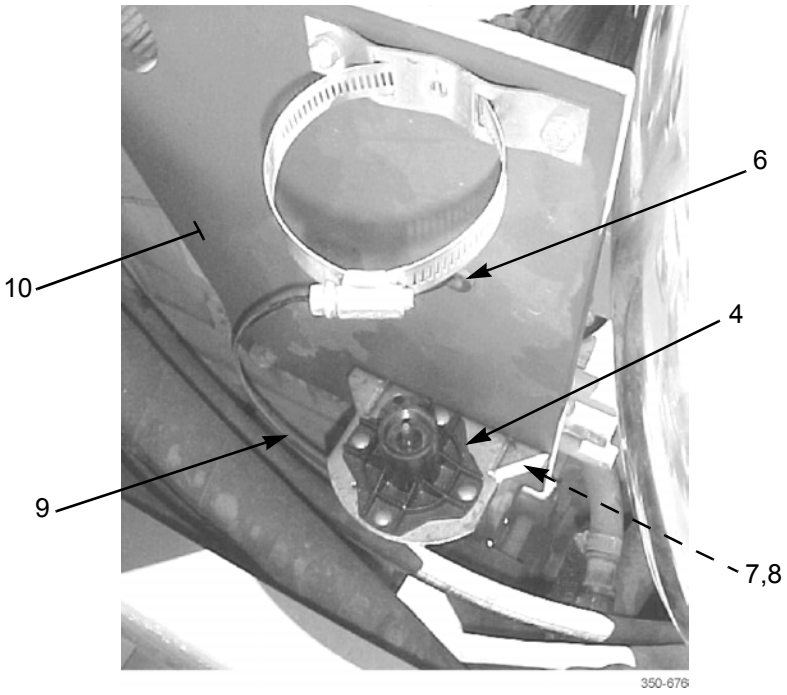


6. If replacing ether supply tube (9), disconnect tube from fitting (13) at air intake elbow (14).



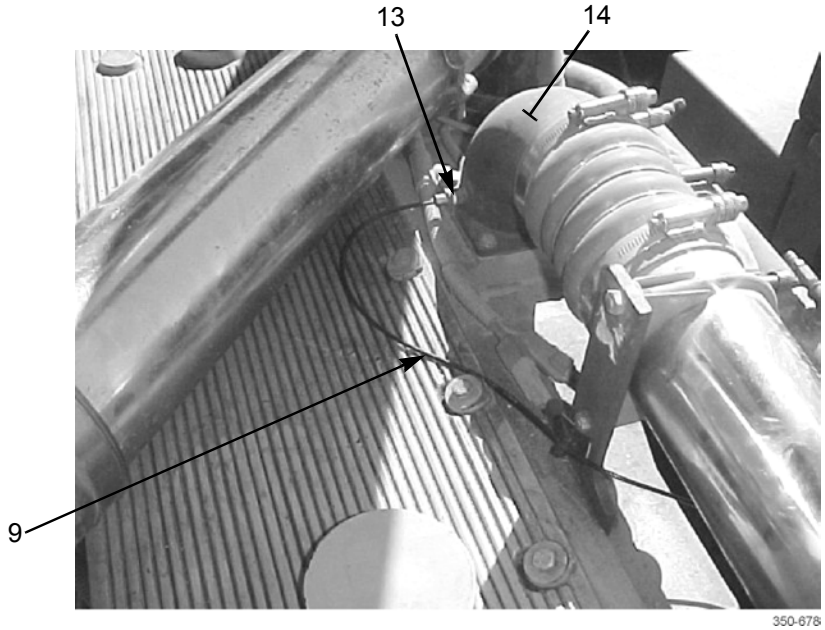
COLD START ACTIVATION SOLENOID REMOVAL - CONTINUED

7. Remove ether supply tube (9) thru grommet (6) in mounting bracket (10).



COLD START ACTIVATION SOLENOID INSTALLATION

1. If removed, feed ether supply tube (9) thru grommet (6) in mounting bracket (10).
2. Connect ether supply tube (9) to fitting (13) at air intake elbow (14).



COLD START ACTIVATION SOLENOID INSTALLATION - CONTINUED

3. Install elbow to bottom of solenoid (4).
4. Connect other end of ether supply tube (9) to elbow.
5. Position solenoid (4) to mounting bracket (10) and install two washers (8) and screws (7).
6. Connect connector (12) of solenoid harness to wiring harness connector (11).



7. Install canister (refer to *Ether Canister Installation*).
8. Install new tiedown straps.
9. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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THROTTLE POSITION SENSOR (ACCELERATOR PEDAL) REPLACEMENT 0061 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

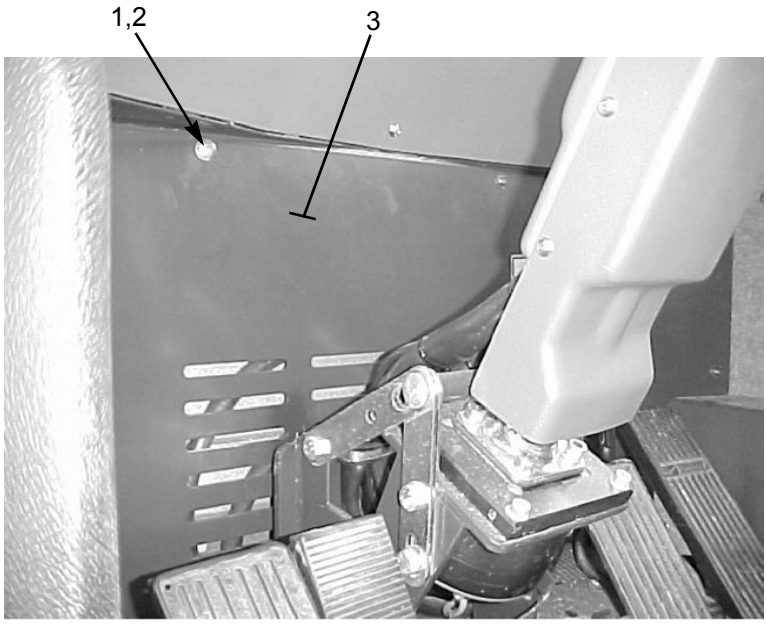
Master battery switch in OFF position

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

REMOVAL

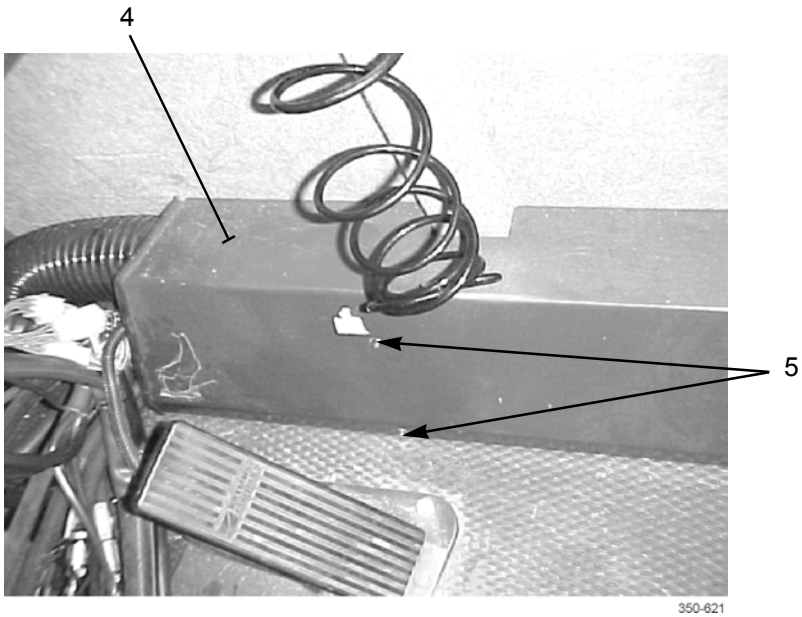
1. Remove four screws (1), washers (2), and lower panel (3) from instrument panel.



350-347

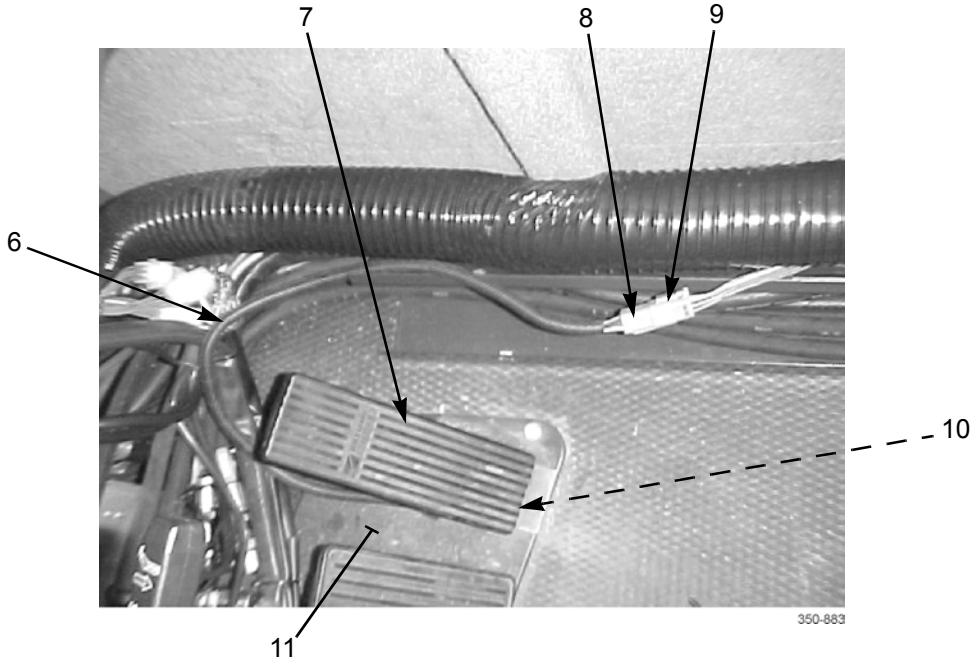
REMOVAL - CONTINUED

2. Remove four screws (5) and cover (4) from right side of cab floor.



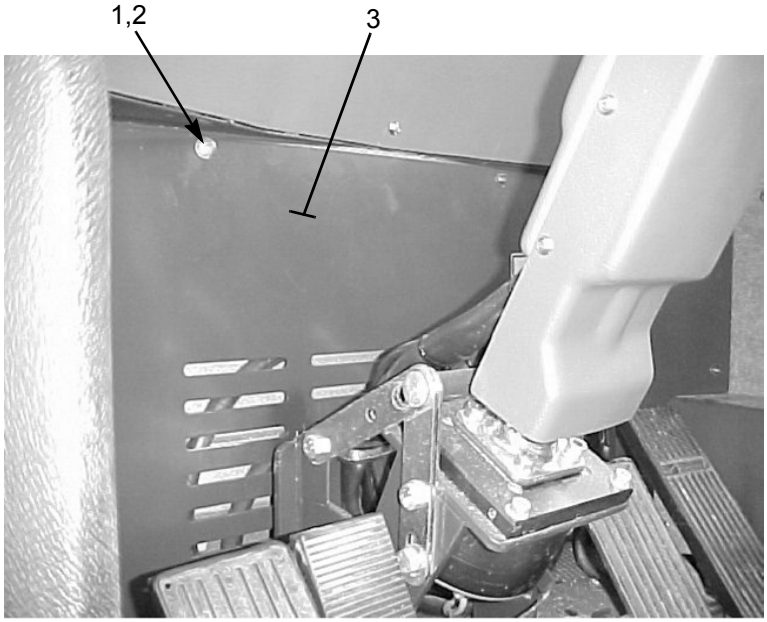
3. Disconnect connector (8) of throttle position sensor wiring harness (6) from electronic control module (ECM) wiring harness connector (9).

4. Remove two screws (10) and throttle position sensor assembly (7) from steering column base (11).



INSTALLATION

1. Install throttle position sensor assembly (7) to steering column base (11) with two screws (10).
2. Connect connector (8) of throttle position sensor wiring harness (6) to ECM wiring harness connector (9).
3. Install cover (4) to right side of cab floor with four screws (5).
4. Install lower panel (3) with four washers (2) and screws (1).



350-347

END OF WORK PACKAGE

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MUFFLER AND EXHAUST PIPE REPLACEMENT 0062 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

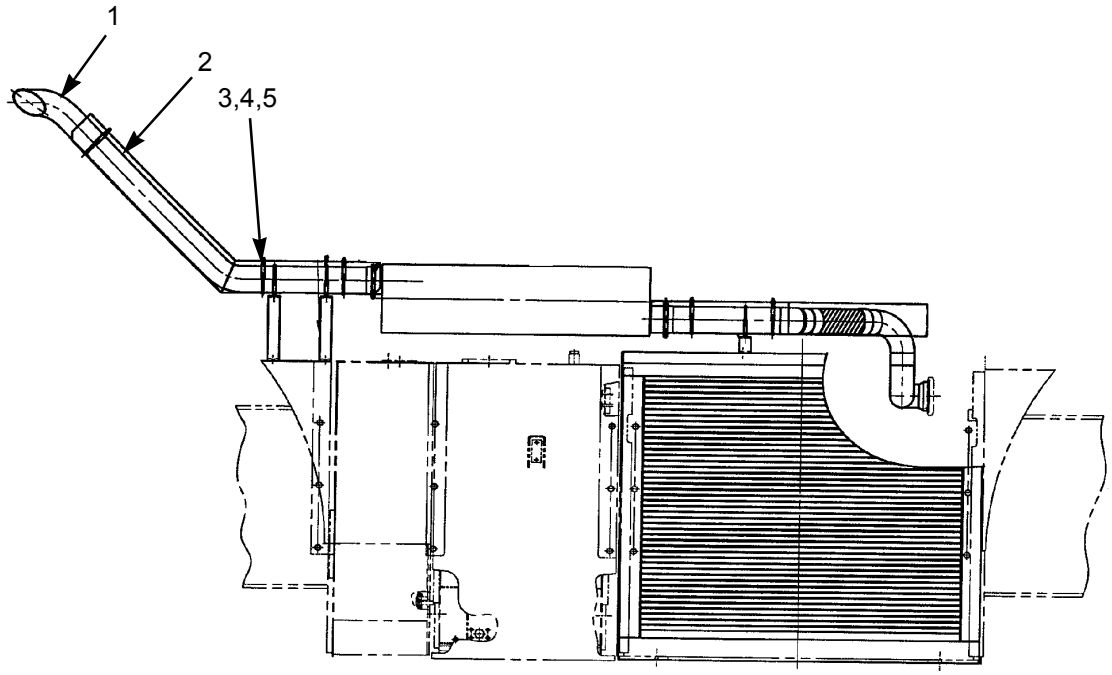
Engine cover removed (WP 0143 00)

REMOVAL

WARNING

Exhaust system components may be hot to the touch. Avoid contact with any part of exhaust system until sufficiently cool. Failure to do so could result in injury to personnel.

1. Remove six nuts (3), washers (4), three U-bolts (5), and heat shield (2) from exhaust pipe (1).



350-349

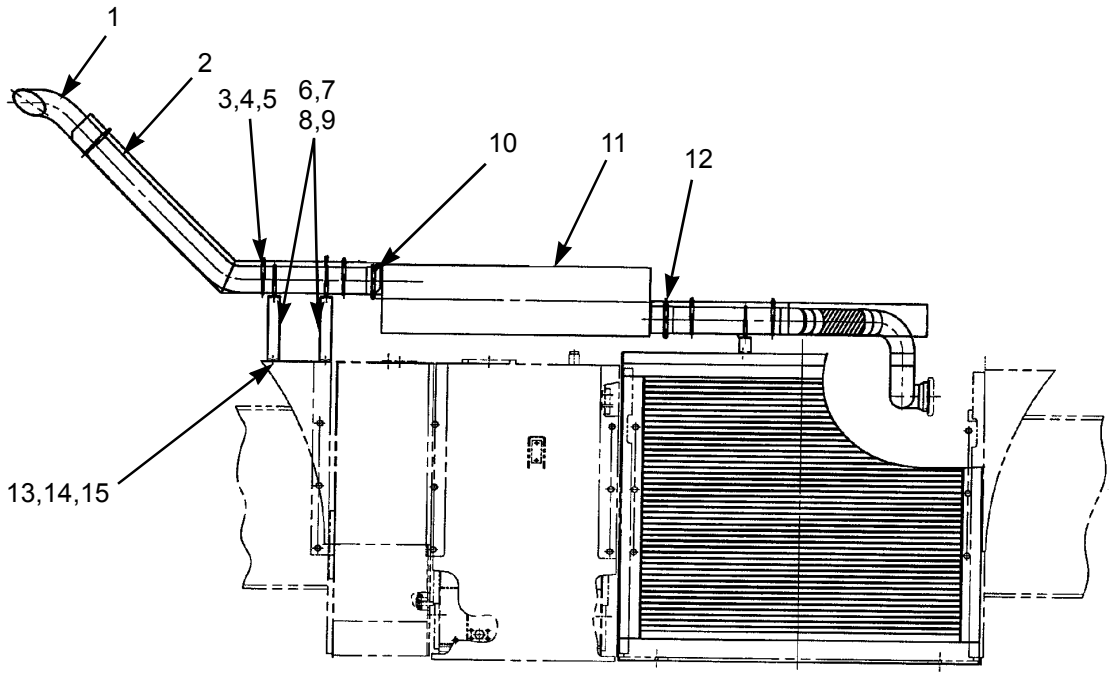
REMOVAL - CONTINUED

2. Remove four nuts (6), washers (7), and two U-bolts (8) holding exhaust pipe (1) to two brackets (9).
3. While supporting muffler (11), remove two clamps (10 and 12), exhaust pipe (1), and muffler from vehicle.

NOTE

Perform following step to remove support brackets.

4. Remove four nuts (13), washers (14), screws (15), and two brackets (9) from vehicle.



350-349

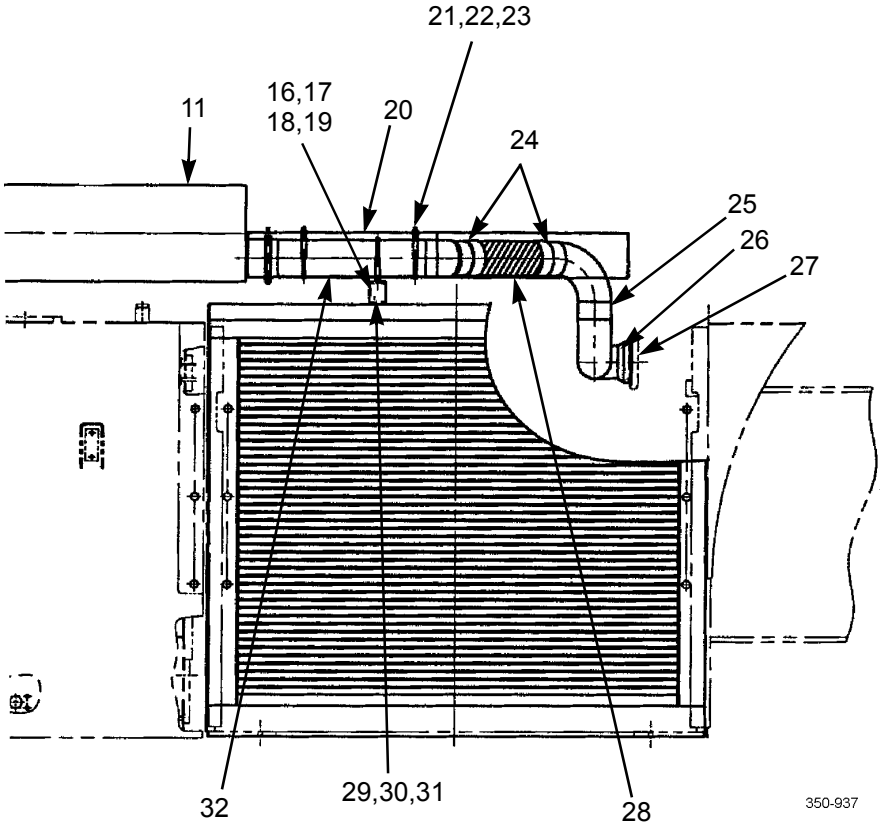
5. Remove six nuts (21) and washers (22), three U-bolts (24), and heat shield (20) from exhaust pipe (32) and exhaust hose (28).
6. Loosen two clamps (24) of exhaust hose (28).
7. Remove two nuts (16) and washers (17), U-bolt (18), exhaust pipe (32), and exhaust hose (28) from bracket (19).
8. Loosen clamp (26) and remove exhaust pipe (25) from turbocharger (27).

NOTE

Perform following step to remove exhaust system support bracket.

9. Remove two nuts (29), washers (30), screws (31), and bracket (19) from vehicle.

REMOVAL - CONTINUED



INSTALLATION

NOTE

Perform following step to install exhaust system support bracket, if removed.

1. Install bracket (19) to vehicle with two screws (31), washers (30), and nuts (29).
2. Install exhaust pipe (25) to turbocharger (27) and tighten clamp (26).
3. Install exhaust hose (28) and exhaust pipe (32) to bracket (19) with U-bolt (18), two washers (17), and nuts (16).
4. Tighten two clamps (24) of exhaust hose (28).
5. Install heat shield (20) to exhaust hose (28) and exhaust pipe (32) with three U-bolts (24), six washers (22), and nuts (21).

NOTE

Perform following step to install support brackets.

6. Install two brackets (9) to vehicle with four screws (15), washers (14), and nuts (13).
7. While supporting muffler (11), install muffler and exhaust pipe (1) with two clamps (10 and 12).
8. Install exhaust pipe (1) to two brackets (9) with two U-bolts (8), four washers (7), and nuts (6).
9. Install heat shield (2) to exhaust pipe (1) with three U-bolts (5), six washers (4), and nuts (3).

INSTALLATION - CONTINUED

10. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

DRAINING AND FILLING RADIATOR ASSEMBLY 0063 00

THIS WORK PACKAGE COVERS

Draining, Filling

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Antifreeze, permanent, ethylene glycol (Item 2 or Item 3, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Hose, radiator drain, ½ in I.D.

References

TM 10-3930-675-10

Equipment Condition

Radiator splash shield removed (WP 0136 00)



WARNING

DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.

DRAINING

NOTE

Bottom of radiator has two drain fittings. Fitting toward rear of vehicle is for draining coolant. Drain fitting toward front of vehicle is for draining possible condensation from engine air intake system.

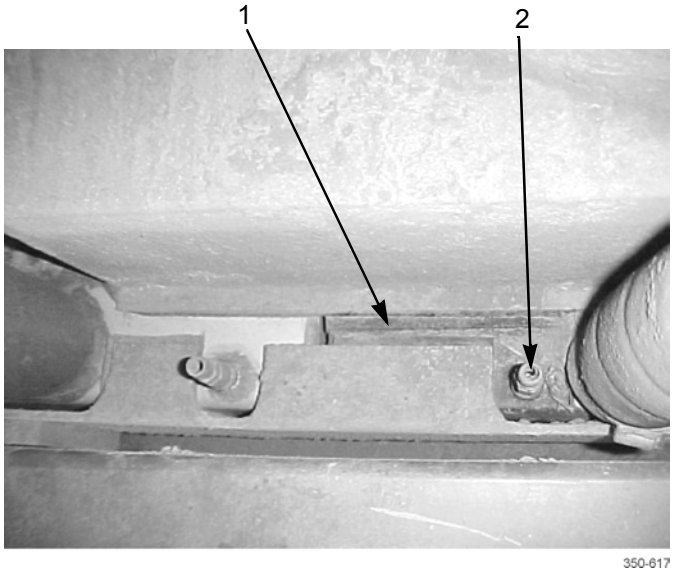
DRAINING - CONTINUED

1. Attach drain hose to drain fitting (2) at bottom of radiator assembly (1).

NOTE

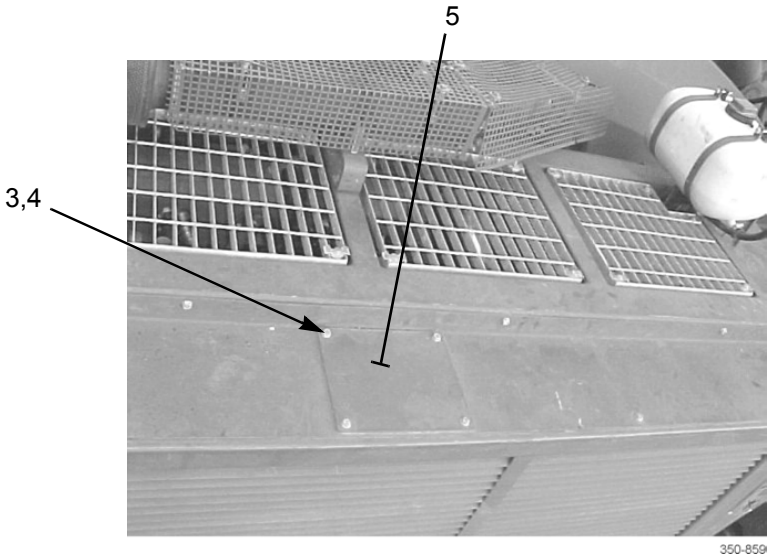
Cooling system capacity is 23.7 gal. (90.1 l).

2. Open drain fitting (2) and allow coolant to drain into a suitable container.
3. Close drain fitting (2) and remove drain hose.



FILLING

1. Remove four screws (3), washers (4), and fill cover plate (5) from top of vehicle.



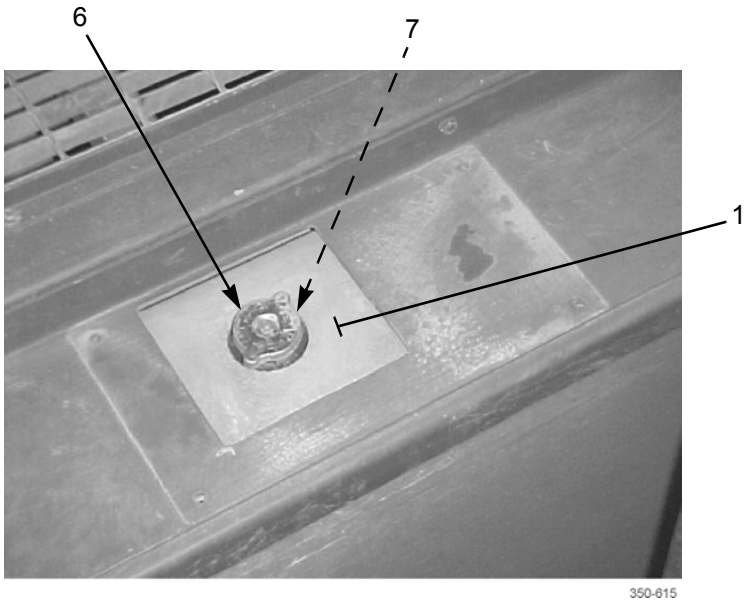
FILLING - CONTINUED

2. Remove radiator cap (6).

NOTE

Use type of coolant appropriate to the anticipated ambient temperature.

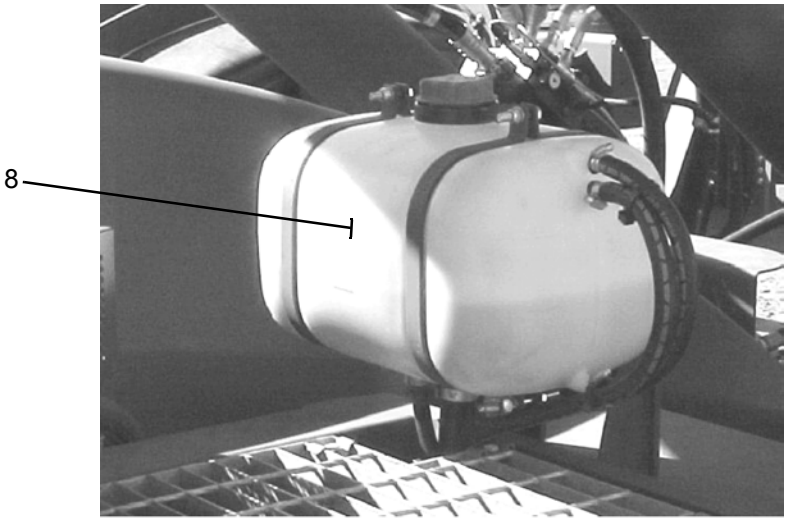
3. Add coolant thru filler opening (7) at top of radiator assembly (1) until coolant level reaches bottom of filler opening.
4. Install radiator cap (6).



5. Install fill cover plate (5) with four washers (4) and screws (3).

FILLING - CONTINUED

6. Start engine (TM 10-3930-675-10) and allow engine to reach operating temperature.
7. Note coolant level in expansion tank (8). Level should be between MIN and MAX lines on tank when engine is at operating temperature. Add coolant to expansion tank as needed.



8. Stop engine (TM 10-3939-675-10).
9. Install radiator splash shield (WP 0136 00).

END OF WORK PACKAGE

COOLING SYSTEM HOSES REPLACEMENT 0064 00

THIS WORK PACKAGE COVERS

Cab Interface Unit-to-Water Pump Hose: Removal, Installation

Cab Interface Unit-to-Engine Block Hose: Removal, Installation

Coolant Reservoir-to-Radiator Hose: Removal, Installation

Coolant Reservoir-to-Water Manifold Hose: Removal, Installation

Coolant Reservoir-to-Water Pump Hose: Removal, Installation

Transmission Oil Cooler-to-Radiator Hoses: Removal, Installation

Transmission Oil Cooler-to-Water Pump Hoses: Removal, Installation

Transmission Oil Cooler-to-Water Pump Return Hose: Removal, Installation

Transmission Oil Cooler U-Hose Replacement

Water Manifold-to-Radiator Hoses: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

References

WP 0135 00

WP 0137 00

Equipment Condition

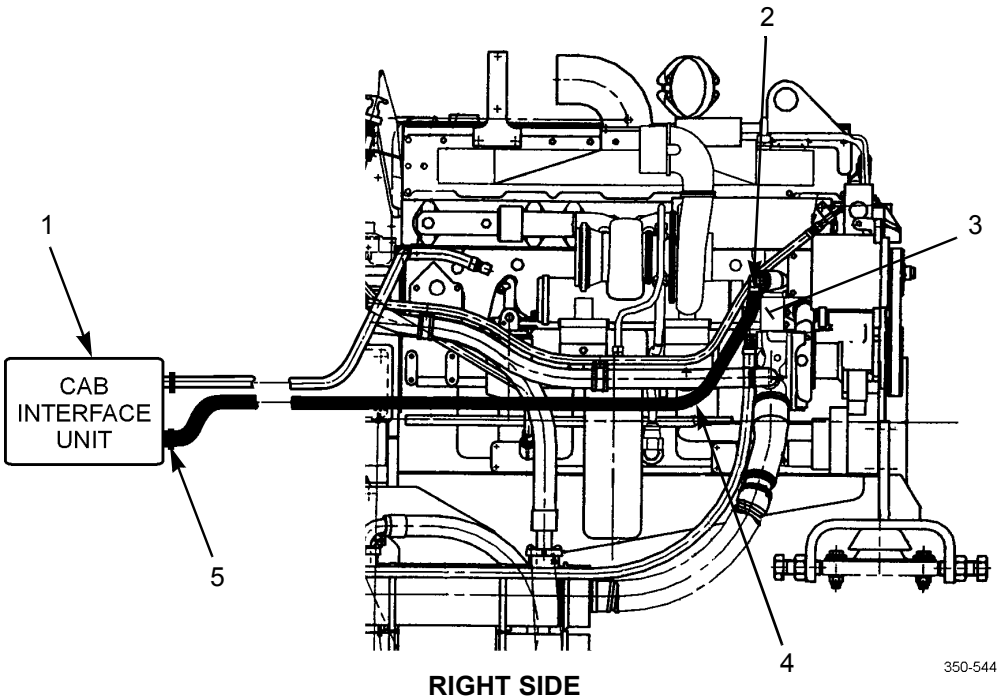
Cooling system drained (WP 0063 00)

NOTE

Note location of hose support clamps for installation. Remove hose support clamps, as necessary.

CAB INTERFACE UNIT-TO-WATER PUMP HOSE REMOVAL

1. Remove transmission access covers (WP 0135 00).
2. Loosen clamp (5) and disconnect hose (4) from cab interface unit (1) at rear of cab.
3. Loosen clamp (2) and remove other end of hose (4) from water pump (3).



RIGHT SIDE

CAB INTERFACE UNIT-TO-WATER PUMP HOSE

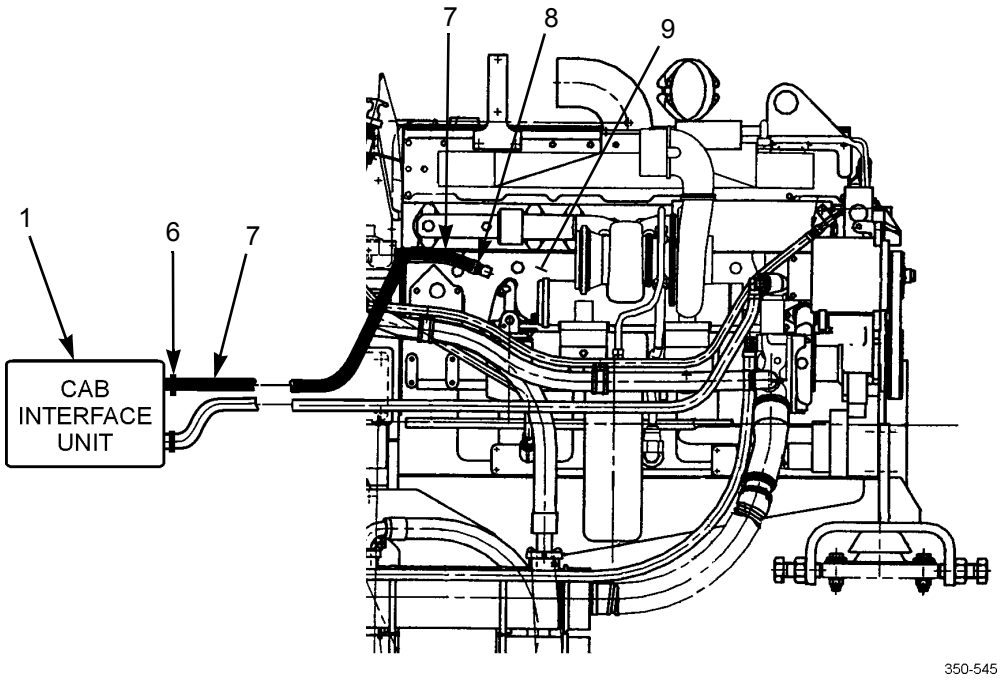
CAB INTERFACE UNIT-TO-WATER PUMP HOSE INSTALLATION

1. Install hose (4) to water pump (3) and tighten clamp (2).
2. Connect other end of hose (4) to cab interface unit (1) at rear of cab and tighten clamp (5).
3. Refill cooling system (WP 0063 00).
4. Install transmission access covers (WP 0135 00).

CAB INTERFACE UNIT-TO-ENGINE BLOCK HOSE REMOVAL

1. Remove transmission access covers (WP 0135 00).
2. Loosen clamp (6) and disconnect hose (7) from cab interface unit (1) at rear of cab.
3. Loosen clamp (8) and remove other end of hose (7) from engine block (9).

CAB INTERFACE UNIT-TO-ENGINE BLOCK HOSE REMOVAL - CONTINUED



RIGHT SIDE

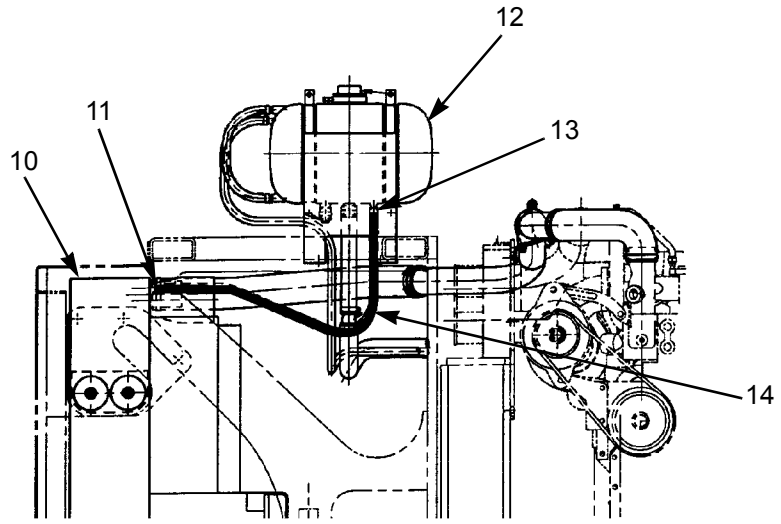
CAB INTERFACE UNIT-TO-ENGINE BLOCK HOSE

CAB INTERFACE UNIT-TO-ENGINE BLOCK HOSE INSTALLATION

1. Install hose (7) to engine block (9) and tighten clamp (8).
2. Connect other end of hose (7) to cab interface unit (1) and tighten clamp (6).
3. Refill cooling system (WP 0063 00).
4. Install transmission access covers (WP 0135 00).

COOLANT RESERVOIR-TO-RADIATOR HOSE REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen clamp (13) and disconnect hose (14) from coolant reservoir (12).
3. Loosen clamp (11) and remove other end of hose (14) from radiator (10).



FRONT VIEW 350-546

COOLANT RESERVOIR-TO-RADIATOR HOSE

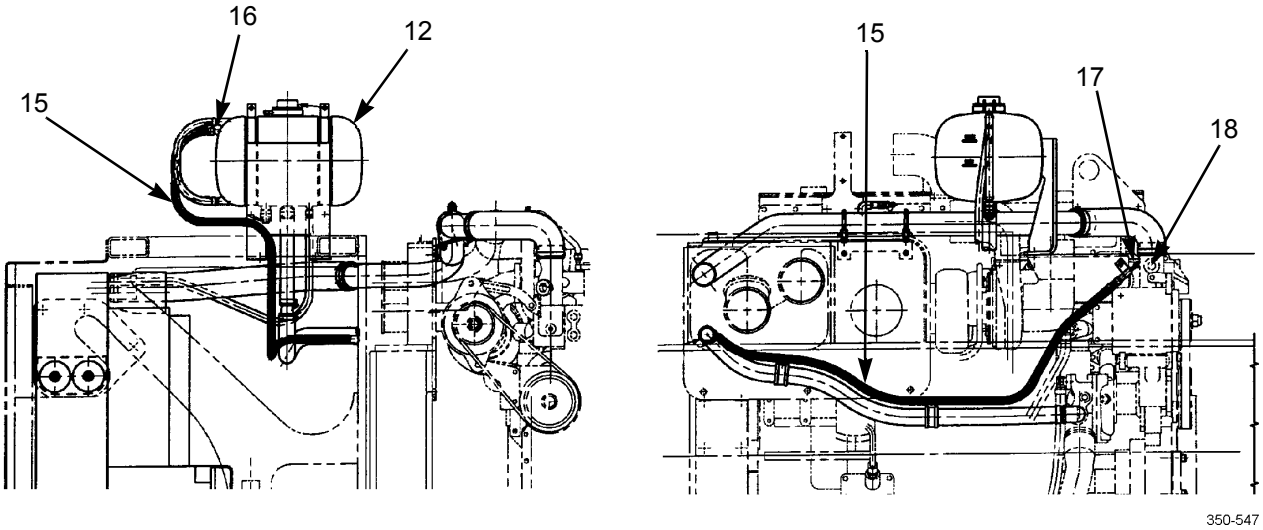
COOLANT RESERVOIR-TO-RADIATOR HOSE INSTALLATION

1. Install hose (14) to radiator (10) and tighten clamp (11).
2. Connect other end of hose (14) to coolant reservoir (12) and tighten clamp (13).
3. Refill cooling system (WP 0063 00).
4. Install radiator top grating (WP 0137 00).

COOLANT RESERVOIR-TO-WATER MANIFOLD HOSE REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen clamp (16) and disconnect hose (15) from coolant reservoir (12).
3. Loosen clamp (17) and remove other end of hose (15) from water manifold (18).

COOLANT RESERVOIR-TO-WATER MANIFOLD HOSE REMOVAL - CONTINUED



FRONT VIEW RIGHT SIDE

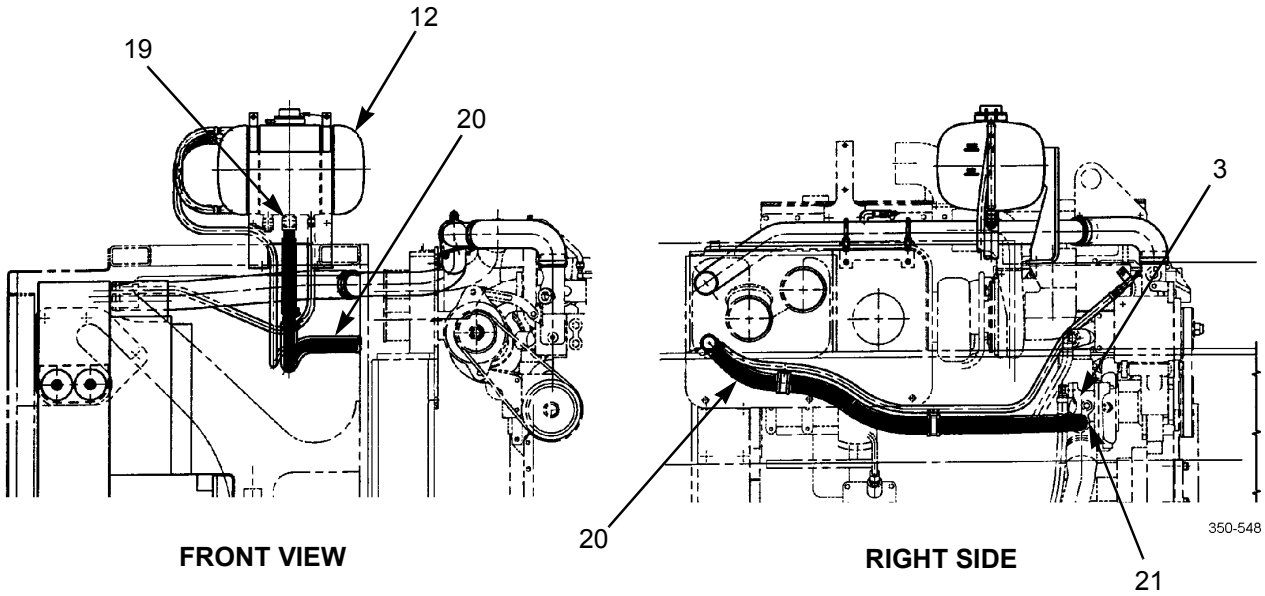
COOLANT RESERVOIR-TO-WATER MANIFOLD HOSE

COOLANT RESERVOIR-TO-WATER MANIFOLD HOSE INSTALLATION

1. Install hose (15) to water manifold (18) and tighten clamp (17).
2. Connect other end of hose (15) to coolant reservoir (12) and tighten clamp (16).
3. Refill cooling system (WP 0063 00).
4. Install radiator top grating (WP 0137 00).

COOLANT RESERVOIR-TO-WATER PUMP HOSE REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen clamp (19) and disconnect hose (20) from coolant reservoir (12).
3. Loosen clamp (21) and remove other end of hose (20) from water pump (3).



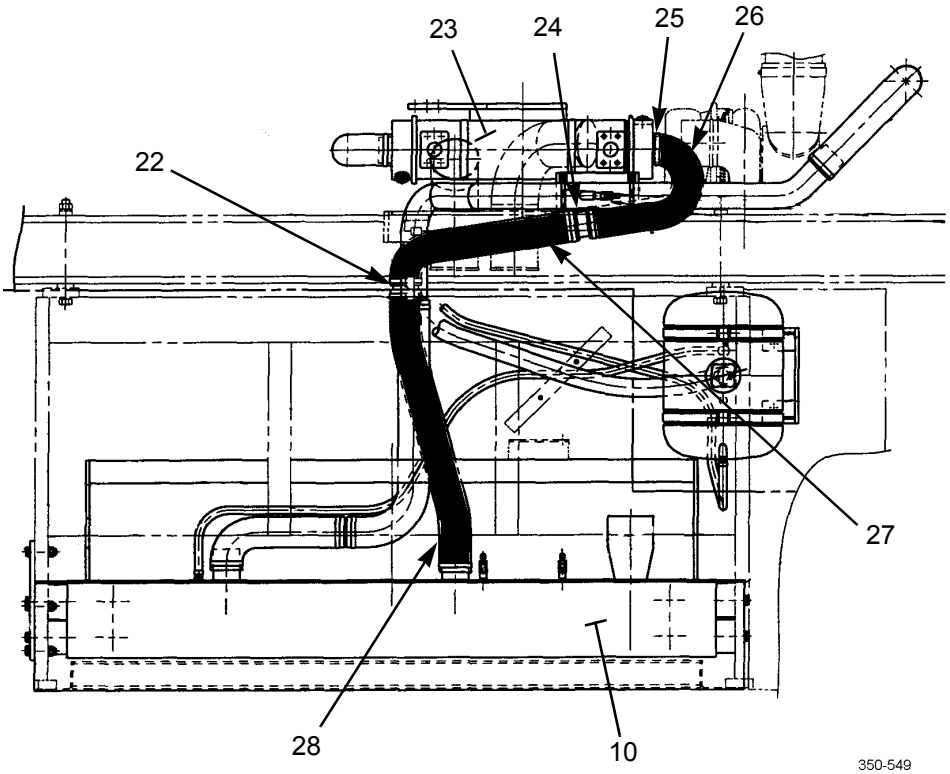
COOLANT RESERVOIR-TO-WATER PUMP HOSE

COOLANT RESERVOIR-TO-WATER PUMP HOSE INSTALLATION

1. Install hose (20) to water pump (3) and tighten clamp (21).
2. Connect other end of hose (20) to coolant reservoir (12) and tighten clamp (19).
3. Refill cooling system (WP 0063 00).
4. Install radiator top grating (WP 0137 00).

TRANSMISSION OIL COOLER-TO-RADIATOR HOSES REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen six clamps (24).
3. Remove three hoses (26, 27, and 28) and two cooling pipes (22 and 24) between transmission oil cooler (23) and radiator (10).



TOP VIEW

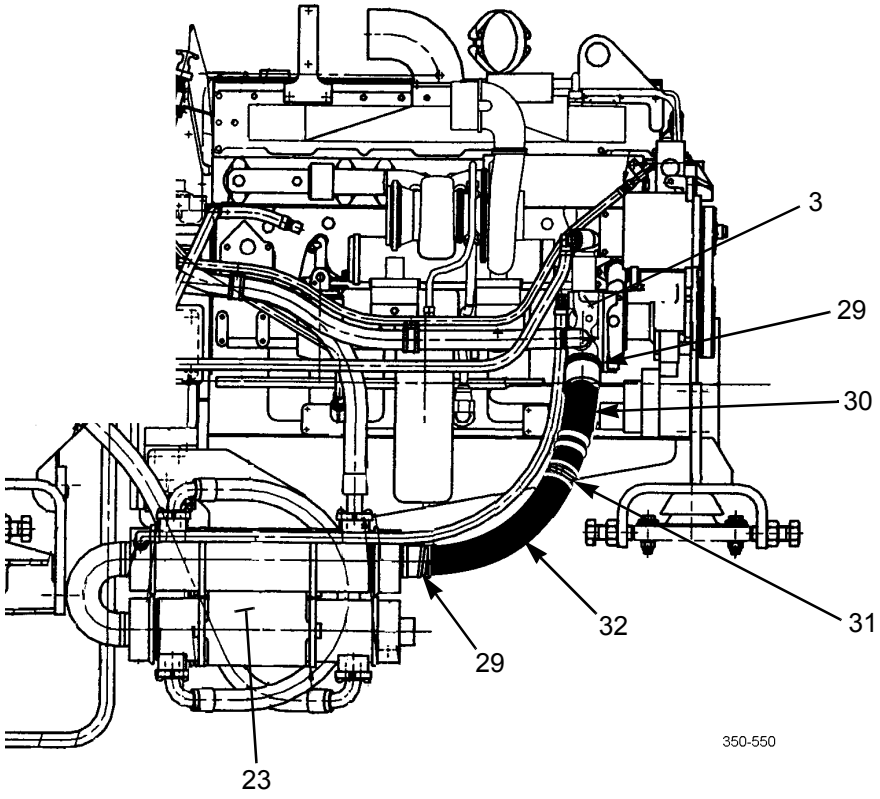
TRANSMISSION OIL COOLER-TO-RADIATOR HOSES

TRANSMISSION OIL COOLER-TO-RADIATOR HOSES INSTALLATION

1. Install two cooling pipes (22 and 24) and three hoses (26, 27, and 28) between radiator (10) and transmission oil cooler (23).
2. Tighten six clamps (25).
3. Refill cooling system (WP 0063 00).
4. Install radiator top grating (WP 0137 00).

TRANSMISSION OIL COOLER-TO-WATER PUMP HOSES REMOVAL

1. Loosen four clamps (29).
2. Remove two hoses (30 and 32) and pipe (31) between transmission oil cooler (23) and water pump (3).



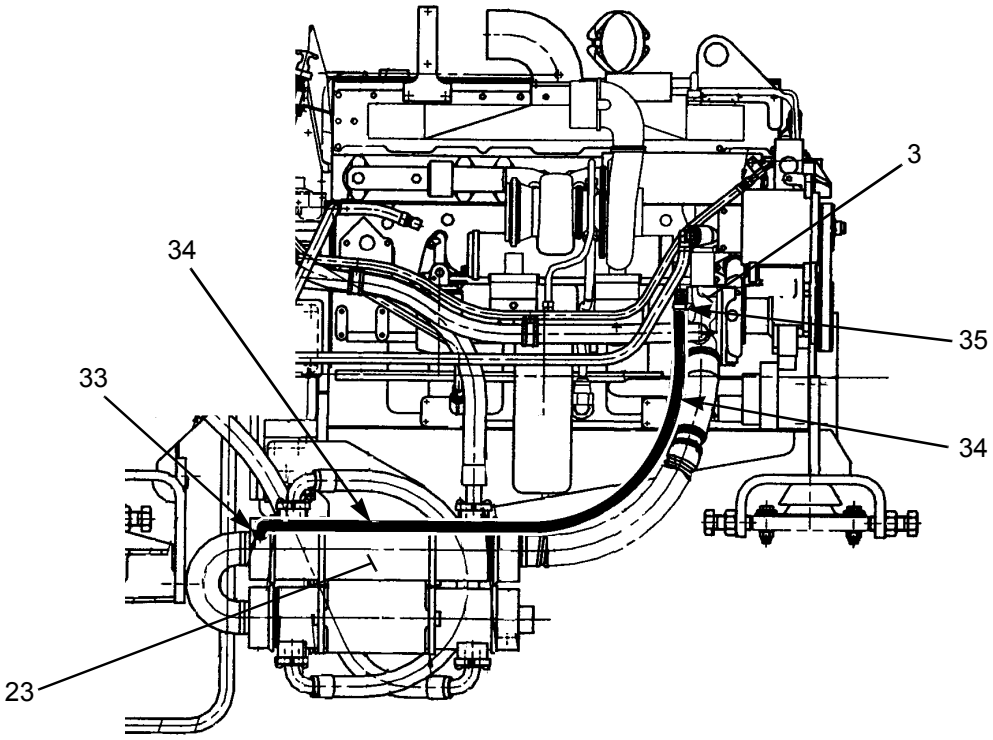
TRANSMISSION OIL COOLER-TO-WATER PUMP HOSES

TRANSMISSION OIL COOLER-TO-WATER PUMP HOSES INSTALLATION

1. Install pipe (31) and two hoses (30 and 32) between water pump (3) and transmission oil cooler (23).
2. Tighten four clamps (29).
3. Refill cooling system (WP 0063 00).

TRANSMISSION OIL COOLER-TO-WATER PUMP RETURN HOSE REMOVAL

1. Loosen clamp (33) and disconnect hose (34) from transmission oil cooler (23).
2. Loosen clamp (35) and remove other end of hose (34) from water pump (3).



RIGHT SIDE

350-551

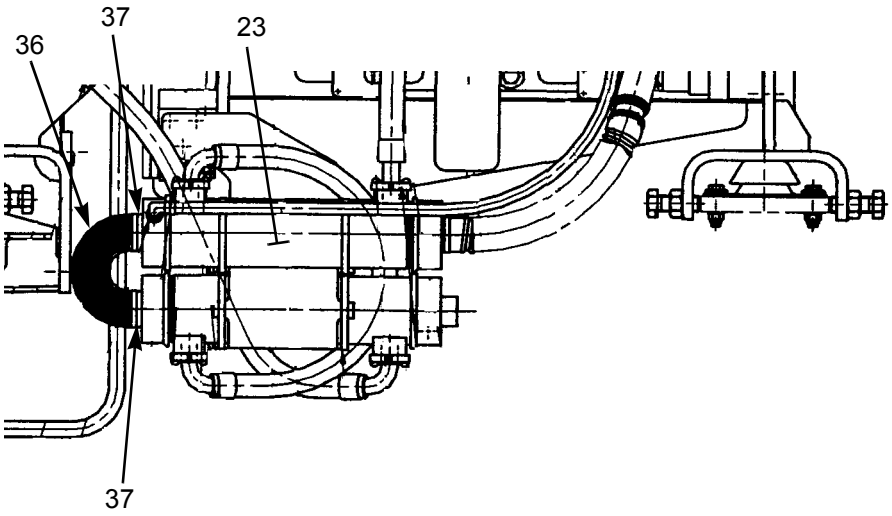
TRANSMISSION OIL COOLER-TO-WATER PUMP RETURN HOSE

TRANSMISSION OIL COOLER-TO-WATER PUMP RETURN HOSE INSTALLATION

1. Install hose (34) to water pump (3) and tighten clamp (35).
2. Connect other end of hose (34) to transmission oil cooler (23) and tighten clamp (33).
3. Refill cooling system (WP 0063 00).

TRANSMISSION OIL COOLER U-HOSE REPLACEMENT

1. Loosen two clamps (37) and remove U-hose (36) from transmission oil cooler (23).
2. Install U-hose (36) to transmission oil cooler (23) and tighten two clamps (37).
3. Refill cooling system (WP 0063 00).

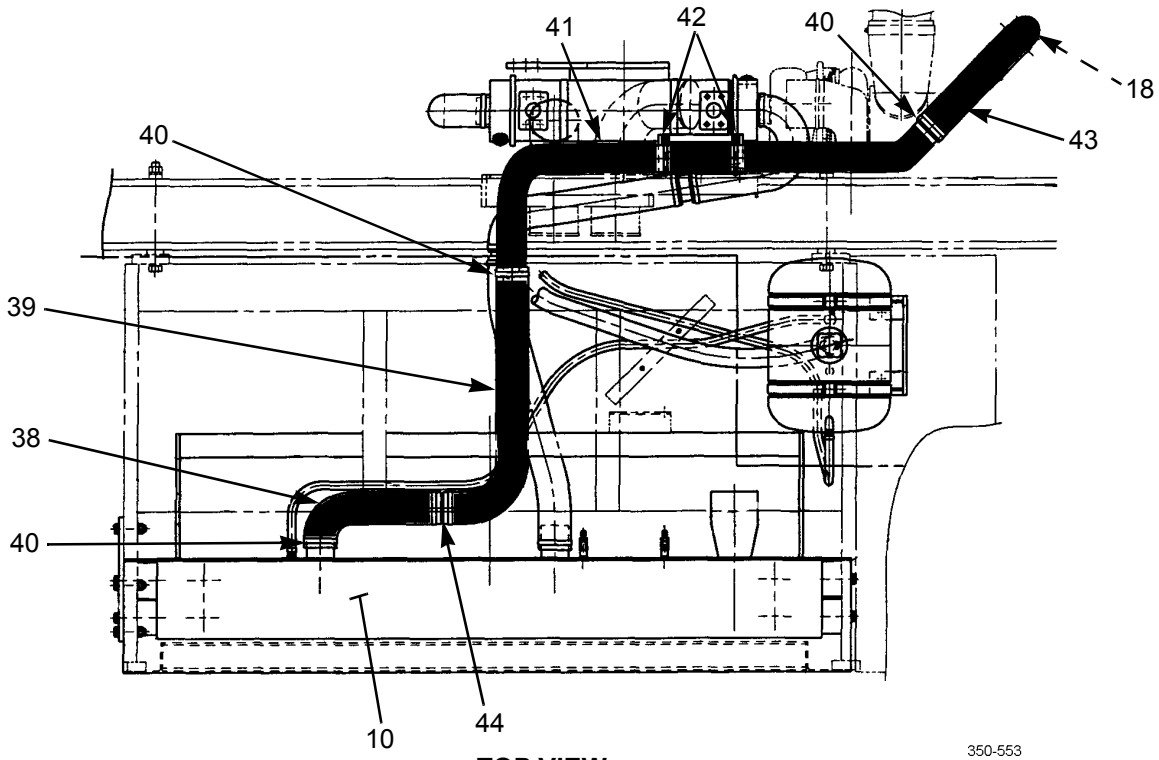


RIGHT SIDE 350-552

TRANSMISSION OIL COOLER U-HOSE

WATER MANIFOLD-TO-RADIATOR HOSES REMOVAL

1. Remove radiator top grating (WP 0137 00).
2. Loosen six clamps (40).
3. Remove two U-clamps (42) from cooling pipe (41).
4. Remove three hoses (38, 39, and 43) and two cooling pipes (41 and 44) from water manifold (18) and radiator (10).



TOP VIEW

WATER MANIFOLD-TO-RADIATOR HOSES

WATER MANIFOLD-TO-RADIATOR HOSES INSTALLATION

1. Install two cooling pipes (41 and 44) and three hoses (38, 39, and 43) between radiator (10) and water manifold (18).
2. Install two U-clamps (42) to cooling pipe (41).
3. Tighten six clamps (40).
4. Refill cooling system (WP 0063 00).
5. Install radiator top grating (WP 0137 00).

END OF WORK PACKAGE

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COOLING SYSTEM EXPANSION TANK MAINTENANCE 0065 00

THIS WORK PACKAGE COVERS

Removal
Disassembly
Cleaning and Inspection
Assembly
Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Detergent (Item 11, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Materials/Parts - Continued

Tag, marker (Item 28, WP 0203 00)

Gasket (P/N 920715.0007)

Nut, lock (P/N 920076.003) (4)

O-ring (P/N 920052.010)

References

WP 0063 00



WARNING

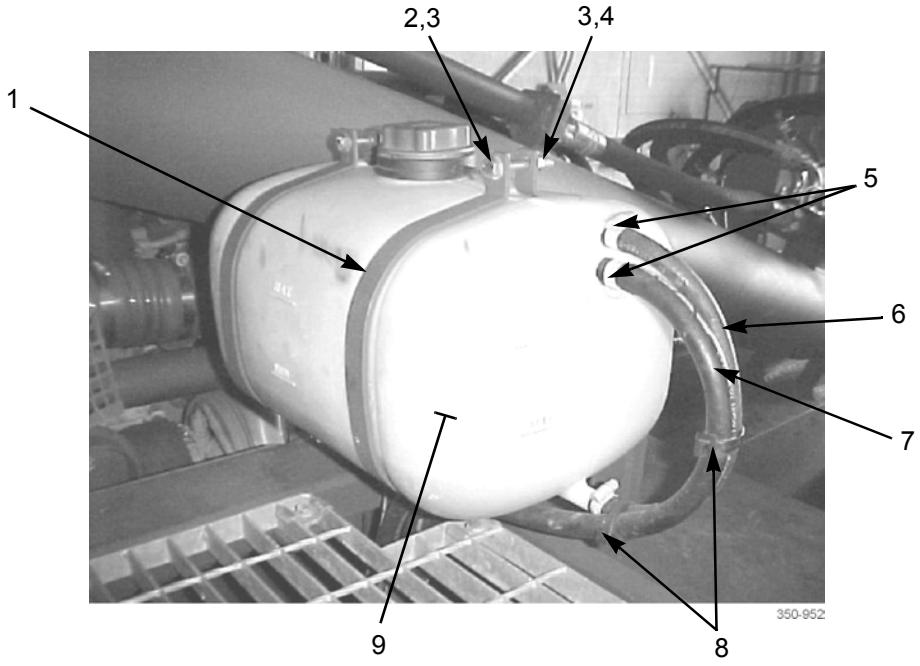
DO NOT perform maintenance on cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.

NOTE

- Tag hoses to aid in installation.
- Use a suitable container to catch any draining coolant.

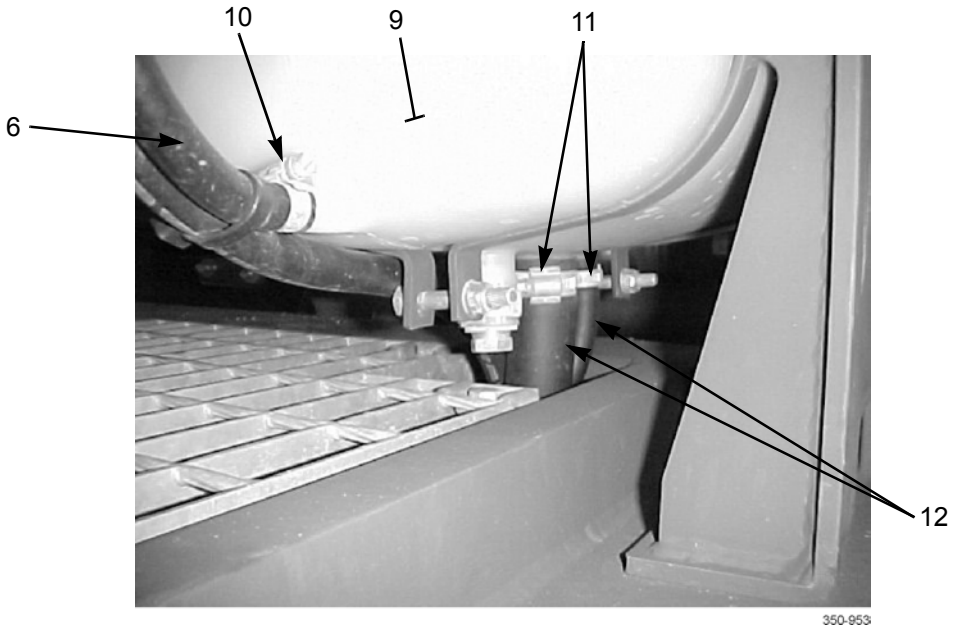
REMOVAL

1. Loosen two hose clamps (5) and disconnect two hoses (6 and 7) from top side of expansion tank (9).
2. Remove four locknuts (4), screws (2), eight washers (3), and two clamps (1) from expansion tank (9). Discard locknuts.
3. Empty coolant from expansion tank (9) by pouring coolant from two openings at top side of tank.
4. Release two hoses (6 and 7) by removing two tiedown straps (8). Discard tiedown straps.



5. Loosen two hose clamps (11) and disconnect two hoses (12) from underside of expansion tank (9).
6. Remove expansion tank (9).
7. Loosen clamp (10) and remove hose (6) from bottom side of expansion tank (9).

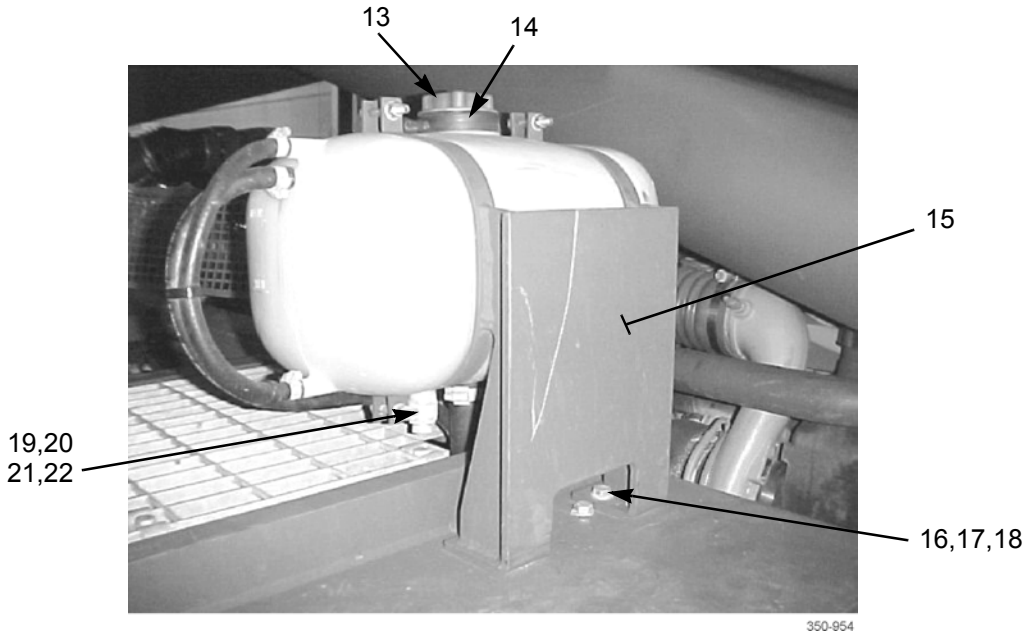
REMOVAL- CONTINUED



8. Remove two nuts (16), four washers (17), two screws (18), and expansion tank mounting bracket (15).

DISASSEMBLY

1. Remove cover (13) and rubber ring (14).
2. Remove nipple (19), o-ring (20), plug (21), and gasket (22) from underside of expansion tank (9). Discard o-ring and gasket.

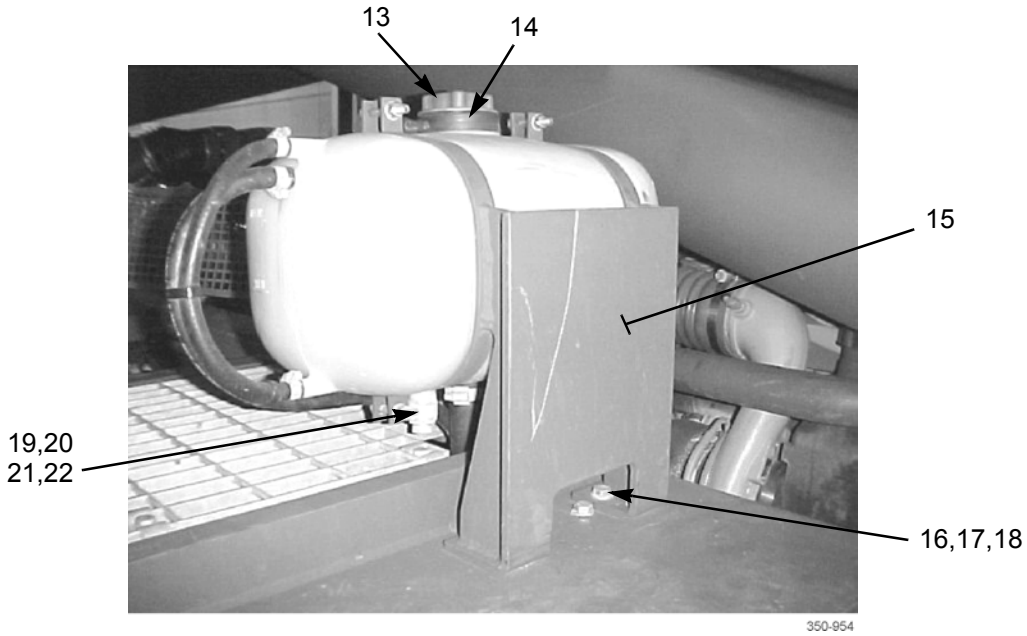


CLEANING AND INSPECTION

1. Wash expansion tank with soap and water. Rinse thoroughly.
2. Inspect expansion tank for cracks that could cause leaks. Replace if tank is cracked or otherwise damaged.
3. Inspect all other removed components for damage. Replace if damaged.

ASSEMBLY

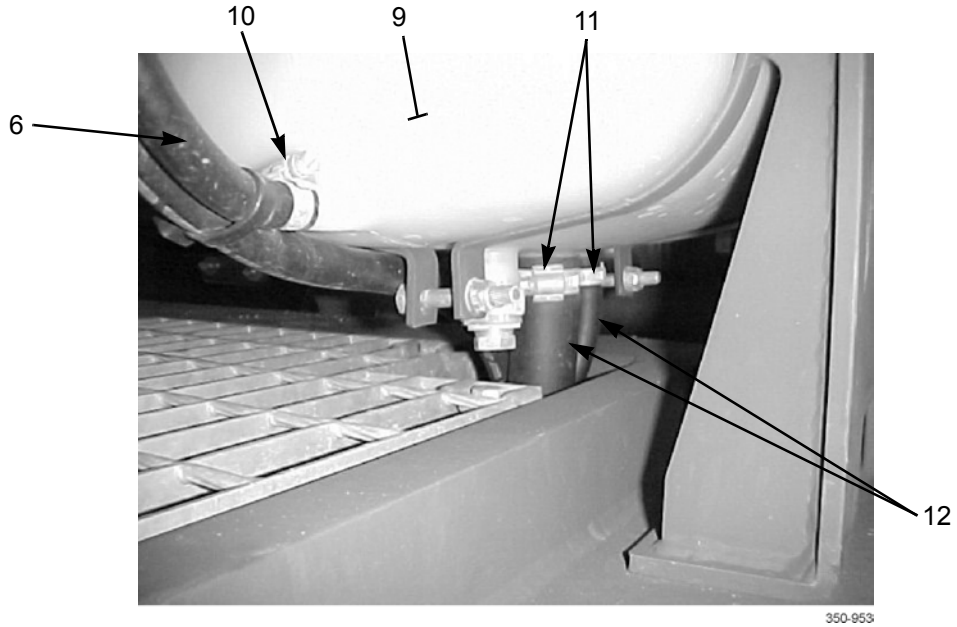
1. Install new gasket (22), plug (21), new o-ring (20), and nipple (19) to underside of expansion tank (9).
2. Install rubber ring (14) and cover (13).



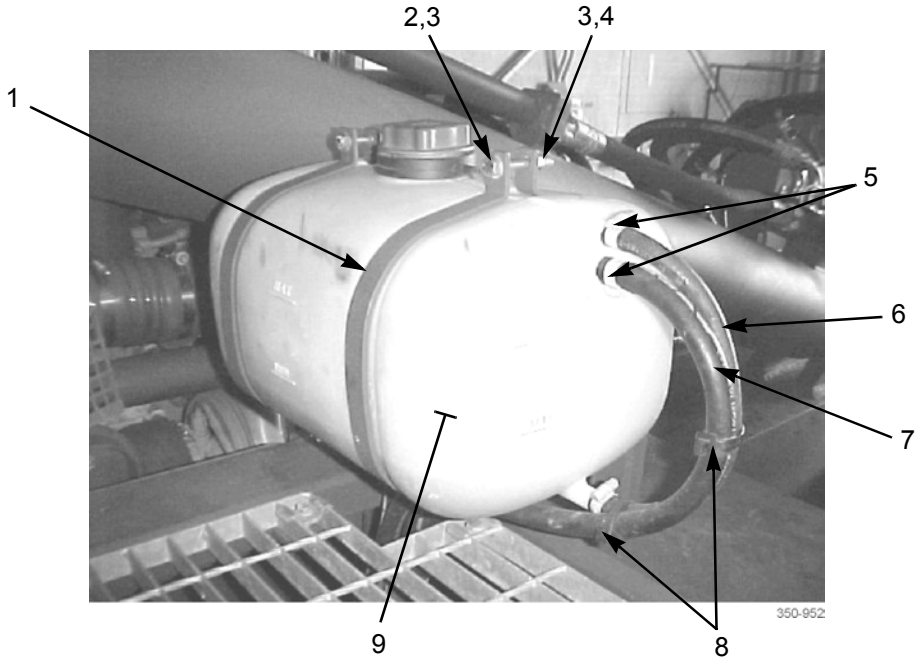
INSTALLATION

1. Install expansion tank mounting bracket (15) with two screws (18), four washers (17), and two nuts (16).
2. Install hose (6) to bottom side of expansion tank (9) and tighten clamp (10).
3. Position expansion tank (9) and connect two hoses (12) to underside of tank. Tighten two hose clamps (11).

INSTALLATION - CONTINUED



4. Secure expansion tank (9) to mounting bracket (15) with two clamps (1), four screws (2), eight washers (3), and four new locknuts (4).
5. Connect two hoses (6 and 7) to top side of expansion tank (9). Tighten two hose clamps (5).
6. Install two new tiedown straps (8) to secure hoses (6 and 7) together.



INSTALLATION - CONTINUED

7. Check coolant level and add as necessary (WP 0063 00).

END OF WORK PACKAGE

THERMOSTAT REPLACEMENT 0066 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Took kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Seal, o-ring (P/N 186780)

References

TM 10-3930-675-10

WP 0063 00

Equipment Condition

Engine cover removed (WP 0143 00)

Radiator splash shield removed (WP 0136 00)

Alternator removed (WP 0069 00)

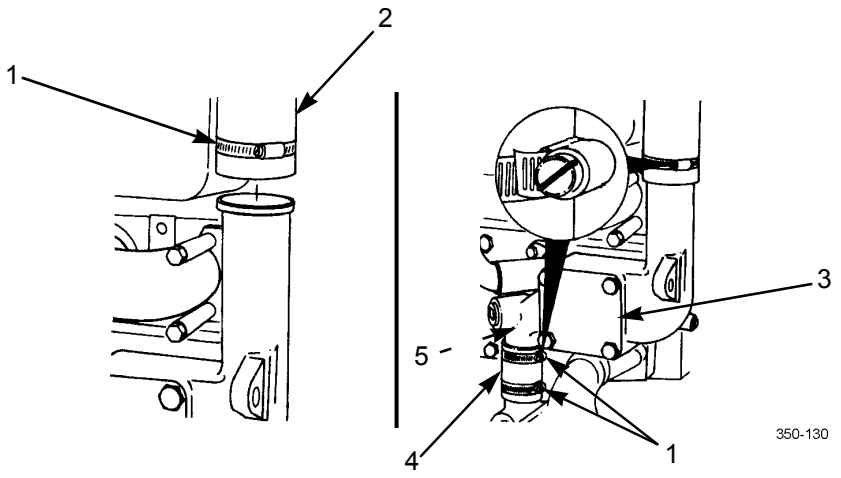
REMOVAL



WARNING

DO NOT perform maintenance on cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.

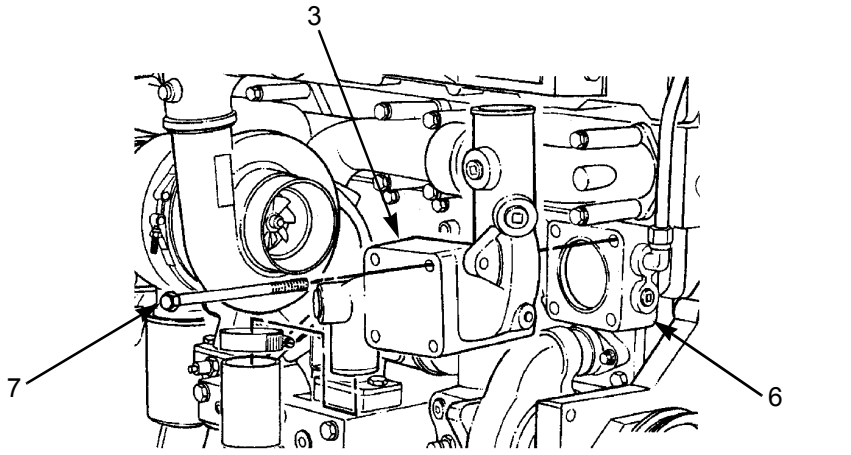
1. Position suitable container under radiator draincock. Open draincock and drain coolant. Retain coolant for filling cooling system.
2. Loosen coolant bypass hose clamps (1) on upper and lower hoses (2 and 4).
3. Remove upper hose (2) and lower hose (4) from thermostat housing (3). Ensure that flow restriction disc (5) is retained for installation.



THERMOSTAT REPLACEMENT - CONTINUED 0066 00

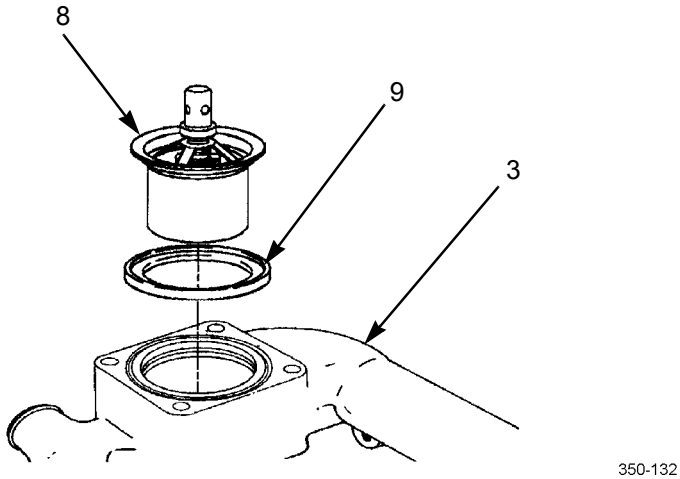
REMOVAL - CONTINUED

4. Remove four screws (7) securing thermostat housing (3) to housing support (6).
5. Remove thermostat housing (3) from housing support (6).



350-131

6. Remove thermostat (8) and seal (9) from thermostat housing (3). Discard seal.



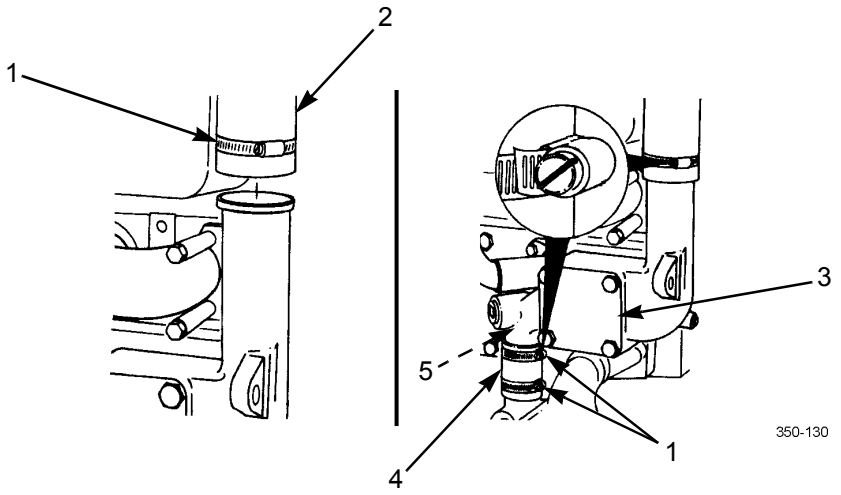
350-132

INSTALLATION

NOTE

Ensure sealing surfaces of thermostat housing and housing support are clean and free of all material.

1. Install thermostat (8) and new seal (9) in thermostat housing (3).
2. Position thermostat housing (3) on housing support (6) and secure with four screws (7). Tighten screws to 40 lb-ft (54 Nm).
3. Connect upper hose (2) and lower hose (4) to thermostat housing (3) and secure with hose clamps (1). Ensure that flow restriction disc (5) is installed.



NOTE

Ensure radiator draincock is closed.

4. Replace coolant in system. Start engine (TM 10-3930-675-10) and check for leaks.
5. Top off coolant level as needed (WP 0063 00).
6. Install radiator splash shield (WP 0136 00).
7. Install alternator (WP 0069 00).

END OF WORK PACKAGE

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WATER PUMP REPLACEMENT 0067 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Puller, mechanical (Item 22, WP 0204 00)

Puller, mechanical (Item 23, WP 0204 00)

Wrench, torque, 0-300 lb-in capacity (Item 41, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 20, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Sealant, silicone (Item 24, WP 0203 00)

Materials/Parts - Continued

Gasket (P/N 3027924)

Gasket (P/N 3328759)

Seal, dust (P/N 3895020)

Seal, oil (P/N 3161772)

Seal, o-ring (P/N 3882774)

Seal, o-ring (P/N 3892095)

References

TM 10-3930-675-10

WP 0063 00

Equipment Condition

Engine cover removed (WP 0143 00)

Alternator drive belt removed (WP 0070 00)

Alternator removed (WP 0069 00)

Thermostat housing removed (WP 0066 00)

REMOVAL



WARNING

DO NOT perform maintenance on cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.

NOTE

Use a drain pan to catch any remaining coolant.

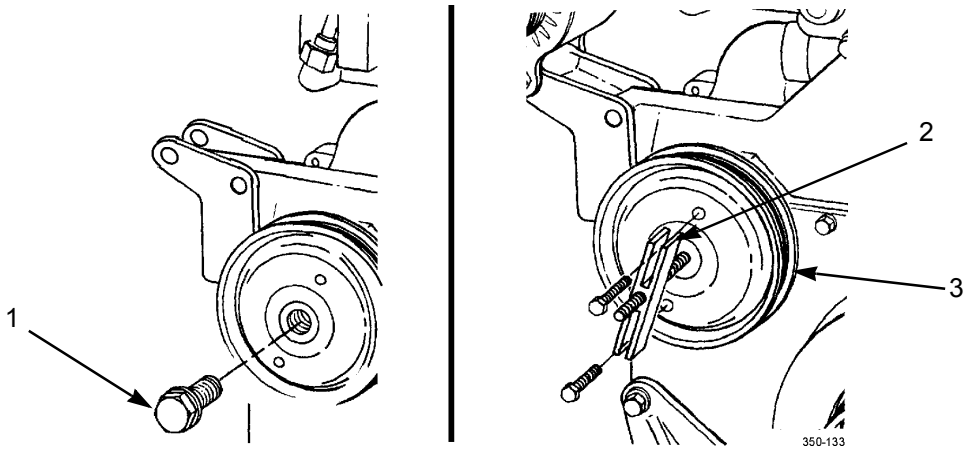
REMOVAL - CONTINUED

1. Remove water pump pulley retaining screw (1).

NOTE

Ensure puller mounting screws are threaded all the way thru puller before applying pressure to puller screw.

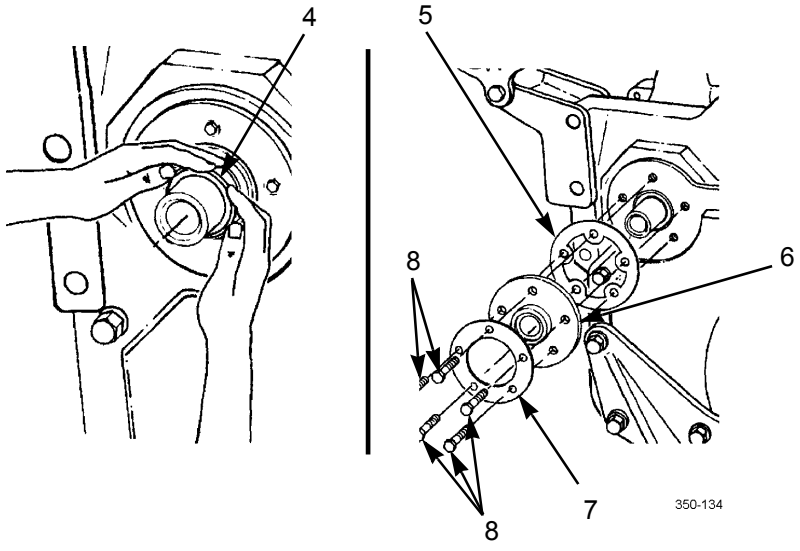
2. Use mechanical puller (2) and remove water pump pulley (3).



NOTE

Dust seal is removed as seal carrier is removed; or use a heel bar or similar tool to pry dust seal away from seal case. Then remove by hand.

3. Remove dust seal (4). Discard dust seal.
4. Remove five screws (8), clamping ring (7), oil seal (6), and gasket (5). Discard oil seal and gasket.



REMOVAL - CONTINUED

5. Remove two water pump transfer connection screws (9).
6. Remove three water pump mounting screws (15).

NOTE

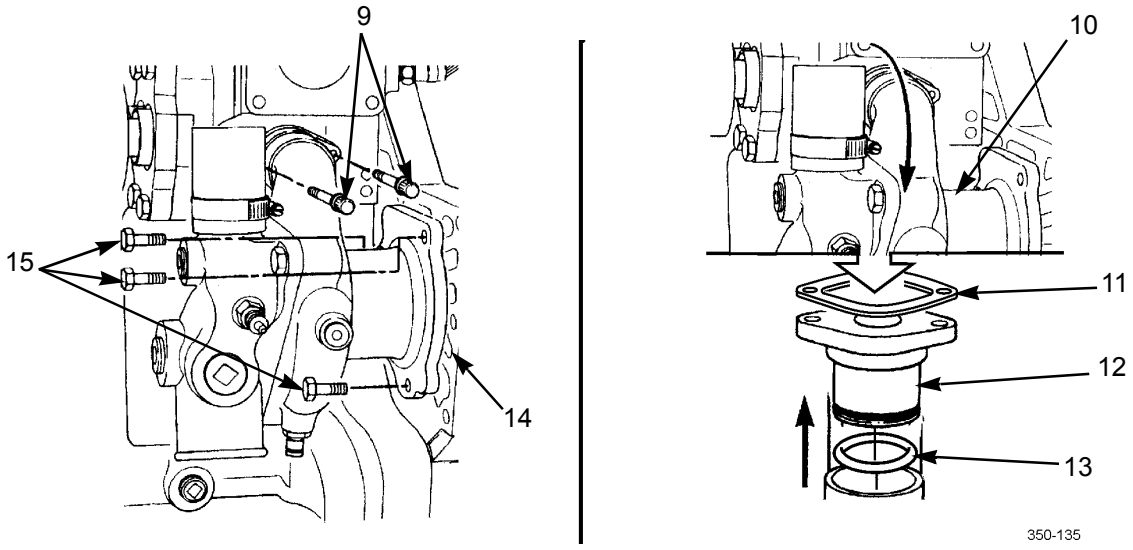
Rotate water pump outward to access transfer connection for removal.

7. Disconnect water transfer connection (12) and gasket (11) from engine and remove transfer connection and seal (13) from water pump (10). Discard gasket and seal.

NOTE

Water pump must be rotated outward and angled downward while being removed to allow pump to pass thermostat housing support.

8. Remove water pump (10) and seal (14). Discard seal.



INSTALLATION

NOTE

Water pump must be rotated outward from the top until transfer outlet clears thermostat housing support during installation.

1. Install new seal (14) on water pump (10) and install water pump.
2. Install new seal (13) on transfer connection (12) and install transfer connection into water pump (10).
3. Rotate water pump (10) inward and install three water pump mounting screws (15). Tighten screws to 35 lb-ft (47 Nm).
4. Install new gasket (11) on water pump transfer connection (12).
5. Position transfer connection (12) and secure in place with two screws (9). Tighten screws to 18 lb-ft (24 Nm).

INSTALLATION - CONTINUED

NOTE

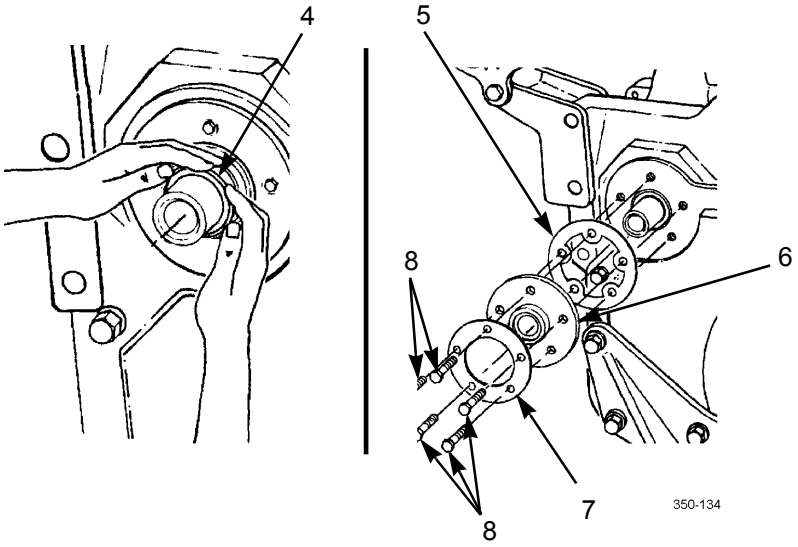
Oil seal must be installed with lip of seal and shaft clean and dry. Yellow lip of seal must face out.

6. Install new gasket (5) and new oil seal (6).

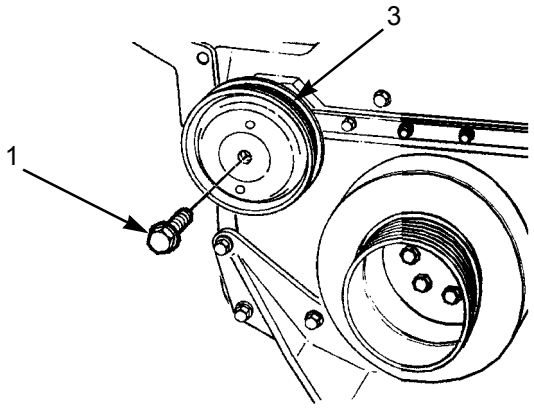
NOTE

To prevent oil leakage, use sealant on clamping ring mounting screws.

7. Install clamping ring (7) and secure in place with five screws (8). Tighten screws to 60 lb-in (7 Nm). Repeat tightening screws to 180 lb-in (20 Nm).
8. Apply a light coat of oil to inside of new dust seal (4) and install dust seal.



9. Using pusher adapter and pulley pusher, install water pump pulley (3).
10. Install water pump pulley retaining screw (1). Tighten screw to 55 lb-ft (75 Nm).



INSTALLATION - CONTINUED

11. Install thermostat and thermostat housing (WP 0066 00).
12. Install alternator (WP 0069 00)
13. Install and adjust alternator drive belt (WP 0070 00).
14. Ensure cooling system is topped off (WP 0063 00). Start engine (TM 10-3930-675-10) and check for operation and leaks.
15. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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COOLANT FILTER REPLACEMENT 0068 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 20, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Filter, coolant (P/N WF2075)

References

TM 10-3930-675-10

Equipment Condition

Engine cover removed (WP 0143 00)

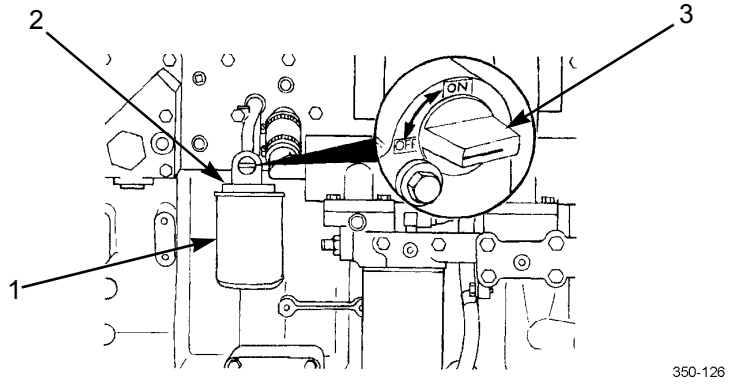
REMOVAL



WARNING

DO NOT perform maintenance on cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam, hot water or coolant will cause serious burns.

1. Turn valve (3) on cooling filter head (2) to OFF position.
2. Remove and discard coolant filter (1).

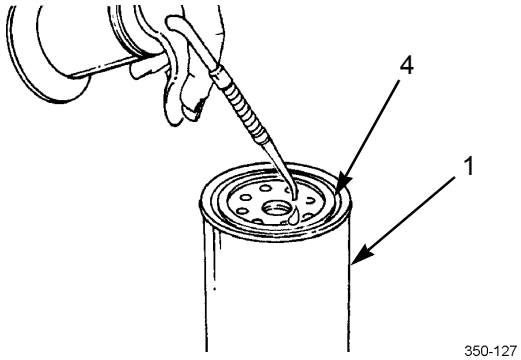


INSTALLATION

NOTE

Ensure coolant filter sealing surface is free of old gasket material.

1. Apply light coat of lubricating oil to gasket sealing surface (4) of new coolant filter (1).

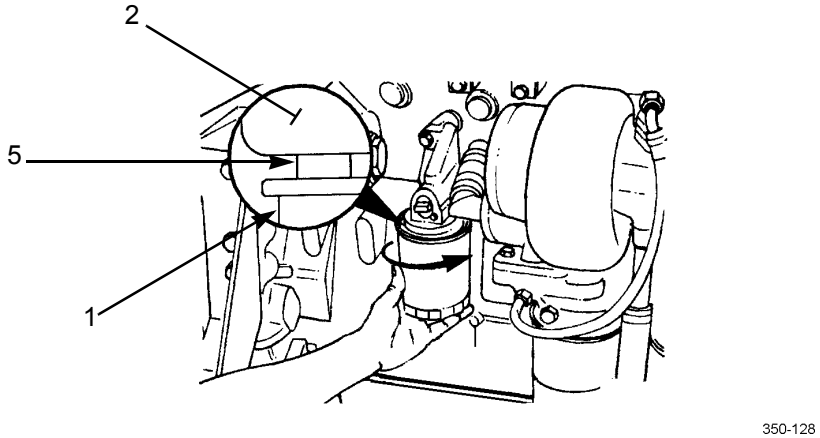


2. Install coolant filter (1) on filter head (2) and tighten until gasket (5) contacts filter head surface.

CAUTION

Overtightening can distort filter threads or damage filter head

3. Tighten coolant filter (1) an additional ½ to ¾ of a turn.

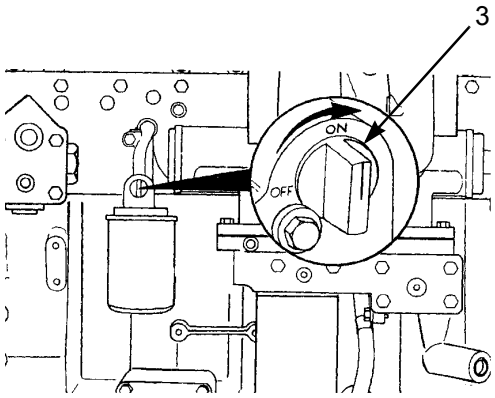


INSTALLATION - CONTINUED

CAUTION

Coolant filter head valve must be in ON position to prevent damage to engine.

4. Turn coolant filter head valve (3) to ON.



350-129

5. Operate engine and check for leaks (TM 10-3930-675-10).
6. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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ALTERNATOR REPLACEMENT 0069 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 7089)

Personnel Required

Two

References

TM 10-3930-675-10

Equipment Condition

Engine cover removed (WP 0143 00)

Battery cables disconnected (WP 0108 00)

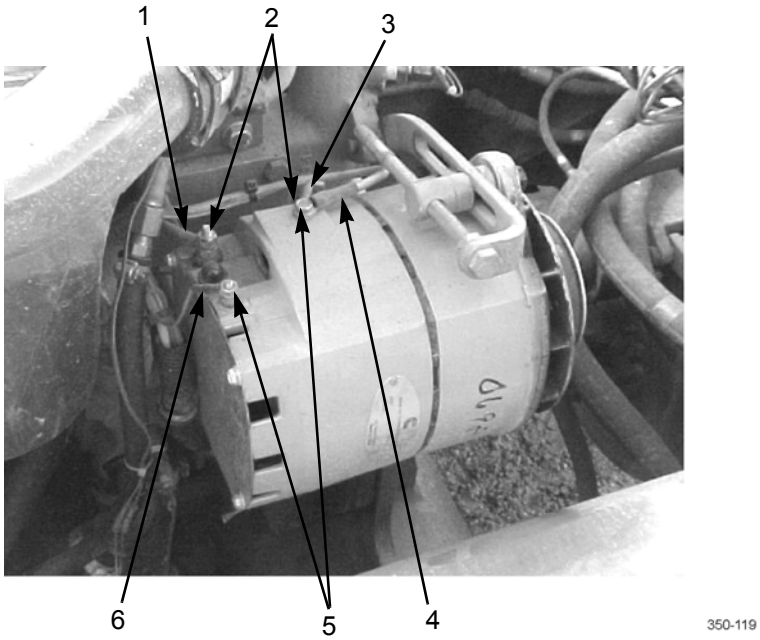
Alternator drive belt removed (WP 0070 00)

REMOVAL

NOTE

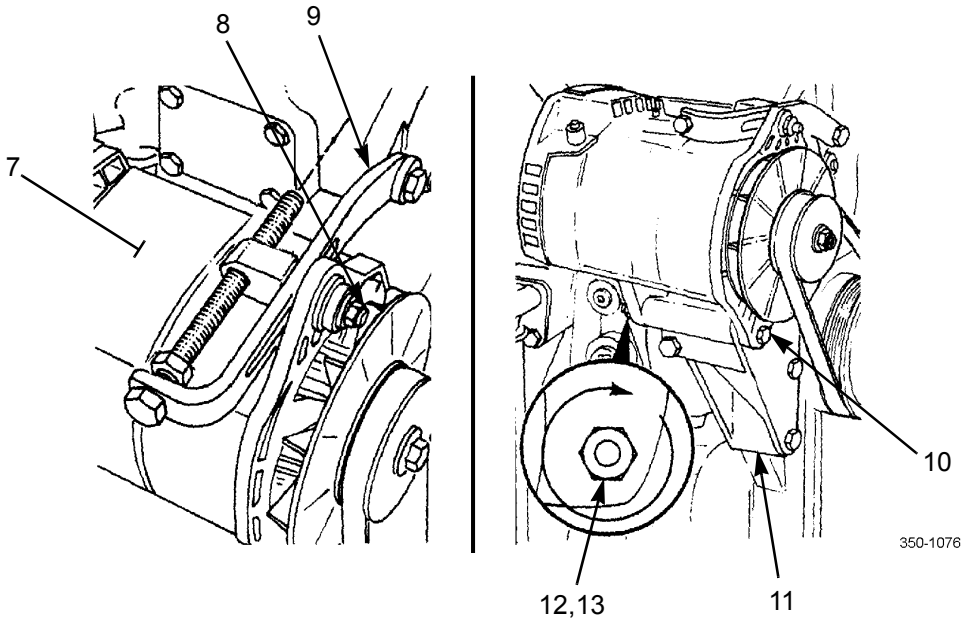
Tag wire leads prior to disconnection to ensure proper connection on installation.

1. Remove three nuts (2) and disconnect wiring harness leads (1, 3, 4, and 6) from three alternator terminals (5). Replace hardware on alternator terminal.



REMOVAL - CONTINUED

2. Remove adjusting link screw (8) securing alternator (7) to adjusting bracket (9).
3. With assistant holding alternator (7), remove mounting screw (10), locknut (12), and washer (13) securing alternator to mounting bracket (11). Remove alternator and discard locknut.

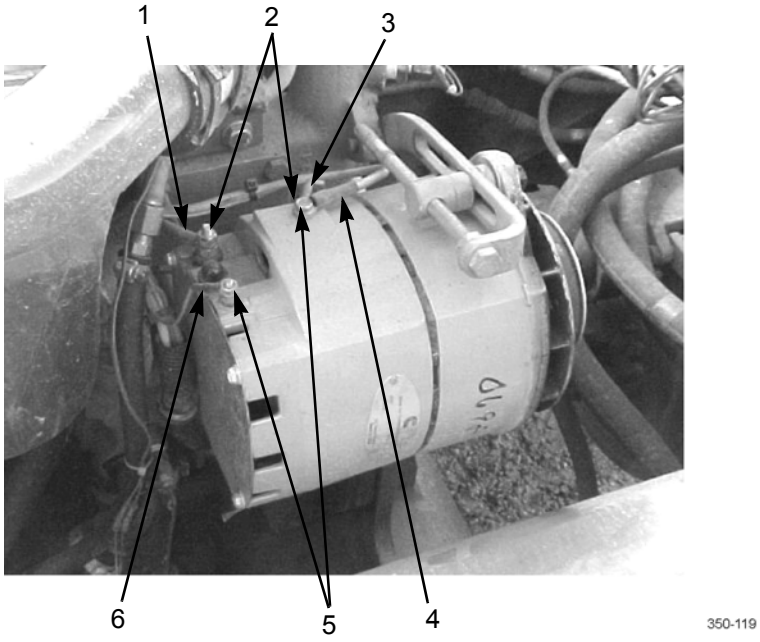


INSTALLATION

1. Position alternator (7) on mounting bracket (11) and secure with screw (10), washer (13), and new locknut (12). Tighten hand tight.
2. Install adjusting link screw (8). Tighten hand tight.
3. Install alternator drive belt (WP 0070 00).

INSTALLATION - CONTINUED

4. Remove three nuts (2) and connect wiring harness leads (1, 3, 4, and 6) to three alternator terminals (5). Secure wiring harness leads with three nuts.



5. Connect battery cables (WP 0108 00).
6. Adjust alternator belt tension (WP 0070 00).
7. Start engine (TM 10-3930-675-10) and verify operation of alternator.
8. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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ALTERNATOR DRIVE BELT MAINTENANCE 0070 00

THIS WORK PACKAGE COVERS

Removal, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Belt, tension gage (Item 3, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

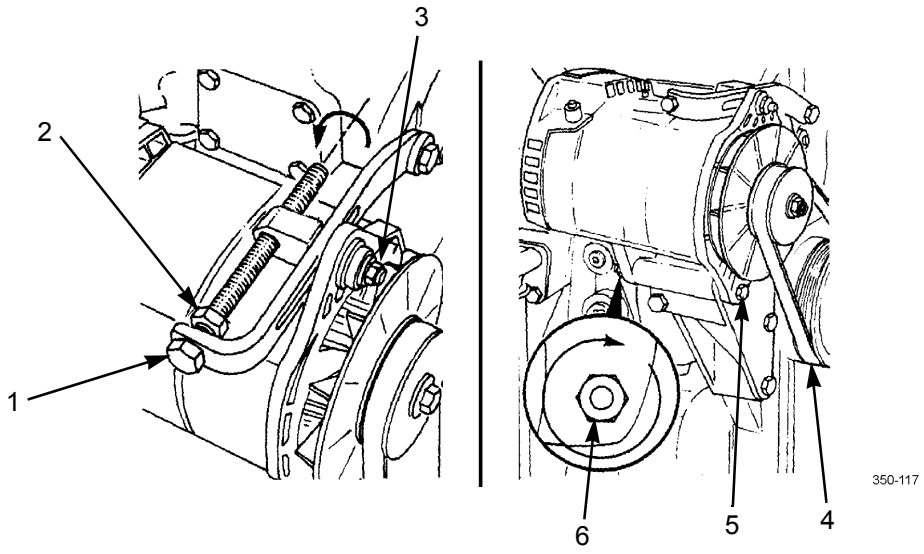
Equipment Condition

Engine cover removed (WP 0143 00)

Master battery switch in OFF position

REMOVAL

1. Loosen jamnut (2).
2. Loosen adjusting link retaining screw (3).
3. Loosen alternator mounting screw (5) and locknut (6).
4. Turn adjusting screw (1) counterclockwise to release alternator drive belt (4) tension.
5. Remove alternator drive belt (4).



INSTALLATION

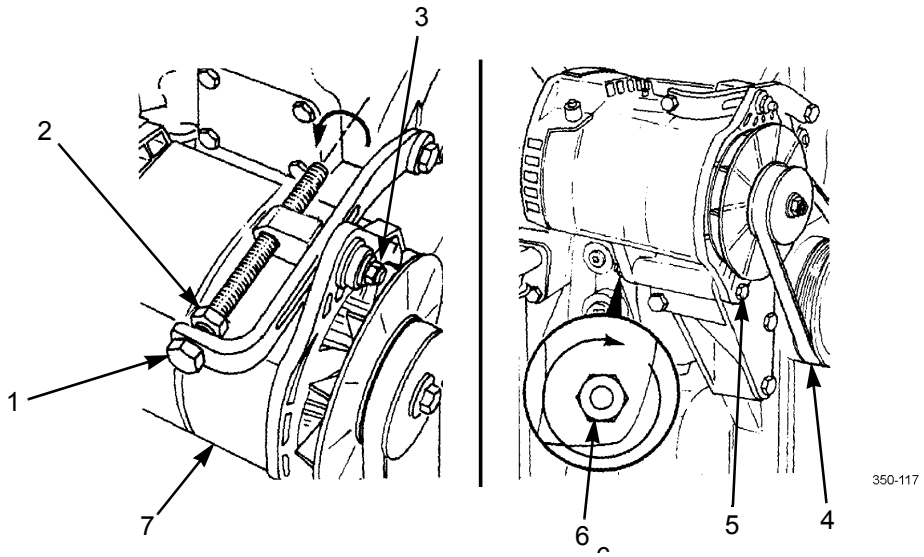
CAUTION

Do not roll drive belt over pulley or pry on drive belt with tools. Rolling or prying on belt can cause damage and shorten life of belt.

NOTE

Ensure sufficient slack adjustment has been allowed to install drive belt.

1. Install drive belt (4).
2. Position alternator (7) to remove slack in drive belt (4) and tighten adjusting link retaining screw (3) to hold alternator in place.
3. Turn adjusting screw (1) clockwise to increase belt tension and tighten jamnut (2) (Refer to *Adjustment*).
4. Tighten retaining screw (3) to 60 lb-ft (81 Nm).
5. Tighten alternator mounting screw (5) and locknut (6) to 35 lb-ft (47 Nm).



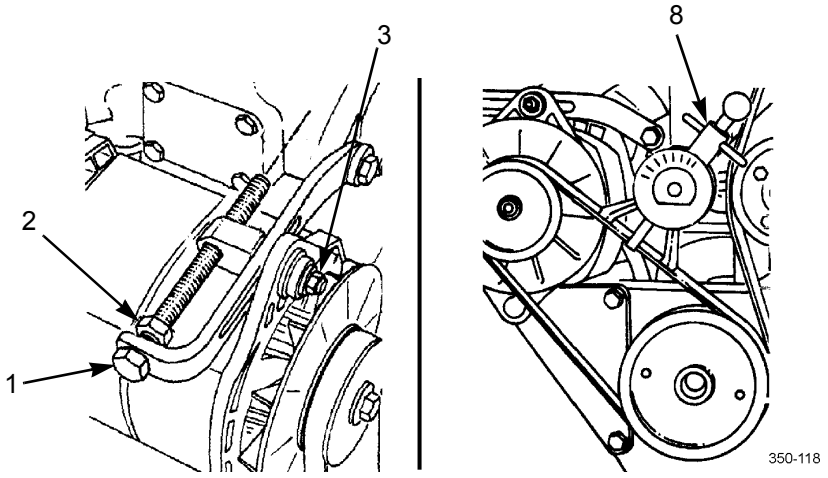
ADJUSTMENT

NOTE

- Belt tension for new alternator drive belt should be 140 lb-ft (190 Nm). For a used belt, adjustment range on belt tension is 60-110 lb-ft (81-149 Nm).
- A drive belt which has been in service more than 10 minutes is considered a used belt.

1. Measure belt tension with gage (8). If measurement is within specified range, no adjustment is required. If measurement is not as specified, proceed to next step.
2. Loosen jamnut (2).

ADJUSTMENT - CONTINUED



NOTE

Turn adjusting screw clockwise to increase tension. Turn adjusting screw counterclockwise to decrease tension.

3. Turn adjusting screw (1) to obtain correct tension. Tighten jamnut (2).
4. Tighten retaining screw (3) to 60 lb-ft (81 Nm).
5. Tighten alternator mounting screw (5) and locknut (6) to 35 lb-ft (47 Nm).
6. Turn master battery switch to ON position.
7. Start engine (TM 10-3930-675-10) and run for approximately 10 minutes. Shut engine down and check belt tension. Readjust belt tension as required.
8. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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STARTER REPLACEMENT 0071 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 50-250 lb-ft capacity (Item 39, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Gasket (P/N 3031007)

Personnel Required

Two

References

TM 10-3930-675-10

Equipment Condition

Engine cover removed (WP 0143 00)

Battery cables disconnected (WP 0108 00)

REMOVAL



WARNING

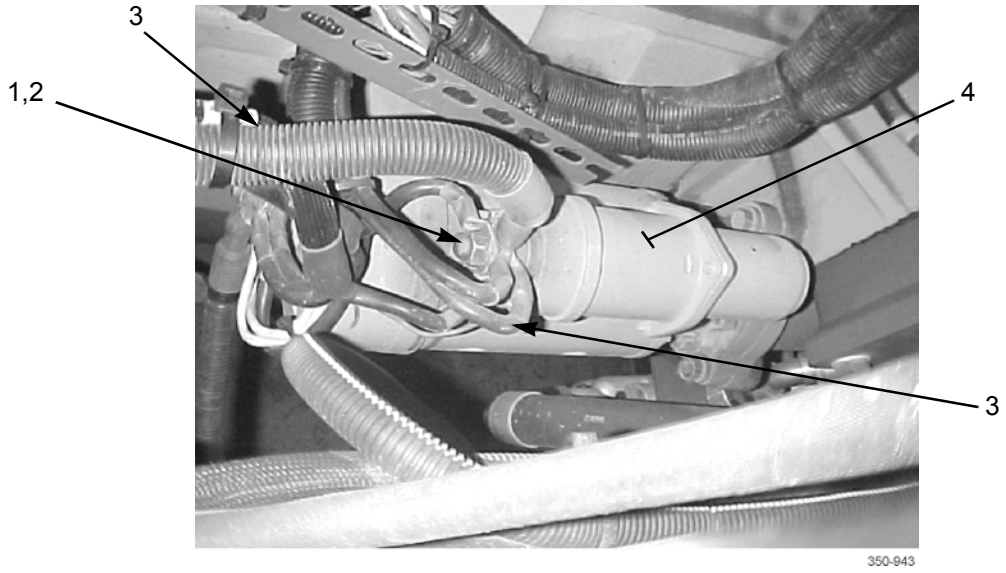
Remove all jewelry, watches, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may result in personnel injury or death.

NOTE

- Tag cables prior to disconnection to ensure proper connection on installation.
- Remove tiedown straps and discard.
- Perform step 1 at rear of starter solenoid.

REMOVAL - CONTINUED

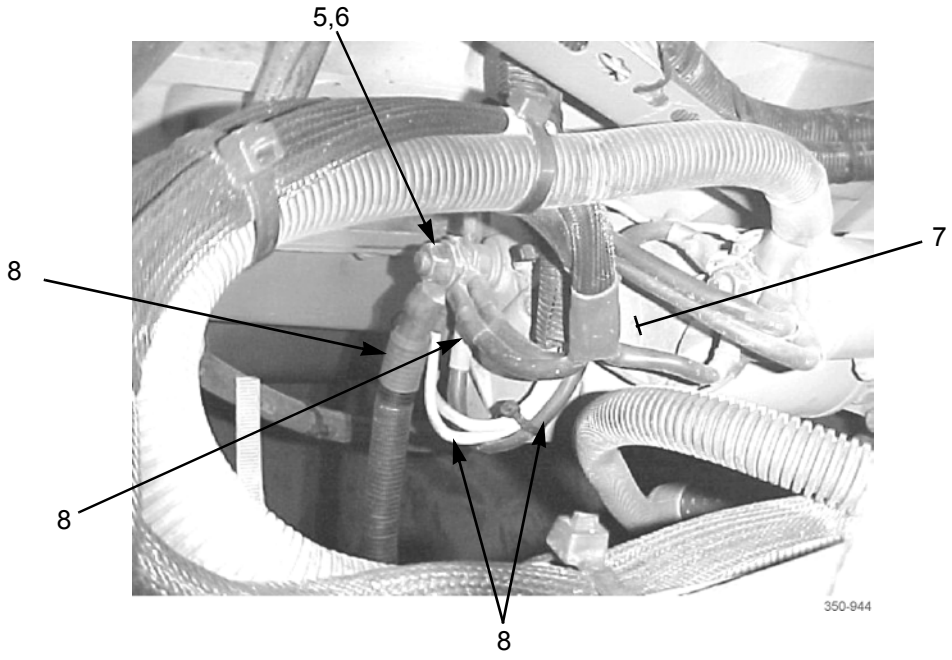
1. Remove nut (1), washer (2), and terminals of cables (3) from solenoid (4). Replace washer and nut.



NOTE

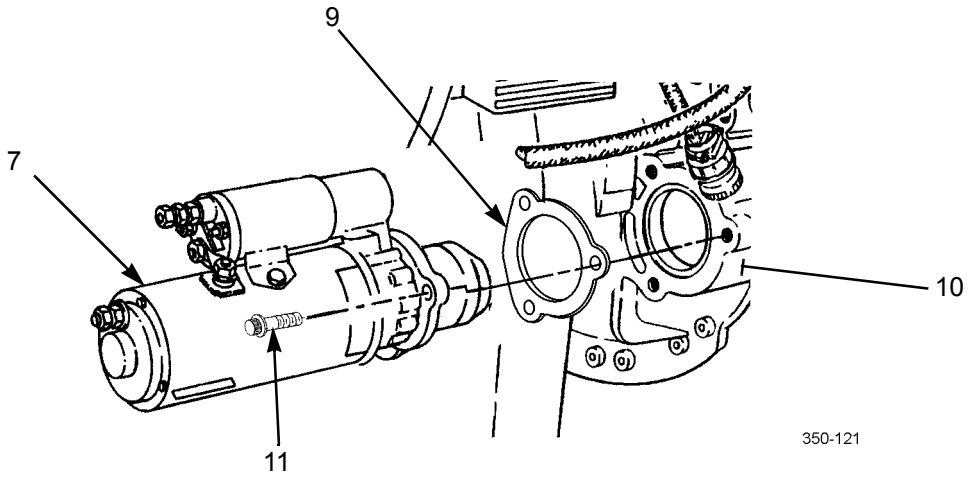
Perform step 2 at rear of starter.

2. Remove nut (5), washer (6), and terminals of cables (8) from starter (7). Replace washer and nut.



REMOVAL - CONTINUED

3. Remove three screws (11), starter (7), and gasket (9) from engine (10). Discard gasket.



INSTALLATION

NOTE

Ensure all old gasket material has been removed from mating surfaces.

1. Install new gasket (9) and starter (7) to engine (10) with three screws (11). Tighten screws to 140 lb-ft (190 Nm).

NOTE

Perform step 2 at rear of starter.

2. Install terminals of cables (8) to starter (7) with washer (6) and nut (5).

NOTE

Perform step 3 at rear of starter solenoid.

3. Install terminals of cables (3) to solenoid (4) with washer (2) and nut (1).
4. Connect battery cables (WP 0108 00).
5. Install new tiedown straps.
6. Perform operational check of engine (TM 10-3930-675-10).
7. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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INSTRUMENT PANEL SWITCHES, GAGES, AND PANEL LAMPS REPLACEMENT 0072 00

THIS WORK PACKAGE COVERS

Rocker Switch: Removal, Installation
Rotary Switch: Removal, Installation
Gage: Removal, Installation
Instrument Panel Lamp: Removal, Installation
12/24-Volt Connector: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)
Key set, socket head screw (Item 15, WP 0204 00)
Screwdriver, jeweler's (Item 25, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)
Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Master battery switch in OFF position

NOTE

- Instrument panel switches, gages, and panel lamps are replaced the same way, except where minor differences are noted.
- Remove and discard tiedown straps as required. Use new tiedown straps on installation.
- Tag wires and connectors as required.

ROCKER SWITCH REMOVAL

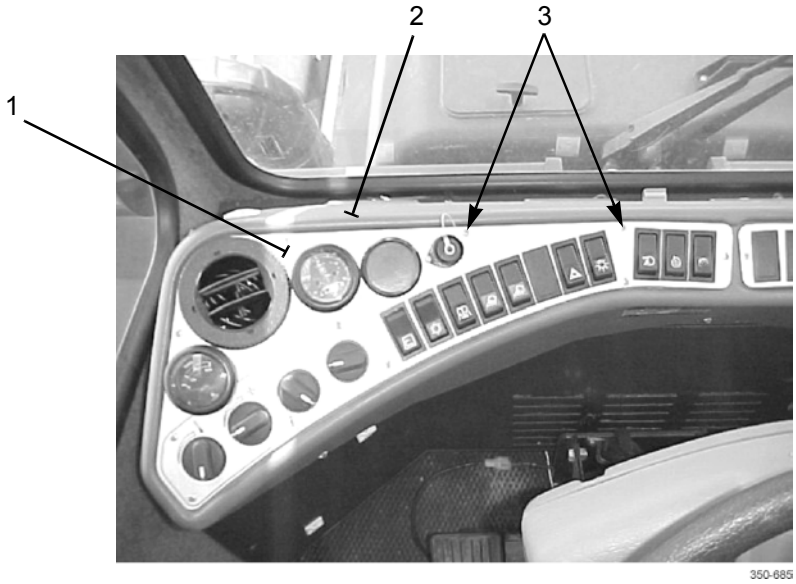
NOTE

Perform the following step for left or right switch/gage panel. Left panel (shown) has ten screws. Right panel has five screws.

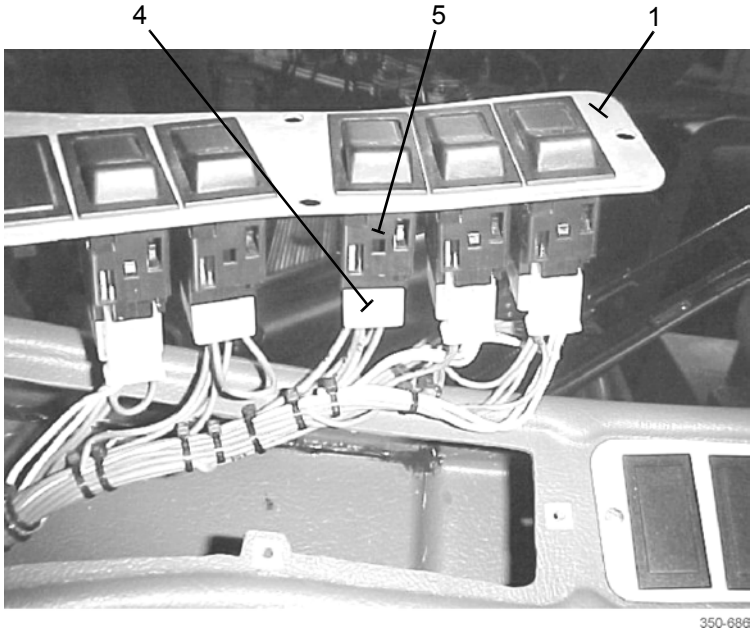
INSTRUMENT PANEL SWITCHES, GAGES, AND PANEL LAMPS
REPLACEMENT - CONTINUED **0072 00**

ROCKER SWITCH REMOVAL - CONTINUED

1. Remove ten screws (3) from switch/gage panel (1).
2. Lift switch/gage panel (1) upward from instrument panel (2) to gain access to rear of panel.



3. Lift tab of instrument panel wiring harness connector (4) and disconnect connector from switch (5).
4. To remove switch lamp, refer to *Instrument Panel Lamp Removal*.
5. Depress tabs at sides of switch (5) and push switch upward and out of switch/gage panel (1).



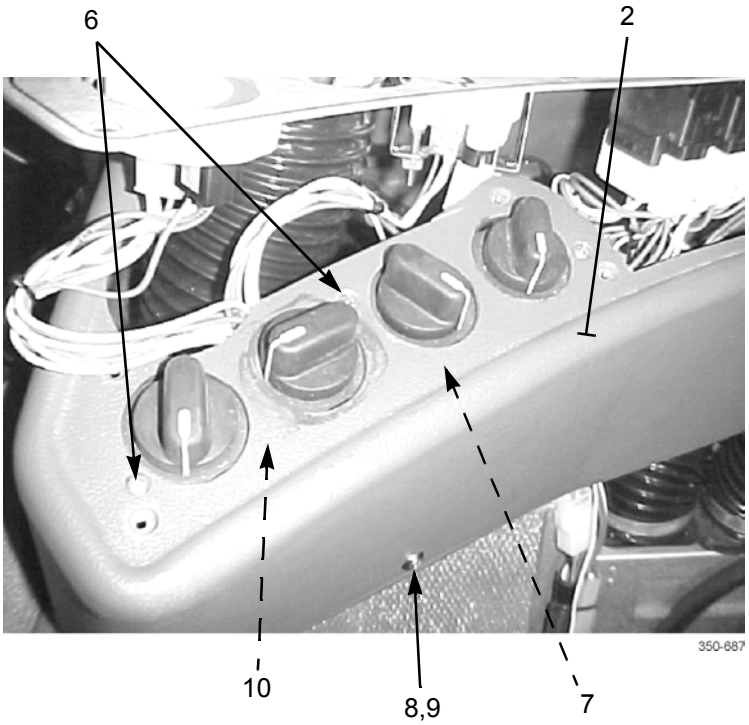
INSTRUMENT PANEL SWITCHES, GAGES, AND PANEL LAMPS REPLACEMENT - CONTINUED **0072 00**

ROCKER SWITCH INSTALLATION

1. Push switch (5) down into switch/gage panel (1) until flush with panel.
2. To install switch lamp, refer to *Instrument Panel Lamp Installation*.
3. Connect instrument panel wiring harness connector (4) to switch (5).
4. Install switch/gage panel (1) to instrument panel (2) with ten screws (3).

ROTARY SWITCH REMOVAL

1. Remove ten screws (3) from switch/gage panel (1).
2. Lift switch/gage panel (1) upward from instrument panel (2).
3. Remove six screws (8) and washers (9) of instrument panel (2) to gain access to switches (7).
4. Remove three screws (6) to separate switch plate (10) from instrument panel (2) and pull switch plate downward for access to switches (7).



ROTARY SWITCH REMOVAL - CONTINUED

5. Loosen setscrew (13) and remove knob (11) from switch (7) to be replaced.
6. Remove nut (12) and switch (7) from switch plate (10).

NOTE

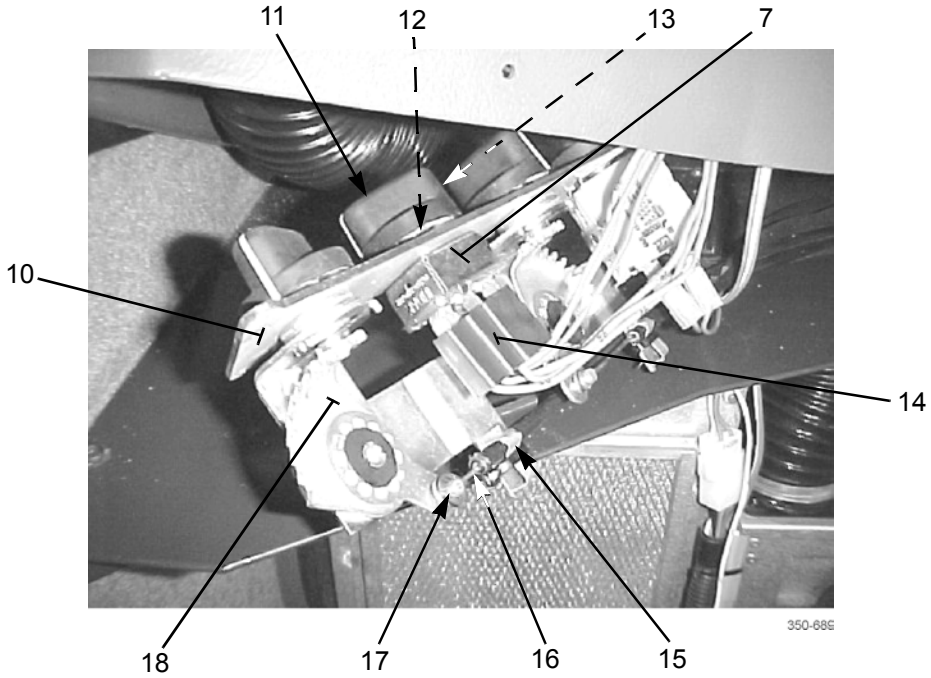
Perform step 7 for switches with electrical connectors.

7. Disconnect connector(s) (14) of instrument panel wiring harness from rear of switch (7).

NOTE

Perform steps 8 and 9 for switches with control cables.

8. Remove pushnut (17) and disconnect control cable (16) from rear of switch (18).
9. Remove tiedown strap, lift tab of clip (15), and remove clip and control cable (16) from switch (18). Discard tiedown strap.



ROTARY SWITCH INSTALLATION

NOTE

Perform steps 1 and 2 for switches with control cables.

1. Install control cable (16) to switch (18) with clip (15) and install new tiedown strap.
2. Connect control cable (16) to rear of switch (18) and install pushnut (17).

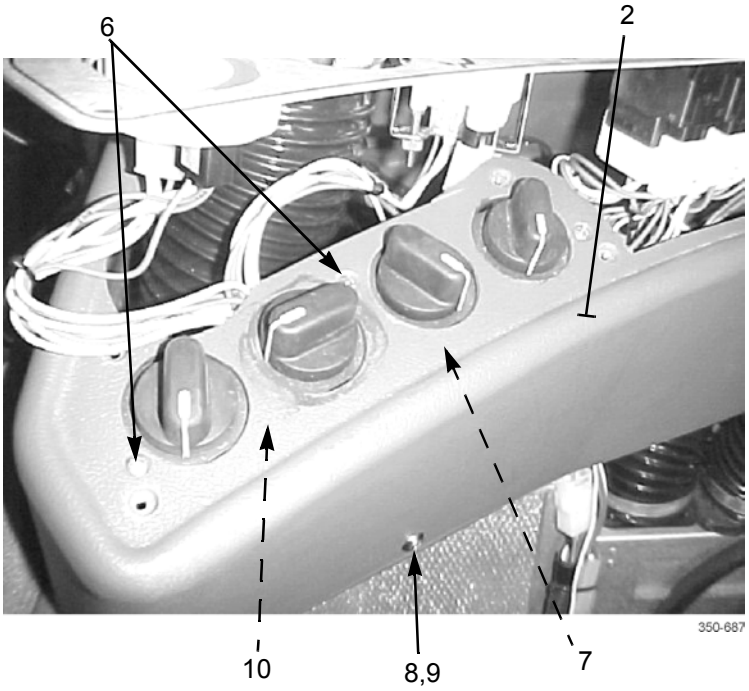
NOTE

Perform step 3 for switches with electrical connectors.

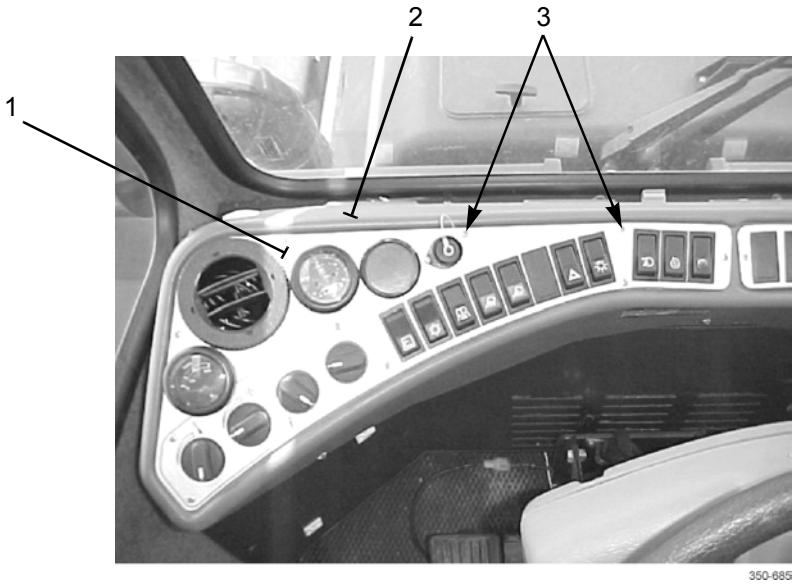
INSTRUMENT PANEL SWITCHES, GAGES, AND PANEL LAMPS
REPLACEMENT - CONTINUED **0072 00**

ROTARY SWITCH INSTALLATION - CONTINUED

3. Connect instrument panel wiring harness connector(s) (14) to rear of switch (7).
4. Push switch (7) upward thru hole in switch plate (10) and install nut (12).
5. Press knob (11) onto shaft of switch (7) and tighten setscrew (13).
6. Install switch plate (10) to instrument panel (2) with three screws (6).
7. Install instrument panel (2) with six washers (9) and screws (8).



8. Install switch/gage panel (1) to instrument panel (2) with ten screws (3).



GAGE REMOVAL

1. Perform steps 1 and 2 of *Rocker Switch Removal* to gain access to rear of gage.
2. To remove gage lamp, refer to *Instrument Panel Lamp Removal*.

NOTE

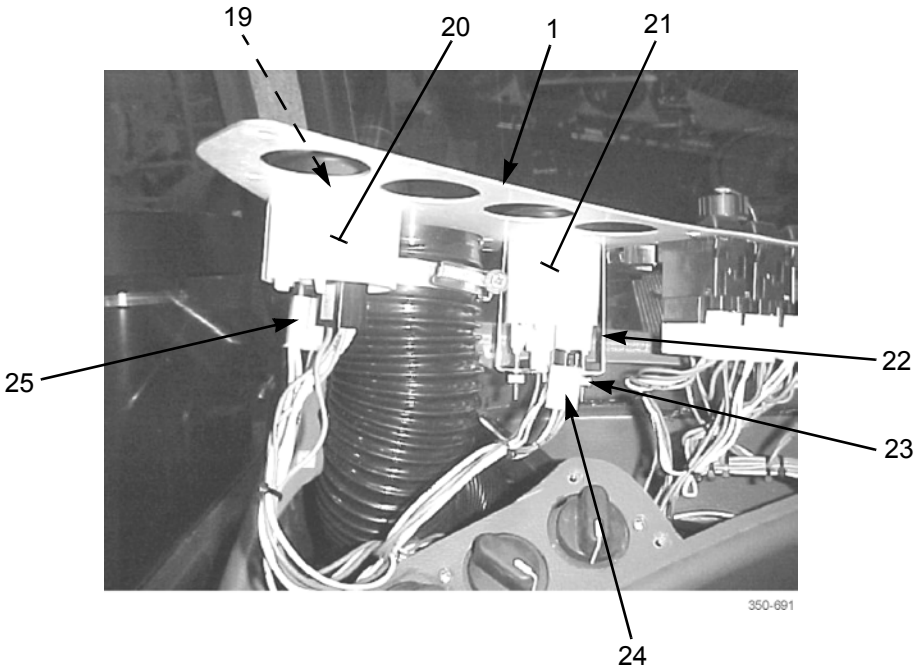
Perform steps 3 and 4 for fuel gage.

3. Disconnect instrument panel wiring harness connector (25) from rear of gage (19).
4. Remove retainer (20) and gage (19) from switch/gage panel (1).

NOTE

Perform steps 5 and 6 for hour meter gage.

5. Disconnect instrument panel wiring harness connector (24) from rear of gage (21).
6. Remove two nuts (23), retainer (22), and gage (21) from switch/gage panel (1).



GAGE INSTALLATION

NOTE

Perform steps 1 and 2 for hour meter gage.

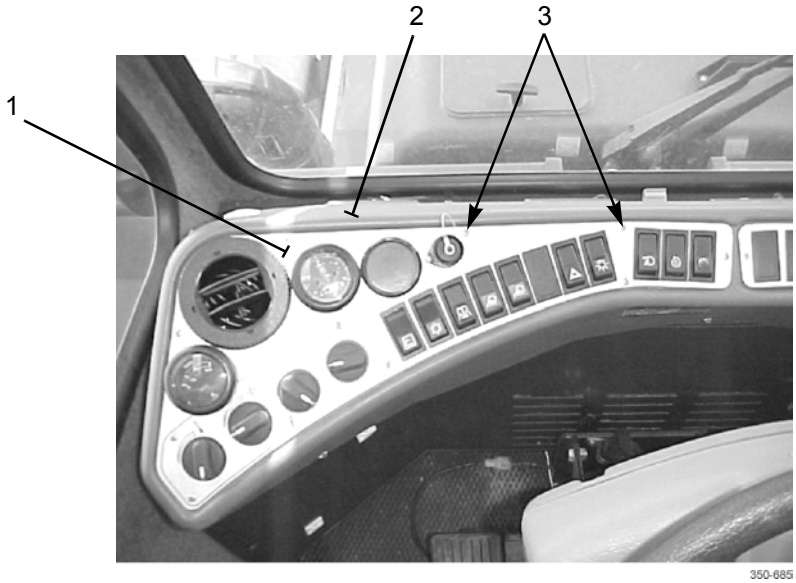
1. Install gage (21) to switch/gage panel (1) with retainer (22) and two nuts (23).
2. Connect instrument panel wiring harness connector (24) to gage (21).

NOTE

Perform steps 3 and 4 for fuel gage.

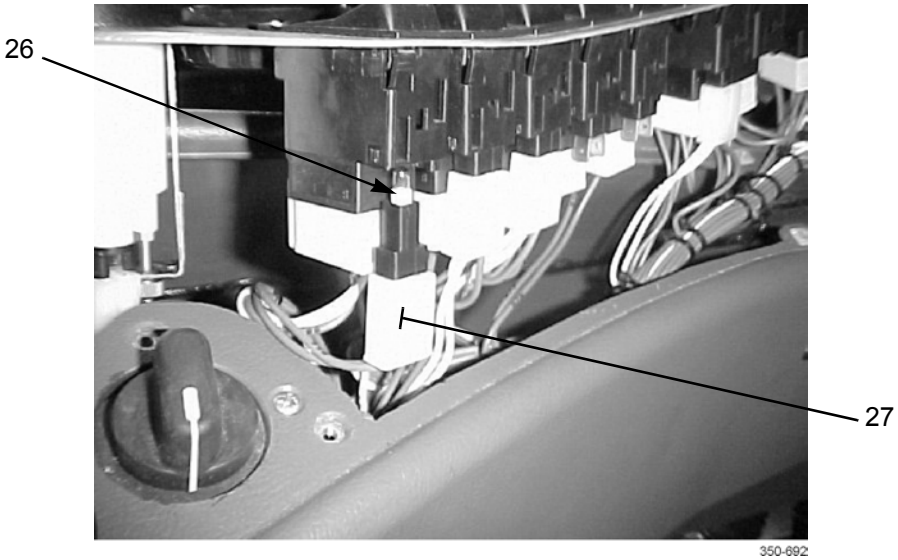
GAGE INSTALLATION - CONTINUED

3. Install gage (19) to switch/gage panel (1) with retainer (20).
4. Connect instrument panel wiring harness connector (25) to gage (19).
5. To install gage lamp, refer to *Instrument Panel Lamp Installation*.
6. Install switch/gage panel (1) to instrument panel (2) with ten screws (3).



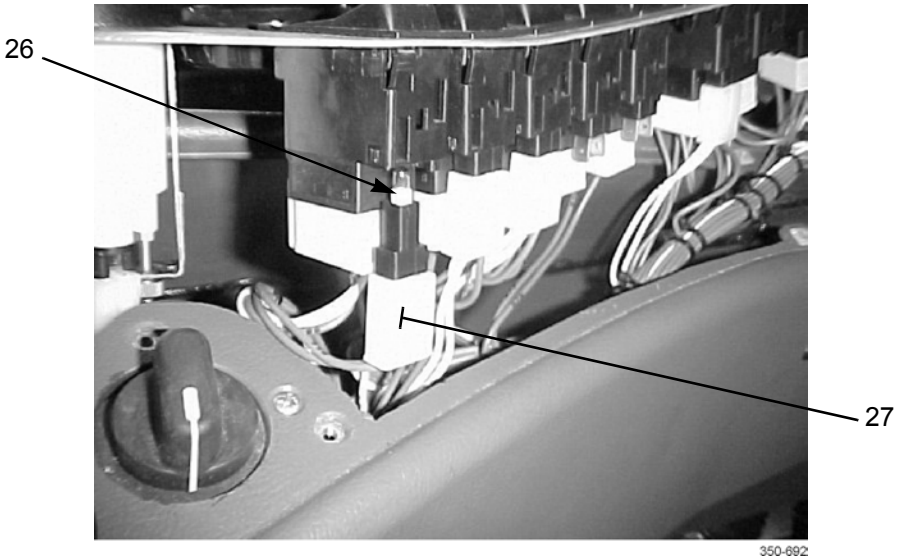
INSTRUMENT PANEL LAMP REMOVAL

1. Perform steps 1 and 2 of *Rocker Switch Removal* to gain access to instrument panel lamps.
2. Disconnect lamp (26), with connector (27) attached, from switch or gage.
3. Remove lamp (26) from connector (27).

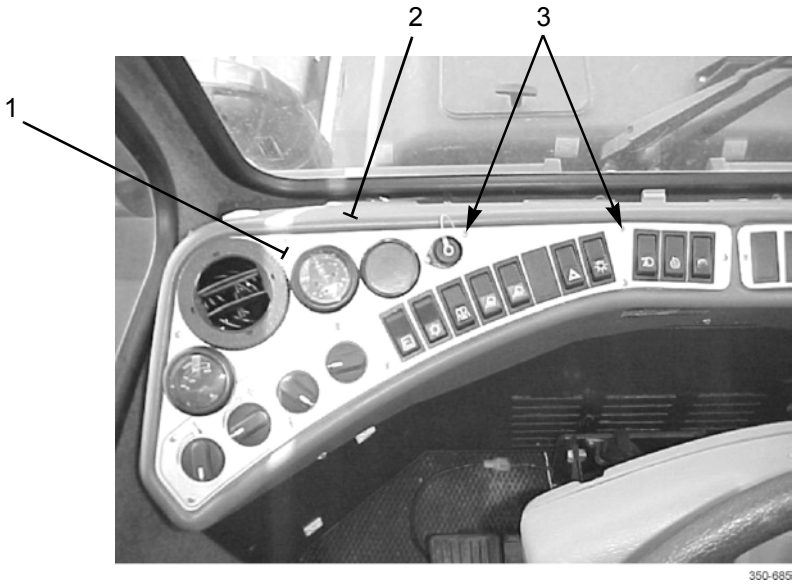


INSTRUMENT PANEL LAMP INSTALLATION

1. Install lamp (26) to connector (27).
2. Connect lamp (26), with connector (27) attached, to switch or gage.



3. Install switch/gage panel (1) to instrument panel (2) with ten screws (3).

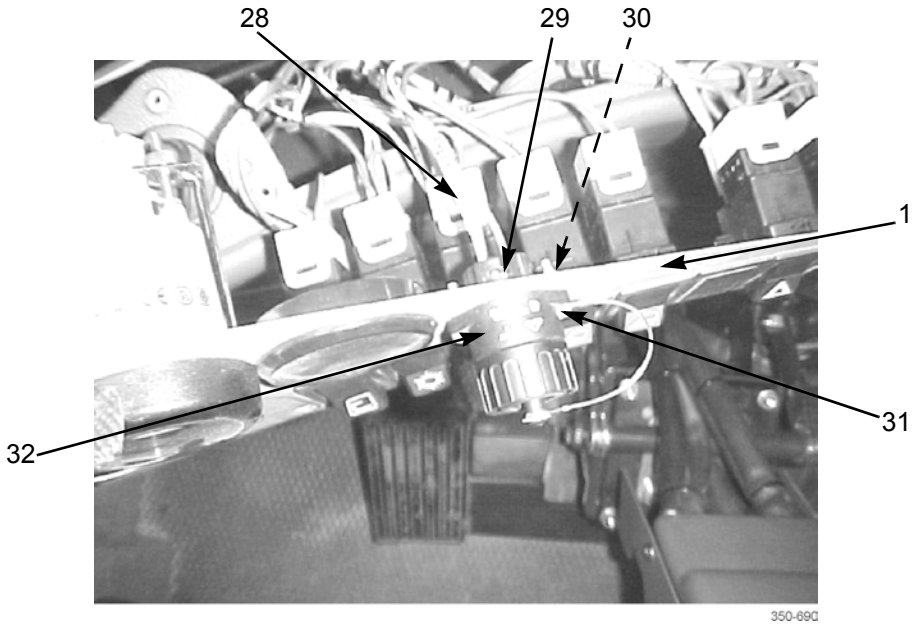


12/24-VOLT CONNECTOR REMOVAL

1. Perform steps 1 and 2 of *Rocker Switch Removal* to gain access to 12/24-volt connector (32).
2. Remove three nuts (30), two screws (31), and 12/24-volt connector (32) from switch/gage panel (1).

12/24-VOLT CONNECTOR REMOVAL - CONTINUED

3. Loosen three screws (29) and disconnect three wires (28) from rear of 12/24-volt connector (32).



12/24-VOLT CONNECTOR INSTALLATION

1. Position three wires (28) up thru switch/gage panel (1).
2. Connect three wires (28) to rear of 12/24-volt connector (32) and tighten three screws (29).
3. Install 12/24-volt connector (32) to switch/gage panel (1) with two screws (31) and three nuts (30).
4. Install switch/gage panel (1) to instrument panel (2) with ten screws (3).

END OF WORK PACKAGE

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CIRCUIT BREAKERS AND RELAYS REPLACEMENT 0073 00

THIS WORK PACKAGE COVERS

Cab Distribution Box Circuit Breakers and Relays: Removal, Installation

50A Circuit Breakers: Removal, Installation

Starter Relay: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

References

WP 0108 00

WP 0143 00

Equipment Condition

Master battery switch in OFF position

CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS REMOVAL

NOTE

All circuit breakers and relays are replaced the same way, except where minor differences are noted.

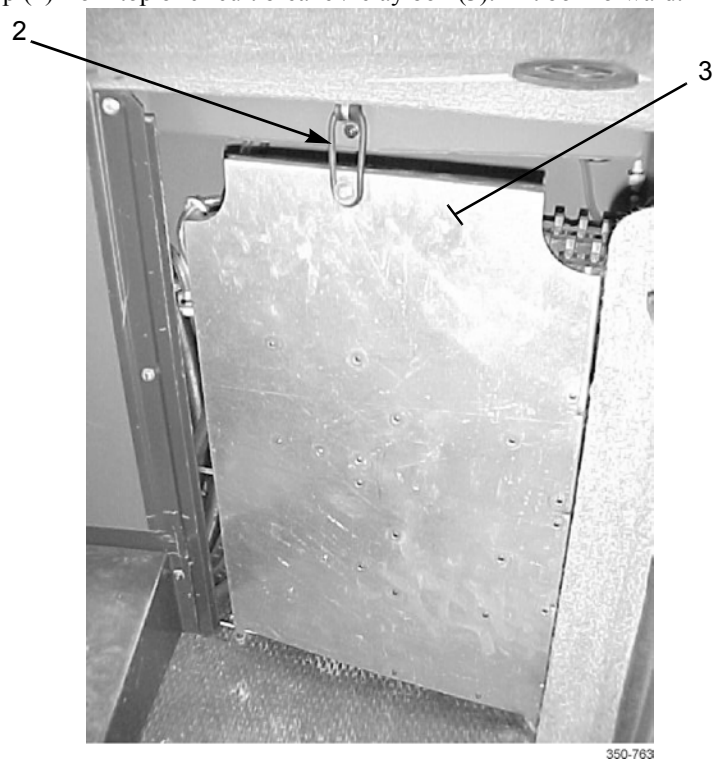
1. Lift and remove access panel (1) from left rear of cab.



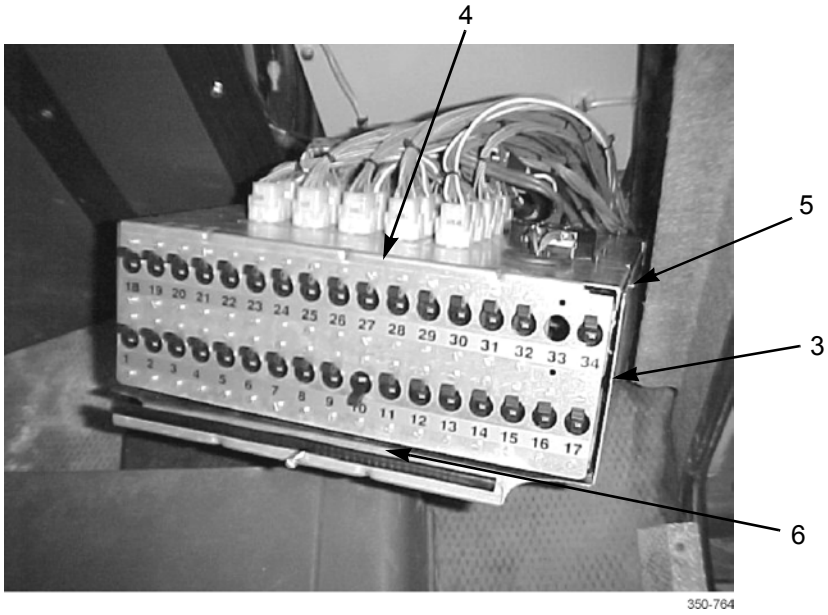
350-762

CAB DISTRUBITION BOX CIRCUIT BREAKERS AND RELAYS REMOVAL - CONTINUED

2. Disconnect elastic loop (2) from top of circuit breaker/relay box (3). Tilt box forward.



3. Remove two screws (5) from side of circuit breaker/relay box (3) and separate circuit breaker panel (4) from relay panel (6).

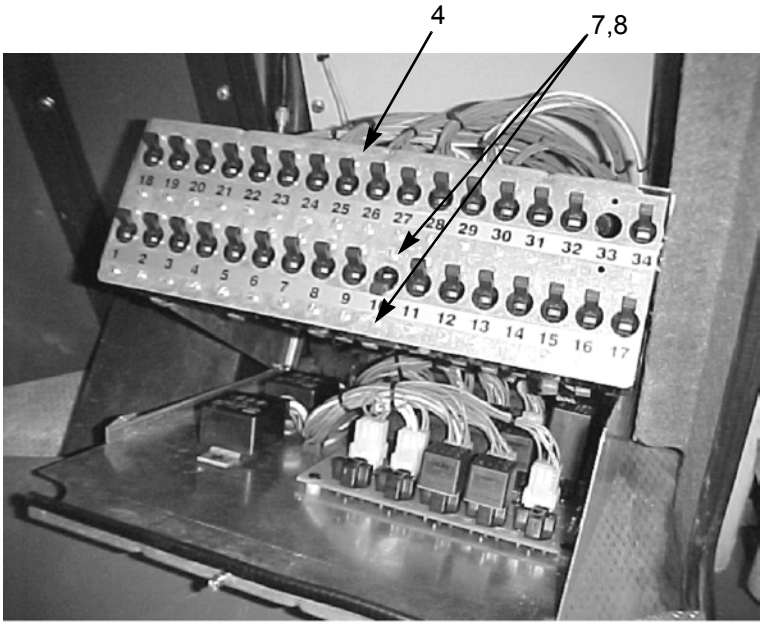


NOTE

Each of 34 circuit breakers is removed the same way.

CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS REMOVAL - CONTINUED

4. Remove two screws (7) and washers (8) from circuit breaker panel (4).

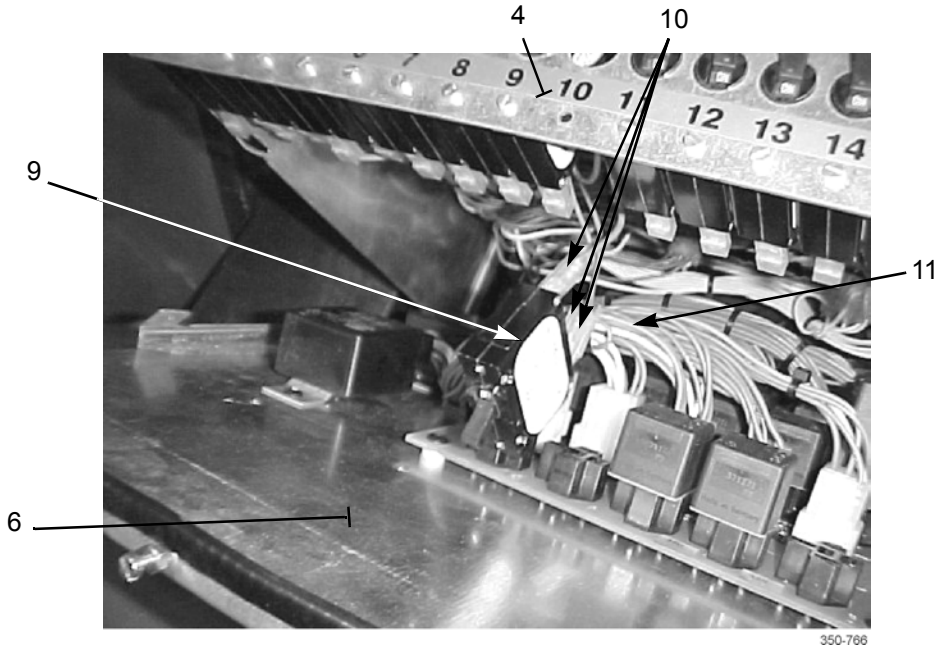


5. Push circuit breaker (9) downward thru hole in circuit breaker panel (4).

NOTE

Tag connectors for installation.

6. Disconnect three connectors (10) of wiring harness (11) from rear of circuit breaker (9). Remove circuit breaker.

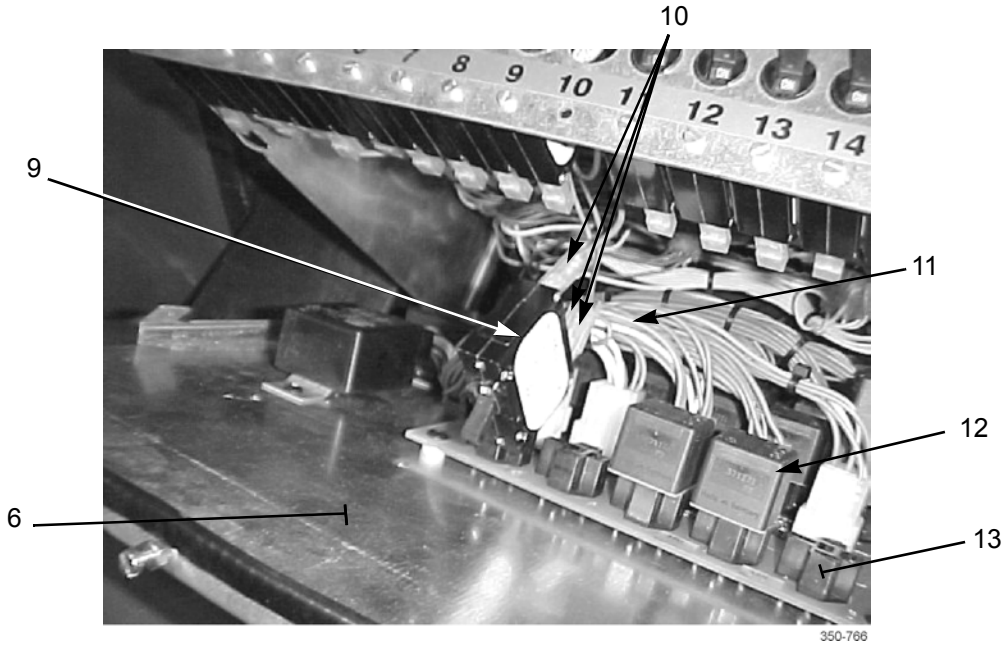


CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS REMOVAL - CONTINUED

NOTE

Perform step 7 to remove each of 15 relays.

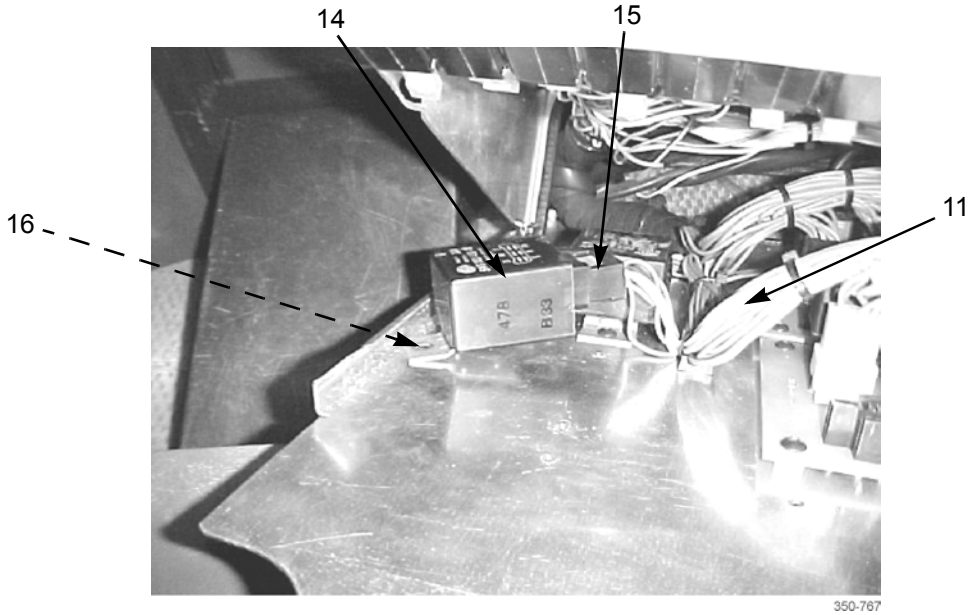
7. Disconnect relay (12) from terminal block (13) of relay panel (6).



NOTE

Perform step 8 to remove each of two relays.

8. Remove screw (16) and disconnect connector (15) of wiring harness (11) from relay (14).



CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS INSTALLATION

NOTE

Perform step 1 to install each of two relays.

1. Connector connector (15) of wiring harness (11) to relay (14) and install screw (16).

NOTE

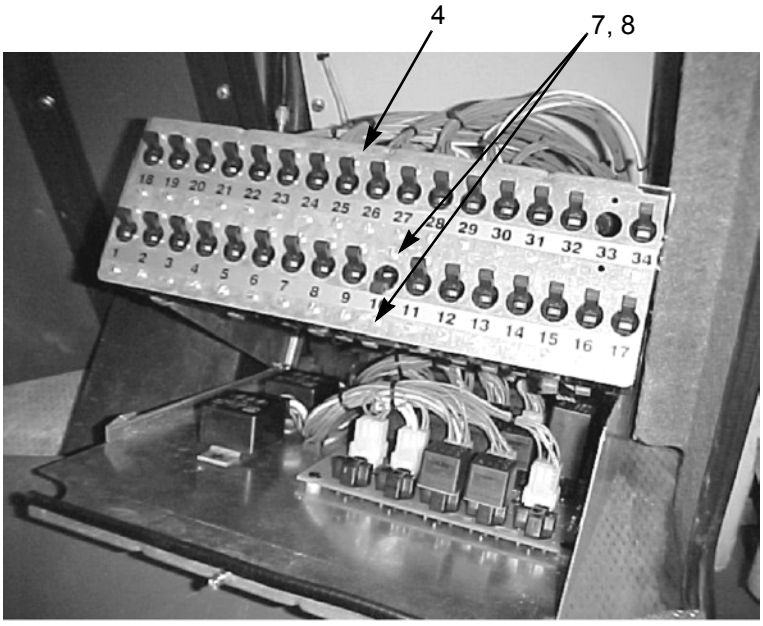
Perform step 2 to install each of 15 relays.

2. Connect relay (12) to terminal block (13) of relay panel (6).

NOTE

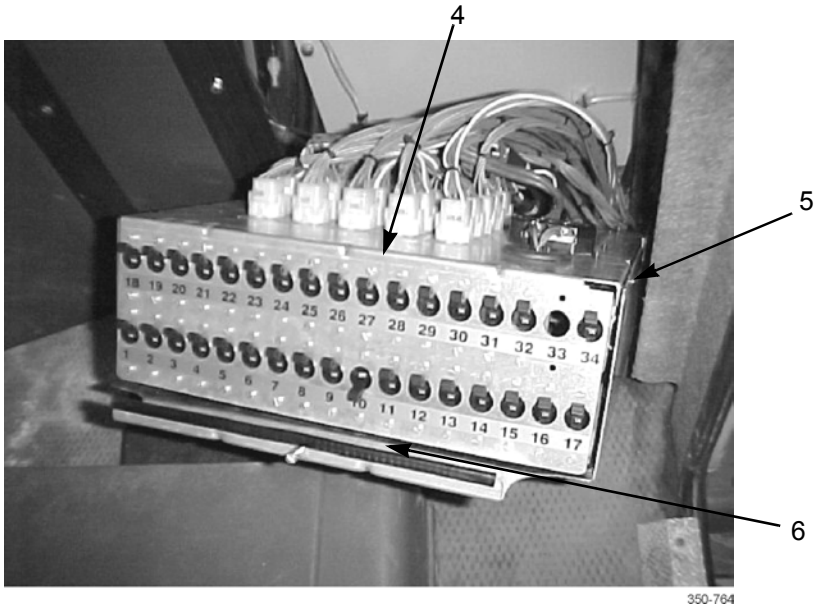
Each of 34 circuit breakers is installed the same way.

3. Connect three connectors (10) of wiring harness (11) to rear of circuit breaker (9).
4. Push circuit breaker (9) upward thru hole in circuit breaker panel (4).
5. Install circuit breaker (9) with two washers (8) and screws (7).



CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS INSTALLATION - CONTINUED

6. Position circuit breaker panel (4) to relay panel (6) and install two screws (5).

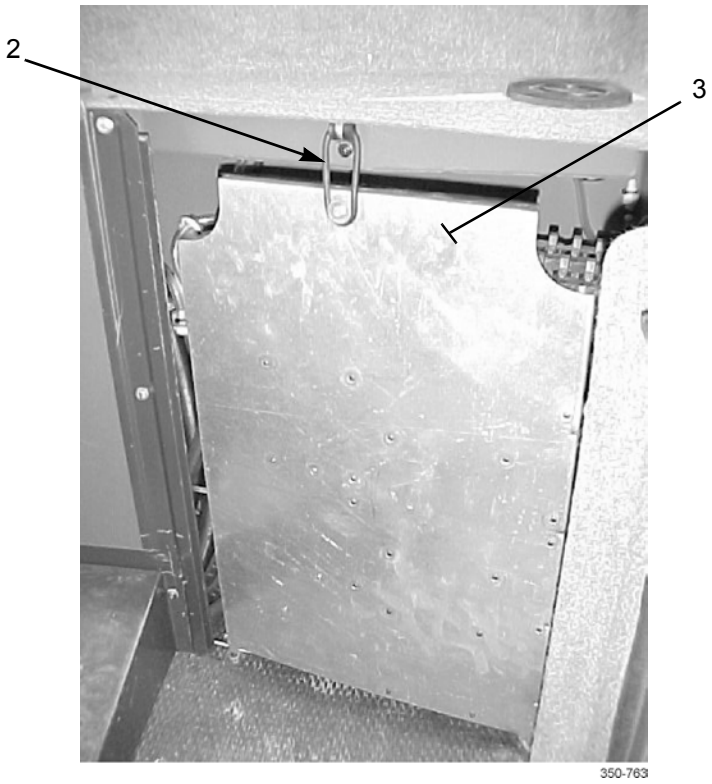


NOTE

Ensure that all circuit breakers remain in ON position while circuit breaker/relay box is secured.

7. Tilt circuit breaker/relay box (3) rearward and connect elastic loop (2) to top of box.

CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS INSTALLATION - CONTINUED



CAB DISTRIBUTION BOX CIRCUIT BREAKERS AND RELAYS INSTALLATION - CONTINUED

8. Install access panel (1) to cab.



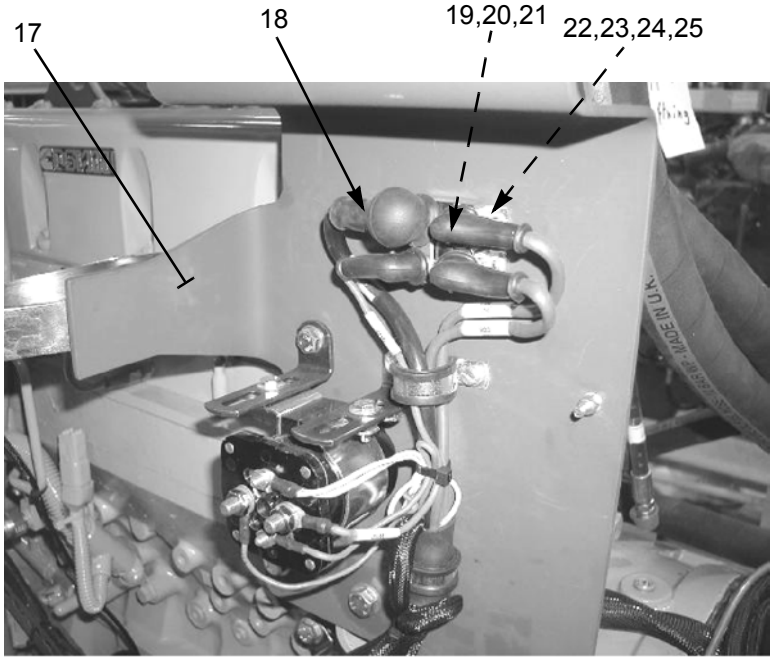
50A CIRCUIT BREAKERS REMOVAL

1. Remove engine cover (WP 0143 00).
2. Disconnect battery cables (WP 0108 00).

NOTE

Tag wires for installation.

3. Remove protective covers (18) from 50A circuit breaker terminals.
4. Remove nuts (19), washers (20), and terminal leads (21) from circuit breakers (22).
5. Remove screws (23), nuts (24), washers (25), and circuit breakers (22) from mounting plate (17).



350-1367

50A CIRCUIT BREAKERS INSTALLATION

1. Position 50A circuit breakers (22) on mounting plate (17) and secure with screws (23), nuts (24), and washers (25).
2. Connect terminal leads (21) to circuit breakers (22) and secure with nuts (19) and washers (20).
3. Place protective covers (18) over circuit breaker terminals.
4. Reconnect battery cables (WP 0108 00).
5. Install engine cover (WP 0143 00).

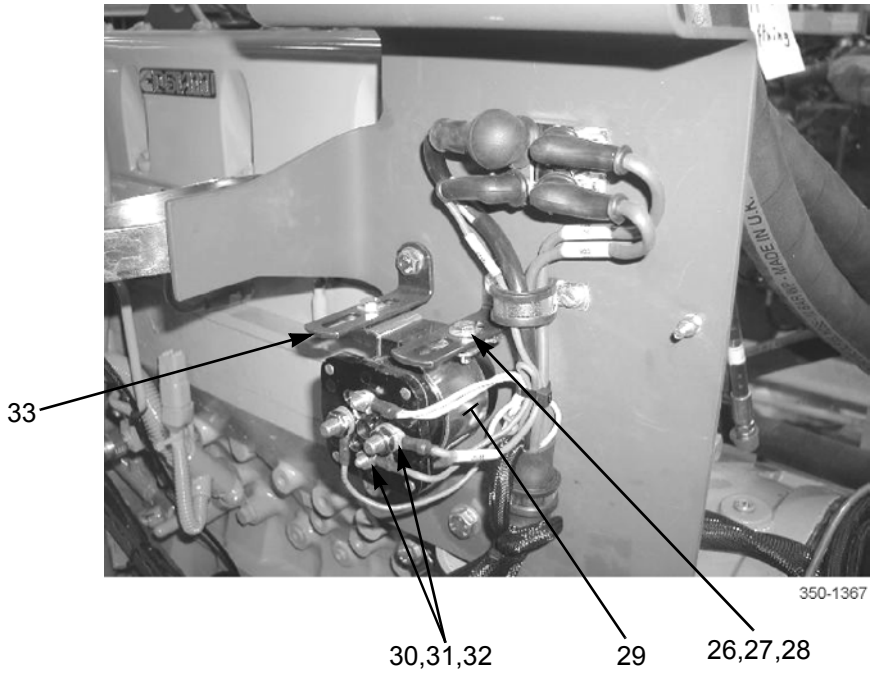
STARTER RELAY REMOVAL

1. Remove engine cover (WP 0143 00).
2. Disconnect battery cables (WP 0108 00).

NOTE

Tag wires for installation.

3. Remove nuts (30), washers (31), and terminal leads (32) from starter relay (29).
4. Remove screws (26), nuts (27), washers (28), and starter relay (29) from mounting brackets (33).



STARTER RELAY INSTALLATION

1. Position starter relay (29), on mounting brackets (33) and secure with screws (26), nuts (27), and washers (28).
2. Connect terminal leads (32) to starter relay (29) and secure with nuts (30) and washers (31).
3. Connect battery cables (WP 0108 00).
4. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

TOPHANDLER PROXIMITY SWITCHES REPLACEMENT 0074 00

THIS WORK PACKAGE COVERS

Twistlock Proximity Switch: Removal, Installation

Forklift Interlock Proximity Switch: Removal, Installation

Spreader Beam Proximity Switch: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Screwdriver set, jeweler's (Item 25, WP 0204 00)

Wrench, torque, 0-300 lb-in capacity (Item 41, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

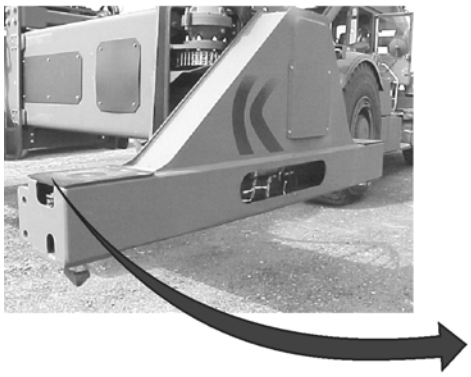
Master battery switch in OFF position

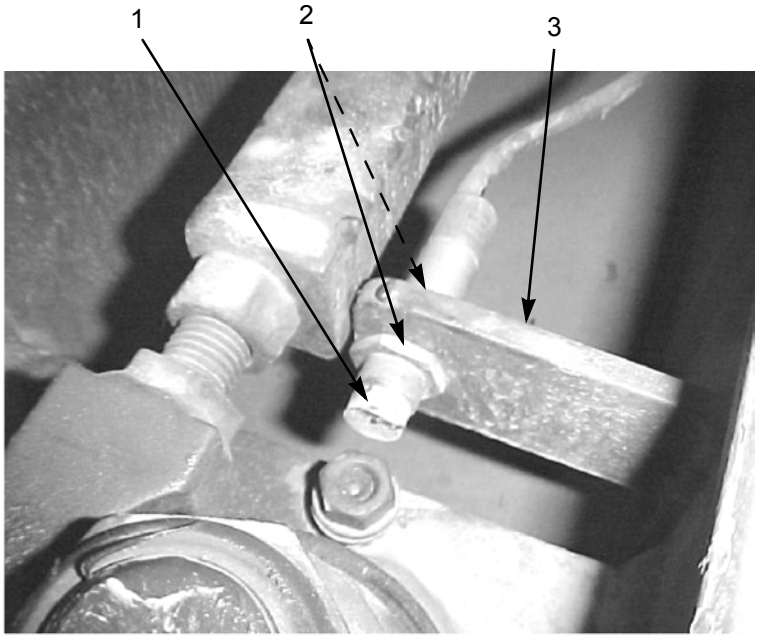
TWISTLOCK PROXIMITY SWITCH REMOVAL

NOTE

- These steps cover eight twistlock proximity switches at middle and at each end of spreader beam.
- To aid in gaining access to junction box in step 3, spreader beam may be extended.

1. Remove two jamnuts (2) and proximity switch (1) from mounting bracket (3).

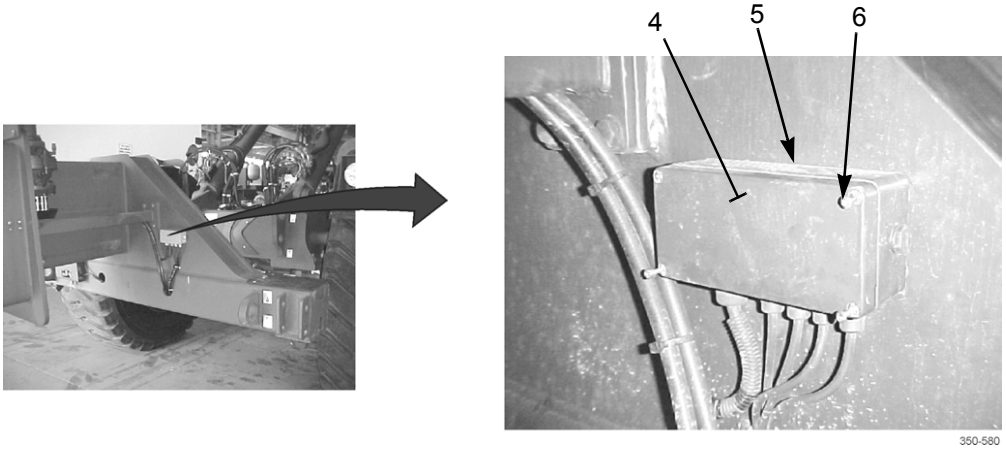




350-554

TWISTLOCK PROXIMITY SWITCH REMOVAL - CONTINUED

2. Loosen four screws (6) and remove cover (4) from junction box (5). Inspect rubber seal in groove of cover. Replace only if damaged.



3. Loosen cable nut (10) and slide cable nut and grommet (9) back on proximity switch (1) cable.

CAUTION

To avoid damage to junction box, a fine-tipped jeweler's screwdriver should be used when disconnecting proximity switch wires. DO NOT use a punch.

NOTE

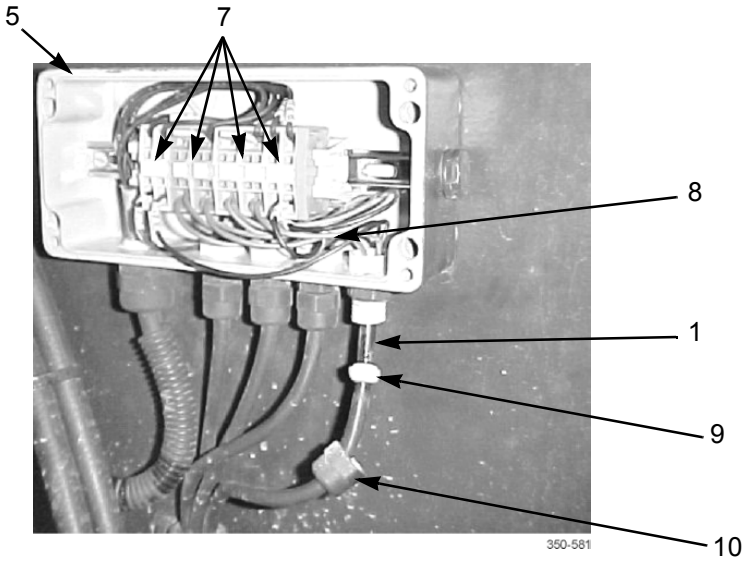
Tag wires for installation.

4. Using a jeweler's screwdriver, disconnect proximity switch wires (8) from terminal blocks (7).

NOTE

Remove cable clamps and tiedown straps as needed. Discard tiedown straps.

5. Remove proximity switch (1) with cable from tophandler.



TWISTLOCK PROXIMITY SWITCH INSTALLATION

1. Position proximity switch (1) with cable to tophandler.
2. Using a jeweler's screwdriver, connect proximity switch wires (8) to terminal blocks (7).
3. Install grommet (9) and cable nut (10) to junction box (5). Tighten cable nut.
4. Install cover (4) to junction box (5) and tighten four screws (6).
5. Loosely install proximity switch (1) and two jamnuts (2) to mounting bracket (3).

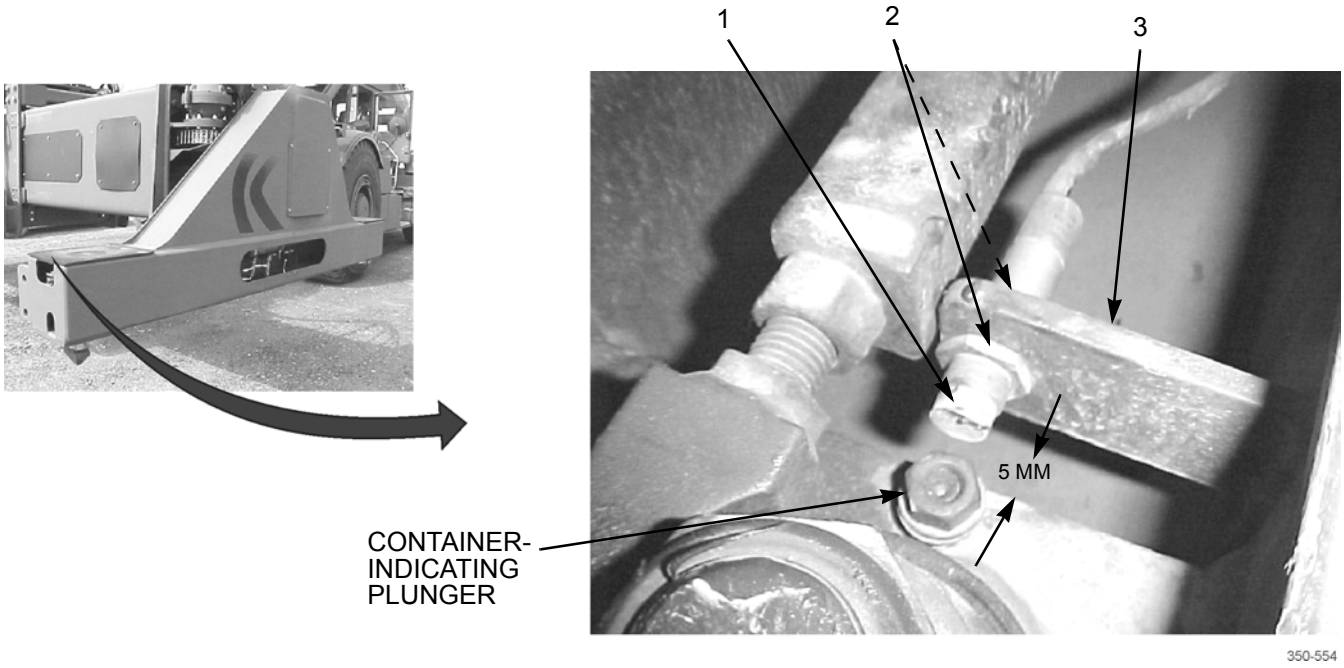
CAUTION

Overtightening jamnuts will damage proximity switch threads.

NOTE

Plunger must be raised in order to properly make adjustment.

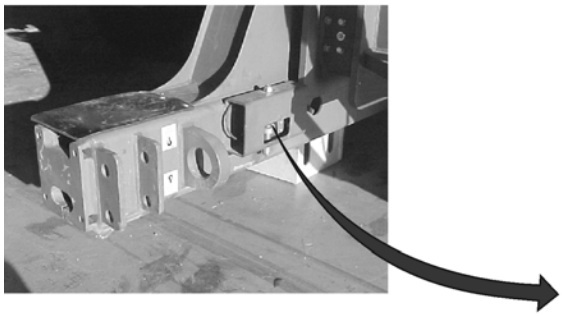
6. Position proximity switch (1) so that a gap of 5 mm (0.20 in) is obtained. Tighten two jamnuts to 177 lb-in (20 Nm).

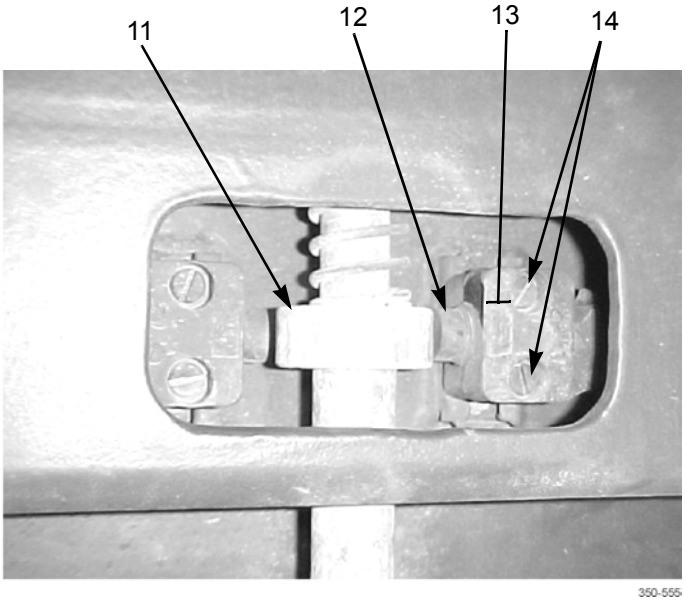


7. Install cable clamps and new tiedown straps as needed.

FORKLIFT INTERLOCK PROXIMITY SWITCH REMOVAL

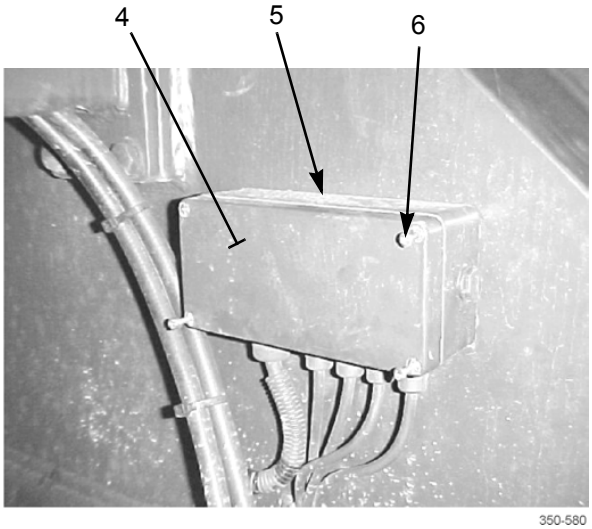
1. Remove two screws (14), plastic clamp (13), and proximity switch (12) from tophandler.





2. Loosen four screws (6) and remove cover (4) from junction box (5). Inspect rubber seal in groove of cover. Replace only if damaged





3. Loosen cable nut (10) and slide cable nut and grommet (9) back on proximity switch (12) cable.

FORKLIFT INTERLOCK PROXIMITY SWITCH REMOVAL - CONTINUED

CAUTION

To avoid damage to junction box, a fine-tipped jeweler's screwdriver should be used when disconnecting proximity switch wires. DO NOT use a punch.

NOTE

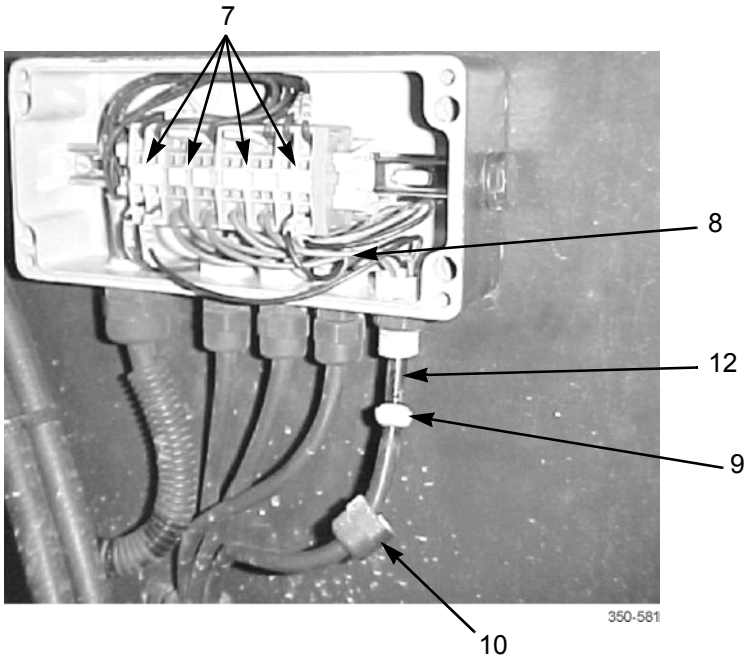
Tag wires for installation.

4. Using a jeweler's screwdriver, disconnect proximity switch wires (8) from terminal blocks (7).

NOTE

Remove cable clamps and tiedown straps as needed. Discard tiedown straps.

5. Remove proximity switch (12) with cable from tophandler.

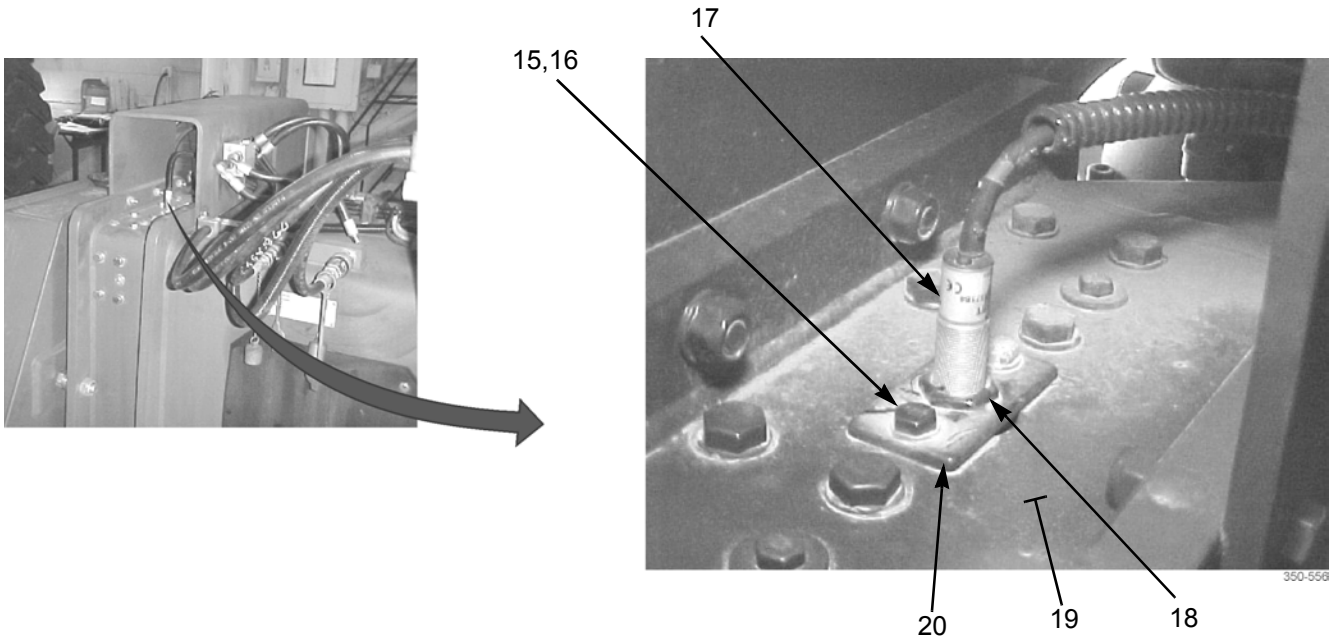


FORKLIFT INTERLOCK PROXIMITY SWITCH INSTALLATION

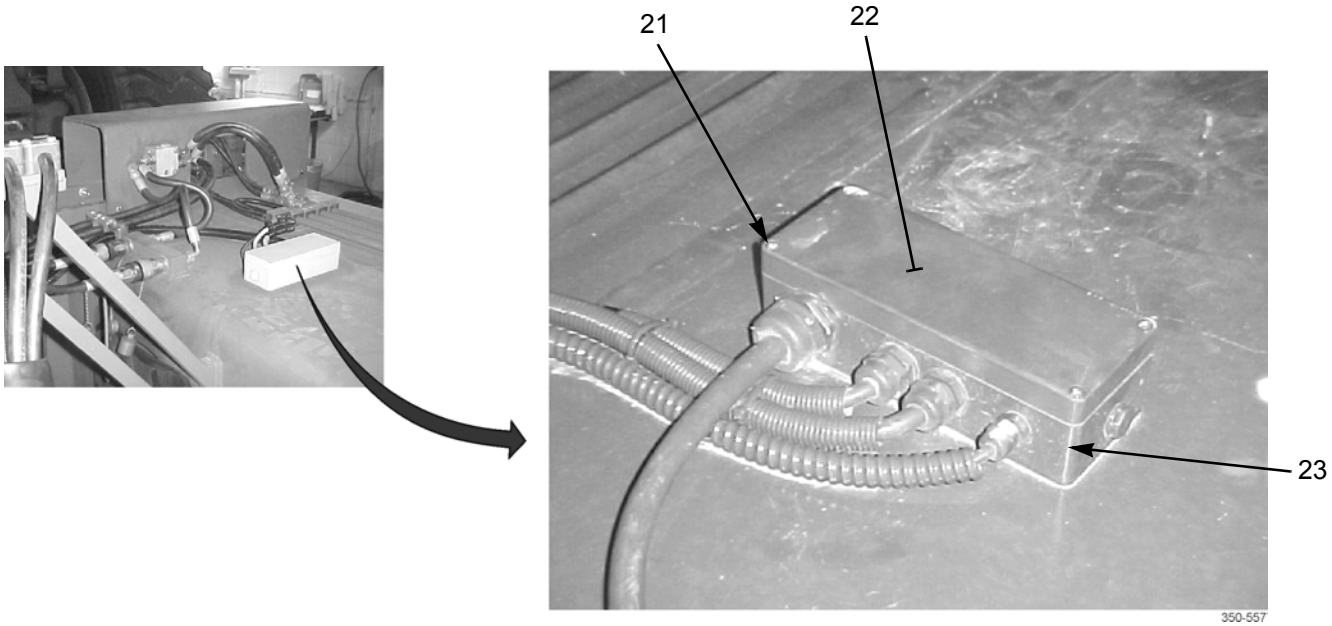
1. Position proximity switch (12) with cable to tophandler.
2. Using a jeweler's screwdriver, connect proximity switch wires (8) to terminal blocks (7).
3. Install grommet (9) and cable nut (10) to junction box (5). Tighten cable nut.
4. Install cover (4) to junction box (5) and tighten four screws (6).
5. Loosely install proximity switch (12) to tophandler with plastic clamp (13) and two screws (14).
6. Position proximity switch (12) so that a gap of 5 mm (0.20 in), between end of proximity switch and ring (11) of actuating plunger, is obtained. Tighten two screws (14).
7. Install cable clamps and new tiedown straps as needed.

SPREADER BEAM PROXIMITY SWITCH REMOVAL

1. Remove two screws (15), washers (16), and proximity switch plate (20) from top of tophandler spreader beam (19).
2. Measure position of proximity switch (17) in proximity switch plate (20), to ensure correct installation. Record measurement.
3. Remove two jamnuts (18) and proximity switch (17) from proximity switch plate (20).



4. Loosen four screws (21) and remove cover (22) from junction box (23). Inspect rubber seal in groove of cover. Replace only if damaged.



SPREADER BEAM PROXIMITY SWITCH REMOVAL - CONTINUED

5. Loosen cable nut (27) and slide cable nut and grommet (26) back on proximity switch (17) cable.

CAUTION

To avoid damage to junction box, a fine-tipped jeweler's screwdriver should be used when disconnecting proximity switch wires. DO NOT use a punch.

NOTE

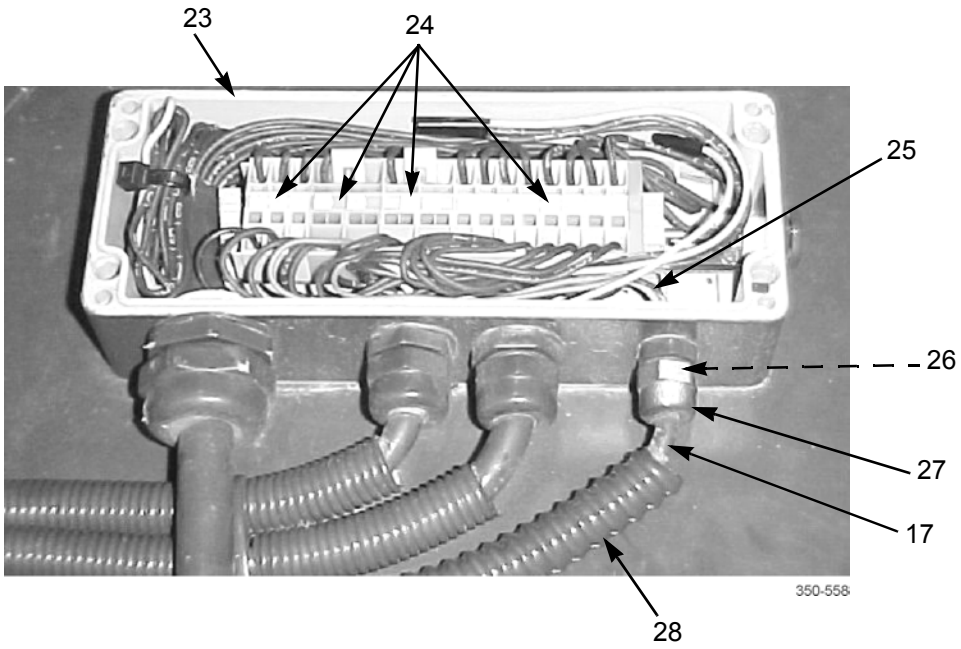
Tag wires for installation.

6. Using a jeweler's screwdriver, disconnect proximity switch wires (25) from terminal blocks (24).

NOTE

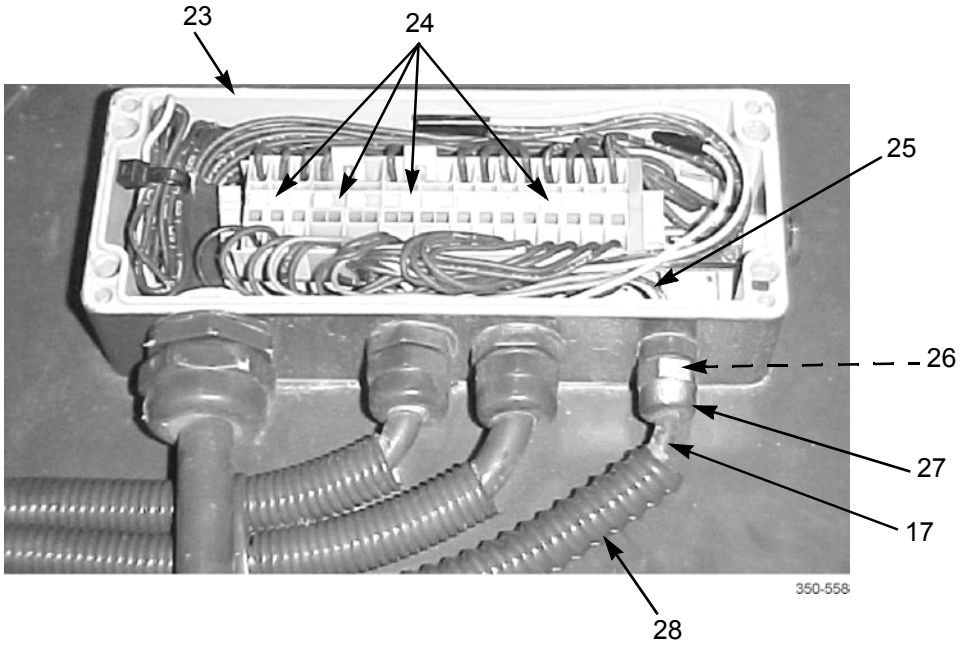
Remove tiedown straps as needed. Discard tiedown straps.

7. Remove proximity switch (17) with cable from tophandler.
8. Remove cable cover (28) from proximity switch (17) cable.

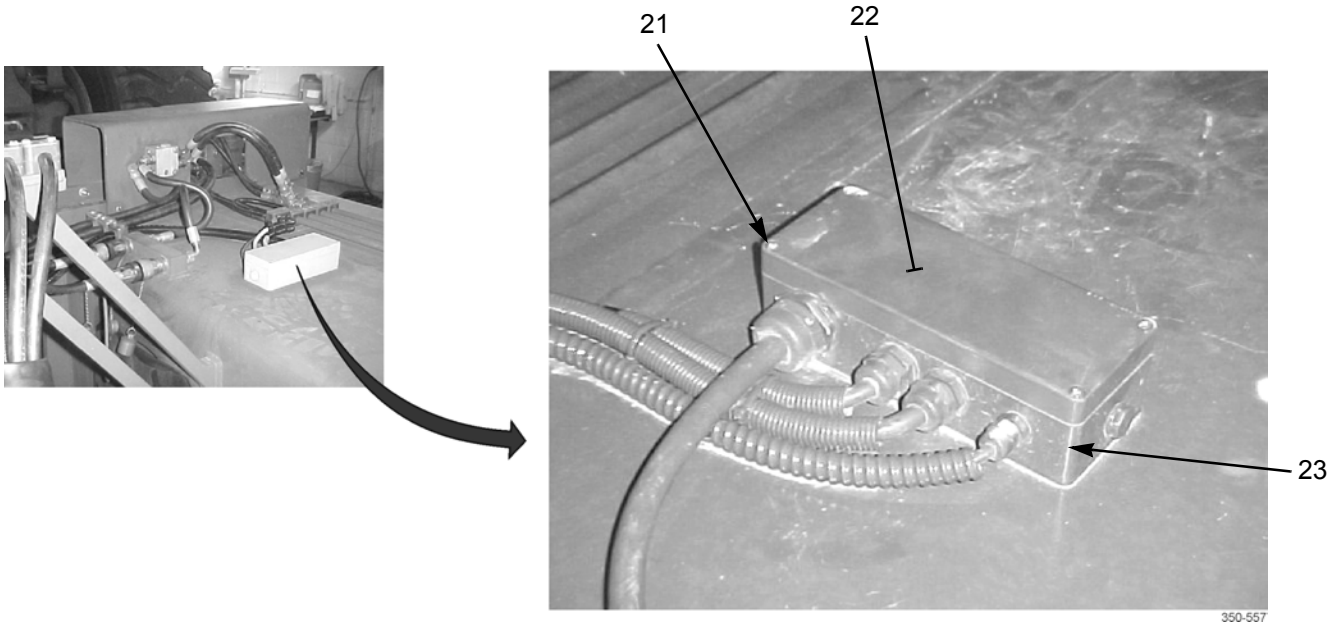


SPREADER BEAM PROXIMITY SWITCH INSTALLATION

1. Install cable cover (28) to proximity switch (17) cable.
2. Position proximity switch (17) with cable to tophandler.



3. Using a jeweler's screwdriver, connect proximity switch wires (25) to terminal blocks (24).
4. Install grommet (26) and cable nut (27) to junction box (23). Tighten cable nut.
5. Install cover (22) to junction box (23) and tighten four screws (21).



SPREADER BEAM PROXIMITY SWITCH INSTALLATION - CONTINUED

6. Loosely install proximity switch (17) to proximity switch plate (20) with two jamnuts (18).

CAUTION

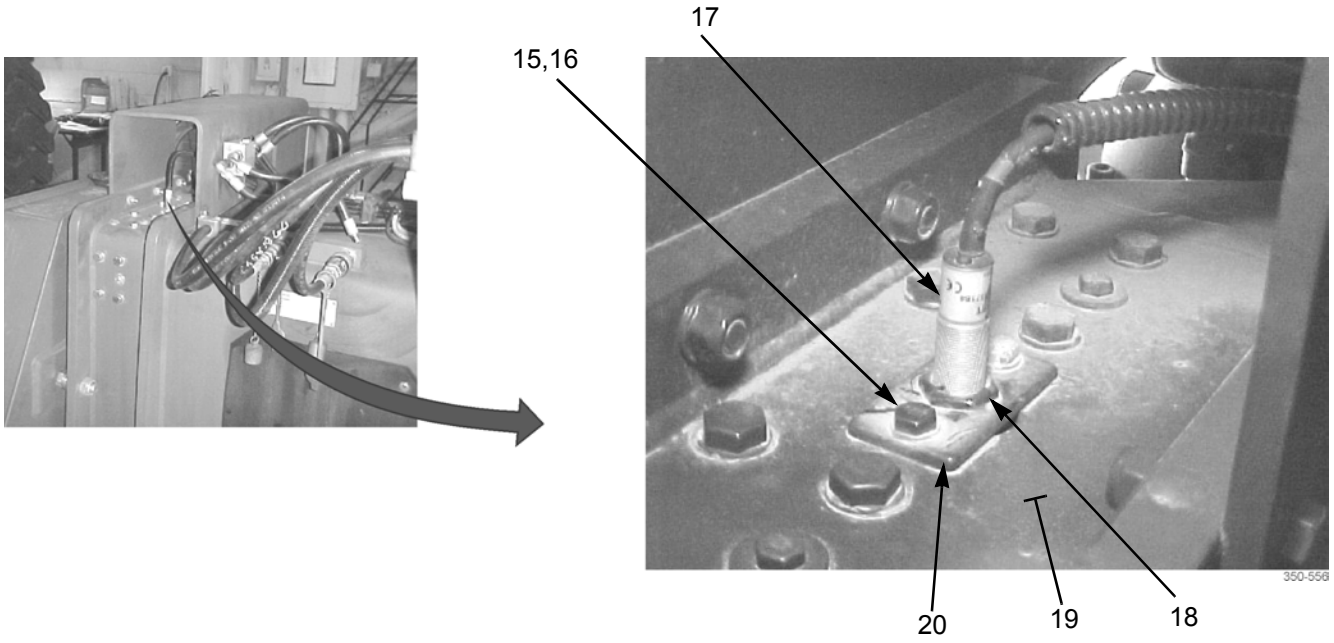
Overtightening jamnuts will damage proximity switch threads.

7. Place proximity switch (17) in same position as measured during removal and tighten two jamnuts (18) to 177 lb-in (20 Nm).

NOTE

Clearance between sensor end of proximity switch and flat rod below should be 5 mm (0.20 in).

8. Install proximity switch (17) and proximity switch plate (20) to spreader beam (19) with two washers (16) and screws (15).



9. Install new tiedown straps.

END OF WORK PACKAGE

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CAB POSITION PROXIMITY SWITCHES REPLACEMENT 0075 00

THIS WORK PACKAGE COVERS

Cab-Mounted Proximity Switch: Removal, Installation

Cab Support-Mounted Proximity Switch: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Screwdriver set, jeweler's (Item 25, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.003) (2)

References

WP 0135 00

Equipment Condition

Cab in transport position, but not lowered (TM 10-3930-675-10).

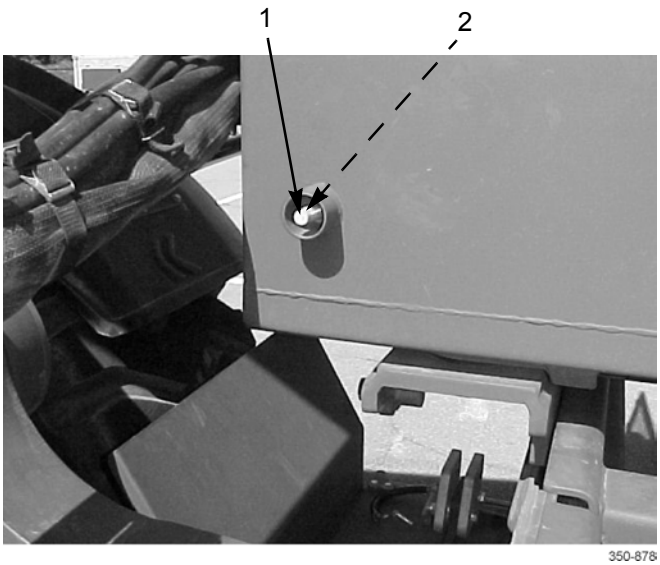
Master battery switch in OFF position.

CAB-MOUNTED PROXIMITY SWITCH REMOVAL

NOTE

Note position of proximity switch relative to cab to ensure accurate installation.

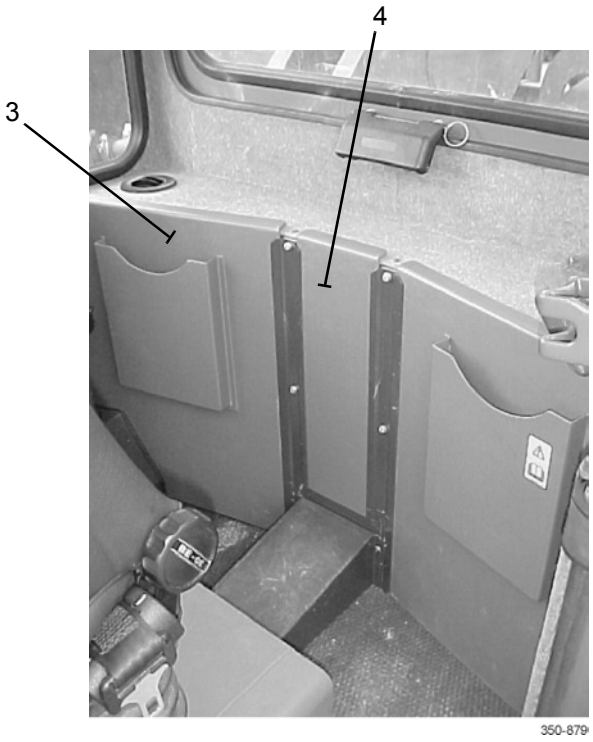
1. From outside of cab, remove jamnut (2) from proximity switch (1).



CAB POSITION PROXIMITY SWITCHES REPLACEMENT - CONTINUED 0075 00

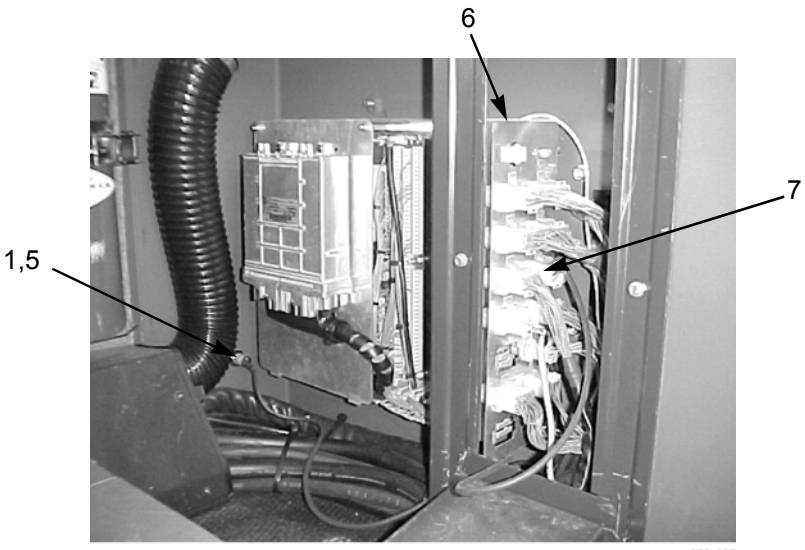
CAB-MOUNTED PROXIMITY SWITCH REMOVAL - CONTINUED

2. From inside rear of cab, remove right access panel (3) and middle access panel (4).



350-879

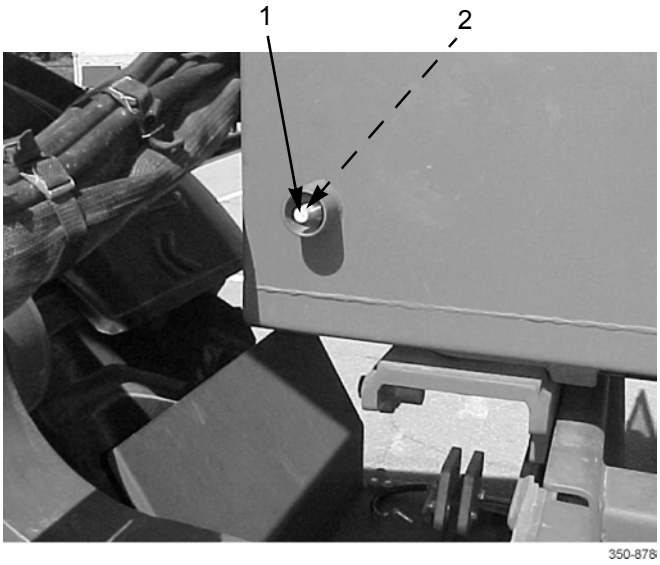
3. Pull proximity switch (1) out from side of cab and remove jamnut (5) from proximity switch.
4. Disconnect connector (7) of proximity switch (1) from electrical panel (6).
5. Remove proximity switch (1) from cab.



350-880

CAB-MOUNTED PROXIMITY SWITCH INSTALLATION

1. Position proximity switch (1) to cab.
2. Connect connector (7) of proximity switch (1) to electrical panel (6).
3. Install jamnut (5) to proximity switch (1) and push proximity switch out side of cab.
4. Outside of cab, install jamnut (2) to proximity switch (1). Do not fully tighten jamnut.



5. Adjust position of proximity switch (1) as noted during removal, by adjusting position of jamnuts (2 and 5).
6. Tighten jamnut (2).

CAB SUPPORT-MOUNTED PROXIMITY SWITCH REMOVAL

1. Remove middle and rear transmission access covers (WP 0135 00).

CAB SUPPORT-MOUNTED PROXIMITY SWITCH REMOVAL - CONTINUED

NOTE

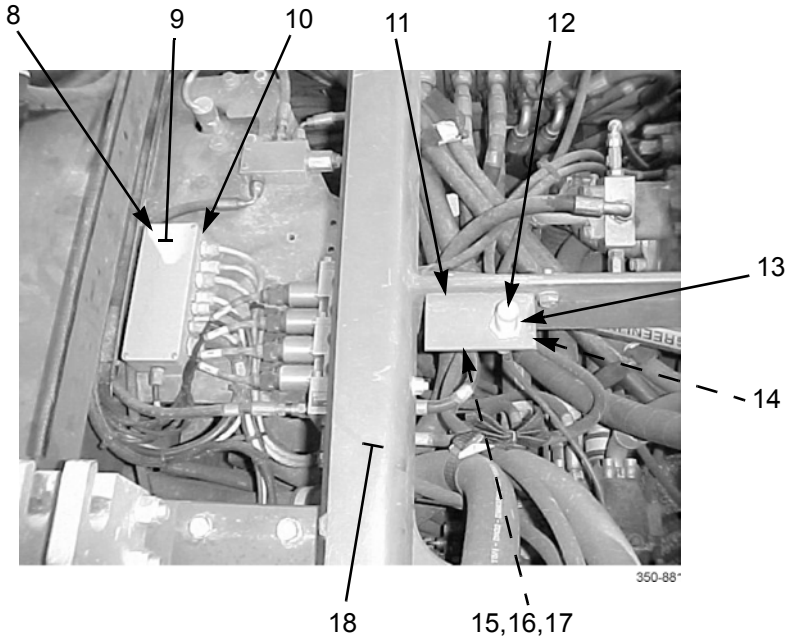
Note position of proximity switch relative to bracket to ensure accurate installation.

2. Remove upper jamnut (13) from proximity switch (12) and push proximity switch downward from bracket (11).
3. Remove jamnut (14) from proximity switch (12).

NOTE

Perform step 4 to remove bracket from cab support.

4. Remove two locknuts (15), screws (16), four washers (17), and bracket (11) from cab support (18). Discard locknuts.
5. Loosen four screws (8) and remove cover (9) from junction box (10).



NOTE

Tag wires for installation.

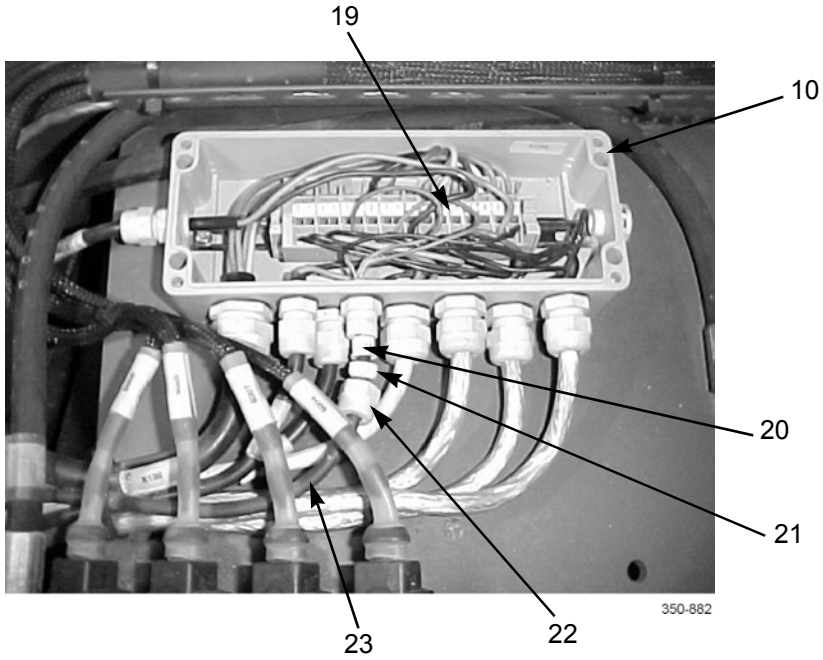
6. Using a jeweler’s screwdriver, disconnect three wires of cable (23) from terminal blocks (19) of junction box (10).
7. Loosen cable nut (22) and slide cable nut, grommet (21), and bushing (20) back on cable (23).

NOTE

Remove tiedown straps as needed. Discard tiedown straps.

8. Remove cable (23) from junction box (10).
9. Remove proximity switch (12) from vehicle.

CAB SUPPORT-MOUNTED PROXIMITY SWITCH REMOVAL - CONTINUED



CAB SUPPORT-MOUNTED PROXIMITY SWITCH INSTALLATION

1. Position proximity switch (12) to vehicle.
2. Feed cable (23) thru cable nut (22), grommet (21), and bushing (20) and into junction box (10).
3. Using a jeweler's screwdriver, connect three wires of cable (23) to terminal blocks (19) of junction box (10).
4. Install bushing (20), grommet (21), and cable nut (22) to junction box (10).
5. Install cover (9) to junction box (10) and tighten four screws (8).

NOTE

Perform step 6 to install bracket to cab support.

6. Install bracket (11) to cab support (18) with four washers (17), two screws (16), and new locknuts (15).
7. Loosely install jamnut (14) to proximity switch (12).
8. Position proximity switch (12) upward thru bracket (11) and loosely install upper jamnut (13).
9. Adjust jamnuts (13 and 14) to position proximity switch (12) as noted during removal and tighten jamnuts.
10. Install new tiedown straps as needed.
11. Install middle and rear transmission access covers (WP 0135 00).
12. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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TOPHANDLER JUNCTION BOX MAINTENANCE 0076 00

THIS WORK PACKAGE COVERS

Tophandler Electronic Control Unit (ECU): Removal, Installation

Relay: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

References

WP 0197 00

WP 0199 00

Equipment Condition

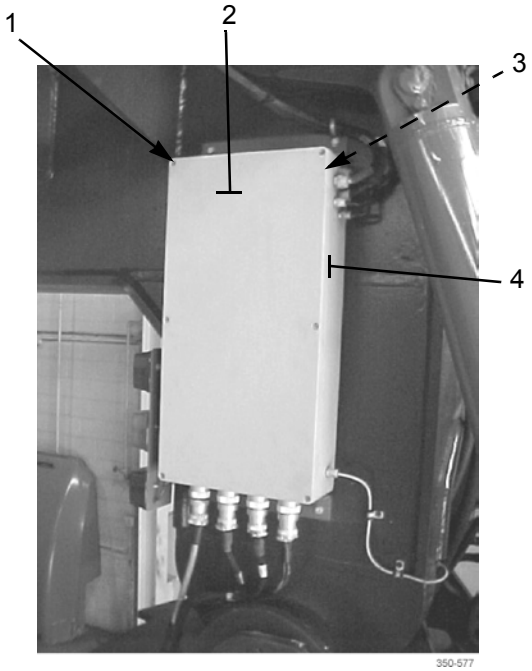
Master battery switch in OFF position

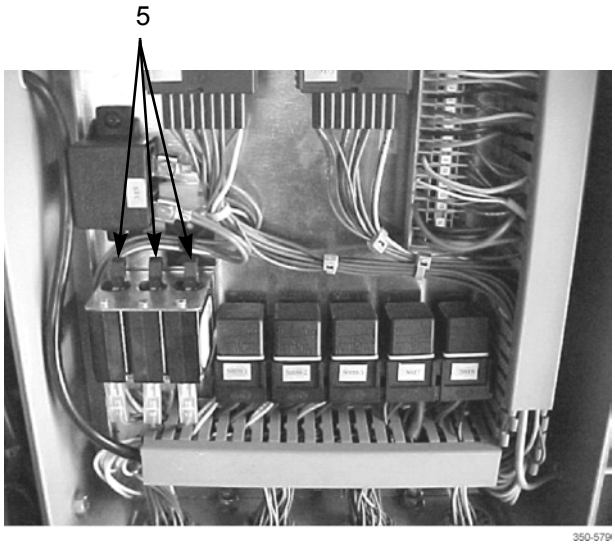
TOPHANDLER ELECTRONIC CONTROL UNIT (ECU) REMOVAL

NOTE

Tophandler ECU is located inside junction box at end of boom, above tophandler. Tophandler ECU is identified as no. 791 on system electrical diagrams (WP 0199 00).

1. Loosen six screws (1) and remove cover (2) of tophandler junction box (4). Note that three circuit breakers (5) should be in ON position.
2. Inspect rubber seal (3) of cover (2). Replace only if damaged.



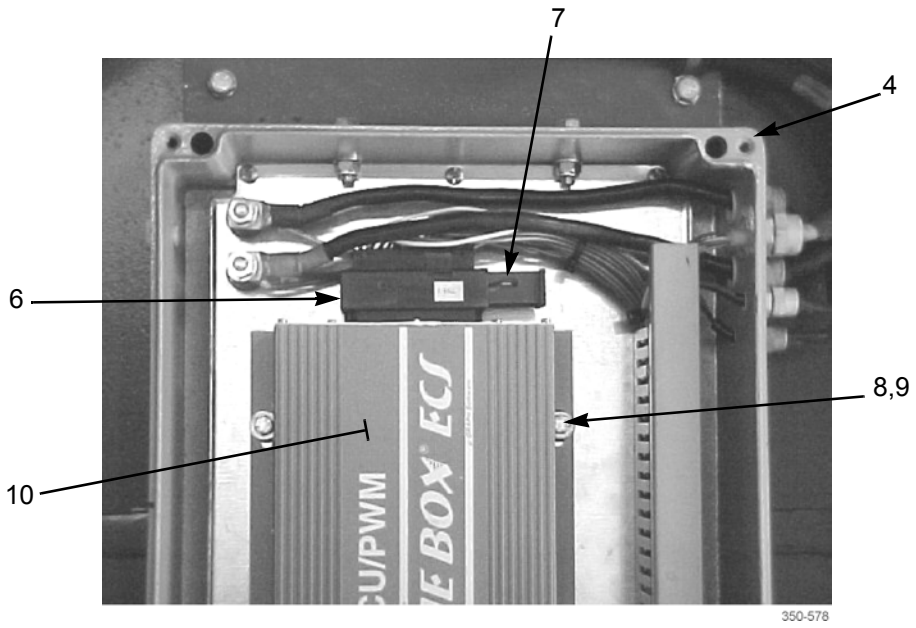


TOPHANDLER ELECTRONIC CONTROL UNIT (ECU) REMOVAL - CONTINUED

NOTE

- Perform step 3 for each of three connectors.
- Tag connectors for installation.

3. With a flat-tip screwdriver, slide red latch segment (7) of connector away from black connector (6) and remove connector from tophandler ECU (10).
4. Remove four screws (8), washers (9), and tophandler ECU (10) from tophandler junction box (4).



TOPHANDLER ELECTRONIC CONTROL UNIT (ECU) INSTALLATION

CAUTION

Do NOT overtighten screws or damage to screws will result.

1. Install tophandler ECU (10) in tophandler junction box (4) with four washers (9) and screws (8).

NOTE

Perform step 2 for each of three connectors.

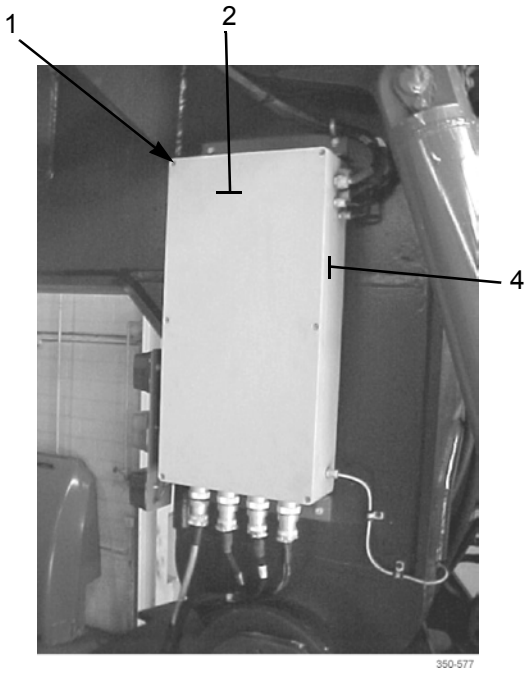
2. Position black connector (6) to tophandler ECU (10) and connect connector by sliding red latch segment (7) of connector inward.
3. Install cover (2) on tophandler junction box (4) and tighten six screws (1).
4. Perform boom and tophandler calibration (WP 0197 00).

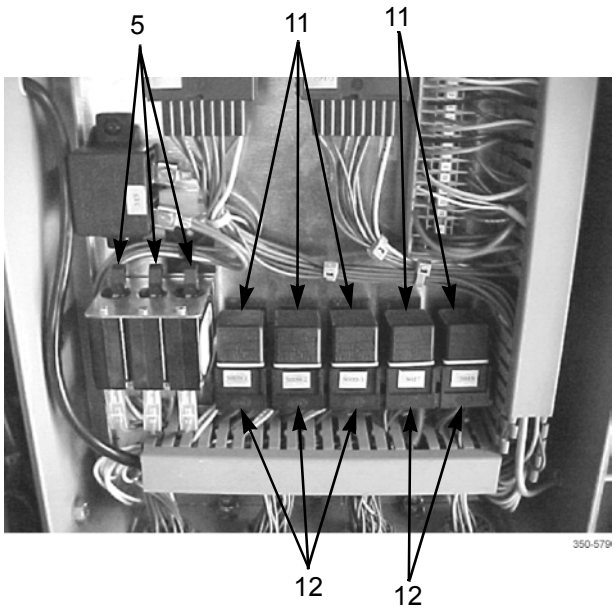
RELAY REMOVAL

NOTE

All five relays are removed the same.

1. Loosen six screws (1) and remove cover (2) of tophandler junction box (4). Note that three circuit breakers (5) should be in ON position.
2. Inspect rubber seal (3) of cover (2). Remove and discard only if damaged.
3. Remove relay (11) from relay holder (12).





RELAY INSTALLATION

NOTE

All five relays are installed the same.

1. Install relay (11) in relay holder (12).
2. If removed, install new rubber seal (3) to cover (2).
3. Install cover (2) on tophandler junction box (4) and tighten six screws (1).

END OF WORK PACKAGE

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TOPHANDLER PROXIMITY SWITCH JUNCTION BOXES REPLACEMENT 0077 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)
Screwdriver set, jeweler's (Item 25, WP 0204 00)

Materials/ Parts

Tag, marker (Item 28, WP 0203 00)

References

WP 0197 00

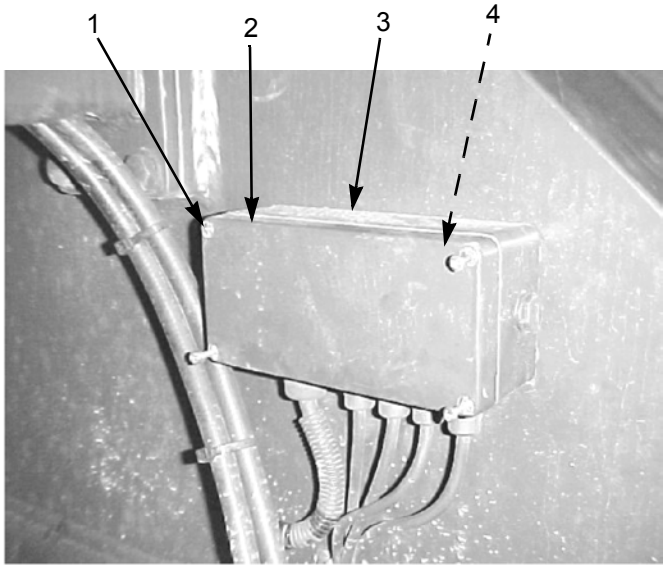
Equipment Condition

Master battery switch in OFF position

REMOVAL

1. Loosen four screws (1) and remove cover (2) from junction box (3).
2. Inspect rubber seal (4) of cover (2). Replace seal only if damaged.





350-580

REMOVAL - CONTINUED

NOTE

Perform steps 3 and 4 in five places.

3. Loosen cable nut (14) and slide cable nut and grommet (13) back on cable (12).

NOTE

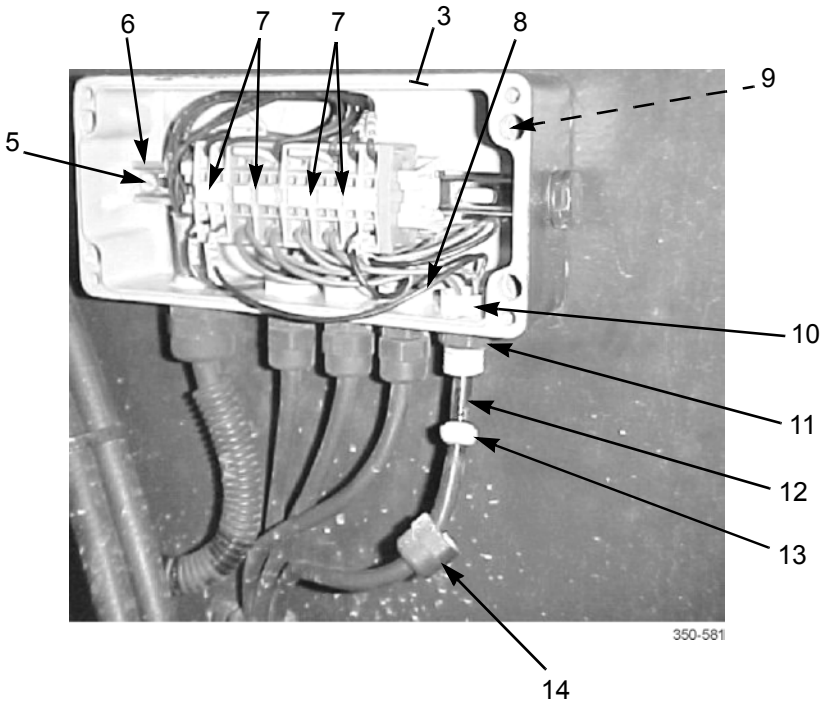
Tag wires for installation.

4. Using a jeweler's screwdriver, disconnect wires (8) from terminal blocks (7) and pull cables (12) with wires from junction box (3).
5. Remove two screws (5), terminal block holder (6), and terminal blocks (7) from junction box (3).

NOTE

Perform step 6 in five places.

6. Remove plastic nut (11) and fitting (10) from bottom of junction box (3).
7. Remove four screws (9) and junction box (3) from tophandler.



INSTALLATION

1. Install junction box (3) to tophandler with four screws (9).

INSTALLATION - CONTINUED

NOTE

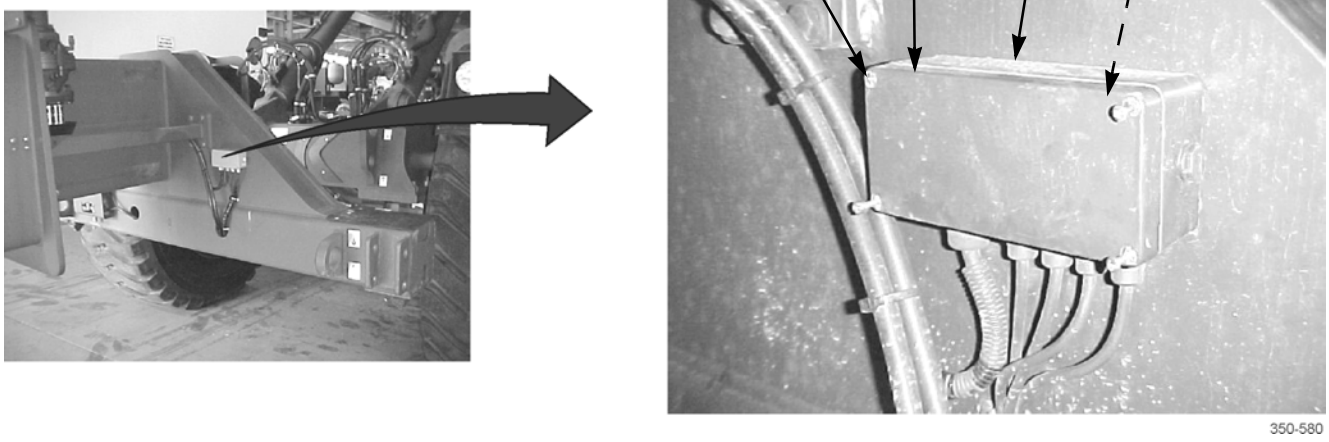
Perform step 2 in five places.

2. Install fitting (10) and plastic nut (11) to bottom of junction box (3).
3. Install terminal blocks (7) and terminal block holder (6) to junction box (3) with two screws (5).

NOTE

Perform steps 4 and 5 in five places.

4. Push cable (12) into junction box (3) and use jeweler's screwdriver to connect wires (8) to terminal blocks (7).
5. Install grommet (13) and cable nut (14) to junction box (3). Tighten cable nut.
6. Install cover (2) to junction box (3) with four screws (1).



7. Perform boom and tophandler calibration (WP 0197 00).

END OF WORK PACKAGE

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ENGINE ELECTRONIC CONTROL MODULE (ECM) REPLACEMENT 0078 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 0-200 lb-in capacity (Item 40, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Master battery switch in OFF position

Engine cover removed (WP 0143 00)

NOTE

Engine ECM is located on left side of engine. Engine ECM is identified as no. 794 on system electrical diagrams (WP 0199 00).

REMOVAL

NOTE

Tag wires prior to disconnection to ensure correct connection on installation.

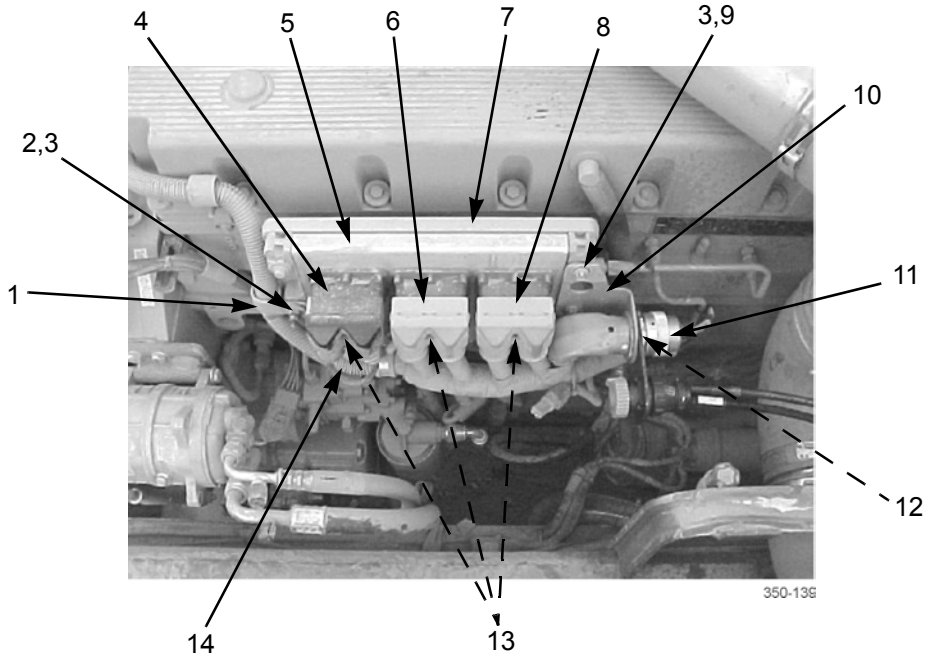
REMOVAL - CONTINUED

1. Loosen three connector captive screws (13) and disconnect actuator harness connector (6), sensor harness connector (8), and OEM harness connector (4) from ECM (5).
2. Disconnect wiring harness (11) from 32-pin connector (12).

NOTE

Note type and location of mounting hardware to aid in installation.

3. Remove screw (9) and washer (3) securing 32-pin connector (12) and bracket (10) to ECM (5).
4. Remove screw (2), washer (3), and cable clamp (1) securing engine wiring harness (14) to ECM (5). Reposition engine wiring harness and OEM wiring harness.
5. Remove remaining screws (2 and 9) and washers (3) securing ECM (5) to cooling plate (7).
6. Remove ECM (5) from cooling plate (7).



INSTALLATION

1. Position ECM (5) on cooling plate (7).

NOTE

Ensure mounting screws are installed as noted in removal.

2. Temporarily secure ECM (5) to cooling plate (7) with screws (2 and 9) and washers (3).

NOTE

Ensure connectors are clean and dry prior to connection to ECM.

INSTALLATION - CONTINUED

3. Position actuator harness connector (6), sensor harness connector (8), and 32-pin connector (12) with bracket (10).
4. Install screw (9) and washer (3) to secure bracket (10) to ECM (5). Tighten captive screws (13) to 25 lb-in (3 Nm) to secure connectors.
5. Position engine wiring harness (14) and OEM wiring harness. Secure engine wiring harness with cable clamp (1), screw (2), and washer (3). Tighten captive screw (13) on OEM wiring harness to 25 lb-in (3 Nm).
6. Connect wiring harness (11) to 32-pin connector (12).
7. Fully tighten ECM screws (2 and 9) evenly to 180 lb-in (20 Nm).

NOTE

If ECM is new, it must be calibrated with information saved from old ECM.

8. Calibrate ECM, if required.
9. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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ELECTRONIC CONTROL UNITS (ECU) REPLACEMENT 0079 00

THIS WORK PACKAGE COVERS

Transmission Electronic Control Unit (ECU): Removal, Installation

Steering System Electronic Control Unit (ECU): Removal, Installation

Hydraulic Servo System Electronic Control Unit (ECU): Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

References

WP 0196 00

WP 0197 00

References - Continued

WP 0195 00

WP 0199 00

Equipment Condition

Master battery switch in OFF position

TRANSMISSION ELECTRONIC CONTROL UNIT (ECU) REMOVAL

NOTE

Transmission ECU is located in cab behind driver's seat, behind right-rear panel. Transmission ECU is identified as no. 793 on system electrical diagrams (WP 0199 00).

1. Lift and remove two access panels (1 and 2) at rear of cab.



350-737

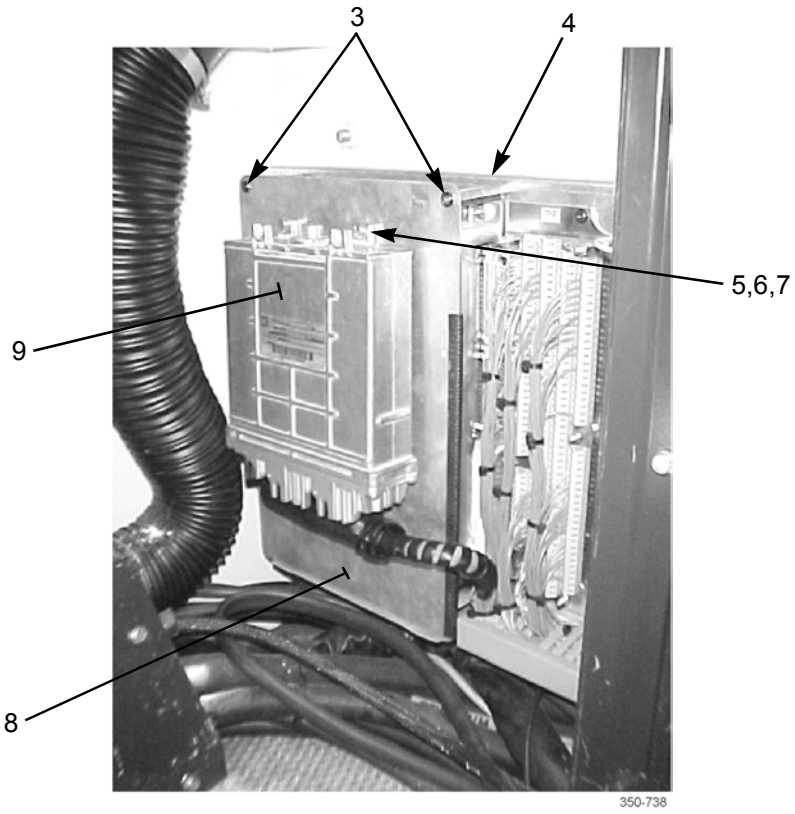
TRANSMISSION ELECTRONIC CONTROL UNIT (ECU) REMOVAL - CONTINUED

2. Remove two screws (3) and plate (8) with transmission ECU (9) from electrical panel (4).

NOTE

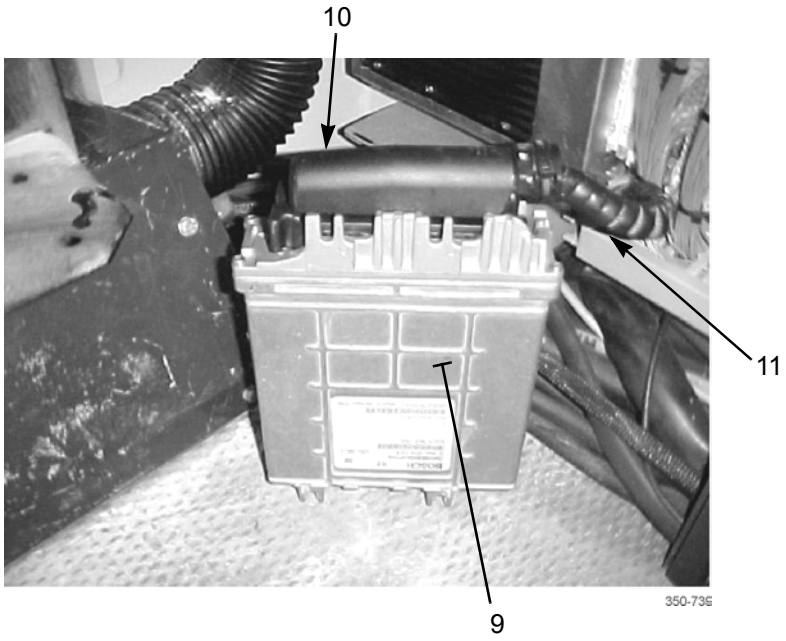
Heads of two screws at top of transmission ECU are not fully accessible. Hold slot of screw heads from the side with screwdriver when removing nuts.

3. Remove four nuts (5), screws (6), washers (7), and transmission ECU (9) from plate (8).



TRANSMISSION ELECTRONIC CONTROL UNIT (ECU) REMOVAL - CONTINUED

4. Disconnect connector (10) of wiring harness (11) from transmission ECU (9) by sliding out handle of connector.



TRANSMISSION ELECTRONIC CONTROL UNIT (ECU) INSTALLATION

1. Connect connector (10) of wiring harness (11) to transmission ECU (9) by sliding in handle of connector.

NOTE

Heads of two screws at top of transmission ECU are not fully accessible. Hold slot of screw heads from the side with screwdriver when installing nuts.

2. Install transmission ECU (9) to plate (8) with four washers (7), screws (6), and nuts (5).
3. Position plate (8) with transmission ECU (9) to electrical panel (4) and install two screws (3).

TRANSMISSION ELECTRONIC CONTROL UNIT (ECU) INSTALLATION - CONTINUED

4. Install two access panels (1 and 2) at rear of cab.



350-737

NOTE

If transmission ECU was removed only for access to steering system ECU, no transmission calibration is required.

5. Perform transmission calibration (WP 0195 00).

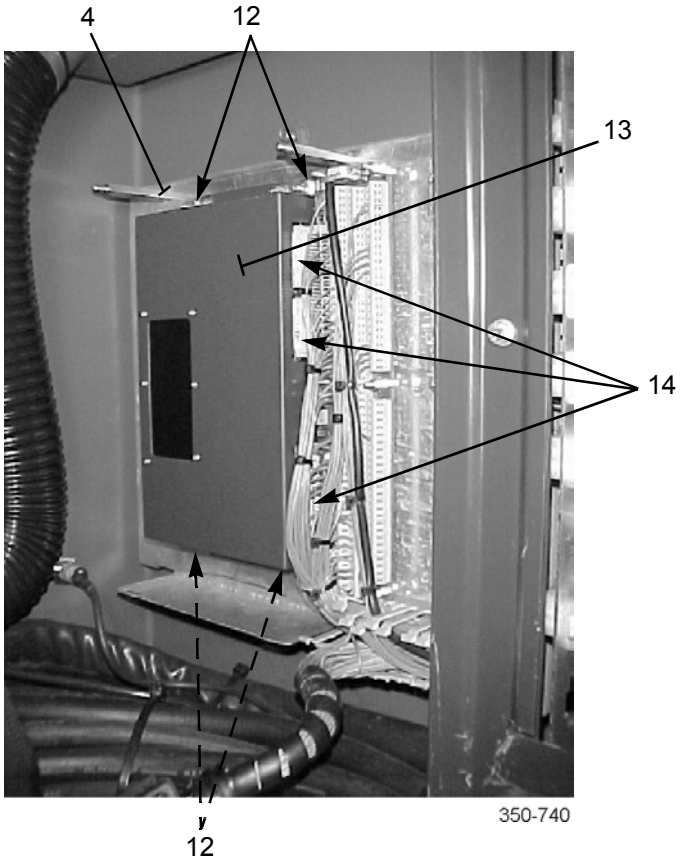
STEERING SYSTEM ELECTRONIC CONTROL UNIT (ECU) REMOVAL

NOTE

Steering system ECU is located in cab behind driver's seat, behind right-rear panel and behind transmission ECU. Steering system ECU is identified as no. 792 on system electrical diagrams (WP 0199 00).

1. Perform *Transmission Electronic Control Unit (ECU) Removal* for access to steering system ECU.
2. Remove four nuts (12) to free steering system ECU (13) from electrical panel (4).
3. Disconnect three connectors (14) from steering system ECU (13) and remove ECU.

STEERING SYSTEM ELECTRONIC CONTROL UNIT (ECU) REMOVAL- CONTINUED



STEERING SYSTEM ELECTRONIC CONTROL UNIT (ECU) INSTALLATION

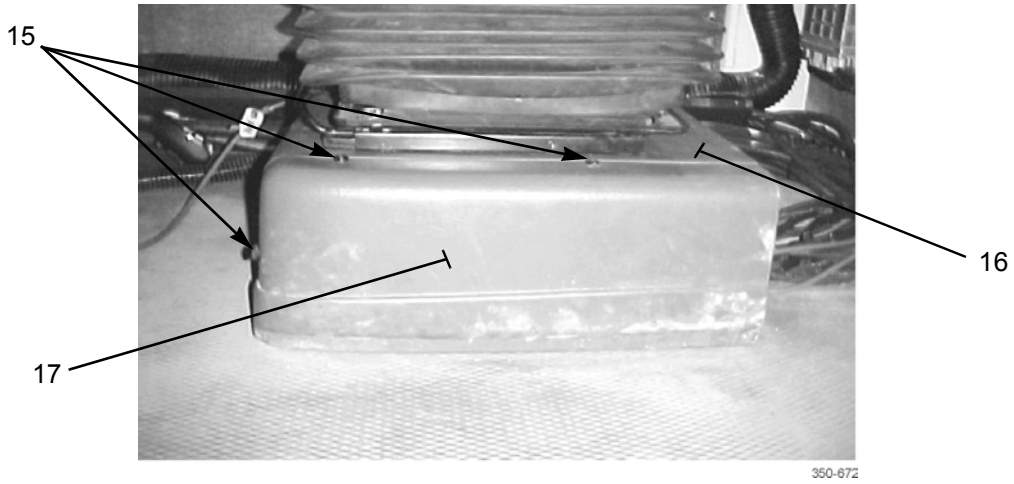
1. Position steering system ECU (13) to electrical panel (4).
2. Connect three connectors (14) to steering system ECU (13).
3. Secure steering system ECU (13) to electrical panel (4) with four nuts (12).
4. Perform *Transmission Electronic Control Unit (ECU) Installation*.
5. Perform steering calibration (WP 0196 00).

HYDRAULIC SERVO SYSTEM ELECTRONIC CONTROL UNIT (ECU) REMOVAL

NOTE

Hydraulic servo system ECU is located in cab under driver's seat. Hydraulic servo system ECU is identified as no. 790 on system electrical diagrams (WP 0199 00).

1. Rotate three turnbuttons (15) and remove cover (17) from seat base (16).

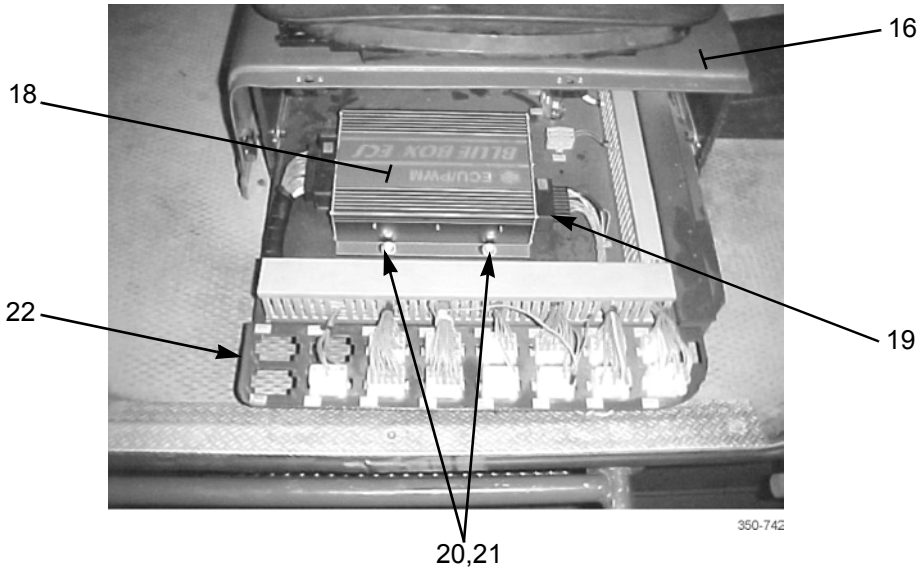


2. Slide electrical tray (22) outward from seat base (16).

NOTE

Perform step 3 for each of two connectors.

3. Disconnect connector (19) from hydraulic servo system ECU (18) by sliding out red latch of connector.
4. Remove four screws (20), washers (21), and hydraulic servo system ECU (18) from electrical tray (22).



HYDRAULIC SERVO SYSTEM ELECTRONIC CONTROL UNIT (ECU) INSTALLATION

CAUTION

Do NOT overtighten screws or damage to screws will result.

1. Install hydraulic servo system ECU (18) to electrical tray (22) with four washers (21) and screws (20).

NOTE

Perform step 2 for each of two connectors.

2. Connect connector (19) to hydraulic servo system ECU (18) by sliding in red latch of connector.
3. Slide electrical tray (22) into seat base (16).
4. Install cover (17) to seat base (16) and rotate three turnbuttons (15).
5. Perform boom and tophandler calibration (WP 0197 00).

END OF WORK PACKAGE

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ECS DISPLAY SCREEN REPLACEMENT 0080 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUPINITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

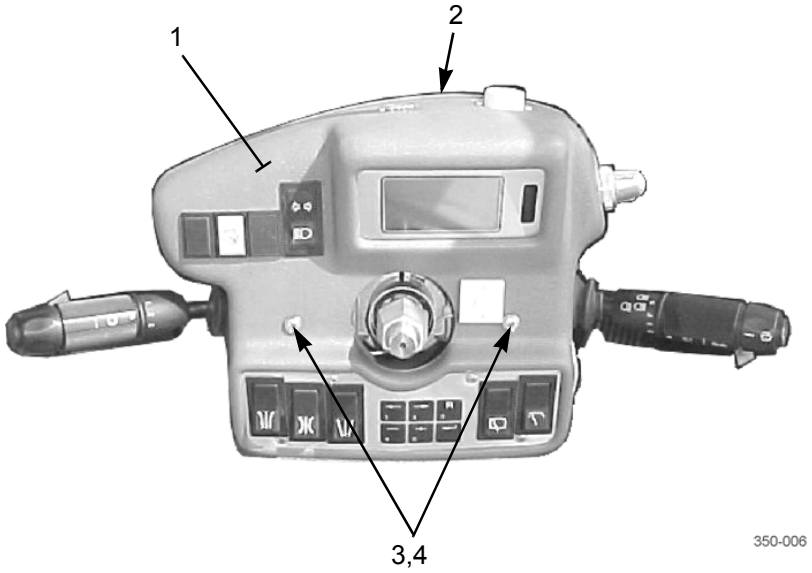
Equipment Condition

Master battery switch in OFF position

Steering wheel removed (WP 0129 00)

REMOVAL

1. Remove eight screws (3) and washers (4) to separate top plastic housing (1) from bottom plastic housing (2).



ECS DISPLAY SCREEN REPLACEMENT - CONTINUED 0080 00

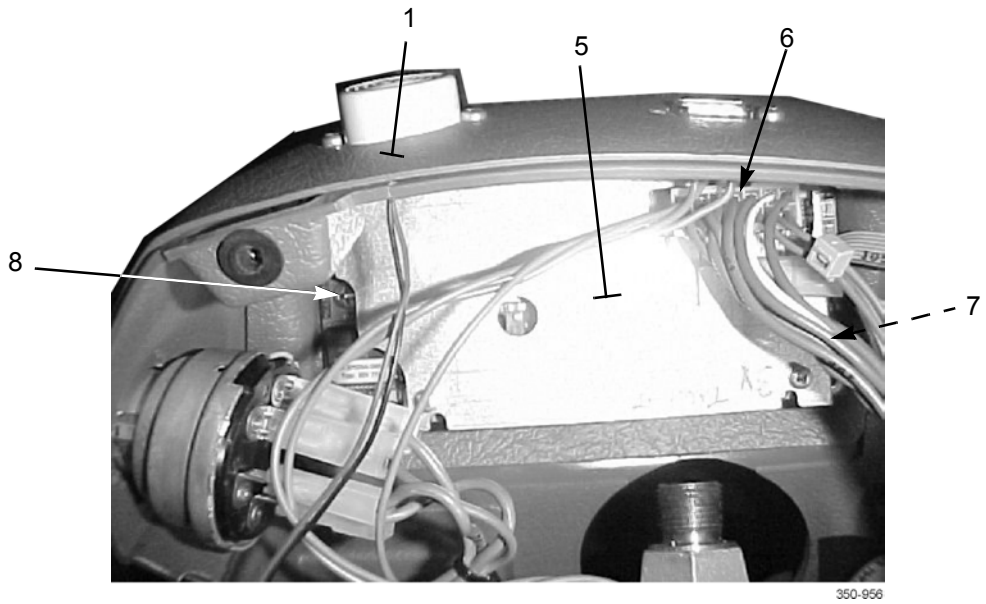
REMOVAL - CONTINUED

2. Raise front of top plastic housing (1) upward for access to display screen (5).
3. Disconnect two-wire ground connector (7) from display screen (5).
4. Disconnect multi-pin connector (6) from display screen (5).

NOTE

- Display screen is a unit consisting of display screen, flat wire connector, and touch pad.
- Note position of display screen for installation.

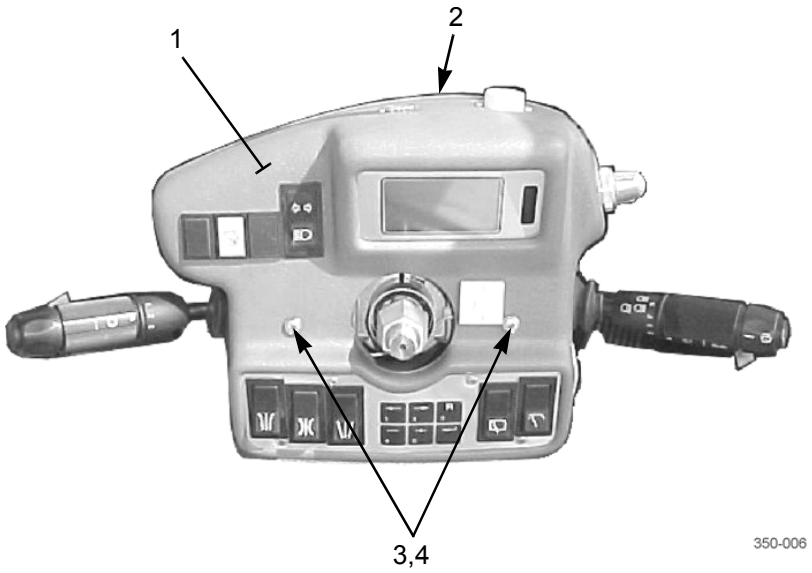
5. Remove two screws (8) and display screen (5) from top plastic housing (1).



INSTALLATION

1. Install display screen (5) to top plastic housing (1) with two screws (8).
2. Connect multi-pin connector (6) to display screen (5).
3. Connect two-wire ground connector (7) to display screen (5).
4. Lower front of top plastic housing (1).
5. Install top plastic housing (1) to bottom plastic housing (2) with eight washers (4) and screws (3).

INSTALLATION - CONTINUED



6. Install steering wheel (WP 0129 00).

END OF WORK PACKAGE

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ELECTRONIC JOYSTICK ASSEMBLY REPLACEMENT 0081 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

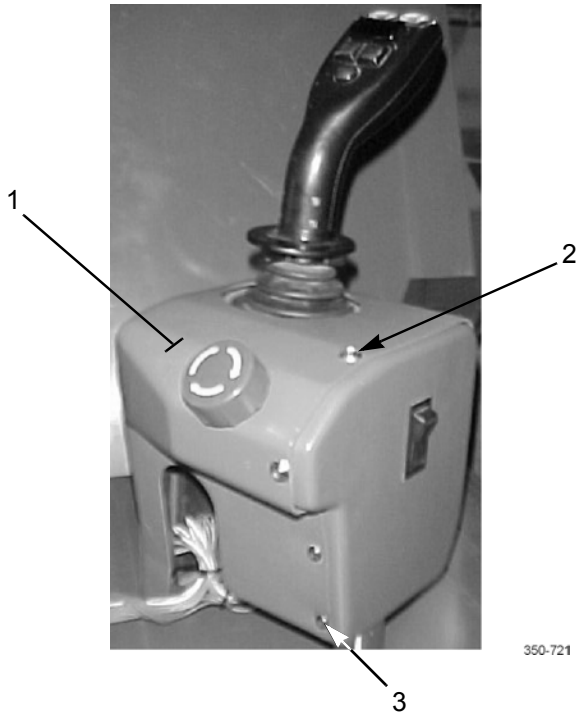
Nut, lock (P/N 920076.001) (4)

Equipment Condition

Electronic joystick assembly wiring harness disconnected from joystick (WP 0082 00)

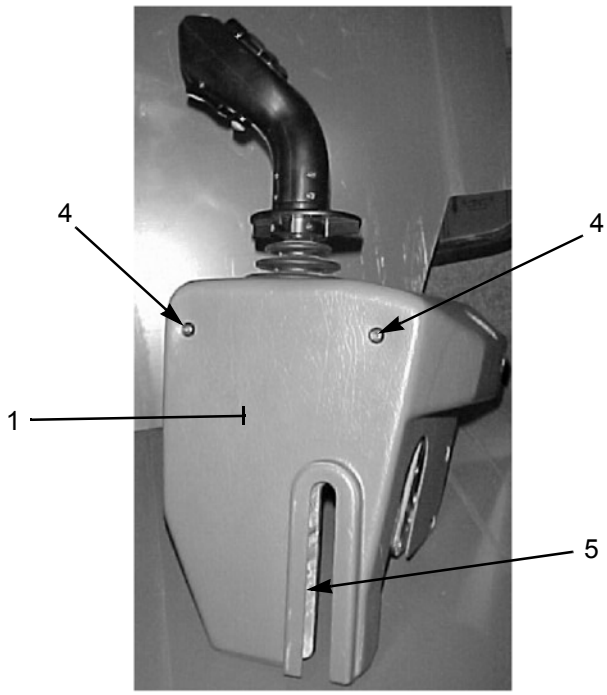
REMOVAL

1. Remove three screws (2) and three screws (3) from joystick housing (1).
2. Separate two halves of joystick housing (1).



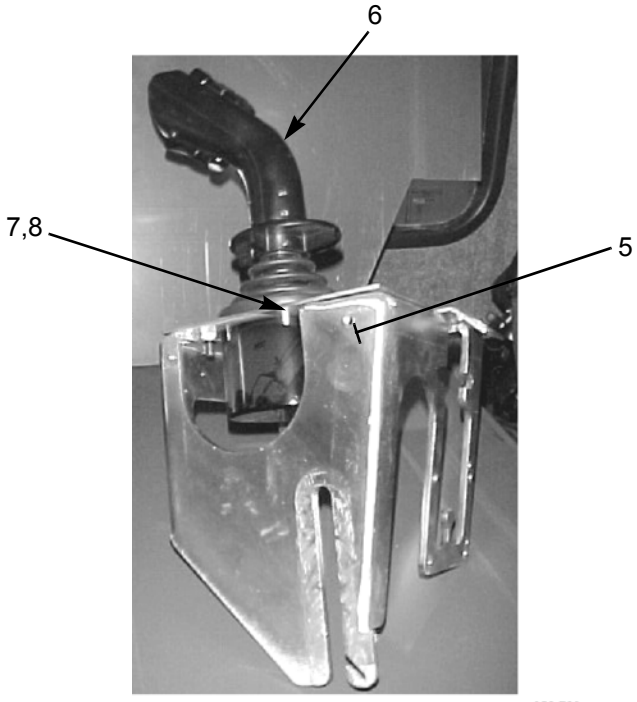
REMOVAL - CONTINUED

3. Remove two screws (4) and remaining half of joystick housing (1) from joystick bracket (5).



350-722

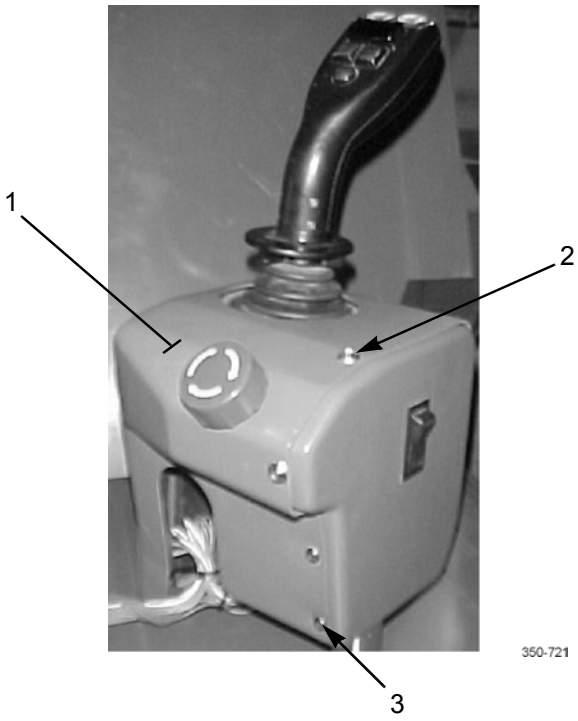
4. Remove four locknuts (7), screws (8), and joystick (6) from joystick bracket (5). Discard locknuts.



350-723

INSTALLATION

1. Install joystick (6) to joystick bracket (5) with four screws (8) and new locknuts (7).
2. Install half of joystick housing (1) to joystick bracket (5) with two screws (4).
3. Join two halves of joystick housing (1).
4. Install three screws (3) and three screws (2) to joystick housing (1).



5. Connect joystick assembly wiring harness to joystick (WP 0082 00).

END OF WORK PACKAGE

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ELECTRONIC JOYSTICK ASSEMBLY WIRING HARNESS REPLACEMENT 0082 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

TM 10-3930-675-10

WP 0199 00

Equipment Condition

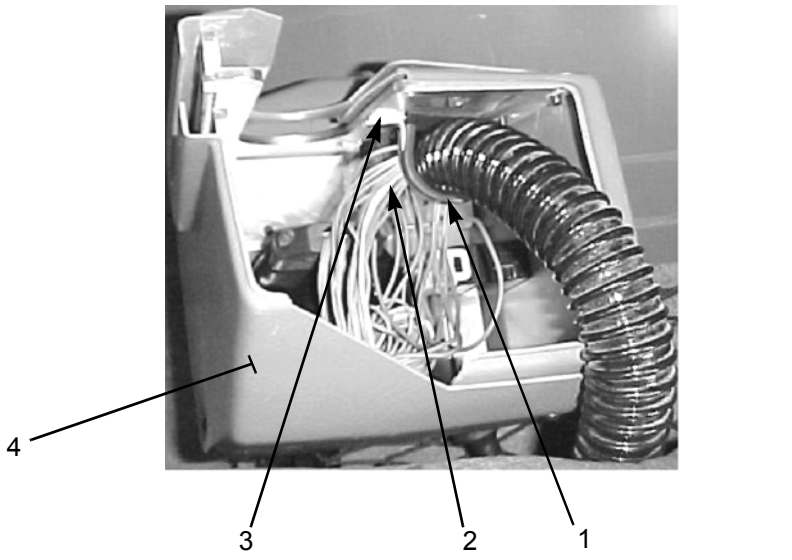
Master battery switch in OFF position

NOTE

Refer to wiring diagrams in WP 0199 00 and use marker tags, as necessary, to ensure proper connection of connectors.

REMOVAL

1. Raise joystick positioning lever and lift joystick assembly upward to free joystick assembly from seat (TM 10-3930-675-10).
2. Turn joystick housing (4) over for access to bottom of joystick housing.
3. Remove screw (3) and clamp (1) from protective cover of joystick wiring harness (2).



350-671

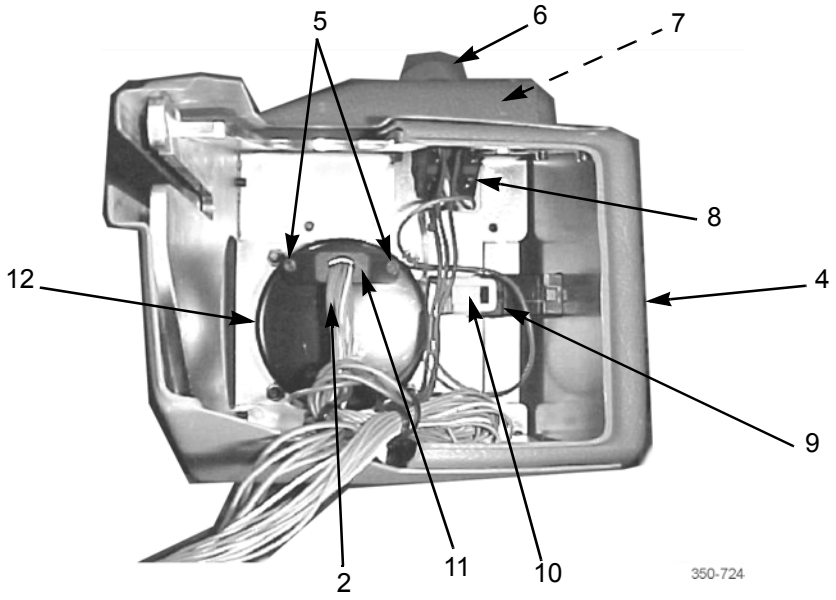
REMOVAL - CONTINUED

4. Loosen two screws (5) and disconnect connector (11) of joystick wiring harness (2) from bottom of joystick (12).

NOTE

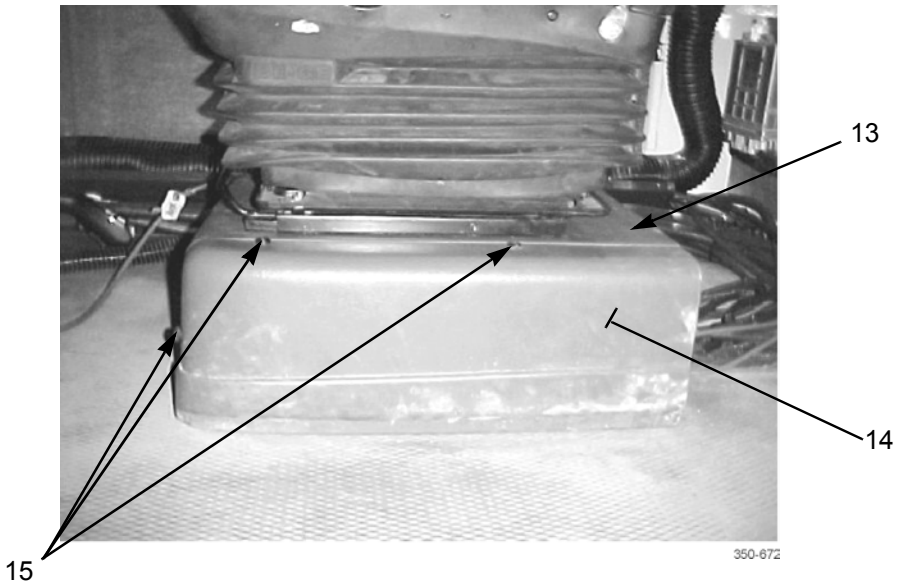
Emergency stop switch will come free of joystick housing when red knob is removed.

5. Push in and rotate red knob (6) of emergency stop switch (7) slightly counterclockwise and remove red knob from joystick housing (4).
6. Pull emergency stop switch (7) downward and away from joystick housing (4).
7. Lift tab of two connectors (8) of joystick wiring harness (2) and disconnect two connectors from emergency stop switch (7).
8. Lift tab of connector (10) of joystick wiring harness (2) and disconnect connector from override switch (9). Remove switch.



REMOVAL - CONTINUED

9. Loosen three turnbuttons (15) and remove cover (14) from seat base (13).

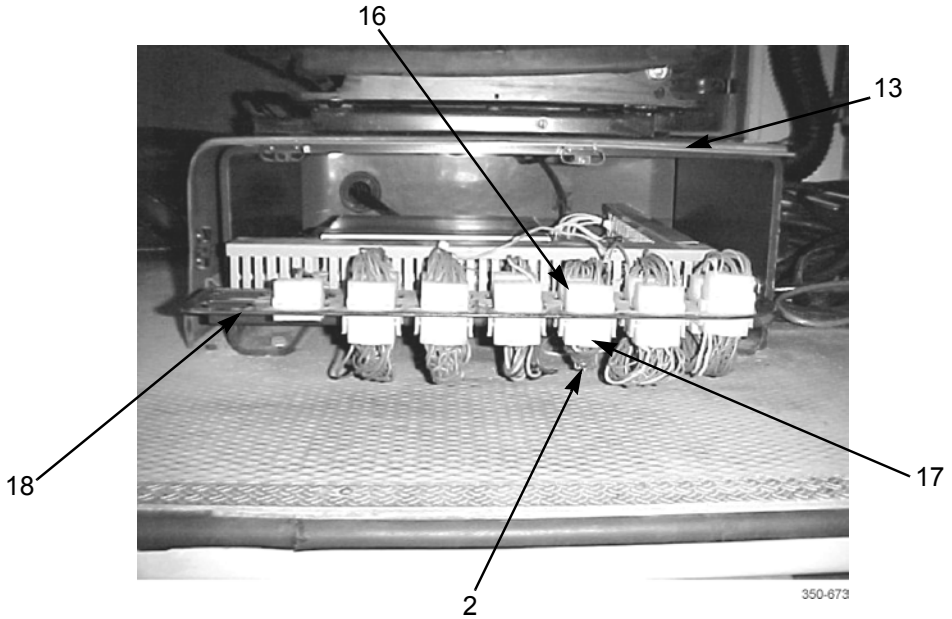


10. Slide electrical tray (18) out from seat base (13) for access to underside of tray.

NOTE

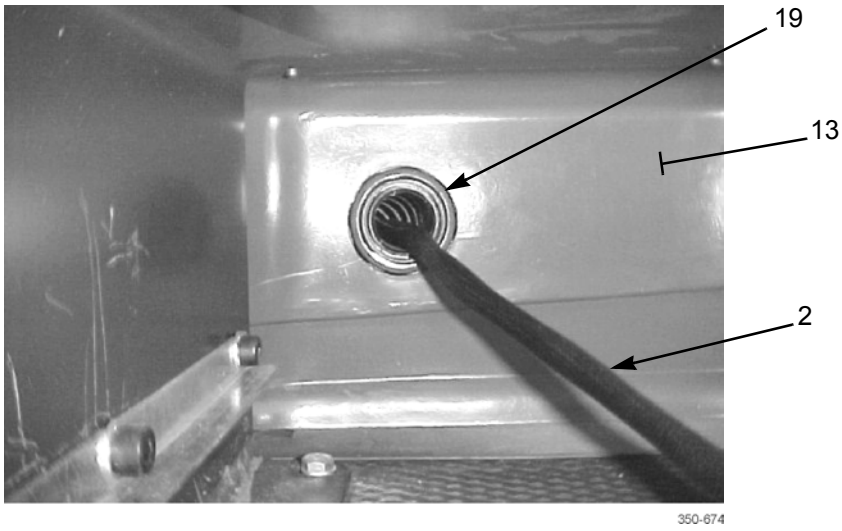
Remove and discard tiedown straps as necessary.

11. Depress tabs of two connectors (17) and disconnect two connectors of joystick wiring harness (2) from two terminal blocks (16).



REMOVAL - CONTINUED

12. Remove nut (19) from inside seat base (13) and remove joystick wiring harness (2) from vehicle.



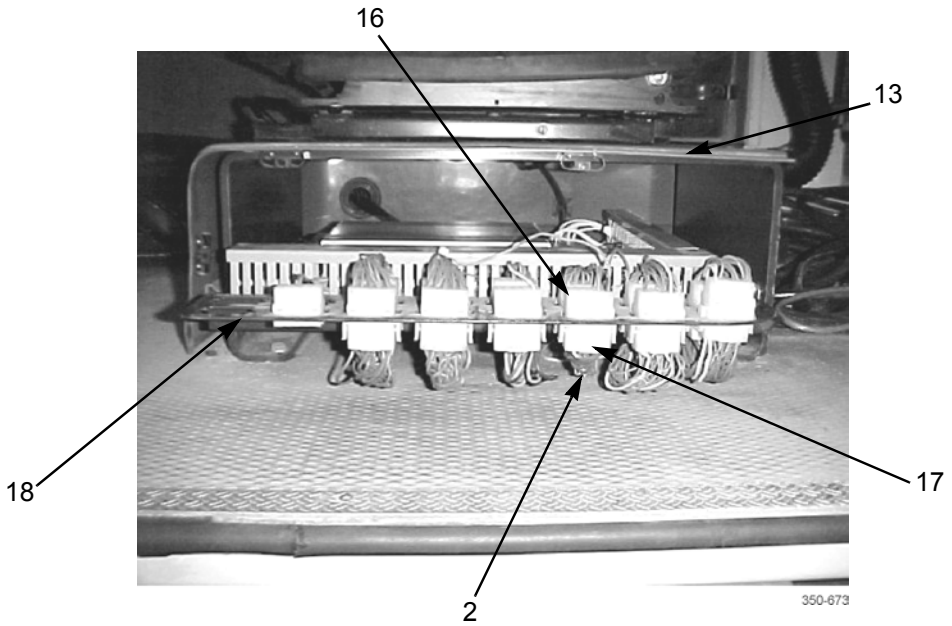
INSTALLATION

1. Position joystick wiring harness (2) thru seat base (13) and install nut (19).

NOTE

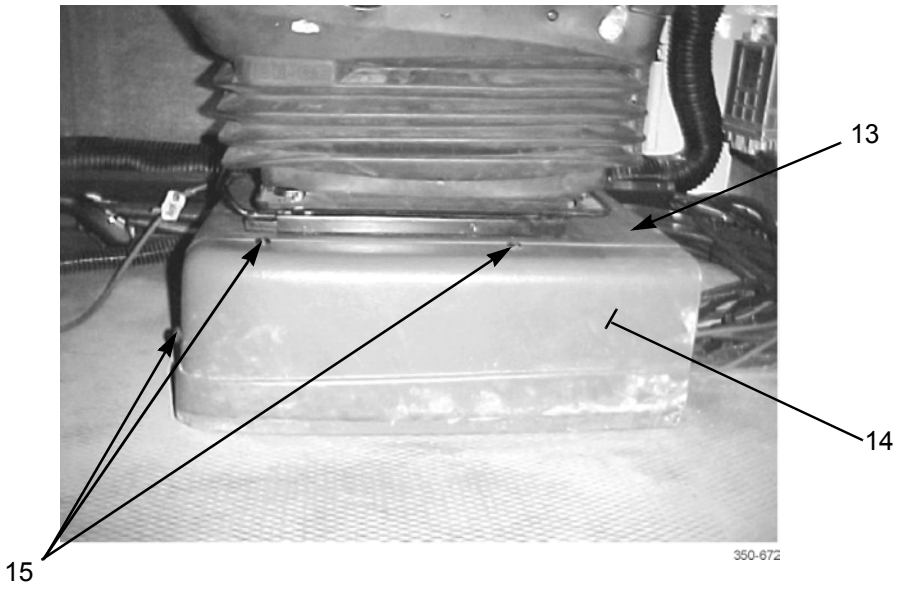
Install new tiedown straps as necessary.

2. Connect two connectors (17) of joystick wiring harness (2) to two terminal blocks (16).
3. Slide electrical tray (18) into seat base (13).

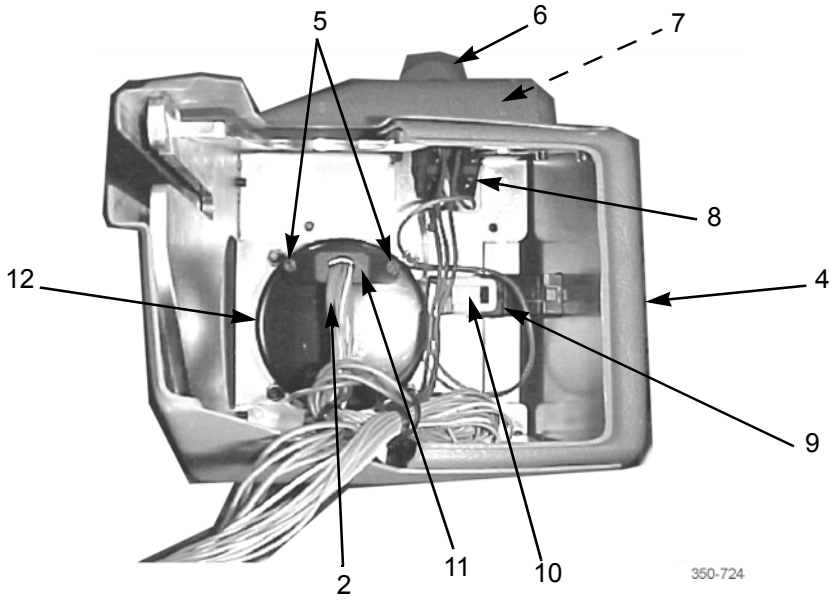


INSTALLATION - CONTINUED

4. Install cover (14) to seat base (13) and tighten three turnbuttons (15).

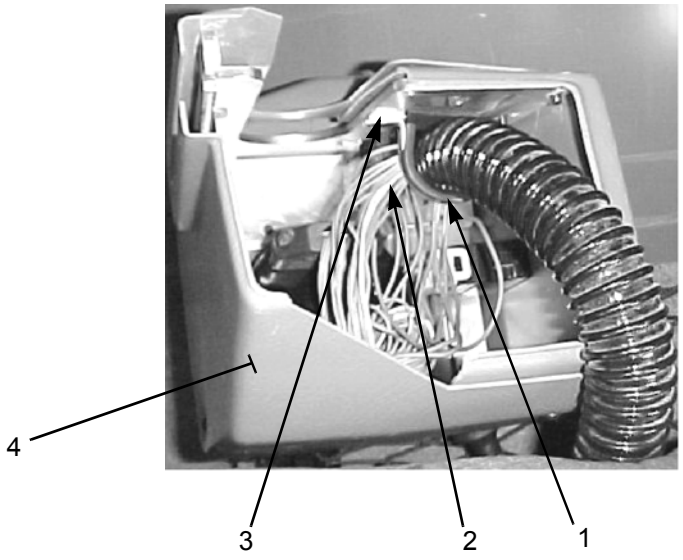


5. Install override switch (9) and connect connector (10) of joystick wiring harness (2) to switch.
6. Connect two connectors (8) of joystick wiring harness (2) to emergency stop switch (7).
7. Position emergency stop switch (7) to hole at upper end of joystick housing (4).
8. Push red knob (6) thru hole and into emergency stop switch (7). Rotate knob slightly clockwise to install.
9. Connect connector (11) of joystick wiring harness (2) to bottom of joystick (12) and tighten two screws (5).



INSTALLATION - CONTINUED

10. Install clamp (1) to protective cover of joystick wiring harness (2) with screw (3).
11. Position joystick housing (4) to seat and lower joystick positioning lever to secure (TM 10-3930-675-10).



350-671

END OF WORK PACKAGE

HEADLIGHT MAINTENANCE 0083 00

THIS WORK PACKAGE COVERS

Bulb Replacement

Light: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

References

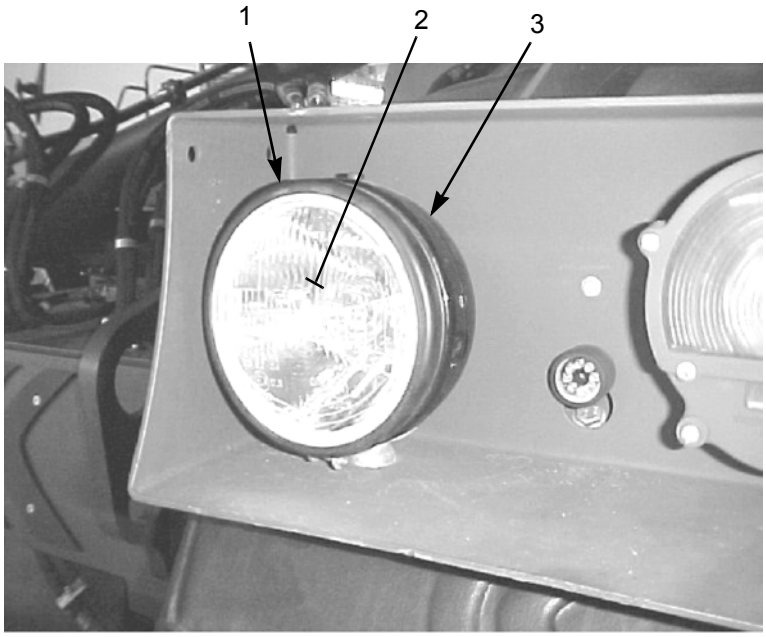
WP 0111 00

Equipment Condition

Master battery switch in OFF position

BULB REPLACEMENT

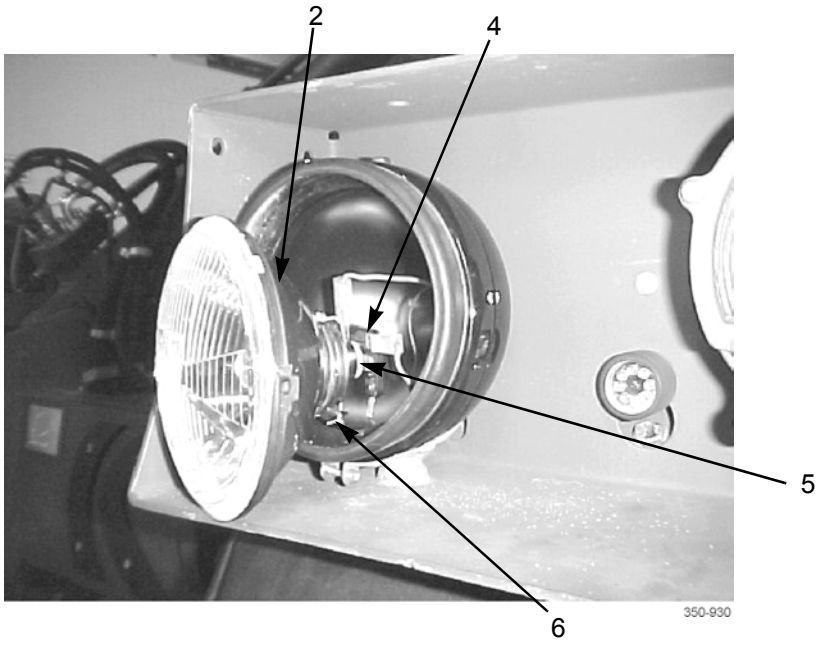
1. Remove reflector (2) from rubber ring (1) of light housing (3).



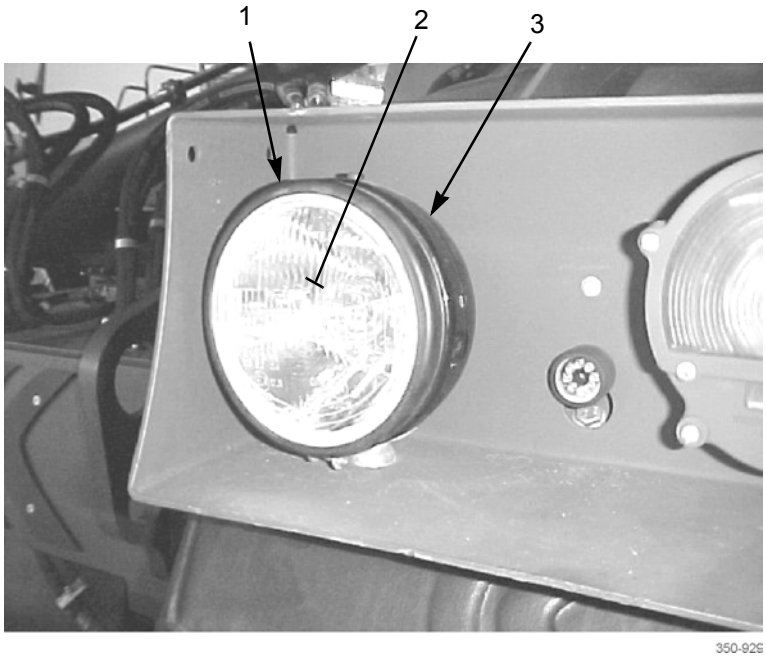
350-929

BULB REPLACEMENT - CONTINUED

2. Disconnect black plastic connector (4) from rear of bulb (5).
3. Release wire clip (6) at rear of reflector (2) and remove bulb (5).



4. Place new bulb (5) into rear of reflector (2) and fasten wire clip (6).
5. Connect black plastic connector (4) to rear of bulb (5).
6. Install reflector (2) to rubber ring (1) of light housing (3).

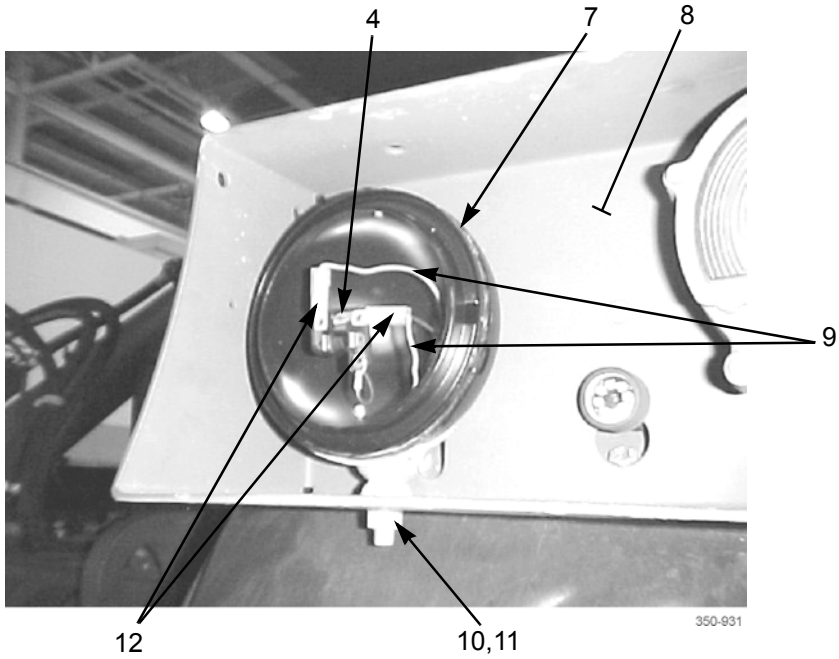


LIGHT REMOVAL

NOTE

- Use marker tags to ensure proper connection of connectors.
- Electrical connectors of light may be repaired in accordance with WP 0111 00.

1. Remove bulb (refer to *Bulb Replacement*).
2. Remove nut (10), lockwasher (11), and light assembly (7) from bracket (8).
3. Disconnect two connectors (12) from black plastic connector (4) and remove two wires (9) with connectors from rear of light assembly (7).



LIGHT INSTALLATION

1. Position two connectors (12) and wires (9) thru rear of light assembly (7) and connect two connectors to black plastic connector (4).
2. Install light assembly (7) to bracket (8) with lockwasher (11) and nut (10).
3. Install bulb (refer to *Bulb Replacement*).

END OF WORK PACKAGE

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BACKUP LIGHT AND WORK LIGHT MAINTENANCE 0084 00

THIS WORK PACKAGE COVERS

Bulb Replacement

Light: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

References

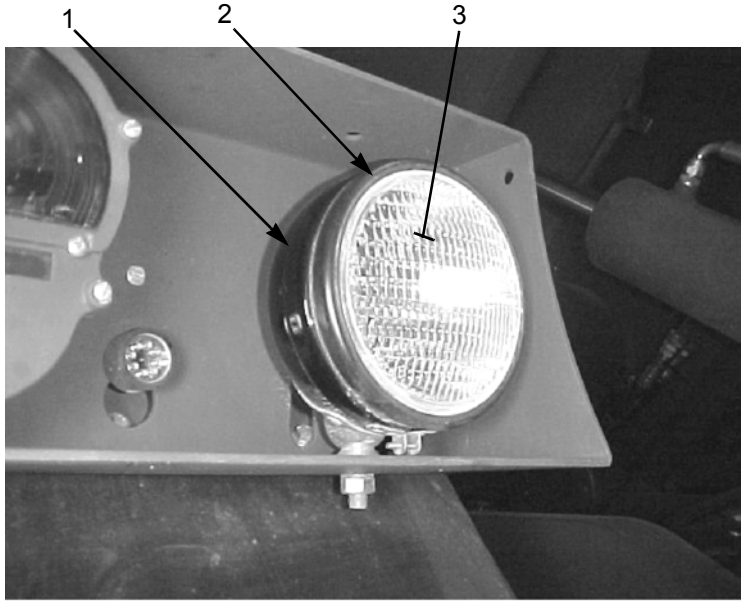
WP 0111 00

Equipment Condition

Master battery switch in OFF position

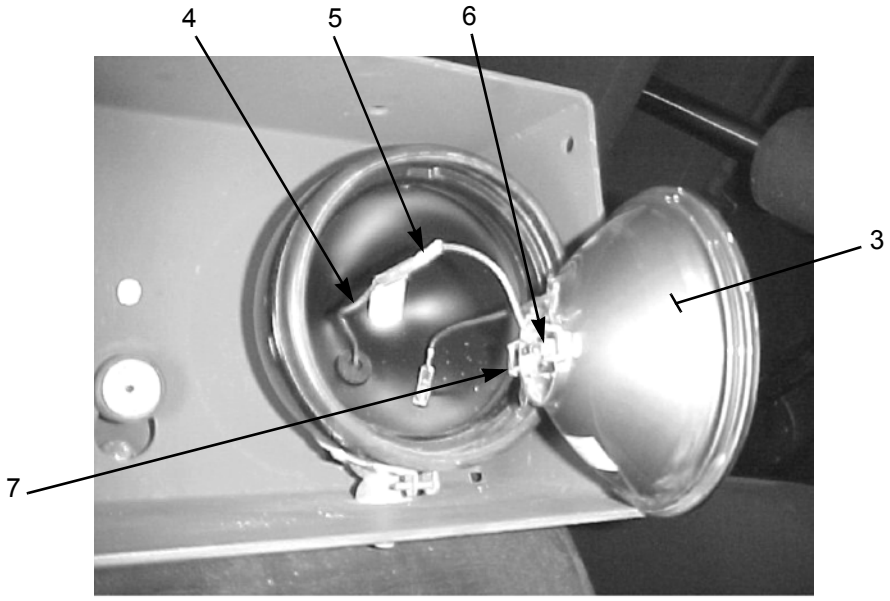
BULB REPLACEMENT

1. Remove reflector (3) from rubber ring (2) of light housing (1).

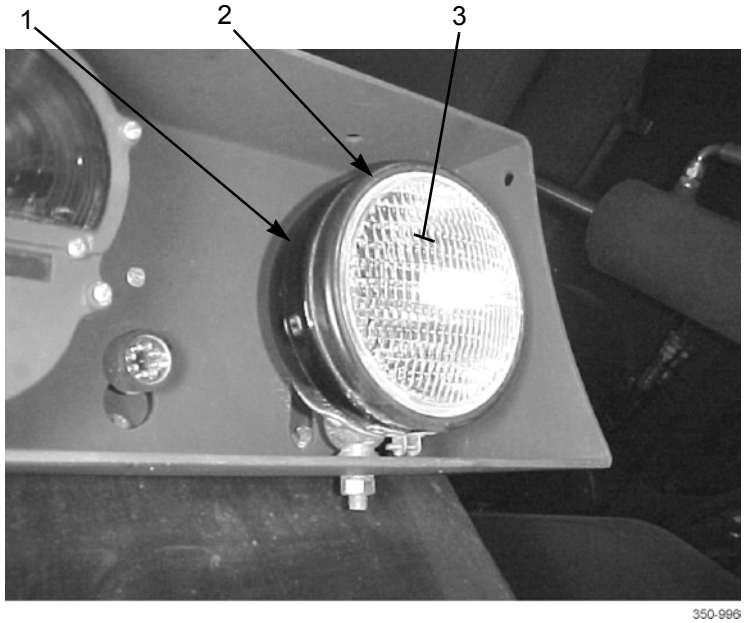


BULB REPLACEMENT - CONTINUED

2. Disconnect connector (5) of bulb (6) from connector of wiring harness (4).
3. Release wire clip (7) at rear of reflector (3) and remove bulb (6).



4. Place new bulb (6) into rear of reflector (3) and fasten wire clip (7).
5. Connect connector (5) of bulb (6) to connector of wiring harness (4).
6. Install reflector (3) to rubber ring (2) of light housing (1).

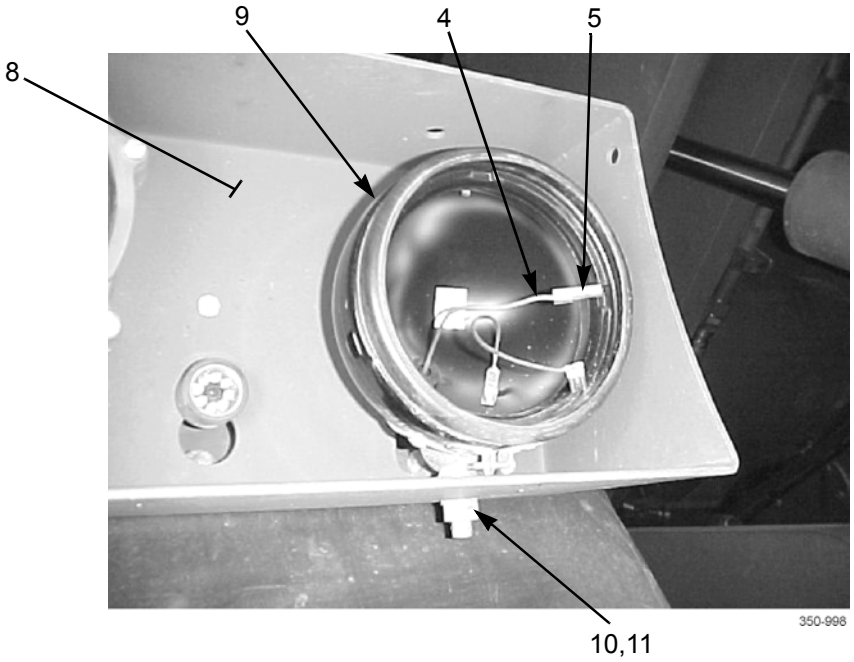


LIGHT REMOVAL

NOTE

Electrical connectors of light may be repaired in accordance with WP 0111 00.

1. Remove bulb (refer to *Bulb Replacement*).
2. Remove nut (10), lockwasher (11), and light assembly (9) from bracket (8).
3. Remove wire of wiring harness (4) with connector (5) from rear of light assembly (9).



LIGHT INSTALLATION

1. Position connector (5) and wire of wiring harness (4) thru rear of light assembly (9).
2. Install light assembly (9) to bracket (8) with lockwasher (11) and nut (10).
3. Install bulb (refer to *Bulb Replacement*).

END OF WORK PACKAGE

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DIRECTIONAL AND SIDE MARKER LIGHT MAINTENANCE 0085 00

THIS WORK PACKAGE COVERS

Directional Light: Bulb and LED Replacement, Removal, Installation

Side Marker Light: Bulb Replacement, Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.001) (2)

References

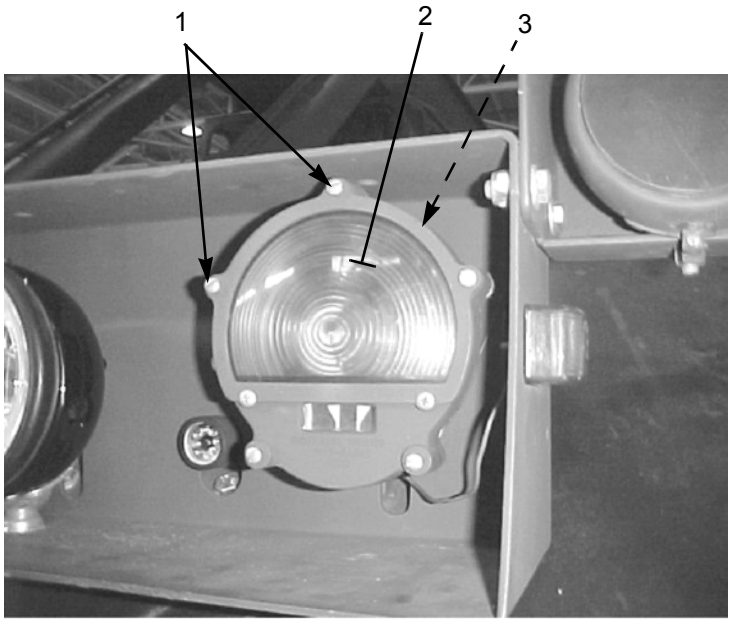
WP 0111 00

Equipment Condition

Master battery switch in OFF position

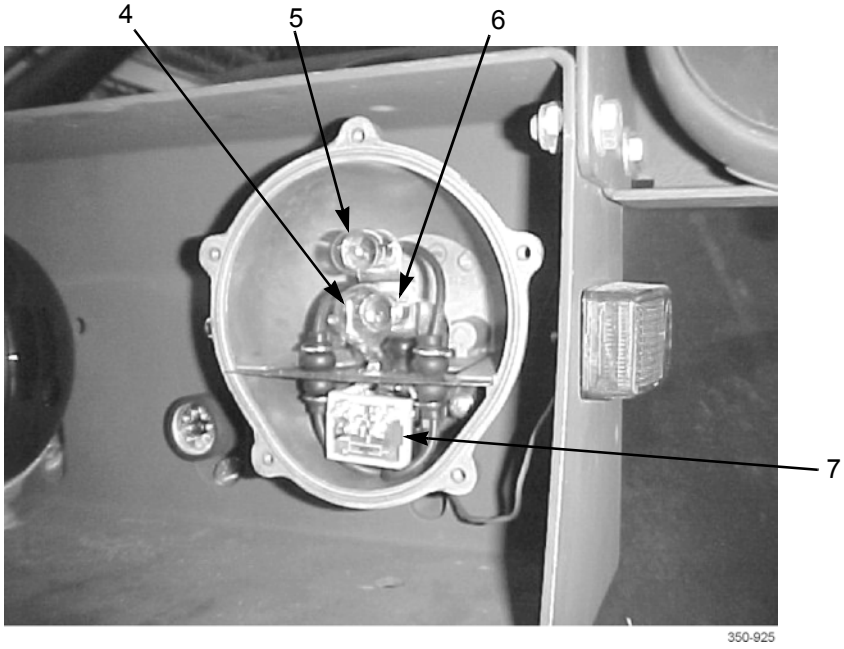
DIRECTIONAL LIGHT BULB AND LED REPLACEMENT

1. Loosen five screws (1) and remove lens assembly (2) from light housing (3).

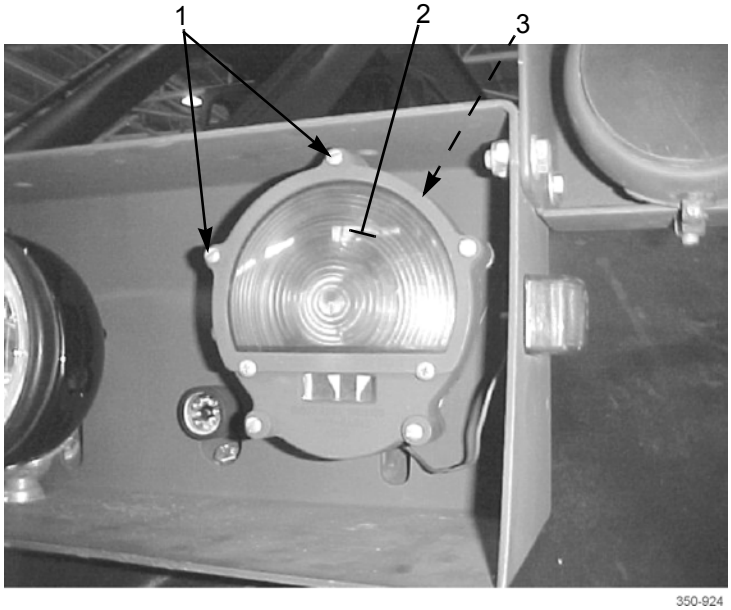


DIRECTIONAL LIGHT BULB AND LED REPLACEMENT - CONTINUED

2. Remove two bulbs (4 and 5) from lamp holder (6).
3. To remove LED (7), pull outward on LED panel until panel just separates from black plastic section of connector.
4. Grasp black plastic and push in and rotate connector slightly counterclockwise and remove LED (7) from socket.
5. To install LED (7), grasp black plastic section of connector and insert connector into socket. Push in and rotate slightly clockwise.
6. Push LED (7) panel over black plastic until fully seated.
7. Install two new bulbs (4 and 5) to lamp holder (6).



8. Install lens assembly (2) to light housing (3) and tighten five screws (1).

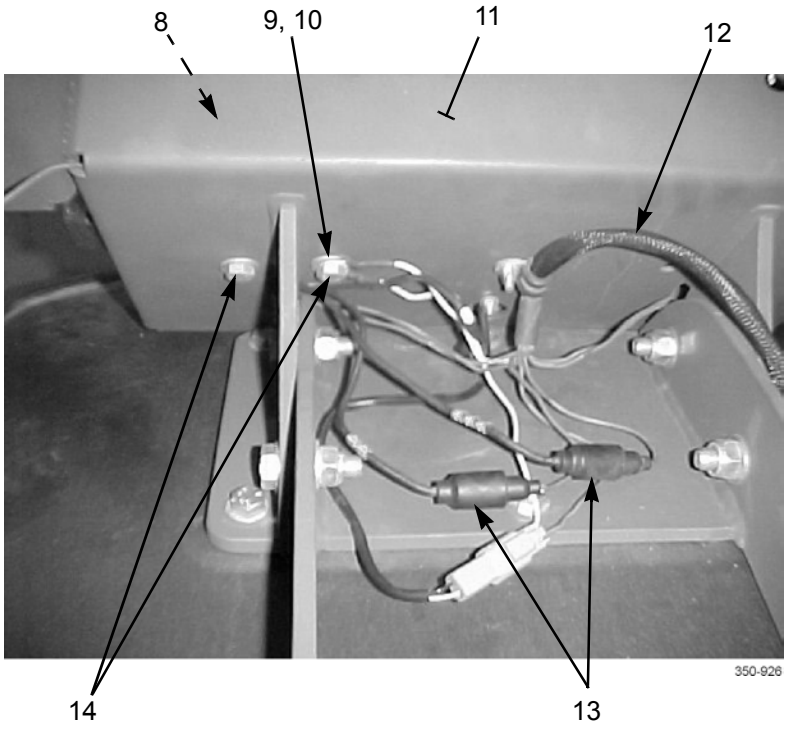


DIRECTIONAL LIGHT REMOVAL

NOTE

- Front and rear directional lights are removed the same way.
- Use marker tags to ensure proper connection of connectors.
- Electrical connectors of light may be repaired in accordance with WP 0111 00.

1. Remove directional light bulbs and LED(s) (refer to *Directional Light Bulb and LED Replacement*).
2. Disconnect two connectors (13) of directional light (8) from connectors of wiring harness (12).
3. Remove two screws (14), ground terminals (9) of wiring harness (12), washers (10), and directional light (8) from bracket (11).



DIRECTIONAL LIGHT INSTALLATION

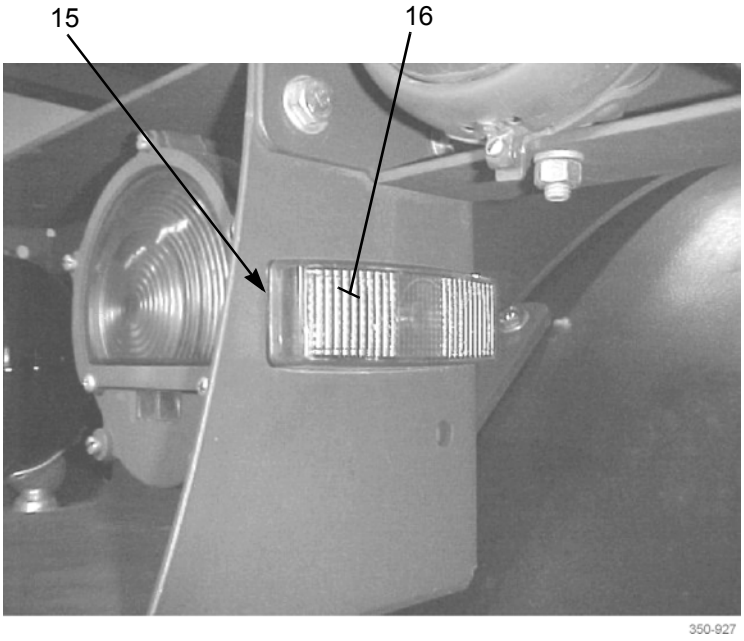
NOTE

Front and rear directional lights are installed the same way.

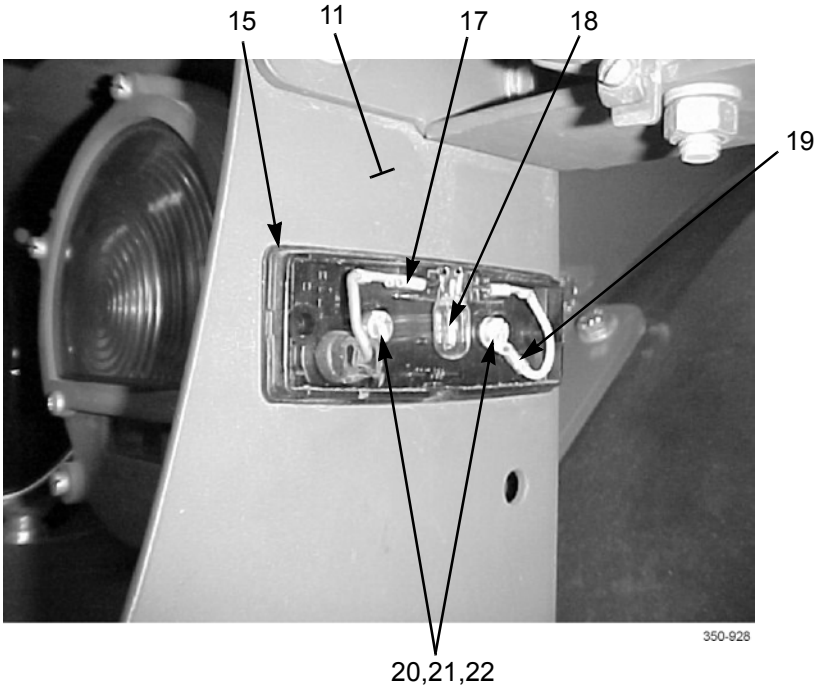
1. Install directional light (8) and ground terminals (9) of wiring harness (12) to bracket (11) with two washers (10) and screws (14).
2. Connect two connectors (13) of directional light (8) to connectors of wiring harness (12).
3. Install bulbs and LED(s) (refer to *Directional Light Bulb and LED Replacement*).

SIDE MARKER LIGHT BULB REPLACEMENT

1. Pry cover (16) of side marker light from lamp housing (15).



2. Remove bulb (18) from lamp housing (15).



3. Install new bulb (18) to lamp housing (15).
4. Install cover (16) to lamp housing (15).

SIDE MARKER LIGHT REMOVAL

NOTE

Front and rear side marker lights are removed the same way.

1. Remove side marker light bulb (refer to *Side Marker Light Bulb Replacement*).
2. Remove two locknuts (20), washers (21), screws (22), white wire terminal (19), and lamp housing (15) from bracket (11).
3. Remove black wire terminal (17) from lamp housing (15).

SIDE MARKER LIGHT INSTALLATION

NOTE

Front and rear side marker lights are installed the same way.

1. Install black wire terminal (17) to lamp housing (15).
2. Install lamp housing (15) and white wire terminal (19) to bracket (11) with two screws (22), washers (21), and new locknuts (20).
3. Install side marker light bulb (refer to *Side Marker Light Bulb Replacement*).

END OF WORK PACKAGE

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BLACKOUT LIGHT MAINTENANCE 0086 00

THIS WORK PACKAGE COVERS

Bulb/Reflector Replacement

Blackout Light: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

References

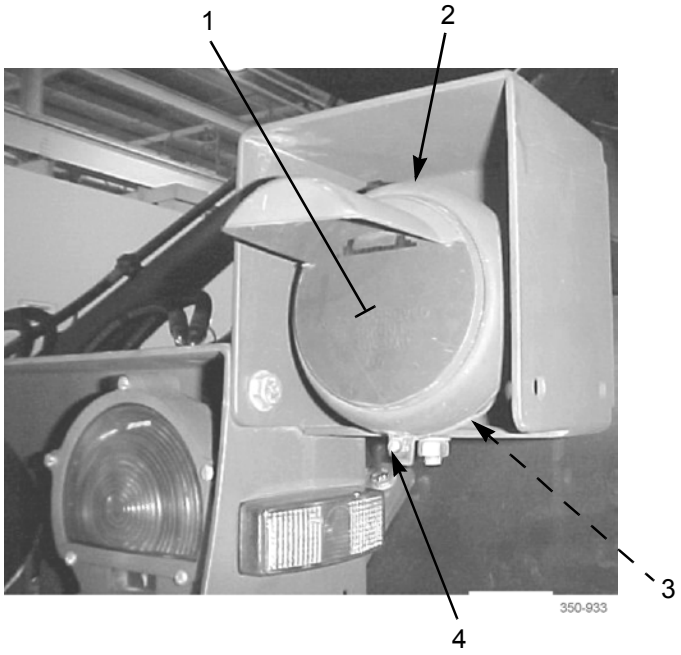
WP 0111 00

Equipment Condition

Master battery switch in OFF position

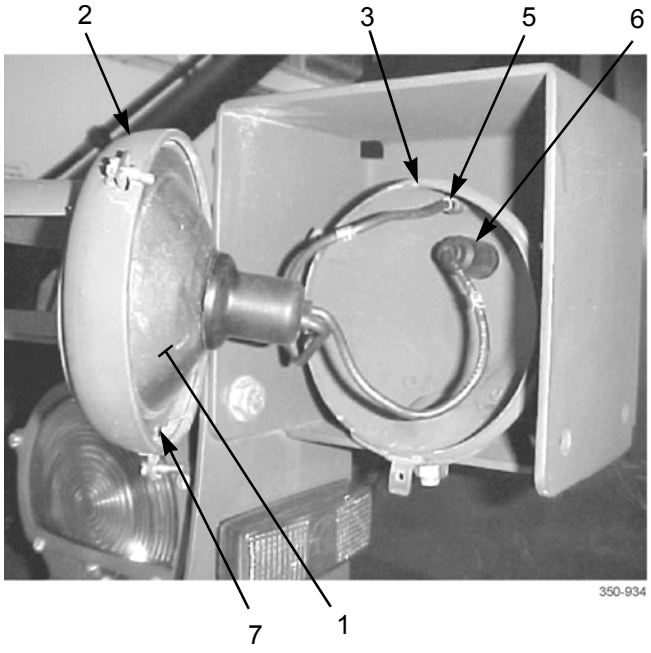
BULB/REFLECTOR REPLACEMENT

1. Loosen three screws (4) and remove bulb/reflector assembly (1) with ring (2) from blackout light housing (3).

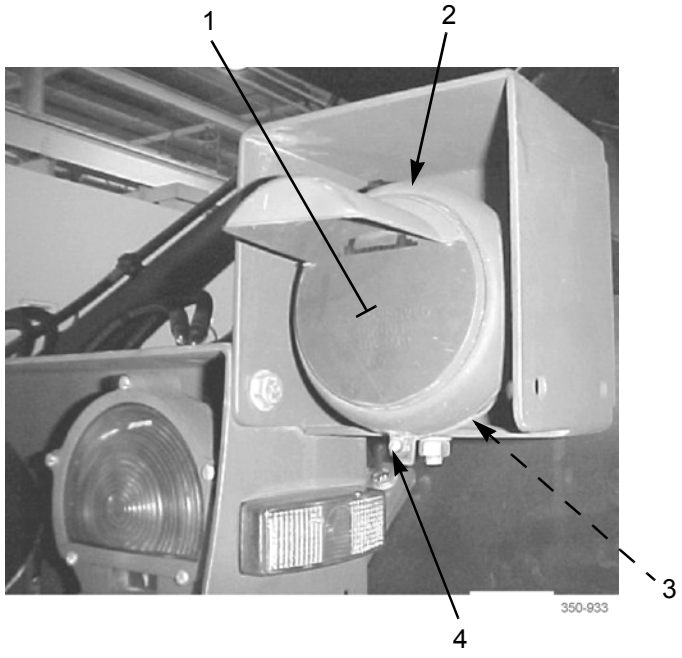


BULB/REFLECTOR REPLACEMENT - CONTINUED

2. Disconnect terminal plug (5) and connector (6) from inside blackout light housing (3).
3. Remove two spring clips (7) and remove bulb/reflector assembly (1) from ring (2).



4. Install new bulb/reflector assembly (1) to ring (2) and install two spring clips (7).
5. Connect connector (6) and terminal plug (5) inside blackout light housing (3).
6. Install bulb/reflector assembly (1) with ring (2) to blackout light housing (3) and tighten three screws (4).

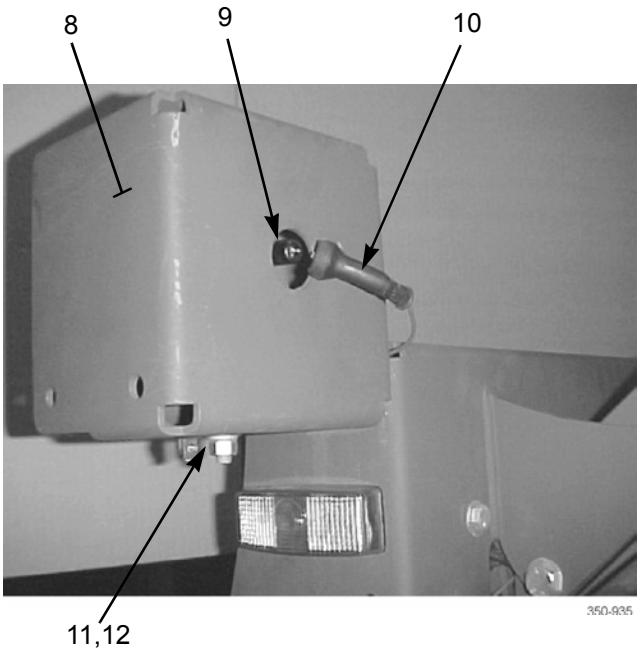


BLACKOUT LIGHT REMOVAL

NOTE

Electrical connectors of light may be repaired in accordance with WP 0111 00.

1. At rear of bracket (8), disconnect connector (10) of wiring harness from rear of blackout light (9).
2. Remove nut (11), washer (12), and blackout light (9) from bracket (8).



BLACKOUT LIGHT INSTALLATION

1. Install blackout light (9) to bracket (8) with washer (12) and nut (11).

NOTE

Apply electrically conductive grease to connector before connection is made.

2. At rear of bracket (8), connect connector (10) of wiring harness to rear of blackout light (9).

END OF WORK PACKAGE

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TWISTLOCK INDICATOR LIGHTS MAINTENANCE 0087 00

THIS WORK PACKAGE COVERS

Twistlock Indicator Light Bulb Replacement

Twistlock Indicator Light: Removal, Installation

Twistlock Infrared (IR) Light: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.003) (2)

References:

WP 0111 00

WP 0199 00

Equipment Condition

Master battery switch in OFF position

WARNING

Do NOT look directly at IR source without eye protection and maintain a minimum of 12 inches from energized IR lights to prevent possible eye discomfort or damage.

NOTE

Electrical connectors of lights may be repaired in accordance with WP 0111 00.

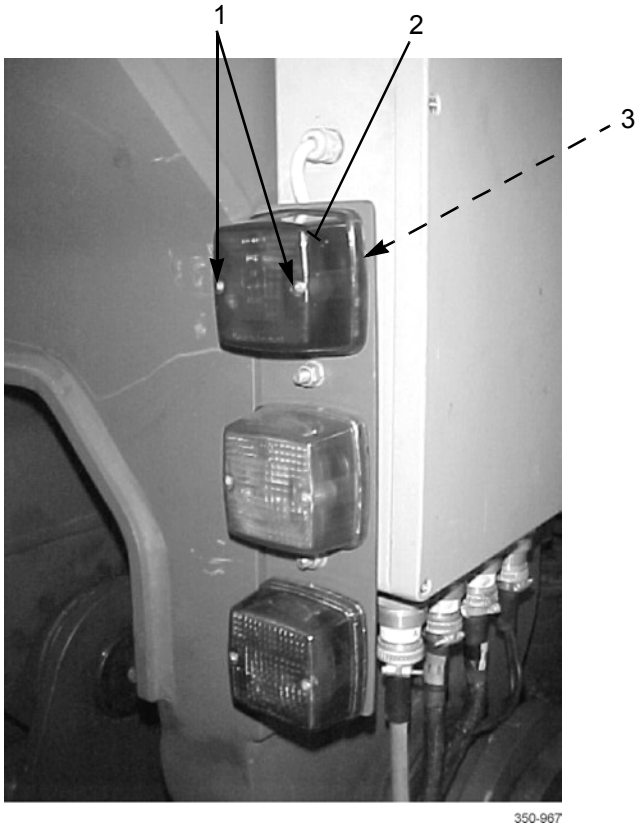
TWISTLOCK INDICATOR LIGHT BULB REPLACEMENT

NOTE

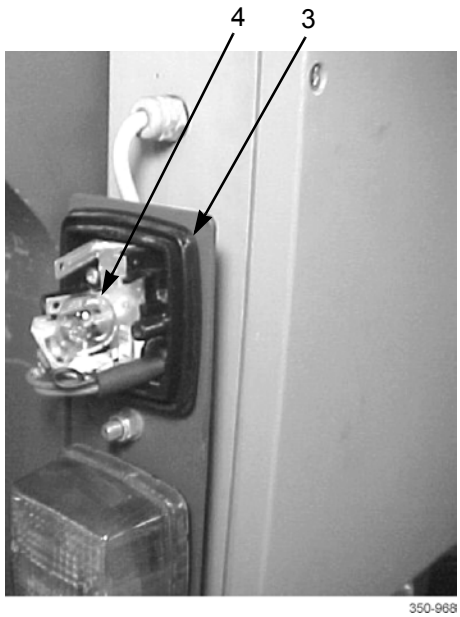
Each of three twistlock indicator light bulbs is replaced the same way.

TWISTLOCK INDICATOR LIGHT BULB REPLACEMENT - CONTINUED

1. Remove two screws (1) and lens (2) from lamp housing (3).



2. Remove bulb (4) from lamp housing (3).



TWISTLOCK INDICATOR LIGHT BULB REPLACEMENT - CONTINUED

3. Install new bulb (4) to lamp housing (3).
4. Install lens (2) to lamp housing (3) with two screws (1).

TWISTLOCK INDICATOR LIGHT REMOVAL

NOTE

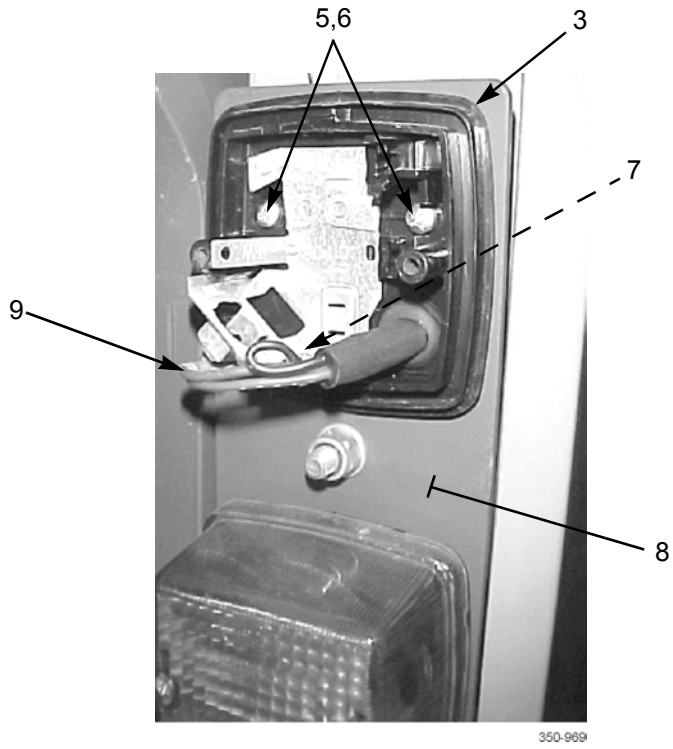
Each of three twistlock indicator lights is removed the same way. Top (red) indicator light is shown.

1. Remove bulb from indicator light (refer to *Twistlock Indicator Light Bulb Replacement*).
2. Disconnect connector (7) and connector (9) from lamp housing (3).

NOTE

Cable clamp at rear of top (red) indicator light housing will also be removed as screws and locknuts are removed.

3. Remove two locknuts (5), screws (6), and lamp housing (3) from light bracket (8). Discard locknuts.



TWISTLOCK INDICATOR LIGHT INSTALLATION

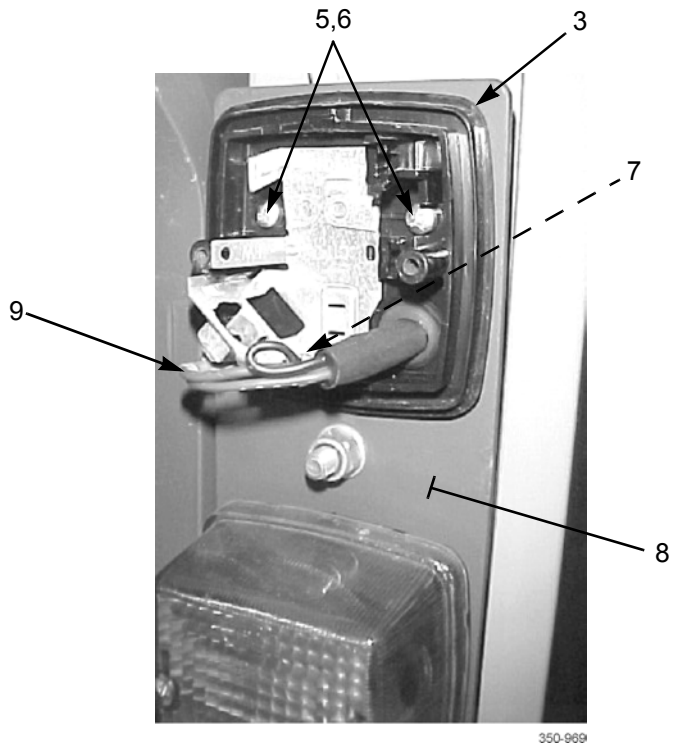
CAUTION

For proper operation of twistlock indicator light, bend two metal tabs at lamp housing mounting screws 180° to prevent grounding lamp housing to light bracket.

NOTE

Cable clamp at rear of top (red) indicator light housing will also be installed as screws and new locknuts are installed.

1. Install lamp housing (3) to light bracket (8) with two screws (6) and new locknuts (5).
2. Connect connector (7) and connector (9) to lamp housing (3).
3. Install bulb to indicator light (refer to *Twistlock Indicator Light Bulb Replacement*).



TWISTLOCK INFRARED (IR) LIGHT REMOVAL

NOTE

- If one IR light needs replacing, all six IR lights must be replaced.
- Remove tiedown straps as required and discard.

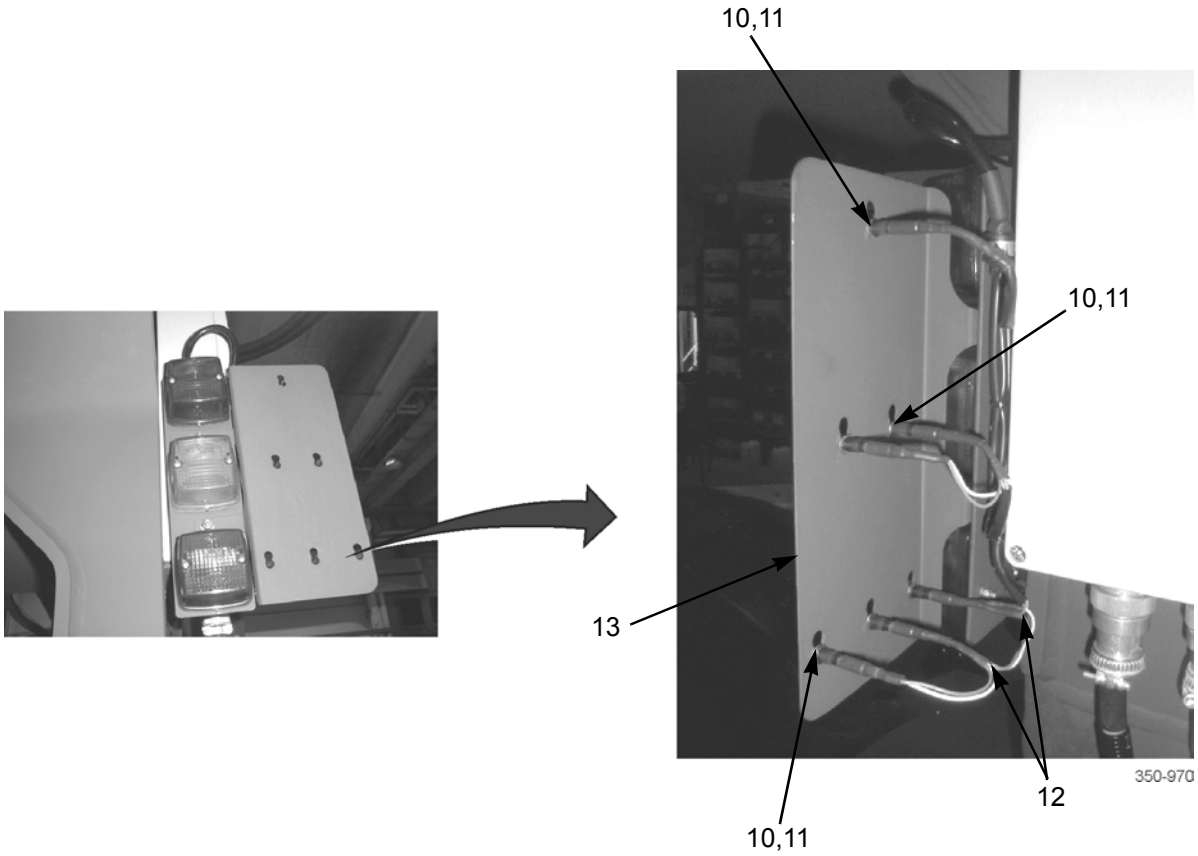
1. Loosen nut (11) and remove IR light (10) from IR light bracket (13).
2. Repeat step 1 for five remaining IR lights (10).

TWISTLOCK INFRARED LIGHT (IR) REMOVAL - CONTINUED

NOTE

Refer to wiring diagrams for assistance (WP 0199 00).

3. Trace wiring harness (12) of IR lights (10) to tophandler junction box and disconnect wires of wiring harness. Remove harness from box. Remove IR lights from vehicle.



TWISTLOCK INFRARED (IR) LIGHT INSTALLATION

1. Position IR lights (10) to IR light bracket (13) and tighten nuts (11).

NOTE

Refer to wiring diagrams for assistance (WP 0199 00).

2. Position wiring harness (12) of IR lights (10) to tophandler junction box and connect wires of wiring harness.
3. Install new tiedowns straps as required.

END OF WORK PACKAGE

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CAB INTERIOR LIGHT MAINTENANCE 0088 00

THIS WORK PACKAGE COVERS

Bulb Replacement

Cab Interior Light: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

References

TM 10-3930-675-10

Materials/Parts

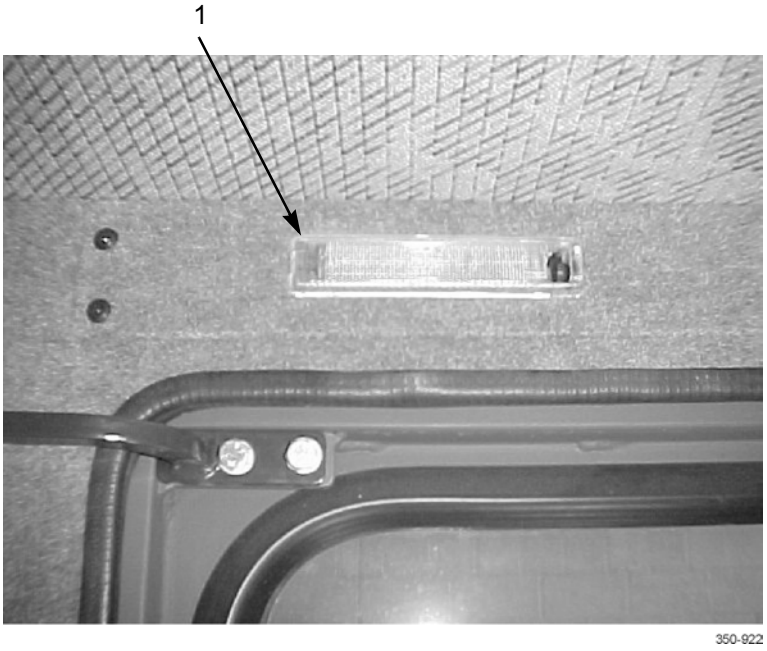
Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Master battery switch in OFF position

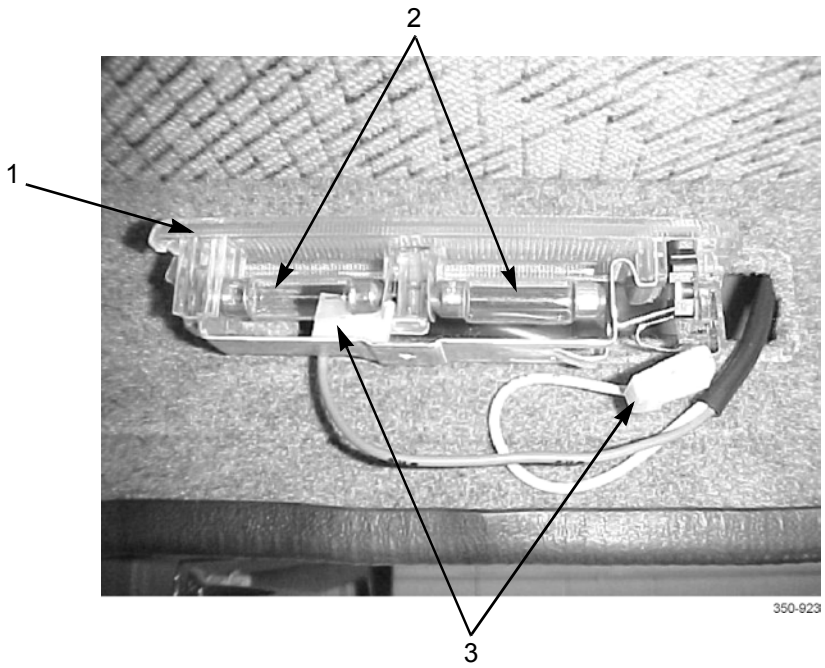
BULB REPLACEMENT

1. Remove interior light (1) from cab.



BULB REPLACEMENT - CONTINUED

2. Remove two bulbs (2) from interior light (1).



3. Install two bulbs (2) in interior light (1).
4. Install interior light (1) to cab.
5. Turn master battery switch to ON position.
6. Check operation of light (TM 10-3930-675-10).

CAB INTERIOR LIGHT REMOVAL

1. Remove interior light and two bulbs from cab (refer to *Bulb Replacement*).

NOTE

Tag wires prior to disconnection to ensure proper connection on installation.

2. Disconnect two wiring harness connectors (3) from interior light (1) and remove light.

CAB INTERIOR LIGHT INSTALLATION

1. Connect two wiring harness connectors (3) to interior light (1).
2. Install two bulbs and interior light to cab (refer to *Bulb Replacement*).
3. Turn master battery switch to ON position.
4. Check operation of light (TM 10-3930-675-10).

END OF WORK PACKAGE

INFRARED (IR) LIGHTS REPLACEMENT 0089 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Nut, lock (P/N 920076.003)

References

WP 0087 00

WP 0111 00

Equipment Condition

Master battery switch in OFF position

WARNING

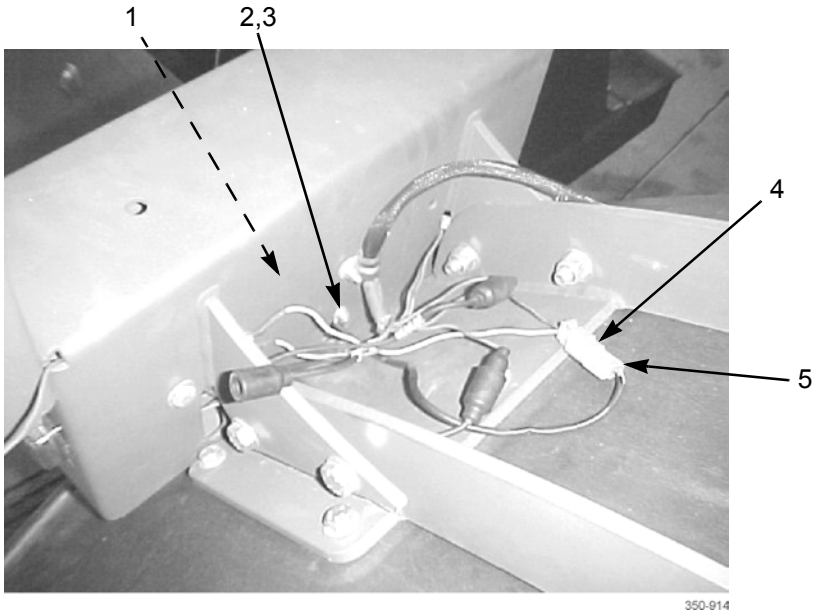
Do NOT look directly at IR source without eye protection and maintain a minimum of 12 inches from energized IR lights to prevent possible eye discomfort or damage.

NOTE

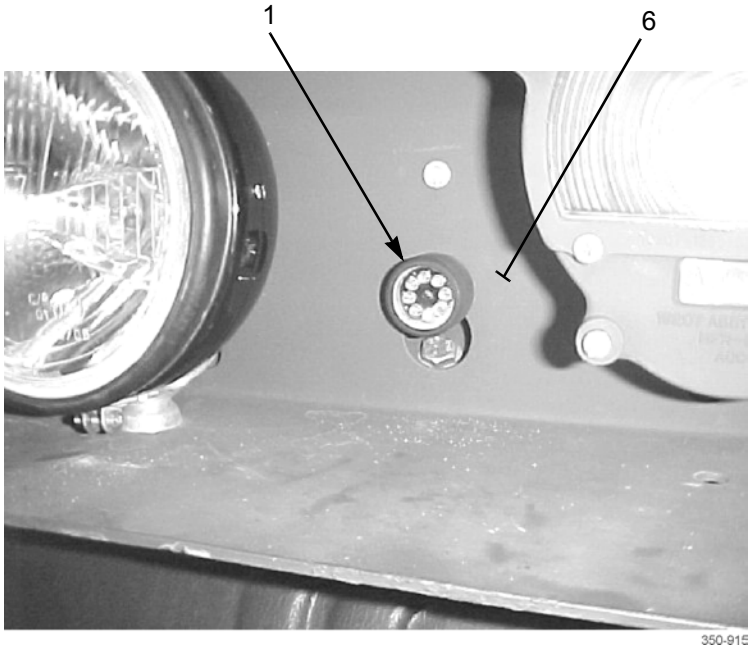
- Twistlock indicator infrared (IR) lights are replaced in WP 0087 00.
- IR lights at front and rear of vehicle and on each side of boom are replaced the same way.
- Electrical connectors may be repaired in accordance with WP 0111 00.

REMOVAL - CONTINUED

1. Disconnect connector (5) of IR light (1) from connector (4) of wiring harness.
2. Remove locknut (2) and washer (3) from rear of IR light (1). Discard locknut.



3. Remove IR light (1) from bracket (6).



INSTALLATION

1. Position IR light (1) to bracket (6).
2. Install washer (3) and new locknut (2) to rear of IR light (1).
3. Connect connector (5) of IR light (1) to connector (4) of wiring harness.

END OF WORK PACKAGE

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FORDING WATER LEVEL SENSOR REPLACEMENT 0090 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

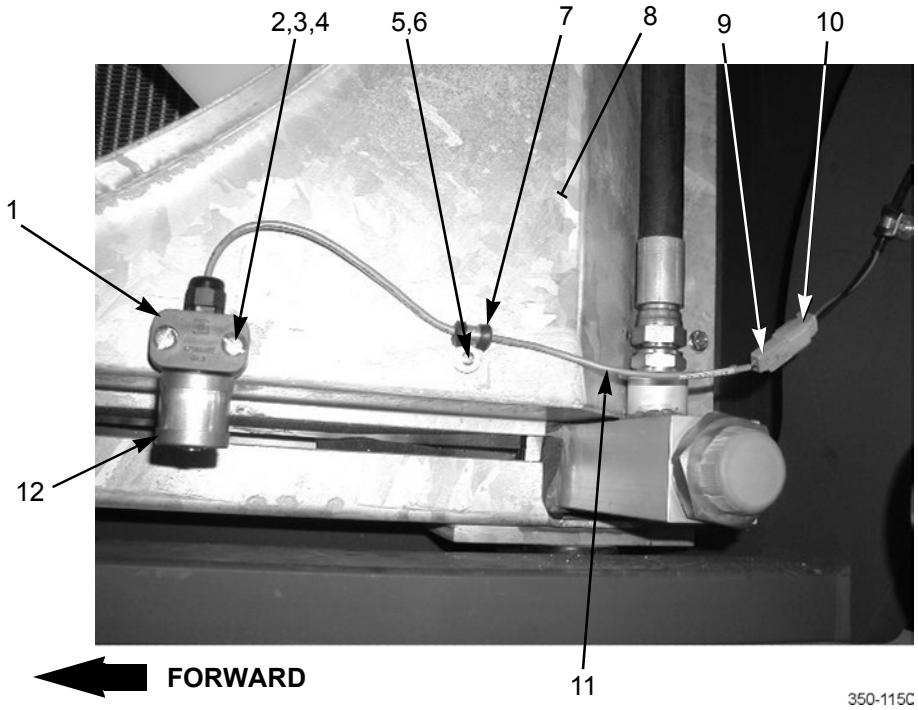
Master battery switch in OFF position

Materials/Parts

Nut, lock (P/N 920076.002) (2)

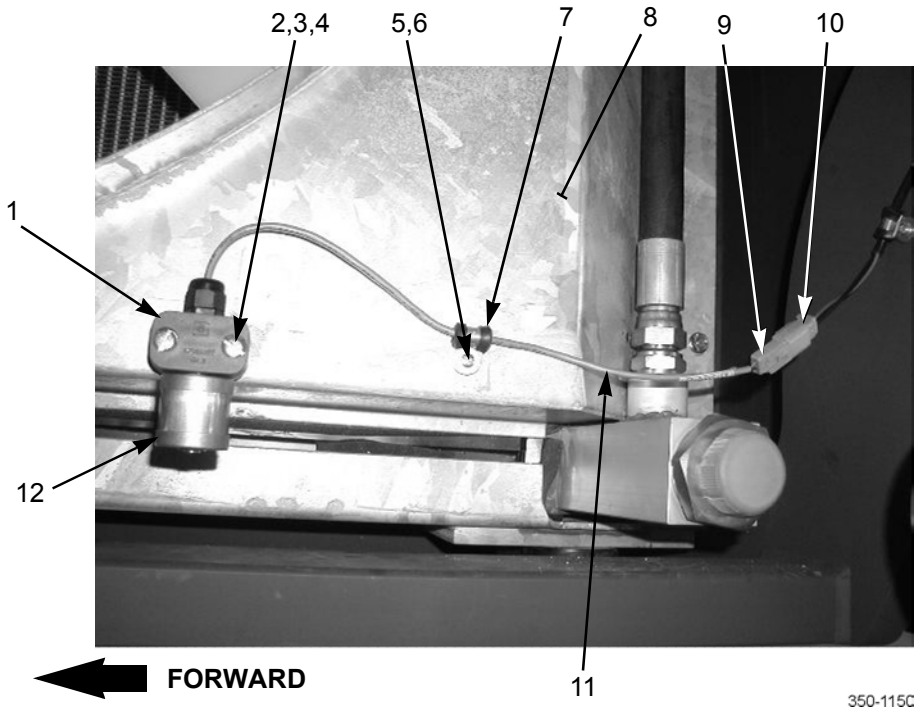
REMOVAL

1. Disconnect sensor connector (9) from wiring harness sensor (10).
2. Remove screw (5), washer (6), and clamp (7) from fan shroud (8) and sensor cable (11).
3. Remove two locknuts (2), washers (3), and screws (4), and remove clamp (1) and sensor (12) from fan shroud (8). Discard locknuts.



INSTALLATION

1. Install sensor (12) to fan shroud (8) with clamp (1), two screws (4), washers (3), and new locknuts (2).
2. Connect sensor connector (9) to wiring harness connector (10).
3. Secure sensor cable (11) to fan shroud (8) with clamp (7), washer (6), and screw (5).



END OF WORK PACKAGE

AMBIENT TEMPERATURE SENSOR REPLACEMENT 0091 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

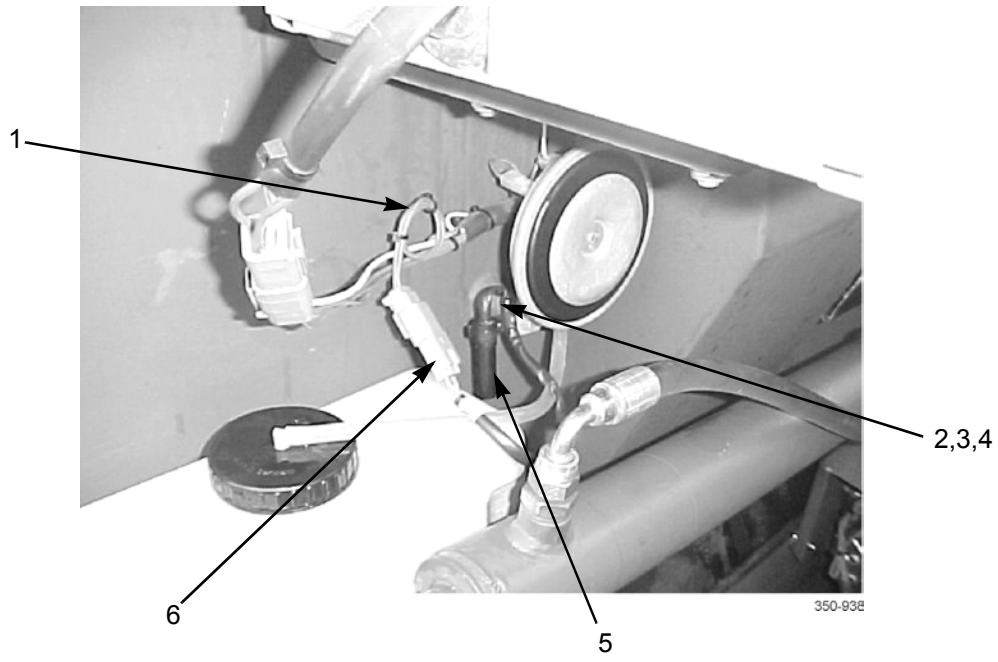
Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

Master battery switch in OFF position

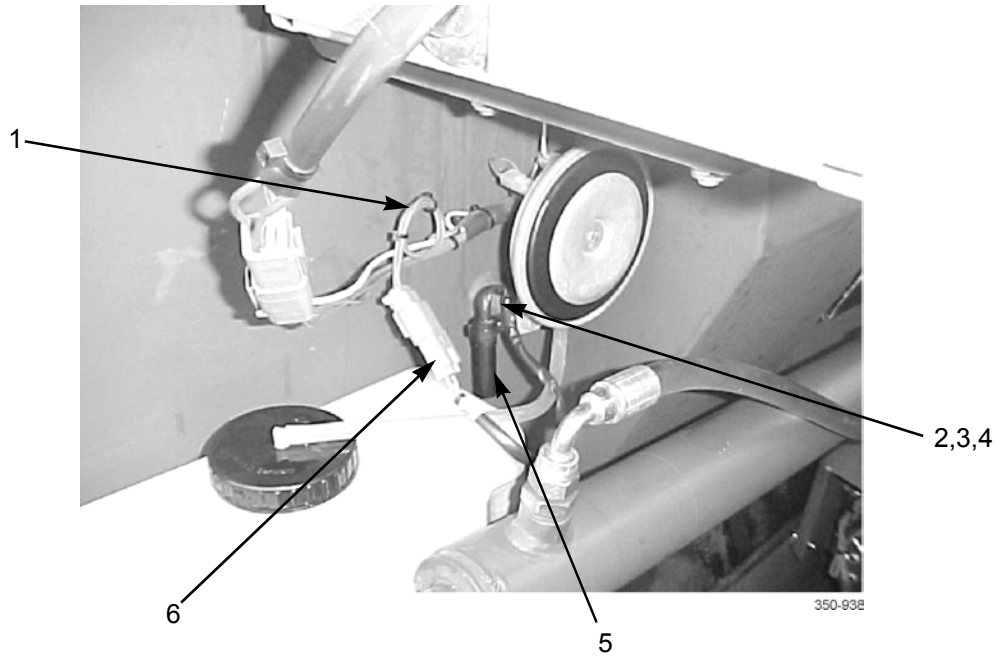
REMOVAL

1. Disconnect connector (6) of ambient temperature sensor (5) from connector of cab wiring harness (1).
2. Remove screw (2), clip (3), and ambient temperature sensor (5) from bracket (4).



INSTALLATION

1. Install ambient temperature sensor (5) to bracket (4) with clip (3). Install screw (2).
2. Connect connector (6) of ambient temperature sensor (5) to connector of cab wiring harness (1).



END OF WORK PACKAGE

WHEEL TEMPERATURE SENSOR REPLACEMENT 0092 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

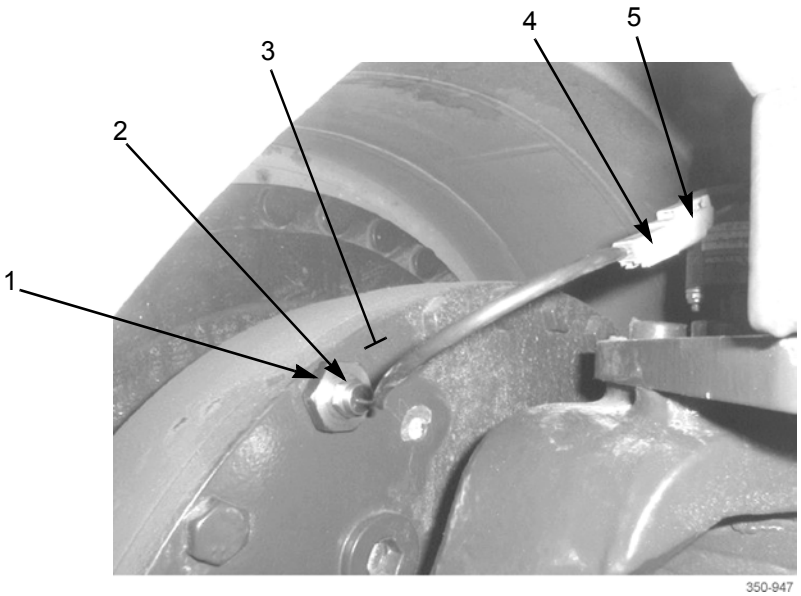
Master battery switch in OFF position

NOTE

Each of two wheel temperature sensors (left-front and left-rear) is replaced the same way.

REMOVAL

1. Disconnect connector (4) of wheel temperature sensor (2) from connector (5) of vehicle wiring harness.
2. Remove wheel temperature sensor (2) and copper washer from adapter (1) of brake housing (3).



INSTALLATION

1. Install copper washer and wheel temperature sensor (2) to adapter (1) of brake housing (3).
2. Connect connector (5) of vehicle wiring harness to connector (4) of wheel temperature sensor (2).

END OF WORK PACKAGE

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ENGINE SENSORS REPLACEMENT 0093 00

THIS WORK PACKAGE COVERS

Coolant Temperature Sensor: Removal, Installation

Engine Position Sensor: Removal, Installation

Intake Air Temperature Sensor: Removal, Installation

Intake Manifold Pressure Sensor: Removal, Installation

Fuel Inlet Restriction Sensor Replacement

Ambient Air Pressure Sensor Replacement

Oil Pressure/Temperature Sensor: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Installation tool (Item 13, WP 0204 00)

Socket, deep well (Item 27, WP 0204 00)

Wrench, torque, 0-300 lb-in capacity (Item 41, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

Oil, lubricating (Item 20, WP 0203 00)

Materials/Parts - Continued

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Seal, o-ring (P/N 3037537) (2)

Seal, o-ring (P/N 3046201)

Seal, o-ring (P/N 3330159) (2)

References

WP 0063 00

Equipment Condition

Master battery switch in OFF position

Engine cover removed (WP 0143 00)

NOTE

- Tag wiring harness leads to ensure correct installation.
- Use electrically conductive grease on all electrical connections before they are made.

COOLANT TEMPERATURE SENSOR REMOVAL



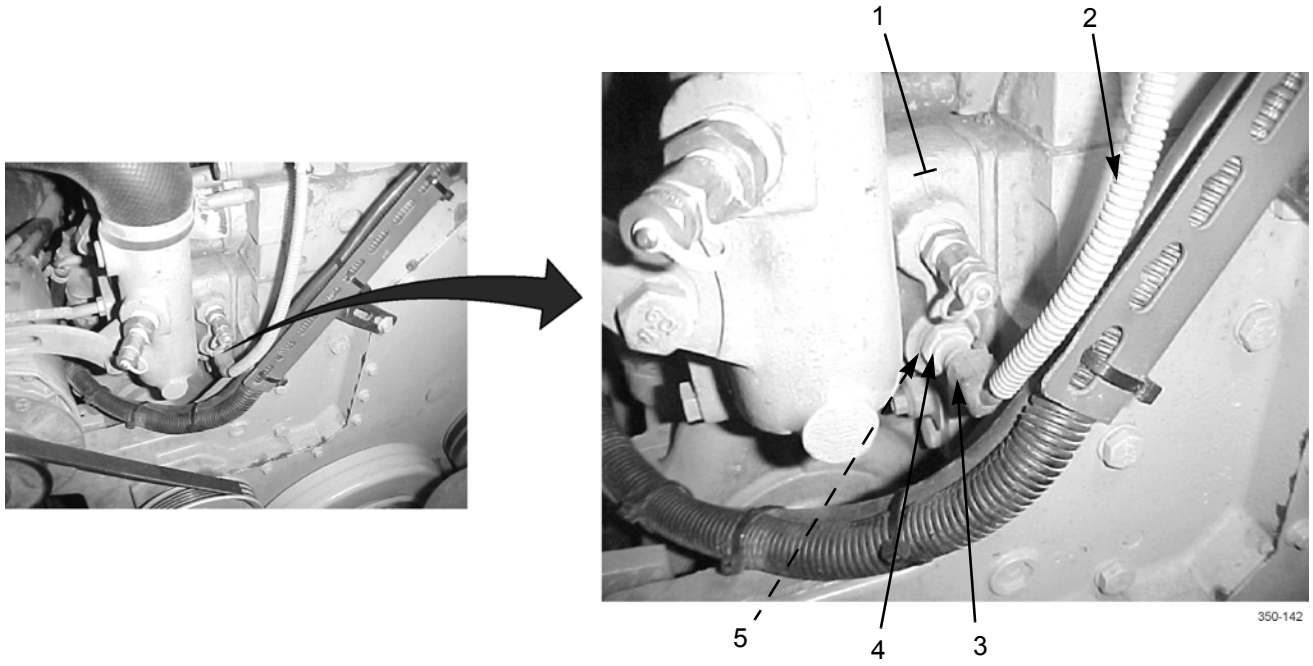
WARNING

DO NOT perform maintenance on cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam, hot water or coolant will cause serious burns.

1. Drain cooling system (WP 0063 00).

COOLANT TEMPERATURE SENSOR REMOVAL - CONTINUED

2. Disconnect connector (3) of engine wiring harness (2) from coolant temperature sensor (4).
3. Remove coolant temperature sensor (4) with o-ring seal (5) from engine (1). Discard o-ring seal.



COOLANT TEMPERATURE SENSOR INSTALLATION

NOTE

Ensure new sensor has o-ring seal installed.

1. Apply a light coat of lubricating oil to new o-ring seal (5).
2. Install o-ring seal (5) and coolant temperature sensor (4) on engine (1). Tighten sensor to 120 lb-in (14 Nm).

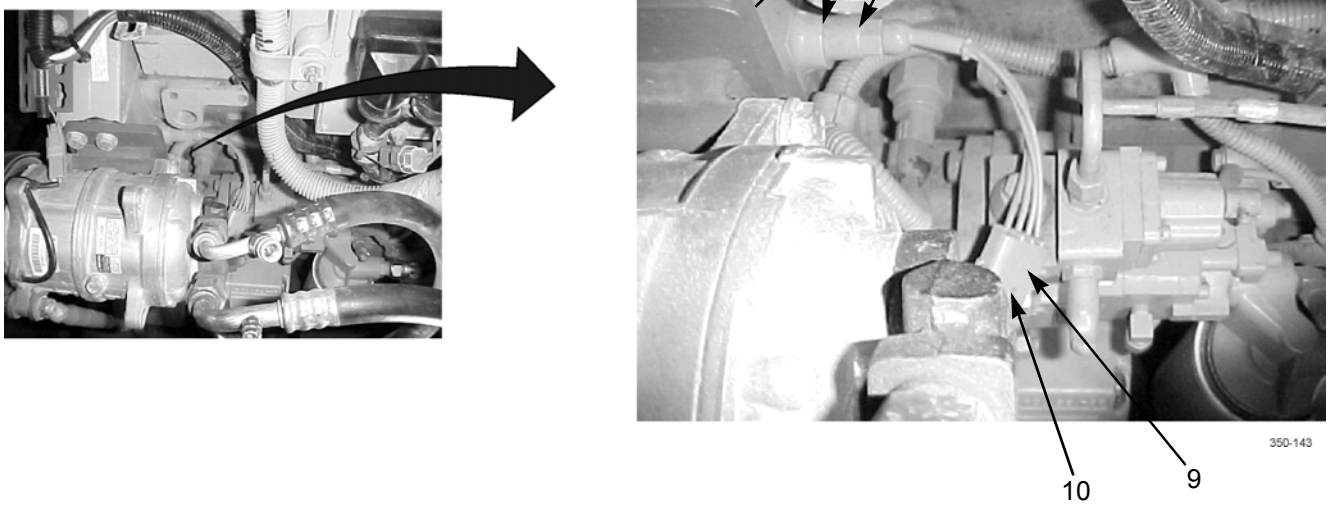
NOTE

Ensure locking tab on connector snaps in place.

3. Connect connector (3) of engine wiring harness (2) to coolant temperature sensor (4).
4. Fill cooling system and check for leaks (WP 0063 00).
5. Install engine cover (WP 0143 00).

ENGINE POSITION SENSOR REMOVAL

1. Disconnect connector (9) of engine position sensor (8) from connector (10) of engine wiring harness.
2. Remove engine position sensor (8) and o-ring seal (7) from engine front cover (6). Discard o-ring seal.



ENGINE POSITION SENSOR INSTALLATION

NOTE

Ensure sensor is free of debris and is not chipped, cracked or damaged.

1. Install new o-ring seal (7) on engine position sensor (8).
2. Install engine position sensor (8) on engine front cover (6). Tighten sensor to 216 lb-in (24 Nm).

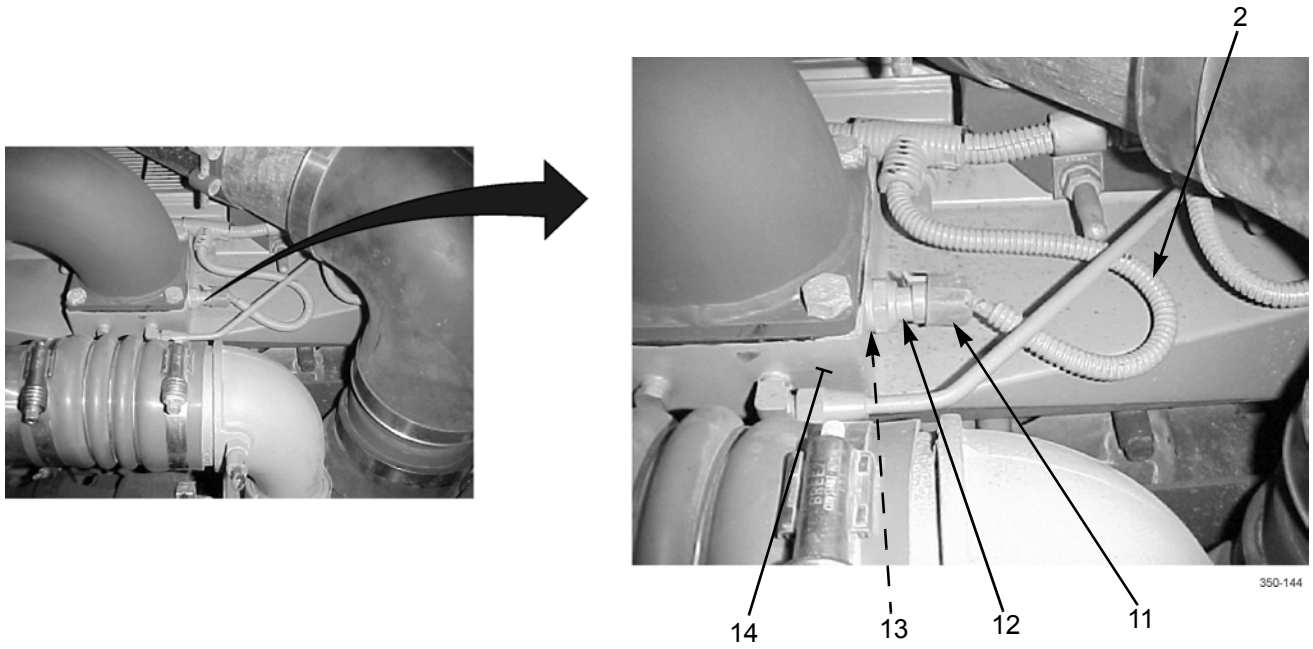
NOTE

Ensure locking tab on connector snaps in place.

3. Connect engine wiring harness connector (10) to connector (9) of engine position sensor (8).
4. Install engine cover (WP 0143 00).

INTAKE AIR TEMPERATURE SENSOR REMOVAL

1. Disconnect connector (11) of engine wiring harness (2) from intake air temperature sensor (12).
2. Remove intake air temperature sensor (12) and o-ring seal (13) from intake manifold (14). Discard o-ring seal.



INTAKE AIR TEMPERATURE SENSOR INSTALLATION

1. Install new o-ring seal (13) on intake air temperature sensor (12).
2. Install intake air temperature sensor (12) on intake manifold (14). Tighten sensor to 120 lb-in (14 Nm).

NOTE

Ensure locking tab on connector snaps in place.

3. Connect connector (11) of engine wiring harness (2) to intake air temperature sensor (12).
4. Install engine cover (WP 0143 00).

INTAKE MANIFOLD PRESSURE SENSOR REMOVAL

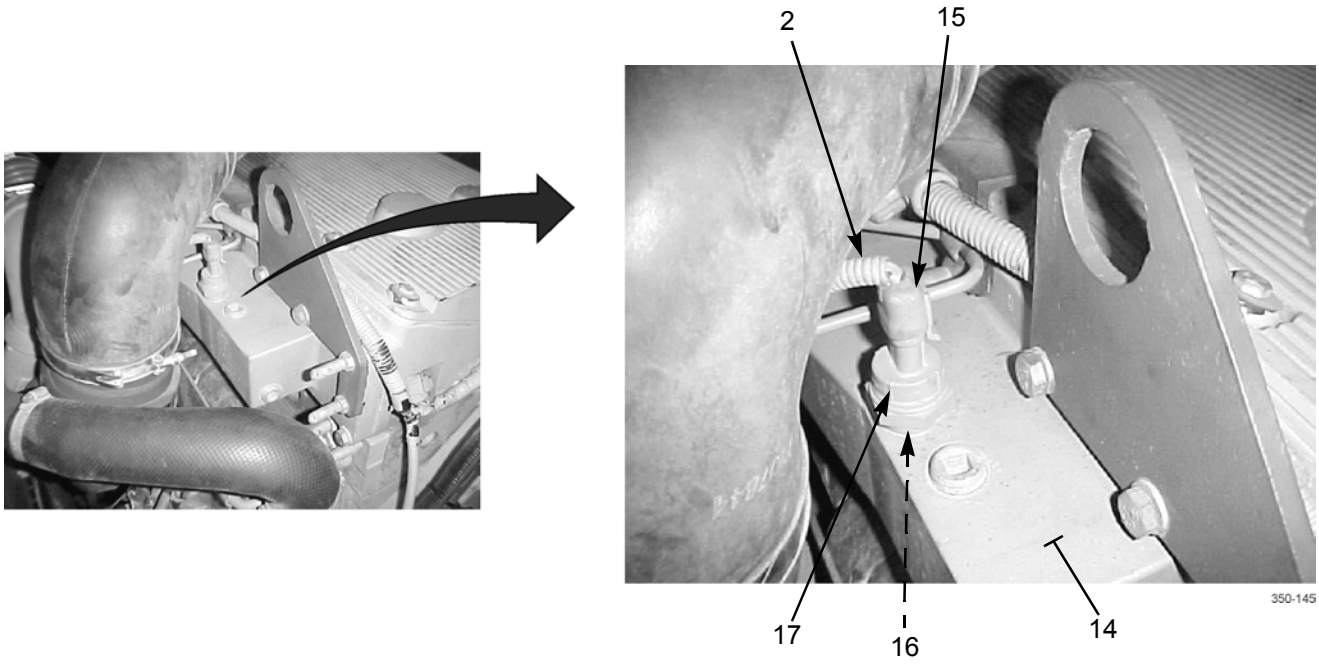
1. Disconnect connector (15) of engine wiring harness (2) from intake manifold pressure sensor (17).

NOTE

Ensure a 1-¼ in deep well socket is used for removal and installation of intake manifold pressure sensor.

2. Remove intake manifold pressure sensor (17) and o-ring seal (16) from intake manifold (14). Discard o-ring seal.

INTAKE MANIFOLD PRESSURE SENSOR REMOVAL - CONTINUED



INTAKE MANIFOLD PRESSURE SENSOR INSTALLATION

1. Install new o-ring seal (16) on intake manifold pressure sensor (17).
2. Install intake manifold pressure sensor (17) on intake manifold (14). Tighten sensor to 120 lb-in (14 Nm).

NOTE

Ensure locking tab on connector snaps in place.

3. Connect connector (15) of engine wiring harness (2) to intake manifold pressure sensor (17).
4. Install engine cover (WP 0143 00).

FUEL INLET RESTRICTION SENSOR REPLACEMENT

NOTE

The fuel inlet restriction sensor is located on the fuel pump filter head. It is replaced in the same manner as the intake manifold pressure sensor.

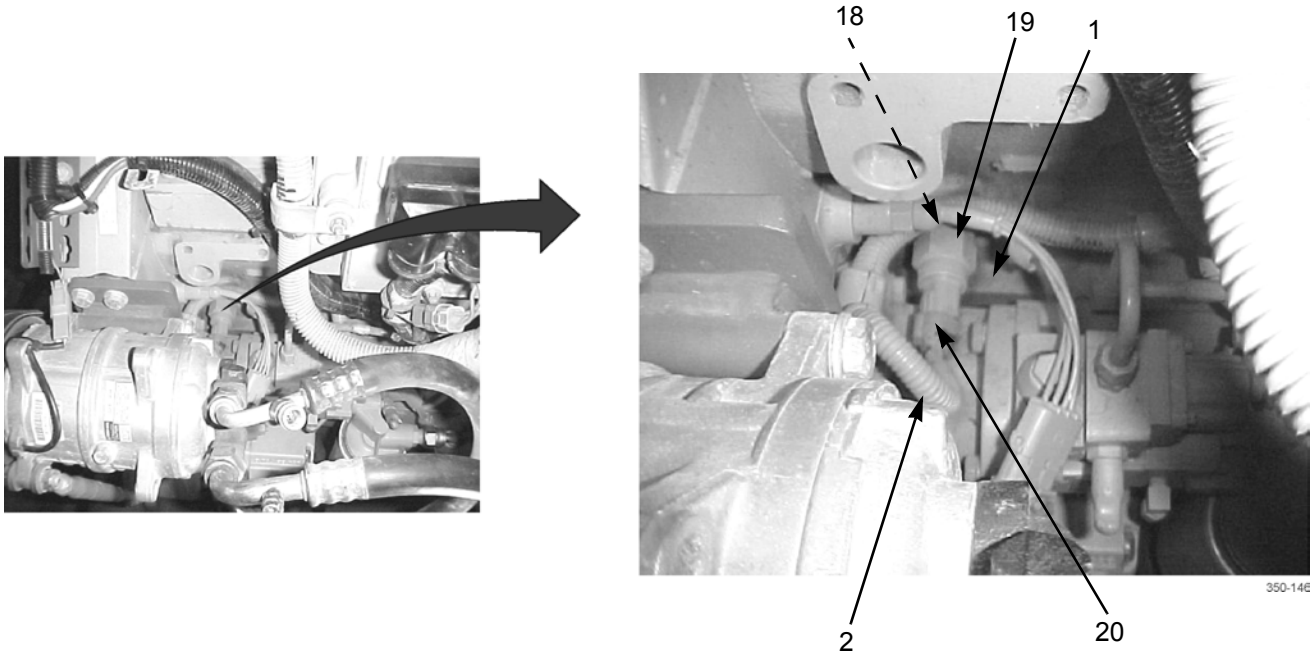
AMBIENT AIR PRESSURE SENSOR REPLACEMENT

NOTE

The ambient air pressure sensor is located on bracket on left side of engine to right-rear of engine ECU. It is replaced in the same manner as the intake manifold pressure sensor.

OIL PRESSURE/TEMPERATURE SENSOR REMOVAL

1. Disconnect connector (20) of engine wiring harness (2) from oil pressure/temperature sensor (19).
2. Remove oil pressure/temperature sensor (19) and o-ring seal (18) from engine (1). Discard o-ring seal.



OIL PRESSURE/TEMPERATURE SENSOR INSTALLATION

1. Install new o-ring seal (18) on oil pressure/temperature sensor (19).
2. Install oil pressure/temperature sensor (19) on engine (1). Tighten sensor to 120 lb-in (14 Nm).

NOTE

Ensure locking tab on connector snaps in place.

3. Connect connector (20) of engine wiring harness (2) to sensor (19).
4. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

FUEL LEVEL SENDING UNIT REPLACEMENT 0094 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

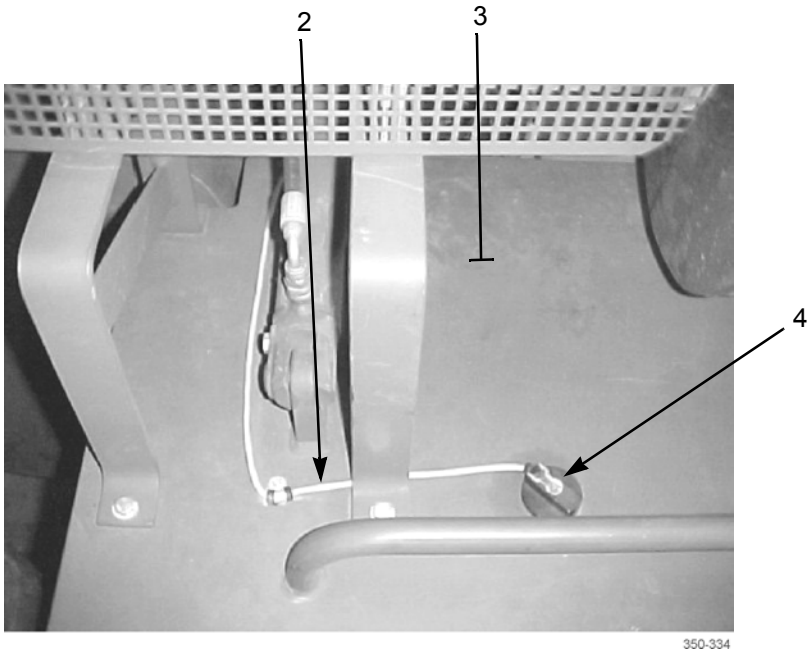
Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

Master battery switch in OFF position

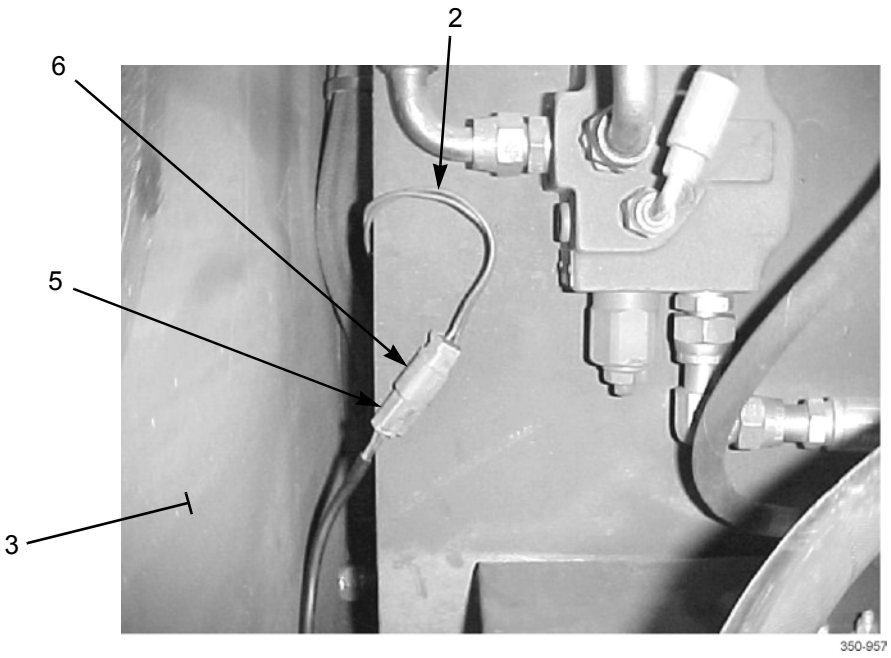
REMOVAL

1. Trace cable (2) of fuel level sending unit (4) back to point of connection, at rear corner of fuel tank (3).



REMOVAL - CONTINUED

2. Disconnect connector (6) of fuel level sending unit (4) from wiring harness connector (5).



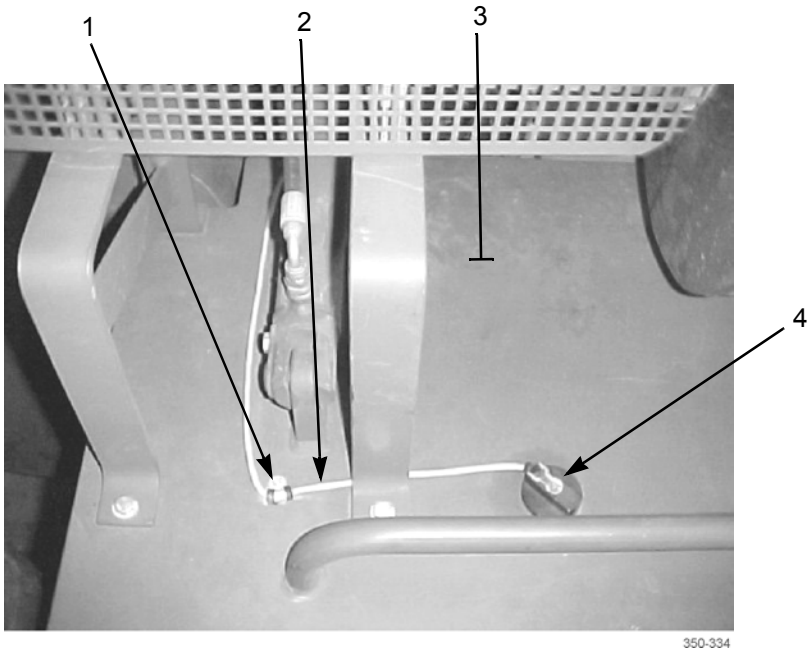
3. Remove two clamps (1) and release cable (2) from top of fuel tank (3).
4. Rotate fuel level sending unit (4) counterclockwise to remove from top of fuel tank (3). Remove o-ring.

INSTALLATION

NOTE

Replacement fuel level sending unit comes with a new o-ring.

1. Install fuel level sending unit (4) with o-ring to top of fuel tank (3).
2. Connect connector (6) of fuel level sending unit (4) to wiring harness connector (5).
3. Secure cable (2) to frame and to fuel tank (3) with two clamps (1).



END OF WORK PACKAGE

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TRANSMISSION SENSORS REPLACEMENT 0095 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 0-300 lb-in capacity (Item 41, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Seal, O-ring (P/N 0634 306 524) (3)

Seal, O-ring (P/N 0634 313 366)

Materials/Parts - Continued

Seal, o-ring (P/N 0634 313 728)

References

WP 0195 00

Equipment Condition

Cab in transport position (TM 10-3930-675-10)

Master battery switch in OFF position

Transmission access covers removed (WP 0135 00)

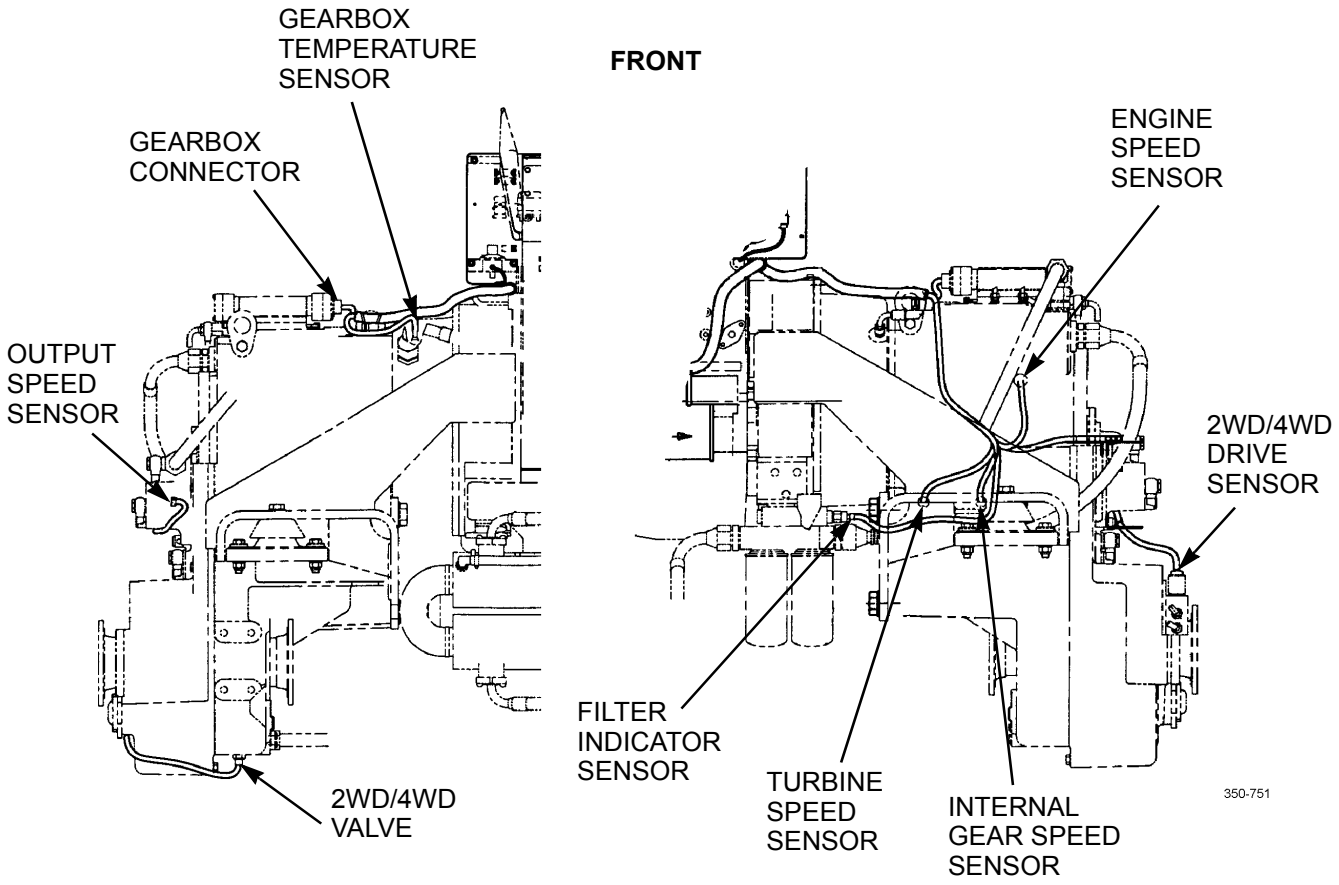
NOTE

- Transmission has provisions for seven sensors: turbine speed, internal gear speed, engine speed, output speed, gearbox temperature, 2wd/4wd, and filter indicator sensor.
- Each sensor is replaced in the same manner. A locator diagram is provided to aid in locating each sensor. Procedures for gearbox temperature sensor are detailed as an example.
- Tag connectors to ensure correct connection on installation.

TRANSMISSION SENSORS REPLACEMENT - CONTINUED **0095 00**

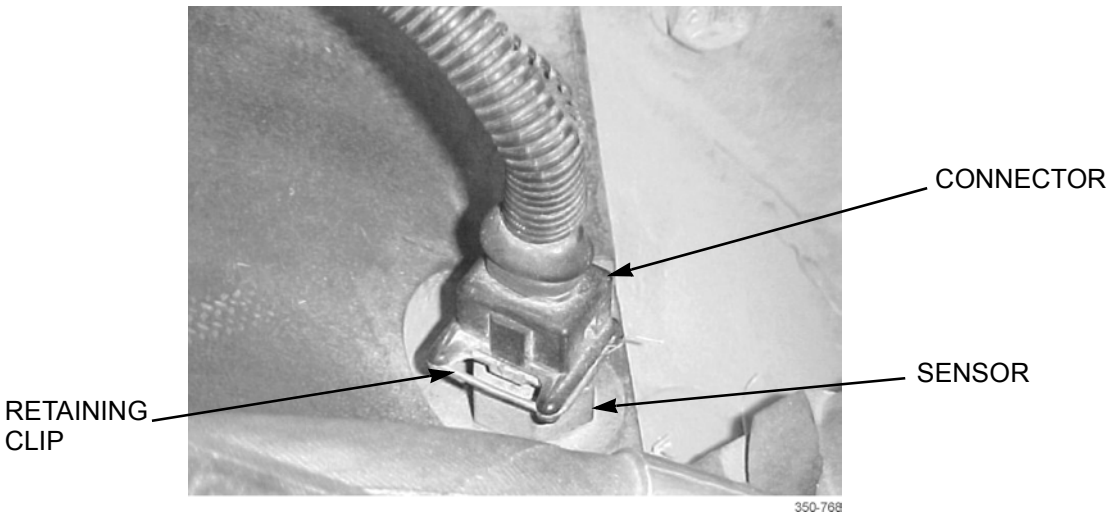
REMOVAL

1. Using locator diagram, locate sensor to be removed.



REMOVAL - CONTINUED

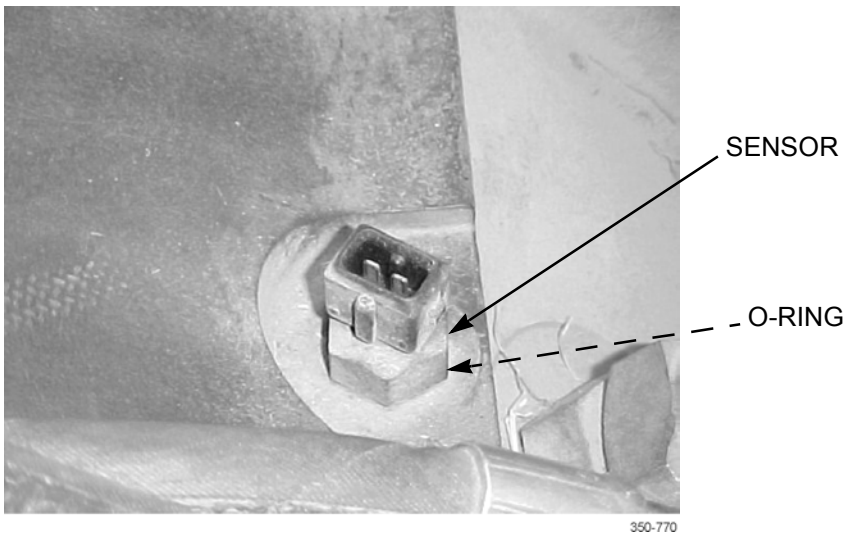
2. Press in on connector retaining clip and disconnect electrical connector from sensor.



CAUTION

Engine speed, internal gear speed, turbine speed, and output speed sensors are installed and positioned with spacers. Spacers are removed with their respective sensor and must be retained for installation. Failure to follow this caution may result in damage to equipment or improper sensor operation.

3. Remove sensor and o-ring from transmission. Discard o-ring.



INSTALLATION

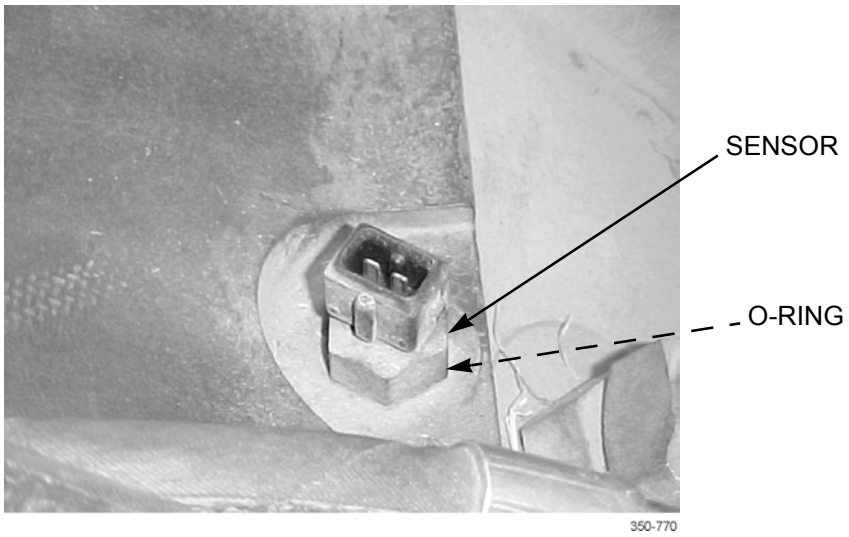
CAUTION

Spacers removed with sensors must be reinstalled with same sensor. If sensor is replaced, spacer must be replaced with the same type and quantity when installing sensor. Failure to follow this caution may result in damage to equipment or improper sensor operation.

NOTE

If reinstalling sensor, ensure new o-ring seal is used. If installing new sensor, ensure o-ring provided is installed.

1. Install sensor with o-ring in transmission. Tighten sensors as follows:
   a. Outspeed speed sensor: 204 lb-in (23 Nm)
   b. All other sensors: 265 lb-in (30 Nm)

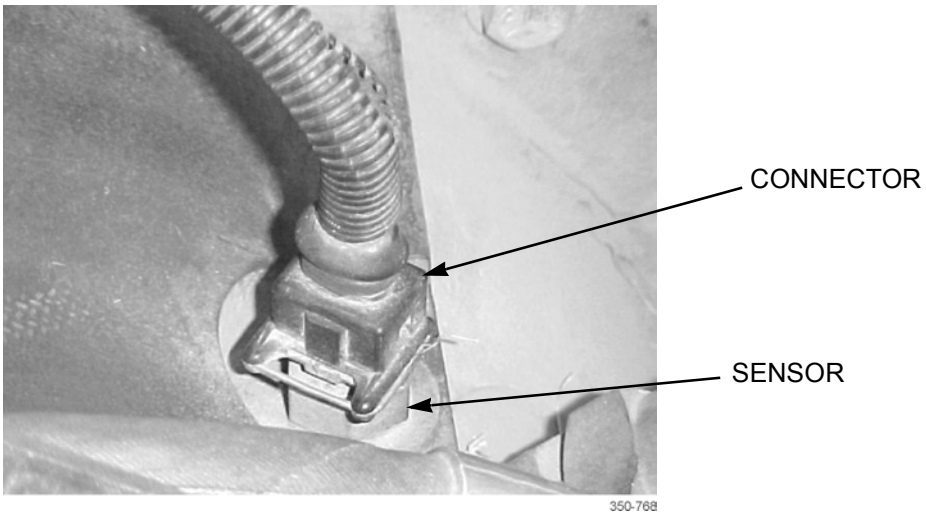


NOTE

Ensure connector and sensor key are alined prior to connection.

2. Connect electrical connector to sensor.

INSTALLATION - CONTINUED



3. If any sensor except for gearbox temperature or filter indicator sensor was replaced, perform transmission calibration (WP 0195 00).
4. Perform operational check (TM 10-3930-675-10).
5. Install transmission access covers (WP 0135 00).
6. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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BRAKE INCHING SWITCH REPLACEMENT 0096 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Equipment Condition

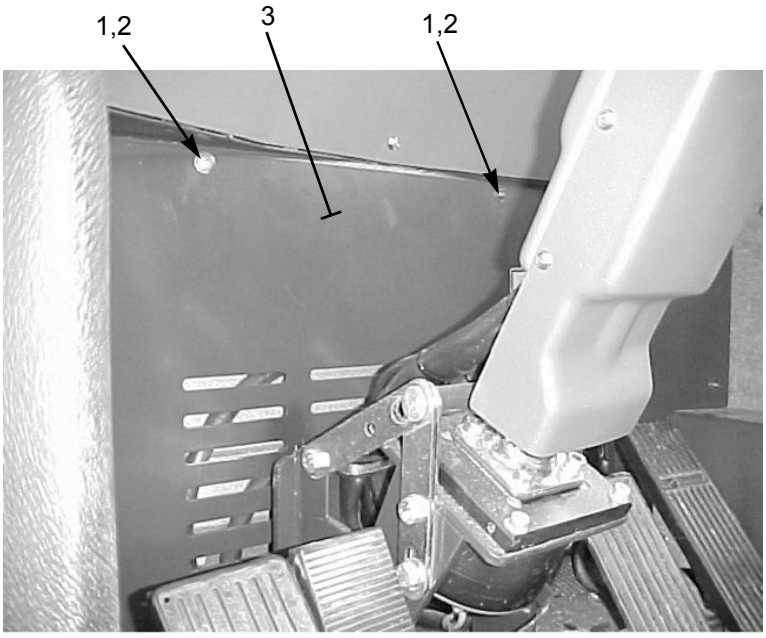
Master battery switch in OFF position

REMOVAL

NOTE

Remove and discard tiedown straps as necessary.

1. Remove four screws (1), washers (2), and lower panel (3) from cab.



350-347

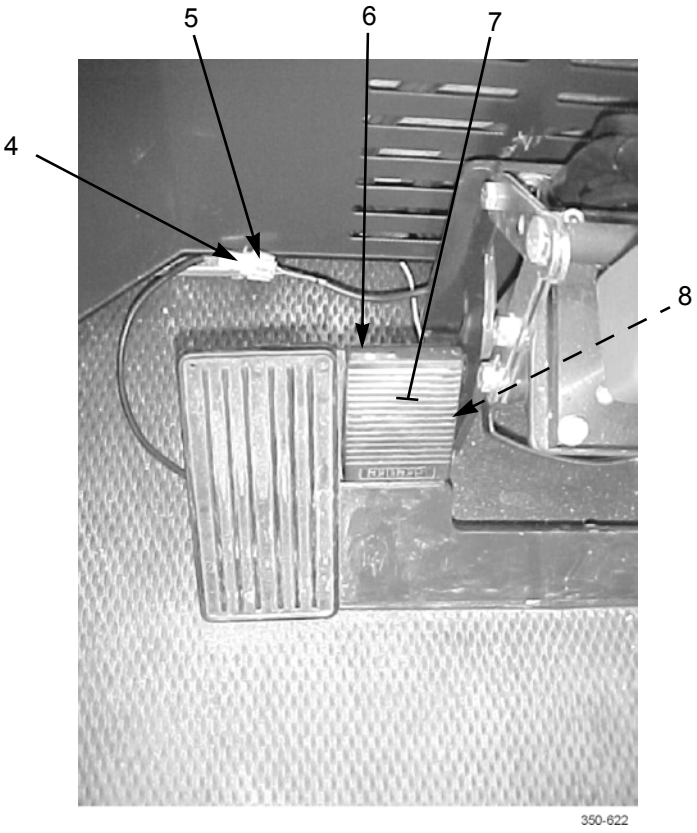
REMOVAL - CONTINUED

2. Disconnect brake inching switch connector (4) from wiring harness connector (5).

NOTE

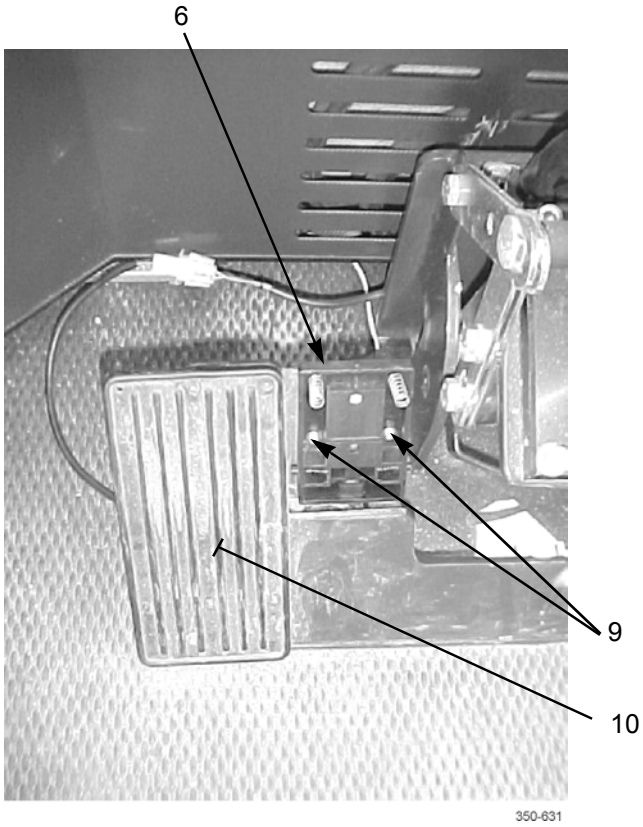
Pivot pin is under slight spring tension.

3. Press inward on two pivot pins (8) and remove cover (7) from brake inching switch (6).



REMOVAL - CONTINUED

4. Remove two screws (9) and brake inching switch (6) from brake pedal (10).



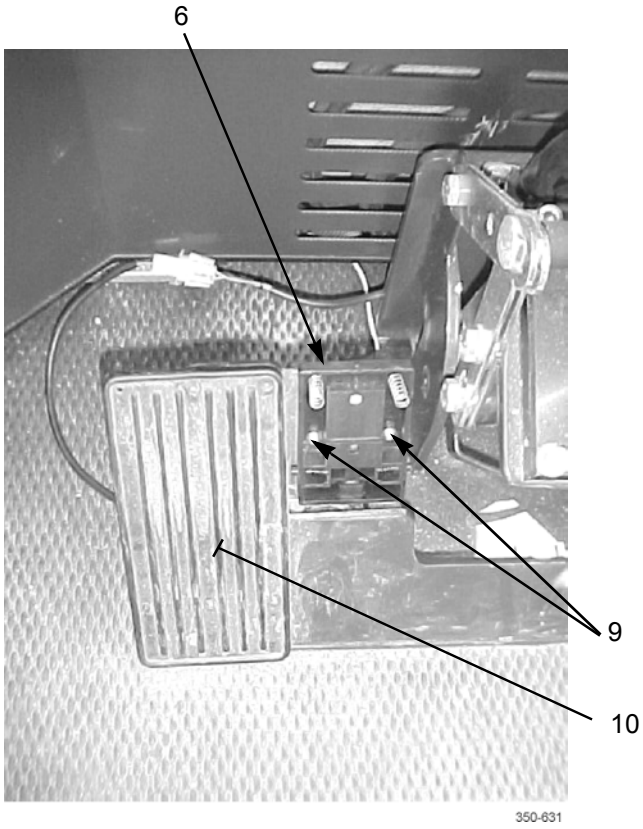
5. Replace cover (7) on brake inching switch (6).

INSTALLATION

NOTE

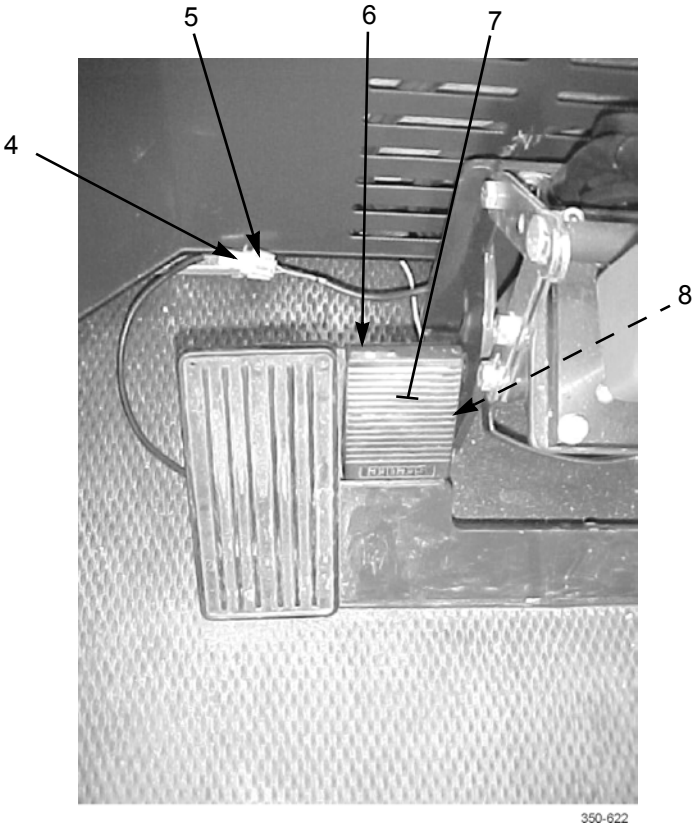
Install new tiedown straps as necessary.

1. Press inward on two pivot pins (8) and remove cover (7) from brake inching switch (6).
2. Install brake inching switch (6) to brake pedal (10) with two screws (9).



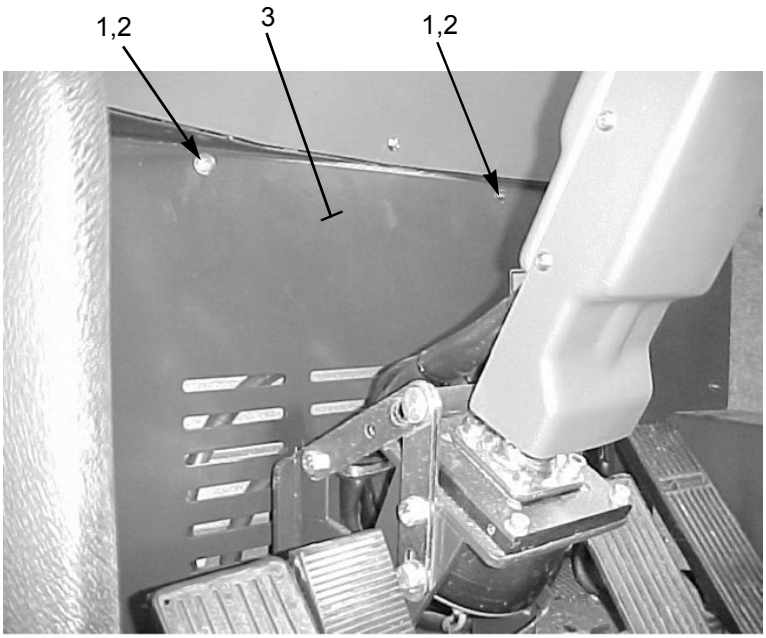
INSTALLATION - CONTINUED

3. Replace cover (7) on brake inching switch (6).
4. Connect brake inching switch connector (4) to wiring harness connector (5).



INSTALLATION - CONTINUED

5. Install lower panel (3) to cab with four washers (2) and screws (1).



350-347

END OF WORK PACKAGE

BRAKE LIGHT AND PRESSURE SWITCHES REPLACEMENT 0097 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Compound, sealing, pipe (Item 10, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Materials/Parts - Continued

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Brake hydraulic system pressure relieved (WP 0164 00)

Steering column base and brake pedal disconnected from mounting and moved aside (WP 0130 00)





WARNING

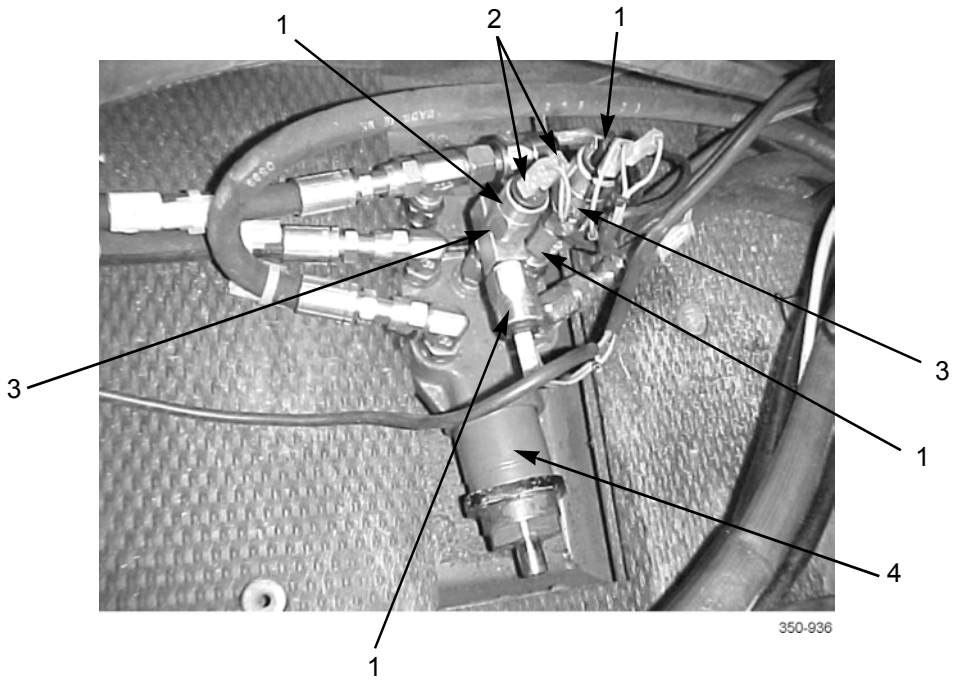
- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before removing switches.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

REMOVAL

NOTE

Tag connectors to ensure correct installation.

1. Disconnect two connectors (2) of cab wiring harness from each of three switches (1).
2. Remove each of four switches (1) from fittings (3) of brake control valve (4).
3. Remove fittings (3) from brake control valve (4).



INSTALLATION

1. Apply sealing compound to threads of fittings (3).
2. Install fittings (3) to brake control valve (4).
3. Install four switches (1) to fittings (3).
4. Connect two connectors (2) of cab wiring harness to each of three switches (1).
5. Install steering column base and brake pedal (WP 0130 00).

END OF WORK PACKAGE

BOOM ANGLE SENSOR REPLACEMENT 0098 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Screwdriver set, jeweler's (Item 25, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

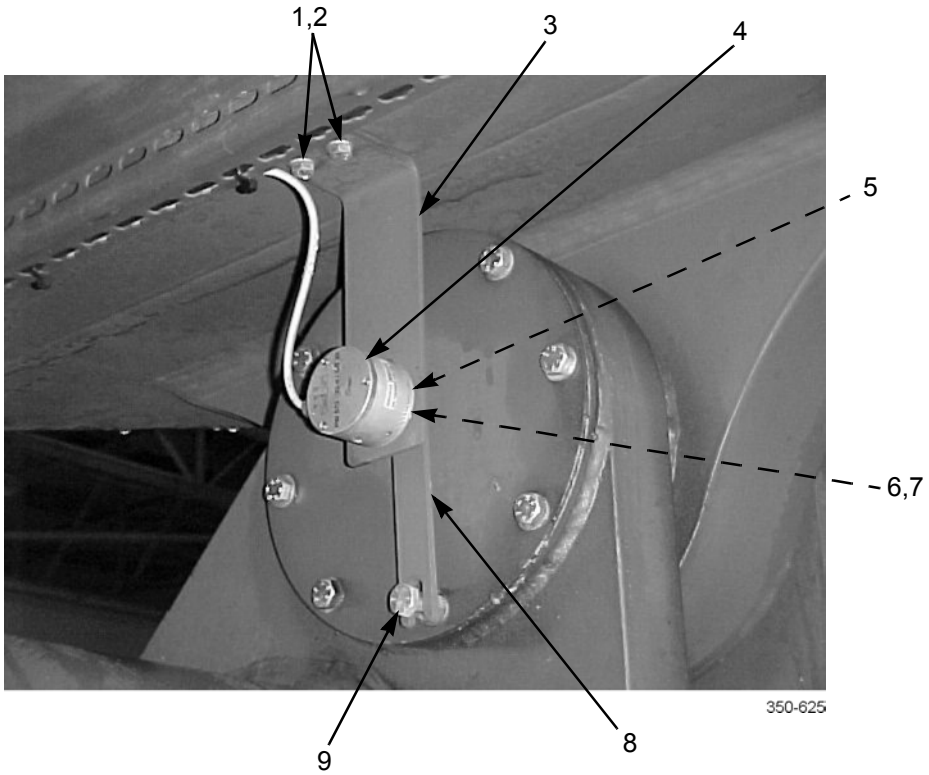
WP 0197 00

Equipment Condition

Master battery switch in OFF position

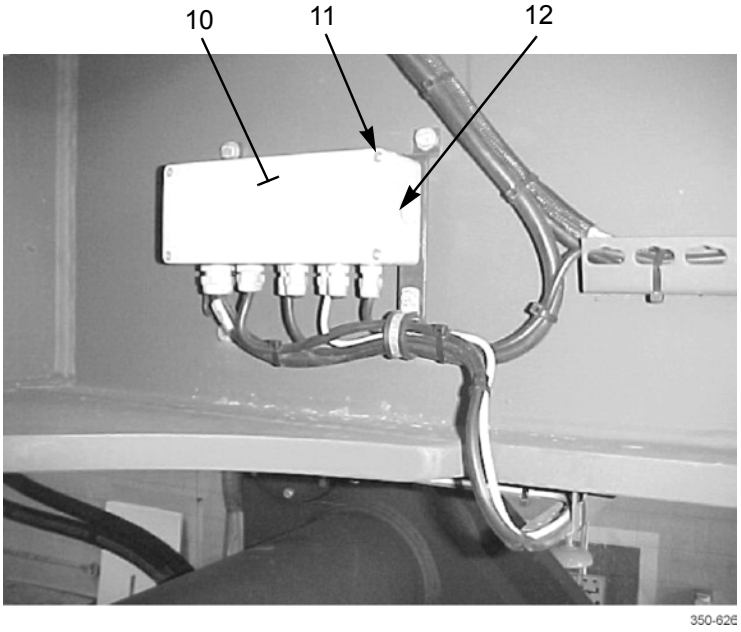
REMOVAL

1. Remove two screws (1), washers (2), and boom angle sensor (4) assembly from boom and bolt (9).
2. Loosen setscrew (5) of lever (8) and remove lever from boom angle sensor (4).
3. Remove three screws (6), washers (7), and bracket (3) from boom angle sensor (4).



REMOVAL - CONTINUED

4. Loosen four screws (11) and remove cover (10) from junction box (12), located on right side of boom. Inspect rubber seal in groove of cover. Replace only if damaged.



5. Loosen cable nut (15) and slide cable nut, grommet (16), and bushing (17) back on cable (14) of boom angle sensor (4).

CAUTION

To avoid damage to junction box, a fine-tipped jeweler's screwdriver should be used when disconnecting wires. DO NOT use a punch.

NOTE

Tag wires for installation.

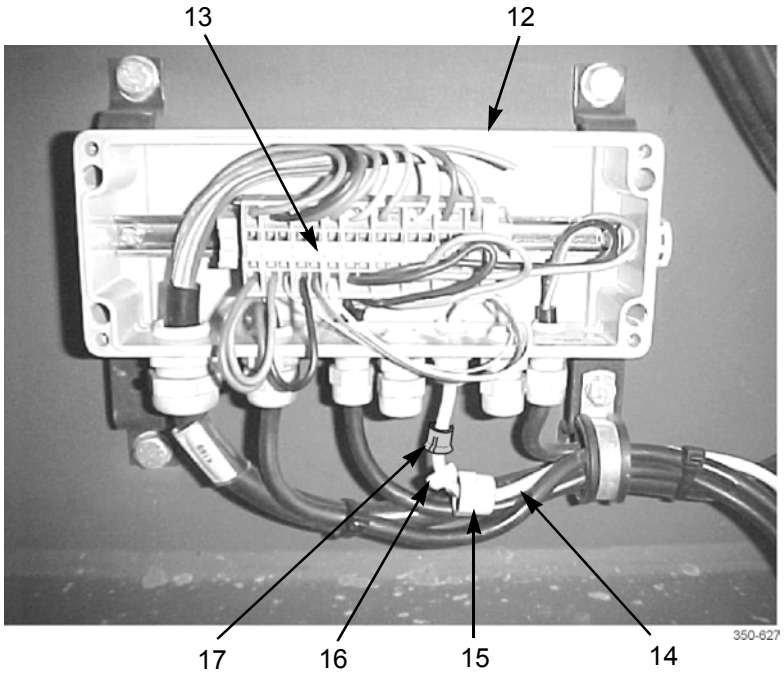
6. Using a jeweler's screwdriver, disconnect three wires of cable (14) from terminal blocks (13) of junction box (12).

NOTE

Remove tiedown straps as needed. Discard tiedown straps.

7. Remove boom angle sensor (4) with cable (14) from vehicle.

REMOVAL - CONTINUED

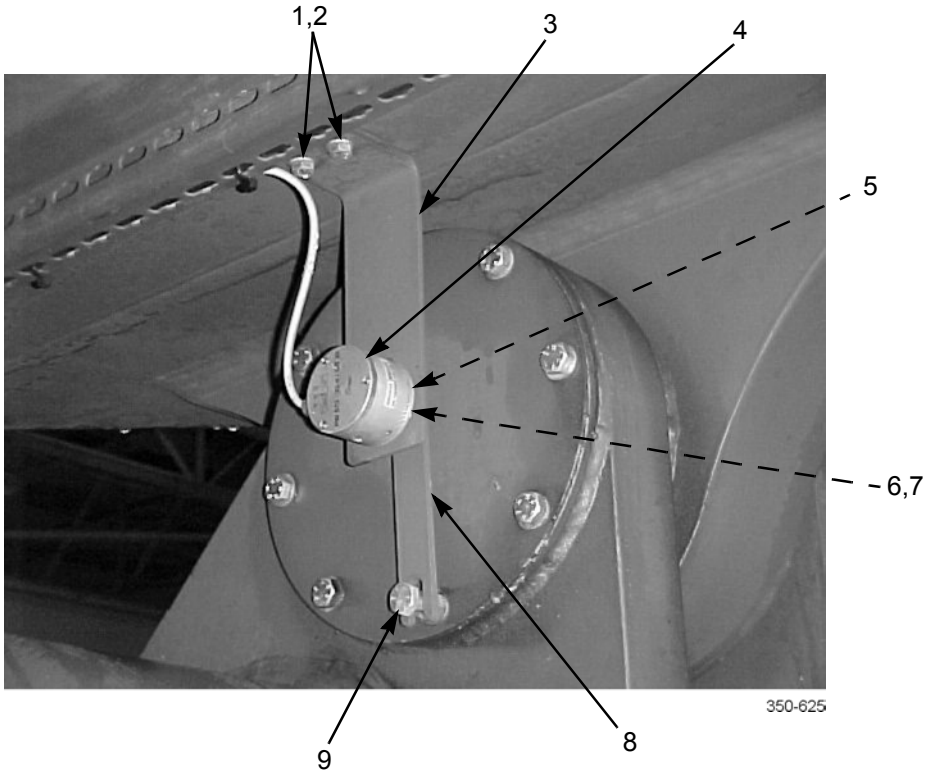


INSTALLATION

1. Position boom angle sensor (4) with cable (14) to vehicle.
2. Using a jeweler’s screwdriver, connect three wires of cable (14) to terminal blocks (13) of junction box (12).
3. Install bushing (17), grommet (16), and cable nut (15) to junction box (12).
4. Install cover (10) on junction box (12) and tighten four screws (11).

INSTALLATION - CONTINUED

5. Install boom angle sensor (4) to bracket (3) with three washers (7) and screws (6).
6. Install lever (8) to boom angle sensor (4) and tighten setscrew (5).
7. Position boom angle sensor (4) assembly to bolt (9) and boom and install two washers (2) and screws (1). Tighten screws.
8. Install new tiedown straps.



9. Perform boom and tophandler calibration (WP 0197 00).

END OF WORK PACKAGE

BOOM EXTENSION SENSOR REPLACEMENT 0099 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

References

WP 0197 00

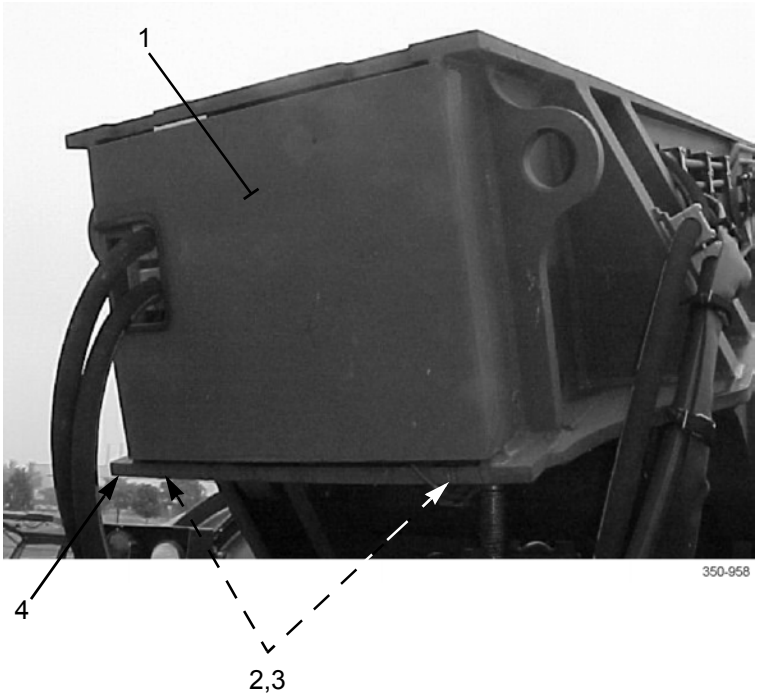
Equipment Condition

Boom fully retracted (TM 10-3930-675-10)

Master battery switch in OFF position

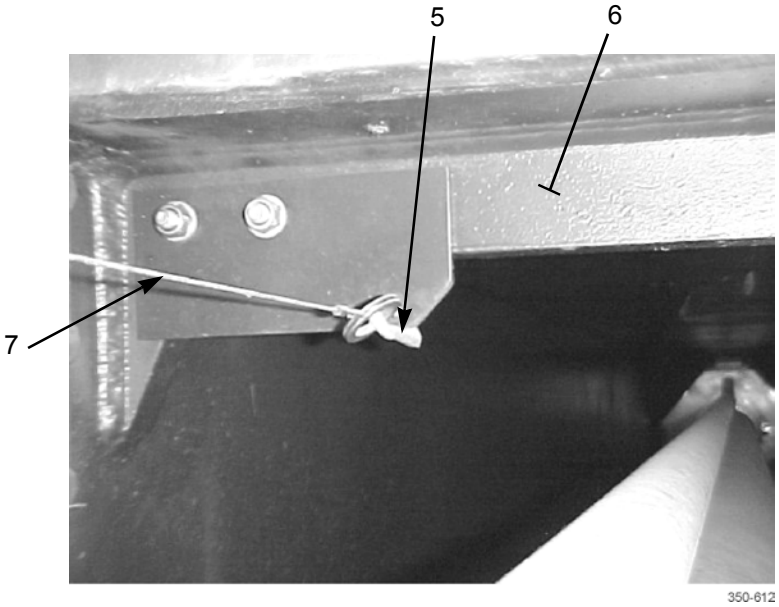
REMOVAL

1. Remove two screws (2), washers (3), and cover plate (1) from rear of boom (4).

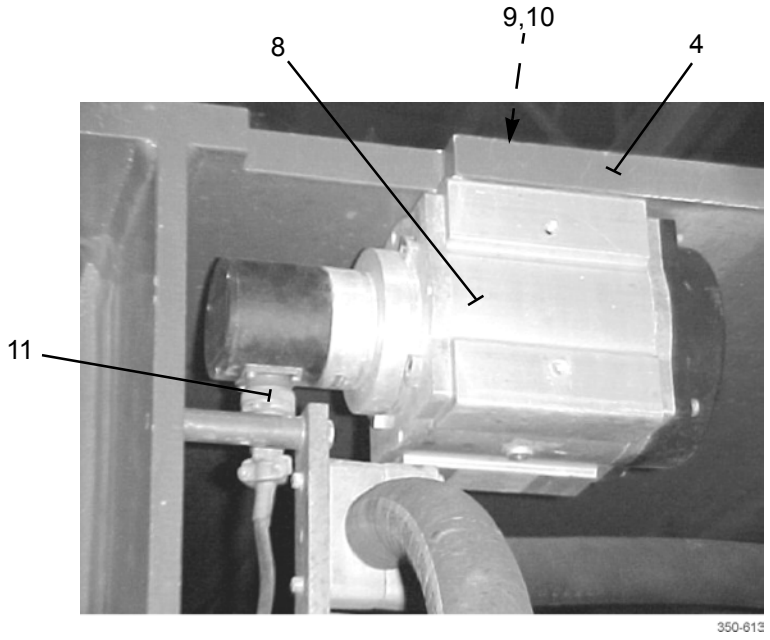


REMOVAL - CONTINUED

2. Open cable connector (5) and remove cable connector to disconnect ring of cable (7) from rear of extension boom (6).

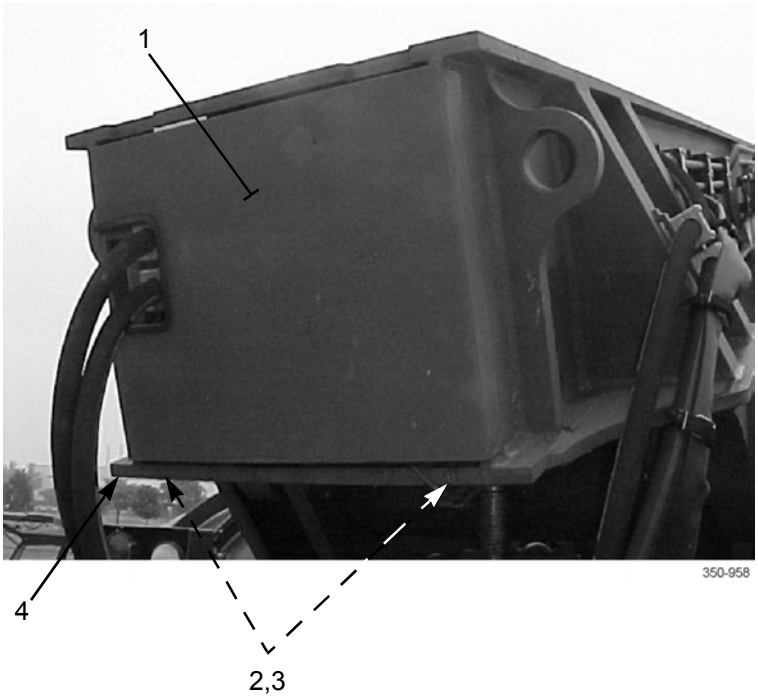


3. While holding ring of cable (7), allow cable to retract into boom extension sensor (8).
4. Disconnect connector (11) of wiring harness from boom extension sensor (8).
5. Remove two screws (9), washers (10), and boom extension sensor (8) from boom (4).



INSTALLATION

1. Install boom extension sensor (8) to boom (4) with two washers (10) and screws (9).
2. Connect connector (11) of wiring harness to boom extension sensor (8).
3. Extend ring of cable (7) from boom extension sensor (8).
4. Install ring of cable (7) to rear of extension boom (6) with cable connector (5). Close cable connector.
5. Install cover plate (1) to rear of boom (4) with two washers (3) and screws (2).



6. Perform boom and tophandler calibration (WP 0197 00).

END OF WORK PACKAGE

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TOPHANDLER ANGLE SENSOR REPLACEMENT 0100 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)
Screwdriver set, jeweler's (Item 30, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

References

WP 0197 00

Equipment Condition

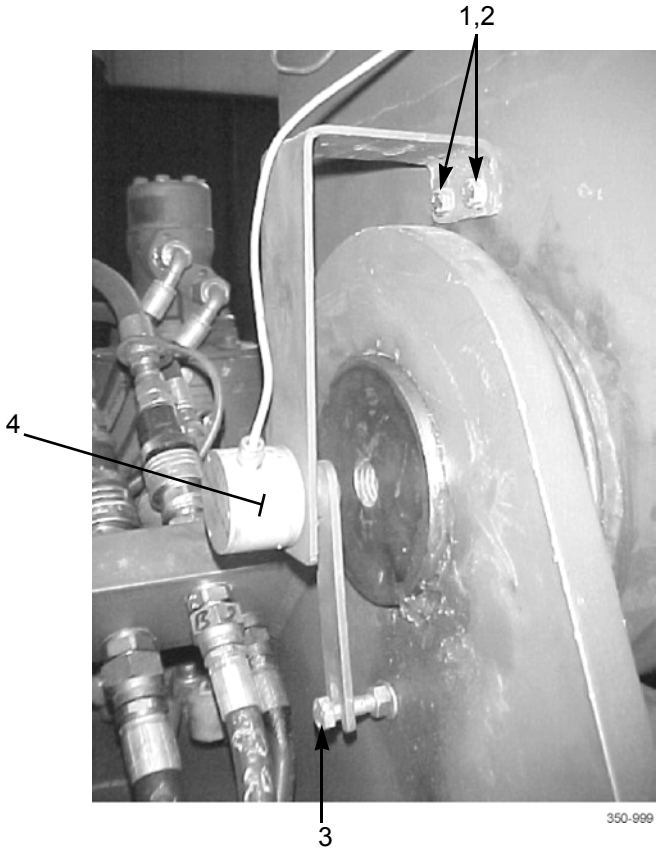
Master battery switch in OFF position

REMOVAL

NOTE

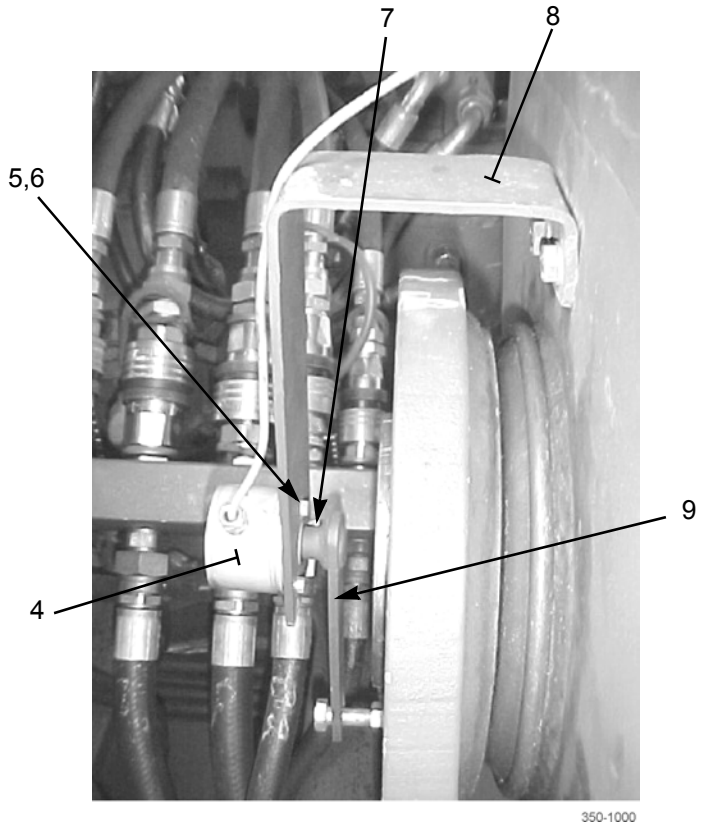
If removing tophandler, perform step 1 only.

1. Remove two screws (1), washers (2), and tophandler angle sensor (4) assembly from boom extension and bolt (3).



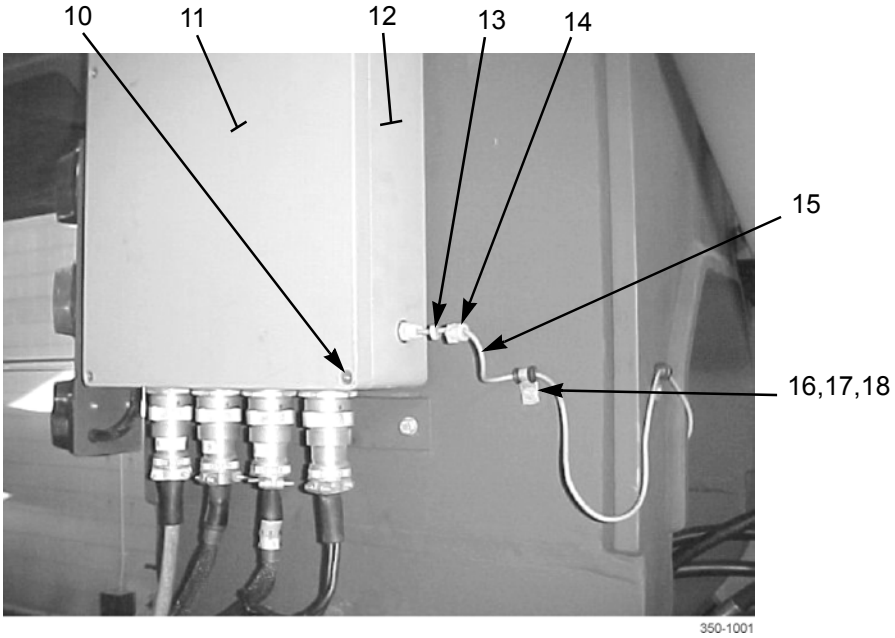
REMOVAL - CONTINUED

2. Loosen setscrew (7) of lever (9) and remove lever from tophandler angle sensor (4).
3. Remove three screws (5), washers (6), and bracket (8) from tophandler angle sensor (4).



4. Remove three screws (16), washers (17), cable (15), and cable clamps (18) from boom extension.
5. Loosen cable nut (14) and slide cable nut and grommet (13) back on cable (15) of tophandler angle sensor.
6. Loosen six screws (10) and remove cover (11) from tophandler junction box (12). Inspect rubber seal in groove of cover. Replace only if damaged.

REMOVAL - CONTINUED

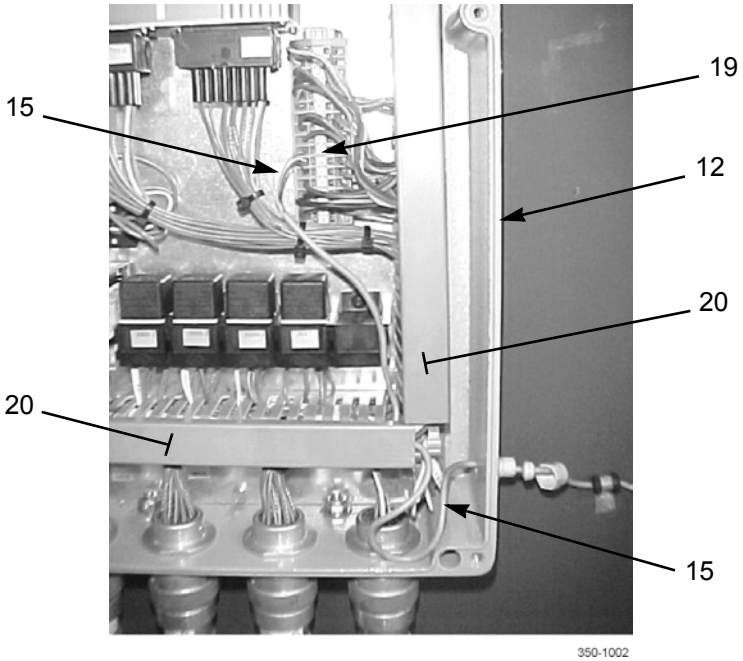


7. Remove plastic covers (20) to expose cable (15) of tophandler angle sensor (4).

NOTE

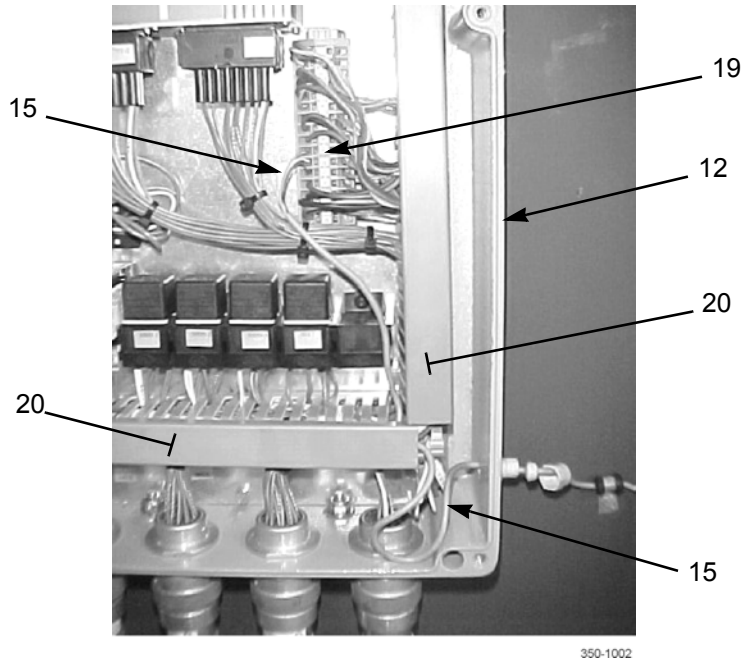
Tag wires for installation.

8. Using a jeweler's screwdriver, disconnect three wires of cable (15) from terminal block (19) of tophandler junction box (12).
9. Remove tophandler angle sensor (4) with cable (15) from vehicle.

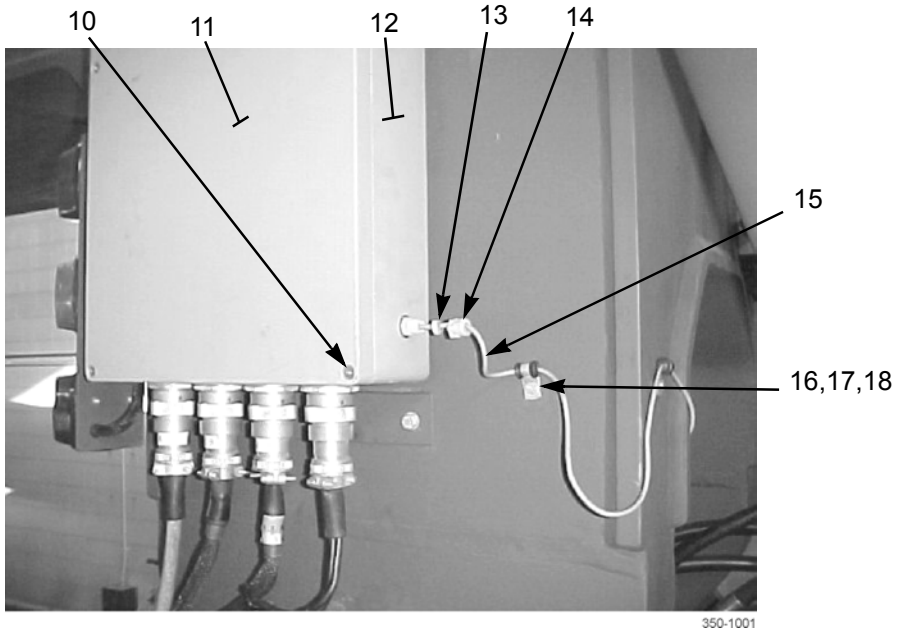


INSTALLATION

1. Position tophandler angle sensor (4) with cable (15) to vehicle.
2. Using a jeweler's screwdriver, connect three wires of cable (15) to terminal block (19) of tophandler junction box (12).
3. Install plastic covers (20) over excess cable (15) of tophandler angle sensor (4).

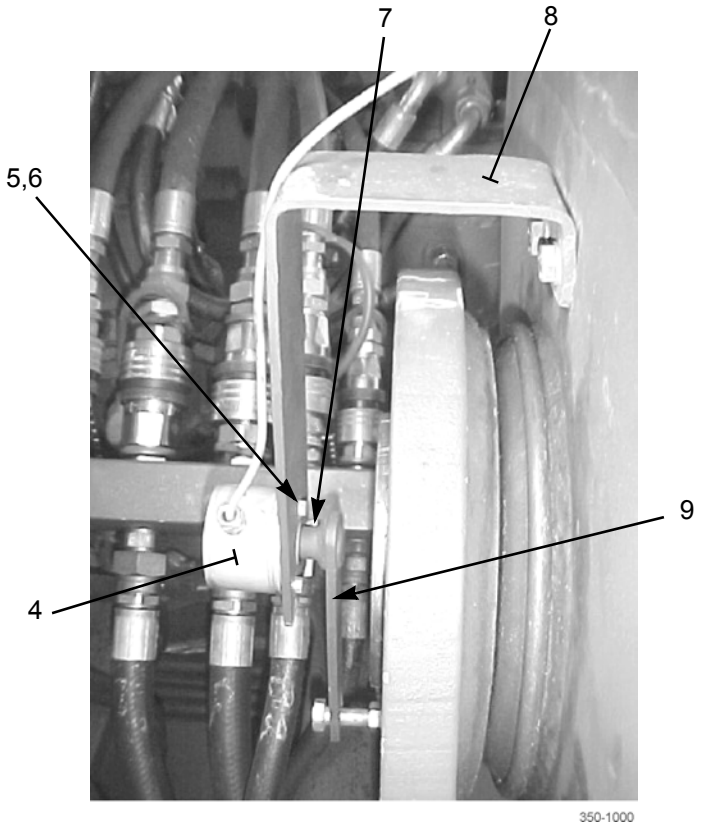


4. Install cover (11) to tophandler junction box (12) and tighten six screws (10).
5. Install grommet (13) and tighten cable nut (14).
6. Install cable (15) to boom extension with three cable clamps (18), washers (17), and screws (16).



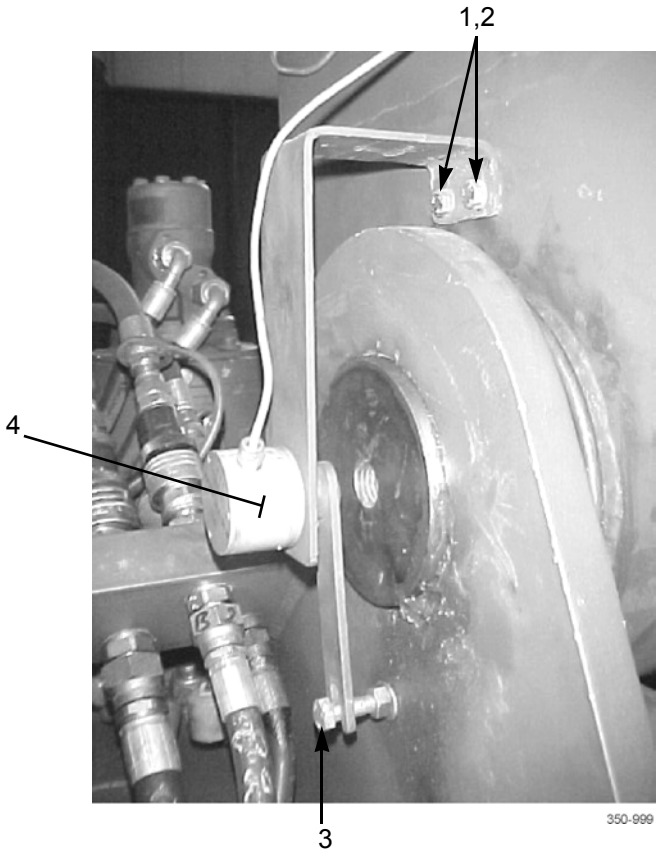
INSTALLATION - CONTINUED

7. Install tophandler angle sensor (4) to bracket (8) with three washers (6) and screws (5).
8. Install lever (9) to tophandler angle sensor (4) and tighten setscrew (7).



INSTALLATION - CONTINUED

9. Position tophandler angle sensor (4) assembly to bolt (3) and boom extension and install two washers (2) and screws (1). Tighten screws.



10. Perform boom and tophandler calibration (WP 0197 00).

END OF WORK PACKAGE

HYDRAULIC RESERVOIR AND LIFT CYLINDER SENSORS REPLACEMENT 0101 00

THIS WORK PACKAGE COVERS

Temperature Sensor Replacement

Pressure Sensor Replacement

Lift Cylinder Sensor Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Grease, electrically conductive (Item 17, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

References

WP 0184 00

WP 0197 00

Equipment Condition

Hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before removing switches.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

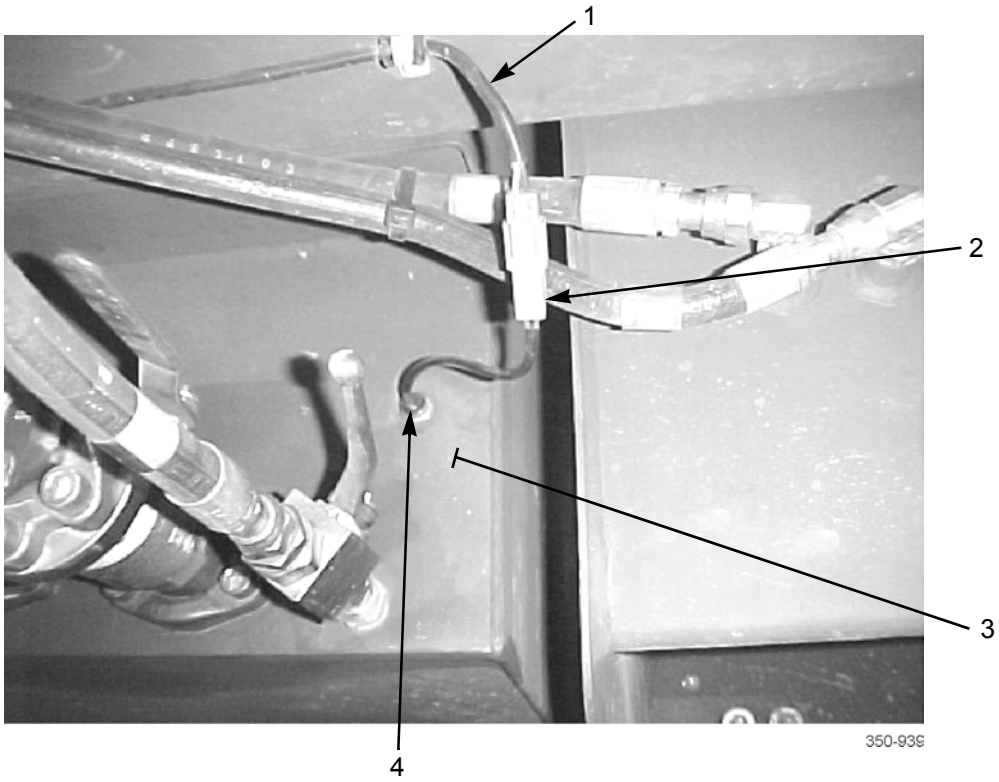
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Remove and discard tiedown straps.
- Apply electrically conductive grease to connectors before connections are made.

TEMPERATURE SENSOR REPLACEMENT

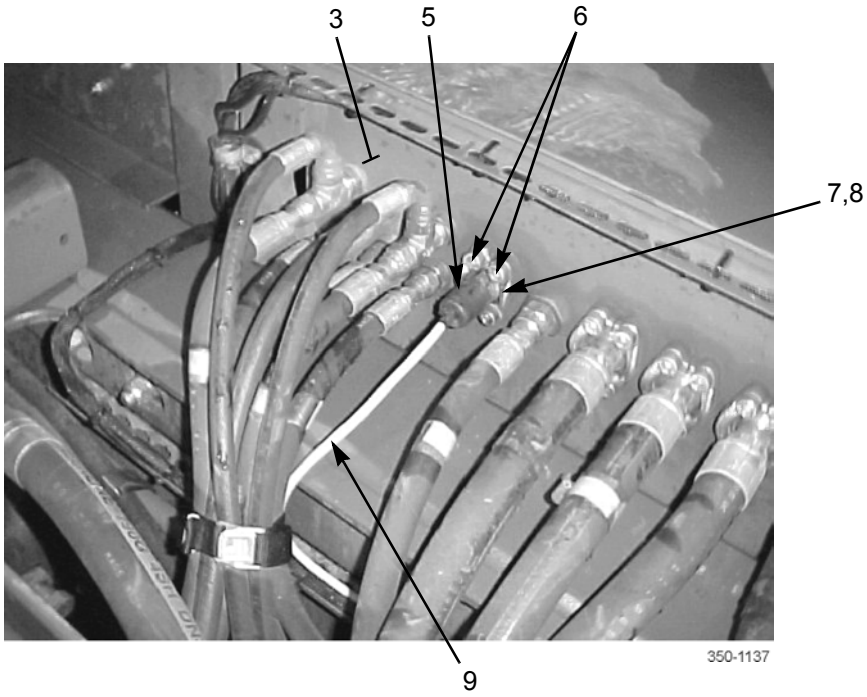
1. Drain hydraulic reservoir (WP 0184 00).
2. Disconnect connector (2) of temperature sensor (4) from wiring harness (1).
3. Remove temperature sensor (4) and four copper washers from hydraulic reservoir (3).



4. Install four copper washers and hydraulic temperature sensor (4) to hydraulic reservoir (3).
5. Connect connector (2) of temperature sensor (4) to wiring harness (1).
6. Fill hydraulic reservoir (WP 0184 00).

PRESSURE SENSOR REPLACEMENT

1. Remove four socket head screws (6) from flange (7).
2. Remove flange (7), sensor (5), and o-ring (8) from hydraulic reservoir (3). Discard o-ring.
3. Trace sensor cable (9) back to junction box. Disconnect wires of cable from terminal blocks. Remove cable from junction box.



NOTE

Replacement sensor comes with new o-ring.

4. Lubricate new o-ring (8) with lubricating oil. Install o-ring and sensor (5) to hydraulic reservoir (3) with flange (7) and four socket head screws (6).
5. Position sensor cable (9) to junction box. Connect wires of sensor cable to terminal blocks of junction box.
6. Secure sensor cable (9) with new tiedown straps.

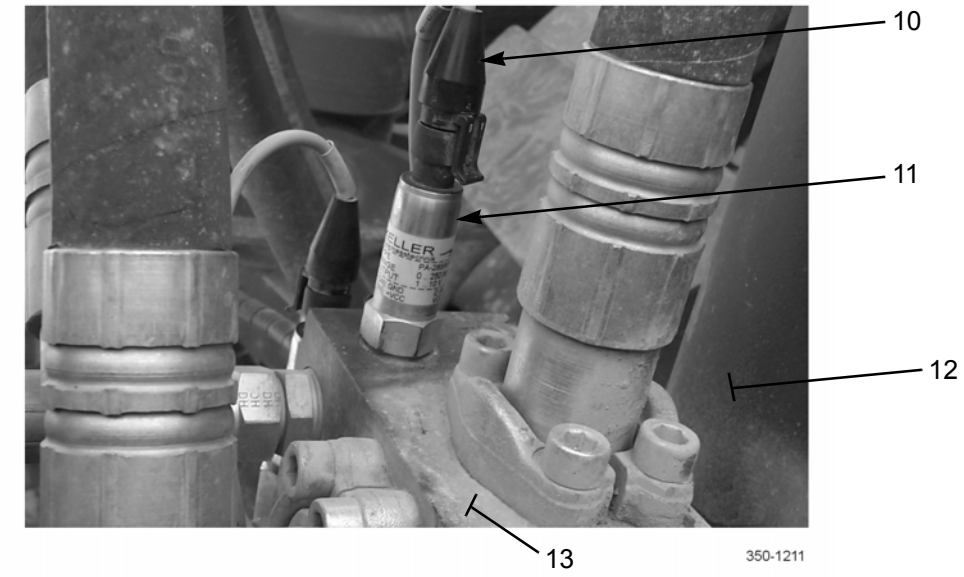
LIFT CYLINDER SENSOR REPLACEMENT

1. Disconnect electrical connector (10) from sensor (11).
2. Remove sensor (11) and o-ring from locking valve (13) at base of lift cylinder (12). Discard o-ring.

NOTE

Replacement sensor comes with new o-ring.

3. Lubricate new o-ring with lubricating oil. Install o-ring and sensor (11) to locking valve (13). Tighten sensor to 35 lb-ft (47 Nm).



4. Connect electrical connector (10) to sensor (11).
5. Calibrate boom and tophandler (WP 0197 00).

END OF WORK PACKAGE

HYDRAULIC FILTER INDICATOR SENSORS REPLACEMENT 0102 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Crowfoot attachment set, socket wrench (Item 5, WP 0204 00)

Screwdriver set, jeweler's (Item 30, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

Materials/Parts - Continued

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Cab in transport position (TM 10-39390675-10)

Transmission access cover(s) removed (WP 0135 00)

Hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



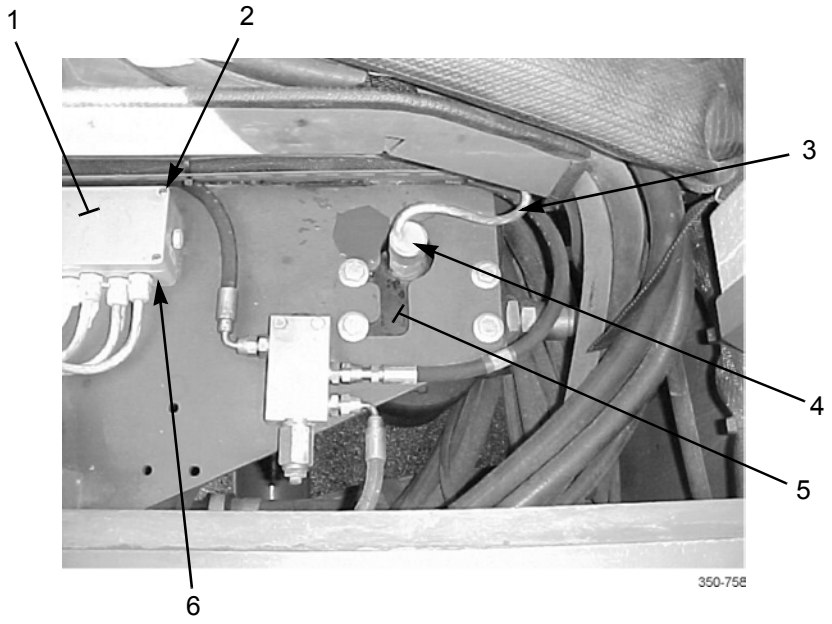
- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before removing switches.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

REMOVAL

NOTE

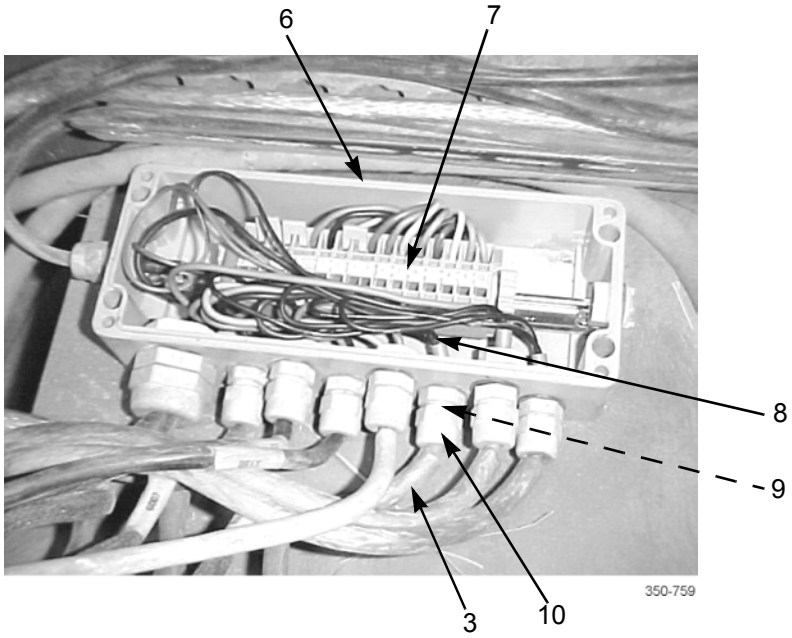
- There are three filter indicator sensors located in filter heads of high-pressure hydraulic filters. Ease of access to remove sensors varies. In some cases, it may be necessary to remove both filter and filter head to access sensor.
- Remove and discard tiedown straps.
- Tag wires to ensure correct installation.

1. Trace electrical cable (3) from sensor (4) back to junction box (6).
2. Loosen four screws (2) and remove cover (1) of junction box (6). Inspect rubber seal in groove of cover. Replace only if damaged.



3. Loosen cable nut (10) and slide cable nut and grommet (9) back on cable (3).
4. Using a jeweler's screwdriver, disconnect cable wires (8) from terminal blocks (7). Remove cable (3) from junction box (6).

REMOVAL - CONTINUED



5. Remove sensor (4) with cable (3) from filter head (5).

INSTALLATION

NOTE

- Use electrically conductive grease on wire connections before connections are made.
- Install new tiedown straps as necessary.

1. Install sensor (4) to filter head (5).
2. Feed cable (3) thru grommet (9) and cable nut (10) and into junction box (6).
3. Using a jeweler’s screwdriver, connect cable wires (8) to terminal blocks (7).
4. Install grommet (9) and cable nut (10) to junction box (6). Tighten cable nut.
5. Install cover (1) on junction box (6) and tighten four screws (2).
6. Install transmission access cover(s) (WP 0135 00).
7. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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STEERING SYSTEM WHEEL SENSOR REPLACEMENT 0103 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Screwdriver set, jeweler's (Item 25, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.002) (3)

References

WP 0196 00

Equipment Condition

Master battery switch in OFF position

Steering hydraulic system pressure relieved (WP 0164 00)

Engine cover removed (to replace front wheel sensors) (WP 0143 00)

NOTE

Four steering system wheel sensors are replaced the same way. Left-front sensor is shown.

REMOVAL

NOTE

Remove and discard tiedown straps as needed.

1. Remove screw (12), washer (13), and clamp (14).



350-642

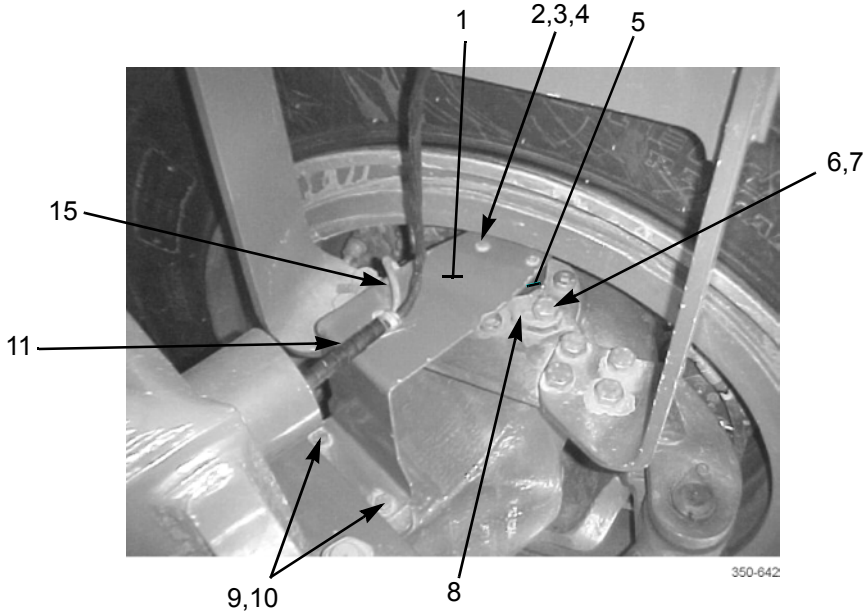
REMOVAL - CONTINUED

2. Remove two screws (9) and washers (10) to loosen bracket (1) from axle.
3. Remove two screws (6) and washers (7) from sensor mounting flange (8).

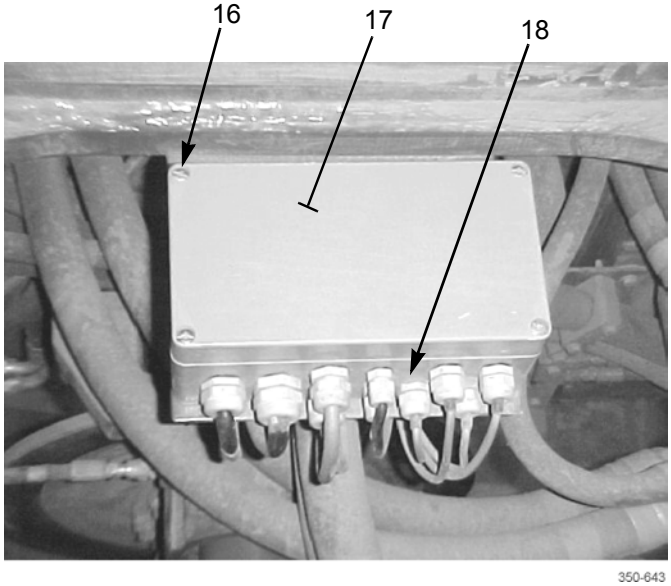
NOTE

Note position of sensor assembly to bracket for installation.

4. Remove three locknuts (2), six washers (3), three screws (4), and sensor (5) assembly from bracket (1). Discard locknuts.
5. Remove protective covering (11) from cable (15) of sensor (5).



6. Loosen four screws (16) and remove cover (17) from front (or rear) junction box (18).



REMOVAL - CONTINUED

NOTE

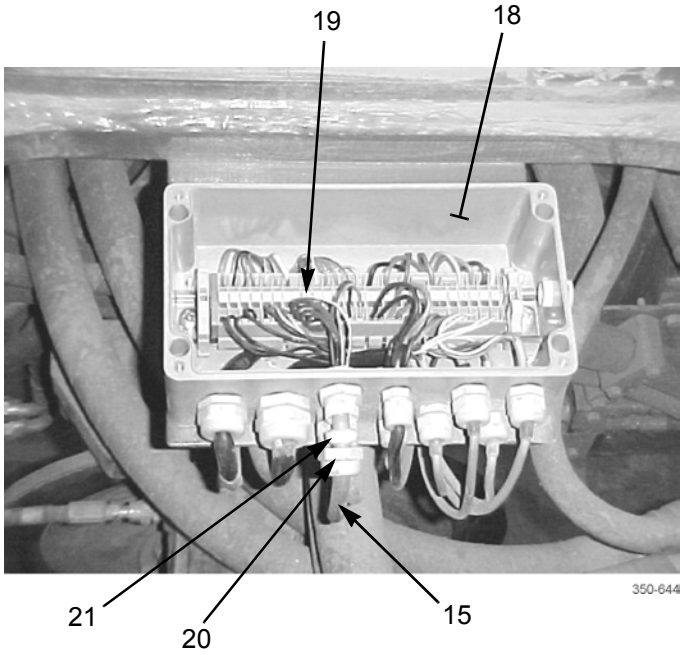
Tag wires for installation.

7. Using a jeweler's screwdriver, disconnect seven wires of cable (15) from terminal blocks (19) of junction box (18).
8. Loosen cable nut (20) and slide cable nut and grommet (21) back on cable (15).
9. Remove cable (15) from junction box (18).

NOTE

Before removing, string may be tied to end of sensor cable, to aid in installation.

10. Remove sensor (5) assembly with cable (15) from vehicle.



INSTALLATION

1. Position cable (15) with sensor assembly to vehicle.
2. Position cable (15) to junction box (18).
3. Install grommet (21) and cable nut (20) to junction box (18).

NOTE

Use electrically conductive grease on wire connections before connections are made.

4. Connect seven wires of cable (15) to terminal blocks (19) of junction box (18) as follows:

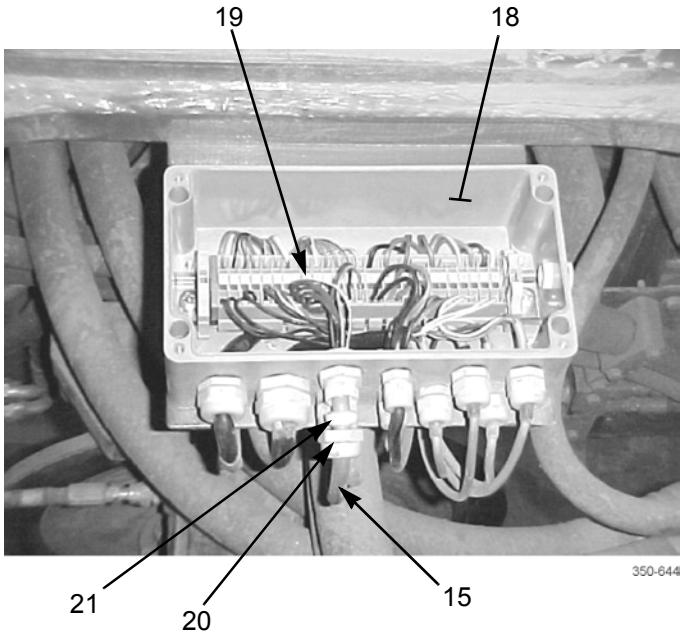


Table 1. Front Junction Box X167 Wire Connections.

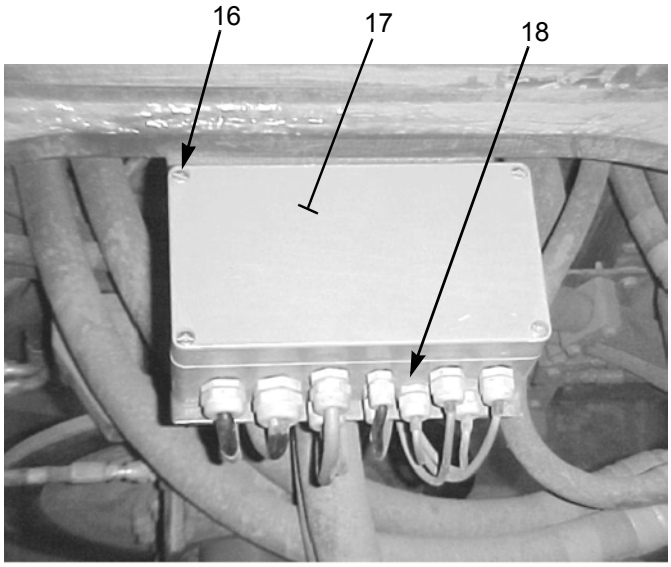
LEFT-FRONT SENSOR	RIGHT-FRONT SENSOR
Black No. 1 across from Brown	Black No. 1 across from Gray
Black No. 2 across from White	Black No. 2 across from Black
Black No. 3 across from Violet	Black No. 3 across from Red
Black No. 4 across from Orange	Black No. 4 across from Blue
Black No. 5 across from White/Black	Black No. 5 across from Yellow
Yellow/Green across from White/Red	Yellow/Green across from Green
Silver to Ground Terminal	Silver to Silver

INSTALLATION - CONTINUED

Table 2. Rear Junction Box X192 Wire Connections.

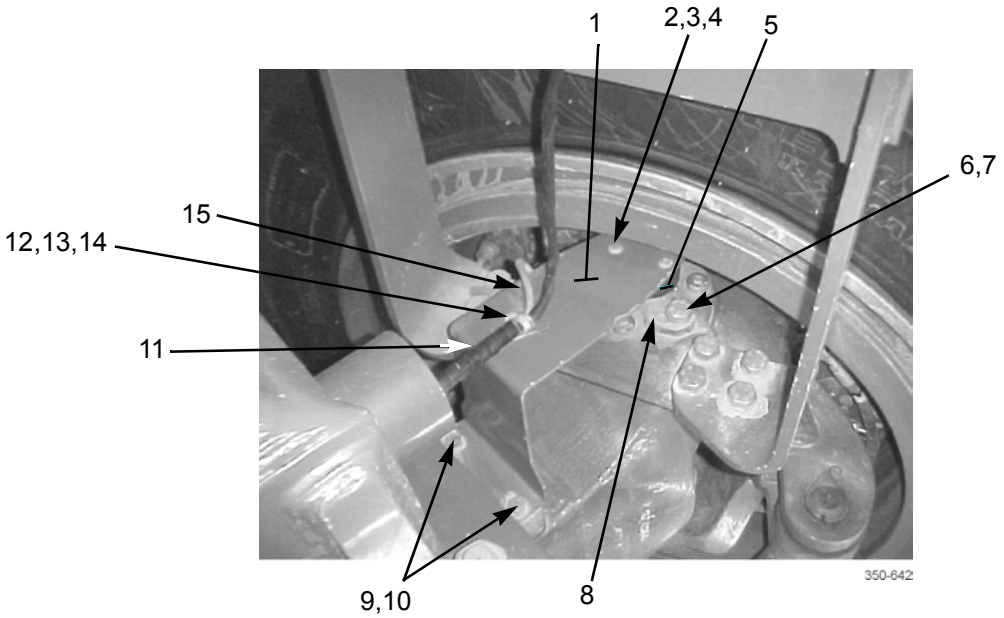
LEFT-REAR SENSOR	RIGHT-REAR SENSOR
Black No. 1 across from Brown	Black No. 1 across from Gray
Black No. 2 across from White	Black No. 2 across from Black
Black No. 3 across from Violet	Black No. 3 across from Red
Black No. 4 across from Orange	Black No. 4 across from Blue
Black No. 5 across from White/Black	Black No. 5 across from Yellow
Yellow/Green across from White/Red	Yellow/Green across from Green
Silver to Ground Terminal	Silver to Silver

5. Install cover (17) to front (or rear) junction box (18) and tighten four screws (16).



INSTALLATION - CONTINUED

6. Install protective covering (11) to cable (15).
7. Install sensor (5) assembly to bracket (1), in position noted during removal, with three screws (4), six washers (3), and three new locknuts (2).
8. Install sensor mounting flange (8) with two washers (7) and screws (6).
9. Install bracket (1) to axle with two washers (10) and screws (9).
10. Install clamp (14) with washer (13) and screw (12).



11. Install new tiedown straps as needed.
12. If removed, install engine cover (WP 0143 00).
13. Perform steering calibration (WP 0196 00).

END OF WORK PACKAGE

ELECTRIC HORN REPLACEMENT 0104 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

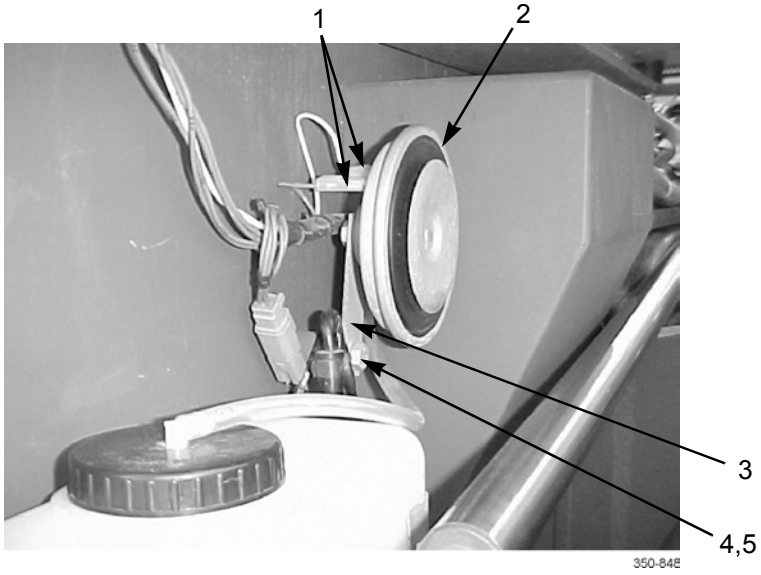
Master battery switch in OFF position

REMOVAL

NOTE

Tag wires for installation.

1. Disconnect two connectors (1) from rear of electric horn (2).
2. Remove screw (4), washer (5), and electric horn (2) with bracket (3) from vehicle.



INSTALLATION

1. Install electric horn (2) with bracket (3) to vehicle with washer (5) and screw (4).
2. Connect two connectors (1) to rear of electric horn (2).

END OF WORK PACKAGE

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BACKUP ALARM REPLACEMENT 0105 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Nut, self-locking (P/N 5957) (2)

References

TM 10-3930-675-10

Equipment Condition

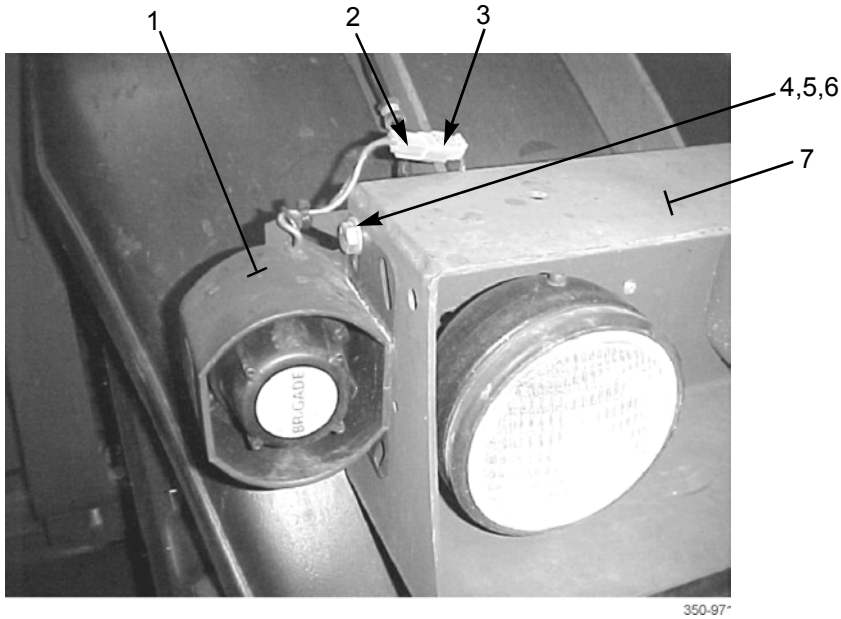
Master battery switch in OFF position

REMOVAL

NOTE

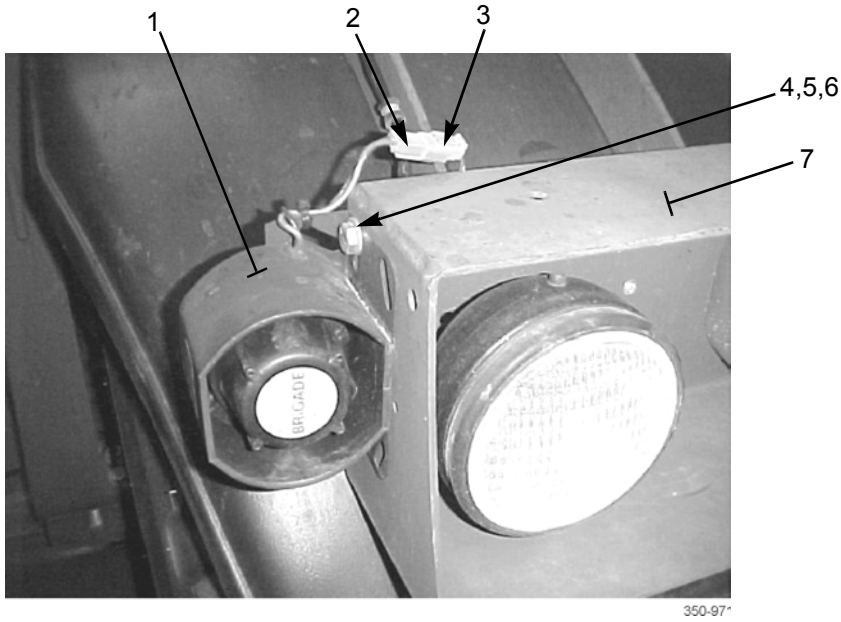
Remove and discard tiedown strap as necessary.

1. Disconnect connector (2) of backup alarm (1) from connector (3) of wiring harness.
2. Remove two locknuts (4), four washers (5), two screws (6), and backup alarm (1) from right-rear light bracket (7). Discard locknuts.



INSTALLATION

1. Install backup alarm (1) on right-rear light bracket (7) with two screws (6), four washers (5), and two new locknuts (4).
2. Connect connector (2) of backup alarm (1) to connector (3) of wiring harness.



3. Turn master battery switch to ON position.
4. Check operation of backup alarm (TM 10-3930-675-10).

END OF WORK PACKAGE

SEAT WARNING BUZZER REPLACEMENT 0106 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

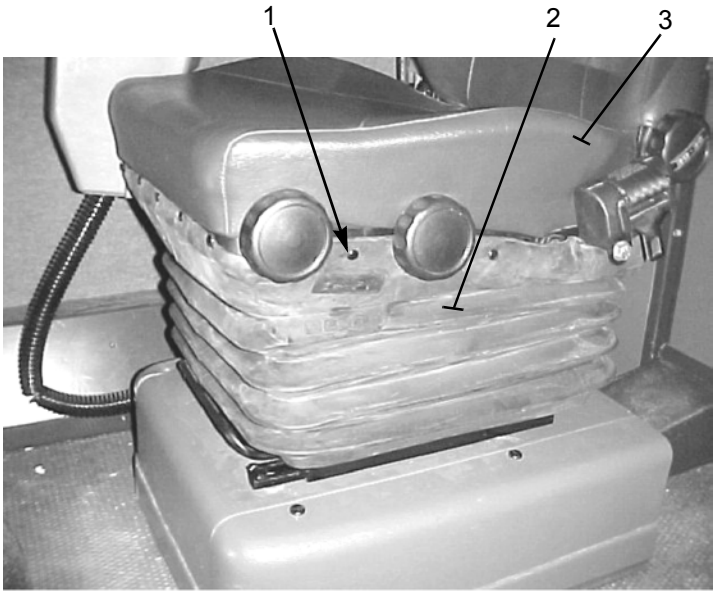
Master battery switch in OFF position

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

REMOVAL

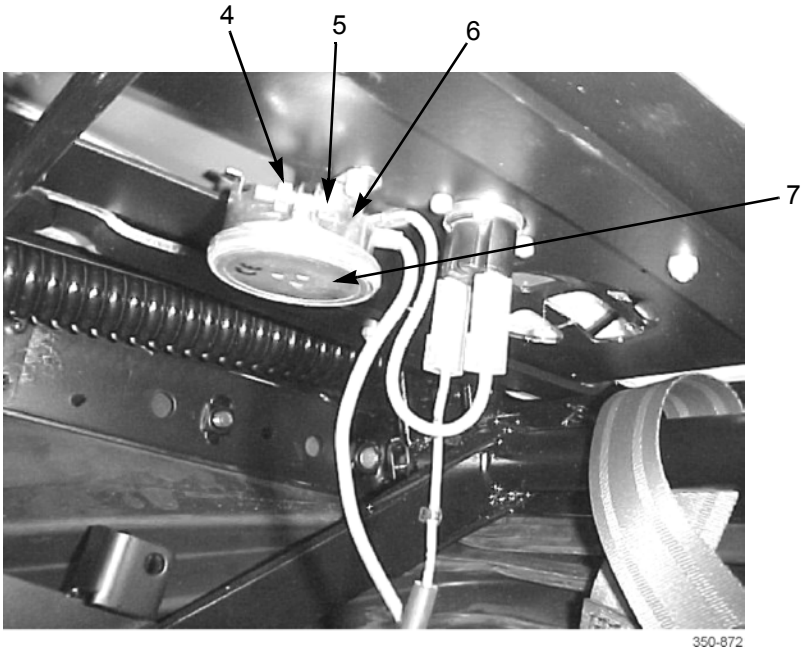
1. Remove approximately eight plastic rivets (1) from rubber bellows (2) of seat (3).
2. Pull rubber bellows (2) downward for access to underside of seat (3).



350-871

REMOVAL - CONTINUED

3. Loosen nut (4) and screw (5) of seat warning buzzer holder (6).
4. Pull seat warning buzzer (7) downward from seat warning buzzer holder (6).



NOTE

Tag wires for installation.

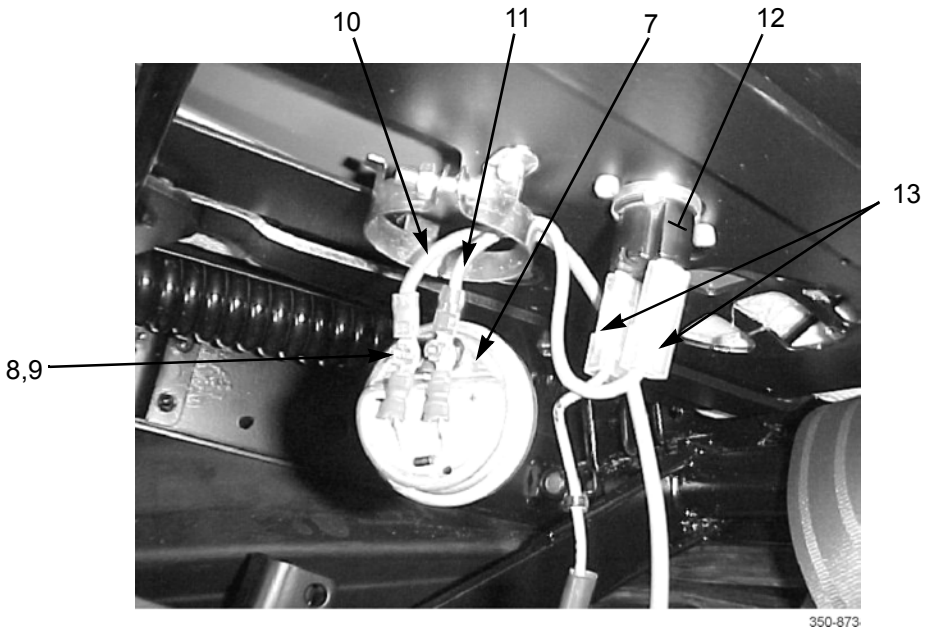
5. Remove two nuts (8) and washers (9) and disconnect two wires (10 and 11) from seat warning buzzer (7).

NOTE

Perform step 6 to disconnect two connectors from seat warning buzzer switch.

6. Disconnect two connectors (13) from seat warning buzzer switch (12).

REMOVAL - CONTINUED



INSTALLATION

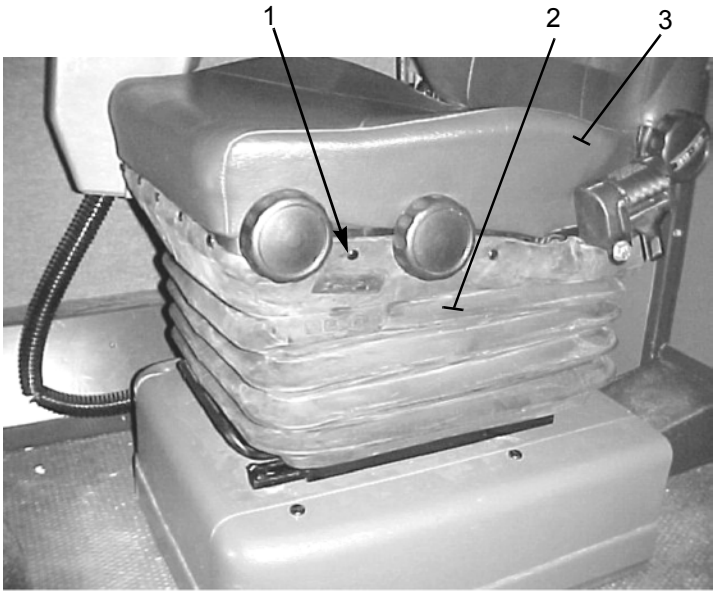
NOTE

Perform step 1 to connect two connectors to seat warning buzzer switch.

1. Connect two connectors (13) to seat warning buzzer switch (12).
2. Connect two wires (10 and 11) to seat warning buzzer (7) with two washers (9) and nuts (8).
3. Push seat warning buzzer (7) upward into seat warning buzzer holder (6).
4. Tighten screw (5) and nut (4) of seat warning buzzer holder (6).

INSTALLATION - CONTINUED

5. Pull rubber bellows (2) upward to seat (3).
6. Install rubber bellows (2) to seat (3) with approximately eight plastic rivets (1).



END OF WORK PACKAGE

BATTERY MAINTENANCE 0107 00

THIS WORK PACKAGE COVERS

Removal, Service, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Apron, utility, impermeable (Item 2, WP 0204 00)

Gloves, rubber (Item 10, WP 0204 00)

Goggles (Item 11, WP 0204 00)

Materials/Parts

Nut, lock (P/N 5957) (4)

References

TM 9-6140-200-14

Equipment Condition

Battery cables removed (WP 0108 00)



WARNING





- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes, or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or serious injury to personnel.
  a. **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.
  b. **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
  c. **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.
  d. **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

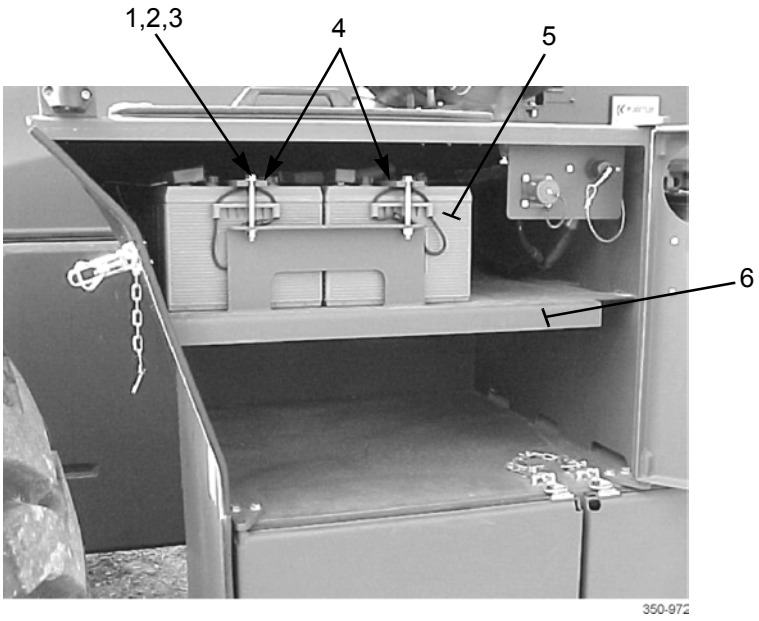
REMOVAL

1. Remove four locknuts (1), eight washers (2), four bolts (3), and two battery holddown straps (4) from across top of batteries (5). Discard locknuts.

NOTE

Note position of batteries in battery compartment for installation.

2. Remove four batteries (5) from battery compartment (6).



SERVICE

Service batteries in accordance with TM 9-6140-200-14.

INSTALLATION

1. Position four batteries (5) into battery compartment (6).
2. Install two battery holddown straps (4) across top of batteries (5) with four bolts (3), eight washers (2), and four new locknuts (1).
3. Install battery cables (WP 0108 00).

END OF WORK PACKAGE

BATTERY CABLES REPLACEMENT 0108 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Apron, utility, impermeable (Item 2, WP 0204 00)

Puller, battery terminal (Item 21, WP 0204 00)

Materials/Parts

Grease, GAA (Item 16, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Materials/Parts - Continued

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

WP 0109 00



WARNING





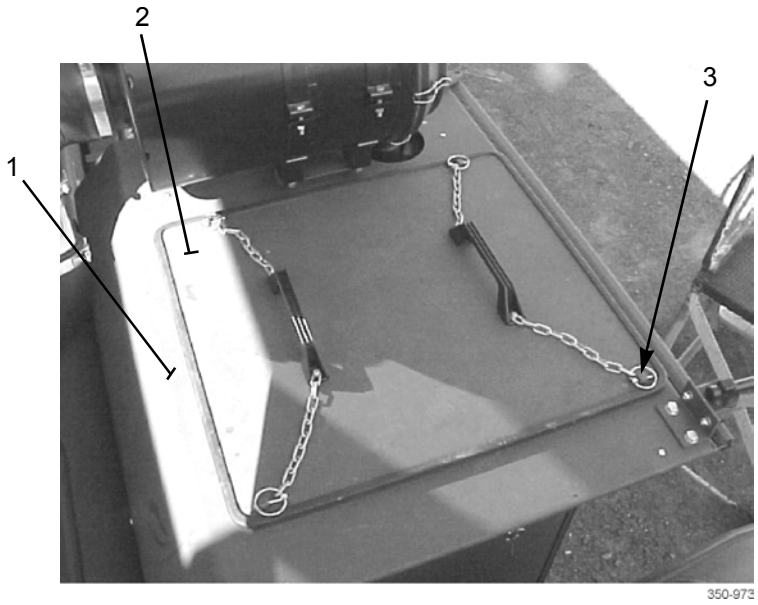
- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. Do not smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel.
- Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in death or serious injury to personnel.
  a. **Eyes.** Flush with cold water for no less than 15 minutes and seek medical attention immediately.
  b. **Skin.** Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
  c. **Internal.** If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Seek medical attention immediately.
  d. **Clothing/Equipment.** Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.

REMOVAL

NOTE

- Tag battery cables prior to removal to aid in installation.
- Cut tiedown straps and remove protective covering from battery cables as necessary.
- Perform steps 1 thru 5 only to disconnect battery cables when performing any electrical maintenance task on vehicle.

1. Remove each of four locking pins (3) from studs of battery compartment (1).
2. Remove battery compartment cover (2) from battery compartment (1).



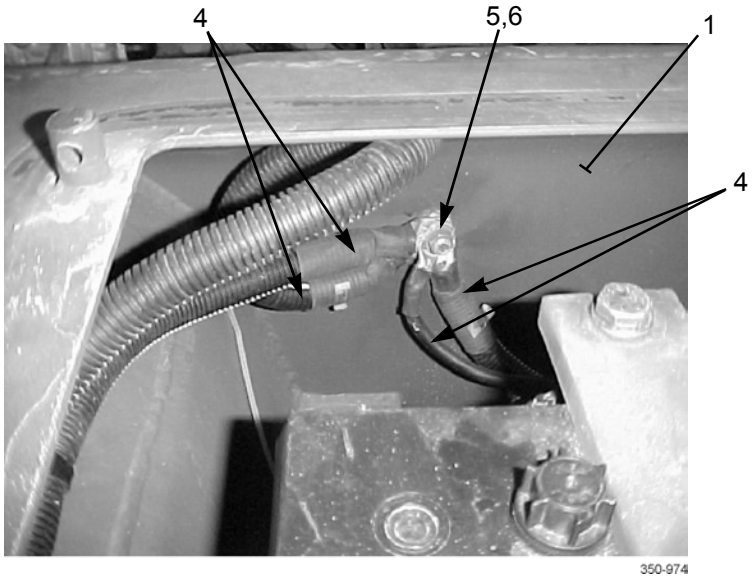


WARNING

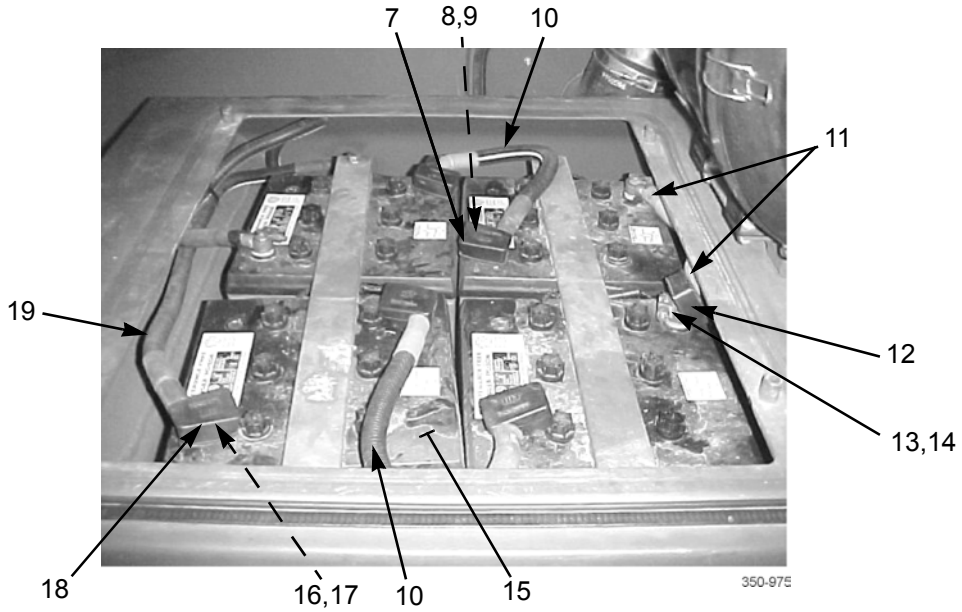
Disconnect NEGATIVE battery cables (19) first to avoid electrical shock.

3. At end of two NEGATIVE battery cables (19), raise plastic cap (18) and loosen nut (16) and screw (17) of battery cable clamp.
4. Disconnect NEGATIVE battery cable (19) from two of four batteries (15) and remove cables.

REMOVAL - CONTINUED



5. Remove locknut (5) and washer (6) and disconnect four NEGATIVE cables (4) from side of battery compartment (1).
6. At ends of two battery cables (10), raise plastic cap (7) and loosen nut (8) and screw (9) of battery cable clamp.
7. Remove two battery cables (10) from four batteries (15).
8. At end of two POSITIVE battery cables (11), raise plastic cap (12) and loosen nut (13) and screw (14) of battery cable clamp.
9. Disconnect POSITIVE battery cables (11) from two of four batteries (15).
10. Disconnect POSITIVE battery cables (11) from master battery switch (WP 0109 00) and remove.

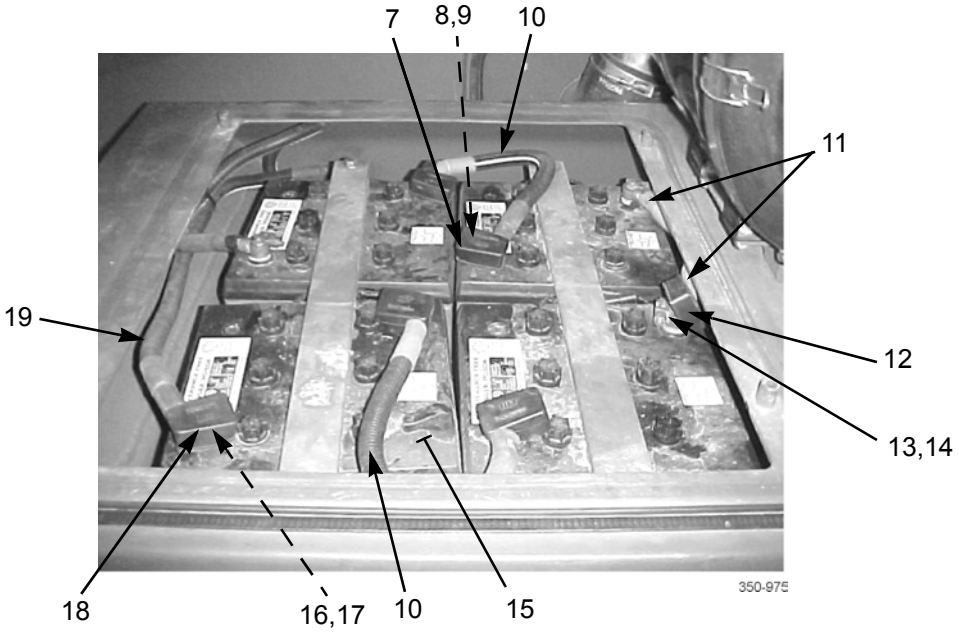


CLEANING AND INSPECTION

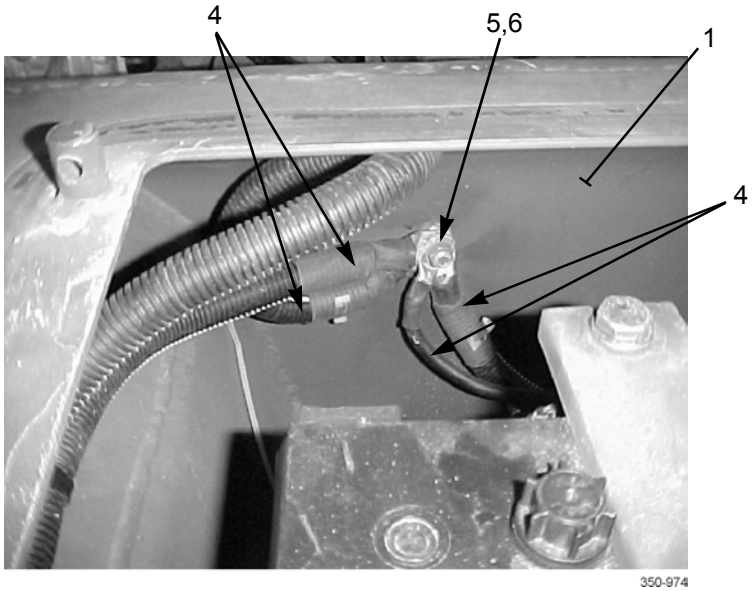
1. Clean batteries and battery posts with a wire brush. Wipe clean with rags.
2. Inspect for corrosion or other damage.
3. Apply a protective coating of grease to battery posts.

INSTALLATION

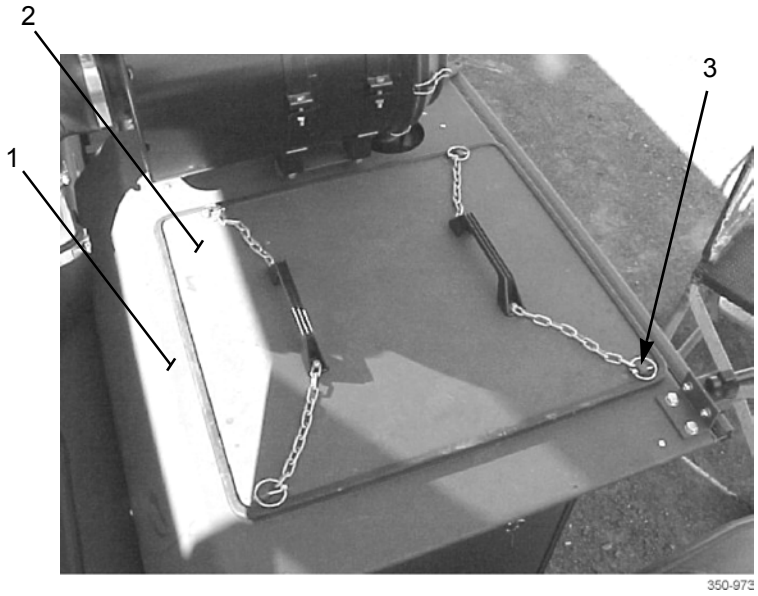
1. Connect two POSITIVE battery cables (11) to master battery switch (WP 0109 00).
2. Connect POSITIVE battery cables (11) to two of four batteries (15).
3. At end of two POSITIVE battery cables (11), raise plastic cap (12) and tighten screw (14) and nut (13) of battery cable clamp.
4. Install two battery cables (10) to four batteries (15).
5. At ends of two battery cables (10), raise plastic cap (7) and tighten screw (9) and nut (8) of battery cable clamp.
6. Connect four NEGATIVE cables (4) to side of battery compartment (1) with washer (6) and locknut (5).
7. Connect NEGATIVE battery cables (19) to two of four batteries (15).
8. At end of two NEGATIVE battery cables (19), raise plastic cap (18) and tighten screw (17) and nut (16) of battery cable clamp.



INSTALLATION - CONTINUED



9. Install battery compartment cover (2) to battery compartment (1).
10. Install each of four locking pins (3) to studs of battery compartment (1).



END OF WORK PACKAGE

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MASTER BATTERY SWITCH REPLACEMENT 0109 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Nut, self-locking (P/N 920076.001) (2)

Equipment Condition

Battery compartment door open

Battery cables disconnected (WP 0108 00)

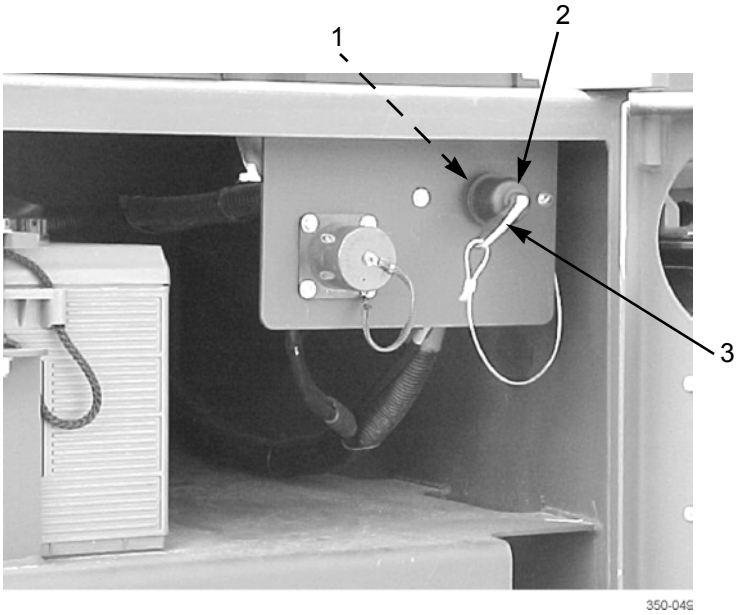


WARNING

Remove all jewelry, watches, rings, etc. prior to disconnecting cables from batteries or other electrical source. Items can come in contact with battery or electrical source and cause electrical shock. Failure to follow this warning may result in personnel injury or death.

REMOVAL

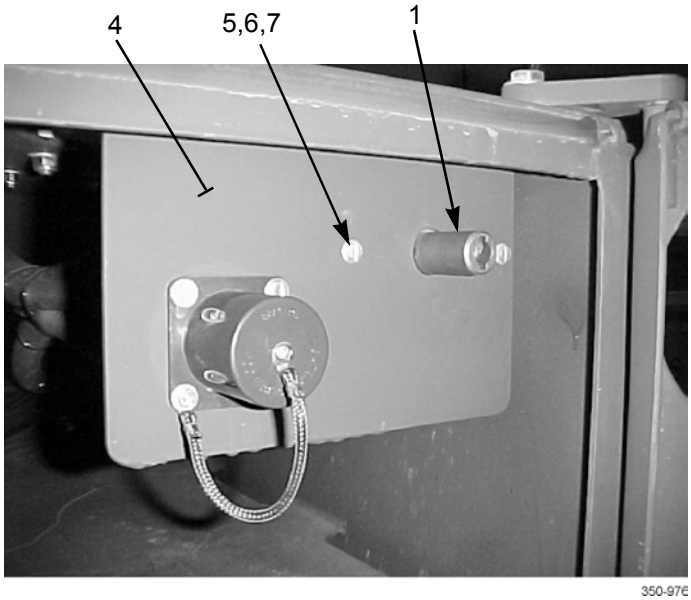
1. Remove handle (3) with boot (2) from master battery switch (1).



NOTE

Note orientation of master battery switch prior to removal to ensure correct installation.

2. Remove two locknuts (5), washers (6), screws (7), and master battery switch (1) from mounting plate (4). Discard locknuts.

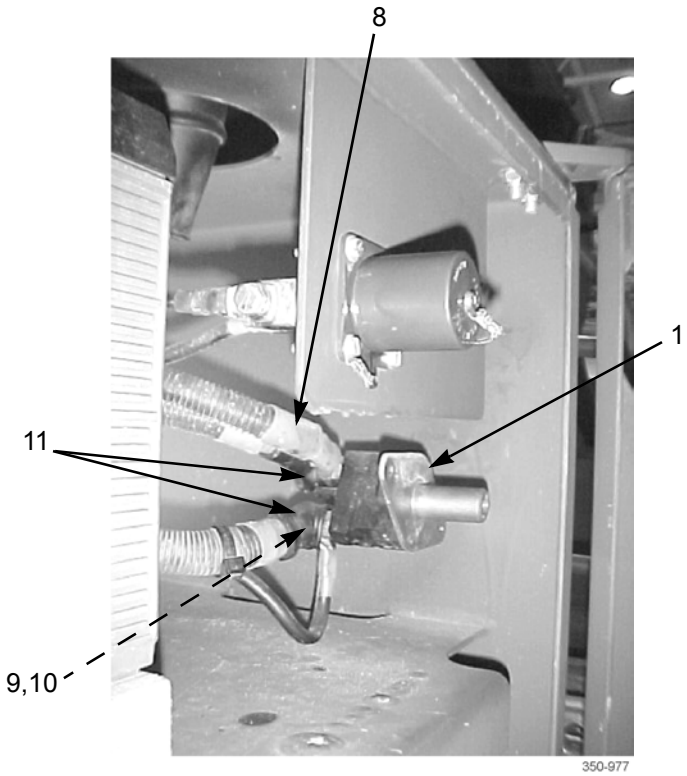


REMOVAL - CONTINUED

NOTE

Tag cables prior to disconnection to ensure proper connection on installation. Also note switch terminal to which cables are connected.

3. Pull back two rubber boots (11) and remove two nuts (9), washers (10), and four cables (8) from terminals of master battery switch (1).



INSTALLATION

1. Install four cables (8), two washers (10), and nuts (9) on terminals of master battery switch (1). Install two rubber boots (11).
2. Position master battery switch (1) with shaft thru opening in mounting plate (4). Install two screws (7), washers (6), and new locknuts (5).
3. Install boot (2) and handle (3) on shaft of master battery switch (1).
4. Connect battery cables (WP 0108 00).
5. Close battery compartment door.

END OF WORK PACKAGE

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SLAVE STARTING RECEPTACLE REPLACEMENT 0110 00

THIS WORK PACKAGE COVERS

Right Slave Starting Receptacle: Removal, Installation

Left Slave Starting Receptacle: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.001) (8)

Materials/Parts - Continued

Nut, lock (P/N 920076.003) (4)

Equipment Condition

Master battery switch in OFF position

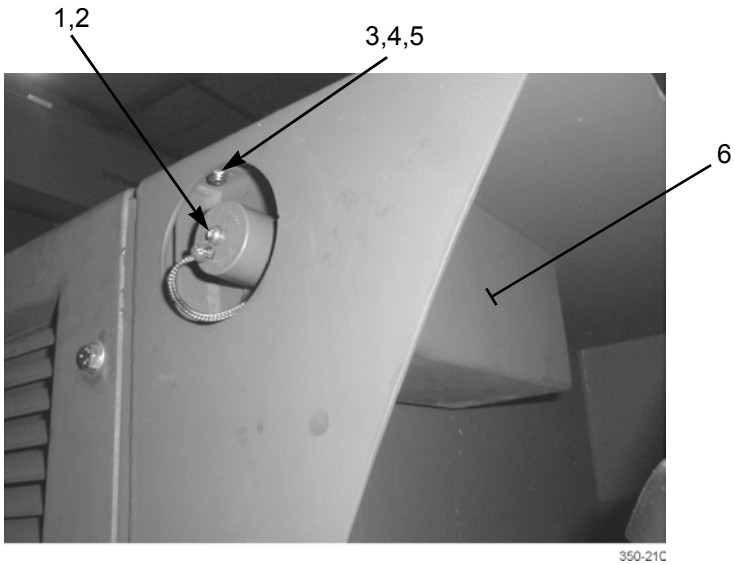
Battery cables disconnected (WP 0108 00)

NOTE

Tag cables to ensure correct installation.

RIGHT SLAVE STARTING RECEPTACLE REMOVAL

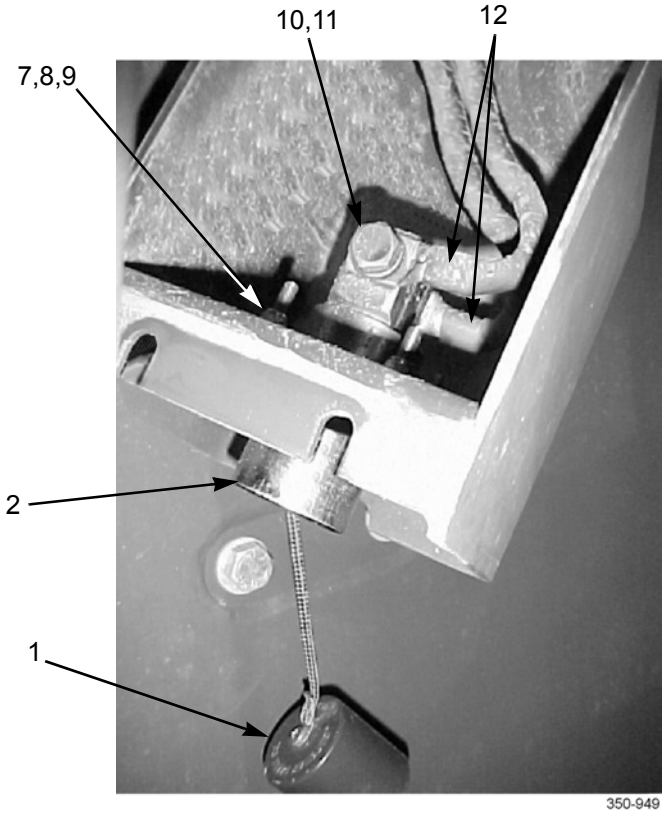
1. Remove cap (1) from slave starting receptacle (2).
2. Remove four locknuts (3), eight washers (4), four screws (5), and bracket (6) from vehicle. Pull bracket downward for access to rear of slave starting receptacle (2). Discard locknuts.



RIGHT SLAVE STARTING RECEPTACLE REMOVAL - CONTINUED

3. Remove four locknuts (7), eight washers (8), four screws (9), slave starting receptacle (2), and cord of cap (1) from bracket (6). Discard locknuts.

4. Remove two screws (10), lockwashers (11), and two cables (12) from rear of slave starting receptacle (2).



RIGHT SLAVE STARTING RECEPTACLE INSTALLATION

NOTE

New slave starting receptacle comes with new lockwashers.

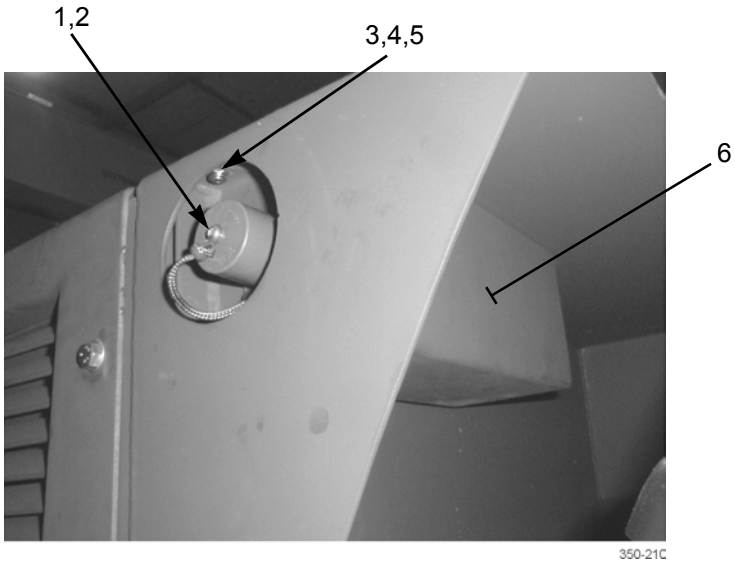
1. Position slave starting receptacle (2) to bracket (6) and install two cables (12) to rear of slave starting receptacle with two new lockwashers (11) and screws (10).

2. Install slave starting receptacle (2) and cord of cap (1) to bracket (6) with four screws (9), eight washers (8), and four new locknuts (7).

3. Install bracket (6) to vehicle with four screws (5), eight washers (4), and four new locknuts (3).

4. Install cap (1) on slave starting receptacle (2).

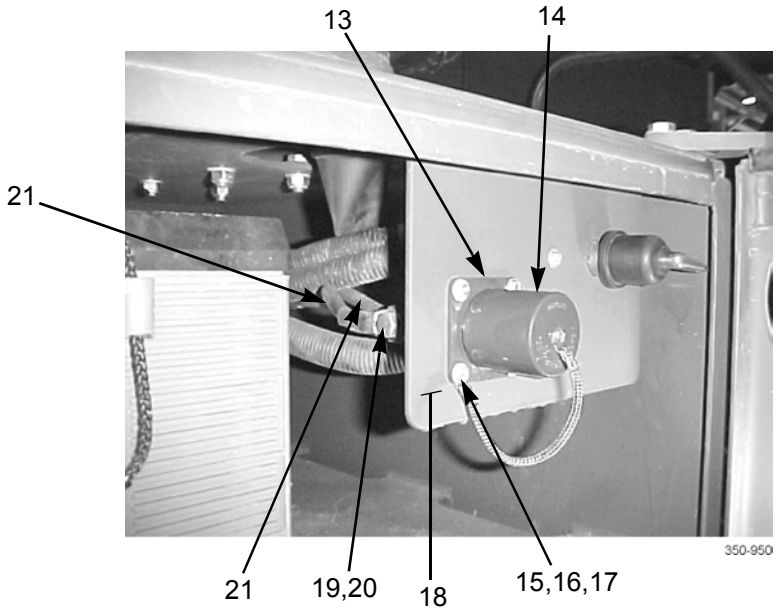
RIGHT SLAVE STARTING RECEPTACLE INSTALLATION - CONTINUED



5. Connect battery cables (WP 0108 00).

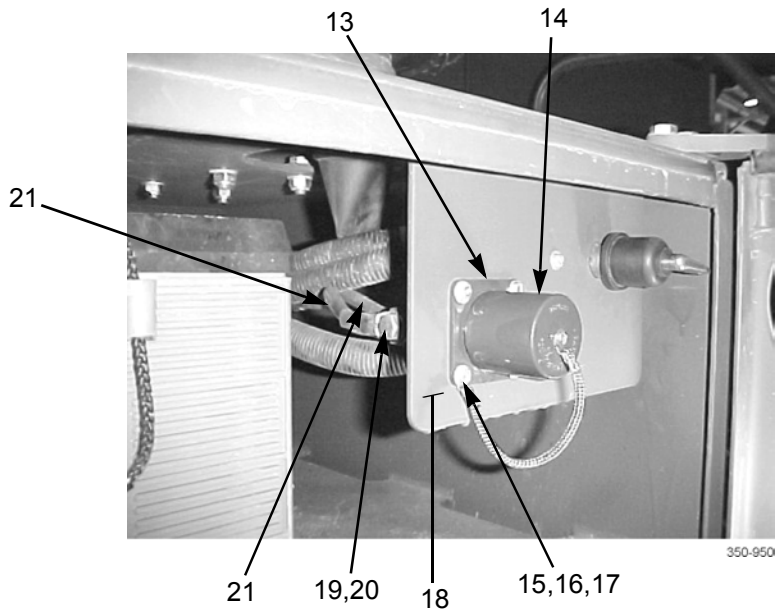
LEFT SLAVE STARTING RECEPTACLE REMOVAL

1. Remove two screws (19), lockwashers (20), and cables (21) from rear of slave starting receptacle (13). Discard lockwashers.
2. Remove cap (14) from slave starting receptacle (13).
3. Remove four locknuts (15), eight washers (16), four screws (17), slave starting receptacle (13), and cord of cap (14) from mounting plate (18). Discard locknuts.



LEFT SLAVE STARTING RECEPTACLE INSTALLATION

1. Install slave starting receptacle (13) and cord of cap (14) to mounting plate (18) with four screws (17), eight washers (16), and four new locknuts (15).
2. Install cap (14) on slave starting receptacle (13).
3. Connect two cables (21) to rear of slave starting receptacle (13) with two new lockwashers (20) and screws (19).



END OF WORK PACKAGE

ELECTRICAL GENERAL MAINTENANCE INSTRUCTIONS 0111 00

THIS WORK PACKAGE COVERS

Multiple-Pin Connector Identification Diagrams
Connector Repair
Sealed Connector Repair
Receptacle Connector Repair
Waterproof Connector Repair
Military Connector Repair
Ring Terminal Repair
Splicing Wires
Electrical Ground Points
Multimeter Usage
Relay Inspection and Test

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)
Heater, gun (Item 12, WP 0204 00)
Multimeter, digital (Item 18, WP 0204 00)
Tool kit, electrical connector repair (Item 30, WP 0204 00)

Materials/Parts

Cloth, abrasive (Item 5, WP 0203 00)
Detergent (Item 11, WP 0203 00)
Grease, electrically conductive (Item 17, WP 0203 00)
Tag, marker (Item 28, WP 0203 00)
Tubing, heat shrinkable (Item 30, WP 0203 00)

CAUTION

Splicing is prohibited on any wire within the RTCH electronic CAN-BUS system. Refer to WP 0199 00 for CAN-BUS system diagrams.

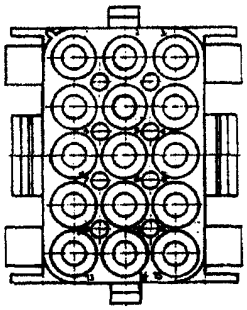
NOTE

Use electrically conductive grease on unprotected (exposed to weather) electrical connectors before connections are made.

MULTIPLE-PIN CONNECTOR IDENTIFICATION DIAGRAMS

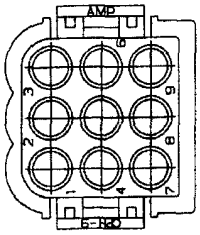
NOTE

The following diagrams illustrate typical multiple-pin connectors and identify pin numbers as viewed from wire side of connector.



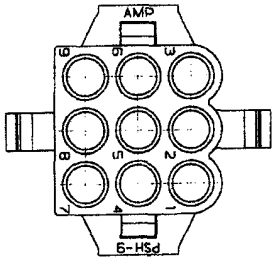
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15

350-1207



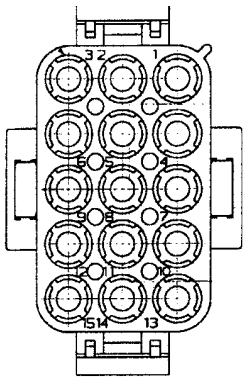
3	6	9
2	5	8
1	4	7

350-1208



9	6	3
8	5	2
7	4	1

350-1209



3	2	1
6	5	4
9	8	7
12	11	10
15	14	13

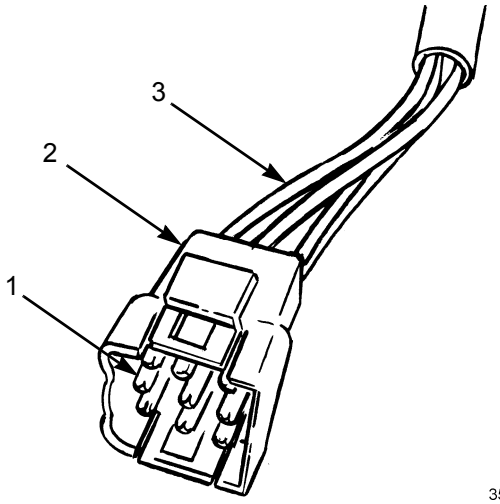
350-1210

CONNECTOR REPAIR

NOTE

- Perform following steps for each wire of connector.
- Tag wires for installation.

1. Using pin removal tool, position tool over pin (1) and push inward to retract two barbs of pin.
2. Remove wire (3) with pin (1) attached, from rear of connector (2).
3. If defective, remove pin (1) from wire (3) by cutting thru wire just behind pin.



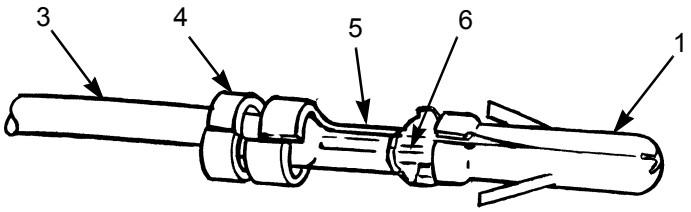
350-1061

4. Using wire stripping tool, strip insulation of wire (3) to expose proper length of metal strands (6).
5. Using crimping tool, securely crimp tabs (5) of pin (1) over metal strands (6) of wire (3).

NOTE

The other two tabs of pin may need to be crimped slightly in order to enter connector.

6. Using crimping tool, crimp tabs (4) at rear of pin (1) over insulation of wire (3).



350-1062

7. Push pin (1) into rear of connector (2) until fully seated.

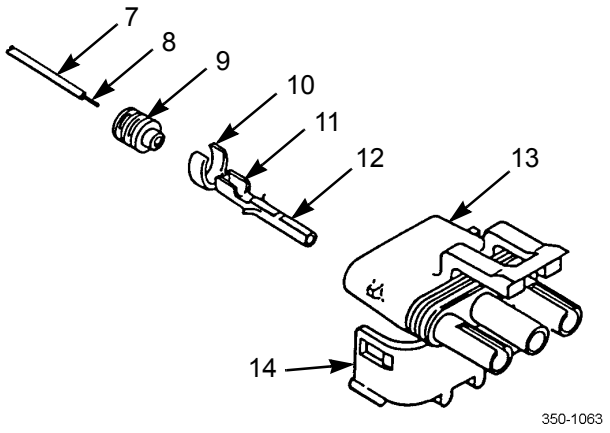
SEALED CONNECTOR REPAIR

1. Open hinged cover (14) of connector (13) for access to rear of connector.

NOTE

- Perform steps 2 thru 9 for each wire of connector.
- Tag wires for installation.

2. Using pin removal tool, position tool over pin (12) and push inward to retract two barbs of pin.
3. Remove wire (7), with pin (12) and seal (9) attached, from rear of connector (13).
4. If defective, remove pin (12) and seal (9) from wire (7) by cutting thru wire just behind seal.

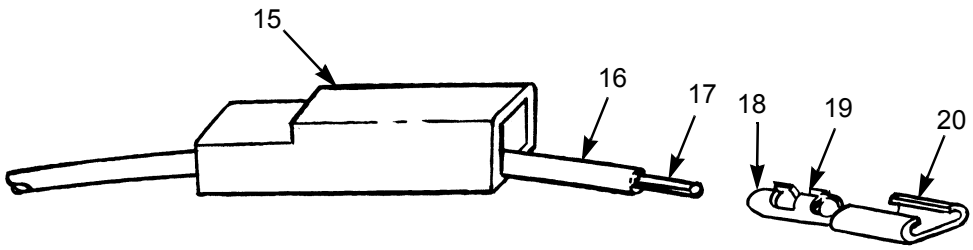


5. Position new seal (9) on wire (7).
6. Using wiring stripping tool, strip insulation of wire (7) to expose 1/8 in (3 mm) length of metal strands (8).
7. Using crimping tool, securely crimp tabs (11) of pin (12) over metal strands (8) of wire (7).
8. Slide seal (9) next to pin (12) and crimp tabs (10) of pin over end of seal.
9. Push pin (12) into rear of connector (13) until fully seated.
10. Close hinged cover (14) of connector (13).

RECEPTACLE CONNECTOR REPAIR

1. Using removal tool, insert tool into front of connector (15) and depress locking tab of receptacle (20).
2. Push wire (16), with receptacle (20) attached, thru front of connector (15).
3. If defective, remove receptacle (20) from wire (16) by cutting thru wire just behind receptacle.
4. Slide connector (15) back on wire (16).

RECEPTACLE CONNECTOR REPAIR - CONTINUED

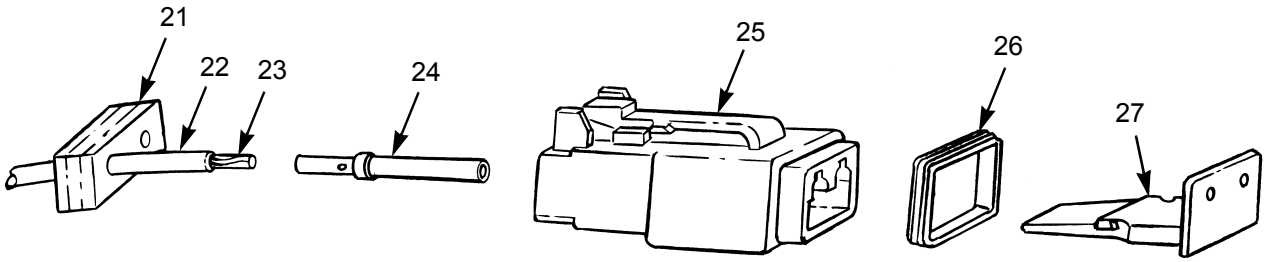


350-1064

5. Using wire stripping tool, strip insulation of wire (16) to expose ¼ in (6 mm) length of metal strands (17).
6. Using crimping tool, securely crimp tabs (19) of receptacle (20) over metal strands (17).
7. Using crimping tool, crimp tabs (18) of receptacle (20) over insulation of wire (16).
8. Slide connector (15) forward over receptacle (20) until locking tab of receptacle snaps into place.

WATERPROOF CONNECTOR REPAIR

1. Remove end cover (27) and gasket (26) from front of connector (25).
2. Remove seal (21) from rear of connector (25) and slide seal back on wire (22).



350-1065

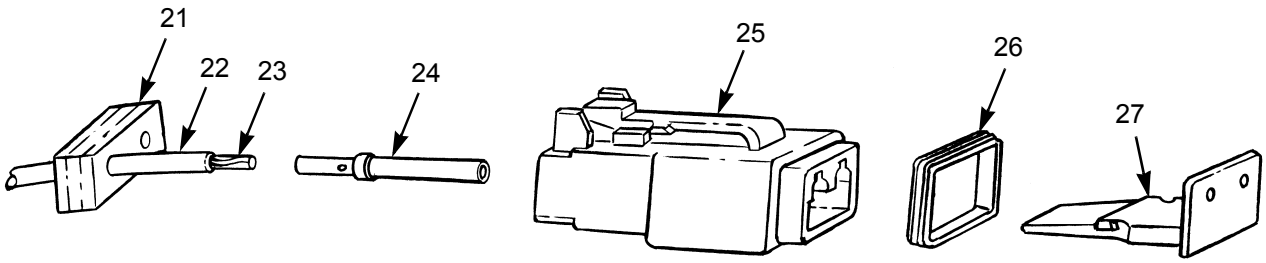
NOTE

- Perform steps 3 thru 9 for each wire of connector.
- Tag wires for installation.

3. Using pin removal tool, insert tool into front of connector (25) and depress locking tab of connector.
4. Remove wire (22) with pin (24) from rear of connector (25).
5. If defective, remove pin (24) from wire (22) by cutting thru wire just behind pin.
6. Using wire stripping tool, strip insulation of wire (22) to expose ¼ in (6 mm) length of metal strands (23).

WATERPROOF CONNECTOR REPAIR - CONTINUED

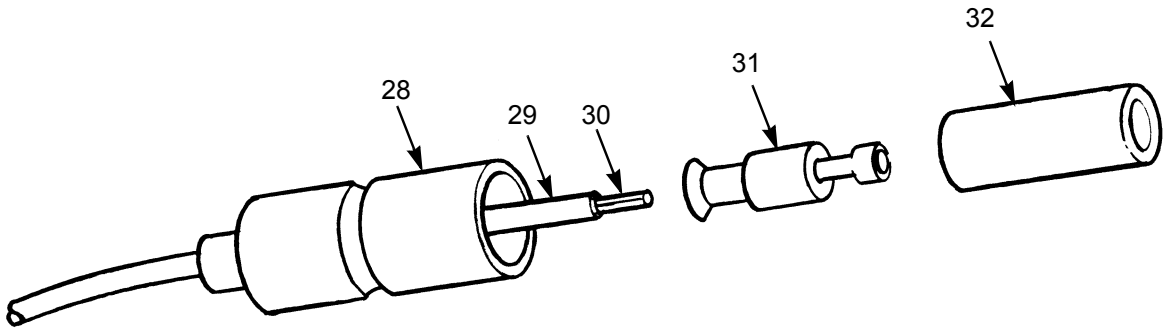
7. Insert metal strands (23) of wire (22) fully into rear of pin (24).
8. Using crimping tool, securely crimp pin (24) to metal strands (23) of wire (22).
9. Push pin (24) into rear of connector (25) until fully seated.
10. Install seal (21) to rear of connector (25).
11. Install gasket (26) and end cover (27) to front of connector (25).



350-1065

MILITARY CONNECTOR REPAIR

1. Slide shell (28) back on wire (29) to expose sleeve (32).
2. Remove sleeve (32) from terminal (31) by pulling sleeve forward.
3. If defective, remove terminal (31) from wire (29) by cutting thru wire just behind terminal.



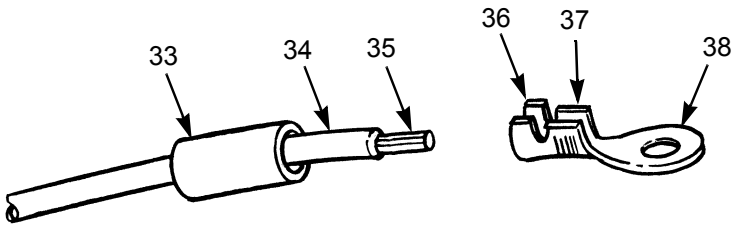
350-1066

4. Using wire stripping tool, strip insulation of wire (29) to expose length of metal strands (30) equal to depth of terminal (31).
5. Using crimping tool, securely crimp terminal (31) to metal strands (30) of wire (29).
6. Install sleeve (32) to terminal (31) by pushing sleeve over front of terminal until fully seated.
7. Slide shell (28) up wire (29) and over sleeve (32).

RING TERMINAL REPAIR

1. Remove ring terminal (38) from wire (34) by cutting thru wire just behind heat shrink tubing (33).

RING TERMINAL REPAIR - CONTINUED



350-1067

2. Cut heat shrink tubing (33) to length sufficient to cover tabs (36 and 37) of ring terminal (38) and ¼ in (6 mm) of wire (34).
3. Slide heat shrink tubing (33) back on wire (34).
4. Using wire stripping tool, strip insulation of wire (34) to expose proper length of metal strands (35).
5. Using crimping tool, securely crimp tabs (37) of ring terminal (38) over metal strands (35).
6. Using crimping tool, crimp tabs (36) of ring terminal (38) over insulation of wire (34).
7. Slide heat shrink tubing (33) over tabs (36 and 37) of ring terminal (38).
8. Using heater gun, apply heat to heat shrink tubing (33) until tubing snugly conforms to ring terminal (38) and insulation of wire (34).

SPLICING WIRES

NOTE

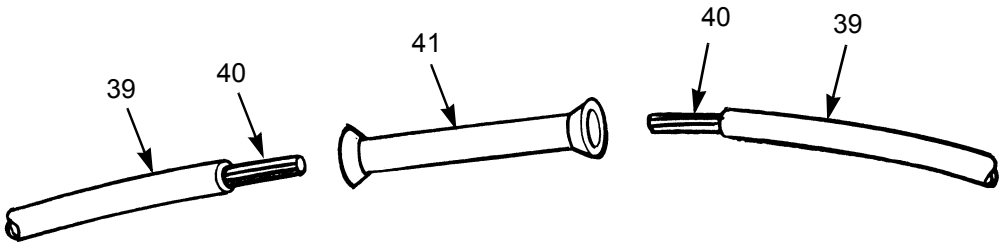
The selection of crimping tool and type of splice connectors is optional. High quality splice connectors can be expected to last the life of the vehicle.

1. Inspect each end of wire (39). Trim insulation and metal strands (40) of wire back, as necessary, to ensure integrity of wire.
2. Using wire stripping tool, strip each end of wire (39) to expose length of metal strands (40) to suit type of splice connector (41) used.

NOTE

Perform steps 3 and 4 at each end of splice connector.

3. Insert metal strands (40) of wire (39) fully into splice connector (41).
4. Using crimping tool, securely crimp splice connector (41) to metal strands (40) of wire (39).



350-1068

ELECTRICAL GROUND POINTS

Many electrical problems are the result of poor ground connections. Ensure that ground connections are good by performing the following steps:



WARNING

Although master battery switch must be ON to test electrical circuit voltage, turn master battery switch to OFF position before performing resistance tests or replacing parts. Failure to follow this warning may result in injury to personnel and damage to parts or equipment.

a. Remove screw, lockwasher, nut, etc. connecting ground wire terminal to vehicle ground point.
b. If necessary, clean mounting hardware, wire terminal, and ground point with detergent and a scrub brush.
c. Remove any rust or corrosion from ground point with a wire brush and abrasive cloth.
d. Replace defective mounting hardware and wire terminal as necessary.
e. Install wire terminal to ground point with screw, lockwasher, nut, etc. and tighten securely.

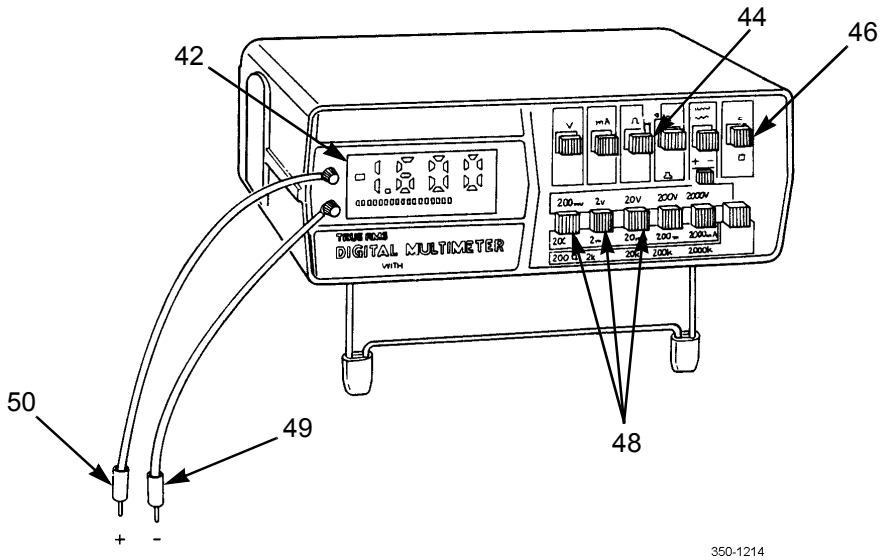
MULTIMETER USAGE

1. **General**. The digital multimeter (Item 18, WP 0204 00) is used to troubleshoot the electrical system of the vehicle. the multimeter's ohms scale is used to test for continuity, shorts, and resistance and the voltmeter scale is used to test voltage levels at any point in the electrical system.
2. **Continuity Tests**. Continuity tests are performed to check for breaks in a circuit (such as a fuse, switch, light bulb or electrical cable).

NOTE

If digital readout will not zero properly, replace batteries and repeat zeroing procedure. If digital readout will not zero after batteries have been replaced, notify your supervisor.

a. **Zero the Multimeter**.
   (1) Set multimeter ON/OFF switch (46) to ON position.
   (2) Press OHMS FUNCTION switch (44).
   (3) Press LOWEST VOLTAGE/OHMS selector switch (48).
   (4) Touch black and red probes (49 and 50) together and check for a zero reading on digital readout (42).



MULTIMETER USAGE - CONTINUED

CAUTION

Before performing a continuity test, always turn master battery switch to OFF position and disconnect circuit to be tested. Failure to follow this caution may damage multimeter.

b. **Testing for Continuity**.

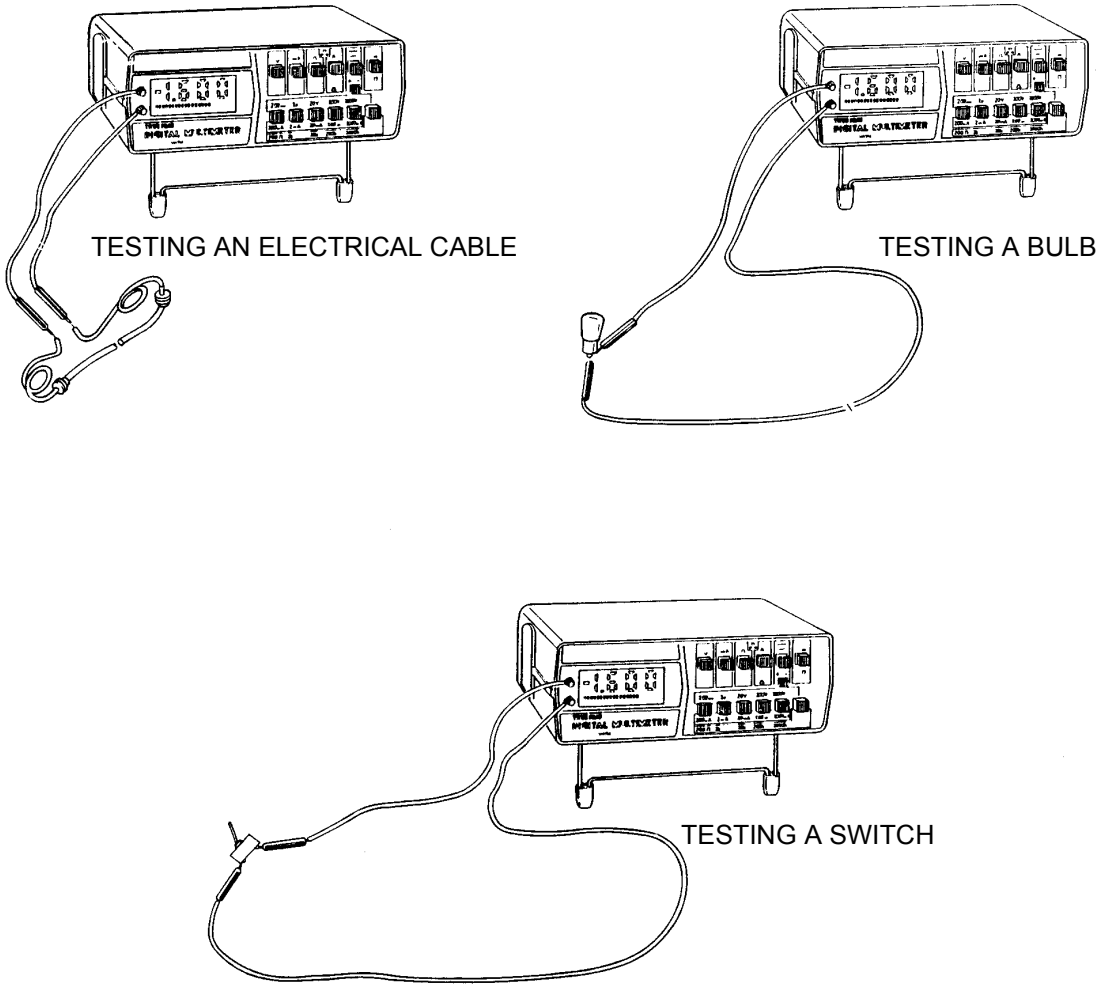
(1) Zero multimeter.

(2) Connect black and red probes (49 and 50) to both terminals to circuit being tested.

(3) Read digital readout (42) and interpret results as follows:

(a) If digital readout indicates 0 (zero), circuit has continuity.

(b) If digital readout indicates resistance, circuit is open.

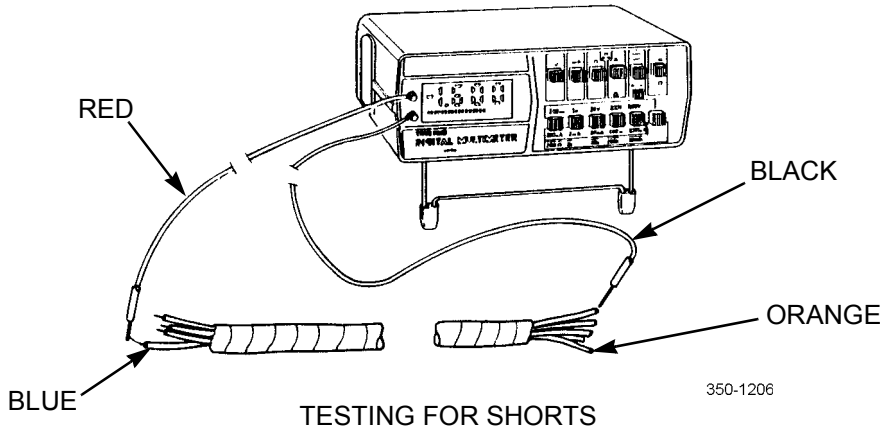


MULTIMETER USAGE - CONTINUED

CAUTION

Before performing a continuity test, always turn master battery switch to OFF position and disconnect circuit to be tested. Failure to follow this caution may damage multimeter.

c. **Testing for Shorts**. A short (or short circuit) occurs when two circuits that should not be connected have metal-to-metal contact with each other. A short also occurs when a circuit that should not touch ground has metal-to-metal contact with ground.



TESTING FOR SHORTS

(1) Zero multimeter.

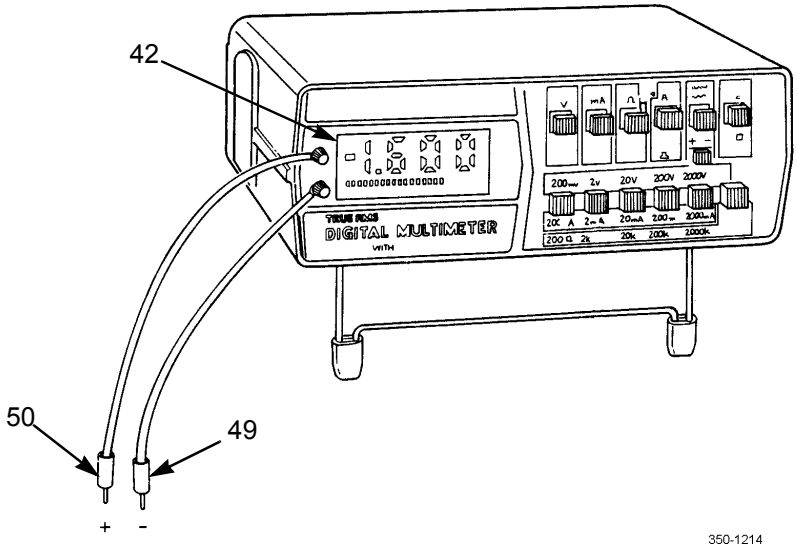
(2) Connect black probe (49) to one circuit and red probe (50) to either a ground or another circuit.

(3) Read digital readout (42) and interpret results as follows:

(a) If digital readout indicates 0 (zero), circuits are shorted or circuit is grounded if testing to ground.

(b) If digital readout does not indicate 0 (zero), circuits are not shorted.

(c) If digital readout jumps or flickers, circuits are shorted or grounded intermittently.



MULTIMETER USAGE - CONTINUED

CAUTION

Before performing a continuity test, always turn master battery switch to OFF position and disconnect circuit to be tested. Failure to follow this caution may damage multimeter.

d. **Testing for Resistance**. Allowable resistance readings depend on circuit being tested. Refer to the particular section dealing with that circuit or component for allowable readings.

(1) Zero multimeter.

(2) Press OHMS FUNCTION switch (44).

(3) Press LOWEST VOLTAGE/OHMS selector switch (48). If test calls for ohms range other than RX1, set RANGE SELECTOR switch (47) to required range.

(4) Connect black and red probes (49 and 50) across circuit to be tested.

(5) Read digital readout (42) and interpret results as circuit resistance.

3. **Measuring DC Voltage**.

a. Set multimeter ON/OFF switch (46) to ON position.

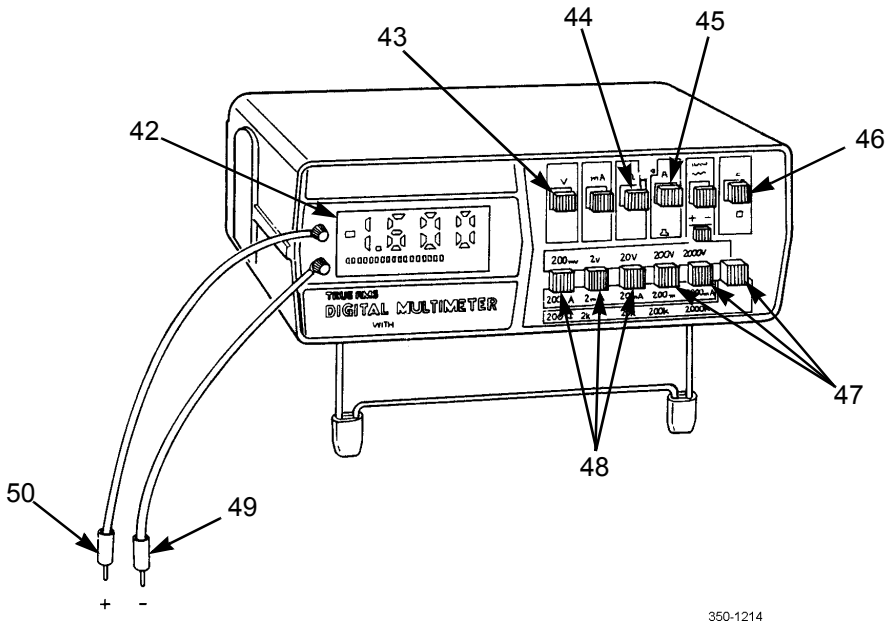
b. Press VOLTS FUNCTION switch (43).

c. Set AC/DC selector switch (45) to DC.

d. Select and press LOWEST VOLTAGE/OHMS selector switch (48) for voltage range higher than volts to be measured.

e. Connect red probe (50) to positive (+) side of circuit and black probe (49) to negative (-) side of circuit.

f. Read digital readout (42) and interpret results as DC voltage in circuit being tested.



RELAY INSPECTION AND TEST

1. **Inspecting Relays.**
   a. Check for bent or damaged pins.
   b. Check for burned or damaged relay case.
2. **Testing Relays.**

NOTE

When testing relays, always refer to the circuit diagram printed or stamped on relay case.

   a. Using a multimeter, check for continuity across relay coil.
   b. Using a multimeter, check open or closed contacts within relay.

END OF WORK PACKAGE

TRANSMISSION AND ACCESSORY CONTROL LEVERS REPLACEMENT 0112 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

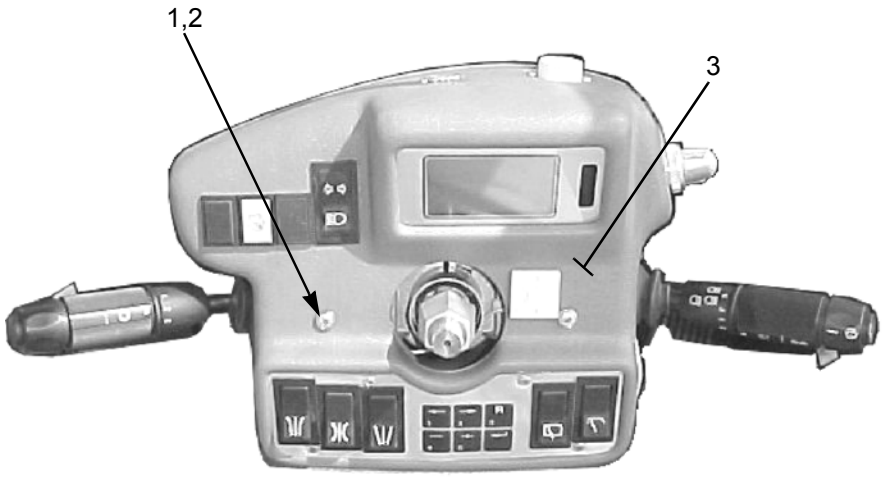
Equipment Condition

Steering wheel removed (WP 0129 00)

Master battery switch in OFF position

REMOVAL

1. Remove eight screws (1) and washers (2) and separate two halves of plastic housing (3).



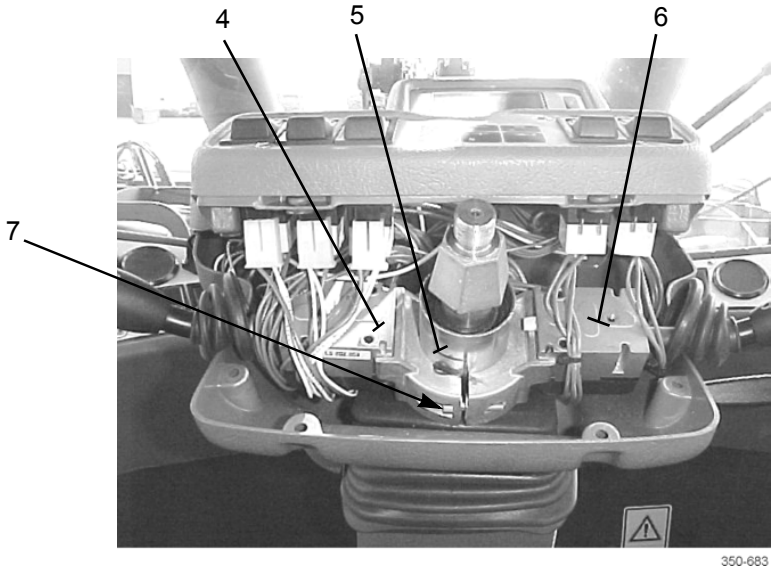
350-006

REMOVAL - CONTINUED

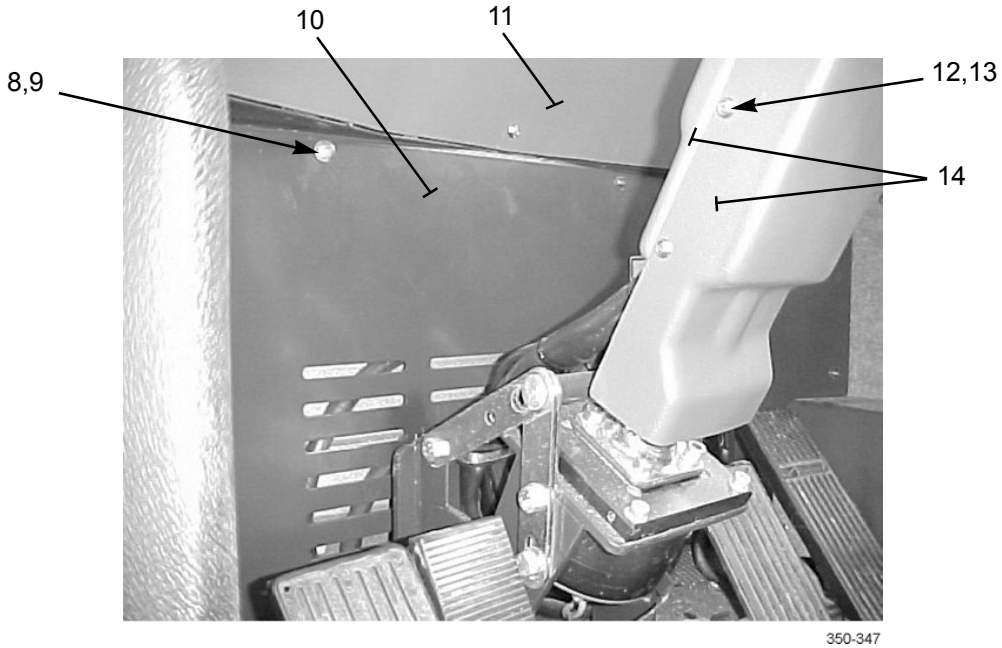
NOTE

Mark position of transmission control lever and accessory control lever on steering column for installation.

2. Remove two screws (7) to free transmission control lever (4) and accessory control lever (6) from steering column (5).



3. Remove seven screws (12), washers (13), and two halves of steering column housing (14).
4. Remove four screws (8), washers (9), and lower panel (10) from instrument panel (11).



REMOVAL - CONTINUED

NOTE

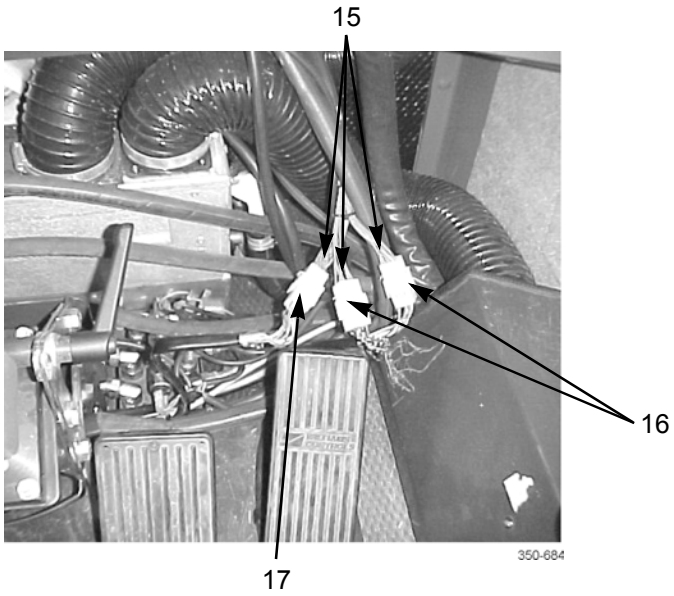
- Perform steps 5 and 6 to remove transmission control lever.
- Remove and discard tiedown straps as necessary.

5. Disconnect connector (17) of transmission control lever (4) from instrument panel wiring harness (15).
6. Remove transmission control lever (4) from steering column (5).

NOTE

- Perform steps 7 and 8 to remove accessory control lever.
- Remove and discard tiedown straps as necessary.

7. Disconnect two connectors (16) of accessory control lever (6) from instrument panel wiring harness (15).
8. Remove accessory control lever (6) from steering column (5).



INSTALLATION

NOTE

- Perform steps 1 and 2 to install accessory control lever.
- Install new tiedown straps as necessary.

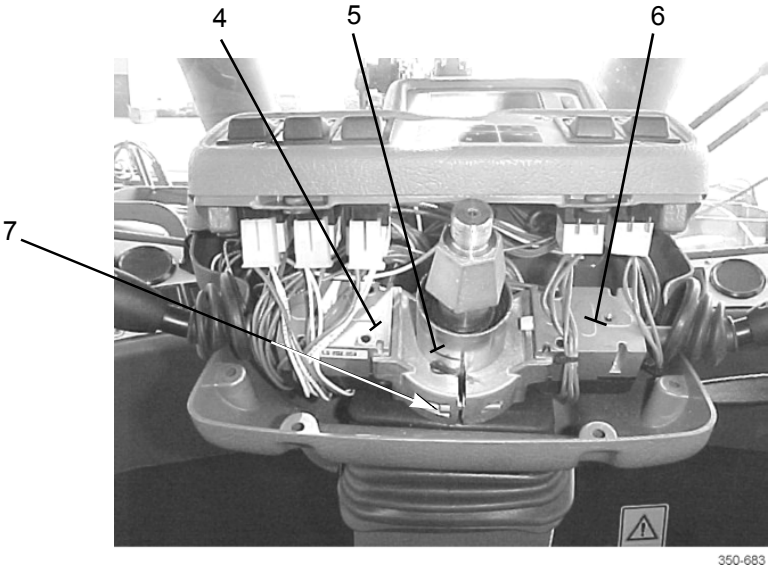
1. Install accessory control lever (6) to steering column (5).
2. Connect two connectors (16) of accessory control lever (6) to instrument panel wiring harness (15).

INSTALLATION - CONTINUED

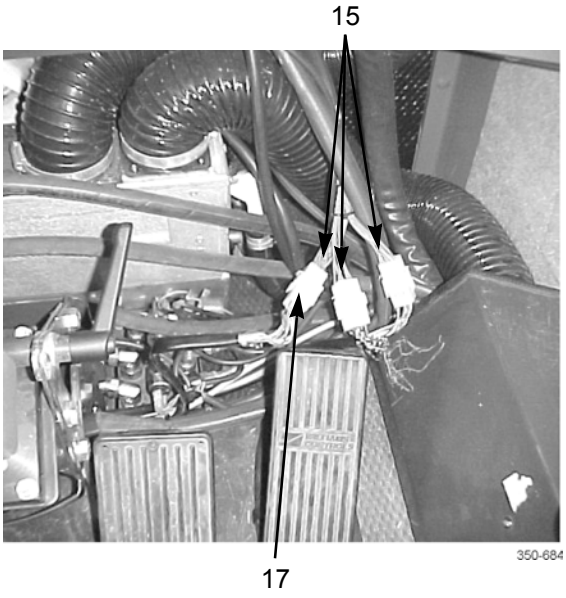
NOTE

- Perform steps 3 and 4 to install transmission control lever.
- Install new tiedown straps as necessary.

3. Install transmission control lever (4) and accessory control lever (6) to steering column (5), in position marked, with two screws (7). Tighten screws.

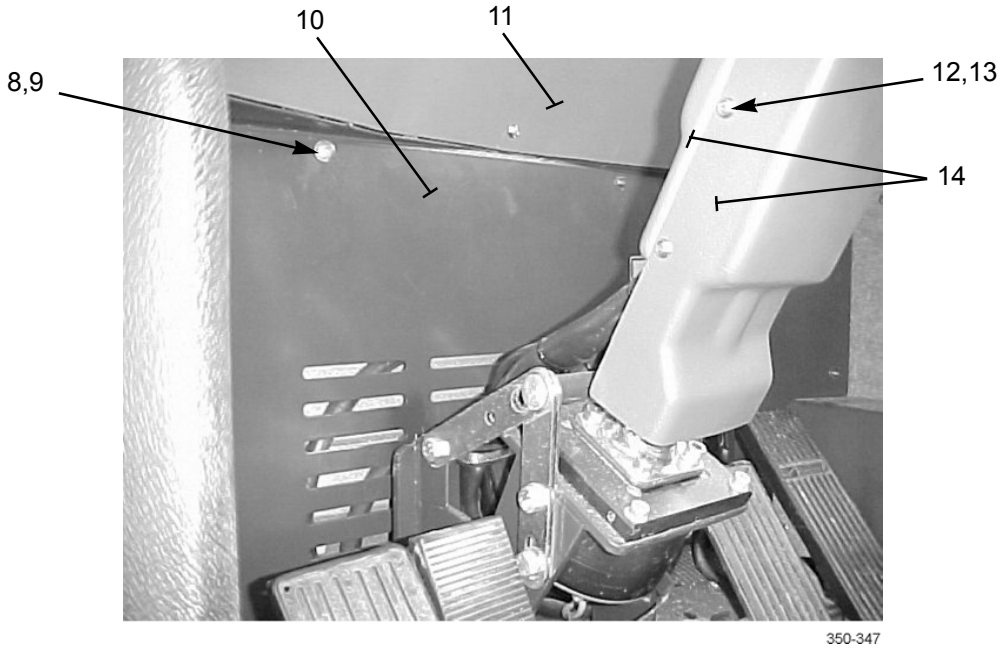


4. Connect connector (17) of transmission control lever (4) to instrument panel wiring harness (15).

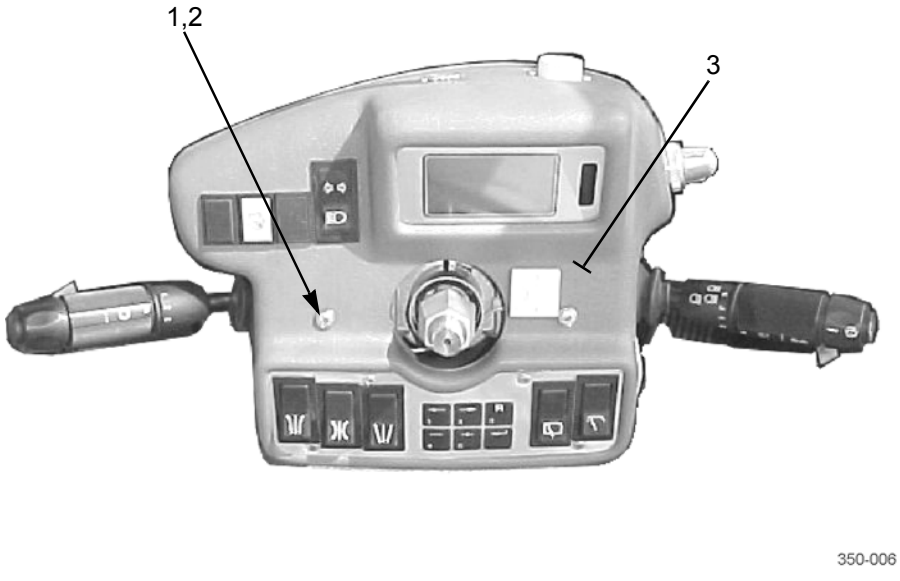


INSTALLATION - CONTINUED

5. Position lower panel (10) to instrument panel (11) and install four washers (9) and screws (8).



6. Install two halves of steering column housing (14) with seven washers (13) and screws (12).
7. Install two halves of plastic housing (3) together with eight washers (2) and screws (1).



8. Install steering wheel (WP 0129 00).

END OF WORK PACKAGE

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TRANSMISSION OIL FILTER AND OIL COOLER HOSES AND FITTINGS REPLACEMENT 0113 00

THIS WORK PACKAGE COVERS

Transmission-to-Oil Cooler Hoses: Removal, Installation

Transmission-to-Oil Filter Hoses: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Sealant, pipe (Item 23, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Materials/Parts - Continued

Tag, marker (Item 28, WP 0203 00)

Seal, o-ring (P/N 920798.0002) (2)

References

LO 10-3930-675-12

Equipment Condition

Cab in transport position (TM 10-3930-675-10)

Engine cover removed (WP 0143 00)

Transmission access covers removed (WP 0135 00)

TRANSMISSION-TO-OIL COOLER HOSES REMOVAL



WARNING

At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.

NOTE

Tag all transmission hydraulic oil hoses.

TRANSMISSION OIL FILTER AND OIL COOLER HOSES AND FITTINGS REPLACEMENT - CONTINUED **0113 00**

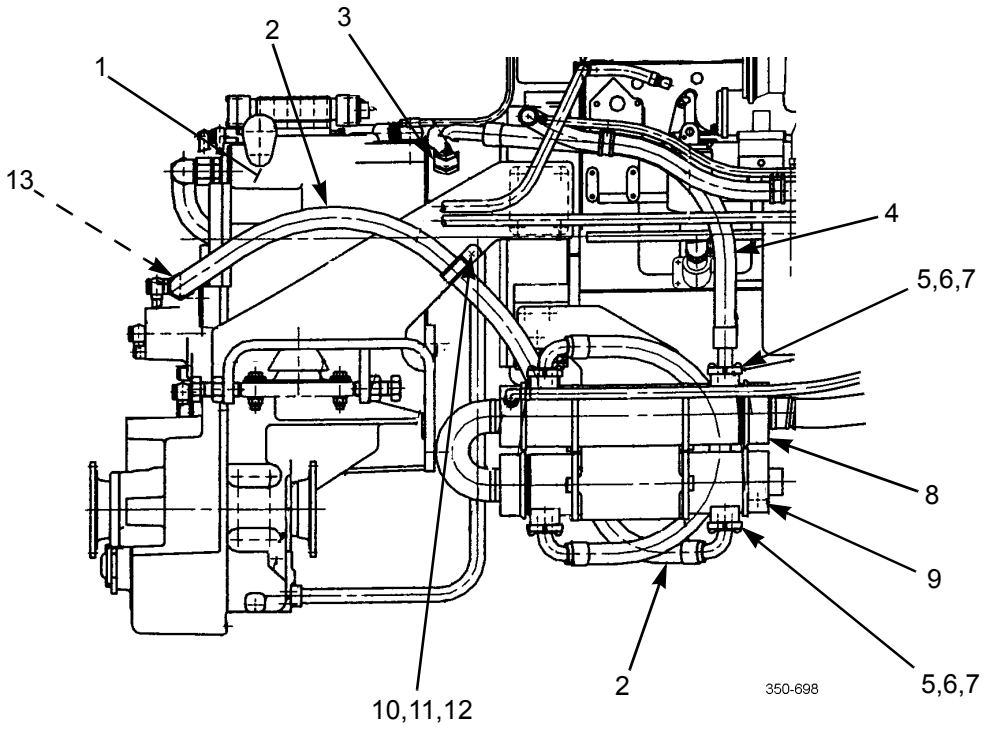
TRANSMISSION-TO-OIL COOLER HOSES REMOVAL - CONTINUED

1. Trace and tag hose (4) from transmission oil cooler upper unit (8) to transmission (1).
2. Trace and tag hose (2) from transmission oil cooler lower unit (9) to transmission (1).

WARNING

Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

3. Position suitable container to catch lubricating oil remaining in hoses (2 and 4).
4. Remove four screws (5), flange (6), o-ring seal (7), and disconnect hose (4) from transmission oil cooler upper unit (8). Discard o-ring seal.
5. Disconnect opposite end of hose (4) from transmission adapter fitting (3). Remove hose.
6. If damaged, remove adapter fitting (3) from transmission (1).
7. Remove four screws (5), flange (6), o-ring seal (7), and disconnect hose (2) from transmission oil cooler lower unit (9). Discard o-ring seal.
8. Remove screw (10), washers (11), and hose clamp (12) securing hose (2).
9. Disconnect opposite end of hose (2) from transmission adapter fitting (13). Remove hose.
10. If damaged, remove adapter fitting (13) from transmission (1).



TRANSMISSION-TO-OIL COOLER HOSES INSTALLATION

1. If removed, apply pipe sealant to threads of adapter fitting (13) and install fitting in transmission (1).
2. Connect hose (2) to adapter fitting (13) and route hose to transmission oil cooler lower unit (9).
3. Secure hose (2) to transmission oil cooler lower unit (9) with new o-ring seal (7), flange (6), and four screws (5).
4. Install hose clamp (12), screw (10), and washers (11) to secure hose (2).
5. If removed, apply pipe sealant to adapter fitting (3) and install fitting in transmission (1).
6. Connect hose (4) to adapter fitting (3) and route hose to transmission oil cooler upper unit (8).
7. Secure hose (4) to transmission oil cooler upper unit (8) with new o-ring seal (7), flange (6), and four screws (5).
8. Check transmission oil level and add oil as needed (LO 10-3930-675-12).
9. Start engine (TM 10-3930-675-10) and check for leaks.
10. Install transmission access covers (WP 0135 00).
11. Install engine cover (WP 0143 00).
12. Return cab to operational position (TM 10-3930-675-10).

TRANSMISSION-TO-OIL FILTER HOSES REMOVAL



WARNING

At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.

NOTE

Tag all transmission hydraulic oil hoses.

TRANSMISSION OIL FILTER AND OIL COOLER HOSES AND FITTINGS REPLACEMENT - CONTINUED **0113 00**

TRANSMISSION-TO-OIL FILTER HOSES REMOVAL - CONTINUED

1. Trace and tag three hoses (14, 16, and 17) from transmission oil filter head (22) to transmission (1).
2. Cut tiedown straps as needed to release hoses (14, 16, and 17).
3. Remove screw (19), nut (20), washer (21), and two clamps (18) from hoses (14 and 16).

WARNING

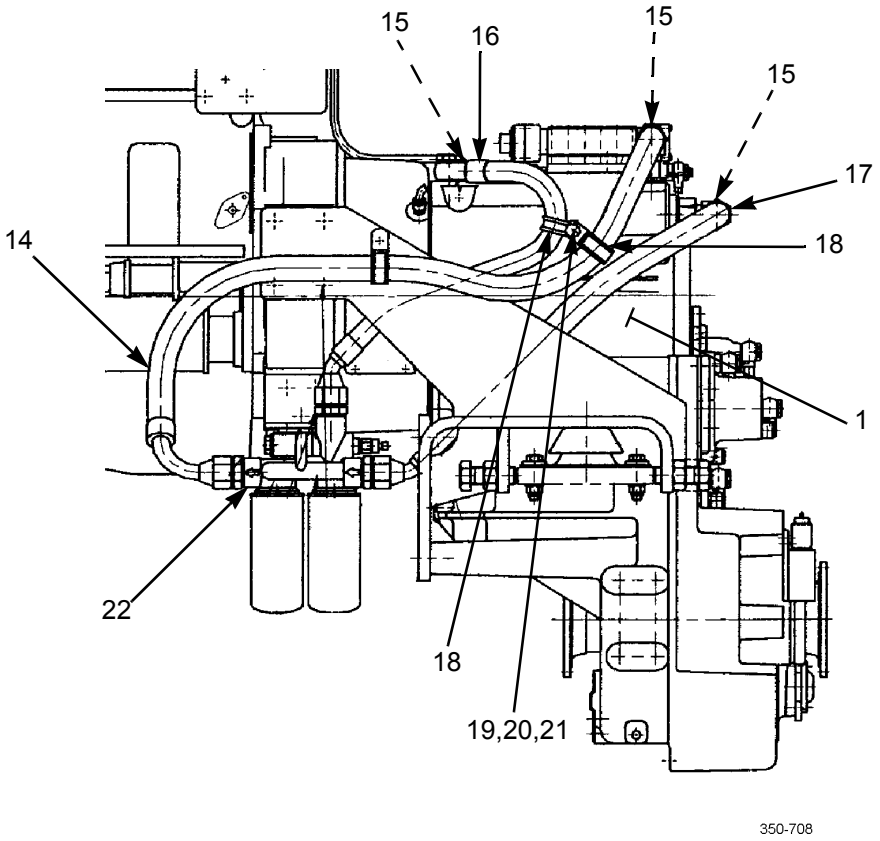
Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

4. Position suitable container to catch lubricating oil contained in hoses (14, 16, and 17).

NOTE

Note hose routing when removing hoses to aid in installation of hoses.

5. Disconnect hoses (14, 16, and 17) from transmission oil filter head (22).
6. Disconnect opposite end of hoses (14, 16, and 17) from three adapter fittings (15). Remove hoses.
7. If damaged, remove adapter fittings (15) from transmission (1).



TRANSMISSION-TO-OIL FILTER HOSES INSTALLATION

1. If removed, apply pipe sealant to threads of adapter fittings (15) and install fittings in transmission (1).
2. Connect hoses (14, 16, and 17) to three adapter fittings (15).
3. Route hoses (14, 16, and 17) as noted in removal and connect opposite end of hoses to transmission oil filter head (22).
4. Install two hose clamps (18), screw (19), washer (21), and nut (20) to hoses (14 and 16).
5. Check transmission oil level and add oil as needed (LO 10-3930-675-12).
6. Start engine (TM 10-3930-675-10) and check for leaks.
7. Install transmission access covers (WP 0135 00).
8. Install engine cover (WP 0143 00).
9. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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TRANSMISSION ASSEMBLY HYDRAULIC HOSES AND PIPES REPLACEMENT 0114 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Seal, o-ring (P/N 0634 304 523)

Seal, o-ring (P/N 0634 306 202) (7)

Seal, o-ring (P/N 0634 306 522)

Materials/Parts - Continued

Seal, o-ring (P/N 0634 306 523) (12)

Seal, o-ring (P/N 0634 801 074) (4)

Seal, o-ring (P/N 0634 801 151) (8)

References

LO 10-3930-675-12

WP 0194 00

Equipment Condition

Cab in transport position (TM 10-3930-675-10)

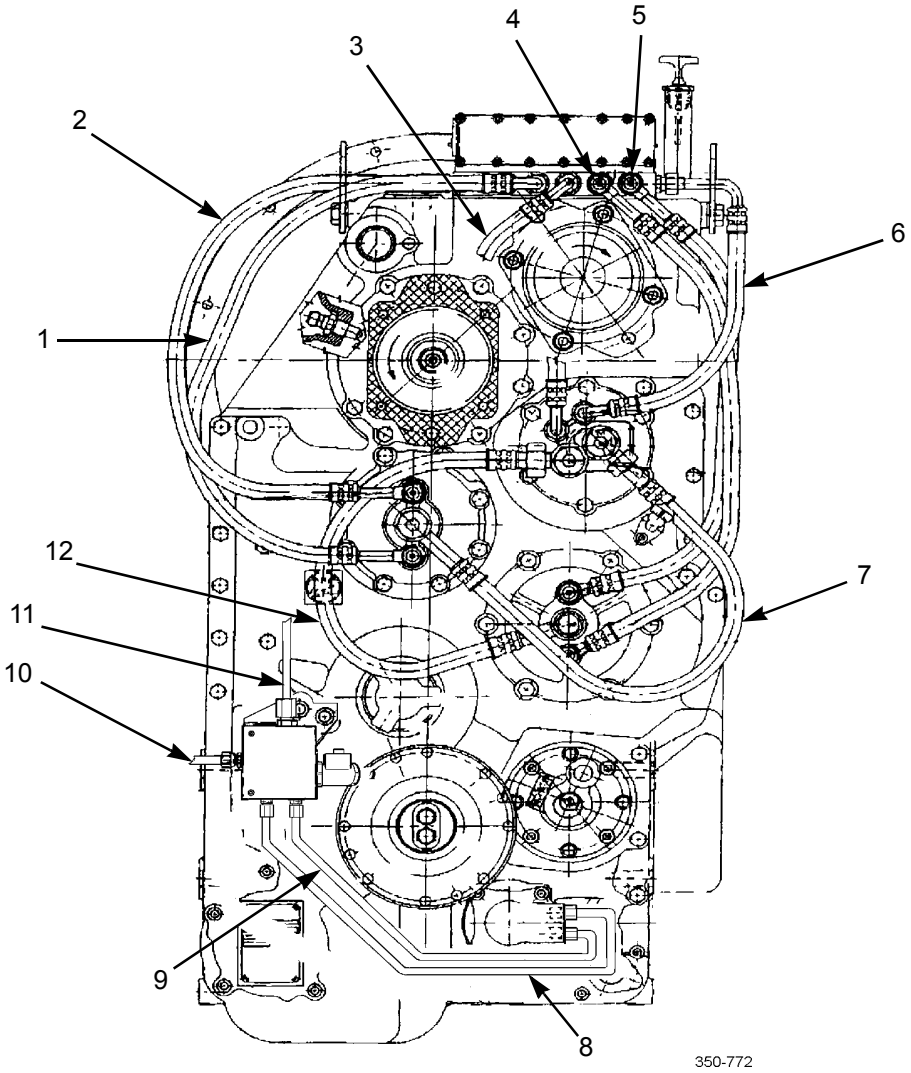
Transmission access covers removed (WP 0135 00)

NOTE

- Hydraulic hoses and pipes are used to interconnect transmission clutches, valve body, and other internal components of transmission. A location diagram is provided to aid in locating and routing hydraulic hoses and pipes.
- Four basic types of hydraulic hoses and one type of pipe are used on transmission assembly. An identification chart is provided to aid in identifying type of hose and connections.
- The following procedures detail replacement of hoses and pipes.

REMOVAL

1. Refer to location diagram and find hydraulic hose or pipe to be removed.



TRANSMISSION ASSEMBLY HOSE AND PIPE LOCATION DIAGRAM

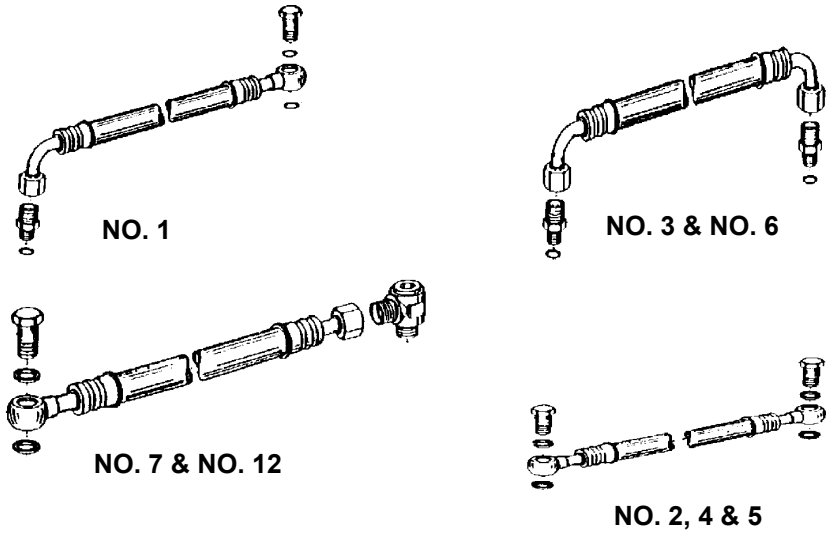
2. Remove and discard tiedown straps, as needed, to release hydraulic hose.

NOTE

Remove adapter fitting and o-ring seal only if damaged or leaking.

3. Position suitable container to catch hydraulic oil retained in hose or pipe and disconnect hose or pipe from adapter fitting.
4. Remove fluid passage bolt, hose connection, and two o-ring seals from transmission. Discard o-rings.
5. Loosen each of two fitting nuts and remove pipe (8, 9, 10 or 11) from transmission.

REMOVAL - CONTINUED



350-773

TRANSMISSION ASSEMBLY HOSE AND PIPE LOCATION DIAGRAM

INSTALLATION

NOTE

- Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and pipes and applying proper torque.
- If adapter fitting and o-ring seal have been removed, perform steps 1 and 2. If not, proceed to step 3.

1. Apply lubricating oil to new o-ring seal and install on adapter fitting.
2. Install adapter fitting on transmission.
3. Connect hose to adapter fitting and route hose to opposite end as indicated on location diagram.
4. Apply lubricating oil to two new o-rings.
5. Install hose connection and two o-rings on transmission and secure with fluid passage bolt.
6. Secure hydraulic hose with new tiedown straps as needed.
7. Position pipe (8, 9, 10, and 11) to transmission and tighten each of two fitting nuts.
8. Operate vehicle and check for leaks.
9. Replace transmission access covers (WP 0135 00).
10. Return cab to operational position (TM 10-3930-675-10).
11. Check transmission oil level and add as needed (LO 10-3930-675-12).

END OF WORK PACKAGE

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TRANSMISSION OIL, OIL FILTERS, AND OIL FILTER HEAD REPLACEMENT 0115 00

THIS WORK PACKAGE COVERS

Transmission Oil: Draining, Filling

Transmission Oil Filters: Removal, Installation

Transmission Oil Filter Head: Removal, Installation

Transmission Internal Coarse Oil Filter: Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, strap (Item 38, WP 0204 00)

Wrench, torque, 0-300 lb-in capacity (Item 41, WP 0204 00)

Materials/Parts

Compound, gasket forming, silicone (Item 8, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Sealant, pipe (Item 23, WP 0203 00)

O-ring (P/N 0634 303 719)

Materials/Parts - Continued

Filter, transmission oil (P/N 923828.0610)

Filter, internal, coarse (P/N 923899.0289)

References

LO 10-3930-675-12

TM 10-3930-675-10

WP 0135 00

WP 0195 00

Equipment Condition

Vehicle parked on level surface

Master battery switch in OFF position

TRANSMISSION OIL DRAINING



WARNING

At operating temperature, transmission oil is hot. Allow transmission to cool before draining. Failure to do so could result in injury to personnel.

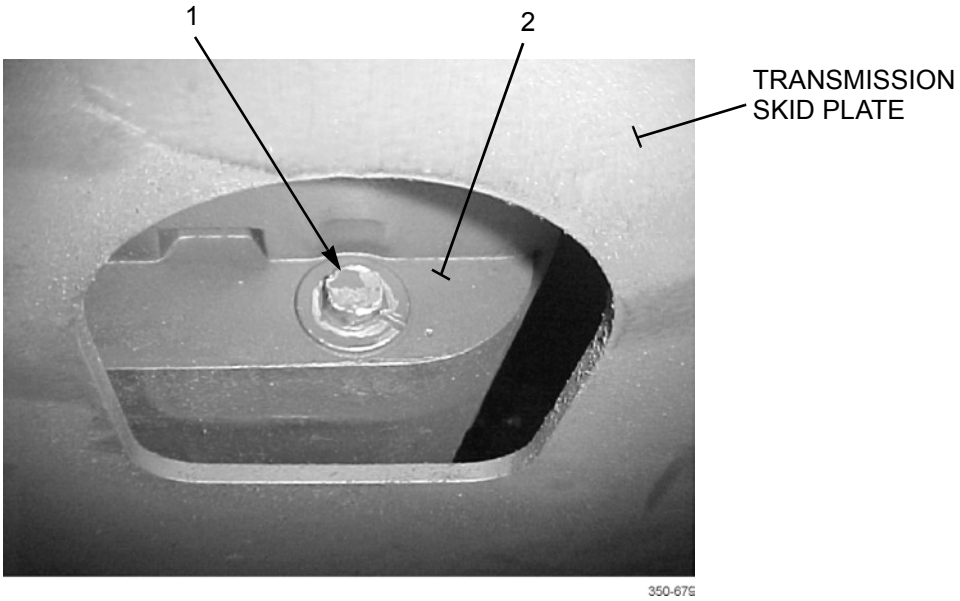
NOTE

- Transmission capacity is approximately 36 qt (34 l) with filter.
- Dispose of old transmission oil in accordance with local policy.

TRANSMISSION OIL, OIL FILTERS, AND OIL FILTER HEAD REPLACEMENT - CONTINUED **0115 00**

TRANSMISSION OIL DRAINING - CONTINUED

1. Position a suitable container under transmission.
2. Remove plug (1) from transmission (2) and allow oil to drain.



TRANSMISSION OIL FILLING

1. Apply pipe sealant to threads of plug (1) and install plug to transmission (2).
2. Fill transmission with oil (LO 10-32930-675-12).
3. Start engine (TM 10-3930-675-10) and check for leaks.
4. Shut down engine and check transmission oil level (LO 10-3930-675-12). Add oil as necessary to obtain proper level.
5. Perform transmission calibration (WP 0195 00).

TRANSMISSION OIL FILTERS REMOVAL



WARNING

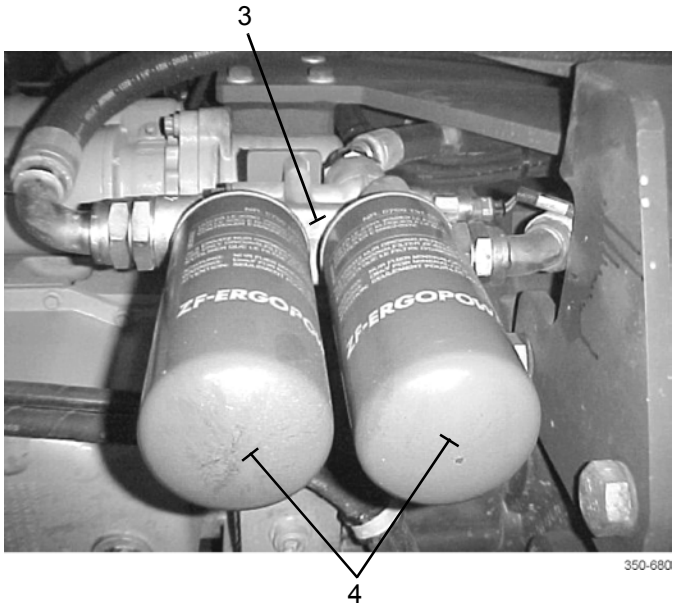
At operating temperature, transmission oil is hot. Allow transmission to cool before performing maintenance on transmission or transmission system components. Failure to do so could result in injury to personnel.

NOTE

Ensure suitable container is placed under oil filters. Filters will contain transmission oil and can spill.

TRANSMISSION OIL FILTERS REMOVAL - CONTINUED

1. Use a strap wrench to loosen oil filter (4).
2. Unscrew oil filter (4) from oil filter head (3) by hand. Discard filter.
3. Perform steps 1 and 2 for second oil filter (4).



TRANSMISSION OIL FILTERS INSTALLATION

NOTE

Ensure oil filter head is clean and free of old oil.

1. Apply a thin coat of lubricating oil to filter seal.
2. Fill new oil filter (4) with clean lubricating oil.

CAUTION

DO NOT overtighten oil filter. Overtightening filter may cause damage to filter or filter head which will result in oil leaks.

3. Install oil filter (4) on oil filter head (3) and hand tighten.
4. Use strap wrench to tighten oil filter (4) an additional ½ to ¾ turn.
5. Perform steps 1 thru 4 for second oil filter (4).
6. Start engine (TM 10-3930-675-10) and check for leaks.
7. Check transmission oil level and add oil as needed (LO 10-3930-675-12).

TRANSMISSION OIL FILTER HEAD REMOVAL



WARNING

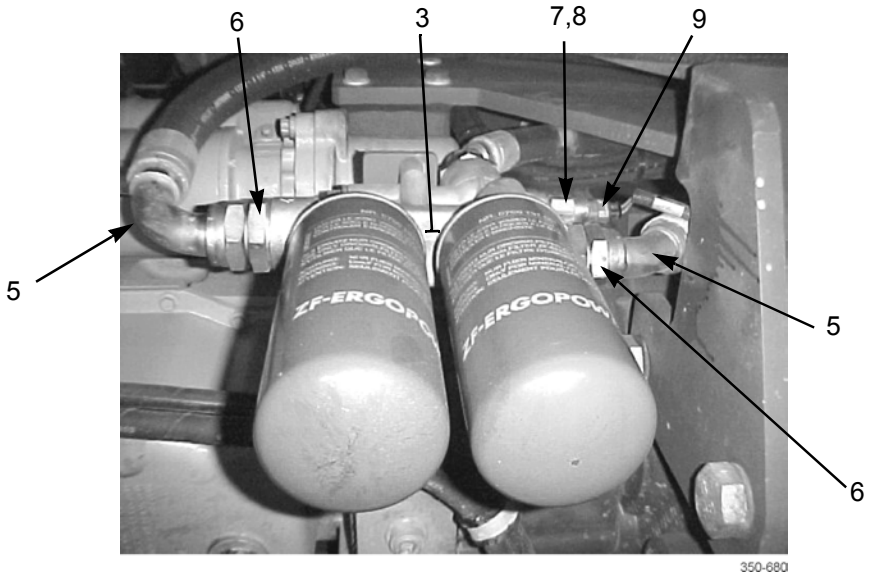
At operating temperature, transmission oil is hot. Allow transmission to cool before performing maintenance on transmission or transmission system components. Failure to do so could result in injury to personnel.

1. Remove two oil filters from oil filter head (refer to *Transmission Oil Filters Removal*).

NOTE

Tag hoses to ensure correct installation.

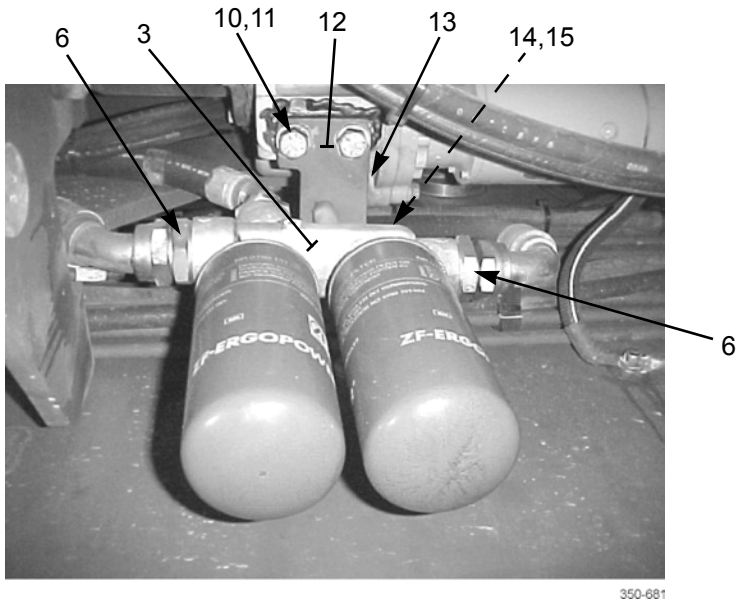
2. Disconnect two hoses (5) from filter head fittings (6).
3. Disconnect connector (9) from oil filter sensor (8).
4. Remove oil filter sensor (8) and o-ring (7) from oil filter head (3).



5. Remove two screws (10) and washers (11) securing bracket (12) with oil filter head (3) to flywheel housing (13).
6. Remove bracket (12) with oil filter head (3).
7. Remove two screws (14), washers (15), and oil filter head (3) from bracket (12).
8. Remove two fittings (6) from oil filter head (3).

TRANSMISSION OIL, OIL FILTERS, AND OIL FILTER HEAD REPLACEMENT - CONTINUED **0115 00**

TRANSMISSION OIL FILTER HEAD REMOVAL - CONTINUED



TRANSMISSION OIL FILTER HEAD INSTALLATION

1. Apply pipe sealant to threads of fittings (6) and install in oil filter head (3).
2. Position bracket (12) on oil filter head (3) and secure with two screws (14) and washers (15).

NOTE

Ensure that mounting surface of flywheel housing is clean and free of old gasket forming compound.

3. Apply gasket forming compound to mounting surface on flywheel housing (13) and install bracket (12) with oil filter head (3) on flywheel housing with two screws (10) and washers (11).
4. Install o-ring (7) and oil filter sensor (8) to oil filter head (3).
5. Connect connector (9) to oil filter sensor (8).
6. Connect two hoses (5) to fittings (6).
7. Install two oil filters to oil filter head (refer to *Transmission Oil Filters Installation*).
8. Operate vehicle (TM 10-3930-675-10) and check for leaks.
9. Check transmission oil level and add as necessary (LO 10-3930-675-12).

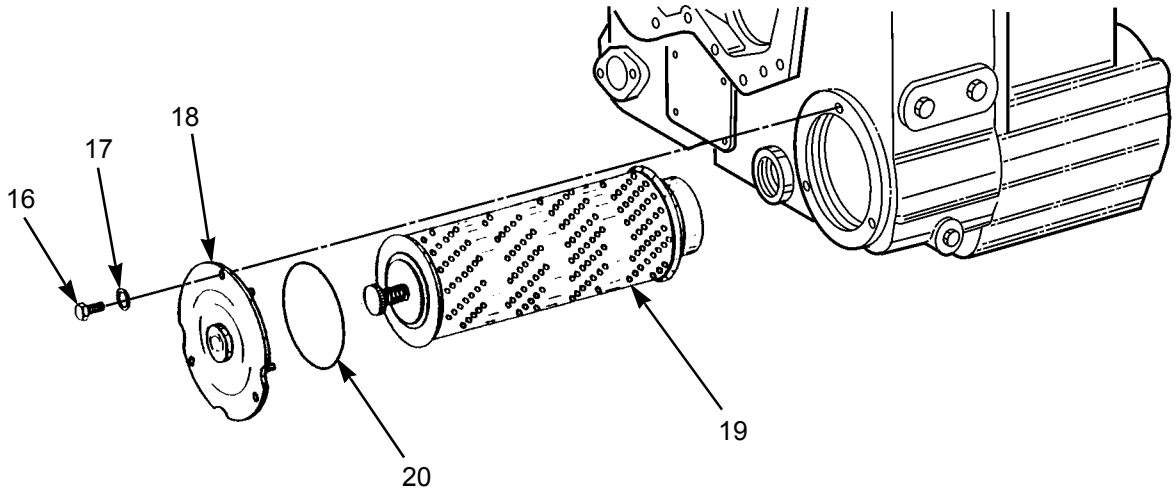
TRANSMISSION INTERNAL COARSE OIL FILTER REMOVAL

1. Remove transmission skid plate (WP 0135 00).
2. Drain transmission oil (refer to *Transmission Oil Draining*).

CAUTION

Ensure no dirt or oil sludge enters transmission.

3. Remove three screws (16), washers (17), and cover (18). Remove and discard o-ring (20).
4. Remove internal coarse oil filter (19) from transmission.



350-1029

TRANSMISSION INTERNAL COARSE OIL FILTER CLEANING AND INSPECTION



WARNING

- Dry cleaning solvent P-D-680 type III is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and do not breathe vapors. Do not use near open flames or excessive heat. The solvent's flash point is 200°F (94°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If solvent contacts eyes, wash your eyes and get medical aid immediately.
- Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.

1. Use solvent to clean internal coarse oil filter.
2. Dry internal coarse oil filter with compressed air.
3. Inspect filter for damage. If not damaged, filter may be reused.

TRANSMISSION INTERNAL COARSE OIL FILTER INSTALLATION

1. Install new o-ring (20) in cover (18).
2. Coat gasket sealing surface of oil filter (19) with lubricating oil and install in transmission.
3. Screw in oil filter (19) by hand until contact with sealing surface is obtained. Tighten by hand and additional 1/3 to 1/2 turn.
4. Install cover (18) with three washers (17) and screws (16). Tighten screws to 203 lb-in (23 Nm).

END OF WORK PACKAGE

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TRANSMISSION OIL DIPSTICK HOSE AND PIPE REPLACEMENT 0116 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Nut, lock (P/N 920076.003)

Seal (P/N 923899.0292)

Equipment Condition

Engine cover removed (WP 0143 00)

Cab moved to the left, but not lowered (TM 10-3930-675-10)

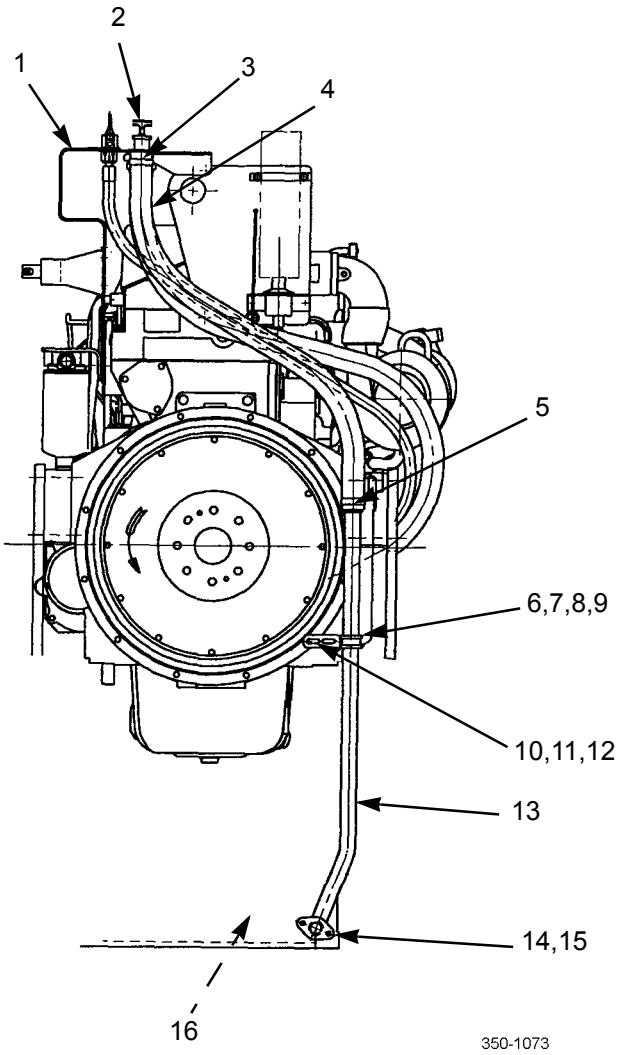
Transmission oil drained, if replacing pipe (WP 0115 00)

NOTE

Transmission oil dipstick hose and engine oil dipstick hose are at same location. Transmission oil dipstick is indicated by a data plate with a transmission symbol.

REMOVAL

1. Remove transmission dipstick (2) from transmission oil dipstick hose (4).
2. Loosen hose clamp (3) and disconnect hose (4) from bracket (1). Remove hose clamp from hose.
3. At other end of hose (4), loosen hose clamp (5) and remove hose from pipe (13). Remove hose clamp from hose.
4. From underneath vehicle, remove locknut (6), two washers (7), screw (8), and clamp (9) from bracket (10). Remove clamp from pipe (13).
5. Remove screw (11), washer (12), and bracket (10) from transmission (16).
6. Remove two screws (14), pipe (13), and seal (15) from transmission (16). Discard seal.



INSTALLATION

1. Install new seal (15) and pipe (13) to transmission (16) with two screws (14).
2. Install bracket (10) to transmission (16) with washers (12) and screw (11). Tighten screw to 38 lb-ft (52 Nm).
3. Position clamp (9) to pipe (13) and install clamp to bracket (10) with screw (8), two washers (7), and new locknut (6).

INSTALLATION - CONTINUED

4. From top of vehicle, position hose clamp (5) to transmission oil dipstick hose (4) and install hose to pipe (13). Tighten hose clamp.
5. At other end of hose (4), position hose clamp (3) to hose and connect hose to bracket (1). Tighten hose clamp.
6. Install transmission dipstick (2) to transmission oil dipstick hose (4).
7. If drained, fill transmission oil (WP 0115 00).
8. Install engine cover (WP 0143 00).
9. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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TRANSMISSION AND FRONT AND REAR AXLE VENT HOSES REPLACEMENT 0117 00

THIS WORK PACKAGE COVERS

Front Axle Vent Hose: Removal, Installation
Rear Axle Vent Hose: Removal, Installation
Transmission Vent Hose: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Compound, sealing (Item 9, WP 0203 00)
Strap, tiedown (Item 27, WP 0203 00)

Materials/Parts - Continued

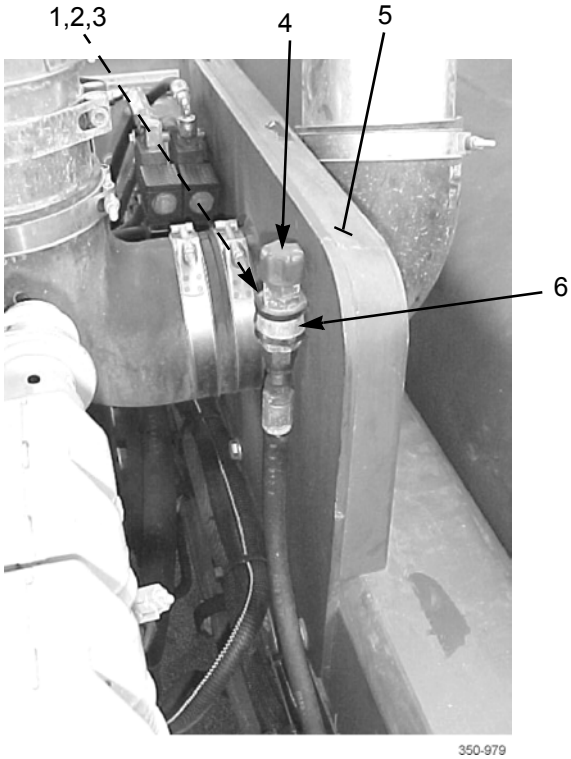
Nut, lock (P/N 920076.001) (1) (transmission vent hose)
Nut, lock (P/N 920076.002) (1) (front axle vent hose)

References

WP 0143 00
WP 0135 00

FRONT AXLE VENT HOSE REMOVAL

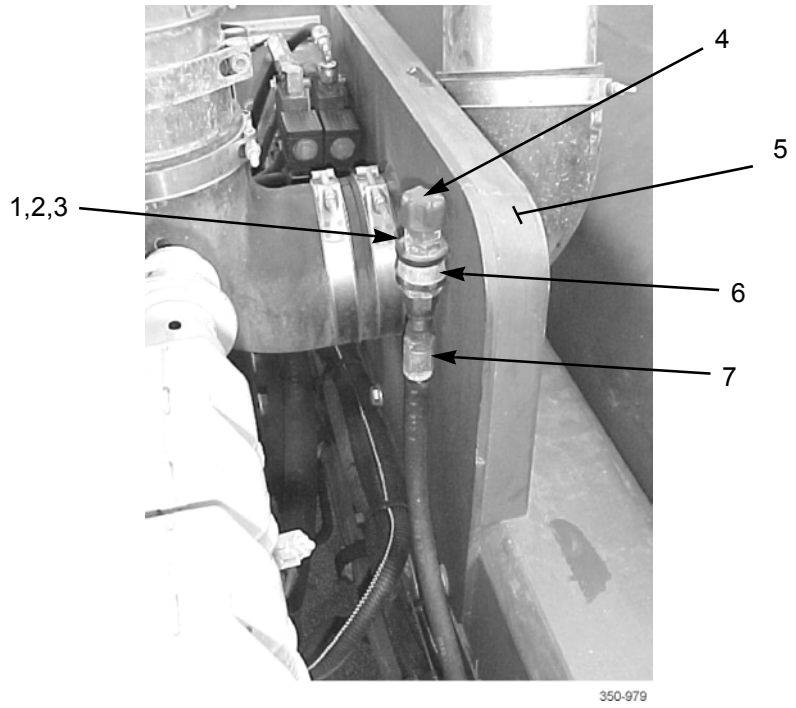
1. Remove engine cover (WP 0143 00).
2. Remove locknut (1), two washers (2), screw (3), and clamp (6) holding front axle vent (4) to plate (5). Discard locknut.



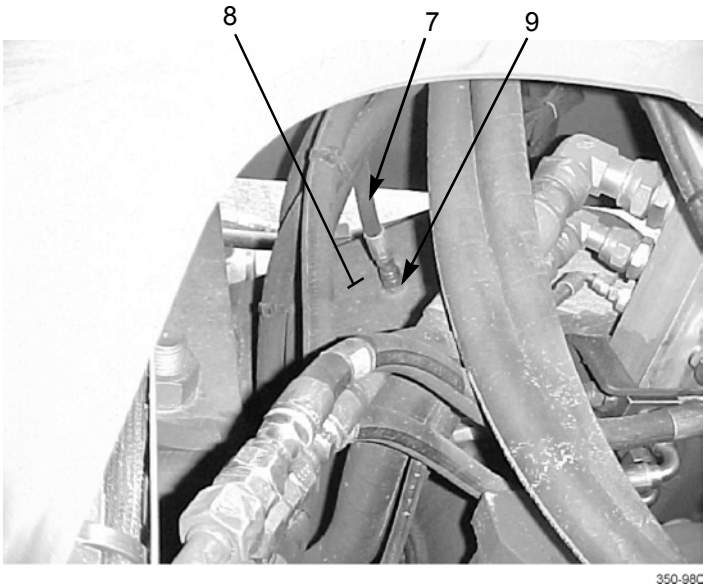
TRANSMISSION AND FRONT AND REAR AXLE VENT HOSES REPLACEMENT - CONTINUED **0117 00**

FRONT AXLE VENT HOSE REMOVAL - CONTINUED

3. Remove clamp (6) from front axle vent (4).
4. Remove front axle vent (4) from vent hose (7).



5. At top-left of front axle (8), disconnect other end of vent hose (7) from adapter (9).
6. Remove adapter (9) from front axle (8).
7. Remove tiedown straps as necessary and remove front axle vent hose (7) from vehicle. Discard tiedown straps.

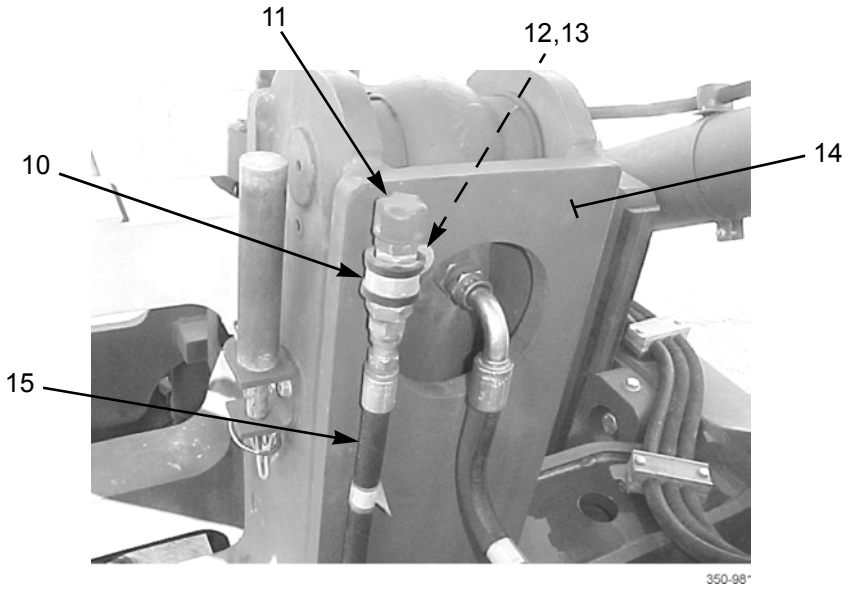


FRONT AXLE VENT HOSE INSTALLATION

1. Position front axle vent hose (7) to vehicle.
2. Apply sealing compound to threads of adapter (9) and install adapter to front axle (8).
3. Connect end of vent hose (7) to adapter (9).
4. At other end of vent hose (7), install front axle vent (4).
5. Install clamp (6) around front axle vent (4).
6. Install clamp (6) to plate (5) with screw (3), two washers (2), and new locknut (1).
7. Install new tiedown straps.
8. Install engine cover (WP 0143 00).

REAR AXLE VENT HOSE REMOVAL

1. Remove screw (12), washer (13), and clamp (10) holding rear axle vent (11) to frame (14) of vehicle.
2. Remove clamp (10) from rear axle vent (11).
3. Remove rear axle vent (11) from vent hose (15).

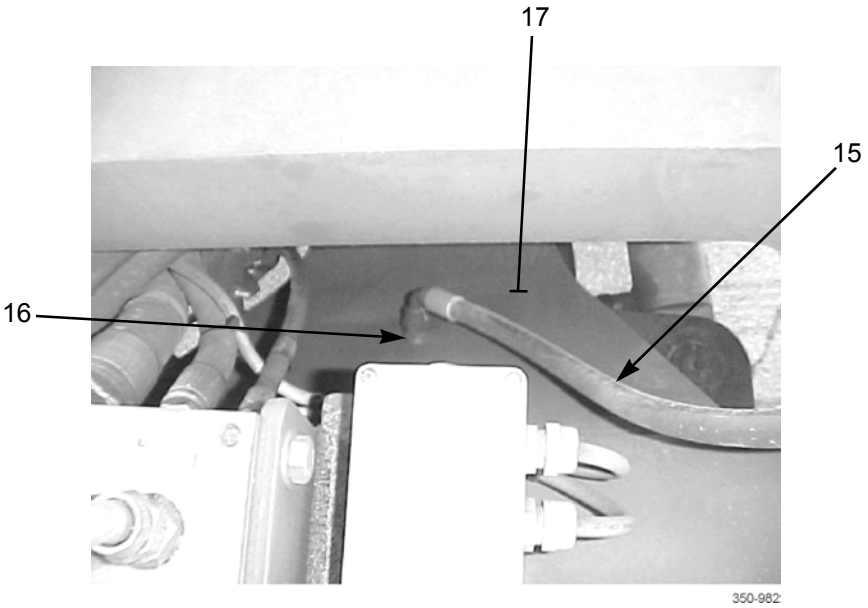


TRANSMISSION AND FRONT AND REAR AXLE VENT HOSES REPLACEMENT - CONTINUED

0117 00

REAR AXLE VENT HOSE REMOVAL - CONTINUED

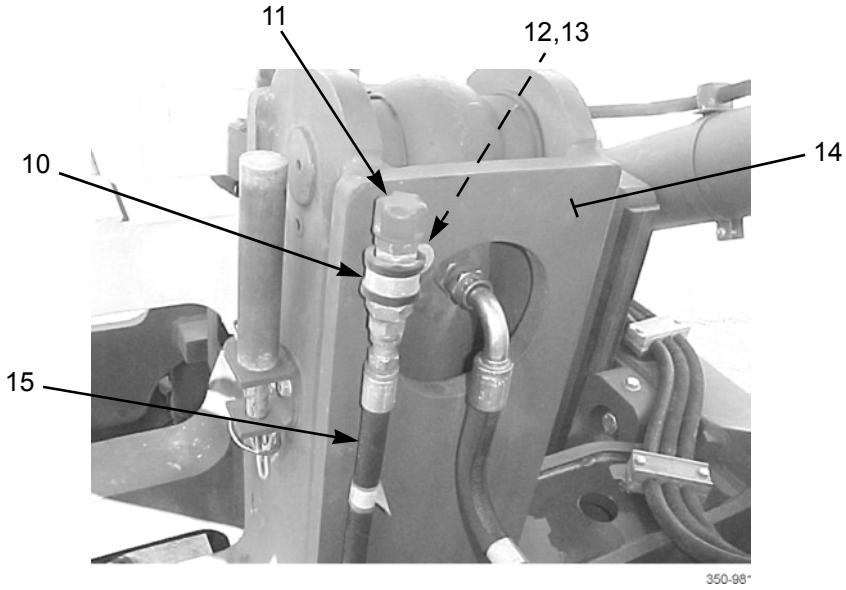
4. At top-right of rear axle (17), disconnect other end of vent hose (15) from adapter (16).
5. Remove adapter (16) from rear axle (17).
6. Remove tiedown straps as necessary and remove rear axle vent hose (15) from vehicle. Discard tiedown straps.



REAR AXLE VENT HOSE INSTALLATION

1. Position rear axle vent hose (15) to vehicle.
2. Apply sealing compound to threads of adapter (16) and install adapter to rear axle (17).
3. Connect end of vent hose (15) to adapter (16).
4. At other end of vent hose (15), install front rear axle vent (11).
5. Install clamp (10) around rear axle vent (11).
6. Install clamp (10) to frame (14) of vehicle with washer (13) and screw (12).
7. Install new tiedown straps.

REAR AXLE VENT HOSE INSTALLATION - CONTINUED



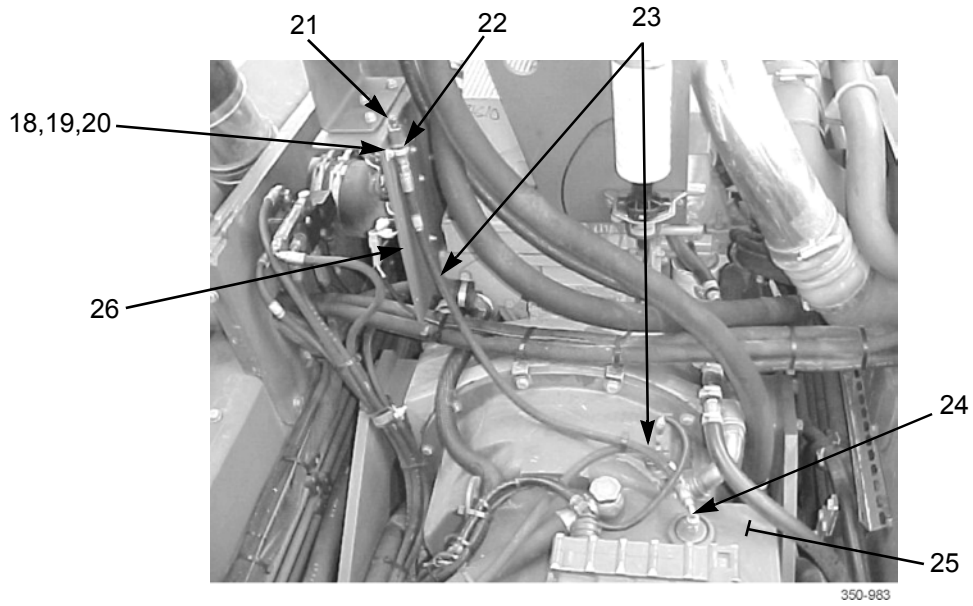
TRANSMISSION VENT HOSE REMOVAL

1. Remove engine cover (WP 0143 00).
2. Remove transmission front access cover (WP 0135 00).

TRANSMISSION AND FRONT AND REAR AXLE VENT HOSES REPLACEMENT - CONTINUED 0117 00

TRANSMISSION VENT HOSE REMOVAL - CONTINUED

3. Remove locknut (18), two washers (19), screw (20), and clamp (22) holding transmission vent (21) to bracket (26). Discard locknut.
4. Remove clamp (22) from transmission vent (21).
5. Remove transmission vent (21) from vent hose (23).
6. At top of transmission (25), disconnect other end of vent hose (23) from adapter (24).
7. Remove adapter (24) from transmission (25).
8. Remove tiedown strap and remove transmission vent hose (23) from vehicle. Discard tiedown strap.



TRANSMISSION VENT HOSE INSTALLATION

1. Position transmission vent hose (23) to vehicle.
2. Apply sealing compound to threads of adapter (24) and install adapter to top of transmission (25).
3. Connect end of vent hose (23) to adapter (24).
4. At other end of vent hose (23), install transmission vent (21).
5. Install clamp (22) around transmission vent (21).
6. Install clamp (22) to bracket (26) with screw (20), two washers (19), and new locknut (18).

TRANSMISSION VENT HOSE INSTALLATION - CONTINUED

7. Install new tiedown strap.
8. Install transmission front access cover (WP 0135 00).
9. Install engine cover (WP 0143 00).

END OF WORK PACKAGE

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FRONT AND REAR PROPELLER SHAFTS REPLACEMENT 0118 00

THIS WORK PACKAGE COVERS

Front Propeller Shaft: Removal, Installation

Rear Propeller Shaft: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 50-250 lb-ft capacity (Item 39, WP 0204 00)

Materials/Parts

Nut, lock (P/N 922974.0004) (48)

Washer, lock (P/N 923657.0004) (48)

Personnel Required

Two

Equipment Condition

Vehicle wheels chocked

Transmission shift lever set to N (TM 10-3930-675-10)



WARNING

Propeller shafts are heavy; they weigh 121 lb (55 kg). Support end of propeller shaft as nuts or screws are removed to prevent shaft from falling. Failure to follow this warning may cause serious injury to personnel.

CAUTION

Place witness marks at slip joint and propeller shaft housing to aid in reassembly, in the event propeller shaft becomes separated. Failure to follow this caution may cause excessive vibration in propeller shaft and transmission damage.

NOTE

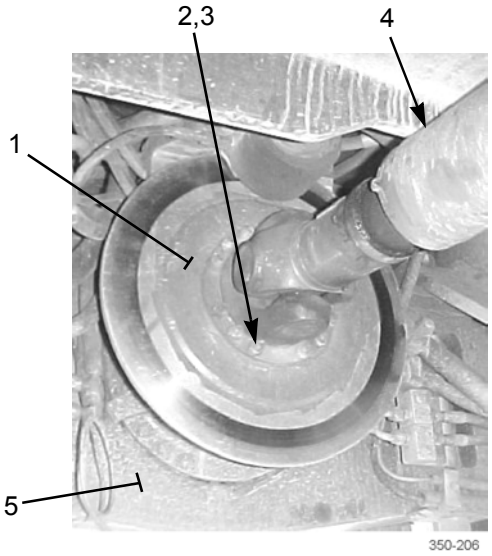
Note position of propeller shaft on vehicle to aid in installation.

FRONT PROPELLER SHAFT REMOVAL

NOTE

Perform following steps at front of front propeller shaft.

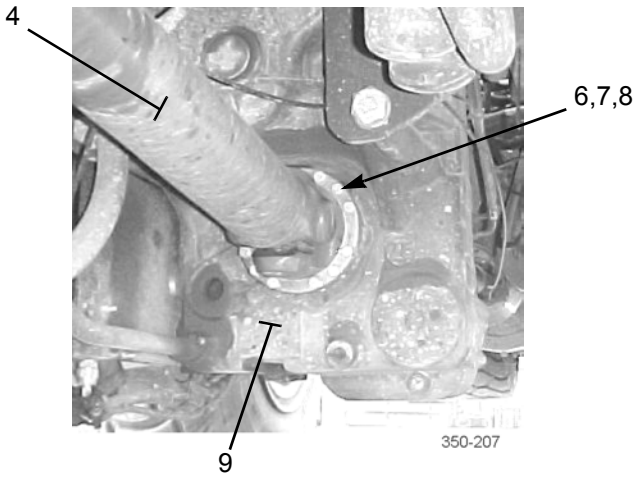
1. Remove 12 locknuts (3) and lockwashers (2) from flange of propeller shaft (4). Discard locknuts and lockwashers.
2. Remove propeller shaft (4) from studs of parking brake disc (1) of front axle (5).



NOTE

Perform following steps at rear of front propeller shaft.

3. Remove 12 screws (6), lockwashers (7), and locknuts (8) from flange of propeller shaft (4). Discard lockwashers and locknuts.
4. Remove propeller shaft (4) from flange of transmission (9) and remove from vehicle.



FRONT PROPELLER SHAFT INSTALLATION

NOTE

- Perform following steps at rear of front propeller shaft.
- Ensure that witness marks are alined.

1. Position propeller shaft (4) to flange of transmission (9).
2. Install 12 screws (6), new lockwashers (7), and new locknuts (8). Tighten locknuts to 85 lb-ft (115 Nm).

NOTE

Perform following steps at front of front propeller shaft.

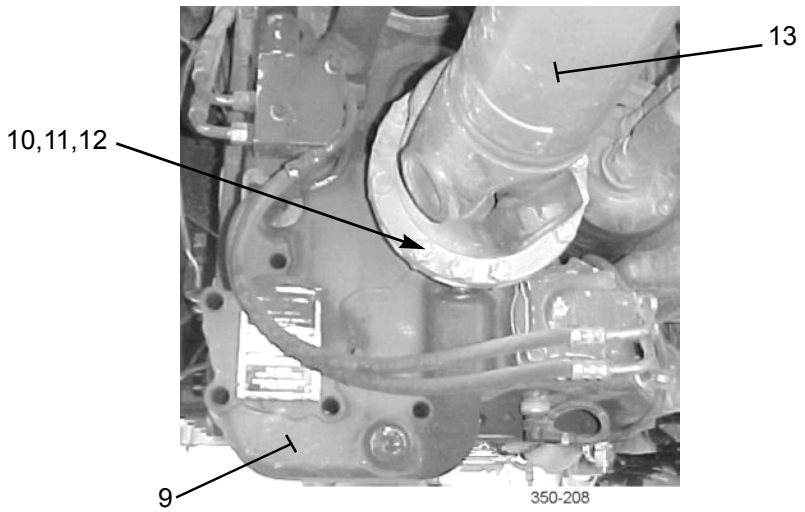
3. Position propeller shaft (4) to studs of parking brake disc (1) of front axle (5).
4. Install 12 new lockwashers (2) and new locknuts (3). Tighten locknuts to 85 lb-ft (115 Nm).

REAR PROPELLER SHAFT REMOVAL

NOTE

Perform following steps at front of rear propeller shaft.

1. Remove 12 screws (10), lockwashers (11), and locknuts (12) from flange of propeller shaft (13). Discard lockwashers and locknuts.
2. Remove propeller shaft (13) from flange of transmission (9).

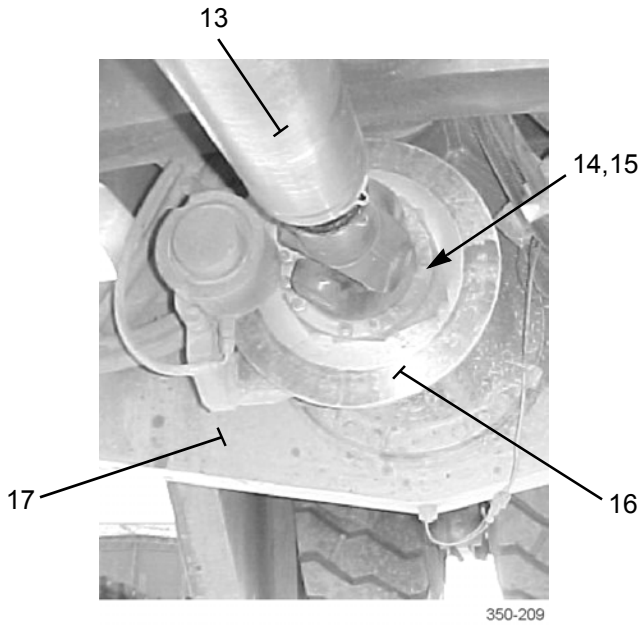


REAR PROPELLER SHAFT REMOVAL - CONTINUED

NOTE

Perform following steps at rear of rear propeller shaft.

3. Remove 12 locknuts (14) and lockwashers (15) from flange of propeller shaft (13). Discard locknuts and lockwashers.
4. Remove propeller shaft (13) from studs of parking brake disc (16) of rear axle (17) and remove from vehicle.



REAR PROPELLER SHAFT INSTALLATION

NOTE

- Perform following steps at rear of rear propeller shaft.
- Ensure that witness marks are alined.

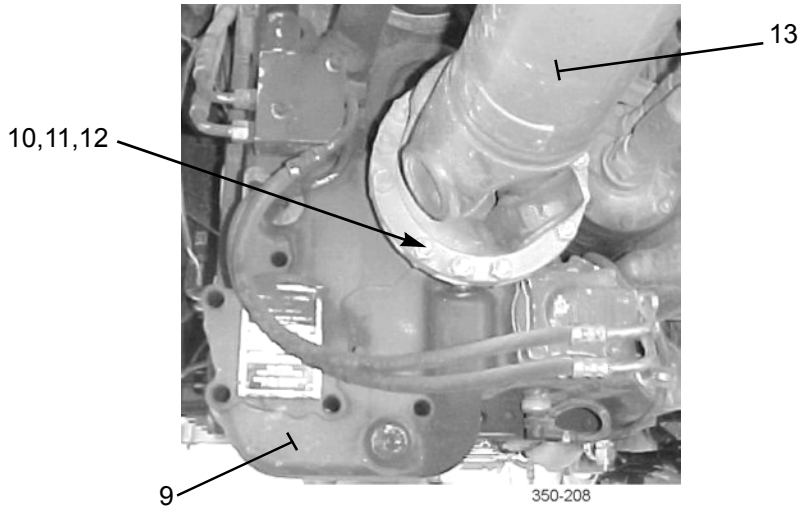
1. Position propeller shaft (13) to studs of parking brake disc (16) of rear axle (17).
2. Install 12 new lockwashers (15) and new locknuts (14). Tighten locknuts to 85 lb-ft (115 Nm).

NOTE

Perform following steps at front of rear propeller shaft.

3. Position propeller shaft (13) to flange of transmission (9).
4. Install 12 screws (10), new lockwashers (11), and new locknuts (12). Tighten locknuts to 85 lb-ft (115 Nm).

REAR PROPELLER SHAFT INSTALLATION - CONTINUED



END OF WORK PACKAGE

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PROPELLER SHAFT UNIVERSAL JOINT REPLACEMENT 0119 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

C-clamp (Item 4, WP 0204 00)

Vise, machinist's (Item 32, WP 0204 00)

Materials/Parts

Grease, GAA (Item 16, WP 0203 00)

References

LO 10-3930-675-12

Equipment Condition

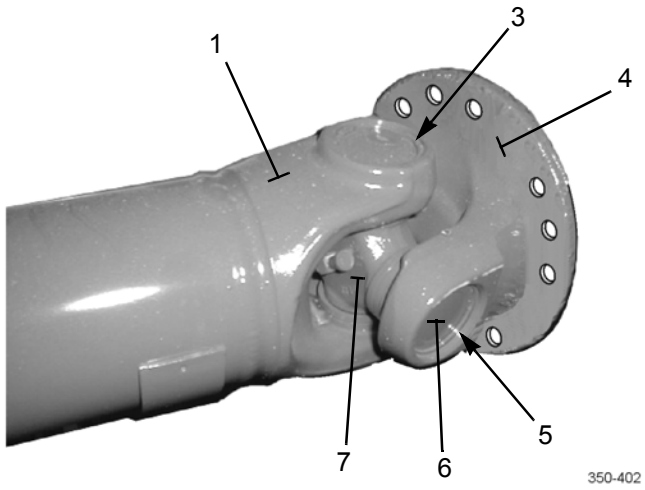
Propeller shaft removed (WP 0118 00)

NOTE

Universal joint at each end of propeller shaft is replaced the same way.

REMOVAL

1. Remove two retaining rings (5) from flanged yoke (4) of propeller shaft.
2. Using C-clamp, push downward on one bearing cap (6) to remove opposite bearing cap from flanged yoke (4).
3. Rotate flanged yoke (4) 180 degrees and push downward on end of tee (7) to remove other bearing cap (6).
4. Remove flanged yoke (4) from tee (7).
5. Remove two retaining rings (3) from yoke (1) of propeller shaft.



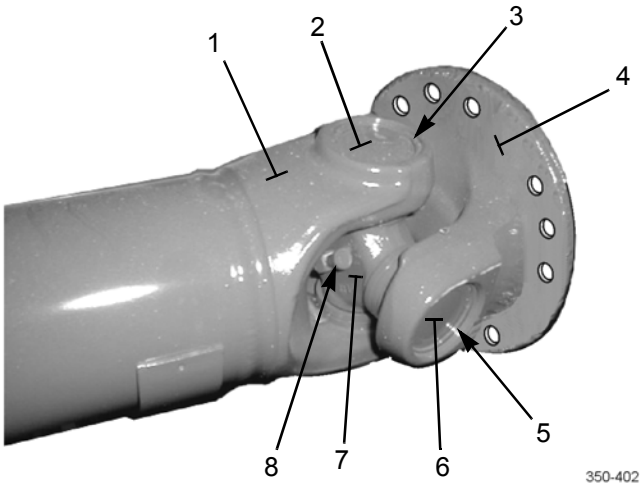
REMOVAL - CONTINUED

6. Using C-clamp, push downward on one bearing cap (2) to remove opposite bearing cap (2) from yoke (1) of propeller shaft.
7. Rotate propeller shaft 180 degrees and press downward on end of tee (7) to remove other bearing cap (2).

NOTE

Note position of tee and grease fitting for installation.

8. Remove tee (7) from yoke (1) of propeller shaft.
9. Remove grease fitting (8) from tee (7).



INSTALLATION

1. Install grease fitting (8) to tee (7).
2. Position tee (7) loosely into yoke (1) of propeller shaft.
3. Install bearing cap (2) into one side of yoke (1) of propeller shaft.
4. Rotate propeller shaft 180 degrees and install other bearing cap (2) to other side of yoke (1). Ensure bearing caps and tee (7) are centered.
5. Install two retaining rings (3) to propeller shaft.
6. Position flange yoke (4) loosely to tee (7).
7. Install bearing cap (6) into one side of flanged yoke (4).
8. Rotate flanged yoke (4) 180 degrees and install other bearing cap (6) to other side of flanged yoke. Ensure bearing caps and tee (7) are centered.
9. Install two retaining rings (5) to flanged yoke (4).
10. Lubricate grease fitting (8) (LO 10-3930-675-12).

INSTALLATION - CONTINUED

11. Install propeller shaft (WP 0118 00).

END OF WORK PACKAGE

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PARKING BRAKE PADS MAINTENANCE 0120 00

THIS WORK PACKAGE COVERS

Removal, Cleaning and Inspection, Installation, Adjustment

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, pipe, strap (Item 36, WP 0204 00)

Materials/Parts

Detergent, general purpose (Item 11, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Brake pad kit (P/N 923828.0497)

Materials/Parts - Continued

Pin, cotter (P/N 923726.0433)

Equipment Condition

Wheels chocked

Parking brake released (TM 10-3930-675-10)

Brake hydraulic system pressure relieved (WP 0164 00)

NOTE

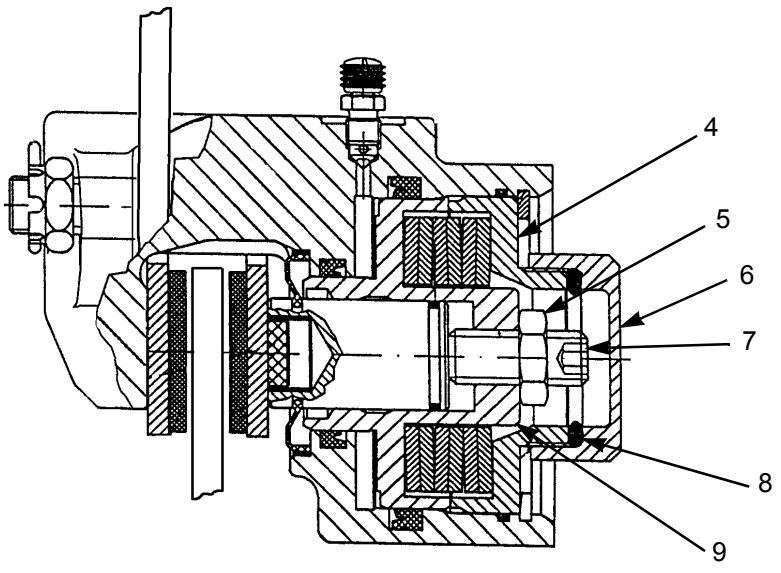
Maintenance of parking brake pads at front and rear parking brake cylinders is performed the same way.

REMOVAL

NOTE

A strap wrench may be required to remove cover.

1. Remove cover (6) from pressure ring (4). Remove and discard o-ring (8) only if damaged.
2. Loosen jamnut (5) and remove adjusting screw (7) and jamnut from piston (9).



350-328

REMOVAL - CONTINUED

3. Retract adjustment cylinder (2) into piston (9) by prying between adjustment cylinder and one brake pad (10).

NOTE

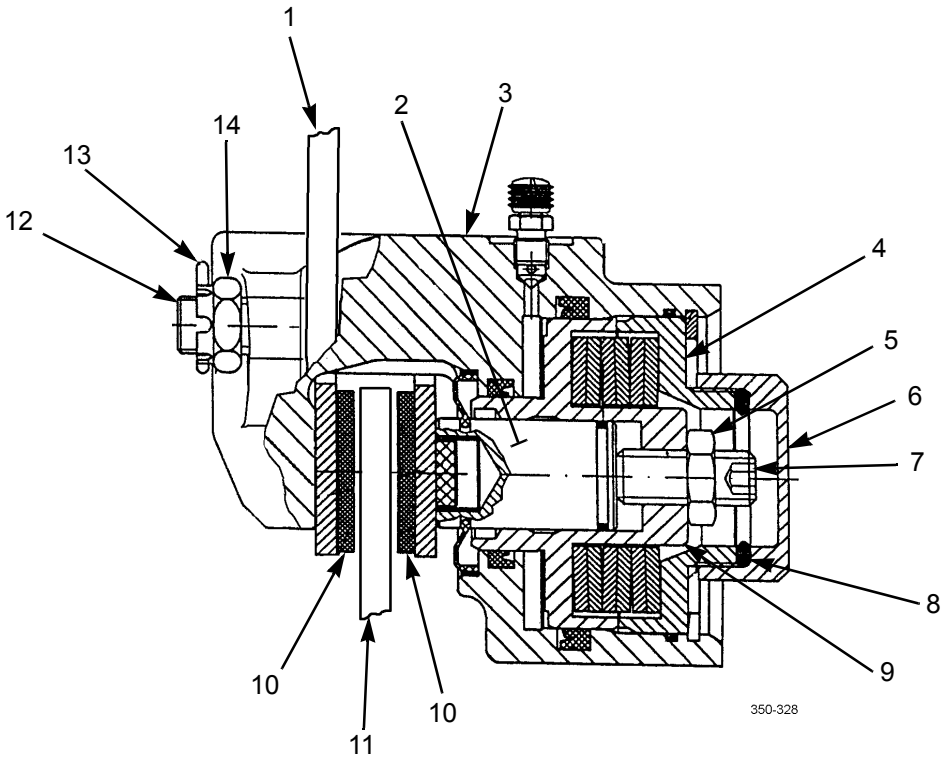
Only one of two bolts needs to be removed in order to remove brake pads.

4. Remove cotter pin (13) from one of two castle nuts (14). Discard cotter pin.
5. Remove castle nut (14) and bolt (12) from parking brake housing (3) and parking brake bracket (1).

NOTE

One brake pad is held in place by a magnet.

6. Remove two brake pads (10) from parking brake housing (3) and parking brake rotor (11).



CLEANING AND INSPECTION

1. Clean brake pads with detergent, clear water, and rags. Rinse with clear water and dry surfaces with rags.
2. Check for damage to brake pads. Replace if damaged.
3. Check thickness of brake lining of each brake pad, using a feeler gage as a basis for comparison. Brake lining must be at least 0.080 in (2 mm) thick. If brake lining thickness is less, discard brake pad.

INSTALLATION

NOTE

One brake pad will be held in place by a magnet.

1. Position two brake pads (10) to parking brake housing (3) and parking brake rotor (11).
2. Install bolt (12) thru parking brake housing (3) and parking brake bracket (1). Install castle nut (14).
3. Install new cotter pin (13) to castle nut (14).
4. Install adjusting screw (7) partially into piston (9) and install jamnut (5) loosely onto adjusting screw.

ADJUSTMENT

NOTE

Ensure that brake accumulator evacuation valves are closed.

1. Start engine (TM 10-3930-675-10) and run approximately 30 seconds to provide hydraulic pressure. Stop engine.
2. Rotate adjusting screw (7) clockwise until both brake pads (10) contact parking brake rotor (11)
3. Back off adjusting screw (7) by rotating screw counterclockwise 4/5th of a turn. Gap should be 1-2 mm (0.04-0.08 in).
4. While holding adjusting screw (7), tighten jamnut (5).
5. If removed, install new o-ring (8) to cover (6).
6. Install cover (6) to pressure ring (4).

END OF WORK PACKAGE

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CAGING AND UNCAGING PARKING BRAKE 0121 00

THIS WORK PACKAGE COVERS

Caging, Uncaging

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, pipe, strap (Item 36, WP 0204 00)

Equipment Condition

Wheels chocked

Parking brake released (TM 10-3930-675-10)

Brake hydraulic system pressure relieved (WP 0164 00)

NOTE

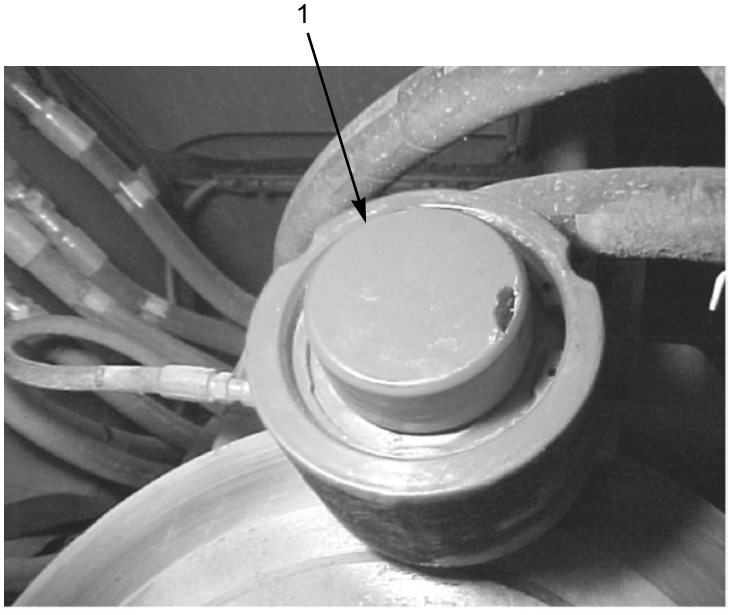
- Caging/uncaging procedures at front and rear parking brake are the same.
- In order to tow a disabled RTCH, the following procedure must be performed at front and rear parking brake to cage/uncage parking brakes.

CAGING

NOTE

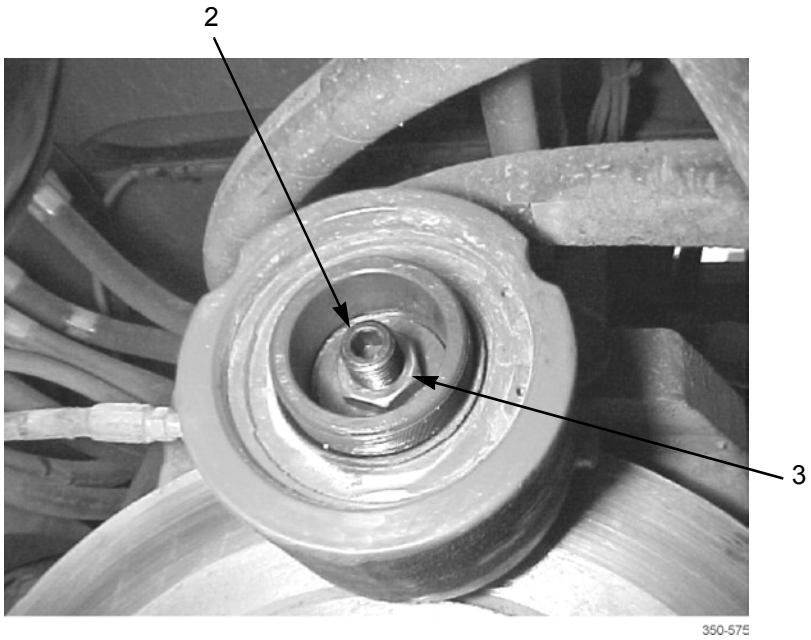
A strap wrench may be required to remove cover.

1. Remove cover (1).

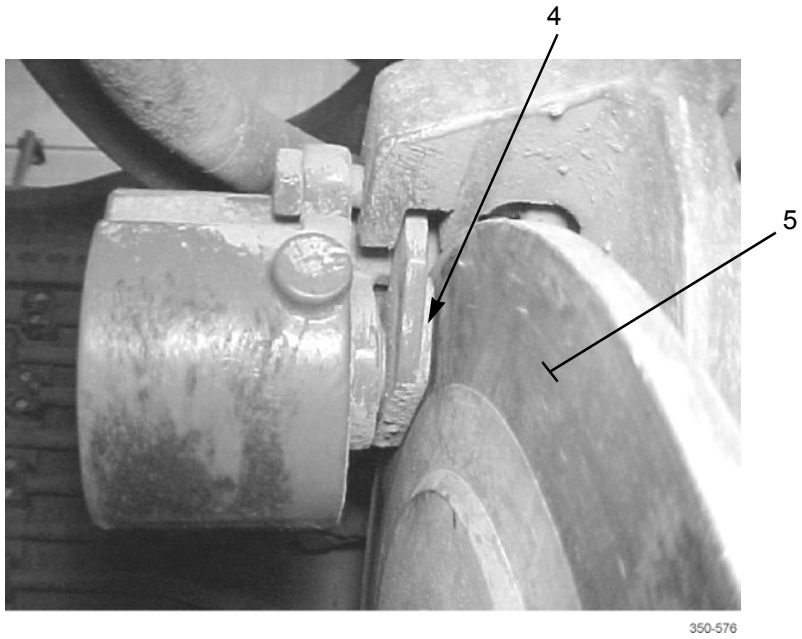


CAGING - CONTINUED

2. Loosen jamnut (3).



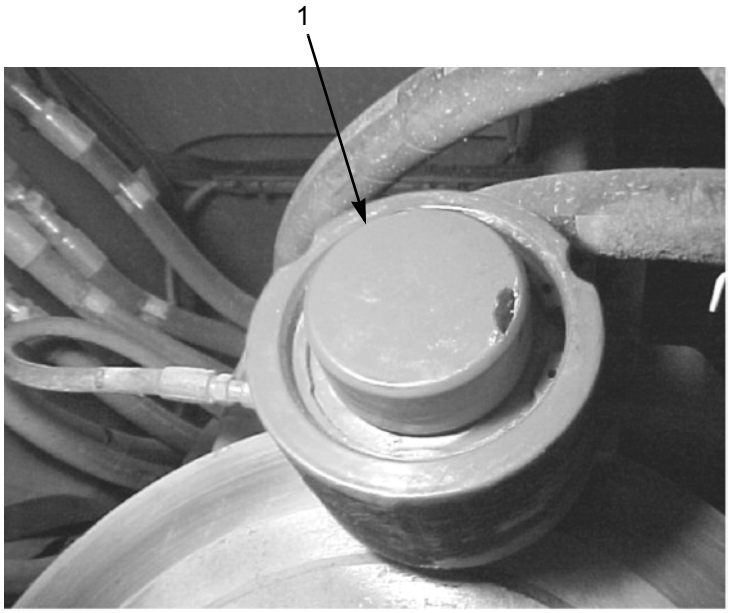
3. Loosen adjusting screw (2) until brake disk pad (4) moves freely.



4. Hand tighten jamnut (3). Reinstall cover (1).

UNCAGING

1. Remove cover (1).
2. Loosen jamnut (3). Tighten adjusting screw (2) until brake disk pad (4) contacts rotor (5). Retighten jamnut.
3. With parking brake released in cab, ensure there is a gap between brake disk pad (4) and rotor (5).
4. Loosen jamnut (3). Tighten adjusting screw (2) until contact is made between brake disk pad (4) and rotor (5), then back off adjusting screw 4/5th of a turn. Gap should be 1-2 mm (0.04-0.08 in).
5. Tighten jamnut (3).
6. Replace cover (1) o-ring only if damaged. Install cover hand tight.



350-574

7. Apply parking brake (TM 10-3930-675-10).
8. Remove wheel chocks.

END OF WORK PACKAGE

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PARKING BRAKE CONTROL VALVE REPLACEMENT 0122 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 923899.0455) (4)

References

LO 10-3930-675-12

TM 10-3930-675-10

WP 0183 00

WP 0194 00

Equipment Condition

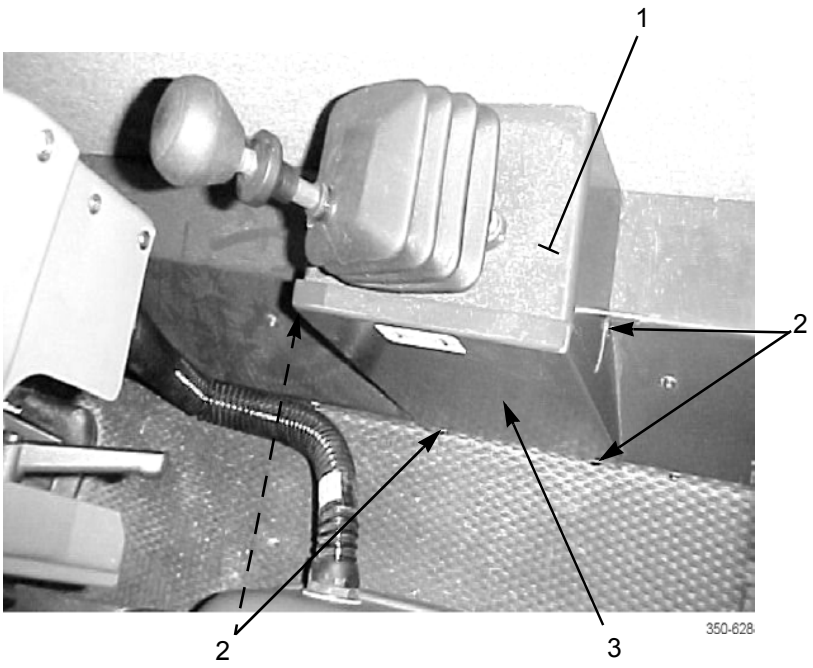
Wheels chocked

Brake hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position

REMOVAL

1. Remove four screws (2) and cover (3) from control valve bracket (1).



REMOVAL - CONTINUED



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

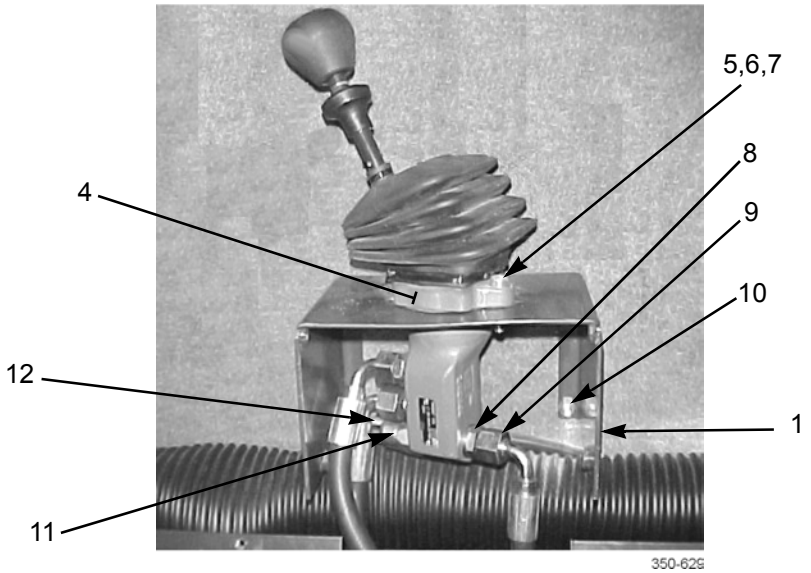
CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag hoses and connectors for installation.

2. Disconnect three hydraulic hoses (9) and remove three fittings (8) from control valve (4).
3. Disconnect two connectors (12) of wiring harness from switch (11).
4. Remove switch (11) from control valve (4).
5. Remove two locknuts (5), washers (6), screws (7), and control valve (4) from control valve bracket (1). Discard locknuts.
6. If control valve bracket (1) is damaged, remove two locknuts (10) and control valve bracket from cab. Discard locknuts.

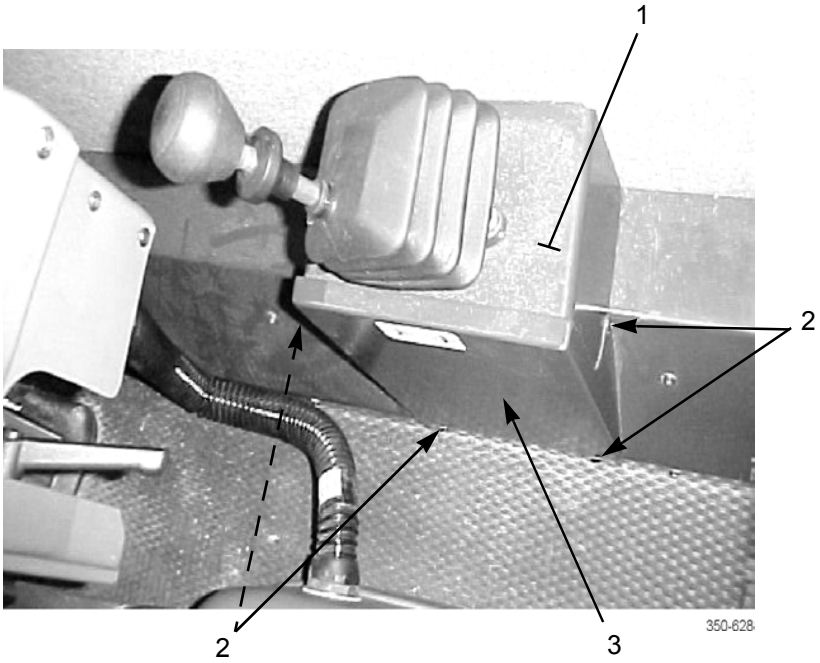


INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. If removed, install control valve bracket (1) to cab with two new locknuts (10).
2. Install control valve (4) to control valve bracket (1) with two screws (7), washers (6), and new locknuts (5).
3. Install switch (11) to control valve (4).
4. Connect two connectors (12) of wiring harness to switch (11).
5. Install three fittings (8) to control valve (4).
6. Connect three hydraulic hoses (9) to fittings (8).
7. Check level of oil in hydraulic reservoir and add oil as needed (LO 10-3930-675-12).
8. Start engine (TM 10-3930-675-10) and check for leaks.
9. Install cover (3) to control valve bracket (1) with four screws (2).



NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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PARKING BRAKE SYSTEM HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0123 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Brake hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-1) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

SERVICE BRAKE CONTROL VALVE REPLACEMENT 0124 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0183 00

WP 0186 00

References - Continued

WP 0196 00

WP 0194 00

Equipment Condition

Wheels chocked

Brake hydraulic system pressure relieved (WP 0164 00)

Steering column base and brake pedal disconnected from mounting and moved aside (WP 0130 00)

Brake light switch and pressure sensors removed (WP 0097 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

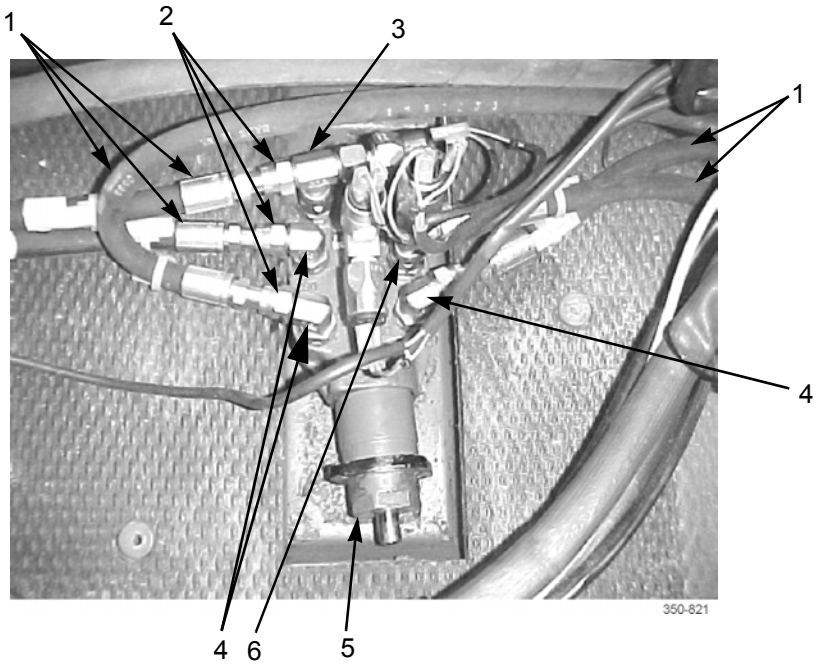
REMOVAL

1. Loosen fitting nut (2) of each hydraulic hose (1) and disconnect hydraulic hoses.

NOTE

Note position of tee fitting, adapter fittings, and elbow fittings to aid in installation.

2. Remove service brake control valve (5) from floor of cab.
3. Remove tee fitting (3), adapter fittings (6), and elbow fittings (4) from service brake control valve (5).



INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Install elbow fittings (4), adapter fittings (6), and tee fittings (3) on service brake control valve (5).
2. Position service brake control valve (5) on floor of cab.
3. Connect hydraulic hoses (1) and tighten fitting nuts (2).

INSTALLATION - CONTINUED

4. Install brake light switch and pressure sensors (WP 0097 00).
5. Install steering column base and brake pedal (WP 0130 00).
6. Check level of oil in hydraulic reservoir (LO 10-3930-675-12).
7. Start engine (TM 10-3930-675-10) and check for leaks.
8. Check pressure at hydraulic system test points (WP 0186 00).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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SERVICE BRAKE SYSTEM HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0125 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Brake hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

SERVICE BRAKE SYSTEM HYDRAULIC HOSES AND FITTINGS REPLACEMENT - CONTINUED 0125 00

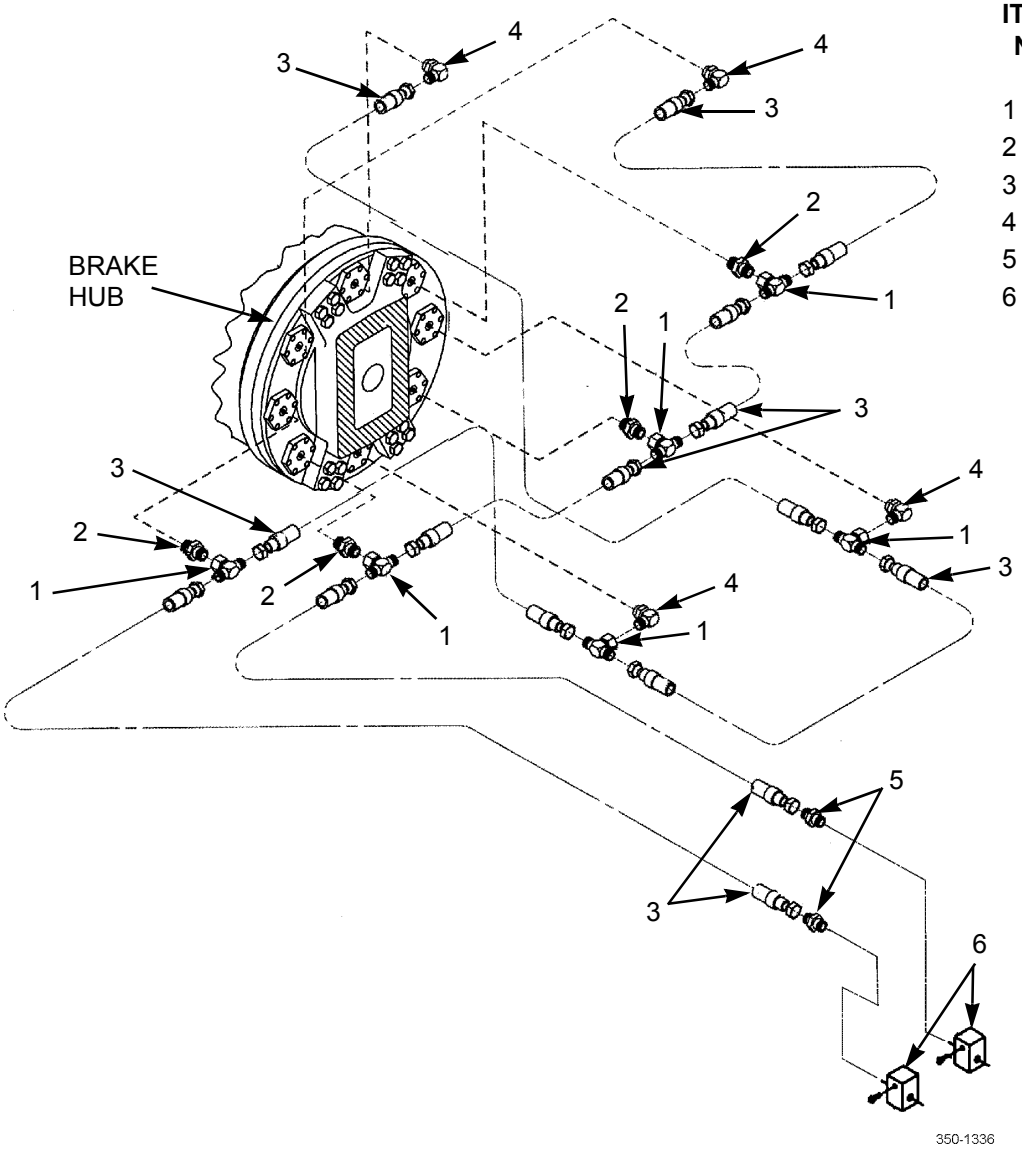
REMOVAL

1. Using illustration in this work package and foldout FO-2 as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.



ITEM NO.	DESCRIPTION
1	Tee
2	Nipple
3	Hydraulic Hose
4	Elbow
5	Adapter
6	Manifold

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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BRAKE COOLING FILTER AND FILTER HEAD REPLACEMENT 0126 00

THIS WORK PACKAGE COVERS

Brake Cooling Filter: Removal, Installation

Brake Cooling Filter Head: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, strap (Item 38, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Sealant, pipe (Item 23, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Filter, brake cooling (P/N 920130.0100) (2)

References

LO 10-3930-675-12

TM 10-3930-675-10

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Brake hydraulic system pressure relieved (WP 0164 (WP 0164 00)





WARNING

- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

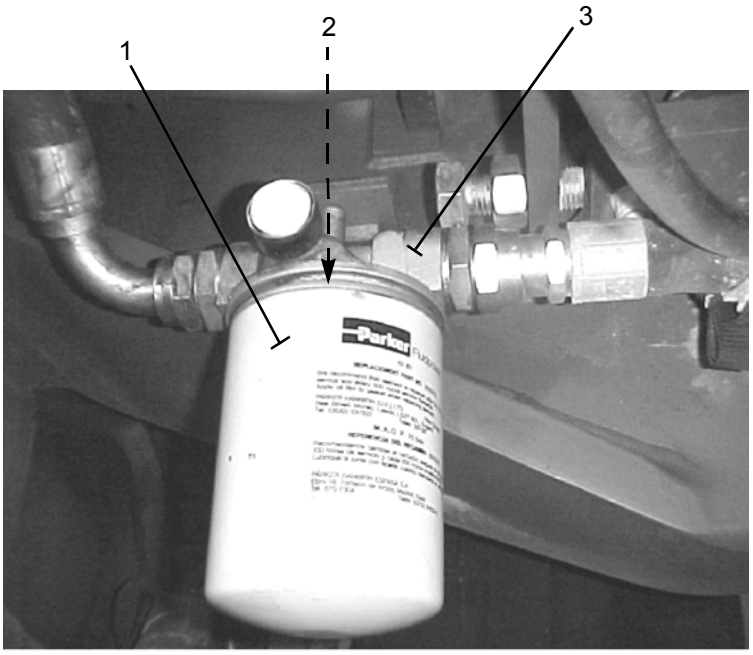
Wipe filter and surrounding area clean prior to removal. After filter removal, immediately install replacement filter or cover area with a clean rag. Contaminated hydraulic system could cause equipment failure.

BRAKE COOLING FILTER REMOVAL

NOTE

Two brake cooling filters are installed on vehicle: one at front and one at rear. Both are replaced in a similar manner. Front brake cooling filter is detailed below.

1. Position suitable container to catch hydraulic oil from lines.
2. Use a filter strap wrench to loosen brake cooling filter (1) and remove from filter head (3) by hand. Discard filter.



350-948

BRAKE COOLING FILTER INSTALLATION

NOTE

Ensure filter head mating surface is clean and free of residue.

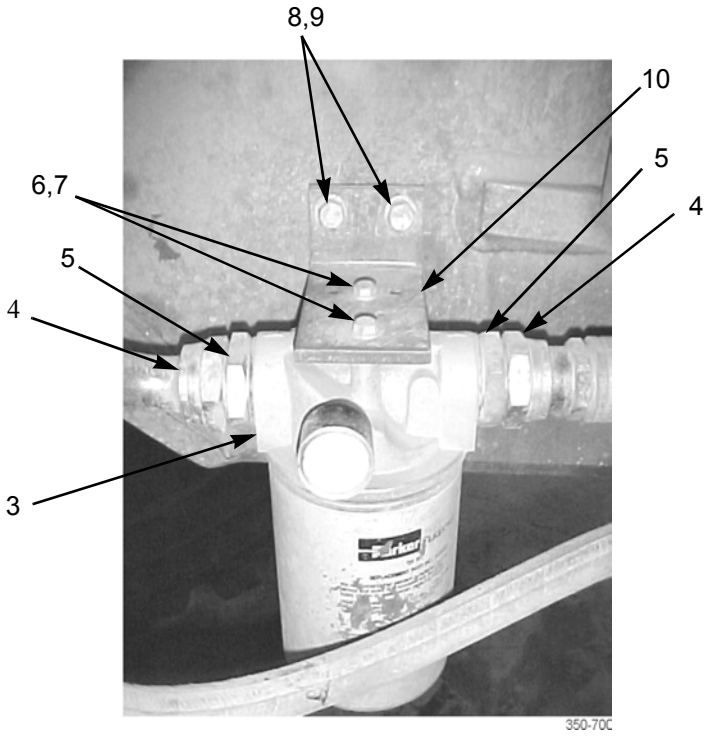
1. Apply a coat of lubricating oil to brake cooling filter seal (2) and fill filter with clean lubricating oil.
2. Install new brake cooling filter (1) on filter head (3) and tighten by hand.
3. Use a strap wrench to tighten brake cooling filter (1) an additional ½ to ¾ turn.
4. Check hydraulic oil level and add oil as needed (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.

BRAKE COOLING FILTER HEAD REMOVAL

NOTE

Tag all hydraulic lines.

1. Remove and discard brake cooling filter (refer to *Brake Cooling Filter Removal*).
2. Disconnect two hydraulic hoses (4).
3. Remove two adapter fittings (5) from filter head (3).
4. Remove two screws (6) and washers (7) securing filter head (3) to mounting bracket (10).
5. If damaged, remove two screws (8), washers (9), and mounting bracket (10) from vehicle.

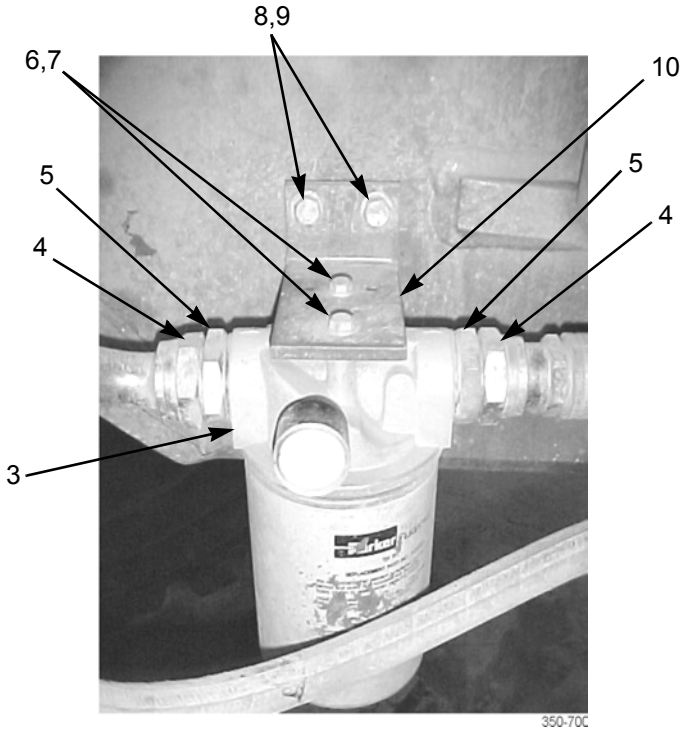


BRAKE COOLING FILTER HEAD INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. If mounting bracket (10) was removed, install bracket to vehicle with two washers (9) and screws (8).
2. Position filter head (3) on mounting bracket (10) and secure with two washers (7) and screws (6).
3. Apply pipe sealant to threads of two adapter fittings (5) and install in filter head (3).
4. Connect two hydraulic hoses (4) to filter head (3).



5. Install new brake cooling filter (refer to *Brake Cooling Filter Installation*).
6. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
7. Start engine (TM 10-3930-675-10) and check for hydraulic oil leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

BRAKE SYSTEM CHARGING VALVE PRESSURE ADJUSTMENT 0127 00

THIS WORK PACKAGE COVERS

Adjustment: Brake Circuit No. 1, Brake Circuit No. 2

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Personnel Required

Two

References

WP 0164 00

WP 0186 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

ADJUSTMENT, BRAKE CIRCUIT NO. 1

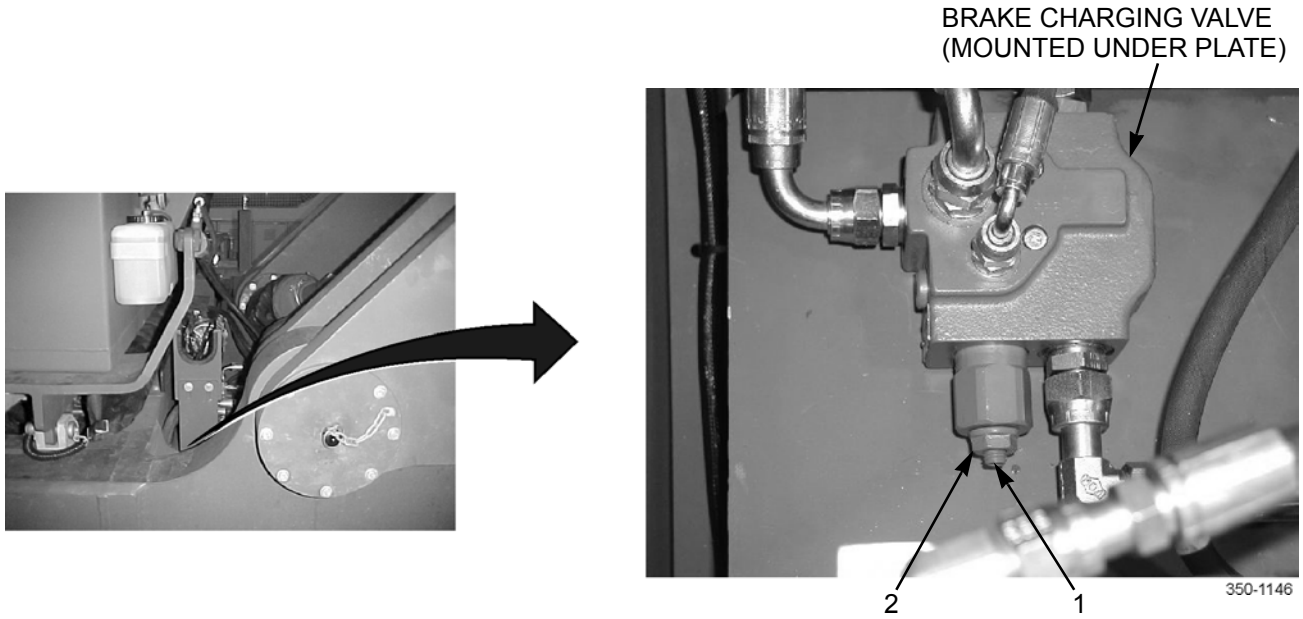
1. Relieve brake system hydraulic pressure by opening evacuation valves, then return valves to CLOSED position (WP 0164 00).
2. Connect hydraulic pressure test gage to hydraulic test point no. 1 (WP 0186 00).
3. Start engine (TM 10-3930-675-10).
4. Test gage indicator will jump to pre-charged accumulator pressure of 1305 psi (90 bar), then slowly increase to system pressure. If system pressure reaches 2900 psi (200 bar), OPEN evacuation valves (WP 0186 00).

ADJUSTMENT, BRAKE CIRCUIT NO. 1 - CONTINUED

WARNING

While adjusting brake charging valve, DO NOT remove adjusting screw from charging valve assembly. The system is under pressure and failure to follow this warning may cause serious injury.

5. Loosen adjusting screw jamnut (2) and slowly turn adjusting screw (1) until test gage indicates 1956-2538 psi (135-175 bar). Secure adjusting screw by tightening jamnut.



6. Shut down engine.
7. Relieve brake system hydraulic pressure by opening brake system evacuation valves (WP 0164 00).
8. Disconnect test gage from hydraulic test point no. 1 (WP 0186 00).
9. Close brake system evacuation valves (WP 0164 00).

ADJUSTMENT, BRAKE CIRCUIT NO. 2

1. Relieve brake system hydraulic pressure by opening evacuation valves, then return valves to CLOSED position (WP 0164 00).
2. Connect hydraulic pressure test gage to hydraulic test point no. 2 (WP 0186 00).
3. Start engine (TM 10-3930-675-10).
4. Test gage indicator will jump to pre-charged accumulator pressure of 1305 (90 bar), then slowly increase to system pressure. If system pressure reaches 2900 psi (200 bar), OPEN evacuation valves (WP 0186 00).

WARNING

While adjusting brake charging valve, DO NOT remove adjusting screw from charging valve assembly. The system is under pressure and failure to follow this warning may cause serious injury.

5. Loosen adjusting screw jamnut (2) and slowly turn adjusting screw (1) until test gage indicates 1956-2538 psi (135-175 bar). Secure adjusting screw by tightening jamnut.

ADJUSTMENT, BRAKE CIRCUIT NO. 2 - CONTINUED

6. Shut down engine.
7. Relieve brake system hydraulic pressure by opening brake system evacuation valves (WP 0164 00).
8. Disconnect test gage from hydraulic test point no. 2 (WP 0186 00).
9. Close brake system evacuation valves (WP 0164 00).

END OF WORK PACKAGE

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DOLLY WHEEL MAINTENANCE 0128 00

THIS WORK PACKAGE COVERS

Disassembly, Cleaning and Inspection, Assembly

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Detergent (Item 11, WP 0203 00)

Grease, GAA (Item 16, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

O-ring (P/N 923873.0008) (2)

Personnel Required

Two

References

LO 10-3930-675-12

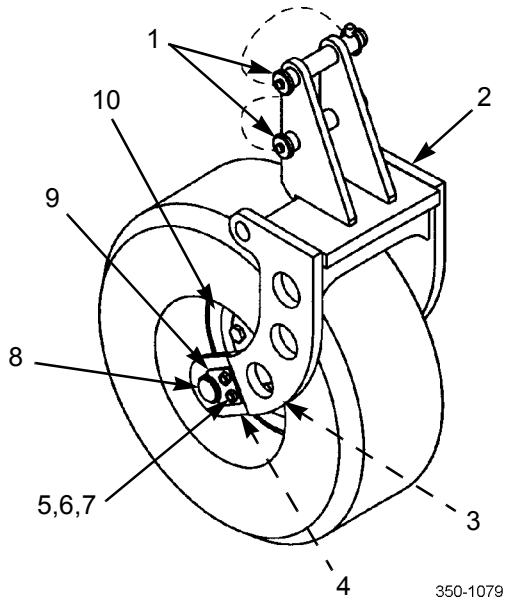
TM 9-2610-200-14

Equipment Condition

Dolly wheel removed from battery and dolly wheels storage compartment (TM 10-3930-675-10)

DISASSEMBLY

10. Remove two nuts (7), washers (6), screws (5), and retainer (9) from each end of axle shaft (8).
11. Remove axle shaft (8), wheel (10), and two o-rings (4) from bracket (2). Discard o-rings.
12. Remove grease fitting (3) from hub of wheel (10).



CLEANING AND INSPECTION

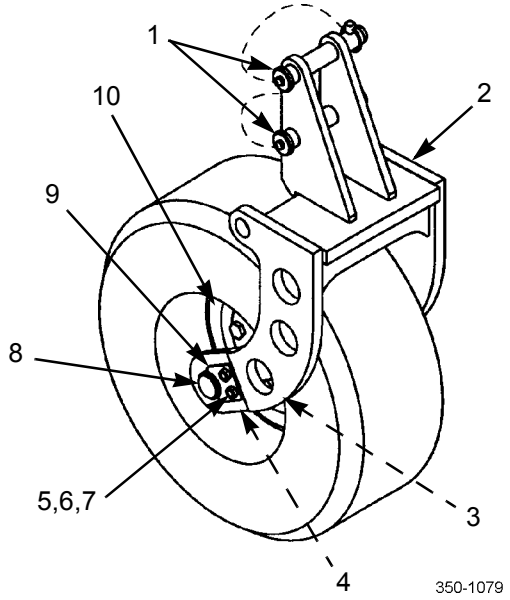
1. Clean tire, wheel, axle shaft, bracket, and two mounting pins (1) with detergent and water. Dry with clean rags.
2. Inspect components for excessive corrosion and damage. Replace defective components.

CLEANING AND INSPECTION - CONTINUED

3. For tire maintenance, refer to TM 9-2610-200-14.

ASSEMBLY

1. Install grease fitting (3) to hub of wheel (10).
2. Apply a thin coat of grease to two new o-rings (4) and position one o-ring on each side of hub of wheel (10).
3. Apply a thin coat of grease to bearing surface of axle shaft (8) and install axle shaft thru bracket (2) and wheel (10). Rotate axle shaft, as necessary, until fully seated.
4. Install retainer (9) to each end of axle shaft (8) with two screws (5), washers (6), and nuts (7).
5. Position each of two o-rings (4) against surface of bracket (2).



6. Lubricate dolly wheel (LO 10-3930-675-12).
7. Return dolly wheel to battery and dolly wheels storage compartment (TM 10-3930-675-10).

END OF WORK PACKAGE

STEERING WHEEL REPLACEMENT 0129 00

THIS WORK PACKAGE COVERS

Removal, Installation

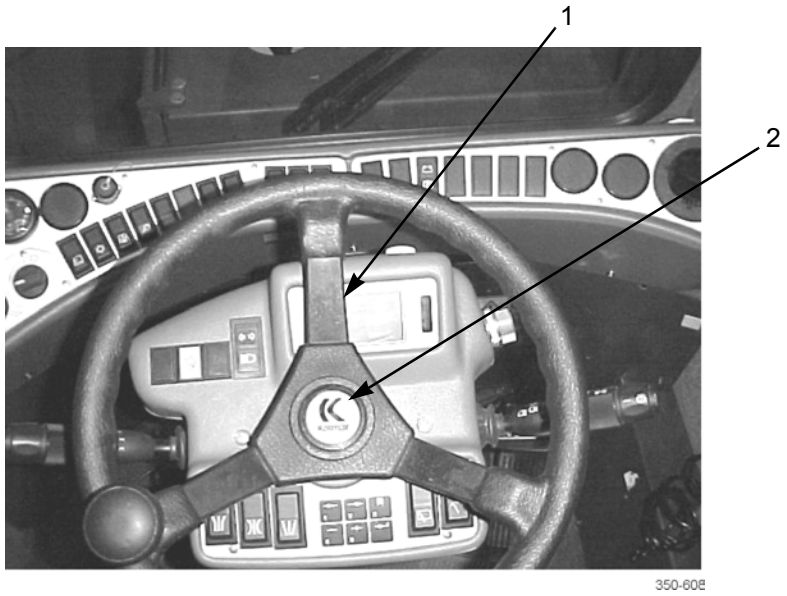
INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

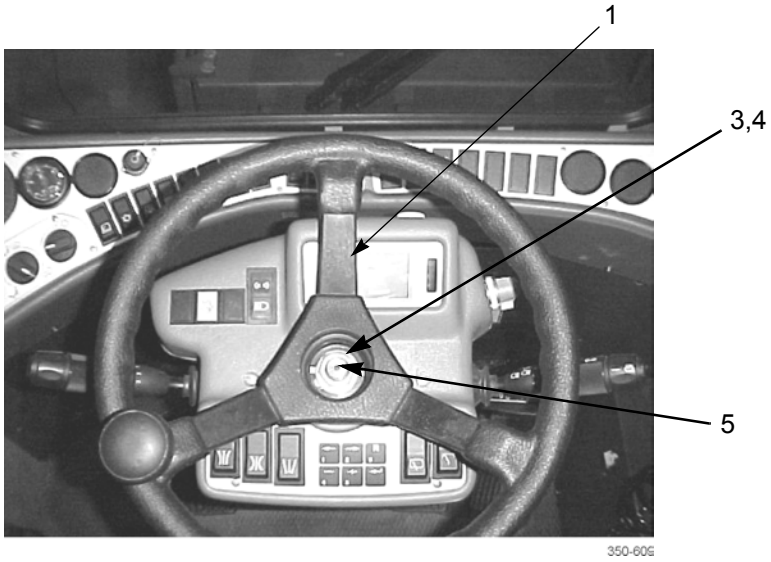
REMOVAL

1. Lift insert (2) from center of steering wheel (1).



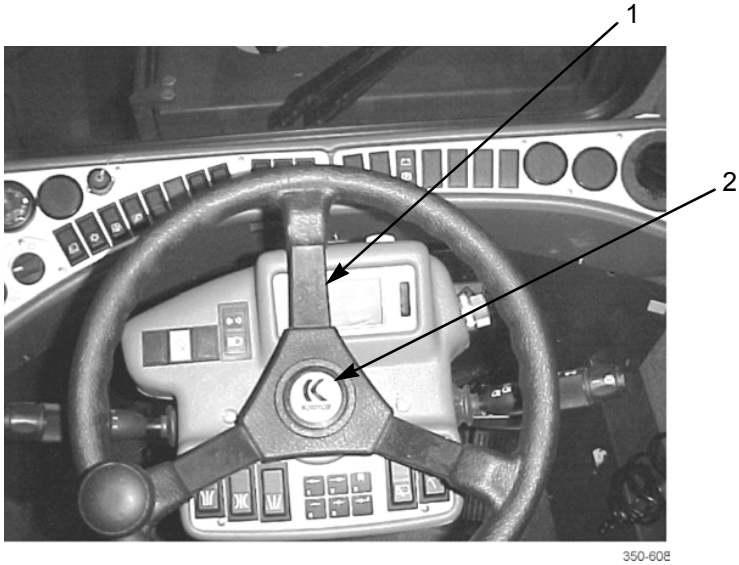
REMOVAL - CONTINUED

2. Remove nut (3) and washer (4) from steering shaft (5).
3. Remove steering wheel (1) from steering shaft (5).



INSTALLATION

1. Position steering wheel (1) on steering shaft (5).
2. Install washer (4) and nut (3) on steering shaft (5).
3. Press insert (2) into center of steering wheel (1).



END OF WORK PACKAGE

STEERING COLUMN BASE AND BRAKE PEDAL MAINTENANCE 0130 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

References

WP 0061 00

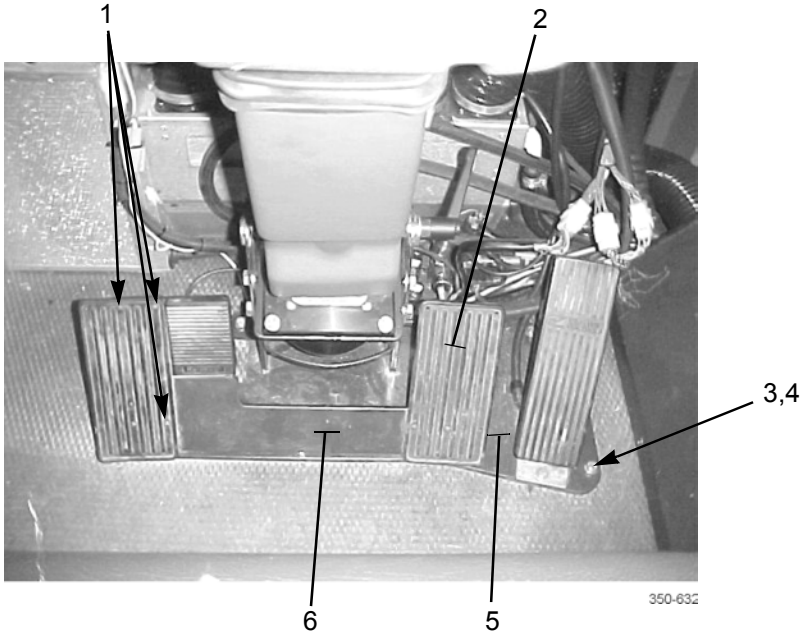
WP 0096 00

Equipment Condition

Steering column removed (WP 0131 00)

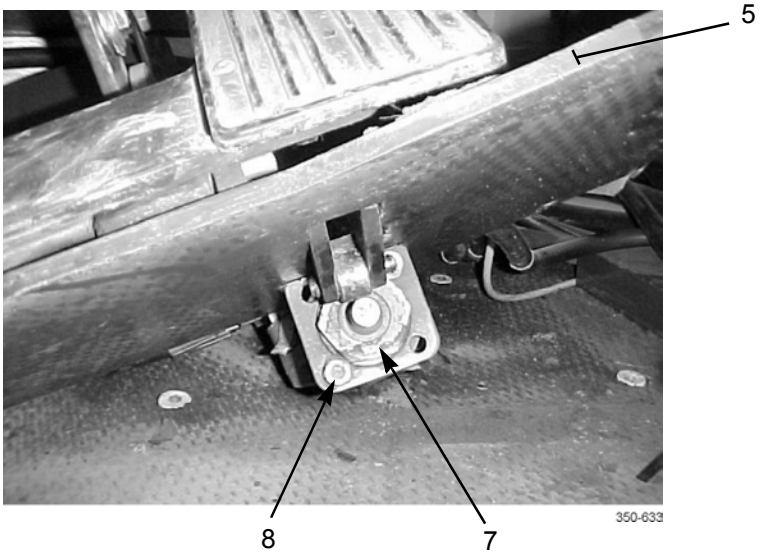
REMOVAL

1. Remove six screws (1) and two extension plates (2) from brake pedal (6).
2. Remove five screws (3) and washers (4) to separate steering column base (5) from floor of cab.



REMOVAL - CONTINUED

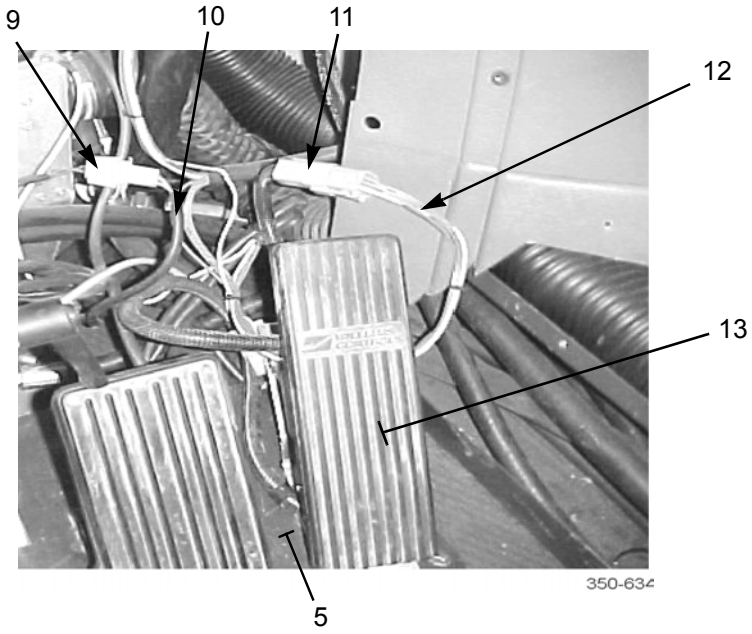
3. Pull up on steering column base (5) and support in upward position for access to brake valve (7) underneath.
4. Remove two screws (8) and separate steering column base (5) from brake valve (7).



NOTE

Remove and discard tiedown straps as necessary.

5. Disconnect connector (11) of throttle position sensor (13) from wiring harness (12).
6. Disconnect connector (9) of brake inching switch from wiring harness (10).
7. Remove steering column base (5) from vehicle.



DISASSEMBLY

1. Remove brake inching switch from brake pedal (WP 0096 00).
2. Remove throttle position sensor from steering column base (WP 0061 00).

WARNING

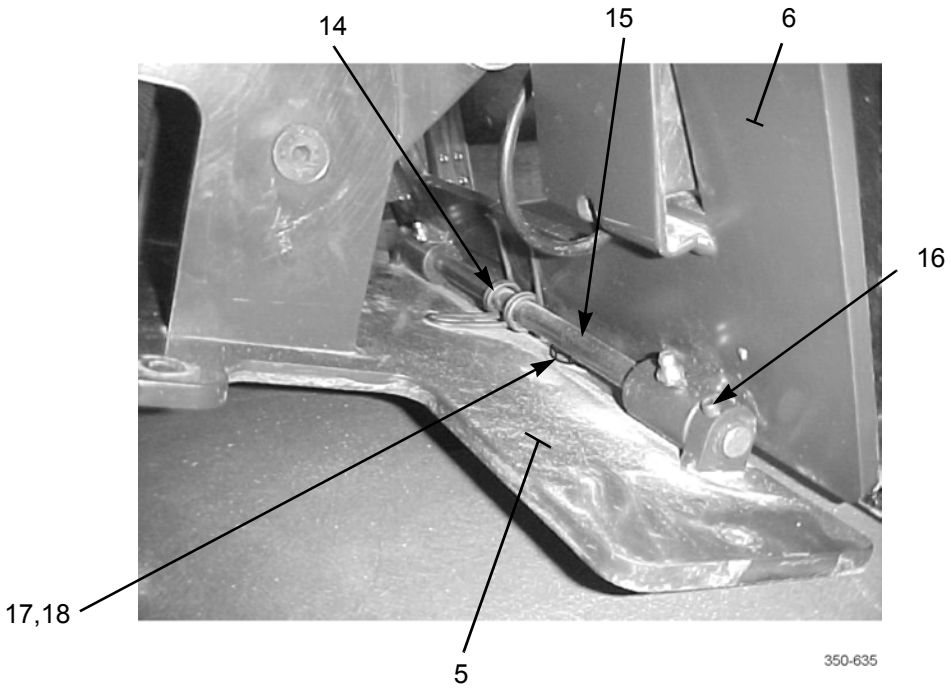
Spring is under tension. Use care when removing spring. Wear protective eyewear to prevent injury.

3. Remove two setscrews (16), pivot rod (15), spring (14), and brake pedal (6) from hinges of steering column base (5).

NOTE

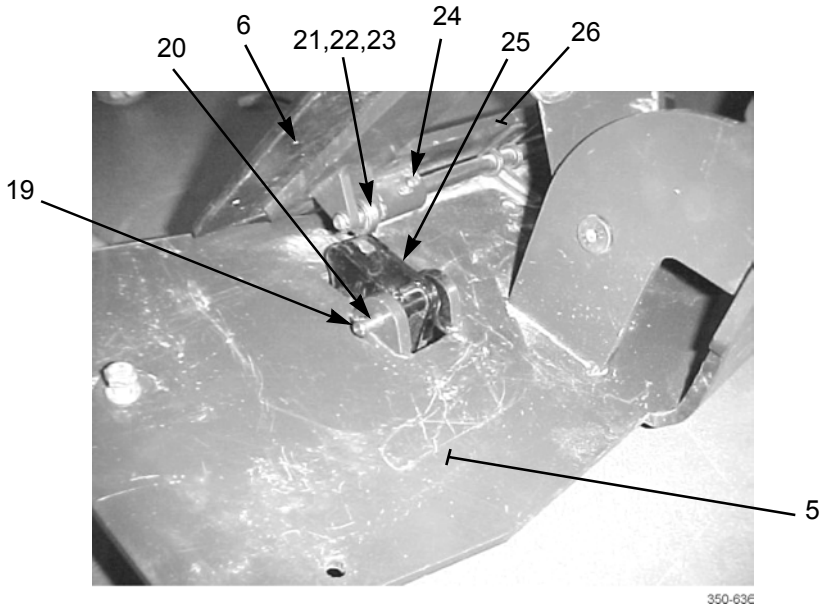
Note position of screw and jamnut for ease in assembly.

4. Remove screw (17) and jamnut (18) from steering column base (5).

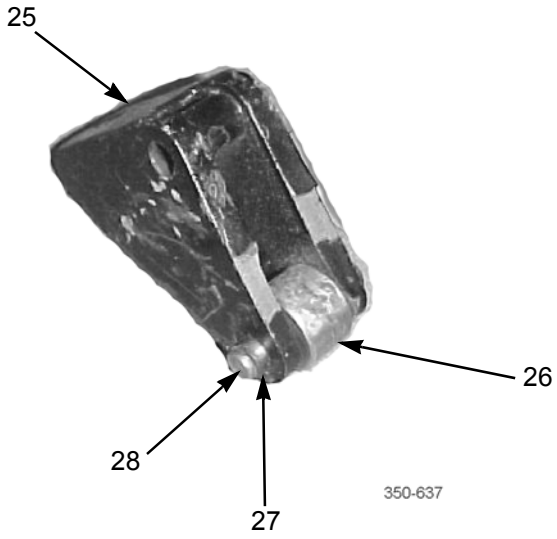


DISASSEMBLY - CONTINUED

5. Remove two retaining rings (19), shaft (20), and lever (25) from steering column base (5).



6. Remove two retaining rings (27), shaft (28), and roller (26) from lever (25).



7. Remove two retaining rings (21), shaft (22), and roller (23) from brake pedal (6).

8. Remove two grease fittings (24) from brake pedal (6).

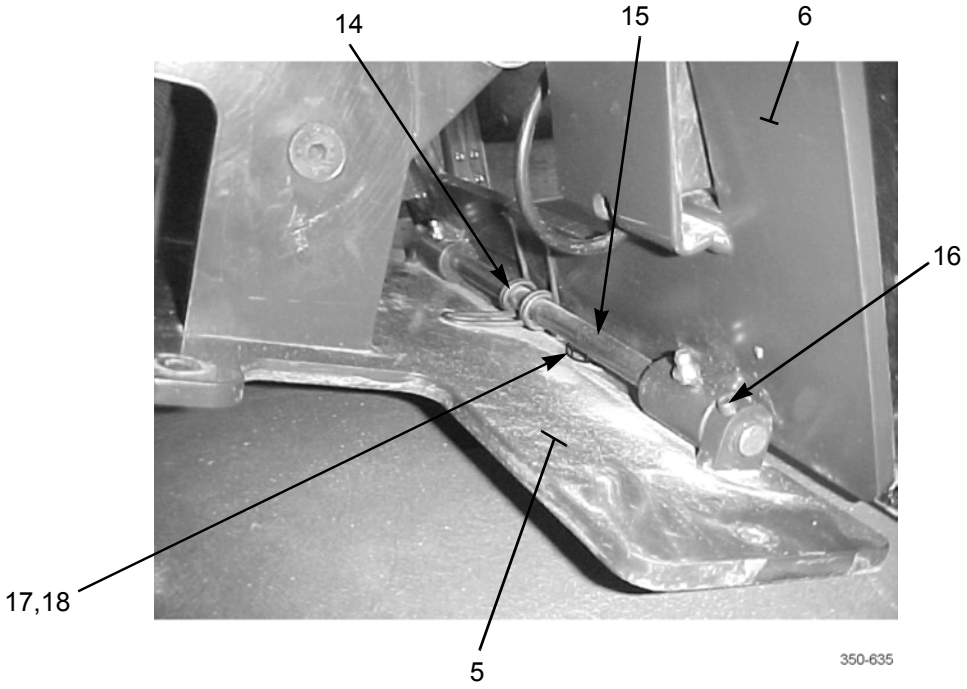
ASSEMBLY

1. Install two grease fittings (24) to brake pedal (6).
2. Install roller (23) and shaft (22) to brake pedal (6) with two retaining rings (21).
3. Install roller (26) and shaft (28) to lever (25) with two retaining rings (27).
4. Install lever (25) and shaft (20) to steering column base (5) with two retaining rings (19).
5. Install jamnut (18) and screw (17) to steering column base (5) in position noted during disassembly.

WARNING

Spring must be placed under tension. Use care when installing spring. Wear protective eyewear to prevent injury.

6. Install brake pedal (6) and spring (14) to steering column base (5) with pivot rod (15) and two setscrews (16).



7. Install throttle position sensor to steering column base (WP 0061 00).
8. Install brake inching switch to brake pedal (WP 0096 00).

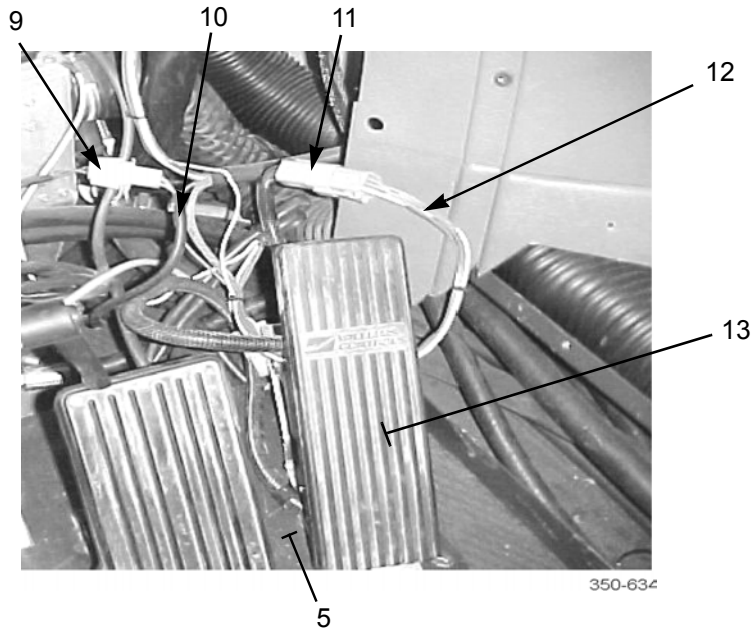
INSTALLATION

1. Position steering column base (5) to floor of cab.

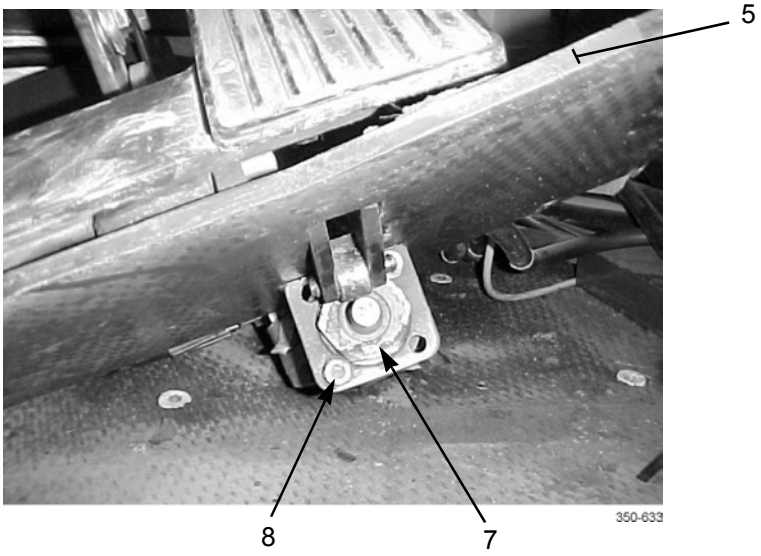
NOTE

- Use electrically conductive grease on connectors before connection is made.
- Install new tiedown straps as necessary.

2. Connect connector (9) of brake inching switch to wiring harness (10).
3. Connect connector (11) of throttle position sensor (13) to wiring harness (12).

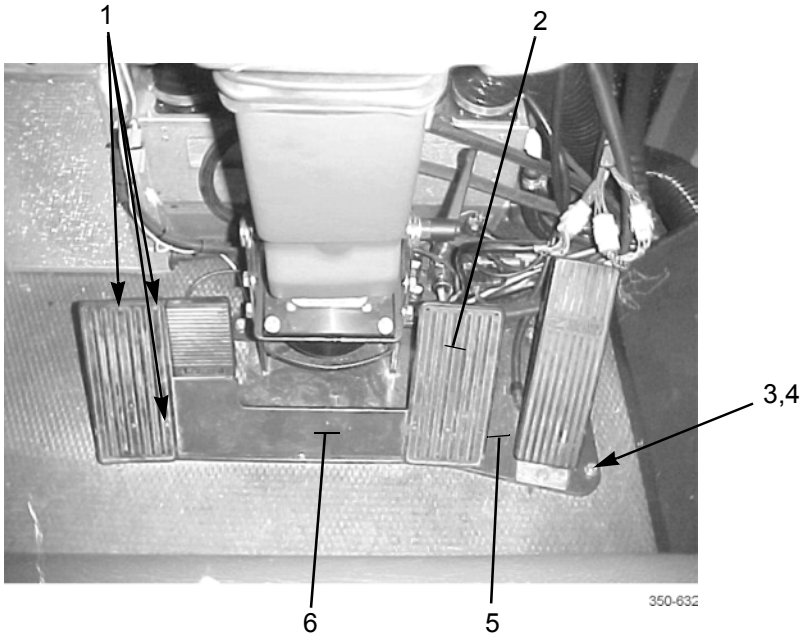


4. Install steering column base (5) to brake valve (7) with two screws (8).



INSTALLATION - CONTINUED

5. Install steering column base (5) to floor of cab with five washers (4) and screws (3).
6. Install two extension plates (2) to brake pedal (6) with six screws (1).



7. Install steering column (WP 0131 00).

END OF WORK PACKAGE

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STEERING COLUMN REPLACEMENT 0131 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Grease, electrically conductive (Item 17, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Materials/Parts - Continued

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 923828.0657) (4)

Equipment Condition

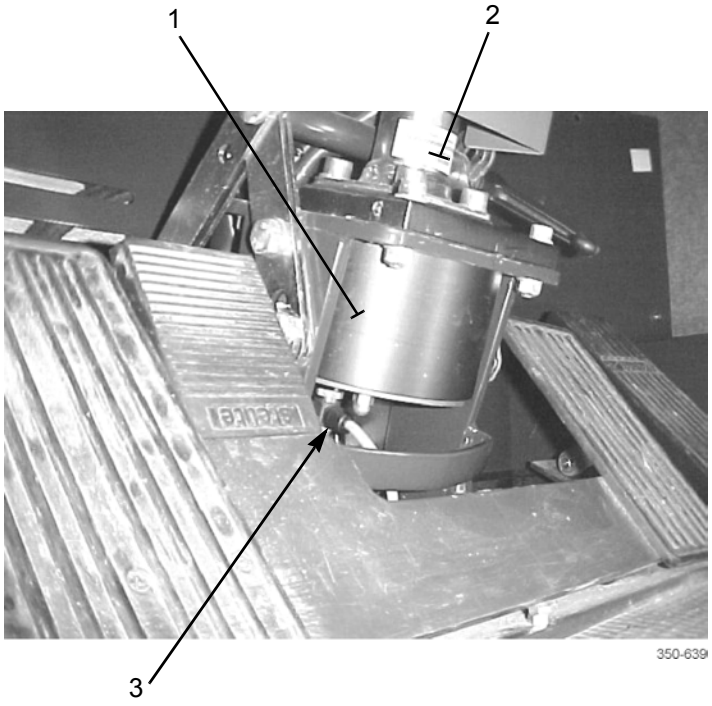
Transmission and accessory control levers removed (WP 0112 00)

REMOVAL

NOTE

Tag wires and connectors for installation.

1. Disconnect connector (3) of cable from steering column sensor (1) at lower end of steering column (2).



REMOVAL - CONTINUED

NOTE

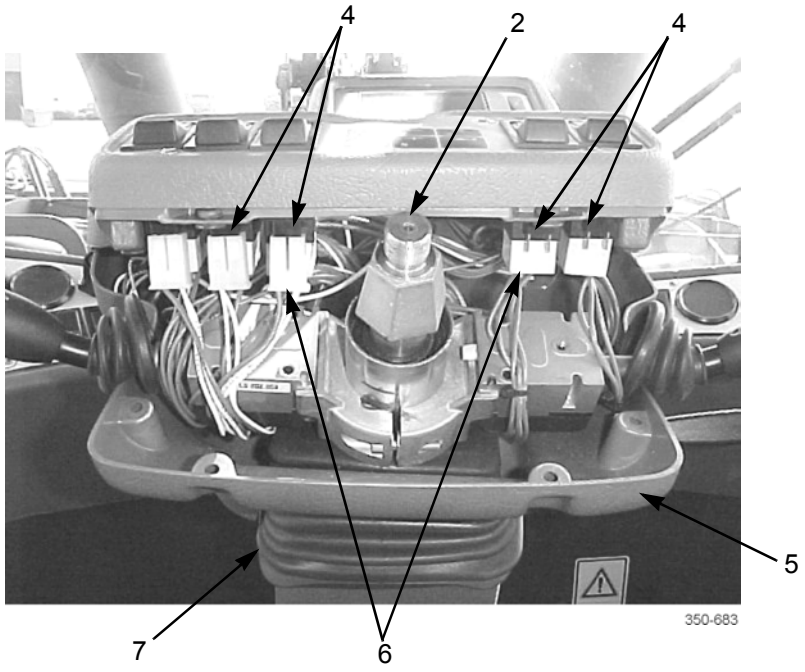
Perform steps 2 and 3 at rear of top plastic housing.

2. Disconnect eight connectors (6) from five switches (4).

NOTE

Remove and discard tiedown straps as necessary.

3. Pull each of eight connectors (6) down thru bottom plastic housing (5), rubber bellows (7), and away from steering column (2).



NOTE

Perform steps 4 thru 7 at front of top plastic housing.

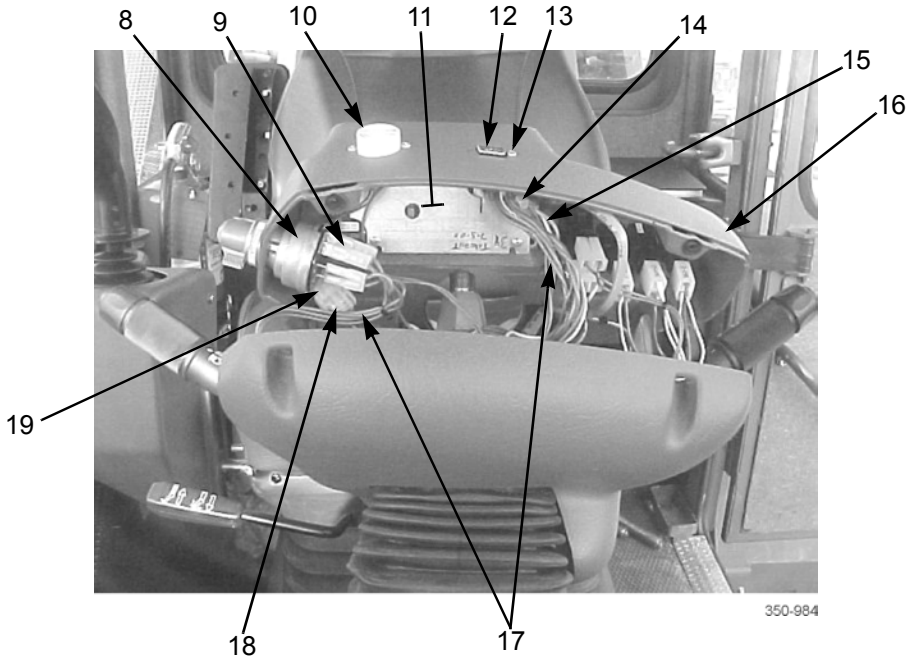
4. At top plastic housing (16) of steering column, disconnect four connectors (9) of steering column wiring harness (17) from rear of ignition switch (8).

5. Disconnect connector (18) of steering column wiring harness (17) from connector (19) of warning buzzer (10).

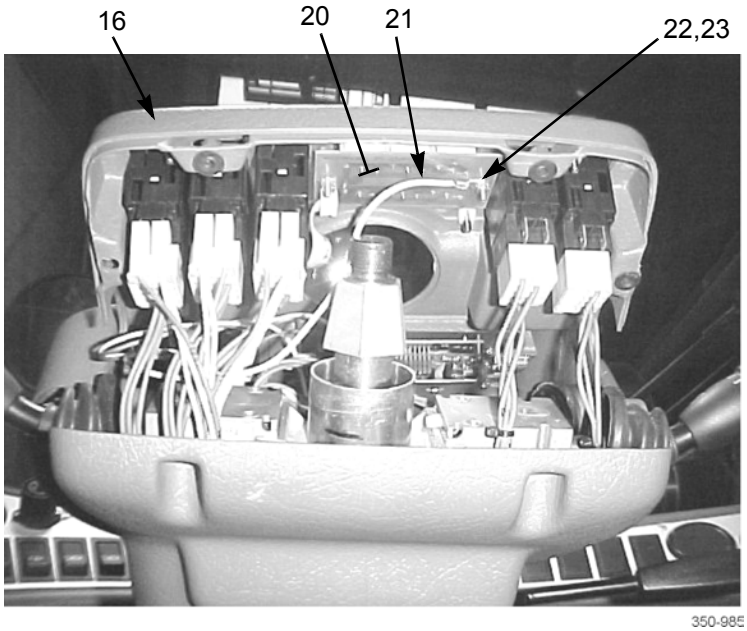
6. Remove two screws (13) and remove test connector (12).

7. Disconnect ground connector (15) and connector (14) of steering column wiring harness (17) from rear of ECS display screen (11).

REMOVAL - CONTINUED

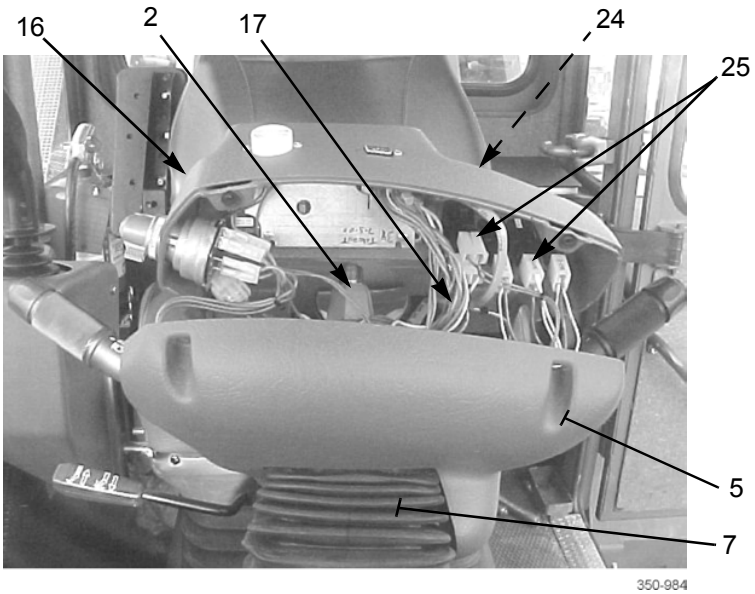


8. Trace one of two ground wires (21) down to transmission indicator light panel (20) at rear of top plastic housing (16).
9. Remove nut (22), lockwasher (23), and ground wire (21) from transmission indicator light panel (20).

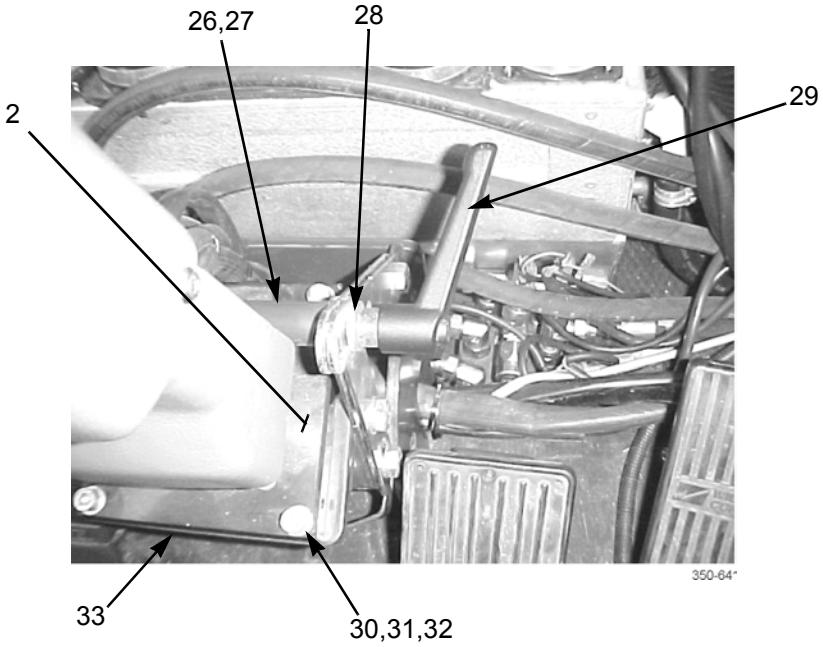


REMOVAL - CONTINUED

10. Disconnect five connectors (25) of steering column wiring harness (17) from five indicator lights (24).
11. Pull each of 13 connectors at front of top plastic housing (16) down thru bottom plastic housing (5), rubber bellows (7), and away from steering column (2).
12. Remove top plastic housing (16) and bottom plastic housing (5) from steering column (2).



13. Remove lever (29), washer (28), bolt (27), and tube (26) from steering column base (33).
14. Remove four locknuts (30), screws (31), eight washers (32), and steering column (2) from steering column base (33). Discard locknuts.



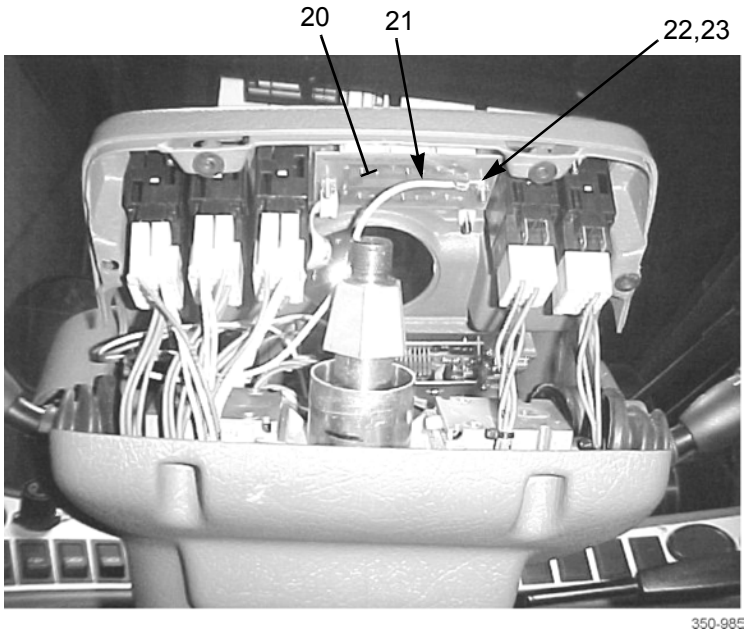
INSTALLATION

1. Install steering column (2) to steering column base (33) with eight washers (32), four screws (31), and new locknuts (30).
2. Install tube (26), bolt (27), washer (28), and lever (29) to steering column base (33).
3. Position bottom plastic housing (5) and top plastic housing (16) to steering column (2).
4. Position each of 13 connectors to steering column (2), thru rubber bellows (7), and up thru bottom plastic housing (5) to front of top plastic housing (16).

NOTE

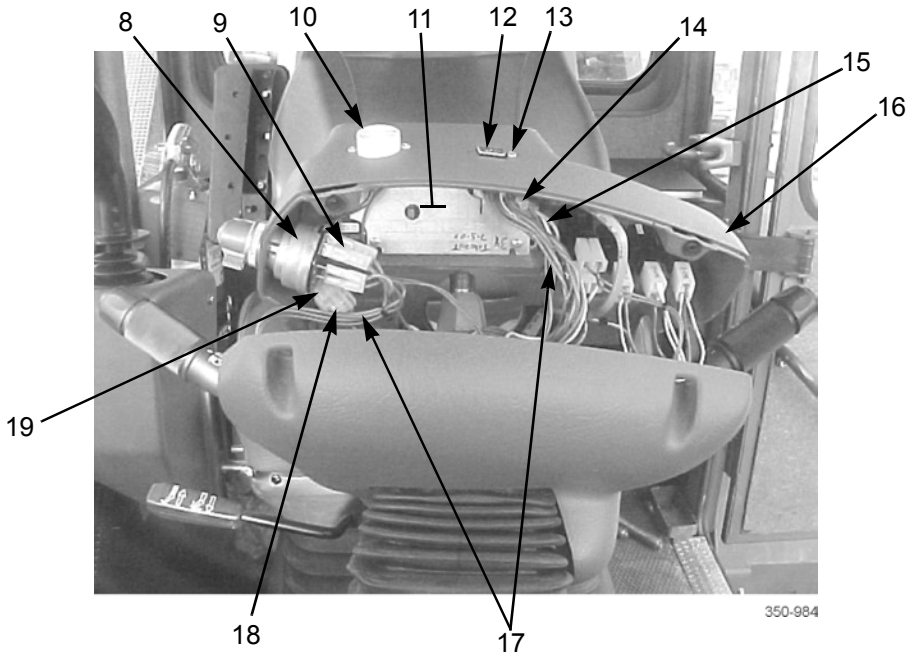
- Perform steps 5 thru 10 at front of top plastic housing.
- Apply electrically conductive grease to connectors before connections are made.

5. Connect five connectors (25) of steering column wiring harness (17) to five indicator lights (24).
6. Connect ground wire (21) to transmission indicator light panel (20) with lockwasher (23) and nut (22).

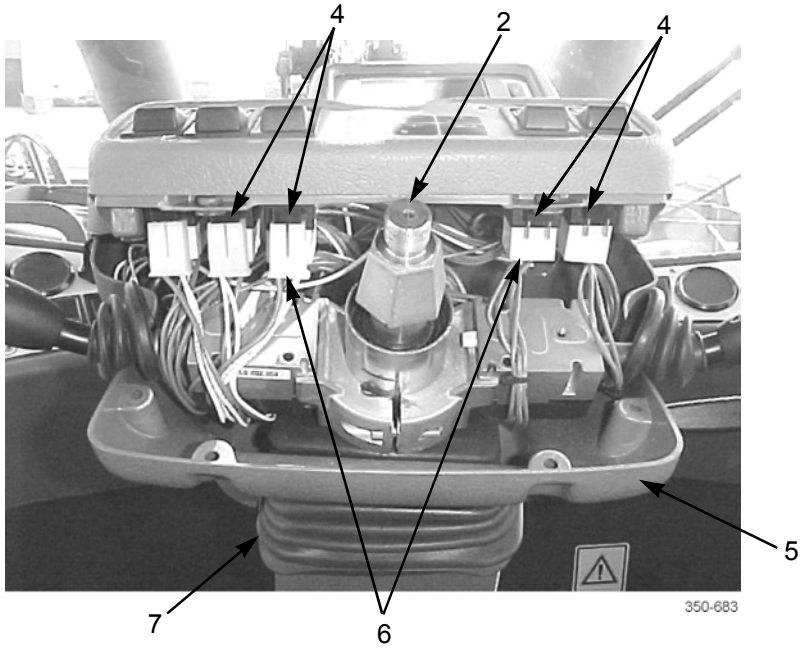


INSTALLATION - CONTINUED

7. Connect connector (14) and ground connector (15) of steering column wiring harness (17) to rear of ECS display screen (11).
8. Install test connector (12) with two screws (13).
9. Connect connector (18) of steering column wiring harness (17) to connector (19) of warning buzzer (10).
10. Connect four connectors (9) of steering column wiring harness (17) to rear of ignition switch (8).



11. Position each of eight connectors (6) to steering column (2), thru rubber bellows (7), and up thru bottom plastic housing (5).

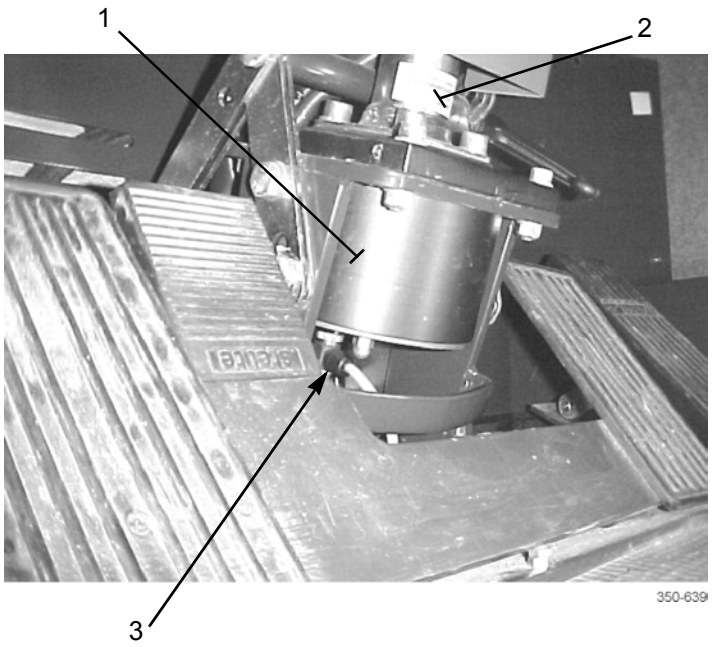


INSTALLATION - CONTINUED

NOTE

- Install new tiedown straps as necessary.
- Perform step 12 at rear of top plastic housing.

12. Connect eight connectors (6) to five switches (4).
13. Connect connector (3) of cable to steering column sensor (1) at lower end of steering column (2).



14. Install transmission and accessory control levers (WP 0112 00).

END OF WORK PACKAGE

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STEERING SYSTEM HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0132 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

Steering hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Close hydraulic reservoir ball valve (25) (refer to foldout, FO-3).
2. Using illustration (refer to foldout, FO-3) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

3. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
4. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Open hydraulic reservoir ball valve (25).
5. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
6. Start engine (TM 10-3930-675-10), operate steering, and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

FRONT AND REAR AXLE STEERING CYLINDERS REPLACEMENT 0133 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Compound, antiseize (Item 6, WP 0203 00)

Grease, GAA (Item 16, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

O-ring (P/N 923873.0001) (front) (2)

O-ring (P/N 923873.0007) (rear) (2)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

WP 0196 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

Steering hydraulic system pressure relieved (WP 0164 00)

Hydraulic reservoir ball valve in closed position (WP 0132 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

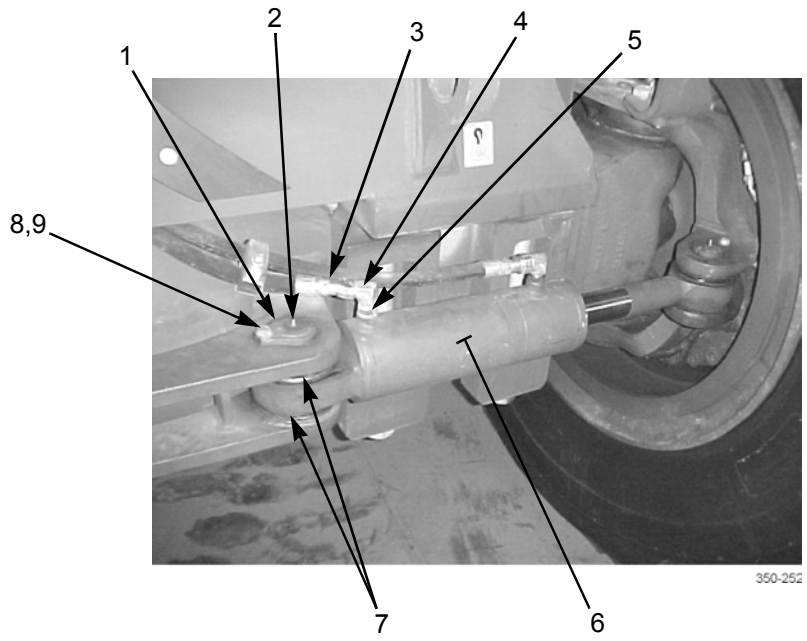
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Front and rear steering cylinders are replaced in same manner, but are NOT interchangeable.
- Tag all hydraulic lines

REMOVAL

1. Disconnect two hydraulic hoses (3) from two elbows (4).
2. Cap/plug both hydraulic hoses (3).
3. Loosen jamnuts (5) and remove two elbows (4).
4. Remove bolt (8) and washer (9).
5. Using a hammer, tap out shaft (1) and remove grease fitting (2).
6. Remove and discard two o-rings (7).
7. Repeat steps 4 thru 6 for opposite end of cylinder (6).
8. Remove cylinder (6).



INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate two new o-rings (7) with lubricating oil.
2. Apply antiseize compound on shaft (1).
3. Aline cylinder (6) end and two o-rings (7) to mounting bracket so that shaft (1) can be installed.
4. Tap shaft (1) into place using hammer and install grease fitting (2).
5. Install washer (9) and bolt (8).
6. Repeat steps 1 thru 5 for opposite end of cylinder (6).
7. Install two elbows (4) and tighten jamnuts (5).
8. Remove cap/plug from two hydraulic hoses (3) and install hoses on two elbows (4).

INSTALLATION - CONTINUED

9. Open hydraulic reservoir ball valve (WP 0132 00).
10. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
11. Lubricate grease fittings (2) with GAA (LO 10-3930-675-12).
12. Start engine (TM 10-3930-675-10), check steering operation, and check for leaks.
13. Perform steering calibration (WP 0196 00).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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STEERING COLUMN SENSOR REPLACEMENT 0134 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

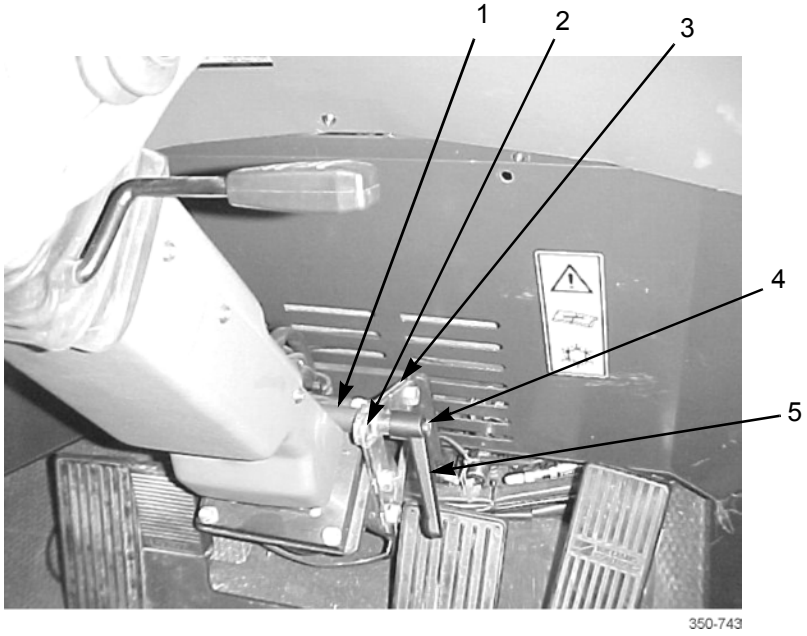
Master battery switch in OFF position

Materials/Parts

Nut, lock (P/N 923828.0657) (4)

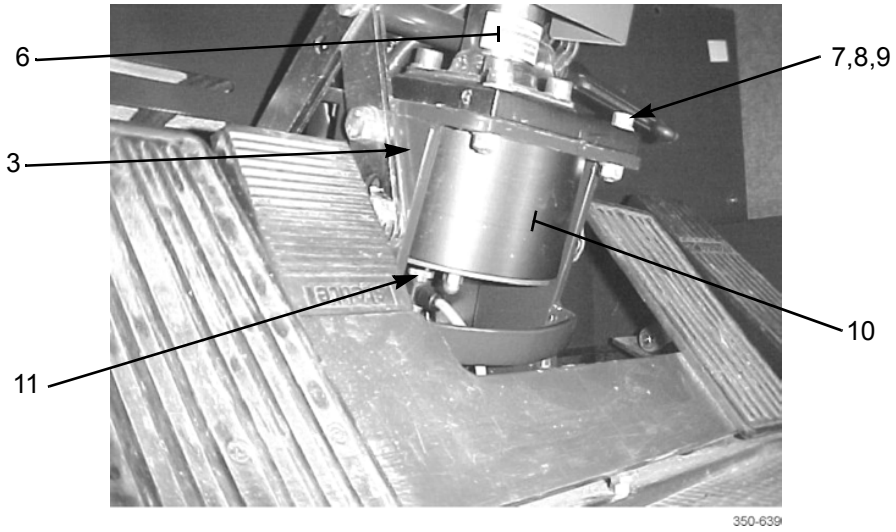
REMOVAL

1. Remove lever (5), washer (2), bolt (4), and tube (1) from steering column base (3).



REMOVAL - CONTINUED

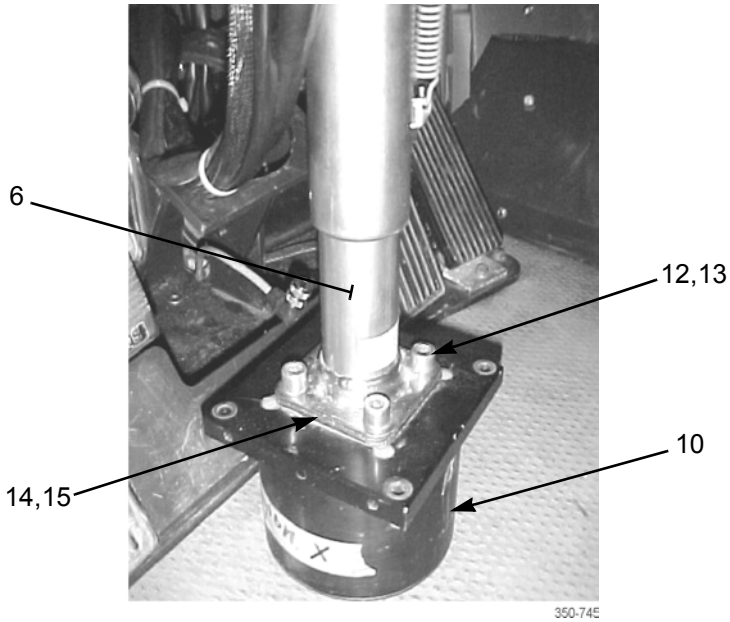
2. Disconnect connector (11) of cable from steering column sensor (10).
3. Remove four locknuts (7), screws (8), and eight washers (9). Discard locknuts.
4. Lift steering column (6) out of steering column base (3).



NOTE

Note steering column and sensor alinement.

5. Remove four screws (12) and washers (13) from steering column (6).
6. Remove steering column sensor (10), paper gasket (14), and metal plate (15) from steering column (6).

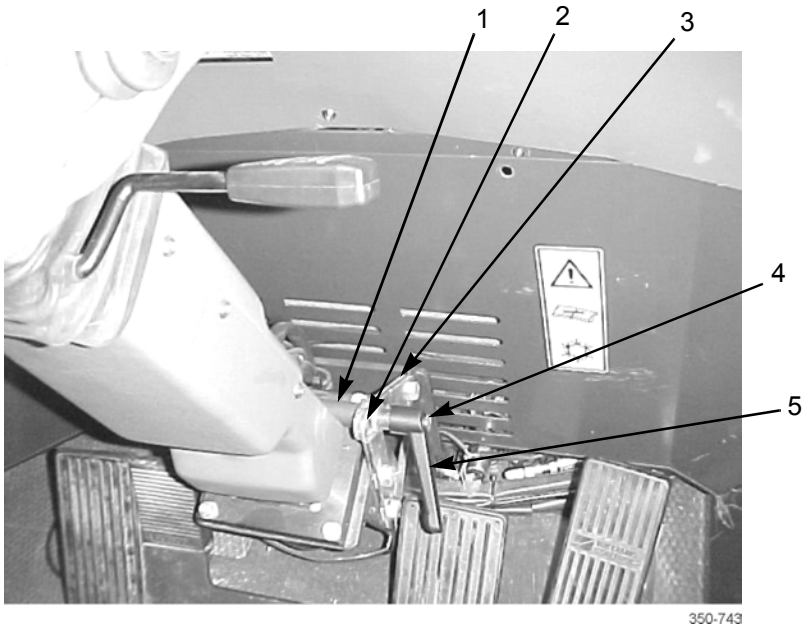


INSTALLATION

NOTE

TOP mark on plate must face forward with connector in lowest possible position.

1. Position metal plate (15), paper gasket (14), and steering column sensor (10) to steering column (6).
2. Install four washers (13) and screws (12) to steering column (6).
3. Position steering column (6) into steering column base (3).
4. Install eight washers (9), four screws (8), and new locknuts (7).
5. Connect connector (11) of cable to steering column sensor (10).
6. Install tube (1), bolt (4), washer (2), and lever (5) to steering column base (3).



END OF WORK PACKAGE

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TRANSMISSION SKID PLATE AND ACCESS COVERS REPLACEMENT 0135 00

THIS WORK PACKAGE COVERS

Skid Plate: Removal, Installation

Front Access Cover: Removal, Installation

Middle Access Cover and Cab Support: Removal, Installation

Rear Access Cover: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Jack, hydraulic, hand: 12 ton capacity (Item 14, WP 0204 00)

Materials/Parts:

Nut, lock (P/N 920076.003) (4)

Nut, lock (P/N 920076.007) (16)

Washer, lock (P/N 923657.0005) (8)

Personnel Required

Two

References

WP 0075 00

WP 0143 00

Equipment Condition

Wheels chocked

Cab in transport position, if replacing access covers (TM 10-3930-675-10)



WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Failure to follow this warning may result in injury to personnel.

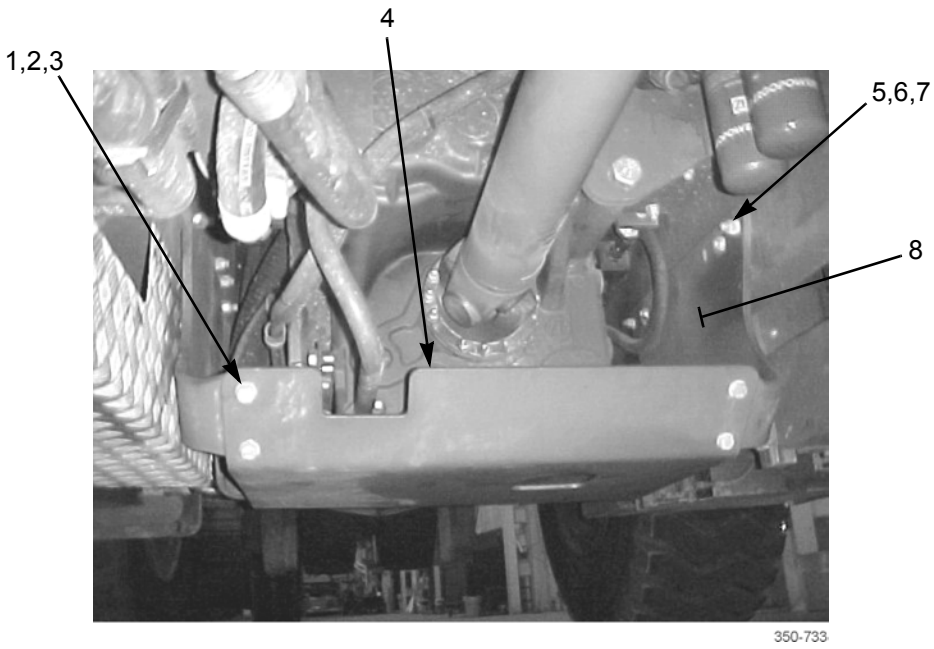
SKID PLATE REMOVAL

1. Position floor jack under center of skid plate (4). Raise jack until it contacts skid plate.
2. Remove eight locknuts (1), screws (2), and 16 washers (3). Discard locknuts.
3. Lower jack and remove skid plate (4) from skid plate brackets (8).

NOTE

Perform step 4 for each of two skid plate brackets.

4. Remove two locknuts (5), screws (6), four lockwashers (7), and skid plate bracket (8) from vehicle. Discard locknuts and lockwashers.



SKID PLATE INSTALLATION

NOTE

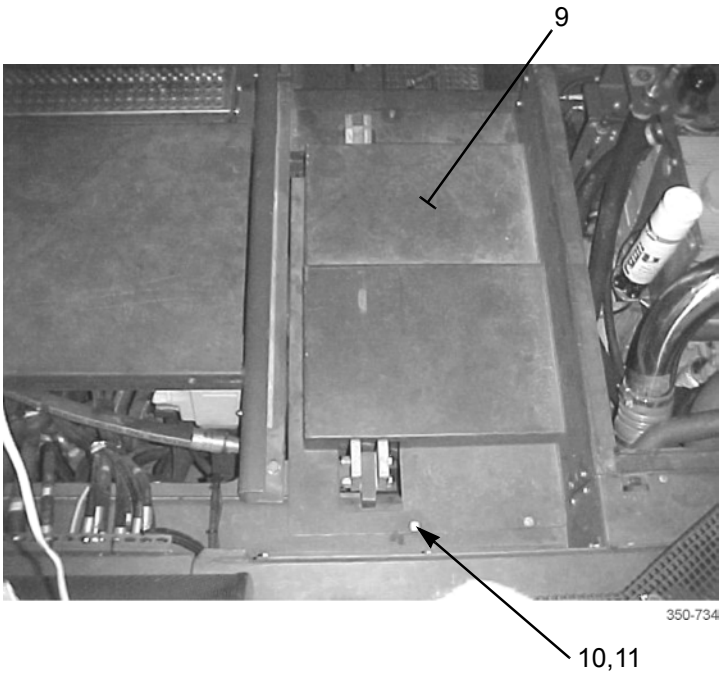
Perform step 1 for each of two skid plate brackets.

1. Install skid plate bracket (8) to vehicle with four new lockwashers (7), two screws (6), and new locknuts (5).
2. Using jack, position skid plate (4) to skid plate brackets (8).
3. Install 16 washers (3), eight screws (2), and new locknuts (1).

FRONT ACCESS COVER REMOVAL

1. Remove engine cover (WP 0143 00).
2. Remove eight screws (10), washers (11), and front access cover (9) from vehicle.

FRONT ACCESS COVER REMOVAL - CONTINUED

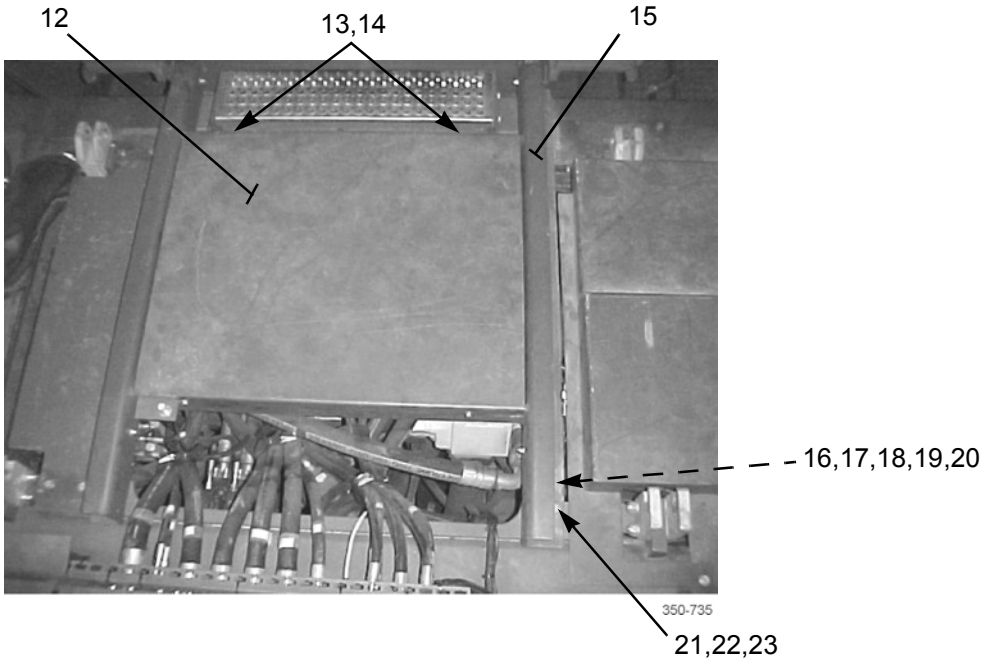


FRONT ACCESS COVER INSTALLATION

1. Install front access cover (9) to vehicle with eight washers (11) and screws (10).
2. Install engine cover (WP 0143 00).
3. Return cab to operational position (TM 10-3930-675-10).

MIDDLE ACCESS COVER AND CAB SUPPORT REMOVAL

1. Remove two screws (13) and washers (14) from middle access cover (12).
2. Remove middle access cover (12) from cab support (15).
3. Remove cab support-mounted cab position proximity switch (WP 0075 00).
4. Remove four locknuts (21), screws (22), eight washers (23), and cab support (15) from vehicle. Discard locknuts.
5. Remove four locknuts (16), screws (17), eight washers (18), two angle plates (19), and two shims (20) from cab support (15). Discard locknuts.

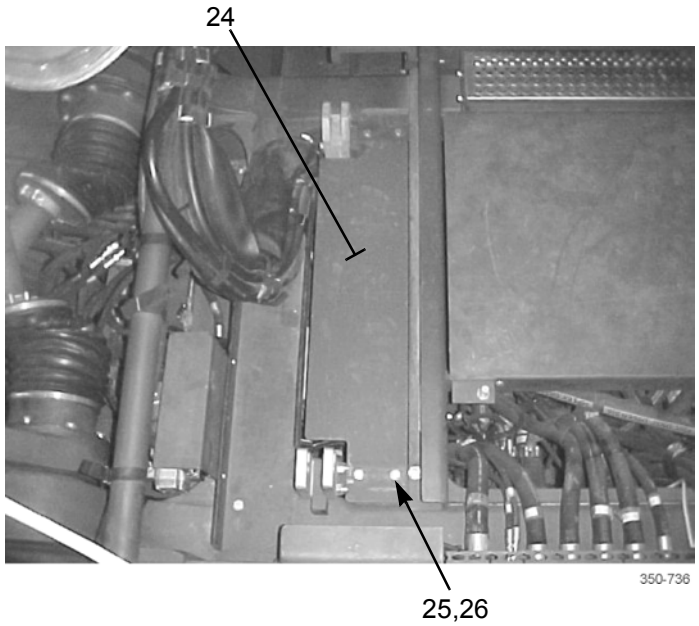


MIDDLE ACCESS COVER AND CAB SUPPORT INSTALLATION

1. Install two shims (20) and two angle plates (19) to cab support (15) with eight washers (18), four screws (17), and new locknuts (16).
2. Install cab support (15) to vehicle with eight washers (23), four screws (22), and new locknuts (21).
3. Install cab support-mounted cab position proximity switch (WP 0075 00).
4. Install middle access cover (12) to cab support (15) with two washers (14) and screws (13).
5. Return cab to operational position (TM 10-3930-675-10).

REAR ACCESS COVER REMOVAL

Remove four screws (25), washers (26), and rear access cover (24) from vehicle.



REAR ACCESS COVER INSTALLATION

1. Install rear access cover (24) to vehicle with four washers (26) and screws (25).
2. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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RADIATOR SPLASH SHIELD REPLACEMENT 0136 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

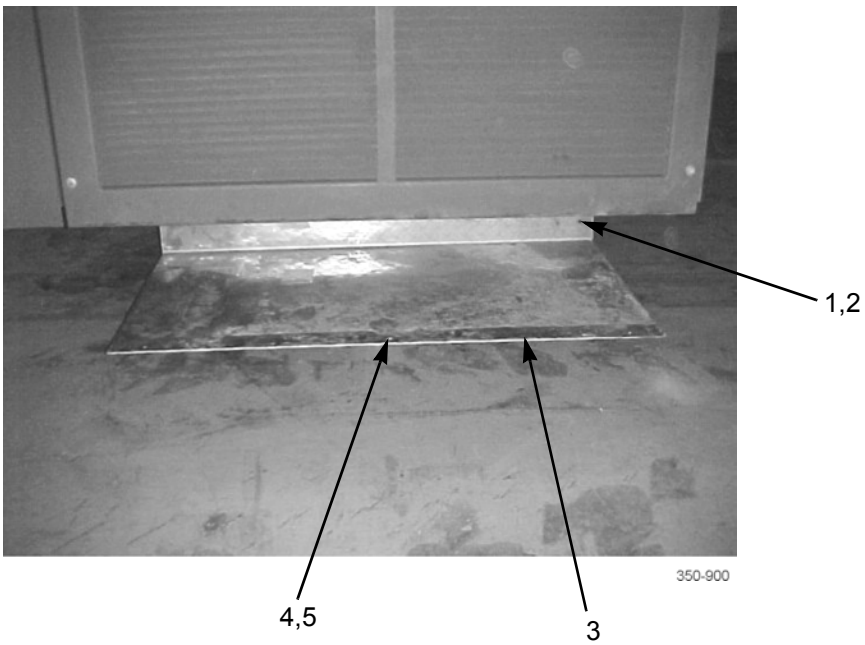
Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Nut, lock (P/N 920076.003)

REMOVAL

1. Remove locknut (1) and washer (2) from stud of bracket at left-front corner of radiator splash shield (3). Discard locknut.
2. Remove four screws (4), washers (5), and radiator splash shield (3) from vehicle.



INSTALLATION

1. Position radiator splash shield (3) to vehicle and install four washers (5) and screws (4).
2. Install washer (2) and new locknut (1) to stud of bracket.

END OF WORK PACKAGE

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RADIATOR TOP GRATING REPLACEMENT 0137 00

THIS WORK PACKAGE COVERS

Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

WARNING

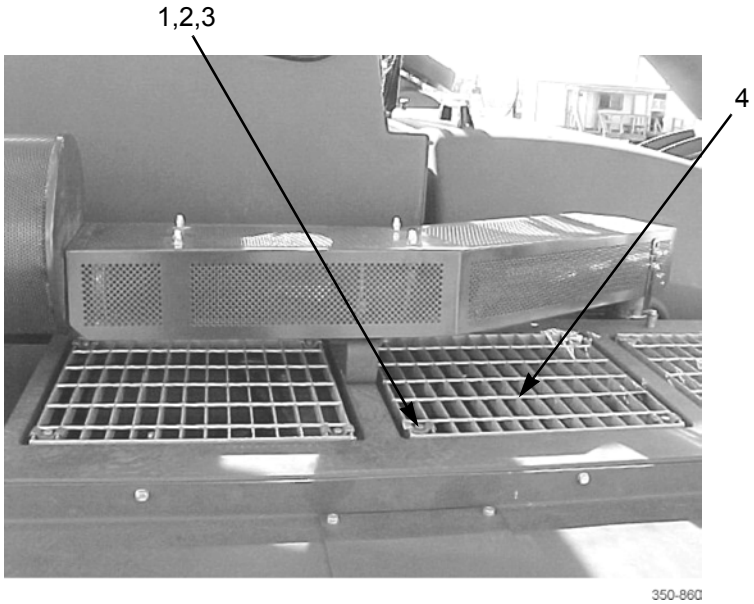
Exhaust and cooling system components may be hot to the touch. Ensure these components have cooled down before replacing radiator top grating. Failure to follow this warning may result in serious burns.

REPLACEMENT

NOTE

Radiator top grating closest to front of vehicle has five mounting screws and hold-down brackets.

1. Remove four screws (1), eight washers (2), four hold-down brackets (3), and grating (4) from vehicle frame.
2. Install grating (4) to vehicle frame with four hold-down brackets (3), eight washers (2), and four screws (1).



END OF WORK PACKAGE

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RADIATOR FILL COVER PLATE REPLACEMENT 0138 00

THIS WORK PACKAGE COVERS

Replacement

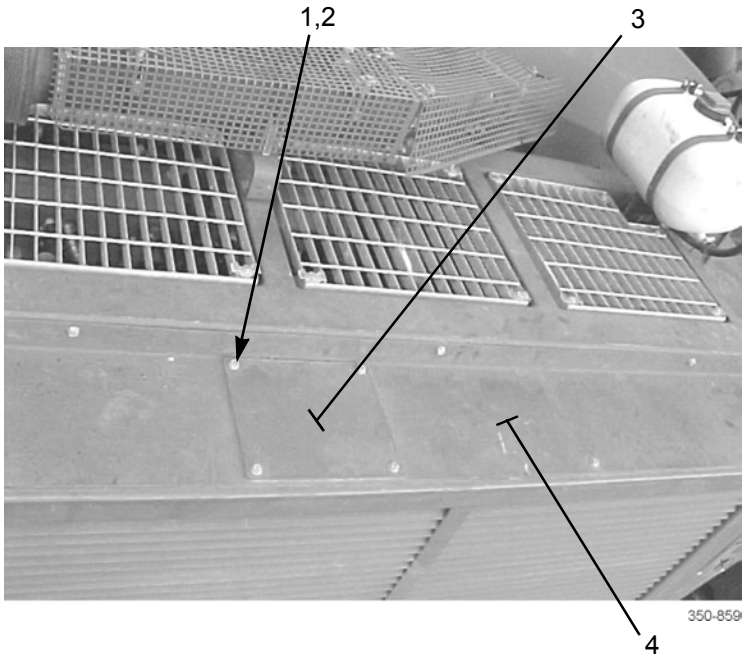
INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

REPLACEMENT

1. Remove four screws (1), washers (2), and fill cover plate (3) from plate (4).
2. Install fill cover plate (3) to plate (4) with four washers (2) and screws (1).



END OF WORK PACKAGE

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BOOM ASSEMBLY WEAR PLATES REPLACEMENT 0139 00

THIS WORK PACKAGE COVERS

General

Style A Wear Plate: Removal, Installation

Style B Wear Plate: Removal, Installation

Style C Wear Plate: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Washer, lock (P/N 920098.009) (4)

Personnel Required

Two

References

WP 0099 00

WP 0198 00

Equipment Condition

Boom and tophandler lowered to transport position (TM 10-3930-675-10)

NOTE

After initial 100 hours of RTCH operation, torque of boom assembly wear plates must be checked.

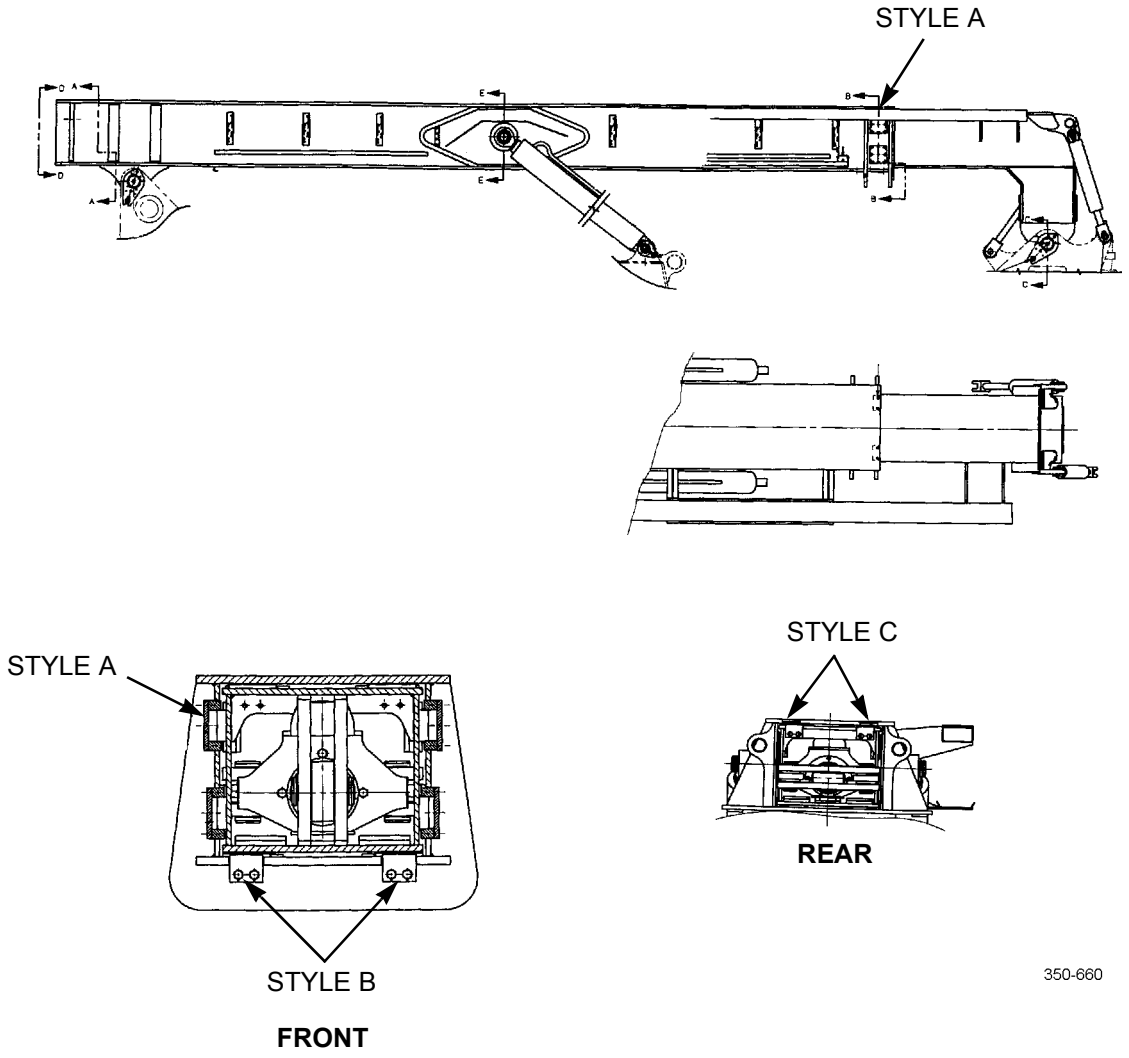
GENERAL

1. Wear plates are used on the boom assembly between sliding components as opposed to using lubrication grease and grease fittings.
2. Spacer blocks and spacers are used with boom wear plates and need to be replaced to maintain proper spacing between boom sliding assemblies.
3. Wear plates are inspected at semi-annual intervals and must be maintained in good working order for the boom assembly to function properly.
4. There are three styles of wear plates used on the boom assembly: style A, B, and C. One wear plate for each style is replaced in this work package.
5. Appropriate notes and access procedures are included for removal and replacement of each style wear plate as applicable.
6. The fixed boom uses four style A wear plates at the front. The extending boom uses four style A wear plates at the rear.

BOOM ASSEMBLY WEAR PLATES REPLACEMENT - CONTINUED 0139 00

GENERAL - CONTINUED

7. An illustration is provided below to aid in identifying the location and style of each wear plate.



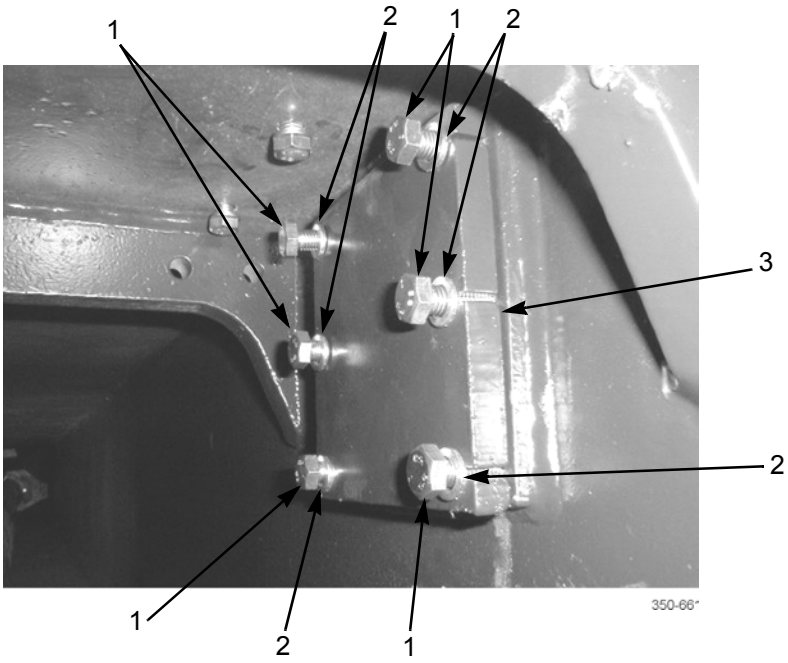
STYLE A WEAR PLATE REMOVAL

NOTE

- Replace style A wear plates one at a time to maintain distance relationship.
- Rear wear plate is illustrated.

1. Retract boom for access to rear wear plates (TM 10-3930-675-10). Remove boom access cover (WP 0099 00).
2. Remove six screws (1), lockwashers (2), and cover plate (3). Discard lockwashers.

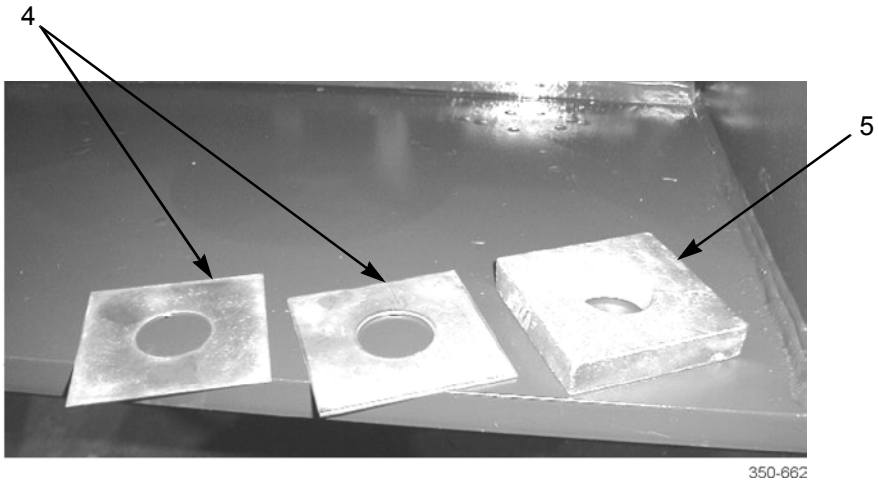
STYLE A WEAR PLATE REMOVAL - CONTINUED



NOTE

Ensure spacers are tagged or marked for location. Spacers must be reinstalled in same location to maintain boom spacing.

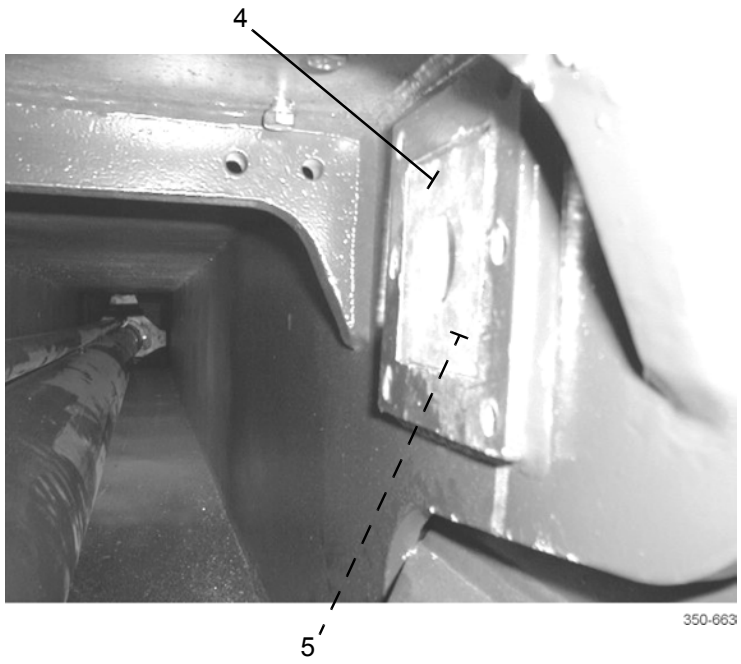
3. Remove spacers (4) and wear plate (5).



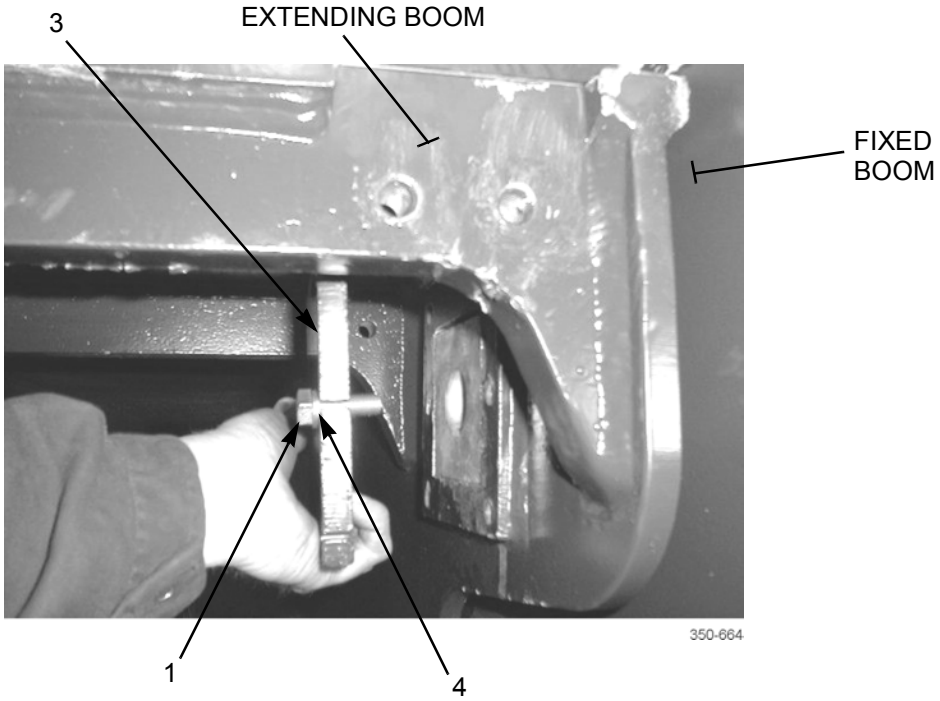
4. Measure wear plate thickness. Measurement must be a minimum of 1 in (25.4 cm). If wear plate is not as specified, replace wear plate.

STYLE A WEAR PLATE INSTALLATION

1. Install wear plate (5) and spacers (4), as noted in removal.



2. Install cover (3) with six screws (1) and new lockwashers (2).



STYLE A WEAR PLATE INSTALLATION - CONTINUED

NOTE

Spacing between extending boom and fixed boom should be as even as possible. Add or remove spacers as necessary to maintain even spacing.

3. Check spacing between wear plate and contact surface. Spacing must be 0.078 in (2 mm). If not, remove cover and add or subtract spacers to adjust wear plate spacing.
4. Tighten all screws in accordance with *Torque Limits* (WP 0198 00).
5. Perform operational check of boom assembly (TM 10-3930-675-10).
6. Install boom access cover (WP 0099 00).

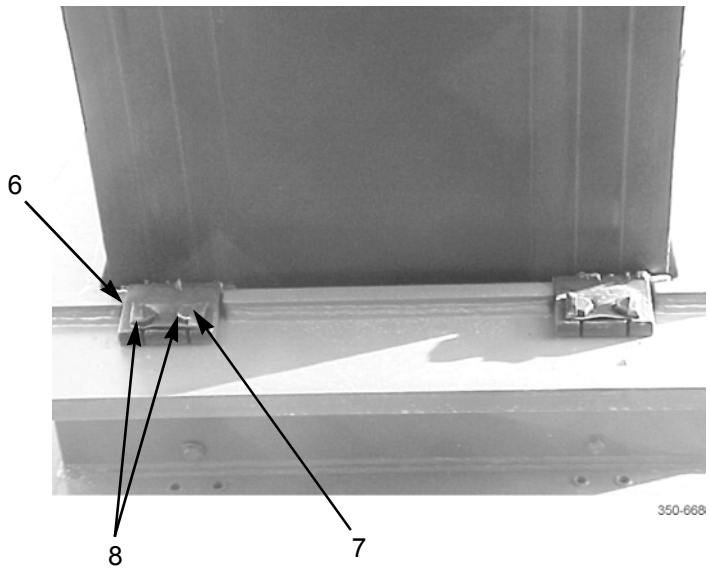
STYLE B WEAR PLATE REMOVAL

1. Measure thickness of wear plate. Measurement should be not less than 9/16 in (14 mm). If wear plate is not as specified, replace wear plate.
2. To remove style B wear plates from fixed boom lower front location, perform the following:

NOTE

Extend boom and support tophandler on cribbing to relieve weight on lower front wear plates.

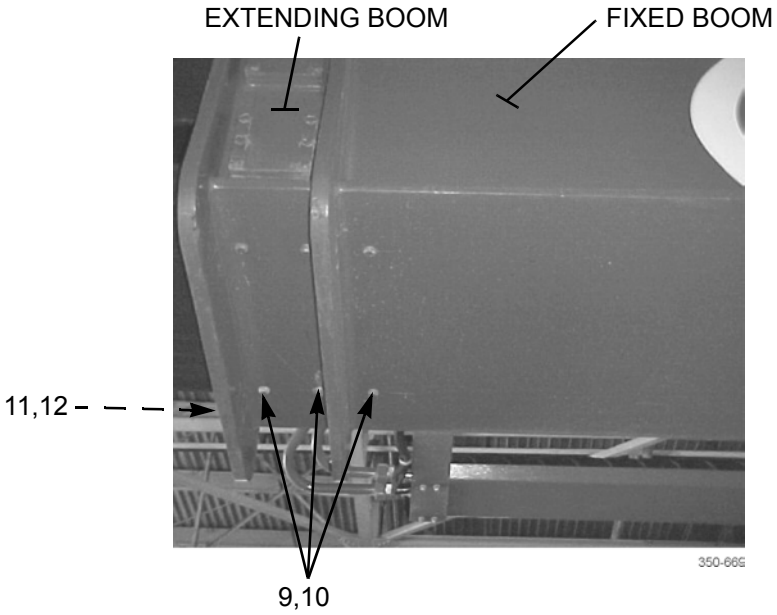
a. Remove two screws (8), lockwashers (7), and lock plate (6). Discard lockwashers



STYLE B WEAR PLATE REMOVAL - CONTINUED

b. Remove three screws (9) and washers (10) securing wear plate (11).

c. Remove shims (12) and wear plate (11).

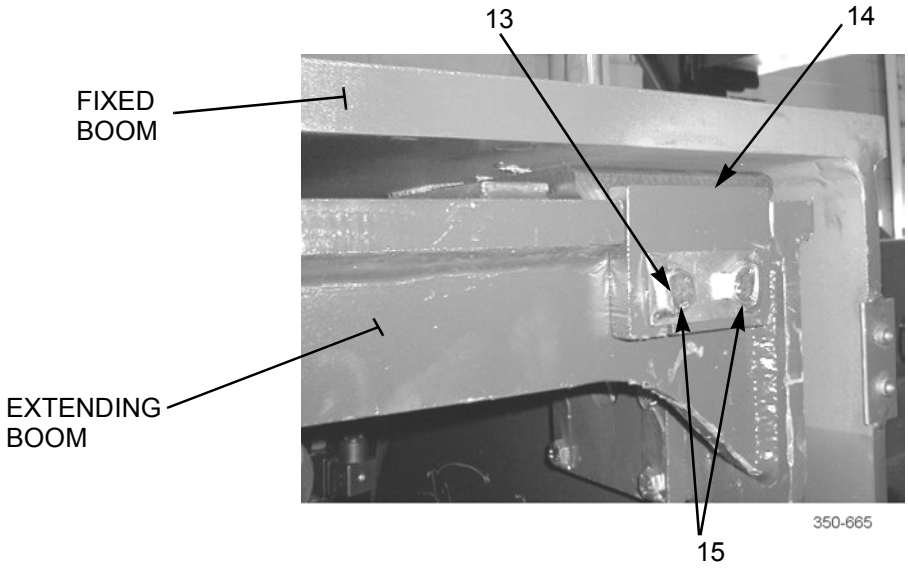


3. To remove style B wear plates from extending boom upper rear location, perform the following:

NOTE

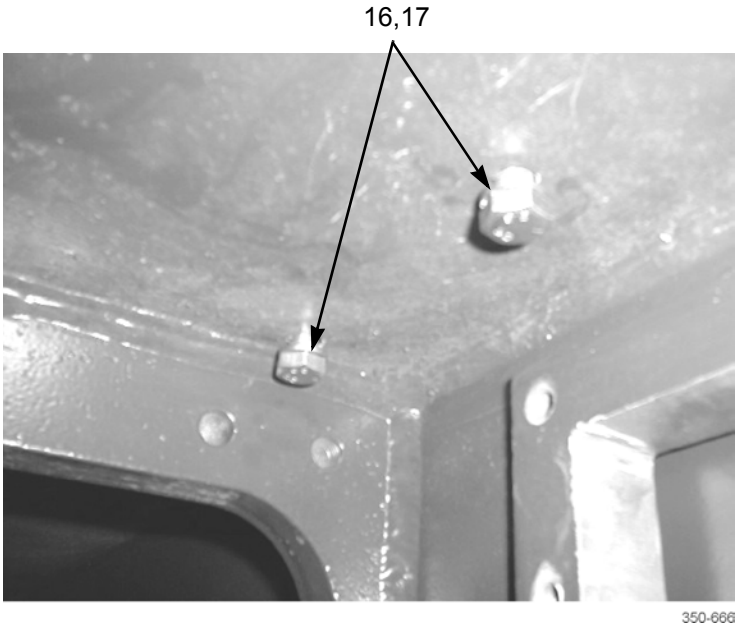
Retract boom and support tophandler on cribbing to relieve weight on upper rear wear plates.

a. Remove two screws (15), lockwashers (13), and lock plate (14). Discard lockwashers.

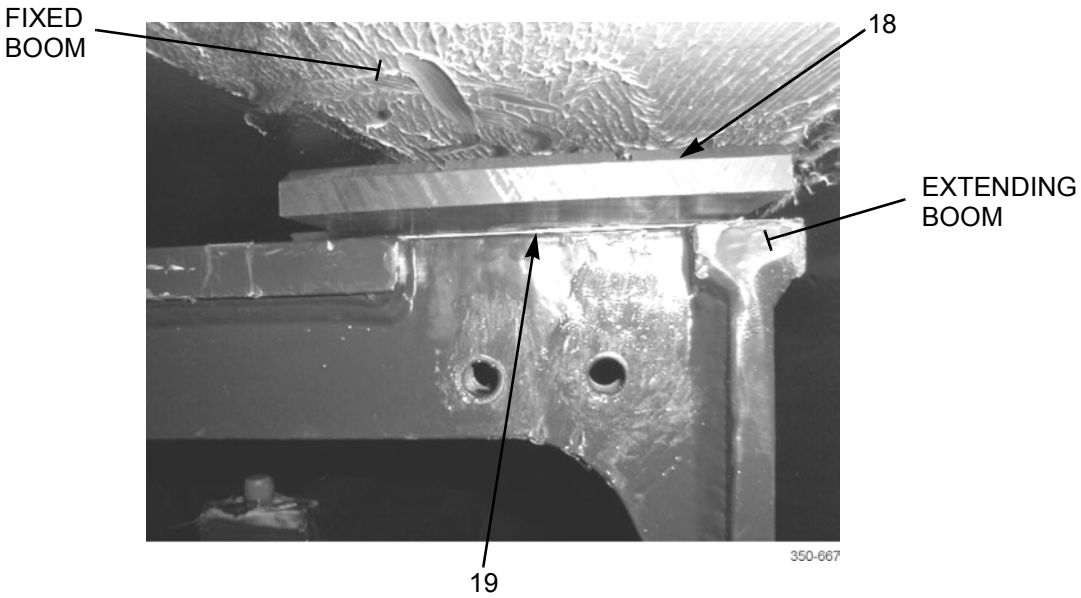


STYLE B WEAR PLATE REMOVAL - CONTINUED

b. Remove three screws (16) and washers (17) securing wear plate.



c. Remove shims (19) and wear plate (18).



STYLE B WEAR PLATE INSTALLATION

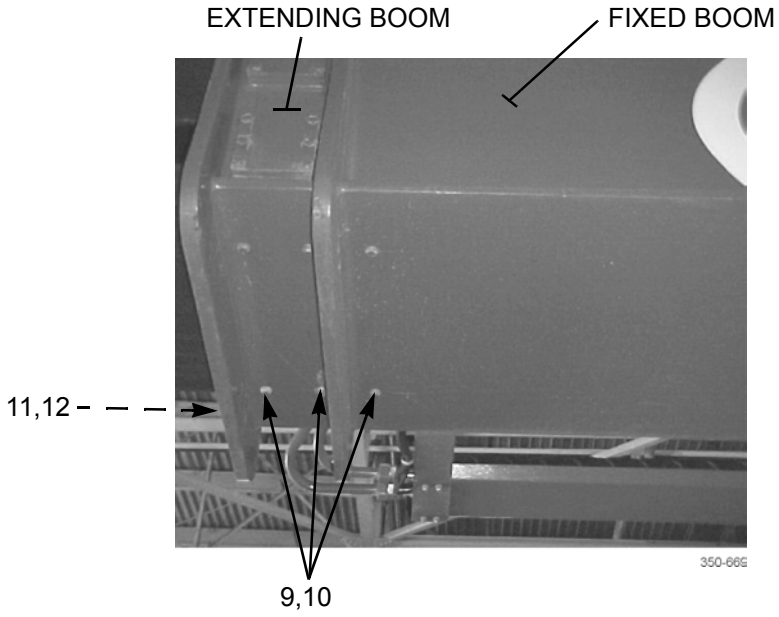
1. To install style B wear plates on fixed boom lower front location, perform the following:

NOTE

Extend boom and support tophandler on cribbing to relieve weight on lower front wear plates.

a. Install shims (12) and wear plate (11) and aline holes in wear plate with holes in bottom of fixed boom.

b. Install and tighten three screws (9) and washers (10) in accordance with *Torque Limits* (WP 0198 00).

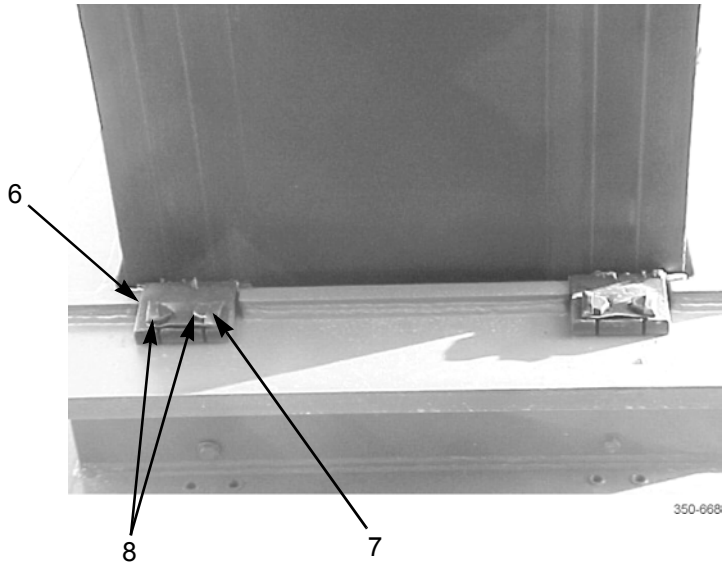


c. Install lock plate (6), two new lockwashers (7), and screws (8).

d. Tighten screws (8) in accordance with *Torque Limits* (WP 0198 00).

e. Perform operational check of boom assembly (TM 10-3930-675-10).

STYLE B WEAR PLATE INSTALLATION - CONTINUED

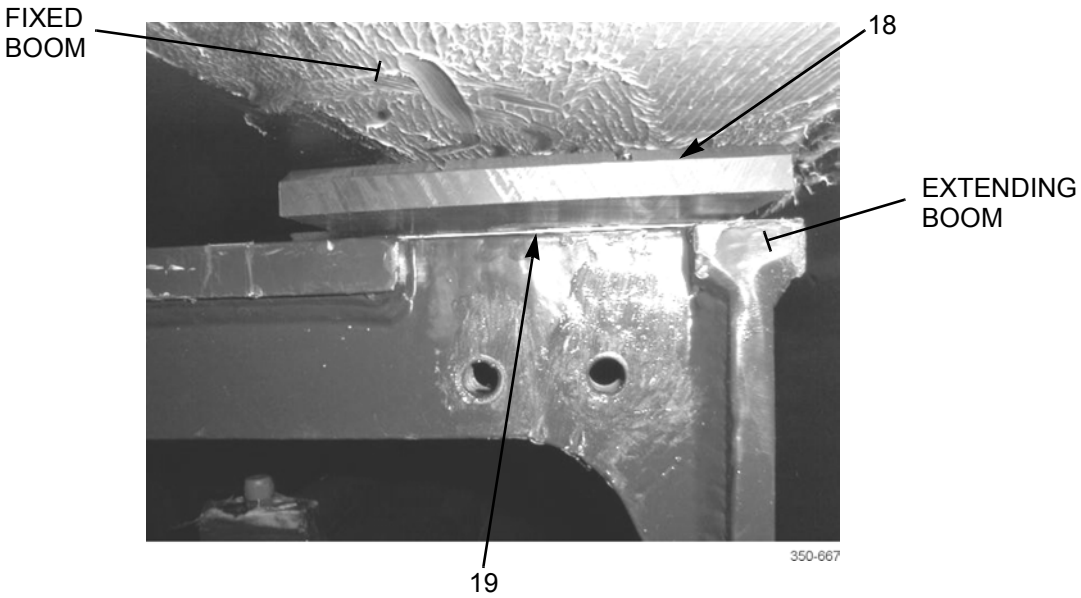


2. To install style B wear plates on extending boom upper rear location, perform the following:

NOTE

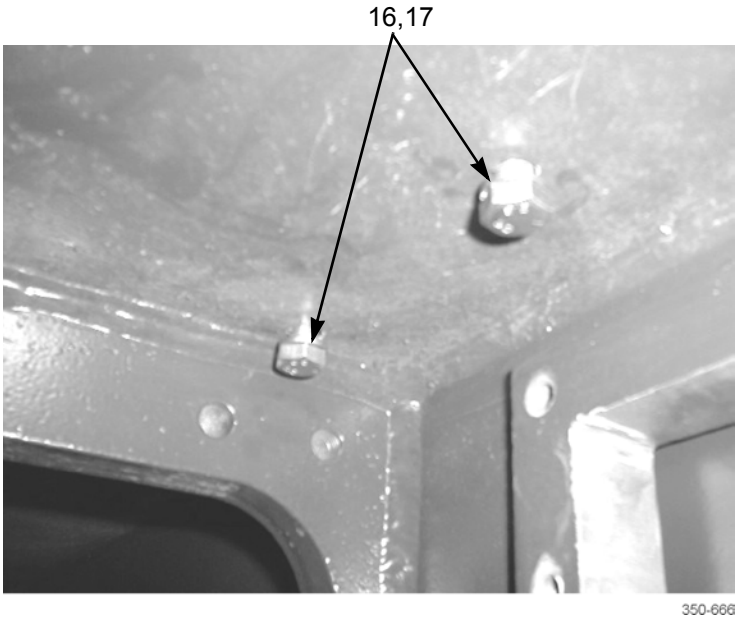
Retract boom and support tophandler on cribbing to relieve weight on upper rear wear plates.

a. Install shims (19) and wear plate (18) and aline holes in wear plate with holes in top of extending boom.



STYLE B WEAR PLATE INSTALLATION - CONTINUED

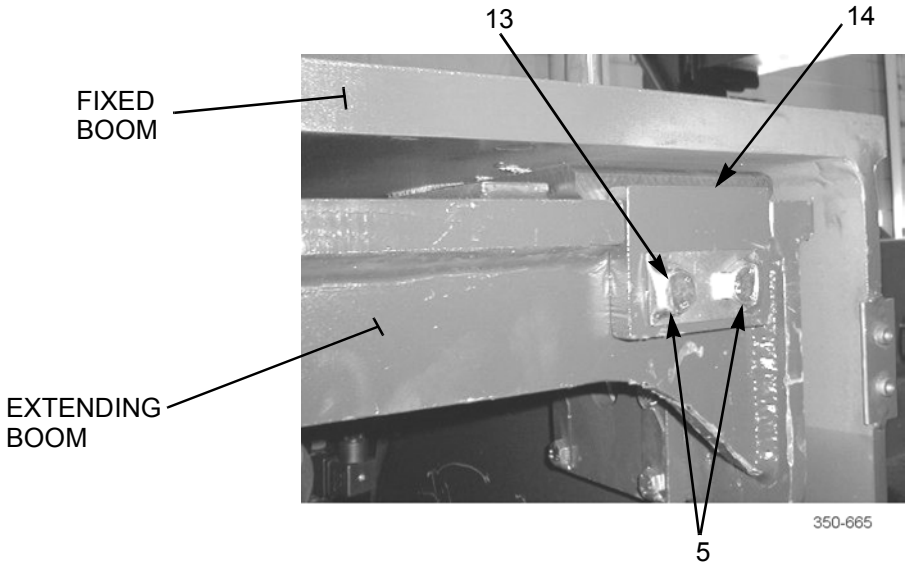
b. Install and tighten three screws (16) and washers (17) in accordance with *Torque Limits* (WP 0198 00).



c. Install lock plate (14), two new lockwashers (13), and screws (15).

d. Tighten screws (15) in accordance with *Torque Limits* (WP 0198 00).

e. Perform operational check of boom assembly (TM 10-3930-675-10).

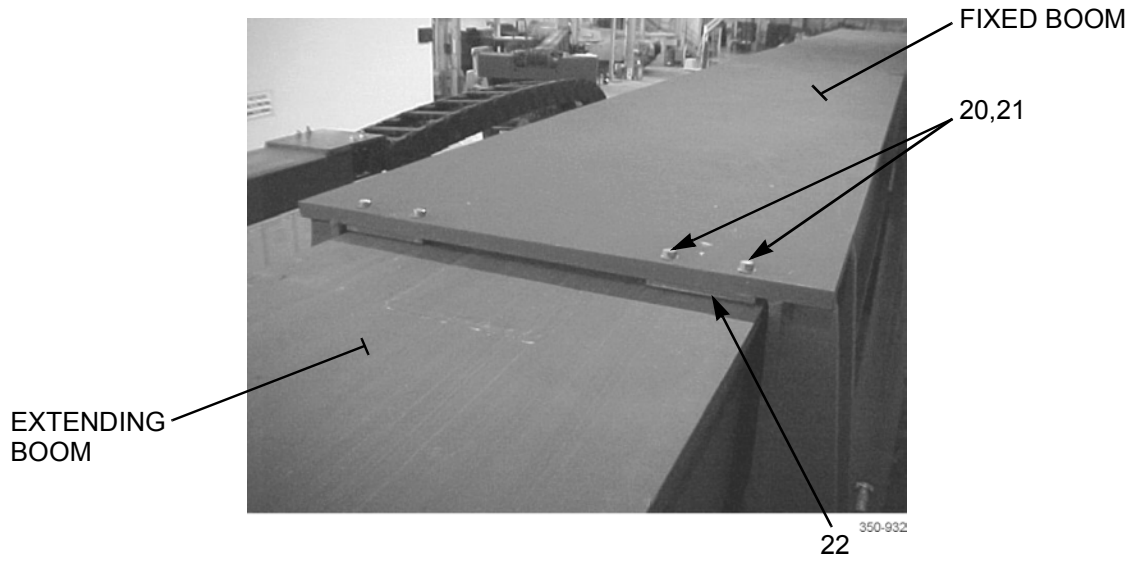


STYLE C WEAR PLATE REMOVAL

NOTE

Extend boom, if necessary, and allow tophandler to hang unsupported.

1. Remove two screws (20) and washers (21) securing each of two spacer plates (22).
2. Slide spacer plate (22) from between fixed and extending boom.



STYLE C WEAR PLATE INSTALLATION

1. Install each of two spacer plates (22) between fixed and extending boom. Aline holes in wear plate with holes in top of fixed boom.
2. Install and tighten two screws (20) and washers (21) in accordance with *Torque Limits* (WP 0198 00).
3. Perform operational check of boom assembly (TM 10-3930-675-10).

END OF WORK PACKAGE

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TOPHANDLER WEAR PLATES REPLACEMENT 0140 00

THIS WORK PACKAGE COVERS

General
Style A Wear Plate: Removal, Installation
Style B Wear Plate: Removal, Installation
Style C Wear Plate: Removal, Installation
Style D Wear Plate: Removal, Installation
Style E Wear Plate: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Personnel Required

Two

References

WP 0198 00

Equipment Condition

Boom and tophandler lowered to transport position (TM 10-3930-675-10)

GENERAL

NOTE

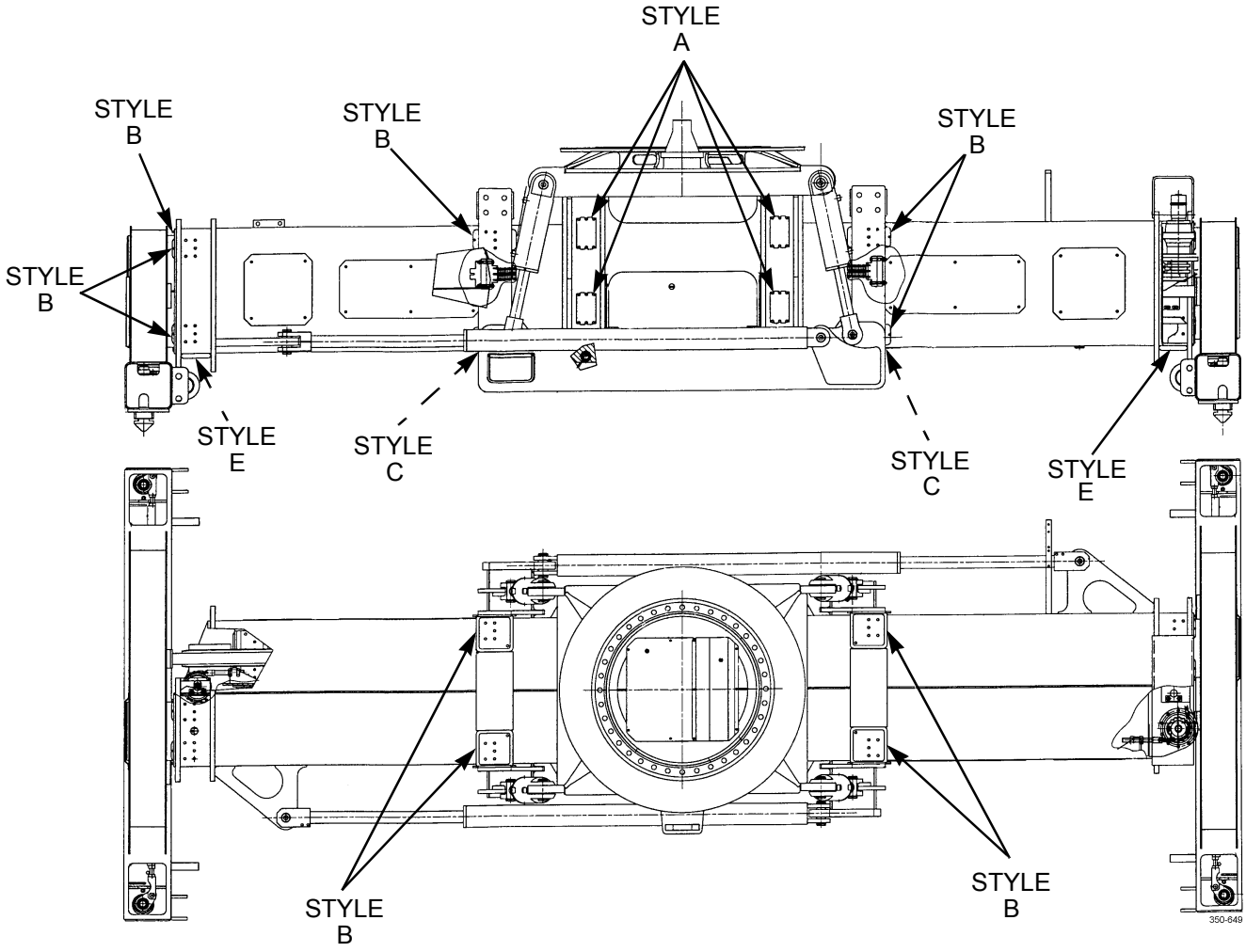
DO NOT lubricate wear plates.

1. Wear plates are used on the tophandler between sliding components as opposed to lubrication grease and grease fittings.
2. Wear plates are inspected at semi-annual intervals and must be maintained in good working order for the tophandler to function properly.
3. There are five styles of wear plates: A, B, C, D, and E.

TOPHANDLER WEAR PLATES REPLACEMENT - CONTINUED **0140 00**

GENERAL - CONTINUED

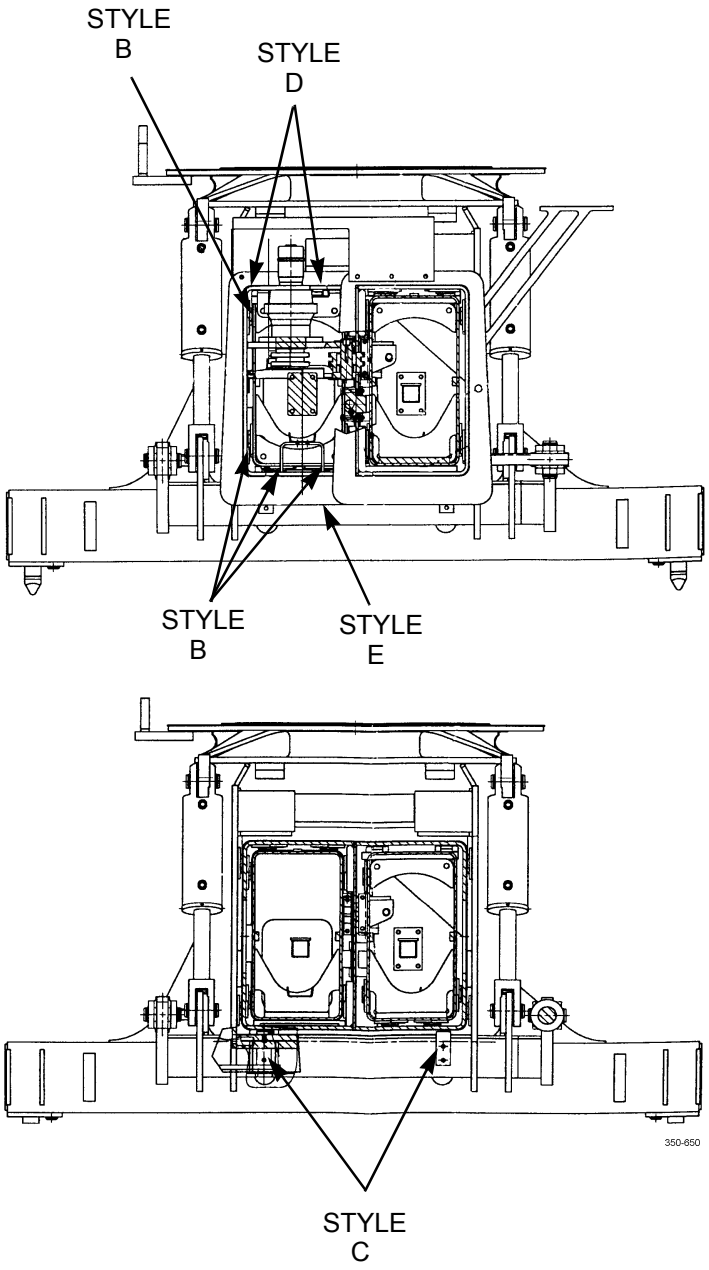
4. Replacement of one wear plate of each style is described in this work package. Appropriate notes and access procedures are included for removal and replacement of each style wear plate, as applicable.
5. Spacer blocks and shims may be used with wear plates and need to be replaced to maintain proper spacing between tophandler assemblies.
6. Illustrations are provided below to aid in identifying the location of each style wear plate.



WEAR PLATE LOCATOR DIAGRAM

TOPHANDLER WEAR PLATES REPLACEMENT - CONTINUED **0140 00**

GENERAL - CONTINUED



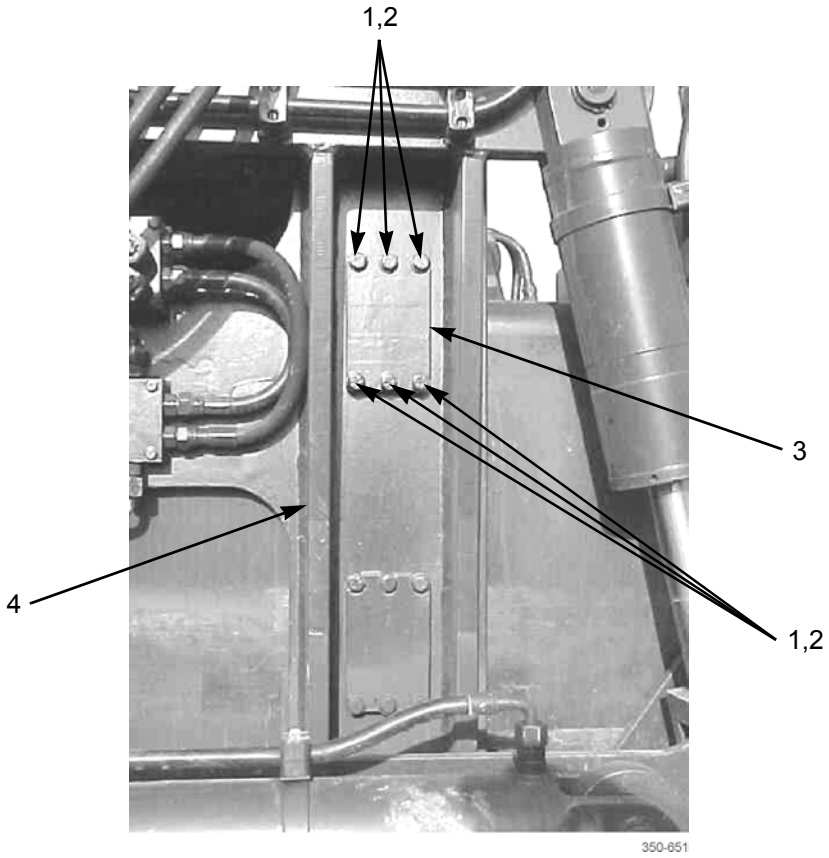
WEAR PLATE LOCATOR DIAGRAM

STYLE A WEAR PLATE REMOVAL

NOTE

- Replace style A wear plates one at a time to maintain distance relationship.
- Replace style A wear plates as a set.

1. Remove six screws (1), washers (2), and cover plate (3) from side shifting carriage frame (4).

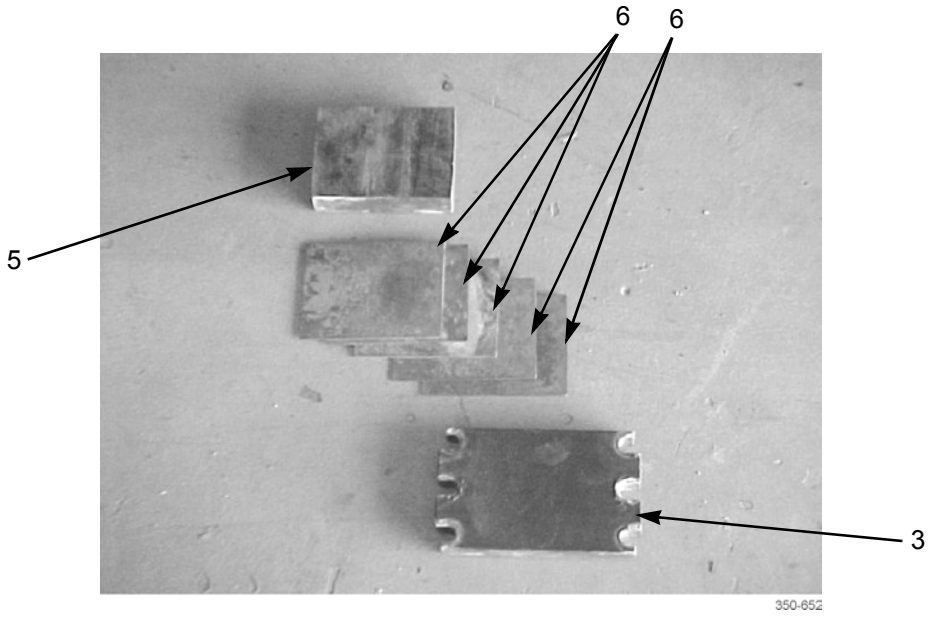


NOTE

If shims are used, note number of shims used.

2. Remove shims (6) and wear plate (5).

STYLE A WEAR PLATE REMOVAL - CONTINUED



3. Measure wear plate thickness. Measurement MUST be a minimum of 1 in (25.4 mm). If wear plate is not as specified, replace wear plate.

STYLE A WEAR PLATE INSTALLATION

1. Measure thickness of shims (6) removed from wear plate location. Shim measurement MUST NOT exceed 0.25 in (6.4 mm). Remove shims as necessary so as not to exceed requirement.

NOTE

Total thickness of wear plate and shims for style A location must not exceed 1.25 in (31.8 mm).

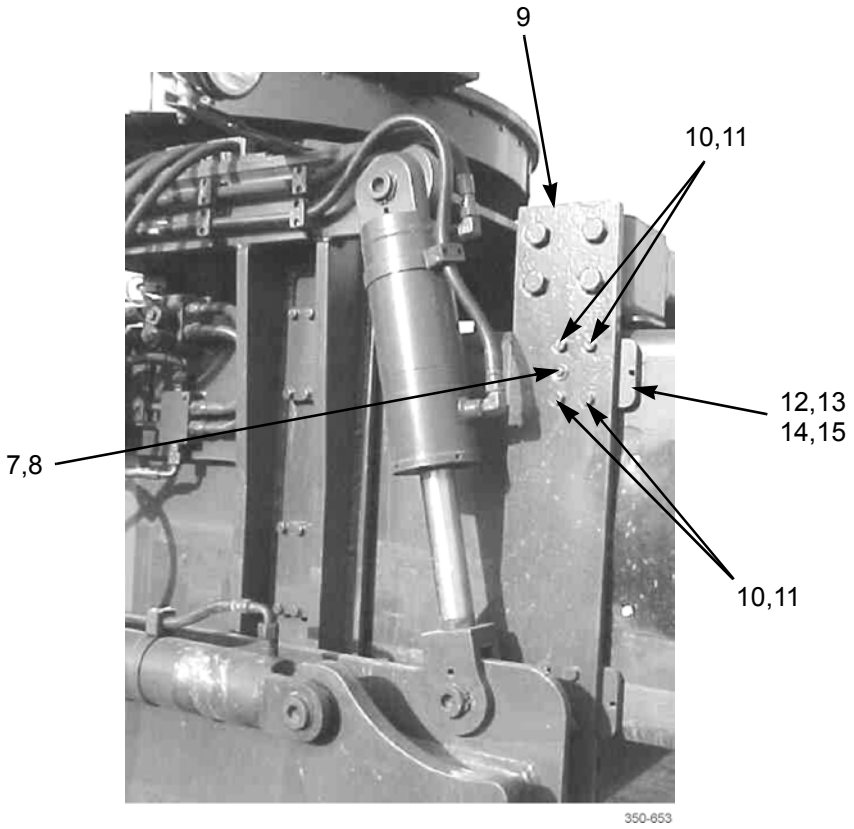
2. Install wear plate (5) and shims (6) as needed in sliding carriage frame (4).
3. Position cover (3) and secure in place with six screws (1) and washers (2). Tighten screws in accordance with *Torque Limits* (WP 0198 00).
4. Perform operational check of tophandler (TM-10-3930-675-10).

STYLE B WEAR PLATE REMOVAL

NOTE

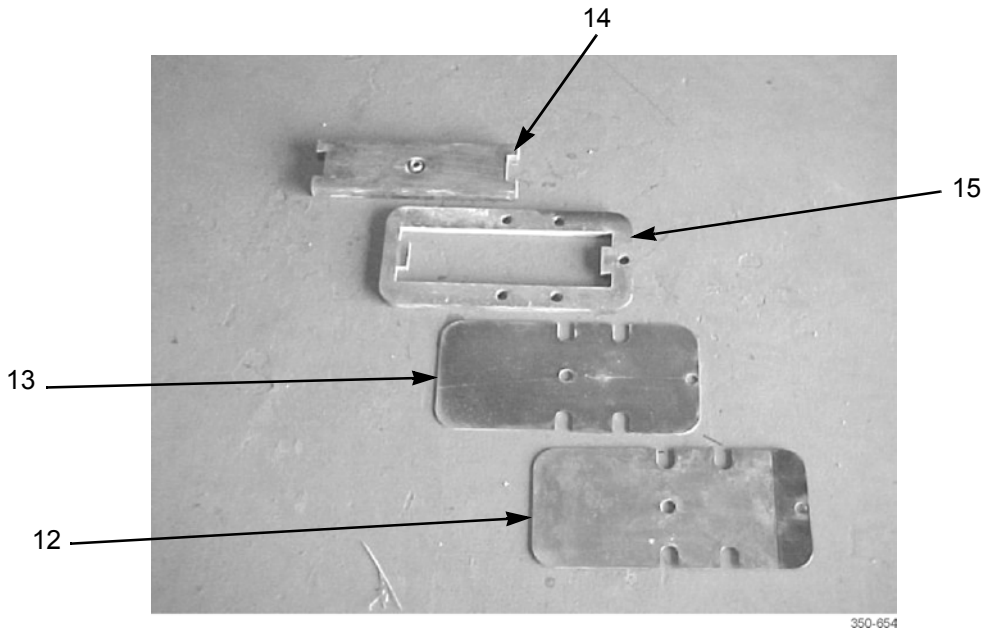
- Style B wear plates use the same hardware. For removal procedures, refer to step 1 below.
- Access procedures and requirements for each location are different. Refer to steps 2 and 3 for specific access procedures.

1. To remove a style B wear plate mounted on sideshift carriage frame, perform the following:
   a. Remove four screws (10) and washers (11) securing mounting plate (12), backing plate (13), and frame (15) to sideshift carriage frame (9).
   b. Remove screw (7) and washer (8) securing wear plate (14).



   c. Remove spacer (12), spacer (13), frame (15), and wear plate (14).
   d. Measure thickness of wear plate (14). Measurement to be not less than 0.5 in (13 mm).
   e. If measurement is more than 0.5 in (12.7 mm) but less than 1 in (25.4 mm), add backing plates (13) as needed.

STYLE B WEAR PLATE REMOVAL - CONTINUED



2. To access a style B wear plate mounted on sideshift carriage horizontal frame, perform the following:
   a. Remove lower right screw (16), nut (17), and washer (18).



   b. Perform procedures in step 1 above to remove wear plate.

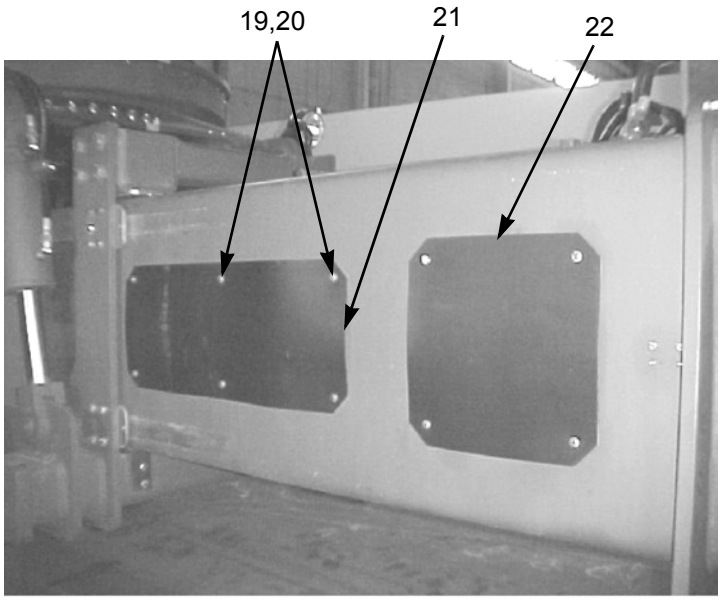
STYLE B WEAR PLATE REMOVAL - CONTINUED

3. To access a style B wear plate on sliding beam interior, perform the following:

NOTE

Internal beam wear plates may use a spacer block in some mounting locations. Ensure spacer block is retained and replaced.

a. Remove 10 screws (19), washers (20), and two access panels (21 and 22) from side of each extending beam.



b. With assistance, extend or retract beams to expose internal-mounted style B wear plates (TM 10-3930-675-10).

c. Position tophandler beams on cribbing to aid in relieving weight from load-bearing wear plates.

d. Perform procedures in step 1 above to remove wear plate, frame, backing plate, and mounting plate.

STYLE B WEAR PLATE INSTALLATION

1. To install a style B wear plate mounted on sideshift carriage frame, perform the following:

a. Position wear plate (14), frame (15), spacer (13), and spacer (12) on sideshift carriage frame (9).

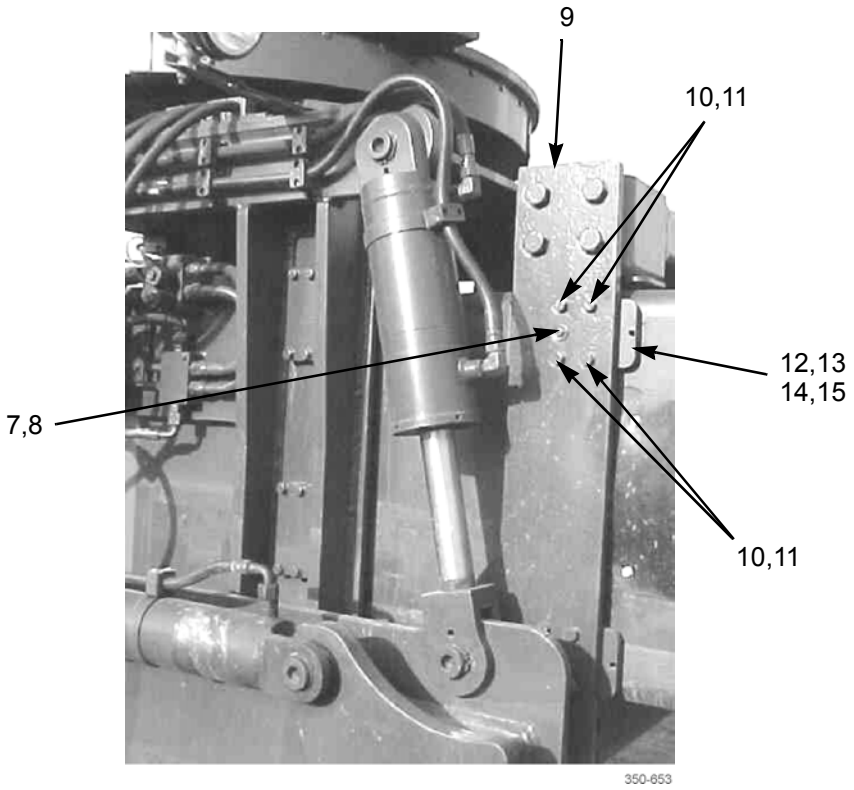
b. Aline and install screw (7) and washer (8) to secure wear plate (14) in position on sideshift carriage frame (9). Hand tighten screw.

c. Aline holes in mounting plate (12) with sideshift carriage frame (9) and install four screws (10) and washers (11).

d. Tighten all screws in accordance with *Torque Limits* (WP 0198 00).

e. Perform operational check of tophandler (TM-10-3930-675-10).

STYLE B WEAR PLATE INSTALLATION - CONTINUED



2. To install a style B wear plate mounted on sideshift carriage horizontal frame, perform the following:
   a. Perform procedures in step 1 above.
   b. Install lower right screw (16), washer (17), and nut (18), which were removed for access. Tighten screw in accordance with *Torque Limits* (WP 0198 00).



STYLE B WEAR PLATE INSTALLATION - CONTINUED

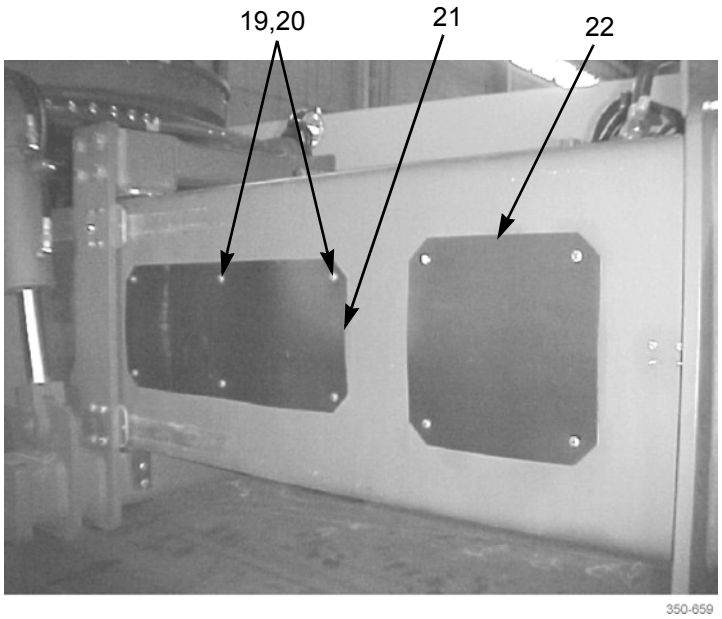
3. To install a style B wear plate on sliding beam interior perform following:

NOTE

Ensure spacer blocks are replaced with sliding beam internal wear plates where used.

a. Perform procedures in step 1 above.

b. Position two access panels (21 and 22). Install and tighten ten screws (19) and washers (20).



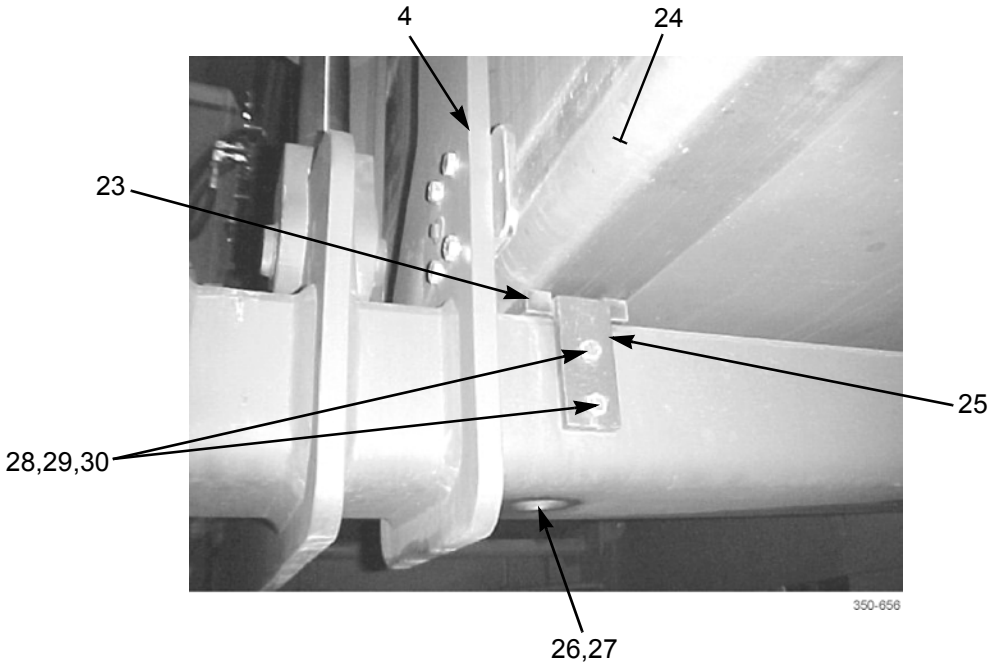
STYLE C WEAR PLATE REMOVAL

NOTE

- If measurement of wear plate is less 0.5 in (12.7 mm), perform steps below to replace wear plate.
- To prevent shifting of sideshift carriage, wear plates should be replaced in sets one at a time.

1. With assistance, position side shifting carriage (24) on cribbing to relieve weight on wear plates (23).
2. Remove two screws (28), washers (29), and nuts (30) securing lock plate (25) in position. Remove lock plate and retain for installation.
3. Thru access hole in frame bottom, remove screw (26) and washer (27) securing wear plate (23) to sideshift carriage frame (4).
4. Slide wear plate (23) from position on sideshift carriage frame (4).

STYLE C WEAR PLATE REMOVAL - CONTINUED



STYLE C WEAR PLATE INSTALLATION

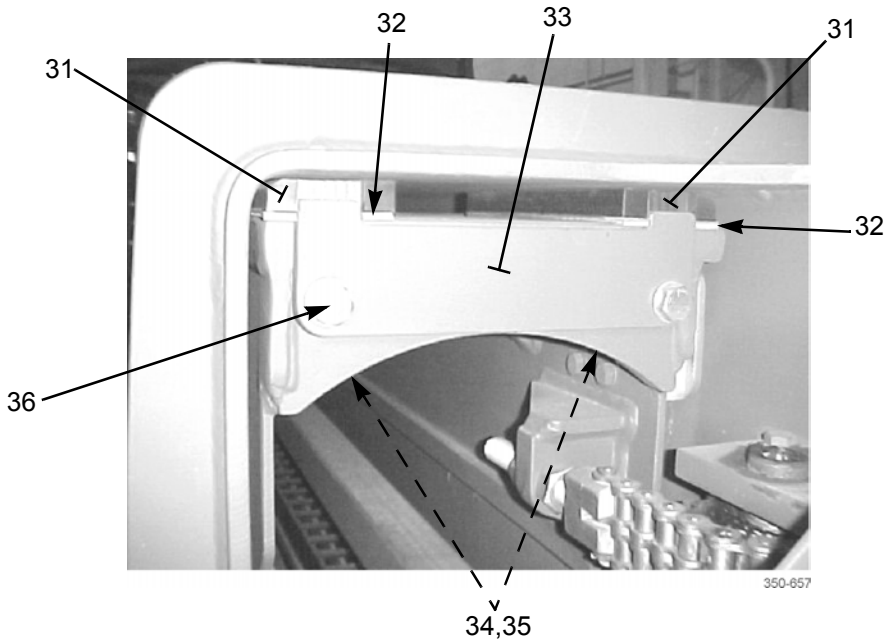
1. Position wear plate (23) on sideshift carriage frame (4) and install screw (26) and washer (27) thru access hole in frame bottom.
2. Install lock plate (25) with two screws (28), washers (29), and nuts (30).
3. Tighten all screws in accordance with *Torque Limits* (WP 0198 00).
4. Perform operational check of tophandler (TM-10-3930-675-10).

STYLE D WEAR PLATE REMOVAL

NOTE

- If measurement of wear plate is less 0.5 in (12.7 mm), perform steps below to replace wear plate.
- Note location of beveled edge on wear plate. Ensure wear plate is oriented with beveled edge in same position for installation.

1. Position sliding beam to access wear plate (31) and remove two screws (36) and lock plate (33).
2. Thru access hole in extending beam, remove two screws (34) and washers (35) securing wear plate (31) and shims (32).
3. Slide two wear plates (31) and shims (32) from extending beam location.



STYLE D WEAR PLATE INSTALLATION

NOTE

Ensure wear plates are oriented with beveled edge the same as noted in removal.

1. Position two wear plates (31) on extending beam.
2. Install two screws (34) and washers (35) thru access hole in extending beam to secure wear plates (31).
3. Position lock plate (33) on extending beam.
4. Install two screws (36) to secure lock plate (33).
5. Tighten all screws in accordance with *Torque Limits* (WP 0198 00).
6. Perform operational check of tophandler (TM-10-3930-675-10).

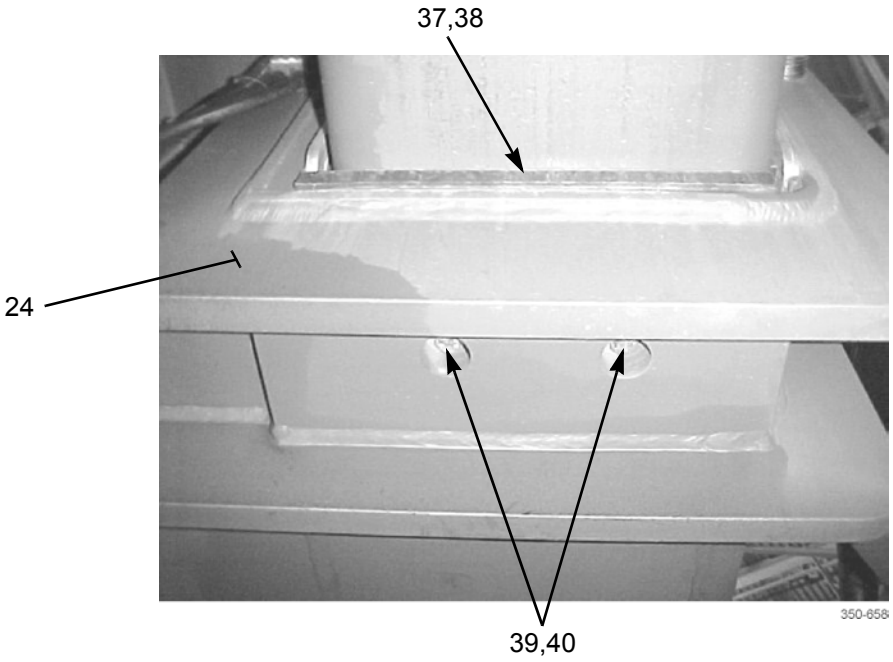
STYLE E WEAR PLATE REMOVAL

NOTE

If measurement of wear plate is less 0.5 in (12.7 mm), perform steps below to replace wear plate.

STYLE E WEAR PLATE REMOVAL - CONTINUED

1. Position sliding beam on cribbing to relieve weight on wear plate (37) in sideshift carriage (24).
2. Thru access hole in bottom of sideshift carriage (24), remove two screws (39) and washers (40) from lock plate (38).
3. Slide wear plate (37) and lock plate (38) from sideshift carriage (24).



STYLE E WEAR PLATE INSTALLATION

1. Position wear plate (37) with lock plate (38) on sideshift carriage (24).
2. Aline lock plate (38) holes with holes in sideshift carriage (24).
3. Install two screws (39) and washers (40) to secure wear plate (37). Tighten screws in accordance with *Torque Limits* (WP 0198 00).
4. Perform operational check of tophandler (TM-10-3930-675-10).

END OF WORK PACKAGE

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TOW PINTLE REPLACEMENT 0141 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

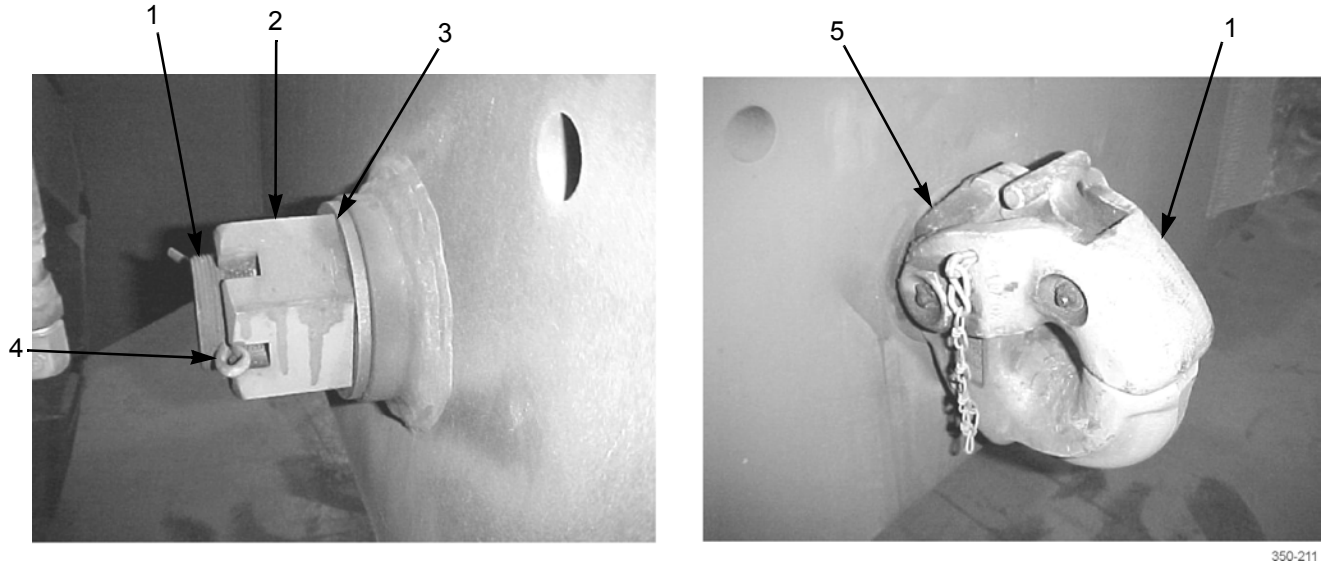
Wrench, adjustable (Item 35, WP 0204 00)

Materials/Parts

Pin, cotter (P/N XB-773)

REMOVAL

1. Remove cotter pin (4), nut (2), and washer (3) from threaded shaft of tow pintle (1). Discard cotter pin.
2. Remove tow pintle (1) and washer (5) from rear of vehicle.



INSTALLATION

1. Position washer (5) and tow pintle (1) at rear of vehicle. Install washer (3) on threaded shaft.
2. Install nut (2) on threaded shaft hand tight, until nut contacts washer (3), then back off nut 1/6 turn. Install new cotter pin (4).

END OF WORK PACKAGE

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CAB TRANSPORT LIFT MAINTENANCE 0142 00

THIS WORK PACKAGE COVERS

Cab Transport Lift: Removal, Installation

Cab Transport Lift Structure: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Sling, nylon (Item 26, WP 0204 00)

Truck, forklift, 4000 lb capacity

Materials/Parts

Nut, lock (P/N 920076.003) (4)

Nut, lock (P/N 5957) (9)

Pin, cotter (P/N 3293) (2)

Personnel Required

Two

References

TM 10-3930-675-10

WP 0153 00

WP 0154 00

Equipment Condition

Left-side stair assembly removed (WP 0145 00)

CAB TRANSPORT LIFT REMOVAL

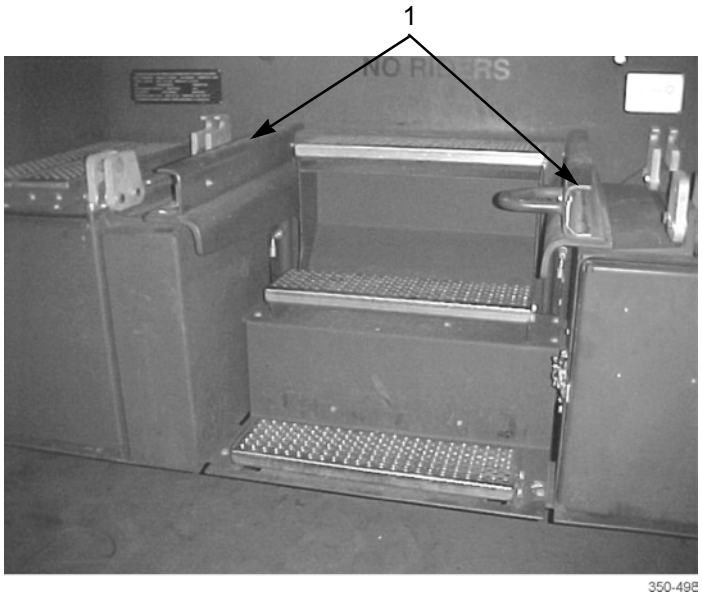


WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Lifting device must have a 2000 lb (908 kg) capacity to lift cab transport lift. Failure to follow this warning may result in death or injury to personnel.

CAB TRANSPORT LIFT REMOVAL - CONTINUED

1. Raise cab transport lift (1) approximately 6 in (15 cm) to gain access to attach nylon sling (TM 10-3930-675-10).
2. Attach a nylon sling to cab transport lift (1) and suitable lifting device. Take up slack in nylon sling.

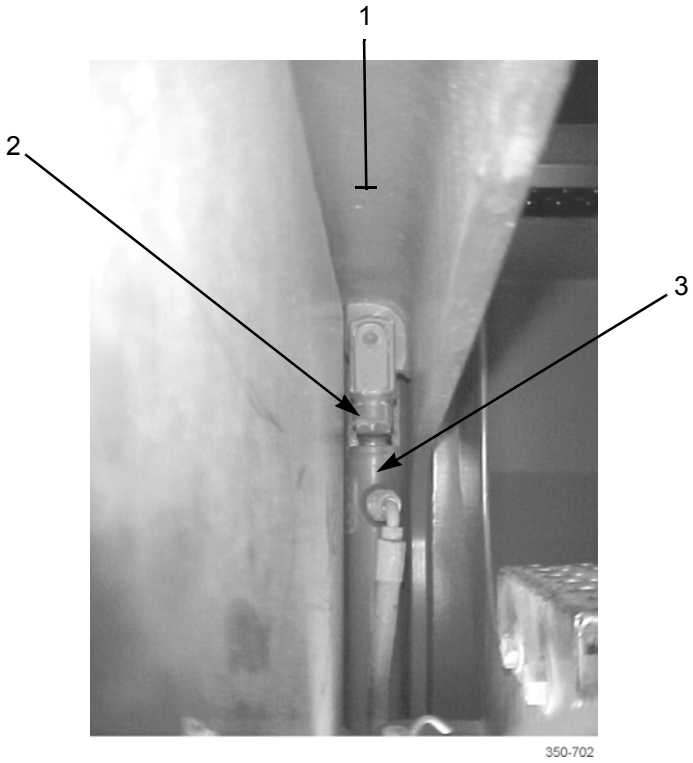


NOTE

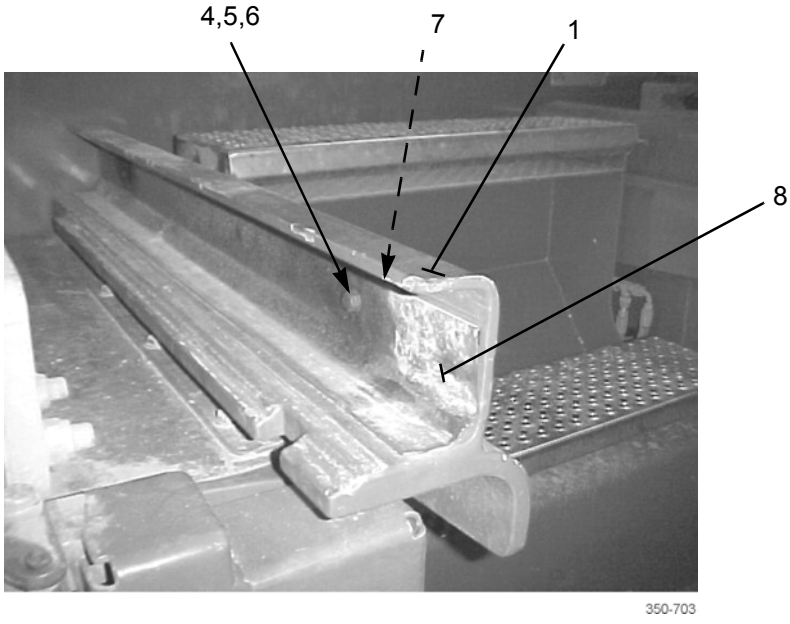
Perform step 3 at top of each of two cab lifting cylinders.

3. Pry spring clip (2) away from cab lifting cylinder (3) and remove spring clip to disconnect cylinder from cab transport lift (1).
4. Using lifting device, remove cab transport lift (1) from vehicle.

CAB TRANSPORT LIFT REMOVAL - CONTINUED

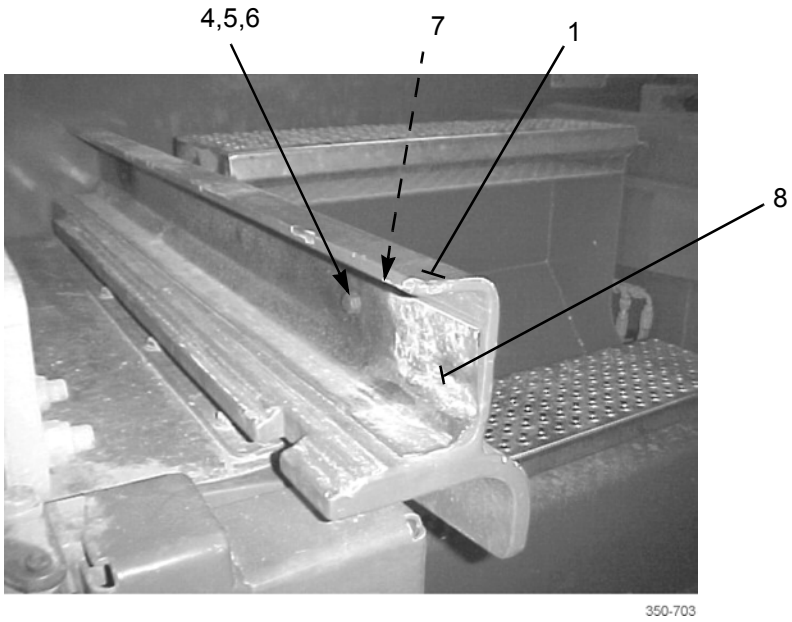


5. Remove four locknuts (4), screws (5), eight washers (6), two shims (7), and rails (8) from cab transport lift (1). Discard locknuts.



CAB TRANSPORT LIFT INSTALLATION

1. Install two shims (7) and rails (8) to cab transport lift (1) with eight washers (6), four screws (5), and new locknuts (4).

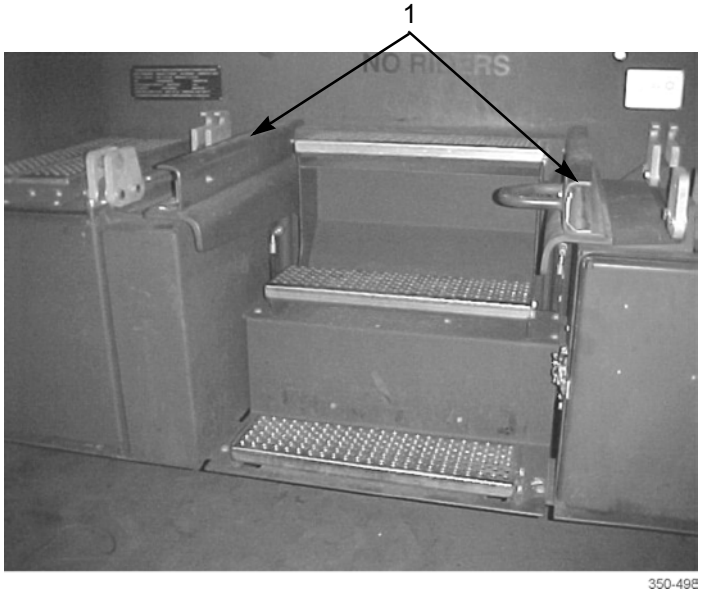


WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Lifting device must have a 2000 lb (908 kg) capacity to lift cab transport lift. Failure to follow this warning may result in death or injury to personnel.

2. Attach a nylon sling to cab lift support (1) and suitable lifting device. Take up slack in nylon sling.

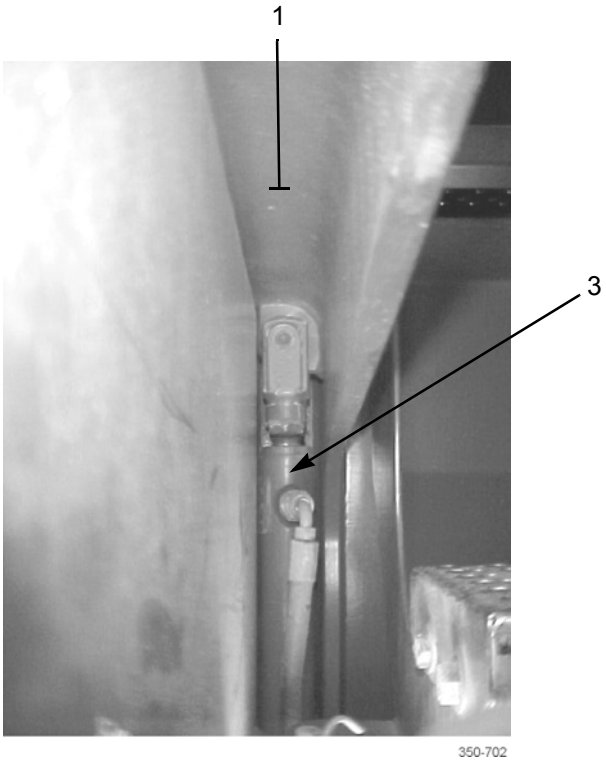
CAB TRANSPORT LIFT INSTALLATION - CONTINUED



NOTE

If a slight misalinement of components makes installation difficult, refer to *Cab Transport Lift Structure Removal*, step 3 and *Cab Transport Lift Structure Installation*, steps 2 and 7.

3. Position cab transport lift (1) to vehicle and lower cab transport lift to cab lifting cylinders (3).

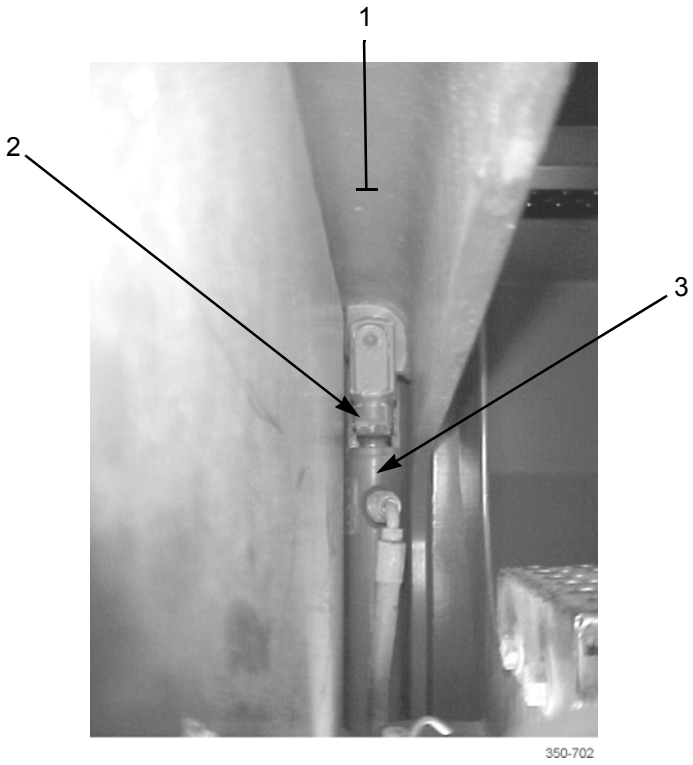


CAB TRANSPORT LIFT INSTALLATION - CONTINUED

NOTE

Perform step 4 at top of each of two cab lifting cylinders.

4. Connect cab lifting cylinder (3) to cab transport lift (1) and install spring clip (2). Ensure spring clip is fully installed.



5. Install left-side stair assembly (WP 0145 00).

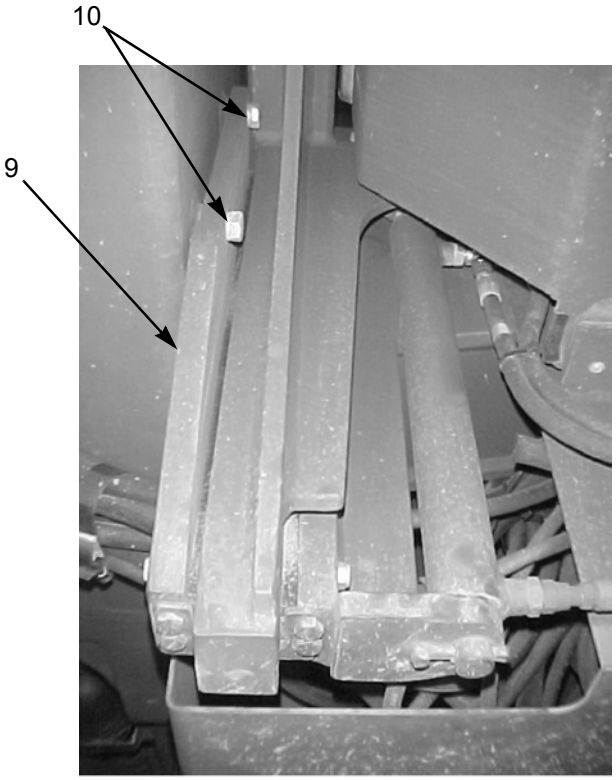
CAB TRANSPORT LIFT STRUCTURE REMOVAL

NOTE

Perform the following only as required to remove support structure for cab transport lift from frame.

1. Remove remote hydraulic control compartment (WP 0154 00).
2. Remove battery and dolly wheels storage compartment (WP 0153 00).
3. With cab transport lift removed, loosen, but do not remove, four screws (10) at each of two transport lift brackets (9).

CAB TRANSPORT LIFT STRUCTURE REMOVAL - CONTINUED



350-704

CAB TRANSPORT LIFT STRUCTURE REMOVAL - CONTINUED

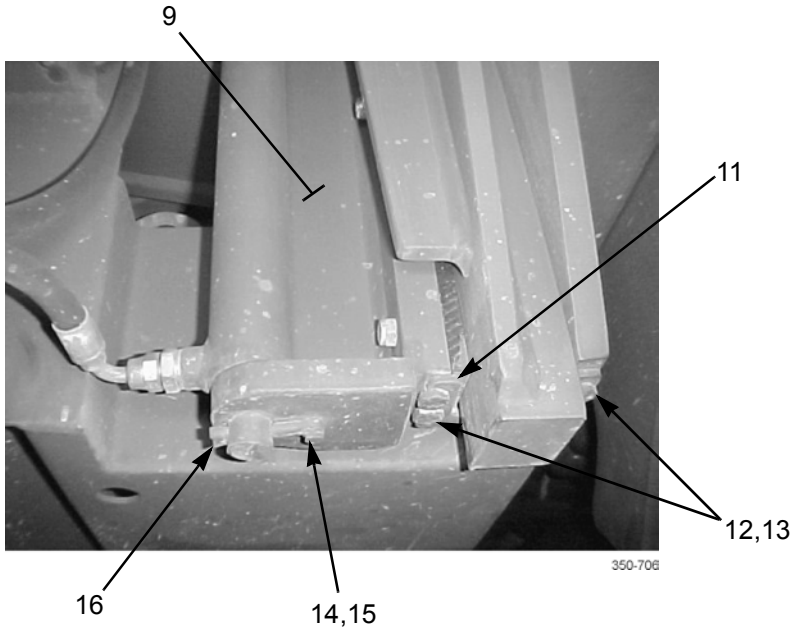
4. Remove four screws (12), washers (13), and plate (11) from bottom of transport lift brackets (9).

5. Remove screw (14), three washers (15), and cotter pin (16) holding bottom of cab lifting cylinders (3) to transport lift brackets (9). Discard cotter pins.

NOTE

Hydraulic hoses are to remain connected to cab lifting cylinders. Do NOT attempt to loosen or remove.

6. Raise lifting cylinders (3) from transport lift brackets (9) and set aside.





WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Lifting device must have a 2000 lb (908 kg) capacity to lift cab transport lift brackets. Failure to follow this warning may result in death or injury to personnel.

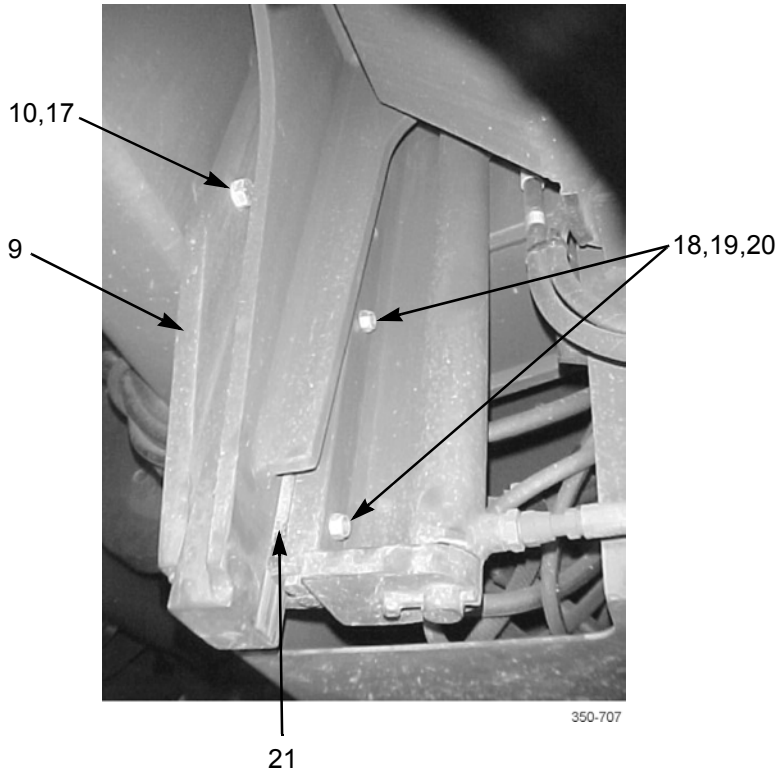
7. Using a nylon sling and suitable lifting device, remove eight screws (10), 16 washers (17), and two transport lift brackets (9) from vehicle.

CAB TRANSPORT LIFT STRUCTURE REMOVAL - CONTINUED

NOTE

Perform step 8 for each transport lift bracket.

8. Remove nine locknuts (18), screws (19), three washers (20), and three wear plates (21). Discard locknuts.



CAB TRANSPORT LIFT STRUCTURE INSTALLATION

NOTE

Perform step 1 for each transport lift bracket.

1. Install three wear plates (21) with three washers (20) and nine screws (19) and new locknuts (18).

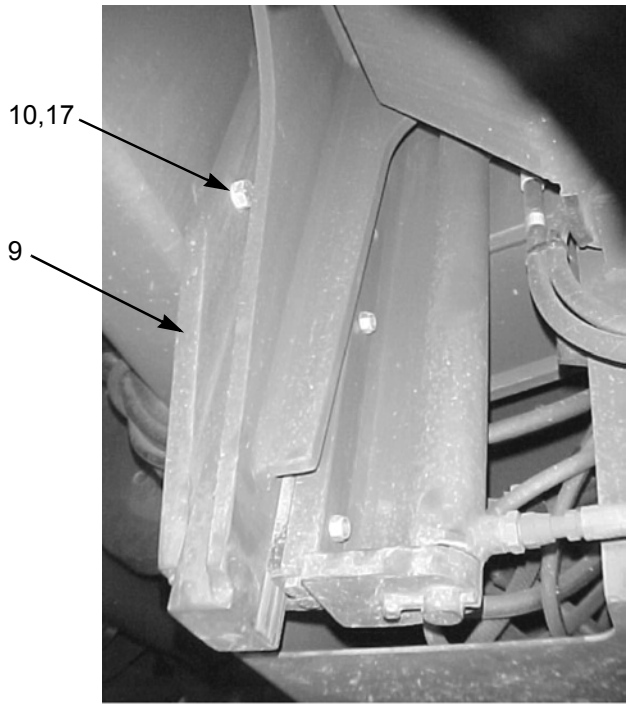
CAB TRANSPORT LIFT STRUCTURE INSTALLATION - CONTINUED



WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Lifting device must have a 2000 lb (980 kg) capacity to lift cab transport lift brackets. Failure to follow this warning may result in death or injury to personnel.

2. Using a nylon sling and suitable lifting device, install two transport lift brackets (9) to vehicle with 16 washers (17) and eight screws (10). Do NOT fully tighten screws.

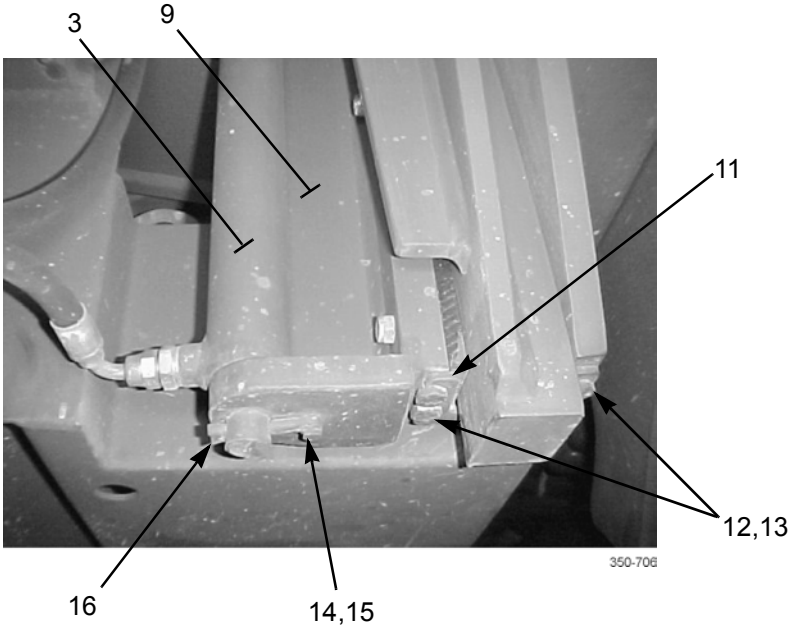


3. Place bottom of cab lifting cylinders (3) into transport lift brackets (9).

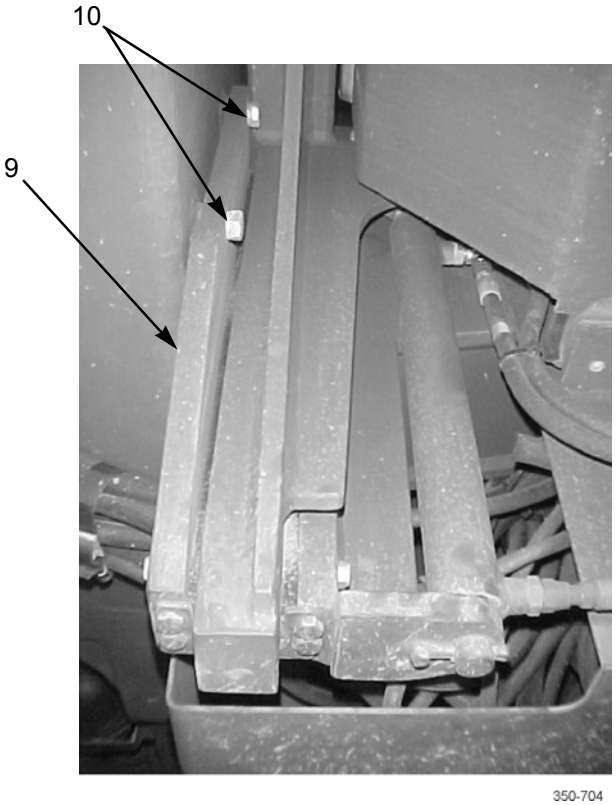
4. Install each of two cab lifting cylinders (3) to transport lift brackets (9) with new cotter pin (16), three washers (15), and screw (14).

5. Install plate (11) to bottom of transport lift brackets (9) with four washers (13) and screws (12).

CAB TRANSPORT LIFT STRUCTURE INSTALLATION - CONTINUED



6. Install cab transport lift (refer to *Cab Transport Lift Installation*). Then fully tighten four screws (10) of transport lift brackets (9).



CAB TRANSPORT LIFT STRUCTURE INSTALLATION - CONTINUED

7. Install battery and dolly wheels storage compartment (WP 0153 00).
8. Install remote hydraulic control compartment (WP 0154 00).

END OF WORK PACKAGE

ENGINE COVER MAINTENANCE 0143 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Adhesive (Item 1, WP 0203 00)
Nut, lock (P/N 920076.002) (6)
Nut, lock (P/N 920076.003) (3)
Weatherseal (P/N 920946.0008)

References

TM 10-3930-675-10

Personnel Required

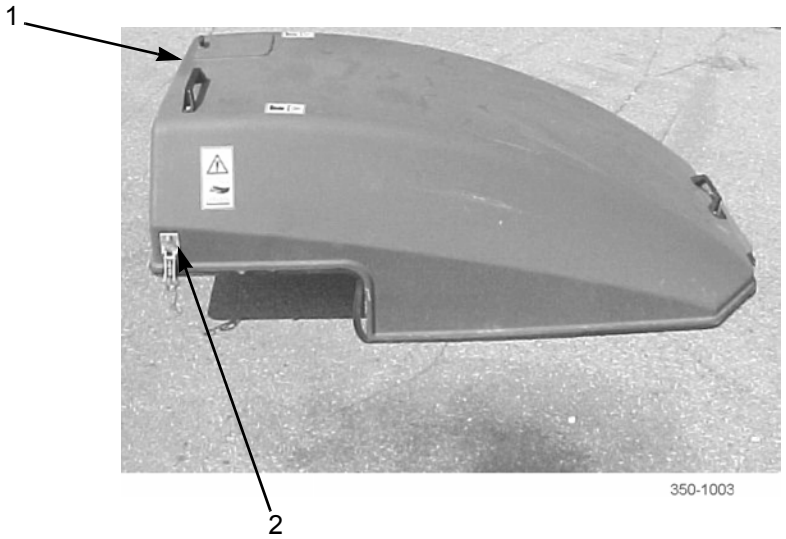
Two

NOTE

For ease in removing engine cover, boom may be raised (TM 10-3930-675-10).

REMOVAL

1. Release latch (2) on each side of engine cover (1).
2. Lift rear of engine cover (1) and slide front of engine cover out from front latch.
3. Lift engine cover (1) off vehicle.

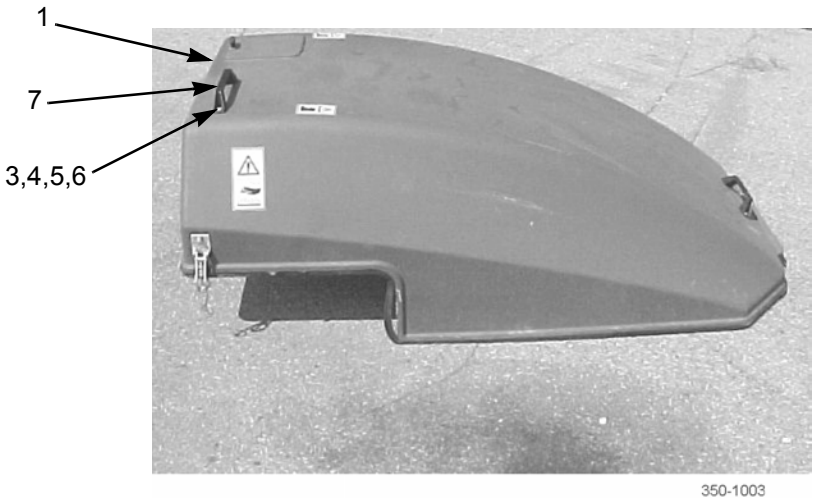


DISASSEMBLY

NOTE

Perform step 1 to remove each of two handles.

1. Remove two locknuts (3), screws (4), washers (5), washers (6), and handle (7) from engine cover (1). Discard locknuts.



NOTE

Perform step 2 to remove each of two latches.

2. Remove four locknuts (8), washers (9), plate (10), four screws (11), and latch (2) from engine cover (1). Discard locknuts.



DISASSEMBLY - CONTINUED

NOTE

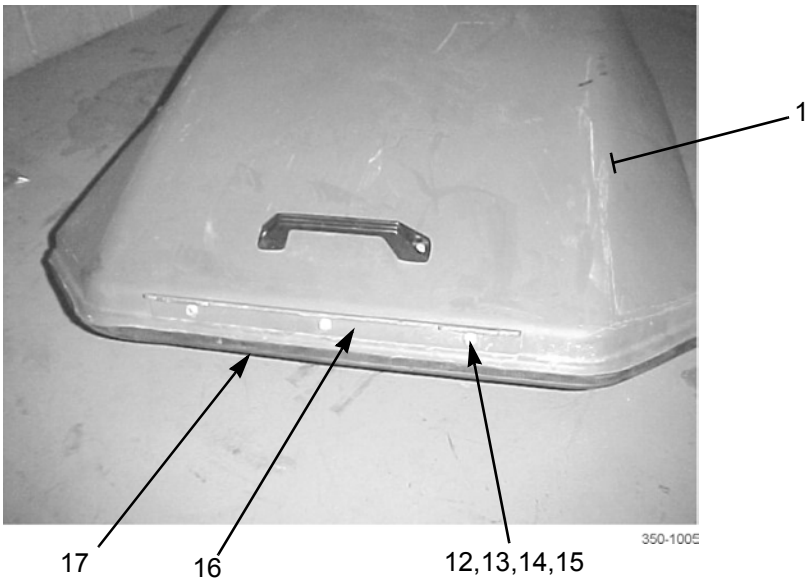
Perform step 3 to remove bracket from front of engine cover.

3. Remove three locknuts (12), washers (13), washers (14), screws (15), and bracket (16) from front of engine cover (1). Discard locknuts.

NOTE

Perform step 4 to remove weatherseal.

4. Remove weatherseal (17) and cut new weatherseal to same length. Discard old weatherseal.



ASSEMBLY

NOTE

Perform step 1 to install weatherseal to engine cover.

1. Apply adhesive to new weatherseal (17) and install weatherseal to edges of engine cover (1).

NOTE

Perform step 2 to install bracket to front of engine cover.

2. Install bracket (16) to front of engine cover (1) with three screws (15), washers (14), washers (13), and new locknuts (12).

NOTE

Perform step 3 to install each of two latches.

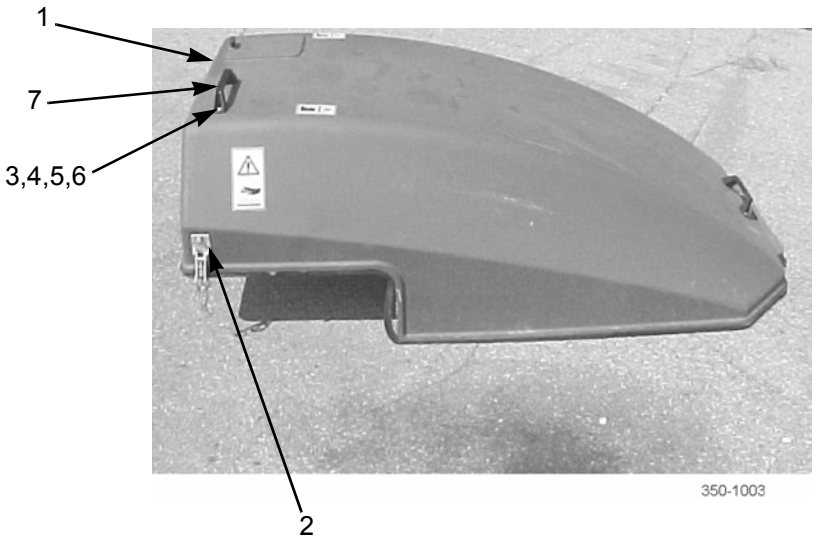
3. Install plate (10) and latch (2) to engine cover (1) with four washers (9), screws (11), and new locknuts (8).

ASSEMBLY - CONTINUED

NOTE

Perform step 4 to install each of two handles.

4. Install handle (7) to engine cover (1) with two washers (6), washers (5), screws (4), and new locknuts (3).



INSTALLATION

1. With assistance, position engine cover (1) over engine compartment and into front latch.
2. Secure engine cover (1) on each side with latch (2).

END OF WORK PACKAGE

RIGHT-SIDE STEP ASSEMBLY REPLACEMENT 0144 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Nut, lock (P/N 920076.002) (4)

Nut, lock (P/N 920076.003) (4)

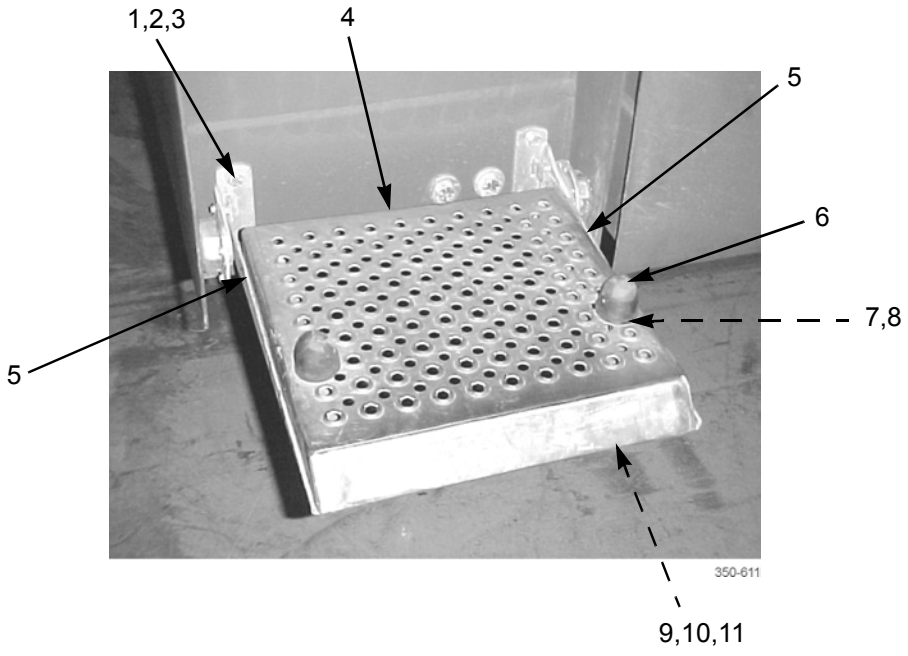


WARNING

Mounting brackets of step are under spring tension. Use care when removing and installing. Wear protective eyewear to prevent injury.

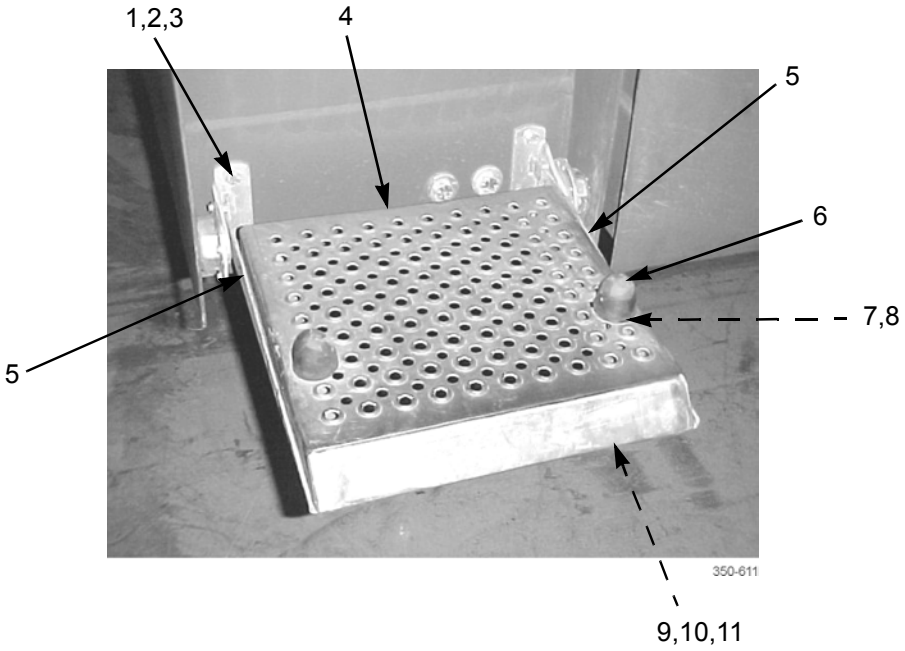
REMOVAL

1. Place step (4) in lowered position.
2. Remove two nuts (7), washers (8), and rubber bumpers (6) from step (4).
3. Remove four locknuts (9), washers (10), screws (11), and step (4) from two step supports (5). Discard locknuts.
4. Remove four locknuts (1), eight washers (2), four screws (3), and two step supports (5) from vehicle. Discard locknuts.



INSTALLATION

1. Install two step supports (5) to vehicle with four screws (3), eight washers (2), and four new locknuts (1).
2. Install step (4) to step supports (5) with four screws (11), washers (10), and new locknuts (9).
3. Install two rubber bumpers (6) to step (4) with two washers (8) and nuts (7).
4. Place step (4) in raised position.



END OF WORK PACKAGE

LEFT-SIDE STAIR ASSEMBLY MAINTENANCE 0145 00

THIS WORK PACKAGE COVERS

Step Replacement

Stair Assembly: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Nut, lock (P/N 5590) (6)

Nut, lock (P/N 5957 (4)

Nut, lock (P/N 920076.003 (4)

Personnel Required

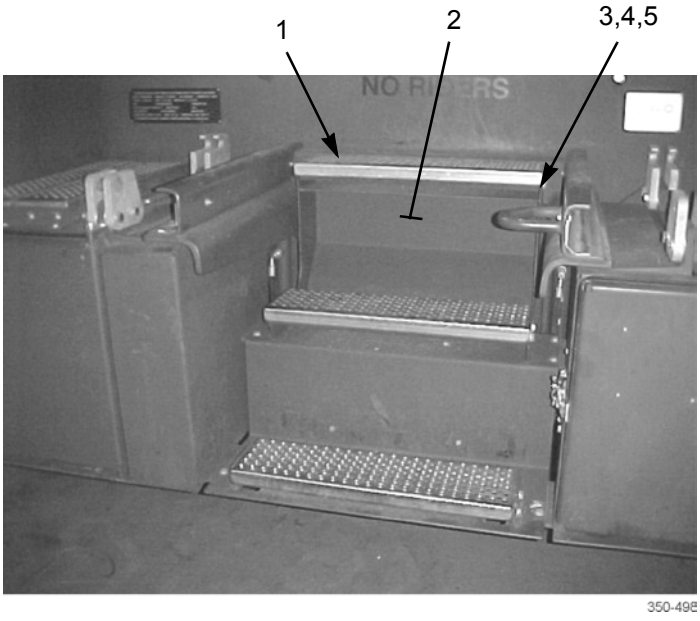
Two (if replacing stair assembly)

Equipment Condition

Wheels chocked

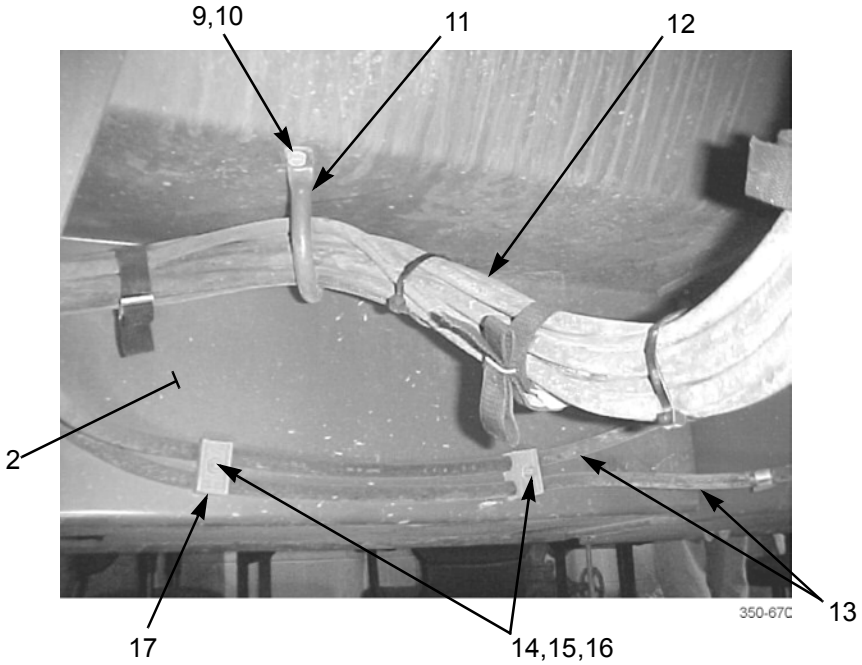
STEP REPLACEMENT

1. Remove four locknuts (3), screws (4), eight washers (5), and step (1) from stair assembly (2). Discard locknuts.
2. Install step (1) to stair assembly (2) with four screws (4), eight washers (5), and four new locknuts (3).

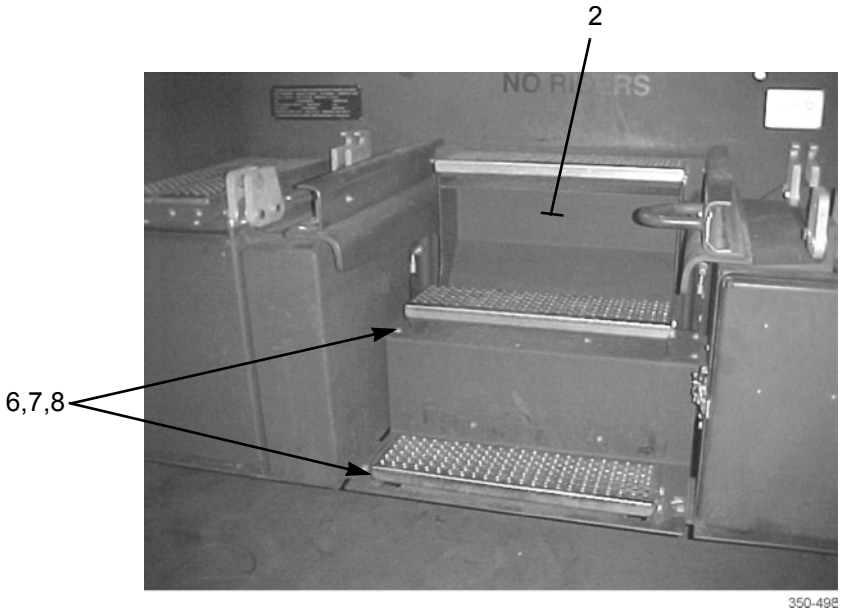


STAIR ASSEMBLY REMOVAL

1. Remove two locknuts (9), screws (10), cable loop (11), and hydraulic hoses (12) from underside of stair assembly (2). Discard locknuts.
2. Remove two locknuts (14), screws (15), washers (16), hose clamps (17), and hydraulic hoses (13) from stair assembly (2). Discard locknuts.



3. Remove six locknuts (6), screws (7), 12 washers (8), and stair assembly (2) from vehicle. Discard locknuts.



STAIR ASSEMBLY INSTALLATION

1. Install stair assembly (2) to vehicle with six screws (7), 12 washers (8), and six new locknuts (6).
2. Secure hydraulic hoses (13) to underside of stair assembly (2) with two hose clamps (17), washers (16), screws (15), and new locknuts (14).
3. Secure hydraulic hoses (12) to stair assembly (2) with cable loop (11), two screws (10), and new locknuts (9).

END OF WORK PACKAGE

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FENDER ASSEMBLY REPLACEMENT 0146 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Nut, lock (P/N 5957) (12)

Nut, lock (P/N 5590) (4)

Washer, lock (P/N 923657.0006) (rear) (8)

Washer, lock (P/N 923657.0011) (front) (8)

Personnel Required

Two

Equipment Condition

Master battery switch in OFF position

Steering hydraulic system pressure relieved (WP 0164 00)

WARNING

DO NOT perform this task without first relieving steering hydraulic system pressure. When working in close proximity to wheels and tires, safety dictates that there be no danger of inadvertent movement in wheels and tires. Failure to relieve steering hydraulic system pressure could result in injury to personnel.

NOTE

All four fenders are replaced the same way.

REMOVAL

NOTE

Perform steps 1 and 2 to remove fender from fender support bracket.

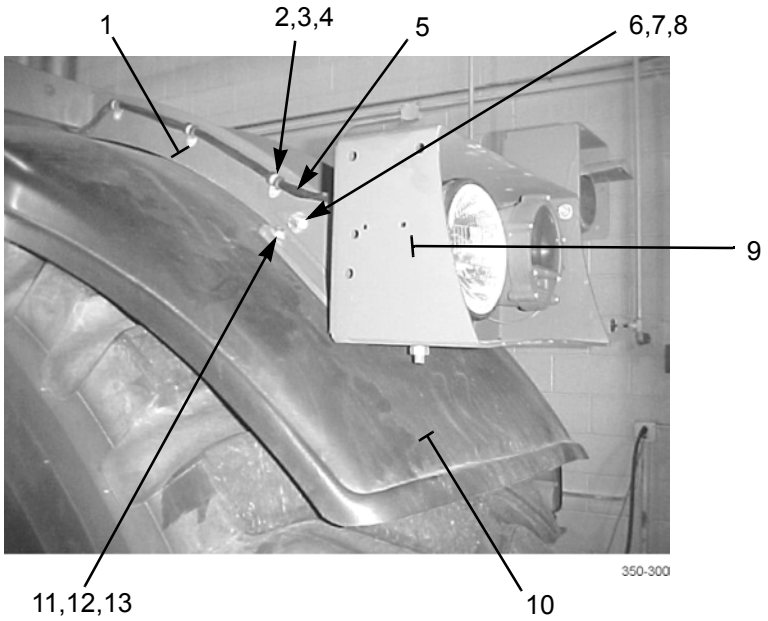
REMOVAL - CONTINUED

1. At front and rear of fender (10), remove six locknuts (11), screws (12), and 12 washers (13). Discard locknuts.
2. Remove fender (10) from fender support bracket (1).

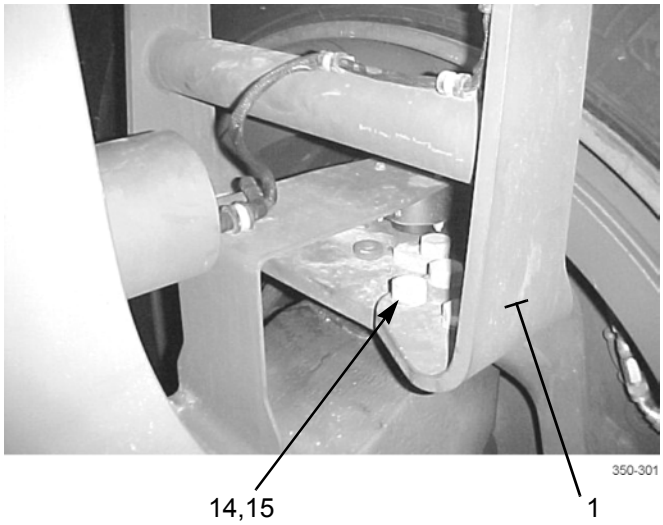
NOTE

Perform steps 3 thru 5 to remove fender support bracket from vehicle.

3. Remove nine screws (2), washers (3), and clamps (4) to release wiring harness (5) from fender support bracket (1).
4. Remove four locknuts (6), screws (7), eight washers (8), and light bracket (9) from fender support bracket (1). Set light bracket and wiring harness (5) aside. Discard locknuts.



5. Remove eight screws (14), lockwashers (15), and fender support bracket (1) from vehicle. Discard lockwashers.



INSTALLATION

NOTE

Perform steps 1 thru 3 to install fender support bracket to vehicle.

1. Install fender support bracket (1) to vehicle with eight new lockwashers (15) and screws (14).
2. Install light bracket (9) to fender support bracket (1) with eight washers (8), four screws (7), and new locknuts (6).
3. Install wiring harness (5) to fender support bracket (1) with nine clamps (4), washers (3), and screws (2).

NOTE

Perform steps 4 and 5 to install fender to fender support bracket.

4. Position fender (10) to fender support bracket (1).
5. Install fender (10) to fender support bracket (1) with 12 washers (13), six screws (12), and new locknuts (11).

END OF WORK PACKAGE

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MUDGUARD REPLACEMENT 0147 00

THIS WORK PACKAGE COVERS

Replacement

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Personnel Required

Two

Materials/Parts

Nut, lock (P/N 5957) (6)

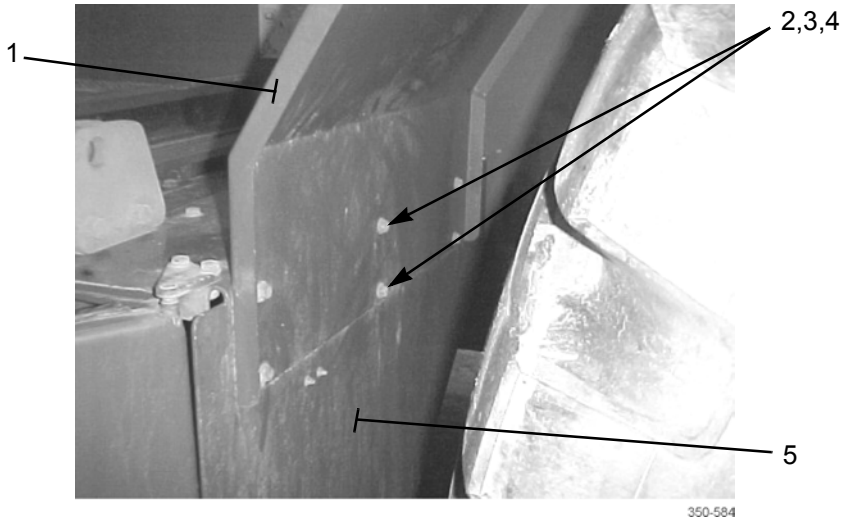


WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

REPLACEMENT

1. Remove six locknuts (2), 12 washers (3), six screws (4), and mudguard (1) from remote hydraulic control compartment (5). Discard locknuts.
2. Install mudguard (1) to remote hydraulic control compartment (5) with six screws (4), 12 washers (3), and six new locknuts (2).



END OF WORK PACKAGE

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BOOM-TO-BOOM EXTENSION FLEXIBLE CONVEYER MAINTENANCE 0148 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Wrench, adjustable (Item 35, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 920076.003) (6)

Personnel Required

Two

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Boom fully extended (TM 10-3930-675-10)

Boom hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

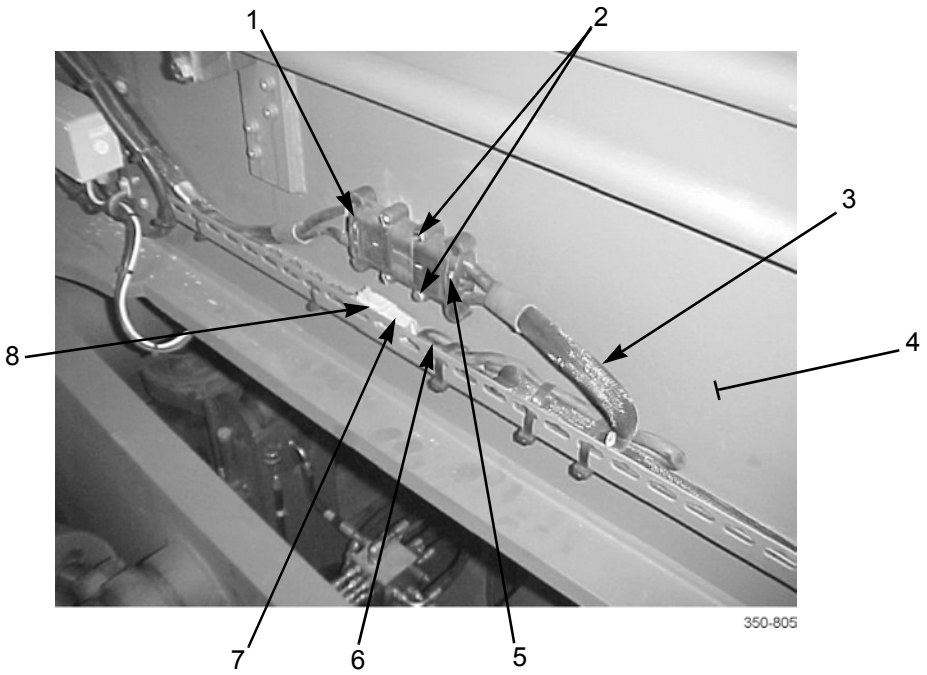
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Tag all hydraulic lines.
- Remove and discard tiedown straps as necessary to gain free movement in hydraulic hoses and wiring harnesses.

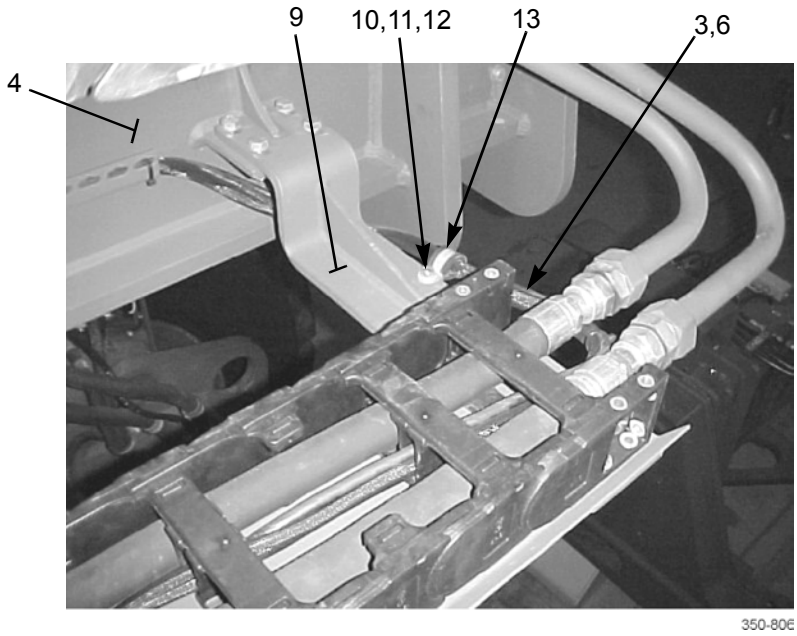
REMOVAL

1. At right-rear of boom (4), remove two screws (2) and disconnect connector (5) of boom wiring harness (3) from connector (1).
2. Disconnect connector (7) of cable (6) from connector (8).
3. Remove boom wiring harness (3) and cable (6) from attachment to right side of boom (4).



4. At right-front of boom (4), remove locknut (10), two washers (11), screw (12), and clamp (13) from conveyer support bracket (9). Discard locknut.
5. Remove clamp (13) from boom wiring harness (3) and cable (6).

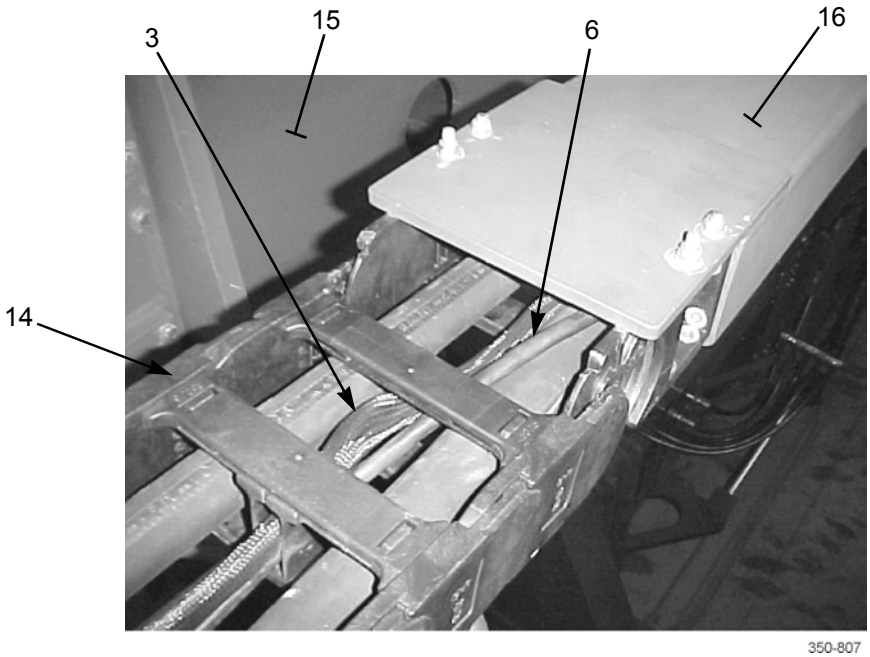
REMOVAL - CONTINUED



NOTE

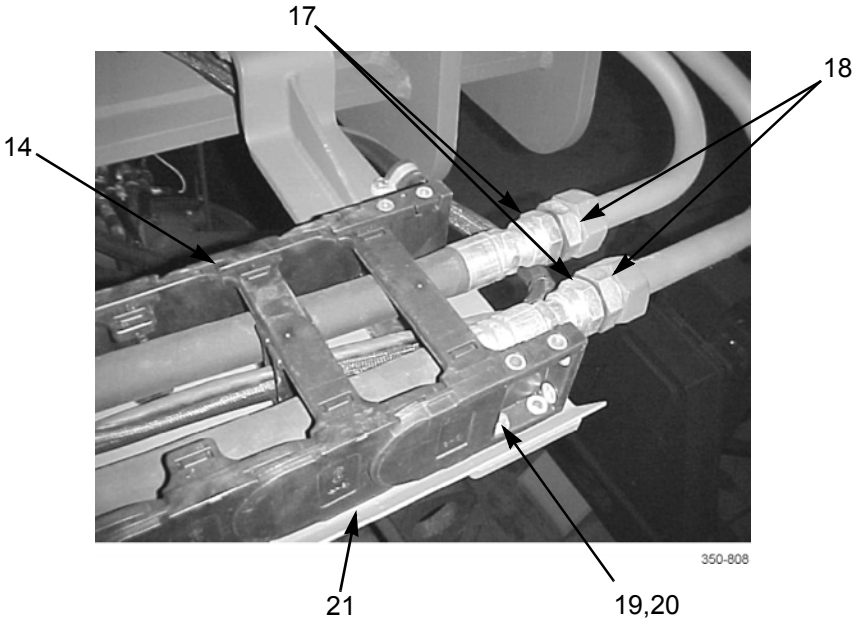
Spacers of conveyer may be separated to allow connector of boom wiring harness to pass thru.

6. At front of box channel (16) of boom extension (15), pull boom wiring harness (3) and cable (6) thru conveyer (14) until wiring harness and cable are just clear of conveyer.

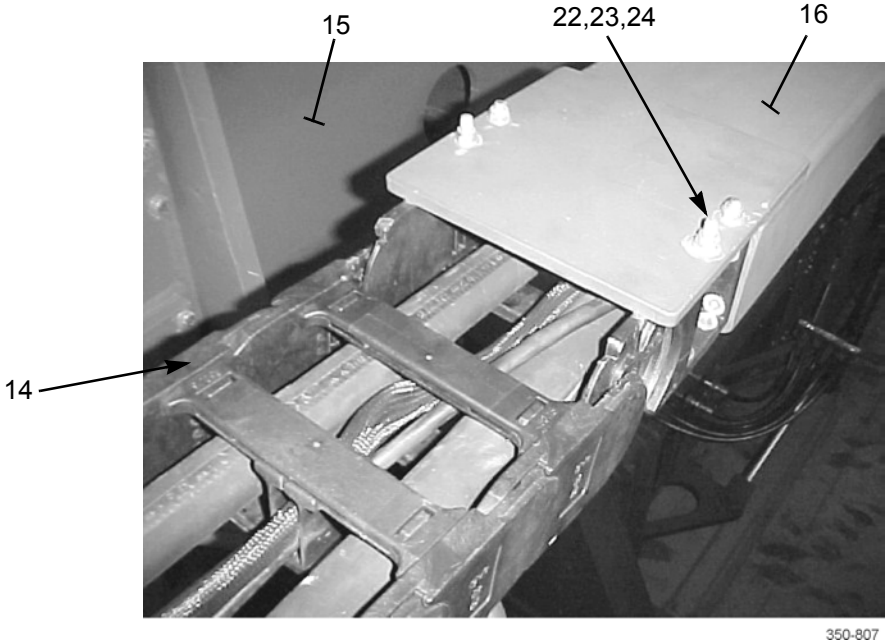


REMOVAL - CONTINUED

7. Disconnect two hydraulic hoses (17) from two adapters (18).
8. Remove two locknuts (19), screws (20), and lower end of conveyer (14) from conveyer support bracket (21). Discard locknuts. Straighten conveyer.
9. At front of box channel (16) of boom extension (15), pull two hydraulic hoses (17) thru conveyer (14) until hoses are just clear of conveyer.



10. Remove four locknuts (22), eight washers (23), four screws (24), and top end of conveyer (14) from box channel (16). Discard locknuts.
11. Remove conveyer (14) from vehicle.

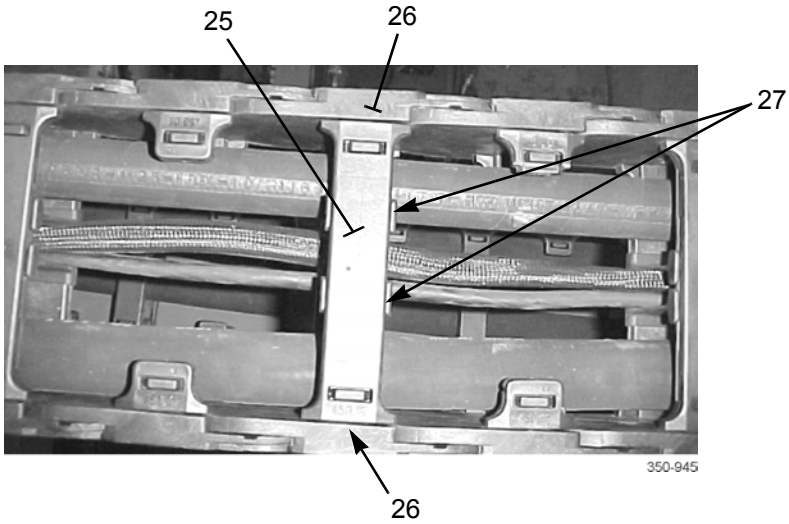


DISASSEMBLY

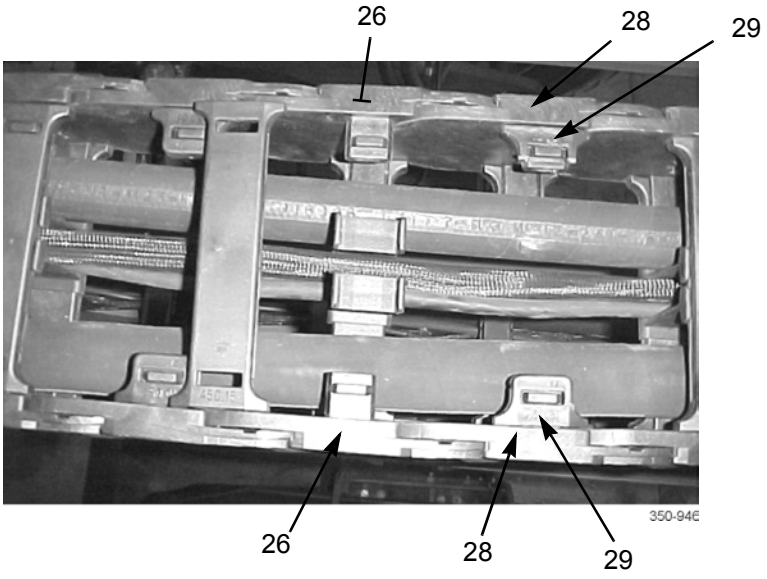
NOTE

Perform following steps to disassemble conveyer and remove damaged or excessively worn links.

1. At each end of crossbar (25), use a flat-tipped screwdriver as a lever to pry upward on crossbar.
2. Remove crossbar (25) from each of two links (26) and two spacers (27).



3. At each clip (29), use a flat-tipped screwdriver as a lever to pry upward on clip.
4. Remove clip (29) from each of two links (26).
5. Repeat steps 1 thru 4 at top and bottom of links (26) to be removed.
6. With conveyer on a flat surface, insert flat-tipped screwdriver between sides of two adjacent links (26 and 28).
7. Pry links (26 and 28) slightly apart and separate two links of conveyer.
8. Pry additional adjacent links apart to remove links from conveyer.

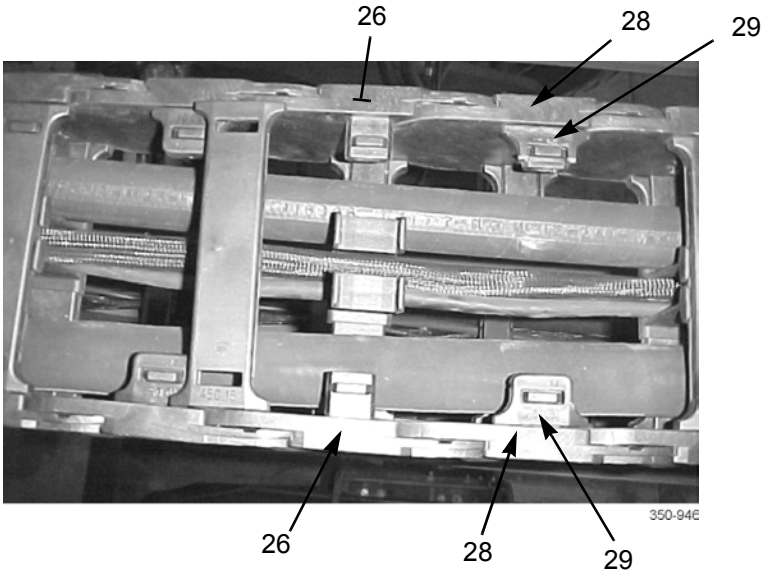


ASSEMBLY

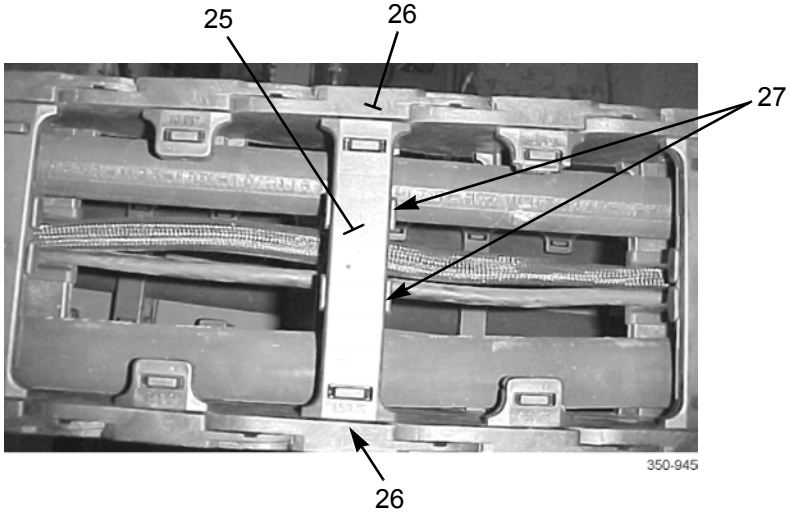
NOTE

Perform following steps to install links to conveyer and assemble conveyer.

1. Ensure crossbar (25) of link (26) to be assembled and crossbar of link (28) of conveyer are removed at each connection point.
2. Position link (26) to conveyer at a slight angle and install one side of link to conveyer by pressing inward on side of link.
3. Install other side of link (26) to conveyer by pressing inward on side of link.
4. Repeat steps 1 thru 3, as necessary, to install links to conveyer and to assemble two sections of conveyer.
5. Position each of two clips (29) to each link (28) of conveyer at an angle and press down firmly to install.



6. Position crossbar (25) to links (26) and two spacers (27) at an angle and press down firmly to install.



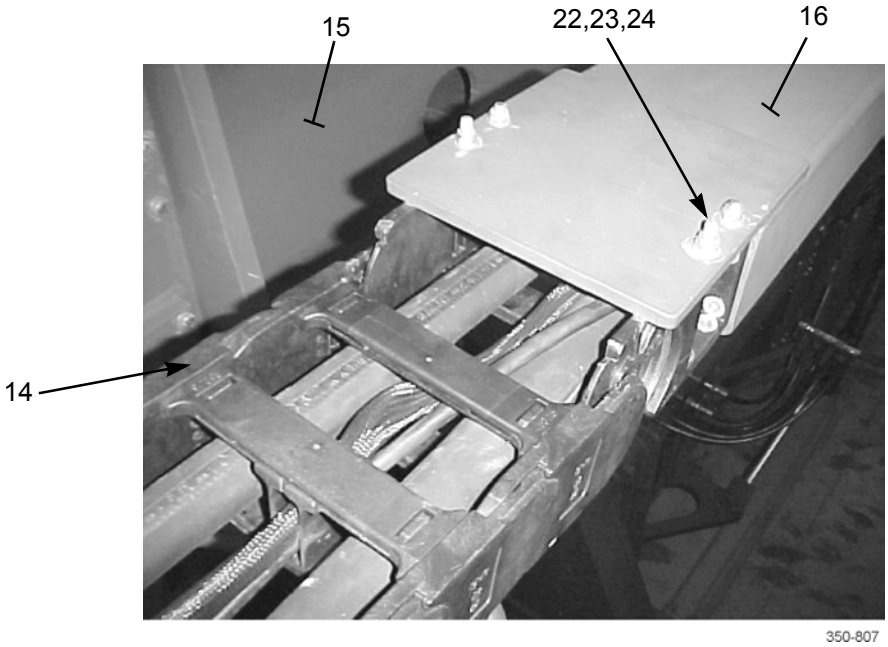
7. Repeat steps 5 and 6 at top and bottom of links that were installed.

INSTALLATION

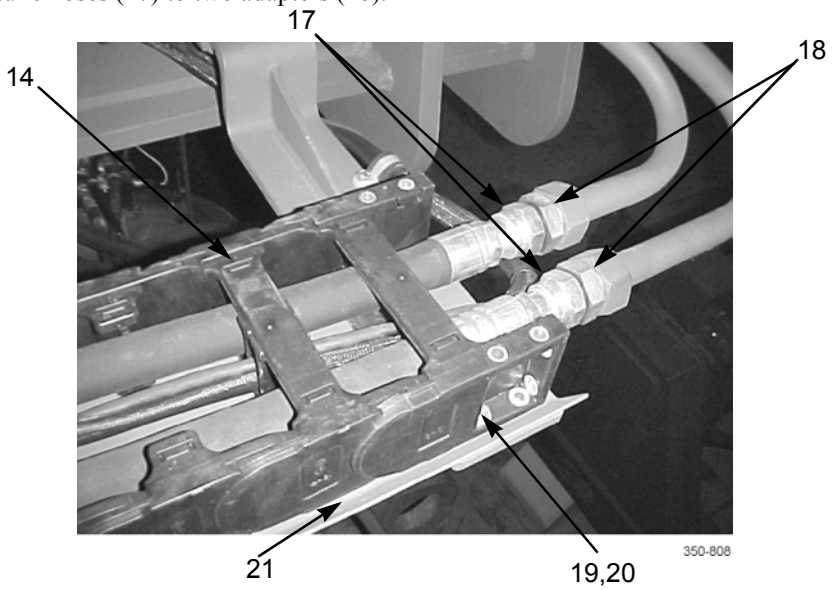
NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Position conveyer (14) to vehicle with conveyer straightened.
2. Install top end of conveyer (14) to box channel (16) with four screws (24), eight washers (23), and four new locknuts (22).

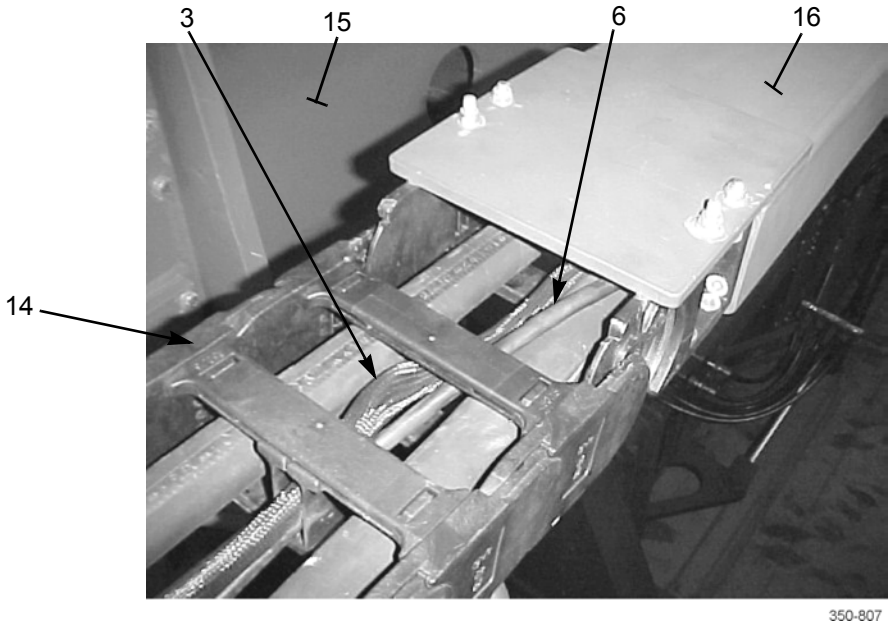


3. Extend two hydraulic hoses (17) out from rear of box channel (16) of boom extension (15), thru conveyer (14).
4. Bend conveyer (14) and Install lower end of conveyer to conveyer support bracket (21) with two screws (20) and new locknuts (19).
5. Connect two hydraulic hoses (17) to two adapters (18).



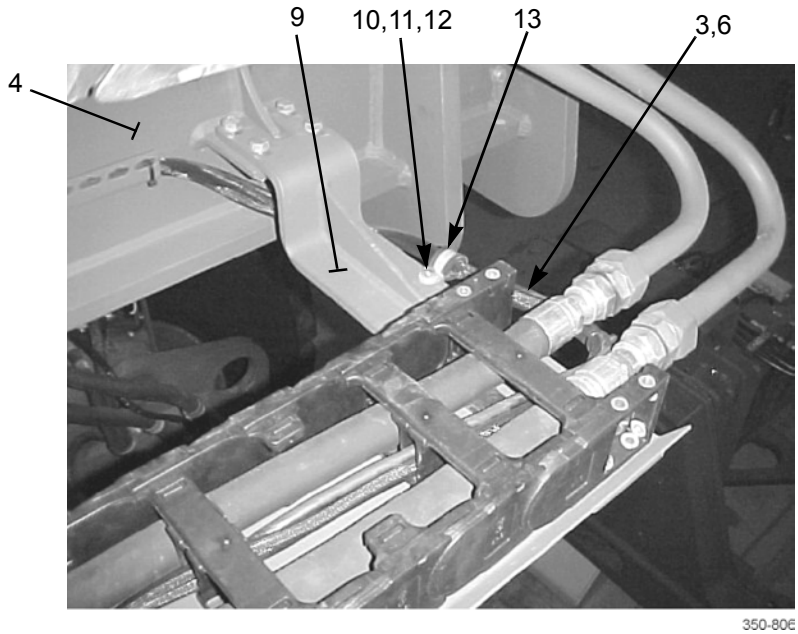
INSTALLATION - CONTINUED

6. Extend boom wiring harness (3) and cable (6) out from rear of box channel (16) of boom extension (15), thru conveyer (14) toward rear of vehicle.



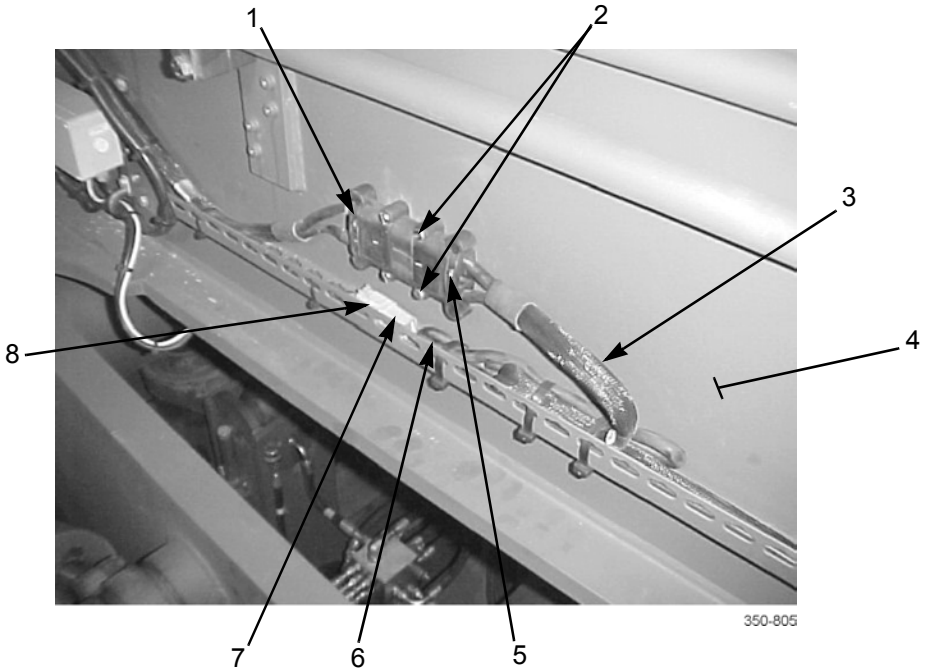
7. At right-front of boom (4), position clamp (13) to boom wiring harness (3) and cable (6).

8. Install clamp (13) to conveyer support bracket (9) with screw (12), two washers (11), and new locknut (10).



INSTALLATION - CONTINUED

9. Using new tiedown straps, install boom wiring harness (3) and cable (6) along right side of boom (4).
10. Connect connector (7) of cable (6) to connector (8).
11. Connect connector (5) of boom wiring harness (3) to connector (1) and install two screws (2).



12. Return boom to operational position (TM 10-3930-675-10) and check for leaks.
13. Add hydraulic oil to reservoir, if necessary (LO 10-3930-675-12).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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SEAT BELT REPLACEMENT 0149 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

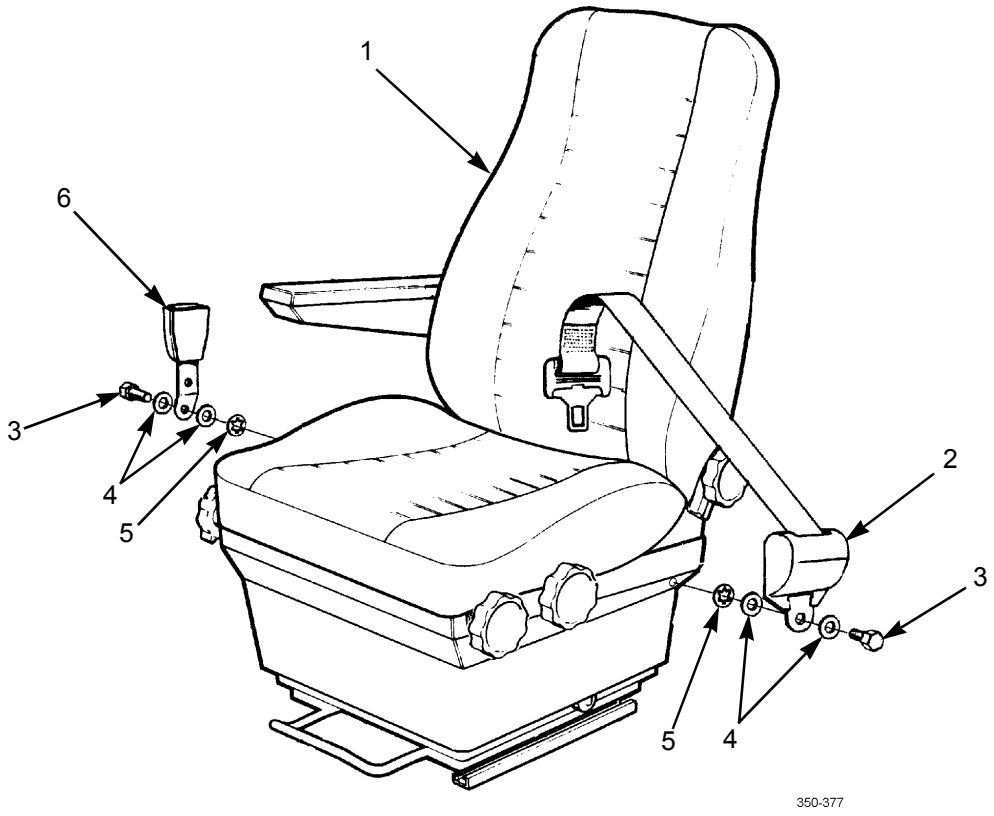
Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Kit, seat belt (P/N 501216)

REMOVAL

Remove two screws (3), four washers (4), two fiber washers (5), seat belt retractor (2), and seat belt receptacle (6) from seat assembly (1).



INSTALLATION

Install seat belt receptacle (6) and seat belt retractor (2) to seat assembly (1) with two fiber washers (5), four washers (4), and two screws (3).

END OF WORK PACKAGE

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SEAT ASSEMBLY MAINTENANCE 0150 00

THIS WORK PACKAGE COVERS

Removal, Disassembly, Assembly, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Drill set, twist (Item 7, WP 0204 00)

Drill, electric (Item 8, WP 0204 00)

Riveter, blind, hand (Item 24, WP 0204 00)

Materials/Parts

Nut, lock (P/N 210401) (2)

Rivet (P/N 923899.0573) (2)

Personnel Required

Two

Equipment Condition

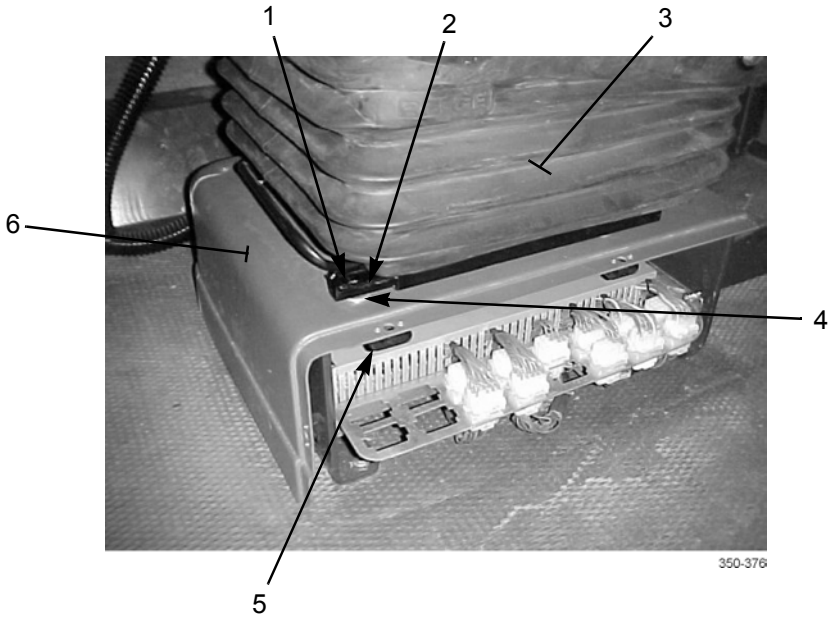
Electronic joystick assembly removed (WP 0081 00)

Seat belt removed (WP 0149 00)

Seat warning buzzer removed (WP 0106 00)

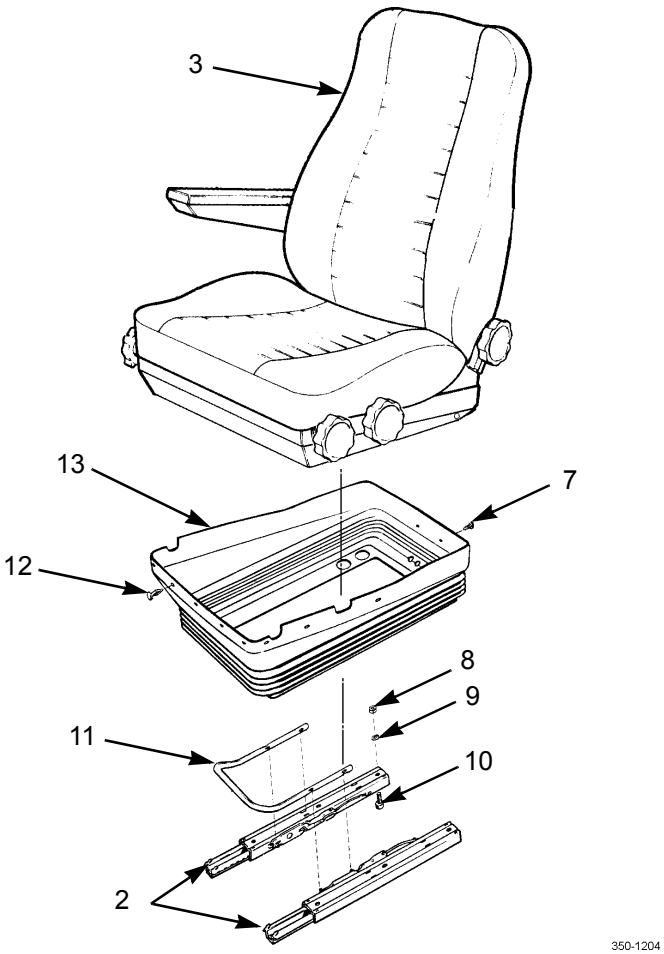
REMOVAL

1. Remove four screws (1) holding slide rails (2) to seat base cover (6) and seat base (5).
2. Remove seat assembly (3) and four spacers (4) from vehicle.



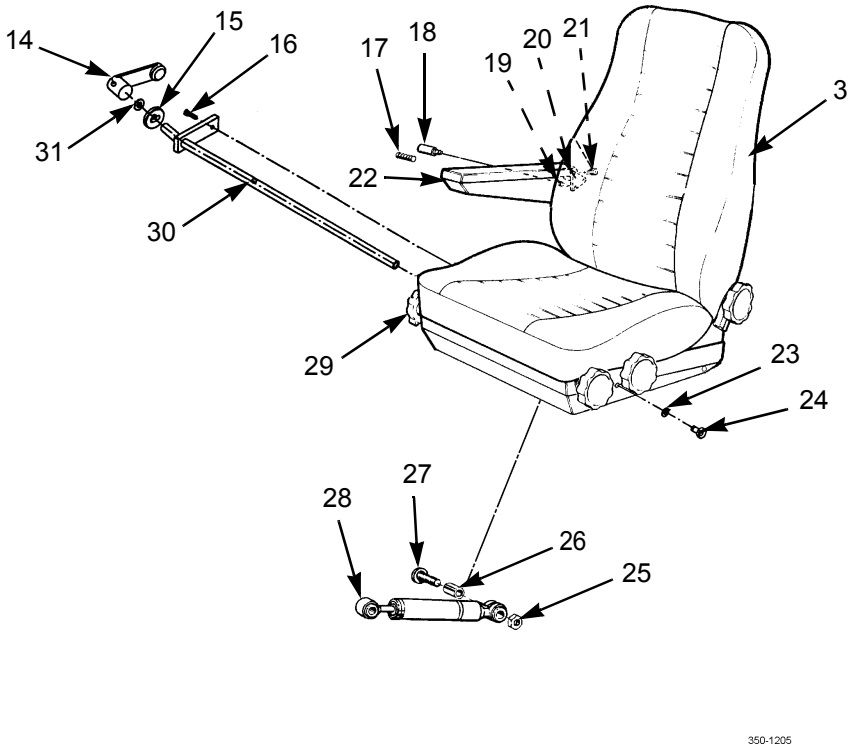
DISASSEMBLY

1. Remove 17 plastic rivets (12) and five plastic rivets (7) from bellows (13) to separate bellows from seat assembly (3).
2. Remove four nuts (8), washers (9), screws (10), two slide rails (2), and handle (11).
3. Remove bellows (13).



4. Remove lever (14), washer (31), and washer (15) from joystick mounting bracket (30).
5. Remove screw (16), screw (24), washer (23), and joystick mounting bracket (30).
6. Remove screw (17), screw (18), three screws (19), and armrest bracket (20) with armrest (22).
7. Remove adjustment screw (21) from armrest (22).
8. Remove five knobs (29).
9. Remove two locknuts (25), screws (27), bushings (26), and shock absorber (28). Discard locknuts.

DISASSEMBLY - CONTINUED

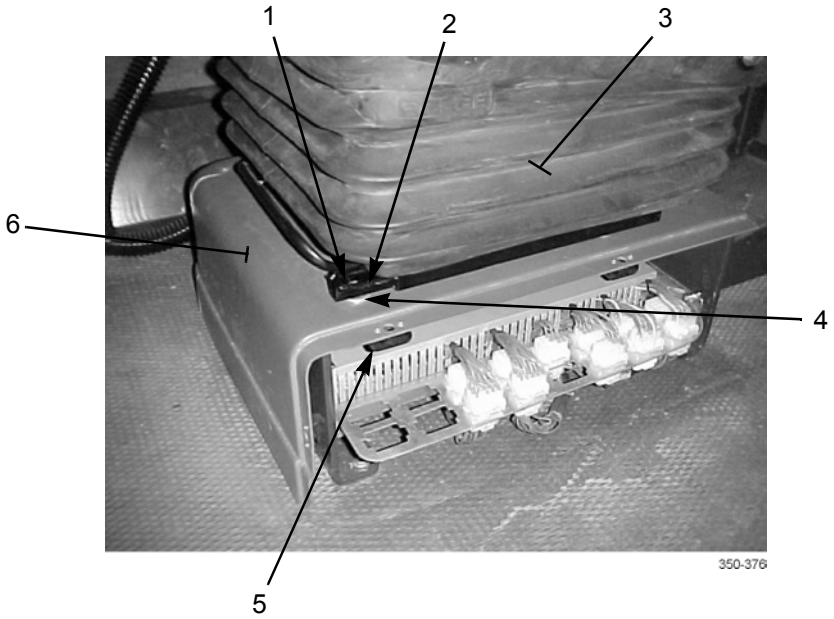


ASSEMBLY

1. Install shock absorber (28) to bottom of seat assembly (3) with two bushings (26), screws (27), and two new locknuts (25).
2. Install five knobs (29).
3. Install adjustment screw (21) to armrest (22).
4. Install armrest bracket (20), with armrest (22), with three screws (19), screw (18), and screw (17).
5. Install joystick mounting bracket (30) with washer (23), screw (24), and screw (16).
6. Install washer (15), washer (31), and lever (14) to joystick mounting bracket (30).
7. Position bellows (13) to seat assembly (3).
8. Install handle (11) and two slide rails (2) with four screws (10), washers (9), and nuts (8).
9. Install five plastic rivets (7) and 17 plastic rivets (12) to bellows (13).

INSTALLATION

1. Position four spacers (4) and seat assembly (3) to vehicle.
2. Install two slide rails (2) to seat base cover (6) and seat base (5) with four screws (1).



3. Install seat warning buzzer (WP 0106 00).
4. Install seat belt (WP 0149 00).
5. Install electronic joystick assembly (WP 0081 00).

END OF WORK PACKAGE

CAB DOOR WEATHERSEAL REPLACEMENT 0151 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Compound, sealing (Item 9, WP 0203 00)

Detergent, general purpose (Item 11, WP 0203 00)

Materials/Parts - Continued

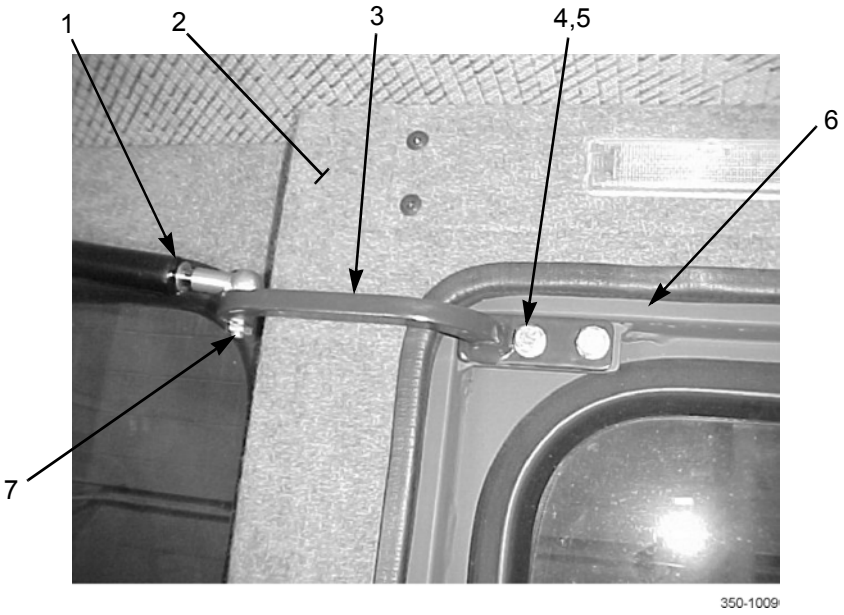
Rag, wiping (Item 22, WP 0203 00)

Nut, lock (P/N 923872.0391)

Weatherseal, rubber (P/N 923899.0564)

REMOVAL

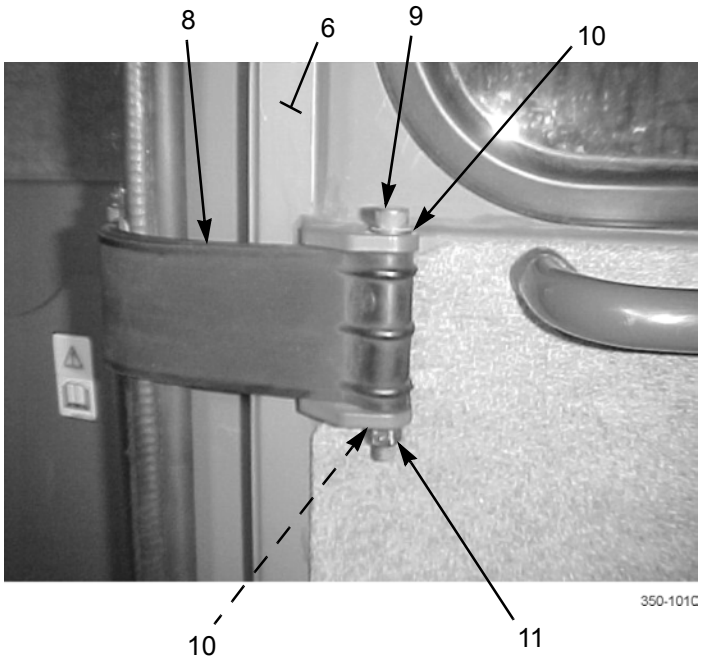
1. From inside cab (2), with cab door (6) closed, remove nut (7) and disconnect yoke (3) from cylinder (1).
2. Remove two screws (4), washers (5), and yoke (3) from cab door (6).



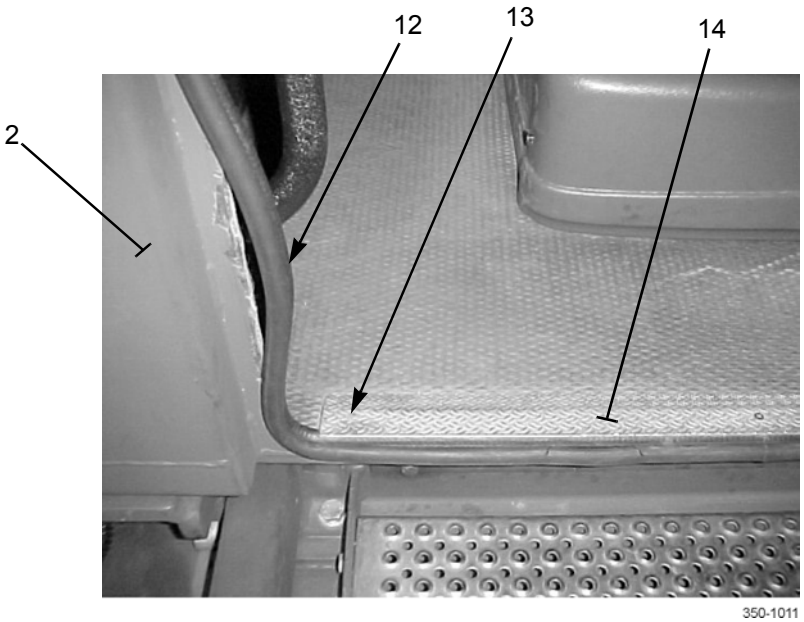
CAB DOOR WEATHERSEAL REPLACEMENT - CONTINUED 0151 00

REMOVAL - CONTINUED

3. Open cab door (6) and secure in opened position.
4. Remove locknut (11), two washers (10), screw (9), and door holder (8) from cab door (6). Discard locknut.

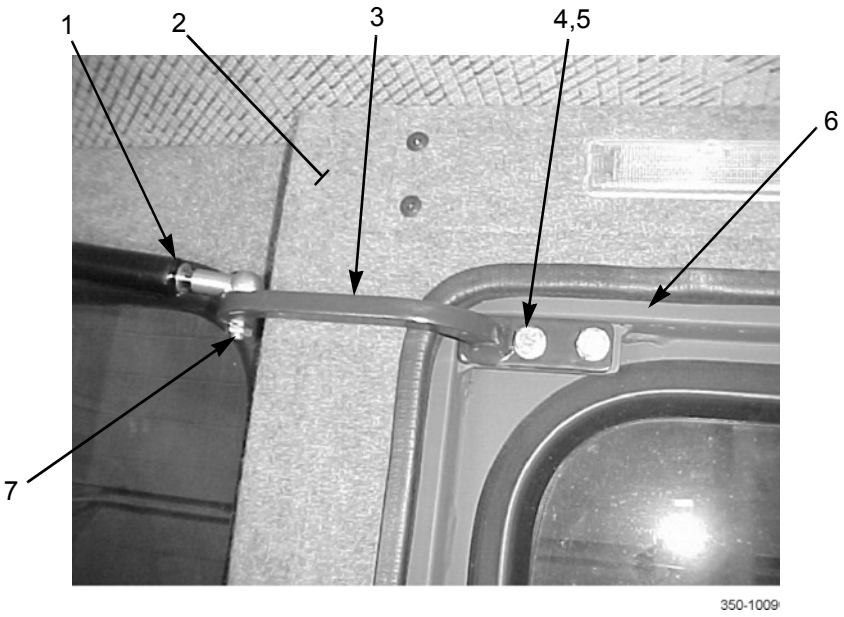


5. Remove three screws (13) and plate (14) from cab floor.
6. Remove cab door weatherseal (12) from cab (2). Discard weatherseal.
7. Clean cab door opening with detergent and water. Dry with clean rags.



INSTALLATION

1. At cab floor, mark center of cab door opening.
2. Start new weatherseal (12) at mark and install weatherseal to cab door opening. Press weatherseal firmly into place.
3. Cut weatherseal (12) to a length that allows ends of weatherseal to come together.
4. Apply sealing compound to ends of weatherseal (12) and press ends together. Allow sealing compound to set.
5. Install plate (14) to cab floor with three screws (13).
6. Install door holder (8) to cab door (6) with screw (9), two washers (10), and new locknut (11).
7. From inside cab (2), with cab door (6) closed, install yoke (3) to cab door with two washers (5) and screws (4).
8. Connect yoke (3) to cylinder (1) and install nut (7).



END OF WORK PACKAGE

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STORAGE COMPARTMENT DOORS AND LATCHES REPLACEMENT 0152 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Personnel Required

Two

Materials/Parts

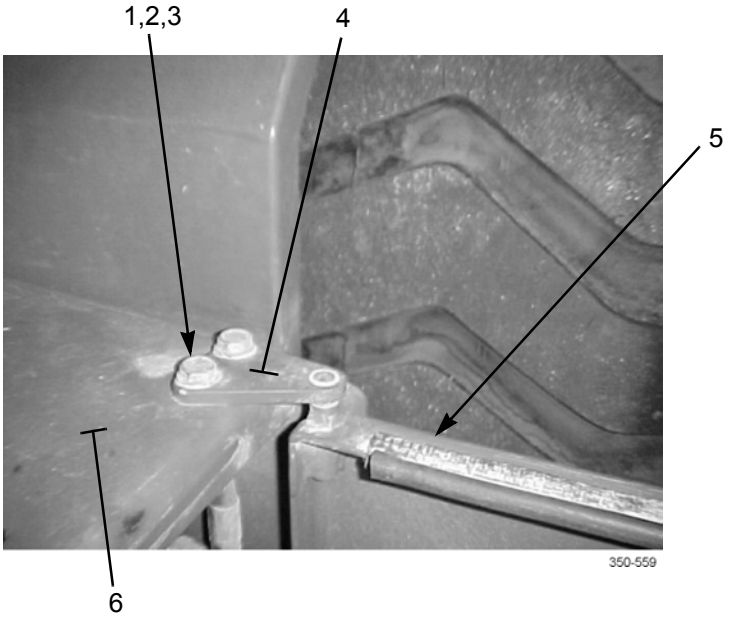
Nut, lock (P/N 920076.002) (10)

REMOVAL

NOTE

- Perform step 1 to remove each door.
- Replace bracket bushings only if damaged.

1. With door (5) unlatched and open, remove four locknuts (1), eight washers (2), four screws (3), two brackets (4), and door from storage compartment (6). Discard locknuts.



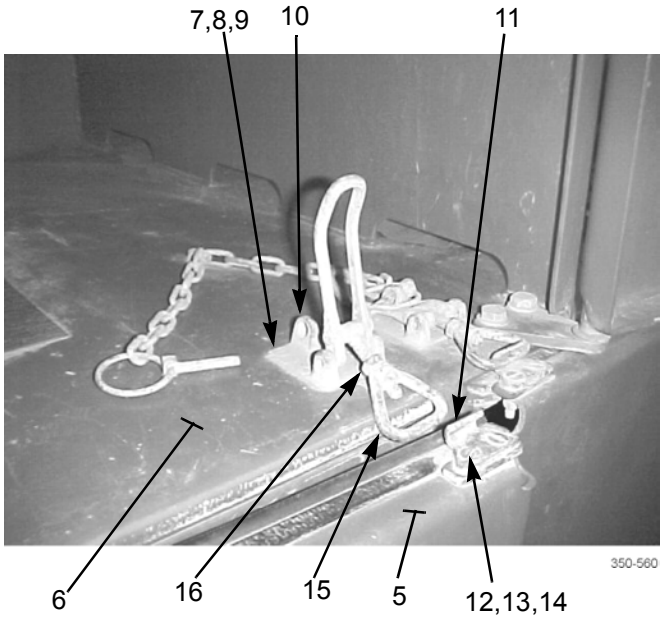
REMOVAL - CONTINUED

NOTE

Perform steps 2 and 3 to remove each door latch.

2. With door (5) unlatched and open, remove four locknuts (7), washers (8), screws (9), and latch (10) from storage compartment (6). Discard locknuts.

3. Remove two locknuts (12), washers (13), screws (14), and hook (11) from door (5). Discard locknuts.



INSTALLATION

NOTE

Perform steps 1 and 2 to install each door latch.

1. Install hook (11) to door (5) with two screws (14), washers (13), and new locknuts (12).

2. Install latch (10) to storage compartment (6) with four screws (9), washers (8), and new locknuts (7).

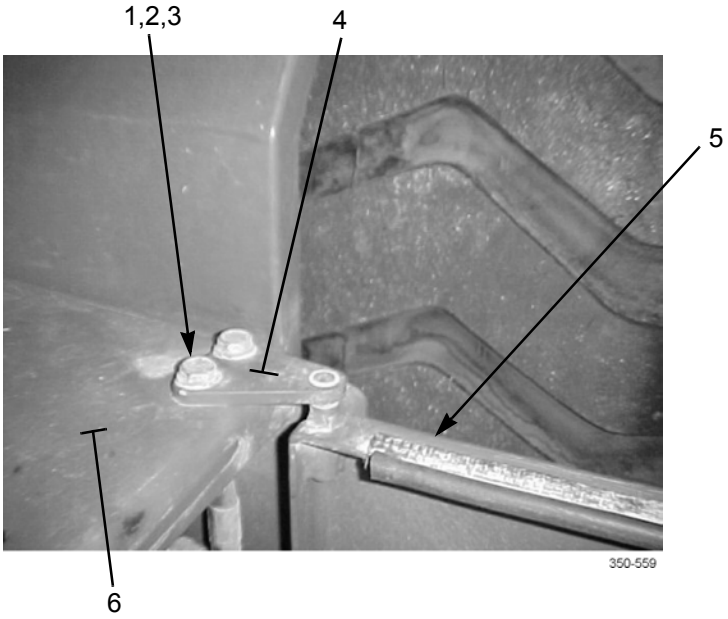
NOTE

Perform steps 3 and 4 to install each door.

3. Loosely install door (5) to storage compartment (6) with two brackets (4), four screws (3), eight washers (2), and four new locknuts (1). Close door to determine proper position of brackets. Readjust door as required for proper closure of door.

4. Open door (5) and tighten four locknuts (1).

INSTALLATION - CONTINUED



5. Loosen jamnut (16).
6. Rotate turnbuckle (15) until door (5) fits snugly when latched.
7. Tighten jamnut (16).

END OF WORK PACKAGE

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BATTERY AND DOLLY WHEELS STORAGE COMPARTMENT REPLACEMENT 0153 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Truck, forklift, 4000 lb capacity

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 5957) (17)

Personnel Required

Three

References

WP 0109 00

WP 0110 00

Equipment Condition

Dolly wheels and ramp removed from storage compartment (TM 10-3930-675-10)

Handrail removed (TM 10-3930-675-10)

Cab transport lift removed (WP 0142 00)

Batteries removed (WP 0107 00)

Air cleaner removed (WP 0056 00)

Exterior rearview mirror removed (WP 0155 00)

Left-side stair assembly removed (WP 0145 00)

Engine cover removed (WP 0143 00)

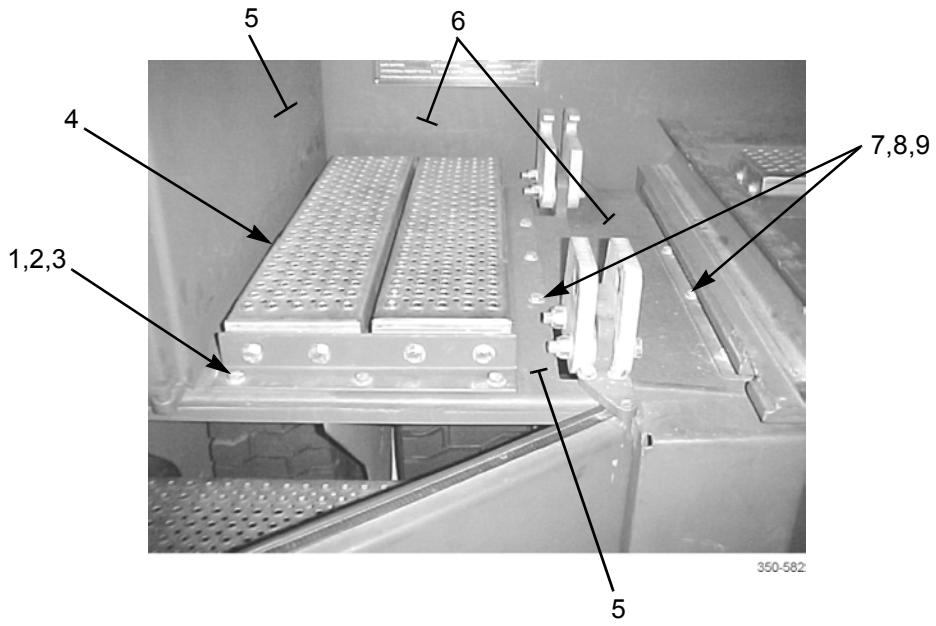


WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

REMOVAL

1. Remove six locknuts (1), screws (2), 12 washers (3), and footstep (4) from top of storage compartment (5). Discard locknuts.
2. Disconnect cables from NATO slave receptacle and master battery switch (WP 0109 00 and WP 0110 00).
3. Remove cables from storage compartment (5) by pulling them out into engine compartment.
4. Position forklift truck against side of vehicle with forklift tines supporting weight of storage compartment (5).
5. Remove five locknuts, ten washers, and five bolts securing storage compartment (5) to side of frame (6). Discard locknuts.
6. Remove six locknuts (7), 12 washers (8), and six bolts (9) securing top of storage compartment (5) to top of frame (6). Discard locknuts.
7. Remove storage compartment (5) from vehicle frame (6).



INSTALLATION

1. Use forklift truck to position storage compartment (5) against vehicle frame (6).
2. Install five bolts, ten washers, and five new locknuts securing storage compartment (5) to side of frame (6).
3. Install six bolts (9), 12 washers (8), and six new locknuts (7) securing top of storage compartment (5) to top of frame (6). Remove forklift truck.
4. Feed cables for NATO slave receptacle and master battery switch into storage compartment thru opening in back of compartment.
5. Connect cables to NATO slave receptacle and to master battery switch (WP 0109 00 and WP 0110 00).
6. Install footstep (4) to top of storage compartment (5) with 12 washers (3), six screws (2), and new locknuts (1).

INSTALLATION - CONTINUED

7. Install engine cover (WP 0143 00).
8. Install left-side stair assembly (WP 0145 00).
9. Install exterior rearview mirror (WP 0155 00).
10. Install air cleaner (WP 0056 00).
11. Install batteries (WP 0107 00).
12. Install cab transport lift (WP 0142 00).
13. Install handrail (TM 10-3930-675-10).
14. Stow dolly wheels and ramp in storage compartment (TM 10-3930-675-10).

END OF WORK PACKAGE

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REMOTE HYDRAULIC CONTROL COMPARTMENT REPLACEMENT 0154 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Truck, forklift, 4000 lb capacity

Materials/Parts

Nut, lock (P/N 5957) (10)

Personnel Required

Two

Equipment Condition

Cab transport lift raised (TM 10-3930-675-10)

Equipment Condition - Continued

Oil sampling valves removed (WP 0054 00)

Hydraulic system test point fittings removed (WP 0178 00)

Cab transport control valve removed (WP 0168 00)

Boom folding control valve removed (WP 0170 00)

Ball valve (shutoff valve #5) removed (WP 0180 00)

Boom lowering solenoid valve removed (WP 0169 00)

Left-side stair assembly removed (WP 0145 00)

Mudguard removed (WP 0147 00)

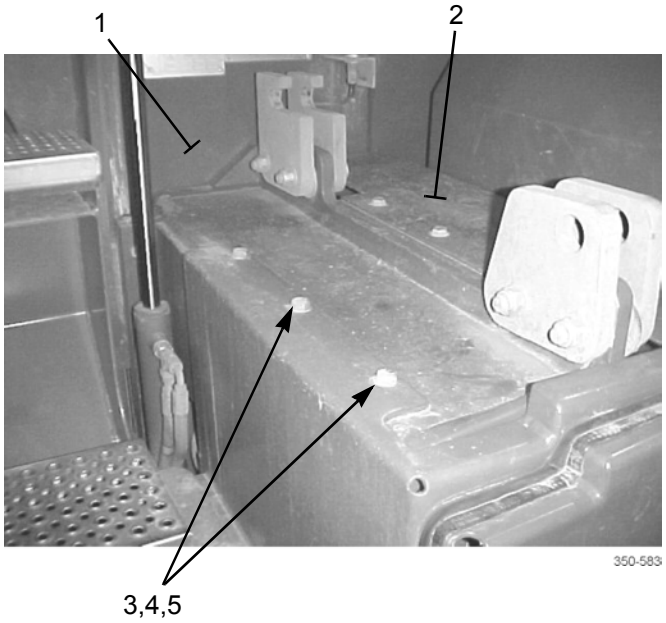


WARNING

Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.

REMOVAL

1. Ensure all hydraulic hoses are removed from compartment (2).
2. Position forklift truck against side of vehicle with forklift tines supporting weight of compartment (2).
3. Remove four locknuts, eight washers, and four screws securing compartment (2) to side of frame (1). Discard locknuts.
4. Remove six locknuts (3), 12 washers (4), and six screws (5) securing top of compartment (2) to top of frame (1). Discard locknuts.
5. Remove compartment (2) from vehicle.



INSTALLATION

1. Use forklift truck to position compartment (2) against vehicle frame (1).
2. Install four screws, eight washers, and four new locknuts securing compartment (2) to side of frame (1).
3. Install six screws (5), 12 washers (4), and six new locknuts (3) securing top of compartment (2) to top of frame (1). Remove forklift truck.
4. Install mudguard (WP 0147 00).
5. Install left-side stair assembly (WP 0145 00).
6. Install boom lowering solenoid valve (WP 0169 00).
7. Install ball valve (shutoff valve #5) (WP 0180 00).
8. Install boom folding control valve (WP 0170 00).
9. Install cab transport control valve (WP 0168 00).
10. Install hydraulic system test point fittings (WP 0178 00).
11. Install oil sampling valves (WP 0054 00).
12. Operate cab lift/lower lever in remote hydraulic control compartment to lower cab transport lift (TM 10-3930-675-10).

END OF WORK PACKAGE

REARVIEW MIRRORS REPLACEMENT 0155 00

THIS WORK PACKAGE COVERS

Interior Rearview Mirror Replacement

Exterior Rearview Mirror: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench set, socket attachment, torx (Item 33, WP 0204 00)

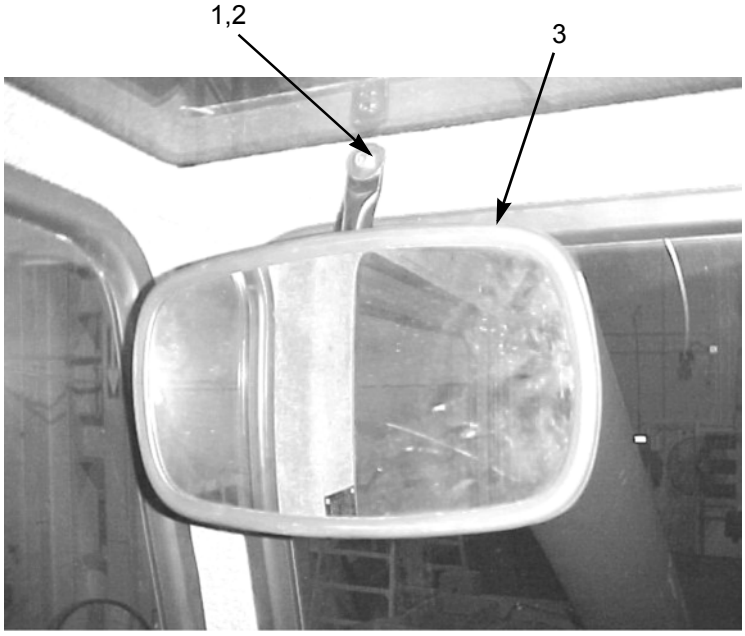
Materials/Parts

Nut, lock (P/N 5957) (2)

Nut, lock (P/N 920076.003) (2)

INTERIOR REARVIEW MIRROR REPLACEMENT

1. Remove screw (1), washer (2), and interior rearview mirror (3) from cab.
2. Install interior rearview mirror (3) to cab with washer (2) and screw (1).



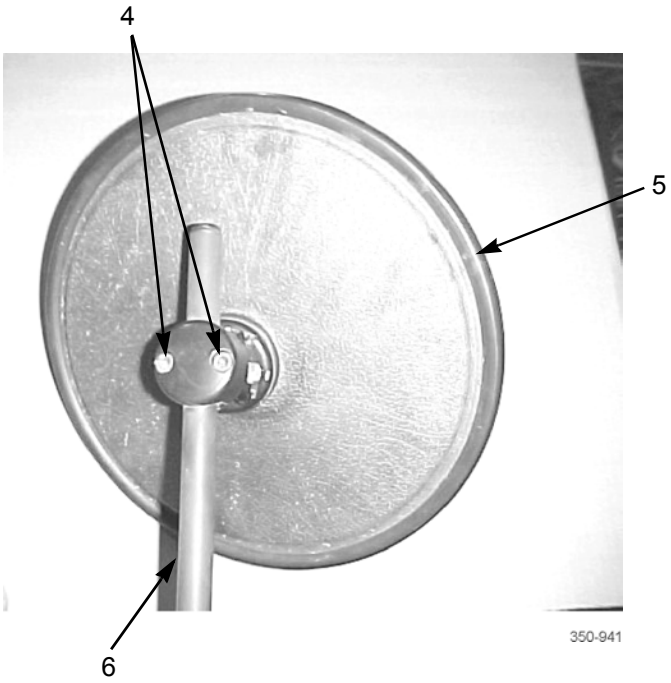
350-419

EXTERIOR REARVIEW MIRROR REMOVAL

NOTE

- Right and left exterior rearview mirrors are removed the same way.
- Perform step 1 to remove exterior rearview mirror from arm.

1. Loosen two screws (4) and remove exterior rearview mirror (5) from arm (6).

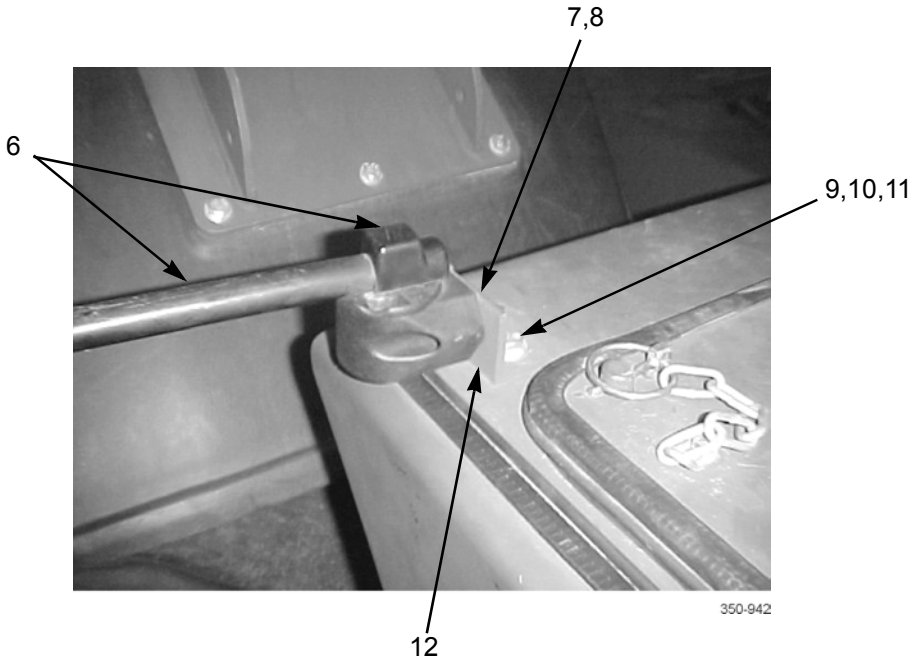


NOTE

Perform steps 2 and 3 to remove arm and mounting bracket from vehicle.

2. Remove two locknuts (7), screws (8), and arm (6) from mounting bracket (12). Discard locknuts.
3. Remove two locknuts (9), four washers (10), two screws (11), and mounting bracket (12) from vehicle. Discard locknuts.

EXTERIOR REARVIEW MIRROR REMOVAL - CONTINUED



EXTERIOR REARVIEW MIRROR INSTALLATION

NOTE

- Right and left exterior rearview mirrors are installed the same way.
- Perform steps 1 and 2 to install mounting bracket and arm to vehicle.

1. Install mounting bracket (12) to vehicle with two screws (11), four washers (10), and two new locknuts (9).
2. Install arm (6) to mounting bracket (12) with two screws (8) and new locknuts (7).

NOTE

Perform step 3 to install exterior rearview mirror to arm.

3. Install exterior rearview mirror (5) to arm (6) and tighten two screws (4).

END OF WORK PACKAGE

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WINDSHIELD WIPER MAINTENANCE 0156 00

THIS WORK PACKAGE COVERS

Front Windshield Wiper and Motor: Removal, Installation

Rear Window Windshield Wiper and Motor: Removal, Installation

Roof Window Windshield Wiper and Motor: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Wrench set, socket attachment, torx (Item 33, WP 0204 00)

Materials/Parts

Compound, gasket forming, silicone (Item 8, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Gasket (P/N 923864.1957)

Kit, mounting (P/N 920890.0004)

Seal (P/N 920887.0017) (2)

Personnel Required

Two

References

TM 10-3930-675-10

Equipment Condition

Master battery switch in OFF position

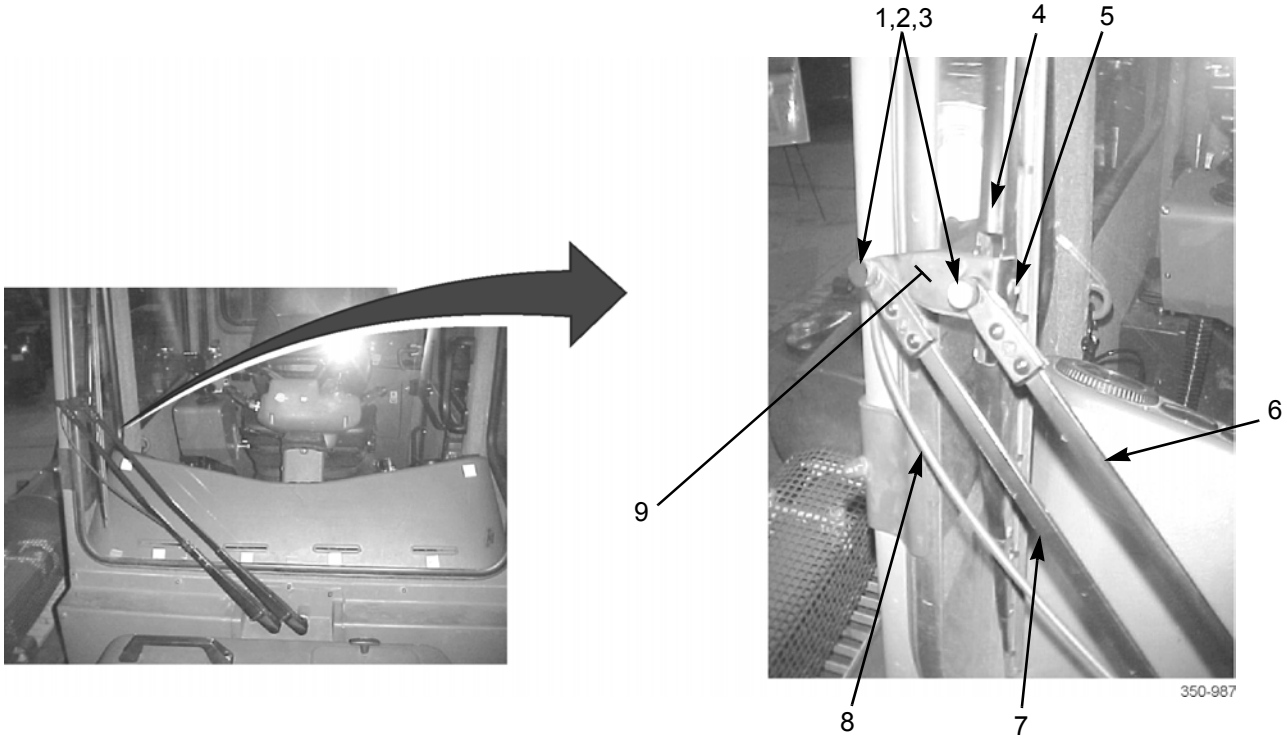
Engine cover removed (to replace front windshield wiper and motor) (WP 0143 00)

FRONT WINDSHIELD WIPER AND MOTOR REMOVAL

NOTE

To remove wiper blade only, perform step 1.

1. Remove screw (5) and wiper blade (4) from yoke (9).
2. Release jet and hose (8) from steering arm (7).
3. As required, remove two caps (1), c-clips (2), and washers (3) to separate steering arm (7) and wiper arm (6) from yoke (9).

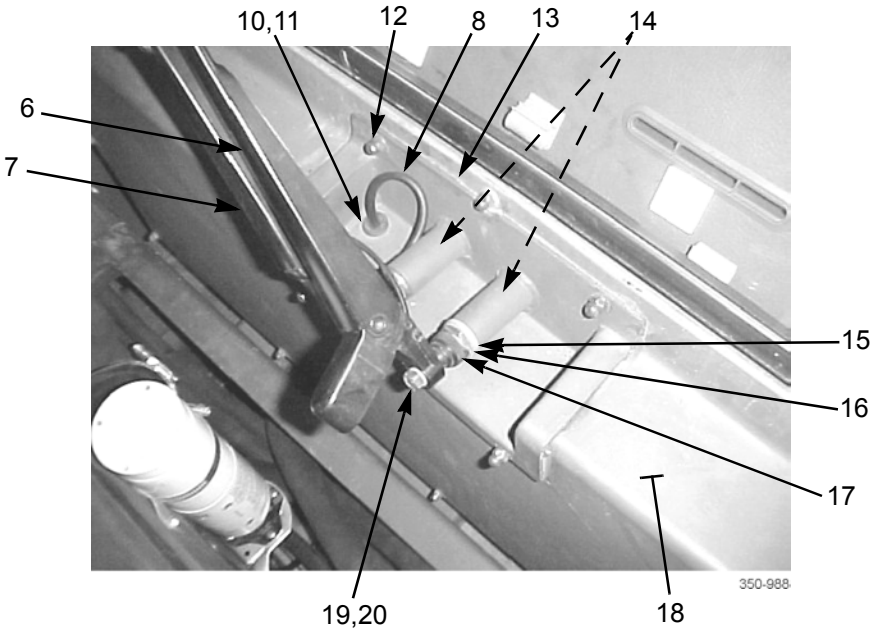


NOTE

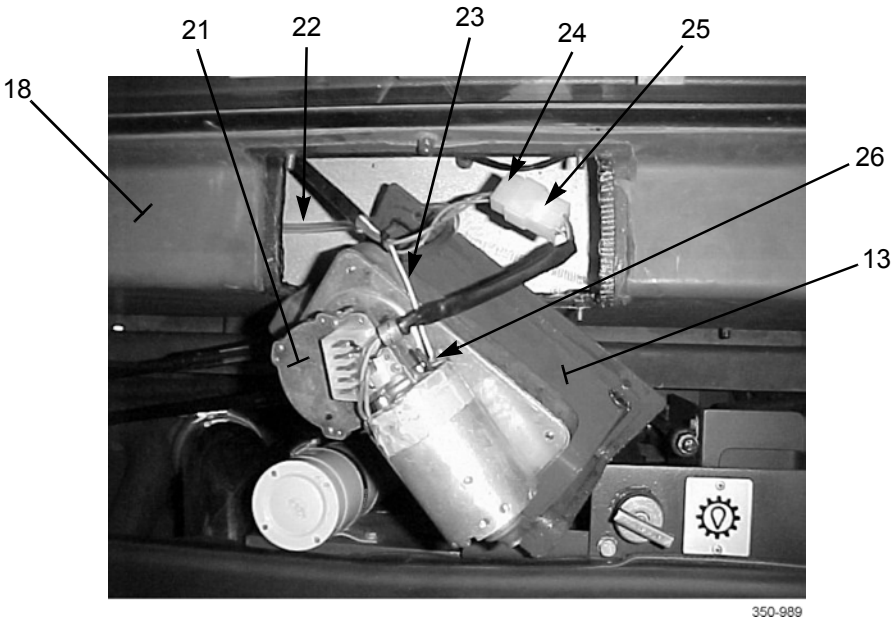
- Perform step 4 to remove steering arm and wiper arm.
- Note position of steering arm and wiper arm prior to removal to ensure correct installation.

4. Lift cover and remove nut (19), lockwasher (20), steering arm (7), and wiper arm (6) from windshield wiper motor shafts (14). Discard lockwasher.
5. Disconnect hose (8) from nipple (11).
6. Remove four capnuts (12), washers, and cover (13) with windshield wiper motor from panel (18).

FRONT WINDSHIELD WIPER AND MOTOR REMOVAL - CONTINUED



7. Disconnect hose (22) from nipple (11) and remove nipple and grommet (10) from cover (13).
8. Disconnect wiring harness connector (24) from motor connector (25).
9. Remove screw (26) and disconnect ground wire (23) from motor (21).
10. Remove two plastic caps (17), nuts (16), and seals (15), and separate cover (13) and windshield wiper motor (21). Discard seals.

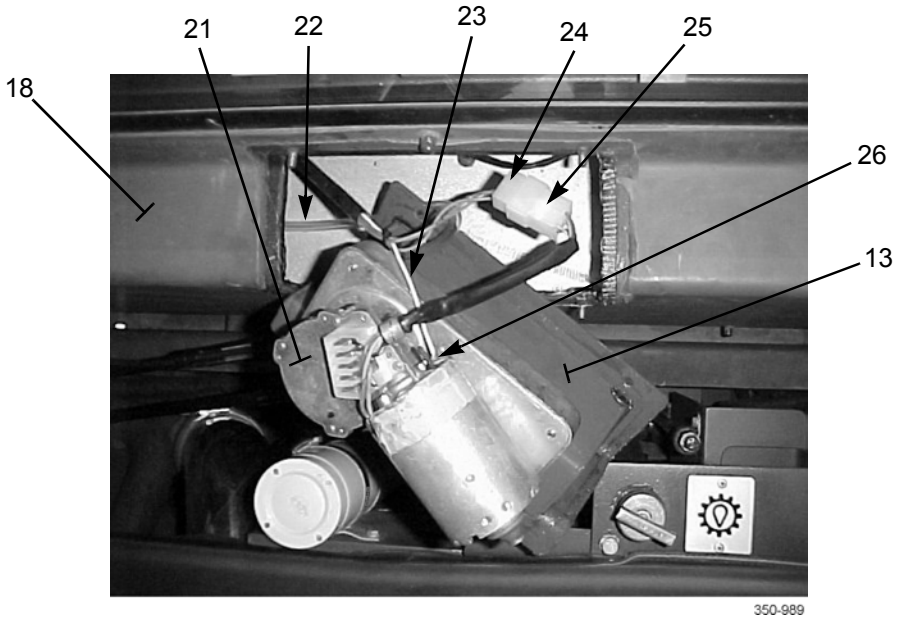


FRONT WINDSHIELD WIPER AND MOTOR INSTALLATION

NOTE

To install wiper blade only, perform step 9.

1. Install windshield wiper motor (21) to cover (13) with windshield wiper motor shafts (14) thru cover. Install two new seals (15), nuts (16), and plastic caps (17).
2. Connect ground wire (23) to motor (21) with screw (26).
3. Connect wiring harness connector (24) to motor connector (25).
4. Install grommet (10) and nipple (11) to cover (13). Connect hose (22) to nipple.



NOTE

Ensure all old gasket forming compound has been removed and mounting surfaces are clean.

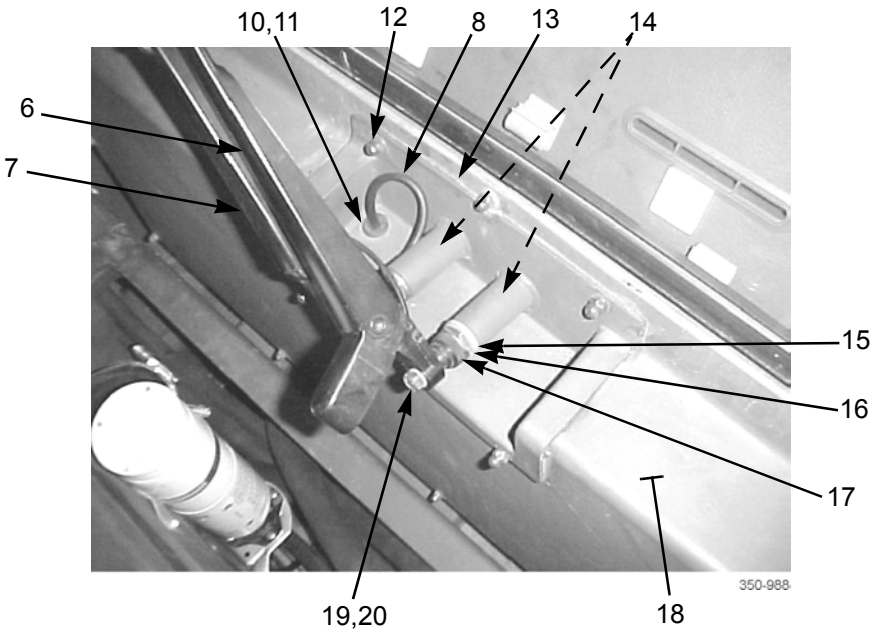
5. Apply gasket forming compound to panel (18). Install cover (13) with windshield wiper motor to panel with four washers and capnuts (12).

NOTE

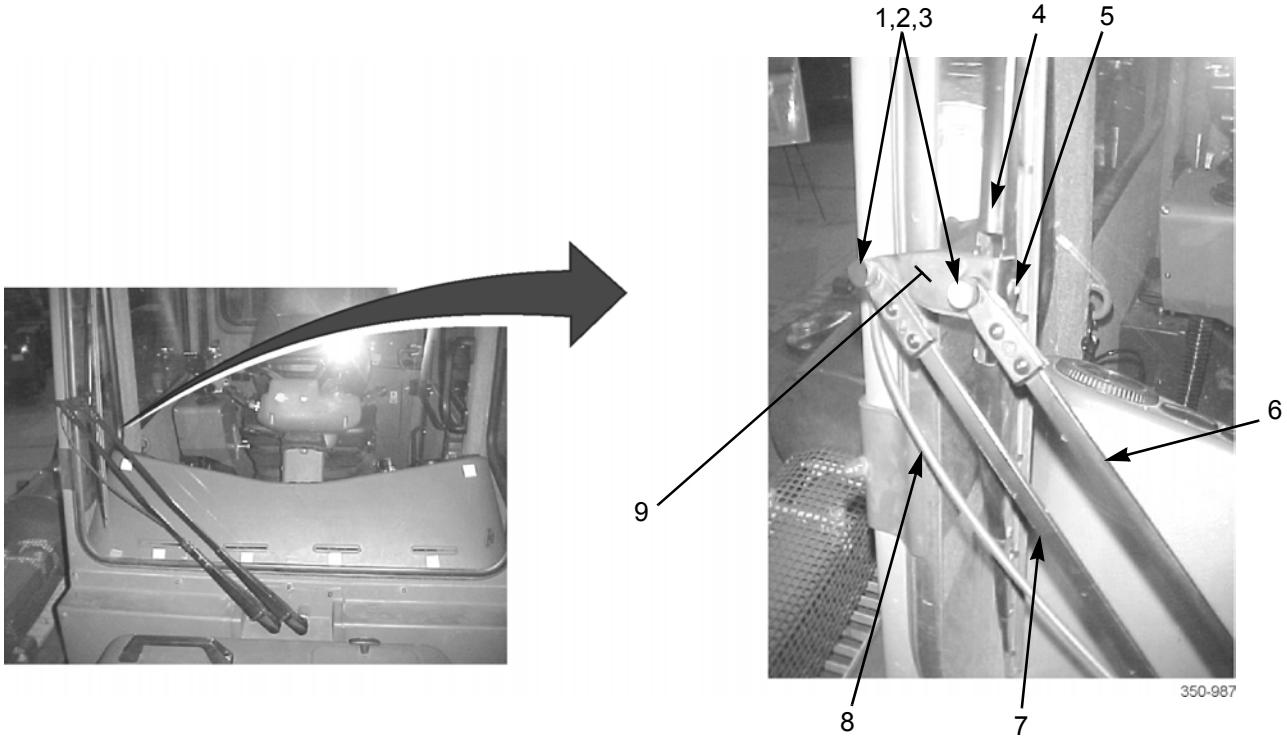
Perform step 6 to install steering arm and wiper arm.

6. Lift cover and install steering arm (7) and wiper arm (6) to windshield wiper motor shafts (14) with new lockwasher (20) and nut (19). Close cover.

FRONT WINDSHIELD WIPER AND MOTOR INSTALLATION - CONTINUED



7. If separated, install wiper arm (6) and steering arm (7) to yoke (9) with two washers (3), c-clips (2), and caps (1).
8. Install hose (8) and jet to steering arm (7).
9. Install wiper blade (4) to yoke (9) with screw (5).



FRONT WINDSHIELD WIPER AND MOTOR INSTALLATION - CONTINUED

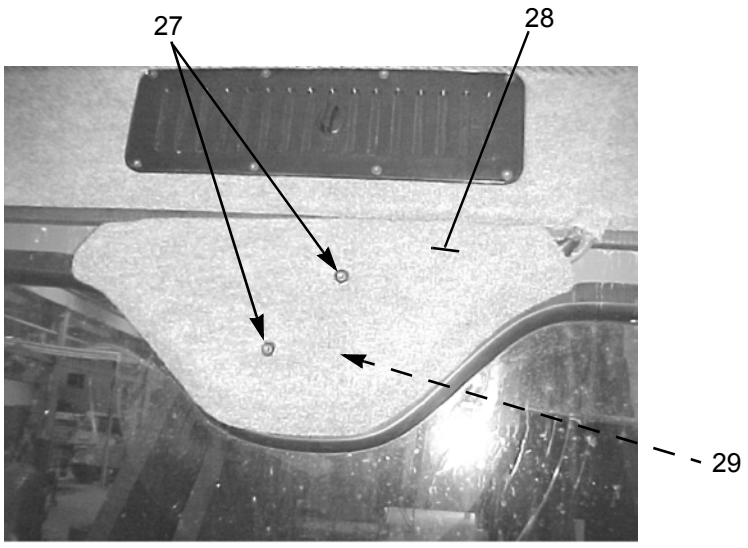
10. Turn master battery switch to ON position and check operation of front windshield wiper and windshield wiper washer (TM 10-3930-675-10).
11. Install engine cover (WP 0143 00).

REAR WINDOW WINDSHIELD WIPER AND MOTOR REMOVAL

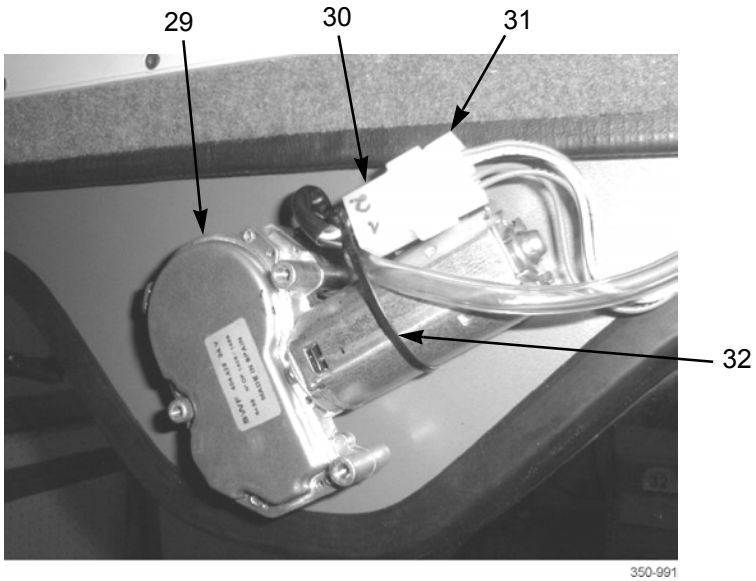
NOTE

To remove wiper blade and arm only, perform steps 3 thru 5.

1. Remove two screws (27) and cover (28) from windshield wiper motor (29) inside cab.



2. Remove and discard tiedown strap (32). Disconnect wiring harness connector (31) from motor connector (30).



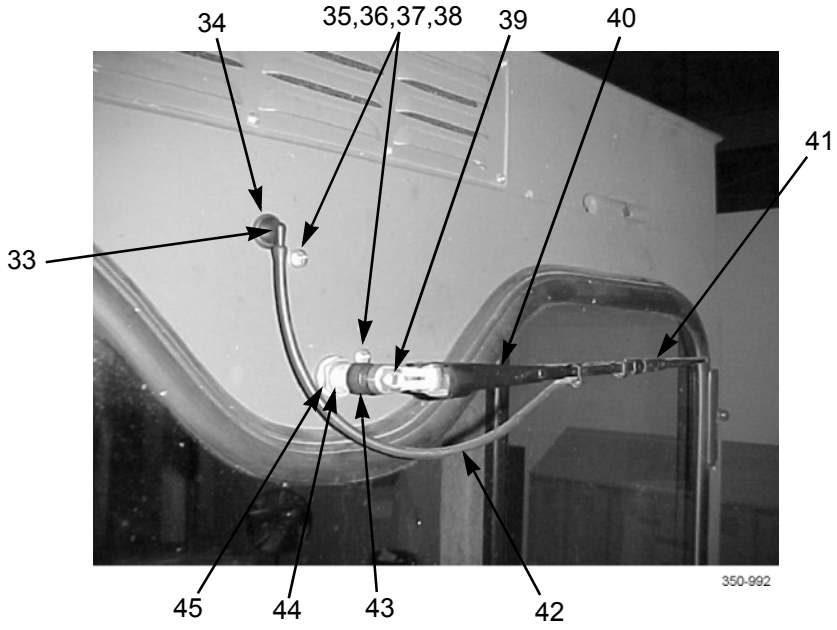
REAR WINDOW WINDSHIELD WIPER AND MOTOR REMOVAL - CONTINUED

3. From outside cab, remove wiper blade (41) from wiper arm (40).
4. Remove hose (42) from wiper arm (40).
5. Lift cover and remove nut (39) and wiper arm (40) from motor shaft (44).
6. Remove plastic cap (43), nut (45), and seal ring from end of motor shaft (44).

CAUTION

Use care when removing windshield wiper motor to avoid damaging windshield.

7. Remove two screws (35), washers (36), seal (37), spacer (38), and windshield wiper motor (29) from cab. Discard seal.
8. If damaged, remove hoses (42) inside and outside cab from fitting (33). Remove fitting and grommet (34) from cab.



REAR WINDOW WINDSHIELD WIPER AND MOTOR INSTALLATION

NOTE

To install wiper blade and arm only, perform steps 4 and 5.

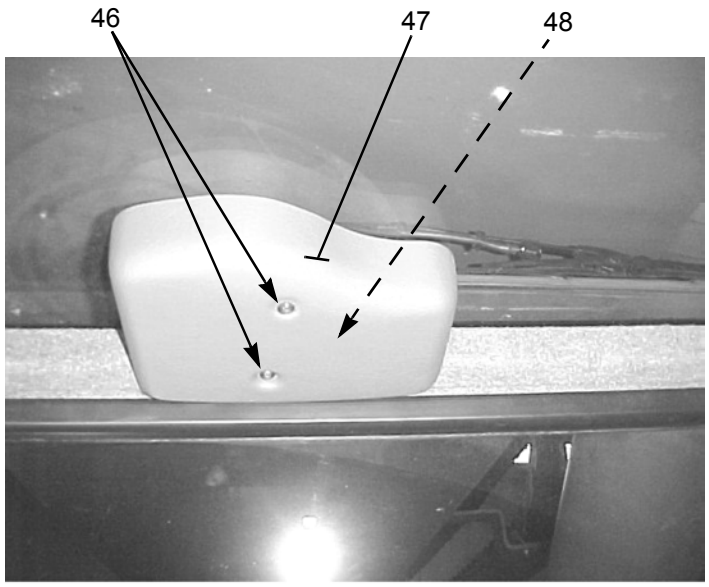
1. If removed, install grommet (34) and fitting (33) to cab. Install hoses (42) inside and outside cab to fitting.
2. Position new seal (37), spacer (38), and windshield wiper motor (29) against cab with motor shaft (44) thru opening in cab. Install two washers (36) and screws (35).
3. From outside cab, install seal ring, nut (45), and plastic cap (43) on end of motor shaft (44).
4. Install wiper arm (40) on motor shaft (44) with nut (39). Close cover over nut. Secure hose (42) to wiper arm.
5. Install wiper blade (41) on wiper arm (42).
6. Inside cab, connect wiring harness connector (31) to motor connector (30). Secure wires and hoses together with new tiedown strap (32) around windshield wiper motor (29).
7. Install two screws (27) and cover (28) to windshield wiper motor (29).
8. Turn master battery switch to ON position and check operation of rear window windshield wiper and windshield wiper washer (TM 10-3930-675-10).

ROOF WINDOW WINDSHIELD WIPER AND MOTOR REMOVAL

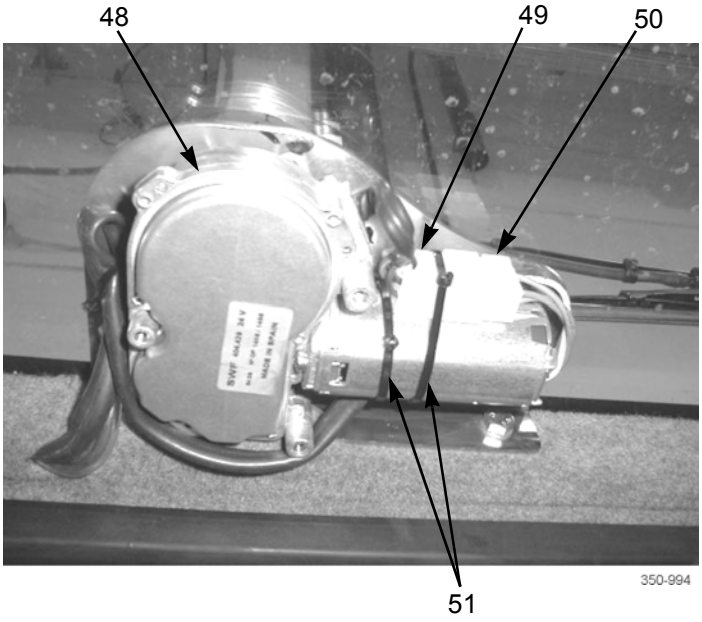
NOTE

- Boom must be raised to allow access to roof window windshield wiper and motor.
- To remove wiper blade and arm only, perform steps 3 thru 5.

1. Remove two screws (46) and cover (47) from windshield wiper motor (48) inside cab.

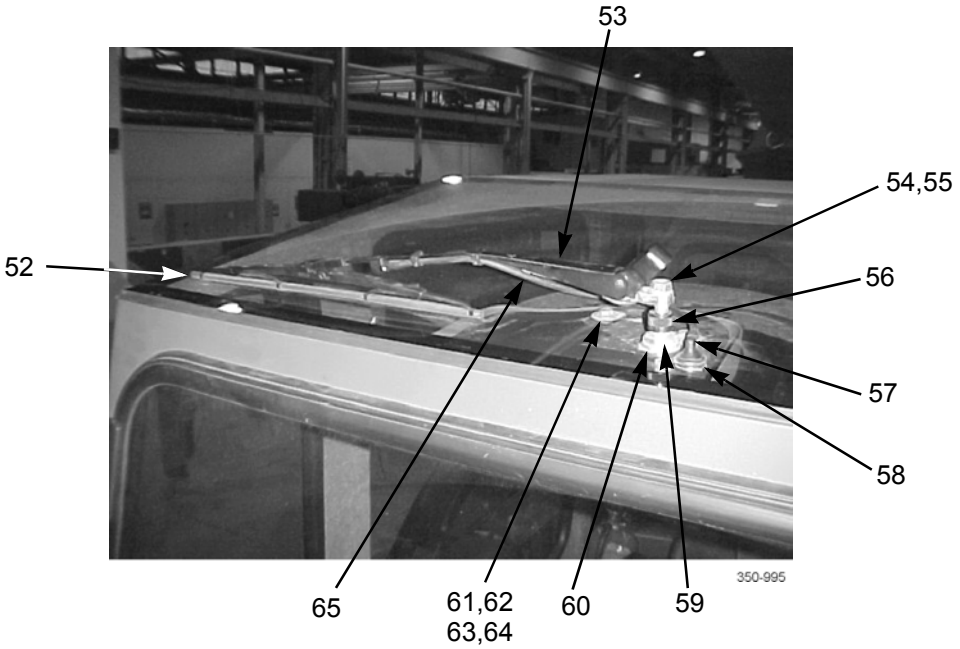


2. Remove and discard tiedown straps (51). Disconnect wiring harness connector (49) from motor connector (50).



ROOF WINDOW WINDSHIELD WIPER AND MOTOR REMOVAL - CONTINUED

3. From outside cab, remove wiper blade (52) from wiper arm (53).
4. Remove hose (65) from wiper arm (53).
5. Lift cover and remove nut (54), lockwasher (55), and wiper arm (53) from motor shaft (59). Discard lockwasher.
6. Remove plastic cap (56), nut (60), and seal ring from end of motor shaft (59).
7. Remove two screws (61), washers (62), seal (63), spacer (64), and windshield wiper motor (48) from roof window. Discard seal.
8. If damaged, remove hoses (65) inside and outside cab from fitting (57). Remove fitting and grommet (58) from roof window.



ROOF WINDOW WINDSHIELD WIPER AND MOTOR INSTALLATION

NOTE

To install wiper blade and arm only, perform steps 4 and 5.

1. If removed, install grommet (58) and fitting (57) to roof window. Install hoses (65) inside and outside cab to fitting.
2. Position new seal (63), spacer (64), and windshield wiper motor (48) against roof window with motor shaft (59) thru opening in roof window. Install two washers (62) and screws (61).
3. From outside cab, install seal ring, nut (60), and plastic cap (56) on end of motor shaft (59).
4. Install wiper arm (53) on motor shaft (59) with new lockwasher (55) and nut (54). Close cover over nut. Secure hose (65) to wiper arm.
5. Install wiper blade (52) on wiper arm (53).
6. Inside cab, connect wiring harness connector (49) to motor connector (50). Secure wires and hoses together with new tiedown straps (51) around windshield wiper motor (48).
7. Install cover (47) on windshield wiper motor (48) with two screws (46).

ROOF WINDOW WINDSHIELD WIPER AND MOTOR INSTALLATION - CONTINUED

8. Turn master battery switch to ON position and check operation of rear window windshield wiper and windshield wiper washer (TM 10-3930-675-10).

END OF WORK PACKAGE

WINDSHIELD WASHER RESERVOIR AND PUMP REPLACEMENT 0157 00

THIS WORK PACKAGE COVERS

Windshield Washer Reservoir: Removal, Installation

Windshield Washer Pump: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Compound, windshield cleaning (Item 7, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Equipment Condition

Master battery switch in OFF position

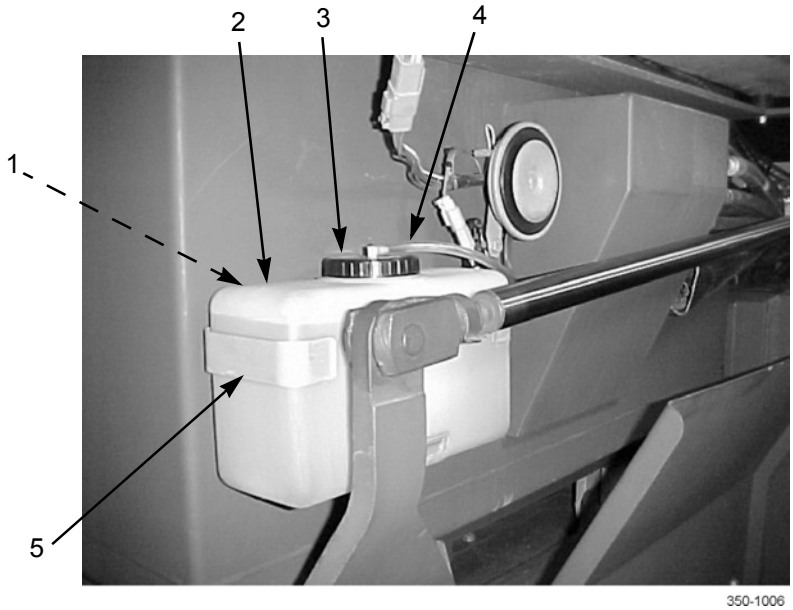
WINDSHIELD WASHER RESERVOIR REMOVAL

1. Disconnect tube (4) from fitting of cap (3).
2. Lift windshield washer reservoir (2) from bracket (5).
3. Remove cap (3) and drain windshield cleaning compound into a suitable container.

NOTE

Perform step 4 to remove bracket from rear of cab.

4. Remove four screws (1) and bracket (5) from cab.



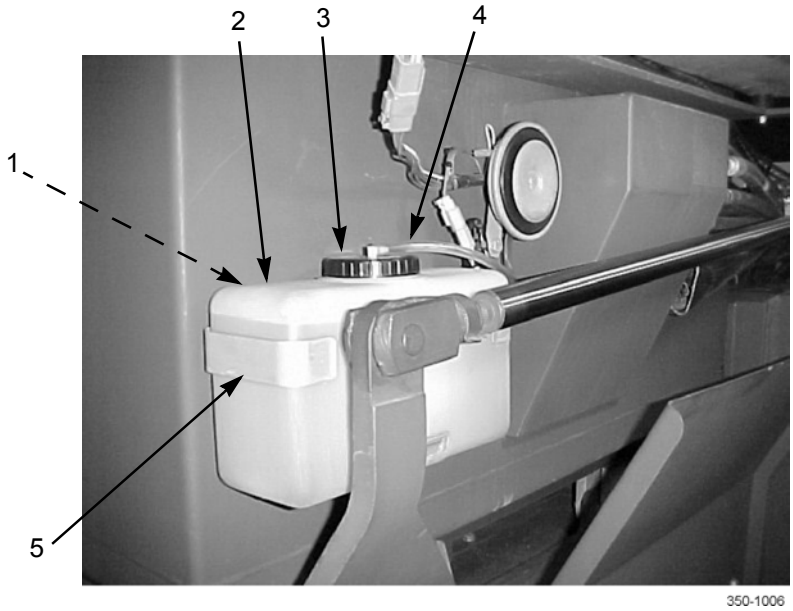
350-1006

WINDSHIELD WASHER RESERVOIR INSTALLATION

NOTE

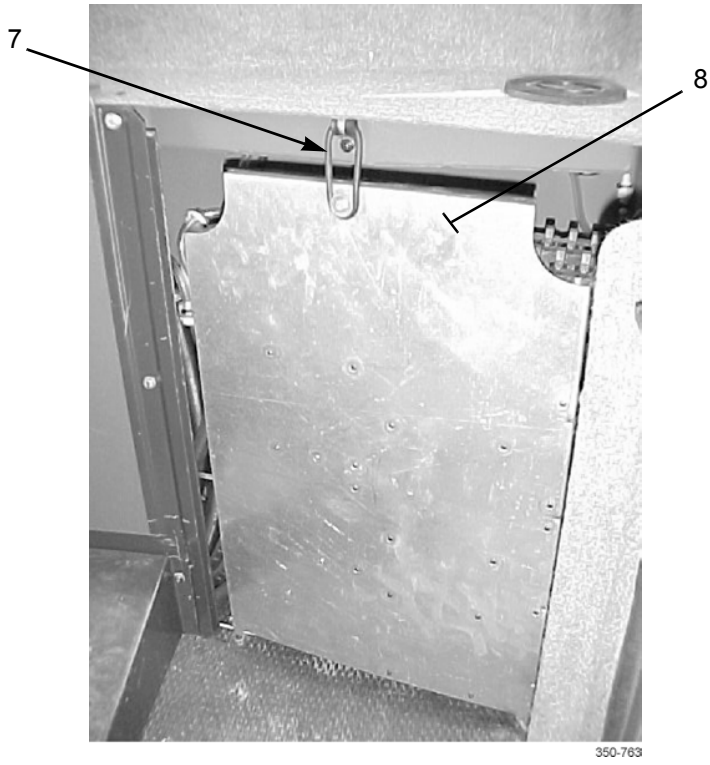
Perform step 1 to install bracket to rear of cab.

1. Install bracket (5) to cab with four screws (1).
2. Install windshield washer reservoir (2) to bracket (5).
3. Fill windshield washer reservoir (2) with windshield cleaning compound.
4. Install cap (3).
5. Connect tube (4) to fitting of cap (3).



WINDSHIELD WASHER PUMP REMOVAL

1. Lift and remove left access cover (6) from rear of cab.
2. Disconnect elastic loop (7) from top of circuit breaker/relay box (8). Lift box and tilt box forward to gain access to windshield washer pump behind box.



350-763



350-1007

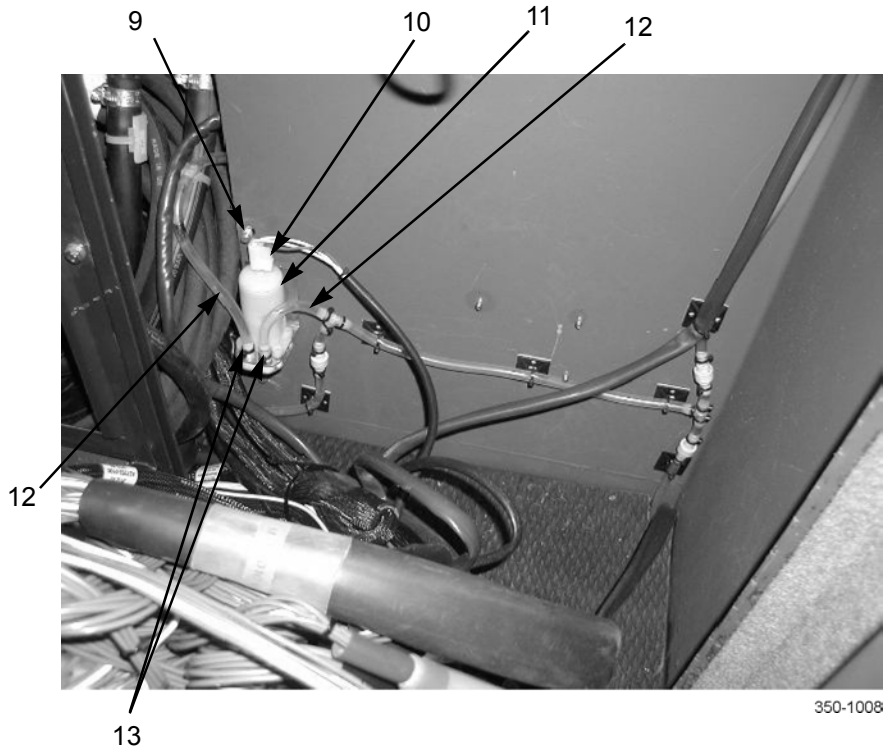
WINDSHIELD WASHER PUMP REMOVAL - CONTINUED

3. Disconnect connector (10) of wiring harness from windshield washer pump (11).

NOTE

Note position of tubes for installation.

4. Remove two tiedown straps (13) and disconnect two tubes (12) from windshield washer pump (11). Discard tiedown straps.
5. Remove two screws (9), washers, and windshield washer pump (11) from rear of cab.



WINDSHIELD WASHER PUMP INSTALLATION

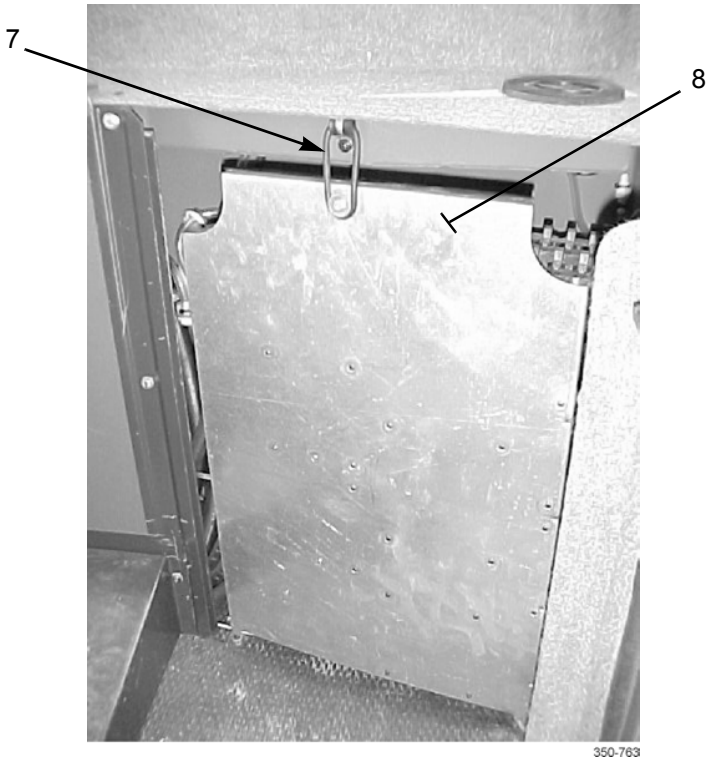
1. Install windshield washer pump (11) to rear of cab with two washers and screws (9).
2. Connect two tubes (12) to windshield washer pump (11) and install two new tiedown straps (13).
3. Connect connector (10) of wiring harness to windshield washer pump (11).

WINDSHIELD WASHER PUMP REMOVAL - CONTINUED

NOTE

Ensure that all circuit breakers remain in ON position while circuit breaker/relay box is secured.

4. Tilt circuit breaker/relay box (8) rearward and connect elastic loop (7) to top of box.
5. Install left access cover (6) to rear of cab.



350-763



350-1007

END OF WORK PACKAGE

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HEATER HOSES REPLACEMENT 0158 00

THIS WORK PACKAGE COVERS

Engine Heater Hoses: Removal, Installation

Cab Heater Hoses: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Antifreeze (Item 3, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Personnel Required

Two (if replacing engine heater hoses)

References

TM 10-3930-675-10

WP 0143 00

WP 0135 00

Equipment Condition

Coolant drained (WP 0063 00)

NOTE

Tag hoses to ensure proper connection on installation.

ENGINE HEATER HOSES REMOVAL

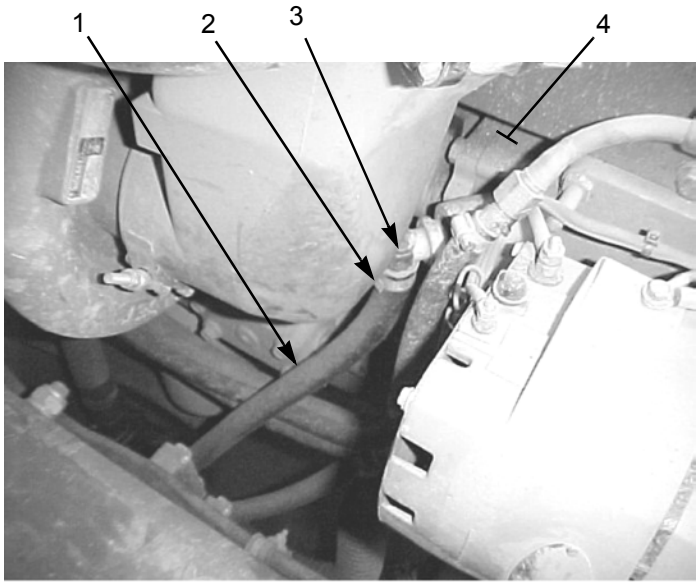
NOTE

- Perform the following steps to remove heater hoses between engine and rear of cab.
- Remove loop clamps and remove and discard tiedown straps as necessary.

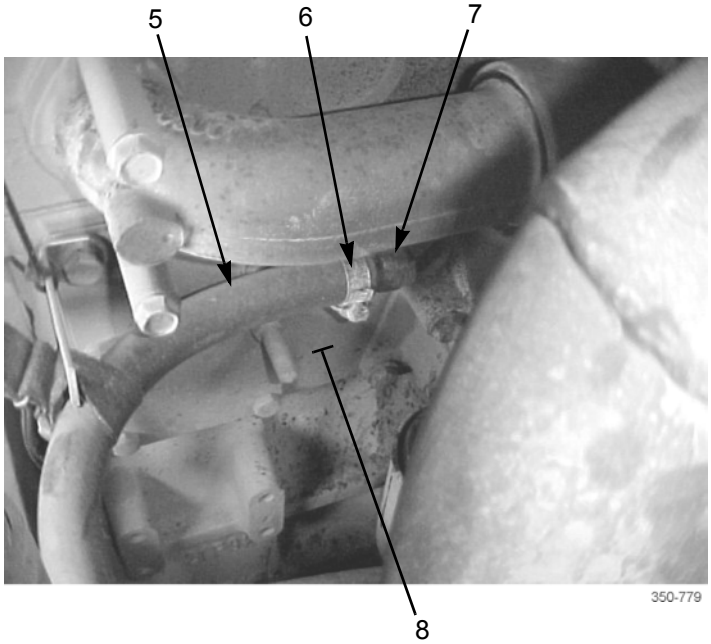
1. Remove engine cover (WP 0143 00).
2. Place cab in transport position (TM 10-3930-675-10).
3. Remove transmission access covers (WP 0135 00).

ENGINE HEATER HOSES REMOVAL - CONTINUED

4. Remove hose clamp (2) and heater hose (1) from fitting (3) at water pump (4).

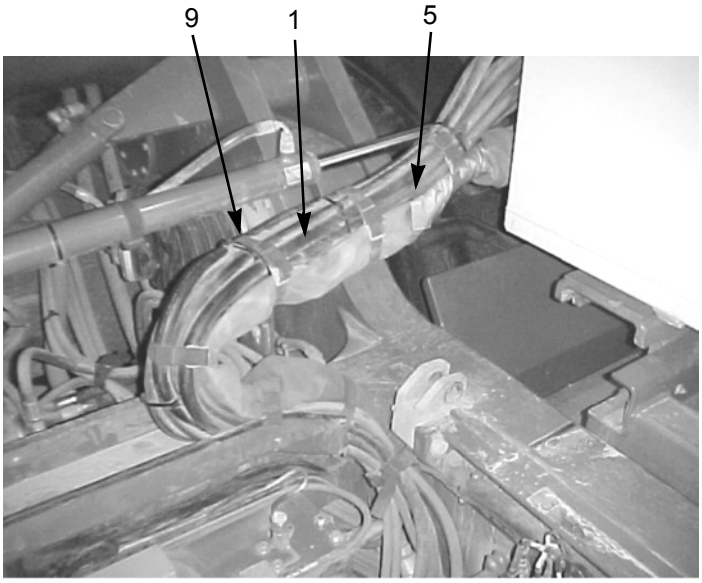


5. Remove hose clamp (6) and heater hose (5) from fitting (7) at right side of engine (8).



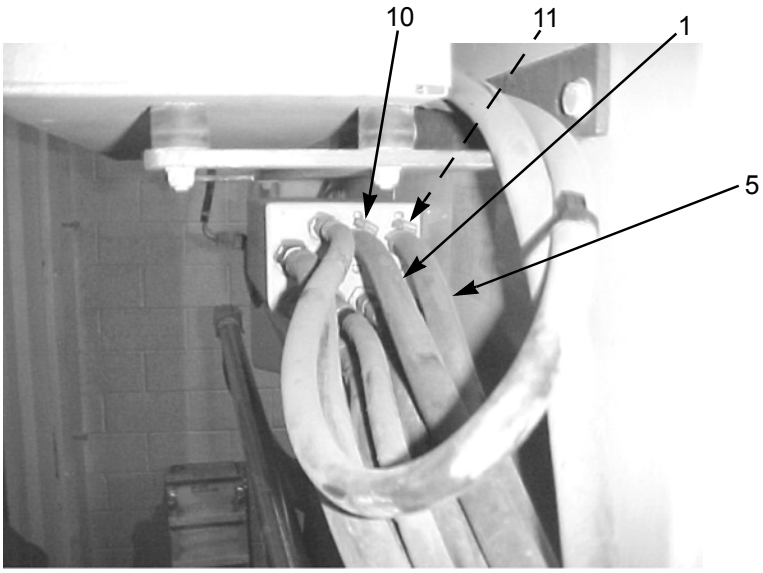
ENGINE HEATER HOSES REMOVAL - CONTINUED

6. Toward rear of vehicle, remove canvas straps (9) from around heater hoses (1 and 5).



350-780

7. At cab interface unit at rear of cab, remove two hose clamps (10) and two heater hoses (1 and 5) from two fittings (11).
8. Remove two heater hoses (1 and 5) from vehicle.



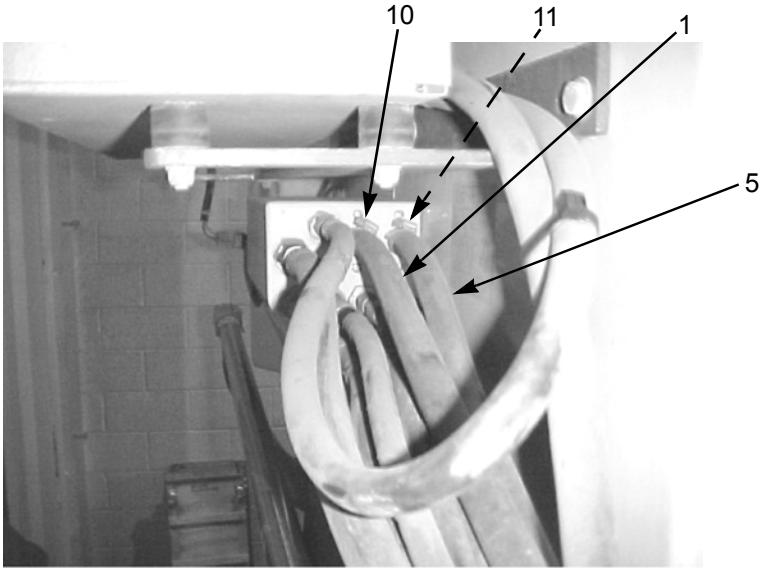
350-781

ENGINE HEATER HOSES INSTALLATION

NOTE

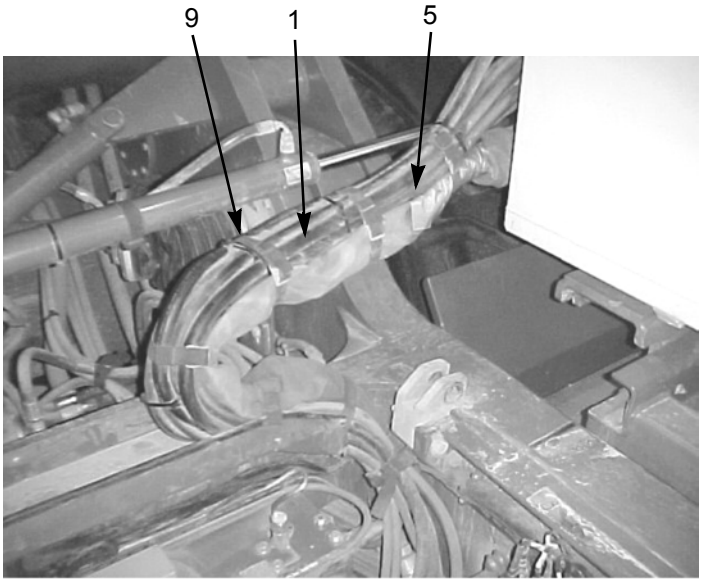
Perform the following steps to install heater hoses between engine and rear of cab.

1. Position two heater hoses (1 and 5) to vehicle.
2. At cab interface unit at rear of cab, install two heater hoses (1 and 5) to two fittings (11) with two hose clamps (10).



350-781

3. Install canvas straps (9) around heater hoses (1 and 5).



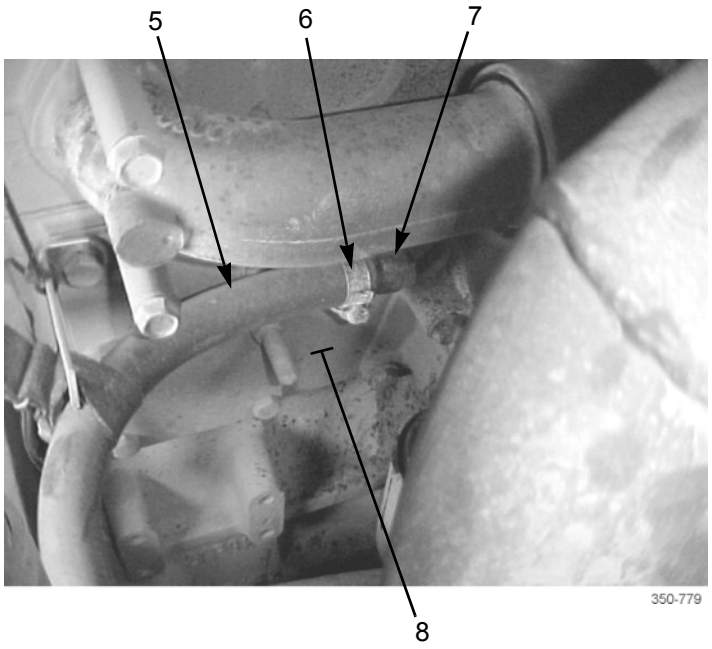
350-780

ENGINE HEATER HOSES INSTALLATION - CONTINUED

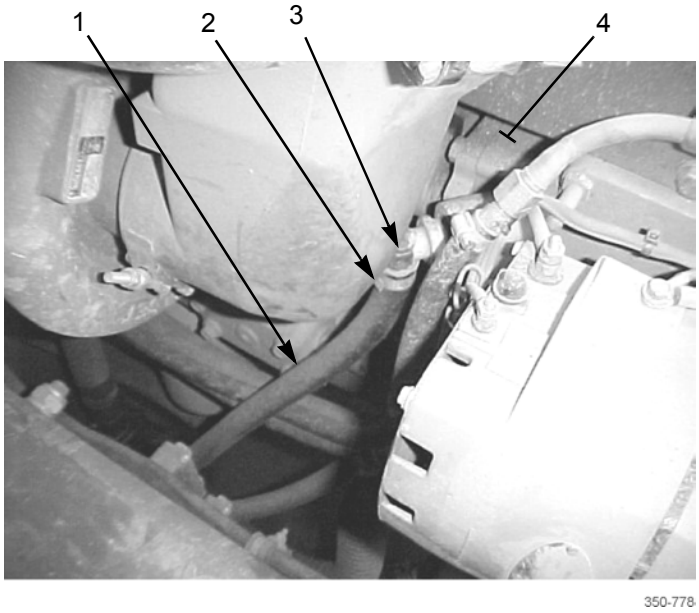
NOTE

Install loop clamps and new tiedown straps as necessary.

4. Install heater hose (5) to fitting (7) at right side of engine (8) with hose clamp (6).



5. Install heater hose (1) to fitting (3) at water pump (4) with hose clamp (2).



ENGINE HEATER HOSES INSTALLATION

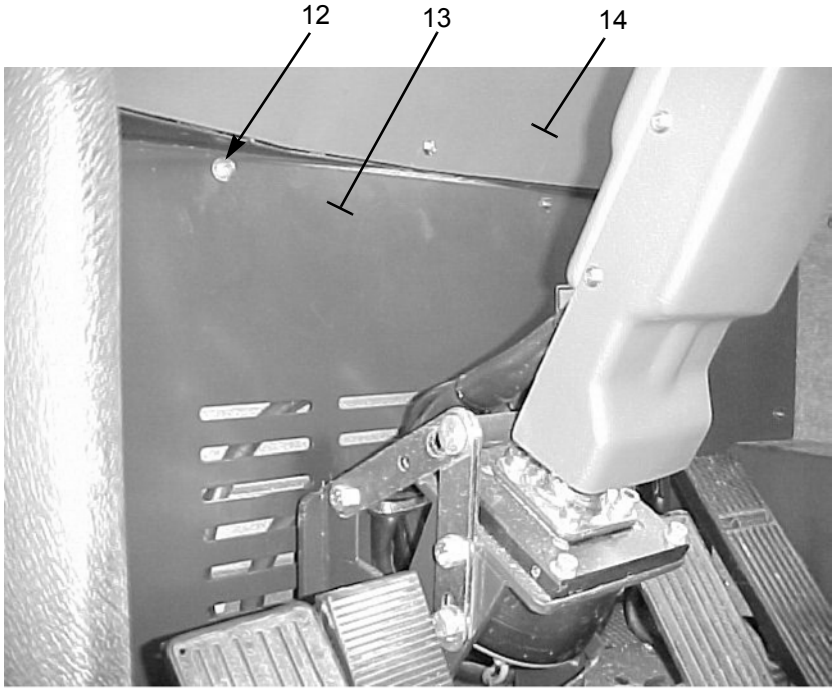
6. Fill cooling system (WP 0063 00).
7. Start engine (TM 10-3930-675-10) and check for leaks.
8. Install transmission access covers (WP 0135 00).
9. Return cab to operational position (TM 10-3930-675-10).
10. Install engine cover (WP 0143 00).

CAB HEATER HOSES REMOVAL

NOTE

Perform the following steps to remove heater hoses between rear of cab and heater.

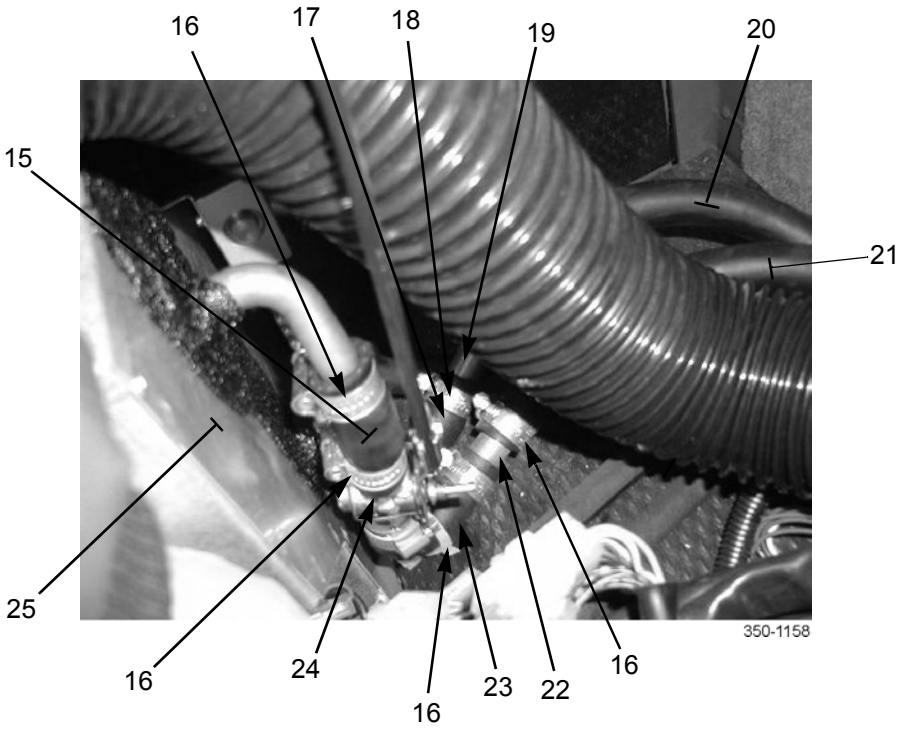
1. Remove four screws (12), washers, and lower panel (13) from instrument panel (14).



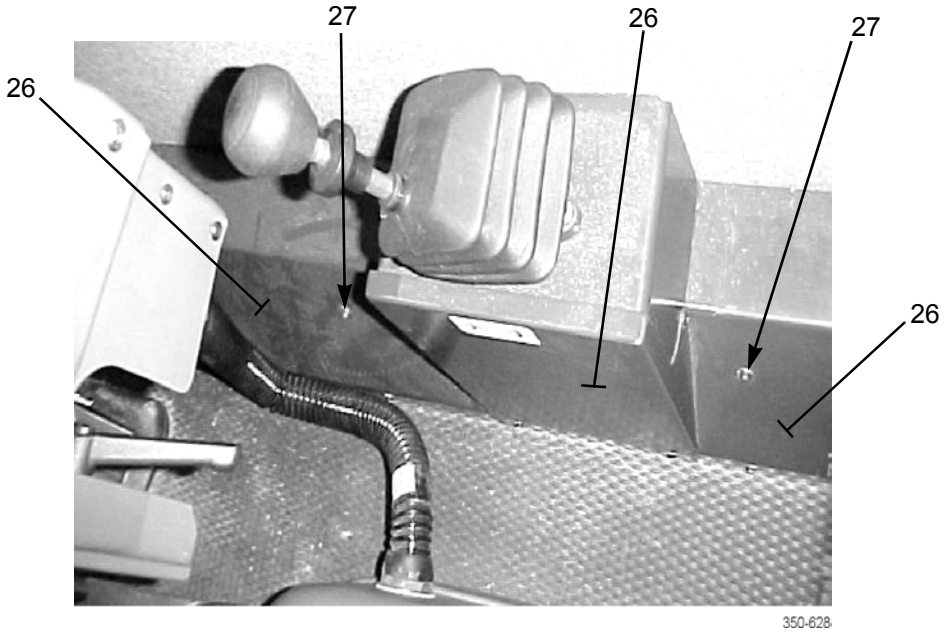
350-347

2. Remove three hose clamps (18), heater hose (20), connector (19), and hose (17) from heater/AC unit (25).
3. Remove five hose clamps (16), heater hose (21), connector (22), hose (23), heat control valve (24), and hose (15) from heater A/C unit (25).

CAB HEATER HOSES REMOVAL - CONTINUED



4. Remove 14 screws (27) and three access covers (26) from right side of cab.



CAB HEATER HOSES REMOVAL - CONTINUED

5. Lift and remove right access cover (28) and middle access cover (29) from rear of cab.



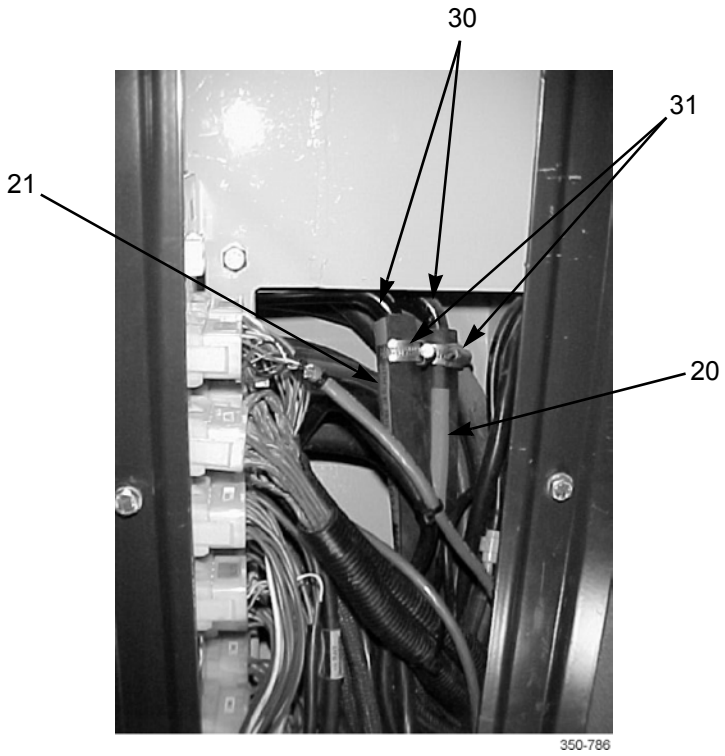
6. Remove two hose clamps (31) and two heater hoses (21 and 20) from two fittings (30).

NOTE

Remove and discard tiedown straps as necessary.

7. Remove two heater hoses (21 and 20) from cab.

CAB HEATER HOSES REMOVAL - CONTINUED



CAB HEATER HOSES INSTALLATION

NOTE

Perform the following steps to install heater hoses between rear of cab and heater.

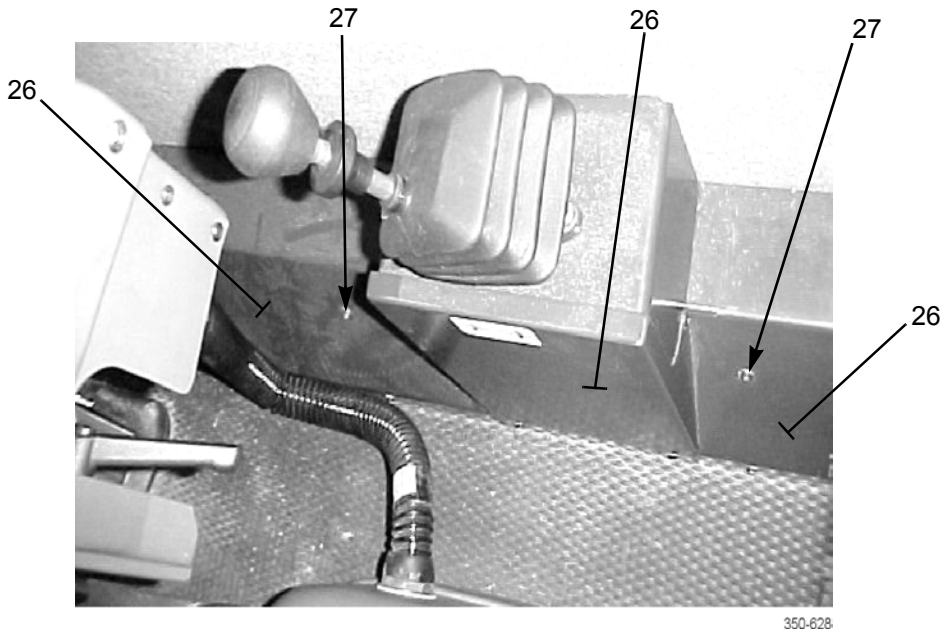
1. Position two heater hoses (21 and 20) to cab.
2. At rear of cab, install two heater hoses (21 and 20) to two fittings (30) with two hose clamps (31)
3. Install middle access cover (29) and right access cover (28) to rear of cab.

CAB HEATER HOSES INSTALLATION - CONTINUED

NOTE

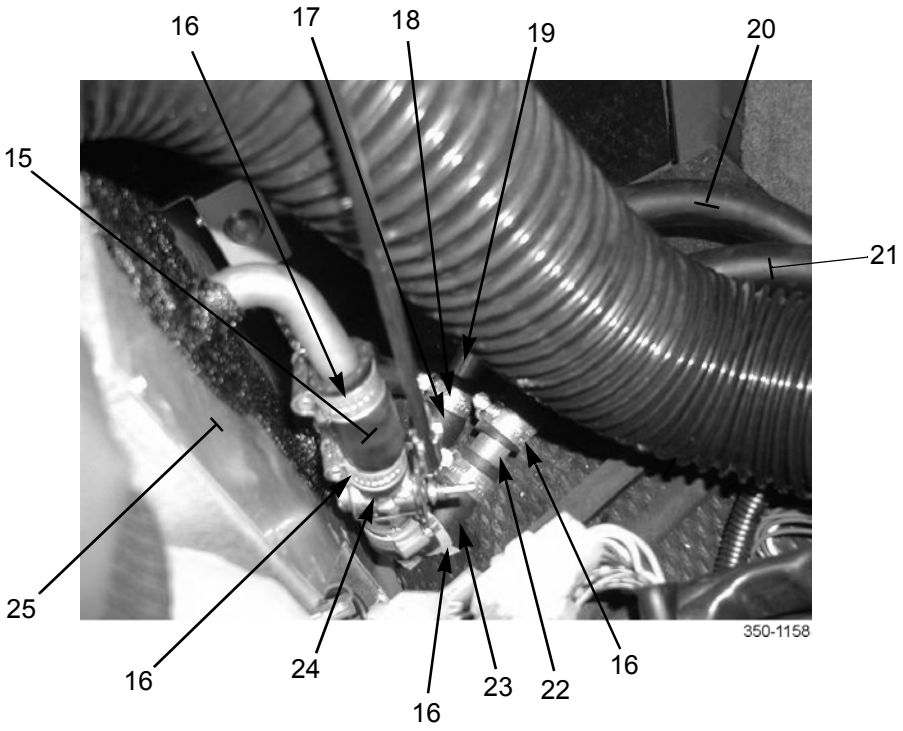
Install new tiedown straps as necessary.

4. Install three access covers (26) to right side of cab with 14 screws (27).



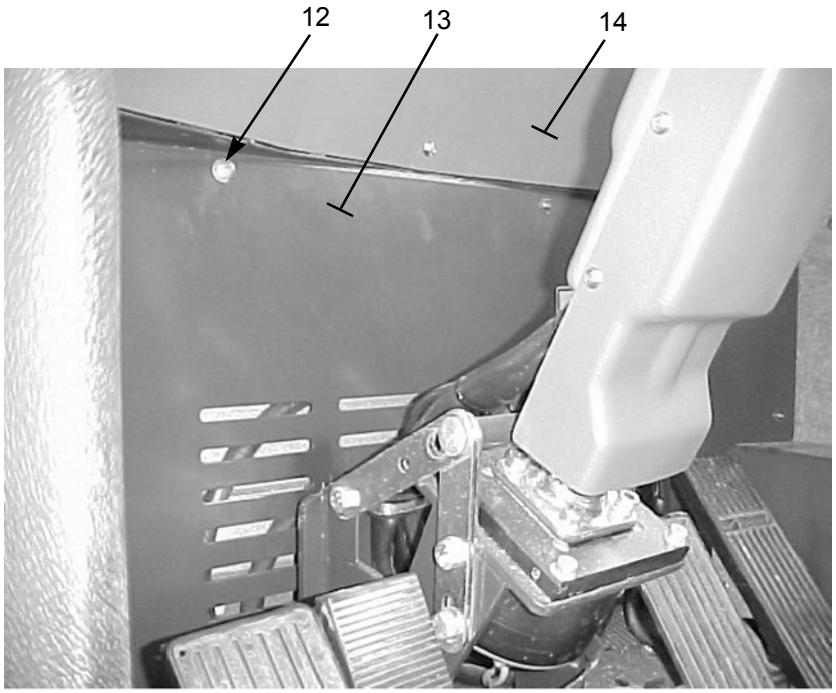
5. Install hose (15), heat control valve (24), hose (23), connector (22), and heater hose (21) to heater/AC unit (25) with five hose clamps (16).
6. Install hose (17), connector (18), and heater hose (20) to heater/AC unit (25) with three hose clamps (18).

CAB HEATER HOSES INSTALLATION - CONTINUED



CAB HEATER HOSES INSTALLATION - CONTINUED

7. Fill cooling system (WP 0063 00).
8. Start engine (TM 10-3930-675-10) and check for leaks.
9. Install lower panel (13) to instrument panel (14) with four washers and screw (12).



350-347

END OF WORK PACKAGE

CAB HEATER/AIR CONDITIONING BLOWER MOTOR AND FAN REPLACEMENT 0159 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)

Equipment Condition

Air cleaner removed (WP 0056 00)

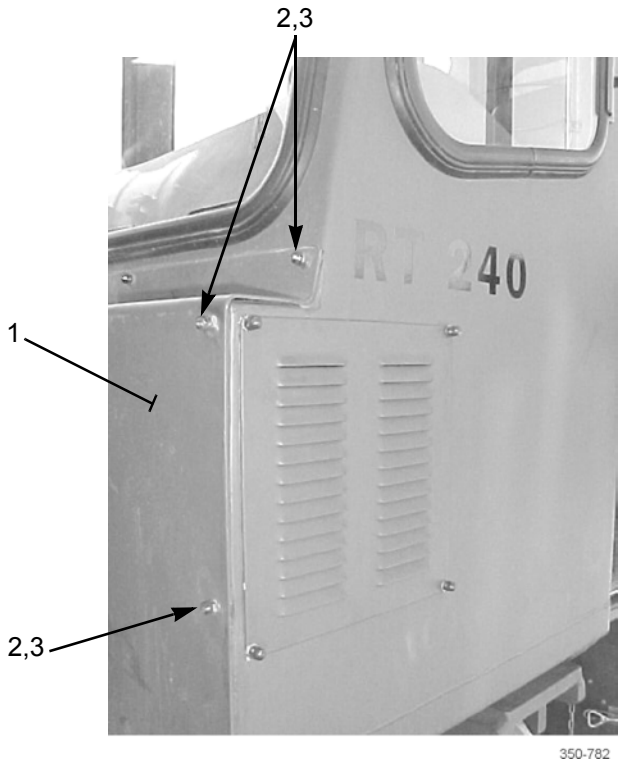
Front windshield wiper assembly removed (WP 0156 00)

Cab moved to the left, but not lowered (TM 10-3930-675-10)

Master battery switch in OFF position

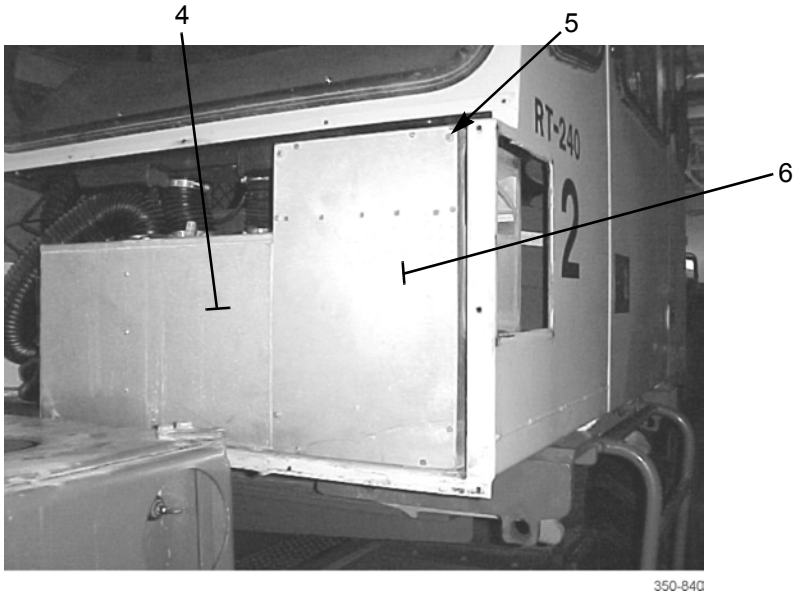
REMOVAL

1. Remove 14 capnuts (2), washers (3), and front panel (1) from cab.



REMOVAL - CONTINUED

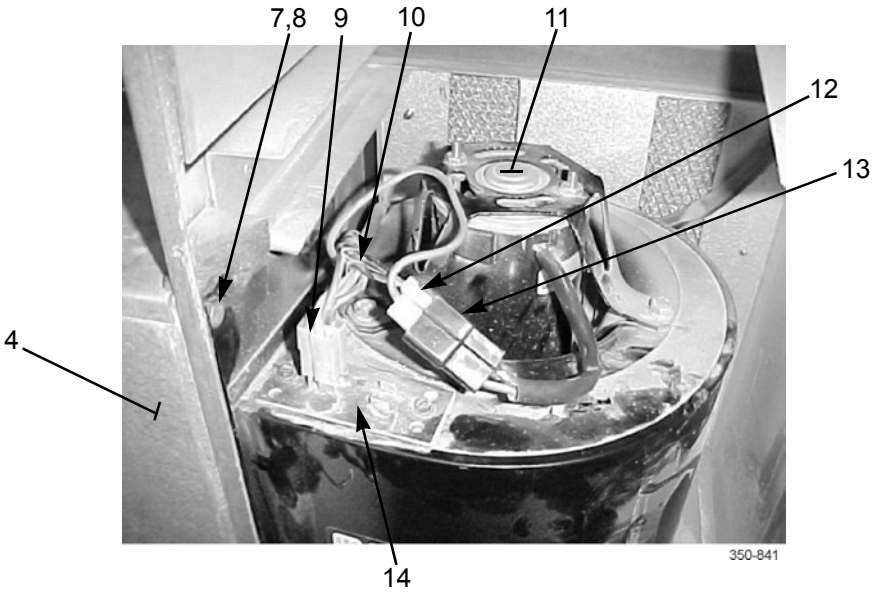
2. Remove eight screws (5) and cover (6) from cab heater/AC unit (4).



NOTE

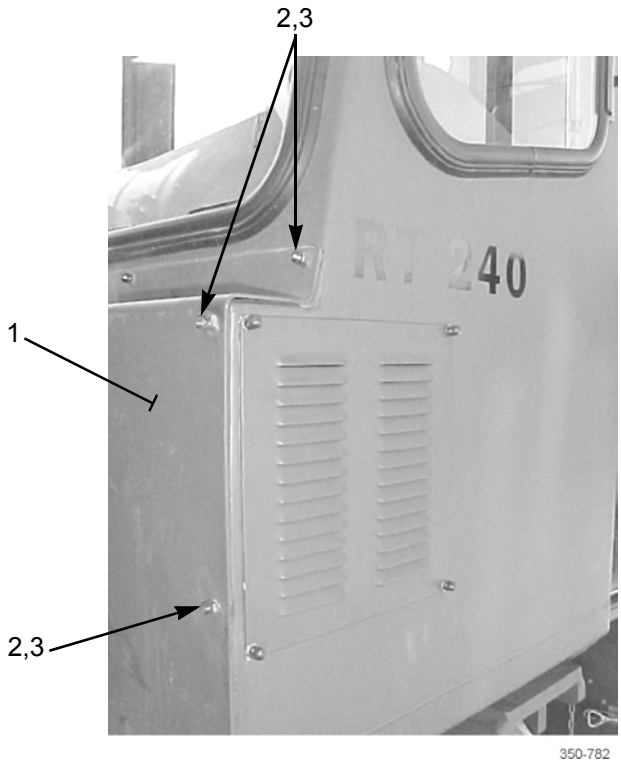
Tag connectors for installation.

3. Disconnect three connectors (9) of wiring harness (10) from temperature sensor (14) of blower motor and fan (11).
4. Disconnect two connectors (12) of wiring harness (10) from connector (13) of blower motor and fan (11).
5. Remove two screws (7), washers (8), and blower motor and fan (11) from cab heater/AC unit (4).



INSTALLATION

1. Install blower motor and fan (11) to cab heater/AC unit (4) with two washers (8) and screws (7).
2. Connect two connectors (12) of wiring harness (10) to connector (13) of blower motor and fan (11).
3. Connect three connectors (9) of wiring harness (10) to temperature sensor (14) of blower motor and fan (11).
4. Install cover (6) to cab heater/AC unit (4) with eight screws (5).
5. Install front panel (1) to cab with 14 washers (3) and capnuts (2).



6. Install front windshield wiper assembly (WP 0156 00).
7. Install air cleaner (WP 0056 00).
8. Return cab to operational position (TM 10-3930-675-10).

END OF WORK PACKAGE

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CAB AIR FILTERS REPLACEMENT 0160 00

THIS WORK PACKAGE COVERS

Cab Side Air Filter: Removal, Cleaning and Inspection, Installation

Cab Interior Air Filter: Removal, Cleaning and Inspection, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Dispenser, sealant (Item 6, WP 0204 00)

Materials/Parts

Compound, gasket forming, silicone (Item 8, WP 0203 00)

Detergent, general purpose (Item 11, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)



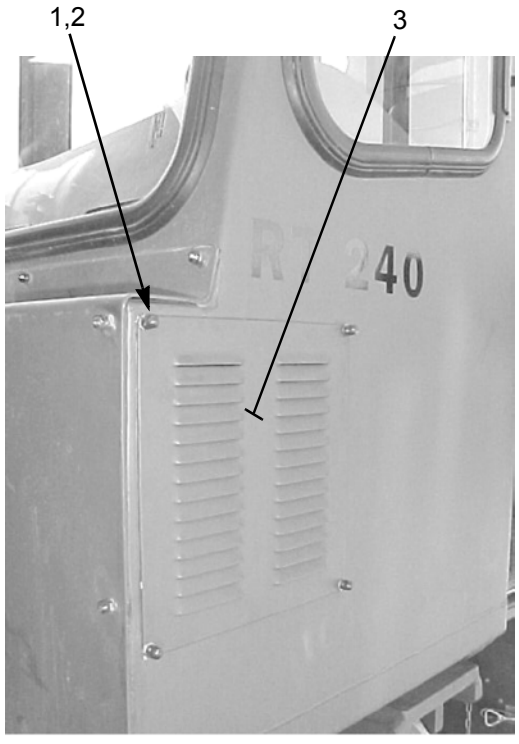
WARNING



If NBC exposure is suspected, all air cleaner media should be handled by personnel wearing protective equipment. Consult your NBC officer or NBC NCO for appropriate handling or disposal procedures.

CAB SIDE AIR FILTER REMOVAL

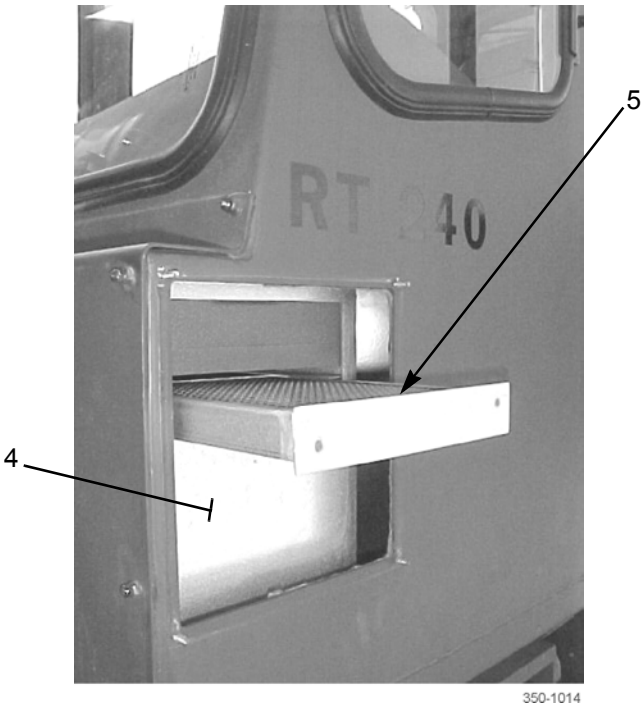
1. Remove four capnuts (1), washers (2), and grille (3) from side of cab.



350-782

CAB SIDE AIR FILTER REMOVAL - CONTINUED

2. Remove filter element (5) from cab heater/AC housing (4).
3. Using rags, wipe interior of cab heater/AC housing (4) free of dust and dirt.



CAB SIDE AIR FILTER CLEANING AND INSPECTION

WARNING

Compressed air used for cleaning or drying purposes, or for cleaning restrictions, should never exceed 30 psi (207 kPa). Use protective equipment and exercise caution to avoid injury to personnel.

1. Use compressed air to clean dirt and debris from air filter.
2. As required, a solution of detergent and water may be used to clean air filter. Dry thoroughly with compressed air.
3. Inspect air filter for damage. Replace if damaged.

CAB SIDE AIR FILTER INSTALLATION

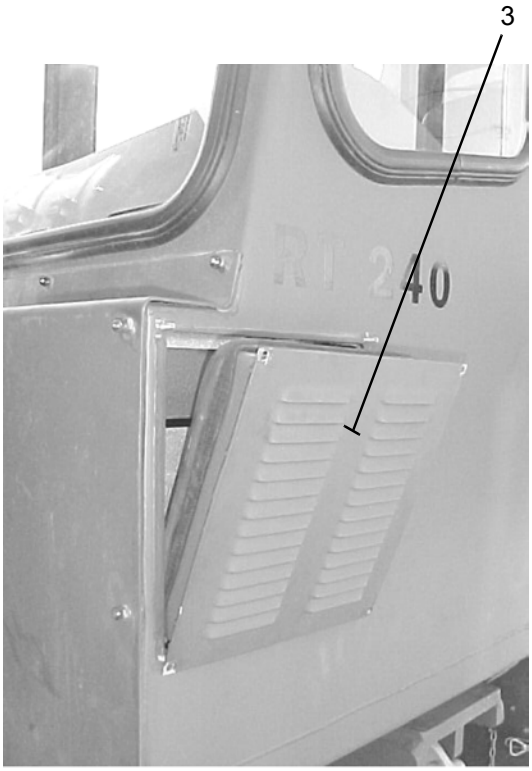
1. Install filter element (5) to cab heater/AC housing (4).

CAUTION

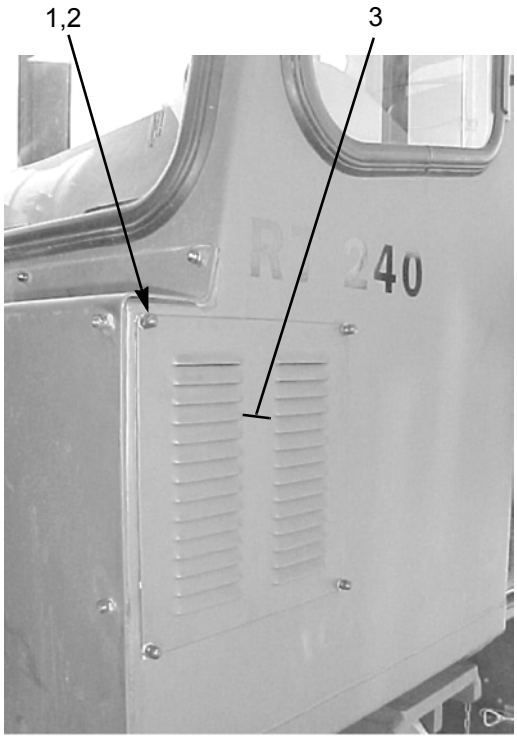
Use care when installing grille to prevent damaging rubber seal.

CAB SIDE AIR FILTER INSTALLATION- CONTINUED

2. Apply a thin bead of gasket forming compound to flange of grille (3) and install grille to side of cab with four washers (2) and capnuts (1).



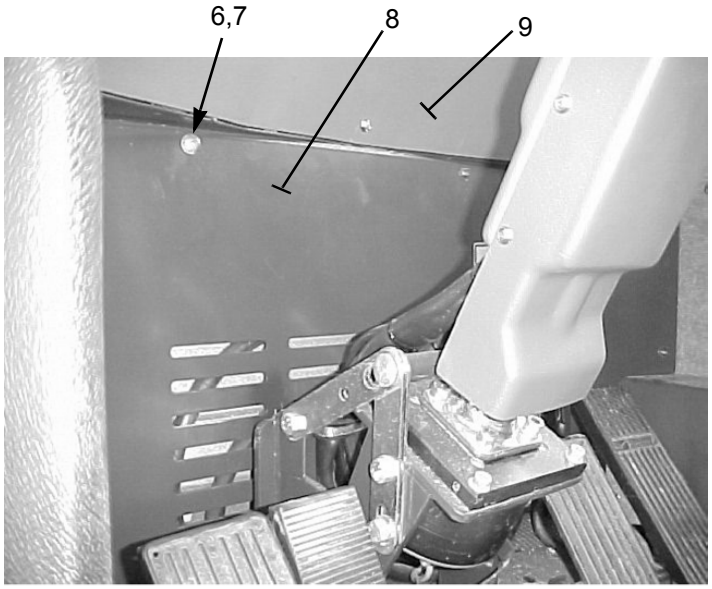
350-1015



350-782

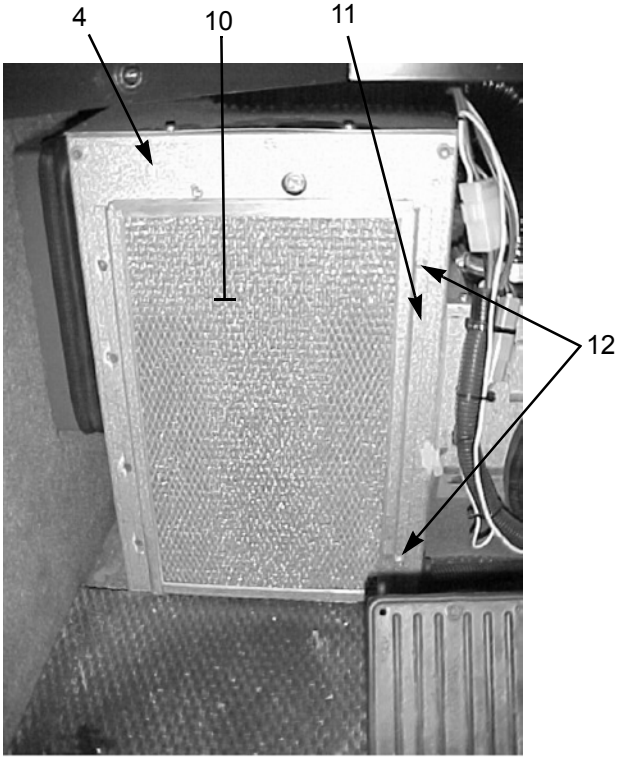
CAB INTERIOR AIR FILTER REMOVAL

1. Remove four screws (6), washers (7), and lower panel (8) from instrument panel (9)



350-347

2. Remove two screws (12), bracket (11), and cab interior air filter (10) from cab heater/AC housing (4).



350-1016

CAB INTERIOR AIR FILTER CLEANING AND INSPECTION

Refer to *Cab Side Air Filter Cleaning and Inspection* procedures.

CAB INTERIOR AIR FILTER INSTALLATION

1. Install cab interior air filter (10) and bracket (11) to cab heater/AC housing (4) with two screws (12).
2. Install lower panel (8) to instrument panel (9) with four washers (7) and screws (6).

END OF WORK PACKAGE

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CAB AUXILIARY FAN REPLACEMENT 0161 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Equipment Condition

Master battery switch in OFF position

REMOVAL

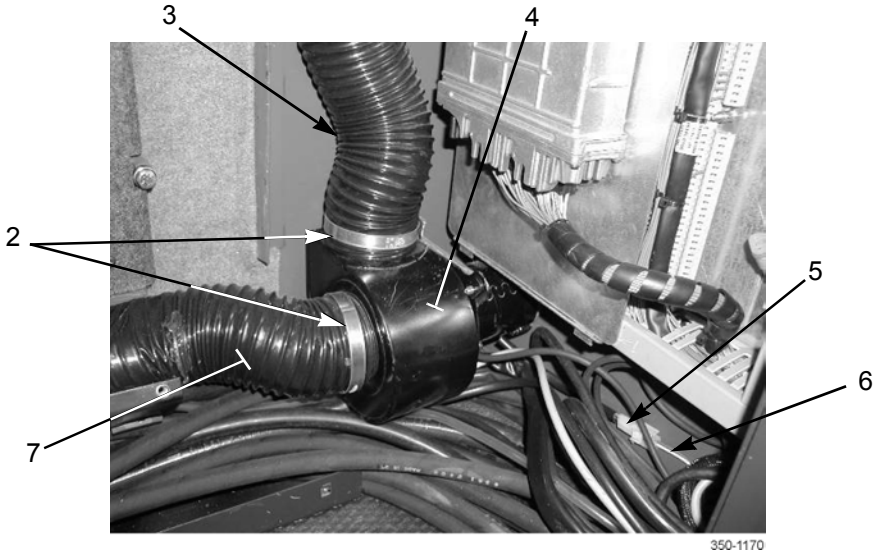
1. Lift and remove access panel (1) at rear of cab.



350-737

REMOVAL - CONTINUED

2. Disconnect connector (5) of auxiliary fan (4) from cab wiring harness (6).
3. Loosen two hose clamps (2) and disconnect two ducts (3 and 7).
4. Remove three screws and auxiliary fan (4) from cab.



INSTALLATION

1. Install auxiliary fan (4) to cab with three screws.
2. Connect two ducts (3 and 7) and tighten two hose clamps (2).
3. Connect connector (5) of auxiliary fan (4) to cab wiring harness (6).
4. Install access panel (1) to rear of cab.



END OF WORK PACKAGE

DATA PLATE REPLACEMENT 0162 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Drill set, twist (Item 7, WP 0204 00)

Drill, electric, portable, 3/8 in size (Item 8, WP 0204 00)

Tools and Special Tools - Continued

Riveter, blind, hand (Item 24, WP 0204 00)

Materials/Parts

Rivets (as required)

REMOVAL

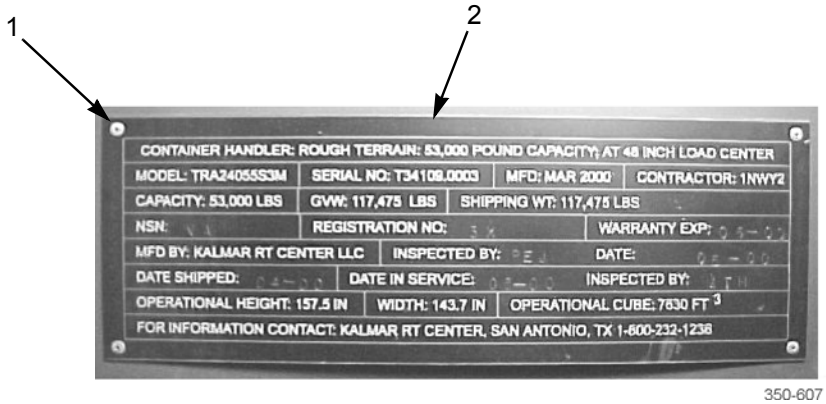
WARNING

Wear eye protection when drilling out rivets. Failure to do so could result in serious eye injury.

CAUTION

Avoid using a twist drill with an excessively large diameter when drilling out rivets. Failure to follow this caution could result in enlarged holes in vehicle, too large for rivet size needed.

1. Drill out four rivets (1) from data plate (2). Discard rivets.
2. Remove data plate (2) from vehicle.



350-607

INSTALLATION

1. Position data plate (2) to existing holes in vehicle.
2. Install data plate (2) to vehicle with four new rivets (1).

END OF WORK PACKAGE

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FIRE EXTINGUISHER BRACKET REPLACEMENT 0163 00

THIS WORK PACKAGE COVERS

Removal, Installation

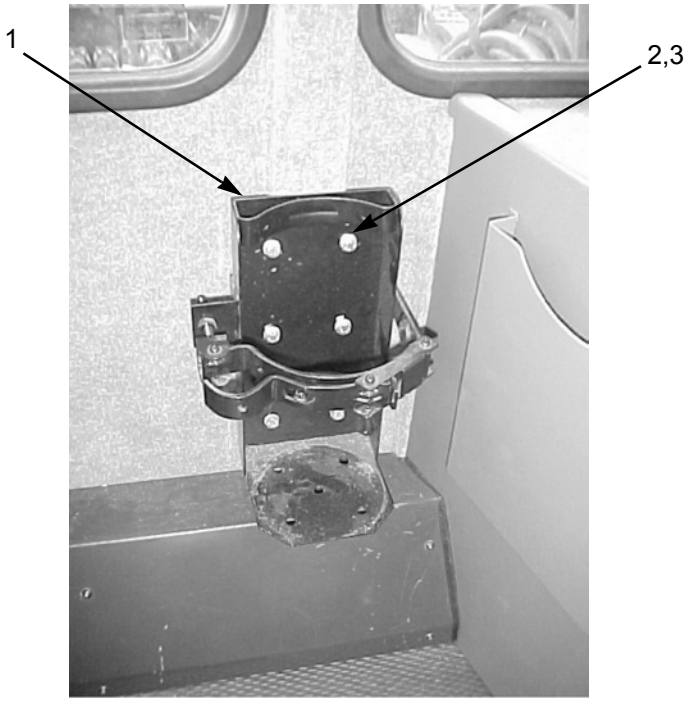
INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

REMOVAL

1. Remove fire extinguisher from fire extinguisher bracket (1).
2. Remove six screws (2), washers (3), and fire extinguisher bracket (1) from cab.



INSTALLATION

1. Install fire extinguisher bracket (1) to cab with six washers (3) and screws (2).
2. Install fire extinguisher to fire extinguisher bracket (1).

END OF WORK PACKAGE

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RELIEVING HYDRAULIC SYSTEM PRESSURE 0164 00

THIS WORK PACKAGE COVERS

General, Relieving Hydraulic System Pressure

INITIAL SETUP

References

TM 10-3930-675-10



WARNING

- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

GENERAL

1. During operation of the RTCH, hydraulic pressure is generated by hydraulic pumps to operate the following:
   a. Lifting boom
   b. Tophandler
   c. Service brakes
   d. Parking brakes
   e. Steering system
   f. Bogie wheel assembly hydraulic cylinders
   g. Cab movement hydraulic cylinders
2. Both brake and steering systems have pressurized accumulators that provide adequate stored energy to operate in the event of engine shutdown.
3. In order to safely perform maintenance on all hydraulic systems, hydraulic pressure must first be relieved.

RELIEVING HYDRAULIC SYSTEM PRESSURE

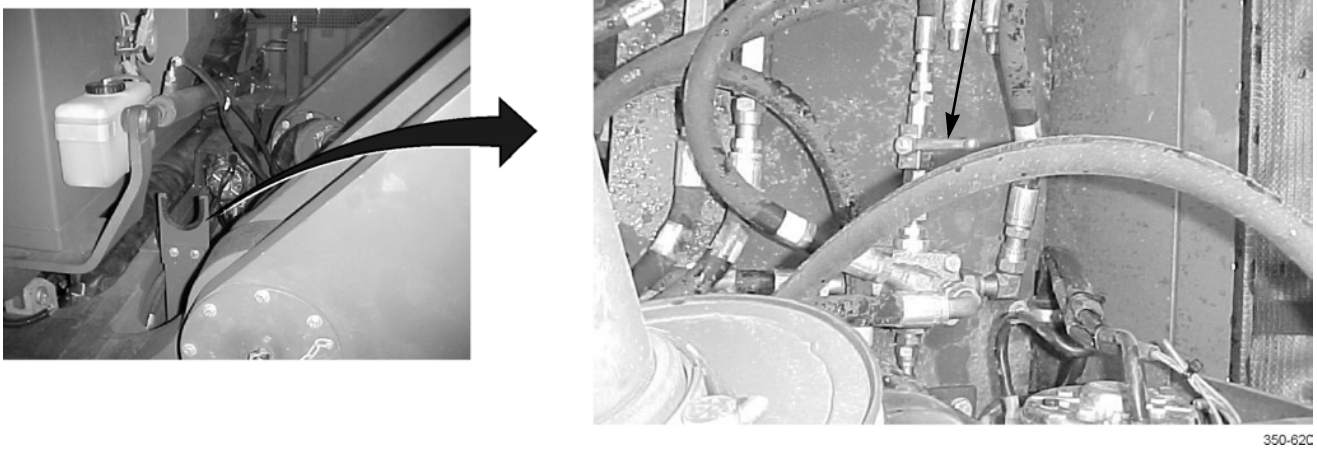
1. To relieve hydraulic pressure in ALL systems, perform the following:
   a. Lower and fully retract boom (TM 10-3930-675-10).
   b. Shut down engine (TM 10-3930-675-10).

RELIEVING HYDRAULIC SYSTEM PRESSURE - CONTINUED

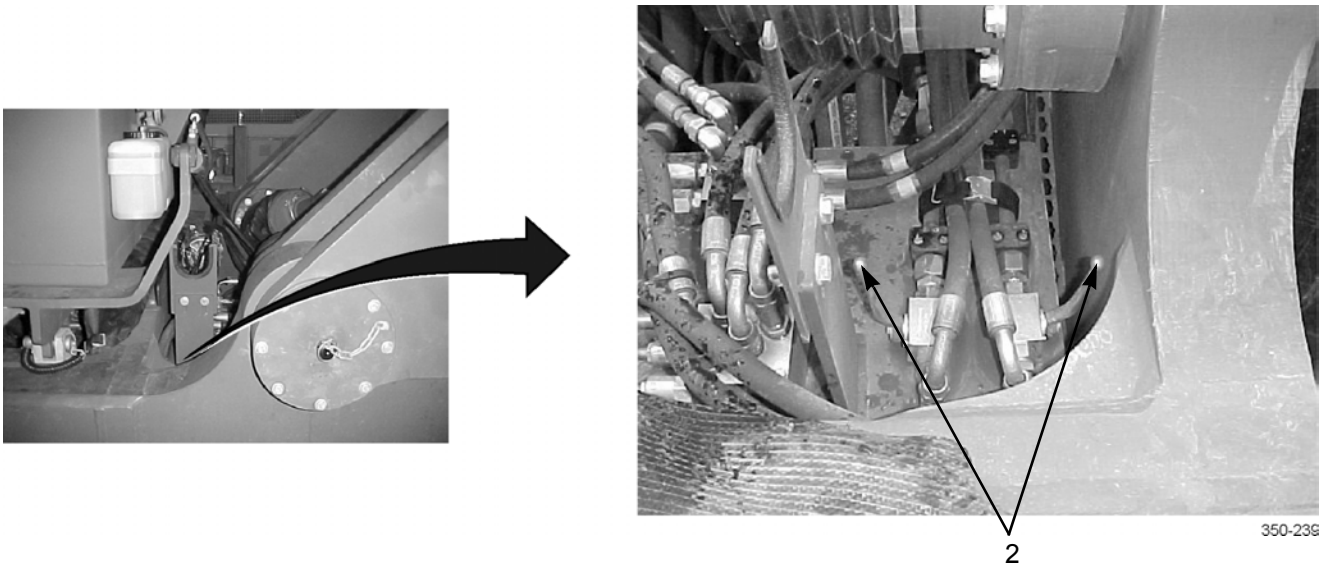
NOTE

When performing steering or brake hydraulic system maintenance, leave evacuation valves open until maintenance action is completed. Then close valves before starting engine to pressurize system.

2. To further release pressure in steering hydraulic system, open steering accumulator evacuation valve (1) behind cab. Allow pressure to release, approximately 15 seconds. It is now safe to perform maintenance on steering system.

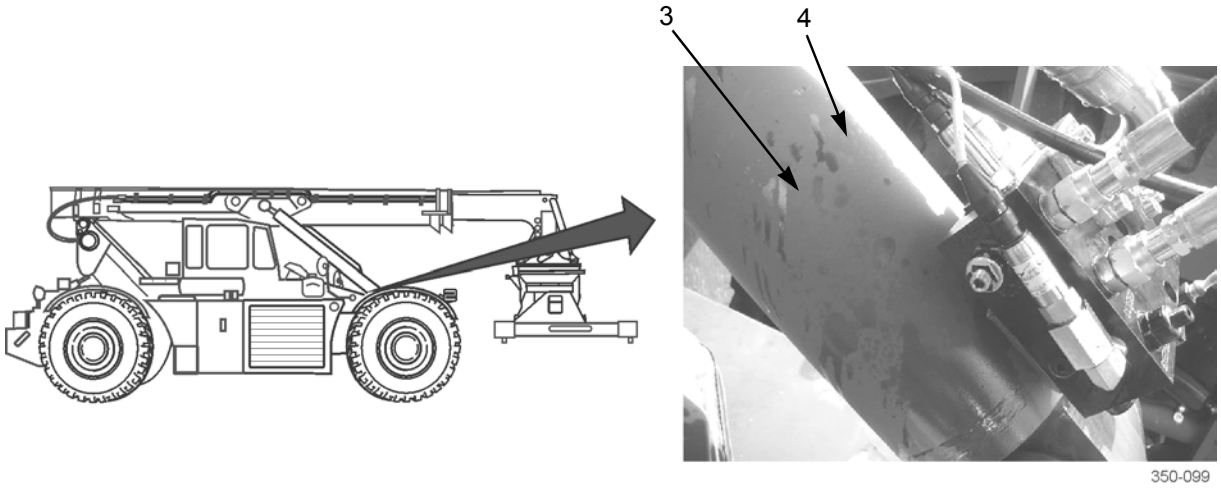


3. To further release pressure in brake hydraulic system, open two brake accumulator evacuation valves (2) behind cab. Allow pressure to release, approximately 15 seconds. It is now safe to perform maintenance on brake system.



RELIEVING HYDRAULIC SYSTEM PRESSURE - CONTINUED **0164 00**

4. To further release pressure in boom hydraulic system (boom extension and lift cylinders, hoses, pipes, and valves), open float control valve (3) and emergency control valve (4) on each locking valve at base of each lift cylinder. Leave valves open until maintenance action is completed, then close valves before starting engine to pressurize system.



5. When disconnecting hydraulic lines from boom folding cylinders, additional precautions are required due to residual pressure in lines:
   a. Wear eye protection.
   b. Have a rag handy and slowly disconnect hydraulic lines.

END OF WORK PACKAGE

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AUXILIARY HYDRAULIC PUMP REPLACEMENT 0165 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Nut, lock (P/N 5957) (3)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Cab moved to the left, but not lowered (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

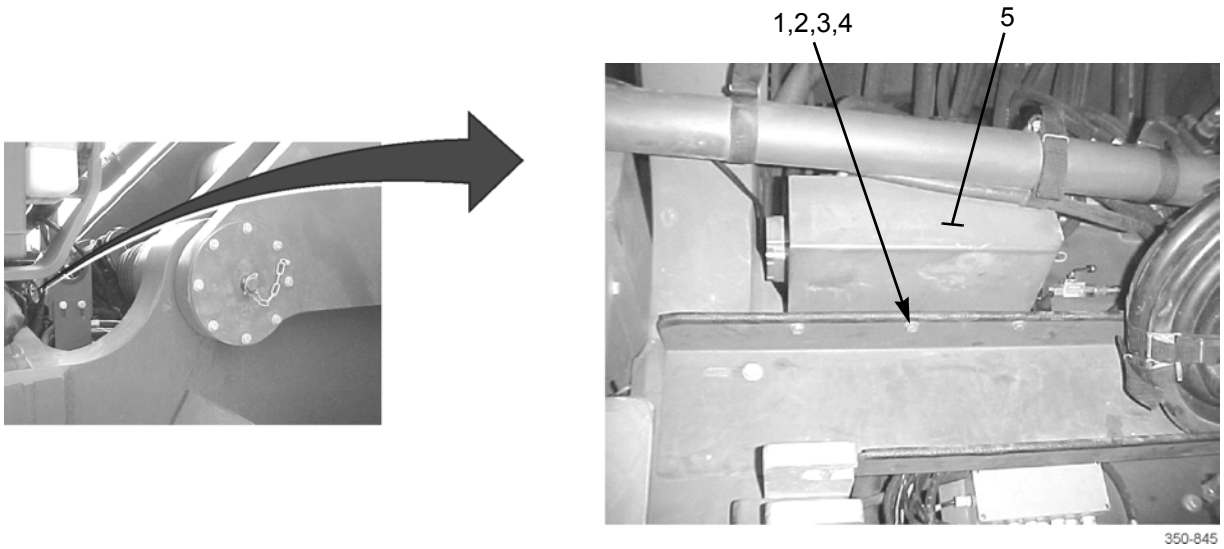
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

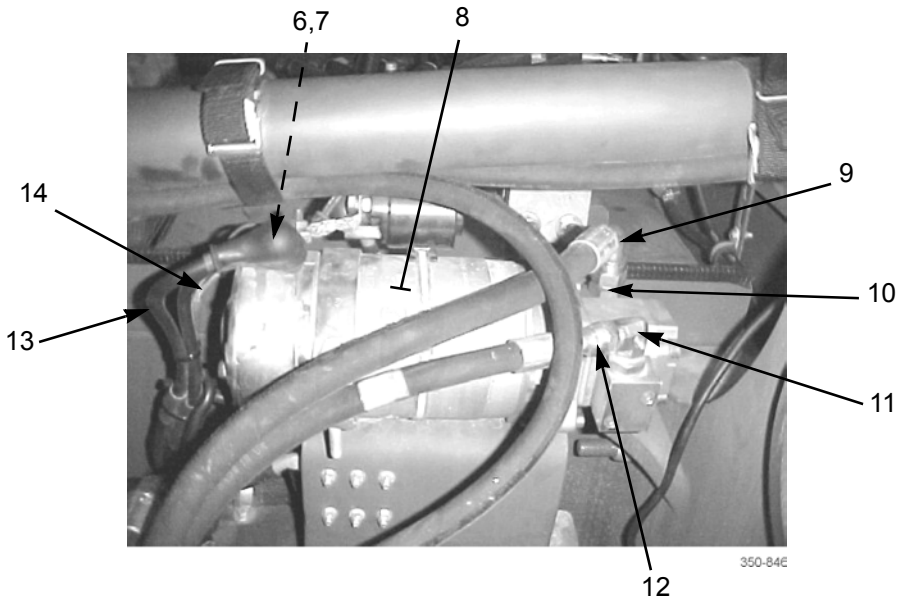
Tag all electrical wires and hydraulic lines and fittings to ensure correct installation.

REMOVAL

1. Remove three locknuts (1), bolts (2), washers (3), spacers (4), and cover (5). Discard locknuts.

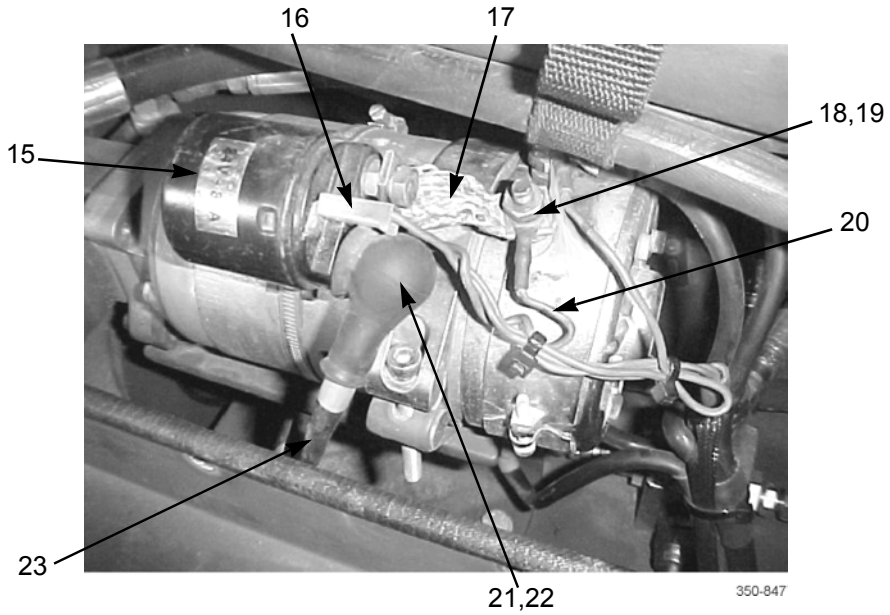


2. Trace supply hose (9) back to hydraulic reservoir. Close ball valve in supply hose at reservoir.
3. Disconnect supply hose (9) from straight connector (10) of pump (8).
4. Disconnect pressure hose (12) from elbow (11).
5. Peel back rubber boot from terminal post (6). Remove nut (7) and disconnect two black wires (13) and gray wire (14) from terminal post.

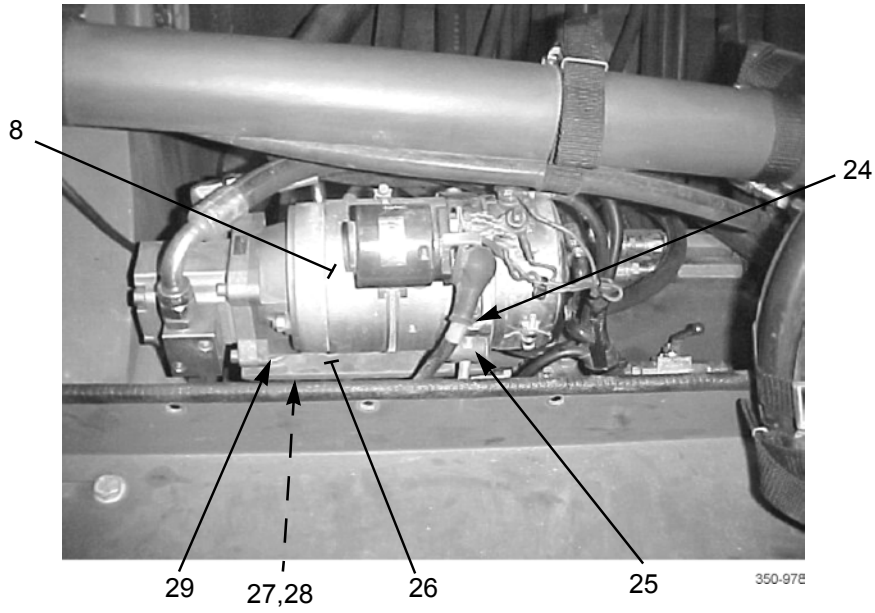


REMOVAL - CONTINUED

6. Remove nut (18), lockwasher (19), and disconnect strap (17) and gray wire (20).
7. Disconnect two connectors (16) from solenoid (15).
8. Peel back rubber boot and remove nut (21), lockwasher (22), and disconnect power cable (23) from solenoid (15).



9. Remove two bolts (27) and washers (28) from underside of pump (8) and mounting bracket (26).
10. Remove two allen screws (24) from clamp (25).
11. Remove pump (8) and two spacers (29) from mounting bracket (26).



REMOVAL - CONTINUED

NOTE

Perform step 12 to remove fittings from pump, if a new pump is being installed.

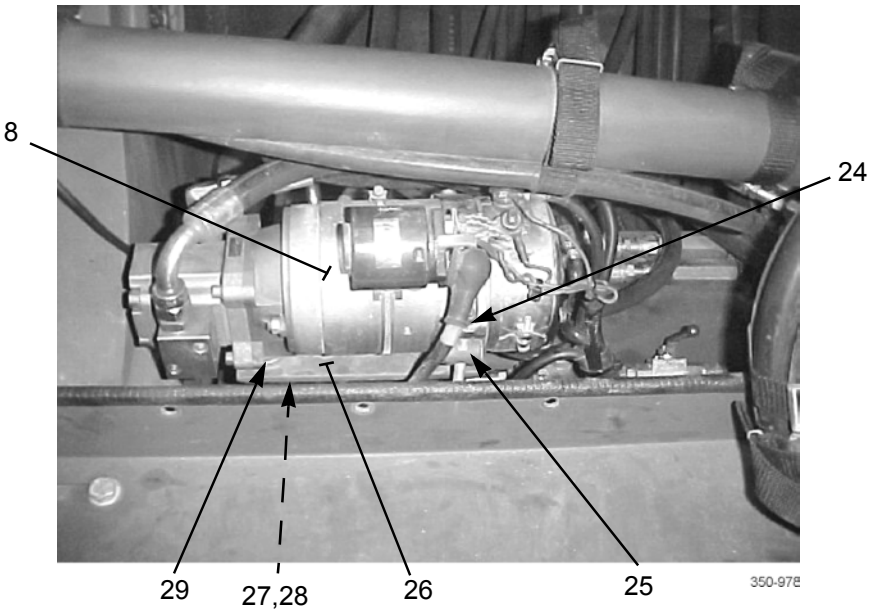
12. Remove straight connector (10) and elbow (11) from pump (8).

INSTALLATION

NOTE

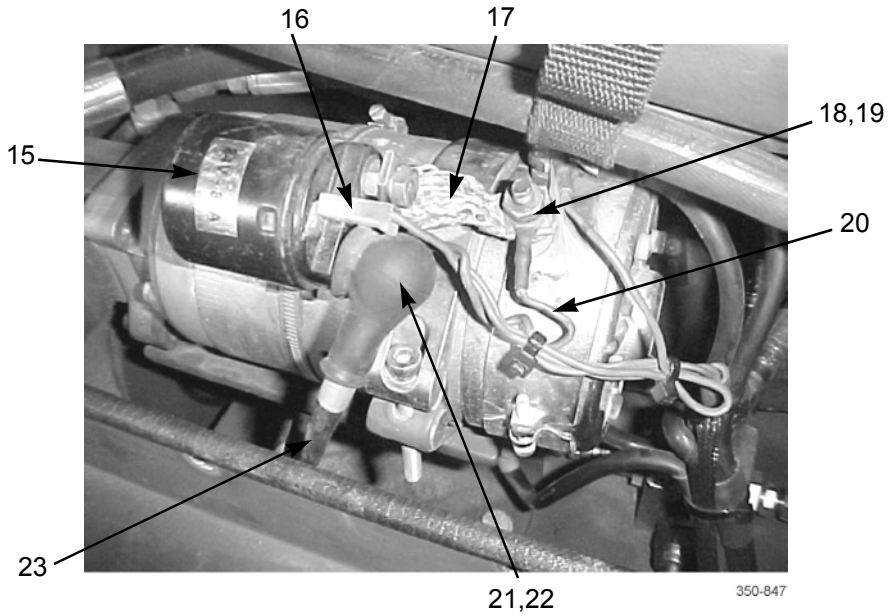
- Refer to *General Maintenance Instructions* (WP 0087 05) for complete instructions on connecting hydraulic hoses and applying proper torque.
- Perform step 1 to install fittings removed from old pump, if a new pump is being installed.

1. Install elbow (11) and straight connector (10) to pump (8).
2. Position two spacers (29) and pump (8) to mounting bracket (26).
3. Loosely install two washers (28) and bolts (27).
4. Secure clamp (25) around pump (8) with two allen screws (24). Fully tighten two bolts (27).

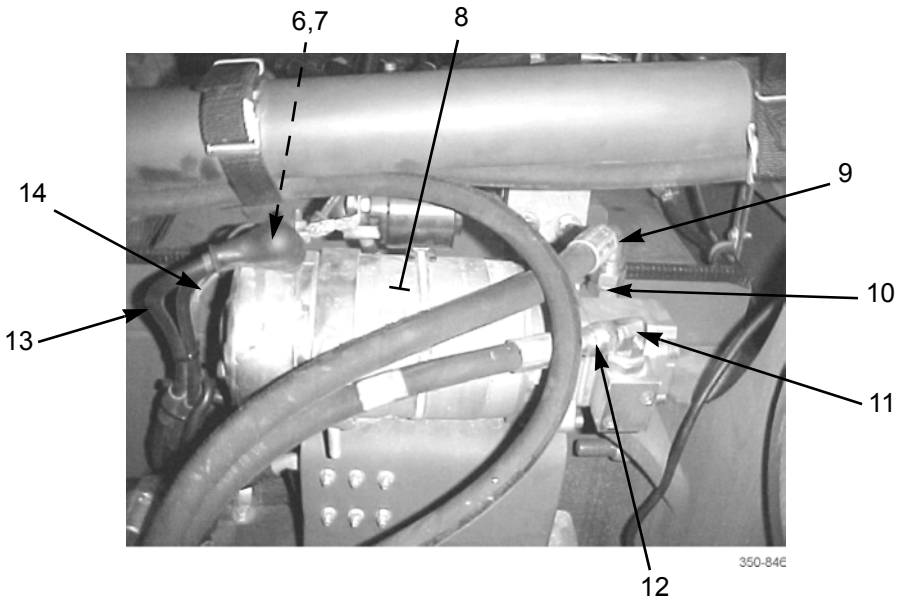


5. Connect power cable (23) to solenoid (15) with lockwasher (22) and nut (21).
6. Connect two connectors (16) to solenoid (15).
7. Connect strap (17) and gray wire (20) with lockwasher (19) and nut (18).

INSTALLATION - CONTINUED

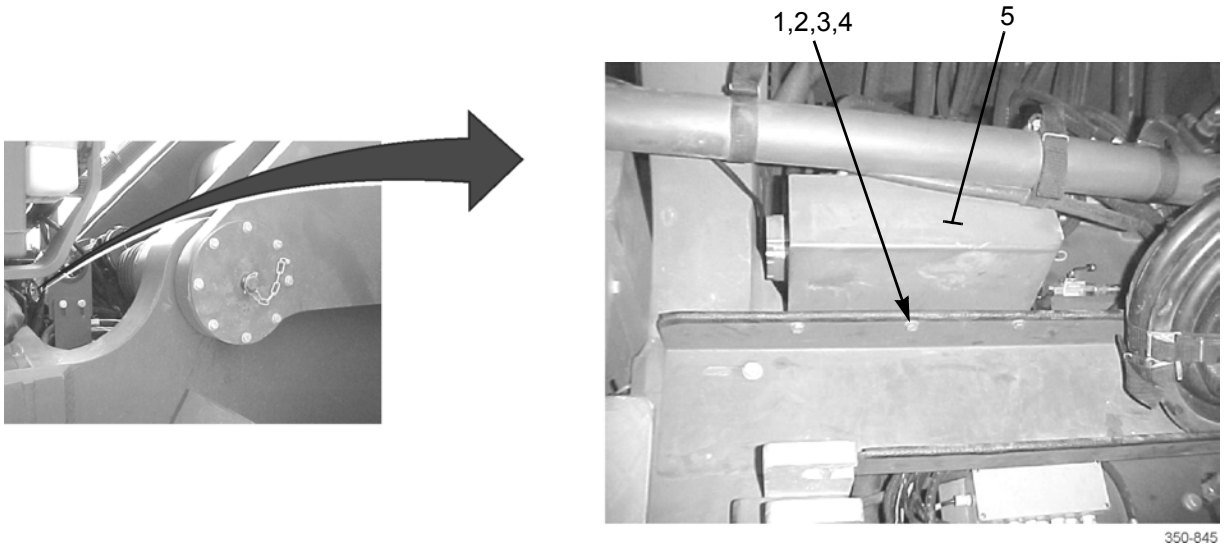


8. Connect two black wires (13) and gray wire (14) to terminal post (6) with nut (7). Cover terminal post with rubber boot.
9. Connect pressure hose (12) to elbow (11).
10. Connect supply hose (9) to straight connector (10).
11. Open ball valve at reservoir for supply hose (9).



INSTALLATION - CONTINUED

12. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
13. Start engine and turn on emergency hydraulic pump (TM 10-3930-675-10). Check for leaks.
14. Install cover (5) with three spacers (4), washers (3), bolts (2), and new locknuts (1).



15. Return cab to operational position (TM 10-3930-675-10).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

TOPHANDLER HYDRAULIC SLEWING MOTORS REPLACEMENT 0166 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Sling, nylon (Item 26, WP 0204 00)

Wrench, torque, 50-250 lb-ft capacity (Item 39, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 18, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Materials/Parts - Continued

O-ring (P/N 923828.0797) (2)

Personnel Required

Two

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

WP 0198 00

Equipment Condition

Boom and tophandler lowered for access (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

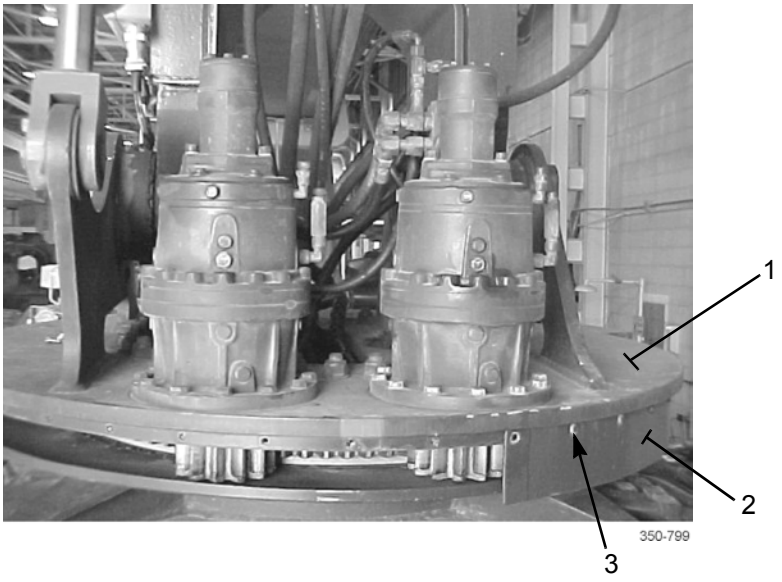
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

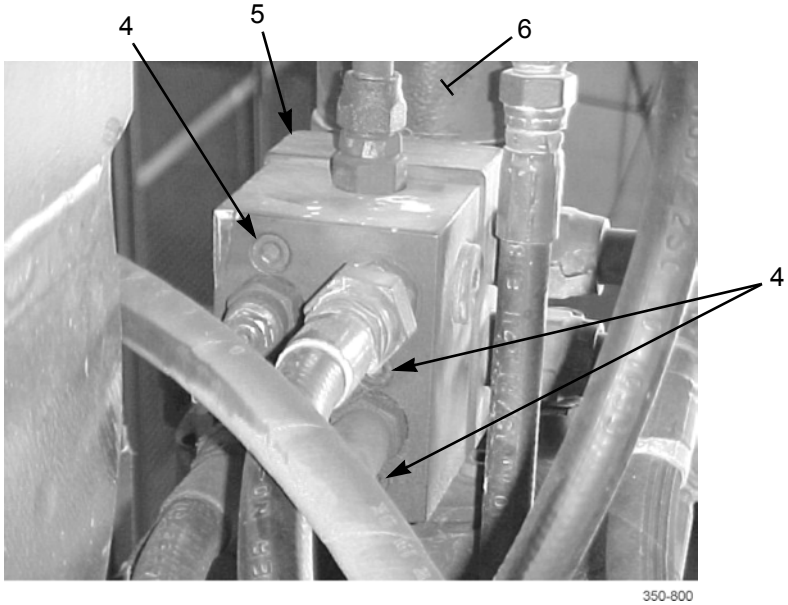
1. Remove ten screws (3) and one of four protection covers (2) from turning plate (1).



NOTE

- To remove slewing motor with hydraulic manifold, perform steps 2 and 3.
- To remove slewing motor without hydraulic manifold, proceed to step 4.

2. Remove four socket head screws (4) securing hydraulic manifold (5) with hoses to slewing motor (6).
3. Remove hydraulic manifold (5) with hoses attached from slewing motor (6). Discard o-rings.

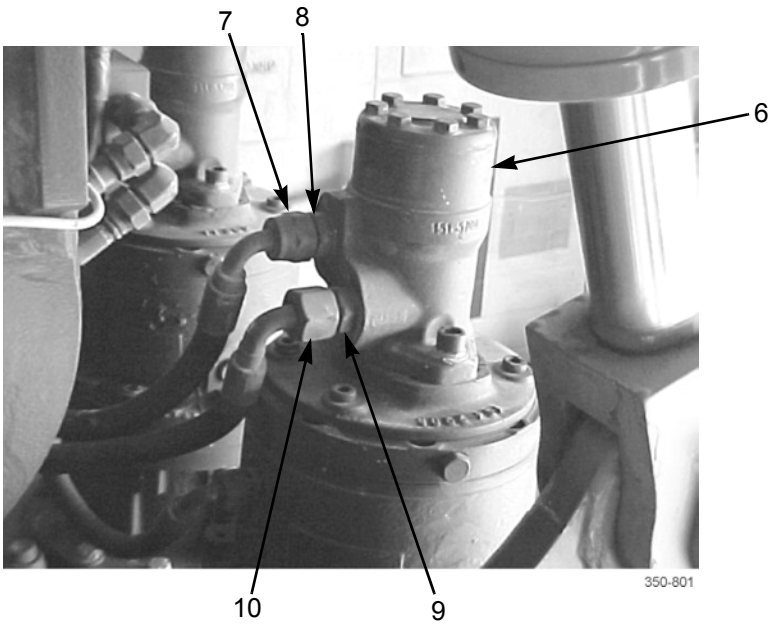


REMOVAL - CONTINUED

NOTE

If removing slewing motor without hydraulic manifold, perform the following step.

4. Remove two hydraulic hoses (7 and 10) and fittings (8 and 9) from slewing motor (6).



REMOVAL - CONTINUED

NOTE

Note orientation of slewing motor for positioning hydraulic connections on installation.

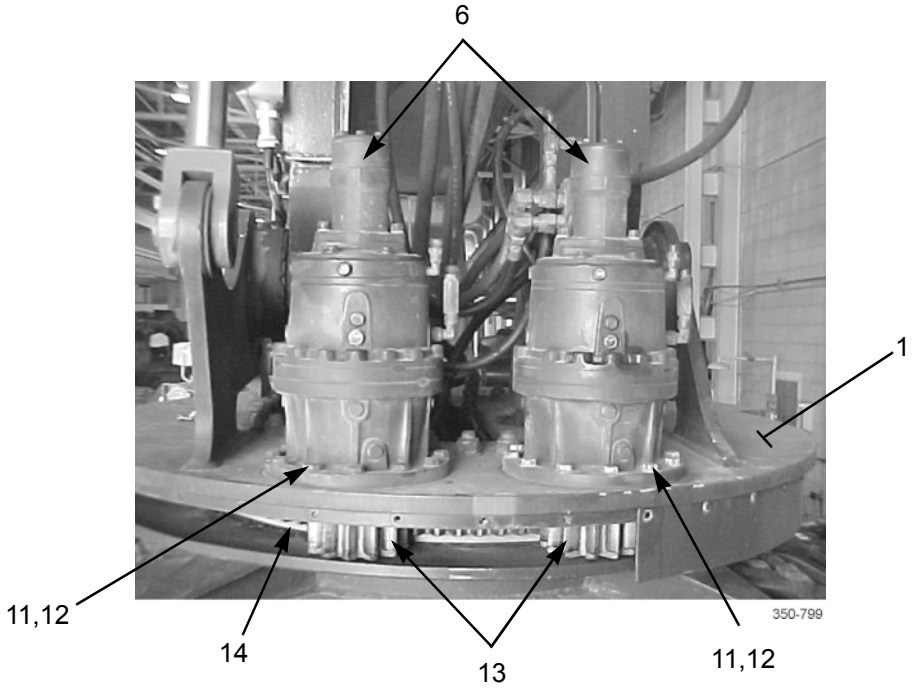
5. Remove ten bolts (11) and washers (12) securing slewing motor (6).



WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Slewing motor weighs approximately 150 lb (68 kg). Lifting device must have sufficient capacity to lift motor. Failure to follow this warning may result in injury to personnel.

6. With assistance, and using nylon sling and suitable lifting device, remove slewing motor (6) with pinion gear (13) from turning plate (1).



INSTALLATION

WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Slewing motor weighs approximately 150 lb (68 kg). Lifting device must have sufficient capacity to lift motor. Failure to follow this warning may result in injury to personnel.

NOTE

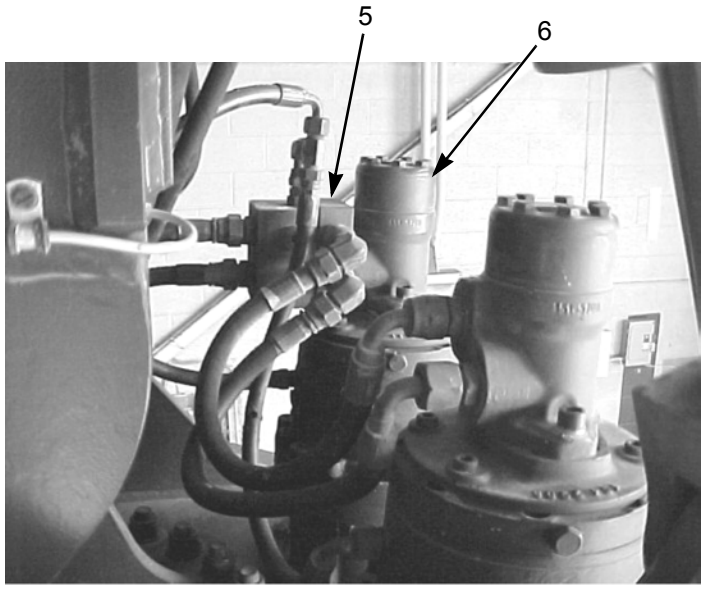
- Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.
- Ensure slewing motor is oriented to allow hoses or hydraulic manifold connections.

1. With assistance, and using nylon sling and suitable lifting device, install slewing motor (6) with pinion gear (13) thru turning plate (1) and engage ring gear (14).
2. Install ten bolts (11) and washers (12) to secure slewing motor (6) in place. Tighten bolts in an even pattern in accordance with *Torque Limits* (WP 0198 00).

NOTE

- To install slewing motor with hydraulic manifold, perform steps 3 and 4.
- To install slewing motor without hydraulic manifold, proceed to step 5.
- Ensure o-rings are lubricated with lubricating oil prior to installation.

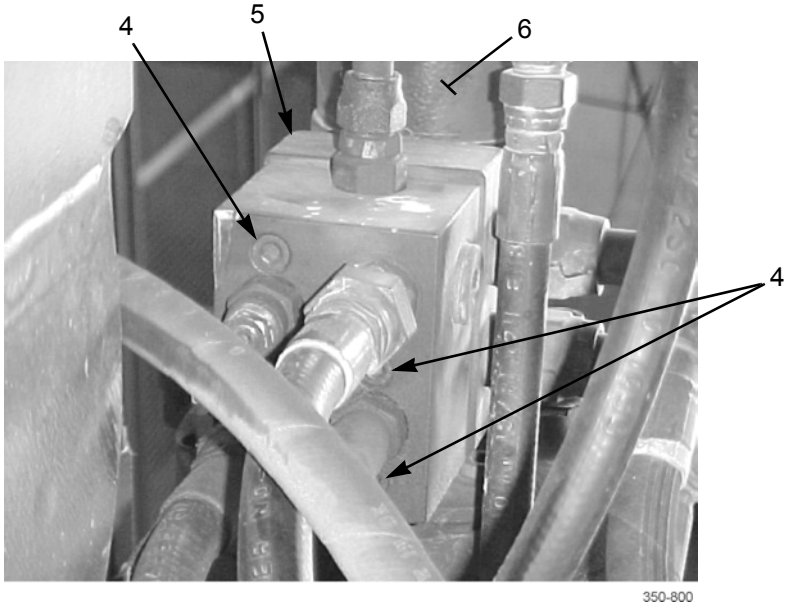
3. Position new o-rings and hydraulic manifold (5) with hoses attached to slewing motor (6) mating surface.



350-802

INSTALLATION - CONTINUED

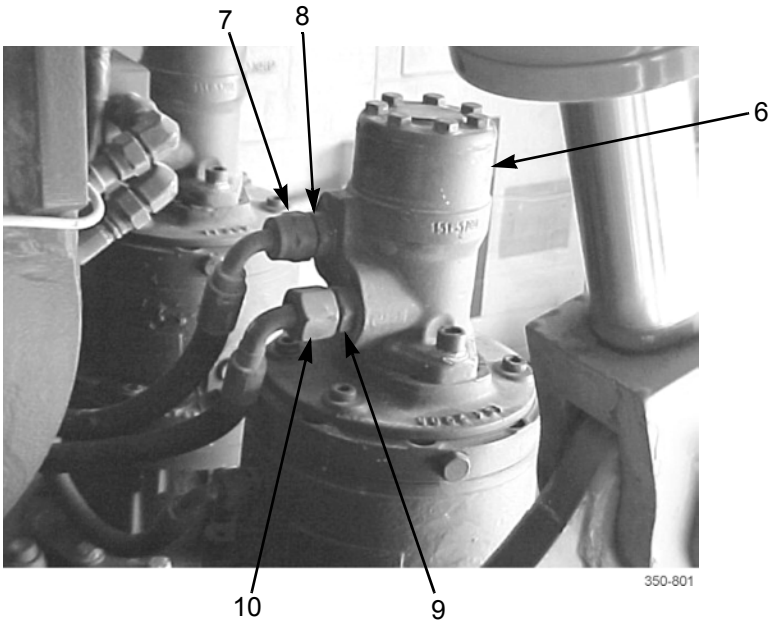
4. Install four socket head screws (4) to secure hydraulic manifold (5) to slewing motor (6).



NOTE

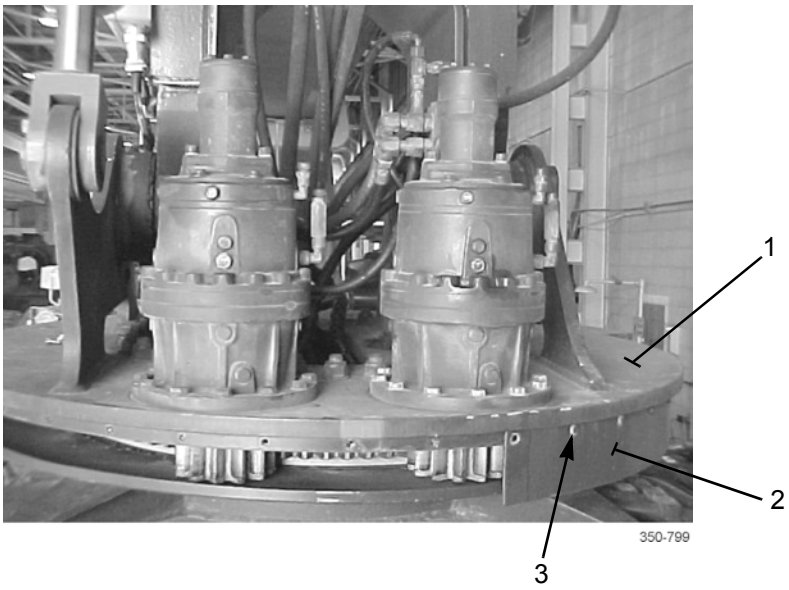
If installing slewing motor without hydraulic manifold, perform the following step.

5. Install fittings (8 and 9) and connect two hydraulic hoses (7 and 10) to slewing motor (6).



INSTALLATION - CONTINUED

6. Position protective cover (2) on turning plate (1) with ten screws (3).



7. If a new slewing motor was installed, lubricate motor in accordance with LO 10-3930-675-12.
8. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
9. Operate tophandler (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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TOPHANDLER HYDRAULIC SPREADER MOTOR REPLACEMENT 0167 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Sling, nylon (Item 26, WP 0204 00)

Wrench, torque, 50-250 lb-ft capacity (Item 39, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Nut, lock (P/N 923863.7200) (7)

O-ring (P/N 923828.0797) (2)

Personnel Required

Two

References

LO 10-3930-675-12

WP 0164 00

WP 0183 00

WP 0198 00

Equipment Condition

Boom and tophandler lowered for access (TM 10-3930-675-10)



WARNING



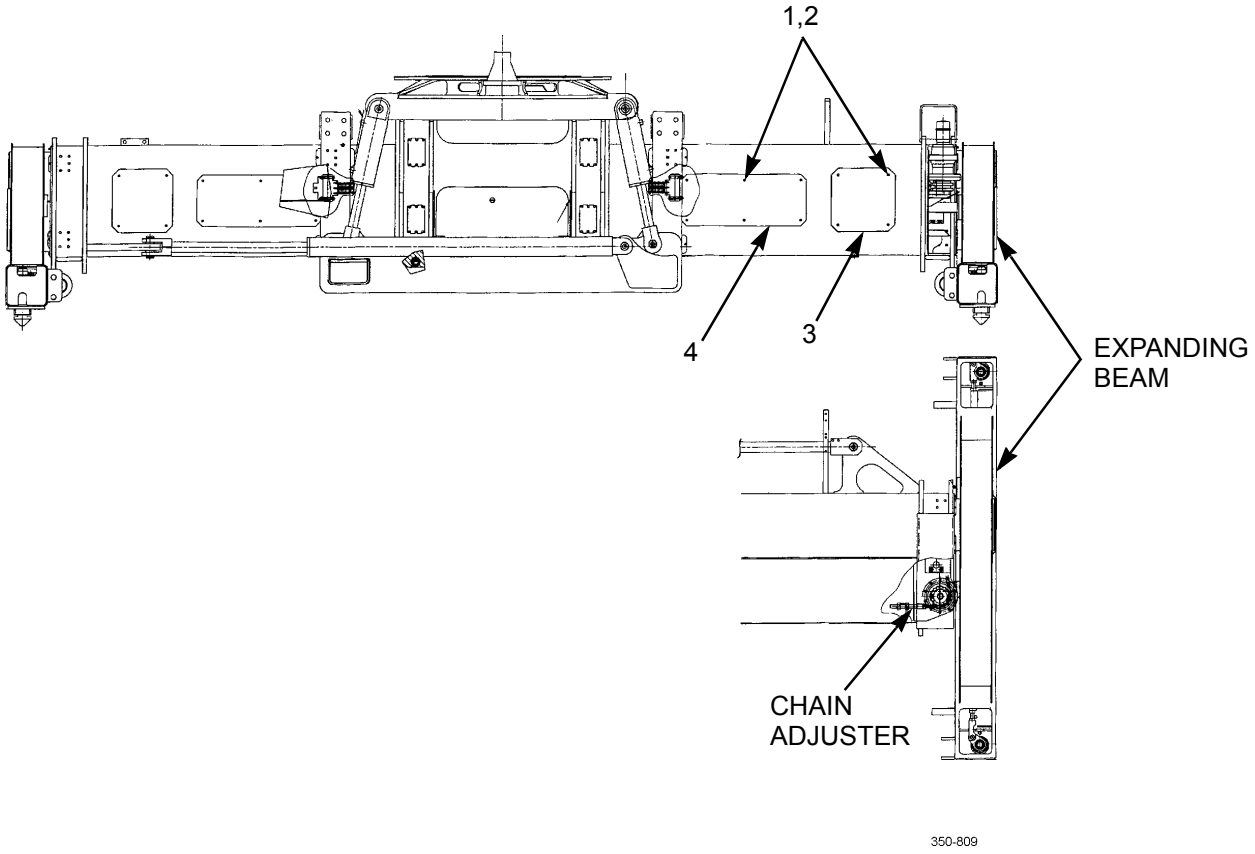
- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

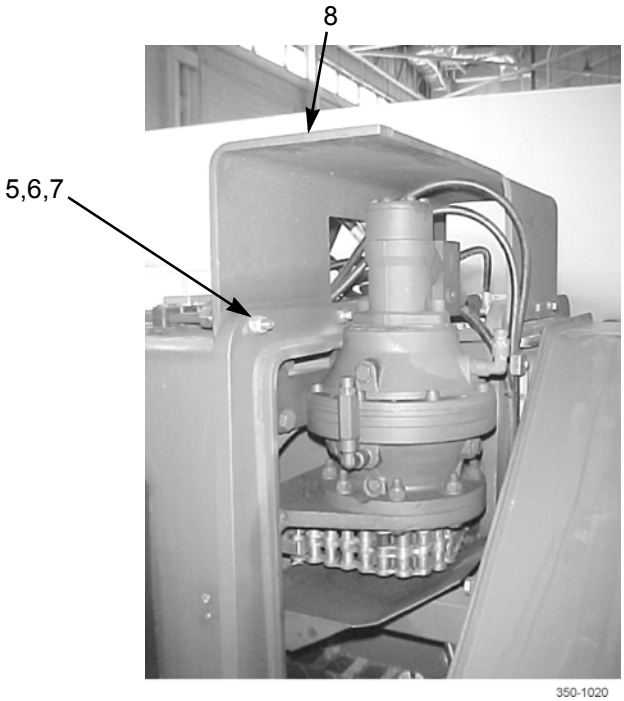
REMOVAL

1. Remove ten screws (1), washers (2), and two access panels (3 and 4) from side of tophandler carriage.
2. Position tophandler expanding beams to access chain adjuster.



REMOVAL - CONTINUED

3. Relieve hydraulic system pressure (WP 0164 00).
4. Remove seven locknuts (5), washers (6), screws (7), and protective cover (8) from tophandler. Set protective cover aside. Discard locknuts.

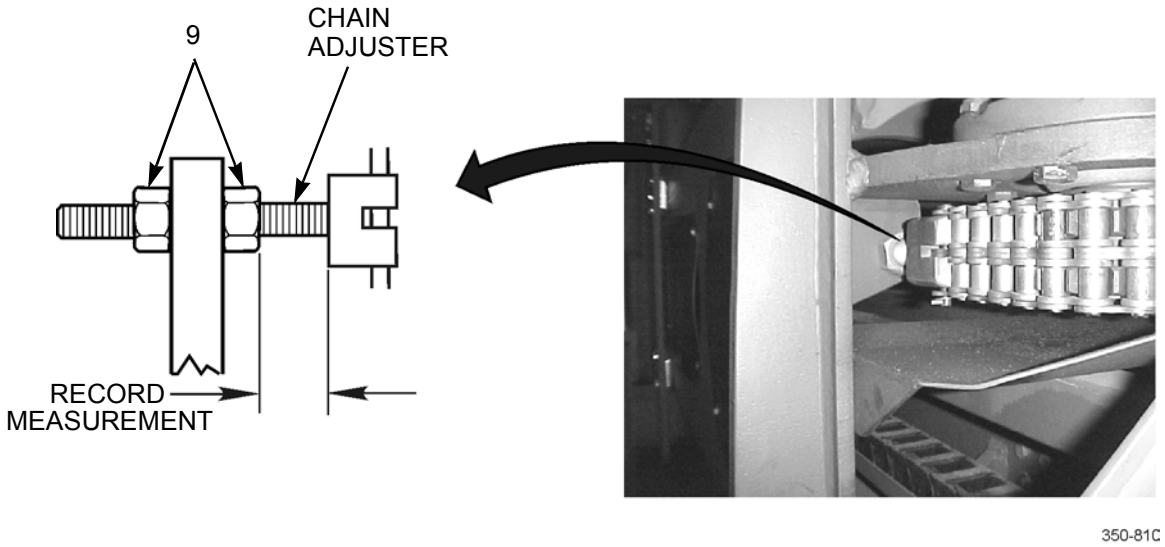


REMOVAL - CONTINUED

NOTE

Prior to removal or disconnection of drive chain, measure and record length of adjuster rod as shown in location diagram to ensure proper chain adjustment on installation.

5. Measure and record chain adjuster as shown.
6. Loosen chain adjuster jamnuts (9).



7. Remove chain (15) from drive sprocket (14).
8. Remove four socket head screws (13), hydraulic manifold (11) with hoses, and o-rings (12) from spreader motor (10). Discard o-rings.

NOTE

Note direction of screws securing spreader motor to mounting weldment for installation.

9. Remove ten screws (16), washers (18), and nuts (19) securing spreader motor (10) to mounting weldment (17).



WARNING

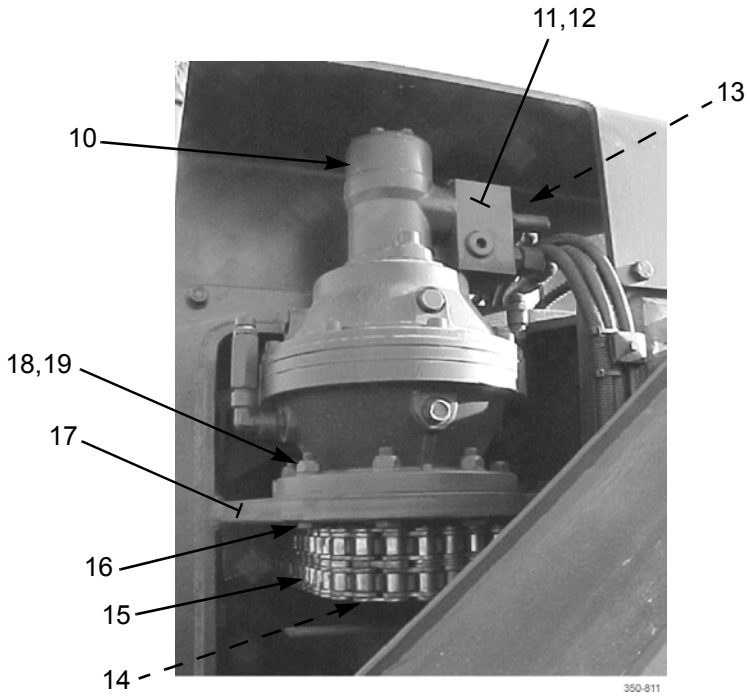
- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Spreader motor weighs approximately 150 lb (68 kg). Lifting device must have sufficient capacity to lift motor. Failure to follow this warning may result in injury to personnel.

REMOVAL - CONTINUED

NOTE

Note orientation of spreader motor to allow connection of hydraulic manifold on installation.

10. Using suitable lifting device, nylon sling, and with assistance, remove spreader motor (10) from mounting weldment (17).



INSTALLATION



WARNING

- Use extreme caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may result in death or injury to personnel.
- Spreader motor weighs approximately 150 lb (68 kg). Lifting device must have sufficient capacity to lift motor. Failure to follow this warning may result in injury to personnel.

NOTE

Ensure spreader motor is oriented to allow connection of hydraulic manifold.

1. Using suitable lifting device, nylon sling, and with assistance, install spreader motor (10) on mounting weldment (17).

NOTE

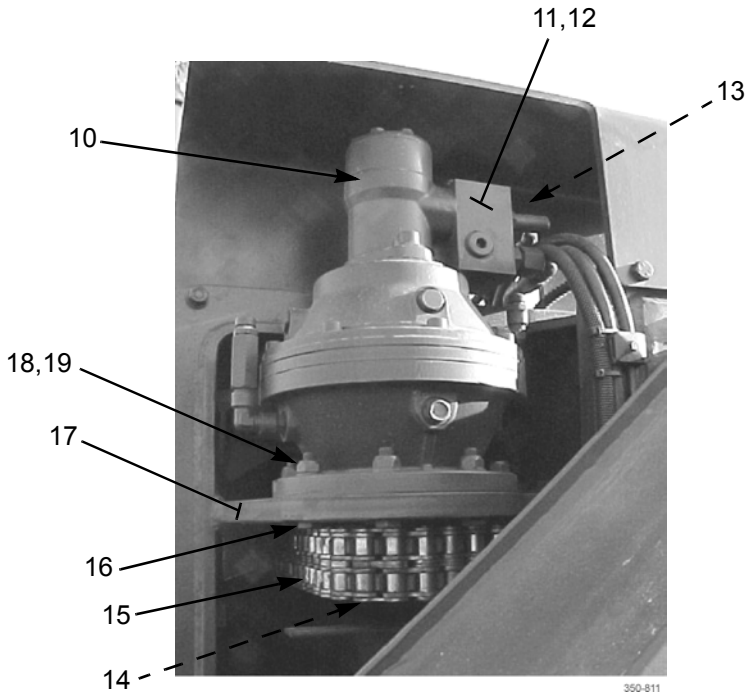
Ensure screws are installed from bottom up as noted in removal.

2. Install ten screws (16), washers (18), and nuts (19) to secure spreader motor (10). Tighten screws in an even pattern in accordance with *Torque Limits* (WP 0198 00).

NOTE

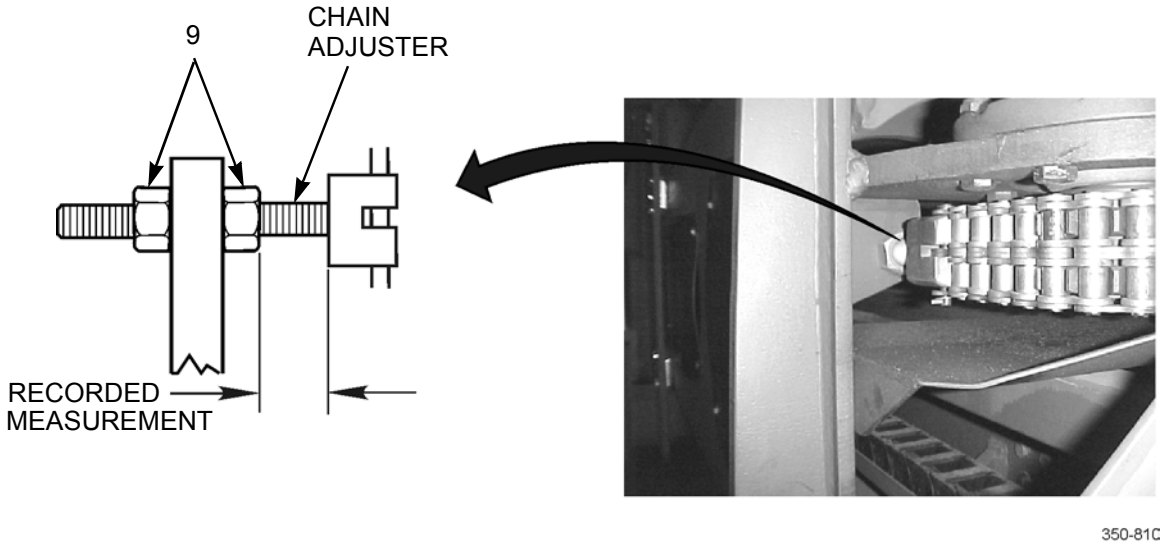
Ensure o-rings are lubricated with lubricating oil prior to installation.

3. Position hydraulic manifold (11) with hoses and new o-rings (12) to spreader motor (10) and secure with four socket head screws (13).
4. Position chain (15) on drive sprocket (14).



INSTALLATION - CONTINUED

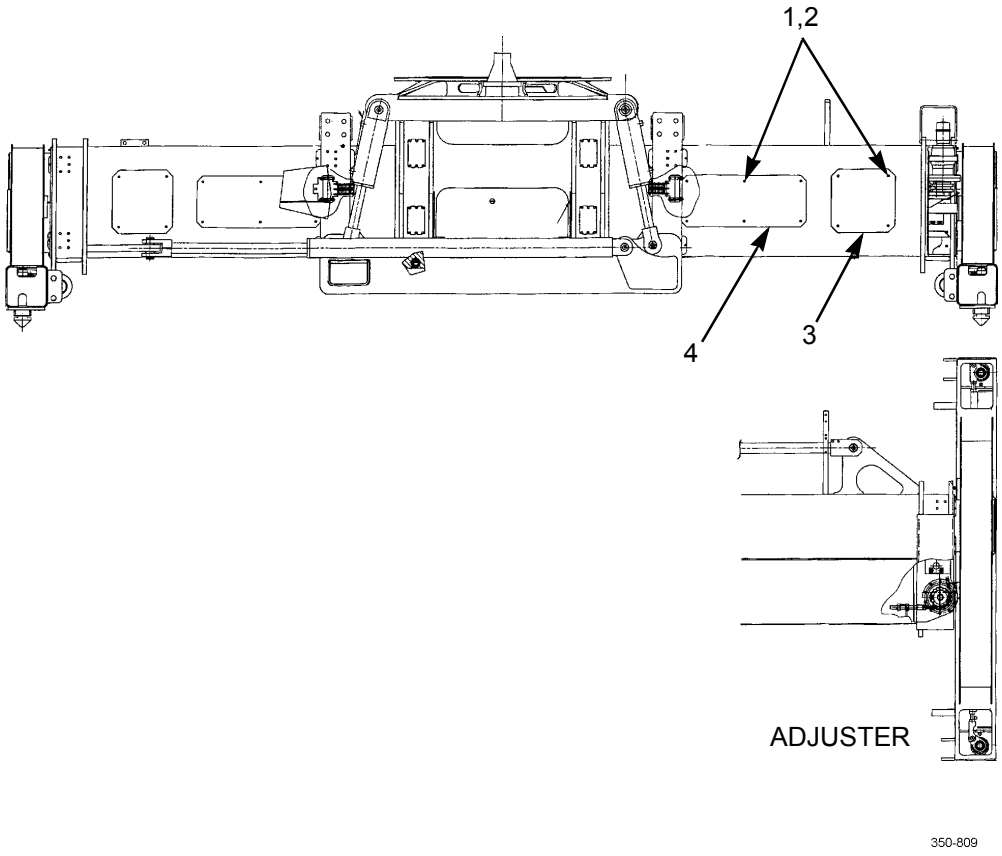
5. Measure chain adjuster and compare reading to measurement recorded during removal.
6. Adjust jamnuts (9) on chain adjuster to obtain recorded reading.



TOPHANDLER HYDRAULIC SPREADER MOTOR REPLACEMENT - CONTINUED 0167 00

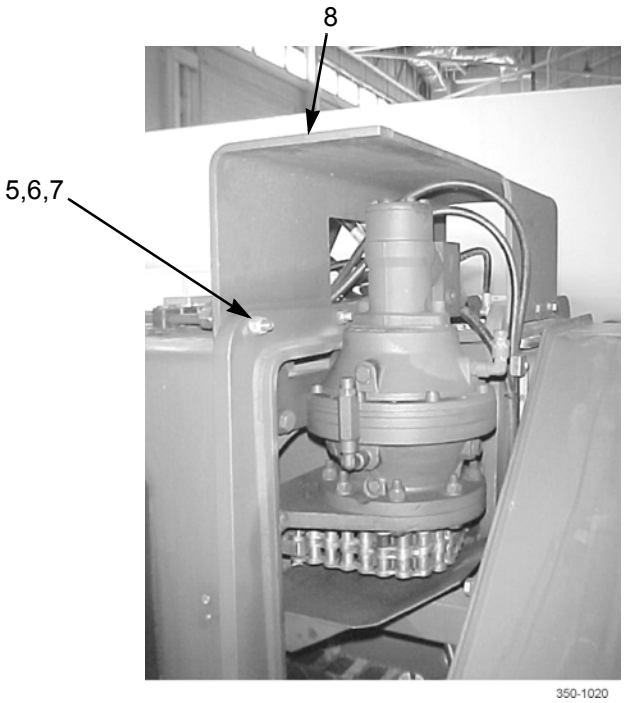
INSTALLATION - CONTINUED

7. If a new spreader motor was installed, lubricate motor in accordance with LO 10-3930-675-12.
8. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
9. Operate tophandler spreader motor (TM 10-3930-675-10) and check for leaks.
10. Recheck chain adjuster measurement and adjust jamnuts as required.
11. Install access panels (3 and 4) to side of tophandler carriage with ten washers (2) and screws (1).



INSTALLATION - CONTINUED

12. Install protective cover (8) to tophandler with seven screws (7), washers (6), and new locknuts (5).



NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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CAB TRANSPORT CONTROL VALVE REPLACEMENT 0168 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Tag all hydraulic lines.
- Remove and discard tiedown straps as necessary to gain free movement in hydraulic hoses.

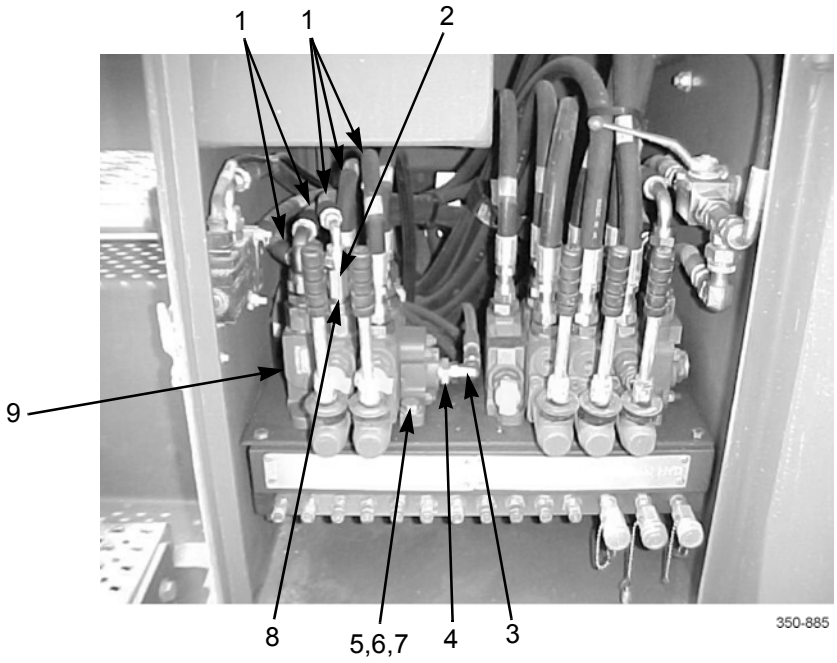
REMOVAL

1. Disconnect nine hoses (1) from fittings at control valve (9).
2. Remove four screws (5), nuts (6), washers (7), and control valve (9) from remote hydraulic control compartment.

NOTE

Perform step 3 to remove fittings from control valve, if a new control valve is being installed.

3. Remove elbow (3), tee (2), adapter fittings (4), and nipples (8) from control valve (9).



INSTALLATION

NOTE

- Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.
- Perform step 1 to install fittings removed from old control valve, if a new control valve is being installed.

1. Install nipples (8), adapter fittings (4), elbow (3), and tee (2) to control valve (9).
2. Install control valve (9) to remote hydraulic control compartment with four screws (5), nuts (6), and washers (7).
3. Connect nine hoses (1) to fittings at control valve (9).
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10), operate control valve levers, and check for leaks.
6. Install new tiedown straps as necessary to support hydraulic hoses.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

CONTROL VALVE SOLENOIDS REPLACEMENT 0169 00

THIS WORK PACKAGE COVERS

Type A Solenoid: Removal, Installation
Type B Solenoid: Removal, Installation
Type C Solenoid: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)
Key set, socket head screw (Item 15, WP 0204 00)

Materials/Parts

Tag, marker (Item 28, WP 0203 00)
Seal kit (P/N 923828.0012)

Equipment Condition

Master battery switch in OFF position

NOTE

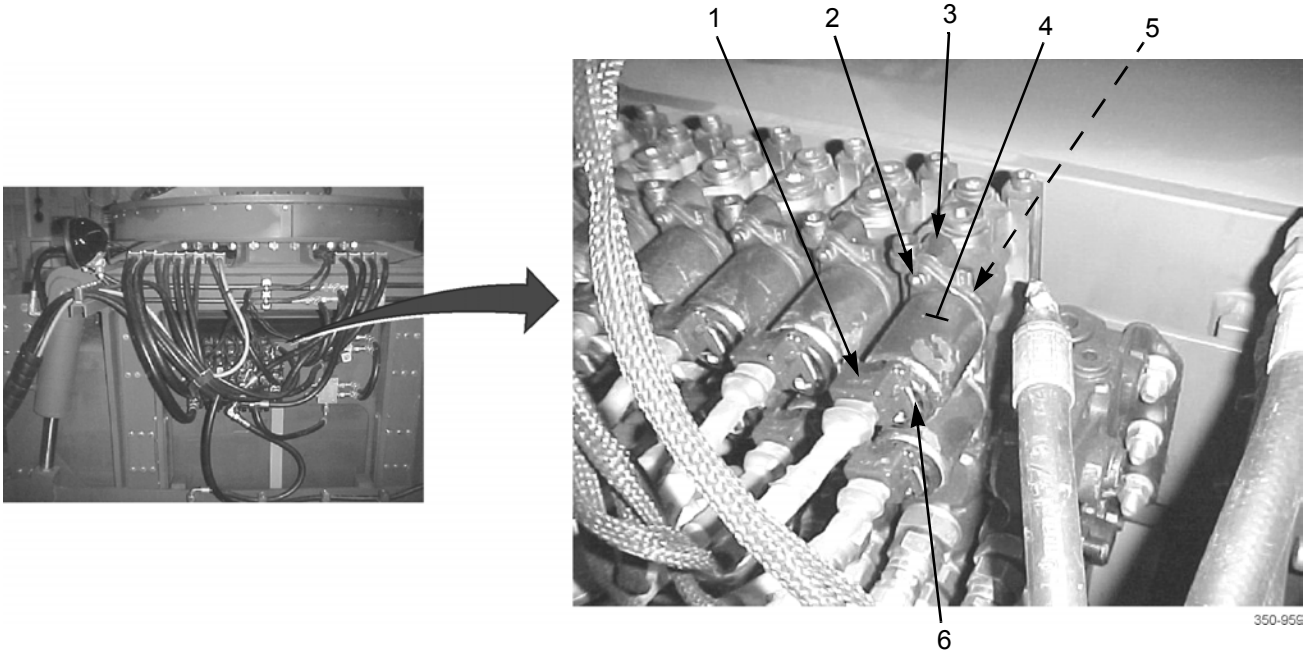
- There are three basic types of solenoids located on control valves throughout the RTCH. Replacement of each type of solenoid is described in this work package.
- Tag connectors to ensure correct installation.

TYPE A SOLENOID REMOVAL

NOTE

Perform following steps for each of 12 solenoids to be removed.

1. Press in on retaining clip (6) on side of connector (1) and disconnect connector of tophandler wiring harness from solenoid (4).
2. Remove two screws (2) and solenoid (4) from control valve (3).
3. Remove o-ring (5) from solenoid (4). Discard o-ring.

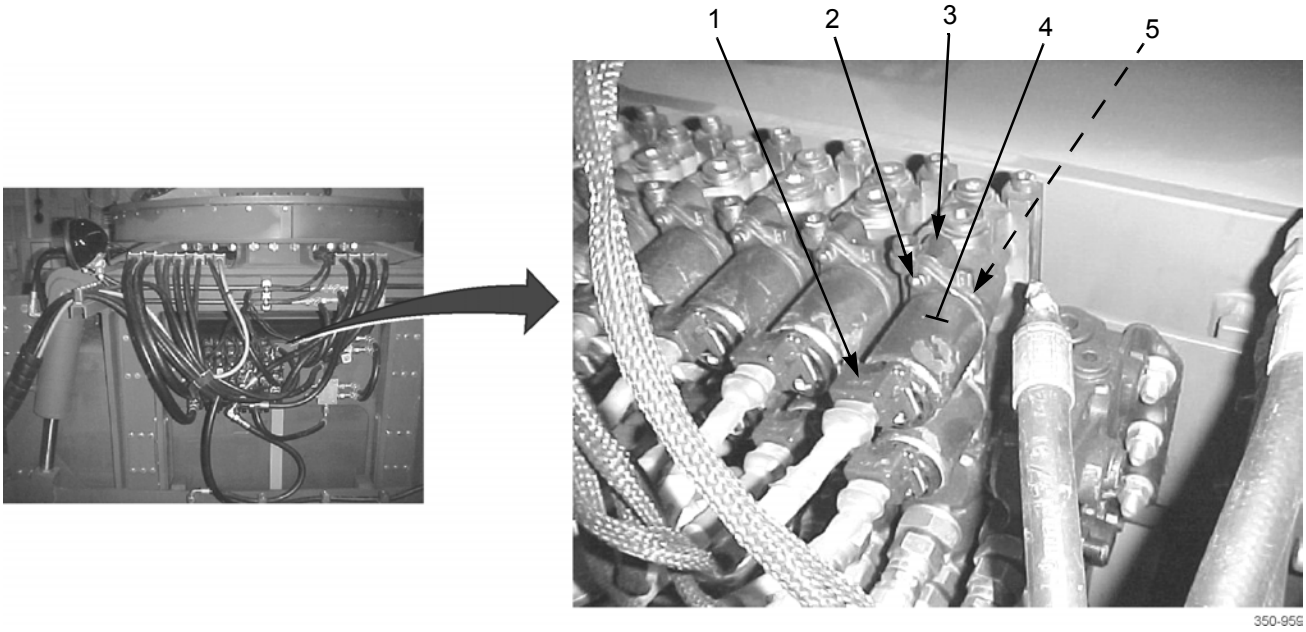


TYPE A SOLENOID INSTALLATION

NOTE

Perform following steps for each of 12 solenoids to be installed.

1. Install new o-ring (5) to solenoid (4).
2. Install solenoid (4) to control valve (3) with two screws (2).
3. Connect connector (1) of tophandler wiring harness to solenoid (4).



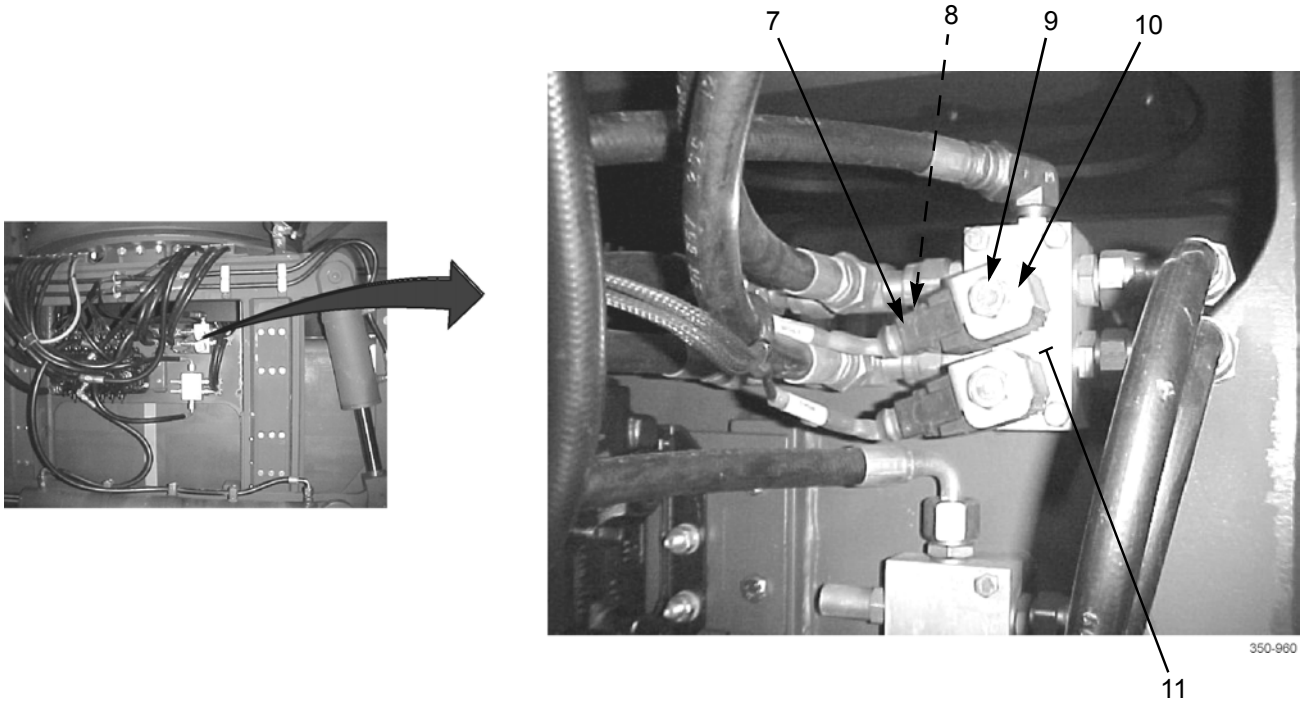
TYPE B SOLENOID REMOVAL

NOTE

Perform following steps for each of two solenoids to be removed.

1. Press in on retaining clip (8) on side of connector (7) and disconnect connector of tophandler wiring harness from side of solenoid (10).
2. Remove nut (9) and slide solenoid (10) out from control valve (11).

TYPE B SOLENOID REMOVAL - CONTINUED



TYPE B SOLENOID INSTALLATION

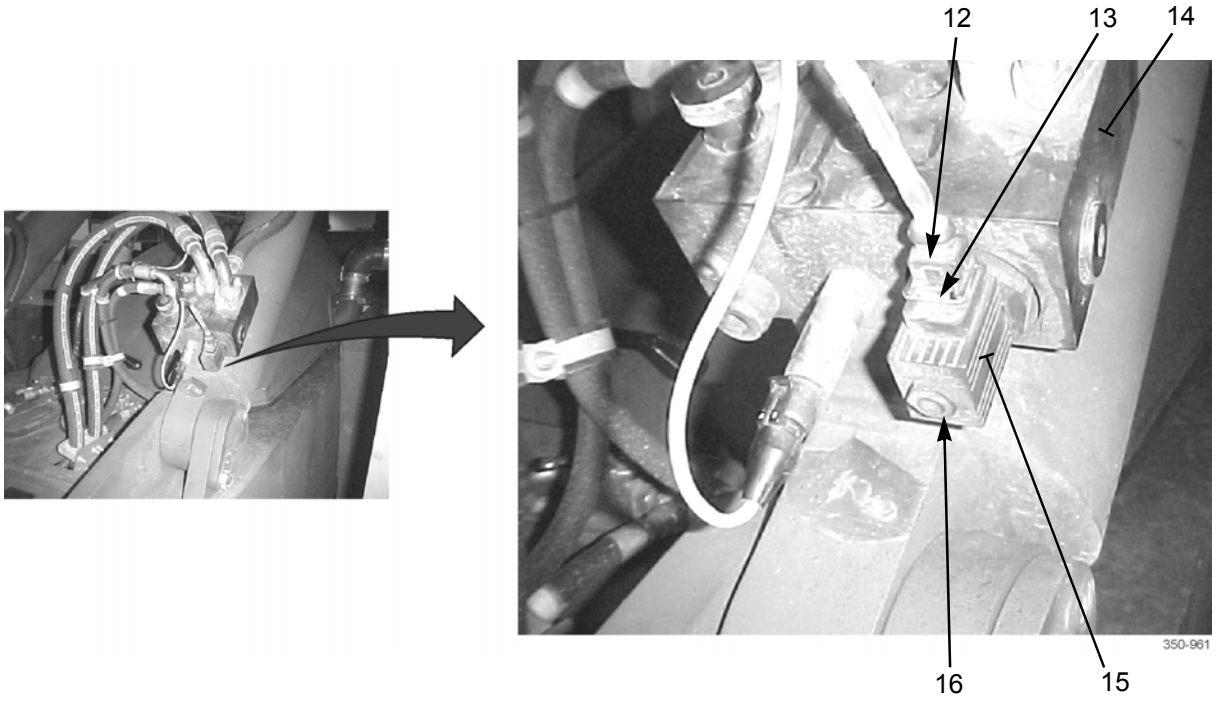
NOTE

Perform following steps for each of two solenoids to be installed.

1. Slide solenoid (10) onto control valve (11) and install nut (9).
2. Connect connector (7) of tophandler wiring harness to side of solenoid (10).

TYPE C SOLENOID REMOVAL

1. Press in on retaining clip (13) on side of connector (12) and disconnect connector of vehicle wiring harness from side of solenoid (15).
2. Remove nut (16) and slide solenoid (15) out from control valve (14).



TYPE C SOLENOID INSTALLATION

1. Slide solenoid (15) onto control valve (14) and install nut (16).
2. Connect connector (12) of vehicle wiring harness to side of solenoid (15).

END OF WORK PACKAGE

BOOM FOLDING CONTROL VALVE REPLACEMENT 0170 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Hydraulic system pressure relieved (WP 0164 00)

Master battery switch in OFF position



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Tag all hydraulic lines.
- Remove and discard tiedown straps as necessary to gain free movement in hydraulic hoses.

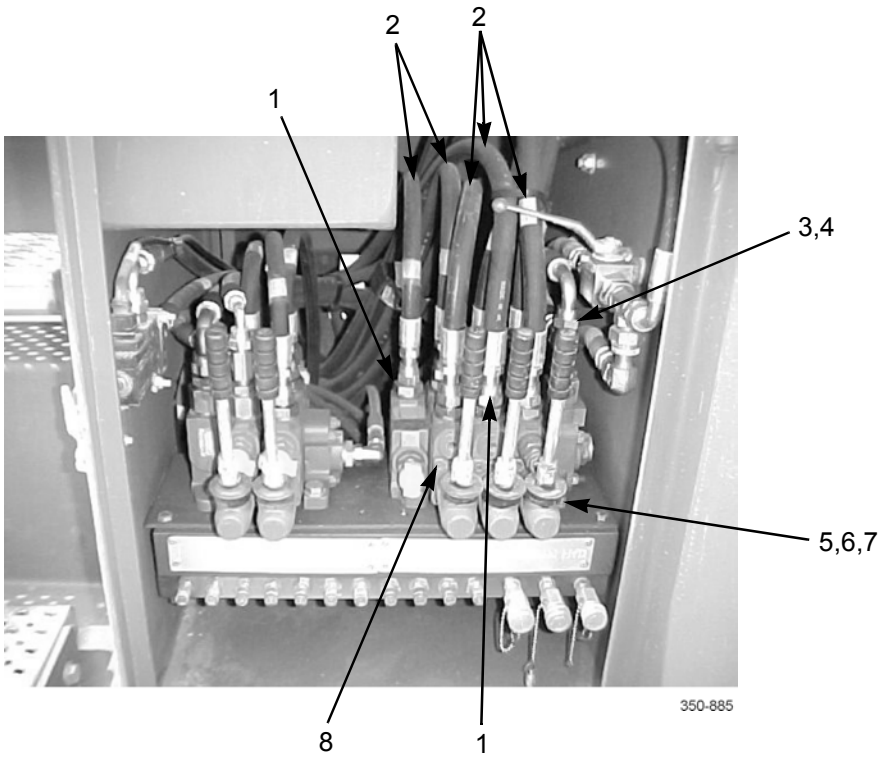
REMOVAL

1. Disconnect nine hoses (2) from fittings at control valve (8).
2. Remove four nuts (5), screws (6), washers (7), and control valve (8) from remote hydraulic control compartment.

NOTE

Perform step 3 to remove fittings from control valve, if a new control valve is being installed.

3. Remove tee (3), adapter fittings (1), and nipples (4) from control valve (8).



INSTALLATION

NOTE

- Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.
- Perform step 1 to install fittings removed from old control valve, if a new control valve is being installed.

1. Install nipples (4), adapter fittings (1), and tee (3) to control valve (8).
2. Install control valve (8) to remote hydraulic control compartment with four washers (7), screws (6), and nuts (5).
3. Connect nine hoses (2) to fittings at control valve (8).

INSTALLATION - CONTINUED

4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10), operate control valve levers, and check for leaks.
6. Install new tiedown straps as necessary to support hydraulic hoses.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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CAB LIFTING CYLINDER REPLACEMENT 0171 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Grease, GAA (Item 16, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

O-ring (2)

Pin, cotter (P/N 3293) (2)

Personnel Required

Two

References

LO 10-3930-675-12

WP 0164 00

WP 0183 00

WP 0179 00

WP 0194 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

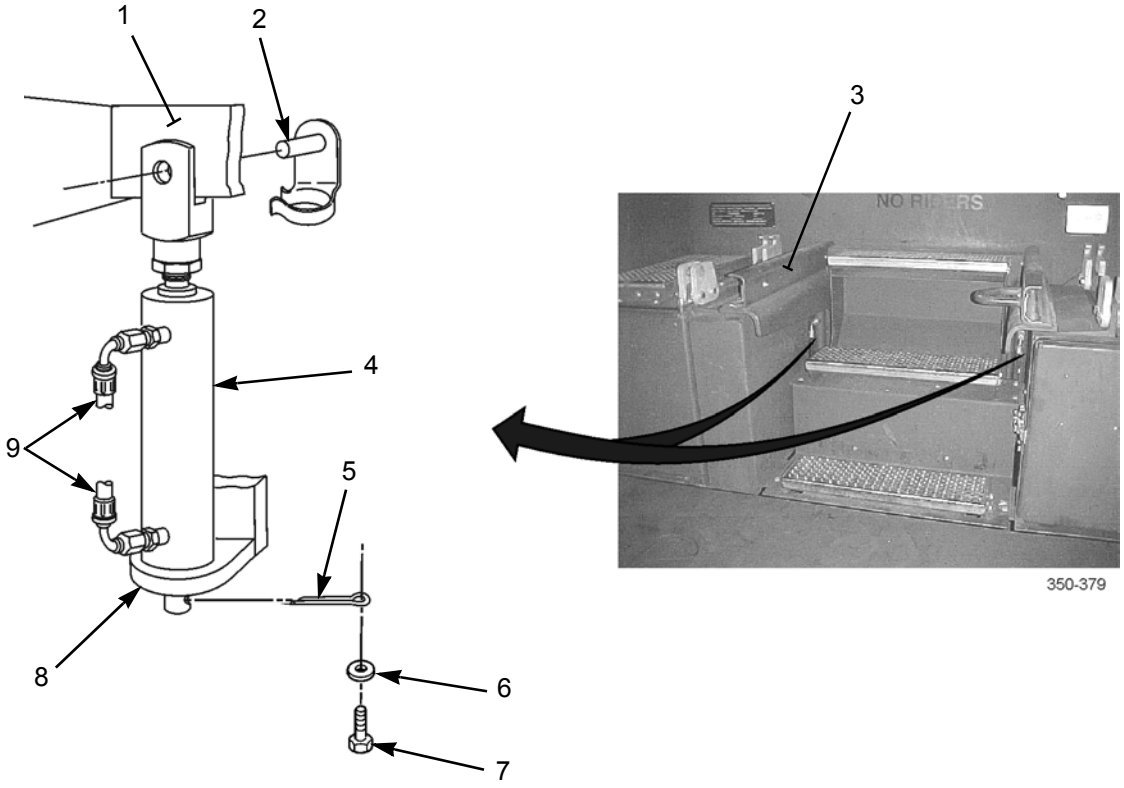
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- Each cab lifting cylinder is replaced in same manner.
- Tag all hydraulic lines.
- Remove ladder from area of step, as necessary.

REMOVAL

1. Raise cab lifting cylinders to the fully raised position (TM 10-3930-675-10).
2. Place wood cribbing under cab transport lift (3) to hold cab transport lift in raised position.
3. Relieve hydraulic system pressure (WP 0164 00).
4. Close hydraulic reservoir ball valve (WP 0179 00).
5. Disconnect two hydraulic hoses (9) from cylinder (4). Cap/plug both hydraulic hoses (9). Remove and discard o-rings.
6. Remove pin (2) from top of cylinder (4).
7. Remove screw (7), washer (6), and cotter pin (5) from bottom of cylinder (4). Discard cotter pin.
8. Lift cab transport lift (3) to remove cylinder (4) from mounting brackets (1 and 8).



INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lift cab transport lift (3) and aline cylinder (4) to mounting brackets (1 and 8).
2. Install new cotter pin (5), washer (6), and screw (7) to bottom of cylinder (4).
3. Apply a thin coat of grease to pin (2). Install pin to top of cylinder (4).

INSTALLATION - CONTINUED

NOTE

Ensure new o-rings are lubricated with lubricating oil before installation.

4. Remove cap/plug from two hydraulic hoses (9) and connect hoses to cylinder (4).
5. Start engine (TM 10-3930-675-10).
6. Remove wood cribbing from cab transport lift (3).
7. Open hydraulic reservoir ball valve (WP 0179 00).
8. Check for leaks and proper operation of cab lifting cylinder (TM 10-3930-675-10). Shut down engine.
9. Check oil level in hydraulic reservoir (LO 10-3930-675-12).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

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CAB SLIDING CYLINDER REPLACEMENT 0172 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Grease, GAA (Item 16, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Personnel Required

Two

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)

Hydraulic reservoir ball valve closed (WP 0179 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

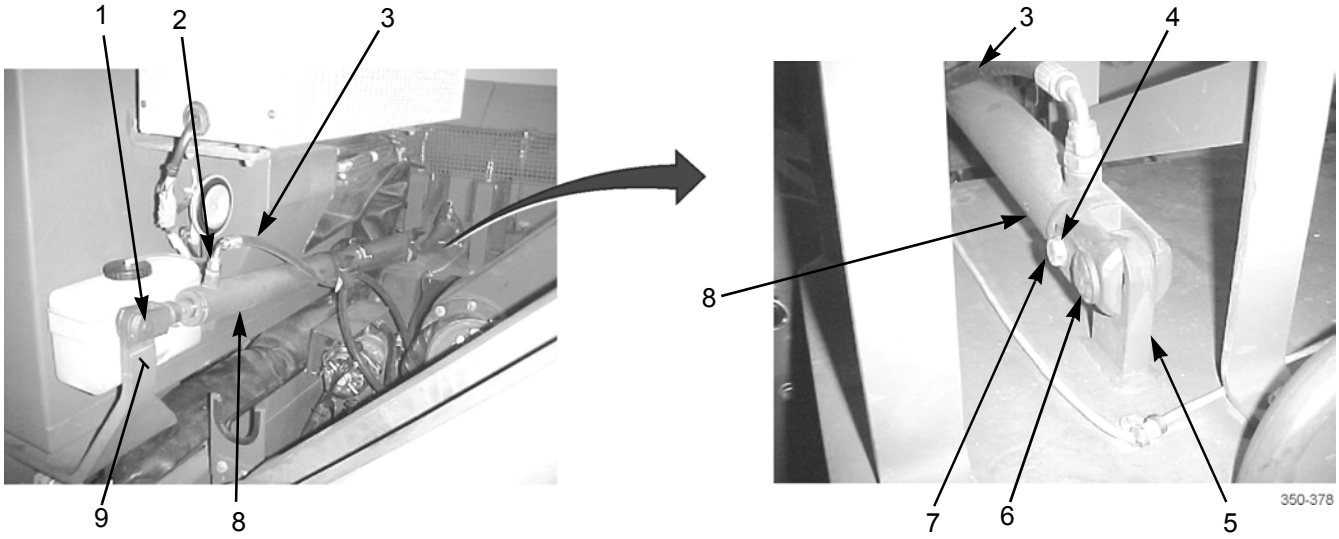
Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Disconnect two hydraulic hoses (3) from cylinder (8). Cap or plug all openings.
2. At end of cylinder (8), remove pin (1).
3. At opposite end of cylinder (8), remove screw (7), washer (4), and shaft (6).
4. Remove cylinder (8) from mounting brackets (5 and 9).
5. Remove two fittings (2) from cylinder (8).



INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Install two fittings (2) to cylinder (8).
2. Aline end of cylinder (8) to mounting bracket (5) so that shaft (6) can be installed.
3. Apply a thin coat of grease to shaft (6) and install cylinder (8) with shaft.
4. Install washer (4) and screw (7).
5. Apply a thin coat of grease to pin (1).
6. At opposite end of cylinder (8), aline cylinder to mounting bracket (9) and install pin (1).
7. Remove caps/plugs and connect two hydraulic hoses (3) to cylinder (8).
8. Open hydraulic reservoir ball valve (WP 0179 00).
9. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
10. Start engine (TM 10-3930-675-10).
11. Check for leaks and proper operation of cab sliding cylinder (TM 10-3930-675-10).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

TOPHANDLER TWISTLOCK CYLINDER REPLACEMENT 0173 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0074 00

WP 0183 00

WP 0194 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

Tophandler tilted, to assist in capturing hydraulic fluid thru spreader beam drain opening

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

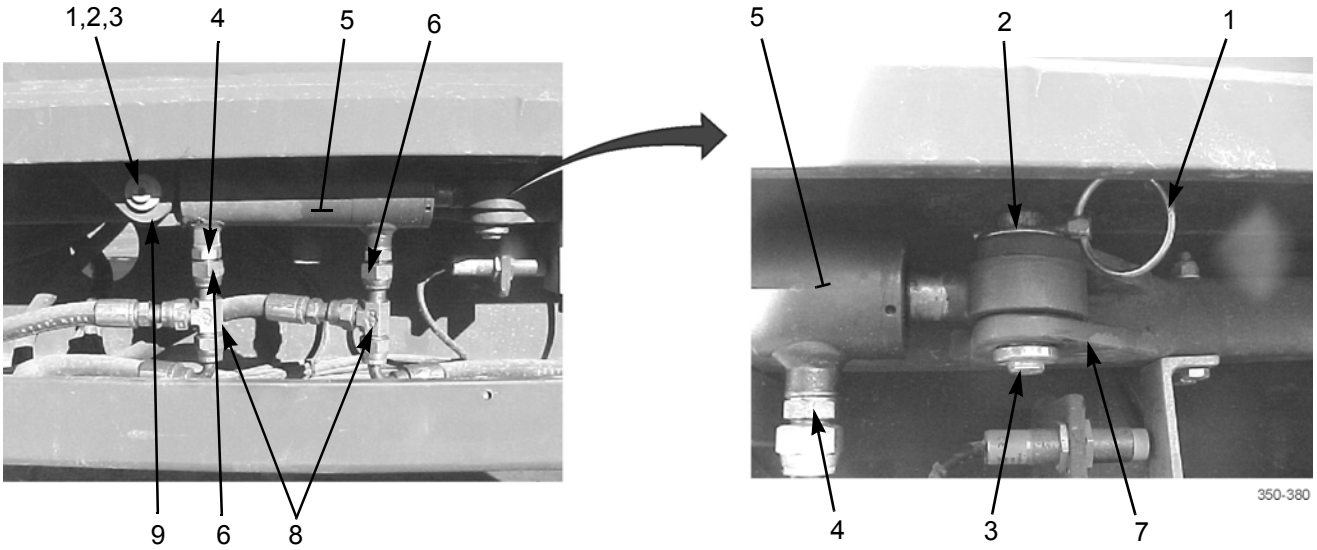
- Tophandler twistlock cylinders are replaced in same manner.
- Note direction of cylinder during removal to aid in installation.
- Tag all hydraulic lines.

REMOVAL

NOTE

A container may be placed under drain opening on underside of spreader beam, inbound from twistlock, to catch draining hydraulic fluid.

1. Loosen fitting nuts (6) and disconnect two tees (8) from fittings (4). Cap/plug hydraulic openings.
2. At each end of cylinder (5), remove retaining pin (1), spacer (2), and shaft (3).
3. Remove cylinder (5) from mounting bracket (9) and link (7).
4. Remove two fittings (4) from cylinder (5).



INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Install two fittings (4) to cylinder (5).
2. Aline cylinder (5) to mounting bracket (9) and link (7).
3. At each end of cylinder (5), install shaft (3), spacer (2), and retaining pin (1).
4. Remove cap/plug from hydraulic openings and connect two tees (8) to fittings (4) and tighten two fitting nuts (6).
5. Adjust proximity switches (WP 0074 00).
6. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
7. Start engine (TM 10-3930-675-10), operate twistlock cylinders, and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

HYDRAULIC SYSTEM COOLING HOSES AND FITTINGS REPLACEMENT 0174 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

Lockwashers (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Brake hydraulic system pressure relieved (WP 0164 00)

Radiator assembly top grating and bottom splash shield removed, if replacing hydraulic cooling fan hoses and fittings (WP 0136 00 and WP 0137 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

- This work package covers replacement of hydraulic hoses and fittings that support the following hydraulic system components:
  - engine-driven hydraulic pump
  - cooling fan
  - front and rear service brake cooling lines
- Tag all hydraulic lines.

REMOVAL

1. Using appropriate illustration (refer to foldouts, FO-4 and FO-5) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.
6. If removed, install radiator assembly top grating and bottom splash shield (WP 0136 00 and WP 0137 00).

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

CAB PARKING AND SERVICE BRAKE HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0175 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake OFF (TM 10-3930-675-10)

Brake hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

CAB PARKING AND SERVICE BRAKE HYDRAULIC HOSES AND FITTINGS REPLACEMENT - CONTINUED 0175 00

REMOVAL

1. Using illustration (refer to foldout, FO-6) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Remove caps/plugs and install and tighten hose(s) or fitting(s).
2. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
3. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
4. Start engine (TM 10-3930-675-10), operate brake system, and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

MAIN HYDRAULIC SYSTEM HOSES AND FITTINGS REPLACEMENT 0176 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

- Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.
- If replacing hydraulic line coming from bottom of reservoir, close ball valve at reservoir so that reservoir need not be drained. After installation of hydraulic line, be sure to open ball valve to restore hydraulic fluid flow. Failure to do so will damage equipment.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-7) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Open any ball valve at hydraulic reservoir that was closed.
5. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
6. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

HYDRAULIC SERVO SYSTEM HOSES AND FITTINGS REPLACEMENT 0177 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-8) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

HYDRAULIC SYSTEM TEST POINT HOSES AND FITTINGS REPLACEMENT 0178 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-9) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Remove caps/plugs and install and tighten hose(s) or fitting(s).
2. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
3. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
4. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

CAB TRANSPORT HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0179 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Materials/Parts - Continued

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheel chocked

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

- Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.
- If replacing hydraulic line coming from bottom of reservoir, close ball valve at reservoir so that reservoir need not be drained. After installation of hydraulic line, be sure to open ball valve to restore hydraulic fluid flow. Failure to do so will damage equipment.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-10) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Open any ball valve at hydraulic reservoir that was closed.
5. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
6. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

BOOM HYDRAULIC SYSTEM HOSES AND FITTINGS REPLACEMENT 0180 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

O-rings (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Boom hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using applicable boom hydraulic subsystem illustration (refer to foldouts, FO-11 thru FO-14) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.
3. Discard o-ring(s) removed.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Lubricate and install new o-ring(s).
2. Remove caps/plugs and install and tighten hose(s) or fitting(s).
3. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
4. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
5. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

TOPHANDLER HYDRAULIC SYSTEM HOSES AND FITTINGS REPLACEMENT 0181 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Locknuts (as required)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Wheels chocked

Parking brake applied (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using applicable tophandler hydraulic subsystem illustration (refer to foldouts, FO-15 thru FO-18) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Remove caps/plugs and install and tighten hose(s) or fitting(s).
2. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
3. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
4. Start engine (TM 10-3930-675-10), operate tophandler, and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

FORKLIFT KIT HYDRAULIC HOSES AND FITTINGS REPLACEMENT 0182 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Cap set, protective (Item 4, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

References

LO 10-3930-675-12

WP 0183 00

WP 0194 00

Equipment Condition

Forklift removed from vehicle



WARNING

- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

- Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

NOTE

Tag all hydraulic lines.

REMOVAL

1. Using illustration (refer to foldout, FO-19) as a guide, remove damaged hose(s) or fitting(s). Cap or plug openings.

NOTE

Note position of tiedown straps and clamps to aid in installation.

2. Remove tiedown strap(s) and clamp(s) (if applicable). Discard tiedown straps.

INSTALLATION

NOTE

Refer to *General Maintenance Instructions* (WP 0194 00) for complete instructions on connecting hydraulic hoses and applying proper torque.

1. Remove caps/plugs and install and tighten hose(s) or fitting(s).
2. Install clamp(s) and new tiedown strap(s) (if applicable) in same position as noted during removal.
3. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
4. Start engine (TM 10-3930-675-10) and check for leaks.

NOTE

Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

END OF WORK PACKAGE

HYDRAULIC SYSTEM OIL FILTERS REPLACEMENT 0183 00

THIS WORK PACKAGE COVERS

Hydraulic Reservoir Return Oil Filter: Removal, Installation

Hydraulic Reservoir Breather Filter: Removal, Installation

Hydraulic System In-Line Filters and Filter Head: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Wrench, strap, oil filter (Item 38, WP 0204 00)

Wrench, torque, 15-75 lb-ft capacity (Item 42, WP 0204 00)

Materials/Parts

Compound, sealing, pipe (Item 10, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Filter, breather (P/N 920130.009) (2)

Materials/Parts - Continued

Filter return, insert (P/N 923110.0668) (2)

Filter, insert (P/N 921689.0009)

Filter, insert (P/N 923071.0002) (2)

Filter, insert (P/N 923071.0001)

References

LO 10-3930-675-12

TM 10-3930-675-10

WP 0102 00

Equipment Condition

Wheels chocked

Steering and brake hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before removing hydraulic system oil filters. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe filter and surrounding area clean prior to removal. After filter removal, immediately install replacement filter or cover area with a clean rag. Contaminated hydraulic system could cause equipment failure.

HYDRAULIC RESERVOIR RETURN OIL FILTER REMOVAL

NOTE

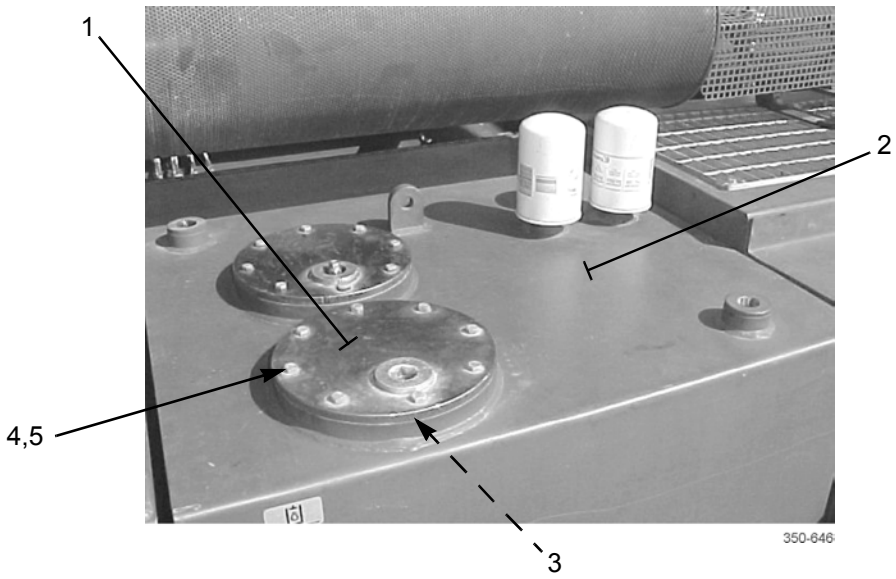
Hydraulic reservoir has two return oil filters. Each is removed the same way.

1. Clean area at top of hydraulic reservoir (2).

WARNING

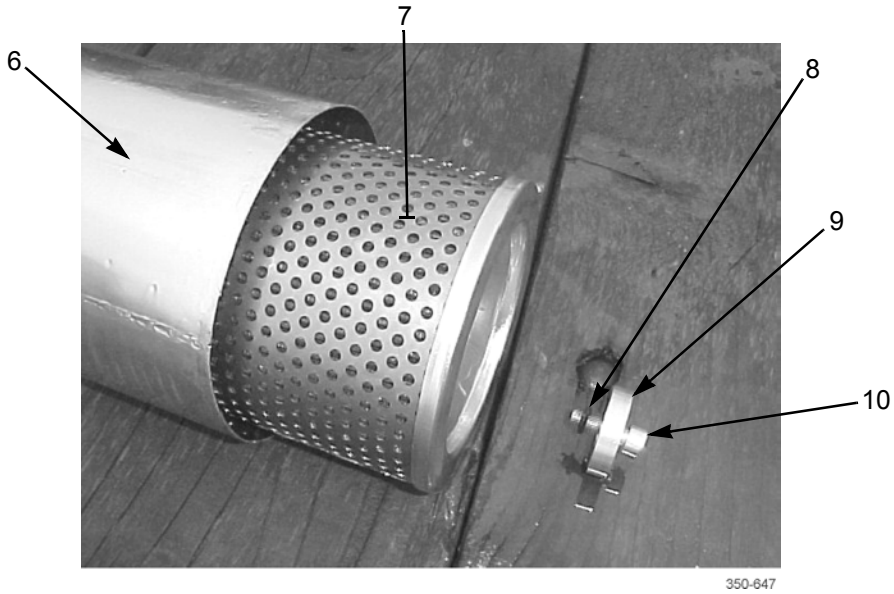
Plate is under spring tension. Use care when removing final screws. Failure to follow this warning may result in injury to personnel.

2. Remove eight screws (4), washers (5), and plate (1) from top of hydraulic reservoir (2).
3. If damaged, remove o-ring (3) from hydraulic reservoir (2). Discard o-ring.



4. Lift oil filter housing (6) out from hydraulic reservoir (2).
5. From bottom of oil filter housing (6), remove screw (10), washer (9), and o-ring (8).
6. Remove oil filter insert (7) from oil filter housing (6). Discard oil filter insert.

HYDRAULIC RESERVOIR RETURN OIL FILTER REMOVAL - CONTINUED



HYDRAULIC RESERVOIR RETURN OIL FILTER INSTALLATION

1. Clean oil filter housing (6).
2. Place new oil filter insert (7) into oil filter housing (6).
3. Install o-ring (8), washer (9), and screw (10).
4. Position oil filter housing (6) into hydraulic reservoir (2).
5. If removed, install new o-ring (3) to hydraulic reservoir (2).

NOTE

Two of eight washers and screws may first be placed on opposite sides of plate, and tightened evenly, to fit plate to hydraulic reservoir.

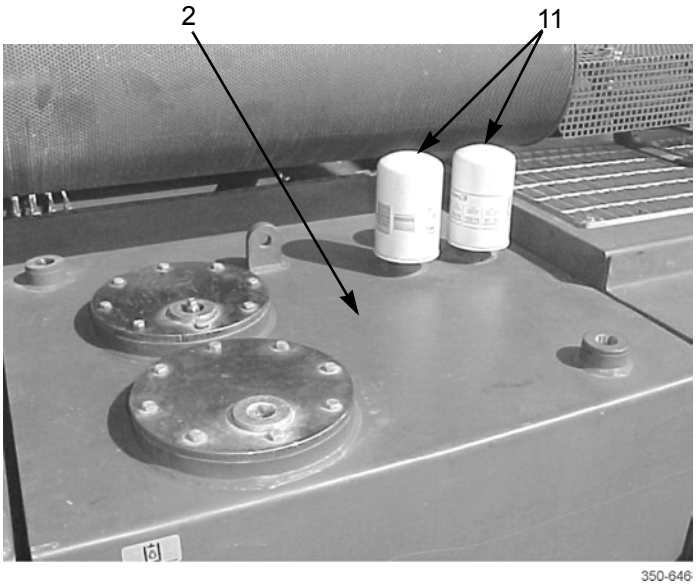
6. Install plate (1) to hydraulic reservoir (2) with eight washers (5) and screws (4). Tighten screws to 27 lb-ft (37 Nm).
7. Operate vehicle (TM 10-3930-675-10) and check for leaks.

HYDRAULIC RESERVOIR BREATHER FILTER REMOVAL

NOTE

Hydraulic reservoir has two breather filters. Each breather filter is removed the same way.

Using strap wrench, remove breather filter (11) from hydraulic reservoir (2). Discard breather filter.



HYDRAULIC RESERVOIR BREATHER FILTER INSTALLATION

NOTE

Breather filter comes with a gasket that is not required for this application. Discard gasket.

1. Apply a thin coat of pipe sealing compound to threads at top of hydraulic reservoir (2).
2. Install new breather filter (11) to hydraulic reservoir (2).

HYDRAULIC SYSTEM IN-LINE FILTERS AND FILTER HEAD REMOVAL

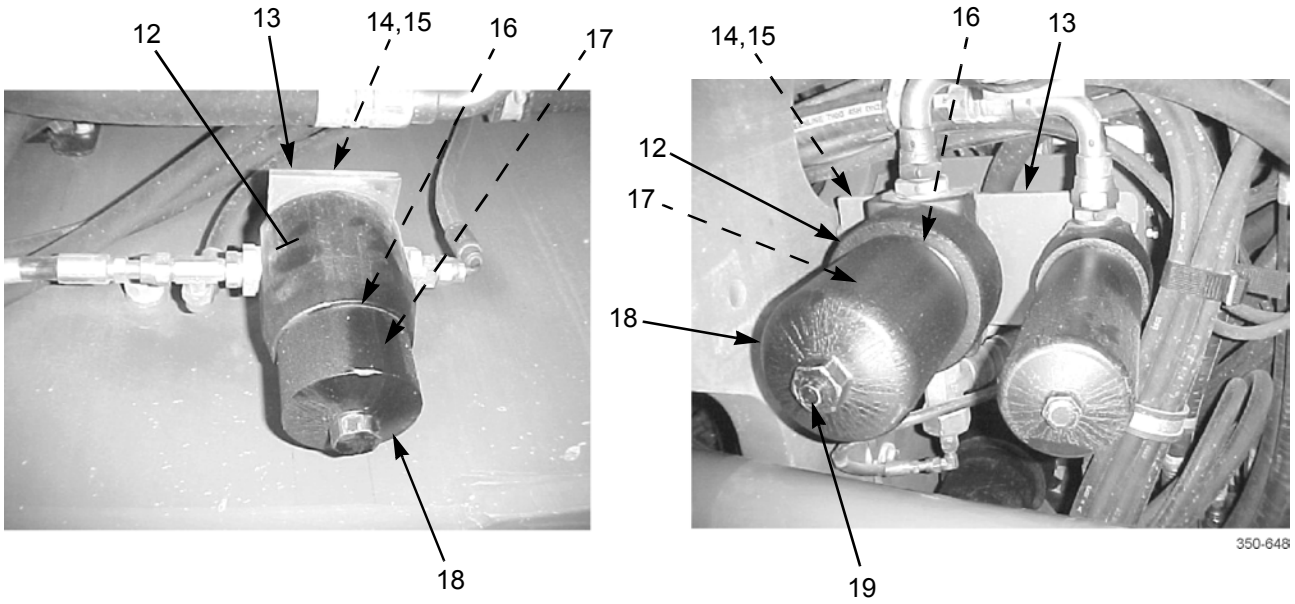
1. Close appropriate ball valve at hydraulic reservoir.
2. If hydraulic filter has a drain plug (19) at bottom of filter bowl (18), remove drain plug and drain hydraulic fluid into a suitable container. Reinstall drain plug.
3. Remove filter bowl (18) from filter head (12) by rotating filter bowl counterclockwise.
4. Remove filter element (17) from filter bowl (18). Discard filter element.
5. Remove o-ring (16) between filter head (12) and filter bowl (18). Discard o-ring.

NOTE

Tag hydraulic lines for installation.

6. Disconnect hydraulic hoses and fittings from filter head (12).
7. Remove sensor from filter head (WP 0102 00).
8. Remove two screws (14), washers (15), and filter head (12) from bracket (13).

HYDRAULIC SYSTEM IN-LINE FILTERS AND FILTER HEAD REMOVAL - CONTINUED



HYDRAULIC SYSTEM IN-LINE FILTERS AND FILTER HEAD INSTALLATION

1. Install sensor to filter head (WP 0102 00).
2. Install filter head (12) to bracket (13) with two washers (15) and screws (14).
3. Connect fittings and hydraulic hoses to filter head (12).

NOTE

New o-ring comes packed with new filter element.

4. Lubricate new o-ring (16) with lubricating oil.
5. Clean filter bowl (18).
6. Insert new filter element (17) in filter bowl (18).
7. Place o-ring (16) between filter head (12) and filter bowl (18) and install filter bowl to filter head by rotating bowl clockwise.
8. Open any ball valve at hydraulic reservoir that was closed.
9. Check oil level in hydraulic reservoir (LO 10-3930-675-12).
10. Start engine (TM 10-3930-675-10) and check for leaks.

END OF WORK PACKAGE

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DRAINING AND FILLING HYDRAULIC RESERVOIR 0184 00

THIS WORK PACKAGE COVERS

Draining, Filling

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Tool, hydraulic reservoir (TM 10-3930-675-10, *Basic Issue Items*)

Materials/Parts

Oil, lubricating (Item 19 or 21, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

References

LO 10-3930-675-12

Equipment Condition

Boom fully lowered and retracted (TM 10-3930-675-10)

Hydraulic system pressure relieved (WP 0164 00)



WARNING



- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before draining reservoir. Failure to so do could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe drain plug and filters and surrounding areas clean prior to removal. After draining, immediately reinstall drain plug and cover openings into reservoir with a clean rag. Contaminated hydraulic system could cause equipment failure.

DRAINING

NOTE

Hydraulic reservoir capacity is 180 gal. (680 l).

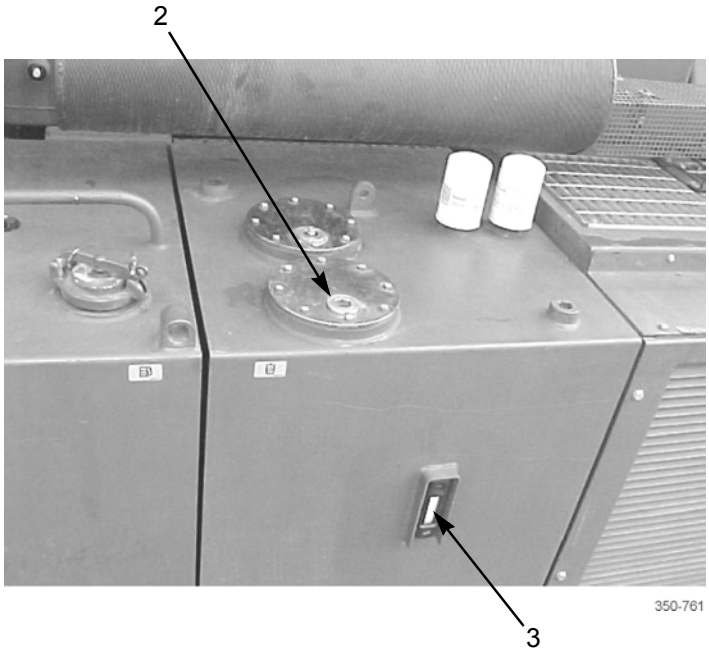
1. Place a suitable container under drain plug (1).
2. Remove drain plug (1) and drain hydraulic fluid into container. Dispose of oil in accordance with standard operating procedures (SOP).
3. Reinstall drain plug (1).



FILLING

1. Fill hydraulic reservoir by removing plug (2) in top of reservoir. Refer to LO 10-3930-675-12 for correct lubricating oil to be used per expected temperature ranges.
2. Replace all hydraulic system filters (WP 0126 00 and WP 0183 00).
3. Start engine (TM 10-3930-675-10) and bring up to operating temperature.
4. Operate joystick and cycle steering and brake system to circulate hydraulic fluid throughout system (TM 10-3930-675-10). Check for leaks.
5. Shut down engine. Wait 3-4 minutes after engine shutdown, then check oil level in hydraulic reservoir. Level should be visible in sight gage (3).
6. As required, add hydraulic fluid thru plug (2) opening on top of hydraulic reservoir.

FILLING - CONTINUED



END OF WORK PACKAGE

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HYDRAULIC RESERVOIR SIGHT GAGE REPLACEMENT 0185 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Equipment Condition

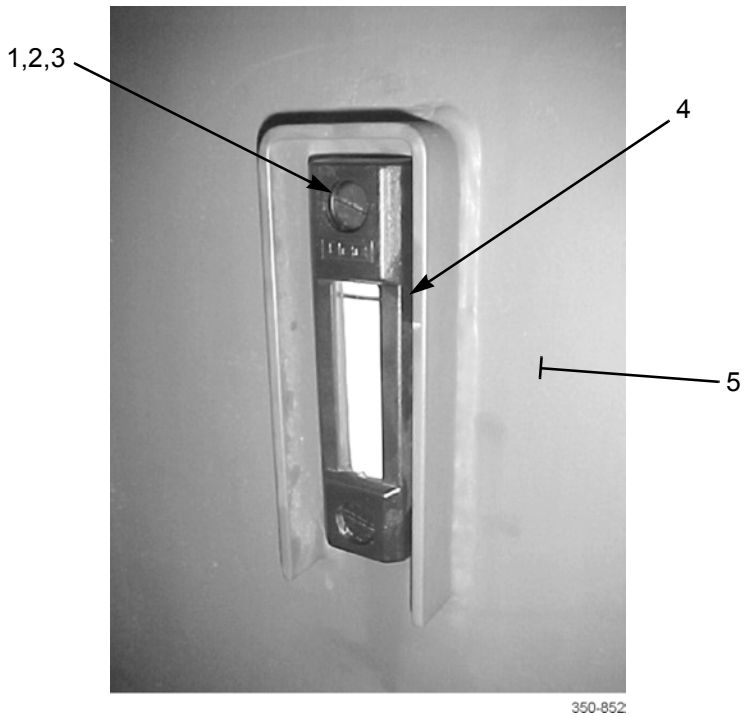
Boom elevated to maximum height (TM 10-3930-675-10)

NOTE

New sight gage comes with new o-rings and new rubber seals.

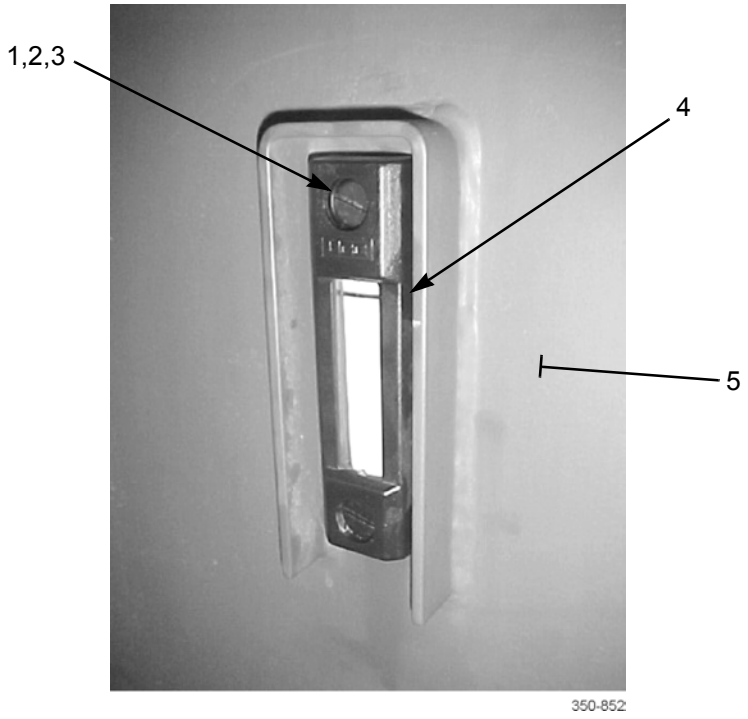
REMOVAL

1. Remove two fluid passage bolts (1) and o-rings (2) from hydraulic reservoir sight gage (4).
2. Remove sight gage (4) and two rubber seals (3) from side of hydraulic reservoir (5).



INSTALLATION

1. Position two new rubber seals (3) and sight gage (4) to side of hydraulic reservoir (5).
2. Install two new o-rings (2) and fluid passage bolts (1) to sight gage (4).



3. Fully lower boom (TM 10-3930-675-10) and check for leaks.

END OF WORK PACKAGE

HYDRAULIC SYSTEM TEST POINT PROCEDURES 0186 00

THIS WORK PACKAGE COVERS

General

Test Point No. 1: Brake Accumulator No. 1

Test Point No. 2: Brake Accumulator No. 2

Test Point No. 3: Steering System Main Valve

Test Point No. 4: Brake Circuit No. 2

Test Point No. 5: Brake Circuit No. 1

Test Point No. 6: Steering Pump No. 1

Test Point No. 7: Steering Pump No. 2

Test Point No. 8: Boom Lift and Extend Main Valve

Test Point No. 9: Servo System

Test Point No. 10: Cab Lift Main Valve

Test Point No. 11: Tophandler and Boom Folding Systems

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Adapter, quick disconnect (Item 1, WP 0204 00)

Gage, pressure (Item 9, WP 0204 00)

Pan, drain (Item 20, WP 0204 00)

Materials/Parts

Rag, wiping (Item 22, WP 0203 00)

Personnel Required

Two

References

WP 0164 00

Equipment Condition

Parking brake applied (TM 10-3930-675-10)

Engine shut down (TM 10-3930-675-10)



WARNING



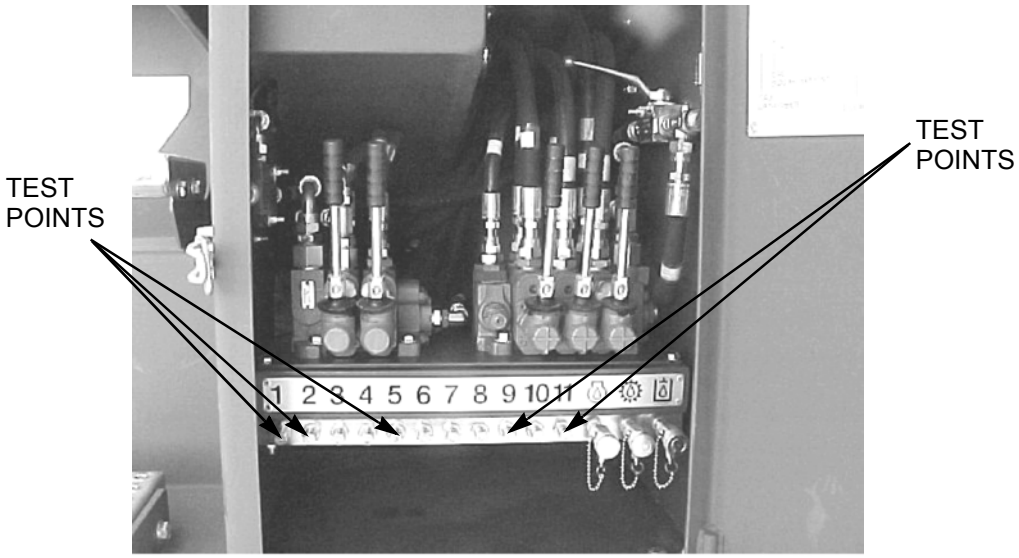
- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- At operating temperature, hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulic lines. Failure to do so could result in injury.
- Hydraulic fluid is very slippery. Immediately wipe up any spills. Failure to follow this warning may result in injury to personnel.

CAUTION

Wipe area clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.

GENERAL

This work package describes how to use each of 11 test points located inside the remote hydraulic control compartment to check hydraulic pressure in various systems/circuits on the vehicle.



HYDRAULIC SYSTEM TEST POINTS

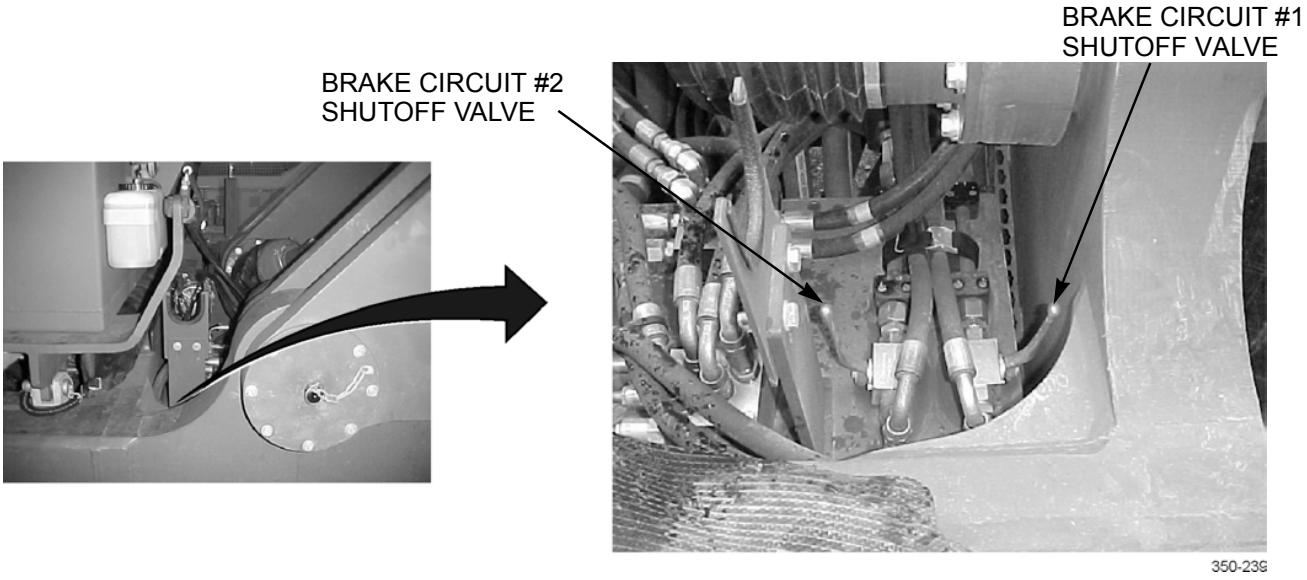
TEST POINT NO. 1: BRAKE ACCUMULATOR NO. 1

NOTE

Test point no. 1 provides a means to check brake charging valve opening pressure and accumulator pre-charge nitrogen pressure within brake circuit no. 1.

1. Drain brake system circuit no. 1 accumulator pressure by opening shutoff valve. When system has completely drained, close shutoff valve.

TEST POINT NO. 1: BRAKE ACCUMULATOR NO. 1 - CONTINUED



2. Connect hydraulic test gage with adapter to test point no. 1.
3. Start engine. Pressure will rise to 2537.5 psi (175 bar).
4. Pump brake pedal. Pressure will slowly drop to 1975.5 psi (135 bar), then pressure will return to 2537.5-2610 psi (175-180 bar).
5. Shut down engine.
6. Slowly open shutoff valve in brake system circuit no. 1. Pressure will drain to 1232.5-1305 psi (85-90 bar) and then drop off completely. The pressure at which gage drops off completely is the pre-charged nitrogen pressure in accumulators. Close shutoff valve.
7. Start engine. Pressure gage will jump to pre-charged nitrogen pressure in accumulators.
8. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
9. Disconnect hydraulic test gage and adapter from test point no. 1.

TEST POINT NO. 2: BRAKE ACCUMULATOR NO. 2

NOTE

Test point no. 2 provides a means to check brake charging valve opening pressure and accumulator pre-charge nitrogen pressure within brake circuit no. 2.

1. Drain brake system circuit no. 2 accumulator pressure by opening shutoff valve. When system has completely drained, close shutoff valve.
2. Connect hydraulic test gage with adapter to test point no. 2.
3. Start engine. Pressure will rise to 2537.5 psi (175 bar).
4. Pump brake pedal. Pressure will slowly drop to 1975.5 psi (135 bar), then pressure will return to 2537.5-2610 psi (175-180 bar).
5. Shut down engine.

TEST POINT NO. 2: BRAKE ACCUMULATOR NO. 2 - CONTINUED

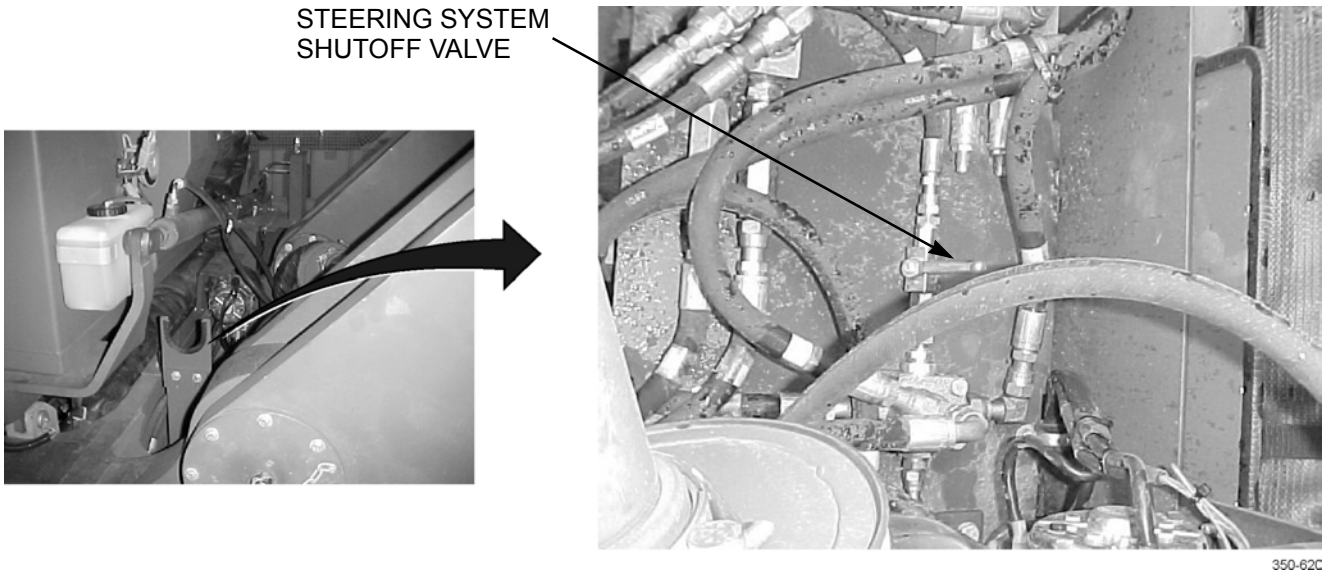
6. Slowly open shutoff valve in brake system circuit no. 2. Pressure will drain to 1232.5-1305 psi (85-90 bar) and then drop off completely. The pressure at which gage drops off completely is the pre-charged nitrogen pressure in the accumulators. Close shutoff valve.
7. Start engine. Pressure gage will jump to the pre-charged nitrogen pressure in the accumulators.
8. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
9. Disconnect hydraulic test gage and adapter from test point no. 2.

TEST POINT NO. 3: STEERING SYSTEM MAIN VALVE

NOTE

Test point no. 3 provides a means to check the steering system main valve operating pressure.

1. Drain steering system pressure by opening shutoff valve. When system has completely drained, close shutoff valve.



2. Connect hydraulic test gage with adapter to test point no. 3.
3. Start engine. Standby pressure of 261 psi (18 bar) will appear on gage. After 5 seconds, steering pump will start and steering system pressure will increase to 3045 psi (210 bar).
4. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
5. Disconnect hydraulic test gage and adapter from test point no. 3.

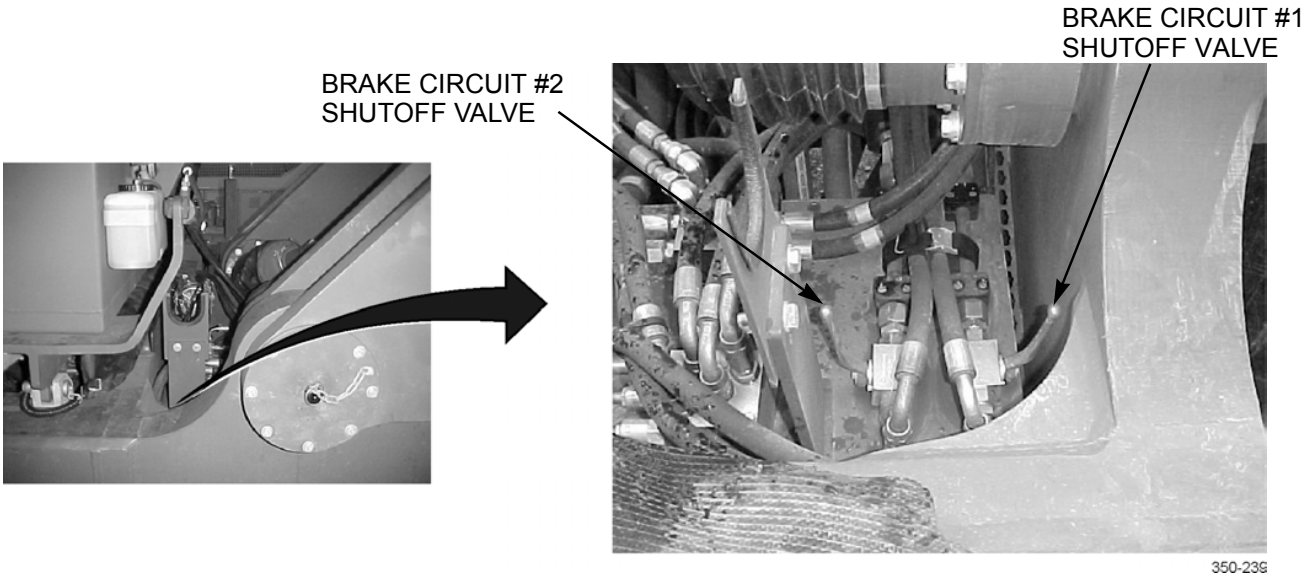
TEST POINT NO. 4: BRAKE CIRCUIT NO. 2

NOTE

Test point no. 4 provides a means to check brake circuit no. 2 operating pressures.

1. Drain brake system circuit no. 2 accumulator pressure by opening shutoff valve. When system has completely drained, close shutoff valve.

TEST POINT NO. 4: BRAKE CIRCUIT NO. 2 - CONTINUED



2. Connect hydraulic test gage with adapter to test point no. 4.
3. Start engine.
4. Press brake pedal. Pressure will stabilize at 1450 psi (100 bar). Release brake pedal and pressure will drop to 0 psi.
5. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
6. Disconnect hydraulic test gage and adapter from test point no. 4.

TEST POINT NO. 5: BRAKE CIRCUIT NO. 1

NOTE

Test point no. 5 provides a means to check brake circuit no. 1 operating pressures.

1. Drain brake system circuit no. 1 accumulator pressure by opening shutoff valve. When system has completely drained, close shutoff valve.
2. Connect hydraulic test gage with adapter to test point no. 5.
3. Start engine. Pressure will rise to 2537.5 psi (175 bar).
4. Press brake pedal. Pressure will stabilize at 1450 psi (100 bar). Release brake pedal and pressure will drop to 0 psi.
5. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
6. Disconnect hydraulic test gage and adapter from test point no. 5.

TEST POINT NO. 6: STEERING PUMP NO. 1

NOTE

Test point no. 6 provides a means to check steering pump operating pressures.

1. Drain steering system pressure by opening shutoff valve. When system has completely drained, close shutoff valve.
2. Connect hydraulic test gage with adapter to test point no. 6.

TEST POINT NO. 6: STEERING PUMP NO. 1 - CONTINUED

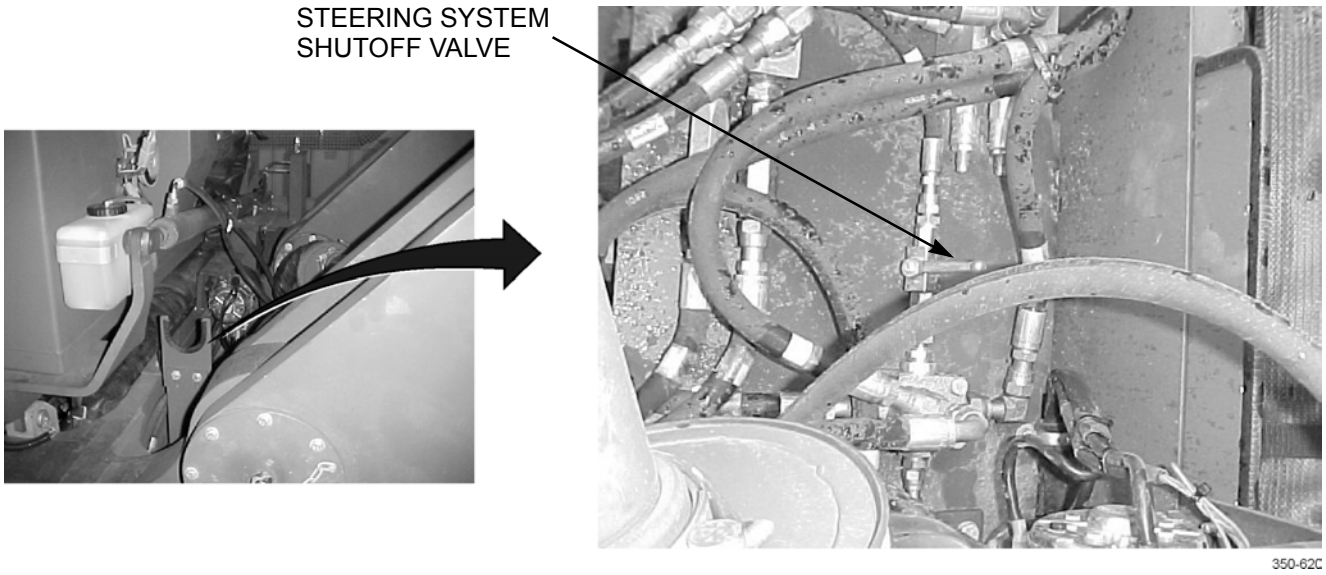
3. Start engine. Standby pressure of 261 psi (18 bar) will appear on gage. After 5 seconds, steering pump will start and steering system pressure will increase to 3045 psi (210 bar).
4. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
5. Disconnect hydraulic test gage and adapter from test point no. 6.

TEST POINT NO. 7: STEERING PUMP NO. 2

NOTE

Test point no. 7 provides a means to check steering pump operating pressures.

1. Drain steering system pressure by opening shutoff valve. When system has completely drained, close shutoff valve.



2. Connect hydraulic test gage with adapter to test point no. 7.
3. Start engine. Standby pressure of 261 psi (18 bar) will appear on gage. After 5 seconds, steering pump will start and steering system pressure will increase to 3045 psi (210 bar).
4. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
5. Disconnect hydraulic test gage and adapter from test point no. 7.

TEST POINT NO. 8: BOOM LIFT AND EXTEND MAIN VALVE

NOTE

Test point no. 8 provides a means to check boom lift and extend main valve operating pressure.

1. Connect hydraulic test gage with adapter to test point no. 8.
2. Start engine and hold engine RPMs between 1000 and 2000 RPMs.
3. Retract boom completely and continue to hold joystick in the retract position.
4. Main valve pressure with boom fully retracted should be 3480 psi (240 bar).
5. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
6. Disconnect hydraulic test gage and adapter from test point no. 8.

TEST POINT NO. 9: SERVO SYSTEM

NOTE

Test point no. 9 provides a means to check the servo system operating pressure.

1. Connect hydraulic test gage with adapter to test point no. 9.
2. Start engine and allow engine to idle.
3. Servo system pressure should be 435 psi (30 bar).
4. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
5. Disconnect hydraulic test gage and adapter from test point no. 9.

TEST POINT NO. 10: CAB LIFT MAIN VALVE

NOTE

Test point no. 10 provides a means to check the cab lift operating pressure.

1. Connect hydraulic test gage with adapter to test point no. 10.
2. Remove handrail from mounted position.
3. Turn ignition on, but DO NOT start engine.
4. Press rocker switch on instrument panel to turn on electrical auxiliary pump.
5. Raise cab transport lift to the highest position. Pressure should be 1595 psi (110 bar).
6. Lower cab transport lift.
7. Turn off electrical auxiliary pump and ignition.
8. Install handrail.
9. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
10. Disconnect hydraulic test gage and adapter from test point no. 10.

TEST POINT NO. 11: TOPHANDLER AND BOOM FOLDING SYSTEMS

NOTE

Test point no. 11 provides a means to check tophandler and boom folding operating pressure.

1. Connect hydraulic test gage with adapter to test point no. 11.
2. Start engine. Standby pressure of 261 psi (18 bar) will appear on gage. After 5 seconds, hydraulic pump will start and system pressure will increase to 3045 psi (210 bar).
3. Shut down engine. Relieve hydraulic system pressure (WP 0164 00).
4. Disconnect hydraulic test gage and adapter from test point no. 11.

END OF WORK PACKAGE

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RIFLE MOUNTING BRACKET REPLACEMENT 0187 00

THIS WORK PACKAGE COVERS

Removal, Installation

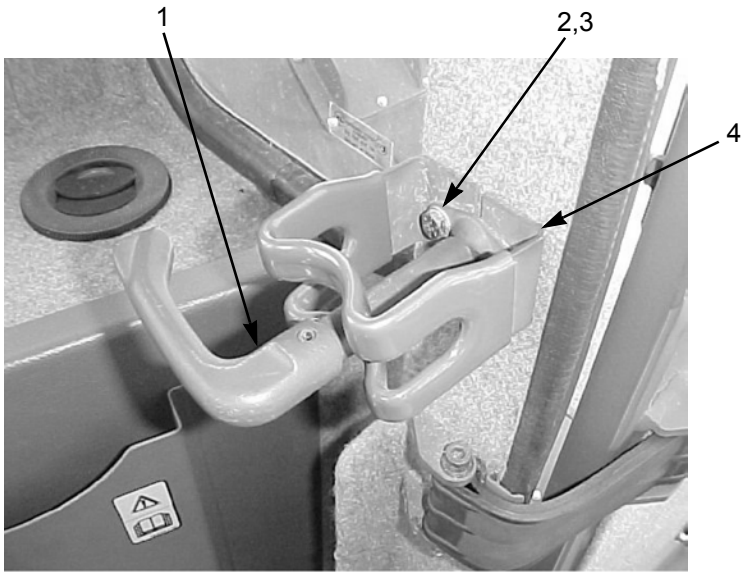
INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

REMOVAL

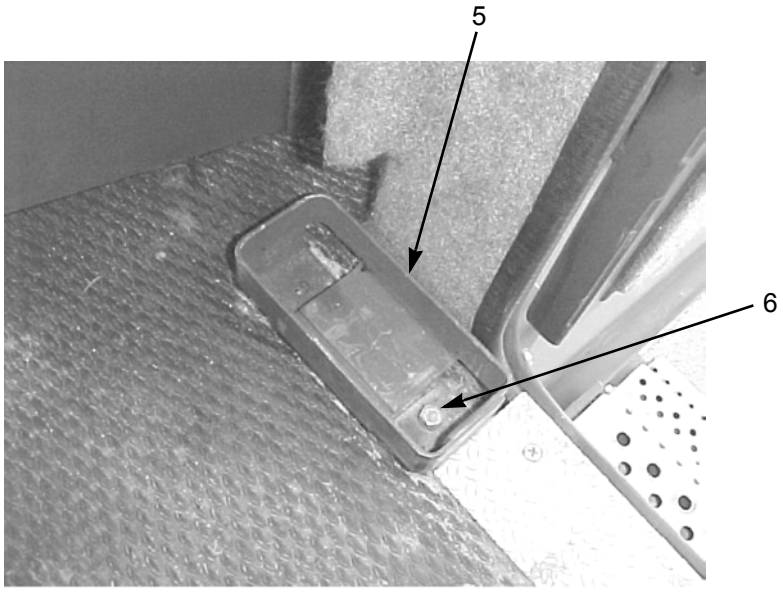
1. Remove two screws (2), washers (3), latch assembly (1), and bracket (4) from side of cab.



350-855

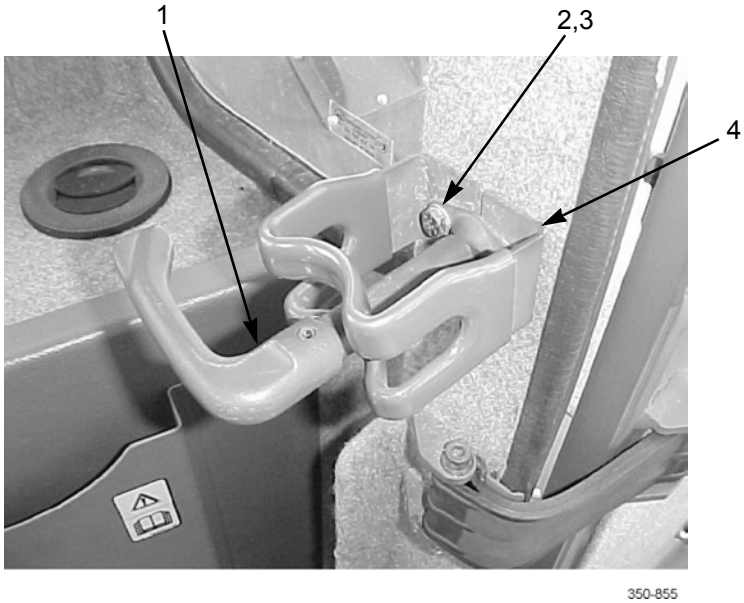
REMOVAL - CONTINUED

2. Remove screw (6) and bracket (5) from floor of cab.



INSTALLATION

1. Install bracket (5) to floor of cab with screw (6).
2. Install bracket (4) and latch assembly (1) to side of cab with two washers (3) and screws (2).



END OF WORK PACKAGE

AIR CONDITIONER LEAK TEST 0188 00

THIS WORK PACKAGE COVERS

Inspection, Test

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Leak detector, refrigerant (Item 16, WP 0204 00)

INSPECTION



WARNING



- Liquid refrigerant, when exposed to air, quickly evaporates and will freeze skin or eye tissue. Use care to prevent refrigerant from touching your skin or eyes. Serious injury or blindness may result if you come in contact with liquid refrigerant.
- Refrigerant R-134a air conditioning systems should not be pressure tested or leak tested with compressed air. Combustible mixtures of air and R-134a may form, resulting in fire or explosion, which could cause personal injury.

NOTE

- Refrigerant is odorless. As a result, all of it may leak away and not be noticed until system stops cooling. All vehicle refrigerant systems lose some refrigerant depending on the condition of system. Higher loss rates signal a need to locate and repair leaks.
- Leaks are most often found at the compressor hose connections and at various fittings and joints in system. If unapproved replacement hoses are installed, refrigerant can be lost thru hose permeation.

1. Visually inspect refrigerant system for air conditioning lubricant leakage and corrosion and damage to lines, hoses, and other components.
2. Visually inspect lowest points of fittings, hoses, and lines for indication of lubricant leakage.

TEST

Use a leak detector in accordance with manufacturer's instruction manual and check for refrigerant leakage at hose connections, fittings, and areas where leakage might occur. If leaks are indicated, notify Direct Support Maintenance of leak in air conditioning system.

END OF WORK PACKAGE

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AIR CONDITIONING COMPRESSOR DRIVE BELTS REPLACEMENT 0189 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

References

TM 10-3930-675-10

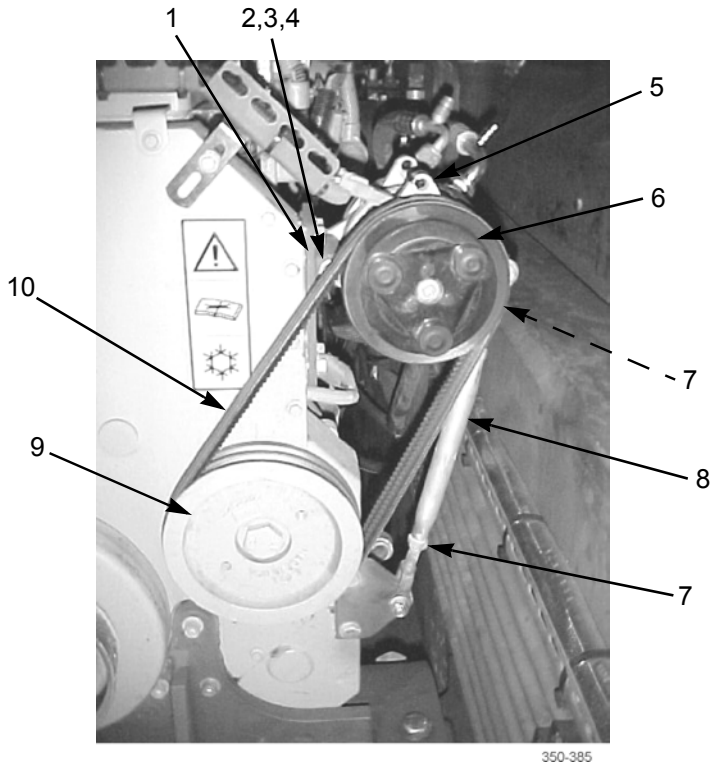
Equipment Condition

Engine cover removed (WP 0143 00)

Master battery switch in OFF position

REMOVAL

1. Loosen screw (2), nut (3), and washer (4) securing AC compressor (5) to mounting bracket (1).
2. Loosen two adjusting jamnuts (7) on belt tension adjusting rod (8).
3. Remove drive belts (10) from accessory drive pulley (9) and AC compressor pulley (6).

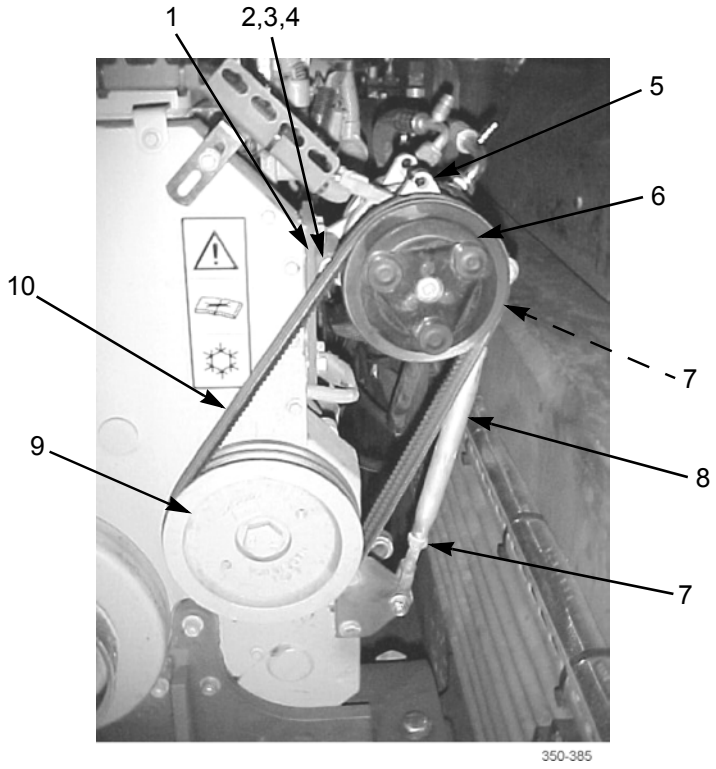


INSTALLATION

NOTE

If drive belts are worn, cracked, frayed or dry rotted, belts must be replaced.

1. Install drive belts (10) around accessory drive pulley (9) and AC compressor pulley (6).
2. Tighten belt tension adjusting rod (8) until drive belts (10) can be depressed no more than ½ in (12.7 mm) at center of belts.
3. Tighten two adjusting jamnuts (7) on belt tension adjusting rod (8).
4. Tighten screw (2), washer (4), and nut (3) securing AC compressor (5) to mounting bracket (1).
5. Recheck tension of drive belts (10) to ensure not more than ½ in (12.7 mm) depression at center of belts.



6. Turn master battery switch to ON position.
7. Operate engine (TM 10-3930-675-10) for ten minutes. Shut down, recheck, and adjust tension as needed.

END OF WORK PACKAGE

AIR CONDITIONER FANS MAINTENANCE 0190 00

THIS WORK PACKAGE COVERS

Air Conditioner Fans: Removal, Installation

Relays and Resistors: Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Strap, tiedown (Item 27, WP 0203 00)

Tag, marker (Item 28, WP 0203 00)

Materials/Parts - Continued

Nut, lock (P/N 920076.001) (6)

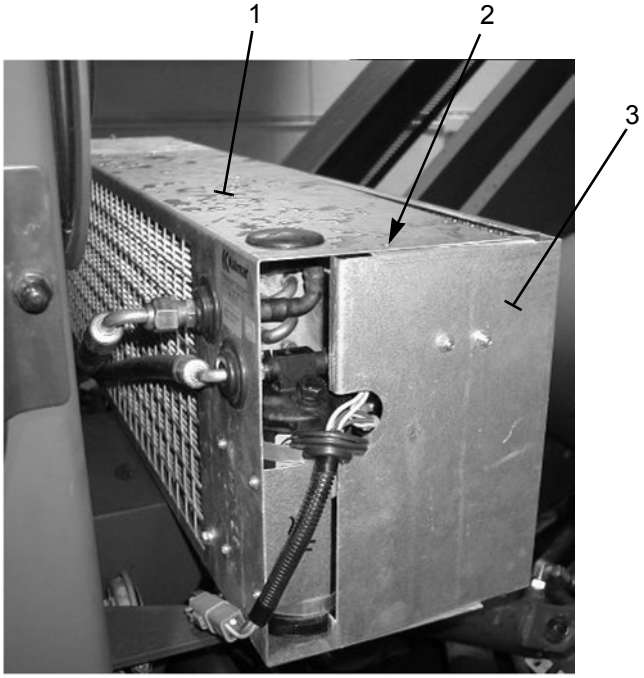
Nut, lock (P/N 920076.002) (8)

Equipment Condition

Master battery switch in OFF position

AIR CONDITIONER FANS REMOVAL

1. Remove ten screws (2) to free cover (3) assembly from condenser fan box (1).

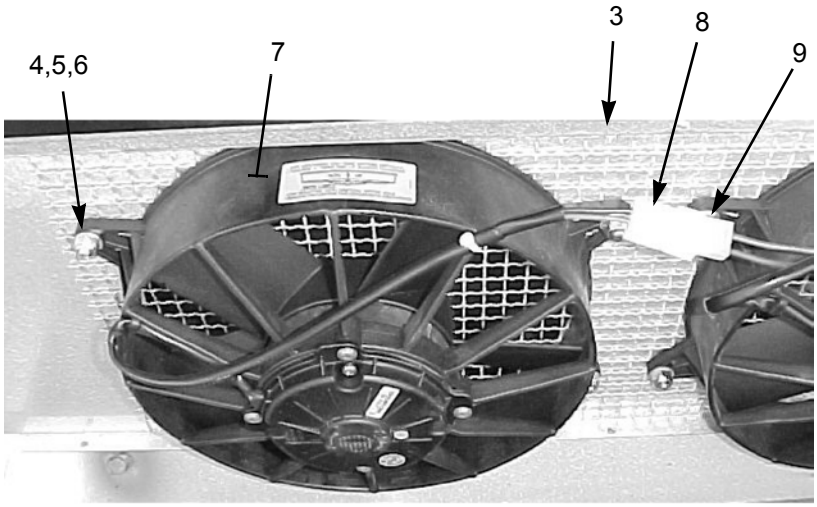


AIR CONDITIONER FANS REMOVAL - CONTINUED

NOTE

- Perform steps 2 and 3 for each of two air conditioner fans.
- Tag connectors for installation.
- Remove tiedown straps as necessary.

2. Disconnect connector (8) of air conditioner fan (7) from fan wiring harness (9).
3. Remove four locknuts (4), eight washers (5), four screws (6), and air conditioner fan (7) from cover (3). Discard locknuts.



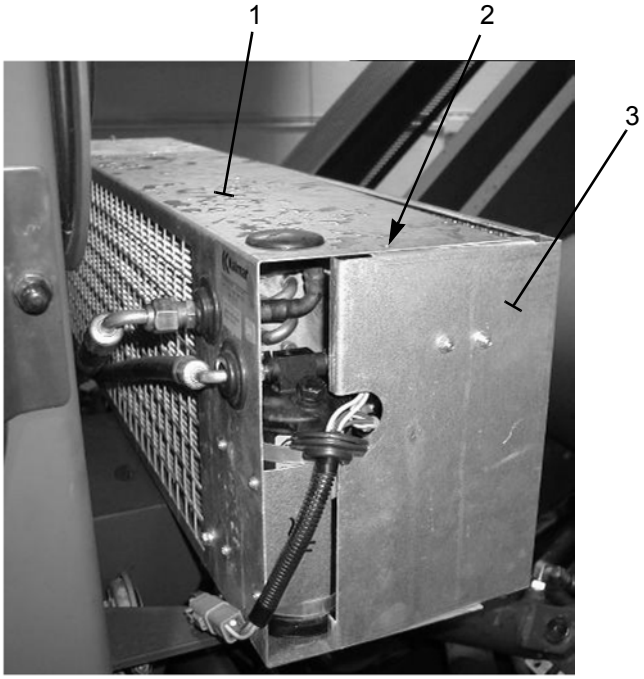
AIR CONDITIONER FANS INSTALLATION

NOTE

Perform steps 1 and 2 for each of two air conditioner fans.

1. Install air conditioner fan (7) to cover (3) with four screws (6), eight washers (5), and four new locknuts (4).
2. Connect connector (8) of air conditioner fan (7) to fan wiring harness (9). Install new tiedown straps.
3. Position cover (3) assembly to condenser fan box (1) and install ten screws (2).

AIR CONDITIONER FANS INSTALLATION - CONTINUED



350-791

RELAYS AND RESISTORS REMOVAL

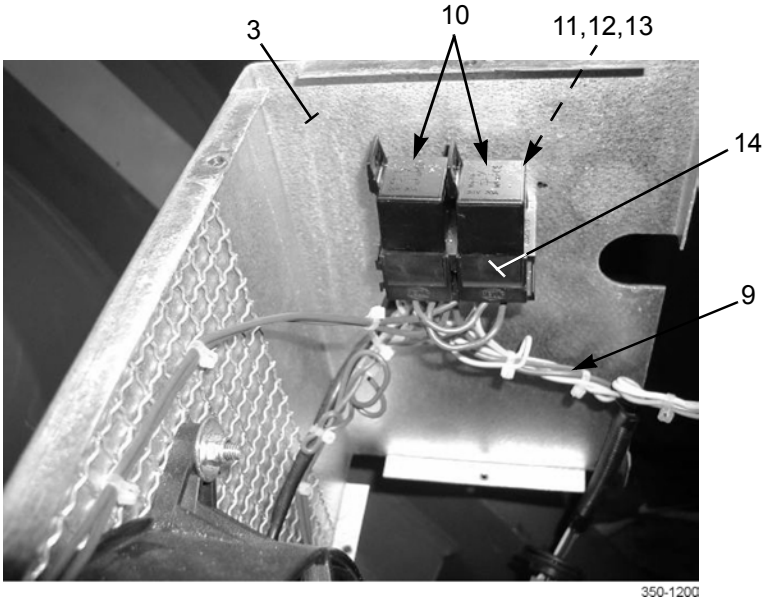
1. Remove two screws (2) to free cover assembly (3) from condenser fan box (1).

RELAYS AND RESISTORS REMOVAL- CONTINUED

NOTE

Perform steps 2 and 3 to remove two fan relays.

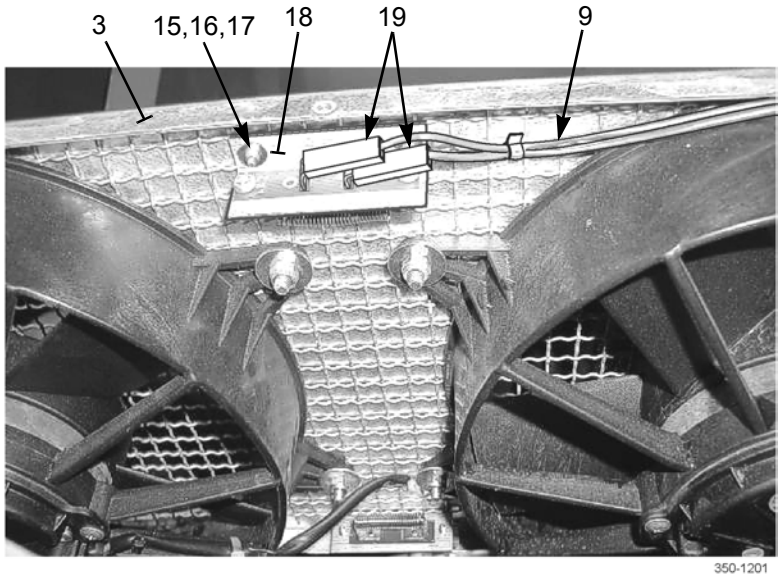
2. Remove two relays (10) from terminal blocks (14) of fan wiring harness (9).
3. Remove two locknuts (11), washers (12), screws (13), and terminal blocks (14) from cover (3). Discard locknuts.



NOTE

Perform steps 4 and 5 to remove each of two resistors.

4. Disconnect two connectors (19) of fan wiring harness (9) from resistor (18).
5. Remove two locknuts (15), washers (16), screws (17), and resistor (18) from cover (3). Discard locknuts.



RELAYS AND RESISTORS INSTALLATION

NOTE

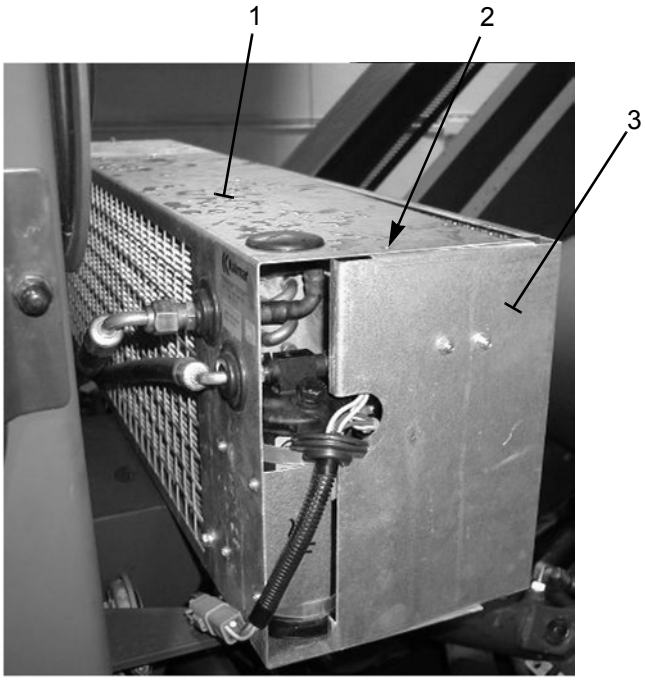
Perform steps 1 and 2 to install each of two resistors.

1. Install resistor (18) to cover (3) with two screws (17), washers (16), and new locknuts (15).
2. Connect two connectors (19) of fan wiring harness (9) to resistor (18).

NOTE

Perform steps 3 and 4 to install two fan relays.

3. Install terminal blocks (14) of fan wiring harness (9) to cover (3) with two screws (13), washers (12), and new locknuts (11).
4. Install two relays (10) to terminal blocks (14).
5. Install position cover (3) assembly to condenser fan box (1) and install ten screws (2).



350-791

END OF WORK PACKAGE

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TOPHANDLER REPLACEMENT 0191 00

THIS WORK PACKAGE COVERS

Removal, Installation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Jackscrew (2) (TM 10-3930-675-10, *Basic Issue Items*)

Materials/Parts

Grease, GAA (Item 16, WP 0203 00)

Oil, lubricating (Item 19, WP 0203 00)

Rag, wiping (Item 22, WP 0203 00)

Materials/Parts - Continued

Tag, marker (Item 28, WP 0203 00)

Washer, lock (P/N 923657.0001) (2)

Washer, lock (P/N 923657.0004) (2)

Personnel Required

Three

References

WP 0100 00

REMOVAL

1. Position RTCH directly behind trailer on which tophandler is to be placed.
2. Extend boom to 90 in (229 cm). Turn tophandler to longitudinal position (TM 10-3930-675-10).
3. Place cribbing of 4 X 4's on deck of trailer, so that twistlocks will not touch trailer deck when tophandler spreader beams are placed on cribbing.
4. With both tilt and oscillation locks OFF, lower tophandler onto cribbing on deck of trailer until oscillation/leveling cylinders are fully collapsed (TM 10-3930-675-10).
5. Shut down RTCH engine. Turn ignition back on and exercise joystick to relieve hydraulic pressure in system (TM 10-3930-675-10).

NOTE

DO NOT disconnect tophandler angle sensor from junction box.

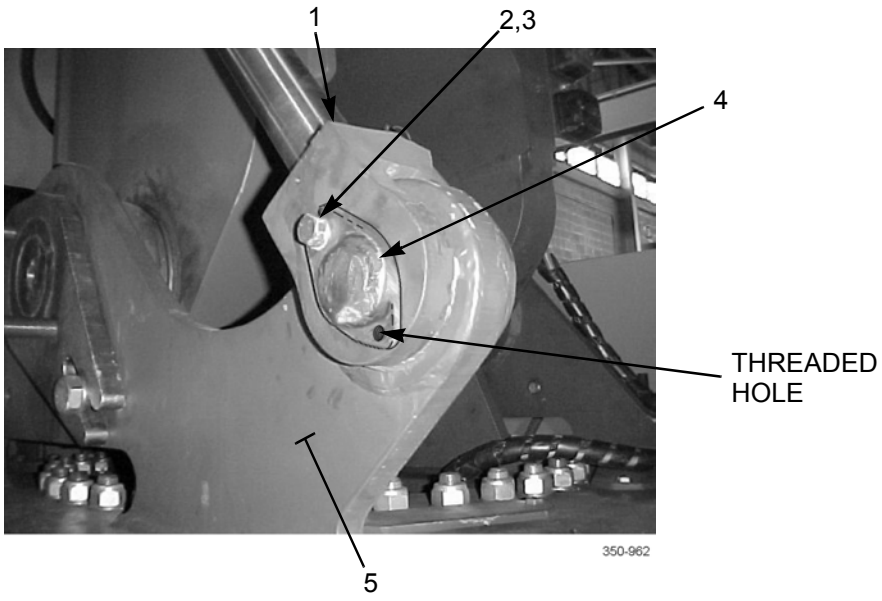
6. Remove tophandler angle sensor and cable clamps from its mounting and secure to boom, out of the way (WP 0040 05.1). Reinstall mounting hardware to prevent loss.

NOTE

DO NOT disconnect tilt cylinder hydraulic hoses when disconnecting tilt cylinders from tophandler.

REMOVAL - CONTINUED

7. Disconnect each tilt cylinder (1) from tophandler (5):
   a. Remove bolt (2) and lockwasher (3). Retain lockwasher.
   b. Install bolt (2) into threaded hole in pin (4) and screw in to withdraw pin.
8. Operate tilt cylinders (1) to fully retract right cylinder and fully extend left cylinder (TM 10-3930-675-10).
9. Rest right tilt cylinder (1) on tilt cylinder support and secure. Secure left tilt cylinder to boom by wrapping tiedown strap around boom



CAUTION

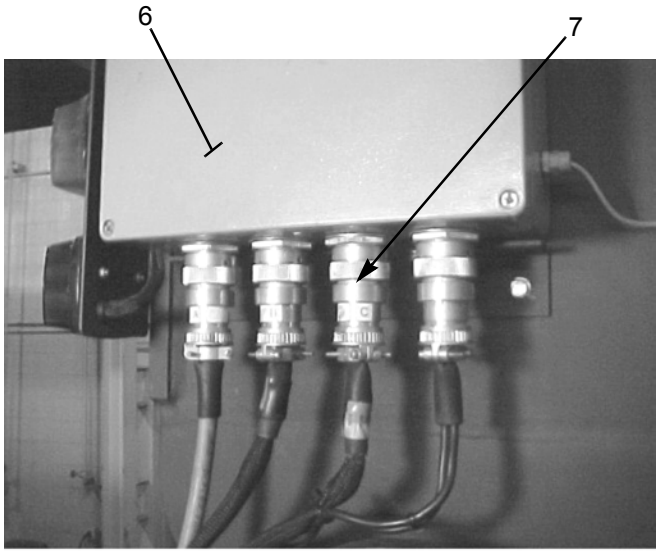
Ensure electrical connectors are clear and secured to avoid damaging connectors.

NOTE

Tag electrical connectors to ensure correct installation.

10. Disconnect four electrical connectors (7) from bottom of tophandler junction box (6) and secure.

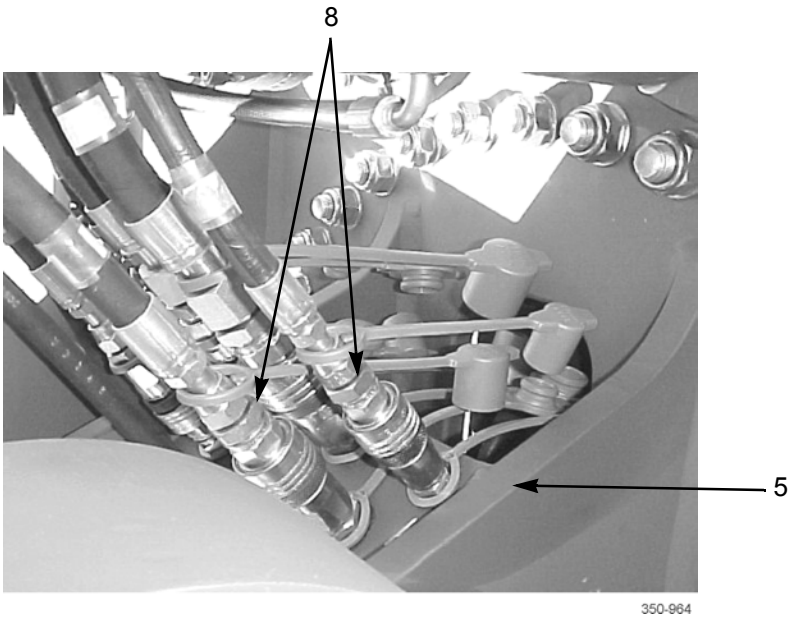
REMOVAL - CONTINUED



CAUTION

- Wipe clean around all hydraulic connections prior to disconnecting. Cap or plug all openings after disconnecting. Contamination of hydraulic system could result in equipment failure.
- Ensure hydraulic hoses and clear and secured to avoid damaging hoses.

11. Disconnect six hydraulic hose quick disconnect fittings (8) from top of tophandler (5). Cap/plug all hydraulic connections. Lift hoses up and over slewing motors and secure.



REMOVAL - CONTINUED

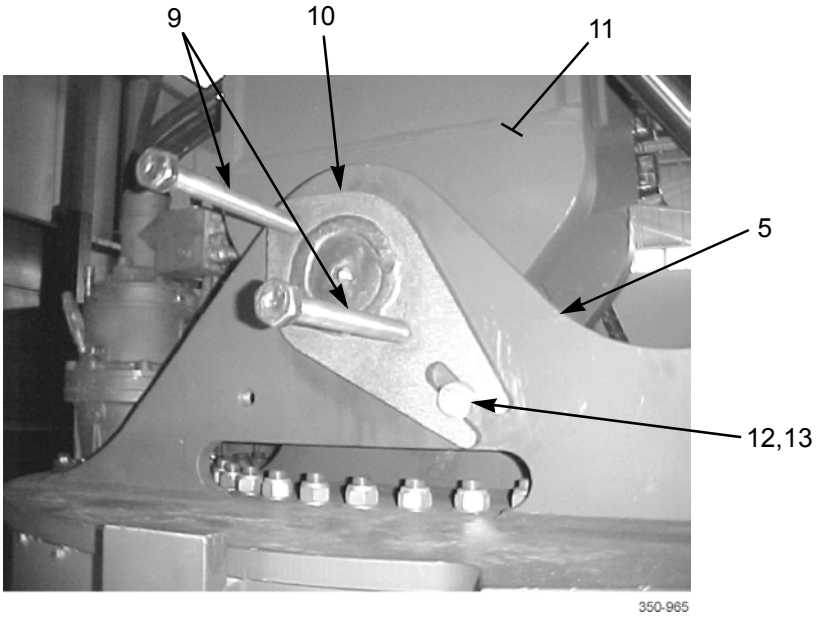
12. Remove bolt (12) and lockwasher (13) from each side of tophandler (5). Retain lockwashers.

13. Lubricate two jackscrews (9) with lubricating oil and install into ear of each pivot shaft (10).

NOTE

To avoid binding pivot shaft, screw in jackscews equally and alternately.

14. Screw in jackscrews (9) approximately 8 in (20.3 cm) to completely withdraw each pivot shaft (10) until boom extension (11) is free of tophandler (5).



NOTE

Because tophandler junction box is disconnected from RTCH electrical system, error codes will appear on driver's ECS display screen when boom is operated. These error codes will include numbers 245-265 as well as others. To continue operation, reset driver's display and use override button on right side of joystick housing (TM 10-3930-675-10).

15. Operate boom while pressing override switch to lift boom extension clear of tophandler (TM 10-3930-0675-10).

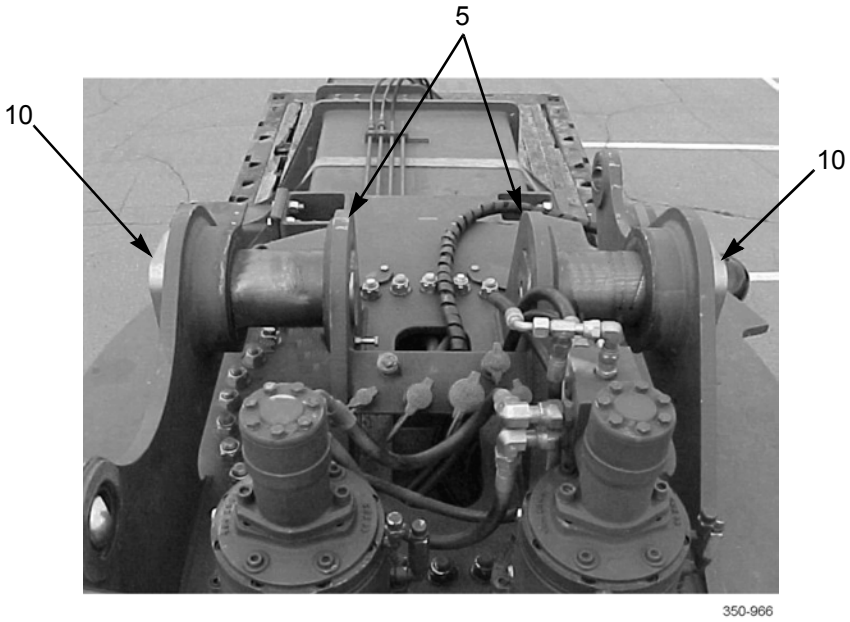
16. Back RTCH away from trailer.

17. Fully retract boom (TM 10-3930-675-10).

18. Tie down tophandler to trailer IAW shipping data plate on RTCH (TM 10-3930-675-10).

19. Reinstall tophandler mounting hardware [pivot shafts (10), lockwashers (13), and bolts (12)] to provide secure stowage of items while tophandler is in transit.

REMOVAL - CONTINUED



20. Reinstall tilt cylinder mounting hardware (pin, lockwasher, and bolt) on each side of tophandler to provide secure stowage of items while tophandler is in transit.

INSTALLATION

1. Remove tiedowns from tophandler and trailer.

NOTE

It is crucial that RTCH and trailer be in alinement. If time is not taken to ensure accurate alinement, installation of tophandler to boom will be very difficult because pivot shafts will bind while being installed.

2. Position RTCH directly behind trailer, so that tophandler and RTCH boom are in line with each other.
3. From each side of tophandler, remove tilt cylinder mounting hardware that was stowed while tophandler was in transit: pin, lockwasher, and bolt. Discard lockwashers if new lockwashers are available.
4. Remove tophandler mounting hardware: pivot shafts (10), lockwashers (13), and bolts (12). Discard lockwashers if new lockwashers are available.

NOTE

- Because tophandler junction box is disconnected from RTCH electrical system, error codes will appear on driver's ECS display screen when boom is operated. These error codes will include numbers 245-265 as well as others. To continue operation, reset driver's display and use override button on right side of joystick housing (TM 10-3930-675-10).
- If alinement of boom extension to tophandler does not look OK, reposition RTCH and ensure accurate alinement before proceeding.

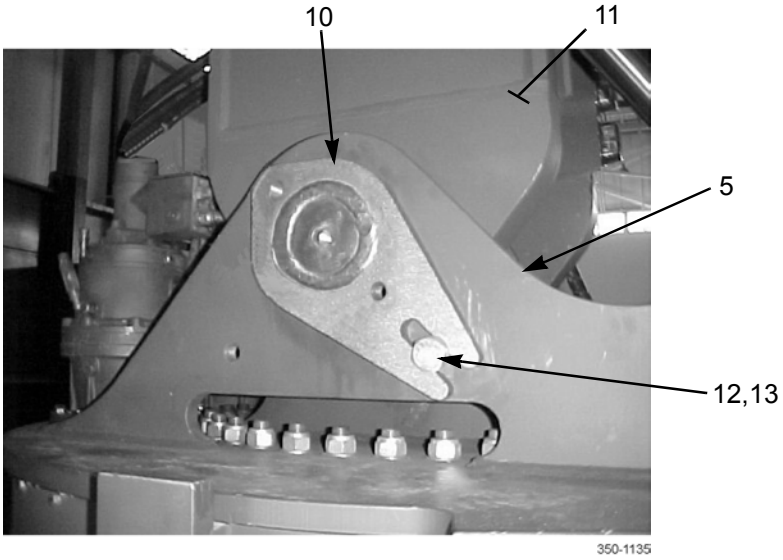
INSTALLATION - CONTINUED

5. Lower boom and position boom extension (11) into tophandler (5), while alining pivot shaft holes in boom extension with holes in tophandler.

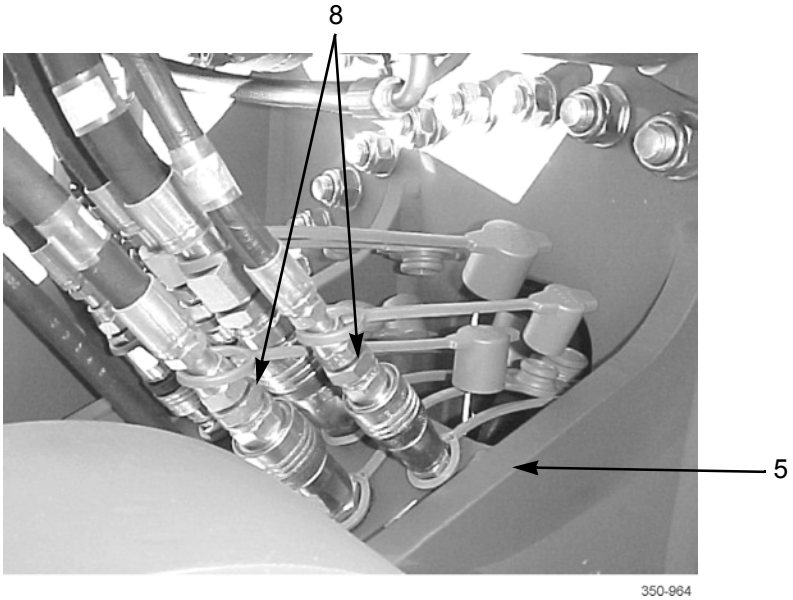
NOTE

- Ensure pivot shafts are clean.
- When installing pivot shafts, slot in pivot shaft for retaining bolt must be alined with bolt hole in tophandler.
- It may be necessary to connect hydraulic hoses and use boom controls to aid in boom to tophandler positioning.

6. Install pivot shaft (10) on each side of tophandler (5). Secure with new lockwasher (13) and bolt (12).

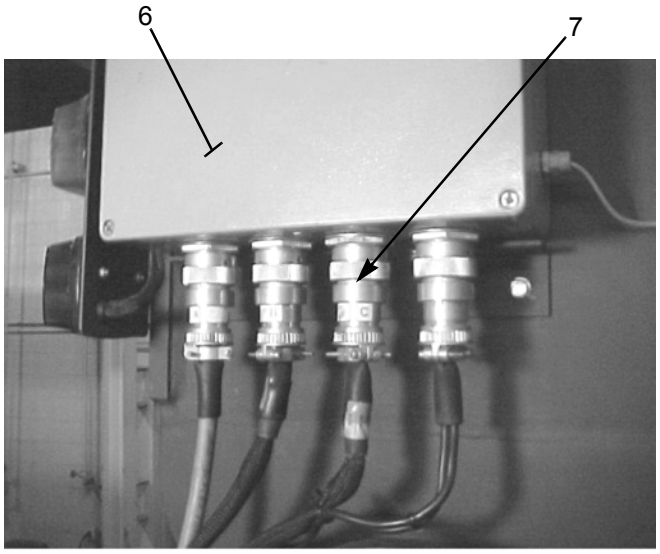


7. Remove caps/plugs and connect six hydraulic hose quick disconnect fittings (8) to top of tophandler (5).

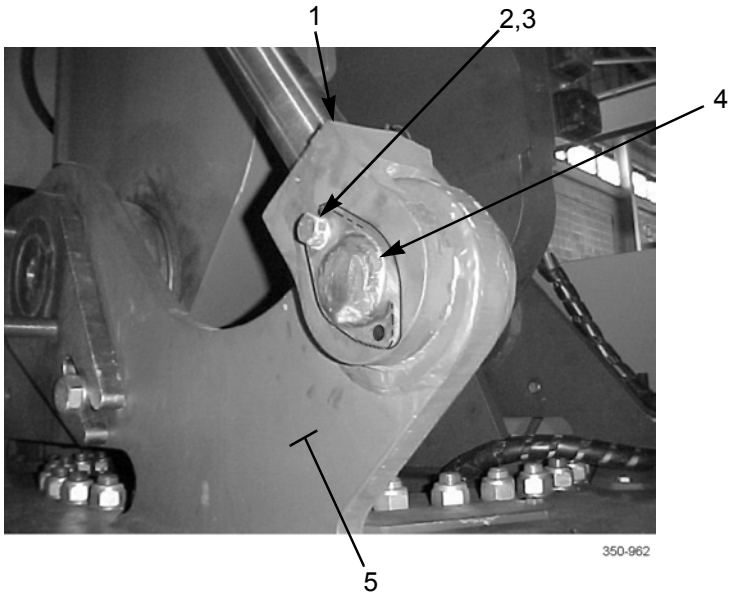


INSTALLATION - CONTINUED

8. Connect four electrical connectors (7) to bottom of tophandler junction box (6).



9. Remove cargo straps from tilt cylinders (1).
10. Operate tilt cylinders (1) to aline cylinder ends with mounting holes in tophandler (5) (TM 10-3930-675-10).
11. Install pin (4) at end of each tilt cylinder (1). Secure with new lockwasher (3) and bolt (2).



INSTALLATION - CONTINUED

NOTE

If operating lever of tophandler angle sensor was not disturbed, boom and tophandler calibration is not required.

12. Install tophandler angle sensor (WP 0100 00).
13. Elevate boom and remove tophandler from trailer (TM 10-3930-675-10).

END OF WORK PACKAGE

PREPARATION FOR ARCTIC OPERATION 0192 00

THIS WORK PACKAGE COVERS

Preparation for Arctic Operation

INITIAL SETUP

Tools and Special Tools

Tool kit, general mechanic's (Item 31, WP 0204 00)

Materials/Parts

Fuel, diesel (Item 13, WP 0203 00)

Oil, lubricating (Item 21, WP 0203 00)

References

TB 750-651

TM 10-3930-675-10

WP 0052 00

WP 0070 00

References - Continued

WP 0115 00

WP 0126 00

WP 0157 00

WP 0189 00

WP 0184 00

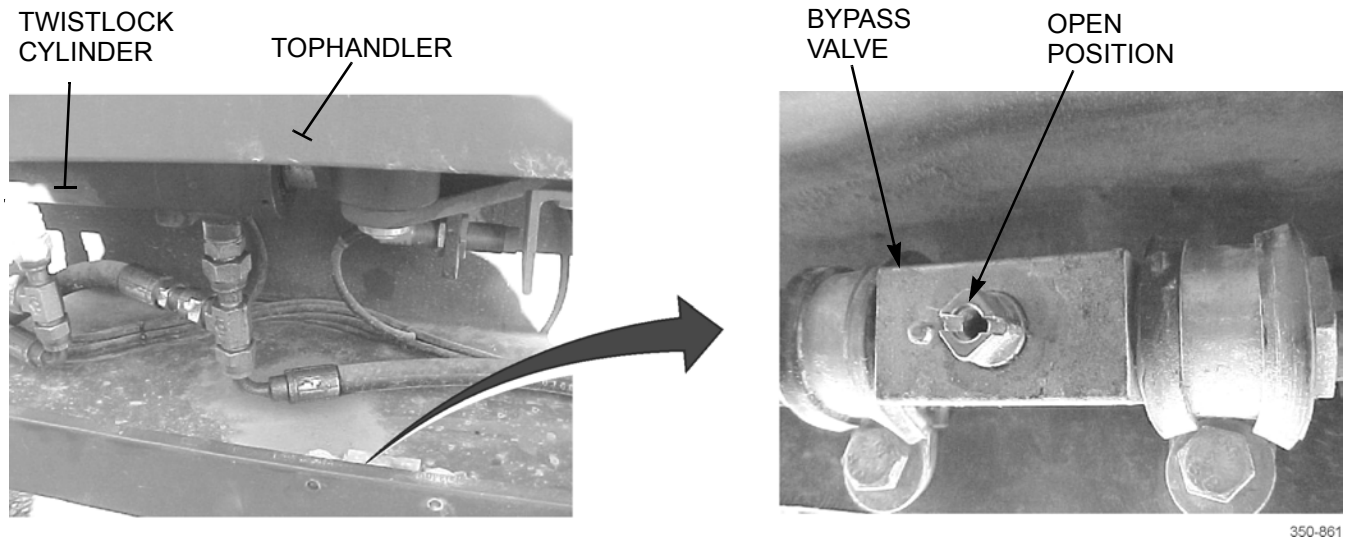
WP 0183 00

PREPARATION FOR ARCTIC OPERATION

1. Drain engine oil and replace with OEA oil. Replace engine oil filter (WP 0052 00).
2. Drain transmission oil and replace with OEA oil. Replace transmission oil filters (WP 0115 00).
3. Drain hydraulic reservoir oil and replace with OEA oil (WP 0184 00).
4. Replace all hydraulic (steering, brake, and boom) system filters (WP 0183 00 and WP 0126 00).

PREPARATION FOR ARCTIC OPERATION - CONTINUED

5. Check engine coolant to ensure safe operation at temperature range down to -50° F (-46° C) (TB 750-651).
6. Drain fuel tank. Refill with arctic grade diesel fuel (TM 10-3930-675-10).
7. Inspect engine drive belts for signs of cracking. Replace belts as required (WP 0070 00 and WP 0189 00).
8. Drain windshield washer fluid (see WP 0157 00).
9. Start truck and allow engine to reach operating temperature (TM 10-3930-675-10).
10. Open both left- and right-side twistlock cylinder bypass valves on tophandler, by using a flat tip screwdriver to turn slotted area on valve so that it is in line with fluid flow thru valve.



11. Operate twistlocks at least five times, while activating override switch, to circulate hydraulic oil within twistlock cylinders (TM 10-3930-675-10).
12. Close both left- and right-side twistlock cylinder bypass valves, by turning slotted area so that it is perpendicular to fluid flow thru valve.
13. Perform operational check of all vehicle systems (TM 10-3930-675-10).

END OF WORK PACKAGE

PREPARATION FOR STORAGE OR SHIPMENT 0193 00

THIS WORK PACKAGE COVERS:

Preparation for Short-Term Storage

Preparation for Return to Service from Short-Term Storage

Preparation for Long-Term Storage

Preparation for Return to Service from Long-Term Storage

Preparation for Shipment

NOTE

Short-term storage is storage for two weeks or less. Long-term storage is for more than two weeks.

PREPARATION FOR SHORT-TERM STORAGE

1. Thoroughly clean vehicle.
2. Perform Operator Preventive Maintenance Checks and Services (PMCS) (TM 10-3930-675-10).
3. Fill fuel tank completely to prevent condensation from forming (TM 10-3930-675-10).
4. Perform Organizational PMCS (WP 0050 00).
5. Schedule next PMCS on ULLS-G (Unit Level Logistics System – Ground).
6. Store vehicle indoors in a dry, protected area with boom fully lowered and retracted (TM 10-3930-675-10).
7. When moderate temperatures are expected, leave batteries in place. If extreme cold is expected, remove batteries (WP 0107 00) and store in a protected area.
8. Check engine coolant to ensure coolant has correct mixture for expected temperatures (TB 750-651).
9. Seal all openings in engine, including air intake, exhaust outlet, and crankcase breather tube.
10. Close cab rear window and door.
11. Ensure engine cover is installed and latched (WP 0143 00).
12. Ensure master battery switch is in OFF position (TM 10-3930-675-10).
13. Relieve hydraulic system pressure. Be sure to close evacuation valves after pressure is relieved (WP 0164 00).
14. Fill in Form DD 1397 completely and attach to a conspicuous part of vehicle.

PREPARATION FOR RETURN TO SERVICE FROM SHORT-TERM STORAGE

1. Remove seals from all engine openings, including air intake, exhaust outlet, and crankcase breather tube.
2. If removed, install batteries (WP 0107 00).
3. Check oil and hydraulic fluid levels in engine crankcase, transmission, axle differentials, wheel hub ends, hydraulic reservoir, and tophandler slewing and spreader motors (LO 10-3930-675-12).
4. Check coolant level in radiator expansion tank (TM 10-3930-675-10).
5. Start engine (TM 10-3930-675-10) and idle engine 3-5 minutes to allow it to warm up. Verify that all indicator and warning lights operate properly on driver's ECS display screen.
6. Ensure fuel tank is full (TM 10-3930-675-10).
7. Drive vehicle without a load and check engine, transmission, brakes, steering, and electrical accessories for proper operation (TM 10-3930-675-10).
8. Check operation of boom and tophandler (TM 10-3930-675-10).

PREPARATION FOR LONG-TERM STORAGE

1. Perform Operator Preventive Maintenance Checks and Services (PMCS) (TM 10-3930-675-10).
2. Perform Organizational PMCS (WP 0050 00).
3. Schedule next PMCS on ULLS-G.
4. Thoroughly clean vehicle.
5. Inspect vehicle for corrosion. Use touch-up paint where necessary to prevent rust.
6. Store vehicle indoors in a dry, protected area with boom fully lowered and retracted and with tophandler resting on cribbing or other suitable supporting device. Exercise joystick thru all positions after engine shutdown to relieve any pressure in hydraulic circuits (TM 10-3930-675-10).
7. Coat all exposed hydraulic cylinder rods with GAA grease (Item 16, WP 0203 00) to protect polished surfaces.

NOTE

If vehicle has accumulated very low mileage since its last scheduled lubrication service, do not drain and refill transmission and axles; skip step 8.

8. Drain and refill transmission and axles with new oil (LO 10-3930-675-12).
9. Drain engine crankcase and refill with recommended oil (LO 10-3930-675-12).
10. Completely drain fuel tank. Mix a solution of diesel fuel (Item 14, WP 0203 00) and flushing oil per instructions supplied with flushing oil. Pour mixture into fuel tank. Run engine for at least 10 minutes on this solution.
11. Before shutting down engine, treat upper cylinders by spraying recommended engine oil into air intake for about two minutes. Open throttle momentarily, shut engine down, and continue spraying oil into air intake until engine comes to a stop.
12. Check engine coolant to ensure coolant has correct mixture for expected temperatures (TB 750-651).
13. Seal all openings in engine, including air intake, exhaust outlet, and crankcase breather tube.
14. Loosen or remove alternator drive belt and air conditioning compressor drive belts (WP 0070 00 and WP 0189 00).
15. Ensure master battery switch is in OFF position (TM 10-3930-675-10).
16. Remove batteries (WP 0107 00). Clean batteries and ensure they are fully charged (TM 9-6140-200-14).
17. Completely drain fuel tank.
18. Close cab rear window and door.
19. Ensure engine cover is installed and latched (WP 0143 00).
20. Place blocking under axles to remove weight from tires.
21. Relieve hydraulic system pressure. Be sure to close evacuation valves after pressure is relieved (WP 0164 00).
22. Fill in Form DD 1397 completely and attach to a conspicuous part of vehicle.

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE

1. Ensure tires are inflated to 85 psi (586 kPa).
2. Remove blocking from under axles.
3. Remove GAA grease from exposed hydraulic cylinder rods. Wipe rods clean with a rag (Item 22, WP 0203 00) dipped in lubricating oil (Item 19, WP 0203 00).
4. Fill fuel tank with fuel (TM 10-3930-675-10).
5. Check oil and hydraulic fluid levels in engine crankcase, transmission, axle differentials, wheel hub ends, hydraulic reservoir, and tophandler slewing and spreader motors (LO 10-3930-675-12).

PREPARATION FOR RETURN TO SERVICE FROM LONG-TERM STORAGE - CONTINUED

6. Check coolant level in radiator expansion tank (TM 10-3930-675-10).
7. Install fully charged batteries (WP 0107 00).
8. Tighten or install alternator drive belt and air conditioning compressor drive belts (WP 0070 00 and WP 0189 00).
9. Remove seals from all engine openings, including air intake, exhaust outlet, and crankcase breather tube.
10. Start engine (TM 10-3930-675-10). Idle engine 3-5 minutes to allow it to warm up. Verify that all indicator and warning lights operate properly on driver's ECS display screen.
11. Drive vehicle without a load and check engine, transmission, brakes, steering, and electrical accessories for proper operation (TM 10-3930-675-10).
12. Check operation of boom and tophandler (TM 10-3930-675-10).

PREPARATION FOR SHIPMENT

1. Follow instructions in TM 10-3930-675-10 to prepare the RTCH for the following transport modes:
    - Highway Transport on M1000 Trailer
    - Rail Transport
    - Marine Transport
    - Air Transport
2. Ensure RTCH transmission control lever is in Neutral (N) and parking brake is applied.
3. Ensure RTCH wheels are securely blocked and adequate tiedowns are used.
4. For rail and marine transport, seal all openings in engine, including air intake, exhaust outlet, and crankcase breather tube.
5. Check engine coolant to ensure coolant has correct mixture for expected temperatures (TB 750-651).

WARNING

Check travel route for overpass and bridge clearances. If clearances are not adequate, an accident causing injury or death to personnel or damage to equipment could result.

6. For highway transport, check state and local laws governing weight, width, and length of load.

END OF WORK PACKAGE

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GENERAL MAINTENANCE INSTRUCTIONS 0194 00

GENERAL

1. These general maintenance instructions contain general shop practices and specific methods you must be familiar with to properly maintain the RT 240 RTCH. You should read and understand these practices and methods before performing any Organizational Maintenance procedures.
2. Before beginning a task, find out how much repair, modification or replacement is needed to fix the equipment. Sometimes the reason for equipment failure can be seen right away and complete teardown is not necessary. Disassemble equipment only as far as necessary to repair or replace damaged parts.
3. In some cases, a part may be damaged during removal. If the part appears to be good, and other parts behind it are not defective, leave it in place and continue with the procedure. Here are a few simple rules:
   a. Do not remove dowel pins or studs unless loose, bent, broken or otherwise damaged.
   b. Do not remove bearings or bushings unless damaged. If you need to remove them to access parts behind, carefully pull out bearings and bushings.
   c. Replace all gaskets, lockwashers, locknuts, seals, cotter pins, and o-rings.
4. All tags and forms attached to the equipment must be checked to learn the reason for removal of equipment from service. Modification Work Orders (MWOs) and Technical Bulletins (TBs) must also be checked for equipment changes and updates.

WORK SAFETY

1. Before beginning a procedure, think about the safety risks and hazards to yourself and to others. Wear protective gear such as safety goggles or lenses, safety shoes, rubber apron or gloves.
2. Before beginning a procedure, ensure that the following conditions have been observed, unless otherwise specified:
   a. Vehicle must be parked on level ground with parking brake applied or wheels chocked.
   b. Transmission must be in N (Neutral).
   c. Engine must be off.
   d. Master battery switch must be in OFF position.
   e. Components must be at operating temperature to be tested.
   f. Components which are hot at operating temperatures (i.e., cooling, exhaust, and hydraulic systems) must cool down before they are removed.



WARNING

- DO NOT disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing serious injury.
- Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

3. DO NOT disconnect any hydraulic line or fitting without first relieving pressure in hydraulic lines. Follow instructions in WP 0164 00 to safely relieve pressure.
4. Immediately clean up spilled fluids to avoid slipping.
5. When lifting heavy parts, have someone help you. Ensure that lifting equipment or jack is working properly, that it meets weight requirement of part being lifted, and that it is securely fastened to part.

WORK SAFETY - CONTINUED

6. Always use power tools carefully.
7. Observe all WARNINGs and CAUTIONS.

CLEANING INSTRUCTIONS

WARNING

Improper cleaning methods and use of unauthorized cleaning liquids or solvents can injure personnel and damage equipment. To prevent this, refer to TM 9-247 for further instructions.

1. **General.** Cleaning instructions will be the same for the majority of parts and components which make up the truck. The following applies to all cleaning operations:
   a. Clean all parts before inspection, after repair, and before assembly.
   b. Keep hands free of grease which can collect dust, dirt, and grit.
   c. After cleaning, all parts should be covered or wrapped to protect them from dust and dirt. Parts that are subject to rust should be lightly oiled after cleaning.

2. Castings, Forgings, and Machined Metal Parts.

   a. Clean inner and outer surfaces with detergent (Item 11, WP 0203 00) and dry with clean rags (Item 22, WP 0203 00).
   b. Remove grease and accumulated deposits with a scrub brush.



WARNING

Compressed air used for cleaning or drying purposes, or for clearing restrictions, should never exceed 30 psi (207 kPa). Wear protective clothing (goggles/shield, gloves, etc.) and use caution to avoid injury to personnel.

   c. Clear all threaded holes with compressed air to remove dirt and cleaning fluids.

CAUTION

DO NOT wash oil seals, electrical cables, and flexible hoses with dry cleaning solvent or mineral spirits. Serious damage or destruction of material will result.

3. **Oil Seals, Electrical Cables, and Flexible Hoses.** Wash oil seals, electrical cables, and flexible hoses with a solution of detergent (Item 11, WP 0203 00) and water, and wipe dry with a clean rag (Item 22, WP 0203 00).
4. **Bearings.** Clean bearings in accordance with TM 9-214.

PRESERVATION OF PARTS

Unpainted metal parts that will not be installed immediately after cleaning may be covered with a thin coat of lubricating oil (Item 19, WP 0203 00).

PAINTING

1. On painted areas where paint has been removed, paint in accordance with procedures outlined in TM 43-0139 and TB 43-0209.
2. For camouflage painting instructions, refer to FM 5-20.

INSPECTION INSTRUCTIONS

NOTE

All damaged areas should be marked for repair or replacement.

1. All components and parts must be carefully checked to determine if they are serviceable for use, can be repaired or must be scrapped.
2. Inspect drilled and tapped (threaded) holes for the following:
   a. Wear, distortion, cracks, and any other damage in or around holes.
   b. Threaded areas for wear distortion (stretching) and evidence of cross-threading.
3. Inspect metal lines, flexible lines or hoses, and metal fittings and connectors for the following:
   a. Metal lines for sharp kinks, cracks, bad bends, and dents.
   b. Flexible lines or hoses for fraying, evidence of leakage, and loose metal fittings or connectors.
   c. Metal fittings and connectors for thread damage and worn or rounded hex heads.
4. Inspect castings, forgings, and machined metal parts for the following:
   a. Machined surfaces for nicks, burrs, raised metal wear, and other damage.
   b. Inner and outer surfaces for breaks and cracks.
5. Inspect bearings in accordance with TM 9-214.

DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

1. Keep major components together whenever possible and practical.
2. Tag hoses, electrical wires, cables, and harnesses to identify them and aid during installation.
3. Keep related parts together for identification purposes.
4. Temporarily install attaching hardware such as screws, bolts, washers, and nuts to prevent loss.
5. Only disassemble to the point of the problem.
6. Ensure that parts are clean and lubricated before assembly.

REPAIR INSTRUCTIONS

CAUTION

Before welding, the following components must be disconnected to avoid damage to electronic components:

- Hydraulic servo system ECU - computer no. 790 (WP 0079 00)
- Tophandler ECU - computer no. 791 (WP 0076 00)
- Steering system ECU - computer no. 792 (WP 0079 00)
- Transmission ECU - computer no. 793 (WP 0079 00)
- Engine ECU - computer no. 794 (WP 0079 00)
- Electronic Control System (ECS) display screen - computer no. 795 (WP 0080 00)

1. Repair castings, forgings, and machined parts using the following instructions:
   a. Repair minor cracked castings or forgings in accordance with TM 9-237.
   b. Repair minor damage to machined surfaces with an abrasive cloth dipped in detergent (Item 11, WP 0203 00).
   c. Replace any deeply nicked machined surface that could affect the assembly operation.
   d. Repair minor damage to threaded capscrew holes with thread tap of same size to prevent cutting oversize.
2. After repair, thoroughly clean all parts to prevent dirt, metal chips or other foreign material from entering any working parts.

LUBRICATION INSTRUCTIONS

NOTE

Refer to LO 10-3930-675-12 and to Organizational PMCS (WP 0050 00) for detailed, illustrated instructions on proper lubrication. Some general practices to remember:

1. Use the correct lubricant.
2. Keep lubricants clean.
3. Clean all fittings prior to lubrication.
4. Lubricate clean disassembled and new parts to prevent rust.

APPLICATION OF ADHESIVES AND SEALING COMPOUNDS

1. **General.** Adhesives are recommended in some tasks to ensure and strengthen seals. Sealing compounds are used to seal parts against moisture. The following information describes their correct use and application.
2. **Adhesive.** Adhesive provides a seal against leakage and a resistance to loosening when used in the assembly of threaded, slip-fitted or press-fitting parts. Always use grade of adhesive specified and never use when other retaining means are provided, such as lockwires, lock washers, lockplates, and fasteners.
3. **Sealing Compound.**
   a. Anytime a seal is broken, the part must be thoroughly cleaned to remove any remaining sealing compound and dirt.
   b. Thoroughly clean surface before applying sealing compound.
   c. When applying sealing compound, ensure that the area is completely covered. Press sealing compound into and around parts as necessary.
   d. Refer to manufacturer's instructions for time needed to set sealing compound.

STANDARD TOOL REQUIREMENTS

1. The following are general practices regarding the use of tools:
   a. Always use the proper tool kit and tools for the procedure being performed.
   b. Ensure that tools are clean and lubricated to reduce wear and to prevent rust.
   c. Keep track of tools. Do not be careless with them.
   d. Return tools to toolbox when finished with repair or maintenance.
   e. Return toolboxes and tools to tool storage when not in use.
   f. Inventory tools before and after each use.
2. Some maintenance tasks may require special or fabricated tools. The "Initial Setup" of the procedure will specify any special or fabricated tools needed to perform that procedure. Use these special tools only for the maintenance procedures for which they are designed or called out. If you are unfamiliar with a required tool, see your supervisor.

TAGGING WIRES AND HOSES

1. Use marker tags (Item 28, WP 0203 00) to identify all electrical wires, fuel, oil, coolant, and hydraulic lines, and any other parts which may be hard to identify or replace later. Fasten tags to parts during removal by wrapping wire fasteners around or thru parts and twisting ends together. Position tags to be out of the way during cleaning, inspection, and repair. Mark tags with a pencil, pen or marker.

TAGGING WIRES AND HOSES - CONTINUED

2. Whenever possible, identify electrical wires with the number of the terminal or wire to which it connects. If no markings can be found, tag both wires or wire and terminal, and use the same identifying mark for both. If you cannot tag a wire because it must fit thru a small hole or you cannot reach it, write down the description of the wire and the point to which it connects or draw a simple diagram on paper. Be sure to write down enough information so you will be able to properly connect the wires during assembly. If you need to identify a loose wire, look for identifying number near end of the wire, stamped on a permanent metal tag. Compare the number to wire numbers on the appropriate electrical schematic.
3. Identify fuel, oil, coolant, and hydraulic lines when you are taking off more than one line at the same time. Mark tags with points to which lines and hoses must be connected. If it is not obvious which end of a line goes where, tag each end of the line.
4. Identify and tag other parts as required by name and installed location.

LINES AND PORTS

To keep dirt from contaminating fluid systems when removing and installing fuel, oil, coolant, and hydraulic lines, perform the following steps:

a. Clean fittings and surrounding area before disconnecting lines.
b. Cover, cap, plug (Item 4, WP 0203 00) or tape lines and ports after disconnecting lines. When these are not available, use plastic bags and rubber bands, clean rags (Item 22, WP 0203 00), duct tape (Item 29, WP 0203 00) or other similar materials to prevent dirt from entering system.
c. Ensure that new and used parts are clean before installing.
d. Wait to remove cover, cap, plug or tape from lines and ports until just before installing lines.

HYDRAULIC HOSE CONNECTION PROCEDURES

1. Always use new o-rings where applicable. O-rings should always be installed wet. Coat o-ring with lubricating oil (Item 19, WP 0203 00).
2. The following tables identify and cross reference various o-rings found on the RTCH by dimensions and part numbers. These o-rings are available in a kit. The complete o-ring kit is available from: Kalmar RT Center LLC, 4734 Broom Street, San Antonio, TX 78217, Tel. 1-800-558-7232, 1-210-599-3478, fax 1-210-599-4009.

Table 1. Boss Type O-Rings.

DIMENSIONS (I.D. x W)	SAE No.	KRTC P/N	QTY PER KIT
0.351 x .072	J515-4-1	12J1038	10
0.468 x .078	J515-6-1	12J1039	10
0.644 x .087	J515-8-1	12J1040	10
0.755 x .097	J515-10-1	12J1041	10
0.924 x .116	J515-12-1	12J1042	10
1.171 x 0.116	J515-16-1	12J1043	5
1.475 x 0.118	J515-20-1	12J1044	5
1.720 x 0.118	J515-24-1	12J1045	5
2.337 x 0.118	J515-32-1	12J1046	5

Table 2. Flat Face Type O-Rings (ORS).

DIMENSIONS (I.D. x W)	SAE No.	KRTC P/N	KRTC P/N	QTY PER KIT
0.301 x 0.070	J515 Type 1	-011	12J1047	10
0.364 x 0.070	J515 Type 1	-012	12J1048	10
0.489 x 0.070	J515 Type 1	-014	12J1049	10
0.614 x 0.070	J515 Type 1	-016	12J1050	10
0.739 x 0.070	J515 Type 1	-018	12J1051	10
0.926 x 0.070	J515 Type 1	-021	12J1052	5
1.176 x 0.070	J515 Type 1	-025	12J1053	5
1.489 x 0.070	J515 Type 1	-029	12J1054	5

3. Connect hydraulic hose and use a crowfoot attachment set (Item 5, WP 0204 00) and appropriate torque wrench to tighten the connection.

4. Table 3 provides torque range in relation to size of hydraulic hose fitting.

Table 3. Hydraulic Hose Torque Chart.

WIDTH ACROSS FLATS IN MM	TORQUE RANGE
18	17-18 lb-ft (23-25 Nm)
21	24-28 lb-ft (33-38 Nm)
24	38-42 lb-ft (51-57 Nm)
29	59-66 lb-ft (80-90 Nm)
35	88-96 lb-ft (120-130 Nm)
41	111-125 lb-ft (150-170 Nm)
48	133-147 lb-ft (180-200 Nm)
51	147-177 lb-ft (200-240 Nm)

CAUTION

Following any hydraulic system maintenance that results in hydraulic system being opened, replacement of hydraulic reservoir return filters is required after 100 hours of operation.

5. Replace hydraulic reservoir return filters after 100 hours of operation (WP 0183 00).

FLUID DISPOSAL

Dispose of contaminated drained fluids in accordance with the Standard Operating Procedures (SOP) of your unit.

END OF WORK PACKAGE

TRANSMISSION CALIBRATION 0195 00

THIS WORK PACKAGE COVERS

Calibration

INITIAL SETUP

References

TM 10-3930-675-10

CALIBRATION

NOTE

Calibration procedures and checks must be performed if any of the following maintenance actions have occurred:

- Transmission ECM replaced or disconnected
- Transmission oil replaced
- Repairs or adjustment to transmission
- Transmission assembly replaced

1. **Access to Calibration Menus.**
   a. Turn master battery switch to ON position.
   b. Turn ignition ON.
   c. Place transmission shift control lever in Neutral (N) position.
   d. Apply parking brake.
   e. Start engine and operate at idle speed.
   f. Wait for transmission oil temperature to reach operating range (55° C to 90° C).
   g. Select Kalmar service menu on driver's Electronic Control System (ESC) display screen and press "Enter".
   h. Enter calibration program access number "13221" and press "Enter".
   i. Press right arrow button to locate "CALIBR GEAR BOX" menu, then press "Enter".

CALIBRATION - CONTINUED

2. **Transmission Calibration, ECM to Clutch Modulation Cycles.**

   a. To initiate calibration process, press “Enter”.

   b. When calibration process is completed without error, ECS display will show an AEB MAIN CODE of no. 7 (refer to Table 1 below). Calibration data will be saved within the transmission ECM when ignition is turned off.

   c. When an error is identified during calibration process, the AEB MAIN CODE will show a range of error codes of 0 thru 14 identifying the transmission component under calibration and an AEB SUB CODE range of error codes of 1 thru 8 (refer to Main Codes and Sub Codes in Table 1 and Table 2 below).

CALIBR GEAR BOX	1 (2)
AEB CYCLE NR AEB MAIN CODE AEB SUB CODE	 0 0 0

   d. When calibration process is completed without error, press “Enter” to return to main menu. ECS display screen should look like the following:

CALIBR GEAR BOX	2 (2)
CALIBRATION OF GEAR BOX DONE	 ENTER

CALIBRATION - CONTINUED

Table 1. Main Code Identification.

MAIN CODE	COMPONENT BEING CALIBRATED
0	AEB mode not selected
1	AEB mode selected, calibrating K1
2	AEB mode selected, calibrating K2
3	AEB mode selected, calibrating K3
4	AEB mode selected, calibrating K4
5	AEB mode selected, calibrating KV
6	AEB mode selected, calibrating KR
7	AEB mode selected, calibration finished
8	AEB mode selected, calibration aborted
9	AEB mode selected, calibration aborted while adjusting K1
10	AEB mode selected, calibration aborted while adjusting K2
11	AEB mode selected, calibration aborted while adjusting K3
12	AEB mode selected, calibration aborted while adjusting K4
13	AEB mode selected, calibration aborted while adjusting KV
14	AEB mode selected, calibration aborted while adjusting KR

CALIBRATION - CONTINUED

Table 2. Sub Code Identification.

SUB CODE	CORRECTIVE ACTION
1	Stop and restart truck if fault code is “0”. Repeat calibration procedure. If failure continues, transmission maintenance may be required.
2	Stop and restart truck. Ensure transmission shift control lever is in Neutral (N) position. Repeat calibration procedure.
3	Stop and restart truck. Ensure parking brake is applied. Repeat calibration procedure.
4	Stop and restart truck. Test parking brake operation. If parking brake operates properly, repeat calibration procedure. If parking brake is not operating properly, service parking brake. Repeat calibration procedure.
5	Stop and restart truck. Allow transmission to warm to operating temperature. Repeat calibration procedure.
6	Allow transmission oil to cool by idling engine but not operating transmission. When oil temperature has cooled, transmission ECM will resume calibration program.
7	Increase engine RPMs. Transmission ECM will resume calibration program when RPMs are within a specified range.
8	Decrease engine RPMs. Transmission ECM will resume calibration program when RPMs are within a specified range.

END OF WORK PACKAGE

STEERING CALIBRATION 0196 00

THIS WORK PACKAGE COVERS

Calibration

INITIAL SETUP

Tools and Special Tools

Tape, measuring (Item 29, WP 0204 00)

References

TM 10-3930-675-10

NOTE

- When calibrating the steering system, perform all ten calibration steps in order. DO NOT skip or omit any steps.
- RTCH must be parked on level ground with all wheels pointing straight ahead.
- RTCH wheels are numbered as follows during calibration procedures:
  a. Right-front wheel is no. 1
  b. Right-rear wheel is no. 2
  c. Left-rear wheel is no. 3
  d. Left-front wheel is no. 4

CALIBRATION

1. **Access to Calibration Menus.**
   a. Turn master battery switch to ON position.
   b. Turn ignition ON and start the truck.
   c. Select Kalmar service menu on driver's Electronic Control System (ESC) display screen and press "Enter".
   d. Enter calibration program access number "13221" and press "Enter".
   e. Press right arrow button to locate "CALIBR STEERING" menu, then press "Enter".
2. **Emergency Steering System Turning Speed Calibration (Menu 1 of 10).**
   a. Press value increase "+" or value decrease "-" buttons until a value of "60" is displayed on ECS display screen.
   b. When value of "60 "is displayed, press "Enter". ECS display screen should look like the following:

CALIBR STEERING	1 (10)
TURNING SPEED FOR BUTTON STEERING	60

   c. Press right arrow button to advance thru remaining steering system calibration menus.

CALIBRATION - CONTINUED

3. **Steering System Hydraulic and Electrical Connections Check (Menu 2 of 10).**

   a. Pressing value increase "+" button will result in wheel no.1 (RF) moving to the right and an increase of values on ECS display screen.

   b. Pressing value decrease "-" button will result in wheel no.1 moving to the left and a decrease of values on ECS display screen. ECS display screen should look like the following:

CALIBR STEERING	2 (10)
AXLE 1	
ADJUST WHEEL	X
ANGLE	X

Range 0 +/-5

   c. Press right arrow button to advance thru remaining steering system calibration menus.

4. **Steering Cylinder No. 1 Calibration (Menu 3 of 10).**

   a. Steering cylinders position must be manually checked by measuring cylinder length. Measurement should be taken from center-to-center of cylinder mounting pins. Correct length is 31 5/16 inches (796 mm). If length is incorrect, adjust steering cylinder for wheel no.1 (RF) by pressing increase "+" or decrease "-" buttons.

   b. Press "Enter".

   c. Recheck steering cylinder position. Correct length should be 31 5/16 inches (796 mm).

   d. ECS display screen should look like the following:

CALIBR STEERING	3 (10)
AXLE 1	
SET WHEEL	0
ANGLE	0

   e. Press right arrow button to advance thru remaining steering system calibration menus.

5. **Steering System Hydraulic and Electrical Connections Check (Menu 4 of 10).**

   a. Pressing value increase "+" button will result in wheel no. 2 (RR) moving to the right and an increase of values on ECS display screen.

   b. Pressing value decrease "-" button will result in wheel no. 2 moving to the left and a decrease of values on ECS display screen. ECS display screen should look like the following:

CALIBR STEERING	4 (10)
AXLE 2	
ADJUST WHEEL	0
ANGLE	0

Range 0 +/-5

   c. Press right arrow button to advance thru remaining steering system calibration menus.

CALIBRATION - CONTINUED

6. **Steering Cylinder No. 2 Calibration (Menu 5 of 10).**
   a. Steering cylinders position must be manually checked by measuring cylinder length. Measurement should be taken from center-to-center of cylinder mounting pins. Correct length is 34 inches (868 mm). If length is incorrect, adjust steering cylinder for wheel no.2 (RR) by pressing increase "+" or decrease "-" buttons.
   b. Press "Enter".
   c. Recheck steering cylinder position. Correct length should be 34 inches (868 mm).
   d. ECS display screen should look like the following:

CALIBR STEERING	5 (10)
AXLE 2	
SET WHEEL	0
ANGLE	0

   e. Press right arrow button to advance thru remaining steering system calibration menus.

7. **Steering System Hydraulic and Electrical Connections Check (Menu 6 of 10).**
   a. Pressing value increase "+" button will result in wheel no. 3 (LR) moving to the right and an increase of values on ECS display screen.
   b. Pressing value decrease "-" button will result in wheel no. 3 moving to the left and a decrease of values on ECS display screen. ECS display screen should look like the following:

CALIBR STEERING	6 (10)
AXLE 3	
ADJUST WHEEL	0
ANGLE	0

Range 0 +/-5

   c. Press right arrow button to advance thru remaining steering system calibration menus.

8. **Steering Cylinder No. 3 Calibration (Menu 7 of 10).**
   a. Steering cylinders position must be manually checked by measuring cylinder length. Measurement should be taken from center-to-center of cylinder mounting pins. Correct length is 34 inches (868 mm). If length is incorrect, adjust steering cylinder for wheel no.3 (LR) by pressing increase "+" or decrease "-" buttons.
   b. Press "Enter".
   c. Recheck steering cylinder position. Correct length should be 34 inches (868 mm).
   d. ECS display screen should look like the following:

CALIBR STEERING	7 (10)
AXLE 3	
SET WHEEL	0
ANGLE	0

   e. Press right arrow button to advance thru remaining steering system calibration menus.

CALIBRATION - CONTINUED

9. **Steering System Hydraulic and Electrical Connections Check (Menu 8 of 10).**

   a. Pressing value increase "+" button will result in wheel no. 4 (LF) moving to the right and an increase of values on ECS display screen.

   b. Pressing value decrease "-" button will result in wheel no. 4 moving to the left and a decrease of values on ECS display screen. ECS display screen should look like the following:

CALIBR STEERING	8 (10)
AXLE 4 ADJUST WHEEL ANGLE	 0 0

Range 0 +/-5

   c. 3. Press right arrow button to advance thru remaining steering system calibration menus.

10. **Steering Cylinder No. 4 Calibration (Menu 9 of 10).**

   a. Steering cylinders position must be manually checked by measuring cylinder length. Measurement should be taken from center-to-center of cylinder mounting pins. Correct length is 31 5/16 inches (796 mm). If length is incorrect, adjust steering cylinder for wheel no.4 (LF) by pressing increase "+" or decrease "-" buttons.

   b. Press "Enter".

   c. Recheck steering cylinder position. Correct length should be 31 5/16 inches (796 mm).

   d. ECS display screen should look like the following:

CALIBR STEERING	9 (10)
AXLE 4 SET WHEEL ANGLE	 0 0

   e. Press right arrow button to advance to remaining steering system calibration menu.

11. **Calibration of Steering System Completed (Menu 10 of 10).**

   a. With all calibration steps complete and corrections or adjustments made, press "Enter" to return to main menu.

   b. ECS display screen should look like the following:

CALIBR STEERING	10 (10)
CALIBRATION OF STEERING DONE	 ENTER

12. Turn off engine and restart to save data.

END OF WORK PACKAGE

BOOM AND TOPHANDLER CALIBRATION 0197 00

THIS WORK PACKAGE COVERS

Calibration

INITIAL SETUP

References

TM 10-3930-675-10

NOTE

- RTCH must be parked on level ground with all wheels pointing straight ahead.
- When calibrating the boom and tophandler, perform all ten calibration steps in order. DO NOT skip or omit any steps.

CALIBRATION

1. **Access to Calibration Menus.**
   a. Turn master battery switch to ON position.
   b. Turn ignition switch ON and start truck.
   c. Select Kalmar service menu on driver's Electronic Control System (ECS) display screen and press "Enter".

NOTE

If boom or tophandler angle sensors have been removed or are being replaced, steps d-f must be performed prior to calibration.

   d. Ensure boom and tophandler are level with ground.
   e. Enter diagnostic menus, select DIAG SERVO menu, and scroll down to display 7(13). Note angle sensor voltage reading.
   f. Loosen setscrew securing angle sensor lever to shaft. Rotate sensor shaft until voltage reading is between 7 and 8 volts (boom angle sensor) or 4 volts (tophandler angle sensor). Retighten setscrew and recheck voltage reading.
   g. Enter calibration program access number "13221" and press "Enter".
   h. Press right arrow button to locate "CALIBR SERVO" menu, then press "Enter".

CALIBRATION - CONTINUED

2. **Boom Calibration, Boom Angle, Lowered Position (Menu 1 of 10).**

   a. Lower boom to lowest position.

   b. Allow ECS display to stabilize, then press “Enter”.

   c. ECS display screen should look like the following:

CALIBR SERVO	1 (10)
LOWER MINIMUM BOOM ANGLE	 XXX XXX

Range 600-800

   d. Press right arrow button to advance thru remaining calibration menus.

3. **Boom Calibration, Tophandler Tilt Position (Menu 2 of 10).**

   a. Lower boom to lowest position.

   b. Level tophandler with the ground.

   c. Allow ECS display to stabilize, then press “Enter”.

   d. ECS display screen should look like the following:

CALIBR SERVO	2 (10)
LOWER MINIMUM TILT ANGLE	 XXX XXX

Range 200-400

   e. Press right arrow button to advance thru remaining calibration menus.

4. **Boom Calibration, Boom Angle, Raised Position (Menu 3 of 10).**

   a. Raise boom to maximum height and fully retract with tophandler level with ground.

   b. Allow ECS display to stabilize, then press “Enter”.

   c. ECS display screen should look like the following:

CALIBR SERVO	3 (10)
LIFT MAXIMUM BOOM ANGLE	 XXX XXX

Range 200-400

   d. Press right arrow button to advance thru remaining calibration menus.

CALIBRATION - CONTINUED

5. **Boom Calibration, Tophandler Tilt Angle (Boom in Raised Position) (Menu 4 of 10).**

   a. Raise boom to maximum height, fully retract, and level tophandler with ground.

   b. Allow ECS display to stabilize, then press “Enter”.

   c. ECS display screen should look like the following:

CALIBR SERVO	4 (10)
LIFT MAXIMUM TILT ANGLE	 XXX XXX

Range 600-800

   d. Press right arrow button to advance thru remaining calibration menus.

6. **Boom Calibration, Retracted Position (Menu 5 of 10).**

   a. Raise boom to maximum height and fully retract.

   b. Allow ECS display to stabilize, then press “Enter”.

   c. ECS display screen should look like the following:

CALIBR SERVO	5 (10)
BOOM MIN EXTENSION	XXX XXX

Range 35-150

   d. Press right arrow button to advance thru remaining calibration menus.

7. **Boom Calibration, Extended Position (Menu 6 of 10).**

   a. Fully extend boom.

   b. Allow ECS display to stabilize, then press “Enter”.

   c. ECS display screen should look like the following:

CALIBR SERVO	6 (10)
BOOM MAX EXTENSION	XXX XXX

Range 400-550

   d. Press right arrow button to advance thru remaining calibration menus.

CALIBRATION - CONTINUED

8. **Boom Calibration, Boom Cylinders (Retracted) (Menu 7 of 10).**
   a. Fully retract and lower boom.
   b. Raise boom 1/4 inch to pressurize boom cylinders, then release joystick. DO NOT reposition or move joystick again until procedure is completed.
   c. Allow system and ECS display to stabilize (10 to 20 seconds), then press “Enter”.
   d. ECS display screen should look like the following:

CALIBR SERVO	7 (10)
INIT BY MIN LOAD	
LE XXX	RI XXX
XXX	XXX

Range 500-650

   e. Press right arrow button to advance thru remaining calibration menus.

9. **Boom Calibration, Boom Cylinders (Extended) (Menu 8 of 10).**
   a. Fully extend and lower boom.
   b. Raise boom 1/4 inch to pressurize lift cylinders, then release joystick. DO NOT reposition or move joystick again until procedure is completed.
   c. Allow system and ECS display to stabilize (10 to 20 seconds), then press “Enter”.
   d. ECS display screen should look like the following:

CALIBR SERVO	8 (10)
INIT BY MAX LOAD	
LE XXX	RI XXX
XXX	XXX

Range 800-950

   e. Press right arrow button to advance thru remaining calibration menus.

10. **Boom Calibration, Load Check (Menu 9 of 10).**
   a. Fully retract boom and raise 1 in (2.5 cm).
   b. Check ECS display. Actual Load should read “0-100” kg.
   c. Reposition boom. Actual Load reading should return to “0-100” lbs. after stabilizing.
   d. Reposition tophandler. Actual Load reading should return to “0-100” lbs. after stabilizing.
   e. ECS display screen should look like the following:

CALIBR SERVO	9 (10)
ALLOWED LOAD	Kg
ACTUAL LOAD	Kg
L-LC	M

   f. Press right arrow button to advance to remaining calibration menus.

CALIBRATION - CONTINUED

11. **Boom Calibration Completed (Menu 10 of 10).**
    a. With all calibration steps completed and corrections or adjustments made, press “Enter” to return to main menu.
    b. ECS display screen should look like the following:

CALIBR SERVO	10 (10)
CALIBRATION OF EL SERVO	DONE

END OF WORK PACKAGE

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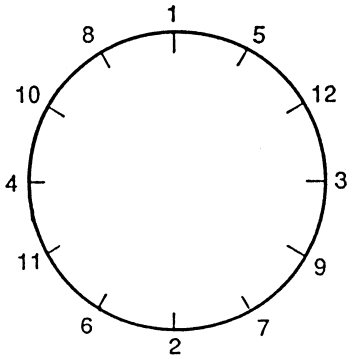
TORQUE LIMITS **0198 00**

SCOPE

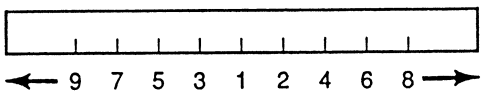
This work package lists standard torque values and provides general information for applying torque. Special torque values and tightening sequences are indicated in the maintenance procedures for applicable components.

GENERAL

1. Always use torque values listed in Table 1 when a maintenance procedure does not give a specific torque value.
2. Unless otherwise indicated, standard torque tolerance shall be ±10%.
3. Torque values listed are based on clean, dry threads. Reduce torque by 10% when engine oil is used as a lubricant. Reduce torque by 20% if new plated capscrews are used.
4. If the maintenance procedures do not specify a tightening order, use the following guides:
   a. Unless otherwise specified, lubricate threads of fasteners with oil (OE/HDO-10 or OEA).
   b. When tightening fasteners above 30 lb-ft (41 Nm), use the torque pattern but only tighten to 70 percent of final value (multiply final value by 0.7). Repeat pattern until final value is reached.
   c. Tighten circular patterns using circular torque pattern and tighten straight patterns using straight torque pattern.



CIRCULAR TORQUE PATTERN

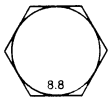
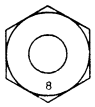
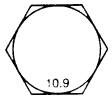
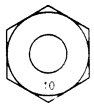


STRAIGHT TORQUE PATTERN

CAUTION

If replacement capscrews are of higher grade than originally supplied, use torque specifications for the original. This will prevent equipment damage due to overtorquing.

Table 1. Torque Limits.

TORQUE VALUES FOR METRIC THREAD FASTENERS WITH LUBRICATED* OR PLATED THREADS†				
Thread Diameter-Pitch	 **Class 8.8 Bolt**	 **Class 8 Nut**	 **Class 10.9 Bolt**	 **Class 10 Nut**
	Torque: lb-ft (Nm)		**Torque: lb-ft (Nm)**	
M6	5 (7)		7 (9)	
M8	12 (16)		17 (23)	
M8 x 1	13 (18)		18 (24)	
M10	24 (33)		34 (46)	
M10 x 1.25	27 (37)		38 (52)	
M12	42 (57)		60 (81)	
M12 x 1.5	43 (58)		62 (84)	
M14	66 (89)		95 (129)	
M14 x 1.5	72 (98)		103 (140)	
M16	103 (140)		148 (201)	
M16 x 1.5	110 (149)		157 (213)	
M18	147 (199)		203 (275)	
M18 x 1.5	165 (224)		229 (310)	
M20	208 (282)		288 (390)	
M20 x 1.5	213 (313)		320 (434)	
M22	283 (384)		392 (531)	
M22 x 1.5	315 (427)		431 (584)	
M24	360 (488)		498 (675)	
M24 x 2	392 (531)		542 (735)	
M27	527 (715)		729 (988)	
M27 x 2	569 (771)		788 (1068)	
M30	715 (969)		990 (1342)	
M30 x 2	792 (1074)		1096 (1486)	

* Kalmar recommends that all plated and unplated fasteners be coated with oil before installation.

† Use these torque values if either the bolt or nut is lubricated or plated (zinc-phosphate conversion-coated, cadmium-plated, or waxed).

NOTE

Refer to legends at end of Work Package for an explanation of common electrical and hydraulic symbols.

Electrical Schematics

Figure 1. ECS Display/CAN-BUS (A34647.0200) 0199 00-2
Figure 2. ECS Electrical Servo (A34648.0200) 0199 00-5
Figure 3. ECS Engine (A34649.0200) 0199 00-10
Figure 4. ECU Transmission (A34650.0200) 0199 00-12
Figure 5. ECS Steering (A34651.0200) 0199 00-16
Figure 6. ECS Attachment (A34652.0200) 0199 00-23
Figure 7. ECS Hydraulics (A34654.0200) 0199 00-29
Figure 8. Current Supply (A34738.0200) 0199 00-31
Figure 9. Shifting (A34739.0200) 0199 00-35
Figure 10. Sender (A34740.0200) 0199 00-36
Figure 11. Wipers (A34741.0200) 0199 00-38
Figure 12. AC and Fan (A34742.0200) 0199 00-39
Figure 13. Cab (A34743.0200) 0199 00-40
Figure 14. Lights (A34744.0200) 0199 00-41
Figure 15. Worklights (A34745.0200) 0199 00-46
Figure 16. Auxiliary Pump (A34746.0200) 0199 00-47
Figure 17. Information (A34749.0200) 0199 00-48

Hydraulic Diagrams

Figure 18. Steering System 0199 00-50
Figure 19. Brake System 0199 00-51
Figure 20. Main System 0199 00-52
Figure 21. Spreader System 0199 00-53

Symbol Legends

Figure 22. Electrical Symbols 0199 00-54
Figure 23. Hydraulic Symbols 0199 00-55

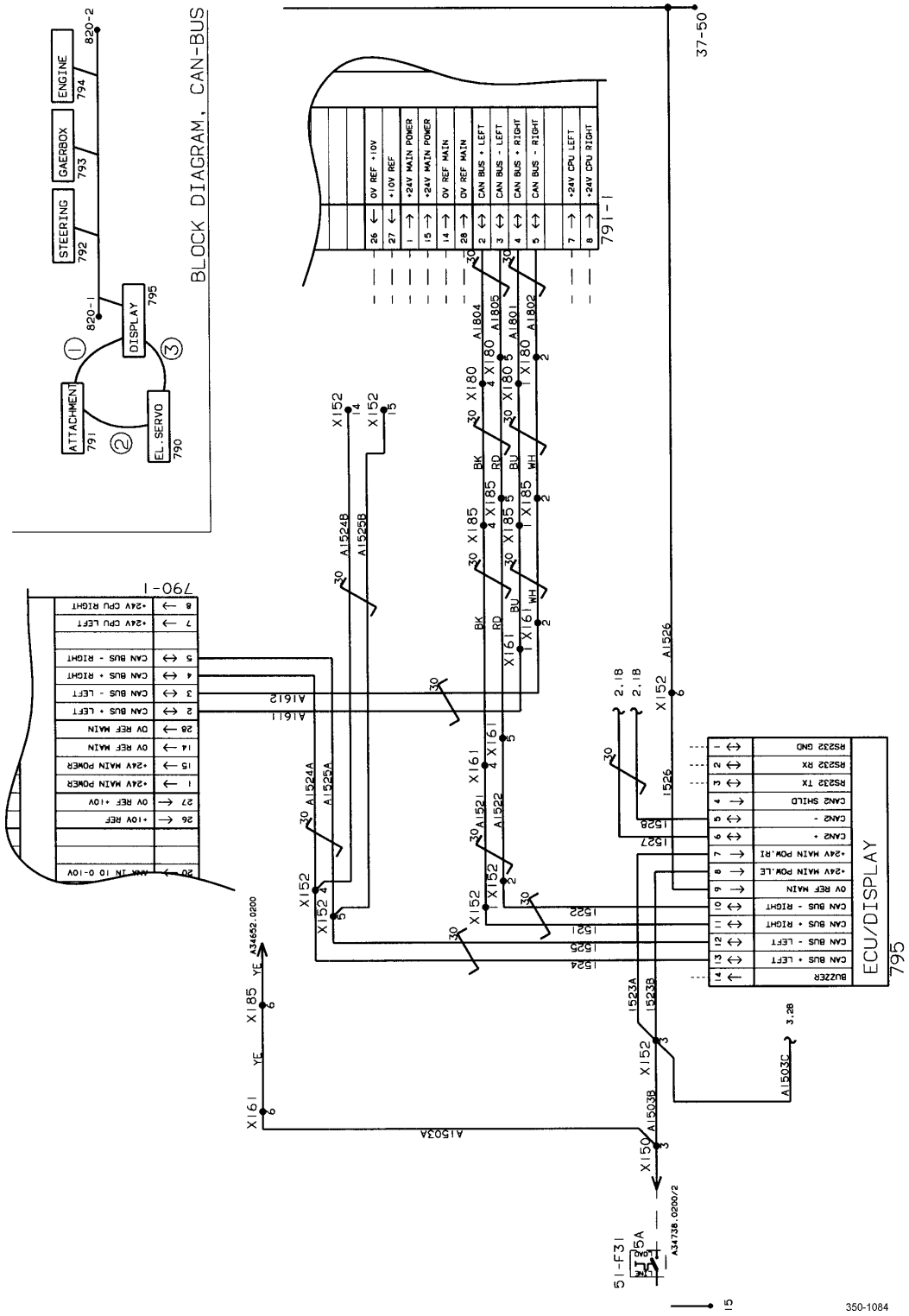


Figure 1. ECS Display/CAN-BUS (A34647.0200).

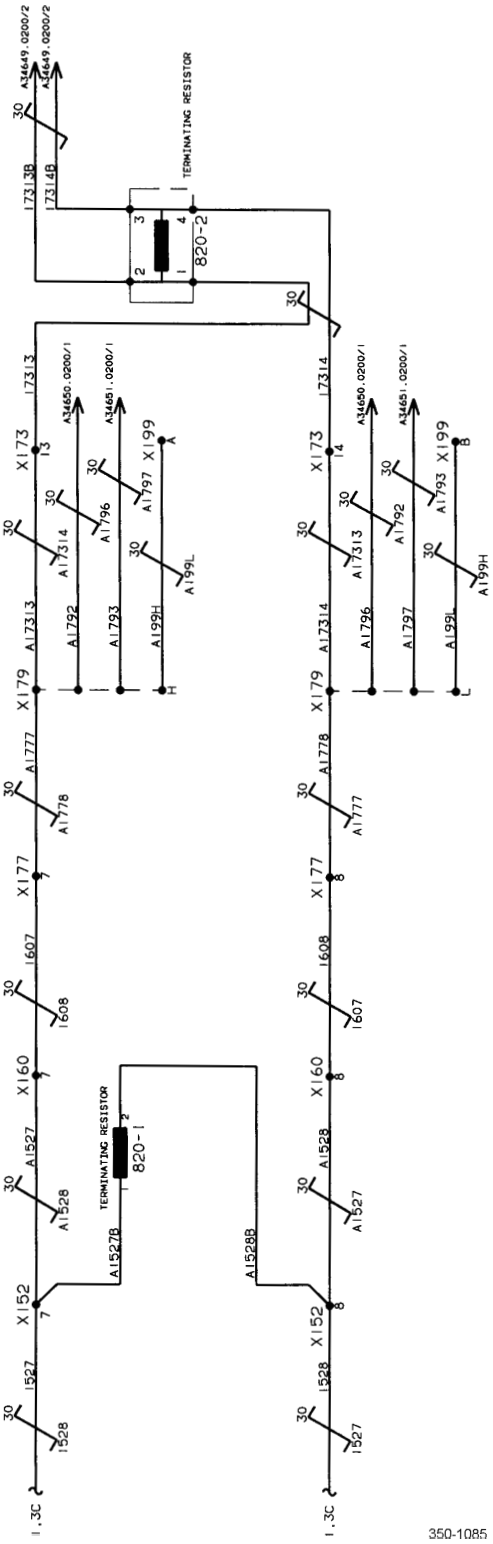


Figure 1. ECS Display/CAN-BUS (A34647.0200) - Continued.

DIAGRAMS - CONTINUED **0199 00**

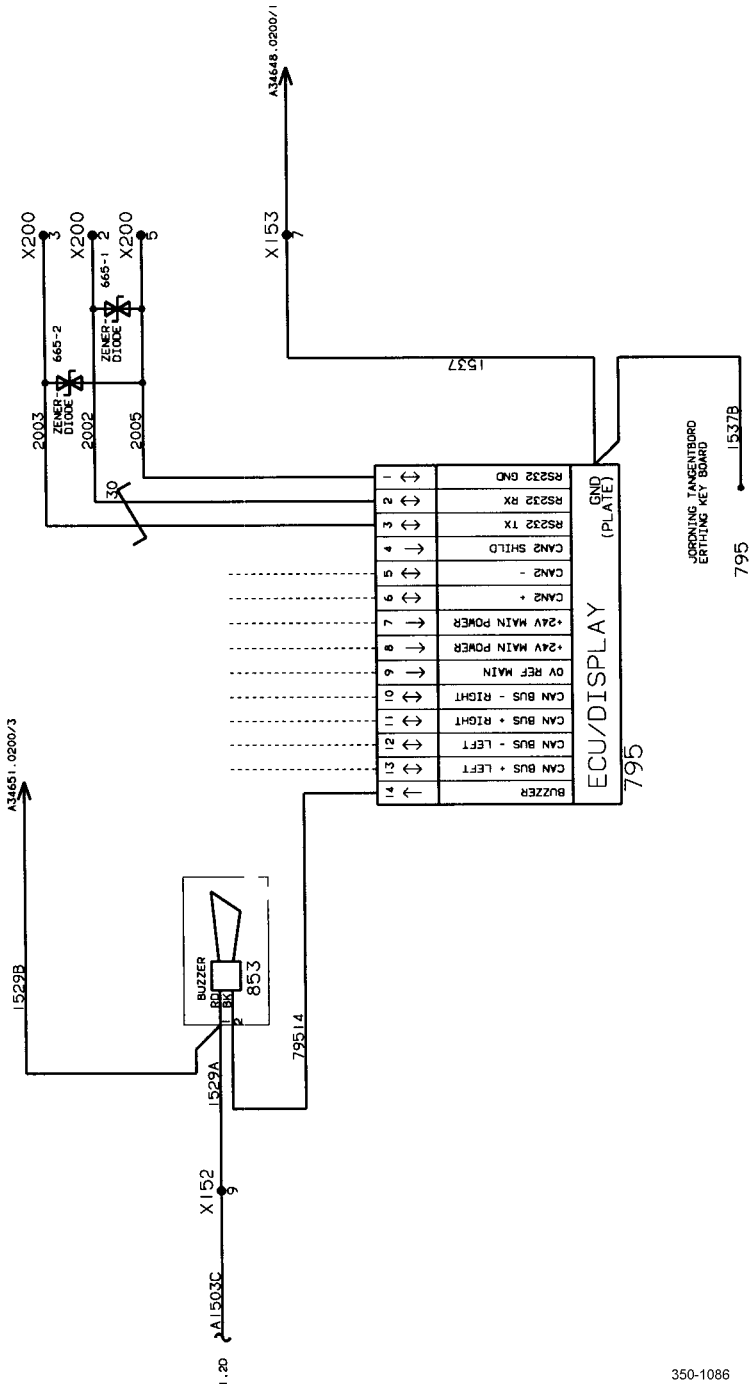
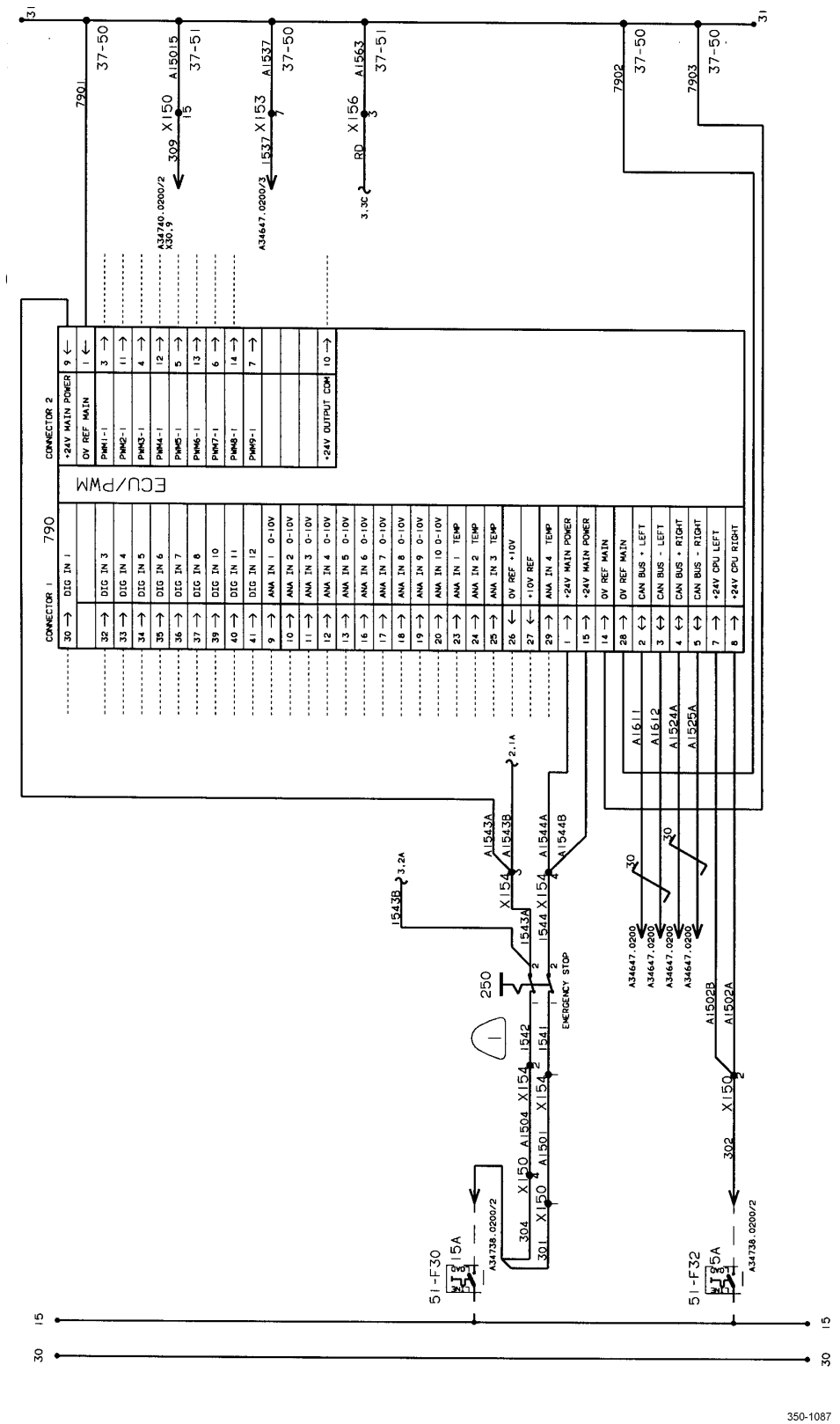


Figure 1. ECS Display/CAN-BUS (A34647.0200) - Continued.

DIAGRAMS - CONTINUED **0199 00**


ECU/PWM
CONNECTOR 1
CONNECTOR 2
790
DIG IN 1
DIG IN 3
DIG IN 4
DIG IN 5
DIG IN 6
DIG IN 7
DIG IN 8
DIG IN 10
DIG IN 11
DIG IN 12
ANA IN 1 0-10V
ANA IN 2 0-10V
ANA IN 3 0-10V
ANA IN 4 0-10V
ANA IN 5 0-10V
ANA IN 6 0-10V
ANA IN 7 0-10V
ANA IN 8 0-10V
ANA IN 9 0-10V
ANA IN 10 0-10V
ANA IN 1 TEMP
ANA IN 2 TEMP
ANA IN 3 TEMP
0V REF +10V
+10V REF
ANA IN 4 TEMP
+24V MAIN POWER
+24V MAIN POWER
0V REF MAIN
0V REF MAIN
CAN BUS + LEFT
CAN BUS - LEFT
CAN BUS + RIGHT
CAN BUS - RIGHT
+24V CPU LEFT
+24V CPU RIGHT
+24V MAIN POWER
0V REF MAIN
PWM1-I
PWM2-I
PWM3-I
PWM4-I
PWM5-I
PWM6-I
PWM7-I
PWM8-I
PWM9-I
+24V OUTPUT COM
A1611
A1612
A1524A
A1525A
A1543A
A1543B
A1544A
A1544B
A1502B
A1502A
A1504
A1501
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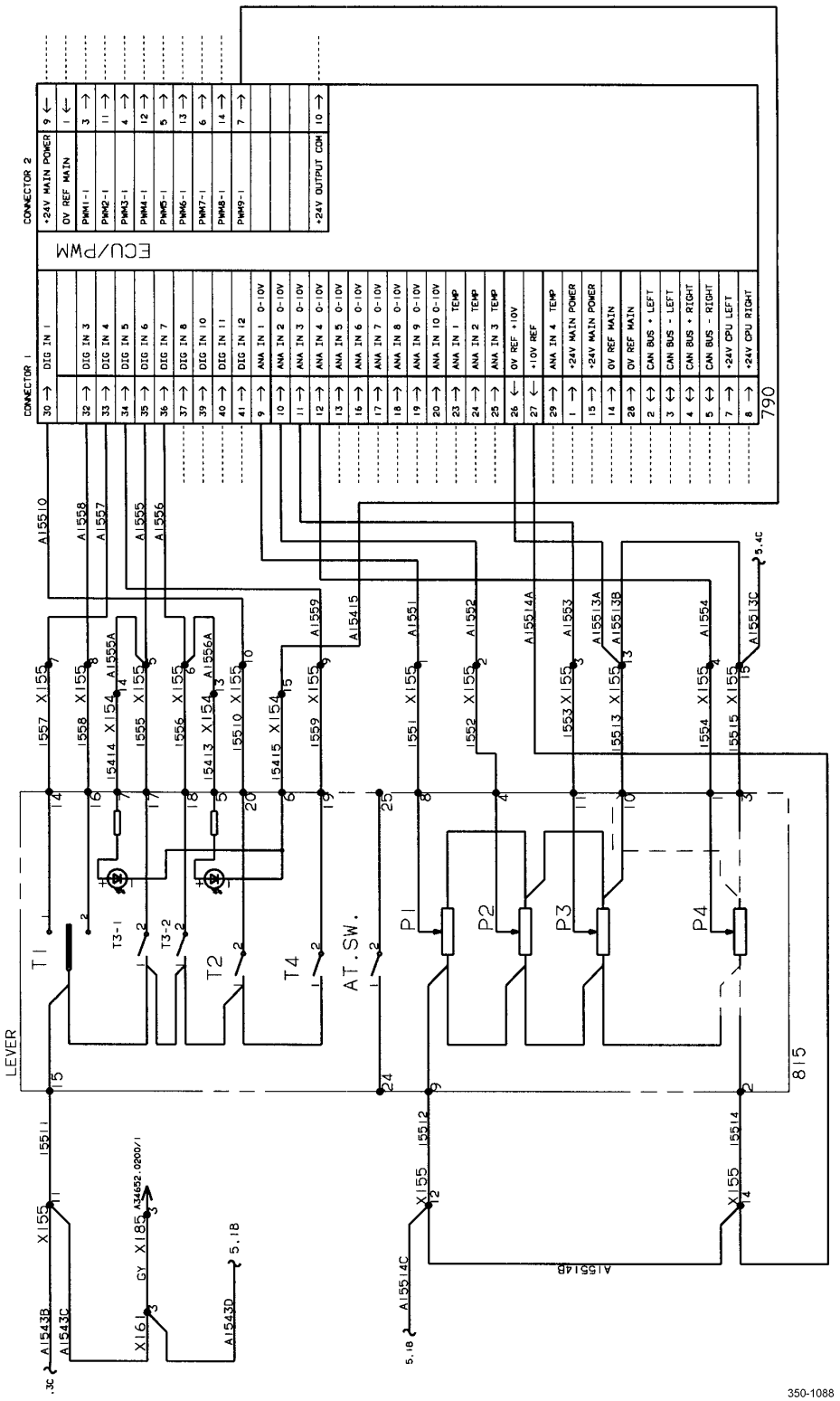


Figure 2. ECS Electrical Servo (A34648.0200) - Continued.

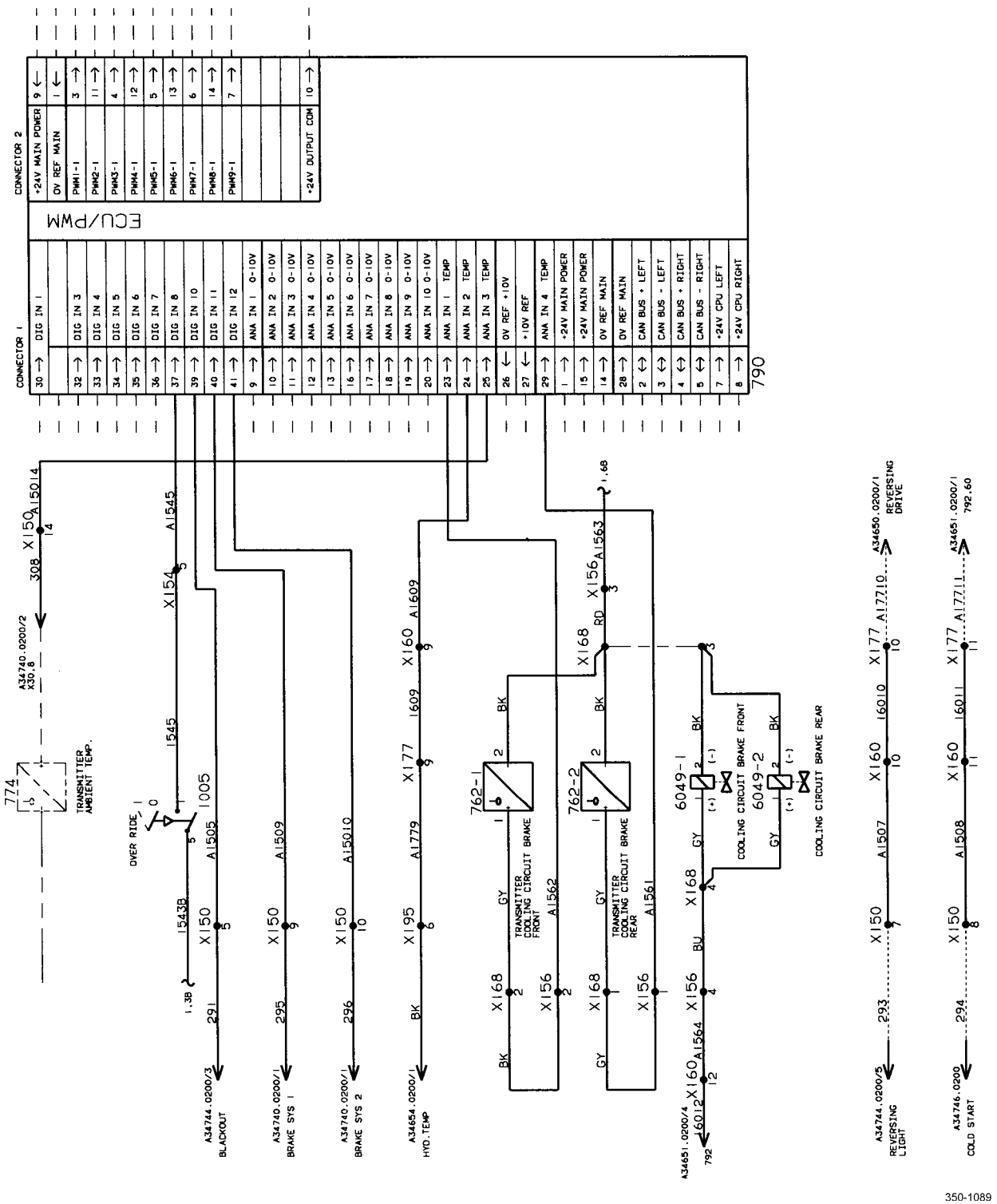


Figure 2. ECS Electrical Servo (A34648.0200) - Continued.

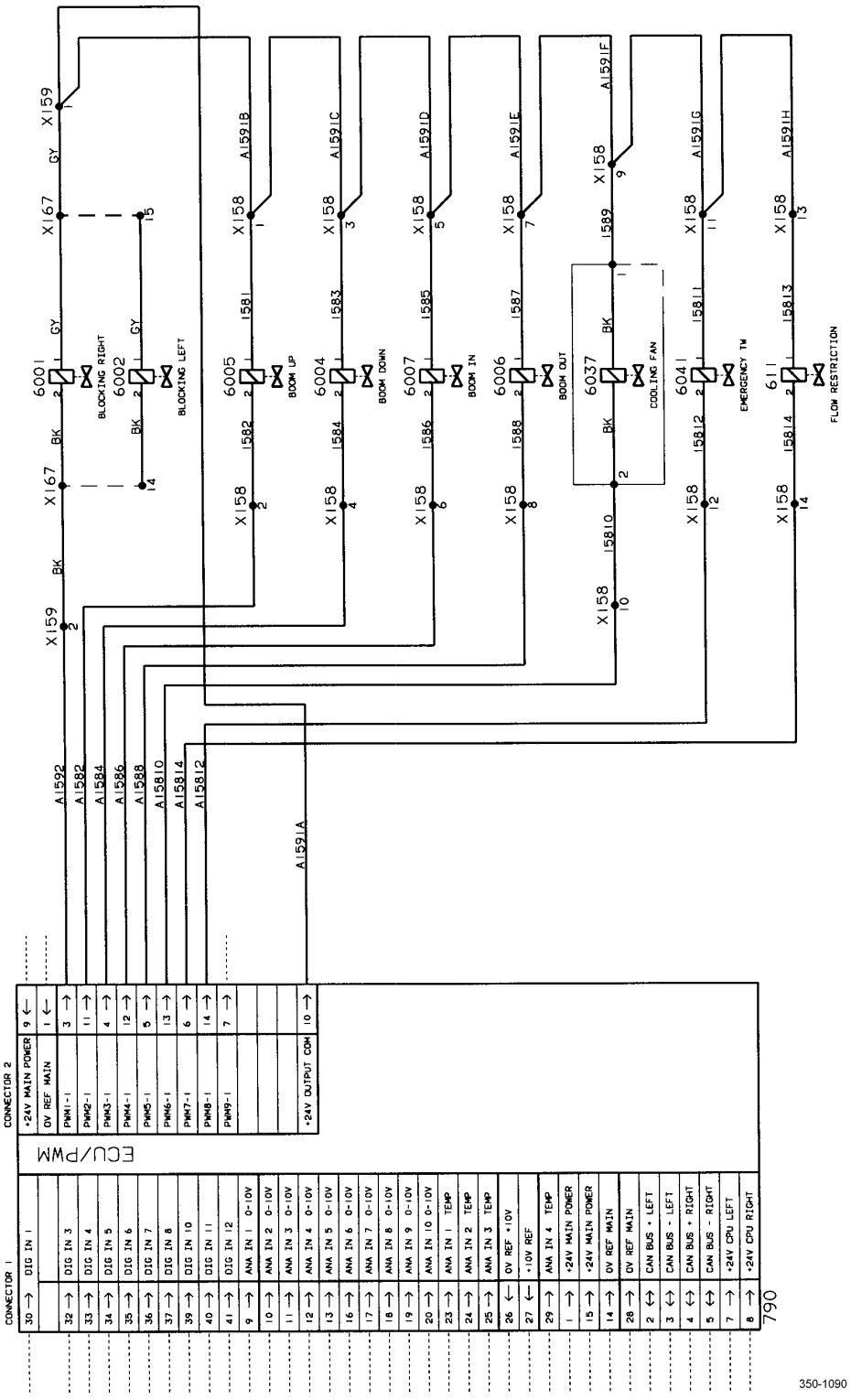


Figure 2. ECS Electrical Servo (A34648.0200) - Continued.

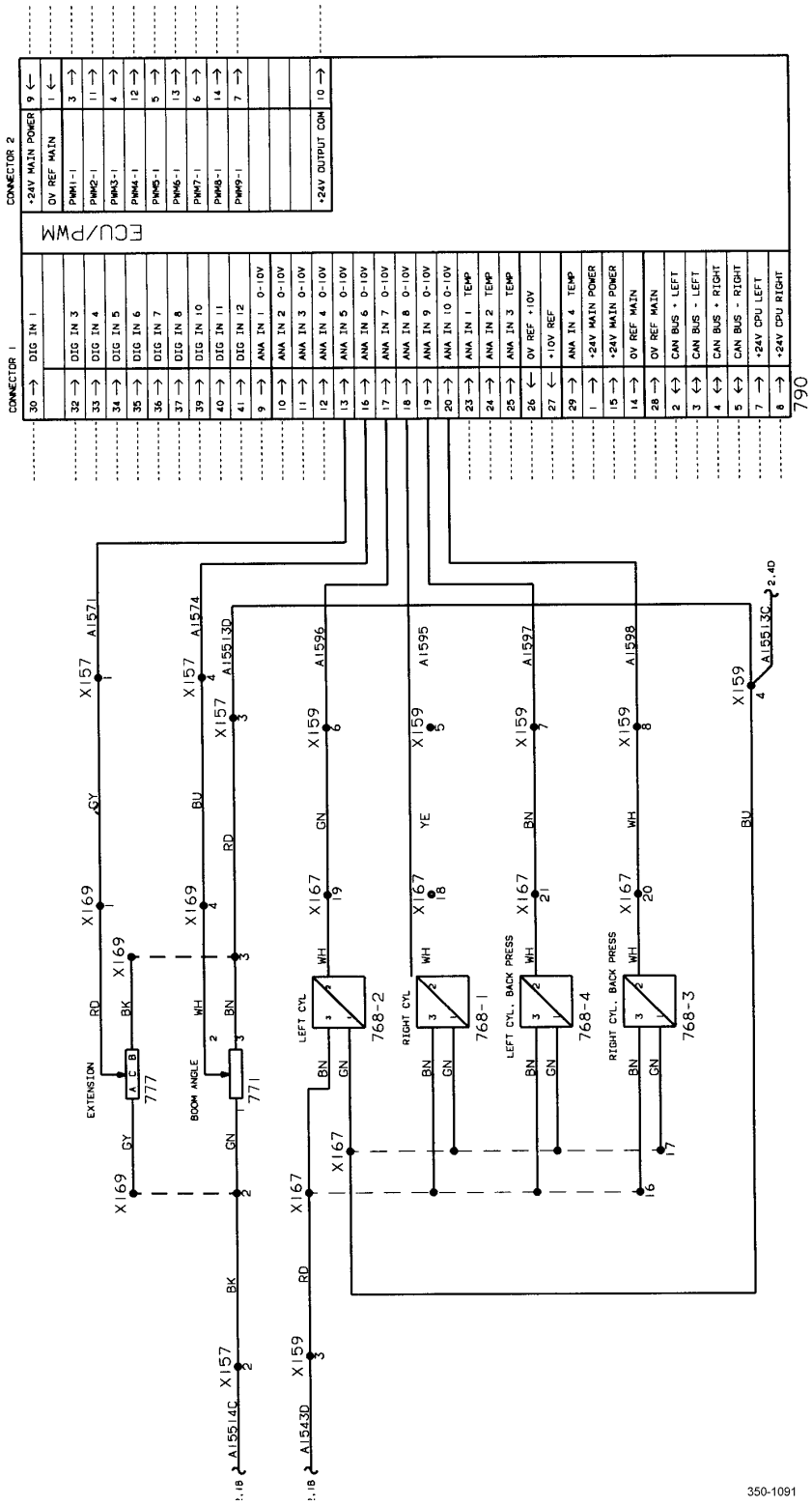


Figure 2. ECS Electrical Servo (A34648.0200) - Continued.

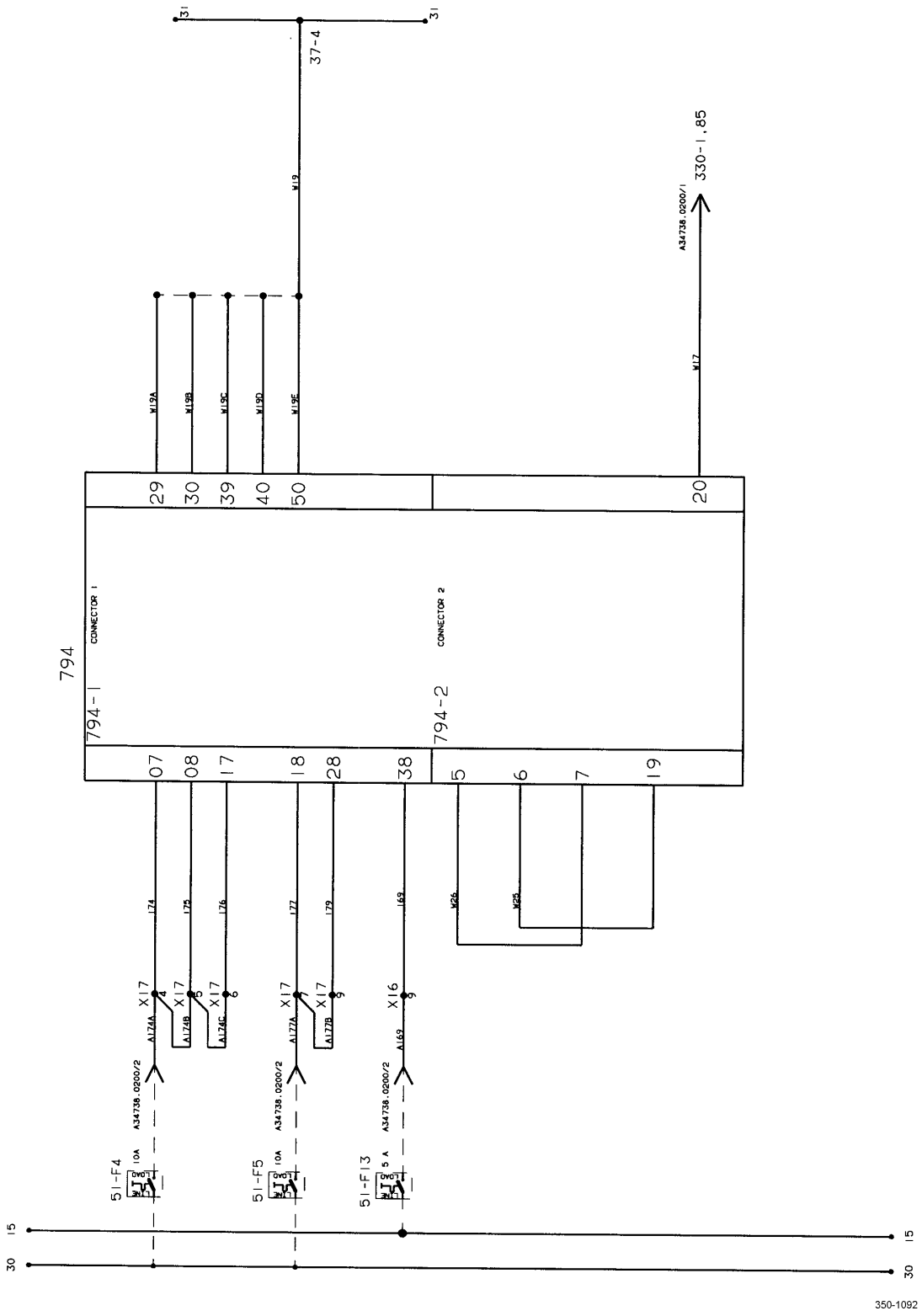


Figure 3. ECS Engine (A34649.0200).

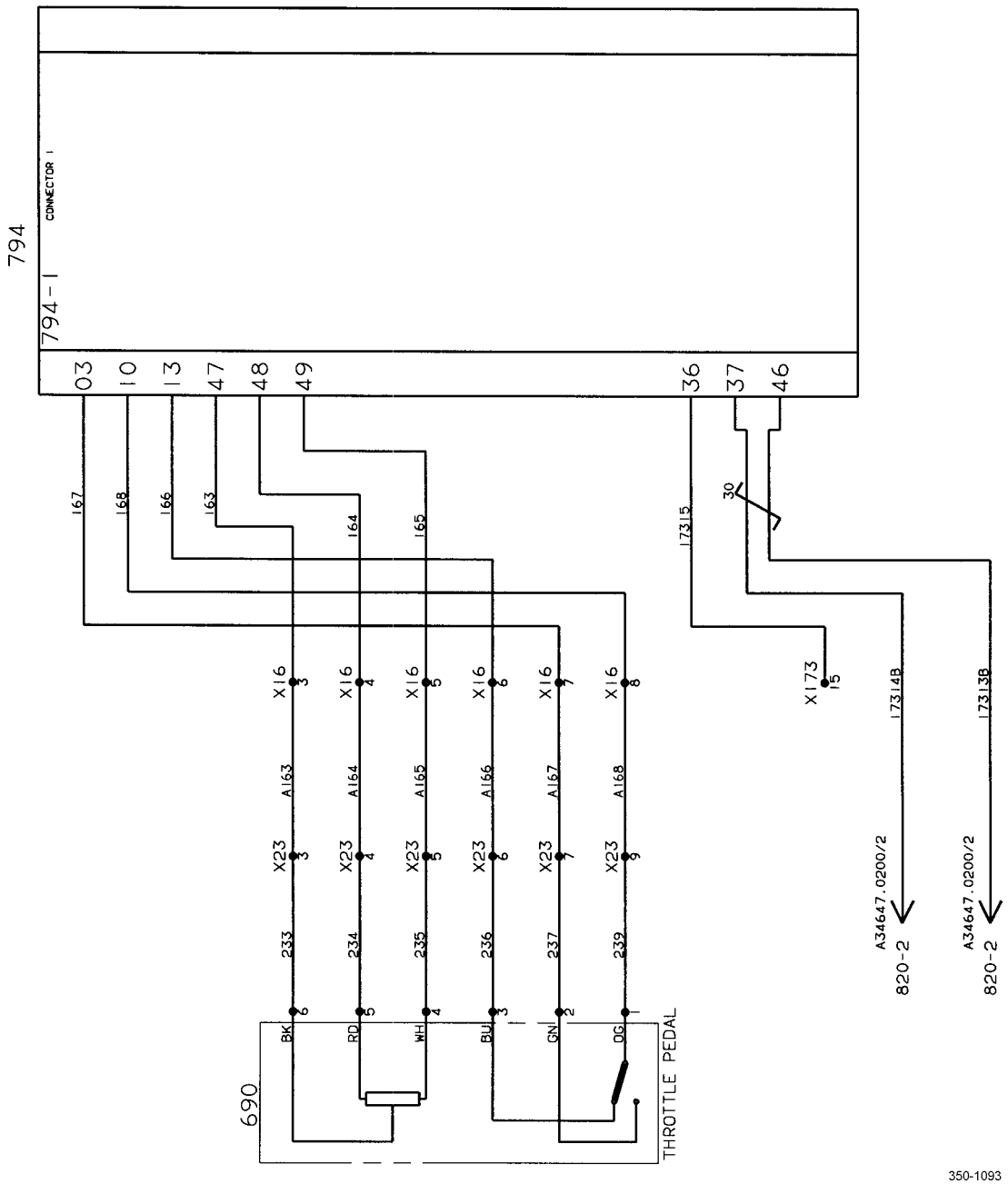


Figure 3. ECS Engine (A34649.0200) - Continued.

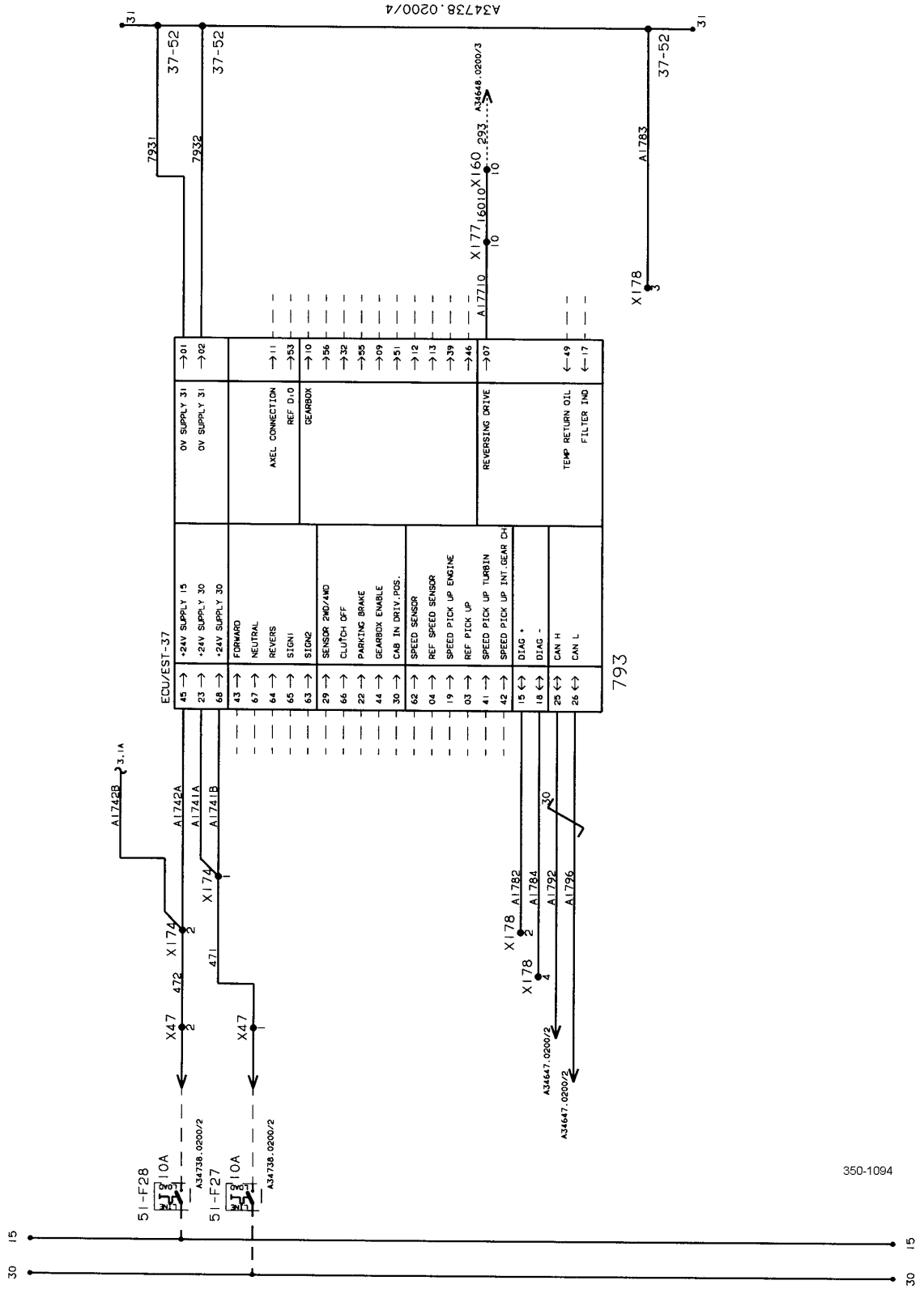


Figure 4. ECS Transmission (A34650.0200).

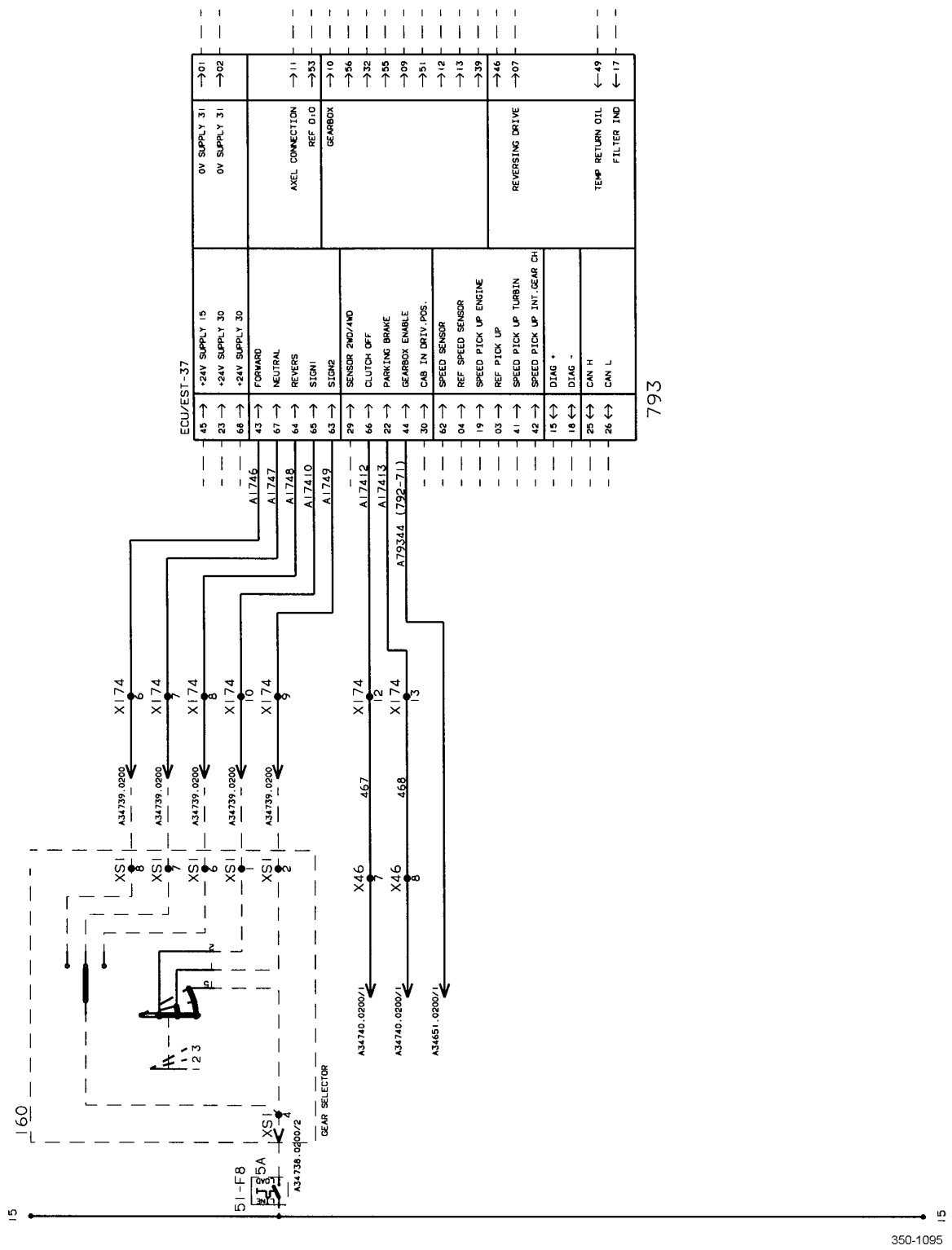


Figure 4. ECS Transmission (A34650.0200) - Continued.

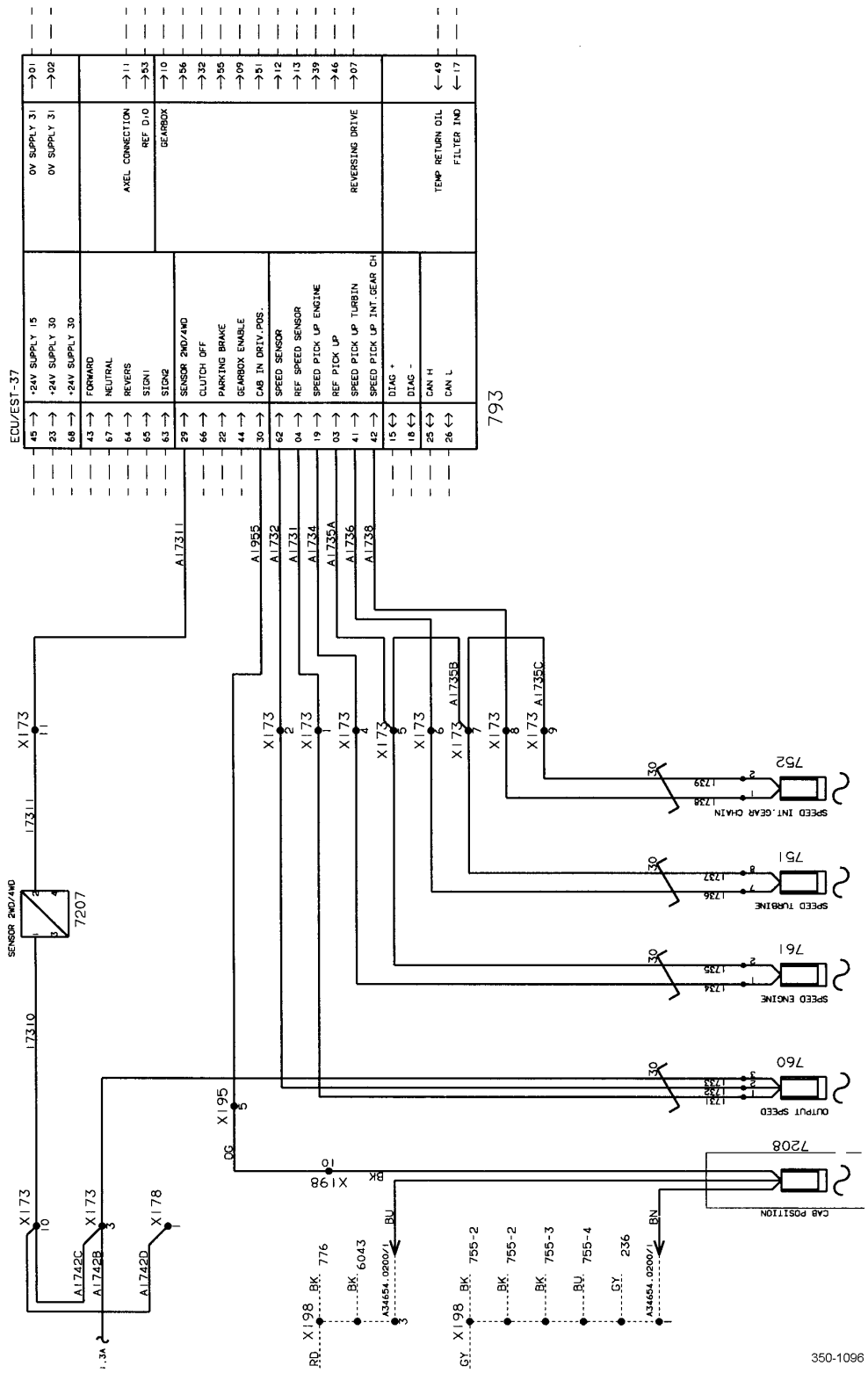


Figure 4. ECS Transmission (A34650.0200) - Continued.

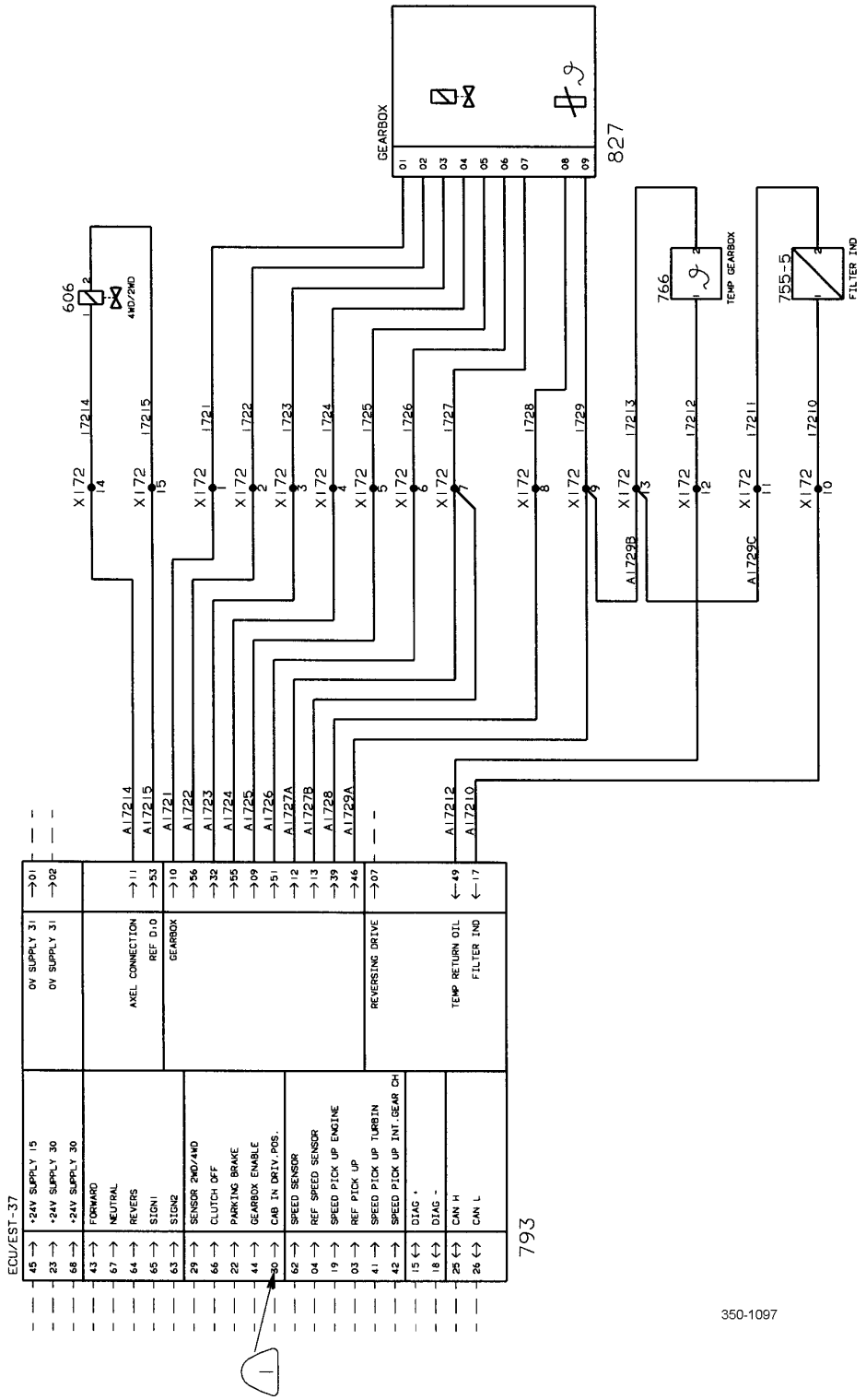


Figure 4. ECS Transmission (A34650.0200) - Continued.

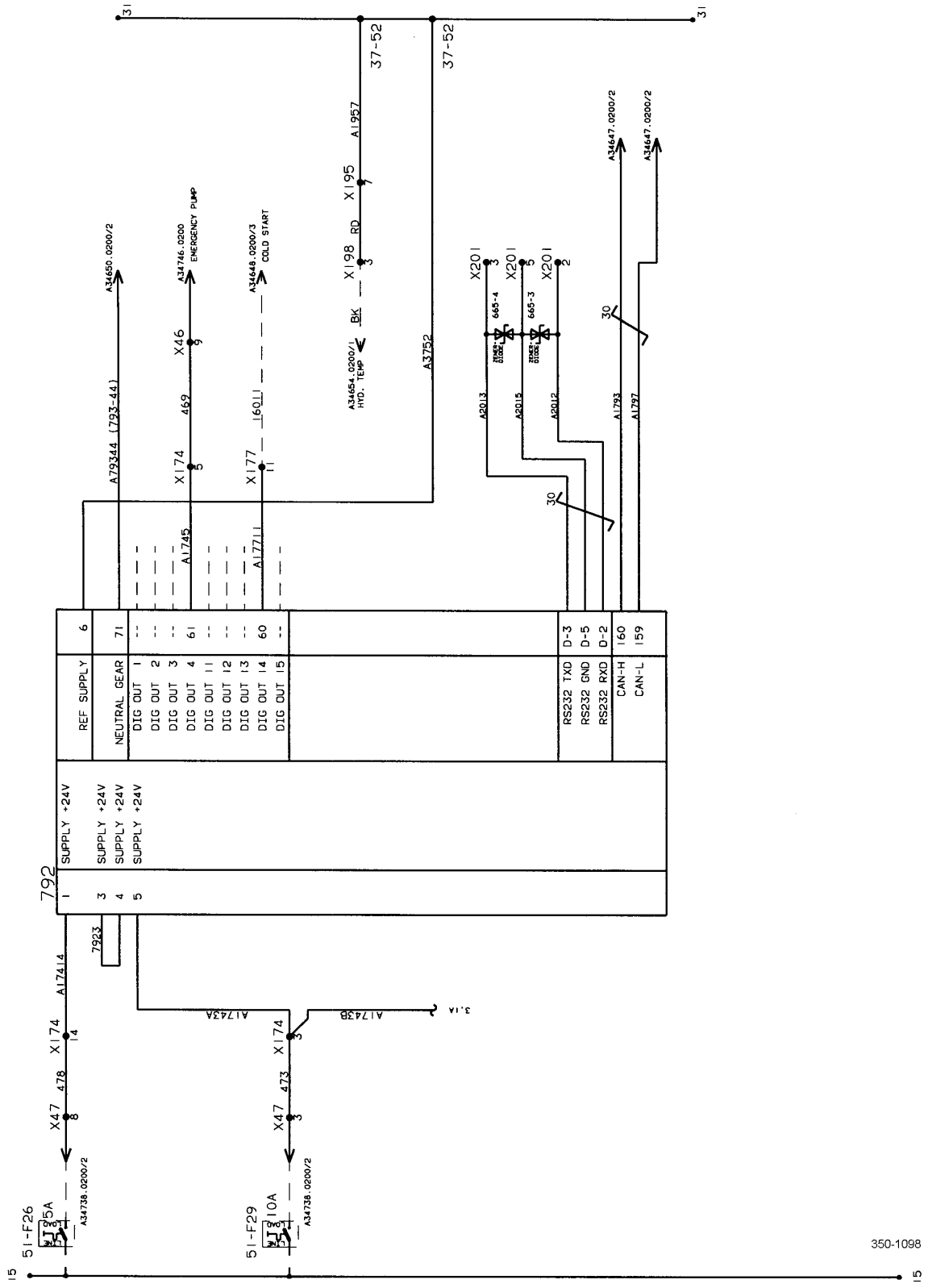


Figure 5. ECS Steering (A34651.0200).

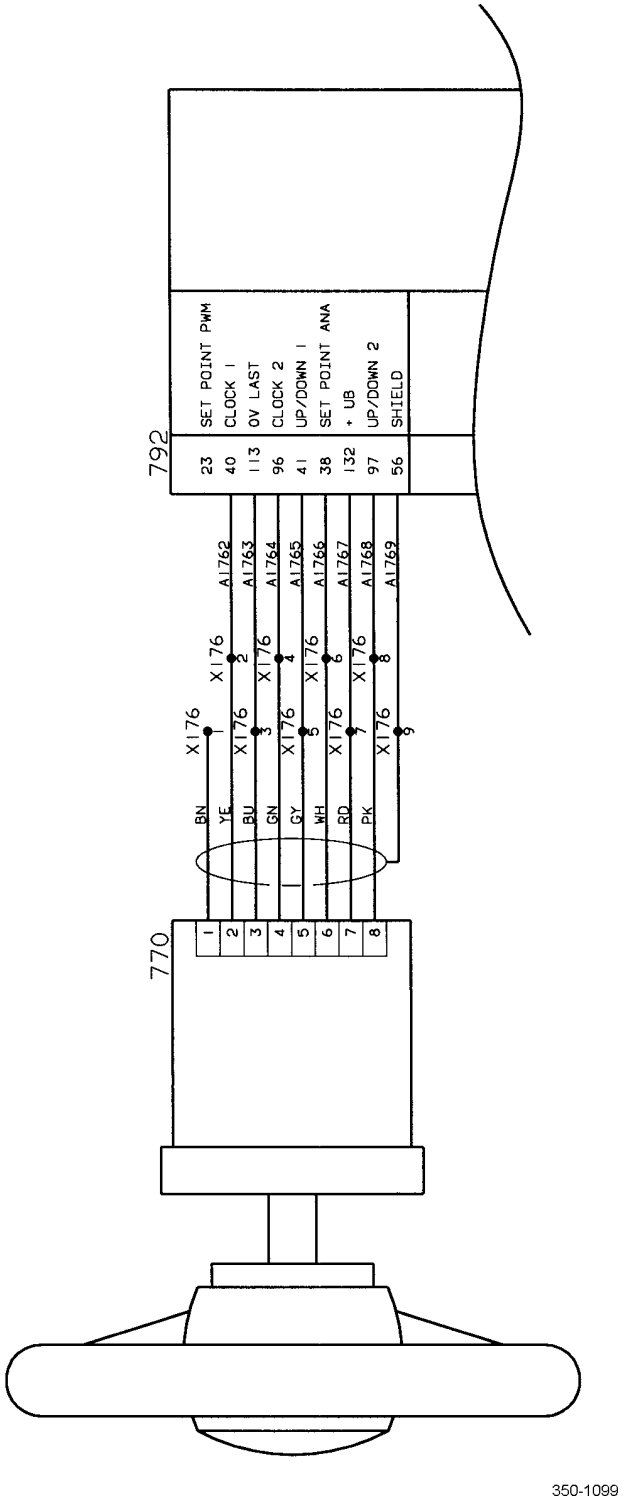


Figure 5. ECS Steering (A34651.0200) - Continued.

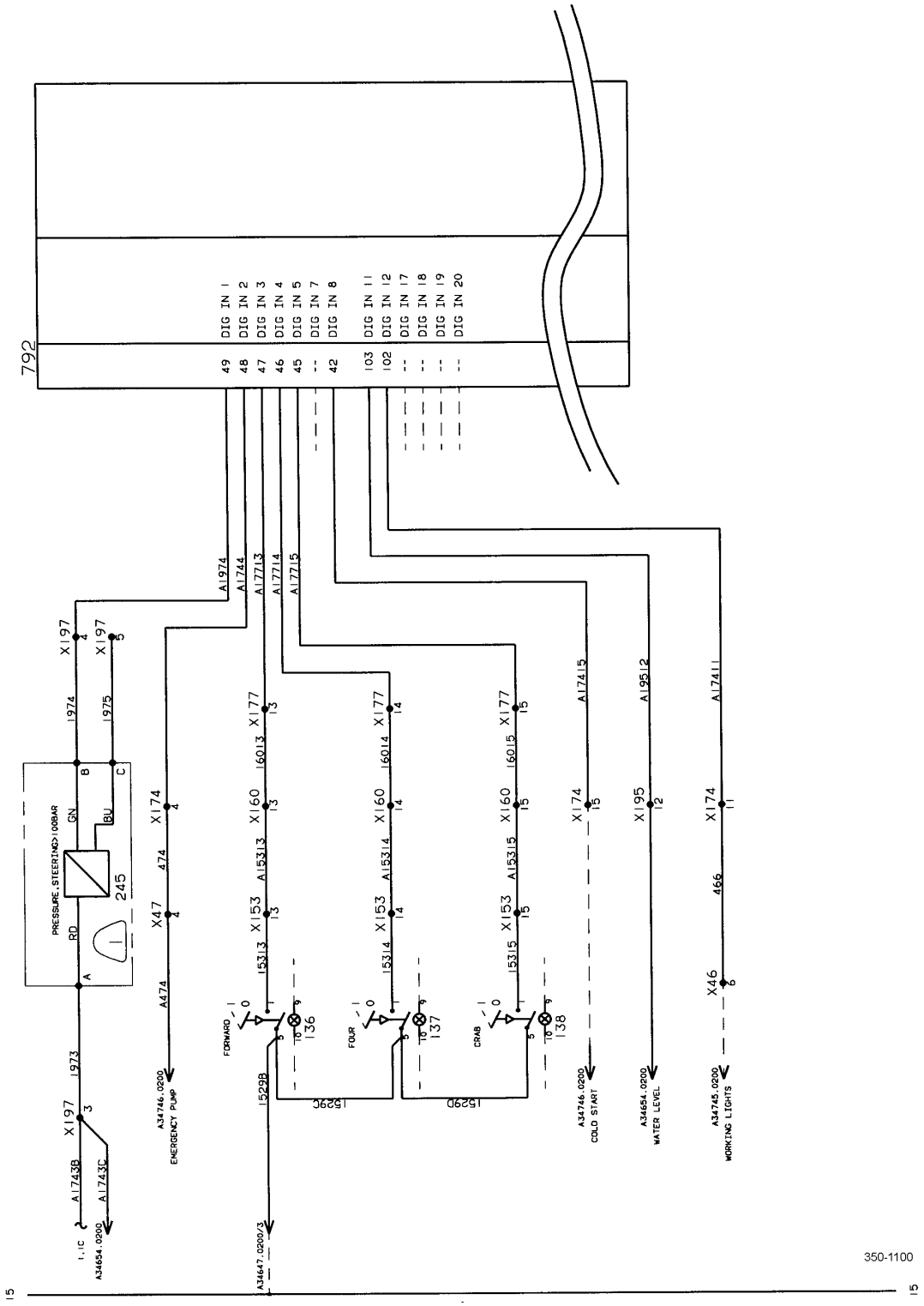


Figure 5. ECS Steering (A34651.0200) - Continued.

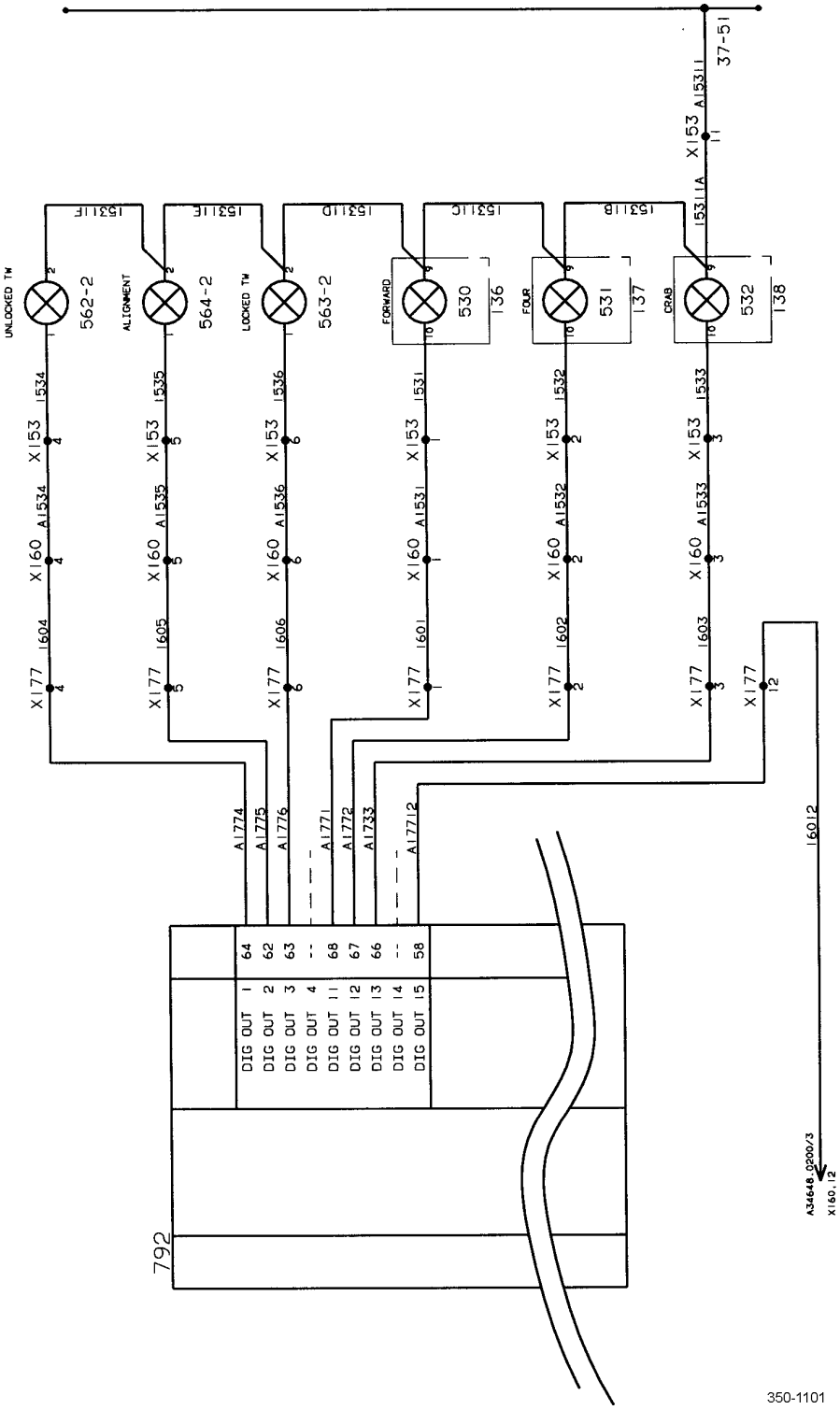


Figure 5. ECS Steering (A34651.0200) - Continued.

DIAGRAMS - CONTINUED **0199 00**

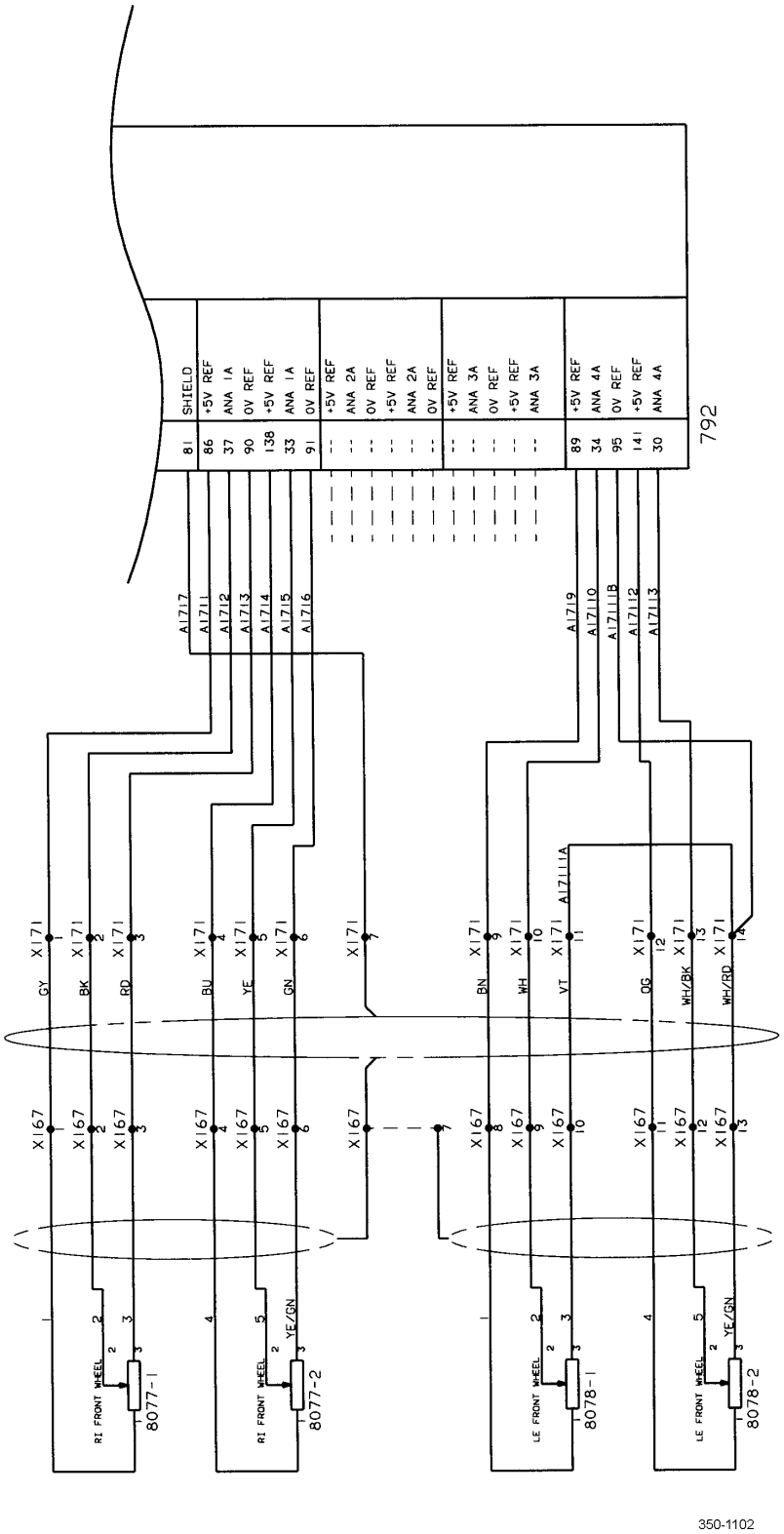


Figure 5. ECS Steering (A34651.0200) - Continued.

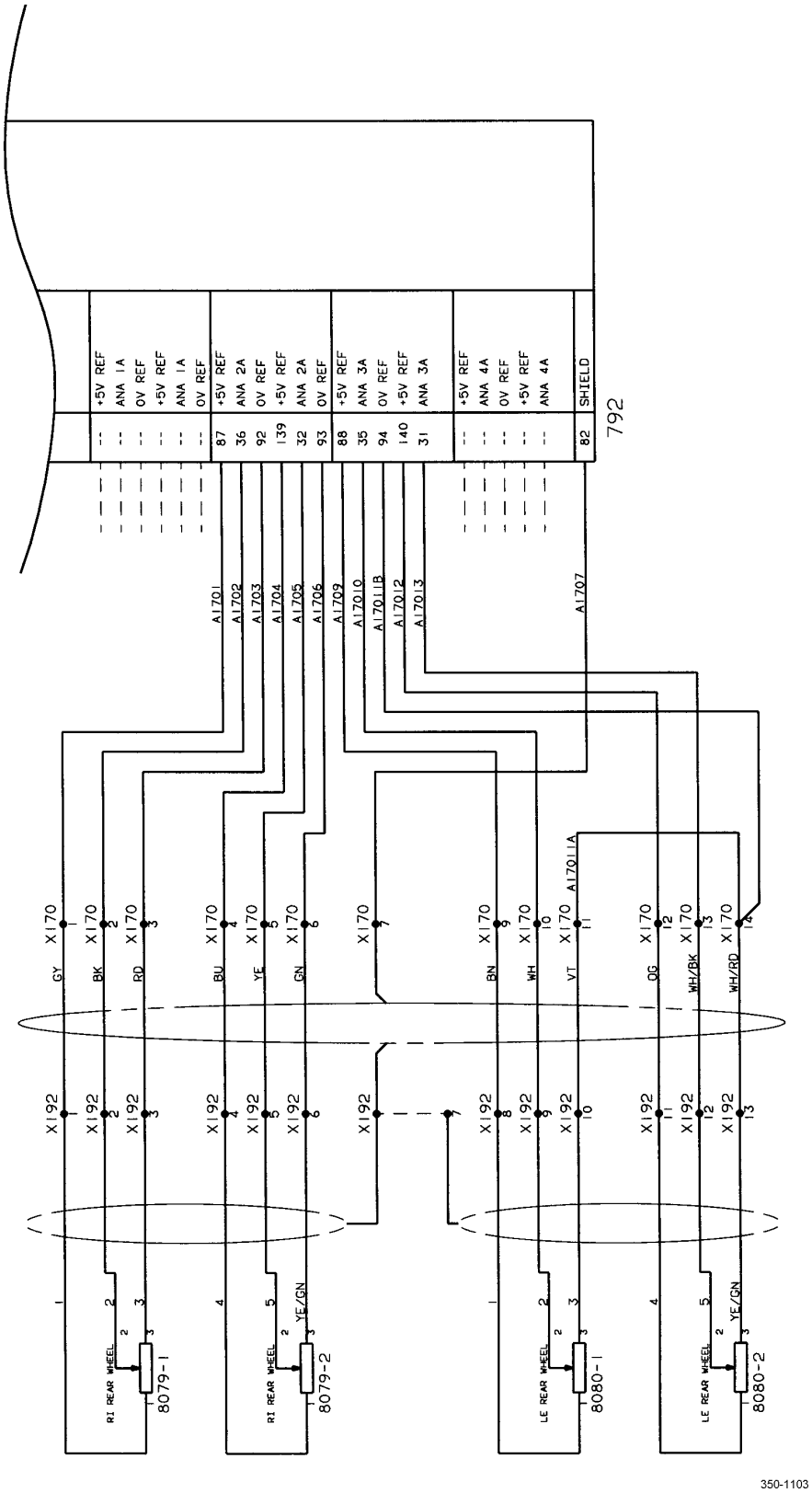


Figure 5. ECS Steering (A34651.0200) - Continued.

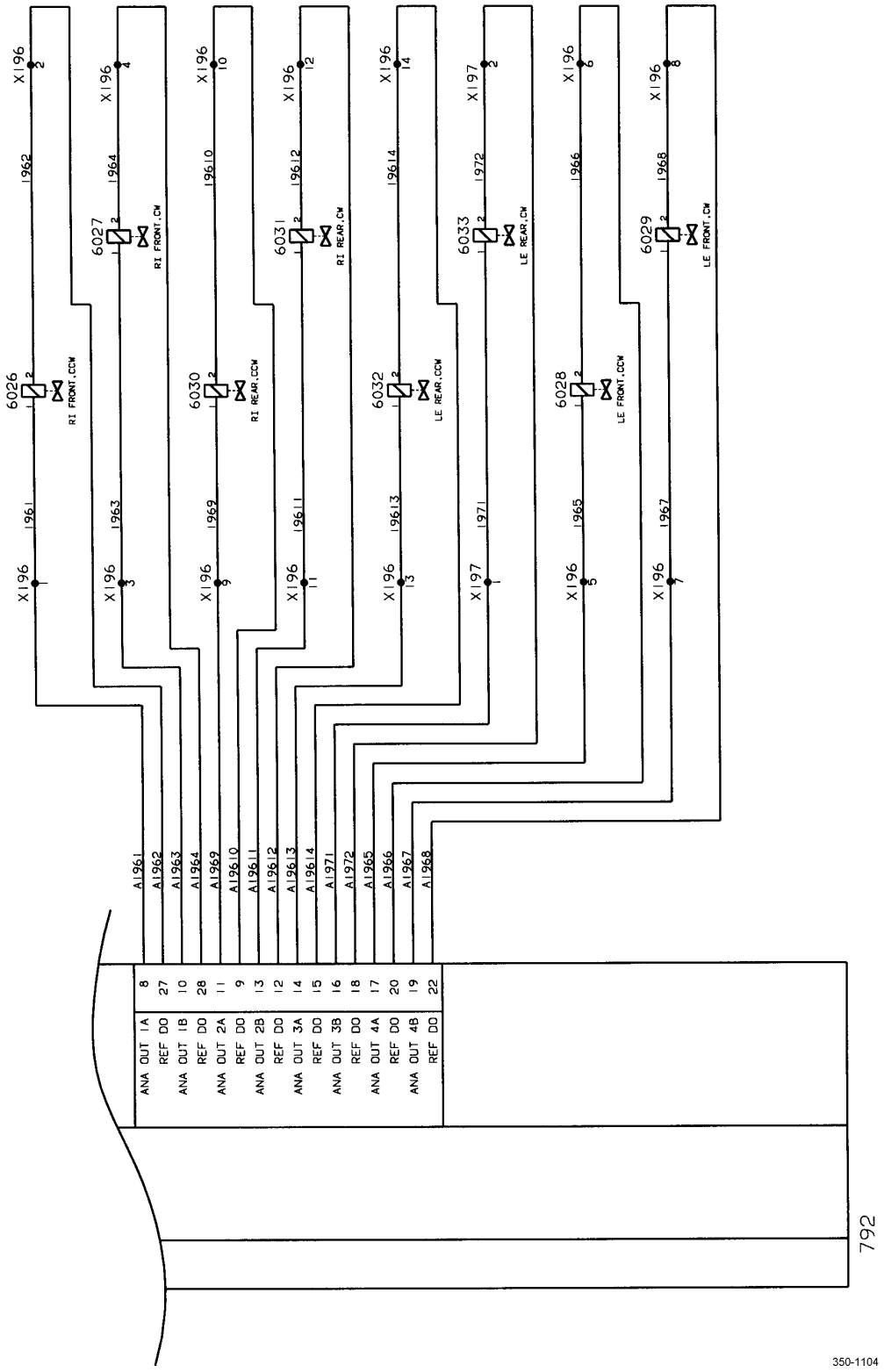
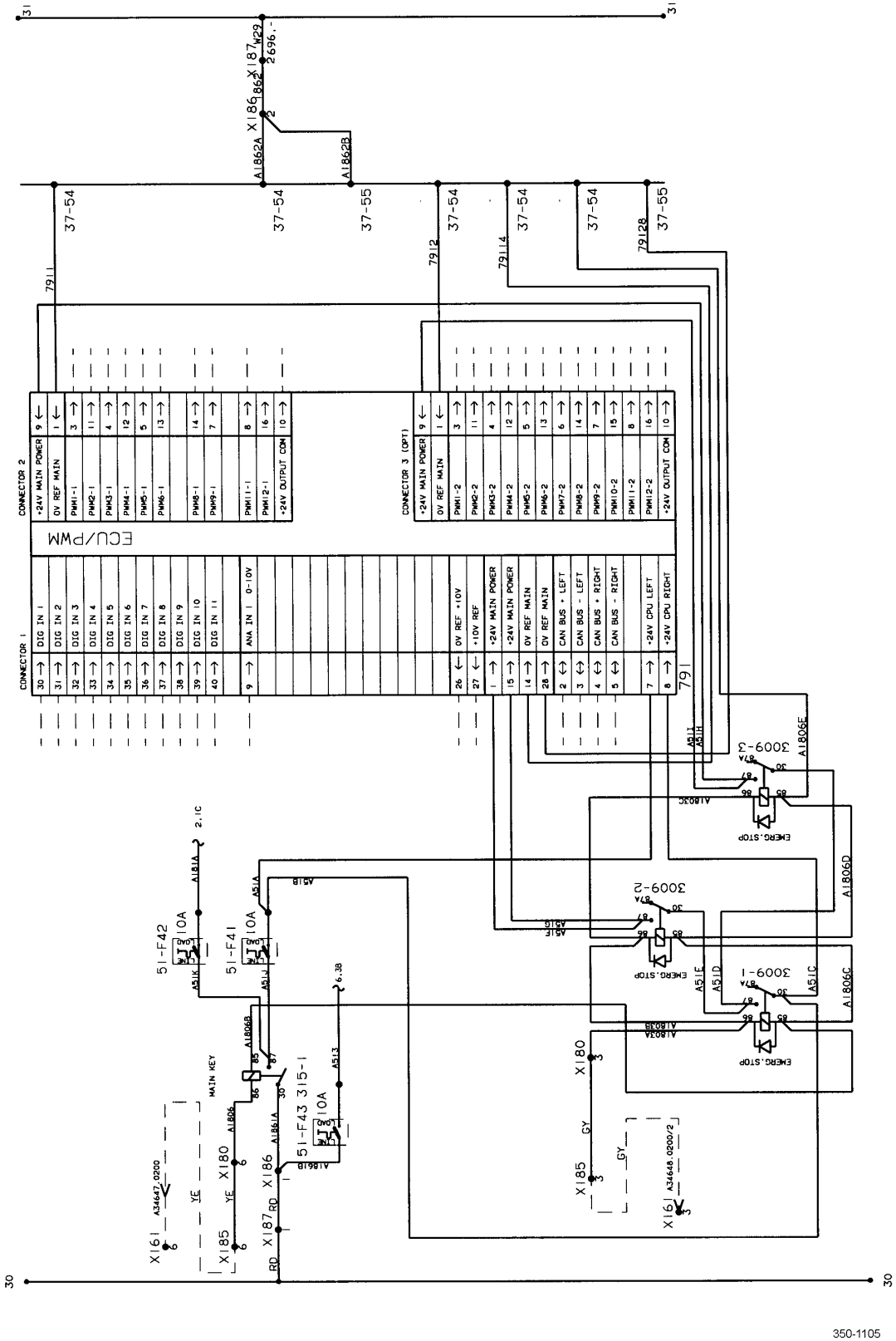


Figure 5. ECS Steering (A34651.0200) - Continued.



350-1105

Figure 6. ECS Attachment (A34652.0200).

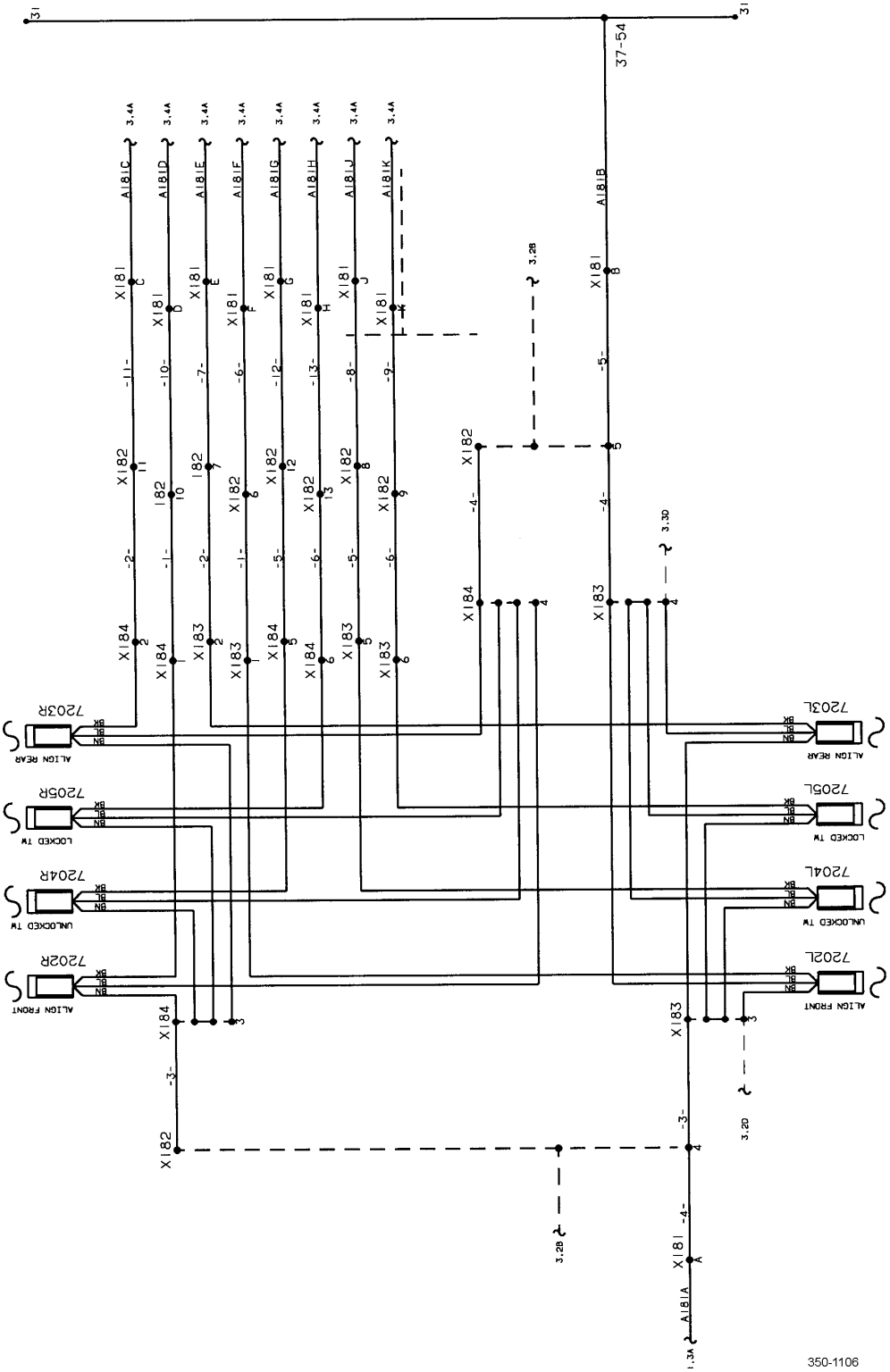


Figure 6. ECS Attachment (A34652.0200) - Continued.

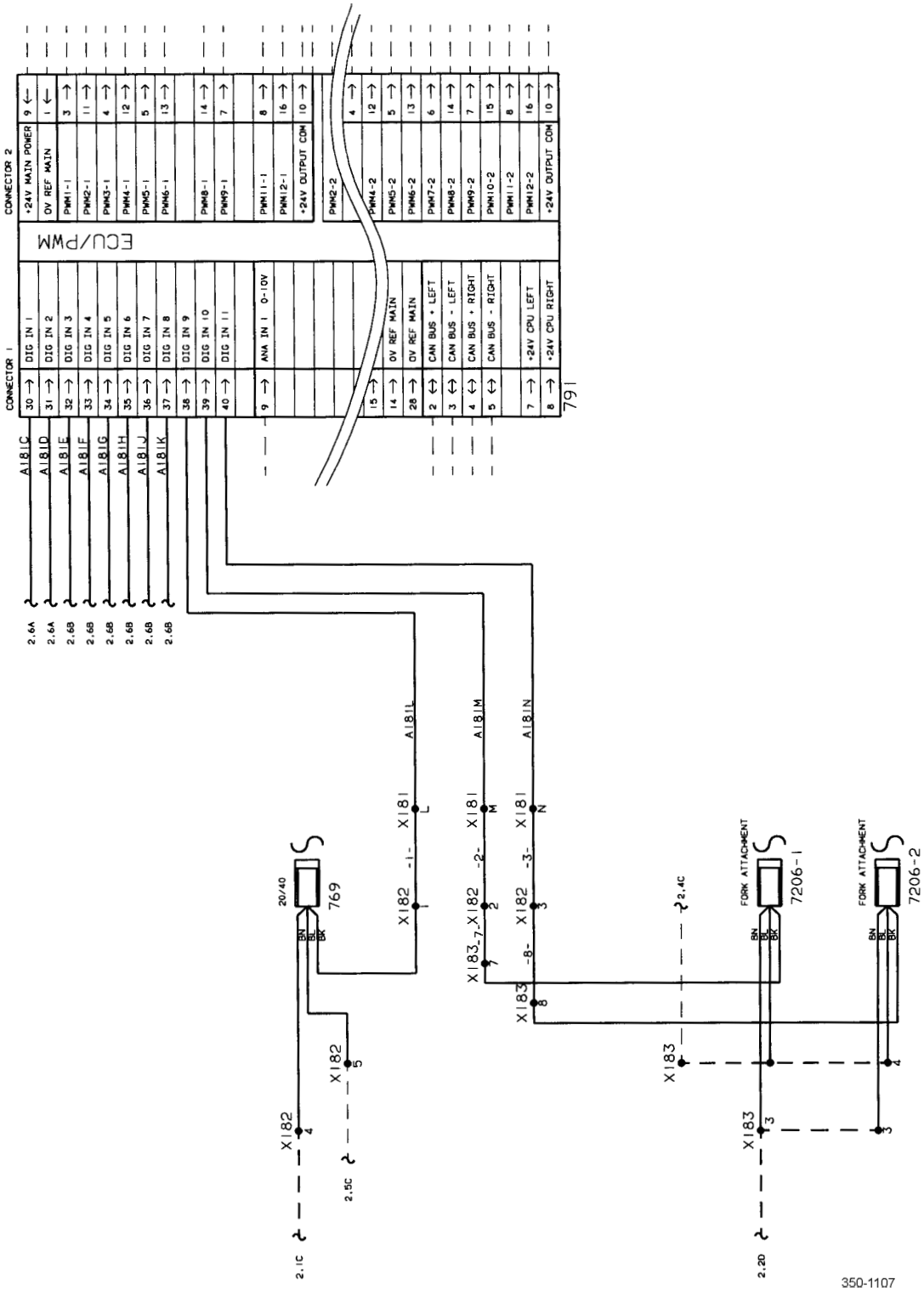


Figure 6. ECS Attachment (A34652.0200) - Continued.

DIAGRAMS - CONTINUED **0199 00**

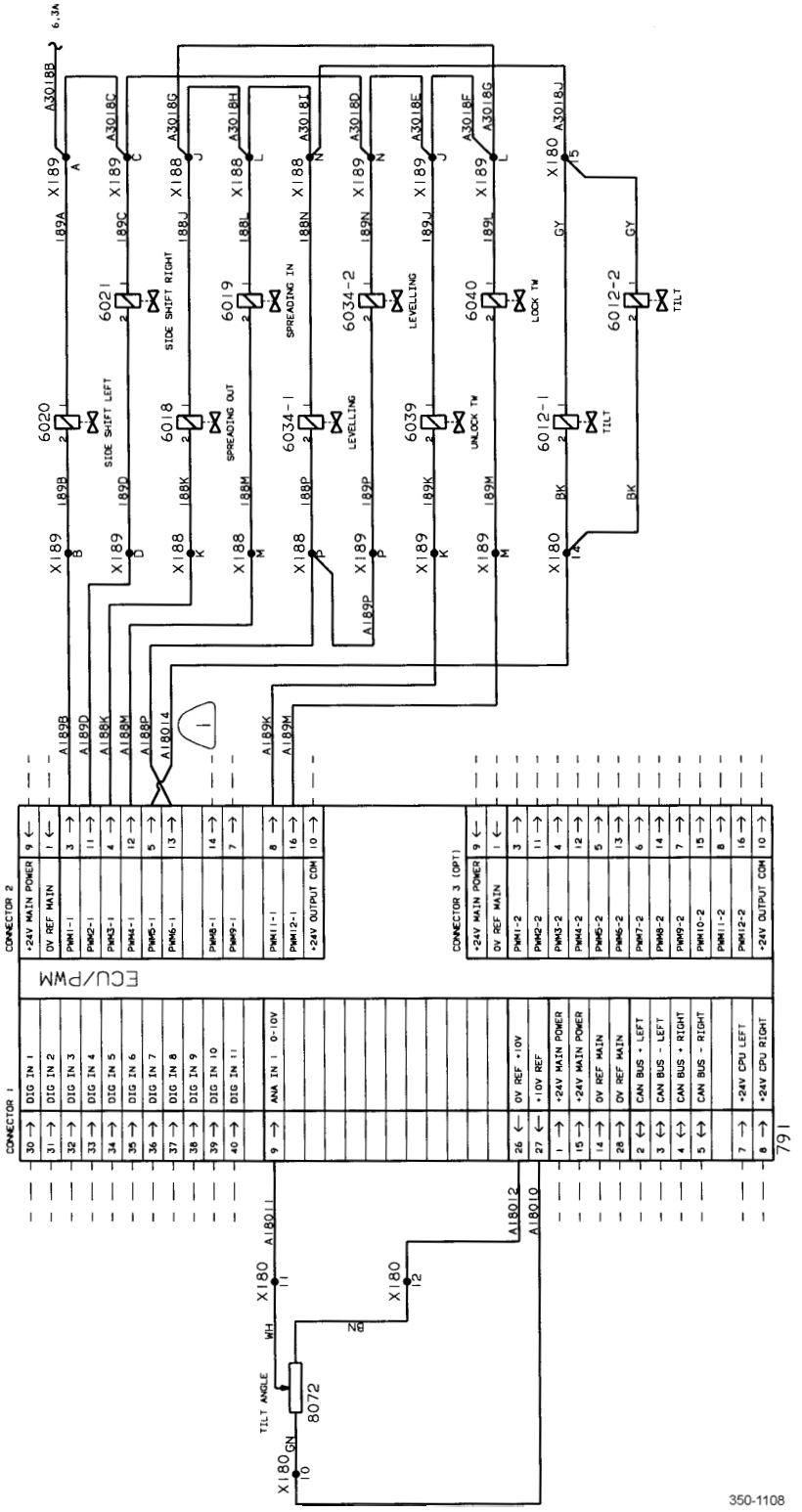


Figure 6. ECS Attachment (A34652.0200) - Continued.

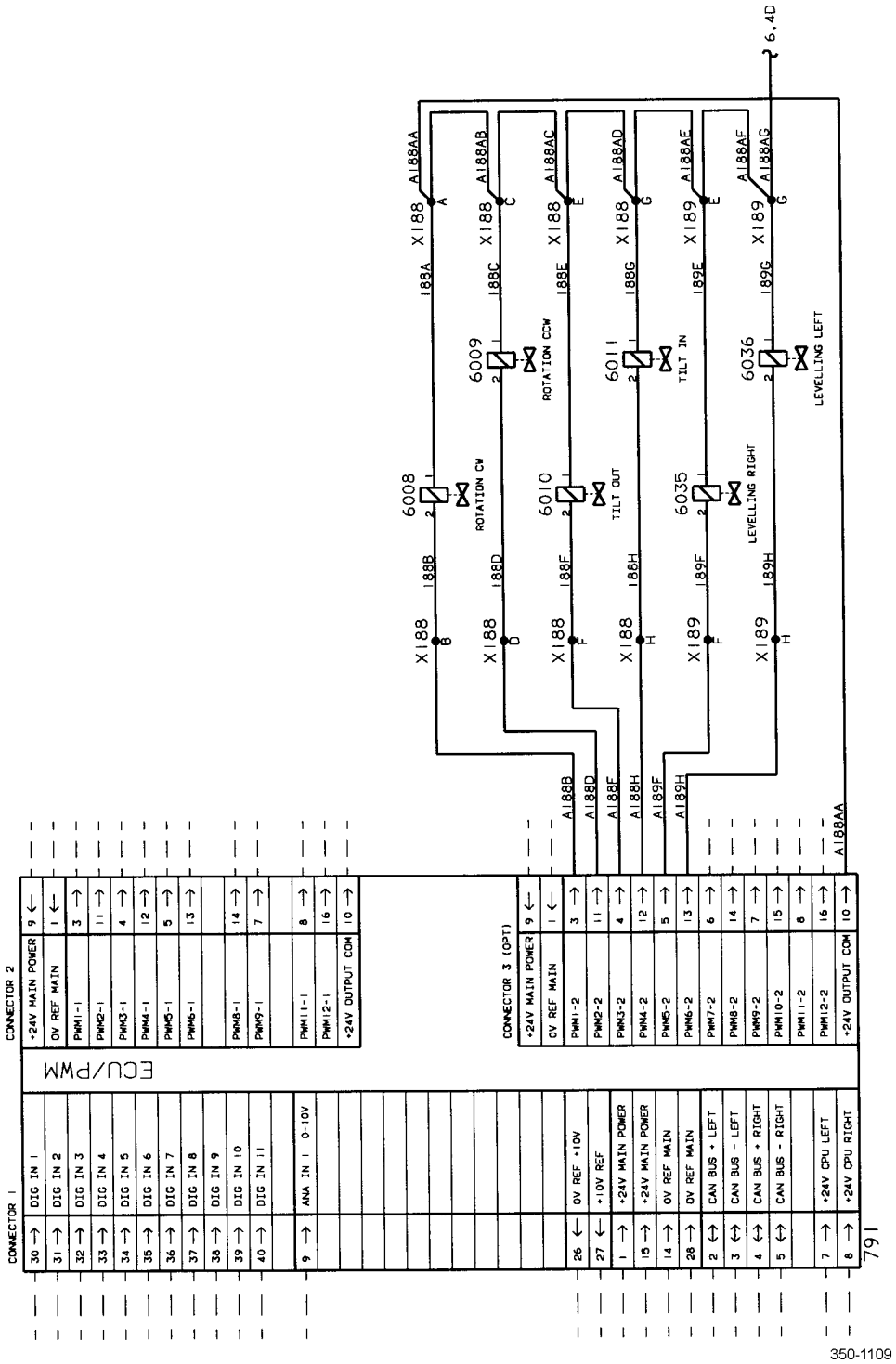


Figure 6. ECS Attachment (A34652.0200) - Continued.

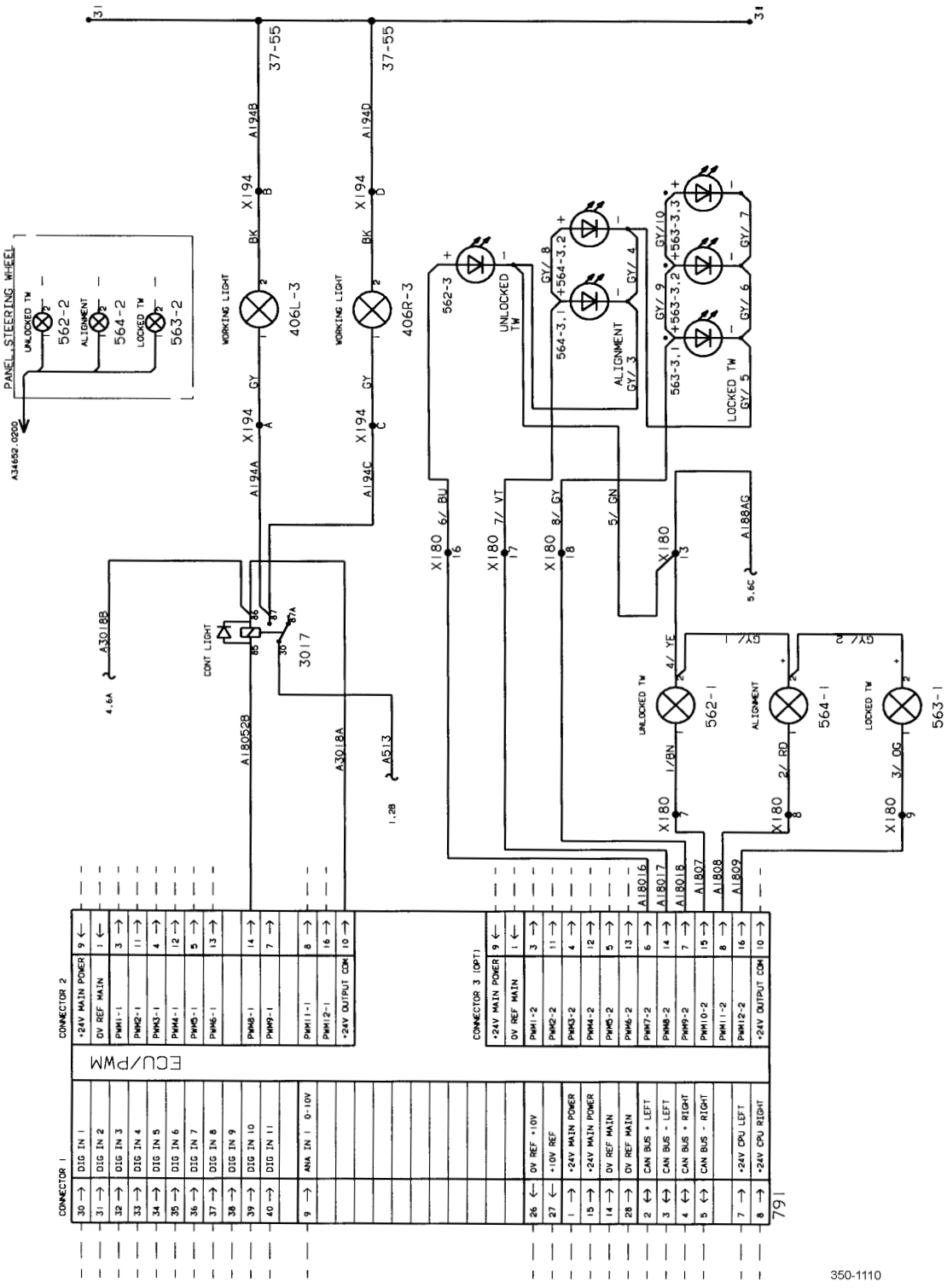


Figure 6. ECS Attachment (A34652.0200) - Continued.

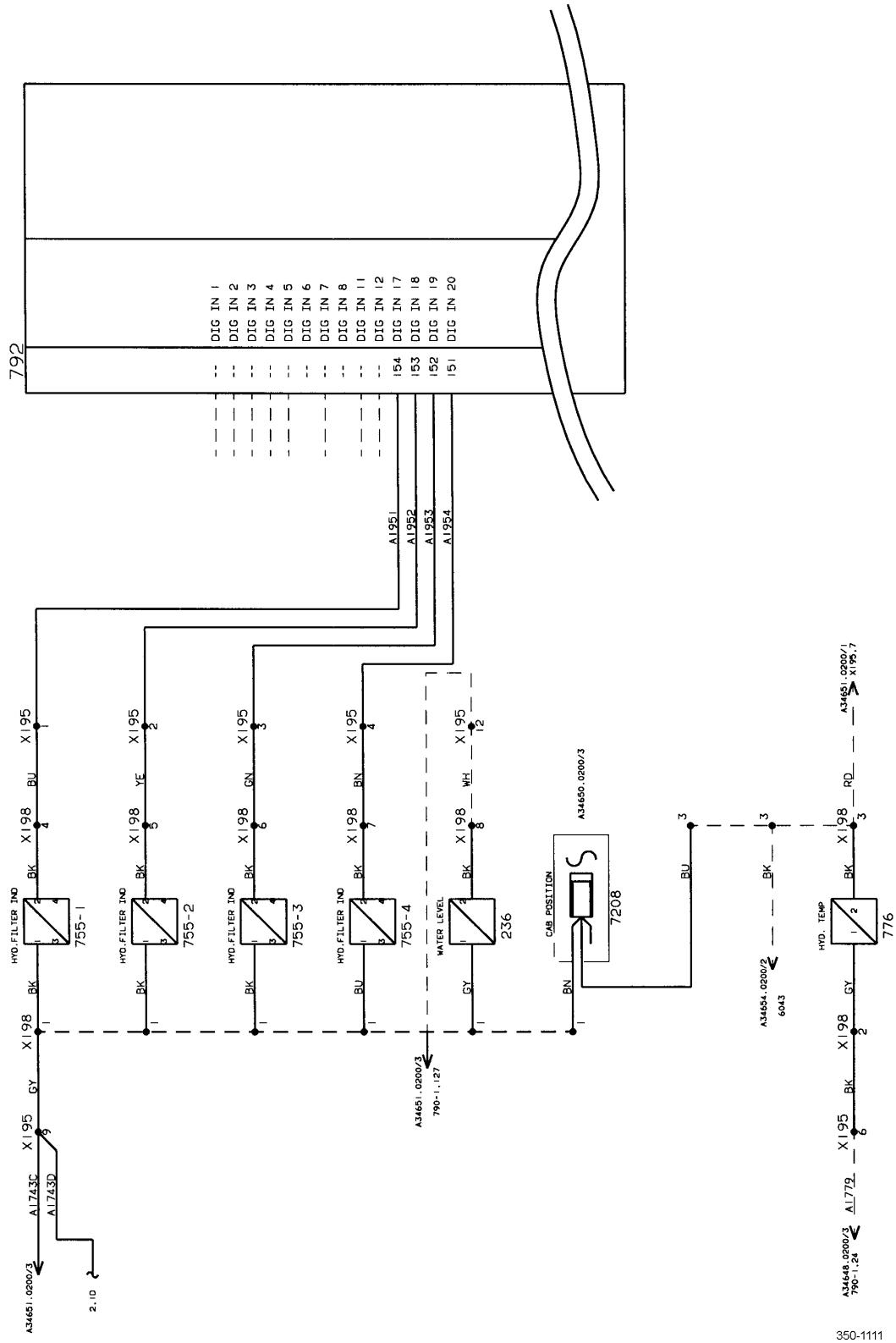


Figure 7. ECS Hydraulics (A34654.0200).

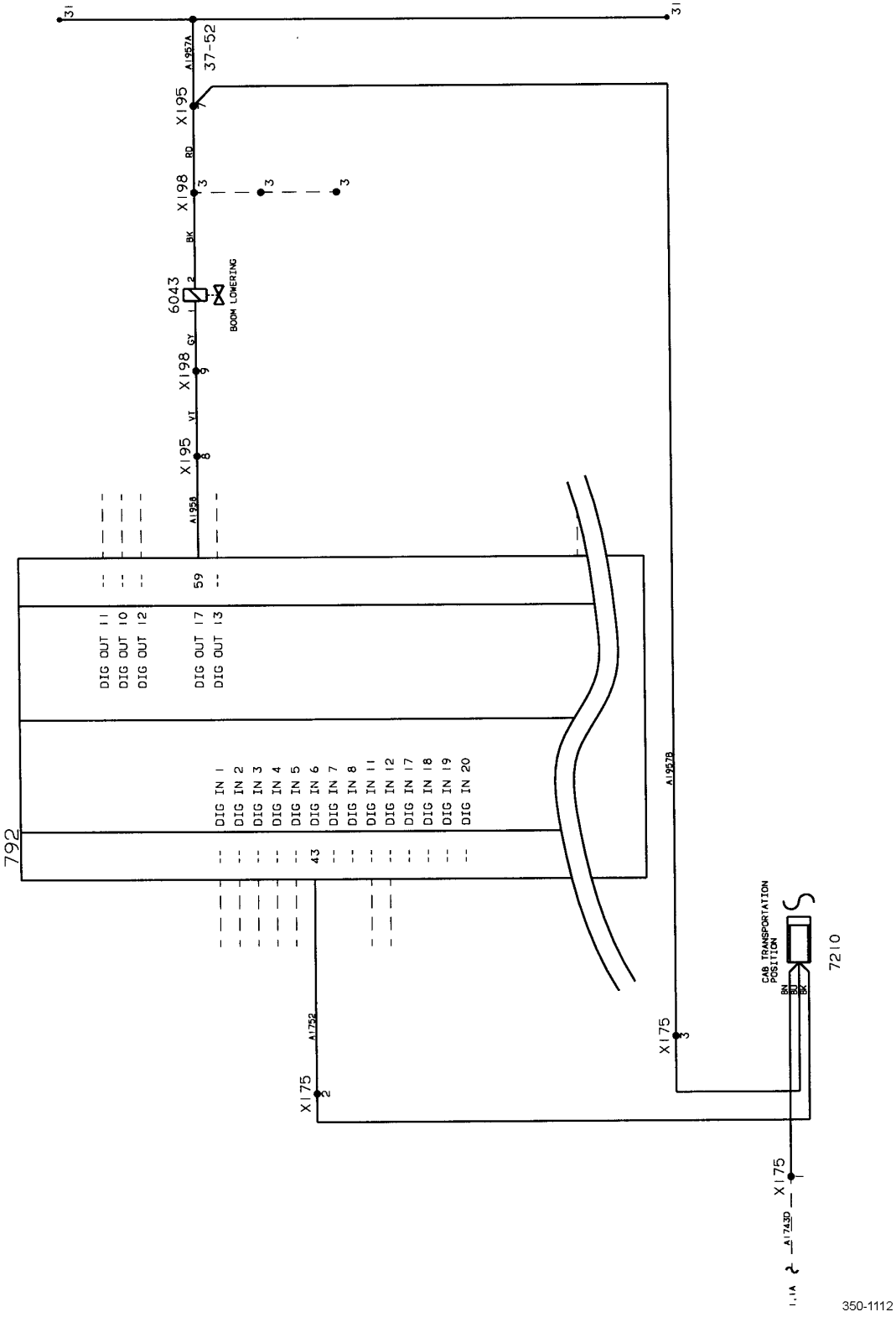


Figure 7. ECS Hydraulics (A34654.0200) - Continued.

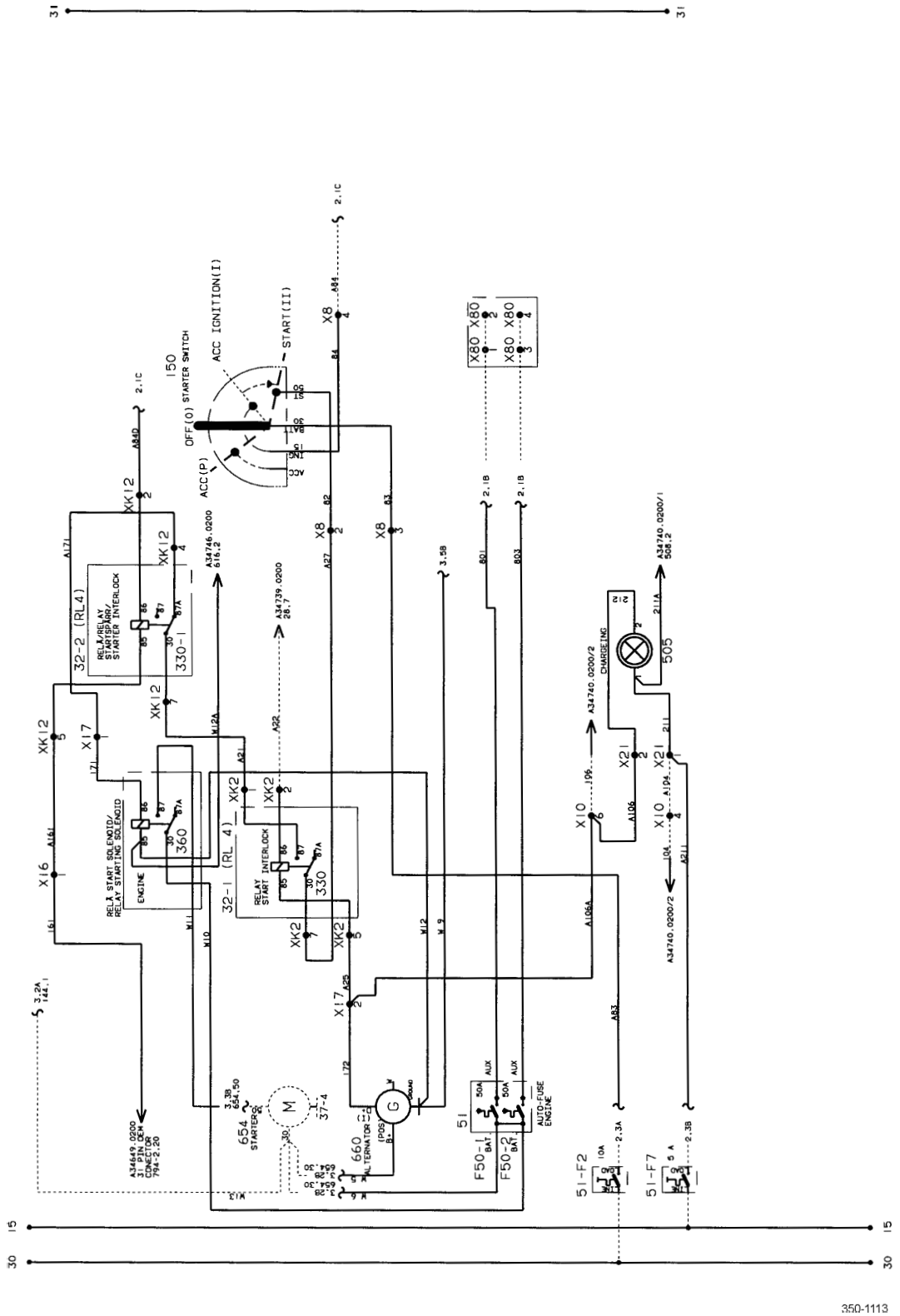


Figure 8. Current Supply (A34738.0200).

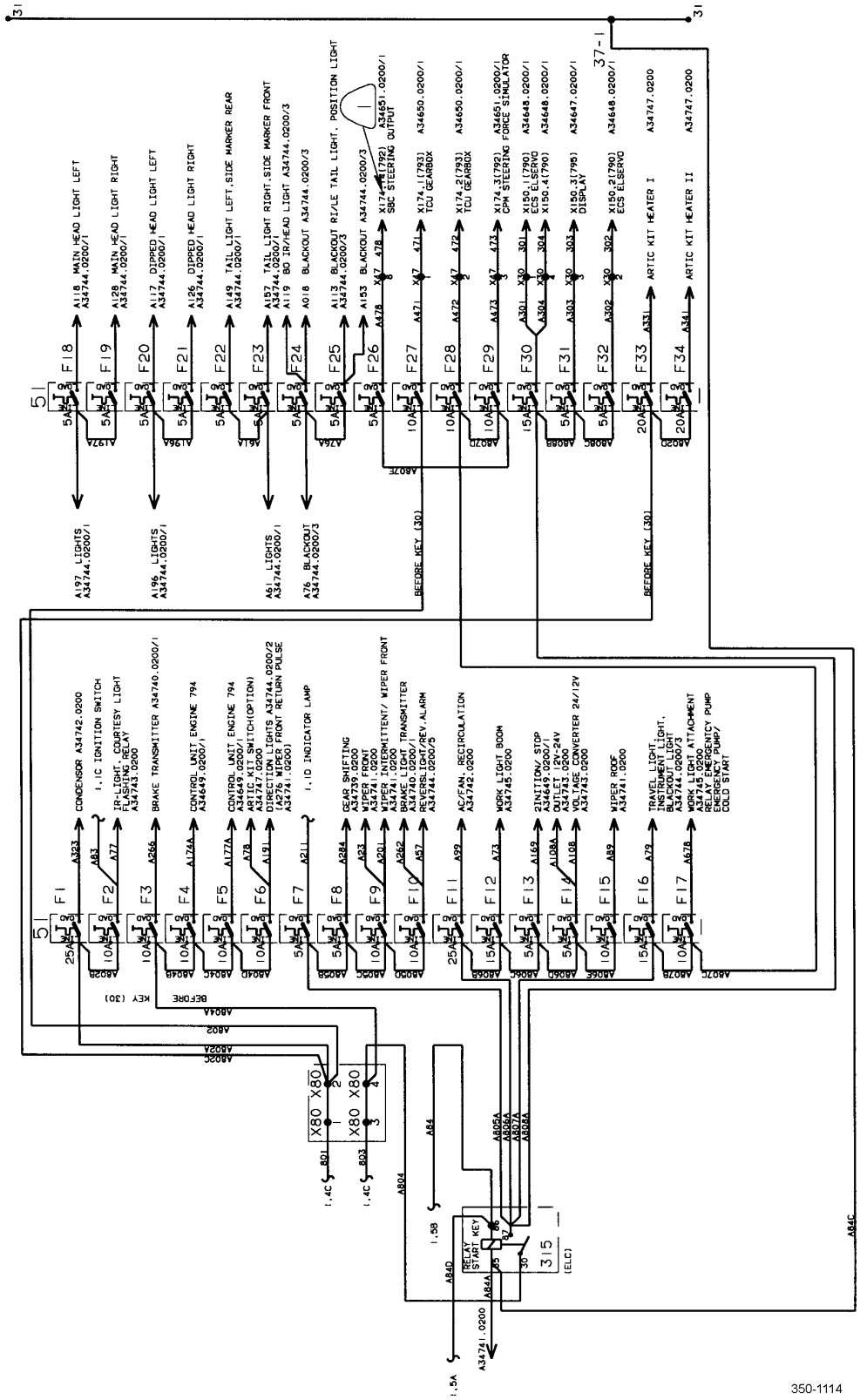


Figure 8. Current Supply (A34738.0200) - Continued.

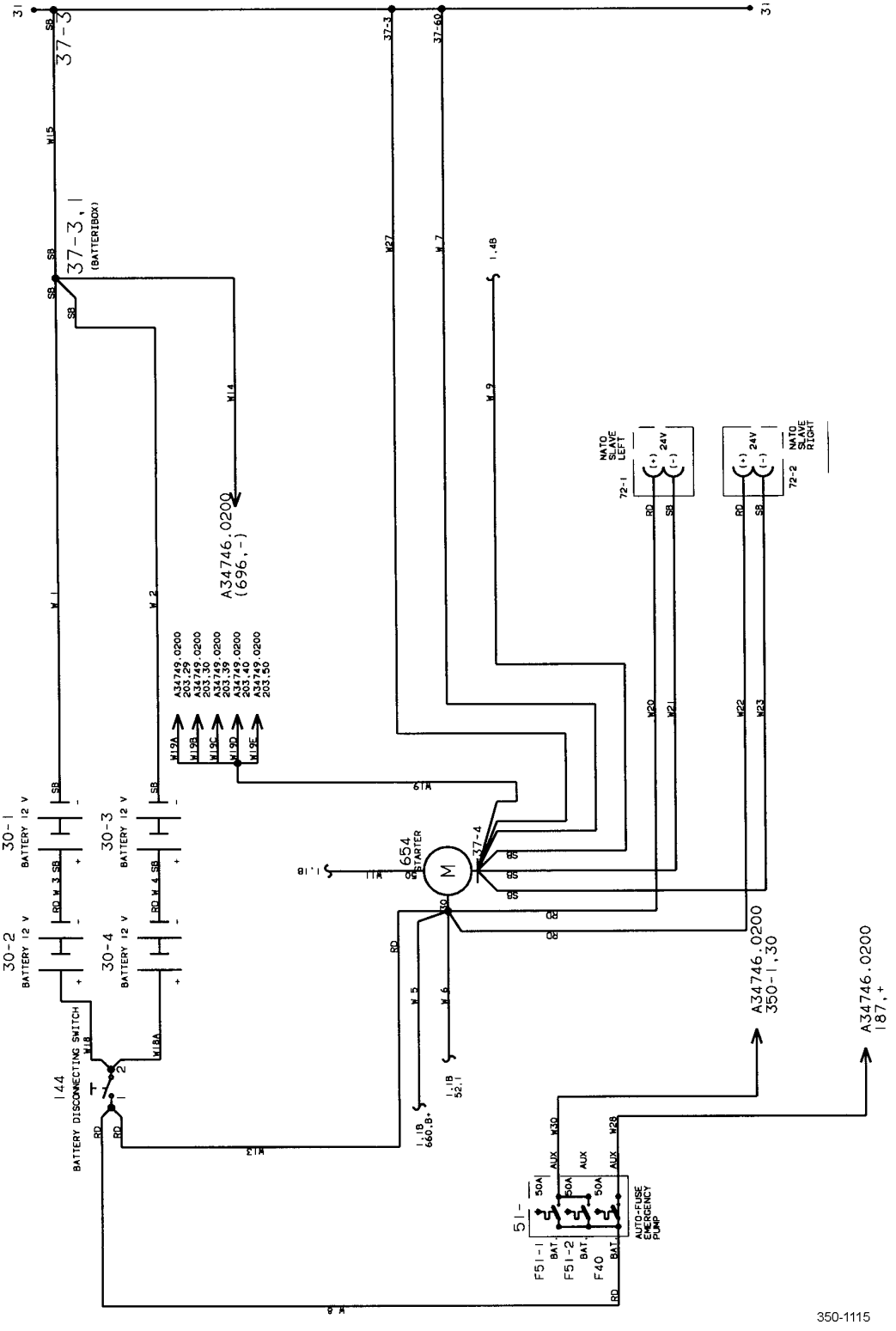


Figure 8. Current Supply (A34738.0200) - Continued.

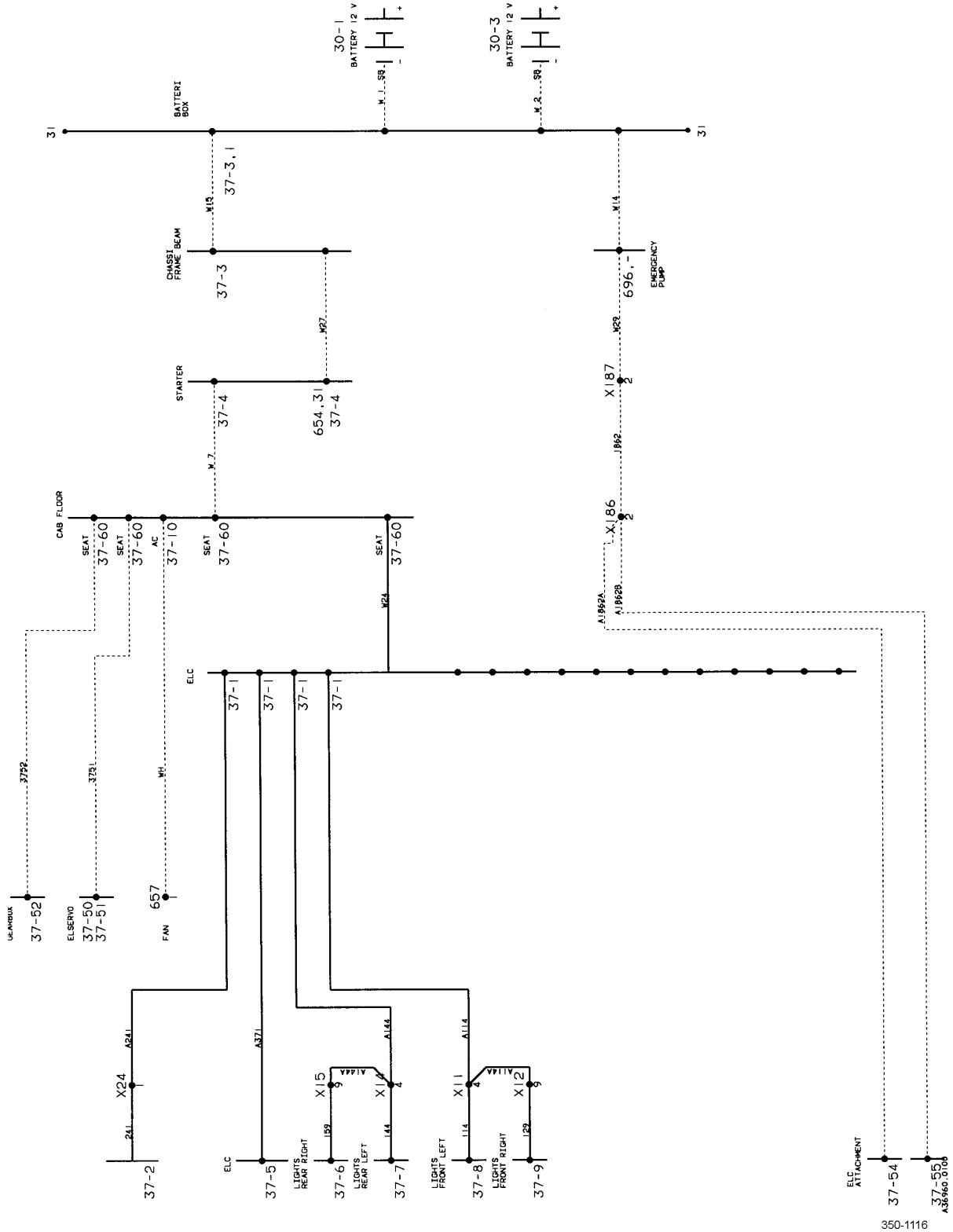


Figure 8. Current Supply (A34738.0200) - Continued.

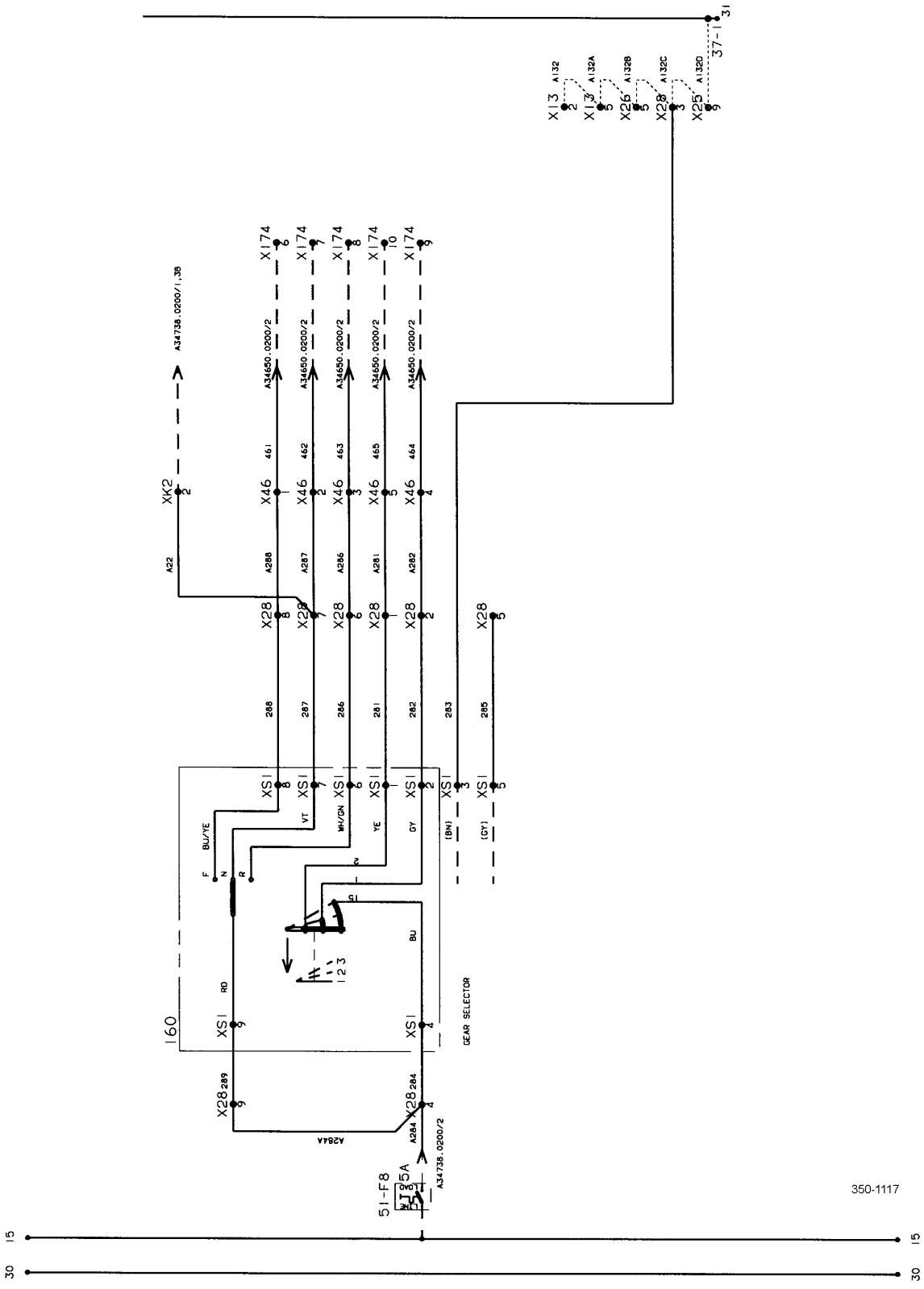


Figure 9. Shifting (A34739.0200).

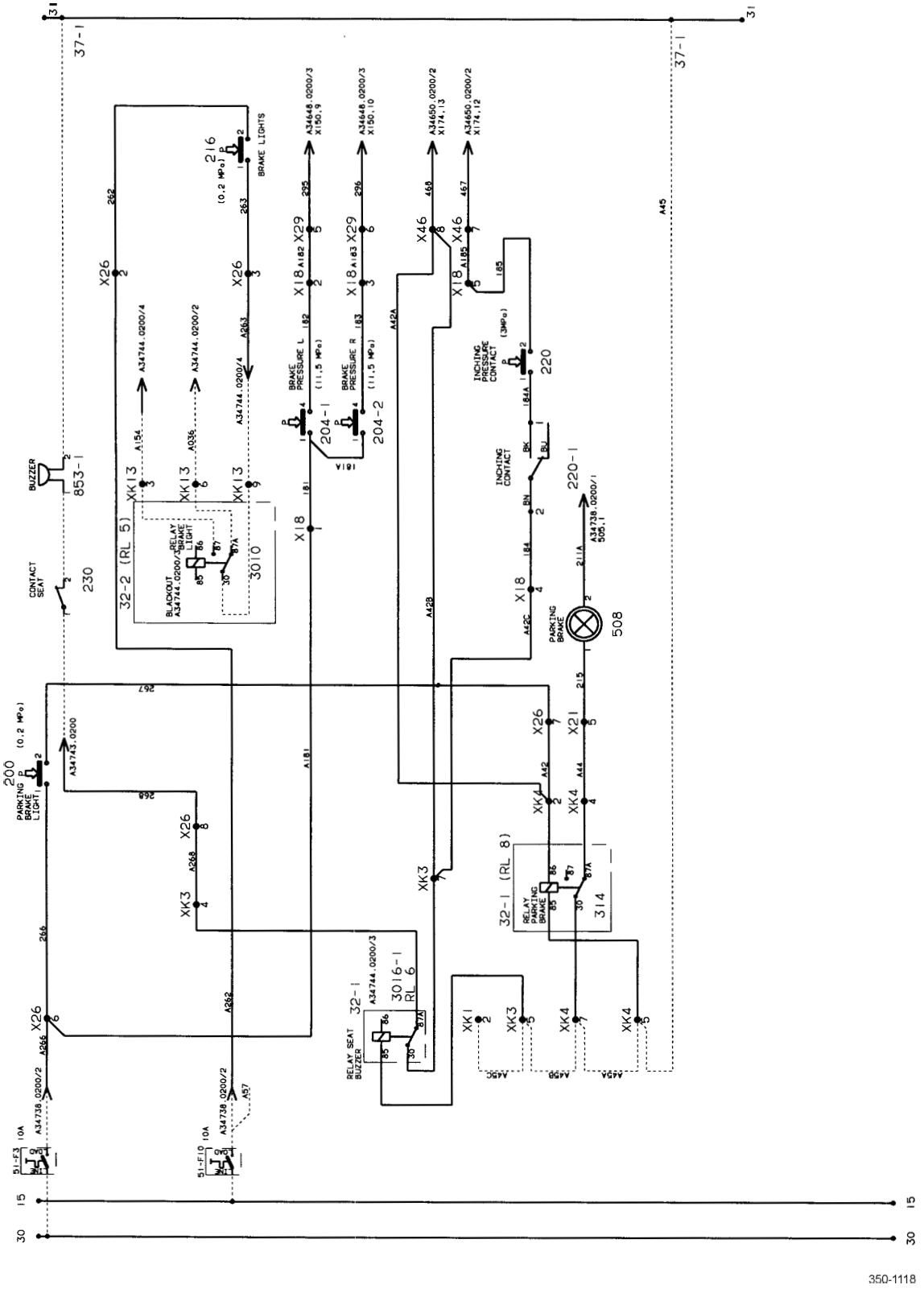


Figure 10. Sender (A34740.0200).

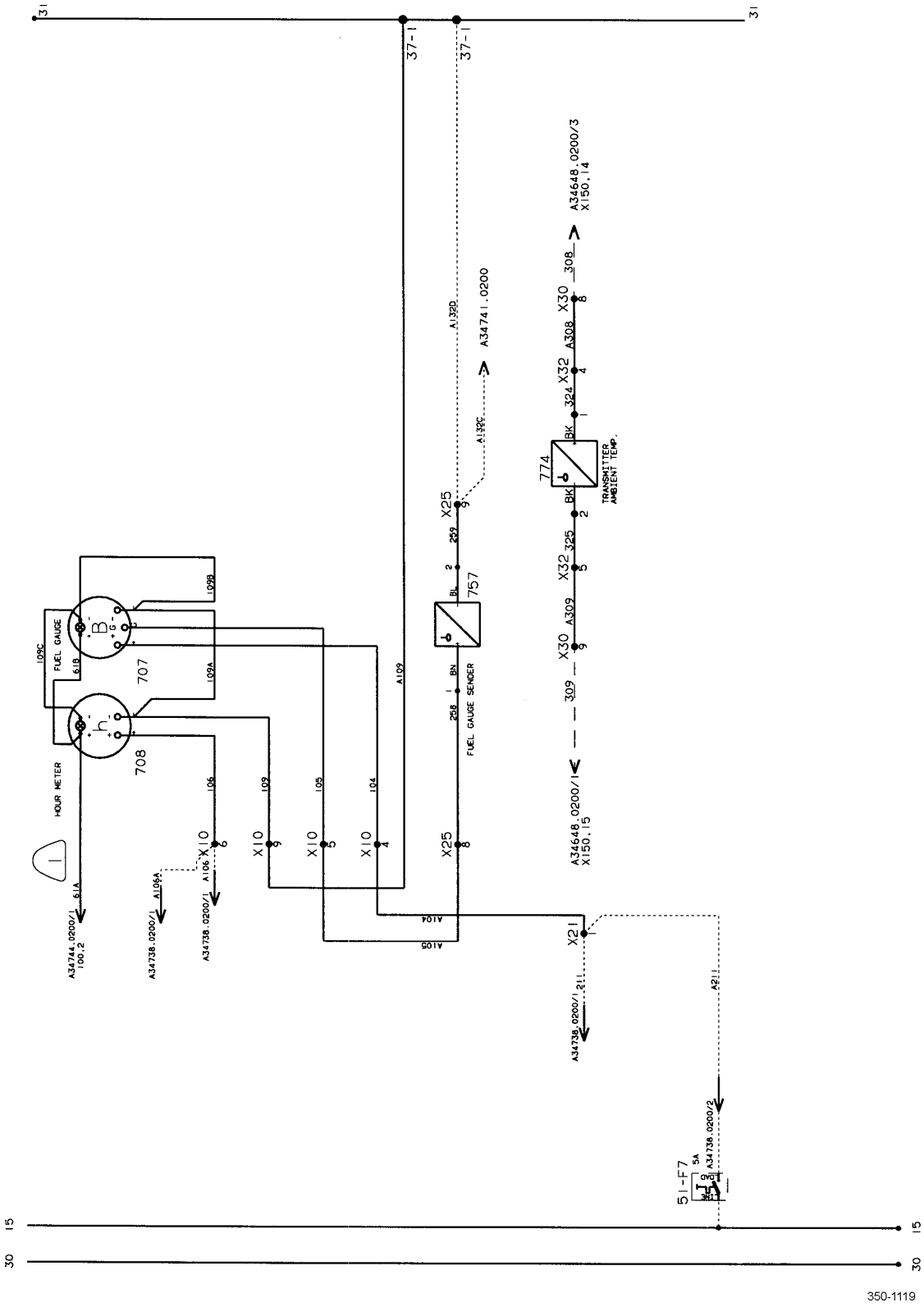


Figure 10. Sender (A34740.0200) - Continued.

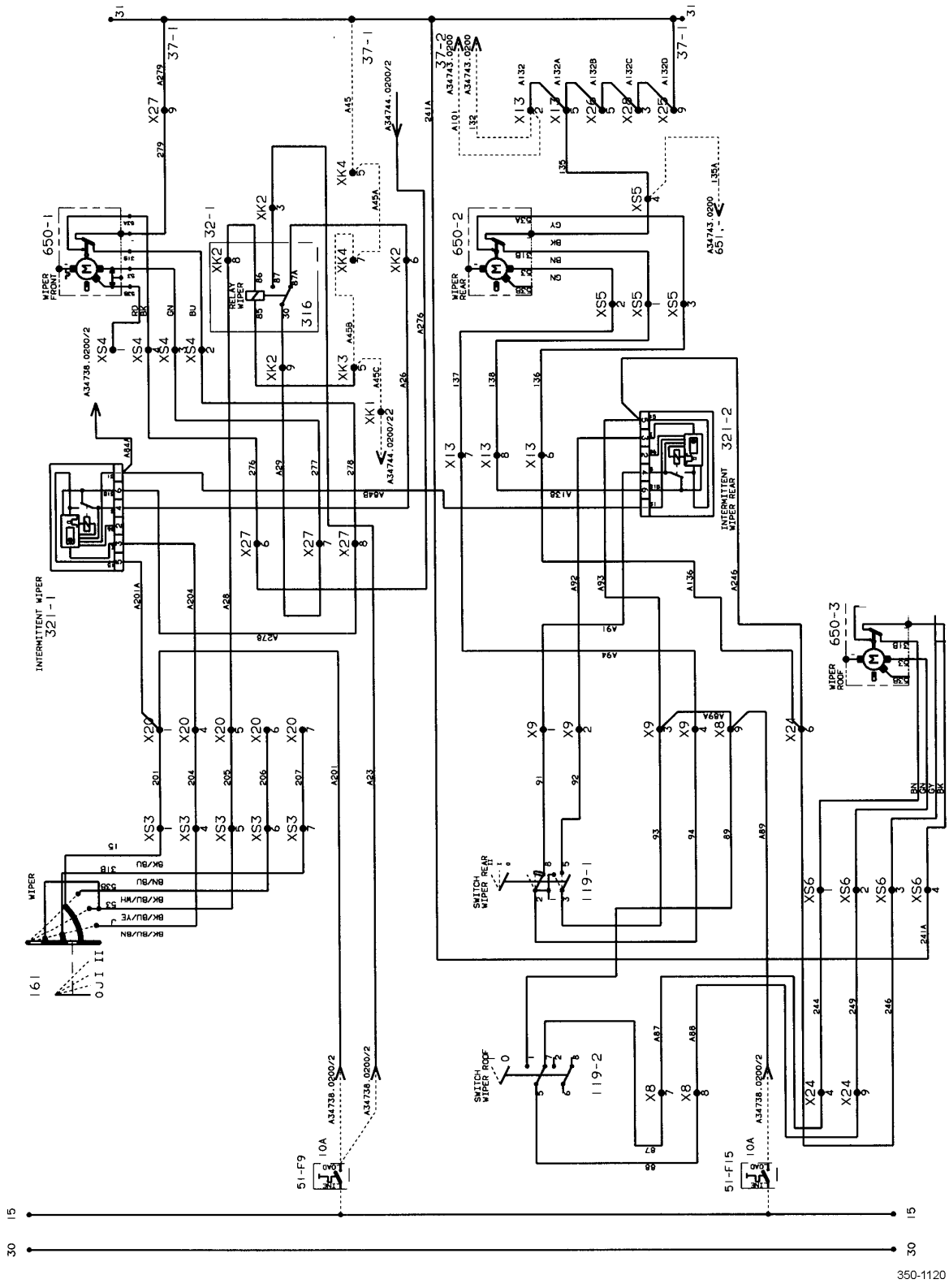
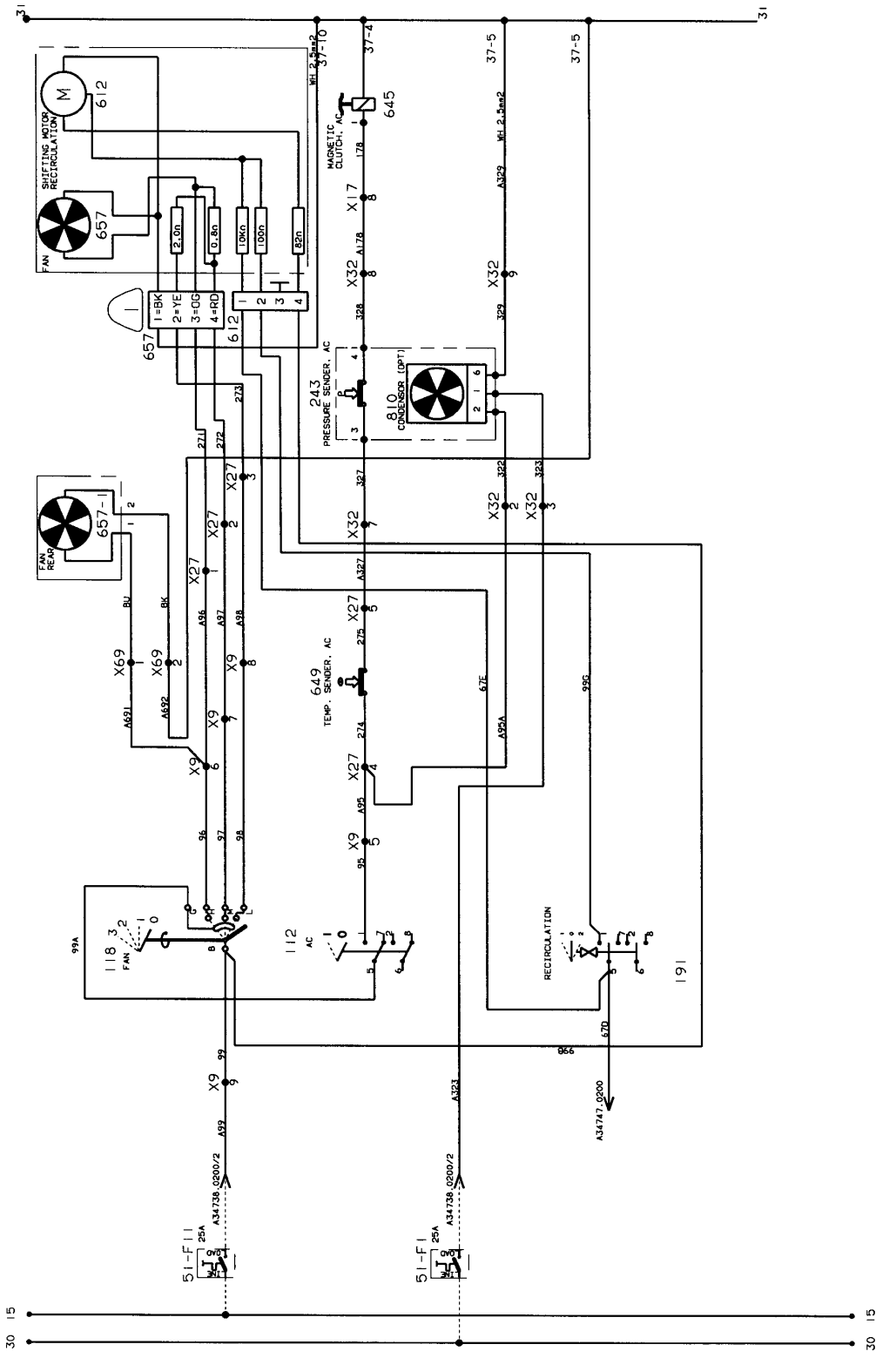


Figure 11. Wipers (A34741.0200).



350-1121

Figure 12. AC and Fan (A34742.0200).

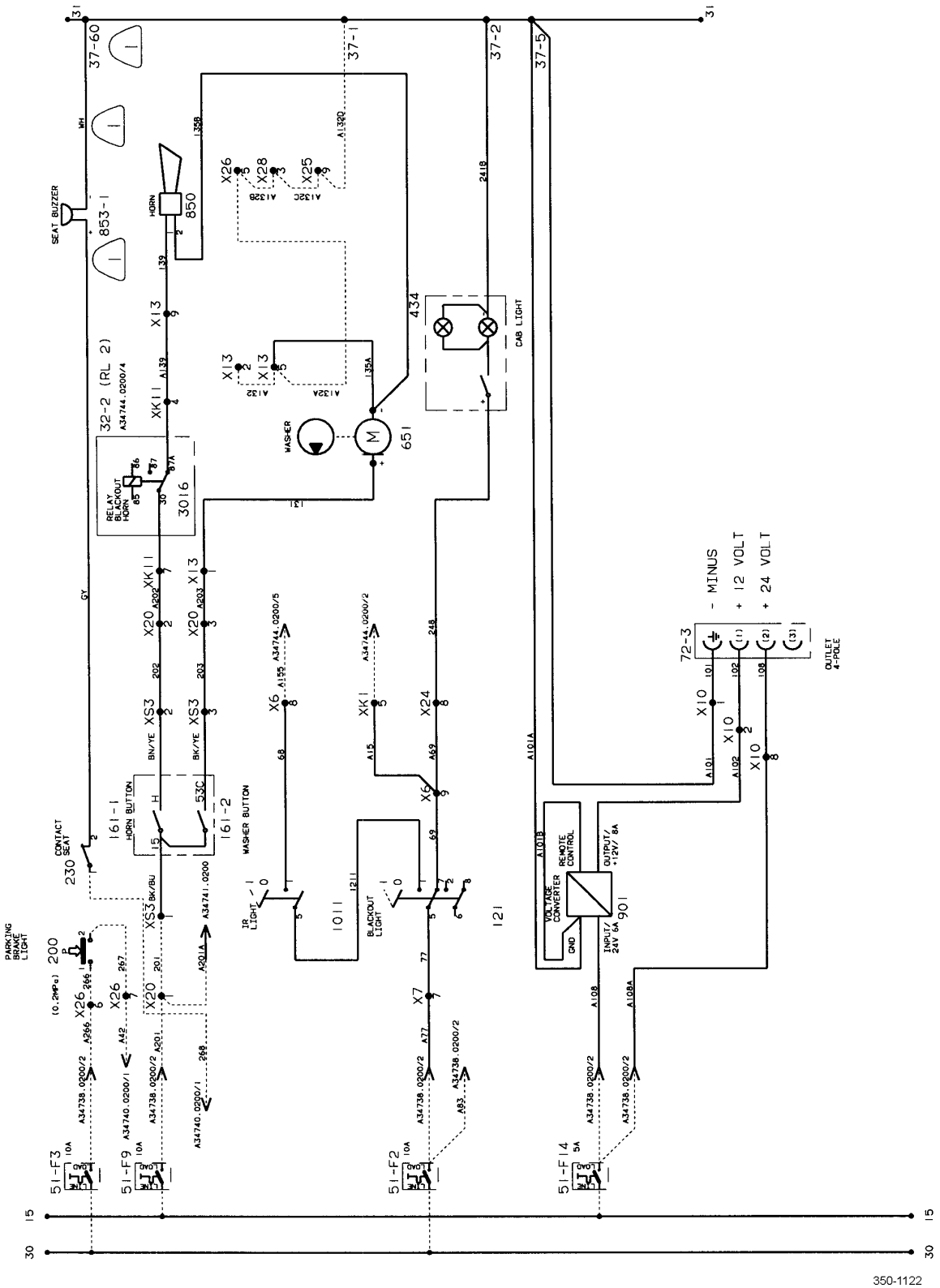


Figure 13. Cab (A34743.0200).

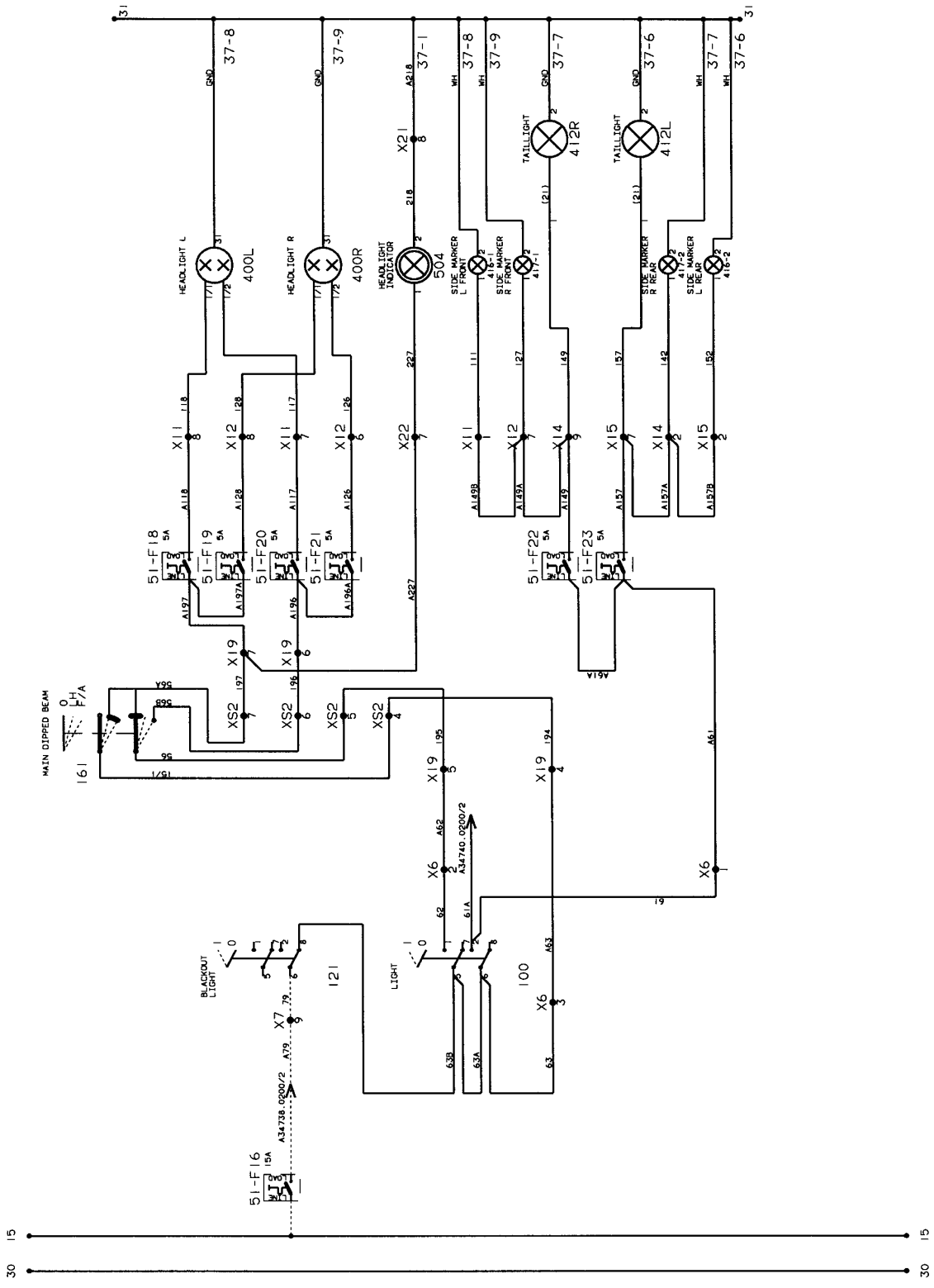
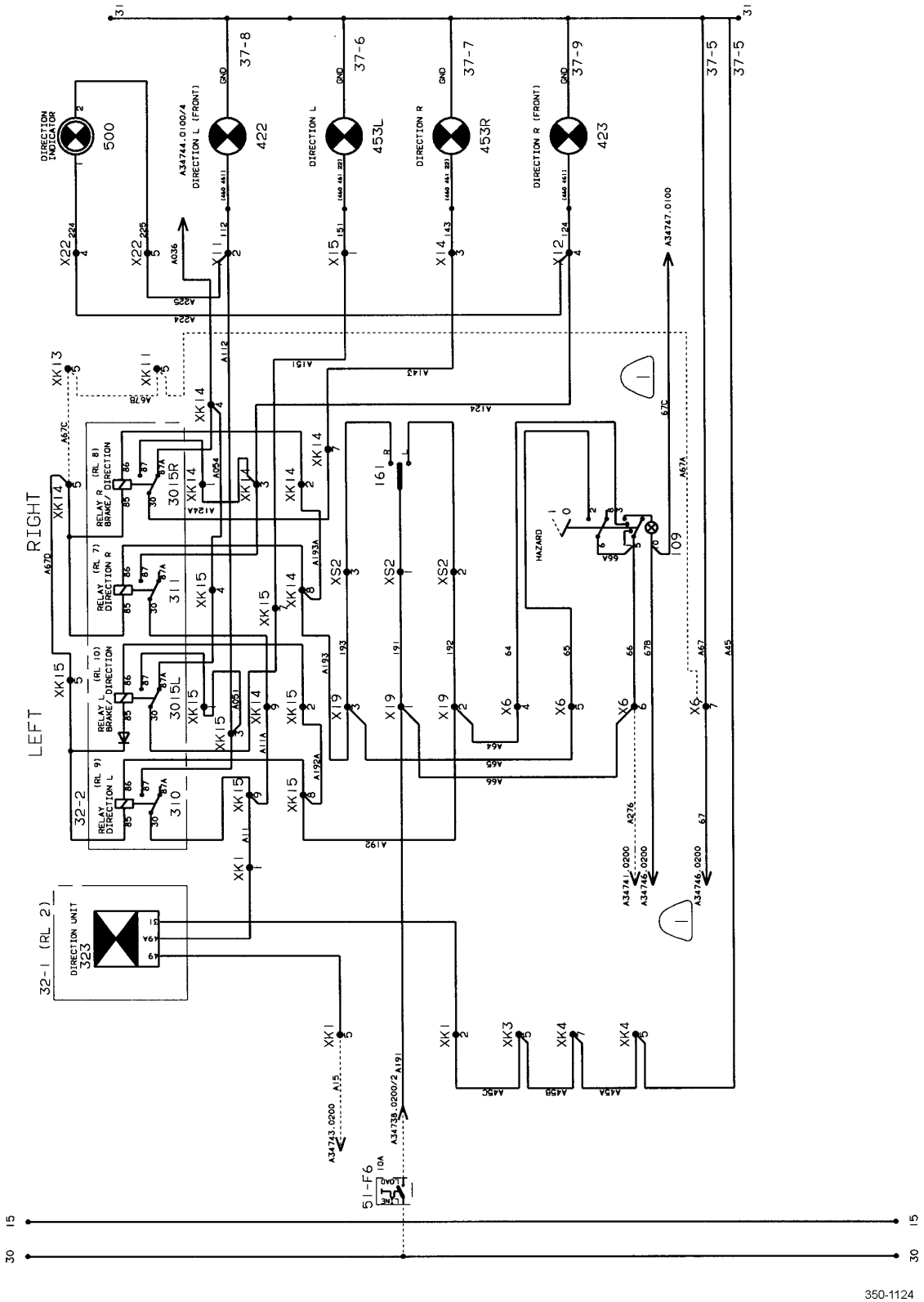


Figure 14. Lights (A34744.0200).



350-1124

Figure 14. Lights (A34744.0200) - Continued.

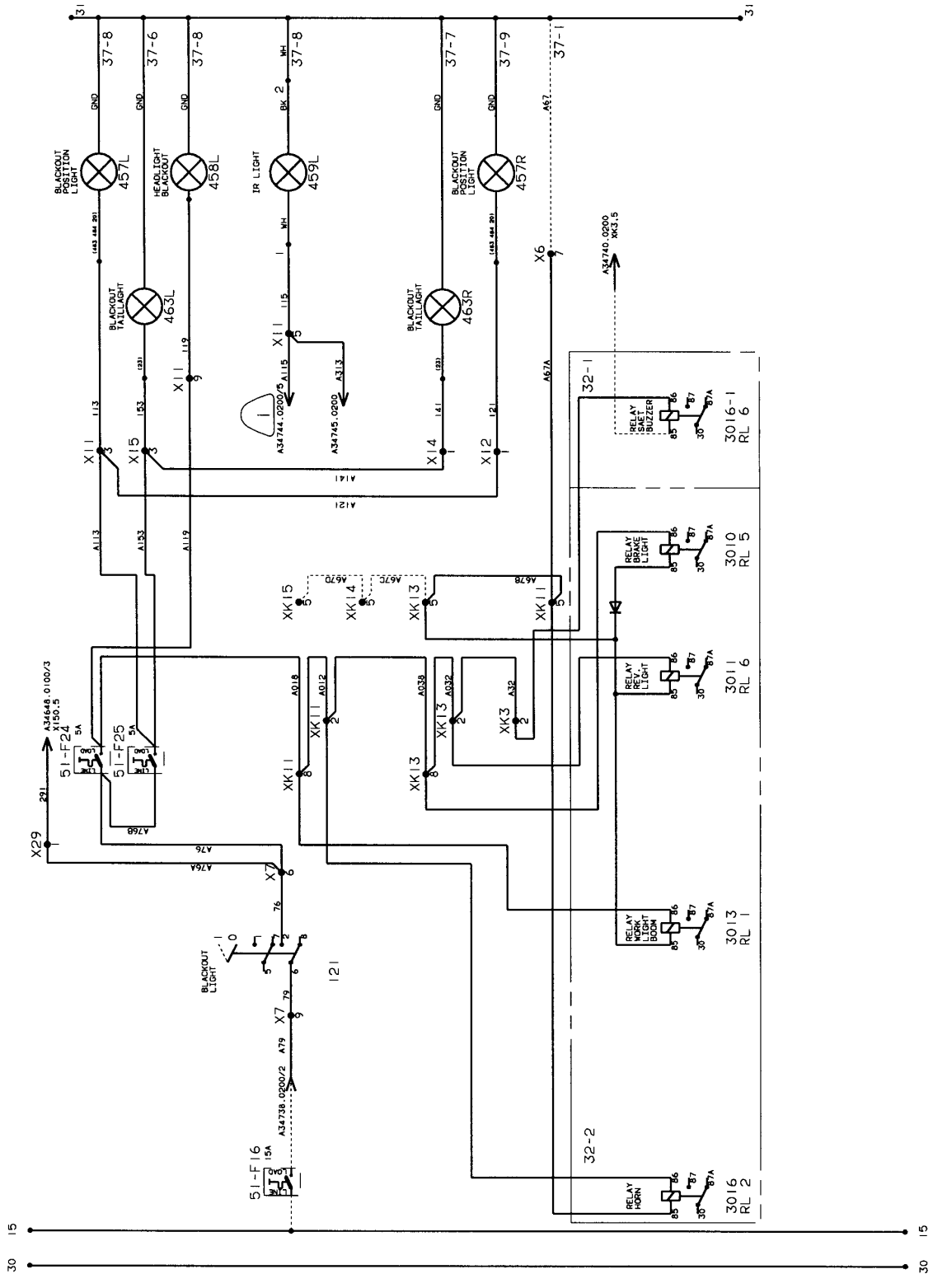
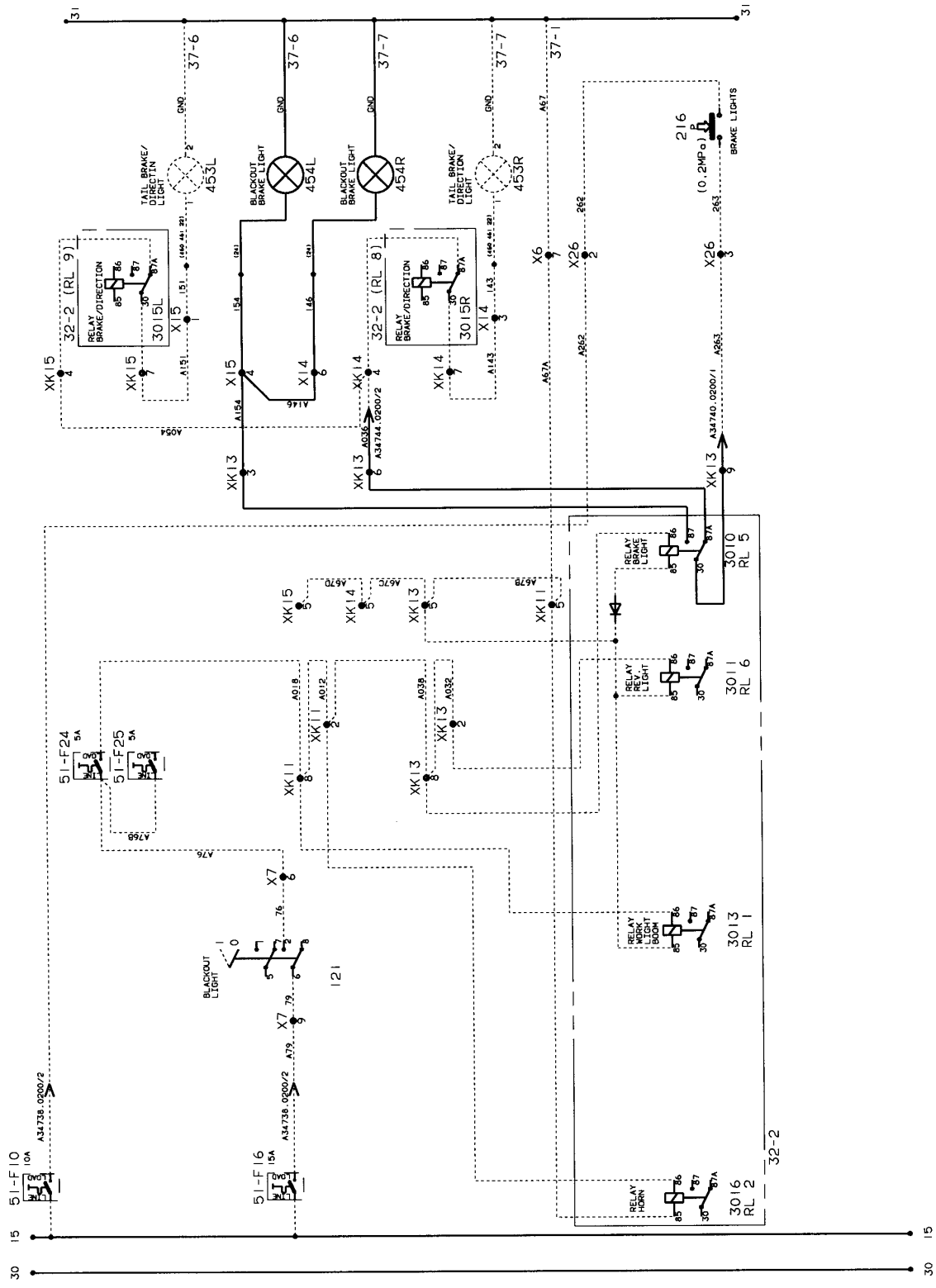
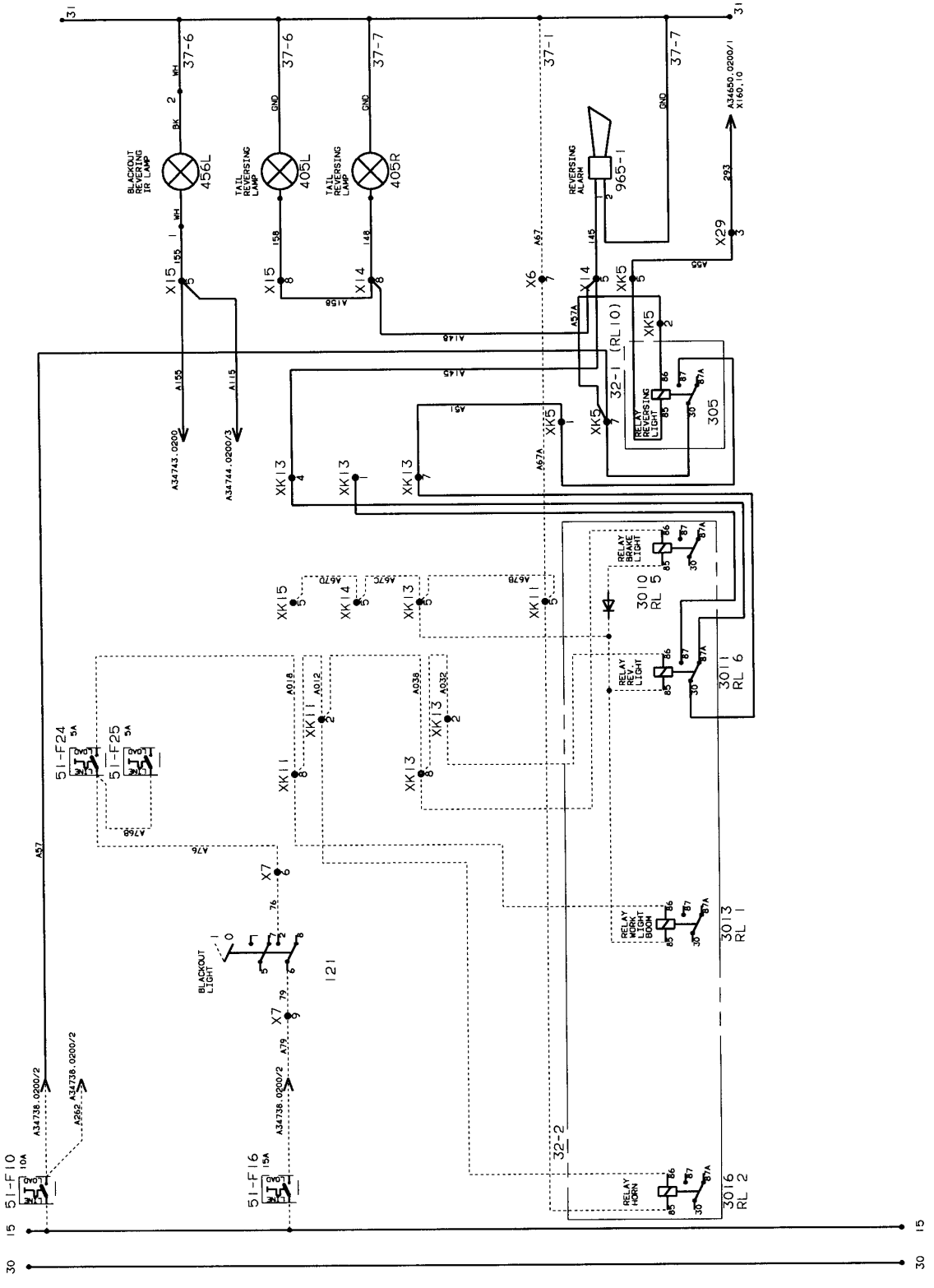


Figure 14. Lights (A34744.0200) - Continued.



350-1126

Figure 14. Lights (A34744.0200) - Continued.



350-1127

Figure 14. Lights (A34744.0200) - Continued.

DIAGRAMS - CONTINUED **0199 00**

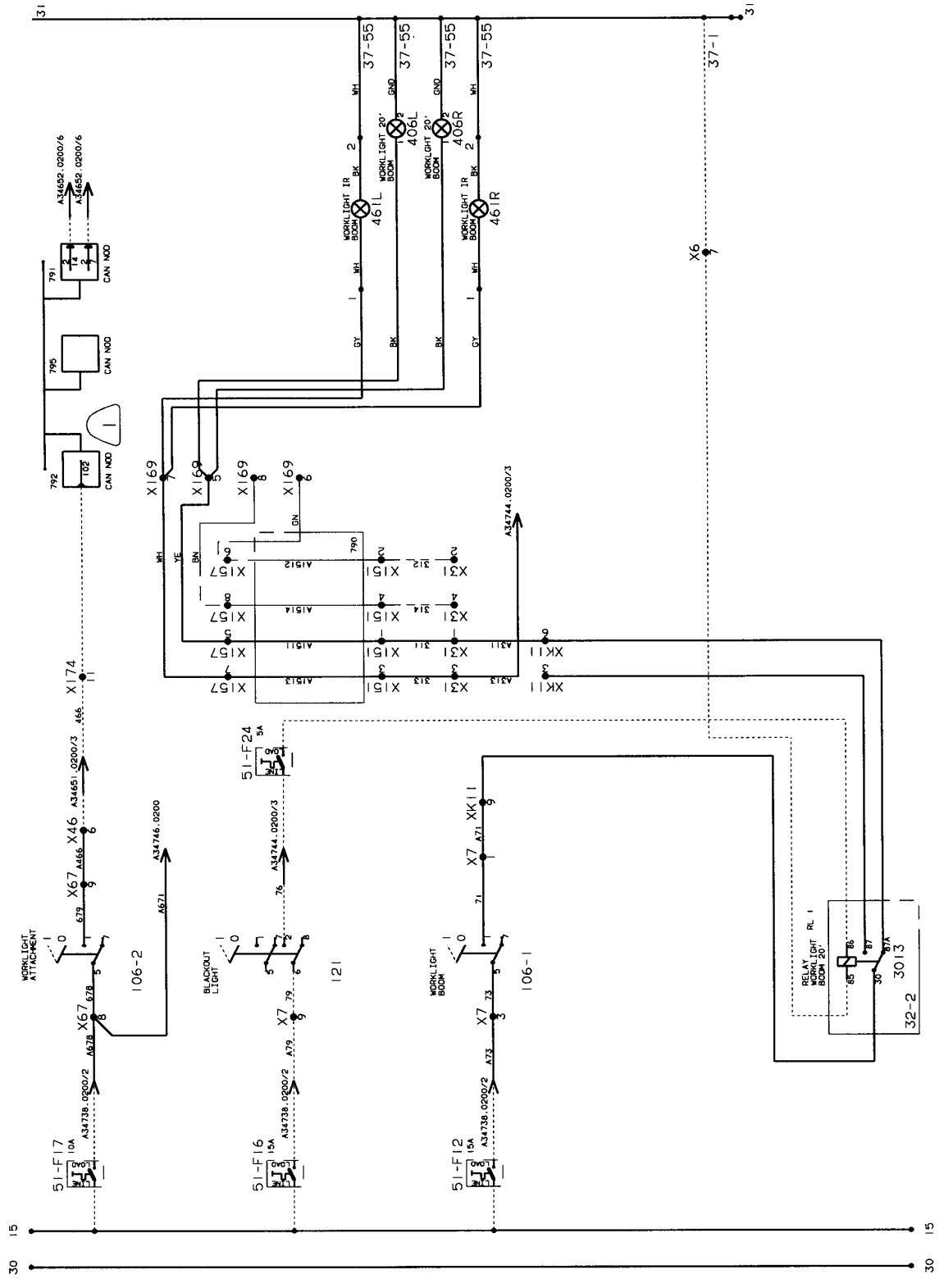
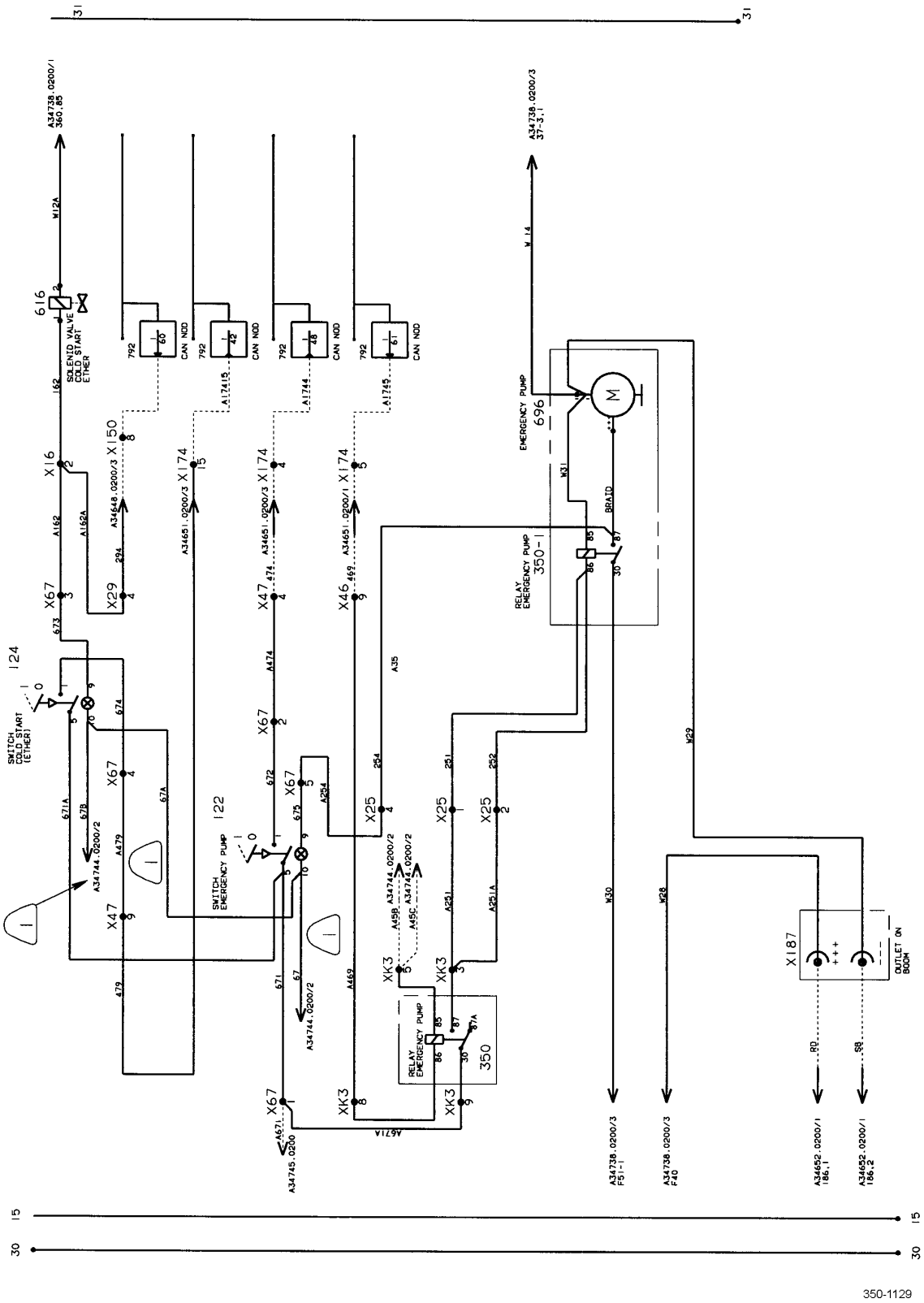


Figure 15. Worklights (A34745.0200).



350-1129

Figure 16. Auxiliary Pump (A34746.0200).

	51-F		Fuses
Before Key	F1	25A	Condenser
	F2	10A	Courtesy Light, Flashing Relay, IR-Light
	F3	10A	Brake Pressure Sensor, Park-Brake Relay, Seat Buzzer, Inching
	F4	10A	Control Unit Engine
	F5	10A	Control Unit Engine
	F6	10A	Direction Indicator, Wiper Front Return Pulse, Arctic Switch Kit (Option)
After Key	F7	5A	Charging Indicator Lamp, Parking Brake Indicator Lamp, Fuel Gage
	F8	5A	Gear Shifting
	F9	10A	Intermittent Wiper Front, Wiper Front
	F10	10A	Brake Light Sensor, Reversing Light, Reversing Alarm
	F11	25A	AC Fan, Recirculation
	F12	15A	Worklight Boom
	F13	5A	Engine Brake - Down
	F14	5A	Voltage Converter 24V - 12V, Outlet 12V and 24V
	F15	10A	Wiper Motor Roof, Wiper Motor Rear, Interval Wiper
	F16	15A	Headlights, Blackout Lights, Instrument Lights
	F17	10A	Working Lights Attachment, Aux Elec Hydr Pump, Coldstart (Ether)
	F18	5A	Main Headlight Left
	F19	5A	Main Headlight Right
	F20	5A	Dipped Headlight Left
	F21	5A	Dipped Headlight Right
	F22	5A	Taillight Right, Side Marker Front
	F23	5A	Taillight Left, Side Marker Rear
	F24	5A	Blackout Relay, Blackout Left Front
	F25	5A	Blackout Right/Left Taillight and Blackout, Position, Light Front
	F26	5A	Control Unit Steering Output
Before Key	F27	10A	Control Unit Gearbox ECU
After Key	F28	10A	Control Unit Gearbox ECU
	F29	10A	Control Unit Steering SBC, Filter Indication, Water Level, Sensor Cab
	F30	15A	Control Unit El Servo ECS
	F31	5A	Display
	F32	5A	Control Unit El Servo ECS
Before Key	F33	20A	Arctic Kit (Option)
	F34	20A	Arctic Kit (Option)
	F41	10A	Control Unit Attachment (Tophandler)
	F42	10A	Transmitter
	F43	10A	Worklight Attachment (Tophandler)
	F50-1	50A	To Cab Fuse
	F50-2	50A	To Cab Main Relay
	F51-1	50A	Aux Elec. Hydraulic Pump
	F51-2	50A	Aux Elec. Hydraulic Pump
	F40	50A	Feeding Attachment (Tophandler)

Pos	Electric Circuit Name	ANT/No	RITN. Number
1	Circuit Current Supply	1-4	A34738.0200
2	Circuit Gear Shifting, Throttle	1	A34739.0200
3	Circuit, Sender Gage	1-2	A34740.0200
4	Wiper	1	A34741.0200
5	Circuit AC & Fan	1	A34742.0200
6	Circuit Cab	1	A34743.0200
7	Circuit, Light, Blackout	1-5	A34744.0200
8	Circuit, Worklight	1	A34745.0200
9	Circuit, Aux Hydr Pump, Coldstart	1	A34746.0200
10	Circuit, ECS Display-CAN-BU	1-3	A34647.0200
11	Circuit, ECS El Servo	1-5	A34648.0200
12	Circuit ECS Engine	1-2	A34649.0200
13	Circuit, Gearbox	1-4	A34650.0200
14	Circuit, Steering	1-7	A34651.0200
15	Circuit, ECS Attachment	1-6	A34652.0200
16	Circuit, Hydraulic	1-2	A34654.0200
17	Arctic Kit, Option	1	A34747.0200

	Number	Relay
32-1	RL 1	Reserved
	323	Turn Signal
	316	Wiper
	330	Starter Interlock
	350	Pump Control
	3016-1	Seat Buzzer
	RL 7	Reserved
	314	Parking Brake
	RL 9	Reserved
	305	Taillight
32-2	3013	Worklight Boom, STD B/O
	3016	Horn
	RL 3	Reserved
	330-1	Starter Interlock
	3010	Brake Light Changing STD B/O
	3011	Reversing, STD B/O
	311	Right Direction
	3015R	Turn Signal - Brake Lgt,Right
	3015L	Turn Signal - Brake Lgt, Left
	310	Left Direction
ELC	321-1	Intermittent Wiper
	321-2	Intermittent Wiper, Rear
	315	Ignition
ENG	360	Starting Solenoid
	Number	**Relay**
ELC Attachment	3009-1	Emergency Stop
	3009-2	Emergency Stop
	3009-3	Emergency Stop
	3017	Worklight Tophandler
	315-1	Starting Key
	350-1	Aux Ele Hydraulic Pump

350-1130

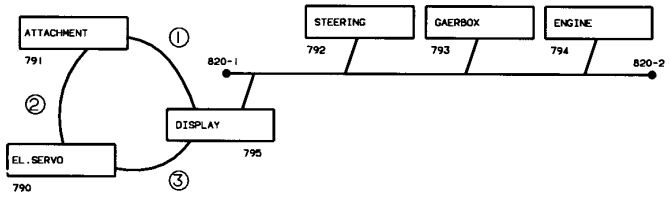
Figure 17. Information (A34749.0200).

DIAGRAMS - CONTINUED 0199 00

Number	Socket	No. of Pins
XK1-XK5	Sockets Printed Circuit Board	9
XK11-XK15	Sockets Printed Circuit Board	9
X6	Lamp Switch	9
X7	Lamp Switch	9
X8	Ignition Lock	9
X9	Wiper Switch	9
X10	Gauge, Voltage Converter 21-12V	9
X11	Lights, Left Front	9
X12	Lights, Right Front	9
X13	Horn, Washer, Wiper Rear	9
X14	Lights, Right Rear	9
X15	Lights, Left Front	9
X16	Throttle Pedal	9
X17	Alternator, AC Compressor, Starter	9
X18	Sender, Inching, Brake Pressure R-L	9
X19	Switch, Direction, Main Dipped	9
X20	Switch, Washer, Front Wiper, Horn	9
X21	Indicator Lamp	9
X22	Indicator Lamp	9
X23	Throttle Pedal	9
X24	Wiper, Roof Interior Light	9
X25	Fuel Transmitter, Relay Emergency Pump	9
X26	Seat Buzzer, Transmission, Parking Brake	9
X27	Fan, Wiper Motor, Front	9
X28	Gear Changing	9
X29	EI Servo X150	9
X30	EI Servo X150	9
X31	EI Servo X151	9
X32	Condenser, Temp Out	9
X33	Arctic Kit (Option)	9
X34	Arctic Kit (Option)	9
X46	Control Unit Gearbox X174	9
X47	Control Unit Gearbox X174	9
X67	Emergency Pump, Coldstart, W-Light Boom	9
X69	Rear Fan	9
X150	Distribution Unit	15
X151	Distribution Unit	15
X152	Display	15
X153	Steering Wheel Panel	15
X154	Emergency Stop	15
X155	Joystick Panel	15
X156	Temp Steering/Brake Cooling	15
X157	Boom	15
X158	Valves Boom	15
X159	Transmitter Cylinder	15
X160	Gear Changing	15
X161	CAN-BUS Attachment (Tophandler)	15
X170	Steering Rear Wheel	15
X171	Steering Front Wheel	15
X172	Gearbox	15
X173	Gearbox	15
X174	Distribution Unit	15
X175	Transmitter Cab	15
X176	Steering Force Simulator	15
X177	EI Servo	15
X178	Diagnose ZF	15
X179	CAN-BUS	15
X180	ECU Attachment	15
X181	Transmitter	14
X186-1	Current Supply	1
X186-2	Current Supply	1
X188	Valve Solenoid	14
X189	Valve Solenoid	14
X194	Worklight Attachment (Tophandler)	14
X195	Hydraulic Filter Indication	15
X196	Valve Solenoid Steering	15
X197	Valve Solenoid Steering	15
X198	Filter Indicator, Sensor Cab, Water Level, Temp Hyd, Valve Tilting Tower	15
X199	CAN - J1939	3
X200	Communication PC-ME	9
X201	Communication PC-ME	9

A37314.0200	Install Chassis
A37311.0200	Install Chassis ECS
A37313.0200	Install Cab ECS
A37312.0200	Install Boom ECS
A32685.0400	Install ELC
A36980.0200	Install ELC Attachment
A37401.0200	Install EL Servo
A37727.0200	Install Steering ECS
A38389.0200	Install Engine, TRA

Number	Earth Connections
37-1	Distribution Unit
37-2	Cab Roof
37-3	Frame, Batteries
37-4	Engine
37-5	Computers
37-6	Lights, Left Rear
37-7	Lights, Right Rear
37-8	Lights, Left Rear
37-9	Lights, Right Rear
37-10	Cab Floor AC
37-50-51	Servo
37-52	Steering ECS
37-54-55	Distribution Unit Attachment
37-60	Cab Floor Seat



BLOCK DIAGRAM, CAN-BUS

350-1142

Figure 17. Information (A34749.0200) - Continued.

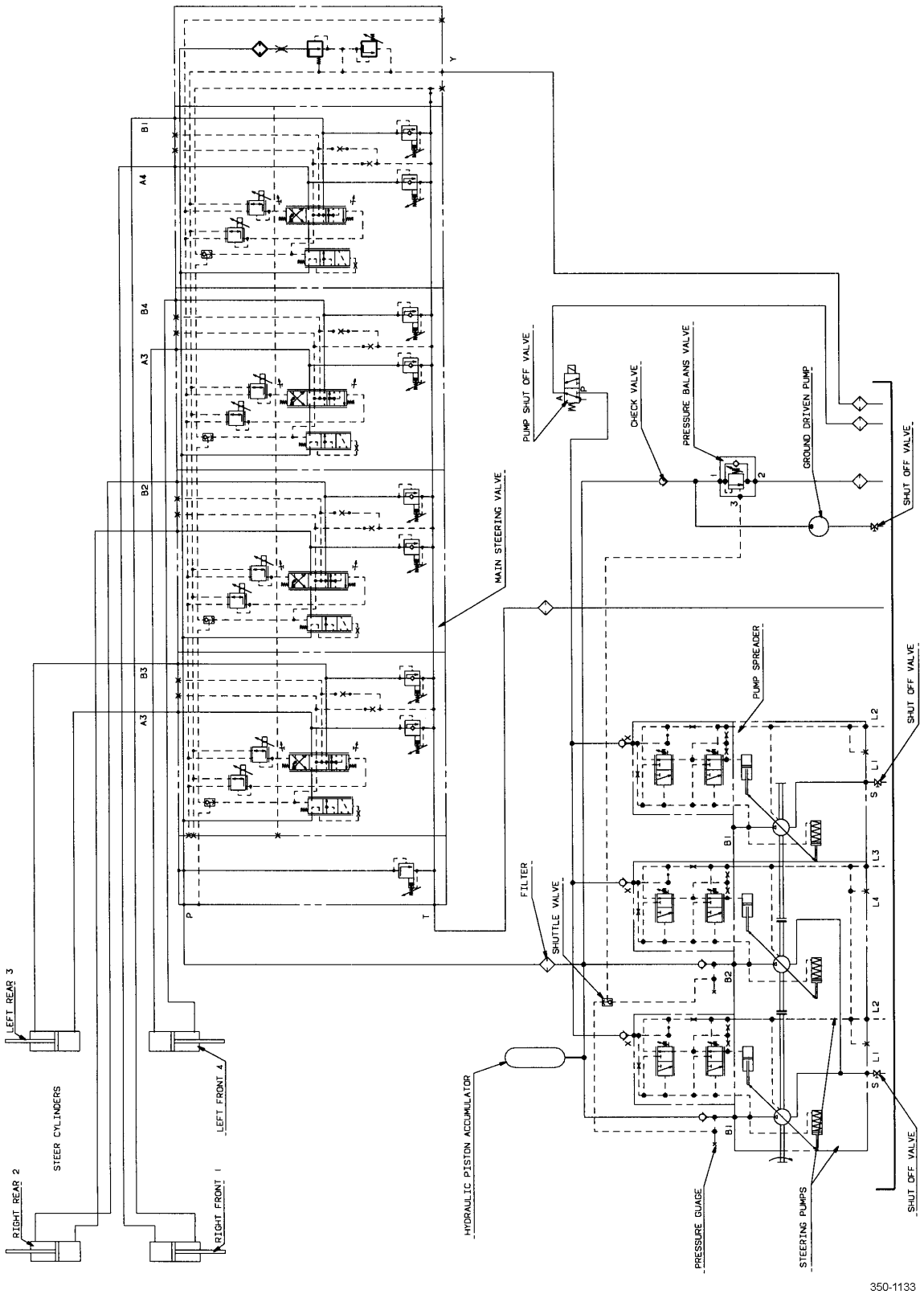


Figure 18. Steering System.

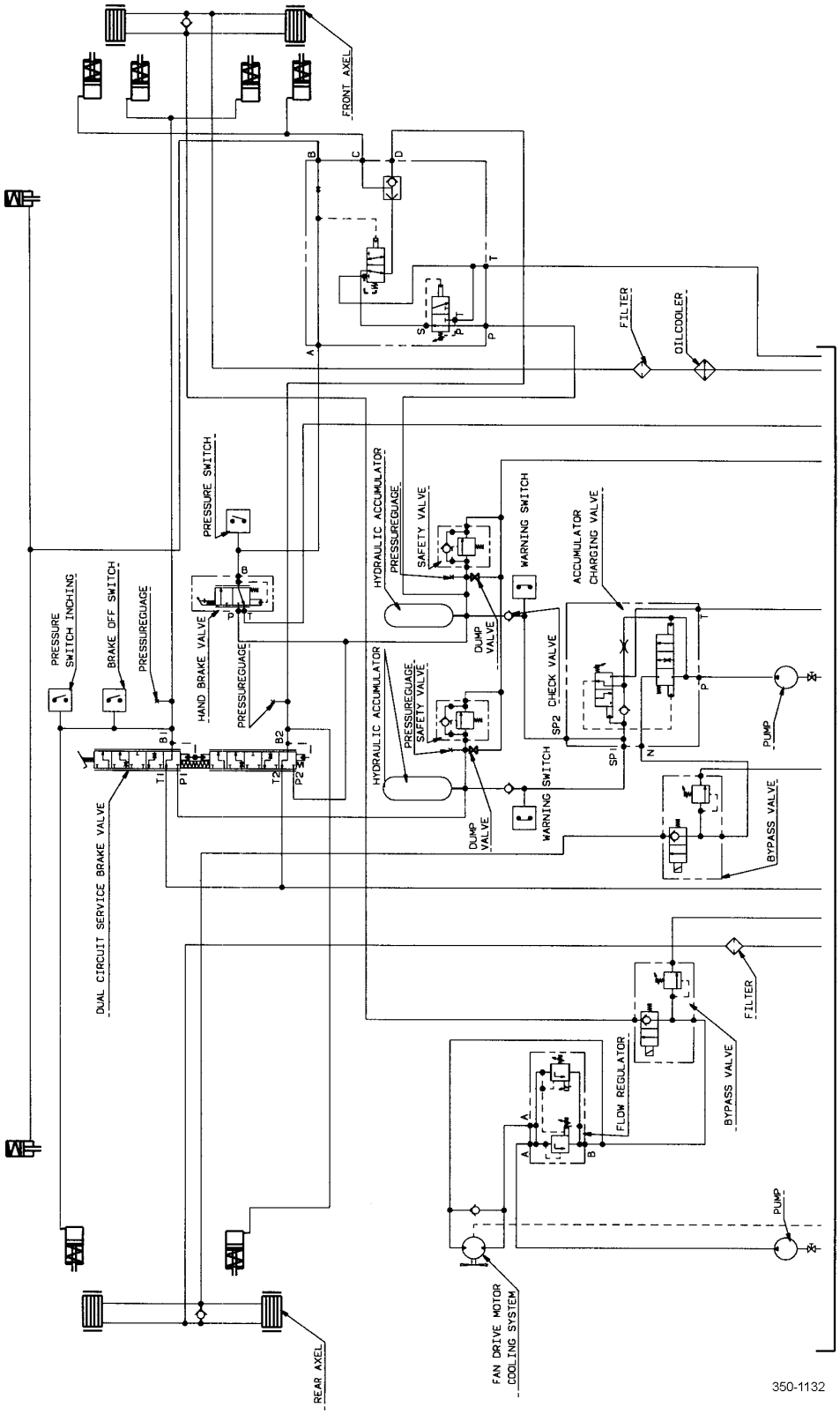


Figure 19. Brake System.

DIAGRAMS - CONTINUED **0199 00**

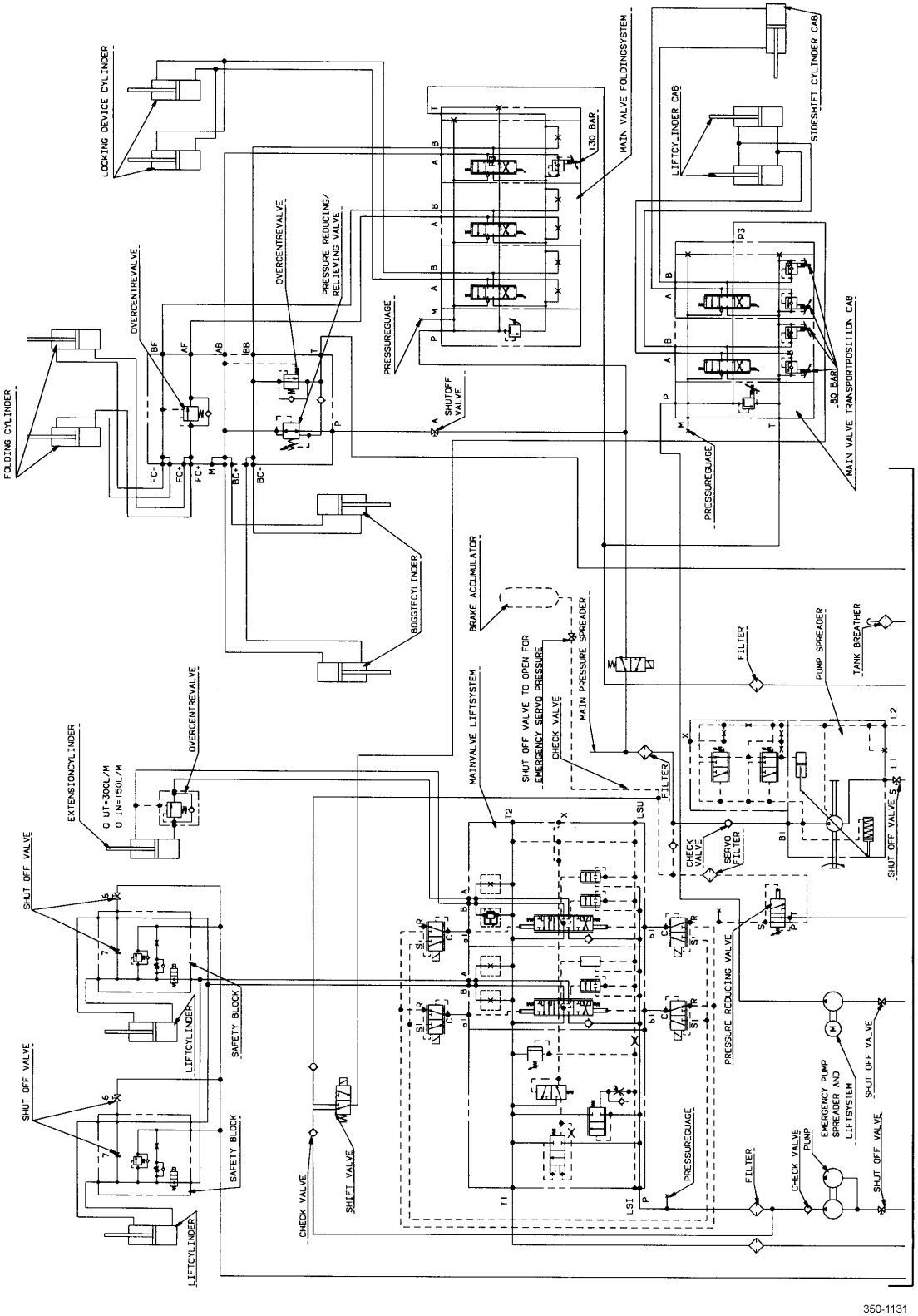


Figure 20. Main System.

DIAGRAMS - CONTINUED **0199 00**

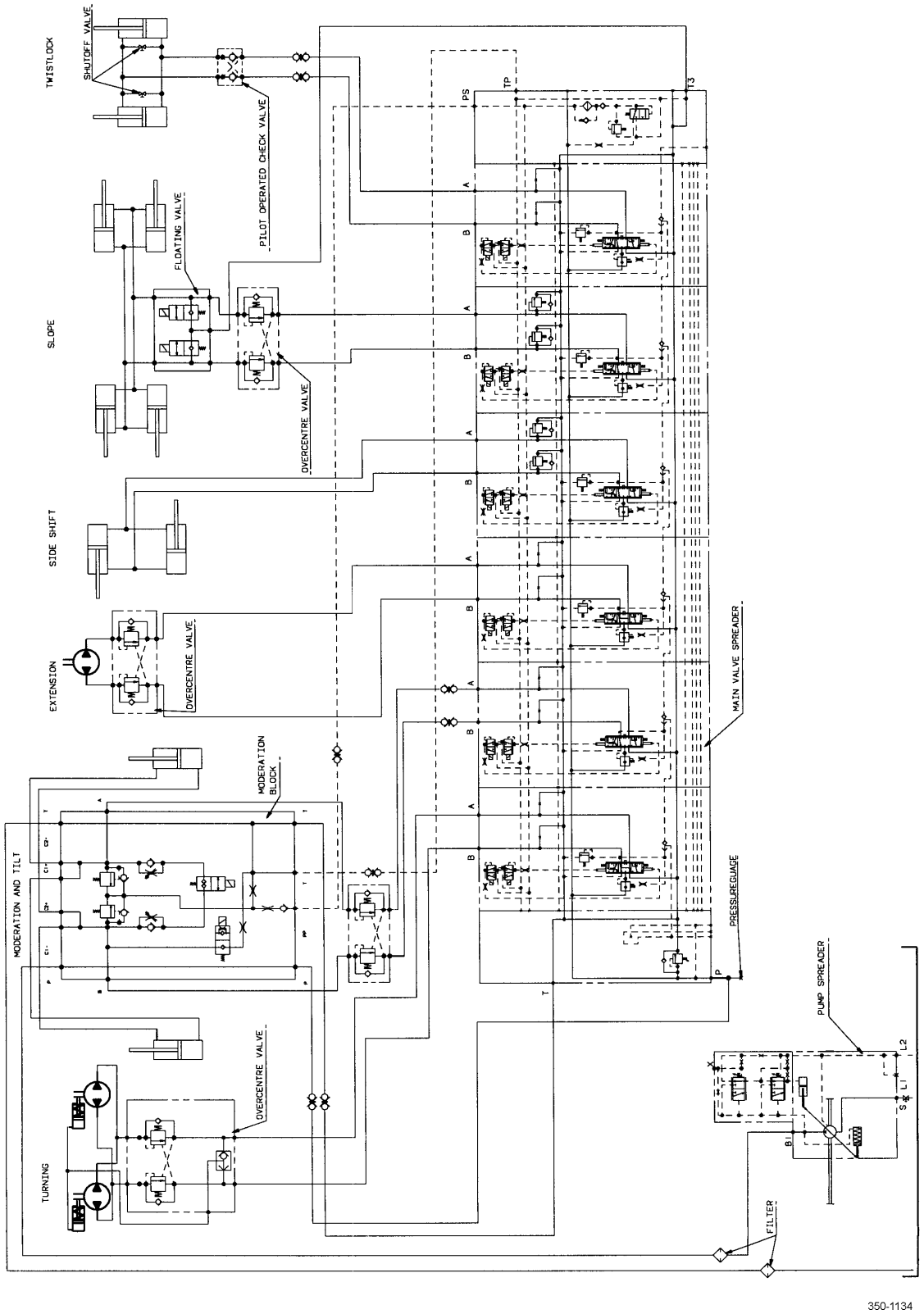


Figure 21. Spreader System.

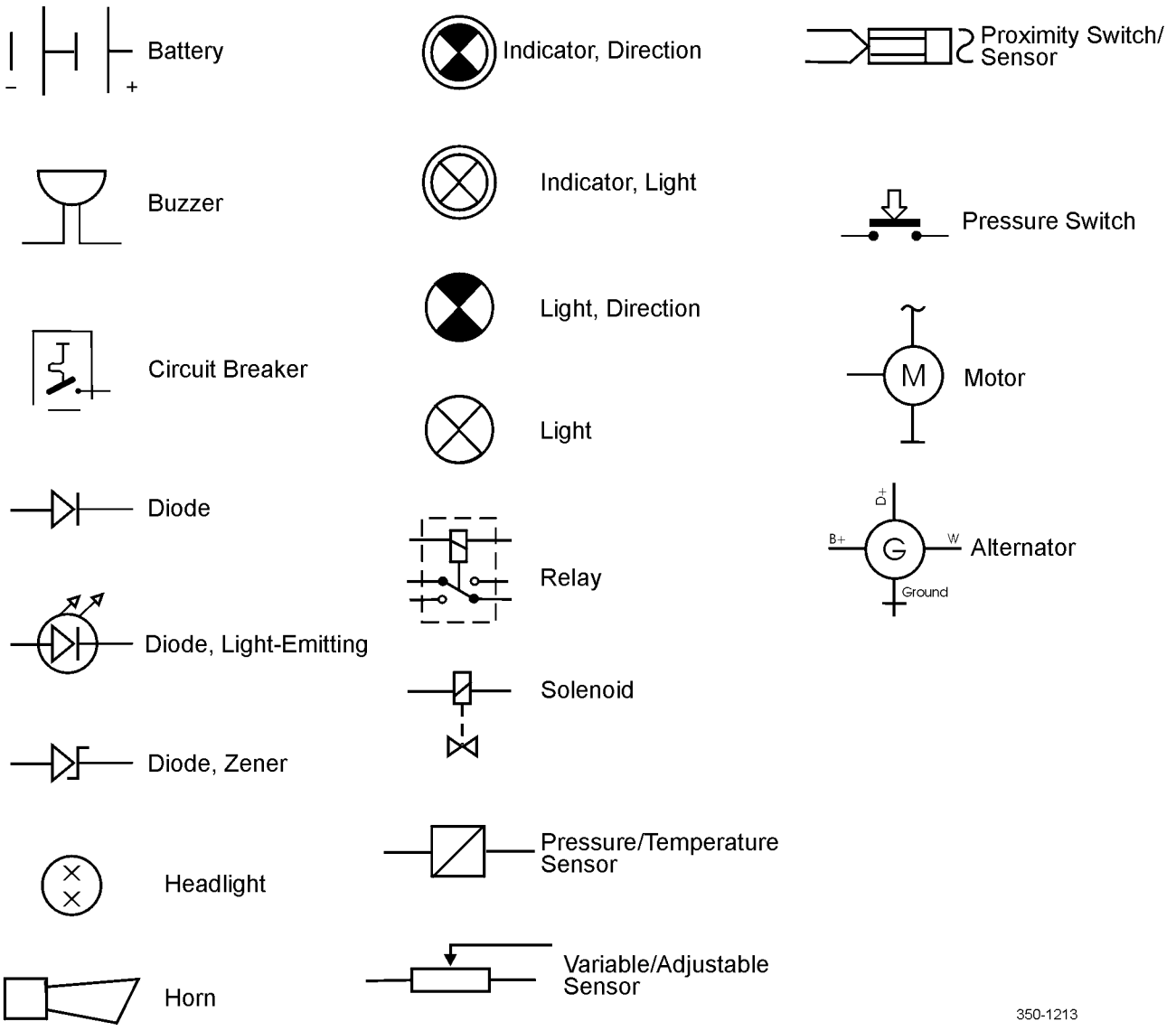


Figure 22. Electrical Symbols.

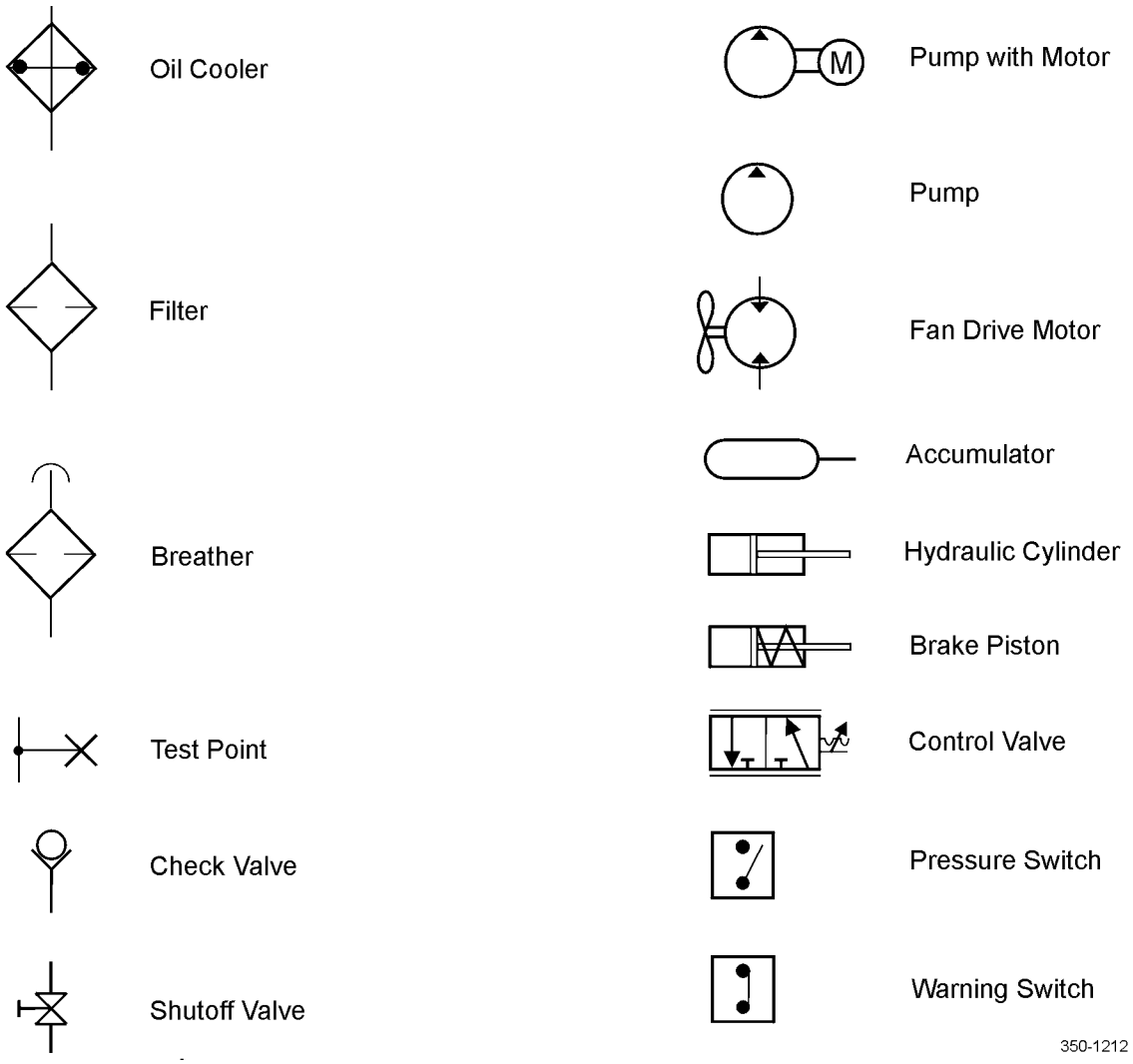


Figure 23. Hydraulic Symbols.

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CHAPTER 4
SUPPORTING INFORMATION

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REFERENCES 0200 00

SCOPE

This work package lists all forms, field manuals, technical bulletins, technical manuals, and other publications referenced in this manual and which apply to Organizational Maintenance of the RTCH-RT 240.

PUBLICATIONS INDEXES

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Index of Army Publications and Blank Forms . . . . . .DA Pam 25-30
Functional User's Manual for the Army Maintenance Management System . . . . . .DA Pam 738-750
U.S. Army Equipment Index of Modification Work Orders . . . . . .DA Pam 750-10

FORMS

Refer to DA Pam 738-750, *The Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

Equipment Inspection and Maintenance Worksheet . . . . . .DA Form 5988-E
Equipment Log Assembly (Records) . . . . . DA Form 2408
Maintenance Request Form . . . . . .DA Form 5990-E
Preventive Maintenance Schedule and Record . . . . . .DA Form 5986-E
Processing and Deprocessing Record for Shipment, Storage and Issue of Vehicles and Spare Engines . . . . . DD Form 1397
Product Quality Deficiency Report . . . . . SF Form 368
Recommended Changes to Equipment Technical Publications . . . . . DA Form 2028-2
Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028
Report of Discrepancy (ROD) . . . . . SF Form 364
Request for AOAP . . . . . DD Form 2026, DA Form 5991-E

FIELD MANUALS

Basic Cold Weather Manual . . . . . .FM 31-70
Camouflage . . . . . .FM 5-20
Chemical, Biological, Radiological, and Nuclear Defense . . . . . .FM 21-40
First Aid for Soldiers . . . . . .FM 21-11
Northern Operations . . . . . .FM 31-71
Operation and Maintenance of Ordnance Material in Extreme Cold Weather (0°F to -65°F) . . . . . .FM 9-207

TECHNICAL BULLETINS AND SUPPLY BULLETINS

Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment . . . . . TB 43-0209
Solder and Soldering . . . . . TB SIG 222
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems . . . . . TB 750-651
Warranty Bulletin for RTCH-RT 240 . . . . . .TB 10-3930-675-14

TECHNICAL MANUALS

Chemical, Biological, Radiological, and Nuclear Defense . . . . . TM 3-220
Cooling Systems: Tactical Vehicles . . . . . TM 750-254
Inspection, Care, and Maintenance of Antifriction Bearings . . . . . TM 9-214

TECHNICAL MANUALS - CONTINUED

Materials Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel and Related Materials, Including Chemicals . . . . . TM 9-247

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tool List for Decontaminating Apparatus, Portable . . . . . TM 3-4230-214-12&P

Operator's, Unit, Direct Support and General Maintenance Manual for Care, Maintenance, Repair and Inspection of Pneumatic Tires and Inner Tubes . . . . . TM 9-2610-200-14

Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . . TM 9-6140-200-14

Operator's Manual for RTCH-RT 240 . . . . . TM 10-3930-675-10

Operator's Manual for Welding Theory and Application . . . . . TM 9-237

Painting Instruction for Field Use . . . . . TM 43-0139

Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use . . . . . TM 750-244-6

Repair Parts and Special Tools Lists for RTCH-RT 240 . . . . . TM 10-3930-675-24P

OTHER PUBLICATIONS

Abbreviations and Acronyms . . . . . ASME Y1438-1999

Army Medical Department Expendable/Durable Items . . . . . CTA 8-100

Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items . . . . . CTA 50-970

Lubrication Order for RTCH-RT 240 . . . . . LO 10-3930-675-12

MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION 0201 00

THE ARMY MAINTENANCE SYSTEM MAC

1. This introduction provides a general explanation of all maintenance and repair functions authorized at the various maintenance levels under the standard Army Maintenance System concept.

2. The MAC immediately following the introduction designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown in the MAC (WP 0202 00) in column (4) as:

   Unit - includes two subcolumns, C (Operator/Crew) and O (Organizational) Maintenance

   Direct Support - includes an F subcolumn

   General Support - includes an H subcolumn

   Depot - includes a D subcolumn

3. The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

4. The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. **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).

2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.

3. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.

6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

7. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

8. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. “Replace” is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

9. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

MAINTENANCE FUNCTIONS - CONTINUED

NOTE

The following definitions are applicable to the "repair" maintenance function:

- Services - Inspect, test, service, adjust, align, calibrate, and/or replace.
- Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
- Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item and to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
- Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

10. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

11. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1

1. **Column (1) - Group Number.** Column (1) lists FGC numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

2. **Column (2) - Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

3. **Column (3) - Maintenance Function.** Column (3) lists the functions to be performed on the item listed in Column (2). (For a detailed explanation of these functions refer to "Maintenance Functions" outlined above).

4. **Column (4) - Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

C . . . . . Operator or Crew Maintenance
O . . . . . Organizational Maintenance
F. . . . . Direct Support Maintenance
L . . . . . Specialized Repair Activity (SRA)
H . . . . . General Support Maintenance
D . . . . . Depot Maintenance

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1 - CONTINUED

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS CODE column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

5. **Column (5) - Tools and Equipment Reference Code.** Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.
6. **Column (6) - Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries (Table 3).

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, TABLE 2

1. **Column (1) - Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.
2. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
3. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.
4. **Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.
5. **Column (5) - Tool Number.** The manufacturer's part number, model number, or type number.

EXPLANATION OF COLUMNS IN THE REMARKS, TABLE 3

1. **Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

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Table 1. MAC for the RT 240 RTCH.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
01	**ENGINE**								
0100	Engine Assembly	Inspect	0.5						
		Test		1.5	2.0				
		Service		2.0				70,81	
		Replace			36.0			25,69,70, 77,81,	A
		Repair		4.0	4.0	95.5		49,51,69, 70,71,76, 77,81	
	Engine Mounts	Inspect		1.1					
		Replace			12.0			69,81	
	Lifting Bracket	Replace			1.0			69,81	
0101	Crankcase, Cylinder Block, and Head								
	Cylinder Block	Repair				30.0		16,17,18, 23,25,28, 30,33,39, 47,51,57, 69,70,76, 77,81	
	Cylinder Head Assembly	Inspect			0.5				
		Replace			2.0			9,26,70, 81,83	
		Repair			8.0			11,14,20, 22,24,31, 36,38,42, 44,60,64, 71,79,81	
0102	Crankshaft Assembly								
	Crankshaft	Replace				8.0		37,51,56, 58,69,70, 72,76,81	
	Main Seals	Replace			4.0			70,71,81	
	Vibration Damper	Replace			2.0			6,37,48, 70,81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0103	Flywheel Assembly								
	Flywheel	Replace			2.0			5,6,37,48, 70,72,81	
	Flywheel Housing	Replace			4.0			4,6,29,48, 69,71,72,81	
0104	Piston and Connecting Rod Assemblies								
	Pistons, Pins, and Rings	Replace				8.0		11,13,21, 50,51,69, 70,76,81	
	Connecting Rods and Bearings	Replace				4.0		11,13,21, 50,51,69, 70,76,81	
0105	Valves, Camshaft, and Timing System								
	Rocker Arm Assemblies	Inspect			1.0			81	
		Replace			4.0			69,70,71,81	
	Rocker Arm Cover	Replace		1.0				71,81	
	Gear Housing	Inspect				1.0		7,49,55,69, 70,81	
		Replace				3.0		7,49,55,69, 70,81	
	Camshaft Assembly	Inspect				1.0		81	
		Replace				4.0		34,37,54, 69,70,81	
	Camshaft Drive Gear	Inspect				0.5		81	
		Replace				2.0		34,37,54, 69,70,81, 43,69,81	
	Cam Follower	Inspect				1.0		43,69,81	
		Replace				3.0		43,69,81	
	Valves	Adjust			2.0			2,3,69,70, 81,87	
0106	Engine Lubrication System								
	Oil Pan	Inspect		0.7					
		Replace			4.0			69,70,81	
	Oil Filter	Replace		0.5				70,81,85	
	Oil Filter Head	Replace			2.0			69,70,78,81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0106 (Con't)	Oil Pump Assembly	Replace Repair				4.0 2.0		37,69,70,81 37,59,69, 70,81	
	Oil Hoses, Tubes, and Fittings	Replace		2.0				81	
	Oil Sampling Valve	Replace		0.5				81	
0108	Manifolds								
	Exhaust Manifold	Replace			3.0			49,70,81	
	Intake Manifold	Replace			3.0			70,81	
0125	Accessory Drive								
	Front Cover	Replace			3.0			70,71,81	
	Idler/Drive Gears	Replace				4.0		10,19,37, 41,53,69, 70,81	
03	**FUEL SYSTEM**								
0301	Fuel Injector								
	Injector	Adjust			2.0			2,3,69,70, 81,86	
		Test			1.0				
		Replace			1.5			52,70,81	
0302	Fuel Pumps								
	Fuel Pump	Test Replace			1.5 4.0			70,81	
	Hoses, Lines, and Fittings	Inspect Replace		0.5 2.0				81	
	Fuel Solenoid Shutoff Valve	Replace		2.5				71,81	
0304	Air Cleaner								
	Air Cleaner Assembly and Element	Inspect Service Replace Repair	0.3 0.5	 1.0 0.5				 81 81	
	Air Intake Hose and Tube Assembly	Replace		1.0				81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0305	Turbocharger	Inspect			1.0			81	
		Replace			2.0			27,70,81	
0306	Fuel Tank	Inspect		1.0				71	
		Replace			8.0			74,81	
0309	Fuel Filter/Water Separator	Service	0.5						
		Replace		0.7				81,85	
0311	Cold Starting Aid	Service		0.4				81	
		Replace		1.5				81	
		Repair		0.5				81	
0312	Throttle Position Sensor (Accelerator Pedal)	Replace		1.5				81	
04	**EXHAUST SYSTEM**								
0401	Muffler	Inspect		0.5					
		Replace		3.0				81	
	Exhaust Pipe	Inspect		0.5					
		Replace		3.0				81	
05	**COOLING SYSTEM**								
0501	Radiator								B
	Radiator Assembly	Inspect	0.5	1.0					
		Service		1.0				81	
		Replace			8.0			81	
		Repair			6.0			70,81	
	Expansion Tank	Service	0.5						
		Replace		1.5				81	
0503	Thermostat	Replace		1.5				70,81	
	Hoses	Replace		1.5				81	
0504	Water Pump	Replace		3.0				61,62,68, 70,81	
0508	Coolant Filter	Replace		0.7				81	
06	**ELECTRICAL SYSTEM**								
0601	Alternator								
	Alternator Assembly	Test		0.7				70	
		Replace		1.5				70,81	
	Drive Belt	Inspect	0.7						
		Adjust		1.0				8,70,81	
		Replace		1.5				70,81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0603	Starter								
	Starter Assembly	Test		1.0				70	
		Replace		1.7				70,81	
0607	Instrument Panel								
	Instrument Panel Switches, Gages, and Indicators Lights	Inspect	0.5						
		Replace		1.0				66,70,81	
	Fuse, Relay, and Circuit Breaker	Replace		1.5				81	
	Proximity Switches	Adjust		0.8				81	
		Replace		1.5				66,70,81	
0608	Miscellaneous Electrical Components								
	Cables	Repair		1.0				35,81	
	Electrical Junction Box	Replace		1.0	3.0			66,81	
		Repair		1.5				81	
	Temperature and Pressure Sensors/Switches	Test		0.7				71	
		Replace		1.5				81	
	Electronic Control Units and Modules	Calibrate		1.0					
		Replace		2.0				71,81	A
	Electronic Joystick Assembly and Wiring Harness	Replace		1.5				81	
0609	Lights								
	Headlights and Backup Light	Replace		0.7				71,81	
		Repair		0.5				71,81	
	Taillights	Replace		0.7				71,81	
		Repair		0.5				71,81	
	Blackout Lights	Replace		0.7				71,81	
	Side Marker Lights	Replace		0.7				71,81	
	Turn Signal Lights	Replace		0.7				71,81	
	Worklights	Replace		0.7				71,81	
		Repair		0.5				71,81	
	Interior Light	Replace		0.5				81	
		Repair		0.3				81	
	IR Lights	Replace		0.5				71,81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0610	Sending Units, Sensors, Warning Switches								
	Oil Pressure Sensor	Replace		1.0				81	
	Oil Temperature Sensor	Replace		1.0				81	
	Water Temperature Sensor	Replace		1.0				81	
	Engine Sensors	Replace		1.5				40,70,75,81	
	Hydraulic Filter Indicator Sensors	Replace		1.5				15,66,81	
	Transmission Sensors	Replace		1.5				70,81	
	Fuel Level Sending Unit	Replace		0.8				81	
	Boom Angle Sensor	Inspect		0.5				81	
		Calibrate		0.5					
		Replace		1.0				81	
	Boom Extension Sensor	Inspect		0.5				81	
		Calibrate		0.5					
		Replace		1.0				81	
	Tophandler Angle Sensor	Inspect		0.5					
		Calibrate		0.5					
		Replace		1.0				81	
0611	Horn and Alarms								
	Electric Horn	Replace		1.0				81	
	Backup Alarm	Replace		0.7				81	
0612	Batteries								
	Batteries	Inspect	0.2						
		Test		1.0				70	
		Service		1.0				70,71,81	
		Replace		1.7				70,71,81	C
	Cables	Inspect	0.4						
		Replace		1.0				71,81	
	Master Battery Switch	Replace		0.9				81	
	Slave Receptacle	Replace		1.0				81	
0613	Electrical Harnesses								
	Engine and Transmission Harness	Test		3.0				71,81	
		Replace							D
		Repair		2.0				70,81	
	Instrument Panel Harness	Test		2.0				70,81	
		Replace		4.0				81	
		Repair		1.5				81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
0613 (Con't)	Cab Harness	Test		1.5				70,81	
		Replace		8.0				81	
		Repair		2.5				81	
	Cab to Chassis Harness	Test		2.5				70,81	
		Replace							D
		Repair		2.5				70,81	
	Boom and Tophandler Harness	Test		2.0				70,81	
		Replace			6.0			66,81	
		Repair		2.0				70,81	
07	**TRANSMISSION**								
0705	Transmission Shifting Components								
	Shift Control Lever	Inspect	0.5						
		Replace		1.5				81	
0708	Torque Converter	Replace			36.0			70,81	A
0710	Transmission Assembly	Inspect	0.5						
		Service		1.0				70,81	
		Replace			36.0			69,70,81	A
		Repair							D
	Hoses	Replace		4.5				81	
0721	Filters, Breathers, and Coolers								
	Oil Filters	Replace		1.5				70,81	
	Oil Cooler Assembly	Replace			4.0			70,81	
	Hoses	Replace		3.5				70,81	
	Oil Sampling Valve	Replace		0.5				81	
09	**PROPELLER AND PROPELLER SHAFTS**								
0900	Propeller Shafts	Inspect		0.7					
		Replace		2.0				70,81	
	Universal Joints	Inspect		0.5					
		Service		0.7				70	
		Replace		2.0				70,71,81	
10	**FRONT AXLE**								
1000	Front Axle Assembly	Inspect		0.7					
		Service		2.0				70,81	
		Replace			24.0			69,70,81	A
		Repair							D

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
1002	Front Differential	Service		2.0				70,81	
		Replace							D
		Repair							D
1003	Front Planetary Wheel Ends	Service		1.5				70,81	
		Replace							D
		Repair							D
11	**REAR AXLE**								
1100	Rear Axle Assembly	Inspect		0.7					
		Service		2.0				70,81	
		Replace			4.0			67,73,80,81	A
		Repair							D
1102	Rear Differential	Service		2.0				70,81	
		Replace							D
		Repair							D
1103	Rear Planetary Wheel Ends	Service		1.5				70,81	
		Replace							D
		Repair							D
12	**BRAKES**								
1201	Parking Brake								
	Brake Cylinder	Replace			2.5			69,81,86	
		Repair			2.5			69,81,86	
	Brake Pads Front/Rear	Inspect		0.5				70,81,86	
		Adjust		1.0				70,81,86	
		Replace		2.0					
1202	Services Brakes								
	Front Brake Pads	Inspect			1.5			28,81	
		Replace							D
	Rear Brake Pads	Inspect			1.5			28,81	
		Replace							D
1204	Hydraulic Brake System								
	Brake Control Valves	Inspect		1.5					
		Replace		2.0				81	
	Accumulators	Service			1.5			45,70,81	
		Replace			2.5			70,71,81	
	Brake Hoses, Lines, and Fittings	Inspect		1.5					
		Replace		2.5				70,81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
1204 (Con't)	Brake System Cooling Filters	Replace		1.5				70,81	
13	**WHEELS**								
1311	Wheel Assembly	Inspect	0.5	0.5					
		Replace			2.5			12,70,81, 82,84	
		Repair							D,G
1313	Tires	Inspect	0.5						
		Replace			2.5			12,69,70, 74,81,82,84	
	Bogie Wheels and Tires	Inspect	0.5	0.5					
		Replace			2.5			70,74,81	
		Repair			3.0			70,74,81	E
14	**STEERING**								
1401	Mechanical Steering								
	Steering Wheel	Replace		0.5				81	
	Adjustable Steering Column	Inspect	1.0						
		Replace		4.0				81	
		Repair			2.0			81	
1410	Hydraulic Steering System								
	Tophandler and Steering	Adjust			1.0			81	
	Hydraulic Pump Assembly	Replace			8.0			70,74,81	A,F
		Repair							D
	Emergency Steering Pump	Replace			4.0			70,71,81	F
		Repair							D
1411	Hoses, Lines, and Fittings	Replace		4.5				70,81	F
1412	Steering Cylinders	Replace		1.5				70,81	F
		Repair							D
1414	Steering System Valves and Accumulator								
	Steering Control Valves	Replace			6.0			70,74,81	F
		Repair							D
	Accumulator	Service			1.5			69,81	
		Replace			2.5			70,81	
	Steering Sensor	Replace		2.5				81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
15	**FRAME ASSEMBLY**								
1501	Frame Components	Inspect		1.5					
	Skid Plates and Access Covers	Replace		2.5				70,81	
	Wear Plates	Inspect		1.0				81	
		Replace		2.5				70,81	
1503	Pintle Hook	Inspect	0.2						
		Service	0.2						
		Replace		0.5				71,81	
18	**BODY, CAB, AND HOOD**								
1801	Cab Assembly	Inspect	1.0						
		Replace							D
	Cab Support Frame	Replace							D
	Cab Lift Frame	Replace		4.0				74,81	
		Repair		1.0				81	
	Cab Door	Replace			2.5			81	
		Repair			1.5			81	
	Engine Cover	Repair		1.5				70,81	
1802	Windshield and Windows	Replace			4.5			69,70,81	
	Fender Assembly	Replace		4.0				81	
1806	Seat Belt Assembly	Inspect	0.1						
		Replace		1.5				81	
	Seat Assembly	Inspect	0.5						
		Replace		2.0				65,70,81	
		Repair		1.0				81	
22	**ACCESSORY ITEMS**								
2202	Accessory Items								
	Mirrors	Inspect	0.2						
		Adjust	0.2						
		Replace		0.8				81,83	
	Front, Rear, and Roof Windshield Wipers	Inspect	0.2						
		Replace		0.4				81,83	
	Windshield Washer and Motor	Service	0.4						
		Replace		1.5				81,83	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
2202 (Con't)	Heater Hoses	Replace		2.0				70,81	
	Heater/Air Conditioning Unit	Test Replace		1.3	 4.0			46 70,81	
	Blower Motor and Fan	Replace		6.0				81	
2210	Data Plates	Replace		1.5				70,81	
24	**HYDRAULIC AND FLUID SYSTEMS**								
2400	Hydraulic System	Test		3.0				1,32,70,81	
2401	Boom and Brake Pump	Replace Repair			8.0			70,74,81	A,F D
	Cooling Fan Hydraulic Pump	Replace Repair			4.0			70,81	F D
	Cooling Fan Hydraulic Motor	Replace Repair			4.0			81	F D
	Hydraulic System Auxiliary Pump	Replace		1.5				81	F
	Tophandler Hydraulic Motors	Replace Repair		6.0				70,74,81	A,F D
2402	Main Control Valve Assembly	Replace Repair			8.0			70,74,81	A,F D
	Servo Control Valve	Replace Repair			6.0			70,81	A,F D
	Tophandler Control Valves	Replace Repair			8.0			70,81	F D
	Forklift Control Valve	Replace Repair		2.0				70,81	F D
2405	Boom Lift Cylinder	Replace Repair			8.0			70,74,81	A,F D
	Boom Extension Cylinder	Replace Repair							D,F D
	Folding Cylinders	Replace Repair			6.0			70,74,81	A,F D
	Cab Lifting and Sliding Cylinders	Replace Repair		3.0				70,81	F D
	Bogie Wheel Lift Cylinders	Replace Repair			3.0			70,74,81	F D

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
2405 (Con't)	Folding Boom Locking Pin Cylinders	Replace Repair			3.0			69,70,81	F D
	Tilt Cylinders	Replace Repair			3.0			70,74,81	F D
	Forklift Cylinders	Replace Repair			2.0			70,81	F D
	Tophandler Sideshifting Cylinders	Replace Repair			2.0			70,74,81	F D
	Tophandler Leveling Cylinders	Replace Repair			2.0			70,74,81	F D
	Twistlock Cylinders	Replace		1.0				70,81	F
2406	Strainers, Filters, Hoses, Tubes, and Fittings								
	Hoses, Lines, and Fittings	Inspect Replace	0.5	 2.5				 15,70,81	 F
	Oil Sampling Valve	Replace		0.5				70,81	F
	Oil Filters	Replace		3.0				70,81,85	
2408	Tanks and Reservoirs								
	Hydraulic Reservoir	Inspect Service Replace	0.5	 1.5	 26.0			 81 70,81	 F
	Gage, Level	Replace		1.5				70,81	
32	**BASIC ISSUE ITEMS, TROOP INSTALLED**								
3200	Dolly Wheels	Inspect Repair	0.3	 1.0				 81	 E
33	**SPECIAL PURPOSE KITS**								
3307	Forklift Kit	Inspect Install	0.5 0.5						
34	**ARMAMENT MATERIAL**								
3401	Rifle Mounting Kit	Replace		0.5				81	

Table 1. MAC for the RT 240 RTCH - Continued.

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			Unit		DS	GS	DEPOT		
Group Number	Component/ Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
52	**REFRIGERATION, AIR CONDITIONER/ HEATER, AND AIR CONDITIONING COMPONENTS**								
5200	Air Conditioning System	Inspect	0.5	0.5				46,81	
		Service			2.0			63,70,81	
	Compressor	Replace			3.0			81	
	Belt	Adjust		0.7				81	
		Replace		1.0				81	
5217	Valves and Lines	Replace			3.5			81	
5230	Condenser	Replace			2.5			81	
	Receiver-Drier	Replace			3.0			81	
74	**CRANES, SHOVELS, AND EARTHMOVING EQUIPMENT COMPONENTS**								
7417	Lifting Boom	Inspect	1.0	1.0					
		Replace			24.0			66,71,81	A
		Repair							D
7421	Tophandler Assembly	Inspect	1.0	1.0					
		Replace		4.0				81	
		Repair							D
	Twistlocks	Inspect	0.5						
		Adjust		1.5				81	
		Replace			2.5			69,81	

Table 2. Tools and Test Equipment Requirements for the RT 240 RTCH.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	O	Adapter, Quick Disconnect		PD260
2	F	Adapter, Wrench Torque		3163196
3	F	Adjustment Kit, Injector	4910-00-548-7984	3823610
4	F	Alinement Plate, Flywheel Housing		3376606
5	F	Attachment, Dial	4910-01-097-6972	ST-1325
6	F	Barring Tool, Engine		3824270
7	F	Bearing Kit, Needle		3823774
8	O	Belt, Tension Gage	5220-01-141-5776	ST1138
9	F	Bracket, Lifting, Cylinder Head		3822479
10	H	Caliper, Inside: Firm joint, 12 in size	5210-00-189-9640	27-12
11	H	Caliper, Micrometer, Outside: 0-1 in range	5210-00-540-2973	T230RL
12	F	Chain Assembly, Single Leg: 14 ft long	4010-00-171-4426	R-R-C-271
13	H	Compressor, Piston Ring		3823309
14	F	Compressor, Valve Spring	5120-01-145-7293	ST-448
15	O	Crowfoot Attachment Set: Socket wrench, 1/2 in drive	5120-01-429-1109	216FCOM
16	H	Driver		3376070
17	H	Driver, Expansion Plug	4910-01-143-3337	3376816
18	H	Driver, Expansion Plug		3822372
19	F	Driver, Gear, Fuel Pump		3823581
20	F	Driver, Injector Sleeve	5120-00-981-3108	ST-1227
21	H	Expander, Piston Ring		ST-821
22	F	Expander, Tube	3441-00-922-6699	ST880
23	H	Extractor, Dowel Pin		ST1134
24	F	Extractor, Valve Seat		3376146
25	F	Fixture, Engine Lifting		3162871
26	F	Gage, Capscrew, Cylinder Head		3823546
27	F	Gage, Depth	4910-00-238-9957	ST-537
28	F	Gage, Depth, Micrometer: 0-6 in range	5210-00-619-4045	52-225-015
29	F	Gage, Depth, Dial Indicating	5210-01-157-3091	3823495
30	H	Gage, Master Ring		3376576

Table 2. Tools and Test Equipment Requirements for the RT 240 RTCH - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
31	F	Gage, Pressure, Dial Indicating	6620-01-382-1206	3375275
32	O	Gage, Pressure, Multiple Dial Indicating	4940-01-086-8756	123221E6828
33	H	Guide		3376069
34	H	Guide, Camshaft Pilot		3376388
35	O	Heater, Gun	4940-00-561-1002	6966C
36	F	Holding Tool, Injector Sleeve	5120-00-104-1795	ST1179
37	F	Indicator, Dial	5210-01-157-2291	3376050
38	F	Insert Kit, Valve Seat	4910-00-345-3708	ST-257
39	H	Inserter, Bearing and Bushing	5120-01-156-6186	3376637
40	O	Installation Tool, EPS		3822759
41	H	Installation Tool, Needle Bearing		3824117
42	F	Installation Tool, Seal, Valve		3823946
43	H	Installation/Removal Tool, Cam Follower		3824519
44	F	Kit, Dye	4820-01-446-7489	3376891
45	F	Kit, Nitrogen Charging	1025-01-070-3200	8449334
46	O	Leak Detector, Refrigerant	4940-01-387-0948	16500
47	H	Liner/Installation Tool		3824272
48	F	Pin Kit, Guide		3376695
49	F	Pin, Guide		3376488
50	H	Pins, Guide, Connecting Rod		3376038
51	H	Plate, Adapter, Engine Stand		3376432
52	F	Puller and Driver, Injector		3823579
53	H	Puller Kit, Cam Gear		3162895
54	H	Puller Kit, Camshaft Gear		3824106
55	H	Puller Kit, Universal	5180-01-104-2762	3375784
56	H	Puller Kit, Universal	5180-01-178-5332	3375840
57	H	Puller, Cylinder Liner		3375629
58	H	Puller, Main Bearing Cap	5120-01-141-5779	ST-1178
59	H	Puller, Mechanical	5120-01-331-6468	3375082
60	F	Puller, Mechanical	5120-00-113-5271	3377079
61	O	Puller, Mechanical	5120-01-156-4183	3376326
62	O	Puller, Mechanical	5120-00-499-1489	ST-647

Table 2. Tools and Test Equipment Requirements for the RT 240 RTCH - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
63	F	Reclaimer, Refrigerant, R134A	4250-01-396-8928	EEEAC304A
64	F	Removal Tool, Valve Guide		3376398
65	O	Riveter, Blind, Hand: 3/32 in, 1/8 in, 5/32 in, and 3/16 in diameters	5120-00-017-2849	98
66	O	Screwdriver Set, Jeweler's	5120-00-288-8739	250
67	F	Shackle, Lifting	4030-00-169-9298	358T1 1-2
68	F	Separator Tool, Bearing	5120-01-128-2674	3375326
69	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic, Less Power	4910-00-754-0705	SC 4910-95-A31
70	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1	4910-00-754-0654	SC 4910-95-A74
71	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2	4910-00-754-0650	SC 4910-95-A72
72	F	Sling, Endless	3940-01-183-9412	3375957
73	F	Sling, Eye	3940-01-334-0749	EE1-202
74	O	Sling, Nylon	2835-01-078-2081	4-8FTX2IN
75	O	Socket, Deep Well: 1-1/4 in		3823843
76	H	Stand, Engine Rebuild	4910-01-128-2686	3375194
77	F	Stand, Engine Support		3376057
78	F	Test Kit, Pressure, Lubricating Oil Cooler		3376861
79	F	Tester, Valve Spring	4910-01-142-4929	3375182
80	F	Tool Kit, Automotive Fuel and Electrical System Repair	5180-00-754-0655	SC 5180-95-B08
81	O	Tool Kit, General Mechanic's: Automotive	5180-00-177-7033	SC 5180-95-N26
82	F	Wrench, Impact, Pneumatic	5130-00-542-3230	5130-00-542-3230
83	O	Wrench Set, Socket Attachment: Screwdriver, torx, 1/4 and 1/8 in drive	5120-01-178-6342	J29843
84	F	Wrench Set, Socket, Impact	5130-00-357-5136	B107.2

Table 2. Tools and Test Equipment Requirements for the RT 240 RTCH - Continued.

(1) Tools or Test Equipment Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
85	O	Wrench, Strap	5120-01-262-7306	3376807
86	O	Wrench, Strap, Pipe	5120-00-242-3249	D170X
87	F	Wrench, Torque	5120-01-348-0959	3376592
88	O	Cable, Breakout: Ambient Air Pressure Sensor		3824774
89	O	Cable, Breakout: Pressure Sensor		3824775
90	O	Cable, Breakout: Pressure Sensor		3824776
91	O	Cable, Breakout: Pressure/ Temperature Sensor		3162898
92	O	Cable, Test/Repair		3823256
93	O	Test Lead, Female		3822917
94	O	Test Lead, Female		3823994
95	O	Test Lead, Female		3823996
96	O	Test Lead, Male		3822758

Table 3. Remarks for the RT 240 RTCH.

(1) Reference Code	(2) Remarks
A	Prior to removing a major assembly or component, contact Specialized Repair Activity (SRA) for possible further troubleshooting information and/or shipping instructions. For SRA assistance, call Kalmar RT Center (KRTC) at: • 1-800-558-7232, ext 24 • 1-210-599-3478, ext 24 • 1-210-599-4009 (fax) • E-mail to: rtch@kalmarRT.com For RT 240 RTCH information and FAQ, visit the KRTC web site: • www.kalmarRT.com
B	Refer to TM 750-254 (cooling systems) for additional information.
C	Refer to TM 9-6140-200-14 (batteries) for additional information.
D	Replacement or repair responsibility is assigned to Specialized Repair Activity (SRA). For SRA assistance, call Kalmar RT Center (KRTC) at: • 1-800-558-7232, ext 24 • 1-210-599-3478, ext 24 • 1-210-599-4009 (fax) • E-mail to: rtch@kalmarRT.com For RT 240 RTCH information and FAQ, visit the KRTC web site: • www.kalmarRT.com
E	Refer to TM 9-2610-200-14 (tires) for additional information.
F	The replacement of hydraulic reservoir return filters is required after 100 hours of operation, following any hydraulic system maintenance action that resulted in the hydraulic system being opened.
G	Local repair of tire and wheel assembly is authorized.

EXPENDABLE AND DURABLE ITEMS LIST 0203 00

SCOPE

This work package lists expendable and durable items you will need to maintain the RT 240 RTCH. This listing is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, *Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items)*, or CTA 8-100, *Army Medical Department Expendable/Durable Items*.

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item [e.g., Use antifreeze (Item 3, WP 0203 00)].
2. **Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.

   C - Operator/Crew

   O - Organizational Maintenance
3. **Column (3) - National Stock Number (NSN).** This is the NSN assigned to the item which you can use to requisition it.
4. **Column (4) - Description, Item Name, Commercial and Government Entity Code (CAGEC), and Part Number (P/N).** This provides the other information you need to identify the item.
5. **Column (5) - Unit of Measure (U/M).** This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

Table 1. Expendable and Durable Items List.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1	O		ADHESIVE (71984) RTV732	
		8040-00-877-9872	3 Ounce Tube	OZ
2	C		ANTIFREEZE: Permanent: Arctic Grade (81349) MILA11755	
		6850-00-174-1806	55 Gallon Drum	GAL
3	C		ANTIFREEZE: Permanent, Ethylene Glycol, Inhibited (81349) MILA46153	
		6850-00-181-7929	1 Gallon Bottle	GAL
		6850-00-181-7933	5 Gallon Can	GAL
		6850-00-181-7940	55 Gallon Drum	GAL
4	O	5340-00-450-5718	CAP SET, PROTECTIVE: Dust and Moisture Seal (19207) 10935405	EA
5	O		CLOTH: Abrasive, Emery, Fine (80204) ANSI B74.18	
		5350-00-584-4654	50 Sheet Package	EA
6	O		COMPOUND: Antiseize (05972) 76764	
		8030-00-251-3980	1 Pound Can	LB
7	C		COMPOUND: Cleaning, Windshield (81348) O-C-1901	
		6850-00-926-2275	16 Ounce Can	OZ
8	O		COMPOUND: Gasket Forming, Silicone (05972) 77C	OZ
			13 Ounce Cartridge	OZ
9	O		COMPOUND: Sealing (81349) MIL-S-46163	
		8030-00-111-2763	10 cc Bottle, Box of 10 Bottles	CC
		8030-00-111-2762	50 cc Bottle	CC
10	O		COMPOUND: Sealing, Pipe (05972) 079-21	
		8030-00-081-2327	10 cc Bottle, Box of 10 Bottles	CC
		8030-00-081-2286	50 cc Bottle	CC
11	C		DETERGENT: General Purpose, Liquid (81348) P-D-220	
		7930-00-282-9699	1 Gallon Can	GAL

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
12	O		FLUX: Soldering (58536) A-A-51145TY1 FORM A	
		3439-00-255-9935	1 Pound Can	LB
13	C		FUEL: Diesel, DF-1 Grade, Winter (81346) ASTM D 975	
		9140-00-286-5286	Bulk	GAL
		9140-00-286-5287	5 Gallon Can	GAL
		9140-00-286-5288	55 Gallon Drum	GAL
14	C		FUEL: Diesel, DF-2 Grade (81346) ASTM D 975	
		9140-00-286-5294	Bulk	GAL
		9140-00-286-5295	5 Gallon Can	GAL
		9140-00-286-5296	55 Gallon Drum	GAL
15	C	9130-01-031-5816	FUEL, TURBINE: Aviation (81349) MILT83133 GR JP8	GAL
16	C		GREASE: Automotive and Artillery, GAA	
		9150-01-197-7688	(81349) M-10924-A 1-1/4 Ounce Tube	OZ
		9150-01-197-7693	(81349) M-10924-B 14 Ounce Cartridge	OZ
		9150-01-197-7690	(81349) M-10924-C 2-1/4 Pound Can	LB
		9150-01-197-7692	(81349) M-10924-E 35 Pound Can	LB
17	O	9150-01-361-8919	GREASE: Electrically Conductive (47224) 5190179	OZ
18	O		OIL: Lubricating, GO 85W/140 (81349) MIL-PRF-2105	
		9150-01-048-4591	1 Quart Can	QT
		9150-01-035-5395	5 Gallon Can	GAL
		9150-01-035-5396	55 Gallon Drum	GAL
19	C		OIL: Lubricating, OE/HDO 10 (81349) MIL-L-2104	
		9150-00-189-6727	1 Quart Can	QT
		9150-00-186-6668	5 Gallon Can	GAL
		9150-00-191-2772	55 Gallon Drum	GAL
20	C		OIL: Lubricating, OE/HDO 15/40 (81349) MIL-L-2104	
		9150-01-152-4117	1 Quart Can	QT
		9150-01-152-4118	5 Gallon Can	GAL
		9150-01-152-4119	55 Gallon Drum	GAL

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
21	C		OIL: Lubricating, OEA, Arctic (81349) 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 Drum	GAL
22	C		RAG: Wiping (64067) 7920-00-205-1711	
		7290-00-205-1711	50 Pound Bale	LB
23	O		SEALANT: Pipe (15434) 3375066	OZ
24	O		SEALANT: Silicone (15434) 3823494	OZ
25	O		SOLDER: Lead-Tin Alloy, Rosin Core (15434) 3823494	
		3439-00-555-4629	1 Pound Spool	LB
26	C		SOLVENT: Dry Cleaning, Type III (81348) P-D-680	
		6850-01-377-1808	1 Quart Container	QT
		6850-01-331-3349	5 Gallon Can	GAL
		6850-01-331-3350	55 Gallon Drum	GAL
27	O		STRAP: Tiedown, Electrical Components	
		5975-00-903-2284	(96906) MS3367-4-0 4 Inch Length, Black Package of 100	EA
		5975-00-984-6582	(96906) MS3367-1-0 6 Inch Length, Black Package of 100	EA
		5975-00-935-5946	(96906) MS3367-2-1 13 Inch Length, Brown Package of 100	EA
28	O		TAG: Marker (64067) 9905-00-537-8954	
		9905-00-537-8954	Pack of 50	EA
29	O		TAPE: Duct, 2 Inches Wide (39482) 1791K70	
		5640-00-103-2254	60 Yard Roll	YD
30	O		TUBING: Heat Shrinkable (81349) M23053/5-106-0	
		5970-00-815-1295	250 Foot Spool	FT

Table 1. Expendable and Durable Items List - Continued.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
31	O	9905-00-596-0191	WIRE: Nonelectrical (81346) ASTM A641 5 Pound Coil	LB

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TOOL IDENTIFICATION LIST 0204 00

SCOPE

This work package lists all common tools and supplements and special tools/fixtures needed to maintain the RT 240 RTCH.

EXPLANATION OF COLUMNS IN THE TOOL IDENTIFICATION LIST

1. **Column (1) - Item Number (No.).** This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Tool kit, general mechanic's, Item 31, WP 0204 00).
2. **Column (2) - Item Name.** This column lists the item by noun nomenclature and other descriptive features (e.g., Caps, vise jaw).
3. **Column (3) - National Stock Number.** This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.
4. **Column (4) - Part Number/CAGEC.** Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.
5. **Column (5) - Reference.** This column identifies the authorizing supply catalog or RPSTL for items listed in this work package.

TOOL IDENTIFICATION LIST

Table 1. Tool Identification List.

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/ CAGEC	(5) REFERENCE
1	Adapter, Quick Disconnect		PD260 (93061)	TM 10-3930-675-24P
2	Apron, Utility, Impermeable	8415-00-082-6108	8415-00-082-6108 (64067)	SC 4910-95-A72
3	Belt, Tension Gage	5220-01-141-5776	ST1138 (15434)	TM 10-3930-675-24P
4	Clamp, C-	5120-00-203-6431	A-A-431 (58536)	SC 4910-95-A72
5	Crowfoot Attachment Set: Socket wrench, 1/2 in drive	5120-01-429-1109	216FCOM (55719)	
6	Dispenser, Sealant	5120-00-061-1283	45RCT (88736)	SC 4910-95-A31
7	Drill Set, Twist	5133-00-293-0983	800434 (19203)	SC 4910-95-A74
8	Drill, Electric, Portable: 3/8 in size	5130-00-935-7354	6635 (55111)	SC 4910-95-A74
9	Gage, Pressure, Multiple Dial Indicating	4940-01-086-8756	123221E6828 (97403)	
10	Gloves, Chemical and Oil Protective: Rubber	8415-00-641-4601	ZZ-G-381 (81348)	SC 4910-95-A74
11	Goggles, Industrial	4240-00-052-3776	A-A-1110 (58536)	SC 4910-95-A74
12	Heater, Gun	4940-00-561-1002	6966C (78976)	
13	Installation Tool, EPS		3822759 (15434)	TM 10-3930-675-24P
14	Jack, Hydraulic, Hand: 12 ton capacity	5120-00-224-7330	67224 (07505)	SC 4910-95-A74
15	Key Set, Socket Head Screw	5120-00-935-4641	56011 (74445)	SC 4910-95-A74
16	Leak Detector, Refrigerant	4940-01-387-0948	16500 (07295)	TM 10-3930-675-24P
17	Lubricating Gun, Hand	4930-00-253-2478	1142 (36251)	SC 4910-95-A72
18	Multimeter, Digital	6625-01-139-2512	T00377 (55026)	SC 4910-95-A72
19	Multiplier, Torque Wrench	5120-00-169-2986	PD1201 (92059)	SC 4910-95-A31
20	Pan, Drain: 4 gallon capacity	4910-00-387-9592	450 (05463)	SC 4910-95-A74
21	Puller, Battery Terminal	5120-00-944-4268	21 (70786)	SC 4910-95-A72
22	Puller, Mechanical	5120-01-156-4183	3376326 (15434)	TM 10-3930-675-24P
23	Puller, Mechanical	5120-00-499-1489	ST-647 (15434)	TM 10-3930-675-24P
24	Riveter, Blind, Hand: 3/32 in, 1/8 in, 5/32 in, and 3/16 in diameters	5120-00-017-2849	98 (54402)	
25	Screwdriver Set, Jeweler's	5120-00-288-8739	250 (33164)	
26	Sling, Nylon	2835-01-078-2081	4-8FTX2IN (91796)	

Table 1. Tool Identification List - Continued.

(1) ITEM NO.	(2) ITEM NAME	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER/ CAGEC	(5) REFERENCE
27	Socket, Deep Well: 1-1/4 in		3823843 (15434)	TM 10-3930-675-24P
28	Soldering Gun	3439-00-618-6623	D550-3 (97049)	SC 4910-95-A74
29	Tape, Measuring: 50 feet long	5210-00-554-7085	403 (37163)	SC 4910-95-A72
30	Tool Kit, Electrical Connector Repair	5180-00-876-9336	7550526 (19204)	SC 4910-95-A72
31	Tool Kit, General Mechanic's: Automotive	5180-00-177-7033	SC5180-90-N26 (50980)	SC 5180-95-N26
32	Vise, Machinist's	5120-00-293-1439	504M2 (79416)	SC 4910-95-A74
33	Wrench Set, Socket Attachment: Screwdriver, torx, 1/4 and 1/8 in drive	5120-01-178-6342	J29843 (33287)	
34	Wrench Set, Socket: 3/4 in drive	5120-00-204-1999	FEDSTD353 (06542)	SC 4910-95-A72
35	Wrench, Adjustable: 3-5/8 in jaw, 15 in long	5120-00-264-3793	2117080 (24617)	SC 4910-95-A72
36	Wrench, Pipe, Strap: 12 in	5120-00-242-3249	D170X (50893)	
37	Wrench, Strap	5120-01-262-7306	3376807 (15434)	TM 10-3930-675-24P
38	Wrench, Strap, Oil Filter	5120-00-020-2947	2432097 (10001)	SC 4910-95-A74
39	Wrench, Torque: 50-250 lb-ft capacity	5120-01-042-0982	VB-2503MFR (27464)	SC 4910-95-A74
40	Wrench, Torque: 3/8 in drive, 0-200 lb-in capacity	5120-00-853-4538	F2001 (90947)	SC 4910-95-A72
41	Wrench, Torque: 3/8 in drive, 0-300 lb-in capacity	5120-00-776-1841	2163993 (10001)	SC 4910-95-A74
42	Wrench, Torque: 3/8 in drive, 15-75 lb-ft capacity	5120-01-355-1739	QC2FR75 (55719)	SC 4910-95-A74
43	Cable, Breakout: Ambient Air Pressure Sensor		3824774 (15434)	TM 10-3930-675-24P
44	Cable, Breakout: Pressure Sensor		3824775 (15434)	TM 10-3930-675-24P
45	Cable, Breakout: Pressure Sensor		3824776 (15434)	TM 10-3930-675-24P
46	Cable, Breakout: Pressure/Temperature Sensor		3162898 (15434)	TM 10-3930-675-24P
47	Cable, Test/Repair		3823256 (15434)	TM 10-3930-675-24P
48	Test Lead, Female		3822917 (15434)	TM 10-3930-675-24P
49	Test Lead, Female		3823994 (15434)	TM 10-3930-675-24P
50	Test Lead, Female		3823996 (15434)	TM 10-3930-675-24P
51	Test Lead, Male		3822758 (15434)	TM 10-3930-675-24P

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ERROR CODES 0205 00

ERROR CODE TABLE

1. The attached error code table (Table 4) identifies error codes resident on the RTCH's on-board computer. These error codes are visible to both the driver and the maintainer and address very specific equipment conditions on the vehicle.
2. This error code listing also addresses required ***driver actions*** based on the category and type of error identified.

EXPLANATION OF ERROR CODE DISPLAY

NOTE

There are three kinds of information in the Electronic Control System (ECS) display.

1. Icons in the ***left lower corner*** of the display describe what the driver should do. Table 1 defines each of the three driver actions.

Table 1. Driver Action Icons.

ICON	DESCRIPTON
	S***TOP VEHICLE IMMEDIATELY in a safe way.*** Can be a safety issue. Machine performance may be restricted. Read operator's manual for instructions. Contact maintenance personnel.
	***WARNING - DEGRADED OPERATION, stop vehicle in a safe way***. Read operator's manual for instructions. Contact maintenance personnel. Confirm that error message is acknowledged by pressing RESET button. Error will appear every three minutes as long as error is active. It can be reset every time it shows.
	***INFORMATION/MAINTENANCE action is needed.*** Error code shows once when vehicle starts up. Acknowledge error message by pressing RESET. These error codes may be de-activated for driver, so that they only show when maintenance personnel activate them.

2. Icons in the ***center*** of the display identify the type of fault. Table 2 describes the five fault types used in the display.

Table 2. Type of Fault Icons.

ICON	DESCRIPTON		ICON	DESCRIPTION
	Sensor			Lever
	Valve			Temperature
	Pressure			

EXPLANATION OF ERROR CODE DISPLAY - CONTINUED

3. Icons in the ***right*** of the display identify what function or vehicle system the fault is related to. Table 3 lists the various functions or vehicle systems used in the display.

Table 3. Function Icons.

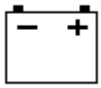
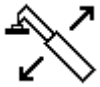
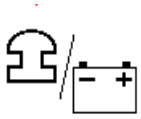
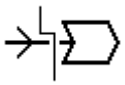
ICON	DESCRIPTON		ICON	DESCRIPTION
	Battery			Twistlock
	Forklift kit			Up/Down
	Emergency stop or battery			In/Out
	Rotation			Transmission
	Hydraulic filter			Fan
	Communication			Engine

Table 3. Function Icons - Continued.

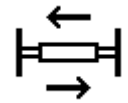
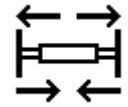
ICON	DESCRIPTON		ICON	DESCRIPTION
	Sideshifting			No overload protection
	Oscillation (leveling)			Brake
	Spreading			Tilt
	Steering			

Table 4. Error Codes.

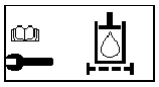
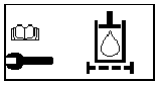
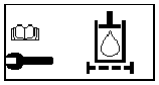
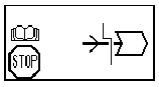
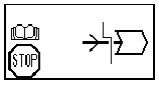
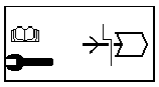
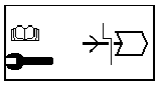
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
1		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Lifting/lowering boom** Hydraulic filter clogged.	None
2		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Steering** Hydraulic filter clogged.	None
3		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Tophandler attachment** Hydraulic filter clogged.	None
4		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Return filter** Hydraulic filter clogged.	None
105		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **ECU 790 not responding** Circuit breaker tripped. Cable defective. ECU 790 defective.	Operating system not responding. Boom and tophandler may not work.
106		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **ECU 791 not responding** Circuit breaker tripped. Cable defective. ECU 791 defective.	Operating system not responding. Boom and tophandler may not work.
107		**Press RESET** Finish mission. Notify maintenance.	**Information/Maintenance** **Communication, cable segment 1 between ECU 795 and 791** Cable between ECU 795 - 791 interrupted or short circuited.	No redundancy in ECS system of boom, display, and tophandler function.
108		**Press RESET** Finish mission. Notify maintenance.	**Information/Maintenance** **Communication, cable segment 2 between ECU 791 and 790** Cable between ECU 791 - 790 interrupted or short circuited.	No redundancy in ECS system of boom, display, and tophandler function.

Table 4. Error Codes - Continued.

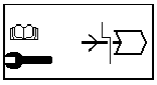
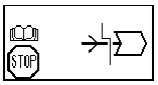
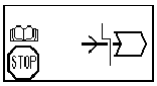
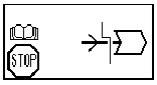
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
109		**Press RESET** Finish mission. Notify maintenance.	**Information/Maintenance** **Communication, cable segment 3 between ECU 790 and 795** Cable between ECU 790 - 795 interrupted or short circuited.	No redundancy in ECS system of boom, display, and tophandler function.
110		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Communication, ECU 792 - steering computer not responding** Circuit breaker tripped. Cable defective. ECU 792 defective.	Steering may not function properly.
111		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Communication, ECU 793 - transmission computer not responding** Circuit breaker tripped. Cable defective. ECU 793 defective.	Transmission may not function properly.
112		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **ECU 794 - engine computer not responding** Circuit breaker tripped. Cable defective. ECU 794 defective.	Engine may not function properly.
118		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **No pressure/signal - both brake systems** Circuit breaker tripped. Hydraulic failure.	Brakes may not function properly.
119		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **No pressure - brake circuit 1** Hydraulic failure.	Only half brake capability available.

Table 4. Error Codes - Continued.

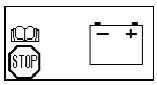
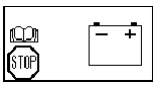
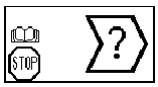
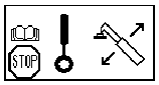
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
120		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **No pressure - brake circuit 2** Hydraulic failure.	Only half brake capability available.
121		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Supply voltage - ECU 790** Emergency stop engaged. Circuit breaker tripped. Cable defective.	Operating system and boom function not working.
122		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Supply voltage - CAN 790** Circuit breaker tripped. Cable defective.	Operating system and boom function not working.
123		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Ref. voltages 10V- ECU 790** Circuit breaker tripped. Cable defective.	Operating system and boom function not working.
125		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Memory fault, check ECU 790** Circuit breaker tripped. Cable defective.	None if code clears. Operating system and boom function not working.
126		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Signal for lifting/lowering, out of range** Cable defective. Short circuit. Potentiometer in joystick not functioning.	Lift/lower does not function properly (hydraulic stops).

Table 4. Error Codes - Continued.

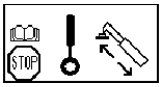
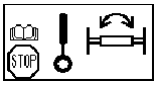
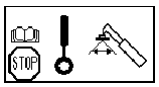
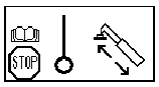
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
127		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Signal for boom in/out, out of range** Cable defective. Short circuit. Potentiometer in joystick not functioning.	Boom in/out does not function properly (hydraulic stops).
128		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Signal for slewing, out of range** Cable defective. Short circuit. Potentiometer in joystick not functioning.	Slewing does not function properly (hydraulic stops).
129		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Signal for tilt in/out of range** Cable defective. Short circuit. Potentiometer in joystick not functioning.	Tilt does not function properly (hydraulic stops).
130		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** Overload protection error Error codes 131 - 136 or 210 have been active.	No overload protection system. Reduced hydraulic speed.
131		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom sensor- boom length out of range or no signal change when boom is moving** Cable defective. Short circuit. Potentiometer damaged. Hydraulic failure.	No overload protection system. Reduced hydraulic speed.

Table 4. Error Codes - Continued.

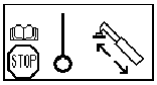
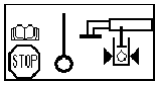
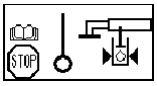
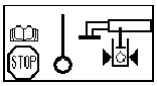
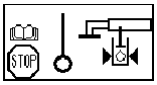
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
132		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom sensor- boom angle out of range or no signal change when lowering/lifting boom** Sensor bracket or lever damaged. Cable defective. Short circuit. Potentiometer damaged. Hydraulic failure.	No overload protection system. Reduced hydraulic speed.
133		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Left lift cylinder pressure sensor - signal out of range** Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
134		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Right lift cylinder pressure sensor - signal out of range** Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
135		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Left lift cylinder return pressure sensor - signal out of range** Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.
136		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Right lift cylinder return pressure sensor - signal out of range** Cable defective. Short circuit. Pressure sensor defective.	No overload protection system. Reduced hydraulic speed.

Table 4. Error Codes - Continued.

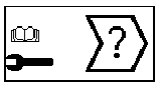
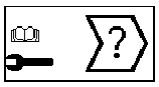
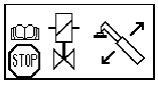
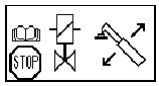
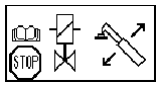
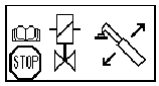
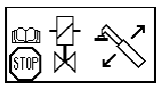
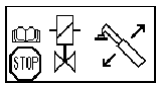
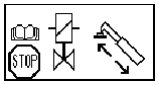
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE CATEGORY/ EXPLANATION	VEHICLE LIMITATIONS
141		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Information/Maintenance** **Communication fault - ECU 790** Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
142		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Information/Maintenance** **Communication fault - ECU 790** Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
151		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Locking valve, broken circuit** Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
152		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Locking valve, short circuit** Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
154		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Lifting valve, broken circuit** Cable to valve defective.	Lifting is impossible.
155		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Lifting valve, short circuit** Cable to valve defective.	Uncontrolled self-lifting may occur.
157		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Lowering valve, broken circuit** Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary.
158		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Lowering valve, short circuit** Cable to valve defective.	Boom cannot be lowered with joystick. Emergency lowering is necessary. Uncontrolled self-lifting may occur.
160		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom in valve, broken circuit** Cable to valve defective.	Boom cannot be retracted.

Table 4. Error Codes - Continued.

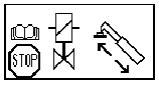
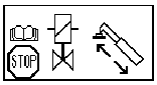
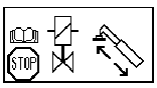
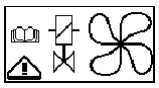
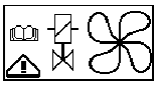
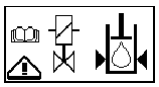
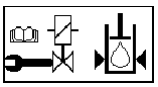
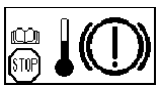
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
161		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom in valve, short circuit** Cable to valve defective.	Boom cannot be retracted. Uncontrolled self-retraction may occur.
163		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom out valve, broken circuit** Cable to valve defective.	Boom cannot be extended.
164		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Boom out valve, short circuit** Cable to valve defective.	Boom cannot be extended. Uncontrolled self-extension may occur.
166		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Cooling fan valve - broken circuit** Cable to valve defective.	Cooling fan will run at full speed. No fording activities possible.
167		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Cooling fan valve - short circuit** Cable to valve defective.	Cooling fan may run at any speed. No fording activities possible. Overheating may occur.
169		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Emergency hydraulic valve - broken circuit** Cable to valve defective.	No hydraulic emergency operation is possible.
172		**Press RESET** Finish mission. Notify maintenance.	**Information/Maintenance** **Pump turn off valve - broken circuit** Cable defective.	May be difficult to start because of engaged pumps.
191		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Temperature in front wheel end above 203°F (95°C)** Cable defective. No cooling.	Brakes may overheat at front axle.

Table 4. Error Codes - Continued.

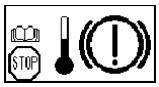
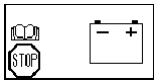
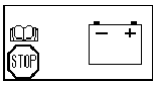
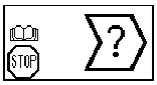
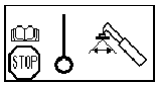
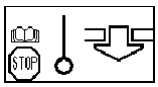
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
192		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Temperature in rear wheel end above 203°F (95°C)** Cable defective. No cooling.	Brakes may overheat at rear axle.
201		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Supply voltage - ECU 791** Emergency stop engaged. Circuit breaker tripped. Cable defective.	Tophandler not working.
202		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Supply voltage - CAN 791** Circuit breaker tripped. Cable defective.	Operating system and tophandler not working.
203		**Stop Vehicle** Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Ref. voltages 10V- 791** Circuit breaker tripped. Cable defective.	Operating system not working.
205		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Memory fault - check ECU 791** Circuit breaker tripped. Cable defective.	None if code clears. Operating system and tophandler not working.
210		**Stop Vehicle** Press RESET. Put load down safely. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Tilt angle sensor - signal out of range** Potentiometer damaged. Cable defective. Short circuit.	Generate error code 130.
212		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Logical error - left twistlock** Short circuit. Signal from both 7204L and 7205L.	Both locked and unlocked twistlock at the same time. Safe operation is not possible.

Table 4. Error Codes - Continued.

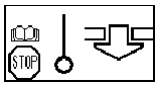
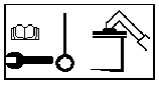
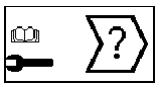
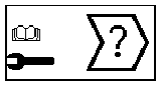
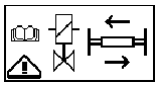
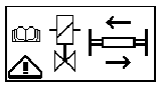
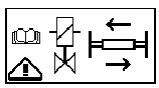
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
213		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Logical error - right twistlock** Short circuit. Signal from both 7204R and 7205R.	Both locked and unlocked twistlock at the same time. Safe operation is not possible.
214		**Stop Vehicle** Press RESET. Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Logical error - forklift sensors** Cable defective. Signal from 7206-1 or 7206-2.	Operation of forklift is not possible.
220		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **One pulse signal to the steering wheel interrupted** Clock 1. Clock 2. Cables defective. Steering column sensor defective.	Stop vehicle by switching to neutral. Steering system will operate but is not redundant. The steering computer uses non interrupted signal to steer the vehicle.
221		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Information/Maintenance** **Communication fault -ECU 791, connector 2** Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
225		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Left sideshift - open circuit** Cable to valve defective.	Left sideshift is not possible.
226		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Left sideshift - short circuit** Cable to valve defective.	Uncontrolled left sideshift may occur.
228		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Right sideshift - open circuit** Cable to valve defective.	Right sideshift is not possible.

Table 4. Error Codes - Continued.

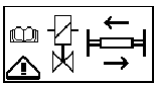
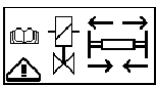
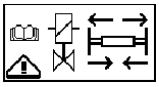
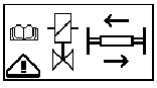
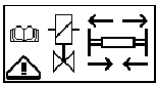
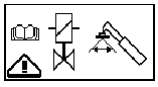
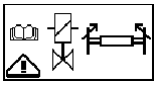
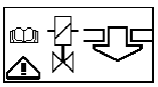
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
229		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Right sideshift - short circuit** Cable to valve defective.	Uncontrolled right sideshift may occur.
231		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **20-40 valve - open circuit** Cable to valve defective.	Spreading from 20 - 40 ft is not possible.
232		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **20-40 valve - short circuit** Cable to valve defective.	Spreading from 20 - 40 ft is not possible.
234		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **40-20 valve - open circuit** Cable to valve defective.	Spreading from 40 - 20 ft is not possible.
235		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **40-20 valve - short circuit** Cable to valve defective.	Spreading from 20 - 40 ft is not possible.
237		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Active tilt valve - open circuit** Cable to valve defective.	Tophandler locked, not automatically leveled.
240		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Active pile slope - open circuit** Cable to valve defective.	Tophandler locked, not free oscillated.
243		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Twistlock valve lock - open circuit** Cable to valve defective.	Impossible to lock twistlock.

Table 4. Error Codes - Continued.

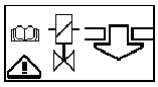
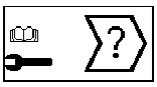
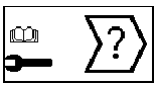
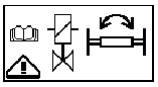
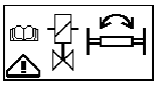
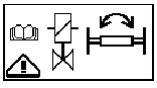
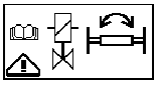
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
246		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Twistlock valve unlock - open circuit** Cable to valve defective.	Impossible to unlock twistlock.
250		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Information/Maintenance** **Communication fault - ECU 791, connector 3** Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
251		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Information/Maintenance** **Communication fault -ECU 791, connector 3** Computer hardware fault.	Possible ECU malfunction. Other codes will also show.
255		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Slewing clockwise valve - open circuit** Cable to valve defective.	Slewing clockwise is not possible.
256		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Slewing clockwise valve - short circuit** Cable to valve defective.	Uncontrolled slewing may occur.
258		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Slewing counterclockwise valve - open circuit** Cable to valve defective.	Slewing clockwise is not possible.
259		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Slewing counterclockwise valve - short circuit** Cable to valve defective.	Uncontrolled slewing may occur.

Table 4. Error Codes - Continued.

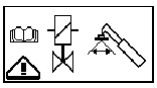
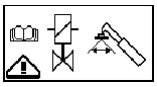
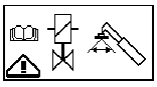
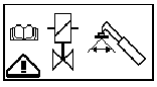
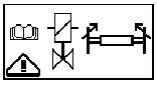
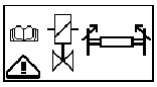
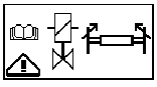
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
261		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Tilt out valve - open circuit** Cable to valve defective.	Tilt out is not possible.
262		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Tilt out valve - short circuit** Cable to valve defective.	Uncontrolled tilt may occur.
264		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Tilt in valve - open circuit** Cable to valve defective.	Tilt in is not possible.
265		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Tilt in valve - short circuit** Cable to valve defective.	Uncontrolled tilt may occur.
267		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Right oscillation valve - open circuit** Cable to valve defective.	Right oscillation (leveling) is not possible.
268		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Right oscillation valve - short circuit** Cable to valve defective.	Uncontrolled oscillation (leveling) may occur.
270		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Left oscillation valve - open circuit** Cable to valve defective.	Left oscillation (leveling) is not possible.

Table 4. Error Codes - Continued.

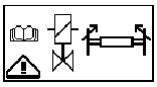
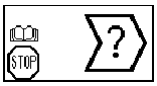
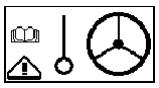
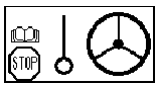
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
271		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Left oscillation valve - short circuit** Cable to valve defective.	Uncontrolled oscillation (leveling) may occur.
300		**Stop Vehicle** Shut engine off for 30 seconds then start vehicle. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Steering system malfunction** Steering computer - hardware error (EPROM, watchdog, reference voltages, etc.)	No steering and driving functions are available.
301 302 303 304 305 306 307 308		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **One track of actual value potentiometer out of range (e.g. cable interrupted)** Wheel 1, track 1. Wheel 2, track 1. Wheel 3, track 1. Wheel 4, track 1. Wheel 1, track 2. Wheel 2, track 2. Wheel 3, track 2. Wheel 4, track 2.	Stop vehicle by switching to neutral. Steering system will operate but is not redundant.
309 310 311 312		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Both tracks of actual value potentiometer out of range** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop vehicle by switching to neutral. The faulty wheel is locked immediately. Other wheels remain operational.

Table 4. Error Codes - Continued.

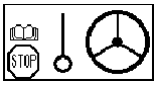
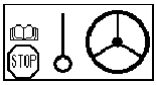
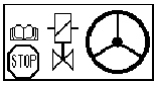
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
313 314 315 316		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Deviation between two potentiometer tracks, but both inside tolerance range** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop vehicle by switching to neutral. Steering system will operate but is not redundant.
317 318 319 320		**Stop Vehicle** Check wheel for blockage. If blocked, remove blockage and press RESET. If not blocked, notify maintenance.	**Stop Vehicle Immediately** **Steering deviation between set point and actual value (tracking error)** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop vehicle by switching to neutral. Steering remains active and tries to close up to set point. System will be active as soon as deviating wheel has closed up.
321 322 323 324		**Stop Vehicle** Notify maintenance.	**Stop Vehicle Immediately** **Wheel alinement values out of range** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	This error prohibits driving after steering calibration if calibration was not successful or calibration values are out of range.
325 326 327 328		**Stop Vehicle** Notify maintenance.	**Stop Vehicle Immediately** **Break in cable to proportional valve** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop vehicle by switching to neutral. Steering computer cannot control wheel with broken cable. Faulty wheel has to be alined by manual operation of valve.

Table 4. Error Codes - Continued.

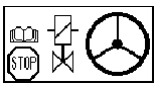
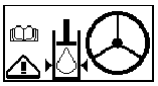
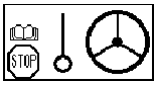
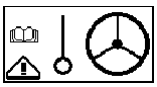
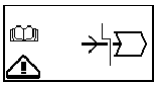
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
329 330 331 332		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Cable to proportional valve - short circuit** Wheel 1. Wheel 2. Wheel 3. Wheel 4.	Stop vehicle by switching to neutral. Steering computer cannot control wheel with broken cable. Faulty wheel has to be alined by manual operation of valve.
340		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Supply pressure below 1450 psi (100 bar)** Leaking hydraulics.	Stop vehicle by switching to neutral. Steering system will operate in a degraded mode.
341		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Steering wheel signals inconsistent (e.g. two incremental counters deviating)** Cables defective. Steering column sensor defective.	Stop vehicle by switching to neutral. Steering system will operate but is not redundant. Steering computer uses one of two counters to steer vehicle.
342 343		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **One pulse signal to steering wheel interrupted** Cables defective. Steering column sensor defective.	Stop vehicle by switching to neutral. Steering system will operate but is not redundant. Steering computer uses non interrupted signal to steer vehicle.
344		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Both pulse signals to steering wheel interrupted** Cables defective. Steering column sensor defective.	Stop vehicle by switching to neutral. Steering system will not operate.
345		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **No CAN communication to display** Cable defective.	Error codes from steering ECU will not show. Steering function is operational.

Table 4. Error Codes - Continued.

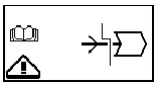
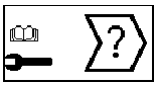
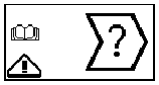
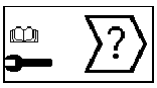
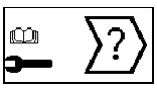
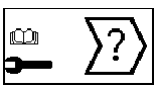
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
346		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **No CAN communication to transmission** Cables defective.	It is not possible to change from 2WD to 4WD or vice versa. The whole steering system remains operational, but steering features dependant on driving speed are not available. To keep vehicle in full operation, steering program selection is allowed at this time.
347		**Select Steering Mode**	**Information/Maintenance** **No valid steering program selected**	None
401		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital output short circuit - *"Enable driving"* (no neutral gear from steering ECU)** Cables defective.	Transmission will not go into neutral automatically.
404		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, front wheel steering"*** Cables defective.	Control lamp at steering selection switch is not working.
405		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, four wheel steering"*** Cables defective.	Control lamp at steering selection switch is not working.
406		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, crab steering"*** Cables defective.	Control lamp at steering selection switch is not working.

Table 4. Error Codes - Continued.

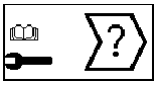
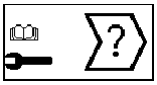
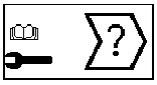
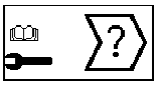
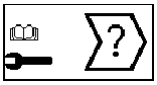
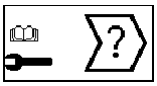
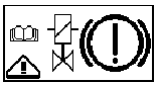
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
408		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, unlocked twist-lock"*** Cables defective.	Control lamp at steering column is not working.
409		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, locked twist-lock"*** Cables defective.	Control lamp at steering column is not working.
410		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Control lamp, alinement"*** Cables defective.	Control lamp at steering column is not working.
411		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Auxiliary hydraulic pump"*** Cables defective.	Cab cannot be moved. No emergency operation of boom or tophandler available.
412		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Ether start kit"*** Cables defective.	Ether start not working.
413		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital output short circuit - *"Oil supply valve, boom folding"*** Cables defective.	Boom cannot be folded.
414		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital output short circuit - *"Drive axle cooling, bypass valves"*** Cables defective.	Brakes may be overheated. Error codes 191 and 192 will show if brakes have overheated.

Table 4. Error Codes - Continued.

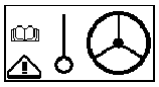
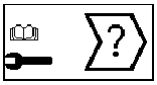
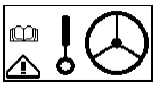
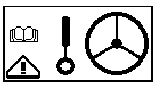
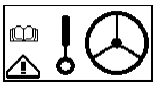
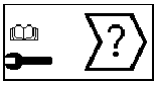
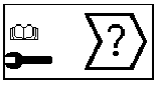
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
416		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital input not read correctly -*"Steering pressure"*** Cables defective.	A steering pressure failure cannot be detected, error code 340.
417		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Auxiliary hydraulic pump switch"*** Cables defective.	Auxiliary hydraulic pump cannot be started.
418		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital input not read correctly -*"Front wheel steering switch"*** Cables defective.	2WD cannot be selected.
419		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital input not read correctly -*"Four wheel steering switch"*** Cables defective.	4WD cannot be selected.
420		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital input not read correctly -*"Crab steering switch"*** Cables defective.	Crab steering cannot be selected.
422		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Sensor, cab in transport position"*** Cables defective. Steering computer damaged.	Boom folding is not possible.
423		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Ether start switch"*** Cables defective. Steering computer damaged.	Ether injection is not possible.

Table 4. Error Codes - Continued.

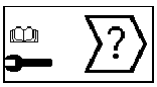
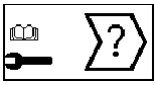
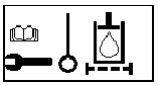
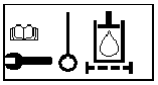
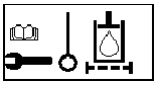
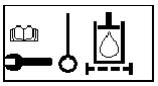
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
426		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Digital input not read correctly -*"Fording level switch"*** Cables defective. Steering computer damaged.	Fording operations are not possible.
427		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Tophandler working light switch"*** Cables defective. Steering computer damaged.	Working lights on tophandler do not function.
432		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Hydraulic filter indication (lift/ lower, boom in/out)"*** Cables defective. Steering computer damaged.	None
433		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Hydraulic filter indication, steering"*** Cables defective. Steering computer damaged.	None.
434		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Hydraulic filter indication, tophandler"*** Cables defective. Steering computer damaged.	None.
435		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Digital input not read correctly -*"Hydraulic filter indication, return oil"*** Cables defective. Steering computer damaged.	None.

Table 4. Error Codes - Continued.

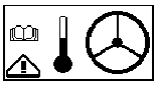
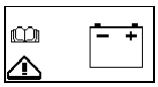
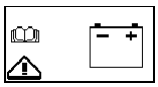
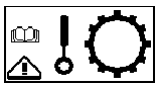
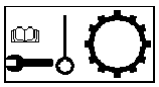
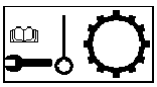
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
450		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Ambient temperature too high** Temperature sensor defective. ECU 792 defective.	None.
451		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Supply voltage too high** Alternator defective.	Stop vehicle by switching to neutral.
452		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Supply voltage too low** Power supply off. Alternator defective.	Stop vehicle by switching to neutral.
618		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Logical error at direction select signal - transmission ECU detected a wrong signal combination for the direction** Cables defective. Shift lever defective.	Stop vehicle by switching to neutral.
622		**Press RESET** If error shows again, notify maintenance. Finish mission.	**Information/Maintenance** **Logical error at axle connection - feedback axle connection measured by transmission ECU and output signal action connection do not match** Cables defective. Switch defective. Mechanical error.	When shifting from 2WD to 4WD or vice versa, engage forward drive and immediately return to neutral. Turn the ignition switch off for at least 30 seconds, then turn switch back on.
637		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage or open circuit at transmission sump temperature sensor input - voltage too high** Cables defective. Sensor defective. Connector pin broken.	None

Table 4. Error Codes - Continued.

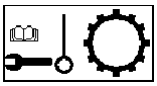
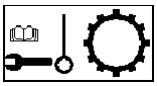
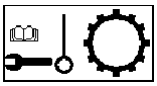
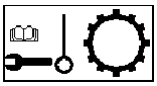
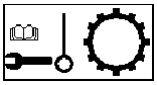
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
638		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to ground at transmission sump temperature sensor input - voltage too low** Cables defective. Sensor defective. Connector pin broken.	None
639		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage or open circuit at converter output temperature sensor input - voltage too high** Cables defective. Sensor defective. Connector pin broken.	None
640		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage or open circuit at converter output temperature sensor input - voltage too low** Cables defective. Sensor defective. Connector pin broken.	None
649		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage or open circuit at engine speed input - transmission ECU measures a voltage higher than 7.0V at speed input pin** Cables defective. Sensor defective. Connector pin broken.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control)
650		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to ground at engine speed input - transmission ECU measures a voltage less than 0.45V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control)

Table 4. Error Codes - Continued.

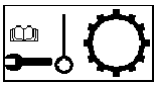
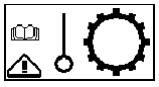
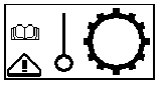
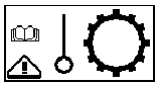
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
651		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Logical error at engine speed input - transmission ECU measures engine speed over a threshold and the next moment the measured speed is zero** Cables defective. Sensor defective. Wrong size sensor gap.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control)
652		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to battery voltage or open circuit at turbine speed input - transmission ECU measures a voltage higher than 7.0V at speed input pin** Cables defective. Sensor defective. Wrong size sensor gap.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
653		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to ground at turbine speed input - transmission ECU measures a voltage less than 0.45V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
654		**Press RESET** Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Logical error at turbine speed input - transmission ECU measures turbine speed over a threshold and at the next moment the measured speed is zero** Cables defective. Sensor defective. Wrong size sensor gap.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.

Table 4. Error Codes - Continued.

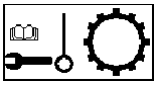
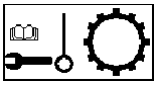
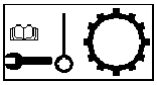
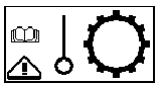
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
655		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage or open circuit at internal speed input - transmission ECU measures a voltage higher than 7.0V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control)
656		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to ground at internal speed input - transmission ECU measures a voltage less than 0.45V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control)
657		**Press RESET** Finish mission. Notify maintenance.	**Information/Maintenance** **Logical error at internal speed input - transmission ECU measures internal speed over a threshold and at the next moment the measured speed is zero** Cables defective. Sensor defective. Wrong size sensor gap.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at output speed, transmission ECU shifts to neutral. Limp home.
658		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to battery voltage or open circuit at output speed input - transmission ECU measures a voltage higher than 12.5V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.

Table 4. Error Codes - Continued.

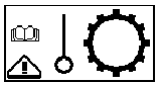
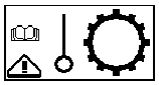
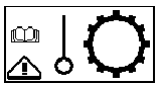
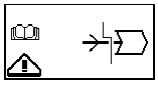
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
659		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to battery voltage at output speed input - transmission ECU measures a voltage less than 1.0V at speed input pin** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
660		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Logical error at output speed input - transmission ECU measures internal speed over a threshold and at the next moment the measured speed is zero** Cables defective. Sensor defective.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
662		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Output speed does not fit other speed signals. If transmission is not in neutral and shifting has finished, transmission ECU measures output speed as zero and turbine or internal speed as not equal to zero** Cables defective. Sensor defective. Wrong size sensor gap.	Gearshift quality is reduced due to another control mode. (Operating mode: substitute clutch control) If there is also a failure at turbine speed, transmission ECU shifts to neutral. Limp home.
684		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Time-out of CAN message from display computer** Cable defective. Defective display computer.	Error codes from transmission ECU will not show.

Table 4. Error Codes - Continued.

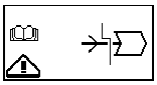
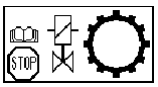
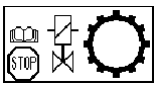
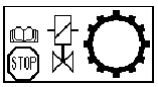
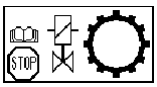
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
685		**Finish Mission** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Time-out of CAN message from display computer** Cable defective. Defective steering computer.	Error codes from transmission ECU will not show.
713		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch K1 - measured resistance value of valve is out of limit, voltage at K1 valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
714		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch K1 - measured resistance value of valve is out of limit, voltage at K1 valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
715		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch K1 - measured resistance value of valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
716		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch K2 - measured resistance value of valve is out of limit, voltage at K2 valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.

Table 4. Error Codes - Continued.

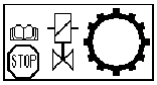
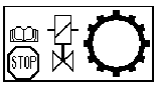
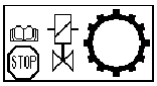
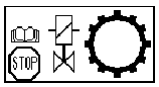
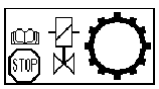
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
717		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch K2 - measured resistance value of valve is out of limit, voltage at K2 valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
718		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch K2 - measured resistance value of valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
719		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch K3 - measured resistance value of valve is out of limit, voltage at K3 valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
720		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch K3 - measured resistance value of valve is out of limit, voltage at K3 valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
721		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch K3 - measured resistance value of valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.

Table 4. Error Codes - Continued.

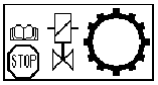
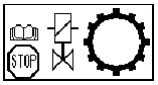
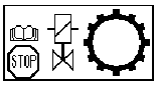
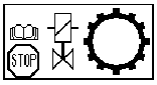
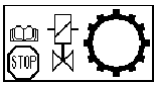
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
729		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch K4 - measured resistance value of valve is out of limit, voltage at K4 valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
730		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch K4 - measured resistance value of valve is out of limit, voltage at K4 valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
731		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch K4 - measured resistance value of valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
732		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch KV - measured resistance value of valve is out of limit, voltage at KV valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
733		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch KV - measured resistance value of valve is out of limit, voltage at KV valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.

Table 4. Error Codes - Continued.

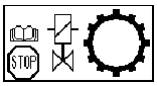
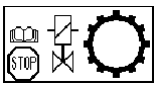
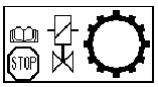
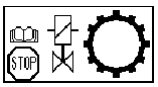
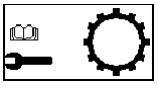
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
734		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch KV - measured resistance value of the valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
735		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to battery voltage at clutch KR - measured resistance value of valve is out of limit, voltage at KR valve is too high** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
736		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Short circuit to ground at clutch KR - measured resistance value of valve is out of limit, voltage at KR valve is too low** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
737		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Open circuit at clutch KR - measured resistance value of valve is out of limit** Cables defective. Regulator defective.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
745		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to ground at relay reverse warning alarm - transmission ECU detected a wrong voltage at output pin that looks like a short circuit to battery voltage** Cables defective. Backup alarm device defective.	None

Table 4. Error Codes - Continued.

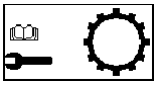
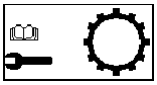
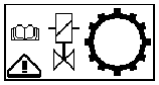
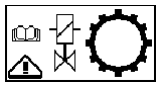
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
746		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Short circuit to battery voltage at relay reverse warning alarm - transmission ECU detected a wrong voltage at output pin that looks like a short circuit to battery voltage** Cables defective. Backup alarm device defective.	None
747		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Open circuit at relay reverse warning alarm - transmission ECU detected a wrong voltage at output pin that looks like an open circuit for this output pin** Cables defective. Backup alarm device defective.	None
761		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to ground at axle connection solenoid - transmission ECU detected a wrong voltage at output pin that looks like a short circuit to vehicle ground.** Cables defective. Axle connection solenoid defective.	Switching from 2WD to 4WD is impossible.
762		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Short circuit to battery voltage axle connection solenoid - transmission ECU detected a wrong voltage at output pin that looks like a short circuit to battery voltage** Cables defective. Axle connection solenoid defective.	Switching from 2WD to 4WD is impossible.

Table 4. Error Codes - Continued.

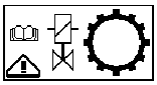
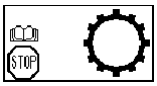
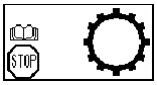
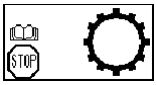
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
763		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Open circuit at axle connection solenoid - transmission ECU detected a wrong voltage at output pin that looks like an open circuit for this output pin** Cables defective. Axle connection solenoid defective.	Switching from 2WD to 4WD is impossible.
777		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch K1 - transmission ECU calculates a differential speed at closed clutch K1. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap. Defective clutch.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
778		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch K2 - transmission ECU calculates a differential speed at closed clutch K2. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap. Defective clutch.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
779		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch K3 - transmission ECU calculates a differential speed at closed clutch K3. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap Defective clutch.	ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.

Table 4. Error Codes - Continued.

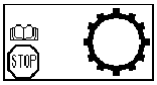
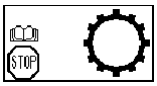
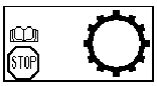
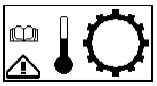
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
780		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch K4 - transmission ECU calculates a differential speed at closed clutch K4. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap Defective clutch.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
781		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch KV - transmission ECU calculates a differential speed at closed clutch KV. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap Defective clutch.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
782		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Slippage at clutch KR - transmission ECU calculates a differential speed at closed clutch KR. If this calculated value is outside of range, ECU interprets this as a slipping clutch** Low pressure. Sensor defective. Wrong size sensor gap Defective clutch.	Transmission ECU shifts to neutral. Limp home. If there is also a failure at another clutch, ECU shifts to neutral. ECU will shut down.
783		**Stop Vehicle** Check oil level. Allow transmission to cool down. Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Overheated sump - transmission ECU measured temperature in oil sump that is over 212°F (100°C)** Low oil level. Temperature sensor defective.	None

Table 4. Error Codes - Continued.

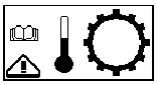
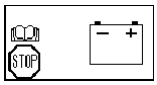
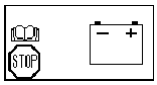
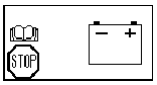
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
786		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Oil filter differential pressure - transmission ECU measured a voltage at differential pressure switch out of allowable range** Oil filter polluted. Cable/connector defective. Differential switch defective.	None
795		**Stop Vehicle** Check oil level. Allow transmission to cool down. Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Overheated converter output - ECU measured oil temperature at converter output that is over 248°F (120°C).** Low oil level. Temperature sensor defective.	None
811		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Low power at battery - measured voltage at power supply is lower than 18V** Defective cable. Defective battery. Defective connector.	Transmission ECU shifts to neutral. ECU will shut down.
812		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **High power at battery - measured voltage at power supply is higher than 32.5V** Defective cable. Defective battery. Defective connector.	Transmission ECU shifts to neutral. ECU will shut down.
813		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Error at shift valve power supply (VPS1)** Defective cable. Defective connector. ECU defective.	ECU shifts to neutral. ECU will shut down.

Table 4. Error Codes - Continued.

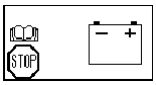
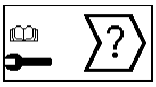
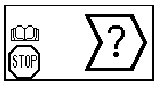
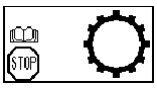
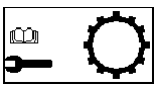
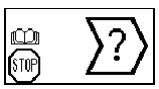
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
814		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Error at shift valve power supply (VPS2)** Defective cable. Defective connector. ECU defective.	ECU shifts to neutral. ECU will shut down.
841		**Finish Mission** Notify maintenance.	**Information/Maintenance** **General EEPROM fault - ECU cannot read memory** ECU defective.	None
843		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Application error** ECU defective.	Transmission stays in neutral. ECU will shut down.
845		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Clutch failure - AEB was not able to adjust clutch filling parameters** Clutch defective.	Transmission stays in neutral. ECU will shut down.
846		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Clutch adjustment data lost - ECU was not able to read correct adjustment parameters** Interference during data saving process.	None
1111		**Engine Will Not Start - Notify Maintenance**	**Stop Vehicle Immediately** **ECM internal internal memory error** Hardware defective. Internal microprocessor communication failure.	Engine will not start.

Table 4. Error Codes - Continued.

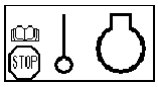
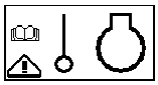
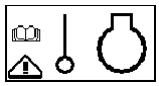
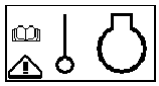
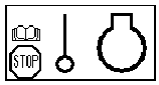
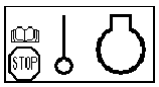
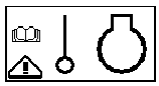
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1115		**Stop Vehicle** Shut engine off for 30 seconds, then turn engine on. If code clears, resume mission, then notify maintenance. If code remains, notify maintenance.	**Stop Vehicle Immediately** **No engine speed signal detected at both engine position sensor circuits**	Engine will shut down and will not start.
1121		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **No engine speed signal detected at one engine position sensor circuit**	None
1122		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **High voltage detected at intake manifold pressure sensor circuit**	Reduced engine power output.
1123		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Low voltage detected at intake manifold pressure sensor circuit**	Reduced engine power output.
1131		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **High voltage detected at throttle position sensor circuit**	Severe power and speed loss. Limp home power only.
1132		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Low voltage detected at throttle position sensor circuit**	Severe power and speed loss. Limp home power only.
1135		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **High voltage detected at oil pressure sensor circuit**	Oil pressure warning not working.

Table 4. Error Codes - Continued.

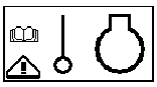
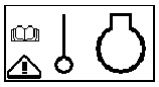
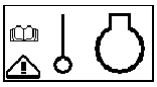
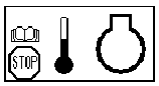
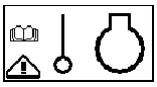
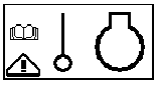
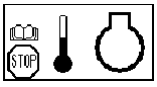
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1141		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Low voltage detected at oil pressure sensor circuit**	Oil pressure warning not working.
1143		**Stop Vehicle** Check oil level. Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Oil pressure signal indicates low oil pressure**	Reduced power and speed.
1144		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **High voltage detected at coolant temperature circuit**	Temperature warning not functioning.
1145		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Low voltage detected at coolant temperature circuit**	Temperature warning not functioning.
1151		**Stop Vehicle** Check coolant level. If error remains, notify maintenance.	**Stop Vehicle Immediately** **Coolant temperature signal indicated coolant temperature above critical threshold**	Reduced power and speed.
1153		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **High voltage detected at intake manifold temperature sensor circuit**	Possible white smoke. No engine protection for intake manifold temperature.
1154		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Low voltage detected at intake manifold temperature sensor circuit**	Possible white smoke. No engine protection for intake manifold temperature.
1155		**Stop Vehicle** Check coolant level. If error remains, notify maintenance.	**Stop Vehicle Immediately** **Intake manifold temperature signal indicated coolant temperature above critical threshold**	Reduced power and speed.

Table 4. Error Codes - Continued.

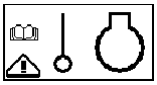
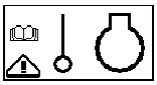
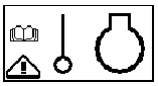
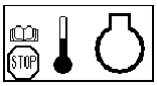
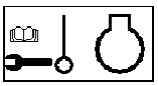
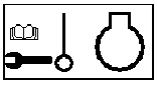
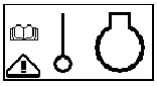
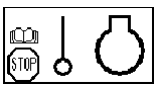
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1187		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Low voltage detected on ECM voltage supply line to some sensors**	Engine will run degraded. No protection for oil pressure.
1212		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **High voltage detected at oil temperature sensor circuit**	No engine protection for oil temperature.
1213		**Stop Vehicle** Press RESET. If error shows again, notify maintenance. Finish mission.	**Warning - Degraded Operation** **Low voltage detected at oil temperature sensor circuit**	No engine protection for oil temperature.
1214		**Stop Vehicle** Check oil level. Press RESET. If error remains, notify maintenance. Finish mission.	**Stop Vehicle Immediately** **Oil pressure signal indicates temperature above critical threshold**	Reduced power and speed.
1221		**Finish Mission** Notify maintenance.	**Information/Maintenance** **High voltage detected at ambient air pressure sensor circuit**	Reduced power and speed.
1222		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Low voltage detected at ambient air pressure sensor circuit**	Reduced power and speed.
1227		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **High voltage detected on ECM voltage supply line to some sensors**	Engine will run degraded. No protection for oil pressure.
1234		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Engine speed signal indicates engine speed greater than 2730 rpm**	Fuel shutoff valve is closed until engine speed drops. Fuel shutoff valve will open when engine speed falls below 2184 rpm.

Table 4. Error Codes - Continued.

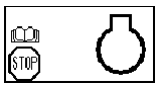
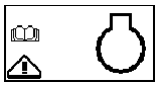
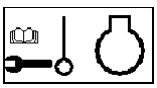
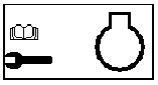
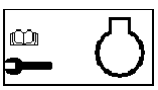
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1254		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Less than 6V detected at fuel shutoff driver** Excessive current draw. Power supply faulty.	ECM turns off FSO supply voltage. Engine will shut down.
1255		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Externally supplied voltage detected going to fuel shutoff supply circuit**	No performance limitations. Fuel shutoff valve stays open.
1285		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Information from multi-plexed device not received by ECM or received too late**	At least one multiplexed device will not operate properly.
1286		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Only a portion of information from multiplexed device received by ECM**	At least one multiplexed device will not operate properly.
1287		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Stop Vehicle Immediately** **Data error received while multi-plexing throttle pedal and IVS**	The engine will only idle.
1295		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Ambient air pressure sensor circuit error detected by ECM**	Engine is degraded to no air setting.
1311		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #1 when voltage is turned OFF**	Injector for cylinder #1 turned off.
1312		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #5 when voltage is turned OFF**	Injector for cylinder #5 turned off.

Table 4. Error Codes - Continued.

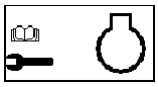
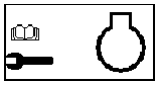
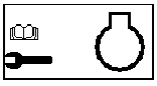
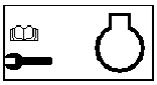
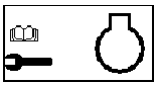
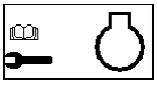
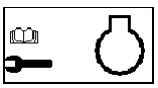
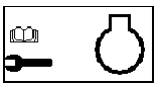
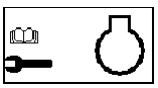
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1313		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #3 when voltage is turned OFF**	Injector for cylinder #3 turned off.
1314		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #6 when voltage is turned OFF**	Injector for cylinder #6 turned off.
1315		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #2 when voltage is turned OFF**	Injector for cylinder #2 turned off.
1321		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Current detected at injector for cylinder #4 when voltage is turned OFF**	Injector for cylinder #4 turned off.
1322		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #1 when voltage is turned ON**	Injector for cylinder #1 turned off.
1323		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #5 when voltage is turned ON**	Injector for cylinder #5 turned off.
1324		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #3 when voltage is turned ON**	Injector for cylinder #3 turned off.
1325		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #6 when the voltage is turned ON**	Injector for cylinder #6 turned off.
1331		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #2 when voltage is turned ON**	Injector for cylinder #2 turned off.

Table 4. Error Codes - Continued.

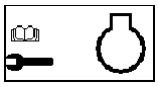
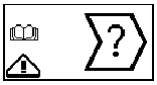
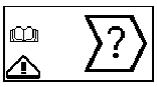
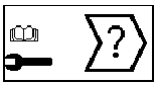
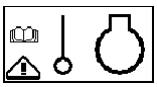
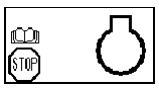
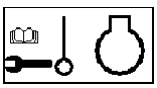
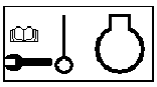
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1332		**Finish Mission** Notify maintenance.	**Information/Maintenance** **No current detected at injector for cylinder #4 when voltage is turned ON**	Injector for cylinder #4 turned off.
1341		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Severe loss of data from ECM**	No noticeable performance effects possible. Possibility of engine stopping or difficulty in starting engine.
1343		**Stop Vehicle** Shut engine off/on. If code clears, resume mission. If code remains, notify maintenance.	**Warning - Degraded Operation** **Microprocessor communication error inside ECM**	No noticeable performance effects possible. May encounter severe loss of power.
1346		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Software error in ECM**	Possibly too short of time for ECM to power down, less than 30 seconds.
1352		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Low voltage detected at sensor** Faulty power supply.	Engine is degraded to no air setting.
1415		**Stop Vehicle** Check oil level. Press RESET. If error remains, notify maintenance. Finish mission.	**Stop Vehicle Immediately** **Oil pressure signal indicates below critical threshold**	Reduced power and speed.
1419		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Error in intake manifold pressure sensor signal detected by ECM**	Engine is degraded to no air setting.
1431		**Finish mission** Notify maintenance.	**Information/Maintenance** **Both idle validation off-idle and on-idle signals indicate the same voltage reading**	None

Table 4. Error Codes - Continued.

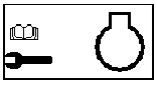
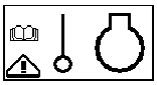
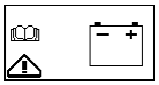
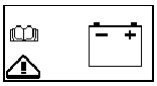
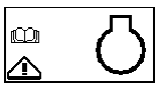
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1432		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Idle validation switch voltages are opposite (complimentary) but disagree with a valid throttle position sensor**	Engine will only idle.
1433		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Intake manifold pressure sensor voltage indicates a high pressure reading**	Engine is degraded to no air setting.
1434		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Battery voltage too low or insufficient amount of time for battery power to ECM for powering down after key off**	No noticeable performance effects possible. Possibility of engine stopping or difficulty in starting engine.
1435		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **ECM detects error in oil pressure sensor signal sensor**	None. No engine protection for oil pressure.
1441		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Battery voltage below normal operating level**	No noticeable performance effects possible. Possibility of rough idle.
1442		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Battery voltage above normal operating level**	None
1443		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Low voltage detected on ECM voltage supply line to throttle**	Engine will only idle.
1474		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Low voltage detected on starter lockout relay circuit when energized or voltage detected when circuit de-energized**	None

Table 4. Error Codes - Continued.

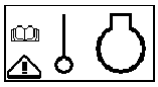
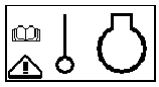
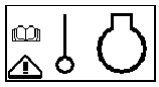
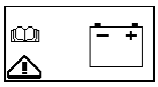
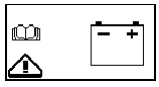
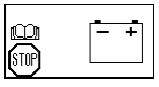
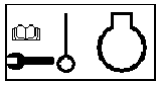
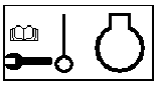
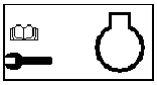
ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1551 IVS		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **No voltage detected simultaneously on both idle validation off-idle and on-idle circuits**	Engine will only idle.
1581		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **High voltage detected at fuel inlet pressure sensor circuit**	None
1582		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Low voltage detected at fuel inlet pressure sensor circuit**	None
1583		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Out-of-range low voltage detected at fuel inlet pressure sensor circuit**	None
1596		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Battery voltage above normal operating range**	None
1597		**Stop Vehicle** Press RESET. Finish mission. Notify maintenance.	**Warning - Degraded Operation** **Battery voltage below normal operating range**	None
1598		**Stop Vehicle** Abort mission. Notify maintenance.	**Stop Vehicle Immediately** **Very low battery voltage - critical level**	None
1697		**Finish Mission** Notify maintenance.	**Information/Maintenance** **High voltage detected at ECM internal temperature sensor circuit**	None

Table 4. Error Codes - Continued.

ERROR CODE	DISPLAY LAYOUT	DRIVER ACTION	ERROR CODE EXPLANATION	VEHICLE LIMITATIONS
1698		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Low voltage detected at ECM internal temperature sensor circuit**	None
1951		**Finish Mission** Notify maintenance.	**Information/Maintenance** **Power imbalance between cylinders detected by ECM**	Engine may rough idle or misfire.
1999		**Stop Vehicle** Press RESET. Check all errors that show. Notify maintenance.	**Stop Vehicle Immediately** **More than 6 errors active on the J1939 bus to the display**	None

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INDEX

Subject	WP Sequence No. - Page No.
A	
Accessory Control Lever, Transmission, Replacement	0112 00-1
Air Cleaner, Engine, Maintenance	0056 00-1
Air Conditioner	
Fans Maintenance	0190 00-1
Leak Test	0188 00-1
Air Conditioning	
Blower Motor Replacement	0159 00-1
Compressor Drive Belts Replacement	0189 00-1
Fan Replacement	0159 00-1
Air Filters Replacement, Cab	0160 00-1
Alternator	
Drive Belt Maintenance	0070 00-1
Replacement	0069 00-1
Ambient Temperature Sensor Replacement	0091 00-1
Arctic Operation, Preparation for	0192 00-1
Auxiliary Fan Replacement, Cab	0161 00-1
Auxiliary Hydraulic Pump Replacement	0165 00-1
B	
Backup Alarm Replacement	0105 00-1
Backup Light Maintenance	0084 00-1
Battery Cables Replacement	0108 00-1
Battery Maintenance	0107 00-1
Blackout Light Maintenance	0086 00-1
Boom and Tophandler Calibration	0197 00-1
Boom Angle Sensor Replacement	0098 00-1
Boom Assembly Wear Plates Replacement	0139 00-1
Boom Extension Sensor Replacement	0099 00-1
Boom Folding Control Valve Replacement	0170 00-1
Boom Hydraulic System Hoses and Fittings Replacement	0180 00-1
Boom-to-Boom Extension Flexible Conveyer Maintenance	0148 00-1
Brake	
Cooling Filter Replacement	0126 00-1
Filter Head Replacement	0126 00-1
System Charging Valve Pressure Adjustment	0127 00-1
Brake Inching Switch Replacement	0096 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.

B - Continued

Brake Light Replacement 0097 00-1

Brake Pressure Switches Replacement 0097 00-1

C

Cab Distribution Box
- Circuit Breakers Replacement 0073 00-1
- Relays Replacement 0073 00-1

Cab Door Weatherseal Replacement 0151 00-1

Cab Heater
- Blower Motor Replacement 0159 00-1
- Fan Replacement 0159 00-1

Cab Interior Light Maintenance 0088 00-1

Cab Lifting Cylinder Replacement 0171 00-1

Cab Parking and Service Brake Hydraulic Hoses and Fittings Replacement. 0175 00-1

Cab Position Proximity Switches Replacement 0075 00-1

Cab Sliding Cylinder Replacement 0172 00-1

Cab Transport Control Valve Replacement 0168 00-1

Cab Transport Hydraulic Hoses and Fittings Replacement 0179 00-1

Cab Transport Lift Maintenance 0142 00-1

Caging and Uncaging Parking Brake 0121 00-1

Calibration
- Boom and Tophandler 0197 00-1
- Steering 0196 00-1
- Transmission. 0195 00-1

Circuit Breakers and Relays Replacement, Cab Distribution Box 0073 00-1

Circuit Breakers, 50A, Replacement. 0073 00-1

Control Valve Solenoids Replacement 0169 00-1

Coolant Filter Replacement 0068 00-1

Cooling System
- Expansion Tank Maintenance. 0065 00-1
- Hoses Replacement 0064 00-1

D

Data Plate Replacement 0162 00-1

Diagrams 0199 00-1

Directional Light Maintenance 0085 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.
D- Continued	
Dolly Wheel Maintenance	0128 00-1
Draining and Filling Radiator Assembly	0063 00-1
E	
ECS Display Screen Replacement	0080 00-1
Electric Horn Replacement	0104 00-1
Electrical General Maintenance Instructions	0111 00-1
Electronic Control Unit (ECU) Replacement	
Servo System	0079 00-1
Steering System	0079 00-1
Tophandler	0076 00-1
Transmission	0079 00-1
Electronic Joystick Assembly	
Replacement	0081 00-1
Wiring Harness Replacement	0082 00-1
Engine	
Air Cleaner Maintenance	0056 00-1
Air Intake Hose Replacement	0057 00-1
Air Intake Tubes Replacement	0057 00-1
Cover Maintenance	0143 00-1
Electronic Control Module (ECM) Replacement	0078 00-1
Oil Dipstick Hose Replacement	0053 00-1
Oil Fill Hose Replacement	0053 00-1
Oil Filter Replacement	0052 00-1
Oil Replacement	0052 00-1
Sensors Replacement	0093 00-1
Error Codes	0205 00-1
Ether Cold Start System Maintenance	0060 00-1
Exhaust Pipe Replacement	0062 00-1
Expendable and Durable Items List	0203 00-1
F	
Fender Assembly Maintenance	0146 00-1
Filter Indicator Sensors, Hydraulic, Replacement	0102 00-1
Fire Extinguisher Bracket Replacement	0163 00-1
Fording Water Level Sensor Replacement	0090 00-1
Forklift Kit Hydraulic Hoses and Fittings Replacement	0182 00-1
Front Axle Steering Cylinders Replacement	0133 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.

F- Continued

Front Axle Vent Hoses Replacement 0117 00-1

Fuel Filter/Water Separator Replacement 0058 00-1

Fuel Hoses, Lines, and Fittings Replacement 0059 00-1

Fuel Level Sending Unit Replacement 0094 00-1

Fuel Solenoid Shutoff Valve Replacement 0055 00-1

G

General Maintenance Instructions 0194 00-1

General Maintenance Instructions, Electrical 0111 00-1

H

Headlight Maintenance 0083 00-1

Heater Hoses Replacement 0158 00-1

Hydraulic Filter Indicator Sensors Replacements 0102 00-1

Hydraulic Hoses and Fittings Replacement
- Boom System 0180 00-1
- Cab Parking and Service Brake 0175 00-1
- Cab Transport 0179 00-1
- Forklift Kit 0182 00-1
- Main System 0176 00-1
- Parking Brake System 0123 00-1
- Service Brake System 0125 00-1
- Servo System 0177 00-1
- Test Point System 0178 00-1
- Tophandler System 0181 00-1

Hydraulic Reservoir
- Draining 0184 00-1
- Filling 0184 00-1
- Sensors Replacement 0101 00-1
- Sight Gage Replacement 0185 00-1

Hydraulic System
- Cooling Hoses and Fittings Replacement 0174 00-1
- Oil Filters Replacement 0183 00-1
- Relieving Pressure 0164 00-1
- Test Point Procedures 0186 00-1

Hydraulic System Test Point Hoses and Fittings Replacement 0178 00-1

I

Infrared (IR) Lights Replacement 0089 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.
I- Continued	
Instrument Panel	
Gages Replacement	0072 00-1
Panel Lamps Replacement	0072 00-1
Switches Replacement	0072 00-1
L	
Leak Test, Air Conditioner	0188 00-1
Left-Side Stair Assembly Maintenance	0145 00-1
Light Maintenance	
Backup	0084 00-1
Blackout	0086 00-1
Cab Interior	0088 00-1
Directional	0085 00-1
Side Marker	0085 00-1
Twistlock Indicator	0087 00-1
Work	0084 00-1
M	
Main Hydraulic System Hoses and Fittings Replacement	0176 00-1
Maintenance Allocation Chart (MAC)	
Introduction	0201 00-1
Table	0202 00-1
Master Battery Switch Replacement	0109 00-1
Mirrors, Rearview, Replacement	0155 00-1
Mudguard Replacement	0147 00-1
Muffler Replacement	0062 00-1
O	
Oil Sampling Valve Hose Replacement	
Engine	0054 00-1
Hydraulic System	0054 00-1
Transmission	0054 00-1
Oil Sampling Valve Replacement	0054 00-1
P	
Parking Brake	
Caging	0121 00-1
Control Valve Replacement	0122 00-1
Pads Maintenance	0120 00-1
System Hydraulic Hoses and Fittings Replacement	0123 00-1
Uncaging	0121 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.
P- Continued	
Preparation for Arctic Operation	0192 00-1
Preparation for Storage or Shipment	0193 00-1
Preventive Maintenance Checks and Services (PMCS)	
Introduction	0049 00-1
Table	0050 00-1
Propeller Shaft	
Front Replacement	0118 00-1
Rear Replacement	0118 00-1
Universal Joint Replacement	0119 00-1
R	
Radiator	
Fill Cover Replacement	0138 00-1
Splash Shield Replacement	0136 00-1
Top Grating Replacement	0137 00-1
Radiator Assembly	
Draining	0063 00-1
Filling	0063 00-1
Rear Axle Steering Cylinders Replacement	0133 00-1
Rear Axle Vent Hoses Replacement	0117 00-1
References	0200 00-1
Relieving Hydraulic System Pressure	0164 00-1
Remote Hydraulic Control Compartment Replacement	0154 00-1
Rifle Mounting Bracket Replacement	0187 00-1
Right-Side Step Assembly Replacement	0144 00-1
Rocker Arm	
Cover Replacement	0051 00-1
Gasket Replacement	0051 00-1
S	
Seat	
Assembly Maintenance	0150 00-1
Belt Replacement	0149 00-1
Warning Buzzer Replacement	0106 00-1
Sensor Replacement	
Boom Angle	0098 00-1
Boom Extension	0099 00-1
Hydraulic Reservoir	0101 00-1
Lift Cylinder	0101 00-1
Tophandler Angle	0100 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.

S- Continued

Service Brake
- Control Valve Replacement 0124 00-1
- System Hydraulic Hoses and Fittings Replacement 0125 00-1

Service Upon Receipt
- Inspection Instructions 0048 00-1
- Servicing Instructions 0048 00-1

Shipment, Preparation for 0193 00-1

Side Marker Light Maintenance 0085 00-1

Slave Starting Receptacle Replacement 0110 00-1

Stair Assembly, Left-Side, Maintenance 0145 00-1

Starter Replacement 0071 00-1

Starter Relay Replacement 0073 00-1

Steering
- Brake Pedal Maintenance 0130 00-1
- Calibration 0196 00-1
- Column Base Maintenance 0130 00-1
- Column Replacement 0131 00-1
- Column Sensor Replacement 0134 00-1
- Cylinders, Front and Rear Axle, Replacement 0133 00-1
- System Hydraulic Hoses and Fittings Replacement 0132 00-1
- Wheel Replacement 0129 00-1

Steering System Wheel Sensor Replacement 0103 00-1

Step Assembly, Right-Side, Replacement 0144 00-1

Storage Compartment
- Battery and Dolly Wheels Replacement 0153 00-1
- Doors Replacement 0152 00-1
- Latches Replacement 0152 00-1

Storage, Preparation for 0193 00-1

T

Thermostat Replacement 0066 00-1

Throttle Position Sensor (Accelerator Pedal) Replacement 0061 00-1

Tool Identification List 0204 00-1

Tophandler
- Angle Sensor Replacement 0100 00-1
- Calibration 0197 00-1
- Hydraulic Slewing Motors Replacement 0166 00-1
- Hydraulic Spreader Motor Replacement 0167 00-1
- Hydraulic System Hoses and Fittings Replacement 0181 00-1
- Junction Box Maintenance 0076 00-1
- Proximity Switch Junction Boxes Replacement 0077 00-1

INDEX - Continued

Subject	WP Sequence No. - Page No.

T- Continued

Tophandler - Continued
- Proximity Switches Replacement . . . 0074 00-1
- Replacement . . . 0191 00-1
- Twistlock Cylinder Replacement . . . 0173 00-1
- Wear Plates Replacement . . . 0140 00-1

Torque Limits . . . 0198 00-1

Tow Pintle Replacement . . . 0141 00-1

Transmission
- Access Covers Replacement . . . 0135 00-1
- Calibration . . . 0195 00-1
- Control Lever Replacement . . . 0112 00-1
- Hydraulic Hoses, Assembly, Replacement . . . 0114 00-1
- Hydraulic Pipes, Assembly, Replacement . . . 0114 00-1
- Oil Dipstick Hose Replacement . . . 0116 00-1
- Oil Dipstick Pipe Replacement . . . 0116 00-1
- Oil Filter and Oil Cooler Hoses and Fittings Replacement . . . 0113 00-1
- Oil Filter Head Replacement . . . 0115 00-1
- Oil Filters Replacement . . . 0115 00-1
- Oil Replacement . . . 0115 00-1
- Sensors Replacement . . . 0095 00-1
- Skid Plate Replacement . . . 0135 00-1
- Vent Hoses Replacement . . . 0117 00-1

Twistlock Indicator Lights Maintenance . . . 0087 00-1

U

Universal Joint, Propeller Shaft, Replacement . . . 0119 00-1

W

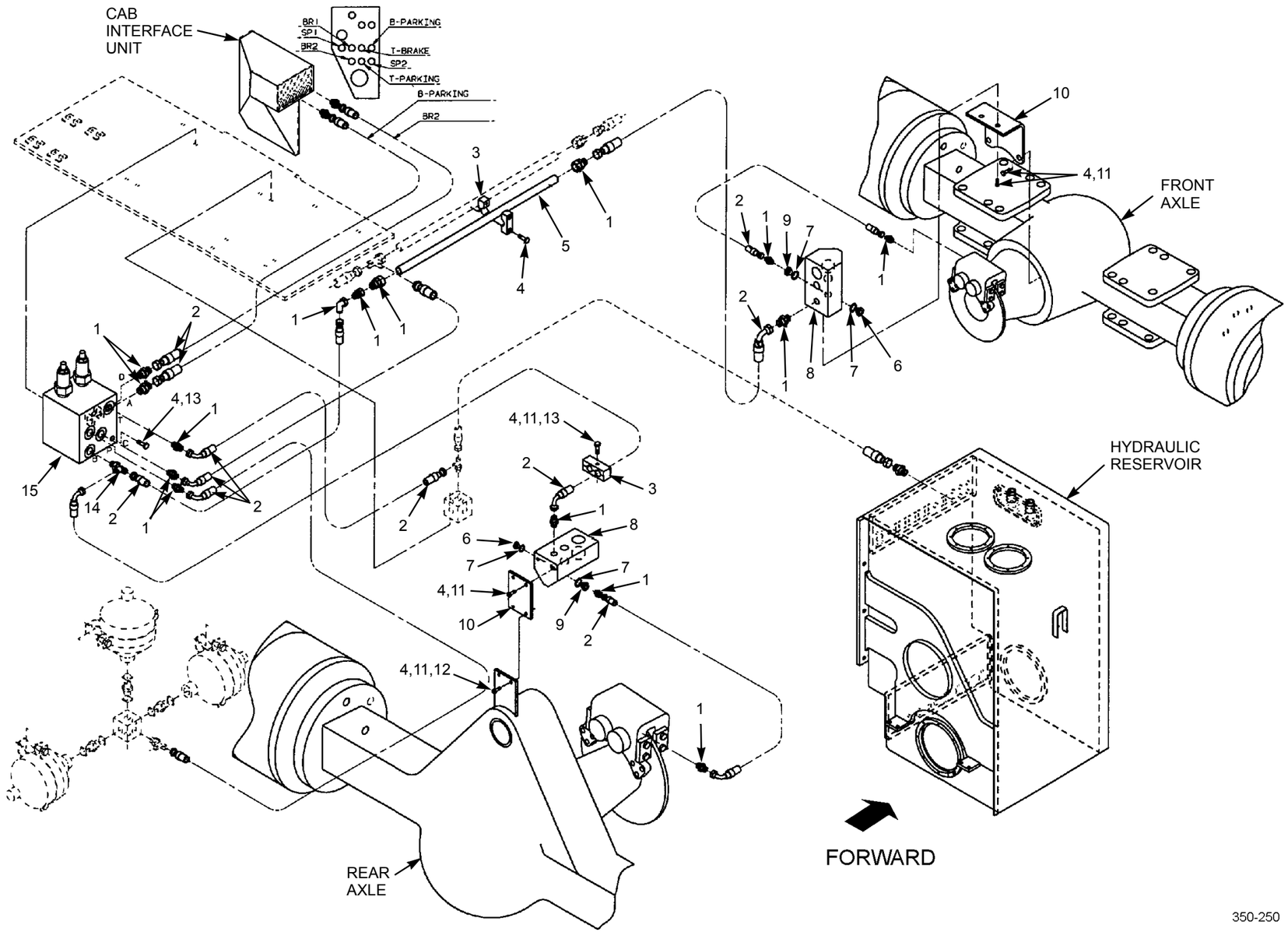
Water Pump Replacement . . . 0067 00-1

Wear Plates
- Boom Assembly . . . 0139 00-1
- Tophandler . . . 0140 00-1

Wheel Temperature Sensor Replacement . . . 0092 00-1

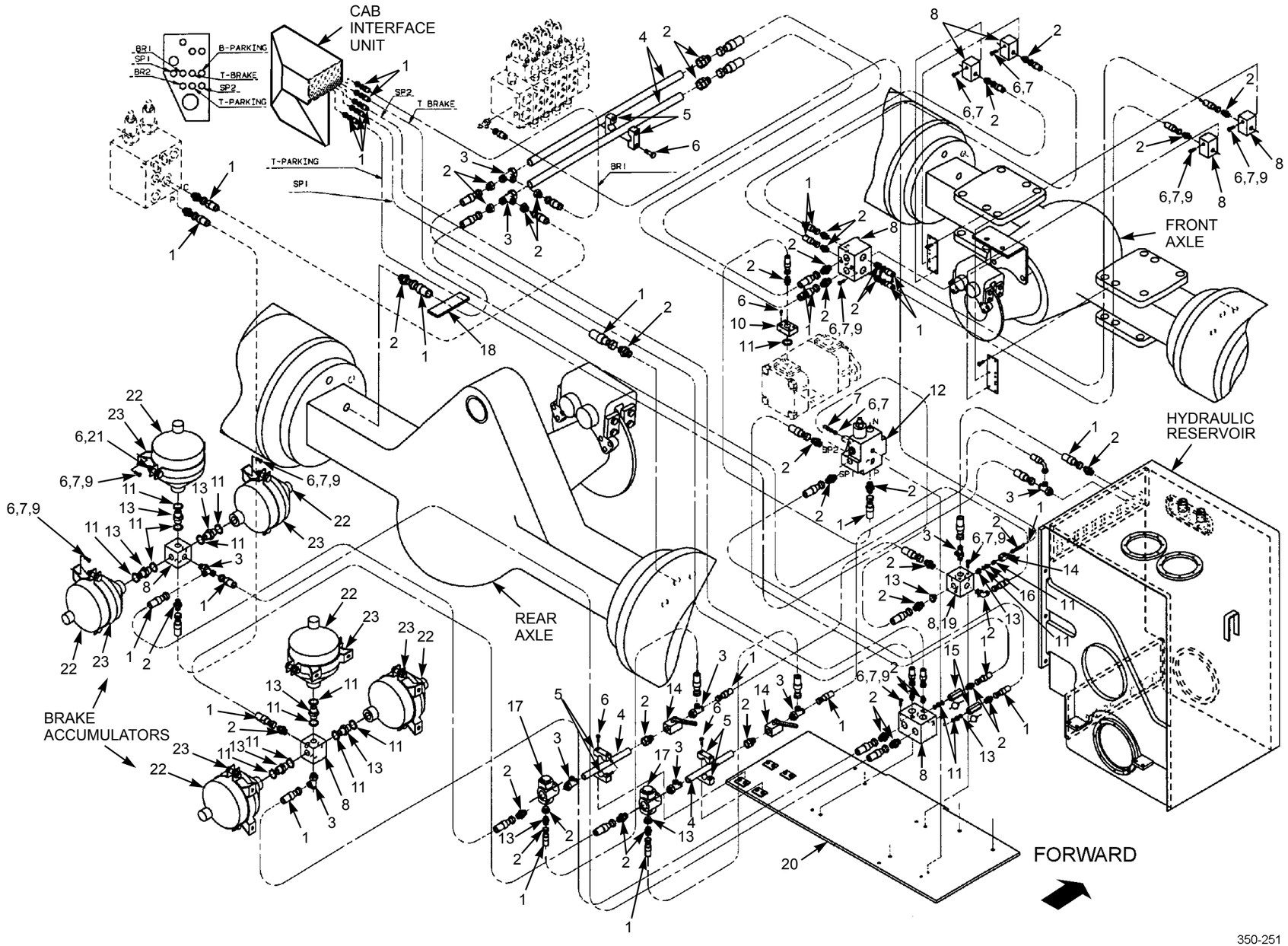
Windshield
- Washer Pump Replacement . . . 0157 00-1
- Washer Reservoir Replacement . . . 0157 00-1
- Wiper Maintenance . . . 0156 00-1

Work Light Maintenance . . . 0084 00-1



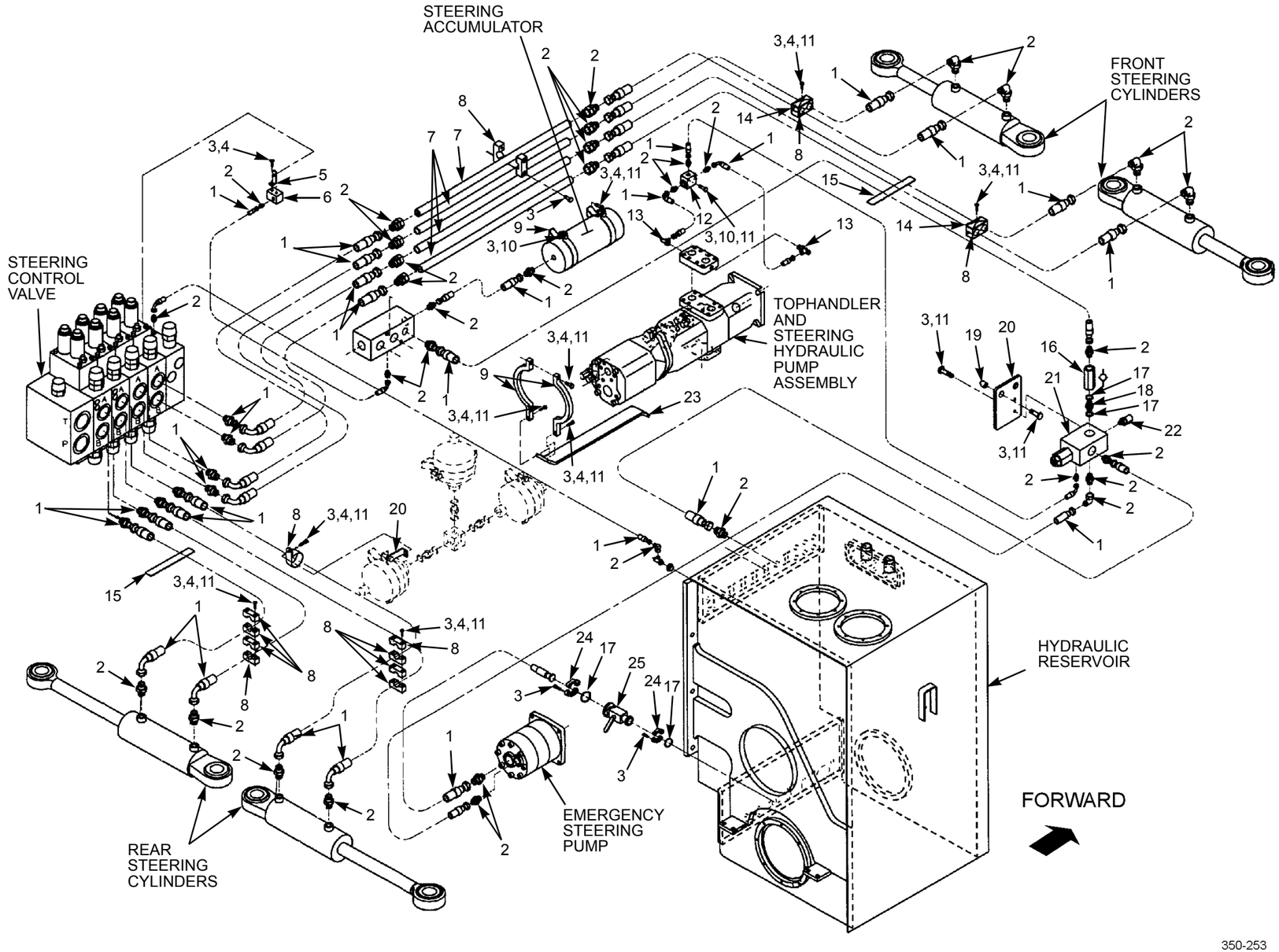
ITEM NO.	DESCRIPTION
1	Fitting
2	Hydraulic Hose
3	Clamp
4	Screw
5	Pipe
6	Plug
7	O-ring
8	Manifold Block
9	Nipple
10	Bracket
11	Washer
12	Nut
13	Locknut
14	T-Fitting
15	Manifold Valve

Figure 1. Parking Brake System Hydraulic Hoses and Fittings.



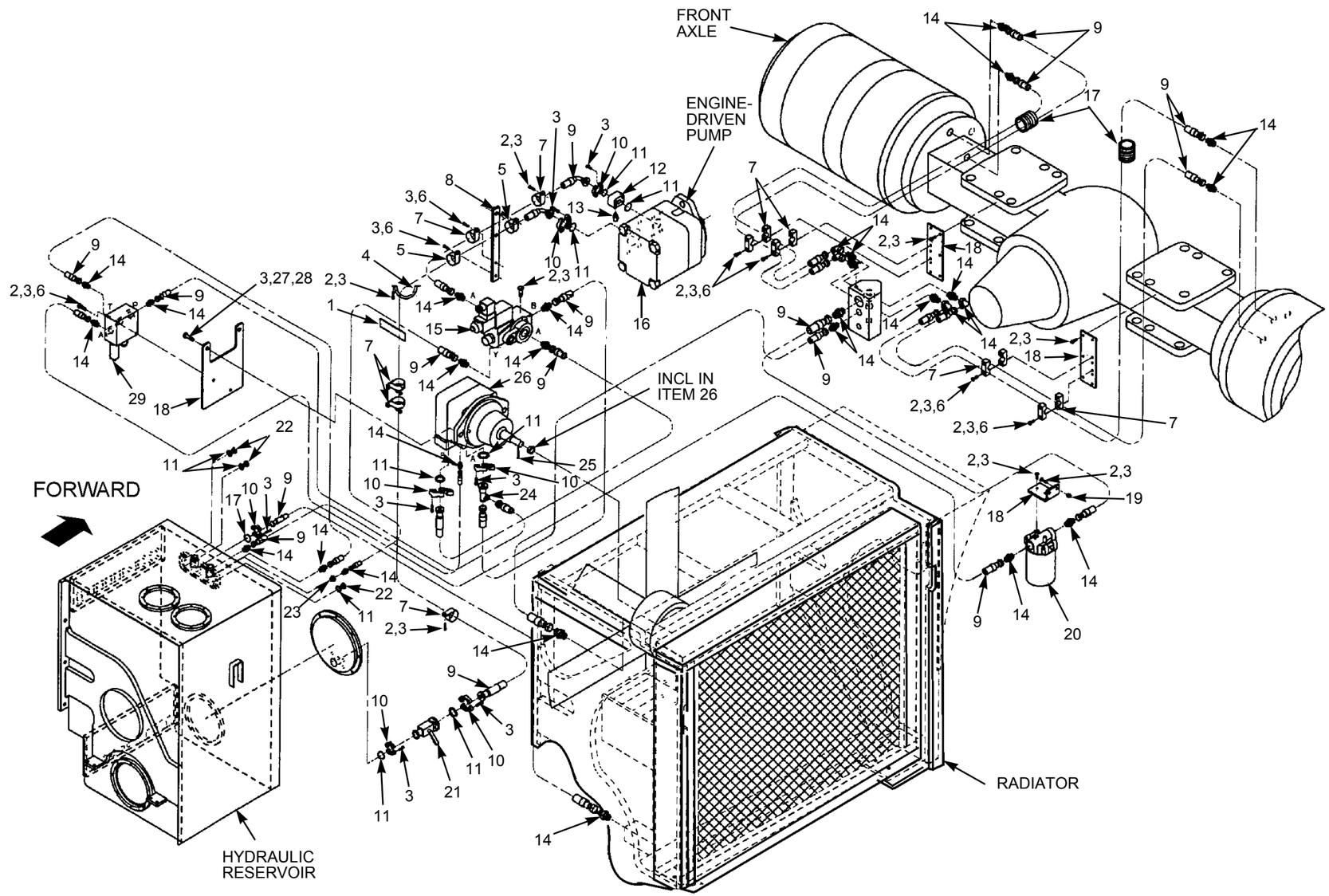
ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	T-Fitting
4	Pipe
5	Clamp
6	Screw
7	Locknut
8	Manifold Block
9	Washer
10	Flange
11	O-ring
12	Brake Charging Valve
13	Nipple
14	Ball Valve
15	Check Valve
16	Adapter
17	Reaction Valve
18	Band
19	Plug
20	Plate (located behind cab)
21	Nut
22	Accumulator
23	Bracket

Figure 2. Service Brake System Hydraulic Hoses and Fittings.



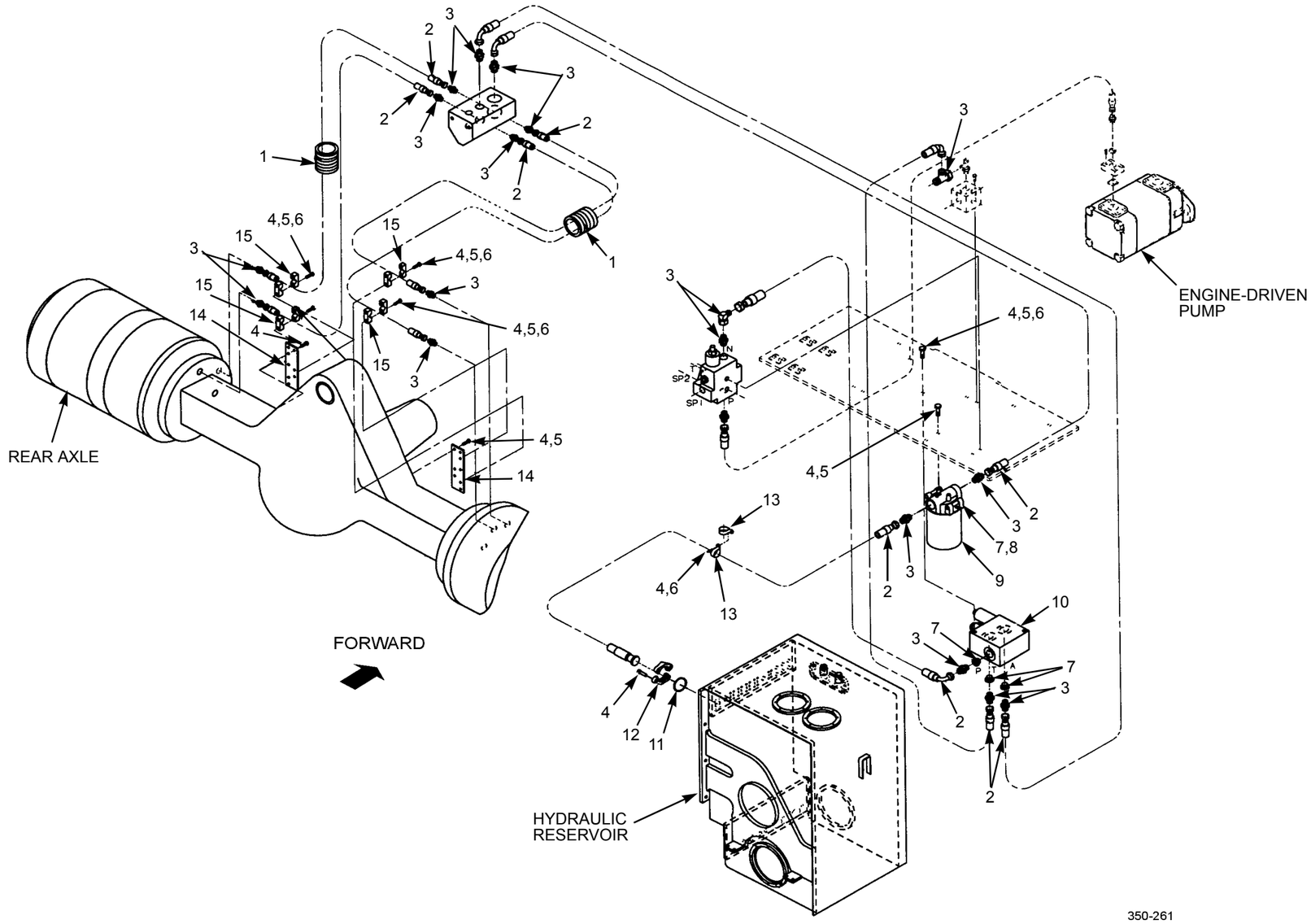
ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	Screw
4	Locknut
5	Bracket
6	Manifold Block
7	Pipe
8	Clamp
9	Yoke
10	Nut
11	Washer
12	Shuttle Valve
13	T-Fitting
14	Plate
15	Band
16	Check Valve
17	O-ring
18	Adapter
19	Spacer
20	Bracket
21	Reverse Valve
22	Test Nipple
23	Stay
24	Flange
25	Ball Valve

Figure 3. Steering System Hydraulic Hoses and Fittings.



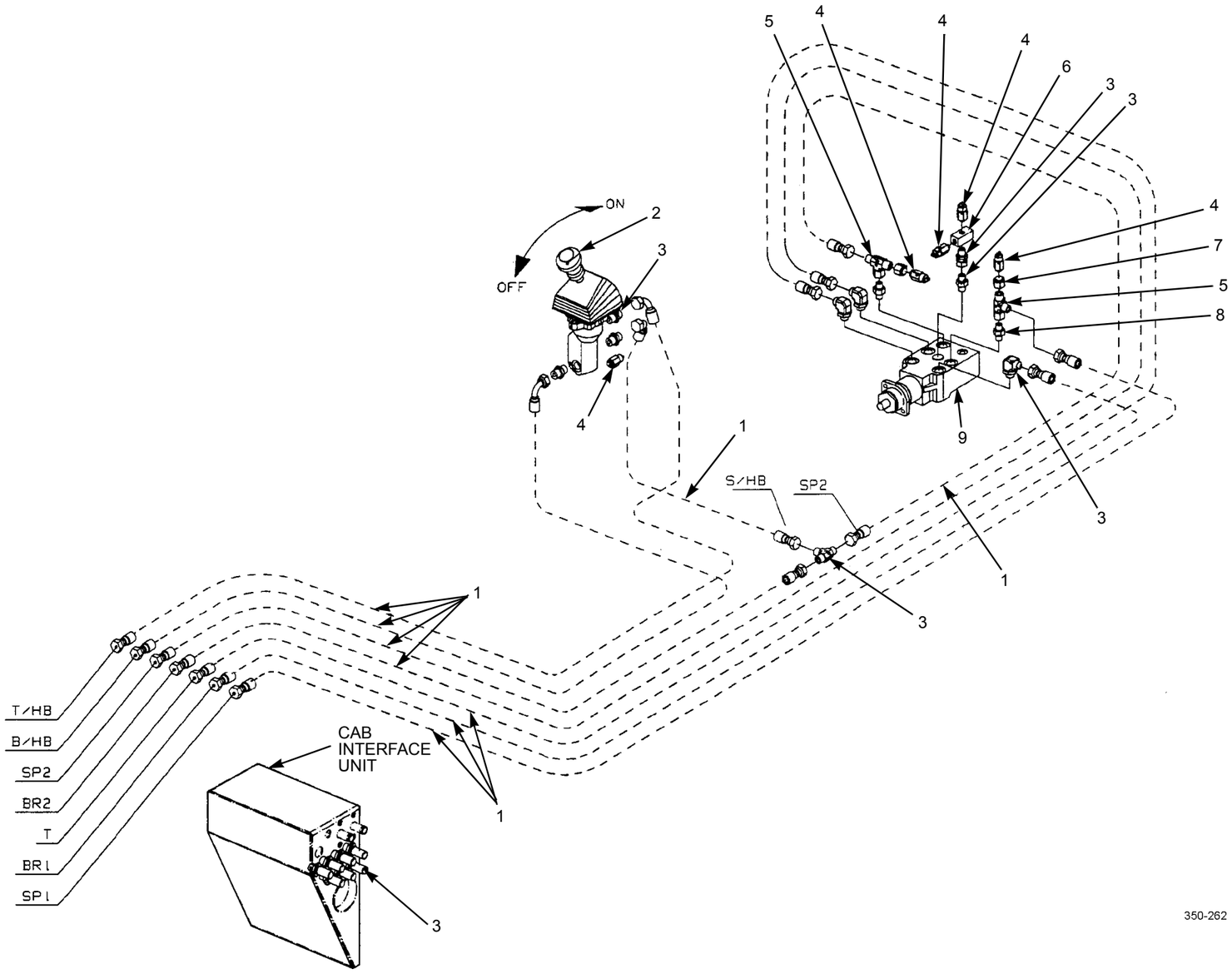
ITEM NO.	DESCRIPTION
1	Band
2	Washer
3	Screw
4	Yoke
5	Rubber Clamp
6	Locknut
7	Clamp
8	Suspension
9	Hydraulic Hose
10	Flange
11	O-ring
12	Manifold Block
13	Test Nipple
14	Fitting
15	Valve
16	Hydraulic Pump
17	Hose Protection
18	Bracket
19	Spacer
20	Cooling Filter (Front Brake)
21	Shutoff Valve
22	Plug
23	Nipple
24	T-fitting
25	Split Pin
26	Fan Motor
27	Nut
28	Lockwasher
29	Control Valve

Figure 4. Hydraulic System Cooling Hoses and Fittings.



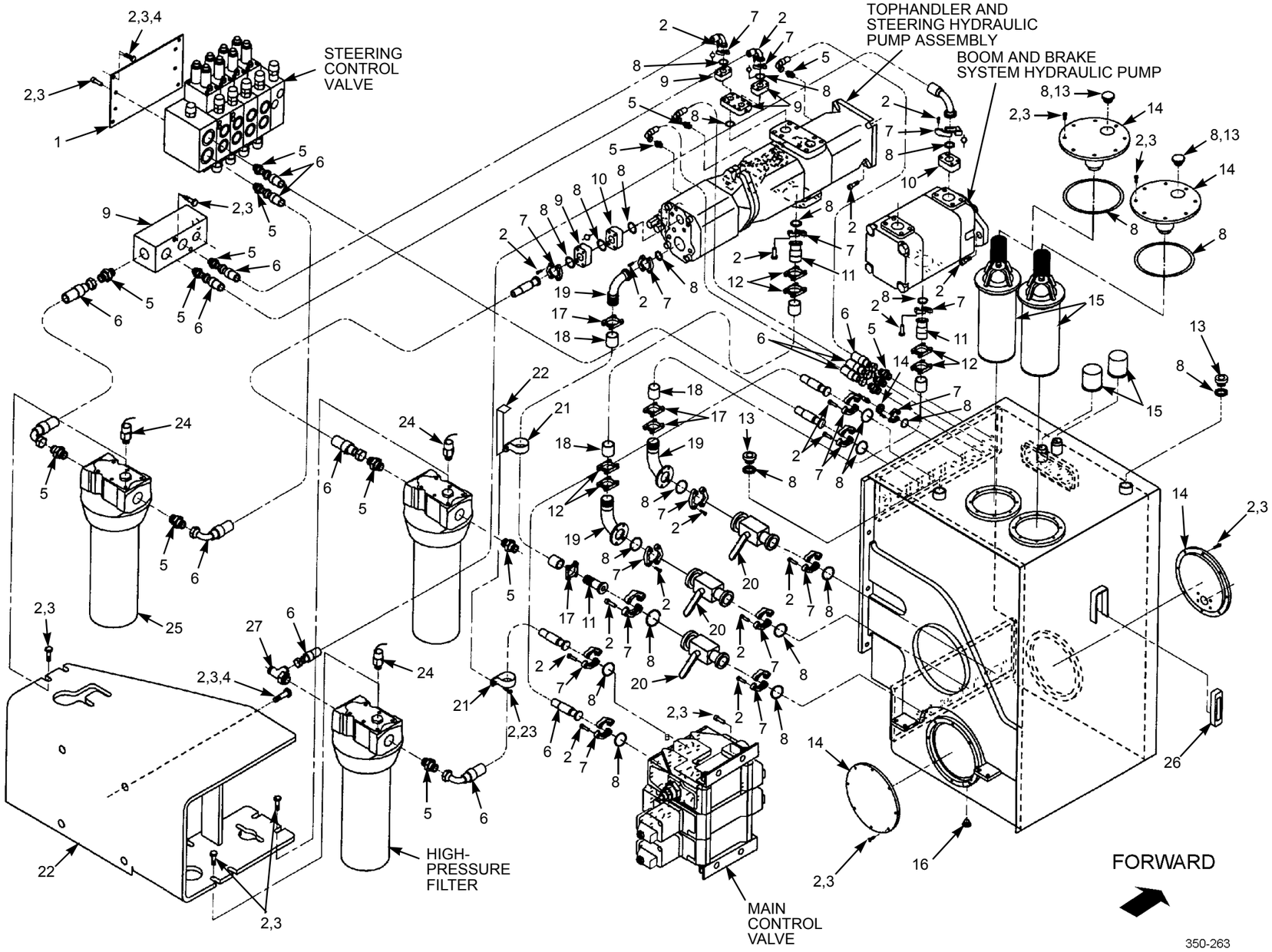
ITEM NO.	DESCRIPTION
1	Hose Protection
2	Hydraulic Hose
3	Fitting
4	Screw
5	Washer
6	Locknut
7	Nipple
8	Lubricator Extension
9	Cooling Filter (Rear Brake)
10	Control Valve
11	O-ring
12	Flange
13	Rubber Clamp
14	Bracket
15	Clamp

Figure 4. Hydraulic System Cooling Hoses and Fittings - Continued.



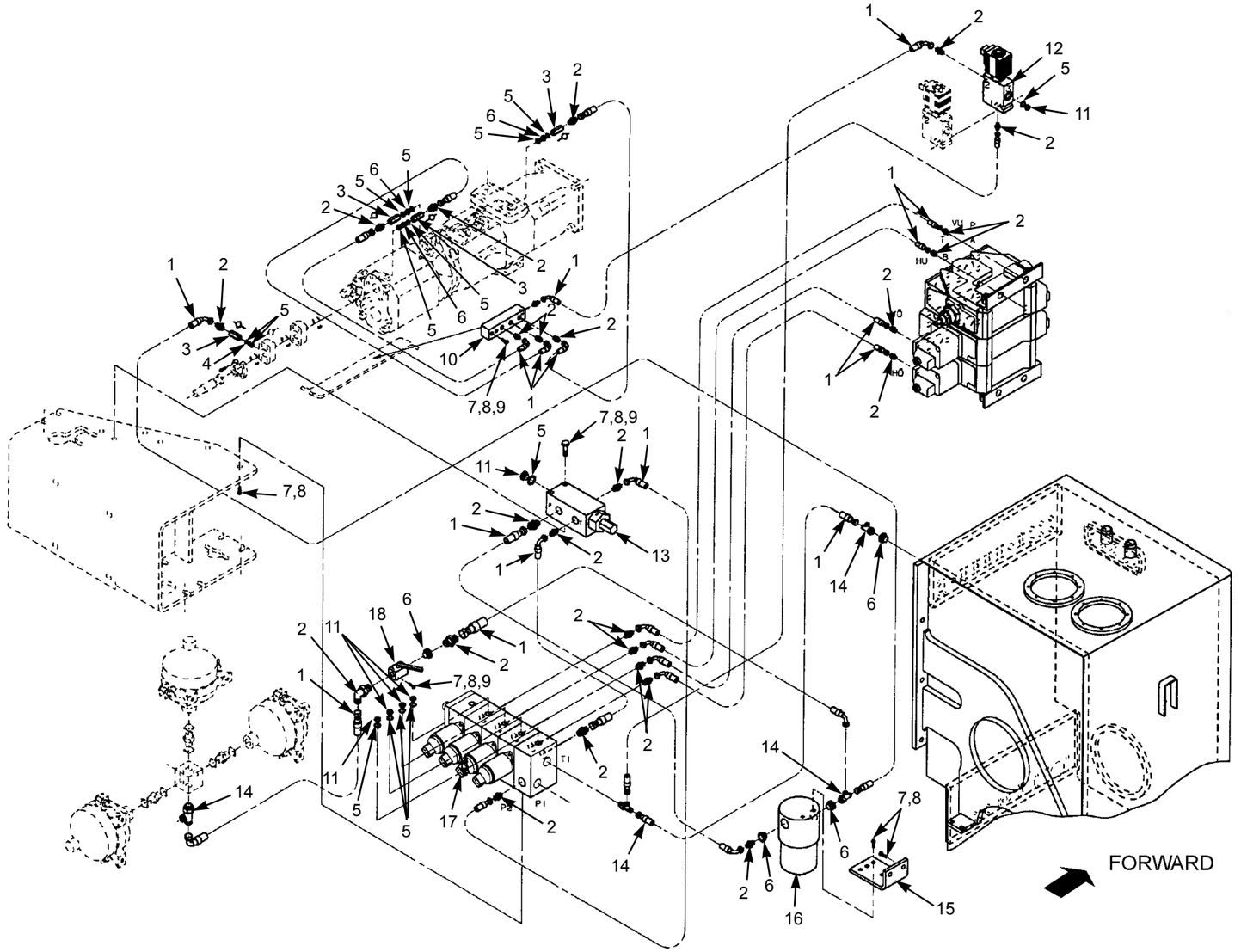
ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Parking Brake
3	Fitting
4	Pressure Sensor
5	T-Fitting
6	Manifold Block
7	Connection
8	Nipple
9	Service Brake Valve

Figure 5. Cab Parking and Service Brake Hydraulic Hoses and Fittings.



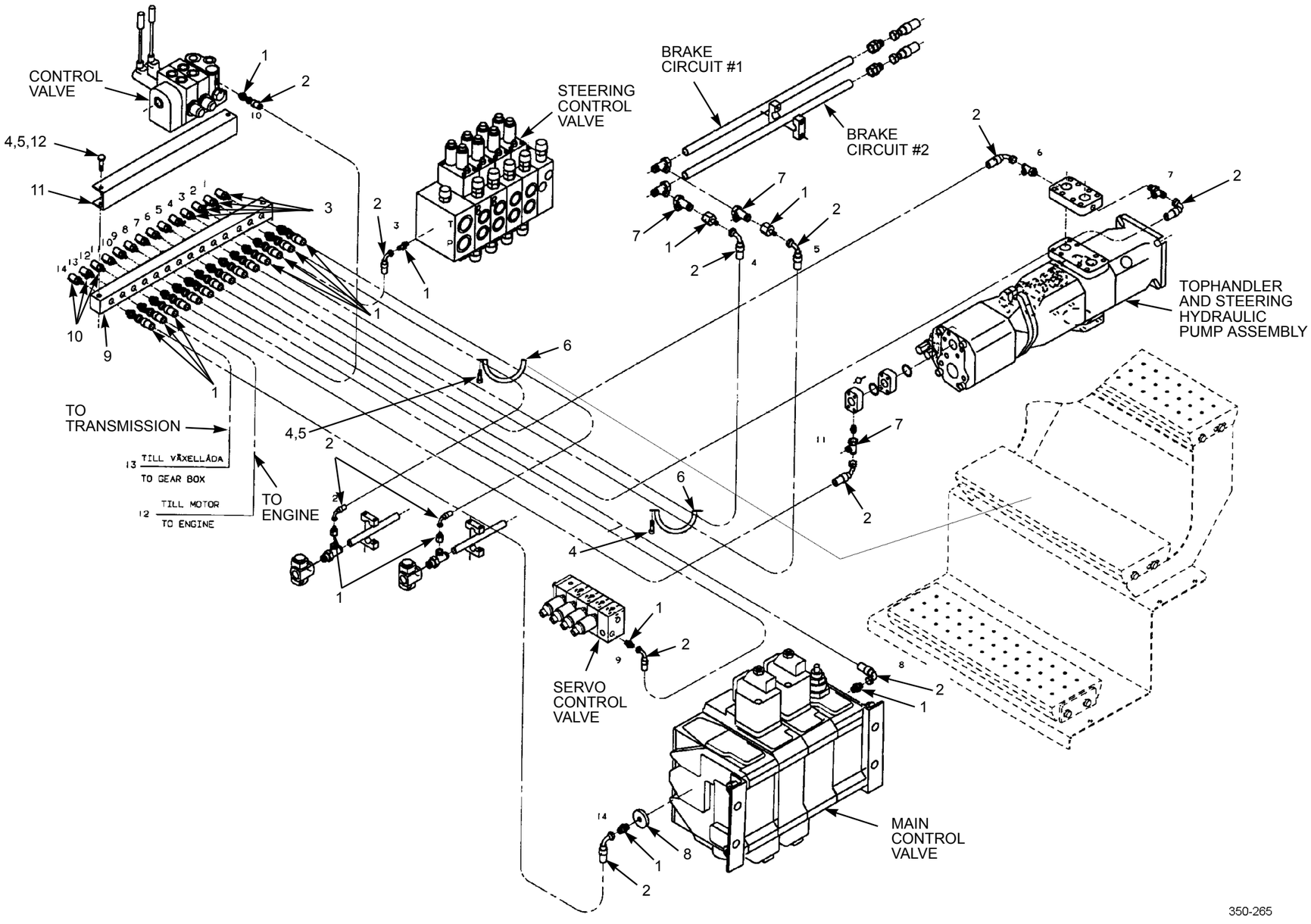
ITEM NO.	DESCRIPTION
1	Plate
2	Screw
3	Washer
4	Nut
5	Fitting
6	Hydraulic Hose
7	Flange
8	O-ring
9	Manifold Block
10	Check Valve
11	Hose Connection
12	Clamp
13	Plug
14	Cover
15	Filters (Return and Breather)
16	Magnetic Plug
17	Hose Clamp
18	Hose
19	Suction Pipe
20	Ball Valve
21	Rubber Clamp
22	Bracket
23	Locknut
24	Sensor
25	High-Pressure Filter
26	Level Indicator
27	T-Fitting

Figure 6. Main Hydraulic System Hoses and Fittings.



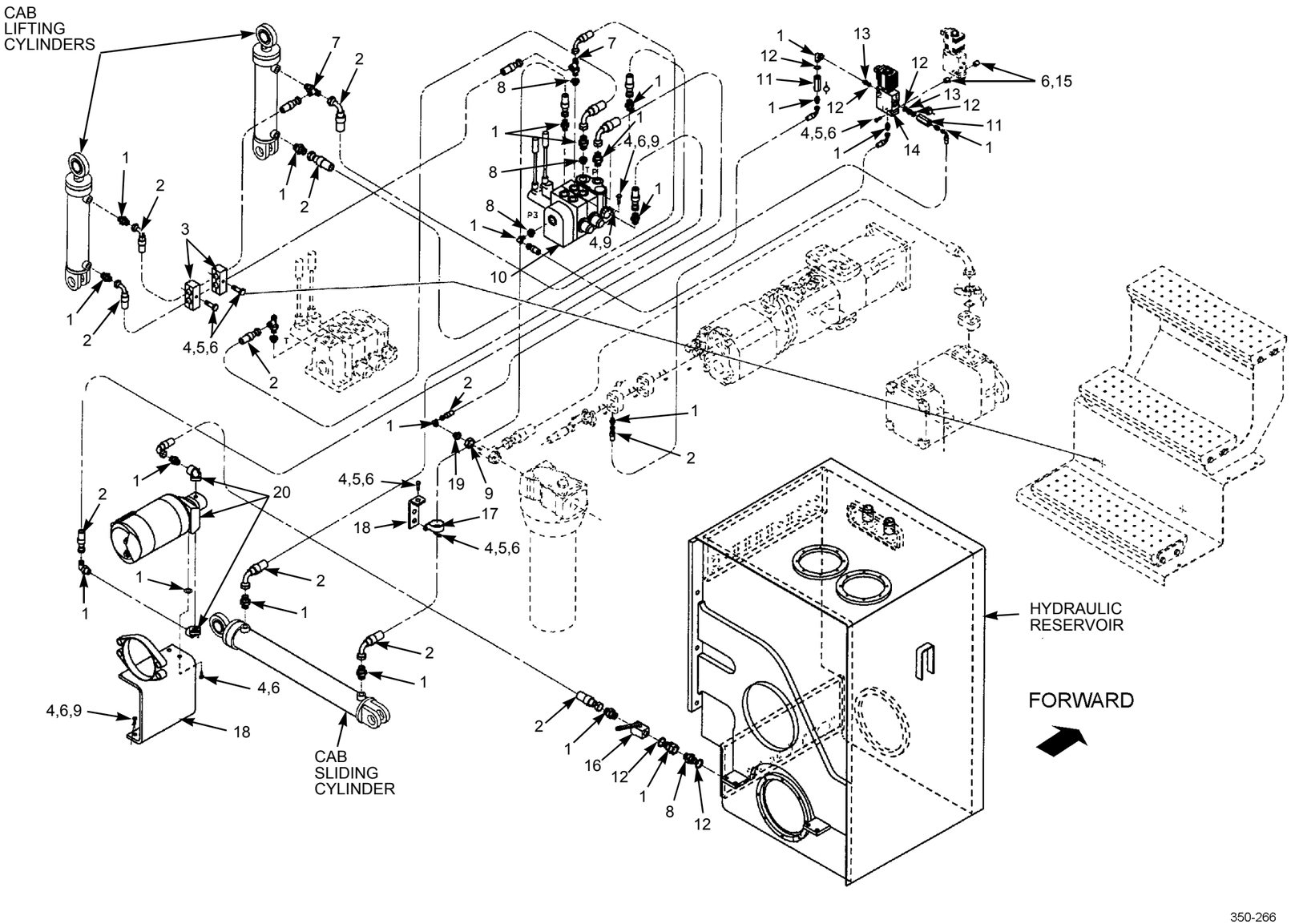
ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	Check Valve
4	Adapter
5	O-ring
6	Nipple
7	Screw
8	Washer
9	Locknut
10	Manifold Block
11	Plug
12	Solenoid
13	Reducing Valve
14	T-Fitting
15	Bracket
16	Servo Filter
17	Control Valve
18	Ball Valve

Figure 7. Hydraulic Servo System Hoses and Fittings.



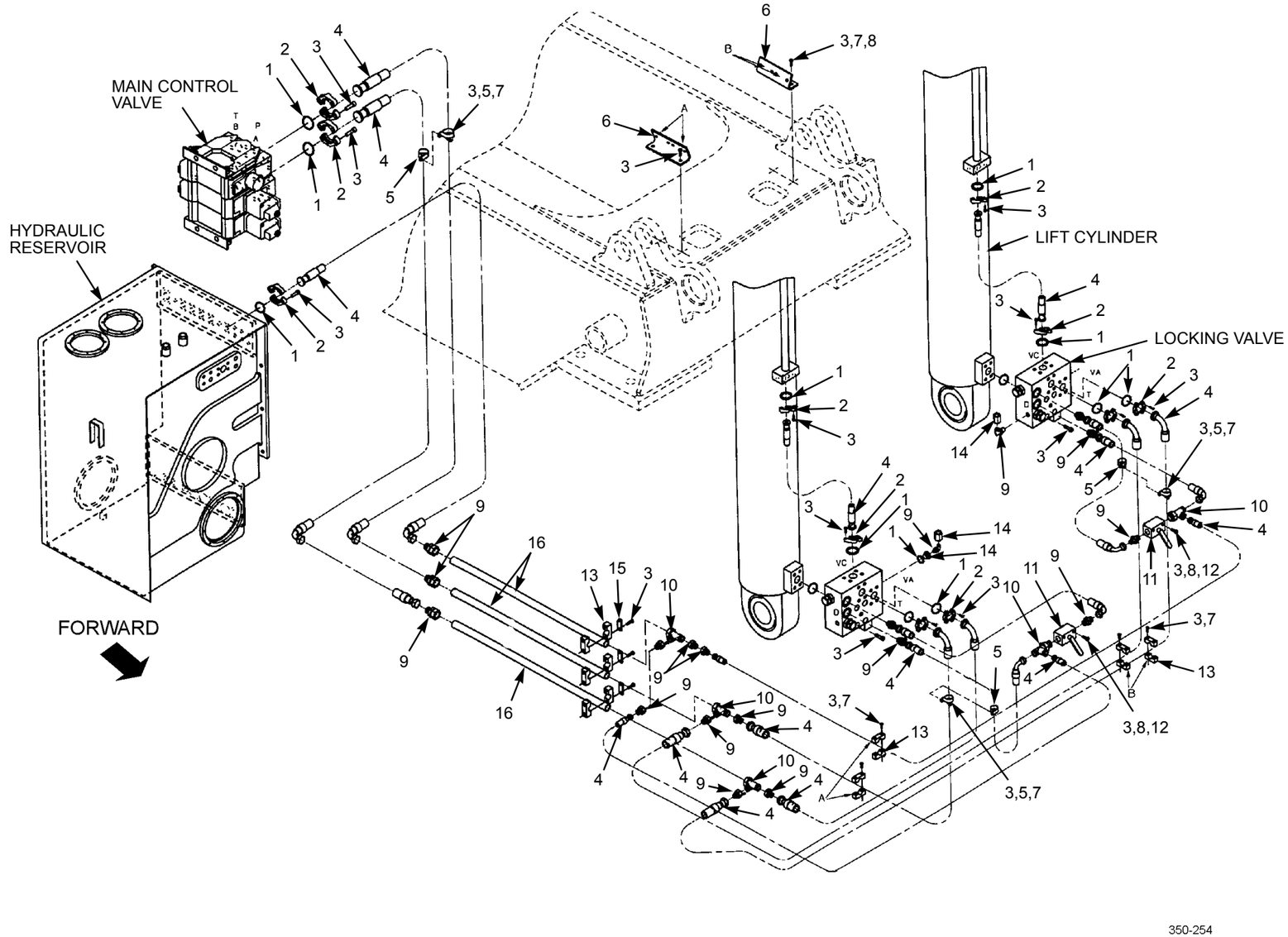
ITEM NO.	DESCRIPTION
1	Fitting
2	Hydraulic Hose
3	Test Nipple
4	Screw
5	Locknut
6	Yoke
7	T-Fitting
8	Cover
9	Manifold Block
10	AOAP Sampling Valve
11	Spacer
12	Washer

Figure 8. Hydraulic System Test Point Hoses and Fittings.



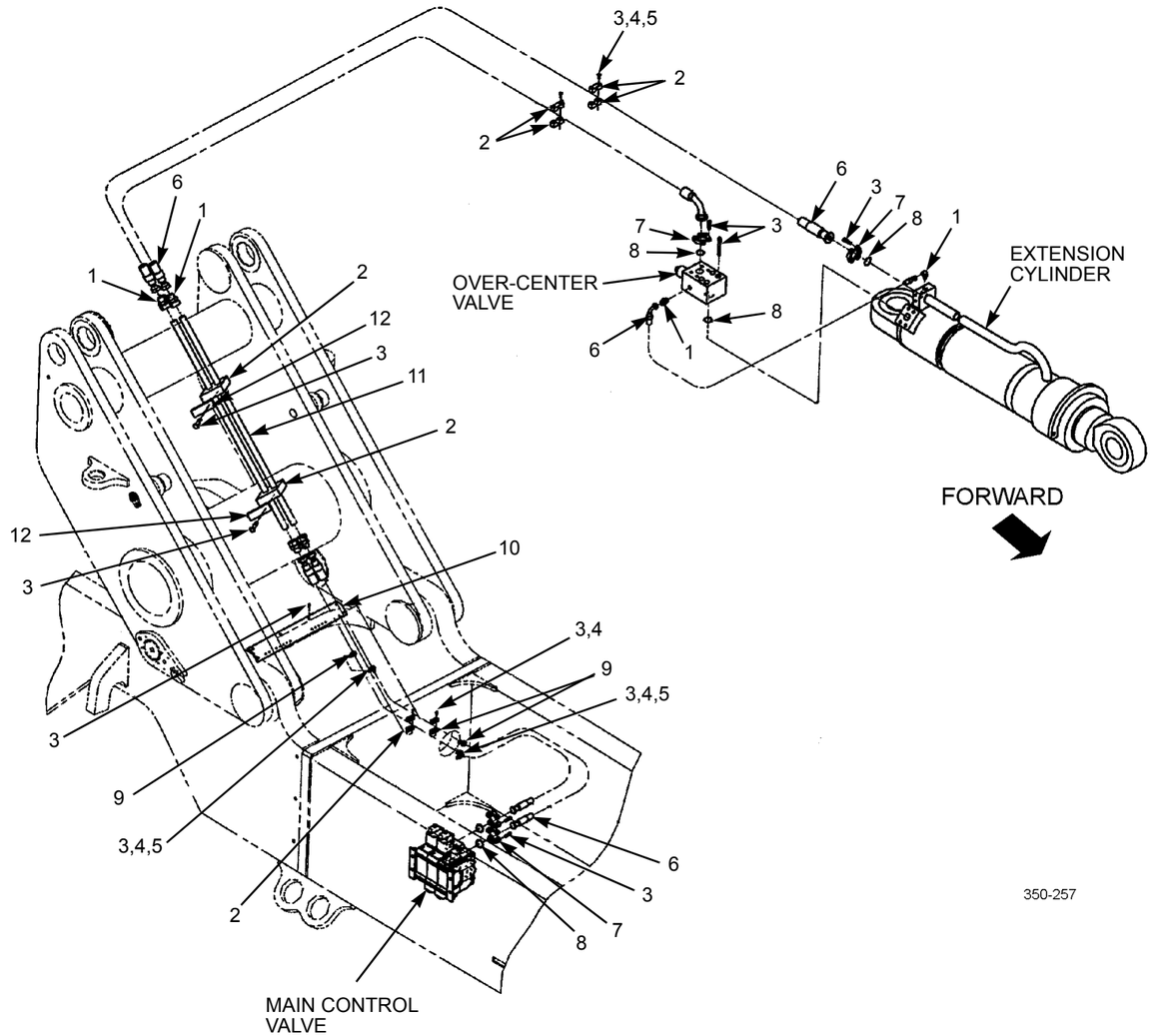
ITEM NO.	DESCRIPTION
1	Fitting
2	Hydraulic Hose
3	Cap
4	Screw
5	Locknut
6	Washer
7	T-Fitting
8	Nipple
9	Nut
10	Control Valve (Cab Transport)
11	Check Valve
12	O-ring
13	Adapter
14	Solenoid Valve
15	Spacer
16	Ball Valve
17	Rubber Clamp
18	Bracket
19	Reducer
20	Auxiliary Pump

Figure 9. Cab Transport Hydraulic Hoses and Fittings.



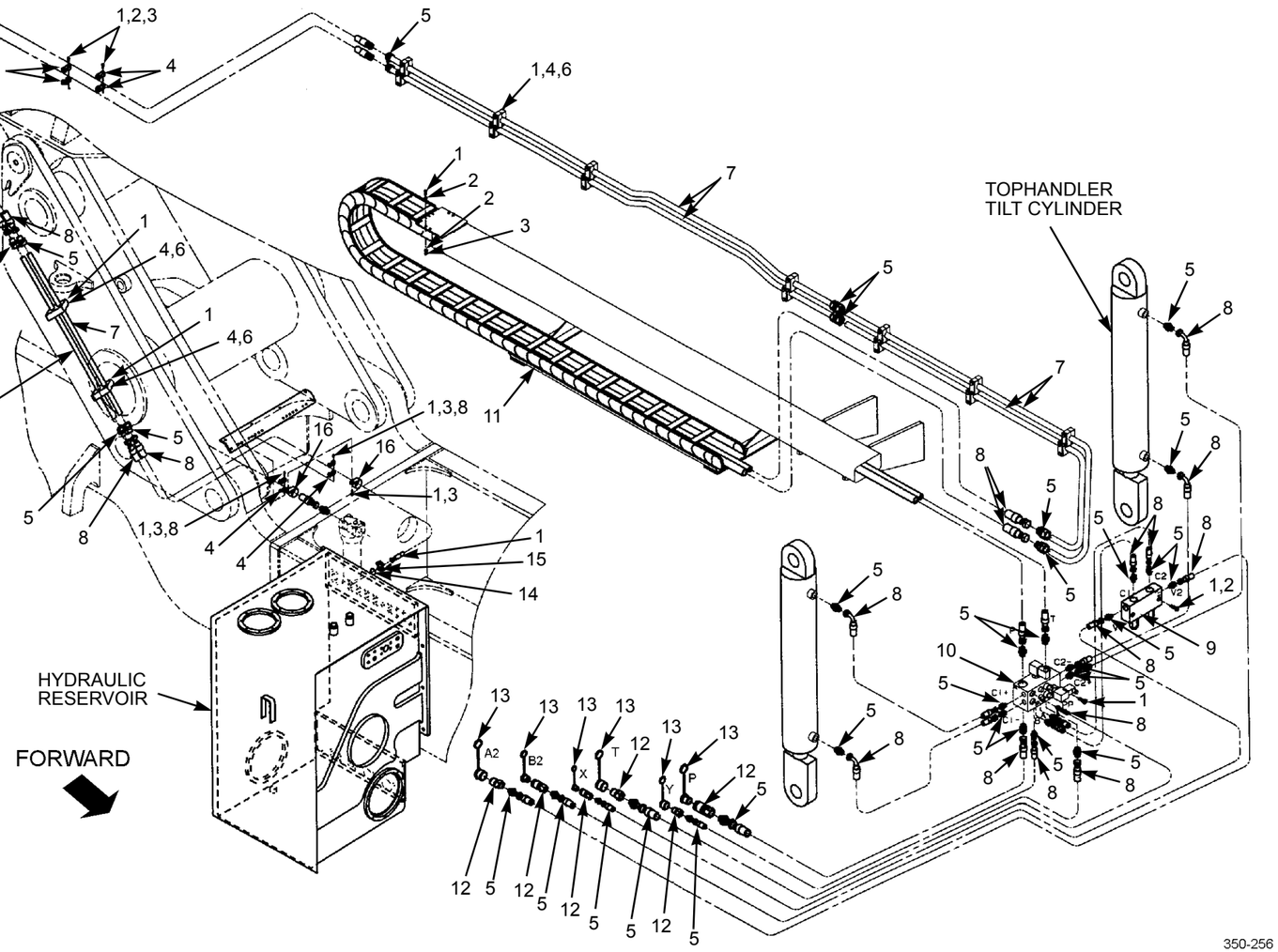
ITEM NO.	DESCRIPTION
1	O-ring
2	Flange
3	Screw
4	Hydraulic Hose
5	Rubber Clamp
6	Bracket
7	Locknut
8	Washer
9	Fitting
10	T-Fitting
11	Ball Valve
12	Nut
13	Clamp
14	Nipple
15	Plate
16	Pipe

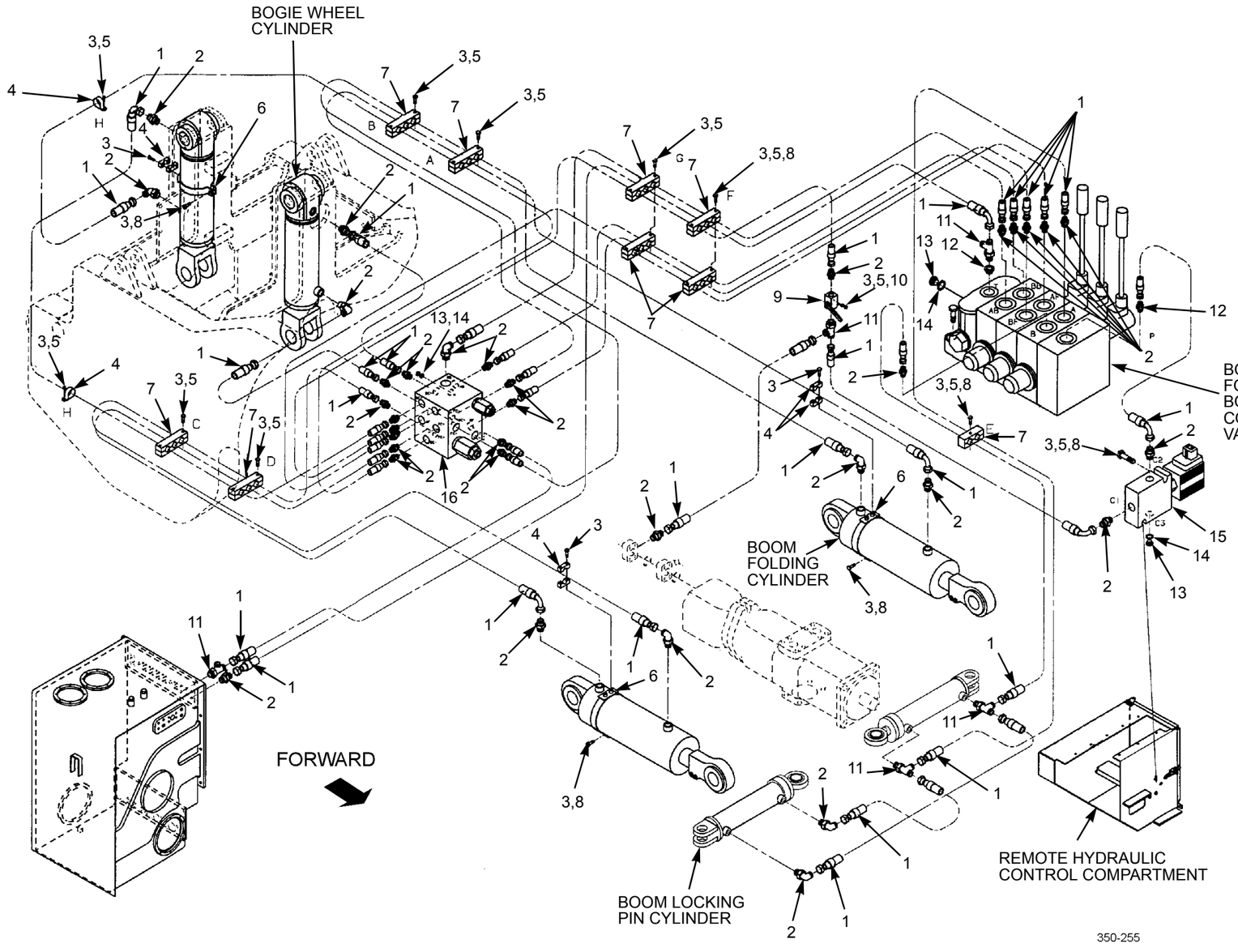
Figure 10. Boom Lifting Hydraulic System.



ITEM NO.	DESCRIPTION
1	Fitting
2	Clamp
3	Screw
4	Locknut
5	Washer
6	Hydraulic Hose
7	Flange
8	O-ring
9	Rubber Clamp
10	Bracket
11	Pipe
12	Plate

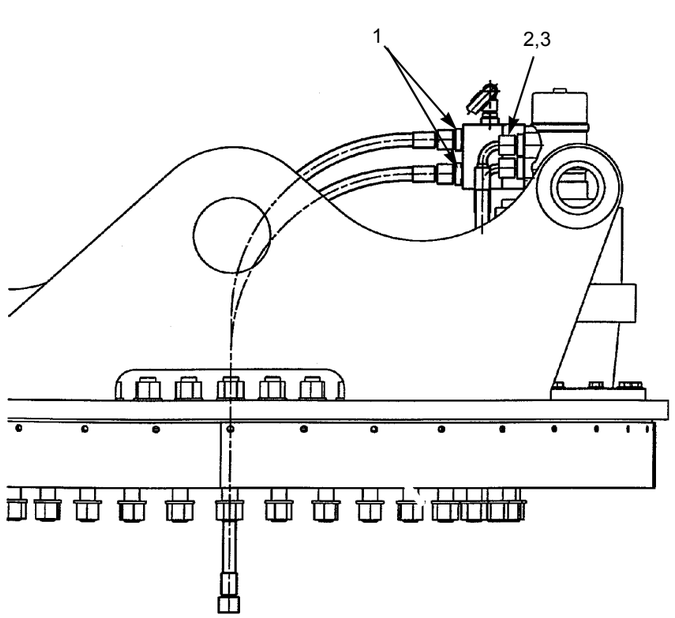
Figure 11. Boom Extension Hydraulic System.

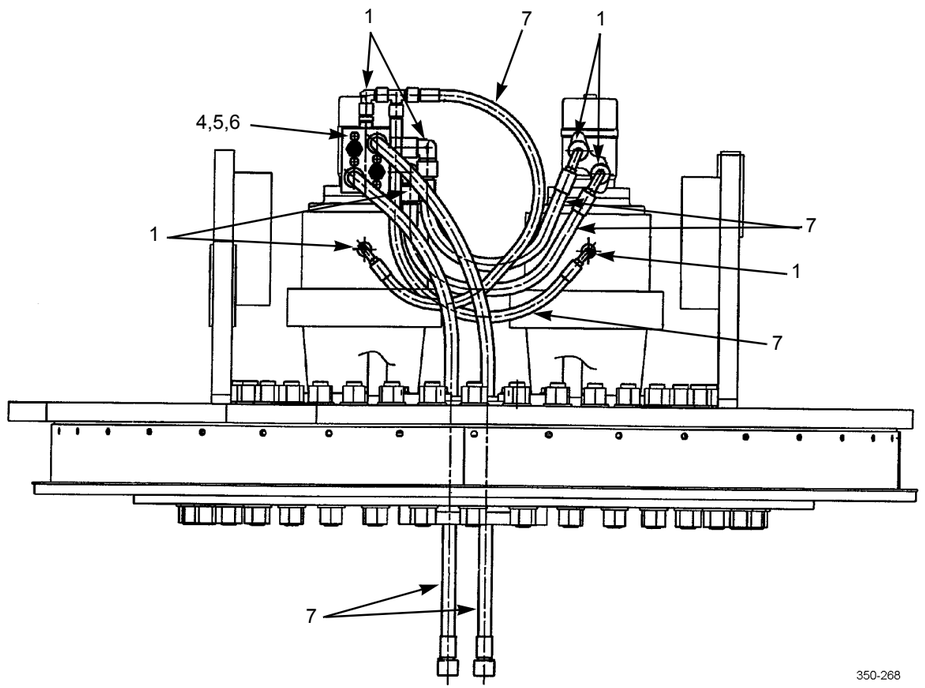

1,2,3
4
4
5
1,4,6
7
TOPHANDLER
TILT CYLINDER
1
2
2
3
11
8
5
1
4,6
7
1
4,6
7
5
8
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8
1,3,8
16
16
1,3
1,3,8
4
4
1
15
14
HYDRAULIC
RESERVOIR
FORWARD
5
8
5
8
5
8



ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	Screw
4	Clamp
5	Washer
6	Hose Holder
7	Cap
8	Locknut
9	Ball Valve (Shutoff Valve #5)
10	Nut
11	T-Fitting
12	Nipple
13	Plug
14	O-ring
15	Reverse Valve
16	Over-Center/ Pressure Control Valve

Figure 13. Boom Support Folding and Bogie Hydraulic System.





ITEM NO.	DESCRIPTION
1	Fitting
2	Spacer
3	Seal
4	Valve
5	Screw
6	Cover
7	Hydraulic Hose
8	Quick Coupling
9	Plug
10	Cover
11	Nipple
12	Adapter

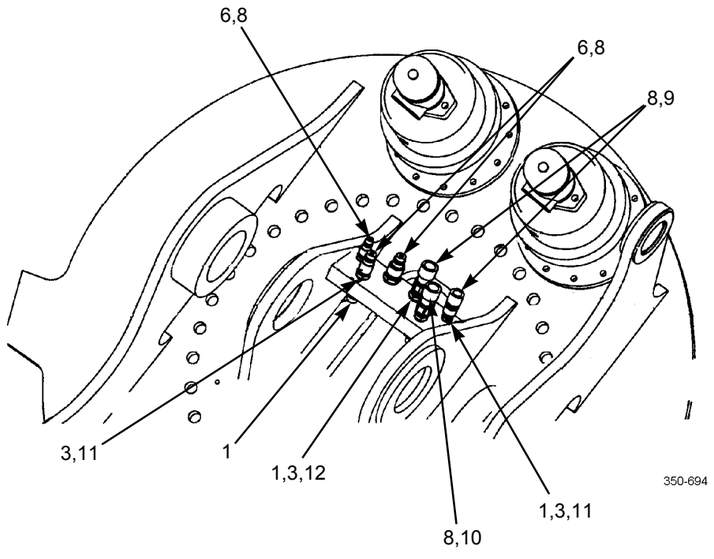
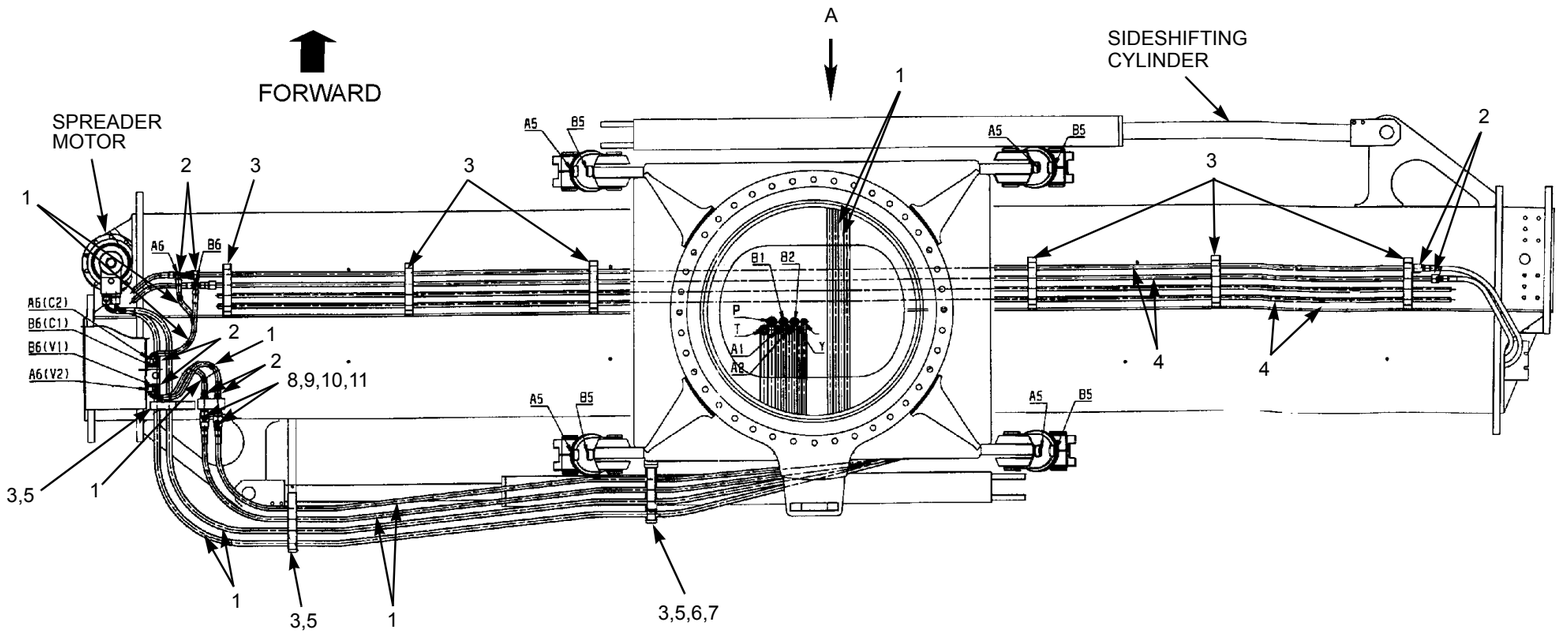


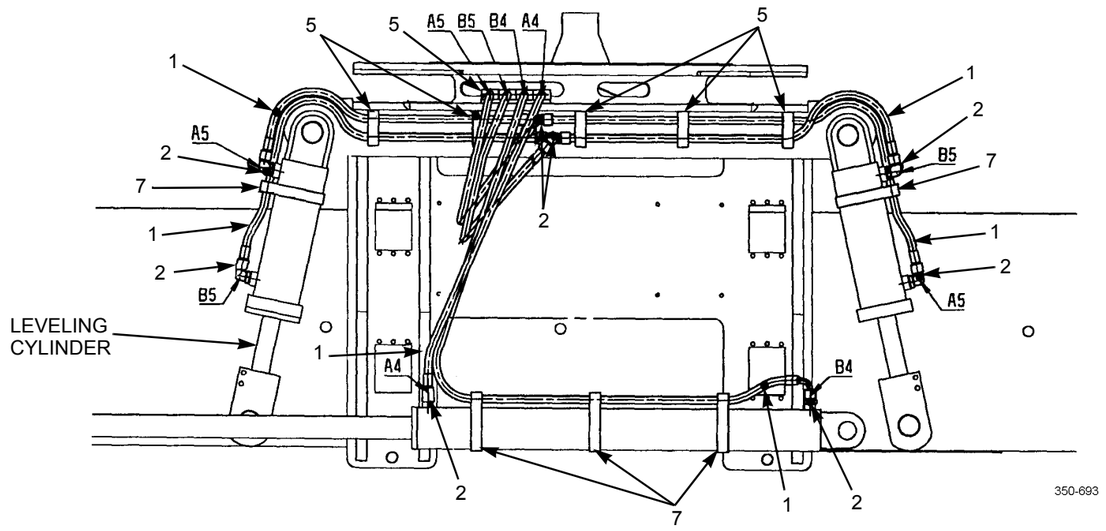
Figure 14. Tophandler Hydraulic System Hoses and Fittings.



ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	Clamp
4	Pipe
5	Retainer
6	Screw
7	Hose Support
8	Nipple
9	Seal
10	Quick Coupling
11	Cover

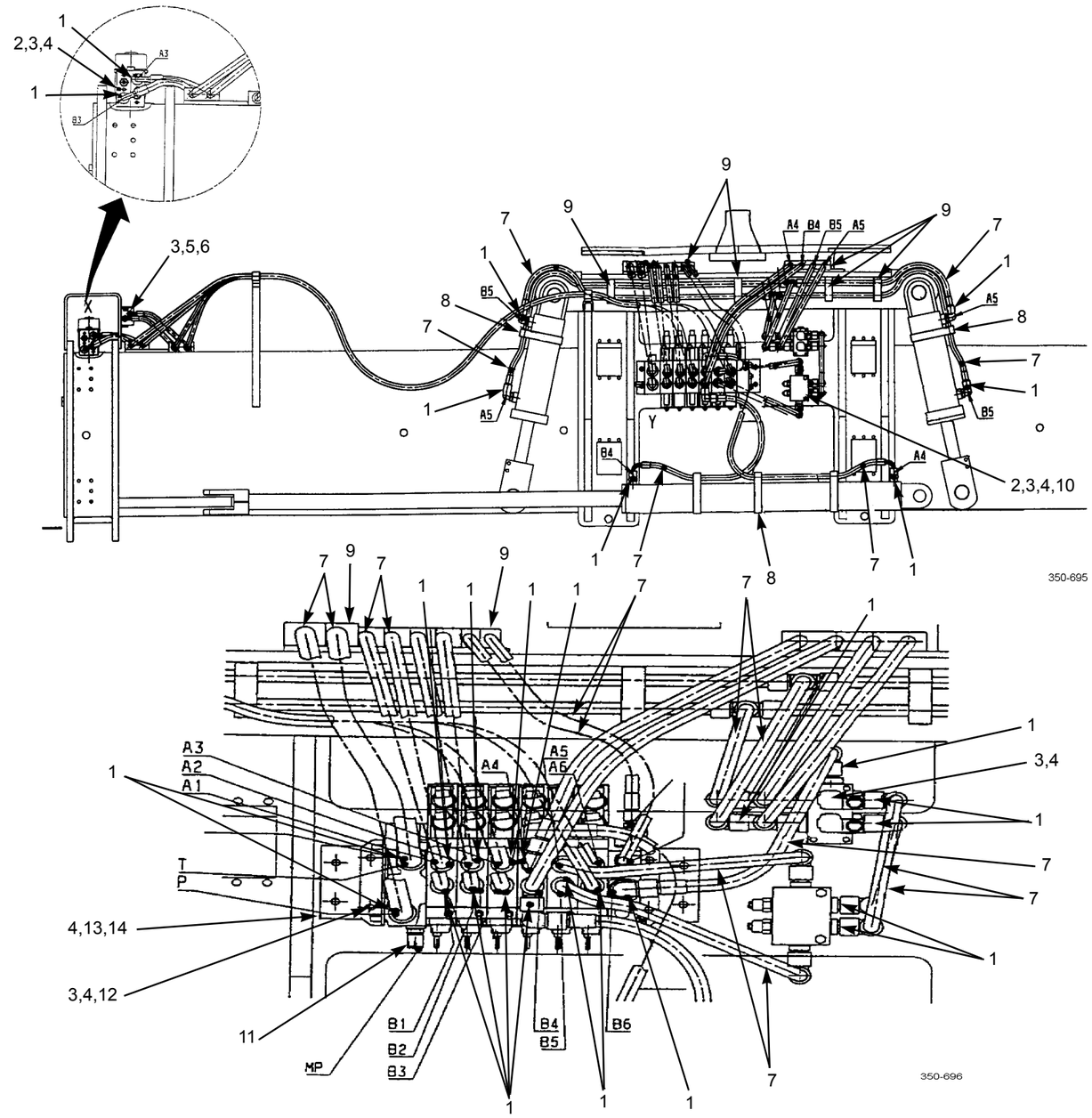
TOP VIEW

350-267



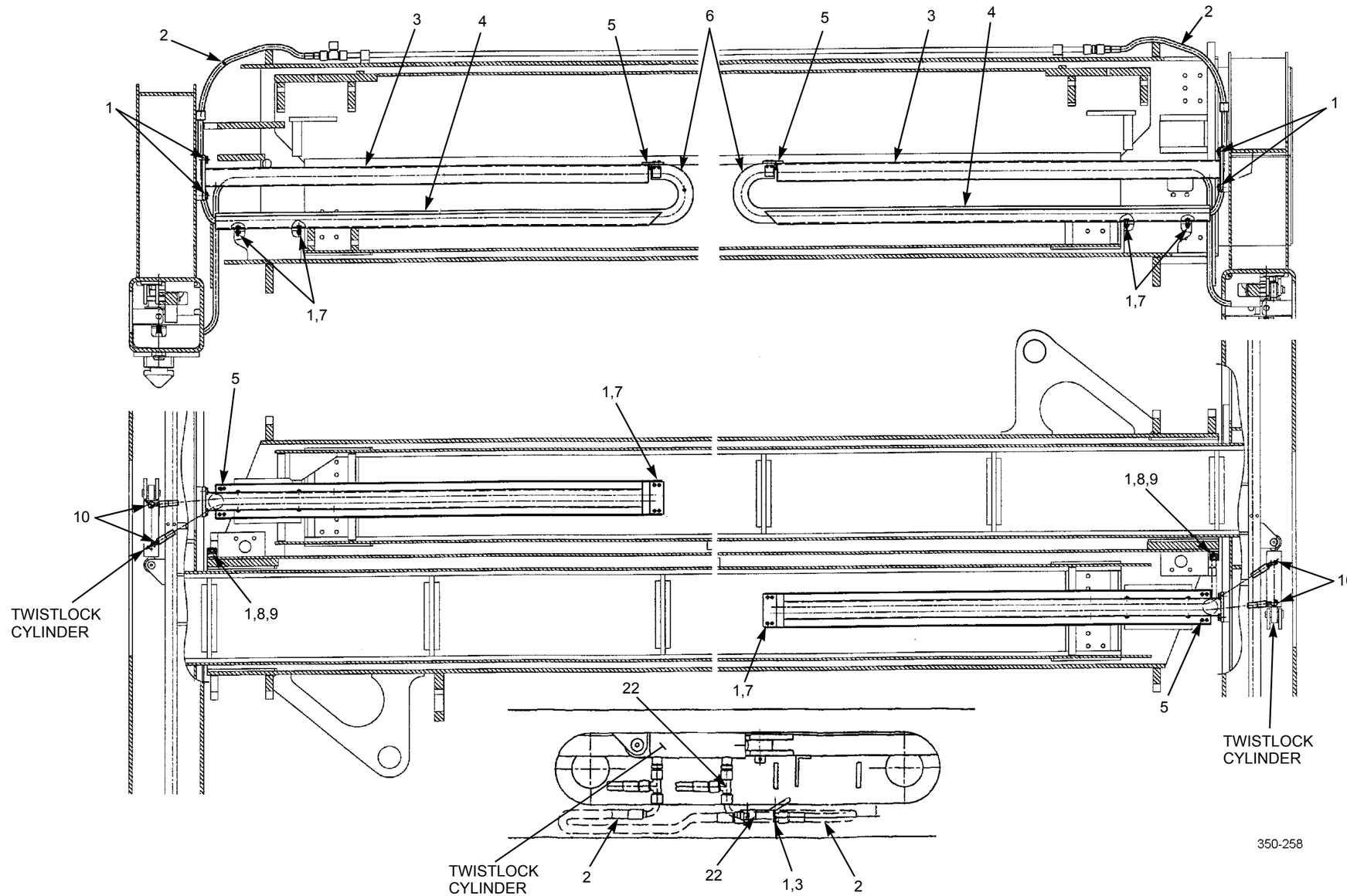
VIEW A

Figure 14. Tophandler Hydraulic System Hoses and Fittings - Continued.



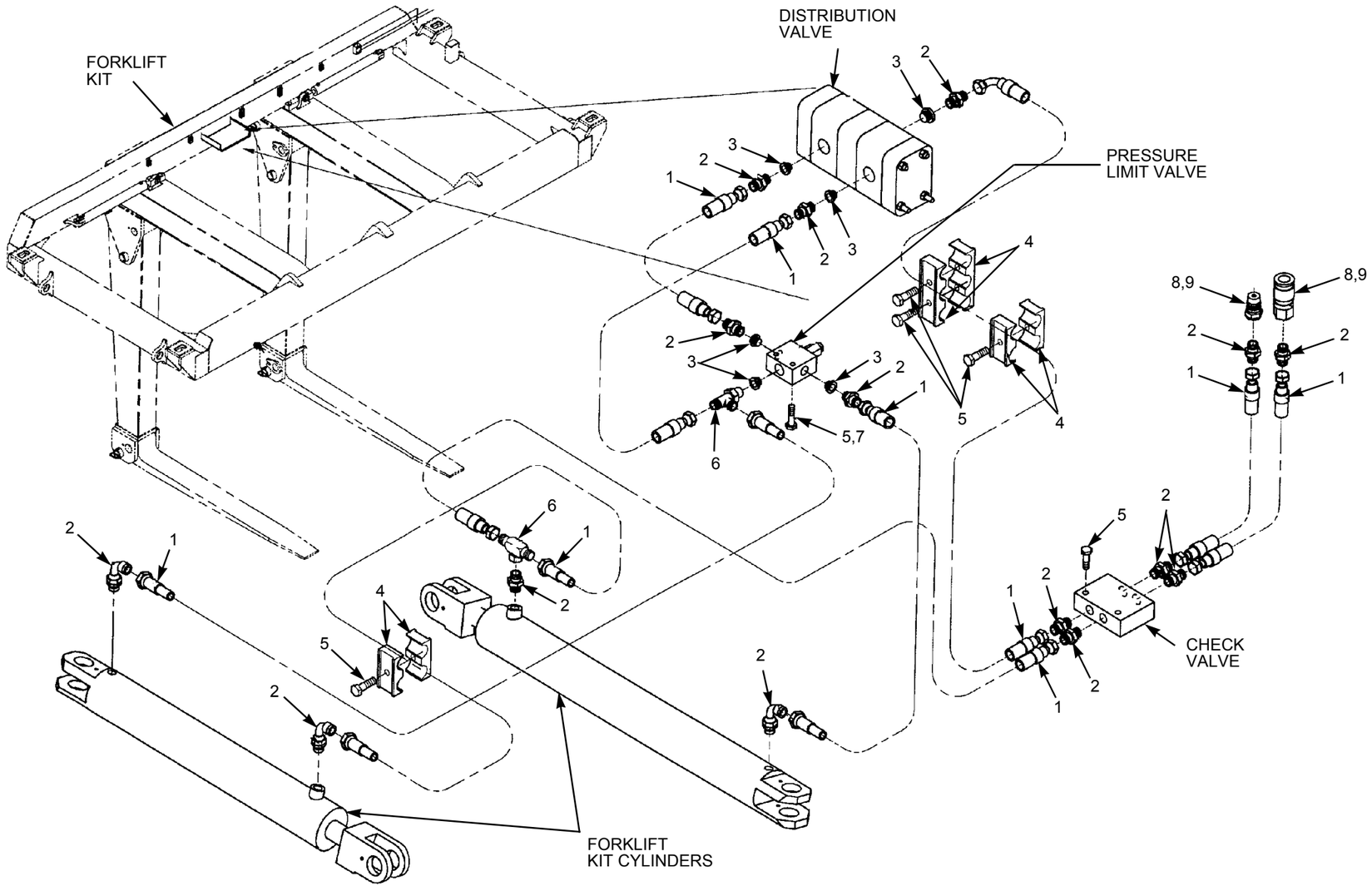
ITEM NO.	DESCRIPTION
1	Fitting
2	Cover
3	Valve
4	Screw
5	Nut
6	Grease Fitting
7	Hydraulic Hose
8	Clamp
9	Retainer
10	Valve Housing
11	Nipple
12	Locknut
13	Washer
14	Support

Figure 14. Tophandler Hydraulic System Hoses and Fittings - Continued.



ITEM NO.	DESCRIPTION
1	Screw
2	Hydraulic Hose
3	Bracket
4	Channel
5	Kit
6	Flexible Conveyer
7	Locknut
8	Hose Clamp
9	Plate
10	Fitting

Figure 14. Tophandler Hydraulic System Hoses and Fittings - Continued.



ITEM NO.	DESCRIPTION
1	Hydraulic Hose
2	Fitting
3	Nipple
4	Cap
5	Screw
6	T-Fitting
7	Nut
8	Quick Coupling
9	Cover

Figure 15. Forklift Kit Hydraulic Hoses and Fittings.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0108505

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				50		Missing Items 2 in Illustration

SAMPLE

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Johnny Wilson, E-5, MOTOR SGT	DSN 867-7967	

DA FORM 1FEB74 2028 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V1.00

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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
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
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

PIN: 079023-000