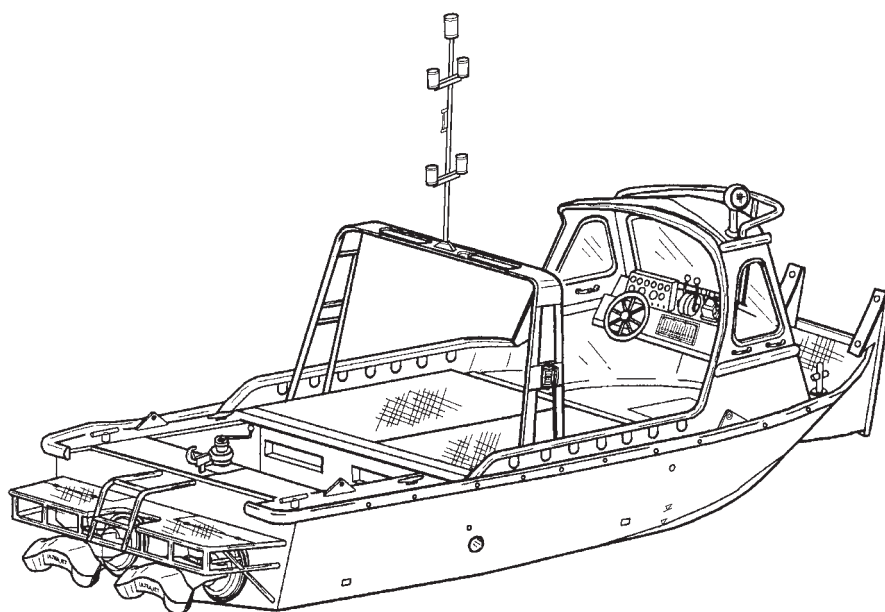


**TECHNICAL MANUAL**  
**UNIT, DIRECT SUPPORT AND**  
**GENERAL SUPPORT MAINTENANCE**  
**FOR**  
**BRIDGE ERECTION BOAT (BEB)**  
**MK II-S**

**NSN: 1940-01-526-0770**



HOW TO USE THIS MANUAL

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GENERAL INFORMATION  
EQUIPMENT DESCRIPTION  
THEORY OF OPERATION

CHAPTER 2  
TROUBLESHOOTING

CHAPTER 3  
FIELD MAINTENANCE  
INSTRUCTIONS

CHAPTER 4  
SUSTAINMENT MAINTENANCE  
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CHAPTER 5  
SUPPORTING INFORMATION

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 2006



**WARNING**

**EXHAUST GASES CAN KILL**

DO NOT operate boat engine in enclosed area.

BE ALERT at all times for exhaust odors.

BE ALERT for exhaust poisoning symptoms. They are:

Headache

Dizziness

Sleepiness

Loss of muscular control

If YOU SEE another person with exhaust poisoning symptoms:

Remove person from area

Expose to open air

Keep person warm

Do not permit person to move

Administer artificial respiration \* or CPR if necessary

\* For artificial respiration, refer to FM 4-25.11.

BE AWARE, the field protective mask for Nuclear-Biological-Chemical (NBC) protection will not protect you from carbon monoxide poisoning. THE BEST DEFENSE AGAINST EXHAUST POISONING IS ADEQUATE VENTILATION.

## WARNING SUMMARY

Place master switch in OFF position. Failure to comply may result in injury or death to personnel.

Use caution when working with battery cables. Failure to comply may result in injury to personnel and/or damage to equipment.

Battery acid (electrolyte) is extremely harmful. Always wear safety goggles and rubber gloves when performing battery maintenance. Severe injury will result if acid contacts eyes or skin.

Do not smoke, have open flame, or make sparks when performing battery maintenance. Batteries may explode causing severe injury to personnel.

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

Failure to perform preliminary inspection on a deadlined boat may result in injury to personnel and/or damage to equipment.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Diesel fuel is flammable. Do not perform fuel system procedures near open flames. Injury or death to personnel may result.

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can ignite by contacting hot engine. Failure to comply may result in death or injury to personnel.

Use caution when closing clamps. Ensure hands are kept clear of clamping area prior to performing clamping and adjustment procedures. Failure to comply may result in injury to personnel.

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

Keep hands clear of lifting area. Use prybar to free engine during lifting operations. Failure to do so may cause injury to personnel.

Lifting device and chains must have a weight capacity greater than 1250 lbs (567.0 kg). Failure to do so may cause injury to personnel and/or damage to equipment.

Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.

Keep hands out of the path of the spring-loaded tensioner. Failure to comply may result in injury to personnel.

Crank engine to ensure fuel flows through the injector pump and fuel lines to vent air from lines. The engine may start; ensure all safety precautions for starting the engine are followed. Failure to comply may result in injury to personnel and/or damage to equipment.



## WARNING SUMMARY (Contd)

It is necessary to position the engine circuit switch ON. The engine may start; ensure all safety precautions for starting the engine are followed. Failure to comply may result in injury to personnel and/or damage to equipment.

Deep dents may require careful application of heat to aid in reforming metal. Use caution when performing repairs with heat. Failure to comply may result in injury to personnel and/or damage to equipment.

When removing a battery cable terminal, disconnect ground (-) terminals first. Ensure all switches are in OFF position before disconnecting. Do not allow tools to come in contact with hull when disconnecting terminals. A direct short can result, causing instant heating of tools, tool damage, battery damage, or battery explosion. Battery acid (electrolyte) is harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing battery maintenance. Severe injury will result if acid contacts eyes or skin. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When checking/servicing an item, ensure that all attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may cause injury to personnel and/or damage to equipment.

Improper cleaning methods and use of unauthorized cleaning solvents may cause injury to personnel and/or damage to equipment.

Do not touch hot exhaust system components with bare hands. Failure to comply may result in injury to personnel.

The bleed valve on the hydraulic lines should be used to bleed residual pressure from the line prior to disconnecting. When disconnecting any hydraulic line, open line slowly while wearing safety glasses to protect face. Hydraulic oil may spray due to residual pressure in system. Failure to comply may result in injury to personnel.

When checking/servicing an item, ensure all attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may cause equipment failure or injury to personnel.

Be mindful of all WARNINGS, CAUTIONS, and NOTES while performing PMCS. Failure to comply may result in injury to personnel and/or damage to equipment.

Keep hands, clothing, and tools away from moving machinery. Failure to comply may result in injury to personnel and/or damage to equipment.

Ensure coolant pressure caps are not removed when engines are hot. Failure to comply may result in injury to personnel.

Engines must be shut down during fueling operations. Failure to comply may result in injury or death to personnel.

Fuel is extremely flammable and explosive. Do not perform fuel system checks or services near open flames or sparks. Always keep a fire extinguisher nearby. Do not allow smoking near boat when refueling. Failure to comply may result in injury or death to personnel.

Use caution when removing cables from adjacent terminals. Cables may touch other terminals. Failure to comply may result in injury to personnel or damage to equipment.

Do not use a cracked or resurfaced flywheel. Failure to comply may result in injury to personnel and/or damage to equipment.

To reduce the possibility of severe burns, wear protective gloves when installing the heated gear. Failure to comply may result in injury to personnel.

Wear eye protection. If the collets are not correctly installed, they can fly out when the stems are hit with a plastic hammer.



## LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for the original manual is:

Original 10 May 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 30.

TOTAL NUMBER OF WORK PACKAGES IS 179.

THE PAGES/WORK PACKAGES CONSIST OF THE FOLLOWING:

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\*Zero in this column indicates an original page.



HEADQUARTERS,  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., *10 MAY 2006*

TECHNICAL MANUAL  
UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL  
FOR  
BRIDGE ERECTION BOAT (BEB)  
MK II-S

NSN: 1940-01-526-0770

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 Publications and Blank Forms), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <https://aeps.ria.army.mil>. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. 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 or DA Form 2028 direct to: AMSTA-LC-LPIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The E-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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## HOW TO USE THIS MANUAL

### ABOUT YOUR MANUAL

Prior to performing vehicle maintenance, you must be familiar with the structure and content of this Technical Manual (TM). Knowing how to use this manual allows you to quickly find information and decrease the time required to perform a procedure.

This TM has the following key features:

- **Work Package Format**—This TM is modular and is organized into Work Packages (WP). Each WP is a stand-alone information package. Each WP has a two-character plus six-digit number (e.g., WP 0001 00). The first four digits identify the sequential WP number (i.e., 0001, 0002, 0003, etc.), and the last two digits indicate the revision level (i.e., 00 is the initial release; 01 is revision 1; 02 is revision 2, etc.).
- **Cover**—Chapter numbers and titles, and a brief description of chapter content are listed on the front cover for quick reference.
- **Table of Contents**—WP titles and numbers are listed in the Table of Contents of this TM.
- **Acronyms and Abbreviations**—A list of acronyms and abbreviations that are used throughout this manual is provided in WP 0001 00.
- **Illustrations**—The illustrations contain numerical callouts to identify parts, components, etc., mentioned in the text. Numerical callouts generally appear in clockwise order, beginning at the 11 o'clock position.
- **Index**—The alphabetical index is located immediately following the last WP. The index lists maintenance procedures and the WP and page number for each entry.

### HOW TO USE YOUR MANUAL

You must familiarize yourself with the entire maintenance procedure before beginning a maintenance task. Here's an example of how to use your manual:

**PROBLEM:** The unit maintenance mechanic receives a DA Form 2407 that reports that the starter motor needs to be replaced.

**SOLUTION:** Follow these steps:

1. Locate the WP for Starter Maintenance (WP 0099 00) in the Table of Contents or Index.
2. Turn to Starter Maintenance (WP 0099 00).
3. Review the Initial Setup section, which contains information you need before starting the maintenance procedure. Included are:
  - **Applicable Models:** Vehicle(s) covered in the maintenance task.
  - **Tools and Special Tools:** Tools needed to perform the maintenance task.
  - **Materials/Parts:** All mandatory replacement parts and materials needed to perform the task.
  - **Personnel Required:** The number of personnel required for a task if task requires more than one.
  - **References:** Manuals needed to complete the task.
  - **Equipment Condition:** Conditions that must exist before starting the task.

This manual was designed so that text and corresponding illustrations appear together. This makes part identification and procedure sequence easier to follow. Illustrations include diagrams of the component, removed from the vehicle, showing part locations, attachments, and spatial relationships.

Your manual is easier to use once you understand its design. We hope it will encourage you to use it more often.

# CHAPTER 1

## GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION BRIDGE ERECTION BOAT (BEB) MK II-S

Work Package Title

WP Sequence No.

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General Information . . . . .	WP 0001 00
Equipment Description and Data . . . . .	WP 0002 00
Theory of Operation . . . . .	WP 0003 00



## GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

### BRIDGE ERECTION BOAT (BEB) MK II-S

NSN 1940-01-526-0770 P/N 12492423

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## GENERAL INFORMATION

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### SCOPE

This Technical Manual (TM) contains field and sustainment level maintenance for the Bridge Erection Boat (BEB). Field maintenance includes maintenance, repair, lubrication, Preventive Maintenance Checks and Services (PMCS), and troubleshooting as allocated by the Maintenance Allocation Chart (MAC).

- a. **Type of Manual**—Field and sustainment maintenance.
- b. **Equipment Names and Model Number**—The MK II-S is a modernized version of the currently fielded United States Combat Support Boat (USCSB) MK I and MK II. The “S” in model number MK II-S refers to Service Life Extension Program (SLEP).
- c. **Purpose of Equipment**—The MK II-S is a work boat used to support U.S. Army Multi-Role Bridge Company (MRBC) units. Its primary purpose is to assist in the construction and operation of both the Improved Float Bridge (IFB), commonly known as Standard Ribbon Bridge (SRB), and the Improved Ribbon Bridge (IRB). BEBs function to maneuver bridge bays after they are launched and position them for coupling in the construction of a bridge or raft assembly. In addition, BEBs serve as floating anchors for emplaced bridges by providing propulsion against water currents, and as propulsion units for maneuvering raft assemblies. Their secondary purpose is to serve as safety boats, troop and cargo carriers, support reconnaissance missions, patrol inland waters, and assist in maritime construction projects and diving operations.
- d. **Special Inclusions**—None

### MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, Functional Users Manual for The Army Maintenance Management System (TAMMS).

### REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your BEB needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. The preferred method for submitting a Quality Deficiency Report (QDR) is through the Army Electronic Product Support (AEPS) website under the Electronic Deficiency Reporting System (EDRS). The web address is: <https://aeps.ria.army.mil>. This is a secured site requiring a password which can be applied for on the front page of the website. If the above method is not available to you, put it on an SF 368, Product Quality Deficiency Report (PQDR), and mail it to us at: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/PQDR MS 267, 6501 E. 11 Mile Road, Warren, MI 48397-5000. We'll send you a reply.

### HAND RECEIPT

There is not a separate Hand Receipt for the MK II-S. For a complete list of end-item-related equipment (i.e., COEI, BII, and AAL) that must be accounted for, refer to TM 5-1940-322-10.

## GENERAL INFORMATION (Contd)

### CORROSION PREVENTION AND CONTROL (CPC)

#### **CAUTION**

Whenever the BEB has been exposed to seawater (salt water) or any aggressive water or chemicals, it must always be rinsed with fresh water to prevent corrosion. Failure to comply will result in damage to equipment.

#### **NOTE**

Anodes are installed on hull keel, keel coolers, and hydrojet units to prevent corrosion from electrolysis.

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems be reported so corrections and/or improvements can be made to future items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation to metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is rusting iron. Corrosion damage in metals can be seen, depending on the metal, in the form of tarnish, surface residue or oxidation, pitting, and perforation.

Plastics, composites, and rubbers will also degrade. Their deterioration is caused by exposure to heat, oxygen, solvents, or light (typically ultraviolet). An example is deteriorated rubber weather stripping. Degradation from excessive exposure of these elements can be seen in the form of shrinkage, hardening, cracks, and breaks.

If a corrosion problem is identified, it should be reported using SF 368, Product Quality Deficiency Report. Use of key words such as corrosion, rust deterioration, or cracking will ensure that the information is identified as a CPC problem.

### CORROSION PREVENTION AND CONTROL (CPC) (Contd)

SF 368 should be submitted to the address specified in DA PAM 750-8, Functional Users Manual for the Army Maintenance Management System (TAMMS).

### OZONE DEPLETING SUBSTANCES (ODS)

The continued use of ODS has been prohibited by Executive Order 12856 of 3 August 1993. The use of ODS in Army equipment is prohibited. The BEB contains a diesel internal combustion engine.

### ARMY PETROLEUM, OIL, AND LUBRICANTS (POL)

Proper disposal of hazardous waste material is vital to protecting the environment and providing a safe work environment. Materials such as batteries, oils, and antifreeze must be disposed of in a safe and efficient manner.

Hazardous materials used in the operation and maintenance of the BEB are listed in the Hazardous materials List table below. Normal operation, storage, transportation and maintenance of the BEB does not use or generate toxins other than those identified in this table. These compounds are common to the operation and maintenance of all diesel engine powered equipment. Radioactive materials are not used or generated during the fabrication, storage, or transport of the BEB.



## GENERAL INFORMATION (Contd)

**Table 1. Hazardous Materials List.**

TYPE	QUANTITY	USE	HAZARD
JP-8	75 Gal.	Engine Fuel	Flammability, Toxicity
15W40 MIL-PRF-2104	4.4. Gal.	Engine Oil	Flammability, Toxicity
Water/Ethylene Glycol (50/50)	18 Gal.	Engine Coolant	Toxicity
Shell Tellus 32	0.5 Gal. 4.0 Gal.	Hydraulic Fluid: Steering System Scoop	Flammability, Toxicity
MIL-PRF-2104 30W	0.9 to 1.2 Gal.	Transmission Fluid	Flammability, Toxicity
EP-2	2 Oz (US)	Drive Shaft Lubricant	Flammability, Toxicity
MIL-PRF-10924G	4 Oz (US)	General Fitting Lubricant	Flammability, Toxicity
CARC Paint*	Indeterminate	Protective Coating	Flammability, Toxicity

Note: \* Item is used during maintenance only.

## ARMY PETROLEUM, OIL, AND LUBRICANTS (POL) (Contd)

The following references are provided as a means to ensure that proper disposal methods are followed:

Technical Guide No. 126 (from the U.S. Army Environmental Hygiene Agency (USAEHA)

National Environmental Policy Act of 1969 (NEPA)

Clean Air Act (CAA)

Resource Conservation and Recovery Act (RCRA)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Emergency Planning and Community Right to Know Act (EPCRA)

Toxic Substances Control Act (TSCA)

Occupational Safety and Health Act (OSHA)

The disposal of Army Petroleum, Oils, and Lubricants (POL) products are affected by some of these regulations. State regulations also may apply to POL.

If you are unsure of which legislation affects you, contact state or local agencies for regulations regarding proper disposal of Army POL.

## DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

The recommended method of rendering the BEB useless is to destroy its hull using heavy tools, weapons fire, or explosive charges. Procedures for destruction of Army materiel to prevent enemy use can be found in TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.

## PREPARATION FOR STORAGE OR SHIPMENT

Refer to TM 5-1940-322-10 for limited storage and shipment instructions. Additional information can be found in TM 746-10, Marking, Packing, and Shipment of Supplies and Equipment: General Packaging Instructions for Field Use, TM 743-200-1, Storage and Materials Handling, TM 55-2200-001-12, Transportability Guidance for Application of Blocking, Bracing, and Tiedown Materials, and TEA PAM 55-19, Tiedown Handbook for Rail Movements.

## GENERAL INFORMATION (Contd)

### WARRANTY INFORMATION

The Bridge Erection Boat (BEB) is covered by a warranty. All U.S. Army customers requiring warranty assistance will initiate direct contact through respective unit Warranty Coordinators (WARCOs). WARCOs will submit all warranty claims for non-consumable items, greater than one-hundred dollars, to the FBM Babcock Marine Ltd. Point of Contact (POC) identified below. Request all claims be submitted both electronically and telephonically.

BEB warranty coverage applies to the following end item:

MK II-S BRIDGE ERECTION BOAT NSN: 1940-01-526-0770

The BEB MK II-S warranty period provides coverage on the boat and its components for 12 months starting on the date of customer handoff, if entering service, or 15 months from the date of customer handoff, if placed in storage. All warranty claims must be filled out on a warranty form, available on FBM's website, and then e-mailed to FBM for evaluation and action.

Minor defects in manufacturing and/or assembly will be corrected by MRBC personnel and a record of each incident must be provided to FBM.

Replacement parts will be provided by FBM and installed by MRBC personnel or a designated FBM representative. If the MRBC carries the required replacement part and is able to install it without delay, FBM will provide a replacement.

Engine related claims will be processed by FBM and resolved by a local Cummins dealership representative in the area. Hydrojet related claims will also be arranged by FBM and evaluated and resolved by an Ultra Dynamics' representative.

The POC for all warranty claims is:

FBM Babcock Marine Ltd  
BEB Service Department  
St. Cross Business Park  
Monks Brook, Newport  
Isle of Wight, P030 5BF  
United Kingdom  
Phone: +44(0) 1983 825700  
Fax: +44(0) 1983 824180  
Email: BEBFBM@babcock.co.uk  
Website: www.fbmuk.com

### NOMENCLATURE CROSS-REFERENCE LIST

Refer to the glossary in the back of this manual for a list of the approved nomenclature appearing in this TM and common unofficial nomenclature. A list of nautical terminology is also provided.

### LIST OF ABBREVIATIONS/ACRONYMS

For a list of standard abbreviations, refer to ASME Y14.38.

### QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this manual. If quality of material requirements are not stated in this manual, the material must meet the requirements of the drawings, standards, specifications, or approved Engineering Change Proposals (ECP) applicable to the subject equipment.

### SAFETY, CARE, AND HANDLING

Observe all warnings, cautions, and notes prior to operating and servicing equipment. If uncertain how to perform any operator's procedure, ask your supervisor for assistance.

### METRIC SYSTEM

Equipment data is presented in U.S. standard measurements followed by metric equivalents. The BEB requires the use of both U.S. standard and metric tools.

END OF WORK PACKAGE

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## GENERAL INFORMATION

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

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## EQUIPMENT DESCRIPTION AND DATA

### CAPABILITIES AND FEATURES

The MK II-S Bridge Erection Boat (BEB) is a 27-ft workboat, primarily used in support of government bridging operations. It is designed to provide the propulsion and maneuvering thrust to assemble both standard and improved ribbon bridges, build and maneuver rafts, and serve as a floating anchor for emplaced bridges.

The boat has subsidiary missions to support diving operations, assist in maritime construction projects, serve as troop and cargo carriers, patrol inland waters, support reconnaissance missions, and act as a safety boat.

The BEB is transported, launched, and retrieved by an M1977 Common Bridge Transporter (CBT) truck, equipped with an M14 Improved Boat Cradle (IBC). BEBs are maintainable using the personnel and equipment assigned to Multi-Role Bridge Company (MRBC) units.

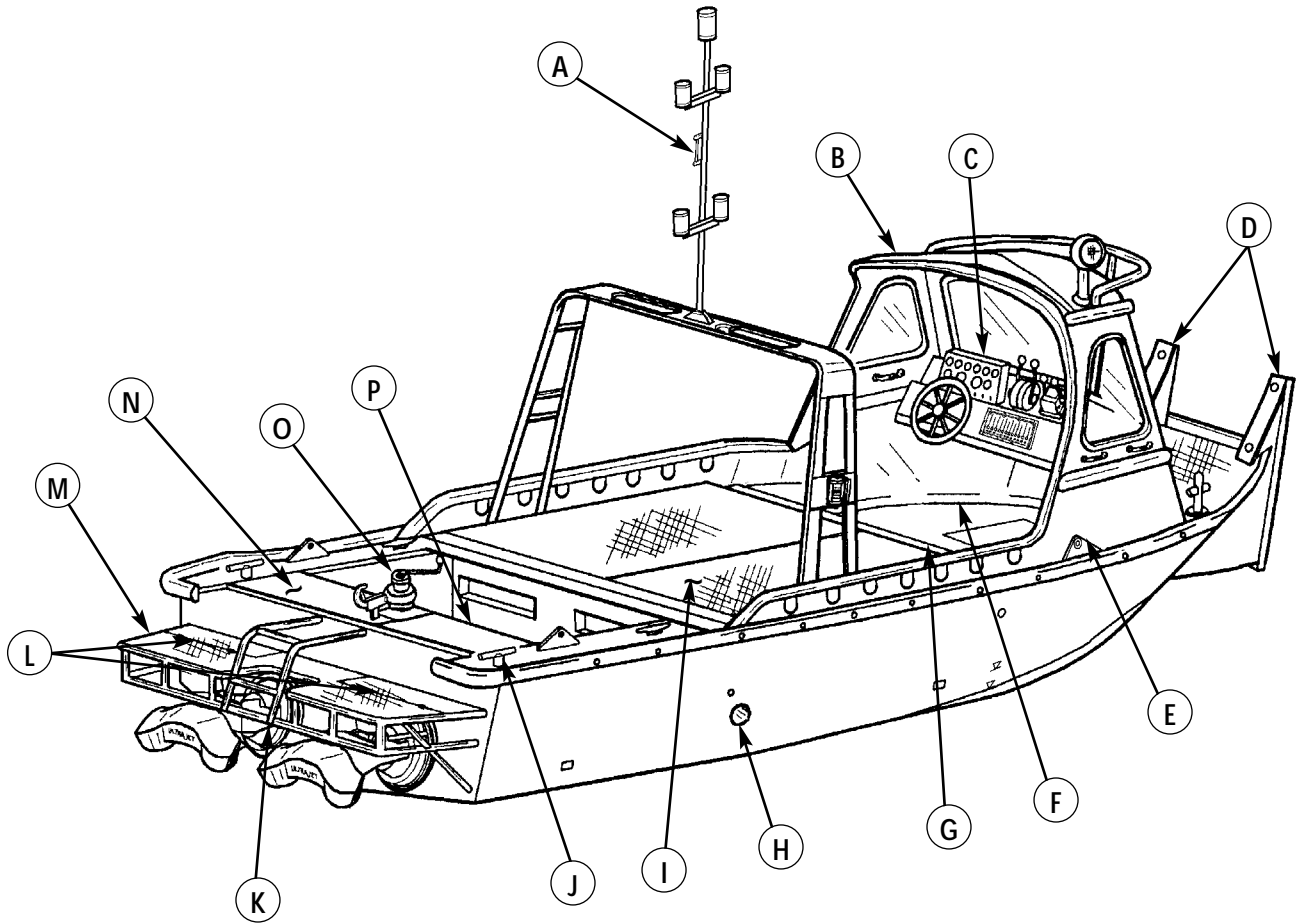
The boat is capable of rotating on its own axis at low engine speeds. It also can be operated in all weather operational conditions. All MK II-S boats have a tow hook for towing, tiedowns for stationary roles, and lifting shackles for boat transport by road, rail, sea, or air.

## EQUIPMENT DESCRIPTION AND DATA (Contd)

### LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

- Ⓐ **Removable Mast** — Contains the navigation lights, towing light, and anchor light. May be lowered and/or removed from the boat when lights are not required.
- Ⓑ **Removable Cab** — Aluminum frame with windows and aluminum roof that can be attached to the boat to provide protection for the crew during bad weather. The cab has windshield wipers and an electrical connection for attaching the searchlight.
- Ⓒ **Control Console** — Contains throttle/transmission control head, scoop control head, steering wheel, emergency engine stop cables, and instrument panel with indicators required for safe operation of the boat.
- Ⓓ **Pushknees** — Provides the front of the boat with a flat vertical surface for pushing barges or maneuvering bridge components. The pushknees can be replaced.
- Ⓔ **Lifting Eyes** — Four lifting eyes used during lifting operations.
- Ⓕ **Forward Cockpit** — Operator and crew work area; contains hand-operated bilge pump, hand-held fire extinguisher, rifle mounts, hatchet, map locker, and storage locker for life preservers and other gear.
- Ⓖ **Battery Hatch** — Allows access to the battery compartment.
- Ⓗ **Exhaust Ports** — Engine exhaust outlet location.
- Ⓘ **Engine Hatches** — Allow access to the engine compartment.
- Ⓙ **Bollards (Mooring Bits) (two per side)** — Secure the boat to other objects.
- Ⓚ **Ladder** — Located aft of the boat; assists crew in and out of boat while in water.
- Ⓛ **Diving Platform Flaps** — Allows access to the hydrojet reverse deflectors, hoses, and aft hull to inspect for damage.
- Ⓜ **Dive Platform** — Located aft of the boat; assists crew during diving exercises.
- Ⓝ **Hydrojet Hatches** — Allow access to the hydrojets, hydraulic steering control, scoop control cables, tie rod, aft bilge pump, and raw water strainers.
- Ⓞ **Capstan and Towing Hook** — Provides the boat with a safe towing capability of 4,000 lb. The tow hook has a quick-release mechanism for disengaging a dangerous load.
- Ⓟ **Aft Cockpit** — Crew work area.

EQUIPMENT DESCRIPTION AND DATA (Contd)

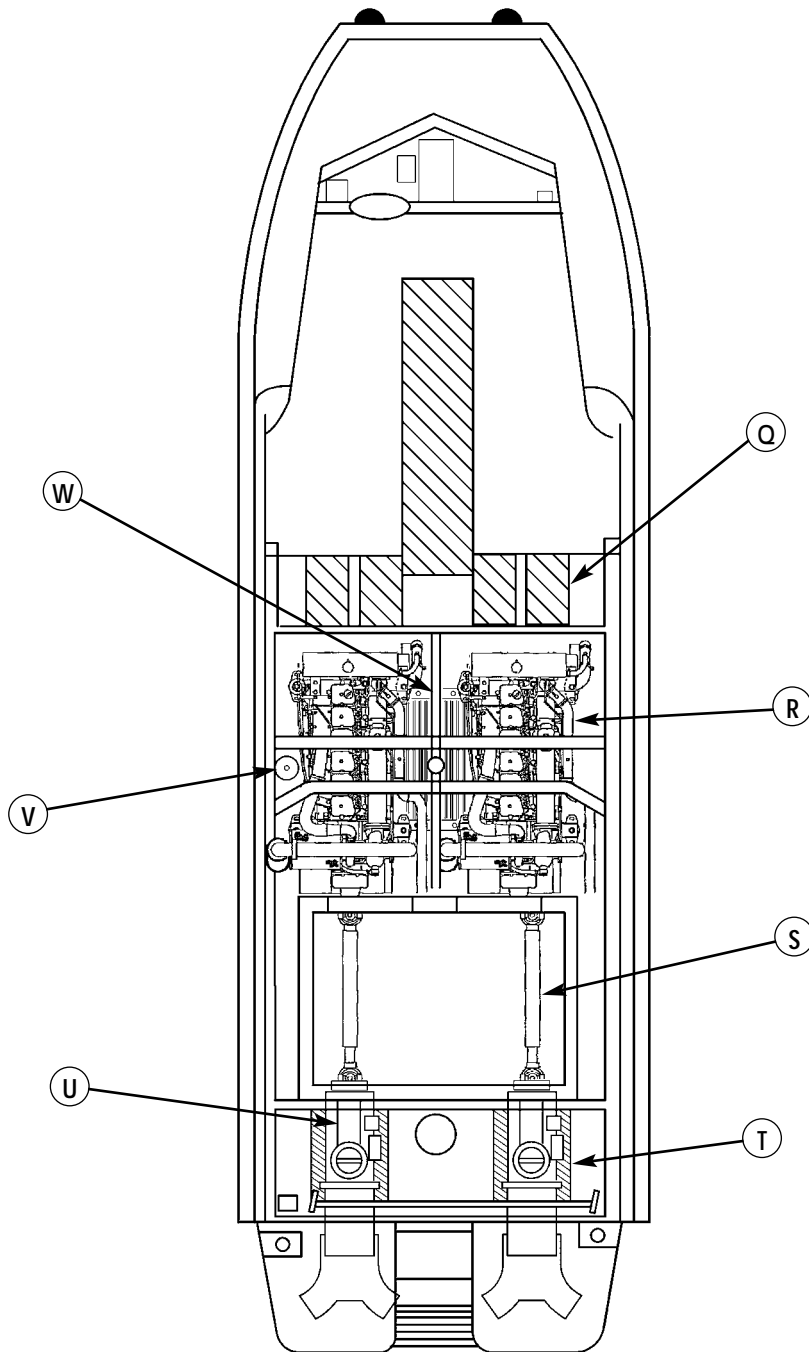


## EQUIPMENT DESCRIPTION AND DATA (Contd)

### LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

- Ⓚ **Battery Compartment** — Consists of three subcompartments as follows:
- Port side compartment: Consists of two batteries, lubricity filter, inspection light, master fuse link, blocking diode, and utility connection plug for the FM200 fire system alarm or inspection light.
- Center compartment: Consists of fuel tank, fuel filler cap, two fuel water separators, port and starboard fuel shut-off valves, and master fuel shut-off valve located below and between the port and starboard fuel shut-off valves.
- Starboard side compartment: Consists of master battery switch, two batteries, lubricity filter, blocking diode, emergency link solenoid, master fuse link, and a NATO slave receptacle that provides/receives electrical power for starting the boat when batteries are not charged.
- Ⓡ **Engine Compartment** — Consists of two diesel engines and transmissions for port side and starboard side. Also contains a fire extinguisher system, keel cooler plumbing, exhaust hoses and tubes, bilge pump, and coolant reservoirs.
- Ⓢ **Drive Shafts** — Located under the aft cockpit, the two drive shafts transfer power from the transmission to the hydrojets.
- Ⓣ **Hydrojet Inlet Grills** — Located near the rear and under boat, the hydrojet inlet grills provide a screen system to help protect the hydrojets from ingesting objects that may cause damage.
- Ⓤ **Hydrojets** — Consist of two hydrojet propulsion units with directional nozzles and scoops. The propulsion units propel and steer the boat. The hydrojets supply a raw water cooling system for the boat.
- Ⓥ **Fire Extinguisher System** — The fire extinguisher bottle is located along the port side hull wall, centered under the port side engine compartment hatch cover. If a fire is detected, the contents of the fire bottle will automatically be dispersed.
- Ⓦ **Keel Coolers** — Centrally located underneath the boat, the keel coolers are part of a closed-loop cooling system that cools the engines, engine oil, exhaust manifolds, and turbocharger. The keel coolers have a protective grill mounted underneath to help prevent damage.

EQUIPMENT DESCRIPTION AND DATA (Contd)



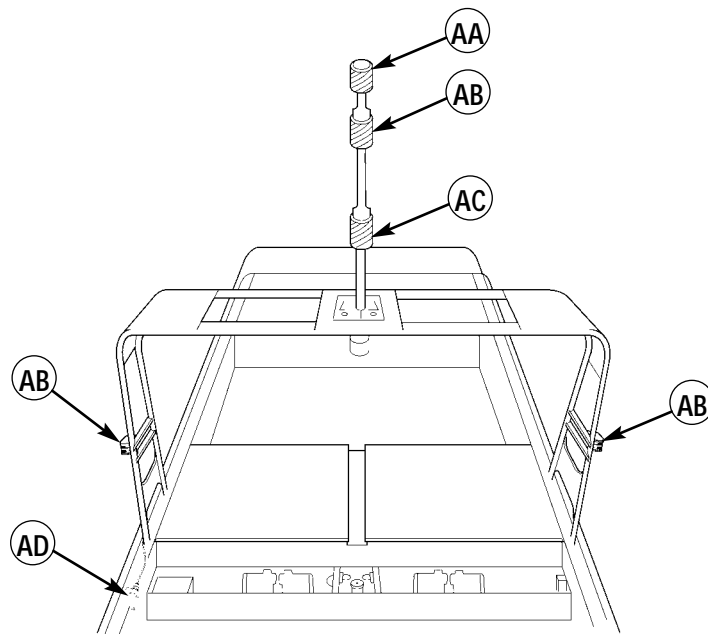
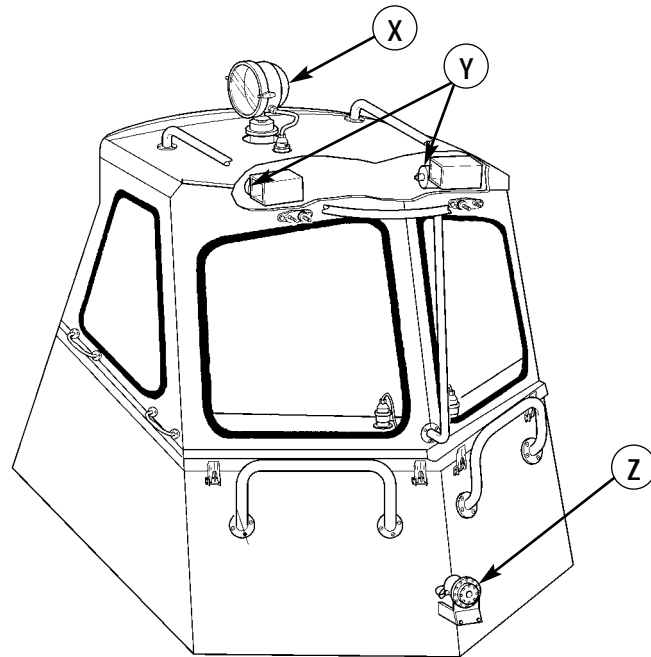
## EQUIPMENT DESCRIPTION AND DATA (Contd)

### LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

- ⓧ **Searchlight** — Located on either the top of the cab (as shown) or on the console when the cab is removed. The searchlight can be used as both a floodlight and spotlight.
- Ⓨ **Wiper Motors** — Located inside cab, above the windshield. The motors are connected to wiper blades that remove water from the windshield.
- Ⓩ **Horn** — Mounted on the front of the forward cockpit. Pressing the horn button on the auxiliary control panel sounds the horn.
- Ⓐ **Anchoring Light** — White light located on top of the mast; used when boat is anchored.
- Ⓑ **Navigation Lights** — Located on both sides of the mast and below the anchoring light. The starboard side light is green, the port side light is red, and the center light is white.
- Ⓒ **Towing Lights** — There are two towing lights, forward and aft. The rear towing light is yellow and the forward light is white.
- Ⓓ **Mast Receptacle and Mast Plug** — Located on starboard side, adjacent to the battery compartment. The mast receptacle supplies power to all mast lights.



EQUIPMENT DESCRIPTION AND DATA (Contd)

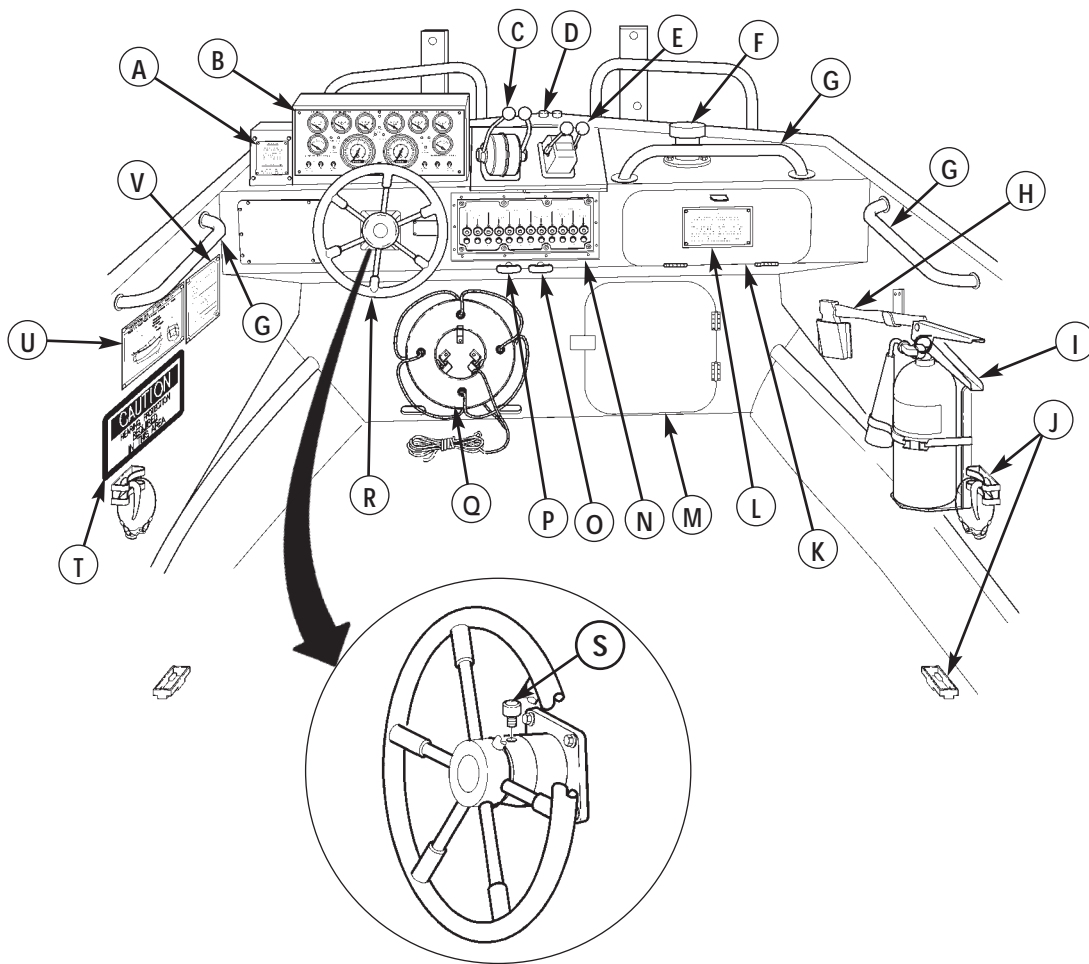


## EQUIPMENT DESCRIPTION AND DATA (Contd)

### FORWARD COMPONENTS LOCATIONS

- Ⓐ **Daily Routine Plate** — This data plate reminds boat operators of the tasks they must perform before boat operation.
- Ⓑ **Engine Instrument Panel** — Contains instrument gauges, switches, and indicator lights that are used during boat operation.
- Ⓒ **Engine Throttle/Transmission Control Head** — These levers control engine speed and transmission direction.
- Ⓓ **Cab Electrical Connectors** — Provide electrical connection for cab windshield wipers and alternate searchlight location.
- Ⓔ **Scoop Control Head** — These levers control the hydrojet scoops.
- Ⓕ **Searchlight Internal Mount** — Located to right of the scoop control levers. Provides mounting for searchlight when cab is removed.
- Ⓖ **Handrails** — There are three handrails located inside cab. Handrails function as safety rails for crew.
- Ⓗ **Hatchet** — Used for cutting lines. Emergency use only.
- Ⓘ **Hand-Held Fire Extinguisher** — Used for fire emergencies.
- Ⓙ **Rifle Mounts** — Used for safe, accessible stowage for two rifles.
- Ⓚ **Map Locker** — Lockable stowage compartment for technical manuals and other equipment.
- Ⓛ **Discharge of Oil Prohibited Plate** — Indicates to operator that discharge of oil is prohibited.
- Ⓜ **Stowage Locker** — Lockable stowage compartment for hand-operated bilge pump, life jackets, and other equipment.
- Ⓝ **Auxiliary Switch Panel** — Operates auxiliary items such as windshield wipers, horn, bilge pumps, and lights.
- Ⓞ **Engine Stop Control, Starboard** — For emergency only, stops the starboard side engine when pulled out.
- Ⓟ **Engine Stop Control, Port** — For emergency only, stops the port side engine when pulled out.
- Ⓠ **Ring Buoy** — For emergency use.
- Ⓡ **Steering Wheel** — Used to steer boat.
- Ⓢ **Steering Pump Fill Cap/Breather**—Provides a means for the operator to check/add hydraulic oil level in hydraulic steering system. The component is located on steering column directly behind steering wheel.
- Ⓣ **Caution Plate** — Indicates to operator that hearing protection is required during operation.
- Ⓤ **Transportation Plate** — Indicates specifics for transportation information.
- Ⓥ **Data Plate** — Contains boat information, specific to each boat.

EQUIPMENT DESCRIPTION AND DATA (Contd)



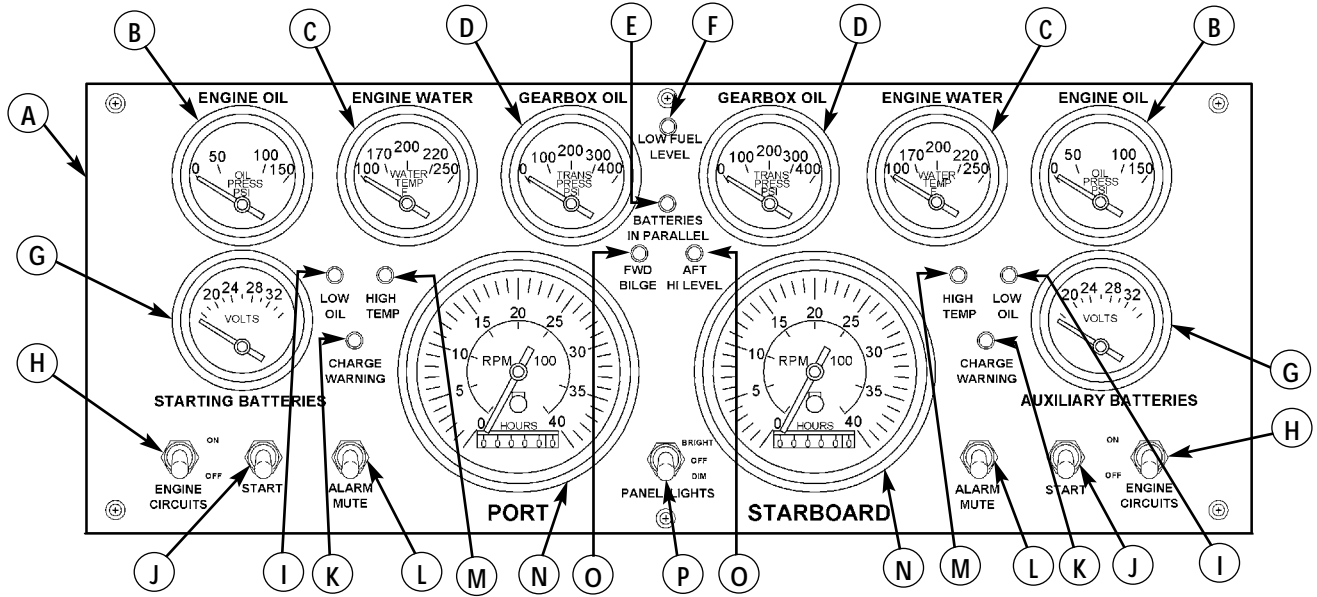
## EQUIPMENT DESCRIPTION AND DATA (Contd)

### DESCRIPTION OF INSTRUMENT PANEL

- Ⓐ **Instrument Panel** — Contains gauges, switches, and indicator lights used during boat operation.
- Ⓑ **Engine Oil Pressure Gauges** — Engine oil pressure gauges range between 0–150 psi. The gauges allow operator to view oil pressure during operation.
- Ⓒ **Engine Coolant Temp Gauges** — Engine water temperature gauges range between 0–250 °F. The gauges allow operator to view coolant temperature during operation.
- Ⓓ **Transmission Oil Pressure Gauges** — Transmission oil pressure gauges range between 0–400 psi. The gauges allow operator to view transmission oil pressure during operation.
- Ⓔ **Batteries In Parallel Light** — Batteries in parallel light illuminates when emergency link button is depressed and all four batteries are being used in parallel for boat operations.
- Ⓕ **Low Fuel Level Light** — Illuminates when there are 12 gallons (45 liters) or less fuel remaining in the fuel tank.
- Ⓖ **Auxiliary and Starting Batteries Volt Gauges** — Battery volt gauges range between 18–34 volts. The gauges allow operator to view voltage for starting and auxiliary batteries.
- Ⓗ **Engine Circuit Switches** — Control circuit power to the instrument panel for port and starboard engine operation.
- Ⓘ **Low Oil Lights** — Illuminate when low engine oil pressure is detected.
- Ⓙ **Starter Switches** — When positioned up, engage the starter to start the engine. Once released, disengages starter.
- Ⓚ **Charge Warning Lights** — Illuminate if the voltage generated by the alternator is more or less than the battery.
- Ⓛ **Alarm Mute Switches** — Allow operator to turn off audible alarms.
- Ⓜ **High Temp Lights** — Illuminate if engine coolant temperature reaches above 210 °F (99 °C).
- Ⓝ **Starboard and Port Tachometer** — The tachometer displays the current speed of the engine crankshaft in revolutions per minute (rpm). The tachometer includes an hour indicator displaying hours of engine use.
- Ⓞ **Aft and Fwd Bilge Hi Level Lights** — Illuminate to inform operator that water buildup is present at the aft and forward bilge areas.
- Ⓟ **Panel Lights Switch** — Controls gauge illumination within the instrument panel.

### EQUIPMENT DESCRIPTION AND DATA (Contd)

#### DESCRIPTION OF INSTRUMENT PANEL (Contd)



## EQUIPMENT DESCRIPTION AND DATA (Contd)

### DESCRIPTION OF CONTROLS

Ⓐ **Engine Throttle/Transmission Control Levers** — The levers have dual positions and functions:

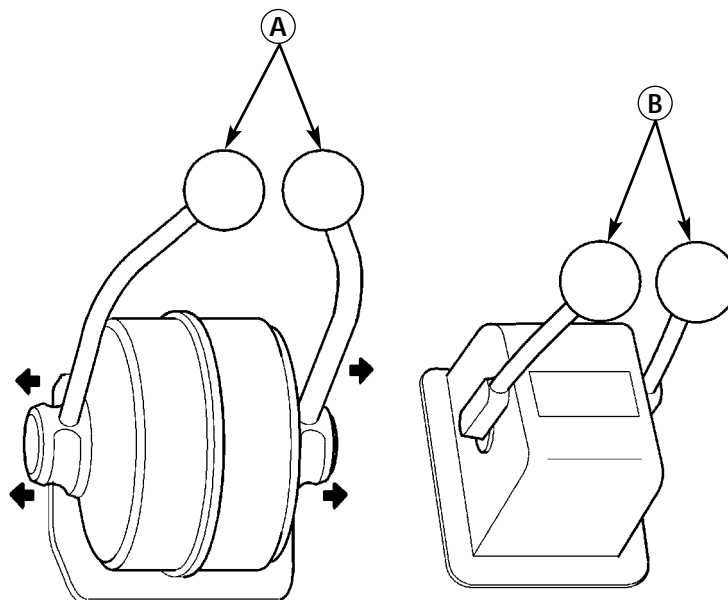
**NOTE**

Control lever must be in neutral position to disengage. This requires manual effort to disengage.

- Levers engaged: Engage transmission and throttle control simultaneously (normal operating position).
- Levers disengaged: Disengage transmission and allows throttle control only (maintenance and start-up only).

The left lever controls the port engine and transmission, and the right lever controls the starboard engine and transmission. This allows the operator to control the rpm of each engine and forward speed. Reverse direction of the throttle/transmission control levers is used to clean debris from the hydrojet intake grills.

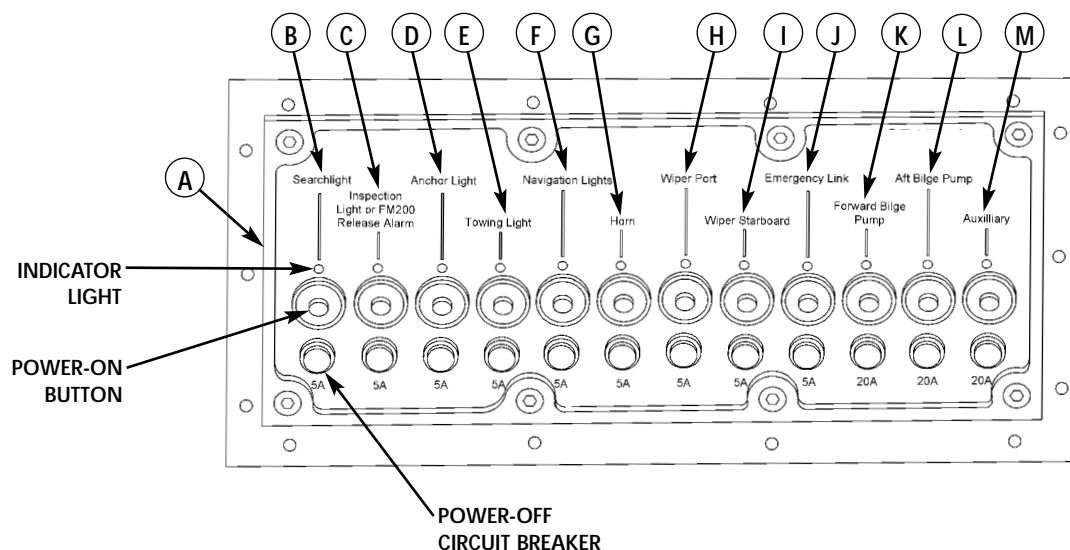
Ⓑ **Scoop Control Levers** — The left lever controls the port hydrojet scoop, and the right lever controls the starboard hydrojet scoop. Also used to assist in turning boat and controlling speed.



## EQUIPMENT DESCRIPTION AND DATA (Contd)

## DESCRIPTION OF AUXILIARY SWITCH PANEL

- Ⓐ **Auxiliary Switch Panel** — Located on the control panel, the auxiliary switch panel contains twelve pushbuttons, circuit breakers, and indicator lights. This panel incorporates ON/OFF buttons and indicator lights to confirm that controls are either on or off. The large buttons are used to turn components on; the small buttons are used to turn components off.
- Ⓑ **Searchlight Button** — The searchlight is used for nighttime illumination viewing.
- Ⓒ **Inspection Light or FM200 Release Alarm** — The inspection light is used for locating objects within the boat. The FM200 release alarm indicates that a fire is detected in the engine compartment and the extinguisher has released its contents.
- Ⓓ **Anchor Light Button** — Allows for nighttime illumination during boat anchoring.
- Ⓔ **Towing Light Button** — Used for nighttime illumination during towing operations.
- Ⓕ **Navigation Light Button** — Used for nighttime operations.
- Ⓖ **Horn Button** — Used for making an audible sound for identification purposes.
- Ⓗ **Wiper Port Button** — Used for operation of the port side windshield wiper.
- Ⓘ **Wiper Starboard Button** — Used for operation of the starboard side windshield wiper.
- Ⓙ **Emergency Link Button** — Links batteries in parallel when low voltage occurs.
- Ⓚ **Forward Bilge Pump Button** — Used for operation of forward bilge pump to clear boat of excess water toward forward compartment.
- Ⓛ **Aft Bilge Pump Button** — Used for operation of aft bilge pump to clear boat of excess water toward aft compartment.
- Ⓜ **Auxiliary Button** — Currently not used.



## EQUIPMENT DESCRIPTION AND DATA (Contd)

## EQUIPMENT DATA

**Operating Weight, w/ Crew, Equipment, and Fuel**

Gross Weight . . . . .	9,800 lb (4,000 kg)
Length . . . . .	322.8 in. (820 cm)
Beam . . . . .	98.0 in. (249 cm)

**Height**

Without cab or mast . . . . .	77.9 in. (198 cm)
With cab . . . . .	109.8 in. (279 cm)
With cab and mast . . . . .	177.9 in. (452 cm)

**Draft**

With crew, equipment, and fuel . . . . .	22.0 in. (56 cm)
Fully loaded . . . . .	26.0 in. (66 cm)

**Transported, w/ Cradle**

Weight . . . . .	10,800 lb (4,909 kg)
Length . . . . .	326.4 in. (826 cm)
Height w/o cab . . . . .	96.3 in. (244 cm)
Width . . . . .	116.3 in. (294 cm)
Shipping weight . . . . .	11,100 lb (2,448 kg)

**Performance**

Speed, w/ crew, equipment, and fuel . . . . .	30.0 mph (48.3 km/hr)
Speed, fully loaded . . . . .	29.0 mph (46.6 km/hr)
Maximum load carrying capacity . . . . .	4,000 lb (1,814 kg)
Towing hook . . . . .	4,400 lb (2,000 kg)

**Turning Radius (with Scoops at Maximum Thrust)**

Full speed ahead . . . . .	2 boat lengths in 15 seconds
Full speed astern . . . . .	2 boat lengths in 25 seconds
One scoop forward and one scoop in reverse . . . . .	Standing circle

**Fuel Consumption (Approximate)**

1750 rpm . . . . .	2.8 gal./hr (11 liters/hr)
2000 rpm . . . . .	4.2 gal./hr (16 liters/hr)
2250 rpm . . . . .	6.0 gal./hr (23 liters/hr)
2450 rpm . . . . .	10.8 gal./hr (40 liters/hr)
Maximum forward thrust . . . . .	3,600 lb (16 kN)
Maximum reverse thrust . . . . .	2,200 lb (9.8 kN)
Maximum safe engine operating speed . . . . .	2,600 rpm

(No load governing setting)

<b>Fuel System Capacity.</b> . . . . .	75 gal. (280 l)
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**Coolant System Capacity**

Engine only . . . . .	13.6 qt (12.0 l)
Engine with heat exchanger . . . . .	21.6 qt (20.6 l)
Engine, heat exchanger, and keel cooler . . . . .	28 qt (26.5 l)



**EQUIPMENT DESCRIPTION AND DATA (Contd)**

**EQUIPMENT DATA (Contd)**

**Engine Oil Capacity**

Oil pan capacity low/high.....	13–15 qt (12.3–14.1 l)
Total system capacity.....	16 qt (15 l)

**Engine/Instrument Panel Gauge Readings**

Type.....	6-cylinder inline
Bore and Stroke.....	4.02 x 4.72 in. (102 x 120 mm)
Displacement.....	359 cu in. (5.9 l)
Lubricant.....	15W40

**Oil Pressure:**

@ Normal operating range.....	30–65 psi (207–448 kPa)
Minimum oil pressure.....	10 psi (69 kPa)

**Tachometer**

Idle speed.....	800 rpm
Operating speed.....	1,000 to 2,200 rpm
Maximum speed (under load).....	2,600 rpm

**Engine Oil Pressure Gauge**

Idle speed.....	20 to 30 lb/in. <sup>2</sup> (1.4 to 2.1 kg/cm <sup>2</sup> )
Operating speed.....	40 lb/in. <sup>2</sup> or above (2.8 kg/cm <sup>2</sup> )

**Coolant Temperature Gauge (Fresh Water System)**

Normal below.....	190 °F (88 °C)
Overheating above.....	210 °F (99 °C)

**NOTE**

The following readings are most reliable if the batteries have stood for at least 8 hours without charge or discharge.

**Battery Condition Meter (Engine Not Running, No Electrical Load)**

Battery fully charged.....	25.4 volts or above
Battery half charged.....	24.6 to 25.4 volts
Battery fully discharged.....	23.7 volts or below

**Battery Condition Meter (Engine Running at about 1,500 rpm and No Electrical Load)**

Battery near to fully charged.....	27.0 to 28.0 volts
Battery partially discharged.....	24.0 to 27.0 volts
Battery charge low.....	Below 24.0 volts
Battery condition meter (normal operation).....	Above 24 volts
	Alternator output matching or greater than electrical load
Below 24 volts.....	Load in excess of alternator output



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# GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

## BRIDGE ERECTION BOAT (BEB) MK II-S

NSN 1940-01-526-0770 P/N 12492423

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### THEORY OF OPERATION

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#### GENERAL

This section explains how components of the BEB work. Functional descriptions of components and their operation are covered in the following paragraphs.

#### FUNCTION OF THE PROPULSION SYSTEM

The propulsion system creates thrust by drawing in water through inlet grills on the underside of the hull and expelling it through nozzles aft of the boat. Thrust is generated by two hydrojet units mounted side-by-side on the transom. The hydrojet contains a large impeller that functions as a high velocity water pump, and the force with which the water is expelled depends on engine speed. Each hydrojet is powered by a diesel engine in conjunction with a transmission. The transmission has a neutral position, one forward and one reverse gear, and transmits power from the engine to the hydrojet through a driveshaft. Thrust from both hydrojets is directed by moving the position of the steering deflectors and reverse deflector scoops.

#### FUNCTION OF THE STEERING SYSTEM

The scoop is a moveable metal shield that deflects the flow of water from the nozzles. Each scoop is controlled independently by a separate control lever. In the neutral position, the scoops direct the thrust straight down. To propel the boat forward the scoops are raised to allow thrust aft. To reverse the boat, the scoops are lowered to deflect thrust toward the bow. At forward speeds, steering is accomplished by controlling the position of the steering deflectors on each hydrojet by way of the boat's steering wheel, or by use of both scoop controls. When stopped, or at low speeds, steering is made possible by placing one scoop in the reverse position, the other in the forward position, and by using the steering wheel. In addition, steering is affected by the amount of thrust generated at a given engine speed.

#### FUNCTION OF ENGINE COOLING SYSTEM

The engine cooling system is identical on both port and starboard engines. Coolant is pumped through the primary cooling system using a water pump. The water pump draws coolant from three locations: water pump supply hose attached to keel cooler, exhaust manifold cooler return hose, and reservoir tank draw hose.

Coolant is pumped through the engine block and routed to the following locations:

- a. Through thermostat housing, keel cooler supply hose, and back to keel cooler.
- b. Through exhaust manifold, exhaust manifold cooler return hose, and back to water pump.
- c. Through engine block air bleed return line and back to coolant reservoir tank.
- d. Through exhaust manifold air bleed return line and back to coolant reservoir tank.
- e. Through turbocharger supply line, turbocharger, turbocharger air bleed return hose, and back to coolant reservoir tank.
- f. Through keel cooler supply hose, thermostat air bleed return hose, and back to coolant reservoir tank.

## THEORY OF OPERATION (Contd)

### FUNCTION OF RAW WATER COOLING SYSTEM

The port and starboard engines have their own separate raw water cooling systems. The raw water cooling system cools the transmission oil and exhaust pipes and allows for raw water to flush the keel cooler area.

High-pressure raw water supplied from the hydrojets circulates using two paths:

1. Path One: High pressure raw water from hydrojet is circulated through raw water strainer supply hose, into raw water strainer, raw water transmission oil cooler supply hose, transmission oil cooler, wet exhaust supply hose, and wet exhaust pipe elbow, and overboard through exhaust port.
2. Path Two: Raw water supplied from hydrojet is circulated through keel cooler raw water flush hose, into keel cooler connection, and out to raw water underneath hull. This prevents still water heat-up near keel cooler.

### FUNCTION OF THE FUEL SYSTEM

Each engine has its own fuel system except that fuel is drawn from a common fuel tank. The fuel systems are identical. Fuel gravity feeds from fuel tank to main shut-off valve. From this point, fuel is drawn through the system using the fuel pump. Fuel splits into two separate fuel lines: one for port and the other for starboard.

Once fuel has reached the starboard fuel shut-off valve and valve is open, fuel flows to fuel water separator, lubricity fuel filter, fuel pump, fuel filter, fuel injector pump, fuel high-pressure supply lines, and fuel injectors. Excess fuel not used by fuel injectors will flow into the low-pressure fuel return line and back into fuel tank. The fuel tank vent line is routed through port side battery compartment and upward along the port side of the boat.

### FUNCTION OF THE AIR INTAKE AND EXHAUST SYSTEM

Each engine is equipped with a breathing tube located on the port side of the engine block. A flexible tube from each engine is routed to a filter bracket and is connected to the breather filter. Noncondensed vapors are vented into the engine compartment.

The port and the starboard engines have individual air intake exhaust systems. The systems are identical except that the port engine discharges exhaust gases to port side and the starboard engine discharges exhaust gases to starboard side. Both port and starboard exhaust systems are cooled by raw water from the hydrojets.

### FUNCTION OF THE FIRE SUPPRESSION SYSTEM

The engine compartment fire suppression system consists of a single fire extinguisher automatically activated when the temperature sensor on the top of the bottle reaches 175° F (79.4° C). During discharge, shut down engines as soon as possible so extinguishing agent (FM200) can flood engine compartment.

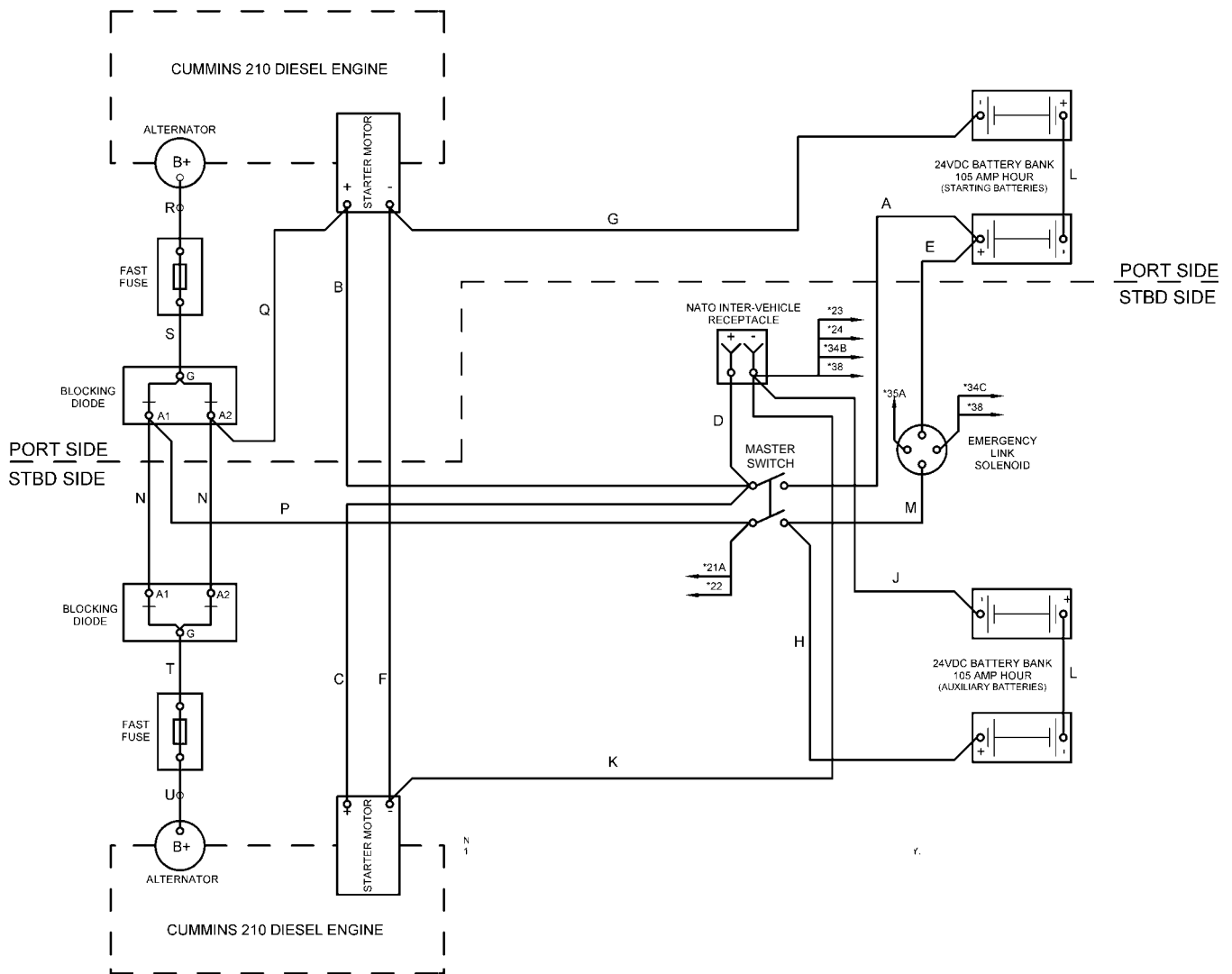
FM200 (CF<sub>3</sub>CHF<sub>2</sub>) extinguishing agent requires no cleanup.

If fire extinguisher has been discharged, report fire extinguisher discharge to supervisor.

**THEORY OF OPERATION (Contd)**

**FUNCTION OF THE ELECTRICAL SYSTEM**

The boat electrical system is 24 VDC. Two 12-volt batteries are connected in series. There are two sets of batteries for power. Each engine has an alternator for charging the batteries. The circuits are arranged so that either alternator charges both sets of batteries automatically. Power is drawn from the batteries by two separate circuits. The batteries on the port side power the starter motor of both engines and the port engine instruments. The batteries on the starboard side power the starboard engine instruments and the auxiliary circuits. If the emergency link pushbutton located on the auxiliary switch panel is depressed, both battery banks are connected in parallel.



END OF WORK PACKAGE



# CHAPTER 2

## FIELD TROUBLESHOOTING BRIDGE ERECTION BOAT (BEB) MK II-S

Work Package Title	WP Sequence No.
Introduction to Troubleshooting . . . . .	WP 0004 00
Troubleshooting Index . . . . .	WP 0005 00
Mechanical Systems Troubleshooting . . . . .	WP 0006 00
Electrical Systems Troubleshooting . . . . .	WP 0007 00
Steering System Troubleshooting . . . . .	WP 0008 00





# TROUBLESHOOTING

## BRIDGE ERECTION BOAT (BEB)

### MK II-S

NSN 1940-01-526-0770 P/N 12492423

## INTRODUCTION TO TROUBLESHOOTING

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### **WARNING**

Failure to perform preliminary inspection on a deadlined boat may result in injury to personnel and/or damage to equipment.

### **NOTE**

If corrective action provided does not correct malfunction, notify your supervisor.

This chapter provides the necessary troubleshooting procedures to diagnose mechanical, electrical, and hydraulic malfunctions for the MK II-S Bridge Erection Boat (BEB). The troubleshooting procedures may not correct all boat malfunctions encountered. However, the procedures provide a step-by-step approach that directs tests and inspections toward the source of a problem.

Use the Troubleshooting Index Work Package (WP 0005 00) to identify malfunctions and locate the troubleshooting procedure needed to diagnose a problem. This manual lists the most common malfunctions that may occur. If a malfunction occurs that is not listed in the Troubleshooting Index, WP 0005 00, notify your supervisor.

Each troubleshooting procedure lists a description of the malfunction followed by a step or sequence of steps to check the operation of a component. Then, in the order of probability, substeps instruct the user to perform a check, inspection, or test to determine if a condition exists. Each substep includes the corrective action required to correct the malfunction.

Prior to performing any troubleshooting procedure observe the following recommendations:

1. Check the Equipment Inspection and Maintenance Worksheet, DA Form 2404, and Maintenance Request Form, DA Form 2407 (DA Form 5988-E and DA Form 5990-E Automated) to find out why the equipment has been deadlined. Note the operator's written description of the problem and, whenever possible, discuss the problem with the operator. This can save time and effort in diagnosing the problem.
2. Do not assume the operator's diagnosis is correct, even if it sounds accurate. Always perform the appropriate troubleshooting procedure(s) to verify the cause of the problem. Performing a corrective action without proof of a fault wastes time and increases the maintenance of the equipment.
3. First isolate the system where the malfunction occurs, then locate the component and perform the corrective action in the ordered listed.
4. Use approved mechanical, electrical, and hydraulic system repair practices provided in the technical manuals, field manuals, and technical bulletins listed in WP 0168 00 of this manual.
5. Use approved special tools and test equipment to determine the known parameters for isolating a fault.

Fill out an Exchange Tag, DA Form 2402, and attach it to any component that will be exchanged as a core and turned in for repair or rebuilding at the field or sustainment maintenance level.



**FIELD MAINTENANCE INSTRUCTIONS**

**BRIDGE ERECTION BOAT (BEB)**

**MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**TROUBLESHOOTING INDEX**

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WP-PAGE
<b>ENGINE</b>		
1.	Engine will not crank . . . . .	0006 00-1
2.	Engine cranks but fails to start . . . . .	0006 00-2
3.	Engine starts but will not keep running . . . . .	0006 00-2
4.	Engine will not shut off. . . . .	0006 00-2
5.	Engine idles rough when warm . . . . .	0006 00-2
6.	Engine oil pressure low. . . . .	0006 00-3
7.	Engine oil pressure low (Audible alarm comes on) (Low gauge reading) . . . . .	0006 00-3
8.	Sudden loss of oil pressure . . . . .	0006 00-3
9.	Engine coolant temperature above normal . . . . .	0006 00-4
10.	Engine has excessive exhaust smoke under load . . . . .	0006 00-4
11.	Engine will not reach rpm with no load . . . . .	0006 00-4
12.	Engine has fuel knocks . . . . .	0006 00-5
13.	Engine alternator not charging . . . . .	0006 00-5
14.	Engine overheats (Engine audible alarm activates) . . . . .	0006 00-5
<b>TRANSMISSION</b>		
1.	Low main oil pressure . . . . .	0006 00-6
2.	No oil pressure or erratic low pressure at control valve . . . . .	0006 00-6
3.	High temperature . . . . .	0006 00-6
4.	Excessive noise . . . . .	0006 00-6
5.	Low lube oil pressure . . . . .	0006 00-6
6.	High lube oil pressure . . . . .	0006 00-6

**TROUBLESHOOTING INDEX (Contd)**

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WP-PAGE
<b>HYDROJET</b>		
1.	Excessive vibration . . . . .	0006 00-7
2.	Noisy hydrojet with aerated water at exit nozzle . . . . .	0006 00-7
3.	Loss of thrust from hydrojet . . . . .	0006 00-7
4.	Excessive engine speed . . . . .	0006 00-7
5.	Excessive operating loads for steering . . . . .	0006 00-7
6.	Reverse deflector inoperative . . . . .	0006 00-8
7.	Noisy hydrojet with no loss of power or speed . . . . .	0006 00-8
8.	Evidence of water mixing with grease in bearing housing . . . . .	0006 00-8
<b>SCUPPERS</b>		
1.	Scuppers do not drain water from boat . . . . .	0006 00-8
<b>WINDSHIELD WIPERS</b>		
1.	Windshield wipers operate but do not clean windshield . . . . .	0006 00-8
<b>ELECTRICAL</b>		
1.	Electrical system inoperative . . . . .	0007 00-1
2.	One or both warning lights do not come on (Master switch on) . . . . .	0007 00-2
3.	Individual lights inoperative . . . . .	0007 00-2
4.	Instrument panel gauge inoperative (Water temperature and oil pressure) . . . . .	0007 00-2
5.	Water temperature gauge inoperative . . . . .	0007 00-2
6.	Oil pressure gauge inoperative . . . . .	0007 00-3
7.	Horn inoperative . . . . .	0007 00-3
8.	Windshield wipers inoperative . . . . .	0007 00-3
9.	Electric bilge pump does not discharge water (Forward or aft) . . . . .	0007 00-4
<b>STEERING</b>		
1.	Steering system out of alignment . . . . .	0008 00-1

## FIELD TROUBLESHOOTING

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MECHANICAL SYSTEMS TROUBLESHOOTING

#### **WARNING**

Eye protection is required when performing fuel system troubleshooting checks. Failure to wear eye protection may result in injury to personnel.

Fuel is extremely flammable and explosive. Do not perform fuel system checks and services near open flames or sparks and while smoking. Always keep a fire extinguisher nearby. Burning fuel or fuel that explodes may cause injury or death to personnel.

Disconnect battery ground cable (WP 0053 00) prior to performing engine troubleshooting procedures. Failure to comply may cause injury to personnel.

#### **NOTE**

Prior to performing any mechanical troubleshooting, refer to General Troubleshooting instructions in Introduction to Troubleshooting, (WP 0004 00).

**Table 1. Engine Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ENGINE WILL NOT CRANK	<ol style="list-style-type: none"> <li>1. Check position of master switch.</li> <li>2. Check starting battery meter reading.</li> <li>3. Check battery connections and cables.</li> <li>4. Check circuit breaker.</li> <li>5. Perform continuity test on master switch.</li> <li>6. Check starter and relay for malfunctions and connections. Perform continuity test on engine starter switch.</li> <li>7. Inspect flywheel (WP 0159 00).</li> </ol>	<p>Set master switch to ON position.</p> <ol style="list-style-type: none"> <li>1. If meter displays less than 24 volts, check battery (TM 9-6140-200-14).</li> <li>2. If battery voltage is less than 24 volts, charge battery (TM 9-6140-200-14).</li> <li>3. If battery will not hold a charge, replace battery (WP 0055 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Clean cable ends and tighten connections (WP 0054 00).</li> <li>2. Replace defective cables (WP 0054 00).</li> </ol> <p>Reset circuit breaker (TM 5-1940-322-10).</p> <p>If master switch is defective, replace (WP 0052 00).</p> <p>If starter or relay is defective, replace (WP 0098 00 and WP 0099 00).</p> <p>If starter switch is defective, replace (WP 0041 00).</p> <p>If flywheel is damaged, replace (WP 0157 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Engine Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>2. ENGINE CRANKS BUT FAILS TO START</b>	<ol style="list-style-type: none"> <li>1. Check position of engine control stop handle and cable.</li> <li>2. Check fuel level in supply tank.</li> <li>3. Check for fuel at engine (ensure fuel is at aft injector).</li> <li>4. Check air cleaner for restrictions.</li> <li>5. Check fuel for contamination.</li> <li>6. Check for continuity to fuel shut-off solenoid.</li> <li>7. Check for malfunctioning fuel lift pump or fuel injection pump.</li> </ol>	<p>Push in engine control stop handle and ensure that cable is not broken and is functioning properly at fuel injection pump (WP 0032 00).</p> <ol style="list-style-type: none"> <li>1. Fill fuel supply tank if empty.</li> <li>2. Bleed the fuel system after refueling (WP 0080 00).</li> </ol> <p>Bleed fuel system if air present (WP 0080 00).</p> <p>Remove restrictions and replace air cleaner if needed (WP 0104 00).</p> <p>Drain supply tanks and clean or replace all fuel filters (WP 0073 00) and fuel water separators (WP 0076 00).</p> <ol style="list-style-type: none"> <li>1. Repair defective wires.</li> <li>2. Replace injection pump (WP 0102 00).</li> </ol> <p>Replace fuel lift pump (WP 0103 00) and fuel injection pump (WP 0102 00).</p>
<b>3. ENGINE STARTS BUT WILL NOT KEEP RUNNING</b>	<ol style="list-style-type: none"> <li>1. Check fuel level in supply tank.</li> <li>2. Check engine stop cable and lever for full forward position.</li> <li>3. Check for plugged fuel lines or filter.</li> <li>4. Check fuel system for air leaks.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill fuel supply tank if empty.</li> <li>2. Bleed fuel system after refueling (WP 0080 00).</li> </ol> <p>Move stop cable and lever to full forward position. Inspect stop cable and lever for proper operation.</p> <p>Drain fuel water traps and filters (WP 0076 00). Warm area if necessary.</p> <p>Bleed fuel system (WP 0080 00) and tighten all fittings and lines.</p>
<b>4. ENGINE WILL NOT SHUT OFF</b>	<ol style="list-style-type: none"> <li>1. Check engine circuit switch for damage.</li> <li>2. Check fuel shut-off cable and lever for full rear position.</li> <li>3. Check blocking diode for loose connections.</li> </ol>	<p>Replace engine circuit switch if damaged (WP 0041 00).</p> <p>Adjust fuel shutoff cable and lever.</p> <p>Replace blocking diode if defective (WP 0062 00).</p>
<b>5. ENGINE IDLES ROUGH WHEN WARM</b>	<ol style="list-style-type: none"> <li>1. Check high pressure fuel line for leaks.</li> <li>2. Check for air in fuel lines.</li> <li>3. Check if idle speed is low.</li> <li>4. Check for plugged fuel injector nozzles.</li> </ol>	<p>Tighten high pressure fuel lines.</p> <p>Bleed fuel system (WP 0080 00) and tighten all lines.</p> <p>Adjust idle speed to 650–750 rpm.</p> <p>Remove, clean or replace fuel injectors (WP 0100 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Engine Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. ENGINE OIL PRESSURE LOW	<ol style="list-style-type: none"> <li>1. Check oil level.</li> <li>2. Check oil pressure sending units or gauge for malfunction.</li> <li>3. Check for plugged oil filter.</li> <li>4. Check engine oil pump for malfunction.</li> </ol>	<p>Add oil to proper level (WP 0012 00).</p> <p>Replace malfunctioning oil pressure sending units or gauge (WP 0093 00).</p> <p>Replace oil filter (WP 0097 00) and change oil (WP 0012 00).</p> <p>Replace oil pump (WP 0153 00).</p>
7. ENGINE OIL PRESSURE LOW (AUDIBLE ALARM COMES ON) (LOW GAUGE READING)	<ol style="list-style-type: none"> <li>1. Turn audible alarm off.</li> <li>2. Check oil level.</li> <li>3. Check oil filter element.</li> <li>4. Check oil lines and filters.</li> <li>5. Check oil pressure sending unit.</li> <li>6. Check water in header tank for oil film as evidence of oil cooler leak.</li> <li>7. Check engine oil pump for malfunction.</li> </ol>	<p>Refer to TM 5-1940-322-10 for location of switch.</p> <p>Add oil to proper level (WP 0012 00).</p> <ol style="list-style-type: none"> <li>1. If oil filter is damaged, replace (WP 0097 00).</li> <li>2. Tighten oil filter (WP 0097 00).</li> </ol> <p>Tighten all oil line connections and filter.</p> <p>If oil pressure sending unit is defective, replace (WP 0093 00).</p> <p>If oil is present in header tank, replace lubricating oil cooler (WP 0096 00).</p> <p>Replace oil pump (WP 0153 00).</p>
8. SUDDEN LOSS OF OIL PRESSURE	<ol style="list-style-type: none"> <li>1. Check engine oil level.</li> <li>2. Check engine for oil leaks while running.</li> <li>3. Check oil pressure sending unit for malfunction.</li> <li>4. Check for oil pressure at engine block with mechanical gauge.</li> <li>5. Check engine oil pump for malfunction.</li> </ol>	<p>Add oil to proper level (WP 0012 00).</p> <ol style="list-style-type: none"> <li>1. If oil leak is present, determine location.</li> <li>2. Repair oil leak as necessary.</li> </ol> <p>If oil pressure sending unit is defective, replace (WP 0093 00).</p> <p>If no pressure present, perform Step 5.</p> <p>Replace oil pump (WP 0153 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Engine Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>9. ENGINE COOLANT TEMPERATURE ABOVE NORMAL</b>	<ol style="list-style-type: none"> <li>1. Check coolant level in reservoir and header tank.</li> <li>2. Check drivebelt tension.</li> <li>3. Check for damaged or clogged keel coolers or pipes.</li> <li>4. Check thermostat and water pump for damage.</li> <li>5. Check keel cooler for debris.</li> </ol>	<p>If coolant is low, add coolant to proper level.</p> <ol style="list-style-type: none"> <li>1. If drivebelt is loose, adjust tension (WP 0086 00).</li> <li>2. If unable to tighten tension, replace tensioner (WP 0087 00).</li> <li>3. If drivebelt is missing, replace drivebelt (WP 0086 00).</li> </ol> <ol style="list-style-type: none"> <li>1. If clogged, clean keel cooler (TM 5-1940-322-10).</li> <li>2. If damaged, replace keel cooler (WP 0068 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Replace damaged thermostat (WP 0092 00).</li> <li>2. Replace damaged water pump (WP 0095 00).</li> </ol> <p>Flush keel cooler (TM 5-1940-322-10).</p>
<b>10. ENGINE HAS EXCESSIVE EXHAUST SMOKE</b>	<ol style="list-style-type: none"> <li>1. Check engine for normal operating temperature.</li> <li>2. Check for air filter for damage or clogging.</li> <li>3. Check for leaks between turbocharger and intake manifold.</li> <li>4. Check for worn or damaged fuel injectors.</li> <li>5. Check for malfunctioning turbocharger.</li> </ol>	<p>Replace thermostat if stuck in open position (WP 0092 00).</p> <ol style="list-style-type: none"> <li>1. If dirty, clean air filter (WP 0104 00).</li> <li>2. If damaged, replace air filter (WP 0104 00).</li> </ol> <p>Repair leaks as needed (WP 0106 00).</p> <p>Replace malfunctioning fuel injectors (WP 0100 00).</p> <p>Replace malfunctioning turbocharger (WP 0107 00).</p>
<b>11. ENGINE WILL NOT REACH RPM WITH NO LOAD</b>	<ol style="list-style-type: none"> <li>1. Check throttle linkage for correct position.</li> <li>2. Ensure stop control cable is disengaged and engine stop lever is disengaged.</li> <li>3. Check fuel injectors for damage or restrictions.</li> <li>4. Check fuel supply for restrictions.</li> <li>5. Check for worn or damaged turbocharger.</li> </ol>	<p>Adjust throttle linkage stop-to-stop position on control lever (WP 0033 00).</p> <p>Adjust stop control cable and control lever (WP 0035 00).</p> <p>Replace fuel injectors if damaged or restricted (WP 0100 00).</p> <p>Clean or replace fuel filter (WP 0079 00).</p> <p>Repair or replace turbocharger (WP 0107 00) or (WP 0164 00).</p>



## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Engine Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
12. ENGINE HAS FUEL KNOCKS	<ol style="list-style-type: none"> <li>1. Check fuel lines for air.</li> <li>2. Check fuel injectors and fuel injection pump for malfunctions.</li> </ol>	<p>Bleed fuel lines (WP 0080 00).</p> <p>Replace damaged or worn fuel injectors and/or fuel injector pump (WP 0102 00).</p>
13. ENGINE ALTERNATOR NOT CHARGING	<ol style="list-style-type: none"> <li>1. Check for loose or corroded battery cables.</li> <li>2. Check for missing or slipping drivebelt.</li> <li>3. Check for loose harness connections.</li> <li>4. Check for malfunctioning alternator.</li> </ol>	<p>Repair or replace battery cables (WP 0054 00) and tighten all connections.</p> <ol style="list-style-type: none"> <li>1. Replace drivebelt (WP 0086 00).</li> <li>2. Replace tensioner (WP 0087 00).</li> </ol> <p>Tighten loose harness connections.</p> <p>Replace damaged alternator (WP 0089 00).</p>
14. ENGINE OVERHEATS (ENGINE AUDIBLE ALARM ACTIVATES)	<ol style="list-style-type: none"> <li>1. Check keel cooler for marine growth and other foreign matter.</li> <li>2. Check keel coolers for evidence of leaks, cracked plating, or signs of corrosion.</li> <li>3. Check coolant level in header tank.</li> <li>4. Check drivebelt for proper tension.</li> <li>5. Check cooling system for malfunctions.</li> <li>6. Check water pump for malfunctions.</li> </ol>	<p>Clean keel coolers (TM 5-1940-322-10).</p> <p>If keel coolers are damaged, replace (WP 0068 00).</p> <p>Fill coolant to 1 in. below neck.</p> <ol style="list-style-type: none"> <li>1. Replace belt tensioner (WP 0087 00).</li> <li>2. Replace drivebelt if evidence of fraying or cracking is noticeable (WP 0086 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Tighten hose clamps.</li> <li>2. Inspect all hoses for leaks and/or damage. Replace damaged hoses (WP 0069 00).</li> <li>3. Tighten header tank and keel cooler drain plugs.</li> </ol> <ol style="list-style-type: none"> <li>1. Tighten hose clamps.</li> <li>2. Inspect all hoses for leaks and/or damage. Replace damaged hoses (WP 0069 00).</li> <li>3. If water pump is damaged, replace (WP 0095 00).</li> </ol>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 2. Transmission Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. LOW MAIN OIL PRESSURE	<ol style="list-style-type: none"> <li>1. Check oil strainer for obstruction.</li> <li>2. Check oil pump assembly for damage or worn parts.</li> </ol>	<p>Remove and clean oil strainer.</p> <p>Replace damaged or worn out oil pump assembly (WP 0088 00).</p>
2. NO OIL PRESSURE OR ERRATIC LOW PRESSURE AT CONTROL VALVE	<ol style="list-style-type: none"> <li>1. Check oil level.</li> <li>2. Check lubricating oil pump suction strainer for obstructions.</li> <li>3. Check for air leaks on suction side of lubricating oil pump.</li> </ol>	<p>Add oil to proper level (WP 0012 00).</p> <p>Remove lubricating oil pump suction strainer and clean (WP 0123 00).</p> <p>Remove lubricating oil pump and correct cause of air leak (WP 0123 00).</p>
3. HIGH TEMPERATURE	<ol style="list-style-type: none"> <li>1. Check oil level.</li> <li>2. Check raw water filter for blockage and/or damage.</li> <li>3. Check transmission oil cooler for blockage.</li> <li>4. Check transmission oil cooler for damage.</li> </ol>	<p>Add oil to proper level (WP 0012 00).</p> <ol style="list-style-type: none"> <li>1. Clean raw water filter basket (WP 0070 00).</li> <li>2. If damage is present, replace raw water filter (WP 0070 00).</li> </ol> <p>If blockage is present, flush transmission oil cooler (WP 0116 00).</p> <p>If damage is present, replace transmission oil cooler (WP 0117 00).</p>
4. EXCESSIVE NOISE	Check drive plate for damage.	If drive plate is damaged, replace (WP 0122 00).
5. LOW LUBE OIL PRESSURE	<ol style="list-style-type: none"> <li>1. Check oil pump output pressure.</li> <li>2. Check pump suction strainer for blockage.</li> </ol>	<p>If oil pump output pressure is low, replace pump (WP 0123 00).</p> <p>Remove pump suction strainer and remove blockage (WP 0123 00).</p>
6. HIGH LUBE OIL PRESSURE	Check oil orifices and passages for clogs or blockage.	<ol style="list-style-type: none"> <li>1. Clear all obstructions from oil orifices and passages (WP 0166 00).</li> <li>2. If damaged, replace air seal ring (WP 0166 00).</li> </ol>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 3. Hydrojet Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. EXCESSIVE VIBRATION	<ol style="list-style-type: none"> <li>1. Check drive shaft couplings for universal joints, and mounting hardware damage.</li> <li>2. Check engine mounting bolts for tightness.</li> <li>3. Remove hydrojet grill (WP 0142 00) and inspect impeller for damage, wear, or debris.</li> <li>4. Inspect bearings for wear.</li> </ol>	<p>If driveshaft couplings or universal joints are cracked, replace driveshaft (WP 0128 00).</p> <p>Torque bolts to 30–35 lb-ft (40–47 N·m)</p> <ol style="list-style-type: none"> <li>1. Replace impeller if worn or damaged (WP 0138 00).</li> <li>2. Clean if debris is present (TM 5-1940-322-10).</li> </ol> <p>Replace bearings and other faulty components (WP 0167 00).</p>
2. NOISY HYDROJET WITH AERATED WATER AT EXIT NOZZLE	<ol style="list-style-type: none"> <li>1. Check intake grill for possible blockage.</li> </ol>	Remove debris from intake grill (TM 5-1940-322-10).
3. LOSS OF THRUST FROM HYDROJET	<ol style="list-style-type: none"> <li>1. Check intake grill for possible blockage.</li> <li>2. Remove hydrojet grill (WP 0142 00) and inspect impeller for damage or wear.</li> <li>3. Check driveshaft for loose, damaged or missing fasteners.</li> <li>4. Check driveshaft and universal joints for proper operation and damage.</li> </ol>	<p>Remove debris from intake grill (TM 5-1940-322-10).</p> <p>Replace impeller if worn or damaged (WP 0138 00).</p> <p>Replace fasteners if damaged or missing.</p> <p>Replace driveshaft if damaged (WP 0128 00).</p>
4. EXCESSIVE ENGINE SPEED	<ol style="list-style-type: none"> <li>1. Check intake grill for possible blockage.</li> <li>2. Remove hydrojet grill (WP 0142 00) and inspect impeller for damage or wear.</li> </ol>	<p>Remove debris from intake grill (TM 5-1940-322-10).</p> <p>Replace impeller if worn or damaged (WP 0138 00).</p>
5. EXCESSIVE OPERATING LOADS FOR STEERING	<ol style="list-style-type: none"> <li>1. Check steering deflector for signs of debris obstructing operation.</li> <li>2. Check oil level and for air in system.</li> <li>3. Check linkage for proper operation.</li> </ol>	<p>Remove debris from steering deflector. (TM 5-1940-322-10).</p> <ol style="list-style-type: none"> <li>1. Add oil to proper level (WP 0012 00).</li> <li>2. Bleed system (WP 0031 00).</li> </ol> <p>Adjust linkage (WP 0139 00).</p>

## MECHANICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 3. Hydrojet Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. REVERSE DEFLECTOR INOPERATIVE	<ol style="list-style-type: none"> <li>1. Check reverse deflector for signs of debris obstruction operation.</li> <li>2. Check for missing or loose hydraulic pump drive belts.</li> <li>3. Check linkage for proper operation.</li> <li>4. Check oil level in scoop control hydraulic reservoir.</li> <li>5. Check operation of scoop hydraulic control valve.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove debris from reverse deflector (TM 5-1940-322-10).</li> <li>2. Replace or tighten drive belts (WP 0132 00).</li> <li>3. Adjust linkage (WP 0034 00).</li> <li>4. Fill hydraulic reservoir to proper level (WP 0012 00).</li> <li>5. Repair or replace scoop hydraulic control valve (WP 0134 00).</li> </ol>
7. NOISY HYDROJET WITH NO LOSS OF POWER OR SPEED	Inspect bearings for wear.	Replace bearings and other faulty components (WP 0167 00).
8. EVIDENCE OF WATER MIXING WITH GREASE IN BEARING HOUSING	<ol style="list-style-type: none"> <li>1. Inspect drain hole for blockage.</li> <li>2. Inspect seal and seal faces for damage.</li> </ol>	<p>Clear drain hole.</p> <p>Replace seal and other faulty components (WP 0167 00).</p>

**Table 4. Scuppers Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. SCUPPERS DO NOT DRAIN WATER FROM BOAT	Inspect scupper drains for blockage or damage.	<ol style="list-style-type: none"> <li>1. Clean scupper drains (WP 0149 00).</li> <li>2. Replace damaged scupper drains (WP 0149 00).</li> </ol>

**Table 5. Windshield Wipers Troubleshooting Procedures.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. WINDSHIELD WIPERS OPERATE BUT DO NOT CLEAN WINDSHIELD	<ol style="list-style-type: none"> <li>1. Ensure wiper blades contact windshield (TM 5-1940-322-10).</li> <li>2. Inspect windshield wiper blades.</li> </ol>	<p>If wiper blades do not contact windshield check for damaged windshield wiper arm. If damage is present, replace wiper arm (WP 0025 00).</p> <p>If windshield wiper blade is defective, replace wiper blade (WP 0024 00).</p>

## FIELD TROUBLESHOOTING

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ELECTRICAL SYSTEMS TROUBLESHOOTING

#### **WARNING**

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result, causing damage to equipment or severe injury to personnel.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with hull when disconnecting cables. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

#### **CAUTION**

During installation of battery terminals, ensure positive clamps are installed on positive (+) posts and negative clamps are installed on negative (-) posts. Failure to connect clamps to correct posts will reverse polarity of circuitry and may cause damage to rectifier diodes in alternator, vehicle wiring, and radios (if equipped).

Do not use a hammer during installation of battery terminal. Failure to comply may result in damage to equipment.

#### **NOTE**

Refer to the general troubleshooting instructions in the Introduction to Troubleshooting, (WP 0004 00) prior to performing any electrical troubleshooting.

***Table 1. Electrical Troubleshooting Procedures.***

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. ELECTRICAL SYSTEM INOPERATIVE	<ol style="list-style-type: none"> <li>1. Check position of master battery switch.</li> <li>2. Check starting batteries and auxiliary batteries voltage readings, indicated on instrument panel gauges.</li> <li>3. Check battery connections and cables.</li> <li>4. Charge battery.</li> <li>5. Check master switch.</li> </ol>	<p>Set master battery switch to ON position.</p> <ol style="list-style-type: none"> <li>1. If readings are below 24 volts, test batteries for load or continuity (TM 9-6140-200-14).</li> <li>2. Replace defective batteries.</li> </ol> <ol style="list-style-type: none"> <li>1. Clean battery posts and cable connector leads.</li> <li>2. Tighten cable leads.</li> <li>3. Replace defective cables (WP 0054 00).</li> <li>4. If battery fails to charge, replace (WP 0055 00).</li> </ol> <p>If master switch is defective, replace (WP 0052 00).</p>

## ELECTRICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Electrical Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. ONE OR BOTH WARNING LIGHTS DO NOT COME ON (MASTER SWITCH ON)	<ol style="list-style-type: none"> <li>1. Check engine circuit switch.</li> <li>2. Inspect engine circuit fuse.</li> <li>3. Test battery for load. (TM 9-6140-200-14).</li> <li>4. Check battery connections and cables.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn switch to ON position.</li> <li>2. Test switch, if switch is defective replace.</li> </ol> <p>If defective, replace fuse.</p> <p>If defective replace battery (WP 0055 00).</p> <ol style="list-style-type: none"> <li>1. Clean battery posts and cable connector leads.</li> <li>2. Tighten cable leads.</li> <li>3. Replace defective cables (WP 0054 00).</li> </ol>
3. INDIVIDUAL LIGHTS INOPERATIVE	<ol style="list-style-type: none"> <li>1. Inspect individual lamps.</li> <li>2. Check lamp sockets for corrosion.</li> <li>3. Test circuit fuse on control panel.</li> <li>4. Test switch on control panel.</li> </ol>	<p>Replace defective lamps. Refer to WP 0056 00 for anchor lamp and WP 0057 00 for towing lamp, steaming lamp, and navigational lamps.</p> <ol style="list-style-type: none"> <li>1. Remove corrosion from lamp sockets.</li> <li>2. If corrosion is not present, check spring action of lamp socket terminals. If terminal springs are defective, replace (WP 0057 00).</li> </ol> <p>If fuse is defective, replace (WP 0043 00).</p> <p>If switch is defective, replace (WP 0039 00)</p>
4. INSTRUMENT PANEL GAUGE INOPERATIVE (WATER TEMPERATURE AND OIL PRESSURE)	<ol style="list-style-type: none"> <li>1. Test individual sending unit.</li> <li>2. Test for continuity &amp; voltage present at gauge.</li> <li>3. Check individual gauge for damage.</li> </ol>	<p>If sending unit is defective, replace. Refer to WP 0094 00 for water temperature sending unit and WP 0093 00 for oil pressure sending unit.</p> <p>If gauge is damaged, replace (WP 0093 00).</p>
5. WATER TEMPERATURE GAUGE INOPERATIVE	<p>Check operation of water temperature sending unit.</p> <ol style="list-style-type: none"> <li>1. Verify voltage is present.</li> <li>2. Verify water temperature sending unit is operating properly.</li> </ol>	<p>If voltage is not present inspect cable and cable connection for damage, replace cable if damaged.</p> <p>If water temperature sending unit is not operating properly, replace (WP 0094 00).</p>

## ELECTRICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Electrical Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. OIL PRESSURE GAUGE INOPERATIVE	Check operation of oil pressure sending unit. 1. Verify voltage is present.  2. Verify oil pressure sending unit is operating properly.	If voltage is not present inspect cable and cable connection for damage, replace cable if damaged.  If oil pressure sending unit is not operating properly, replace (WP 0093 00).
7. HORN INOPERATIVE	Test for 24 VDC at horn connections.	1. If 24 volts are not present, inspect all connections and cables for damage (and button on auxiliary switch panel).  2. If 24 volts are present, replace horn (WP 0049 00).
8. WINDSHIELD WIPERS INOPERATIVE	1. Visually inspect wiper motor for normal operation.  2. Check for power at motor connector.  3. Check power at wiper button.	If wiper motor is not working properly, ensure power plug is connected to motor.  1. If power is present, replace motor (WP 0026 00).  2. If power is not present, check for power on wiper button on auxiliary switch panel.  1. If power is present, replace wiring on wiper electrical leads.  2. If power is not present, replace wiper button on auxiliary switch panel (WP 0043 00).

## ELECTRICAL SYSTEMS TROUBLESHOOTING (Contd)

**Table 1. Electrical Troubleshooting Procedures (Contd).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<p>9. ELECTRIC BILGE PUMP DOES NOT DISCHARGE WATER (FORWARD OR AFT)</p>	<ol style="list-style-type: none"> <li>1. Inspect electrical connections, wires, and switches on control panel.</li> <li>2. Inspect bilge pump for damage.</li> <li>3. Check intake screen for blockage.</li> <li>4. Check all hoses for leaks or damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten all electrical connections.</li> <li>2. Replace any damaged wires (WP 0048 00).</li> <li>3. Test switch for proper operation.</li> <li>4. Replace damaged switch (WP 0043 00).</li> </ol> <p>Replace bilge pump if damaged (WP 0126 00) or (WP 0127 00).</p> <p>Remove blockage from intake screen.</p> <ol style="list-style-type: none"> <li>1. Replace cracked hoses (WP 0126 00) or (WP 0127 00).</li> <li>2. Tighten all hose connections that leak.</li> <li>3. Remove any debris causing blockage in hose.</li> </ol>
<p>10. HIGH WATER LEVEL LIGHT WILL NOT TURN OFF WHEN WATER IS CLEARED FROM BILGE AREA</p>	<ol style="list-style-type: none"> <li>1. Check high level indicator light for proper operation and damage.</li> <li>2. Check float for blockage or damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Test light for continuity.</li> <li>2. Replace high level indicator light (WP 0040 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Remove blockage from float.</li> <li>2. Replace float if damaged (WP 0126 00) or (WP 0127 00).</li> </ol>
<p>11. HIGH WATER LEVEL LIGHT WILL NOT TURN ON WHEN WATER IS PRESENT IN BILGE AREA</p>	<ol style="list-style-type: none"> <li>1. Check high level indicator light for proper operation and damage.</li> <li>2. Check float for blockage or damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Test light for continuity.</li> <li>2. Replace high level indicator light (WP 0040 00).</li> </ol> <ol style="list-style-type: none"> <li>1. Remove blockage from float.</li> <li>2. Replace float if damaged (WP 0126 00) or (WP 0127 00).</li> </ol>



## FIELD TROUBLESHOOTING

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

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### STEERING SYSTEM TROUBLESHOOTING

#### NOTE

Boat must be out of water on cradle or hardstand to inspect.

***Table 1. Steering System Troubleshooting Procedures.***

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>1. STEERING SYSTEM OUT OF ALIGNMENT, HARD TO STEER, OR SLIPS</b>	1. Check steering hoses for leaks or damage.  2. Check tie rod for proper adjustment and damage.  3. Check hydrojet steering unit for proper operation.  4. Check oil level and for air in system.  5. Check steering wheel shaft and key for damage.	1. Tighten all nuts and fasteners (WP 0031 00).  2. If hoses leak or are damaged, replace (WP 0031 00).  1. Adjust tie rod to proper position (WP 0139 00).  2. Replace damaged tie rod (WP 0139 00).  1. Replace steering pump (WP 0030 00).  2. Replace damaged steering hydraulic cylinder (WP 0136 00).  3. Replace damaged hydrojet (WP 0142 00).  Bleed steering system (WP 0031 00).  1. Replace key if damaged (WP 0029 00).  2. Replace steering pump if shaft is damaged (WP 0030 00).



# CHAPTER 3

## FIELD MAINTENANCE INSTRUCTIONS BRIDGE ERECTION BOAT (BEB) MK II-S

Work Package Title	WP Sequence No.
Service Upon Receipt . . . . .	WP 0009 00
Preventative Maintenance Checks and Services (PMCS) Introduction . . . . .	WP 0010 00
Preventative Maintenance Checks and Services (PMCS) . . . . .	WP 0011 00
Lubrication Instructions . . . . .	WP 0012 00
General Maintenance Procedures . . . . .	WP 0013 00
Pushknee Fender Replacement . . . . .	WP 0014 00
Fendering (Rub Rail) Replacement . . . . .	WP 0015 00
Aft Cockpit Replacement . . . . .	WP 0016 00
Aft Cleat Replacement . . . . .	WP 0017 00
Boat Hook Clamps Replacement . . . . .	WP 0018 00
Cab Assembly Maintenance . . . . .	WP 0019 00
Ring Buoy Brackets Replacement . . . . .	WP 0020 00
Hatchet Brackets Replacement . . . . .	WP 0021 00
Cab Clamp Maintenance . . . . .	WP 0022 00
Windshield Replacement . . . . .	WP 0023 00
Windshield Wiper Blade Replacement . . . . .	WP 0024 00
Windshield Wiper Arm Replacement . . . . .	WP 0025 00
Windshield Wiper Motor Replacement . . . . .	WP 0026 00
Cab Lifting Handle Replacement . . . . .	WP 0027 00
Handle/Handrail Replacement . . . . .	WP 0028 00
Steering Wheel Replacement . . . . .	WP 0029 00
Steering Pump and Hoses Replacement . . . . .	WP 0030 00
Steering System Maintenance . . . . .	WP 0031 00
Engine Stop Control Cable and Handle Replacement . . . . .	WP 0032 00
Scoop Control Head Assembly Replacement . . . . .	WP 0033 00
Scoop Control Cable Maintenance . . . . .	WP 0034 00
Throttle/Transmission Control Head Assembly Replacement . . . . .	WP 0035 00
Throttle Control Cable Maintenance . . . . .	WP 0036 00
Transmission Control Cable Maintenance . . . . .	WP 0037 00
Instrument Panel Replacement . . . . .	WP 0038 00
Instrument Panel Gauge and Bulb Replacement . . . . .	WP 0039 00

## CHAPTER 3 (Contd)

Work Package Title	WP Sequence No.
Instrument Panel Indicator Light Replacement . . . . .	WP 0040 00
Instrument Panel Switch Replacement . . . . .	WP 0041 00
Audible Alarm Replacement . . . . .	WP 0042 00
Auxiliary Switch Panel Push Button and Circuit Breaker Replacement . . . . .	WP 0043 00
Access Panel and Hinges Maintenance . . . . .	WP 0044 00
Stowage Compartment Door, Map Locker Door, and Hinges Maintenance . . . . .	WP 0045 00
Bus Bars and Junction Box Replacement . . . . .	WP 0046 00
Auxiliary Switch Panel to Junction Box Wiring Harness Replacement . . . . .	WP 0047 00
Intermediate Wiring Harness Replacement . . . . .	WP 0048 00
Horn Replacement . . . . .	WP 0049 00
Exhaust Replacement . . . . .	WP 0050 00
Battery Hatch Cover, Hinges, and Support Brace Maintenance . . . . .	WP 0051 00
Master Switch Maintenance . . . . .	WP 0052 00
NATO Slave Maintenance . . . . .	WP 0053 00
Battery Cables Maintenance . . . . .	WP 0054 00
Batteries and Battery Boxes Replacement . . . . .	WP 0055 00
Anchor Light Assembly and Bulb Maintenance . . . . .	WP 0056 00
Towing, Steaming, and Navigation Light Assembly and Bulb Maintenance . . . . .	WP 0057 00
Inspection Light, Bulb, and Bracket Replacement . . . . .	WP 0058 00
Searchlight and Light Bulb Replacement . . . . .	WP 0059 00
Wiring Harness Connector Repair . . . . .	WP 0060 00
Emergency Link Solenoid Maintenance . . . . .	WP 0061 00
Blocking Diode Replacement . . . . .	WP 0062 00
Master Link and Fuse Replacement . . . . .	WP 0063 00
Mast Assembly Maintenance . . . . .	WP 0064 00
Mast Wiring Harness Replacement . . . . .	WP 0065 00
Header Tank and Reservoir Maintenance . . . . .	WP 0066 00
Keel Cooler Grate Replacement . . . . .	WP 0067 00
Keel Cooler Maintenance . . . . .	WP 0068 00
Keel Cooler Inlet Pipe and Outlet Pipe Replacement . . . . .	WP 0069 00
Raw Water Strainer Maintenance . . . . .	WP 0070 00
Fuel Tank Replacement . . . . .	WP 0071 00
Fuel Level Sending Unit Maintenance . . . . .	WP 0072 00
Nylon Fuel Plumbing Replacement . . . . .	WP 0073 00
Intermediate Fuel Shutoff Valve Maintenance . . . . .	WP 0074 00
Fuel Master Shutoff Valve and Adapters Maintenance . . . . .	WP 0075 00
Fuel Water Separator Maintenance . . . . .	WP 0076 00
Fuel Water Separator Element Maintenance . . . . .	WP 0077 00
Lubricity Filter Maintenance . . . . .	WP 0078 00
Fuel Filter Maintenance . . . . .	WP 0079 00
Fuel System Bleeding . . . . .	WP 0080 00
Engine Hatch Cover, Hinges, and Support Brace Maintenance . . . . .	WP 0081 00
Engine Mounts and Brackets Replacement . . . . .	WP 0082 00

## CHAPTER 3 (Contd)

Work Package Title	WP Sequence No.
Engine Wiring Harness Replacement . . . . .	WP 0083 00
Fuel Injector Plumbing Replacement . . . . .	WP 0084 00
Belt Guard Replacement. . . . .	WP 0085 00
Engine Drivebelt Replacement. . . . .	WP 0086 00
Belt Tensioner Replacement. . . . .	WP 0087 00
Oil Sump Pump Maintenance . . . . .	WP 0088 00
Alternator, Support Bracket, and Support Brace Maintenance. . . . .	WP 0089 00
Alternator Pulley Maintenance . . . . .	WP 0090 00
Engine Water Inlet Connection Replacement . . . . .	WP 0091 00
Engine Thermostat and Front Lifting Bracket Maintenance . . . . .	WP 0092 00
Oil Pressure Sending Unit Maintenance. . . . .	WP 0093 00
Water Temperature Sending Unit Maintenance. . . . .	WP 0094 00
Water Pump Maintenance . . . . .	WP 0095 00
Lubricating Oil Cooler Maintenance . . . . .	WP 0096 00
Engine Oil Filter Maintenance. . . . .	WP 0097 00
Starter Relay Maintenance. . . . .	WP 0098 00
Starter Maintenance. . . . .	WP 0099 00
Fuel Injector Replacement . . . . .	WP 0100 00
Cylinder Head Maintenance. . . . .	WP 0101 00
Fuel Injection Pump and Accessory Drive Gear Maintenance. . . . .	WP 0102 00
Fuel Lift Pump Maintenance . . . . .	WP 0103 00
Air Cleaner Maintenance . . . . .	WP 0104 00
Magnetic Pick-up Maintenance . . . . .	WP 0105 00
Turbocharger Plumbing Maintenance. . . . .	WP 0106 00
Turbocharger Maintenance . . . . .	WP 0107 00
Engine Valve Covers Maintenance. . . . .	WP 0108 00
Rocker Arms Maintenance . . . . .	WP 0109 00
Air Intake Cover Maintenance. . . . .	WP 0110 00
Vibration Damper Replacement. . . . .	WP 0111 00
Exhaust Manifold Maintenance . . . . .	WP 0112 00
Engine Breather, Bracket, Clamp, and Hose Assembly Maintenance. . . . .	WP 0113 00
Engine Rear Lifting Bracket Replacement . . . . .	WP 0114 00
Engine Replacement . . . . .	WP 0115 00
Transmission Oil Cooler Flushing Maintenance. . . . .	WP 0116 00
Transmission Oil Cooler Replacement. . . . .	WP 0117 00
Transmission Oil Cooler Plumbing Maintenance . . . . .	WP 0118 00
Transmission Oil Hoses and Fittings Replacement . . . . .	WP 0119 00
Transmission Adapter Plate Replacement . . . . .	WP 0120 00
Transmission Driveplate Replacement . . . . .	WP 0121 00
Transmission Filter Screen Maintenance . . . . .	WP 0122 00
Transmission Oil Pump Maintenance . . . . .	WP 0123 00
Transmission Pressure Sending Unit Replacement . . . . .	WP 0124 00
Transmission Replacement. . . . .	WP 0125 00

## CHAPTER 3 (Contd)

Work Package Title	WP Sequence No.
Electric Bilge Pump, Bracket, and Float Replacement (Forward) . . . . .	WP 0126 00
Electric Bilge Pump, Bracket, and Float Replacement (Aft) . . . . .	WP 0127 00
Driveshaft Replacement . . . . .	WP 0128 00
Hydrojet Hatch Cover, Hinges, and Support Brace Maintenance . . . . .	WP 0129 00
Hydrojet Oil Cooler Cover and Hoses Maintenance . . . . .	WP 0130 00
Scoop Control Hydraulic Reservoir and Hoses Maintenance . . . . .	WP 0131 00
Scoop Hydraulic Drive Belts Replacement . . . . .	WP 0132 00
Scoop Hydraulic Pump, Mounting Bracket, and Hoses Maintenance . . . . .	WP 0133 00
Scoop Hydraulic Control Valve, Control Valve Hoses, Control Linkage, and Main Frame Brackets Maintenance . . . . .	WP 0134 00
Scoop Hydraulic Cylinder and Hoses Maintenance . . . . .	WP 0135 00
Steering Hydraulic Cylinder and Mounting Bracket Maintenance . . . . .	WP 0136 00
Hydrojet Steering Deflector, Rod, and Pivot Maintenance . . . . .	WP 0137 00
Hydrojet Impeller Replacement . . . . .	WP 0138 00
Steering Tie Rod Maintenance . . . . .	WP 0139 00
Hydrojet Scoop Reverse Deflector Maintenance . . . . .	WP 0140 00
Hydrojet Grill Maintenance . . . . .	WP 0141 00
Hydrojet Assembly Maintenance . . . . .	WP 0142 00
Rifle Mount Support and Bracket Replacement . . . . .	WP 0143 00
Capstan, Tow Hook, and Mounting Post Bracket Maintenance . . . . .	WP 0144 00
Diving Platform Flap, Hinges, and Brackets Replacement . . . . .	WP 0145 00
Automatic Fire Extinguisher Bracket and Mounting Plate Replacement . . . . .	WP 0146 00
Automatic Fire Extinguisher Alarm Replacement . . . . .	WP 0147 00
Handheld Fire Extinguisher Bracket Replacement . . . . .	WP 0148 00
Forward and Aft Scupper Drains Maintenance . . . . .	WP 0149 00
Anodes Maintenance . . . . .	WP 0150 00
Data Plate Replacement . . . . .	WP 0151 00

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SERVICE UPON RECEIPT

#### GENERAL, GENERAL INSPECTION AND SERVICING INSTRUCTIONS, AND SPECIFIC INSPECTION AND SERVICING INSTRUCTIONS

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#### GENERAL

Upon receipt of a new, used, or reconditioned boat, refer to TM 5-1940-322-10 and perform the following steps to determine if the boat has been properly prepared for service.

#### **NOTE**

The operator will assist when performing service upon receipt inspections.

1. Inspect all assemblies, subassemblies, and accessories to ensure they are in proper working order.
2. Secure, clean, lubricate, or adjust equipment as indicated in the Preventive Maintenance Checks and Services (PMCS) (WP 0011 00).
3. Check all Basic Issue Items (BII) to ensure every item is present, in good condition, and properly mounted or stowed (TM 5-1940-322-10).

#### GENERAL INSPECTION AND SERVICING INSTRUCTIONS

Refer to TM 5-1940-322-10 and other WPs in this manual when servicing, inspecting, and lubricating equipment.

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use. Failure to do so may result in injury to personnel.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to do so may result in injury to personnel.

Use Skysol 100 to clean all exterior surfaces coated with rust-preventive compounds.

**SERVICE UPON RECEIPT (Contd)****SPECIFIC INSPECTION AND SERVICING INSTRUCTIONS**

1. Perform quarterly (Q) PMCS listed in WP 0011 00.
2. Lubricate the boat according to the instructions found in WP 0012 00.
3. Schedule quarterly service on DD Form 314 (Preventive Maintenance Schedule and Record Card) or DA Form 5986-E (automated).
4. If boat is delivered with dry-charged battery, activate battery according to TM 9-6140-200-14.
5. Check boat coolant level and determine if solution is proper for climate.  
(Refer to TB 750-651 for preparation of antifreeze solutions.)



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

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### PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

#### GENERAL (PMCS), REPORTING ERRORS, AND GENERAL SERVICE AND INSPECTION PROCEDURES

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#### GENERAL (PMCS)

The best way to maintain boats covered by this manual is to inspect them on a regular basis so minor faults can be discovered and corrected. This will help prevent serious damage or failure of the boat and equipment, or injury to personnel. WP 0011 00 contains systematic instructions for inspection, adjustment, and correction of boat components to avoid costly repairs or major breakdowns. This is referred to as Preventive Maintenance Checks and Services (PMCS).

#### REPORTING REPAIRS

Uncorrected defects will be recorded on the Equipment Inspection and Maintenance Worksheet, DA Form 2404 or DA Form 5988-E (automated), in accordance with DA Pam 750-8.

#### GENERAL SERVICE AND INSPECTION PROCEDURES

Definitions of class I, II, and III leaks and their effect on boat operation are listed in TM 5-1940-322-10.

While performing specific PMCS procedures, verify items are correctly assembled, secure, serviceable, not worn, not leaking, and adequately lubricated as defined below:

1. An item is **CORRECTLY ASSEMBLED** when all parts are present and in proper position.
2. When wires, nuts, washers, hoses, or attaching hardware cannot be moved by hand, wrench, or prybar, they are **SECURE**.
3. An item is **UNSERVICEABLE** if worn beyond established wear limits or likely to fail before the next scheduled inspection.
4. An item is **WORN** if there is play between joining parts, or warning and caution plates are not readable.
5. An item is **ADEQUATELY LUBRICATED** if it meets the requirements specified by the Lubrication Instructions, WP 0012 00.
6. When the instruction tighten appears in a procedure, you must tighten with a wrench to the given torque value even when the item appears to be secure.

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION (Contd)

### GENERAL SERVICE AND INSPECTION PROCEDURES (Contd)

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

7. Use Skysol 100 to clean grease or oil from metal parts. After the item is cleaned, rinsed, and dried, apply a light grade of oil to unprotected surfaces to prevent rusting. Use soap and water to clean rubber and plastic materials.

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

#### GENERAL

##### **NOTE**

Designated PMCS intervals are to be followed under usual operating conditions. PMCS must be performed more frequently when operating under unusual conditions.

Perform all checks and services per the designated intervals specified in the PMCS table. Service intervals are for normal operation of the BEB in moderate temperatures, humidity, and atmospheric conditions. The intervals are hard-time intervals which are performed per the BEB age or calendar time. The hard-time intervals are based on calendar time or hours. An example of calendar intervals are quarterly delivery or three months or 250 hours.

#### EXPLANATION OF COLUMNS

The following is a list of the PMCS table column headings with a description of the information found in each column.

- a. Item Number.** This column shows the sequence in which the inspection and services are to be performed, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404 or 5988-E (automated), in accordance with DA Form 750-8.
- b. Interval.** This column shows when each check is to be performed.
- c. Location/Item To Check/Service.** This column lists the location of the item to be inspected by part, component, or assembly name.
- d. Item to be Inspected/Procedures.** This column identifies the general area or specific part where the check or service is to be done and explains how to do it.

##### **NOTE**

The terms *ready/available* and *mission capable* refer to the same status: equipment is on hand and is able to perform its combat mission. Refer to DA PAM 750-8.

- e. Not Fully Mission Capable If.** This column lists conditions that make the equipment unavailable for use because it is unable to perform its mission, or because it would represent a safety hazard. Do not accept or operate equipment with a condition in the Not Fully Mission Capable If column.

#### REPORTING DEFICIENCIES

If any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the field maintenance level, it must be reported. Refer to DA PAM 750-8 and report the deficiency on Equipment Inspection and Maintenance Worksheet, DA Form 2404.

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

### CORROSION PREVENTION AND CONTROL (CPC)

- a. Corrosion prevention and control (CPC) of Army materiel is a continuing concern. It is important that corrosion problems are reported so they can be corrected and improvements can be made to prevent future problems.
- b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.
- c. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as *corrosion*, *rust*, *deterioration*, or *cracking* will ensure that the information is identified as a CPC problem.
- d. The form should be submitted to the address specified in DA PAM 750-8.

### SPECIAL INSTRUCTIONS

Preventive maintenance is not limited to performing the checks and services listed in the PMCS.

#### **WARNING**

Skysol 100 cleaning solvent is combustible. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. DO NOT use or store near heat, sparks, flame, or other ignition sources. Keep container sealed when not in use.

Contact with Skysol 100 cleaning solvent may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least fifteen (15) minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source will not exceed 30 psi (207 kPa). When cleaning with compressed air, eyeshields must be worn. Failure to comply may result in injury to personnel.

- a. **Keep it clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean work area as needed. Use Skysol 100 on all metal surfaces. Use soap and water to clean rubber or plastic material.
- b. **Bolts, nuts, and screws.** Check them all for obvious loose, missing, bent, or broken condition. Look for chipped paint, bare metal, or rust around bolt heads; check and tighten where necessary.

#### **WARNING**

The bleed valve on hydraulic line should be used to bleed residual pressure from the line prior to disconnecting. When disconnecting any hydraulic line, open line slowly while wearing safety glasses to protect face. Hydraulic oil may spray due to residual pressure in system. Failure to comply may result in injury to personnel.

- c. **Hydraulic lines.** Look for wear, damage, and leaks. Ensure clamps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a loose connector, tighten it. If something is broken or worn out, refer to the appropriate maintenance Work Package (WP) task and repair or replace it.
- d. **Data plates.** Check all data plates. If any plate is worn, broken, painted over, missing hardware, or unreadable, it must be replaced. Refer to WP 0151 00.

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

### LEAKS

- a. It is necessary to know how fluid leaks affect equipment operation and readiness. The following definitions for types/classes of leakage shall be observed.
  - 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 the item being checked/inspected.
- b. Identify and report any sign of leakage, and perform all maintenance and repair in this manual.
- c. Under emergency conditions where use of the hydraulic system is necessary to complete the mission, consideration must be given to the fluid capacity and the leak classification.

### PAINTING

Paint touch-up of the BEB should be performed as needed during PMCS. Refer to painting instructions, WP 0176 00.

This PMCS uses the one-look format. Conduct PMCS with BEB on transport, start at the starboard aft side of boat nearest the driver's side of cab, proceeding counterclockwise.

### **WARNING**

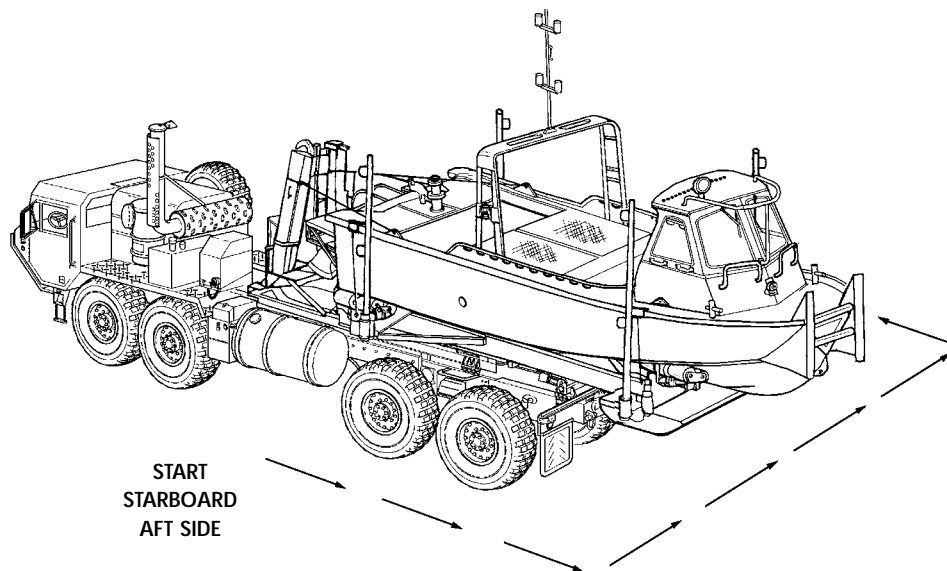
When checking/servicing an item, ensure all attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may cause equipment failure or injury to personnel.

### **CAUTION**

During PMCS, ensure that components and assemblies are correctly installed. Incorrect installation may cause equipment damage or failure.

### LUBRICATION

Perform lubrication checks and services after completing PMCS. Refer to WP 0012 00.



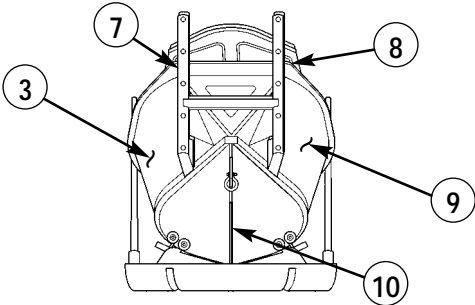
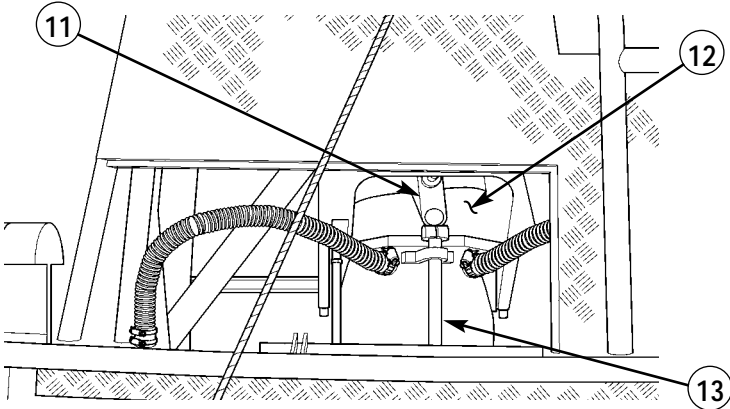
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Be mindful of all WARNINGS, CAUTIONS, and NOTES while performing PMCS. Failure to comply may result in injury to personnel and/or damage to equipment.</p> <p style="text-align: center;"><b><u>NOTE</u></b></p> <p>PMCS is performed with BEB on Improved Boat Cradle (IBC).</p>	
1.	Quarterly	Port and starboard hydrojet scoop deflector (1) and hydraulic cylinder control rod (2).	Inspect for loose or worn binding or missing mounting hardware and scoop deflector components and control rod. Repair or replace damaged, loose, worn, binding or missing hardware. Refer to WP 0135 00, WP 0136 00, and WP 0140 00.	Missing, loose, or damaged.
2.	Quarterly	Port and starboard hydrojet anodes (6) and keel anodes (5).	Inspect for missing or damaged anodes. Repair or replace damaged, loose, or missing hardware. If anodes are less than 50% of original volume missing, replace. Refer to WP 0150 00.	Missing, loose, or damaged.
3.	Quarterly	Starboard hull surface (3).	Inspect for cracks, holes, or damage to hull surface. Repair or replace damaged, loose, or missing hardware. Refer to WP 0178 00.	Any crack, hole, or damage that allows water to enter boat.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
4.	Quarterly	Pushknees mounting brackets (7), welds, and bow protection plate (10).	a. Inspect for damaged brackets or cracked welds. Repair or replace damaged, loose, or missing hardware. Refer to WP 0178 00. b. Inspect bow protection plate for damaged or missing hardware (WP 0178 00).	Any missing, loose, or damaged mounting brackets or cracked welds.
5.	Quarterly	Port hull surface (6).	Inspect for cracks, holes, or damage to under-hull surface. Repair or replace damaged, loose, or missing hardware. Refer to WP 0178 00.  	Any crack, hole, or damage that allows water to enter boat.
6.	Quarterly	Hull transom (4).	Inspect for cracks or holes on transom. Repair or replace damaged, loose, or missing hardware. Refer to WP 0178 00.  <p style="text-align: center;"><b>NOTE</b></p> Perform items 7 through 52 from inside of boat starting at stern and working forward to bow. Mast should be in raised position and cab either installed or removed from forward cockpit prior to performing.	Any crack, hole, or damage that allows water to enter boat.
7.	Quarterly	Port and starboard hydrojet steering deflector (12), steering control arm (13), and ball socket (11).	Inspect for missing, loose, worn, binding or damaged steering deflector, steering control arm, or ball socket. Repair or replace damaged, loose, worn, binding, or missing hardware. Refer to WP 0137 00.  	Missing, loose, or damaged.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

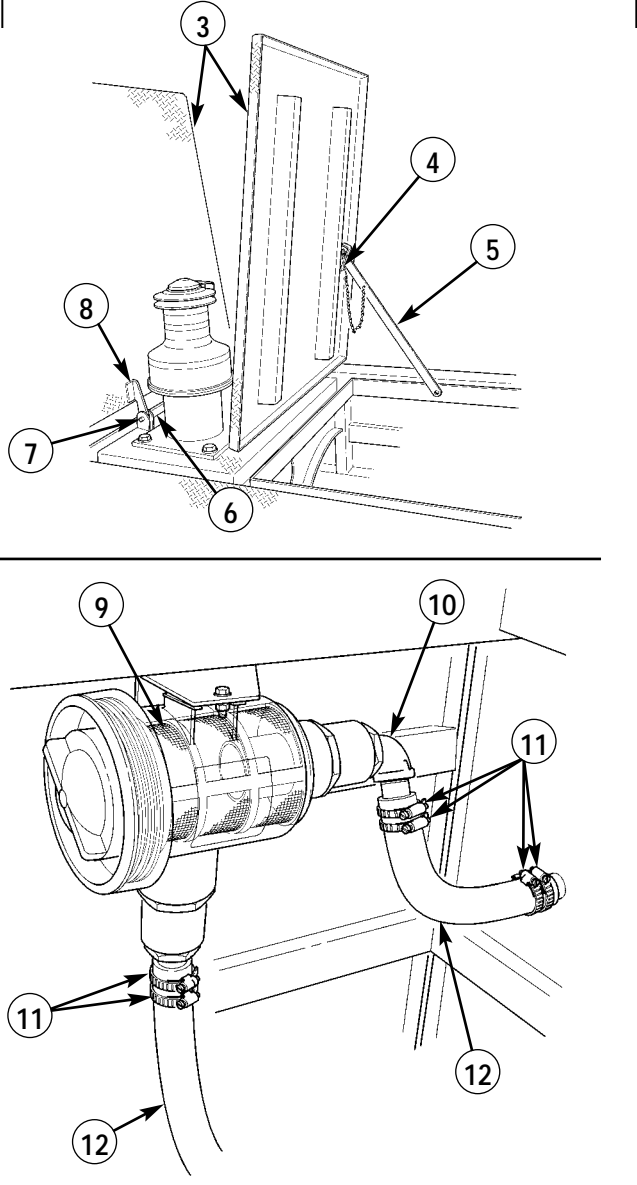
**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
8.	Quarterly	Capstan mounting hardware (2) and tow hook (1).	<p>a. Inspect tow hook unlock lever for proper operation in locked and unlocked positions. Repair or replace damaged, loose, or missing hardware. Refer to WP 0178 00.</p> <p>b. Inspect for missing, loose, or damaged hardware, or damaged spring. Repair or replace damaged, loose, or missing hardware. Refer to WP 0144 00.</p>	
9.	Quarterly	Port and starboard hydrojet hatches (3), hinges (8), screws (7), nuts (6), support braces (5), and hooks and chains (4).	<p>a. Inspect for missing, loose, or damaged hatches, hinges, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0129 00.</p> <p>b. Open hatches and inspect for missing or damaged support braces and hooks and chains. Repair or replace damaged, loose, or missing hardware. Refer to WP 0129 00.</p>	Missing or damaged.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
10.	Quarterly	Raw water strainers (9), hoses (12), clamps (11), and elbows (10)	<p><b>CAUTION</b></p> <p>Strainer is plastic. Take care when disassembling and reassembling strainer. Verify gasket is present when assembled. Failure to comply may result in damage to equipment.</p> <p><b>NOTE</b></p> <p>Items 10 through 18 are performed with hydrojet hatches opened and secured.</p> <p>Inspect for damaged elbows, hoses, and clamps. Repair or replace damaged, loose, or missing hardware. Refer to WP 0070 00.</p> 	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

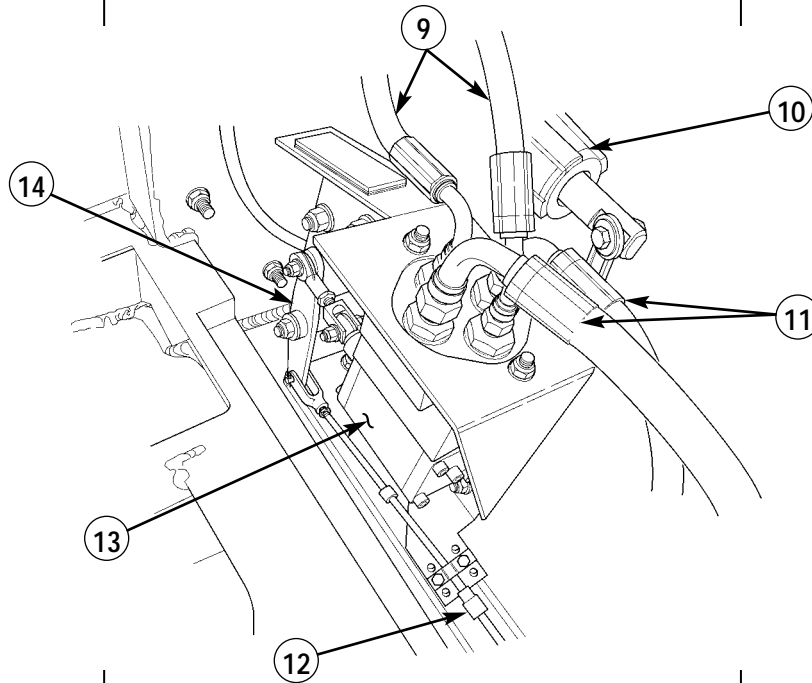
**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
11.	Quarterly	Hydrojet hydraulic steering cylinder (5), hoses and fittings (3), mounting bracket (4), steering levers (2), tie rod (1), and mounting hardware.	<p>a. Inspect for missing, loose, worn, binding, or damaged hydraulic steering cylinder. Repair or replace damaged, loose, worn, binding, or missing hardware. Refer to WP 0136 00.</p> <p>b. Inspect for missing, loose, damaged, or leaking hoses and fittings. Repair or replace damaged, loose, or missing hardware. Refer to WP 0136 00.</p> <p>c. Inspect for missing, loose, or damaged cylinder mounting bracket. Repair or replace damaged, loose, or missing hardware. Refer to WP 0136 00.</p> <p>d. Inspect for missing, loose, or damaged steering levers. Repair or replace damaged, loose, or missing hardware. Refer to WP 0136 00.</p>	<p>a. Missing, loose, or leaking.</p> <p>b. Missing, loose, damaged, or leaking.</p> <p>c. Missing, loose, or damaged.</p> <p>d. Missing loose or damaged.</p>
<p>The diagram shows a side view of the hydrojet steering assembly. Callout 1 points to the tie rod, 2 to the steering levers, 3 to the hoses and fittings, 4 to the mounting bracket, and 5 to the hydraulic steering cylinder.</p>				
12.	Quarterly	Port and starboard hydrojet impeller (8), hydrojet inspection cover (7), and O-ring (6).	Inspect impeller for damage. Replace as necessary. Refer to WP 0138 00.	Damaged or missing O-ring.
<p>The diagram shows the inspection cover (7) and the impeller (8) with the O-ring (6) in place. Callout 6 points to the O-ring, 7 to the inspection cover, and 8 to the impeller.</p>				

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

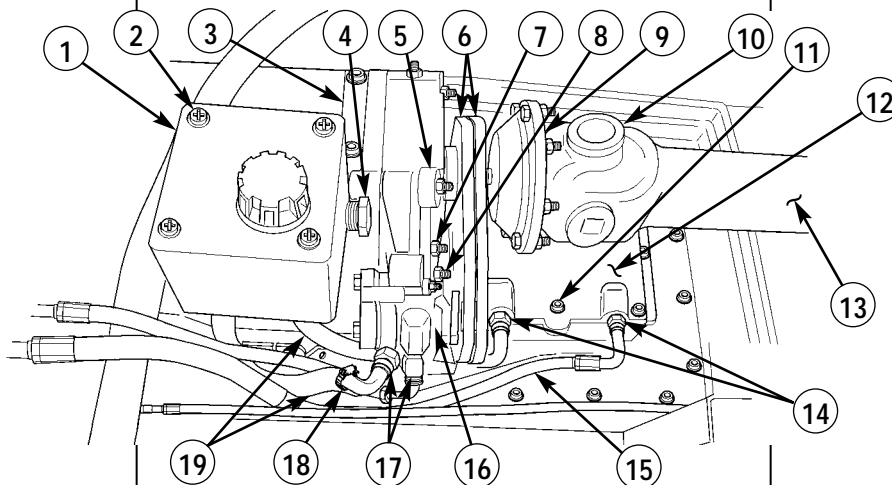
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
13.	Quarterly	Hydrojet hydraulic control valves (13), cylinders (10), linkage (14), hoses and fittings (9) and (11), and cables (12).	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Keep hands, clothing, and tools away from moving machinery. Failure to comply may result in injury to personnel and/or damage to equipment.</p> <p style="text-align: center;"><b><u>NOTE</u></b></p> <p>Start and operate boat machinery as necessary to perform checks 13 through 17.</p> <p>a. Inspect for missing, loose, or damaged linkage and control cable for proper adjustment. Repair or replace damaged, loose, or missing hardware. Refer to WP 0119 00, WP 0034 00, and WP 0134 00.</p> <p>b. Inspect for missing, loose, or damaged brackets and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0134 00.</p>	<p>a. Missing, loose, or damaged.</p> <p>b. Missing, loose, or damaged.</p>



PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

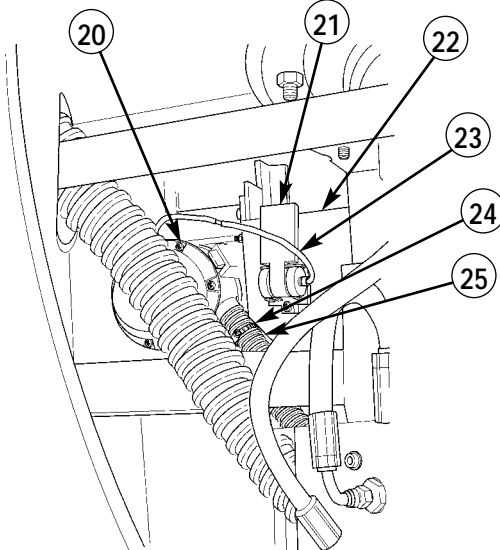
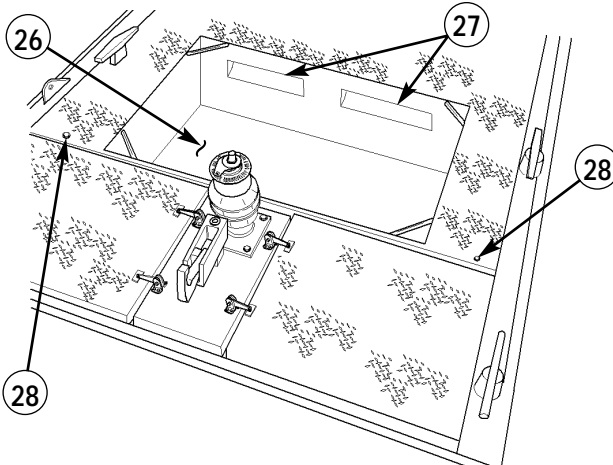
**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
14.	Quarterly	Port and starboard scoop control hydraulic reservoirs (1), site glass (4), hoses (19), fittings (17), screws (2), clamps (18), and mounting brackets (3).	a. Inspect for missing, loose, or damaged reservoir, screws, nuts, or mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0131 00. b. Inspect hydraulic hoses and fittings for leaks or damage. Repair or replace damaged, loose, or missing hardware. Refer to WP 0131 00. c. Inspect reservoir oil level on site glass; if necessary fill reservoir with oil until oil is at center of site glass. Refer to WP 0012 00. Repair or replace damaged, loose, or missing hardware. Refer to WP 0131 00.	a. Missing loose, or damaged. b. Any Class III leak.
15.	Quarterly	Port and starboard scoop hydraulic pumps (16), drive belts (6), hoses (19), fittings (17), mounting brackets (5), screws (8), and nuts (7).	a. Inspect hydraulic pump, hoses, and fittings for leaks or damage. Repair or replace damaged, loose, or missing hardware. Refer to WP 0132 00. b. Inspect pump drive belt and adjust as required. Repair or replace damaged, loose, or missing hardware. Refer to WP 0132 00. c. Inspect for missing, loose, or damaged mounting brackets and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0132 00.	a. Any Class III leak or damage. b. Missing or damaged. c. Missing or damaged.
16.	Quarterly	Port and starboard hydrojet oil cooler housings (12), hydraulic hoses (15), fittings (14), screws (11), and mounting hardware.	a. Inspect hydraulic hoses, fittings, and oil cooler for leaks or damage. Repair or replace damaged, loose, or missing hardware. Refer to WP 0130 00. b. Inspect for missing, loose, or damaged mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0130 00.	a. Any Class III leak or damage. b. Missing, loose, or damaged.
17.	Quarterly	Port and starboard hydrojet driveshaft flanges (9), driveshafts (13), U-joints (10), and mounting hardware.	a. Inspect for missing, loose, or worn binding or damaged driveshaft flange or driveshaft. Repair or replace damaged, loose, or missing hardware. Refer to WP 0128 00. b. Inspect U-joints. Repair or replace driveshaft if damaged, loose, or missing hardware. Refer to WP 0128 00. c. Observe operating shaft for signs of imbalance. Tighten hardware or replace driveshaft as necessary. Refer to WP 0128 00.	a. Missing, loose, or damaged. c. Out-of-balance driveshaft.



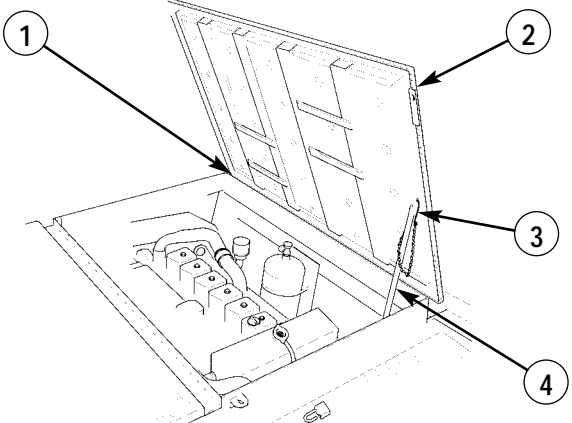
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

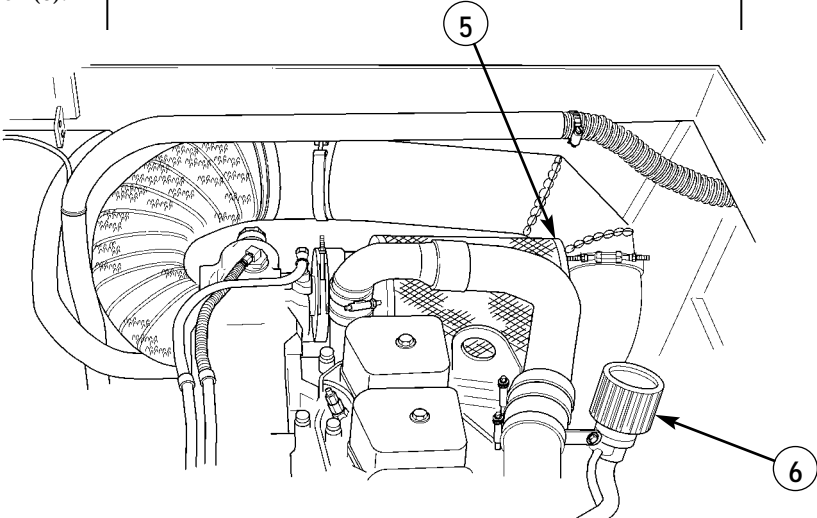
**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
18.	Quarterly	Aft bilge pump (20), hose (25), clamps (24), float switch (21), wiring (23), mounting bracket (22), and mounting hardware.	<p>a. Inspect for missing, loose, or damaged mounting hardware. Repair or replace damaged, loose, or missing hardware, damaged wiring, float, mounting bracket, and mounting hardware. Refer to WP 0126 00.</p> <p>b. Operate pump for 10 seconds to ensure correct operation. Refer to TM 5-1940-322-10.</p> <p>c. Lift float switch to activate indicator light on instrument panel. Repair or replace as necessary. Refer to WP 0129 00.</p>  <p style="text-align: center;"><b>NOTE</b> Ensure both hydrojet hatches are closed.</p>	
19.	Quarterly	Aft cockpit (26) and mounting screws (28) and air vents (27).	<p>Inspect for missing, loose, or damaged mounting screws or aft cockpit. Ensure air vents are not blocked or obstructed. Repair or replace damaged, loose, or missing hardware. Refer to WP 0016 00.</p> 	Aft cockpit is missing.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
20.	Quarterly	Port and starboard engine hatches (2), hinges (1), mounting hardware, support braces (4), and hooks and chains (3).	<p><b>NOTE</b> Items 20 through 44 are performed with engine hatches opened and secured.</p> <p>a. Inspect for missing, loose, or damaged hatches, hinges, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0081 00.</p> <p>b. Open hatches and inspect for missing or damaged support braces and hooks and chains. Repair or replace damaged, loose, or missing hardware. Refer to WP 0081 00.</p> 	Items are missing or damaged.
21.	Quarterly	Port and starboard engine air cleaners (5).	Clean or replace if necessary. Refer to WP 0104 00.	Air cleaner is clogged or missing.
22.	Quarterly	Port and starboard engine breather (6).	Remove and clean if necessary. Refer to WP 0113 00.	



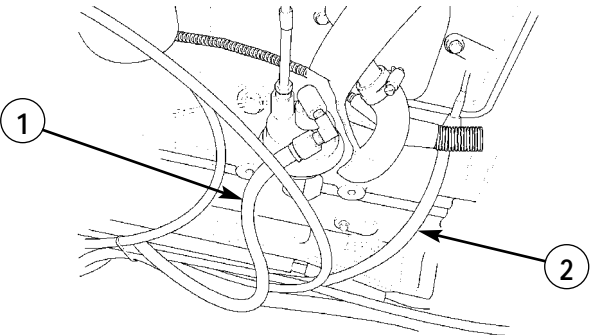
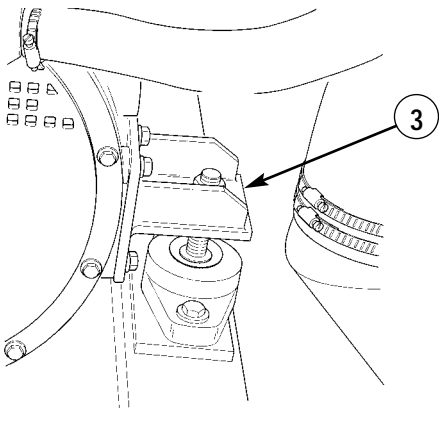
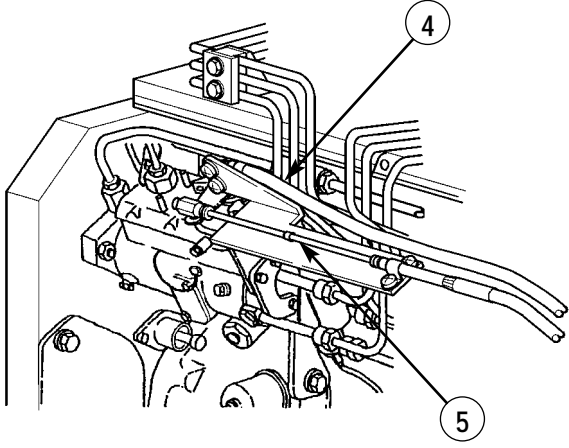
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
23.	Quarterly	Port and starboard transmission oil cooler (8), raw water hoses (9), tubes (13), clamps (7), hydraulic hoses (11), and fittings (10).	Inspect for missing, loose, or damaged oil cooler, raw water hoses, tubes, or clamps. Repair or replace damaged, loose, or missing hardware. Refer to WP 0117 00.	Missing, loose, damaged, or any Class III leak.
24.	Quarterly	Port and starboard transmission shift cables (12).	Inspect for loose or damaged shift cables and proper cable adjustment. Repair or replace if damaged. Refer to WP 0035 00 and WP 0037 00.	Loose or damaged.
25.	Quarterly	Port and starboard transmission drive flange (16), U-joint (14), driveshaft (15), and mounting hardware.	Inspect for damaged drive flange, driveshaft, and U-joints. Repair or replace driveshaft if damaged, or missing hardware. Refer to WP 0128 00.	Missing, loose, or damaged.
26.	Quarterly	Forward bilge pump (17), hose (20), clamps (19), float (22), wiring (18), mounting bracket (21), and mounting hardware.	<p>a. Inspect for missing, loose, or damaged bilge pump, hose, clamps, wiring, float, mounting bracket, and mounting hardware. Replace damaged, loose, or missing hardware. Refer to WP 0126 00.</p> <p>b. Operate pump for 10 seconds to ensure correct operation. Refer to TM 5-1940-322-10.</p> <p>c. Lift float switch to activate indicator light on instrument panel. Repair or replace as necessary. Refer to WP 0126 00.</p>	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
27.	Quarterly	Port and starboard fuel lift pump supply hoses (1) or fuel return hoses (2).	<p>Inspect for missing, loose, damaged, or leaking fuel supply hoses and fuel return hoses. Repair or replace damaged, loose, or missing hardware. Refer to WP 0103 00.</p> 	Any Class III leak.
28.	Quarterly	Port and starboard engine motor mounts (3).	<p>Inspect for missing, loose, or damaged hardware. Torque or replace damaged, loose, or missing hardware. Refer to WP 0082 00.</p> 	Missing, loose, or damaged.
29.	Quarterly	Port and starboard fuel injection pump throttle cables (5) and engine stop cables (4).	<p>Inspect cables. Adjust or replace damaged, loose, or missing hardware. Refer to WP 0032 00, WP 0035 00, and WP 0036 00.</p> 	Missing, loose, or damaged.



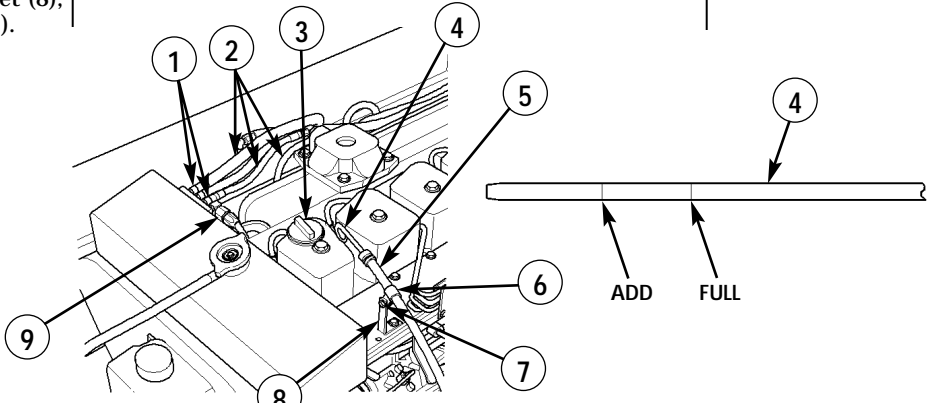
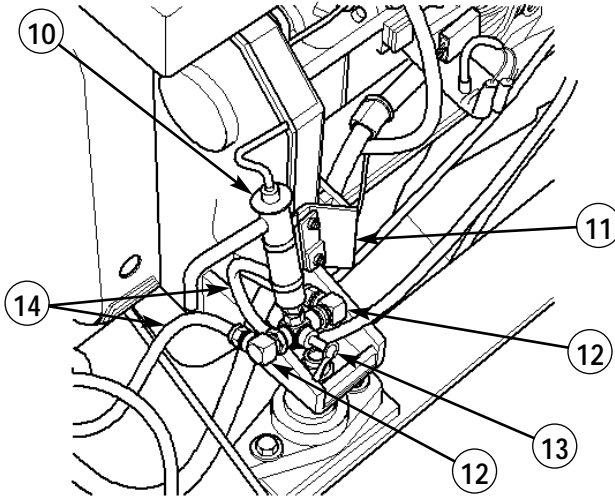
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
30.	Quarterly	Port and starboard fuel injection pump high pressure fuel lines (6), insulators (8), clamps (7), and mounting hardware.	Inspect for missing, loose, leaking, or damaged high pressure fuel lines, clamps, insulators, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0084 00.	Missing, loose, or damaged items or Class III leaks.
31.	Quarterly	Port and starboard fuel injectors (9) and fuel return lines (10).	<p>a. Inspect for missing, loose, or damaged injector fuel lines or return lines. Repair or replace damaged, loose, or missing hardware. Refer to WP 0084 00 and WP 0100 00.</p> <p>b. Inspect for fuel leaks. Repair or replace damaged, loose, or missing hardware. Refer to WP 0084 00 and WP 0100 00.</p>	<p>a. Missing, loose, or damaged.</p> <p>b. Any Class III leak.</p>

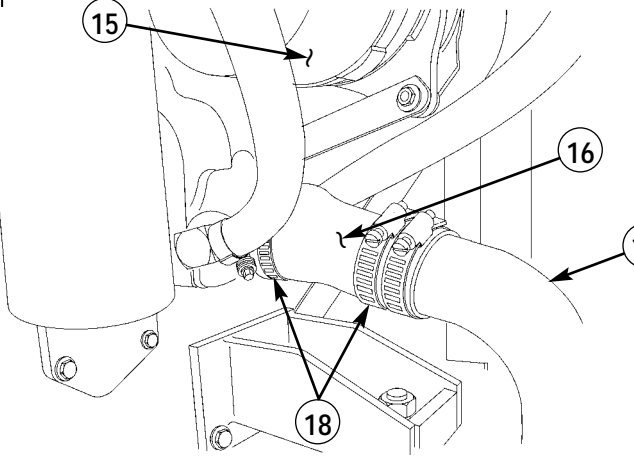
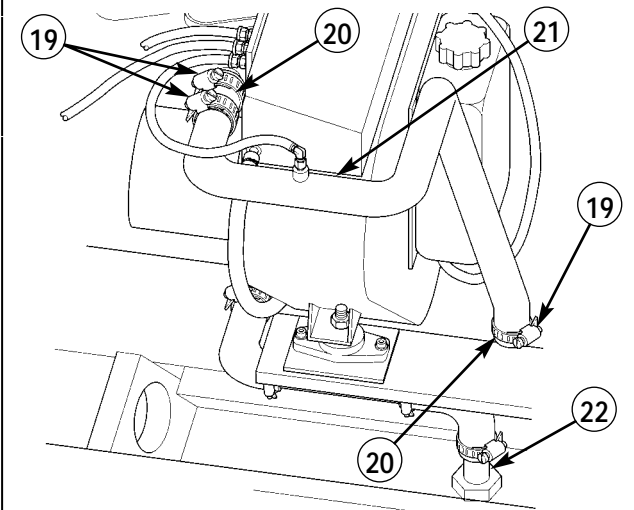
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
32.	Quarterly	Port and starboard coolant vent hoses (2), fittings (1), and elbows (9).	<p>a. Inspect for missing, loose, or damaged coolant vent hoses, fittings, or elbows. Repair or replace damaged, loose, or missing hardware. Refer to WP 0066 00.</p> <p>b. Inspect vent hoses for leaks.</p>	<p>b. Any Class III leaks.</p>
33.	Quarterly	Port and starboard engine oil level dipsticks (4), dipstick tubes (5), clamps (6), screws (7), bracket (8), and oil fill cap (3).	<p>Inspect for missing, loose, or damaged engine oil dipstick, dipstick tube, clamp, screws, bracket, and oil fill cap.</p> 	<p>Missing, loose, or damaged.</p>
34.	Quarterly	Port and starboard oil sump pumps (10), valves (13), hoses (14), fittings (12), and mounting brackets (11).	<p>a. Inspect for missing, loose, or damaged sump pump, valve hoses, fittings, and mounting bracket. Repair or replace damaged, loose, or missing hardware. Refer to WP 0088 00.</p> <p>b. Inspect for leaks in hoses or fittings. Repair or replace damaged, loose, or missing hardware. Refer to WP 0088 00.</p> 	<p>a. Missing, loose, or damaged.</p> <p>b. Any Class III leaks.</p>

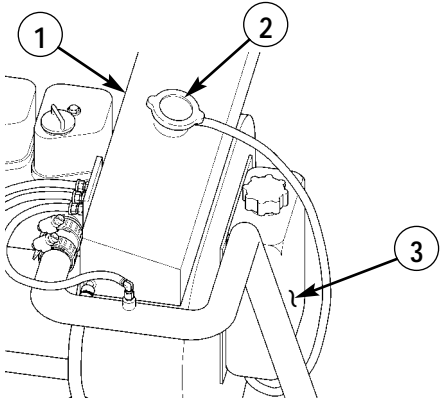
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
36.	Quarterly	Port and starboard alternators (15), drive belts, and tensioner.	<p>a Inspect drive belt and tensioner for damage. Refer to WP 0085 00, WP 0086 00, and WP 0087 00.</p> <p>b. Inspect alternator for missing, loose, worn, or damaged component, unusual noise, or no voltage output.</p>	<p>a Missing, loose, or damaged belt.</p> <p>b. Damaged alternator.</p>
37.	Quarterly	Port and starboard engine water inlet connection tubes (17), hoses (16), and clamps (18).	<p>Inspect for missing, loose, or damaged engine water inlet connection tubes, hoses, or clamps. Repair or replace damaged, loose, or missing hardware. Refer to WP 0091 00.</p> 	Class III leaks.
38.	Quarterly	Port and starboard engine thermostat outlet coolant tubes (21), hoses (20), and clamps (19).	<p>Inspect for missing, loose, or damaged thermostat outlet coolant tube, hoses, and clamps. Repair or replace damaged, loose, or missing hardware. Refer to WP 0092 00.</p>	Class III leaks.
39.	Quarterly	Port and starboard keel cooler inlet and outlet ports (22).	<p>Inspect for missing loose, or damaged keel cooler inlet and outlet ports, seals, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0069 00.</p> 	Class III leaks.

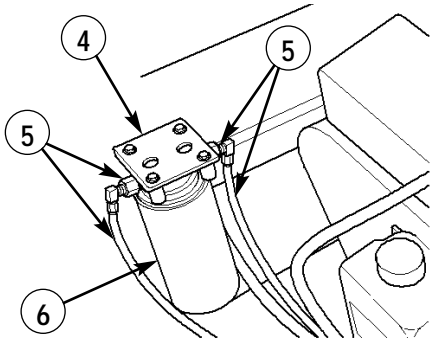
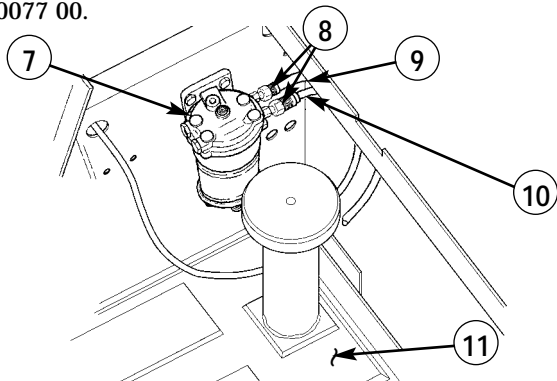
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
40.	Quarterly	Port and starboard header tank (1), pressure caps (2), overflow reservoir (3), and coolant levels (cold check).	<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Ensure coolant pressure caps are not removed when engines are hot. Failure to comply may result in injury to personnel.</p> <p>Inspect for missing, loose, or damaged header tank or pressure cap. Coolant level should be within 1 in. of header tank opening. Verify coolant protection (strength). Repair or replace damaged, loose, or missing hardware. Refer to WP 0066 00.</p>  <p>The diagram shows a side view of the engine header tank assembly. Callout 1 points to the header tank opening. Callout 2 points to a pressure cap on a hose. Callout 3 points to an overflow reservoir on the side of the tank.</p>	Cap is missing, loose, or damaged.
41.	Quarterly	Port and starboard lubricity fuel filters (6), hoses and fittings (5), mounting brackets (4), and mounting hardware.	Inspect for missing, loose, leaking, or damaged lubricity fuel filters, hoses, fittings, mounting brackets, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0078 00.	a. Missing, loose, damaged, or any Class III fuel leak is noted.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			<p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Engines must be shut down during fueling operations. Failure to comply may result in injury or death to personnel.</p> <p>Fuel is extremely flammable and explosive. Do not perform fuel system checks or services near open flames or sparks. Always keep a fire extinguisher nearby. Do not allow smoking or any open flame near boat when refueling. Failure to comply may result in injury or death to personnel. Clean-up spilled fuel as required.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Perform items 42 through 47 with engine hatches closed and battery hatch open.</p> 	
42.	Quarterly	Fuel tank (11).	<p>a. Inspect fuel tank for leaks. Refer to WP 0071 00.</p> <p>b. Inspect attached hoses and fittings for leakage.</p>	<p>a. Any Class III fuel leak.</p> <p>b. Any Class III fuel leak.</p>
43.	Quarterly	Port and starboard fuel water separators (7), hoses (9), tubes (10), and fittings (8), and mounting hardware.	<p style="text-align: center;"><b>NOTE</b></p> <p>When draining fuel water separators, do not drain into bilge. Have container ready to catch fuel and water.</p> <p>Inspect hoses and tubes for damage. Inspect separators for water and drain as necessary. Repair or replace any leaking hoses. Repair or replace damaged, loose, or missing hardware. Refer to WP 0076 00 and WP 0077 00.</p> 	Missing, loose, damaged, or any Class III fuel leak.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
<b>NOTE</b>				
44.	Quarterly	Four batteries (6).	Battery box covers are removed prior to performing item No. 44. Refer to WP 0055 00.	
45.	Quarterly	NATO slave receptacle (4), battery master switch (3), battery cables (2), screws (5), and wingnuts (1).	Inspect for corrosion on or around battery. Replace damaged or corroded batteries, loose, or missing hardware as necessary. Refer to WP 0055 00. Clean batteries, if necessary.	Damaged/will not hold charge.
45.	Quarterly	NATO slave receptacle (4), battery master switch (3), battery cables (2), screws (5), and wingnuts (1).	Inspect NATO slave and battery master switch connector and hardware for corrosion. Clean battery posts and cables, if necessary. Repair or replace damaged hardware. Refer to WP 0053 00 and WP 0054 00.	Missing, loose, or damaged cables.
<p>A technical diagram showing a battery master switch and NATO slave receptacle assembly. Callout 1 points to wingnuts, 2 to battery cables, 3 to the master switch, 4 to the slave receptacle, and 5 to screws. Callout 6 points to the battery box covers.</p>				
46.	Quarterly	Port and starboard master fuse links (9), blocking diodes (10), wiring (11), mounting plates (8), screws and mounting hardware.	Inspect for missing, loose, or damaged master fuse link, blocking diodes, wiring, mounting plate, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0062 00 and WP 0063 00.	Missing, loose, or damaged.
47.	Quarterly	Emergency link solenoid (7), battery cables (12), wiring (13), and mounting hardware.	Inspect for missing, loose, or damaged emergency link, battery cables, and wiring mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0061 00.	Missing, loose, or damaged.
<p>A technical diagram showing an emergency link solenoid and associated wiring. Callouts 7, 8, 9, 10, 11, 12, and 13 point to various components including the solenoid, mounting plates, fuse links, blocking diodes, wiring, and battery cables.</p>				

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
48.	Quarterly	Automatic fire extinguisher (14), alarm (21), sensor receptacle (15), inspection light (19), plug receptacles (17), wiring (18), clamps (16) and (20), and mounting hardware	<p>a. Inspect for missing, loose, or damaged sensor receptacle, light receptacle, wiring, screws, mounting brackets, or nuts. Repair or replace damaged, loose, or missing hardware. Refer to WP 0058 00, WP 0148 00, and WP 0149 00.</p> <p>b. Check operation of automatic fire extinguisher and alarm by disconnecting connector line by bottle. Repair or replace as necessary. WP 0058 00.</p> <p>c. Check weight tag on bottle for original weight of bottle. Weigh bottle and record on provided tag.</p>	<p>a. Missing, loose, or damaged.</p> <p>b. Alarm does not sound.</p> <p>c. Bottle weighs 16 oz or less of original weight.</p>
49.	Quarterly	Battery hatch (22), hinges (23), support brace (24), and mounting hardware.	<p>Inspect for missing, loose, or damaged battery hatch, hinges, support brace, and mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0051 00.</p>	
50.	Quarterly	Handheld fire extinguisher (25), safety pins (27), bracket (26) and mounting hardware.	<p>a. Inspect bracket for adjustment. Adjust if necessary.</p> <p>b. Weigh fire extinguisher. Fully charged extinguisher will weigh 13.5 lbs. Have refilled if less than 12.5 lbs.</p> <p>c. Inspect if fire extinguisher safety pin is installed.</p>	<p>a. Missing, loose, or damaged.</p> <p>b. Weight not within range.</p> <p>c. Safety pin is missing.</p>

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

**Table 1. Preventive Maintenance Checks and Services (Contd).**

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
51.	Quarterly	Electrical system.	Check all connectors and receptacles for corrosion. Clean or replace connectors or receptacles as necessary. Refer to WP 0013 00 or WP 0060 00.	
52.	Quarterly	Steering wheel (1) and steering pump (2).	<p>a. Inspect steering wheel for damage or loose mounting hardware. Repair or replace damaged, loose, or missing hardware. Refer to WP 0029 00.</p> <p>b. Inspect steering pump, hoses, and fittings for damaged, loose, or missing hardware. Repair or replace damaged, loose, missing hardware, or leaking hoses. Refer to WP 0030 00 and WP 0031 00.</p> <div style="text-align: center;"> </div>	<p>a. Missing steering wheel.</p> <p>b. Any Class III leak.</p>



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### LUBRICATION INSTRUCTIONS

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#### GENERAL

The lubrication instructions include table 1, Lubrication Specifications and table 2, Lubrication Intervals and Locations. Table 2 is used for lubricating the boat under normal operating conditions.

#### SERVICE INTERVALS

Service intervals are for normal operation of the boat in moderate temperatures, humidity, and atmospheric conditions. The intervals are hard-time intervals performed in accordance with the boat's age, calendar, or operating time. The hard-time intervals in table 2 are based on hour and calendar times. An example of hour usage and calendar intervals is 250/Q; 250 stands for 250 hours of operation, and Q stands for quarterly (every three months). The lubrication for the boat is to be performed at whichever interval occurs first.

Hard-time oil service intervals must be followed for equipment under manufacturer's warranty. Hard-time intervals may be shortened if lubricants are known to be contaminated or operation is under adverse conditions, including longer than usual operating hours, extended idling periods, or extreme dust. Hard-time intervals may be extended during periods of low activity, although adequate preservation precautions must be taken.

Service intervals under abnormal conditions will increase the frequency of lubricating service, such as high or low temperatures, or extended operations. These conditions can diminish a lubricant's protective quality.

#### ARCTIC CONDITIONS

Refer to FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather 0 to -65 °F (-18 to -54 °C), or table 1, Lubrication Specifications.

#### CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army material is a continuing concern. It is important that corrosion problems are reported so that corrections and improvements can be made to prevent future problems.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as corrosion, rust, deterioration, or cracking will ensure that the information is identified as a CPC problem. This form should be submitted to the address specified in DA Pam 750-8.

## LUBRICATION INSTRUCTIONS (Contd)

### FILTERS

Filters shall be serviced, cleaned, or changed as applicable when they are known to be contaminated or clogged. Service is recommended at prescribed hard-time intervals.

### AOAP REQUIREMENTS

The BEB is not currently enrolled in the Army Oil Analysis Program (AOAP).

### CLEANING

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

#### **CAUTION**

Keep container covers clean and free of dust, dirt, or other foreign material. Keep all lubrication equipment clean and ready to use. Failure to comply may result in damage to equipment.

External parts not requiring lubrication should be kept clean and free of lubricants. Failure to comply may result in damage to equipment.

Clean fittings before lubricating equipment. Use Skysol 100 to clean dirt and grease from all lubrication points. Dry lubrication points before lubricating. After servicing lubrication points, clean excess lubricants to prevent accumulation of foreign matter.

## LUBRICATION INSTRUCTIONS (Contd)

### MILITARY SYMBOLS FOR LUBRICANTS AND INTERVALS

The following symbols are used within this WP:

#### Lubricant Symbols

OE/HDO – Lube Oil, ICE, MIL-PRF-2104  
OEA – Lube Oil, ICE, Arctic, MIL-PRF-46167  
TO – Lube Oil, Transmission, MIL-PRF-2104  
GAA – Grease, Automotive and Artillery, MIL-PRF-10924G  
JP8 – Fuel MIL-T-83133 GR JP8  
ANT – Antifreeze, Ethylene Glycol, A-A-52624  
HO – Shell Tellus 32

#### Lubrication Interval Symbols

OC	On-Condition, unless changed by the Army Oil Analysis Program (AOAP)
C/MR	Change gear lubricant only when required by maintenance repair action or if contaminated
D	Daily
Q	Quarterly (3 months)
S	Semiannually (6 months)
A	Annually (12 months)
B	Biennially (24 months)
250	250 hours
500	500 hours
1,000	1,000 hours
2,000	2,000 hours

LUBRICATION INSTRUCTIONS (Contd)

**Table 1. Lubrication Specifications.**

APPLICATION	CAPACITY	LUBRICANTS	AMBIENT TEMPERATURE RANGE USAGE																		
			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
Engine	16 qt (15 L)	Lubricating Oil, OE/HDO-15W-40 or OE/HDO-5W-30 (MIL-PRF-2104)	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
			°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
			OE/HDO-15W-40 [Redacted] OE/HDO-5W-30 [Redacted]																		
Transmission	1.8 qt (1.7 L)	Lubricating Oil, OE/HDO-30 (MIL-PRF-2104)	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
			°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
			OE/HDO-30 [Redacted] All Temperatures																		
Drive Shaft (3)	As Required	Grease, Automotive and Artillery, (MIL-PRF-10924)	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
Hydraulic Steering Cylinder (2)			°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
Scoop Reverse Cylinder Rod (1)			GAA																		
Hydrojet Bearing (1)			[Redacted]																		
Cooling System	Engine only 13.6 qt (12.0 L) Engine and Keel Cooler 21.6 qt (20.6 L)	Antifreeze, Ethylene Glycol (A-A-52624)	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
			°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
			Normal [Redacted] Arctic [Redacted]																		
Steering Hydraulic System	2 qt (1.89 L)	Shell Tellus 32	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
			°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
Scoop Hydraulic Reservoir	4 qt (3.78 L)	Shell Tellus 32	All Temperatures																		

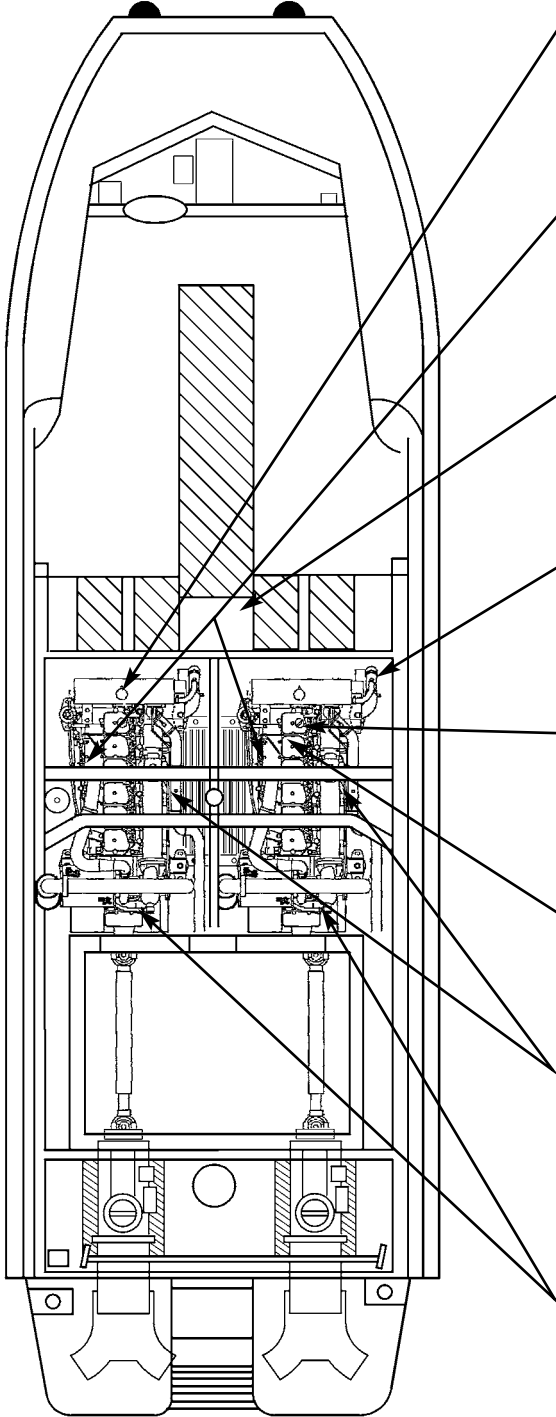
## LUBRICATION INSTRUCTIONS (Contd)

**Table 2. Lubrication Intervals and Locations.**

COMPONENT	INTERVAL
Engine Crankcases	Change oil every 3 months or 250 hours.
Engine Oil Filters	Replace at each engine oil change.
Lubricity filter	Change lubricity filter every 3 months or 250 hours.
Fuel Filter	Replace fuel filter every 6 months or 500 hours.
Transmissions and oil filter screens	Change oil and clean filter screen every 12 months or 1,000 hours.
Steering Hydraulic System	Change hydraulic oil every 12 months or 1,000 hours.
Scoop Hydraulic Reversing System	Change hydraulic oil every 12 months or 1,000 hours.
Driveshafts	Lubricate fittings every 12 months or 1,000 hours.
Hydraulic Steering Cylinder	Lubricate fittings every 12 months or 1,000 hours.
Scoop Reverse Cylinder Rods	Lubricate fittings every 12 months or 1,000 hours.
Cooling System	Drain and flush every 24 months or 2,000 hours.

LUBRICATION INSTRUCTIONS (Contd)

**Table 2. Lubrication Intervals and Locations.**

	INTERVAL	LUBRICANT	
	B/2000	ANT	Cooling System (Drain, Flush, and Fill) (Cap. - 21.6 qts [20.6 L])
	6/500	JP8	Engine Fuel Filter (Replace Filter)
	D	JP8	Engine Fuel Filter/Water Separator (Drain Element)
	Q/250	JP8	Lubricity Filters (Replace Filter)
	Q/250	OE/HDO	Crankcase Fill (Cap. - 16 qts 15 L including filter)
	Q/250	OE/HDO	Engine Crankcase (Change Oil)
	Q/250	OE/HDO	Oil Filters
3	TO	Transmission Fill and Level (check level) (Remove dipstick to check level)	

LUBRICATION INSTRUCTIONS (Contd)

**Table 2. Lubrication Intervals and Locations (Contd).**

	INTERVAL	LUBRICANT	
	B/2000	HO	Steering Hydraulic Reservoir (Cap. - 2 qt [1.8 L])
	A/1000	OE/HDO	Transmission (Change Oil) (Cap. - 1.8 qt [1.7 L])
	A/1000	HO	Scoop Hydraulic Reservoir (Change Oil) (Cap. Site Glass)
	A/1000	GAA	Driveshaft Fittings [A]
	A/1000	GAA	Driveshaft Fittings [B]
	A/1000	GAA	Driveshaft Fittings [C]
	<p style="text-align: center;">MK II-S</p>	<p><b>NOTE</b> Letters in brackets after lubrication entries refer to localized views. See page 9.</p>	

LUBRICATION INSTRUCTIONS (Contd)

**Table 2. Lubrication Intervals and Locations (Contd).**

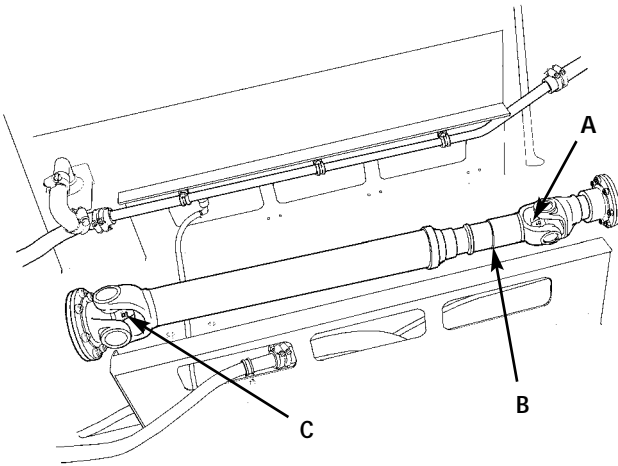
	INTERVAL	LUBRICANT	
	A/1000	GAA	Hydrojet Bearing Fittings [G]
	A/1000	GAA	Steering Hydraulic Cylinder Fitting [E] and [D]
	A/1000	GAA	Scoop Reverse Cylinder Rod Fittings (2) [F]
<p style="text-align: center;"><b>NOTE</b> Letters in brackets after lubrication entries refer to localized views. See page 9.</p>			

MK II-S

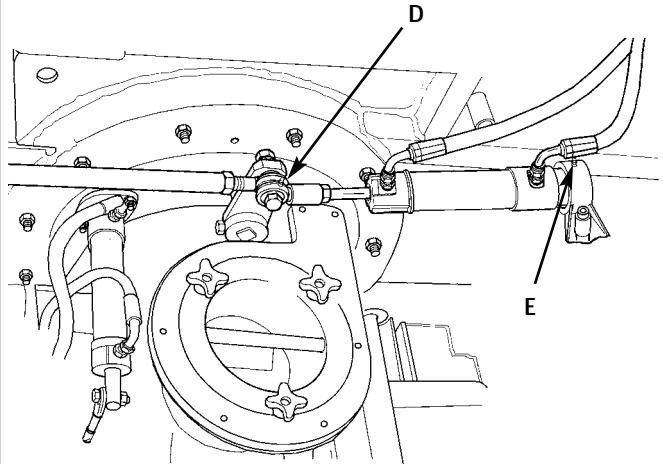


LUBRICATION INSTRUCTIONS (Contd)

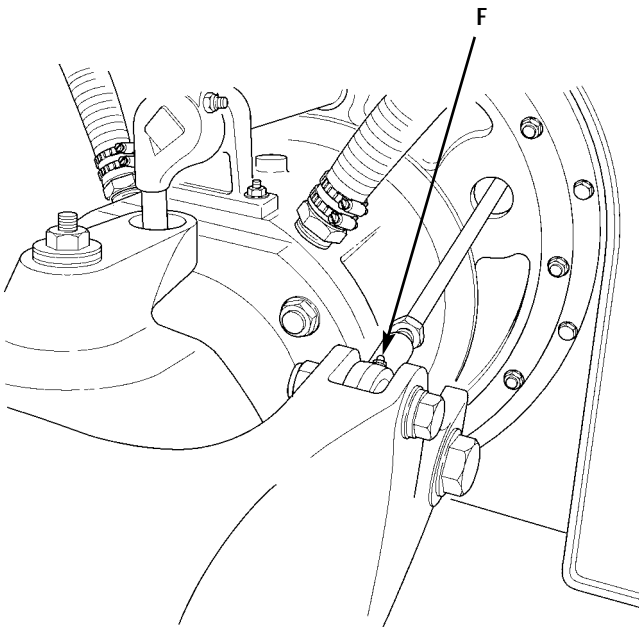
LOCALIZED LUBRICATION POINTS A THROUGH G



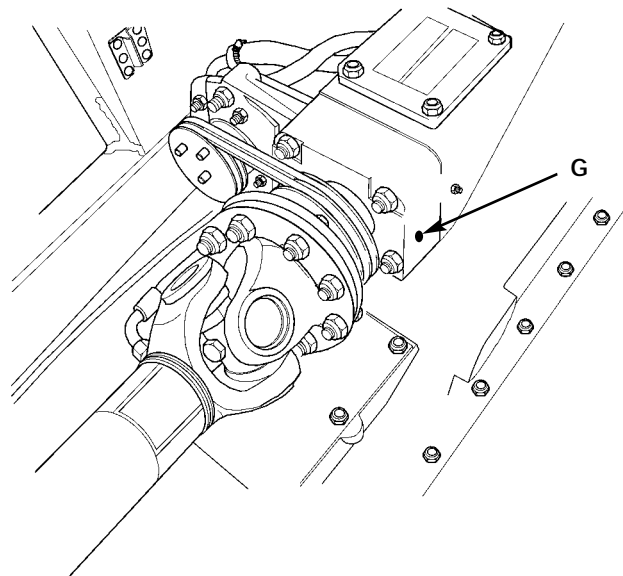
DRIVESHAFT FITTINGS



STEERING HYDRAULIC FITTINGS



SCOOP REVERSE CYLINDER FITTING



HYDROJET BEARING FITTING

## LUBRICATION INSTRUCTIONS (Contd)

### COOLING SYSTEM DRAINING AND FILLING

#### **WARNING**

If cooling system is hot, allow cooling system to cool before taking reservoir cap off and releasing pressure. If engine is overheated, do not touch reservoir cap with bare hands. Failure to comply may result in injury or death to personnel.

#### **NOTE**

Boat must be on Improved Boat Cradle (IBC) or on blocks to drain cooling system.

1. Remove keel cooler grate (WP 0067 00).

#### **NOTE**

Have container ready to catch coolant.

2. Remove drain plug (2) from keel cooler (1). Allow coolant to drain.
3. Apply coat of sealing compound to thread of drain plug (2) and install drain plug (2) in keel cooler (1).
4. Remove filler cap (3) from header tank (6).
5. Fill header tank (6) with a 50/50 mixture of antifreeze and water to one inch below fill cap neck.
6. Install filler cap (3) on header tank (6).
7. Install keel cooler grate (WP 0067 00).

### CRANKCASE DRAINING AND FILLING

#### **WARNING**

If engine is hot, allow engine to cool before draining and filling oil. If engine is overheated, do not touch filler cap with bare hands. Failure to comply may result in injury or death to personnel.

#### **NOTE**

Have container ready to catch oil.

The oil pump lever is closed when in center position.

1. Turn valve (9) to forward position.
2. Lift handle (8) and pump on sump pump (7) until oil is drained.
3. Turn valve (9) to center closed position.
4. Remove filler cap (4) from valve cover (5) and fill engine with oil. See table 1 for lubrication specifications.
5. Install filler cap (4) on valve cover (5).

### TRANSMISSION DRAINING AND FILLING

#### **NOTE**

Have container ready to catch transmission oil.

The oil pump lever is closed when in center position.

1. Turn valve (9) to aft position.
2. Lift handle (8) and pump on sump pump (7) until oil is drained.
3. Turn valve (9) to center closed position.
4. Remove filler cap (10) from transmission (11) and fill transmission with oil. See table 1 for lubrication specifications.
5. Install filler cap (10) on transmission (11).

**LUBRICATION INSTRUCTIONS (Contd)**

**SCOOP HYDRAULIC SYSTEM DRAINING AND FILLING**

**NOTE**

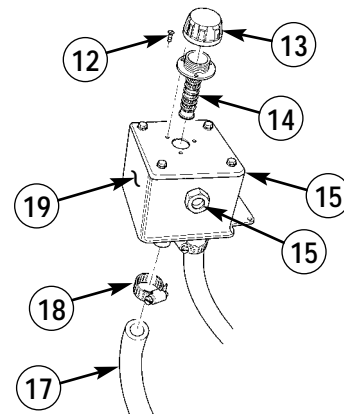
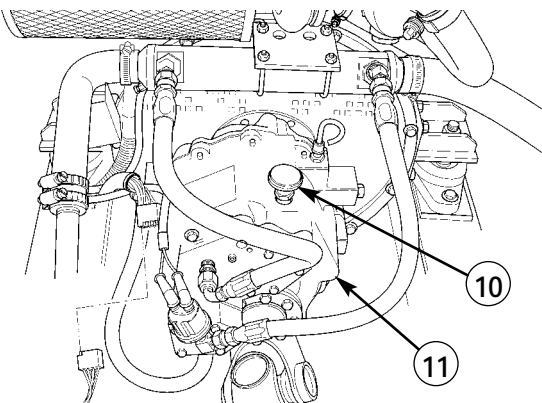
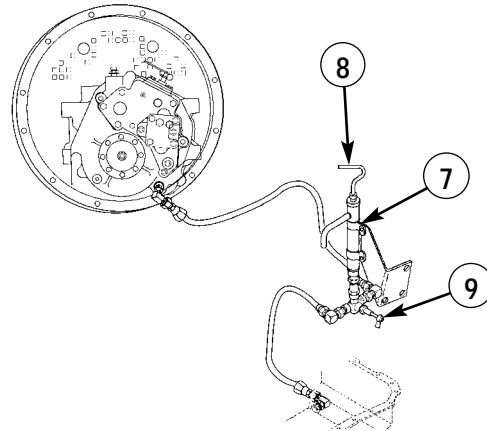
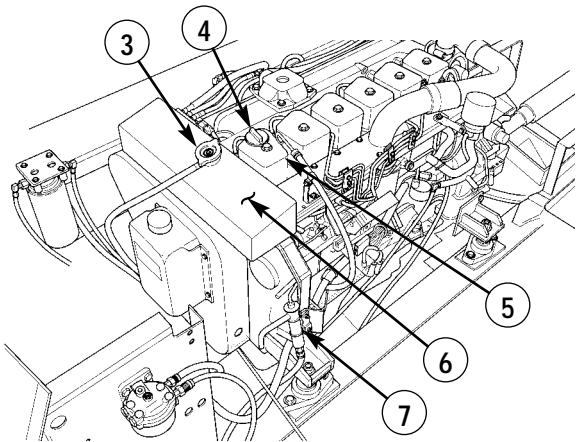
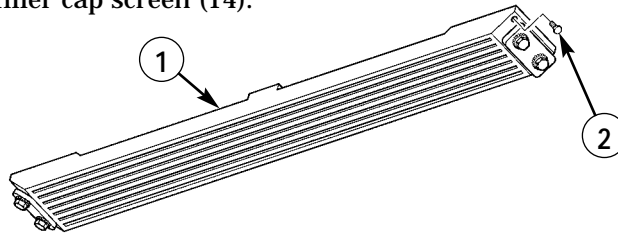
Have container ready to catch hydraulic oil.

1. Remove filler cap (13) from filler cap screen (14).
2. Remove clamp (18) and hose (17) from scoop hydraulic reservoir (19). Allow hydraulic oil to drain.
3. Remove three screws (12) and filler cap screen (14) from scoop hydraulic reservoir cover (15). Clean filler cap screen (14).
4. Install hose (17) on scoop hydraulic reservoir (19) with clamp (18).
5. Install filler cap screen (14) on scoop hydraulic reservoir cover (15) with three screws (12).

**NOTE**

Fill scoop hydraulic reservoir with hydraulic oil to proper level on site glass.

6. Fill scoop hydraulic reservoir (19) with hydraulic oil. See table 1 for lubrication specifications.
7. Check site glass (16) for oil level.
8. Install filler cap (13) on filler cap screen (14).



## LUBRICATION INSTRUCTIONS (Contd)

### STEERING SYSTEM DRAINING

1. Remove filler cap (1) from steering pump (2).
2. Open and secure port side hydrojet hatch (TM 5-1940-322-10).

**NOTE**

Have container ready to catch hydraulic oil.

3. Remove nuts (3) and (4) from adapters (5) and (10) on steering cylinder (9).

**NOTE**

Loosening the nuts on bleed fittings ensures that all hydraulic oil will be drained.

4. Loosen nuts (6) and (8) on bleed fittings (7) and drain hydraulic oil from steering cylinder (9).
5. Tighten nuts (6) and (8) on bleed fittings (7).
6. Install nuts (3) and (4) on adapters (5) and (10).
7. Install filler cap (1) on steering pump (2).
8. For filling and bleeding, refer to WP 0031 00.

### FUEL TANK DRAINING

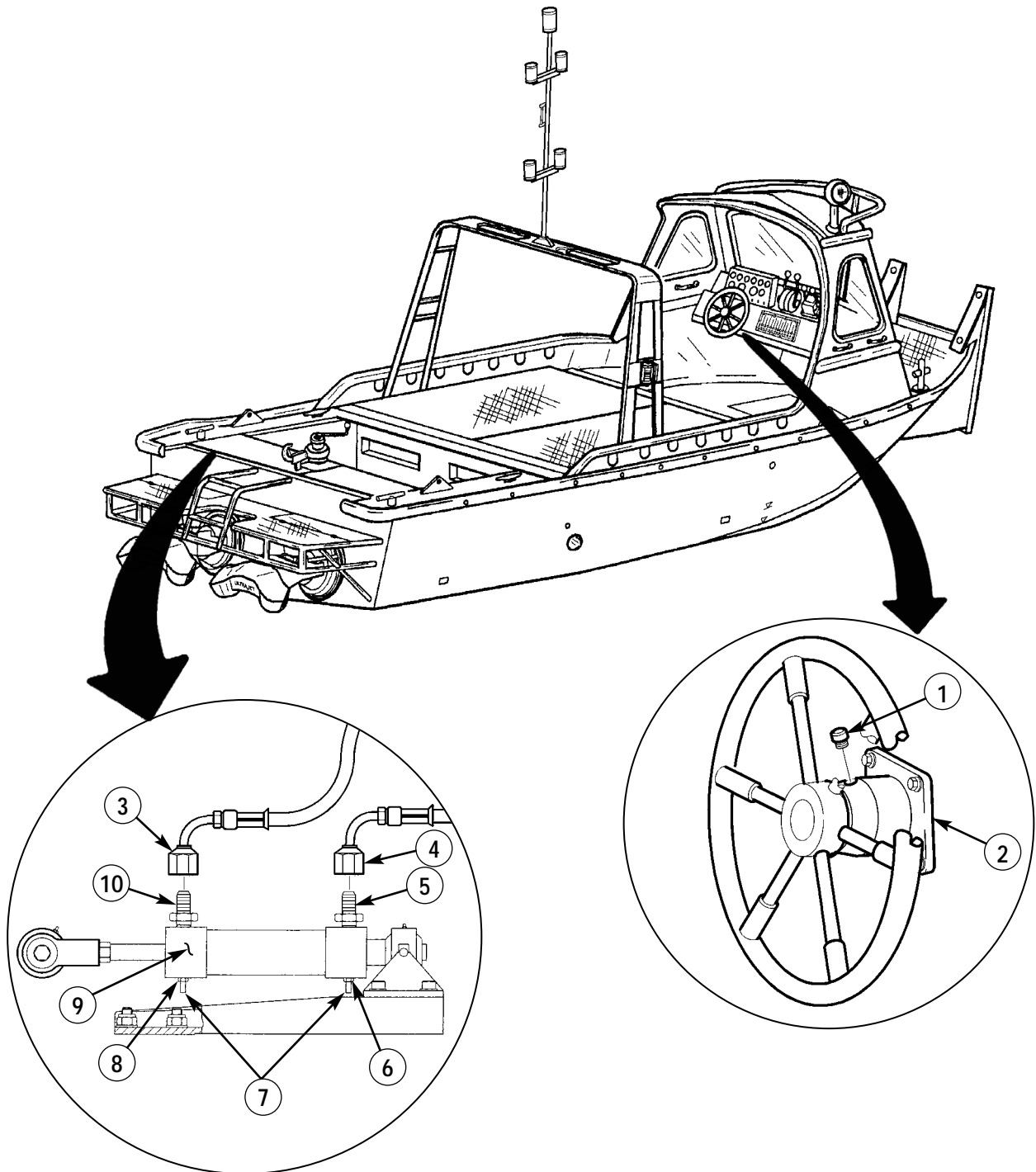
**NOTE**

Use lubricant transfer pump (item 45, WP 0172 00) to assist with draining and filling the fuel tank.

Have two clean 55-gallon drums on hand to store fuel.

1. Remove tank filler cap with dipstick from tank.
2. Install fuel transfer pump pick-up tube in tank and pump fuel out of tank into 55-gallon drums.
3. Fill fuel tank by transferring fuel from 55-gallon drums back to tank.
4. For bleeding of fuel system, refer to WP 0080 00.

### LUBRICATION INSTRUCTIONS (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### GENERAL MAINTENANCE PROCEDURES

GENERAL CLEANING PROCEDURES, GENERAL INSPECTION PROCEDURES,  
GENERAL REPAIR PROCEDURES, AND GENERAL ASSEMBLY PROCEDURES

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#### GENERAL CLEANING PROCEDURES

Cleaning procedures are the same for most parts and components that make up the vessel subassemblies. Great care and effort are required in all cleaning operations. Dirt and foreign material can jeopardize satisfactory vessel operation and maintenance.

The following guidelines apply to all cleaning operations:

1. Clean all parts before inspection, after repair, and before assembly.
2. Keep hands free of any grease accumulation which could transfer contaminants to BEB.
3. After cleaning, wrap or cover all parts with plastic or paper to protect them from dust and/or dirt.

#### **NOTE**

All electrical equipment and other parts that can be damaged by steam cleaning or moisture must be removed and all openings must be covered before cleaning. Dry parts with compressed air.

4. Place disassembled parts in wire baskets for cleaning. Dry and cover all cleaned parts and inspect or repair as necessary. All parts subject to rusting must be oiled and wrapped in paper or plastic to avoid dirt and/or dust settling on them. Keep all subassembly parts together and avoid mixing parts.

#### **WARNING**

Improper cleaning methods and use of unauthorized cleaning solvents may cause injury to personnel and/or damage to equipment.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

5. Clean inner and outer surfaces of castings and all areas likely to collect grease and oil with cleaning solvents. Use a stiff brush to remove sludge and gum deposits. Use compressed air to blow out all tapped screw holes and to dry castings after cleaning.
6. Particular attention must be given to all oil passages in castings and machined parts. Oil passages must be kept clean and free of obstructions. Clean passages with wire probes to break up any sludge or gum deposits. Wash passages by flushing with cleaning solvents. Dry passages with compressed air.
7. Clean electrical cables and flexible hoses with soap and water. Allow to air dry.

## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL CLEANING PROCEDURES (Contd)

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use. Failure to comply may result in injury to personnel.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

8. Clean machined-tooled parts with Skysol 100 solvent and dry with compressed air.
9. Clean machined surfaces with Skysol 100 solvent and dry with lint-free cloth.
10. Use compressed air to blow out all tapped screw holes where gasket material covers mating surfaces. This will clear holes from any deteriorating gasket material.

### GENERAL INSPECTION PROCEDURES

Procedures for inspections are the same for many parts and components that make up subassemblies. Dimensional standards for parts have been fixed at extremely close tolerances, so use specification tables located throughout this manual. Use specified inspection equipment for inspections where cracks and other damage cannot be seen. Exercise extreme care in all phases of inspection and adhere to the following guidelines:

1. When inspecting castings perform the following inspections:
  - a. Inspect all ferrous and non-ferrous castings for cracks using a magnifying glass and a strong light.
  - b. Check areas around studs, pipe plugs, threaded inserts, and sharp corners. Replace all cracked castings.
  - c. Inspect machined surfaces for nicks, burrs, or raised metals. Mark damaged areas for repair or replacement.
  - d. Inspect all pipe plugs, pipe plug openings, screws, and screw openings for damaged or stripped threads.
  - e. Using a straightedge or surface plate, check all gasket mating surfaces, flanges on housings, and supports for warpage. Visually inspect mating flanges for discolorations. This may indicate persistent oil leakage.
  - f. Check all castings for conformance to applicable repair standards.
2. Refer to TM 9-214 for inspection of bearings. Check all bearings for conformance to applicable repair standards.
3. Replace studs, bolts, and screws if threads are damaged, bent, loose, or stretched.



## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL INSPECTION PROCEDURES (Contd)

4. Inspect all gears for cracks, using a magnifying glass and strong light. No cracks are allowed. Inspect gear teeth for wear, sharp fins, burrs, and galled or pitted surfaces. Check keyway slots for wear and/or damage.
5. Check all bushings and bushing-type bearings for secure fit, evidence of overheating, wear, burrs, nicks, and out-of-round condition. Check for dirt in lubrication holes or grooves. Holes and grooves must be clean and free from damage.
6. All seals must be replaced with new seals.
7. Inspect core hole expansion plugs for leakage. Replace plugs when leakage is present.
8. Inspect machine-tooled parts for cracks, breaks, elongated holes, wear, and chips.
9. Inspect machined surfaces for cracks, evidence of wear, burrs, nicks, pitted surfaces, and scratches.
10. Inspect mated surfaces for remains of old gaskets or seals, evidence of leakage, pitting, and secure fit.
11. Inspect surfaces for rust, pitting, holes, and severe damage.
12. Inspect oil bathed internal parts for cracks, nicks, burrs, evidence of overheating, and wear.
13. Inspect air actuated internal parts for cracks, nicks, burrs, evidence of overheating, and wear.
14. Inspect externally exposed parts for breaks, cracks, rust damage, and wear.

### GENERAL REPAIR PROCEDURES

Use the appropriate Work Package (WP) within this manual for the part or component being repaired and the guidelines listed below.

#### **CAUTION**

Repaired items must be thoroughly cleaned to remove metal chips and abrasives. Metal chips and abrasives can enter working parts of vessel and cause damage to equipment.

1. All cracked castings must be replaced. Only minor repairs to machined surfaces, flanges, and gasket mating surfaces are permitted. Use the following methods to remove minor nicks, burrs, and/or scratches:
  - a. File with a fine mill file.
  - b. Wipe surface with a crocus cloth dipped in cleaning solvent.
  - c. Smooth rough surfaces using a surface plate.
2. Remachining of machined surfaces to repair damage, warpage, or uneven surfaces is not permitted. Replace castings.
3. Repair damaged threaded pipe plugs and/or screw threads with a screw tapper. Repair oversized holes with threaded inserts.
4. Refer to TM 9-214 for repair of bearings.
5. Replace all bent and stretched studs. Repair minor thread damage with a thread die. Use the following methods to replace studs having stripped or damaged threads:
  - a. Use a stud remover to remove studs. Back studs out slowly to avoid heat buildup and seizure, which can cause stud to break off.
  - b. If studs break off too short to use a stud remover, use a stud extractor to remove studs, or use welding method.
  - c. Broken studs can be removed by welding a nut or bar stock to stud and removing with wrench.

## GENERAL MAINTENANCE PROCEDURES (Contd)

### GENERAL REPAIR PROCEDURES (Contd)

#### **CAUTION**

Replacement studs have a special coating and must have a small amount of antiseize compound (NSA16) applied on threads before stud is installed. Failure to comply may result in damage to equipment.

#### **NOTE**

Standard studs may have a coarse thread on one end and a fine thread on the other end. The coarse thread end is installed in the aluminum casting. The short threaded end goes into the casting. Studs having coarse threads on both ends are used in some applications. Refer to TM 5-1940-322-24P for correct part numbers.

6. Use puller to remove gears. Remove minor nicks, burrs, or scratches on gear teeth. If keyways are worn or enlarged, replace gear.
7. Replace bushings when bushing and bushing-type bearings seize to a shaft and spin in the bore, also replace the associated part.

#### **CAUTION**

Be careful not to damage casting or adapter bore when removing oil seals.

8. Remove oil seals by pressing or prying out. Use proper seal replacement tool to install new seal in bore.
9. Replacement of the cylinder head and cylinder block is limited to procedures outlined in WP 0101 00 and WP 0163 00.

### GENERAL ASSEMBLY PROCEDURES

When assembling components, follow these rules to ensure proper operation of boat:

1. Cleanliness is essential in all component assembly operations. Dirt and dust, even in small quantities, are abrasive. Parts must be cleaned as specified and kept clean. Wrap or cover parts and components when assembly procedures are not immediately completed.
2. Coat all bearings and contact surfaces with operating oil (axle oil for axle parts, transmission oil for transmission parts, etc.) to ensure lubrication of parts during initial operation after repair.
3. Use new gaskets and preformed packing during assembly of all components.

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### PUSHKNEE FENDER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Five locknuts (item 52, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)

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## PUSHKNEE FENDER REPLACEMENT (Contd)

### NOTE

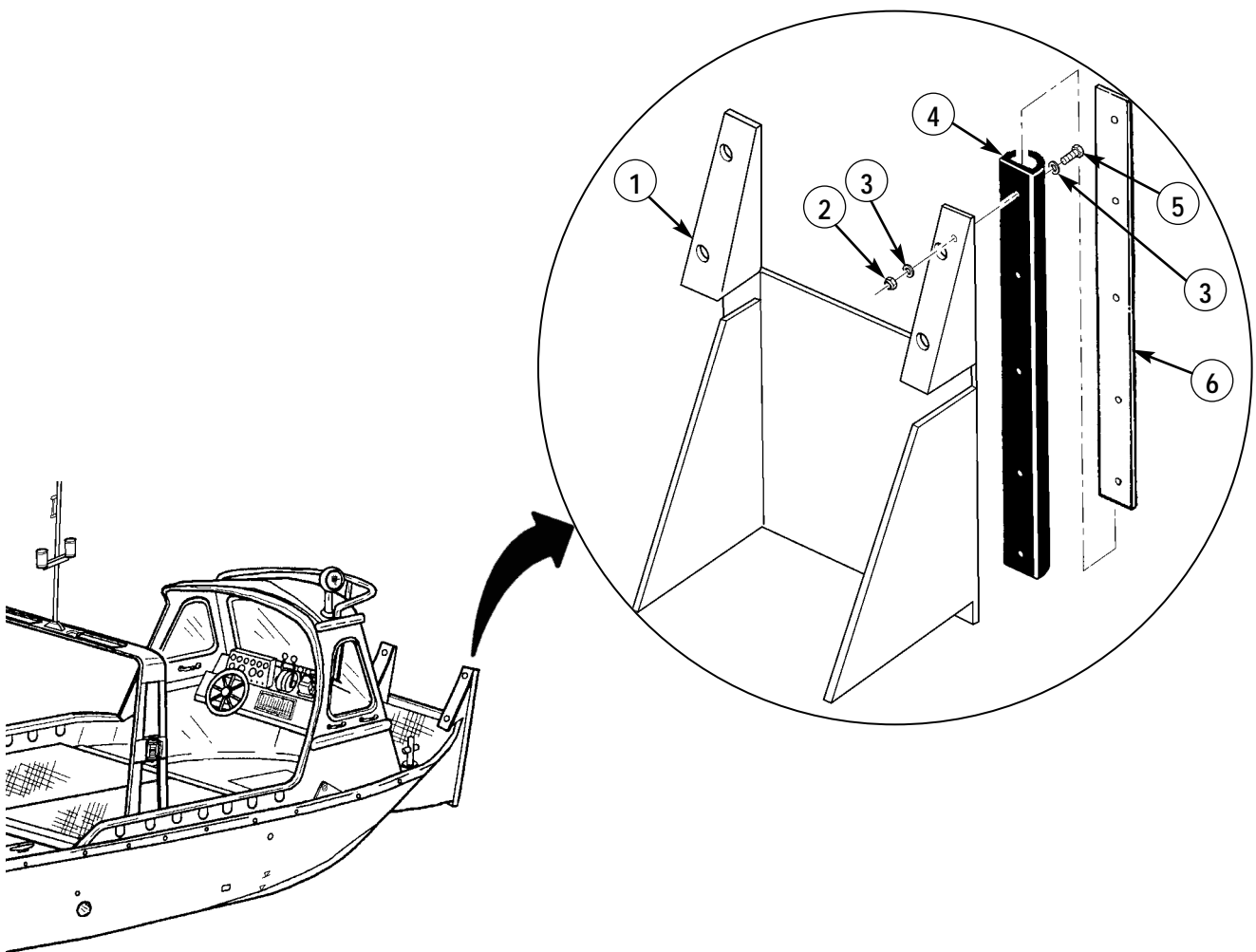
Both pushknees are replaced the same way. This procedure covers the replacement of one pushknee.

### REMOVAL

1. Remove five locknuts (2), ten washers (3), and five bolts (5) securing fendering section (4) and metal insert (6) to pushknees (1). Discard locknuts (2).
2. Remove fendering section (4) and metal insert (6).

### INSTALLATION

1. Install metal insert (6) into fendering section (4).
2. Apply coat of antiseize compound to threads of bolts (5).
3. Install fendering section (4) on pushknee (1) with five bolts (5), ten washers (3), and five new locknuts (2).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FENDERING (RUB RAIL) REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Forty-nine locknuts (item 52, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)

##### Personnel Required

Two

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## FENDERING (RUB RAIL) REPLACEMENT (Contd)

### REMOVAL

1. Remove forty-nine locknuts (6) and washers (7) securing fendering (3) and metal insert (5) to gunwale (4). Discard locknuts (6).
2. Remove forty-nine bolts (2) and washers (7) from gunwale (4) by pushing inward to clear metal insert (5) and flat section of fendering (3).
3. Remove fendering (3) with metal insert (5) from boat (1).
4. Remove metal insert (5) from inside of fendering (3).

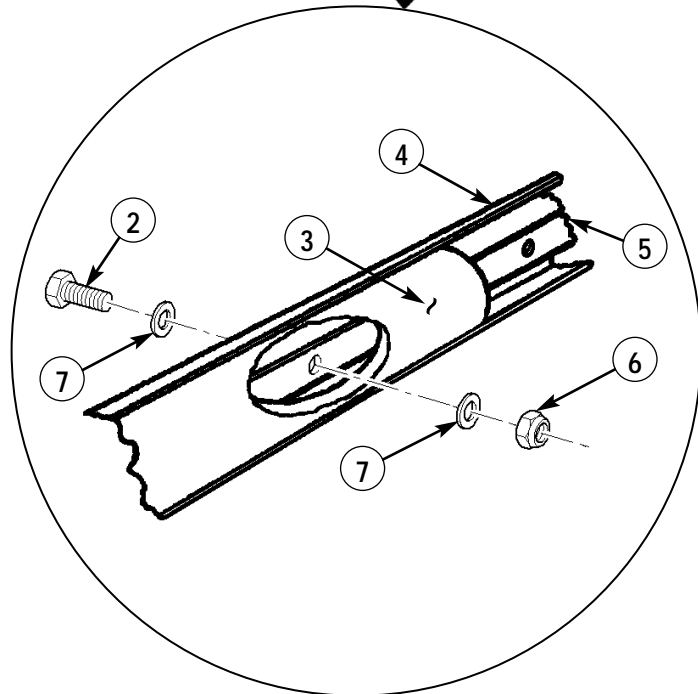
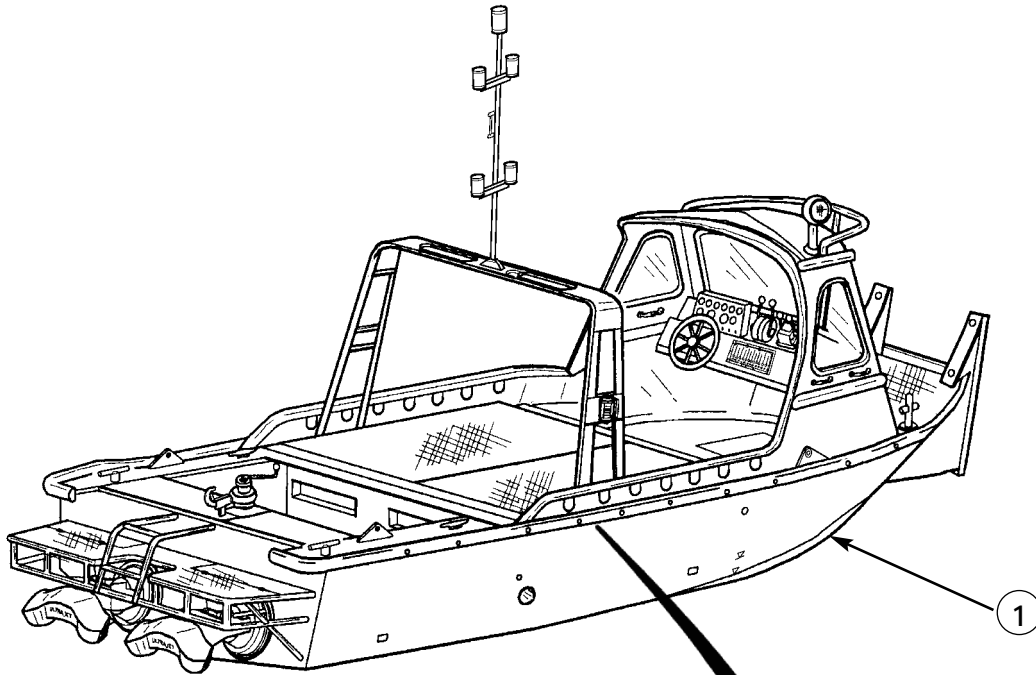
### INSTALLATION

#### **NOTE**

Bolts must be installed from inside of gunwale with bolt heads flush with flange and gunwale so that bolt will not turn when metal insert, fendering, and locknut are attached.

1. Install metal insert (5) inside of fendering (3).
2. Apply coat of antiseize compound to threads of bolts (2).
3. Install fendering (3) and metal insert (5) on gunwale (4) with forty-nine bolts (2), ninety-eight washers (7), and forty-nine new locknuts (6).

FENDERING (RUB RAIL) REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AFT COCKPIT REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Lifting device

##### Materials/Parts

Antiseize compound (item 6, WP 0171 00)

##### Personnel Required

Three

##### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Mast raised and secured (TM 5-1940-322-10) or  
removed (WP 0064 00).

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## AFT COCKPIT REPLACEMENT (Contd)

### **NOTE**

A suitable lifting device or three personnel are required to lift aft cockpit during removal and installation.

It may be necessary to tilt aft cockpit for removal and installation.

### REMOVAL

1. Remove hose clamp (5) and hose (6) from aft cockpit drain (7).
2. Repeat step 1 for other side.
3. Remove four screws (3) and washers (2) from aft cockpit (1).

### **WARNING**

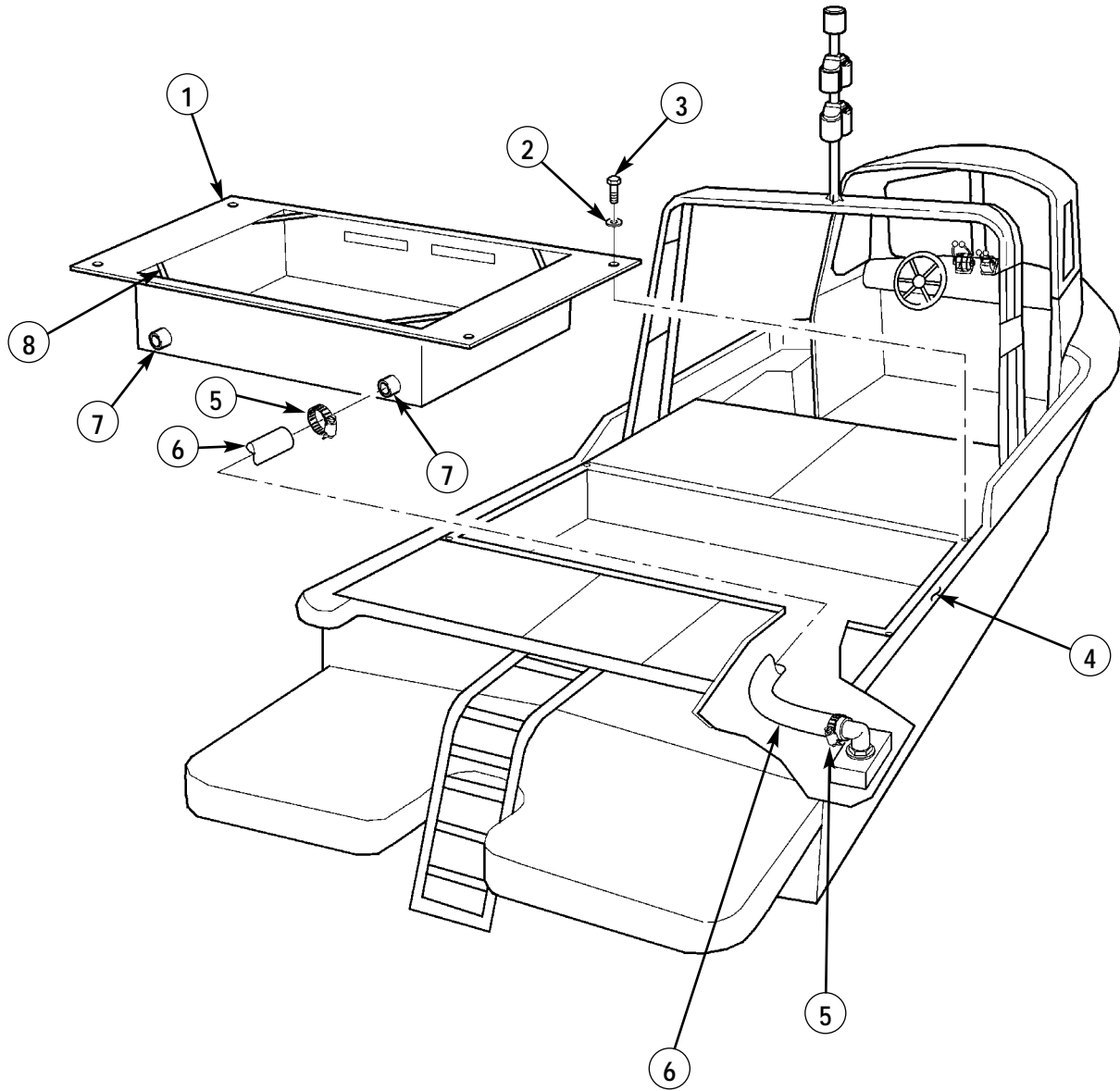
All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

4. Lift aft cockpit (1) using handles (8) provided at each corner until it clears deck area (4) and place on ground.

### INSTALLATION

1. List aft cockpit (1) and place on deck area (4).
2. Align holes on aft cockpit (1) with holes on deck (4).
3. Apply coat of antiseize compound on threads of screws (3).
4. Install aft cockpit (1) on deck (4) with four washers (2) and screws (3).
5. Install hose (6) on aft cockpit drain (7) with hose clamp (5).
6. Repeat step 4 for other side.
7. Close hydrojet hatches (TM 5-1940-322-10).

AFT COCKPIT REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AFT CLEAT REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 55, WP 0173 00)

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## AFT CLEAT REPLACEMENT (Contd)

### NOTE

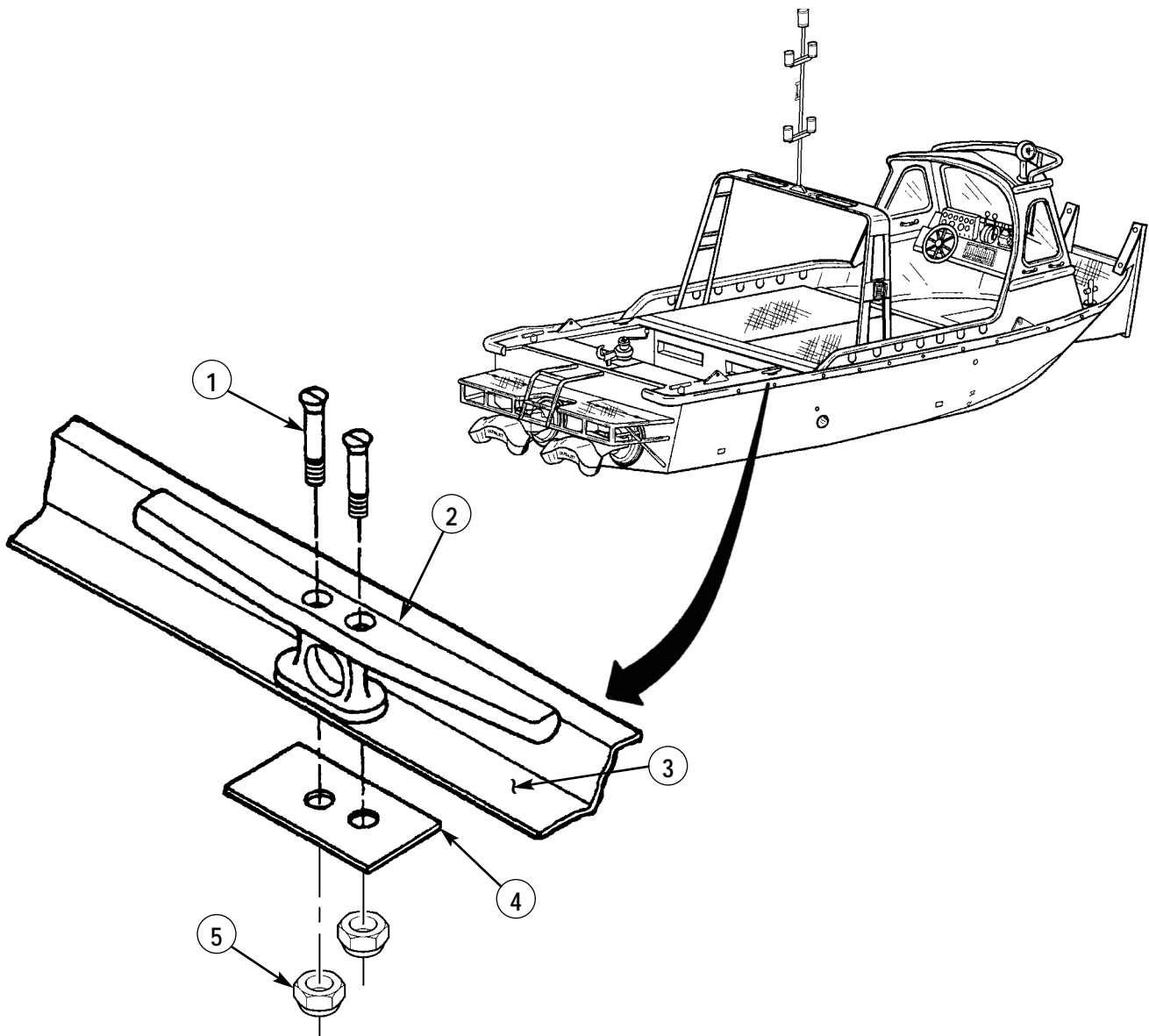
Both aft cleats are replaced the same way. This procedure covers the replacement of one aft cleat.

### REMOVAL

Remove two locknuts (5), metal plate (4), two screws (1) and aft cleat (2) from gunwale (3). Discard locknuts (5).

### INSTALLATION

Secure aft cleat (2) to gunwale (3) using two screws (1), metal plate (4) and two new locknuts (5).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BOAT HOOK CLAMPS REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)

(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four locknuts (item 56, WP 0173 00)

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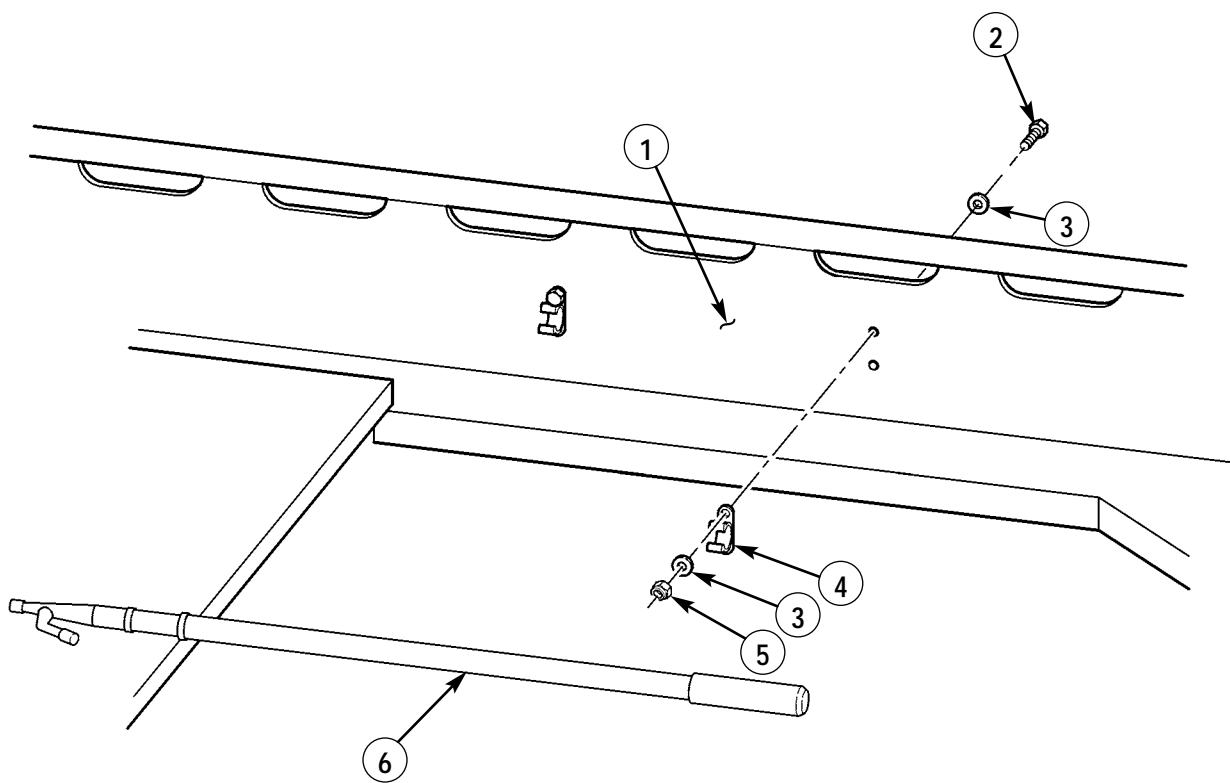
## BOAT HOOK CLAMPS REPLACEMENT (Contd)

### REMOVAL

1. Remove boat hook (6) from clamps (4).
2. Remove four locknuts (5), eight washers (3), two clamps (4), and four screws (2) from hull (1). Discard locknuts (2).

### INSTALLATION

1. Install two clamps (4) on hull (1) with four screws (2), eight washers (3), and four new locknuts (5).
2. Snap boat hook (6) on clamps (4).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAB ASSEMBLY MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Personnel Required

Three

###### References

WP 0013 00

###### Materials/Parts

Adhesive (item 1, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Rubber sheet (item 31, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

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## CAB ASSEMBLY MAINTENANCE (Contd)

### REMOVAL

1. Disconnect searchlight and windshield wiper electrical plug (3) from receptacle at center of control panel.

#### **NOTE**

Four clamps are located outside on forward cab and two clamps are located inside cab rear port and starboard.

2. Release clamps (5) securing cab (2) to deck (1).
3. Using four lifting handles (6), lift cab (2) to clear engine, transmission, and scoop controls. Remove cab (2) from boat.

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

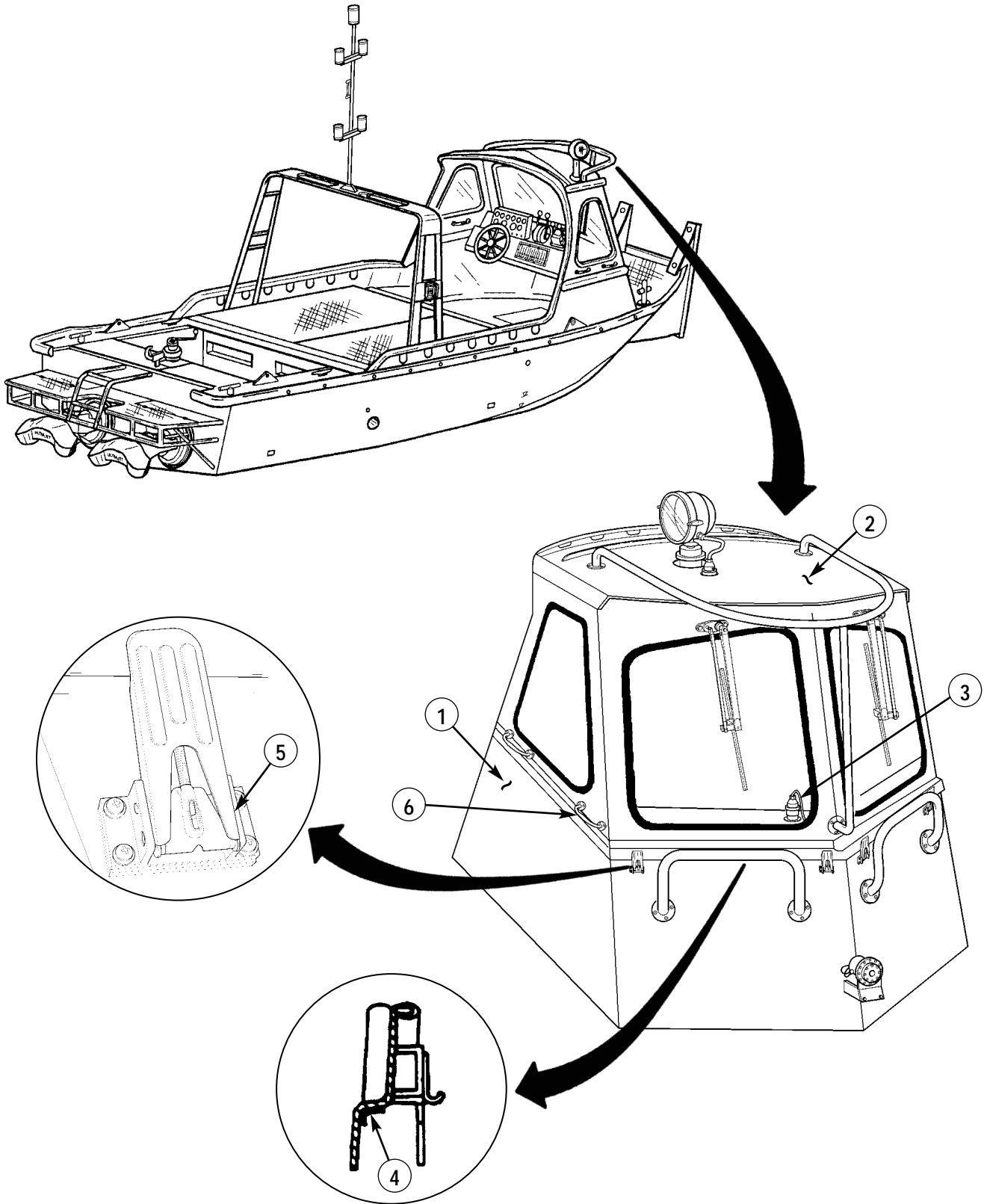
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Inspect rubber seal around cab enclosure for damage. If necessary, remove existing rubber strip (4), clean surface with Skysol 100, dry with cloth, and apply new 1-inch strip of rubber with rubber adhesive to cab mounting joint along length of cab.

### INSTALLATION

1. Using four lifting handles (6), position cab (2) on deck (1).
2. Align and close clamps (5).
3. Connect searchlight and windshield wiper electrical plug (3) to receptacle at center of control panel.

CAB ASSEMBLY MAINTENANCE (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### MKII-S BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### RING BUOY BRACKETS REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)

(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Six locknuts (item 56, WP 0173 00)

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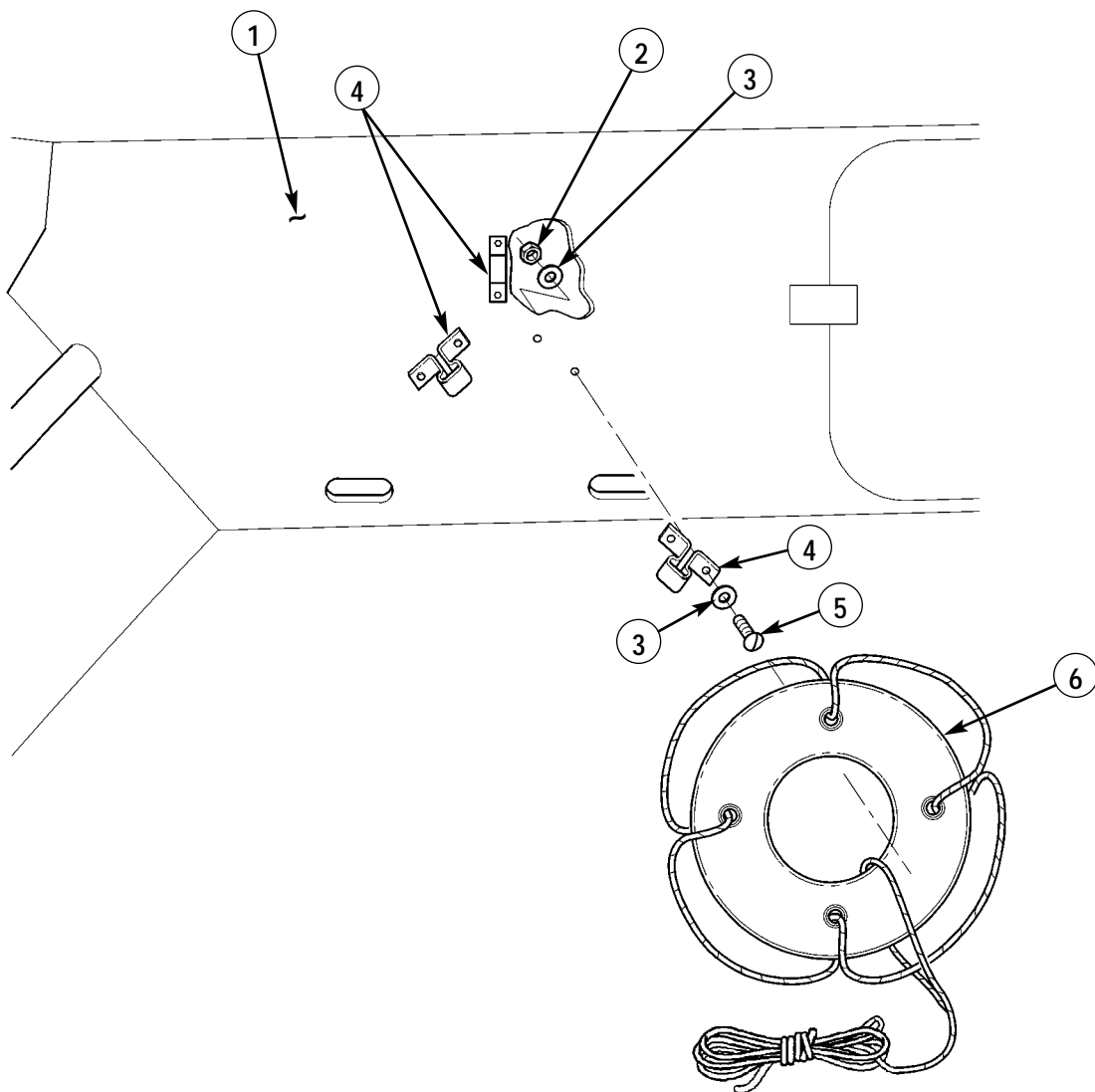
## RING BUOY BRACKETS REPLACEMENT (Contd)

### REMOVAL

1. Remove ring buoy (6) from ring buoy brackets (4).
2. Remove six locknuts (2), twelve washers (3), six screws (5), and three ring buoy brackets (4) from forward cockpit bulkhead (1). Discard locknuts (2).

### INSTALLATION

1. Install three ring buoy brackets (4) on forward cockpit bulkhead (1) with six screws (5), twelve washers (3), and six new locknuts (2).
2. Install ring buoy (6) on ring buoy brackets (4).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HATCHET BRACKETS REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Six locknuts (item 56, WP 0173 00)

##### References

TM 5-1940-322-24P

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## HATCHET BRACKETS REPLACEMENT (Contd)

### NOTE

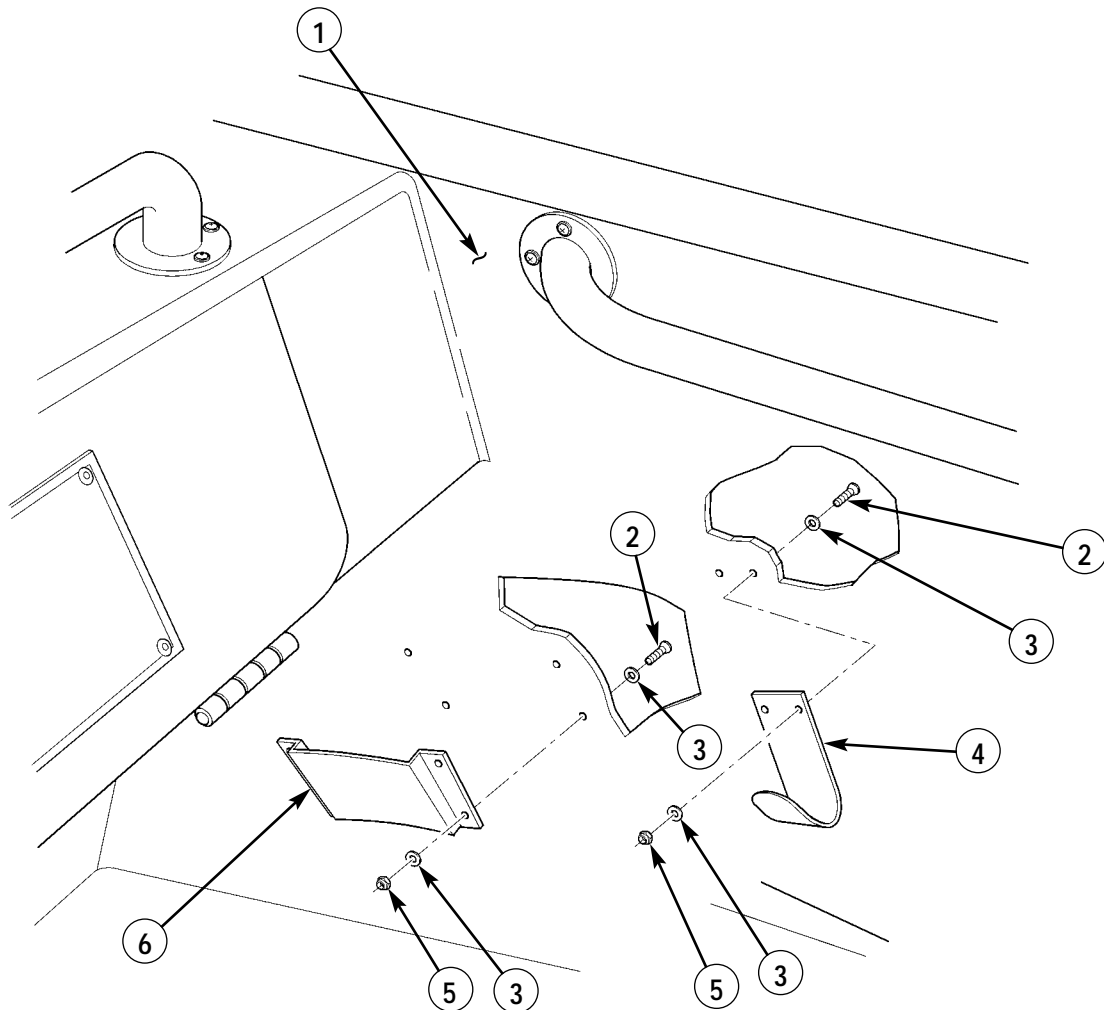
If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

1. Remove four locknuts (5), eight washers (3), four screws (2), and hatchet blade bracket (6) from forward cockpit (1). Discard locknuts (5).
2. Remove two locknuts (5), four washers (3), two screws (2), and hatchet handle bracket (4) from forward cockpit (1). Discard locknuts (5).

### INSTALLATION

1. Install hatchet handle bracket (4) on forward cockpit (1) with two screws (2), four washers (3), and two new locknuts (5).
2. Install hatchet blade bracket (6) on forward cockpit (1) with four screws (2), eight washers (3), and four new locknuts (5).



END OF WORK PACKAGE



## OPERATOR INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAB CLAMP MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four locknuts (item 169, WP 0173 00)

---

## CAB CLAMP MAINTENANCE (Contd)

### **NOTE**

There are six cab clamps on the boat. Four cab clamps are located outside of cab and two are located inside of cab. All cab clamps are replaced the same way. This procedure covers the replacement of one clamp.

### REMOVAL

1. Release clamp (2) from cab (6).
2. Remove four locknuts (3), eight washers (5), four screws (1), spacer (4), and clamp (2). Discard locknuts (3).

### INSTALLATION

1. Align clamp (2) with existing holes in cab (6).
2. Install clamp (2) with spacer (4), four screws (1), eight washers (5), and four new locknuts (3).

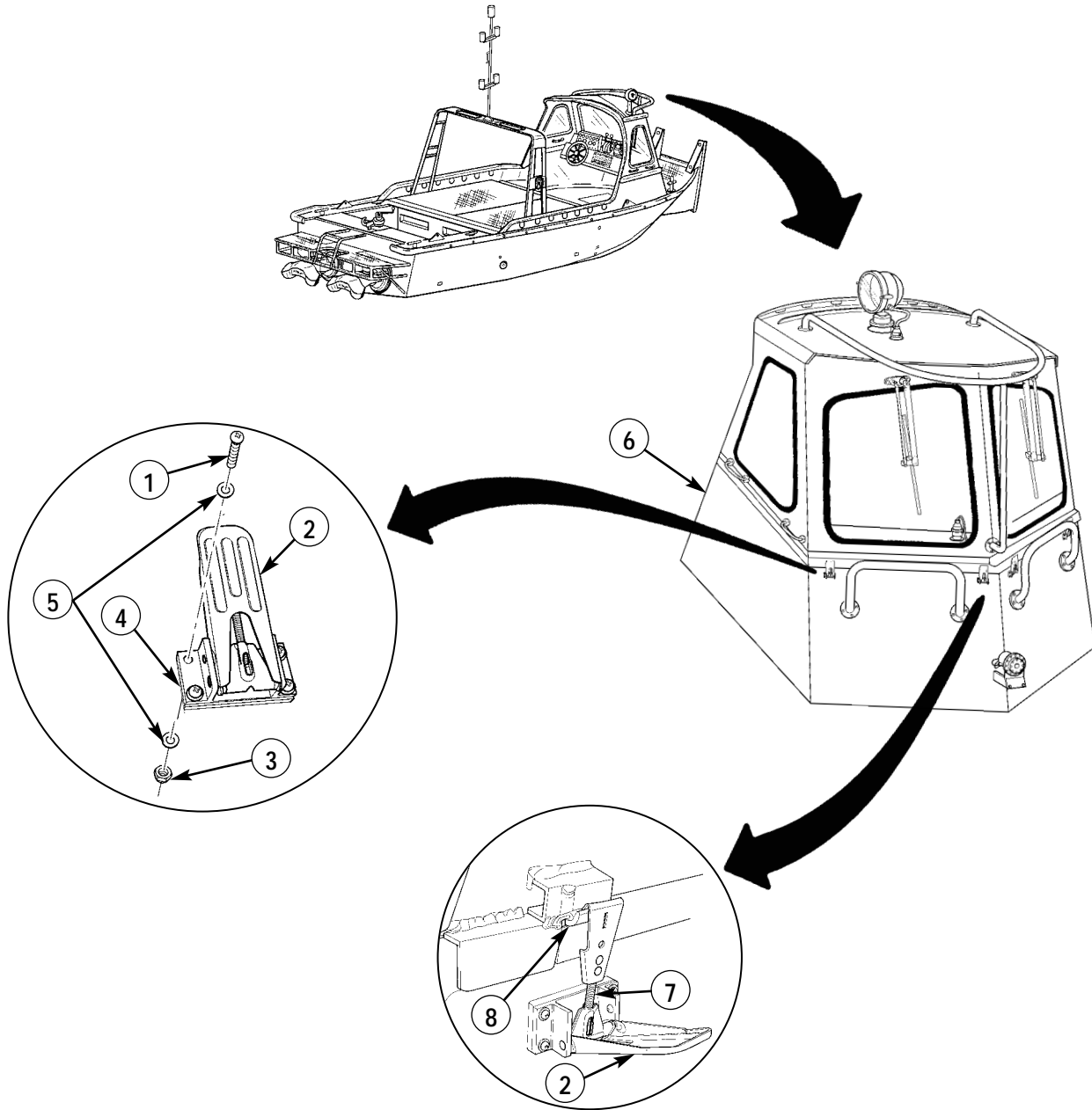
### ADJUSTMENT

### **WARNING**

Use caution when closing clamps. Ensure hands are kept clear of clamping area. Failure to comply may result in injury to personnel.

If necessary, adjust clamp (2) by turning bolt (7) and aligning it with catch (8). Secure cab (6) by closing clamp (2).

### CAB CLAMP MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WINDSHIELD REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Windshield installation kit  
(item 54, WP 0172 00)

##### Personnel Required

Two

##### Equipment Condition

Windshield wiper arms removed (WP 0025 00).

##### Materials/Parts

Seal (item 145, WP 0173 00)  
Rubber filler strip (item 154, WP 0173 00)  
General purpose detergent  
(item 11, WP 0171 00)

---

## WINDSHIELD REPLACEMENT (Contd)

### NOTE

All windshields and side windows are replaced the same way. This procedure covers replacement of one windshield panel.

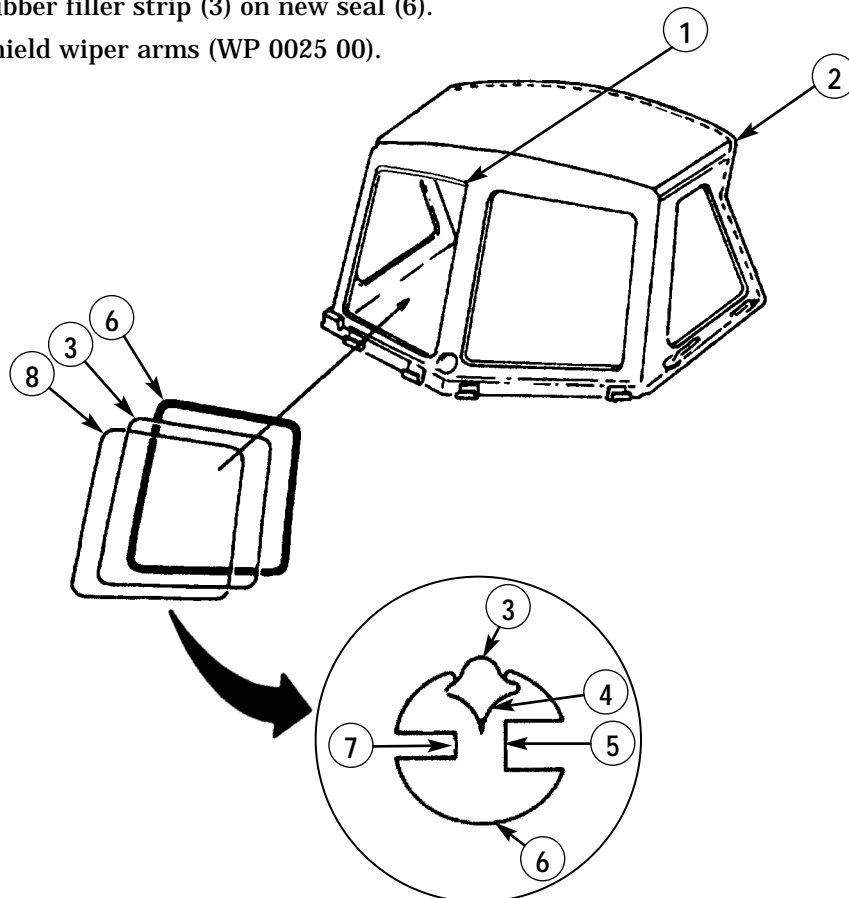
Assistant will help with removal and installation.

### REMOVAL

1. Remove rubber filler strip (3) from seal (6). Discard rubber filler strip (3).
2. Start at corner of windshield frame (1) and remove windshield (8) from seal (6) using windshield kit.
3. Remove seal (6) from windshield frame (1). Discard seal (6).

### INSTALLATION

1. Measure and cut new seal (6) and new rubber filler strip (3) to fit in windshield frame (1).
2. Apply general purpose detergent to new seal (6).
3. Install new seal (6) on windshield frame (1), position seal channel (7) over windshield frame (1) with rubber filler strip channel (4) facing inside of cab (2).
4. Using windshield installation kit, install windshield panel (8) into new seal (6) starting at corner of windshield frame (1) and applying force with windshield kit to seat windshield panel (8) into seal channel (5).
5. Install new rubber filler strip (3) on new seal (6).
6. Install windshield wiper arms (WP 0025 00).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WINDSHIELD WIPER BLADE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cotter pin (item 4, WP 0173 00)

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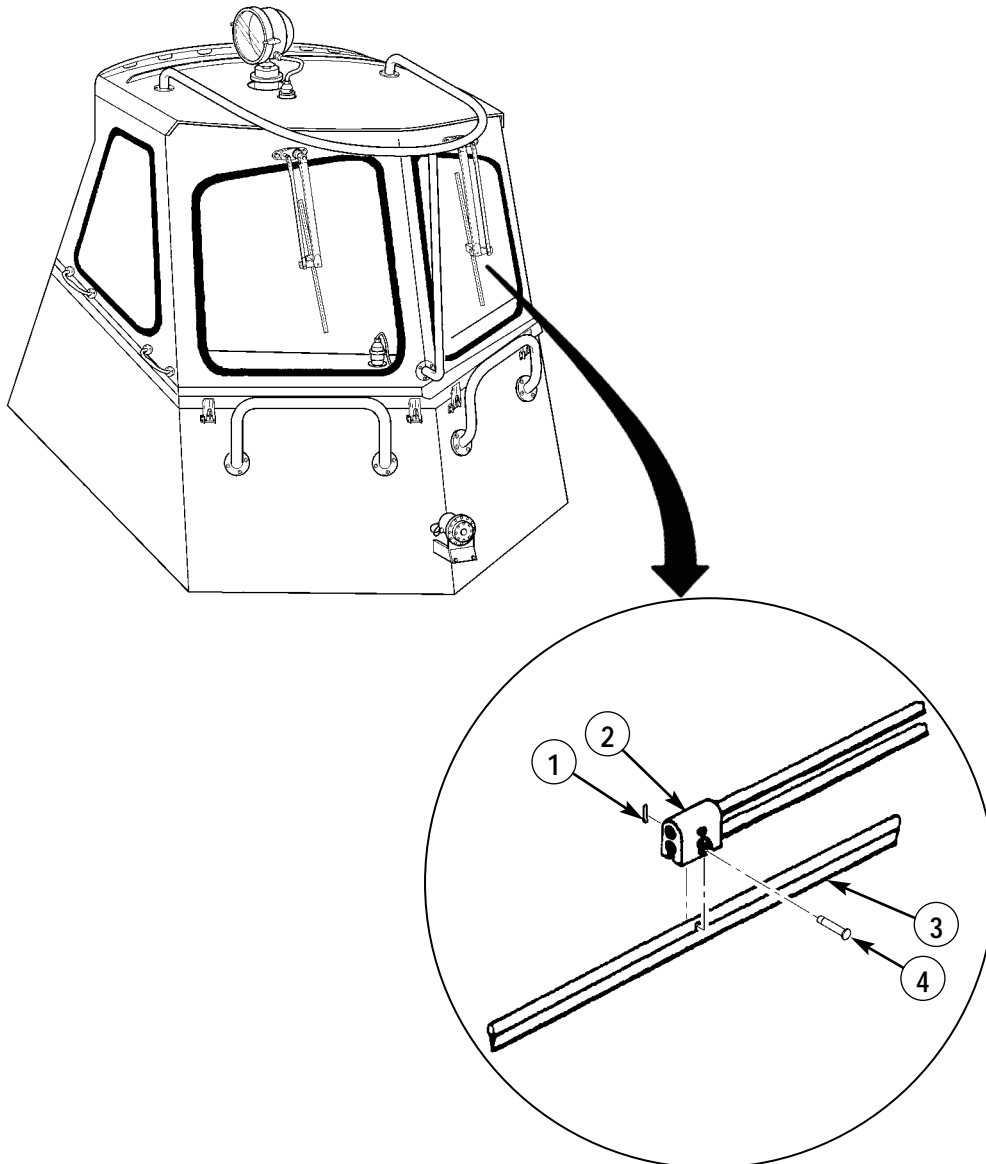
## WINDSHIELD WIPER BLADE REPLACEMENT (Contd)

### REMOVAL

1. Remove cotter pin (1) from wiper blade holding pin (4) located on wiper arm connector (2). Discard cotter pin (1).
2. Remove holding pin (4) from connector (2) and wiper blade (3).

### INSTALLATION

1. Install new holding pin (4) through connector (2) and blade (3).
2. Install new cotter pin (1) into end of holding pin (4). Spread end of new cotter pin (1).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WINDSHIELD WIPER ARM REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### References

TM 5-1940-322-10  
WP 0024 00

---

## WINDSHIELD WIPER ARM REPLACEMENT (Contd)

### **NOTE**

Both wiper arms are replaced the same way. This procedure covers the replacement of one wiper arm.

### REMOVAL

#### **CAUTION**

Hold wiper assembly while removing. Failure to comply may result in damage to equipment.

1. Remove nut (6) and wiper arm (4) from post (1).
2. Remove nut (5) and idler arm (3) from post (2) while holding wiper assembly.
3. Inspect windshield wiper blade for damage, replace if necessary (WP 0024 00).

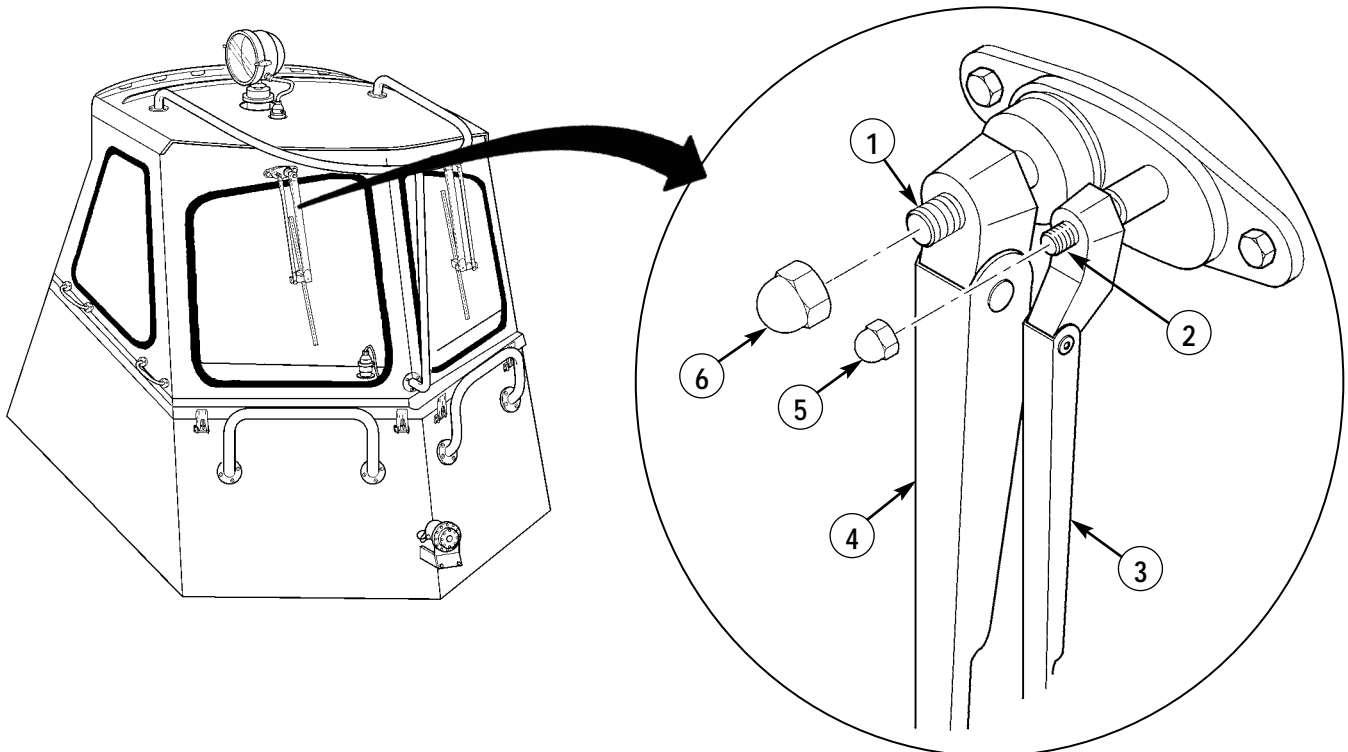
### INSTALLATION

1. Install idler arm (3) on post (2) with nut (5). Tighten nut (5) to 50 lb-in. (5.65 N·m).
2. Install wiper arm (4) on post (1) with nut (6). Tighten nut (6) to 90–110 lb-in. (10.17–12.43 N·m).
3. Install windshield wiper blade (WP 0024 00).

#### **CAUTION**

Do not run wiper on dry windshield for more than one or two strokes. Failure to comply may result in wiper blade and/or windshield damage. Wet down windshield if further testing is required.

4. Test windshield wipers (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WINDSHIELD WIPER MOTOR REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Personnel Required

Two

##### Equipment Condition

Windshield wiper arm removed (WP 0025 00).

##### Materials/Parts

Two lockwashers (item 79, WP 0173 00)

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## WINDSHIELD WIPER MOTOR REPLACEMENT (Contd)

### **NOTE**

Both windshield wiper motors are replaced the same way. This procedure covers the replacement of one windshield wiper motor.

### REMOVAL

1. Disconnect electrical connector (2) from electrical connector (3) on wiper motor (4).

### **NOTE**

Assistant will help with steps 2 and 3.

2. Remove two screws (8), lockwashers (7), washers (6), and mount (5) from cab (1). Discard lockwashers (7).
3. Remove windshield wiper motor (4) from inside cab (1).

### INSTALLATION

### **NOTE**

Assistant will help with step 1.

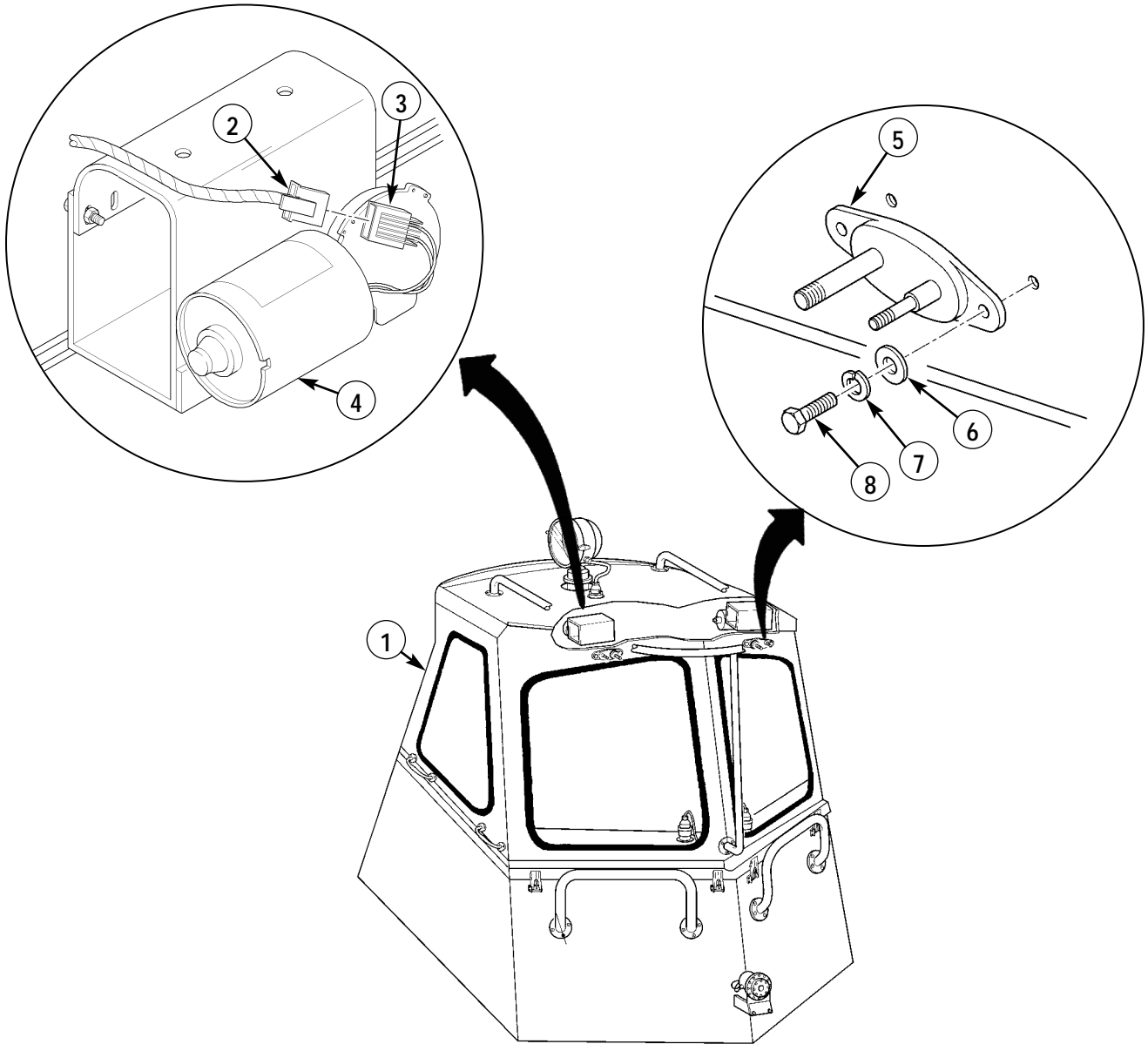
1. Install windshield wiper motor (4) on mount (5) with two washers (6), new lockwashers (7), and screws (8). Tighten screws (8) to 140–180 lb-in (15–20 N·m).
2. Connect electrical connector (2) to electrical connector (3) of wiper motor (4).
3. Install windshield wiper arm (WP 0025 00).

### **CAUTION**

Do not run wiper on dry windshield for more than one or two strokes. Failure to comply may result in wiper blade and/or windshield damage. Wet down windshield if further testing is required.

4. Test windshield wipers (TM 5-1940-322-10).

### WINDSHIELD WIPER MOTOR REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAB LIFTING HANDLE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Six locknuts (item 54, WP 0173 00)

##### References

TM 5-1940-322-24P

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## CAB LIFTING HANDLE REPLACEMENT (Contd)

### NOTE

There are four cab lifting handles on the cab. All cab lifting handles are replaced the same way. This procedure covers the replacement of one cab lifting handle.

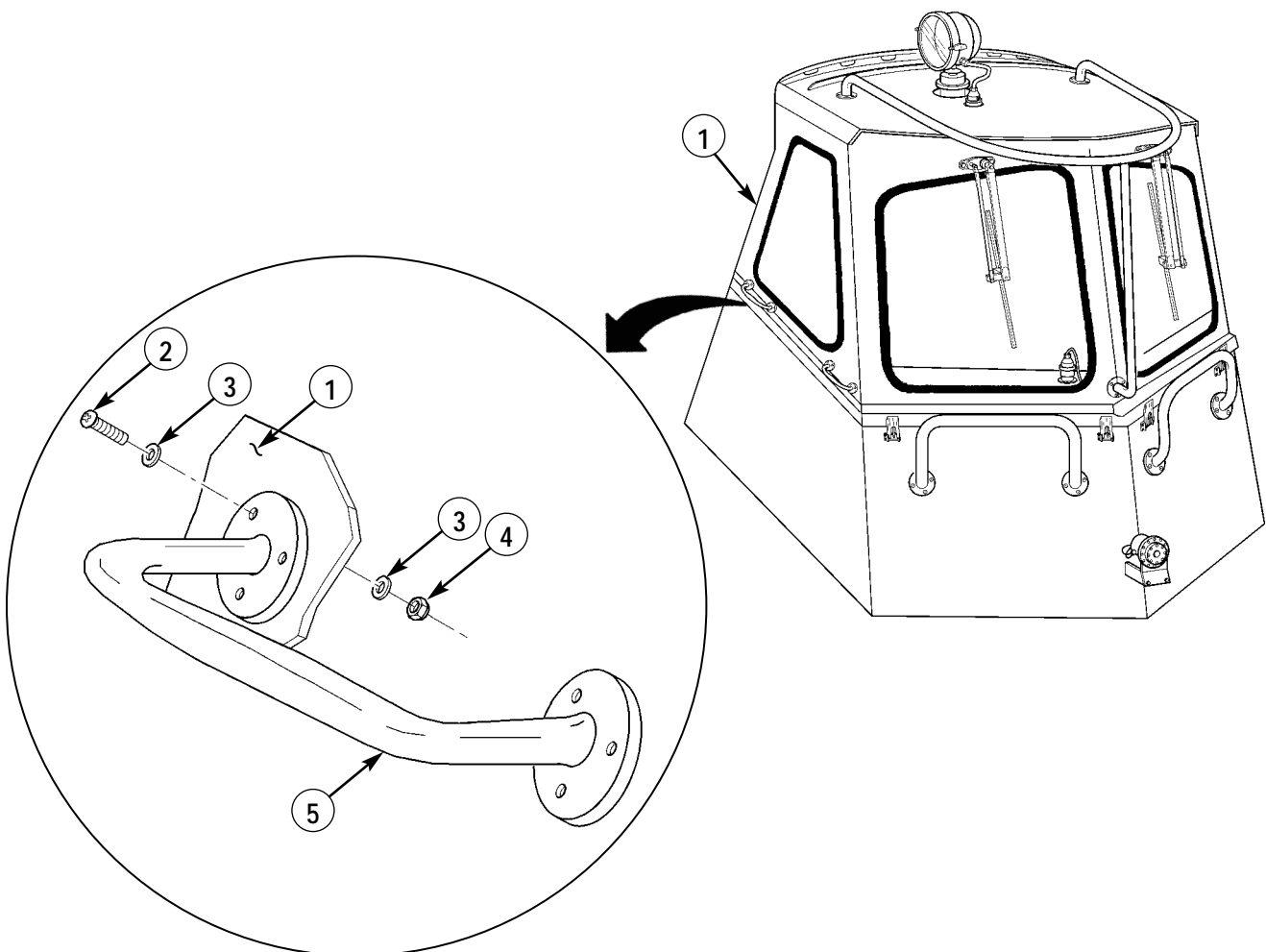
If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

Remove six locknuts (4), twelve washers (3), six screws (2), and cab lifting handle (5) from cab (1). Discard locknuts (4).

### INSTALLATION

Install cab lifting handle (5) on cab (1) with six screws (2), twelve washers (3), and six new locknuts (4).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HANDLE/HANDRAIL REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Eight locknuts (item 54, WP 0173 00)

##### References

TM 5-1940-322-24P

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## HANDLE/HANDRAIL REPLACEMENT (Contd)

### NOTE

All handles/handrails are replaced the same way. This procedure covers the replacement of one handrail.

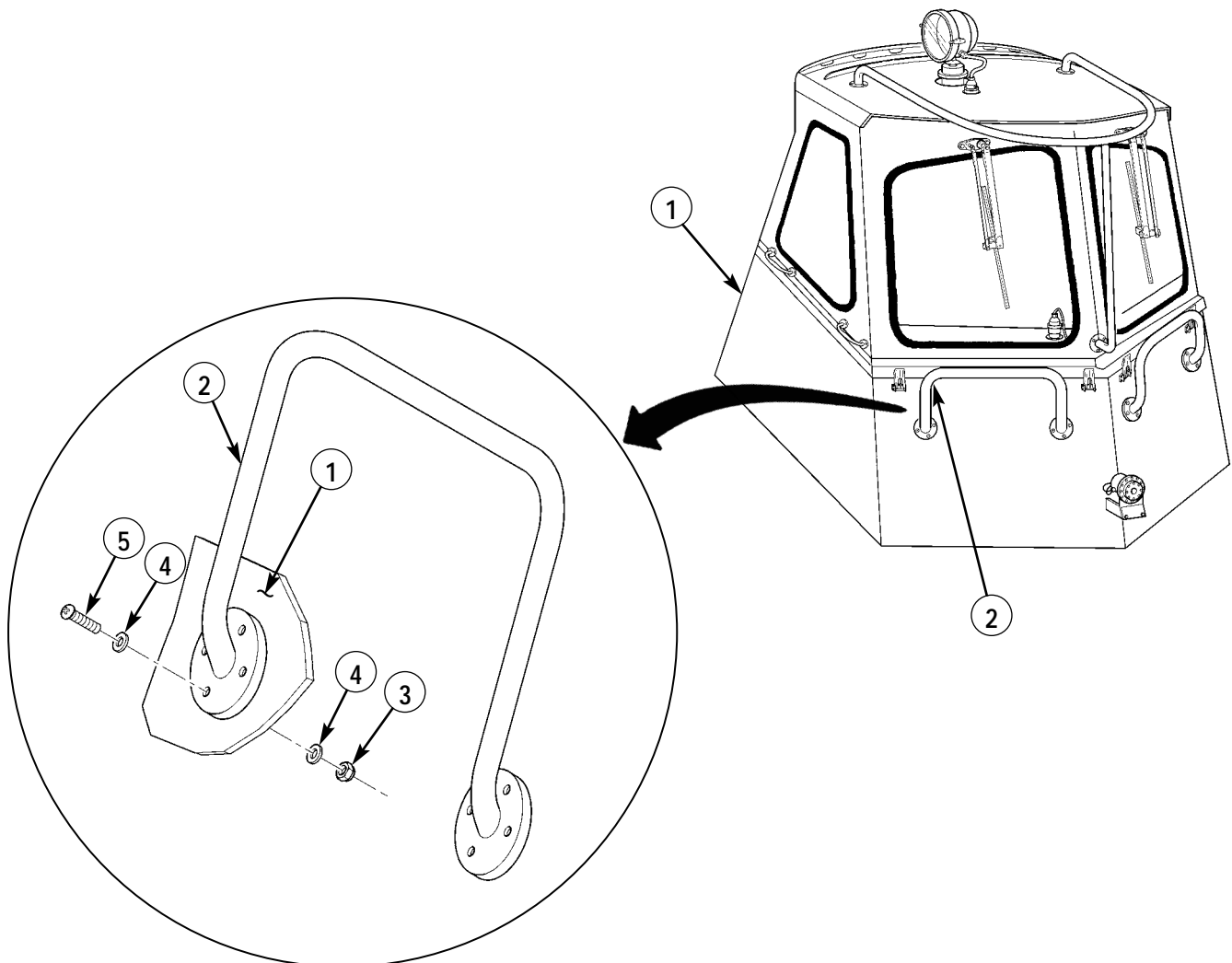
If rivets are present on handrail, drill out and replace rivets with screws, washers, and locknuts. See TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

Remove eight locknuts (3), sixteen washers (4), and eight screws (5) securing handrail (2) on forward cockpit (1). Discard locknuts (3).

### INSTALLATION

Install handrail (2) on forward cockpit (1) with eight screws (5), sixteen washers (4), and eight new locknuts (3).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STEERING WHEEL REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)

(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

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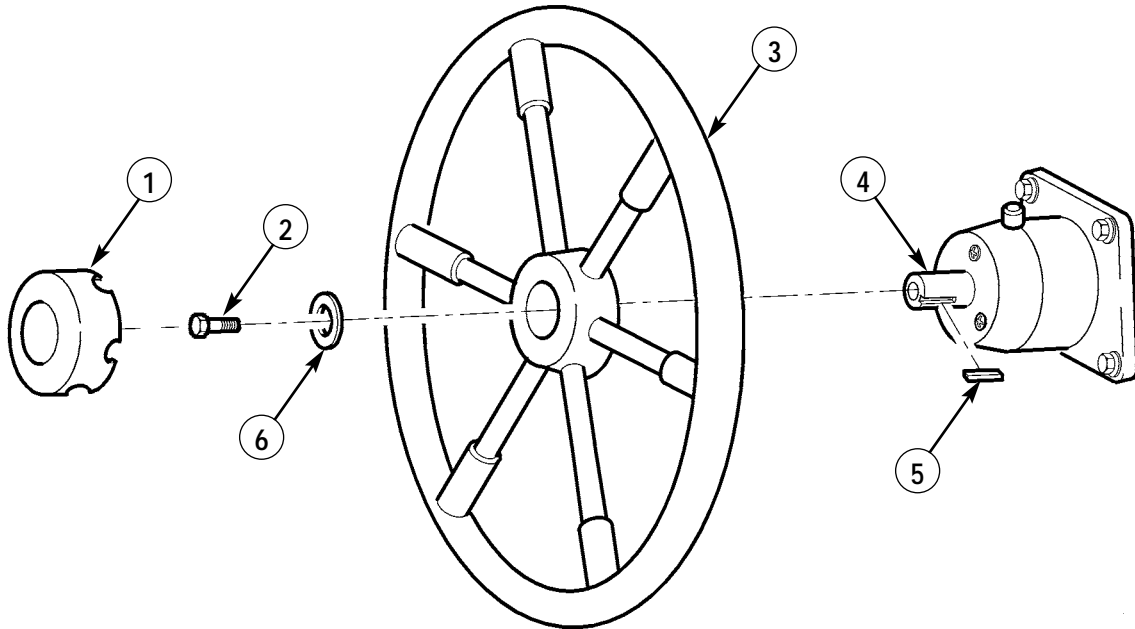
## STEERING WHEEL REPLACEMENT (Contd)

### REMOVAL

1. Remove center cap (1) from steering wheel (3).
2. Remove bolt (2) and washer (6) from shaft (4).
3. Remove steering wheel (3) and key (5) from shaft (4).

### INSTALLATION

1. Install key (5) in shaft (4).
2. Position steering wheel (3) on shaft (4).
3. Secure steering wheel (3) on shaft (4) with washer (6) and bolt (2).
4. Install center cap (1) on steering wheel (3).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STEERING PUMP AND HOSES REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four locknuts (item 53, WP 0173 00)  
Two O-rings (item 170, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Hydraulic fluid (item 18, WP 0171 00)  
Tape (item 39, WP 0171 00)  
Tiedown straps (item 38, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0031 00

###### Equipment Condition

Drain steering system (WP 0012 00).  
Control access panel opened  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

---

## STEERING PUMP AND HOSES REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

### **NOTE**

Two personnel are required for steering pump and hoses replacement.

Tag all hoses during removal to assist with installation.

### REMOVAL

1. Remove center cap (14) from steering wheel (11).
2. Remove bolt (13) and washer (12) from shaft (19).
3. Remove steering wheel (11) and key (18) from shaft (19).

### **NOTE**

Have container ready to catch fluid.

4. Loosen two nuts (10) from adapters (16) on steering pump (17).
5. Disconnect hoses (2) from adapters (16) on steering pump (17).
6. Remove four locknuts (9), eight washers (7), four screws (6), and steering pump (17) from control panel (8). Discard locknuts (9).
7. Loosen two nuts (5) from adapters (3) on steering cylinder (4).
8. Disconnect hoses (2) from adapters (3) on steering cylinder (4) and remove O-rings (15). Discard O-rings (15).
9. Remove tiedown straps as necessary.

### INSTALLATION

### **NOTE**

Tape new hoses to old hoses and pull hoses through following original route, avoiding high points where air could trap.

1. Install and secure hoses (2) in boat (1) with tiedown straps as necessary.
2. Install two new O-rings (15) on adapters (3).
3. Connect two hoses (2) to adapters (3) on steering cylinder (4) and tighten nuts (5).
4. Secure steering pump (17) on control panel (8) with four screws (6), eight washers (7), and four new locknuts (9).
5. Connect two hoses (2) to adapters (16) on steering pump (17) and tighten nuts (10).
6. Install key (18) and steering wheel (11) on shaft (19).
7. Secure steering wheel (11) on shaft (19) with washer (12) and bolt (13).
8. Install center cap (14) to steering wheel (11).
9. Fill and bleed steering system (WP 0031 00).
10. Close and secure control access panel (TM 5-1940-322-10).
11. Close engine hatches (TM 5-1940-322-10).
12. Close hydrojet hatches (TM 5-1940-322-10).







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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STEERING SYSTEM MAINTENANCE

#### FILLING AND BLEEDING

---

##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Hydraulic fluid (item 18, WP 0171 00)  
Plastic 1/4 in. tubing  
Funnel  
Fill adapter 1/2"-20

##### Personnel Required

Three

##### Equipment Condition

Port hydrojet hatch opened and secured  
(TM 5-1940-322-10).

---

## STEERING SYSTEM MAINTENANCE (Contd)

### NOTE

Three personnel are required to fill and bleed the steering system.

### FILLING AND BLEEDING

### NOTE

Have container ready to catch any fluid.

1. Remove filler cap (6) from steering pump (8), and install adapter (5) and hose (4) in filler hole (7).
2. Fill steering system with fluid using a funnel (10) on hose (4).
3. Turn steering wheel (9) slowly in one direction until fluid level drops, check frequently, and top off fluid level.
4. Continue turning steering wheel (9) in same direction until resistance is felt. Top off fluid level.
5. Attach a hose to bleed fitting (3) on steering cylinder (1).

### NOTE

There may be a blowback of air in the hoses, which can expel fluid with force from the filler hole or funnel. A rag held over the top will prevent splashing onto the surrounding areas.

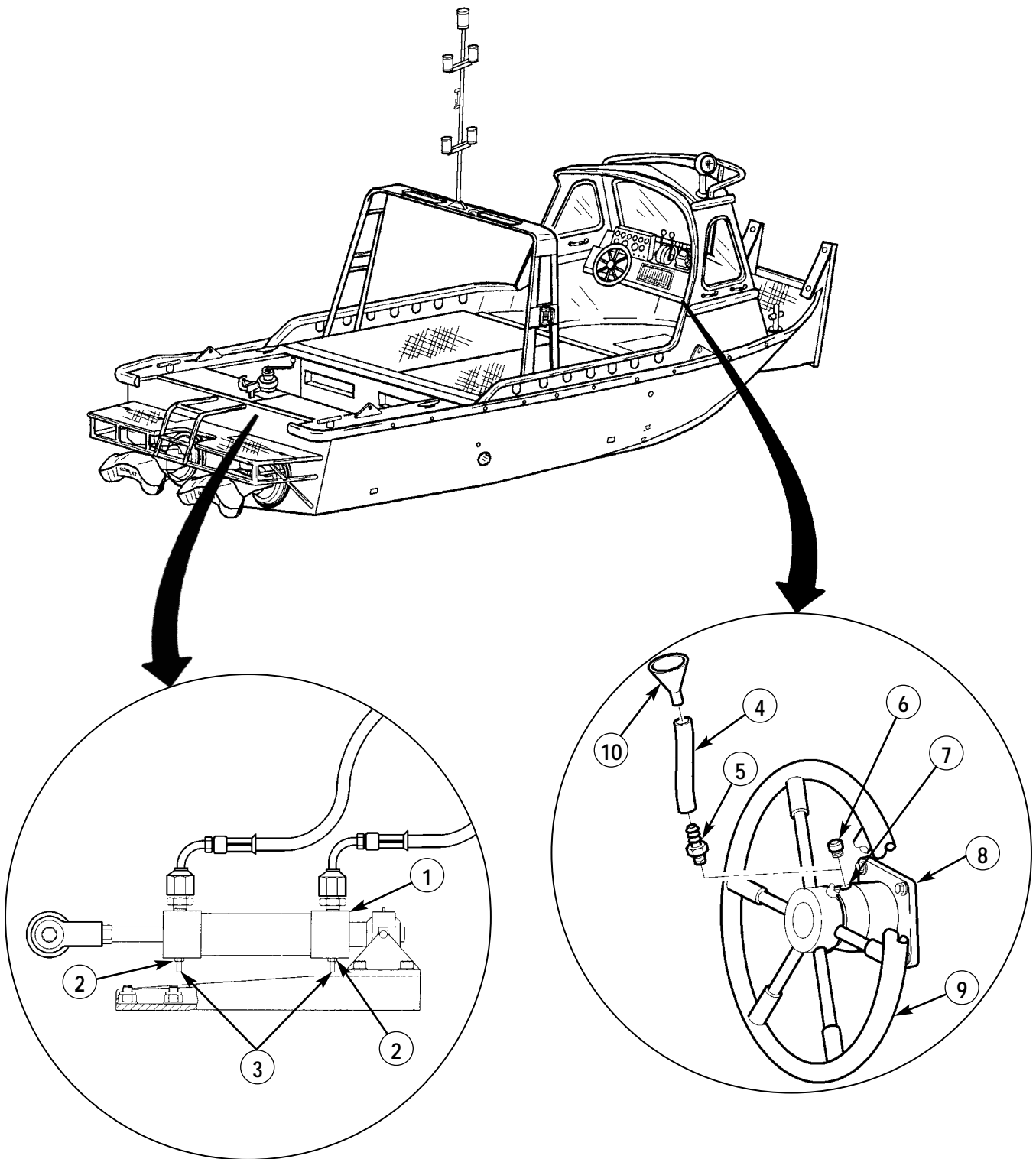
6. Loosen nut (2) to open bleed fitting (3) on steering cylinder side that is under pressure.
7. Continue turning steering wheel (9) in same direction until clear fluid emerges from bleed fitting (3). Top off fluid level.
8. Tighten nut (2) to close bleed fitting (3).
9. Continue turning steering wheel (9) until steering cylinder (1) moves to full extension.
10. Turn steering wheel (9) slowly in opposite direction, check frequently, and top off fluid level.
11. Attach hose to bleed fitting (3) on steering cylinder (1).
12. Loosen nut (2) to open bleed fitting (3) on steering cylinder side that is under pressure.
13. Continue turning steering wheel (9) in same direction until clear fluid emerges from bleed fitting (3). Top off fluid level.

### NOTE

Steering system should be free of air and steering cylinder should operate in both directions when steering wheel is turned.

14. Tighten nuts (2) to 44 lb-in. (5 N·m).
15. Repeat steps 1 thru 14, if all air is not removed.
16. Remove funnel (10), hose (4), and adapter (5) from steering pump (8).
17. Place filler cap (6) on steering pump (8).
18. Close port hydrojet hatch (TM 5-1940-322-10).

STEERING SYSTEM MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE STOP CONTROL CABLE AND HANDLE REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 61, WP 0173 00)  
Cotter pin (item 7, WP 0173 00)

##### Equipment Condition

Control panel access panel opened and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## ENGINE STOP CONTROL CABLE AND HANDLE REPLACEMENT (Contd)

### **NOTE**

Both engine stop control cables and handles are replaced the same way. This procedure covers replacement of one engine stop control cable and one handle.

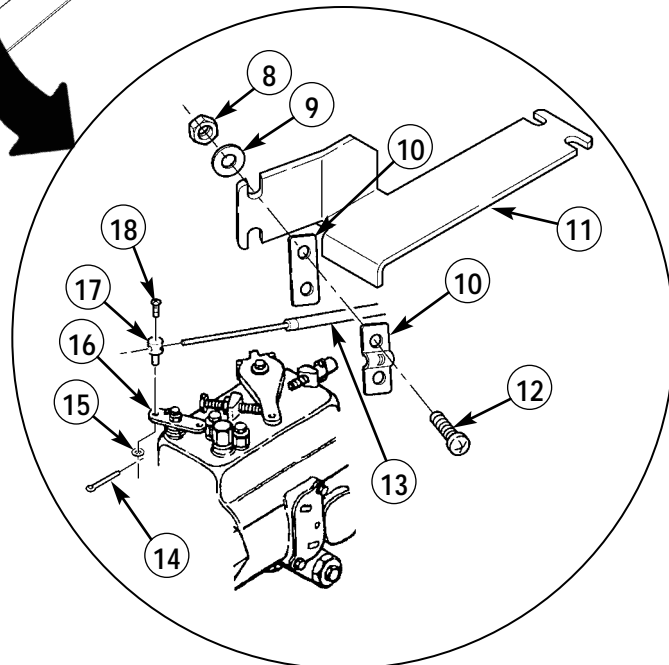
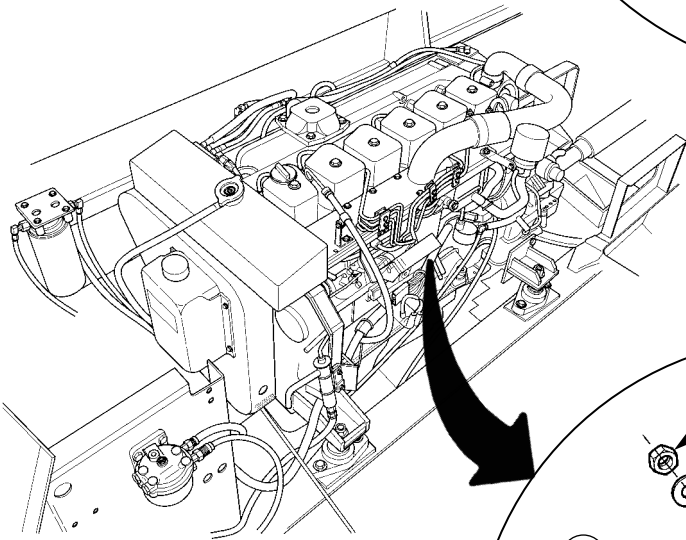
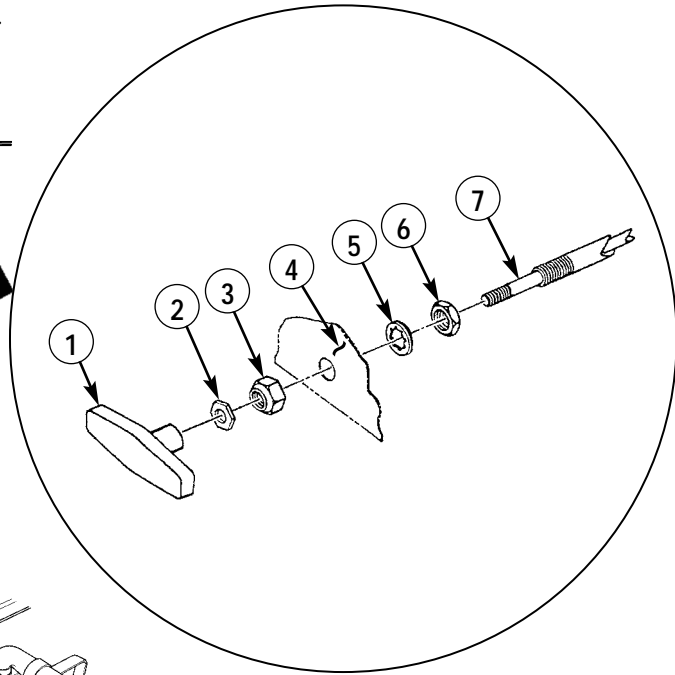
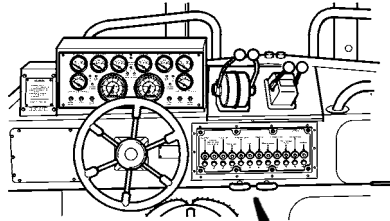
### REMOVAL

1. Remove two locknuts (8), washers (9), cable clamps (10), screws (12) and cable (13) from bracket (11). Discard locknuts (8).
2. Remove screw (18), cotter pin (14), and washer (15) from trunnion (17). Discard cotter pin (14).
3. Remove trunnion (17) from injection pump stop lever (16).
4. Hold nut (2) and remove handle (1) from cable (7).
5. Remove nuts (2) and (3) from cable (7).
6. Remove cable (7) from console panel (4).
7. Remove washer (5) and nut (6) from cable (7).

### INSTALLATION

1. Install nut (6) and washer (5) on cable (7).
2. Position cable (7) through existing hole in console panel (4).
3. Secure cable (7) on console panel (4) with nuts (3) and (2).
4. Hold nut (2) and screw on handle (1).
5. Position handle (1) against console panel (4).
6. Install trunnion (17) on injection pump stop lever (16) with washer (15) and new cotter pin (14).
7. Install cable (13) through trunnion (17).
8. Secure cable (13) on bracket (11) with two screws (12), cable clamps (10), washers (9), and new locknuts (8).
9. Adjust cable (13) and install screw (18) on trunnion (17).
10. Close and secure control panel access panel (TM 5-1940-322-10).
11. Start engine and shut down using engine stop handle (1). If necessary, readjust cable.
12. Close engine hatches (TM 5-1940-322-10).

### ENGINE STOP CONTROL CABLE AND HANDLE REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP CONTROL HEAD ASSEMBLY REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four locknuts (item 54, WP 0173 00)  
Two cotter pins (item 6, WP 0173 00)

##### References

WP 0034 00

##### Equipment Condition

Control panel access panel opened  
(TM 5-1940-322-10).

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## SCOOP CONTROL HEAD ASSEMBLY REPLACEMENT (Contd)

### **NOTE**

Tag all cables during removal to assist with installation. This will allow identification of port and starboard locations.

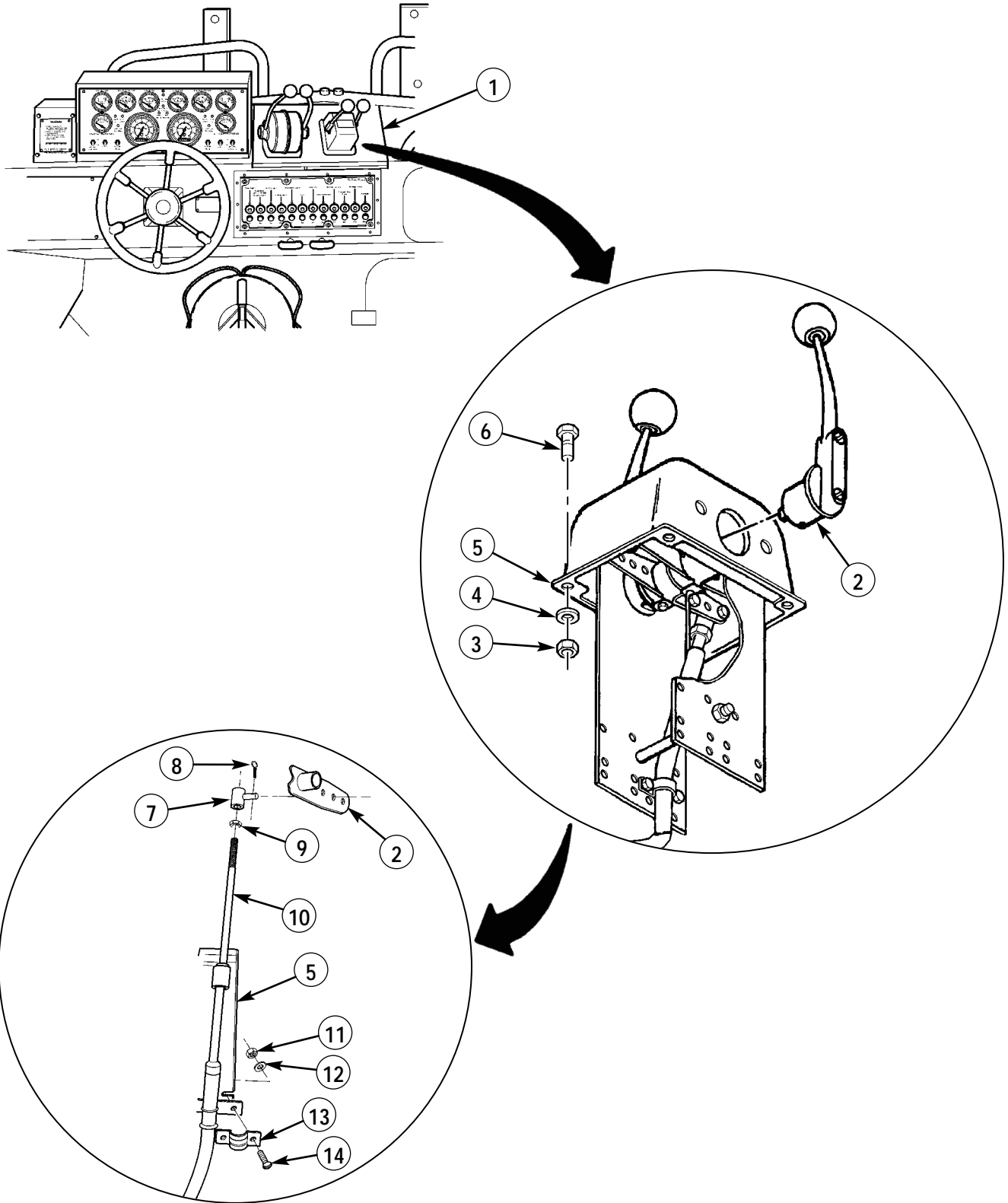
### REMOVAL

1. Remove four screws (6), washers (4), locknuts (3), and control head assembly (5) from control panel (1). Discard locknuts (3).
2. Remove four screws (14), two clamps (13), four washers (12), and nuts (11) from control head assembly (5).
3. Remove two cotter pins (8) from cable ends (7). Discard cotter pins (8).
4. Disconnect cable ends (7) from control head levers (2).
5. Remove cable ends (7) and nuts (9) from cables (10).

### INSTALLATION

1. Install two nuts (9) and cable ends (7) on cables (10).
2. Connect cable ends (7) on control head levers (2).
3. Install two new cotter pins (8) on cable ends (7).
4. Secure cables (10) on control head assembly (5) with four screws (14), two clamps (13), four washers (12), and four nuts (11).
5. Secure control head assembly (5) on control panel (1) with four screws (6), washers (4), four new locknuts (3).
6. If necessary, adjust scoop control cables (WP 0034 00).
7. Close and secure control panel access panel (TM 5-1940-322-10).

### SCOOP CONTROL HEAD ASSEMBLY REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP CONTROL CABLE MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 77, WP 0173 00)  
Tape (item 39, WP 0171 00)  
Tiedown straps (item 38, WP 0171 00)  
Cotter pin (item 5, WP 0173 00)

##### Personnel Required

Two

##### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Scoop control head assembly removed  
(WP 0033 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

## SCOOP CONTROL CABLE MAINTENANCE (Contd)

### NOTE

There are two scoop control cables. Both cables are replaced the same way. This procedure covers the replacement of one scoop control cable.

### REMOVAL

1. Remove cotter pin (13) and pin (12) from clevis (11) and lever (14). Discard cotter pin (13).
2. Remove two screws (8), cable clamp (7), plate (6), washers (4), and locknuts (3) from bracket (2). Discard locknuts (3).
3. Remove clevis (11) and nut (10) from cable (9).
4. Remove cable (9) from boat (1).

### INSTALLATION

### NOTE

Attach new cable to existing cable with tape to assist with installation.

1. Install cable (9) on boat (1).
2. Install nut (10) and clevis (11) on cable (9). Tighten nut (10).
3. Install clevis (11) on lever (14) with pin (12) and new cotter pin (13).
4. Secure cable (9) on bracket (2) with two screws (8), cable clamp (7), plate (6), two washers (4), and two new locknuts (3).
5. Install scoop control head assembly (WP 0033 00).
6. Secure cable (9) on boat (1) with tiedown straps as necessary.

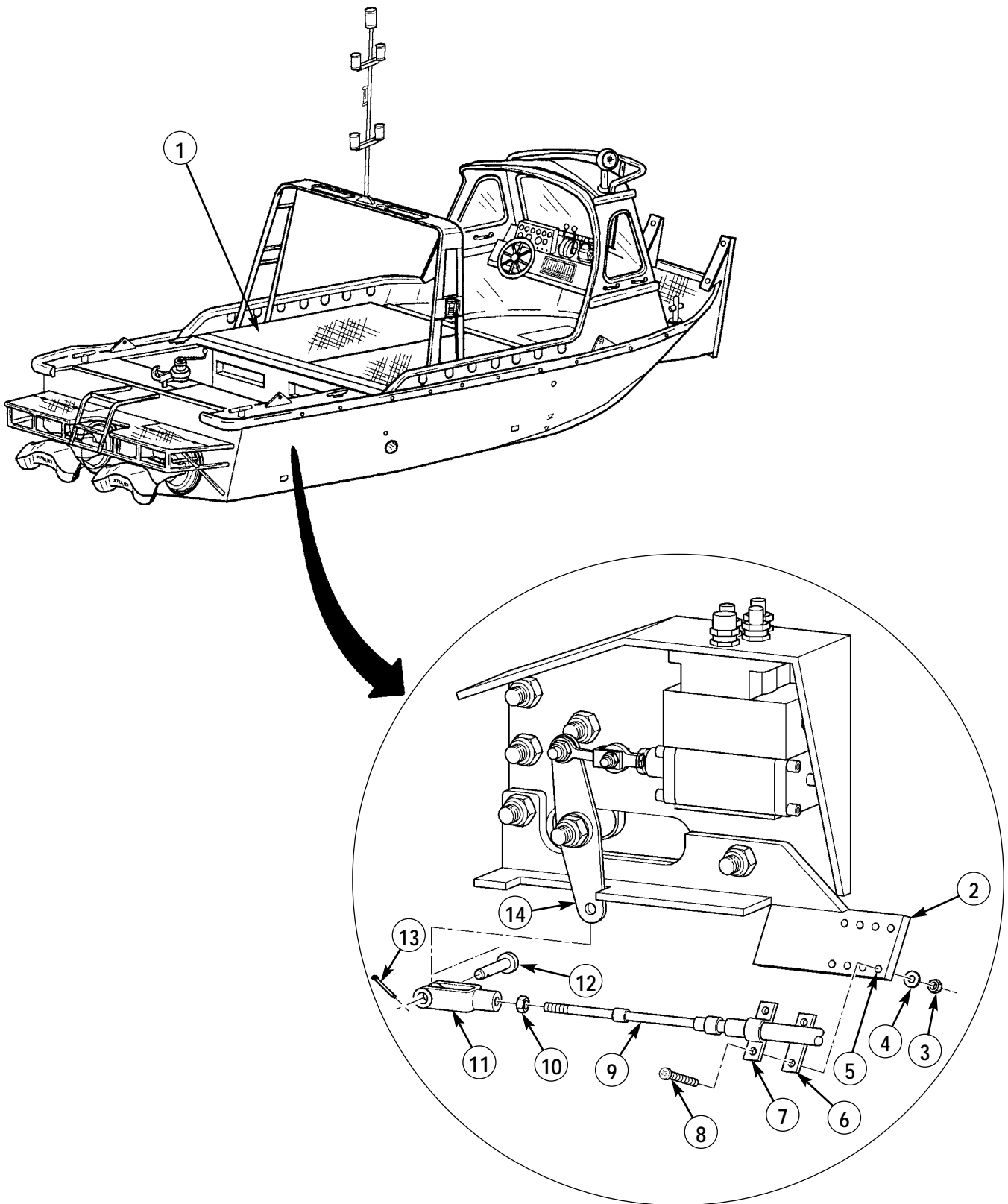
### ADJUSTMENT

### NOTE

Clevis must be disconnected to check travel.

1. Ensure that cable travel is 3 in. when scoop control head is moved from full ahead to full astern.
2. If cable does not travel 3 in., ensure cable clamp (7) is installed on bracket (2) in correct position (5).
3. Install aft cockpit (WP 0016 00).
4. Close hydrojet hatches (TM 5-1940-322-10).
5. Close battery hatch (TM 5-1940-322-10).
6. Close engine hatches (TM 5-1940-322-10).

### SCOOP CONTROL CABLE MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### THROTTLE/TRANSMISSION CONTROL HEAD ASSEMBLY REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four locknuts (item 54, WP 0173 00)  
Two cotter pins (item 7, WP 0173 00)  
Two E-clips (item 8, WP 0173 00)

##### References

WP 0036 00  
WP 0037 00

##### Equipment Condition

Control panel access panel opened  
(TM 5-1940-322-10).

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## THROTTLE/TRANSMISSION CONTROL HEAD ASSEMBLY REPLACEMENT (Contd)

### NOTE

Tag all cables during removal to assist with installation.

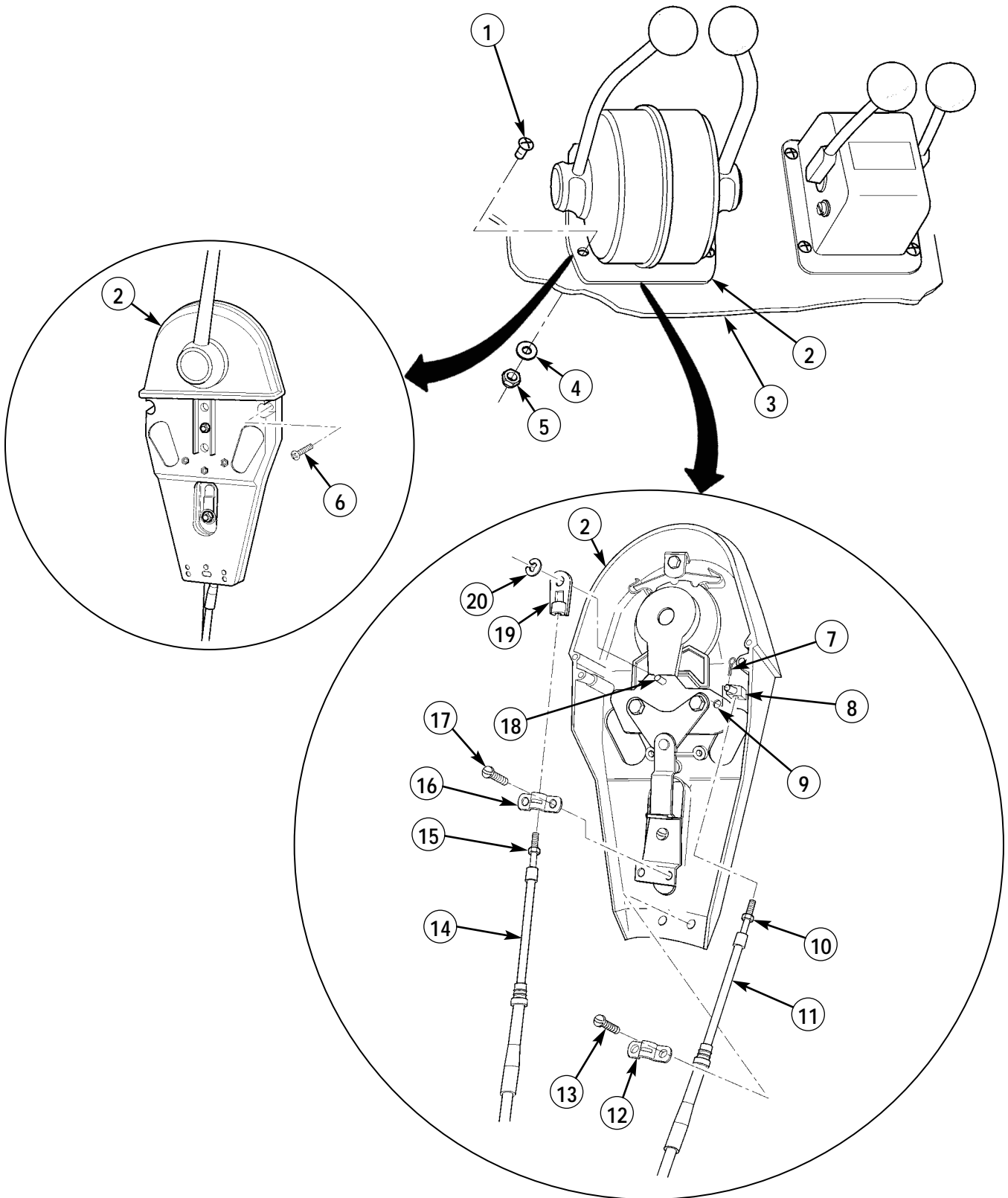
### REMOVAL

1. Remove four screws (1), four washers (4), four locknuts (5), and control head assembly (2) from control panel (3). Discard locknuts (5).
2. Remove two screws (6) from control head assembly (2). Separate control head assembly (2).
3. Remove two screws (17) and throttle control cable clamp (16) from control head (2).
4. Remove E-clip (20) from throttle control lever (18). Discard E-clip (20).
5. Disconnect throttle control cable end (19) from throttle control head lever (18).
6. Remove throttle control cable end (19) from throttle control cable (14).
7. Remove nut (15) from throttle control cable (14).
8. Remove two screws (13) and transmission control cable clamp (12) from control head (2).
9. Remove cotter pin (7) from transmission control cable end (8). Discard cotter pin (7).
10. Disconnect transmission control cable end (8) from transmission control head lever (9).
11. Remove cable end (8) from transmission control cable (11).
12. Remove nut (10) from transmission control cable (11).
13. Perform steps 3 through 12 for remaining half of control head assembly (2).

### INSTALLATION

1. Install nut (10) on transmission control cable (11).
2. Install cable end (8) on transmission control cable (11).
3. Connect transmission control cable end (8) on transmission control head lever (9).
4. Install new cotter pin (7) on transmission control cable end (8).
5. Secure transmission control cable (11) on control head (2) with cable clamp (12) and two screws (13).
6. Install nut (15) on throttle control cable (14).
7. Install cable end (19) on throttle control cable (14).
8. Connect throttle control cable end (19) on throttle control head lever (18).
9. Secure throttle control cable (14) on control head (2) with cable clamp (16) and two screws (17).
10. Install new E-clip (20) on throttle control head lever (18).
11. Perform steps 1 through 11 for remaining half of control head assembly (2).
12. Secure control head halves (2) together with two screws (6).
13. Install control head assembly (2) on control panel (3) with four screws (1), washers (4), and new locknuts (5).
14. If necessary, adjust transmission control cable (WP 0037 00).
15. If necessary, adjust throttle control cable (WP 0036 00).
16. Close and secure control panel access panel (TM 5-1940-322-10).

### THROTTLE/TRANSMISSION CONTROL HEAD ASSEMBLY REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### THROTTLE CONTROL CABLE MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Three locknuts (item 54, WP 0173 00)  
Tape (item 39, WP 0171 00)  
Tiedown straps (item 38, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0035 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Throttle/transmission control head assembly  
removed (WP 0035 00).

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## THROTTLE CONTROL CABLE MAINTENANCE (Contd)

### NOTE

There are two throttle control cables. Both cables are replaced the same way. This procedure covers replacement of one throttle control cable.

### REMOVAL

1. Remove two screws (5), cable clamp (4), washers (7), and locknuts (8) from bracket (6). Discard locknuts (8).
2. Pull sleeve (13) back on cable end (1) and disconnect from ball stud (12).
3. Loosen nut (2) on cable (3).
4. Remove cable end (1) and nut (2) from cable (3).
5. Remove locknut (9), washer (10), and ball stud (12) from injector pump lever (11). Discard locknut (9).
6. Remove cable (3) from boat.

### NOTE

Attach new cable to existing cable with tape to assist with installation.

### INSTALLATION

1. Install cable (3) on boat.
2. Secure ball stud (12) on injector pump lever (11) with washer (10) and new locknut (9).
3. Install nut (2) and cable end (1) on cable (3).
4. Position sleeve (13) back on cable end (1) and connect on ball stud (12).
5. Secure cable (3) on bracket (6) with two screws (5), cable clamp (4), washers (7), and new locknuts (8).
6. Install control head assembly (WP 0035 00).
7. Secure cable (3) with tiedown straps.

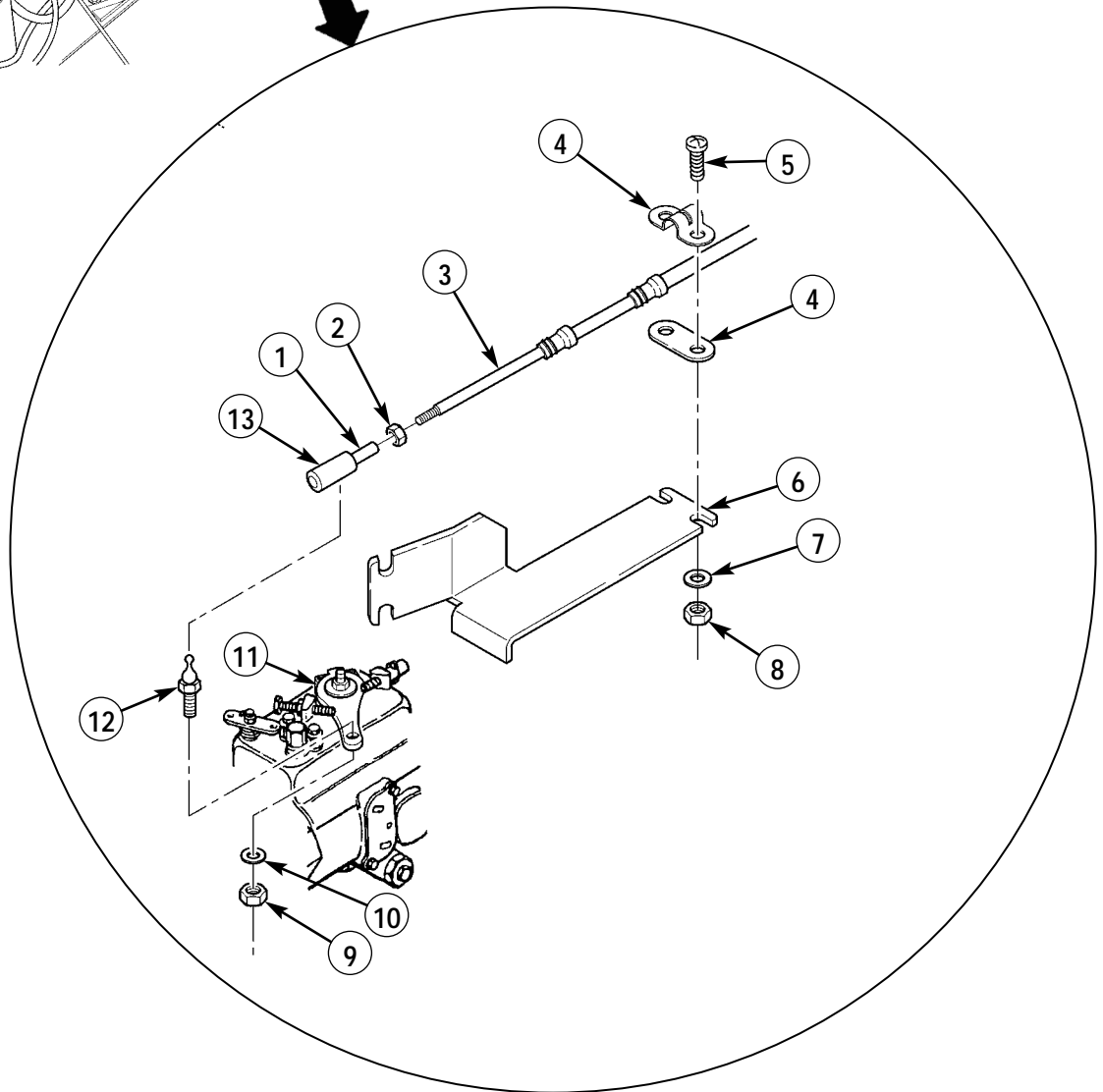
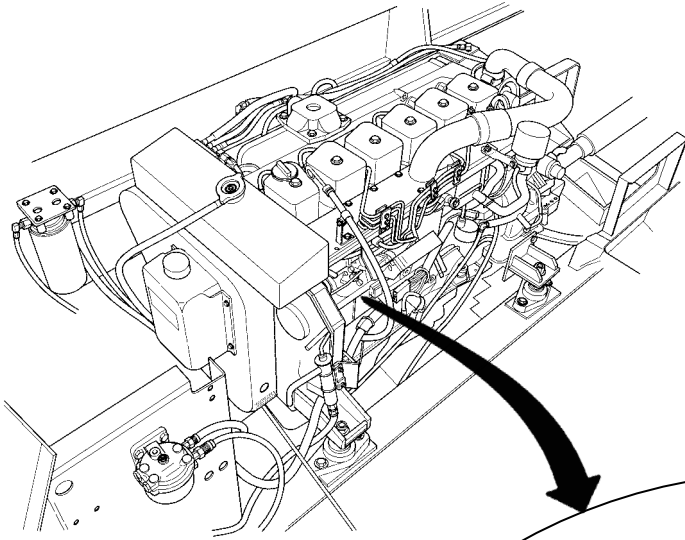
### ADJUSTMENT

### NOTE

Adjustment of cable requires two personnel.

1. Loosen nut (2) on cable (3).
2. Position sleeve (13) on cable end (1) and disconnect from ball stud (12).
3. Position throttle/transmission control head assembly to full throttle (TM 5-1940-322-10).
4. Position injector pump lever (11) to full throttle.
5. Rotate cable end (1) to adjust cable length. Ensure cable travel is 3 inches.
6. Position sleeve (13) on cable end (1) and connect on ball stud (12).
7. Tighten nut (2) on cable (3).
8. Close engine hatches (TM 5-1940-322-10).

### THROTTLE CONTROL CABLE MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION CONTROL CABLE MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Three locknuts (item 54, WP 0173 00)  
Tape (item 39, WP 0171 00)  
Tiedown straps (item 38, WP 0171 00)

##### Personnel Required

Two

##### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Throttle/transmission control head assembly  
removed (WP 0035 00).

---

## TRANSMISSION CONTROL CABLE MAINTENANCE (Contd)

### NOTE

Both transmission control cables are replaced the same way. This procedure covers replacement of one transmission control cable.

### REMOVAL

1. Remove tiedown straps as necessary.
2. Remove two screws (1), cable clamp (2), two washers (12), and two locknuts (11) from bracket (13). Discard locknuts (11).
3. Pull sleeve (5) back on cable end (10) and disconnect from ball stud (6).
4. Loosen nut (4) on cable (3).
5. Remove cable end (10) and nut (4) from cable (3).
6. Remove locknut (7), washer (8), and ball stud (6) from transmission control lever (9). Discard locknut (7).
7. Remove cable (3) from boat.

### NOTE

Attach new cable to existing cable with tape to assist with installation.

### INSTALLATION

1. Install cable (3) on boat.
2. Install ball stud (6) on transmission control lever (9) with washer (8) and new locknut (7).
3. Install nut (4) and cable end (10) on cable (3).
4. Pull sleeve (5) back on cable end (10) and connect on ball stud (6).
5. Secure cable (3) on bracket (13) with two screws (1), cable clamp (2), two washers (12), and two new locknuts (11).
6. Install throttle/transmission control head assembly (WP 0035 00).
7. Secure cable (3) on boat with tiedown straps as necessary.

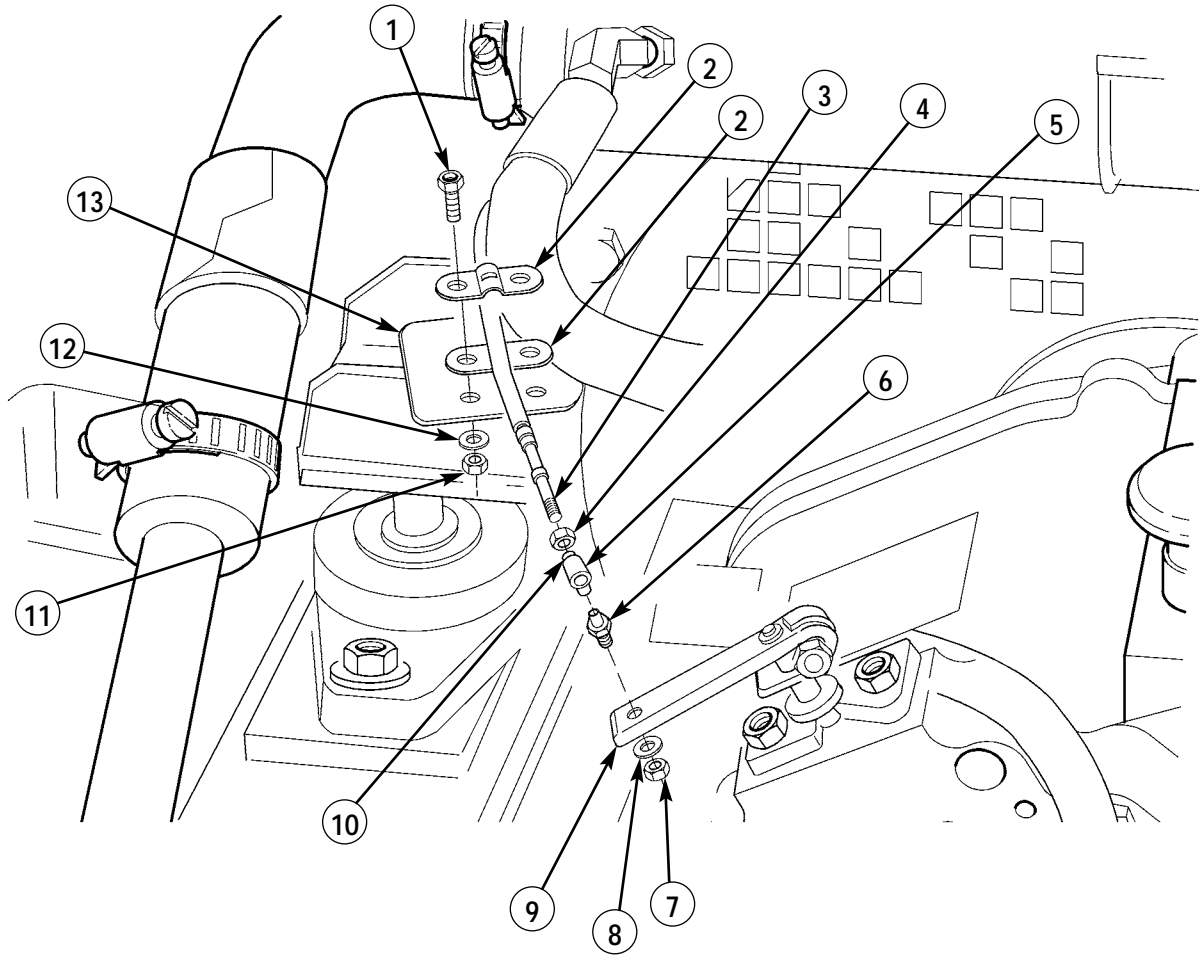
### ADJUSTMENT

### NOTE

Adjustment of cable requires two personnel.

1. Loosen nut (4) on cable (3).
2. Position sleeve (5) on cable end (10) and disconnect ball stud (6).
3. Position throttle/transmission control head assembly in neutral (TM 5-1940-322-10).
4. On transmission, position control lever (9) in neutral.
5. Rotate cable end (10) to adjust cable length. Ensure cable travel is 3 inches.
6. Position sleeve (5) on cable end (10) and connect ball stud (6).
7. Tighten nut (4) on cable end (10).
8. Install aft cockpit (WP 0016 00).
9. Close engine hatches (TM 5-1940-322-10).

TRANSMISSION CONTROL CABLE MAINTENANCE (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INSTRUMENT PANEL REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Tiedown straps (item 38, WP 0171 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).

Battery ground cables disconnected  
(WP 0054 00).

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## INSTRUMENT PANEL REPLACEMENT (Contd)

### **CAUTION**

Ensure instrument panel is supported during removal and installation. Failure to comply may result in damage to equipment.

### **NOTE**

Tag all connectors during removal to assist with installation. Remove tiedown straps as necessary.

## REMOVAL

### **CAUTION**

Use caution when removing instrument panel from control console. Failure to comply may result in damage to equipment.

1. Remove six screws (2) and instrument panel (1) from control console (3).
2. Disconnect five electrical connectors (4) from instrument panel (1).
3. Disconnect port and starboard engine wiring harnesses (5) and (6) from instrument panel harnesses (7).

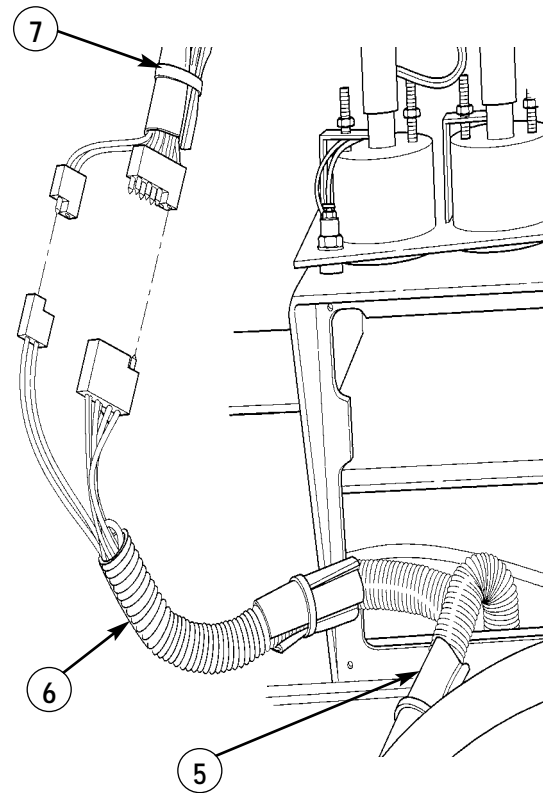
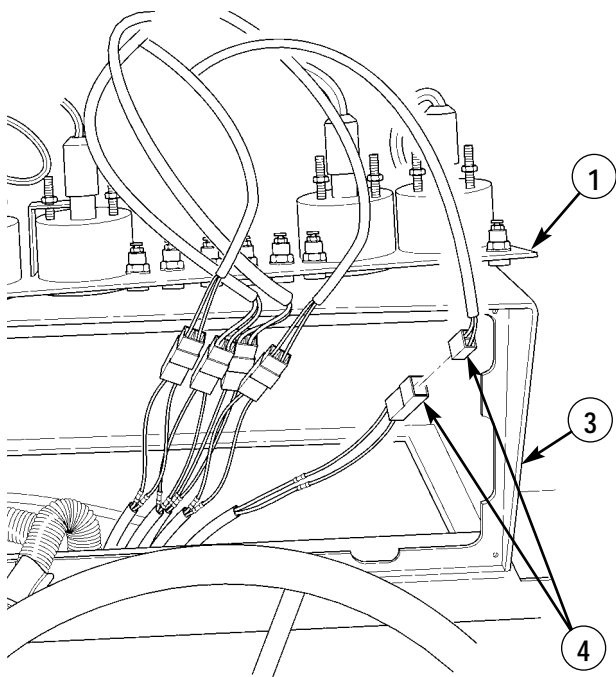
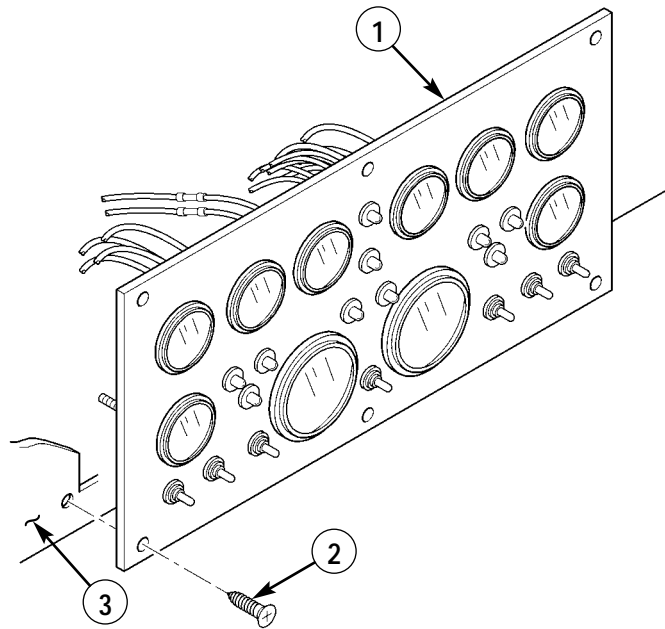
## INSTALLATION

### **NOTE**

Secure electrical connectors with tiedown straps as necessary.

1. Connect port and starboard engine wiring harnesses (5) and (6) to instrument panel harnesses (7).
2. Connect five electrical connectors (4), as noted at removal, to instrument panel (1).
3. Install instrument panel (1) on control console (3) with six screws (2).
4. Connect battery ground cables (WP 0054 00).
5. Close battery hatch (TM 5-1940-322-10).

### INSTRUMENT PANEL REPLACEMENT (Contd)



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INSTRUMENT PANEL GAUGE AND BULB REPLACEMENT

INSTRUMENT PANEL GAUGE REMOVAL, BULB REMOVAL, BULB INSTALLATION,  
AND INSTRUMENT PANEL GAUGE INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

##### References

WP 0042 00

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## INSTRUMENT PANEL GAUGE AND BULB REPLACEMENT (Contd)

### **CAUTION**

Ensure instrument panel is supported during removal and installation. Failure to comply may result in damage to equipment.

### **NOTE**

All gauges on the instrument panel are replaced the same way. This procedure covers replacement of one gauge.

Tag all wires during removal to assist with installation.

### INSTRUMENT PANEL GAUGE REMOVAL

#### **CAUTION**

Use caution when removing instrument panel from control console. Failure to comply may result in damage to equipment.

1. Remove six screws (11) and instrument panel (12) from control console (13).
2. If necessary, remove audible alarm (WP 0042 00).
3. Remove three nuts (4), three washers (5), and three lead wires (6) from terminals (10) on gauge (9).
4. Remove two nuts (1), two washers (2), clamp (3), and gauge (9) from instrument panel (12).

### BULB REMOVAL

1. Remove bulb holder (7) from gauge (9) by turning counterclockwise.
2. Remove bulb (8) from bulb holder (7).

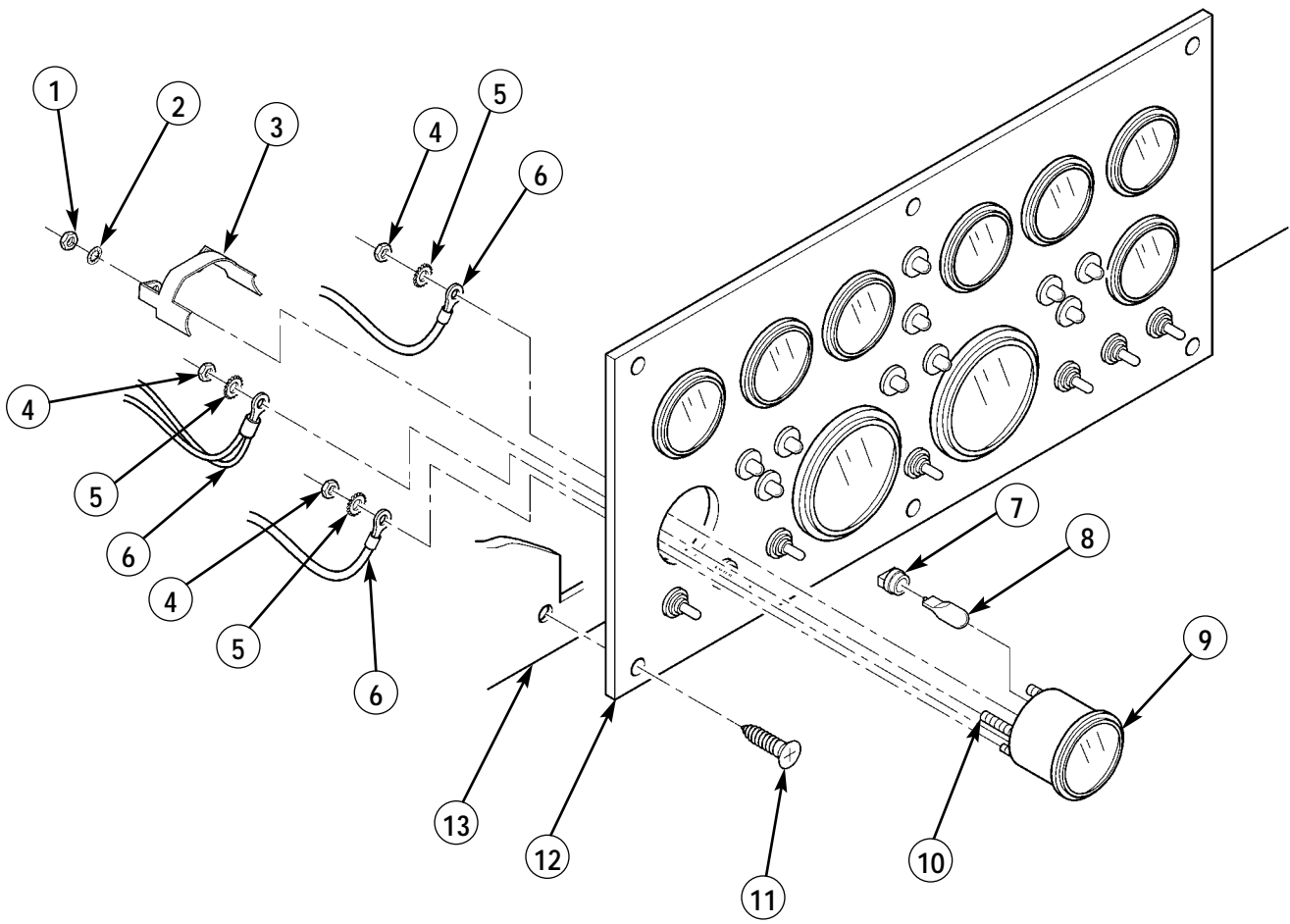
### BULB INSTALLATION

1. Install bulb (8) in bulb holder (7).
2. Install bulb holder (7) in gauge (9) by turning clockwise.

### INSTRUMENT PANEL GAUGE INSTALLATION

1. Install gauge (9) in instrument panel (12) with clamp (3), two washers (2), and two nuts (1).
2. Install three lead wires (6) on terminals (10) of gauge (9) with three washers (5) and three nuts (4).
3. If removed, install audible alarm (WP 0042 00).
4. Install instrument panel (12) on control console (13) with six screws (11).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).

INSTRUMENT PANEL GAUGE AND BULB REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INSTRUMENT PANEL INDICATOR LIGHT REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Adhesive (item 3, WP 0171 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

---

## INSTRUMENT PANEL INDICATOR LIGHT REPLACEMENT (Contd)

### **CAUTION**

Ensure instrument panel is supported during removal and installation. Failure to comply may result in damage to equipment.

### **NOTE**

All indicator lights on the instrument panel are replaced the same way. This procedure covers replacement of one indicator light.

Tag all wires during removal to assist with installation.

## REMOVAL

### **CAUTION**

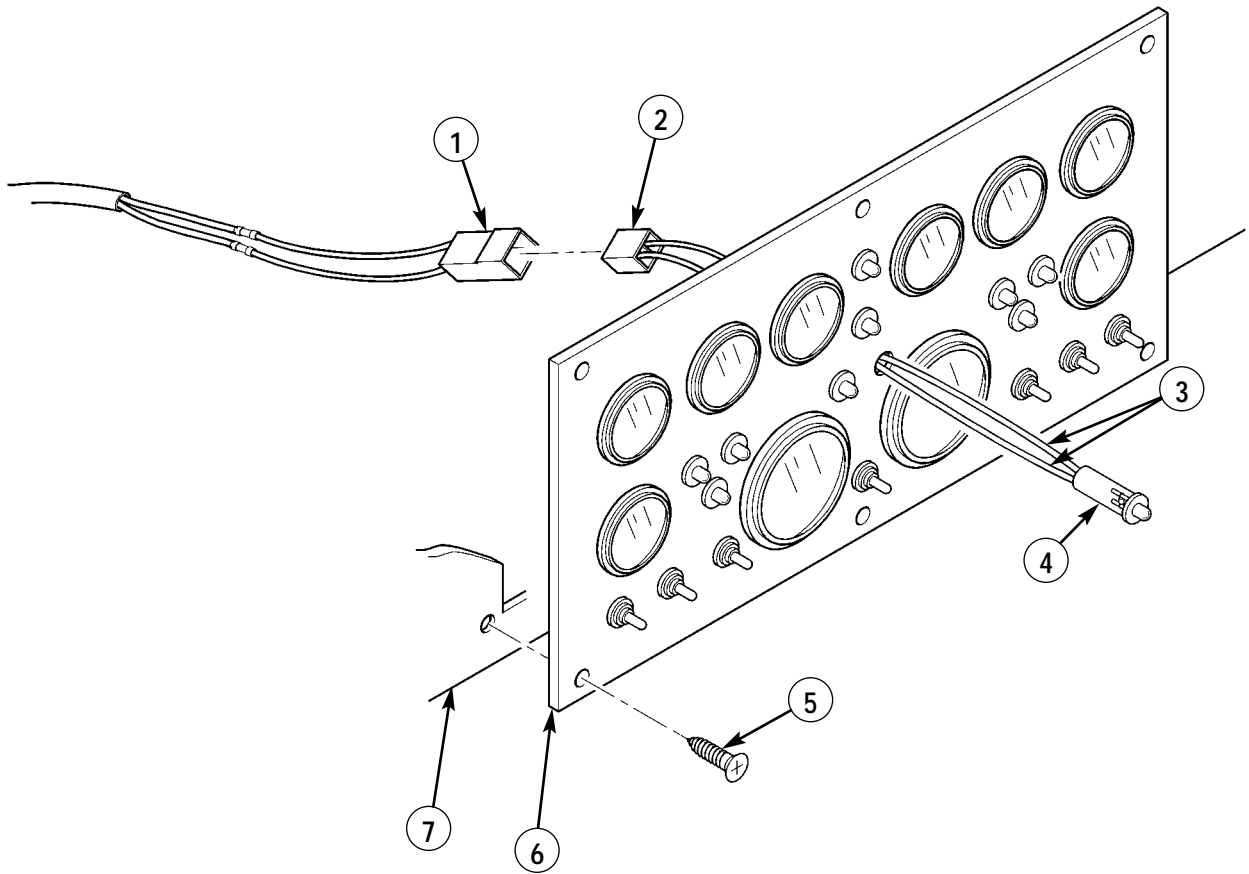
Use caution when removing instrument panel from control console. Failure to comply may result in damage to equipment.

1. Remove six screws (5) and instrument panel (6) from control console (7).
2. Disconnect electrical connector (1) from electrical connector (2).
3. Disconnect two lead wires (3) from electrical connector (2).
4. Remove indicator light (4) from instrument panel (6).

## INSTALLATION

1. Apply thin coat of adhesive under shoulder of indicator light (4).
2. Install indicator light (4) in instrument panel (6).
3. Connect lead wires (3) to electrical connector (2).
4. Connect electrical connector (1) to electrical connector (2).
5. Install instrument panel (6) on console (7) with six screws (5).
6. Connect battery ground cables (WP 0054 00).
7. Close battery hatch (TM 5-1940-322-10).

INSTRUMENT PANEL INDICATOR LIGHT REPLACEMENT (Contd)



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INSTRUMENT PANEL SWITCH REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Instrument panel removed (WP 0038 00).

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## INSTRUMENT PANEL SWITCH REPLACEMENT (Contd)

### NOTE

All switches on the instrument panel are replaced the same way.  
This procedure covers replacement of one switch.

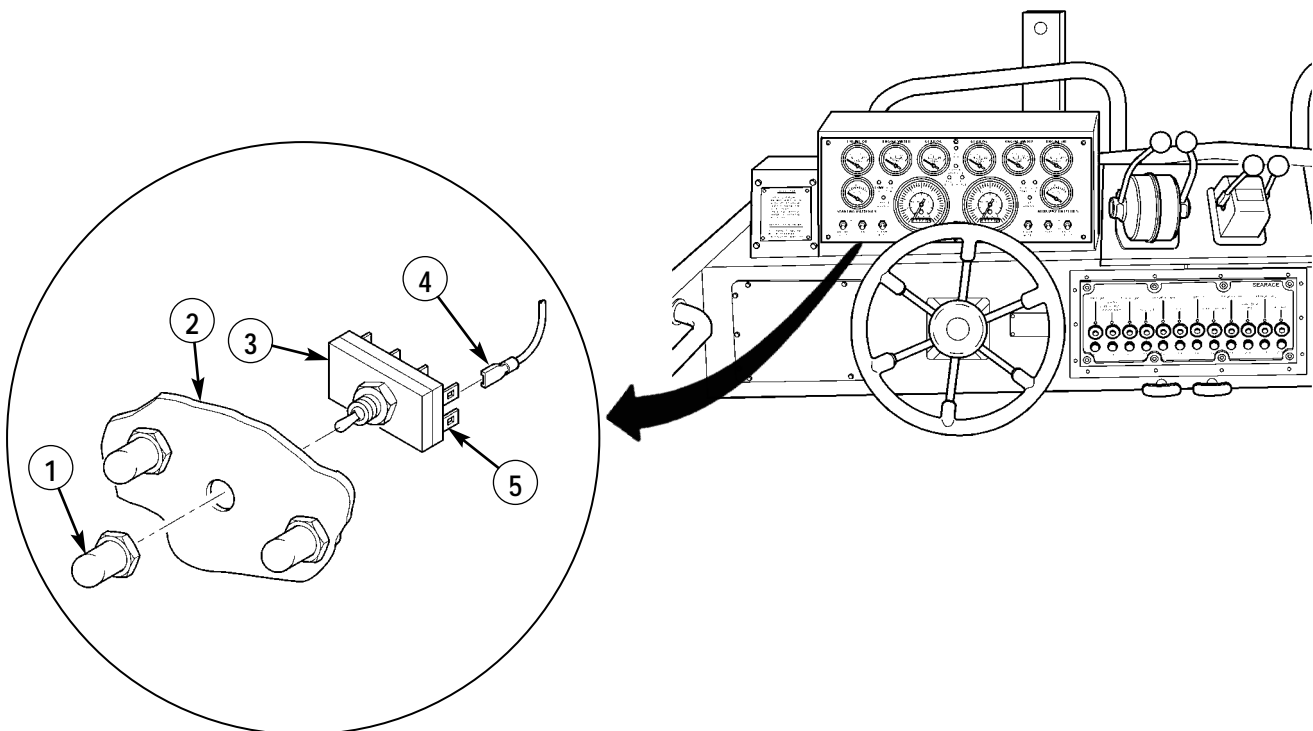
Tag all wires during removal to assist with installation.

### REMOVAL

1. Remove nut (1) from switch (3).
2. Remove switch (3) from back of instrument panel (2).
3. Disconnect four lead wires (4) from terminals (5) on switch (3).

### INSTALLATION

1. Connect four lead wires (4) to terminals (5) on switch (3).
2. Position switch (3) through existing holes in instrument panel (2).
3. Secure switch (3) on instrument panel (2) with nut (1).
4. Install instrument panel (WP 0038 00).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AUDIBLE ALARM REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four lockwashers (item 93, WP 0173 00)  
Tiedown straps (item 38, WP 0171 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Instrument panel removed (WP 0038 00).

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## AUDIBLE ALARM REPLACEMENT (Contd)

### **NOTE**

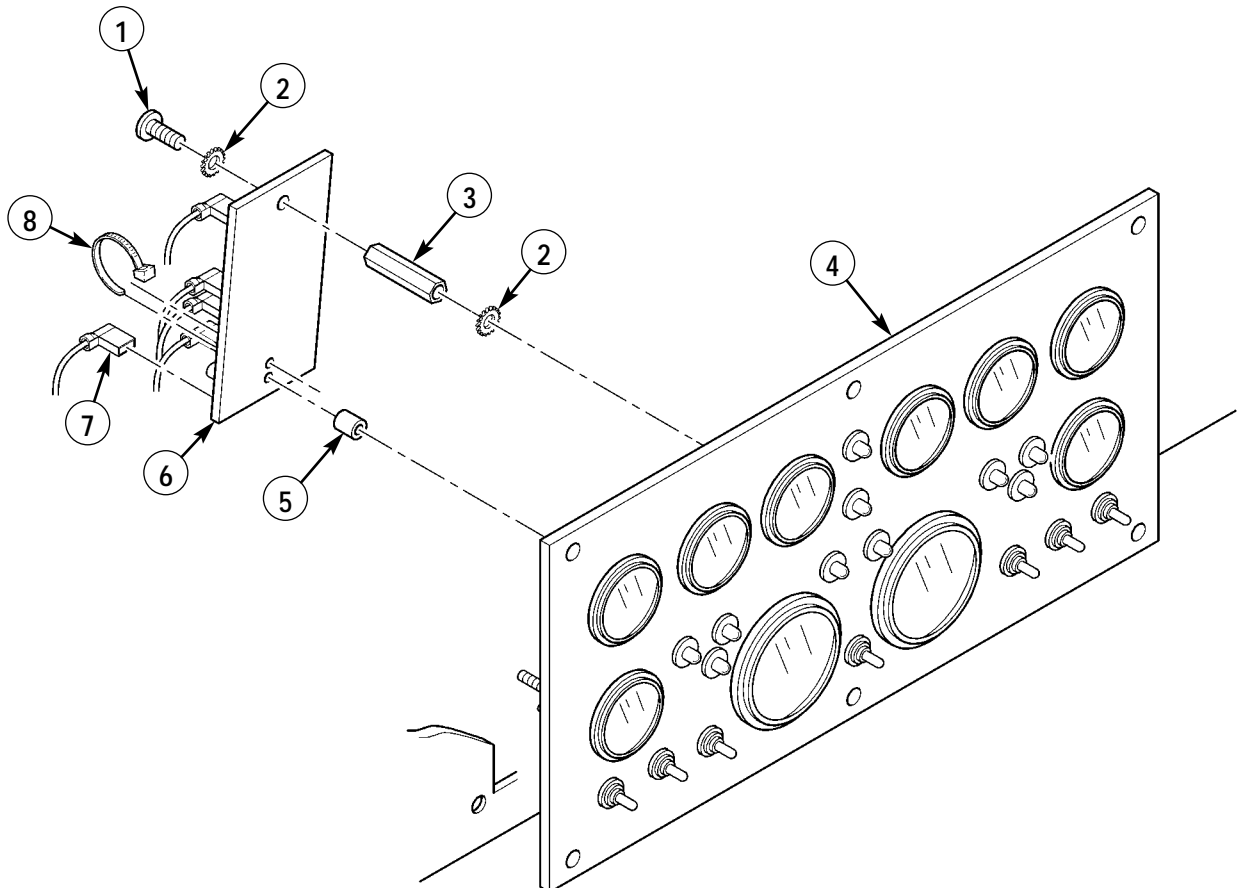
Tag all lead wires during removal to assist with installation.

### REMOVAL

1. Remove tiedown strap (8), spacer (5), and ten lead wires (7) from audible alarm (6). Discard tiedown strap (8).
2. Remove two screws (1), lockwashers (2), standoffs (3), and audible alarm (6) from instrument panel (4). Discard lockwashers (2).

### INSTALLATION

1. Install ten lead wires (7), spacer (5), and new tiedown strap (8) on audible alarm (6).
2. Install audible alarm (6) on instrument panel (4) with four new lockwashers (2), standoffs (3), and screws (1).
3. Install instrument panel (WP 0038 00).
4. Connect battery ground cables (WP 0054 00).
5. Close battery hatch (TM 5-1940-322-10).



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AUXILIARY SWITCH PANEL PUSH BUTTON AND CIRCUIT BREAKER REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0173 00) or  
Common No. 1 tool kit (item 41, WP 0173 00)

##### Materials/Parts

Fourteen locknuts (item 58, WP 0173 00)  
Eight seal washers (item 143, WP 0173 00)

##### References

TM 5-1940-322-10

##### Equipment Condition

Battery ground cables disconnected  
(WP 0054 00).

---

## AUXILIARY SWITCH PANEL PUSH BUTTON AND CIRCUIT BREAKER REPLACEMENT (Contd)

### **NOTE**

Tag all wires during removal to assist with installation.

All circuit breakers and buttons are replaced the same way. This procedure covers the replacement of one circuit breaker and one button.

### REMOVAL

1. Remove eight screws (16), seal washers (17), and panel frame (15) from circuit cover panel (12). Discard seal washers (17).
2. Remove push buttons (13) and (14), circuit cover panel (12), gasket (11), washer (10), and circuit breaker indicator (9) from circuit breaker (8).
3. Inspect gasket (11) for damage. If damaged, discard gasket (11).
4. Remove fourteen locknuts (1), washers (2), screws (4), and auxiliary switch panel (3) from console (18). Discard locknuts (1).
5. Loosen two conduit nuts (22) and grommets (23) from back cover (24).
6. Loosen two conduit nuts (21) and grommets (20) from back cover (24).

### **CAUTION**

Use caution when removing back cover. Failure to comply may result in damage to wiring.

7. Remove eight screws (19) and back cover (24) from auxiliary switch panel (3).
8. Remove six screws (25) and cover (26) from back of main body (7).
9. Remove three screws (5), spacers (6), and circuit breaker (8) from main body (7).
10. If necessary, repeat step 8 for additional circuit breakers.

### **NOTE**

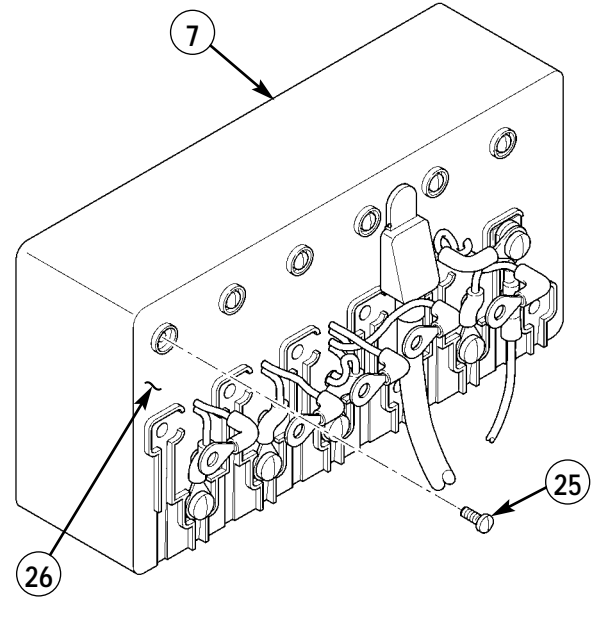
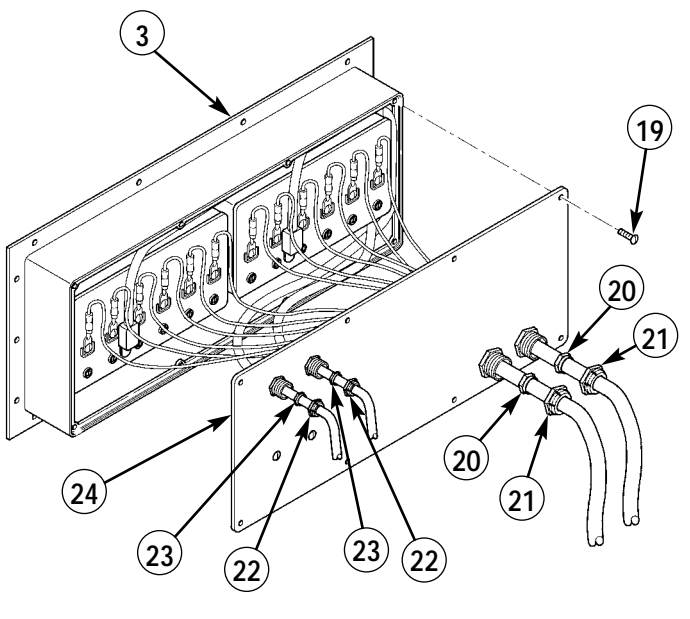
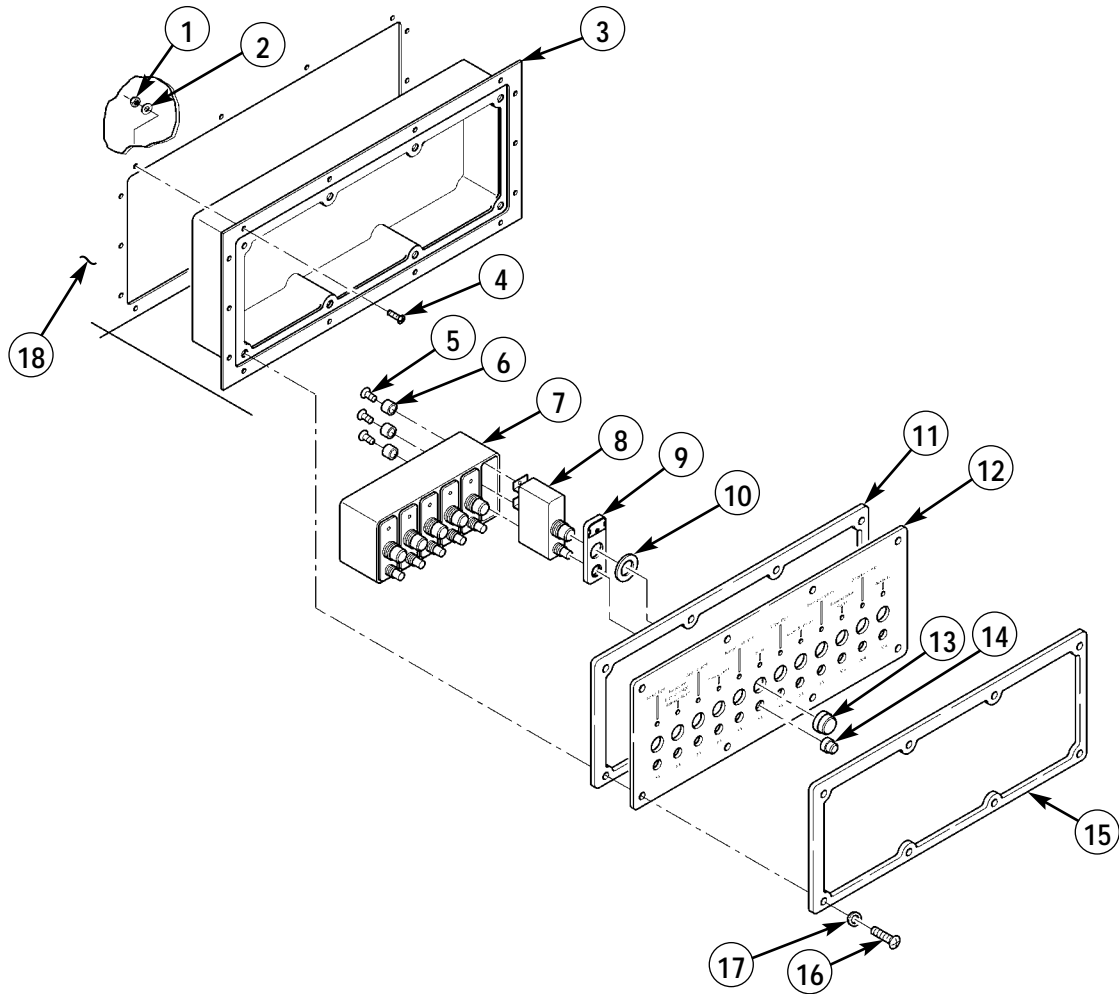
When the auxiliary switch panel back cover is removed, it allows access to two main body circuit breakers.

11. If necessary, repeat steps 7 through 9 for other main body.

### INSTALLATION

1. Install circuit breaker (8) in main body (7) with three spacers (6) and screws (5).
2. Install cover (26) on back of main body (7) with six screws (25).
3. Install back cover (24) on auxiliary switch panel (3) with eight screws (19).
4. Tighten two grommets (20) and conduit nuts (21) on back cover (24).
5. Tighten two grommets (23) and conduit nuts (22) on back cover (24).
6. Install auxiliary switch panel (1) on console (18) with fourteen screws (4), washers (2), and new locknuts (1).
7. Install circuit breaker indicator (9), washer (10), gasket (11) (if discarded), circuit cover panel (12), and push buttons (13) and (14) on circuit breaker (8).
8. Install panel frame (15) on circuit cover panel (12) with eight new seal washers (17) and screws (16).
9. Install battery ground cables (WP 0054 00).
10. Test auxiliary switch panel buttons (TM 5-1940-322-10).

AUXILIARY SWITCH PANEL PUSH BUTTON AND CIRCUIT BREAKER REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ACCESS PANEL AND HINGES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Twelve locknuts (item 171, WP 0173 00)  
Four locknuts (item 52, WP 0173 00)  
Adhesive (item 1, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Rubber seal (item 31, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

TM 5-1940-322-24P  
WP 0013 00

###### Equipment Condition

Junction box and bus bars removed from access  
panel (WP 0046 00).

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## ACCESS PANEL AND HINGES MAINTENANCE (Contd)

### NOTE

If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

### NOTE

Perform step 1 if rivets are present. Perform step 2 if locknuts, washers, and screws are present.

1. Drill out six rivets (6) from hinges (5) and bulkhead (2). Discard rivets (6).
2. Support access panel (1) and remove six locknuts (3), twelve washers (4), and six screws (7) from access panel (1) and bulkhead (2). Remove access panel (1) from bulkhead (2). Discard locknuts (3).
3. Remove six locknuts (3), twelve washers (4), six screws (7), and two hinges (5) from access panel (1). Discard locknuts (3).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect threads on bolt bracket (8) for damage. If damaged, remove four locknuts (10), four washers (9), four screws (12), and two bolt brackets (8) from access panel opening (11). Discard locknuts (10).

### WARNING

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

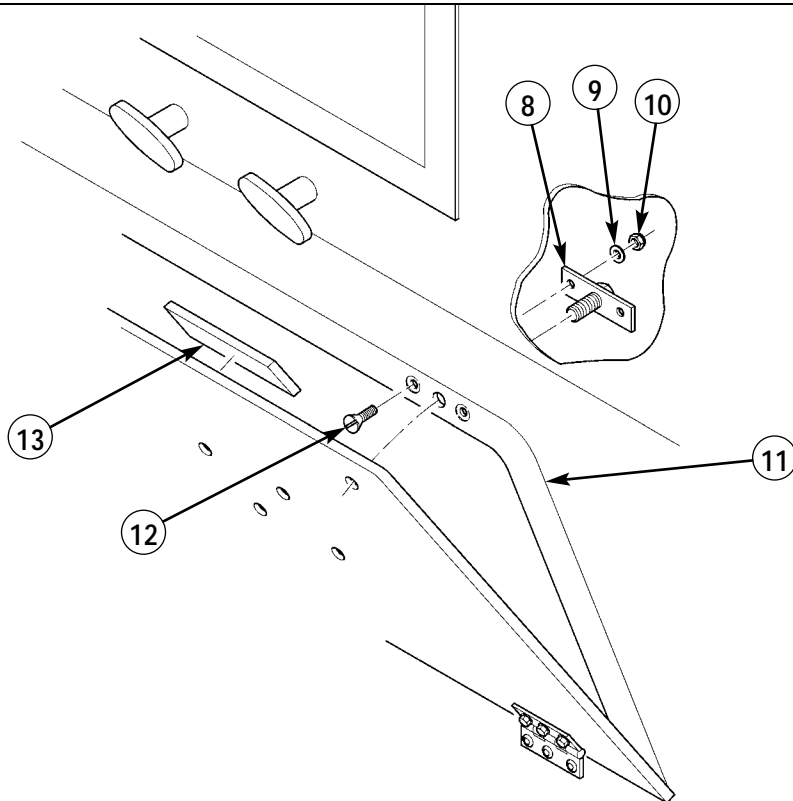
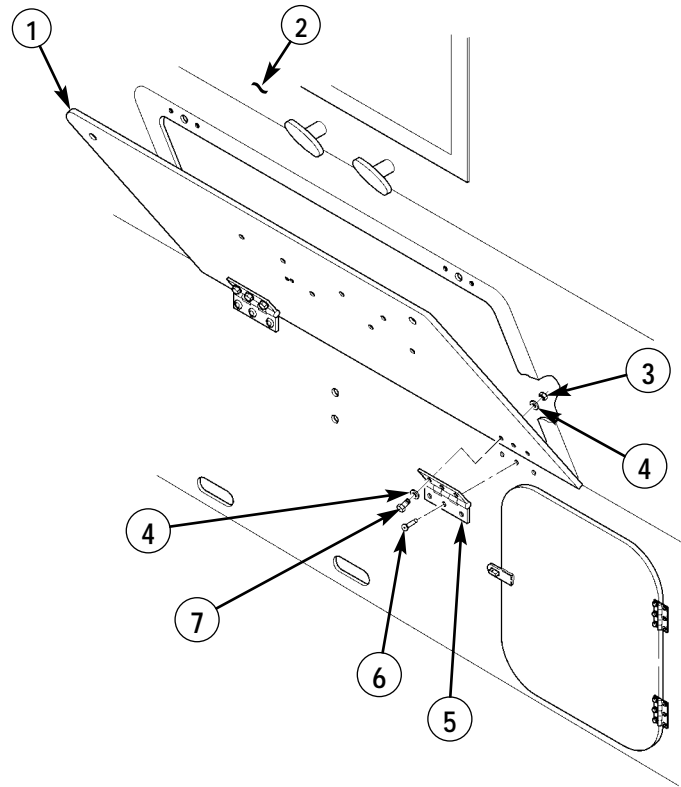
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

3. Check for missing or damaged rubber seal (13). If missing or damaged, clean area with Skysol 100, dry with cloth, and replace rubber seal (13).

### INSTALLATION

1. Apply light coat of adhesive on inside edges of access panel (1).
2. Install new rubber seal (13) around inside edges of access panel (1).
3. If bolt brackets (8) were removed, install two bolt brackets (8) on access panel opening (11) with four screws (12), four washers (9), and four new locknuts (10).
4. Install two hinges (5) on access panel (1) with twelve washers (4), six screws (7), and six new locknuts (3).
5. Position access panel (1) with hinges (5) on bulkhead (2).
6. Secure two hinges (5) on bulkhead (2) with six screws (7), twelve washers (4), and new locknuts (3).
7. Install junction box and bus bars (WP 0046 00).

ACCESS PANEL AND HINGES MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

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### STOWAGE COMPARTMENT DOOR, MAP LOCKER DOOR, AND HINGES MAINTENANCE

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### References

TM 5-1940-322-24P  
TC 9-237  
WP 0013 00

##### Materials/Parts

Twelve locknuts (item 54, WP 0173 00)  
Adhesive (item 1, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Rubber sheet (item 31, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

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## STOWAGE COMPARTMENT DOOR, MAP LOCKER DOOR, AND HINGES MAINTENANCE (Contd)

### **NOTE**

The stowage compartment door, map locker door, and hinges are replaced the same way. This procedure covers the stowage compartment door.

If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

1. Drill out rivets (8) or remove six locknuts (5), twelve washers (6), six screws (9), and door (1) from bulkhead (4). Discard locknuts (5).
2. Drill out rivets (8) or remove six locknuts (5), twelve washers (6), six screws (9), and hinges (7) from door (1). Discard locknuts (5).

### INSPECTION

1. For general inspection instructions, refer to WP 0013 00.
2. Latch (10) and hasp (3) are welded to door (1) and bulkhead (4). Replace latch (10) or hasp (3) if damaged. Refer TC 9-237 for welding repair.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

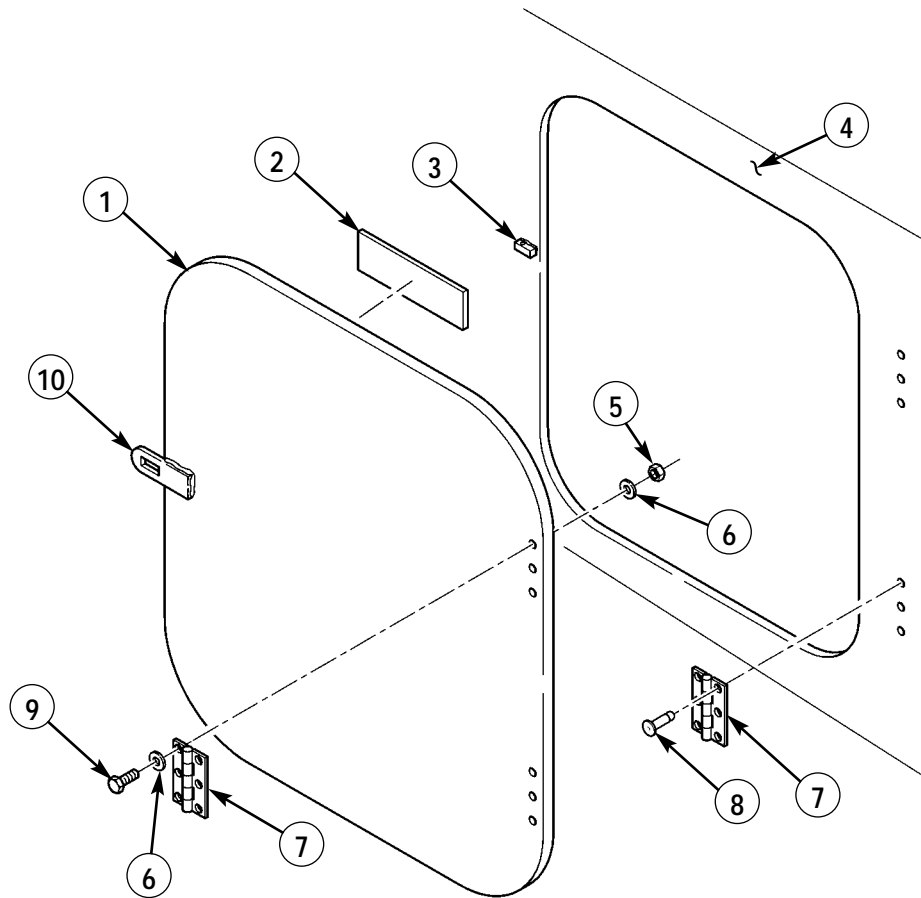
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

3. Inspect rubber seal (2) for damage. If missing or damaged, clean area with Skysol 100 and replace rubber seal (2).

### INSTALLATION

1. Apply coat of adhesive on edges of door (1).
2. Install new seal (2) on door (1).
3. Install two hinges (7) on door (1) with six screws (9), twelve washers (6), and six new locknuts (5).
4. Install door (1) and hinges (7) on bulkhead (4) with six screws (9), twelve washers (6), and six new locknuts (5).

STOWAGE COMPARTMENT DOOR, MAP LOCKER DOOR, AND HINGES MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BUS BARS AND JUNCTION BOX REPLACEMENT

BUS BARS REMOVAL, JUNCTION BOX REMOVAL, JUNCTION BOX INSTALLATION, BUS BARS INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery ground cables disconnected  
(WP 0054 00).

##### Materials/Parts

Eight locknuts (item 52, WP 0173 00)  
Tiedown straps (item 38, WP 0171 00)

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## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

### NOTE

Tag all electrical leads during removal to assist with installation.

### BUS BARS REMOVAL

1. Remove two wing nuts (2) and open access panel (1).
2. Remove nut (4), lockwasher (28), and electrical leads Nos. 67 (5) and 24 (6) from stud (7) on bus bar (8). Discard lockwasher (28).
3. Remove two screws (27), lockwashers (12), and electrical leads Nos. 34F (10) and 34E (11) from bus bar (8). Discard lockwashers (12).

### NOTE

The mounting hardware is the same for both bus bars. Only one bus bar is shown removed from access panel.

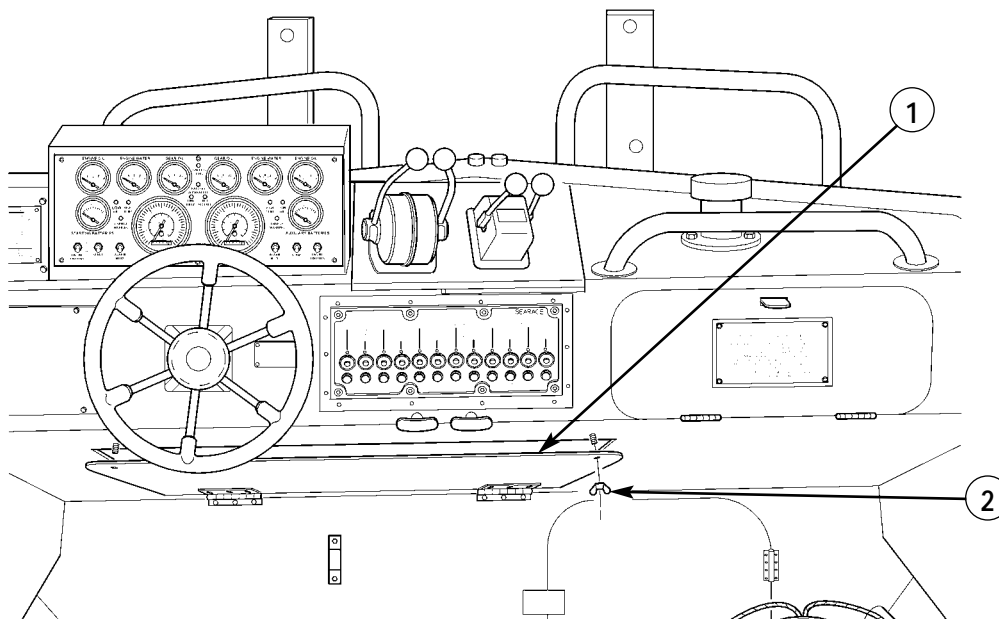
4. Remove two locknuts (9), washers (19), screws (20), and bus bar (8) from access panel (1). Discard locknuts (9).
5. Remove nut (21), lockwasher (18), and electrical leads Nos. 21A (15) and 21B (16) from stud (13) on bus bar (14). Discard lockwasher (18).
6. Remove three screws (23), lockwashers (22), and electrical leads Nos. 31B (17), 32B (24), 33B (25), and 68 (26) from bus bar (14). Discard lockwashers (22).
7. Remove two locknuts (9), washers (19), screws (20), and bus bar (14) from access panel (1). Discard locknuts (9).

### JUNCTION BOX REMOVAL

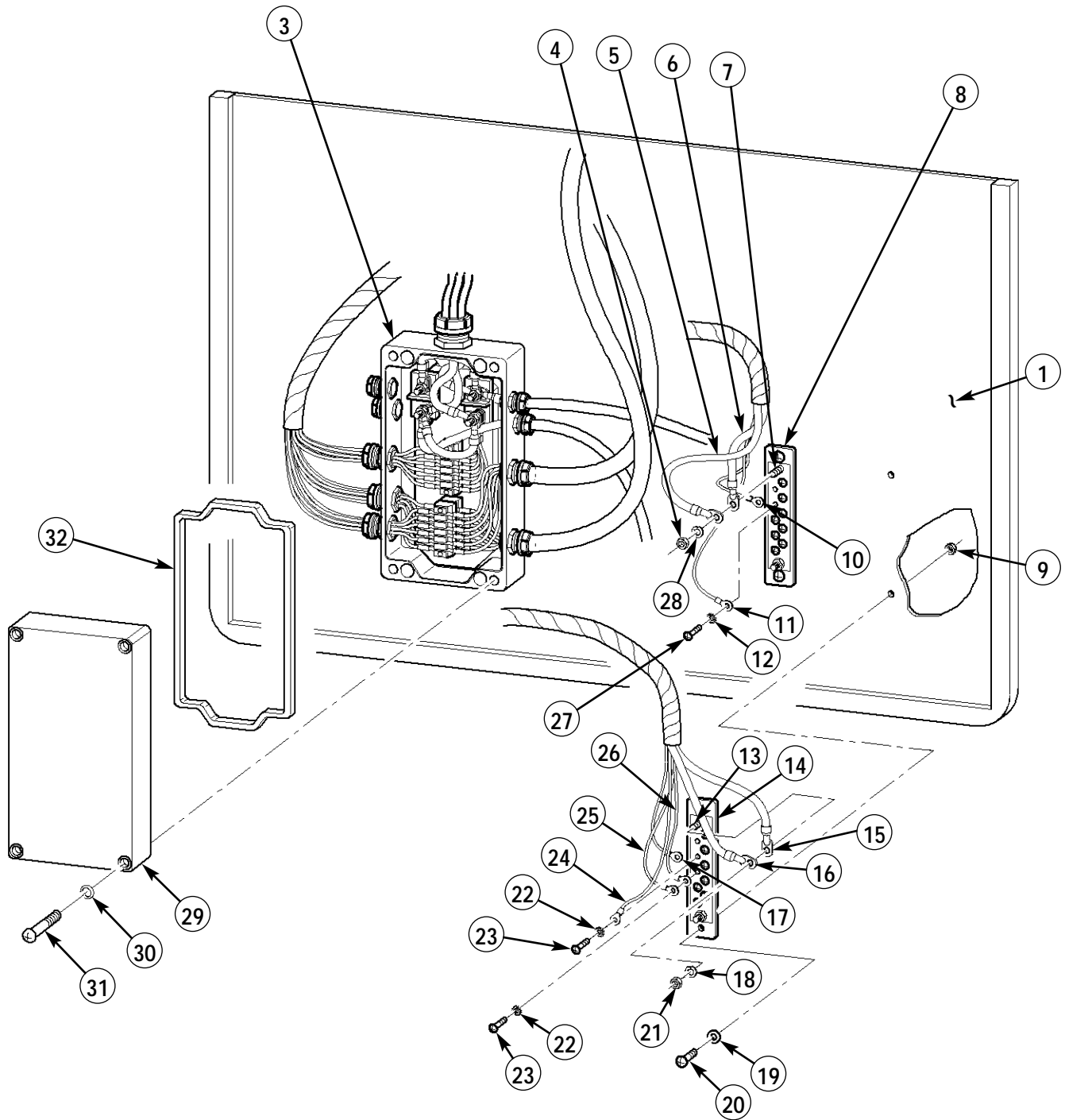
### NOTE

Tag all electrical leads, cables, and harnesses at removal to assist in installation.

1. Loosen four captive screws (31) and remove junction box cover (29), and cover seal (32) from junction box housing (3). Discard cover seal (32) if damaged.
2. Remove four captive screws (31) and O-rings (30) from cover (29) if O-rings (30) are damaged.



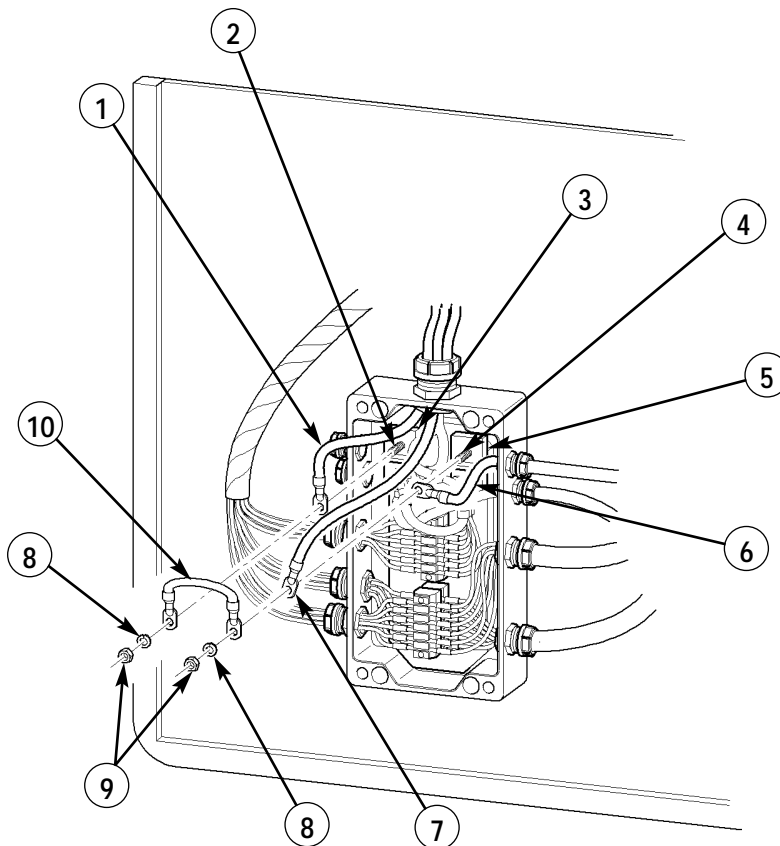
### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)



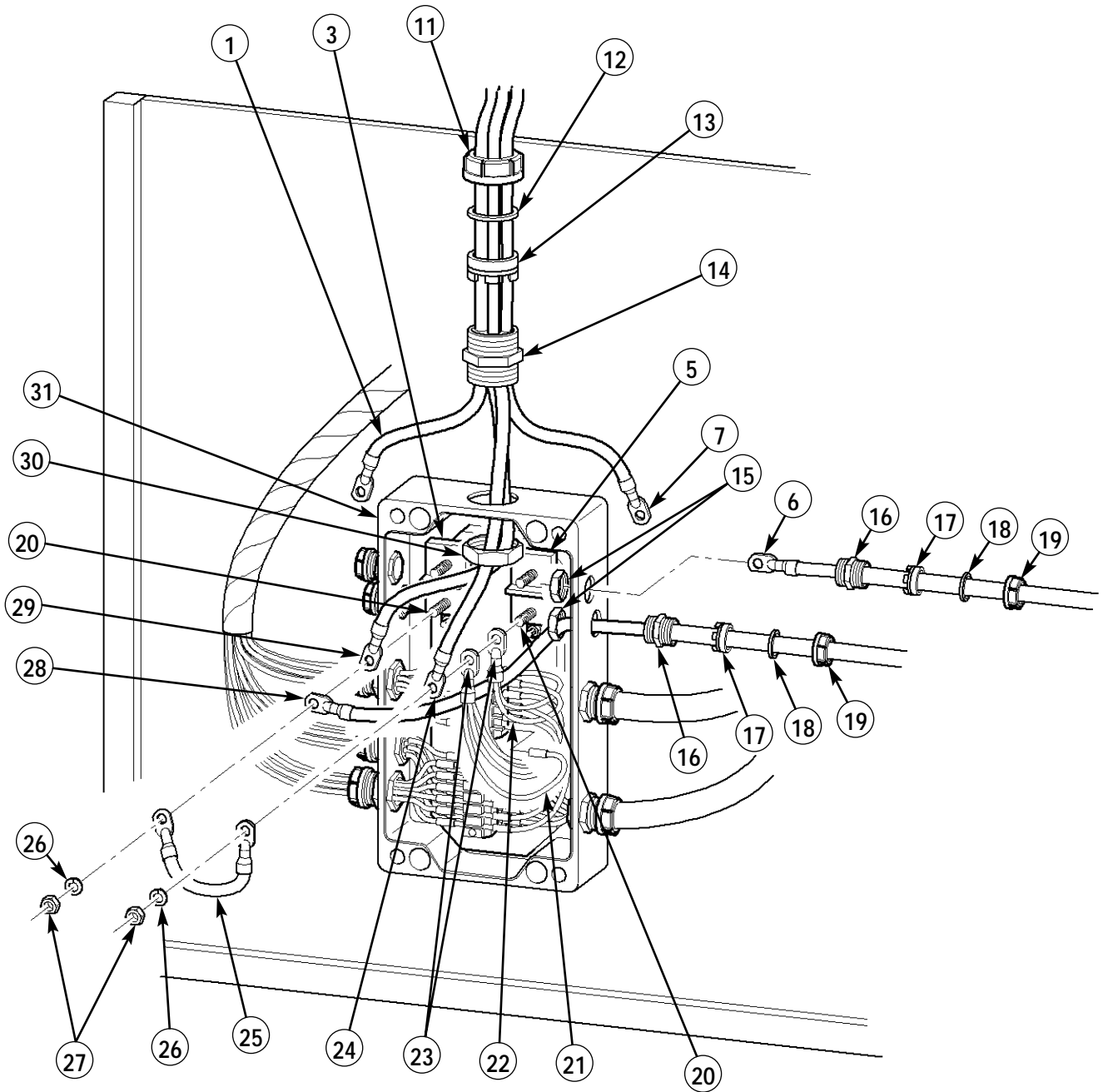
## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

### JUNCTION BOX REMOVAL (Contd)

3. Remove two nuts (9), lockwashers (8), jumper cable (10), positive (+) electrical lead (6), electrical lead No. 21B (1), and electrical lead No. 22 (7) from positive (+) studs (2) and (4) on isolator blocks (3) and (5). Discard lockwashers (8).
4. Remove two nuts (27), lockwashers (26), jumper cable (25), negative (-) electrical lead (28), electrical lead No. 23 (24), electrical lead No. 67 (29), and two terminals (23) with three electrical leads (21) from negative (-) studs (20) on isolator blocks (3) and (5). Discard lockwashers (26).
5. Remove conduit nut (11), seal ring (12), collar (13), and electrical leads (1), (7), (24), and (29) from fitting (14) and end of junction box (31). Discard seal ring (12) if damaged.
6. Remove nut (30) and fitting (14) from end of junction box (31).
7. Remove two conduit nuts (19), seal rings (18), collars (17), positive (+) electrical lead (6), and negative (-) electrical lead (28) from side of junction box (31) and fittings (16). Discard seal rings (18) if damaged.
8. Remove two nuts (15) and fittings (16) from junction box (31).
9. Disconnect six electrical leads (21) from junction block (22) and remove two terminals (23) from negative (-) stud (21) on isolator block (5).



### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

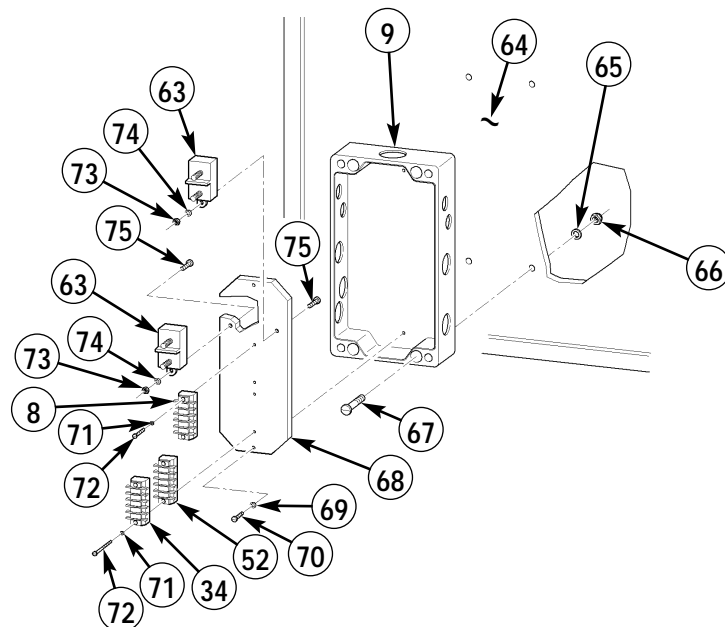
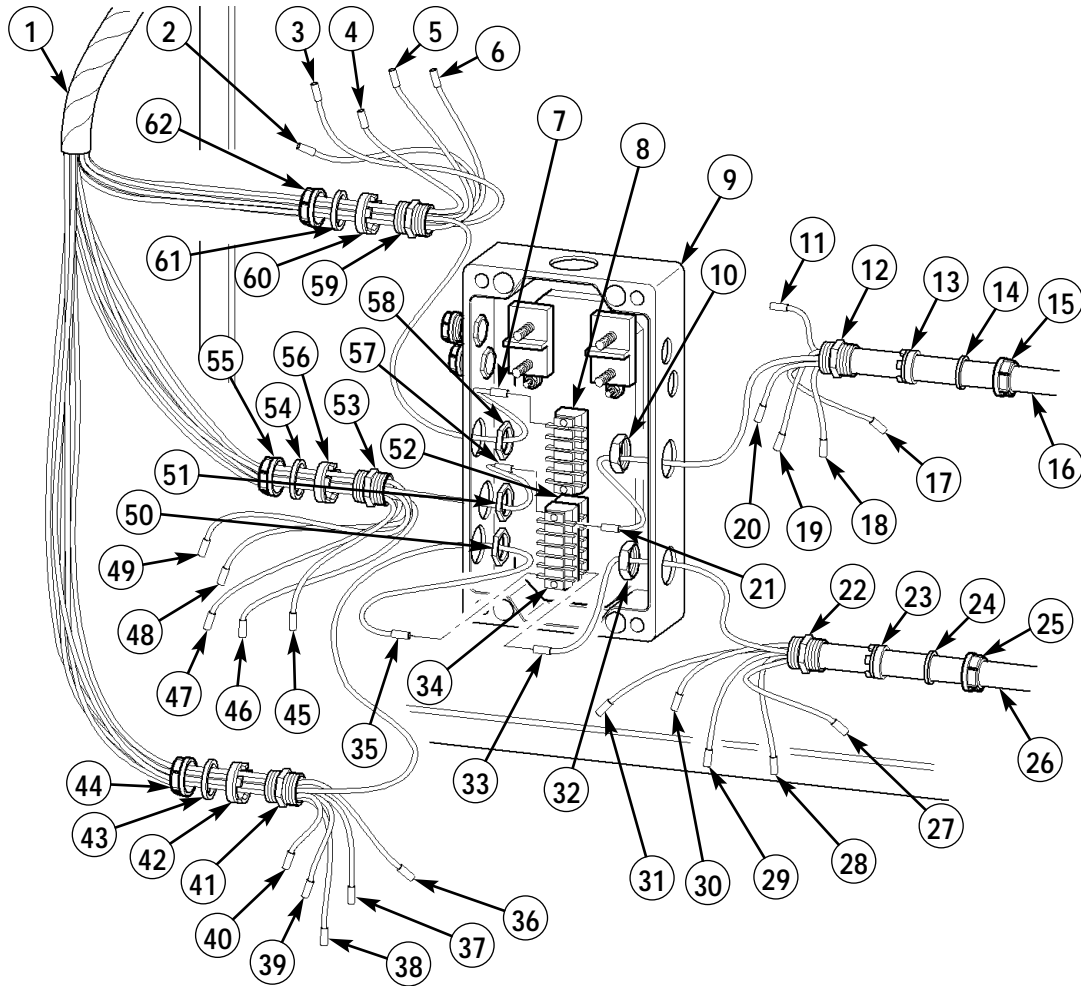


## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

### JUNCTION BOX REMOVAL (Contd)

10. Disconnect wiring harness (1) electrical leads Nos. 47A (2), 14 (3), 34R (4), 34N (5), 4M (6), and 35B (7) from junction block (8).
11. Remove conduit nut (62), seal ring (61), collar (60), and electrical leads (2), (3), (4), (5), (6), and (7) from fitting (59) and junction box (9). Discard seal ring (61) if damaged.
12. Remove nut (58) and fitting (59) from junction box (9).
13. Disconnect wiring harness cable G (16) electrical leads Nos. 6 (11), 5 (17), 4 (18), 3 (19), 2 (20), and 1 (21) from junction block (34).
14. Remove conduit nut (15), seal ring (14), collar (13), and electrical leads (11), (17), (18), (19), (20), and (21) from right-side fitting (12) and junction box (9). Discard seal ring (14) if damaged.
15. Remove nut (10) and fitting (12) from junction box (9).
16. Disconnect wiring harness (1) electrical leads Nos. 46B (36), 39 (37), 40 (38), 41 (39), 43 (40), and 42A (35) from other side of junction block (34).
17. Remove conduit nut (44), seal ring (43), collar (42), and electrical leads (35), (36), (37), (38), (39), and (40) from left-side fitting (41) and junction box (9). Discard seal ring (43) if damaged.
18. Remove nut (50) and fitting (41) from junction box (9).
19. Disconnect wiring harness cable F (26) electrical leads Nos. 7 (27), 8 (28), 9 (29), 10 (30), 11 (31), and 12 (33) from bottom junction block (52).
20. Remove conduit nut (25), seal ring (24), collar (23), and electrical leads (27), (28), (29), (30), (31), and (33) from right-side fitting (22) and junction box (9). Discard seal ring (24) if damaged.
21. Remove nut (32) and fitting (22) from junction box (9).
22. Disconnect wiring harness (1) electrical leads Nos. 17 (49), 38A (48), (47), 30K (46), 19A (45), and (57) from other side of junction block (52).
23. Remove conduit nut (55), seal ring (54), collar (56), and electrical leads (49), (48), (47), (46), (45), and (57) from left-side fitting (53) and junction box (9). Discard seal ring (54) if damaged.
24. Remove nut (51) and fitting (53) from junction box (9).
25. Remove four locknuts (66), washers (65), screws (67), and junction box (9) from access panel (64). Discard locknuts (66).
26. Remove two screws (70), lockwashers (69), and base plate (68) from inside of junction box (9). Discard lockwashers (69).
27. If damaged, remove four screws (72), lockwashers (71), and junction blocks (8), (34), and (52) from base plate (68). Discard lockwashers (71).
28. If damaged, remove two screws (75), nuts (73), lockwashers (74), and two isolator blocks (63) from base plate (68). Discard lockwashers (74).

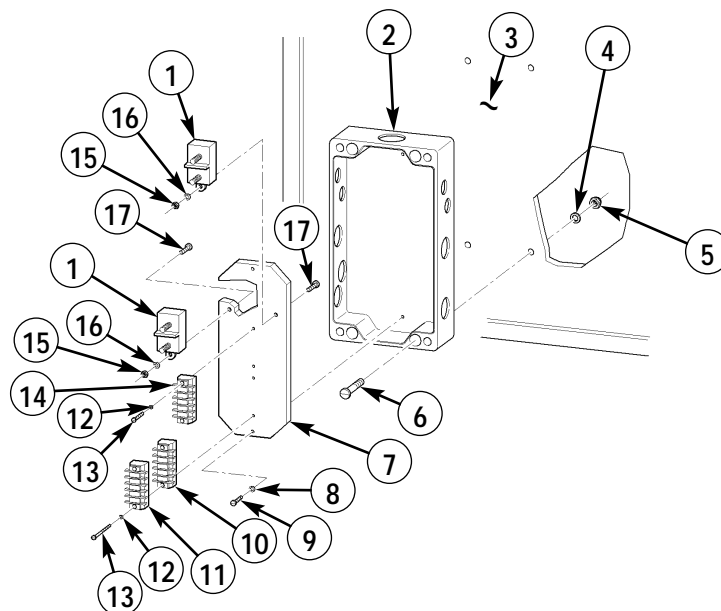
### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)



## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

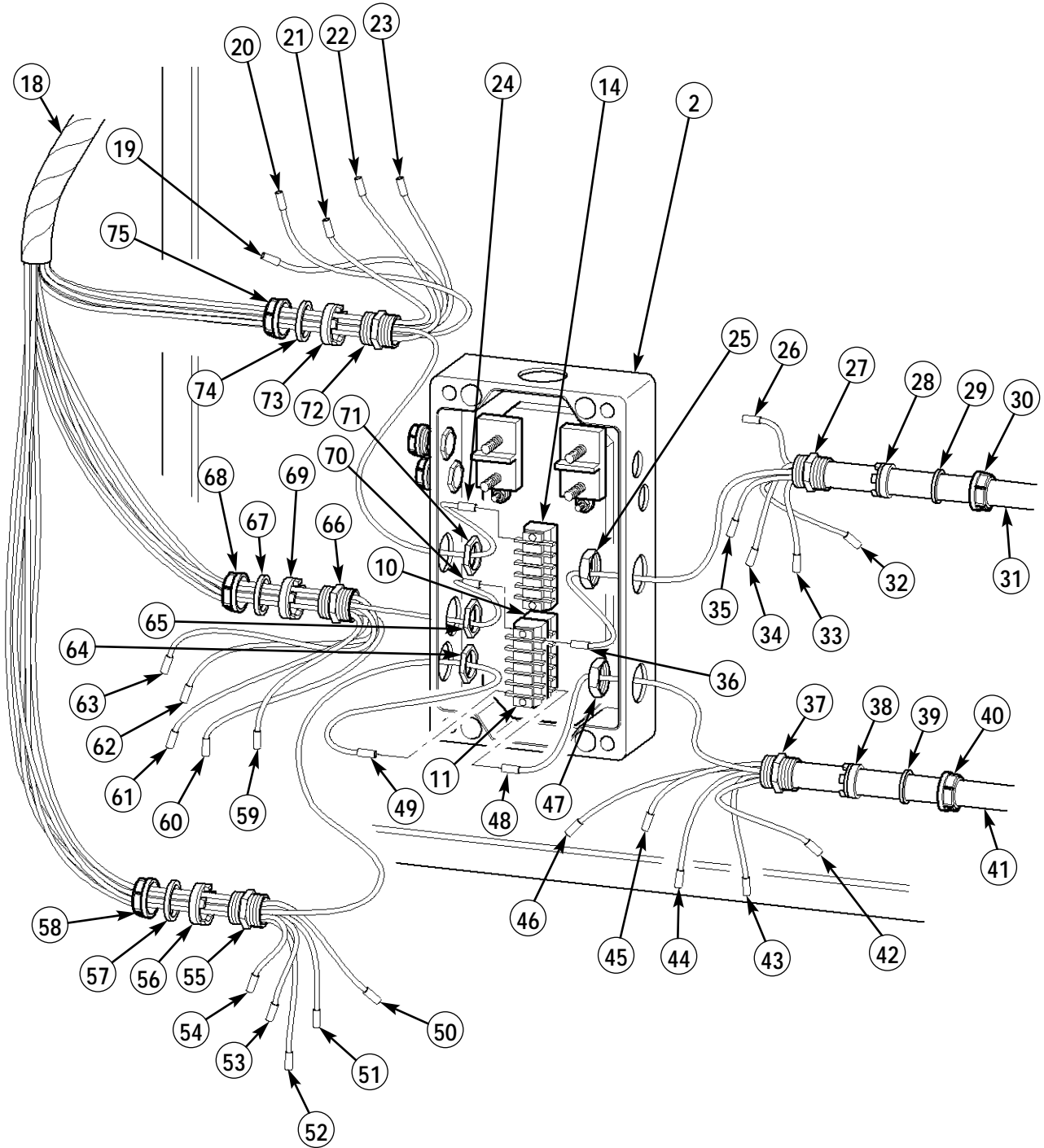
### JUNCTION BOX INSTALLATION

1. If removed, install two isolator blocks (1) on base plate (7) with two screws (17), new lockwashers (16), and nuts (15).
2. If removed, install junction blocks (10), (11), and (14) on base plate (7) with four new lockwashers (12) and screws (13).
3. Install base plate (7) on inside of junction box (2) with two lockwashers (8) and screws (9).
4. Install junction box (2) on access panel (3) with four screws (6), washers (4), and new locknuts (5).
5. Install fitting (66) on side of junction box (2) with nut (65).
6. Install conduit nut (68), seal ring (67), and collar (69) on wiring harness (18).
7. Route harness (18) electrical leads (63), (62), (61), (60), (59), and (70) through fitting (66) and connect leads to bottom junction block (10) as noted at removal. Tighten conduit nut (68).
8. Install fitting (37) on side of junction box (2) with nut (47).
9. Install conduit nut (40), seal ring (39) and collar (38) on wiring harness cable F (41).
10. Route harness cable F (41) electrical leads (42), (43), (44), (45), (46), and (48) through fitting (37) and connect leads to other side of bottom junction block (10) as noted at removal. Tighten conduit nut (40).
11. Install fitting (55) on side of junction box (2) with nut (64).
12. Install conduit nut (58), seal ring (57), and collar (56) on wiring harness (18).
13. Route harness (18) electrical leads (49), (50), (51), (52), (53), and (54) through fitting (55) and connect leads to top junction block (11) as noted at removal. Tighten conduit nut (58).
14. Install fitting (27) on side of junction box (2) with nut (25).
15. Install conduit nut (30), seal ring (29), and collar (28) on wiring harness cable G (31).
16. Route harness cable G (31) electrical leads (26), (32), (33), (34), (35), and (36) through fitting (27) and connect leads to other side of top junction block (11) as noted at removal. Tighten conduit nut (30).
17. Install fitting (72) on side of junction box (2) with nut (71).
18. Install conduit nut (75), seal ring (74), and collar (73) on wiring harness (18).
19. Route harness (18) electrical leads (19), (20), (21), (22), (23), and (24) through fitting (72) and connect leads to junction block (14) as noted at removal. Tighten conduit nut (75).





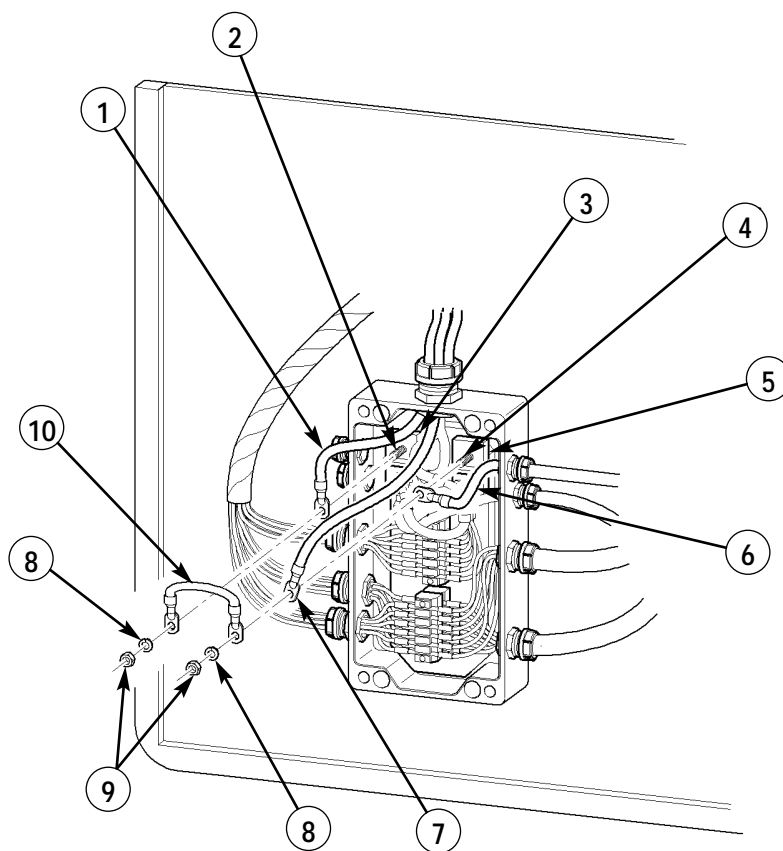
### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)



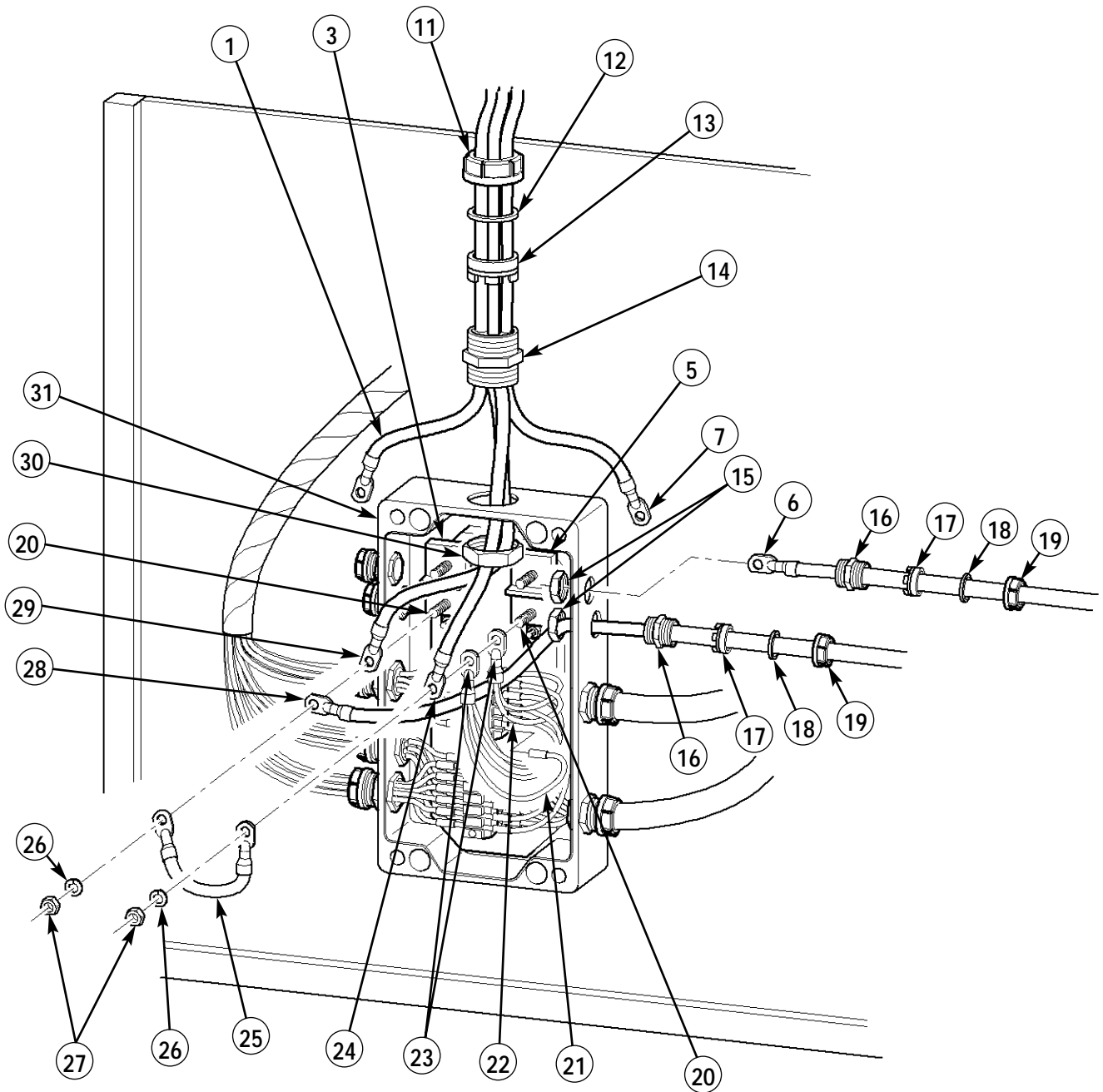
## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

### JUNCTION BOX INSTALLATION (Contd)

20. Connect six electrical leads (21) to junction block (22) and install two terminals (23) on one negative (-) stud (20) on insulator block (5).
21. Install two fittings (16) on side of junction box (31) with nuts (15).
22. Install conduit nuts (19), seal rings (18), and collars (17) on positive (+) electrical lead (6) and negative (-) electrical lead (28).
23. Route positive (+) electrical lead (6) and negative (-) electrical lead (28) through fittings (16) and install on positive (+) stud (4) and negative (-) stud (20) on isolator blocks (3) and (5) as noted at removal. Tighten conduit nuts (19).
24. Install fitting (14) on end of junction box (31) with nut (30).
25. Install conduit nut (11), seal ring (12), and collar (13) on four electrical leads (1), (7), (24), and (29).
26. Route electrical leads (1), (7), (24), and (29) through fitting (14) and connect leads to positive (+) isolator block studs (2) and (4), and negative (-) isolator block stud (20) as noted at removal. Tighten conduit nut (11).
27. Install jumper cable (25) on negative (-) stud (20) of isolator blocks (3) and (5) with new lockwashers (26) and nuts (27) as noted at removal.
28. Install jumper cable (10) on positive (+) studs (2) and (4) of isolator blocks (3) and (5) with new lockwashers (8) and nuts (9) as noted at removal.



### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)



## BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)

### JUNCTION BOX INSTALLATION (Contd)

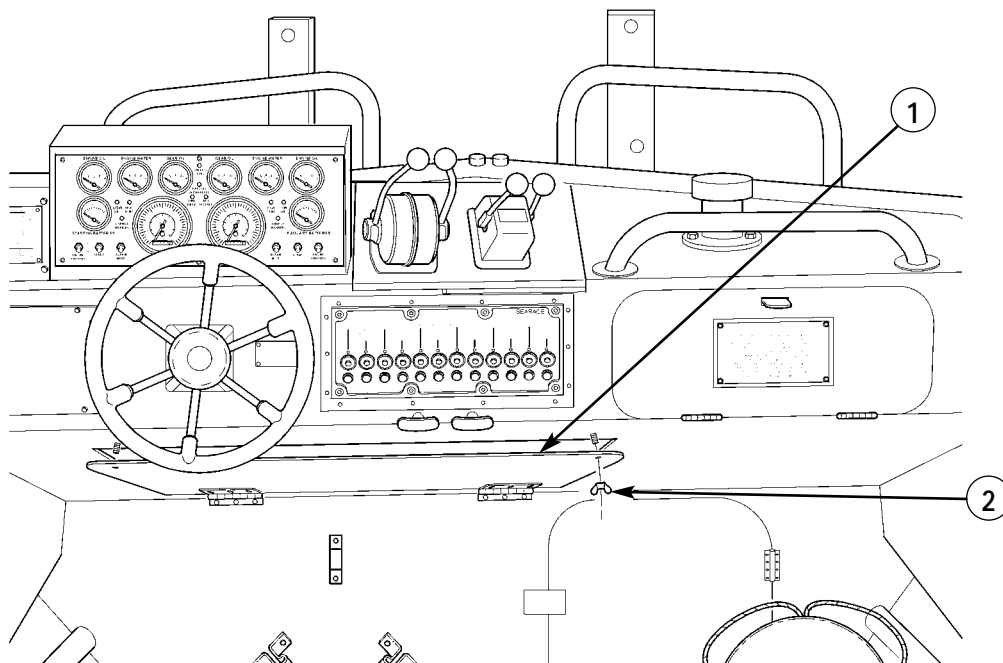
29. If removed, install four new O-rings (30) on captive screws (31) and install screws (31) on junction box cover (29).
30. If removed, install new cover seal (32) on junction box cover (29) and install cover (29) on junction box housing (3) and tighten four screws (31).

### BUS BARS INSTALLATION

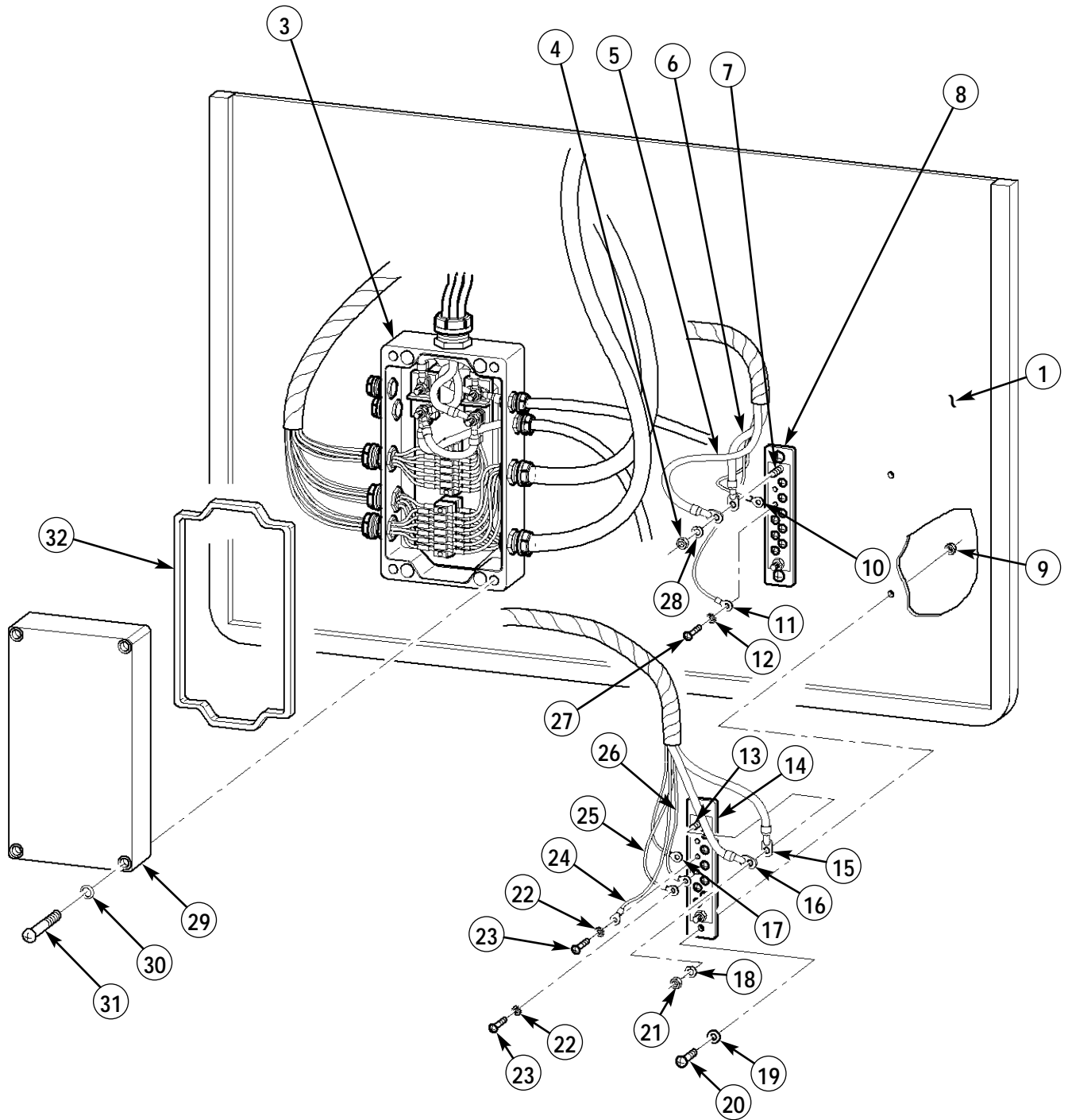
#### NOTE

The mounting hardware is the same for both bus bars. Only one bus bar is shown removed from access panel.

1. Install bus bar (14) on access panel (1) with two screws (20), washers (19), and new locknuts (9).
2. Install electrical leads (17), (24), (25), and (26) on bus bar (14) with three new lockwashers (22) and screws (23) as noted at removal.
3. Install electrical leads (15) and (16) on stud (13) of bus bar (14) with new lockwasher (18) and nut (21) as noted at removal.
4. Install bus bar (8) on access panel (1) with two screws (20), washers (19), and new locknuts (9).
5. Install electrical leads (10) and (11) on bus bar (8) with two new lockwashers (12) and screws (27) as noted at removal.
6. Install electrical leads (5) and (6) on stud (7) of bus bar (8) with new lockwasher (28) and nut (4) as noted at removal.
7. Close access panel (1) and install two wing nuts (2).
8. Connect battery ground cables (WP 0054 00).



### BUS BARS AND JUNCTION BOX REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

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**AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT (Contd)****CAUTION**

Ensure auxiliary switch panel is supported during removal and installation. Failure to comply may result in damage to wiring.

**NOTE**

Tag all lead wires and cables during removal to assist with installation. Additionally, tag junction box wire locations for easier identification.

**REMOVAL**

1. Remove fourteen screws (3) and auxiliary switch panel (2) from console (1).
2. Remove two junction connectors (7) and (11) and grommets (6) and (12) from access panel (4).

**CAUTION**

Use caution when removing access panel from auxiliary switch panel. Failure to comply may result in damage to wiring.

3. Remove eight screws (5) and access panel (4) from auxiliary switch panel (2).
4. Remove six screws (14), lead wires (15) (nos. 1 through 6), harness wires (16), and switch wires (17) from auxiliary switch panel (2).
5. Repeat step 4 for remaining side of auxiliary switch panel (2) (nos. 7 through 12).
6. Remove screw (18), washer (19), nut (21), and cables (10) and (13) from bracket (22).
7. Remove screw (18), washer (19), nut (21), cables (10) and (20), and bracket (22) from access panel (4).
8. Remove harnesses (8) and (9) and cables (10) from access panel (4).





## AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT (Contd)

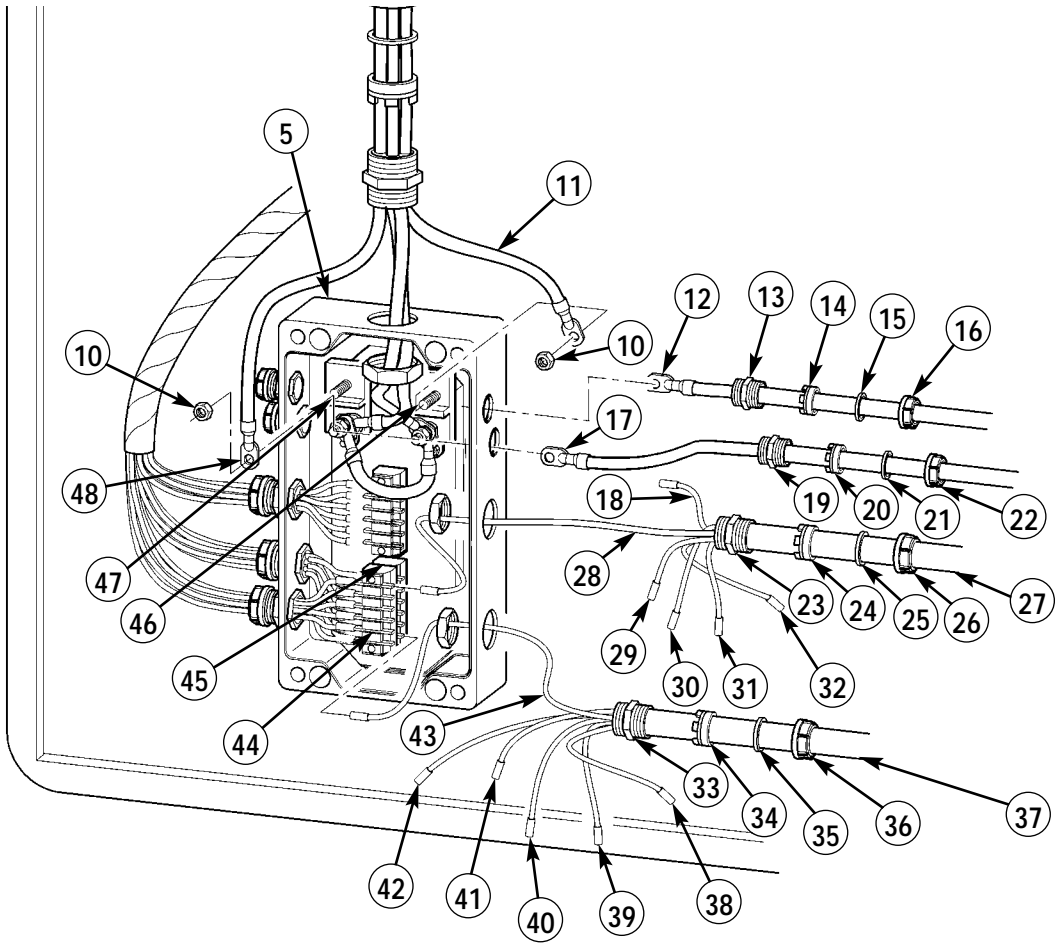
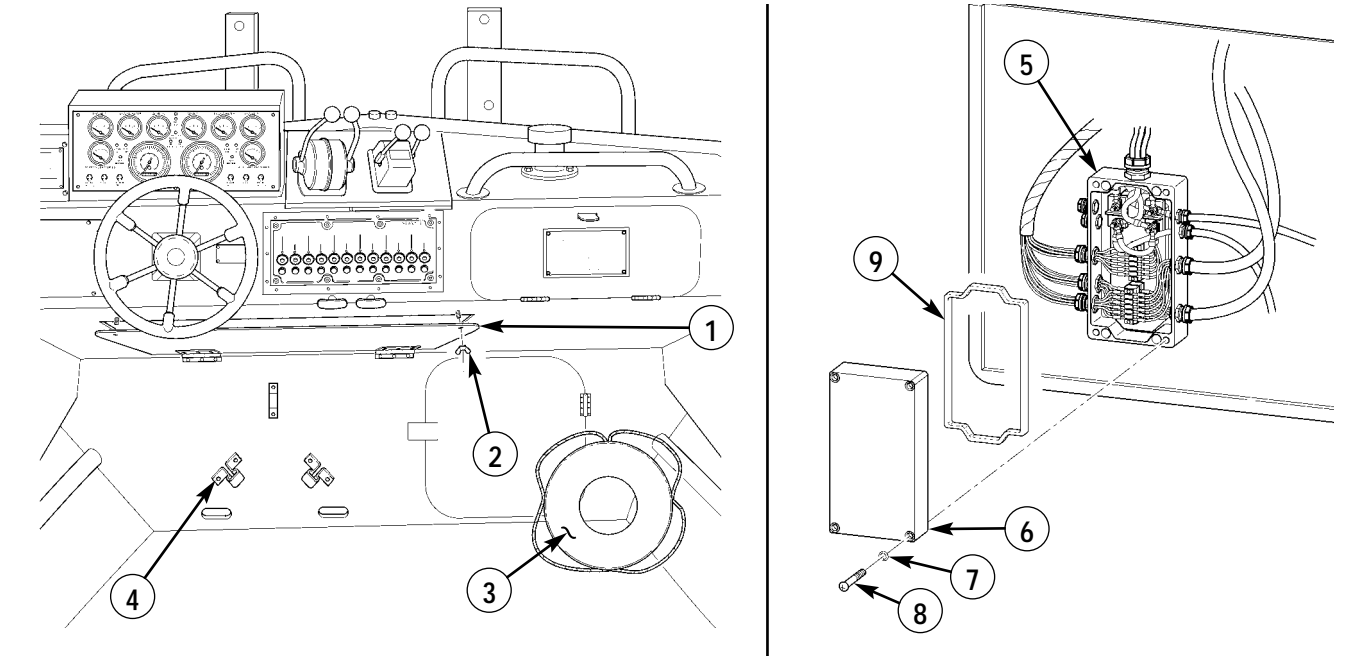
### REMOVAL (Contd)

9. Remove ring buoy (3) from mounting brackets (4) and set aside.
10. Remove two wingnuts (2) from access panel (1) and lower.
11. Remove four screws (8), seal washers (7), junction box cover (6), and cover seal (9) from junction box (5).
12. Remove nut (10) and electrical lead (11) from post (46) and junction box (5).
13. Remove nut (10) and electrical lead (48) from post (47) and junction box (5).
14. Remove conduit nut (16), seal ring (15), and collar (14) from fitting (13) and junction box (5).
15. Disconnect electrical lead (12) from post (46) and remove from junction box (5).
16. Remove conduit nut (22), seal ring (21), and collar (20) from fitting (19) and junction box (5).
17. Disconnect electrical lead (17) from post (47) and remove from junction box (5).
18. Disconnect electrical leads (18), (28), (29), (30), (31), and (32) from bottom junction block (45).
19. Remove conduit nut (26), seal ring (25), and collar (24) from fitting (23) and junction box (5).
20. Remove cable (27) from junction box (5).
21. Disconnect electrical leads (43), (42), (41), (40), (39), and (38) from top of junction block (44).
22. Remove conduit nut (36), seal ring (35), and collar (34) from fitting (33) and junction box (5).
23. Remove cable (37) from junction box (5).

### INSTALLATION

1. Install cable (37) in junction box (5).
2. Connect electrical leads (43), (42), (41), (40), (39), and (38) to top of junction block (44).
3. Install fitting (33), collar (34), seal ring (35), and conduit nut (36) on junction box (5).
4. Install cable (27) in junction box (5).
5. Connect electrical leads (18), (28), (29), (30), (31), and (32) to bottom junction block (45).
6. Install fitting (23), collar (24), seal ring (25), and conduit nut (26) on junction box (5).
7. Install electrical lead (17) in junction box (5) and connect electrical lead (17) to post (47).
8. Install fitting (19), collar (20), seal ring (21), and conduit nut (22) on junction box (5).
9. Install electrical lead (12) in junction box (5) and connect electrical lead (12) to post (46).
10. Install fitting (16), collar (15), seal ring (14), and conduit nut (13) on junction box (5).
11. Install electrical lead (48) in junction box (5) and secure on post (47) with nut (10).
12. Install electrical lead (11) in junction box (5) and secure on post (46) with nut (10).
13. Install cover seal (9) and junction box cover (6) on junction box (5) with four seal washers (7) and screws (8).
14. Close and secure access panel (1) with two wingnuts (2).
15. Install ring buoy (3) on mounting brackets (4).

### AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT (Contd)



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## AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION (Contd)

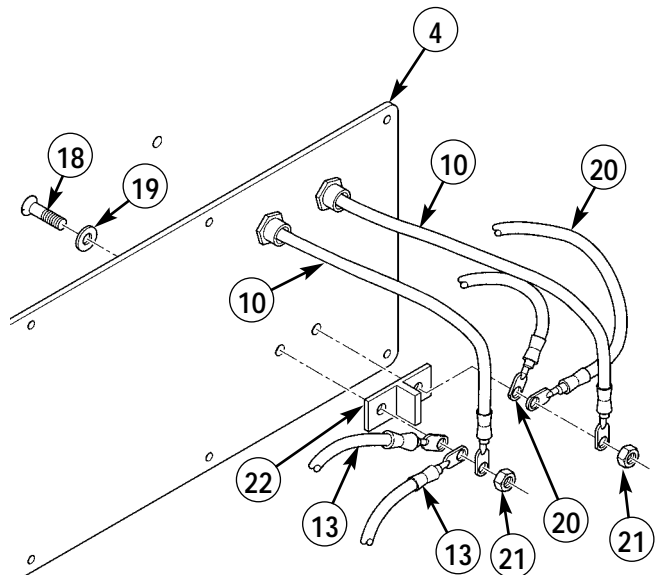
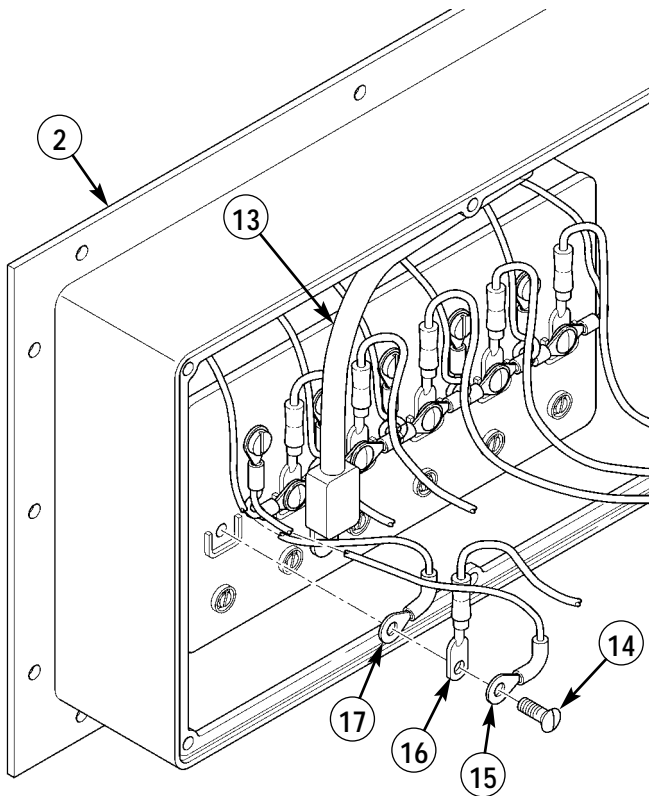
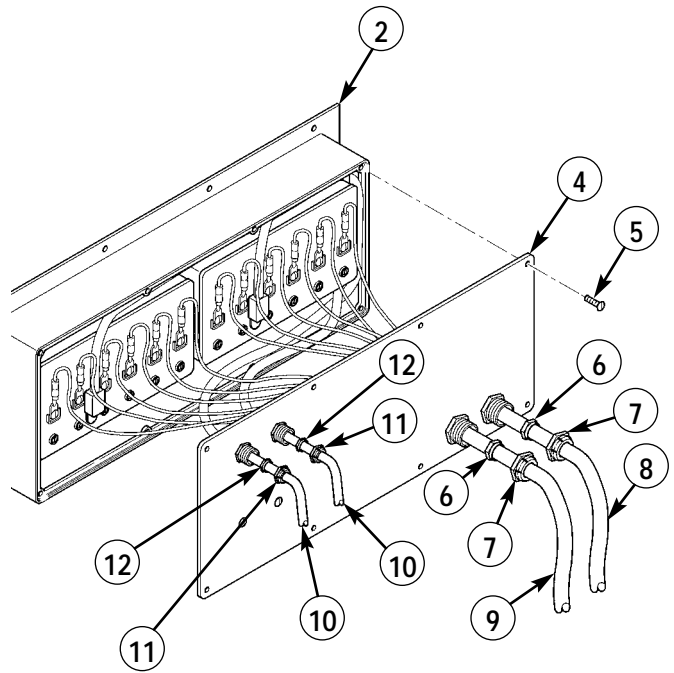
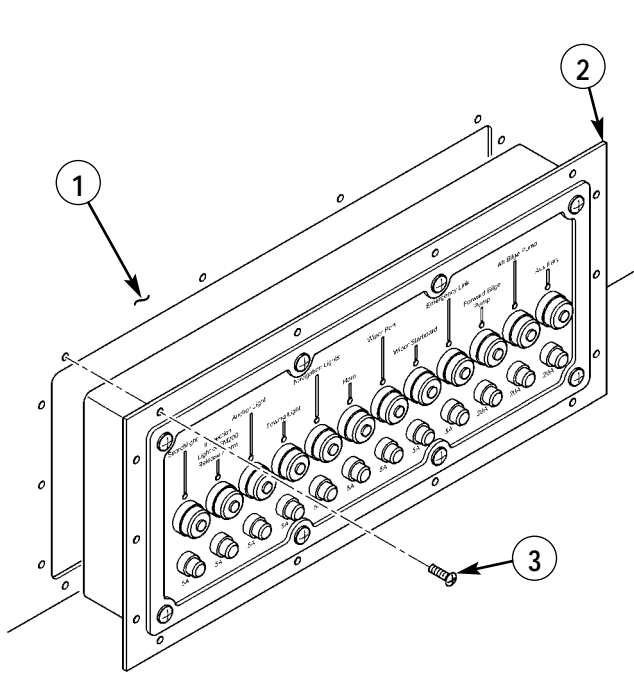
16. Install cables (10) and harnesses (8) and (9) through access panel (4).
17. Install bracket (22) on access panel (4) with screw (18), washer (19), cables (10) and (20), and nut (21).
18. Install cables (10) and (13) on bracket (22) with screw (18), washer (19), and nut (21).

#### **NOTE**

Perform steps 19 and 20 if installing a new auxiliary switch panel.

19. Remove six screws (14), lead wires (15) (nos. 1 through 6), and switch wires (17) from auxiliary switch panel (2).
20. Repeat step 19 for remaining side of auxiliary switch panel (2).
21. Install six switch wires (17), harness wires (16), and lead wires (15) (nos. 1 through 6) on auxiliary switch panel (2) with screws (14).
22. Repeat step 6 for remaining side of auxiliary switch panel (2) (nos. 7 through 12).
23. Install access panel (4) on auxiliary switch panel (2) with eight screws (5).
24. Install two grommets (6) and (12) and junction connectors (7) and (11) on access panel (4).
25. Install auxiliary switch panel (2) on console (1) with fourteen screws (3).
26. Install battery ground cable (WP 0054 00).
27. Close battery hatch (TM 5-1940-322-10).

AUXILIARY SWITCH PANEL TO JUNCTION BOX WIRING HARNESS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INTERMEDIATE WIRING HARNESS REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Tiedown straps (item 38, WP 0171 00)  
Three locknuts (item 58, WP 0173 00)

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Access panel opened (WP 0044 00).  
Instrument panel removed (WP 0038 00).  
Battery ground cables disconnected  
(WP 0054 00).

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## INTERMEDIATE WIRING HARNESS REPLACEMENT (Contd)

### NOTE

Port and starboard intermediate wiring harnesses are replaced the same way. This procedure covers the replacement of one intermediate wiring harness.

Tag all connectors and electrical leads to assist with installation.

### REMOVAL

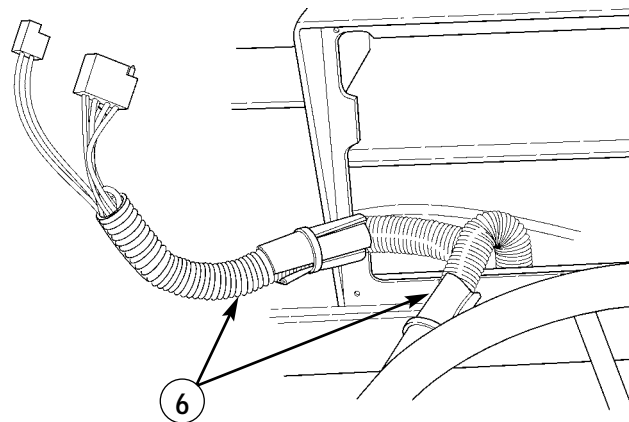
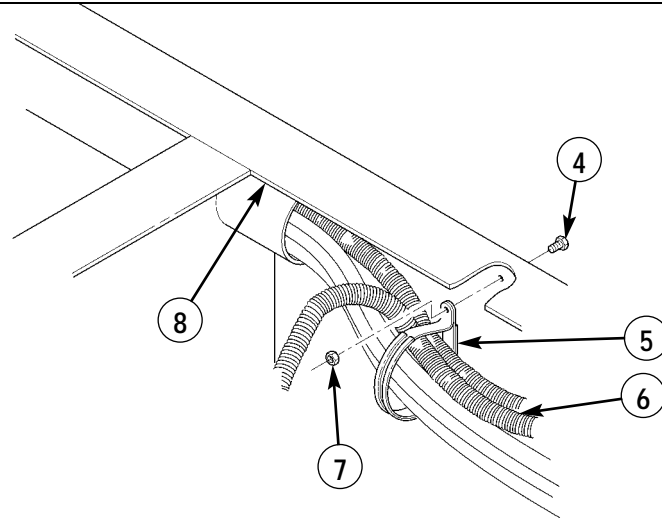
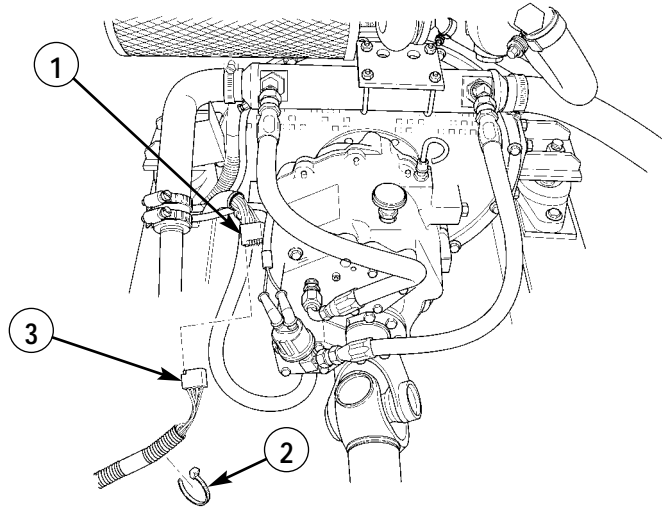
1. Disconnect intermediate wiring harness connector (3) from engine wiring harness connector (1).
2. Remove three locknuts (7), screws (4), and clamps (5) holding intermediate wiring harness (6) to battery compartment forward bulkhead (8). Discard locknuts (7).
3. Remove tiedown straps (2) and intermediate wiring harness (6) from engine compartment, battery compartment, starboard side of cockpit, and stowage compartment.
4. Remove intermediate wiring harness (6) from stowage compartment and boat.

### INSTALLATION

1. Route intermediate wiring harness (6) from stowage compartment to starboard side of cockpit through battery compartment to engine compartment.
2. Install intermediate wiring harness (6) on battery compartment bulkhead (8) with three screws (4), clamps (5), and new locknuts (7).
3. Connect intermediate wiring harness connector (3) to engine wiring harness connector (1) with new tiedown straps (2).
4. Install instrument panel (WP 0038 00).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).
7. Close engine hatches (TM 5-1940-322-10)
8. Close and secure access panel (WP 0044 00).



INTERMEDIATE WIRING HARNESS REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HORN REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 54, WP 0173 00)  
Two lockwashers (item 97, WP 0173 00)

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## HORN REPLACEMENT (Contd)

### **CAUTION**

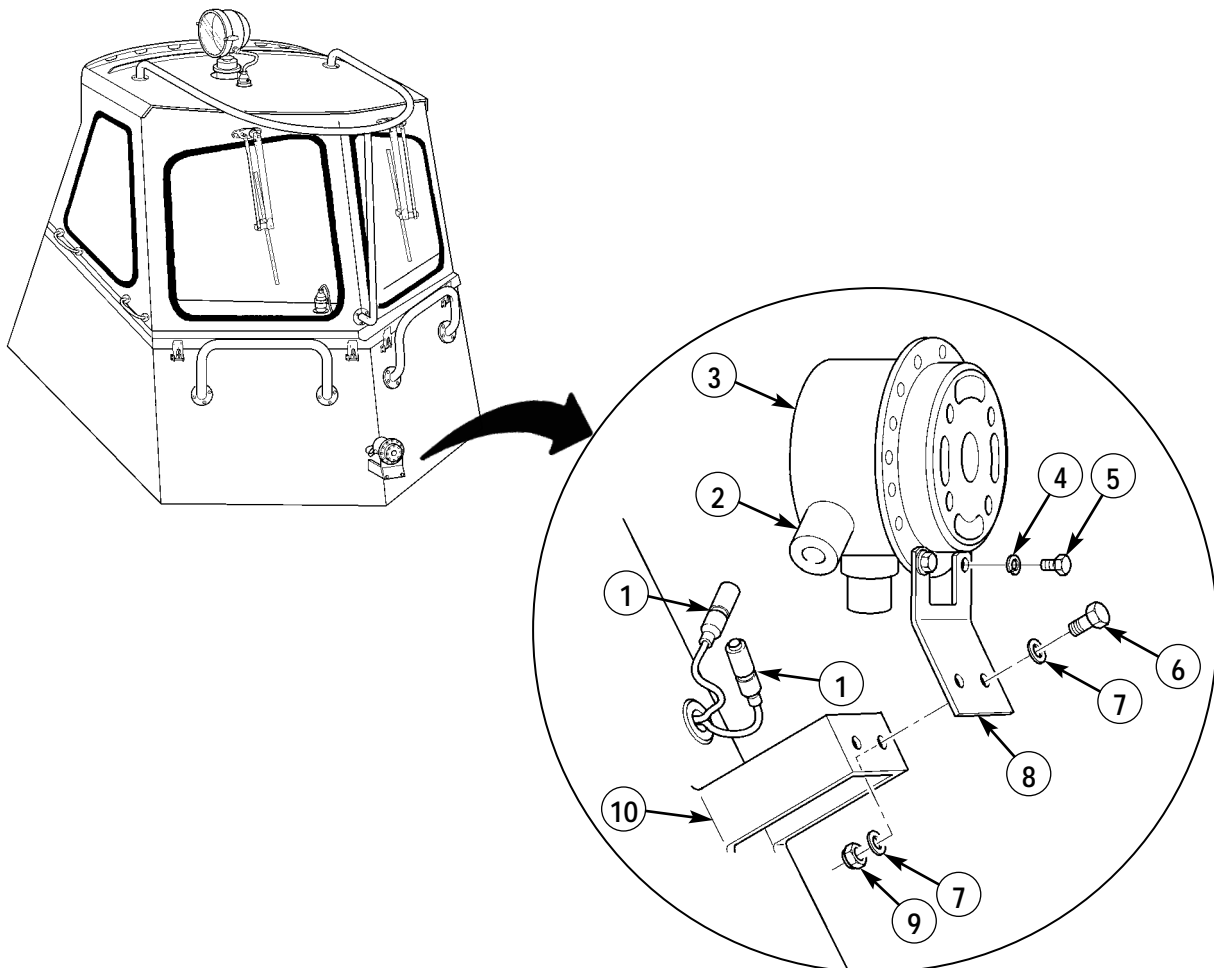
Support horn during removal and installation. Failure to comply may result in damage to equipment.

### REMOVAL

1. Disconnect electrical leads (1) from horn connections (2).
2. Remove two locknuts (9), four washers (7), two screws (6), and horn (3) from bracket (10). Discard locknuts (9).
3. Remove two screws (5), two lockwashers (4), and bracket (8) from horn (3). Discard lockwashers (4).

### INSTALLATION

1. Install bracket (8) on horn (3) with two new lockwashers (4) and screws (5).
2. Install horn (3) on bracket (10) with two screws (6), four washers (7), and two new locknuts (9).
3. Connect two electrical leads (1) to horn connectors (2).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### EXHAUST REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

##### Materials/Parts

Gasket (item 18, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)

---

## EXHAUST REPLACEMENT (Contd)

### **WARNING**

Do not touch hot exhaust system components with bare hands. Allow exhaust to cool. Failure to comply may result in injury to personnel.

### **CAUTION**

Cover all openings to keep debris from entering turbocharger. Failure to comply may result in damage to equipment.

### **NOTE**

The port side exhaust and starboard side exhaust are replaced the same way. The port side exhaust contains four clamps; the starboard side exhaust contains two clamps. This procedure covers the replacement of the starboard side exhaust.

## REMOVAL

### **NOTE**

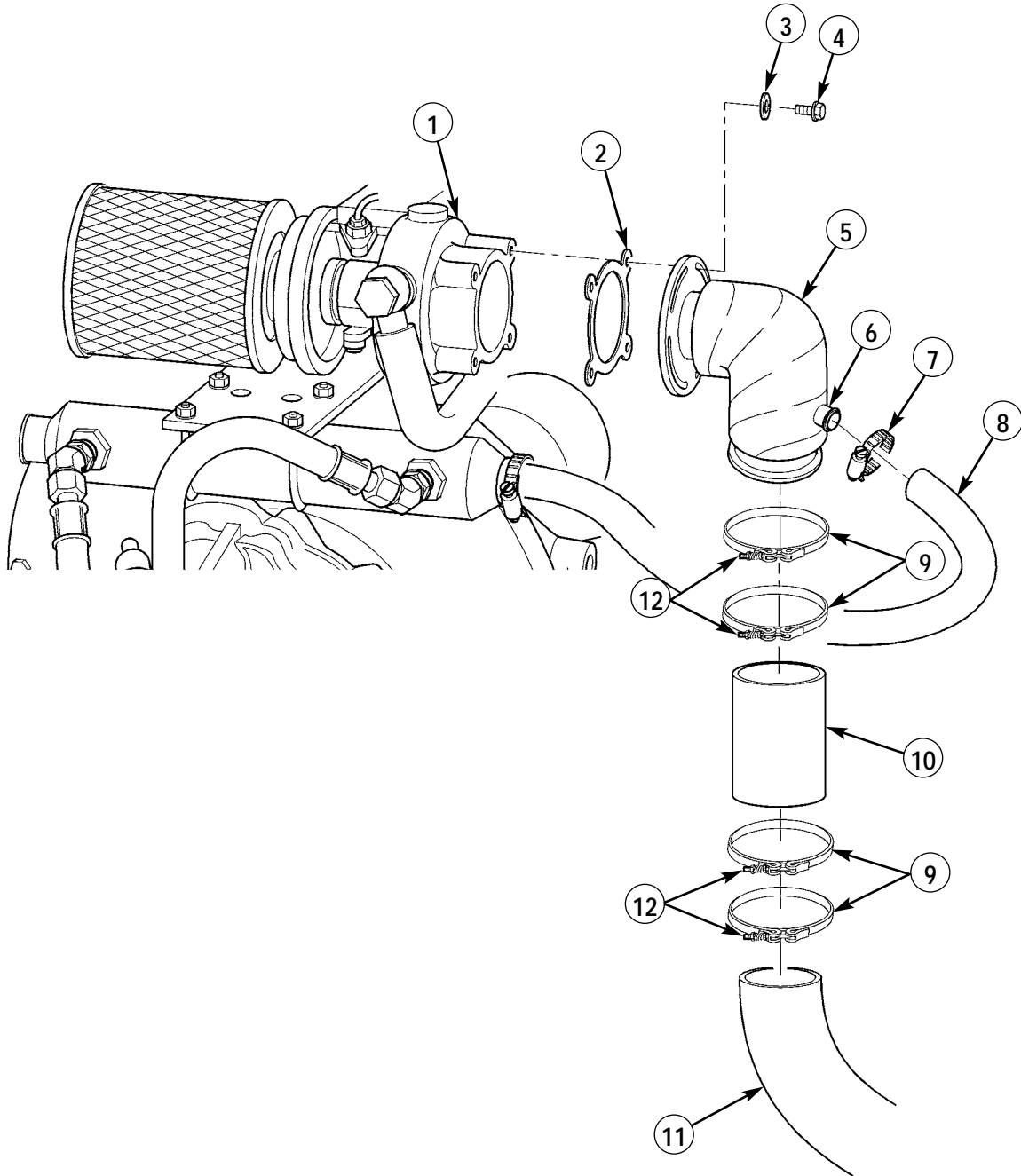
Keep hose raised above engine level to ensure there is no fluid spill.

1. Loosen clamp (7) on hose (8).
2. Disconnect hose (8) from exhaust elbow nipple (6).
3. Loosen four locknuts (12) on clamps (9).
4. Remove four clamps (9) and sleeve (10) from exhaust port (11) and exhaust elbow (5).
5. Remove four screws (4), washers (3), exhaust elbow (5), and gasket (2) from turbocharger housing (1). Discard gasket (2).

## INSTALLATION

1. Apply thin coat of antiseize compound on four screws (4).
2. Install new gasket (2) and exhaust elbow (5) on turbocharger housing (1) with four washers (3) and screws (4).
3. Position sleeve (10) with four clamps (9) on exhaust elbow (5) and exhaust port (11) and tighten locknuts (12).
4. Connect hose (8) to exhaust elbow nipple (6) and tighten clamp (7).
5. Close engine hatches (TM 5-1940-322-10).
6. Install aft cockpit (WP 0016 00).

EXHAUST REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BATTERY HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE REMOVAL, CLEANING AND INSPECTION AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### References

TM 5-1940-322-10  
WP 0013 00

##### Materials/Parts

Twenty-eight locknuts (item 53, WP 0173 00)  
Seal (item 135, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

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## BATTERY HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)

### REMOVAL

1. Open battery hatch (1).
2. Remove twenty-seven locknuts (4), fifty-four washers (5), and twenty-seven screws (7) from three hinges (8), battery hatch (1), and boat frame (6). Discard locknuts (4).
3. Remove three hinges (8) and battery hatch (1) from boat frame (6).
4. Remove locknut (4), washers (5), and screw (7) securing battery hatch support brace (3) to boat frame (6). Discard locknut (4).
5. Remove battery hatch support brace (3) from boat frame (6).
6. If necessary, remove seal (2) from inside of battery hatch (1). Discard seal (2).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

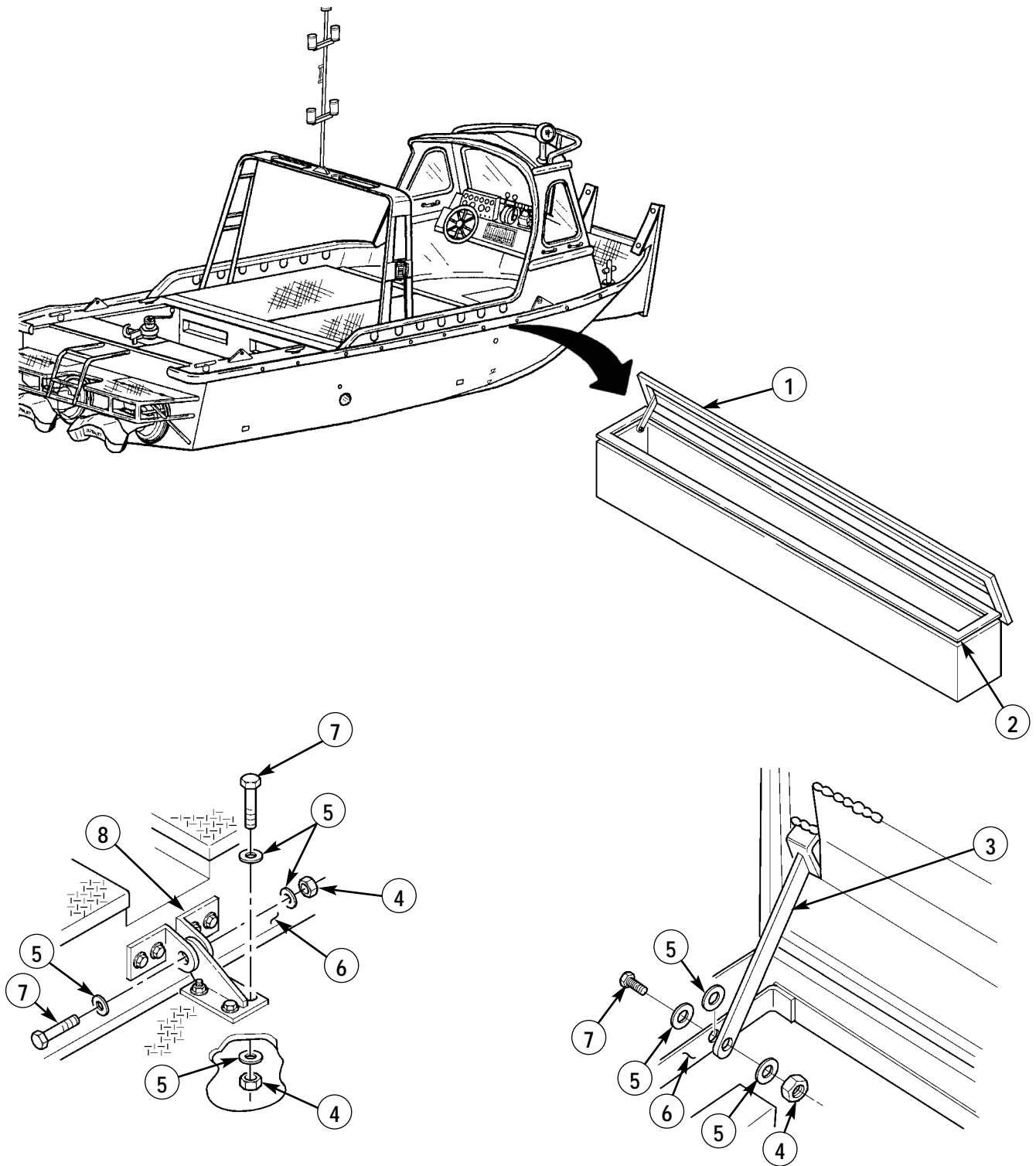
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean surface of old adhesive seal with Skysol 100 and dry with cloth.

### INSTALLATION

1. Install new seal (2), if removed, around inside of battery hatch (1).
2. Install support brace (3) to boat frame (6) with washers (5), screw (7), and new locknut (4).
3. Fit hinge assemblies (8) to boat frame (6) and align holes.
4. Secure three hinge assemblies (8) to boat frame (6) and battery hatch (1) with twenty-seven screws (7), fifty-four washers (5), and twenty-seven new locknuts (4).
5. Close battery hatch (TM 5-1940-322-10).

### BATTERY HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MASTER SWITCH MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Three locknuts (item 53, WP 0173 00)

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

---

## MASTER SWITCH MAINTENANCE (Contd)

### **WARNING**

Use caution when working with battery cables. Failure to comply may result in injury to personnel and/or damage to equipment.

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

### **NOTE**

Tag all cables and lead wires during removal to assist with installation.

### REMOVAL

1. Remove four nuts (2), six cables (1), three lead wires (4), and washers (3) from terminals (5).
2. Remove three locknuts (6) and screws (9) from master switch (8). Discard locknuts (6).
3. Remove master switch (8) from mounting plate (7).

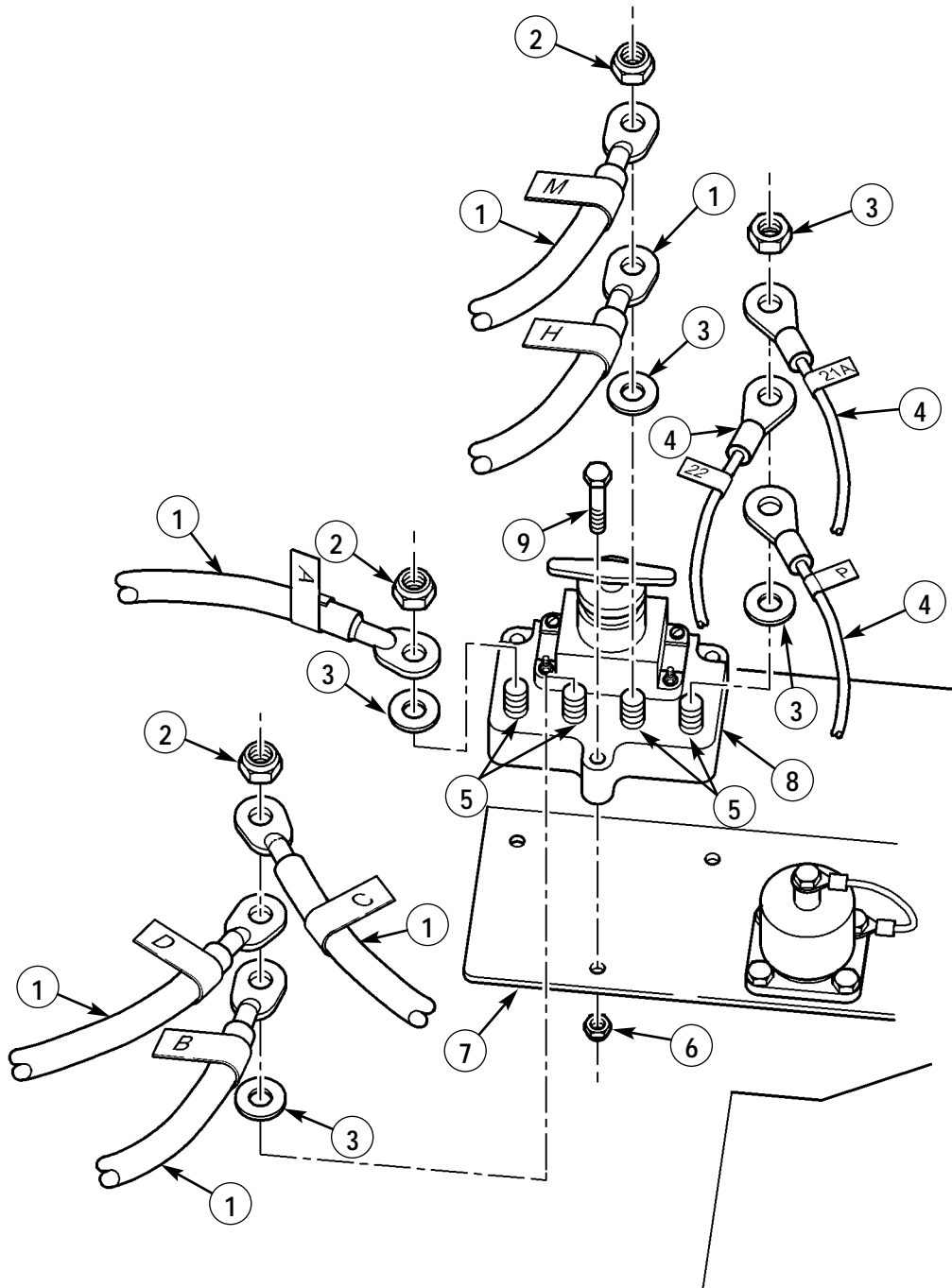
### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect cables (1) for corrosion. If cables are corroded, clean with parts cleaning brush.
3. Inspect cables (1) for damage. If damage is present, replace cables (1) (WP 0054 00).

### INSTALLATION

1. Install master switch (8) on plate (7) with three screws (9) and new locknuts (6).
2. Install four washers (3), five cables (1), one lead (4), and four nuts (2) on terminals (5).
3. Connect battery ground cables (WP 0054 00).
4. Close battery hatch (TM 5-1940-322-10).

MASTER SWITCH MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### NATO SLAVE MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four locknuts (item 58, WP 0173 00)  
Two locknuts (item 74, WP 0173 00)

###### References

WP 0013 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

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## NATO SLAVE MAINTENANCE (Contd)

### **WARNING**

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

### REMOVAL

1. Remove screw (12), washer (11), and battery cable (23) from slave receptacle (4).
2. Remove locknut (17), two washers (16), electrical leads (15), (14), (13), and (19) battery cable (18), screw (21), and battery cable (20) from slave receptacle spacer (10). Discard locknut (17).
3. Remove screw (12), washer (11), slave receptacle spacer (10) and, if necessary, slave receptacle rubber block (22) from slave receptacle (4).
4. Remove screw (1) and strap (2) from cap (9).
5. Remove cap (9) and O-ring (8) from slave receptacle (4).
6. Remove four locknuts (7), seven washers (6), screws (3), strap (2), and slave receptacle (4) from bracket (5). Discard locknuts (7).

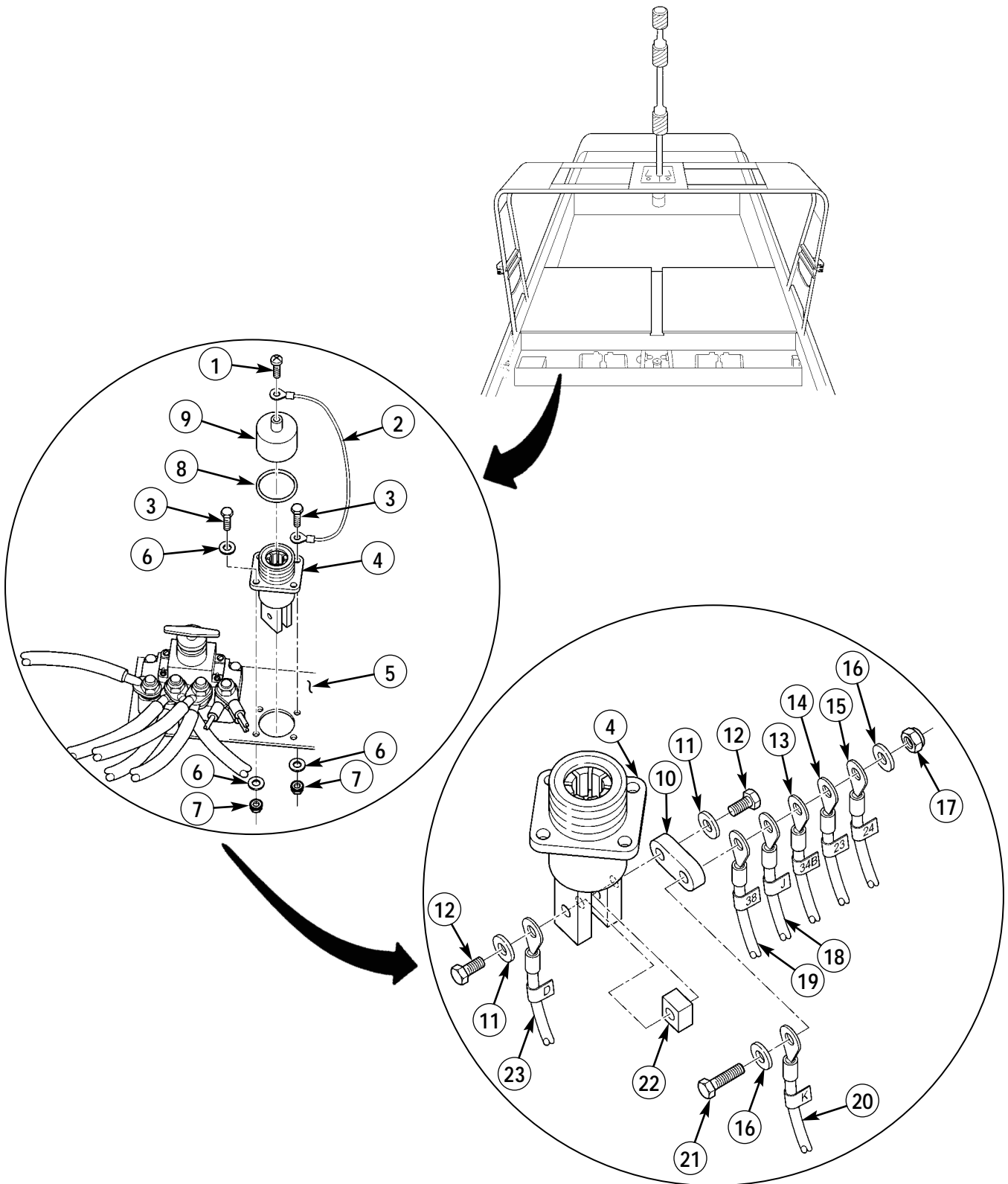
### CLEANING AND INSPECTION

1. Inspect battery cables, slave receptacle, and slave receptacle spacer for corrosion. If cables, slave receptacle, or slave receptacle spacer are corroded, clean with parts cleaning brush. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect battery cables for damage. Replace if damaged (WP 0054 00).
3. Inspect O-ring and slave receptacle rubber block for damage. Replace if damaged.

### INSTALLATION

1. Install slave receptacle (4) and strap (2) on bracket (5) with four screws (3) seven washers (6) and new locknuts (7).
2. Install cap (9) and O-ring (8) on slave receptacle (4).
3. Install strap (2) on cap (9) with screw (1).
4. Install slave receptacle spacer (10) and, if removed, slave receptacle rubber block (22) on slave receptacle (4) with washer (11) and screw (12).
5. Install battery cables (20) and (18), and electrical leads (19), (13), (14), and (15) on slave receptacle spacer (10) with screw (21), two washers (16), and new locknut (17).
6. Install battery cable (23) on slave receptacle (4) with screw (12) and washer (11).
7. Connect battery ground cables (WP 0054 00).
8. Close battery hatch (TM 5-1940-322-10).

# NATO SLAVE MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BATTERY CABLES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four lockwashers (item 89, WP 0173 00)  
Two locknuts (item 74, WP 0173 00)  
Two lockwashers (item 90, WP 0173 00)  
Silicone compound (item 37, WP 0171 00)  
Tiedown straps (item 38, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Master switch turned OFF (TM 5-1940-322-10).

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## BATTERY CABLES MAINTENANCE (Contd)

### **WARNING**

Use caution when working with battery cables. Failure to comply may result in injury to personnel and/or damage to equipment.

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

Use caution when removing cables from adjacent terminals. Cables may touch other terminals. Failure to comply may result in injury to personnel or damage to equipment.

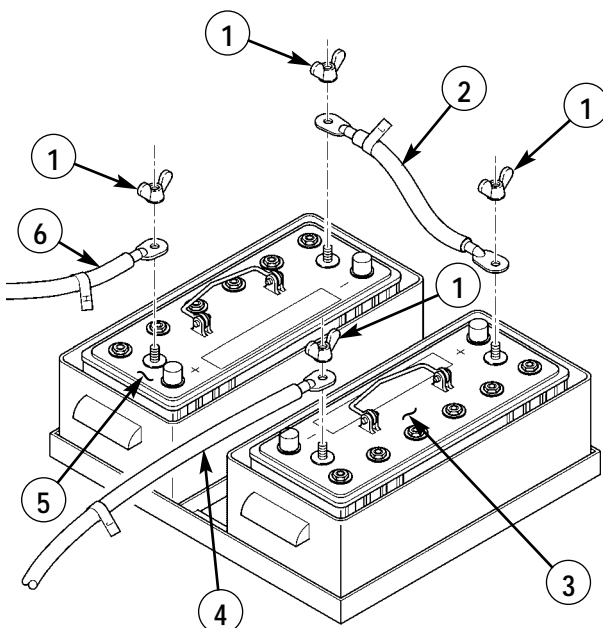
### **NOTE**

Tag all battery cables during removal to assist with installation.

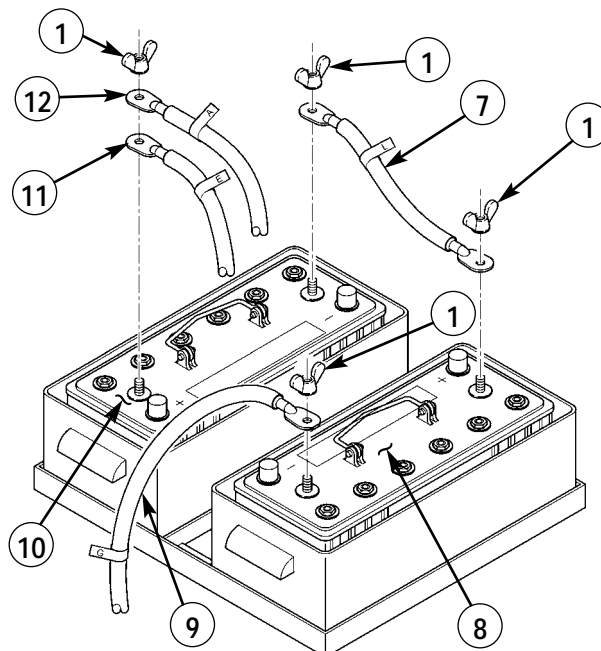
Battery cables may be fastened to other cables and harnesses with tiedown straps. Battery cables have a lettered plastic clip at each end for identification. Reuse this clip with new cable.

### REMOVAL

1. Remove wing nut (1) and battery ground cable (9) from port battery (8).
2. Remove wing nut (1) and battery ground cable (4) from starboard battery (3).
3. Remove two wing nuts (1) and battery cable (2) from starboard batteries (3) and (5).
4. Remove wing nut (1) and battery cable (6) from starboard batteries (5).
5. Remove two wing nuts (1) and battery cable (7) from port batteries (8) and (10).
6. Remove wing nut (1) and two battery cables (11) and (12) from port batteries (8) and (10).



STARBOARD BATTERIES

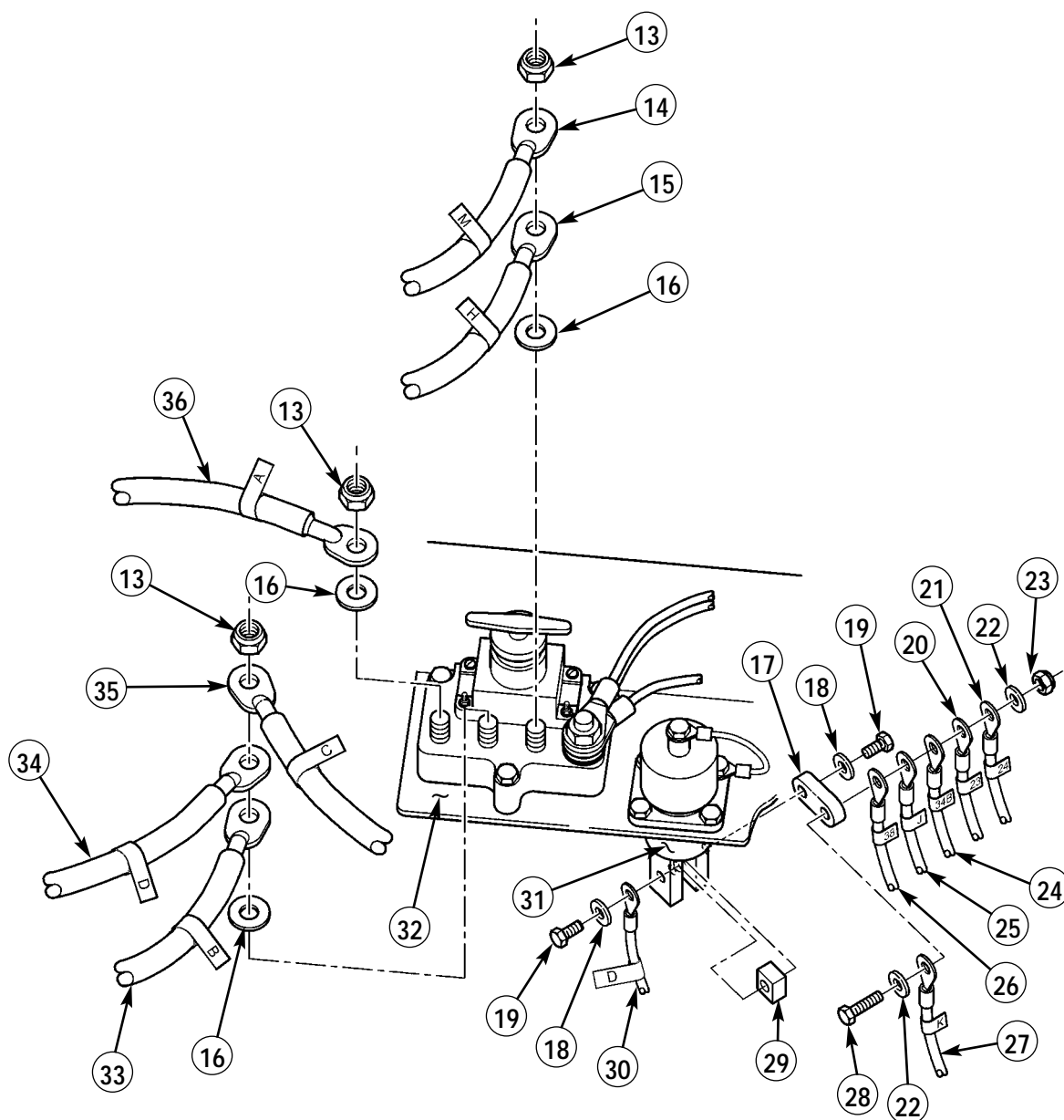


PORT BATTERIES

## BATTERY CABLES MAINTENANCE (Contd)

### REMOVAL (Contd)

7. Remove nut (13), battery cables (35), (34), and (33), and washer (16) from master switch (32).
8. Remove nut (13), battery cable (36), and washer (16) from master switch (32).
9. Remove nut (13), battery cables (14) and (15), and washer (16) from master switch (32).
10. Remove locknut (23), washers (22), electrical leads (21), (20), (24), battery cable (25), leads (26), and screw (28) and battery cable (27) from slave receptacle (12). Discard locknut (23).
11. If necessary, remove screw (19), washer (18), slave receptacle spacer (17), and rubber spacer block (29) from slave receptacle (31).
12. Remove screw (19), washers (18), and battery cable (30) from slave receptacle (31).



## BATTERY CABLES MAINTENANCE (Contd)

### REMOVAL (Contd)

13. Remove nuts (4), lockwashers (3), and battery cables (2) and (5) from emergency link solenoid (1). Discard lockwashers (3).

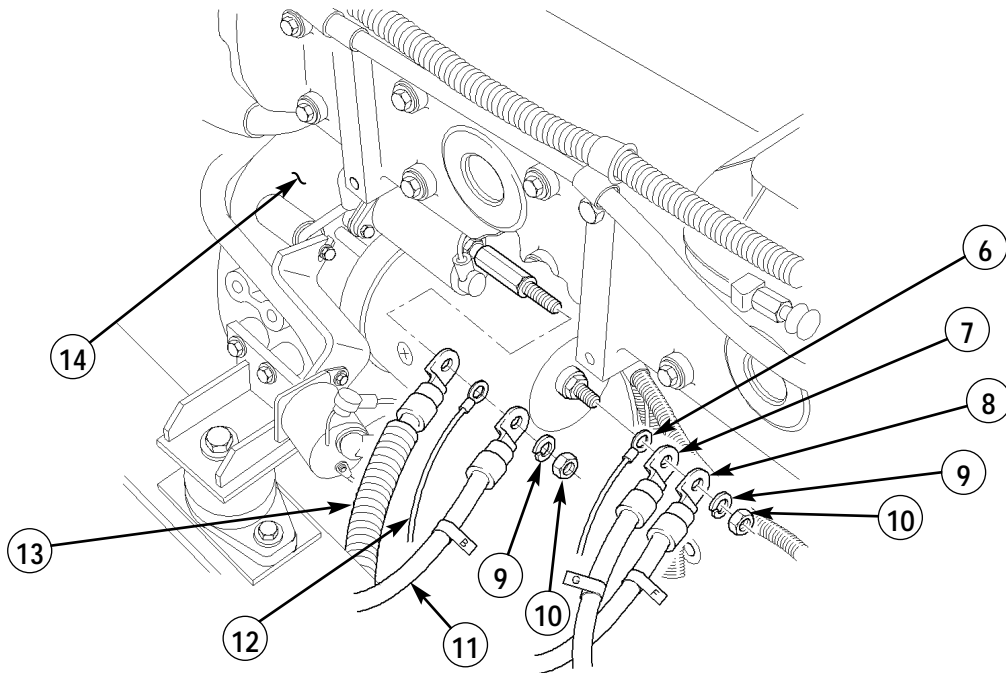
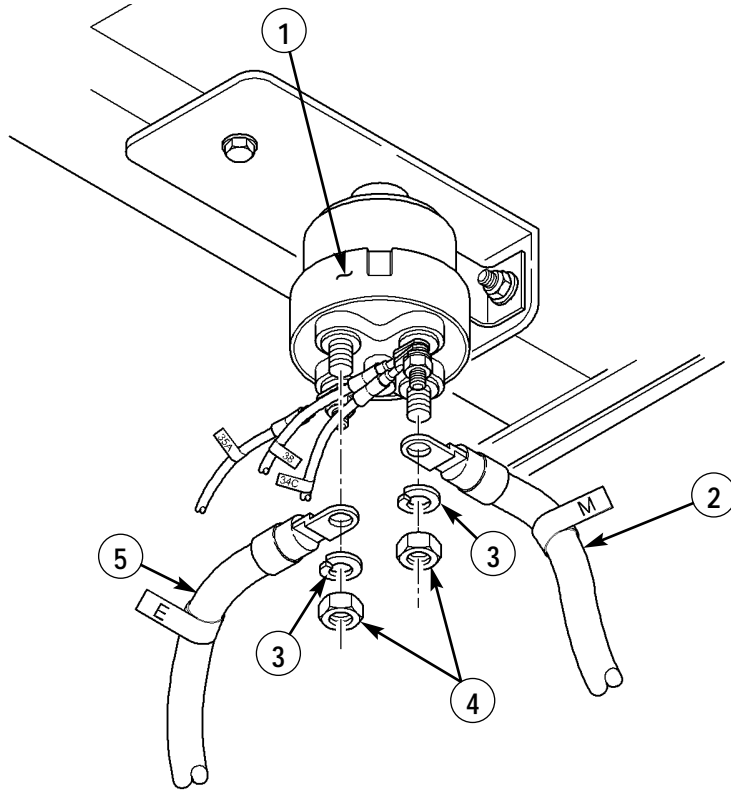
#### **NOTE**

The battery starter cables on both engines are replaced the same way. Steps 14 and 15 apply to the port side engine.

14. Remove nut (10), lockwasher (9), battery ground cables (8) and (7), and lead wire (6) from engine starter (14). Discard lockwasher (9).
15. Remove nut (10), lockwasher (9), battery cable (11), and lead wires (12) and (13) from engine starter (14). Discard lockwasher (9).
16. Repeat steps 13 through 15 as necessary from starboard side.



BATTERY CABLES MAINTENANCE (Contd)



## BATTERY CABLES MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect battery cables for damage. Replace if damaged.
3. Inspect battery cables and lead wires for corrosion. Clean with wire brush if corroded.

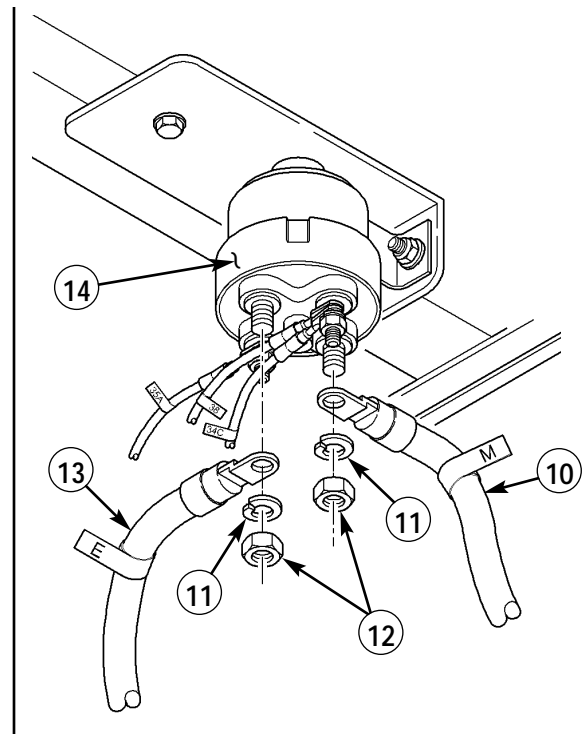
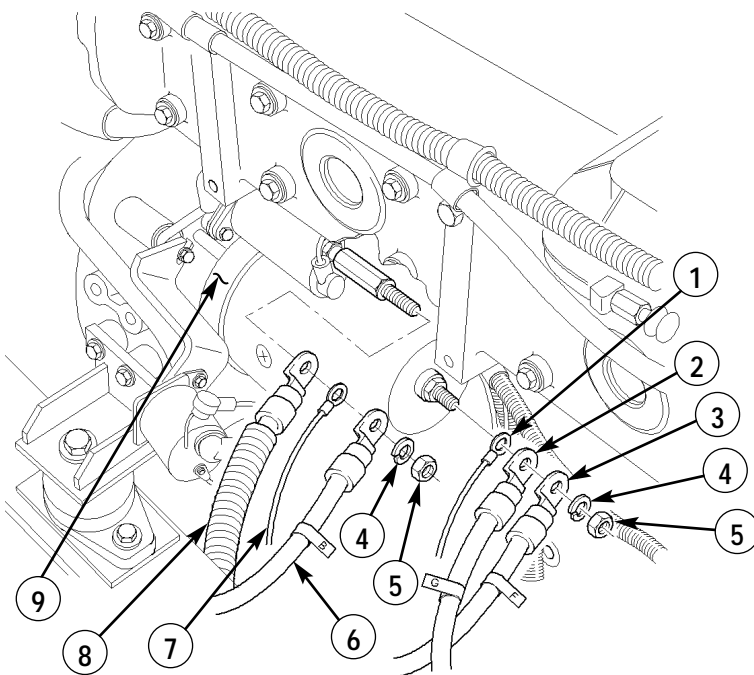
### INSTALLATION

#### NOTE

The battery starter cables are installed the same way on both engines. Steps 1 and 2 apply to the port side engine.

Add coat of silicone compound to terminals prior to installation.

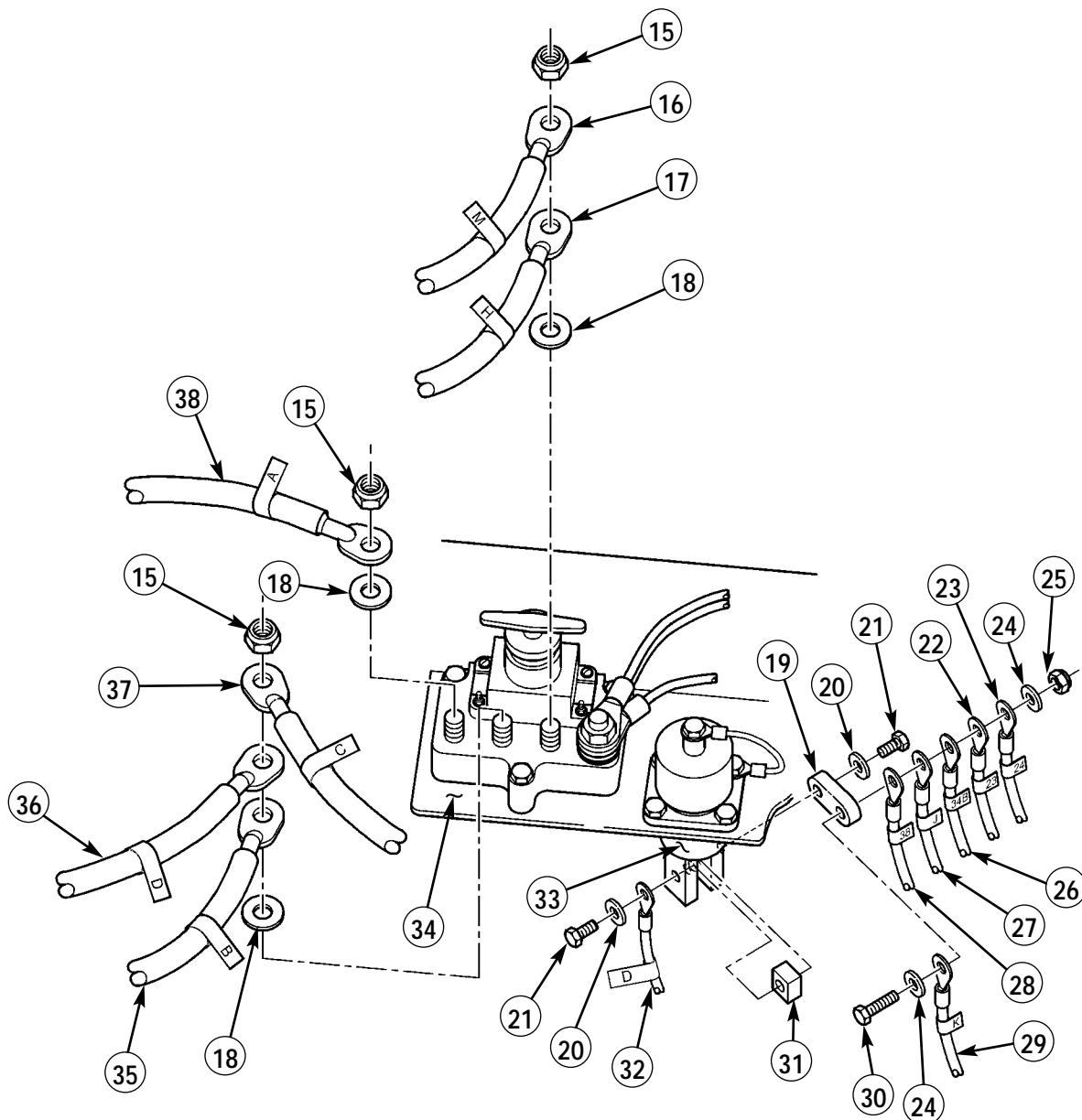
1. Install lead wires (8) and (7) and battery cable (6) on engine starter (9) with new lockwasher (4) and nut (5).
2. Install lead wire (1) and battery ground cables (2) and (3) on engine starter (9) with new lockwasher (4) and nut (5).
3. Install battery cables (10) and (13) on emergency link solenoid (14) with two new lockwashers (11) and nuts (12).



## BATTERY CABLES MAINTENANCE (Contd)

### INSTALLATION (Contd)

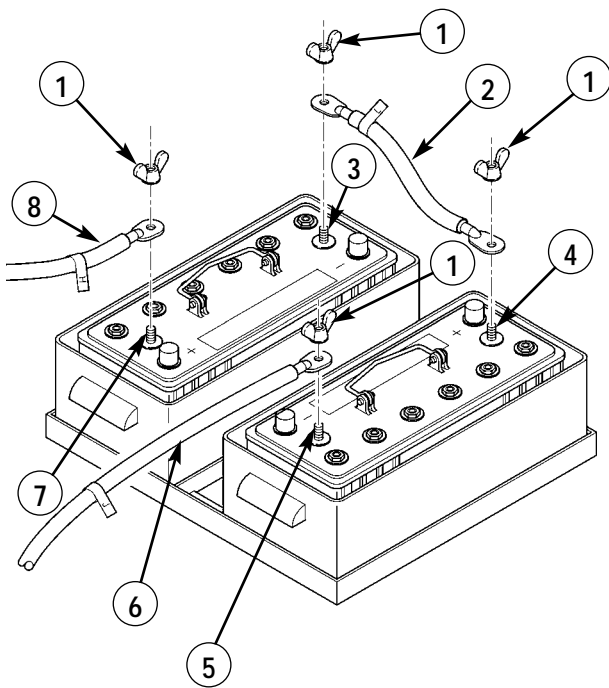
4. Install battery cable (32) on slave receptacle (33) with screw (21) and washer (20).
5. If removed, install rubber spacer block (31) and slave receptacle spacer (19) on slave receptacle (33) with washer (20) and screw (21).
6. Install battery cables (29) and (27), and electrical leads (28), (26), (22), and (23) on slave receptacle spacer (19), with screw (30), two washers (24), and new locknut (25).
7. Install battery cables (16) and (17) on master switch (34) with washer (18) and nut (15).
8. Install battery cables (35), (36), and (37) on master switch (34) with washer (18) and nut (15).
9. Install battery cable (38) on master switch (34) with washer (18) and nut (15).



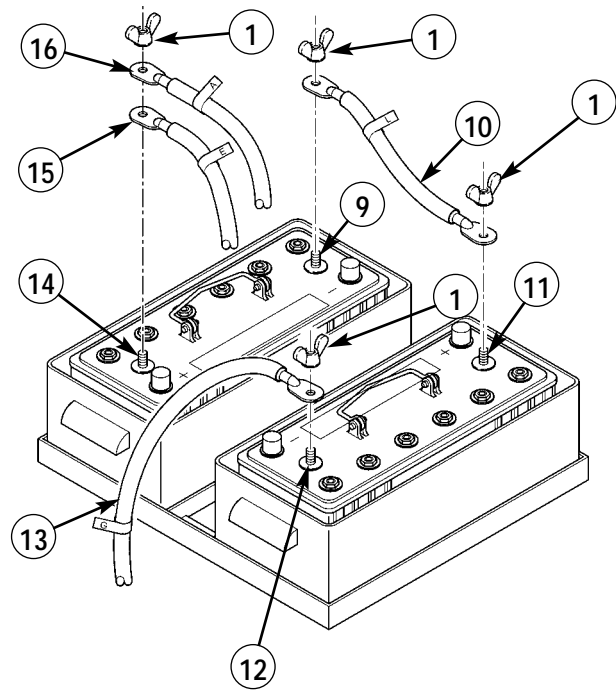
## BATTERY CABLES MAINTENANCE (Contd)

### INSTALLATION (Contd)

10. Install battery cables (15) and (16) on battery post (14) with wing nut (1).
11. Install battery cable (10) on battery posts (9) and (11) with two wing nuts (1).
12. Install battery cable (8) on battery post (7) with wing nut (1).
13. Install battery cable (2) on battery posts (3) and (4) with two wing nuts (1).
14. Install battery ground cable (6) on battery post (5) with wing nut (1).
15. Install battery ground cable (13) on battery post (12) with wing nut (1).
16. Turn master switch ON (TM 5-1940-322-10).
17. Close battery hatch (TM 5-1940-322-10).
18. Close engine hatches (TM 5-1940-322-10).



STARBOARD BATTERIES



PORT BATTERIES

END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BATTERIES AND BATTERY BOXES REPLACEMENT

PORT BATTERY BANK REMOVAL, PORT BATTERY BANK INSTALLATION,  
STARBOARD BATTERY BANK REMOVAL, AND STARBOARD BANK INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery hatches opened and secured  
(TM 5-1940-322-10).  
Master switch turned OFF (TM 5-1940-322-10).

##### Materials/Parts

Silicone compound (item 37, WP 0210 00)

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## BATTERIES AND BATTERY BOXES REPLACEMENT (Contd)

### **WARNING**

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery terminal, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing a battery cable terminal, disconnect ground (negative) terminals first. Ensure all switches are in OFF position before disconnecting. Do not allow tools to come in contact with hull when disconnecting terminals. A direct short can result, causing instant heating of tools, tool damage, battery damage, or battery explosion. Battery acid (electrolyte) is harmful. Always wear safety goggles and rubber gloves, and do not smoke when performing battery maintenance. Severe injury will result if acid contacts eyes or skin. Failure to comply may result in injury or death to personnel and/or damage to equipment.

### **NOTE**

Tag all battery cables during removal to assist with installation.

Apply silicone compound to terminals during removal and installation.

Note position of batteries during removal to assist with installation.

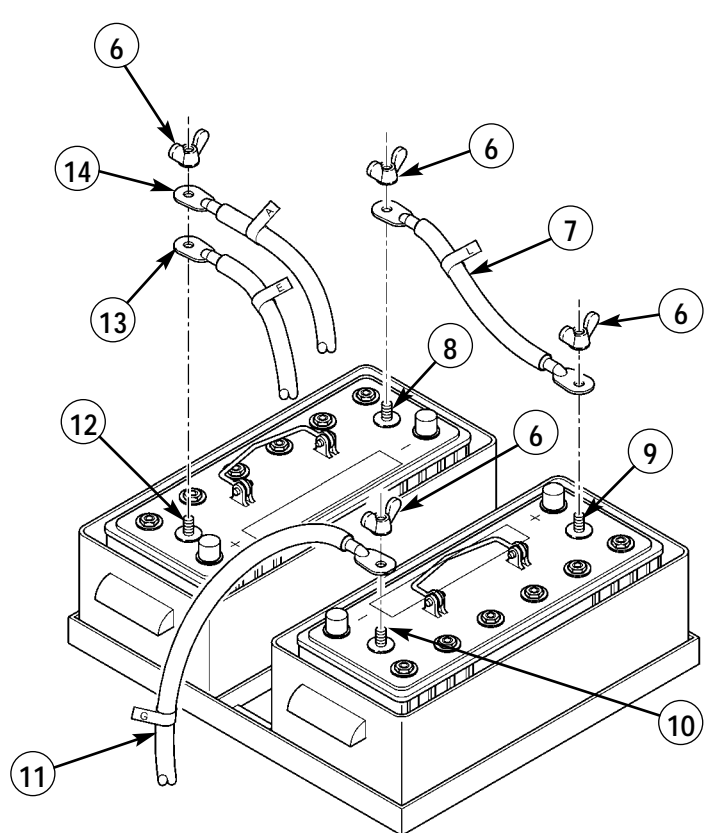
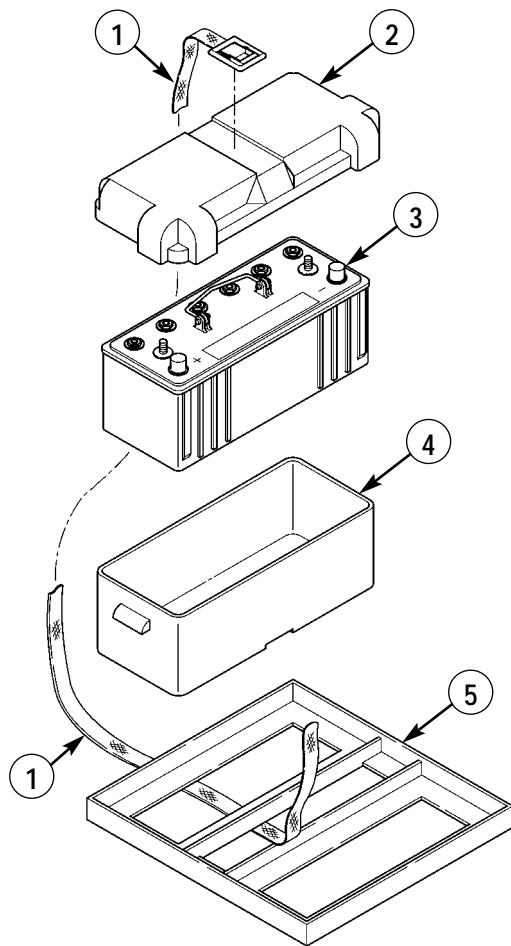
### PORT BATTERY BANK REMOVAL

1. Disconnect battery box hold-down strap (1) and remove battery box cover (2) from battery box (4).
2. Repeat step 1 for additional battery.
3. Remove wing nut (6) and battery cable (11) from battery post (10).
4. Remove two wing nuts (6) and battery cable (7) from battery posts (8) and (9).
5. Remove wing nut (6) and battery cables (13) and (14) from battery post (12).
6. Remove two batteries (3) from battery boxes (4).
7. Remove battery boxes (4) from battery support frames (5).
8. Remove battery hold-down straps (1) from under support frames (5).

## BATTERIES AND BATTERY BOXES REPLACEMENT (Contd)

### PORT BATTERY BANK INSTALLATION

1. Install hold-down straps (1) to support frames (5).
2. Install battery boxes (4) on support frames (5).
3. Install two batteries (3) in battery boxes (4) as noted at removal.
4. Install battery cables (13) and (14) on battery post (12) with wing nut (6).
5. Install battery cable (7) on battery posts (8) and (9) with two wing nuts (6).
6. Install battery cable (11) on battery post (10) with wing nut (6).
7. Install battery box covers (2) on battery boxes (4).
8. Connect and tighten battery hold-down straps (1).



## BATTERIES AND BATTERY BOXES REPLACEMENT (Contd)

### STARBOARD BATTERY BANK REMOVAL

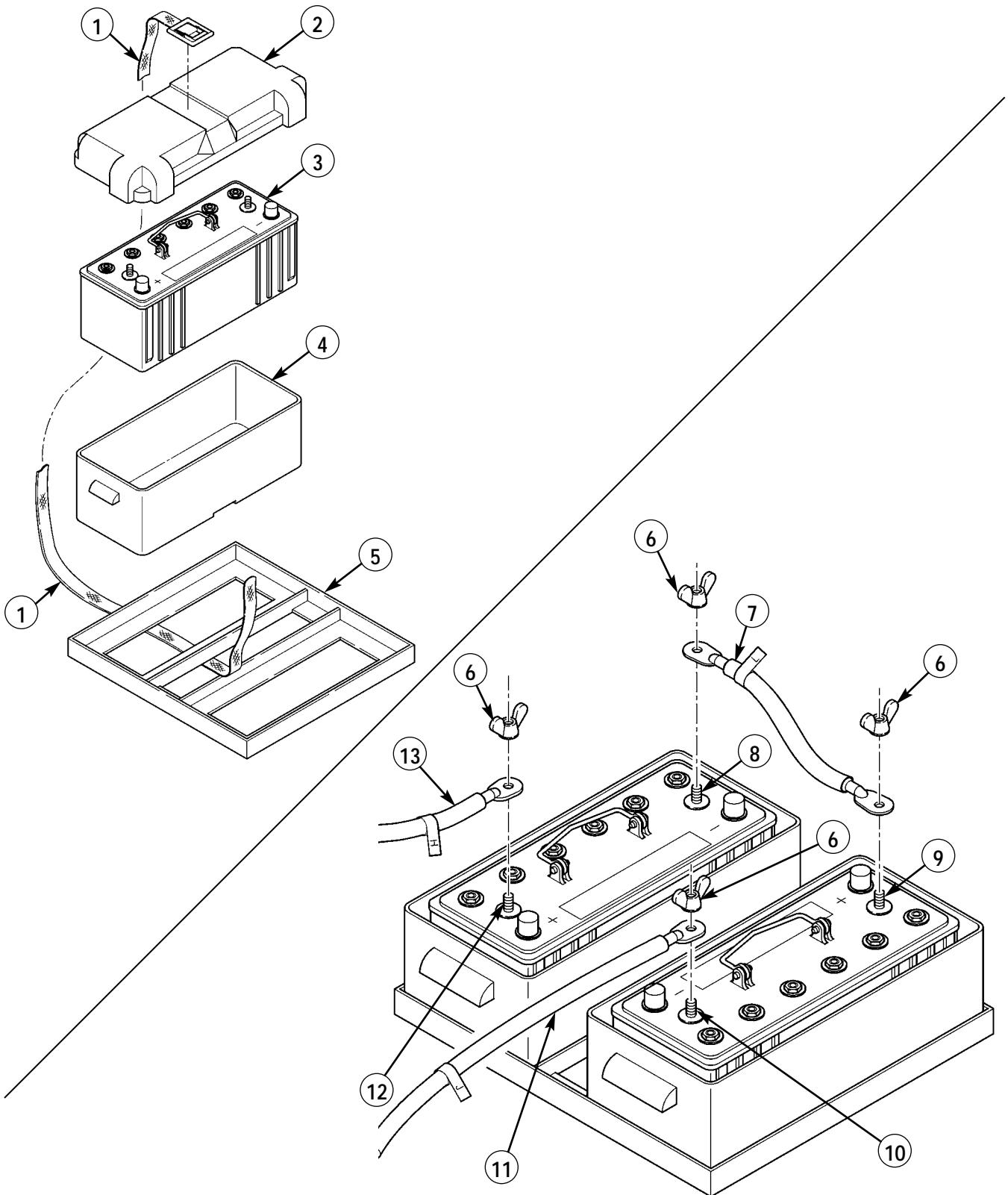
1. Disconnect battery box hold-down strap (1) and remove battery box cover (2) from battery box (4).
2. Repeat step 1 for additional battery.
3. Remove wing nut (6) and battery cable (11) from battery post (10).
4. Remove two wing nuts (6) and battery cable (7) from battery posts (8) and (9).
5. Remove wing nut (6) and cable (13) from battery post (12).
6. Remove batteries (3) from battery boxes (4).
7. Remove battery boxes (4) from battery support frames (5) and hold-down straps (1).
8. Remove hold-down straps (1) from battery support frames (5).

### STARBOARD BATTERY BANK INSTALLATION

1. Install hold-down straps (1) on support frames (5).
2. Install battery boxes (4) on battery support frames (5).
3. Install batteries (3) in battery boxes (4).
4. Install battery cable (13) on battery post (12) with wing nut (6).
5. Install battery cable (7) on battery posts (8) and (9) with two wing nuts (6).
6. Install battery cable (11) on battery post (10) with wing nut (6).
7. Install battery box covers (2) on battery boxes (4).
8. Connect and tighten battery hold-down straps (1).
9. Close battery hatches (TM 5-1940-322-10).
10. Turn master switch ON (TM 5-1940-322-10).



### BATTERIES AND BATTERY BOXES REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ANCHOR LIGHT ASSEMBLY AND BULB MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

O-ring (item 111, WP 0173 00)  
Cloth (item 8, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Mast lowered (TM 5-1940-322-10).

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## ANCHOR LIGHT ASSEMBLY AND BULB MAINTENANCE (Contd)

### **NOTE**

Tag all wires during removal to assist with installation.

### REMOVAL

1. Disconnect upper mast harness (1) from receptacle (3).
2. Turn lens (4) counterclockwise until lens mark (17) aligns with removal mark (14) on housing (2).
3. Remove lens (4) and O-ring (5) from housing (2). Discard O-ring (5).
4. Remove bulb (6) from lamp socket (16) by pushing in, turning one-quarter turn counterclockwise and pulling out.
5. Loosen two terminal screws (10) from terminals (9).
6. Disconnect two wires (15) from terminals (9).
7. Remove two screws (7) and washers (8) securing housing (2) and rubber seal (13) to mast (12).
8. Remove housing (2) and rubber seal (13) from mast (12) allowing wires (15) to feed through hole (11).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect O-ring (5) for damage. Replace O-ring (5) if damaged.
3. Inspect bulb (6) for damage. Replace bulb (6) if damaged.
4. Inspect bulb (6) for grease or dirt. Clean with dry cloth if grease or dirt is present.

### INSTALLATION

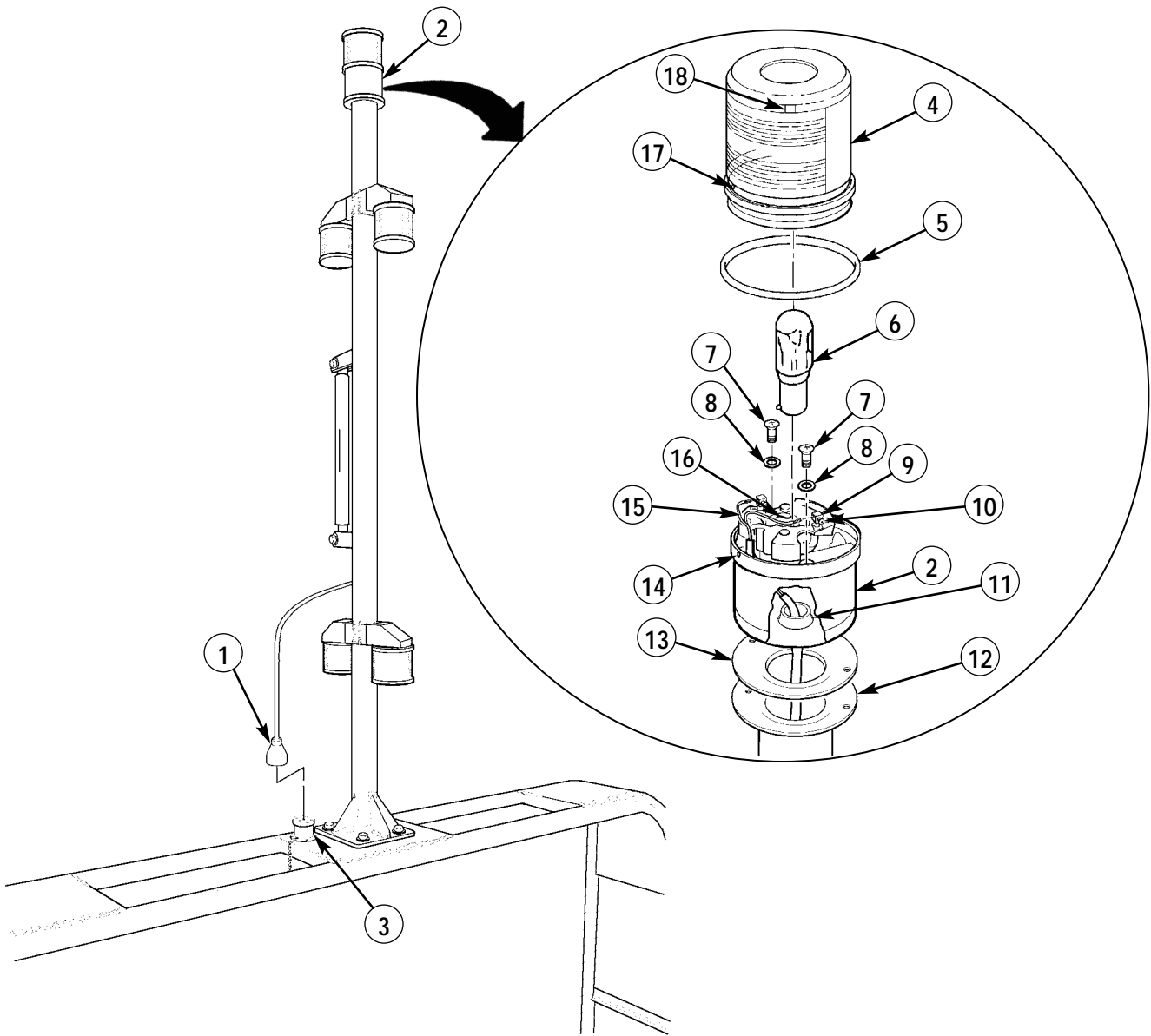
1. Feed wires (15) through rubber seal (13) and hole (11) in housing (2).
2. Install rubber seal (13) and housing (2) on mast (12) with two washers (8) and screws (7).
3. Connect wires (15) to terminals (9). Tighten screws (10).

### **NOTE**

Clean bulb with dry cloth after installation.

4. Position bulb (6) in lamp socket (16), push down, turn one-quarter turn clockwise to secure.
5. Position new O-ring (5) on lens (4).
6. Install lens (4) on housing (2) aligning lens (17) with removal mark (14).
7. Turn lens (4) clockwise until removal mark (14) aligns with stop position (18).
8. Connect upper mast harness (1) to receptacle (3).
9. Test anchor lights (TM 5-1940-322-10).
10. Raise mast (TM 5-1940-322-10).

ANCHOR LIGHT ASSEMBLY AND BULB MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TOWING, STEAMING, AND NAVIGATION LIGHT ASSEMBLY AND BULB MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 172 00) or  
Common No. 1 tool kit (item 41, WP 172 00)

###### Materials/Parts

O-ring (item 111, WP 0173 00)  
Cloth (item 8, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Mast lowered (TM 5-1940-322-10).

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**TOWING, STEAMING, AND NAVIGATION LIGHT ASSEMBLY AND BULB MAINTENANCE (Contd)****NOTE**

Tag all wires during removal to assist with installation.

**REMOVAL**

1. Disconnect upper mast harness (1) from receptacle (2).
2. Turn lens (18) counterclockwise until lens mark (16) aligns with removal mark (9) on housing (6).
3. Remove lens (18) and O-ring (15) from housing (6). Discard O-ring (15).
4. Remove bulb (14) from lamp socket (8) by pushing in, turning one-quarter turn counterclockwise and pulling out.
5. Loosen two terminal screws (13) from terminals (7).
6. Disconnect two wires (10) and (11) from terminals (7) and (12).
7. Remove two screws (20) from housing (6).
8. Remove two screws (19), housing (6), bracket (5) and spacer (4) from mast (3) allowing wires (10) and (11) to feed through holes (21) and (22).
9. Remove housing (6) and rubber seal (12) from mast (3) allowing wires (14) to feed through hole (10).

**CLEANING AND INSPECTION**

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect O-ring (15) for damage. Replace O-ring (15) if damaged.
3. Inspect bulb (14) for damage. Replace bulb (14) if damaged.
4. Inspect bulb (14) for grease or dirt. Clean with dry cloth if grease or dirt is present.

**INSTALLATION**

1. Feed wires (10) and (11) through holes (22) and (23) and through housing (6).
2. Install spacer (4), bracket (5), and housing (6) on mast (3) with screws (19) and (20).
3. Connect wires (10) and (11) to terminals (7) and (12). Tighten screws (13).

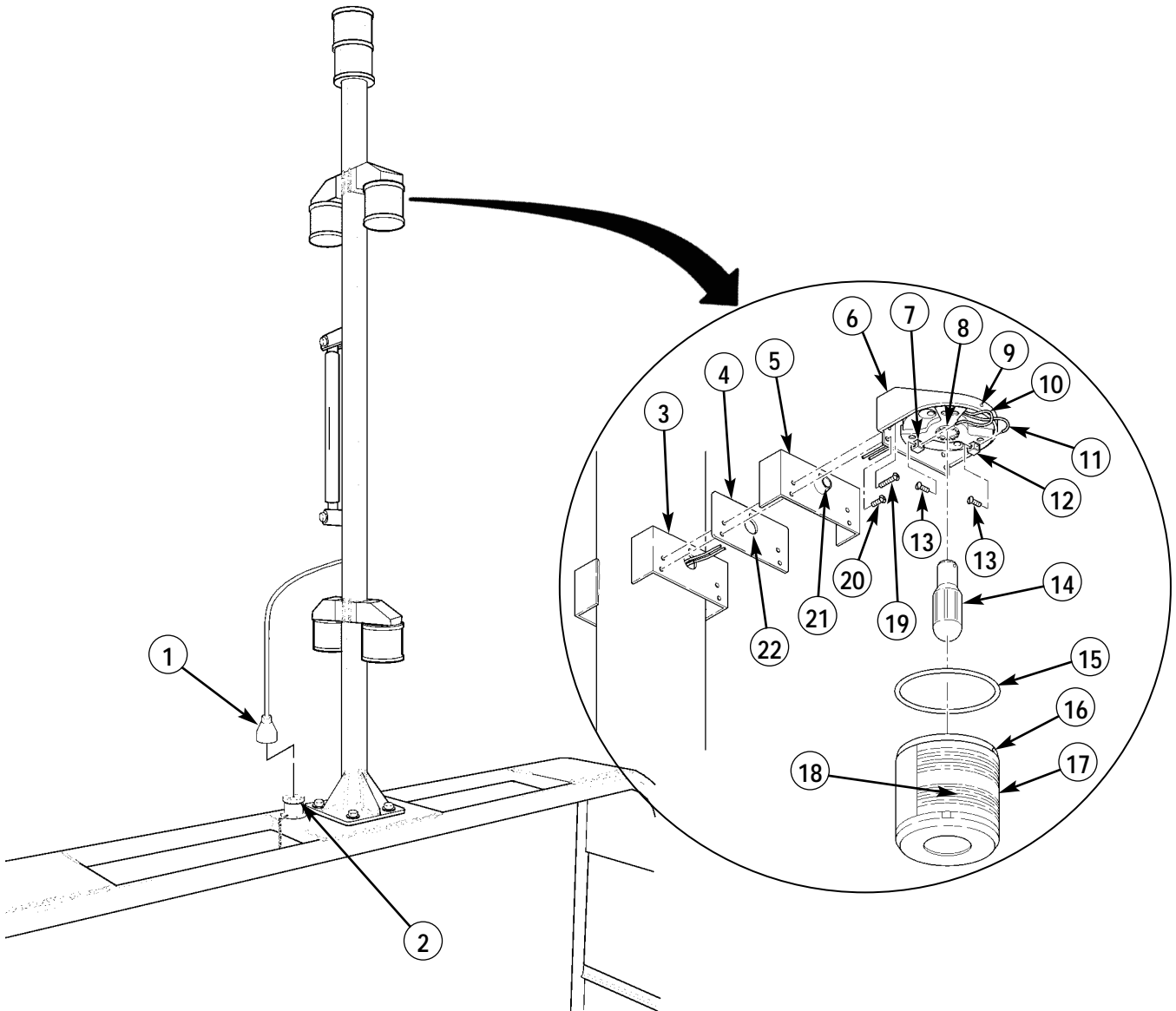
**NOTE**

Clean bulb with dry cloth after installation.

4. Position bulb (14) in lamp socket (8), push down, turn one-quarter turn clockwise to secure.
5. Position new O-ring (15) on lens (18).
6. Install lens (18) on housing (6) aligning lens (16) with removal mark (9).
7. Turn lens (18) clockwise until removal mark (9) aligns with stop position (16).
8. Connect upper mast harness (1) to receptacle (2).
9. Test lights (TM 5-1940-322-10).
10. Raise mast (TM 5-1940-322-10).



TOWING, STEAMING, AND NAVIGATION LIGHT ASSEMBLY AND BULB MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INSPECTION LIGHT, BULB, AND BRACKET REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).

##### Materials/Parts

Three locknuts (item 56, WP 0173 00)  
Locknut (item 54, WP 0173 00)

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## INSPECTION LIGHT, BULB, AND BRACKET REPLACEMENT (Contd)

### **NOTE**

Tag all lead wires during removal to assist with installation.

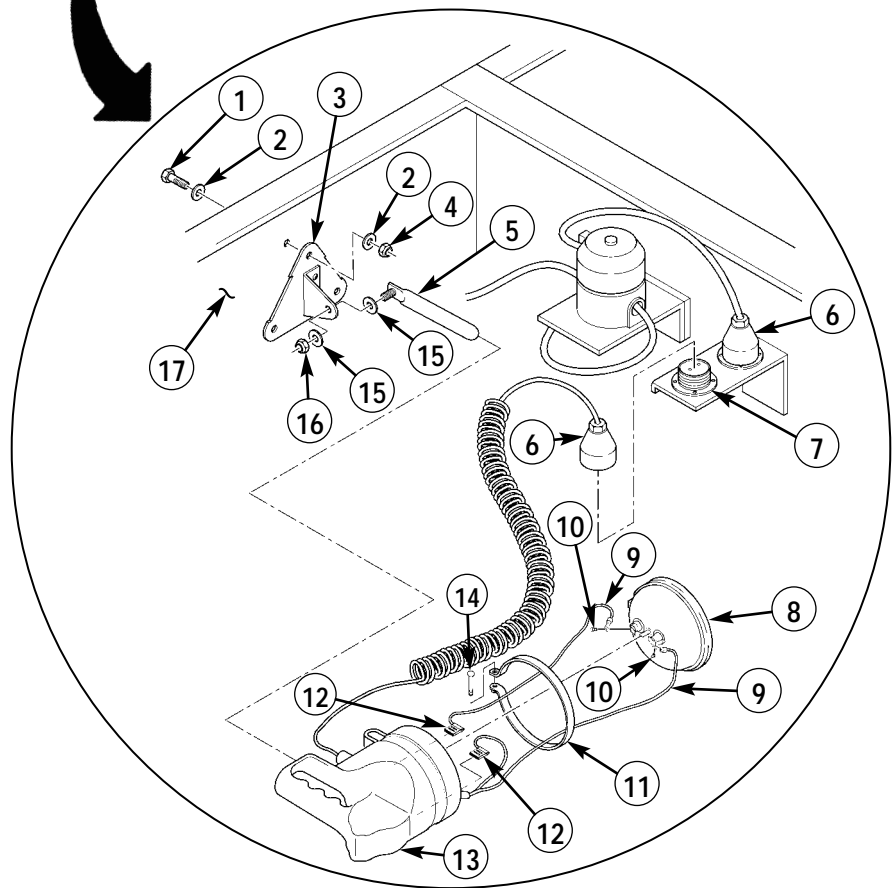
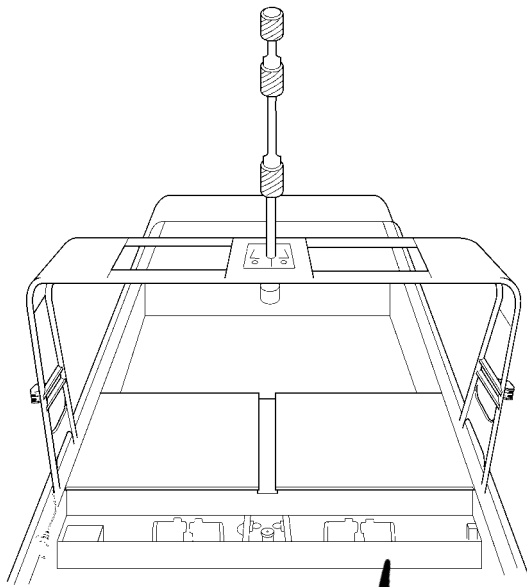
### REMOVAL

1. Disconnect plug (6) from receptacle (7).
2. Remove inspection light (13) from post (5).
3. Remove screw (14), clamp (11), and lamp (8) from inspection light (13) by folding lip of inspection light back.
4. Disconnect two electrical connectors (12) from inspection light (13).
5. Remove two screws (10) and lead wires (9) from lamp (8).
6. Remove locknut (16), two washers (15), and post (5) from bracket (3). Discard locknut (16).
7. Remove three locknuts (4), six washers (2), and three screws (1) from bracket (3). Discard locknuts (4).
8. Remove bracket (3) from boat (17).

### INSTALLATION

1. Secure bracket (3) on boat (17) with three screws (1), six washers (2), and three new locknuts (4).
2. Install post (5) on bracket (3) with two washers (15) and new locknut (16).
3. Install two lead wires (9) on lamp (8) with screws (10).
4. Connect two electrical connectors (12) on inspection light (13).
5. Install lamp (8) in inspection light (13) with clamp (11) and screw (14).
6. Install inspection light (13) on post (5).
7. Connect plug (6) to receptacle (7).
8. Close battery hatch (TM 5-1940-322-10).

### INSPECTION LIGHT, BULB, AND BRACKET REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SEARCHLIGHT AND LIGHT BULB REPLACEMENT

SEARCHLIGHT REMOVAL, LIGHT BULB REMOVAL, LIGHT BULB INSTALLATION, AND SEARCHLIGHT INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Three locknuts (item 58, WP 0173 00)  
Cloth (item 8, WP 0171 00)

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## SEARCHLIGHT AND LIGHT BULB REPLACEMENT (Contd)

### SEARCHLIGHT REMOVAL

1. Disconnect harness plug (7) from receptacle (9).
2. Remove nut (10), washer (11), screw (13), and handle (12) from searchlight (6).
3. Unscrew searchlight (6) from mounting base flange (16) and remove searchlight (6) from cab (8).
4. Remove three locknuts (15), six washers (18), three screws (19), searchlight (6), and gasket (17) from mounting base (14). Discard locknuts (15). Discard gasket (17) if damaged.

### LIGHT BULB REMOVAL

1. Remove two screws (22), washers (21), spacers (20), trim ring (1), lens (2), and seal (3) from searchlight (6).
2. Remove light bulb (5) from light socket (4).

### LIGHT BULB INSTALLATION

#### **NOTE**

Clean light bulb with dry cloth after installation.

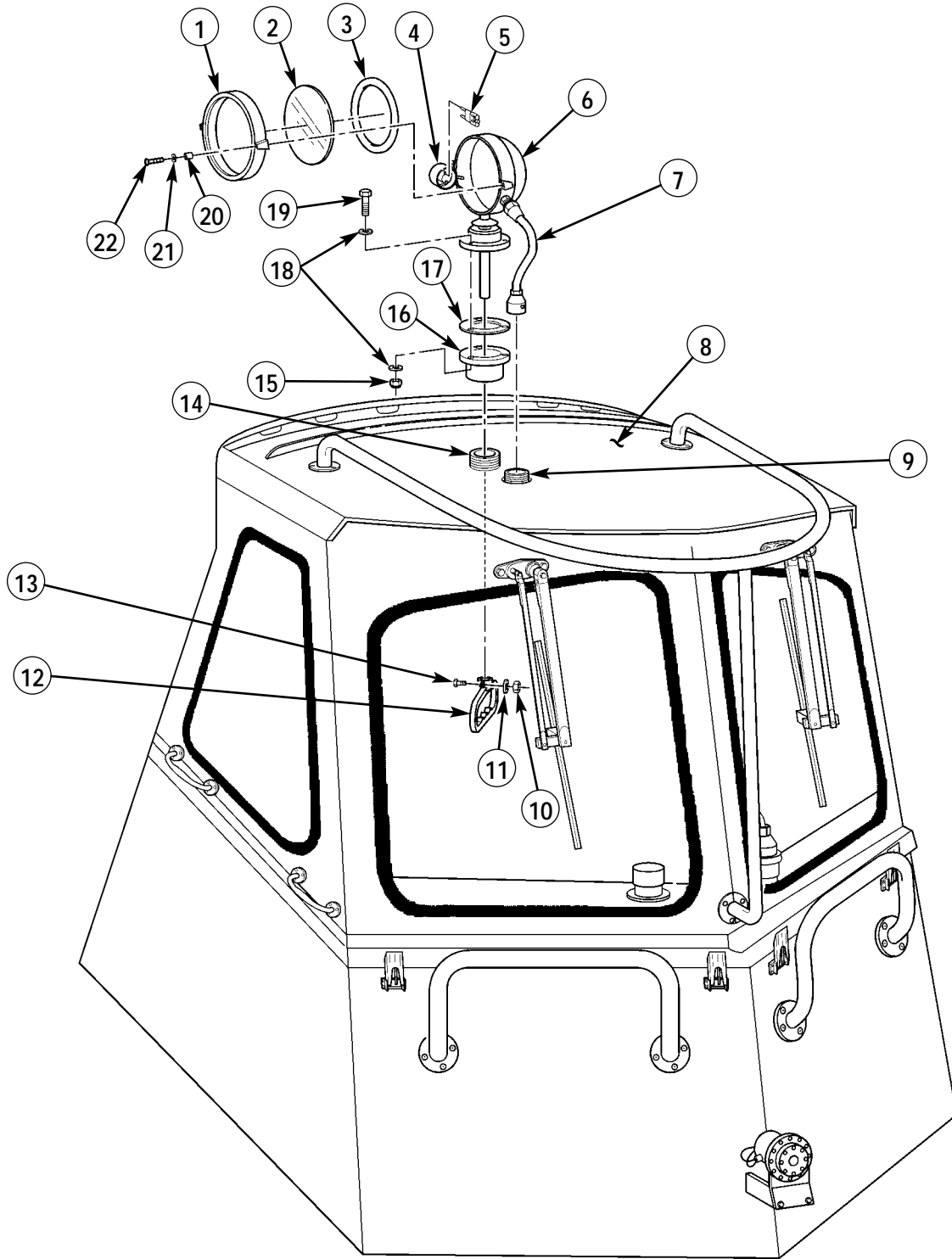
1. Install light bulb (5) on light socket (4).
2. Install trim ring (1), lens (2), and seal (3) on searchlight (6) with two spacers (20), washers (21), and screws (22).

### SEARCHLIGHT INSTALLATION

1. Install searchlight (6) on mounting base (14) and mounting base flange (16) with gasket (17), three screws (19), six washers (18), and three new locknuts (15).
2. Screw searchlight (6) on mounting base flange (16).
3. Install handle (12) on searchlight (6) with screw (13), washer (11), and nut (10).
4. Connect harness plug (7) to receptacle (9).



SEARCHLIGHT AND LIGHT BULB REPLACEMENT (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WIRING HARNESS CONNECTOR REPAIR

TERMINAL-TYPE CABLE CONNECTOR REPAIR, MALE CABLE CONNECTOR REPAIR,  
FEMALE CABLE CONNECTOR REPAIR, CONNECTOR ASSEMBLY REPAIR, AND RECEPTACLE ASSEMBLY REPAIR

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Electrical tool kit (item 42, WP 0172 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

##### References

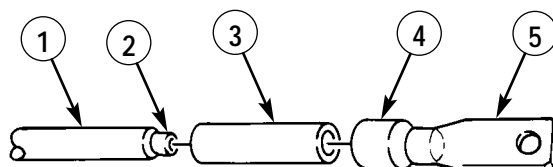
TC 9-237

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## WIRING HARNESS CONNECTOR REPAIR (Contd)

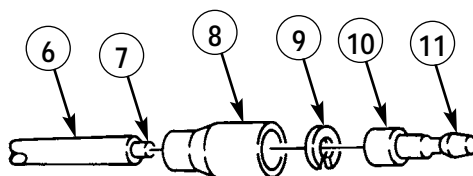
### TERMINAL-TYPE CABLE CONNECTOR REPAIR

1. Strip cable insulation (1) from cable (2) to equal depth of terminal well (4).
2. Slide insulator (3) over cable insulation (1).
3. Insert cable (2) into terminal well (4) and crimp.
4. Slide insulator (3) over crimped end of terminal (5).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).



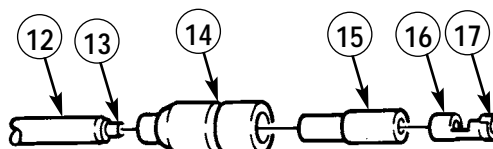
### MALE CABLE CONNECTOR REPAIR

1. Strip cable insulation (6) from cable (7) to equal depth of terminal well (10).
2. Slide shell (8) and slotted washer (9) over cable insulation (6).
3. Insert cable (7) into terminal well (10) and crimp.
4. Place slotted washer (9) over crimped junction at terminal (11).
5. Slide shell (8) over slotted washer (9) and terminal (11).
6. Connect battery ground cables (WP 0054 00).
7. Close battery hatch (TM 5-1940-322-10).



### FEMALE CABLE CONNECTOR REPAIR

1. Strip cable insulation (12) from cable (13) to equal depth of terminal well (16).
2. Slide shell (14) and sleeve (15) over cable insulation (12).
3. Insert cable (13) into terminal well (16) and crimp.
4. Slide sleeve (15) and shell (14) over terminal (17).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).



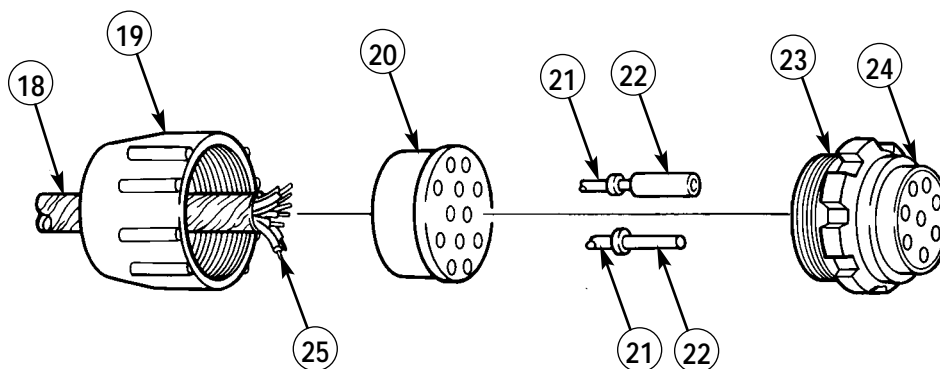
## WIRING HARNESS CONNECTOR REPAIR (Contd)

### CONNECTOR ASSEMBLY REPAIR

#### NOTE

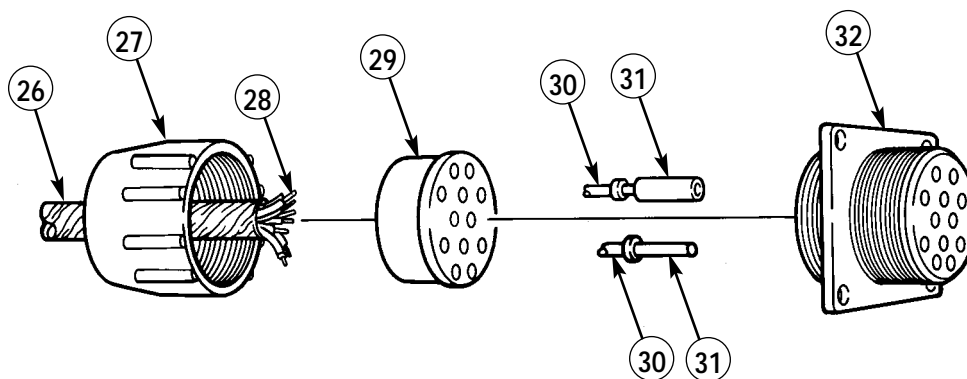
Refer to TC 9-237 for soldering instructions.

1. Strip cable insulation (18) to depth of solder wells (21) on inserts (22).
2. Slide cable ends (25) through grommet retaining nut (19) and grommet (20).
3. Place cable ends (25) into solder wells (21) and solder.
4. Slide grommet (20) over inserts (22) and press into shell assembly (23) until seated.
5. Screw grommet retaining nut (19) on shell assembly (23) and coupling nut (24) until seated.
6. Connect battery ground cables (WP 0054 00).
7. Close battery hatch (TM 5-1940-322-10).



### RECEPTACLE ASSEMBLY REPAIR

1. Strip cable insulation (26) to depth of solder wells (30) on inserts (31).
2. Slide cable ends (28) through grommet retaining nut (27) and grommet (29).
3. Place cable ends (28) into solder wells (30) and solder.
4. Slide grommet (29) over inserts (31) and press into receptacle (32) until seated.
5. Screw grommet retaining nut (27) onto receptacle (32) until seated.
6. Connect battery ground cables (WP 0054 00).
7. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### EMERGENCY LINK SOLENOID MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 172, WP 0173 00)  
Two locknuts (item 56, WP 0173 00)  
Two lockwashers (item 89, WP 0173 00)  
Two lockwashers (item 95, WP 0173 00)

##### References

WP 0013 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

---

## EMERGENCY LINK SOLENOID MAINTENANCE (Contd)

### **WARNING**

Use caution when working with battery cables. Failure to comply may result in injury to personnel and/or damage to equipment

Remove all jewelry such as rings, identification tags, bracelets, etc. If jewelry or disconnected battery ground cable contacts battery positive post, a direct short can result. Failure to comply may result in injury or death to personnel and/or damage to equipment.

When removing cables, disconnect the ground cable first. Do not allow tools to come in contact with vehicle when disconnecting cable clamps. A direct short can result, causing instant heating of tools, tool damage, battery damage or battery explosion, and severe injury to personnel.

### **NOTE**

Tag all battery cables and lead wires during removal to assist with installation.

### REMOVAL

1. Remove two nuts (13), two lockwashers (12), and lead wires (11) and (15) from studs (6) and (14). Discard lockwashers (12).
2. Remove two nuts (10), two lockwashers (9), and battery cables (8) and (16) from studs (7) and (17). Discard lockwashers (9).
3. Remove two locknuts (18), four washers (3), two screws (4), and emergency link solenoid (5) from bracket (2). Discard locknuts (18).
4. Remove two locknuts (1), washers (20), screws (19), and bracket (2) from boat (21). Discard locknuts (1).

### CLEANING AND INSPECTION

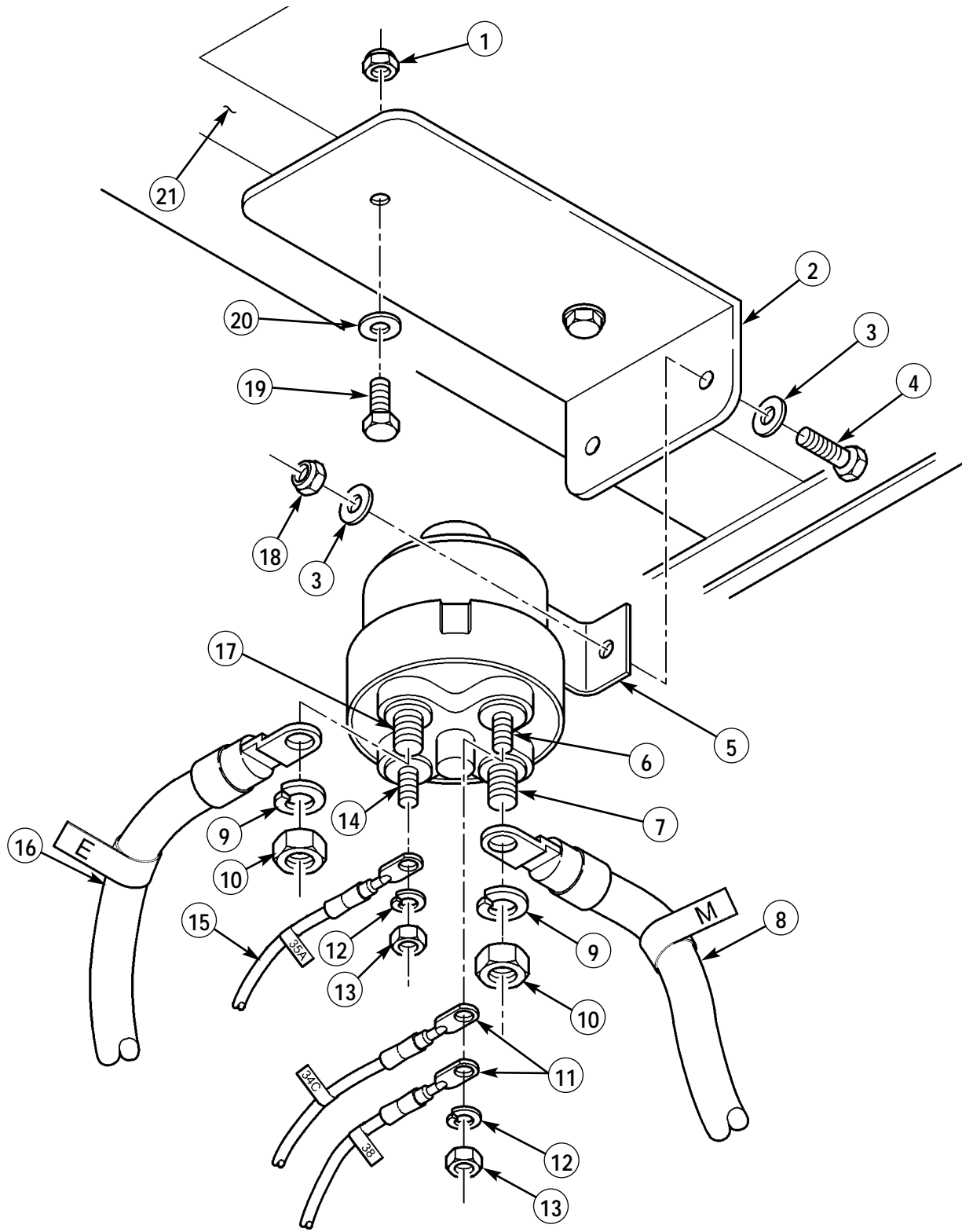
1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect battery cables (8) and (16) and lead wires (11) and (15) for damage. Replace if damaged.
3. Inspect battery cables (8) and (16) and lead wires (11) and (15) for corrosion. If corroded, clean with wire brush.
4. Inspect emergency link solenoid (5) for corrosion. If corroded, clean with wire brush.

### INSTALLATION

1. Install bracket (2) on boat (21) with two screws (19), washers (20), and new locknuts (1).
2. Install emergency link solenoid (5) on bracket (2) with two screws (4), four washers (3), and two new locknuts (18).
3. Install lead wires (11) and (15) on studs (6) and (14) with two new lockwashers (12) and two nuts (13).
4. Install battery cables (8) and (16) on studs (7) and (17) with two new lockwashers (8) and two nuts (10).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatches (TM 5-1940-322-10).



EMERGENCY LINK SOLENOID MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BLOCKING DIODE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Eight locknuts (item 53, WP 0173 00)  
Three lockwashers (item 52, WP 0173 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Master link cables disconnected (WP 0063 00).

---

## BLOCKING DIODE REPLACEMENT (Contd)

### NOTE

Both blocking diodes are replaced the same way. This procedure covers the replacement of the port side blocking diode. Refer to wiring schematic for starboard side configuration.

Tag all cables during removal to assist with installation.

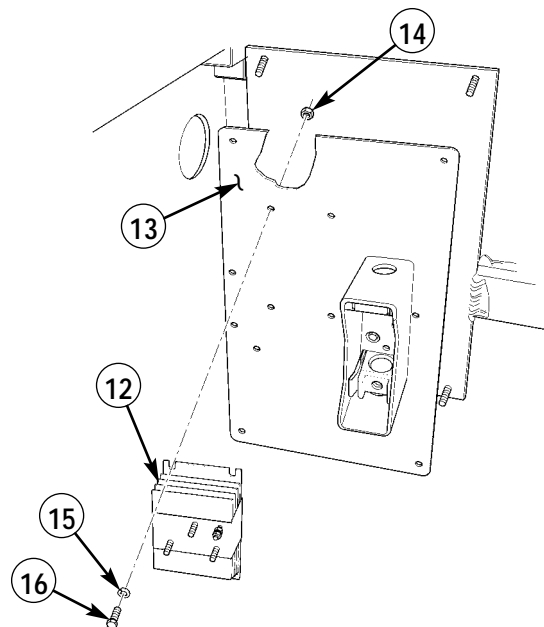
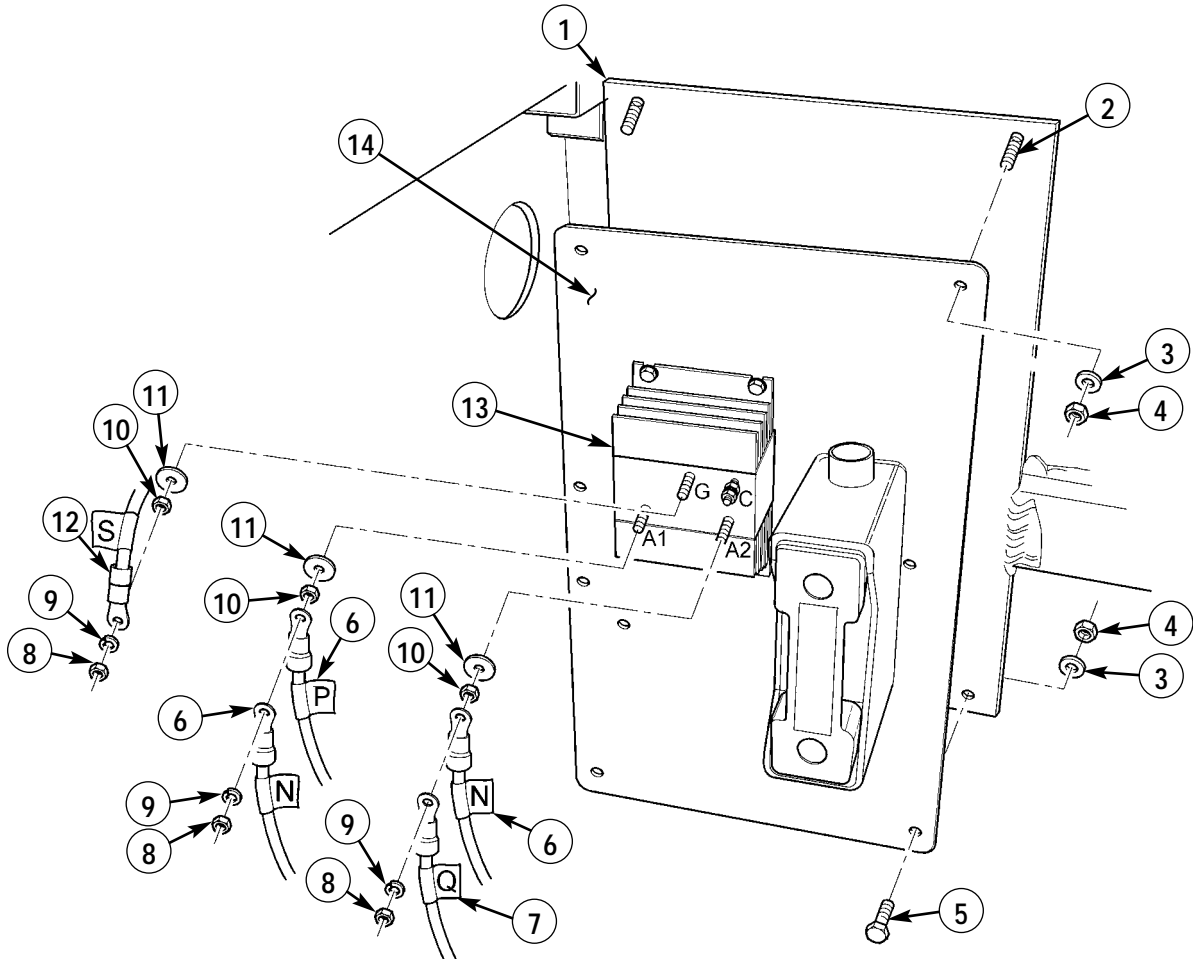
### REMOVAL

1. Remove three nuts (8), lockwashers (9), and cables (6), (7), and (12) from blocking diode (13). Discard lockwashers (9).
2. Remove three nuts (10) and isolators (11) from blocking diode (13).
3. Remove two locknuts (4) and washers (3) from studs (2). Discard locknuts (4).
4. Remove two locknuts (4), washers (3), and screws (5) from mounting plate (14). Discard locknuts (4).
5. Remove mounting plate (13) from hull (1).
6. Remove locknuts (14), washers (15), and screws (16) securing blocking diode (12) to mounting plate (13). Discard locknuts (14).

### INSTALLATION

1. Install blocking diode (12) on mounting plate (13) with four screws (16), washers (15), and new locknuts (14).
2. Position mounting plate (13) on studs (2).
3. Install mounting plate (14) on hulls (12) with two screws (5), washers (3), and new locknuts (4).
4. Install mounting plate (13) on hull (1) with two washers (3) and new locknuts (4).
5. Install three isolators (10) and nuts (9) on blocking diode (12).
6. Install cables (5), (6), and (11) on blocking diode (12) with three new lockwashers (8) and nuts (7).
7. Connect master link cables (WP 0063 00).
8. Connect battery ground cables (WP 0054 00).
9. Close battery hatch (TM 5-1940-322-10).

BLOCKING DIODE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MASTER LINK AND FUSE REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Six locknuts (item 53, WP 0173 00)  
Tiedown straps (item 38, WP 0171 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Blocking diode cables disconnected  
(WP 0062 00).

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## MASTER LINK AND FUSE REPLACEMENT (Contd)

### **NOTE**

Both master links are replaced the same way. This procedure covers the replacement of the port side master link. Refer to wiring schematic for starboard side configuration.

Tag all lead wires during removal to assist with installation.

### REMOVAL

1. Remove tiedown straps (1) from cables (2). Discard tiedown straps (1).
2. Disconnect master link connector (13) from housing (8).
3. Remove two screws (12) and covers (14) from housing (8).
4. Loosen two screws (10) and remove cables (11) and caps (9) from housing (8).
5. Remove four locknuts (7) and washers (6) from studs (4). Discard locknuts (7).
6. Remove mounting plate (15) from hull (3).
7. Remove two locknuts (16) and screws (17) securing housing (8) on mounting plate (15). Discard locknuts (16).
8. Remove two screws (18) and fuse (19) from master link fuse terminal (20).

### INSTALLATION

1. Install fuse (19) on master link fuse terminal (20) with two screws (18).
2. Secure housing (8) on mounting plate (15) with two screws (17) and new locknuts (16).
3. Secure mounting plate (15) on studs (4) with four washers (6) and new locknuts (7).
4. Snap two caps (9) on housing (8).

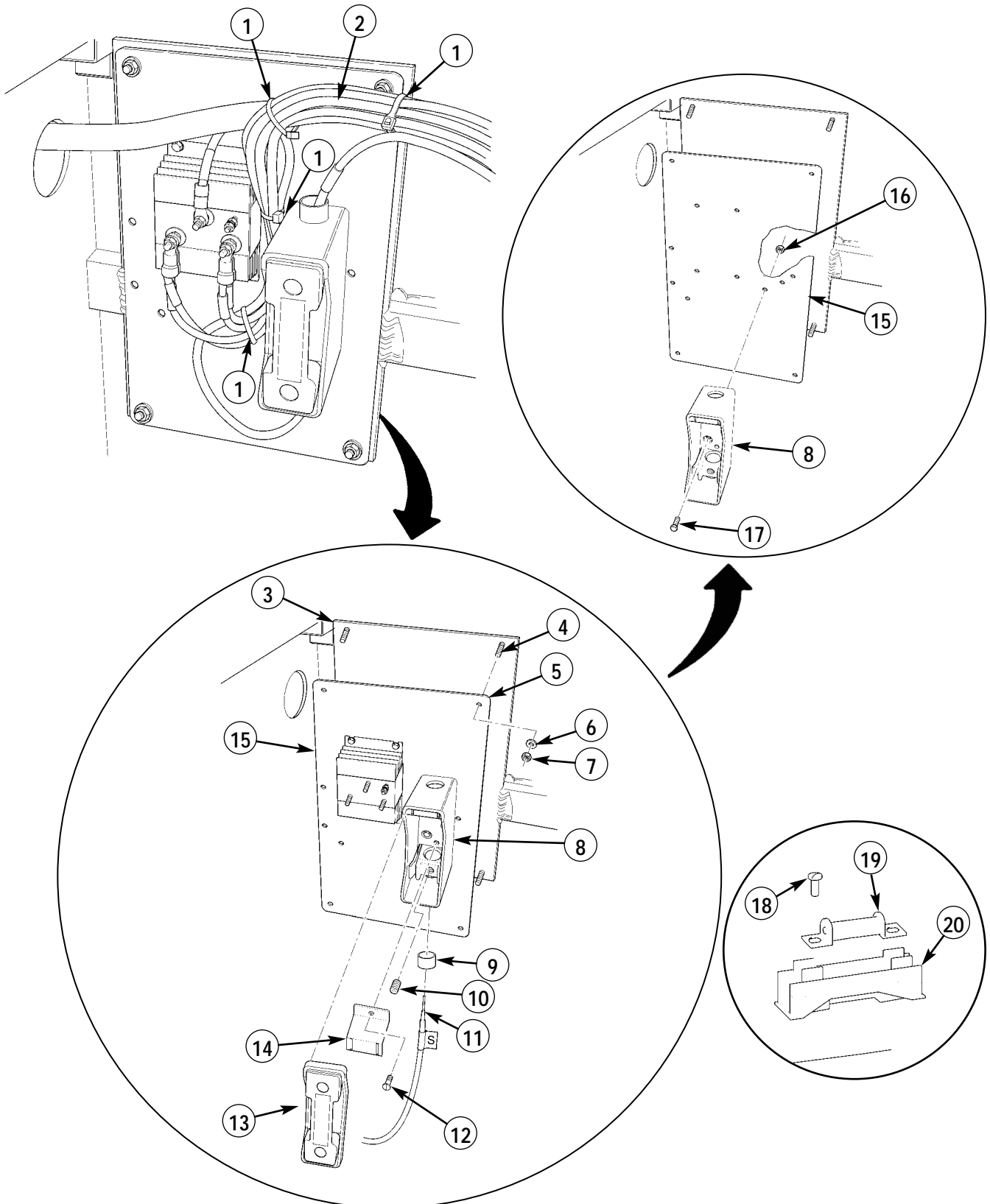
### **CAUTION**

Ensure enough bare wire is accessible on cable to allow screw to make good connection with housing. Failure to comply may result in damage to equipment.

5. Install two cables (11) on housing (8) and tighten screws (10).
6. Install two covers (14) on housing (8) with screws (12).
7. Connect master link connector (13) on housing (8).
8. Install new tiedown straps (1) on cables (2).
9. Connect blocking diode cables (WP 0062 00).
10. Connect battery ground cables (WP 0054 00).
11. Close battery hatch (TM 5-1940-322-10).



### MASTER LINK AND FUSE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MAST ASSEMBLY MAINTENANCE

MAST ASSEMBLY REMOVAL, UPPER MAST REMOVAL, INSPECTION,  
UPPER MAST INSTALLATION, AND MAST ASSEMBLY INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Personnel Required

Two

##### References

TC 9-237

##### Materials/Parts

Four locknuts (item 53, WP 0173 00)  
Two locknuts (item 59, WP 0173 00)

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## MAST ASSEMBLY MAINTENANCE (Contd)

### MAST ASSEMBLY REMOVAL

#### NOTE

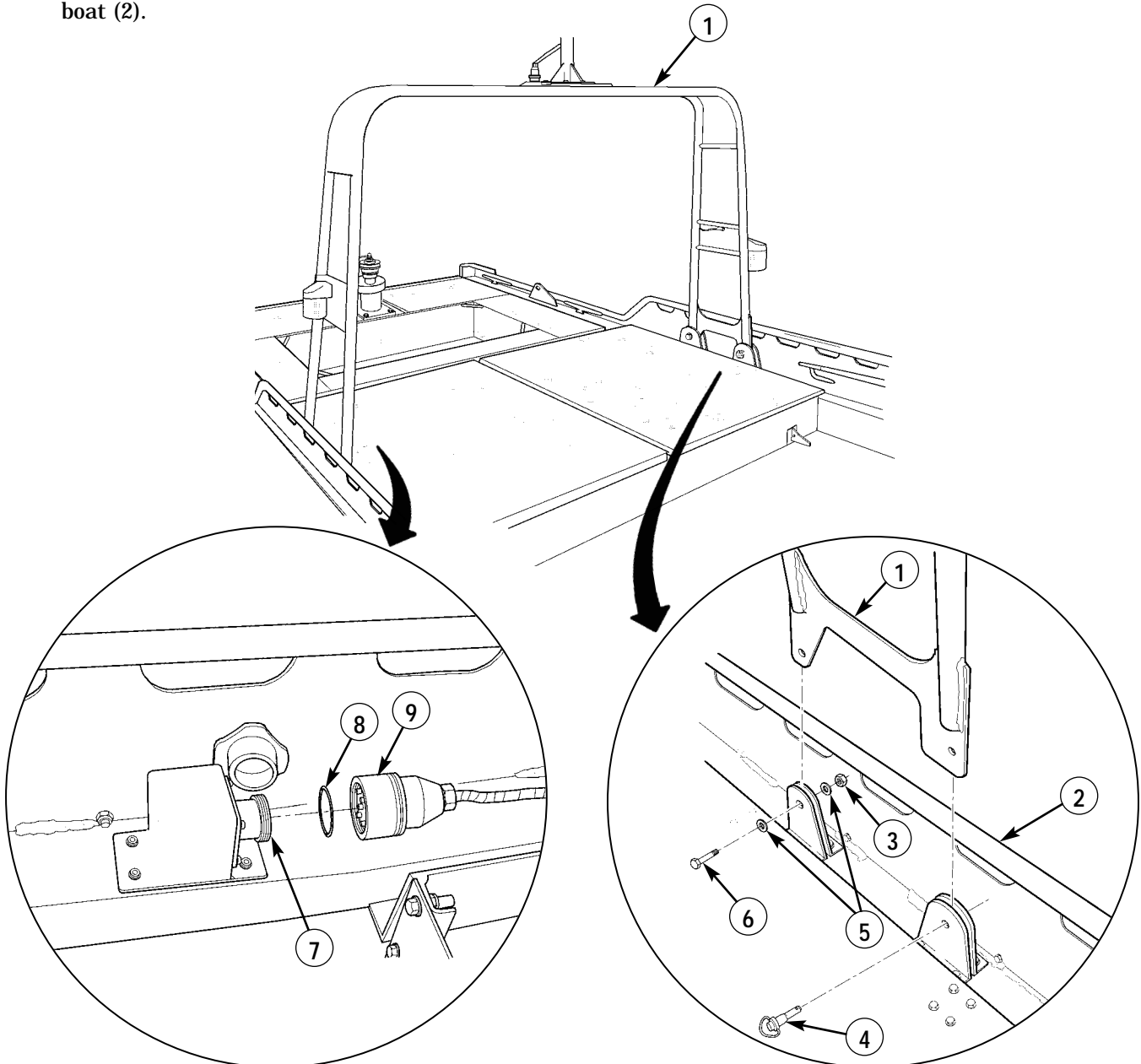
Two personnel or suitable lifting device is required for removal and installation of the mast assembly.

1. Disconnect mast assembly plug (9) with seal (8) from receptacle (7). Replace seal (8) if damaged.

#### NOTE

Step 3 covers both sides of the mast.

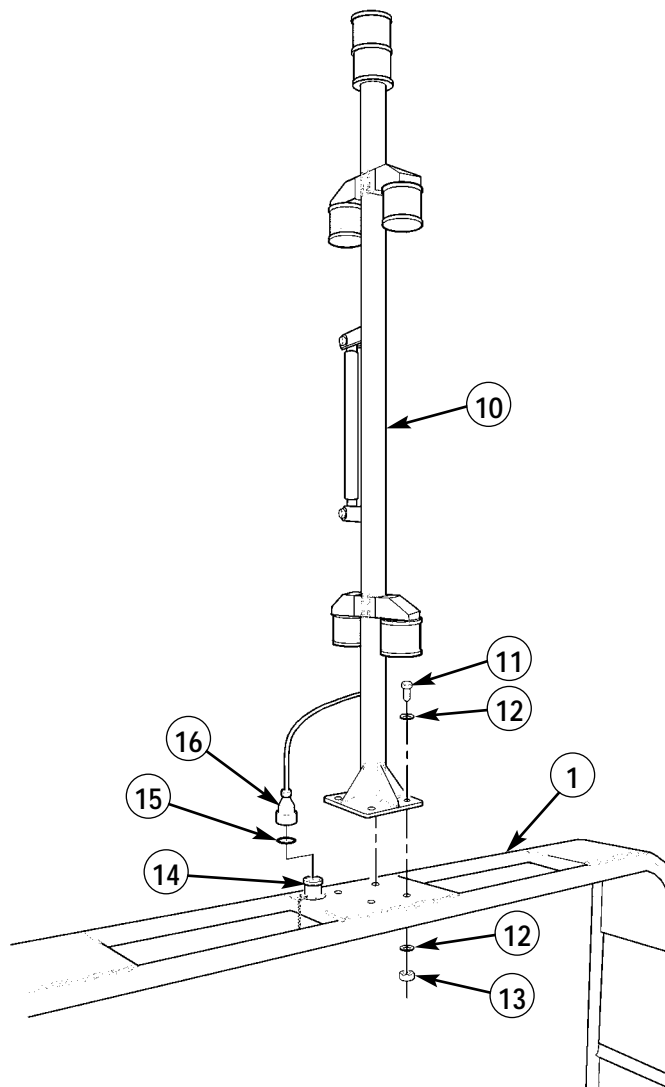
2. Remove two pins (4) from forward legs of mast assembly (1).
3. Remove two locknuts (3), four washers (5), two screws (6), and mast assembly (1) from boat (2).



## MAST ASSEMBLY MAINTENANCE (Contd)

### UPPER MAST REMOVAL

1. Disconnect upper mast plug (16) with seal (15) from receptacle (14). Replace seal (15) if damaged.
2. Remove four locknuts (13), eight washers (12), four screws (11), and upper mast (10) from lower mast assembly (1). Discard locknuts (13).



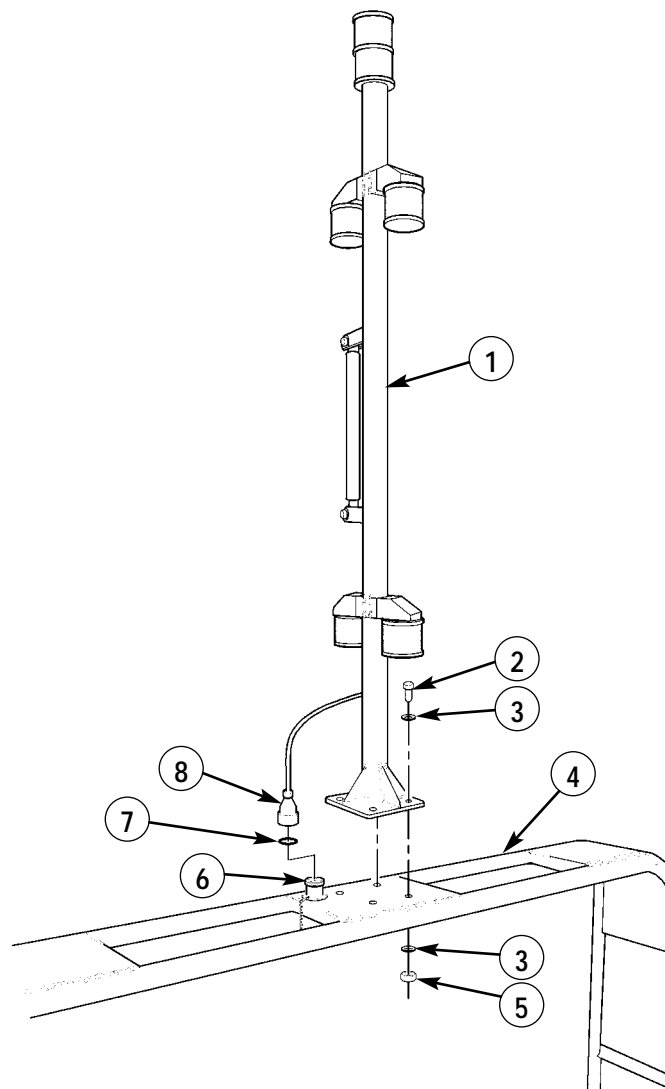
## MAST ASSEMBLY MAINTENANCE (Contd)

### INSPECTION

Inspect upper and lower mast sections for cracks. If cracks are present, refer to TC 9-237 for welding repair.

### UPPER MAST INSTALLATION

1. Install upper mast (1) on lower mast assembly (4) with four screws (2), eight washers (3), and four new locknuts (5).
2. Connect upper mast plug (8) with seal (7) to receptacle (6).



## MAST ASSEMBLY MAINTENANCE (Contd)

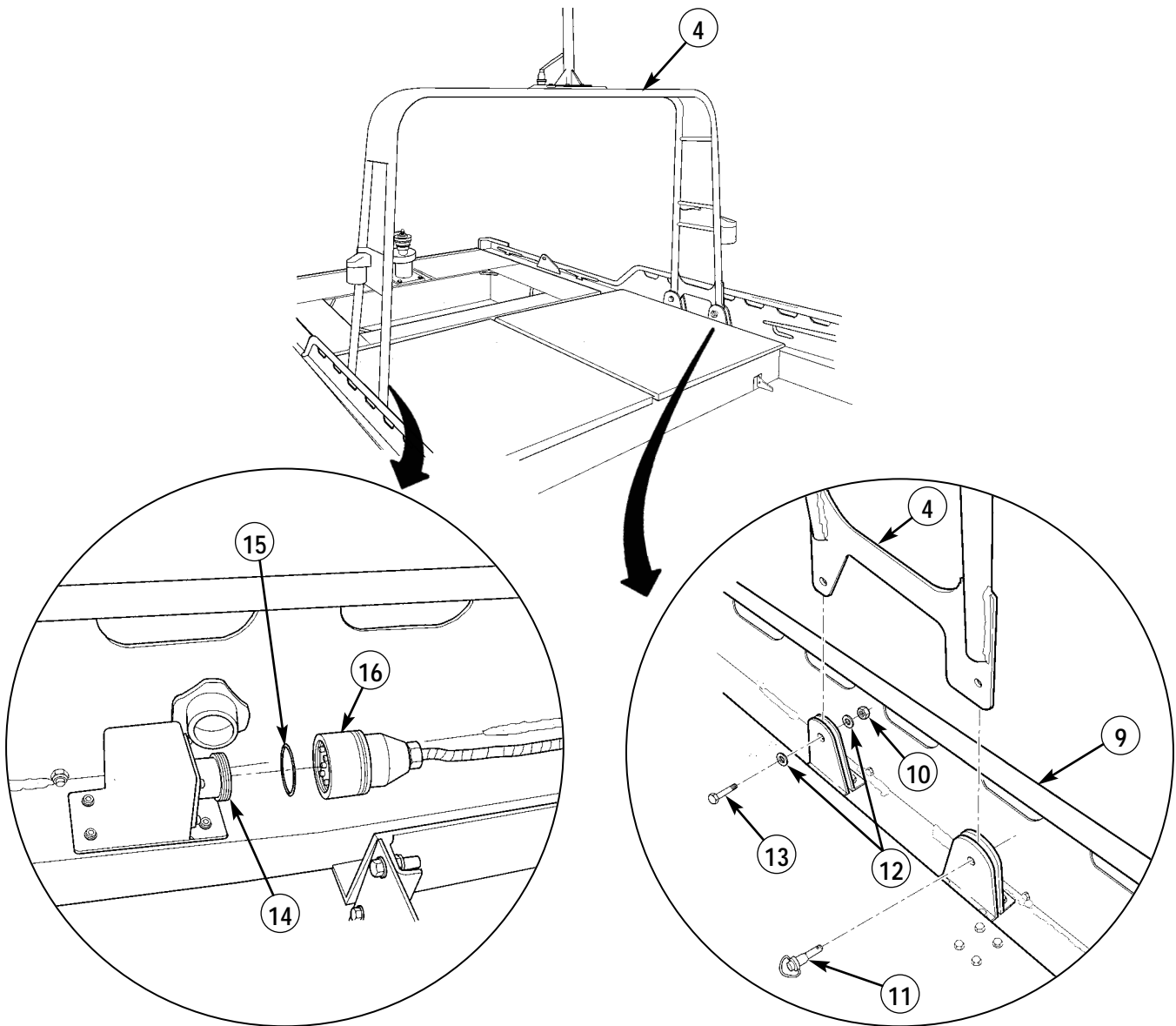
### MAST ASSEMBLY INSTALLATION

#### NOTE

Step 1 covers both sides of the mast.

Ensure mast plug is on starboard side.

1. Install lower mast assembly (4) on boat (9) with two screws (13), four washers (12), and two new locknuts (10).
2. Install two pins (11) on forward legs of mast assembly (4).
3. Connect mast assembly plug (16) with seal (15) to receptacle (14).
4. Check mast lights for proper operation (TM 5-1940-322-10).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MAST WIRING HARNESS REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Three locknuts (item 58, WP 0171 00)  
Electrical tape (item 39, WP 0171 00)

###### References

WP 0175 00

###### Equipment Condition

Mast removed (WP 0064 00).  
Anchor light removed (WP 0056 00).  
Towing, steaming, and navigation lights  
removed (WP 0057 00).

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## MAST WIRING HARNESS REPLACEMENT (Contd)

### NOTE

Tag all wires during removal to assist with installation.  
Refer to WP 0175 00 for mast wiring schematic if necessary.

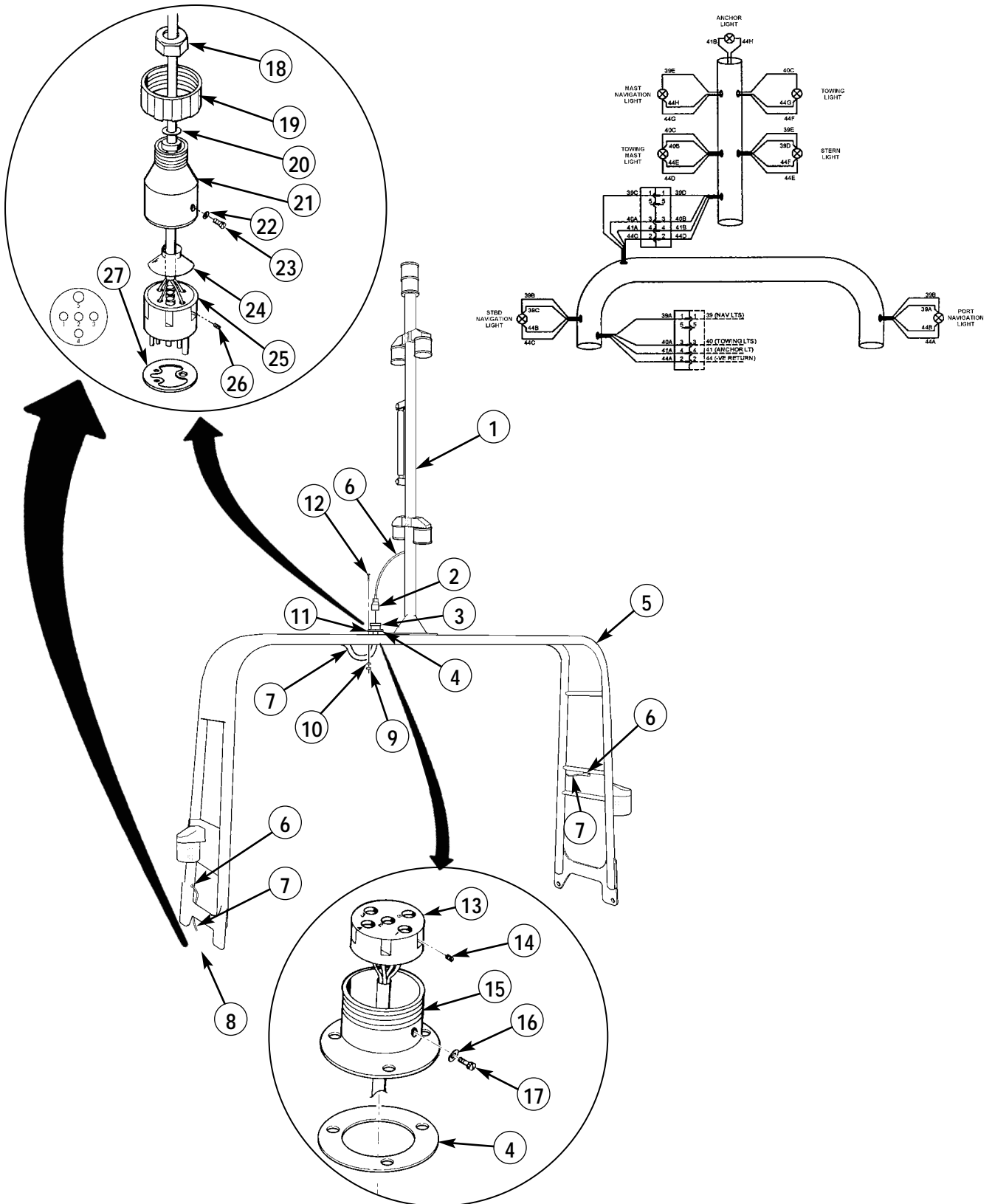
### UPPER MAST HARNESS REMOVAL

1. Disconnect upper mast plug (2) with seal (3) from receptacle (11) on lower mast (5). Replace seal (3) if damaged.
2. Remove nut (18) from plug case (21) on plug (2).
3. Remove screw (23), washer (22), and plug core (25) from plug case (21).
4. Remove four screws (26) and four wires (7) from plug core (25), shield (24), plug case (21), seal (20), and nuts (19) and (18).
5. Remove rubber grommet (6) from upper mast (1).
6. Remove four wires (7) from rubber grommet (6).
7. Remove any tape from wiring (4).
8. Tape each new wire to end of each old wire.
9. Pull old wires through upper mast (1).

### LOWER MAST HARNESS REMOVAL

1. Remove three locknuts (9), washers (10), screws (12), receptacle (11), and gasket (4) from lower mast (5). Discard locknuts (9).
2. Remove screw (17) and washer (16) from side of receptacle case (15).
3. Remove socket (13) from receptacle case (15)
4. Remove four screws (14) and four wire leads (7) from socket (13).
5. Remove nut (18) from plug case (21) on plug (8).
6. Remove screw (23), washer (22), and plug core (25) from plug case (21).
7. Remove four screws (26) and four wires (7) from plug core (25), seal (27), shield (24), plug case (21), seal (20), and nuts (19) and (18). Discard seals (27) and (20) if damaged.
8. Remove four rubber grommets (6) from lower mast (5).
9. Remove wires (7) from rubber grommets (6).
10. Remove any tape from wiring (7).
11. Tape each new wire to end of each old wire.
12. Pull old wire through lower mast (5).

MAST WIRING HARNESS REPLACEMENT (Contd)



## MAST WIRING HARNESS REPLACEMENT (Contd)

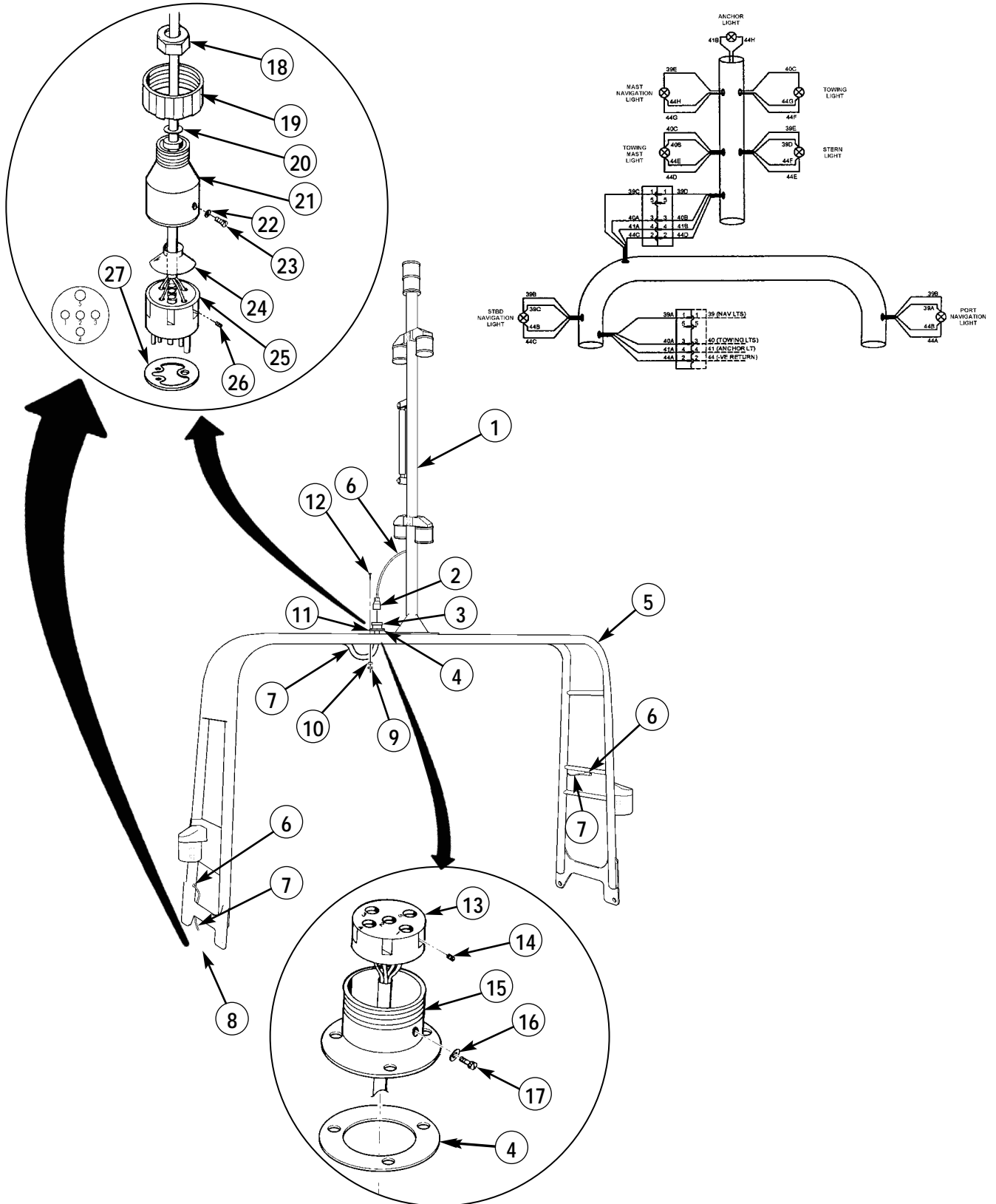
### LOWER MAST HARNESSS INSTALLATION

1. Draw new wires (7) through lower mast (5). Remove and discard old wires.
2. Install new wires (7) in rubber grommets (6).
3. Install four rubber grommets (6) on lower mast (5).
4. Install electrical tape on all exposed wires (7) past rubber grommets (6).
5. Feed four wires (7) through nuts (18) and (19), seal (20), plug case (21), and shield (24).
6. Install four wires (7) on plug core (25) with four screws (26).
7. Install plug core (25) and seal (27) on plug case (21) with washer (22) and screw (23).
8. Install nut (18) on plug case (21).
9. Install four wires (7) on socket (13) with four screws (14).
10. Install socket (13) on receptacle case (15) with washer (16) and screw (17).
11. Install receptacle (11) on lower mast (5) with gasket (4), three screws (12), washers (10), and new locknuts (9).
12. Install navigation lights (WP 0057 00).
13. Install mast (WP 0064 00).
14. Raise mast (TM 5-1940-322-10).

### UPPER MAST HARNESSS INSTALLATION

1. Draw new wires (7) through mast (1). Remove and discard old wires.
2. Install new wires (7) in rubber grommets (6).
3. Install rubber grommet (6) on mast (1).
4. Install electrical tape on all wires (7) exposed past rubber grommet (6).
5. Install four wires (7) through nuts (18) and (19), seal (20), plug case (21), and shield (24).
6. Install four wires (7) on plug core (25) with four screws (26).
7. Install plug core (25) and seal (3) on plug case (21) with washer (22) and screw (23).
8. Install nut (18) on plug case (21).
9. Connect upper mast wiring harness plug (2) to receptacle (11) on mast (1).
10. Install anchor light (WP 0056 00).
11. Install towing and steaming lights (WP 0057 00).
12. Install mast (WP 0064 00).
13. Raise mast (TM 5-1940-322-10).

### MAST WIRING HARNESS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HEADER TANK AND RESERVOIR MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Material/Parts

Antifreeze (item 5, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0085 00  
WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Cooling system drained (WP 0012 00).

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## HEADER TANK AND RESERVOIR MAINTENANCE (Contd)

### **NOTE**

The header tank and reservoir on both engines are replaced the same way. This procedure covers the replacement of one header tank and reservoir.

### REMOVAL

### **NOTE**

Have a container ready to catch coolant.

1. Remove hose (13) from header tank (1).
2. Remove four screws (10) and reservoir (11) from belt guard (9).
3. Remove belt guard (9) (WP 0085 00).
4. Remove hoses (3), (5), and (6) from adapters (2) on header tank (1).
5. Remove hose (7) from elbow (4) on header tank (1).
6. Remove elbow (4) and three adapters (2) from header tank (1).
7. Remove clamp (14) and hose (15) from header tank (1).
8. Remove four screws (12) and header tank (1) from engine (8).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

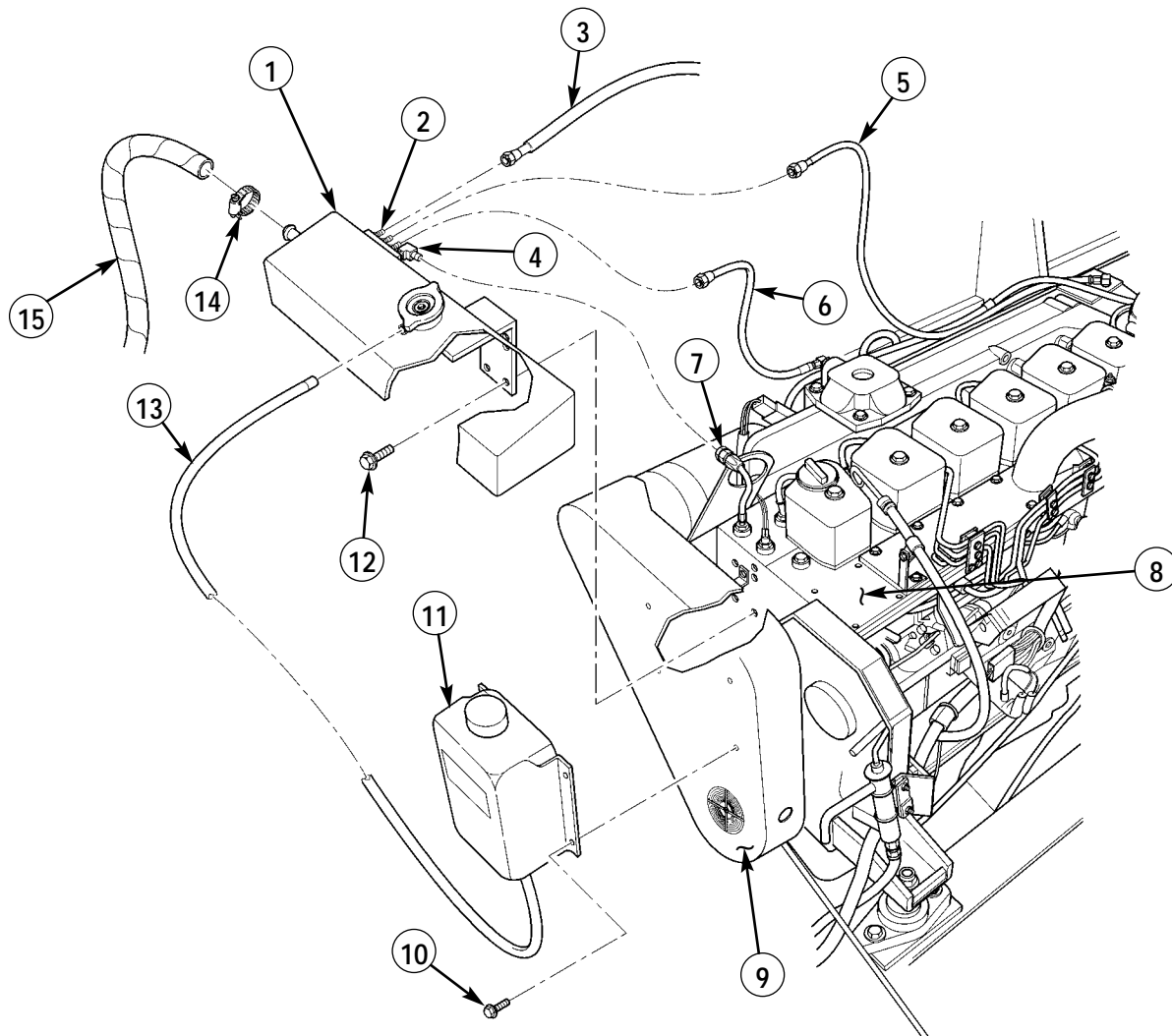
2. Clean excess sealing compound from hoses (3), (5), (6), and (7), elbow (4), and adapters (2) with Skysol 100 and dry with cloth.



## HEADER TANK AND RESERVOIR MAINTENANCE (Contd)

### INSTALLATION

1. Apply thin coat of sealing compound to nuts on hoses (3), (5), (6), and (7), elbow (4), and three adapters (2) on header tank (1).
2. Install header tank (1) on engine (8) with four screws (12).
3. Install hose (15) on header tank (1) with clamp (14).
4. Install elbow (4) and three adapters (2) on header tank (1).
5. Install hose (7) on elbow (4) of header tank (1).
6. Install hoses (3), (5), and (6) on adapters (2) of header tank (1).
7. Install belt guard (9) (WP 0085 00).
8. Install reservoir (11) on belt guard (9) with four screws (10).
9. Install hose (13) on header tank (1).
10. Fill cooling system (WP 0012 00).
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

0066 00-3/(4 blank)



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### KEEL COOLER GRATE REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Sixteen lockwashers (item 85, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)

##### Personnel Required

Two

##### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).

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## KEEL COOLER GRATE REPLACEMENT (Contd)

### **NOTE**

There are four keel cooler grates on the hull of the boat. All keel cooler grates are replaced the same way. This procedure covers the replacement of one keel cooler grate.

Note position of grates on hull during removal to assist with installation.

### REMOVAL

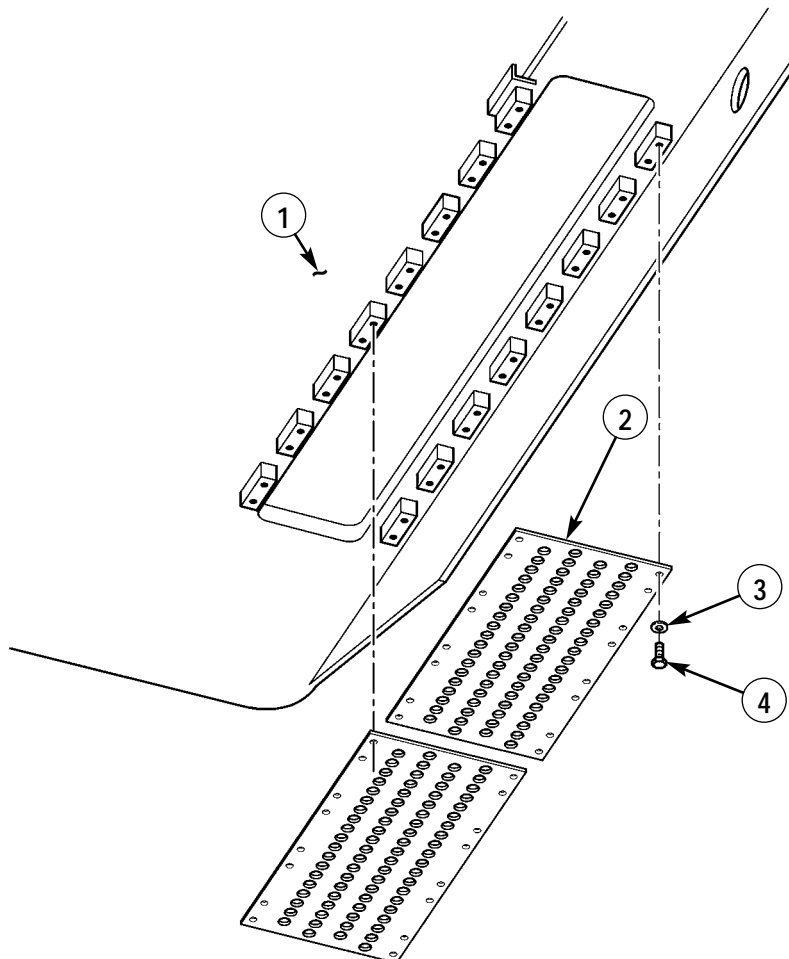
Remove sixteen bolts (4), lockwashers (3), and grate (2) from hull (1). Discard lockwashers (3).

### INSTALLATION

### **CAUTION**

Do not use an impact wrench when installing bolts. Failure to comply may result in damage to hull.

1. Apply thin coat of antiseize compound to bolts (4).
2. Secure grate (2) on hull (1) with sixteen new lockwashers (3) and bolts (4). Tighten bolts (4) to 25 lb-ft (35 N·m).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### KEEL COOLER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Gasket kit (item 49, WP 0173 00)  
Adhesive (item 2, WP 0171 00)  
Antifreeze (item 5, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### Personnel Required

Three

###### References

WP 0013 00

###### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10)  
Keel cooler grates removed (WP 0067 00).  
Coolant drained (WP 0012 00).

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## KEEL COOLER MAINTENANCE (Contd)

### REMOVAL

#### **NOTE**

Keel cooler replacement requires three personnel. One person will assist inside the boat while two persons stand under the boat, supporting the keel cooler.

Tag hoses during removal to assist with installation.

1. From inside boat, loosen two clamps (3) on inlet and outlet hoses (2).
2. Disconnect two hoses (2) from nozzles (8).
3. Remove two nuts (4), washers (5), and gaskets (6) from nozzles (8). Discard gaskets (6).
4. Remove two nuts (16), washers (15), and gaskets (14) from posts (12). Discard gaskets (14) and washers (15).
5. Remove two nuts (1), washers (19), and gaskets (18) from posts (9). Discard gaskets (18) and washers (19).
6. From outside boat, lower keel cooler (10) to ground.
7. Remove gaskets (7), (11), and (13) from keel cooler (10). Discard gaskets (7), (11), and (13).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Remove excess gasket material from hull (17) with Skysol 100 and dry with cloth.

### INSTALLATION

1. From outside boat, apply coat of adhesive around existing holes in hull (17).
2. Install new gaskets (7), (11), and (13) on posts (9) and (12), and nozzles (8).
3. Position keel cooler (10) through existing holes in hull (17).
4. From inside boat, apply coat of adhesive around existing holes in hull (17).

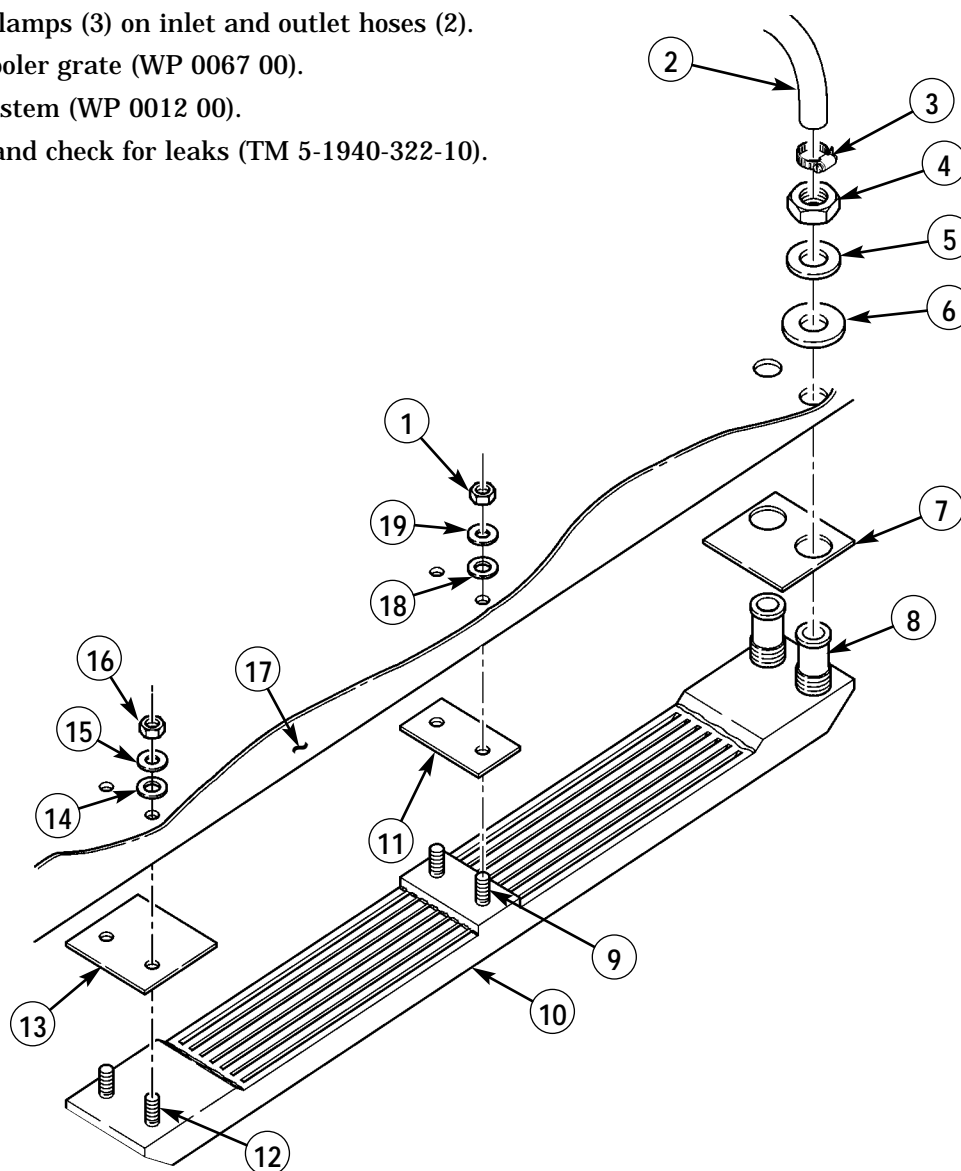
## KEEL COOLER MAINTENANCE (Contd)

### INSTALLATION (Contd)

#### **CAUTION**

Install and tighten nuts in order procedure states. Failure to comply may result in damage to equipment.

5. Install two new gaskets (14), new washers (15), and nuts (16) on posts (12). Do not tighten nuts (16).
6. Install two new gaskets (6), washers (5), and nuts (4) on nozzles (8). Do not tighten nuts (4).
7. Install two new gaskets (18), new washers (19), and nuts (1) on posts (9). Do not tighten nuts (1).
8. Tighten nuts (16) to 50–60 lb-ft (67 N•m).
9. Tighten nuts (4) to 70–100 lb-ft (54 N•m).
10. Tighten nuts (1) to 30–40 lb-ft (135 N•m).
11. Install two hoses (2) on nozzles (8).
12. Tighten two clamps (3) on inlet and outlet hoses (2).
13. Install keel cooler grate (WP 0067 00).
14. Fill cooling system (WP 0012 00).
15. Start engine and check for leaks (TM 5-1940-322-10).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### KEEL COOLER INLET PIPE AND OUTLET PIPE REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Cooling system drained (WP 0012 00).

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## KEEL COOLER INLET PIPE AND OUTLET PIPE REPLACEMENT (Contd)

### NOTE

The inlet pipe and outlet pipe for both keel coolers are replaced the same way. This procedure covers the replacement of the inlet pipe and outlet pipe for one keel cooler.

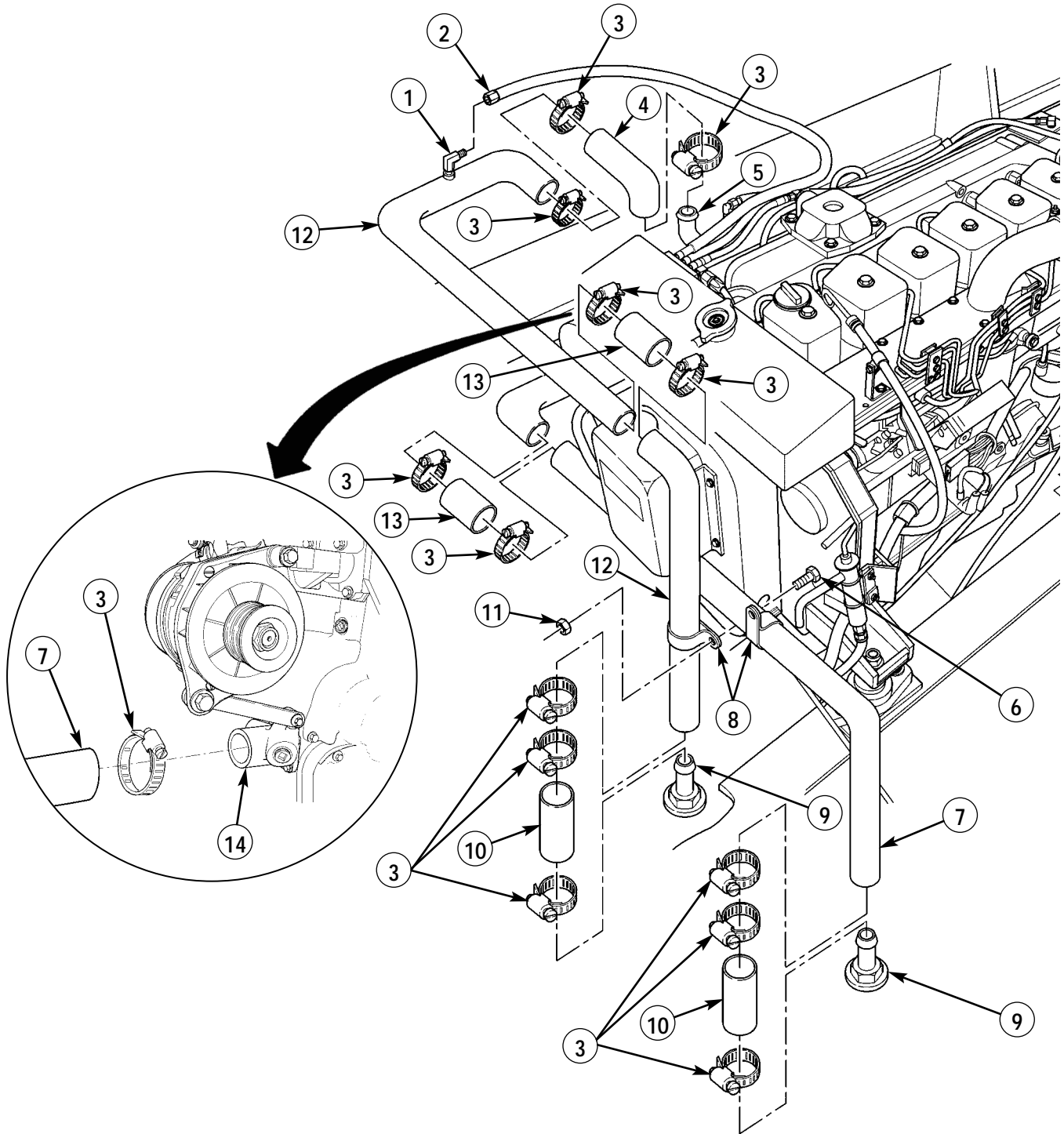
### REMOVAL

1. Remove hose (2) from fitting (1).
2. Remove hose clamps (3) and hose (4) from inlet pipe (12) and thermostat housing (5).
3. Remove nut (11), screw (6), and two pipe clamps (8) from inlet pipe (12) and outlet pipe (7).
4. Remove two clamps (3) and tube (13) from outlet pipe (7).
5. Remove hose clamps (3), tube (10), and inlet pipe (12) from keel cooler fitting (9).
6. Remove hose clamps (3), tube (10), and outlet pipe (7) from keel cooler fitting (9).
7. Remove hose clamp (3) and outlet pipe (7) from engine water inlet connection (14).

### INSTALLATION

1. Install outlet pipe (7) and hose (10) on keel cooler fitting (9) with hose clamps (3).
2. Install outlet pipe (7) on engine water inlet connection (13) with hose clamp (3).
3. Install inlet pipe (12) and hose (10) on keel cooler fitting (9) with hose clamps (3).
4. Install tube (13) on outlet pipe (7) with two clamps (3).
5. Install inlet pipe (12) on outlet pipe (7) with two pipe clamps (8), screw (6), and nut (11).
6. Install hose (2) on fitting (1).
7. Install inlet pipe (12) and hose (4) on thermostat housing (5) with hose clamps (3).
8. Fill cooling system (WP 0012 00).
9. Start engine and check for leaks (TM 5-1940-322-10).
10. Close engine hatches (TM 5-1940-322-10).

### KEEL COOLER INLET PIPE AND OUTLET PIPE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### RAW WATER STRAINER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Three locknuts (item 53, WP 0173 00)

###### References

WP 0013 00

###### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

---

## RAW WATER STRAINER MAINTENANCE (Contd)

### **NOTE**

Both raw water strainers are replaced the same way. This procedure covers the replacement of one raw water strainer.

### REMOVAL

1. Remove clamps (5) and hoses (6) and (8) from raw water strainer (7).
2. Remove three locknuts (4), washers (2), screws (1), and raw water strainer (7) from bracket (3). Discard locknuts (4).
3. Remove cover (11), basket (10), and O-ring (9) from raw water strainer (7).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

2. Clean basket (10) with compressed air.
3. Inspect basket (10) and O-ring (9) for damage. Replace basket (10) or O-ring (9) if damaged.

### INSTALLATION

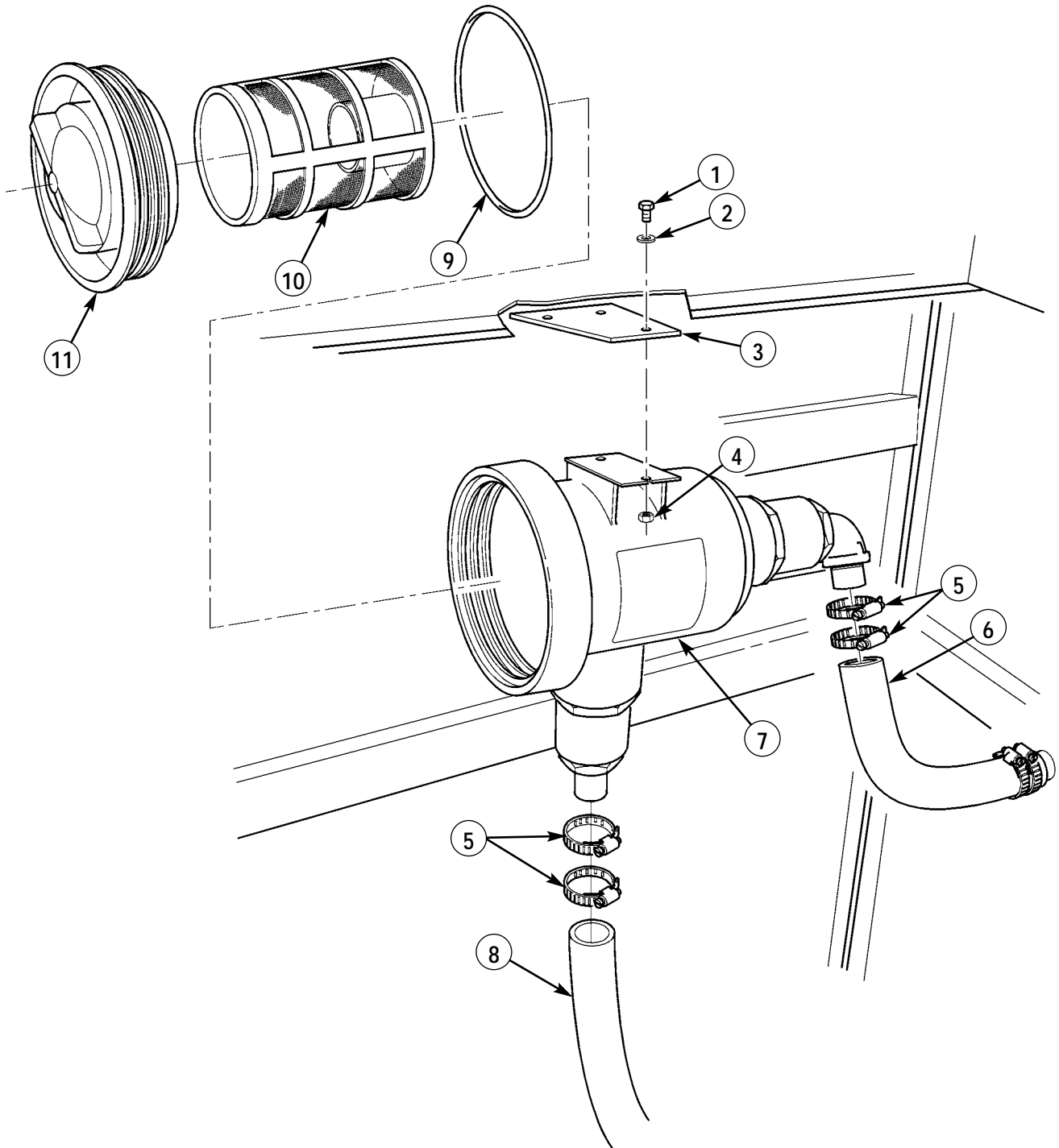
1. Install O-ring (9) and basket (10) in raw water strainer (7).
2. Install raw water strainer (7) on bracket (3) with three screws (1), washers (2), and new locknuts (4).
3. Install hoses (6) and (8) on raw water strainer (7) with clamps (5).

### **CAUTION**

Use care when installing cover on raw water strainer. Failure to comply may result in damage to raw water strainer and/or O-ring.

4. Install cover (11) on raw water strainer (7).
5. If boat is in water, start engine, engage transmission, and check for leaks (TM 5-1940-322-10).
6. Close hydrojet hatches (TM 5-1940-322-10).

RAW WATER STRAINER MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL TANK REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Hand riveting tool (item 38, WP 0172 00)

##### Materials/Parts

Fifty-two rivets (item 129, WP 0173 00)  
Two locknuts (item 52, WP 0173 00)  
Rubber seal (item 50, WP 0173 00)  
Adhesive (item 4, WP 0171 00)  
Cap and plug set (item 7, WP 0173 00)  
Sealing compound (item 36, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0072 00  
WP 0075 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel tank drained (WP 0012 00).

---

## FUEL TANK REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can ignite by contacting hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Two personnel or suitable lifting device is required for removal and installation of fuel tank.

Have container ready to catch fuel.

## REMOVAL

1. Remove fifty-two rivets (1) from center deck plate (2). Discard rivets (1).
2. Remove center line deck plate (2) and rubber seal (3) from deck (4). Discard rubber seal (3) if damaged.
3. Remove two screws (16), washers (15), locknuts (14), and fuel tank bracket (17) from fuel tank compartment (20). Discard locknuts (14).
4. Loosen nuts (9) and disconnect two fuel return lines (10) from elbows (8).
5. Remove hose clamp (6) and vent hose (5) from fuel tank vent (7).
6. Disconnect fuel level sending unit lead wire (12) from fuel level sending unit (11).
7. Remove fuel tank (18) and rubber pads (13) from fuel tank compartment (20). Replace rubber pads (13), if necessary.
8. Remove fuel level sending unit (11) (WP 0072 00).
9. Remove elbows (8) from fuel tank (18).
10. Remove fuel master shut-off valve (19) (WP 0075 00).

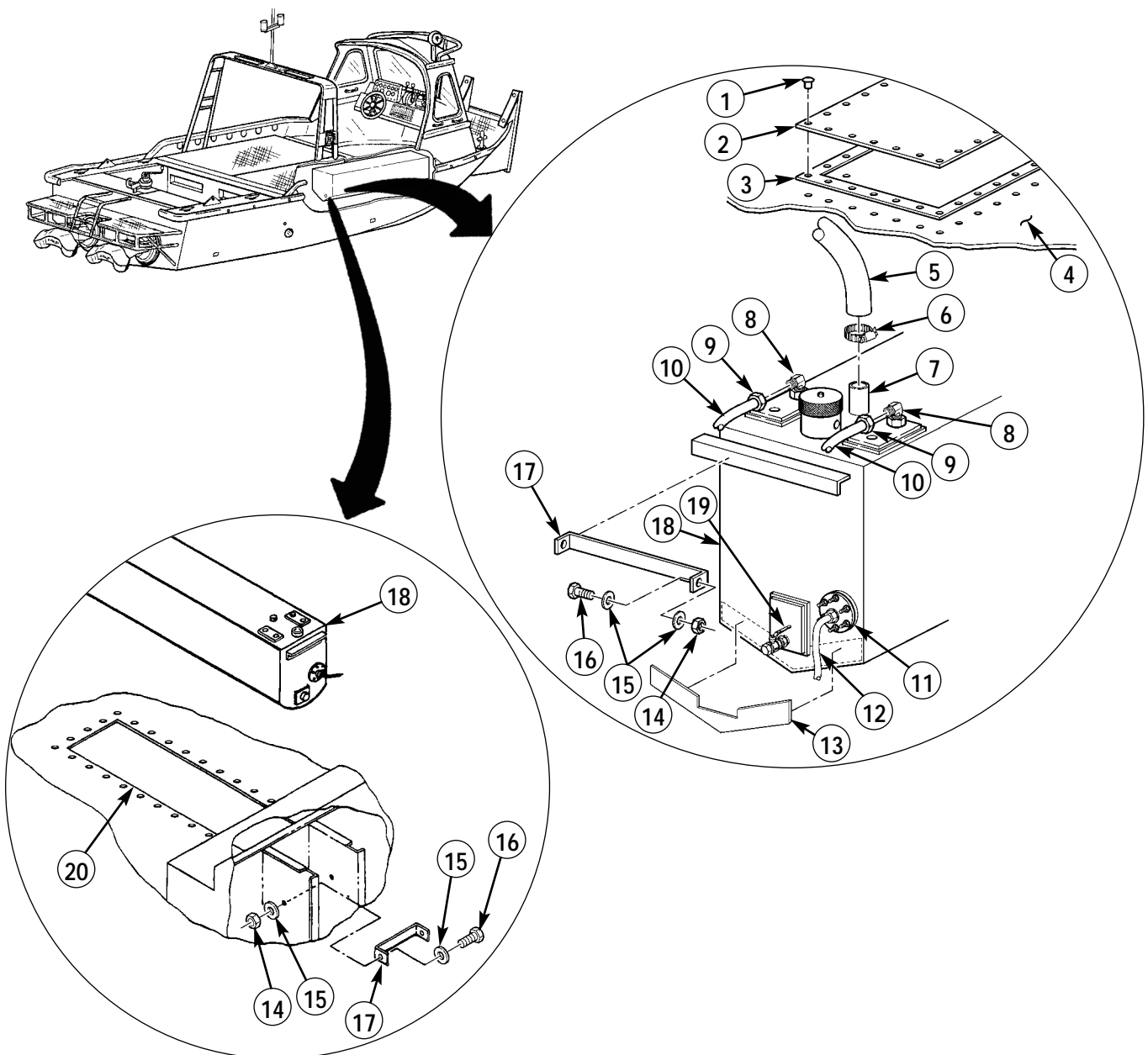
## INSTALLATION

1. Install fuel master shut-off valve (19) (WP 0075 00).
2. Install fuel tank sending unit (11) (WP 0072 00).
3. Apply coat of sealing compound to threads of elbows (8).
4. Install elbows (8) on fuel tank (18).
5. Position fuel tank (18) and rubber pads (13) in fuel tank compartment (20).
6. Connect fuel level sending unit lead wire (12) to fuel level sending unit (11).
7. Secure fuel tank bracket (17) in fuel tank compartment (20) with two screws (16), washers (15), and new locknuts (14).
8. Install vent hose (5) on fuel tank vent (7) with hose clamp (6).
9. Install two fuel return lines (10) on elbows (8). Tighten nuts (9).
10. Apply coat of adhesive to rubber seal (3) prior to installation.

## FUEL TANK REPLACEMENT (Contd)

### INSTALLATION (Contd)

11. Position center deck plate (2) on deck (4) with rubber seal (3).
12. Secure center deck plate (2) to deck (4) with fifty-two new rivets (1).
13. Close engine hatches (TM 5-1940-322-10).
14. Connect battery ground cables (WP 0054 00).
15. Fill fuel tank (TM 5-1940-322-10).
16. Start engines and check for leaks (TM 5-1940-322-10).
17. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL LEVEL SENDING UNIT MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Six locknuts (item 56, WP 0173 00)  
Gasket (item 29, WP 0173 00)  
Cloth (item 8, WP 0173 00)  
Fuel (item 21, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel tank drained (WP 0012 00).

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## FUEL LEVEL SENDING UNIT MAINTENANCE (Contd)

### **NOTE**

Tag leads during removal to assist with installation.

### REMOVAL

### **NOTE**

Have container ready to catch fuel.

1. Disconnect two lead wires (9) from connectors (7).
2. Remove six locknuts (5), washers (4), and mounting plate (3) with fuel level sending unit (10) from fuel tank (1). Discard locknuts (5).
3. Remove nut (6), fuel level sending unit (10), washer (8), and gasket (2) from mounting plate (3). Discard gasket (2).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material from fuel tank (1) with Skysol 100 and dry with cloth.

### INSTALLATION

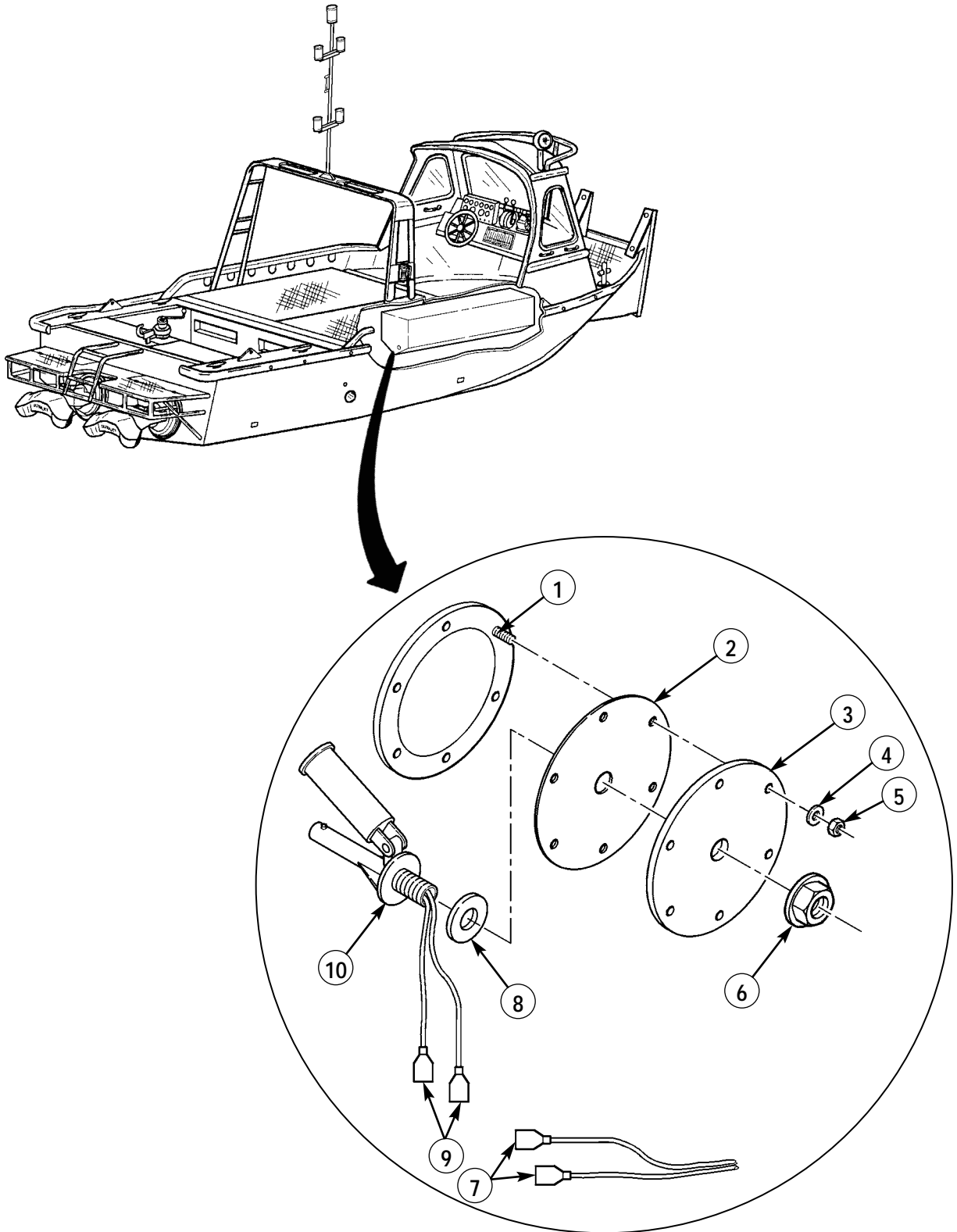
1. Route two lead wires (9) through washer (8), new gasket (2), mounting plate (3), and nut (6).

### **NOTE**

Float on sending unit must be positioned for upward flotation.

2. Position fuel level sending unit (10), washer (8), and new gasket (2) on mounting plate (3) and tighten nut (6).
3. Install fuel level sending unit (10) on fuel tank (1) with six washers (4) and new locknuts (5).
4. Connect two lead wires (9) to connectors (7).
5. Fill fuel tank (WP 0012 00).
6. Connect battery ground cables (WP 0054 00).
7. Start engines and check for leaks (TM 5-1940-322-10).
8. Close engine hatches (TM 5-1940-322-10).
9. Close battery hatch (TM 5-1940-322-10).

### FUEL LEVEL SENDING UNIT MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### NYLON FUEL PLUMBING REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cap and plug set (item 7, WP 0171 00)

##### References

WP 0080 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## NYLON FUEL PLUMBING REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

All fuel lines are replaced the same way. This procedure covers replacement of one fuel line.

Have container ready to catch fuel.

### REMOVAL

1. Turn handle (1) to closed position on fuel master shutoff valve (2).
2. Loosen nut (7) and disconnect fuel line (8) from adapters (4).
3. Repeat step 2 for other end of fuel line (8).
4. Remove fuel line (8) from boat (3).

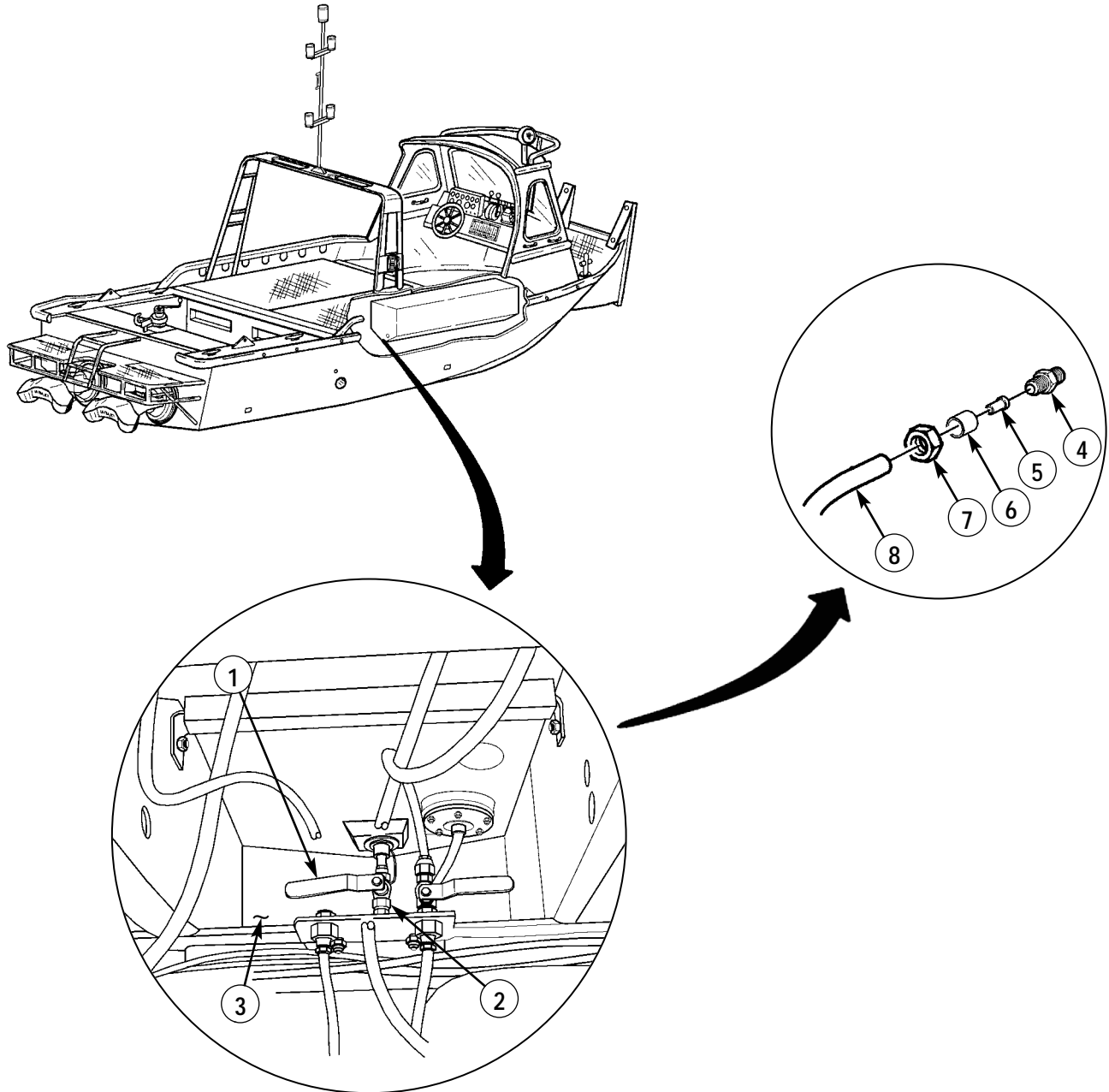
### INSTALLATION

### **NOTE**

Fuel line is not precut. Measure and cut fuel line to length of fuel line being replaced.

1. Cut fuel line (8) to correct length.
2. Install nut (7) on fuel line (8).
3. Install fuel line sleeve (6) and reducer (5) 1/2 in. from end of fuel line (8).
4. Install end of fuel line (8) on adapter (4) and seat firmly.
5. Position nut (7) on fuel line sleeve (6).
6. Hand-tighten nut (7) on adapter (4).
7. Tighten nut (7) on adapter (4) to seat fuel line sleeve (6).
8. Repeat steps 2 through 7 for other end of fuel line (8).
9. Turn handle (1) to open position on fuel master shutoff valve (2).
10. Bleed fuel system (WP 0080 00).
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Close engine hatches (TM 5-1940-322-10).
13. Close battery hatch (TM 5-1940-322-10).

# NYLON FUEL PLUMBING REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### INTERMEDIATE FUEL SHUTOFF VALVE MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0080 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## INTERMEDIATE FUEL SHUTOFF VALVE MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

There are two intermediate fuel shutoff valves. Both fuel shutoff valves are replaced the same way. This procedure covers the replacement of one intermediate fuel shutoff valve.

Have container ready to catch fuel.

## REMOVAL

1. Turn handle (1) to closed position on fuel master shutoff valve (2).
2. Loosen nut (4) and remove fuel line (3) from adapter (5).
3. Loosen nut (9) and remove fuel line (10) from adapter (8).
4. Remove adapter (5) and fuel shutoff valve (7) from bulkhead (6).
5. Remove adapter (8) from fuel shutoff valve (7).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

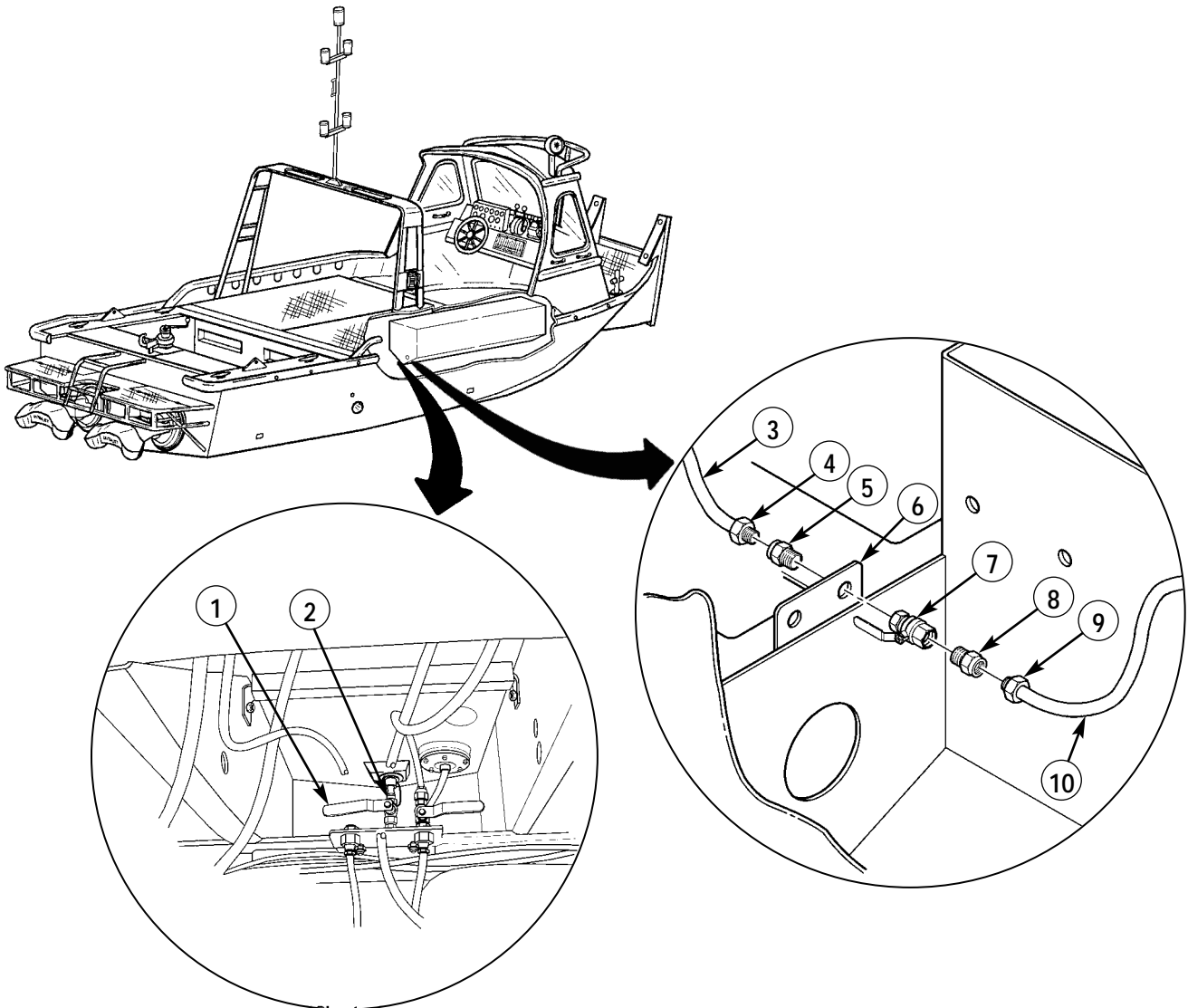
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess sealing compound from adapters (8) and (5) with Skysol 100 and dry with cloth.

## INTERMEDIATE FUEL SHUTOFF VALVE MAINTENANCE (Contd)

### INSTALLATION

1. Apply thin coat of sealing compound to adapters (8) and (5).
2. Install adapter (8) on fuel shutoff valve (7).
3. Secure fuel shutoff valve (7) on bulkhead (6) with adapter (5).
4. Connect fuel lines (10) and (3) to adapters (8) and (5). Tighten nuts (9) and (4).
5. Turn handle (1) to open position on fuel master shutoff valve (2).
6. Bleed fuel system (WP 0080 00).
7. Start engine and check for leaks (TM 5-1940-322-10).
8. Close engine hatches (TM 5-1940-322-10).
9. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL MASTER SHUTOFF VALVE AND ADAPTERS MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Fuel (item 21, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00  
WP 0080 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel tank drained (WP 0012 00).

---

## FUEL MASTER SHUTOFF VALVE AND ADAPTERS MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

## REMOVAL

### **NOTE**

Have container ready to catch fuel.

1. Loosen nuts (6) and remove fuel lines (7) from pipe tee (5).
2. Remove pipe tee (5) from adapter (4).
3. Remove adapter (4) from fuel master shutoff valve (3).
4. Remove fuel master shutoff valve (3) from adapter (2).
5. Remove adapter (2) from fuel tank (1).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess sealing compound from adapters (2) and (4) with Skysol 100 and dry with cloth.

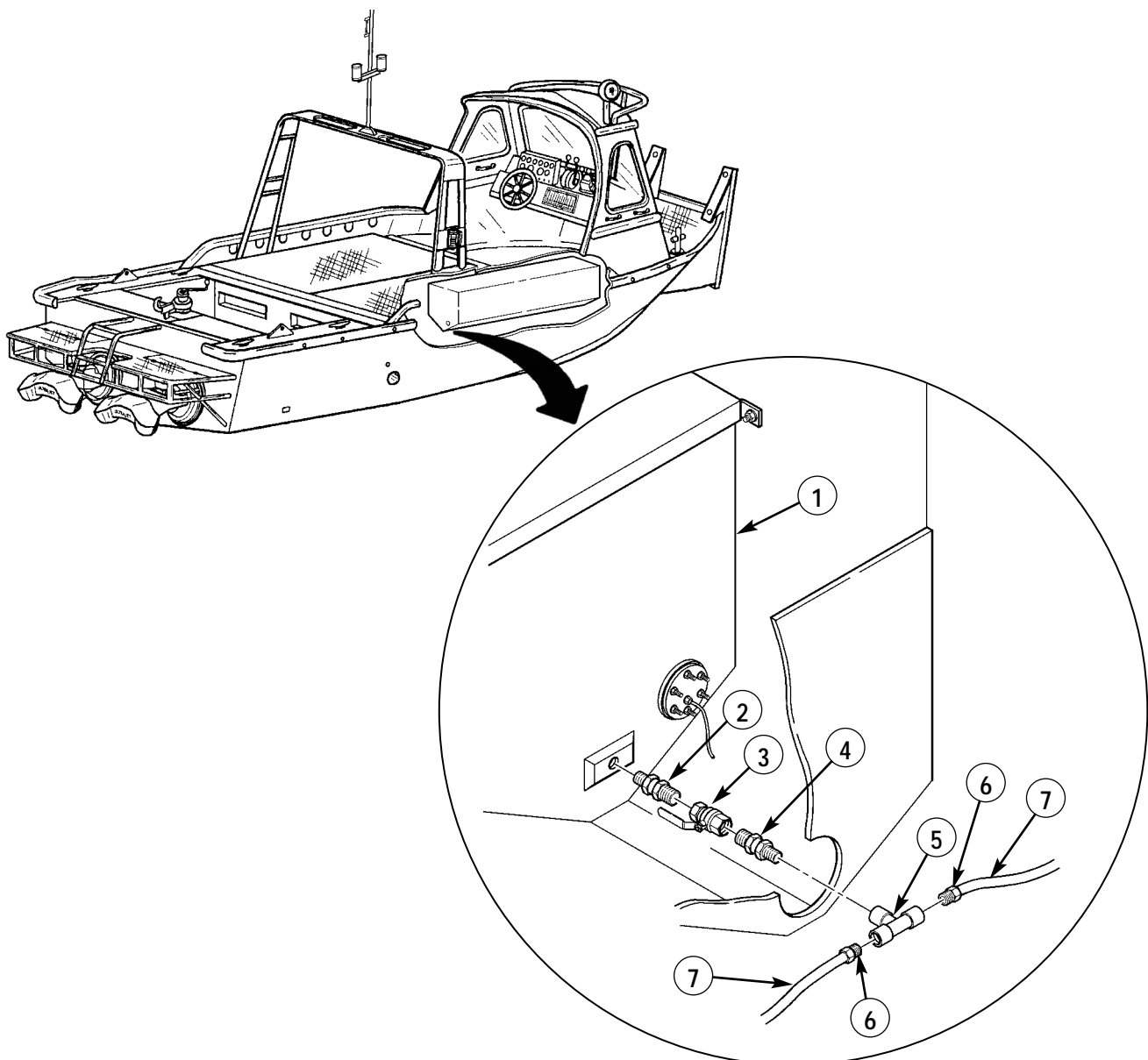
## INSTALLATION

1. Apply thin coat of sealing compound on male sides of adapters (2) and (4).
2. Install adapter (2) on fuel tank (1).
3. Install fuel master shutoff valve (3) on adapter (2).
4. Install adapter (4) on fuel master shutoff valve (3)

## FUEL MASTER SHUTOFF VALVE AND ADAPTERS MAINTENANCE (Contd)

### INSTALLATION (Contd)

5. Install pipe tee (5) on adapter (4).
6. Connect two fuel lines (7) on pipe tee (5). Tighten nuts (6).
7. Fill fuel tank with fuel (TM 5-1940-322-10).
8. Bleed fuel system (WP 0080 00).
9. Start engine and check for leaks (TM 5-1940-322-10).
10. Close engine hatches (TM 5-1940-322-10).
11. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL WATER SEPARATOR MAINTENANCE

#### DRAINING, REMOVAL, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 54, WP 0173 00)  
Fuel (item 21, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0080 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

## FUEL WATER SEPARATOR MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **NOTE**

Both fuel water separators are replaced the same way. This procedure covers the replacement of one fuel water separator.

## DRAINING

### **NOTE**

Have container ready to catch fuel.

1. Check fuel water separator (11) for water.
2. Loosen drain plug (10) on fuel water separator (11) to drain water until clean fuel runs out.
3. Tighten drain plug (10) on fuel water separator (11).
4. Start engine and check for leaks (TM 5-1940-322-10).
5. Bleed fuel system if necessary (WP 0080 00).

## REMOVAL

### **NOTE**

Have container ready to catch fuel.

1. Turn handle (2) to closed position on intermediate fuel shutoff valve (1).
2. Loosen drain plug (10) on fuel water separator (11) to drain fuel.
3. Loosen nuts (6) on fuel line (8) and fuel hose (7).
4. Disconnect fuel line (8) and fuel hose (7) from fuel water separator (11).
5. Remove two screws (9), four washers (4), two locknuts (3), and fuel water separator (11) from bulkhead (5). Discard locknuts (3).

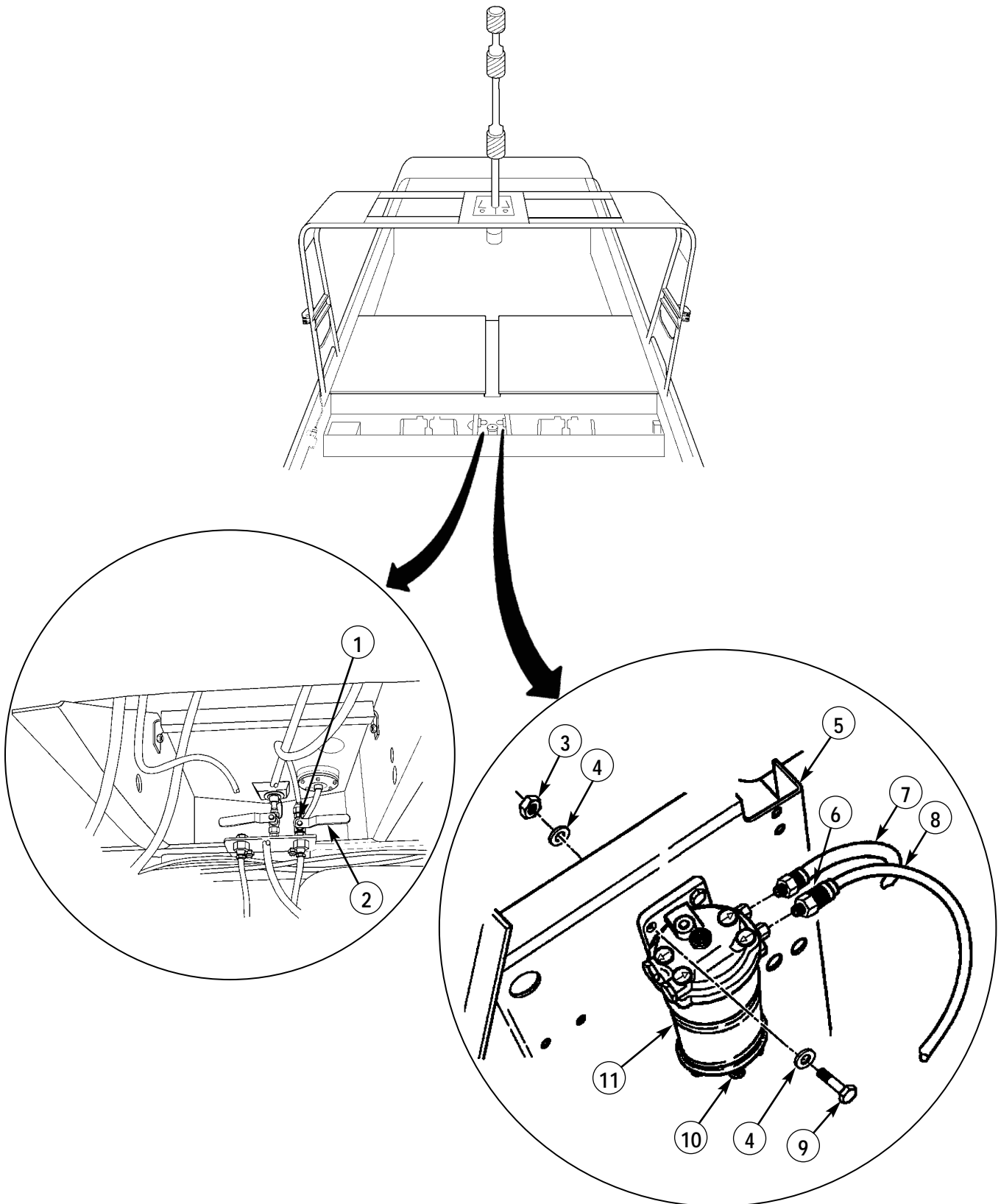
## INSTALLATION

### **NOTE**

Fill fuel/water separator with fuel prior to installation.

1. Install fuel water separator (11) on bulkhead (5) with four washers (4), two screws (9), and two new locknuts (3). Ensure drain plug is tight.
2. Connect fuel line (8) and fuel hose (7) to fuel water separator (11) and tighten nuts (6).
3. Turn handle (2) to opened position on intermediate fuel shutoff valve (1).
4. Start engine and check for leaks (TM 5-1940-322-10).
5. Bleed fuel system if necessary (WP 0080 00).
6. Close battery hatch (TM 5-1940-322-10).
7. Close engine hatches (TM 5-1940-322-10).

### FUEL WATER SEPARATOR MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL WATER SEPARATOR ELEMENT MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Two O-rings (item 103, WP 0173 00)  
Seal (item 137, WP 0173 00)  
Seal (item 138, WP 0173 00)  
O-ring (item 104, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Fuel (item 21, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0080 00

###### Equipment Condition

Battery hatch open and secured  
(TM 5-1940-322-10).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## FUEL WATER SEPARATOR ELEMENT MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **NOTE**

Both fuel water separator elements are replaced the same way. This procedure covers the replacement of one fuel water separator element.

## REMOVAL

### **NOTE**

Have container ready to catch fuel.

1. Turn handle (14) to closed position on intermediate fuel shutoff valve (15).
2. Remove drain plug (13) and washer (12). Drain fuel water separator.
3. Remove screw (1), washer (2), seal (3), seal (5), O-ring (6), element (7), O-ring (8), sediment bowl (9), O-ring (10), and base (11) from fuel water separator head (4). Discard seals (3) and (5), and O-rings (6), (8), and (10).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean element (7), sediment bowl (9), and base (11) with Skysol 100 and dry with cloth.
3. Inspect fuel water separator head (4), element (7) and base (11) for damage to O-ring seating area. Replace if cracked or seating area is damaged.
4. Inspect base (11) and drain plug (13) for stripped threads. Replace if threads are stripped.

## INSTALLATION

### **NOTE**

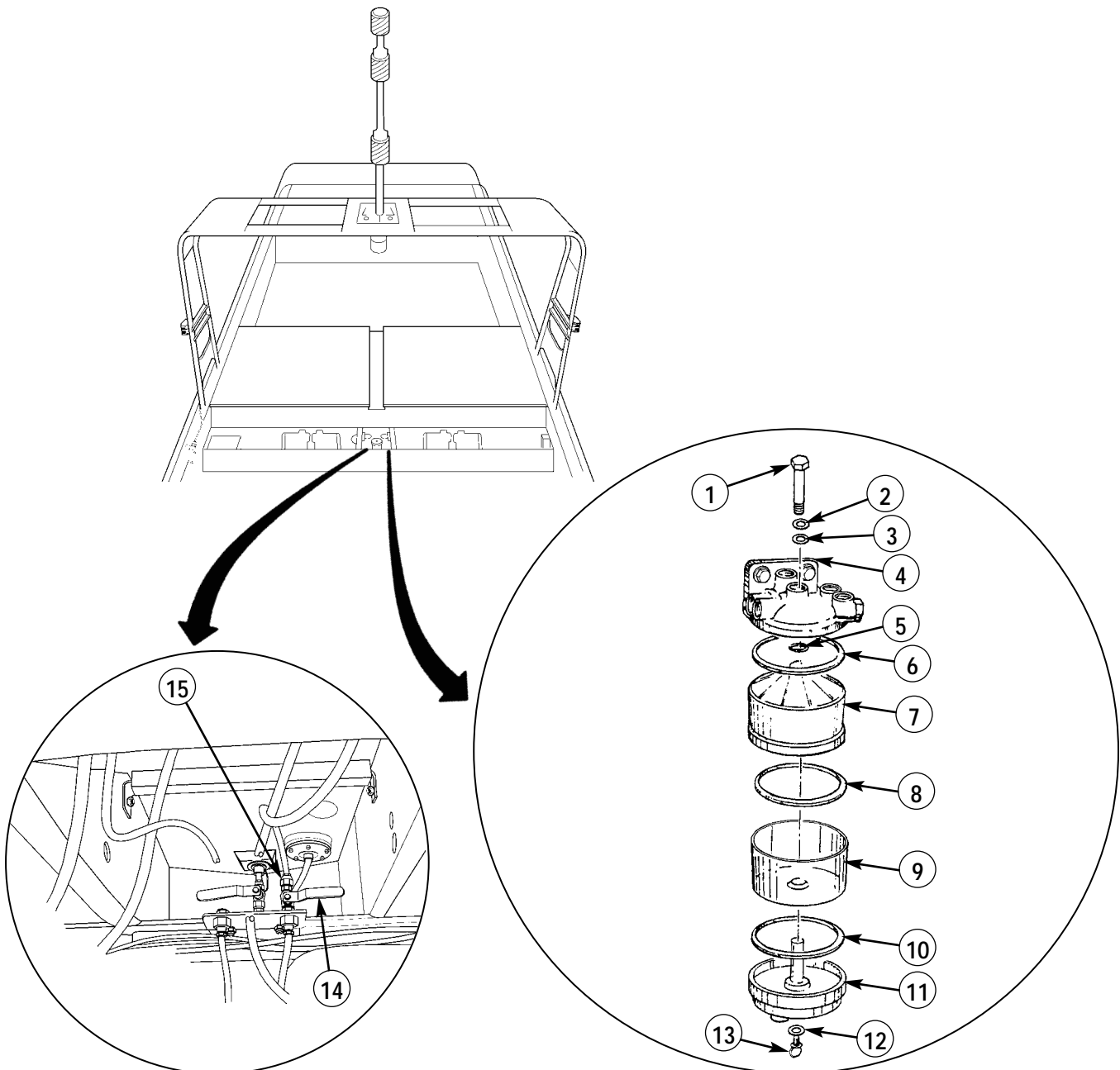
Fill sediment bowl with fuel prior to installation.

1. Install screw (1) washer (2), and new seal (3) securing base (11), new O-ring (10), sediment bowl (9), new O-ring (8), element (7), new O-ring (6), and new seal (5) on fuel water separator head (4).
2. Install drain plug (13) and washer (12) on base (11). Tighten drain plug (13).

## FUEL WATER SEPARATOR ELEMENT MAINTENANCE (Contd)

### INSTALLATION (Contd)

3. Turn handle (14) to open position on intermediate fuel shutoff valve (15).
4. Start engine and check for leaks (TM 5-1940-322-10).
5. Bleed fuel system, if necessary (WP 0080 00).
6. Close battery hatch (TM 5-1940-322-10).
7. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### LUBRICITY FILTER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Lubricity filter (item 15, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Fuel (item 21, WP 0171 00)  
Oil (item 16, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## LUBRICITY FILTER MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **NOTE**

Both lubricity filters are replaced the same way. This procedure covers the replacement of one lubricity filter.

## REMOVAL

### **NOTE**

Have container ready to catch fuel.

Remove lubricity filter element (3) from filter base (1) by turning counterclockwise. Discard lubricity filter (3).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

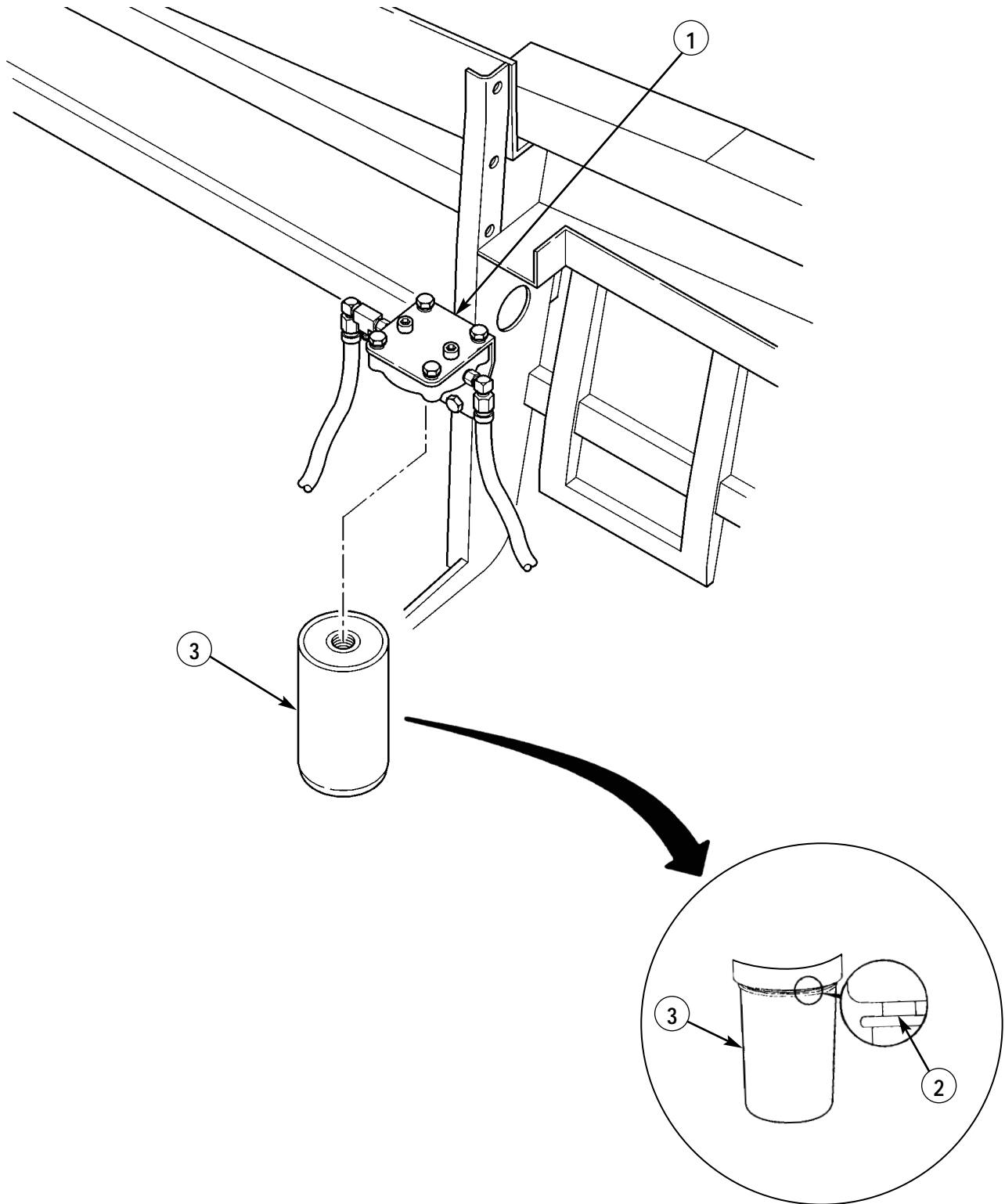
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean filter base (1) with Skysol 100 and dry with cloth.

## INSTALLATION

1. Fill new lubricity filter element (3) with clean fuel.
2. Apply light coat of oil to filter seal (2).
3. Install new lubricity filter element (3) on filter base (1) until filter seal (2) contacts filter base (1).
4. Secure new lubricity filter element (3) on filter base (1) by turning one-half turn clockwise.
5. Start engine and check for fuel leaks (TM 5-1940-322-10).
6. Bleed system, if necessary (WP 0080 00).
7. Close engine hatches (TM 5-1940-322-10).

LUBRICITY FILTER MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL FILTER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cloth (item 8, WP 0171 00)  
Fuel (item 21, WP 0171 00)  
Oil (item 16, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0080 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## FUEL FILTER MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **NOTE**

The fuel filters on both engines are replaced the same way. This procedure covers the replacement of one fuel filter.

## REMOVAL

### **NOTE**

Have container ready to catch fuel.

Remove fuel filter element (1) from filter base (2) by turning counterclockwise. Discard fuel filter element (1).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

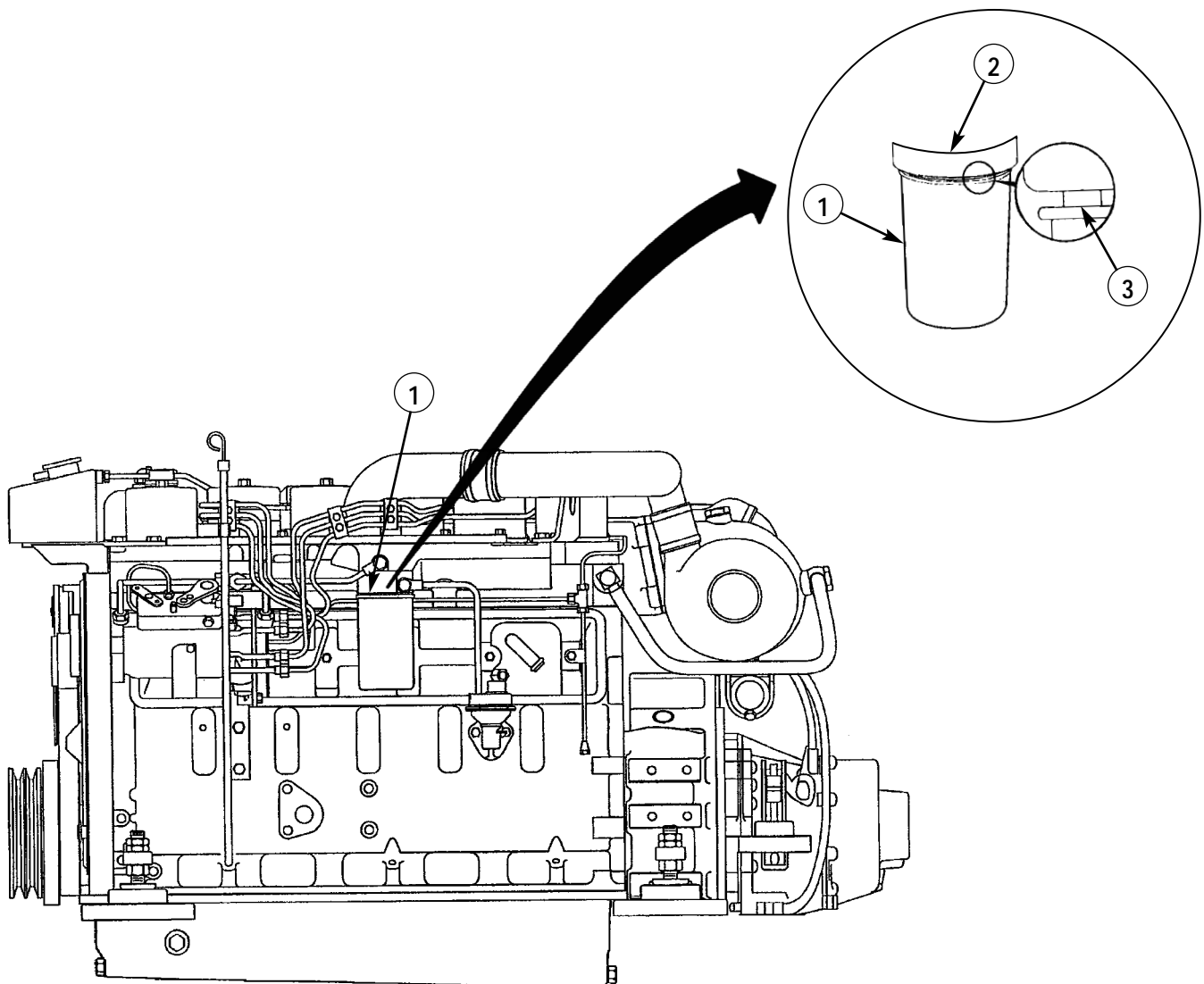
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use. Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean filter base (2) with Skysol 100 and dry with cloth.

## FUEL FILTER MAINTENANCE (Contd)

### INSTALLATION

1. Fill new fuel filter element (1) with clean fuel.
2. Apply a light coat of oil to filter seal (3).
3. Install new fuel filter element (1) on filter base (2) until filter seal (3) contacts filter base (2).
4. Secure filter element (1) on filter base (2) by turning one-half turn.
5. Start engine and check for fuel leaks (TM 5-1940-322-10).
6. Bleed fuel system, if necessary (WP 0080 00).
7. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL SYSTEM BLEEDING

#### LOW PRESSURE FUEL LINES AND FUEL FILTER BLEEDING AND FUEL INJECTION PUMP BLEEDING

---

##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-323-10).

##### Personnel Required

Two

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## FUEL SYSTEM BLEEDING (Contd)

### **NOTE**

Controlled venting is provided at the injection pump, through the fuel drain manifold. Small amounts of air introduced by changing the filters or injection pump will be vented automatically.

Manual venting will be required if fuel filter is not filled prior to installation, injection pump is replaced, high pressure fuel line connections are loosened or lines replaced, initial engine start up or start up after an extended period of no engine operation, or fuel tank has run empty.

### LOW PRESSURE FUEL LINES AND FUEL FILTER BLEEDING

1. Loosen vent screw (1) on filter head (2).
2. Operate plunger (3) on lift pump (4) until fuel flowing from vent screw (1) is free of air.
3. Position plunger (3) upward in locked position.
4. Tighten vent screw (1) to 71 lb-in (8 N·m).

### INJECTION PUMP BLEEDING

#### **NOTE**

Air/fuel can be pumped from the fuel injection pump locations with the lift pump plunger.

Have container ready to catch fuel.

1. Loosen vent screw (7) on fuel injection pump (9).
2. Operate plunger (3) on lift pump (4) until fuel flowing from vent screw (7) is free of air.
3. Tighten vent screw (7) 71 lb-in (8 N·m).
4. Loosen vent screw (8).
5. Operate plunger (3) on lift pump (4) until fuel flowing from vent screw (8) is free of air.
6. Tighten vent screw (8) to 71 lb-in (8 N·m).
7. Position plunger (3) upward in locked position.

#### **WARNING**

It is necessary to position the engine circuit switch ON. The engine may start; ensure all safety precautions for starting the engine are followed. Failure to comply may result in injury to personnel and/or damage to equipment.

#### **CAUTION**

When using the starter to vent the system, do not engage it for more than 30 seconds at a time. Wait two minutes between engagements. Failure to comply may result in damage to equipment.

#### **NOTE**

Air can be vented from the pump through the fuel drain manifold line by engaging the starter.

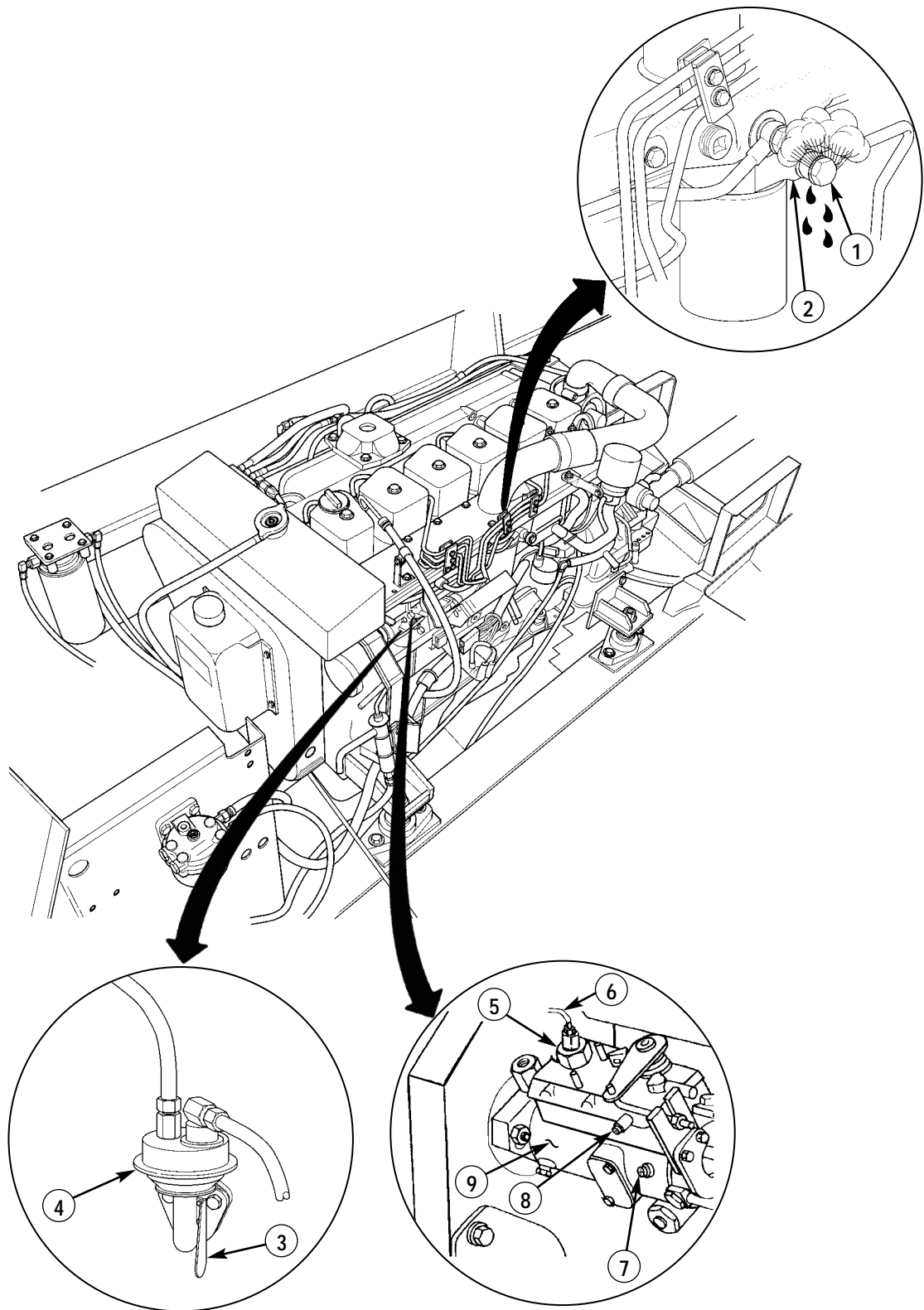
8. Loosen nut (5) on fuel drain manifold line (6).

#### **NOTE**

Assistant will help with step 9.

9. Crank engine to allow air to vent from line (TM 5-1940-322-10).
10. Tighten nut (5) on fuel drain manifold line (6) to 22 lb-ft (30 N·m) when fuel flowing from nut is free of air.
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Close engine hatches (TM 5-1940-322-10).

FUEL SYSTEM BLEEDING (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Twelve locknuts (item 52, WP 0173 00)  
Five locknuts (item 54, WP 0173 00)  
Four cotter pins (item 5, WP 0173 00)  
Two locknuts (item 53, WP 0173 00)  
Adhesive (item 1, WP 0171 00)

##### Materials/Parts (Contd)

Cloth (item 8, WP 0171 00)  
Rubber seal (item 31, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## ENGINE HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)

### REMOVAL

#### **NOTE**

Both engine hatch covers, hangers, and support braces are replaced the same way. This procedure covers the replacement of one engine hatch cover, two hinges and one support brace

1. Remove four cotter pins (5) from two hinge pins (6). Discard cotter pins (5).
2. Remove hook (15) from hole (14) in engine hatch cover (12).

#### **NOTE**

Assistant will help with steps 3 and 4.

3. Remove support brace (23) from slot (13) in engine hatch cover (12).
4. Remove two hinge pins (6), four washers (7), and engine hatch cover (12) from hull (26).
5. Remove four locknuts (1), eight washers (2), four screws (4), and two hinges (3) from engine hatch cover (12). Discard locknuts (1).
6. Remove eight locknuts (11), sixteen washers (9), eight screws (8), and two hinges (10) from hull (26). Discard locknuts (11).
7. Remove locknut (21), washer (22), screw (16), and chain (17) from support brace (23). Discard locknut (21).
8. Remove locknut (19), washer (18), spacer nut (20), washer (18), screw (24), and support brace (23) from hull (26). Discard locknut (19).

#### **NOTE**

Perform step 9 for starboard side engine hatch cover.

9. Remove five locknuts (29), ten washers (28), five screws (27), and hatch channel (25) from engine hatch cover (12). Discard locknuts (29).

### CLEANING AND INSPECTION

1. For general cleaning and inspection, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Inspect seal (30) for damage. Replace seal (30) if damaged.
3. If replacing seal (30) remove excess gasket material with Skysol 100 and dry with cloth.

**ENGINE HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)**

**INSTALLATION**

**NOTE**

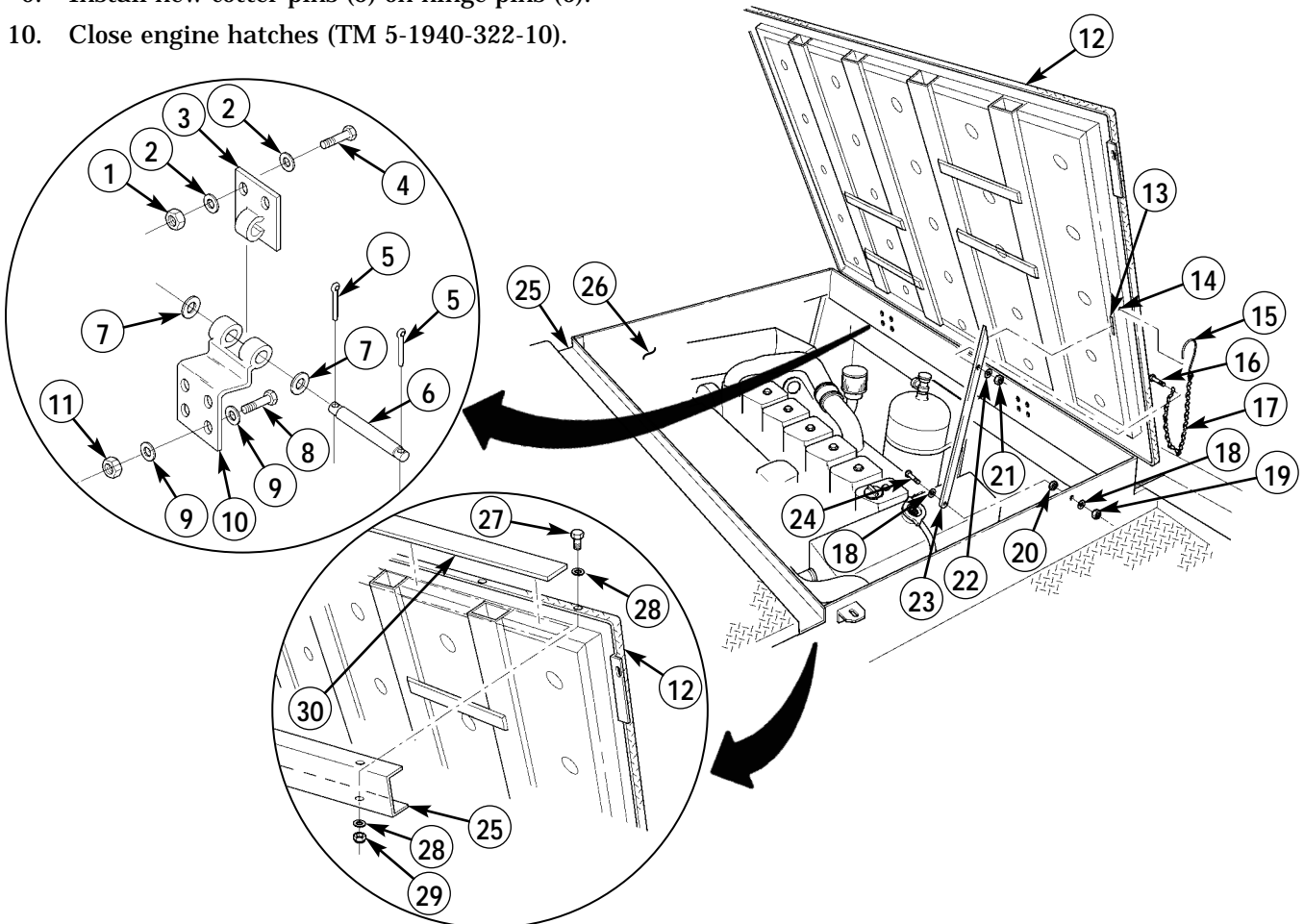
Perform step 1 for starboard side engine hatch cover.

1. Install hatch channel (25) on engine hatch cover (12) with five screws (27), ten washers (28), and five new locknuts (29).
2. Install support brace (23) on hull (26) with screw (24), washer (18), spacer nut (20), washer (18), and new locknut (19).
3. Install chain (17) on support brace (23) with screw (16), washer (22), and new locknut (21).
4. Install two hinges (10) on hull (26) with eight screws (8), sixteen washers (9), and eight new locknuts (11).
5. Install two hinges (3) on engine hatch cover (12) with four screws (4), eight washers (2), and four new locknuts (1).

**NOTE**

Assistant will help with steps 6 and 7.

6. Install engine hatch cover (12) on hull (26) with two hinge pins (6) and four washers (7).
7. Position support brace (23) in slot (13) on engine hatch cover (12).
8. Install hook (15) in hole (14) on engine hatch cover (12).
9. Install new cotter pins (5) on hinge pins (6).
10. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE MOUNTS AND BRACKETS REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Sling (item 44, WP 0172 00)  
Lifting device

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

###### Materials/Parts

Locknut (item 60, WP 0173 00)  
Sealing compound (item 36, WP 0171 00)  
Transmission oil (item 19, WP 0171 00)

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## ENGINE MOUNTS AND BRACKETS REPLACEMENT (Contd)

### **WARNING**

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

Keep hands clear of lifting area. Use prybar to free engine during lifting operations. Failure to comply may result in injury to personnel.

Lifting device must have a weight capacity greater than the weight of the engine and transmission. Failure to comply may cause injury to personnel and/or damage to equipment.

Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. Failure to comply may cause injury to personnel.

### **CAUTION**

Do not raise engine more than 2 in. when replacing engine mounts or brackets. Failure to comply may result in damage to equipment.

### **NOTE**

The front and rear engine mounts and brackets on both engines are replaced the same way.

The front bracket is secured with three screws; the rear with four screws. This procedure covers the replacement of one engine mount and bracket.

The engine mounts are slotted for alignment of engine and driveshaft.

## REMOVAL

1. Remove locknut (1) and washer (2) from engine mount (5). Discard locknut (1).
2. Connect sling (9) to lifting brackets (10) and (11).
3. Connect lifting device (8) to sling (9).
4. Raise engine (7) until weight is supported by lifting device (8).
5. Remove three screws (3) and engine mounting bracket (4) from engine (7).
6. Remove two nuts (14), washers (13), screws (12), and engine mount (5) from boat (6).

## INSTALLATION

### **CAUTION**

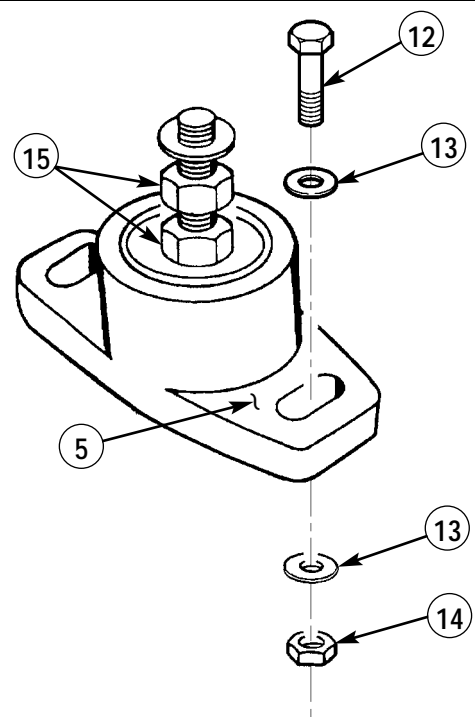
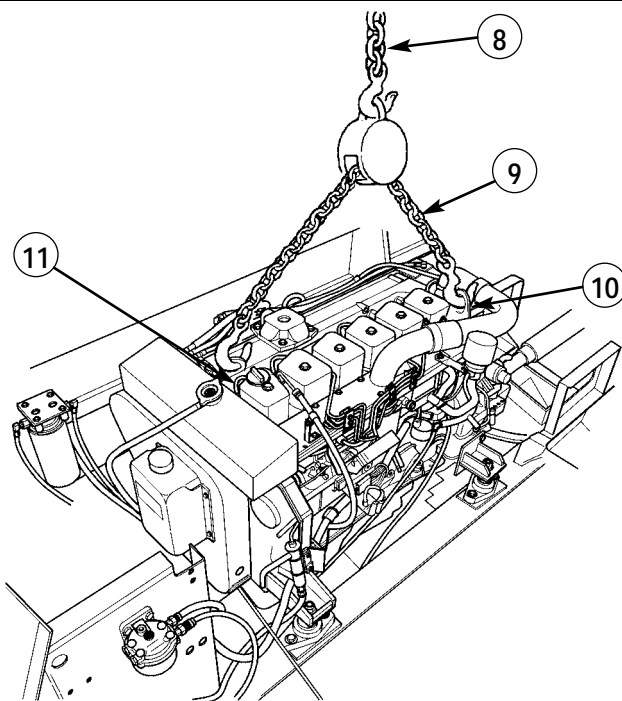
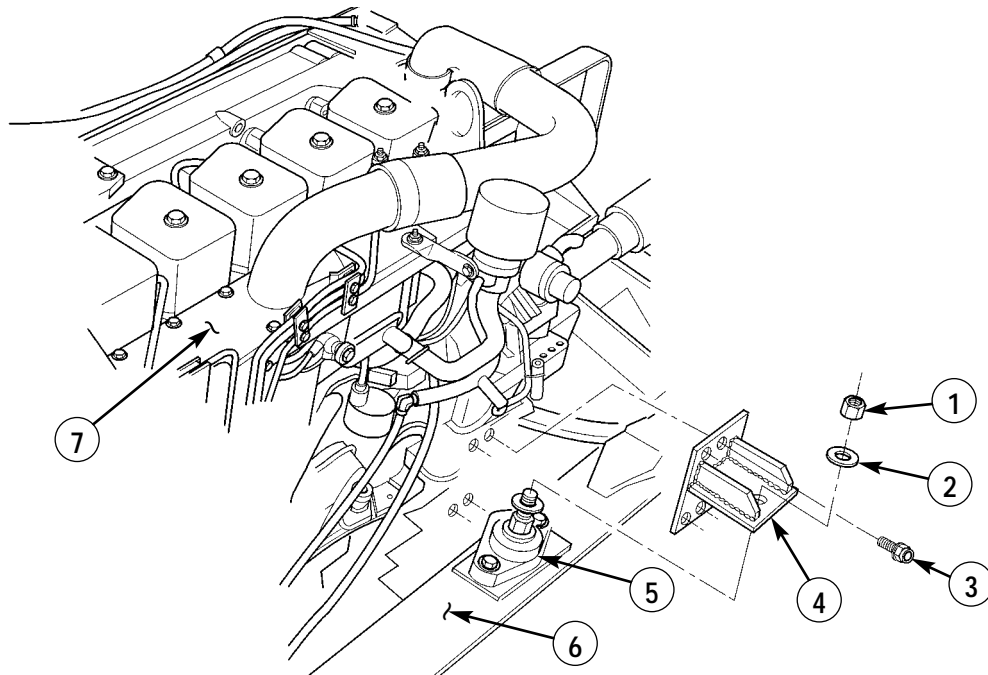
Ensure all engine mounts are preset to 1.750 in. (4.445 cm). Failure to comply may result in equipment damage.

1. Install engine mount (5) on boat (6) with two screws (12), washers (13), and nuts (14). Tighten nuts (14).
2. Apply coat of sealing compound on threads of screws (3).
3. Install engine mounting bracket (4) on engine (7) with three screws (3). Tighten screws (3).
4. Lower engine (7) until weight is supported by engine mount (5) and engine mounting bracket (4).
5. Ensure engine (7) is level by adjusting nut (15). Tighten nut (15).
6. Secure engine mounting bracket (4) on engine mount (5) with washer (2) and new locknut (1). Tighten locknut (1) to 35 lb-ft (47 N•m).

## ENGINE MOUNTS AND BRACKETS REPLACEMENT (Contd)

### INSTALLATION (Contd)

7. Remove sling (9) from lifting brackets (10) and (11).
8. Connect battery ground cables (WP 0054 00).
9. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE WIRING HARNESS REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Tiedown straps (item 38, WP 0171 00)  
Electrical tape (item 39, WP 0171 00)

###### References

WP 0089 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## ENGINE WIRING HARNESS REPLACEMENT (Contd)

### **NOTE**

Port and starboard engine wiring harnesses are replaced the same way. This procedure covers the replacement of one wiring harness.

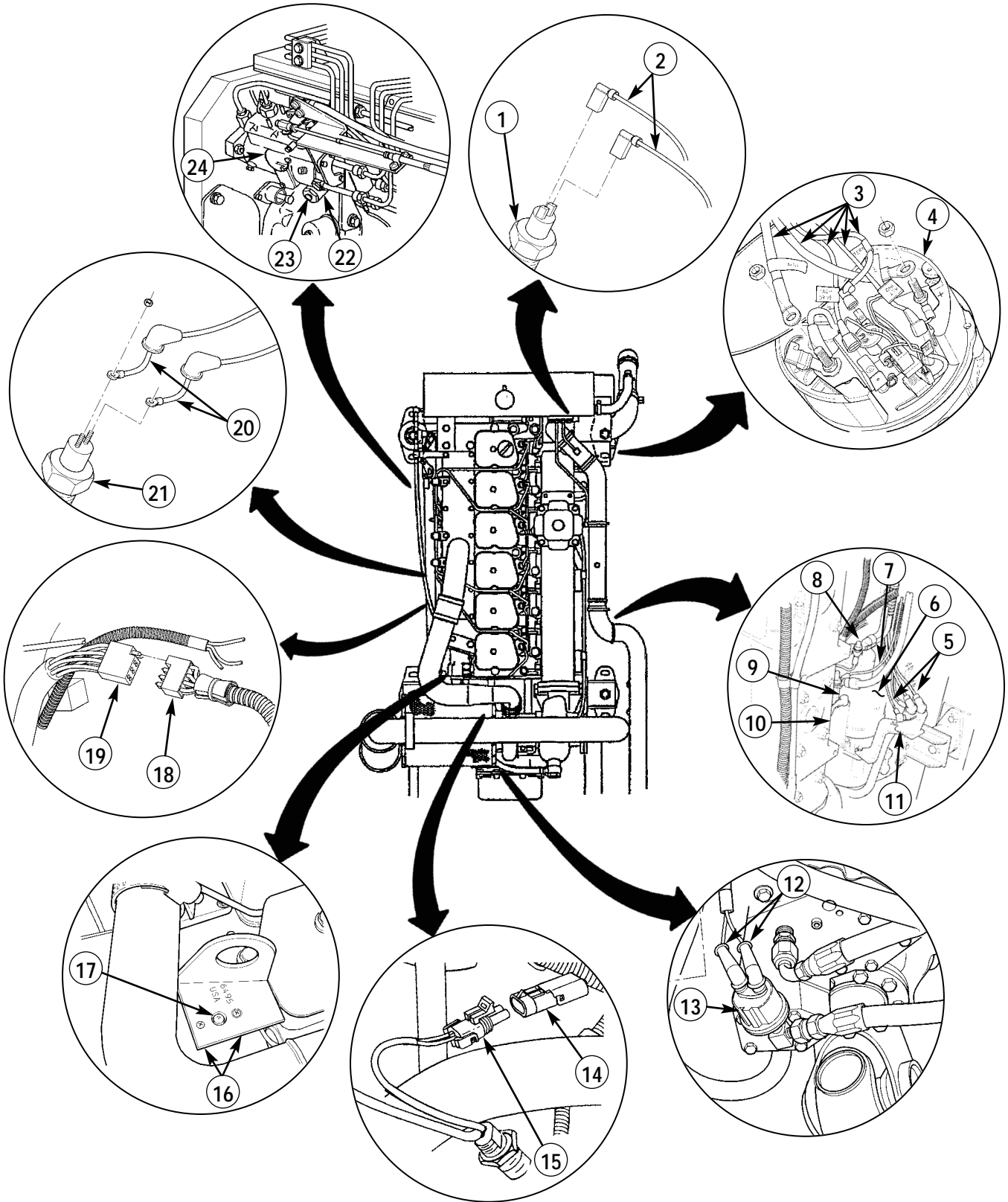
### REMOVAL

### **NOTE**

Tag all electrical leads during removal to assist with installation.

1. Disconnect two leads (2) from engine coolant temperature sending unit (1).
2. Remove alternator and alternator cover, refer to WP 0089 00 and to disconnect five leads (3) from alternator (4).
3. Disconnect six leads (5) from starter relay (11).
4. Disconnect two leads (9) from starter solenoid (10).
5. Disconnect positive (+) lead (7) from stud on starter solenoid (10).
6. Disconnect two negative (-) leads (8) from ground stud on starter (6).
7. Disconnect two leads (12) from transmission pressure sending unit (13).
8. Disconnect connector (14) from magnetic pickup connector (15).
9. Disconnect two leads (16) from 10 amp circuit breaker (17).
10. Disconnect engine wiring harness connector (19) from intermediate wiring harness connector (18).
11. Disconnect two leads (20) from engine oil pressure sending unit (21).
12. Disconnect two leads (23) from fuel pump solenoid (22) on fuel injection pump (24).
13. Remove tiedown straps and tape from harness as necessary, to remove engine wiring harness from engine. Discard tiedown straps.

# ENGINE WIRING HARNESS REPLACEMENT (Contd)

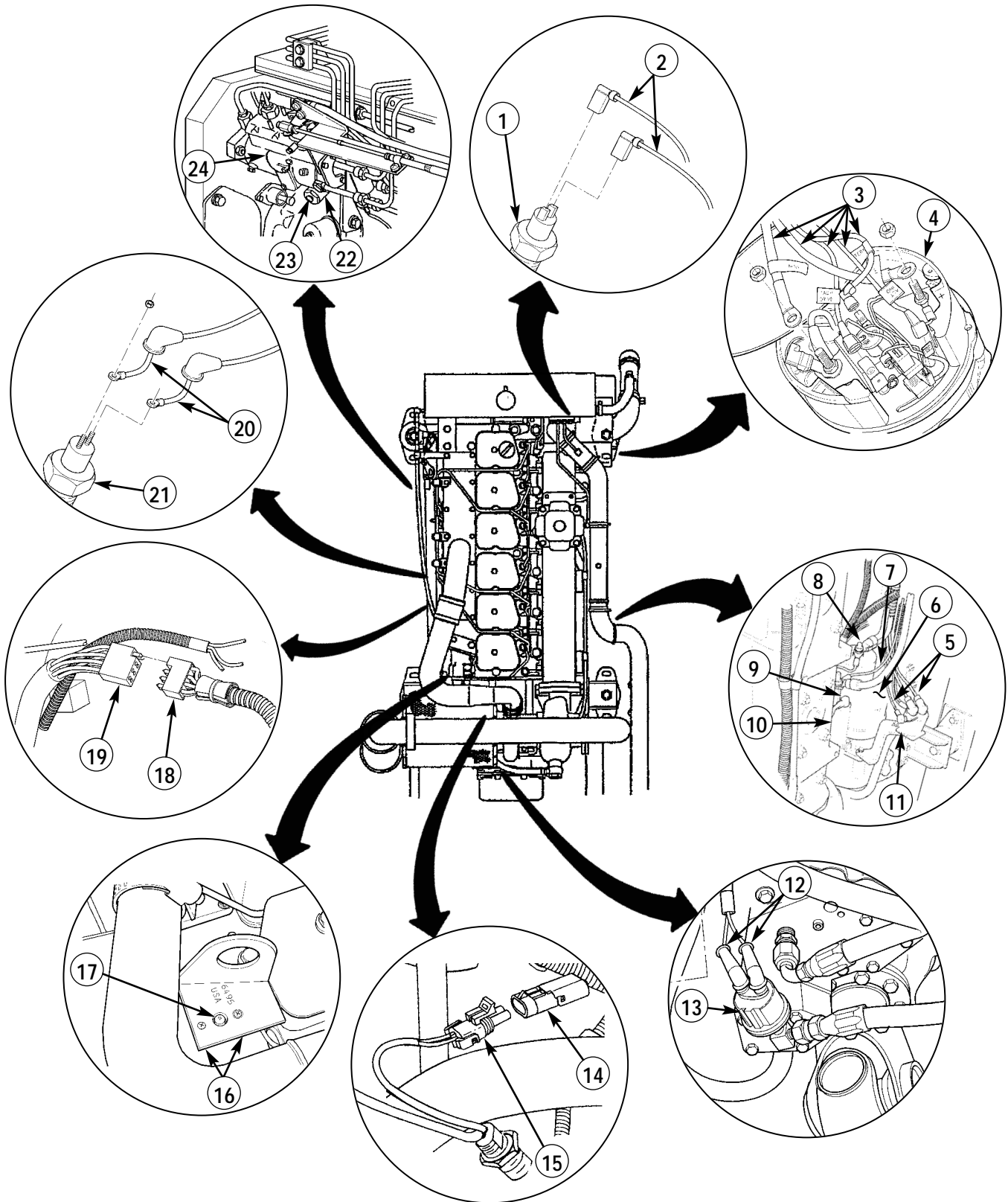


## ENGINE WIRING HARNESS REPLACEMENT (Contd)

### INSTALLATION

1. Connect two leads (23) on fuel pump solenoid (22) of fuel injection pump (24).
2. Connect two leads (20) on engine oil pressure sending unit (21).
3. Connect engine wiring harness connector (19) to intermediate wiring harness connector (18).
4. Connect two leads (16) on 10 amp circuit breaker (17).
5. Connect connector (14) to magnetic pickup connector (15).
6. Connect two leads (12) on transmission pressure sending unit (13).
7. Connect two negative (-) leads (8) on ground stud of starter (6).
8. Connect positive (+) lead (7) to stud on starter solenoid (10).
9. Connect two leads (9) to starter solenoid (10).
10. Connect six leads (5) to starter relay (11).
11. Connect five leads (3) on alternator (4) and install alternator cover and alternator, refer to WP 0089 00.
12. Connect two leads (2) on engine coolant temperature sending unit (1).
13. Install tiedown straps and tape on harness as necessary, to secure engine wiring harness from engine.
14. Connect battery ground cables (WP 0054 00).
15. Close battery hatch (TM 5-1940-322-10).
16. Close engine hatches (TM 5-1940-322-10).

# ENGINE WIRING HARNESS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL INJECTOR PLUMBING REPLACEMENT

FUEL INJECTOR LINE REMOVAL, FUEL RETURN MANIFOLD AND RETURN TUBES REMOVAL,  
FUEL INJECTOR LINE INSTALLATION, AND FUEL RETURN MANIFOLD AND RETURN TUBES INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Material/Parts

Six banjo seals (item 144, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)

##### References

WP 0080 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Intermediate fuel shutoff valve in closed position  
(WP 0074 00).

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## FUEL INJECTOR PLUMBING REPLACEMENT (Contd)

### FUEL INJECTOR LINE REMOVAL

#### **CAUTION**

Do not move lines more than 1/8 in. (3.2 mm) from their free state position to line up with fuel injectors or fuel injection pump outlets. Failure to comply may result in damage to equipment.

#### **NOTE**

If individual lines are to be replaced, remove support clamp from set of lines containing the line to be replaced. The fuel injector lines on both engines are replaced the same way. This procedure covers the replacement of six fuel injector lines.

1. Remove six screws (8), washers (7), three support brackets (6), and six vibration isolators (5) from six high-pressure lines (1), two tube braces (4), and tube brace (9).

#### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

#### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

Do not bend fuel lines when removing or installing lines. Failure to comply may result in damage to equipment.

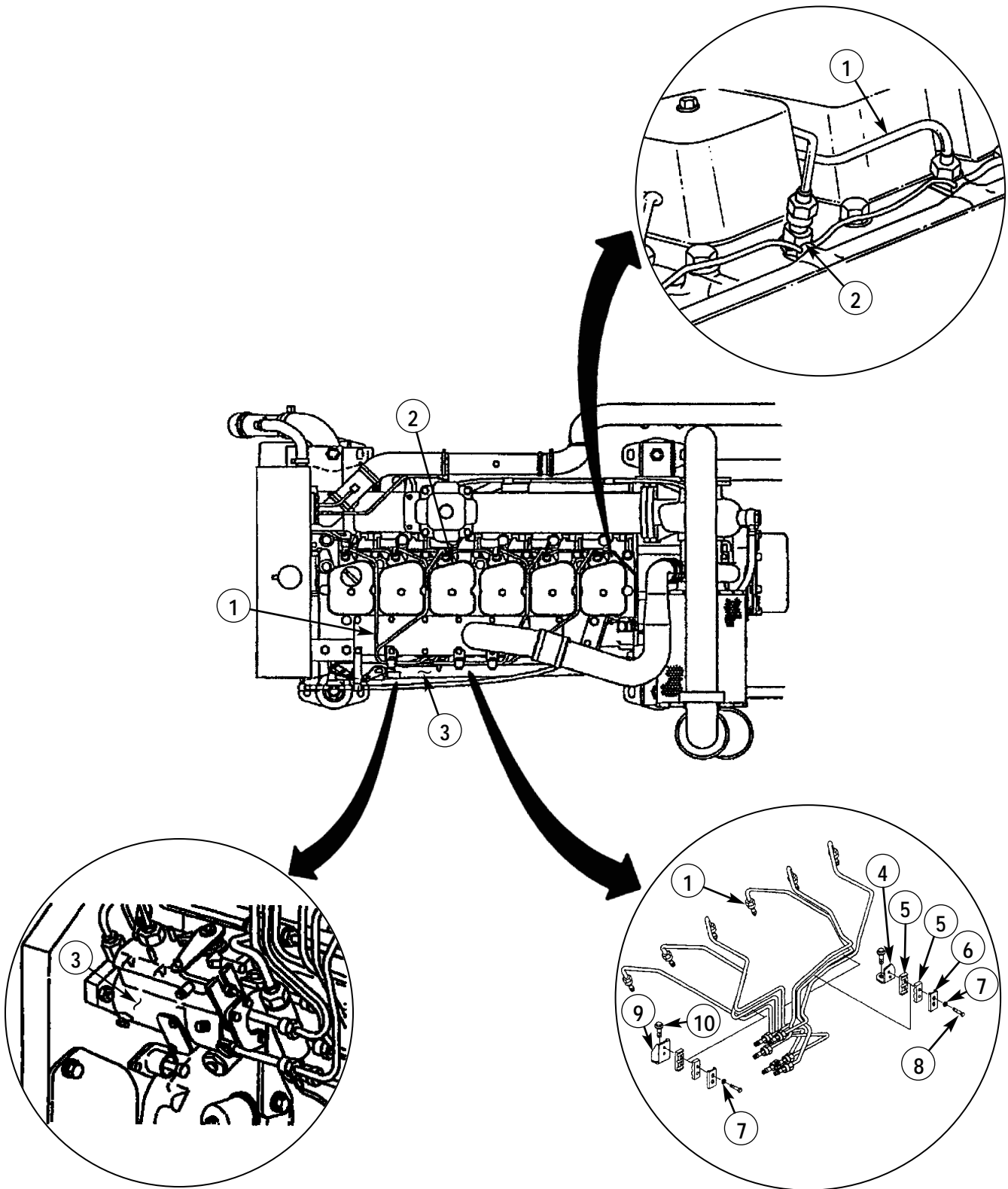
#### **NOTE**

Have container ready to catch fuel.

2. Disconnect and remove fuel lines (1) from fuel injectors (2) and fuel injection pump (3).
3. Remove three screws (10) and tube braces (4) and (9) from injector (2).



FUEL INJECTOR PLUMBING REPLACEMENT (Contd)



## FUEL INJECTOR PLUMBING REPLACEMENT (Contd)

### FUEL RETURN MANIFOLD AND RETURN TUBES REMOVAL

#### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

#### **CAUTION**

Cap or plug all hoses, tubes, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

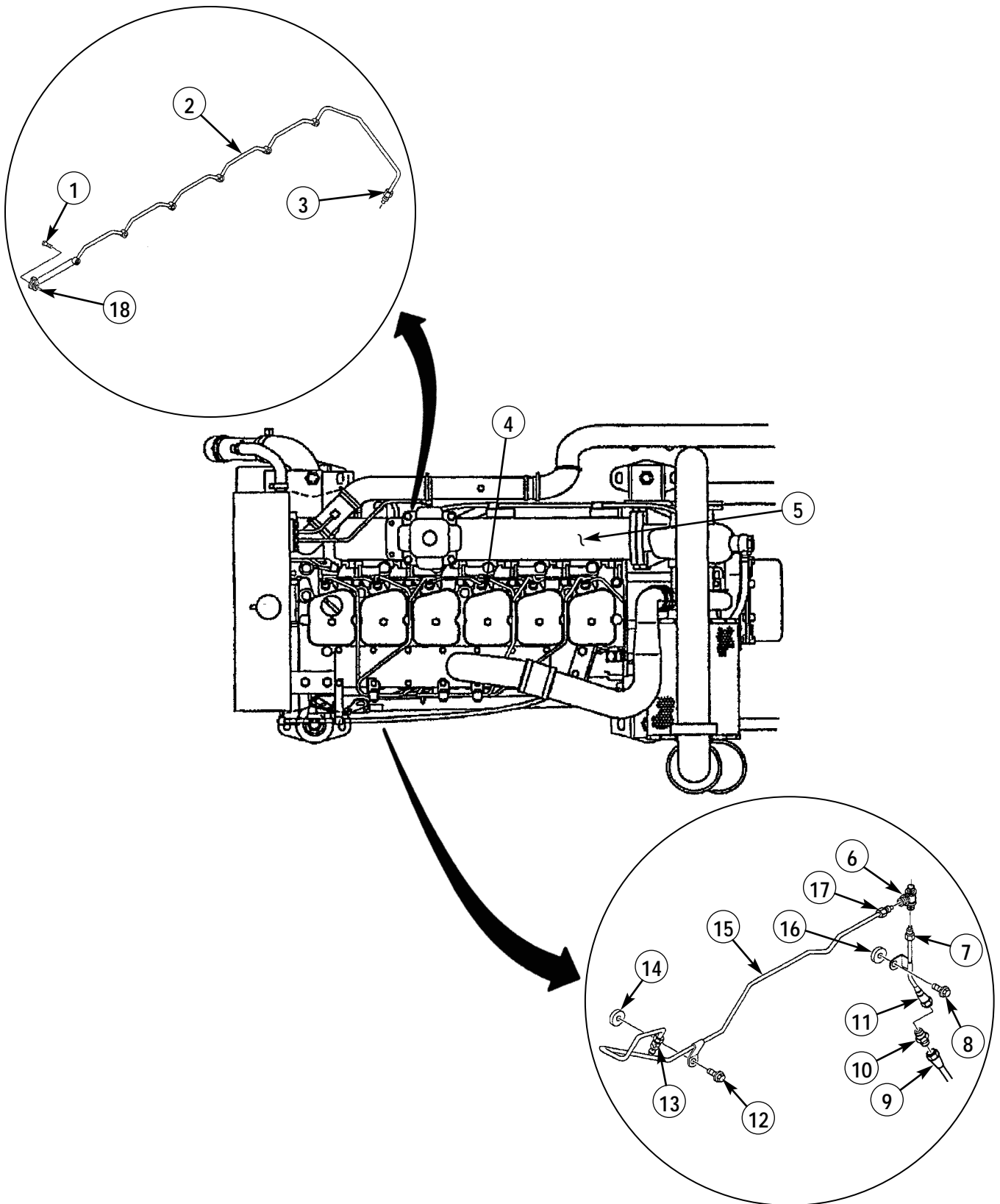
Do not bend fuel lines when removing or installing lines. Failure to comply may result in damage to equipment.

#### **NOTE**

Have container ready to catch fuel.

1. Remove six screws (1) and banjo seals (18) from fuel return manifold (2) and fuel injectors (4). Discard banjo seals (18).
2. Loosen nut (3) and remove fuel return manifold (2) from engine (5).
3. Disconnect fuel return hose (9) from fitting (10) on return tube (11).
4. Loosen nut (7) on return tube (11) and tee fitting (6).
5. Remove screw (8), return tube (11), and rubber grommet (16) from engine (5).
6. Loosen nuts (13) and (17) on fuel return tube (15).
7. Remove screw (12), fuel return tube (15), and rubber grommet (14) from engine (5).
8. Remove fitting (10) from fuel return tube (11).

### FUEL INJECTOR PLUMBING REPLACEMENT (Contd)



## FUEL INJECTOR PLUMBING REPLACEMENT (Contd)

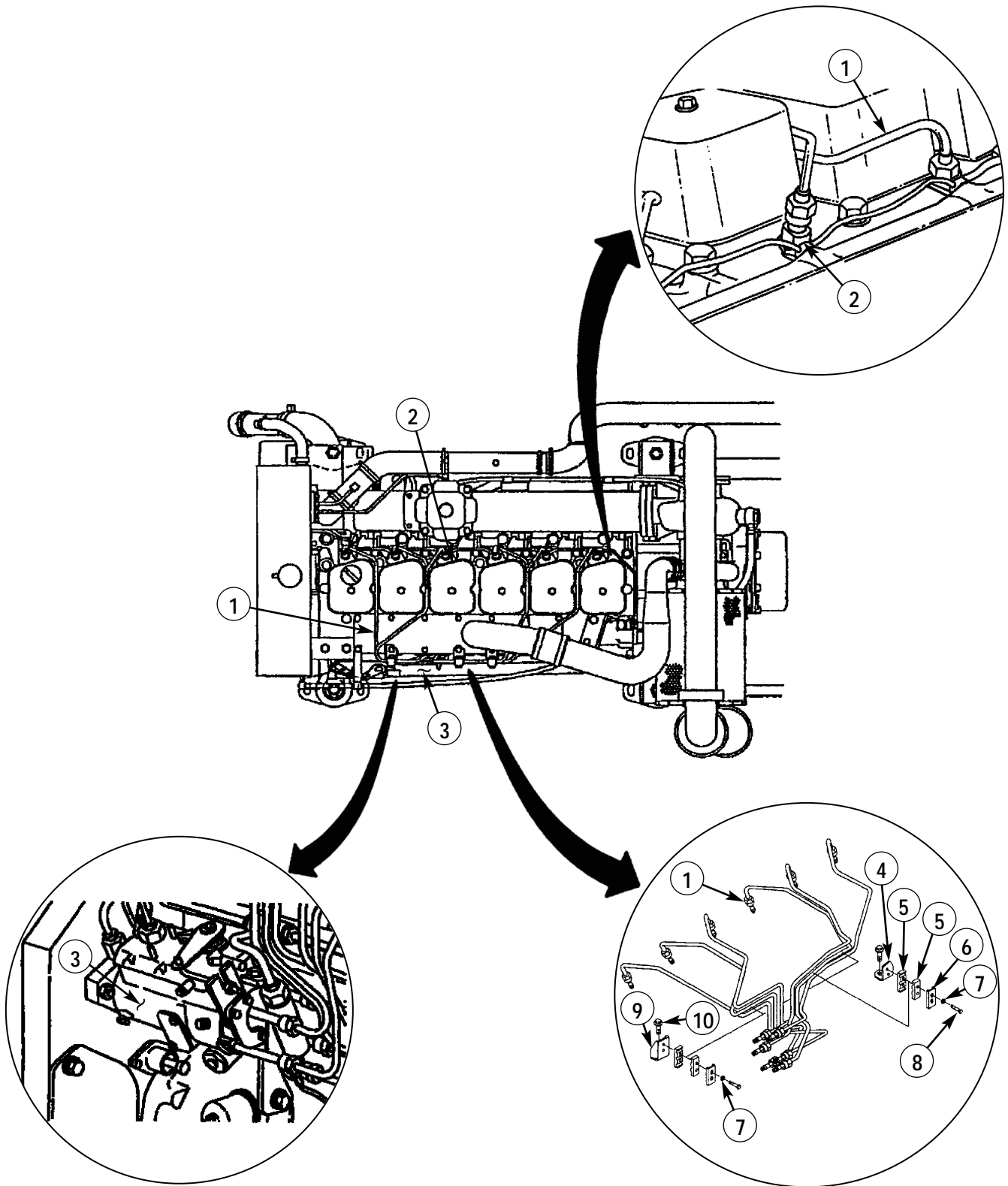
### FUEL INJECTOR LINE INSTALLATION

#### **CAUTION**

Do not bend fuel lines when removing or installing lines. Failure to comply may result in damage to equipment.

1. Hand-tighten fuel lines (1) on fuel injectors (2) and fuel injection pump (3).
2. Install six tube braces (4) and (9) on fuel injectors (2) with six screws (10).
3. Secure six vibration isolators (5) on fuel lines (1), tube braces (4) and (9) with three support brackets (6), six washers (7), and screws (8). Tighten screws (8) to 53 lb-in. (6 N·m).
4. Tighten fuel lines (1) on fuel injectors (2) and fuel injection pump (3) to 22 lb-ft (30 N·m).

### FUEL INJECTOR PLUMBING REPLACEMENT (Contd)



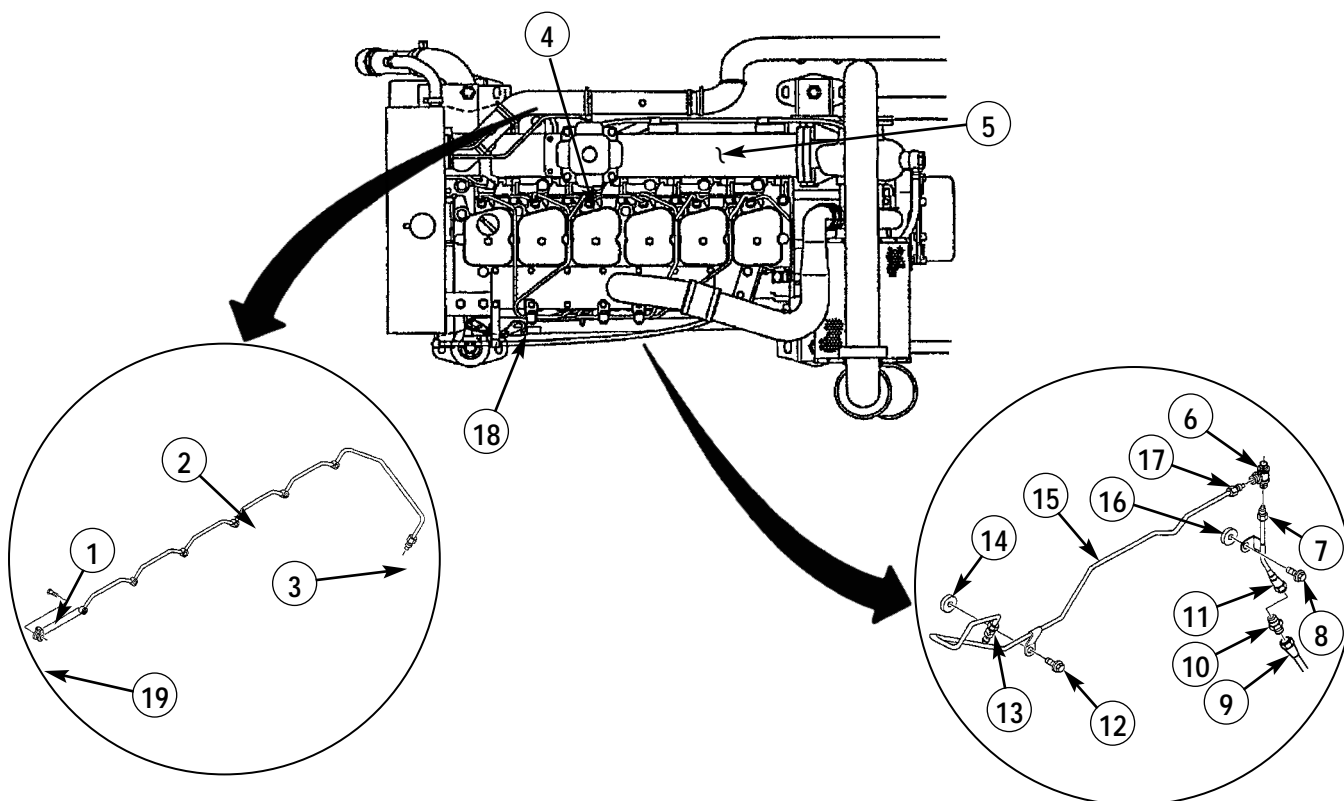
## FUEL INJECTOR PLUMBING REPLACEMENT (Contd)

### **CAUTION**

Do not bend fuel lines when removing or installing lines. Failure to comply may result in damage to equipment.

### FUEL RETURN MANIFOLD AND RETURN TUBES INSTALLATION

1. Install fitting (10) on fuel return tube (9).
2. Install fuel return tube (15) to tee fitting (6) on fuel injection pump (18). Tighten nuts (13) and (17).
3. Secure fuel return tube (15) to engine (5) with rubber grommet (14) and screw (12).
4. Install fuel return tube (11) to tee fitting (6). Tighten nut (7) to 24 lb-ft (32 N·m).
5. Install fuel return tube (11) to fitting (10).
6. Secure fuel return tube (11) to engine (5) with rubber grommet (16) and screw (8).
7. Install fuel return manifold (2) to engine (5) and connect return manifold (2) on tee fitting (6). Tighten nut (3) to 18 lb-ft (24 N·m).
8. Install fuel return manifold (2) on six fuel injectors (4) with new banjo seals (19) and screws (1). Tighten screws (1) to 11 lb-ft (15 N·m).
9. Open intermediate fuel shutoff valve.
10. Bleed fuel lines (WP 0080 00).
11. Connect battery ground cables (WP 0054 00).
12. Start engine and check for leaks (TM 5-1940-322-10)
13. Close battery hatch (TM 5-1940-322-10).
14. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BELT GUARD REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## BELT GUARD REPLACEMENT (Contd)

### **NOTE**

Belt guards on both engines are replaced the same way. The port cover has a bracket that holds a cooling pipe that must be disconnected. This procedure covers replacement of the starboard engine belt guard.

### REMOVAL

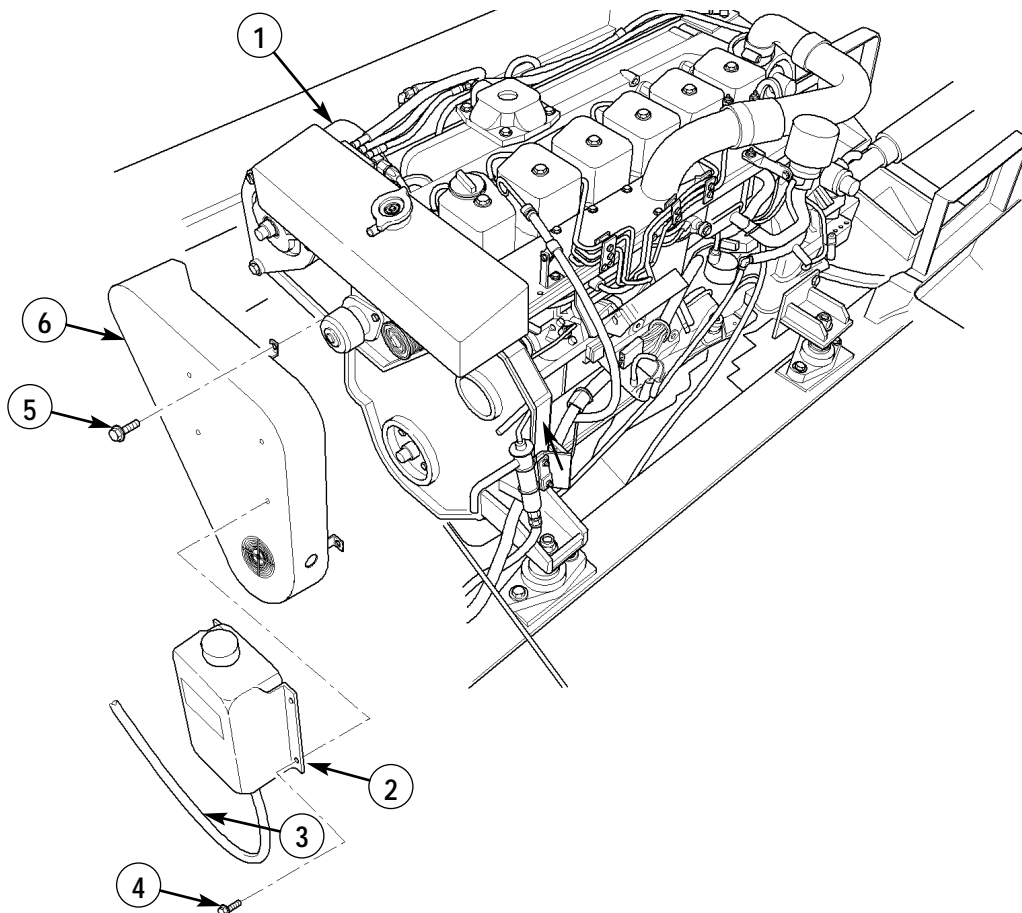
1. Disconnect hose (3) and remove four screws (4) and coolant reservoir (2) from belt guard (6).
2. Remove three screws (5) and belt guard (6) from engine (1).

### INSTALLATION

### **CAUTION**

Ensure that belt tensioner tang is aligned with hole in engine bracket before tightening screw. Failure to comply may result in damage to equipment.

1. Install belt guard (6) on engine (1) with three screws (5). Tighten screws (5) to 18 lb-ft (24 N·m).
2. Install coolant reservoir (2) and hose (3) on belt guard (6) with four screws (4).
3. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE DRIVEBELT REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Belt guard removed (WP 0085 00).

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## ENGINE DRIVEBELT REPLACEMENT (Contd)

### **WARNING**

Keep hands out of path of spring-loaded tensioner. Failure to comply may result in injury to personnel.

### **CAUTION**

The drivebelt tensioner is spring loaded and must be pivoted away from the drivebelt. Failure to comply may result in damage to equipment.

### **NOTE**

The drivebelts on both engines are replaced the same way. This procedure covers replacement of one drivebelt.

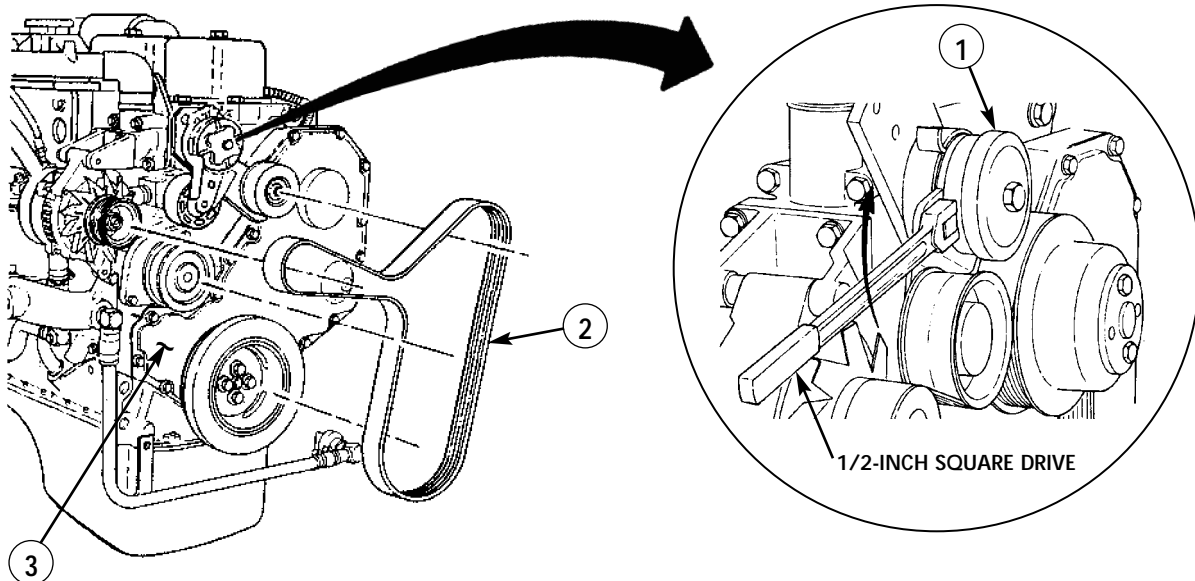
Note how drivebelt is installed on pulleys to assist with installation.

### REMOVAL

1. Use a 1/2-inch square drive ratchet to turn tensioner arm (1) off drivebelt (2).
2. Remove drivebelt (2) from engine (3).

### INSTALLATION

1. Use a 1/2-inch square drive ratchet to turn tensioner arm (1)
2. Install drivebelt (2) on engine (3).
3. Remove 1/2-inch square drive ratchet from tensioner arm (1).
4. Install belt guard (WP 0085 00).
5. Close engine hatches (TM 5-1940-322-10).



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### BELT TENSIONER REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Drivebelt removed (WP 0086 00).

---

## BELT TENSIONER REPLACEMENT (Contd)

### REMOVAL

#### **NOTE**

The belt tensioner on both engines are replaced the same way. This procedure covers replacement of the belt tensioner on one engine.

Remove screw (3) and tensioner (2) from bracket (1).

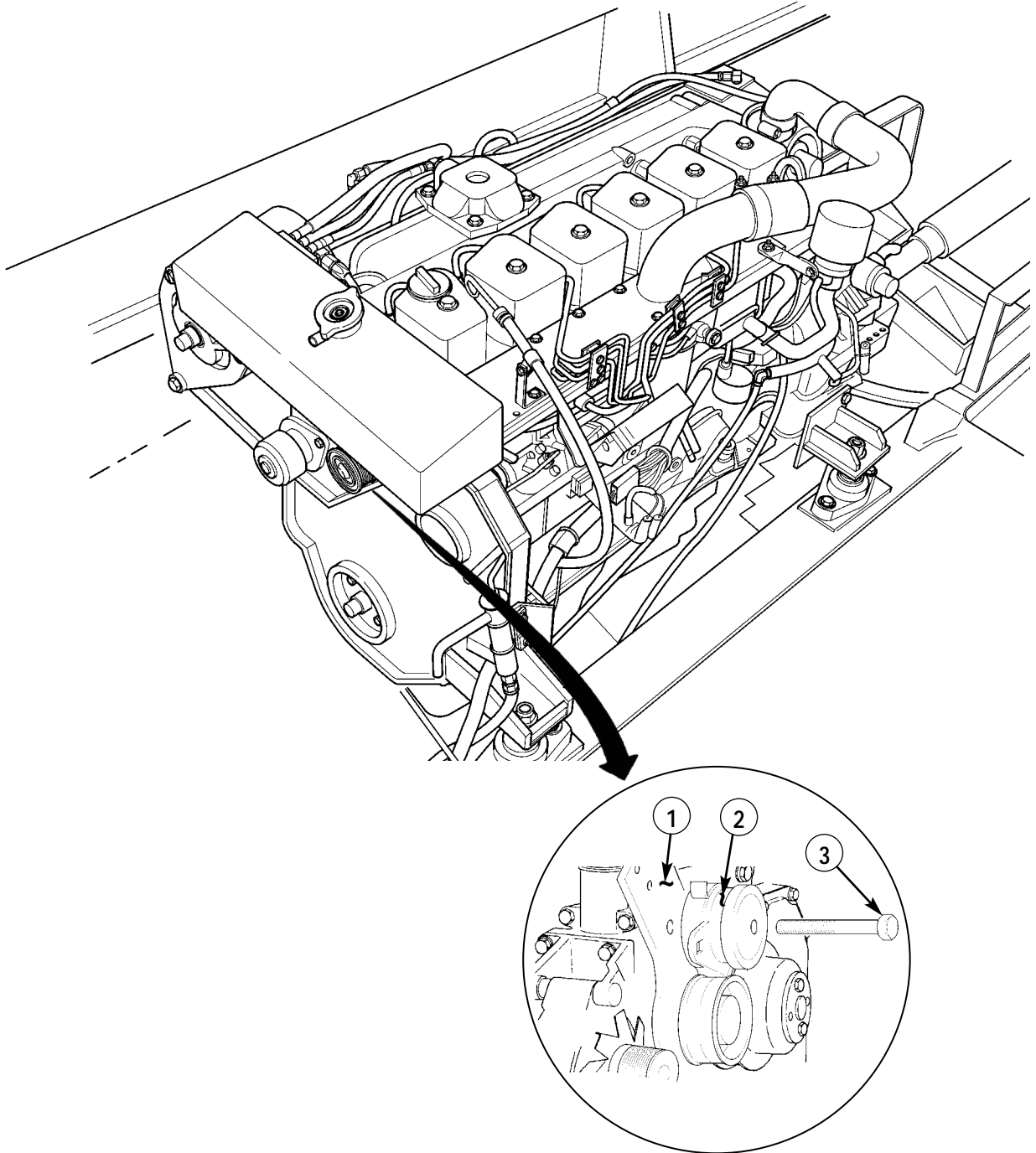
### INSTALLATION

#### **CAUTION**

Ensure that belt tensioner tang is aligned with hole in the engine bracket before tightening screw. Failure to comply may result in damage to equipment.

1. Install tensioner (2) on bracket (1) with screw (3). Tighten screw (3) to 32 lb-ft (43 N·m).
2. Install drivebelt (WP 0086 00).
3. Close engine hatches (TM 5-1940-322-10).

**BELT TENSIONER REPLACEMENT (Contd)**



**END OF WORK PACKAGE**



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### OIL SUMP PUMP MAINTENANCE

TRANSMISSION OIL DRAIN HOSE REMOVAL, ENGINE OIL DRAIN HOSE REMOVAL, OIL SUMP PUMP REMOVAL, OIL SUMP PUMP BRACKET REMOVAL, CLEANING AND INSPECTION, OIL SUMP PUMP BRACKET INSTALLATION, OIL SUMP PUMP INSTALLATION, ENGINE OIL DRAIN HOSE INSTALLATION, AND TRANSMISSION OIL DRAIN HOSE INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cloth (item 8, WP 0171 00)  
Oil (item 16, WP 0171 00)  
Oil (item 19, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed for transmission hose  
replacement (WP 0016 00).  
Engine or transmission oil drained for hose  
replacement (WP 0012 00).

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## OIL SUMP PUMP MAINTENANCE (Contd)

### **NOTE**

The transmission oil drain hoses on both engines are replaced the same way. This procedure covers the replacement of one transmission oil drain hose.

#### TRANSMISSION OIL DRAIN HOSE REMOVAL

1. Loosen nuts (2) and (6) from adapter (1) and elbow (9) and remove hose (3).
2. Remove adapter (1) from transmission (17).
3. Remove elbow (9) from valve (10).
4. Inspect adapter (1) and elbow (9) for damage or corrosion. Replace if damage is present.
5. Remove excess sealing compound with Skysol 100 and dry with cloth. For general cleaning and inspection instructions, refer to WP 0013 00.

#### ENGINE OIL DRAIN HOSE REMOVAL

### **NOTE**

The engine oil drain hoses on both engines are replaced the same way. This procedure covers the replacement of one engine oil drain hose.

1. Loosen nuts (14) and (16) from elbows (13) and (11) and remove hose (15).
2. Remove elbow (13) from engine oil pan (12).
3. Remove elbow (11) from valve (10).
4. Inspect elbows (13) and (11) for damage or corrosion. Replace if damage is present.

#### OIL SUMP PUMP REMOVAL

### **NOTE**

The oil sump pump and brackets on both engines are replaced the same way. This procedure covers the replacement of one oil sump pump and bracket.

1. Remove two screws (5) securing oil sump pump (4) to bracket (7).
2. Remove oil sump pump (4) from bracket (7).
3. Remove adapter (18) from oil sump pump (4) and valve (10).

#### OIL SUMP PUMP BRACKET REMOVAL

Remove three screws (8) and bracket (7) from engine block (19).



## OIL SUMP PUMP MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

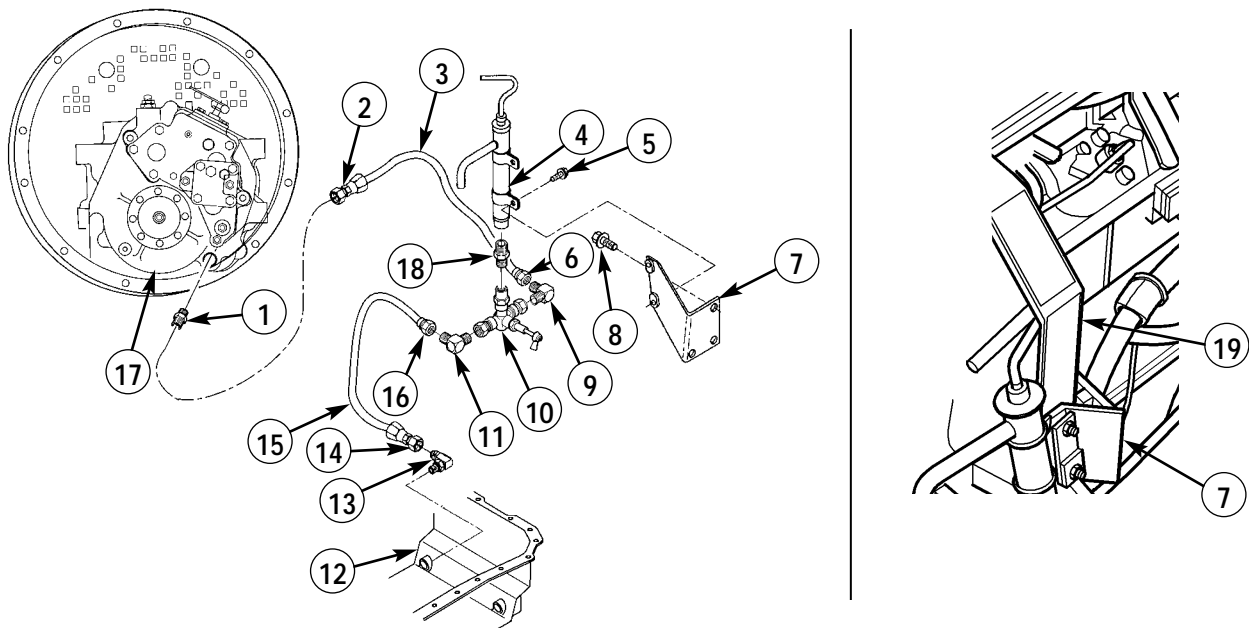
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Remove excess sealing compound from adapters with Skysol 100 and dry with cloth.

### OIL SUMP PUMP BRACKET INSTALLATION

Install bracket (7) on engine block (19) with three screws (8). Tighten screws to 18 lb-ft (24 N·m).



## OIL SUMP PUMP MAINTENANCE (Contd)

### OIL SUMP PUMP INSTALLATION

1. Apply coat of sealing compound to both sides of adapter (18).
2. Install adapter (18) on oil sump pump (4).
3. Install valve (10) on adapter (18).
4. Install oil sump pump (4) on bracket (7) with two screws (5). Tighten screws to 18 lb-ft (24 N•m).

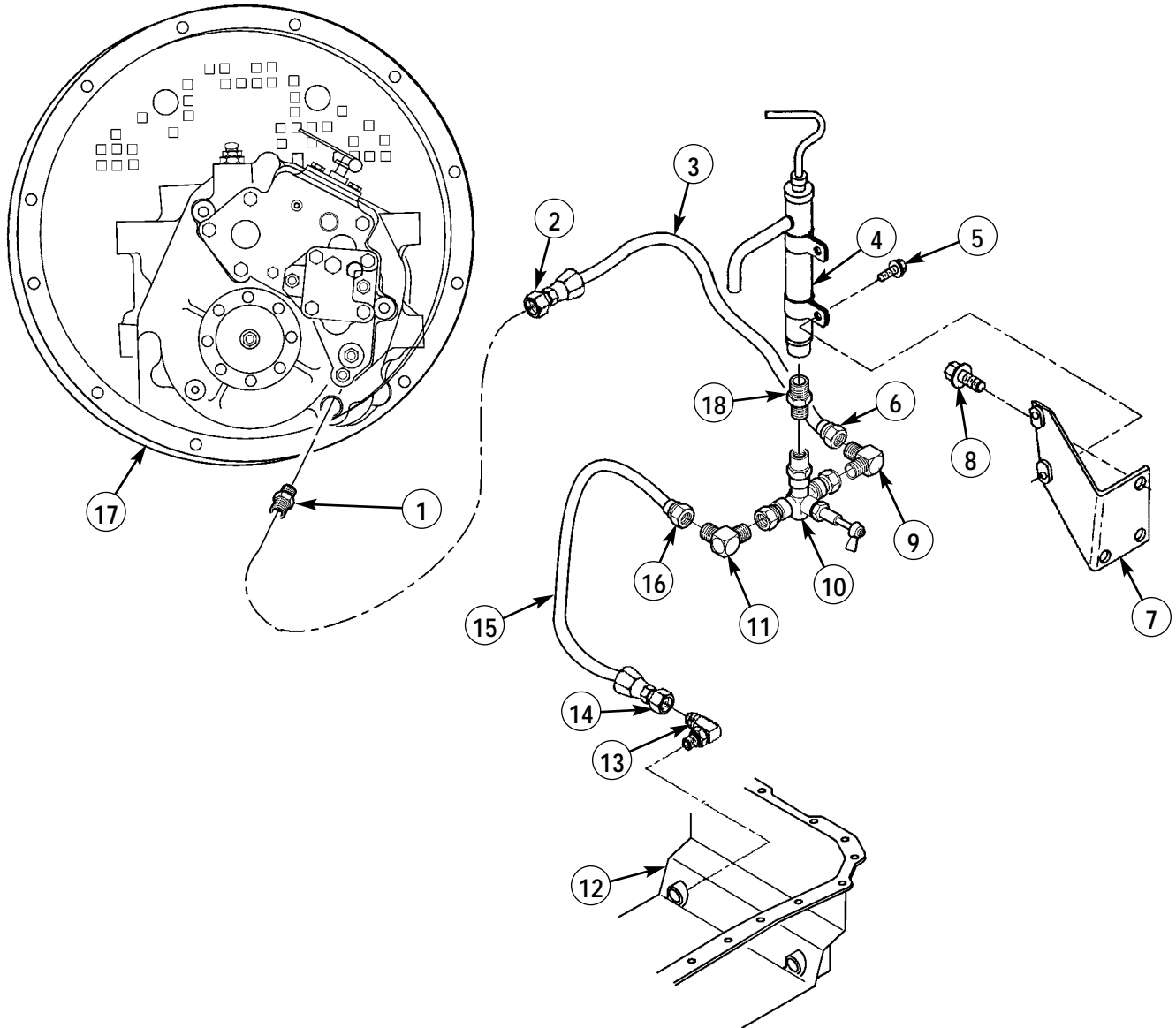
### ENGINE OIL DRAIN HOSE INSTALLATION

1. Apply coat of sealing compound to threads of elbows (11) and (13).
2. Install elbow (13) on oil pan (12).
3. Install elbow (11) on valve (10).
4. Connect hose (15) on elbows (13) and (11) and tighten nuts (14) and (16).

### TRANSMISSION OIL DRAIN HOSE INSTALLATION

1. Apply coat of sealing compound to threads of adapter (1) and elbow (9).
2. Install adapter (1) on transmission (17).
3. Install elbow (9) on valve (10).
4. Connect hose (3) on adapter (1) and elbow (9) and tighten nuts (2) and (6).
5. Fill transmission and engine with oil (WP 0012 00).
6. Check for leaks (TM 5-1940-322-10).
7. Close engine hatches (TM 5-140-322-10).
8. If removed, install aft cockpit (WP 0016 00).

OIL SUMP PUMP MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ALTERNATOR, SUPPORT BRACKET, AND SUPPORT BRACE MAINTENANCE REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two lockwashers (item 84, WP 0173 00)

##### References

WP 0090 00  
WP 0013 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Drivebelt removed (WP 0086 00).

## ALTERNATOR, SUPPORT BRACKET, AND SUPPORT BRACE MAINTENANCE (Contd)

### **CAUTION**

Ensure alternator is supported during removal and installation. Failure to comply may result in damage to equipment.

### **NOTE**

The alternators on both engines are replaced the same way. This procedure covers the replacement of one alternator.

### REMOVAL

1. Remove nut (9), screw (11), and support brace (10) from alternator (12).
2. Remove nut (6) and screw (7) from support brace (10) and engine water inlet connection (8).
3. Remove nut (4), sleeve (3), and bolt (1) from support bracket (2).
4. Remove four screws (13) and support bracket (2) from thermostat housing (5).
5. Remove two screws (16), lockwashers (17), and washers (18) from alternator cover (19). Discard lockwashers (17).

### **CAUTION**

Use caution when removing cover from alternator. Failure to comply may result in damage to wiring.

6. Position alternator cover (19) away from alternator (12).

### **NOTE**

Tag all lead wires during removal to assist with installation.

7. Remove two nuts (20) and lead wires (22) and (30) from posts (23) and (29).
8. Disconnect lead wire (21) from terminal (24).
9. Disconnect lead wire (25) from terminal (26).
10. Disconnect lead wire (28) from terminal (27).
11. Remove wiring harness (14) and grommet (15) from alternator cover (19).
12. Remove alternator pulley (WP 0090 00).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0012 05.
2. Inspect lead wires (22), (25), and (28) for corrosion, clean with wire brush if corroded.
3. Inspect lead wires (22), (25), and (28) for damage, replace if damaged.

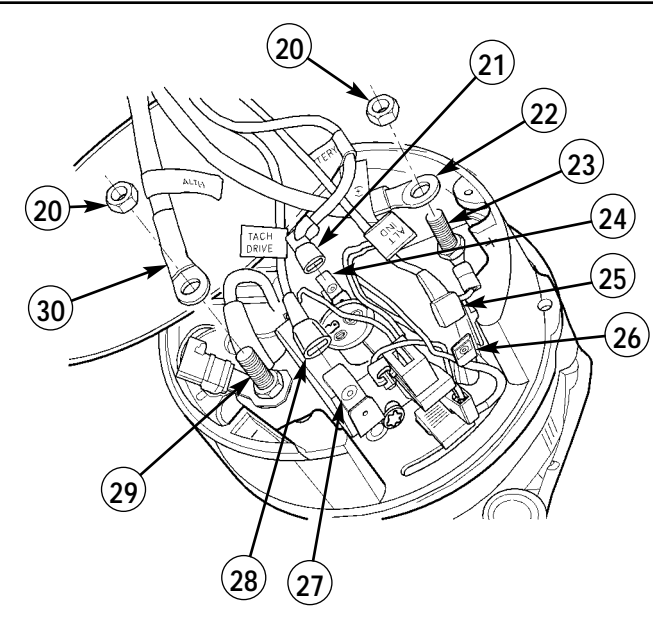
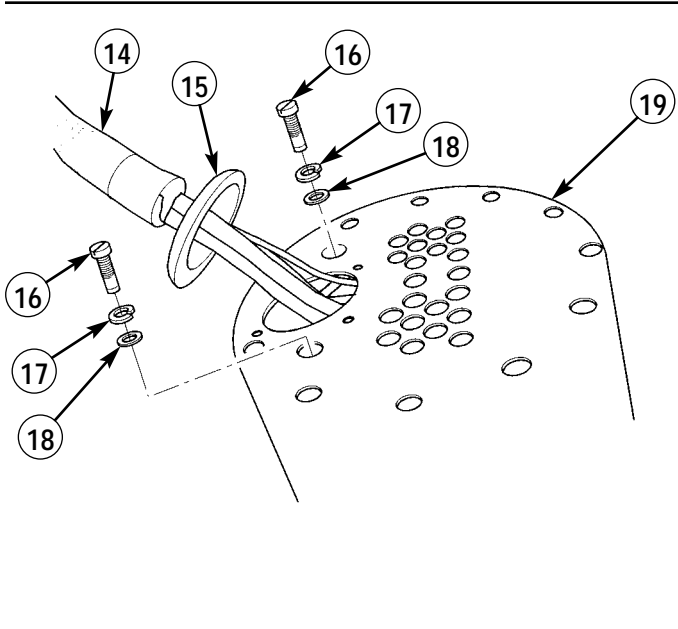
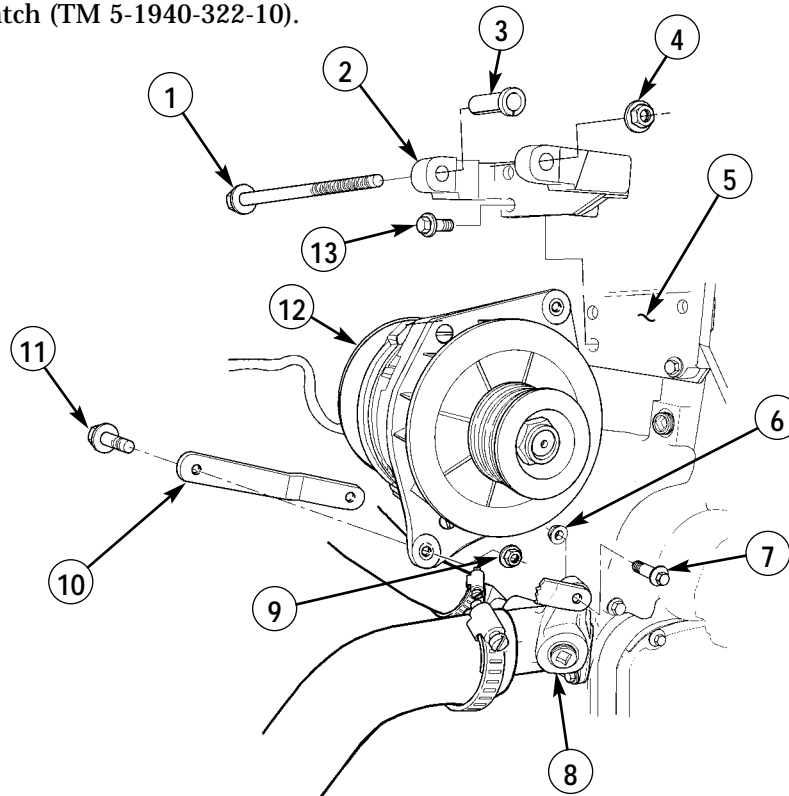
### INSTALLATION

1. Install alternator pulley (WP 0090 00).
2. Position wiring harness (14) and grommet (15) through alternator cover (19).
3. Connect lead wire (28) to terminal (27).
4. Connect lead wire (21) to terminal (24).
5. Connect lead wire (25) to terminal (26).
6. Install lead wire (22) on post (23) with nut (20).
7. Install lead wire (30) on post (29) with nut (20).
8. Install alternator cover (19) on alternator (12) with two washers (18), new lockwashers (17), and screws (16).
9. Install support bracket (2) on thermostat housing (5) with four screws (13).
10. Install alternator (12) on support bracket (2) with bolt (1), sleeve (3), and nut (4).
11. Install support brace (10) on engine water inlet connection (8) with screw (7) and nut (6).

**ALTERNATOR, SUPPORT BRACKET, AND SUPPORT BRACE MAINTENANCE (Contd)**

**INSTALLATION (Contd)**

12. Install alternator (12) on support brace (10) with screw (11) and nut (9).
13. Install drivebelt (WP 0086 00).
14. Close engine hatches (TM 5-1940-322-10).
15. Connect battery ground cables (WP 0054 00).
16. Close battery hatch (TM 5-1940-322-10).



END OF WORK PACKAGE





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**FIELD MAINTENANCE INSTRUCTIONS****BRIDGE ERECTION BOAT (BEB)****MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**ALTERNATOR PULLEY MAINTENANCE****REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION**

---

**INITIAL SETUP:****Tools and Special Tools**

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

**Materials/Parts**

Locknut (item 75, WP 0173 00)

**References**

WP 0013 00  
WP 0089 00

**Equipment Condition**

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Drivebelt removed (WP 0086 00).

---

## ALTERNATOR PULLEY MAINTENANCE (Contd)

### NOTE

Both alternator pulleys are replaced the same way. This procedure covers the replacement of one alternator pulley.

### REMOVAL

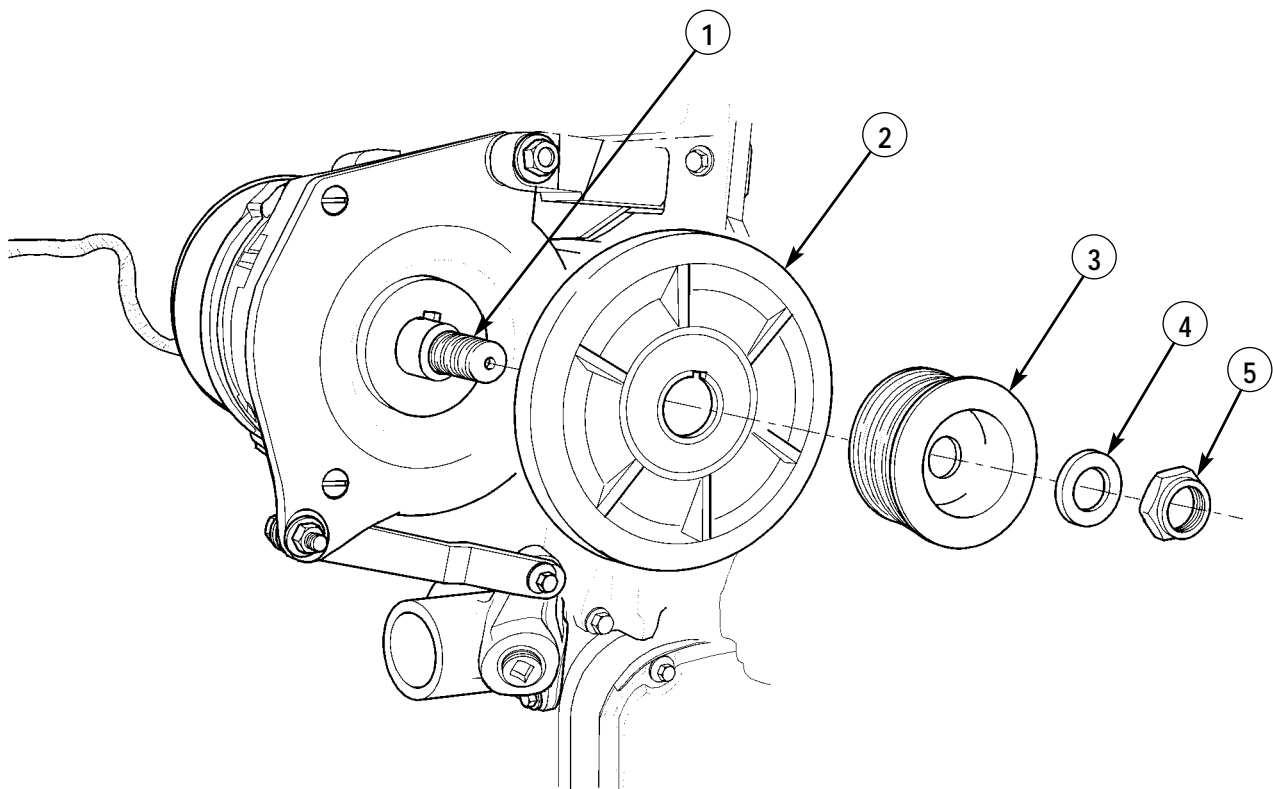
Remove locknut (5), washer (4), pulley (3), and fan (2) from alternator shaft (1). Discard locknut (5).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect fan (2) and alternator shaft (1) for damage. If damaged, replace alternator (WP 0089 00).

### INSTALLATION

1. Install fan (2) and pulley (3) on alternator shaft (1) with washer (4) and new locknut (5).
2. Install drivebelt (WP 0086 00).
3. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

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**FIELD MAINTENANCE INSTRUCTIONS****BRIDGE ERECTION BOAT (BEB)****MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**ENGINE WATER INLET CONNECTION REPLACEMENT****REMOVAL AND INSTALLATION**

---

**INITIAL SETUP:****Tools and Special Tools**

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

**Materials/Parts**

Seal (item 37, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)  
Sealing compound (item 32, WP 0171 00)

**Equipment Condition**

Boat out of water on IBC or on blocks  
(TM 5-1940-322-10).  
Engine coolant drained (WP 0012 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## ENGINE WATER INLET CONNECTION REPLACEMENT (Contd)

### NOTE

The engine water inlet connections on both engines are replaced the same way. This procedure covers the replacement of the engine water inlet connection on one engine.

### REMOVAL

### NOTE

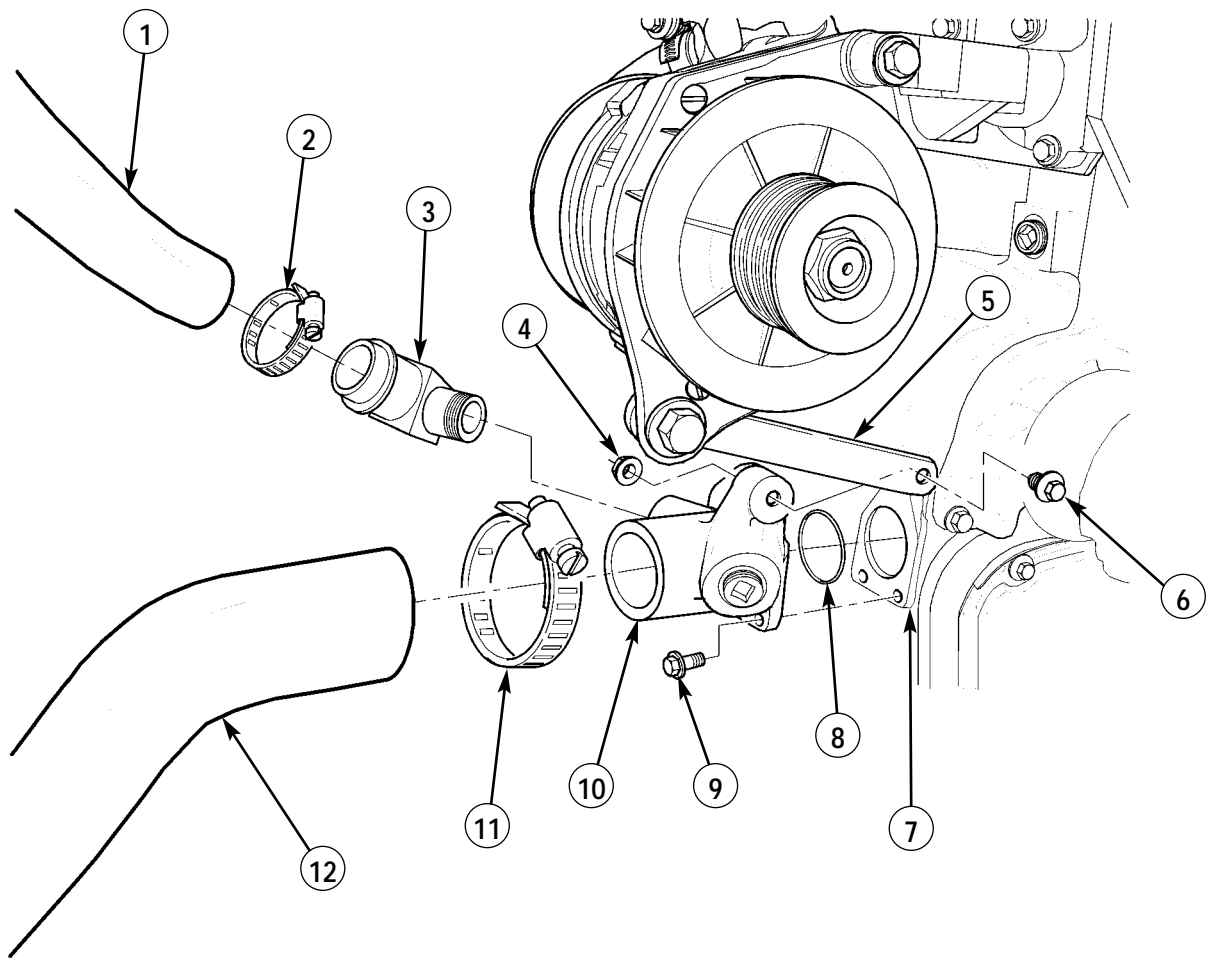
Have container ready to catch excess coolant.

1. Remove hose clamp (11) and hose (12) from engine water inlet connection (10).
2. Remove hose clamp (2) and hose (1) from elbow (3).
3. Remove elbow (3) from engine water inlet connection (10).
4. Remove nut (4) and screw (6) from engine water inlet connection (10) and alternator support brace (5).
5. Remove two screws (9), engine water inlet connection (10), and seal (8) from engine (7). Discard seal (8).

### INSTALLATION

1. Install new seal (8) and engine water inlet connection (10) on engine (7) with two screws (9). Tighten screws (9) to 43 lb-ft (32 N·m).
2. Install alternator support brace (5) on engine water inlet connection (10) with screw (6) and nut (4).
3. Apply thin coat of sealing compound on male threads of elbow (3).
4. Install elbow (3) on engine water inlet connection (10).
5. Install hose (1) on elbow (3) with hose clamp (2).
6. Install hose (12) on engine water inlet connection (10) with hose clamp (11).
7. Fill engine with coolant (WP 0012 00).
8. Start engine and check for leaks (TM 5-1940-322-10).
9. Close engine hatches (TM 5-1940-322-10).

ENGINE WATER INLET CONNECTION REPLACEMENT (Contd)



END OF WORK PACKAGE



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**FIELD MAINTENANCE INSTRUCTIONS**  
**BRIDGE ERECTION BOAT (BEB)**  
**MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**ENGINE THERMOSTAT AND FRONT LIFTING BRACKET MAINTENANCE**  
**REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION**

---

**INITIAL SETUP:**

**Tools and Special Tools**

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

**Materials/Parts**

Gasket (item 23, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)

**References**

WP 0013 00

**Equipment Condition**

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Belt guard removed (WP 0085 00).  
Drivebelt removed (WP 0086 00).  
Alternator removed (WP 0089 00).  
Cooling system drained (WP 0012 00).

---

## ENGINE THERMOSTAT AND FRONT LIFTING BRACKET MAINTENANCE (Contd)

### **NOTE**

The engine thermostat and front lifting bracket on both engines are replaced the same way. This procedure covers the replacement of one engine thermostat and one front lifting bracket.

### REMOVAL

1. Remove three screws (2) from thermostat housing (3).
2. Remove thermostat housing (3), thermostat (4), gasket (5) and engine lifting bracket (6) from engine (1). Discard gasket (5).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **CAUTION**

Do not let any debris fall into the thermostat cavity when cleaning mating gasket. Failure to comply may result in damage to equipment.

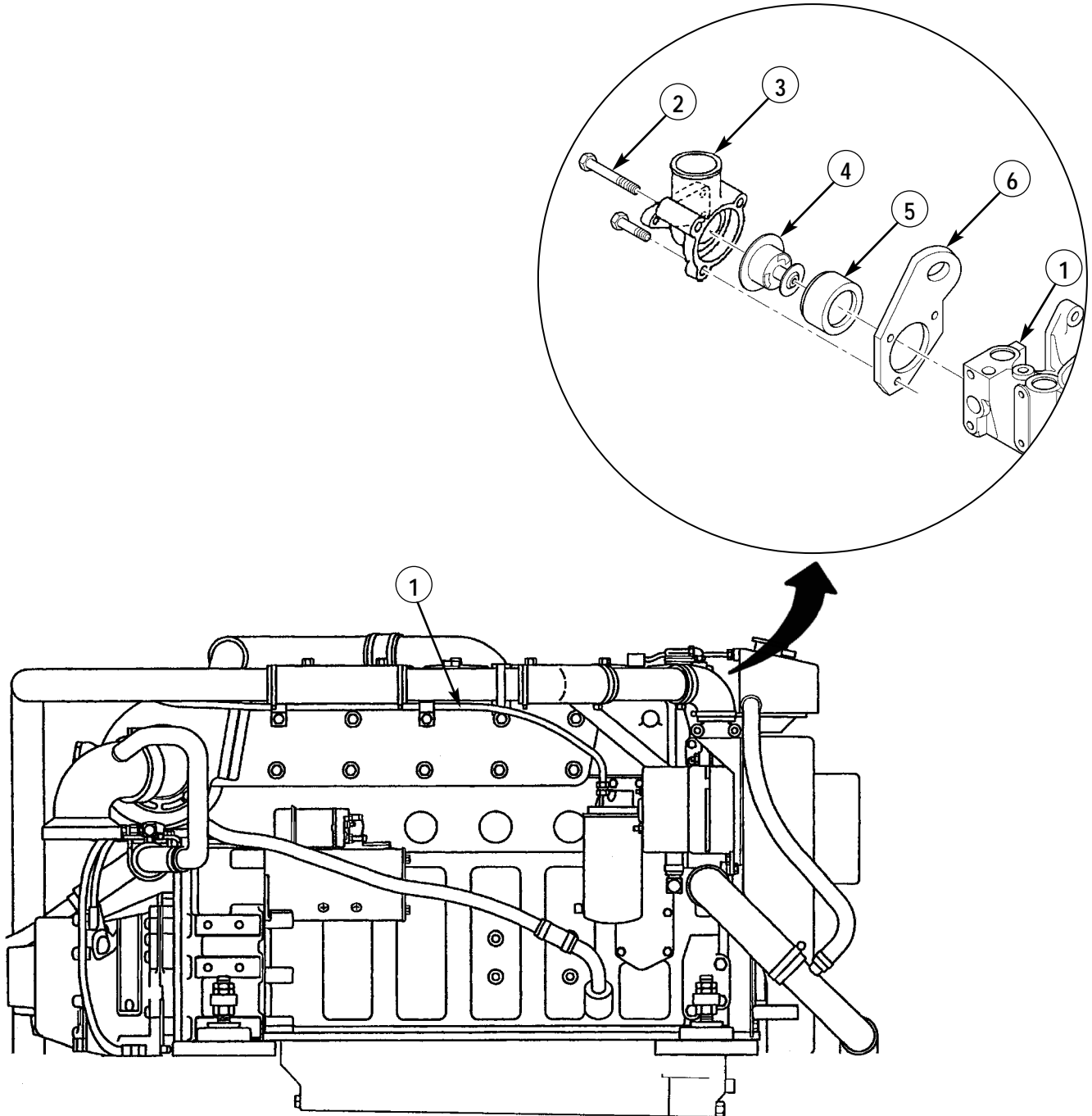
2. Clean gasket (5) mating surfaces with parts cleaning brush.

### INSTALLATION

1. Install engine lifting bracket (6), new gasket (5), thermostat (4), and thermostat housing (3) on engine (1) with three screws (2). Tighten screws (2) to 18 lb-ft (24 N·m).
2. Install alternator (WP 0089 00).
3. Install drivebelt (WP 0086 00).
4. Install belt guard (WP 0085 00).
5. Fill cooling system (WP 0012 00).
6. Connect battery ground cable (WP 0054 00).
7. Start engine and check for coolant leaks (TM 5-1940-322-10).
8. Close battery hatch (TM 5-1940-322-10).
9. Close engine hatches (TM 5-1940-322-10).



ENGINE THERMOSTAT AND FRONT LIFTING BRACKET MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### OIL PRESSURE SENDING UNIT MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## OIL PRESSURE SENDING UNIT MAINTENANCE (Contd)

### **NOTE**

The oil pressure sending units on both engines are replaced the same way. This procedure covers replacement of one oil pressure sending unit.

Tag lead wires during removal to assist with installation.

### REMOVAL

1. Remove two nuts (3) and lead wires (4) from oil pressure sending unit (2).
2. Remove oil pressure sending unit (2) from engine (1) by turning counterclockwise.

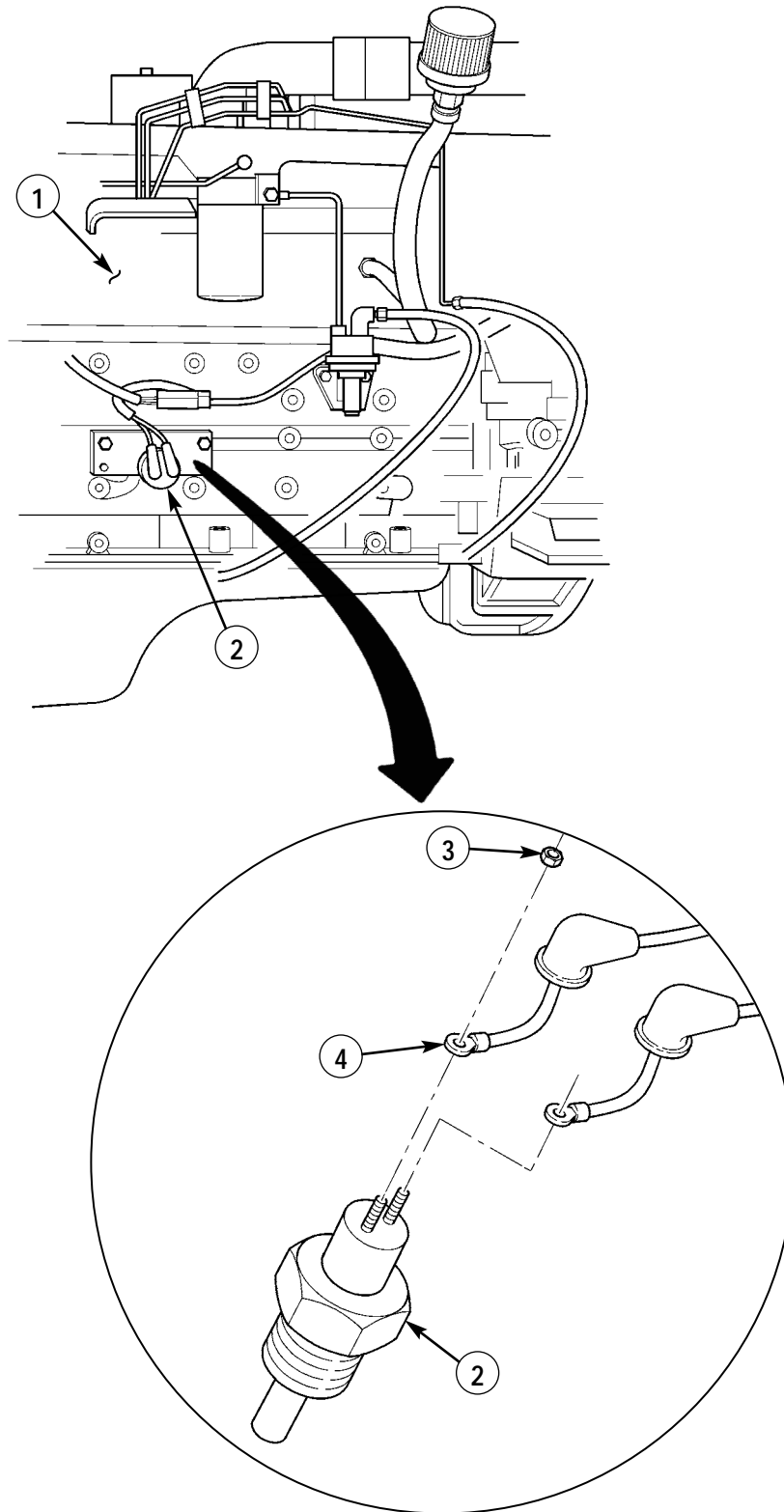
### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Wipe excess oil from engine (1) with cloth.

### INSTALLATION

1. Apply thin coat of sealing compound to threads of oil pressure sending unit (2).
2. Install oil pressure sending unit (2) to engine (1) by turning clockwise.
3. Install two lead wires (4) and nuts (3) on oil pressure sending unit (2).
4. Start engine and check for leaks (TM 5-1940-322-10).
5. Close engine hatches (TM 5-1940-322-10).

OIL PRESSURE SENDING UNIT MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WATER TEMPERATURE SENDING UNIT MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Antifreeze (item 5, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Coolant drained (WP 0012 00).

---

## WATER TEMPERATURE SENDING UNIT MAINTENANCE (Contd)

### **NOTE**

The water temperature sending units on both engines are replaced the same way. This procedure covers the replacement of one water sending unit.

### REMOVAL

1. Disconnect wires (3) from the water temperature sending unit (2).
2. Remove water temperature sending unit (2) from thermostat housing (1) by turning counterclockwise.

### CLEANING AND INSPECTION

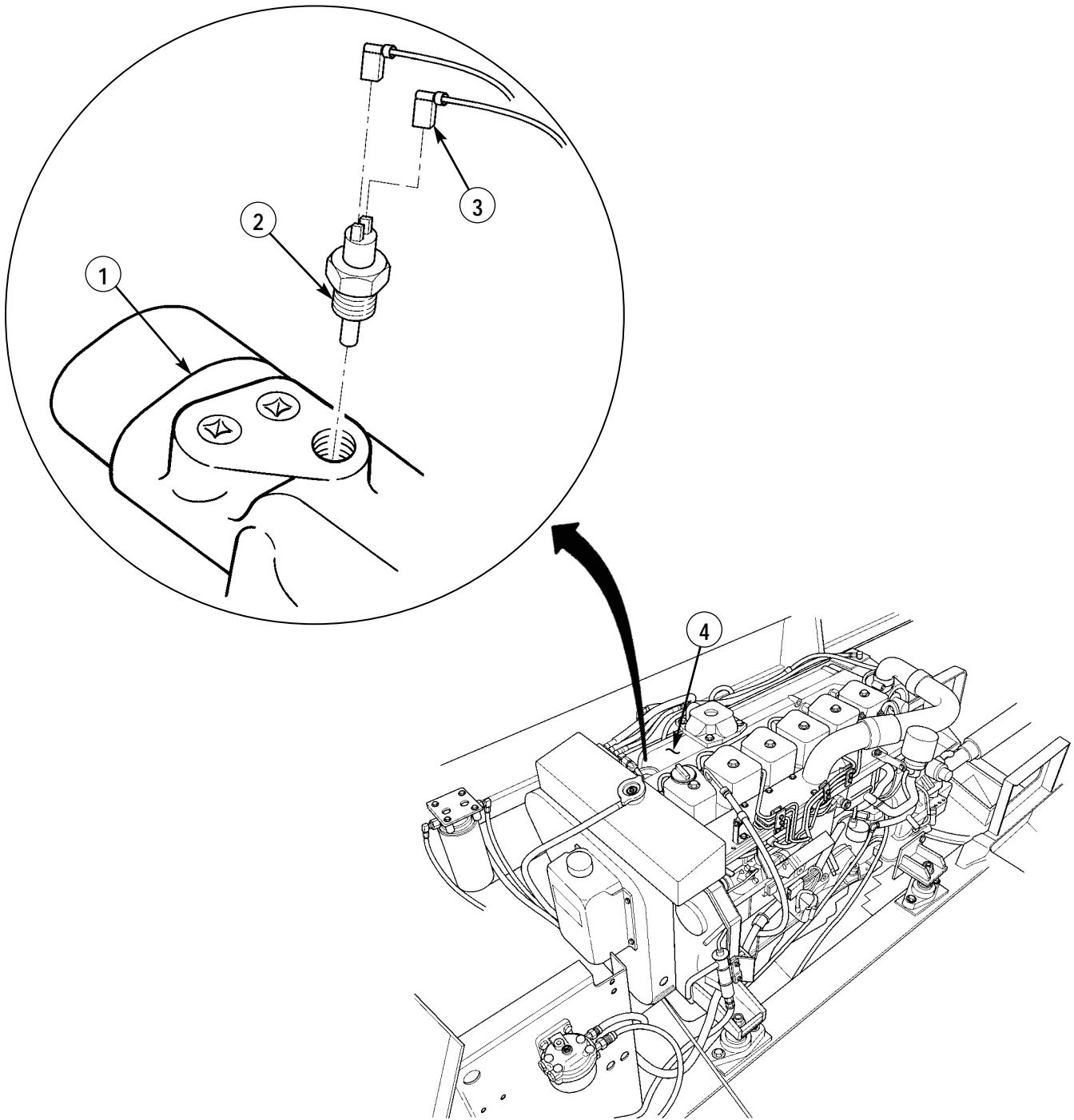
1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Wipe excess coolant from thermostat housing (1) and engine (4) with cloth.

### INSTALLATION

1. Apply thin coat of sealing compound to water temperature sending unit (2).
2. Install water temperature sending unit (2) to thermostat housing (1). Tighten water temperature sending unit (2) to 37 lb-ft (50 N·m).
4. Connect wires (3) to water temperature sending unit (2).
5. Fill engine cooling system with coolant (WP 0012 00).
6. Start engine and check for leaks (TM 5-1940-322-10).
7. Close engine hatches (TM 5-1940-322-10).



WATER TEMPERATURE SENDING UNIT MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WATER PUMP MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Gasket (item 26, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)

###### Reference

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Cooling system drained (WP 0012 00).  
Belt guard removed (WP 0085 00).  
Drivebelt removed (WP 0086 00).

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## WATER PUMP MAINTENANCE (Contd)

### NOTE

The water pumps on both engines are replaced the same way. This procedure covers the replacement of one water pump.

### REMOVAL

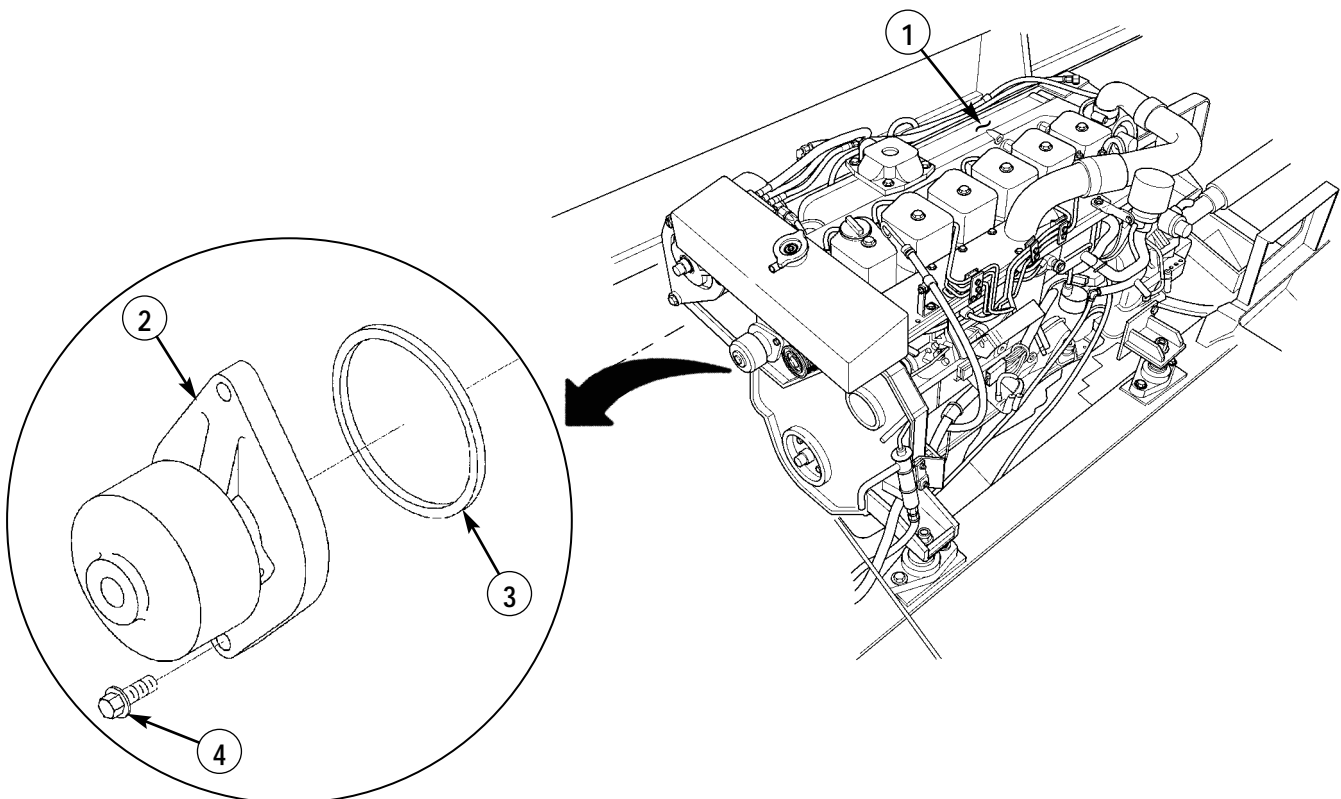
Remove two screws (4), water pump (2), and gasket (3) from engine (1). Discard seal (3).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean gasket mating surfaces with parts cleaning brush.

### INSTALLATION

1. Install water pump (2) and new gasket (3) on engine (1) with two screws (4). Tighten screws (4) to 18 lb-ft (24 N·m).
2. Install drivebelt (WP 0086 00).
3. Install belt guard (WP 0085 00).
4. Fill cooling system (WP 0012 00).
5. Start engine and check for leaks (TM 5-1940-322-10).
6. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### LUBRICATING OIL COOLER MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Gasket (item 33, WP 0173 00)  
Gasket (item 34, WP 0173 00)  
O-ring (item 109, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 16, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Cooling system drained (WP 0012 00).  
Engine oil filter removed (WP 0097 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## LUBRICATING OIL COOLER MAINTENANCE (Contd)

### **NOTE**

The lubricating oil coolers on both engines are replaced the same way. This procedure covers replacement of one lubricating oil cooler.

Have container ready to catch oil.

### REMOVAL

1. Remove turbo oil supply line (3) from adapter (4).
2. Remove fourteen screws (10), lubricating oil cooler housing (5), gasket (7), lubricating oil cooler core (8), and gasket (9) from engine (1). Discard gaskets (7) and (9).

### DISASSEMBLY

1. Remove bypass valve (6) from lubricating oil cooler housing (5).
2. Remove oil filter adapter (11) from lubricating oil cooler housing (5).
3. Remove plug (2) from lubricating oil cooler housing (5).
4. Remove adapter (4) from lubricating oil cooler housing (5).
5. Remove plug (15), O-ring (14), spring (13), and pressure regulator plunger (12) from lubricating oil cooler housing (5). Discard O-ring (14).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material from engine (1), lubricating oil cooler core (8), and lubricating oil cooler housing (5) with Skysol 100 and dry with cloth.
3. Remove excess oil and clean inside of lubricating oil cooler housing (5) and lubricating oil cooler (8) with Skysol 100 and dry with cloth.
4. Inspect lubricating oil cooler housing (5), bypass valve (6), pressure regulator plunger (12), and lubricating oil cooler core (8) for damage. Replace if damaged.

### ASSEMBLY

1. Install pressure regulator plunger (12), spring (13), new O-ring (14), and plug (15) in lubricating oil cooler housing (5).
2. Apply thin coat of sealing compound on adapter threads (4) and plug threads (2).

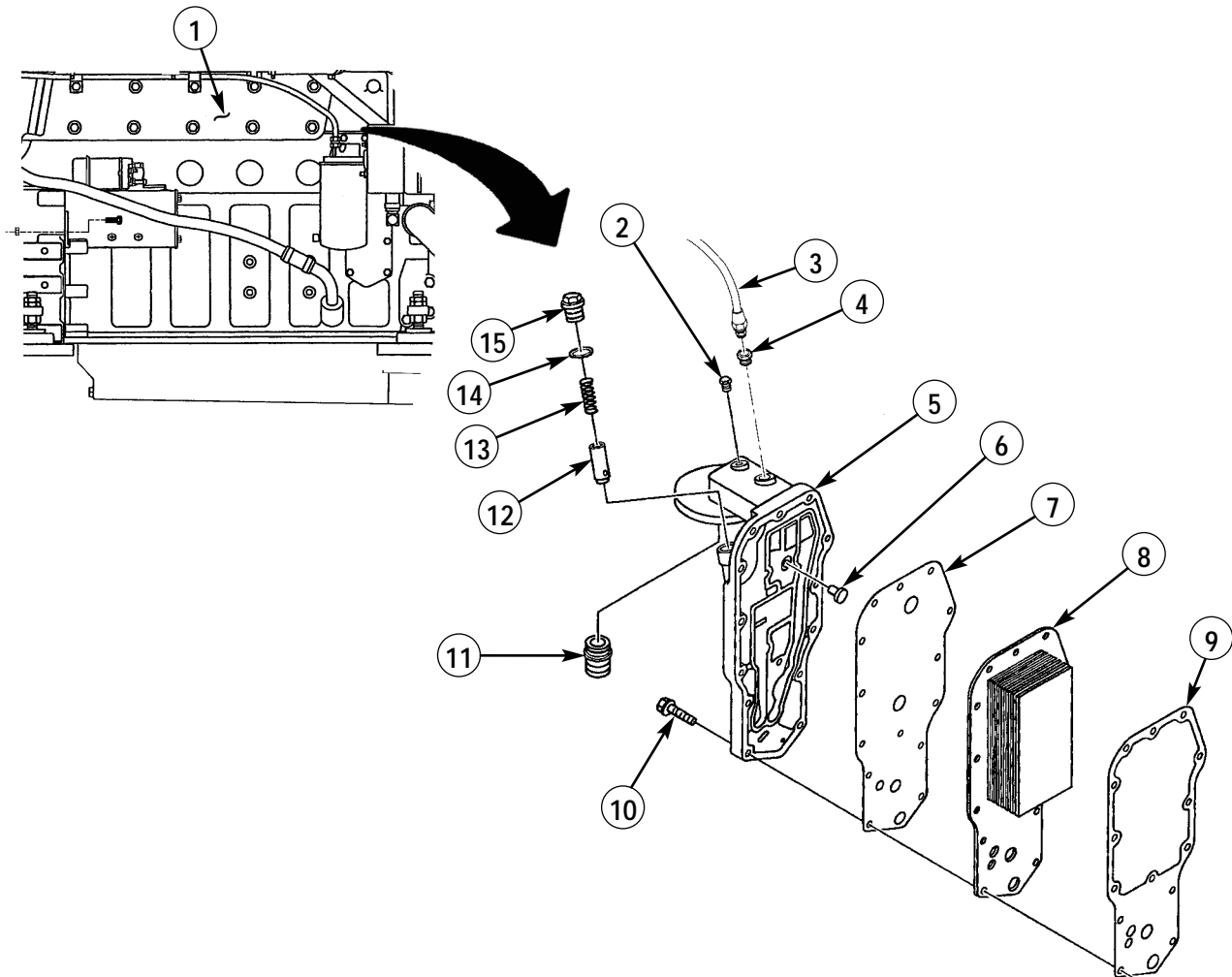
## LUBRICATING OIL COOLER MAINTENANCE (Contd)

### ASSEMBLY (Contd)

3. Install adapter (4) in lubricating oil cooler housing (5).
4. Install plug (2) in lubricating oil cooler housing (5).
5. Install oil filter adapter (11) in lubricating oil cooler housing (5).
6. Install bypass valve (6) in lubricating oil cooler housing (5).

### INSTALLATION

1. Install new gasket (9), lubricating oil cooler core (8), new gasket (7), and lubricating oil cooler housing (5) on engine (1) with fourteen screws (10).
2. Install turbo oil supply line (3) on adapter (4).
3. Install oil filter (WP 0097 00).
4. Check oil level on dipstick and add as necessary (TM 5-1940-322-10).
5. Fill cooling system (WP 0012 00).
6. Start engine and check for leaks (TM 5-1940-322-10).
7. Check oil and add as necessary (TM 5-1940-322-10).
8. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE





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**FIELD MAINTENANCE INSTRUCTIONS****BRIDGE ERECTION BOAT (BEB)****MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**ENGINE OIL FILTER MAINTENANCE****REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION**

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**INITIAL SETUP:****Tools and Special Tools**

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

**Materials/Parts**

Oil filter (item 16, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 10, WP 0171 00)

**References**

WP 0013 00

**Equipment Condition**

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## ENGINE OIL FILTER MAINTENANCE (Contd)

### **NOTE**

The oil filters on both engines are replaced the same. This procedure covers the replacement of one oil filter.

### REMOVAL

1. Place shallow liquid container under oil filter (1) to catch oil during removal.
2. Remove oil filter (1) from filter base (2) by turning counterclockwise. Discard oil filter (1).

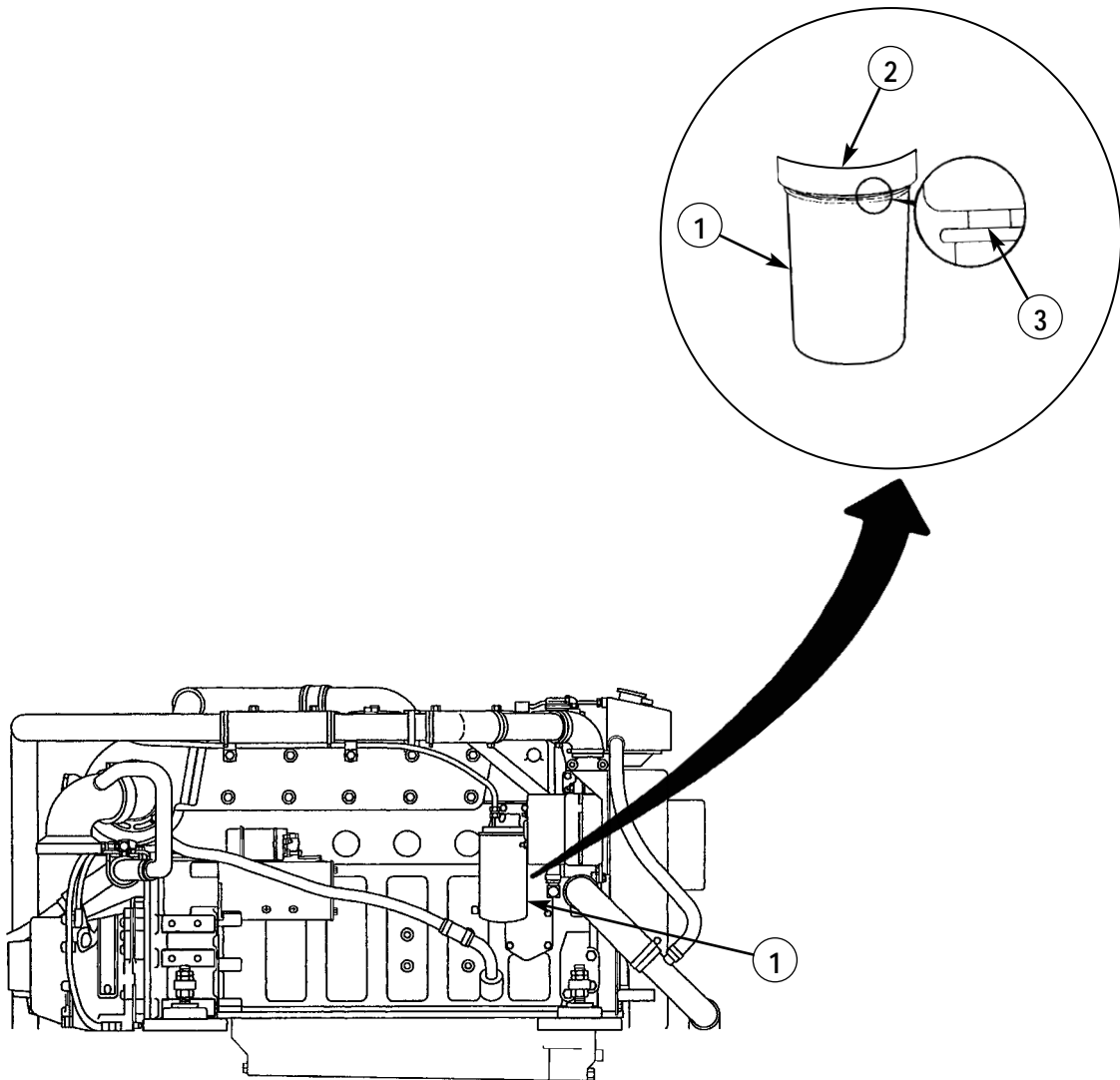
### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Wipe excess oil from filter base (2) with dry cloth.

### INSTALLATION

1. Apply light coat of oil to filter seal (3).
2. Fill new oil filter (1) with oil.
3. Install new filter (1) onto filter base (2) until filter seal (3) contacts filter base (2).
4. Secure new oil filter (1) on filter base (2) by turning one-half turn clockwise.
5. If necessary, wipe spilled oil from filter element and oil cooler.
6. Start engine and check for leaks (TM 5-1940-322-10).
7. Check oil level on dipstick, add oil if necessary (TM 5-1940-322-10).
8. Close engine hatches (TM 5-1940-322-10).

ENGINE OIL FILTER MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STARTER RELAY MAGNETIC SWITCH MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two lockwashers (item 80, WP 0173 00)  
Lockwasher (item 81, WP 0173 00)

##### References

WP 0013 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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## STARTER RELAY MAGNETIC SWITCH MAINTENANCE (Contd)

### NOTE

The starter relay magnetic switches on both engines are replaced the same way. This procedure covers the replacement of one starter relay magnetic switch.

Tag all electrical leads during removal to assist with installation.

### REMOVAL

1. Remove two nuts (11) and lockwashers (10) from posts (5) and (15). Discard lockwashers (10).
2. Remove electrical leads (3) and (4) and cable (16) from posts (5) and (15).
3. Remove nut (9) and lockwasher (8) from post (6). Discard lockwasher (8).
4. Remove nut (9) from post (1).
5. Remove electrical leads (2) and (7) from posts (6) and (1).
6. Remove two nuts (17), bolts (12), and starter relay magnetic switch (13) from mounting bracket (14).

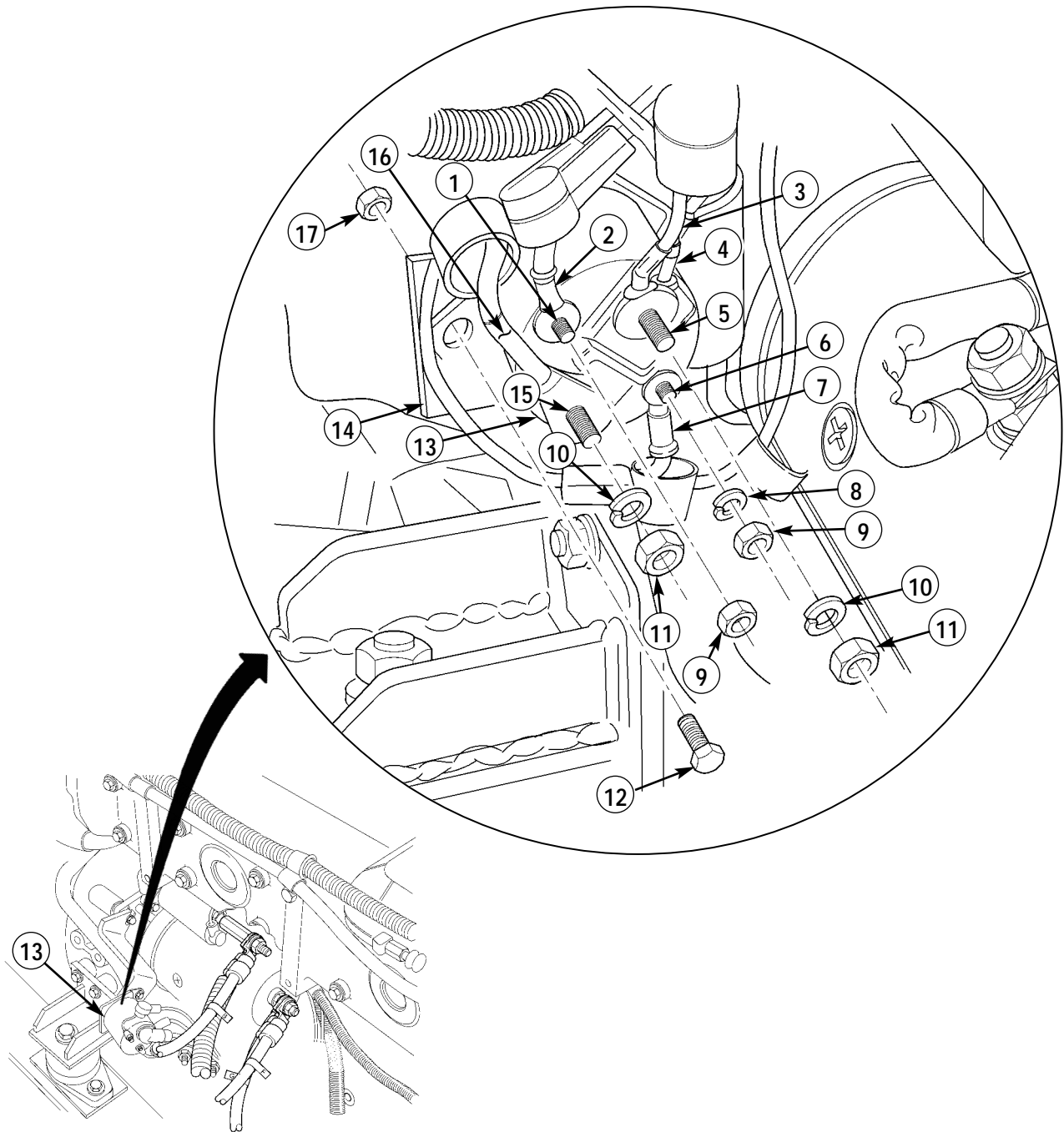
### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean cable (16) and electrical leads (2), (3), and (7) with parts cleaning brush. Replace cable or lead wires if damaged.

### INSTALLATION

1. Install starter relay magnetic switch (13) on mounting bracket (14) with two bolts (12) and nuts (18). Tighten nuts to 32 lb-ft (43 N•m).
2. Install electrical lead (2) on post (1) with nut (9).
3. Install electrical lead (7) on post (6) with new lockwasher (8) and nut (9).
4. Install electrical leads (3), (4), and (16) on posts (5) and (15) with new lockwashers (10) and nuts (11).
5. Connect battery ground cables (WP 0054 00).
6. Close battery hatch (TM 5-1940-322-10).
7. Close engine hatches (TM 5-1940-322-10).

### STARTER RELAY MAGNETIC SWITCH MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STARTER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Lockwasher (item 80, WP 0212 00)  
Lockwasher (item 81, WP 0212 00)

###### References

WP 0013 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

## STARTER MAINTENANCE (Contd)

### **NOTE**

Tag all electrical leads during removal to assist with installation.

The starters on both engines are replaced the same way. This procedure covers the replacement of one starter.

### REMOVAL

1. Remove nuts (5) and (8), lockwashers (4) and (9), and electrical leads (3), (6), (7), and (11) from posts (2) and (10). Discard lockwashers (4) and (9).
2. Remove three screws (13) securing starter (12) to bell housing (14). Remove starter (12).

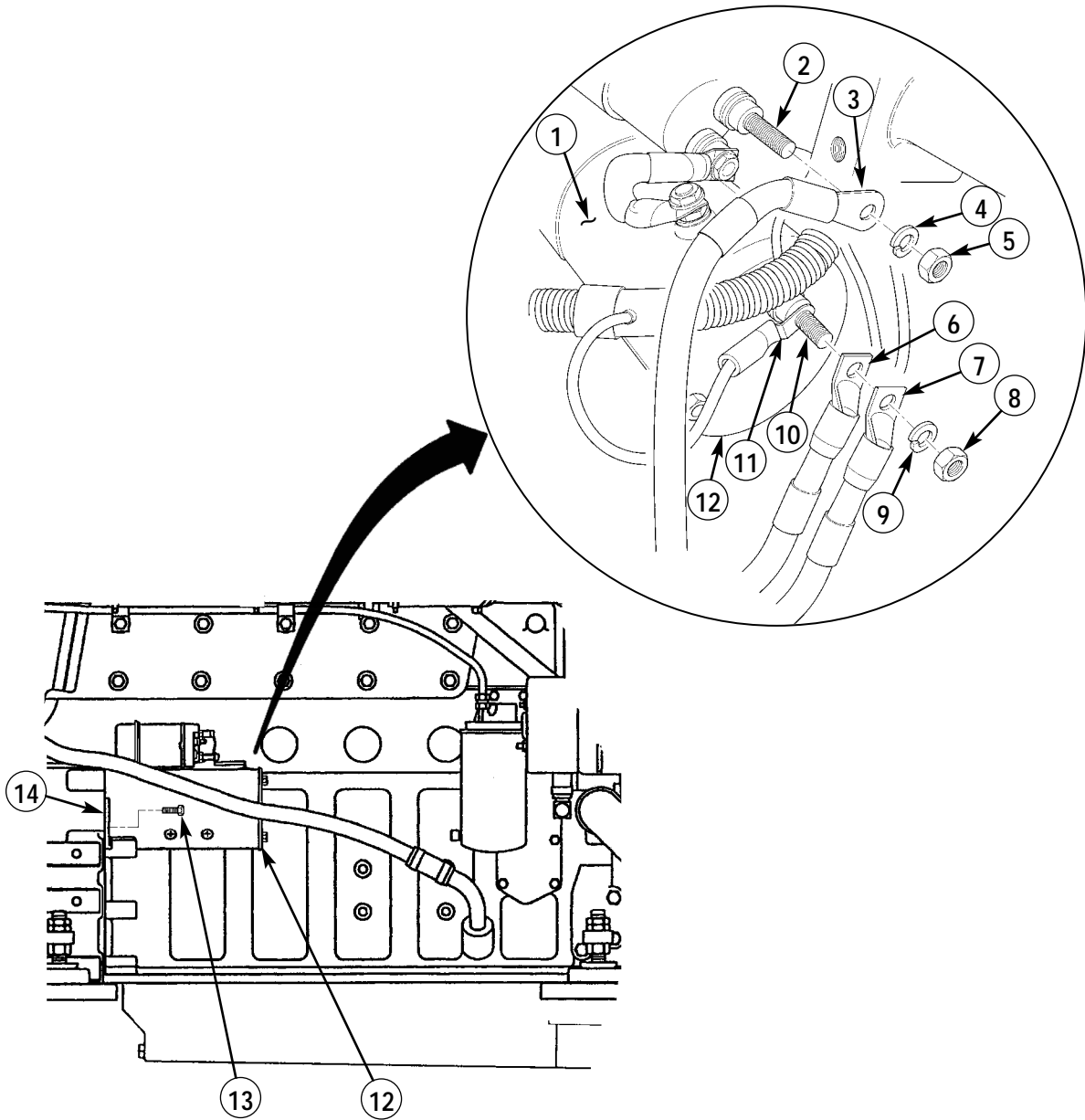
### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0012 05.
2. Inspect electrical leads (3), (6), (7), and (11) for damage. Replace electrical leads if damaged.
3. Inspect electrical leads (3), (6), (7), and (11) for corrosion. Clean electrical leads with parts cleaning brush if corroded.

### INSTALLATION

1. Secure starter (12) on bell housing (14) with screws (13). Tighten screws to 32 lb-ft (43 N·m).
2. Connect electrical leads (3), (6), (7), and (11) with two new lockwashers (4) and (9) and nuts (5) and (8) to posts (2) and (10).
3. Connect battery ground cables (WP 0054 00).
4. Close battery hatch (TM 5-1940-322-10).
5. Close engine hatches (TM 5-1940-322-10).

STARTER MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL INJECTOR REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Injector cleaning brush (item 2, WP 0172 00)  
Injector puller (item 31, WP 0172 00)  
Injector cleaning kit (item 24, WP 0172 00)

##### Materials/Parts

Gasket (item 30, WP 0173 00)  
Saddle washer (item 133, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel high pressure and return manifold lines  
removed (WP 0084 00).

---

## FUEL INJECTOR REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

The fuel injectors on both engines are replaced the same way. This procedure covers the replacement of one fuel injector on one engine.

## REMOVAL

### **NOTE**

Clean area around fuel injectors with cloth prior to removal.

1. Apply light coating of Skysol 100 or rust penetrating solvent around base of injectors and cylinder head (4). Let set for 3 minutes before removing. For general cleaning and inspection instructions, refer to WP 0013 00.

### **CAUTION**

Use care when tapping the injector to loosen rust. Failure to comply may result in damage to equipment.

2. If necessary, use a hammer and brass drift to tap injector (3) to loosen rust.

## FUEL INJECTOR REPLACEMENT (Contd)

### **CAUTION**

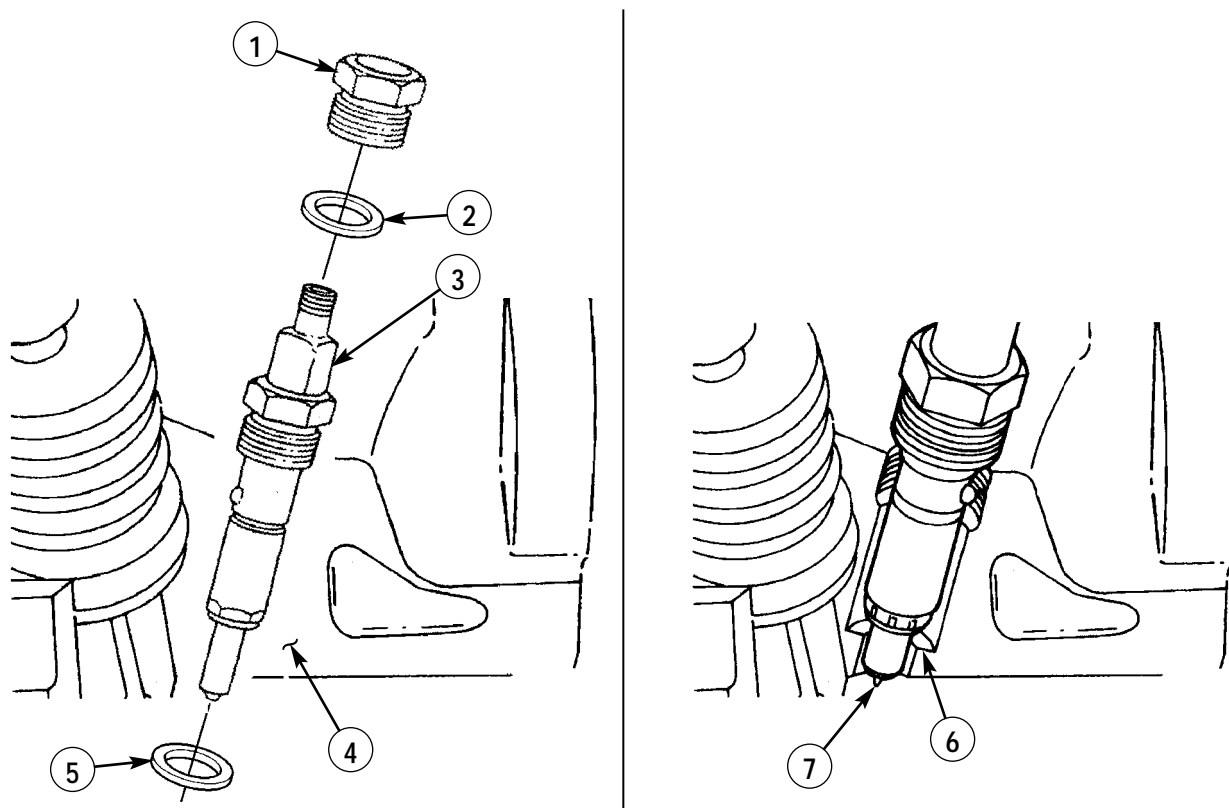
Injector must not rotate in bore of cylinder head when loosening holddown nut. Failure to comply may result in damage to equipment.

3. Hold injector (3), loosen nut (1), and remove injector (3) from cylinder head (4).

### **CAUTION**

Perform steps 4 thru 7 only if injector is difficult to remove. Failure to comply may result in damage to equipment.

4. Remove nut (1) gasket (2) from injector (3) and attach injector puller. Discard gasket (2).
5. Fill bore (6) around injector (3) with Skysol 100 or rust penetrating solvent.
6. Pull injector (3) out as far as possible; use injector puller slide-out hammer to tap against puller nut.
7. Drive injector (3) into bore (6), allowing Skysol 100 or rust penetrating solvent to penetrate to injector tip (7) and loosen carbon deposits.
8. Clean cylinder head (4) with injector cleaning brush. For general cleaning and inspection, refer to WP 0013 00.
9. Remove nut (1) and saddle washer (5) from injector (3). Discard saddle washer (5).



## FUEL INJECTOR REPLACEMENT (Contd)

### INSTALLATION

#### **CAUTION**

Ensure antiseize compound does not contact fuel drain hole. Failure to comply may result in damage to equipment.

1. Apply light coat of antiseize compound on threads of injector (3).
2. Install new gasket (2) and nut (1) on injector (3).
3. Install new saddle washer (5) on bottom of injector (3).

#### **CAUTION**

Ensure cylinder head bore is clean and there are no copper washers at bottom of bore. Failure to comply may result in damage to equipment.

4. Apply coat of antiseize compound to threads of nut (1).
5. Position protrusion (6) on injector (3) with notch on cylinder head bore (7). Install fuel injector (3) in cylinder head (4). Tighten nut (1) to 44 lb-ft (60 N·m).

#### **CAUTION**

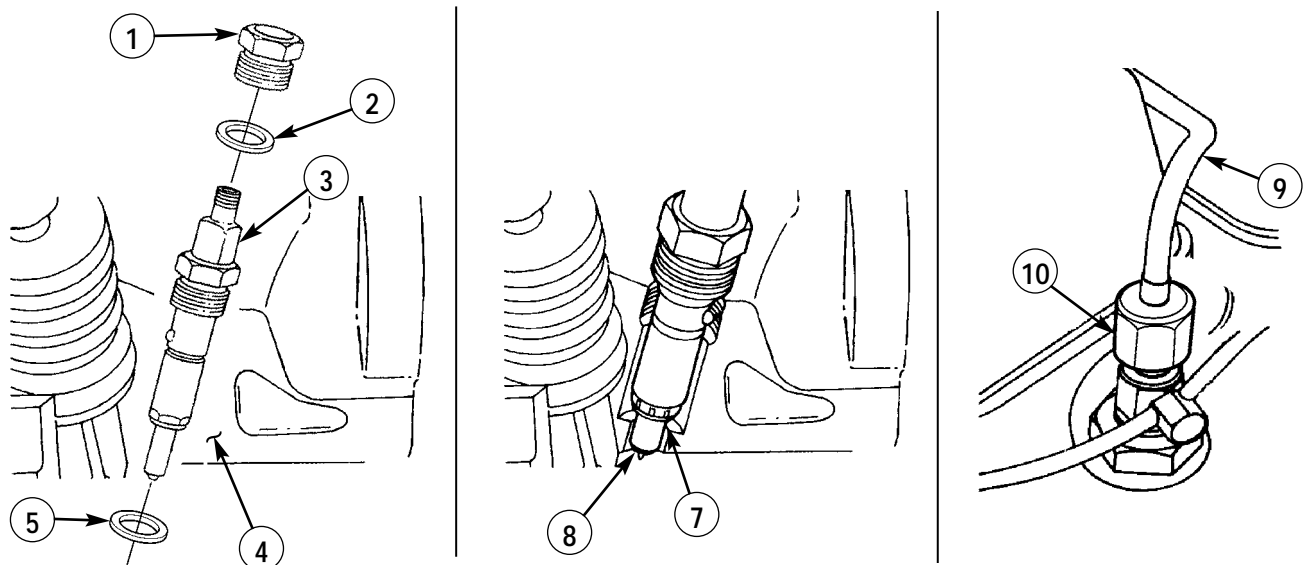
Do not bend fuel lines when removing or installing lines. Failure to comply may result in damage to equipment.

6. Install fuel return manifold and fuel high pressure lines (WP 0084 00). Do not tighten.
7. Connect battery ground cables (WP 0054 00).

#### **WARNING**

Crank engine to ensure fuel flows through the injector pump and fuel lines to vent air from lines. The engine may start; ensure all safety precautions for starting the engine are followed. Failure to comply may result in injury to personnel and/or damage to equipment.

8. Crank engine to allow entrapped air to vent from high pressure lines (9). When fuel without air comes from line (9), tighten nut (10) to 22 lb-ft (30 N·m). If necessary, repeat step for all injectors.
9. Start engine and check for leaks (TM 5-1940-322-10).
10. Close battery hatch (TM 5-1940-322-10).
11. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CYLINDER HEAD MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool (item 41, WP 0172 00)

###### Materials/Parts

Gasket (item 25, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 16, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0013 00  
WP 0161 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel injector lines removed (WP 0084 00).  
Fuel injectors removed (WP 0100 00).  
Valve covers removed (WP 0108 00).  
Rocker arms removed (WP 0109 00).  
Air intake manifold removed (WP 0110 00).  
Exhaust manifold removed (WP 0112 00).

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## CYLINDER HEAD MAINTENANCE (Contd)

### **NOTE**

The cylinder heads on both engines are replaced the same way. This procedure covers the replacement of one cylinder head.

Assistant will help with removal and installation.

### REMOVAL

### **NOTE**

There are three different lengths of cylinder head bolts. Note the position of each bolt for installation.

1. Remove twenty bolts (1), cylinder head (2), and gasket (3) from cylinder block (4). Discard gasket (3).
2. Remove dowels (5) from cylinder block (4).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

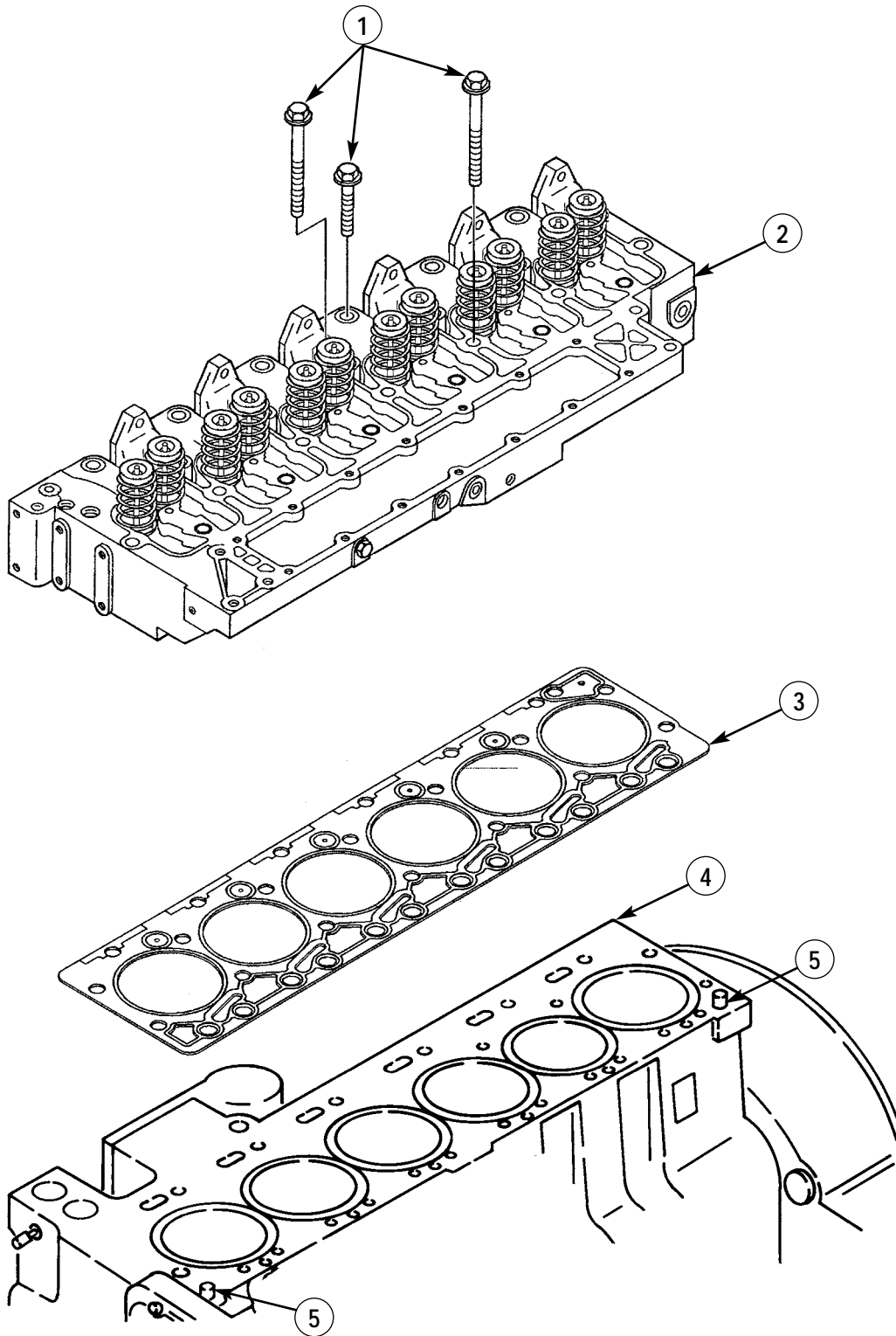
### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material from cylinder head (2) and cylinder block (4) mating surfaces with Skysol 100 and dry with cloth.

CYLINDER HEAD MAINTENANCE (Contd)



## CYLINDER HEAD MAINTENANCE (Contd)

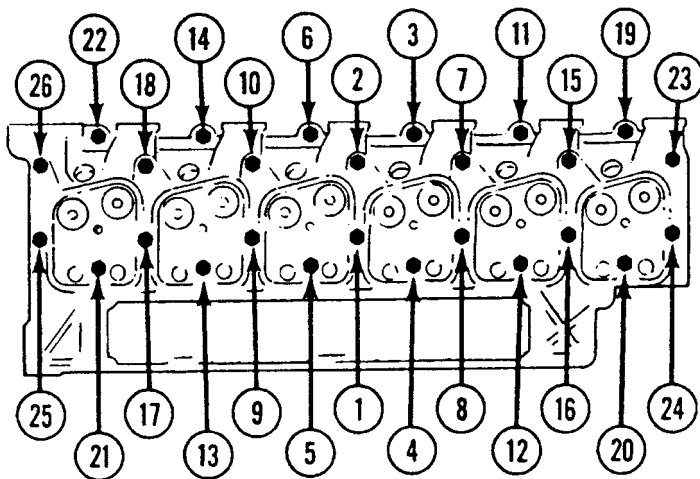
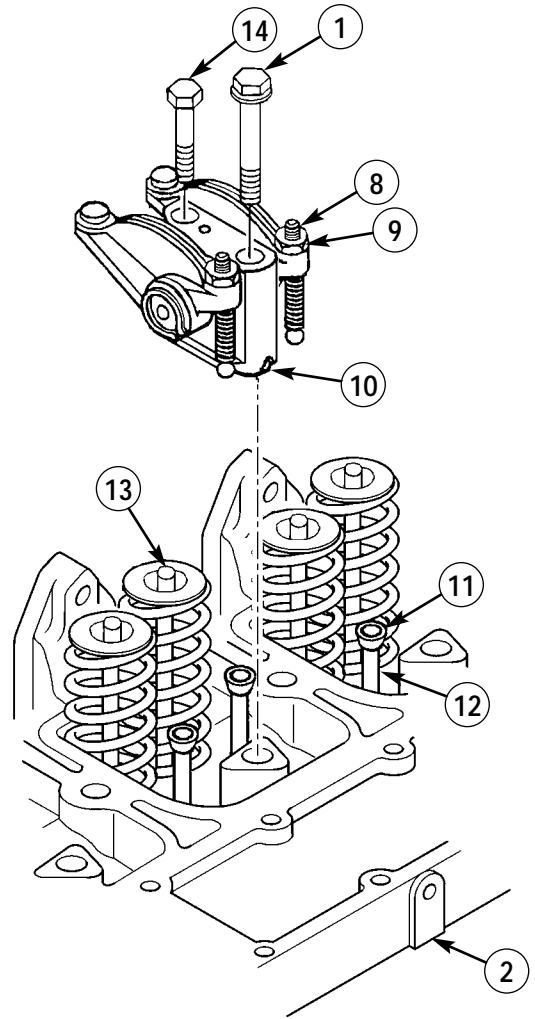
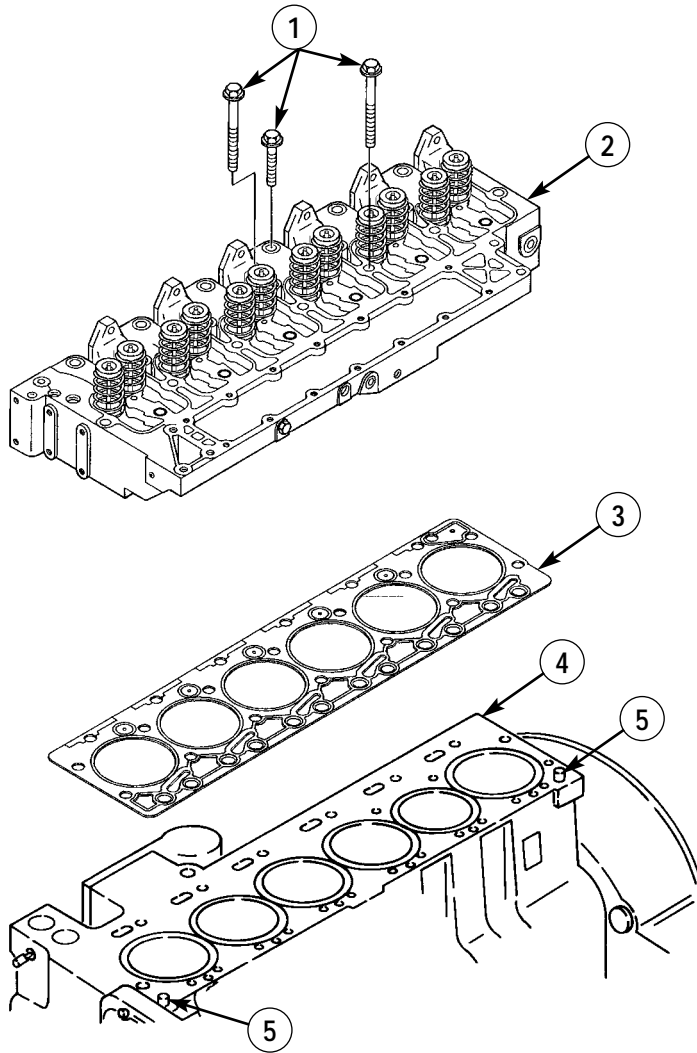
### INSTALLATION

#### **CAUTION**

Do not allow lubricating oil to contact the mating surface on engine block where cylinder head gasket seats. Cylinder head gasket may become contaminated with oil and fail to seal on engine block and cylinder head. Failure to comply may result in damage to equipment.

1. Install dowels (5) on cylinder block (4).
2. Apply thin coat of new engine oil on threads of twenty-six screws (1).
3. Install new cylinder head gasket (3) on dowels (5) and cylinder block (4). Ensure that holes in gasket (3) align with holes in cylinder block (4).
4. Install cylinder head (2) on dowels (5), cylinder head gasket (3) and cylinder block (5).
5. Install push rods (11) on valve tappets.
6. Apply thin coat of new engine oil on pushrod sockets (11) and valve stems (13)
7. Loosen locknut (9) and rocker arm adjusting screws (8) on rocker arm pedestals (10).
8. Install six rocker arm pedestals (10) on cylinder head (2).
9. Install twenty-six bolts (1) on cylinder head (2) in position noted in removal.
10. Tighten twenty-six bolts (1) to 29 lb-ft (40 N·m) in torque sequence shown.
  - a. Using torque sequence, tighten bolts (1) to 62 lb-ft (62 N·m).
  - b. Using torque sequence, tighten bolts (1) to 93 lb-ft (126 N·m).
11. Install six bolts (14) on rocker arm pedestals (10). Tighten bolts (14) to 18 lb-ft (24 N·m).
12. Adjust engine valve tappets (WP 0161 00).
13. Install valve covers (WP 0108 00).
14. Install exhaust manifold (WP 0112 00).
15. Install air intake manifold (WP 0110 00).
16. Install fuel injectors (WP 0100 00).
17. Install injector lines (WP 0084 00).
18. Fill engine with coolant (WP 0012 00).
19. Drain and fill engine with oil (WP 0012 00).
20. Start engine and check for leaks (TM 5-1940-322-10).
21. Close engine hatches (TM 5-1940-322-10).

CYLINDER HEAD MAINTENANCE (Contd)



TORQUE SEQUENCE

END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL INJECTION PUMP AND ACCESSORY DRIVE GEAR MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward repair system (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)  
Universal puller (item 32, WP 0172 00)

###### Materials/Parts

Gasket (item 19, WP 0173 00)  
Lockwasher (item 78, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Fuel supply, high-pressure, and return fuel lines  
disconnected (WP 0084 00).  
Throttle cable disconnected (WP 0036 00).  
Engine stop cable disconnected (WP 0032 00).

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## FUEL INJECTION PUMP AND ACCESSORY DRIVE GEAR MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can ignite by contacting hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, tubes, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

## REMOVAL

### **NOTE**

Have suitable container ready to catch fuel.

1. Remove plug (1) from flywheel housing (2).

### **CAUTION**

Disengage locating pin after locating Top Dead Center (TDC). Failure to comply may result in damage to equipment.

2. Using gear barring tool, rotate flywheel (3) until locating pin (10) engages. Disengage locating pin (10). This is TDC position.
3. Loosen lock screw (9) and position special washer (8) so lock screw (9) will tighten against injection pump shaft (11).
4. Remove gear cover access cap (14) from gear housing (4).
5. Remove nut (13) and lockwasher (12) from injection pump shaft (11). Discard lockwasher (12).
6. Using universal puller, remove drive gear (15) from injection pump shaft (11).

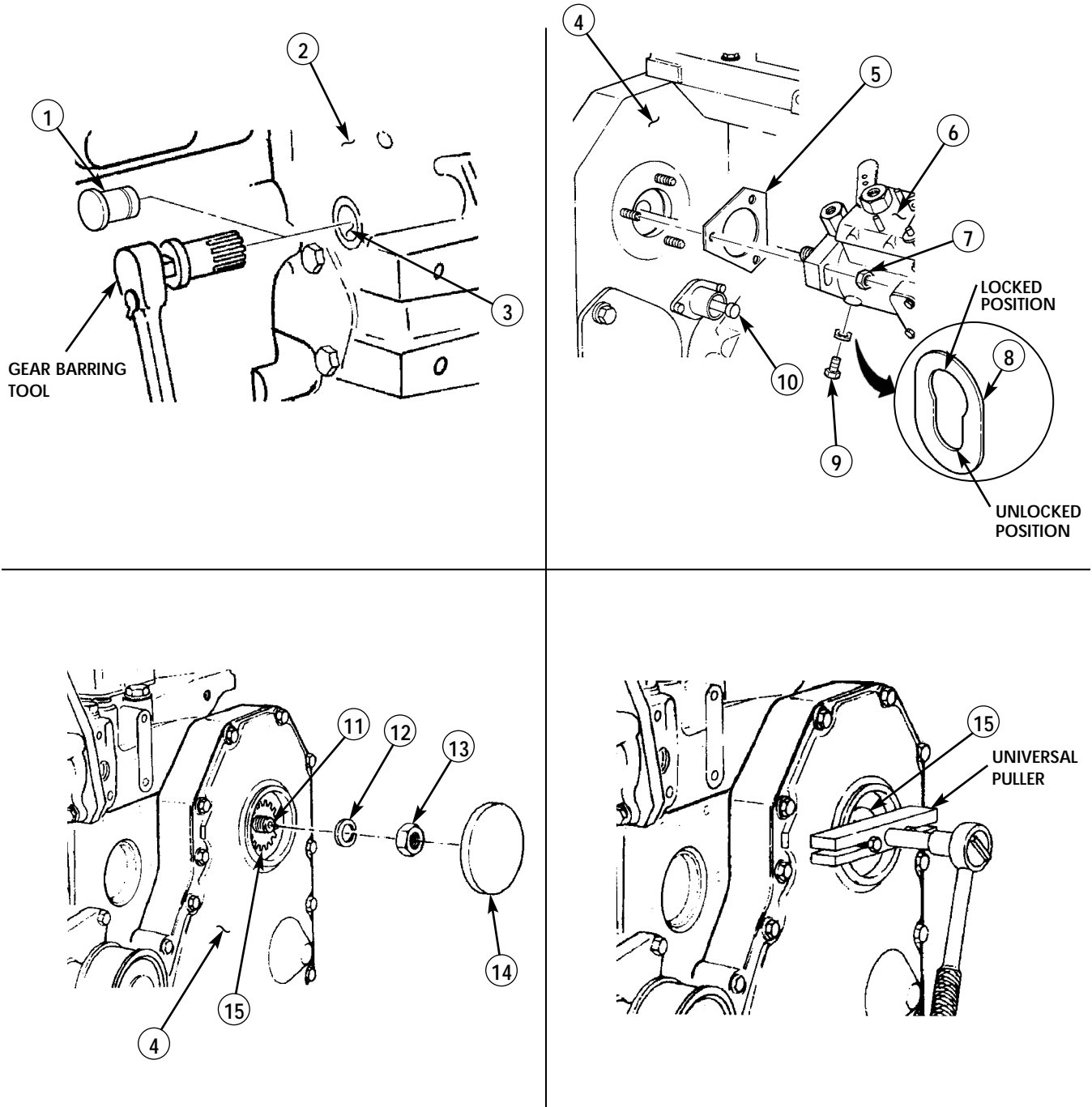
### **CAUTION**

Use care when removing injection pump from front housing. Do not drop pump driveshaft key when removing pump. Failure to comply may result in damage to equipment.

7. Remove three nuts (7), injection pump (6), and gasket (5) from gear housing (4). Discard gasket (5).



FUEL INJECTION PUMP AND ACCESSORY DRIVE GEAR MAINTENANCE (Contd)



## FUEL INJECTION PUMP AND ACCESSORY DRIVE GEAR MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean excess gasket material from gear housing (4) with cloth.
3. Inspect drive gear (15) for damage and wear. Replace drive gear (15) if damaged or excessively worn.

### INSTALLATION

#### **NOTE**

The keyway in the shaft of new and reconditioned pumps will be locked in a position corresponding to the keyway in the drive gear when cylinder No. 1 is at TDC position.

1. Install new gasket (5) on injection pump (6).
2. Verify TDC position and install injection pump (6) on drive gear (15) and gear housing (4) with three nuts (7). Finger-tighten nuts (7). Injection pump (6) must be free to move in flange slots.
3. Install new lockwasher (12) and nut (13) on injection pump shaft (11) and drive gear (15). Tighten nut (13) to 11–15 lb-ft (15–20 N·m).

#### **CAUTION**

Pump shaft must be unlocked after installation. Failure to comply may result in damage to equipment.

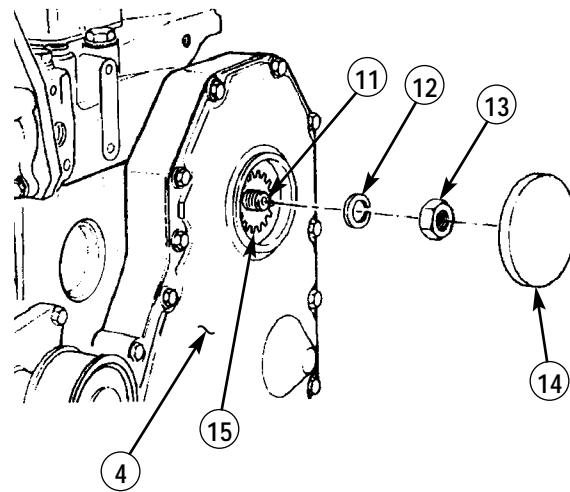
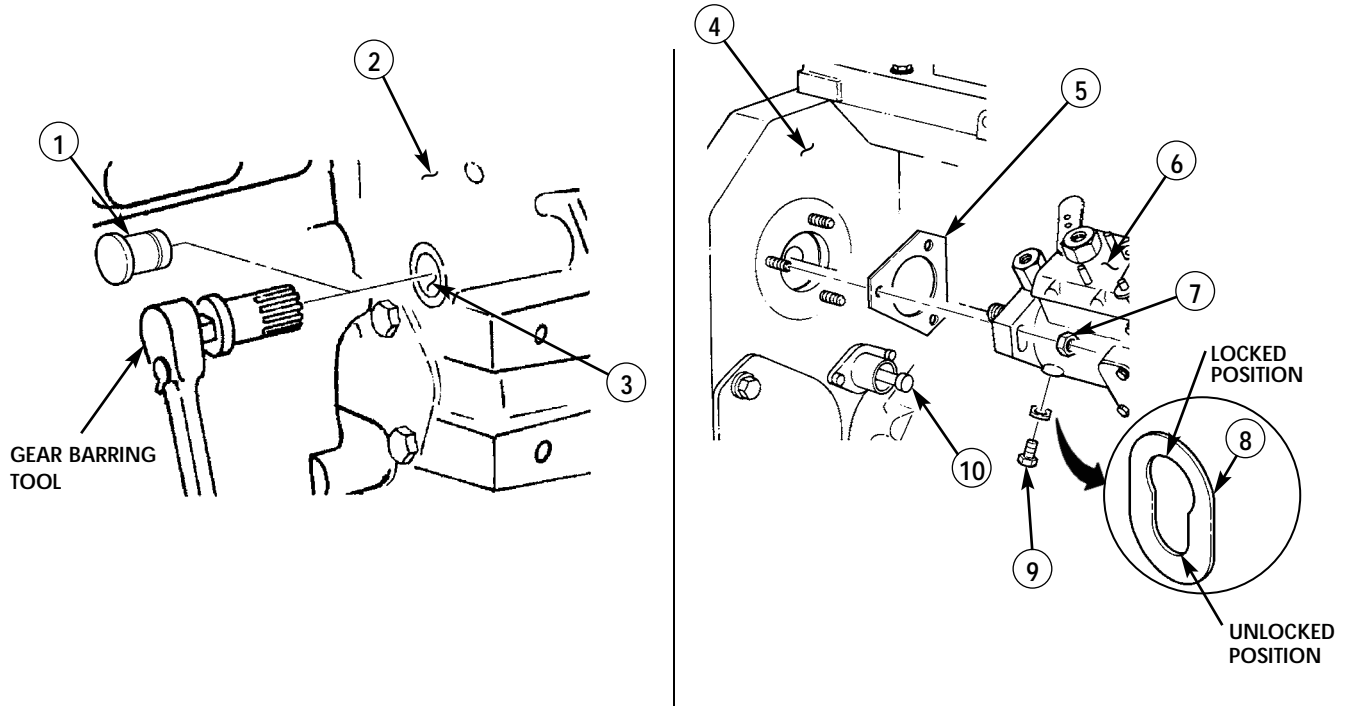
4. Loosen locking screw (9) and slide special washer (8) to unlocked position. Tighten locking screw (9) to 15 lb-ft (20 N·m).
5. If injection pump (6) with alignment marks is being installed, align mark on injection pump (6) with mark on gear housing (4). Tighten three nuts (13) to 18 lb-ft (24 N·m).
6. Minimize gear lash by rotating injection pump (6) counterclockwise. Tighten nut (13) to 18 lb-ft (24 N·m).
7. Tighten nut (13) on injection pump shaft (11) to 48 lb-ft (65 N·m). Install access cap (14) on gear housing (4).

#### **NOTE**

When connecting cables it may be necessary to adjust cable to length so levers will move from stop to full throttle position.

8. Connect throttle and engine stop cables to levers (WP 0036 00 and WP 0032 00).
9. Install fuel supply, high-pressure, and return fuel lines on fuel injection pump (WP 0084 00).
10. Connect battery ground cables (WP 0054 00).
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Close battery hatch (TM 5-1940-322-10).

FUEL INJECTION PUMP AND ACCESSORY DRIVE GEAR MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FUEL LIFT PUMP MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Gasket (item 23, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Sealing compound (pipe)  
(item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

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## FUEL LIFT PUMP MAINTENANCE (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

The fuel lift pumps on both engines are replaced the same way. This procedure covers the replacement of one fuel lift pump.

## REMOVAL

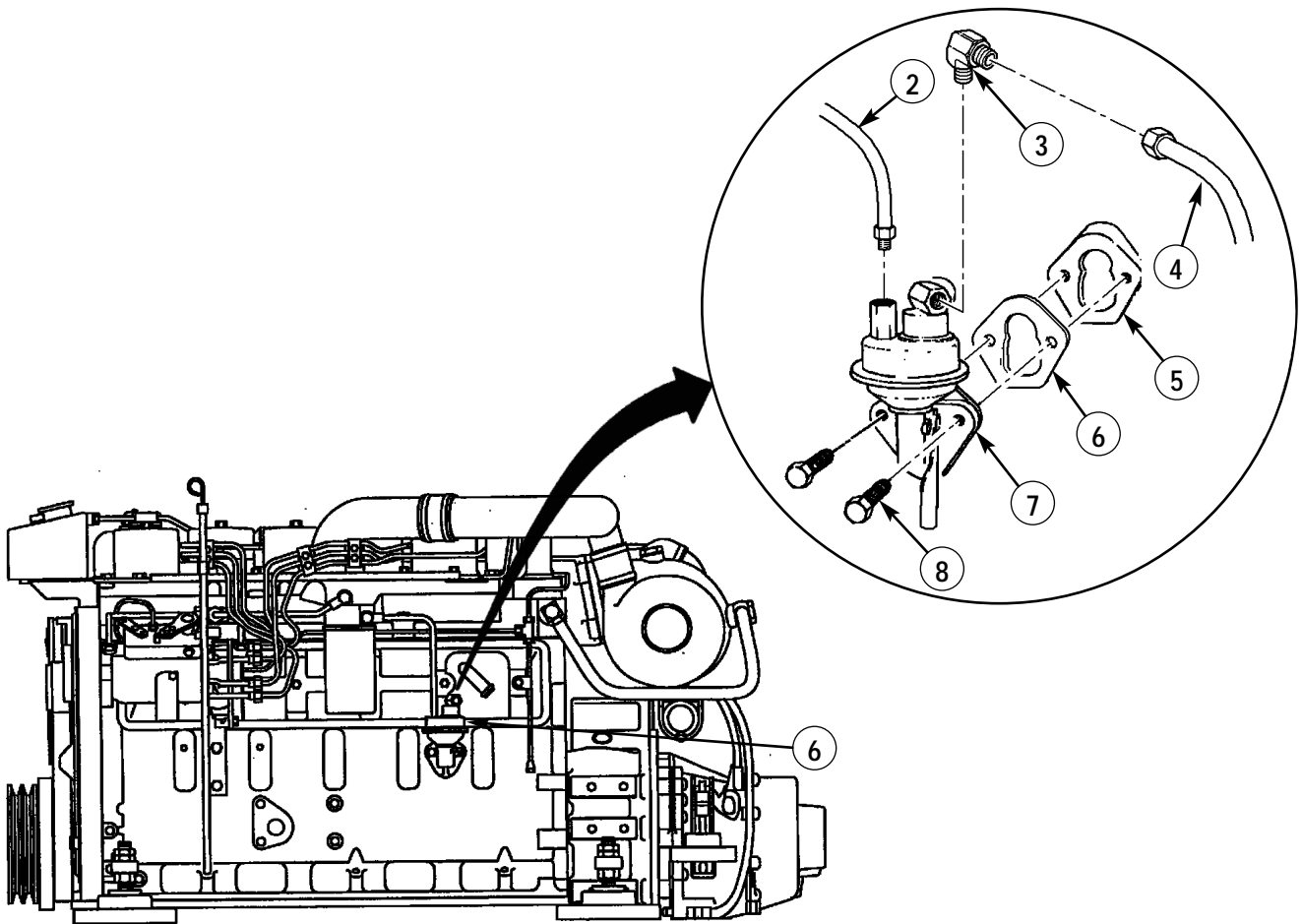
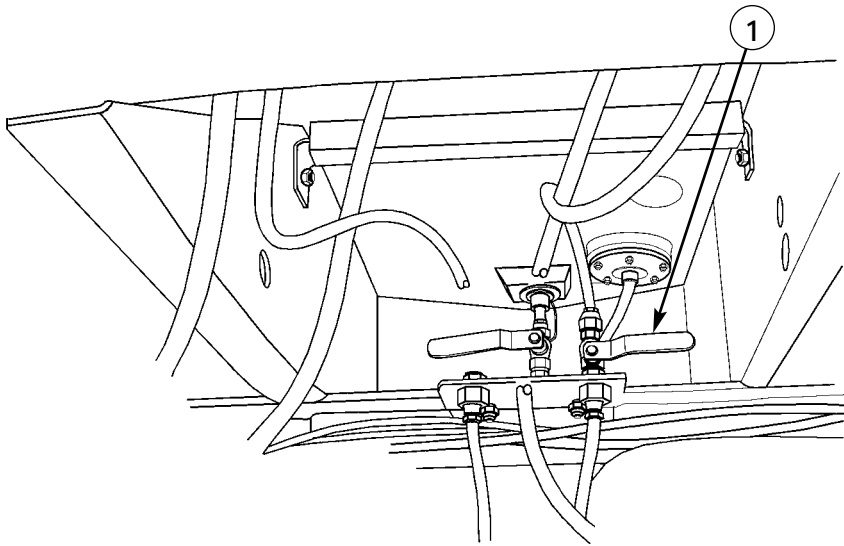
1. Turn intermediate fuel shutoff valve (1) to closed position.

### **NOTE**

Have container ready to catch fuel.

2. Disconnect fuel line (2) and fuel hose (4) from fuel pump (7).
3. Remove two screws (8), fuel pump (7), and gasket (6) from engine block (5). Discard gasket (6).
4. Remove elbow (3) from fuel pump (7).

FUEL LIFT PUMP MAINTENANCE (Contd)



## FUEL LIFT PUMP MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Remove excess gasket material from mating surfaces on fuel pump (5) and engine block (3) with Skysol 100 and dry with cloth.

### INSTALLATION

1. If removed, apply sealing compound to threads of elbow (2). Install elbow (2) on fuel pump (6).

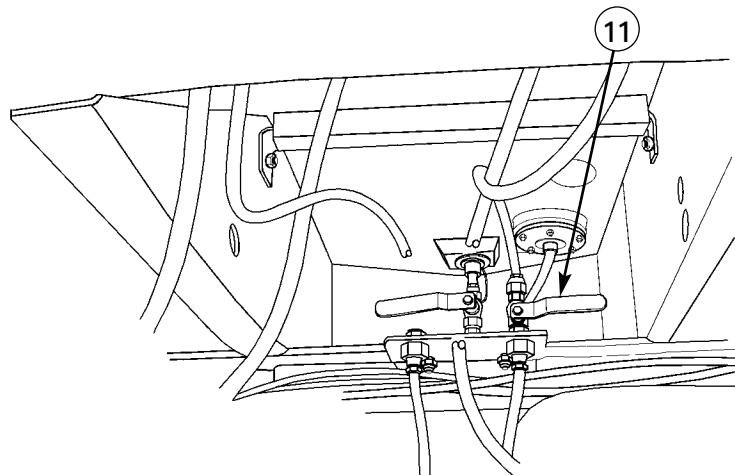
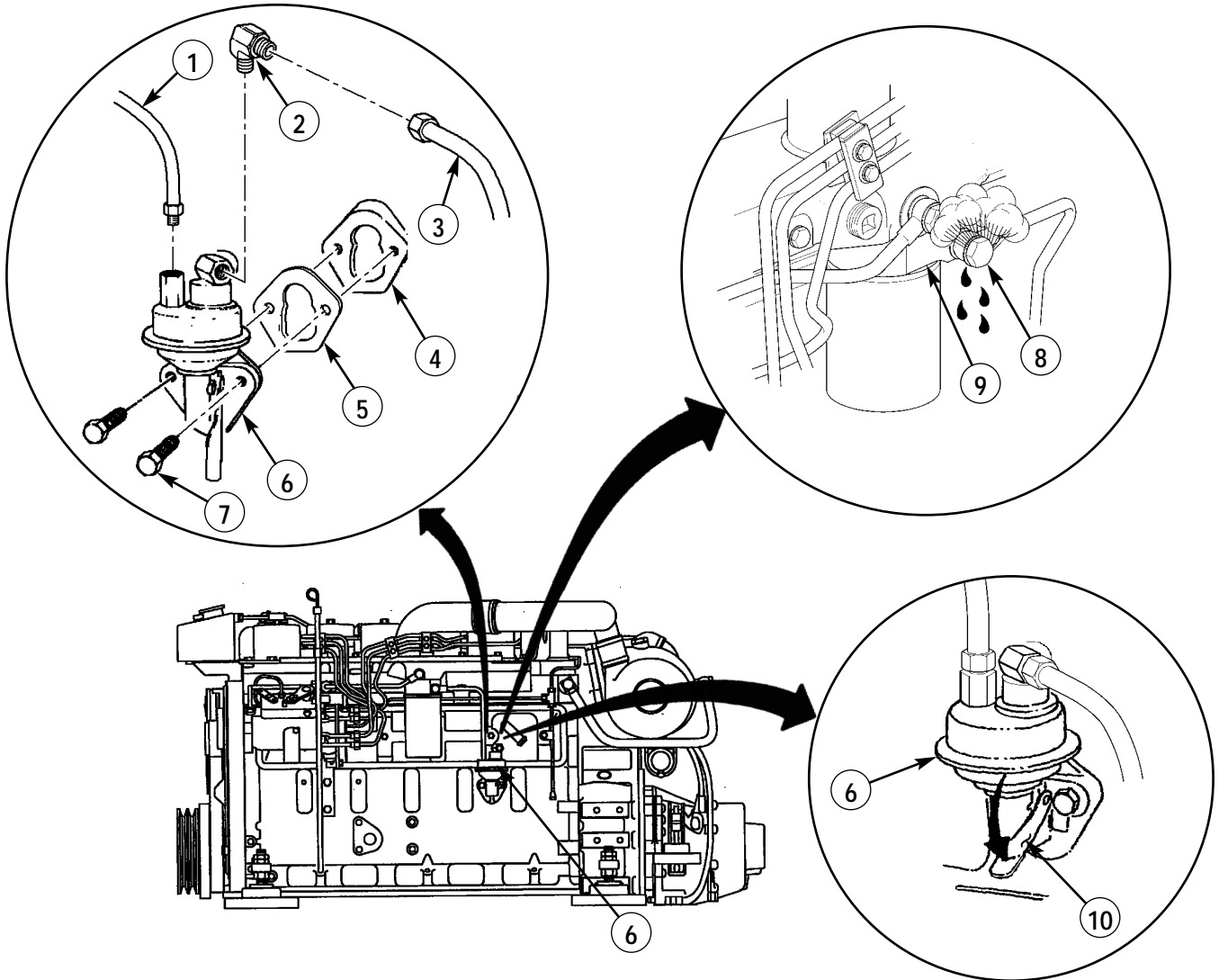
#### **NOTE**

Placing priming lever in the down (locked) position will assist in the installation of fuel pump for the engine. Lever must be in the locked position to allow maximum pumping capability.

2. Install new gasket (5) and fuel pump (6) on engine block (4) with two screws (7). Tighten screws (7) to 18 lb-ft (24 N·m).
3. Connect fuel line (1) to fuel pump (6).
4. Connect fuel supply hose (3) to fuel pump (6).
5. Turn intermediate fuel shutoff valve (11) to opened position.
6. Loosen screw (8) on filter head (9).
7. Pump priming lever (10) until clean fuel without air comes out of screw (8). Tighten screw (8).
8. Connect battery ground cables (WP 0054 00).
9. Start engine and check for leaks (TM 5-1940-322-10).
10. Close battery hatch (TM 5-1940-322-10).
11. Close engine hatches (TM 5-1940-322-10).



FUEL LIFT PUMP MAINTENANCE (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AIR CLEANER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## AIR CLEANER MAINTENANCE (Contd)

### **NOTE**

The air cleaners on both engines are replaced the same way. This procedure covers the replacement of one air cleaner.

### REMOVAL

Remove clamp (2) and air cleaner (1) from air inlet (3).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

### **CAUTION**

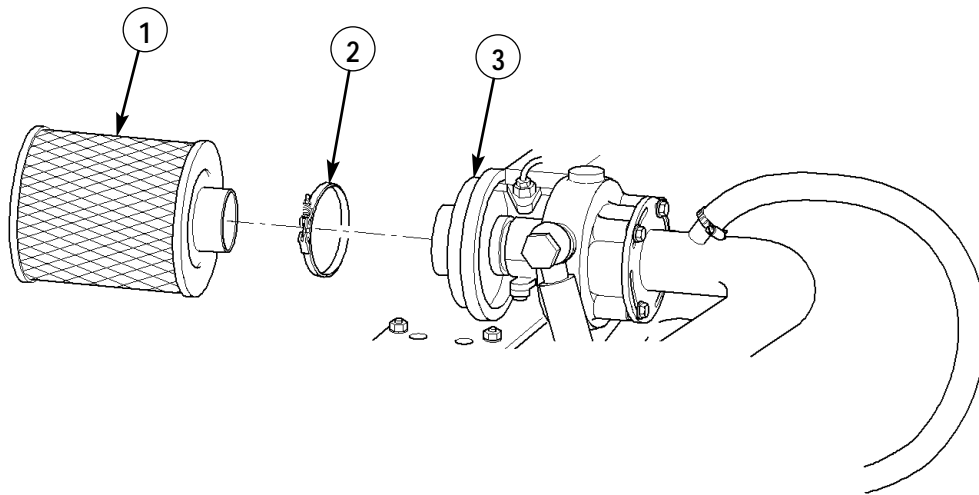
Do not use solvent to clean air cleaner. Failure to comply may result in damage to equipment.

2. Clean air cleaner (1) with compressed air.
3. Inspect air cleaner for dirt. Replace if dirty after cleaning.

### INSTALLATION

1. Install air cleaner (1) on air inlet (3) with clamp (2). Tighten clamp (2) to 71 lb-in (8 N•m).
2. Close engine hatches (TM 5-1940-322-10).

AIR CLEANER MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### MAGNETIC PICK-UP MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)

###### Materials/Parts

Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## MAGNETIC PICK-UP MAINTENANCE (Contd)

### **NOTE**

The magnetic pick-up on both engines are replaced the same way. This procedure covers the replacement of the magnetic pick-up on one engine.

### REMOVAL

1. Disconnect magnetic pick-up connector (1) from harness connector (2).
2. Loosen jamnut (3) and remove magnetic pick-up (4) from flywheel housing (5).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

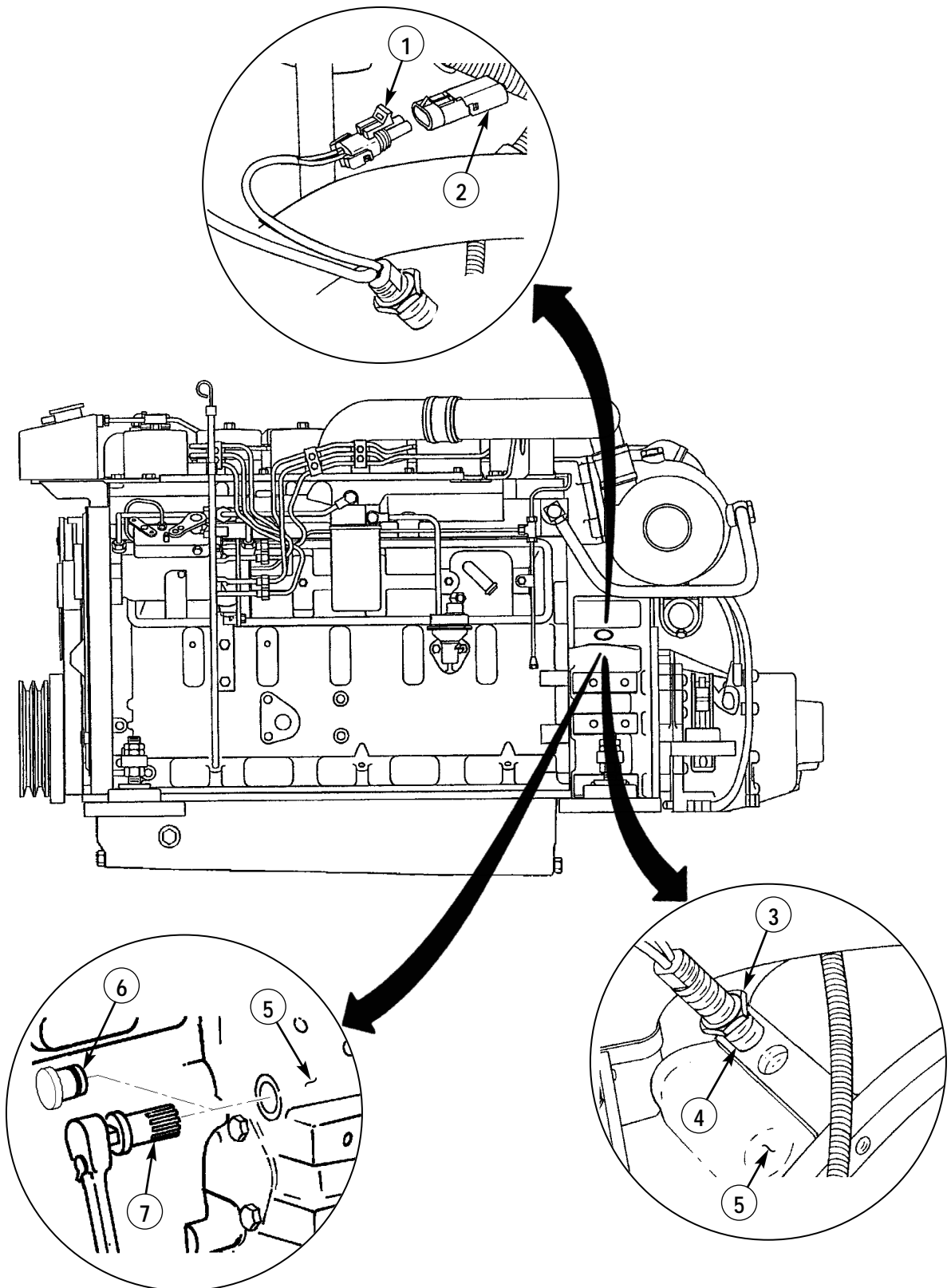
2. Clean and inspect the magnetic pick-up (4) with Skysol 100 and dry with cloth.

### INSTALLATION

1. Remove plug (6) from flywheel housing (5).
2. Rotate crankshaft with gear barring tool (7) until any ring gear tooth is at center of hole.
3. Position magnetic pick-up (4) on flywheel housing (5).
4. Thread pick-up (4) until it contacts ring gear tooth, then back out magnetic pick-up (4) one-half turn.
5. Hold magnetic pick-up (4) and tighten jamnut (3) to 25–35 lb-ft (34–47 N•m).
6. Connect magnetic pick-up connector (1) to harness connector (2).
7. Close engine hatches (TM 5-1940-322-10).



MAGNETIC PICK-UP MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TURBOCHARGER PLUMBING MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Cooling system drained (WP 0012 00).

###### Materials/Parts

Three sealing washers (item 146, WP 0173 00)  
Gasket (item 35, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

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## TURBOCHARGER PLUMBING MAINTENANCE (Contd)

### NOTE

Both turbochargers plumbing is replaced the same way. This procedure covers the replacement of plumbing for one turbocharger.

### REMOVAL

### NOTE

Have container ready to catch coolant and oil.

1. Remove clamp (19) and air filter (20) from turbocharger inlet (18).
2. Remove two clamps (3) and air crossover hose (2) from turbocharger outlet (21).
3. Remove two clamps (3), air crossover hose (22), and air crossover tube (1) from intake manifold (27).
4. Remove banjo bolt (13), two sealing washers (9), and banjo fitting (10) from turbocharger (7). Discard sealing washers (9).
5. Remove two clamps (11), banjo fitting (10), and vent hose (12) from vent tube (24).
6. Remove screw (23), vent tube (24), and gasket (25) from engine (26). Discard gasket (25).
7. Remove oil supply hose (4) from turbocharger fitting (8).
8. Remove two screws (29) and clamps (28) from engine (26).
9. Remove oil supply line (4) from oil filter housing (30).
10. Remove coolant vent hose (6) from header tank (31) and elbow adapter (5).
11. Remove elbow adapter (5) from adapter (34).
12. Remove adapter (34) and sealing washer (9) from turbocharger (7). Discard sealing washer (9).
13. Remove two clamps (17) and oil drain hose (16) from turbocharger drain (14).
14. Remove two clamps (17), oil drain hose (33), and oil drain tube (15) from fitting (32).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

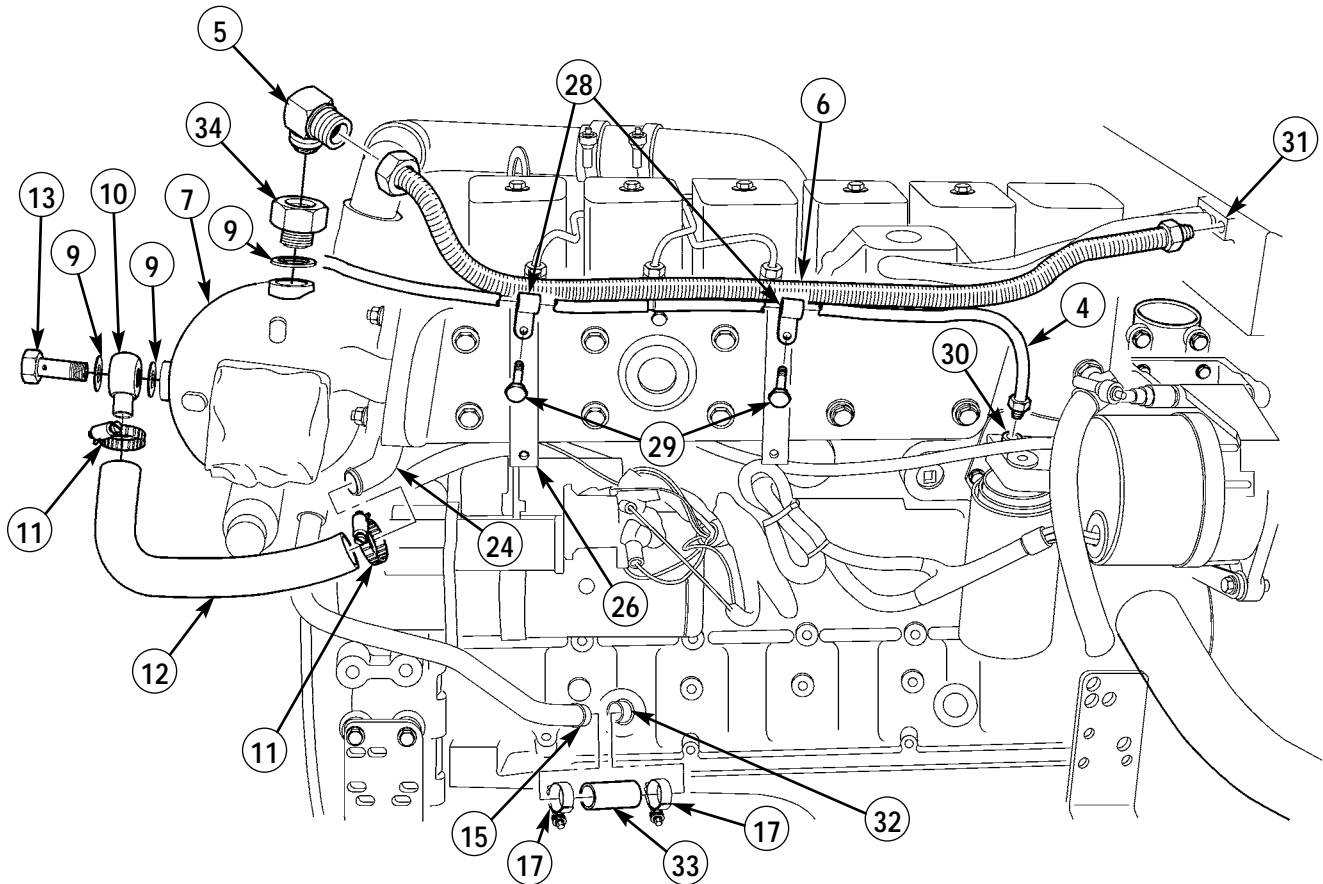
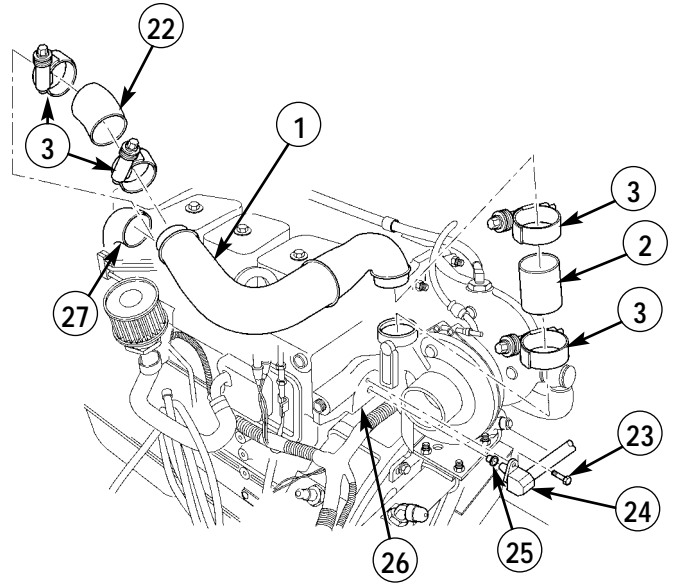
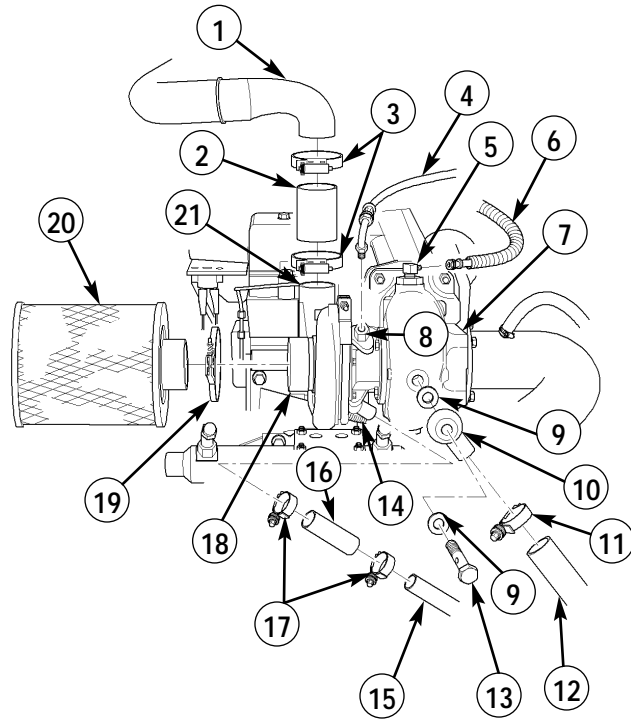
### WARNING

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2. Clean excess sealing compound from banjo fitting (10), turbocharger fitting (8), coolant supply hose (6), oil supply hose (4), and adapters (5), (32), and (34) with Skysol 100 and dry with cloth.
3. Inspect all hoses and fittings for damage. Replace if damaged.

### TURBOCHARGER PLUMBING MAINTENANCE (Contd)

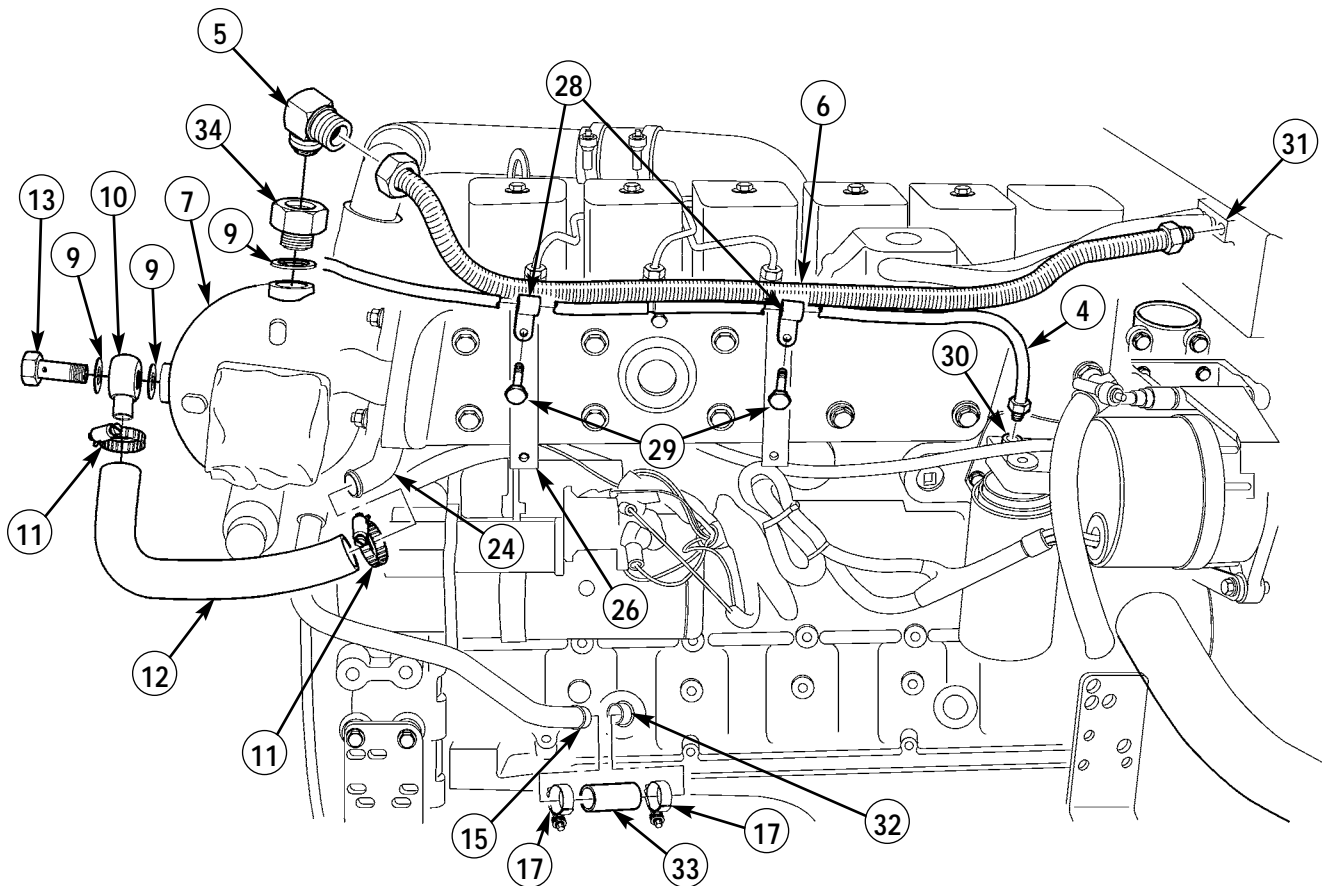
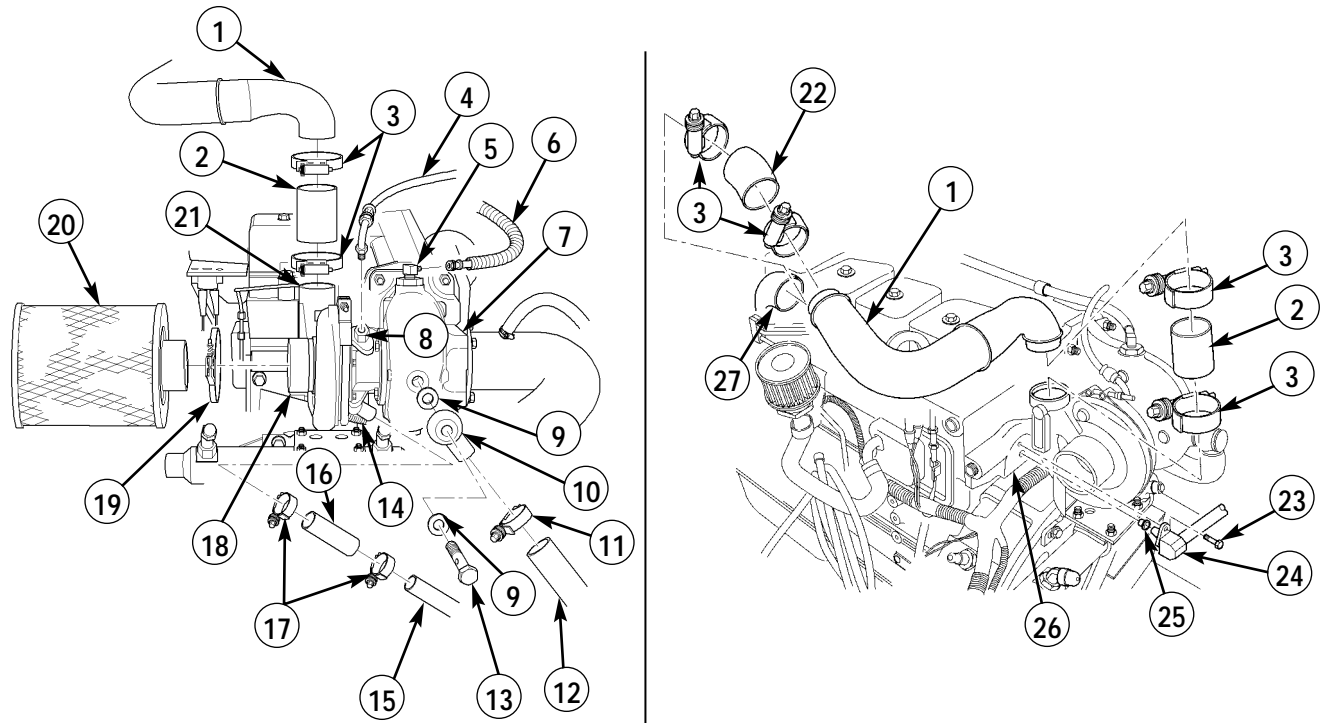


## TURBOCHARGER PLUMBING MAINTENANCE (Contd)

### INSTALLATION

1. Apply thin coat of sealing compound on male threads of coolant supply hose (6), oil supply hose (4), and elbow adapter (5).
2. Install oil drain hose (33) on fitting (32) with clamp (17).
3. Install oil drain tube (15) on oil drain hose (33) with clamp (17).
4. Install oil drain hose (16) on oil drain tube (15) and turbocharger oil drain (14) with two clamps (17).
5. Install adapter (34) and new sealing washer (9) on turbocharger (7).
6. Install elbow (5) on adapter (34).
7. Install coolant vent hose (6) on elbow (5) and header tank (31).
8. Install oil supply hose (4) on oil filter housing (30).
9. Secure oil supply hose (4) and coolant vent hose (6) on engine (26) with two clamps (28) and screws (29).
10. Install oil supply hose (4) on turbocharger fitting (8).
11. Install vent tube (24) on engine (26) with screw (23) and new gasket (25).
12. Install vent hose (12) on vent tube (24) and banjo fitting (10) with two clamps (11).
13. Install banjo fitting (10) on turbocharger (7) with two new sealing washers (9) and banjo bolt (13).
14. Install air crossover hose (22) and air crossover tube (1) on intake manifold (27) with two clamps (3).
15. Install air crossover hose (2) and air crossover tube (1) on turbocharger outlet (21) with two clamps (3).
16. Install air filter (20) on turbocharger inlet (18) with clamp (19).
17. Fill cooling system (WP 0012 00).
18. Start engine and check for leaks (TM 5-1940-322-10).
19. Install aft cockpit (WP 0016 00).
20. Close engine hatches (TM 5-1940-322-10).

### TURBOCHARGER PLUMBING MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB) MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TURBOCHARGER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two sealing washers (item 146, WP 0173 00)  
Gasket (item 2, WP 0173 00)  
Gasket (item 26, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)  
Antisieze compound (item 6, WP 0171 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0210 00)

##### Materials/Parts (Contd)

Oil (item 16, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Cooling system drained (WP 0012 00).

---

## TURBOCHARGER MAINTENANCE (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both turbochargers are replaced the same way. This procedure covers the replacement of one turbocharger.

Tag all hoses during removal to assist with installation.

## REMOVAL

### **NOTE**

Have container ready to catch coolant and engine oil.

1. Remove clamp (20) and air cleaner (21) from turbocharger inlet (19).
2. Remove four screws (14), washers (13), exhaust elbow (10), and gasket (9) from turbocharger (8). Discard gasket (9).
3. Remove clamp (2) and air crossover hose (3) from turbocharger outlet (1).
4. Remove oil supply hose (4) from fitting (7).
5. Remove coolant supply hose (6) from fitting (5).
6. Remove banjo bolt (15), two sealing washers (11), and vent hose (12) from turbocharger (8). Discard sealing washers (11).
7. Remove clamp (18) and oil drain hose (17) from turbocharger drain (16).
8. Remove four nuts (24), turbocharger (8), and gasket (22) from exhaust manifold (23). Discard gasket (22).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

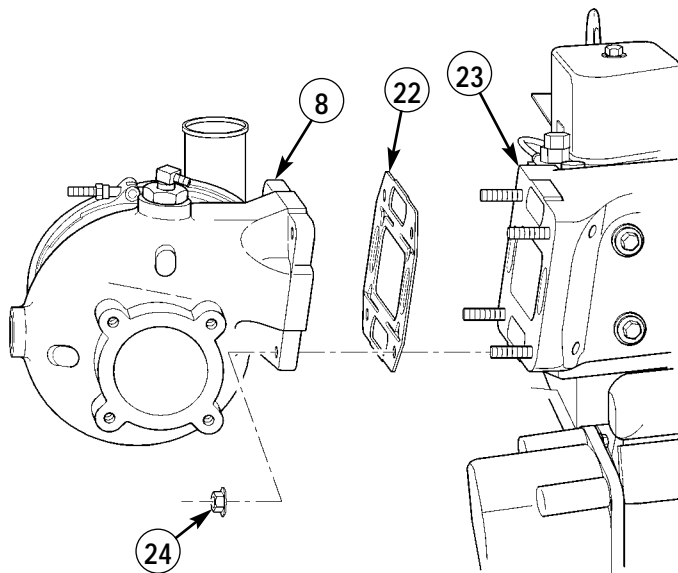
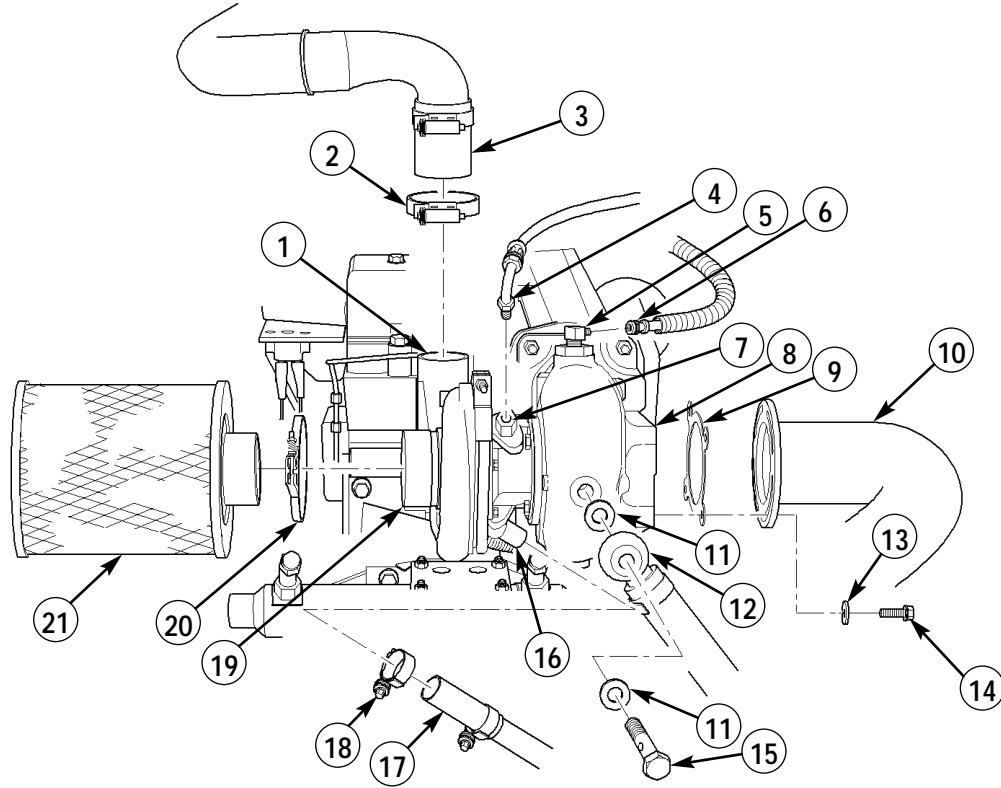
### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean mating surfaces of turbocharger (8), exhaust manifold (23), and exhaust elbow (10) with Skysol 100 and dry with cloth.
3. Clean and inspect all components for damage. Replace damaged components.

TURBOCHARGER MAINTENANCE (Contd)



## TURBOCHARGER MAINTENANCE (Contd)

### INSTALLATION

1. Apply antiseize compound on threads of studs (23) and screws (14).
2. Install turbocharger (8) and new gasket (22) on exhaust manifold (24) with four nuts (25). Tighten nuts (25) to 24 lb-ft (32 N•m).
3. Install oil drain hose (17) on turbocharger drain (16) with clamp (18).

#### **CAUTION**

Turbocharger must be lubricated before engine is started. Failure to comply may result in damage to equipment.

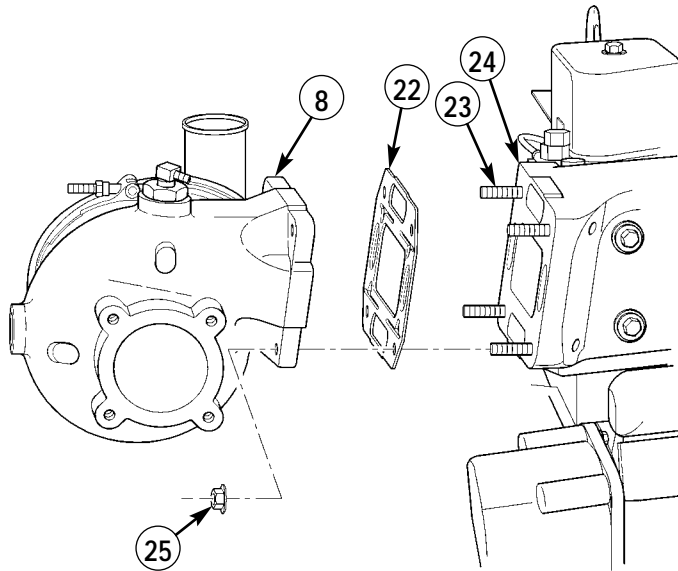
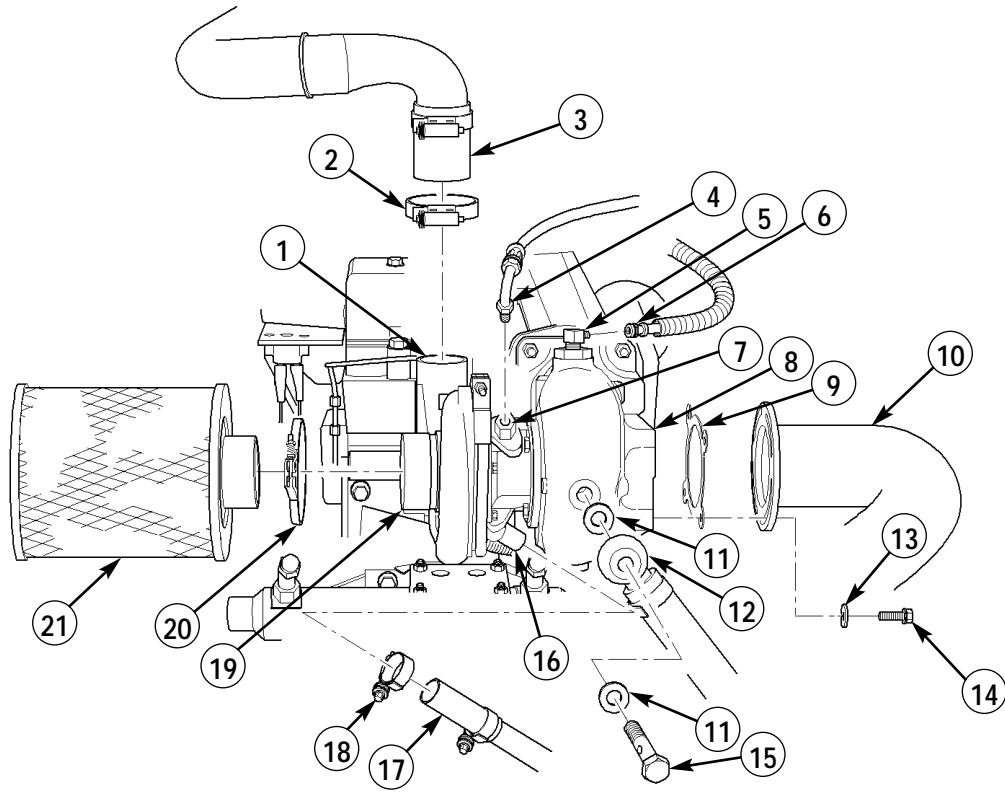
4. Pour 2–3 oz (55–80 cc) of engine oil in supply fitting (7) while rotating turbine wheel.
5. Install vent hose (12) on turbocharger (8) with banjo bolt (15) and two new sealing washers (11).
6. Install coolant supply hose (6) on fitting (5).
7. Install oil supply hose (4) on fitting (7).
8. If necessary, loosen clamp (2) and align turbocharger outlet (1) with air crossover hose (3). Tighten clamp (2) to 50 lb-in. (5.7 N•m).
9. Install crossover hose (3) on turbocharger (8) with clamp (2).

#### **CAUTION**

Turbocharger gasket is marked with “THIS SIDE TOWARDS TURBO” and must be installed in this position. Failure to comply may result in damage to equipment.

10. Install exhaust elbow (10) and new gasket (9) on turbocharger (8) with four washers (13) and screws (14).
11. Install air cleaner (21) on turbocharger inlet (19) with clamp (20).
12. Fill cooling system (WP 0012 00).
13. Start engine and check for leaks (TM 5-1940-322-10).
14. Install aft cockpit (WP 0016 00).
15. Close engine hatches (TM 5-1940-322-10).

TURBOCHARGER MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE VALVE COVERS MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Six gaskets (item 27, WP 0173 00)  
Six gaskets (item 28, WP 0173 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

---

## ENGINE VALVE COVERS MAINTENANCE (Contd)

### REMOVAL

#### **NOTE**

The valve covers on both engines are replaced the same way. This procedure covers the replacement of all valve covers on one engine.

1. Remove filler cap (1), seal (8), capscrew (2), gasket (3), valve cover (7), and gasket (6) from engine (5). Discard gaskets (3) and (6).
2. Remove five capscrews (2), gaskets (3), valve covers (4), and gaskets (6) from engine (5). Discard gaskets (3) and (6).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

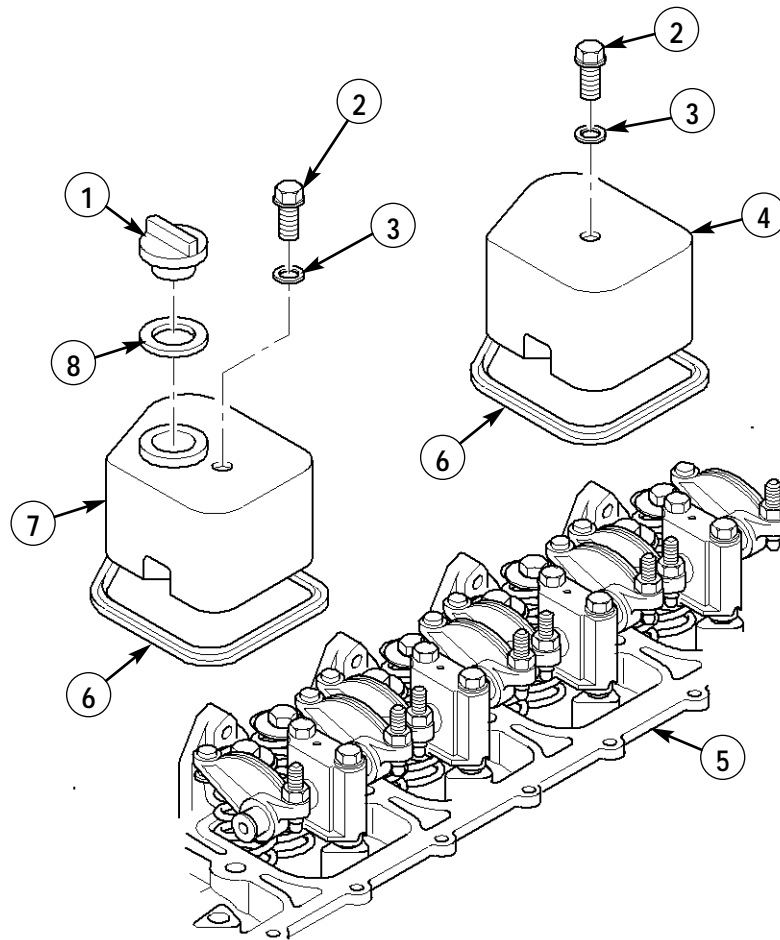
2. Remove excess gasket materials with Skysol 100 and dry with compressed air.
3. Inspect all components for damage. Replace damaged components.
4. Inspect seal (8) for cracks or damage. Replace seal (8) if damaged or cracked.

### INSTALLATION

1. Position six new gaskets (6) on engine (5).
2. Install seal (8) and filler cap (1) on valve cover (7).
3. Install valve cover (7) on front position of engine (5) with new gasket (3) and capscrew (2).
4. Install five valve covers (4) on engine with new gaskets (3) and capscrews (2).
5. Start engine and check for leaks (TM 5-1940-322-10).
6. Close engine hatches (TM 5-1940-322-10).



ENGINE VALVE COVERS MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ROCKER ARMS MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00  
WP 0161 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Valve cover removed (WP 0108 00).

---

## ROCKER ARMS MAINTENANCE (Contd)

### **NOTE**

The rocker arms on both engines are replaced the same way. This procedure covers the replacement of one rocker arm assembly. Note the position of the rocker arms as they must go back on the shaft in the same position. Tag rockers during removal to assist with installation.

### REMOVAL

Remove screws (2) and (3), and rocker arm assembly (1) from engine (17).

### DISASSEMBLY

1. Remove retaining ring (8), washer (7), and intake rocker arm (5) from rocker arm shaft (10).
2. Remove nut (6), adjusting screw (9), and rocker arm insert (4) from intake rocker arm (5).
3. Remove retaining ring (12), washer (13), and exhaust rocker arm (15) from rocker arm shaft (10).
4. Remove nut (16), adjusting screw (11), and rocker arm insert (14) from exhaust rocker arm (15).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

### **NOTE**

Tag rockers during removal to assist with installation

2. Inspect rocker arms (5) and (15) for cracks, breaks, surface wear, or scoring. Replace rocker arms (5) and (15) if damaged.
3. Inspect rocker arm assembly (1) for cracks, breaks, and other damage. Replace rocker arm assembly (1) if damaged.
4. Inspect shaft (10) for cracks, breaks, surface wear, or scoring. Replace shaft (10) if damaged.
5. Clean all components with Skysol 100 and dry with cloth.

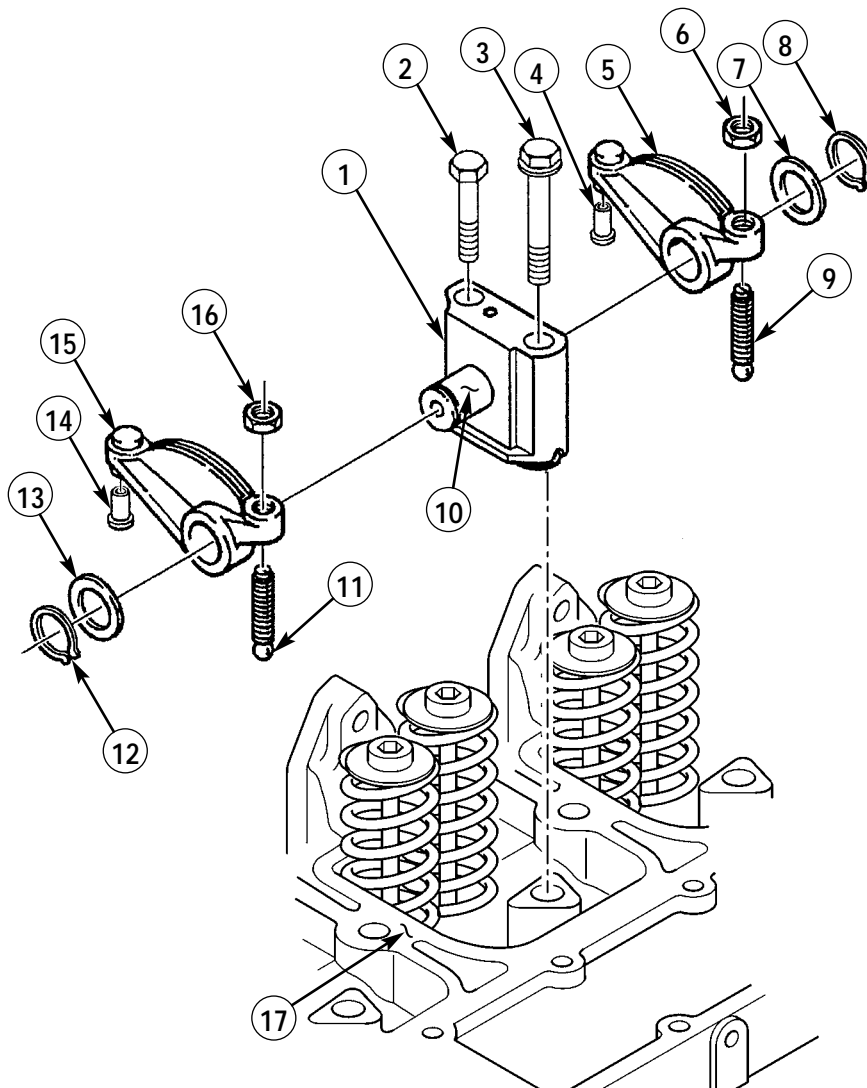
## ROCKER ARMS MAINTENANCE (Contd)

### ASSEMBLY

1. Install adjusting screw (11), nut (16), and rocker arm insert (14) in exhaust rocker arm (15).
2. Secure exhaust rocker arm (15) and washer (13) on rocker arm shaft (10) with retaining ring (12).
3. Install adjusting screw (9), nut (6), and rocker arm insert (4) on intake rocker arm (5).
4. Secure intake rocker arm (5) and washer (7) on rocker arm shaft (10) with retaining ring (8).

### INSTALLATION

1. Install rocker arm assembly (1) on engine (17) with screws (2) and (3). Tighten screws (2) and (3) to 18 lb-ft (24 N·m).
2. Adjust valve tappets (WP 0161 00).
3. Install valve cover (WP 0108 00).
4. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AIR INTAKE COVER MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Gasket (item 21, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Fuel injector lines removed (WP 0084 00).

---

## AIR INTAKE COVER MAINTENANCE (Contd)

### **NOTE**

The air intake cover on both engines are replaced the same way.  
This procedure covers the replacement of one air intake cover.

### REMOVAL

1. Loosen hose clamp (1) from hose (6) on air intake cover (2).
2. Disconnect hose (6) from air intake cover (2).
3. Remove fourteen screws (3), air intake cover (2), and gasket (4) from cylinder head (5). Discard gasket (4).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect intake covers (2) for cracks, breaks, surface wear, or scoring. Replace intake cover (2) if damage is present.

### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

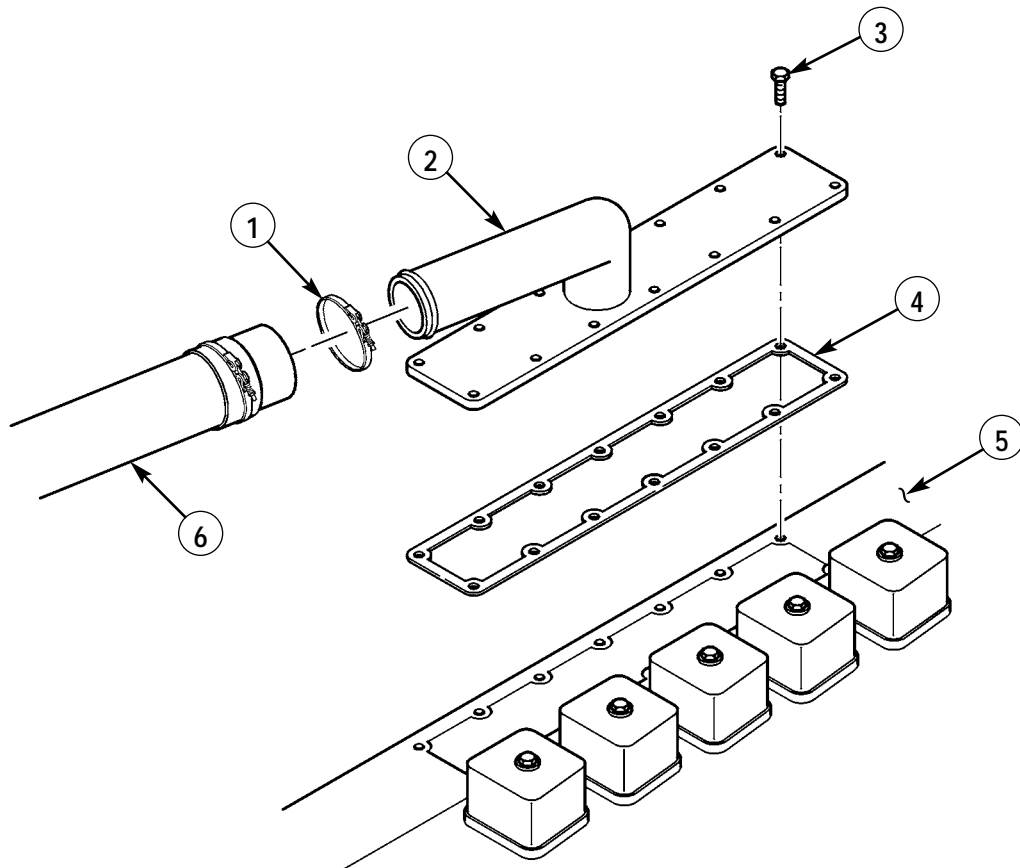
3. Remove excess gasket (4) from intake cover (2) and cylinder head (5). Clean all components with Skysol 100 and dry with compressed air.

### INSTALLATION

1. Apply thin coat of antiseize compound on threads of screws (3).
2. Install new gasket (4) and intake cover (2) on cylinder head (5) with fourteen screws (3). Tighten screws (3) to 18 lb-ft (24 N·m).
3. Install hose (6) on air intake cover (2) with clamp (1). Tighten clamp (1).
4. Install fuel injector lines (WP 0084 00).
5. Close engine hatches (TM 5-1940-322-10).



AIR INTAKE COVER MAINTENANCE (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### VIBRATION DAMPER REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Belt guard removed (WP 0085 00).  
Drivebelt removed (WP 0086 00).

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## VIBRATION DAMPER REPLACEMENT (Contd)

### NOTE

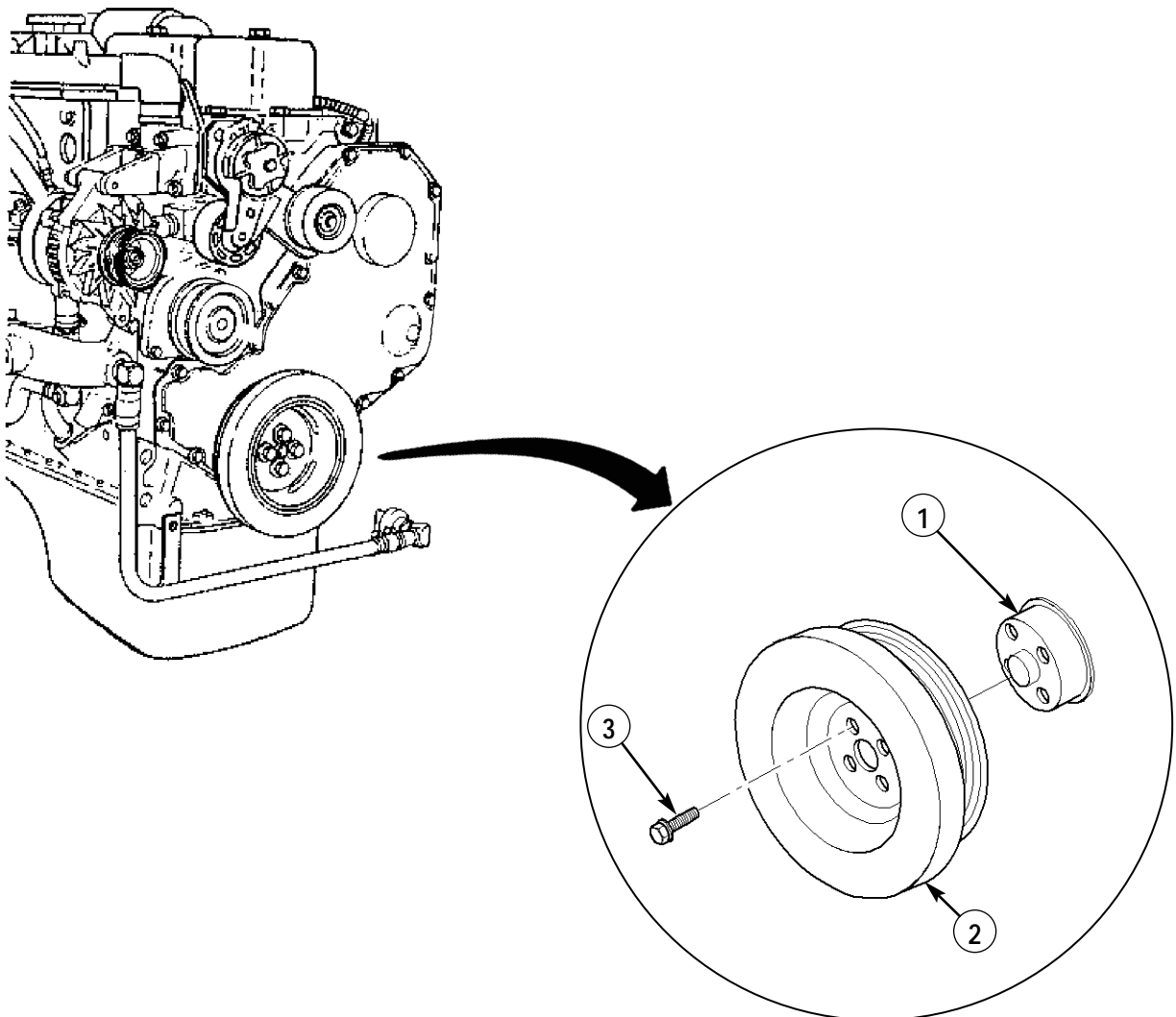
The vibration dampers on both engines are replaced the same way.  
This procedure covers the replacement of one vibration damper.

### REMOVAL

Remove four screws (3) and vibration damper (2) from crankshaft (1).

### INSTALLATION

1. Secure vibration damper (2) on crankshaft (1) with four screws (3). Tighten screws (3) to 92 lb-ft (125 N·m).
2. Install drivebelt (WP 0086 00).
3. Install belt guard (WP 0085 00).
4. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### EXHAUST MANIFOLD MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Six gaskets (item 22, WP 0173 00)  
Gasket (item 20, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### Reference

WP 0013 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Cooling system drained (WP 0012 00).  
Turbocharger and lines removed (WP 0107 00).  
Alternator removed (WP 0089 00).

---

## EXHAUST MANIFOLD MAINTENANCE (Contd)

### NOTE

The exhaust manifolds on both engines are replaced the same way. This procedure covers the replacement of one exhaust manifold.

### REMOVAL

1. Disconnect coolant intake hose (5) from elbow (4).
2. Remove elbow (4) and adapter (3) from water transfer connector (2).
3. Loosen clamp (9) from elbow (8).
4. Disconnect coolant return hose (10) from elbow (8).
5. Remove elbow (8) from exhaust manifold (7).
6. Remove four screws (1), water transfer connector (2), and gasket (6) from exhaust manifold (7). Discard gasket (6).
7. Remove twelve screws (11), exhaust manifold (7), and six gaskets (12) from cylinder head (13). Discard gaskets (12).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Inspect exhaust manifold (7) for cracks, breaks, surface wear, or scoring. Replace exhaust manifold (7) if damaged.
3. Remove excess gasket material from exhaust manifold (7), water transfer connector (2), and cylinder head (13) using Skysol 100 and dry with cloth.

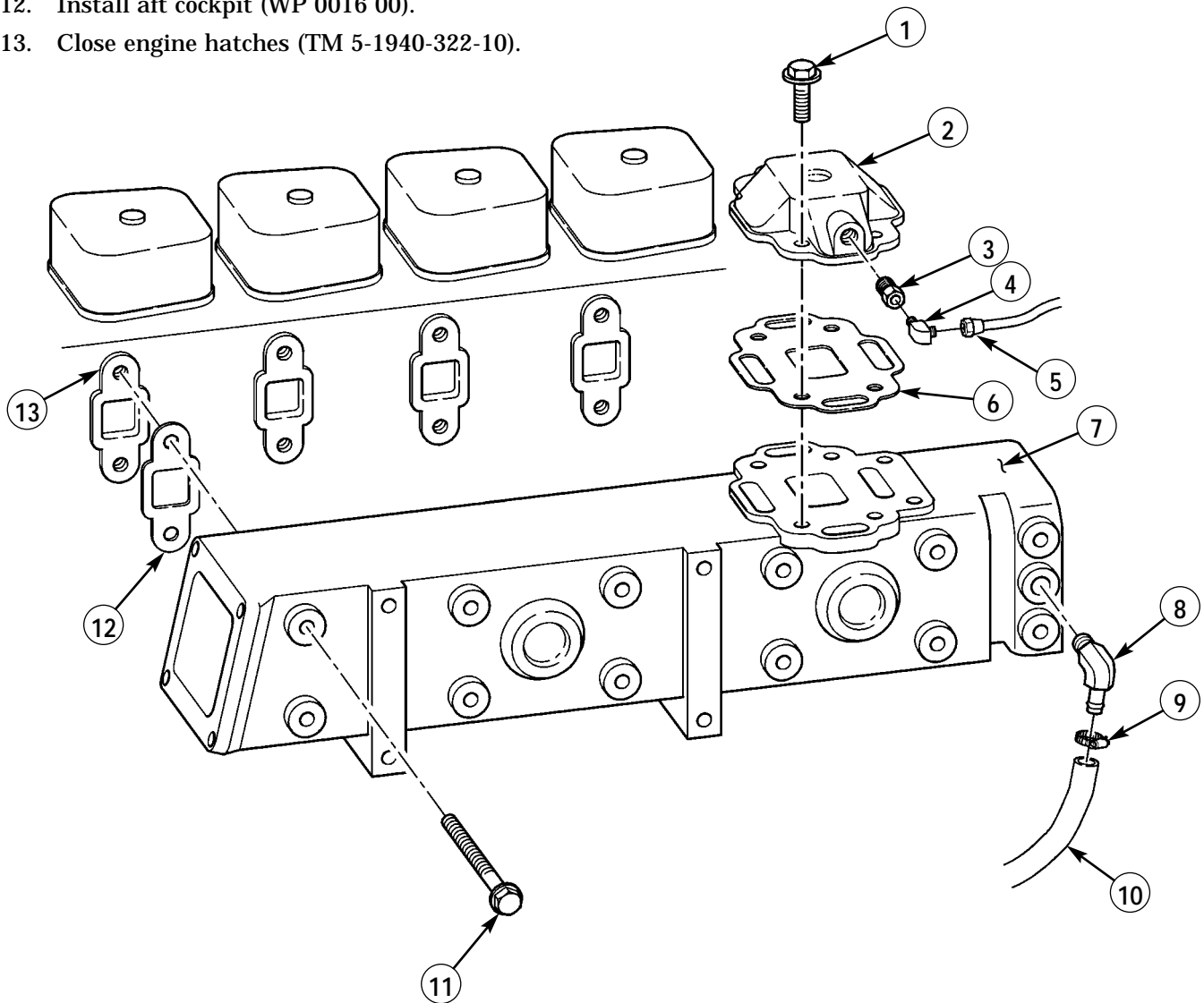
### INSTALLATION

1. Apply thin coat of sealing compound on threads of adapter (3) and elbows (4) and (8) at installation.
2. Install six new gaskets (12) and exhaust manifold (7) on cylinder head (13) with twelve screws (11). Tighten screws (11) to 32 lb-ft (43 N·m).
3. Install new gasket (6) and water transfer connector (2) on exhaust manifold (7) with four screws (1). Tighten screws (1) to 33 lb-ft (45 N·m).
4. Install elbow (8) on exhaust manifold (7).

## EXHAUST MANIFOLD MAINTENANCE (Contd)

### INSTALLATION (Contd)

5. Install coolant return hose (10) on elbow (8) with clamp (9).
6. Install adapter (3) and elbow (4) on water transfer connector (2).
7. Connect coolant intake hose (5) on elbow (4).
8. Install alternator (WP 0089 00).
9. Install turbocharger (WP 0107 00).
10. Fill cooling system (WP 0012 00).
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Install aft cockpit (WP 0016 00).
13. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE BREATHER, BRACKET, CLAMP, AND HOSE ASSEMBLY MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10)

---

## ENGINE BREATHER, BRACKET, CLAMP, AND HOSE ASSEMBLY MAINTENANCE (Contd)

### **NOTE**

The engine breathers, brackets, clamps, and hoses on both engines are replaced the same way. This procedure covers the replacement of one engine breather, bracket, clamp, and hose.

### REMOVAL

1. Remove engine breather (5), clamp (6), and plug (7) from adapter (8) by rotating plug (7) counterclockwise.
2. Remove clamp (6) and engine breather (5) from plug (7).
3. Remove clamp (12) and hose (9) from inlet (10).
4. Remove hose (9) from adapter (8).
5. Remove nut (3), washers (2), screw (13), and P-clamp (4) from bracket (14).
6. Remove screw (1) and bracket (14) from engine (11).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

#### **CAUTION**

Do not use solvent to clean engine breather. Failure to comply may result in damage to equipment.

2. Clean engine breather (5) with compressed air.
3. Inspect engine breather (5) for dirt. If dirt is present, replace engine breather (5).

#### **WARNING**

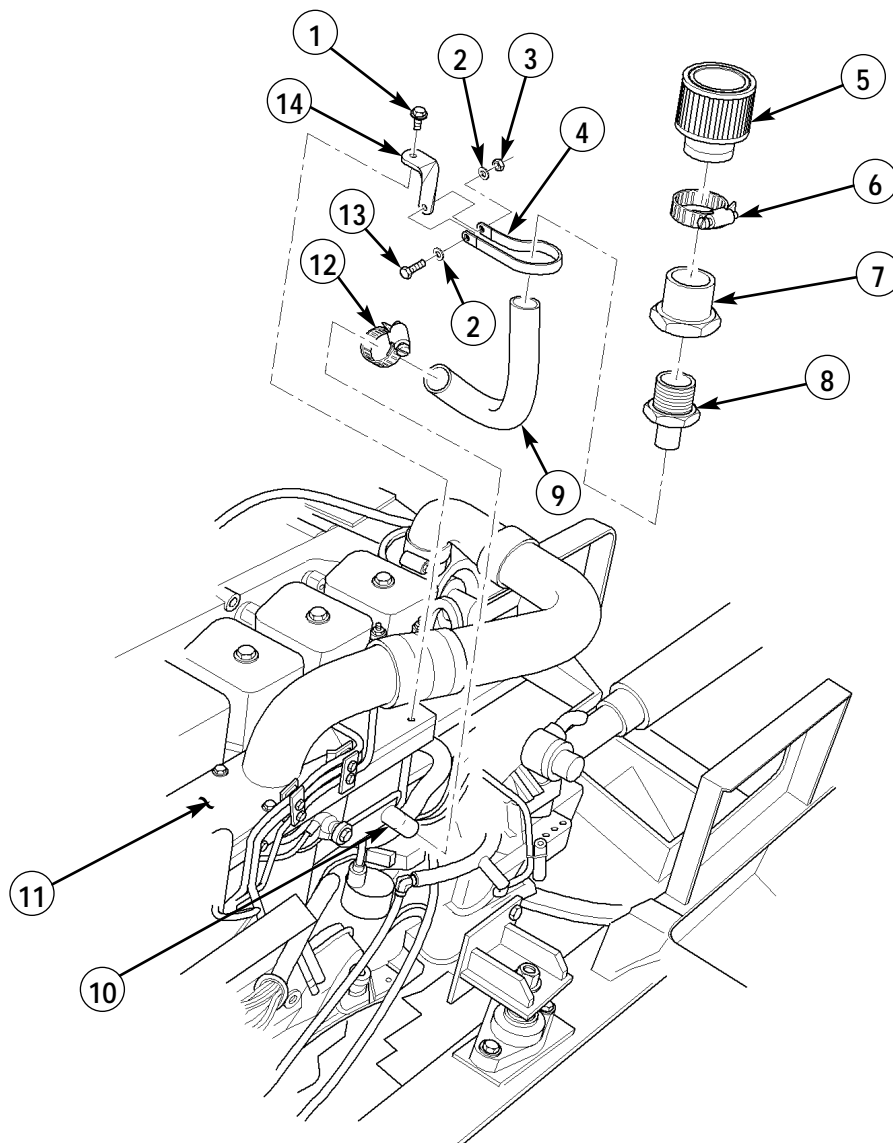
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

4. Clean excess sealing compound from adapter (8) with Skysol 100 and dry with cloth.

**ENGINE BREATHER, BRACKET, CLAMP, AND HOSE ASSEMBLY MAINTENANCE (Contd)****INSTALLATION**

1. Install bracket (14) on engine (11) with screw (1).
2. Install P-clamp (4) on bracket (14) with screw (13), washers (2), and nut (3). Do not tighten nut (3).
3. Install hose (9) on inlet (10) with clamp (12).
4. Secure hose (9) in P-clamp (4) with nut (3). Tighten nut (3).
5. Apply thin coat of sealing compound to threads of adapter (8).
6. Install plug (7) on adapter (8).
7. Install adapter (8) and plug (7) on hose (9).
8. Install engine breather (5) on plug (7) with clamp (6).
9. Close engine hatches (TM 5-1940-322-10).

**END OF WORK PACKAGE**



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE REAR LIFTING BRACKET REPLACEMENT REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## ENGINE REAR LIFTING BRACKET REPLACEMENT (Contd)

### NOTE

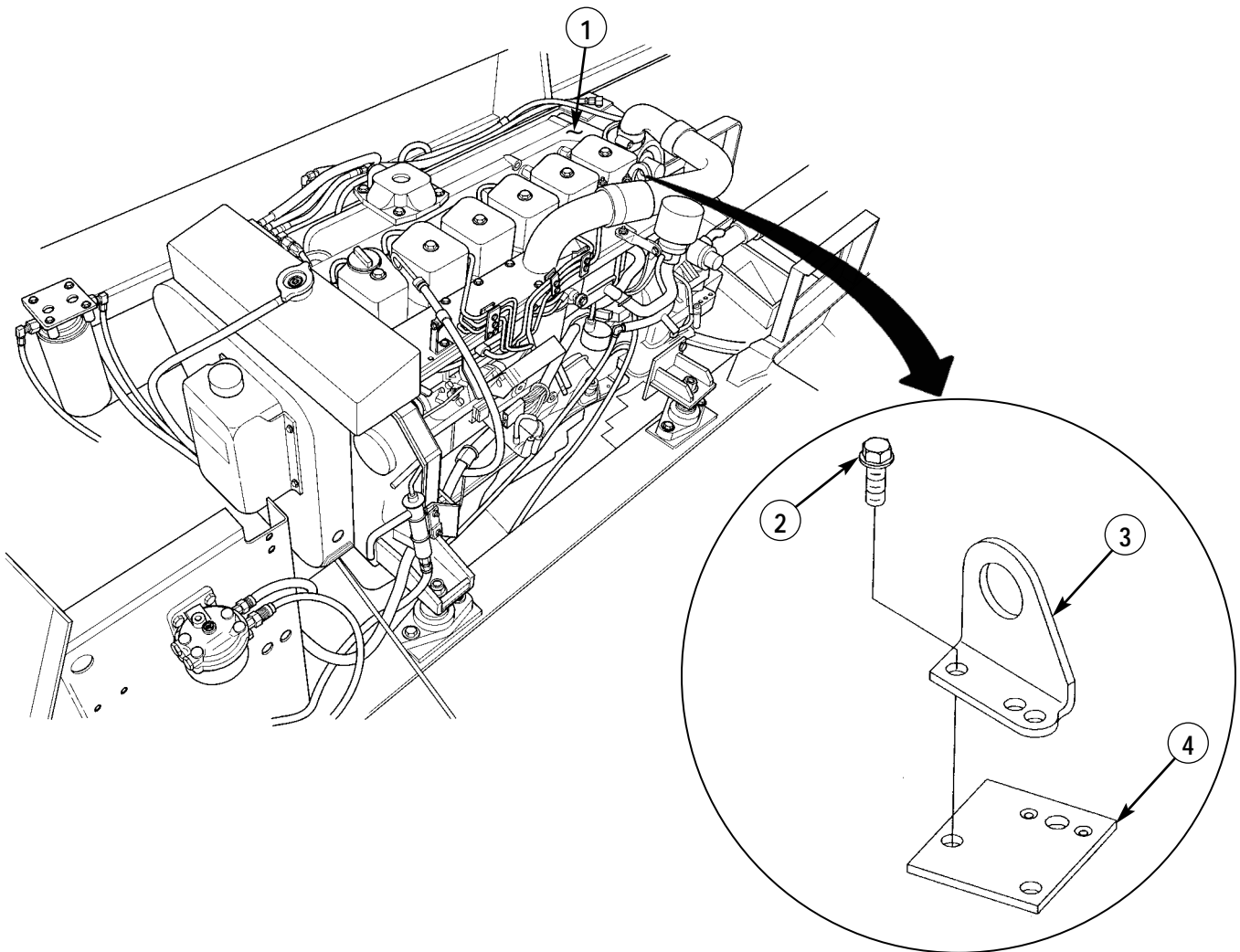
The rear engine lifting brackets on both engines are replaced the same way. This procedure covers the replacement of one rear engine lifting bracket.

### REMOVAL

Remove two screws (2), rear engine lifting bracket (3), and switch bracket (4) from engine (1).

### INSTALLATION

1. Install switch bracket (4) and rear engine lifting bracket (3) on engine (1) with two screws (2).
2. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE REPLACEMENT

#### REMOVAL AND INSTALLATION

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
 (item 13, WP 0172 00) or  
 Common No. 1 tool kit (item 41, WP 0172 00)  
 Sling (item 44, WP 0172 00)  
 Chains  
 Lifting device

##### Materials/Parts

Locknut (item 53, WP 0173 00)  
 Eight locknuts (item 54, WP 0173 00)  
 Four locknuts (item 62, WP 0173 00)  
 Two locknuts (item 60, WP 0173 00)  
 Two locknuts (item 61, WP 0173 00)  
 Gasket (item 18, WP 0173 00)  
 Lockwasher (item 80, WP 0173 00)  
 Lockwasher (item 81, WP 0173 00)  
 Two terminals (item 175, WP 0173 00)  
 Two washers (item 177, WP 0173 00)  
 Screw (item 176, WP 0173 00)  
 Antifreeze (item 5, WP 0171 00)  
 Tape, pressure sensitive adhesive  
 (item 40, WP 0171 00)

##### Materials/Parts (Contd)

Insulation sleeving, electrical  
 (item 41, WP 0171 00) Antiseize compound  
 (item 6, WP 0171 00)  
 Cap and plug set (item 7, WP 0171 00)

##### Personnel Required

Three

##### References

WP 0121 00  
 WP 0125 00

##### Equipment Condition

Mast lowered and secured (TM 5-1940-322-10).  
 Engine hatches opened and secured  
 (TM 5-1940-322-10).  
 Battery ground cables disconnected  
 (WP 0054 00).  
 Engine cooling system drained  
 (WP 0012 00).  
 Aft cockpit removed (WP 0016 00).

## ENGINE REPLACEMENT (Contd)

### **WARNING**

Diesel fuel is flammable. Keep fuel away from open flames and keep fire extinguisher within reach when working with fuel. Do not work on fuel system while engine is hot. Fuel can be ignited by contact with hot engine. Failure to comply may result in death or injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both engines are replaced the same way. This procedure covers the replacement of one engine.

As necessary, cut and remove tiedown straps to remove hoses, battery cables, and control cables from engine.

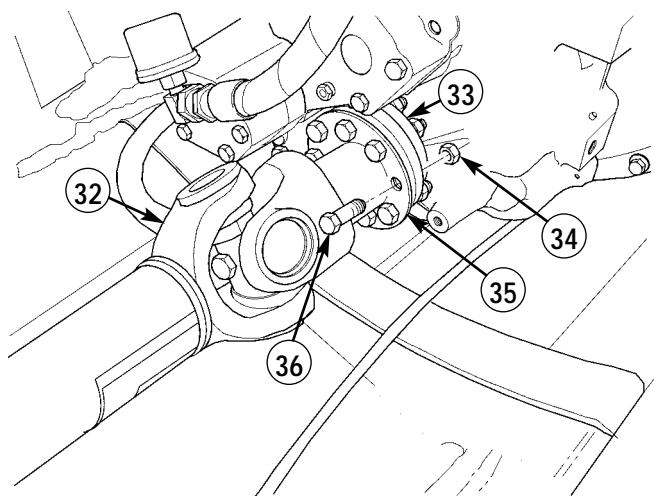
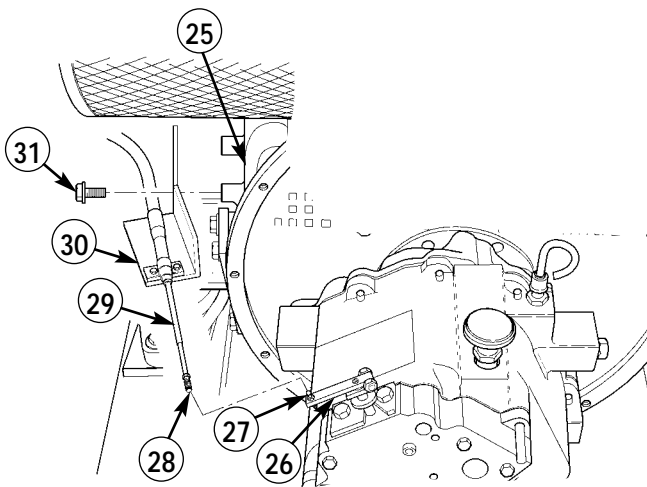
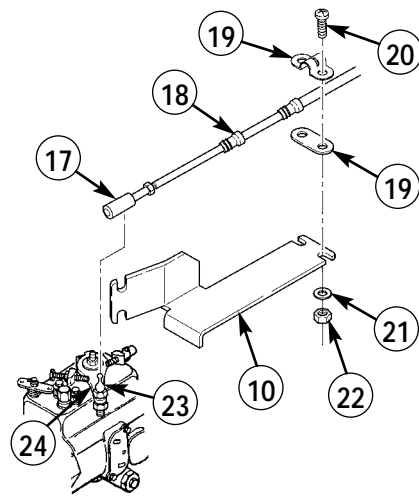
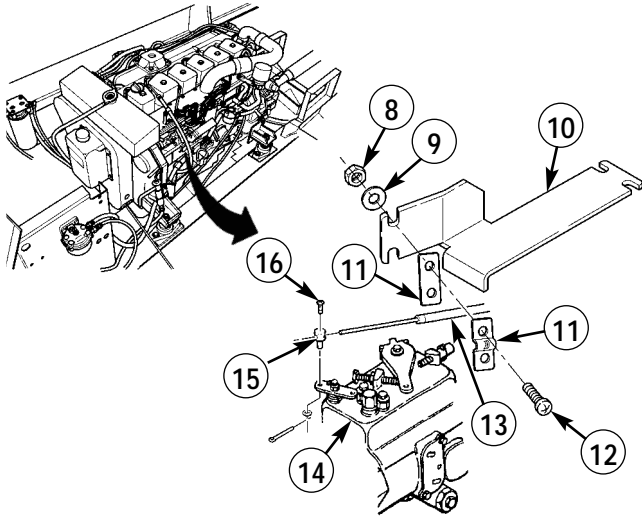
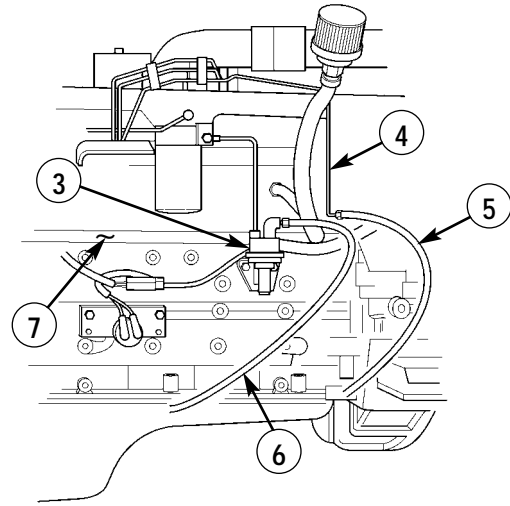
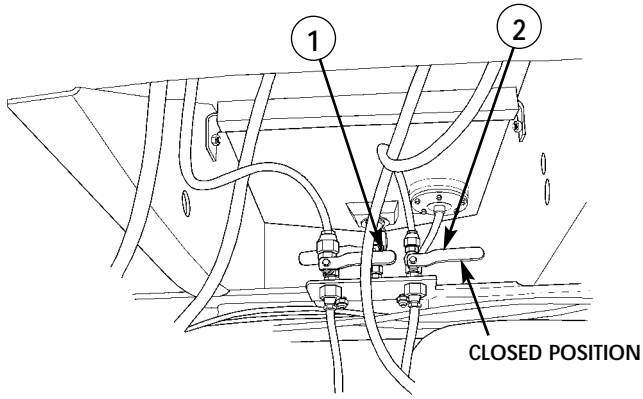
Have container ready to catch fuel and coolant.

## REMOVAL

1. Place intermediate fuel shutoff valves (1) or (2) in closed position for engine being removed.
2. Disconnect fuel supply hose (6) from fuel lift pump (3).
3. Disconnect fuel return hose (5) from fuel return tube (4) on engine (7).
4. Remove two locknuts (8), washers (9), screws (12), cable clamp (11), and engine stop cable (13) from throttle cable bracket (10) on fuel injection pump (14). Discard locknuts (8).
5. Loosen setscrew (16) on trunnion (15) and pull engine stop cable (13) from trunnion (15) on fuel injection pump (14).
6. Slide sleeve (17) back on throttle cable (18) and disconnect throttle cable (18) from ball stud (23) on fuel injection pump lever (24).
7. Remove two locknuts (22), washers (21), screws (20), cable clamps (19), and throttle cable (18) from throttle cable bracket (10). Discard locknuts (22).
8. Slide sleeve (28) back on transmission control cable (29) and disconnect control cable (29) from ball stud (27) on transmission control lever (26).
9. Remove two screws (31) and transmission control cable bracket (30) with control cable (29) from side of flywheel housing (25).
10. Remove eight locknuts (34) and screws (36) from driveshaft flange (35) and transmission flange (33). Slide driveshaft flange (35) back away from transmission flange (33). Discard locknuts (34).



ENGINE REPLACEMENT (Contd)



## ENGINE REPLACEMENT (Contd)

11. Loosen two hose clamps (1) and remove hoses (3) and (4) from transmission oil cooler (2).
12. Remove four screws (8) and washers (7), starboard exhaust elbow (9), and gasket (6) from turbocharger (5). Discard gasket (6).
13. Loosen four hose clamps (12) on exhaust elbow (9) and outlet port (11). Remove hose (10) and exhaust elbow (9) from engine (13).

### NOTE

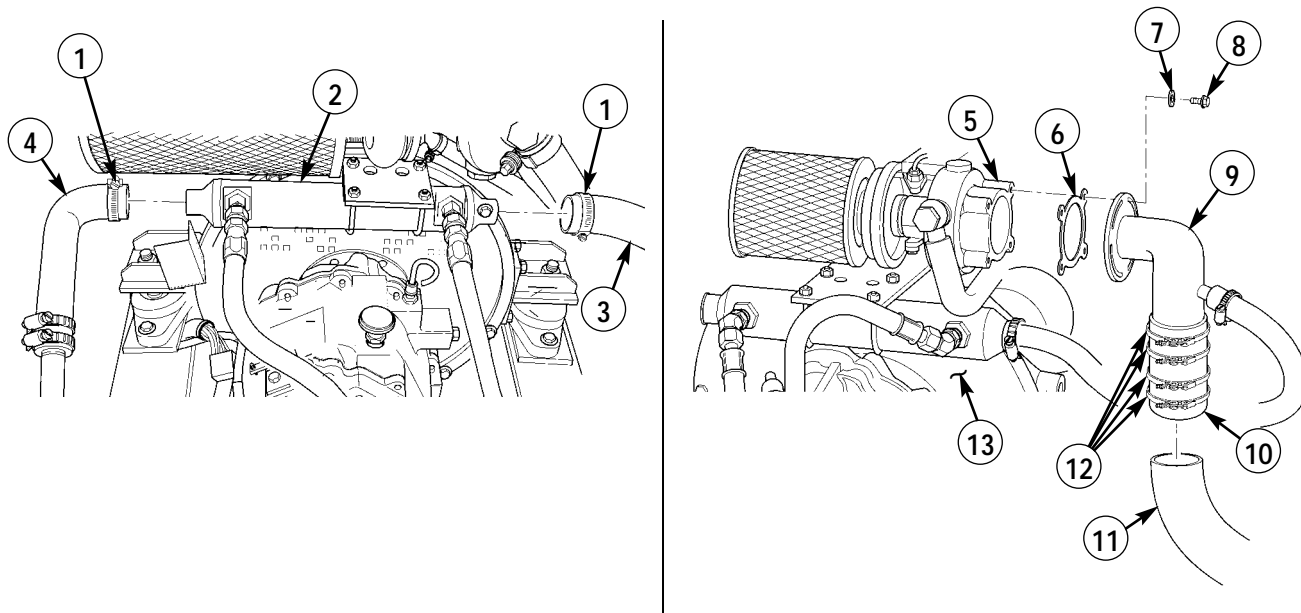
Tag all electrical leads and battery cables during removal to assist with installation.

14. Disconnect engine wiring harness connector (22) from boat wiring harness connector (21).
15. Remove nut (29), lockwasher (28), two battery negative (-) ground cables (30), and ground lead (27) from ground stud (26) on starter (34). Discard lockwasher (28).
16. Remove nut (31), lockwasher (32), battery positive (+) cable (33), electrical lead (24), and battery positive (+) cable (23) from starter solenoid stud (25). Discard lockwasher (32).

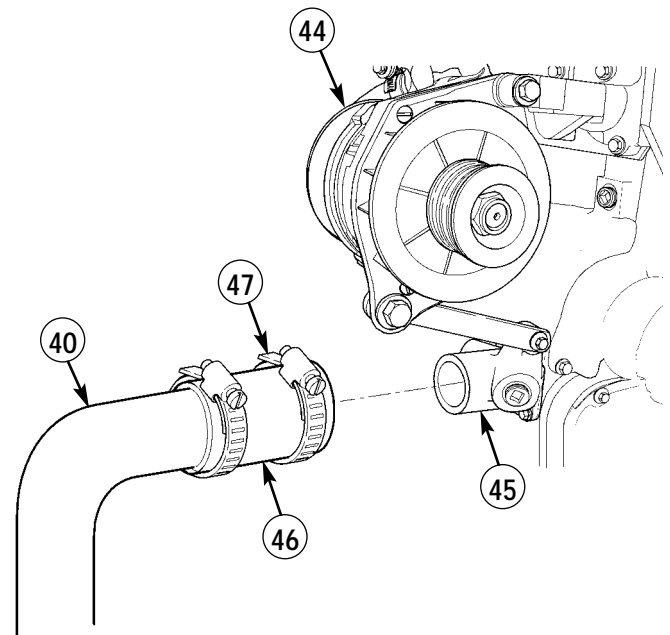
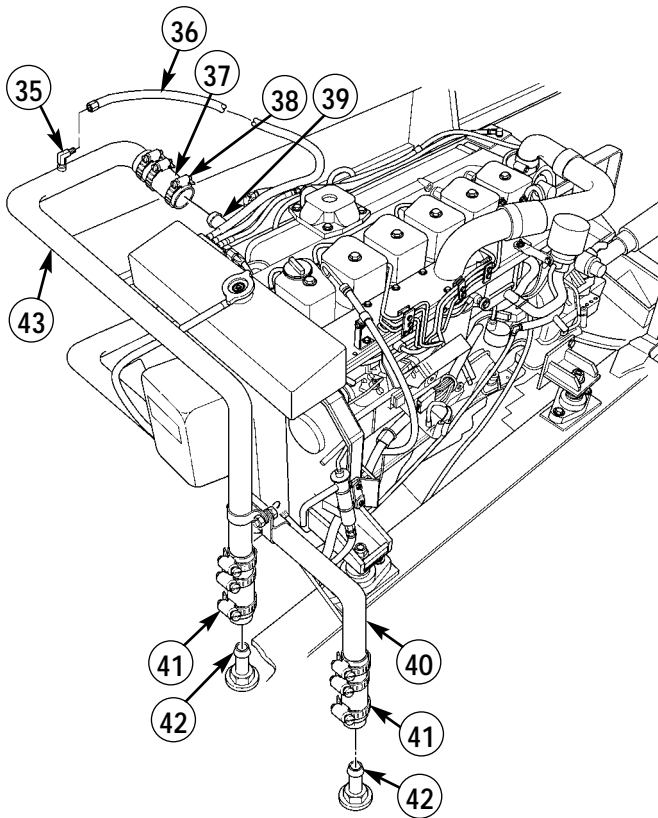
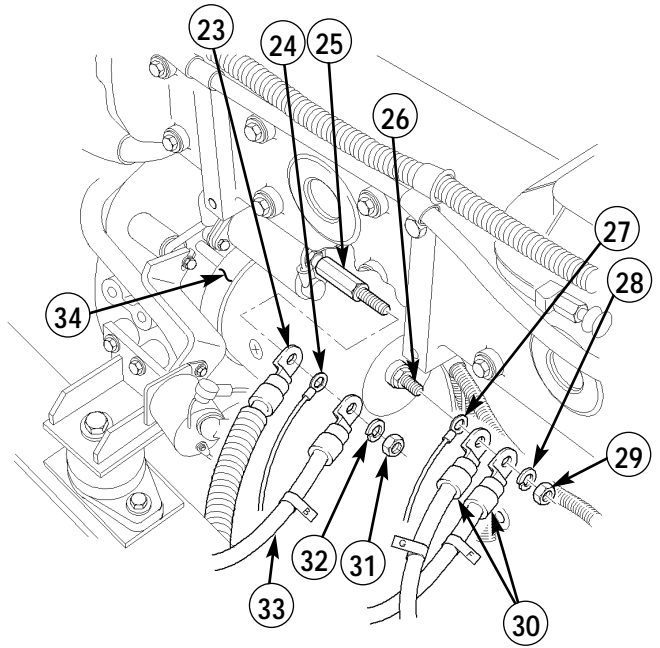
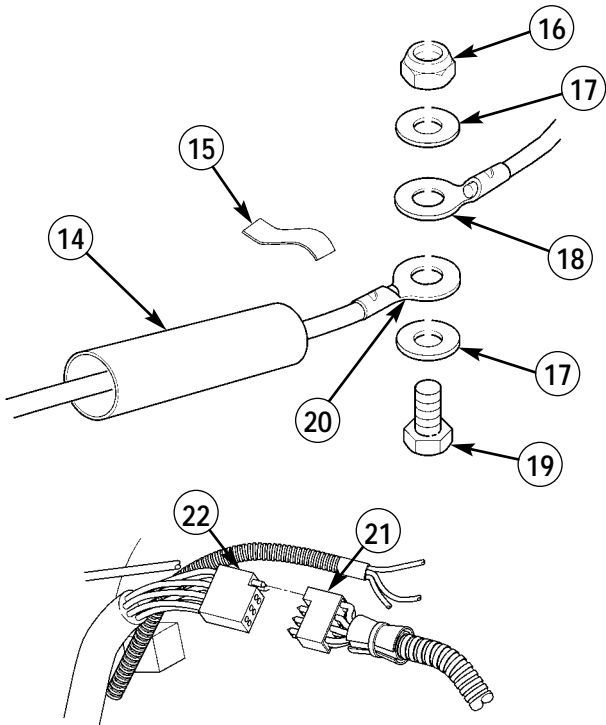
### NOTE

If equipped with two terminals, washers, screw, and locknut, perform step 17. If not equipped, install as shown.

17. Remove insulation sleeve (14), pressure tape (15), locknut (16), screw (19), two washers (17), and fast fuse lead R terminal (20) from port alternator lead R terminal (18) or fast fuse lead U terminal (20) from starboard alternator lead U terminal (18). Discard locknut (16).
18. Loosen hose clamp (38) and disconnect keel cooler outlet pipe hose (37) from thermostat housing (39).
19. Remove vent hose (36) from elbow (35) on keel cooler outlet pipe (43).
20. Loosen hose clamp (47) and disconnect keel cooler water inlet pipe hose (46) from engine coolant inlet connection (45).
21. If necessary, loosen hose clamps (41) on other ends of keel cooler pipes (40) and (43) and remove keel cooler pipes (40) and (43) from keel cooler inlet and outlet ports (42) and boat.



ENGINE REPLACEMENT (Contd)



## ENGINE REPLACEMENT (Contd)

21. Remove four locknuts (1) and washers (2) from engine mounting brackets (3). Discard locknuts (1).

### **WARNING**

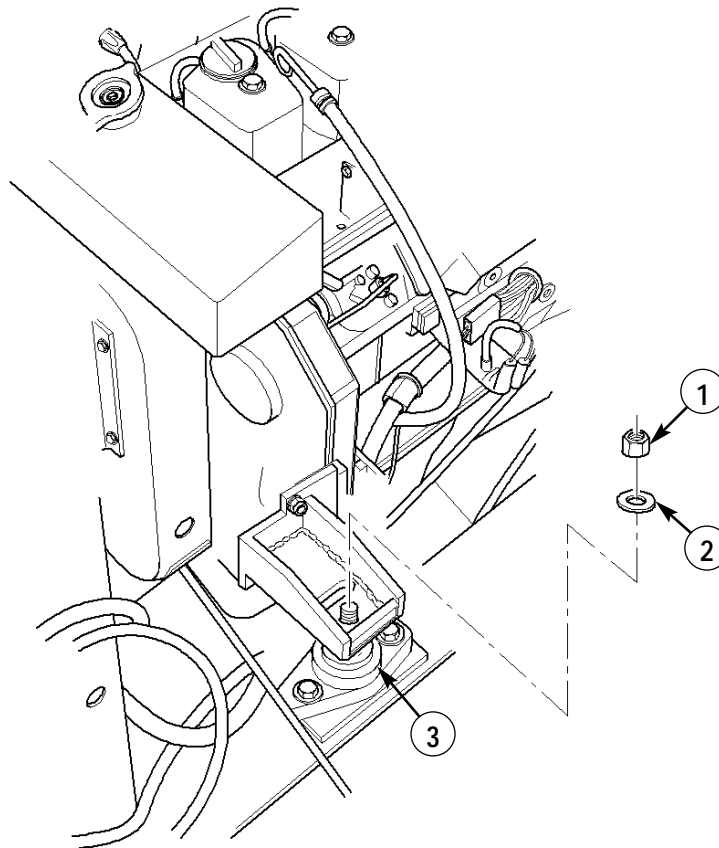
All nonessential personnel must stand clear during lifting operations. Failure to comply may result in injury to personnel.

Keep hands clear of lifting area. Use pry bar to free engine during lifting operations. Failure to comply may result in injury to personnel.

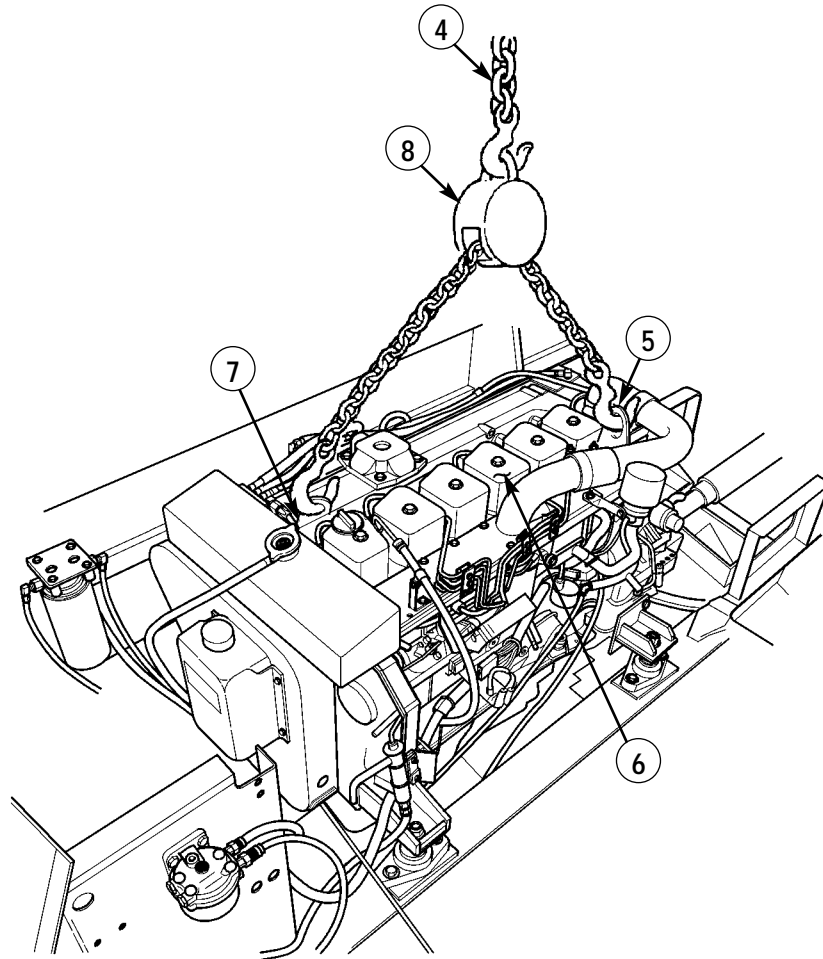
Lifting device and chains must have a weight capacity greater than 1,250 lbs (567.0 kg). Failure to comply may result in injury to personnel and/or damage to equipment.

Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.

22. Install chain or sling (8) to engine lifting brackets (5) and (7).
23. Connect lifting device (4) to chain or sling (8).
24. Raise engine (6) until engine weight is supported by lifting device (4). Remove engine (6) from boat and place on suitable engine stand or blocks.



ENGINE REPLACEMENT (Contd)



## ENGINE REPLACEMENT (Contd)

### INSTALLATION

#### **NOTE**

Perform steps 1 and 2 if transmission was removed from engine.

1. Install transmission driveplate on engine (WP 0121 00).
2. Install transmission on engine (WP 0125 00).
3. Make sure engine mounting brackets (2) are adjusted to 1.750 in. (4.445 cm) from top of base (3) to top of washer (1) and jamnuts (4) are tight before installing engine.

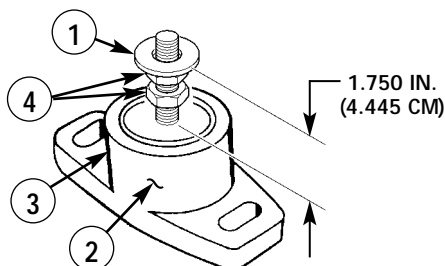
#### **WARNING**

All nonessential personnel must stand clear during lifting operations. Failure to comply may result in injury to personnel.

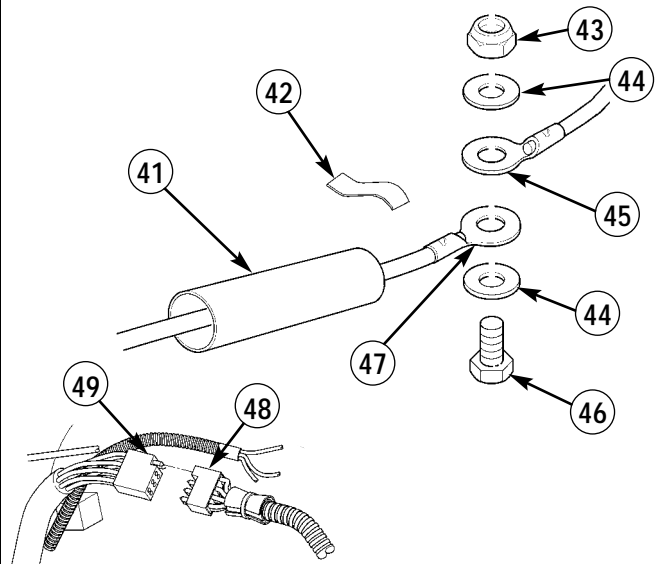
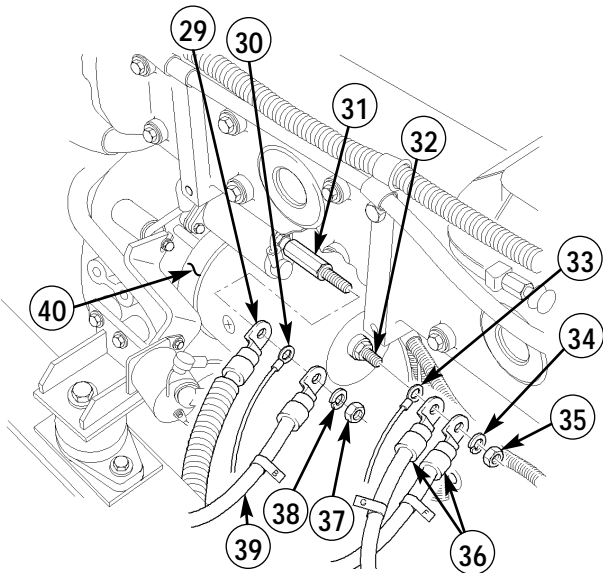
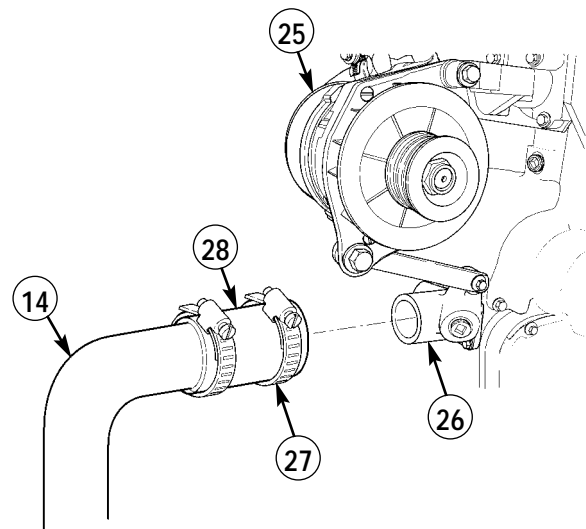
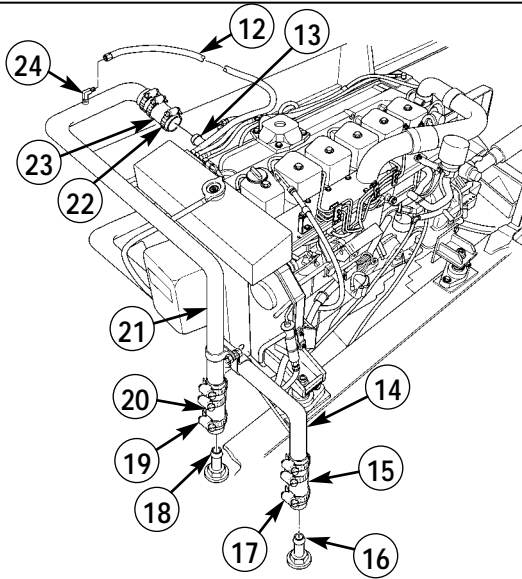
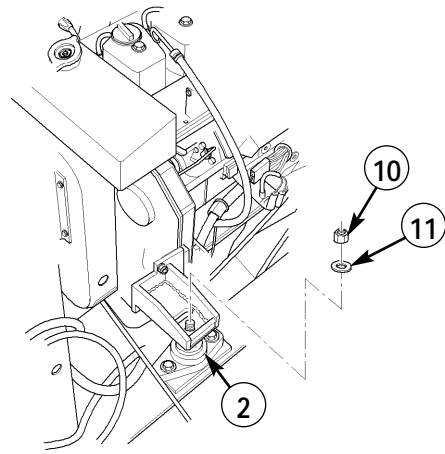
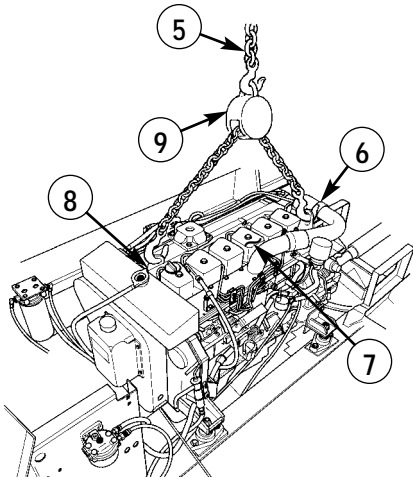
Keep hands clear of lifting area. Use pry bar to free engine during lifting operations. Failure to comply may result in injury to personnel.

Lifting device must have a weight capacity greater than the weight of the engine and transmission. Failure to comply may result in injury to personnel and/or damage to equipment.

4. Install chain or sling (9) on engine lifting brackets (6) and (8) on engine (7).
5. Connect lifting device (5) to chain or sling (9).
6. Lift engine (7) from suitable engine stand or blocks and place engine (7) on four engine mounting brackets (2) in boat.
7. Install four washers (11) and new locknuts (10) on engine mounting brackets (2). Tighten locknuts (10) to 125 lb-ft (169 N·m).
8. If removed, install hoses (15) and (20) of keel cooler inlet and outlet pipes (14) and (21) on keel cooler inlet and outlet ports (16) and (18) and tighten hose clamps (17) and (19).
9. Install hose (28) on other end of keel cooler inlet pipe (14) to engine coolant inlet connection (26) and tighten hose clamp (27).
10. Install hose (23) on other end of keel cooler outlet pipe (21) to thermostat housing (13) and tighten hose clamp (22).
11. Install vent hose (12) to elbow (24) on keel cooler outlet pipe (21).
12. Install battery positive (+) cable (29), electrical lead (30), and battery positive (+) cable (39) on starter solenoid stud (31), as noted at removal, with new lockwasher (38) and nut (37).
13. Install ground lead (33) and two battery negative (-) cables (36) on ground stud (32) of starter (40) as noted at removal, with new lockwasher (34) and nut (35).
14. Slide new insulaton sleeve (41) over one lead wire before connecting fast fuse lead R terminal (47) to port alternator lead R terminal (45) or fast fuse lead U terminal (47) on starboard alternator lead U terminal (45) with two washers (44), screw (46), and new locknut (43). Apply three layers of pressure tape (42) around terminals (45) and (47) and slide insulation sleeve (41) over terminals and leads.
15. Connect engine wiring harness connector (48), as noted at removal, to boat wiring harness connector (49).



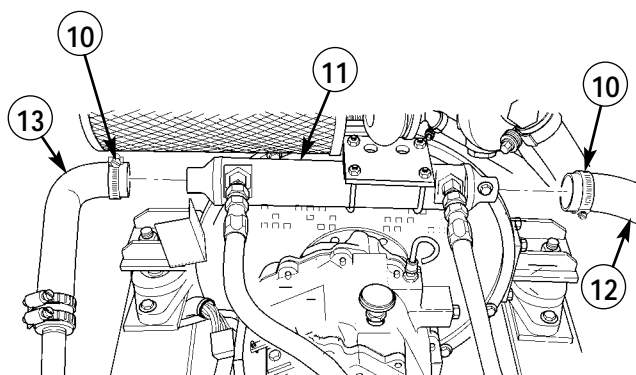
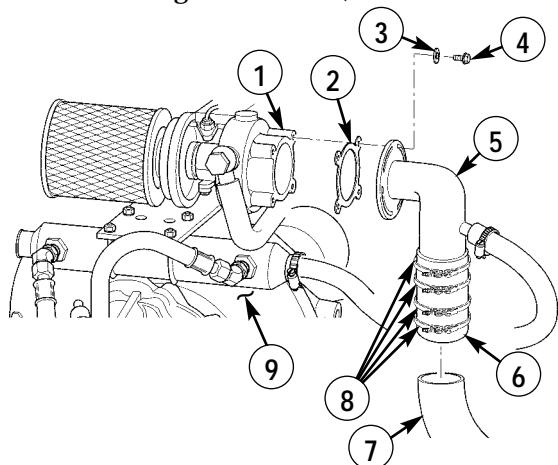
### ENGINE REPLACEMENT (Contd)



## ENGINE REPLACEMENT (Contd)

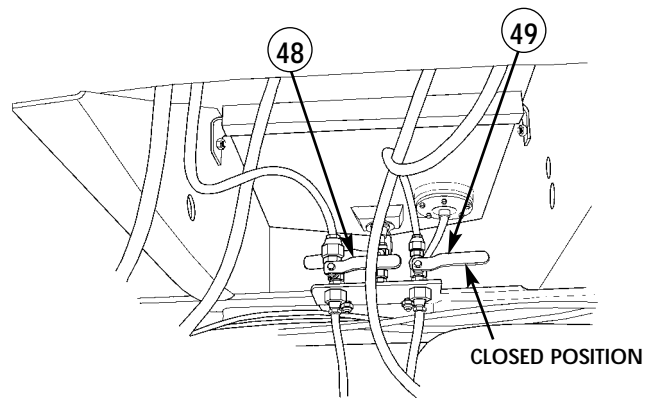
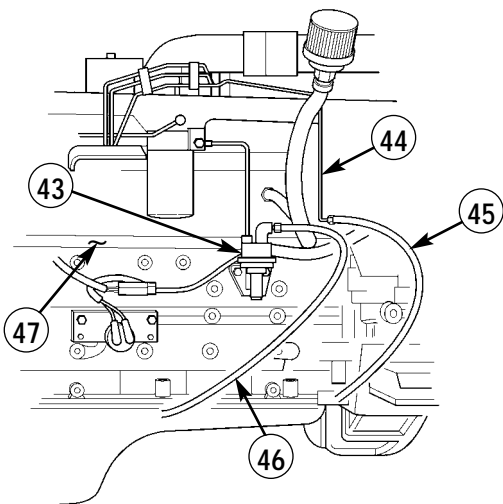
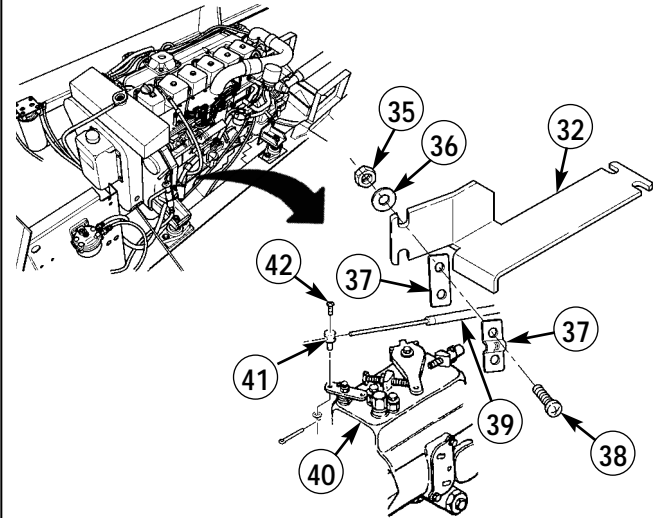
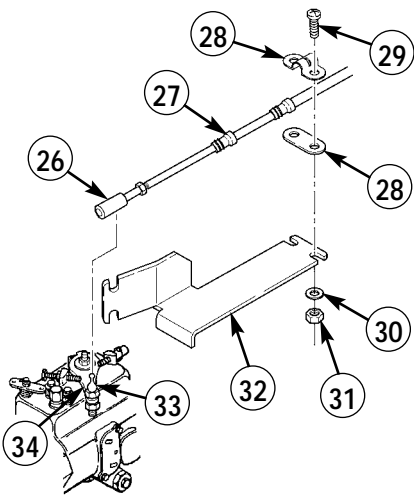
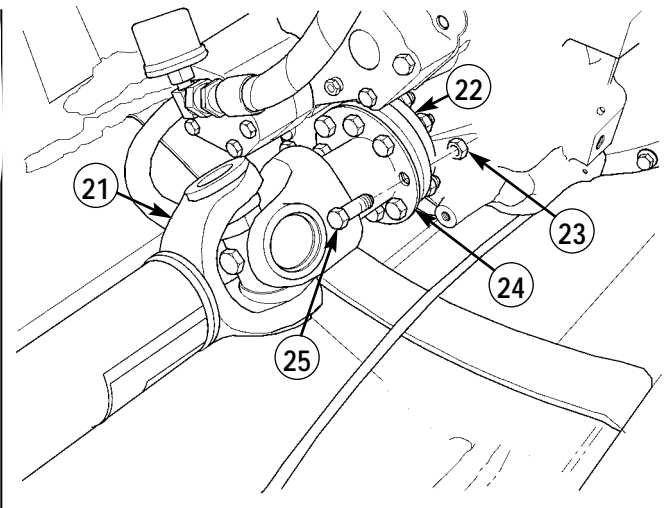
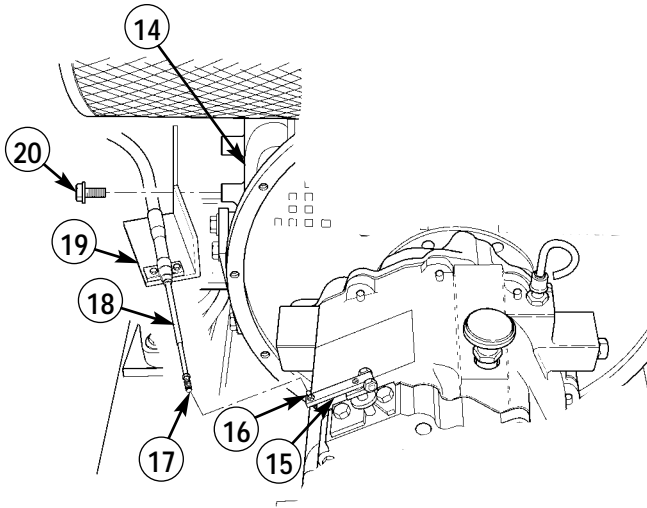
### INSTALLATION (Contd)

16. Install hose (6) and exhaust elbow (5) on outlet port (7) with four hose clamps (8). Tighten hose clamps (8).
17. Install new gasket (2) and exhaust elbow (5) on turbocharger (1) with four washers (3) and screws (4). Tighten screws (4) to 18 lb-ft (24 N•m).
18. Install hoses (12) and (13) on transmission oil cooler (11) with two hose clamps (10).
19. Install transmission control bracket (19) and transmission control cable (18) on side of flywheel housing (14) with two screws (20).
20. Slide sleeve (17) back on control cable (18) and connect control cable (18) to ball stud (16) on transmission control lever (15).
21. Slide drive shaft flange (24) forward and position drive shaft flange (24) on transmission flange (22). Apply light coat of antisieze compound to screws (25) and install eight screws (25) and new locknuts (23) and drive shaft flange (24) on transmission flange (22). Tighten screws (25) to 55 lb-ft (75 N•m).
22. Install throttle cable (27) on throttle cable bracket (32) with two cable clamps (28), screws (29), washers (30), and new locknuts (31).
23. Slide sleeve (26) back on throttle cable (27) and connect throttle cable (27) to ball stud (33) on fuel injection pump lever (34).
24. Install engine stop cable (39) through trunnion (41) on fuel injection pump (40) and tighten setscrew (42) on trunnion (41).
25. Install engine stop cable (39) on throttle cable bracket (32) with cable clamps (37), two screws (38), washers (36), and new locknuts (35).
26. Connect fuel return hose (45) on fuel return tube (44) on engine (47).
27. Connect fuel supply hose (46) on fuel lift pump (43).
28. Move intermediate fuel shutoff valve (48) or (49) from closed position to open position for engine being installed.
29. Fill engine and transmission with oil as necessary (WP 0012 00).
30. Fill cooling system (WP 0012 00).
31. Connect battery ground cables (WP 0054 00).
32. Bleed fuel system (WP 0080 00).
33. Start engine and check for leaks (TM 5-1940-322-10).
34. Install aft cockpit (WP 0016 00).
35. Close engine hatches (TM 5-1940-322-10).





### ENGINE REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION OIL COOLER FLUSHING MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
5/32 in. solid electrode (item 11, WP 0172 00)  
Hose (item 17, WP 0172 00)

###### Materials/Parts

Sealing compound (item 36, WP 0171 00)

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

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## TRANSMISSION OIL COOLER FLUSHING MAINTENANCE (Contd)

### NOTE

The transmission oil cooler flushing procedure is performed the same way on both engines. This procedure covers flushing the transmission oil cooler on one engine.

Tag transmission oil cooler hoses during removal to assist with installation.

### REMOVAL

1. Remove two hose clamps (1), water inlet hose (5), and water outlet hose (3) from transmission oil cooler (2).
2. Turn drain plug (4) counterclockwise and remove from transmission oil cooler (2).

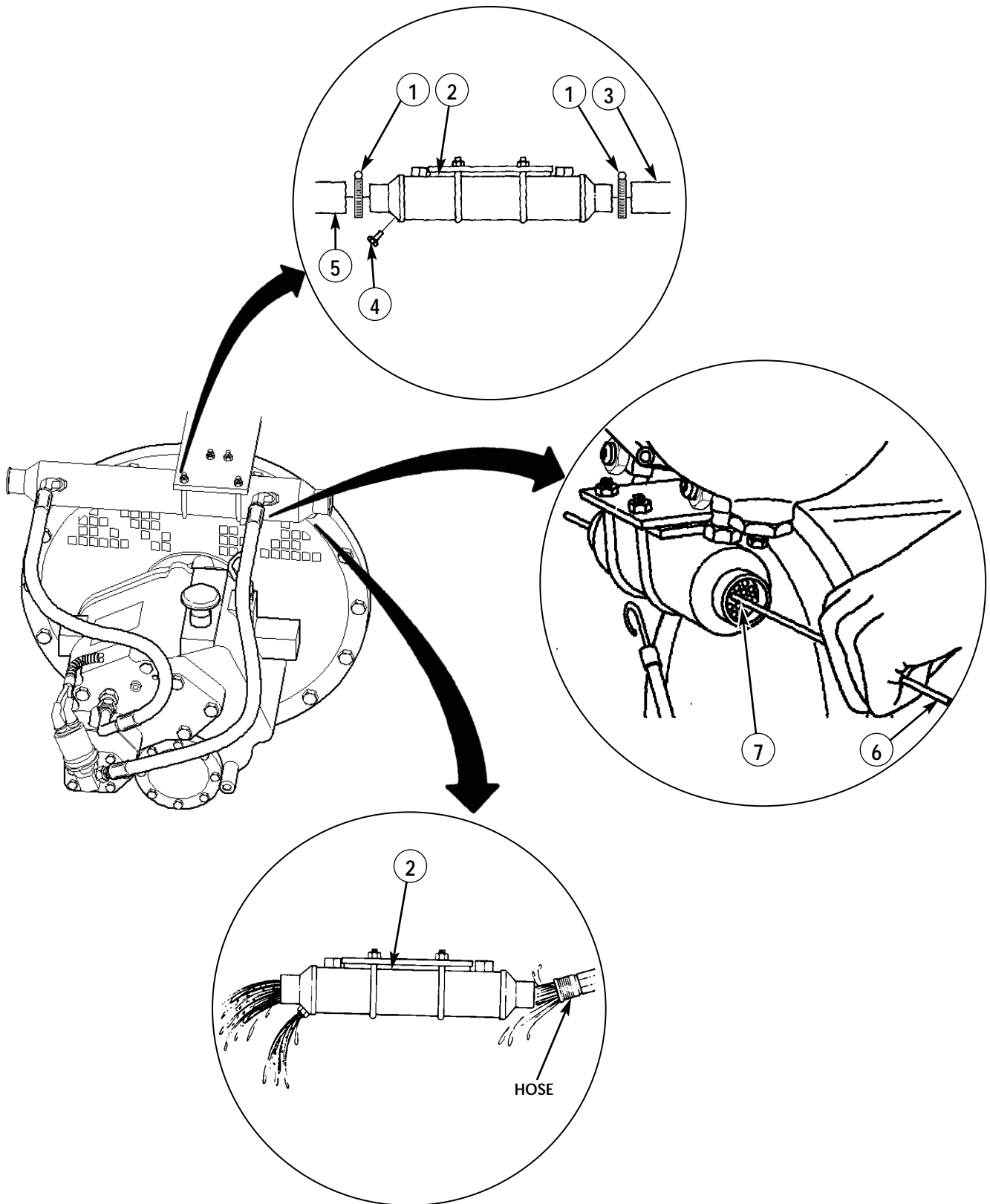
### CLEANING AND INSPECTION

1. Use solid electrode (6) to clean cooler tubes.
2. Use hose (7) to backflush debris from transmission oil cooler (2).
3. Inspect transmission oil cooler (2) for damage or leakage. If damaged or leaking, replace (WP 0125 00).
4. Run bilge pump to remove water from boat (TM 5-1940-322-10).

### INSTALLATION

1. Apply thin coat of sealing compound to drain plug (4).
2. Install drain plug (4) on transmission oil cooler (2). Tighten drain plug (4) by turning clockwise.
3. Secure water outlet hose (3) and water inlet hose (5) on transmission oil cooler (2) with clamps (1). Tighten clamps (1).
4. Close engine hatches (TM 5-1940-322-10).

# TRANSMISSION OIL COOLER FLUSHING MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION OIL COOLER REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cap and plug set (item 7, WP 0171 00)  
Transmission oil (item 19, WP 0171 00)

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Transmission oil drained (WP 0012 00).

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## TRANSMISSION OIL COOLER REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

The transmission oil coolers on both engines are replaced the same way. This procedure covers the replacement of one transmission oil cooler.

Have container ready to catch transmission oil.

### REMOVAL

1. Remove two hose clamps (6) and raw water hoses (5) and (10) from transmission oil cooler (1).
2. Remove transmission oil cooler hoses (7) and (9) from transmission oil cooler (1).
3. Remove four nuts (3), two U-bolts (8), rubber mounting pad (4), and transmission oil cooler (1) from bracket (2).

### INSTALLATION

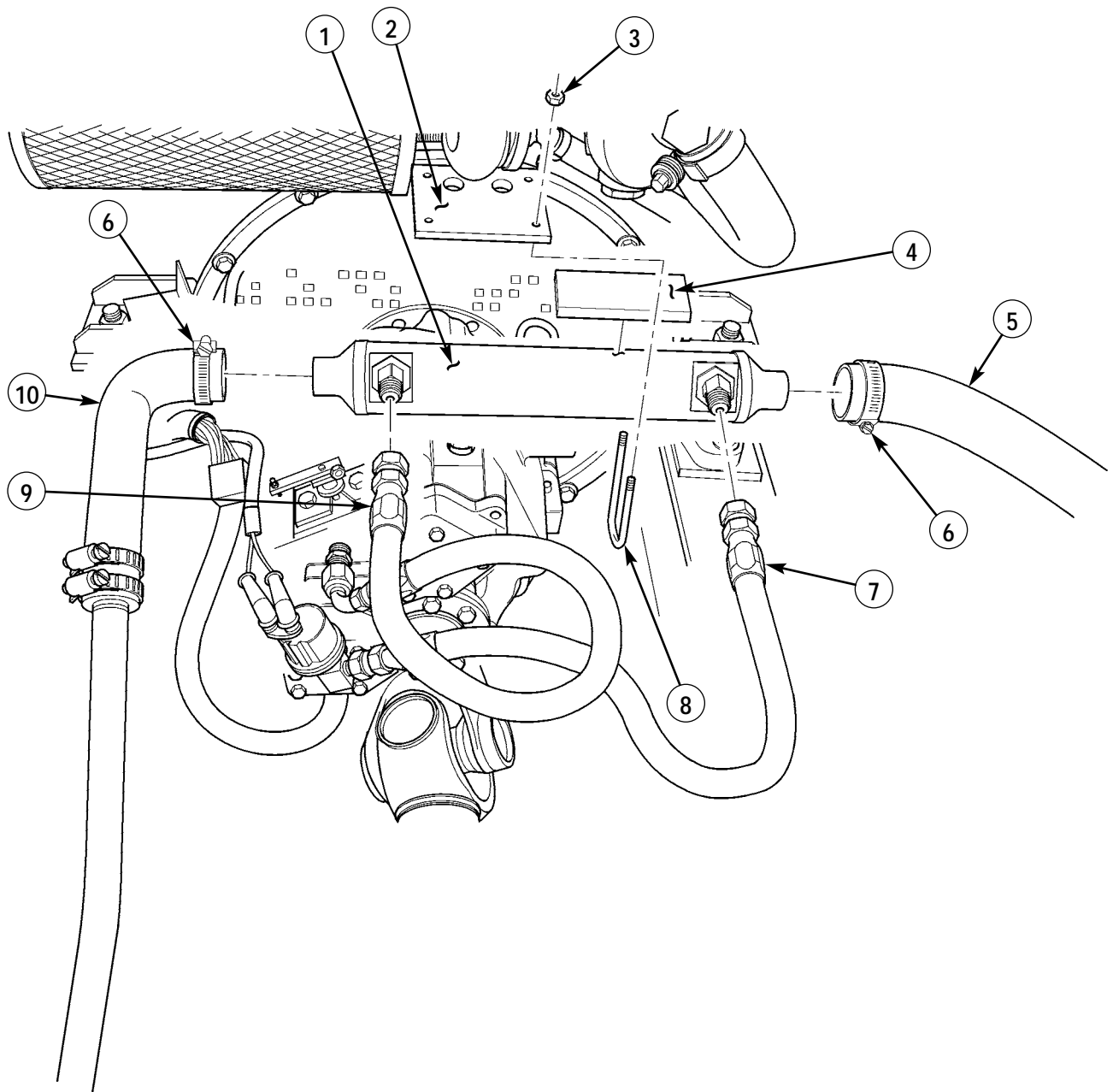
### **CAUTION**

Do not over tighten nuts securing transmission oil cooler to bracket. Failure to comply may result in damage to transmission oil cooler.

1. Install transmission oil cooler (1) and rubber mounting pad (4) on bracket (2) with two U-bolts (8) and four nuts (3).
2. Install transmission oil cooler hoses (7) and (9) on transmission oil cooler (1).
3. Install raw water hoses (5) and (10) on transmission oil cooler (1) with two hose clamps (6).
4. Fill transmission with oil (WP 0012 00).
5. Install aft cockpit (WP 0016 00).
6. Close engine hatches (TM 5-1940-322-10).



TRANSMISSION OIL COOLER REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION OIL COOLER PLUMBING MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cloth (item 8, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

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## TRANSMISSION OIL COOLER PLUMBING MAINTENANCE (Contd)

### **NOTE**

The plumbing for both transmission oil coolers is replaced the same way. This procedure covers the replacement of the plumbing for one transmission oil cooler.

### REMOVAL

1. Remove two hose clamps (2) and hose (4) from exhaust elbow (5) and transmission oil cooler (3).
2. Remove hose clamp (2) and hose (1) from transmission oil cooler (3).
3. Remove two hose clamps (2) and hose (1) from pipe (8).
4. Remove hose clamp (15) and hose (16) from adapter (14).
5. Remove four hose clamps (2) and hose (7) from pipe (8) and raw water filter (6).
6. Remove three nuts (13), washers (12), screws (10), clamps (11), and pipe (8) from boat frame (9).
7. Remove adapter (14) from pipe (8).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instruction, refer to WP 0013 00.

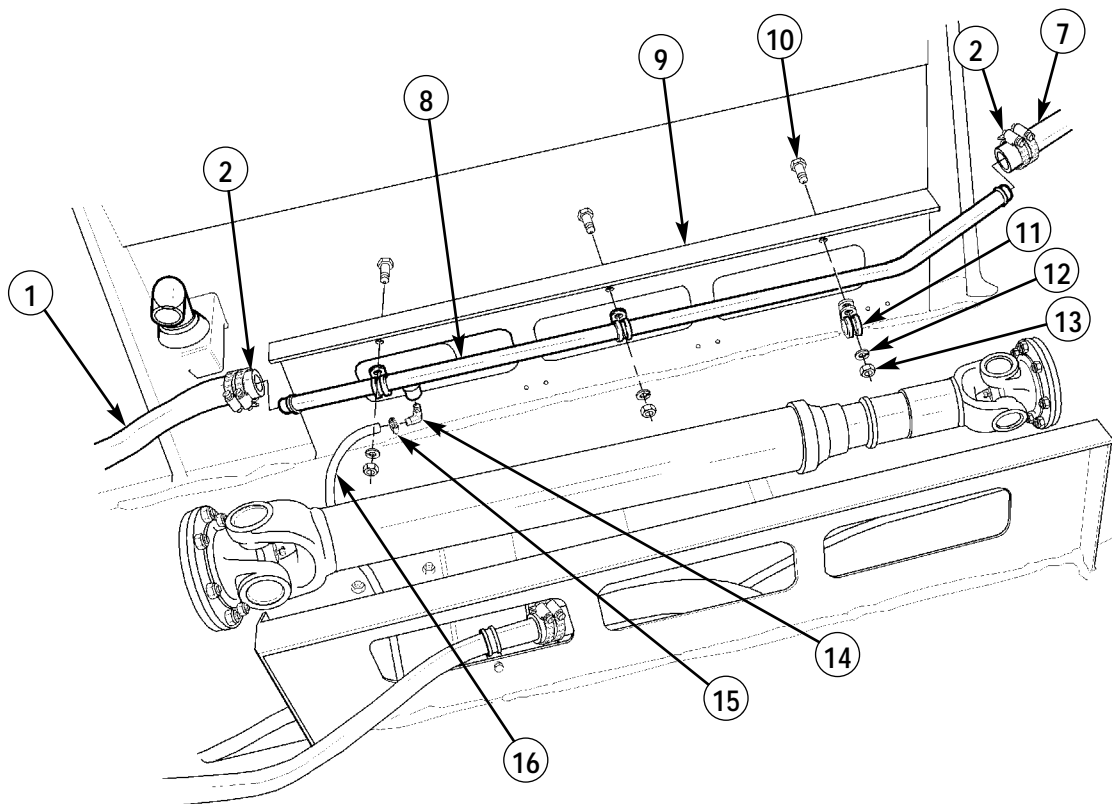
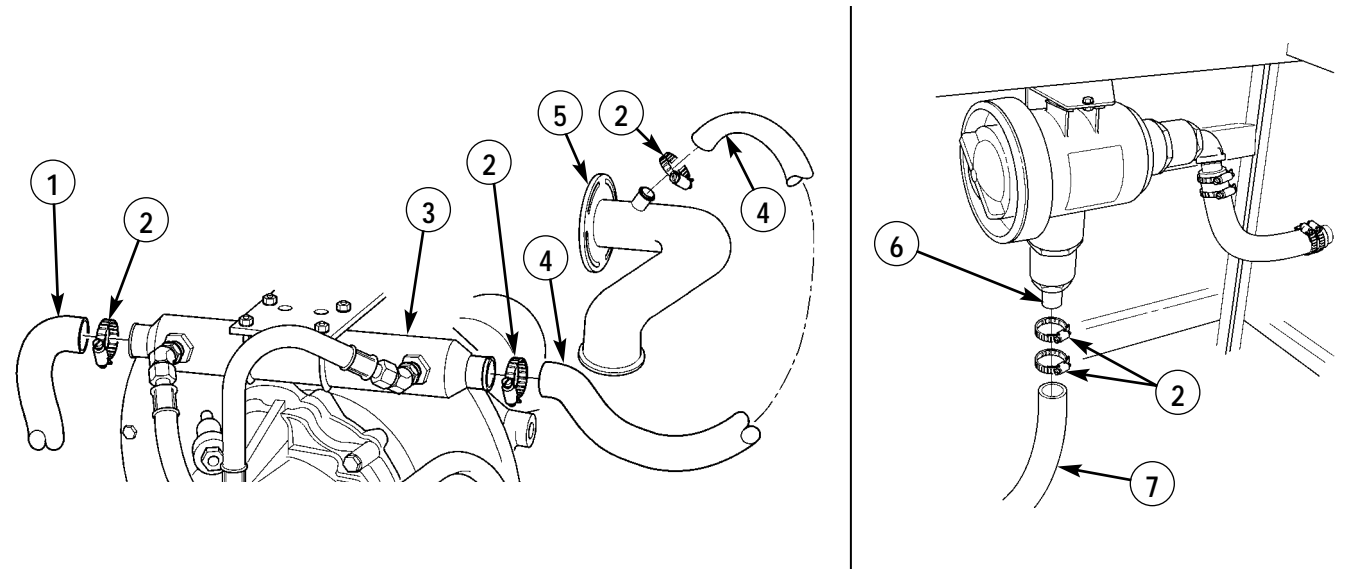
### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess sealing compound from adapter (14) with Skysol 100 and dry with cloth.

### TRANSMISSION OIL COOLER PLUMBING MAINTENANCE (Contd)



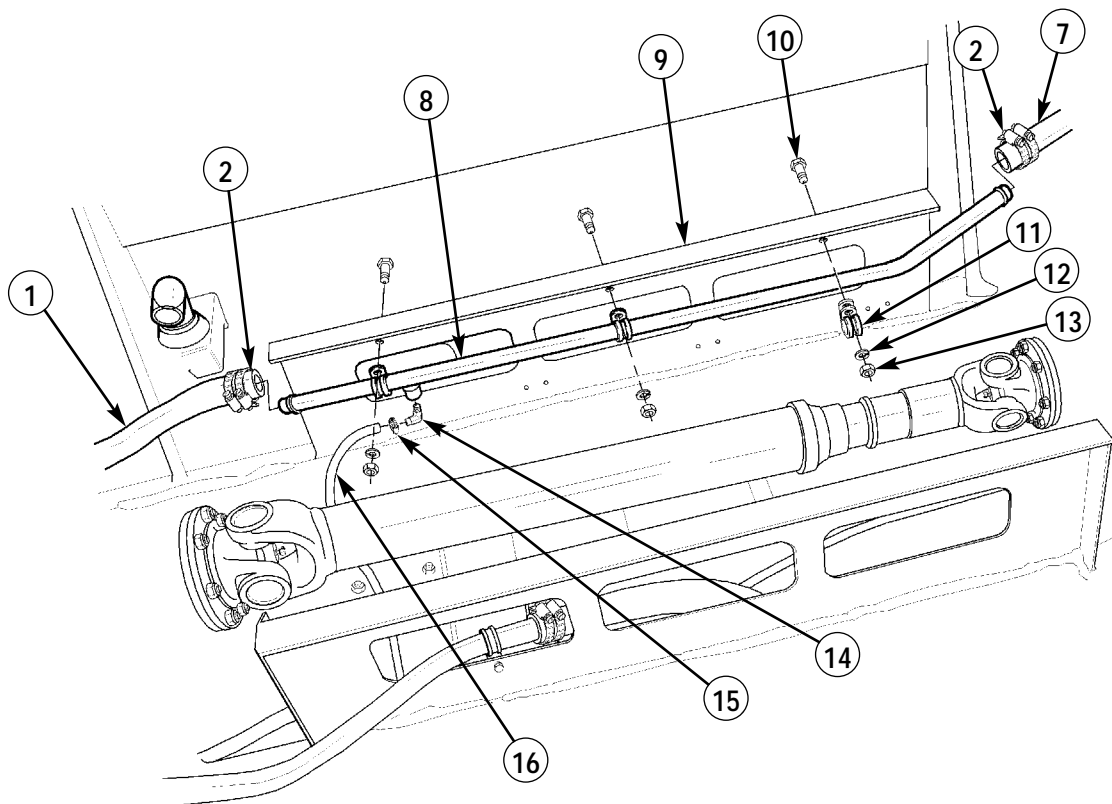
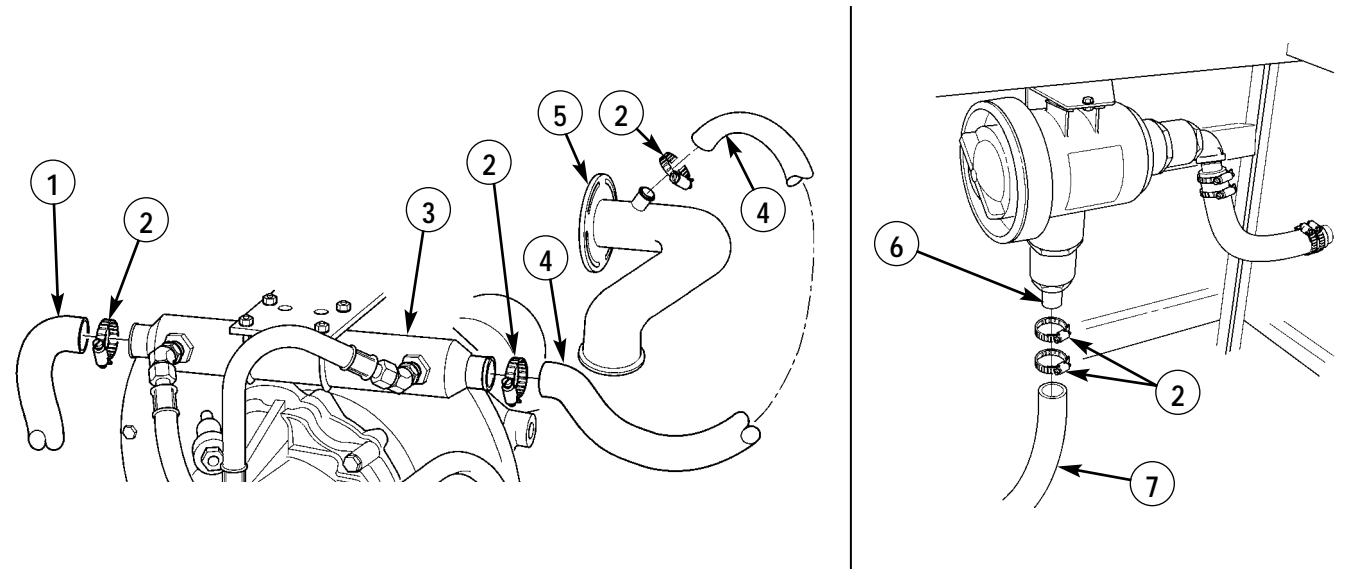
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## TRANSMISSION OIL COOLER PLUMBING MAINTENANCE (Contd)

### INSTALLATION

1. Apply thin coat of sealing compound on threads of adapter (14).
2. Install adapter (14) on pipe (8).
3. Install pipe (8) on boat frame (9) with three clamps (11), screws (10), washers (12), and nuts (13).
4. Install hose (7) on raw water filter (6) with two hose clamps (2).
5. Install hose (7) on pipe (8) with two hose clamps (2).
6. Install hose (16) on adapter (14) with hose clamp (15).
7. Install hose (1) on pipe (8) with two hose clamps (2).
8. Install hose (4) and (1) on transmission oil cooler (3) with two hose clamps (2).
9. Install hose (4) on exhaust elbow (5) with hose clamp (2).
10. Launch boat in water (TM 5-1940-322-10).
11. Start engine and check for leaks (TM 5-1940-322-10).
12. Close hydrojet hatches (TM 5-1940-322-10).
13. Install aft cockpit (WP 0016 00).

### TRANSMISSION OIL COOLER PLUMBING MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION OIL HOSES AND FITTINGS MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 19, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)

###### References

WP 0013 00  
WP 0124 00

###### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Transmission oil drained (WP 0012 00).

---

## TRANSMISSION OIL HOSES AND FITTINGS MAINTENANCE (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

The transmission oil cooler hoses on both engines are replaced the same way. This procedure covers the replacement of two transmission oil cooler hoses.

## REMOVAL

### **NOTE**

Note position of elbows to assist with installation.

Have container ready to catch transmission oil.

1. Disconnect oil cooler hoses (2) and (5) from fittings (1), (4), and (6).
2. Remove transmission oil pressure sending unit (WP 0124 00).
3. Remove oil cooler fittings (1), (4), and (6) from transmission (3) and transmission oil cooler (7).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

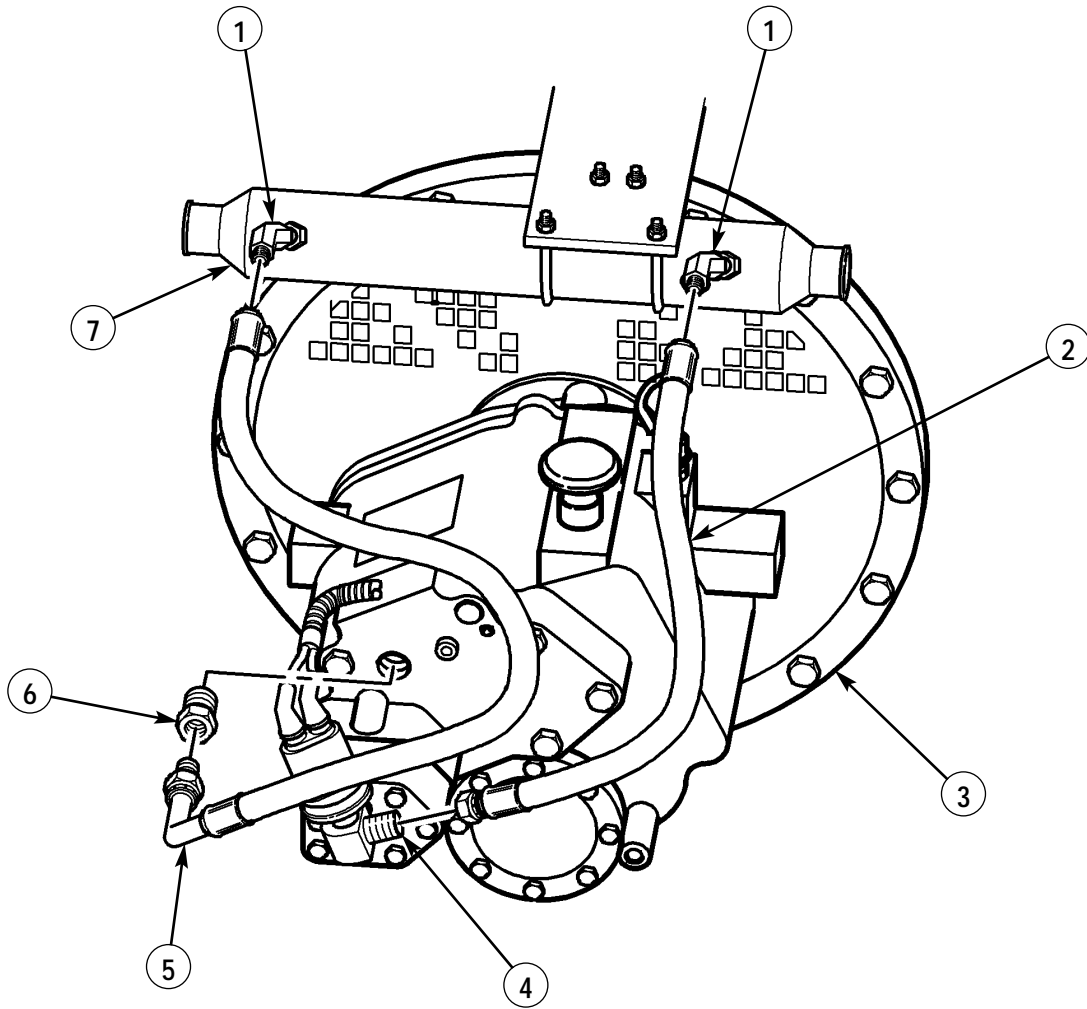
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Remove excess sealant from fittings with Skysol 100 and dry with cloth.

## INSTALLATION

1. Apply thin coat of sealing compound to threads of all fittings.
2. Install four oil cooler fittings (1), (4), and (6) on transmission (3) and transmission oil cooler (7).
3. Install transmission oil pressure sending unit (WP 0124 00).
4. Connect transmission oil cooler hoses (2) and (5) on fittings (1), (4), and (6).
5. Fill transmission with oil (WP 0012 00).
6. Start engine and check for leaks (TM 5-1940-322-10).
7. Install aft cockpit (WP 0016 00).
8. Close engine hatches (TM 5-1940-322-10).

TRANSMISSION OIL HOSES AND FITTINGS MAINTENANCE (Contd)





## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION ADAPTER PLATE REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)

(item 13, WP 0172 00) or

Common No. 1 tool kit (item 41, WP 0172 00)

###### Equipment Condition

Transmission removed (WP 0125 00).

###### Materials/Parts

Sealing compound (item 32, WP 0171 00)

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## TRANSMISSION ADAPTER PLATE REPLACEMENT (Contd)

### **NOTE**

Both transmission adapter plates are replaced the same way. This procedure covers the replacement of one transmission adapter plate.

### REMOVAL

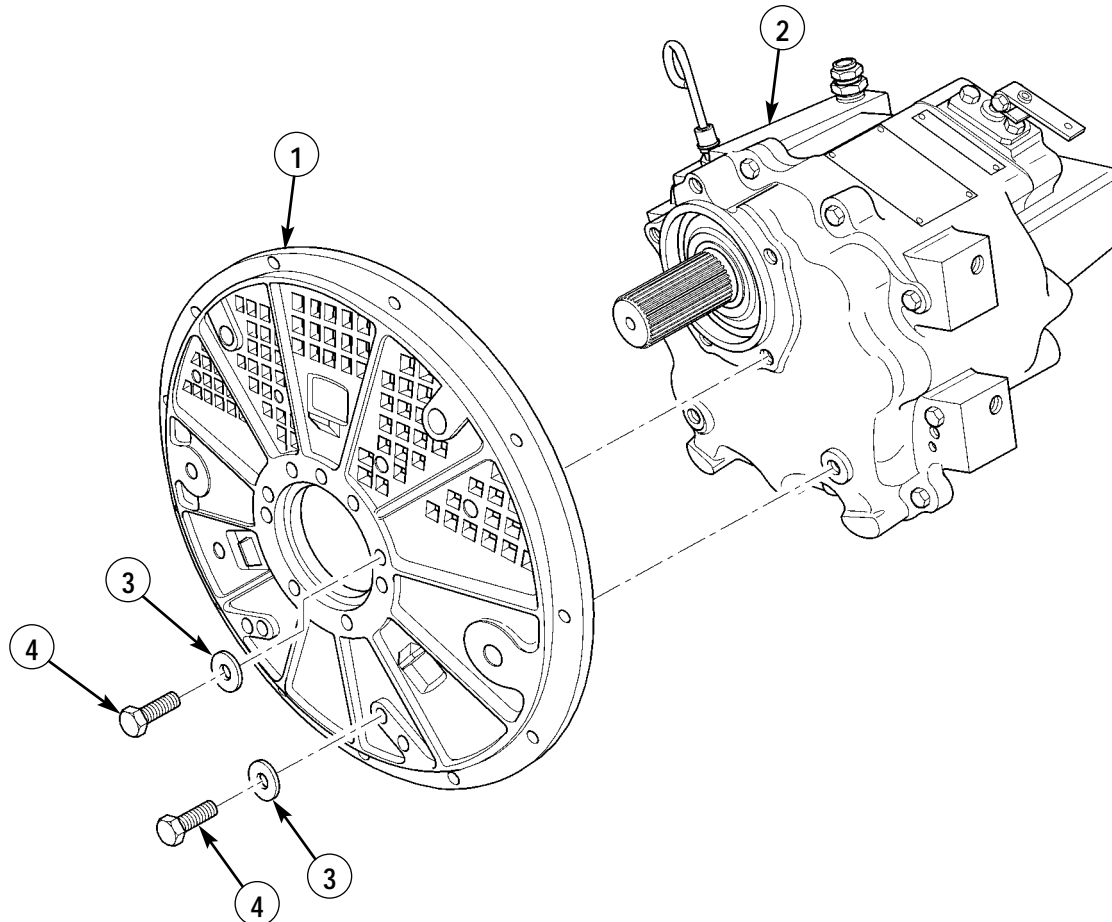
### **CAUTION**

Ensure transmission adapter plate is supported during removal. Failure to comply may result in damage to equipment.

Remove seven screws (4), washers (3), and transmission adapter plate (1) from transmission housing (2).

### INSTALLATION

1. Apply light coat of sealing compound to threads of screws (4).
2. Install transmission adapter plate (1) on transmission housing (2) with seven washers (3) and screws (4). Tighten screws (4) to 50 lb-ft (68 N·m).
3. Install transmission (WP 0125 00).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

## TRANSMISSION DRIVEPLATE REPLACEMENT

### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Transmission removed (WP 0125 00).

##### Materials/Parts

Eight lockwashers (item 80, WP 0173 00)  
Sealing compound (item 32, WP 0171 00)

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## TRANSMISSION DRIVEPLATE REPLACEMENT (Contd)

### NOTE

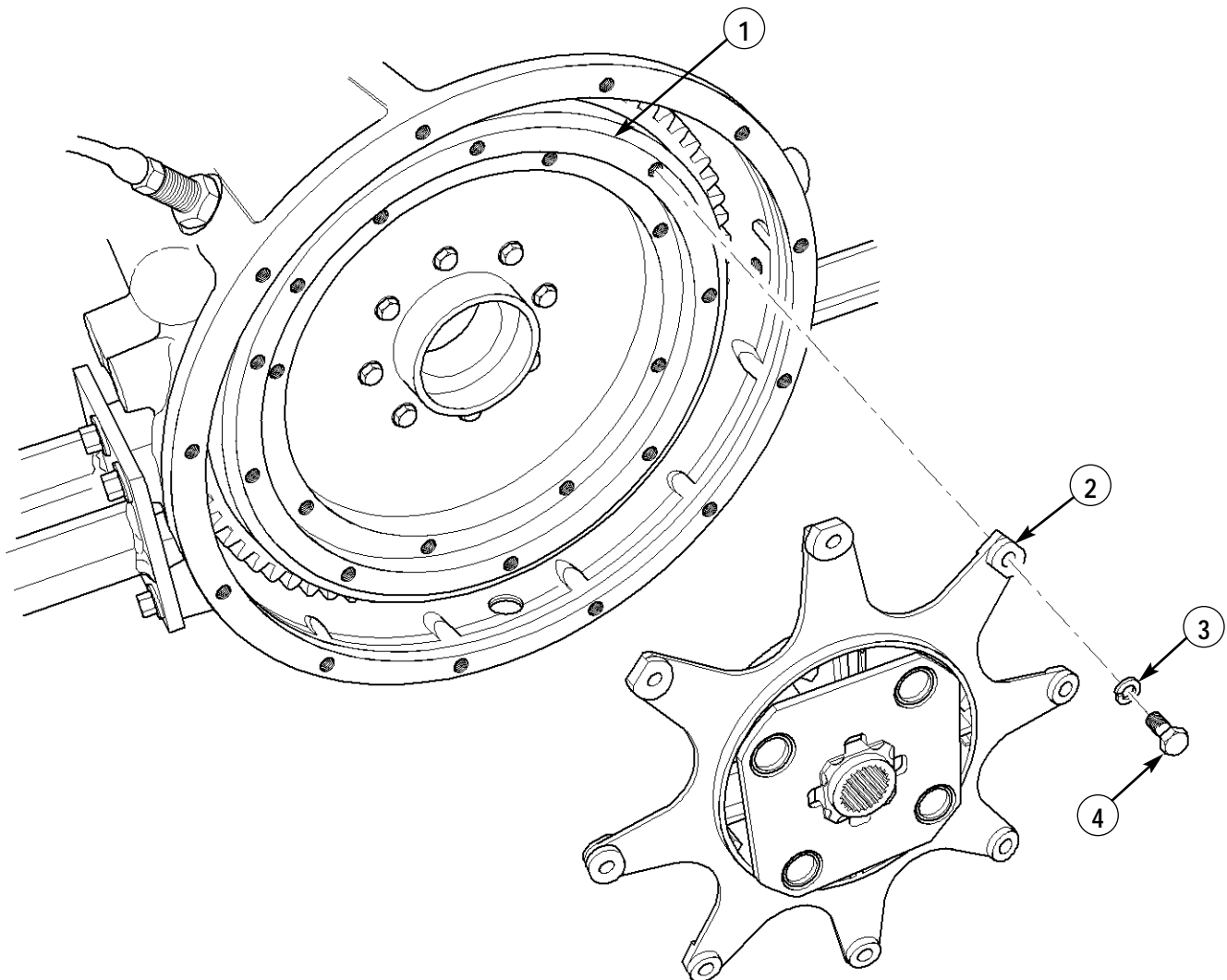
Both transmission driveplates are replaced the same way. This procedure covers the replacement of one transmission driveplate.

### REMOVAL

Remove eight screws (4), lockwashers (3), and transmission drive plate (2) from engine flywheel (1). Discard lockwashers (3).

### INSTALLATION

1. Apply light coat of sealing compound to threads of screws (4).
2. Install transmission driveplate (2) on engine flywheel (1) with eight new lockwashers (3) and screws (4). Tighten screws (4) to 35 lb-ft (47 N·m).
3. Install transmission (WP 0125 00).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION FILTER SCREEN MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

O-ring (item 102, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 19, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0165 00

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Transmission drained (WP 0012 00).

---

## TRANSMISSION FILTER SCREEN MAINTENANCE (Contd)

### **CAUTION**

Clean transmission filter screen every time transmission oil is changed. Failure to comply may result in damage to transmission.

### **NOTE**

Both transmission filter screens are replaced the same way. This procedure covers the replacement of one transmission filter screen.

## REMOVAL

### **NOTE**

Have container ready to catch transmission oil.

1. Remove transmission filter screen plug (3) and O-ring (2) from transmission housing (1). Discard O-ring (2).
2. Remove transmission filter screen (4) from transmission housing (1).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. For general transmission inspection, refer to WP 0165 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

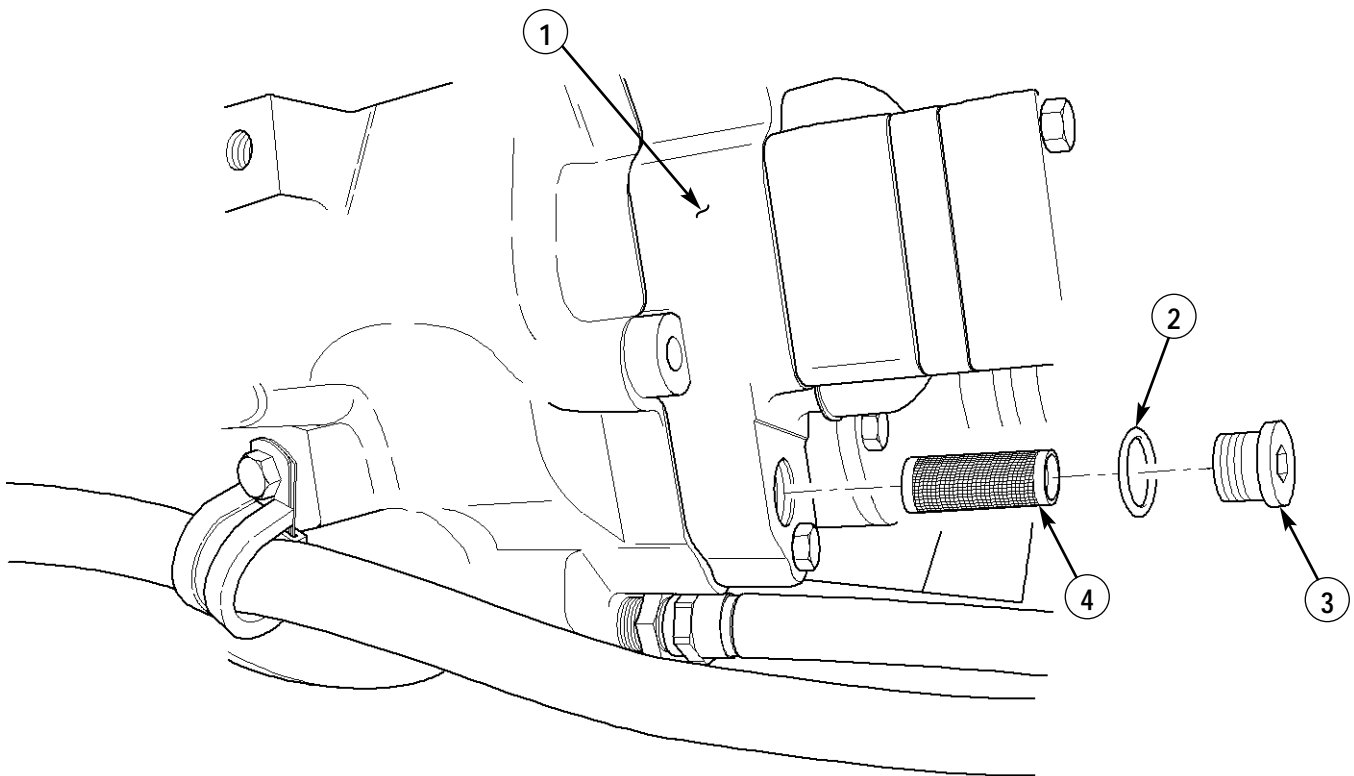
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

3. Clean filter screen (4) with Skysol 100 and dry with cloth.
4. Inspect filter screen (4) for tears, cracks, or holes. Replace if damaged.
5. Inspect filter screen plug (3) for damaged threads. Replace if damaged.
6. Inspect transmission housing (1) for damaged plug hole threads.

## TRANSMISSION FILTER SCREEN MAINTENANCE (Contd)

### INSTALLATION

1. Install transmission filter screen (4) in transmission housing (1).
2. Apply light coat of transmission oil to new O-ring (2).
3. Install new O-ring (2) on transmission filter screen plug (3).
4. Install transmission filter screen plug (3) in transmission housing (1).
5. Fill transmission with oil (WP 0012 00).
6. Start engine and check for leaks (TM 5-1940-322-10).
7. Install aft cockpit (WP 0016 00).
8. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION OIL PUMP MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Two lockwashers (item 88, WP 0173 00)  
Gasket (item 38, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Oil (item 19, WP 0171 00)

###### Materials/Parts (Contd)

Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0165 00  
TM 5-1940-322-10

###### Equipment Condition

Aft cockpit removed (WP 0016 00).

---

## TRANSMISSION OIL PUMP MAINTENANCE (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after removal to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both transmission oil pumps are replaced the same way. This procedure covers the replacement of one transmission oil pump.

Note position of elbow during removal to assist with installation.

## REMOVAL

### **NOTE**

Have a container ready to catch transmission oil.

1. Remove two nuts (1), lockwashers (7), and electrical leads (2) from transmission pressure sending unit (6). Discard lockwashers (7).
2. Remove transmission pressure sending unit (6) from elbow (5) on transmission oil pump (3).
3. Disconnect transmission oil supply hose (4) from elbow (5) on transmission oil pump (3).
4. Remove elbow (5) from transmission oil pump (3).
5. Remove four screws (10), transmission oil pump (3), and gasket (11) from manifold assembly (8) on transmission housing (9). Discard gasket (11).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. For general transmission inspection, refer to WP 0165 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

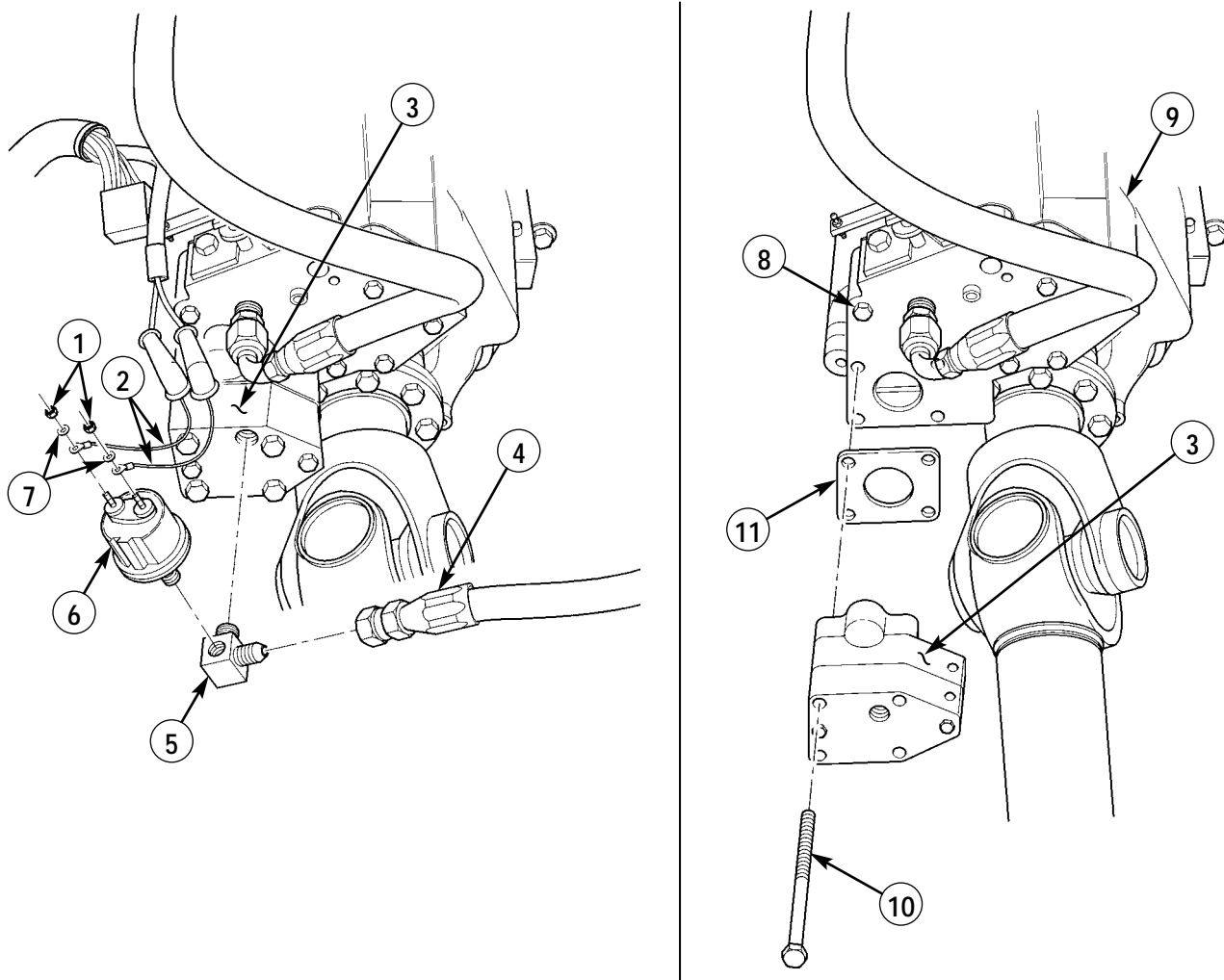
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

3. Remove excess sealing compound from elbow (5) with Skysol 100 and dry with cloth.
4. Remove excess gasket material from transmission oil pump (3) and manifold assembly (8) mating surfaces with Skysol 100 and dry with cloth.

## TRANSMISSION OIL PUMP MAINTENANCE (Contd)

### INSTALLATION

1. Install new gasket (11) and transmission oil pump (3) on manifold assembly (8) with four screws (10). Tighten screws (10) to 19 lb-ft (25 N·m).
2. Apply light coat of sealing compound to threads of elbow (5).
3. Install elbow (5) on transmission oil pump (3).
4. Connect transmission oil supply hose (4) on elbow (5).
5. Apply light coat of sealing compound to threads of transmission pressure sending unit (6).
6. Install transmission pressure sending unit (6) on elbow (5).
7. Install two electrical leads (7) on transmission pressure sending unit (6) with new lockwashers (7) and nuts (1).
8. Check transmission oil level and add if necessary (TM 5-1940-322-10).
9. Start engine and check transmission pressure sending unit (6) for leaks, oil level, and operating pressure on gauge (TM 5-1940-322-10).
10. Install aft cockpit (WP 0016 00).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION PRESSURE SENDING UNIT REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two lockwashers (item 155, WP 0173 00)  
Oil (item 19, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)

##### References

TM 5-1940-322-10

##### Equipment Condition

Aft cockpit removed (WP 0016 00).

---

## TRANSMISSION PRESSURE SENDING UNIT REPLACEMENT (Contd)

### NOTE

Both transmission pressure sending units are replaced the same way. This procedure covers the replacement of one transmission pressure sending unit.

Tag all lead wires during removal to assist with installation.

### REMOVAL

1. Remove two nuts (6), lockwashers (5), and electrical leads (7) from transmission pressure sending unit (4). Discard lockwashers (5).

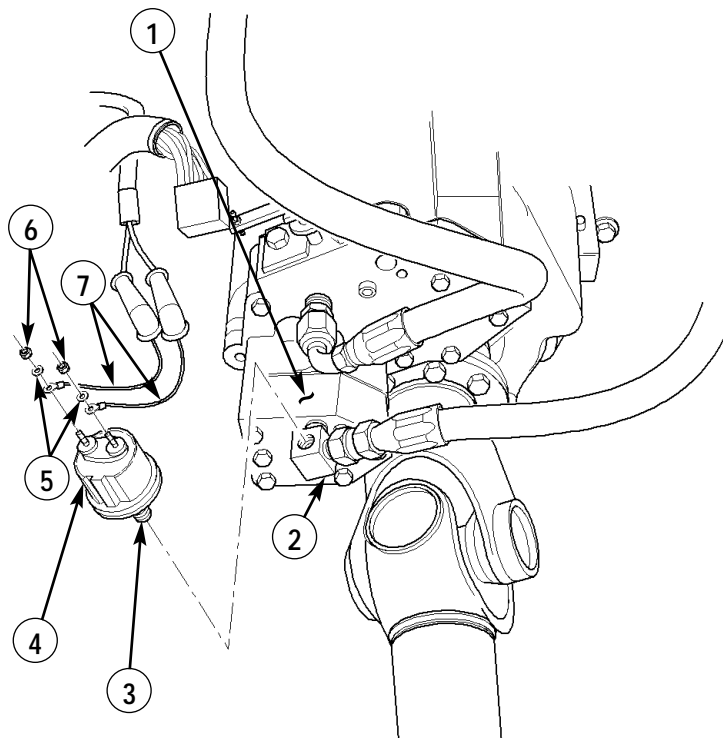
### NOTE

Have container ready to catch transmission oil.

2. Remove transmission pressure sending unit (4) from elbow (2) on transmission oil pump (1).

### INSTALLATION

1. Apply thin coat of sealing compound to threads (3) on transmission pressure sending unit (4).
2. Install transmission pressure sending unit (4) on elbow (2) of transmission oil pump (1).
3. Install two electrical leads (7) on transmission pressure sending unit (4) with new lockwashers (5) and nuts (6).
4. Start engine and check transmission pressure sending unit (4) for leaks, oil level, and operating pressure on gauge (TM 5-1940-322-10).
5. Fill transmission with oil, as necessary (WP 0012 00).
6. Install aft cockpit (WP 0016 00).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION REPLACEMENT

#### REMOVAL AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Twelve lockwashers (item 23, WP 0173 00)  
Eight locknuts (item 62, WP 0173 00)  
Two lockwashers (item 88, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)  
Cap and plug set (item 7, WP 0171 00)  
GAA grease (item 14, WP 0171 00)  
Oil (item 19, WP 0171 00)

###### Materials/Parts (Contd)

Sealing compound (pipe) (item 36, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)

###### Personnel Required

Two

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Transmission oil drained (WP 0012 00).

---

## TRANSMISSION REPLACEMENT (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both transmissions are replaced the same way. This procedure covers the replacement of one transmission.

Tag all electrical leads and hoses during removal to assist with installation.

### REMOVAL

1. Remove two nuts (16), lockwashers (15), and electrical leads (17) from transmission pressure sending unit (14). Discard lockwashers (15).
2. Loosen two hose clamps (1) and remove water supply hose (18) and water outlet hose (7) from transmission oil cooler (5).
3. Remove transmission oil cooler supply hose (9) from oil cooler fitting (8) and oil pump elbow (13).
4. Remove transmission pressure sending unit (14) from oil pump elbow (13).
5. Remove oil return hose (12) from oil cooler fitting (11) and top adapter (2) on transmission housing (19).
6. Remove four nuts (4), two U-bolts (10), transmission oil cooler (5), and rubber pad (6) from mounting bracket (3).
7. Disconnect transmission shift cable (36) from shift control lever (35).
8. Remove two screws (38) and shift cable mounting bracket (37) with shift cable (36) from side of flywheel housing (23).
9. Remove eight locknuts (29) and screws (32) from drive shaft coupling (31) and transmission output flange (30), slide drive shaft (33) back from output flange (30). Discard locknuts (29).
10. Disconnect transmission drain hose (20) from bottom adapter (2) on transmission housing (19).
11. Remove screw (22), clamp (21), and drain hose (20) from transmission housing (19).

### **CAUTION**

Ensure transmission is supported for steps 12 and 13. Failure to comply may result in damage to equipment.

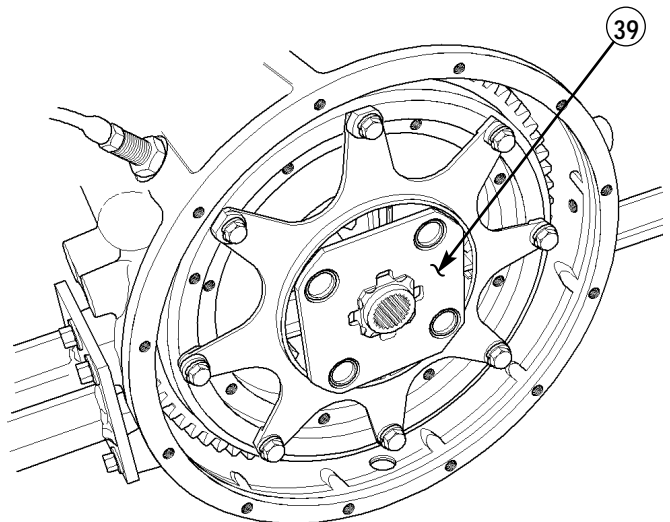
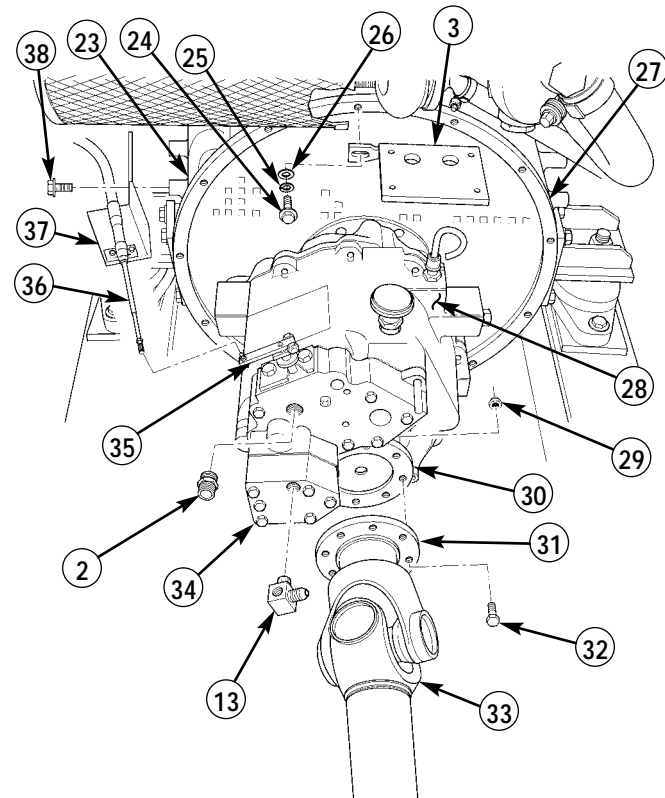
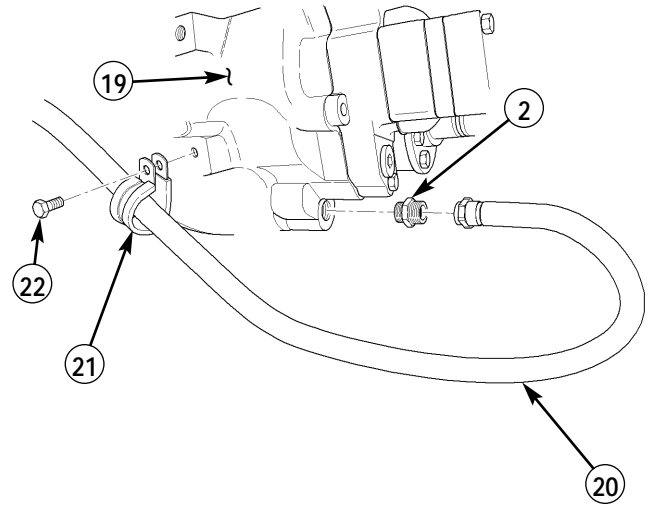
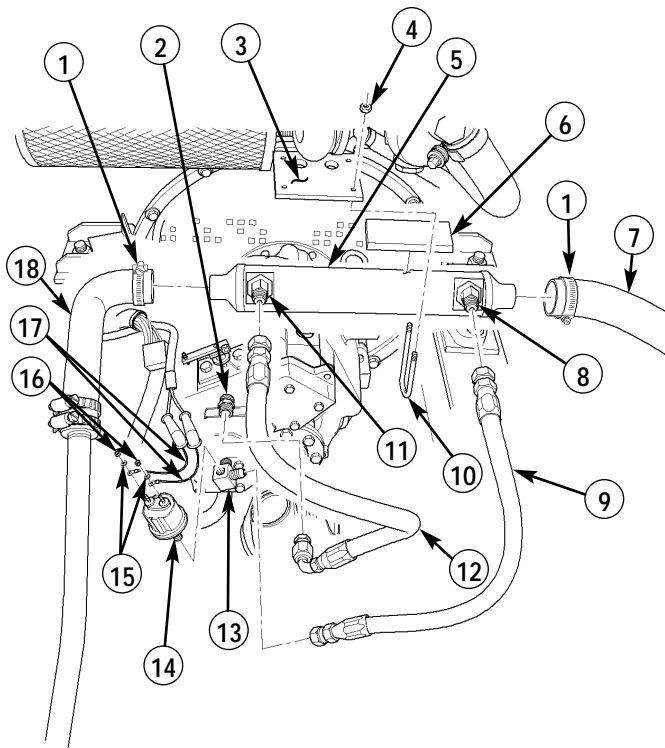
12. Support transmission (28) and remove twelve screws (24), lockwashers (25), washer (26), and adapter plate (27), and oil cooler bracket (3), and flywheel housing (23). Discard lockwashers (25).
13. Slowly pull transmission (28) back from flywheel housing (23) and drive plate (38) until transmission (28) can be removed from boat.

### **NOTE**

Note position of elbows and adapter during removal to assist with installation.

14. If transmission (28) is being replaced, remove oil pump elbow (13) and two adapters (2) from transmission (28).

### TRANSMISSION REPLACEMENT (Contd)



## TRANSMISSION REPLACEMENT (Contd)

### INSTALLATION

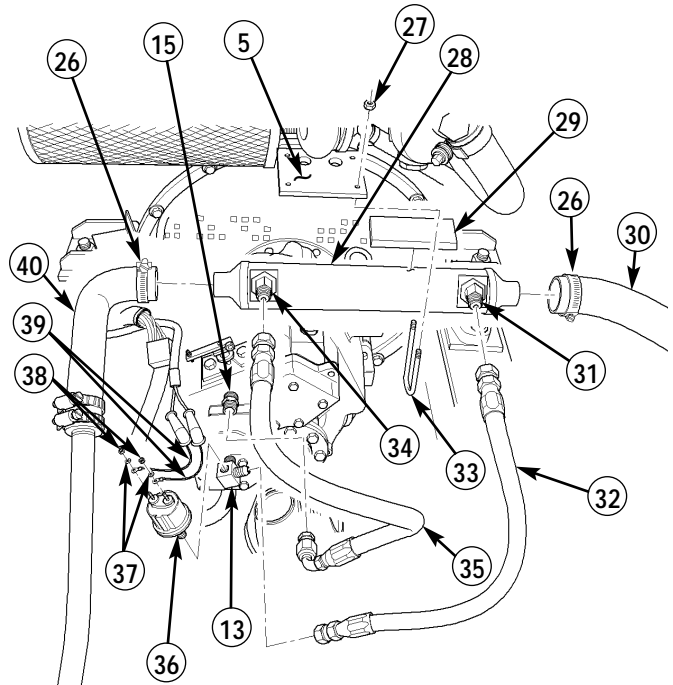
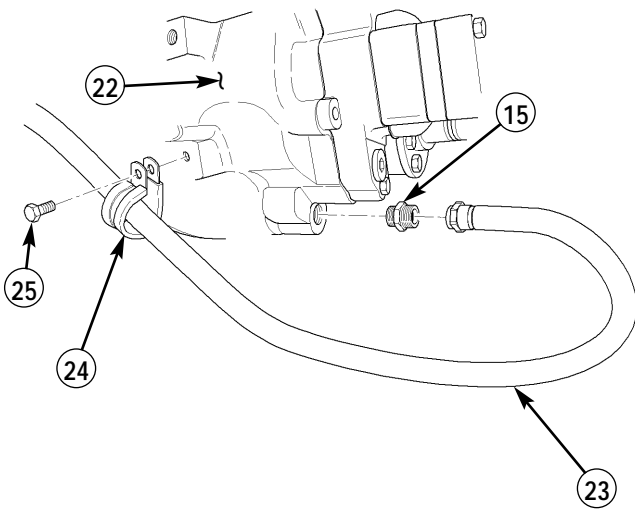
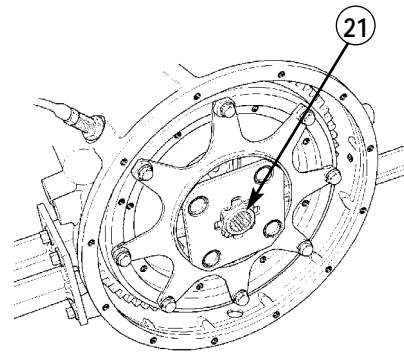
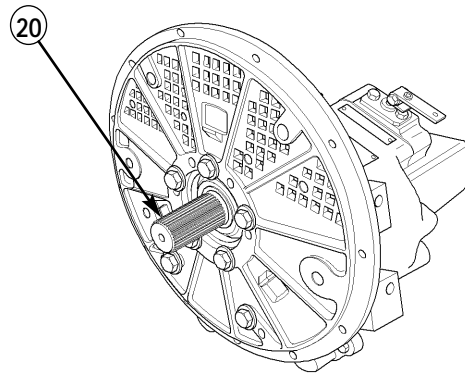
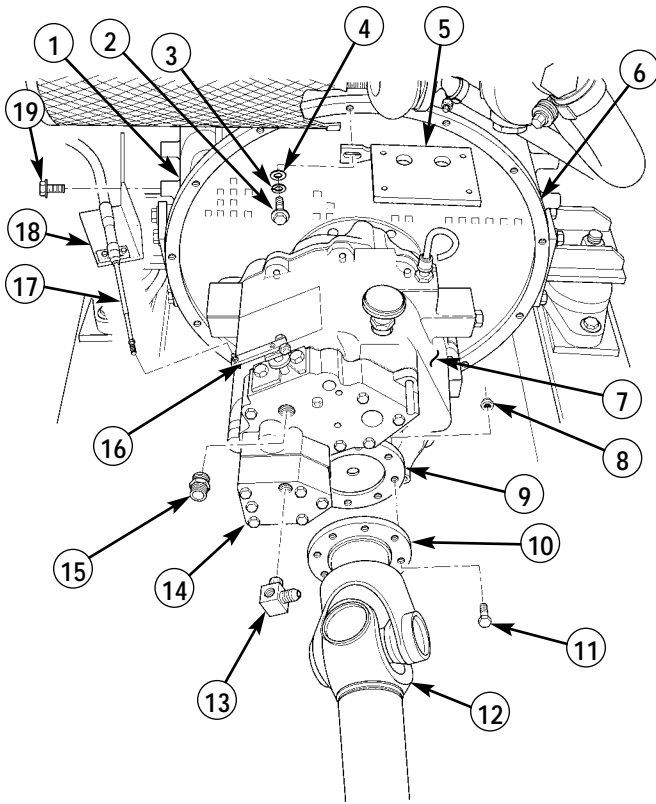
1. Apply sealing compound to threads of elbow (13), adapters (15), and pressure sending unit (36).
2. If new transmission (7) is being installed, install oil pump elbow (13) and top and bottom adapters (15) in transmission (7).
3. Apply light coat of GAA grease on splines of drive plate (21) and transmission spline (20).
4. Align transmission spline (20) with drive plate spline (21) and slowly install transmission (7) onto flywheel housing (1).
5. Apply light coat of sealing compound to threads of screws (2).
6. Install transmission oil cooler bracket (5) on transmission adapter plate (6) and flywheel housing (1) with twelve new lockwashers (3), washers (4), and screws (2). Tighten screws (2) to 35 lb-ft (47 N·m).
7. Connect transmission drain hose (23) to bottom adapter (15) on transmission housing (22).
8. Install drain hose (23) on side of transmission housing (22) with clamp (23) and screw (25).
9. Apply light coat of antiseize compound to screws (11).
10. Install drive shaft coupling (10) on transmission output flange (9) with eight screws (11) and new locknuts (8). Tighten locknuts (8) to 55 lb-ft (75 N·m).
11. Install shift cable mounting bracket (18) with shift cable (17) on side of flywheel housing (1) with two screws (19).
12. Connect shift cable (17) to shift control lever (16) on transmission (7).

### **CAUTION**

Do not over tighten nuts securing oil cooler to oil cooler bracket.  
Failure to comply may result in damage to oil cooler.

13. Install transmission oil cooler (28) on oil cooler bracket (5) with rubber pad (29), two U-bolts (33), and four nuts (27).
14. Connect oil return hose (35) to adapter (15) on transmission housing (22) and to oil cooler fitting (34).
15. Install transmission pressure sending unit (36) on elbow (13).
16. Connect oil supply hose (32) to elbow (13) on transmission oil pump (14) and to oil cooler elbow (31).
17. Install water outlet hose (30) and water supply hose (40) on oil cooler (28) with two hose clamps (26).
18. Install two electrical leads (39) on transmission pressure sending unit (36) with two new lockwashers (37) and nuts (38).
19. Fill transmission with oil (WP 0012 00).
20. Start engine, check hoses and fitting for leaks, shift transmission to forward and reverse to check operation, recheck oil level, and refill if necessary (TM 5-1940-322-10).
21. Install aft cockpit (WP 0016 00).
22. Close engine hatches (TM 5-1940-322-10).

TRANSMISSION REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (FORWARD)

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Eight locknuts (item 58, WP 0173 00)  
Three lockwashers (item 97, WP 0173 00)  
Two locknuts (item 53, WP 0173 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).

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**ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (FORWARD) (Contd)****NOTE**

Tag all wires during removal to assist with installation.

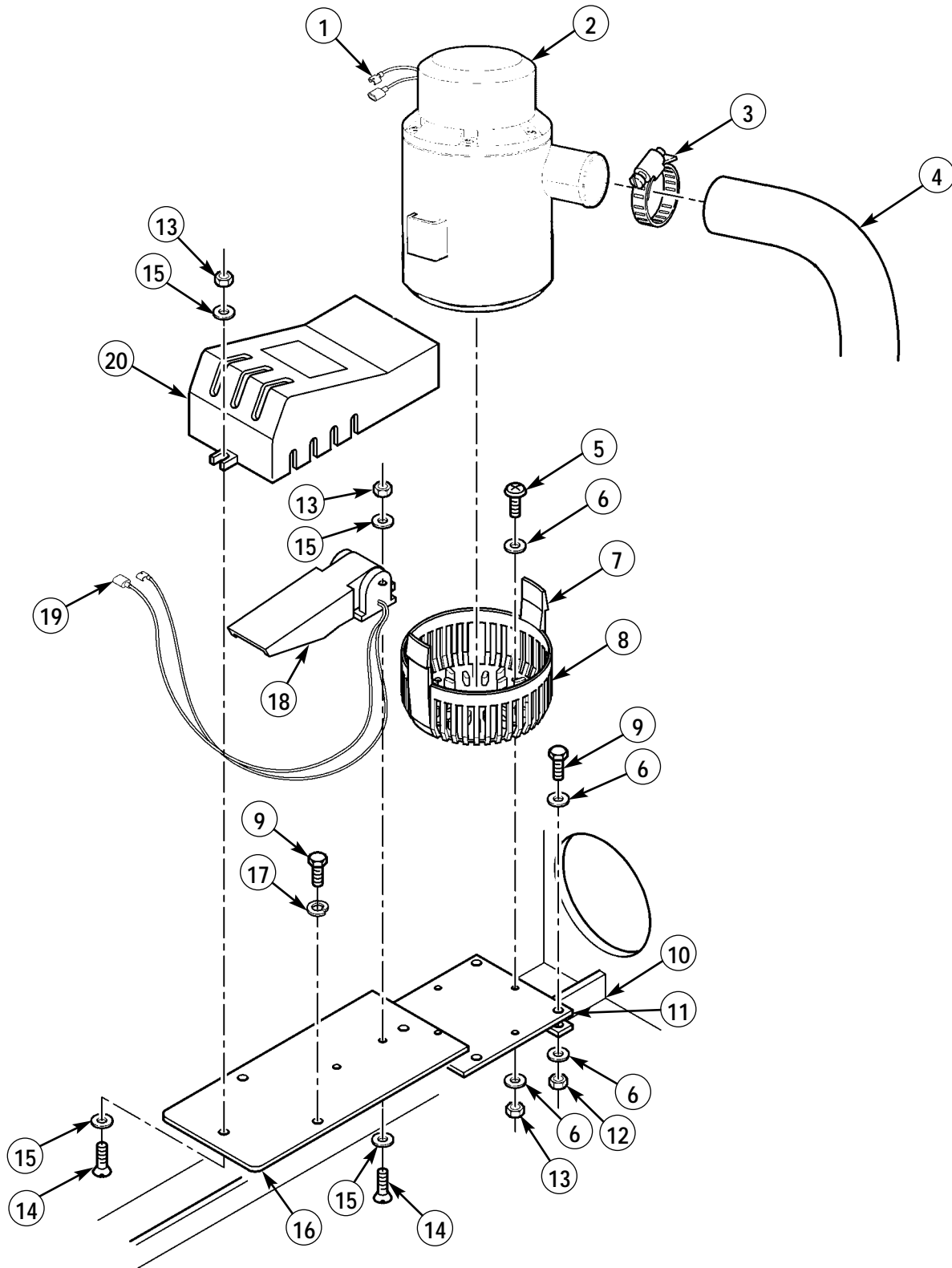
**REMOVAL**

1. Disconnect lead wires (1) and (19) from bilge pump (2) and bilge pump float (18).
2. Remove clamp (3) and disconnect hose (4) from bilge pump (2).
3. Remove two locknuts (12), four washers (6), two screws (9), and bilge pump bracket (11) from hull (10). Discard locknuts (12).
4. Remove three screws (9), lockwashers (17), and float bracket (16) from hull (10). Discard lockwashers (17).
5. Remove two locknuts (13), four washers (15), two screws (14), and float cover (20) from float bracket (16). Discard locknuts (13).
6. Remove two screws (14), four washers (15), two locknuts (13), and float (18) from float bracket (16). Discard locknuts (13).
7. Remove bilge pump (2) from bilge pump strainer (8) on bilge pump bracket (11) by releasing clips (7).
8. Remove four screws (5), eight washers (6), four locknuts (13), and bilge pump strainer (8) from bracket (11). Discard locknuts (13).

**INSTALLATION**

1. Install bilge pump strainer (8) on bilge pump bracket (11) with four screws (5), eight washers (6), and four new locknuts (12).
2. Install bilge pump (2) on bilge pump strainer (8). Ensure clips (7) are seated properly.
3. Install float (18) on float bracket (16) with two screws (14), four washers (15), and two new locknuts (13).
4. Install float cover (20) on float bracket (16) with three screws (14), four washers (15), and two new locknuts (13).
5. Install float bracket (16) on hull (10) with three screws (9) and new lockwashers (17).
6. Install bilge pump bracket (11) on hull (10) with two screws (9), four washers (6), and two new locknuts (12).
7. Install hose (4) on bilge pump (2) with clamp (3). Tighten clamp (3).
8. Connect lead wires (1) and (19) to bilge pump (2) and bilge pump float (18).
9. Close engine hatches (TM 5-1940-322-10).
10. Connect battery ground cables (WP 0054 00).
11. Test bilge pump and float, ensure light illuminates on instrument panel (TM 5-1940-322-10).
12. Close battery hatch (TM 5-1940-322-10).

ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (FORWARD) (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (AFT)

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Two locknuts (item 47, WP 0173 00)  
Two locknuts (item 174, WP 0173 00)

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

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**ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (AFT) (Contd)****NOTE**

Tag all wires during removal to assist with installation.

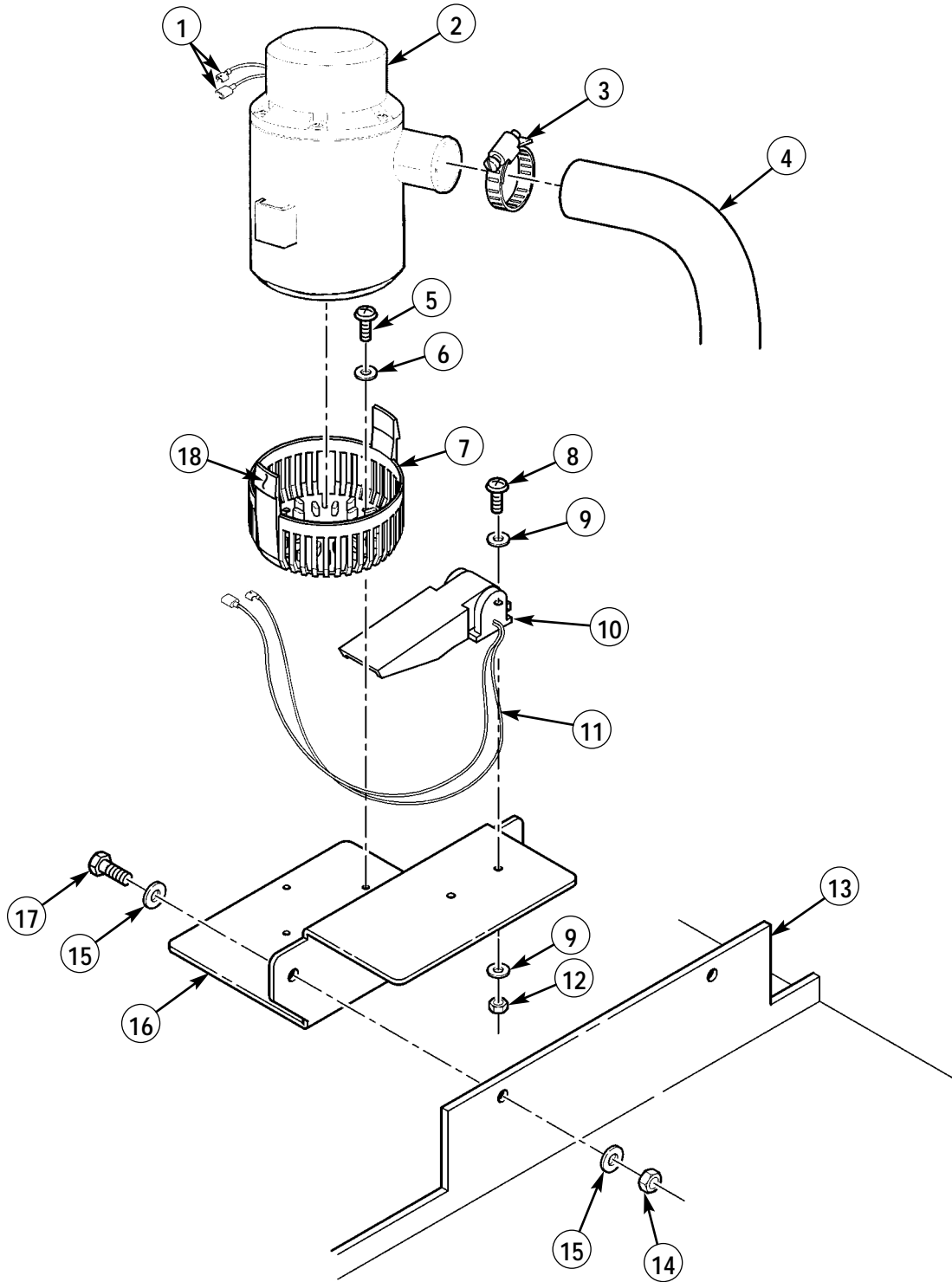
**REMOVAL**

1. Disconnect lead wires (1) and (11) from bilge pump (2) and bilge pump float (10).
2. Remove clamp (3) and disconnect hose (4) from bilge pump (2).
3. Remove two screws (17), four washers (15), two locknuts (14), and bilge pump and float bracket assembly from boat (13). Discard locknuts (14).
4. Remove two screws (8), washers (9), locknuts (12), and float (10) from bracket (16). Discard locknuts (12).
5. Remove bilge pump (2) from bilge pump strainer (7) on bracket (16) by releasing clips (18).
6. Remove four screws (5), four washers (6), and bilge pump strainer (7) from bracket (16).

**INSTALLATION**

1. Install bilge pump strainer (7) on bracket (16) with four screws (5) and washers (6).
2. Install bilge pump (2) on bilge pump strainer (7). Ensure clips (18) are seated.
3. Install float (10) on bracket (16) with two screws (8), four washers (9), and two new locknuts (12).
4. Install bilge pump and float bracket assembly on boat (13) with two screws (17), four washers (15), and two new locknuts (14).
5. Install hose (4) on bilge pump (2) with clamp (3). Tighten clamp (3).
6. Connect lead wires (1) and (11) to bilge pump (2) and bilge pump float (10).
7. Close hydrojet hatches (TM 5-1940-322-10).
8. Connect battery ground cables (WP 0054 00).
9. Test bilge pump and float, ensure light illuminates on instrument panel (TM 5-1940-322-10).
10. Close battery hatch (TM 5-1940-322-10).

ELECTRIC BILGE PUMP, BRACKET, AND FLOAT REPLACEMENT (AFT) (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### DRIVESHAFT REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Personnel Required

Two

##### Equipment Condition

Aft cockpit removed (WP 0016 00).

##### Materials/Parts

Eight locknuts (item 54, WP 0173 00)  
Eight locknuts (item 62, WP 0173 00)  
Antiseize compound (item 2, WP 0171 00)

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## DRIVESHAFT REPLACEMENT (Contd)

### **CAUTION**

Ensure driveshaft is supported during removal and installation.  
Failure to comply may result in damage to equipment.

### **NOTE**

Both driveshafts are replaced the same way. This procedure covers replacement of one driveshaft.

Assistant will help with removal and installation.

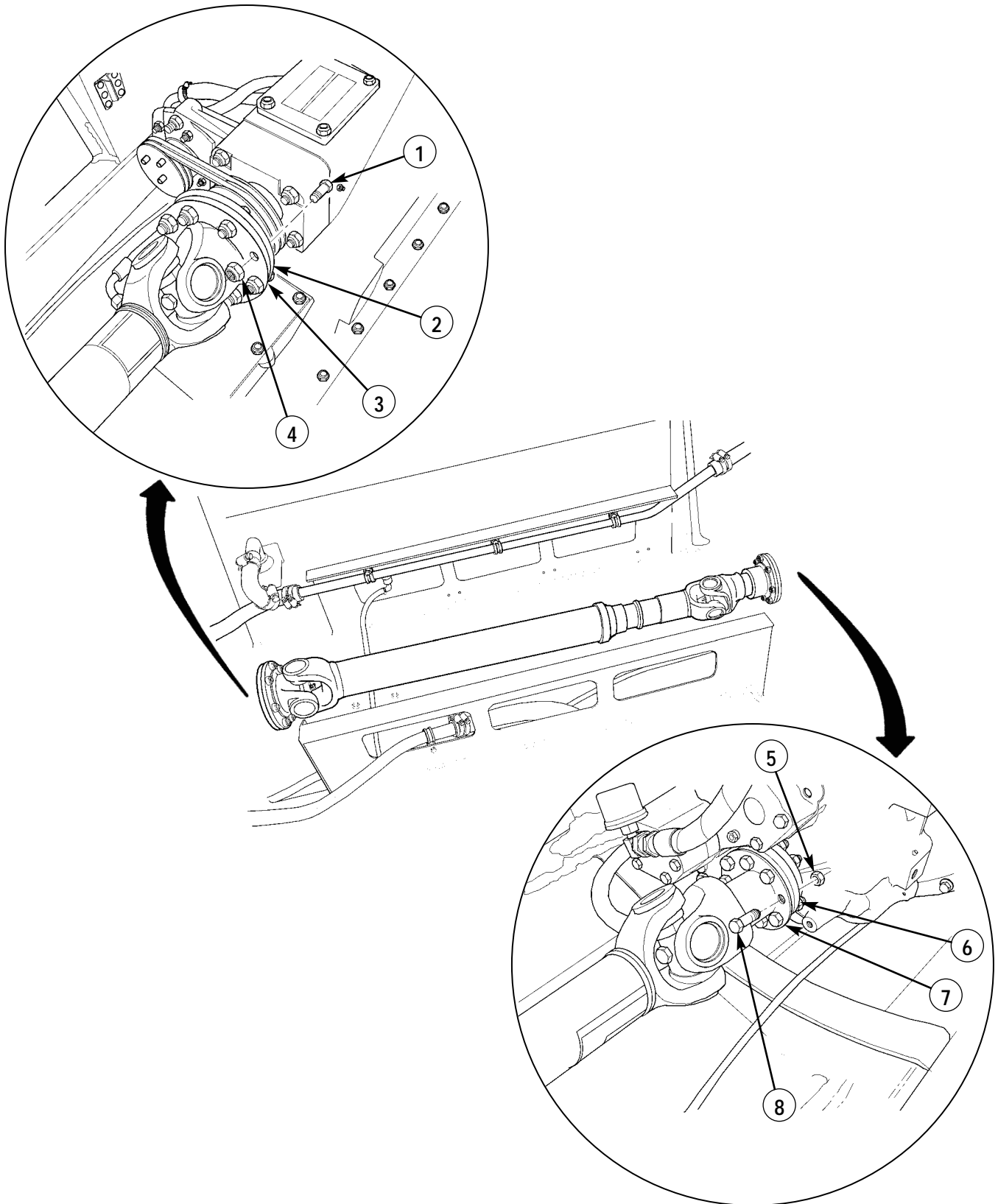
### REMOVAL

1. Remove eight locknuts (4) and screws (1) from driveshaft flange (3) and hydrojet drive flange (2). Discard locknuts (4).
2. Remove eight locknuts (5) and screws (8) from driveshaft flange (7) and transmission flange (6). Discard locknuts (5).

### INSTALLATION

1. Apply thin coat of antiseize compound to screws (8) and (1).
2. Install driveshaft flange (7) on transmission flange (6) with eight screws (8) and new locknuts (5). Tighten locknuts (5) to 55 lb-ft (75 N·m).
3. Install driveshaft flange (3) on hydrojet drive flange (2) with eight screws (1) and new locknuts (4). Tighten locknuts (4) to 38 lb-ft (51 N·m).
4. Install aft cockpit (WP 0016 00).

DRIVESHAFT REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Twenty locknuts (item 53, WP 0173 00)  
Adhesive (item 1, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Seal (item 31, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0013 00

###### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

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## HYDROJET HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)

### REMOVAL

1. Remove hook (13) from hole (16) in hydrojet hatch cover (1).

#### **NOTE**

Assistant will help with steps 2 and 3.

2. Remove support brace (6) from slot (3) on hydrojet hatch cover (1).
3. Remove two locknuts (8), four washers (4), two screws (10), and hydrojet hatch cover (1) from hinges (11). Discard locknuts (8).
4. Remove eight locknuts (8), sixteen washers (4), eight screws (15), and two hinges (14) from hydrojet hatch cover (1). Discard locknuts (8).
5. Remove eight locknuts (8), sixteen washers (4), eight screws (12), and two hinges (11) from hull (7). Discard locknuts (8).
6. Remove locknuts (8), two washers (4), screw (5), and chain (9) from support brace (6). Discard locknut (8).
7. Remove locknut (8), three washers (4), screw (5), and support brace (6) from hull (7). Discard locknut (8).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Inspect seals (2) for damage. If missing or damaged, clean area with Skysol 100, dry with cloth, and replace seals (2).

## HYDROJET HATCH COVER, HINGES, AND SUPPORT BRACE MAINTENANCE (Contd)

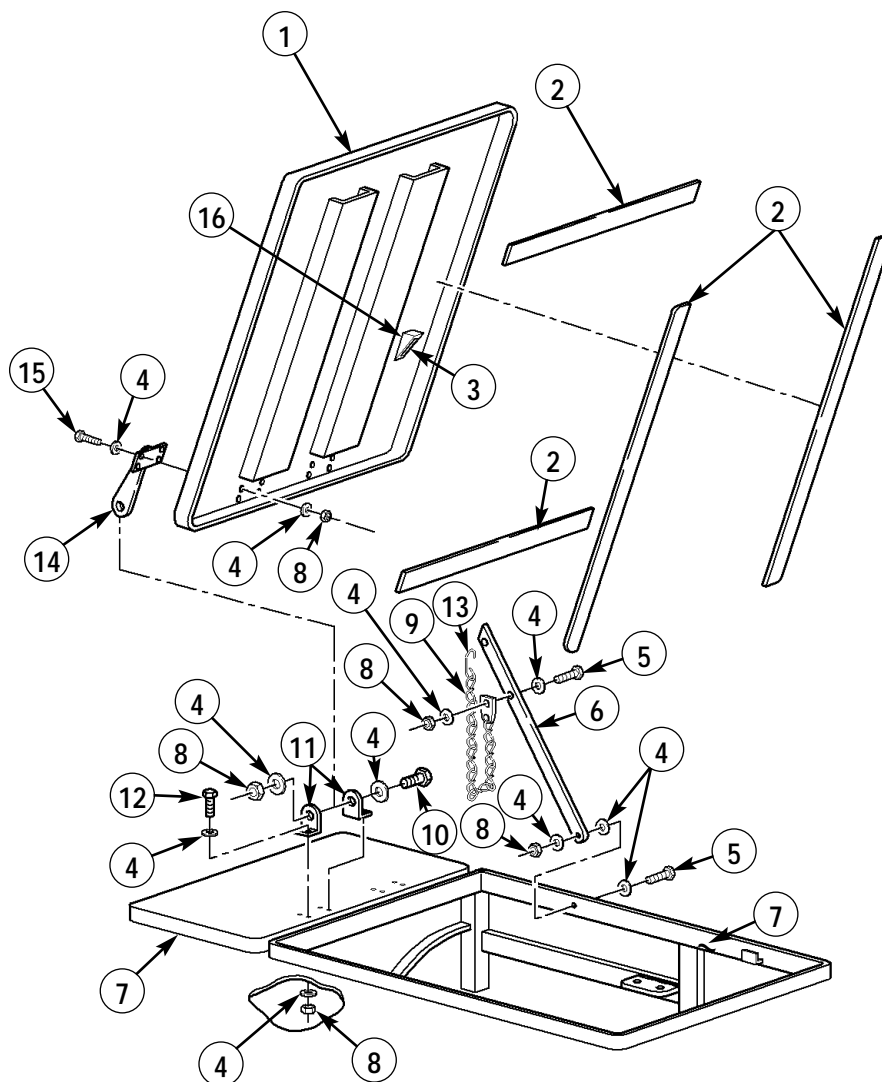
### INSTALLATION

1. Install support brace (6) on hull (7) with screw (5), three washers (4), and new locknut (8).
2. Install chain (9) on support brace (6) with screw (5), two washers (4), and new locknut (8).
3. Install two hinges (11) on hull (7) with eight screws (12), sixteen washers (4), and eight new locknuts (8).
4. Install two hinges (14) on hydrojet hatch cover (1) with eight screws (15), sixteen washers (4), and eight new locknuts (8).

### NOTE

Assistant will help with steps 5 and 6.

5. Install hydrojet hatch cover (1) on hinges (11) with two screws (10), four washers (4), and two new locknuts (8).
6. Confirm support brace (6) installs in slot (3) on hydrojet hatch cover (1).
7. Confirm hook (13) installs in hole (16) on hydrojet hatch cover (1).
8. Close hydrojet hatch cover (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET OIL COOLER COVER AND HOSES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Eight locknuts (item 65, WP 0173 00)  
Two seal washers (item 139, WP 0173 00)  
Gasket (item 31, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Hydraulic oil (item 18, WP 0171 00).  
Sealing compound (pipe) (item 36, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00  
WP 0142 00

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Scoop control hydraulic reservoir drained  
(WP 0012 00).

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## HYDROJET OIL COOLER COVER AND HOSES MAINTENANCE (Contd)

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both hydrojet oil cooler covers and hoses are replaced the same way. This procedure covers the replacement of one oil cooler cover and two hoses.

## REMOVAL

### **NOTE**

Have container ready to catch hydraulic oil.

1. Disconnect hose tube elbows (9) and (10) from two adapters (1) on hydrojet oil cooler cover (2).
2. Remove eight locknuts (3), washers (4), oil cooler cover (2), and gasket (7) from hydrojet housing (5). Discard gasket (7) and locknuts (3).
3. Remove two adapters (1) and seal washers (8) from oil cooler cover (2). Discard seal washers (8).
4. Remove hose clamps (11) and hose (13) from hose tube elbow (10) and bottom of scoop control reservoir (14).
5. Disconnect hose tube elbow (15) and hose (12) from scoop control valve (16).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material from hydrojet housing (5) and oil cooler cover (2) with Skysol 100 and dry with cloth.
3. Remove excess oil and clean inside of hydrojet housing (5) with Skysol 100 and dry with cloth.

### **NOTE**

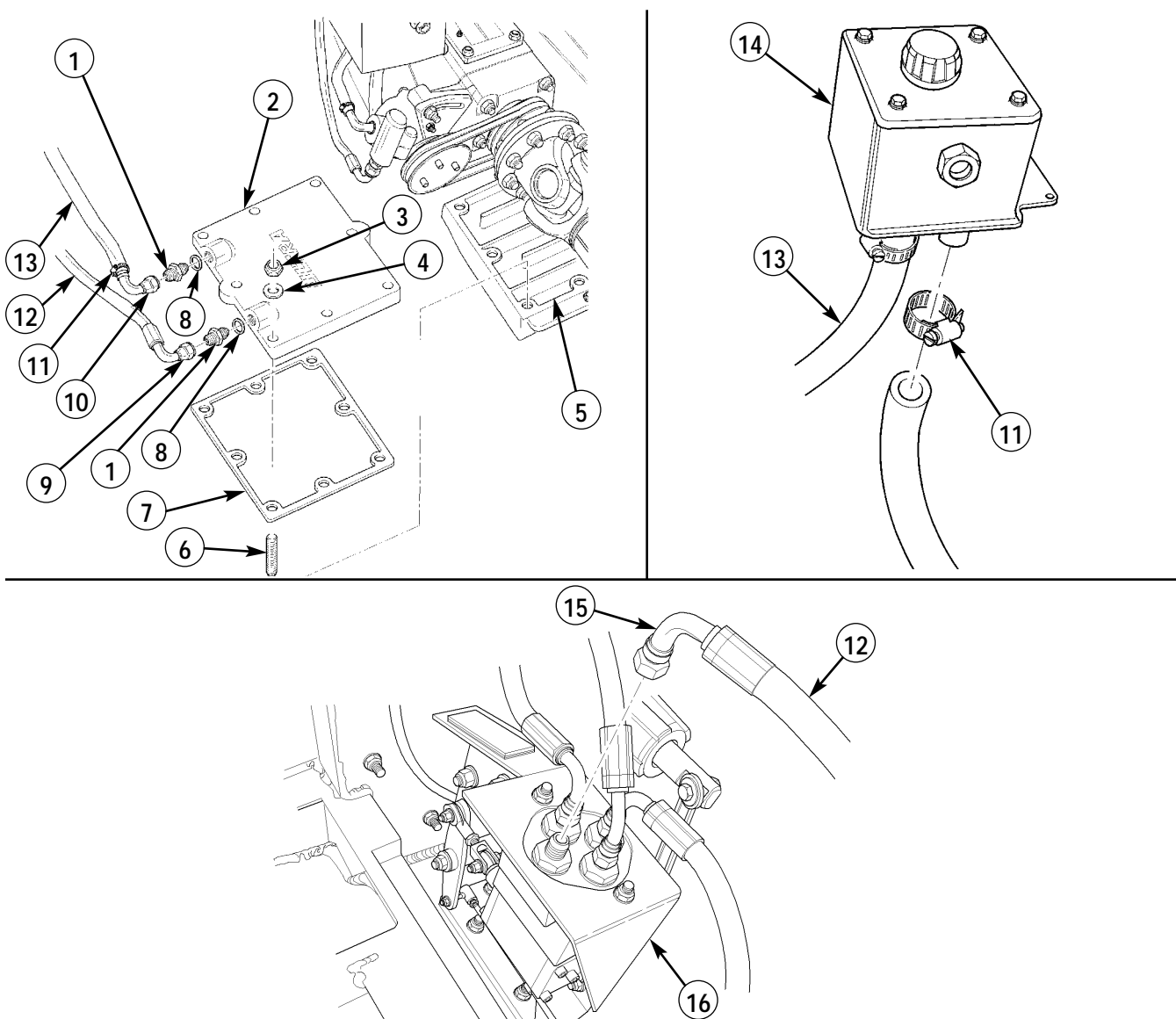
Apply sealing compound (272) to threads of studs if being replaced.

4. Inspect studs (6) for damage, replace if damaged.
5. Inspect hydrojet housing (5) for damage, replace hydrojet (WP 0142 00) if damaged.

## HYDROJET OIL COOLER COVER AND HOSES MAINTENANCE (Contd)

### INSTALLATION

1. Connect hose (12) and tube elbow (15) on scoop control valve (16).
2. Install hose tube elbow (10) on hose (13) with hose clamp (11).
3. Connect hose (13) to scoop control hydraulic reservoir (14) with hose clamp (11).
4. Install two new seal washers (8) and adapters (1) on side of oil cooler cover (2).
5. Install new gasket (7) and oil cooler cover (2) on studs (6) of hydrojet housing (5) with eight washers (4) and new locknuts (3). Tighten locknuts (3) to 23–25 lb-ft (31–34 N·m).
6. Connect hose tube elbows (9) and (10) to two adapters (1) on oil cooler cover (2).
7. Fill scoop control hydraulic reservoir with hydraulic oil (WP 0012 00).
8. Start engine, engage transmission in forward at idle rpm, and check for oil leaks (TM 5-1940-322-10).
9. Install aft cockpit (WP 0016 00).
10. Close hydrojet hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP CONTROL HYDRAULIC RESERVOIR AND HOSES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four lockwashers (item 84, WP 0173 00)  
Two locknuts (item 65, WP 0173 00)  
Gasket (item 32, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Hydraulic oil (item 18, WP 0171 00)  
Sealing compound (item 36, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

TM 5-1940-322-10  
WP 0013 00

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Scoop control hydraulic reservoir drained  
(WP 0012 00).

---

## SCOOP CONTROL HYDRAULIC RESERVOIR AND HOSES MAINTENANCE (Contd)

### **CAUTION**

Cap and plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both scoop control hydraulic reservoirs and hoses are replaced the same way. This procedure covers the replacement of one scoop control hydraulic reservoir and two hoses.

## REMOVAL

### **NOTE**

Have container ready to catch oil.

1. Remove two hose clamps (6) and hoses (10) and (13) from scoop control hydraulic reservoir (1).
2. Remove two locknuts (2), washers (3), and scoop control hydraulic reservoir (1) from inspection cover (4). Discard locknuts (2).
3. Remove hose clamp (12) and hose (13) from hydraulic pump inlet tube (11).
4. Remove tube elbow (8) from oil cooler adapter (7).
5. Remove hose clamp (9) and hose (10) from tube elbow (8).
6. Remove filler cap (15), three screws (14), and filler cap screen (16) from scoop control hydraulic reservoir cover (17).
7. Remove four screws (21), lockwashers (20), scoop control hydraulic reservoir cover (17), and gasket (18) from scoop control hydraulic reservoir housing (1). Discard lockwashers (20) and gasket (18).
8. Remove site glass (19) from side of scoop control hydraulic reservoir housing (1).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **CAUTION**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

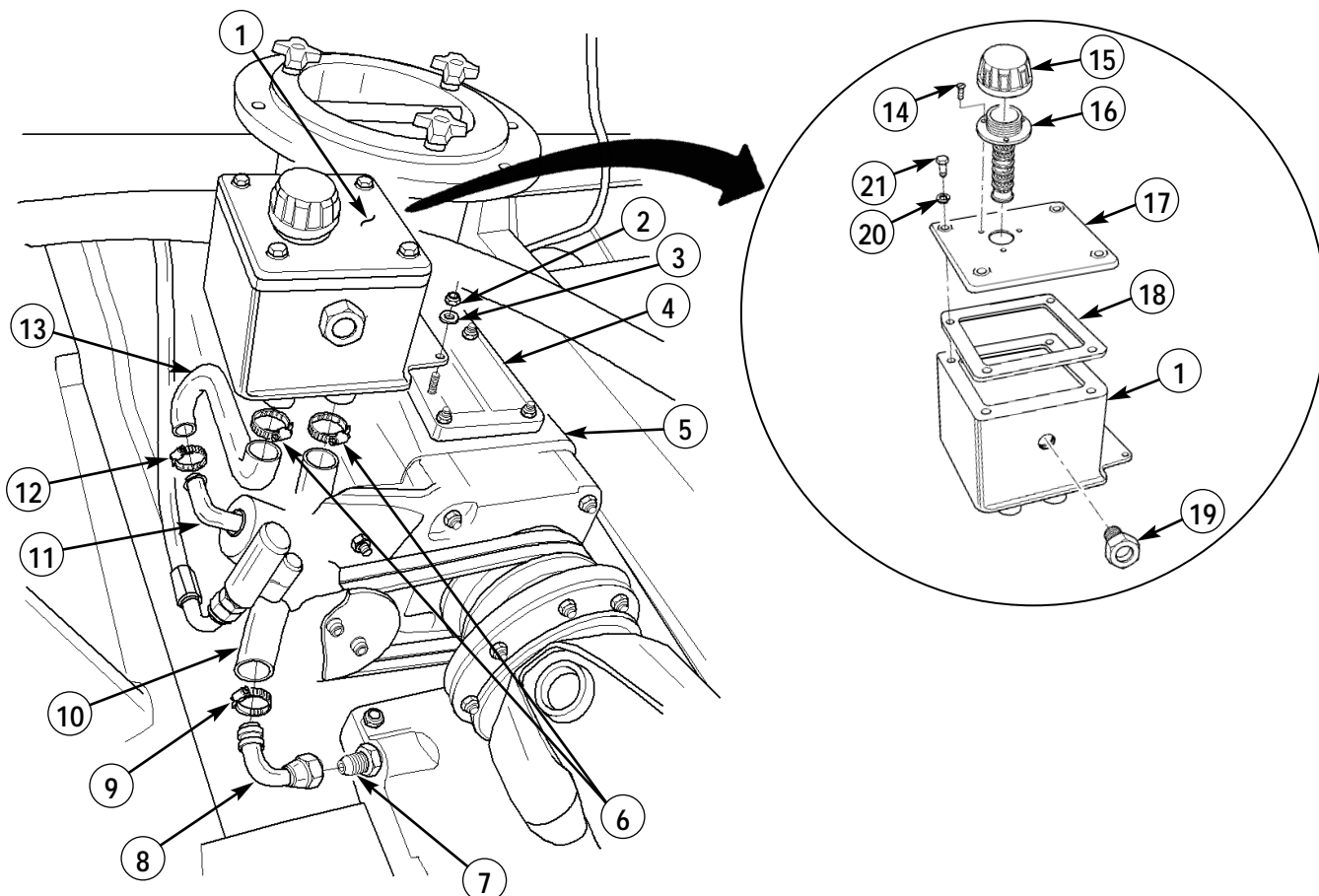
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean inside of scoop control hydraulic reservoir housing (1) with Skysol 100 and dry with cloth.
3. Clean filter screen (16) with Skysol 100 and let air dry.

## SCOOP CONTROL HYDRAULIC RESERVOIR AND HOSES MAINTENANCE (Contd)

### INSTALLATION

1. Apply light coat of sealing compound to threads on site glass (19).
2. Install site glass (19) in scoop control hydraulic reservoir housing (1).
3. Install new gasket (18) and hydraulic scoop control reservoir cover (17) on scoop control hydraulic reservoir housing (1) with four new lockwashers (20) and screws (21).
4. Install filler cap screen (16) on scoop control hydraulic reservoir cover (17) with three screws (14).
5. Install filler cap (15) on filler cap screen (16).
6. Install hose (10) and clamp (9) on tube elbow (8).
7. Install tube elbow (8) on oil cooler adapter (7).
8. Install hose (13) and clamp (12) on hydraulic pump inlet tube (11).
9. Install scoop control hydraulic reservoir (1) on inspection cover (4) with two washers (3) and new locknuts (2).
10. Install hoses (10) and (13) and two hose clamps (6) on scoop control hydraulic reservoir housing (1).
11. Fill scoop control hydraulic reservoir (1) with hydraulic oil (WP 0012 00).
12. Start engine, engage transmission in forward at idle rpm, and check for oil leaks (TM 5-1940-322-10).
13. Install aft cockpit (WP 0016 00).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP HYDRAULIC DRIVE BELTS REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Eight locknuts (item 67, WP 0171 00)  
Antiseize compound (item 6, WP 0171 00)

##### References

TM 5-1940-322-10

##### Equipment Condition

Aft cockpit removed (WP 0016 00).

---

## SCOOP HYDRAULIC DRIVE BELTS REPLACEMENT (Contd)

### **NOTE**

Both scoop hydraulic drive belts are replaced the same way. This procedure covers the replacement of one set of scoop hydraulic drive belts.

Belts must be replaced as set.

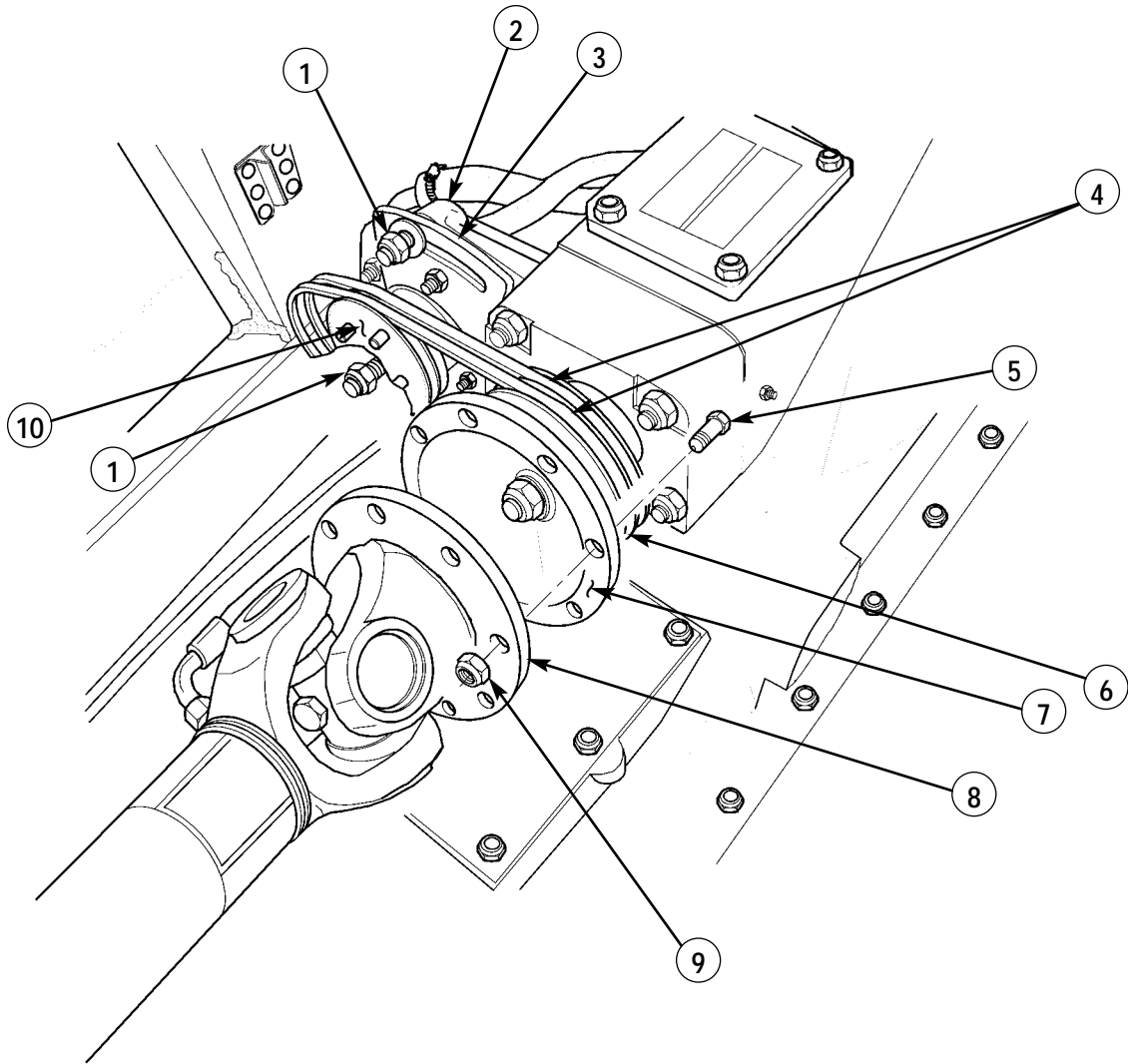
### REMOVAL

1. Remove eight locknuts (9), screws (5), and drive shaft flange (8) from hydrojet drive flange (7).
2. Position drive shaft flange (8) away from hydrojet drive flange (7).
3. Loosen top and bottom locknuts (1) on scoop hydraulic pump mounting bracket (3) and position hydraulic pump (2) inward to loosen drive belts (4).
4. Remove two drive belts (4) from pump drive pulley (10) and pulley (6) on hydrojet drive flange (7).

### INSTALLATION

1. Install two drive belts (4) on pulley (6) of hydrojet drive flange (7) and pump flange pulley (10).
2. Check belt alignment, position hydraulic pump (2) to tighten belts (4), and tighten two locknuts (1) to 23–25 lb-ft (31–34 N•m).
3. Apply light coat of antiseize compound to screws (5).
4. Install drive shaft flange (8) on hydrojet drive flange (7) with eight screws (5) and new locknuts (7). Tighten locknuts (8) to 55–60 lb-ft (75–81 N•m).
5. Start engine, engage transmission forward at idle rpm, and check hydraulic pump and drive belts for proper operation (TM 5-1940-322-10).
6. Install aft cockpit (WP 0016 00).

SCOOP HYDRAULIC DRIVE BELTS REPLACEMENT (Contd)





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP HYDRAULIC PUMP, MOUNTING BRACKET, AND HOSES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Two locknuts (item 65, WP 0173 00)  
Three lockwashers (item 86, WP 0173 00)  
Three lockwashers (item 87, WP 0173 00)  
O-ring (item 178, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)

###### Materials/Parts (Contd)

Hydraulic oil (item 18, WP 0171 00)  
Sealing compound (item 33, WP 0171 00)

###### References

TM 5-1940-322-10  
WP 0013 00  
WP 0167 00

###### Equipment Condition

Aft cockpit removed (WP 0016 00).  
Scoop control hydraulic reservoir drained  
(WP 0012 00).

---

## SCOOP HYDRAULIC PUMP, MOUNTING BRACKET, AND HOSES MAINTENANCE (Contd)

### **CAUTION**

Cap and plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Scoop hydraulic pumps, mounting brackets, and hoses are replaced the same way. This procedure covers the replacement of one scoop hydraulic pump, mounting bracket, and two hoses.

## REMOVAL

### **NOTE**

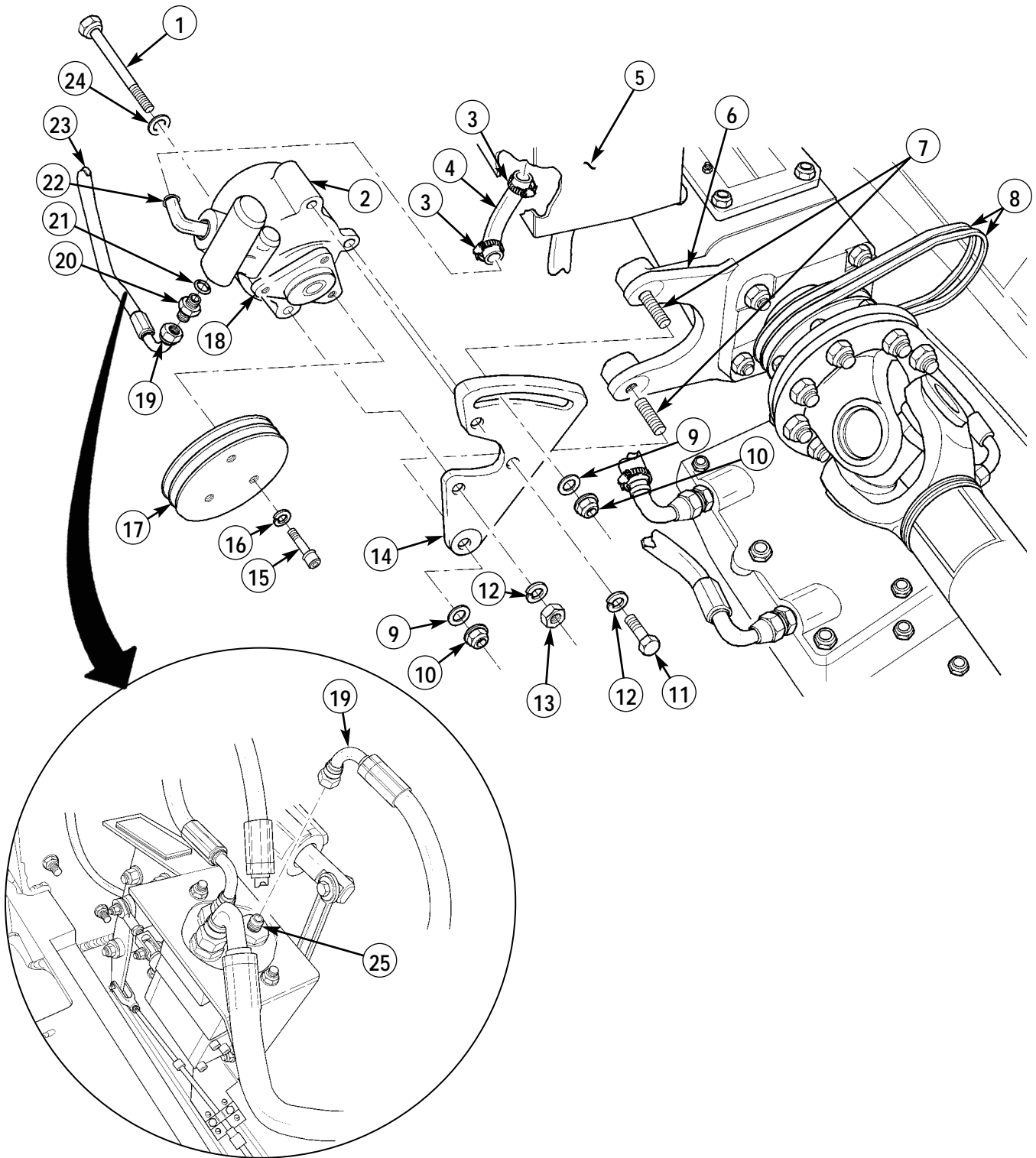
Have container ready to catch hydraulic oil.

1. Remove hose clamp (3) and hose (4) from hydraulic pump inlet tube (22).
2. Remove hose tube elbow (19) from adapter (20).
3. Loosen three screws (15) on drive pulley (17).
4. Loosen two locknuts (10) on mounting bracket (14).
5. Relieve tension from drive belts (8) by adjusting mounting bracket (14).
6. Remove drive belts (8) from pump drive pulley (17).
7. Remove three screws (15), lockwashers (16), and drive pulley (17) from pump drive flange (18). Discard lockwashers (16).
8. Remove two locknuts (10), washers (9), hydraulic pump (2), and mounting bracket (14) from two studs (7) on hydrojet bearing bracket (6). Discard locknuts (10).
9. Remove two nuts (13), lockwashers (12), screws (1), and washers (24) from mounting bracket (14) and hydraulic pump (2). Discard lockwashers (12).
10. Remove screw (11), lockwasher (12), and mounting bracket (14) from hydraulic pump (2). Discard lockwasher (12).
11. Remove adapter (20) and O-ring (21) from hydraulic pump (2). Discard O-ring (21).
12. Remove hose tube elbow (19) from control valve (25).
13. Remove hose clamp (3) and hose (4) from hydraulic reservoir (5).

## CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean excess oil from hydraulic reservoir pump (2), mounting bracket (14), hose assembly (23) and hose (4) with cloth.
3. Inspect studs (7) for damage. If damaged, replace studs (7).
4. Inspect hydrojet bearing bracket (6) for damage. If damaged, replace hydrojet bearing bracket (6) (WP 0167 00).
5. Inspect hose assembly (23) and hose (4) for leaks or damage. If leaks or damage is present, replace hose assembly (23) or hose (4).
6. Inspect adapter (20) for damaged threads. If damaged, replace adapter (20).

### SCOOP HYDRAULIC PUMP, MOUNTING BRACKET, AND HOSES MAINTENANCE (Contd)



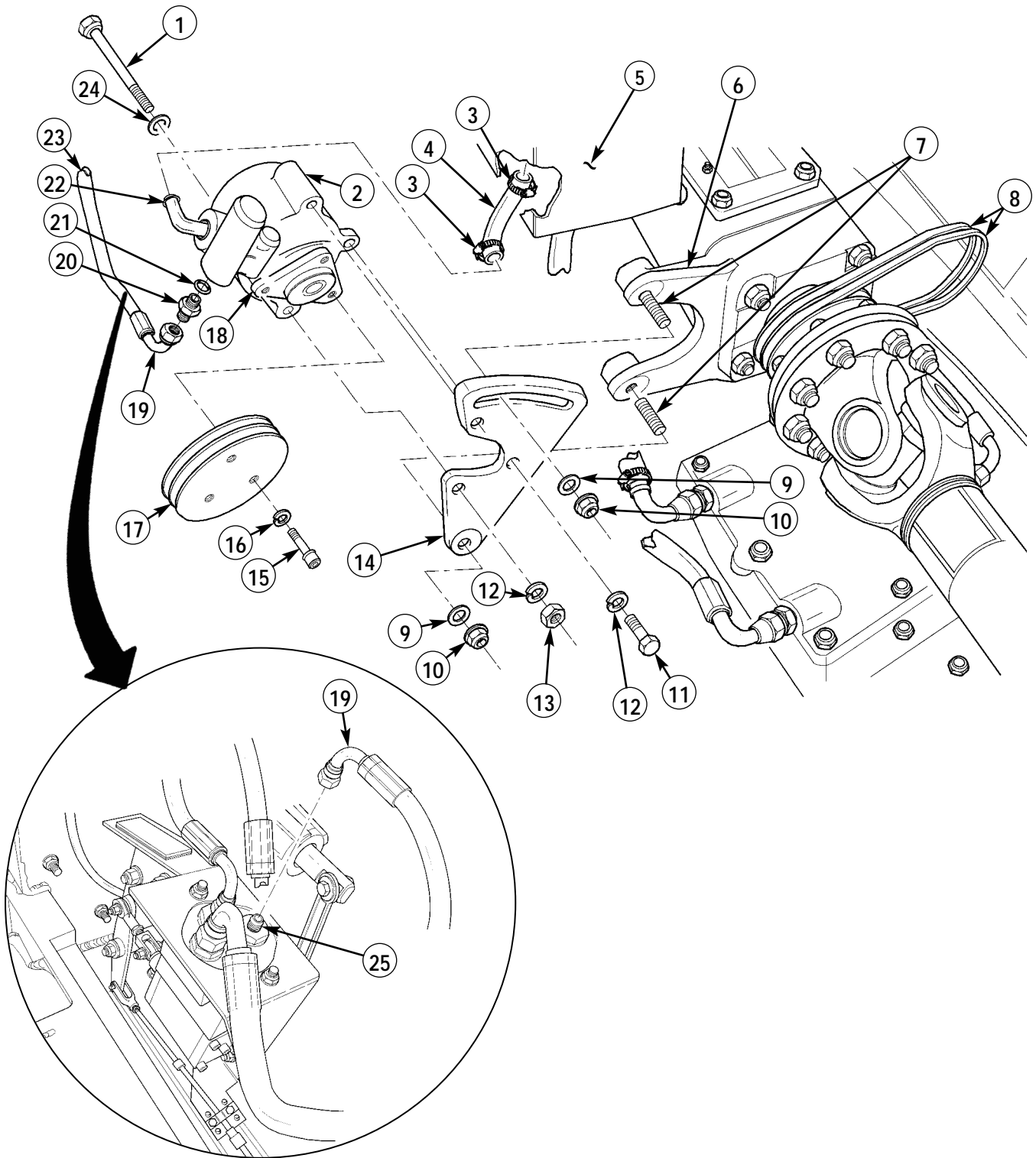
## SCOOP HYDRAULIC PUMP, MOUNTING BRACKET, AND HOSES MAINTENANCE (Contd)

### INSTALLATION

1. Install hose (4) on hydraulic reservoir (5) with hose clamp (3).
2. Install hose tube elbow (19) on control valve (25).
3. Install new O-ring (21) and adapter (20) on scoop hydraulic pump (2).
4. Apply light coat of sealing compound on threads of screw (11) and two screws (1).
5. Install hydraulic pump (2) on mounting bracket (14) with three new lockwashers (12), screw (11), two screws (1), washers (24), and nuts (13).
6. Apply light coat sealing compound on threads of studs (7).
7. Install hydraulic pump (2) and mounting bracket (14) on two studs (7) with two washers (9) and new locknuts (10). Do not tighten locknuts (10).
8. Apply light coat of sealing compound on threads of screws (15).
9. Install drive pulley (17) on pump drive flange (18) with three new lockwashers (16) and screws (15). Tighten screws (15) to 7–9 lb-ft (10–12 N•m).
10. Install two drive belts (8) on pump drive pulley (17).
11. Align drive belts (8) and position hydraulic pump (2) to set drive belt tension. Tighten two locknuts (10) to 23–25 lb-ft (31–34 N•m).
12. Install hose tube elbow (19) of hose assembly (23) on adapter (20).
13. Install hose (4) on hydraulic pump inlet tube (22) with hose clamp (3).
14. Fill scoop hydraulic reservoir with hydraulic oil (WP 0012 00).
15. Start engine, engage transmission to forward at idle rpm, check hoses and pump for leaks, recheck oil level, and fill if necessary (TM 5-1940-322-10).
16. Install aft cockpit (WP 0016 00).



### SCOOP HYDRAULIC PUMP, MOUNTING BRACKET, AND HOSES MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE

CONTROL VALVE HOSES REMOVAL, MAIN FRAME BRACKET REMOVAL, CONTROL VALVE REMOVAL, CONTROL VALVE LINKAGE REMOVAL, CONTROL VALVE DISASSEMBLY, CLEANING AND INSPECTION, CONTROL VALVE ASSEMBLY, CONTROL VALVE LINKAGE INSTALLATION, CONTROL VALVE INSTALLATION, MAIN FRAME BRACKET INSTALLATION, AND CONTROL VALVE HOSES INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Eight O-rings (item 108, WP 0173 00)  
Six locknuts (item 16, WP 0173 00)  
Four locknuts (item 53, WP 0173 00)  
Four lockwashers (item 91, WP 0173 00)  
Four seal washers (item 93, WP 0173 00)  
Cotter pin (item 5, WP 0173 00)  
Locknut (item 69, WP 0173 00)

##### Materials/Parts (Contd)

Cap and plug set (item 7, WP 0171 00)  
Hydraulic oil (item 18, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)

##### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Aft cockpit removed (WP 0016 00).  
Scoop control hydraulic reservoir drained  
(WP 0012 00).

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## SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)

### **CAUTION**

Cap and plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

Ensure scoop hydraulic control valve assembly is supported during removal, disassembly, assembly, and installation. Failure to comply may result in damage to equipment.

### **NOTE**

Scoop hydraulic control valve assemblies, control valve hoses, control linkage, and mounting brackets are replaced the same way. This procedure covers replacement of one scoop hydraulic control valve assembly; four control valve hoses, control linkage, and mounting bracket.

Tag all hoses during removal to assist with installation.

### CONTROL VALVE HOSES REMOVAL

#### **NOTE**

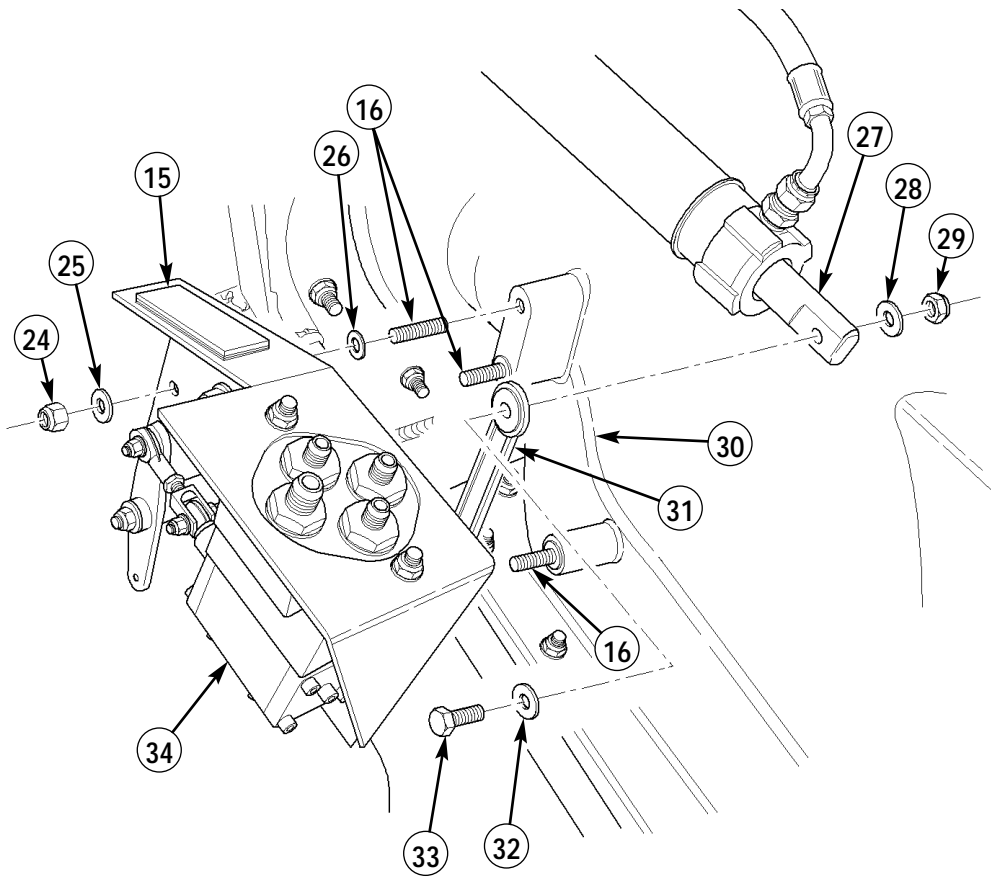
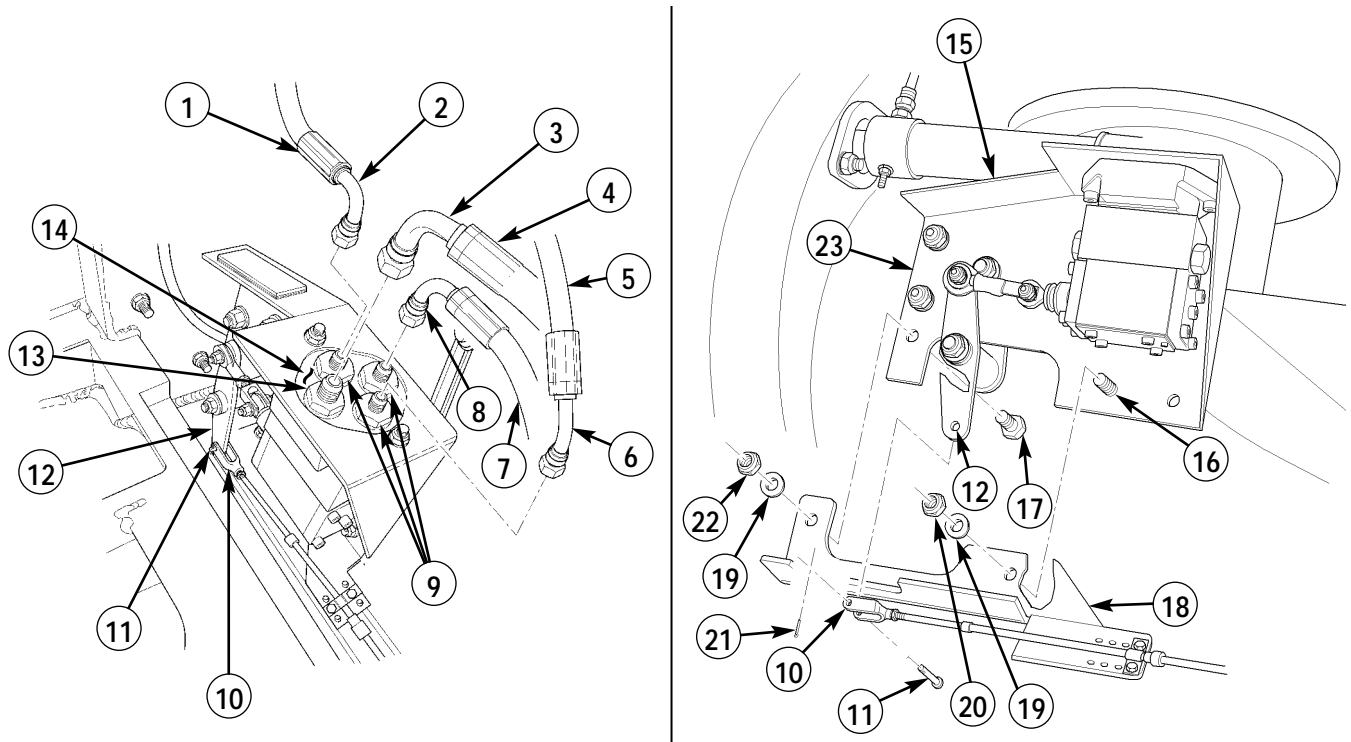
Have container ready to catch oil.

1. Disconnect hose tube elbows (2), (3), (6), and (8) from three adapters (9) and adapter (13) on scoop hydraulic control assembly manifold (14).
2. Disconnect other ends of hoses (1) and (5) from scoop hydraulic cylinder (27).
3. Disconnect other end of hose (7) from hydraulic pump.
4. Disconnect other end of hose (4) from hydrojet oil cooler.

### MAIN FRAME BRACKET REMOVAL

1. Remove cotter pin (21), pin (11), and clevis (10) from control link (12). Discard cotter pin (21).
2. Remove locknuts (20) and (22), two washers (19), screw (17), and lever stop bracket (18) with clevis (10) from main frame bracket (15) and stud (16). Discard locknuts (20) and (22).
3. Remove locknut (27), washer (28), screw (33), washer (32), and one end of control link (31) from scoop hydraulic cylinder (26). Discard locknut (29).
4. Remove two locknuts (24), washers (25), main frame bracket (15), control valve assembly (34), and fiber washers (26) from three studs (16) on hydrojet housing (30). Discard locknuts (24).

**SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)**



## SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)

### CONTROL VALVE REMOVAL

1. Remove two locknuts (35), washers (36), screws (4), washers (3), and connecting link (34) from control link (30) and selector valve plunger (24). Discard locknuts (35).
2. Remove two locknuts (7), four washers (6), screws (28), and control valve assembly (41) from main frame bracket (5). Discard locknuts (7).

### CONTROL VALVE LINKAGE REMOVAL

1. If not removed, remove two locknuts (35), washers (36), screws (4), washers (3), and connecting link (34) from control link (30) and selector valve plunger (24). Discard locknuts (35).
2. Remove locknut (33), washer (32), and control link (30) from main link pivot pin (18). Discard locknut (33).
3. Remove nut (43), lockwasher (44), and ball stud (45) from control link (30). Discard lockwasher (44).
4. Remove locknut (11), thick washer (10), and main link (12) from main pivot shaft (8). Discard locknut (11).

#### **NOTE**

Note position of control link on main link to assist with installation.

5. If not removed, remove locknut (14), washer (15), screw (17), washer (16), and control link (13) from main link (12). Discard locknut (14).
6. Remove locknut (1), washer (2), and main pivot shaft (8) from main frame bracket (5). Discard locknut (1).

### CONTROL VALVE DISASSEMBLY

#### **CAUTION**

Ensure control valves are supported during disassembly. Failure to comply may result in damage to equipment.

#### **NOTE**

Mark position of control valve manifold, pilot check valve, and selector valve to assist with assembly.

1. Remove four screws (23), lockwashers (22), selector valve (21), four O-rings (19), pilot check valve (20), and four O-rings (19) from control valve manifold (27). Discard lockwashers (22) and O-rings (19).

#### **NOTE**

Note position of adapters during disassembly to assist with assembly.

2. Remove three adapters (25), adapter (29), and four seal washers (26) from control valve manifold (27). Discard seal washers (26).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. If fiber washers (37) are damaged, remove fiber washers (37) from three studs (38) on hydrojet housing (39) and replace.

#### **NOTE**

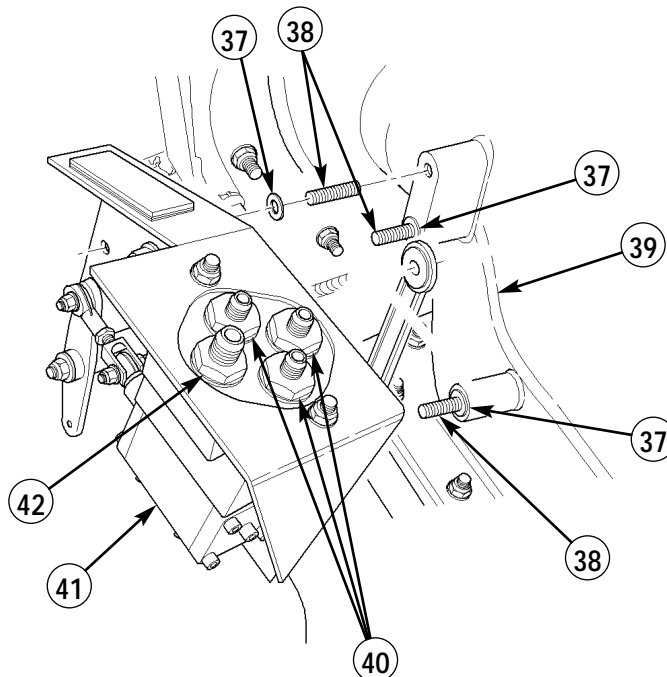
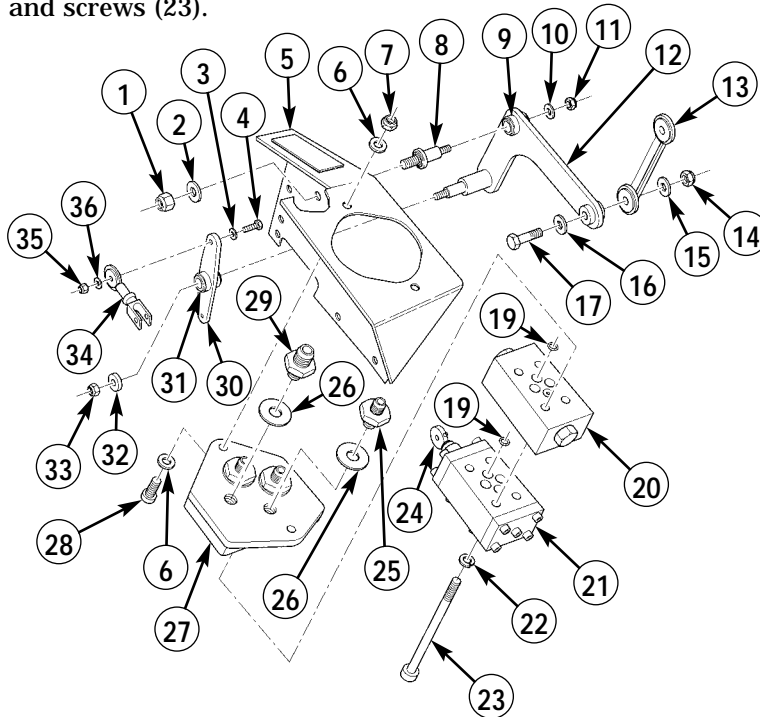
If replacing studs, apply coat of sealing compound (272) when installing.

3. If stud (38) threads are damaged, remove stud (38) from hydrojet housing (39) and replace.
4. If main pivot shaft bushings (9) are worn or damaged, remove bushings (9) from main link (12) and replace.
5. If pivot pin bushings (31) are worn or damaged, remove bushings (31) from control link (30) and replace.

**SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)**

**CONTROL VALVE ASSEMBLY**

1. Install four new seal washers (26), three adapters (25), and adapter (29) on manifold (27).
2. Apply light coat of hydraulic oil to new O-rings (19).
3. Position four new O-rings (19) on pilot check valve (20) and selector valve (21).
4. Install pilot valve (20) and selector valve (21) on manifold (27) as marked, with four new lockwashers (22) and screws (23).



## SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)

### CONTROL VALVE LINKAGE INSTALLATION

#### **NOTE**

Apply sealing compound (243) to all locknuts prior to installation.

1. Install main pivot shaft (8) on main frame bracket (5) with washer (2) and new locknut (1). Tighten locknut (1) to 58 lb-ft (79 N·m).
2. Install control link (13) on main link (12) as noted at removal with washer (16), screw (17), washer (15), and new locknut (14).
3. If main pivot shaft bushings (9) removed, install two new bushings (9) on main link (12).
4. Install main link (12) on main pivot shaft (8) with thick washer (10) and new locknut (11).
5. If pivot bushings (23) removed, install two new pivot bushings (23) on control link (24).
6. Install control link (24) on main link pivot pin (18) as noted at removal with washer (21) and new locknut (22).
7. Install clevis (25) between control link (24) and selector valve plunger (19) with two washers (3), screws (4), washers (27), and new locknuts (26).

### CONTROL VALVE INSTALLATION

If not installed, install control valve assembly (38) on main frame bracket (5) with two screws (20), washers (6), and new locknuts (7).

### MAIN FRAME BRACKET INSTALLATION

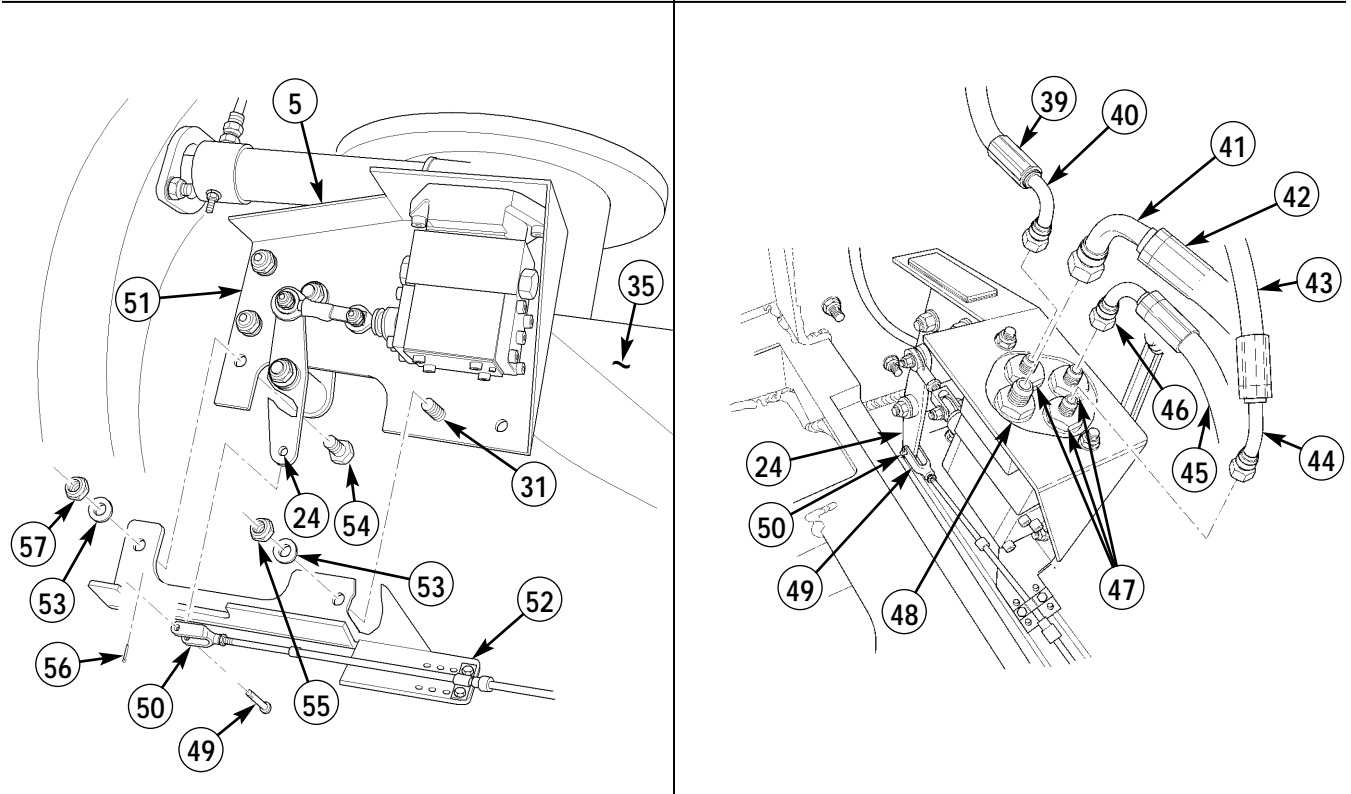
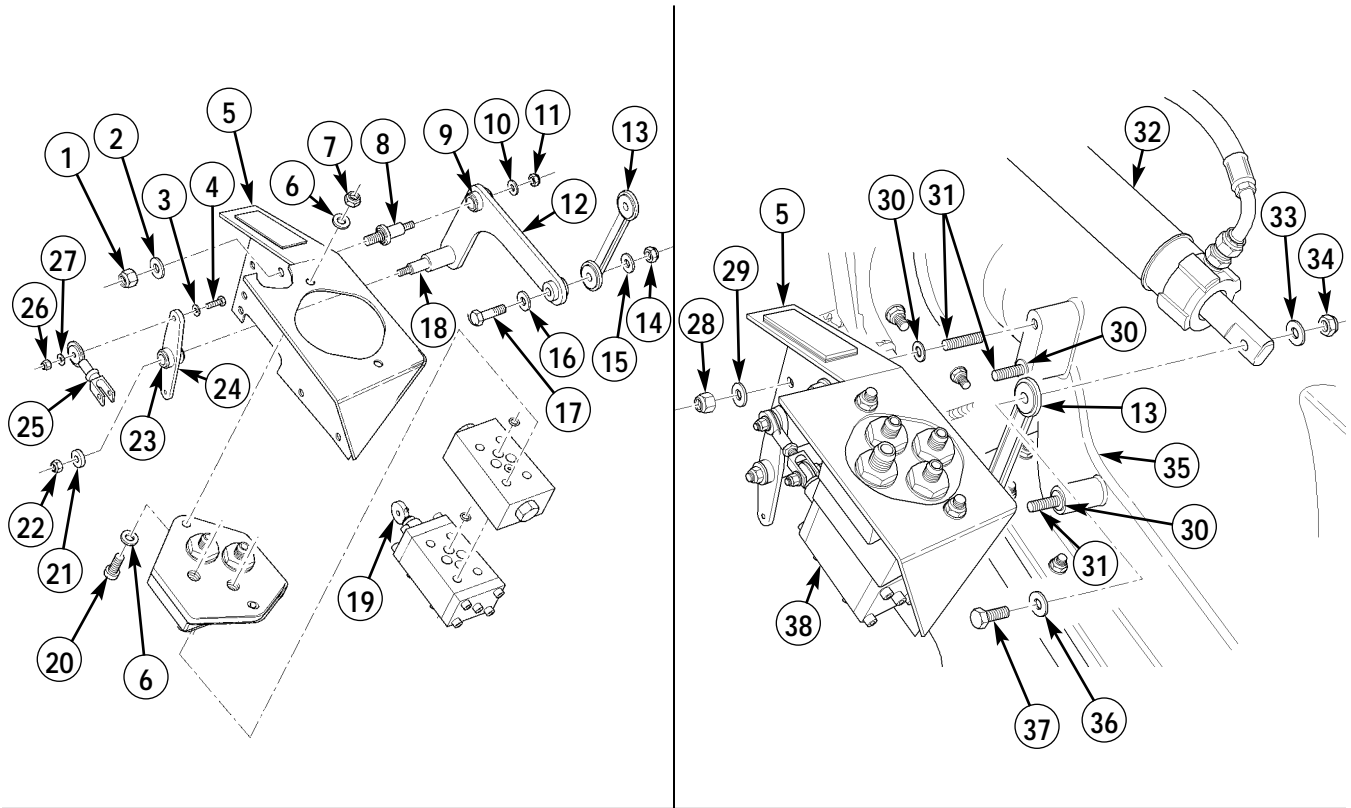
1. Install main frame bracket (5) with control valve assembly (38) on three fiber washers (30) and studs (31) of hydrojet housing (35) with two washers (29) and new locknuts (28). Do not tighten locknuts (28).
2. Install one end of control link (13) to scoop hydraulic cylinder (32) with washer (36), screw (37), washer (33), and new locknut (34).
3. Install lever stop bracket (52) with shift clevis (50) on stud (31) of hydrojet housing (35) and main frame bracket (5) with screw (54), two washers (53), and new locknuts (55) and (57). Tighten locknuts (28), (55), and (57) on screw (54) and studs (31).
4. Connect shift clevis (50) to control link (24) with pin (49) and new cotter pin (56).

### CONTROL VALVE HOSES INSTALLATION

1. Connect one end of hose (42) to hydrojet oil cooler as noted at removal.
2. Connect one end of hose (45) to hydraulic pump as noted at removal.
3. Connect one end of hoses (39) and (43) to scoop hydraulic cylinder (32) as noted at removal.
4. Connect hose tube elbows (40), (41), and (44) to three adapters (47) and hose tube elbow (46) to adapter (48) as noted at removal.
5. Fill scoop hydraulic reservoir with hydraulic oil (WP 0012 00).
6. Start engine, engage transmission forward at idle rpm, operate scoop controls, and check for oil leaks and operation of reverse deflector (TM 5-1940-322-10).
7. Install aft cockpit (WP 0016 00).
8. Close hydrojet hatches (TM 5-1940-322-10).



**SCOOP HYDRAULIC CONTROL VALVE, CONTROL VALVE HOSES, CONTROL LINKAGE, AND MAIN FRAME BRACKETS MAINTENANCE (Contd)**



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### SCOOP HYDRAULIC CYLINDER AND HOSES MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Three locknuts (item 65, WP 0173 00)  
Locknut (item 69, WP 0173 00)  
O-ring (item 106, WP 0173 00)  
O-ring (item 107, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
GAA grease (item 14, WP 0171 00)  
Hydraulic oil (item 18, WP 0171 00)

###### Materials/Parts (Contd)

Sealing compound (pipe) (item 36, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

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## SCOOP HYDRAULIC CYLINDER AND HOSES MAINTENANCE (Contd)

### **CAUTION**

Ensure hydrojet scoop reverse deflectors are supported during removal and installation. Failure to comply may result in damage to equipment.

Cap and plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both scoop hydraulic cylinders and hoses are replaced the same way. This procedure covers replacement of one scoop hydraulic cylinder and two hoses.

Tag hoses during removal to assist with installation.

### REMOVAL

1. Loosen jam nut (1) on scoop hydraulic cylinder rod (2).
2. Remove locknut (9), two washers (6), two fiber washers (7), and screw (5) from hydrojet scoop reverse deflector (8) and cylinder rod clevis (4). Discard locknut (9).
3. Remove clevis (4) and two fiber washers (3) from scoop deflector (8).

### **NOTE**

Note position of clevis on cylinder rod to assist with installation.

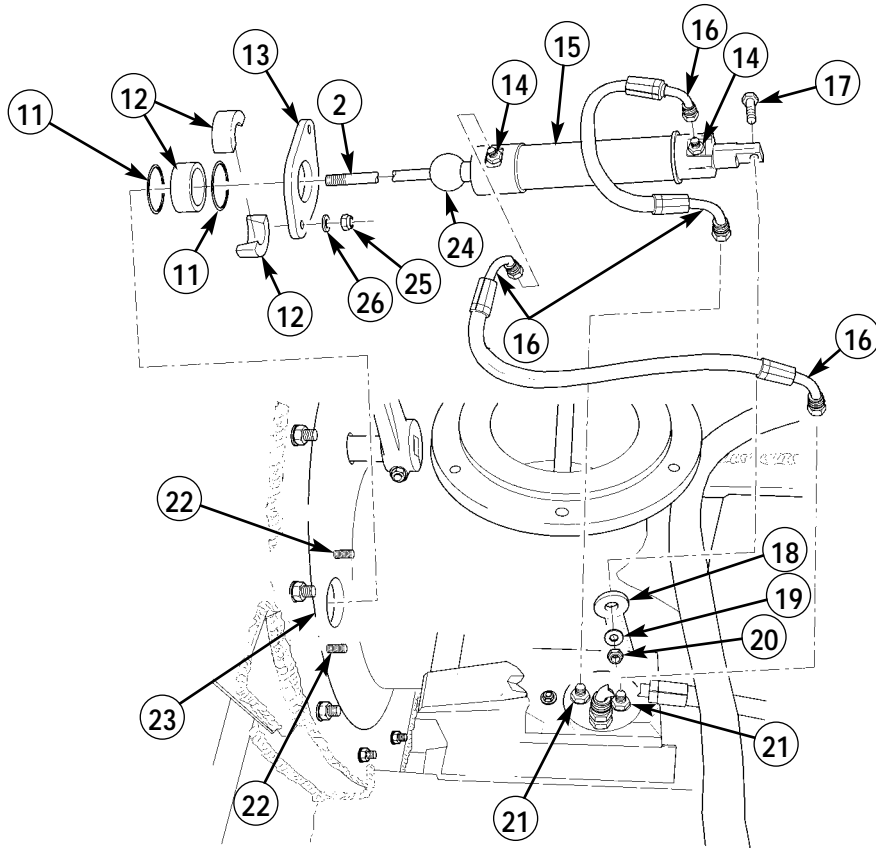
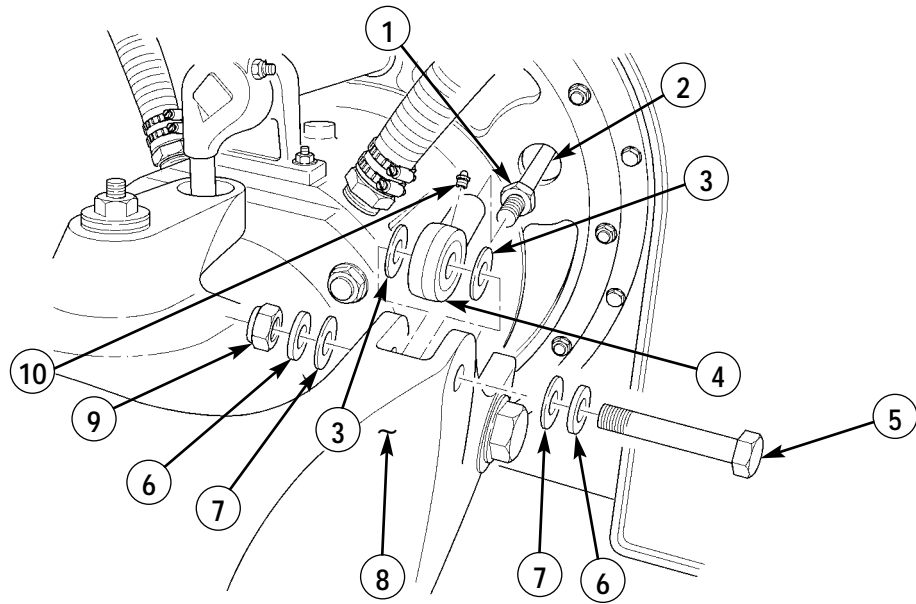
4. Remove clevis (4) from cylinder rod (2).
5. Remove locknut (20), washer (19), screw (17), and hydraulic cylinder (15) from control link (18). Discard locknut (20).

### **NOTE**

Have container ready to catch hydraulic oil.

6. Remove four hose tube elbows (16) from adapters (14) and (21).
7. Remove two locknuts (25) and washers (26) from studs (22). Discard locknuts (25).
8. Remove hydraulic cylinder (15), mounting plate (13), and swivel bearing set (12) with two O-rings (11) from mounting flange (23).
9. Remove O-rings (11) and swivel bearing set (12) from swivel ball (24). Discard O-rings (11).
10. Remove two adapters (14) and mounting plate (13) from hydraulic cylinder (15).

### SCOOP HYDRAULIC CYLINDER AND HOSES MAINTENANCE (Contd)



## SCOOP HYDRAULIC CYLINDER AND HOSES MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 mixture is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use. Failure to do so may result in injury to personnel.

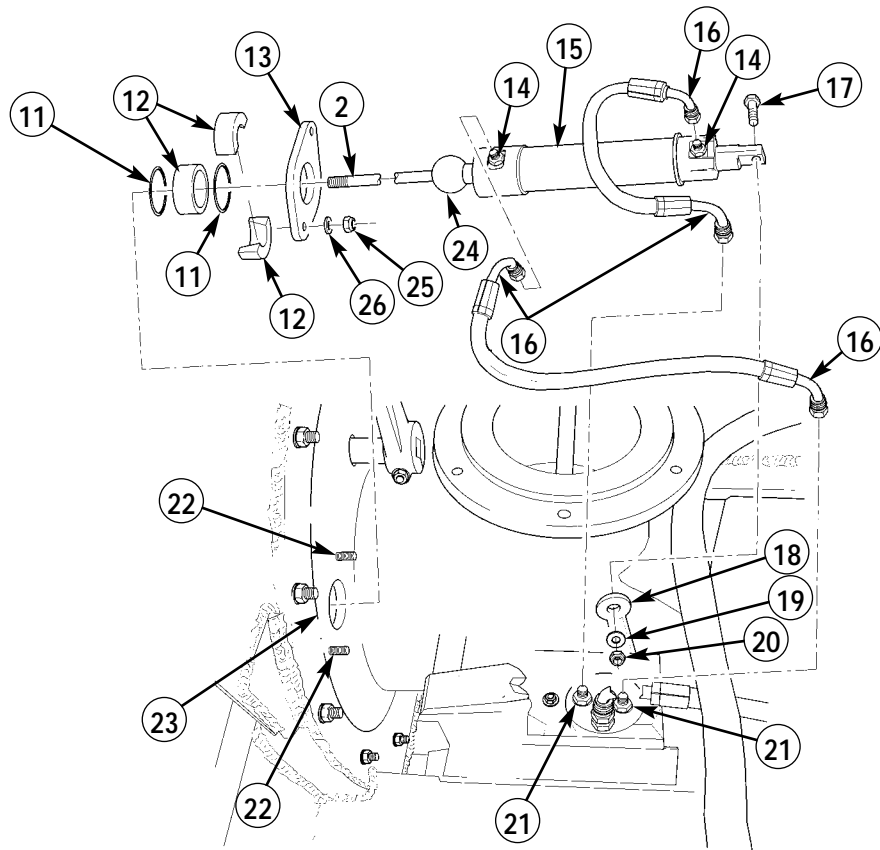
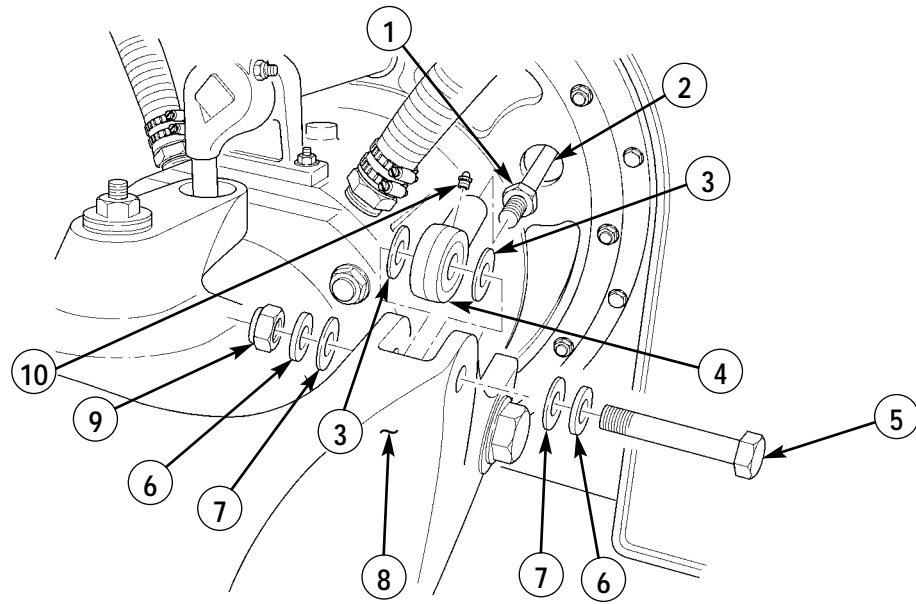
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to do so may result in injury to personnel.

2. Clean excess sealing compound from adapters (14) with Skysol 100 and dry with cloth.
3. Inspect threads on adapters (14) for damage. Replace adapters (14) if damaged.
4. Inspect threads on lube fitting (10) for damage. Replace lube fitting (10) if damaged.

### INSTALLATION

1. Apply light coat of sealing compound (pipe) on threads of adapters (14).
2. Install two adapters (14) in hydraulic cylinder (15).
3. Position mounting plate (13) on hydraulic cylinder (15).
4. Apply light coat of GAA grease on new O-rings (11) and swivel bearing set (12).
5. Position swivel bearing set (12) and O-rings (11) on swivel ball (24).
6. Apply thin coat of sealing compound (243) on threads of studs (22).
7. Position cylinder rod (2) through mounting flange (23).
8. Install mounting plate (13) on two studs (22) with two washers (26) and new locknuts (25). Tighten locknuts (25) to 23–25 lb-ft (31–34 N•m).
9. Install four hose tube elbows (16) on adapters (14) and (21).
10. Apply light coat of sealing compound (243) on threads of cylinder rod (2).
11. Install clevis (4), as noted in removal, on cylinder rod (2) and tighten jam nut (1).
12. Install hydraulic cylinder (15) on control link (18) with screw (17), washer (19), and locknut (20).
13. Apply light coat of sealing compound (243) on threads of screw (5).
14. Install two fiber washers (3) and clevis (4) on scoop reverse deflector (8) with screw (5), two fiber washers (7), two washers (6), and new locknut (9). Tighten locknut (9) to 23–25 lb-ft (31–34 N•m).
15. Start engine, operate scoop, and check hoses and hydraulic cylinder for leaks (TM 5-1940-322-10).
16. Check oil level in scoop hydraulic reservoir, fill if necessary (TM 5-1940-322-10).
17. Close hydrojet hatches (TM 5-1940-322-10).

### SCOOP HYDRAULIC CYLINDER AND HOSES MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STEERING HYDRAULIC CYLINDER AND MOUNTING BRACKET MAINTENANCE

#### REMOVAL, INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four locknuts (item 65, WP 0173 00)  
Locknut (item 70, WP 0173 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
GAA grease (item 14, WP 0171 00)

###### Materials/Parts Contd

Sealing compound (243) (item 32, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)  
Sealing compound (pipe) (item 36, WP 0171 00)

###### References

WP 0031 00  
WP 0013 00

###### Equipment Condition

Port side hydrojet hatch opened and secured  
(TM 5-1940-322-10).

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## STEERING HYDRAULIC CYLINDER AND MOUNTING BRACKET MAINTENANCE (Contd)

### **CAUTION**

Cap and plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to comply may result in damage to equipment.

### REMOVAL

1. Remove locknut (15), washer (16), two washers (23), tie rod (24), screw (25), and clevis (1) from hydrojet steering lever (22). Discard locknut (15).

### **NOTE**

Have container ready to catch hydraulic oil.

Tag all hoses during removal to assist with installation.

2. Remove hydraulic hoses (5) and (7) from adapters (6) on steering hydraulic cylinder (11).
3. Remove four screws (13), washers (14), and steering hydraulic cylinder (11) from mounting bracket (19).

### **NOTE**

Note position of clevis on cylinder rod end to assist with installation.

4. Loosen jam nut (3) and remove clevis (1) from cylinder rod (4).
5. Remove two screws (8), washers (9), cylinder ball clamp (10), and hydraulic cylinder (11) from ball clamp base (12).
6. Remove two adapters (6) from hydraulic cylinder (11).
7. Remove four locknuts (17), washers (18), and mounting bracket (19) from hydrojet housing (21). Discard locknuts (17).
8. Remove lube fitting (2) from clevis (1).
9. Remove lube fitting (2) from cylinder ball clamp (10).

### INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean steering hydraulic cylinder (11) with clean cloth.
3. Inspect threads on lube fittings (2) for damage. Replace lube fittings (2) if damaged.
4. Inspect threads on studs (20) for damage. Replace studs (20) if damaged.

### **NOTE**

If replacing a stud, apply coat of sealing compound (272) on mounting threads prior to installation.

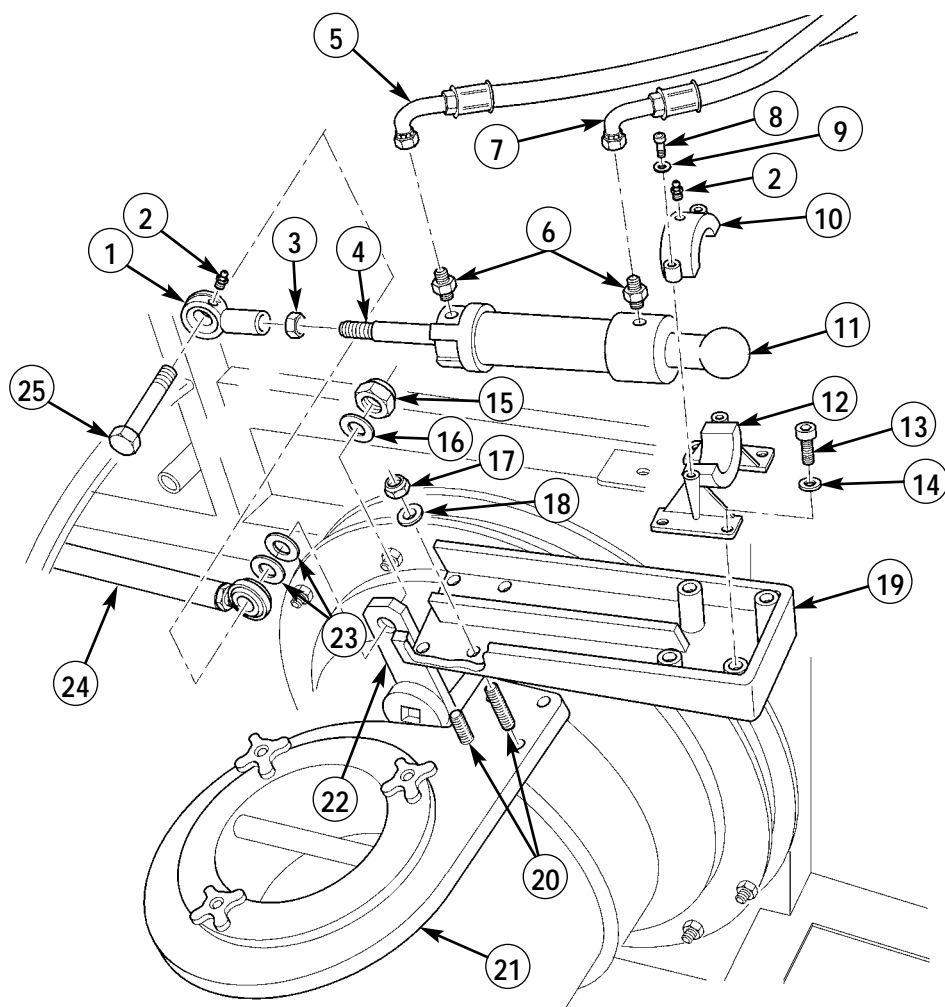
### INSTALLATION

1. Apply light coat of sealing compound (243) on threads of studs (20).
2. Install mounting bracket (19) on hydrojet housing (21) with four washers (18) and new locknuts (17). Tighten locknuts (17) to 23–25 lb-ft (31–34 N·m).
3. Apply light coat of sealing compound (pipe) on threads of adapters (6).
4. Install two adapters (6) in steering hydraulic cylinder (11).
5. Apply light coat of GAA grease on ball end of steering hydraulic cylinder (11), ball clamp (10), and ball clamp base (12).

## STEERING HYDRAULIC CYLINDER AND MOUNTING BRACKET MAINTENANCE (Contd)

### INSTALLATION (Contd)

6. Install steering hydraulic cylinder (11) on ball clamp base (12) with ball clamp (10), two washers (9), and screws (8).
7. Apply light coat of sealing compound (243) on threads of cylinder rod (4).
8. Install clevis (1) on cylinder rod (4) as noted at removal. Tighten jam nut (3).
9. Apply light coat of sealing compound (243) on threads of screws (13).
10. Install ball clamp base (12) on mounting bracket (19) with four washers (14) and screws (13). Tighten screws (13) to 13–14 lb-ft (17–19 N·m).
11. Install hydraulic hoses (7) and (5) on adapters (6).
12. Install clevis (1) and tie rod (24) on hydrojet steering lever (22) with screw (25), two washers (23), washer (16), and new locknut (15). Tighten locknut (15) to 170–180 lb-ft (231–244 N·m).
13. Bleed steering hydraulic system (WP 0031 00).
14. Check for leaks and correct operation of steering system (TM 5-1940-322-10).
15. Close port side hydrojet hatch (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET STEERING DEFLECTOR, ROD, AND PIVOT MAINTENANCE

#### REMOVAL, INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Three locknuts (item 66, WP 0173 00)  
Two locknuts (item 70, WP 0173 00)  
Locknut (item 65, WP 0173 00)  
Shaft seal (item 149, WP 0173 00)  
Adhesive (item 3, WP 0171 00)  
GAA grease (item 14, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0013 00  
WP 0167 00

##### Equipment Condition

Boat out of water on IBC or on blocks  
(TM 5-1940-322-10).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Tie rod and steering cylinders removed from  
steering levers (WP 0139 00).  
Hydrojet reverse deflector removed  
(WP 0140 00).

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## HYDROJET STEERING DEFLECTOR, ROD, AND PIVOT MAINTENANCE (Contd)

### NOTE

Both hydrojet steering deflectors, rods, and pivots are replaced the same way. This procedure covers the replacement of one steering deflector, rod, and pivot.

Assistant will help with removal and installation.

### REMOVAL

1. Remove locknut (20), washer (19), screw (23), and washer (22) from pivot (21). Discard locknut (20).
2. Slide rod (24) back and remove pivot (21) from ball socket (9).
3. Remove two locknuts (10), washers (11), fiber washers (12), screws (15), and steering pivot (14) from steering deflector (13). Discard locknuts (10).
4. Remove steering deflector (13) and two fiber washers (17) from hydrojet nozzle (18).
5. Remove locknut (6), washer (5), screw (2), and washer (3) from inboard steering lever (4). Discard locknut (6).
6. Remove inboard steering lever (4) from push rod (24) and push rod (24) from hydrojet housing (30) and shaft seal (1).
7. Remove two locknuts (28), washers (27), support bracket (29), and two fiber washers (26) from studs (7). Discard locknuts (28).

### INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect shaft seal (1) for leaking or damage. Replace if leaking or damaged (WP 0167 00).

### NOTE

If bushing is being replaced, apply coat of silicone sealant to bushing prior to installation.

3. Inspect bushing (8), two bushings (16), and bushing (25) for damage. Replace if damaged (WP 0167 00).

### NOTE

If studs are being replaced, apply coat of sealing compound (272) to threads of studs prior to installation.

4. Inspect threads of studs (7) for damage, replace if damaged.

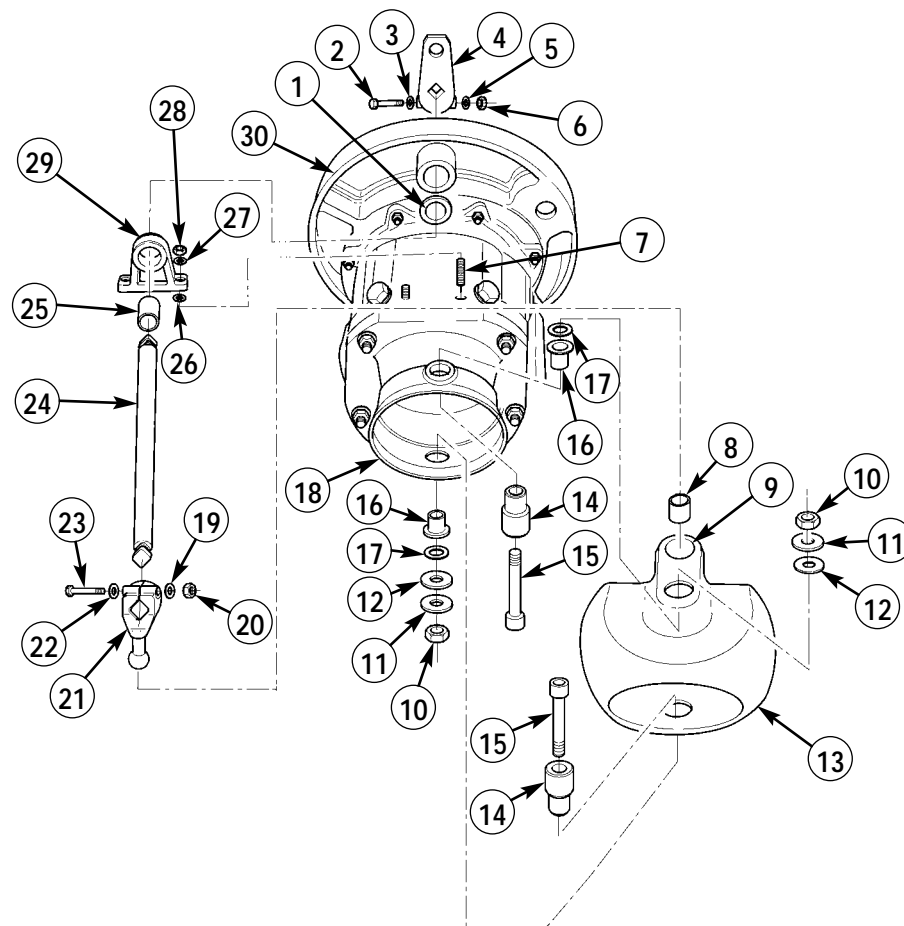
### INSTALLATION

1. Apply light coat of sealing compound (243) to threads of studs (7).
2. Install two fiber washers (26), support bracket (29), two washers (27), and new locknuts (28) on studs (7). Tighten locknuts (28) to 13–14 lb-ft (17–19 N·m).
3. Apply light coat of GAA grease inside bushing (25) and shaft seal (1).
4. Position push rod (24) through bushing (25) and shaft seal (1) into boat.
5. Install inboard steering lever (4) on push rod (24) with washer (3), screw (2), washer (5), and new locknut (6). Tighten locknut (6) to 23–25 lb-ft (31–34 N·m).
6. Position two fiber washers (17) on mounting holes on hydrojet nozzle (18).
7. Position steering deflector (13) over fiber washers (17).
8. Position screw (15) and steering pivot (14) up on hydrojet nozzle (18) through fiber washers (17) and steering deflector (13).

## HYDROJET STEERING DEFLECTOR, ROD, AND PIVOT MAINTENANCE (Contd)

### INSTALLATION (Contd)

9. Position screw (15) and steering pivot (14) down on inside nozzle (18) through fiber washers (17) and steering deflector (13).
10. Install two fiber washers (12), washers (11), and new locknuts (10) on screws (15). Tighten locknuts (10) to 44–48 lb-ft (60–65 N·m).
11. Position pivot (21) on steering deflector lever ball socket (9).
12. Position push rod (24) back and install push rod (24) on pivot (21) with washer (22), screw (23), washer (19), and new locknut (20). Tighten locknut (20) to 13–14 lb-ft (17–19 N·m).
13. Install tie rod and steering cylinder on steering levers (WP 0139 00).
14. Install hydrojet reverse deflector (WP 0140 00).
15. Close hydrojet hatches (TM 5-1940-322-10).



END OF WORK PACKAGE





## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET IMPELLER REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
 (item 13, WP 0172 00) or  
 Common No. 1 tool set (item 41, WP 0172 00)  
 Impeller removal tool (item 18, WP 0172 00)  
 Drive shaft support tool (item 8, WP 0172 00)  
 Shaft/impeller locking tool  
 (item 40, WP 0172 00)

##### Materials/Parts

Nine locknuts (item 65, WP 0173 00)  
 Gasket (item 44, WP 0173 00)  
 Locknut (item 69, WP 0173 00)  
 Locknut (item 66, WP 0173 00)  
 O-ring (item 120, WP 0171 00)  
 Cloth (item 8, WP 0171 00)  
 GAA grease (item 14, WP 0171 00)

##### Materials/Parts (Contd)

Sealing compound (243) (item 32, WP 0171 00)  
 Sealing compound (272) (item 33, WP 0171 00)  
 Skysol 100 (item 12, WP 0173 00)

##### Personnel Required

Two

##### References

WP 0013 00  
 WP 0167 00

##### Equipment Condition

Boat out of water on IBC or blocks  
 (TM 5-1940-322-10).  
 Hydrojet scoop reverse deflector removed  
 (WP 0140 00).

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## HYDROJET IMPELLER REPLACEMENT (Contd)

### NOTE

Both hydrojet impellers are removed and installed the same way. This task covers the replacement of one impeller with hydrojet assembly installed in boat.

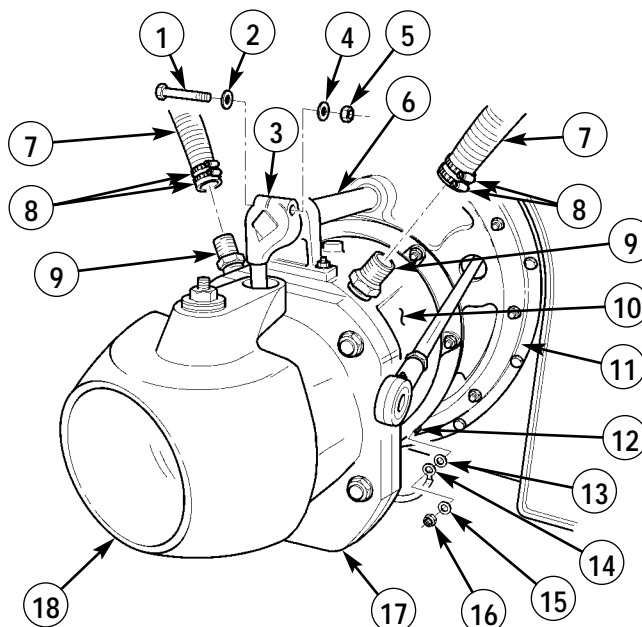
### REMOVAL

1. Remove locknut (5), washer (4), screw (1), and washer (2) from steering shaft (6) and pivot lever (3). Discard locknut (5).
2. Loosen four hose clamps (8) and disconnect two hoses (7) from water supply adapters (9) on top of tailpipe housing (10).
3. Remove locknut (16), washer (15), ground strap (14), and insulator washer (13) from bottom stud (12) on mounting plate (11). Discard locknut (16).
4. Remove three wing nuts (19) and inspection cover (20) with O-ring (27) from intake housing (23). Install drive shaft support tool TD-321257 through inspection cover opening with carriage (25) around impeller shaft (26). Install support plate (22) and wing nut (21) on rod (24). Adjust wing nut (21) to support impeller shaft (26).
5. Support hydrojet steering deflector (18), hydrojet nozzle (17), and tailpipe housing (10) while removing eight locknuts (30), washers (31), and insulator washers (32) from studs (33) on intake housing (23). Discard locknuts (30).

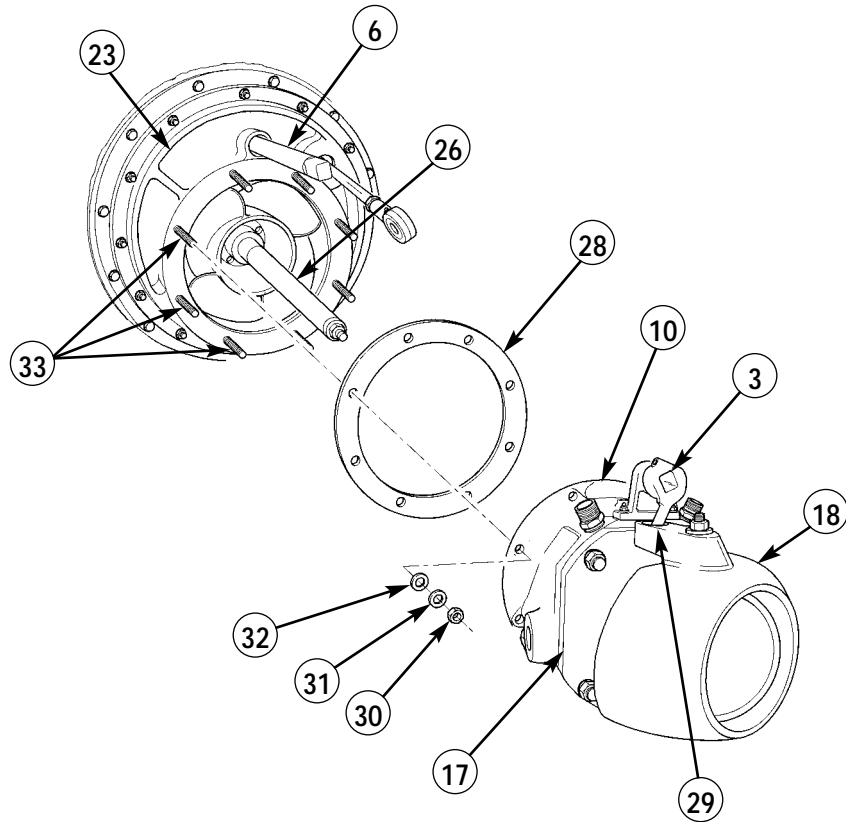
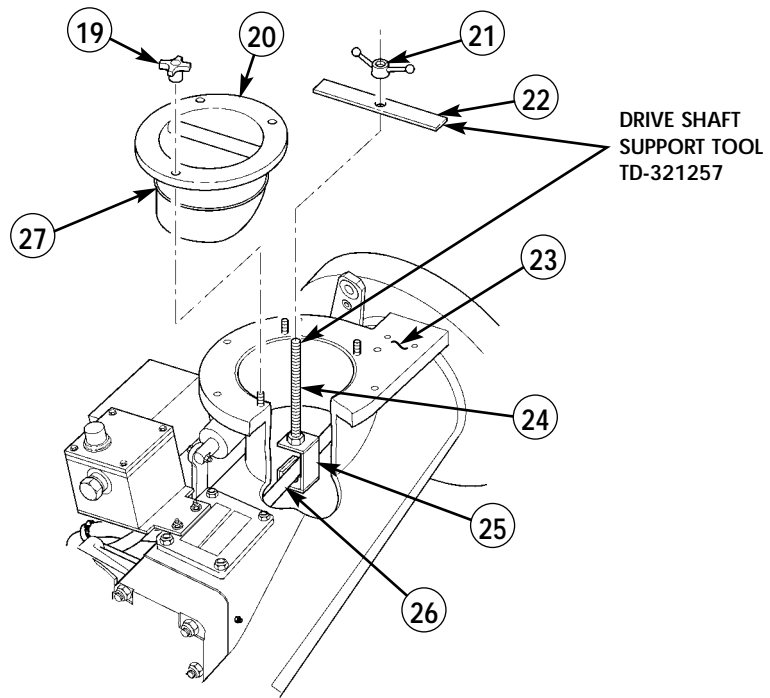
### CAUTION

Tailpipe housing must be supported at all times when pulling housing off studs and impeller shaft. Failure to comply will result in damage to equipment.

6. Slowly pull tailpipe housing (10) back away from intake housing (23), gasket (28), and studs (33).
7. Remove pivot lever (3) from steering shaft (6) and steering deflector bushing (29) as tailpipe housing (10) is removed from gasket (28), intake housing (23), studs (33), and impeller shaft (26). Discard gasket (28).



**HYDROJET IMPELLER REPLACEMENT (Contd)**



## HYDROJET IMPELLER REPLACEMENT (Contd)

### REMOVAL (Contd)

8. Position shaft/impeller locking tool TD-321273 over impeller shaft sleeve (4) and studs (8). Install three screws (7) from tool set through locking plate (3) into impeller hub (9).
9. Remove locknut (6), washer (5), impeller shaft sleeve (4), and retainer pin (1) from impeller shaft (2). Discard locknut (6).
10. Remove shaft/impeller locking tool TD-321273.
11. Install impeller removal tool set TD-120891 on end of impeller shaft (2) as follows:
  - a. Install thrust pad (13) from set over threads (11) on impeller shaft (2).
  - b. Install draw tube (14) from set over impeller shaft (2) with screw (15) backed out.
  - c. Install three screws (16) from set through draw tube flange (14) and into end of impeller hub (9). Tighten screws (16) until draw tube flange (14) is tight against impeller (12).

### **CAUTION**

Ensure impeller shaft is clean and lightly greased prior to removal.  
Failure to comply may result in damage to equipment.

When removing impeller from shaft, do not twist impeller on shaft.  
Failure to comply may result in damage to shaft or impeller.

12. Tighten screw (15) on draw tube (14) to remove impeller (12) from cone (17), key (10), and impeller shaft (2). Remove key (10) and cone (17) from impeller shaft (2). Remove three screws (16) and draw tube (14) from impeller hub (9).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

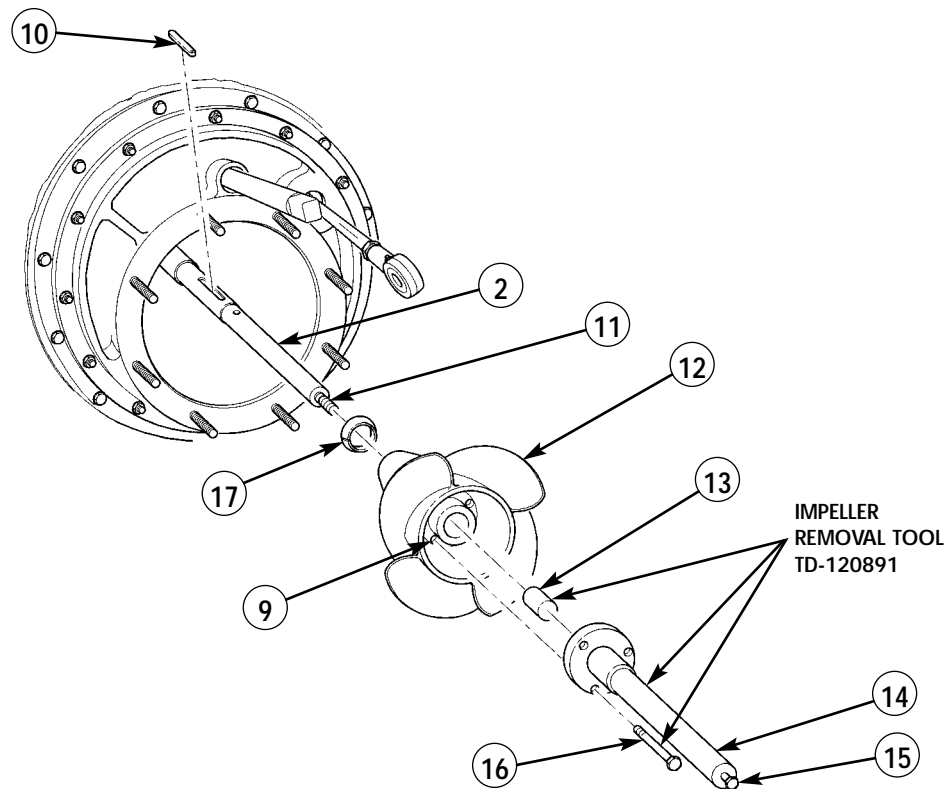
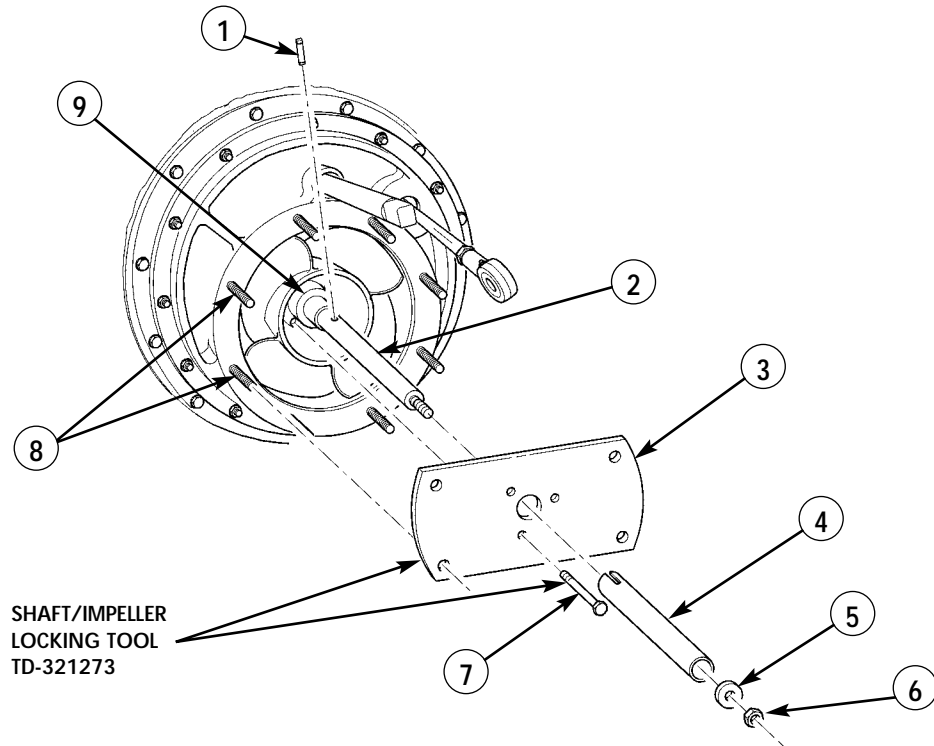
### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material and sealing compound from mating surfaces of housings with Skysol 100 and dry with cloth.
3. Inspect all studs for damaged threads. If damage is present, replace studs using sealing compound (272).
4. Inspect insulator washers for cracks or damage. If cracks or damage are noted, replace insulator washers.
5. Inspect water lubricated bearing for wear or damage. If worn or damaged, replace water lubricated bearing (WP 0167 00).

HYDROJET IMPELLER REPLACEMENT (Contd)



## HYDROJET IMPELLER REPLACEMENT (Contd)

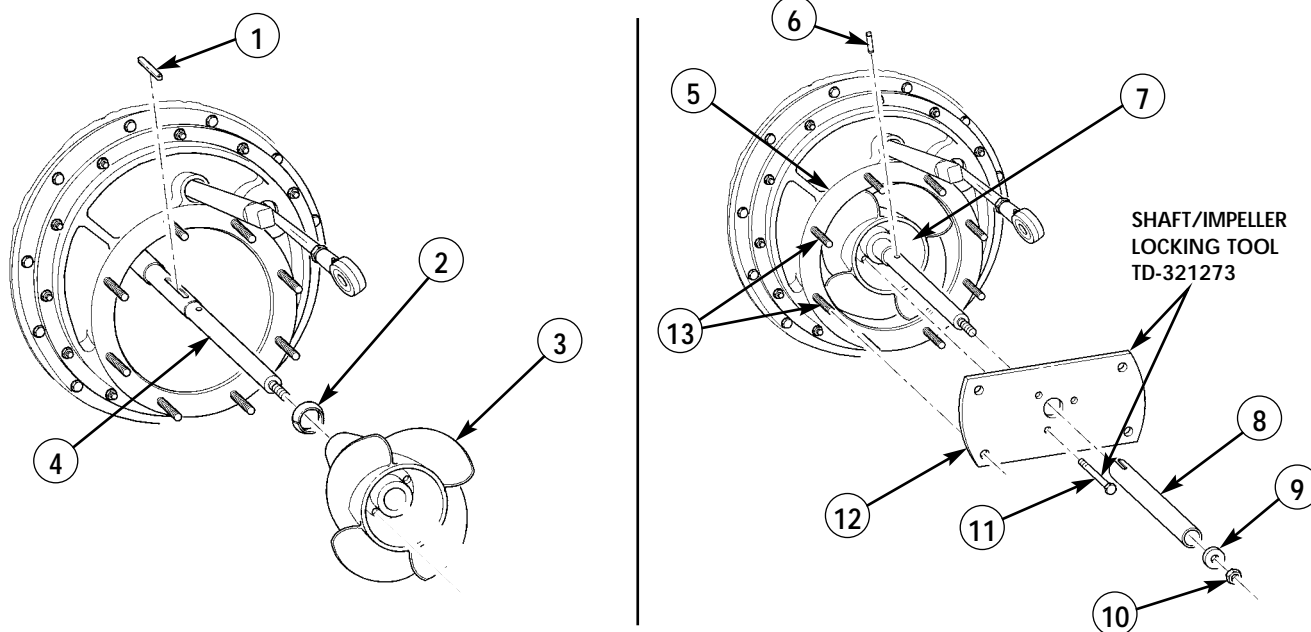
### INSTALLATION

1. Install cone (2) on impeller shaft (4), pushing cone (2) all the way to impeller shaft (4) shoulder. Install key (1), impeller (3), retaining pin (6), shaft sleeve (8), washer (9), and new locknut (10) on impeller shaft (4). Do not apply sealing compound or tighten locknut (10) until shaft/impeller locking tool TD-321273 is installed.
2. Install shaft/impeller locking tool TD-321273 plate (12) into position over shaft sleeve (8) and on studs (13) of intake housing (5). Install three screws (11) on impeller hub (7). Apply light coat of sealing compound (243) to threads of impeller shaft (4) and tighten locknut (10) to 172–192 lb-ft (234–260 N·m). Remove three screws (11) and shaft/impeller locking tool plate (12) from impeller hub (7), impeller shaft (4), and intake housing (5).

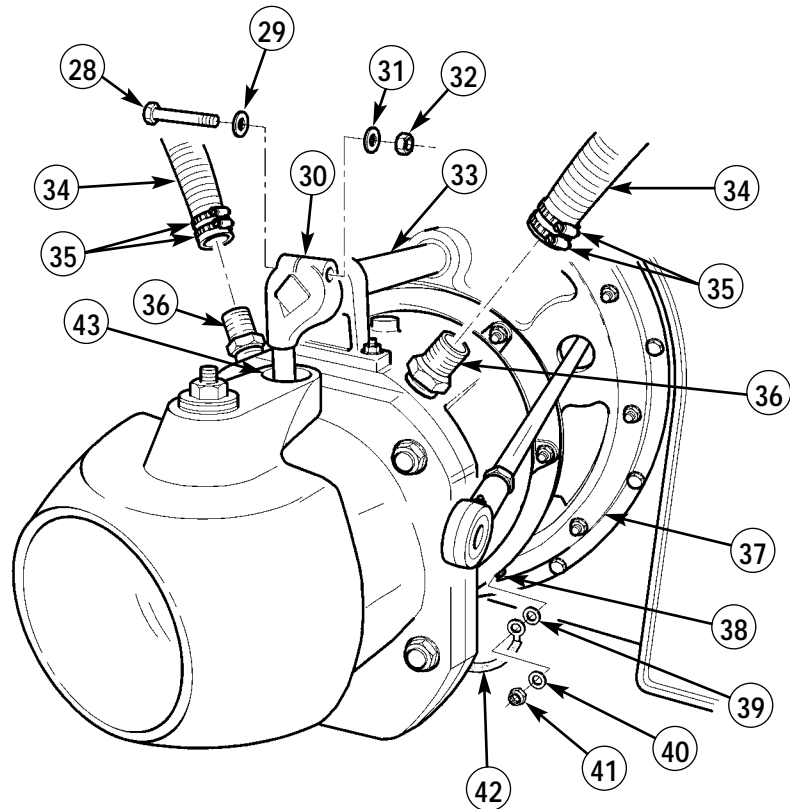
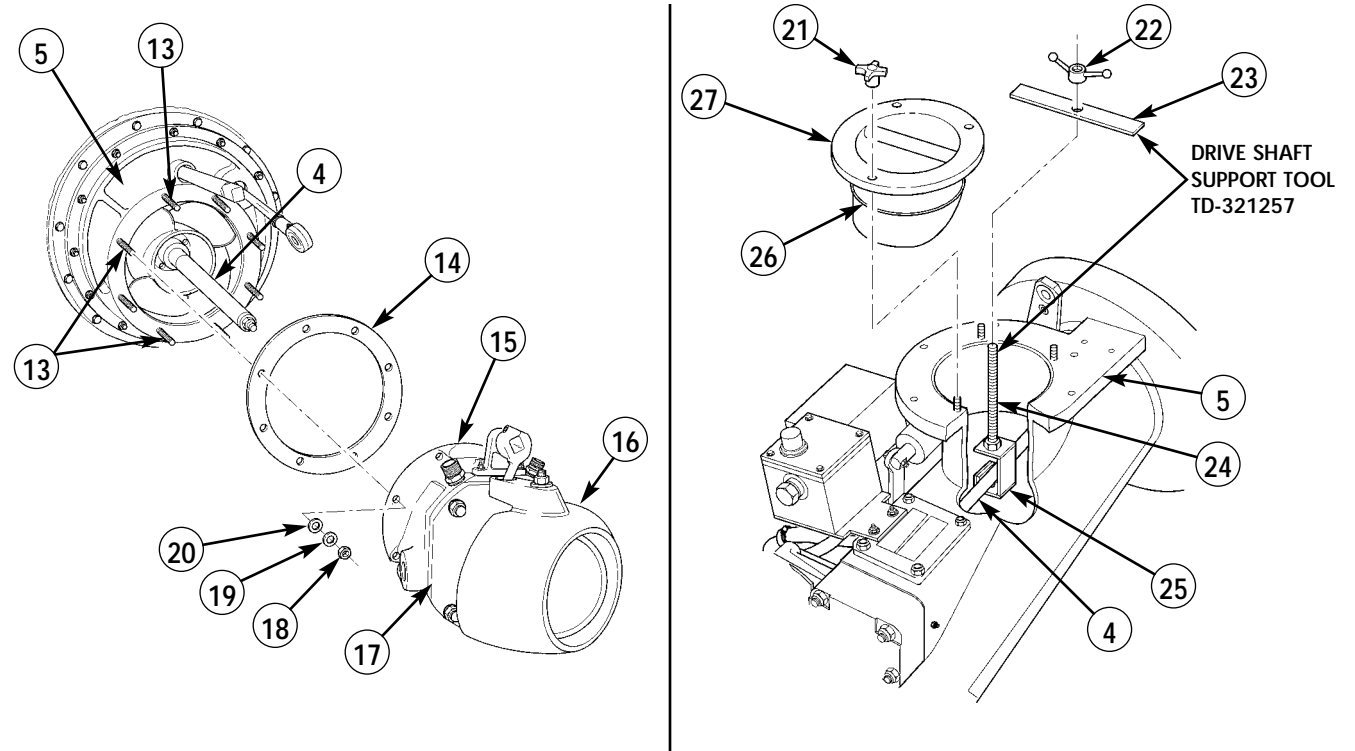
### **CAUTION**

Tailpipe housing must be supported at all times when pushing housing over impeller shaft and onto studs. Failure to comply will result in damage to equipment.

3. Apply light coat of grease to new gasket (14) and install gasket (14), tailpipe housing (15), hydrojet nozzle (17), and hydrojet steering deflector (16) on impeller shaft (4) and intake housing (5). Apply light coat of sealing compound (243) to studs (13) and install eight insulator washers (20), washers (19), and new locknuts (18) on studs (13). Tighten locknuts (18) to 23–25 lb ft (31–34 N·m).
4. Loosen wing nut (22) on rod (24) and remove plate (23) from drive shaft support tool TD-321257, impeller shaft (4), and inspection cover opening. Install new O-ring (26), if damaged. Install inspection cover (27) on intake housing (5) with three wing nuts (21).
5. Install pivot lever (30) on steering shaft (33) and steering deflector bushing (43) with washer (29), screw (28), washer (31), and new locknut (32). Apply light coat of sealing compound (243) to threads of screw (28) and tighten locknut (32) to 12–14 lb-ft (17–19 N·m).
6. Install ground strap (42) on bottom stud (38) of mounting plate (37) with insulator washer (39), washer (40), and new locknut (41). Tighten locknut (41) to 23–25 lb-ft (31–34 N·m).
7. Install hoses (34) on two water supply adapters (36) and tighten four hose clamps (35).
8. Install hydrojet reverse deflector (WP 0140 00).
9. Place boat in water, start engine, and check hydrojet operation (TM 5-1940-322-10).



### HYDROJET IMPELLER REPLACEMENT (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### STEERING TIE ROD MAINTENANCE

#### REMOVAL, INSTALLATION, AND ADJUSTMENT

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Two locknuts (item 63, WP 0173 00)

##### Equipment Condition

Hydrojet hatches opened and secured  
(TM 5-1940-322-10).  
Scoop reverse deflectors in full upward position  
(TM 5-1940-322-10).

## STEERING TIE ROD MAINTENANCE (Contd)

### REMOVAL

1. Remove locknut (9), two washers (10), fiber washer (4), and screw (12) from steering lever (8) and steering tie rod (11). Discard locknut (9).
2. Remove locknut (2), two washers (3), fiber washer (4), and screw (7) from steering cylinder (6), steering tie rod (5), and steering arm (1). Discard locknut (2).

### NOTE

The adjustment preset position measurements are 32.25 in. (81.915 cm) from center of tie rod bearing to center of tie rod bearing on steering tie rods.

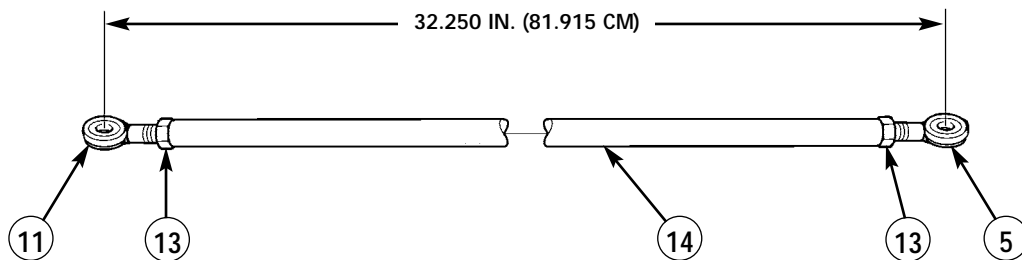
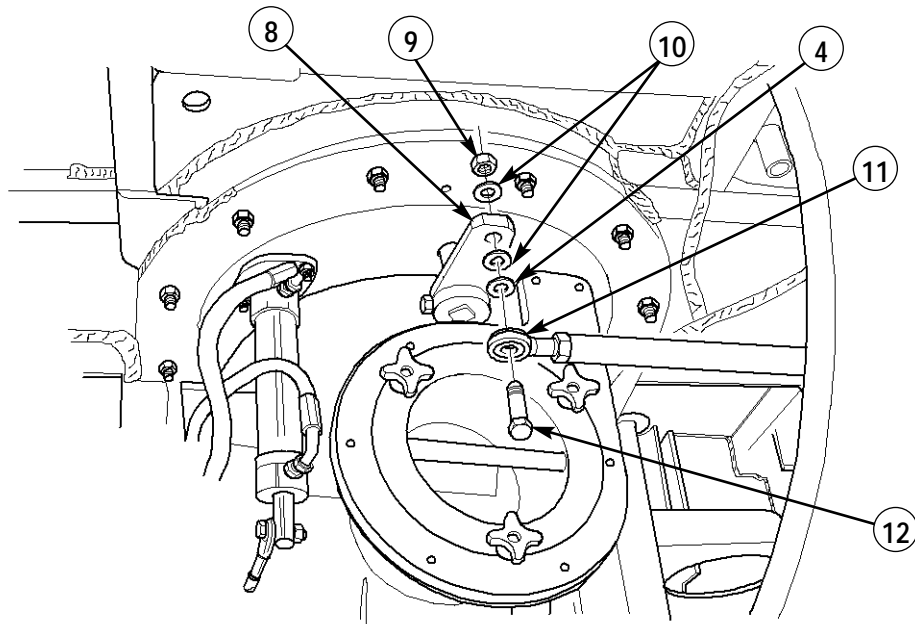
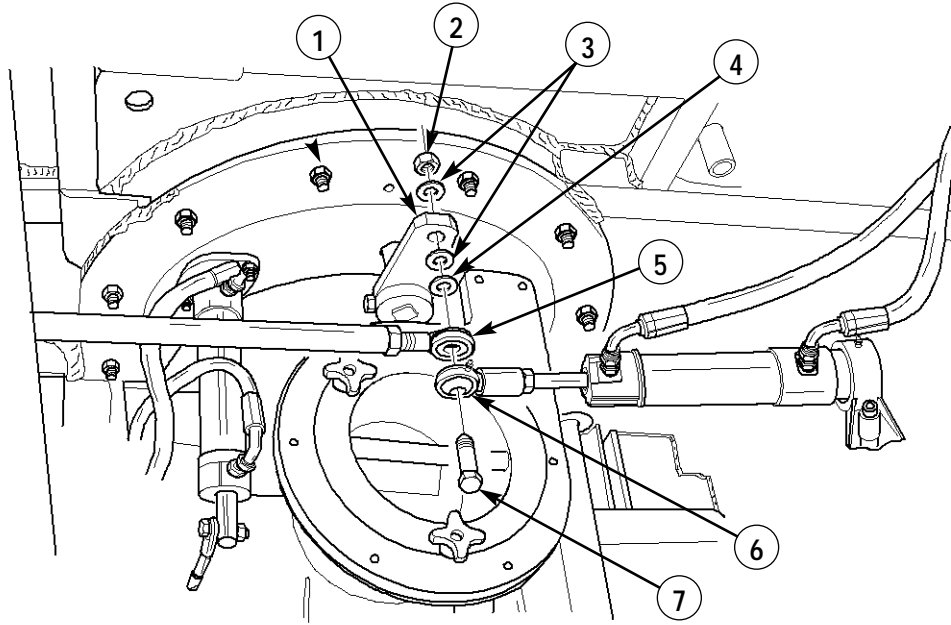
### ADJUSTMENT

1. Loosen two jam nuts (13) on steering tie rods (11) and (5).
2. Rotate tie rod bar (14) until steering arms (1) and (8) are in up position.
3. Tighten jam nuts (13) on steering tie rods (11) and (5) while holding tie rod bar (14).

### INSTALLATION

1. Install steering cylinder (6) and steering tie rod (5) on steering lever (1) with screw (7), fiber washer (4), washers (3), and new locknut (2).
2. Install steering tie rod (11) on steering lever (8) with screw (12), fiber washer (4), washers (10), and new locknut (9).

### STEERING TIE ROD MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET SCOOP REVERSE DEFLECTOR MAINTENANCE

#### REMOVAL, INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Four locknuts (item 66, WP 0173 00)  
Locknut (item 68, WP 0173 00)  
Antiseize compound (item 6, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0013 00

###### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).

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## HYDROJET SCOOP REVERSE DEFLECTOR MAINTENANCE (Contd)

### **CAUTION**

Ensure hydrojet scoop reverse deflector is supported during removal and installation. Failure to comply may result in damage to equipment.

### **NOTE**

Both hydrojet scoop reverse deflectors are replaced the same way. This procedure covers the replacement of one hydrojet scoop reverse deflector.

Assistant will help with removal and installation.

### REMOVAL

1. Remove locknut (1), two washers (2), two fiber washers (3), and screw (11) from hydrojet scoop reverse deflector (15) and cylinder rod clevis (5). Discard locknut (1).
2. Remove clevis (5) and two fiber washers (4) from scoop reverse deflector (15).
3. Remove two shoulder bolts (12), washers (13), fiber washers (14), and scoop reverse deflector (15) from hydrojet housing (16).
4. Remove four locknuts (6), washers (7), anodes (8), and fiber washers (9) from studs (10). Discard locknuts (6).

### INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **NOTE**

If replacing a stud, apply light coat of sealing compound (272) on studs prior to installation.

2. Inspect threads on studs (10) for damage. Replace studs (10) if damaged.

### **NOTE**

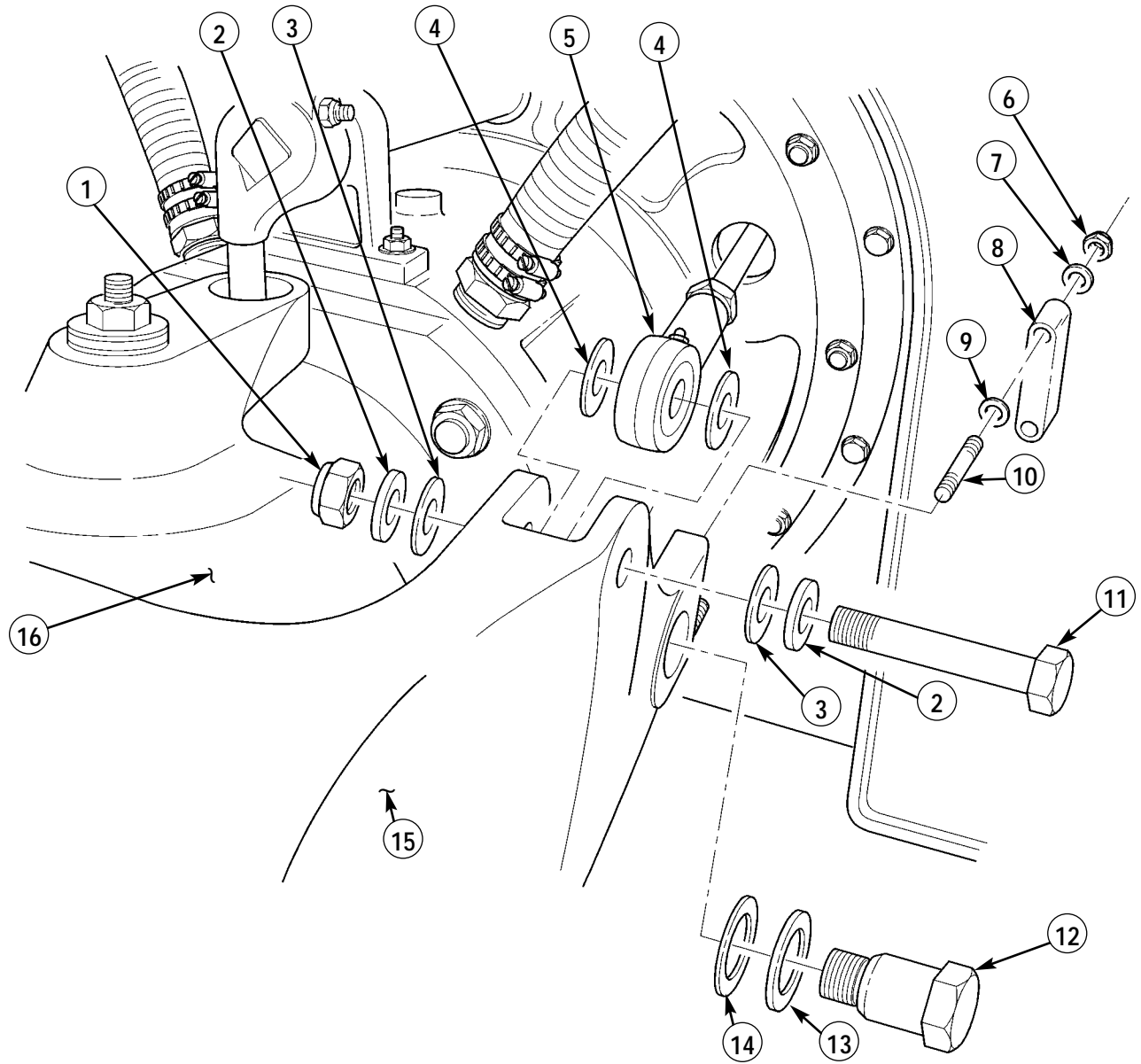
Replace anodes at 50% wear.

3. Inspect anodes (8) for damage. Replace anodes (8) if damaged.

### INSTALLATION

1. Apply light coat of sealing compound (243) on threads of studs (10).
2. Install two anodes (8) with four fiber washers (9), washers (7), and new locknuts (6). Tighten locknuts (6) to 12–14 lb-ft (17–19 N•m).
3. Apply light coat of antiseize compound on threads of shoulder bolts (12).
4. Install scoop reverse deflector (15) on hydrojet housing (16) with two fiber washers (14), washers (13), and shoulder bolts (12). Tighten shoulder bolts (12) to 236–266 lb-ft (320–360 N•m).
5. Apply light coat of sealing compound (243) on threads of screw (11).
6. Install two fiber washers (4) and clevis (5) on scoop reverse deflector (15) with two fiber washers (3), two washers (2), screw (11), and new locknut (1). Tighten locknut (1) to 23–25 lb-ft (31–34 N•m).
7. Start engine and ensure proper operation of scoop reverse deflector (TM 5-1940-322-10).

HYDROJET SCOOP REVERSE DEFLECTOR MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET GRILL MAINTENANCE

#### REMOVAL, INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Four locknuts (item 71, WP 0173 00)  
Sealing compound (243) (item 32, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)

##### Personnel Required

Two

##### References

WP 0013 00

##### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).

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## HYDROJET GRILL MAINTENANCE (Contd)

### **WARNING**

Hydrojet grill must be supported during removal and installation. Failure to comply may result in damage to equipment or injury to personnel.

### **NOTE**

Assistant will help with removal and installation.

### REMOVAL

Support hydrojet grill (3) and remove four locknuts (5), washers (4), and hydrojet grill (3) from hydrojet inlet housing (1). Discard locknuts (5).

### INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

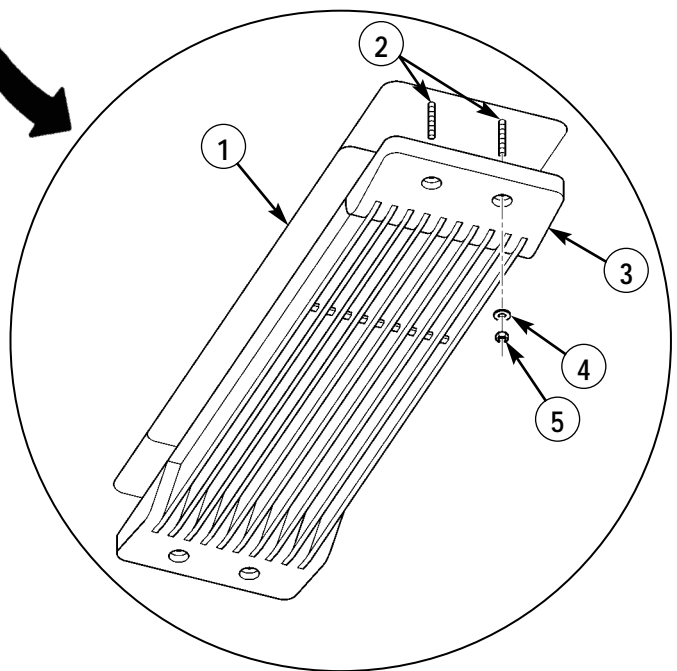
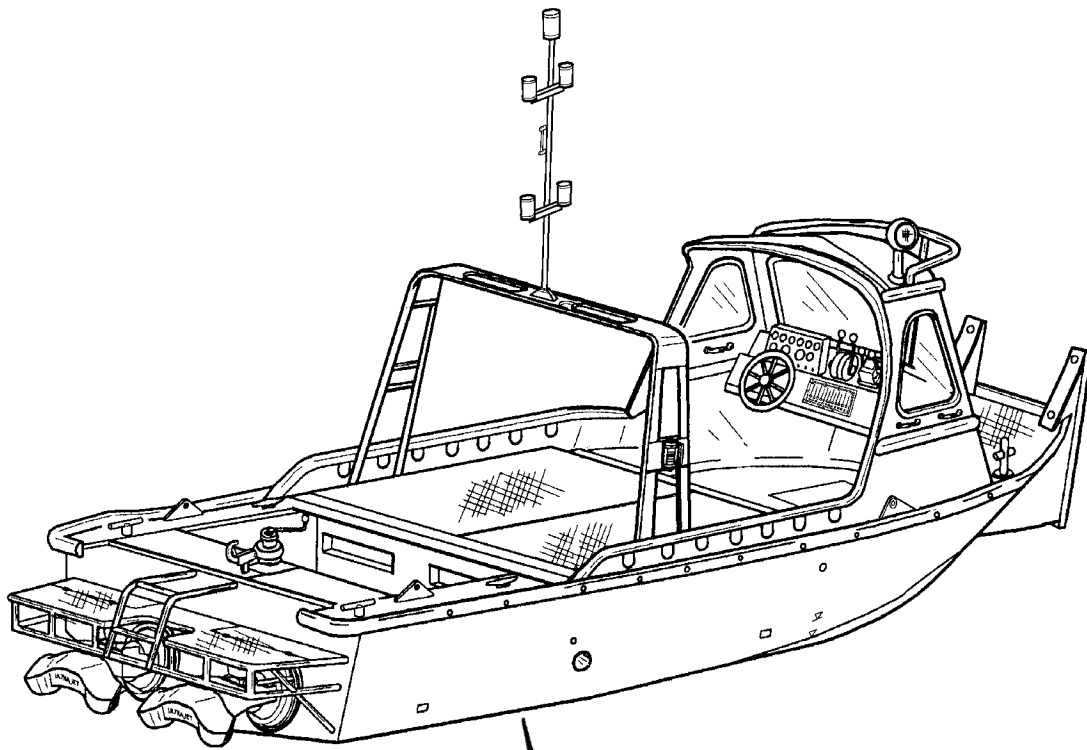
Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Inspect threads on studs (2). Replace studs (2) if damaged. If replacing studs, apply coat of sealing compound (272) on studs prior to installation.

### INSTALLATION

1. Apply light coat of sealing compound (243) on threads of studs (2).
2. Install hydrojet grill (3) on hydrojet inlet housing (1) with four washers (4) and new locknuts (5). Tighten locknuts (5) to 44–48 lb-ft (60–65 N·m).

# HYDROJET GRILL MAINTENANCE (Contd)



END OF WORK PACKAGE



## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET ASSEMBLY MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
 (item 13, WP 0172 00) or  
 Common No. 1 tool kit (item 41, WP 0172 00)  
 Sling (item 44, WP 0172 00)  
 Lifting device

##### Materials/Parts

Fifty-four locknuts (item 65, WP 0173 00)  
 Eight locknuts (item 62, WP 0173 00)  
 Four locknuts (item 71, WP 0173 00)  
 Two locknuts (item 54, WP 0173 00)  
 Cotter pin (item 5, WP 0173 00)  
 Gasket (item 42, WP 0173 00)  
 Locknut (item 69, WP 0173 00)  
 Locknut (item 63, WP 0173 00)  
 Locknut (item 70, WP 0173 00)  
 O-ring (item 116, WP 0173 00)  
 Adhesive (item 3, WP 0171 00)  
 Antiseize compound (item 6, WP 0171 00)

##### Materials/Parts (Contd)

Sealing compound (item 32, WP 0171 00)  
 Skysol 100 (item 12, WP 0171 00)

##### Personnel Required

Three

##### Reference

WP 0178 00  
 TC 9-237

##### Equipment Condition

Boat out of water on IBC or blocks  
 (TM 5-1940-322-10).  
 Aft cockpit removed (WP 0016 00).  
 Hydrojet hatches open and secured  
 (TM 5-1940-322-10).  
 Hydrojet scoop reverse deflector removed  
 (WP 0140 00).

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## HYDROJET ASSEMBLY MAINTENANCE (Contd)

### NOTE

Both hydrojets are replaced the same way. This procedure covers the replacement of the port-side hydrojet.

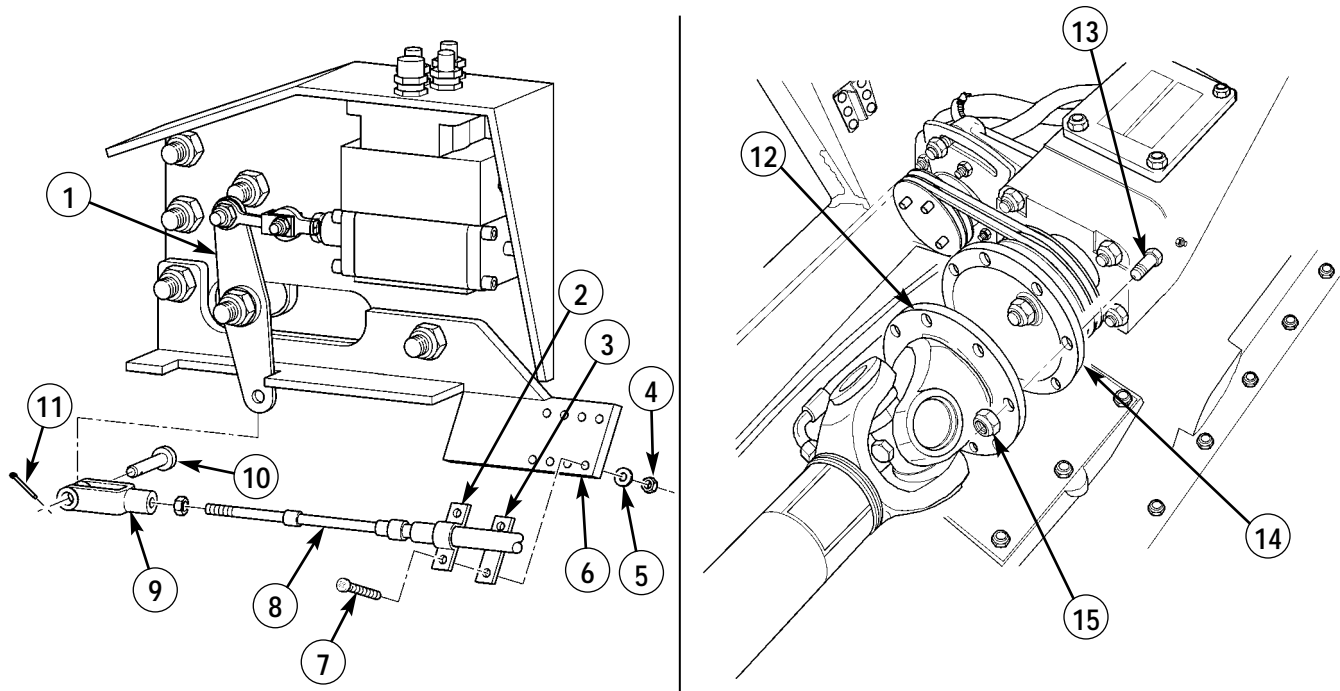
### REMOVAL

1. Remove cotter pin (11), pin (10), and scoop control cable clevis (9) from scoop hydraulic control lever (1). Discard cotter pin (11).
2. Remove two locknuts (4), washers (5), screws (7), cable clamp (2), plate (3), and cable (8) from scoop control bracket (6). Discard locknuts (4).
3. Remove eight locknuts (15) and screws (13) and disconnect drive shaft flange (12) from hydrojet drive flange (14). Discard locknuts (15).
4. Remove locknut (18), washer (19), screw (26), hydraulic steering cylinder rod (27), tie rod end (16), and two washers (17) from hydrojet steering lever (25). Discard locknut (18).

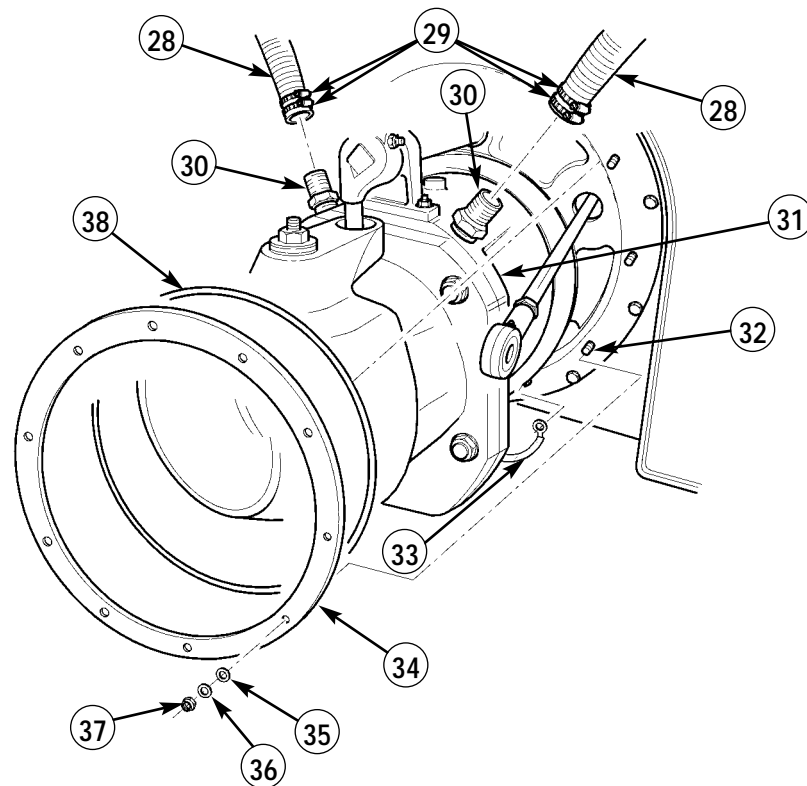
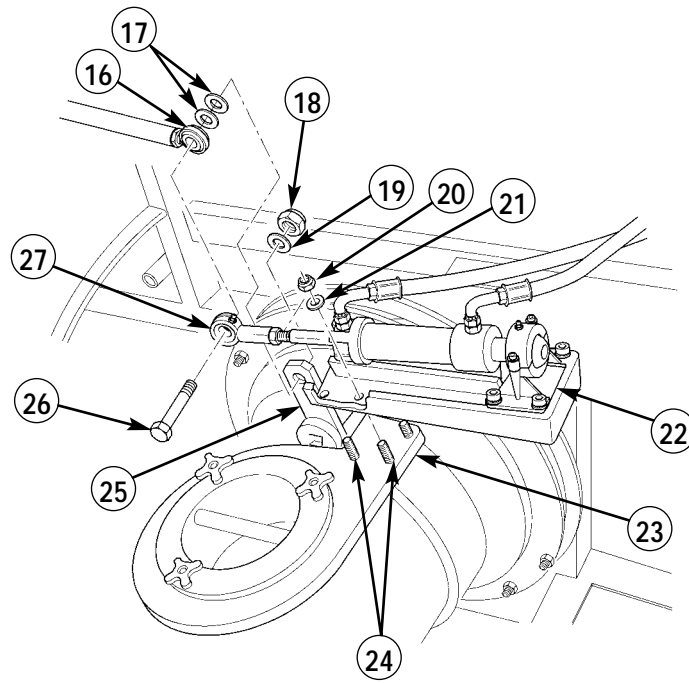
### NOTE

The hydraulic steering cylinder is connected to the port hydrojet steering lever along with one end of the tie rod and must be removed from the mounting bracket on the hydrojet housing before removing hydrojet assembly.

5. Remove four locknuts (20) and washers (21) and hydraulic steering cylinder mounting bracket (22) from studs (24) on hydrojet housing (23). Discard locknuts (20).
6. Loosen four hose clamps (29) and disconnect two hoses (28) from adapters (30) on scoop hydrojet housing (31).
7. Remove twelve locknuts (37), washers (36), insulator washers (35), ground strap (33), transom sealing flange (34), and O-ring (38) from transom adapter flange studs (32). Discard O-ring (38) and locknuts (37).



HYDROJET ASSEMBLY MAINTENANCE (Contd)



## HYDROJET ASSEMBLY MAINTENANCE (Contd)

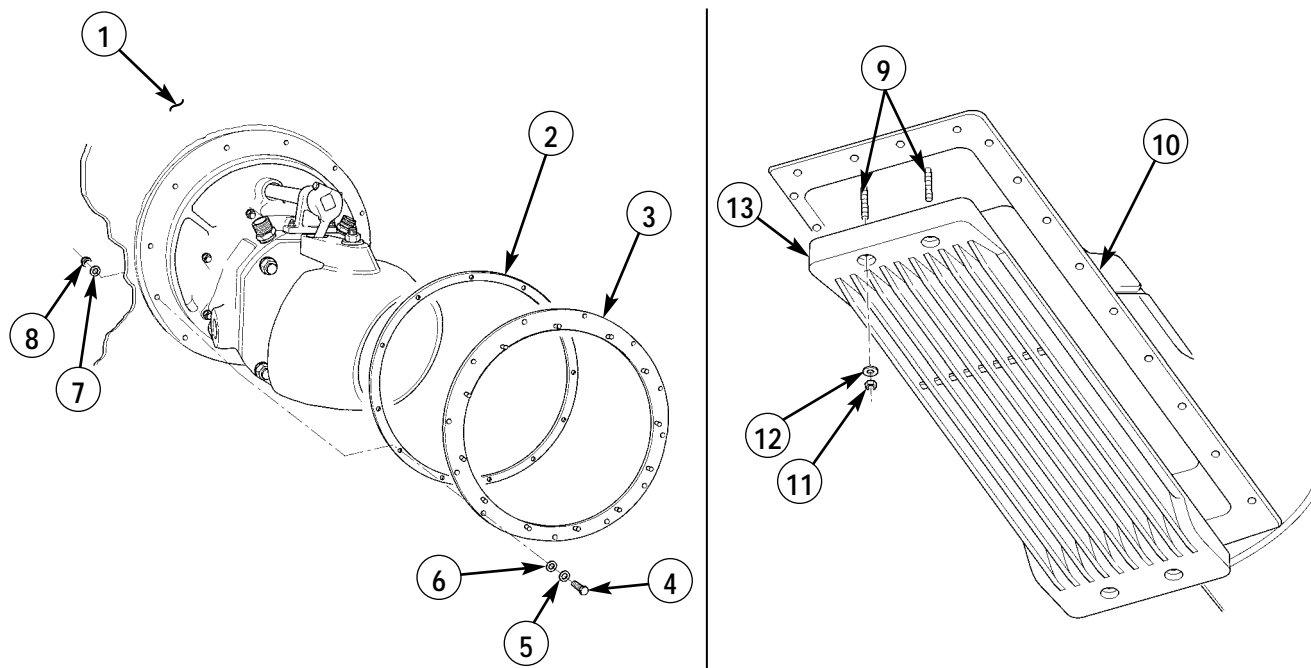
### REMOVAL (Contd)

8. Remove twelve locknuts (8), washers (7), screws (4), washers (5), insulator washers (6), transom flange (3), and gasket (2) from transom (1). Discard gasket (2) and locknuts (8).
9. Support intake grill (13) and remove four locknuts (11), washers (12), and intake grill (13) from studs (9) on bottom of hydrojet housing (10). Discard locknuts (11).
10. Install lifting strap around hydrojet housing (10) and connect to suitable lifting device.
11. Remove twenty-six locknuts (15) and washers (16) from studs (17) on hydrojet base plate (18). Discard locknuts (15).
12. Disconnect one end of drain down hose (19) and move hose (19) out of way.
13. Loosen silicone rubber adhesive between hydrojet housing (10) and hydrojet base plate (18) before lifting hydrojet assembly (14) from hydrojet base plate (18).
14. Slowly lift hydrojet assembly (14) off hydrojet base plate (18) and studs (17) tilting as necessary to clear studs (17) and slowly moving forward to remove hydrojet steering deflector (20) from opening in transom (1).

### NOTE

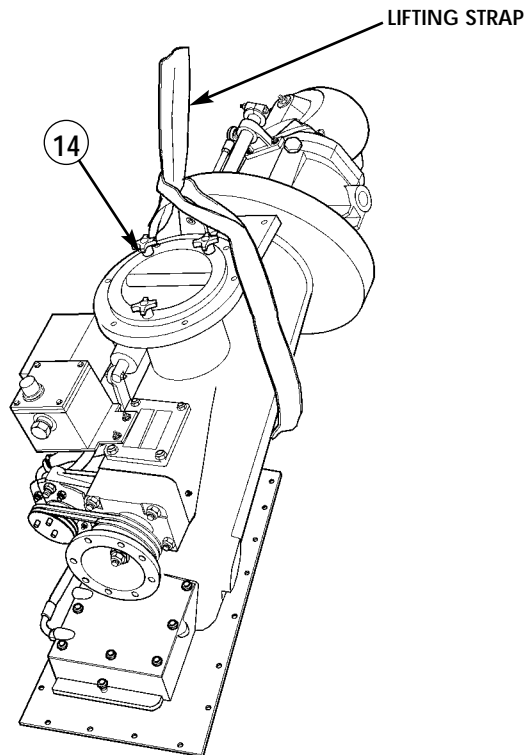
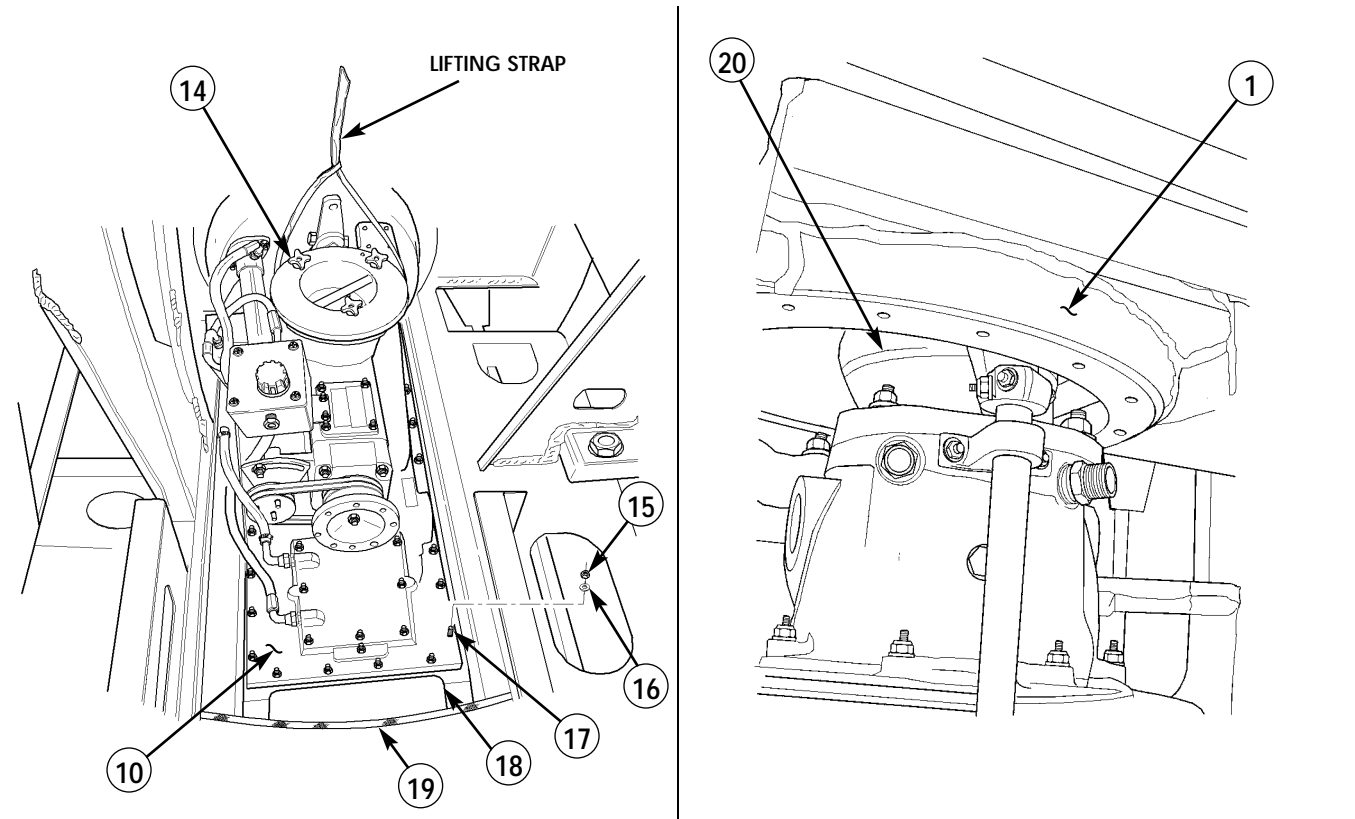
It may be necessary to rest hydrojet assembly on blocks or support braces to readjust lifting strap before lifting hydrojet assembly from boat.

15. Lift and tilt hydrojet assembly (14) as necessary to remove from boat.





### HYDROJET ASSEMBLY MAINTENANCE (Contd)



## HYDROJET ASSEMBLY MAINTENANCE (Contd)

16. Place hydrojet assembly (14) on blocks and remove lifting strap from hydrojet assembly (14).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Remove excess gasket material and sealing compound from hydrojet housing, transom, and transom flange with Skysol 100 and dry with cloth.
3. Inspect studs for damage. If damage is present, replace studs.
4. Inspect all screws and mounting hardware for damage. If damage is present, replace hardware.
5. Inspect area around transom and under hull for cracks or damage. If cracks or damage is noted, repair cracks or damage (WP 0178 00 or refer to TC 9-237).

### INSTALLATION

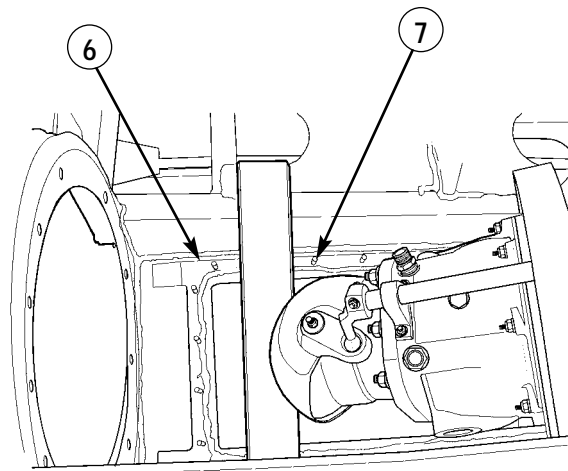
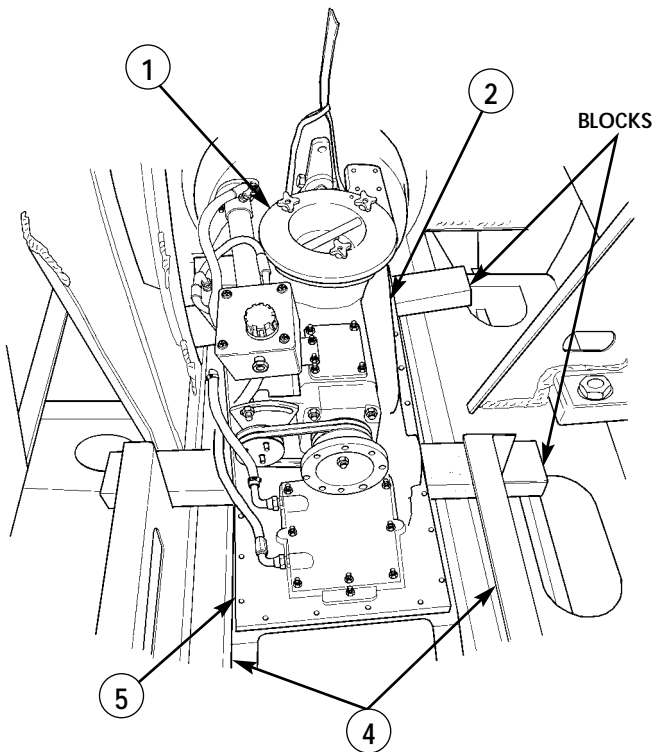
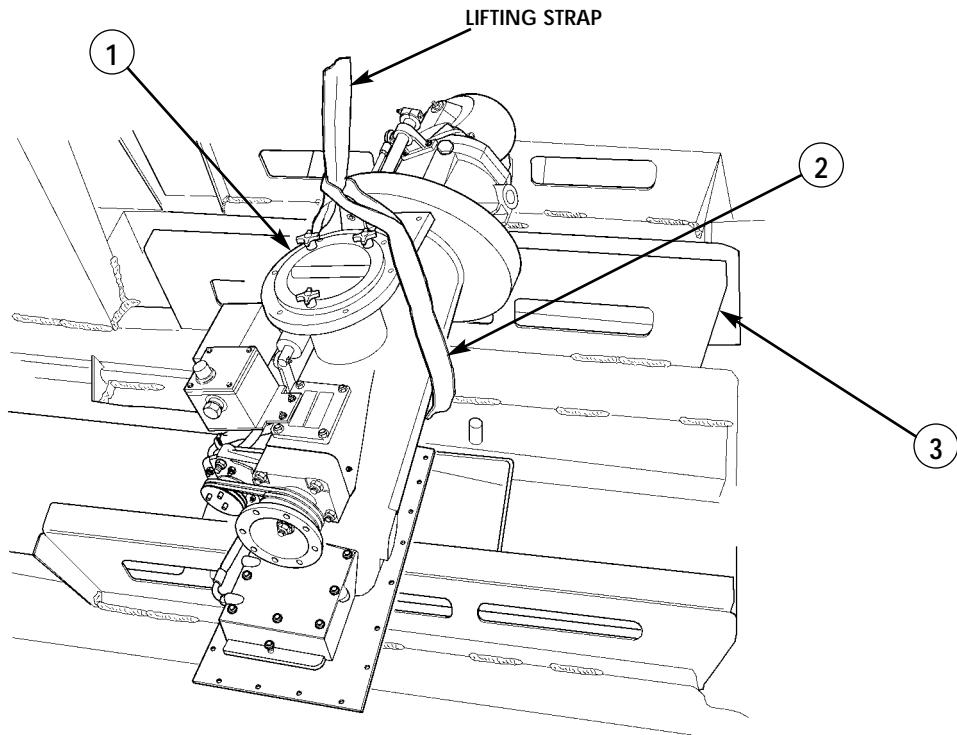
#### **NOTE**

It may be necessary to rest hydrojet assembly on blocks or support braces to readjust lifting strap several times as hydrojet assembly is being installed in boat.

Allow silicone rubber adhesive 24 hours to cure after application.

1. Apply a heavy coat of silicone rubber adhesive around hydrojet base plate (6) and studs (7) before installing hydrojet assembly (1) on base plate (6) and studs (7).
2. Install lifting strap around hydrojet housing (2) and lift hydrojet assembly (1) off blocks. Place hydrojet assembly (1) in boat resting sideways across aft cockpit frame rails (3).
3. Place two blocks across frame rails (4) in hydrojet compartment so as to tilt hydrojet assembly (1). Readjust lifting strap so hydrojet assembly (1) can be lifted through hydrojet hatch opening. Lift hydrojet assembly (1) and remove blocks.

### HYDROJET ASSEMBLY MAINTENANCE (Contd)



## HYDROJET ASSEMBLY MAINTENANCE (Contd)

### INSTALLATION (Contd)

#### **CAUTION**

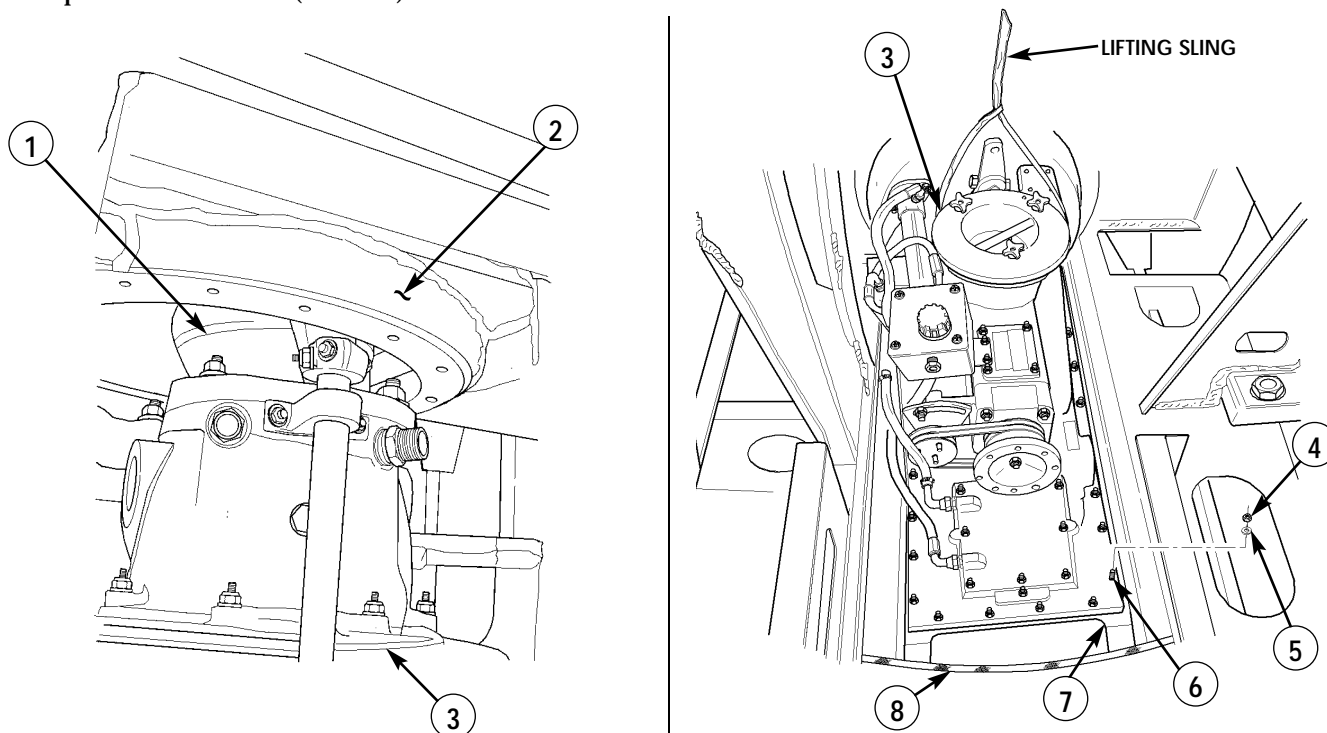
Take care when installing hydrojet assembly through opening in transom, or when lowering hydrojet assembly down onto base plate studs. Failure to comply may result in damage to equipment.

4. Install hydrojet assembly (3) through opening in transom (2), tilting as necessary. Slowly move hydrojet assembly (3) rearward and position hydrojet steering deflector (1) through opening in transom (2).
5. Lower hydrojet assembly (3) onto base plate (7) and studs (6).
6. Install twenty-six washers (5) and new locknuts (4) on studs (6). Tighten locknuts (4) to 23–25 lb-ft (31–34 N·m).
7. Remove lifting device and lifting strap from hydrojet assembly (3).
8. Connect drain down hose (8).

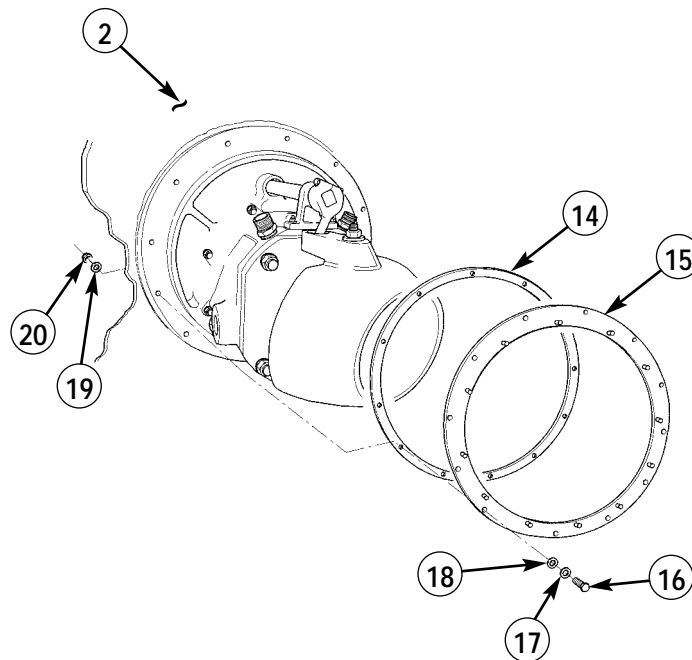
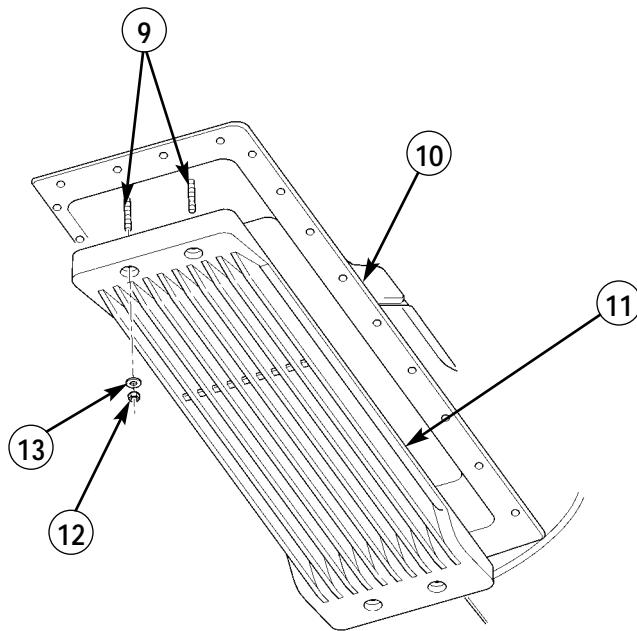
#### **NOTE**

Ensure excess silicone rubber adhesive materials are removed from intake prior to installing hydrojet grill.

9. Apply light coat of sealing compound (243) to studs (9) on underside of hydrojet housing (10) and install intake grill (11) on hydrojet housing (10) and studs (9) with washers (13) and new locknuts (12). Tighten locknuts (12) to 44–48 lb-ft (60–65 N·m).
10. Apply light coat of silicone rubber adhesive to twelve screws (16), around opening on transom (2), and on mating side of transom flange (15).
11. Install new gasket (14) and transom flange (15) on transom (2) with twelve insulator washers (18), washers (17), screws (16), washers (19), and new locknuts (20). Tighten locknuts (20) evenly in star pattern to 23 lb-ft (31 N·m).



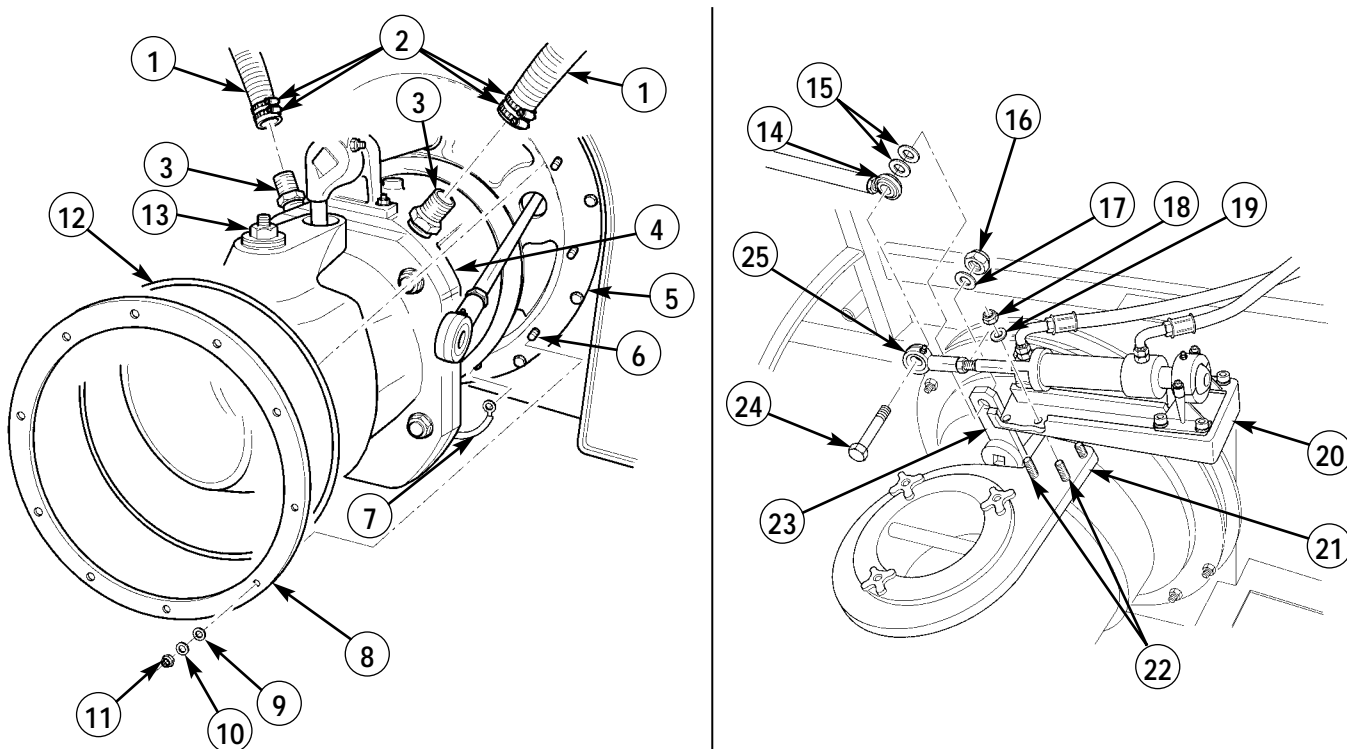
HYDROJET ASSEMBLY MAINTENANCE (Contd)



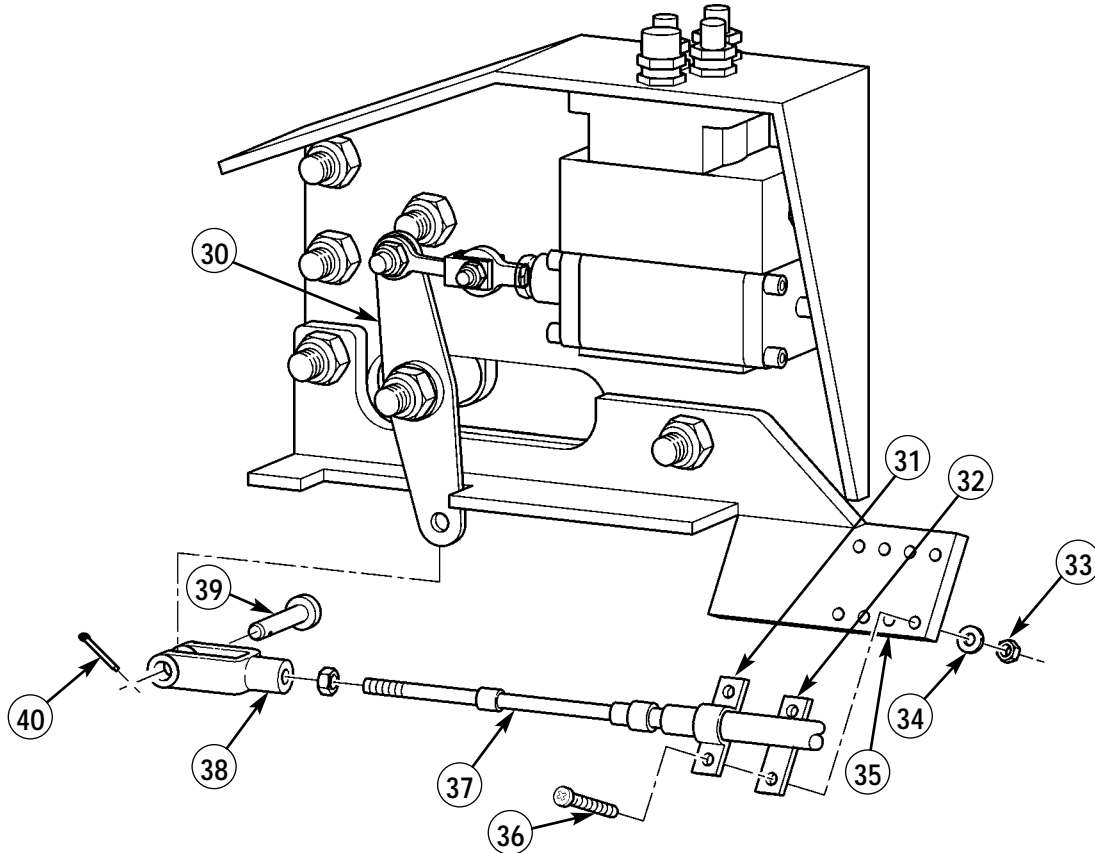
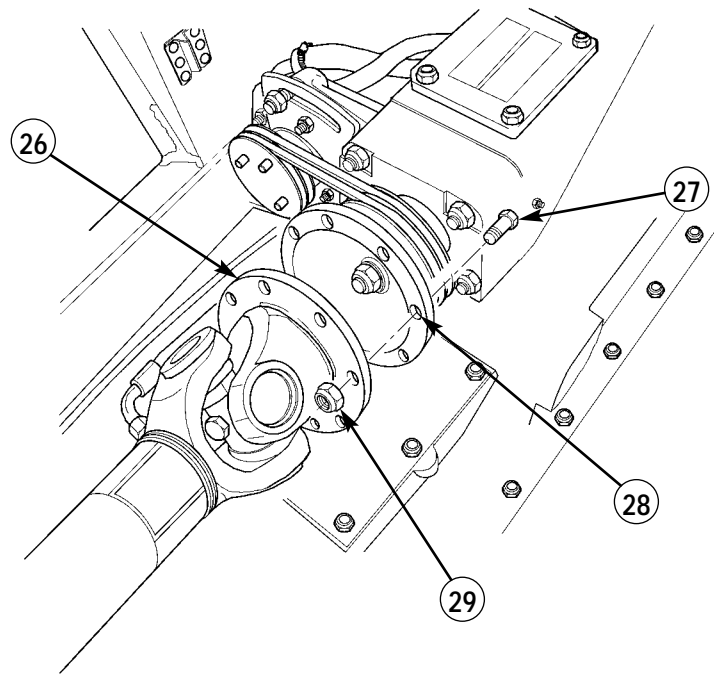
## HYDROJET ASSEMBLY MAINTENANCE (Contd)

### INSTALLATION (Contd)

11. Apply light coat of sealing compound (243) to threads of studs (6) on transom flange (5) and install new O-ring (12) and transom sealing flange (8) on transom flange (5) with ground strap (7), twelve insulator washers (9), washers (10), and new locknuts (11). Tighten locknuts (11) evenly in star pattern to 23–25 lb-ft (31–34 N·m).
12. Install two hoses (1) on adapters (3) of scoop hydrojet housing (13) and tighten four hose clamps (2).
13. Install hydraulic steering cylinder mounting bracket (20) on four studs (22) of hydrojet intake housing (21) with four washers (19) and new locknuts (18). Tighten locknuts (18) to 23–25 lb-ft (31–34 N·m).
14. Install hydraulic cylinder rod end (25), tie rod end (14), two washers (15), on hydrojet steering lever (23) with screw (24), washer (17), and new locknut (16). Tighten locknut (16) to 150 lb-ft (203 N·m).
15. Apply antisieze compound to screws (27) and install drive shaft flange (26) on hydrojet drive flange (28) with eight screws (27) and new locknuts (29). Tighten locknuts (29) to 55–60 lb-ft (75–81 N·m).
16. Install scoop control cable (37) on scoop control bracket (35) with plate (32), cable clamp (31), two screws (36), washers (34), and new locknuts (33).
17. Connect scoop control cable clevis (38) on scoop hydraulic control lever (30) with pin (39) and new cotter pin (40).
18. Install hydrojet reverse deflector (WP 0142 00).
19. Close hydrojet hatches (TM 5-1840-322-10).
20. Install aft cockpit (WP 0016 00).
21. Remove boat from blocks or IBC and place in water and check for leaks (TM 5-1940-322-10).
22. Start engine and check operation of hydrojet (TM 5-1940-322-10).



HYDROJET ASSEMBLY MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### RIFLE MOUNT SUPPORT AND BRACKET REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Hand riveting tool (item 38, WP 0172 00)

###### Materials/Parts

Two locknuts (item 56, WP 0173 00)  
Two rivets (item 132, WP 0173 00)

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## RIFLE MOUNT SUPPORT AND BRACKET REPLACEMENT (Contd)

### NOTE

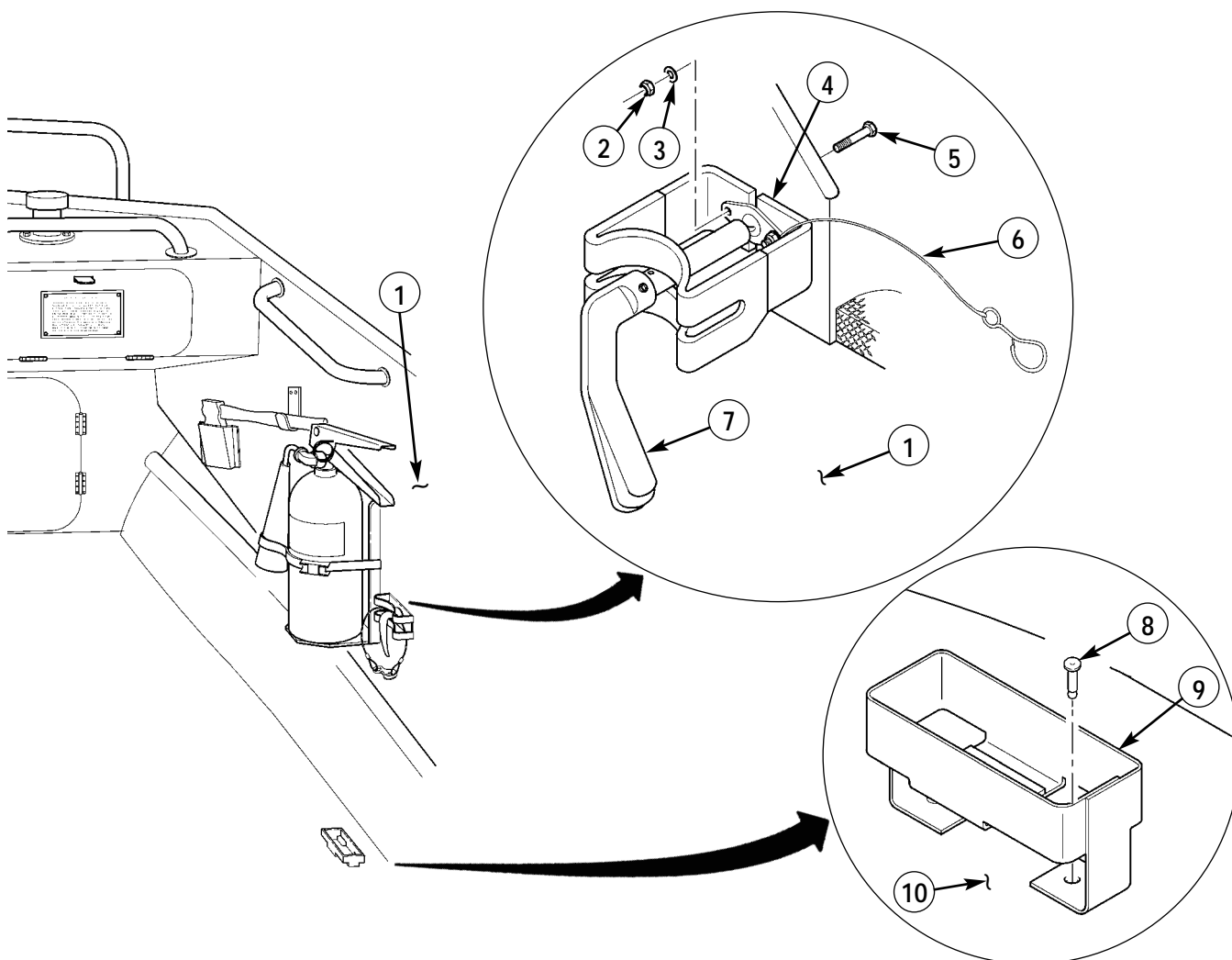
Both rifle mount supports and brackets are replaced the same way. This procedure covers the replacement of one rifle mount support and bracket.

### REMOVAL

1. Remove two locknuts (2), washers (3), lanyard (6), and screws (5) securing catch mount (4) and lever (7) on cockpit (1). Discard locknuts (2).
2. Remove two rivets (8) and support (9) from floor plate (10). Discard rivets (8).

### INSTALLATION

1. Install support (9) on floor plate (10) with two new rivets (8).
2. Position catch mount (4) and lever (7) on cockpit (1).
3. Install catch mount (4), lever (7), and lanyard (6) on cockpit (1) with two screws (5), washers (3), and new locknuts (2).



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE

CAPSTAN REMOVAL, TOW HOOK REMOVAL, MOUNTING POST BRACKET REMOVAL,  
TOW HOOK DISASSEMBLY, CLEANING AND INSPECTION, TOW HOOK ASSEMBLY,  
MOUNTING POST BRACKET INSTALLATION, TOW HOOK INSTALLATION, AND CAPSTAN INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Seven locknuts (item 52, WP 0173 00)  
Four locknuts (item 64, WP 0173 00)  
Gasket (item 36, WP 0173 00)  
Locknut (item 54, WP 0173 00)  
Locknut (item 72, WP 0173 00)  
Locknut (item 73, WP 0173 00)  
Spring pin (item 122, WP 0173 00)

##### Materials/Parts (Contd)

Spring pin (item 123, WP 0173 00)  
O-ring (item 110, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
GAA grease (item 14, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Mast raised and secured (TM 5-1940-322-10).  
Hydrojet hatches opened and secured  
(TM 5-1940-322-10).

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## CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)

### CAPSTAN REMOVAL

1. Remove threaded cap (1) and O-ring (2) from main spindle (5) and feeder arm (3) on capstan rope drum (4). Check O-ring (2) for damage. Replace if damaged.

#### **NOTE**

Note position of feeder arm to assist with installation.

2. Remove feeder arm (3) from top of main spindle (5) and drum (4).

#### **CAUTION**

Take care when removing drum from main spindle. Needle roller bearings and two collets may come off with drum. Failure to comply may result in damage to equipment.

3. Lift drum (4) and collets (24) off main spindle (5) and capstan gear assembly (23).
4. Remove six locknuts (16), washers (15), screws (22), capstan gear assembly (23), and gasket (21) from mounting post bracket (14). Discard locknuts (16) and gasket (21).

### TOW HOOK REMOVAL

#### **NOTE**

Note position of spring washer to assist with installation.

1. Remove locknut (12) and washer (11) from pivot shaft (6). Discard locknut (12).
2. Remove tow hook assembly (7), pivot shaft (6), spring washer (8), and washer (9) from tow hook mounting bracket (10).
3. Remove pivot shaft (6) from tow hook assembly (7).

### MOUNTING POST BRACKET REMOVAL

#### **NOTE**

Note position of mounting post bracket to assist with installation.

Remove four locknuts (17), washers (18), screws (20), washers (19), and mounting post bracket (14) from aft deck (13). Discard locknuts (17).

### TOW HOOK DISASSEMBLY

1. Remove spring (43) from spring retainer (41) and quick release lever (28).
2. Remove locknut (42), spring retainer (41), washer (40), screw (34), and tow hook (39) from tow hook body (31). Discard locknut (42).

#### **NOTE**

Note position of hook quick release pin to assist with installation.

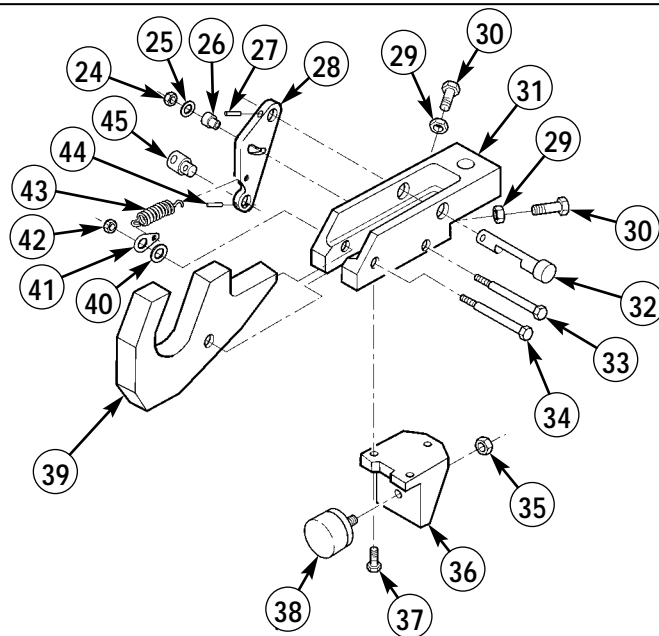
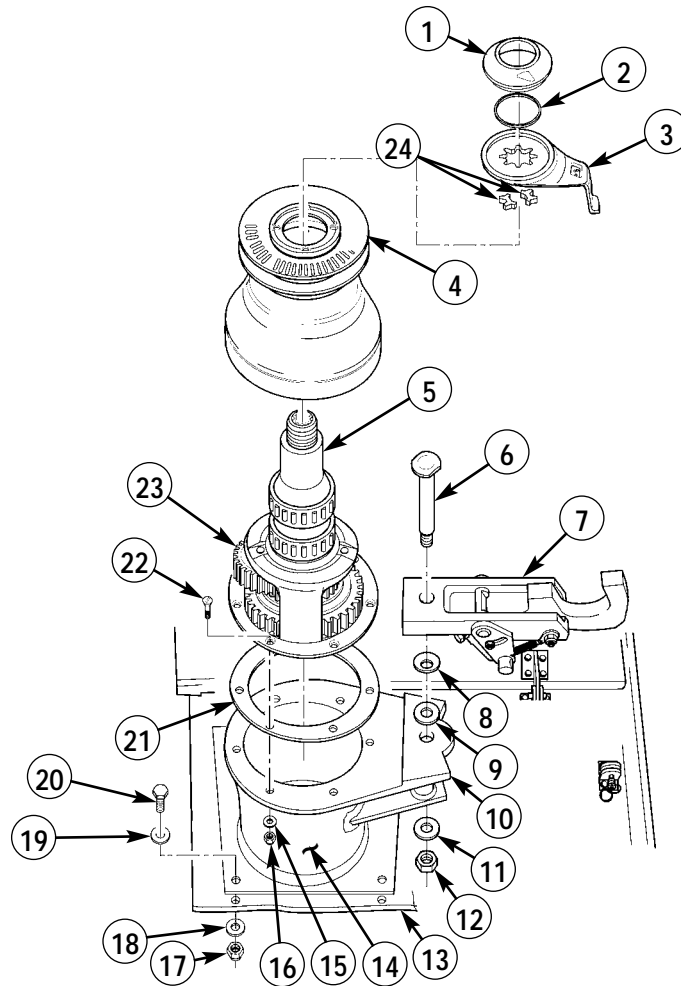
3. Remove spring pin (27) from quick release lever (28) and hook quick release pin (32). Push hook quick release pin (32) out of quick release lever (28) and tow hook body (31). Discard spring pin (27).
4. Remove locknut (46), washer (25), spacer sleeve (26), shoulder bolt (33), and quick release lever (28) from tow hook body (31). Discard locknut (46).
5. Remove spring pin (44) and boss (45) from quick release lever (28). Discard spring pin (44).
6. Remove locknut (35) and circular buffer (38) from buffer bracket (36). Discard locknut (35).
7. Remove three screws (37) and buffer bracket (36) from tow hook body (31).

#### **NOTE**

Note position of jam nuts and stop screws to assist with installation.

8. Loosen two jam nuts (29) and remove stop screws (30) from tow hook body (31).
9. If necessary, remove jam nuts (29) from stop screws (30).

CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)



## CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

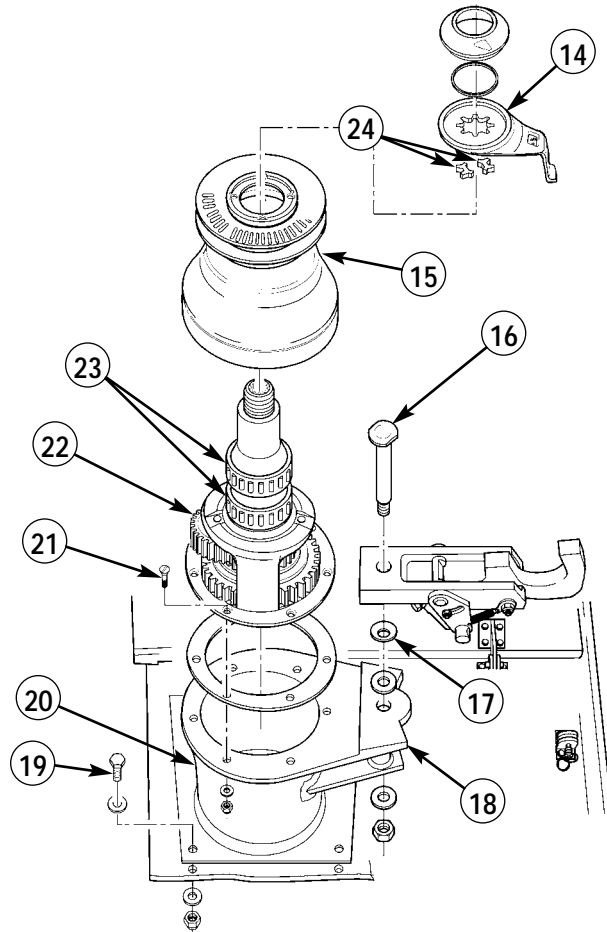
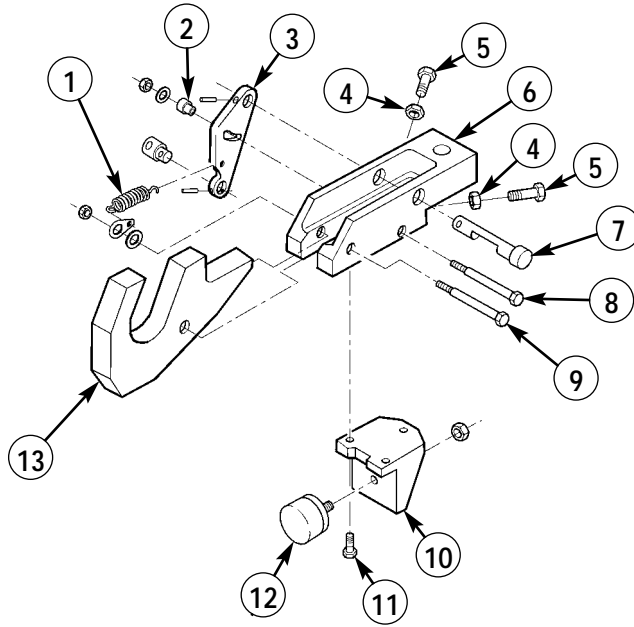
#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean all metal parts with Skysol 100 and dry with cloth before inspection.
3. Inspect tow hook (13), tow hook body (6), quick release lever (3), hook quick release pin (7), and buffer bracket (10) for damage. Replace if damaged.
4. Inspect threads on screws (9), (11), (19), and (21), pivot shaft (16), and shoulder bolt (8) for damage. Replace if damaged.
5. Inspect spring washer (17) and spring (1) for cracks or damage. Replace if cracked or damaged.
6. Inspect capstan mounting post bracket (20) and tow hook mounting brackets (18) for damage. Replace if damaged.
7. Inspect feed arm (14), collets (24), and rope drum (15) for damage. Replace if damaged.
8. Inspect capstan gear assembly (22) and needle roller bearings (23) for damage. Replace capstan if damaged.

CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)



## CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)

### TOW HOOK ASSEMBLY

1. If removed, install two jam nuts (6) on stop screws (7) as noted at removal.
2. Install two stop screws (7) on tow hook body (8) and tighten jam nuts (6).
3. Install buffer bracket (13) on tow hook body (8) with three screws (14).
4. Install circular buffer (15) on buffer bracket (13) with new locknut (12).
5. Install boss (22) on quick release lever (5) with new spring pin (21).
6. Install quick release lever (5) on tow hook body (8) with shoulder bolt (10), spacer sleeve (3), washer (2), and new locknut (1).
7. Position quick release pin (9) through tow hook body (8). Install quick release lever (5) on quick release pin (9) with new spring pin (4).
8. Install tow hook (16) on tow hook body (8) with screw (11), washer (17), spring retainer (18), and new locknut (19).
9. Install spring (20) on quick release lever (5) and spring retainer (18).

### MOUNTING POST BRACKET INSTALLATION

Install mounting post bracket (36) on aft deck (35) with four washers (41), screws (42), washers (40), and new locknuts (39). Tighten locknuts (39) to 160 lb-ft (217 N•m).

### TOW HOOK INSTALLATION

1. Apply light coat of grease to pivot shaft (28) and spring washer (30).
2. Install pivot shaft (28) in tow hook assembly (29).
3. Install tow hook assembly (29) and pivot shaft (28) on tow hook mounting bracket (32) with washer (31), spring washer (30), washer (33), and new locknut (34). Tighten locknut (34) until tow hook assembly (29) has tension when moved from full port to full starboard positions.

### CAPSTAN INSTALLATION

1. Install new gasket (43) and capstan gear assembly (45) on mounting post bracket (36) with six screws (44), washers (37), and new locknuts (38). Tighten locknuts (38) to 25 lb-ft (34 N•m).
2. Apply light coat of GAA grease on needle roller bearings (46).

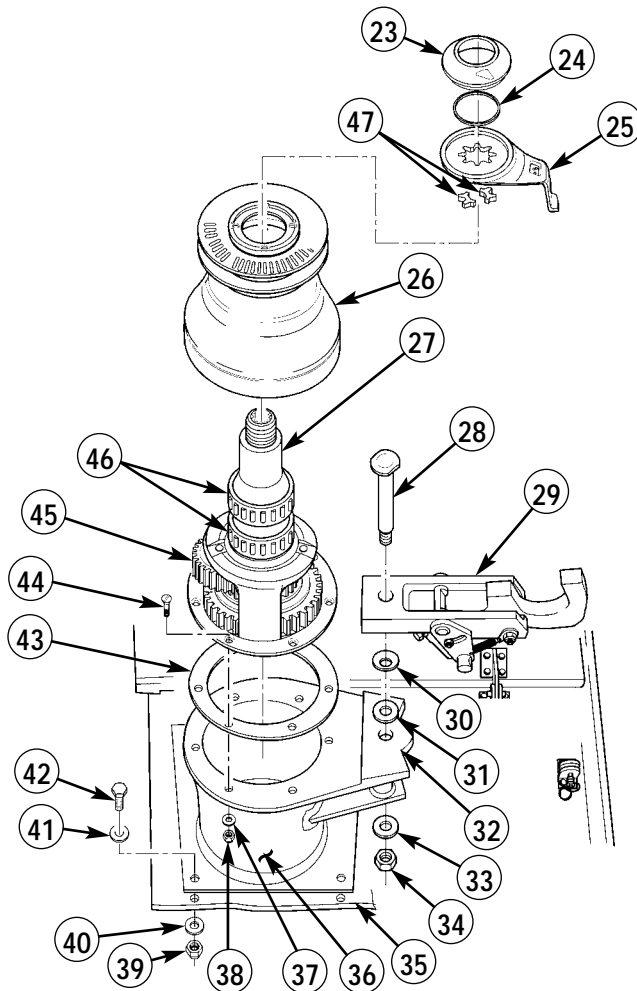
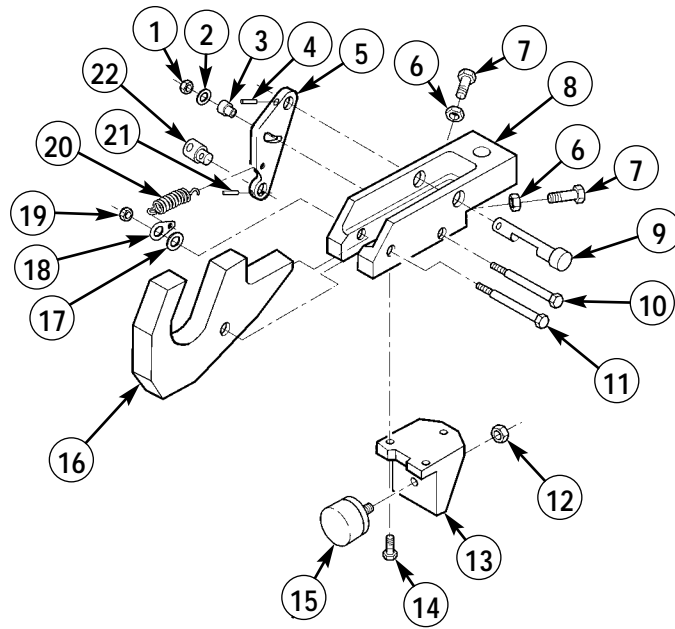
#### **NOTE**

Ensure collets are in position prior to proceeding to step 3.

3. Install rope drum (26) over capstan gear assembly (45) and push collets (47) to outward position.
4. Install feeder arm (25) over collets (47) and on rope drum (26) and main spindle (27).
5. If removed, apply light coat of grease on new O-ring (24). Install O-ring (24) on threaded cap (23).
6. Install threaded cap (23) on main spindle (27) and feeder arm (25).
7. Install capstan handle and check operation of capstan (TM 5-1940-322-10).
8. Lower and secure mast (TM 5-1949-322-10).
9. Close hydrojet hatches (TM 5-1940-322-10).



CAPSTAN, TOW HOOK, AND MOUNTING POST BRACKET MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### DIVING PLATFORM FLAP, HINGES, AND BRACKETS REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### References

TM 5-1940-322-24P

###### Materials/Parts

Twenty-seven locknuts (item 53, WP 0173 00)

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## DIVING PLATFORM FLAP, HINGES, AND BRACKETS REPLACEMENT (Contd)

### NOTE

Both diving platform flaps and hinges are replaced the same way. This procedure covers the replacement of one diving platform flap, two hinges, and four brackets.

### REMOVAL

### NOTE

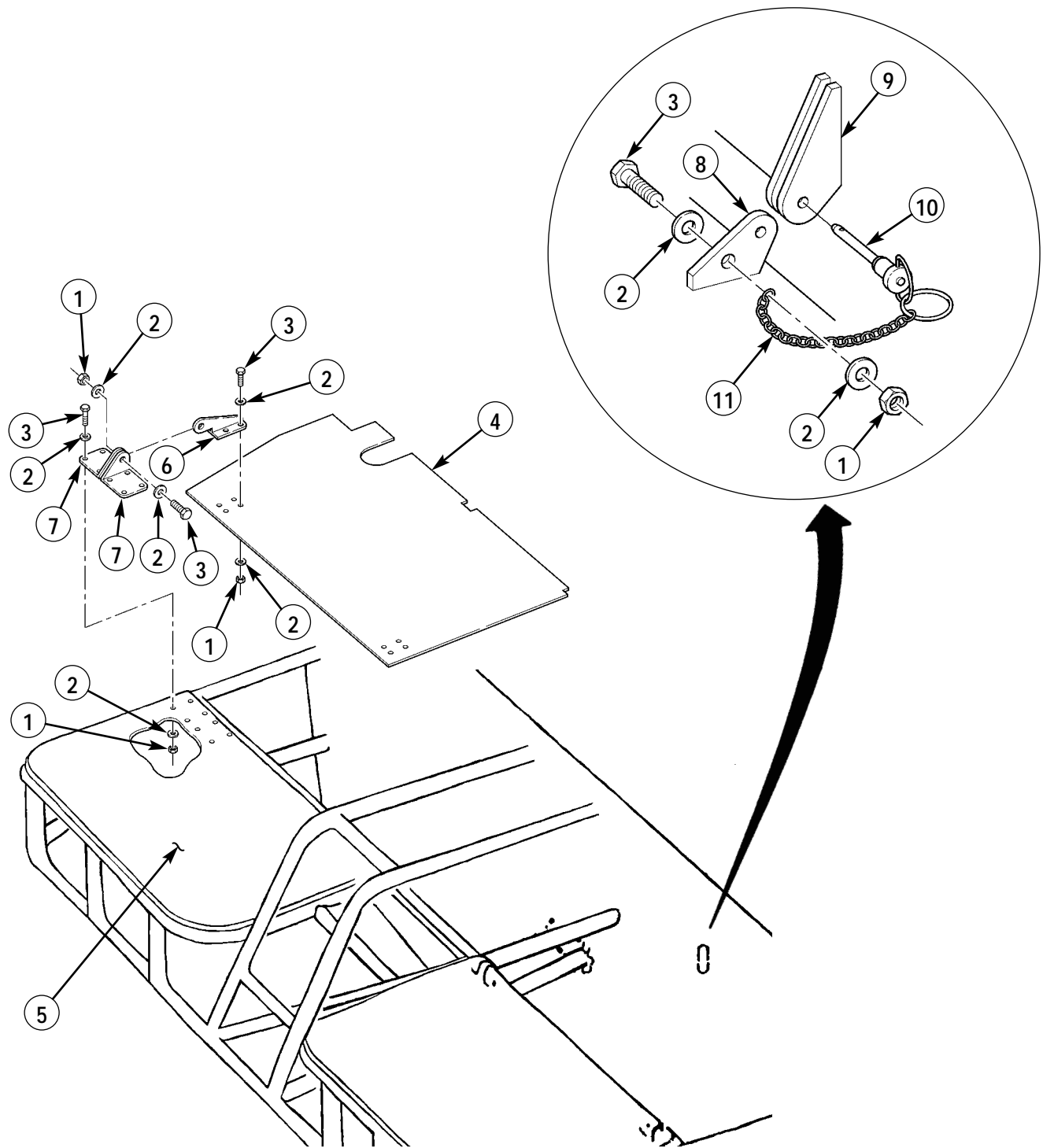
If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for mounting hardware.

1. Remove locknut (1), two washers (2), chain (11), and screw (3) from latches (8) and (9). Discard locknut (1).
2. Depress, release, and remove retaining pin (10) from latches (8) and (9).
3. Remove eight locknuts (1), sixteen washers (2), and eight screws (3) securing hinges (6) to diving platform flap (4). Discard locknuts (1).
4. Remove two locknuts (1), four washers (2), and two screws (3) securing two hinges (6) to four brackets (7). Discard locknuts (1).
5. Remove sixteen locknuts (1), thirty-two washers (2), and sixteen screws (3) securing four brackets (7) to diving platform (5). Discard locknuts (1).

### INSTALLATION

1. Install four brackets (7) on diving platform (5) with sixteen screws (3), thirty-two washers (2), and sixteen new locknuts (1).
2. Install two hinges (6) on diving platform flap (4) with eight screws (3), sixteen washers (2), and eight new locknuts (1).
3. Install two hinges (6) on brackets (7) with two screws (3), four washers (2), and two new locknuts (1).
4. Install chain (11) on latch (8) with screw (3), two washers (2), and new locknut (1).
5. Press release button and install retaining pin (10) on latches (8) and (9).

### DIVING PLATFORM FLAP, HINGES, AND BRACKETS REPLACEMENT (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AUTOMATIC FIRE EXTINGUISHER BRACKET AND MOUNTING PLATE REPLACEMENT REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Hand riveting tool (item 38, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

##### Materials/Parts

Six rivets (item 129, WP 0173 00)  
Four locknuts (item 54, WP 0173 00)

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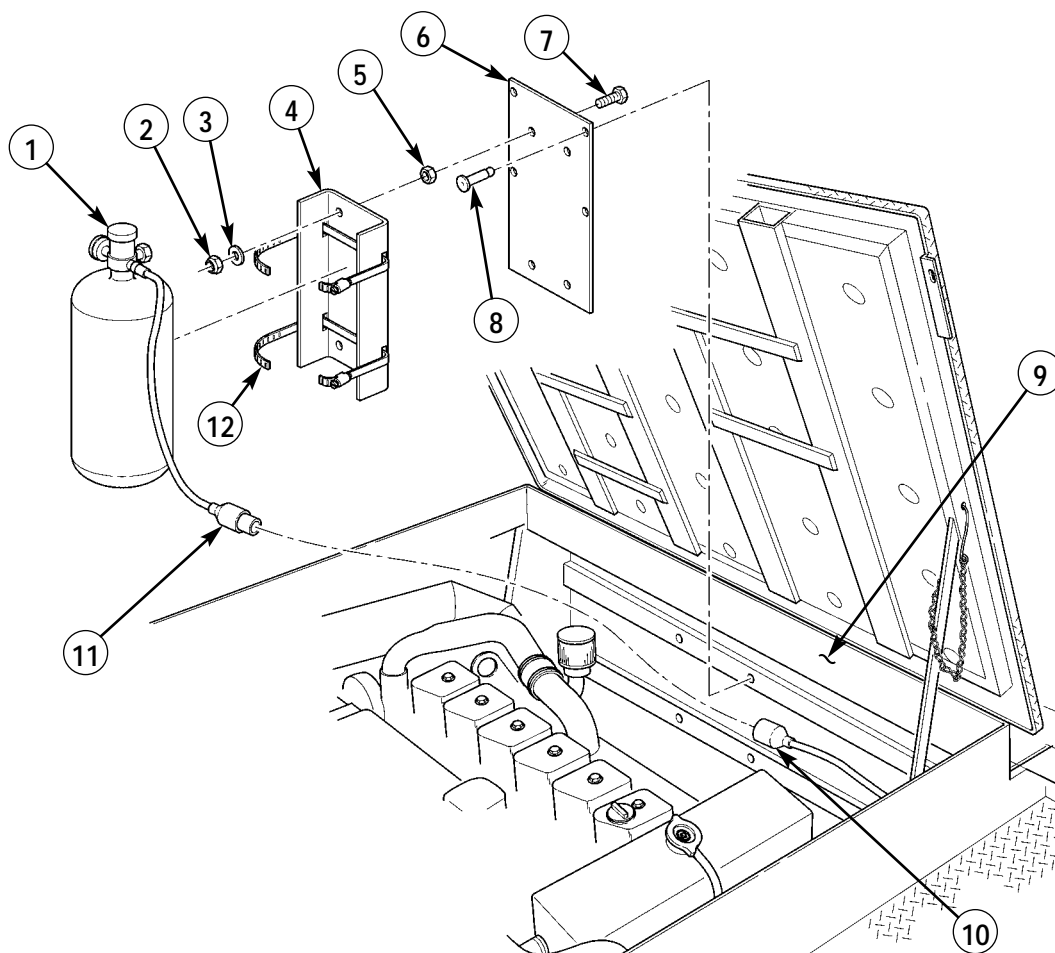
## AUTOMATIC FIRE EXTINGUISHER BRACKET AND MOUNTING PLATE REPLACEMENT (Contd)

### REMOVAL

1. Disconnect harness (11) from harness (10).
2. Loosen two clamps (12) and remove automatic fire extinguisher (1) from bracket (4).
3. Remove four locknuts (2), washers (3), and bracket (4) from mounting plate (6) and screws (7). Discard locknuts (2).
4. Remove four nuts (5) and screws (7) from mounting plate (6).
5. Inspect mounting plate (6) for damage. If damaged, drill out four rivets (8) and remove mounting plate (6) from engine compartment (9). Discard rivets (8).

### INSTALLATION

1. If removed, install mounting plate (6) on engine compartment (9) with four new rivets (8).
2. Install four screws (7) and nuts (5) on mounting plate (6).
3. Install bracket (4) on mounting plate (6) and screws (7) with four washers (3) and four new locknuts (2).
4. Install automatic fire extinguisher (1) on bracket (4) with two clamps (12). Tighten clamps (12).
5. Connect harness (11) to harness (10).
6. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### AUTOMATIC FIRE EXTINGUISHER ALARM REPLACEMENT

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

###### Materials/Parts

Two locknuts (item 77, WP 0173 00)  
Tiedown straps (item 38, WP 0171 00)

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).

---

## AUTOMATIC FIRE EXTINGUISHER ALARM REPLACEMENT (Contd)

### **CAUTION**

Ensure cap is supported during removal. Failure to comply may result in damage to wires.

### REMOVAL

1. Disconnect slave (6) from receptacle (7).
2. Turn cap (10) counterclockwise and disconnect from alarm body (14).
3. Disconnect ground wire (8) from terminal (9).
4. Disconnect blue positive wire (12) from terminal (9) and remove cap (10) from alarm body (14).
5. Remove two tiedown straps (5) from wires (1), (2), (3), (8), (12), (13), (21), (22), (24), and (25). Discard tiedown straps (5).
6. Disconnect ground wire (24) from ground wire (25).
7. Disconnect positive wire (2) from positive wire (3).
8. Remove cables (13) and (21) from alarm body (14).
9. Disconnect wires (1) and (22) from bridge rectifier (23).
10. Disconnect wires (18) and (19) from relay (20).
11. Remove two locknuts (15), washers (16), screws (4), and alarm body (14) from bracket (17). Discard locknuts (15).
12. Inspect O-ring (11) on cap (10) for damage. Replace O-ring (11) if damaged.

### INSTALLATION

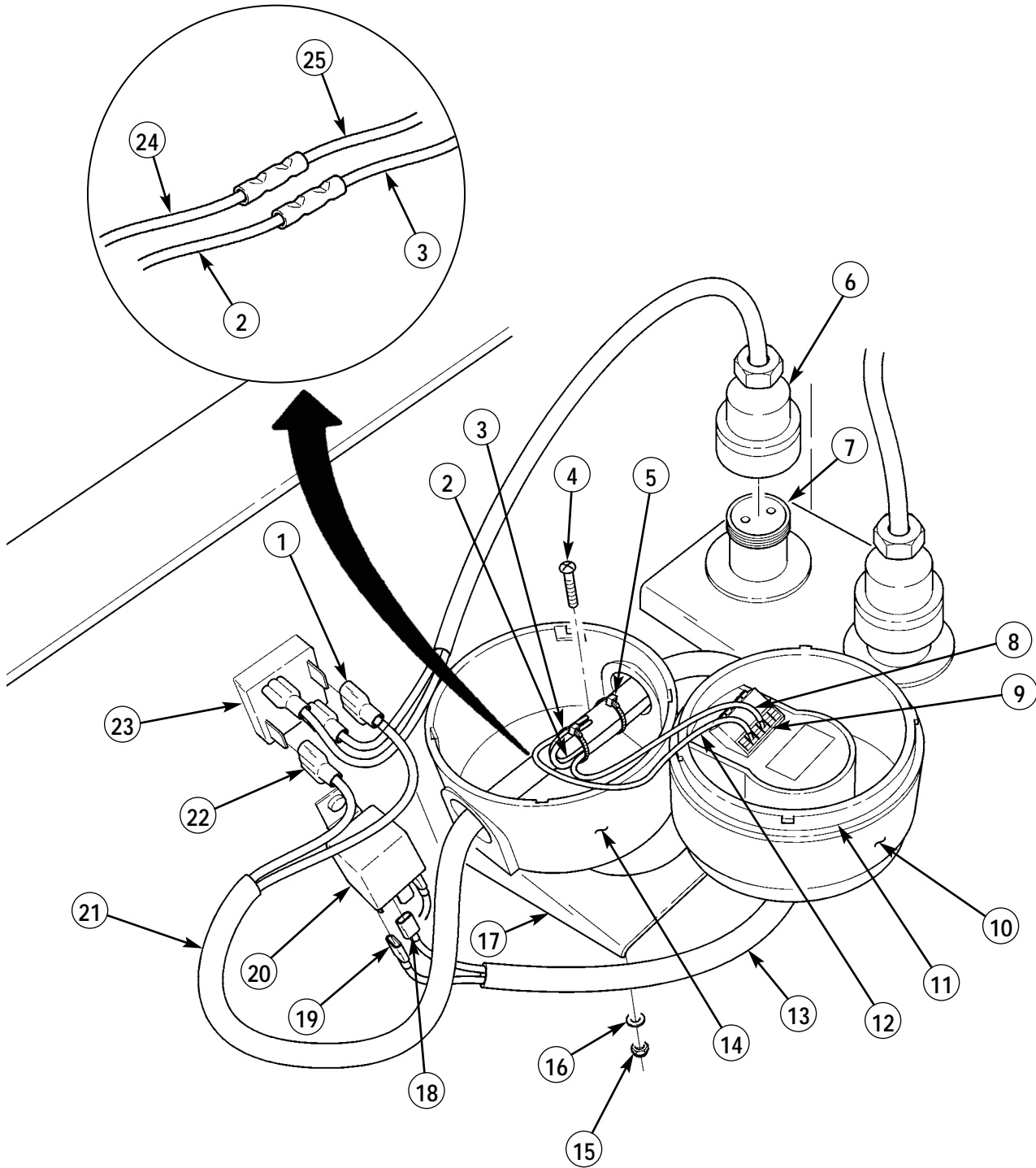
1. Install alarm body (14) on bracket (17) with two screws (4), washers (16), and new locknuts (15).
2. Install cables (13) and (21) through holes in alarm body (14).
3. Connect wires (18) and (19) to relay (20).
4. Connect wires (1) and (22) to bridge rectifier (23).
5. Connect positive wire (2) to positive wire (3).
6. Connect ground wire (24) to ground wire (25).
7. Secure wires (1), (2), (3), (8), (12), (13), (21), (22), (24), and (25) together with new tiedown straps (5).

### **CAUTION**

Ensure cap is supported during installation. Failure to comply may result in damage to wires.

8. Connect blue positive wire (12) to terminal (9) in cap (10).
9. Connect ground wire (8) to terminal (9) in cap (10).
10. Install cap (10) on alarm body (14) by turning counterclockwise.
11. Connect slave (6) to receptacle (7).
12. Connect battery ground cables (WP 0054 00).
13. Close battery hatch (TM 5-1940-322-10).

**AUTOMATIC FIRE EXTINGUISHER ALARM REPLACEMENT (Contd)**





## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HANDHELD FIRE EXTINGUISHER BRACKET REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### References

TM 5-1940-322-24P

##### Materials/Parts

Two locknuts (item 54, WP 0173 00)

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## HANDHELD FIRE EXTINGUISHER BRACKET REPLACEMENT (Contd)

### NOTE

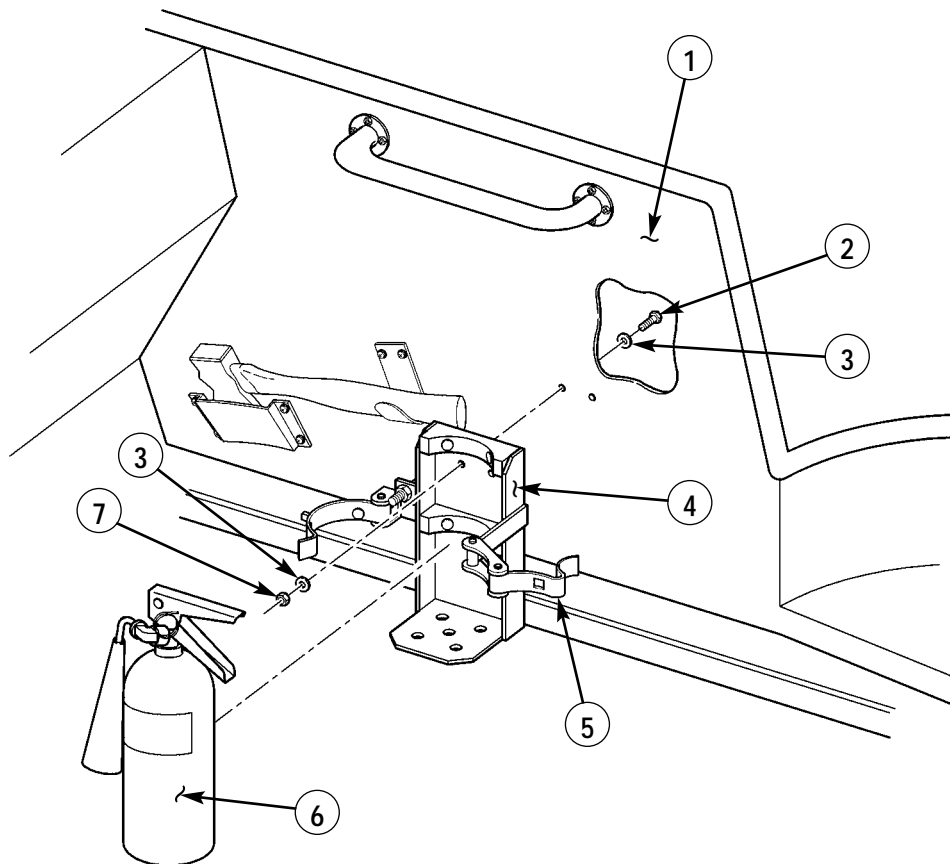
If rivets are present, drill out and replace with screws, washers, and locknuts. Refer to TM 5-1940-322-24P for all mounting hardware.

### REMOVAL

1. Release clamp (5) and remove handheld fire extinguisher (6) from bracket (4).
2. Remove two locknuts (7), four washers (3), two screws (2), and bracket (4) from forward cockpit (1). Discard locknuts (7).

### INSTALLATION

1. Install bracket (4) on forward cockpit (1) with two screws (2), four washers (3), and two new locknuts (7).
2. Install handheld fire extinguisher (6) on bracket (4) with clamp (5).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FORWARD AND AFT SCUPPER DRAINS MAINTENANCE

FORWARD SCUPPER DRAIN REMOVAL, AFT SCUPPER DRAIN REMOVAL, CLEANING AND INSPECTION,  
AFT SCUPPER DRAIN INSTALLATION, FORWARD SCUPPER DRAIN INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Scupper drain tool (item 39, WP 0172 00)

##### References

WP 0016 00  
WP 0013 00

##### Materials/Parts

Cloth (item 8, WP 0171 00)  
Silicone adhesive (item 3, WP 0171 00)

---

## FORWARD AND AFT SCUPPER DRAINS MAINTENANCE (Contd)

### FORWARD SCUPPER DRAIN REMOVAL

1. Using scupper drain tool, remove scupper drain fitting (9) from forward scupper drain (10).
2. Remove scupper drain ball (7) and retainer (6) from forward scupper drain (10).

### AFT SCUPPER DRAIN REMOVAL

1. Remove aft cockpit (WP 0016 00).
2. Remove hose clamp (2) and hose (1) from hose adapter (3).
3. Remove hose adapter (3) and elbow (4) from scupper drain fitting (5).
4. Remove scupper drain fitting (5) from aft scupper drain (8).
5. Remove scupper drain ball (7) and retainer (6) from aft scupper drain (8).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Clean scupper drain balls (7) and retainers (6) with dry cloth.
3. Inspect scupper drain balls (7) and retainers (6) for damage. Replace scupper drain balls (7) or retainers (6) if damaged.

### AFT SCUPPER DRAIN INSTALLATION

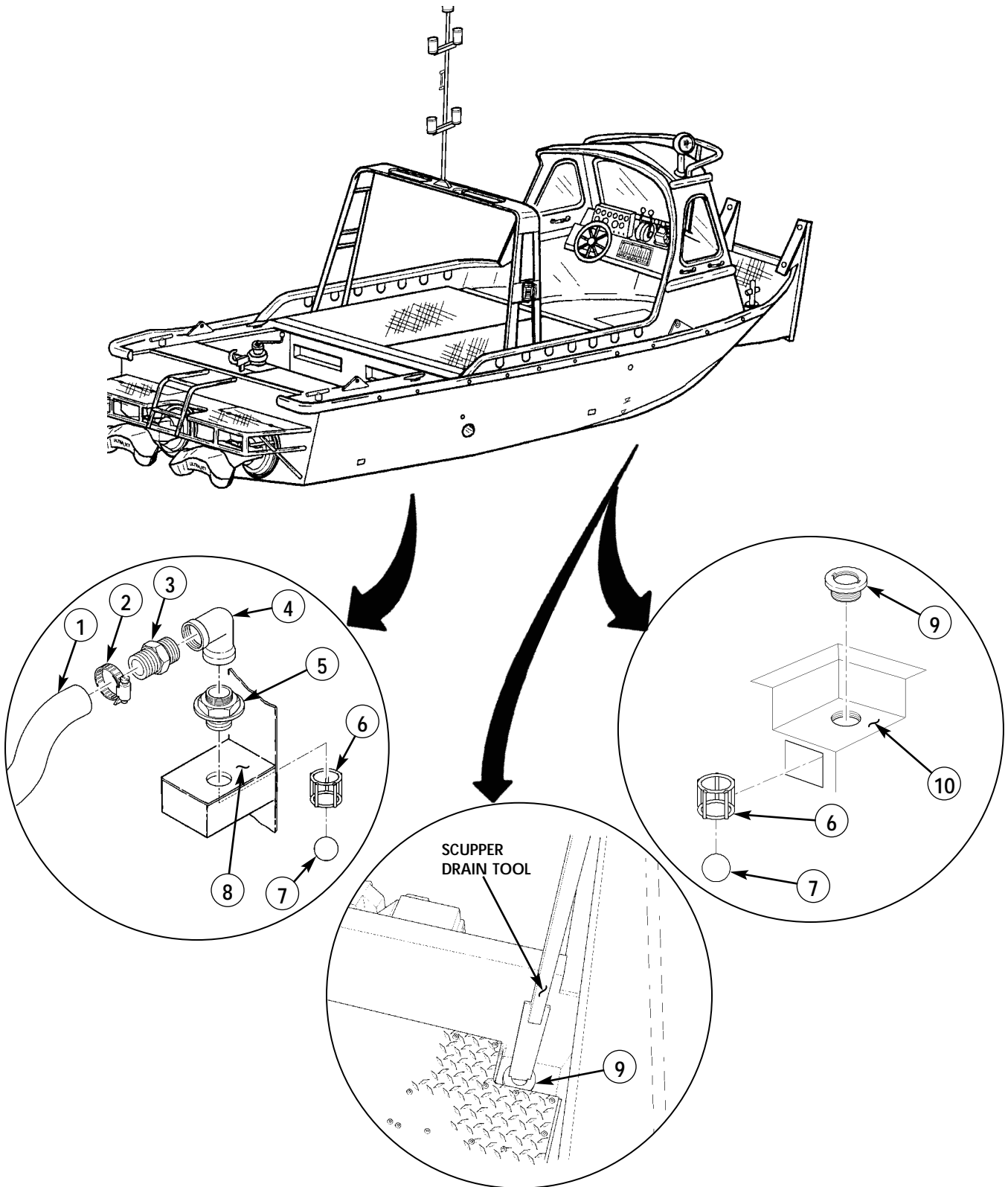
1. Install scupper drain ball (7) and retainer (6) in aft scupper drain (8).
2. Apply thin coat of silicone adhesive on threads of scupper drain fitting (5).
3. Install scupper drain fitting (5) in aft scupper drain (8).
4. Install hose adapter (3) and elbow (4) in scupper drain fitting (5).
5. Install hose (1) on hose adapter (3) with hose clamp (2).
6. Install aft cockpit (WP 0016 00).

### FORWARD SCUPPER DRAIN INSTALLATION

1. Install scupper drain ball (7) and retainer (6) in forward scupper drain (10).
2. Apply thin coat of silicone adhesive on threads of scupper drain fitting (9).
3. Using scupper drain tool, install scupper drain fitting (9) in forward scupper drain (10).



### FORWARD AND AFT SCUPPER DRAINS MAINTENANCE (Contd)



END OF WORK PACKAGE



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ANODES MAINTENANCE

HYDROJET ANODE REMOVAL, SCOOP REVERSE DEFLECTOR ANODE REMOVAL,  
HULL ANODE REMOVAL, KEEL COOLER ANODE REMOVAL, CLEANING AND INSPECTION,  
KEEL COOLER ANODE INSTALLATION, HULL ANODE INSTALLATION,  
SCOOP REVERSE DEFLECTOR ANODE INSTALLATION, AND HYDROJET ANODE INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00)  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Materials/Parts

Ten locknuts (item 66, WP 0173 00)  
Six locknuts (item 65, WP 0173 00)  
Five fiber washers (item 10, WP 0173 00)  
Fiber washer (item 11, WP 0173 00)  
Anode replacement kit-keel cooler only  
(item 1, WP 0173 00)

##### Materials/Parts (Contd)

Two locknuts (item 71, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00  
WP 0067 00

##### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).

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## ANODES MAINTENANCE (Contd)

### HYDROJET ANODE REMOVAL

#### **NOTE**

Anodes should be replaced when 50% of original volume is missing.

1. Position and support scoop reverse deflectors in raised position (TM 5-1940-322-10).
2. Remove locknut (2), washer (3), and anode (4), from hydrojet tail shaft (1). Discard locknut (2).
3. Remove locknut (8), washer (7), anode (6), and fiber washer (5) from hydrojet drive (15). Discard fiber washer (5) and locknut (8).
4. Remove locknut (10), washer (11), anode (12), wire lead (9), and spacer (14) from hydrojet drive (15). Discard locknut (10).
5. Remove locknut (10), washer (11), anode (12), wire lead (9), and fiber washer (13) from hydrojet drive (15). Discard fiber washer (13) and locknut (10).
6. Repeat steps 1 through 5 for other hydrojet anodes.

### SCOOP REVERSE DEFLECTOR ANODE REMOVAL

1. Remove two locknuts (29), washers (28), anode (25), and two fiber washers (27) from hydrojet scoop reverse deflector (26). Discard fiber washers (27) and locknuts (29).
2. Perform step 1 for remaining scoop reverse deflector anode.

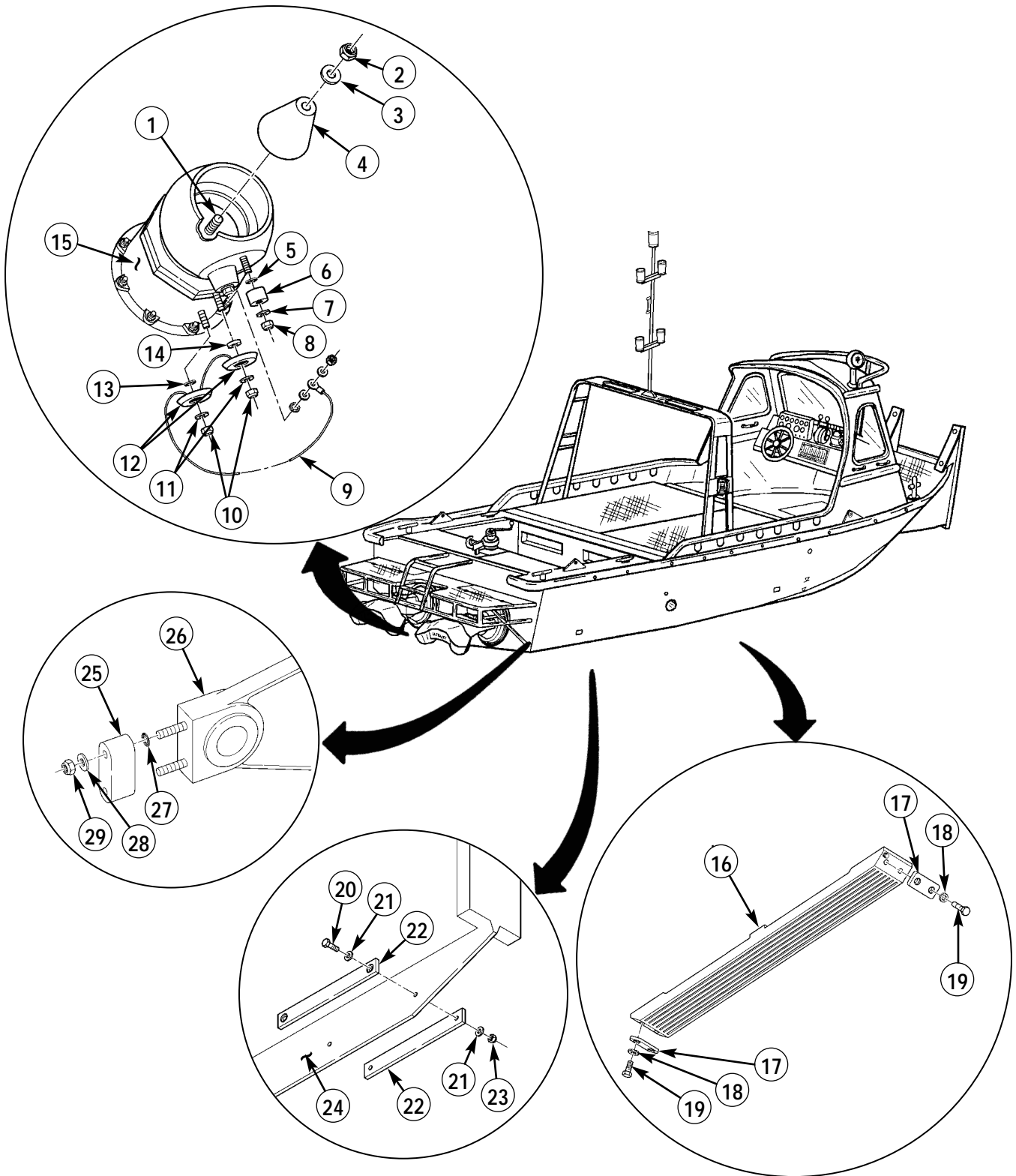
### HULL ANODE REMOVAL

Remove two locknuts (23), washers (21), anodes (22), and screws (20) from hull keel (24). Discard locknuts (23).

### KEEL COOLER ANODE REMOVAL

1. Remove keel cooler grates (WP 0067 00).
2. Remove four screws (19), lockwashers (18), and anodes (17) from keel cooler (16). Discard lockwashers (18).
3. Perform steps 1 and 2 for remaining keel cooler anodes.

### ANODES MAINTENANCE (Contd)



## ANODES MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision.

Use face shield or goggles when eye contact may occur.

In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean any corrosion from anode mounting surfaces with Skysol 100 and dry with cloth.
3. Inspect anodes for pitting and wear, replace anodes if pitting is through anodes or if 50% of original anode material is missing.

### KEEL COOLER ANODE INSTALLATION

1. Install two anodes (17) on keel cooler (16) with four screws (19) and new lockwashers (18).
2. Install keel cooler grates (WP 0067 00).
3. Perform steps 1 and 2 for remaining keel cooler anodes.

### HULL ANODE INSTALLATION

Install two anodes (22) on hull keel (24) with two screws (25), four washers (21), and two new locknuts (23).

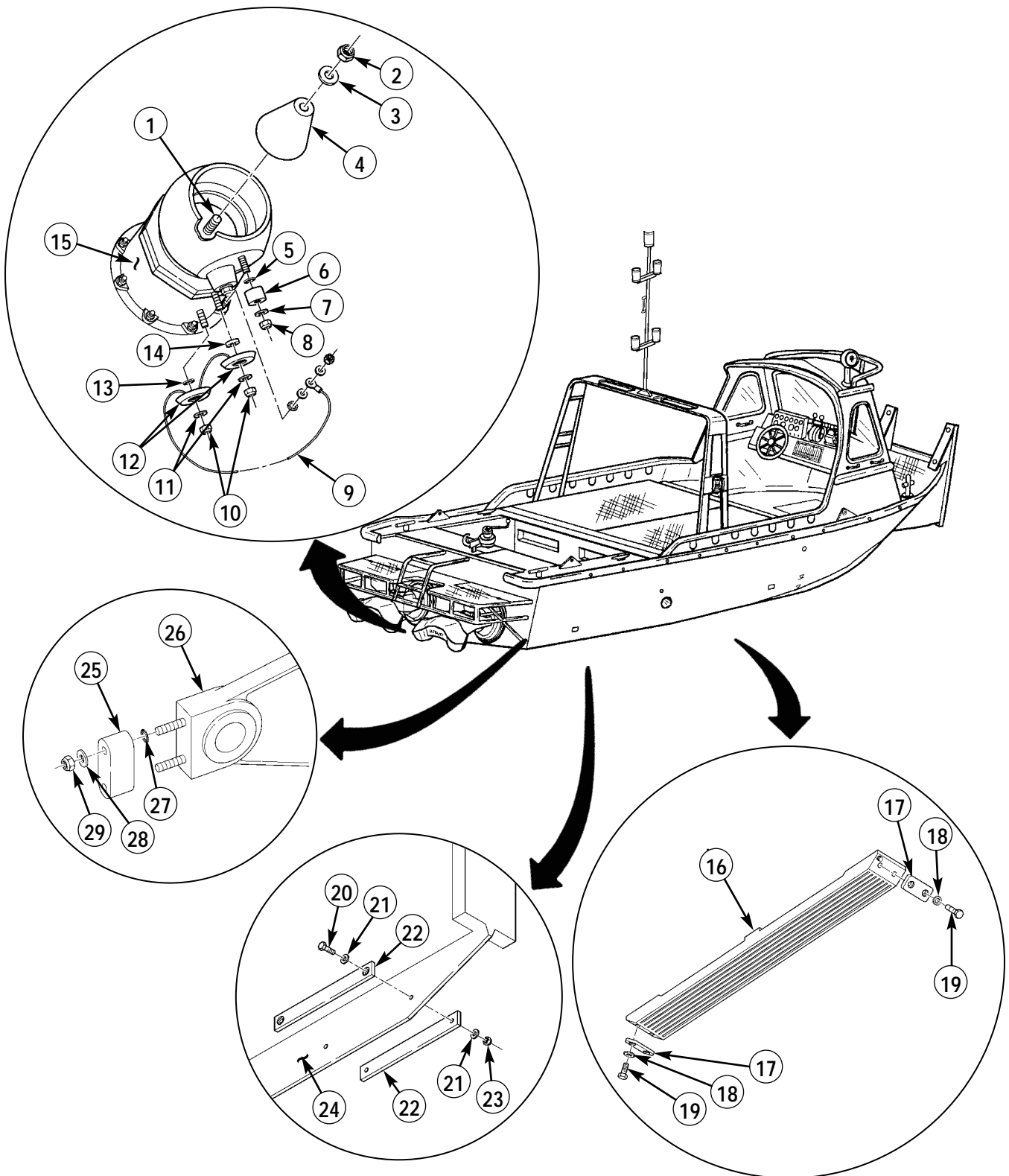
### SCOOP REVERSE DEFLECTOR ANODE INSTALLATION

1. Install two new fiber washers (27) and anode (25) on scoop reverse deflector (26) with two washers (28) and new locknuts (29). Tighten locknuts (29) to 12.5–14 lb-ft (17–19 N·m).
2. Repeat step 1 for additional side.

### HYDROJET ANODE INSTALLATION

1. Install new fiber washer (13), wire lead (9), and anode (12) on hydrojet drive (15) with washer (11) and new locknut (10). Tighten locknut (10) to 23–25 lb-ft (31–34 N·m).
2. Install spacer (14), wire lead (9), and anode (12) on hydrojet drive (15) with washer (11) and new locknut (10). Tighten locknut (10) to 23–25 lb-ft (31–34 N·m).
3. Install new fiber washer (5) and anode (6) on hydrojet drive (15) with washer (7) and new locknut (8). Tighten locknut (8) to 12.5–14 lb-ft (17–19 N·m).
4. Install anode (4) on hydrojet tail shaft (1) with washer (3) and new locknut (2). Tighten locknut (2) to 44–48 lb-ft (60–65 N·m).
5. Perform steps 1 through 4 for remaining hydrojet anodes.

ANODES MAINTENANCE (Contd)



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### DATA PLATE REPLACEMENT

#### REMOVAL AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Hand riveting tool (item 38, WP 0172 00)

##### Materials/Parts

Four rivets (item 131, WP 0173 00)

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## DATA PLATE REPLACEMENT (Contd)

### NOTE

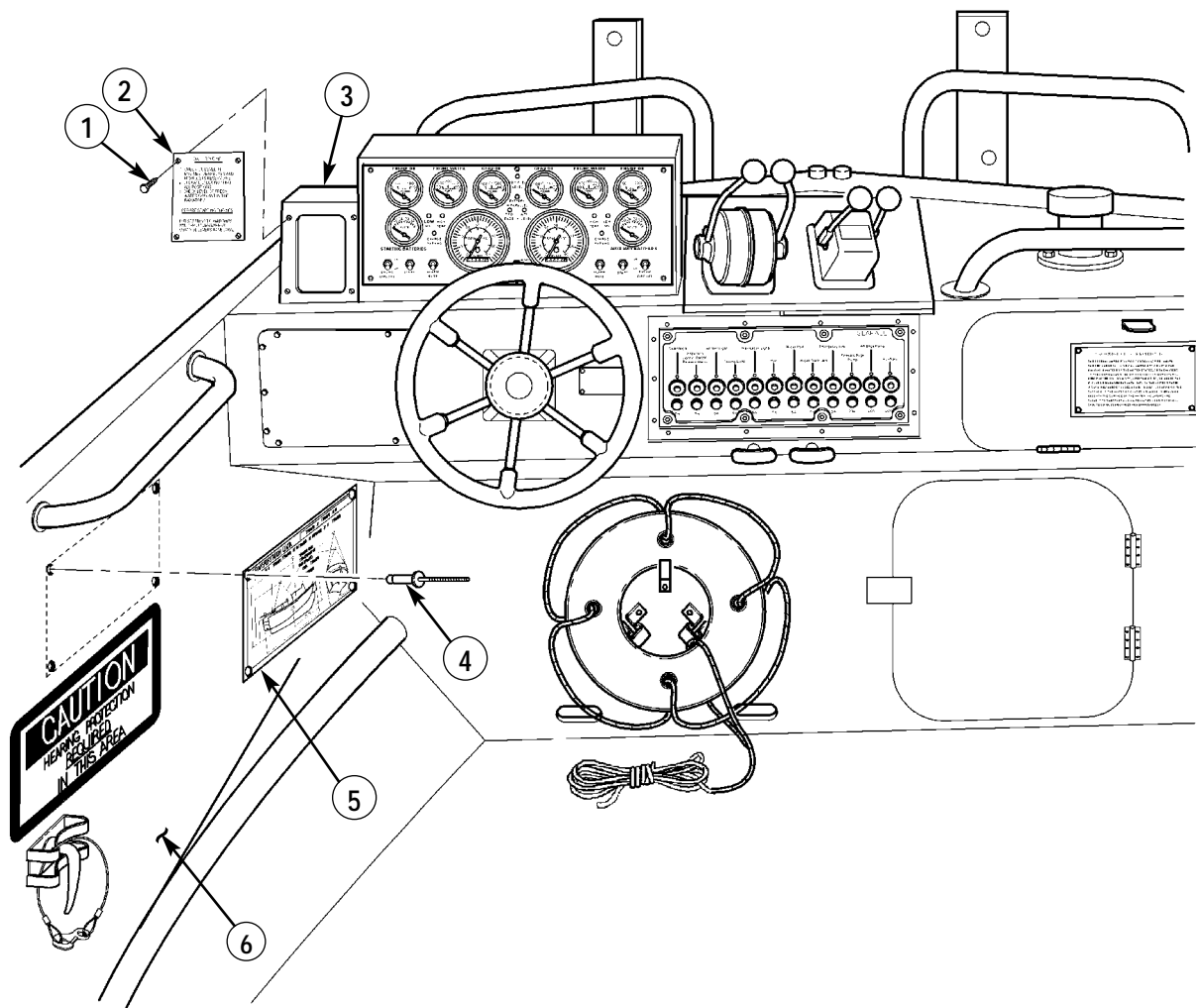
All data plates are replaced the same way. This procedure covers replacement of one riveted and one screwed on data plate.

### REMOVAL

1. Remove four screws (1) and data plate (2) from dash panel (3).
2. If damaged, drill out four rivets (4) and remove data plate (5) from forward cockpit (6). Discard rivets (4).

### INSTALLATION

1. If removed, install data plate (5) on forward cockpit (6) with four new rivets (4).
2. Install data plate (2) on dash panel (3) with four screws (1).



# CHAPTER 4

## SUSTAINMENT MAINTENANCE INSTRUCTIONS BRIDGE ERECTION BOAT (BEB) MK II-S

Work Package Title	WP Sequence No.
Piston and Connecting Rod Maintenance . . . . .	WP 0152 00
Engine Oil Pump Maintenance . . . . .	WP 0153 00
Oil Pan, Suction Tube, and Suction Tube Bracket Maintenance . . . . .	WP 0154 00
Front Gear Housing Cover, Crankshaft Front Seal, and Front Gear Housing Maintenance . . . . .	WP 0155 00
Crankshaft and Crankshaft Gear Replacement . . . . .	WP 0156 00
Flywheel, Flywheel Housing, and Crankshaft Rear Seal Maintenance . . . . .	WP 0157 00
Camshaft, Cam Gear, and Cam Bushing Maintenance . . . . .	WP 0158 00
Flywheel Ring Gear Maintenance . . . . .	WP 0159 00
Valves and Valve Springs Maintenance . . . . .	WP 0160 00
Engine Valve Tappets Maintenance . . . . .	WP 0161 00
Timing Pin and Housing Replacement . . . . .	WP 0162 00
Cylinder Block Maintenance . . . . .	WP 0163 00
Turbocharger Repair . . . . .	WP 0164 00
Transmission Inspection . . . . .	WP 0165 00
Transmission Repair . . . . .	WP 0166 00
Hydrojet Assembly Repair . . . . .	WP 0167 00



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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### PISTON AND CONNECTING ROD MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Engine stand (item 45, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)  
Piston ring expander (item 12, WP 0172 00)  
Piston ring compressor (item 5, WP 0172 00)  
Ridge reamer (item 35, WP 0172 00)

##### Materials/Parts

Engine oil (item 16, WP 0171 00)  
Cleaning pad (item 23, WP 0171 00)  
Detergent (item 11, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)  
Lubriplate (item 20, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).  
Engine removed (WP 0115 00).  
Cylinder head removed (WP 0101 00).  
Gear housing cover removed (WP 0155 00).  
Oil pan and suction tube removed (WP 0154 00).

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## PISTON AND CONNECTING ROD MAINTENANCE (Contd)

### **NOTE**

All pistons and connecting rods are replaced the same way. This procedure covers the replacement of one piston and one connecting rod.

### REMOVAL

### **CAUTION**

Take care when using ridge reamer on ridge area. Failure to comply may result in damage to equipment.

Do not use an identifying stamp on anodized pistons. Failure to comply may result in damage to anodized coating.

### **NOTE**

Position engine horizontally and rotate so pistons are below carbon deposits above ring travel area.

1. Using ridge reamer, loosen carbon deposits on ring travel area in cylinder bore (5). Remove remaining carbon deposits with cleaning pad.
2. Mark location of piston (1) and connecting rod cap (3).

### **NOTE**

Rotate engine vertically to remove piston and connecting rod assembly.

3. Remove two cap screws (4), connecting rod cap (3), and bearings (10) from connecting rod (2).

### **CAUTION**

Take care when removing piston from cylinder liner. Failure to comply may result in damage to equipment.

4. Remove piston (1) and connecting rod (2) from cylinder bore (5).

### DISASSEMBLY

### **NOTE**

Heating the piston is not required for disassembly.

Note position of piston rings during disassembly to assist with assembly.

1. Remove two retaining rings (8), piston pin (7), connecting rod (2), and rod bushing (9) from piston (1).
2. Remove piston rings (6) from piston (1).



## PISTON AND CONNECTING ROD MAINTENANCE (Contd)

### CLEANING AND INSPECTION (Contd)

#### **CAUTION**

Do not use bead blast to clean pistons. Pistons will be damaged by blast material embedded in the aluminum.

Do not clean pistons and rods in an acid tank. Failure to comply may result in damage to equipment.

2. Soak piston (1) overnight in Skysol 100.
3. Wash piston (1) and connecting rod (2) in a strong solution of detergent and hot water.

#### **CAUTION**

Do not use a ring groove cleaner. Use caution when cleaning grooves. Failure to comply may result in scratches on the ring sealing surface in the piston groove.

4. Clean excess deposits from ring grooves (6), (7), and (8) with square end of broken ring.

#### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

5. Wash piston (1) and rod (2) in strong solution of detergent and hot water. Rinse piston (1) and connecting rod (2) and dry with compressed air.
6. Inspect connecting rod (2) for deep scratches. Replace connecting rod (2) if damaged.
7. Inspect piston (1) for damage and excessive wear. Check top of piston (1), ring grooves (6), (7), and (8), skirt (3), and pin bore (9). Replace piston (1) if damaged.
8. Using micrometer, measure piston skirt (3) diameter 0.500 in. (12.7 mm) from bottom of piston. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits. Replace piston (1) if worn past limits.
9. Inspect upper groove (8) of piston (1) for damage. Replace piston (1) if damaged.
10. Using feeler gauge and piston ring (4), measure intermediate ring groove (7) clearance. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits.
11. Using feeler gauge and piston ring (5), measure oil ring groove (6) clearance. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits. Replace piston (1) if worn past limits.
12. Using telescopic gauge, measure piston pin bore (9) in two locations. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits. Replace piston (1) if worn past limits.
13. Inspect piston pin (10) for nicks, gouges, and excessive wear. Replace piston pin (10) if nicked, gouged, or excessively worn.
14. Using micrometer, measure piston pin (10) diameter on 90° axis in three locations. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits. Replace piston pin (10) if worn past limits.

#### **CAUTION**

The I-beam section of the rod cannot have dents or other damage. Damage to this part can cause stress risers which will progress to breakage.

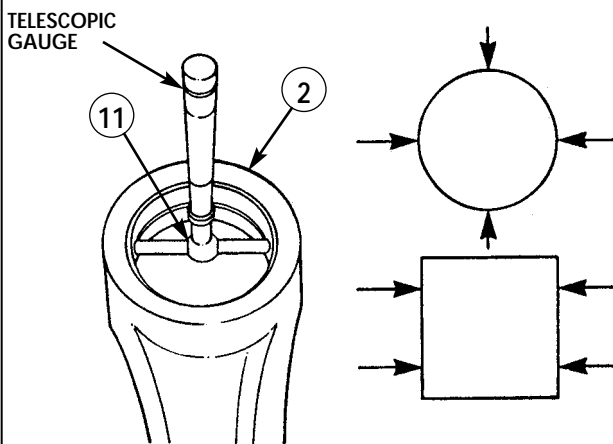
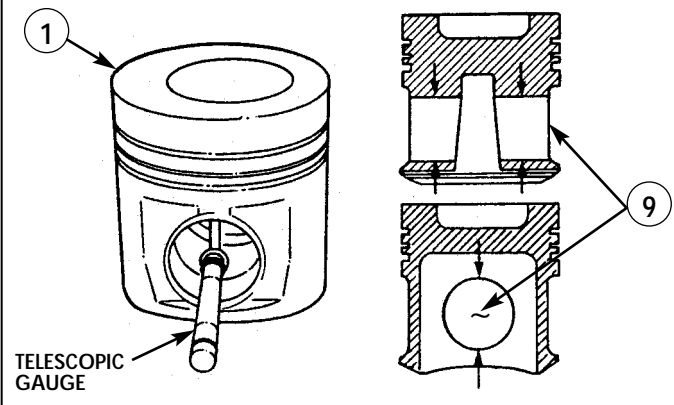
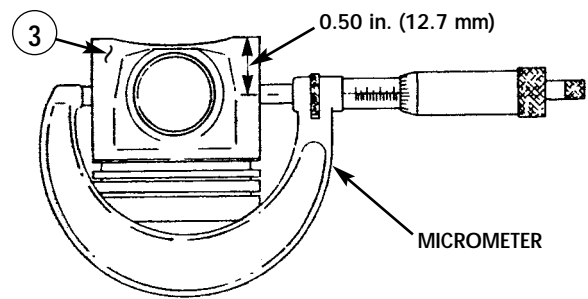
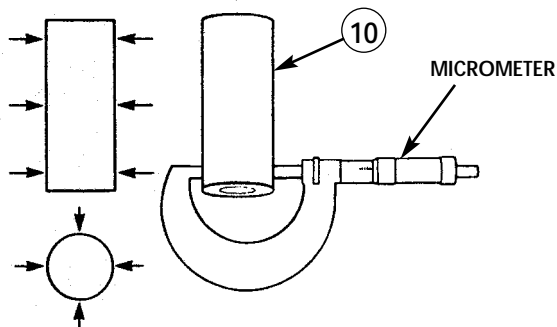
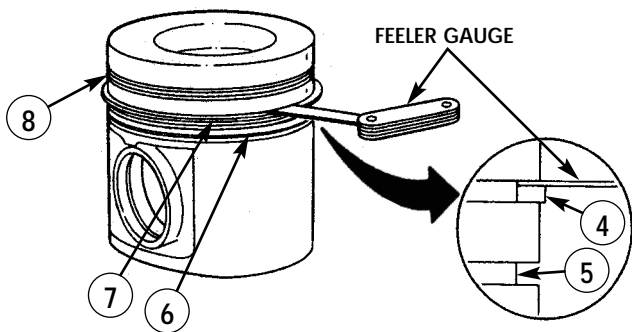
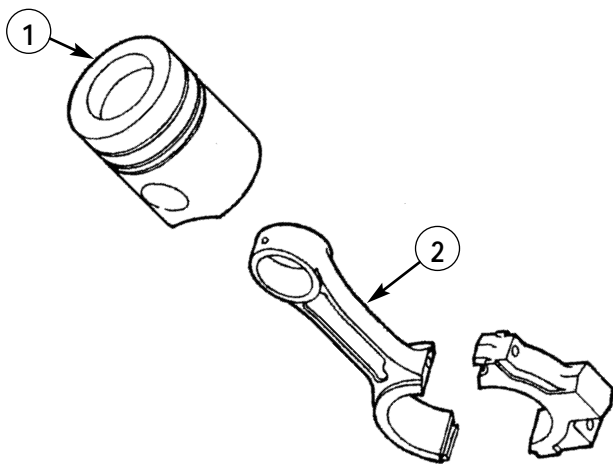
15. Inspect connecting rod (2) for damage and wear. Replace connecting rod (2) if damaged or worn.
16. Using telescopic gauge, measure connecting rod pin bore (11) in two locations on 90° axis. For measurements, refer to table 1, Piston and Connecting Rod Wear Limits. Replace connecting rod (2) if worn past limits.



PISTON AND CONNECTING ROD MAINTENANCE (Contd)

**Table 1. Piston and Connecting Rod Wear Limits.**

ITEM NO.	ITEM/POINT OF MEASUREMENT	WEAR LIMITS/CLEARANCE	
		MIN	MAX
3	Skirt Diameter	4.0088 in. (101.823 mm)	4.0107 in. (101.887 mm)
7	Intermediate Ring Groove	0.003 in. (0.075 mm)	0.0059 in. (0.150 mm)
6	Oil Ring Groove	0.0016 in. (0.040 mm)	0.0016 in. (0.040 mm)
9	Piston Pin Bore	1.5750 in. (40.006 mm)	1.5758 in. (40.025 mm)
10	Piston Pin Diameter	1.5744 in. (39.990 mm)	1.5749 in. (40.003 mm)
11	Connecting Rod Pin Bore	2.7150 in. (68.962 mm)	2.7170 in. (69.013 mm)



## PISTON AND CONNECTING ROD MAINTENANCE (Contd)

### ASSEMBLY

#### **CAUTION**

Ensure FRONT marking on the piston and the numbers on the rod and cap are oriented. Failure to comply may result in damage to equipment.

1. Install retaining ring (6) into pin groove (13) on FRONT side of piston (1).
2. Lubricate piston pin (5) and cylinder bore (17) with engine oil.

#### **NOTE**

The piston does not require heating to install piston pin; however, the piston must be at room temperature or above.

3. Install piston pin (5) through piston (1), bushing (7), and connecting rod (8).
4. Install remaining retaining ring (6) into pin groove (13).
5. Install rings (4), (3), and (2) in cylinder bore (17) and use a piston to square with cylinder bore (17) at a depth of 3.5 in. (8.89 cm).
6. Using feeler gauge, measure piston ring gaps. For measurements, refer to table 2, Piston Ring Gaps.
7. Remove rings (2), (3), and (4) from cylinder bore (17).

***Table 2. Piston Ring Gaps.***

ITEM NO.	PISTON RING	MIN	MAX
4	Oil Ring	0.0100 in. (0.250 mm)	0.0215 in. (0.550 mm)
3	Intermediate Ring	0.0100 in. (0.250 mm)	0.0215 in. (0.550 mm)
2	Top Ring	0.0160 in. (0.400 mm)	0.0275 in. (0.700 mm)

#### **CAUTION**

The top surfaces of all rings are identified with TOP or a suppliers MARK. Assemble rings with TOP or MARK facing up. Failure to comply may result in damage to equipment.

8. Apply coat of engine oil to rings (2), (3), and (4).
9. Using piston ring expander tool, install oil ring (4) with end gap 180° from ends of piston ring expander tool.
10. Using piston ring expander tool, install intermediate ring (3) with end gap 120° from gap of oil ring (4).
11. Using piston ring expander tool, install top ring (2) with end gap 120° from gap of intermediate ring (3).
12. Using piston ring compressor, compress rings (2), (3), and (4).
13. Remove plug (15) from flywheel housing (14).
14. Using gear barring tool, bar crankshaft to Bottom Dead Center (BDC) position.
15. Install plug (15) on flywheel housing (14).
16. Apply coat of lubriplate to bearings (11) and (12).

## PISTON AND CONNECTING ROD MAINTENANCE (Contd)

### INSTALLATION

1. Install bearings (11) and (12) on rod (8) and cap (9).

#### **CAUTION**

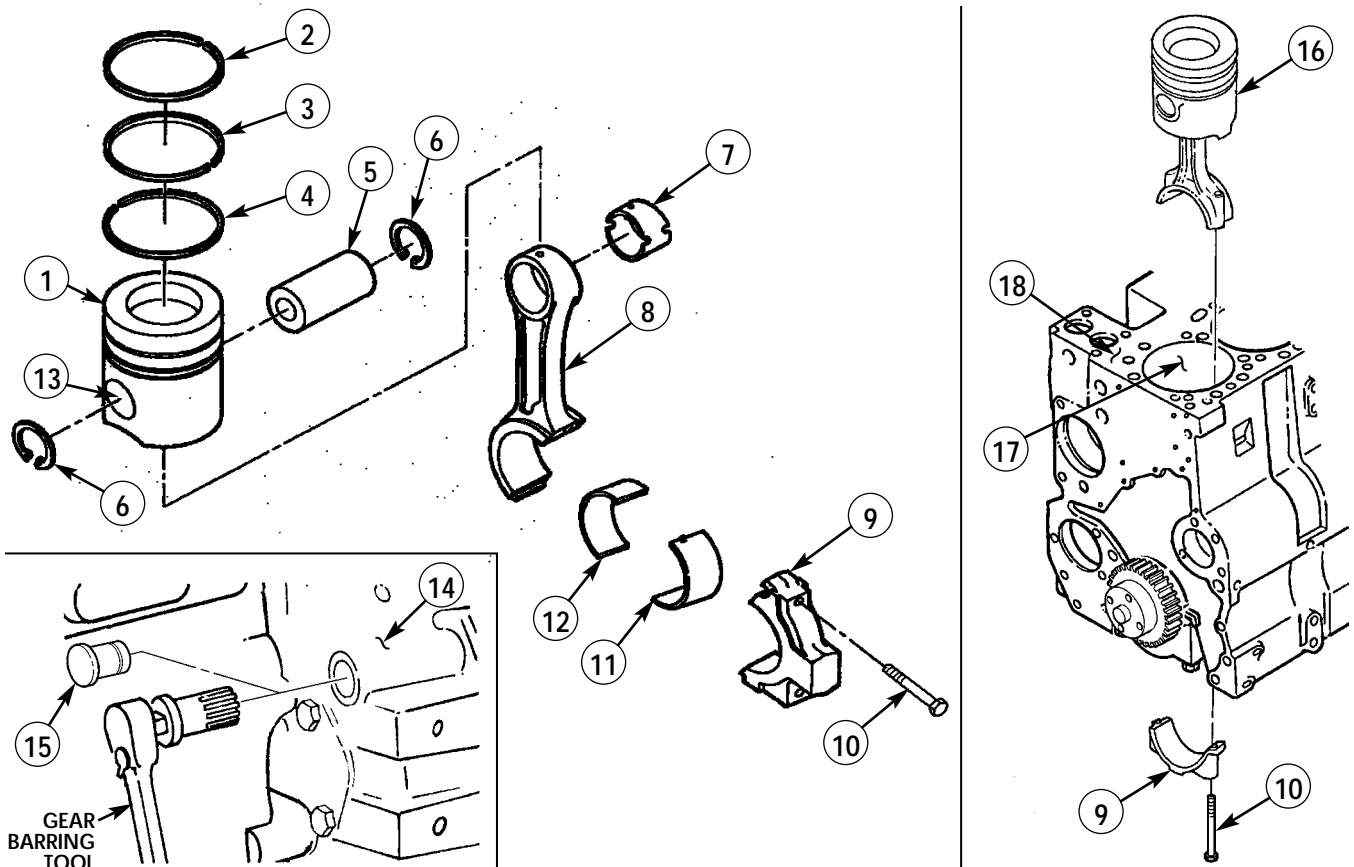
Take care when installing piston and rod assembly in cylinder bore.  
Failure to comply may result in damage to cylinder bore.

2. Position piston and rod assembly (16) in cylinder bore (17).
3. Push piston and rod assembly (16) into cylinder bore (17) until top of piston and rod assembly (16) is approximately 2 in. (5 cm) below neck or contacts crankshaft.
4. Apply coat of engine oil to threads of screws (10).

#### **NOTE**

Rotate engine horizontally to install piston and connecting rod assembly.

5. Install rod cap (9) on piston and rod assembly (16) with screws (10).
  - a. Tighten screws (10) to 26 lb-ft (35 N·m).
  - b. Tighten screws (10) to 51 lb-ft (70 N·m).
  - c. Tighten screws (10) to 73 lb-ft (100 N·m).
6. Install oil pan and suction tube (WP 0154 00).
7. Install gear housing cover (WP 0155 00).
8. Install cylinder head (WP 0101 00).
9. Install engine (WP 0115 00).



END OF WORK PACKAGE



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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE OIL PUMP MAINTENANCE

REMOVAL, DISASSEMBLY, CLEANING AND INSPECTION, ASSEMBLY, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Chamfer/Straightedge (item 3, WP 0172 00)

##### Materials/Parts

Engine oil (item 6, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Coolant reservoir and hoses removed  
(WP 0066 00).  
Belt guard removed (WP 0085 00).  
Engine drivebelt removed (WP 0086 00).  
Gear housing cover removed (WP 0155 00).

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## ENGINE OIL PUMP MAINTENANCE (Contd)

### **NOTE**

The engine oil pumps on both engines are replaced the same way. This procedure covers the replacement of one engine oil pump.

### REMOVAL

Remove four screws (5) and oil pump (1) from cylinder block (2).

### DISASSEMBLY

### **NOTE**

Mark oil pump back plate during removal to assist with installation.

Remove oil pump back plate (6), gerotor planetary (8), and gerotor drive (7) from oil pump (1).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Inspect oil pump gear (4) and idler gear (3) for chips, cracks, or excessive wear. Replace oil pump (1) if gears are chipped, cracked, or excessively worn.
3. Inspect oil pump back plate (6) for excessive wear or damage. Replace oil pump (1) if oil pump back plate (6) is excessively worn or damaged.
4. Inspect oil pump (1) and gerotor drive (7) for excessive wear or damage. Replace oil pump (1) if gerotor drive (7) or oil pump (1) are excessively worn or damaged.

### **WARNING**

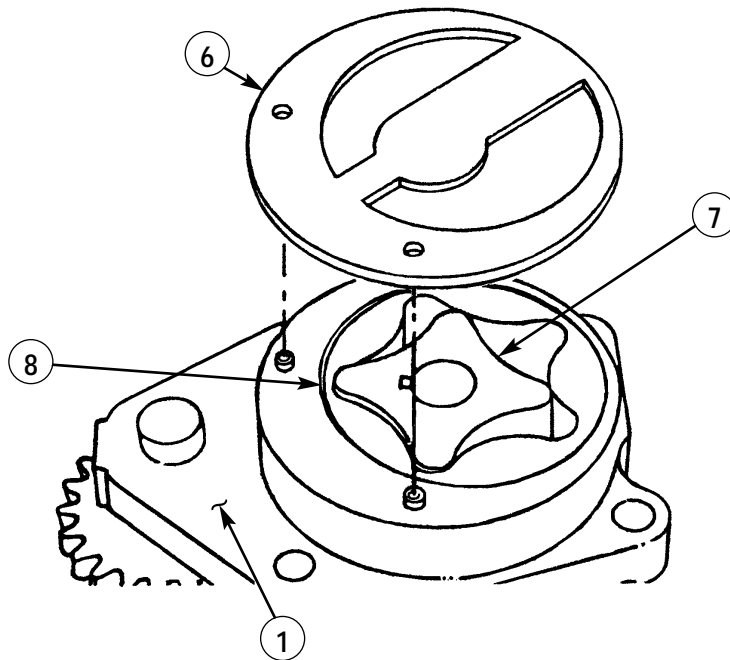
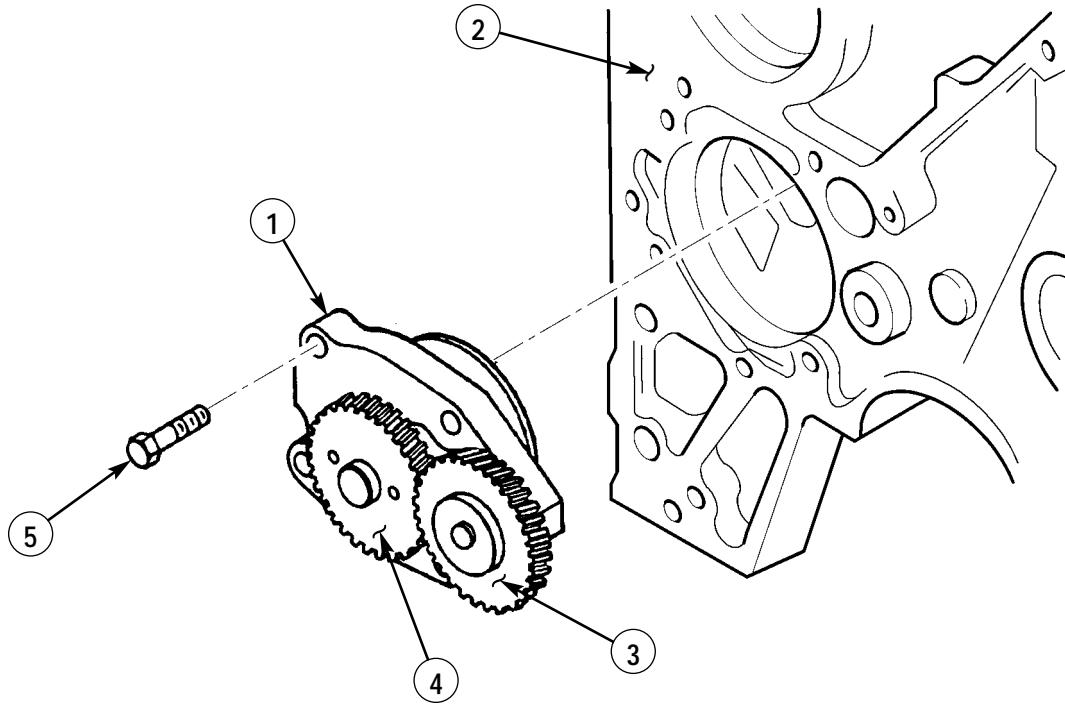
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

5. Clean all parts with Skysol 100 and dry with compressed air.
6. Install gerotor planetary (8) on gerotor drive (7).

ENGINE OIL PUMP MAINTENANCE (Contd)



## ENGINE OIL PUMP MAINTENANCE (Contd)

### CLEANING AND INSPECTION (Contd)

#### **NOTE**

The feeler gauge must be on the outside diameter and down.

7. Using feeler gauge, measure tip clearance between the gerotor drive (7) and gerotor planetary (8). For measurements, refer to table 1, Engine Oil Pump Wear Limits. Replace oil pump (1) if worn past limits.
8. Using straightedge and feeler gauge, measure chamfer of gerotor drive (7) and gerotor planetary (8) to body bore (9). For measurements, refer to table 1, Engine Oil Pump Wear Limits. Replace oil pump (1) if worn past limits.
9. Using feeler gauge, measure clearance of gerotor planetary (8) to body bore (9). For measurements, refer to table 1, Engine Oil Pump Wear Limits. Replace oil pump (1) if worn past limits.
10. Using dial indicator, measure backlash of idler gear (3) and oil pump drive gear (4). For measurements, refer to table 1, Engine Oil Pump Wear Limits. Replace oil pump (1) if worn past limits.

**Table 1. Engine Oil Pump Wear Limits.**

ITEM NO.	ITEM/POINT OF MEASUREMENT	WEAR LIMITS/CLEARANCE	
		INCHES	MILLIMETERS
7, 8	Tip Clearance	0.007	0.1778
7, 8, 9	Gerotor Drive/Gerotor Planetary to Chamfer	0.005	0.127
8, 9	Gerotor Planetary to Body Bore	0.015	0.381
3, 4	Gear Backlash	0.003–0.015	0.080–0.381

### ASSEMBLY

Install oil pump back plate (6), gerotor planetary (8), and gerotor drive (7) on oil pump (1).

### INSTALLATION

1. Lubricate oil pump (1) with engine oil.

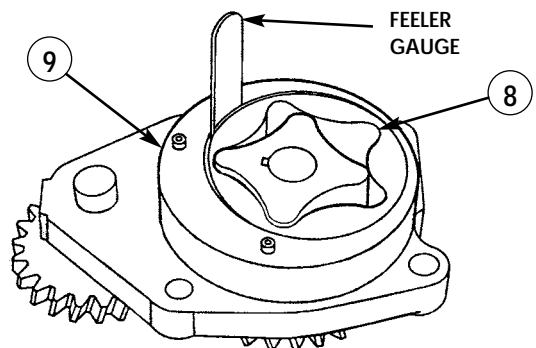
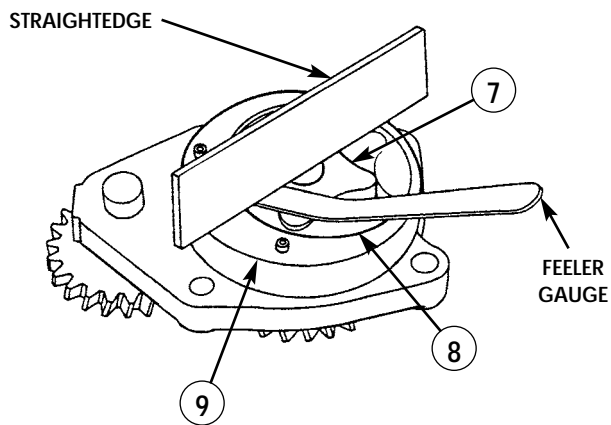
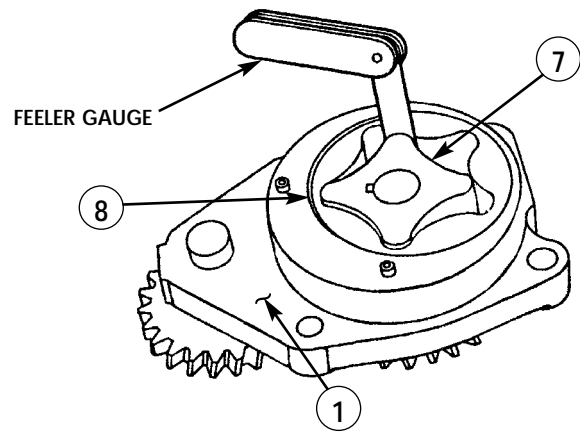
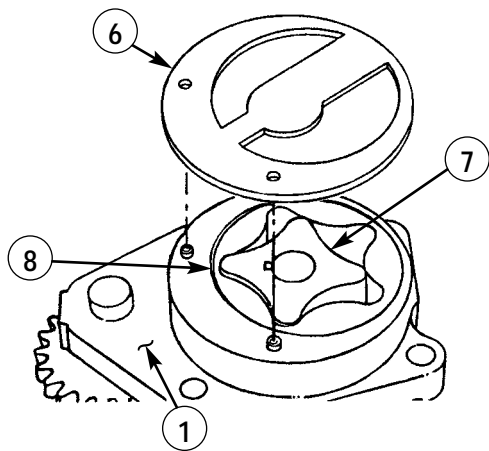
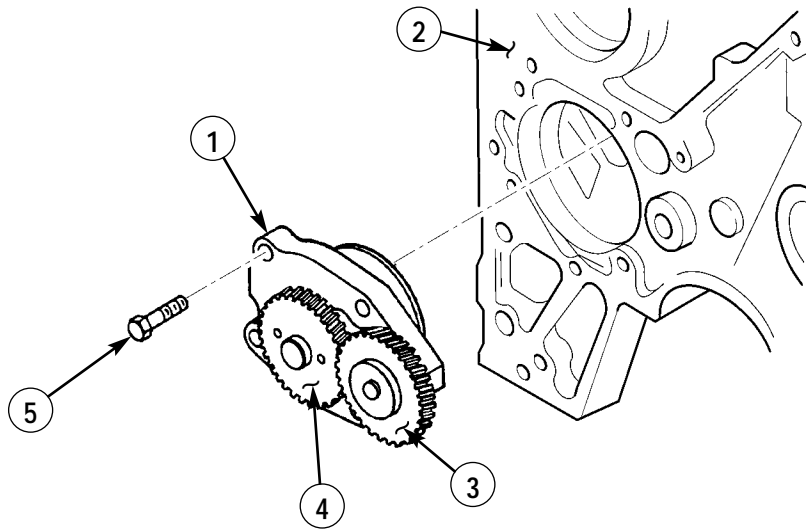
#### **CAUTION**

Ensure idler gear pin is installed in the locating bore in the cylinder block. Failure to comply may result in damage to equipment.

2. Install oil pump (1) on cylinder block (2) with four screws (5).
  - a. Tighten screws (5) to 44 lb-in (5 N·m) in star pattern.
  - b. Tighten screws (5) to 18 lb-ft (24 N·m) in star pattern.
3. Install gear housing cover (WP 0155 00).
4. Install engine drivebelt (WP 0086 00).
5. Install belt guard (WP 0085 00).
6. Install coolant reservoir and hoses (WP 0066 00).
7. Close engine hatches (TM 5-1940-322-10).



### ENGINE OIL PUMP MAINTENANCE (Contd)



END OF WORK PACKAGE



## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### OIL PAN, SUCTION TUBE, AND SUCTION TUBE BRACKET MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Sling (item 44, WP 0172 00)  
Engine stand (item 45, WP 0172 00)  
Lifting device

##### Materials/Parts

Gasket (item 45, WP 0173 00)  
Gasket (item 46, WP 0173 00)  
Antifreeze (item 5, WP 0171 00)  
Cap and plug set (item 7, WP 0171 00)  
Cloth (item 8, WP 0171 00)  
Engine oil (item 16, WP 0171 00)  
Gasket forming compound  
(item 13, WP 0171 00)  
Sealing compound (item 35, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)  
Transmission oil (item 19, WP 0171 00)

##### Personnel Required

Three

##### References

WP 0013 00

##### Equipment Condition

Boat out of water on IBC or blocks  
(TM 5-1940-322-10).  
Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Engine oil, transmission oil, and coolant drained  
(WP 0012 00).  
Fuel plumbing disconnected (WP 0073 00).  
Keel cooler plumbing disconnected  
(WP 0069 00).  
Throttle control cable removed (WP 0033 00).  
Transmission control cable removed  
(WP 0037 00).  
Engine wiring harness disconnected  
(WP 0083 00).  
Starter relay cables removed (WP 0098 00)  
Starter cables removed (WP 0099 00).  
Aft cockpit removed (WP 0016 00).  
Exhaust removed (WP 0050 00).  
Engine removed (WP 0115 00).  
Transmission removed (WP 0125 00).

## OIL PAN, SUCTION TUBE, AND SUCTION TUBE BRACKET MAINTENANCE (Contd)

### **WARNING**

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

Lifting device and chains must have a weight capacity greater than 1,250 lbs (567.0 kg) of the engine and transmission. Failure to do so may cause injury to personnel and/or damage to equipment.

Do not detach lifting device from engine until all engine weight is equally distributed and engine is stable. An improperly supported engine may cause injury to personnel.

### **CAUTION**

Cap or plug all hoses, connections, and openings immediately after disconnection to prevent contamination. Remove caps or plugs prior to installation. Failure to do so may result in damage to equipment.

### **NOTE**

The oil pans, suction tubes, and suction tube brackets on both engines are replaced the same way. This procedure covers the replacement of one oil pan, suction tube, and suction tube bracket.

Tag all electrical leads and hoses during removal to assist with installation.

### REMOVAL

1. Remove thirty-six screws (4), oil pan (1), and gasket (2) from cylinder block (3). Discard gasket (2).
2. Remove two screws (6), nut (8), screw (10), and bracket (9) from cylinder block (3).

### **NOTE**

Note position of suction tube during removal to assist with installation.

3. Remove two screws (6), suction tube (5), and gasket (7) from cylinder block (3). Discard gasket (7).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

## OIL PAN, SUCTION TUBE, AND SUCTION TUBE BRACKET MAINTENANCE (Contd)

### CLEANING AND INSPECTION (Contd)

#### **WARNING**

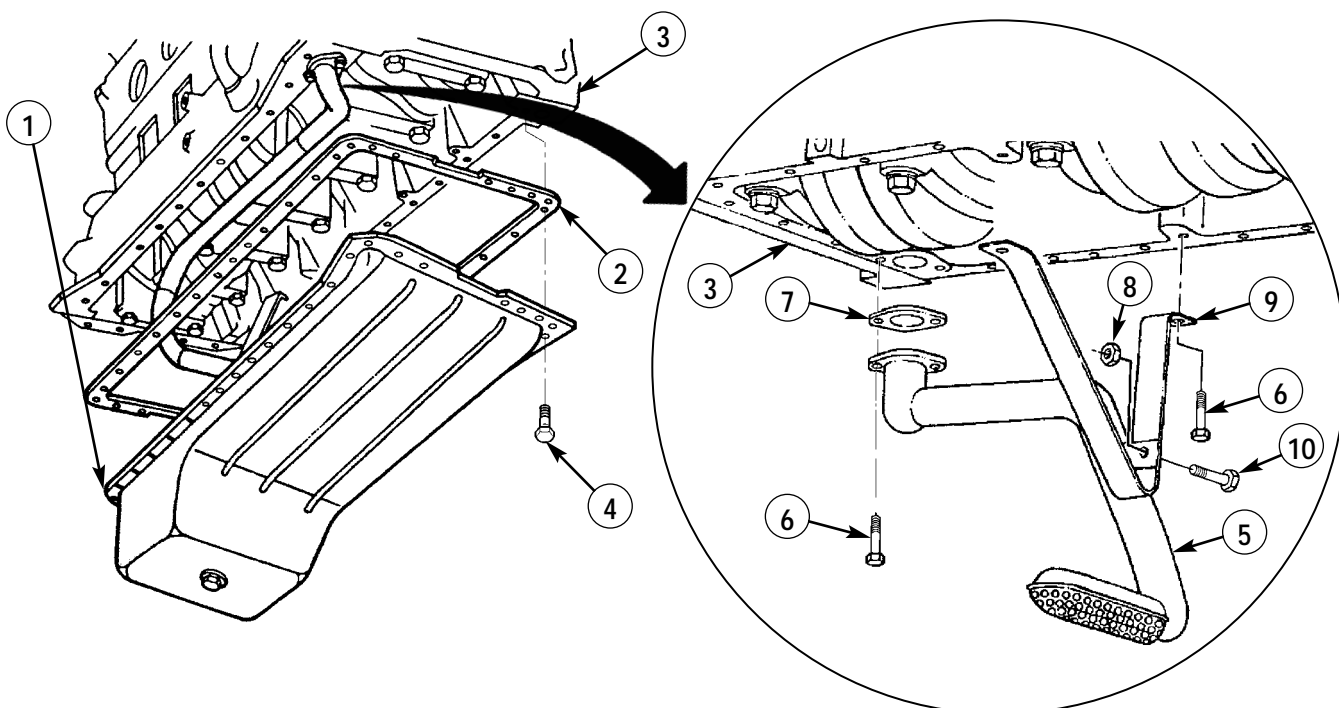
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

#### **CAUTION**

When cleaning with Skysol 100, ensure solvent does not enter cylinder bore. Failure to comply may result in damage to equipment.

2. Clean excess gasket material from cylinder block (3) and oil pan (1) with Skysol 100 and dry with cloth.



## OIL PAN, SUCTION TUBE, AND SUCTION TUBE BRACKET MAINTENANCE (Contd)

### INSTALLATION

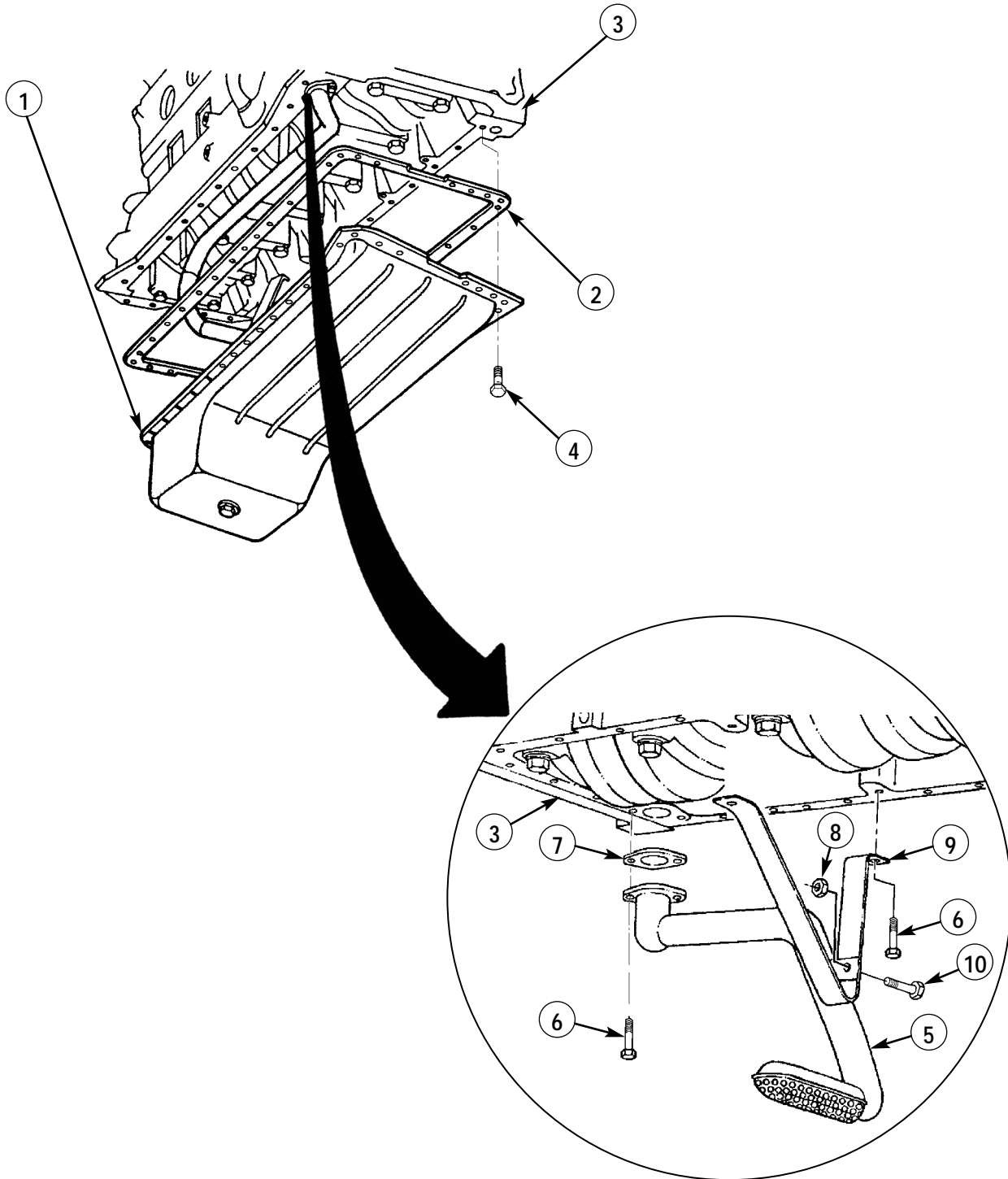
1. Apply coat of gasket forming compound to both sides of new gasket (7).
2. Install new gasket (7) and suction tube (5) on cylinder block (3) with two screws (6). Tighten screws (6) to 18 lb-ft (24 N·m).
3. Install bracket (9) on suction tube (5) and cylinder block (3) with two screws (6), screw (10), and nut (8). Tighten screws (6) to 18 lb-ft (24 N·m).

#### **NOTE**

Apply coat of sealing compound filling the joints between the pan rail, gear housing, and rear cover.

4. Apply light coat of gasket forming compound around edge of cylinder block (3) and new gasket (2).
5. Install new gasket (2) and oil pan (1) on cylinder block (3) with thirty-six screws (4). Tighten screws (4) to 18 lb-ft (24 N·m).
6. Install transmission (WP 0125 00).
7. Install engine (WP 0115 00).
8. Install exhaust (WP 0050 00).
9. Install starter cables (WP 0099 00).
10. Install starter relay cables (WP 0098 00).
11. Connect engine wiring harness (WP 0083 00).
12. Install transmission control cable (WP 0037 00).
13. Install throttle control cable (WP 0036 00).
14. Connect keel cooler plumbing (WP 0069 00).
15. Connect fuel plumbing (WP 0073 00).
16. Connect battery ground cables (WP 0054 00).
17. Fill engine oil, transmission oil, and coolant (WP 0012 00).
18. Start engine and check for leaks (TM 5-1940-322-10).
19. Install aft cockpit (WP 0016 00).
20. Close engine hatches (TM 5-1940-322-10).
21. Close battery hatch (TM 5-1940-322-10).

OIL PAN, SUCTION TUBE, AND SUCTION TUBE BRACKET MAINTENANCE (Contd)



END OF WORK PACKAGE





## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FRONT GEAR HOUSING COVER, CRANKSHAFT FRONT SEAL, AND FRONT GEAR HOUSING MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Lifting device

##### References

WP 0013 00  
WP 0102 00  
WP 0111 00  
WP 0158 00

##### Materials/Parts

Front seal service kit (item 17, WP 0173 00)  
Gasket (item 47, WP 0173 00)  
Gasket (item 48, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
Detergent (item 11, WP 0171 00)  
Engine oil (item 16, WP 0171 00)  
Gasket-forming compound  
(item 13, WP 0171 00)  
Sealing compound (item 34, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Engine removed (WP 0115 00).  
Belt guard removed (WP 0085 00).  
Drivebelt removed (WP 0086 00).  
Belt tensioner removed (WP 0087 00).

##### Personnel Required

Two

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## FRONT GEAR HOUSING COVER, CRANKSHAFT FRONT SEAL, AND FRONT GEAR HOUSING MAINTENANCE (Contd)

### **WARNING**

All personnel must stand clear during lifting operations. A swinging or shifting load may cause injury to personnel.

Two personnel or a suitable lifting device is required for removal and installation. Failure to comply may cause injury to personnel and/or damage to equipment.

### **NOTE**

The front seal, housing cover, and housing, on both engines are replaced the same way. This procedure covers the replacement of one front seal, housing cover, and housing.

Tag all electrical leads and hoses during removal to assist with installation.

### REMOVAL

1. Remove sixteen screws (6), gear cover (1), and gasket (2) from gear housing (3). Discard gasket (2).

### **CAUTION**

Use caution when positioning gear cover. Failure to comply may result in damage to gear cover.

2. Position gear cover (1) front-side down. Remove seal (8) from gear cover (1). Discard seal (8).
3. Remove access cap (7) from gear cover (1).
4. Remove vibration damper (WP 0111 00).
5. Remove camshaft (WP 0158 00).
6. Remove fuel injection pump (WP 0102 00).
7. Remove four screws (11) and two screws (10) from gear housing (3) and cylinder block (9).
8. Gently pry gear housing (3) and gasket (4) from cylinder block (9). Discard gasket (4).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

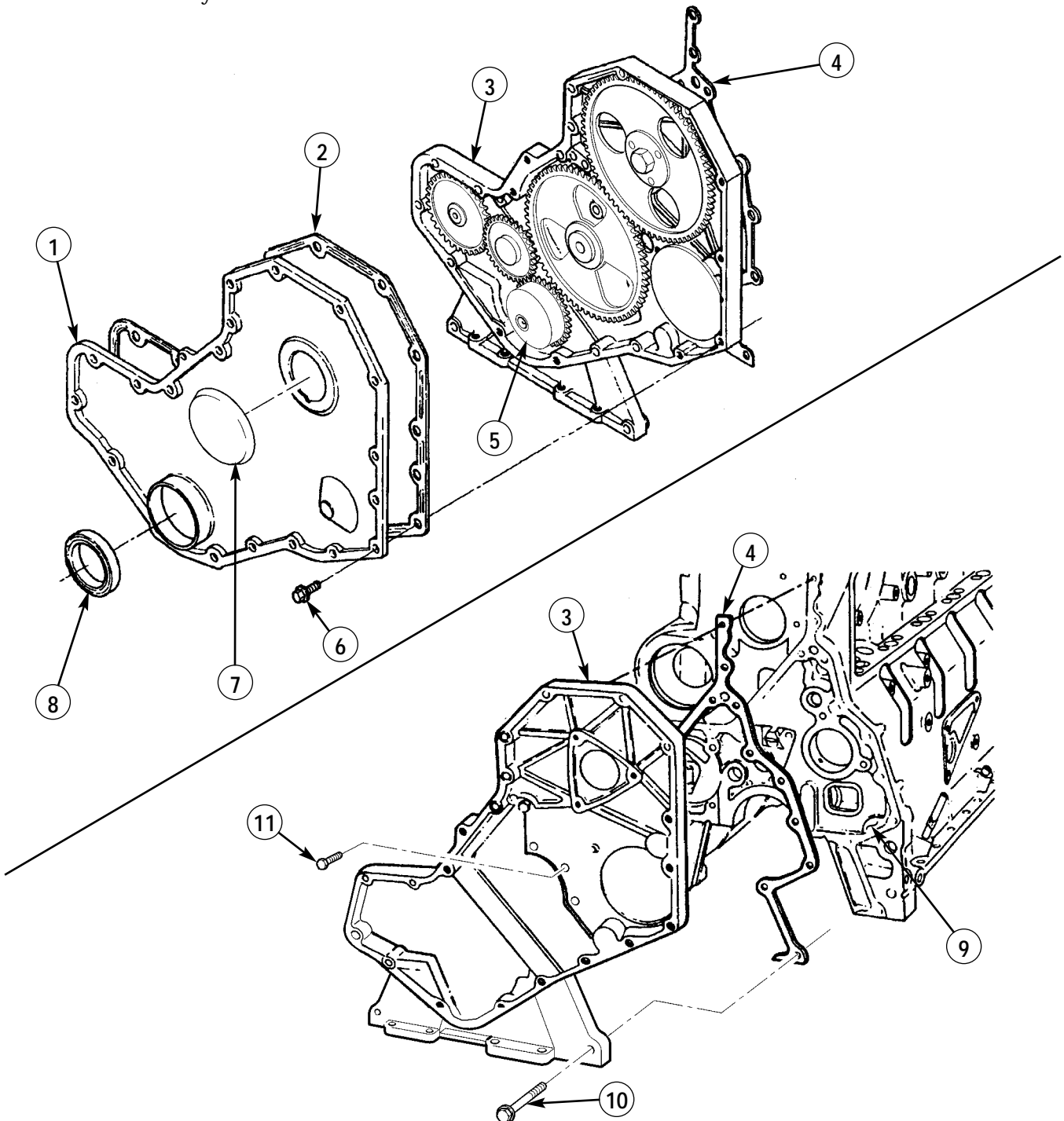
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

## FRONT GEAR HOUSING COVER, CRANKSHAFT FRONT SEAL, AND FRONT GEAR HOUSING MAINTENANCE (Contd)

### CLEANING AND INSPECTION (Contd)

2. Clean excess gasket material from gear housing (3) and gear cover (1) with Skysol 100 and dry with cloth.
3. Thoroughly clean front seal area of crankshaft (5) with detergent and water solution and dry with cloth.
4. Clean excess gasket material from cylinder block (9) and gear housing (3) with detergent and water solution and dry with cloth.



## FRONT GEAR HOUSING COVER, CRANKSHAFT FRONT SEAL, AND FRONT GEAR HOUSING MAINTENANCE (Contd)

### INSTALLATION

1. Apply coat of gasket-forming compound on both sides of new gasket (4).

#### **NOTE**

Assistant will help with step 2 to support housing.

2. Install new gasket (4) and gear housing (3) on engine (9) with four screws (11) and two screws (10). Tighten screws (11) and (10) to 18 lb-ft (24 N·m).
3. Install camshaft (WP 0158 00).
4. Install fuel injection pump (WP 0102 00).
6. Apply coat of gasket-forming compound on both sides of new gasket (2), gasket surfaces of gear cover (1), and gear housing (3).
7. Install new gasket (2) and gear cover (1) on gear housing (3) with sixteen screws (6). Do not tighten screws (6).

#### **CAUTION**

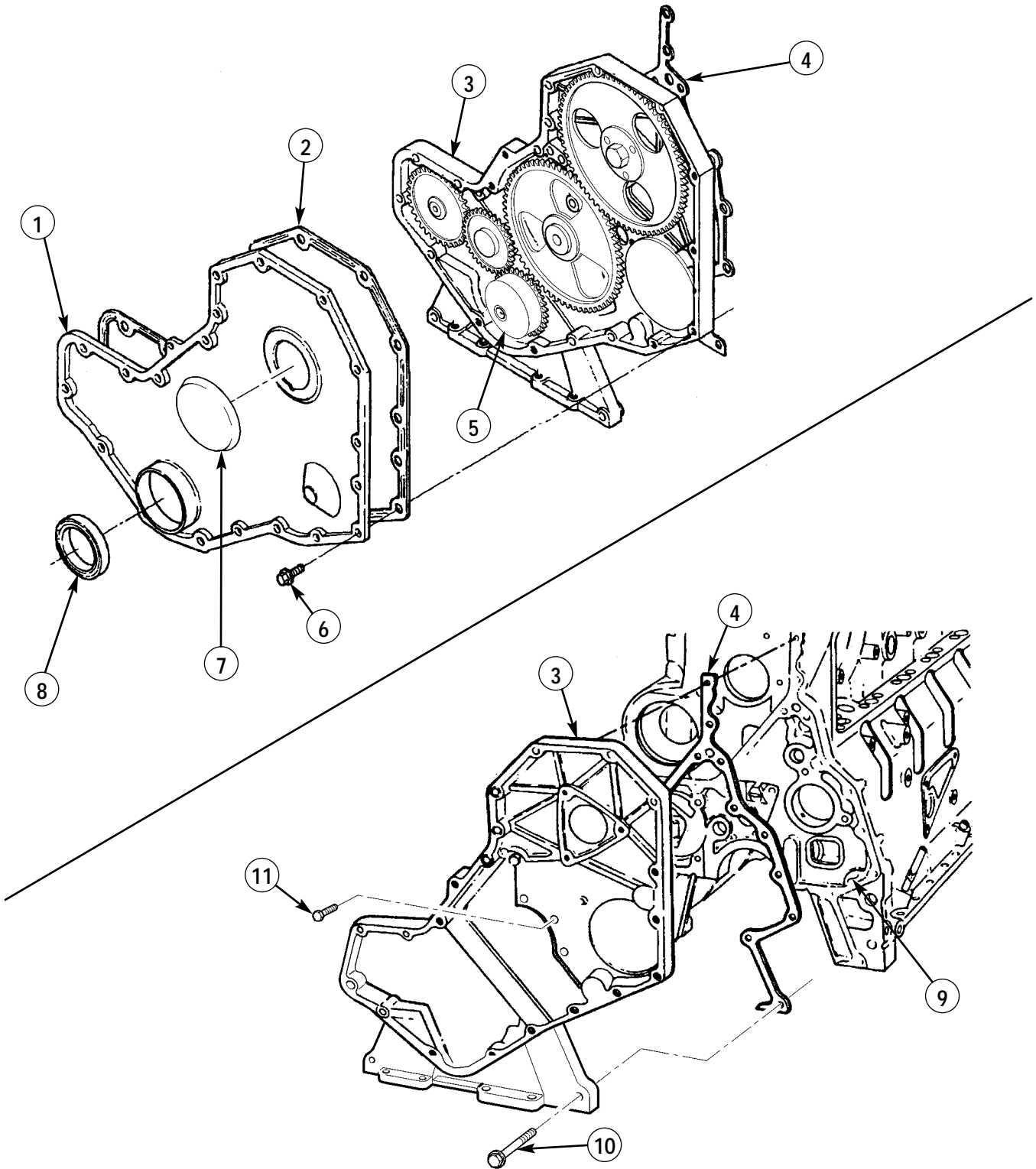
The seal pilot is included in the front seal service kit. Always use a seal pilot when installing the front seal. Failure to comply may result in damage to equipment.

#### **NOTE**

The seal pilot is also used as an alignment tool.

8. Using seal pilot, align gear cover (1) to crankshaft (5).
9. Tighten screws (6) to 18 lb-ft (24 N·m) and remove seal pilot.
10. Apply bead of sealing compound to outside diameter of seal (8).
11. Using seal pilot, install seal (8) over crankshaft (5) and position in gear cover (1). Remove seal pilot.
12. Using seal pilot and plastic hammer, drive seal (8) to correct depth by striking at 12, 3, 6, and 9 o'clock positions.
13. Install gear cover access cap (7) on gear cover (1).
14. Install vibration damper (WP 0111 00).
15. Install belt tensioner (WP 0087 00).
16. Install drivebelt (WP 0086 00).
17. Install belt guard (WP 0085 00).
18. Install engine (WP 0115 00).
19. Close engine hatches (TM 5-1940-322-10).
20. Connect battery ground cables (WP 0054 00).
21. Close battery hatch (TM 5-1940-322-10).

**FRONT GEAR HOUSING COVER, CRANKSHAFT FRONT SEAL, AND FRONT GEAR HOUSING MAINTENANCE (Contd)**



END OF WORK PACKAGE



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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Mechanical puller (item 32, WP 0172 00)  
Dial indicator (item 20, WP 0172 00)  
Lifting device

###### Materials/Parts

Bearing sleeve (item 150, WP 0173 00)  
Bearing sleeve (item 151, WP 0173 00)  
Front seal service kit (item 17, WP 0173 00)  
Engine oil (item 16, WP 0171 00)  
Lubriplate (item 20, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0013 00

###### Equipment Condition

Engine removed (WP 0115 00).  
Front gear housing removed (WP 0155 00).  
Flywheel, crankshaft rear seal and housing  
removed (WP 0157 00).  
Pistons and connecting rods removed  
(WP 0152 00).

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## CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT (Contd)

### **NOTE**

Both crankshafts and crankshaft gears are replaced the same way. This procedure covers the replacement of one crankshaft and one crankshaft gear.

### REMOVAL

### **NOTE**

Rotate engine so crankshaft faces up.

The main bearing caps should be numbered. If they are not, mark them beginning with number one at the front of the engine, and with number seven at the rear of the engine.

1. Remove fourteen bolts (1) from main bearing caps (2).

### **CAUTION**

Do not pry on the main caps to free them from the cylinder block. Failure to comply may result in damage to equipment.

2. Using two main cap bolts (1), remove main caps (2) from cylinder block (3).

### **WARNING**

Do not detach lifting device from crankshaft until all crankshaft weight is equally distributed and stable. An improperly supported crankshaft may cause injury to personnel.

3. Using lifting device, remove crankshaft (4) and crankshaft gear (8) from cylinder block (3).
4. Remove upper main bearing halves (9) and lower main bearing halves (7) from cylinder block (3) and main bearing caps (2).
5. Using mechanical puller, remove crankshaft gear (8) from crankshaft (4).
6. Using 3/16-in. pin, remove piston cooling nozzles (5) from cylinder block (3).
7. Remove ring dowels (6) from main bearing caps (2).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. Using nylon brush, clean crankshaft oil galley holes (10).

### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

3. Rinse crankshaft (4) in Skysol 100 and dry with compressed air.



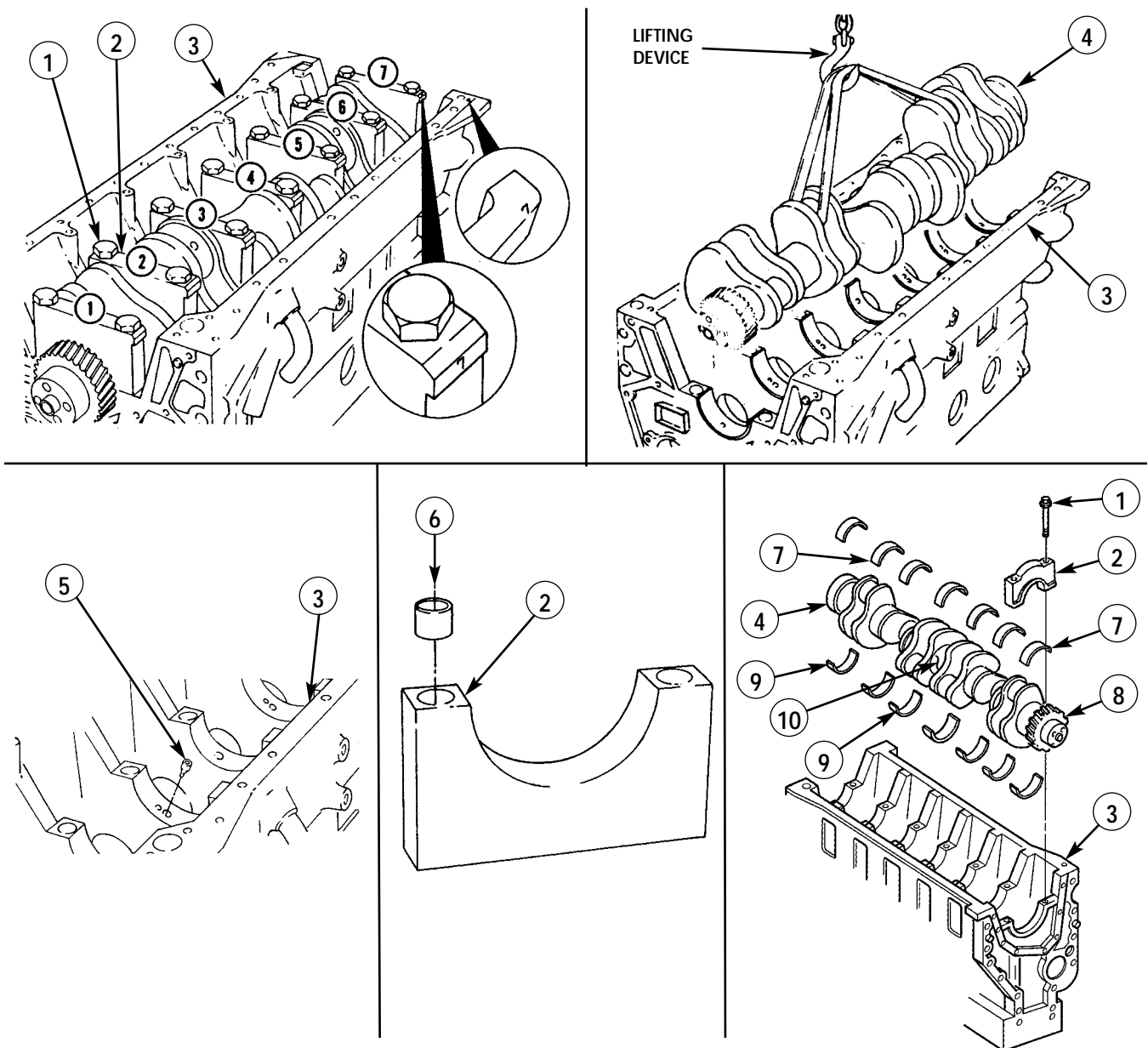
## CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT (Contd)

### CLEANING AND INSPECTION (Contd)

**NOTE**

The front and rear seal service kits will position the seal slightly deeper into the seal bore so it will contact the crankshaft at a different location. Wear sleeves may be required to provide a new contact surface for the front and rear seals. Wear sleeves are provided in the service kits.

4. Inspect front and rear seal contact areas on crankshaft (4) for scratches or grooving. Install wear sleeves in contact areas if scratches or grooving is present.
5. Inspect crankshaft (4) for deep scores, signs of overheating, and other abnormal marks. If scarred deeply, showing signs of overheating, or abnormally marked, use oversized bearings during installation.
6. Inspect ring dowel (6) for damage. If damaged, replace ring dowel (6).



## CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT (Contd)

### INSTALLATION

#### **CAUTION**

Use only hand force to push the piston cooling nozzle in place. If driven with a hammer, it will cause damage to the piston cooling nozzle.

#### **NOTE**

Install cooling nozzles even with or slightly below the saddle surface.

- Using center punch, push piston cooling nozzle (5) in cylinder block (3).

#### **CAUTION**

Ensure saddle surface is clean and dry. Failure to comply may cause engine damage.

- Install crankshaft gear (8) on crankshaft (4).
- Install upper main bearing halves (9) in cylinder block (3).
- Install upper combination thrust main bearing (10) in cylinder block (3).
- Apply coat of lubriplate to six bearings (9) and upper combination thrust main bearing (10).

#### **WARNING**

Do not detach lifting device from crankshaft until all crankshaft weight is equally distributed and stable. An improperly supported crankshaft may cause injury to personnel.

#### **CAUTION**

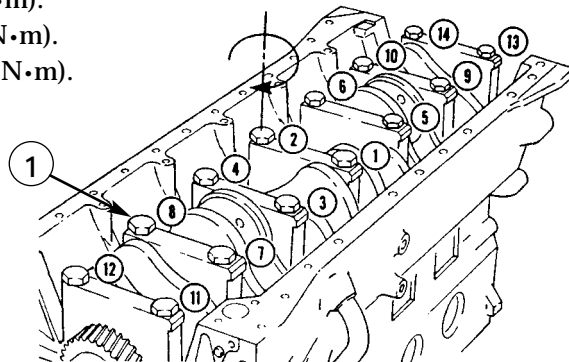
Crankshaft must be lowered on the bearings straight to prevent damage to thrust bearings.

- Using lifting device, install crankshaft (4) on six bearings (9) and upper combination thrust main bearing (10) in cylinder block (3).
- Install ring dowels (6) in main bearing caps (2).
- Install six lower main bearing halves (7) and lower combination thrust main bearing (11) in main bearing caps (2).
- Apply coat of lubriplate on lower main bearings (7) and lower combination thrust main bearing (11).

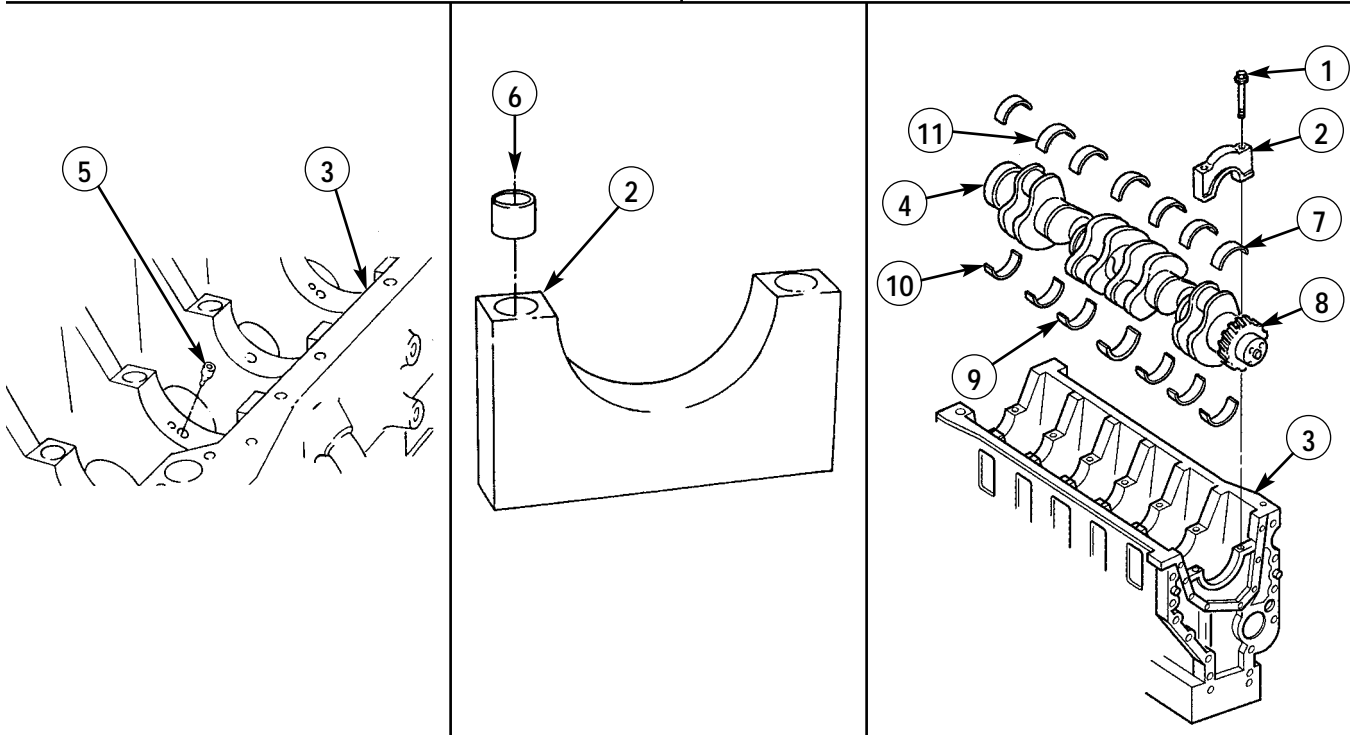
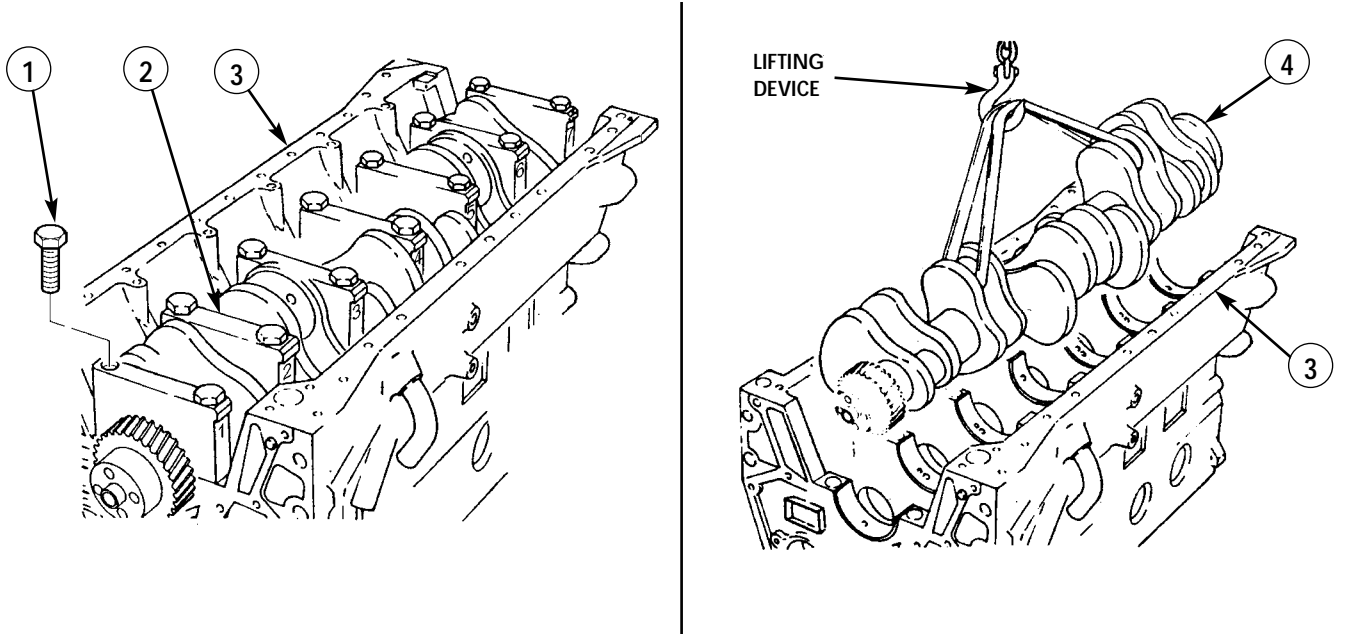
#### **NOTE**

Numbers on the main bearing caps face the oil cooler side of the engine with number one at the front of the engine.

- Apply coat of engine oil to threads of bolts (1).
- Install seven main bearing caps (2) on cylinder block (3) with fourteen bolts (1). Tighten bolts (1) evenly in sequence (shown in figure below).
  - Tighten bolts (1) in sequence to 44 lb-ft (60 N·m).
  - Tighten bolts (1) in sequence to 88 lb-ft (119 N·m).
  - Tighten bolts (1) in sequence to 129 lb-ft (176 N·m).



CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT (Contd)



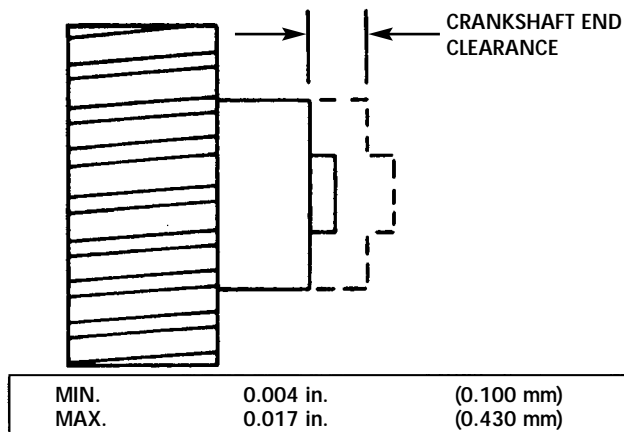
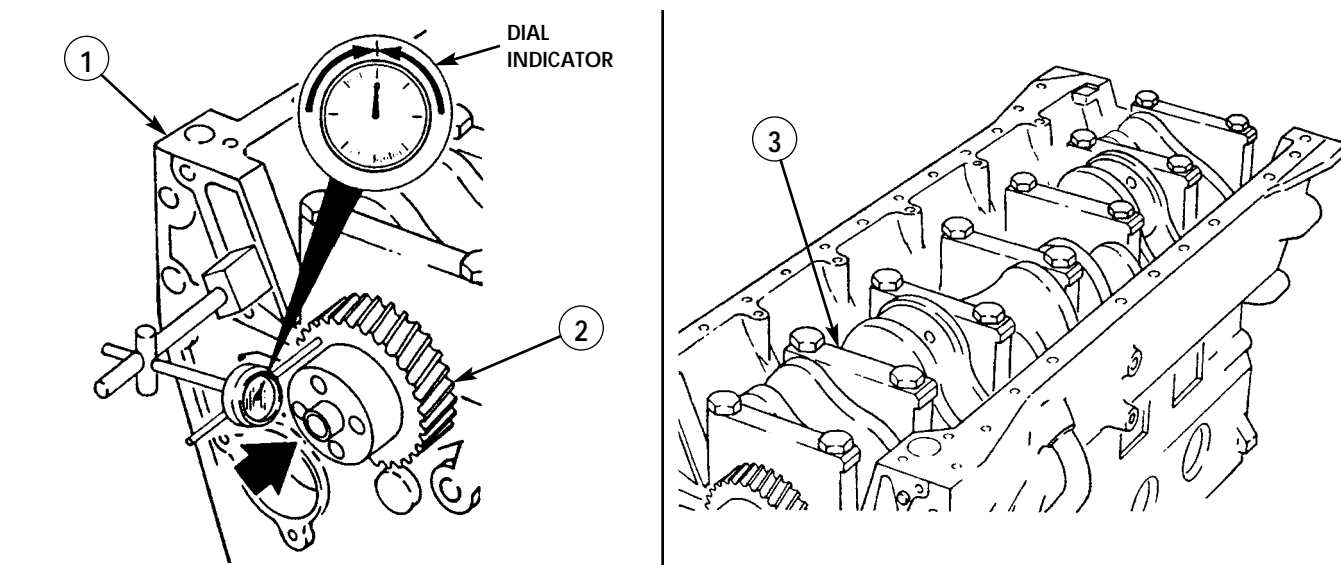
## CRANKSHAFT AND CRANKSHAFT GEAR REPLACEMENT (Contd)

### INSTALLATION (Contd)

#### NOTE

Perform steps 12 through 14 if the crankshaft does not rotate easily.

12. Turn crankshaft gear (2) 360° to determine that it will rotate freely.
13. Check main bearing caps (3) and/or bearing sizes if the crankshaft gear (2) does not turn easily.
14. Push crankshaft gear (2) towards one end of its thrust.
15. Using dial indicator, zero indicator and push crankshaft gear (2) towards other end of its thrust and record crankshaft end clearance.
16. Ensure crankshaft end clearance meets specifications. See figure below for crankshaft end clearance.
17. Install pistons and connecting rods (WP 0152 00).
18. Install flywheel, crankshaft rear seal and housing (WP 0157 00).
19. Install front gear housing (WP 0155 00).
20. Install engine (WP 0115 00).



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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE

FLYWHEEL REMOVAL, FLYWHEEL HOUSING REMOVAL, CRANKSHAFT REAR SEAL REMOVAL,  
CLEANING AND INSPECTION, MEASUREMENT, CRANKSHAFT REAR SEAL INSTALLATION,  
FLYWHEEL HOUSING INSTALLATION, AND FLYWHEEL INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)  
Two T-bar pullers (item 32, WP 0172 00)  
Crack detection kit (item 56, WP 0172 00)  
Indicator dial (item 57, WP 0172 00)  
Dial indicator adapter (item 58, WP 0172 00)  
Sling  
Lifting device  
Two M12 x 1.25 x 90-mm guide pins  
Parts cleaning brush

##### Materials/Parts

Rear seal service kit (item 126, WP 0173 00)  
Gasket (item 165, WP 0173 00)  
Seal (item 166, WP 0173 00)  
Cloth (item 5, WP 0171 00)  
Cleaning pad (item 23, WP 0171 00)

##### Materials/Parts (Contd)

Lubriplate (item 20, WP 0171 00)  
Oil (item 17, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)  
Crocus cloth (item 9, WP 0171 00)

##### References

WP 0013 00  
WP 0054 00  
WP 0099 00  
WP 0154 00  
WP 0158 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Transmission removed (WP 0125 00).  
Transmission adapter plate removed  
(WP 0120 00).  
Transmission driveplate removed (WP 0121 00).

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## FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)

### **NOTE**

Both flywheels, crankshaft rear seals, and housings are replaced the same way. This procedure covers the replacement of one flywheel, crankshaft rear seal, and housing.

### FLYWHEEL REMOVAL

#### **NOTE**

Use the gear barring tool to hold the flywheel, preventing rotation.

1. Remove two screws (6) 180° apart from flywheel (2).
2. Install two guide pins (5) in flywheel (2) where screws (6) were removed.
3. Determine screw thread design and size, and install two T-handles (1) in flywheel (2).
4. Remove six remaining screws (6) from flywheel (2).
5. Position sling and lifting device around T-handles (1) to support flywheel (2) during lifting operations.
6. Using sling and lifting device, remove flywheel (2) from guide pins (5) and flywheel housing (3).
7. Remove two guide pins (5) from flywheel housing (3).

### FLYWHEEL HOUSING REMOVAL

1. Remove battery ground cables (WP 0054 00).
2. Remove starter (WP 0099 00).
3. Remove four screws (7) securing top of motor mount (8) on cylinder block (4).
4. Repeat step 3 for other rear motor mount.

#### **CAUTION**

Ensure flywheel housing is supported during removal.

5. Remove eight screws (9) from flywheel housing (3).
6. Using rubber hammer, strike flywheel housing (3) to loosen it from cylinder block (4).
7. Remove flywheel housing (3) and seal (10) from cylinder block (4). Discard seal (10).

### CRANKSHAFT REAR SEAL REMOVAL

#### **CAUTION**

If the crankshaft seal has worn a groove in the crankshaft flange, a wear sleeve must be installed to prevent oil leakage.

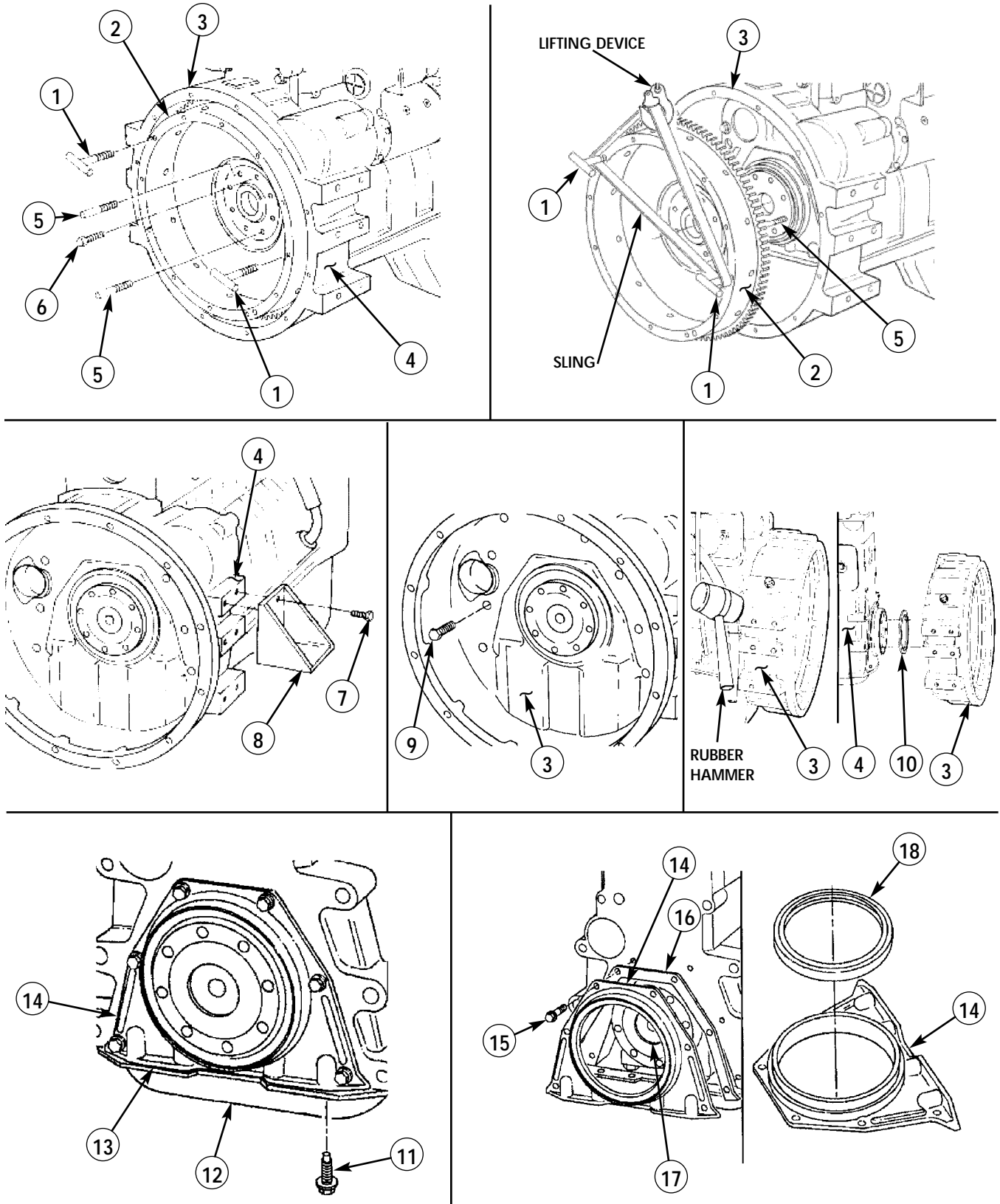
1. Loosen four screws (11) four revolutions.

#### **CAUTION**

Use extreme caution when releasing the oil pan gasket from the rear cover. Failure to comply may result in damage to the oil pan gasket.

2. Remove four screws (11) securing oil pan (12) to rear cover (14).
3. Insert feeler gauge or shim stock between rear cover (14) and oil pan gasket (13). Move feeler gauge or shim stock back and forth to release oil pan gasket (13) from rear cover (14).
4. Inspect edges of gasket (13) for damage. If damaged, oil pan must be removed and gasket replaced (WP 0154 00).
5. Remove six screws (15), rear cover (14), and gasket (16) from crankshaft flange (17). Discard gasket (16).
6. Remove seal (18) from rear cover (14). Discard seal (18).

FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)



## FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

#### **CAUTION**

The seal lip and the sealing surface on the crankshaft must be free from all oil residue to reduce the possibility of seal leaks.

2. Clean the rear crankshaft sealing surface (1) with Skysol 100 and dry with compressed air.
3. Using crocus cloth, remove any rust or other deposits from crankshaft flange (4).
4. Use clean cloth to clean crankshaft flange (4).
5. Inspect crankshaft flange (4) for dirt and nicks. Clean if dirt is present; replace crankshaft flange (4) if nicked.
6. Inspect rear cover (2) for cracks and other damage. Replace rear cover (2) if cracked or damaged.
7. Using wire brush, clean crankshaft pilot bore (3).
8. Clean flywheel (5) with Skysol 100 and dry with compressed air.

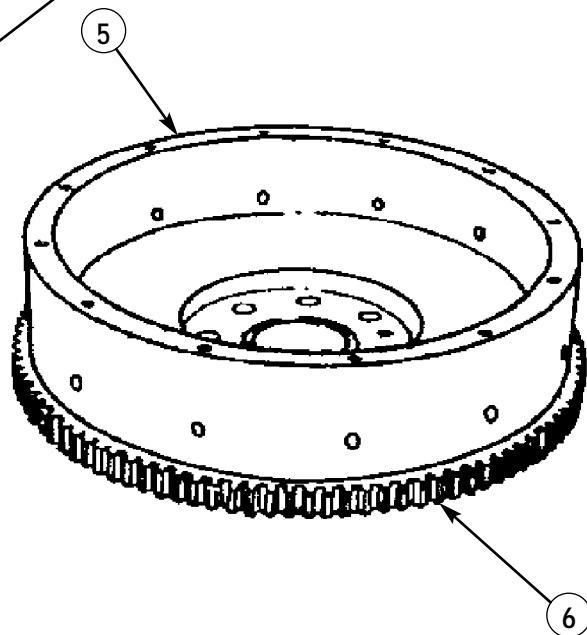
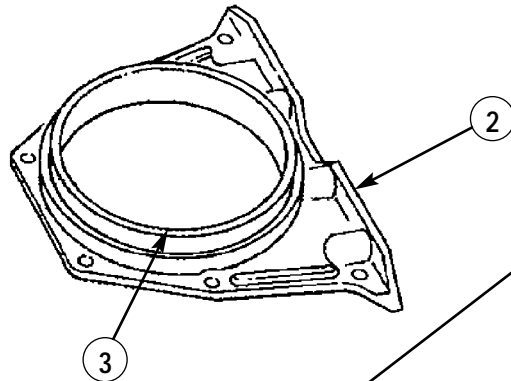
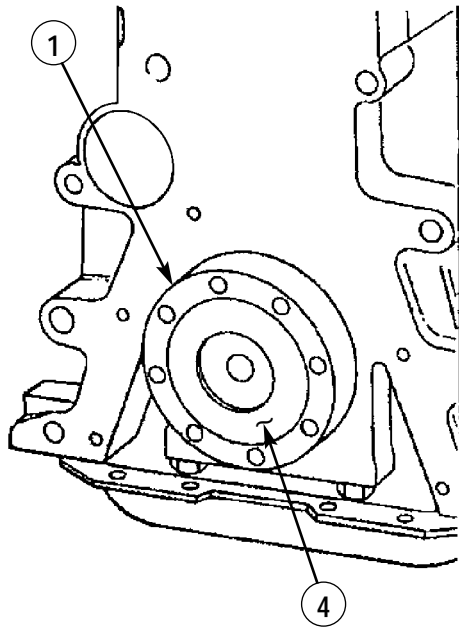
#### **WARNING**

Do not use a cracked or resurfaced flywheel. Failure to comply may result in injury to personnel and/or damage to equipment.

9. Inspect flywheel (5) for nicks and burrs. Clean flywheel (5) with cleaning pad if burrs or nicks are present.
10. Using crack detection kit, check for cracks in flywheel (5). Replace flywheel (5) if cracked or damaged.
11. Inspect flywheel ring gear teeth (6) for cracks and chips. Replace flywheel ring gear (6) if teeth are cracked, chipped, or broken (WP 0158 00).



FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)



## FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)

### MEASUREMENT

1. Install flywheel housing (2) on cylinder block (3) with eight screws (1).
2. Install two T-handles (4) on flywheel (5).
3. Position sling and lifting device around T-handles (4) to support flywheel (5) during lifting operations.
4. Install two guide pins (7) in flywheel housing (2) 180° apart.
5. Using sling and lifting device, install flywheel (5) on guide pins (7) and flywheel housing (2).
6. Install six screws (8) in vacant holes in flywheel (5). Do not tighten screws (8).
7. Remove two guide pins (7) from flywheel (5) and flywheel housing (2), and install two remaining screws (8) in flywheel (5) and flywheel housing (2). Tighten all screws (8) to 101 lb-ft (137 N·m) in star pattern.
8. Using gear barring tool, rotate crankshaft (6) one complete revolution.
9. Using dial indicator and dial indicator adapter, measure flywheel bore (9) and flywheel face surface (10) run-out. Total Indicator Reading (TIR) must not exceed 0.0050 in. (0.127 mm).
10. If TIR is greater than specifications, remove flywheel (5) as shown in removal procedure and inspect for dirt, damage, or out-of-roundness.
11. Inspect crankshaft (6) for dirt or damage.
12. Perform steps 4 through 11 to re-install flywheel (5) and re-inspect bore run-out. Replace flywheel (5) if bore run-out does not meet specifications.
13. Install contact tip of indicator (11) against flywheel face surface (10), as close to outside diameter as possible, to inspect face run-out.

### NOTE

Push the flywheel forward to remove the crankshaft end clearance.  
Adjust the dial on the indicator until the needle points to zero.

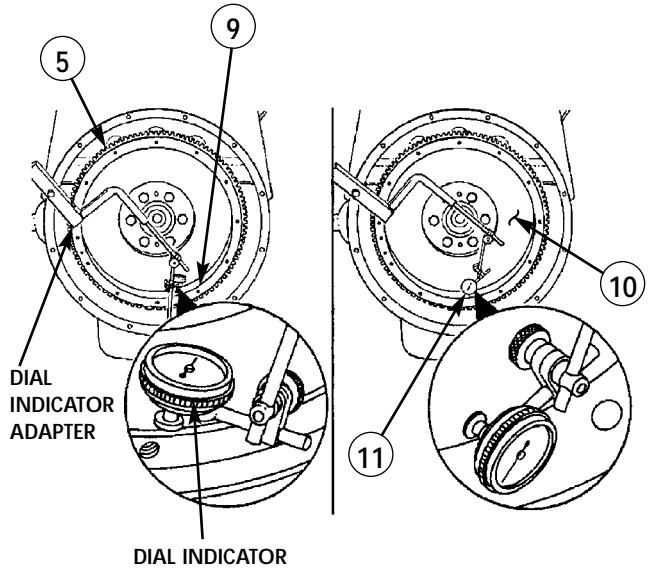
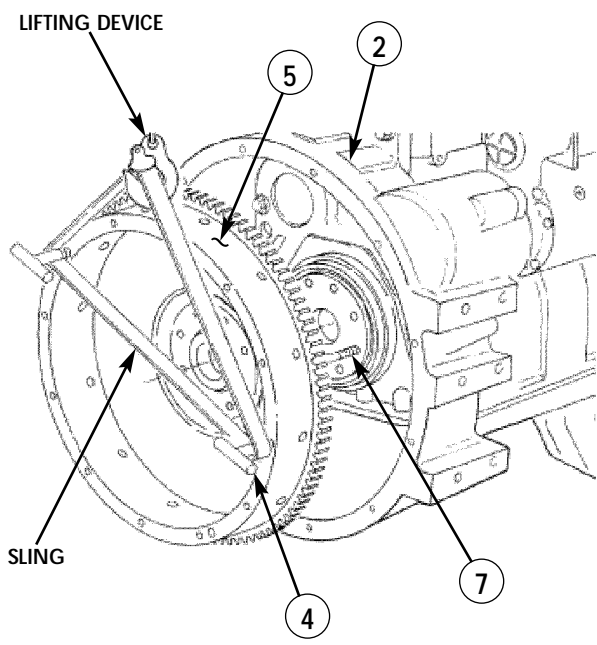
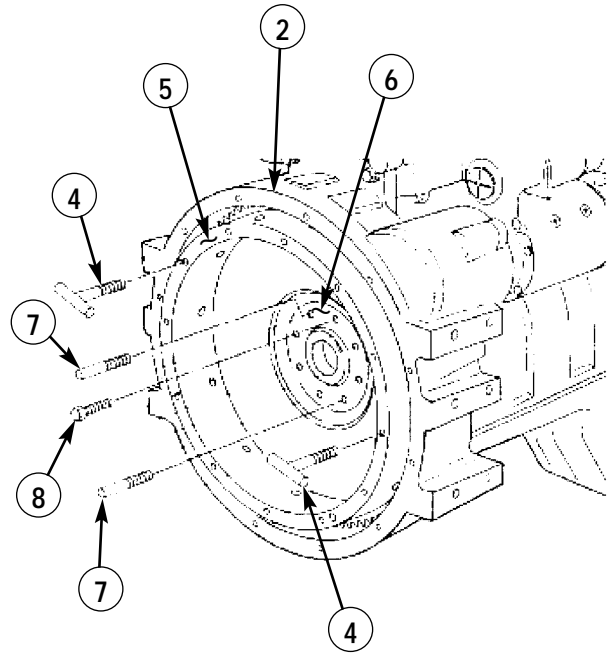
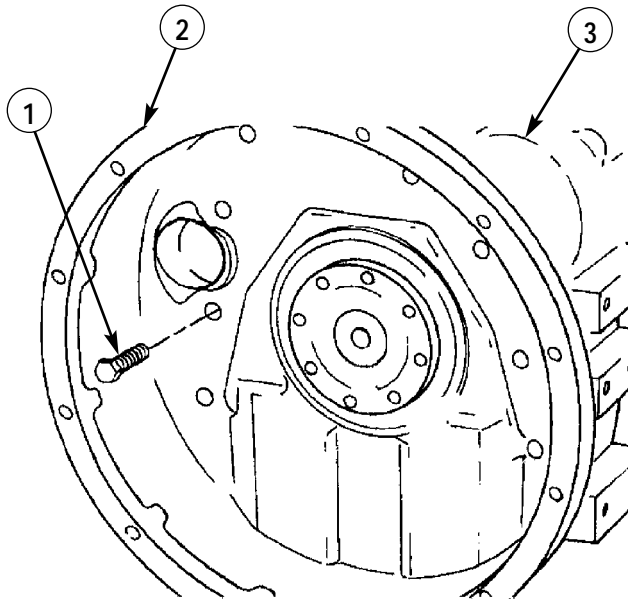
14. Using gear barring tool, rotate crankshaft (6) one complete revolution. Measure flywheel (5) run-out at four equal points on flywheel (5).
15. Using dial indicator, measure flywheel (5) run-out. Refer to Table 1, Flywheel Radius and Flywheel Face Limits.

**Table 1. Flywheel Radius and Flywheel Face Limits.**

Flywheel Radius		Flywheel Face	
in	mm	in	mm
8	203	0.008	0.203
10	254	0.010	0.254
12	305	0.012	0.305
14	356	0.014	0.356
16	406	0.016	0.406

16. If flywheel (5) face run-out is not within specifications, remove flywheel as noted in flywheel removal procedure and check for burrs, nicks, and foreign material between flywheel mounting surface and crankshaft (6) flange.

FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)



## FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)

### CRANKSHAFT REAR SEAL INSTALLATION

#### **CAUTION**

The combination crankshaft rear seal/wear sleeve replacement kit is installed on the crankshaft as an assembly. The crankshaft rear seal should not be removed from the crankshaft rear seal wear sleeve. Failure to comply will result in damage to equipment.

Do not use any kind of lubricant to install crankshaft rear seal. The seal must be installed with the lip of the seal facing the crankshaft and the crankshaft clean and dry to ensure proper sealing. Clean the lip of the seal of any existing lubricant with a dry cloth prior to installation. Failure to comply may result in damage to seal and premature engine failure.

#### **NOTE**

If the oil pan is installed, loosen the oil pan screws to allow clearance for rear cover and gasket clearance.

1. Install new gasket (4) and rear cover (2) on cylinder block (1) with six screws (6). Do not tighten screws (6).

#### **CAUTION**

The seal installation tool (included in rear seal service kit) is being used to align the rear cover properly. Do not push or force the cover in any direction to prevent irregular seal lip position after seal installation. Failure to comply may result in damage to equipment.

2. Apply small coat of oil to crankshaft (5), threaded studs (8), and inside diameter of crankshaft rear seal installation tool (10).
3. Install two retaining rings (11) and threaded studs (8) on crankshaft (5).
4. Position chamfered end of rear seal/wear sleeve assembly (3) on end of crankshaft (5).
5. Position counterbore end of installation tool (10) over threaded studs (8), and align rear sleeve/wear sleeve assembly (3) perpendicular to end of crankshaft (5).

#### **CAUTION**

Do not exceed one-half revolution of each nut to prevent rear seal/wear sleeve binding and irregular stretch.

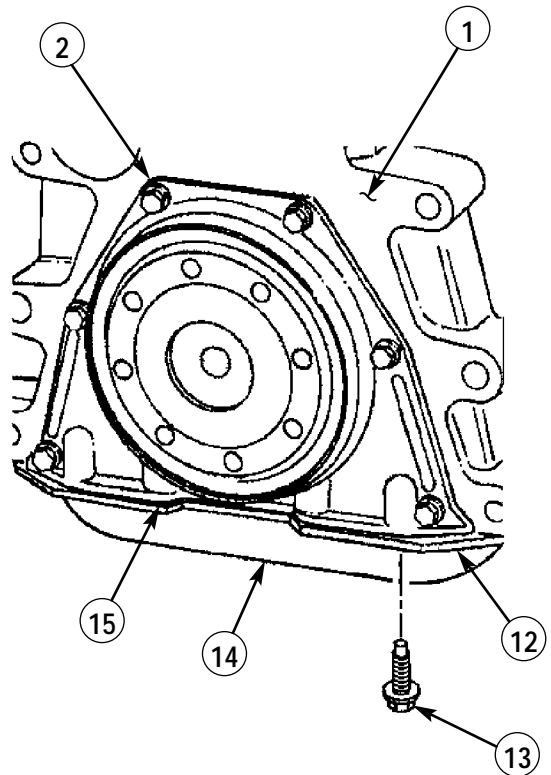
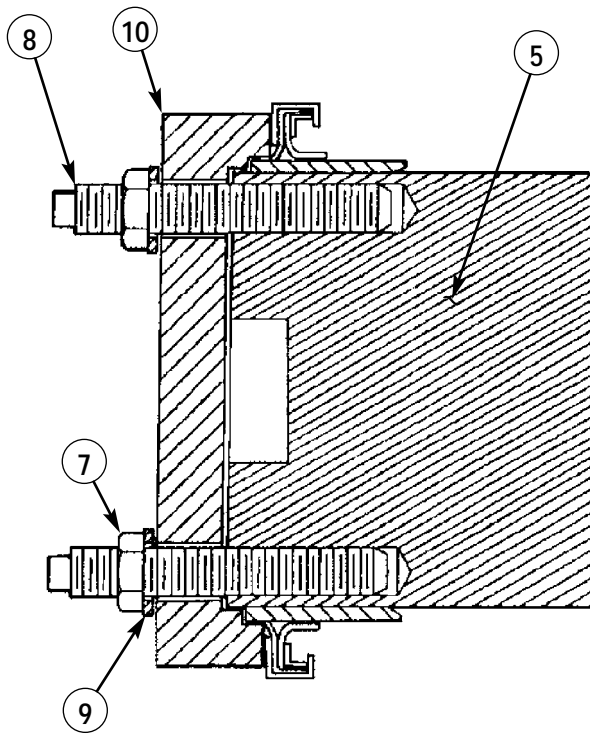
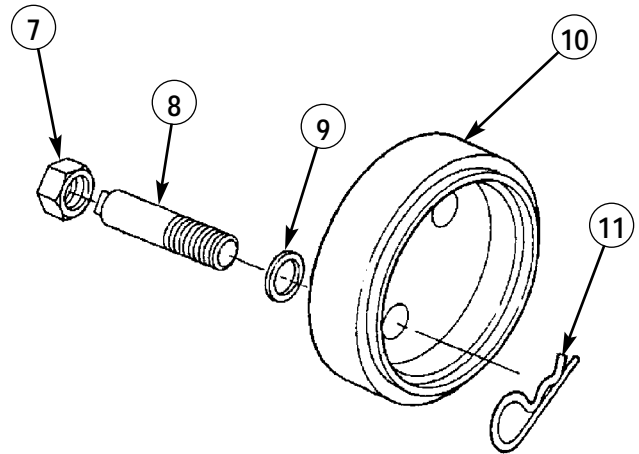
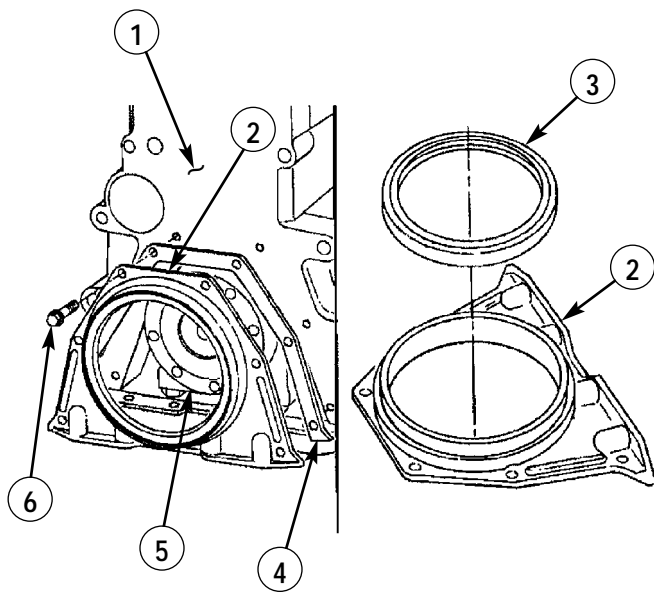
6. Install two washers (9) and nuts (7) on threaded studs (8). Alternately tighten nuts (7) one-half turn until installation tool (10) contacts end of crankshaft (5). Tighten nuts (7) to 15 lb-ft (20 N·m).
7. Remove two nuts (7), washers (9), installation tool (10), and threaded studs (8) from crankshaft (5).
8. Align rear cover (2) evenly with both sides of oil pan rail (12) on cylinder block (1). Tighten screws (6) to 80 lb-in (9 N·m).

#### **CAUTION**

Ensure gasket trim does not enter the engine.

9. Trim gasket (4) evenly with oil pan mounting surface (15).
10. Secure rear cover (2) to oil pan (14) with four screws (13). Tighten screws (13) to 18 lb-ft (24 N·m).

FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)



## FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)

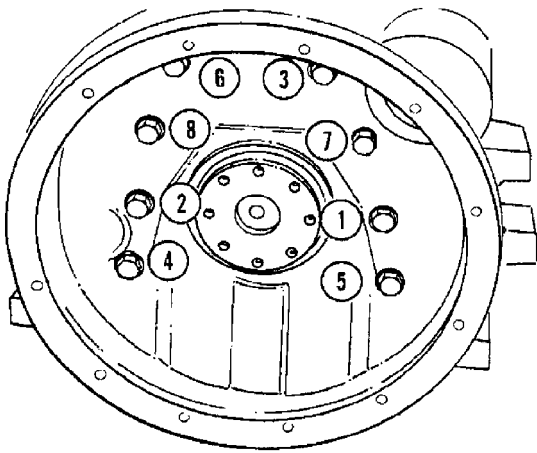
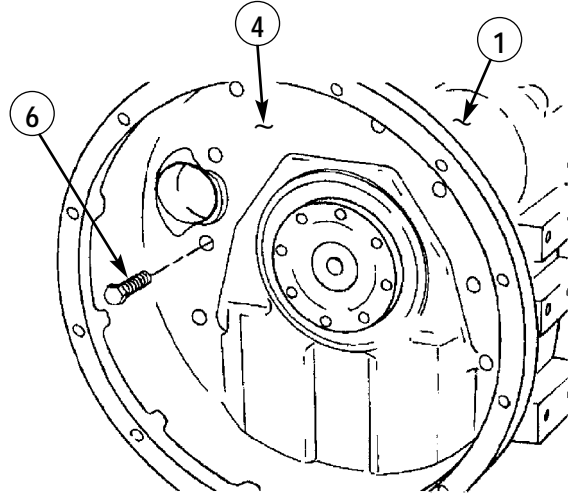
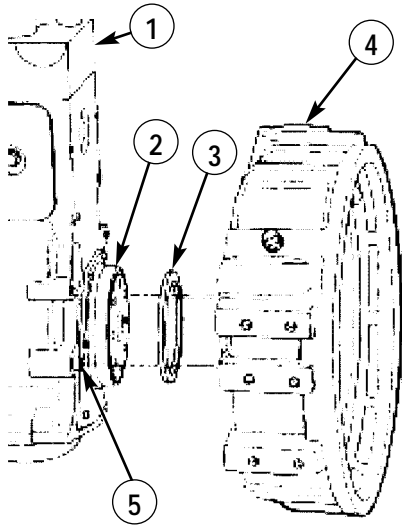
### FLYWHEEL HOUSING INSTALLATION

1. Apply lubriplate to both sides of new seal (3).
2. Install new seal (3) on crankshaft (2).
3. Position flywheel housing (4) over two ring dowels (5).
4. Secure flywheel housing (4) to cylinder block (1) with eight screws (6). Tighten screws (6) in sequence shown to 57 lb-ft (77 N·m).
5. Secure motor mount (8) to cylinder block (1) with four screws (7).
6. Install starter (WP 0099 00).
7. Install battery ground cables (WP 0054 00).

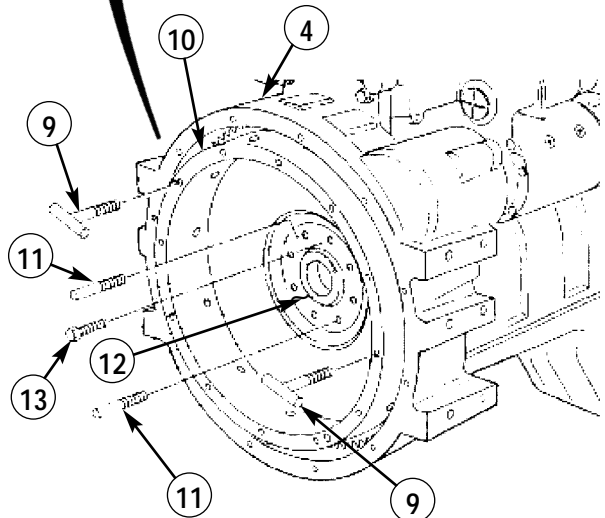
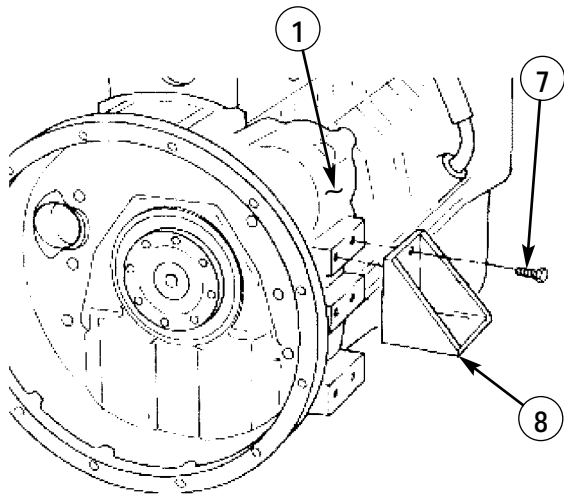
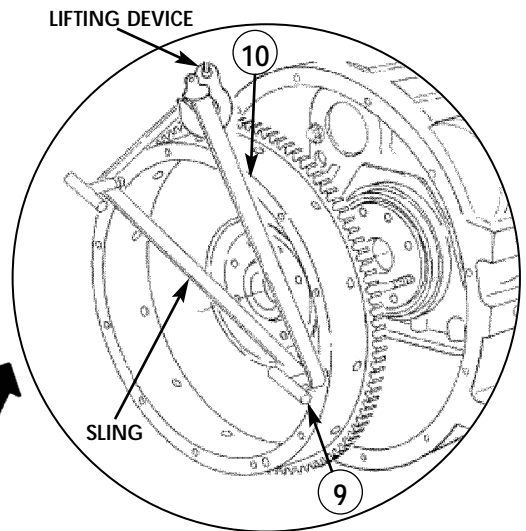
### FLYWHEEL INSTALLATION

1. Install two T-handles (9) on flywheel (10).
2. Position sling and lifting device around T-handles (9) to support flywheel (10) during lifting operations.
3. Install two guide pins (11) in flywheel housing (4) 180° apart.
4. Using sling and lifting device, install flywheel (10) on guide pins (11) and flywheel housing (4).
5. Apply thin coat of oil on threads of six screws (13).
6. Install six screws (13) in vacant holes in flywheel (10). Do not tighten screws (13).
7. Using gear barring tool, hold crankshaft (12) while tightening screws (13).
8. Remove two guide pins (11) from flywheel (10) and flywheel housing (4), and install two remaining screws (13) securing flywheel (10) on flywheel housing (4). Tighten all screws (13) to 101 lb-ft (137 N·m) in star pattern.
9. Install transmission driveplate (WP 0121 00).
10. Install transmission adapter plate (WP 0120 00).
11. Install transmission (WP 0125 00).
12. Start engine and check for leaks (TM 5-1940-322-10).
13. Close engine hatches (TM 5-1940-322-10).

FLYWHEEL, FLYWHEEL HOUSING, AND CRANKSHAFT REAR SEAL MAINTENANCE (Contd)



FLYWHEEL HOUSING TIGHTENING SEQUENCE



END OF WORK PACKAGE





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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Tappet installation kit (item 49, WP 0172 00)  
Camshaft bushing tool (item 61, WP 0172 00)  
Telescoping gauge set (item 60, WP 0172 00)  
Micrometer set (item 59, WP 0172 00)  
Dial indicator set (item 20, WP 0172 00)  
Magnetic base, dial indicator  
(item 62, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)  
Heat protective gloves  
Oven  
Hydraulic press (item 33, WP 0172 00)

###### Materials/Parts

Skysol 100 (item 12, WP 0171 00)  
Cleaning cloth (item 8, WP 0171 00)  
Engine oil (item 16, WP 0171 00)  
Sealing compound (item 42, WP 0171 00)  
Prime coating (item 43, WP 0171 00)

###### References

WP 0156 00

###### Equipment Condition

Engine removed from boat (WP 0115 00).  
Front gear housing cover removed (WP 0155 00).  
Fuel injection pump removed (WP 0084 00).  
Fuel lift pump removed (WP 0103 00).  
Rocker arm assemblies and push rods removed  
(WP 0109 00).

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## CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)

### NOTE

Both engine camshafts and bushings are replaced the same way. This procedure covers replacement of one engine camshaft and bushing.

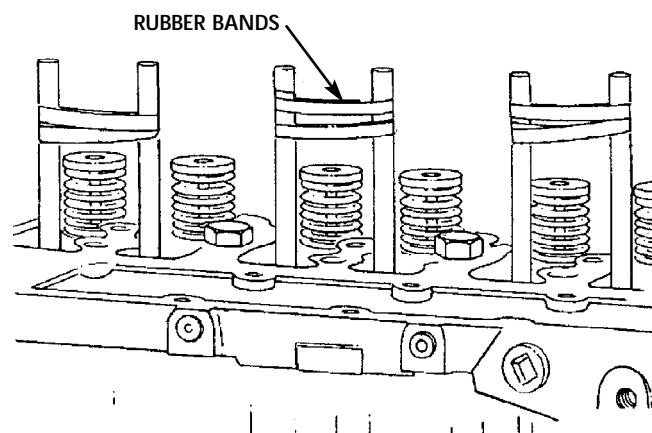
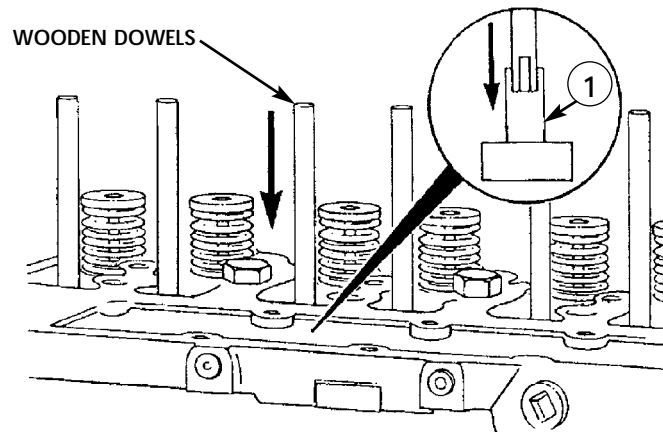
### REMOVAL

1. Install twelve wooden dowels from tappet installation kit into tops of twelve tappets (1). Lift tappets (1) off camshaft lobes and install rubber bands around each set of wooden dowels.
2. Rotate crankshaft (5) and align timing marks on camshaft gear (2) with marks on crankshaft gear (4).
3. Remove two screws (7) from camshaft thrust support (8) and engine block (6).

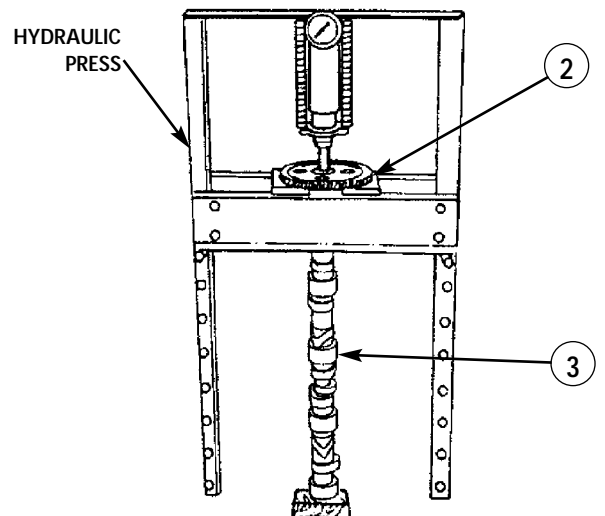
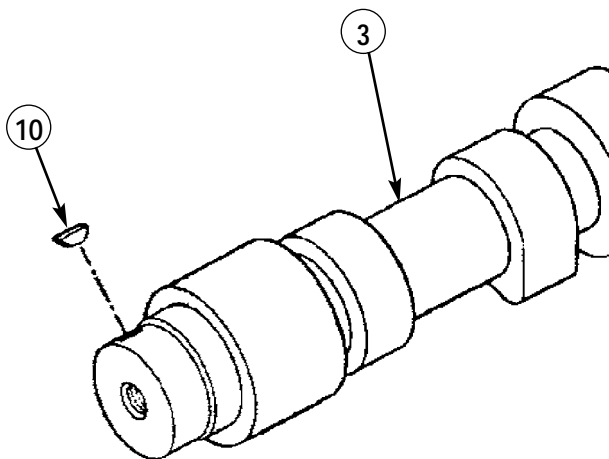
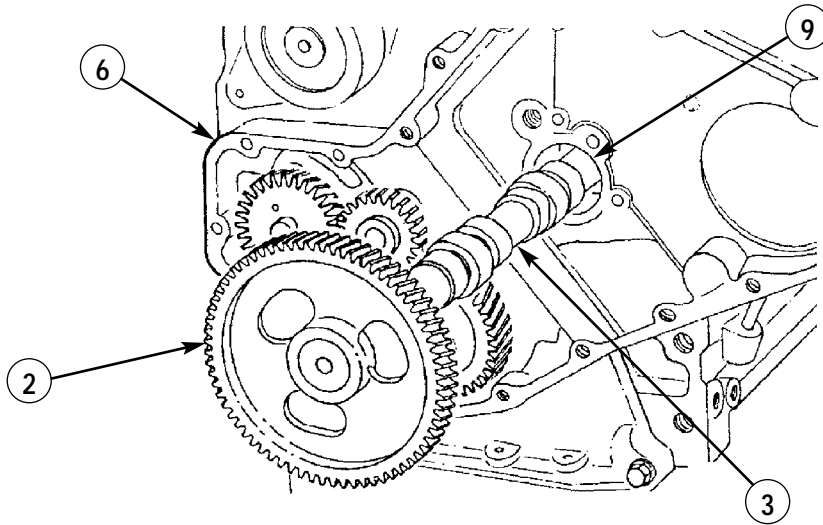
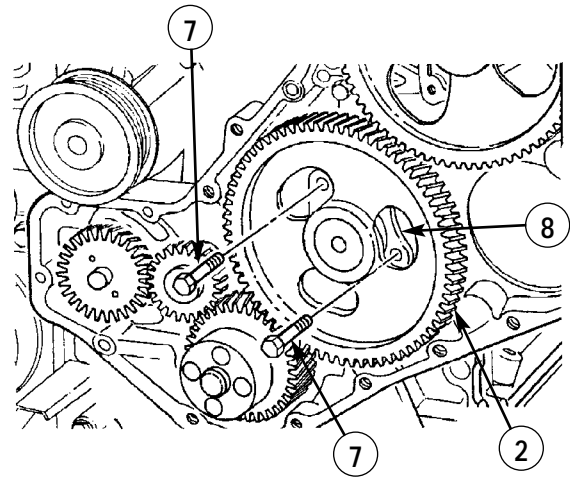
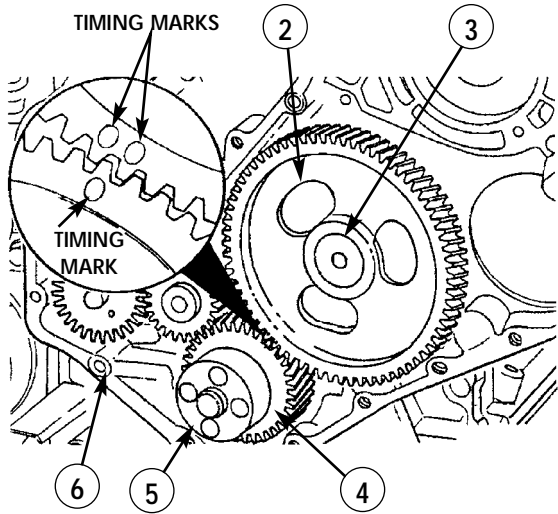
### CAUTION

Camshaft must be supported and rotated slowly as it is being removed from camshaft bushing and engine block. Failure to comply may result in damage to camshaft or camshaft lobes.

4. Slowly remove camshaft (3) from bushing (9) and engine block (6).
5. If camshaft gear (2) or camshaft (3) is being replaced, place camshaft (3) in hydraulic press, support gear (2) and camshaft (3), and press camshaft (3) out of gear (2).
6. Remove key (10) from camshaft (3).



### CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)



## CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instruction, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Measure camshaft bushing (1). Bushing (1) must be between 2.1302 in. (5.410 cm) minimum and 2.1317 in. (5.414 cm) maximum. If not within limits, bushing (1) must be replaced.
3. Remove bushing (1) from engine block (2) using camshaft bushing tool.

#### **NOTE**

To inspect and measure all other camshaft bores, engine oil pan must be removed. To access camshaft bores from under side of engine block, refer to WP 0156 00 for removal of engine oil pan.

4. Inspect camshaft bores (3) in engine block (2) for obvious damage and excessive wear.
5. Measure all camshaft bores (3) starting with first camshaft bore (3) for bushing (1).
6. Camshaft bore (3) for bushing (1) must be no more than 2.1317 in. (5.414 cm). Other camshaft bores (3) must be no more than 2.1324 in. (5.416 cm). If camshaft bores (3) are not within limits, engine block (2) must be machined and service bushings installed, or engine block (2) must be replaced.
7. If all camshaft bores (3) without bushings measure to within limits, new bushing (1) can be installed.

#### **CAUTION**

Do not apply sealing compound around area of oil hole or oil hole may become plugged. Failure to comply may result in damage to equipment.

8. Apply primer to outside of bushing (1) and inside of camshaft bore (3) on engine block (2). Allow primer to dry 30–70 seconds before installing bushing (1).
9. Apply bead of sealing compound around 270° of bushing (1) outer edge.

#### **NOTE**

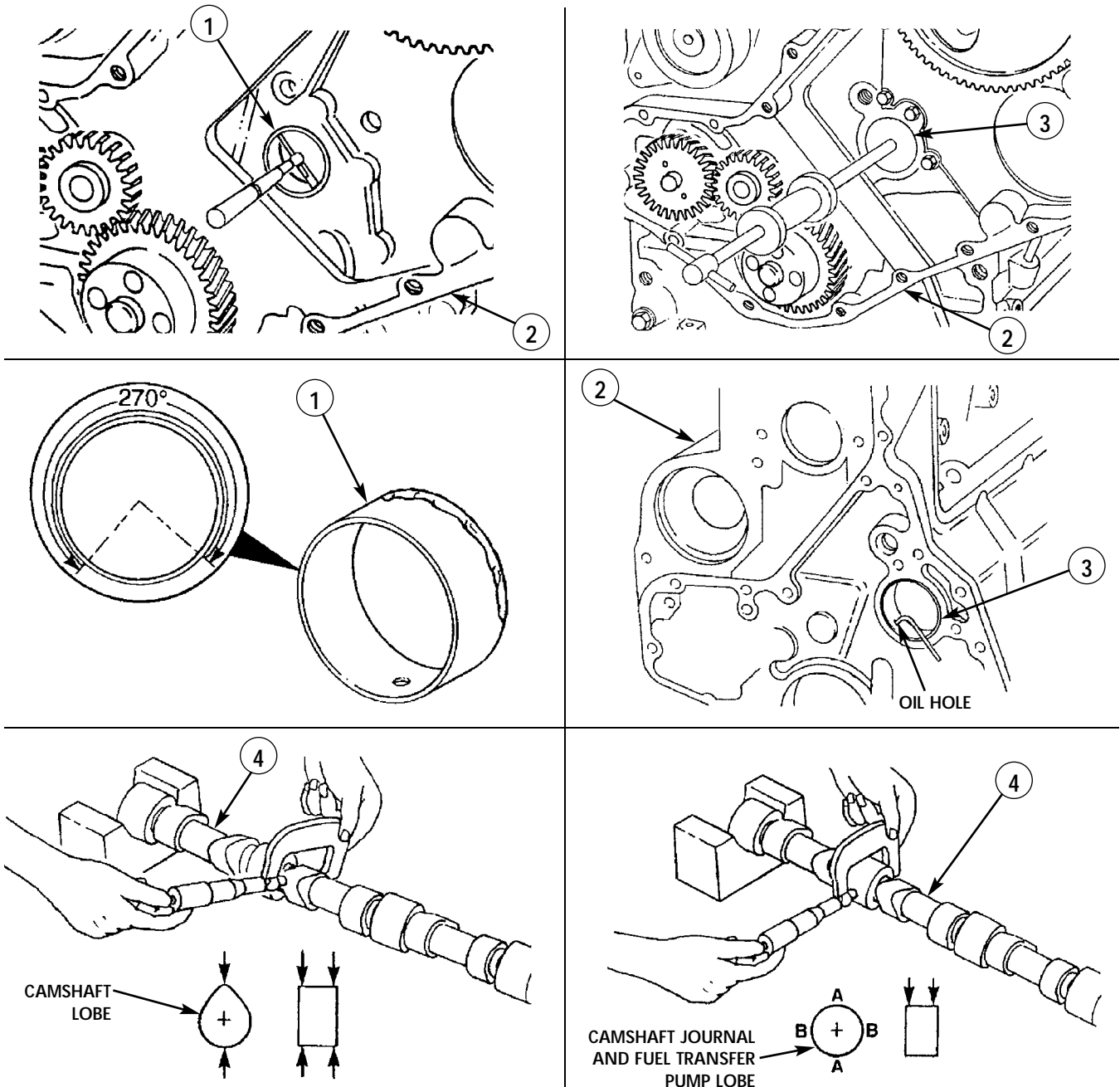
Check that the oil holes in the bushing and engine block are aligned before installing bushing. After installation, check that a 0.126-in. (3.2-mm) rod will be able to pass through both oil holes.

10. Using camshaft bushing tool, install bushing (1) so that front edge of bushing (1) is even with front face of engine block (2). Clean excess sealing compound from around bushing (1) and engine block (2).

**CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)**

**CLEANING AND INSPECTION (Contd)**

11. Inspect camshaft (4) for obvious damage and excessive wear.
12. Measure peaks of all camshaft valve lobes in two places. Minimum measurements are 1.787 in. (4.540 cm) for intake camshaft valve lobes and 1.777 in. (4.514 cm) for exhaust camshaft valve lobes. Replace camshaft if not within limits.
13. Measure camshaft bearing journals in four places. Minimum measurement is 2.1245 in. (5.396 cm) and maximum measurement is 2.1265 in. (5.401 cm). Replace camshaft if not within limits.
14. Measure camshaft fuel transfer pump lobe. Minimum measurement is 1.398 in. (3.550 cm) and maximum measurement is 1.428 in. (3.626 cm). Replace camshaft if not within limits.



## CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)

### INSTALLATION

#### **CAUTION**

Camshaft gear will be permanently distorted if overheated. Do not heat oven to more than 300° F (149° C). Failure to comply may result in damage to equipment.

1. If camshaft gear (1) was removed, place camshaft gear (1) in oven with temperature set at 300° F (149° C) for 45 minutes.

#### **WARNING**

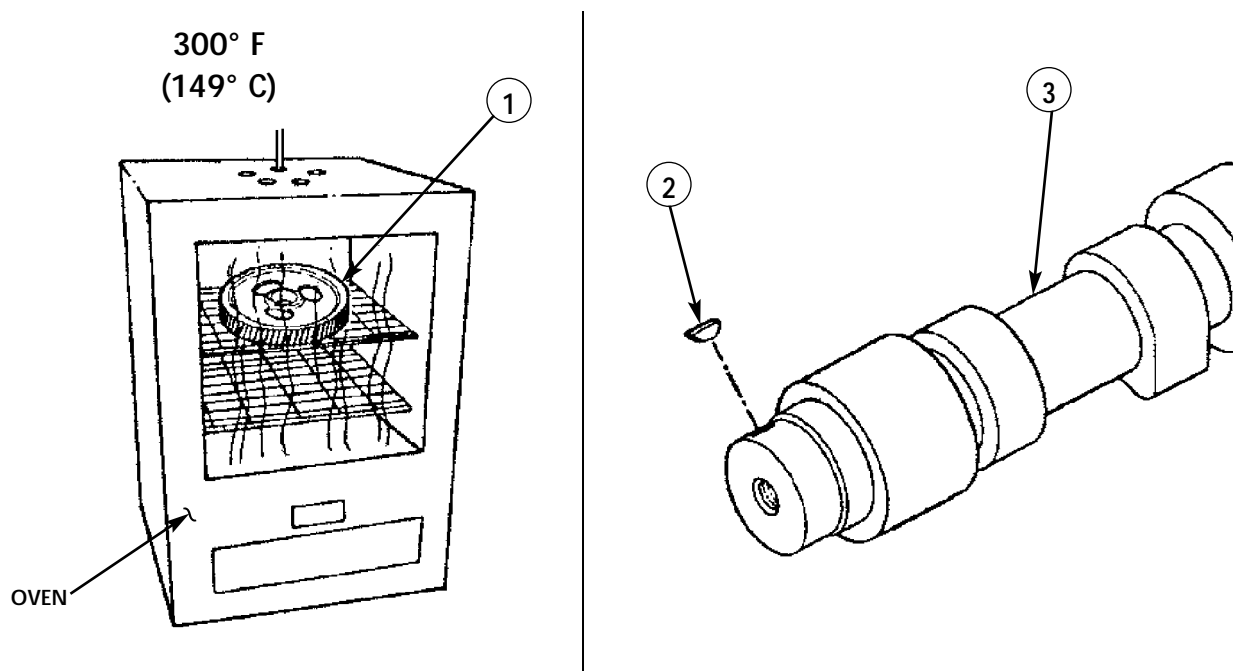
Wear protective gloves when handling heated parts. Failure to comply may result in injury to personnel.

2. Install key (2) on camshaft (3). Remove heated gear (1) from oven. Align keyway in gear (1) with key (2) on camshaft (3) and install gear (1) on camshaft (3) with timing marks facing away from camshaft (3) and gear (1) seated against camshaft (3) shoulder.

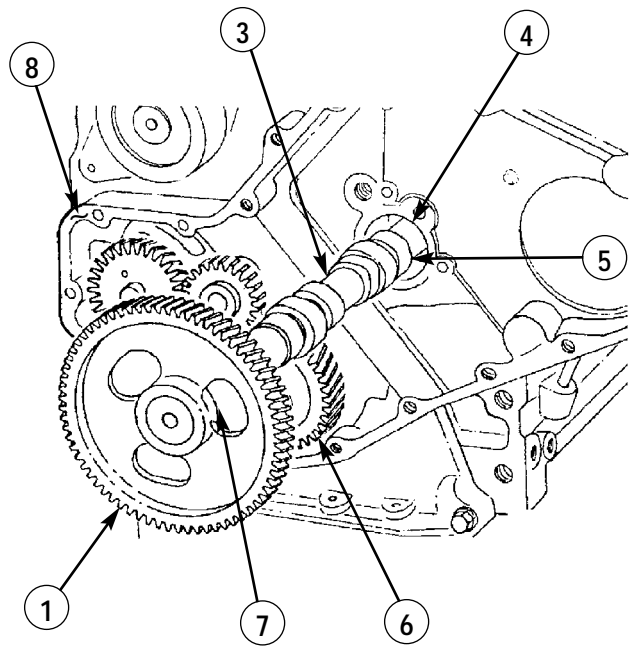
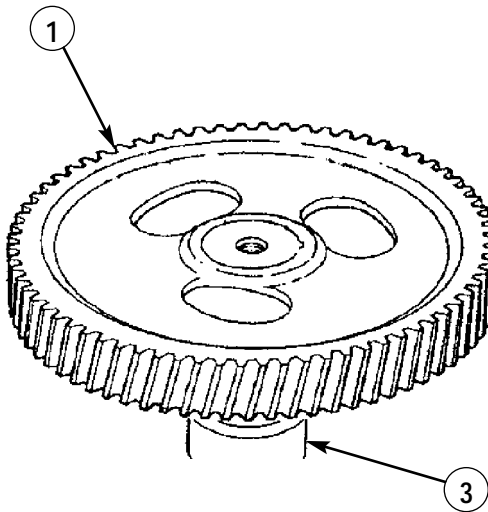
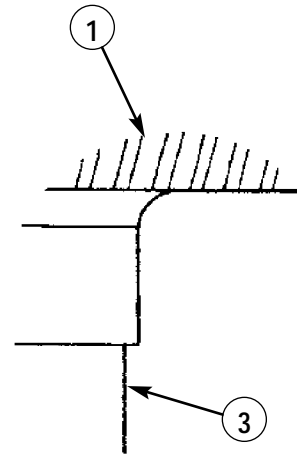
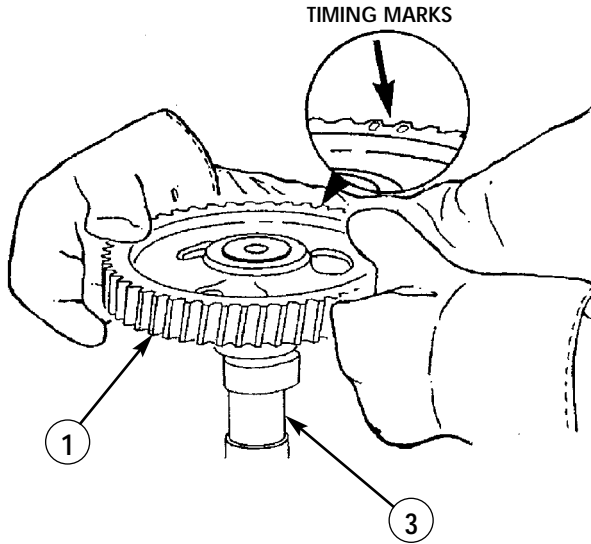
#### **CAUTION**

Do not use water to reduce cooling time of gear. Failure to comply may result in damage to equipment.

3. Keep camshaft (3) in vertical position with gear (1) in up position until gear (1) has cooled.
4. Apply coat of oil to bushing (4), all engine block bores (5), camshaft (3), and camshaft thrust support (7) before installing camshaft (3) in engine block (8).
5. Slowly rotate and install camshaft (3) through bushing (4) and engine block bores (5) until camshaft gear (1) is in position to engage with crankshaft gear (6).
6. Install camshaft thrust support (7) on camshaft (3), align and position timing marks on camshaft gear (1) between timing mark on crankshaft gear (6), and push camshaft (3) into engine block (8).



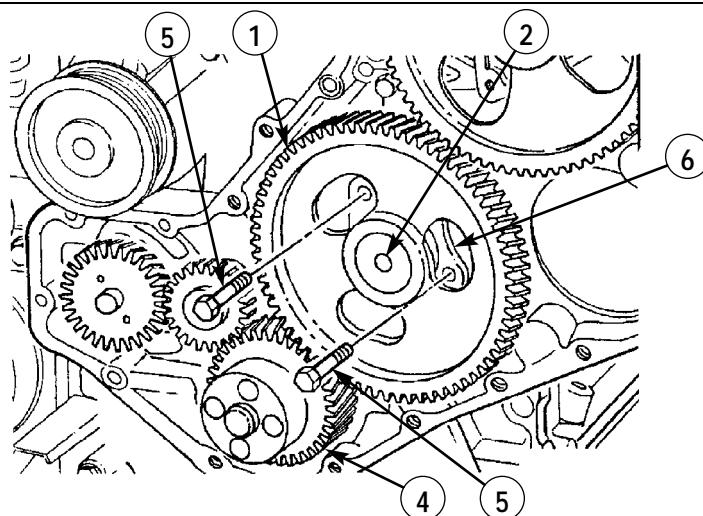
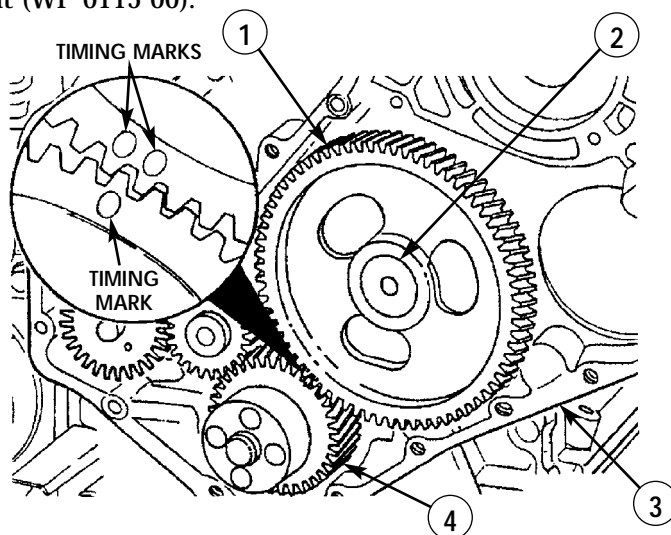
CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)



## CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)

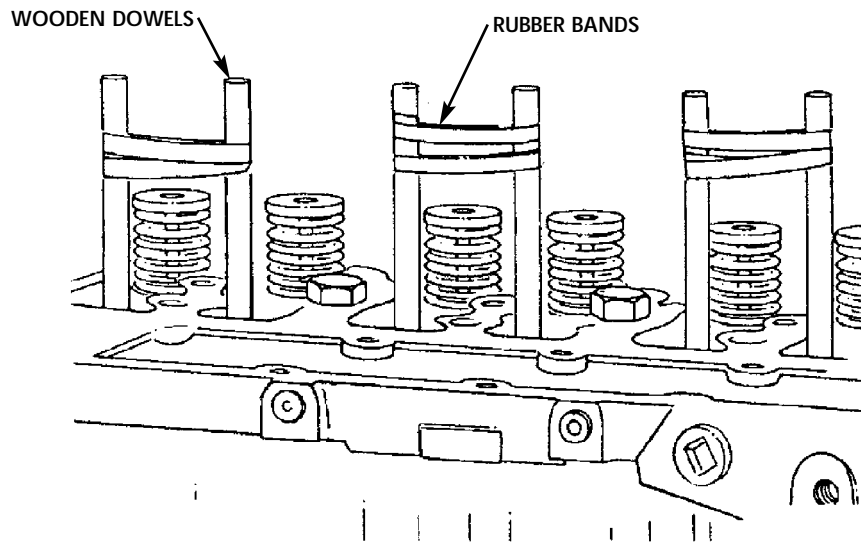
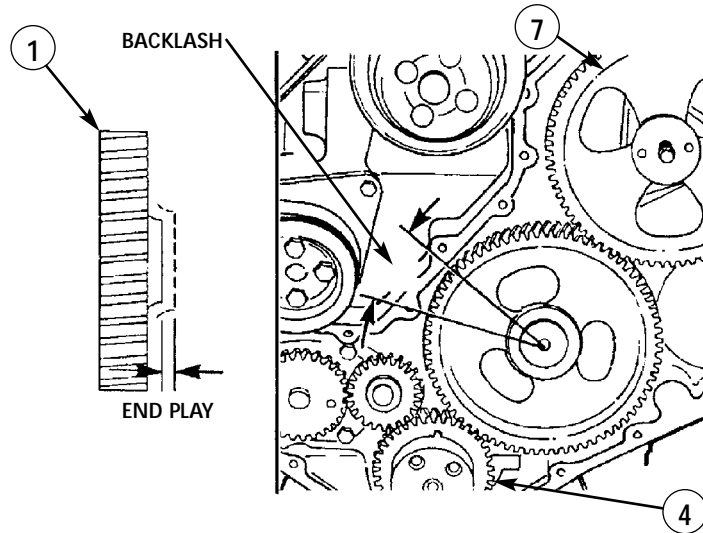
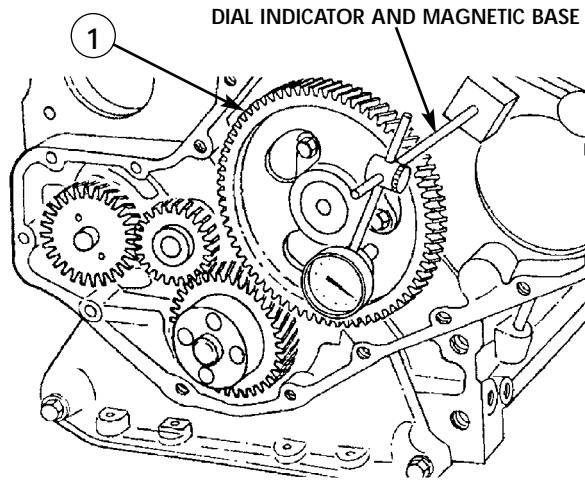
### INSTALLATION (Contd)

7. Install two screws (5) on camshaft thrust support (6) and engine block (3). Tighten screws (5) to 18 lb-ft (24 N·m).
8. Using dial indicator and magnetic base, measure camshaft gear (1) end play. End play must be between 0.005 in. (0.12 mm) minimum and 0.018 in. (0.47 mm) maximum. If not within limits, replace camshaft thrust support (6) and recheck end play.
9. Install fuel injection pump (WP 0084 00).
10. Using dial indicator and magnetic base, measure camshaft gear (1) backlash between crankshaft gear (4) and fuel injection pump gear (7). Backlash must be between 0.013 in. (0.330 mm) minimum and 0.030 in (0.76 mm) maximum. If not within limits, replace camshaft gear (1), crankshaft gear (4), or fuel injection pump gear (7), and recheck backlash.
11. Remove twelve wooden dowels and six rubber bands from tappets.
12. Install push rods and rocker arm assemblies (WP 0109 00).
13. Install fuel lift pump (WP 0103 00).
14. Install front gear housing cover (WP 0155 00).
15. Install engine in boat (WP 0115 00).





### CAMSHAFT, CAM GEAR, AND CAM BUSHING MAINTENANCE (Contd)





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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### FLYWHEEL RING GEAR MAINTENANCE

#### REMOVAL AND INSTALLATION

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##### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Oven

##### References

WP 0013 00

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).  
Transmission removed (WP 0125 00).  
Transmission adapter plate removed  
(WP 0120 00).  
Transmission driveplate removed (WP 0121 00).  
Flywheel removed (WP 0157 00).

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## FLYWHEEL RING GEAR MAINTENANCE (Contd)

### **NOTE**

Both flywheel ring gears are replaced the same way. This procedure covers the replacement of one flywheel ring gear.

### REMOVAL

#### **CAUTION**

Do not use a steel drift pin. Failure to comply may result in damage to ring gear and/or flywheel.

Using brass drift pin, remove flywheel ring gear (1) from flywheel (2).

### INSTALLATION

1. Heat new ring gear (1) for 20 minutes in oven preheated to 127° C (260° F).

#### **WARNING**

To reduce the possibility of severe burns, wear protective gloves when installing the heated gear. Failure to comply may result in injury to personnel.

#### **CAUTION**

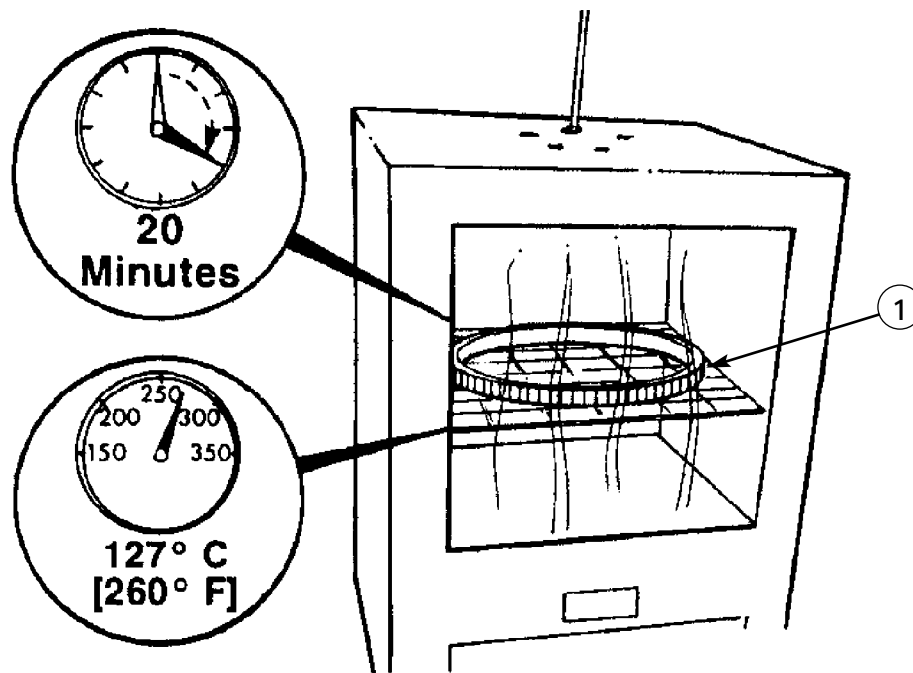
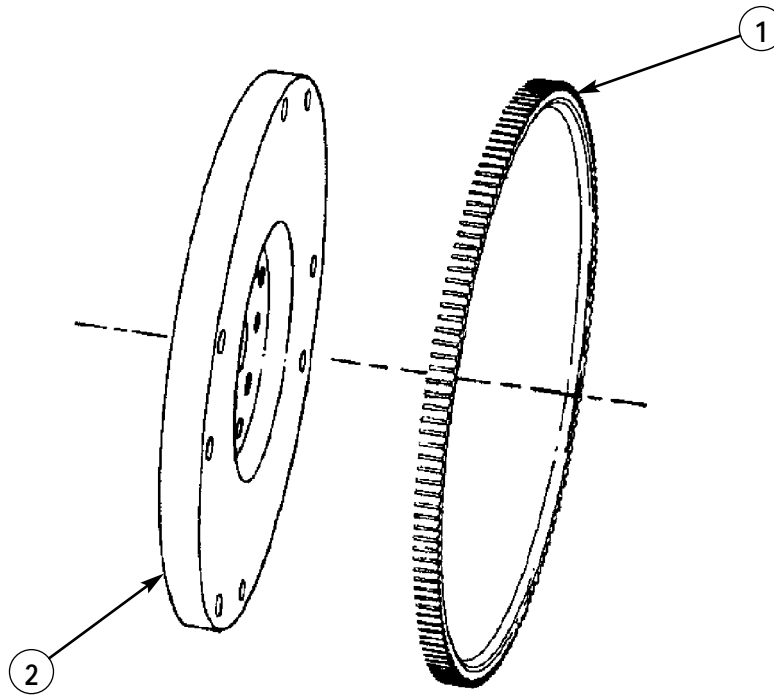
The ring gear must be installed so the bevel on the teeth is toward the crankshaft side of the flywheel. Failure to comply may result in damage to equipment.

### **NOTE**

If experiencing difficulty installing flywheel ring gear on flywheel, use a brass drift pin to assist with installation.

2. Install flywheel ring gear (1) on flywheel (2).
3. Install flywheel (WP 0157 00).
4. Install transmission driveplate (WP 0121 00).
5. Install transmission adapter plate (WP 0122 00)
6. Install transmission (WP 0125 00).
7. Close engine hatches (TM 5-1940-322-10).

FLYWHEEL RING GEAR MAINTENANCE (Contd)



END OF WORK PACKAGE



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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### VALVES AND VALVE SPRINGS MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, AND INSTALLATION

---

##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Valve spring compressor (item 63, WP 0172 00)  
Plastic hammer

###### References

WP 0013 00

###### Equipment Condition

Cylinder head removed (WP 0101 00).

###### Materials/Parts

Cloth (item 5, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)  
Crocus cloth (item 9, WP 0171 00)  
Oil (item 22, WP 22, WP 0171 00)

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## VALVES AND VALVE SPRINGS MAINTENANCE (Contd)

### NOTE

Valves and valve springs on both engines are replaced the same way. This procedure covers the replacement of valves and valve springs on one engine.

### REMOVAL

1. Mark valves (1) to identify their position.
2. Using valve spring compressor, compress valve spring (2) and remove valve spring collets (3).
3. Release valve spring (2) and remove retainer (4) and valve spring (2).

### NOTE

After removing collets, retainers, springs, and valves, place in a labeled rack for identification.

4. Remove the remaining valve spring collets (3), retainers (4), valve springs (2), and valves (1) from cylinder block (5).
5. Remove valve stem seals (6) from cylinder block (5).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

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2. Clean cylinder block (5) and components with Skysol 100 and dry with cloth.

### NOTE

Note the valve number prior to cleaning the valves.

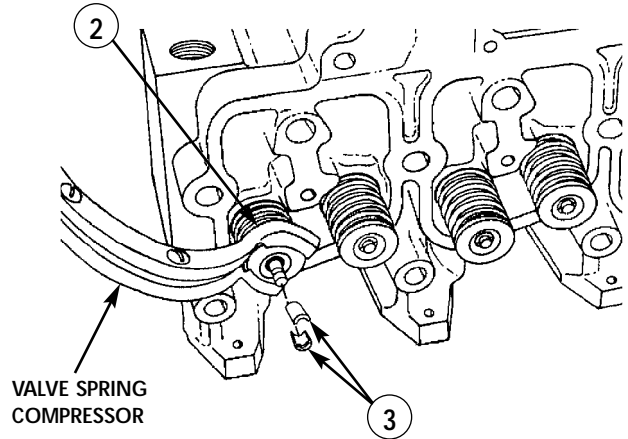
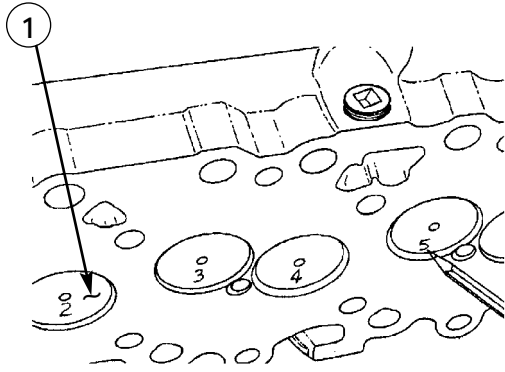
3. Clean valve heads (8) with soft wire wheel.
4. Polish valve stems (7) with crocus cloth.
5. Inspect for abnormal wear on valve heads (8) and valve stems (7). Replace valve (1) if abnormally or excessively worn.
6. Check valve (1) for bending. Replace valve (1) if bent.
7. Measure valve stem (7) diameter. Refer to Table 1. Valve Stem Diameter Limits for specifications. Replace valve (1) if valve stem (7) is not within specifications.

**Table 1. Valve Stem Diameter Limits.**

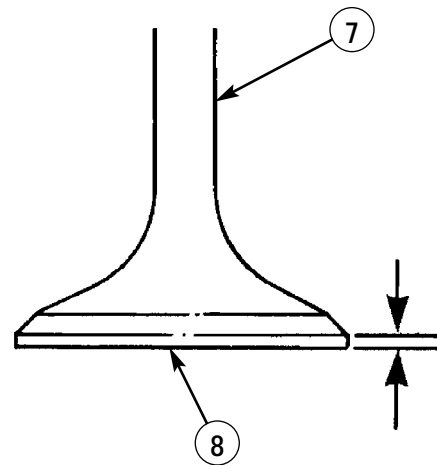
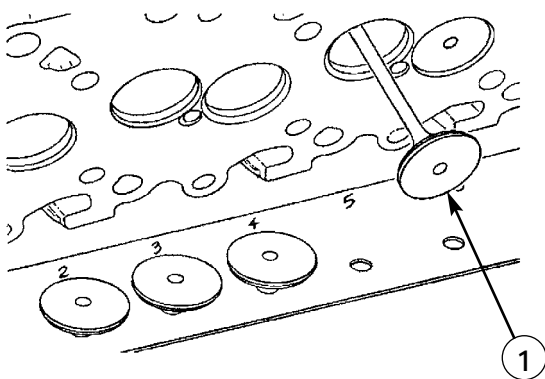
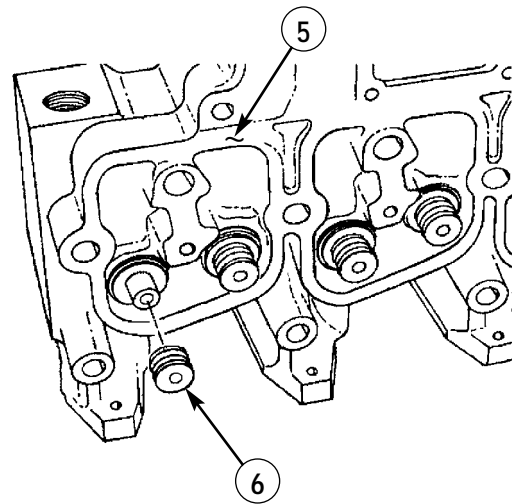
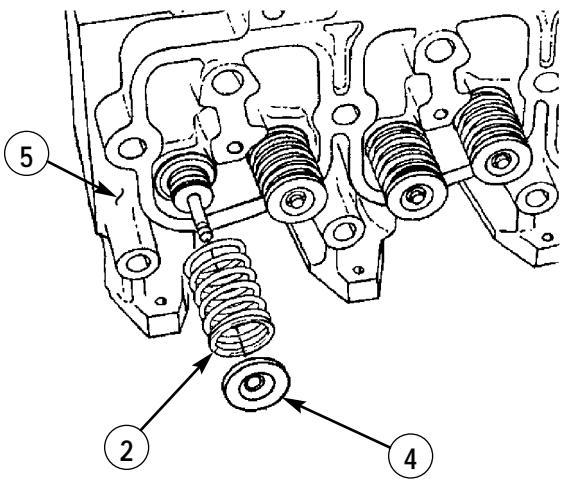
in.		mm	
0.312	MIN	6	7.94
0.314	MAX	2	7.98



VALVES AND VALVE SPRINGS MAINTENANCE (Contd)



VALVE SPRING COMPRESSOR



## VALVES AND VALVE SPRINGS MAINTENANCE (Contd)

8. Measure valve rim (1) for thickness. Refer to Table 2. Valve Rim Thickness Limits for specifications.

**Table 2. Valve Rim Thickness Limits.**

in.		mm	
0.031	MIN	0.79	

9. Inspect valve stem tip (3) for flatness. If required, resurface valve stem tip (3) or replace valve (2).
10. Measure valve spring (4) length. Refer to Table 3. Valve Spring Length Limits for specifications. Replace valve spring (4) if specifications are not met.

**Table 3. Valve Spring Length Limits.**

	in.	mm
Approximate Free Length	2.362	60.00
Maximum Inclination	0.039	1.00

## INSTALLATION

### **NOTE**

A load of 80.7–89.2 lb (359–397 N) is required to compress the spring to a height of 1.94 in. (49.25 mm).

1. Using a press, compress valve springs (4) to a height of 1.94 in. (49.25 mm).

### **NOTE**

The intake and exhaust seals are the same.

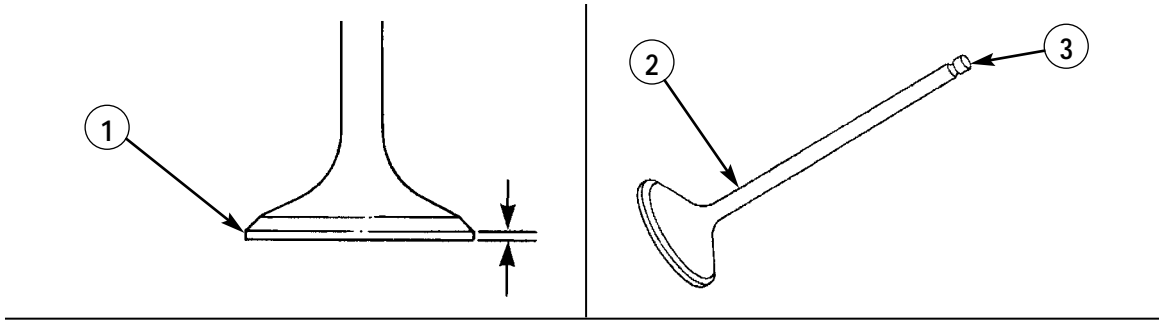
2. Install valve stem seals (6) on cylinder block (5).
3. Lubricate valves (7) with oil prior to installation.
4. Install valves (7) in original location as noted at removal.
5. Install valve spring (8) and retainer (9) on valve (7).
6. Using valve spring compressor, compress valve spring and retainer assembly (10) on valve (7).
7. Install collets (11) on valve (7) and release tension on valve spring compressor.

### **WARNING**

Wear eye protection. If the collets are not correctly installed, they can fly out when the stems are hit with a plastic hammer.

8. After assembly, strike valves (7) with a plastic hammer ensuring collets (11) are seated.
9. Repeat steps 1 through 8 for remaining valves and valve springs.
10. Install cylinder head (WP 0101 00).

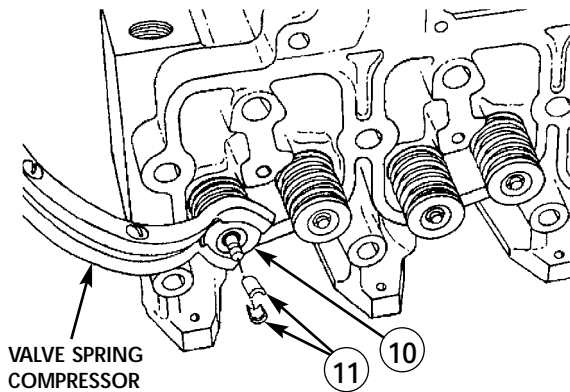
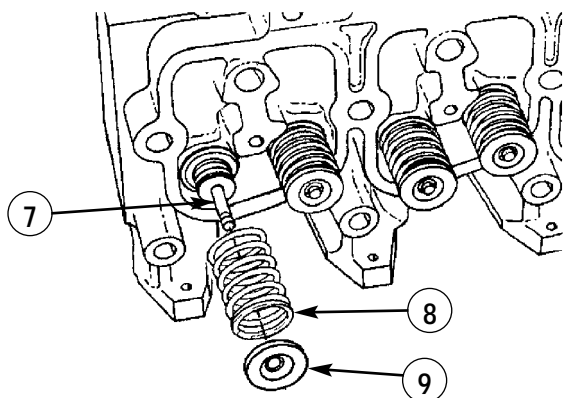
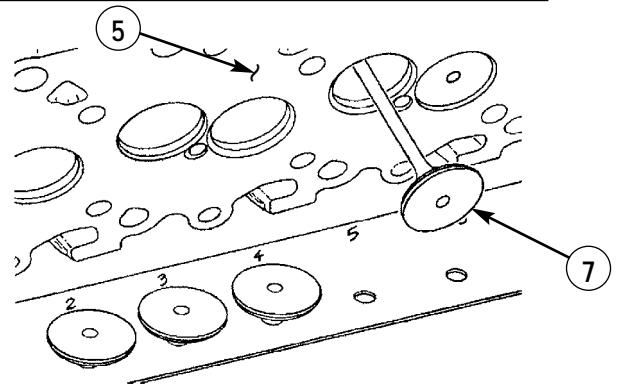
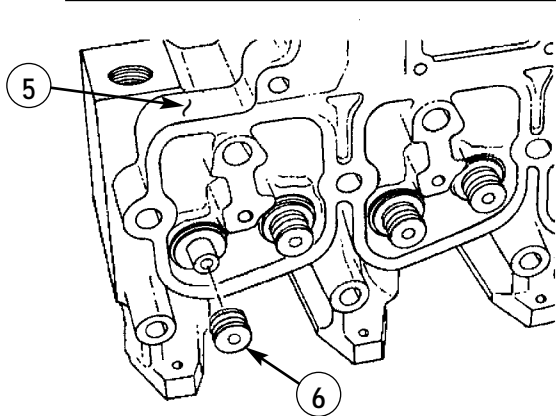
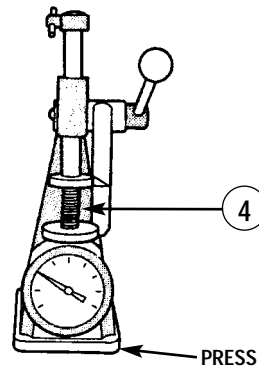
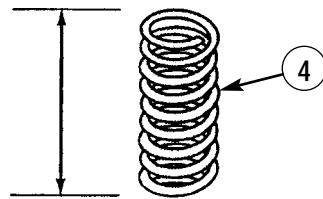
### VALVES AND VALVE SPRINGS MAINTENANCE (Contd)



**VALVE OPEN**

- HEIGHT: 1.62 in. (41.25 mm)
- LOAD: 28.4 lb (126 N)

FREE LENGTH: 2.6 in. (66 mm)





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## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### ENGINE VALVE TAPPETS MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, INSTALLATION, AND ADJUSTMENT

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Tappet installation kit (item 49, WP 0172 00)  
Gear barring tool (item 15, WP 0172 00)

###### Materials/Parts

Lubriplate (item 20, WP 0171 00)

###### Personnel Required

Two

###### References

WP 0013 00

###### Equipment Condition

Valve covers removed (WP 0108 00).  
Rocker arms removed (WP 0109 00).  
Vibration damper removed (WP 0111 00).  
Front gear housing cover removed (WP 0155 00).  
Camshaft removed (WP 0158 00).

## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### **NOTE**

The valve tappets on both engines are replaced the same way. This procedure covers the replacement of valve tappets on one engine.

The tappet installation kit includes the rubber bands, trough, and tappet installation tool.

### REMOVAL

1. Insert trough (3) to full length of cam bore (2).
2. Position trough (3) to catch tappet (1) when wooden dowel (4) is removed.

### **CAUTION**

Identify and mark the location of each tappet as it is removed. Tappets must be installed in their original locations. Failure to comply may result in damage to equipment.

3. Attach rubber bands (5) to wooden dowels (4) not being removed.

### **CAUTION**

Take care when removing the No. 6 cylinder tappets. Do not knock or shake these tappets over the end barrier of the trough. Failure to comply may result in damage to equipment.

### **NOTE**

Remove one tappet at a time. Attach a rubber band to the other wooden dowels to support the companion dowel not being removed.

Tappet should fall through to trough. If tappet does not fall, gently shake trough, allowing tappet to fall through.

4. Pull wooden dowel (4) from tappet bore (6), allowing tappet to fall into trough (3).
5. Carefully pull trough (3) and tappet (1) from cam bore (2) and remove tappet (1).
6. Repeat steps 1 through 5 for remaining tappets.

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

### **WARNING**

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Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to comply may result in injury to personnel.

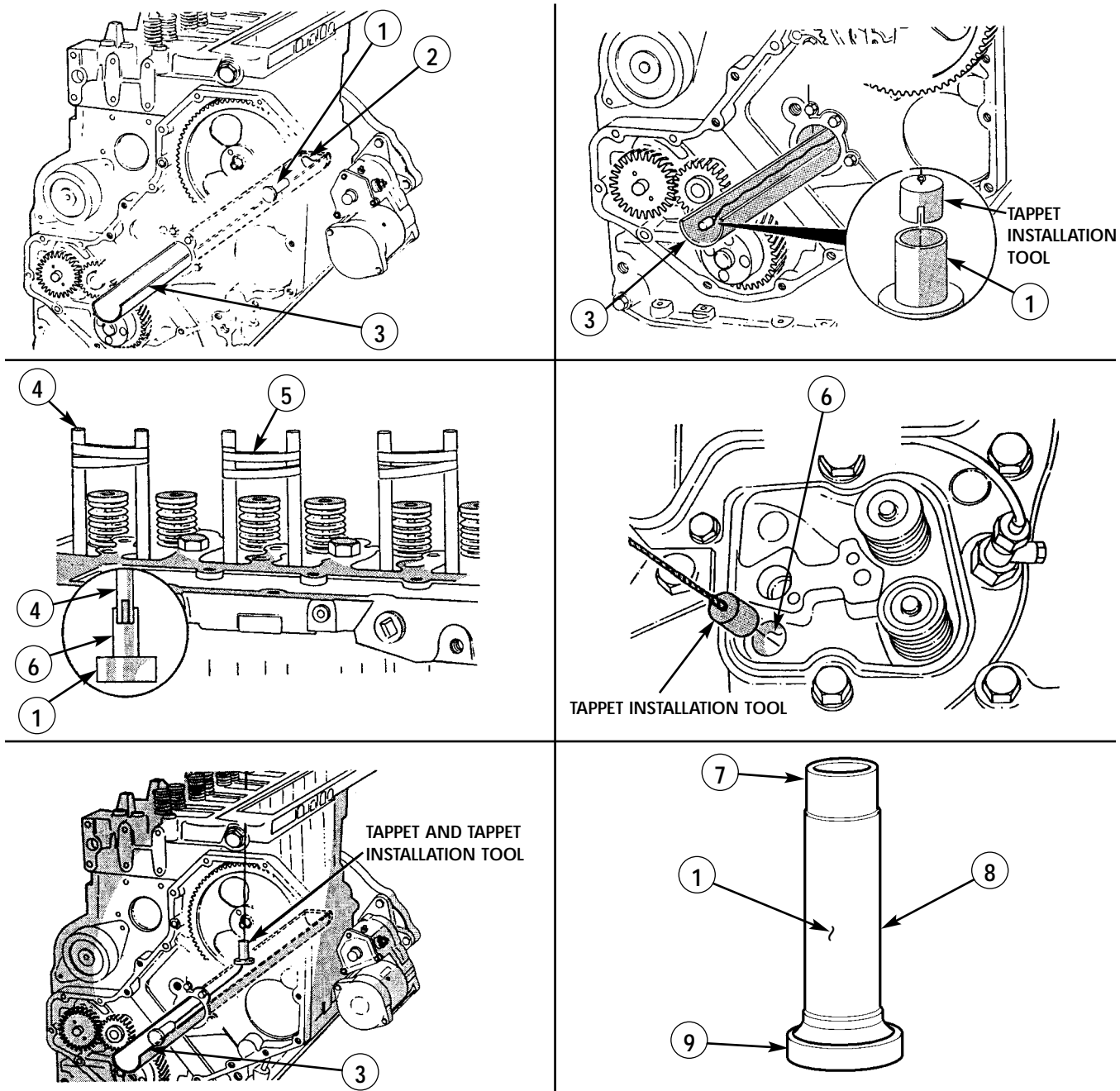
2. Clean tappets (1) with Skysol 100 and dry with compressed air.

ENGINE VALVE TAPPETS MAINTENANCE (Contd)

**CAUTION**

Pit marks on the tappet faces are acceptable. A single pit cannot be greater than 0.078 in. (2 mm). An interconnect of pits is unacceptable. No pits are allowed on the edge of the face. The pits, when added together, should not exceed 0.236 in. (6 mm) or four percent of the face. Failure to comply may result in damage to the engine.

3. Inspect the socket (7), stem (8), and face (9) of each tappet (1) for excessive wear, cracks, and other damage. If damaged, replace tappet (1).



## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### INSTALLATION

1. Insert trough (3) to full length of cam bore (2).
2. Feed tappet installation tool down tappet bore (6) and into trough (3).
3. Feed tappet installation tool cord through the cam bore (2).

**NOTE**

The barrier at the rear of the trough will assure the tool will be removed with the trough..

4. Carefully pull trough (3) and tappet installation tool out front side of cam bore (2).
5. Lubricate tappet (1) with lubriplate.

**NOTE**

To aid in removing the installation tool after the tappet is installed, work the tool in and out of the tappet several times before installing the tappets.

6. Insert tappet installation tool into tappet (1).

**NOTE**

If it is difficult to get the tappet to make the bend from the trough up to the tappet bore, pull the trough out enough to allow the tappet to drop down and align itself; then, pull the tappet up into the bore.

7. Pull tappet installation tool and tappet through cam bore (2) and up into tappet bore (6).

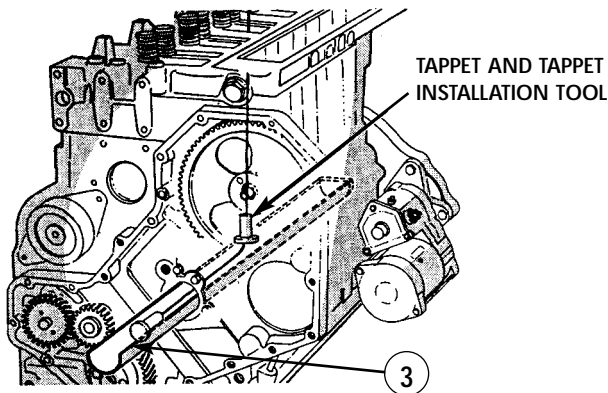
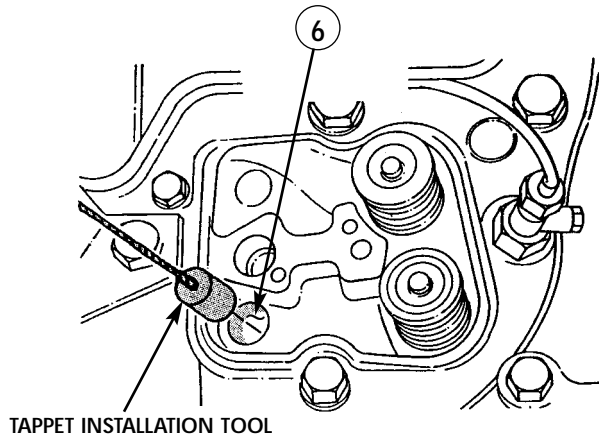
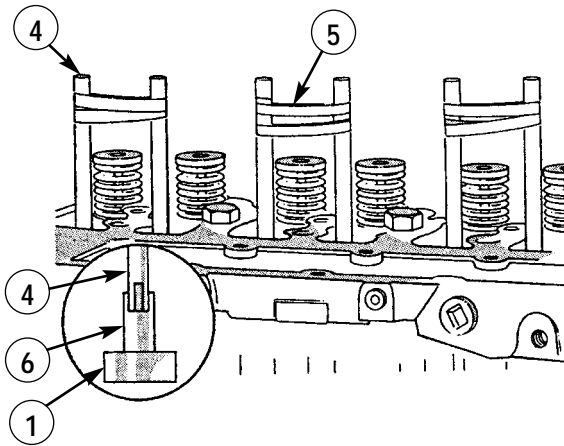
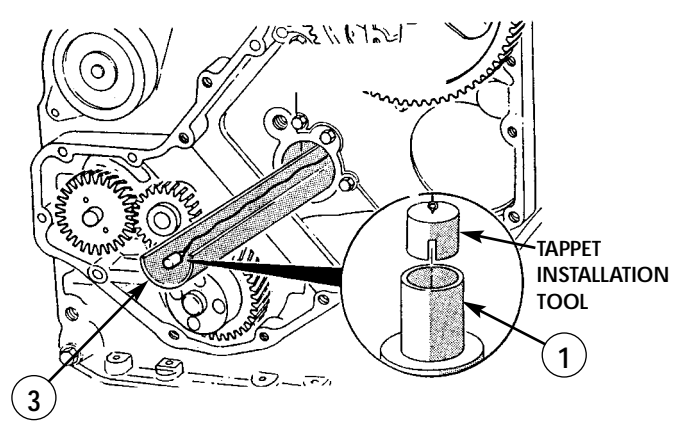
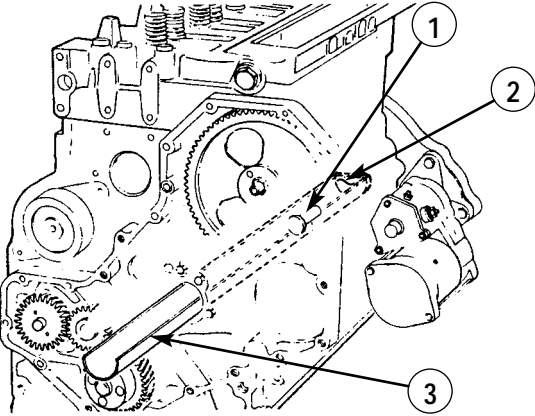
**NOTE**

After the tappet has been pulled up into position, slide the trough back into the cam bore and rotate it one-half turn. This will position the round side of the trough facing up, which will hold the tappet in place.

8. Remove tappet installation tool from tappet (1).
9. Install wooden dowel (4) into top of tappet (1). Wrap rubber bands (5) around wooden dowels (4) to secure tappets (1).
10. Repeat steps 1 through 9 for remaining tappets.



# ENGINE VALVE TAPPETS MAINTENANCE (Contd)



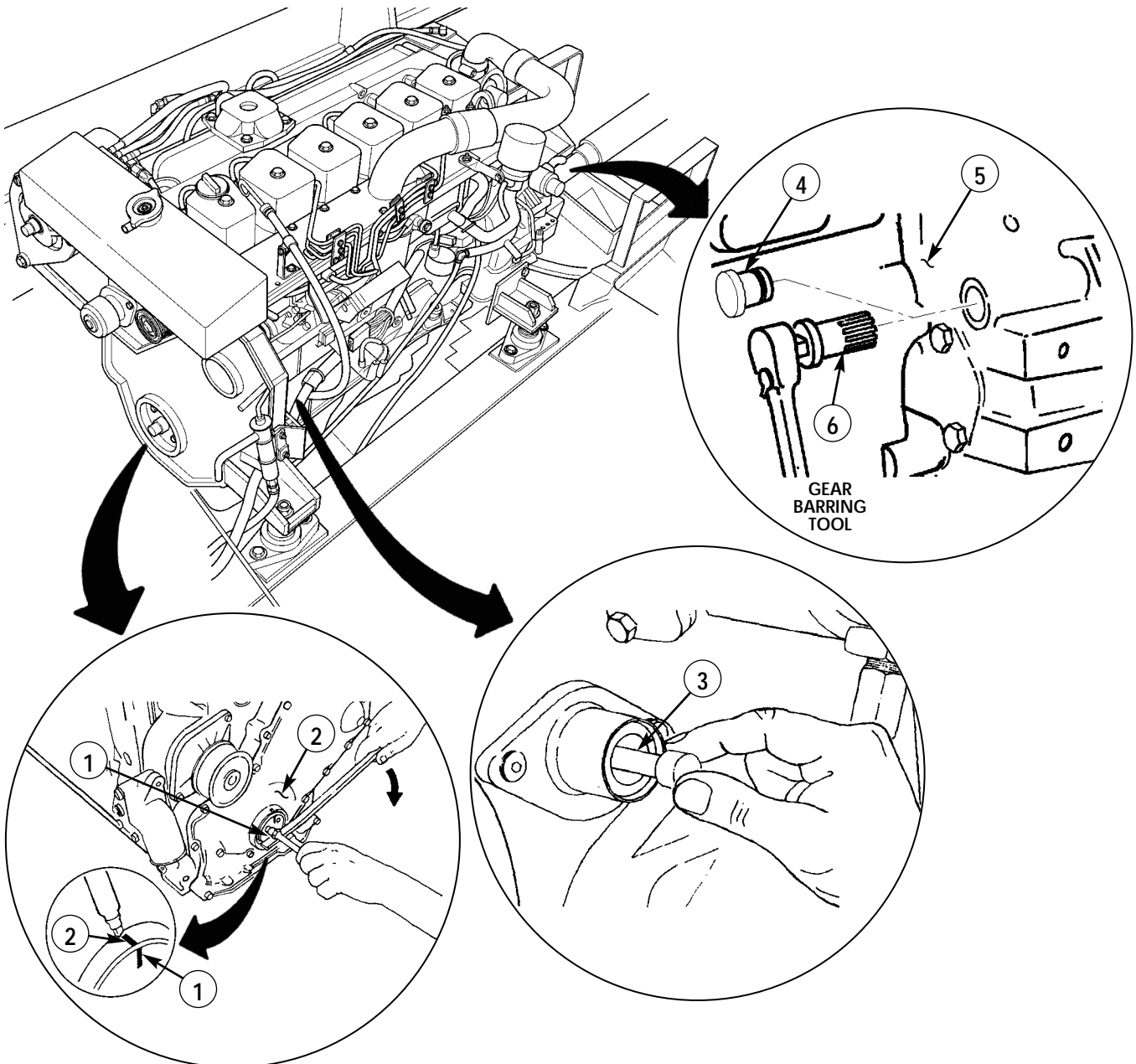
## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### ADJUSTMENT

#### NOTE

The engine valve tappets on both engines are adjusted the same way. This procedure covers the valve tappets on one engine.

1. Remove plug (4) from flywheel housing (5). Slowly rotate flywheel with gear barring tool (6) until locating pin (3) engages. This is Top Dead Center (TDC) position.
2. Disengage locating pin (3).
3. Mark engine crankshaft (1) and front cover (2).



## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### ADJUSTMENT (Contd)

**NOTE**

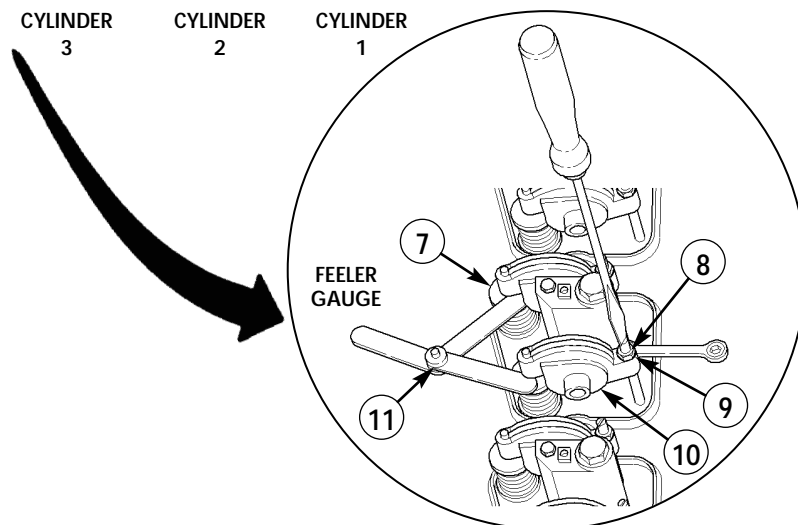
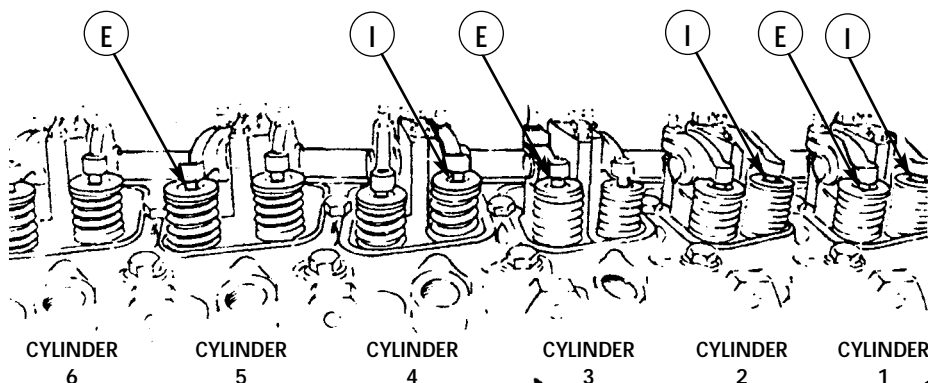
The intake valve rocker lever clearance should be adjusted to 0.010 in. (0.25 mm) The exhaust valve rocker lever clearance should be adjusted to 0.020 in. (0.51 mm).

Perform adjustment of the following tappets with cylinder number 1 at TDC compression stroke (timing pin will engage).

Valve tappet clearance is optimal when a slight drag is felt on feeler gauge being used.

4. To adjust valve tappet clearance, loosen nut (9) on adjusting screw (8). Rotate screw (8) until feeler gauge (11) is snug between rocker arm (10) and valve stem cap (7) of valve being adjusted.
5. Remove feeler gauge (11) from valve stem cap (7) and rocker arm (10). Tighten nut (9) to 18 lb-ft (24 N·m).

CYLINDER	INTAKE VALVE (I)	EXHAUST VALVE (E)
1	Set	Set
2	Set	Do not set
3	Do not set	Set
4	Set	Do not set
5	Do not set	Set
6	Do not set	Do not set



## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### ADJUSTMENT (Contd)

#### NOTE

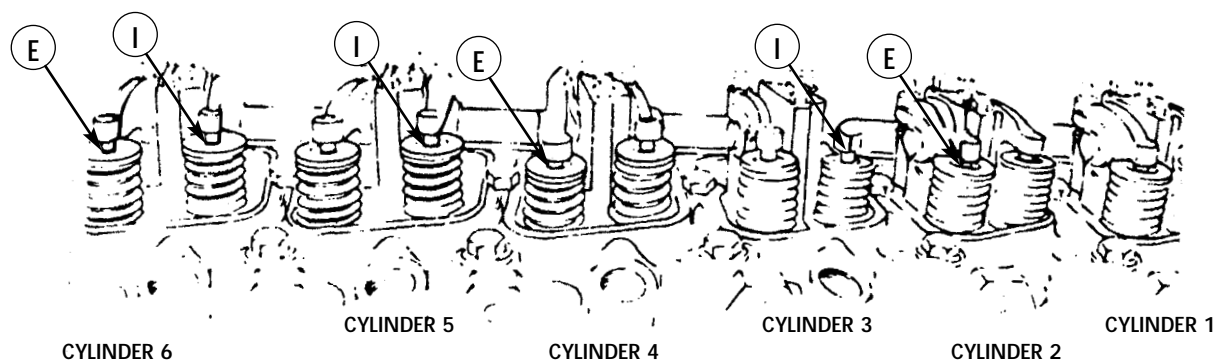
Perform adjustment of the following tappets with cylinder number 1 at TDC position plus one 360° clockwise turn.

Valve tappet clearance is optimal when a slight drag is felt on feeler gauge being used.

The intake valve rocker lever clearance should be adjusted to 0.010 in. (0.25 mm). The exhaust valve rocker lever clearance should be adjusted to 0.020 in. (0.51 mm).

6. Loosen nut (5) on adjusting screw (4) and rotate screw until feeler gauge (7) is snug between rocker arm (6) and valve stem cap (8) of valve being adjusted.
7. Remove feeler gauge (7) from valve stem cap (8) and rocker arm (6). Tighten nut (5) to 18 lb-ft (24 N·m).

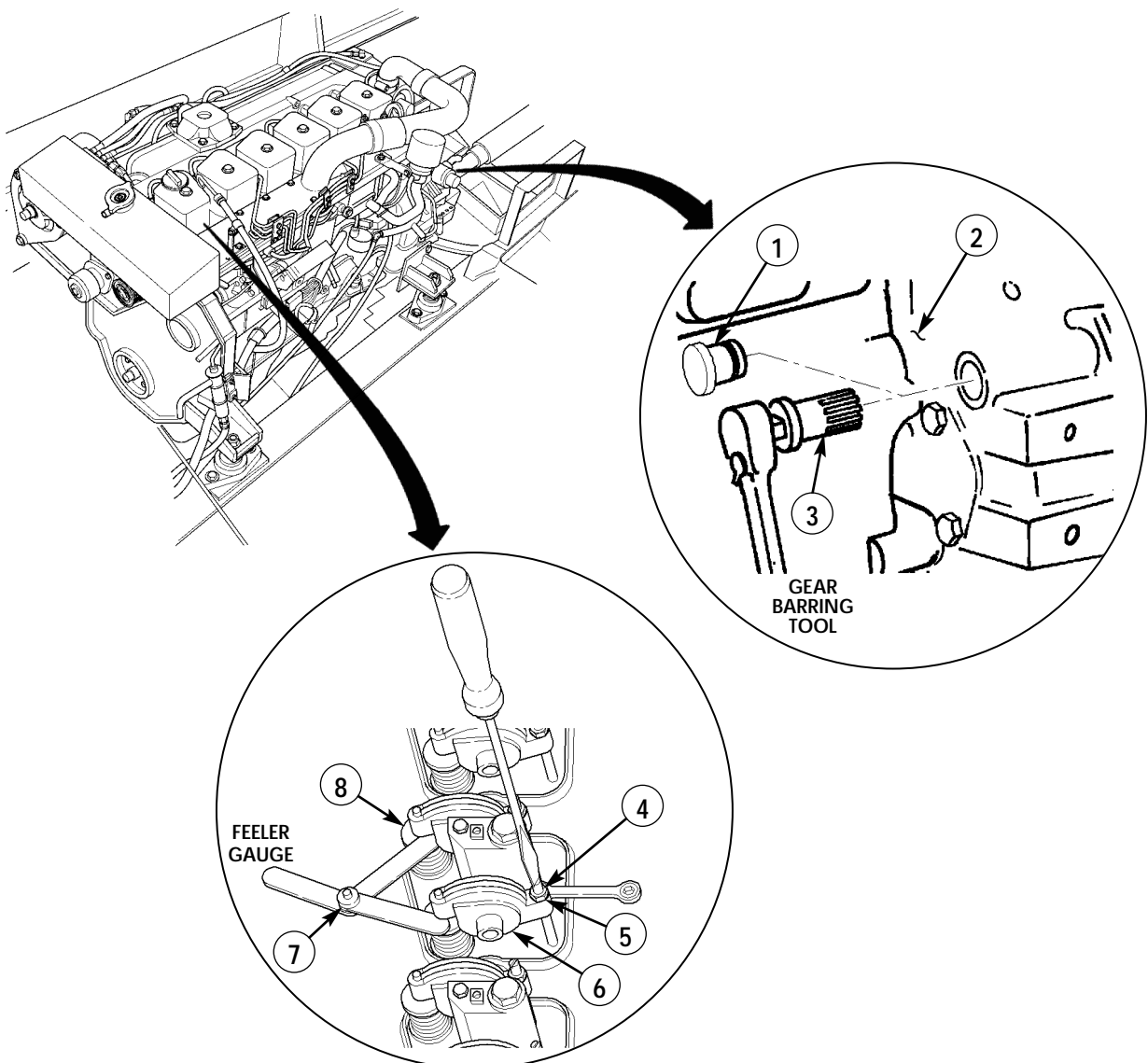
CYLINDER	INTAKE VALVE (I)	EXHAUST VALVE (E)
1	Do not set	Do not set
2	Do not set	Set
3	Set	Do not set
4	Do not set	Set
5	Set	Do not set
6	Set	Set



## ENGINE VALVE TAPPETS MAINTENANCE (Contd)

### ADJUSTMENT (Contd)

8. Remove gear barring tool (3) from flywheel housing (2).
9. Install plug (1) on flywheel housing (2).
10. Install camshaft (WP 0158 00).
11. Install front gear housing cover (WP 0155 00).
12. Install vibration damper (WP 0111 00).
13. Install rocker arms (WP 0109 00).
14. Install valve covers (WP 0108 00).
15. Install coolant reservoir and hose (WP 0066 00).
16. Close engine hatches (TM 5-1940-322-10).



END OF WORK PACKAGE

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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TIMING PIN AND HOUSING REPLACEMENT

#### REMOVAL AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward repair system (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)

##### Equipment Condition

Engine hatches opened and secured  
(TM 5-1940-322-10).

##### Materials/Parts

Retaining ring (item 160, WP 0173 00)  
Gasket (item 161, WP 0173 00)  
O-ring (item 162, WP 0173 00)  
Grease (item 14, WP 0171 00)

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## TIMING PIN AND HOUSING REPLACEMENT (Contd)

### NOTE

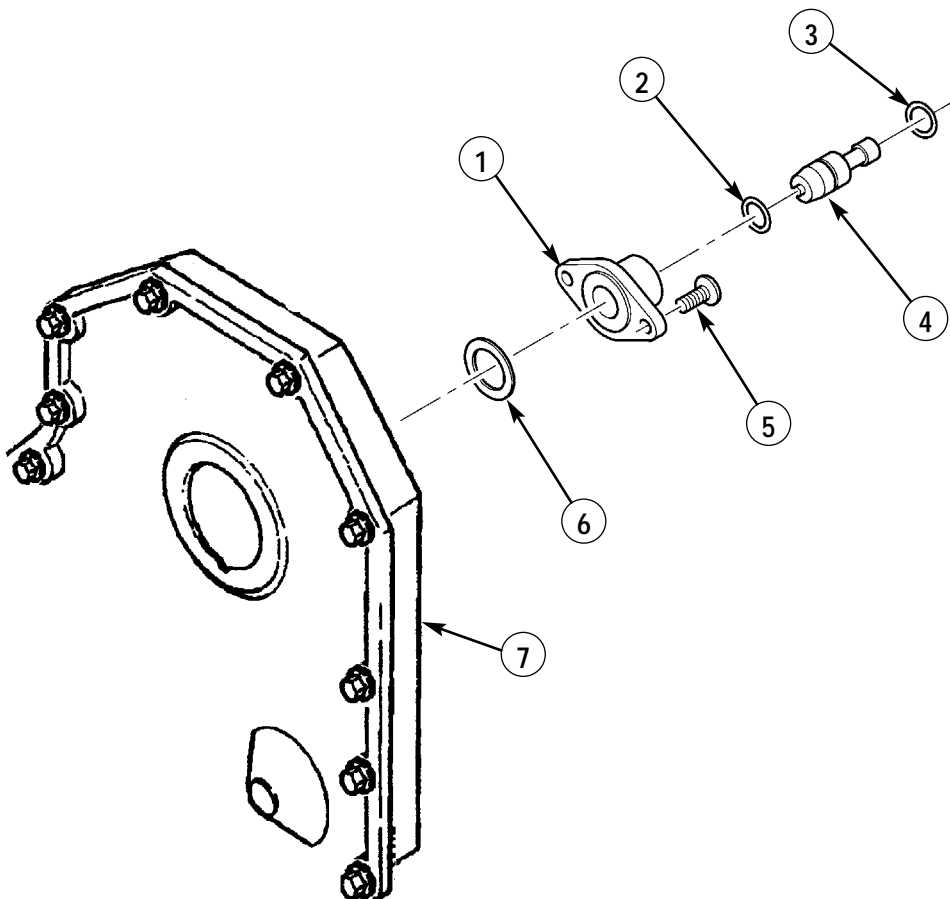
Port and starboard engine timing pins and housings are replaced the same way. This procedure covers the replacement of one timing pin and housing.

### REMOVAL

1. Remove two screws (5), timing pin (4), housing (1), and gasket (6) from engine gear housing (7). Discard gasket (6).
2. Remove timing pin (4) and O-ring (2) from timing pin housing (1). Discard O-ring (2).
3. Remove retaining ring (3) from timing pin housing (1). Discard retaining ring (3).

### INSTALLATION

1. Install new retaining ring (3) in timing pin housing (1).
2. Apply coat of grease to new O-ring (2) and install new O-ring (2) and timing pin (4) in timing pin housing (1).
3. Install new gasket (6) and timing pin housing (1) with timing pin (4) on engine gear housing (7) with two screws (5). Tighten screws (5) to 48 lb-in. (5 N·m).
4. Close engine hatches (TM 5-1940-322-10).





## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CYLINDER BLOCK MAINTENANCE

#### REMOVAL, CLEANING AND INSPECTION, INSTALLATION

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
 (item 13, WP 0172 00) or  
 Common No. 1 tool kit (item 41, WP 0172 00)  
 Telescoping gauge set (item 60, WP 0172 00)  
 Micrometer set (item 59, WP 0172 00)  
 Dial bore gauge kit (item 14, WP 0172 00)  
 Driver, expansion plug (item 10, WP 0172 00)  
 Driver, cup plug (item 9, WP 0172 00)  
 Handle, cap plug (item 16, WP 0172 00)  
 Installer, cup plug (item 21, WP 0172 00)  
 Installer, cup plug (item 22, WP 0172 00)  
 Installer, cup plug (item 23, WP 0172 00)  
 Slide hammer  
 Drill motor  
 Drills  
 Wire brushes

##### Materials/Parts

O-ring (item 167, WP 0173 00)  
 Five expansion plugs (item 179, WP 0173 00)  
 Four expansion plugs (item 180, WP 0173 00)  
 Three expansion plugs (item 181, WP 0173 00)  
 Expansion plug (item 182, WP 0173 00)  
 Expansion plug (item 183, WP 0173 00)  
 Three expansion plugs (item 184, WP 0173 00)  
 Expansion plug (item 185, WP 0173 00)  
 Skysol 100 (item 12, WP 0171 00)  
 Cloth (item 8, WP 0171 00)

##### Materials/Parts (Contd)

Engine oil (item 16, WP 0171 00)  
 Sealing compound (item 36, WP 0171 00)  
 Adhesive (item 2, WP 0171 00)  
 Transmission oil (item 19, WP 0171 00)  
 Antifreeze (item 5, WP 0171 00)

##### Equipment Condition

Engine oil, transmission oil, and coolant drained  
 (WP 0012 00).  
 Engine wiring harness disconnected  
 (WP 0083 00).  
 Engine removed from boat (WP 0115 00).  
 Flywheel, flywheel housing, and crankshaft rear  
 seal removed (WP 0157 00).  
 Fuel injection pump removed (WP 0084 00).  
 Fuel lift pump removed (WP 0103 00).  
 Rocker arm assemblies and push rods removed  
 (WP 0109 00).  
 Front gear housing cover, crankshaft front seal,  
 and front gear housing removed (WP 0155 00).  
 Cylinder head removed (WP 0101 00).  
 Oil pan and suction tube removed (WP 0154 00).  
 Pistons and connecting rods removed  
 (WP 0152 00).  
 Crankshaft and crankshaft gear removed  
 (WP 0156 00).  
 Valve tappets removed (WP 0161 00).

## CYLINDER BLOCK MAINTENANCE (Contd)

### REMOVAL

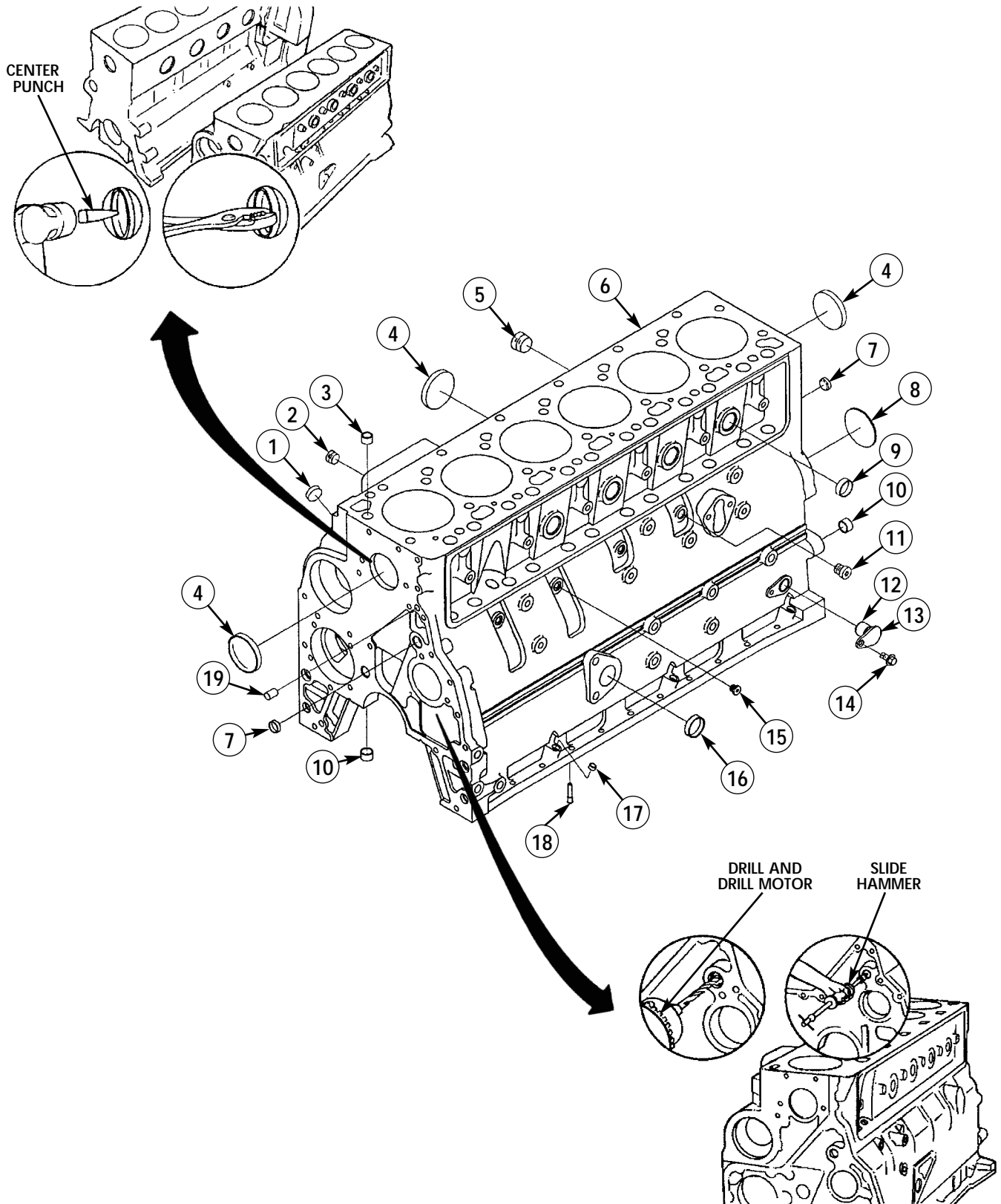
#### **CAUTION**

Do not allow expansion plugs to be driven into block. If expansion plug will not pivot in opening, it may be necessary to drill a small hole in expansion plug and use a slide hammer to pull expansion plug from cylinder block. Failure to comply may result in damage to equipment.

Do not allow metal shavings to fall into engine when drilling a hole in expansion plug. Failure to comply may result in damage to equipment.

1. Using center punch, drive in one corner of expansion plug (4) so expansion plug (4) will pivot in opening. Pull expansion plug (4) from cylinder block (6). Repeat this step to remove remaining four expansion plugs (4) from cylinder block (6). Discard expansion plugs (4).
2. Using center punch, drive in one corner of expansion plug (9) so expansion plug (9) will pivot in opening. Pull expansion plug (9) from cylinder block (6). Repeat this step to remove remaining three expansion plugs (9) from cylinder block (6). Discard expansion plugs (9).
3. Using center punch, drive in one corner of expansion plug (7) so expansion plug (7) will pivot in opening. Pull expansion plug (7) from cylinder block (6). Repeat this step to remove remaining two new expansion plugs (7) from cylinder block (6). Discard new expansion plugs (7).
4. Using center punch, drive in one corner of expansion plug (17) so expansion plug (17) will pivot in opening. Pull expansion plug (17) from cylinder block (6). Repeat this step to remove remaining two new expansion plugs (17) from cylinder block (6). Discard new expansion plugs (17).
5. Using center punch, drive in one corner of expansion plug (8) so expansion plug (8) will pivot in opening. Pull expansion plug (8) from cylinder block (6). Repeat this step to remove remaining new expansion plugs (1) and (16) from cylinder block (6). Discard new expansion plugs (1), (8), and (16).
6. Remove three threaded plugs (15) from cam side of cylinder block (6).
7. Remove threaded plug (11) from cam side of cylinder block (6).
8. Remove pipe plugs (5) and (2) from cylinder block (6).
9. Remove screw (14), plug (13), and O-ring (12) from cylinder block (6). Discard O-ring (12).
10. If damaged, remove two dowel pins (19) from front of cylinder block (6).
11. If damaged, remove six piston cooling nozzles (18) from underside of cylinder block (6).
12. If damaged, remove two dowel rings (3) from top of cylinder block (6).
13. If damaged, remove fourteen dowel rings (10) from underside of cylinder block (6) and two dowel rings (10) from rear end of cylinder block (6).

### CYLINDER BLOCK MAINTENANCE (Contd)



## CYLINDER BLOCK MAINTENANCE (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instruction, refer to WP 0013 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean cylinder block (1) using wire brush and Skysol 100, dry with clean cloth, and apply light coat of oil to all unpainted surfaces.

#### **WARNING**

Compressed air source must not exceed 30 psi (207 kPa). Wear eyeshields when cleaning with compressed air. Failure to wear eyeshields may result in injury to personnel.

3. Clean all oil passages in cylinder block (1) using wire brush and Skysol 100. Blow out oil passages with compressed air.
4. Clean all expansion plug openings and threaded holes with Skysol 100.
5. Inspect cylinder block (1) for cracks or damage. Replace cylinder block (1) if cracked or damaged.
6. Measure overall flatness of cylinder block deck surface with straightedge and feeler gauge from end-to-end and side-to-side. Flatness must not exceed 0.003 in. (0.075 mm). If deck surface is not within limits, cylinder block deck surface must be ground/milled or cylinder block (1) replaced.
7. Inspect cylinder block deck for any localized dips or imperfections. Cylinder block deck must be milled/ground if dips or imperfections are present.

#### **NOTE**

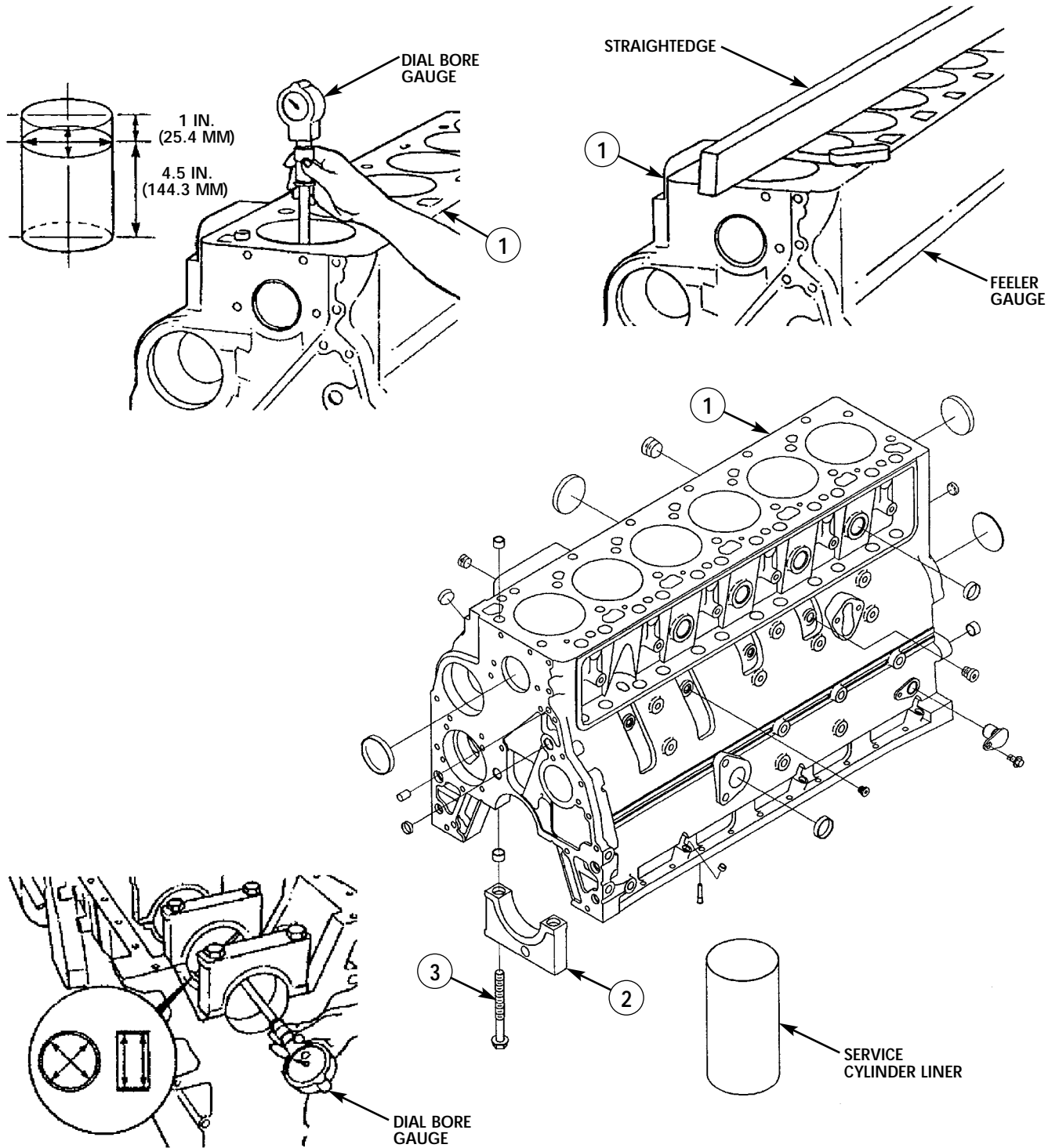
Perform steps 8, 9, and 10 to check cylinder block bores. If bores are not within limits, cylinder block can be bored out for oversize service pistons or service cylinder liners using standard pistons.

8. Using dial bore gauge kit, measure cylinder bore diameter at 1 in. (25.4 mm) and 6.7 in. (170.7 mm) from top of cylinder block deck.
9. Bore I.D. maximum is 4.0203 in. (102.116 mm).
10. Bore out-of-round maximum is 0.0014 in. (0.035 mm).
11. Bore taper maximum is 0.003 in. (0.076 mm).
12. If not installed, install all crankshaft main bearing caps (2) and tighten mounting bolts (3) before measuring main bearing bores. Maximum main bearing bore measurement is 3.272 in. (83.106 mm). If bore is not within limits, cylinder block (1) and main bearing caps (2) must be machine line bored for oversize bearings or cylinder block (1) must be replaced.

CYLINDER BLOCK MAINTENANCE (Contd)

CLEANING AND INSPECTION (Contd)

13. Inspect and thoroughly clean all expansion plug holes. Check areas for damage or cracks. Replace cylinder block (1) if damaged or cracked.



## CYLINDER BLOCK MAINTENANCE (Contd)

### INSTALLATION

1. If removed, install fourteen dowel rings (10) on underside of cylinder block (6) and two dowel rings (10) on rear of cylinder block (6).
2. If removed, install two dowel rings (3) on top of cylinder block (6).
3. If removed, install six piston cooling nozzles (18) on underside of cylinder block (6).
4. If removed, install two dowel pins (19) on front of cylinder block (6).
5. Apply coat of engine oil to new O-ring (12) and install O-ring (12) and plug (13) on cylinder block (6) with screw (14).
6. Apply coat of sealing compound to pipe plugs (2) and (5) and install pipe plugs (2) and (5) on cylinder block (6).
7. Apply coat of sealing compound to threaded plug (11) and install threaded plug (11) on cam side of cylinder block (6).
8. Apply coat of sealing compound to three threaded plugs (15) and install threaded plugs (15) on cam side of cylinder block (6).

### **CAUTION**

Do not install new expansion plugs too deeply into cylinder block. If expansion plug is not installed straight and flat, it must be removed and replaced with a new expansion plug. Failure to comply may result in damage to equipment.

Allow sealing compound to dry for a minimum of two hours before engine is operated or sealing compound can run back into engine. Failure to comply may result in damage to equipment.

### **NOTE**

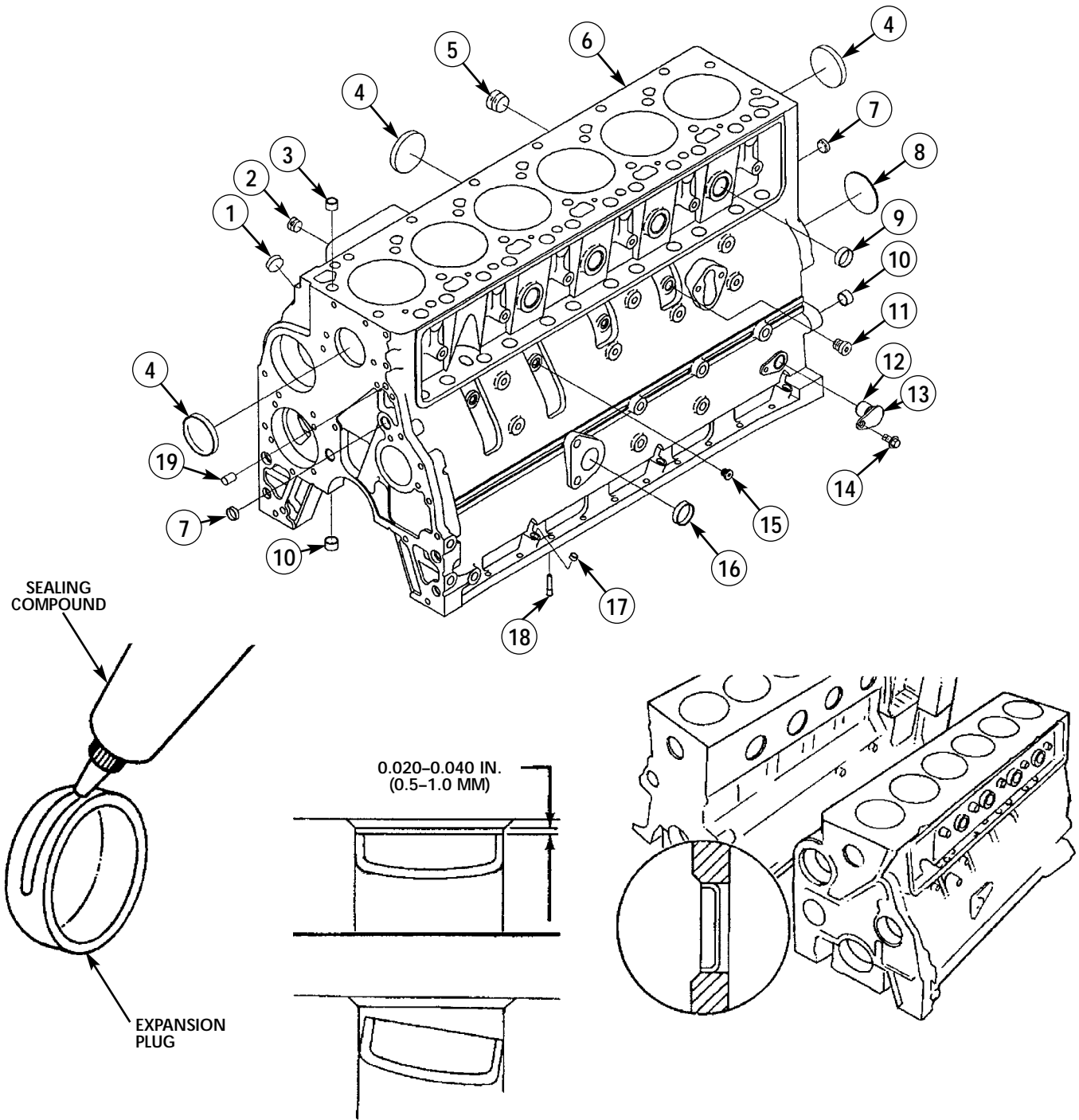
Apply a 1/16-in. (2 mm) bead of sealing compound around outside circumference of all new expansion plugs and inside circumference of plug bores before installation of new expansion plugs.

9. Using cap plug handle and appropriate cup plug installer, install new expansion plugs (1), (8), and (16) in cylinder block (6) with expansion plug outer edge 0.020–0.040 in. (0.5–1.0 mm) deeper than leading chamfer of bore.
10. Using cap plug handle and appropriate cup plug installer, install three new expansion plugs (17) in cylinder block (6) with expansion plug outer edge 0.020–0.040 in. (0.5–1.0 mm) deeper than leading chamfer of bore.
11. Using cap plug handle and appropriate cup plug installer, install three new expansion plugs (7) in cylinder block (6) with expansion plug outer edge 0.020–0.040 in. (0.5–1.0 mm) deeper than leading chamfer of bore.
12. Using cap plug handle and appropriate cup plug installer, install four new expansion plugs (9) in cylinder block (6) with expansion plug outer edge 0.020–0.040 in. (0.5–1.0 mm) deeper than leading chamfer of bore.
13. Using cap plug handle and appropriate cup plug installer, install five new expansion plugs (4) in cylinder block (6) with expansion plug outer edge 0.020–0.040 in. (0.5–1.0 mm) deeper than leading chamfer of bore.
14. Install valve tappets (WP 0161 00).
15. Install crankshaft and crankshaft gear (WP 0156 00).
16. Install pistons and connecting rods (WP 0152 00).
17. Install oil pan and suction tube (WP 0154 00).
18. Install cylinder head (WP 0101 00).
19. Install front gear housing, crankshaft front seal, and front gear housing cover (WP 0155 00).
20. Install rocker arm assemblies and pushrods (WP 0109 00).
21. Install fuel lift pump (WP 0103 00).
22. Install fuel injection pump (WP 0084 00).

### CYLINDER BLOCK MAINTENANCE (Contd)

#### INSTALLATION (Contd)

23. Install crankshaft rear seal, flywheel housing, and flywheel (WP 0157 00).
24. Install engine in boat (WP 0115 00).
25. Connect engine wiring harness (WP 0083 00).
26. Fill engine with oil, transmission with oil, and fill cooling system (WP 0012 00).



END OF WORK PACKAGE





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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TURBOCHARGER REPAIR

#### DISASSEMBLY, CLEANING AND INSPECTION, AND ASSEMBLY

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##### INITIAL SETUP:

###### Tools and Special Tools

Forward repair system (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Vise (item 50, WP 0172 00)

###### Materials/Parts

Four retaining rings (item 127, WP 0173 00)  
Two bearings (item 2, WP 0173 00)  
Two sealing washers (item 147, WP 0173 00)  
Two sealing washers (item 148, WP 0173 00)  
Gasket (item 24, WP 0173 00)  
O-ring seal (item 101, WP 0173 00)  
Ring seal (item 134, WP 0173 00)  
Split ring seal (item 152, WP 0173 00)  
Split ring seal (item 153, WP 0173 00)  
Thrust bearing (item 157, WP 0173 00)  
Thrust collar (item 158, WP 0173 00)

###### Materials/Parts (Contd)

Cloth (item 8, WP 0171 00)  
Crocus cloth (item 9, WP 0171 00)  
Engine oil (item 16, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

###### References

WP 0013 00

###### Equipment Condition

Battery hatch opened and secured  
(TM 5-1940-322-10).  
Battery ground cables disconnected  
(WP 0054 00).  
Engine hatches opened and secured  
(TM 5-1940-322-10).  
Air cleaner removed (WP 0104 00).  
Turbocharger and lines removed (WP 0107 00).

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## TURBOCHARGER REPAIR (Contd)

### DISASSEMBLY

1. Clamp turbocharger in suitable vise. Scribe alignment mark on compressor housing (1) and turbine housing (29) to aid in assembly.
2. Remove four screws (16) and clamping plates (17) from turbine housing (29).
3. Remove nut (3) and clamp (2) securing compressor housing (1) to diffuser (7).
4. Remove nut (5) and impeller (6) from shaft and wheel (22).
5. Remove four screws (23) securing bearing housing (32) to diffuser (7).
6. Remove O-ring seal (4) and ring seal (8) from diffuser (7). Discard O-ring seal (4) and ring seal (8).
7. Remove split ring seal (9), oil slinger (10), and oil baffle (11) from shaft and wheel (22). Discard split ring seal (9).
8. Remove three screws (33), thrust bearing (12), and thrust collar (13) from bearing housing (32). Discard thrust bearing (12) and thrust collar (13).
9. Remove retaining rings (14) and bearing (15) from shaft and wheel (22). Discard bearing (15) and retaining rings (14).
10. Remove shaft and wheel (22) from bearing housing (32).
11. Remove retaining rings (18), bearing (19), heat shield (20), and split ring seal (21) from shaft and wheel (22). Discard retaining rings (18), bearing (19), and split ring seal (21).
12. Remove two screws (30), sealing washers (31), drain connector (25), and gasket (24) from bearing housing (32). Discard sealing washers (31) and gasket (24).
13. Remove adapter (26) and sealing washer (27) from turbine housing (29). Discard sealing washer (27).
14. Remove plug (28) and sealing washer (27) from turbine housing (29). Discard sealing washer (27).

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.

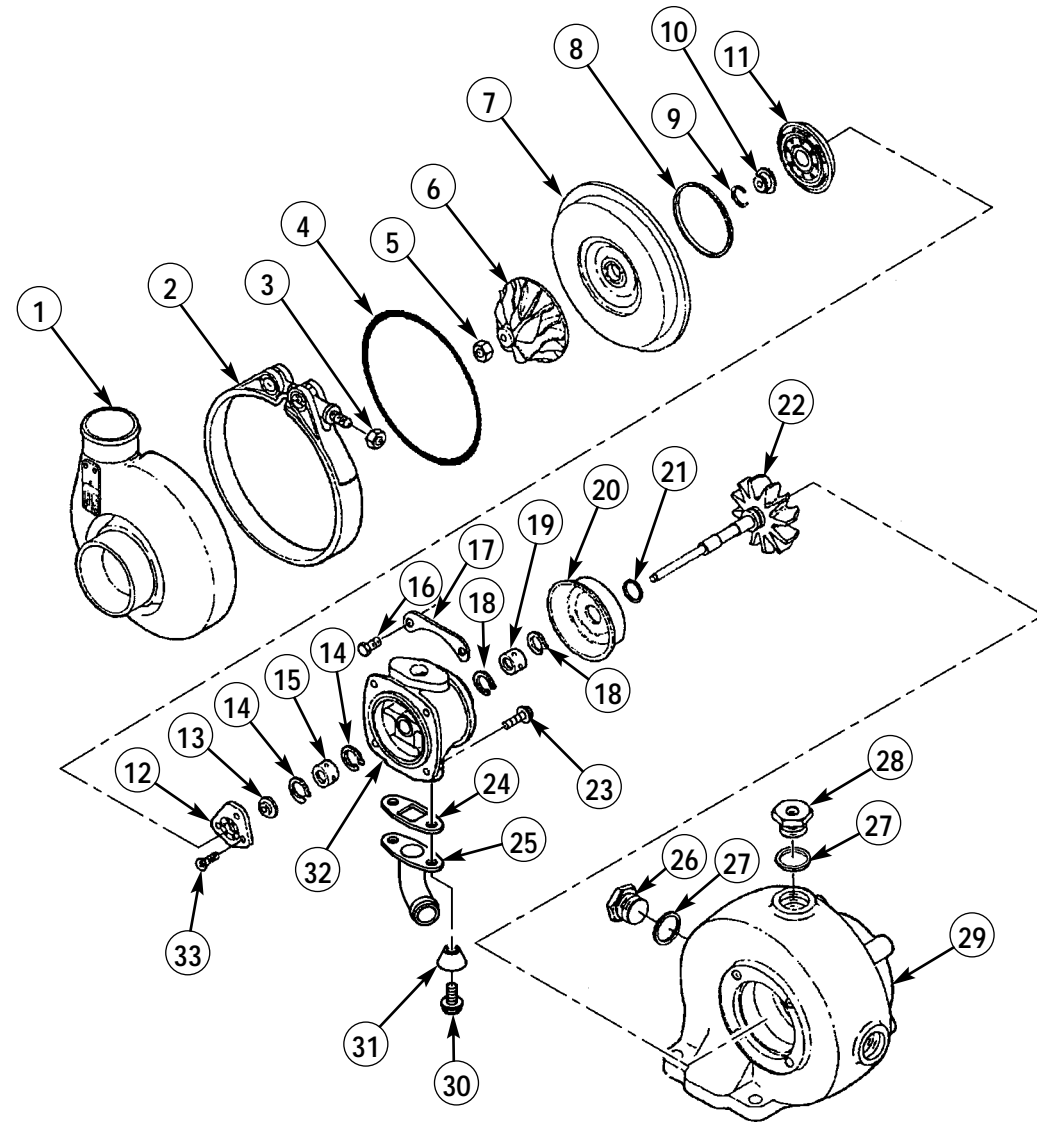
#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean all components with Skysol 100 and dry with cloth.

TURBOCHARGER REPAIR (Contd)



## TURBOCHARGER REPAIR (Contd)

### CLEANING AND INSPECTION (Contd)

3. Inspect shaft and wheel (22) for wear, scratching, and galling. Minor scratches are acceptable if they can be polished out using crocus cloth. If not acceptable, replace shaft and wheel (22).
4. Inspect turbine blades for cracks, bends, or chipped blades. Replace if defects are present.
5. Inspect bearing housing (32) for scratches and wear. Replace if unable to polish out scratches with crocus cloth.
6. Inspect compressor impeller (6) for cracks, bends, and chips. Replace if defect is present.

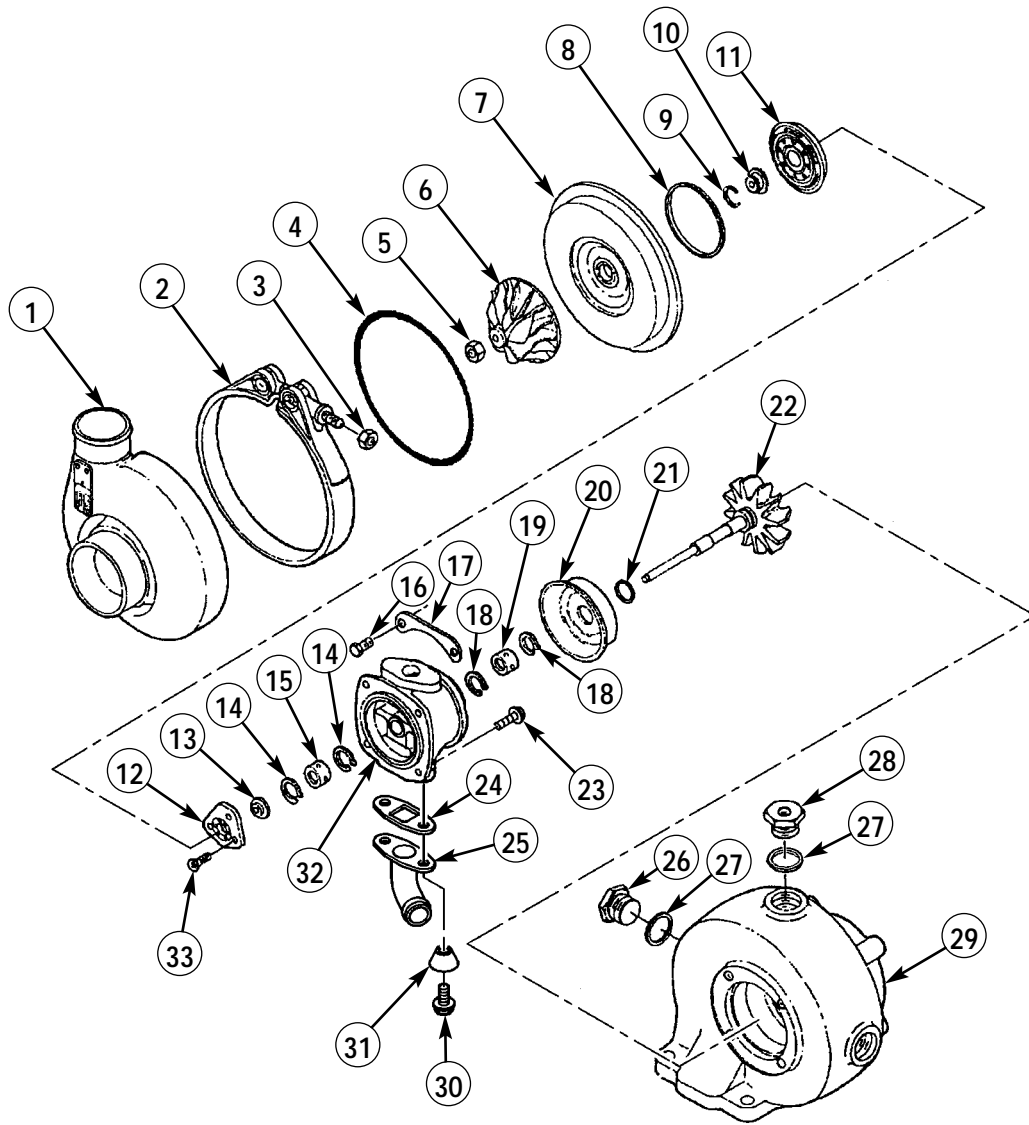
### ASSEMBLY

#### **NOTE**

Prior to assembly lubricate all parts with thin coat of engine oil.

1. Install new sealing washer (27) and plug (28) in turbine housing (29).
2. Install new sealing washer (27) and adapter (26) in turbine housing (29).
3. Install new split ring seal (21), heat shield (20), new retaining ring (18), new bearing (19), and new retaining ring (18) on shaft and wheel (22).
4. Install shaft and wheel (22) on bearing housing (32).
5. Install new retaining ring (14), new bearing (15), and new retaining ring (14) on shaft and wheel (22).
6. Install new thrust collar (13) and new thrust bearing (12) on bearing housing (32) with three screws (33).
7. Install oil baffle (11), oil slinger (10), and new split ring seal (9) on shaft and wheel (22).
8. Install new O-ring seal (4) and new ring seal (8) on diffuser (7).
9. Install bearing housing (32) on diffuser (7) with four screws (23).
10. Install impeller (6) on shaft and wheel (22) with nut (5).
11. Install bearing housing (32) on turbine housing (29) with two clamping plates (17) and four screws (16).
12. Install diffuser (7) on housing (1) with clamp (2) and nut (3).
13. Install new gasket (24) and drain connector (25) on bearing housing (32) with new sealing washers (31) and screws (30).
14. Install turbocharger and lines (WP 0107 00).
15. Install air cleaner (WP 0104 00).
16. Connect battery ground cables (WP 0054 00).
17. Start engine and check for leaks (TM 5-1940-322-10).
18. Close battery hatch (TM 5-1940-322-10).
19. Close engine hatches (TM 5-1940-322-10).

TURBOCHARGER REPAIR (Contd)



END OF WORK PACKAGE



## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION INSPECTION

HOUSING, CAST PARTS, AND MACHINED SURFACES;  
VALVE SEATS; BEARINGS; BUSHINGS AND SLEEVES;  
THRUST WASHERS AND SPACERS; GEARS; SPLINED PARTS; SNAPRINGS;  
SPRINGS; AND FLEXIBLE HOSES

#### HOUSING, CAST PARTS, AND MACHINED SURFACES

1. Replace cast parts or housings that are cracked.
2. Inspect bores for wear, grooves, scratches, and dirt. Remove burrs and scratches with crocus cloth or soft stone. Replace parts that are deeply grooved or scratched.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

3. Inspect oil passages for obstructions. Remove obstructions with compressed air or by working wire back and forth through passage and flushing it with Skysol 100.
4. Inspect machined surfaces for burrs, scratches, nicks, and foreign matter. If defects cannot be removed with crocus cloth or soft stone, replace part.
5. Inspect threaded openings for damaged threads. Chase damaged threads with correct size tap.
6. Inspect studs for damaged threads and looseness. Replace damaged studs.
7. Inspect dowel pins for wear or damage. Replace damaged dowel pins.
8. Inspect dowel pin holes for wear due to movement between mating parts. If dowel pin hole is worn, rebore and sleeve hole. If damage is excessive, replace parts.

#### VALVE SEATS

1. Inspect valve seats for burrs, nicks, and scratches. If defects cannot be removed with crocus cloth, replace part.
2. Ensure valve is seated properly after reworking valve seat.

## TRANSMISSION INSPECTION (Contd)

### BEARINGS

1. Inspect bearings for damage or roughness of rotation. Replace if damage or roughness of rotation is present.
2. Inspect bearings for corrosion; scored, scratched, cracked, pitted, or chipped races; and for indication of excessive wear of balls or rollers. If defect or damage is present, replace part.
3. Inspect bearing bores and shafts for grooved, burred, or galled conditions that indicate bearing has been turning in its housing or on its shaft. If damage cannot be repaired with crocus cloth, replace part.

### BUSHINGS AND SLEEVES

1. Inspect bushings for out-of-roundness, scores, burrs, sharp edges, and evidence of overheating.
2. Remove scores with crocus cloth.
3. If bushing is out-of-round, deeply scored, or excessively worn, replace bushing.

### THRUST WASHERS AND SPACERS

Inspect thrust washers for distortion, scores, burrs, or wear. Rework or replace if defect is present.

### GEARS

1. Inspect gears for scuffed, nicked, burred, or broken teeth. If defect cannot be removed with soft stone, replace gear.
2. Inspect gear teeth for wear that may have destroyed original tooth shape. If defect is found, replace gear.
3. Inspect thrust faces of gears for scores, scratches, and burrs. If defects cannot be removed with soft stone, replace gear.

### SPLINED PARTS

Inspect splined parts for stripped, twisted, chipped, or burred splines. Remove burrs with soft stone. If other damage is present, replace part.

### SNAPRINGS

Replace damaged or distorted snaprings.

### SPRINGS

Inspect springs for broken or distorted coils. If damage is present, replace springs.

### FLEXIBLE HOSES

Inspect flexible hoses for cracks and sponginess. If damage is present, replace hose.

END OF WORK PACKAGE



## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TRANSMISSION REPAIR

REMOVAL, CLUTCH PACK DISASSEMBLY, REAR HOUSING AND OUTPUT SHAFT DISASSEMBLY, FRONT HOUSING DISASSEMBLY, SELECTOR VALVE DISASSEMBLY, CLEANING AND INSPECTION, SELECTOR VALVE ASSEMBLY, FRONT HOUSING ASSEMBLY, REAR HOUSING AND OUTPUT SHAFT ASSEMBLY, CLUTCH PACK ASSEMBLY, AND INSTALLATION

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#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
 (item 13, WP 0172 00) or  
 Common No. 1 tool kit (item 41, WP 0172 00)  
 Clutch spring compressor  
 (item 4, WP 0172 00)  
 Hydraulic press (item 33, WP 0172 00)  
 Outer bearing pusher (item 28, WP 0172 00)  
 Piston entering sleeve (item 30, WP 0172 00)  
 SKF adapter (item 43, WP 0172 00)  
 Output gear pusher (item 29, WP 0172 00)  
 Hydraulic press (item 33, WP 0172 00)

##### Materials/Parts

Four piston rings (item 124, WP 0173 00)  
 Two piston rings (item 125, WP 0173 00)  
 Two O-rings (item 112, WP 0173 00)  
 Input oil seal (item 141, WP 0173 00)  
 Gasket (item 40, WP 0173 00)  
 Gasket (item 41, WP 0173 00)

##### Materials/Parts (Contd)

Gasket (item 39, WP 0173 00)  
 O-ring (item 113, WP 0173 00)  
 O-ring (item 114, WP 0173 00)  
 O-ring (item 115, WP 0173 00)  
 Output oil seal (item 140, WP 0173 00)  
 Cloth (item 5, WP 0171 00)  
 GAA grease (item 14, WP 171 00)  
 Oil soluble grease (item 15, WP 0171 00)  
 Skysol 100 (item 12, WP 0171 00)  
 Transmission oil (item 19, WP 0171 00)

##### References

WP 0013 00  
 WP 0157 00  
 WP 0165 00

##### Equipment Condition

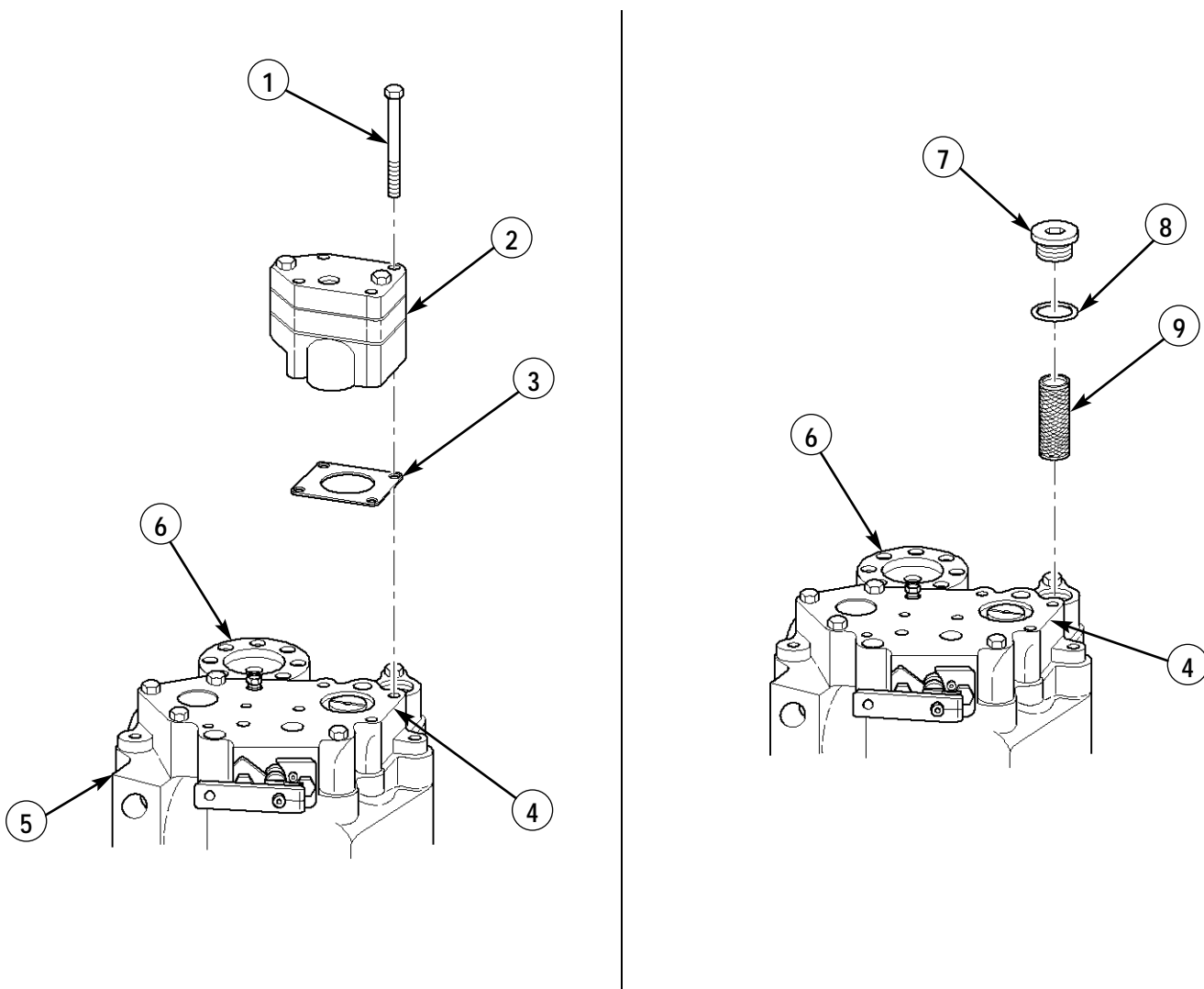
Transmission removed (WP 0125 00).  
 Transmission adapter plate removed  
 (WP 0120 00).

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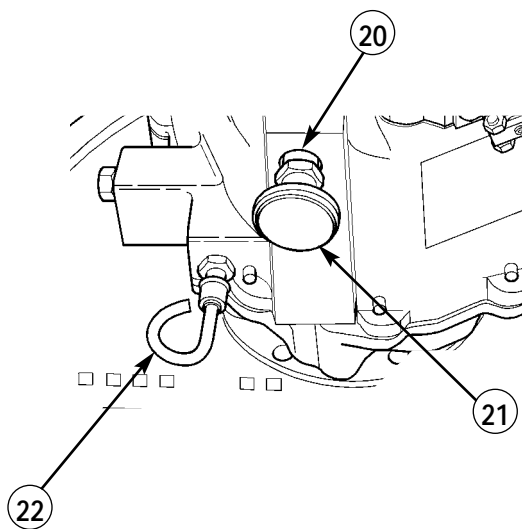
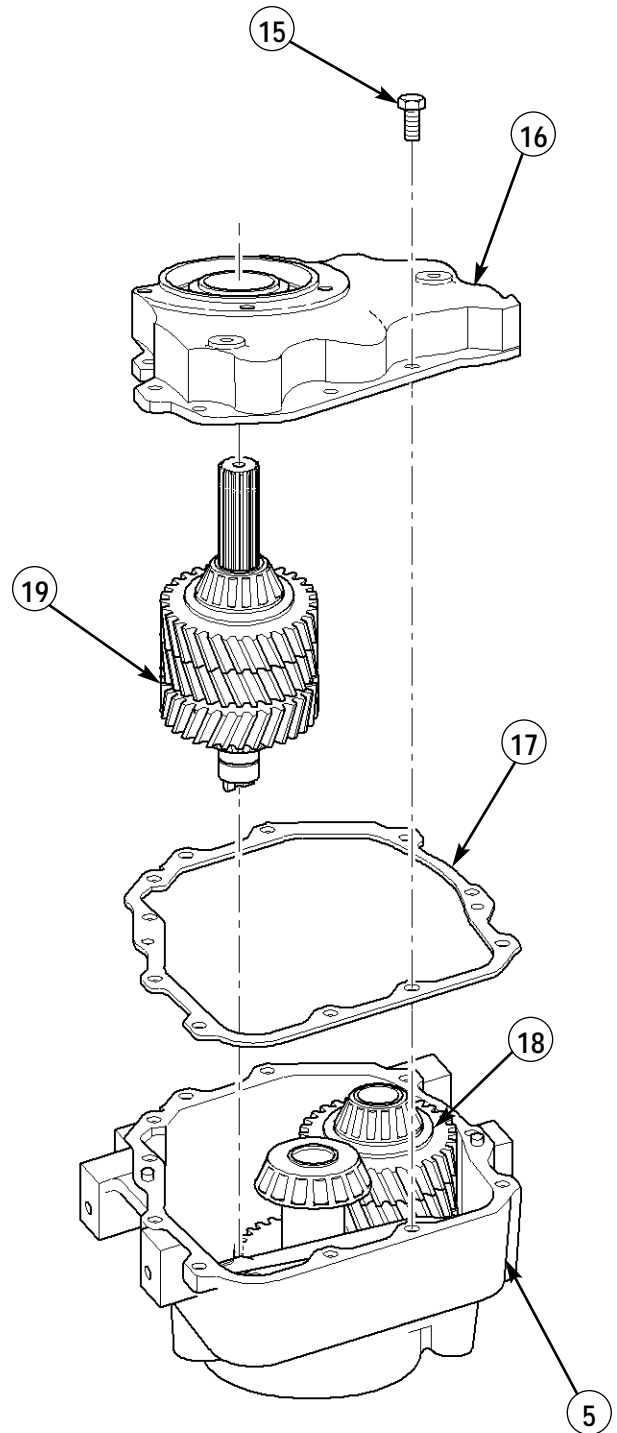
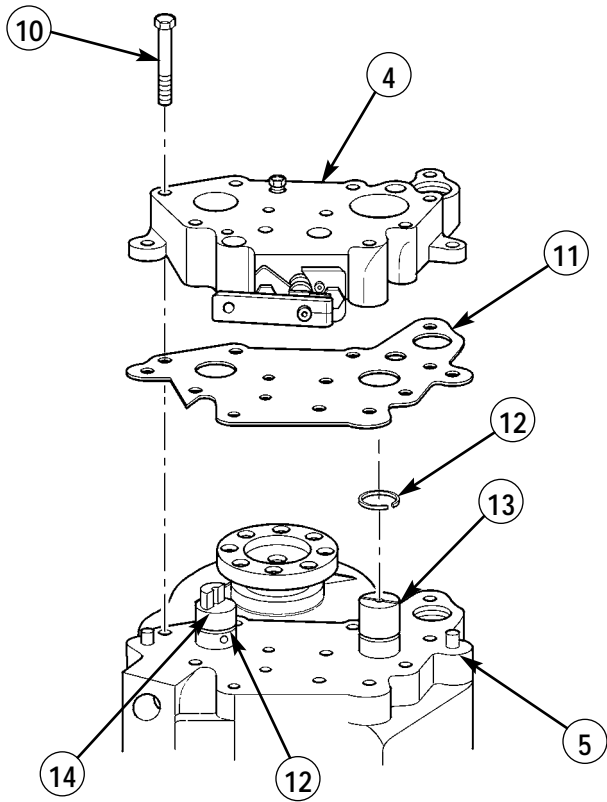
## TRANSMISSION REPAIR (Contd)

### REMOVAL

1. Place transmission housing (5) on suitable workbench with output flange (6) facing up.
2. Remove four screws (1), transmission oil pump (2), and gasket (3) from manifold (4) on transmission housing (5). Discard gasket (3).
3. Remove plug (7), O-ring (8), and filter screen (9) from manifold (4). Discard O-ring (8).
4. Remove five screws (10), manifold (4), and gasket (11) from rear half of transmission housing (5). Discard gasket (11).
5. Remove piston rings (12) from ends of shafts (13) and (14). Discard piston rings (12).
6. Turn transmission housing (5) over with rear housing side facing down and rest on suitable blocks.
7. Remove eleven screws (15), front housing (16), and gasket (17) from rear housing (5). Discard gasket (17).
8. Lift forward and reverse clutch packs (19) and (18) from rear housing (5).
9. Remove oil gauge tube (22), filler/breather plug (21), and adapter (20) from rear housing (5).



TRANSMISSION REPAIR (Contd)



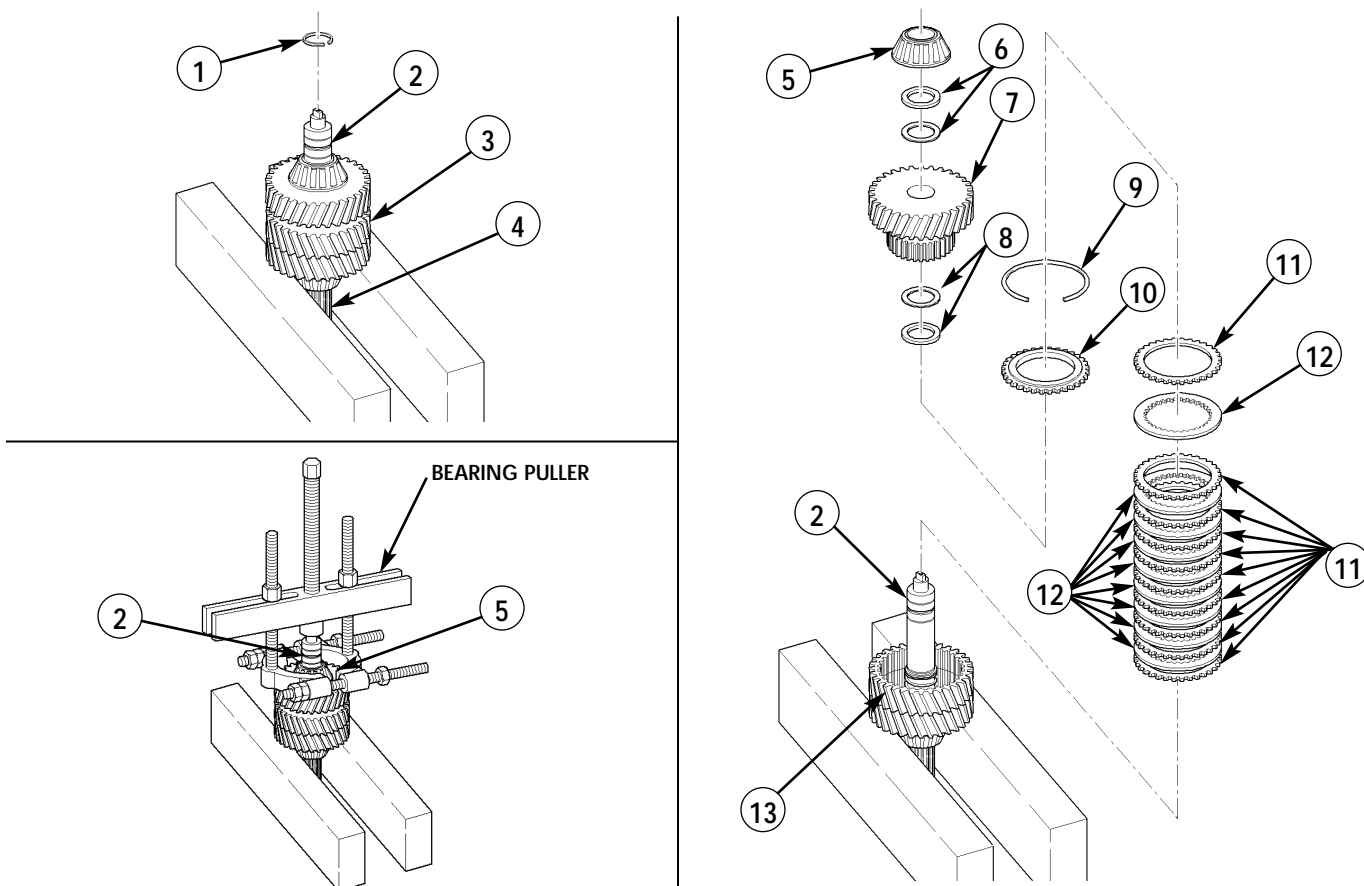
## TRANSMISSION REPAIR (Contd)

## CLUTCH PACK DISASSEMBLY

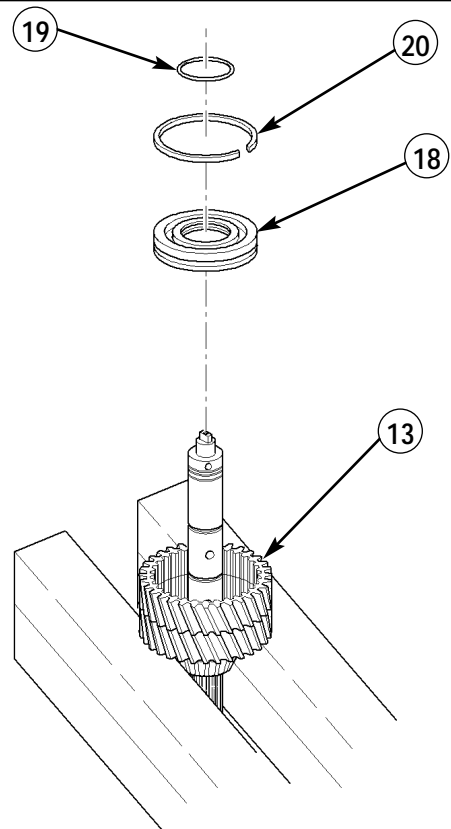
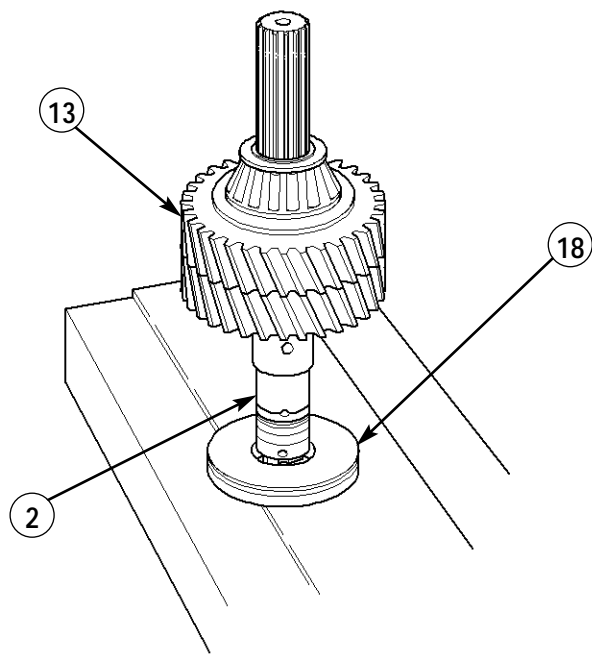
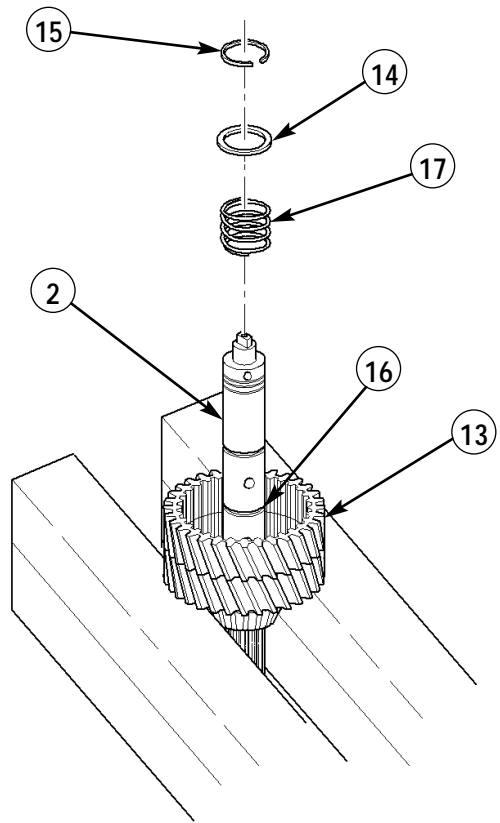
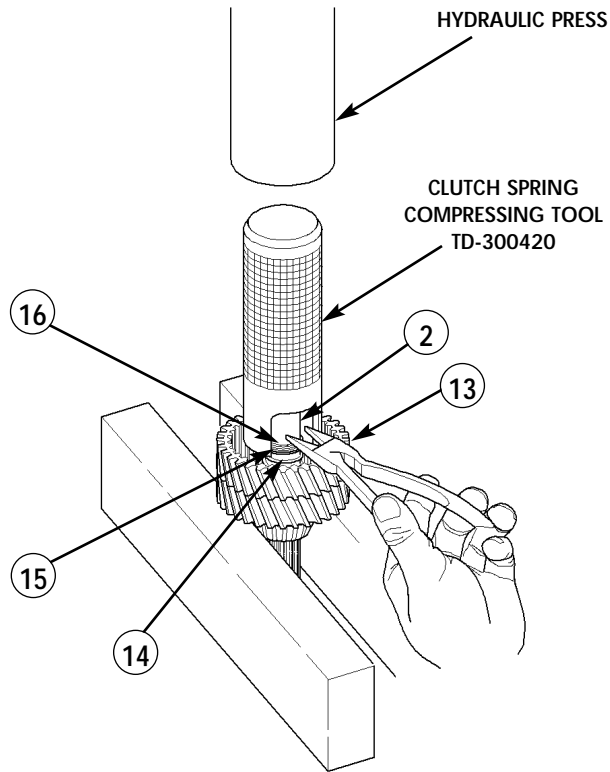
**NOTE**

Forward and reverse clutch packs are disassembled the same way.  
The forward clutch pack is shown.

1. Support forward clutch assembly (3) on workbench with drive spline (4) down between blocks.
2. Remove piston ring (1) from end of clutch shaft (2). Discard piston ring (1).
3. Using tapered bearing puller, remove rear tapered bearing (5) from clutch shaft (2).
4. Remove two thrust race washers (6), forward pinion (7), and two thrust race washers (8) from clutch shaft (2).
5. Remove snapping (9), clutch backing plate (10), and clutch plates (11) and (12) from clutch gear housing (13).
6. Support clutch gear housing (13) on hydraulic press and install clutch spring compressing tool TD-300420 over clutch shaft (2). Compress clutch spring retainer (14) until snapping (15) can be unlocked from groove (16) on clutch shaft (2).
7. Release pressure on hydraulic press and remove clutch spring compressing tool TD-300420, snapping (15), clutch spring retainer (14), and clutch spring (17) from clutch shaft (2).
8. Remove clutch piston (18) from clutch gear housing (13) by striking clutch shaft (2) end against wooden surface until clutch piston (18) dislodges from clutch gear housing (13).
9. Remove piston ring (20) and O-ring (19) from clutch piston (18). Discard piston ring (20) and O-ring (19).



TRANSMISSION REPAIR (Contd)



## TRANSMISSION REPAIR (Contd)

### CLUTCH PACK DISASSEMBLY (Contd)

#### **CAUTION**

Do not remove front-tapered roller bearings from forward or reverse clutch pack shafts unless bearing replacement is necessary. Close tolerance between inner bearing cone and transfer gear face prohibits installation of bearing puller behind inner cone.

10. If front-tapered roller bearing must be removed, perform the following steps.
  - a. Split bearing cage (2) and remove roller bearings (3) and cage (2) from bearing cone (4).
  - b. Install bearing puller over edge (5) of bearing cone (4), gripping against shoulder on bearing cone (4).

#### **CAUTION**

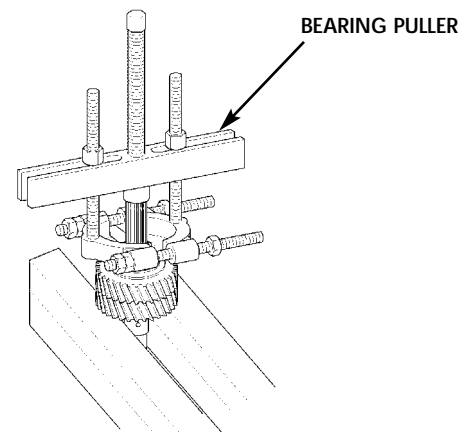
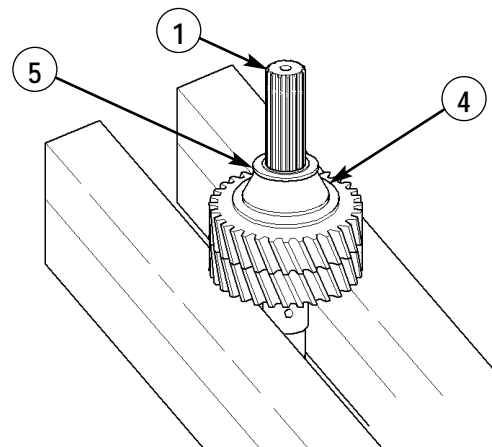
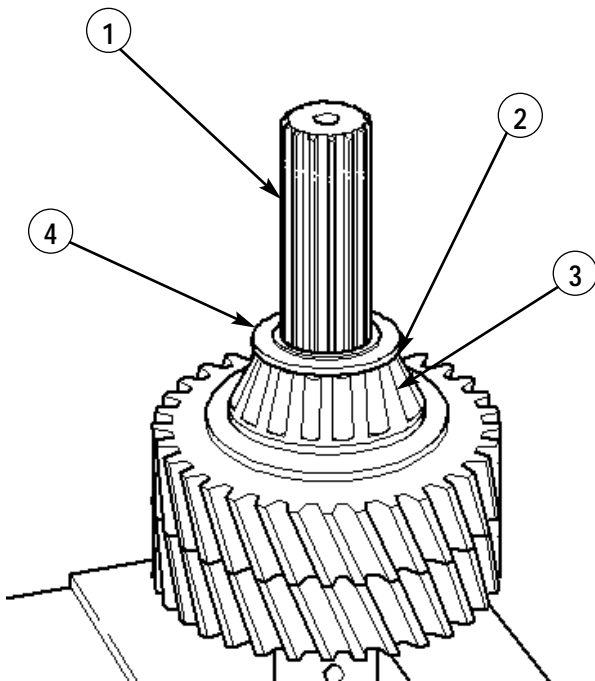
Prolonged or excessive heating must be avoided so shaft will not be annealed.

- c. Apply pulling force to puller, flash-heat bearing cone (4), and remove bearing cone (4) from clutch pack shaft (1).

#### **CAUTION**

Do not remove driving transfer gears from shafts. Shaft and gear are supplied as an assembly only.

11. Repeat steps 1 through 10 to disassemble reverse clutch pack.



## TRANSMISSION REPAIR (Contd)

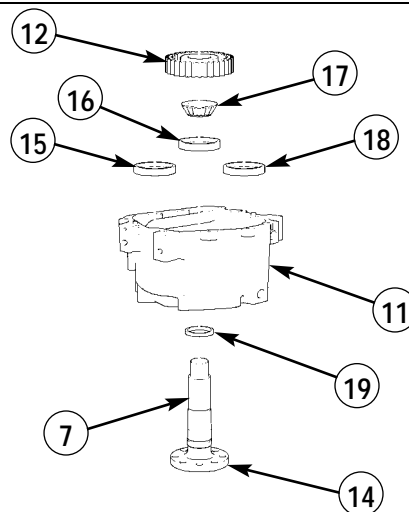
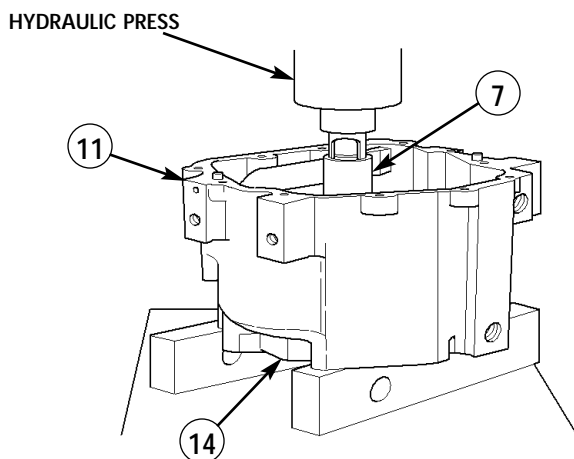
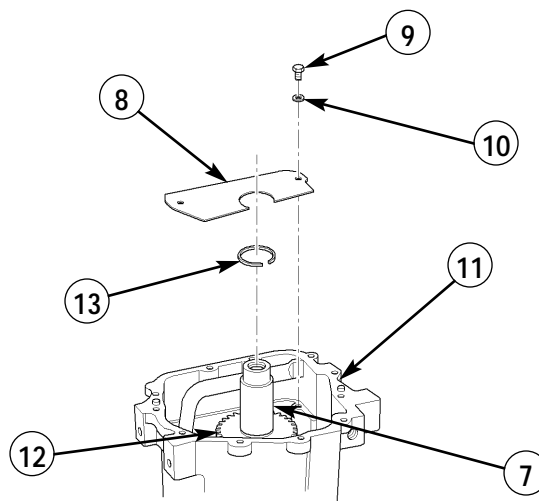
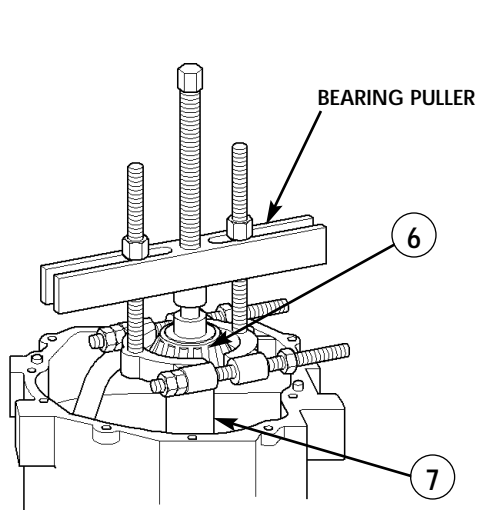
### REAR HOUSING AND OUTPUT SHAFT DISASSEMBLY

1. Using bearing puller, remove tapered roller bearing (6) from output shaft (7).
2. Remove two screws (9), washers (10), and oil pan (8) from rear housing (11).
3. Remove snapping (13) from output shaft (7).
4. Install oil injector adapter tool TD-300350 on end of output shaft flange (14).

#### **WARNING**

Gear may leave shaft with force when pressure is applied to adapter tool; restrain gear to prevent possible damage to gear and housing or injury to personal.

5. Using SKF oil injector, apply high pressure oil to adapter tool TD-300350 to remove gear (12) from tapered end of output shaft (7) and rear housing (11).
6. Turn over rear housing (11) and support on hydraulic press with output flange (14) down. Press output shaft (7) out of tapered roller bearing (17).
7. Remove tapered roller bearing outer races (15), (16), and (18) from rear housing (11).
8. Remove output shaft oil seal (19) from rear housing (11). Discard oil seal (19).



## TRANSMISSION REPAIR (Contd)

### FRONT HOUSING DISASSEMBLY

1. Remove input shaft oil seal (1) from front housing (6).

#### NOTE

Note position and number of adjusting shims removed from beneath bearing races to assist in installation.

2. Remove tapered roller bearing outer races (3), (4), and (5) and adjusting shims (2) from front housing (6).

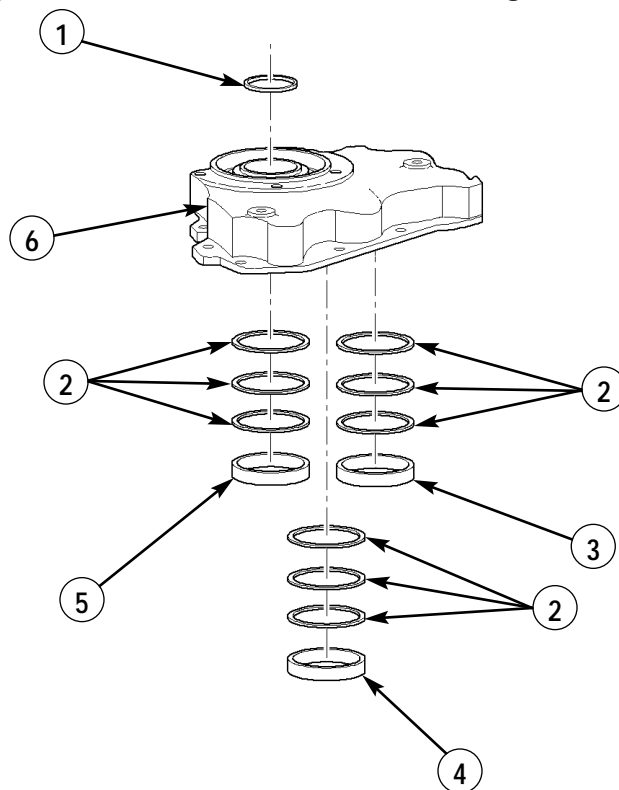
### SELECTOR VALVE DISASSEMBLY

1. Remove snapping (7) that holds selector valve bottom plug (8) in manifold (14).

#### NOTE

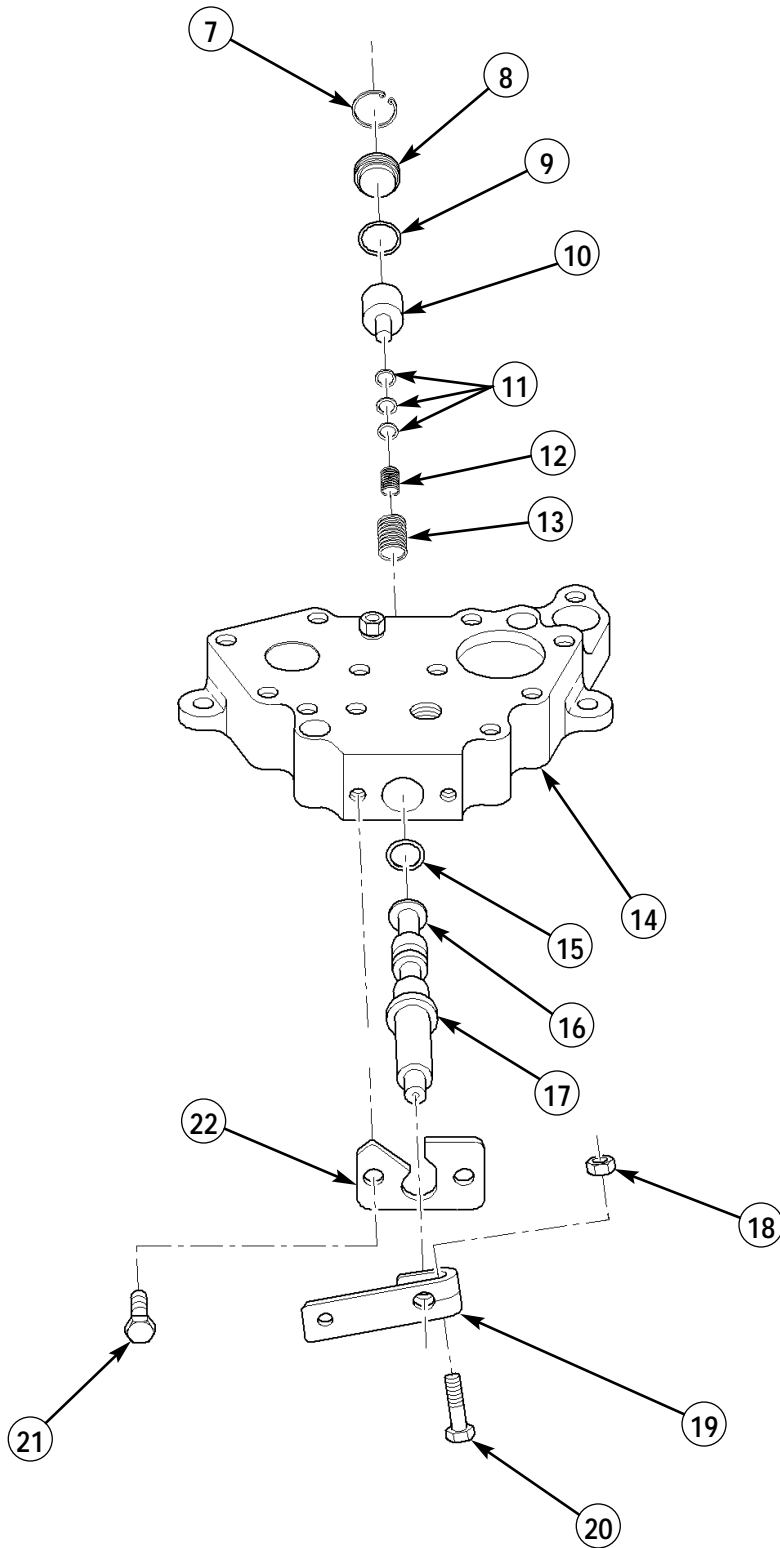
Note position and number of shims removed to assist in installation.

2. Remove bottom plug (8), O-ring (9), piston (10), outer spring (13), inner spring (12), and shims (11) from manifold (14). Discard O-ring (9).
3. Remove two screws (21) from detent plate assembly (22) and remove selector valve stem (17), detent plate (22), and pressure regulating piston (16) from manifold (14).
4. Remove detent plate (22) from selector valve stem (17).
5. Remove pressure regulating piston (16) from valve stem (17).
6. Remove nut (18), screw (20), and selector valve lever (19) from valve stem (17).
7. Remove O-ring (15) from valve stem (17). Discard O-ring (15).





TRANSMISSION REPAIR (Contd)



## TRANSMISSION REPAIR (Contd)

### CLEANING AND INSPECTION

1. For general cleaning and inspection instructions, refer to WP 0013 00.
2. For general transmission inspection, refer to WP 0165 00.

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

2. Clean excess gasket material from housing mating surfaces with Skysol 100 and dry with cloth.
3. Remove excess oil and clean inside housings with Skysol 100 and dry with cloth.
4. Inspect threaded openings in housings for damage. If threads are damaged, chase threads with correctly sized tap.
5. Inspect all oil passages for obstructions. If obstructed, clean oil passages with wire and flush with Skysol 100.
6. Inspect valve seats for burrs, nicks, and scratches. If damage is noted, replace valve seats.
7. Inspect tapered roller bearings for roughness of rotation. Replace bearings if rotation is rough.
8. Inspect bearings for corrosion, scores, scratches, cracks, pitted or chipped races, and indications of excessive roller wear. If worn or damaged, replace damaged bearing and bearing race.
9. Inspect thrust race washers and washers for distortion, scores, burrs, and wear. If damage is noted, replace thrust race washers and washers.
10. Inspect gears for scuffs, nicks, burrs, or broken teeth. If damage is noted, replace gears.
11. Inspect gear thrust faces for scores, scratches, and burrs. If damage is noted, replace gears.
12. Inspect all splines for signs of, twists, chips, or burrs. If damage is noted, replace damaged parts.
13. Inspect snaprings for distortion. Replace any distorted snaprings.
14. Inspect springs for broken or distorted coils. Replace any broken or distorted springs.

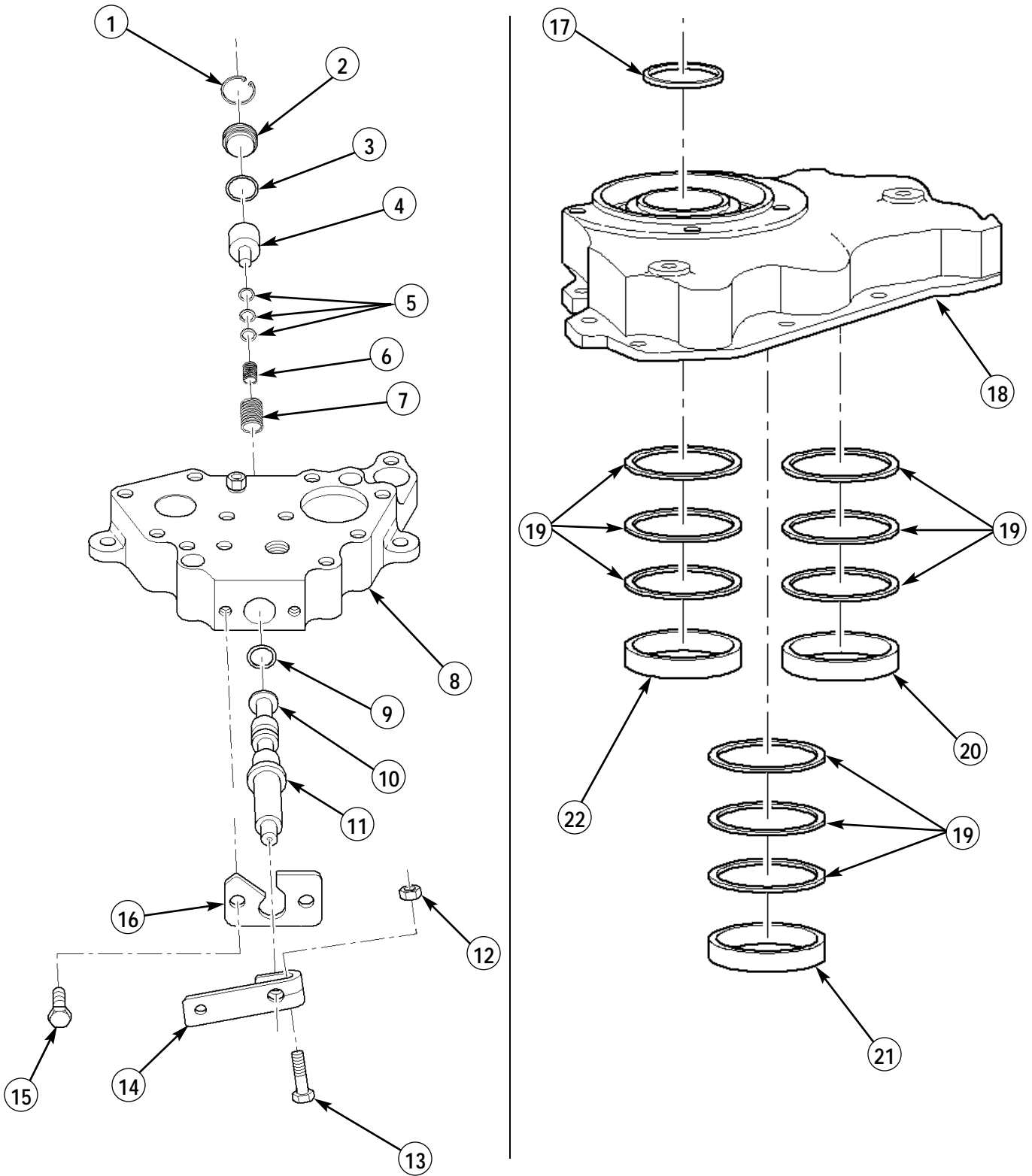
### SELECTOR VALVE ASSEMBLY

1. Install new O-ring (9), pressure regulating piston (10), and detent plate (16) on selector valve stem (11).
2. Apply light coat of grease to O-ring (9) and selector valve stem (11) and install selector valve stem (11) in manifold assembly (8) with two screws (15). Tighten screws (15) to 19 lb-ft (26 N·m).
3. Install shims (5), inner spring (6), outer spring (7), and piston (4) in manifold assembly (8) as noted at removal.
4. Install new O-ring (3) on plug (2). Apply light coat of grease to O-ring (3) and install plug (2) in manifold assembly (8) with snapring (1).
5. Install selector valve lever (14) on valve stem (11) with screw (13) and nut (12).

### FRONT HOUSING ASSEMBLY

1. Install new input shaft oil seal (17) on front housing (18).
2. Do not install adjusting shims (19) or tapered-roller bearing races (20), (21), and (22) until end play is checked.

TRANSMISSION REPAIR (Contd)



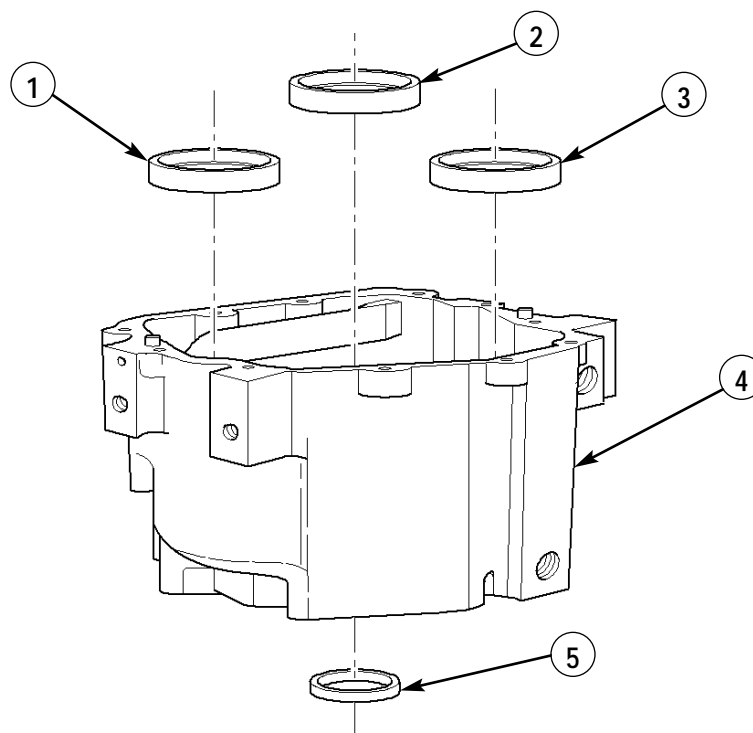
## TRANSMISSION REPAIR (Contd)

### REAR HOUSING AND OUTPUT SHAFT ASSEMBLY

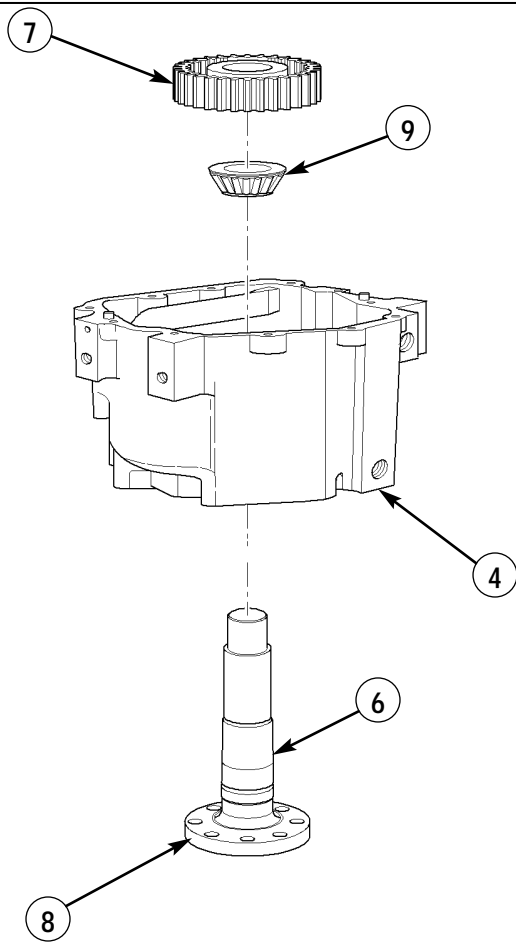
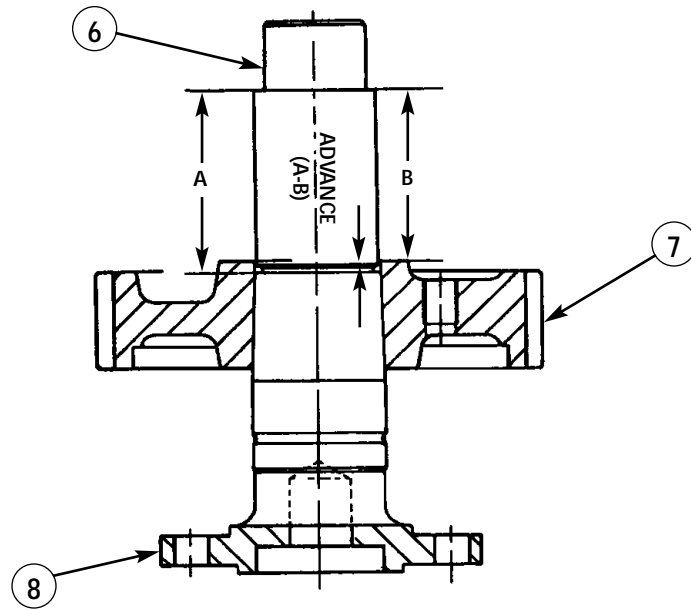
#### NOTE

Place inner bearing races and tapered-roller bearing in a 275° F (135° C) oven for 30 minutes immediately prior to installation.

1. Install new output shaft oil seal (5) on rear housing (4).
2. Install heated tapered-roller bearing races (1), (2), and (3) on rear housing (4).
3. Check preset position of output gear (7) on output shaft (6) before assembly as follows:
  - a. Measure and record distance from groove of output shaft (6) to shoulder on output shaft (6) at small end of taper (measurement A, as shown).
  - b. Place output gear (7) on output shaft (6) and install on output shaft (6) taper with 100–200 lb (45–91 kg) of force.
  - c. Measure and record distance from rear of output shaft (6) to rear face of output gear (7) (measurement B, as shown).
  - d. Subtract distance B from distance A to find preset position of output gear (7). This dimension must be between 0.064–0.096 in. (0.164–0.244 cm). Replace output gear (7) or output shaft (6) if not within limits.
4. Remove output gear (7) from output shaft (6). Apply light coat of grease to oil seal area of output shaft (6) and install output shaft (6) on rear housing (4) through output shaft oil seal (5) and tapered-roller bearing race (2).
5. Position rear housing (4) and output shaft (6) on hydraulic press with output shaft flange (8) resting on press table. Install heated tapered-roller bearing (9) on output shaft (6) and, using bearing installer tool TD-300422, install bearing (9) on output shaft (6).

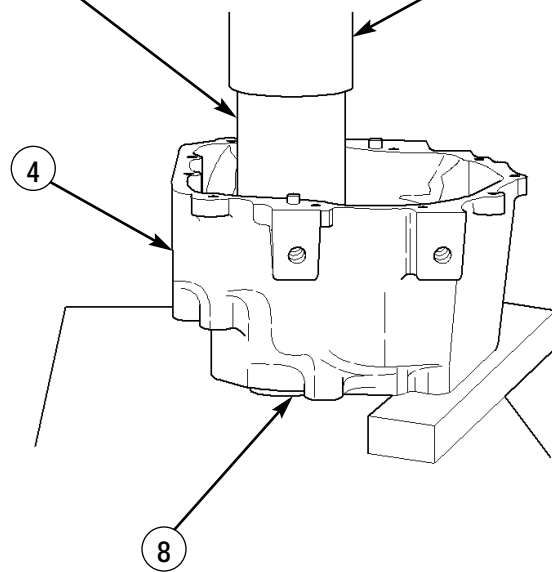


TRANSMISSION REPAIR (Contd)



BEARING  
INSTALLER  
TD-300422

HYDRAULIC PRESS



## TRANSMISSION REPAIR (Contd)

### REAR HOUSING AND OUTPUT SHAFT ASSEMBLY (Contd)

6. Install output gear (2) on output shaft (1) as follows:

#### **WARNING**

Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

- a. Clean all grease and oil from tapered area of output shaft (1) and inner taper of output gear (2) with Skysol 100.

#### **CAUTION**

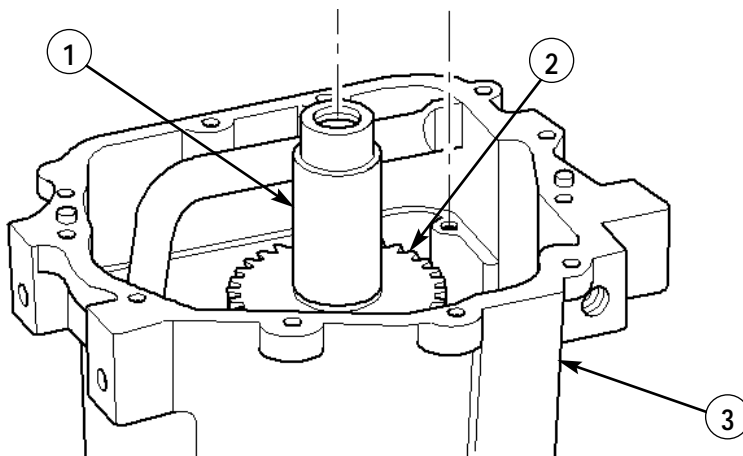
Do not chill output shaft or heat output gear; both must be at room temperature during assembly. Failure to comply may result in damage to equipment.

- b. Place output gear (2) on output shaft (1) and install on output shaft (1) taper with 100–200 lb (45–91 kg) of force.

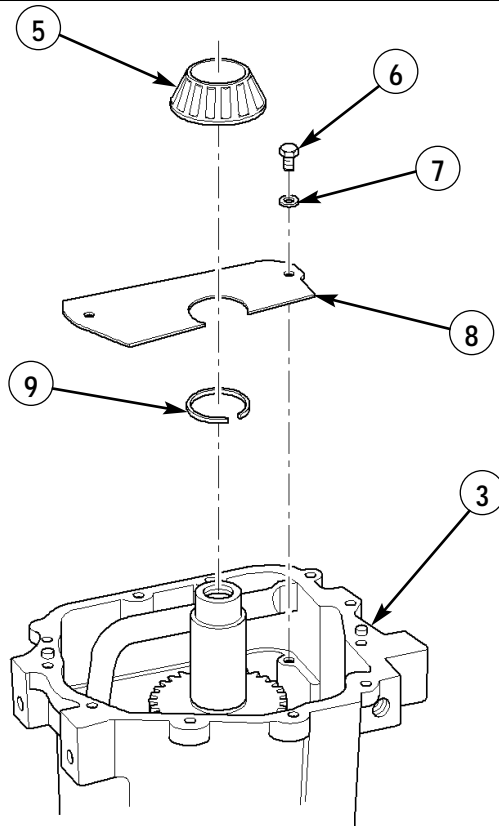
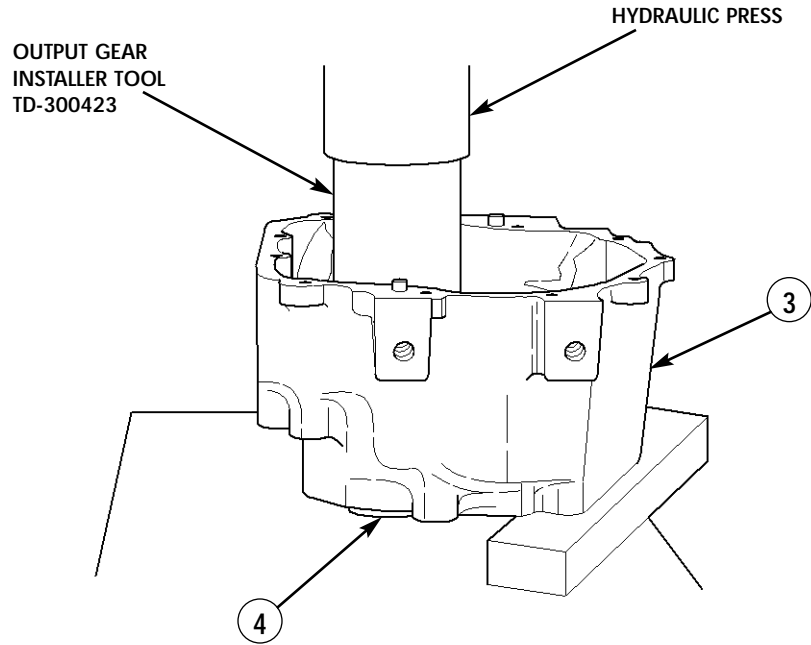
#### **WARNING**

A pressing force of approximately 17–26 tons is required to install output gear on output shaft taper. Due to the force necessary to install gear, the press should be shielded as a precautionary measure. Failure to comply may result in injury or death to personnel.

- c. Position rear housing (3) and output shaft (1) on hydraulic press with output shaft flange (4) resting on press table. Install output gear (2) on output shaft (1) taper. Using output gear installer tool TD-300423, press output gear (2) on shaft (1) until snapping (9) can be installed in output shaft (1) groove.
7. Install oil pan (8) on rear housing (3) with two washers (7) and screws (6). Tighten screws (6) to 19 lb-ft (26 N·m).
8. Install heated tapered-roller bearing (5) on end of output shaft (1).



TRANSMISSION REPAIR (Contd)



## TRANSMISSION REPAIR (Contd)

### CLUTCH PACK ASSEMBLY

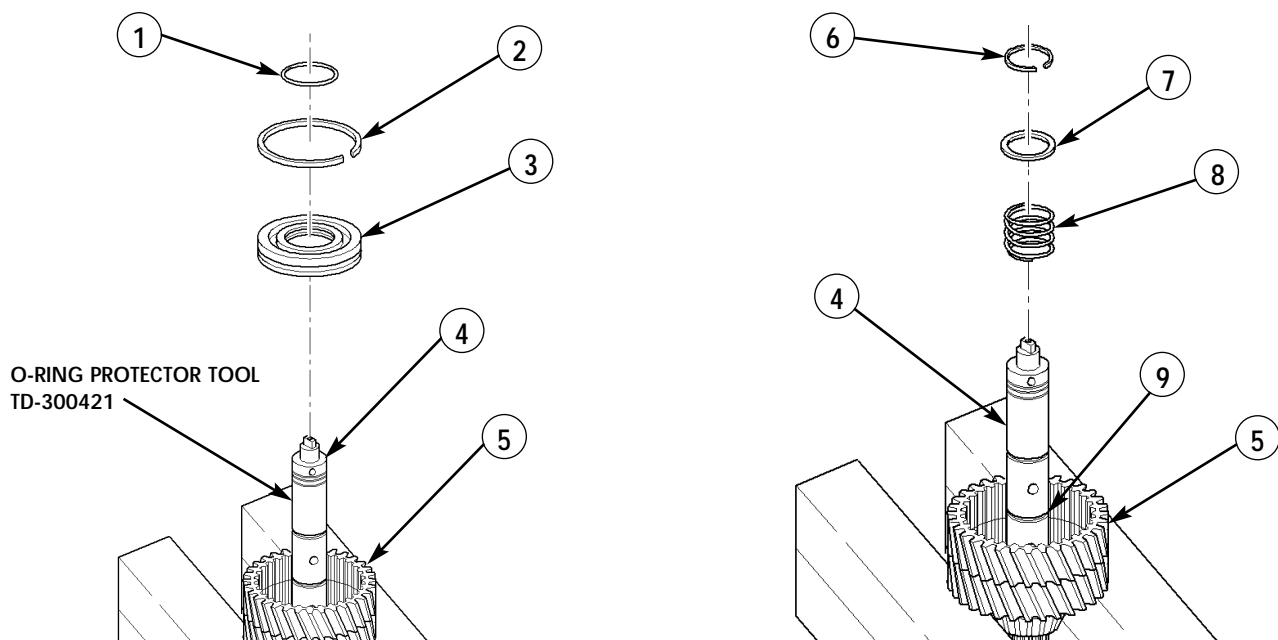
#### NOTE

Forward and reverse clutch packs are assembled the same way. The forward clutch pack is shown.

Place inner bearing races and tapered-roller bearing in a 275° F (135° C) oven for 30 minutes immediately prior to installation.

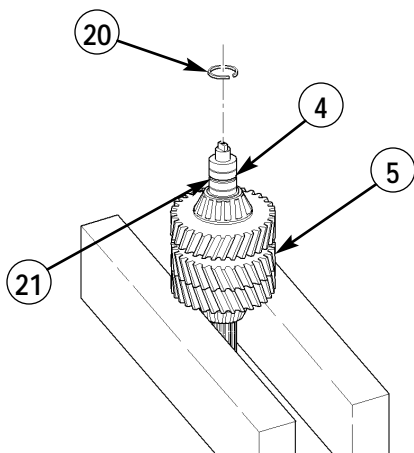
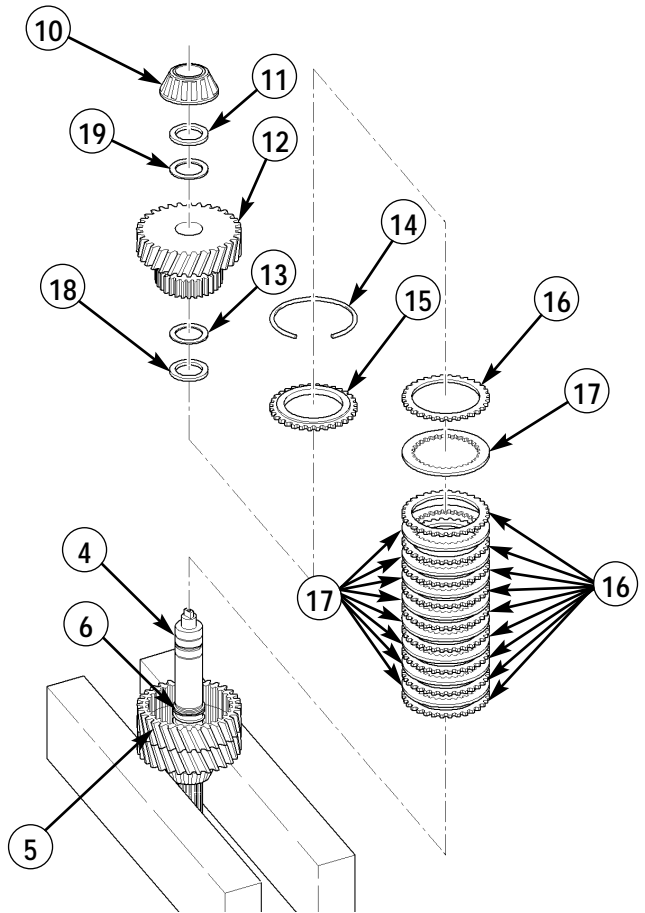
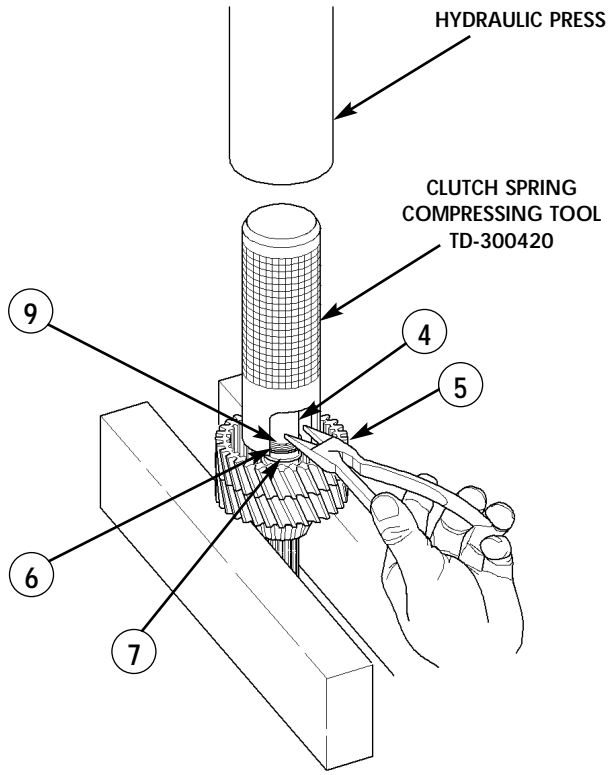
Submerge all sintered clutch plates in oil for a minimum of one hour prior to assembly. Use the same oil that is normally used in the transmission.

1. Apply light coat of oil to new piston ring (2) and O-ring (1) and install piston ring (2) and O-ring (1) on clutch piston (3).
2. Place piston O-ring protector tool TD-300421 over end of clutch shaft (4). Apply light coat of oil to clutch shaft (4) and inside of clutch gear (5). Install clutch piston (3) on clutch shaft (4) and clutch gear (5). Remove protector from end of clutch shaft (4).
3. Position clutch spring (8), clutch spring retainer (7), and snapping (6) down on clutch shaft (4).
4. Support clutch gear (5) on hydraulic press. Install clutch spring compressing tool TD-300420 over clutch shaft (4) and compress clutch spring retainer (7) until snapping (6) can be locked into groove (9) on clutch shaft (4). Release pressure on hydraulic press and remove clutch spring compressing tool from clutch shaft (4).
5. Install oiled clutch plates as follows: Starting with one friction clutch plate (16), alternatively install ten friction clutch plates (16) and nine steel clutch plates (17) in gear (5).
6. Install clutch backing plate (15) and snapping (14) on clutch gear (5).
7. Position front thrust race (13) and bronze thrust race washer (18) on input shaft (4) and install front thrust race (13) over snapping (6). Install bronze thrust race washer (18) on input shaft (4).
8. Pre-align spline teeth on steel clutch plates (17). Install forward pinion (12) on input shaft (4), aligning steel clutch plates (17) with splines on pinion (12).
9. Position rear thrust race (19) on forward pinion (12) and install bronze thrust race washer (11) and rear thrust race (19) on forward pinion (12).
10. Install heated tapered-roller bearing (10) on clutch shaft (4).
11. Install new piston ring (20) on bottom groove (21) of clutch shaft (4).
12. Repeat steps 1 through 10 to assemble reverse clutch pack.
13. Perform steps 14 through 20 to set end play on all three shafts.





TRANSMISSION REPAIR (Contd)



## TRANSMISSION REPAIR (Contd)

### CLUTCH PACK ASSEMBLY (Contd)

#### CAUTION

Take care when installing clutch assemblies not to damage front piston rings as they enter the rear housing bores. Failure to comply may result in damage to equipment.

14. Install forward and rear clutch assemblies (10) and (4) in rear housing (6), ensuring that forward and reverse pinions (9) and (5) are correctly meshed with output gear (8).

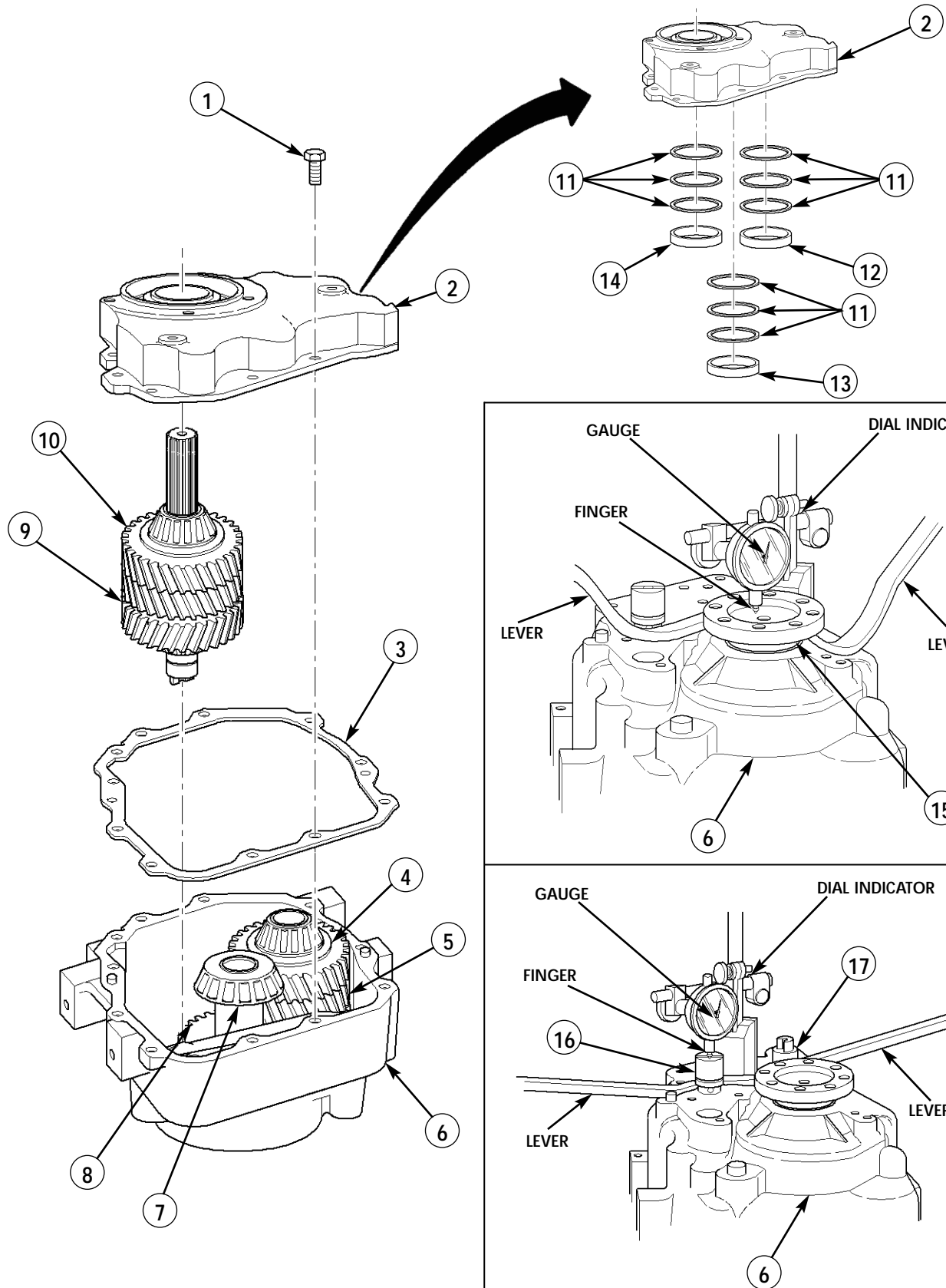
#### NOTE

Apply a light coat of soluble grease around the outside of bearing races at installation to prevent races from falling out of front housing during installation.

Do not install adjusting shims under bearing races at this time.

15. Install forward clutch, reverse clutch, and output shaft tapered-roller bearing outer races (14), (12), and (13) in their respective bores in front housing (2).
16. Install gasket (3) and front housing (2) on rear housing (6) with eleven screws (1). Tighten screws (1) to 33 lb-ft (45 N·m).
17. Measure end play of output shaft tapered-roller bearings as follows:
  - a. Position transmission so it rests on front housing (2).
  - b. Install dial indicator on rear housing (6) and position finger of dial indicator on face of output flange (15).
  - c. Rotate output shaft two to three complete turns while pushing downward to seat front bearing. Set dial indicator to zero position on gauge.
  - d. Using two levers, lift output shaft flange (15) to take up play in bearing. Total amount of play will be shown on dial indicator gauge. Record amount of play registered on gauge.
18. Measure end play on forward and reverse clutch shafts as follows:
  - a. Rotate output shaft (16) two to three complete turns while pushing downward to seat front bearing.
  - b. Install dial indicator on rear housing (6) and position finger of dial indicator on rear end of clutch shaft (16). Set dial indicator to zero position on gauge.
  - c. Using two levers, lift clutch shaft (16) to take up all play in bearing. Total amount of play will be shown on dial indicator gauge. Record amount of play registered on gauge.
  - d. Repeat step 18 for second clutch shaft (17).
19. Set final clearance of tapered-roller bearings as follows:
  - a. Remove eleven screws (1), front housing (2), and gasket (3) from rear housing (6).
  - b. Prepare pack of adjusting shims (11) for each bearing. Shim packs should be selected to correct end play values recorded in steps 17 and 18.
  - c. Correct end play values for each shaft are:  
Forward and reverse clutch shafts (16) and (17): 0.001–0.003 in. (0.025–0.076 mm).  
Output shaft: (7) 0.001–0.004 in. (0.025–0.1020 mm).  
**Example:**  
If end play of 0.52 in. (1.321 mm) was recorded for output shaft (7), required shim pack thickness should be: 0.52–0.002 in. (1.321–0.051 mm). Nominal end play = 0.050 in. (1.270 mm).
  - e. Remove bearing outer races (12), (13), and (14) from front housing (2). Install shim packs in their respective housing (2) bores. Coat outside of bearings with soluble grease to hold bearings (12), (13), and (14) in housing (2) on top of shim packs.
  - f. Install gasket (3) and front housing (2) on rear housing (6) with eleven screws (1). Tighten screws (1) to 33 lb-ft (45 N·m).
20. Recheck end play on all three shafts to ensure it is within limits. If necessary, repeat steps 17 through 19.

TRANSMISSION REPAIR (Contd)



## TRANSMISSION REPAIR (Contd)

### INSTALLATION

1. Apply light coat of oil to two piston rings (3) and install piston rings (3) in grooves of clutch shafts (4) and (6).

#### **CAUTION**

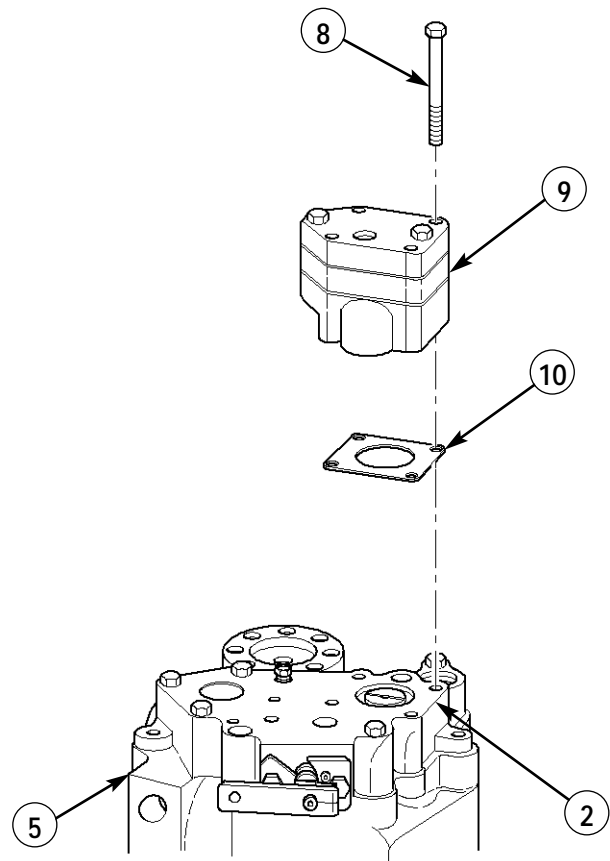
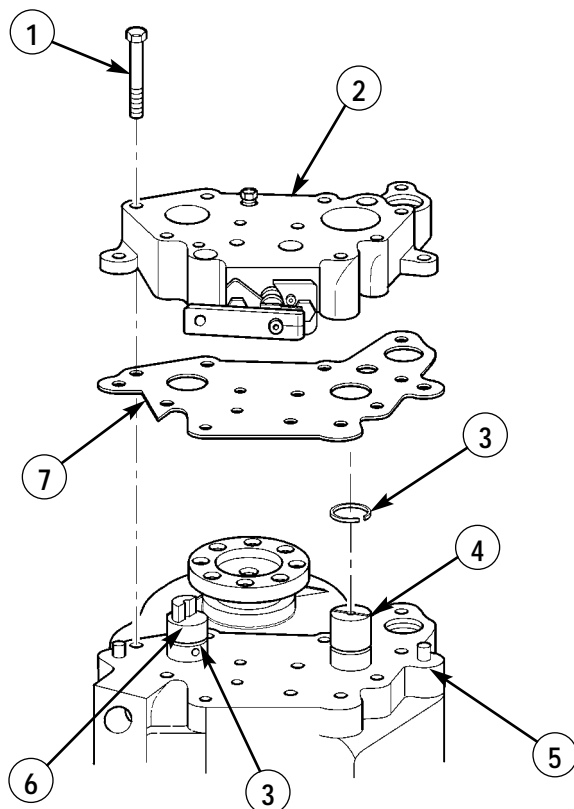
Take care when installing manifold not to damage front piston rings as they enter the manifold bores. Failure to comply may result in damage to equipment.

2. Install new gasket (7) and manifold (2) on rear housing (5) with five screws (1). Tighten screws (1) to 19 lb-ft (26 N·m).

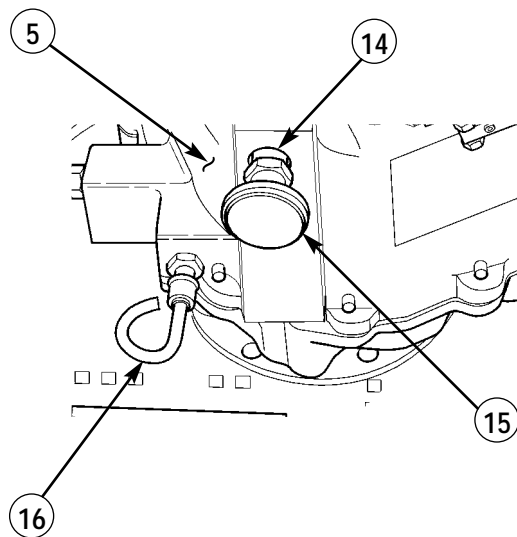
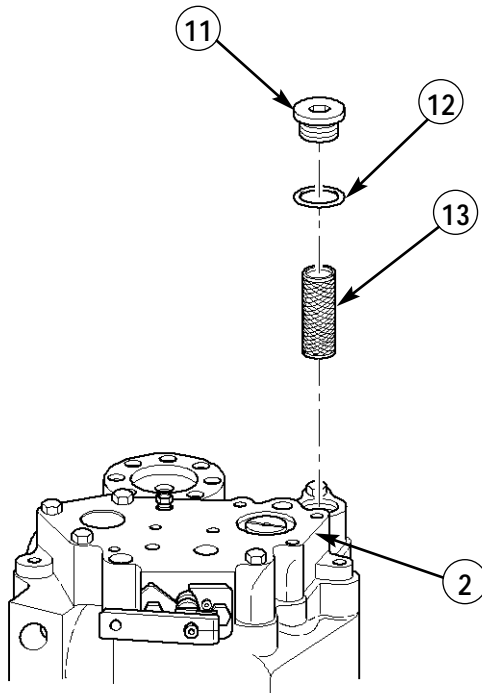
#### **CAUTION**

When installing oil pump, ensure that oil pump drive tang is engaged correctly in slot in reverse clutch shaft. Failure to comply may result in damage to equipment.

3. Install new gasket (10) and oil pump (9) on manifold (2) with four screws (8). Tighten screws (8) to 19 lb-ft (26 N·m).
4. Install filter screen (13), O-ring (12), and plug (11) on manifold (2).
5. Install oil gauge tube (16), adapter (14), and filler/breather plug (15) on rear housing (5).
6. Install transmission adapter plate (WP 0120 00).
7. Before installing transmission on engine, check flywheel and flywheel housing alignment. (Refer to WP 0157 00).
8. Install transmission (WP 0125 00).



TRANSMISSION REPAIR (Contd)



END OF WORK PACKAGE



## SUSTAINMENT MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### HYDROJET ASSEMBLY REPAIR

#### DISASSEMBLY, CLEANING AND INSPECTION, AND ASSEMBLY

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 13, WP 0172 00) or  
Common No. 1 tool kit (item 41, WP 0172 00)  
Impeller removal tool (item 18, WP 0172 00)  
Drive flange C-spanner tool  
(item 6, WP 0172 00)  
Drive shaft support tool (item 8, WP 0172 00)  
Shaft/impeller locking tool  
(item 40, WP 0172 00)  
Drive flange removal tool (item 7, WP 0172 00)  
Impeller wear sleeve expander tool  
(item 19, WP 0172 00)  
Mechanical seal assembly bullet tool  
(item 25, WP 0172 00)  
Mechanical seal removal tool  
(item 26, WP 0172 00)  
Water lubricated bearing press tool  
(item 51, WP 0172 00)  
Steering shaft bushing and seal assembly tool  
(item 47, WP 0172 00)  
Nozzle bushing assembly tool  
(item 27, WP 0172 00)  
Steering deflector bushing assembly tool  
(item 46, WP 0172 00)  
Reverse deflector pivot bushing assembly tool  
(item 37, WP 0172 00)  
Reverse deflector cylinder bushing assembly tool  
(item 36, WP 0172 00)  
Cylinder support bracket bushing assembly tool  
(item 48, WP 0172 00)  
Bearing casing seal assembly tool  
(item 1, WP 0172 00)

##### Materials/Parts

Twenty locknuts (item 65, WP 0173 00)  
Five locknuts (item 71, WP 0173 00)  
Four locknuts (item 66, WP 0173 00)  
Four locknuts (item 68, WP 0173 00)

##### Materials/Parts (Contd)

Two locknuts (item 69, WP 0173 00)  
Two O-rings (item 117, WP 0173 00)  
Two shaft seals (item 142, WP 0173 00)  
Gasket (item 43, WP 0173 00)  
Gasket (item 31, WP 0173 00)  
Gasket (item 44, WP 0173 00)  
Mechanical seal (item 98, WP 0173 00)  
O-ring (item 118, WP 0173 00)  
O-ring (item 119, WP 0173 00)  
O-ring (item 120, WP 0173 00)  
Water lubricated bearing (item 168, WP 0173 00)  
Cloth (item 8, WP 0171 00)  
GAA grease (item 14, WP 0171 00)  
Sealing compound (243) (item 32, WP 0171 00)  
Sealing compound (272) (item 33, WP 0171 00)  
Skysol 100 (item 12, WP 0171 00)

##### References

WP 0013 00

##### Equipment Condition

Hydrojet scoop reverse deflector removed  
(WP 0140 00).  
Hydrojet steering deflector, rod, and pivot  
removed (WP 0137 00).  
Scoop control hydraulic reservoir drained  
(WP 0012 00).  
Scoop control hydraulic reservoir removed  
(WP 0131 00).  
Scoop hydraulic control valves, control valve  
hoses, control linkage, and main frame bracket  
removed (WP 0134 00).  
Scoop hydraulic cylinder and hoses removed  
(WP 0135 00).  
Scoop hydraulic pump, mounting bracket, and  
hoses removed (WP 0133 00).  
Hydrojet assembly removed from boat  
(WP 0142 00).

## HYDROJET ASSEMBLY REPAIR (Contd)

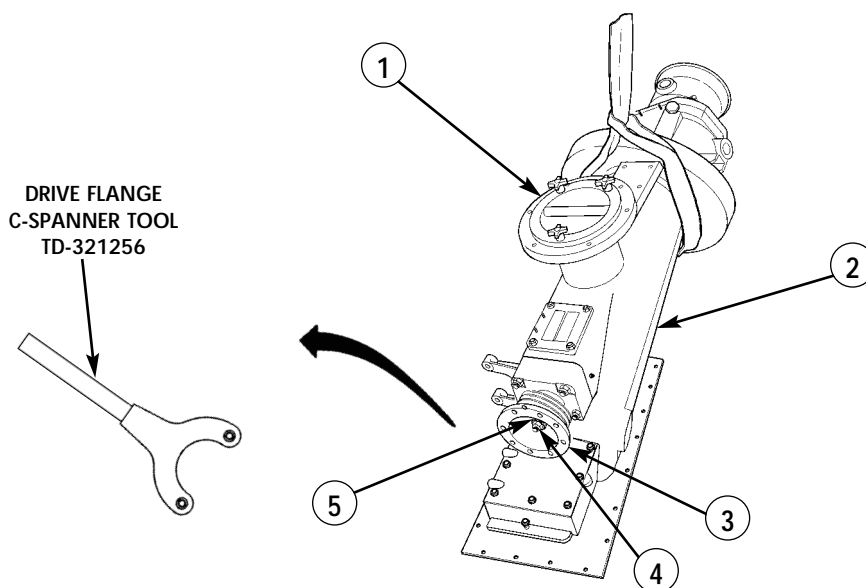
### DISASSEMBLY

1. Place hydrojet assembly (1) on suitable blocks to support intake housing (2) during disassembly.
2. Remove four locknuts (22), washers (23), insulator washers (24), and hydrojet nozzle (19) from tailpipe housing (12). Discard locknuts (22).
3. Remove locknut (17), washer (18), and anode (16) from stud (15) on end cone (14). Discard locknut (17).
4. Remove four locknuts (20), washers (21), and end cone (14) from tailpipe housing (12). Discard locknuts (20).
5. Remove three wing nuts (28) and inspection cover (29) with O-ring (34) from top of intake housing (2). Install drive shaft support tool TD-321257 through inspection cover opening with carriage (33) around impeller shaft (6).
6. Install support plate (31) and wing nut (30) on rod (32). Adjust wing nut (30) to support impeller shaft (6).
7. Remove eight locknuts (25), washers (26), insulator washers (27), and tailpipe housing (12) with water bearing (13) and gasket (9) from impeller shaft (6) and intake housing flange (7). Discard locknuts (25) and gasket (9).
8. Install drive flange C-spanner tool TD-321256 on hydrojet flange (3) to keep impeller shaft (6) from turning. Loosen locknuts (4) and (11) on hydrojet flange end of shaft (6) and impeller end of shaft (6). Do not remove locknuts (4) and (11) or washers (5) and (10) from end of shaft (6).
9. Remove locknut (11), washer (10), and shaft sleeve (8) from end of impeller shaft (6). Remove retaining pin (36) from shaft (6) and install impeller removal tool set TD-120891 on end of shaft (6) as follows:
  - a. Install thrust pad (38) from set over threads of shaft (6).
  - b. Install draw tube (39) from set over shaft (6) with screw (40) backed out.
  - c. Install three screws (41) from set through end of draw tube (39) and into end of impeller hub (42), tighten screws (41) until end of draw tube (39) is tight against impeller hub (42).

### **CAUTION**

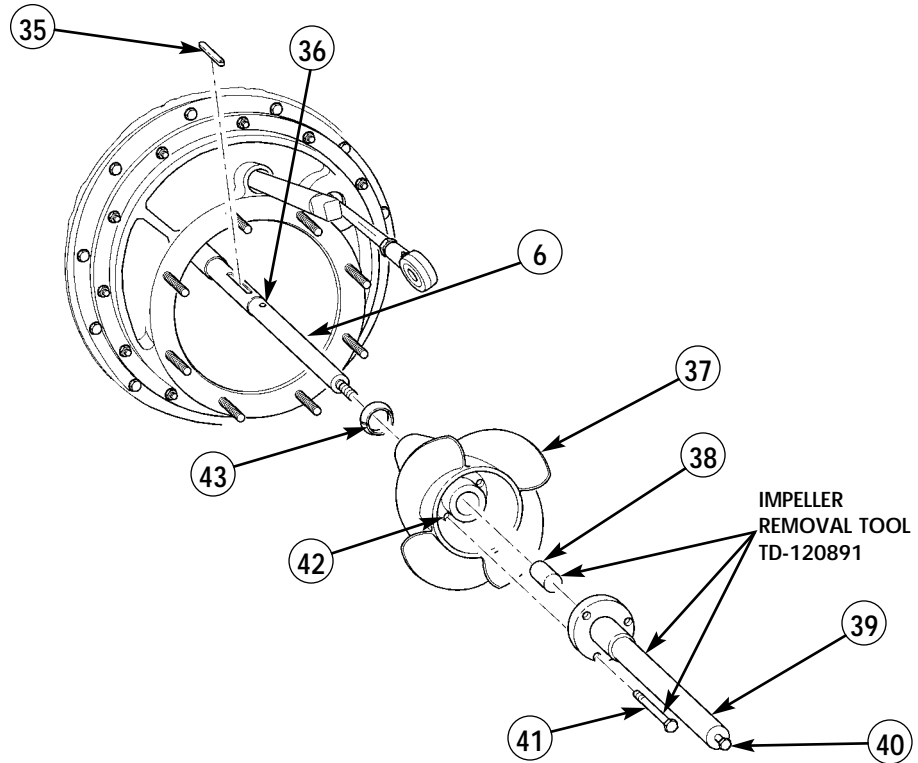
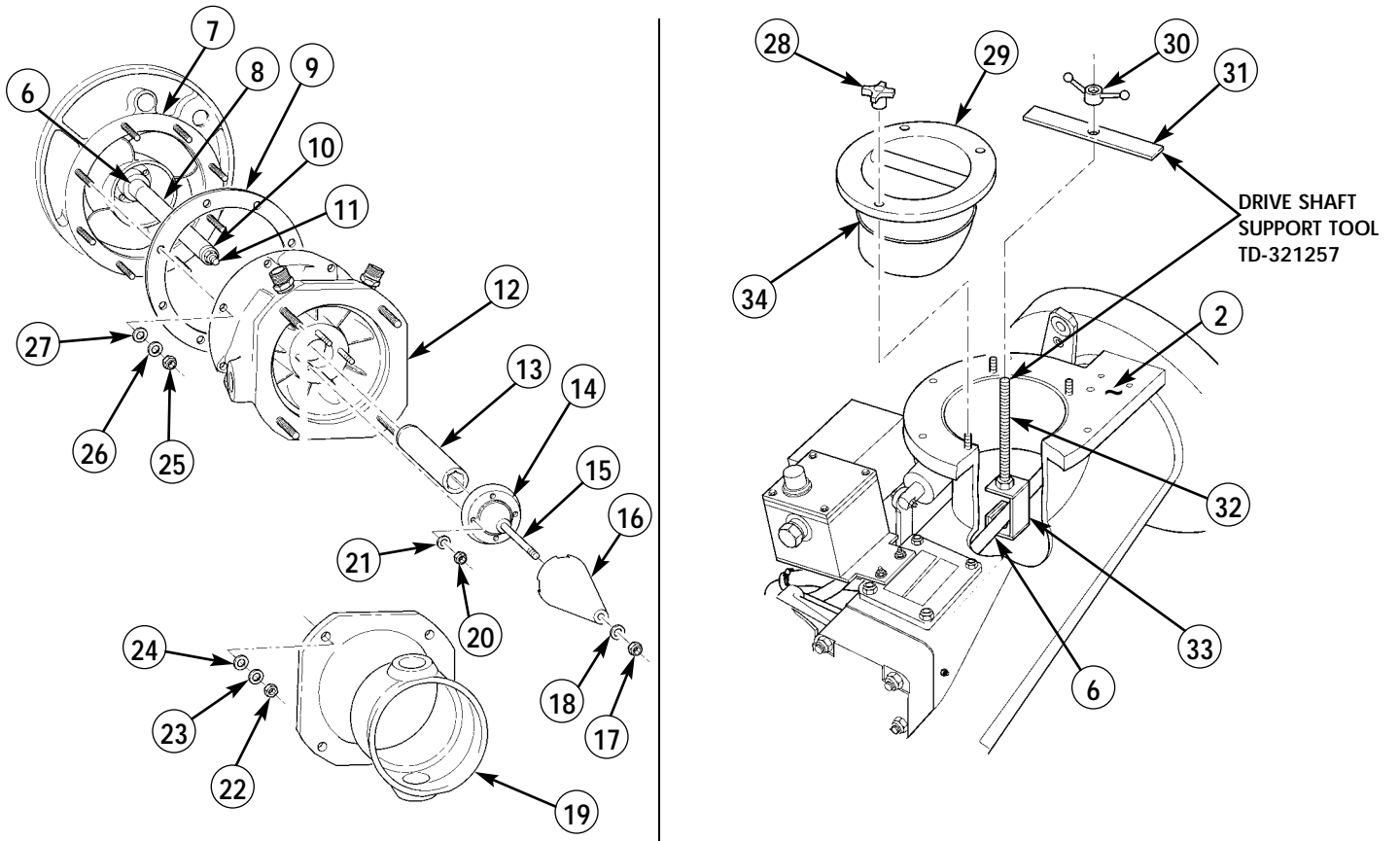
When removing impeller from shaft, do not twist impeller on shaft.  
Failure to comply may result in damage to shaft or impeller.

10. Tighten screw (40) from set on of draw tube (39) and remove impeller (37) from key (35), cone (43), and impeller shaft (6). Remove key (35) and cone (43) from impeller shaft (6). Remove three screws (41) and draw tube (39) from impeller hub (42).





### HYDROJET ASSEMBLY REPAIR (Contd)



## HYDROJET ASSEMBLY REPAIR (Contd)

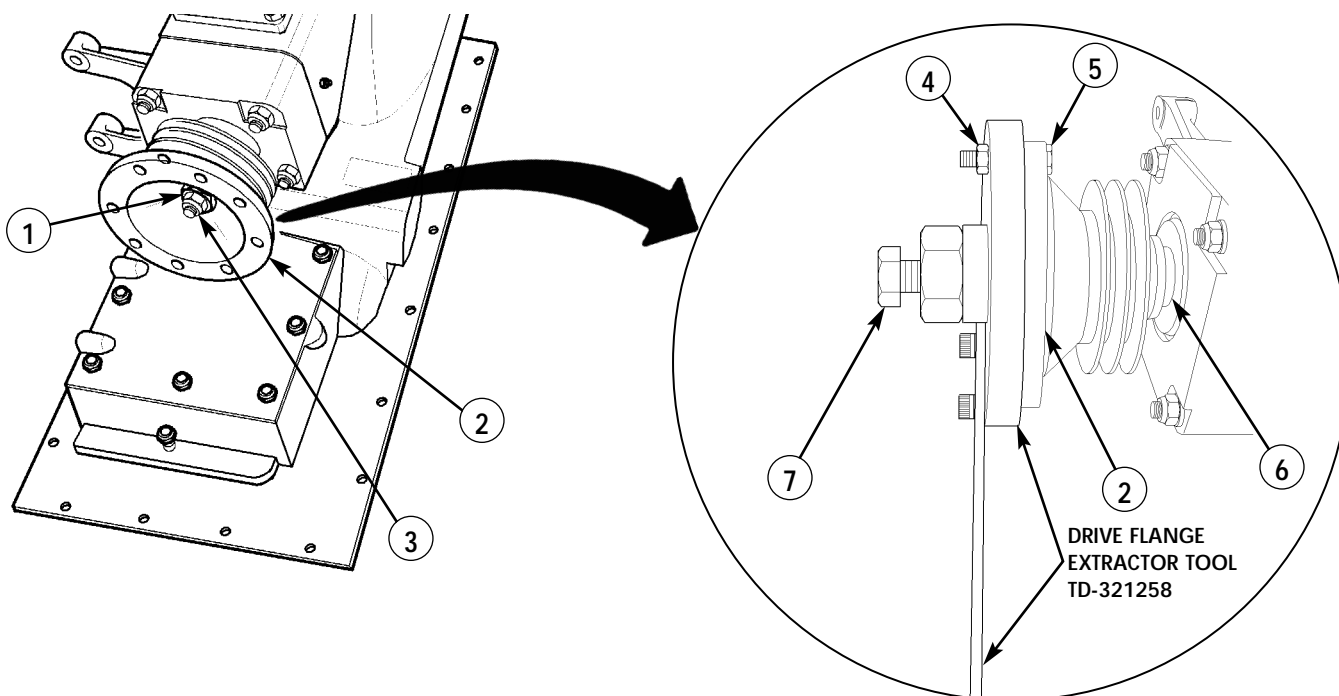
### DISASSEMBLY (Contd)

11. Remove locknut (3) and washer (1) from hydrojet flange (2) and shaft (6). Discard locknut (3).
12. Install drive flange extractor tool TD-321258 on hydrojet flange (2) with two screws (5) and nuts (4). Tighten screw (7) on tool and remove hydrojet flange (2), and cone (25) from end of impeller shaft (6) and key (26). Remove key (26) from impeller shaft (6).
13. Remove four locknuts (8), washers (31), cover (30), and gasket (29) from hydrojet housing (9). Discard gasket (29) and locknuts (8).
14. Remove four locknuts (27), washers (28), bearing cap (23), and O-ring (22) from hydrojet housing (9) and shaft (6). Discard locknuts (27) and O-ring (22).
15. Remove seal sleeve (24), ball bearing (20), bearing sleeve (18), O-rings (19) and (17), and seal sleeve (16) from shaft (6). Discard O-rings (19) and (17).

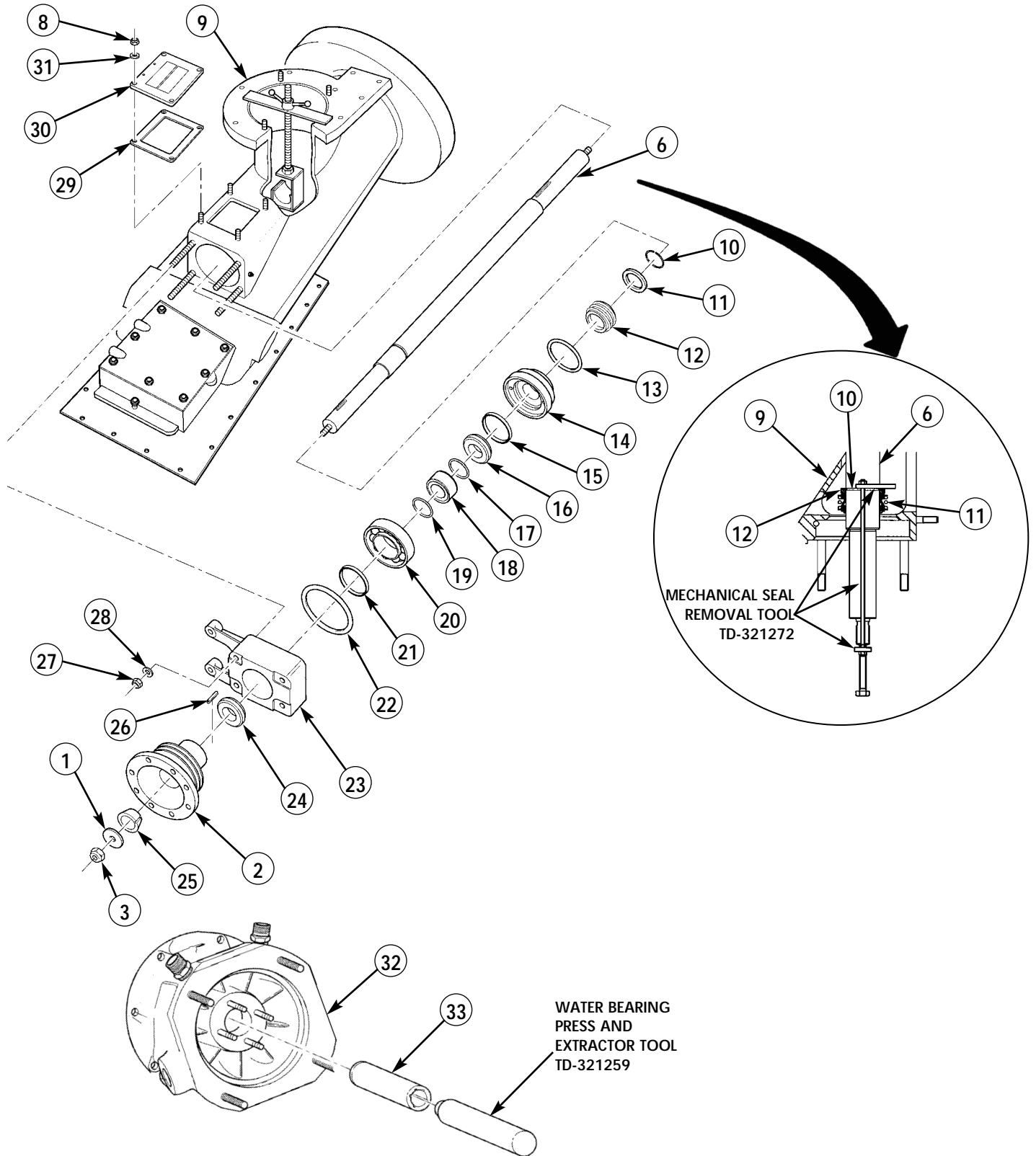
### **CAUTION**

Do not damage static element of mechanical seal when removing sealing housing. Failure to comply may result in damage to sealing surface.

16. Using two 5 mm screws installed into tapped holes on sealing housing (14), pull sealing housing (14) from hydrojet housing (9).
17. Using mechanical seal removal tool TD-321272, remove mechanical seal (11) and collar (12) from shaft (6) and pull shaft (6) from hydrojet housing (9). Discard mechanical seal (11) if damaged.
18. Remove snap ring (10) from shaft (6).
19. Remove shaft seals (21) and (15) from bearing cup (23) and sealing housing (14). Discard shaft seals (21) and (15).
20. Using water bearing press and extractor tool TD-321259, remove water lubricated bearing (33) from tailpipe housing (32). Discard water lubricated bearing (33).



### HYDROJET ASSEMBLY REPAIR (Contd)



## HYDROJET ASSEMBLY REPAIR (Contd)

### CLEANING AND INSPECTION

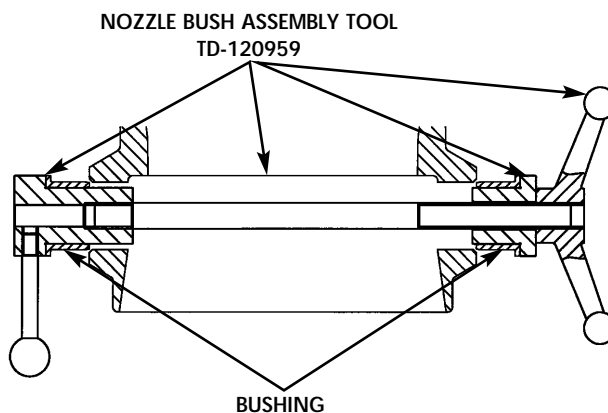
1. For general cleaning and inspection instructions, refer to WP 0013 00.

#### **WARNING**

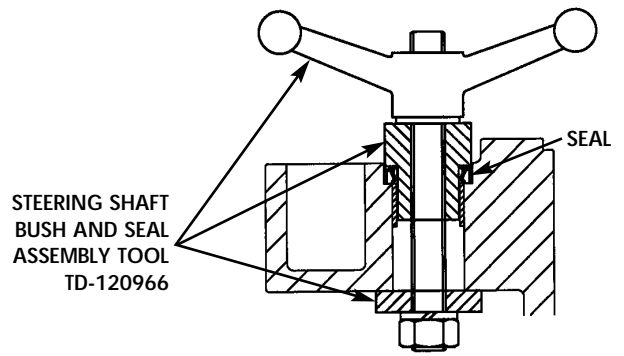
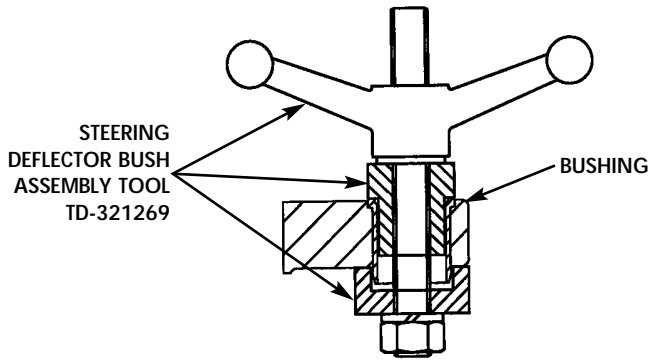
Skysol 100 solvent is combustible; DO NOT use or store near heat, sparks, flame, or other ignition sources. Use mechanical ventilation whenever product is used in a confined space, heated above ambient temperatures, or agitated. Keep container sealed when not in use.

Contact with Skysol 100 may cause skin irritation. Use chemical-resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing, or blurring of vision. Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least 15 minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.

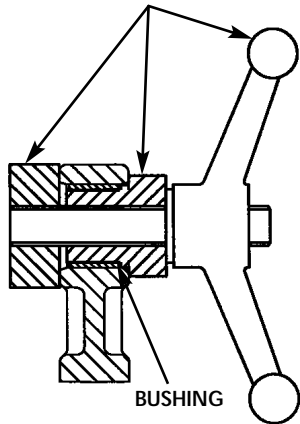
2. Clean excess gasket material and sealing compound from housing mating surfaces with Skysol 100 and dry with cloth.
3. Inspect all studs for damaged threads. If damage is present, replace studs.
4. Inspect bearing for roughness of rotation. Replace bearing if rotation is rough.
5. Inspect insulator washers for cracks or damage. If cracks or damage are noted, replace insulator washers.
6. Inspect impeller for scuffs, nicks, burrs, or damage. If damage is noted, replace impeller.
7. Inspect all bushings for cracks, wear, or damage. If damage is noted, replace bushings using tools as shown.
8. Inspect shaft for nicks, worn seal areas, or damaged threads. If damage is noted, replace shaft.
9. Inspect snapping for distortion. Replace snapping if distorted.
10. Inspect housings, bearing carrier, hydrojet nozzle, steering deflector, and reverse deflector for cracks or damage. If cracks or damage are noted, replace parts as necessary.
11. Inspect anodes for damage. If pitting is through anodes or if 50 percent of original material is missing, replace anodes.
12. Inspect impeller wear sleeve for signs of excessive wear. If there exists a step of more than 0.039 in. (1 mm) from an unworn area on impeller wear sleeve, remove impeller wear sleeve from intake housing using impeller wear sleeve expander tool TD-321268, and replace with new impeller wear sleeve.
13. Inspect reverse deflector, steering nozzle, and intake housing for wear, damage, or chipped paint. Clean, sand, and paint all areas with chipped paint, and replace any item that is damaged.



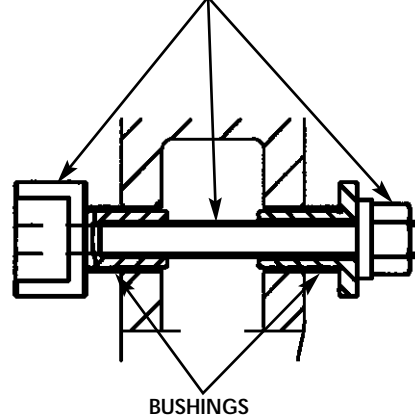
HYDROJET ASSEMBLY REPAIR (Contd)



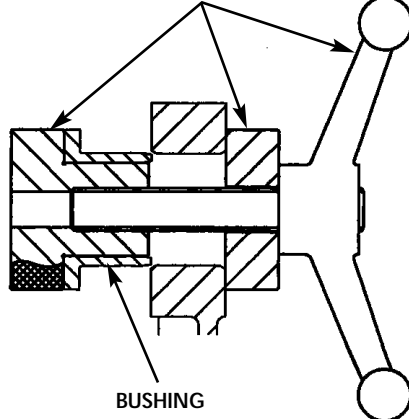
STEERING SUPPORT BRACKET BUSH ASSEMBLY TOOL TD-121046



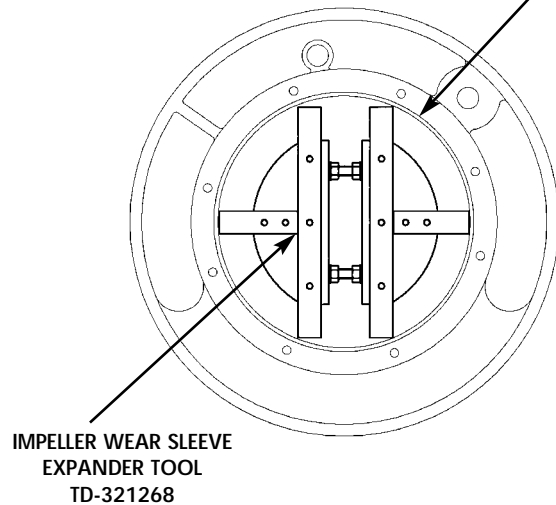
REVERSE DEFLECTOR BUSH ASSEMBLY TOOL TD-120960



REVERSE DEFLECTOR BUSH ASSEMBLY TOOL TD-120961



IMPELLER WEAR SLEEVE



## HYDROJET ASSEMBLY REPAIR (Contd)

### ASSEMBLY

1. Using water bearing press and extractor tool TD-321259, install new water lubricated bearing (2) on tailpipe housing (1).
2. Pack seal cavities of new seals (3) with grease before assembly.
3. Using bearing casing seal assembly tool TD-120962, install two new seals (3) on bearing cup (4) and sealing housing (11).
4. Install snapping (7) on shaft (6) and position mechanical seal assembly tool TD-621250-01 up to step on end of shaft (6).

#### **CAUTION**

Do not allow grease to touch static element of seal sealing surface.  
Failure to comply may result in damage to equipment.

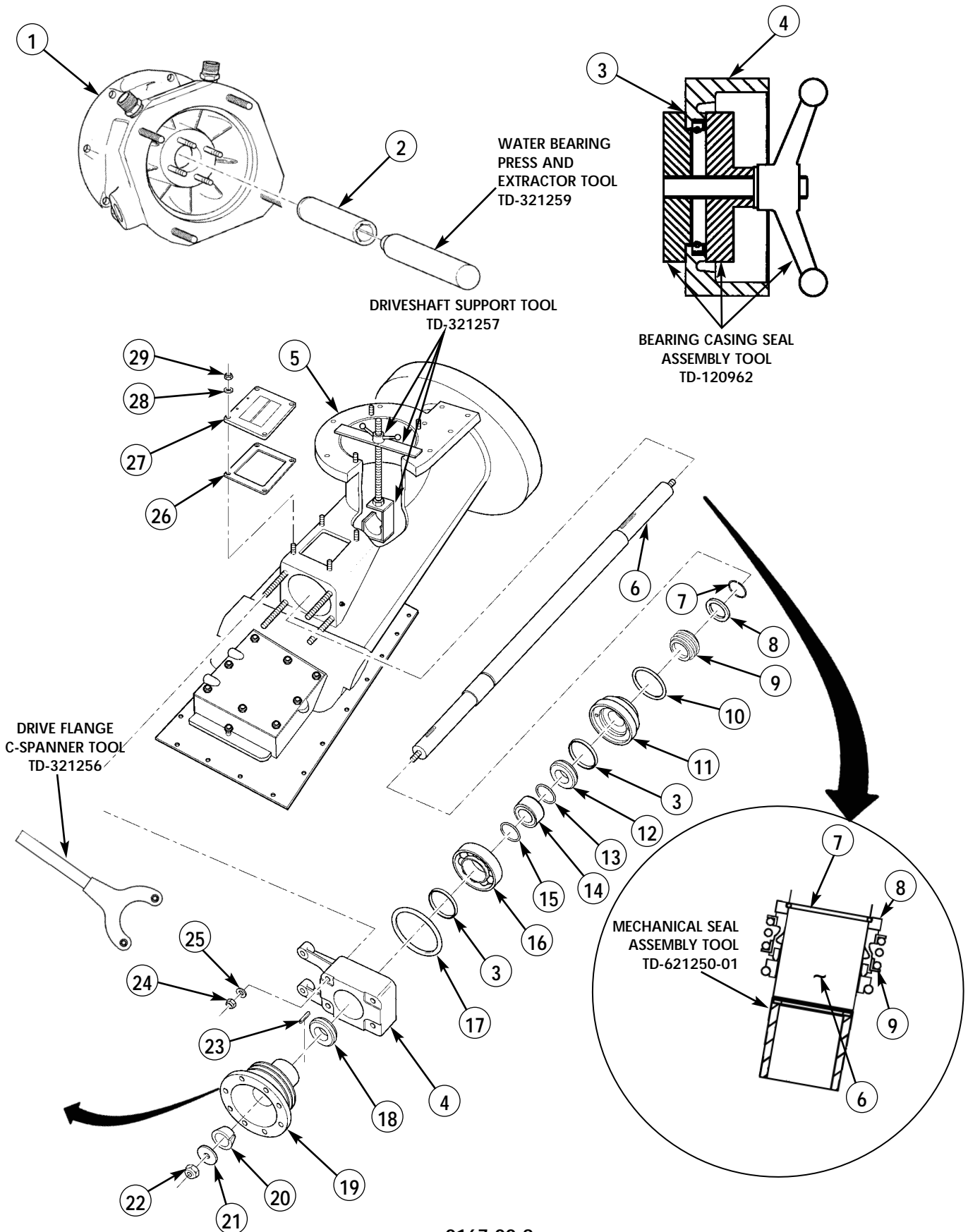
5. Apply light coat of grease around tool and shaft (6). Slide collar (8) and mechanical seal (9) up shaft (6) to snapping (7). Remove tool from shaft (6) and clean all grease from shaft (6).

#### **CAUTION**

Seal housing must be installed with vent hole in the down position.  
Failure to comply may result in damage to equipment.

6. Apply light coat of grease to new O-ring (10) and install O-ring (10) and sealing housing (11) with vent hole in down position on intake housing (5).
7. Install shaft (6) and mechanical seal (9) in nozzle end of intake housing (5), sealing housing (11), and seal (3). Support shaft (6) with drive shaft support tool TD-321257 as shaft (6) is being installed.
8. Apply light coat of grease to new O-rings (13) and (15) and seal sleeve (12). Slide seal sleeve (12) and O-ring (13) on shaft (6) and push into position.
9. Install bearing sleeve (14), ball bearing (16), new O-ring (15), and seal sleeve (18) on shaft (6).
10. Apply light coat of grease to new O-ring (17) and install new O-ring (17) and bearing cap (4) over shaft (6) on intake housing (5). Apply light coat of sealing compound (243) to studs and install four washers (25) and new locknuts (24) on bearing cap (4). Tighten locknuts (24) to 44–48 lb-ft (60–65 N•m).
11. Install key (23), hydrojet flange (19), cone (20), and washer (21) on shaft (6). Apply light coat of sealing compound (243) to threads of shaft (6) and install new locknut (22). Hold hydrojet flange (19) with drive flange C-spanner tool TD-321256 and tighten locknut (22) to 172–192 lb ft (234–260 (N•m).
12. Install new gasket (26) and cover (27) on intake housing (5) with four washers (28) and new locknuts (29). Tighten locknuts (29) to 23–25 lb-ft (31–34 N•m).

# HYDROJET ASSEMBLY REPAIR (Contd)



## HYDROJET ASSEMBLY REPAIR (Contd)

### ASSEMBLY (Contd)

13. Install cone (2) on impeller shaft (4), seating cone (2) against impeller shaft (4) shoulder. Install key (1), impeller (3), retaining pin (6), shaft sleeve (8), washer (9), and new locknut (10) on impeller shaft (4). Do not apply sealing compound or tighten locknut (10) until shaft/impeller locking tool TD-321273 is installed.
14. Position shaft/impeller locking tool plate (12) over shaft sleeve (8) and on studs (13) of intake housing (5). Install three screws (11) on impeller hub (7). Apply light coat of sealing compound (243) to threads of impeller shaft (4) and tighten locknut (10) to 172–192 lb-ft (234–260 N•m). Remove three screws (11) and shaft/impeller locking tool plate (12) from impeller hub (7), impeller shaft (4), and intake housing (5).

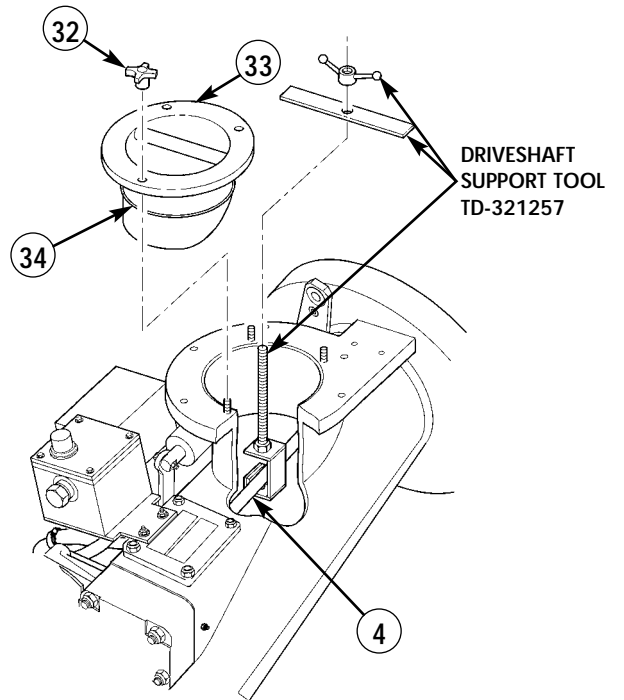
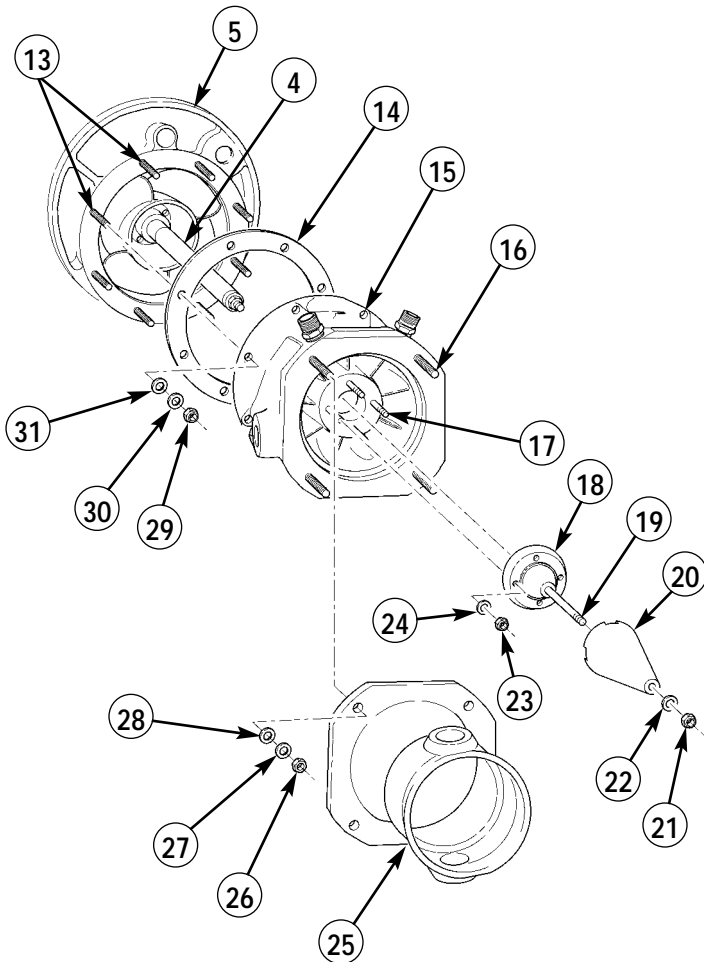
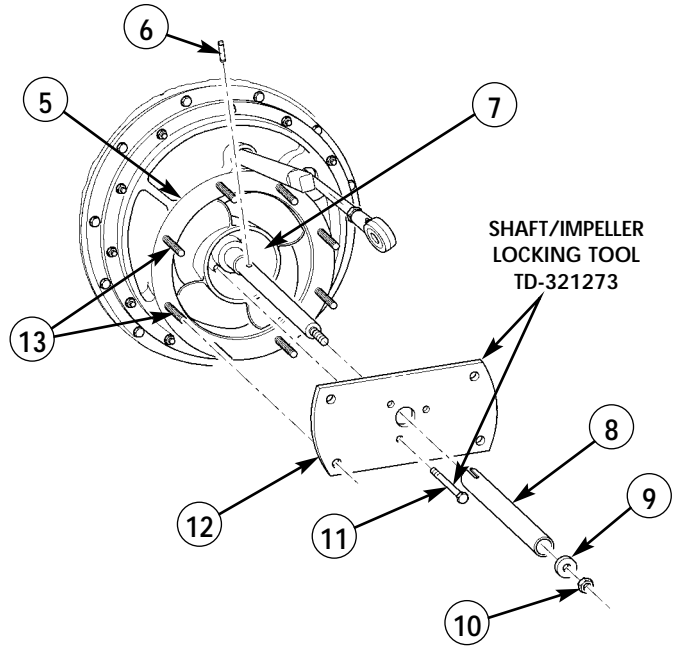
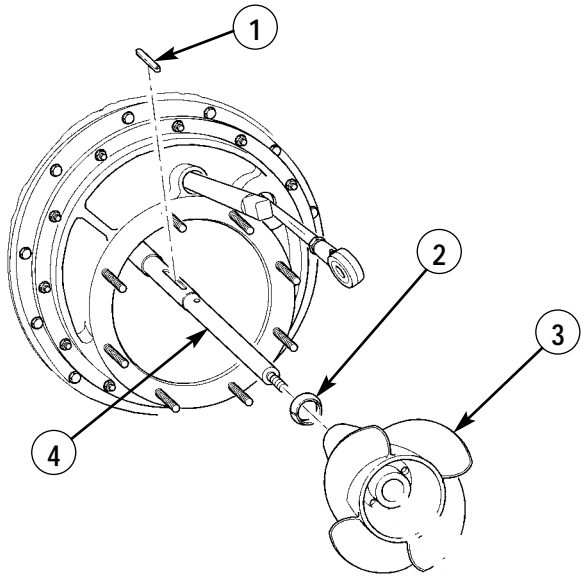
### **CAUTION**

Tailpipe housing must be supported at all times when pushing housing over impeller shaft and onto studs. Failure to comply may result in damage to equipment.

15. Apply light coat of grease to new gasket (14) and install gasket (14) and tailpipe housing (15) on shaft (4) and intake housing (5). Apply light coat of sealing compound (243) to studs (13) and install eight insulator washers (31), washers (30), and new locknuts (29) on studs (13). Tighten locknuts (29) to 23–25 lb-ft (31–34 N•m).
16. Apply light coat of sealing compound (243) to threads of studs (17) on tailpipe housing (15) and install end cone (18) on studs (17) with four washers (24) and new locknuts (23). Tighten locknuts (23) to 12.5–14 lb-ft (17–19 N•m).
17. Apply light coat of sealing compound (243) to threads of stud (19) on end cone (18) and install anode (20) on stud (19) with washer (22) and new locknut (21). Tighten locknut (21) to 44–48 lb-ft (60–65 N•m).
18. Apply light coat of sealing compound (243) to studs (16) of tailpipe housing (15) and install hydrojet nozzle (25) on studs (16) with four insulator washers (28), washers (27), and new locknuts (26). Tighten locknuts (26) to 103–110 lb-ft (140–150 N•m).
19. Remove driveshaft support tool TD-321257 from around impeller shaft (4) and inspection cover (33) opening.
20. Install new O-ring (34) and inspection cover (33) on top of intake housing (5) with three wing nuts (32).
21. Install scoop hydrojet assembly in boat (WP 0142 00).
22. Install hydraulic pump, mounting bracket, and hoses (WP 0133 00).
23. Install scoop hydraulic cylinder and hoses (WP 0135 00).
24. Install main frame bracket, control linkage, control valve hoses, and scoop hydraulic control valves (WP 0134 00).
25. Install scoop hydraulic reservoir (WP 0131 00).
26. Fill scoop hydraulic reservoir with oil (WP 0012 00).
27. Install pivot, rod, and hydrojet steering deflector (WP 0137 00).
28. Install hydrojet reverse deflector (WP 0140 00).
29. Put boat in water, start engine, operate hydrojet, and check for leaks and proper operation (TM 5-1940-322-10).



### HYDROJET ASSEMBLY REPAIR (Contd)



END OF WORK PACKAGE



# CHAPTER 5

## SUPPORTING INFORMATION BRIDGE ERECTION BOAT (BEB) MK II-S

Work Package Title	WP Sequence No.
References .....	WP 0168 00
Maintenance Allocation Chart (MAC) Introduction .....	WP 0169 00
Maintenance Allocation Chart (MAC) .....	WP 0170 00
Expendable and Durable Items List .....	WP 0171 00
Tool Identification List .....	WP 0172 00
Mandatory Replacement Parts .....	WP 0173 00
Illustrated List of Manufactured Items .....	WP 0174 00
Wiring Schematics .....	WP 0175 00
Painting Instructions .....	WP 0176 00
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Welding Instructions .....	WP 0178 00
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## SUPPORTING INFORMATION

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

## REFERENCES

### INDEX

The Department of the Army pamphlet (DA PAM 25-30) contains records of current and obsolete publications and blank forms published by the Army, other military services, Department of Defense (DOD) activities, and other government agencies and activities. This pamphlet also provides resources for materials published by other services, but not available through this index, which are used worldwide.

Consolidated Index of Army Publications and Blank Forms ..... DA PAM 25-30

### FORMS

Equipment Control Record..... DA FORM 2408-9  
 Equipment Inspection and Maintenance Worksheet..... DA FORM 2404  
 Equipment Log Assembly (Record)..... DA FORM 2408  
 Equipment Maintenance Log (Consolidated)..... DA FORM 2409  
 Equipment Operators Qualification Record (Except Aircraft)..... DA FORM 348  
 Exchange Tag ..... DA FORM 2402  
 Index of Army Equipment Modification Work Orders..... DA PAM 25-33  
 Maintenance Request ..... DA FORM 2407  
 Maintenance Request Continuation Sheet..... DA FORM 2407-1  
 Maintenance Request Register ..... DA FORM 2405  
 Material Condition Status Report ..... DA FORM 2406  
 Organizational Control Record for Equipment ..... DA FORM 2401  
 Preventative Maintenance Schedule and Record ..... DD FORM 314  
 Product Quality Deficiency Report ..... SF 368  
 Report of Discrepancy ..... SF 364  
 Recommended Changes to Publications and Blank Forms ..... DA FORM 2028  
 Functional Users Manual for The Army Maintenance  
 Management System (TAMMS) ..... DA PAM 750-8

### FIELD MANUALS (FM)

Basic Cold Weather Manual..... FM 31-70  
 Concepts and Equipment of Petroleum Operations ..... FM 10-67-1  
 First Aid..... FM 4-25.11  
 Military Symbols..... FM 101-5-1  
 NBC Decontamination..... FM 3-5  
 Multiservice Tactics, Techniques, and Procedures for NBC..... FM 3-11.4  
 Northern Operations ..... FM 31-71  
 Operation and Maintenance of Army Material in Extreme Cold Weather ..... FM 9-207

**REFERENCES (Contd)****TECHNICAL MANUALS (TM)**

Lead Acid Storage Battery Maintenance .....	TM 9-6140-200-14
Procedures for Destruction of Tank–Automotive Equipment .....	TM 750-244-6
Operator’s Manual, Boat, Bridge Erection, Inboard Engine MKII-S .....	TM 5-1940-322-10
General Packaging Instructions for Field Units.....	TM 746-10
Use and Care of Hand Tools and Measuring Tools.....	TM 9-243
Materials Used for Cleaning, Preserving, Abrading, and Cementing .....	TM 9-247
Field and Sustainment Maintenance Repair Parts and Special Parts List .....	TM 5-1940-322-24P
Painting Instructions for Field Use Preservation, Packing of Military Supplies and Equipment .....	TM 43-0139
Joint Service Manual for Storage and Materials Handling .....	TM 38-400

**TECHNICAL BULLETINS (TB)**

Safety, Inspection, and Testing of Lifting Devices .....	TB 43-0142
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems.....	TB 750-651

**TECHNICAL CATALOG (TC)**

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Operator’s Manual: Welding Theory and Application.....	TC 9-237

**COMMON TABLE OF ALLOWANCES (CTA)**

Army Medical Department Expendable/Durable Items.....	CTA 8-100
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**ARMY REGULATIONS (AR)**

Accident Reporting and Records.....	AR 385-40
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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

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### MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION

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#### THE ARMY MAINTENANCE SYSTEM (AMS)

This Work Package (WP) provides a general explanation of all maintenance and repair functions authorized at two maintenance levels under Two-Level Maintenance System concept.

The Maintenance Allocation Chart (MAC) (WP 0170 00) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of maintenance to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

**Field Level** (Tactical)–C (operator/crew), O (unit) maintenance, and F (Direct Support). Field Maintenance is on-system maintenance and is mainly replacement of defective parts and preventative maintenance. Field maintenance returns repaired equipment to operation. It covers crew, unit, and selected DS maintenance tasks. Some “off-system” maintenance can be done at field level, if based on task analysis, it is simple to complete or it is critical to mission readiness.

**Sustainment Level** (Sustainment)–H (General Support) and D (Depot). Sustainment is off-system maintenance and is mainly repair of defective or worn out equipment/parts. Sustainment maintenance returns repaired equipment/parts to the supply system. It covers selected DS tasks, GS and Depot maintenance.

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.

The remark (immediately following the tools and test equipment requirements) contains supplemental instructions and explanatory notes for a particular maintenance function.

## MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION (Contd)

### 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; i.e., to clean (includes decontamination, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms.
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 or test, measuring, and diagnostic equipment used in a 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.

#### NOTE

The following definitions are applicable to the repair maintenance functions:

**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 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.



## MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION (Contd)

### MAINTENANCE FUNCTIONS (contd)

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.
10. **Overhaul.** The 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 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 (e.g., hours/miles) considered in classifying Army equipment/components.

### EXPLANATION OF COLUMNS IN THE MAC

- Column 1 – Group Number.** Column (1) lists Functional Group Code (FGC) numbers. The purpose of FGC numbers is to identify maintenance significant components, subassemblies, and modules with the Next Higher Assembly (NHA).
- Column 2 – Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
- 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.
- 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 man-hours in whole hours or decimals) in the appropriate sub column. 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 be shown for each level. The work time figure represents the average time required to restore an item 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.

**Field:**

C Operator or crew maintenance  
 O Unit maintenance  
 F Direct support maintenance

**Sustainment:**

H General support maintenance  
 D Depot maintenance

**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 column 6. this code is keyed to the remarks and the SRA complete repair application is explained there.

**MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION (Contd)**

**Column 5 – Tools and Equipment Reference Code.** Column (5) specifies, by code, 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.

**Column 6 – Remarks Code.** When applicable this column contains a letter code, in alphabetic order, which is keyed to the remarks table entries.

**EXPLANATION OF COLUMNS IN THE TOOLS, SPECIAL TOOLS, AND TEST EQUIPMENT IDENTIFICATION LIST**

**Column 1 – Tools or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.

**Column 2 – Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**Column 3 – Nomenclature.** Name or identification of the tool or test equipment.

**Column 4 – National Stock Number (NSN).** The NSN of the tool or test equipment.

**Column 5 – Tool Number.** The manufacturer's part number, model number, or type number.

**EXPLANATION OF COLUMNS IN THE REMARKS**

**Column 1 – Remarks Code.** The code recorded in column (6) of the MAC.

**Column 2 – Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

## FIELD MAINTENANCE INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)

MK II-S

NSN 1940-01-526-0770 P/N 12492423

MAINTENANCE ALLOCATION CHART

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**MAINTENANCE ALLOCATION CHART (Contd)**

**Table 1. Maintenance Allocation Chart.**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD		SUSTAINMENT				
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>0100</b>	<b>Bow Hull</b>								
	Push Knees	Inspect Replace	0.1	1.0			13,41		
	Fendering (Rub Rails)	Inspect Replace		0.1 2.0			13,41		
	Aft Cockpit	Inspect Replace Repair	0.1	0.4	0.5		13,41	A	
	Tiedown Bars	Inspect Repair	0.1		0.5			A	
	Cleat	Inspect Replace	0.1	0.2			13,41		
	Boat Hook Clamps	Inspect Replace	0.1	0.2			13,41		
<b>0200</b>	<b>Cab</b>								
	Cab Assembly	Inspect Replace Repair	0.1	0.2	2.0		13,41	A	
	Life Ring and Hatchet Brackets	Inspect Replace	0.1	0.2			13,41		
	Cab Clamps	Inspect Replace	0.1	0.2			13,41		
	Windshield	Inspect Replace	0.1		0.5		13,41,54		
	Windshield Wiper Blades	Inspect Replace	0.1	0.1			13,41		
	Windshield Wiper Arms	Inspect Replace	0.1	0.3			13,41		
	Windshield Wiper Motor	Inspect Replace Repair	0.1	0.2	1.0		13,41	A	
	Cab Lifting Handle	Inspect Replace	0.1	0.2			13,41		
	Safety Handrails	Replace Repair		1.0	1.0		13,41	A	
	<b>0300</b>	<b>Controls</b>							
		Steering Wheel Assembly	Inspect Replace	0.1	0.5			13,41	B
Steering Pump and Hoses		Inspect Replace	0.1	1.5			13,41	B	
Steering System Bleeding		Inspect Service	0.1	1.0				B	

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD		SUSTAINMENT				
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>0300</b> (Contd)	Engine Stop Control Handle	Inspect Replace	0.1	0.5				13,41	
	Engine Stop Control Cable	Inspect Adjust Replace	0.1	0.2 1.0				13,41	
	Scoop Control Head Assembly	Inspect Replace	0.1	1.6				13,41	
	Scoop Control Cable	Inspect Adjust Replace	0.1	0.5 1.0				13,41	
	Throttle/Transmission Control Head Assembly	Inspect Replace	0.1	1.6				13,41	
	Throttle Control Cable	Inspect Adjust Replace	0.1	0.5 1.5				13,41	
	Transmission Control Cable	Inspect Adjust Replace	0.1	0.5 1.5				13,41	
	<b>0400</b>	<b>Control Panel</b>							
	Instrument Panel	Inspect Replace	0.1	1.0				13,41	
	Auxiliary Switch Panel	Inspect Replace	0.1	2.0				13,41	
	Forward Cockpit Stowage and Access Panel	Inspect Repair	0.1	1.5					A
	Junction Box and Bus Bars	Inspect Replace	0.2	2.0				13,41	
	Auxiliary Switch Panel to Junction Box Wiring	Inspect Replace	0.1	1.5				13,41	
	Intermediate Wiring Harness	Inspect Replace	0.1	2.0				13,41	
	Instrument Panel Gauges and Warning Lights	Inspect Replace	0.1	1.7				13,41	
	Instrument Panel Switch	Inspect Replace	0.1	0.5				13,41	
	Audible Alarm	Inspect Replace	0.1	0.5				13,41	
	Horn	Inspect Replace	0.1	0.2				13,41	

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>0500</b>	<b>Exhaust System</b>								
	Port Exhaust Arrangement	Inspect Replace	0.1					13,41	
	Starboard Exhaust Arrangement	Inspect Replace	0.1	3.2				13,41	
<b>0600</b>	<b>Electrical</b>								
	Battery Hatch Cover, Hinges, and Support Brace	Inspect Replace Repair	0.1	0.8				13,41	
	Master Switch	Inspect Replace	0.1		1.0			13,41	
	NATO Slave Receptacle	Inspect Replace	0.1					13,41	
	Battery Cables	Inspect Replace Repair	0.2					13,41	
	Batteries and Battery Boxes	Inspect Test Replace	0.1					13,41	
	Anchor Light Assembly	Repair Replace		0.1				13,41	
	Towing, Steaming, and Navigation Light Assembly	Inspect Replace Repair	0.1					13,41	
	Inspection Light	Inspect Replace Repair	0.1					13,41	
	Leads, Cables, and Connectors	Inspect Replace Repair		0.5				13,41	
	Emergency Link Solenoid	Inspect Replace		0.5		4.0		13,41	
	Blocking Diode	Test Replace		0.2				13,41	
	Master Link and Fuse	Inspect Replace	0.1		0.5			13,41	
	Wiring Harness Connector	Inspect Replace	0.1		0.3			13,41,42	

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>0700</b>	<b>Mast</b>								
	Upper and Lower Mast Assembly	Inspect Replace Repair	0.1	0.2	1.0			13,41 A	
	Mast Wiring Harnesses	Inspect Replace	0.1	1.5				13,41	
<b>0800</b>	<b>Cooling System</b>								
	Header Tank	Inspect Service Replace Repair	0.1 0.1		0.5			13,41 A	
	Keel Cooler Grate	Inspect Replace	0.1	1.5				13,41	
	Keel Cooler	Inspect Replace Repair	0.1	4.0	1.0			13,41 A	
	Piping, Hoses, and Fittings	Inspect Replace	0.1	0.2				13,41	
<b>0900</b>	<b>Fuel System</b>								
	Fuel Tank	Inspect Replace	0.1		5.0			13,38,41	
	Fuel Level Sending Unit	Inspect Replace	0.1		1.5			13,41	
	Fuel Plumbing	Inspect Replace	0.1	0.2				13,41	
	Fuel Fittings and Shutoff Valves	Inspect Replace	0.1	1.0				13,41	
	Fuel Water Separator	Inspect Service Replace	0.1 0.1 0.2					13,41	
	Lubricity Filter	Inspect Replace	0.1	0.3				13,41	
	Fuel Filter	Inspect Replace	0.1	0.2				13,41	
	Fuel System Bleeding	Inspect Service	0.1 2.0						

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>1000</b>	<b>Engine</b>								
	Engine Hatch Cover, Hinges, and Support Brackets	Inspect Replace Repair	0.1	0.8 0.1			13,41	A	
	Engine Mounts and Brackets	Inspect Replace	0.1	1.0			13,41,44		
	Engine Wiring Harness	Inspect Replace Repair		0.2	6.0 0.8		13,41		
	Belt Guard	Inspect Replace	0.1	0.2			13,41		
	Belt Tensioner	Inspect Replace	0.1	0.5			13,41		
	Drivebelt	Inspect Replace	0.1	0.4			13,41		
	Engine/Transmission Oil Sump Pump	Inspect Replace Service	0.1	0.4			13,41		
	Engine Oil	Service		0.4					
	Alternator	Inspect Test Replace Repair	0.1	0.5 1.0	1.5		13,41		
	Alternator Pulley	Inspect Replace	0.1	0.2			13,41		
	Thermostat Unit	Inspect Test Replace		0.5 0.6 0.6			13,41		
	Oil and Water Sending Unit	Inspect Replace		0.2 0.4			13,41		
	Water Pump	Inspect Replace	0.1	0.4			13,41		
	Front Gear Accessory Drive	Inspect Replace	0.1	0.4			13,41		
	Lubricating Oil Cooler	Inspect Replace		0.1 0.4			13,41		
	Water Inlet Connection	Inspect Replace	0.1	0.4			13,41		



MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD		SUSTAINMENT				
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>1000</b> (Contd)	Oil Filter	Inspect Replace		0.1 0.2				13,41	
	Starter Relay	Inspect Replace	0.1	0.6				13,41	
	Starter Motor	Inspect Replace Repair		0.1 0.8			2.0	13,41	
	Flywheel and Housing	Inspect Replace		0.5			4.0	13,15,32,41,56,57,58	
	Injectors	Inspect Test Replace Repair		0.1			0.2	2,13,31,41	
	Injector Lines and Fittings	Inspect Replace	0.1	1.0				13,41	
	Fuel Injection Pump	Inspect Replace		1.0 2.0				13,15,32,41	
	Fuel Lift Pump	Inspect Replace	0.1	1.0				13,41	
	Air Cleaner	Inspect Service Replace	0.1	0.5 0.2				13,41	
	Magnetic Pickup	Inspect Replace	0.2	1.0				13,15,41	
	Turbocharger Plumbing	Inspect Replace	0.1	0.6				13,41	
	Turbocharger	Inspect Replace Repair	0.1	1.0			2.0	13,41	
	Air Intake Tubing	Inspect Replace	0.1	0.5				13,41	
	Valve Cover	Inspect Replace	0.1	0.2				13,41	
	Valve Tappets	Inspect Replace Adjust	0.3	1.5 0.5				13,15,41	
	Rocker Arms, Shafts, and Push Rods	Inspect Adjust Replace	0.2	1.5			2.0	13,41	
	Air Intake Cover	Inspect Replace	0.2	1.0				13,41	

**MAINTENANCE ALLOCATION CHART (Contd)**

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS	
			FIELD			SUSTAINMENT				
			UNIT		DS	GS	DEPOT			
			C	O	F	H	D			
<b>1000</b> (Contd)	Vibration Damper	Inspect Replace	0.1						13,41	
	Exhaust Manifold	Inspect Replace	0.2	2.0					13,41	
	Cylinder Head	Inspect Replace Repair				0.5 8.5 5.0			13,41	
	Engine Breather	Inspect Service Replace	0.1 0.1	0.1					13,41	
	Engine Lift Bracket	Inspect Replace	0.1	0.3					13,41	
	Engine Assembly	Inspect Replace	0.5		3.0				13,41,44	
	Pistons and Connecting Rod Assembly	Inspect Replace				0.5 8.0			5,12,13,15,35,41,45	
	Oil Pump	Inspect Replace				1.0 4.0			13,35,41	
	Oil Pan, Suction Tube, and Suction Tube Bracket	Inspect Replace	1.0			4.5			13,41,44,45	
	Crankshaft Front Seal	Inspect Replace				0.5 2.0			13,41	
	Crankshaft Gear	Inspect Replace				0.5 3.0			13,20,32,41	
	Crankshaft Rear Seal Housing	Inspect Replace				0.6 3.0			13,41	
	Crankshaft Rear Seal	Inspect Replace				1.0 4.0			13,41	
	Crankshaft	Inspect Replace				1.0 6.0			13,20,32,41	
	Camshaft	Inspect Replace			0.2	6.5			13,41	
	Flywheel Ring Gear	Inspect Replace			0.4	6.5			13,41	
	Gear Housing Cover	Inspect Replace			0.5	3.0			13,41	
	Gear Housing	Inspect Replace			1.0	3.5			13,41	
	Valves and Valve Springs	Inspect Replace			0.4	3.0			13,41	
	Timing Pin and Housing	Inspect Replace			0.2	2.5			13,41	

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>1100</b>	<b>Transmission</b>								
	Transmission Oil Cooler	Inspect Replace Service	0.1	0.2 0.2				11,13,41	
	Transmission Oil Hoses and Fittings	Inspect Replace	0.1	0.4				13,41	
	Transmission Adapter Plate	Inspect Replace	0.1	0.4				13,41	
	Transmission Drive Plate	Inspect Replace	0.1	0.3				13,41	
	Transmission Filter Screen	Inspect Replace	0.2	1.5				13,41	
	Transmission Oil Pump	Inspect Replace		1.5 2.5				13,41	
	Transmission Pressure Sending Unit	Inspect Replace	0.1	1.0				13,41	
	Transmission Assembly	Inspect Service Replace Repair		0.4 0.5	1.0	6.0		13,41	
<b>1200</b>	<b>Bilge Pumps</b>								
	Electric Bilge Pump, Bracket, and Float	Inspect Replace	0.1	1.0				13,41	
		Inspect Replace	0.1	0.1				13,41	
<b>1300</b>	<b>Driveshaft</b>								
		Inspect Service Replace	0.1	0.5 2.0				13,41	
	Driveshaft Assembly	Inspect Service Replace	0.1	0.5 2.0				13,41	

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>1400</b>	<b>Hydrojet Unit</b>								
	Hydrojet Hatch Cover, Hinges, and Support Brace	Inspect Replace Repair	0.1	0.5	0.8			13,41	A
	Scoop Hydraulic Pump Drivebelts	Inspect Service Replace		0.2 0.2 1.0				13,41	
	Scoop Hydraulic Pump, Reservoir, and Hoses	Inspect Service Replace	0.1	0.2 2.0				13,41	
	Scoop Hydraulic Control Valve and Linkage	Inspect Replace Repair	0.1	2.0 1.5				13,41	
	Hydraulic Steering Cylinder and Bracket	Inspect Service Replace Repair	0.1	0.1 0.4 0.8				13,41	
	Steering Tie Rod	Inspect Service Replace	0.1	0.2 0.4				13,41	
	Scoop Deflector, Rod, and Pivot	Inspect Replace	0.1	0.5				13,27,41,46,47,48	
	Scoop Reverse Deflector	Inspect Replace	0.2		1.5			13,41	
	Hydrojet Grill	Inspect Replace	0.1	0.5				13,41	
Hydrojet Assembly	Inspect Service Replace Repair	0.1 0.2		4.0	6.0		1,6,7,8,13,19,25,26,27,36,37,40,41,46,47,48,51		

MAINTENANCE ALLOCATION CHART (Contd)

**Table 1. Maintenance Allocation Chart (Contd).**

(1) GROUP NO.	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT REF. CODE	(6) REMARKS
			FIELD		SUSTAINMENT				
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
<b>1500</b>	<b>Accessory Items</b>								
	Rifle Mount	Inspect Replace	0.1	0.3				13,41	
	Capstan, Tow Hook, and Mounting Post	Inspect Replace	0.1	0.2				13,41	
	Searchlight	Inspect Replace Service	0.1 0.1	0.4				13,41	
	Automatic Fire Extinguisher	Inspect Replace	0.3	0.5				13,41	
	Handheld Fire Extinguisher	Inspect Replace	0.1	0.1				13,41	
	Scupper Drains	Inspect Replace	0.1	0.4				13,41	
	Anodes	Inspect Replace	0.1	1.5				13,41	
	Diving/Swim Platform	Inspect Repair	0.1		1.0				A
	Data Plate	Inspect Replace	0.1	0.2				13,41	

## MAINTENANCE ALLOCATION CHART (Contd)

**Table 2. Tools and Equipment Reference Codes.**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
1.	Bearing Casing Seal Assembly Tool		TD120962	Ultrajet
2.	Brush, Injector Cleaning	7920-01-381-6132	3822509	Cummins
3.	Chamfer/Straightedge	5210-00-174-3231	4800-024B	
4.	Clutch Spring Compressor			Local fabrication
5.	Compressor, Piston Ring	5120-01-171-3936	3823294	
6.	Drive Flange C Spanner		TD321256	Ultrajet
7.	Drive Flange Removal Tool		TD321258	Ultrajet
8.	Drive Shaft Support Tool		TD321257	Ultrajet
9.	Driver, Cup Plug	5120-01-522-4288	3823520	Cummins
10.	Driver, Expansion Plug, Crankcase	4910-01-143-3337	3376816	Cummins
11.	Electrode, Cutting Solid	3439-00-766-7749	102156	
12.	Expander, Piston Ring	5120-01-387-8935	3823137	Cummins
13.	Forward Repair System (FRS)	4940-01-463-7940	RIA149000	
14.	Gauge Kit, Dial Bore	4910-01-140-4930	3375072	Cummins
15.	Gear barring tool	5120-01-285-5193	3824591	
16.	Handle, Cup Plug	4910-01-328-0679	3376795	Cummins
17.	Hose Assembly, Non Metallic	4720-01-101-7373	NP5015003	
18.	Impeller Removal Tool		TD120891	Ultrajet
19.	Impeller Wear Sleeve Expander Tool		TD321268	Ultrajet
20.	Indicator, Dial, Timing Indicator and Adapter	5210-01-381-5657	3377259	Cummins
21.	Installer, Cup Plug	5120-01-516-2833	3823524	Cummins
22.	Installer, Cup Plug, alternate dipstick holes	5120-01-487-0685	3822372	Cummins
23.	Installer, Cup Plug, alternate oil fill, cylinder head	5120-01-344-2699	3376817	Cummins
24.	Kit, Nozzle Cleaning	2915-01-285-2527	3376947	Cummins
25.	Mechanical Seal Assembly Bullet		TD621250-1	Ultrajet
26.	Mechanical Seal Removal Tool		TD321272	Ultrajet
27.	Nozzle Bush Assembly Tool		TD120959	Ultrajet
28.	Outer bearing pusher			Local fabrication
29.	Output gear pusher			Local fabrication
30.	Piston entering sleeve			Local fabrication
31.	Puller, Injector	5120-01-389-5917	3164706	Cummins

## MAINTENANCE ALLOCATION CHART (Contd)

**Table 2. Tools and Equipment Reference Codes (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
32.	Puller, Mechanical, T-bar or Fuel Pump Drive Gear	5120-01-387-8925	3163381	Cummins
33.	Press, Hydraulic	3442-01-085-3355	6-225	
34.	Pump, Lubricant Transfer	4930-00-288-3829	MILP43253	
35.	Reamer, Cylinder Ridge	5110-00-237-8598	MIL-C-82069	
36.	Reverse Deflector Cylinder Bush Assembly Tool		TD120960	Ultrajet
37.	Reverse Deflector Pivot Bush Assembly Tool		TD120961	Ultrajet
38.	Riveter, blind, hand	5120-00-017-2849		
39.	Scupper drain tool			Local fabrication
40.	Shaft/Impeller Locking Tool		TD321273	Ultrajet
41.	Shop equipment contract maint. trk. Mtd (Common No. 1 tool kit)	4940-01-016-2216		
42.	Shop equipment, fuel and electrical system engine, field maintenance, basic less power	4910-00-754-0714		
43.	SKF adapter			Local fabrication
44.	Sling, Engine and Transmission	4910-00-944-4915	MILS45944	
45.	Stand, maintenance, automotive engine	4910-00-529-8387	MIL-S-45004	
46.	Steering Deflector Bush Assembly Tool		TD321269	Ultrajet
47.	Steering Shaft Bush & Seal Assembly Tool		TD120966	Ultrajet
48.	Steering Support Bracket Bush Assembly Tool		TD121046	Ultrajet
49.	Tappet Installation Kit (Repair Kit, Diesel Engine)	2815-01-506-9975	3822513	Cummins
50.	Vise	5120-00-278-1065	676	
51.	Water Lubricated Bearing Press Tool		TD321259	Ultrajet
52.	Welding set arc, inert gas shield	3431-00-079-0483	235-0685	FSCM 00741
53.	Welding set arc, inert gas shielded	3431-00-079-0483	1-2UIW	
54.	Windshield Installation Kit			
55.	Wrench, Oil Filter	5120-01-160-8863	3397929	Cummins

## MAINTENANCE ALLOCATION CHART (Contd)

**Table 2. Tools and Equipment Reference Codes (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
56.	Kit, Crack Detection	6635-01-329-2210	3375432	Cummins
57.	Indicator, Dial	5210-01-157-2291	3376050	Cummins
58.	Attachment, Dial	4910-01-097-6972	ST-1325	Cummins
59.	Micrometer Set	5210-01-468-3287	809536-25	
60.	Telescoping Gauge Set	5210-00-473-9350	64-0007-00	ST
61.	Camshaft Bushing Tool	5120-01-389-8449	3823509	Cummins
62.	Magnetic Base Dial Indicator Holder	5210-01-507-6932	3377399	Cummins
63.	Compressor, Valve Spring	5120-01-145-7293	ST448	Cummins

**Table 3. Remarks.**

A	Welding will be in accordance with TC 9-237.
B	Repair of lines and fittings will be in accordance with TM 9-243.



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

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### EXPENDABLE AND DURABLE ITEMS LIST

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This work package (WP) lists expendable and durable items that you will need to operate and maintain the MKII-S Bridge Erection Boat (BEB). This list 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.

#### EXPLANATIONS OF COLUMNS IN THE EXPENDABLE/DURABLE ITEMS LIST

**Column 1—Item Number.** Number assigned for cross-referencing from the Material/Parts list in WP Initial Setups.

**Column 2—Level.** Lowest level of maintenance that requires the listed item. C = Operator/Crew, O = Unit/AVUM, F = Direct Support/AVIM, H = General Support, D = Depot.

**Column 3—National Stock Number (NSN).** Number used for requisitioning the item.

**Column 4—Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N).** Other information needed to identify and requisition the item.

**Column 5—Unit of Measure (U/M).** Unit of measure or count of the item as issued per the NSN shown in column 3.

## EXPENDABLE AND DURABLE ITEMS LIST (Contd)

**Table 1. Expendable and Durable Items List.**

(1) ITEM NO	(2) NATIONAL/NATO STOCK NUMBER	(3) PART NUMBER	(4) SUPPLY CATALOG
1	8040-00-221-3811	Adhesive, rubber base, general purpose, type II, (81348) MMM-A-1617 2-Ounce Bottle	OZ
2	8040-00-865-8991	Adhesive, Silicone Rubber, black, 1 oz primer in a plastic or glass bottle and 10.3 oz adhesive on a MIL-A-46106 12 oz cartridge	KT
3	8040-00-833-9563	Adhesive, silicone rubber, Non-Hardening (94833) 52498	KT
4	8040-01-167-2613 8040-01-090-9320	Adhesive, type II, class I, clear (58536) A-A-3097 5-Ounce Tube 1-Pint Can	TU PT
5	6850-01-464-9125 6850-01-464-9137 6850-01-464-9152 6850-01-464-9096	Antifreeze, permanent, ethylene glycol, (-60°F (-51°C) inhibited, heavy-duty, green in color, recycled (58536) A-A-52624 1-Gallon Container 5-Gallon Container 55-Gallon Drum 55-Gallon Drum (Arctic)	GAL
6	8030-00-155-6444	Antiseize Compound, (15145) NSA16 16-Ounce Can	OZ
7	5340-00-450-5718	Cap and Plug Set, (19207) 10935405 1 Set	SET
8	7920-00-044-9281	Cloth, cleaning, general purpose, white, (58536) A-A-59323 10-Pound Box	LB
9	8305-00-267-3015	Cloth, Crocus, cotton (81348) CCCC40	YD
10	8030-00-244-1297	Corrosion Preventative Compound, Grade II, soft film, (81349) MIL-PRF-16173 1-Gallon Can	GAL
11	7930-00-282-9699	Detergent, general, liquid (81349) MIL-PRF-16173 1-Gallon Can	GAL
12	6850-01-381-4423	Dry Cleaning Solvent Compound, (0K209), SKYSOL 100 5-Gallon Can	GAL
13	5330-00-993-2784	Gasket Forming Compound, K&W Copper Coat (75261) KANDWCOPPERCOAT 4-oz tube	OZ

## EXPENDABLE AND DURABLE ITEMS LIST (Contd)

**Table 1. Expendable and Durable Items List (Contd).**

(1) ITEM NO	(2) NATIONAL/NATO STOCK NUMBER	(3) PART NUMBER	(4) SUPPLY CATALOG
14	9150-01-197-7693 9150-01-197-7690	Grease, automotive and artillery, (81349) MIL-PRF-10924-G 14-Ounce Cartridge 1-3/4-Pound Can	OZ LB
15	6850-00-224-9582	Grease, Oil Soluble, (81349) MIL-C-4339 5-gallon can	GAL
16	9150-00-188-9862	Lubricating Oil, engine, OE/HDO 15W40, multi-purpose, (81349) MIL-PRF-2104 55-Gallon Drum	GAL
17	9150-01-348-1596	Lubricating Oil, engine, OE/HDO 5W30, arctic condition MIL-PRF-46167 (81343) J2362 55- Gallon Drum	GAL
18.	9150-01-336-6589	Lubricating Oil, Hydraulic, all weather 1- Quart Bottle (54527) SHELL TELLUS 32 5-Gallon Container	GAL
19.	9150-00-247-0481	Lubricating oil, transmission, 30W (81349) MIL-PRF-2104	GAL
20.	9150-01-523-4017	Lubriplate 630-A/L0066-001 (73219)	CAN
21.	9130-01-031-5816	Fuel, aviation, turbine, all temperature, JP8 (81349) MIL-T-83133 GR JP8 Bulk	BU
22.	9150-00-577-5844	Oil, lubricating gear, G 80W/90 (81349) M2105-3-80W90 5-Gallon Can	GAL
23.	7920-01-519-4141	Pad, Cleaning, Aircraft 61-5001-8695-4 (76381) Box of 200 pads	BOX
24.	9535-00-855-6919	Plate, Metal (Aluminum), (81343) AMS-QQA250-11 36-in. X 96-in. Plate	IN
25.	8010-01-260-0913	Polyurethane Coating, black, (81349) M46168-4-37030- 1Q1/2P	KT
26.	8010-01-260-7482	Polyurethane Coating, brown, (81349) M46168-4-30051- 1Q1/2P	KT
27.		Polyurethane Coating, green, (81349)	
28.	8010-01-306-9681	Polyurethane Coating, tan, (81349) M46168-4-33446- 1Q1/2P	KT

## EXPENDABLE AND DURABLE ITEMS LIST (Contd)

**Table 1. Expendable and Durable Items List (Contd).**

(1) ITEM NO	(2) NATIONAL/NATO STOCK NUMBER	(3) PART NUMBER	(4) SUPPLY CATALOG
29.	8010-01-144-9883	Polyurethane Coating, white, (81349) M46168-4-37875- 1Q1/2P	KT
30.	8010-00-281-7399	Primer Coating, aluminum oxide, type II, (81349) DOD-P-17545 1-QT Can	QT
31.	9320-00-964-2569	Rubber Sheet, (K1511) ASTM D2000 1-Roll	RO
32.	8030-01-475-2446	Sealing Compound, (243) thread-locking, medium strength, type II, grade N, blue, (81349) MIL-S-46163 24078 50-CC Bottle	CC
33.	8030-01-171-7628	Sealing Compound, (272), thread locking, liquid, red, MIL-S-46163 (05972) 27240 50-CC Bottle	CC
34.	8030-01-510-9460	Sealing Compound, (277), red, high strength for large bolts MIL-S-46163 21434 (81349) 10-CC bottle	BT
35.	8030-01-299-1762	Sealing Compound, (587), silicone paste 3.350 Ounce Tube	OZ
36.	8030-01-218-0321	Sealing Compound, Pipe, Teflon, off-white, 24 hour dry time, (02570) MS-PTS-50 50 CC Tube	TU
37.	6850-00-880-7616 6850-00-295-7685	Silicone Compound, dielectric colloid, non- melting, heat stable, NATO code no. S-736 (81349) MIL-S-8660 8 Ounce Tube 10 Pound Can	OZ LB
38.	5975-00-899-4606	Strap, Tiedown Electrical Components, polyamide nylon, self locking, black color 1 Hundred (81343) MS3367-2-0	BOX
39.	5970-00-419-4291	Tape, Insulation, Electrical, black 17 3/4INBLACK -Foot Roll	FT
40.	7510-01-072-2546	Tape, Pressure Sensitive Adhesive (26066) 850 3in. colorless x 216 Foot Roll	FT
41.	5970-01-255-8990	Insulation Sleeving, electrical (81349) M23053/15-102-0	FT
42.	8030-00-180-6150	Sealing Compound (05972) 60921 10 ml Bottle	OZ
43.	8010-01-395-6541	Prime Coating (05972) 7471 1.75 fl oz Bottle	OZ

## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### TOOL IDENTIFICATION LIST

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This Work Package (WP) lists all common tools and supplements and special tools/fixtures needed to maintain the MKII-S Bridge Erection Boat (BEB).

#### EXPLANATION OF COLUMNS

**Column (1)—Item Number.** This number is assigned to the entry in the list and is referenced in the initial setup to identify the item (e.g., Scupper Drain Tool (item 50, WP 0172 00)).

**Column (2)—Nomenclature.** This column lists the item by noun nomenclature and other descriptive features (e.g., Gauge, belt tension).

**Column (3)—National Stock Number.** This is the National Stock Number (NSN) assigned to the item; use it to requisition the item.

**Column (4)—Part Number.** 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.

**Column (5)—Reference.** This column identifies the authorizing supply catalog or RPSTL for items listed in this WP.

## TOOL IDENTIFICATION LIST (Contd)

**Table 1. Common and Special Tools List.**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
1.	Bearing Casing Seal Assembly Tool		TD120962	Ultrajet
2.	Brush, Injector Cleaning	7920-01-381-6132	3822509	Cummins
3.	Chamfer/Straightedge	5210-00-174-3231	4800-024B	
4.	Clutch Spring Compressor			Local fabrication
5.	Compressor, Piston Ring	5120-01-171-3936	3823294	
6.	Drive Flange C Spanner		TD321256	Ultrajet
7.	Drive Flange Removal Tool		TD321258	Ultrajet
8.	Drive Shaft Support Tool		TD321257	Ultrajet
9.	Driver, Cup Plug	5120-01-522-4288	3823520	Cummins
10.	Driver, Expansion Plug, Crankcase	4910-01-143-3337	3376816	Cummins
11.	Electrode, Cutting Solid	3439-00-766-7749	102156	
12.	Expander, Piston Ring	5120-01-387-8935	3823137	Cummins
13.	Forward Repair System (FRS)	4940-01-463-7940	RIA149000	
14.	Gauge Kit, Dial Bore	4910-01-140-4930	3375072	Cummins
15.	Gear barring tool	5120-01-285-5193	3824591	
16.	Handle, Cup Plug	4910-01-328-0679	3376795	Cummins
17.	Hose Assembly, Non Metallic	4720-01-101-7373	NP5015003	
18.	Impeller Removal Tool		TD120891	Ultrajet
19.	Impeller Wear Sleeve Expander Tool		TD321268	Ultrajet
20.	Indicator, Dial, Timing Indicator and Adapter	5210-01-381-5657	3377259	Cummins
21.	Installer, Cup Plug	5120-01-516-2833	3823524	Cummins
22.	Installer, Cup Plug, alternate dipstick holes	5120-01-487-0685	3822372	Cummins
23.	Installer, Cup Plug, alternate oil fill, cylinder head	5120-01-344-2699	3376817	Cummins
24.	Kit, Nozzle Cleaning	2915-01-285-2527	3376947	Cummins
25.	Mechanical Seal Assembly Bullet		TD621250-1	Ultrajet
26.	Mechanical Seal Removal Tool		TD321272	Ultrajet
27.	Nozzle Bush Assembly Tool		TD120959	Ultrajet
28.	Outer bearing pusher			Local fabrication
29.	Output gear pusher			Local fabrication
30.	Piston entering sleeve			Local fabrication
31.	Puller, Injector	5120-01-389-5917	3164706	Cummins

## TOOL IDENTIFICATION LIST (Contd)

**Table 1. Common and Special Tools List (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
32.	Puller, Mechanical, T-bar or Fuel Pump Drive Gear	5120-01-387-8925	3163381	Cummins
33.	Press, Hydraulic	3442-01-085-3355	6-225	
34.	Pump, Lubricant Transfer	4930-00-288-3829	MILP43253	
35.	Reamer, Cylinder Ridge	5110-00-237-8598	MIL-C-82069	
36.	Reverse Deflector Cylinder Bush Assembly Tool		TD120960	Ultrajet
37.	Reverse Deflector Pivot Bush Assembly Tool		TD120961	Ultrajet
38.	Riveter, blind, hand	5120-00-017-2849		
39.	Scupper drain tool			Local fabrication
40.	Shaft/Impeller Locking Tool		TD321273	Ultrajet
41.	Shop equipment contract maint. trk. Mtd (Common No. 1 tool kit)	4940-01-016-2216		
42.	Shop equipment, fuel and electrical system engine, field maintenance, basic less power	4910-00-754-0714		
43.	SKF adapter			Local fabrication
44.	Sling, Engine and Transmission	4910-00-944-4915	MILS45944	
45.	Stand, maintenance, automotive engine	4910-00-529-8387	MIL-S-45004	
46.	Steering Deflector Bush Assembly Tool		TD321269	Ultrajet
47.	Steering Shaft Bush & Seal Assembly Tool		TD120966	Ultrajet
48.	Steering Support Bracket Bush Assembly Tool		TD121046	Ultrajet
49.	Tappet Installation Kit (Repair Kit, Diesel Engine)	2815-01-506-9975	3822513	Cummins
50.	Vise	5120-00-278-1065	676	
51.	Water Lubricated Bearing Press Tool		TD321259	Ultrajet
52.	Welding set arc, inert gas shield	3431-00-079-0483	235-0685	FSCM 00741
53.	Welding set arc, inert gas shielded	3431-00-079-0483	1-2UIW	
54.	Windshield Installation Kit			
55.	Wrench, Oil Filter	5120-01-160-8863	3397929	Cummins

## TOOL IDENTIFICATION LIST (Contd)

**Table 1. Common and Special Tools List (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) NATIONAL/NATO STOCK NUMBER	(4) PART NUMBER	(5) SUPPLY CATALOG
56.	Kit, Crack Detection	6635-01-329-2210	3375432	Cummins
57.	Indicator, Dial	5210-01-157-2291	3376050	Cummins
58.	Attachment, Dial	4910-01-097-6972	ST-1325	Cummins
59.	Micrometer Set	5210-01-468-3287	809536-25	
60.	Telescoping Gauge Set	5210-00-473-9350	64-0007-00	ST
61.	Camshaft Bushing Tool	5120-01-389-8449	3823509	Cummins
62.	Magnetic Base Dial Indicator Holder	5210-01-507-6932	3377399	Cummins
63.	Compressor, Valve Spring	5120-01-145-7293	ST448	Cummins



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

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### MANDATORY REPLACEMENT PARTS

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#### INTRODUCTION

This Work Package (WP) lists mandatory replacement parts you will need to maintain MKII-S Bridge Erection Boat (BEB).

This WP includes a list of all mandatory replacement parts referenced in the task initial setups and procedures. These are items that must be replaced during maintenance whether they have failed or not. This includes items based on usage intervals such as miles, time, rounds fired, etc.

#### EXPLANATION OF COLUMNS

**Column (1)—Item Number.** Number is assigned to each component/part and is referenced in each WP task initial setups “Materials/Parts” heading.

**Column (2)—Nomenclature.** Name or identification.

**Column (3)—Part Number.** The manufacturer’s part number.

**Column (4)—National Stock Number.** The national stock number of the part.

## MANDATORY REPLACEMENT PARTS (Contd)

**Table 1. Mandatory Replacement Parts (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
1	Anode Replacement Kit	8200119AK	Duramax Duracooler
2	Bearing	3503100	3120-01-272-3270
3	Bearing	A300626	
4	Cotter Pin	MS24665-1011	5315-00-288-2478
5	Cotter Pin	MS24665-370	5315-00-236-8359
6	Cotter Pin	12485420-010	5315-01-522-0377
7	Cotter Pin	98401A442	McMaster-Carr
8	E-Clip	91590A115	McMaster-Carr
9	End Washer, Rubber	821900055	Duramax-Marine
10	Fiber Washer	9223-210-00C	5310-01-129-2432
11	Fiber Washer	9223-211-00Z	5310-01-129-7260
12	Fiber Washer	8703-055-00P	Ultrajet
13	Filter, Fuel	3930942	2910-01-192-4622
14	Filter, Fuel	3903640	2910-00-238-0033
15	Filter, Lubricity	FS2000	Cummins
16	Filter, Oil	LF3349	2910-01-461-9518
17	Front Seal Service Kit	3904353	5330-01-191-4513
18	Gasket	3921961	5330-01-389-6999
19	Gasket	39393550	5330-01-306-8642
20	Gasket	3921926	5330-01-389-4399
21	Gasket	3938152	5330-01-319-8523
22	Gasket	3929881	5330-01-480-3282
23	Gasket	J923331	5330-01-190-1904
24	Gasket	3519807	5330-01-379-8380
25	Gasket	3283335	5330-01-450-6037
26	Gasket	3906698	5330-01-297-6308
27	Gasket	3935449	5330-01-492-7729
28	Gasket	3930906	5330-01-453-7148
29	Gasket	25-46-07	5330-01-121-0837
30	Gasket	3909356	5330-01-267-2985
31	Gasket	8985-015-00X	Ultrajet
32	Gasket		Ultrajet
33	Gasket		5330-01-464-1300
34	Gasket	3926760	5330-01-191-2965
35	Gasket	3914388	5330-01-190-1905
36	Gasket	3051-03K-01-01	
37	Gasket	3906697	5330-01-314-0902
38	Gasket	B-2136-A	5330-01-451-8852
39	Gasket	B-2136-A	5330-01-451-8852
40	Gasket	P-9850	Twin Disc

## MANDATORY REPLACEMENT PARTS (Contd)

**Table 1. Mandatory Replacement Parts (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
41	Gasket	P-9854	Twin Disc
42	Gasket	8978-031-00T	Ultrajet
43	Gasket	8978-016-00H	Ultrajet
44	Gasket	8978-043-00E	Ultrajet
45	Gasket	3911536	5330-01-407-9026
46	Gasket	3914383	5330-01-316-5761
47	Gasket	3914385	5330-01-191-7322
48	Gasket	3938156	5330-01-453-7142
49	Gasket Kit	837002355	Duramax-Marine
50	Gasket, Rubber	M3BC617A14C12E034	.
51	Intermediate Washer, Rubber	821900054	Duramax-Marine
52	Locknut	52-04-08	5310-99-316-1162
53	Locknut	52-04-06	5310-01-121-5397
54	Locknut	52-04-10	5310-99-477-3192
55	Locknut	MS16228-8C	5310-00-241-6667
56	Locknut	52-04-05	5310-99-921-6880
57	Locknut	3529372	5310-01-270-8245
58	Locknut	52-04-04	5310-99-894-0490
59	Locknut	52-04-12	5310-99-495-7895
60	Locknut	62-01-12	5310-01-121-5394
61	Locknut	91851A030	McMaster-Carr
62	Locknut	97135A245	McMaster-Carr
63	Locknut	9145-281-00A	Ultrajet
64	Locknut	52-06-16	5310-01-123-0506
65	Locknut	9145-180-00L	5310-01-127-2470
66	Locknut	9145-179-00J	5310-01-128-4039
67	Locknut	91828A415	McMaster-Carr
68	Locknut	9145-183-00Z	Ultrajet
69	Locknut	9145-185-00O	Ultrajet
70	Locknut	95621A600	McMaster-Carr
71	Locknut	9145-181-00G	5310-01-121-5248
72	Locknut	B18163A120	5310-01-121-5248
73	Locknut	93520A205	McMaster-Carr
74	Locknut	91831A150	McMaster-Carr
75	Locknut	91831A120	McMaster-Carr
76	Locknut	91831A411	McMaster-Carr
77	Lockwasher	3904642	5310-01-234-1406
78	Lockwasher	MS35333-76	5310-00-180-0277
79	Lockwasher	MS35338-46	5310-00-637-9541
80	Lockwasher	M535338-45	5310-00-407-9566
81	Lockwasher	M535338-42	5310-00-045-3299

## MANDATORY REPLACEMENT PARTS (Contd)

**Table 1. Mandatory Replacement Parts (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
82	Lockwasher	MS35338-148	5310-00-974-6642
83	Lockwasher	91111A124	McMaster-Carr
84	Lockwasher	92148A210	McMaster-Carr
85	Lockwasher	92148A241	McMaster-Carr
86	Lockwasher	9223-457-00A	Ultrajet
87	Lockwasher	9223-405-00E	Ultrajet
88	Lockwasher	MS35338-42	5310-00-045-3299
89	Lockwasher	MS35338-161	5310-00-926-5879
90	Lockwasher	MS35338-160	5310-00-926-5877
91	Lockwasher	9223-403-00N	Ultrajet
92	Lockwasher	MS35338-137	5310-00-933-8119
93	Lockwasher	MS35335-30	5310-00-0209-0788
94	Lockwasher	92148A170	McMaster-Carr
95	Lockwasher	92148A200	McMaster-Carr
96	Lockwasher	MS35333-74	5310-00-543-2740
97	Lockwasher	91111A129	McMaster-Carr
98	Mechanical Seal	9470-050-00X	Ultrajet
99	Nozzle Gasket, Main	837002339	Duramax-Marine
100	Nozzle Washer, Rubber	821900035	Duramax-Marine
101	O-ring	3523958	5331-01-272-1125
102	O-ring	A2916BT	5331-00-251-4401
103	O-ring	7111-853	5331-01-306-6584
104	O-ring	7111-843	5331-01-306-6583
105	O-ring	RWS5	Raritan Engineering
106	O-ring	9322-26-009	Ultrajet
107	O-ring	9329-037-00N	Ultrajet
108	O-ring	NA	Ultrajet
109	O-ring	3929457	5331-01-453-7141
110	O-ring	B6061	3110-01-205-4128
111	O-ring	1119	5331-01-268-0438
112	O-ring	A-2074-EH	Twin Disc
113	O-ring	A2916BT	5331-00-251-4401
114	O-ring	A-2916-BL	5331-00-484-6266
115	O-ring	A-2916-FD	5331-01-090-4808
116	O-ring	8978-030-00W	Ultrajet
117	O-ring	9327-017-00H	Ultrajet
118	O-ring	9327-018-00O	Ultrajet
119	O-ring	9327-019-009	Ultrajet
120	O-ring	9327-023-00U	Ultrajet
121	Pin	W1581-37	5315-01-219-6784
122	Pin	MS16562-2	5315-00-058-9771

## MANDATORY REPLACEMENT PARTS (Contd)

**Table 1. Mandatory Replacement Parts (Contd).**

(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
123	Pin	13226E0435	5315-01-223-3447
124	Piston Ring	M-1904-BQ	Twin Disc
125	Piston Ring	M-1904-CM	Twin Disc
126	Rear Seal Service Kit	J934486	5330-01-192-2037
127	Retaining Ring	3762259	5325-01-270-8361
128	Retaining ring	A51302-228	
129	Rivet, Blind	2771-0817	5320-01-157-0908
130	Rivet, blind	MS20601B6W4	5320-00-616-5536
131	Rivet, blind	MS20600B4W4	5320-00-845-9501
132	Rivet, Drive	97510A535	McMaster-Carr
133	Saddle Washer	3906659	5310-01-270-8417
134	Seal	3758848	5330-01-213-1258
135	Seal	V534-1IN	5330-01-123-0496
136	Seal	3936876	5330-01-199-6159
137	Seal	5855-30	5330-01-200-6703
138	Seal	5855-30G	5330-99-801-6628
139	Seal	9341-023-00R	Ultrajet
140	Seal	1002238	Twin Disc
141	Seal	MA-349	5330-01-352-7739
142	Seal	9411-459-006	Ultrajet
143	Seal washer	CB100-CC-06-46	5310-99-995-9017
144	Seal, banjo	3903380	5330-01-195-5268
145	Seal, nonmetallic	I.R.S.769 WS	5330-01-128-1743
146	Sealed washer	3755947	5310-01-414-0991
147	Sealing Washer	3755947	5310-01-414-0991
148	Sealing Washer	3924389	5310-01-449-8430
149	Shaft Seal	9411-461-004	Ultrajet
150	Sleeve, bearing	3802820	3120-01-266-1529
151	Sleeve, bearing	3926126	3120-01-266-1530
152	Split Ring Seal	3502449	5330-01-272-1250
153	Split Ring Seal	3756754	5330-01-203-3612
154	Strip, rubber filler	FILLER STRIP FOR IRS 769 WS	2040-01-128-3850
155	Support Gasket, End	837002346	Duramax-Marine
156	Support Gasket, Intermediate	837002350	Duramax-Marine
157	Thrust Bearing	3525739	3120-01-272-3269
158	Thrust Collar	3518980	3040-01-289-1636
159	Weatherseal	S-2756	5340-01-210-7618
160	Retaining Ring	3904849	5325-00-598-1297
161	O-ring	3913994	5330-01-291-6537
162	Gasket	391577200	5380-01-263-6179
163	Seal Grommet	3928759	5330-01-450-6038

## MANDATORY REPLACEMENT PARTS (Contd)

**Table 1. Mandatory Replacement Parts (Contd).**

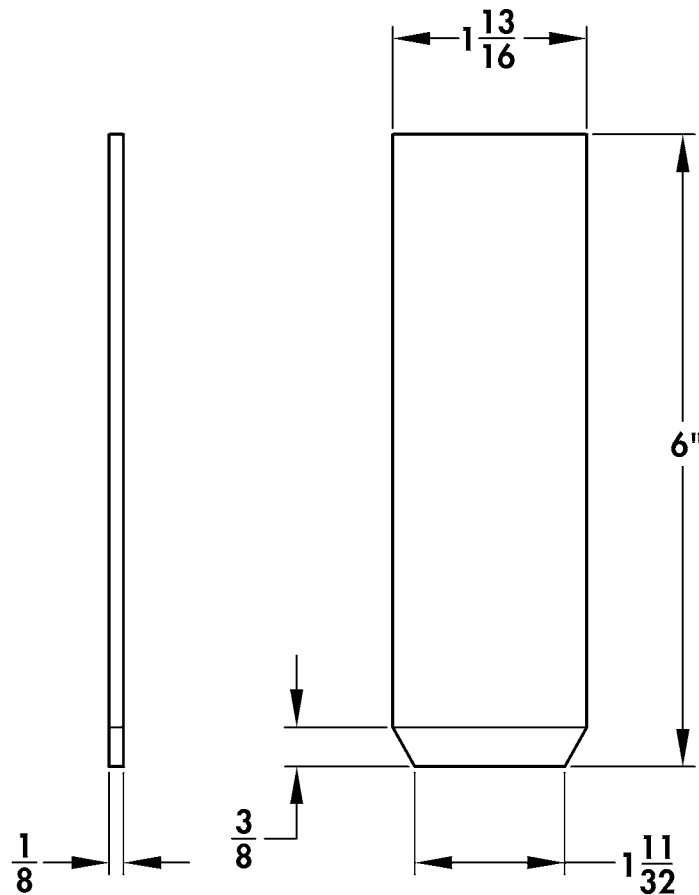
(1) ITEM NO	(2) NOMENCLATURE	(3) PART NUMBER	(4) NATIONAL/NATO STOCK NUMBER
164	Gasket, Push Rod Cover	3284623	5330-01-492-7606
165	Gasket	3938159	5330-01-304-7807
166	Seal	3912473	5330-01-271-9375
167	O-ring	3926047	5331-01-453-7143
168	Water Bearing	9530-009-00Z	
169	Locknut	90101A225	5310-01-466-1914
170	O-ring	12334553-3	5331-01-273-8383
171	Locknut	91831A009	5310-01-359-2589
172	Locknut	90098A110	
173	Lockwasher	92148A180	
174	Locknut	93625A300	5310-01-505-8734
175	Terminal	M520659-141	5940-00-113-9825
176	Screw	890.37.09	5305-01-485-7603
177	Washer	M527183-9	5310-00-823-8804
178	O-ring	9341-229-005	5348-01-431-8753
179	Expansion Plug	3922072	5340-01-431-8753
180	Expansion Plug	4429735	5340-01-435-7103
181	Expansion Plug	3900956	5340-01-190-7424
182	Expansion Plug	3900687	5340-01-194-4667
183	Expansion Plug	3920706	5340-01-431-8752
184	Expansion Plug	3900955	5340-01-239-8607
185	Expansion Plug	3900958	5340-01-190-7425

**SUPPORTING INFORMATION****BRIDGE ERECTION BOAT (BEB)****MK II-S**

NSN 1940-01-526-0770 P/N 12492423

**ILLUSTRATED LIST OF MANUFACTURED ITEMS**

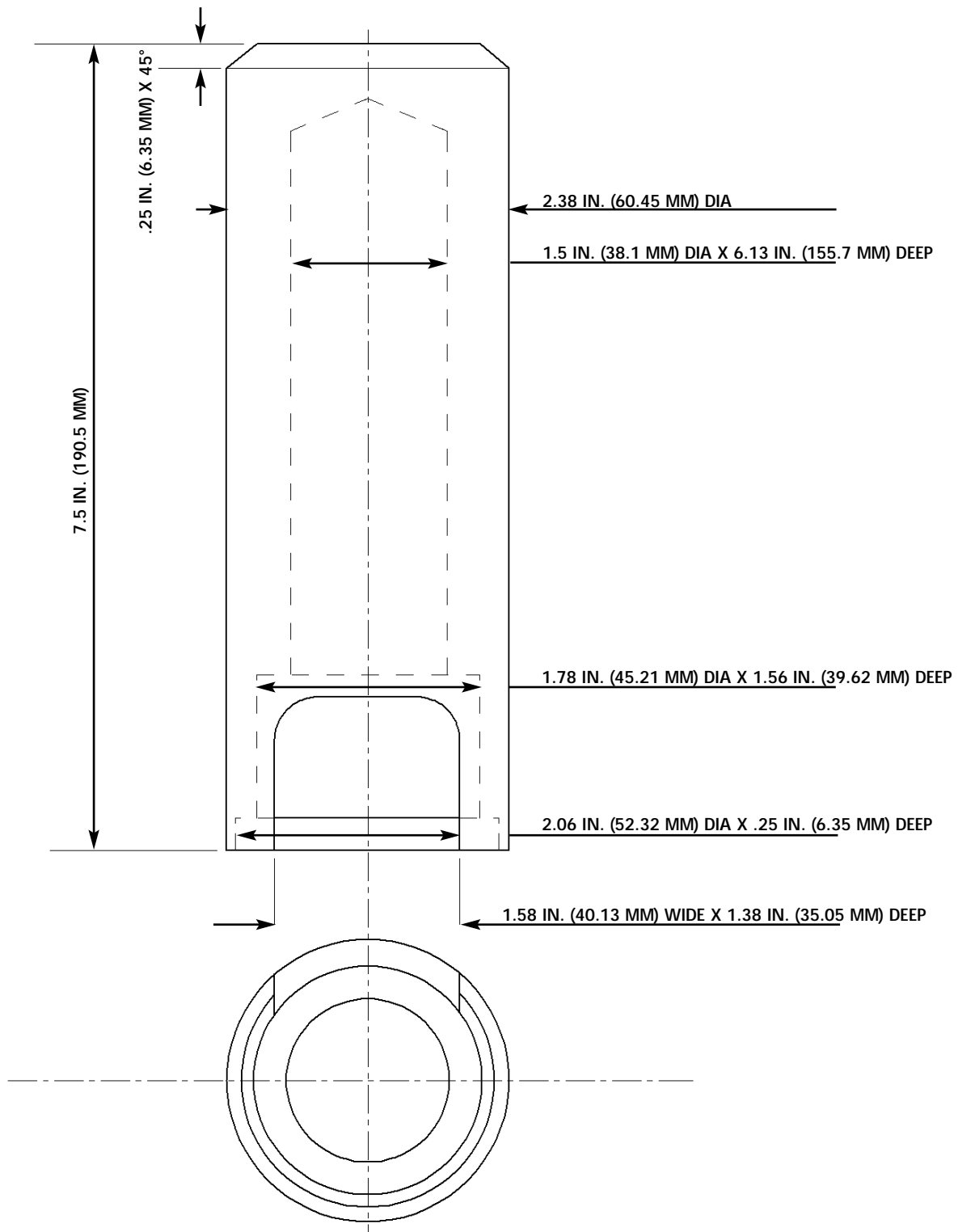
*This Work Package (WP) includes complete instructions for making items authorized to be manufactured at field maintenance level.*

**SCUPPER DRAIN TOOL**

1. Fabricate from NSN 9530-00-167-2144, ASTM B272, carbon steel bar.
2. Trim steel to specifications in diagram above.
3. Tool is used for removal and installation of forward scupper drains.

ILLUSTRATED LIST OF MANUFACTURED ITEMS (Contd)

CLUTCH SPRING COMPRESSOR

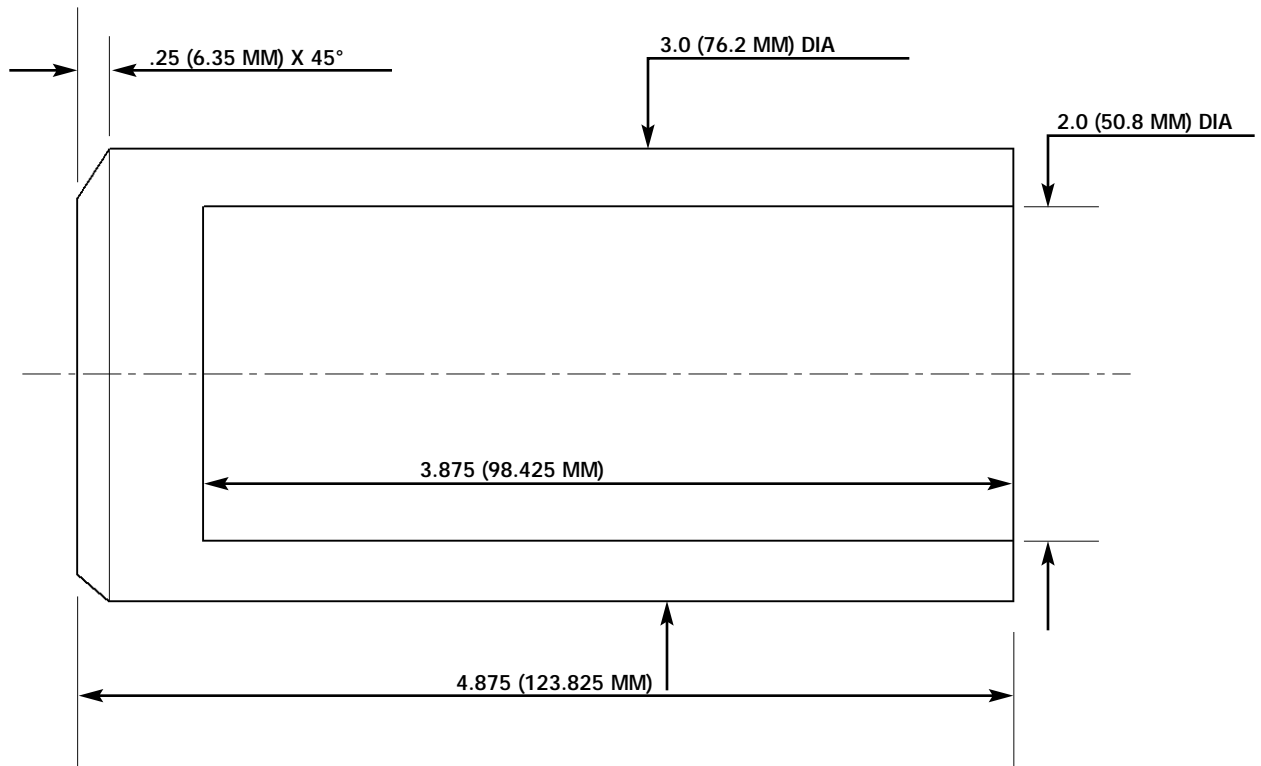


1. Fabricate from P/N 8935K191 (39428), ASTM A191 multipurpose alloy steel bar.
2. Machine steel to specifications in diagram above.



## ILLUSTRATED LIST OF MANUFACTURED ITEMS (Contd)

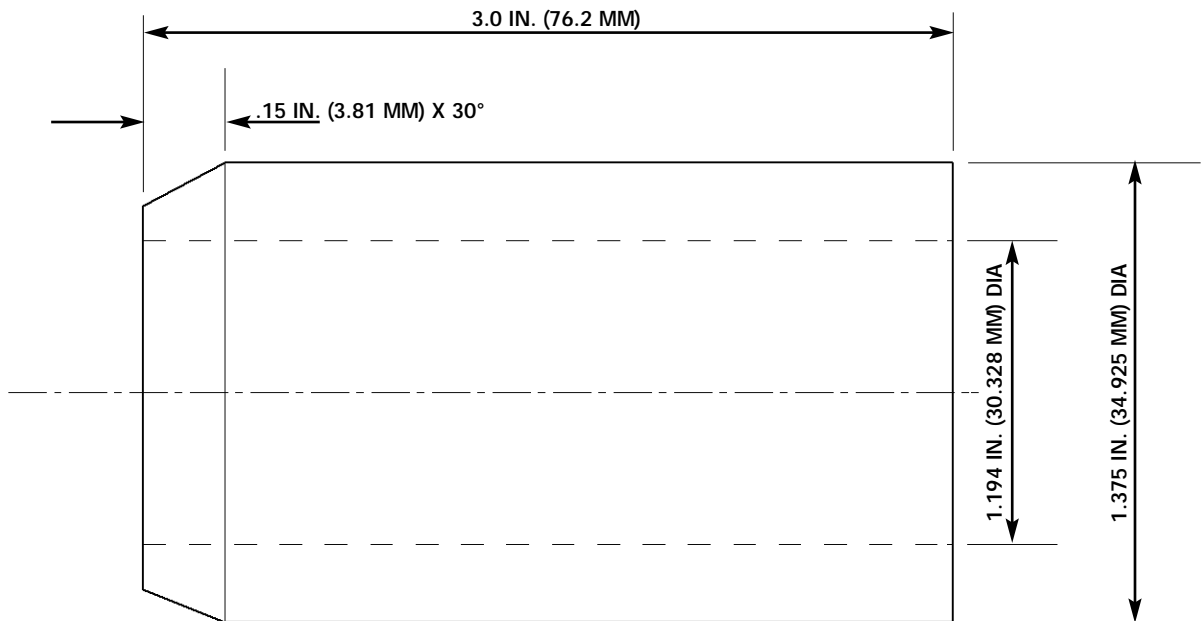
## OUTER BEARING PUSHER



1. Fabricate from P/N 8935K241 (39428), ASTM A193 multipurpose alloy steel bar.
2. Machine steel to specifications in diagram above.

## ILLUSTRATED LIST OF MANUFACTURED ITEMS (Contd)

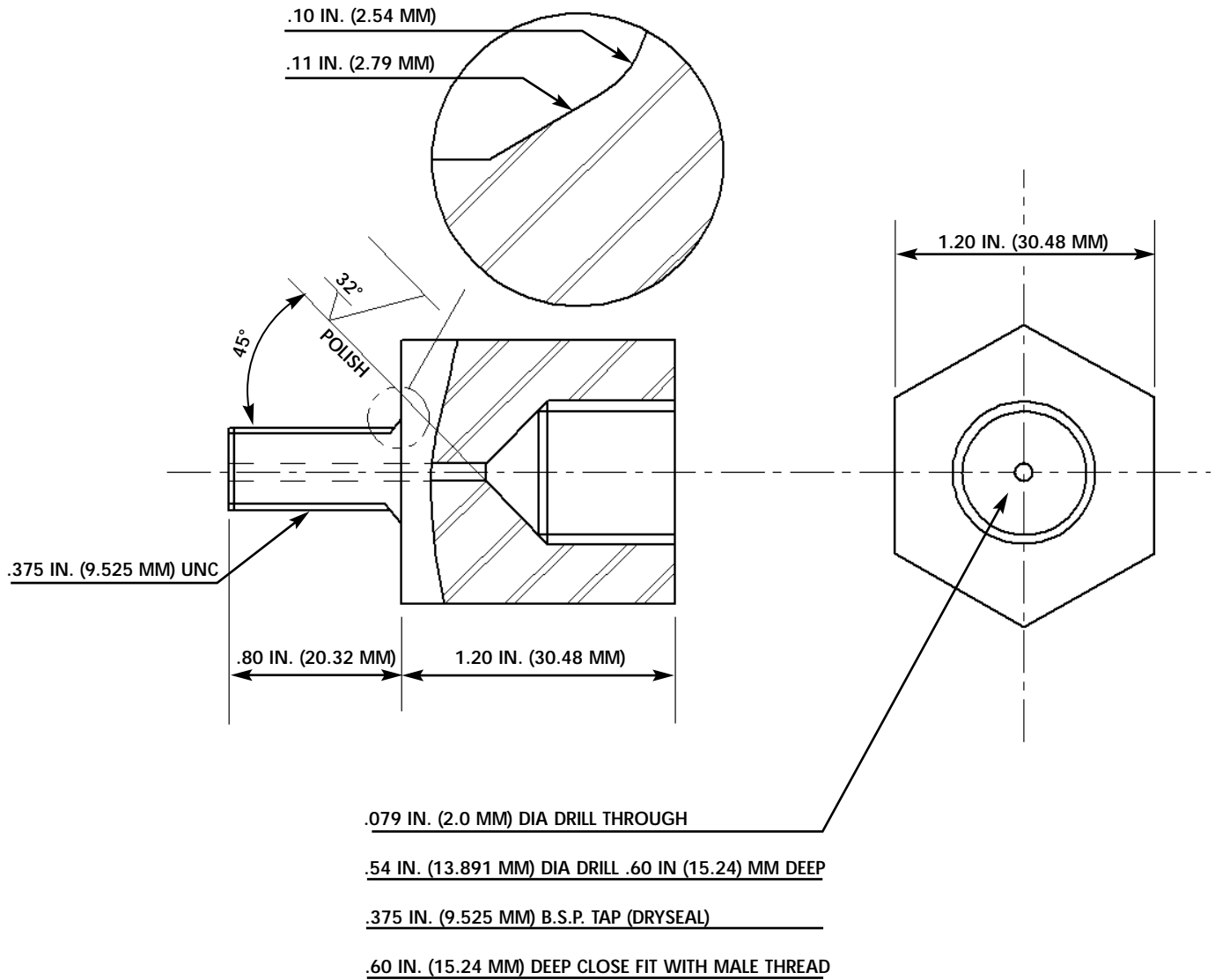
## PISTON ENTERING SLEEVE



1. Fabricate from P/N 8935K491 (39428), ASTM A193 multipurpose alloy steel bar.
2. Machine steel to specifications in diagram above.

ILLUSTRATED LIST OF MANUFACTURED ITEMS (Contd)

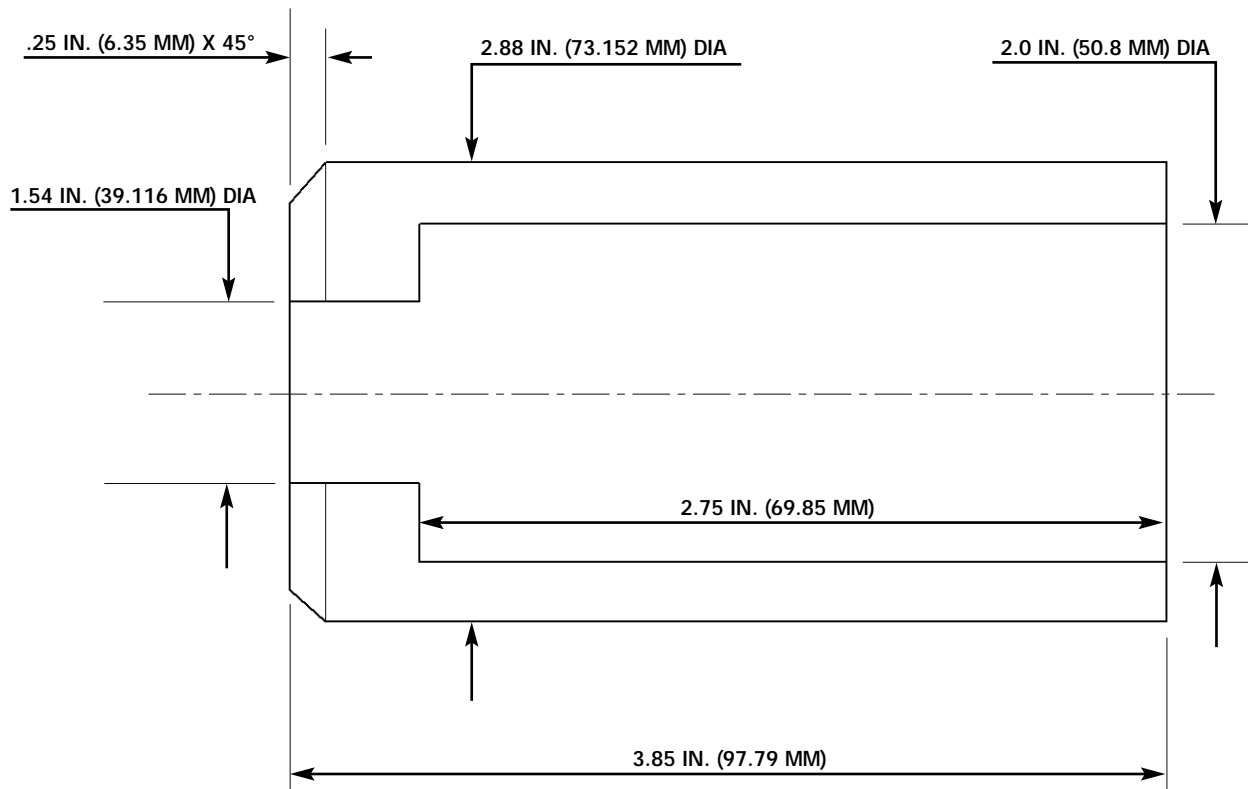
SKF ADAPTER



1. Fabricate from NSN 9510-00-596-6296 (81346), ASTM A686 hex metal bar.
2. Machine steel to specifications in diagram above.

## ILLUSTRATED LIST OF MANUFACTURED ITEMS (Contd)

## OUTPUT GEAR PUSHER



1. Fabricate from P/N 8935K241 (39428), ASTM A193 multipurpose alloy steel bar.
2. Machine steel to specifications in diagram above.

END OF WORK PACKAGE

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## SUPPORTING INFORMATION

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

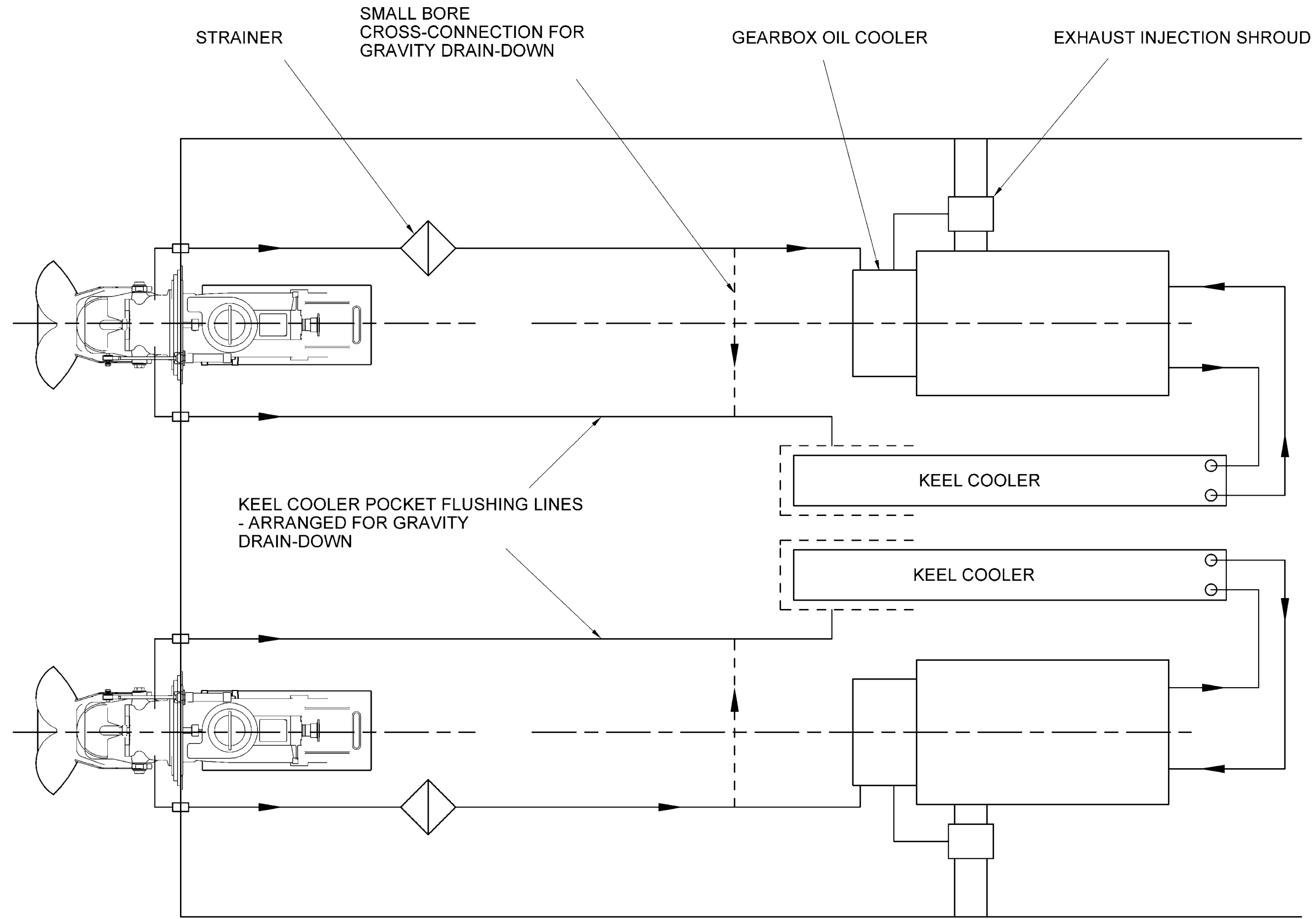
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## SCHEMATICS AND DIAGRAMS

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DIAGRAM/FOLDOUT	PAGE
Cooling System Diagram . . . . .	0175 00-3
Fuel System Diagram . . . . .	0175 00-5
Automatic Fire Extinguisher Wiring Schematic . . . . .	0175 00-7
Battery Starting and Charging Schematic . . . . .	0175 00-9
Auxiliary Wiring Harness Layout . . . . .	0175 00-11
Auxiliary Wiring Harness Details . . . . .	0175 00-13
Auxiliary Wiring Harness Schematic . . . . .	0175 00-15
Cab and Mast Layout Details . . . . .	0175 00-17
Auxiliary Switch Panel and Junction Box Details . . . . .	0175 00-19
Depth Sounder Schematic . . . . .	0175 00-21
Instrument Panel Wiring Harness Schematic . . . . .	0175 00-23
Engine Wiring Harness Schematic . . . . .	0175 00-25
Upper and Lower Mast Wiring Schematic . . . . .	0175 00-27
Cab Wiring Schematic . . . . .	0175 00-29

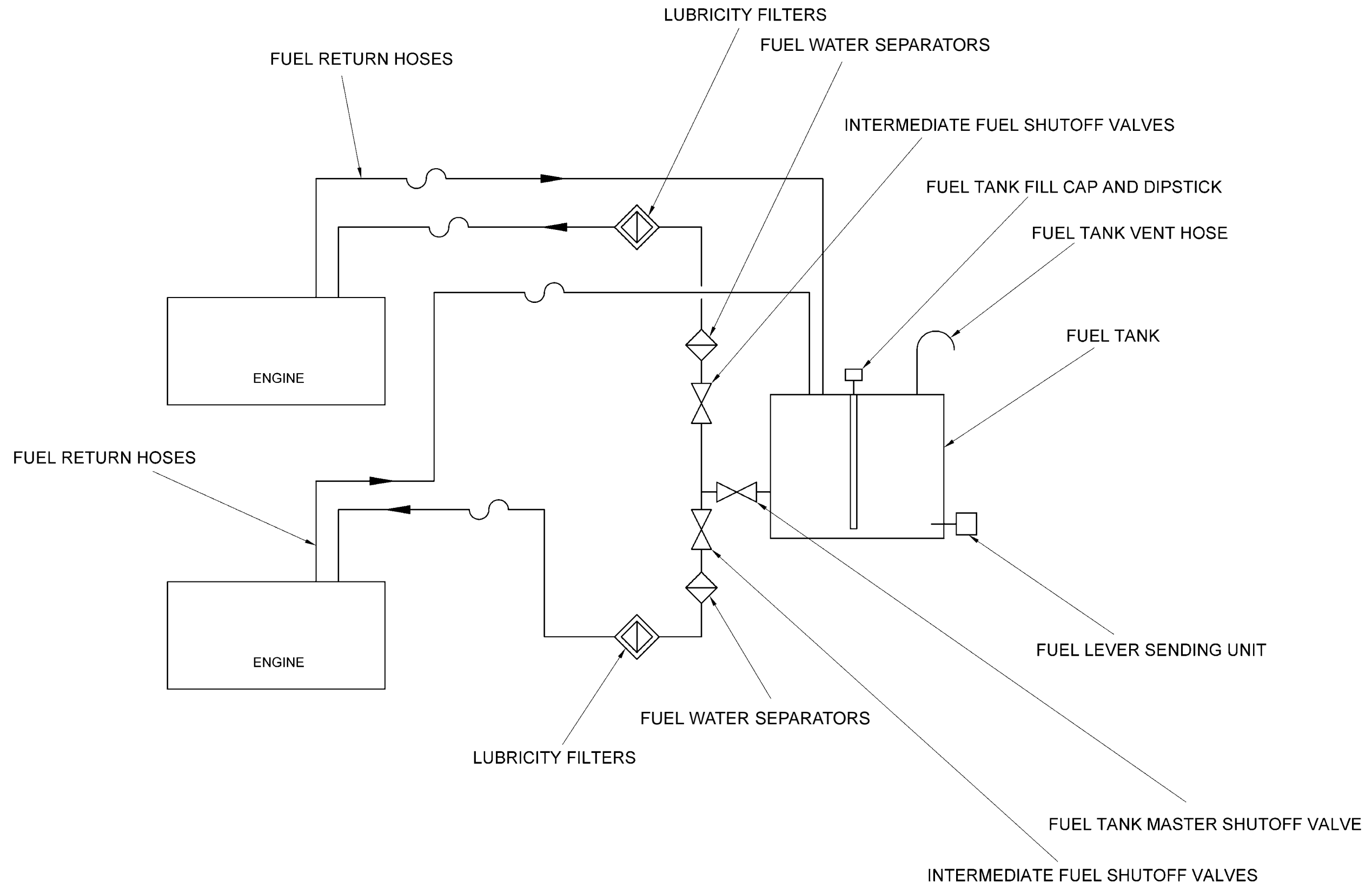




Cooling System Diagram Foldout 1.





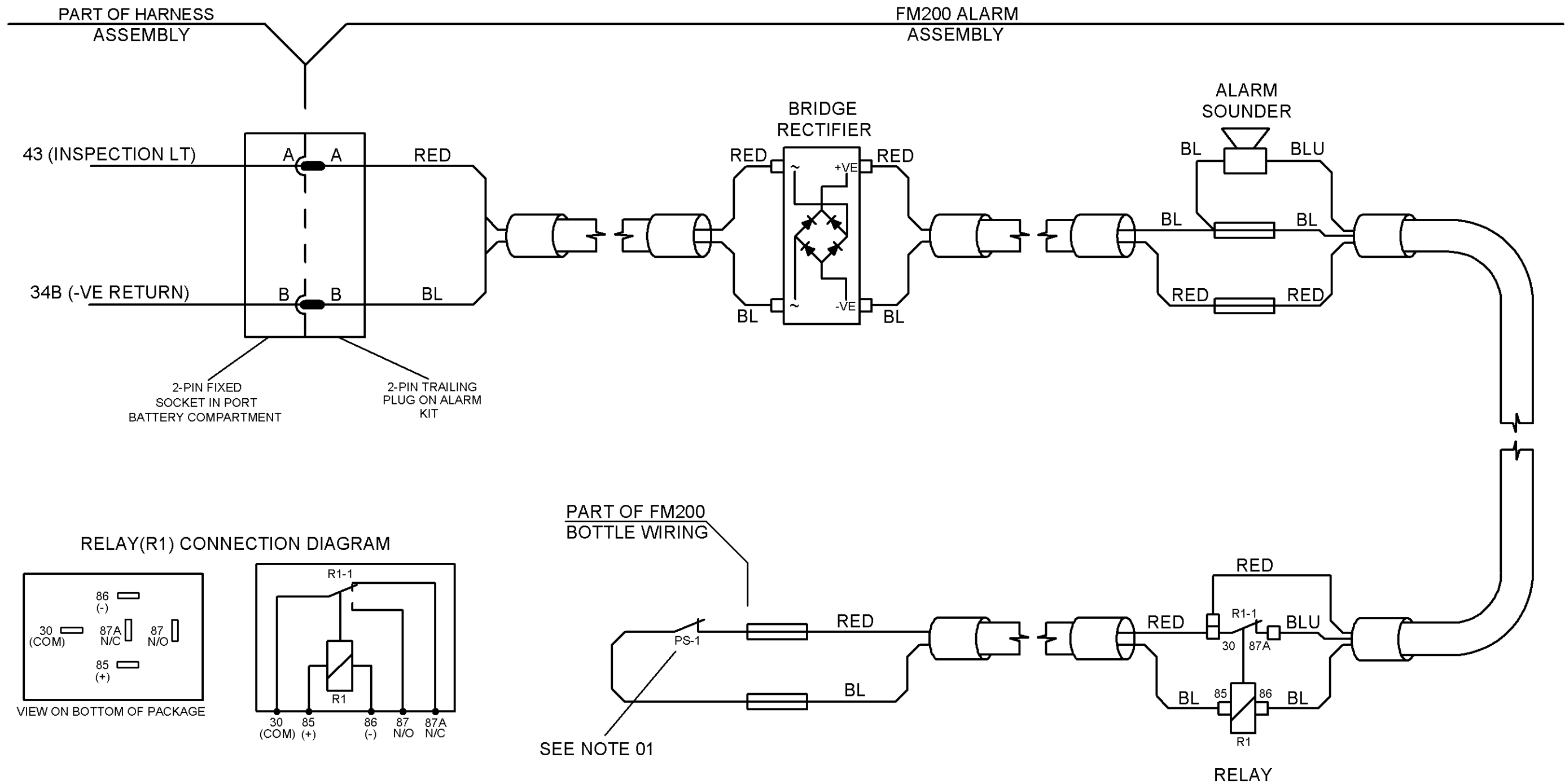


Fuel System Diagram Foldout 2.

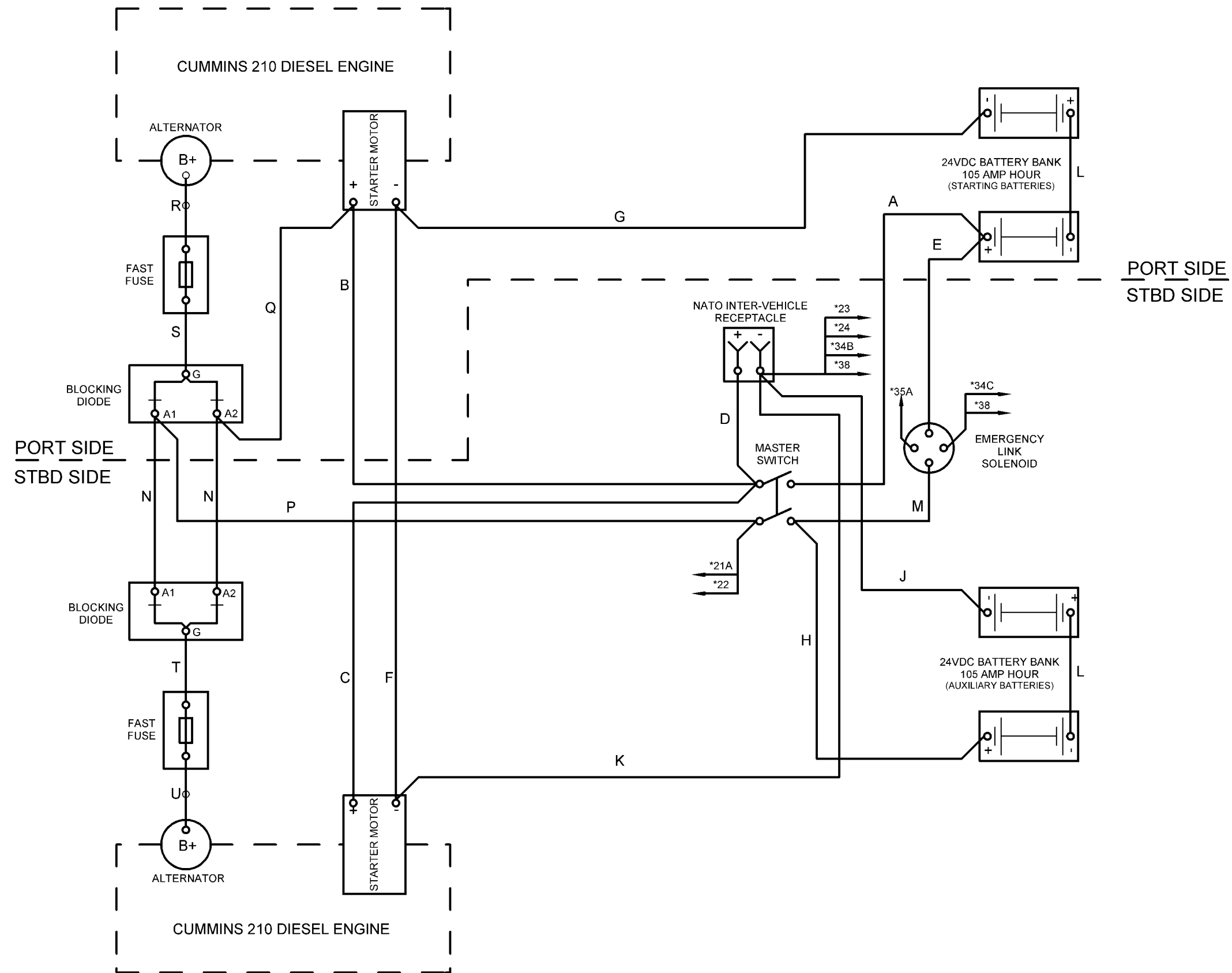


NOTES:

1. PS1 IS A NORMALLY CLOSED, VOLT FREE CONTACT, IN THE FORM OF A PRESSURE SWITCH ON THE FM200 BOTTLE.
2. CIRCUIT IS DRAWN DE-ENERGISED. WHEN POWERED UP, CONTACT R1-1 IS HELD OPEN. WHEN PS1 OPENS (GAS RELEASE) R1 IS DE-ENERGISED AND THE ALARM SOUNDS.

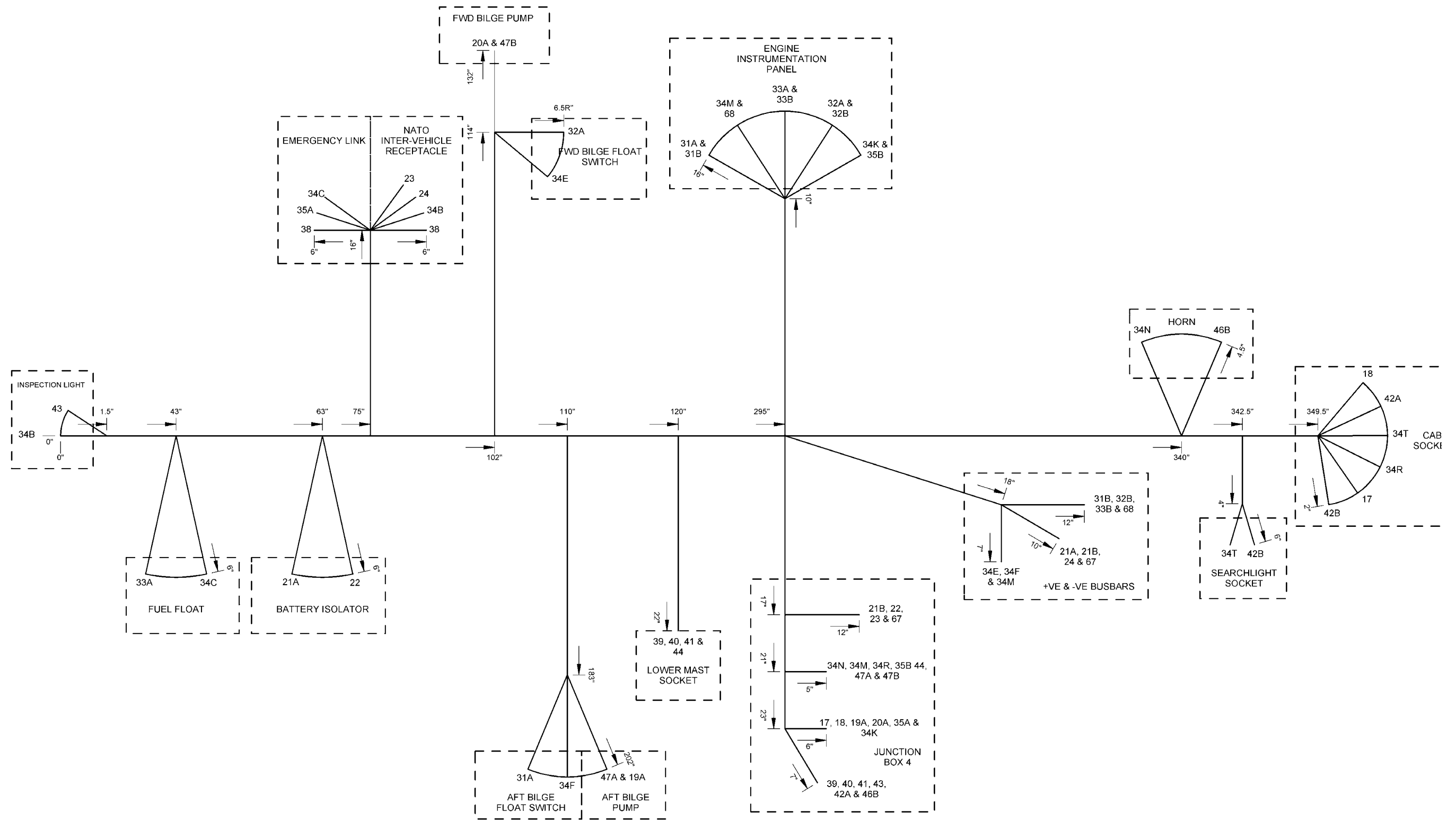






Battery Starting and Charging Schematic Foldout 4.





Auxiliary Wiring Harness Layout Foldout 5.





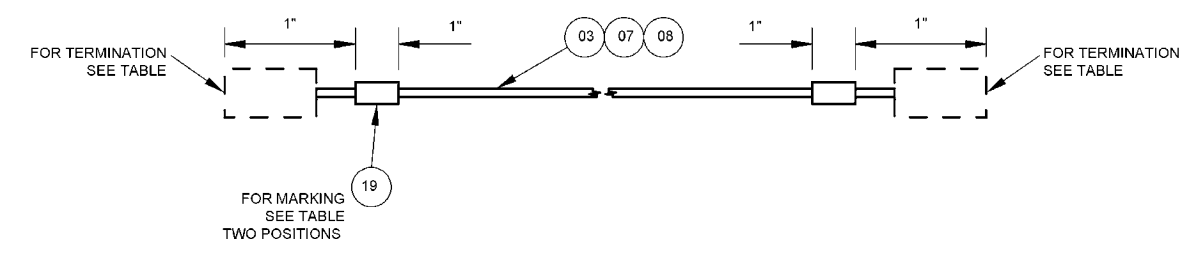
CABLE NO	TERMINATION				TERMINATION				CABLE TYPE	CABLE LENGTH	CONTINUITY OK?
	FROM	TYPE	TERM OK?	IDENT OK?	TO	TYPE	TERM OK?	IDENT OK?			
17	JB1 - 7 (P. WIPER +VE)	5			CAB SOCKET - 4	T			7	43.5	
18	JB1 - 8 (S. WIPER +VE)	5			CAB SOCKET - 3	T			7	42.5	
19A	JB1 - 11 (+VE)	5			AFT BILGE PUMP - A (+VE)	2			8	44.3	
20A	JB1 - 10 (+VE)	5			FWD BILGE PUMP - A (+VE)	2			8	38.3	
21A	TB (+VE)	4			BATTERY ISOLATOR	16			3	2.51	
21B	JB1 (+VE)	16			TB (+VE)	16			3	4.9	
22	JB1 (+VE)	4			BATTERY ISOLATOR	16			3	2.68	
23	JB1 (-VE)	4			NATO RECEPTACLE (-VE)	16			3	2.38	
24	TB (-VE)	4			NATO RECEPTACLE (-VE)	16			3	2.40	
31A	AFT BILGE FLOAT SWITCH	2			ENG INST. PANEL - J8	11/12			7	4.25	
31B	TB (+VE)	1			ENG INST. PANEL - J8	11/12			7	15.5	
32A	FWD BILGE FLOAT SWITCH	2			ENG INST. PANEL - J4	11/12			7	351.5	
32B	TB (+VE)	1			ENG INST. PANEL - J4	11/12			7	15	
33A	FUEL FLOAT SWITCH	2			ENG INST. PANEL - J9	11/12			7	2.97	
33B	TB (+VE)	1			ENG INST. PANEL - J9	11/12			7	14.5	
34B	INSPECTION LIGHT SOCKET - B	T			NATO RECEPTACLE (-VE)	18			7	7.9	
34C	EMERGENCY LINK (-VE)	1			FUEL FLOAT SWITCH	2			7	1.3	
34E	TB (-VE)	-			FWD BILGE FLOAT	1			7	323.5	
34F	TB (-VE)	-			AFT BILGE FLOAT	1			7	3.96	
34K	JB1 - 9 (EMERG LINK IND +VE)	5			ENG INST. PANEL - J3	11/12			7	2.4	
34M	TB (-VE)	5			ENG INST. PANEL - J10	11/12			7	2.4	
34N	JB1 (-VE)	5			HORN (-VE)	2			7	5.8	
34R	JB1 (-VE)	5			CAB SOCKET - 2	T			7	34.5	
34T	CONSOLE SEARCH LT SKT - B	T			CAB SOCKET - 2	T			7	1.5	
35A	JB1 - 9 (+VE)	6			EMERGENCY LINK (+VE)	1			8	2.88	
35B	JB1 (-VE)	5			ENG INST. PANEL - J3	11/12			7	3.0	
38	EMERGENCY LINK (-VE)	1			NATO RECEPTACLE (-VE)	18			8	40.5	
39	JB1 - 5 (NAV LT +VE)	5			MAST SOCKET - B	T			7	2.32	
40	JB1 - 4 (TOW LT +VE)	5			MAST SOCKET - C	T			7	2.30	
41	JB1 - 3 (ANCHOR LT +VE)	5			MAST SOCKET - F	T			7	228.5	
42A	JB1 - 1 (S/L +VE)	5			CAB SOCKET - 1	T			7	44.5	
42B	CONSOLE SEARCH LT SKT - A	T			CAB SOCKET - 1	T			7	1.5	
43	JB1 - 2 (+VE)	5			INSPECTION LIGHT SOCKET - A	T			7	3.29	
44	JB1 (-VE)	5			MAST SOCKET - D	T			8	2.27	
46B	JB1 - 6 (+VE)	5			HORN (+VE)	2			7	108.5	
47A	JB1 (-VE)	6			AFT BILGE PUMP - B	2			8	3.95	
47B	JB1 (-VE)	5			FWD BILGE PUMP - B	2			8	3.34	
67	TB (-VE)	16			JB1 (-VE)	16			3	3.6	
68	TB (+VE)	1			ENG INST. PANEL - J10	11/12			7	1.6	
39A	LOWER MAST PLUG - 1	T			PORT NAV LT (+VE)	T			7	-	
39B	PORT NAV LT (+VE)	T			STBD NAV LT (+VE)	T			7	-	
39C	STBD NAV LT (+VE)	T			TOP MAST SOCKET - 1	T			7	-	
39D	TOP MAST PLUG - 1	T			STERN LT (+VE)	T			7	-	
39E	STERN LT (+VE)	T			MASTHEAD LT (+VE)	T			7	-	
40A	LOWER MAST PLUG - 3	T			TOP MAST SOCKET - 3	T			7	-	
40B	TOP MAST PLUG - 3	T			TOWING MASTHEAD LT (+VE)	T			7	-	
40C	TOWING MASTHEAD LT (+VE)	T			TOWING STERN LT (+VE)	T			7	-	
41A	LOWER MAST PLUG - 4	T			TOP MAST SOCKET - 4	T			7	-	
41B	TOP MAST PLUG - 4	T			ANCHOR LT (+VE)	T			7	-	
44A	LOWER MAST PLUG - 2	T			PORT NAV LT (-VE)	T			7	-	
44B	PORT NAV LT (-VE)	T			STBD NAV LT (-VE)	T			7	-	
44C	STBD NAV LT (-VE)	T			TOP MAST SOCKET - 2	T			7	-	
44D	TOP MAST PLUG - 2	T			ANCHOR LT (-VE)	T			7	-	
44E	ANCHOR LT (-VE)	T			TOWING MASTHEAD LT (-VE)	T			7	-	
44F	TOWING MASTHEAD LT (-VE)	T			TOWING STERN LT (-VE)	T			7	-	
44G	TOWING STERN LT (-VE)	T			STERN LT (-VE)	T			7	-	
44H	STERN LT (-VE)	T			MASTHEAD LT (-VE)	T			7	-	
17A	CAB PLUG - 4	T			PORT WIPER (+VE)	9/10			7	-	
17B	CAB PLUG - 3	T			STBD WIPER (+VE)	9/10			7	-	
34U	CAB PLUG - 2	T			PORT WIPER (-VE)	9/10			7	-	
34V	CAB PLUG - 2	T			STBD WIPER (-VE)	9/10			7	-	
34W	CAB PLUG - 2	T			CAB SEARCHLIGHT SOCKET - B	T			7	-	
42C	CAB PLUG - 1	T			CAB SEARCHLIGHT SOCKET - A	T			7	-	
-	-	-			-	-			-	-	

MAIN AUXILIARY HARNESS  
(SEE SHEET 01 OF THIS DRAWING)

MAST HARNESS  
SEE DWG 3051-07G-04-01

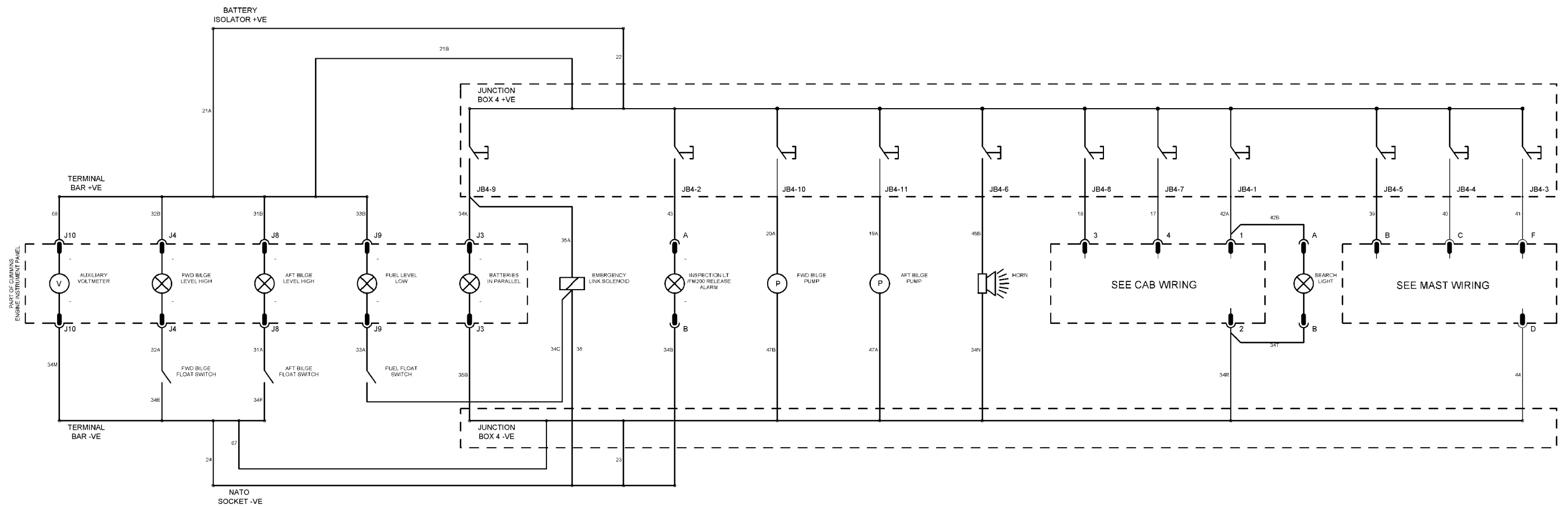
CAB HARNESS  
SEE DWG 3051-07G-04-01

ITEM	DESCRIPTION	QTY	MOD
01	TERMINAL, LUG, CRIMP STYLE, INSULATED, 16-14 AWG, 0.19 STUD	12 off	01
02	TERMINAL, INSULATED, RECEPTACLE, FEMALE, SNAP CONNECT	6 off	01
03	UL1426 TINNED 8 AWG WHITE CABLE	95ft	01
04	TERMINAL, LUG, CRIMP STYLE, INSULATED, 8 AWG, 0.375 STUD	4 off	01
05	RECEPTACLE, INSULATED, SPADE, FEMALE, 16-14 AWG	18 off	01
06	RECEPTACLE, INSULATED, SPADE, FEMALE, MULTI-STACK, 16-14 AWG	2 off	01
07	UL1426 TINNED 16 AWG WHITE CABLE	285ft	01
08	UL1426 TINNED 14 AWG WHITE CABLE	180ft	01
09	SSI TO SUPPLY PART NUMBER & DESCRIPTION	4 off	01
10	SSI TO SUPPLY PART NUMBER & DESCRIPTION	2 off	01
11	CUMMINS TO SUPPLY ITEM PART NUMBER & DESCRIPTION	5 off	01
12	CUMMINS TO SUPPLY ITEM PART NUMBER & DESCRIPTION	10 off	01
13	BAG OF 100 ANCOR UV RESISTANT BLACK 6" TIE WRAPS	AR	01
14	SOLDER	AR	01
15	3/4" DIA BLACK SPIRAL WRAP	AR	01
16	TERMINAL, LUG, CRIMP STYLE, INSULATED, 8 AWG, 0.19 STUD	8 off	01
17	100ft ROLL OF ANCOR 1/4" DIA BLACK SPIRAL WRAP	AR	01
18	TERMINAL, LUG, CRIMP STYLE, INSULATED, 16-14 AWG, 0.375 STUD	2 off	01
19	WHITE HEATSHRINK, 3" LONG, 3:1 RATIO (3/8 TO 1/8)	15 off	01
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-
-	-	-	-



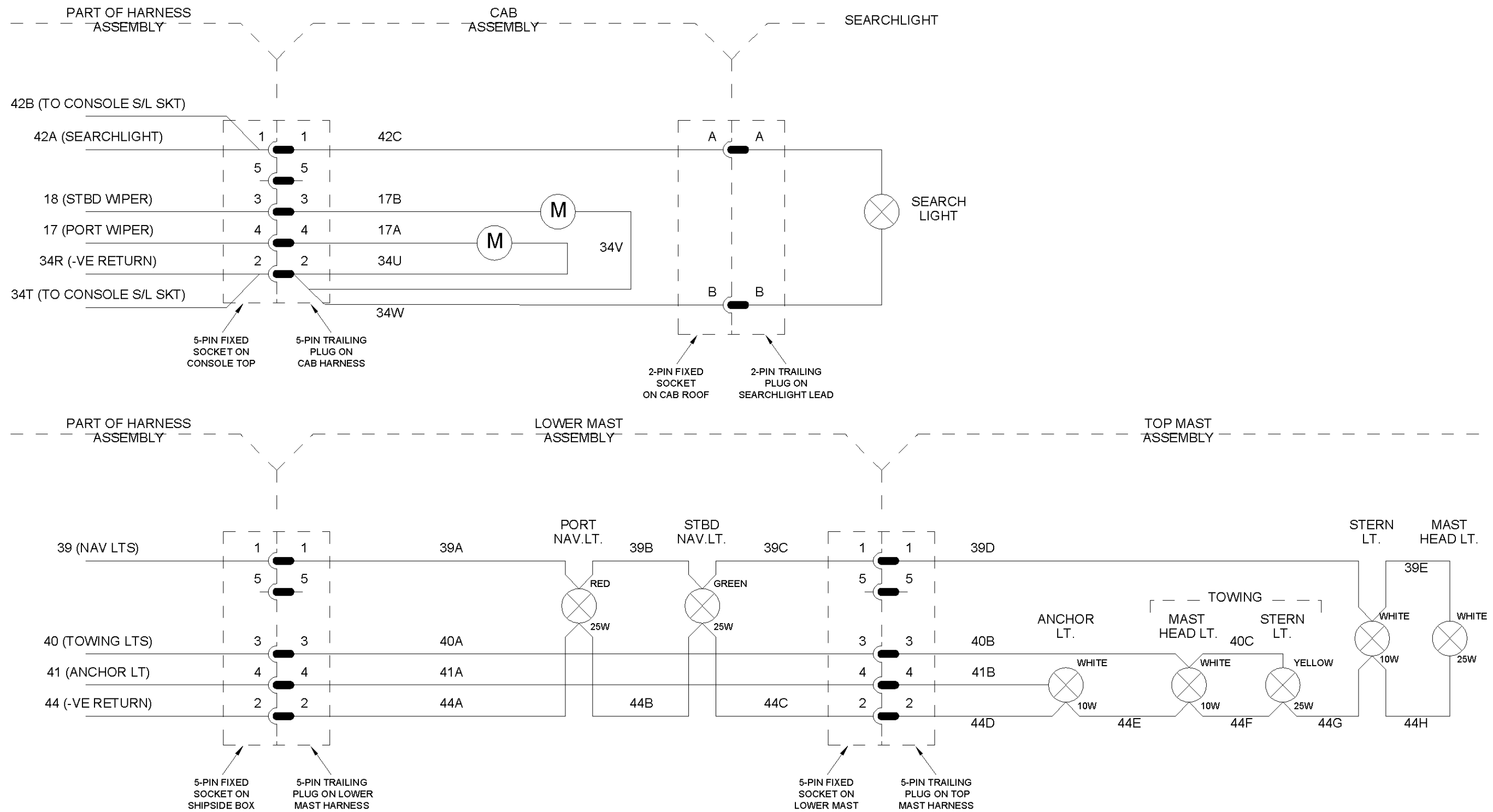
Auxiliary Wiring Harness Details Foldout 6.





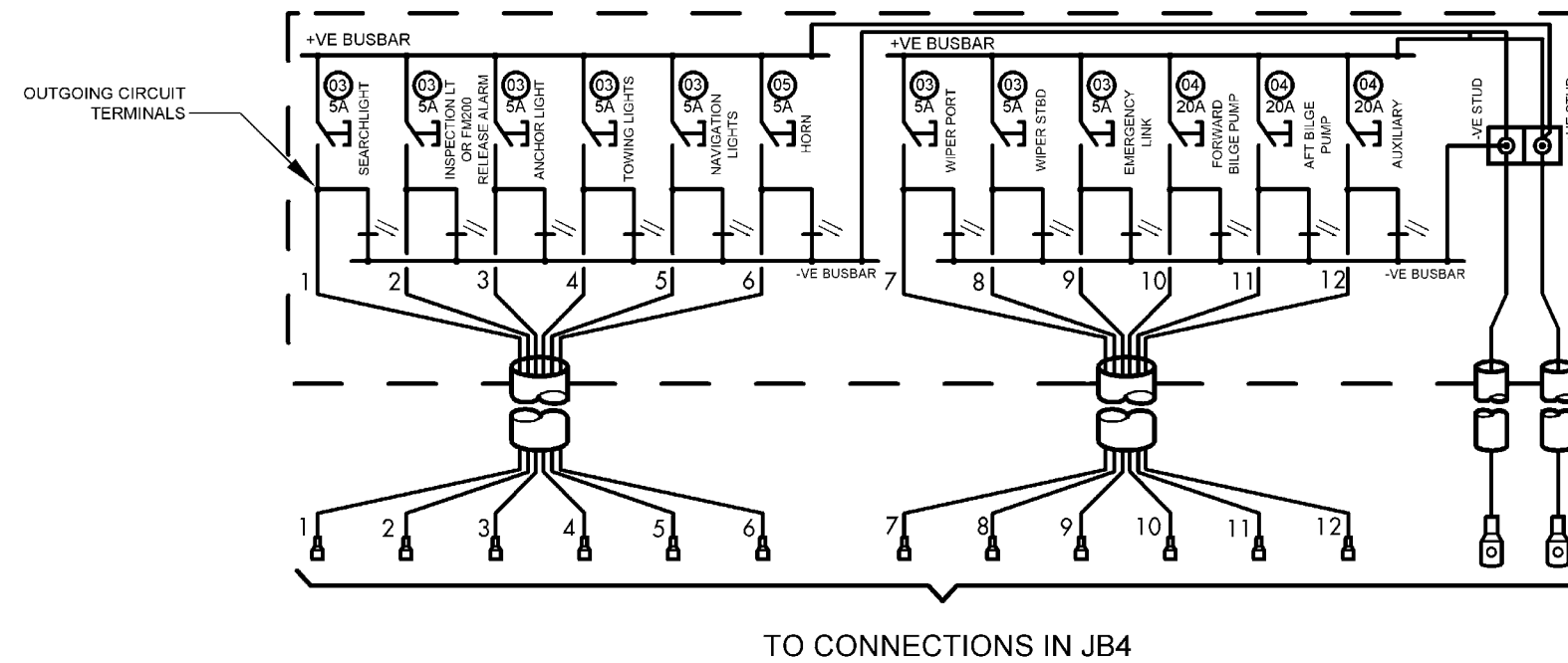
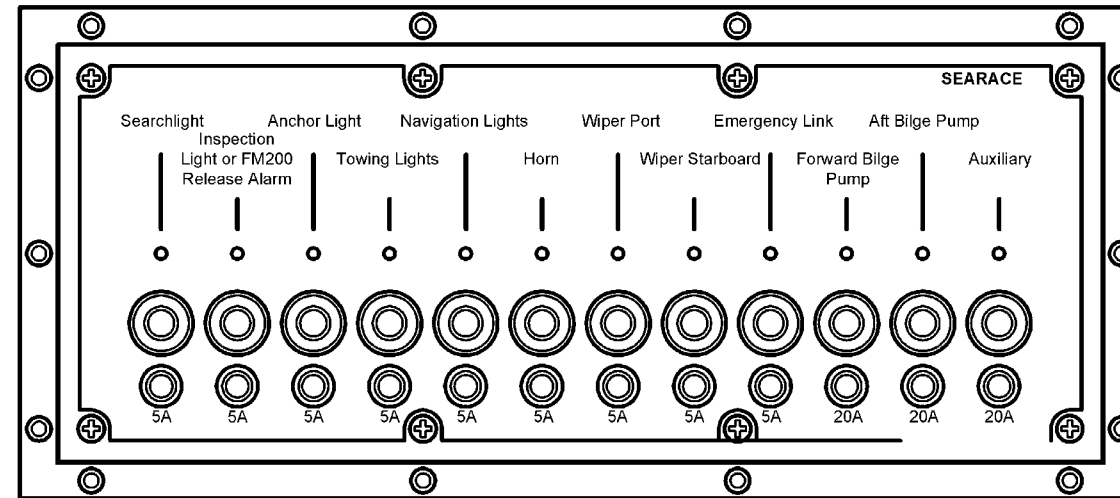
Auxiliary Wiring Harness Schematic Foldout 7.





Cab and Mast Layout Details Foldout 8.

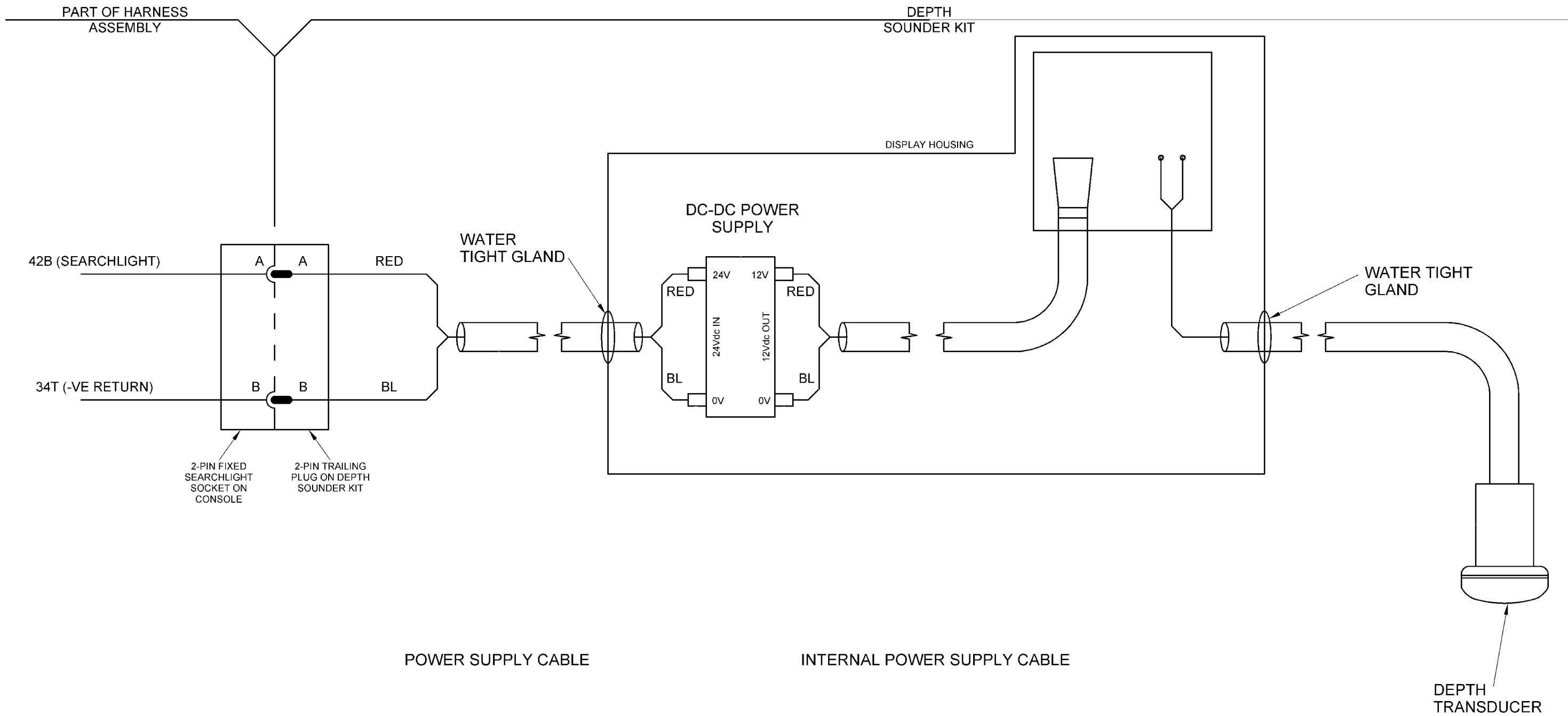




Auxiliary Switch Panel and Junction Box Details  
Foldout 9.



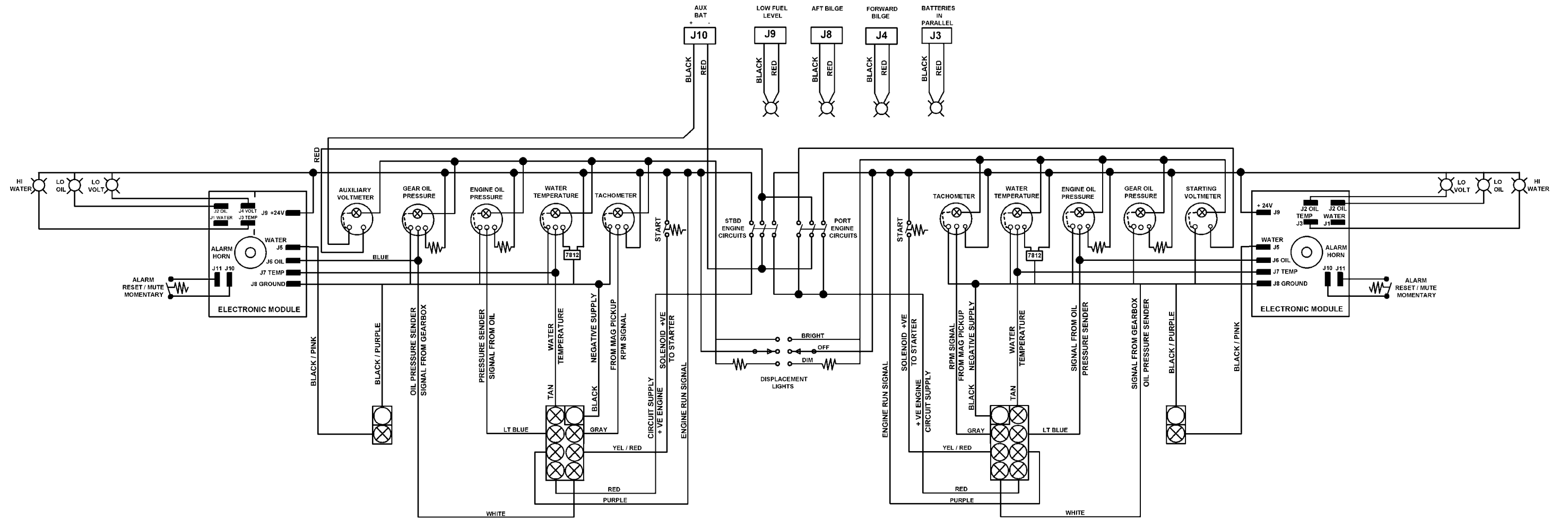




Depth Sounder Schematic Foldout 10.



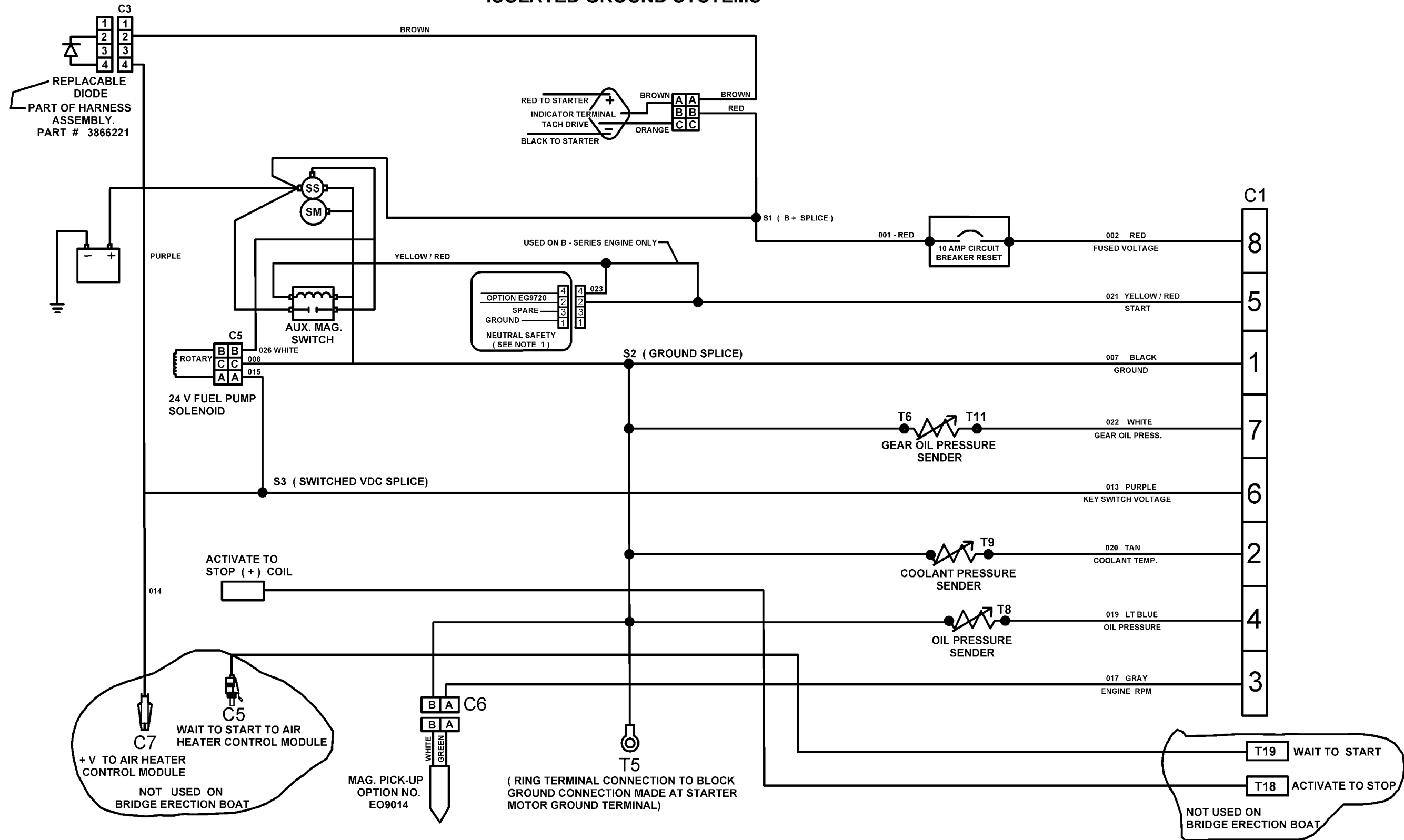
### ENGINE INSTRUMENT PANEL WIRING DIAGRAM



*Instrument Panel Wiring Harness Schematic  
Foldout 11.*

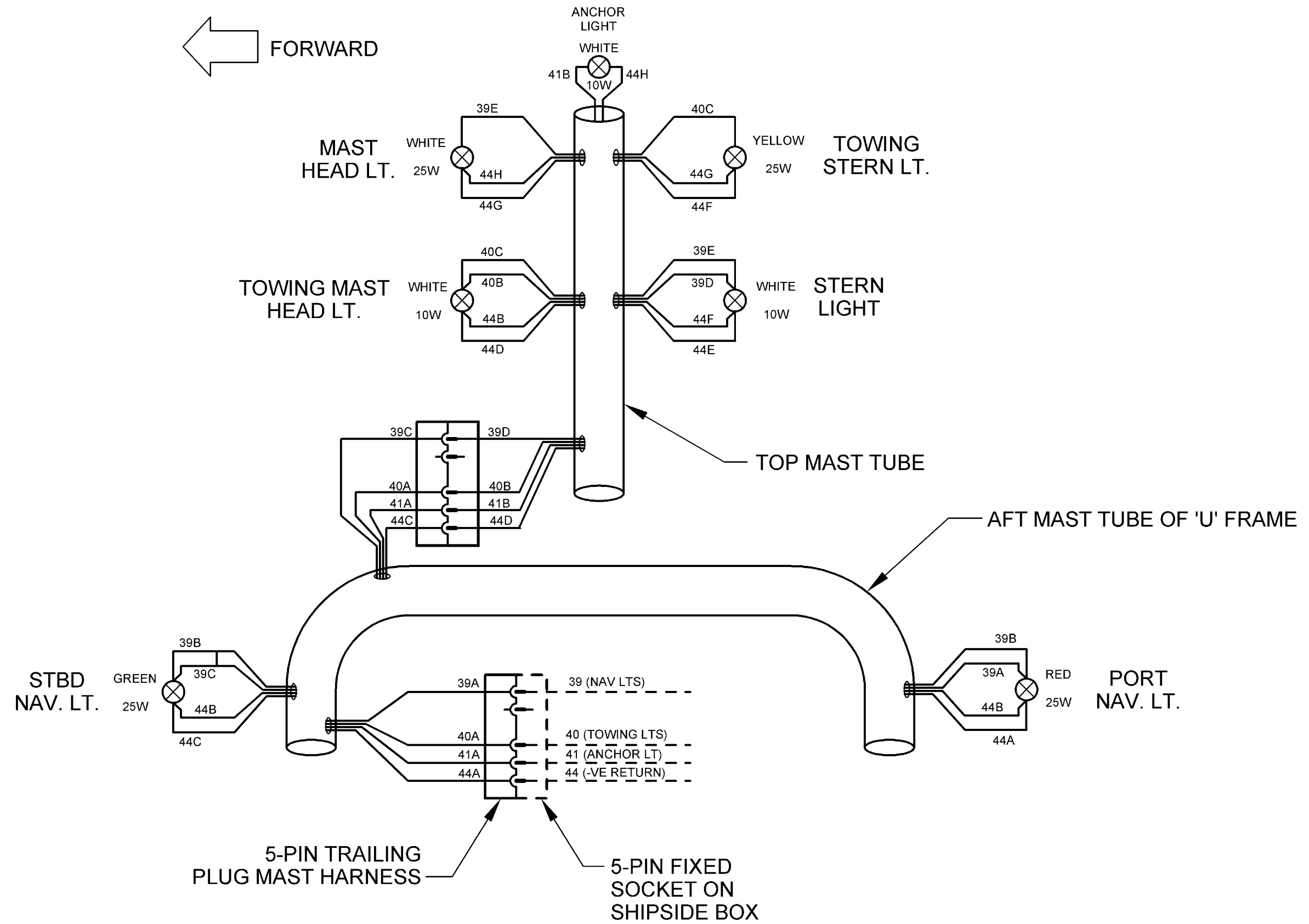


### MARINE ENGINE HARNESS ISOLATED GROUND SYSTEMS



Engine Wiring Harness Schematic Foldout 12.

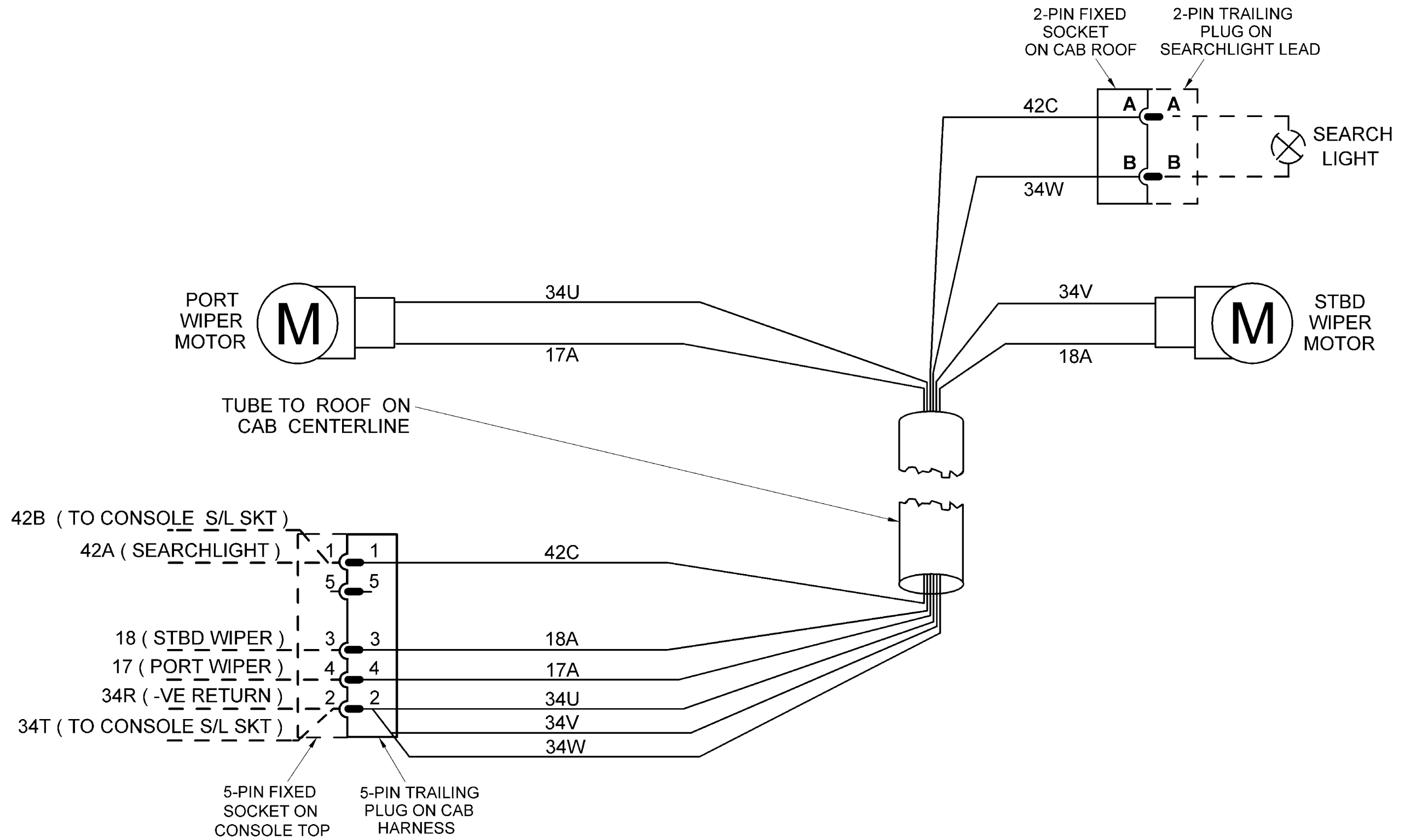




Upper and Lower Mast Wiring Schematic Foldout 13.







Cab Wiring Schematic Foldout 14.



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

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### PAINTING INSTRUCTIONS

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#### GENERAL

For specific painting procedures and techniques, refer to Painting Instructions for Field Use, TM 43-0139.

#### TREATMENT AND PAINTING

The Bridge Erection Boat (BEB) normally painted shall be cleaned and treated in accordance with TT-C-490 if ferrous, or MIL-C-5541 if aluminum, primed and painted with chemical agent resistance coating (CARC) in accordance with MIL-DTL-53072. Refer to TM 43-0139 for painting instructions. Unless otherwise specified, the topcoat color shall be Color Chip No. 34094, Green 383, of FED-STD-595. When camouflage patterns are required, the top coat shall be overcoated per the Government furnished camouflage patterns and top coat colors conforming to MIL-C-53072. For camouflage patterns specific to the MK II-S BEB, refer to WP 0177 00.



## SUPPORTING INFORMATION

### BRIDGE ERECTION BOAT (BEB)

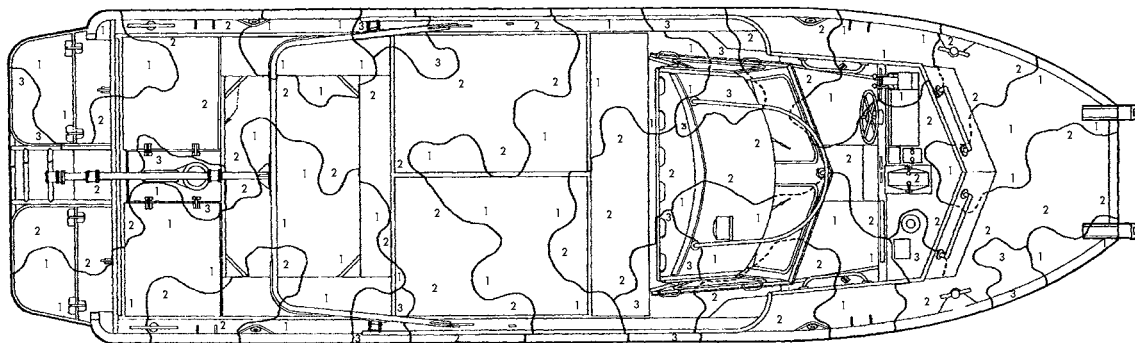
#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### CAMOUFLAGE PATTERNS AND ALIGNMENT MARKS

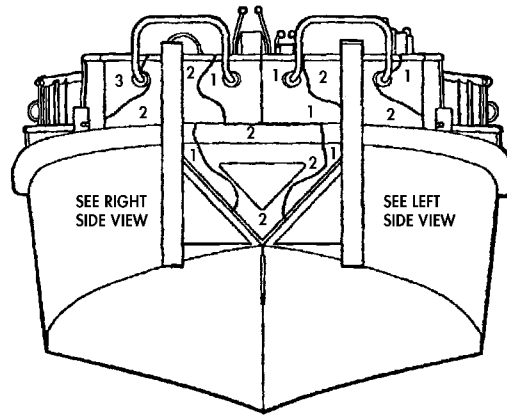
Refer to Painting Instructions (WP 0176 00) for preparation and painting of the MKII-S BEB camouflage patterns.

COLOR CODES			
NO.	STANDARD	DESERT	WINTER/SNOW
1	BLACK	TAN 686	BLACK
2	GREEN 383	TAN 686	WHITE
3	BROWN 383	TAN 686	BROWN 383

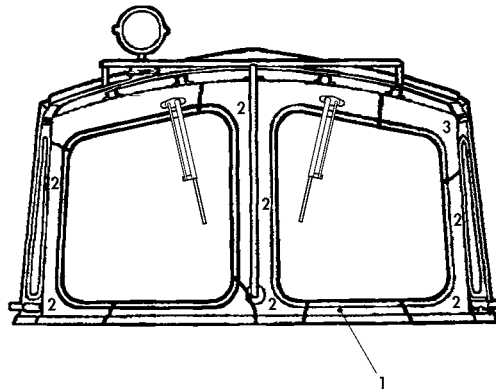


*Top View.*

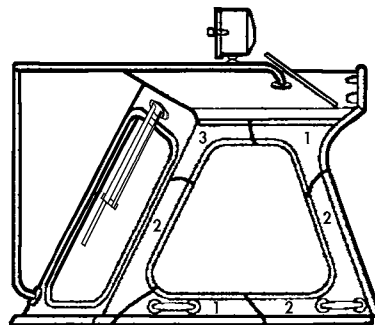
CAMOUFLAGE PATTERNS AND ALIGNMENT MARKS (Contd)



*Front View.*

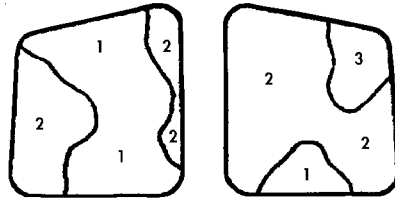


*Front View Cab.*

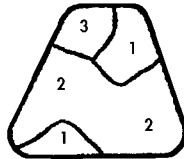


*Port Side Cab.*

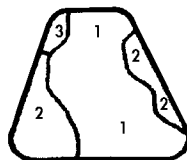
CAMOUFLAGE PATTERNS AND ALIGNMENT MARKS (Contd)



*Front Glare Cover.*

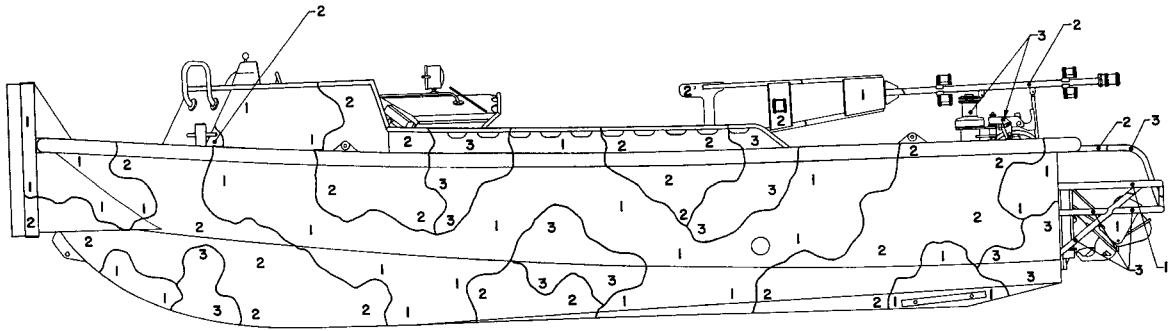


*Port Side Glare Cover.*

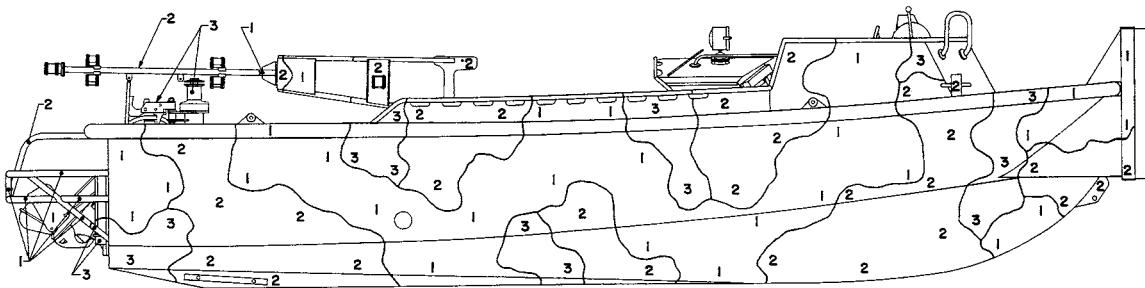


*Starboard Side Glare Cover.*

CAMOUFLAGE PATTERNS AND ALIGNMENT MARKS (Contd)



*Port Side View.*



*Starboard Side View.*



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## FIELD MAINTENANCE INSTRUCTIONS

### BRIDGE ERECTION BOAT (BEB)

#### MK II-S

NSN 1940-01-526-0770 P/N 12492423

### WELDING INSTRUCTIONS

#### PREPARATION AND WELDING

---

#### INITIAL SETUP:

##### Tools and Special Tools

Forward Repair System (FRS)  
(item 15, WP 0172 00) or  
Common No. 1 tool kit (item 52, WP 0172 00)  
Welder (item 70, WP 0172 00) or  
Welder (item 71, WP 0172 00)

##### References

TC 9-237  
WP 0176 00

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## WELDING INSTRUCTIONS (Contd)

### NOTE

If there are several cracks or holes within a damaged area, repair must be performed by removing damaged area and welding in a new sheet metal plate, P/N AMS-QQ-A-25014, NSN 9535-00-003-6946.

### PREPARATION

1. Position boat (1) so crack (2) is face-up for welding.
2. Grind welding area and find ends of crack (2).
3. Drill hole (3) at ends of crack (2) to prevent enlargement of crack (2). Use a drill with diameter corresponding to half plate thickness.

### NOTE

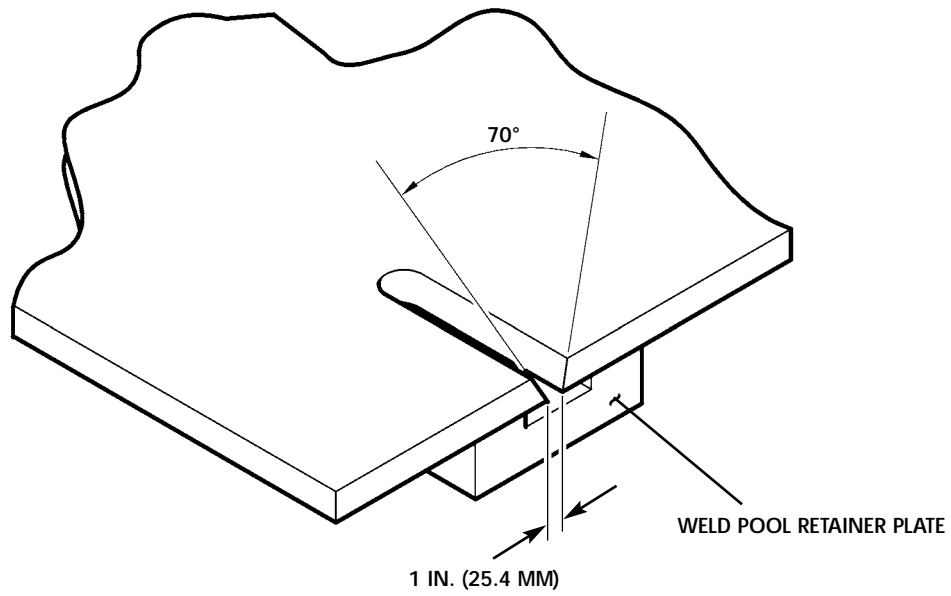
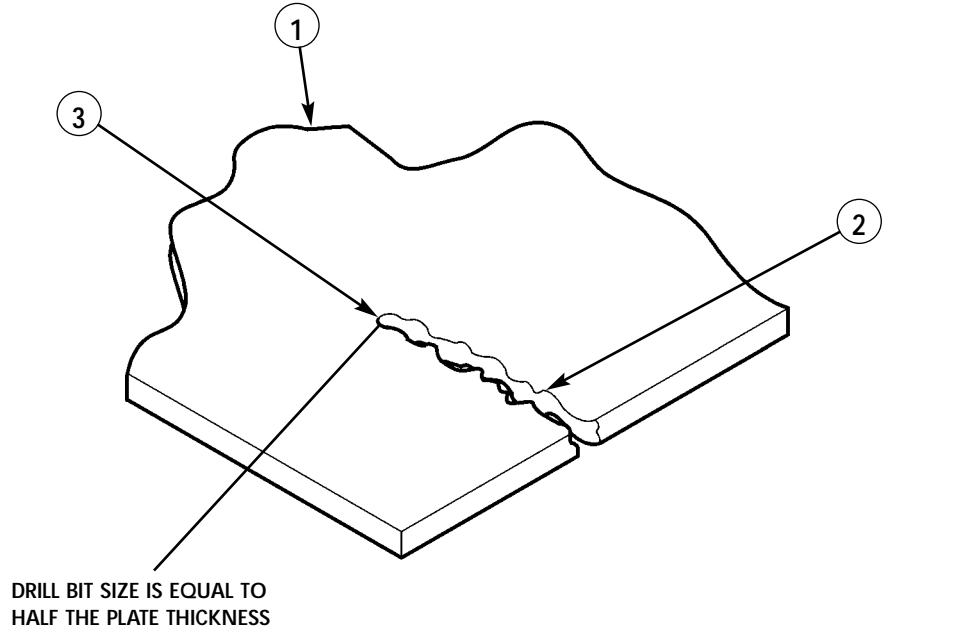
If crack is open 0.098 in. (2.5 mm) or more, and additional permanent weld pool retainer is required. For this retainer, use a metal strip 1 in. (25.4 mm) or more in width and with a milled groove.

4. Mill or grind a V-seam along crack (2) with a groove angle of 70 degrees.
5. Clean welding area with a stainless steel wire brush.

### WELDING

1. If necessary, insert and clamp weld pool retainer plate under opening. Refer to TC 9-237.
2. Finish weld area to be welded root, filler, and final pass welds. Refer to TC 9-237.
3. Clean, treat, and paint area. Refer to WP 0176 00 or MIL-T-704 TYPE B.

WELDING INSTRUCTIONS (Contd)





# FIELD MAINTENANCE INSTRUCTIONS

## BRIDGE ERECTION BOAT (BEB)

### MK II-S

NSN 1940-01-526-0770 P/N 12492423

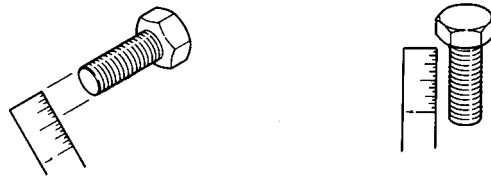
## TORQUE LIMITS

INTRODUCTION, HOW TO USE TORQUE LIMITS, CAPSCREW HEAD MARKINGS, TORQUE TABLES, TUBING APPLICATION TIGHTENING ASSEMBLY INSTRUCTIONS, TORQUE WRENCH ADAPTERS, AND CONVERSION FORMULA

### INTRODUCTION

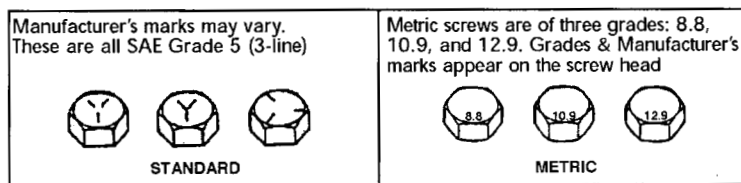
This Work Package (WP) provides general torque limits for screws used on the MKII-S Bridge Erection Boat (BEB). Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits in this WP shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket, then tighten it one complete turn.

### HOW TO USE TORQUE LIMITS



1. Measure the diameter of the screw you are installing.
2. Count the number of threads per inch.
3. Under the heading **SIZE**, look down the left hand column until you find the diameter of the screw you are installing. (There will usually be two lines beginning with the same size).
4. In the second column under **SIZE**, find the number of threads per inch that matches the number of threads you counted in step 2. (Not required for metric screws).

### CAPSCREW HEAD MARKINGS



1. To find the grade screw you are installing, match the markings on the head to the correct picture of Capscrew Head Markings in the illustration preceding the torque table.
2. Look down the column under the picture you found in step 1, until you find the torque limit (in., lb-ft or N·m) for the diameter and threads per inch of the screw.

### TORQUE TABLES

Table 1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table 2 lists wet torque limits. Wet torque limits are used on screws that have high pressure lubricants applied to the threads. For metric fasteners, refer to table 3 for torque limit requirements.

**TORQUE LIMITS (Contd)**

**TORQUE TABLES (Contd)**


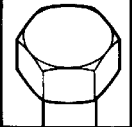
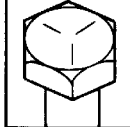
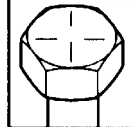
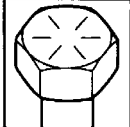
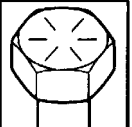
**Table 1. Torque Limits for Dry Fasteners.**

SIZE			TORQUE									
			SAE GRADE NO.1 OR 2		SAE GRADE NO.5		SAE GRADE NO. 6 OR 7		SAE GRADE NO. 8		STAINLESS 18-8	
DIA. INCHES	THREADS PER INCH	DIA. MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	5	7	8	11	10	14	10	16	6.3	8.5
1/4	28	6.35	6	8	10	14	12	16	12	16	7.8	10.6
5/16	18	7.94	11	15	17	23	21	28	24	33	11.0	14.9
5/16	24	7.94	12	16	19	26	24	33	27	37	12.0	14.6
3/8	16	9.53	20	27	30	41	40	54	45	61	19.7	26.8
3/8	24	9.53	23	31	35	47	45	61	50	68	21.8	29.6
7/16	14	11.11	30	41	50	68	60	81	70	95	31.3	42.3
7/16	20		35	47	55	75	70	95	80	108	33.3	45.3
1/2	13	12.70	50	68	75	102	95	129	110	149	43.0	58.5
1/2	20		55	75	90	122	100	136	120	163	45.0	61.2
9/16	12	14.29	65	88	110	149	135	183	150	203	56.8	77.2
9/16	18		75	102	120	163	150	203	170	230	62.7	85.3
5/8	11	15.88	90	122	150	203	190	258	220	298	92.5	125.8
5/8	18		100	136	180	244	210	285	240	325	103.6	140.9
3/4	10	19.05	160	217	260	353	320	434	380	515	131.8	178.6
3/4	16		180	244	300	407	360	488	420	596	132.3	179.3
7/8	9	22.23	140	190	400	542	520	705	600	813	202.5	274.3
7/8	14		155	210	440	597	580	786	660	895	201.6	273.3
1	8	25.40	220	298	580	786	800	1085	900	1220	299.5	406.1
1	12		240	325	640	868	860	1166	1000	1356	—	—
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1735	413	560
1-1/8	12		340	461	880	1193	1260	1708	1440	1952	390	528.8
1-1/4	7	31.75	420	569	1120	1519	1580	2142	1820	2468	523	709.1
1-1/4	12		460	624	1240	1681	1760	2386	2000	2712	480	650.8
1-3/8	6	34.93	560	759	1460	1979	2080	2820	2380	3227	—	—
1-3/8	12		640	868	1690	2291	2380	3227	2720	3688	—	—
1-1/2	6	38.10	740	1003	1940	2630	2780	3769	3160	4284	888	1203
1-1/2	12		840	1139	2200	2983	3100	4203	3560	4827	703	953.1

**TORQUE LIMITS (Contd)**

**TORQUE TABLES (Contd)**

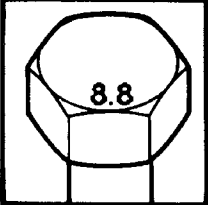
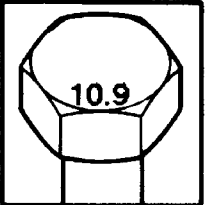
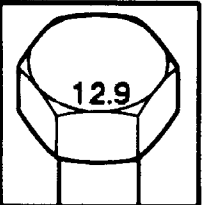
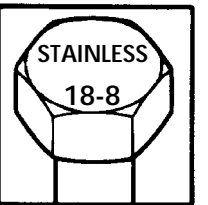
**Table 2. Torque Limits for Wet Fasteners.**

CAPSCREW HEAD MARKINGS			TORQUE									
 <p>Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).</p>												
SIZE			SAE GRADE NO.1 OR 2		SAE GRADE NO.5		SAE GRADE NO. 6 OR 7		SAE GRADE NO. 8		STAINLESS 18-8	
DIA. INCHES	THREADS PER INCH	DIA. MILLIMETERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
1/4	20	6.35	4	5	6	8	8	11	9	12	6.3	8.5
1/4	28	6.35	5	7	7	9	9	12	10	14	7.8	10.6
5/16	18	7.94	8	11	13	18	16	22	18	24	11.0	14.9
5/16	24	7.94	9	12	14	19	18	24	20	27	12.0	14.6
3/8	16	9.53	15	20	23	31	30	41	40	54	19.7	26.8
3/8	24	9.53	17	23	25	34	30	41	44	60	21.8	29.6
7/16	14	11.11	24	33	35	47	45	61	55	75	31.3	42.3
7/16	20		25	34	40	54	50	68	60	81	33.3	45.3
1/2	13	12.70	35	47	55	75	70	95	80	108	43.0	58.5
1/2	20		40	54	65	88	80	108	90	122	45.0	61.2
9/16	12	14.29	50	68	80	108	100	136	110	149	56.8	77.2
9/16	18		55	75	90	122	110	149	130	176	62.7	85.3
5/8	11	15.88	70	95	110	149	140	190	170	239	92.5	125.8
5/8	18		80	108	130	176	160	217	180	244	103.6	140.9
3/4	10	19.05	120	163	200	271	240	325	280	380	131.8	178.6
3/4	16		140	190	220	298	280	380	320	434	132.3	179.3
7/8	9	22.23	110	149	300	407	400	542	460	624	202.5	274.3
7/8	14		120	163	320	434	440	597	500	678	201.6	273.3
1	8	25.40	160	217	440	597	600	813	680	922	299.5	406.1
1	12		170	230	480	651	660	895	740	1003	—	—
1-1/8	7	25.58	220	298	600	813	840	1139	960	1302	413	560
1-1/8	12		260	353	660	895	940	1274	1080	1464	390	528.8
1-1/4	7	31.75	320	434	840	1139	1100	1491	1360	1844	523	709.1
1-1/4	12		360	488	920	1247	1320	1790	1500	2034	480	650.8
1-3/8	6	34.93	420	569	1100	1491	1560	2115	1780	2413	—	—
1-3/8	12		460	624	1260	1708	1780	2413	2040	2766	—	—
1-1/2	6	38.10	560	759	1460	1979	2080	2820	2360	3200	888	1203
1-1/2	12		620	841	1640	2224	2320	3145	2660	3606	703	953.1

TORQUE LIMITS (Contd)

TORQUE TABLES (Contd)

**Table 3. Torque Limits for Metric Fasteners.**

CAPSCREW HEAD MARKINGS									
									
SIZE		TORQUE							
		METRIC GRADE 8.8		METRIC GRADE 10.9		METRIC GRADE 12.9		METRIC GRADE 12.9	
DIA. MM	DIA. INCHES	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS	POUND FEET	NEWTON METERS
M4	.157	2	3	3	4	4	5	3	4
M5	.197	4	5	6	8	7	9	4	5
M6	.236	7	9	10	14	11	15	6	8
M7	.276	11	15	16	22	20	27	12	16
M8	.315	18	24	25	34	29	39	20	27
M10	.394	32	43	47	64	58	79	24	32
M12	.472	58	79	83	113	100	136	34	46
M14	.551	94	127	133	180	159	216	65	88
M16	.630	144	195	196	266	235	319	96	130
M18	.709	190	258	269	365	323	438	108	146
M20	.787	260	353	366	496	440	597	132	178
M22	.866	368	499	520	705	678	919	201	273
M24	.945	470	637	664	900	794	1077	542	734
M27	1.063	707	959	996	1350	1235	1674	432	585
M30	1.181	967	1311	1357	1840	1630	2210	546	740



**TORQUE LIMITS (Contd)**

**TUBING APPLICATION TIGHTENING ASSEMBLY INSTRUCTIONS**

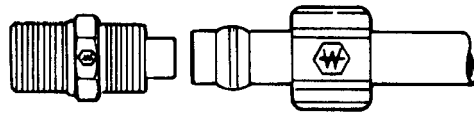
Slide tubing over barbed insert until it bottoms on fitting.

MINI BARB



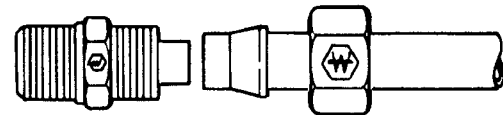
1. Slide nut and then sleeve on tubing.
2. Slide Inner Diameter (I.D.) of tubing onto fitting insert until it bottoms.
3. Assemble nut to fitting body.
4. Tighten assembly finger-tight to cover body threads.

KNURL-ON



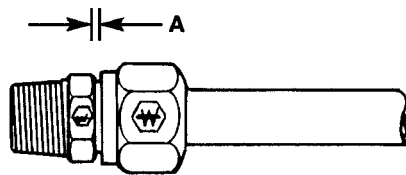
1. Slide nut and then sleeve on tubing.
2. Slide I.D. of tubing onto fitting insert until it bottoms.
3. Assemble nut to fitting body.
4. Finger-tighten nut.
5. Tighten nut two complete turns.

SELF-ALIGN-PTF



1. Cut tubing to desired length. Ensure tubing ends are reasonably square.
2. Slide tubing into preassembled fitting and push until tube bottoms.
3. Tighten nut as indicated in chart. Another check on proper assembly is dimension A, when nut is fully tightened.

NYLON TUBING FOR AIR BRAKE



**DISASSEMBLY**—Remove nut and pull tubing out of fitting body. Insert will remain on tubing.

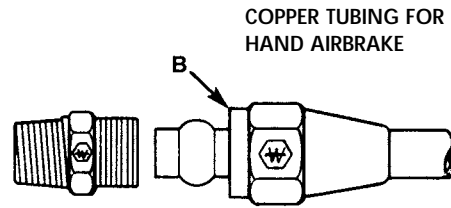
**ASSEMBLY**—Push tubing and insert into fitting body until it bottoms. Thread nut onto fitting body and tighten as in step 3.

TUBE O.D.	TIGHTEN NUT TO	A
1/4	85–115 lb-in (9.6–13.0 N·m)	0.085–0.105 in.
3/8	12–17 lb-ft (16.3–23.0 N·m)	0.125–0.145 in.
1/2	25–33 lb-ft (33.9–44.7 N·m)	0.100–0.120 in.
5/8	26–35 lb-ft (35.3–47.5 N·m)	0.115–0.135 in.
3/4	38–50 lb-ft (51.5–67.8 N·m)	0.180–0.200 in.

**TORQUE LIMITS (Contd)**

**TUBING APPLICATION TIGHTENING ASSEMBLY INSTRUCTIONS (CONTD)**

1. Slide nut and then sleeve on tubing. Threaded end of nut B must face out.
2. Insert tubing into fitting. Ensure tubing is bottomed on fitting shoulder.
3. Thread nut onto fitting body hand-tight.
4. Tighten number of turns indicated at below.



TUBE SIZE	ADDITIONAL NUMBER OF TURNS FROM HAND-TIGHT
1/4, 3/8	1-3/4
1/2, 5/8, 3/4	3-1/4

**TORQUE WRENCH ADAPTERS**

Some tasks require the use of a torque wrench adapter when the nut or screw cannot be reached with a regular socket on the end of the torque wrench. These adapters add to the overall length of the torque wrench and make the dial or scale reading less than actual torque applied to the nut or screw. To prevent over torquing and damage to equipment, calculate correct dial or scale reading using the conversion formula on the following page.

**TORQUE LIMITS (Contd)**

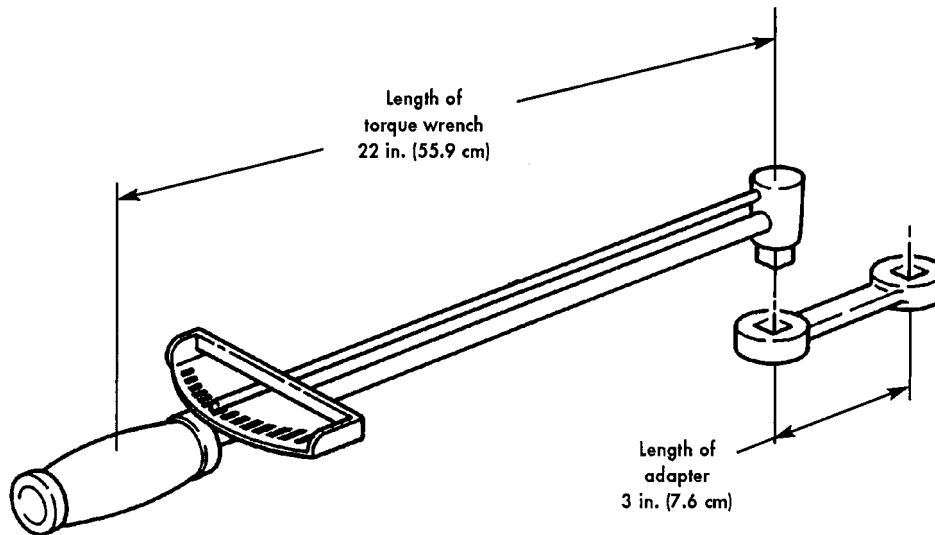
**CONVERSION FORMULA**

Correct dial or scale readings are determined by the use of the following formula:

$$\text{Correct Reading} = \text{Required torque value} \div \frac{\text{Length of torque wrench} + \text{Length of adapter}}{\text{Length of torque wrench}}$$

**NOTE**

The length of the torque wrench is measured from the center of the handle to the center of the drive. The length of the adapter is measured from the center of the drive to the center of the wrench.



In this example, the torque wrench measures 22 in. (55.9 cm) and the adapter is 3 in. (7.6 cm). The required torque is 19 lb-ft (25.8 N•m).

$$\begin{aligned} \text{Correct Reading} &= 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div \frac{22 \text{ in. (55.9 cm)} + 3 \text{ in.}}{22 \text{ in. (55.9 cm)}} \\ \text{Correct Reading} &= 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div \frac{25 \text{ in. (63.5 cm)}}{22 \text{ in. (55.9 cm)}} \\ \text{Correct Reading} &= 19 \text{ lb-ft (25.8 N}\cdot\text{m)} \div 1.14 \\ \text{Correct Reading} &= 17 \text{ lb-ft (23.0 N}\cdot\text{m)} \end{aligned}$$



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By Order of the Secretary of the Army:

Official:



JOYCE E. MORROW  
*Administrative Assistant to the  
Secretary of the Army*

0608710

PETER J. SCHOOMAKER  
*General, United States Army  
Chief of Staff*

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PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER  <b>TM 5-1940-322-24</b>	DATE  <b>10 MAY 2006</b>	TITLE  <b>TECHNICAL MANUAL, FIELD AND SUSTAINMENT BOAT (BEB) MKII-S</b>
--	--------------------------------	---

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible)</i>
1	<b>0076</b> <b>0048</b>  <b>0015</b> <b>0076</b>				1	<b>Item number 1 reads part number 024522600. Should read 4522601.</b>  <b>Callout to pump outlet reads 21. Should read 2.</b>

**SAMPLE**

*\*Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE, OR TITLE  <b>Pat Smith</b>	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION  <b>AV272-4162</b>	SIGNATURE  <i>Pat Smith</i>
---	---	-----------------------------------

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PART II - REPAIR PARTS AND SPECIAL TOOLS LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER <b>TM 5-1940-322-24</b>	DATE <b>10 MAY 2006</b>	TITLE <b>TECHNICAL MANUAL, for BRIDGE ERECTION BOAT (BEB) MKII-S</b>
--	----------------------------	---

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<h1>SAMPLE</h1>								

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE, OR TITLE			TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE		
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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 = 1,000 Millimeters = 39.37 Inches
- 1 Kilometer = 1,000 Meters = 0.621 Miles

## 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 = 0.386 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

## LIQUID MEASURE

- 1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
- 1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

## TEMPERATURE

- Degrees Fahrenheit (F) =  $^{\circ}\text{C} \cdot 9 \div 5 + 32$
- Degrees Celsius (C) =  $\text{F}^{\circ} - 32 \cdot 5 \div 9$
- 212° Fahrenheit is equivalent to 100° Celsius
- 90° Fahrenheit is equivalent to 32.2° Celsius
- 32° Fahrenheit is equivalent to 0° Celsius

## WEIGHTS

- 1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1,000 Grams = 2.2 Lb
- 1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

## APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Millimeters	25.4
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square 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	0.4536
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Bar	0.06895
Pounds Per Square 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
Millimeters	Inches	0.03937
Centimeters	Inches	0.3937
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square 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	2.2046
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Bar	Pounds Per Square Inch	14.503
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621

