TM 5-1940-322-10

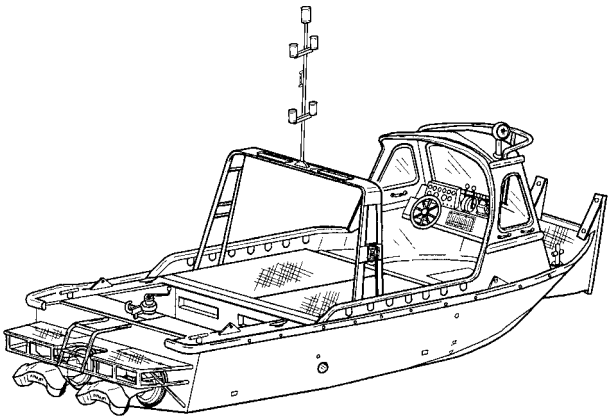
OPERATOR'S MANUAL

FOR

BRIDGE ERECTION BOAT (BEB)

MK II-S

NSN: 1940-01-526-0770



HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 2006

WARNING

EXHAUST GASES CAN KILL

DO NOT operate boat engine in an 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 a person with exhaust poisoning symptoms:

Remove person from area

Expose person to fresh air

Keep person warm

Do not permit person to move

Make the person comfortable, keep them at rest.

Administer artificial respiration* or CPR if necessary

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

BE AWARE, the field protective mask and ambulance Nuclear-Biological-Chemical (NBC) system does not protect personnel against exhaust gas poisoning. THE BEST DEFENSE AGAINST EXHAUST GAS POISONING IS ADEQUATE VENTILATION.

WARNING SUMMARY

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.

Improper cleaning methods and use of unauthorized cleaning solvents may result in injury to personnel and damage to equipment.

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

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.

Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal, and military regulation. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

Prior to performing transporter operations, ensure a site survey is conducted. Failure to meet all site requirements for a given launch method may result in damage to equipment or possible injury or death to personnel.

All personnel must wear approved life jackets while on boat and bridge. Failure to comply may result in injury or death to personnel.

When raising or lowering mast, two personnel are required to perform task. Ensure the wiring harness is clear of mast bracket to prevent harness damage. Ensure aft deck area is clear of all occupants and equipment, and exercise caution if deck is wet to avoid slipping. Failure to comply may result in damage to equipment or injury to personnel.

During rafting procedures BEB operator must follow hand signals from raft commander. Failure to comply may result in damage to equipment and possible injury or death to personnel.

Hazard to personnel and equipment is increased if boat is launched at less-than-ideal site. Site must be inspected and prepared to be within the operating limits of the equipment. Failure to adequately prepare site could result in damage to equipment or possible injury or death to personnel.

WARNING SUMMARY (Contd)

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

When launching boat, side to side slope must not exceed 8% or 5 degrees. Failure to comply may result in injury or death to personnel and damage to equipment.

Prior to launch, the hull drain plug must be installed. Failure to comply may result in injury or death to personnel and damage to equipment.

When retrieving boat, side to side slope must not exceed 8% or 5 degrees. Failure to comply may result in possible injury or death to personnel and damage to equipment.

The stanchion poles weigh 60 lbs. (27.24 kg) each and require two personnel to remove them from their pockets. Failure to follow this warning may result in injury to personnel or damage to equipment.

Transporter personnel will ensure both cab windows are fully opened, and seatbelt is not being used by operator before entering water. Failure to comply may result in possible injury or death to personnel.

Ensure that IBC hook safety plate is installed on hook. Failure to comply may result in injury to personnel or damage to equipment.

Ensure both engine throttle/transmission control levers are in neutral position prior to starting engines. The MK II-S does not have a neutral safety switch on its transmissions. Failure to comply may result injury or death to personnel and damage to equipment.

Keep engine hatch covers closed when engines are running unless engine maintenance is being performed. Failure to comply may result in injury or death to personnel.

Do not attempt to make turns at high engine rpm using the scoop controls. Failure to comply may result in injury or death to personnel and equipment damage.

Operator must be aware of reverse movement speed. Reversing at high speeds or reversing into a heavy current can cause water to flow over the hydrojets and into the aft cockpit (bird bath) and may flood boat. Failure to comply may result in injury or death to personnel and damage to equipment.

Do not use reverse position of scoop reverse deflectors at high engine rpm. Failure to comply may result in injury or death to personnel and damage to equipment.

Never follow directly behind another boat while traveling at high speeds in case lead boat comes to an abrupt stop. Failure to comply may result in injury or death to personnel.

Do not get any part of body between the bridge and boat. Failure to comply may result in serious injury or death to personnel.

WARNING SUMMARY (Contd)

Never intermix IFB (SRB) bays with IRB bays when building rafts. Failure to comply may result in injury or death to personnel and damage to equipment.

Different size rafts require different numbers of boats. At a minimum, one boat is required for every three bays. Use additional boats in rough water, when the current is fast, in bad weather and when directed. Failure to comply may cause injury to personnel or damage to equipment.

Hold safety rails to avoid being thrown overboard. Failure to comply may result in injury or death to personnel.

Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

Reduce speed in rough water and when water washes over the raft. Failure to comply may result in injury to personnel and damage to equipment.

Ensure each bowline is tight and bay is held firmly against pushknees or bridge will tend to pull off to side of boat. Failure to comply may result in damage to equipment or injury to personnel.

Always position controls so boat holds raft against shore during loading and off-loading of traffic. Failure to comply may cause injury to personnel or damage to equipment.

Always secure raft to bank with approach guys during loading and off-loading of traffic. Failure to comply may cause injury to personnel or damage to equipment.

Longitudinal rafting is performed only when water current is 5 ft (1.5 m)/sec or less in loading/unloading areas. Raft commander will determine method of rafting. Failure to comply may result in injury or death to personnel and damage to equipment.

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment on or near water. Failure to comply may result in injury or death to personnel.

Crewmembers must keep hands and feet from between raft and boat when installing rafting brackets. Failure to comply may result in serious injury or death to personnel.

The cable drum requires a minimum of three wraps of cable for safety. Failure to comply may result in injury or death to personnel and damage to equipment.

Ensure each bowline is tight and bay is held firmly against pushknees or bridge will tend to pull off to side of boat. Failure to comply may result in damage to equipment or injury to personnel.

Do not exceed 2,000 rpms if operating with only one engine. Failure to comply may result in injury to personnel or damage to equipment.

WARNING SUMMARY (Contd)

If engine can't be used due to damage, close fuel valve to damaged engine. Failure to comply may result in injury to personnel or damage to equipment.

Wear gloves when operating or handling metallic equipment that is wet or ice covered, and exercise caution when working on boat and bridge bays where snow or ice exist. Failure to comply may result in injury to personnel.

If NBC exposure is suspected, NBC contaminated filters must be handled and disposed of only by authorized and trained personnel. The unit commander or senior officer in charge of maintenance personnel must ensure that prescribed protective clothing is used, and prescribed safety measures and decontamination procedures (FM 3-5) are followed. The local unit SOP is responsible for final disposal of contaminated air filters. Failure to do this may cause severe injury to personnel.

In fast moving currents do not position boat directly downstream in front of overboard person. Overboard personnel may be swept under boat. Failure to comply may result in injury or death to personnel.

Approach overboard person at slow speeds. Failure to comply may result in injury or death to personnel.

Do not throw ring buoy directly at overboard person. Failure to comply may result in injury or death to personnel.

Approach object at slow speeds. Failure to comply may result in injury or death to personnel and damage to equipment.

Depth instrument cable is routed across bow and connected to cab electrical connector, avoid tripping or stepping on cable. Failure to comply may result in injury to personnel 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 result in injury to personnel or damage to equipment.

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

Engines must be shut down before 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 or any open flame near boat when refueling. Clean up spilled fuel as required. Failure to comply may result in injury or death to personnel.

PMCS item numbers 32 through 36 are performed with both engines off. Failure to comply may cause injury to personnel and damage to equipment.

WARNING SUMMARY (Contd)

Do not lift a load greater than the rated load capacity of the crane or materiel handling equipment. Failure to comply may result in damage to equipment or possible injury or death to personnel.

All personnel must stand clear of equipment prior to lifting operations or serious injury or death may result.

Do not perform maintenance on equipment while in operation. Do not allow vehicles on bridge while performing operator maintenance. Failure to comply may result in injury or death to personnel and damage to equipment.

Before removing shackles ensure that no tension is applied to any lines connected to shackle. Failure to comply may result in injury or death to personnel.

Diesel fuel is flammable. Do not allow smoking or any open flames near the boat when refueling. Make sure you have metal-to-metal contact between the fuel nozzle and the fuel tank. Failure to comply may result in injury or death to personnel and/or damage to equipment.

Engine must be off and transmission must be in neutral during filling. Failure to comply may result in injury or death to personnel.

The anchor line must always be tied to the bow. Ensure anchor line is positioned around a bollard to prevent line from rubbing and wearing on topsides of hull. Failure to comply may result in damage to equipment and possible injury to personnel.

Hearing protection is required during operation. Failure to comply may result in injury to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

The date of issue for original pages/work packages for this TM is:

Original 10 May 2006

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 272.

TOTAL NUMBER OF WORK PACKAGES IS 53.

THE PAGES/WORK PACKAGES CONSIST OF THE FOLLOWING:

*Zero in this column indicates original page.

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

TECHNICAL MANUAL

OPERATOR'S 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 Equipment Technical Publications), 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 email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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ABOUT YOUR MANUAL

Equipment operators shall familiarize themselves with the format and use of this Technical Manual (TM) prior to operating equipment or performing routine maintenance. Learning how to use this manual will enable personnel to quickly locate information, gain proper knowledge of the equipment, and shorten the time necessary to complete the required procedure.

Features of this TM are:

a. Work Package Format—This TM is organized in Work Packages (WP). Each WP is an independent, stand-alone data unit. The subject title of each WP is assigned a six-digit sequence number. The first four digits of the sequence number identify the WP, and WPs are positioned in the TM in numerical order using the same four digits. The fifth and sixth digits of the sequence number are reserved for numbering WPs added to the TM as part of a future revision. Each WP is page numbered consecutively, after the sequence number, at the bottom of each page. A WP may contain as many as thirty pages.

b. Text Design—Chapter titles are listed on the front cover for quick reference. WP titles and sequence numbers are listed in the Table of Contents at the beginning of each chapter, and in the index. The index is organized by subject, in alphabetical order, with WP sequence and page numbers provided. Task steps and illustrations are located side-by-side on facing pages. Lubrication instructions are included with Preventive Maintenance Checks and Services (PMCS).

c. Use of Illustrations—Illustrations are presented with exploded views, cut-away views, and individual callouts for identification of components and parts. Callouts are numbered in clockwise order starting at the 11 o'clock position.

d. Glossary—A list of abbreviations/acronyms used in this manual is provided in the glossary found at the back of the manual.

HOW TO USE YOUR MANUAL

The format of this manual is designed to make accessing information quick and easy. The following example is intended as a guide and should be reviewed and put to memory before attempting to use this manual. If you have any questions after reviewing the following example, don't hesitate to ask your supervisor.

PROBLEM: You receive a report that states the port engine will not start when cranked.

SOLUTION: You must find information on troubleshooting the engine in the BEB manual and perform the necessary troubleshooting tasks to solve the problem.

HOW TO USE THIS MANUAL (Contd)

NOTE

If you are trying to find information by subject, a subject index can be found at the back of the book.

1. Refer to the front cover for a quick chapter reference or go to the Table of Contents or the Index and find the chapter or WP for Troubleshooting Procedures. In this example, Troubleshooting is in Chapter 3 starting with WP 0040 00. Turn to WP 0040 00, Introduction to Troubleshooting, and read the information under "General" in Introduction to Troubleshooting.

2. In this case, you have an engine problem. Go to WP 0041 00, Mechanical Troubleshooting. Review the Mechanical Troubleshooting Symptom Index and look down the list of malfunctions until you identify the heading for Engine Cranks, But Will Not Start.

3. Go to WP 0041 00, malfunction no. 1, Engine Cranks But Will Not Start, and follow the steps and substeps listed. As you perform steps 1 through 4, you discover that the port engine emergency stop cable was not fully pushed in. Now you must follow the corrective action and push the stop cable in, then start port engine to verify problem is solved.

4. When maintenance is allocated at operator's level, you must perform and complete all instructions as outlined. If maintenance is not authorized, you must notify field maintenance as instructed.

CHAPTER 1

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

BRIDGE ERECTION BOAT (BEB) MK II-S

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

BRIDGE ERECTION BOAT (BEB) MK II-S

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

GENERAL INFORMATION

SCOPE

This TM contains operator level instructions for the operation and servicing of the Bridge Erection Boat (BEB), model MK II-S. Operating instructions include safety requirements, description of equipment, use of all controls, launch and retrieval of boat, operating and maneuvering, bridge anchoring, and rafting. Servicing instructions include operator level Preventive Maintenance Checks and Services (PMCS), lubrication, maintenance, and troubleshooting as allocated by the Maintenance Allocation Chart (MAC). Replacement and repair of BEB components are allocated for field level or higher maintenance, and are subsequently not authorized at operator level nor included in this manual.

a. Type of Manual—Operator/crew

b. Equipment Names and Model Number—The BEB 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 BEB 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), also known as the 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 the serve as safety boats, troop and cargo carriers, support reconnaissance missions, patrol inland waters, and assist in maritime construction projects and diving operations.

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).

GENERAL INFORMATION (Contd)

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 BEB 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 WP 0051 00 and WP 0052 00.

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.

GENERAL INFORMATION (Contd)

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.

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.

Hazardous Materials List Table

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	4 Gal.	Hydraulic Fluid: Scoop	Flammability, Toxicity
Shell Tellus 32	0.5 Gal.	Hydraulic Fluid: Steering System	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.

GENERAL INFORMATION (Contd)

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 WP 0048 00 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.

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

GENERAL INFORMATION (Contd)

WARRANTY INFORMATION (Contd)

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

Refer to the glossary in the back of this manual for a list of abbreviations/acronyms that appear in this TM.

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.

GENERAL INFORMATION (Contd)

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

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION

BRIDGE ERECTION BOAT (BEB) MK II-S

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

EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The BEB MK II-S is a twin diesel, dual hydrojet powered, aluminum hull workboat 27.3 ft (8.3 m) in overall length with a beam width of 8.2 ft (2.5 m) and a draft of 26 in. (66 cm). It is capable of rotating on its own axis at low engine speeds by the use of water jet propulsion, making it highly maneuverable.

The BEB MK II-S retains the basic design characteristics and safety features of the MK II BEB. New technology components have replaced older non-supportable components without changing the overall configuration, locations of controls, and general operating characteristics and capabilities of the MK II. The MK II-S utilizes the existing aluminum hull with modifications to its transom and an added mounting base for accommodating new hydrojets.

New Ultra Jet 305 hydrojets utilize larger heavy duty drive shafts and new intake grills. Hydrojet steering deflectors are operated in tandem by a single hydraulic cylinder powered by a Kobelt 7031 helm pump at the boat's steering wheel, and reverse deflectors (scoops) are individually operated by a TeleflexMorse dual lever/single function Twin S control linked to hydraulic actuators at the hydrojets.

New Cummins 6BT5.9 engines and Twin Disc MG-5011SC transmissions are installed utilizing the same motor mount locations and configuration, and a new single Duramax Duracooler keel cooler is used for each engine. Engine throttle and transmission gear selection are now combined in one dual lever/dual function TeleflexMorse Twin MT-3 control. Morse 33C series cables are used on the throttle, transmission, and scoop controls.

Other features on the MK II-S are:

a. New instrument panel with improved circuit breaker system
b. Redesigned raw-water cooling system with positive drainage
c. 2,000 GPH fore-and-aft electric bilge pumps and portable 6 GPM hand-operated bilge pump
d. Automatic fire extinguisher system with Halon-free FM-200 extinguishing agent
e. New master power battery switch and electrical wiring system
f. New 2-speed Lewmar winch (capstan)

EQUIPMENT DESCRIPTION AND DATA (Contd)

EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES (Contd)

g. Added individual rifle mounts
h. Sump pump for sampling/changing engine and transmission oils
i. Depth sounder available for surveying operations

The MK II-S retains the same basic safety features of the MK II BEB including:

a. Use of hydrojets for propulsion in place of open propellers
b. Dual independent engines and hydrojets for redundancy and increased maneuverability
c. Removable cab with searchlight mount, windshield wipers, and shatter-resistant windshields and plastic side windows.
d. Audible alarms and indicator lights for monitoring engine, fire, and flooded bilge
e. Remote tripping provision for towing hook
f. Emergency engine stop pulls
g. Automatic engine fire extinguisher
h. Provisions for fathometer (depth sounder)
i. Paralleling battery circuit for engine starting and NATO slave receptacle
j. Forward cockpit non-slip matting
k. Basic Issue Items: life jackets, ring buoy, first aid kit, fire extinguisher, and hatchet, boat hook, tools

Boat launch and retrieval operations for the MK II-S are the same as for the MK II, except that engines are not left running during launch. Performance and handling characteristics are basically the same with the exception that the MK II-S has a single throttle/transmission control and hydraulically operated steering and scoop controls. Bridging and rafting operations with the MK II-S are exactly the same as for the MK II, and the same personnel and equipment are utilized.

Transport, launch, retrieval, and ground storage of the BEB requires use of the M14 Improved Boat Cradle (IBC) and the M1977 Common Bridge Transporter (CBT) truck, equipped with Load Handling System (LHS). BEBs are maintainable using the personnel and equipment assigned to Multi-Role Bridge Company (MRBC) units. All MK II-S boats have tiedowns and lifting shackles for boat transport by road, rail, sea, or air.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

(A) **REMOVABLE CAB**—The cab is a removable aluminum structure with windows that mounts to the forward cockpit to provide weather protection for boat operator and crewmembers. The removable cab is provided with windshield wipers and a mounting base for attaching a searchlight.

(B) **CONTROL CONSOLE**—Located in the forward cockpit, the control console contains a throttle/transmission control head, a scoop control head, steering wheel, emergency stop cables, instrument panel, and auxiliary switch panel for safe operation of the boat.

EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

(C) **FORWARD COCKPIT**—Includes operator and crew work area. In addition, the cockpit contains a hand operated bilge pump, hand held fire extinguisher, rifle mounts, hatchet, glove box, life ring, and bow stowage locker for life preservers and other gear.

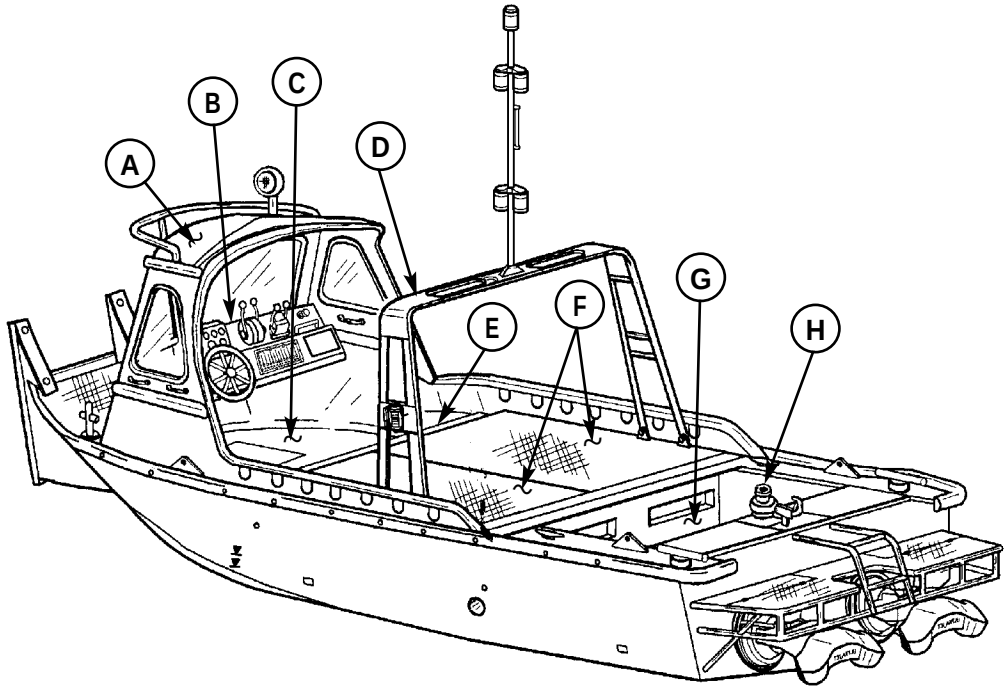
(D) **REMOVABLE MAST**—Contains navigation lights, towing lights, and anchor lights. The mast is lowered for transport of boat and raised during boat operation.

(E) **BATTERY HATCH**—Opens and closes to gain access to battery compartment.

(F) **ENGINE HATCHES**—The hatches open and close to gain access to the engine compartment.

(G) **AFT COCKPIT**—Includes the stowage area for rafting brackets, or cargo, or personnel, and is also used for crew work area.

(H) **CAPSTAN AND TOWING HOOK**—Capstan is a manually operated, hand cranked, 2-speed winch, which is used by crewmembers during rafting operations. The capstan has a safe maximum capacity of 3,000 lbs (1,361 kg). Tow hook provides boat with safe towing capability of 4,400 lbs (2,000 kg). The tow hook is equipped with a quick-release mechanism for disengagement of dangerous loads.



EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

(I) **BOLLARD (MOORING BIT)**—Consist of four bollards used to support and secure lines to boat.

(J) **LADDER—**Located in the rear of the boat; used to assist crew in and out of boat while boat is in the water.

(K) **DIVING PLATFORM—**Located at rear of boat transom, this platform is used to assist crew during diving operations and contains an inspection flap for each hydrojet.

(L) **DIVING PLATFORM FLAPS—**Allows access to the hydrojet reverse deflectors, hoses, and aft hull to inspect for damage.

(M) **HYDROJET HATCHES—**The hatches open and close to gain access to the hydrojet raw water strainers, hydraulic steering controls, scoop control cables, drive belts, pump, reservoir, hoses, cylinders, control valves, tierod, and aft bilge pump.

(N) **LIFTING EYES—**Consist of four lifting eyes used to lift only the boat during lifting operations. Do not use lifting eyes to lift boat and IBC together.

(O) **CLEATS—**Two cleats used for securing rope lines.

(P) **EXHAUST PORTS—**The location where the engine exhaust exits the boat.

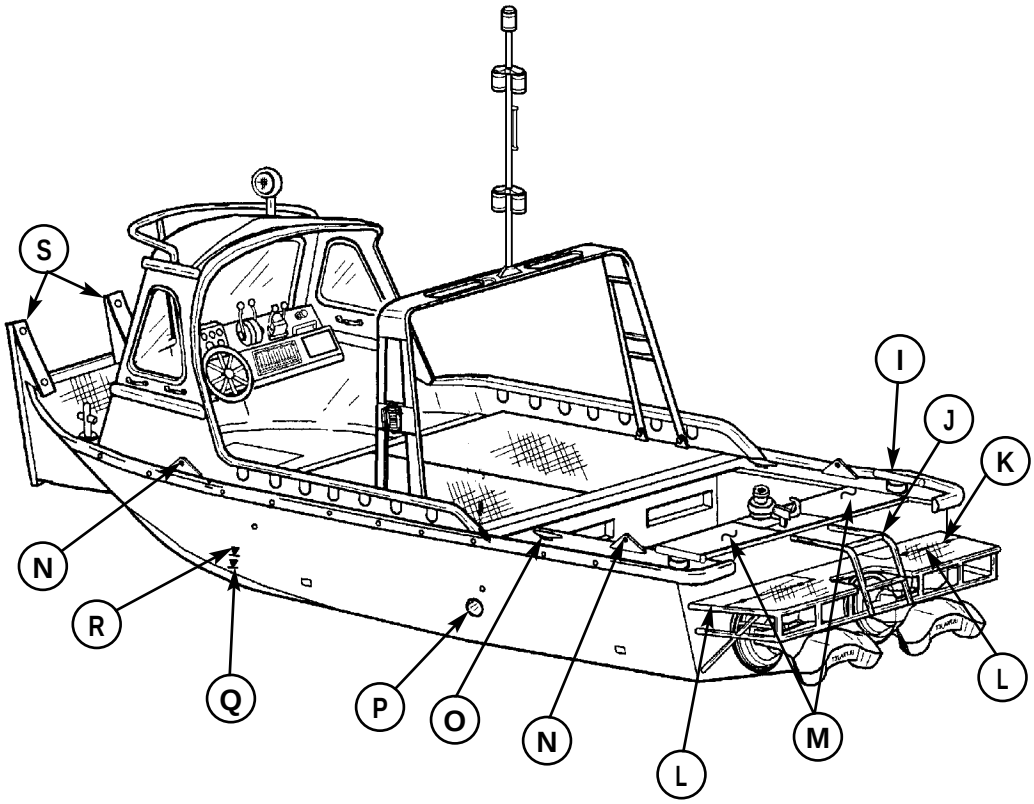
(Q) **LOWER DRAFT MARK**—Marks are applied to both port and starboard side of BEB. Top of horizontal bar indicates normal load condition with fuel, BII, boat operator, and two crewmembers.

(R) **UPPER DRAFT MARK**—Marks are applied to both port and starboard side of BEB. Top of horizontal bar indicates normal load condition with fuel, BII, boat operator, two crewmembers, and 4,000 lbs of equipment.

(S) **PUSHKNEES—**Provides front of boat with a flat vertical surface for pushing bridge bays, anchoring bridge assemblies, and maneuvering raft assemblies.

EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)



EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

(S) **BATTERY COMPARTMENT—**Consist of three sub compartments as follows:

(1) Port side compartment: Consists of two batteries, lubricity filter, inspection light, master fuse link, blocking diode, FM200 fire detection alarm sounder, and two utility connection plugs for the FM200 fire extinguisher system and inspection light.

(2) Center compartment: Consists of fuel tank, fuel filler cap with dipstick, fuel return hose, two fuel water separators, port and starboard fuel shut-off valves, and one master fuel shut-off valve located below and between the port and starboard fuel shut-off valves.

(3) Starboard side compartment: Consists of master battery switch, lubricity filter, two batteries, blocking diode, emergency link solenoid, master fuse link, and a NATO slave receptacle that provides electrical power for starting the boat when batteries are not charged.

(T) **ENGINE COMPARTMENT—**Consists of port and starboard transmissions, transmission coolers and diesel engines. Port side engine compartment fire extinguisher, FWD bilge pump, keel cooler inlet, outlet, flush hose connections, exhaust hoses and tubes, and coolant reservoirs.

(U) **DRIVE SHAFTS—**Located under the aft cockpit. The two drive shafts transfer power from transmissions to hydrojets.

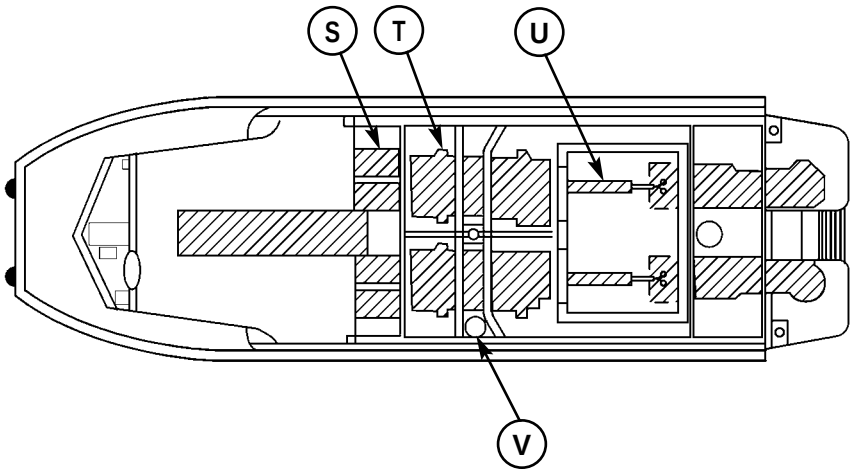
(V) **FM200 FIRE EXTINGUISHER SYSTEM—**The fire extinguisher bottle is located in the engine compartment adjacent to the port engine on the hull sidewall. If a fire is detected, the contents of the fire bottle are discharged automatically.

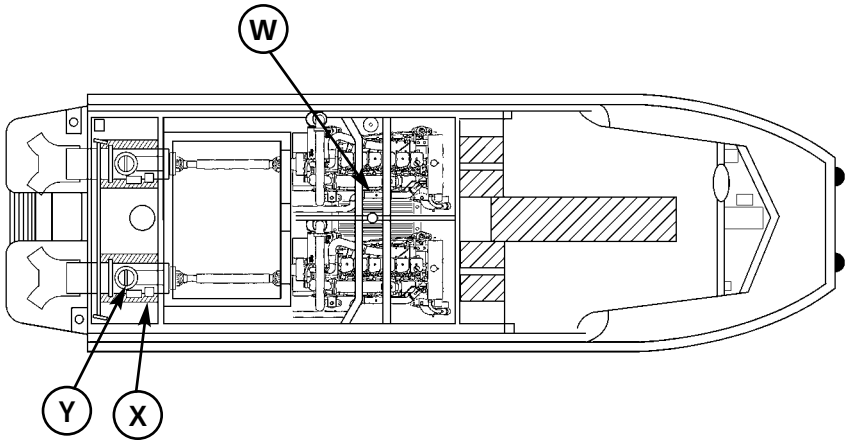
(W) **KEEL COOLERS—**Centrally located underneath the boat, the keel coolers are part of a closed-loop cooling system that cools the engines, engine oil, exhaust manifolds, and turbochargers. The keel coolers are protected by grates mounted on the bottom of hull.

(X) **HYDROJET INLET GRILLS—**Located at stern under the boat. The hydrojet inlet grills provide a screen system to help protect the hydrojets from ingesting objects that may cause damage to the hydrojets.

(Y) **HYDROJET—**The hydrojet is a propulsion unit located on the transom with directional nozzles and scoops. The propulsion units propel and steer the boat. The hydrojets supply a raw water cooling system for the boat.

EQUIPMENT DESCRIPTION AND DATA (Contd)





EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Contd)

(Z) **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.

(AA) **WIPER MOTORS—**Located inside of the cab above the windshield. The wiper motors are connected to wiper blades that remove water from the windshield.

(AB) **HORN—**Located on the front of the forward cockpit. Pressing the horn button on the auxiliary control panel sounds the horn.

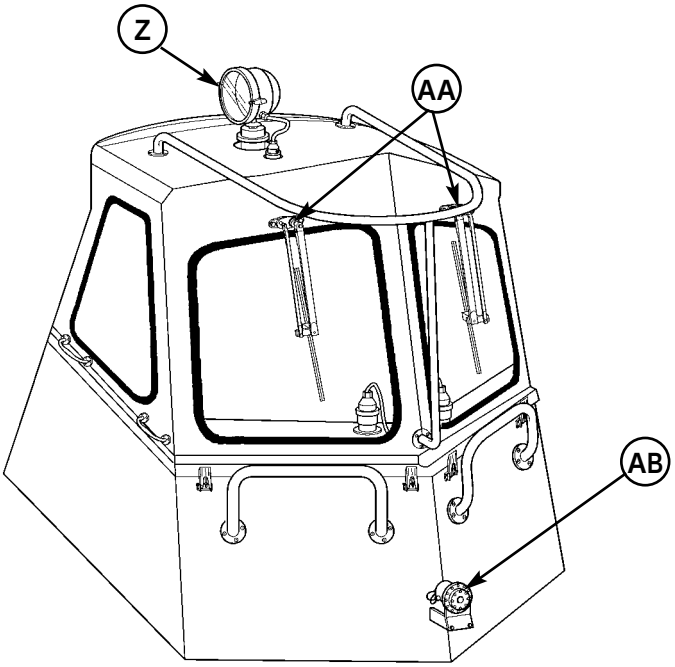
(AC) **ANCHOR LIGHT—**Located on top of the mast and is to be lit when boat is anchored. The light is white when illuminated.

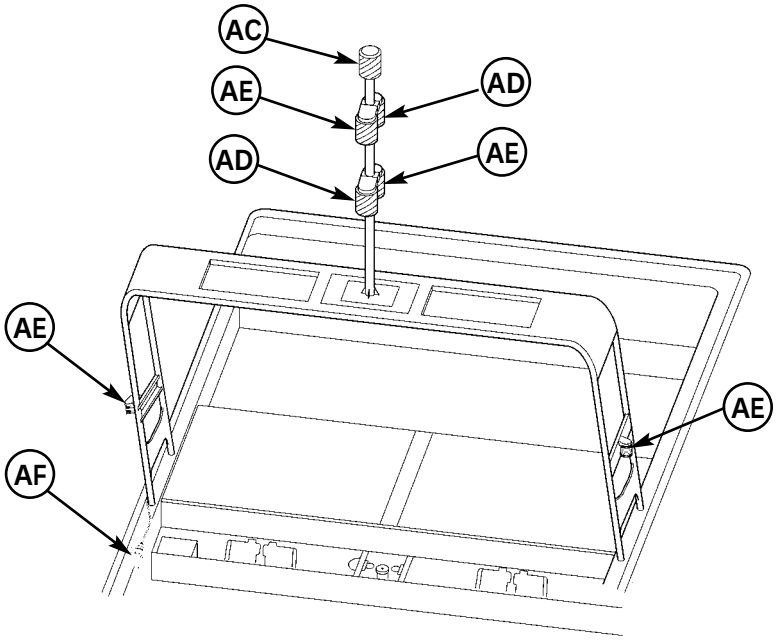
(AD) **TOWING LIGHTS—**Must be lit when the boat has a load under tow. There are two towing lights. The rear towing light is a yellow light on the aft side of the mast just below the anchor light. The front towing light is white on the forward side of the mast and located just below the navigation light. Both will illuminate at the same time.

(AE) **NAVIGATION LIGHTS—**Located on both sides of the mast. The starboard side light is green and the port side light is red. The aft light is white and is located on the forward side of the mast just below the anchor light.

(AF) **MAST RECEPTACLE AND MAST PLUG—**Located on the starboard side of the boat adjacent to the battery compartment. This receptacle supplies power to all mast lights.

EQUIPMENT DESCRIPTION AND DATA (Contd)





EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF FORWARD COCKPIT COMPONENTS

(A) **DAILY ROUTINE PLATE—**This data plate reminds boat crew operator what task they must perform before operating the boat.

(B) **ENGINE INSTRUMENT PANEL—**Contains instrument gauges, switches, and indicator lights that are used during boat operation.

(C) **ENGINE THROTTLE/TRANSMISSION CONTROL LEVERS—**These levers have dual positions and functions. The levers can control engine RPM speed in the outward position or engine RPM speed and transmission shift positions while levers are in the inward position.

(D) **CAB ELECTRICAL CONNECTORS—**Provides electrical connection for cab windshield wipers, searchlight and hand worklight.

(E) **SCOOP CONTROL LEVERS—**The left lever controls the port and the right lever controls the starboard hydrojet scoops positioning.

(F) **SEARCHLIGHT INTERNAL MOUNT—**Located forward and right of the scoop control levers. This provides mounting for searchlight when cab is removed.

(G) **HANDRAILS—**Functions as safety rails for crew. There are five rails located on the boat; three in the forward cockpit and two outside of forward cockpit near the front of the boat.

(H) **HATCHET—**Located on starboard wall forward cockpit, the hatchet is provided for emergencies such as cutting lines.

(I) **RIFLE MOUNTS—**Located on port and starboard walls in forward cockpit.

(J) **HAND HELD FIRE EXTINGUISHER—**Located on starboard wall of forward cockpit. Extinguisher is used by crew to extinguish fires.

(K) **MAP LOCKER—**Lockable stowage compartment for maps, manuals, and other authorized equipment.

(L) **DISCHARGE OF OIL PROHIBITED PLATE—**Indicates to operator that the discharge of oil is prohibited.

(M) **BOW STORAGE LOCKER—**Provides a lockable stowage compartment for hand operated bilge pump, life jackets, and other equipment.

(N) **AUXILIARY SWITCH PANEL—**Located to the right of the steering wheel, this panel operates auxiliary items such as windshield wipers, horn, bilge pumps, and lights.

(O) **EMERGENCY ENGINE STOP CONTROL, STARBOARD—**Stops the starboard engine when pulled out. For emergency use only.

(P) **EMERGENCY ENGINE STOP CONTROL, PORT—**Stops the port engine when pulled out. For emergency use only.

EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF FORWARD COCKPIT COMPONENTS (Contd)

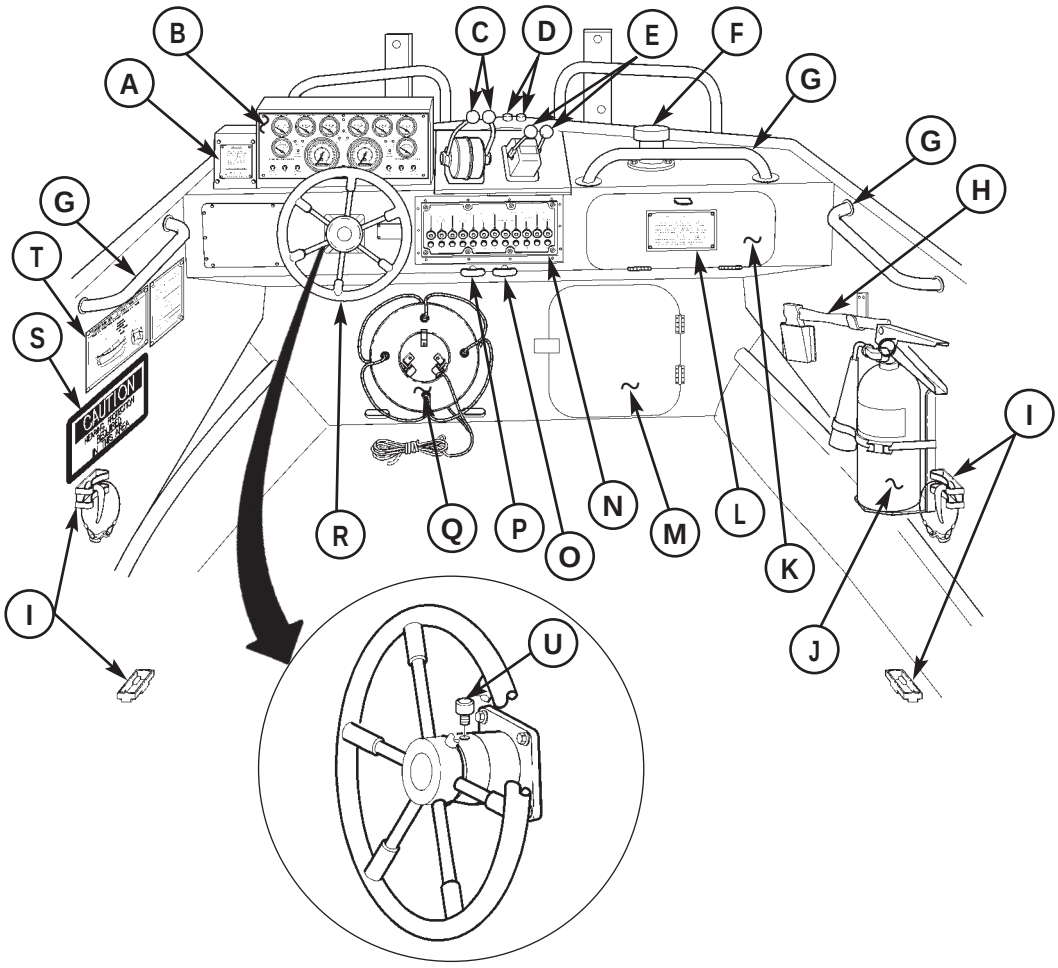
(Q) **RING BUOY—**For emergency use.

(R) **STEERING WHEEL—**Used to steer boat.

(S) **CAUTION PLATE—**Indicates to operator that hearing protection is required during operation.

(T) **TRANSPORTATION DATA PLATE—**Data provided to aid in transporting the BEB.

(U) **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.



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EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF INSTRUMENT PANEL GAUGES AND INDICATORS

(A) **INSTRUMENT PANEL—**Contains instrument gauges, switches, and indicator lights used during boat operation. The instrument panel contains separate gauges, switches, and indicator lights for port and starboard engines, transmissions, and accessories. The LOW FUEL LEVEL, BATTERIES IN PARALLEL, and FWD/AFT BILGE HI LEVEL indicators apply to both engines. PANEL LIGHT switch illuminates all gauges.

(B) **ENGINE OIL PRESSURE GAUGES—**Engine oil pressure gauges range between 0–150 psi. The gauges allow operator to monitor oil pressure during operation.

(C) **ENGINE WATER TEMP GAUGES—**Engine water temperature gauges range between 0–250° F. The gauges allow operator to monitor coolant temperature during operation.

(D) **GEARBOX OIL PRESSURE GAUGES—**Engine gearbox/transmission pressure gauges range between 0–400 psi. The gauges allow operator to monitor gearbox/transmission oil pressure during operation.

(E) **BATTERIES IN PARALLEL—**Batteries in parallel light illuminates red when emergency link button is depressed and all four batteries are being used in parallel for boat operations.

(F) **LOW FUEL LEVEL—**Low fuel level light illuminates red when there are 12 gal. (45 L) or less fuel remaining in the fuel tank.

(G) **HIGH TEMP LIGHTS—**Illuminates red once engine coolant reaches above 210° F (98.9° C).

(H) **LOW OIL LIGHTS—**Illuminates red at startup when low engine oil pressure is detected.

(I) **AUXILIARY AND STARTING BATTERIES VOLT GAUGES—**Battery volt gauges range between 18–34 volts. The gauges allow operator to monitor voltage for starting and auxiliary batteries.

(J) **ENGINE CIRCUIT SWITCHES—**Control circuit power to the instrument panel for the port and starboard engine operation. Also used to normally stop engines.

(K) **START SWITCHES—**When held in the up position engages the starter to start the engine. Once switch is released, starter disengages.

(L) **ALARM MUTE SWITCHES—**Allow operator to turn off engine audible alarm that indicates low engine oil pressure or high water temperature.

(M) **CHARGE WARNING LIGHTS—**Charge warning lights illuminate red when voltage drops to 21 volts or below.

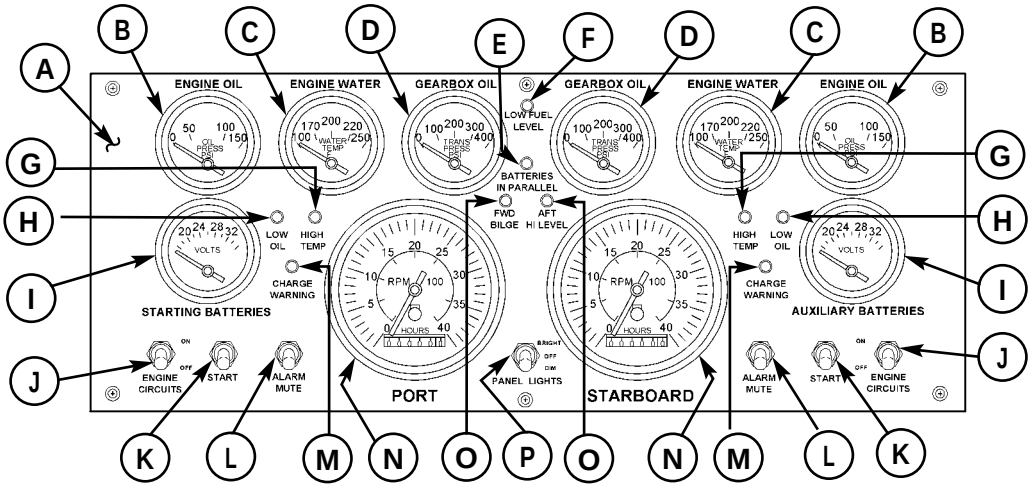
EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF INSTRUMENT PANEL GAUGES AND INDICATORS (Contd)

(N) **STARBOARD AND PORT TACHOMETER/ HOUR METER—**Displays the current speed of the engine crankshaft in Revolutions Per Minute (RPM). Actual speed is a scale reading times 100. The hours of engine usage are displayed within the lower portion of the gauges.

(O) **AFT AND FWD BILGE HI LEVEL LIGHTS—**Lights illuminate red to inform operator that water build up is present at the AFT and FWD bilge area.

(P) **PANEL LIGHTS SWITCH—**A switch that controls the gauge lights. To operate panel lights switch: center position turns gauge lights off, down position turns gauge lights on dim, and up position turns gauge lights on bright.



EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF AUXILIARY SWITCH PANEL PUSHBUTTONS AND INDICATORS

(A) **AUXILIARY SWITCH PANEL—**Located to the right of the steering wheel, the auxiliary switch panel contains twelve pushbuttons, circuit breakers, and indicator lights. This panel incorporates ON\OFF switches and indicator lights to confirm that controls are either on or off. This panel controls the following equipment on the boat:

(B) **SEARCHLIGHT—**Contains a small red indicator light, large pushbutton used for turning on searchlight, and a small pushbutton used for turning off searchlight. The purpose of the searchlight is to allow for nighttime illumination viewing.

(C) **INSPECTION LIGHT OR FM200 RELEASE ALARM—**Contains a small red indicator illumination light, large pushbutton used for turning on inspection light or FM200 Release Alarm and a small pushbutton used for turning off inspection light or FM200 Release Alarm.

(D) **ANCHOR LIGHT—**Contains a small red indicator illumination light, large pushbutton used for turning on anchor light, and a small pushbutton used for turning off anchor light. The purpose of the anchor light is to allow for nighttime illumination during boat anchoring.

(E) **TOWING LIGHT—**Contains a small red indicator illumination light, large pushbutton used for turning on towing light, and a small pushbutton used for turning off towing light. The purpose of the towing light is to allow for nighttime illumination during towing operations.

(F) **NAVIGATION LIGHT—**Contains a small red indicator illumination light, large pushbutton used for turning on navigation light, and a small pushbutton used for turning off navigation light. The purpose of the navigation light is to allow for nighttime illumination during nighttime operations.

(G) **HORN—**Contains a small red indicator illumination light, pressing the large button sounds the horn. As long as the button is depressed the horn will sound. Releasing the button stops the horn.

(H) **WIPER PORT—**Contains a small red indicator illumination light. To operate wiper port: press the large button to turn on port wipers and press the small pushbutton to turn off port wipers.

(I) **WIPER STARBOARD—**Contains a small red indicator illumination light. To operate wiper starboard: press the large button to turn on starboard wipers and press the small pushbutton to turn off starboard wipers.

(J) **EMERGENCY LINK—**Contains a small red indicator illumination light. To operate emergency link: press the large button to link batteries in parallel and press the small pushbutton to unlink batteries.

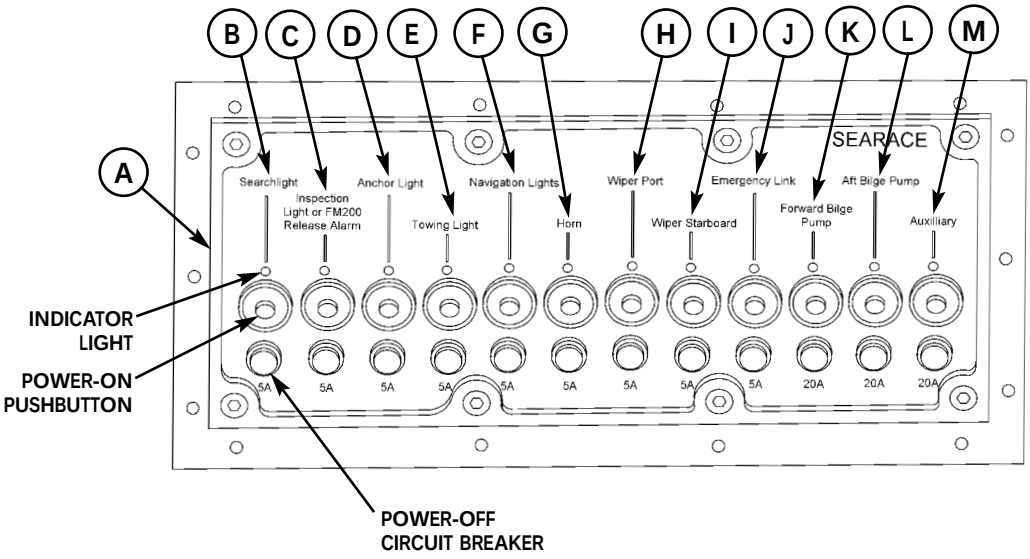
EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF AUXILIARY SWITCH PANEL PUSHBUTTONS AND INDICATORS (Contd)

(K) **FORWARD BILGE PUMP—**Contains a small red indicator light. To operate forward bilge pump: press the large button to turn on forward bilge pump and press the small button to turn off forward bilge pump. Bilge pump is used to clear boat of excess water build-up toward forward compartment.

(L) **AFT BILGE PUMP—**Contains a small red indicator illumination light. To operate aft bilge pump: press the large button to turn on aft bilge pump and press the small button to turn off aft bilge pump. Bilge pump is used to clear boat of excess water buildup toward aft compartment.

(M) **AUXILIARY—**Currently not used.



EQUIPMENT DESCRIPTION AND DATA (Contd)

DESCRIPTION OF CONTROL LEVERS

(A) **ENGINE THROTTLE/TRANSMISSION CONTROL LEVERS—**The levers have dual positions and functions:

NOTE

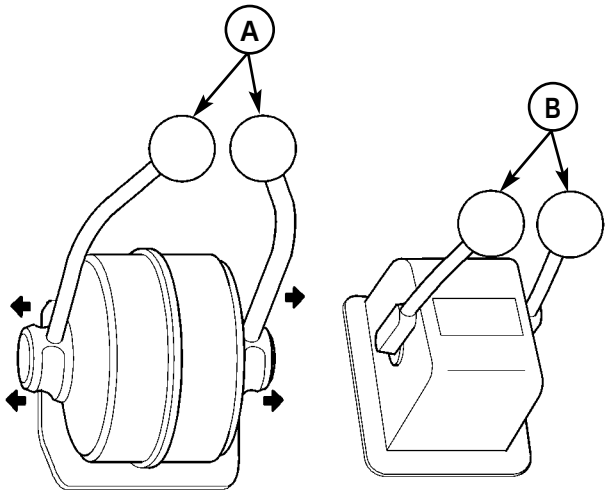
Control lever must be in neutral position to disengage. This requires manual effort to disengage.

- Levers engaged control: Shifting and engine rpm speed. (Normal operating position.)
- Levers disengaged (pulled outward in neutral position) control: Engine rpm speed only for fast engine warm up. (Maintenance and start-up only.)

The left lever controls the port throttle/transmission control handles and the right lever controls the starboard throttle/transmission control handles that allow the operator to control rpm of each engine and forward speed. The reverse direction of the throttle/transmission control handles is only used to clean debris from the hydrojet intake grills underneath the boat.

Position engine throttle/transmission control lever in neutral and manually pull lever outward to use as throttle control only. This is mainly used by maintenance personnel.

(B) **SCOOP CONTROL LEVERS—**The left lever controls the port side hydrojet scoop and the right lever controls the starboard hydrojet scoop allowing the operator to control direction of output from hydrojets to forward or reverse direction of boat. This component may also be used to assist in boat maneuvering and controlling speed.



EQUIPMENT DESCRIPTION AND DATA (Contd)

EQUIPMENT DATA (Contd)

NOTE

Refer to the following tables for specific equipment data.

Table 1. Bridge Erection Boat (BEB) Data.

Engine

Type	4 cycle, 6 cylinder inline B-series
Bore and stroke	4.02 x 4.72 in. (102 x 120 mm)
Displacement	359 cu in. (5.9 l)
Lubricant	15W40

Engine Oil Capacity

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

Oil Pressure

@ Idle speed—minimum	10 psi (69 kPa)
@ Normal operating range	30–65 psi (207–448 kPa)

Engine Oil Pressure Gauge

Idle speed	20–30 1b/in.^{2} (1.4 to 2.1 kg/cm^2)
Operating speed	40 lb/in.^{2} (2.8 kg/cm^2 or above)

Tachometer

Idle speed	800 rpm
Operating speed	1000–2,200 rpm
Maximum speed (under load)	2,600 rpm

Coolant Temperature Gauge (Fresh Water System)

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

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

NOTE

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

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

EQUIPMENT DESCRIPTION AND DATA (Contd)

EQUIPMENT DATA (Contd)

Table 1. Bridge Erection Boat (BEB) Data (Contd).

Battery Condition Meter (Engine Running About 1500 rpm and No Electrical Load)	
Battery near to fully charged	27.0–28.0 volts
Battery partially discharged	24.0–27.0 volts
Battery charge low	Below 24.0 volts
Battery condition meter (normal operation)	Above 24 volt alternator output matching or greater than electrical load
Below 24 volts	Load in excess of alternator output
Fuel System Capacity	
Fuel	75 gal. (283 l)
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)
Performance	
Speed, with crew, equipment and fuel	30.0 mph (48.3 km/h)
Speed, fully loaded	29.0 mph (46.6 km/h)
Maximum load carrying capacity	4,000 lb (1,814 kg)
Towing hook load capacity	4,400 lb (2,000 kg)
Capstan (winch) maximum safe working load	3,000 lb (1,360 kg)
Fuel Consumption (Approximate)	
1750 Rpm	2.8 gal./hr (11 liter/hr)
2000 Rpm	4.2 gal./hr (16 liter/hr)
2250 Rpm	6.0 gal./hr (23 liter/hr)
2450 Rpm	10.8 gal./hr (40 liter/hr)
Maximum forward thrust	3,600 lb (16 kN)
Maximum reverse thrust	2,200 lb (9.8 kN)
Maximum safe engine operating speed (No load governing setting)	2,600 rpm
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
Draft	
With crew, equipment and fuel	22.0 in. (56 cm)
Fully loaded	26.0 in. (66 cm)

EQUIPMENT DESCRIPTION AND DATA (Contd)

EQUIPMENT DATA (Contd)

Table 2. Bridge Erection Boat (BEB) Dimensions.

Boat Fully Equipped and Fueled	
Gross weight	9,800 lbs (4,445 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)
BEB and IBC	
Weight	10,800 lb (4,909 kg)
Length	326.4 in. (826 cm)
Width	116.3 in. (294 cm)
Height w/o cab	96.3 in. (294 cm)
Shipping weight	11,100 lbs (5,035 kg)

EQUIPMENT DESCRIPTION AND DATA (Contd)

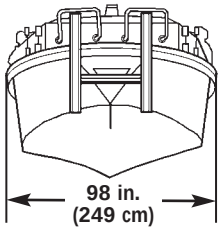
EQUIPMENT DATA (Contd)

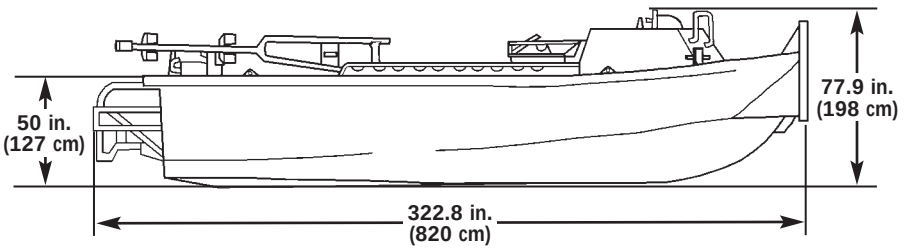
Table 3. Military Load Class (MLC) Ratings.

Configuration	MLC
CBT unloaded	14
CBT maximum load	19
IBC only	3
IBC and BEB	8
CBT loaded with IBC	22
CBT loaded with IBC and BEB	27

EQUIPMENT DIMENSIONS

Dimensions of BEB are detailed below.

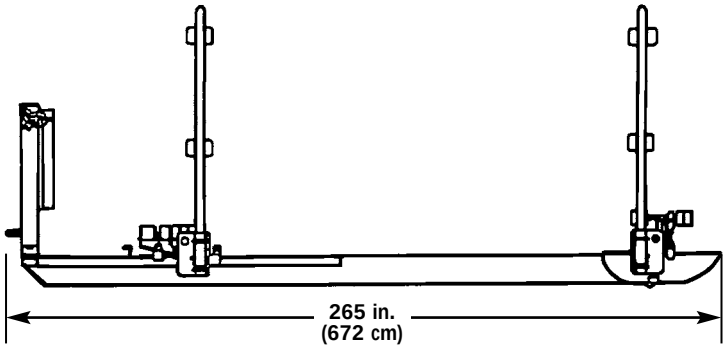


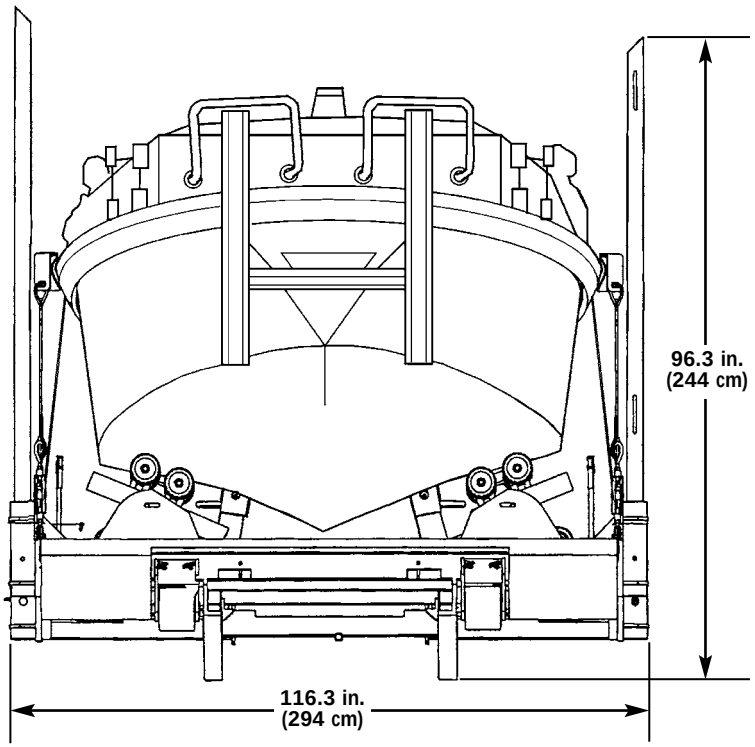


EQUIPMENT DESCRIPTION AND DATA (Contd)

EQUIPMENT DIMENSIONS (Contd)

Dimensions of IBC are detailed below.





EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF DATA PLATES

Locations and descriptions of data plates and decals found on the MK II-S BEB are provided under this heading. If any data plate or decal is worn, broken, unreadable, painted over, or missing, it must be replaced; notify your supervisor.

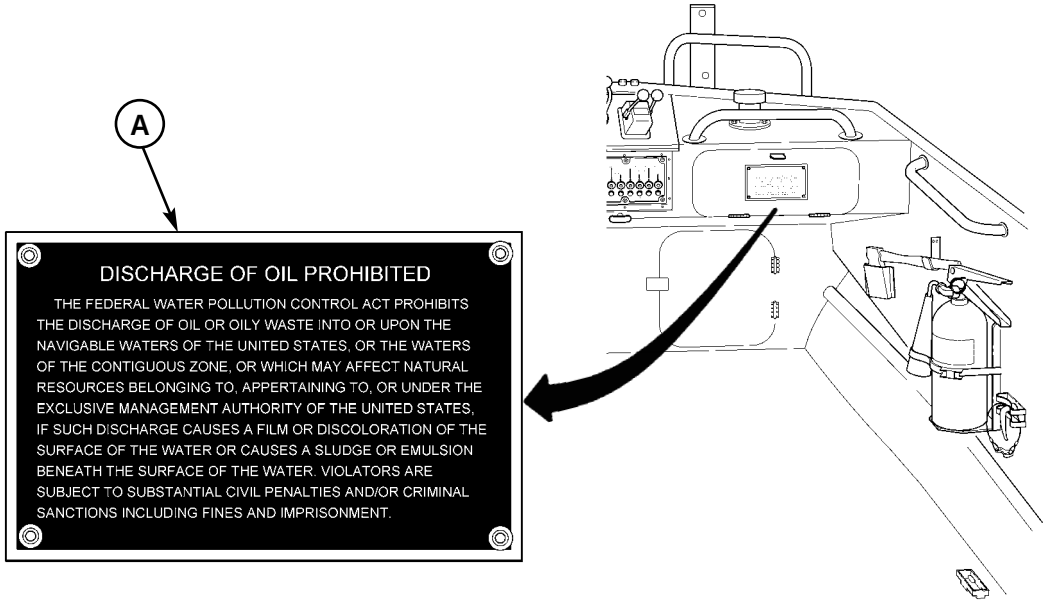
(A) **DISCHARGE OF OIL PROHIBITED**—This data plate, located on the map locker door, identified Federal Water Pollution Control Act laws pertaining to discharge of oil.

(B) **DAILY ROUTINE**—This data plate, located adjacent to the instrument panel, is a reminder to ensure oil and coolant levels, steering, and throttle/transmission controls are checked daily.

(C) **BOAT, BRIDGE ERECTION, INBOARD ENGINE**—This data plate, located on the port side of the forward cockpit, identifies the model, NSN, serial No., USA REG No., contractor, builder, and warranty date.

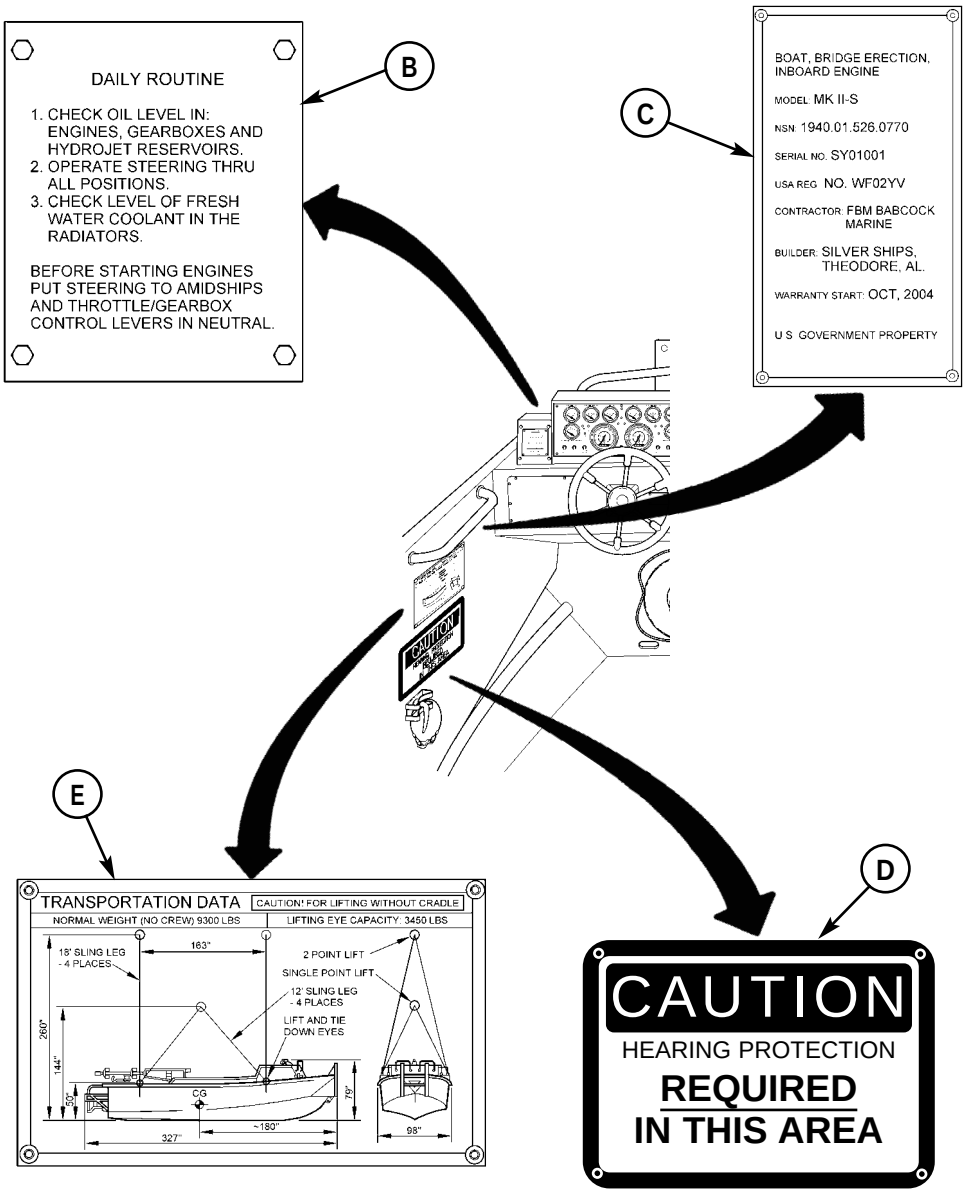
(D) **CAUTION**—This data plate, located on the port side of the forward cockpit, alerts the operator to wear hearing protection during boat operation.

(E) **TRANSPORTATION DATA**—This data plate, located on the port side of the forward cockpit, describes shipping data such as capacities, center of gravity, and lifting points.



EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF DATA PLATES (Contd)



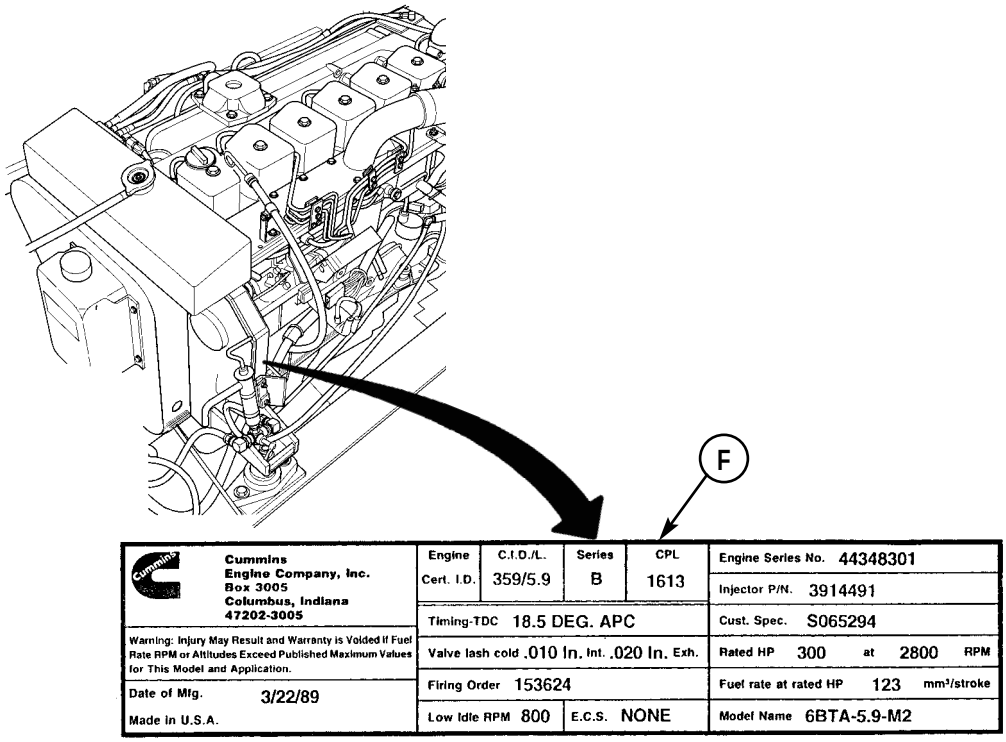
EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF DATA PLATES (Contd)

(F) **CUMMINS—**This data plate, located on the side of the timing gear housing, provides the engine manufacturer's technical data for the Cumins diesel engine.

(G) **TWIN DISK—**This data plate, located on the top of the transmission, identifies transmission data and service information for the Twin Disc Marine Transmission.

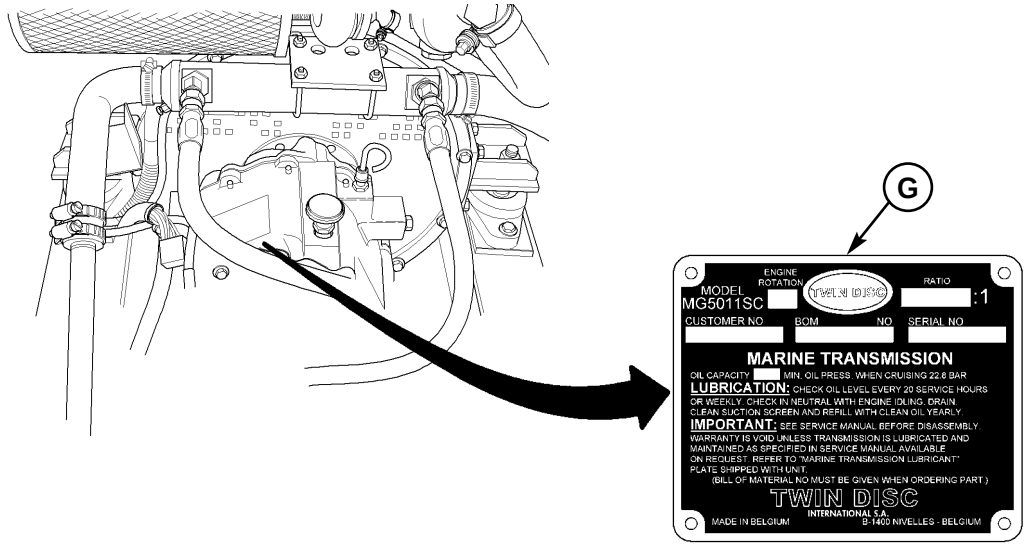
(H) **CONNECTING BATTERY CABLE—**This data plate, located on the inside of the battery access hatch, identifies battery terminal connections.

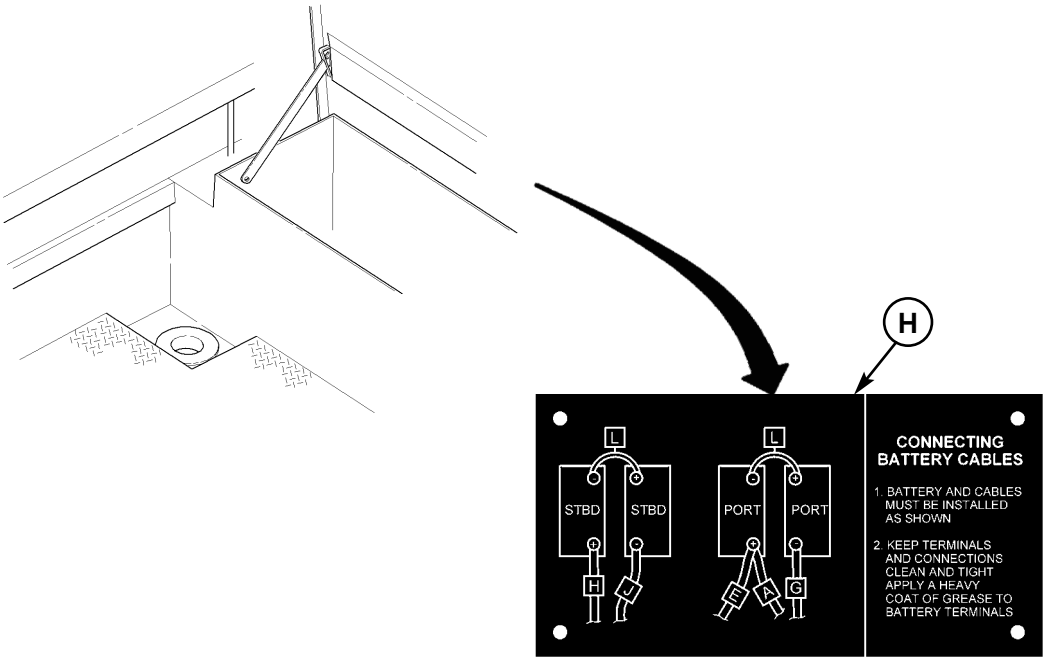


Cummins Engine Company, Inc. Box 3005 Columbus, Indiana 47202-3005	Engine Cert. I.D.	C.I.D./L. 359/5.9	Series B	CPL 1613	Engine Series No. 44348301
					Injector P/N. 3914491
	Timing-TDC 18.5 DEG. APC				Cust. Spec. S065294
Warning: Injury May Result and Warranty is Voided if Fuel Rate RPM or Altitudes Exceed Published Maximum Values for This Model and Application.	Valve lash cold .010 In. Int. .020 In. Exh.				Rated HP 300 at 2800 RPM
Date of Mfg. 3/22/89	Firing Order 153624				Fuel rate at rated HP 123 mm³/stroke
Made in U.S.A.	Low Idle RPM 800		E.C.S. NONE		Model Name 6BTA-5.9-M2

EQUIPMENT DESCRIPTION AND DATA (Contd)

LOCATION AND DESCRIPTION OF DATA PLATES (Contd)





END OF WORK PACKAGE

GENERAL INFORMATION

BRIDGE ERECTION BOAT (BEB) MKII-S

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

THEORY OF OPERATION

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 at the stern. 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 deflectors (scoops).

FUNCTION OF THE STEERING SYSTEM

The scoop is a moveable metal shield that deflects the flow of water from the nozzles, and 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 to the stern. To reverse the boat, the scoops are lowered to deflect thrust towards 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, and 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.

THEORY OF OPERATION (Contd)

FUNCTION OF ENGINE COOLING SYSTEM

The engine cooling system is identical on both port and starboard engines. Coolant is pumped through the primary cooling systems 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

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.

THEORY OF OPERATION (Contd)

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 other for starboard.

Once fuel has reached the starboard fuel shut-of 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 left 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 fore 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 with an electrically nonconductive, non corrosive vapor and residue-free extinguishing agent that stops the combustion process through both physical and chemical means.

FM200 (CF3CHFCF3) is an electrically nonconductive and residue-free extinguishing agent that requires no clean up. FM200 is an effective heat transfer agent that removes heat energy from the fire to the extent that combustion reaction cannot sustain itself. However, in order for the fire suppression system to be effective, both engine compartment access hatches must be kept closed.

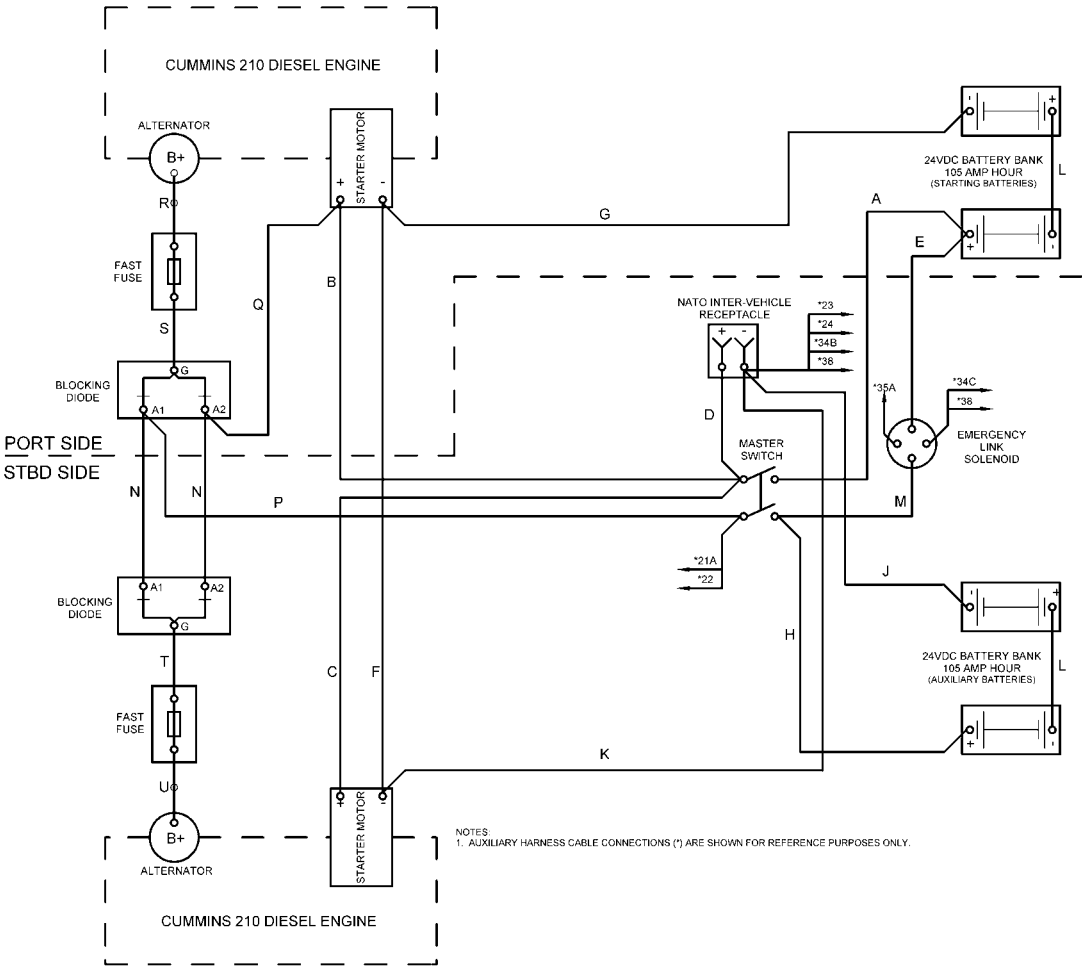
If the fire extinguisher has been discharged, report fire extinguisher discharge to supervisor. Refer to gauge on top of tank to determine if system is fully charged.

In addition to the fire suppression system, there is a portable hand-held fire extinguisher stowed on the starboard wall of the forward cockpit. If the seal is broken, determining if the extinguisher has been discharges is done by weighing it; 8-1/2 lb empty, and 13-1/2 lb full.

THEORY OF OPERATION (Contd)

FUNCTION OF THE ELECTRICAL SYSTEM

The boat electrical system is 24 VDC: two sets of 12-volt batteries are connected in series. 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, starting and auxiliary batteries are connected in parallel.



END OF WORK PACKAGE

CHAPTER 2

OPERATOR INSTRUCTIONS
BRIDGE ERECTION BOAT (BEB)
MK II-S

CHAPTER 2 (Contd)

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

THROTTLE/TRANSMISSION CONTROLS

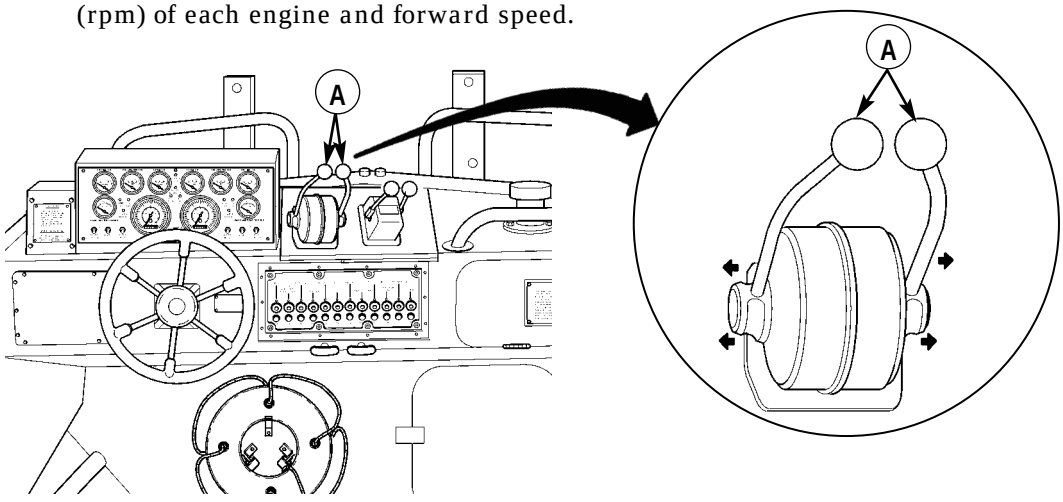
(A) **ENGINE THROTTLE/TRANSMISSION CONTROL LEVERS—**Dual-lever action controls located to the right of the steering wheel. The left lever controls port transmission and rpm engine speed. The right lever controls the starboard transmission and rpm engine speed.

Pushing the levers forward engages transmission into forward gear and engine to drive hydrojet units so that water is ejected through nozzles at the back of the boat. Putting levers in neutral position disengages the transmission. Pulling the levers backward into reverse position engages the transmission to drive the hydrojet units in reverse so that water enters the nozzles and is ejected through the inlet grills at the bottom of the boat. The reverse position is used only to clean debris from the grille and is not to be used to control the boat

The levers have dual positions and functions:

1. Levers retracted inward control shifting and engine rpm speed.
2. Levers pulled outward control engine rpm speed only.

The left lever controls the port side engine throttle/transmission control handle and the right lever controls the starboard side engine throttle/transmission control handle. This allows the operator to control the revolutions per minute (rpm) of each engine and forward speed.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(B) **SCOOP CONTROL LEVERS—**Scoop controls are located to the right of throttle/transmission control levers and above the auxiliary switch panel. The left lever controls the port side scoop (reverse deflector) and the right lever controls the starboard side scoop (reverse deflector), allowing operator to control direction of output from hydrojet nozzles to obtain forward and reverse direction of boat. In addition, the scoop controls may be used to assist in boat maneuvering and controlling speed.

WARNING

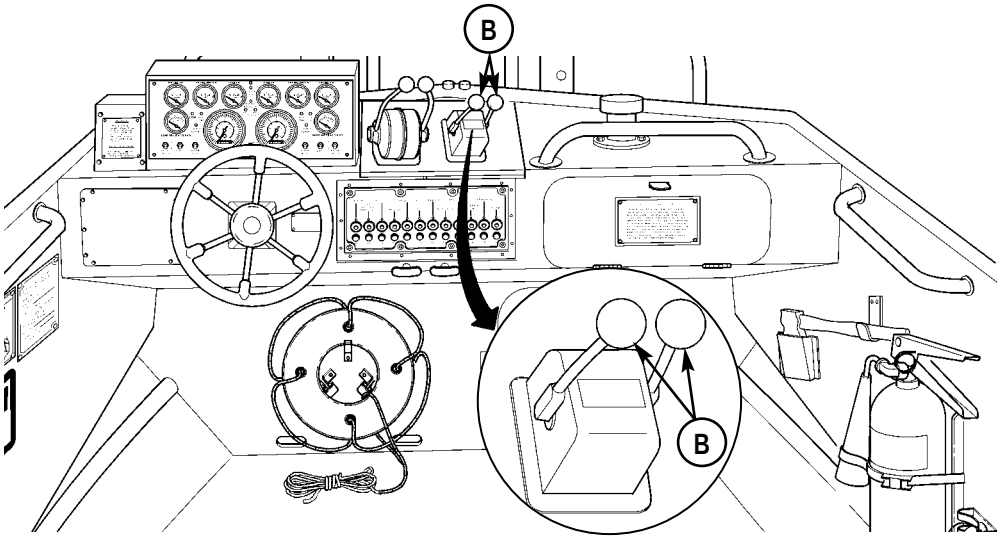
Scoop control levers should not be moved from full ahead to reverse at high engine rpm. Failure to comply may result in death or injury to personnel and damage to equipment.

NOTE

Scoop controls will not function unless throttle/transmission control levers are placed in forward position to start hydrojets.

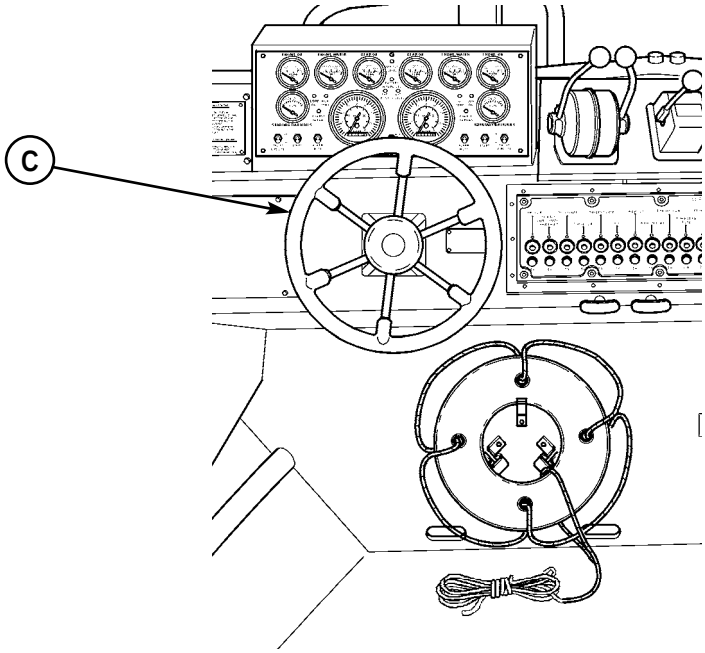
Before scoop controls can move, the throttle/transmission control levers must be placed in forward position to start hydrojets.

Putting the levers in the center position allows the thrust from the hydrojets to be deflected downward and the boat to remain stationary. Pushing the levers forward raises the scoops, increases the forward thrust, and moves the boat forward. Pushing the levers all the way forward allows full forward thrust. Pulling the levers back lowers the scoops. This deflects the thrust from the hydrojets to the front and moves the boat backwards. Pulling the levers all the way back allows full backward thrust. The levers can be set at any position from full forward to full back. Levers can be operated independently of each other for effective steering at low engine rpm.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(C) **STEERING WHEEL—**Used to steer the boat. Steering wheel will turn approximately 1.5 revolutions in either port or starboard direction. Turning the steering wheel to port (counterclockwise) moves both steering deflectors toward port side and turns the boat in a port direction. Turning the wheel to starboard (clockwise) moves both steering deflectors toward starboard side and turns the boat in a starboard direction. When the wheel is centered, both steering deflectors are centered and the boat travels straight ahead.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

NOTE

The panel has duplicate instrument gauges, switches, and indicator lights that are used while operating the boat. All instrument gauges, switches, and indicator lights left of the panel lights switch are used when operating the port engine. All others are used for the starboard engine. The LOW FUEL LEVEL and BATTERIES IN PARALLEL indicator lights are used for both engines. Panel lights illuminate both port and starboard gauges.

(D) **INSTRUMENT PANEL—**Contains instrument gauges, switches, and indicator lights that are used during port and starboard engine operation.

(E) **ENGINE OIL PRESSURE GAUGES—**ENGINE OIL pressure gauges range from 0–150 psi. The gauges allow operator to view current pressure range. The normal range when engine is at idle speed should be 20–30 psi. The PSI range will increase as engine rpm increases, at 1,000 rpm the engine oil pressure gauge should indicate approximately 50 psi.

(F) **ENGINE WATER TEMPERATURE GAUGES—**Engine water temperature gauges range between 0–250 °F. The normal operating range should be 210° F or below.

(G) **GEARBOX OIL PRESSURE GAUGES—**Transmission gearbox oil pressure gauges range from 0–400 psi. The minimum oil pressure while cruising should not be below 30 psi.

(H) **BATTERIES IN PARALLEL—**Illuminates red when emergency link button is depressed and all four batteries are being used in parallel for boat operations.

(I) **LOW FUEL LEVEL—**Illuminates red when there are 12 gallons (45 liters) or less fuel remaining in the fuel tank.

(J) **LOW OIL LIGHTS—**Illuminate red whenever 20 psi or lower engine oil pressure is detected.

(K) **AUXILIARY AND STARTING BATTERIES—**Battery volt gauges range from 18–34 volts. The gauges allow operator to view voltage for starting and auxiliary batteries. Refer to the following specifications.

Engine not running; no electrical load

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

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

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

Engine running at approx. 1500 rpm and no electrical load

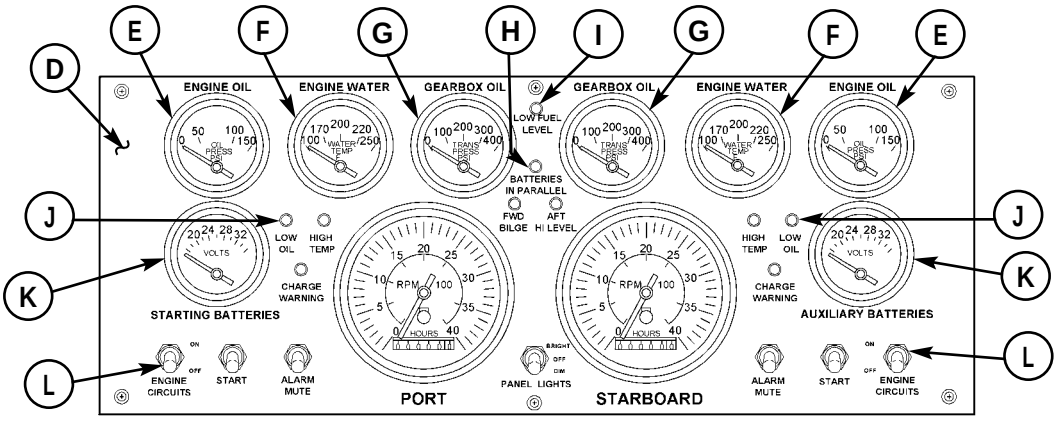
Battery near to fully charged	27.0–28.0 volts
Battery partially discharged	24.0–27.0 volts
Battery charge low	Below 24.0 volts

Normal operation

Above 24 volts: Alternator output matching or greater than electrical load

Below 24 volts: Load in excess of alternator output

(L) **ENGINE CIRCUIT SWITCHES—**Control circuit power to the instrument panel for the port and starboard engine operation. Also used to normally stop engines.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(M) **HIGH TEMP LIGHTS—**Illuminate red when engine coolant reaches above 210° F (99° C).

(N) **STARTER SWITCH—**START switches, when held in the up position will engage the starter to start the engine. Once switch is released, starter will be disengaged.

(O) **ALARM MUTE SWITCHES—**Allow operator to turn off engine audible alarms that indicate low engine oil pressure below 20 psi or high water temperature above 210° F (99° C). If problem remains, alarm will sound every 90 seconds.

(P) **CHARGE WARNING LIGHTS—**Illuminate red when voltage drops to 21 volts or below.

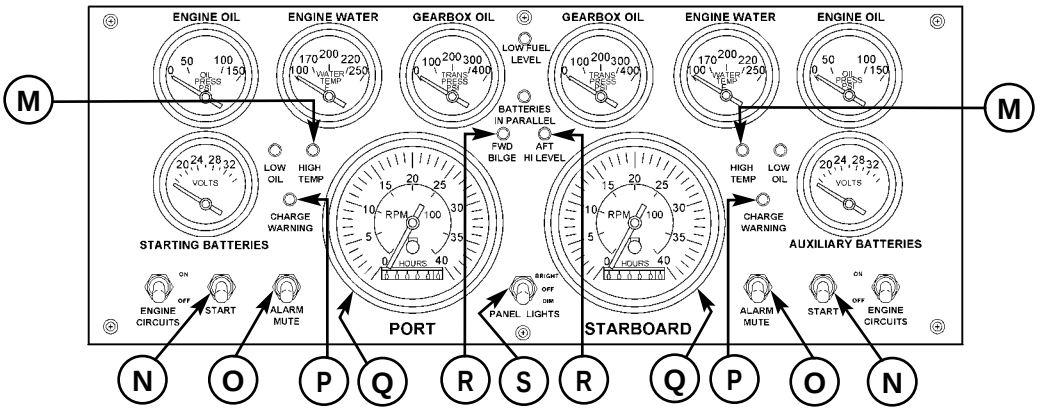
(Q) **STARBOARD AND PORT TACHOMETER/ HOUR METER—**Displays the current speed of the engine crankshaft in rpms. Actual speed is gauge reading times 100. The hours of engine usage are displayed within the lower portion of the gauges.

(R) **AFT AND FWD BILGE HI LEVEL LIGHTS—**Illuminate red to inform operator that water buildup is present at the AFT and FWD bilge areas.

NOTE

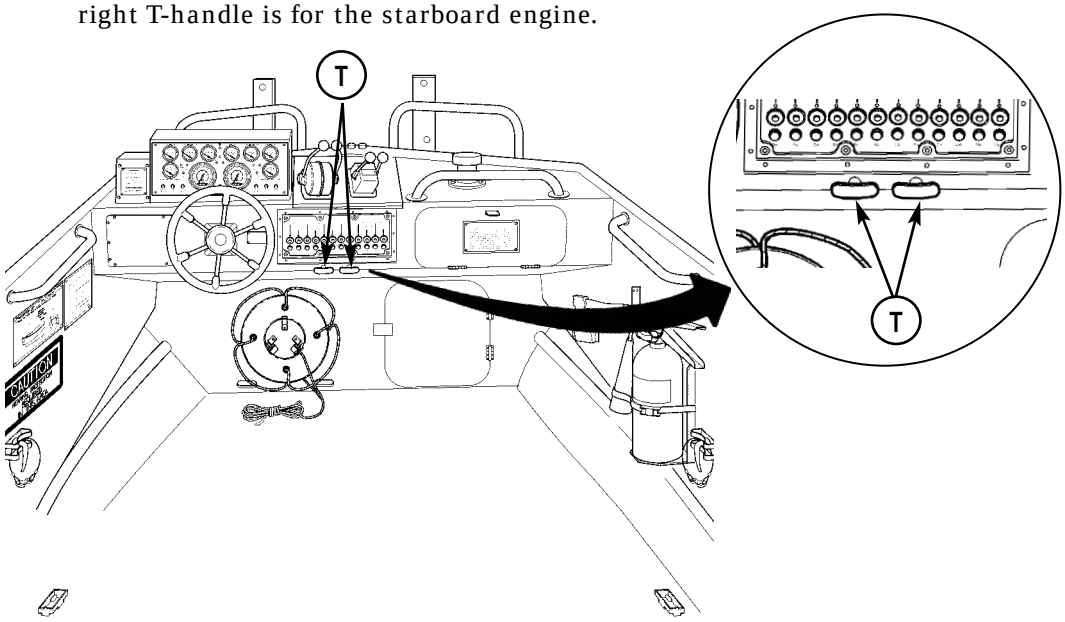
Port or starboard engine circuit switches must be in ON position for panel light switch to function. Both port and starboard sides operate independent of each other.

(S) **PANEL LIGHTS SWITCH—**Controls the gauge lights. Center position turns gauge lights OFF. Down position turns gauge lights on DIM. Up position turns gauge lights on BRIGHT.

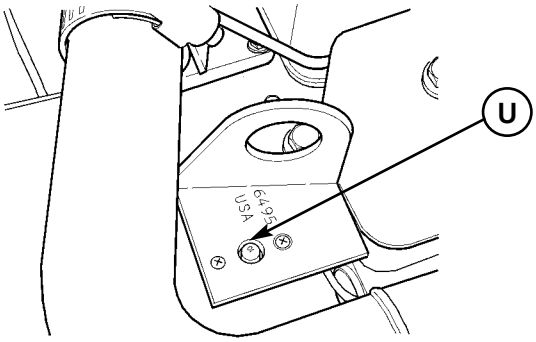


DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(T) **EMERGENCY ENGINE STOP CONTROLS—**The emergency engine stop controls are the two T-handle controls located below the auxiliary switch panels, and are to be used only in the case of an emergency. When the controls are pushed in, the engines will run. When the controls are pulled out, the engines will stop. Pulling the emergency engine stop controls out stops the flow of fuel from the injection pump to the injectors. The left T-handle is for the port engine and the right T-handle is for the starboard engine.



(U) **ENGINE CIRCUIT BREAKER—**Located on top of engine. Depress circuit breaker to reset for operation of engine starting solenoid.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

AUXILIARY SWITCH PANEL

(V) **AUXILIARY SWITCH PANEL—**Located right of the steering wheel, the auxiliary switch panel contains a bank of twelve pushbuttons, circuit breakers, and indicator lights. This panel incorporates ON/OFF switches and indicator lights to confirm that controls are either on or off. The panel controls the following equipment on the boat.

(W) **SEARCHLIGHT—**Includes a small red indicator light, large pushbutton for turning on searchlight, and small pushbutton for turning off searchlight. Allows for nighttime illumination viewing.

(X) **INSPECTION LIGHT OR FM200 RELEASE ALARM—**Includes a small red indicator light, large pushbutton for turning on inspection light or FM200 release alarm, and small pushbutton for turning off inspection light or FM200 release alarm.

(Y) **ANCHOR LIGHT—**Includes a small red indicator light, large pushbutton for turning on anchor light, and small pushbutton for turning off anchor light. Allows for nighttime illumination during boat anchoring.

(Z) **TOWING LIGHTS—**Includes a small red indicator light, large pushbutton for turning on towing light, and small pushbutton for turning off towing light. Allows for nighttime illumination during towing operations.

(AA) **NAVIGATION LIGHTS—**Includes a small red indicator light, large pushbutton for turning on navigation light, and small pushbutton for turning off navigation light. Allows for nighttime illumination during nighttime operations.

(AB) **HORN—**Includes a small red indicator light and a large pushbutton for sounding the horn.

(AC) **WIPER PORT—**Includes a small red indicator light, large pushbutton to turn on port wipers, and small pushbutton to turn off port wipers.

(AD) **STARBOARD PORT—**Includes a small red indicator light, large pushbutton to turn on starboard wipers, and small pushbutton to turn off starboard wipers.

(AE) **EMERGENCY LINK—**Includes a small red indicator light, large pushbutton to link batteries in parallel, and small pushbutton to unlink batteries.

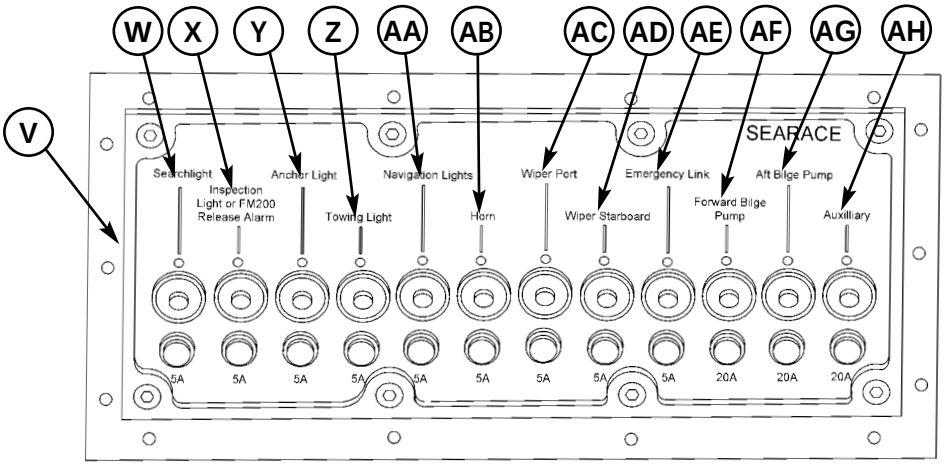
(AF) **FORWARD BILGE PUMP—**Includes a small red indicator light, large pushbutton to turn on forward bilge pump, and small pushbutton to turn off forward bilge pump. Bilge pump is used to clear boat of excess water build-up toward forward compartments.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

AUXILIARY SWITCH PANEL (Contd)

(AG) **AFT BILGE PUMP—**Includes a small red indicator light, large pushbutton to turn on aft bilge pump, and small pushbutton to turn off aft bilge pump. Bilge pump is used to clear boat of excess water build-up toward aft compartments.

(AH) **AUXILIARY—**Currently not used.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

WARNING

When raising or lowering mast, two personnel are required to perform task. Ensure wiring harness is clear of mast bracket to prevent harness damage. Ensure the aft deck area is clear of all occupants and equipment, and exercise caution if deck is wet to avoid slipping. Failure to comply may result in damage to equipment or injury to personnel.

(AI) **MAST—**The mast, located at center of boat, is raised and lowered as follows:

NOTE

Peform steps 1 through 3 to raise mast and steps 4 through 8 to lower mast.

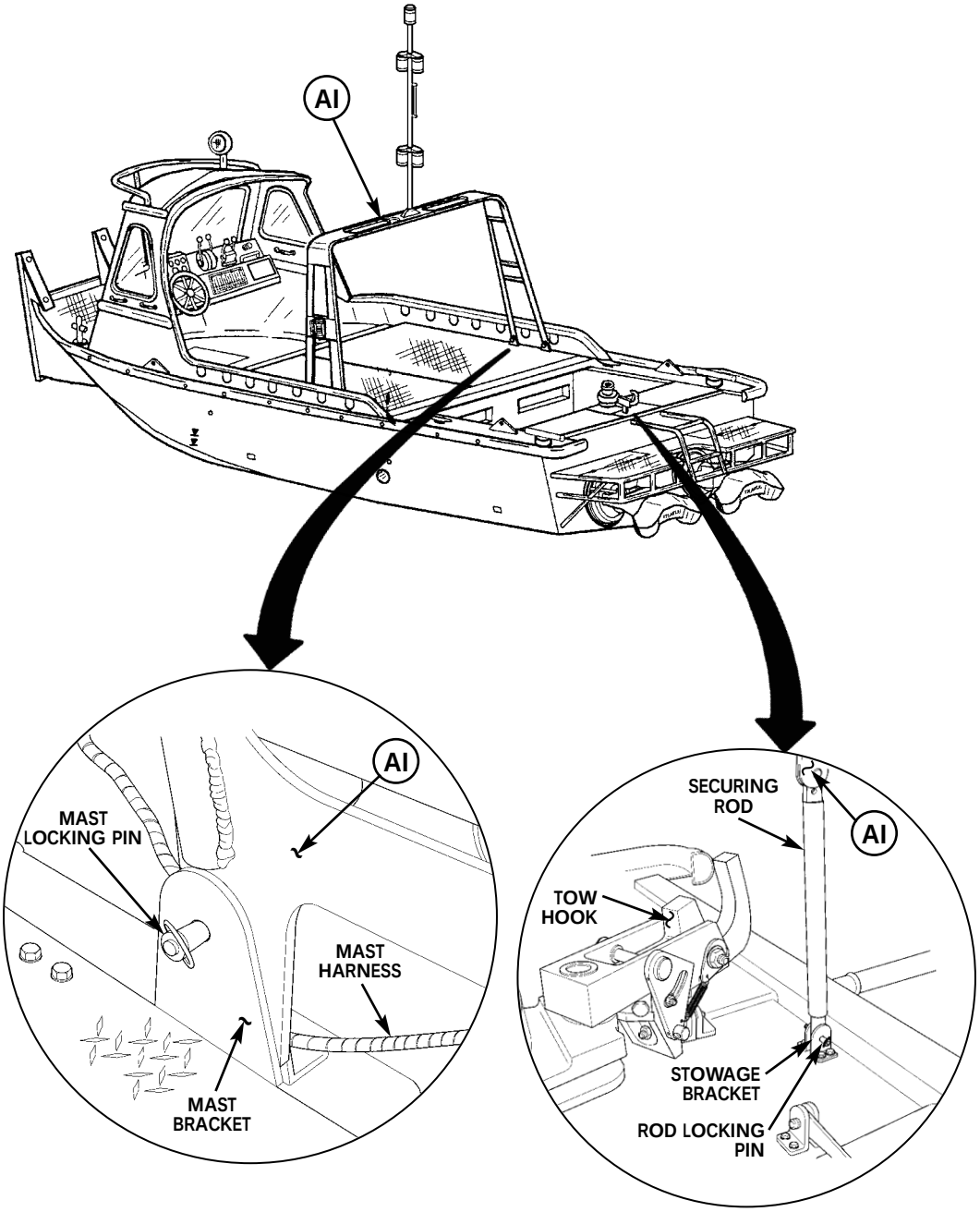
1. Remove two mast locking pins from mast brackets and remove securing rod locking pin from securing rod and stowage bracket.
2. With aid from crew member, raise mast to up position.
3. Install two mast locking pins on mast brackets and mast, and stow securing rod on mast bracket with rod locking pin.
4. Ensure tow hook is angled toward port or starboard side of boat.
5. Remove two mast locking pins from mast brackets and mast, and remove rod locking pin from mast bracket.
6. With aid from crew member, lower mast with securing rod extended.

NOTE

Use lower hole on securing rod to connect to aft mast bracket.

7. Align securing rod to aft mast bracket, and install securing rod on stowage bracket bracket with rod locking pin.
8. Install two mast locking pins on forward mast brackets.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

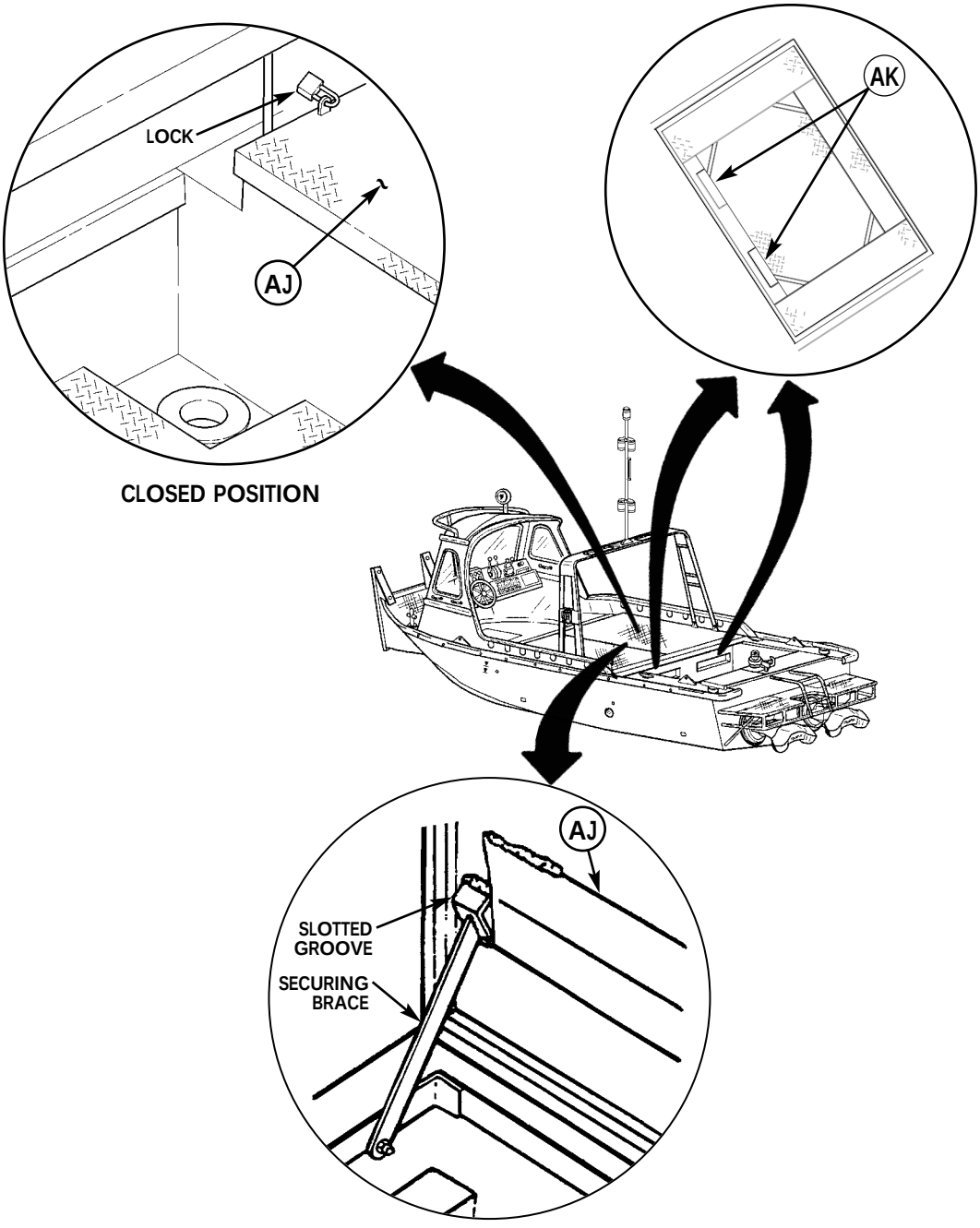
(AJ) **BATTERY HATCH—**The battery hatch, located adjacent to forward cockpit, is opened and closed as follows:

1. If installed, remove lock on battery hatch.
2. To open, lift battery hatch and position securing brace in slotted groove, then lower battery hatch on securing brace.
3. To close, raise battery hatch, lower securing brace from slotted groove, and lower battery hatch to closed position.
4. If authorized, secure lock on battery hatch.

(AK) **AFT COCKPIT AIR INTAKES**

1. Ensure aft cockpit air intakes are not blocked or restricted by cargo or debris.
2. Remove or reposition cargo away from air intakes if blocked.

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)



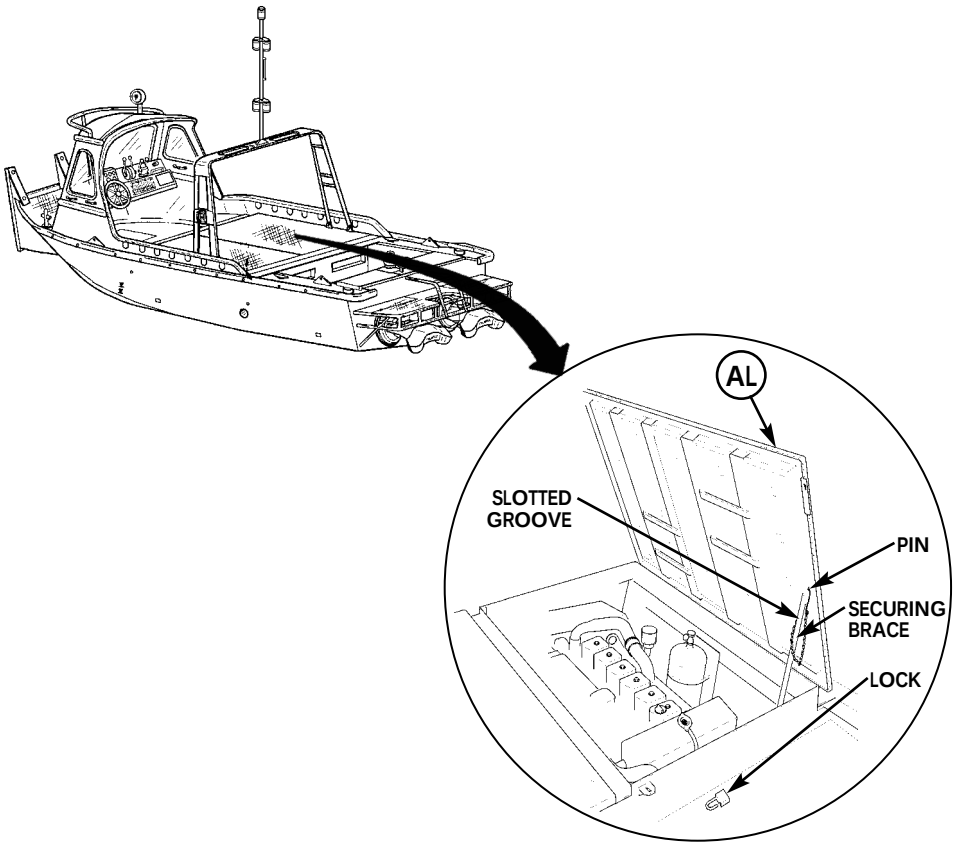
CLOSED POSITION

OPENED AND SECURED POSITION

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AL) **ENGINE HATCH COVERS—**The engine hatches, located between forward and aft cockpits, are opened and closed as follows:

1. If installed, remove lock from port engine hatch.
2. To open, lift engine hatch first, raise securing brace into slotted groove, then lower engine hatch on securing brace. Place pin through retaining hole on securing brace on port engine hatch.
3. Repeat steps 1 and 2 for starboard engine hatch.
4. To close, raise starboard engine hatch, remove pin, lower securing brace from slotted groove, then lower starboard hatch to closed position.
5. Repeat step 4 to close port engine hatch.
6. If authorized, secure lock on engine hatch.

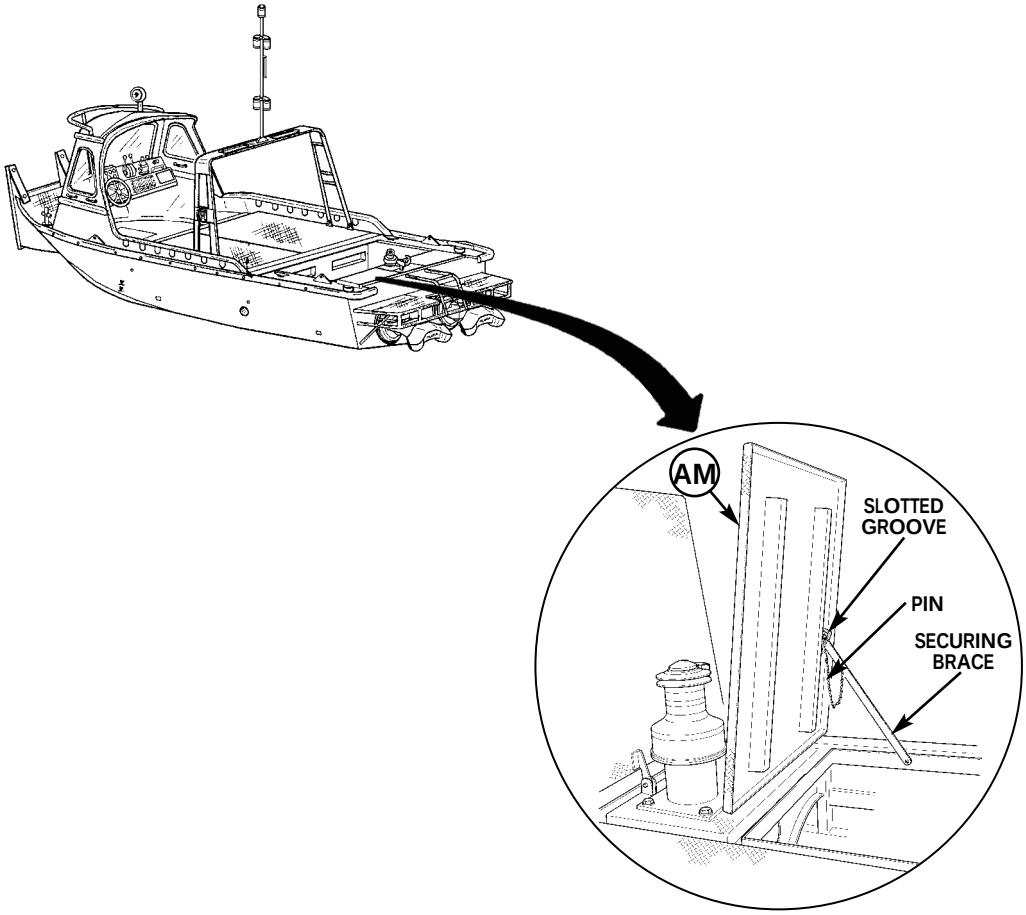


PORT ENGINE HATCH, OPENED AND SECURED POSITION

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AM) **HYDROJET HATCH COVERS—**The hydrojet hatch covers, located between aft cockpit and transom, are opened and closed as follows:

1. To open either hydrojet hatch, raise securing brace into slotted groove, and lower hydrojet hatch on securing brace. Place pin through retaining hole and securing brace on hydrojet hatch.
2. To close, raise either hydrojet hatch, remove pin, lower securing brace from slotted groove, then lower hydrojet hatch to closed position.

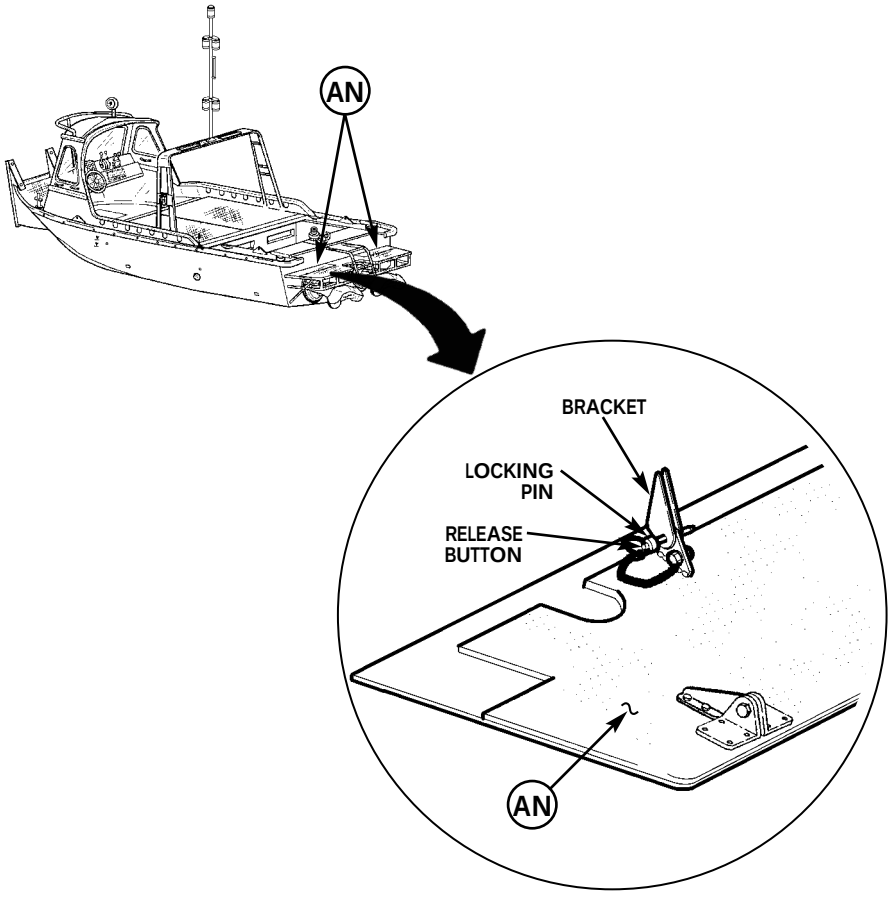


OPENED AND SECURED POSITION

DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AN) DIVING PLATFORM FLAPS

1. To open, press locking pin release button on either flap and remove locking pin from bracket and diving platform flap.
2. Raise flap to open position.
3. To close, lower diving platform flap to close position.
4. Press locking pin release button, and install locking pin on bracket and flap.



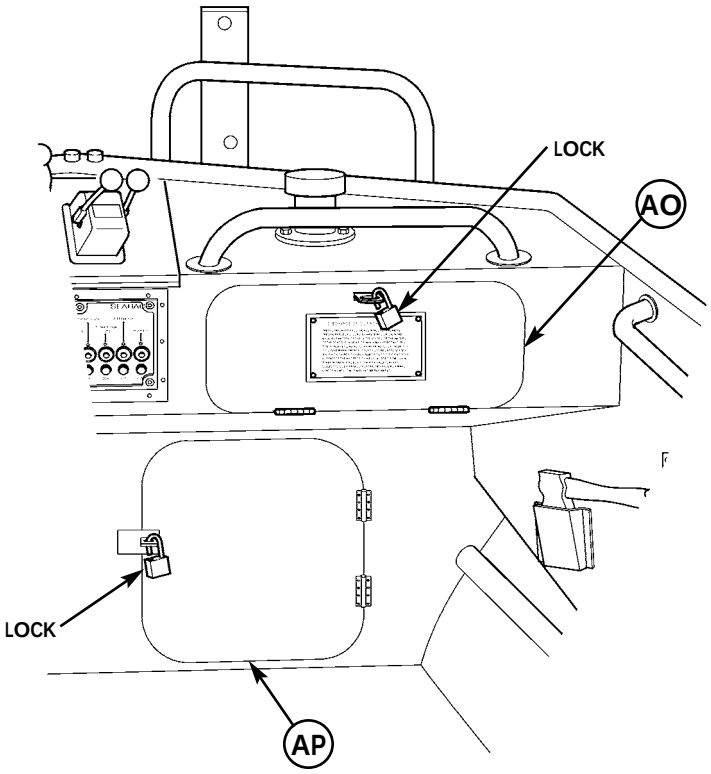
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AO) MAP LOCKER DOOR

1. If installed, remove lock from map locker door.
2. To open, lower map locker door to open position.
3. To close, raise map locker door to closed position.
4. If authorized, secure lock on map locker door.

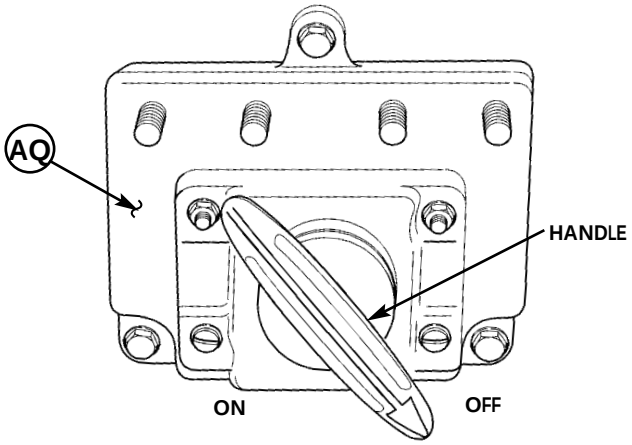
(AP) BOW STORAGE LOCKER DOOR

1. If installed, remove lock from bow storage locker door.
2. To open, swing bow storage locker door to open position.
1. To close, swing bow storage locker door to closed position.
2. If authorized, secure lock on bow storage locker door.

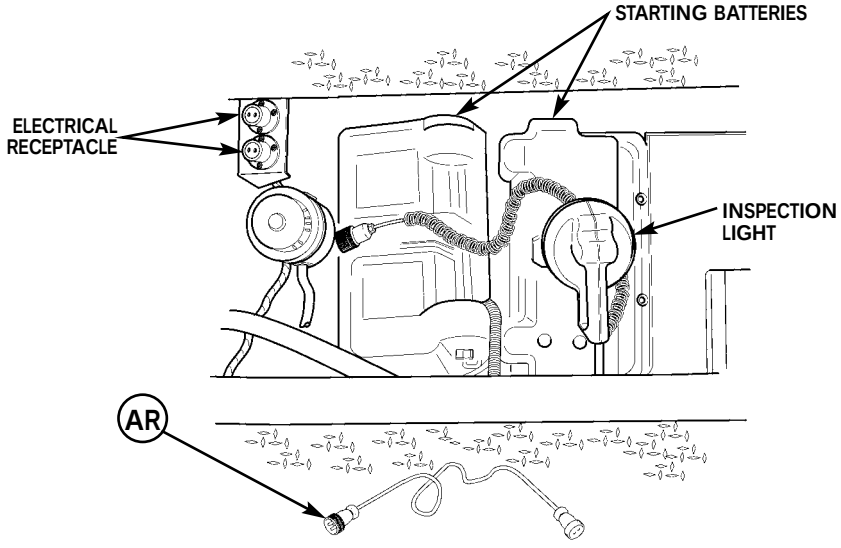


DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AQ) **MASTER BATTERY SWITCH—**The master battery switch is mounted inside the battery box compartment at starboard side of boat. To turn power on, rotate handle clockwise until it stops. To turn power off, pull handle out and rotate counterclockwise until it stops.

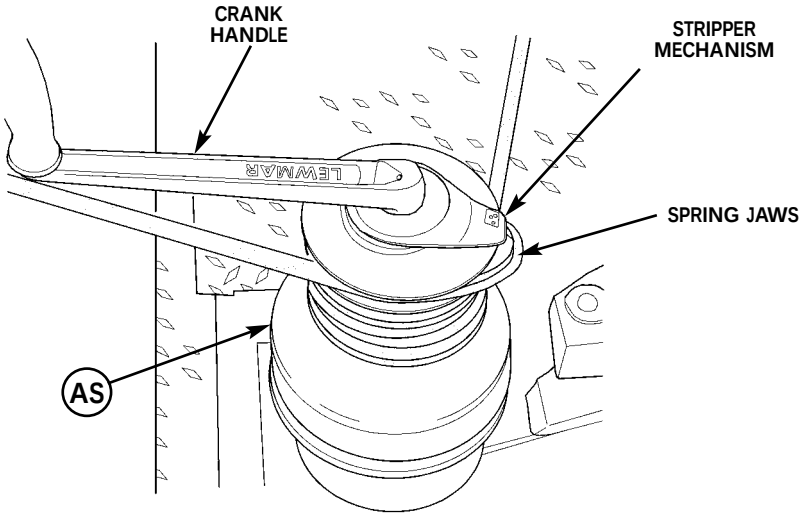


(AR) **INSPECTION LIGHT EXTENSION LEAD—**The extension lead, stowed in bow stowage locker, is connected to the electrical receptacle, adjacent to the engine starting batteries, and the inspection light. It provides an additional 15 ft (4.6 m) of extension when needed.



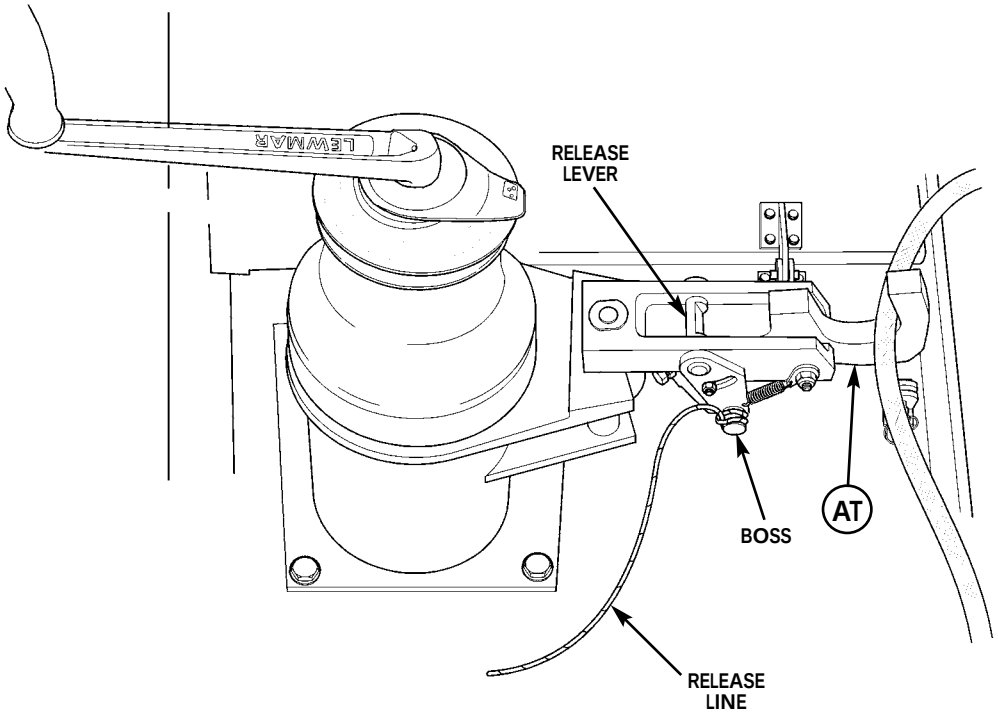
DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AS) **CAPSTAN—**The capstan, located between hydrojet hatches, is a hand cranked 2-speed winch. Turning crank handle to the right operates 1st gear retraction (low speed). and turning crank handle to the left operates 2nd gear retraction (high speed). The crank handle is stowed separately in the map locker when winch is not in use. Line diameter should be no larger then 5/8 in. diameter and a minimum of three turns around capstan drum is required. To tighten line, the free end leading from capstan drum is passed across stripper mechanism and placed in spring jaws prior to cranking winch. To release line, slowly unwrap and release line from capstan drum.



DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS (Contd)

(AT) **TOW HOOK—**The tow hook, located between the hydrojet hatches, can be rotated left or right of center, and is equipped with a quick-release mechanism for disengagement. To operate quick-release mechanism, attach BII tow hook release line to boss. Set release lever to engage tow hook. Pull on tow hook release line to drop tow hook.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

LOCATION OF BASIC ISSUE ITEMS (BII), COMPONENTS OF END ITEMS (COEI), AND ADDITIONAL AUTHORIZATION LIST (AAL) ITEMS

BASIC ISSUE ITEMS (BII)

1. The following items are stowed on the BEB:
   a. Three personal flotation devices are stowed within bow stowage locker.
   b. Ring buoy and 50 ft × 1/2 in. diameter line, is stowed beneath steering wheel in forward cockpit.
   c. Portable fire extinguisher is stowed on starboard wall of forward cockpit.
   d. Boat hook is stowed on port wall of forward cockpit.
   e. Portable bilge pump is stowed in bow stowage locker.
   f. Anchor & Line assembly will be connected to anchor and is stowed in bow stowage locker.
      (1) Anchor: danforth, 25 lb
      (2) Anchor line, 5/8in. x 100
      (3) Anchor chain
      (4) Two 1/2 in. shackles
   g. Towing line 5/8 in. diameter × 100 ft long, is stowed in bow stowage locker.
   h. Four bow lines 5/8 in. diameter × 30 ft long, are stowed in bow stowage locker.
   i. Two steering lines 5/8 in. diameter × 60 ft long, are stowed in bow stowage locker.
   j. Towing hook release line is stowed in bow stowage locker.
   k. Screwdriver flat tip ¼ in., are stowed in map locker.
   l. Screwdriver Phillips #2, is stowed in map locker.
   m. Adjustable wrench 8 in., is stowed in map locker.
   n. First aid kit is stowed in map locker.
   o. Hatchet is stowed on starboard wall of forward cockpit.
   p. Matting is stowed on floor of forward cockpit.
   q. Four shackles, 7/8 in. screw pin, are mounted in place on boat lifting eyes.
   r. Extension lead for inspection light is stowed on a cleat located in engine compartment.

LOCATION OF BASIC ISSUE ITEMS (BII), COMPONENTS OF END ITEM (COEI), AND ADDITIONAL AUTHORIZATION LIST (AAL) ITEMS (Contd)

COMPONENTS OF END ITEMS (COEI)

2. The following items are stowed on the BEB:
   a. Capstan handle is stowed in map locker.
   b. Inspection light, and extension lead, hand-held, is stowed in battery compartment.

ADDITIONAL AUTHORIZATION LIST (AAL) ITEMS

3. The following items can be stowed on the BEB:
   a. Flare: pistol.
   b. Light: chemiluminescent, 6 in. long, red, 12 hour, waterproof.
   c. Lubrication gun: hand lever operated, 14 oz cap, 6,000 PSIG, w/coupling and extension.
   d. Tape: measuring, fibre, 100 ft, hand crank winding.
   e. Depth sounder: fathometer.
   f. Tie-down strap: 15 ft, w/load binder and D-ring.
   g. Tape: reflective, yellow, pressure sensitive, 1.000 in. wide, 1800 in. long.
   h. Cable, NATO slave: intervehicular power cable, 12 ft long.
   i. Padlock set.
   j. Radio set: wireless intercom.
   k. Compass: nautical.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

KNOTS AND SECURING LINES

NOTE

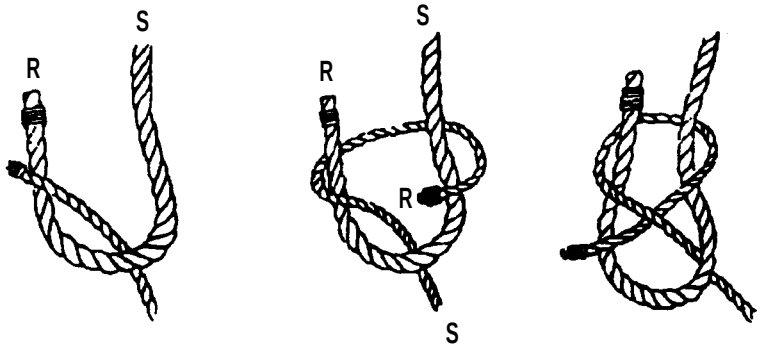
For additional information on knots and lashings refer to TM 5-725.

DEFINITIONS

The standing part of a rope is that end which, because it is fixed or in use, cannot be worked. In the illustrations given in this work package, the standing end of the rope is marked “S.” The running end is the free end with which the knot is tied. The running end of the rope is marked “R” in the illustrations.

SINGLE SHEET BEND

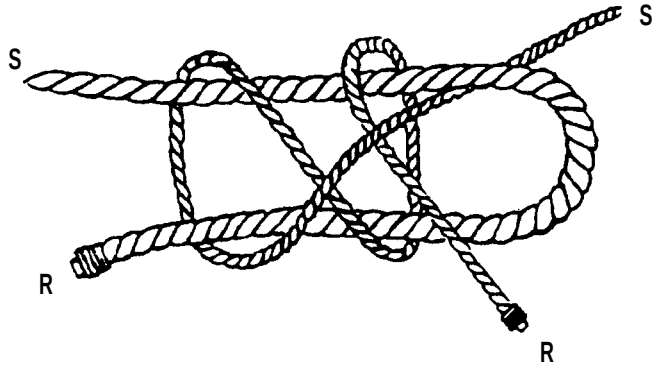
The single sheet bend, also known as the weaver’s knot, is used primarily to tie together two ropes of unequal size. This knot will draw tight but will loosen or slip when the lines are slackened.



KNOTS AND SECURING LINES (Contd)

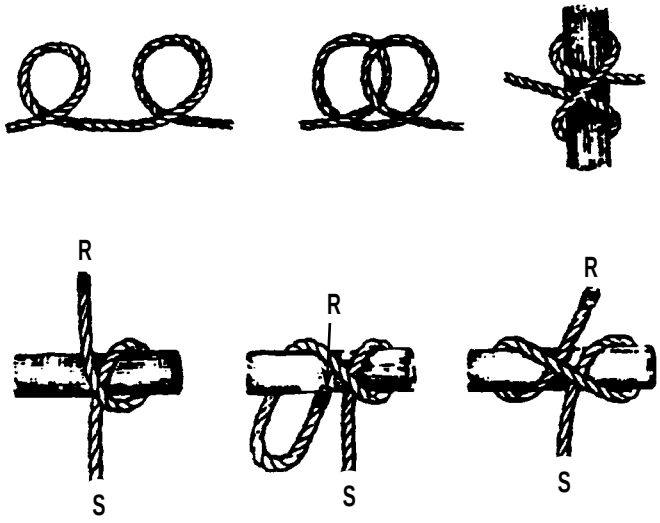
DOUBLE SHEET BEND

The double sheet bend has greater holding power than the single sheet bend when joining ropes of equal or unequal diameter, joining wet ropes, or tying a rope to an eye. It will not slip or draw tight under heavy loads.



CLOVE HITCH

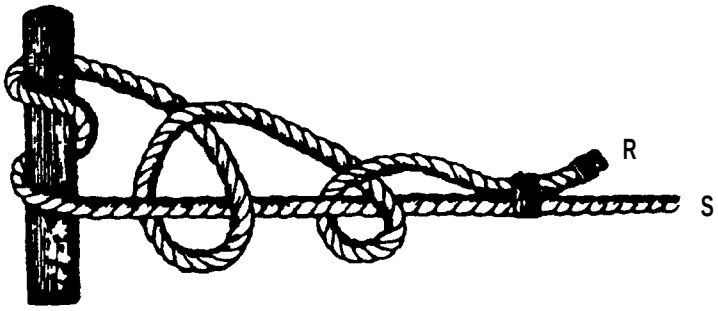
The clove hitch is used to fasten a rope to a timber or post. This knot puts little strain on the rope fibers when the rope is put around an object in one continuous direction. This hitch can be tied along any point on a rope. If there is no constant tension on the rope, another loop around the timber (under the center of the clove hitch) will permit a tightening and slackening motion of the rope.



KNOTS AND SECURING LINES (Contd)

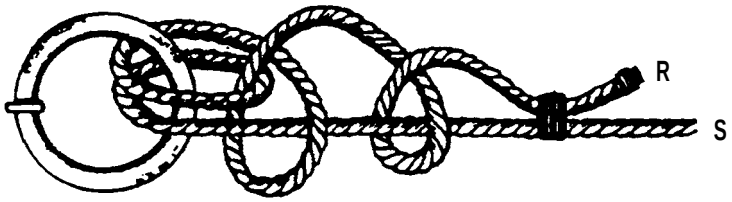
ROUND TURN AND HALF-HITCHES

The round turn with two half-hitches is the primary means of securing a rope to a post or other anchorage. For greater security, after this knot is tied the running end should be tied to the standing part of the rope with twine. This process is known as "seizing."



FISHERMAN'S BEND

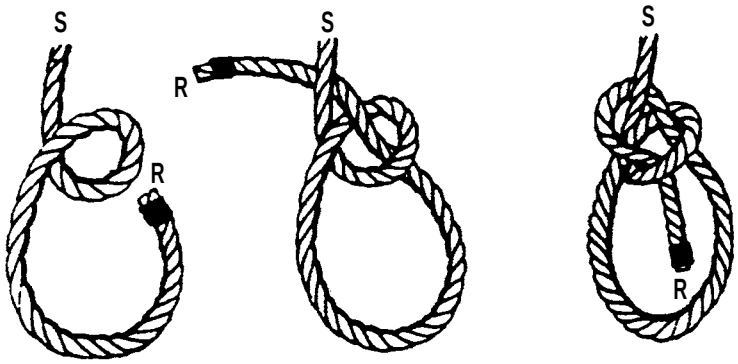
The fisherman's bend is an excellent method for attaching a rope to an anchor, a ring, or a rectangular stone. It can also be used to fasten a rope or cable to a ring or post in situations where there will be a slackening and tightening motion in the rope.



KNOTS AND SECURING LINES (Contd)

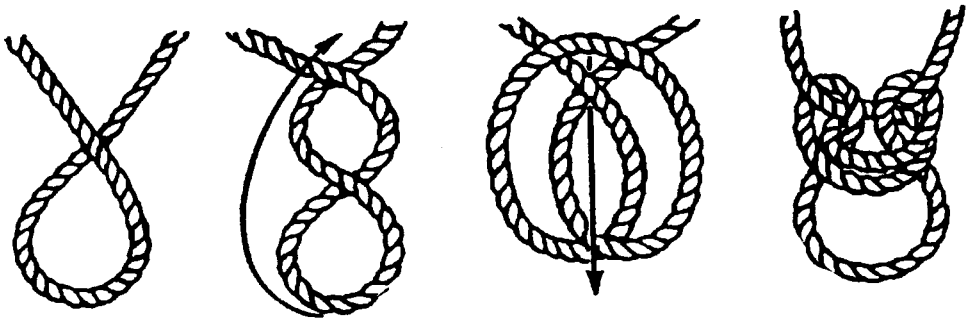
BOWLINE

This is the best knot for making a single loop that will not tighten or slip under strain.



BUTTERFLY KNOT

The butterfly knot is used to pull taut a high line or handline, as a tread rope for footbridges, or for other similar installations. This knot provides the capability to tighten a fixed rope when mechanical means are not available.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

HAND SIGNALS

RAFTING HAND SIGNALS

WARNING

During rafting procedures BEB operator must follow hand signals from raft commander. Failure to comply may result in damage to equipment and possible injury or death to personnel.

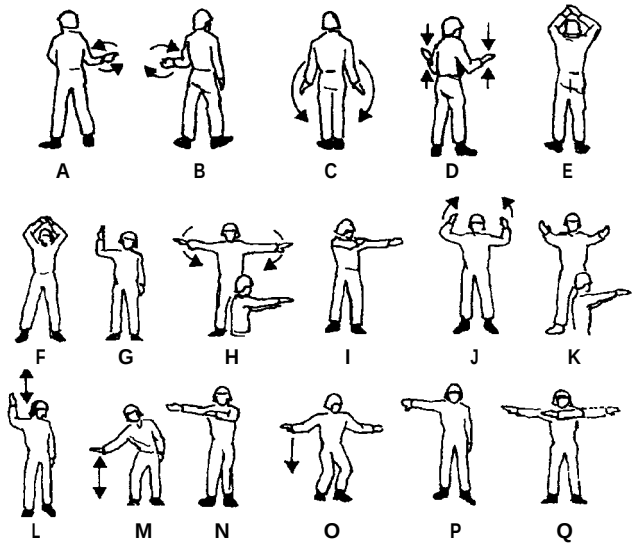
NOTE

Refer to FM 21-60 as primary source for hand signals.

It is impossible for BEB operators to independently control the direction and speed of raft movements and navigate at the same time. For this reason, the raft commander directs all rafting maneuvers.

HAND SIGNALS (Contd)

RAFTING HAND SIGNALS



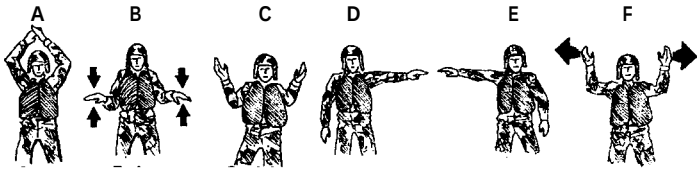
A – Left turn
B – Right turn
C – Back up
D – Reduce Speed
E – Stop
F – Connect Units
G – Approach for hook-up
H – Pilot designation
I – Side slipping left
J – Backing
K – Straight ahead
L – Increase power
M – Decrease power
N – Side slipping right
O – Apply power
P – Ramp signals
Q – Reduce power (stop engine)

COMMON BRIDGE TRANSPORTER (CBT) HAND SIGNALS

NOTE

Refer to FM 21-60 as primary source for hand signals.

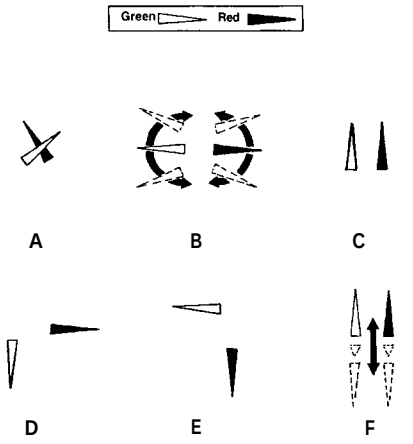
The hand signals shown below are used during daylight. The below view is illustrated as if you are sitting inside the cab of the CBT and ground guild is positioned forward of the CBT.



A – Stop
B – Reduce speed
C – Straight ahead
D – Turn right
E – Turn left
F – Backup

HAND SIGNALS (Contd)

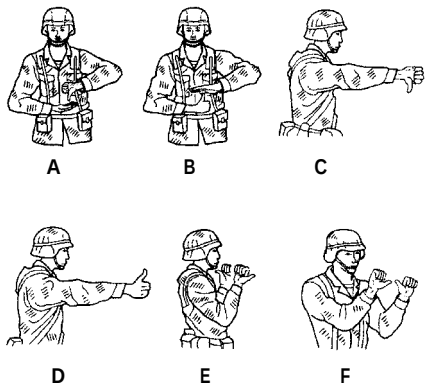
COMMON BRIDGE TRANSPORTER (CBT) HAND SIGNALS (Contd)



LOAD HANDLING SYSTEM (LHS) HAND SIGNALS

NOTE

Refer to FM 21-60 as primary source for hand signals.



A - Auto unload-make fist with thumb pointing down, touching palm of opposite hand.

B - Auto load-make fist with thumb pointing up, touching palm of opposite hand.

C - Hook arm unload-make fist with thumb pointing down.

D - Hook arm load-make fist with thumb pointing up.

E - Main frame unload-make fist with both hands and thumbs pointing outward.

F - Main frame load-make fist with both hands and thumbs pointing inward.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

OPERATION UNDER USUAL CONDITIONS

GENERAL

Work packages 0008 00 through 0036 00 provide instructions for operation of BEB under normal operating conditions. Operator instructions include site requirements, launch/retrieval of BEB, BEB operation, and bridge and raft assembly construction. In addition, operator instructions include deployment by helicopter, bridge anchorage using BEBs, conventional and longitudinal rafting, and other requirements for operating the BEB.

BEB PREPARATION FOR USE

Operation of the BEB under usual conditions is described in this work package. Operation under unusual conditions is described in WP 0037 00. Prior to operating the BEB, the operator must perform the following:

a. Ensure field maintenance has serviced the vessel; refer to DA Form 2404/5988-E, Equipment Inspection and Maintenance Worksheet.

b. Perform all operator/crew Before PMCS as listed in WP 0046 00, Table 1.

c. Review operating instructions prior to boat operation.

d. Review the proper hand signals for operation. Refer to Hand Signals WP 0007 00.

e. Review launch and retrieval procedures (refer to WP 0010 00 and WP 0011 00), and the Improved Boat Cradle (IBC) operating instructions prior to its use. Refer to TM 5-5420-277-14&P.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

SITE REQUIREMENTS AND LAYOUTS

Site selection for boat operations depends on several factors. It is usually a compromise of tactical and technical requirements. A careful survey of the proposed boat launching site should be made by reconnaissance, not by the operator/crew. Site selection is the result of a commander's strategic decision based on tactical requirements. However, the operator/crew must understand and observe the site requirements when performing boat operations.

Tactical Requirements — The ability of the U.S. Army to cross a river, gully, or ditch quickly and efficiently is critical. A float bridge will be used where conditions warrant a crossing and no other method of crossing a gap quickly is available to advance army forces.

- **Boat site preparation.** Where tactically and strategically possible, perform a preliminary study and site selection checks to determine the proposed launch site of the boat prior to marking out the site.
- **Preliminary study.** Carry out intelligence gathering and reconnaissance of the proposed boat launch location.
- **Intelligence gathering.** Refer to intelligence studies and reports, maps, aerial photographs, and personal aerial reconnaissance. If possible, seek the advice of friendly local civilians.
- **Site reconnaissance.** Reconnaissance is required to:
    1. Select a suitable site.
    2. Measure the bank heights and slopes.
- **Hasty reconnaissance.** This is carried out when it is not possible to take measurements with instruments and when access to the far bank is not possible. Make best estimates of bank heights.
- **Deliberate reconnaissance.** Deliberate reconnaissance should always be carried out where possible, following standard practice. Determine the relative bank heights by means of a suitable instrument.

SITE REQUIREMENTS AND LAYOUTS (Contd)

Site Requirements — Site selection is a critical step in performing a boat launch. The requirements are generally based on equipment limitations.

An assault site is selected for the following characteristics:

1. Enemy forces are weak, the terrain on the friendly shore provides concealment from enemy observation, and there is room for the assault to be supported by overmatching fire.
2. Adequate launch routes exist.
3. Firm banks permit rapid launching at multiple points along the span.

All boat sites require the following characteristics:

1. The site should be located where there are established road networks on both sides of the span.
2. The site should be located at a narrow point along the span, free of obstructions that would impede operations.
3. The site should have firm ground.
4. Water velocity must not exceed 8 ft per second (2.438 m per second).
5. The site should have an overhead clearance of 22 ft, 2 in (6.766 m).
6. The side-to-side slope is not greater than 8% or 5°.
7. The site must be clear of personnel and obstructions.
8. The minimum water depth must be determined by commander.

Site Layout Requirements — Boat launching sites require two-way access roads to areas for parking, preparation of equipment, and routing of personnel and vehicle traffic. Site conditions will determine the location of boat site and the location of access roads. Single or multi-launch sites are established depending on how quickly the advancing forces are directed to make a crossing. Refer to FM 5-34, Engineer Field Manual, for additional information on site requirements and layouts.

SITE REQUIREMENTS AND LAYOUTS (Contd)

Site Parameters — Perform further checks upon arrival at the proposed location to ascertain site suitability for boat launching deployment. Although not all-inclusive, consider the following factors:

- **Access routes.** Tie in the access routes at both ends of the launching and retrieving sites to existing main road network, where possible, to reduce preparation and maintenance.
- **Local weather conditions.** Ensure the strength and direction of prevailing winds will not hamper deployment or usage of the boat. The deployment should not commence in wind speeds in excess of 33 mph (15 m/sec). Ensure that heavy rainfall will not cause problems at the launch site such as a rise in water level affecting the ability to launch or retrieve boats when crossing rivers, streams, etc.

Launch Condition Requirements — Shore conditions are used to determine the launch site. Perform the following procedure if the desired launch site is uneven and would inhibit launching the boat.

WARNING

Hazard to personnel and equipment is increased if boat is launched at less-than-ideal site. Site must be inspected and prepared to be within the operating limits of the equipment. Failure to adequately prepare site could result in damage to equipment or possible injury or death to personnel.

1. Grade or fill entire site until grade is 10% or less.
2. Grade or fill entire site until side slope is 8% or less.
3. Remove large stones and fill in low spots until launch and retrieval areas are reasonably flat.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

BEB LAUNCH USING CBT

WARNING

Prior to performing transporter operations, ensure a site survey is conducted. Failure to meet all site requirements for a given launch method may result in injury or death to personnel and damage to equipment.

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

When launching boat, side to side slope must not exceed 8% or 5 degrees. Failure to comply may result in injury or death to personnel and damage to equipment.

Prior to launch, the hull drain plug must be installed. Failure to comply may result in injury or death to personnel and damage to equipment.

NOTE

This work package covers boat launch instructions using the Common Bridge Transporter (CBT) and Improved Boat Cradle (IBC). Launch instruction using M945 or M812 trucks with boat cradle is not provided.

SITE REQUIREMENTS

In order to launch boat and construct a bridge or raft, it is necessary to locate a site based on a list of technical site requirements. The operator/crew must understand and observe the following site requirements when performing BEB launch.

1. Ensure launch site conditions exist for deployment of boat. Refer to WP 0009 00. If launch site conditions do not meet requirements, notify supervisor.
2. Ensure launch site requirements and authorized layout exists for deployment of boat. Refer to WP 0009 00. If launch site does not meet requirements, notify supervisor.

BEB LAUNCH USING CBT (Contd)

BOAT PREPARATION

CAUTION

If boat is equipped with depth sounder, remove depth sounder prior to launch of boat or damage to equipment may result.

NOTE

If cab is present, ensure that cab is mounted prior to launch. Operator and crew will help prepare boat for launch.

1. Remove tie down line (2) from cab (3).
2. Position cab (3) over forward compartment using lifting handles (4).
3. Align and close cab fasteners (5).
4. Connect windshield wiper electrical plug (6) to receptacle on control console (1).

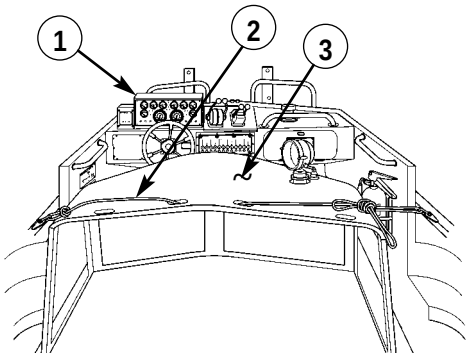
WARNING

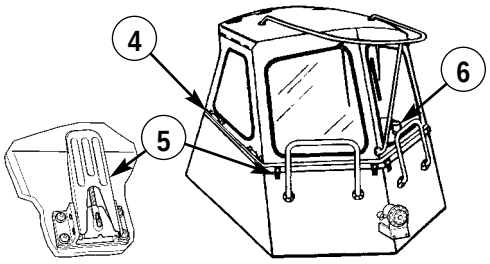
Prior to launch the hull drain plug must be installed. Failure to comply may result in injury or death to personnel and damage to equipment.

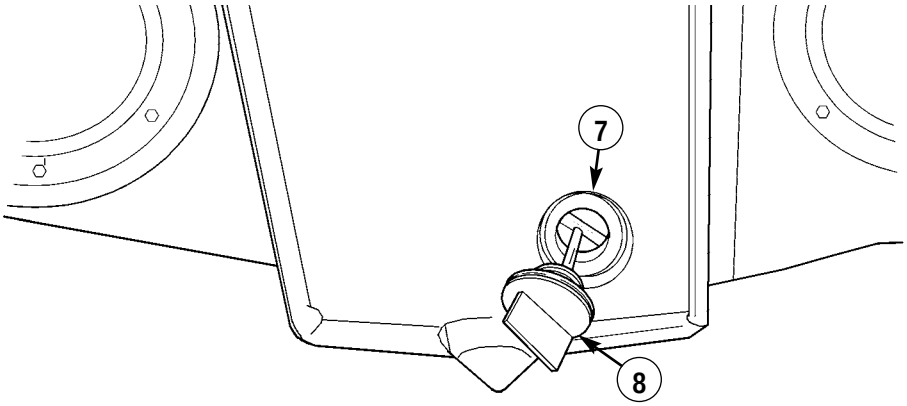
5. Ensure drain plug (8) is installed in hull drain hole (7).

BEB LAUNCH USING CBT (Contd)

BOAT PREPARATION (CONTD)







BEB LAUNCH USING CBT (Contd)

LAUNCHING BOAT

WARNING

Ensure that IBC hook safety plate is installed on hook. Failure to comply may result in injury to personnel or damage to equipment.

All personnel must wear approved life jackets and unblouse pants from boots while on the boat. Failure to comply may result in possible injury or death to personnel.

NOTE

During all transporter operations, the CBT operator will drive and be responsible for the operation of the Load Handling System (LHS) by means of the cab or remote control boxes. The assistant will act as a ground guide, responsible for directing the operator by using hand signals (WP 0007 00), and assist the CBT operator as needed.

For transporter operation, refer to TM 5-5420-234-14&P.

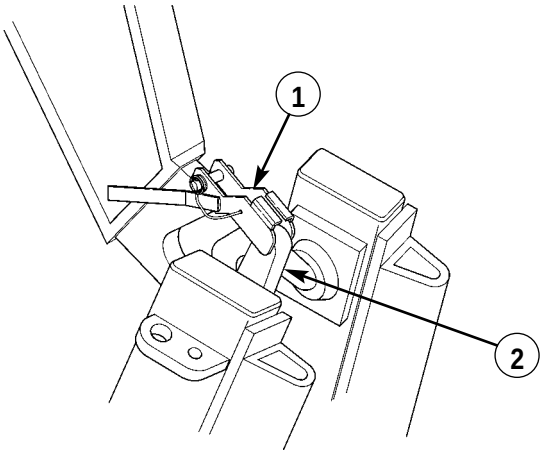
1. Install IBC hook safety plate (1) to CBT hook arm (2).
2. Transporter operator, set parking brake (3) on transporter (4).
3. Ground guide and boat crewmembers, remove front and rear side tie down cables (6) and (5) from port and starboard sides of cradle (8) and boat (7). Stow tie down cables (6) and (5) in boat aft cockpit.

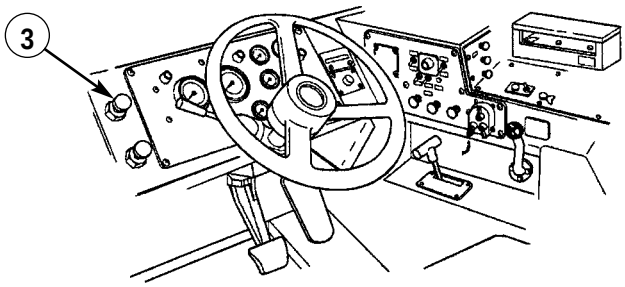
WARNING

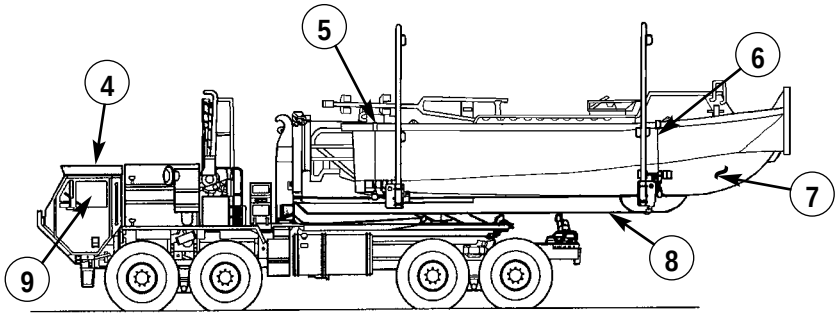
Transporter personnel will ensure both cab windows are fully opened, life jacket is being worn, and seatbelt is not being used by operator before entering water. Failure to comply may result in possible injury or death to personnel.

4. Transporter operator, open both windows (9) on transporter (4). Windows (9) must be in fully opened position, life jacket must be worn, and operator must not wear seat belt during launching procedures.
5. Post ground guide forward and aft of transporter (4).

BEB LAUNCH USING CBT (Contd)







BEB LAUNCH USING CBT (Contd)

LAUNCHING BOAT (Contd)

CAUTION

The high idle switch must be in the OFF position prior to moving the LHS MODE SELECTION switch. If the MODE SELECTION switch is moved during high idle sudden application of hydraulic pressure to the LHS may result in damage to equipment.

NOTE

Front ground guide will inform transporter operator when it is safe to begin operations.

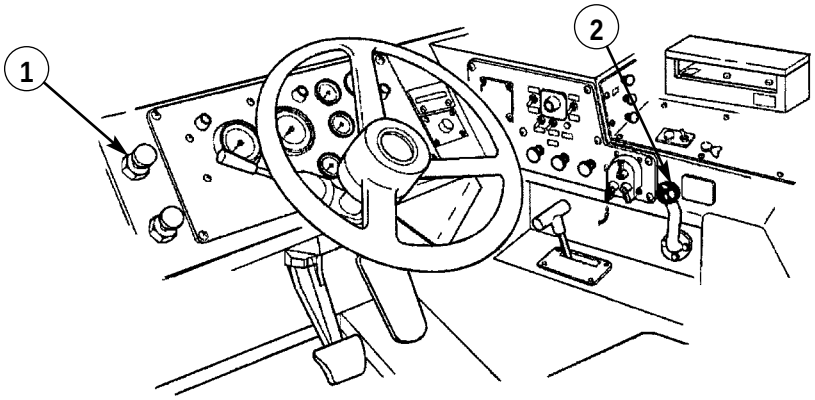
6. Transporter operator, place transmission in N (neutral) position.
7. Transporter operator, place transfer case shift lever (2) in LO position.
8. Transporter operator, release parking brake (1).
9. Transporter operator, place transmission in R (reverse) position.

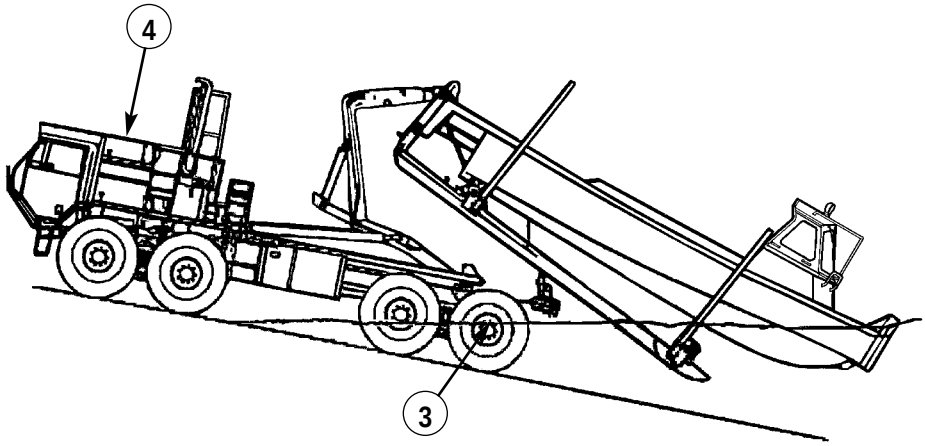
NOTE

Ground guide will signal transporter to stop when top of rear wheel hubcap becomes even with water level.

10. Transporter operator, back transporter (4) into water, stop when top of rear wheel hubcap (3) becomes even with water level.
11. Transporter operator, set parking brake (1).

BEB LAUNCH USING CBT (Contd)





BEB LAUNCH USING CBT (Contd)

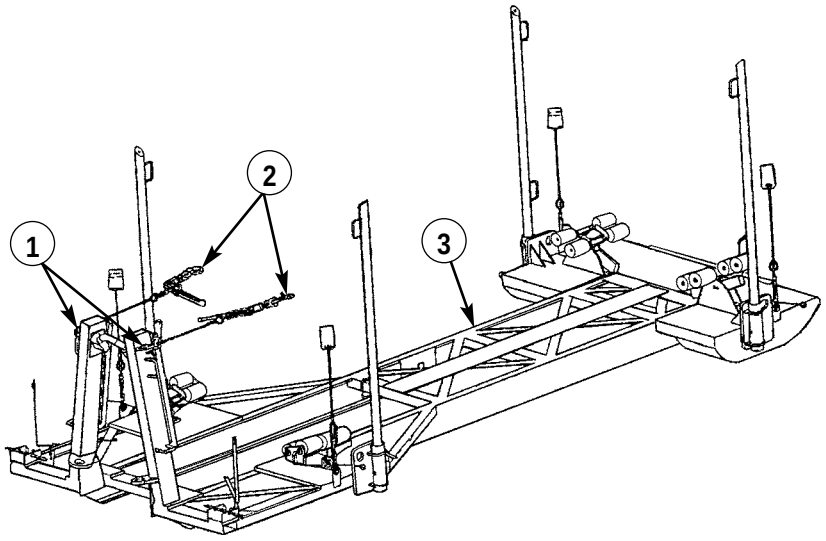
LAUNCHING BOAT (Contd)

12. Transporter operator, place PTO ENGAGE switch (9) in the ON position.
13. Transporter operator, place MODE SELECTION switch (6) in the AUTO position.
14. Transporter operator, place HIGH IDLE switch (8) in the ON position.

CAUTION

BEB Engines must not be running during launching. Failure to comply may cause damage to equipment.

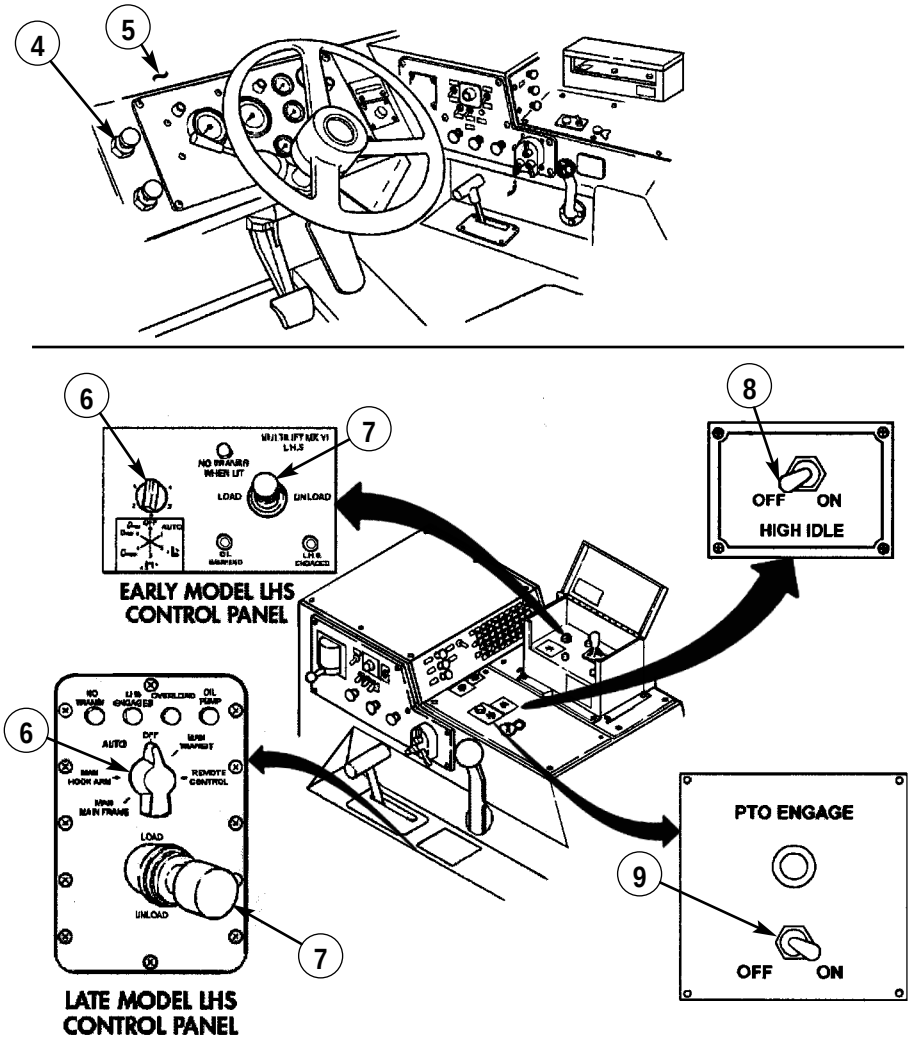
15. Ground guide signals transporter operator to place and hold joystick (7) in the UNLOAD position, until boat is floating in water.
16. Boat operator will start BEB engines (WP 0012 00).
17. Boat crew raise mast (WP 0004 00), unfastens load binder cables (2) and stows them on each side of cradle's A-frame brackets (1).



BEB LAUNCH USING CBT (Contd)

LAUNCHING BOAT (Contd)

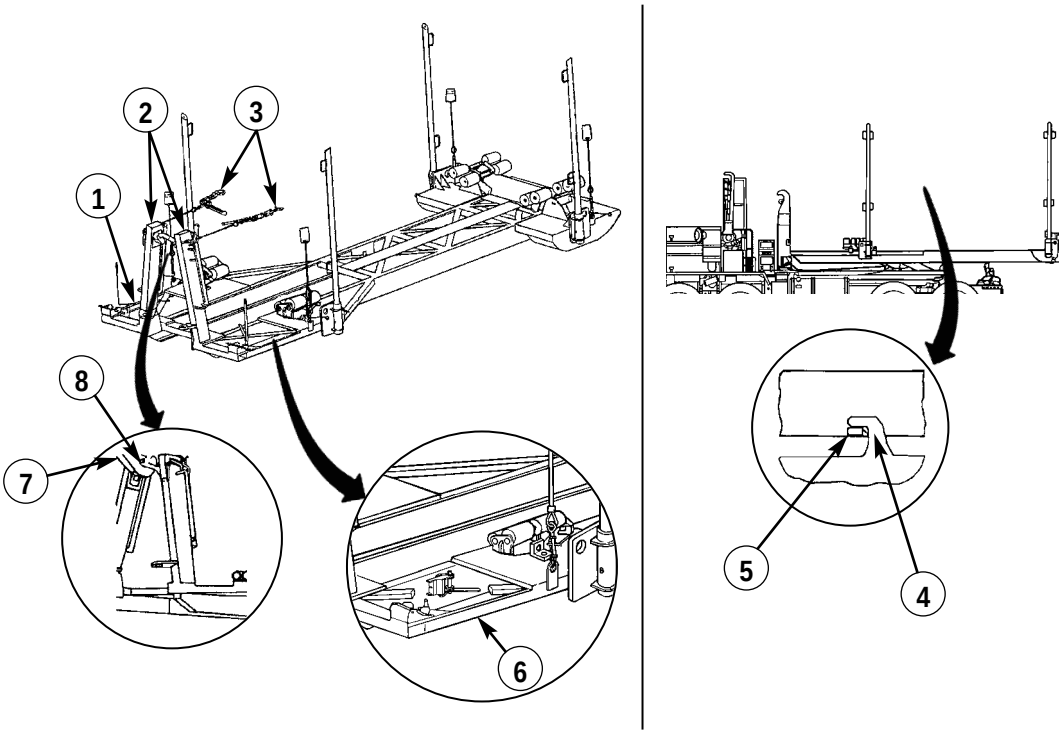
18. Boat operator will move boat forward (WP 0015 00) to desired location.
19. Ground guide signals operator to place and hold joystick (7) in LOAD position until cradle (3) is fully loaded on transporter (5).
20. Transporter operator, place HIGH IDLE switch (8) in OFF position.
21. Transporter operator, place PTO ENGAGE switch (9) in OFF position.
22. Transporter operator, place transmission in D (drive) position.
23. Transporter operator, release parking brake (4).



BEB LAUNCH USING CBT (Contd)

LAUNCHING BOAT (Contd)

24. Ground guide signals transporter operator to drive forward and stop at safe location to inspect cradle (1). Ensure cradle locking tabs (5) are engaged into transporter frame (4).
25. Stow safety hook plate (6) to cradle (1).
26. Ensure hook bar (8) is secured and hooked into hook arm (7).
27. Ensure two load binder cables (3) are secured to cradle A-frame bracket (2).



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

BEB RETRIEVAL USING CBT

WARNING

Prior to performing transporter operations, ensure a site survey is conducted. Failure to meet all site requirements for a given launch method may result in possible injury or death to personnel and damage to equipment.

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

When retrieving boat, side to side slope must not exceed 8% or 5 degrees. Failure to comply may result in possible injury or death to personnel and damage to equipment.

NOTE

This work package covers boat retrieval instructions using the CBT and IBC. Retrieval instructions using M945 or M812 trucks is not covered.

SITE REQUIREMENTS

In order to launch boat and construct a bridge or raft, it is necessary to locate a site based on a list of technical site requirements. The operator/crew must understand and observe the following site requirements when performing BEB retrieval.

1. Ensure launch site conditions exist for deployment of boat. Refer WP 0009 00. If launch site conditions do not meet requirements, notify supervisor.
2. Ensure launch site requirements and layouts exist for deployment of boat. Refer to WP 0009 00. If launch site conditions do not meet requirements, notify supervisor.

BEB RETRIEVAL USING CBT (Contd)

RETRIEVE BOAT

WARNING

The stanchion poles weigh 60 lbs. (27.24 kg) each and require two personnel to remove them from their pockets. Failure to follow this warning may result in injury to personnel or damage to equipment.

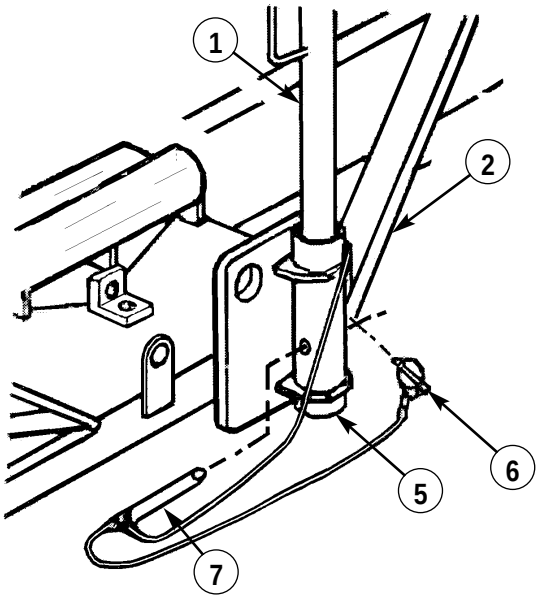
NOTE

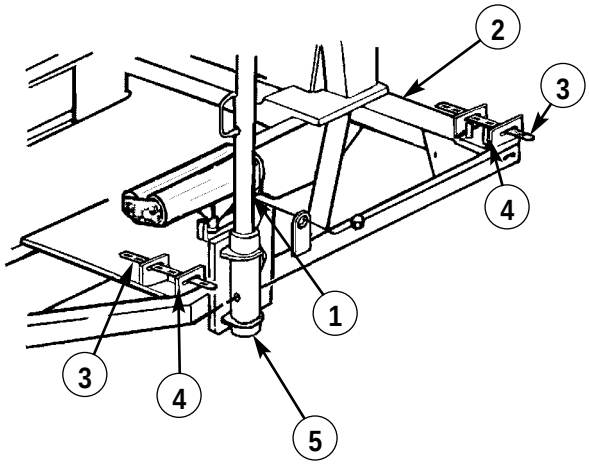
During all transporter operations, the CBT operator will drive and be responsible for the operation of the Load Handling System (LHS) by means of the cab or remote control boxes. The assistant will act as a ground guide, responsible for directing the operator by using hand signals (WP 0007 00), and assist the operator as needed.

For transporter operation, refer to TM 5-5420-234-14&P.

1. Remove front and rear stanchions poles (1) from pockets (5) on upstream side of cradle (2).
   a. While assistant holds stanchion pole (1), remove ring pin (6) from straight pin (7). Remove straight pin (7) from stanchion pole (1), and pocket (5).
   b. Lift and remove stanchion poles (1) from pockets (5) and place into storage brackets (4). Secure with two straps (3).
   c. Place straight pin (7) into pocket (5) and secure with ring pin (6).

BEB RETRIEVAL USING CBT (Contd)





BEB RETRIEVAL USING CBT (Contd)

RETRIEVE BOAT (Contd)

WARNING

Transporter personnel will ensure both cab windows are fully opened, and seatbelt is not being used by operator before entering water. Failure to comply may result in possible injury or death to personnel.

CAUTION

If depth sounder is installed, remove depth sounder prior to retrieval of boat or damage to equipment may result.

When retrieving boat from fast moving water, ensure cradle is in-line with transporter. CBT driver may need to reposition CBT to correct alignment.

The high idle switch must be in the OFF position prior to moving the LHS MODE SELECTION switch. If the MODE SELECTION switch is moved during high idle sudden application of hydraulic pressure to the LHS may result in damage to equipment.

NOTE

Front ground guide will inform transporter operator when it is safe to begin operations.

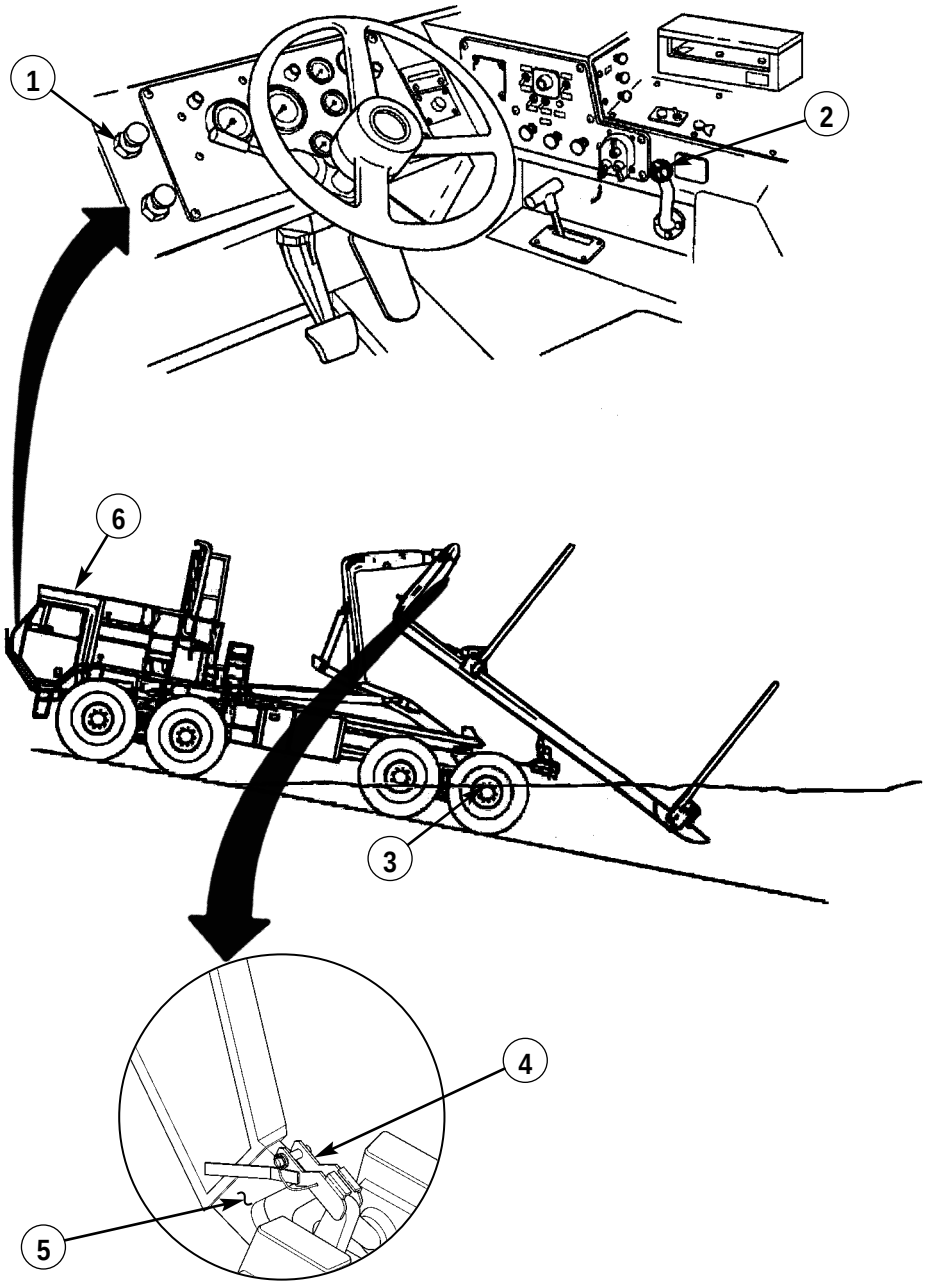
2. Install hook safety plate (4) to CBT hook arm (5).
3. Transporter operator, place transmission in N (neutral) position.
4. Transporter operator, place transfer case shift lever (2) in LO position.
5. Transporter operator, release parking brake (1).
6. Transporter operator, place transmission in R (reverse) position.

NOTE

Ground guide will signal transporter to stop when top of rear wheel hubcap becomes even with water level.

7. Transporter operator, back transporter (6) into water, stop when top of rear wheel hubcap (3) becomes even with water level.
8. Transporter operator, set parking brake (1).

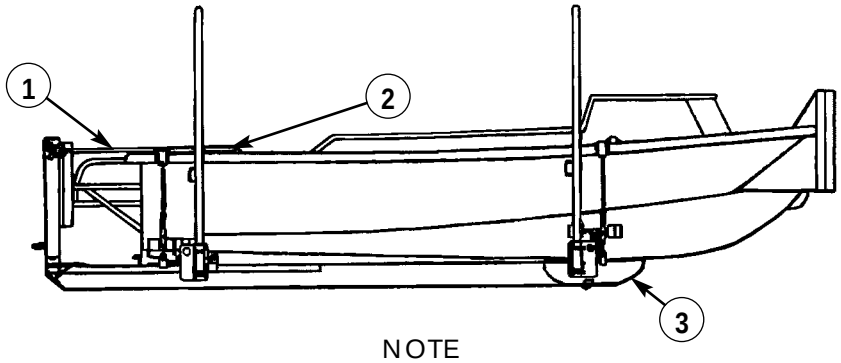
BEB RETRIEVAL USING CBT (Contd)



BEB RETRIEVAL USING CBT (Contd)

RETRIEVE BOAT (Contd)

9. Transporter operator, place PTO ENGAGE switch (7) in ON position.
10. Transporter operator, place MODE SELECTION switch (9) in AUTO position.
11. Transporter operator, place HIGH IDLE switch (6) in ON position.
12. Ground guide signals transporter operator to place and hold joystick (8) in UNLOAD position, until cradle is in place.
13. Boat crew members will lower mast (WP 0004 00).



NOTE

Once BEB is aligned to center of stanchions, idle engines down to 1,100 RPM to maneuver into cradle.

14. Boat operator will back boat into position on cradle (WP 0028 00).
15. Boat crewmembers will fasten load binder cables (1) to boat aft lifting eyes (2).

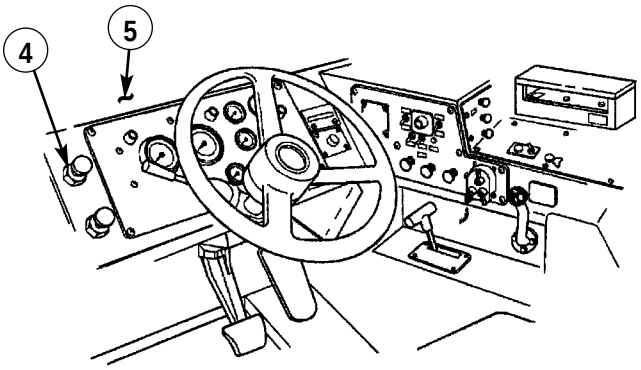
CAUTION

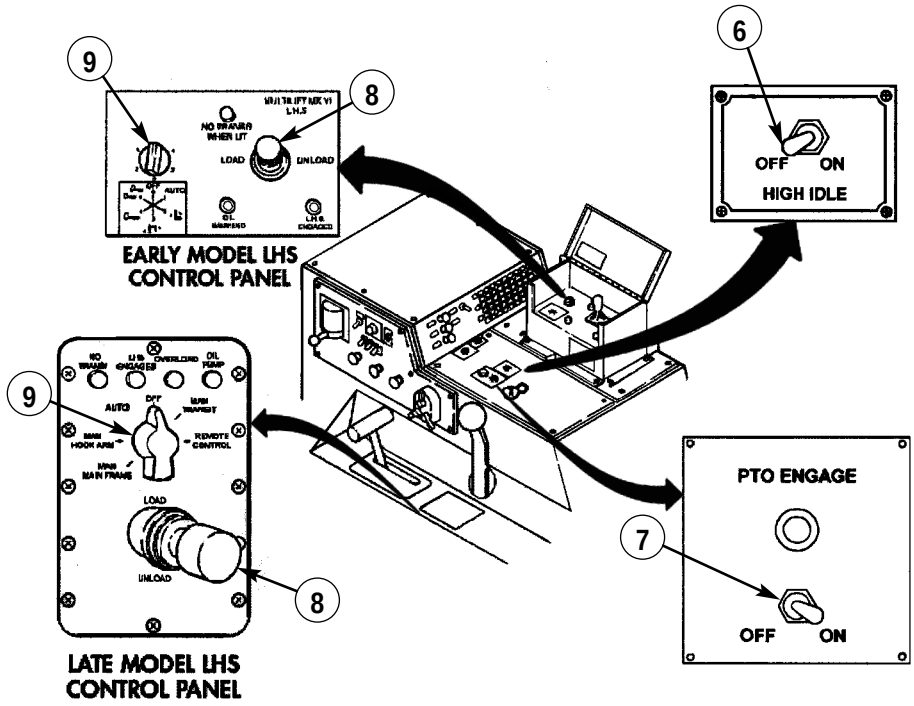
Engines must not be running during retrieval. Failure to comply may cause damage to equipment.

Ensure scoop reverse deflectors are in full up position prior to boat retrieval or damage to deflectors may result.

16. Boat operator will put scoop reverse deflector control levers in full up position, refer to WP 0004 00, and stop engines. Refer to WP0013 00.
17. Ground guide signals operator to place and hold joystick (8) in LOAD position until cradle (3) is fully loaded on transporter (5).
18. Transporter operator, place HIGH IDLE switch (6) in OFF position.
19. Transporter operator, place PTO ENGAGE switch (7) in OFF position.
20. Transporter operator, place transmission in D (drive) position.
21. Transporter operator, release parking brake (4).

BEB RETRIEVAL USING CBT (Contd)

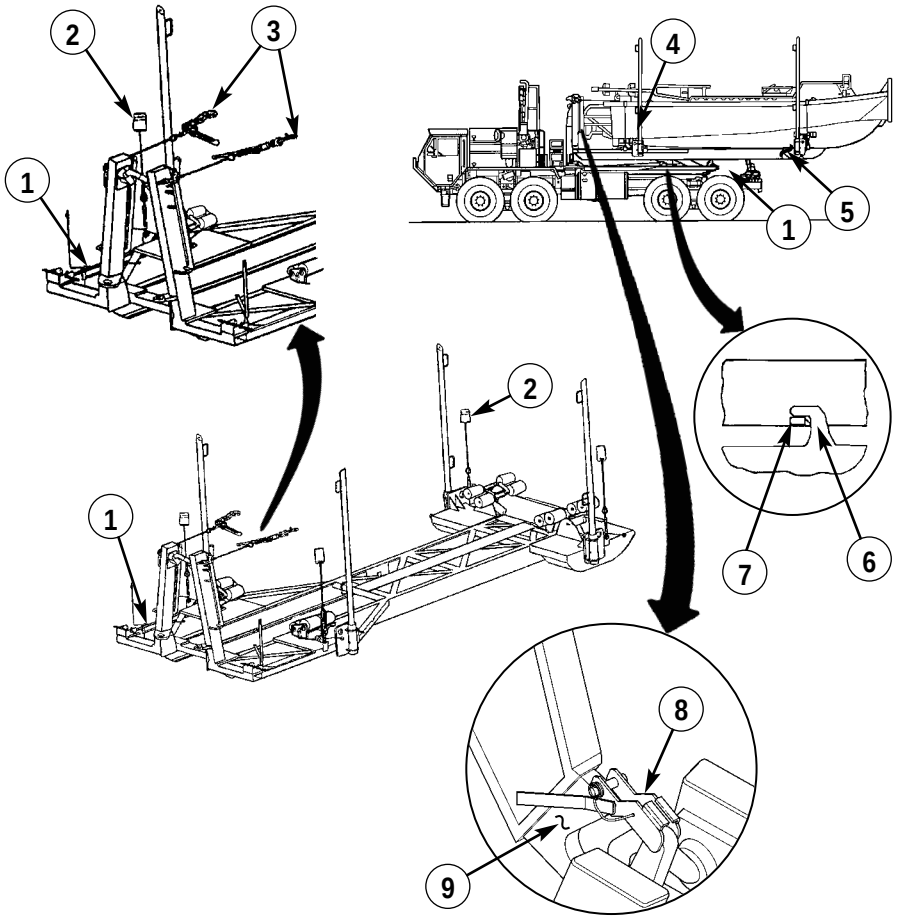




BEB RETRIEVAL USING CBT (Contd)

RETRIEVE BOAT (Contd)

22. Ground guide signals transporter operator to drive forward and stop at safe location to inspect cradle (1). Ensure cradle locking tabs (7) are engaged into transporter frame (6).
23. Connect four tiedown cables (2) to boat (5).
24. Remove hook safety plate (8) from hook arm (9) and place in stowed position on cradle (1).
25. Ensure two load binder cables (3) are secured to boat lifting eyes (4).



BEB RETRIEVAL USING CBT (Contd)

RETRIEVE BOAT (Contd)

26. Disconnect windshield wiper electrical plug (15) from receptacle on control console (1).
27. Release cab fasteners (16), and place cab (12) on floor of forward cockpit (13).
28. Stow cab (12) in forward cockpit (13) using lifting handles (14).
29. Secure cab (12) to floor of forward cockpit (13) with rope (11).

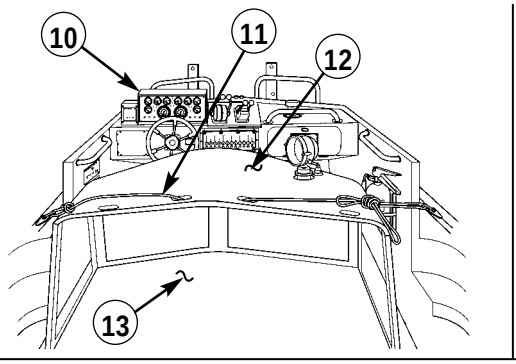
WARNING

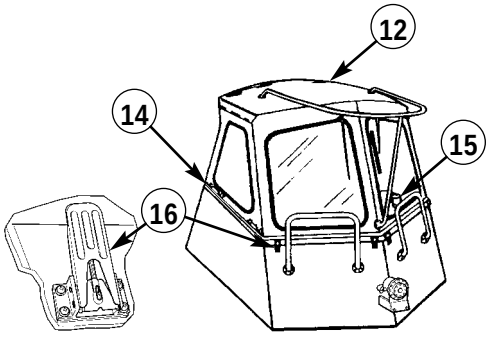
Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal, and military regulation. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

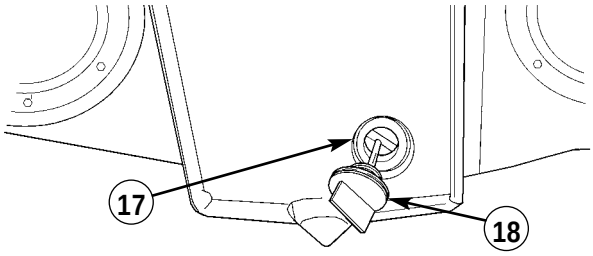
CAUTION

After retrieval operation and boat is secured to cradle hull drain plug must be removed to drain excess water from hull and to avoid possible accumulation of rainwater buildup within the hull. Failure to comply may result in damage to equipment.

30. Remove hull drain plug (18) from hull drain hole (17).





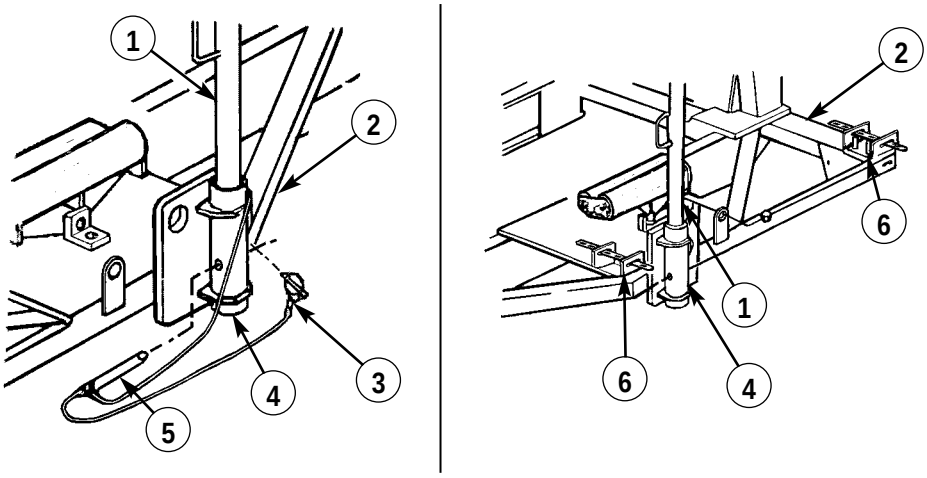


BEB RETRIEVAL USING CBT (Contd)

WARNING

The stanchion poles weigh 60 lbs. (27.24 kg) each and require two personnel to remove them from their pockets. Failure to follow this warning may result in injury to personnel or damage to equipment.

31. Remove stanchion poles (1) from storage brackets (6) on cradle (2).
    a. Lift and remove stanchion poles (1) from storage brackets (6) and place into pockets (4).
    b. Place straight pin (5) into pocket (4) and secure with ring pin (3).



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

STARTING ENGINES

STARTING ENGINES (PRE-LAUNCH START-UP AND NORMAL)

WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

Hearing protection is required during operation. Failure to comply may result in injury to personnel.

CAUTION

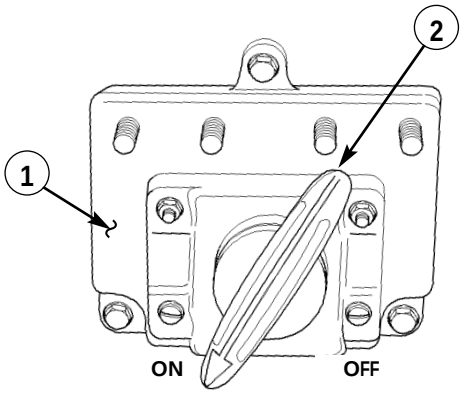
The engines must not be operated out of water, or in water with the transmissions in neutral position, for more than 10 minutes at idle speed. Ensure engine temperature does not rise above 210° F (99° C). Failure to comply may cause serious engine damage.

Do not use the electric bilge pumps for longer than 1 minute unless the engines are running. Without the engines running, the bilge pumps will run down the batteries.

NOTE

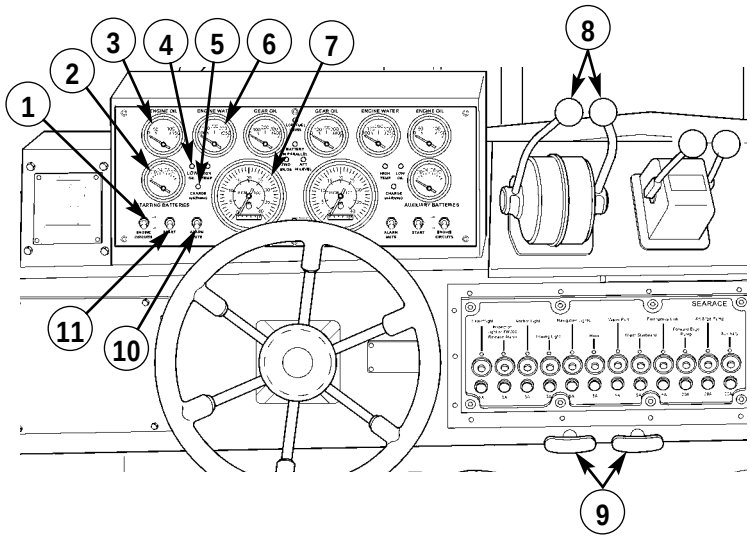
The MASTER BATTERY switch is mounted inside the battery box. The battery box hatch must be opened to gain access to the master battery switch.

1. Turn master battery switch (1) to ON position by turning handle (2) clockwise until it stops.



STARTING ENGINES (Contd)

STARTING ENGINES (NORMAL) (Contd)



WARNING

Ensure both engine throttle/transmission control levers are in neutral position prior to starting engines. The MK II-S does not have a neutral safety switch on its transmissions. Failure to comply may result injury or death to personnel and damage to equipment.

2. Place engine THROTTLE/TRANSMISSION control levers (8) in neutral position.
3. Push EMERGENCY ENGINE STOP controls (9) in.
4. Place ENGINE CIRCUIT switches (1) in ON position. Engine audible alarm will sound, and CHARGE WARNING light (5) and LOW OIL light (4) should illuminate. VOLT gauge (2) should read 25 VDC or more. Lift ALARM MUTE switch (10) up and release. This will temporarily stop audible alarm for 90 seconds.

STARTING ENGINES (Contd)

STARTING ENGINES (NORMAL) (Contd)

CAUTION

Do not start both engines at same time, as this will run down the batteries.

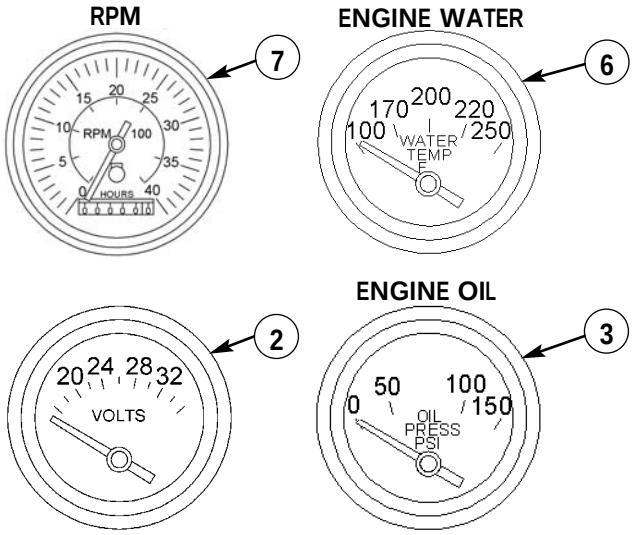
After engine starts, oil pressure must be above 20 psi. If oil pressure is not above 20 psi, shut engine down to avoid damage to equipment.

If engine fails to start after 30 seconds, release start switch and let starter motor cool for 2 minutes. Failure to comply may cause damage to equipment.

NOTE

If engines will not crank or crank slowly with main power switch ON, refer to Starting Engines In Parallel or Slave Starting BEB, WP 0037 00.

6. Hold START switch (11) up until engine starts. Release start switch (11).
7. After engine starts, observe ENGINE OIL pressure gauge (3). If gauge does not register 20 psi pressure within 10 seconds, position ENGINE CIRCUITS switch (1) to OFF position to shut down engine. Notify your supervisor if oil pressure was below 20 psi.
8. Position THROTTLE/TRANSMISSION control levers (8) until engine is idling smoothly (1,000 rpm as indicated on RPM gauge (7)).
9. Repeat steps 1–8 to start other engine. If performing pre-launch start-up, refer to WP 0013 00, and stop both engines.
10. After both engines have been started, move boat away from IBC as soon as possible.



STARTING ENGINES (Contd)

STARTING ENGINES (AFTER 4 WEEKS OF NON-USE)

WARNING

Keep the engine hatch covers closed when engines are running unless engine maintenance is being performed. Failure to comply may result in injury or death to personnel.

CAUTION

The engines must not be operated out of water, or in water with the hydrojets disengaged, for more than 10 minutes at idle speed. Ensure engine temperature does not rise above 210° F (99° C). Failure to comply may cause serious engine damage.

Do not use the electric bilge pumps for longer than 1 minute unless the engines are running. Without the engines running, the bilge pumps will run down the batteries.

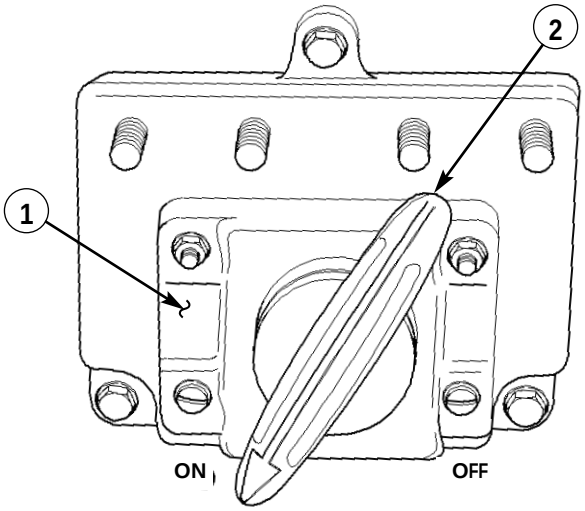
NOTE

The master battery switch is mounted inside the battery box. The battery box hatch must be opened to gain access to the master battery switch.

This procedure is used to circulate oil throughout engine before engine starts. This procedure should be used if engine has been in service for long periods, and any time engine oil has been drained.

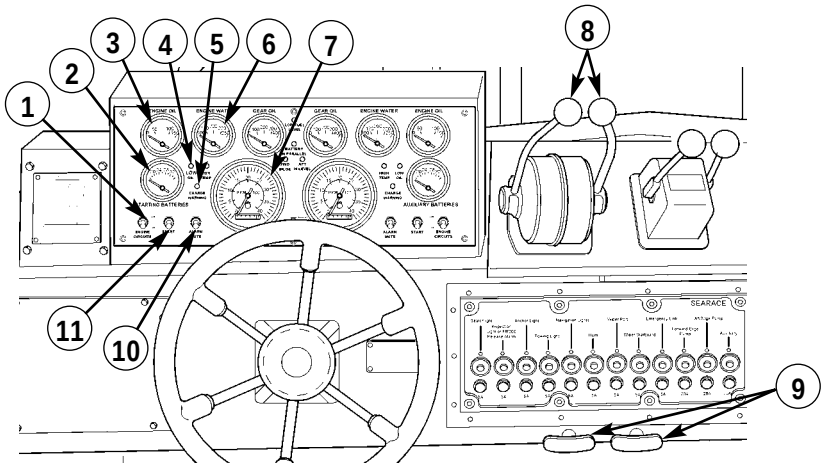
1. Turn MASTER BATTERY switch (1) to ON position turning handle (2) clockwise until it stops.

STARTING ENGINES (Contd)



STARTING ENGINES (Contd)

STARTING ENGINES (AFTER 4 WEEKS OF NON-USE) (Contd)



WARNING

Ensure both engine throttle/transmission control levers are in neutral position prior to starting engines. The MK II-S does not have a neutral safety switch on its transmissions. Failure to comply may result in injury or death to personnel and damage to equipment.

2. Place engine throttle/transmission control levers (8) in neutral position.
3. Pull emergency engine stop controls (9) out.
4. Place engine circuit switches (1) in ON position. Engine audible alarm will sound, and charge warning light (5) and low oil light (4) should illuminate. Volt gauge (2) should read 25 vdc or more. Lift alarm mute switch (10) up and release. This will temporarily stop audible alarm for 90 seconds.
5. Pull engine throttle/transmission control levers (8) outward and move levers (8) forward halfway between forward stop and neutral position.

CAUTION

Do not start both engines at same time, as this will run down the batteries.

After engine starts, oil pressure must be above 20 psi. If oil pressure is not above 20 psi, shut engine down to avoid damage to equipment.

If engine fails to start after 30 seconds, release start switch and let starter motor cool for 2 minutes.

NOTE

If engines will not crank or crank slowly with main power switch ON, refer to Starting Engines in Parallel or Slave Starting BEB, WP 0037 00.

STARTING ENGINES (Contd)

STARTING ENGINES (AFTER 4 WEEKS OF NON-USE) (Contd)

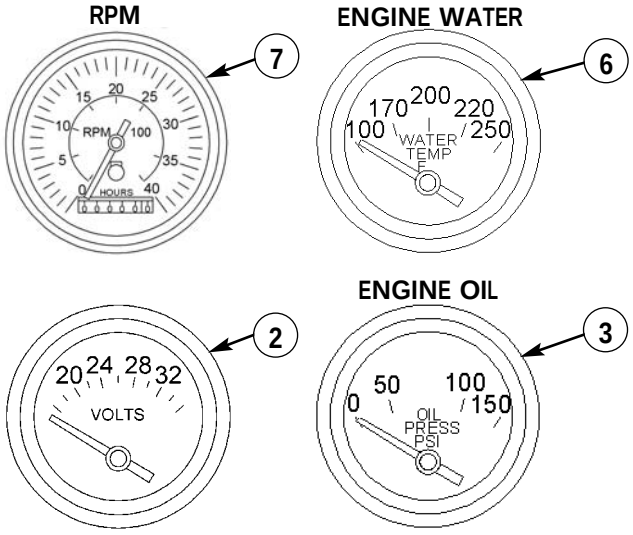
6. Hold START switch (11) up and crank engine until oil pressure starts to register on ENGINE OIL pressure gauge (3) (approximately 10 seconds). Release START switch (11).
7. Push EMERGENCY ENGINE STOP controls (9) completely in.

CAUTION

Do not start both engines at same time, as this will run down the batteries.

If engine fails to start after 30 seconds, release start switch and let starter motor cool for 2 minutes.

8. Hold START switch (11) up until engine starts. Release START switch (11).
9. Position THROTTLE/TRANSMISSION control levers (8) until engine is idling smoothly (1,000 rpm as indicated on RPM gauge (7)).
10. Repeat steps 1–9 to start other engine.
11. After both engines have been started, move boat away from IBC as soon as possible.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

STOPPING ENGINES

WARNING

Keep engine hatch covers closed when engines are running unless engine maintenance is being performed. Failure to comply may result in injury or death to personnel.

1. Place SCOOP REVERSE DEFLECTOR control levers (4) and (5) in neutral position.
2. With THROTTLE/TRANSMISSION control levers (2) and (3) in forward position, allow both engines to idle for a minimum of three to five minutes.

CAUTION

Engines must be allowed to idle for a minimum of three to five minutes to allow for sufficient cooling before shut-off. Failure to comply may result in damage to equipment.

NOTE

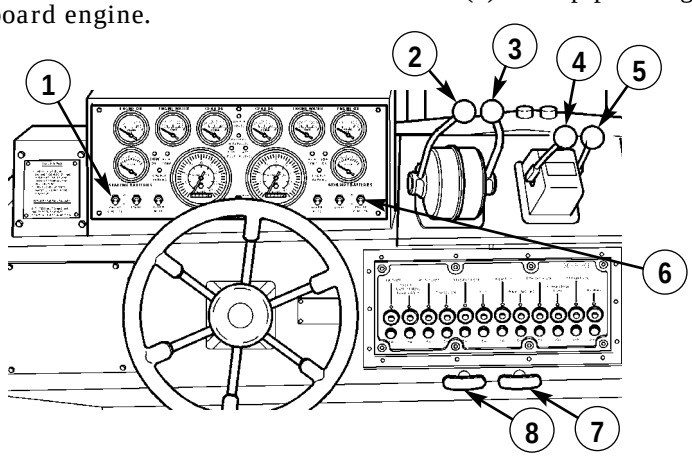
If loading on IBC, perform step 3.

3. Place THROTTLE/TRANSMISSION control levers (2) and (3) in forward position and scoop control levers (4) and (5) in forward position.
4. Place port and starboard engine CIRCUIT SWITCH (1) and (6) in OFF position.

NOTE

Perform step 5 if either engine does not shut off when placing CIRCUIT SWITCH IN OFF POSITION.

5. Pull out EMERGENCY ENGINE STOP control (8) to stop port engine or (7) to stop starboard engine.



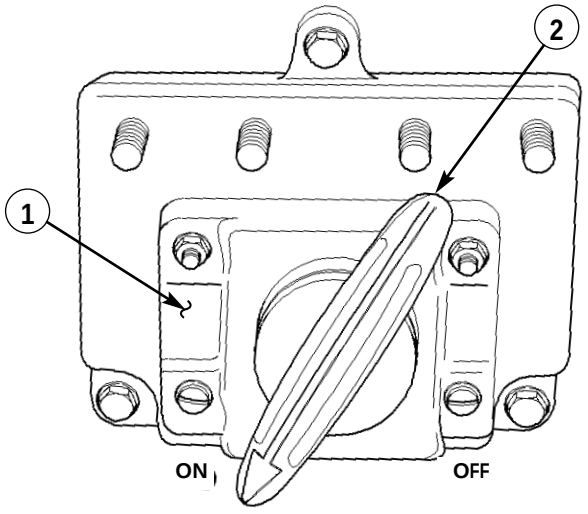
0013 00-1

STOPPING ENGINES (Contd)

NOTE

Master battery switch is mounted inside the battery box. The battery box hatch must be opened to gain access to the master battery switch.

6. Turn MASTER BATTERY switch (1) to OFF position by lifting and turning handle (2) counterclockwise until it stops.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

STEERING

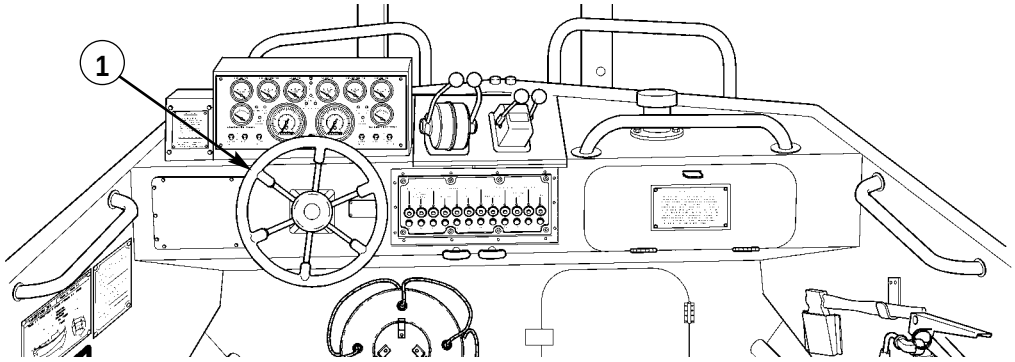
STEERING, USING STEERING WHEEL

WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

Mismatch in engine speed or scoop control position will cause the boat to steer to the port or starboard direction when the steering wheel is centered.



1. To make starboard turn while going forward, turn STEERING WHEEL (1) clockwise.
2. To make port turn while going forward, turn STEERING WHEEL (1) counterclockwise.
3. To make starboard turn while going backward, turn STEERING WHEEL (1) counterclockwise.
4. To make port turn while going backward, turn STEERING WHEEL (1) clockwise.

STEERING (Contd)

STEERING, USING STEERING WHEEL AND SCOOP REVERSE DEFLECTOR CONTROL

WARNING

Do not attempt to make turns at high engine rpm using the scoop controls. Failure to comply may result in injury or death to personnel and equipment damage.

NOTE

Using both steering wheel and scoop controls allows boat to turn within its own length.

1. To make tight turn to starboard while going forward at 1,000 rpm or less, turn STEERING WHEEL (1) fully clockwise and pull starboard SCOOP REVERSE DEFLECTOR control lever (3) back to full reverse position. Leave port SCOOP REVERSE DEFLECTOR control lever (2) in full forward position.
2. To make tight turn to port while going forward at 1,000 rpm or less, turn STEERING WHEEL (1) fully counterclockwise and pull port SCOOP REVERSE DEFLECTOR control lever (2) back to full reverse position. Leave starboard SCOOP REVERSE DEFLECTOR control lever (3) in full forward position.
3. To recover from tight turn while going forward, reduce engine rpms, position both SCOOP REVERSE DEFLECTOR control levers (2) and (3) to full forward position before completing turn, and center STEERING WHEEL (1).
4. To make tight turn to starboard while going backward, turn STEERING WHEEL (1) fully counterclockwise and push port SCOOP REVERSE DEFLECTOR control lever (2) to full forward position. Leave starboard SCOOP REVERSE DEFLECTOR control lever (3) in full reverse position.
5. To make tight turn to port while going backward, turn STEERING WHEEL (1) fully clockwise and push starboard SCOOP REVERSE DEFLECTOR control lever (3) to full forward position. Leave port SCOOP REVERSE DEFLECTOR control lever (2) in full reverse position.
6. To recover from tight turn while going backward, reduce engine rpms, position both SCOOP REVERSE DEFLECTOR control levers (2) and (3) to full reverse position before completing turn, and center STEERING WHEEL (1).

STEERING (Contd)

STEERING, USING SCOOP REVERSE DEFLECTOR CONTROLS

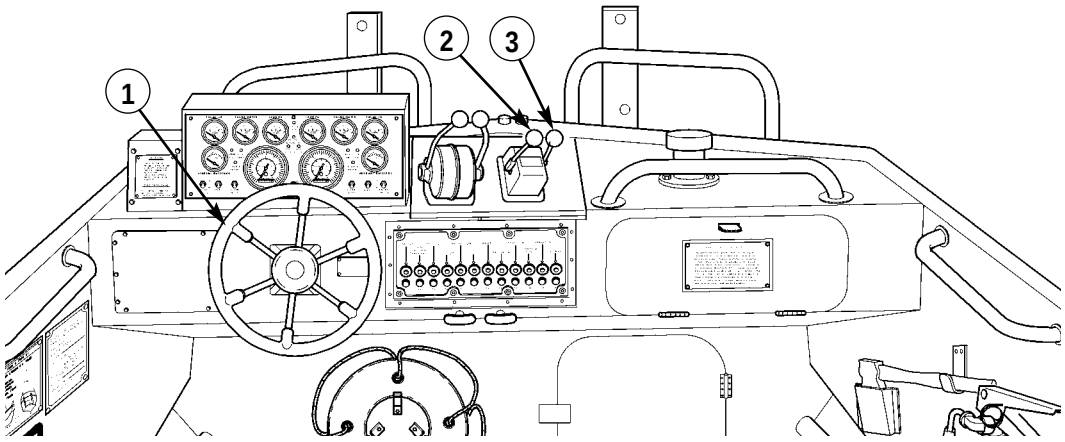
WARNING

Do not attempt to make turns at high engine rpm using the scoop controls. Failure to comply may result in equipment damage and injury or death to personnel.

NOTE

This method of steering is used at approximately 1,000 engine rpm to make slow and fine adjustments to heading. It is commonly called “inching into position.”

1. To make small starboard turn while boat is moving slowly forward, move starboard SCOOP REVERSE DEFLECTOR control lever (3) slightly back toward neutral position. Moving port SCOOP REVERSE DEFLECTOR control lever (2) slightly forward increases turn capabilities.
2. To make small port turn while boat is moving slowly forward, move port scoop REVERSE DEFLECTOR control lever (2) slightly back toward neutral position. Moving starboard SCOOP REVERSE DEFLECTOR controllever (3) slightly forward increases turn capabilities.
3. To make small starboard turn while boat is moving slowly backward, move starboard SCOOP REVERSE DEFLECTOR control lever (3) slightly forward toward neutral position. Moving lever (3) further toward neutral increases turn capabilities.
4. To make small port turn while boat is moving slowly backward, move port SCOOP REVERSE DEFLECTOR control lever (2) slightly forward toward neutral position. Moving lever (2) further toward neutral increases turn capabilities.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

FORWARD MOVEMENT

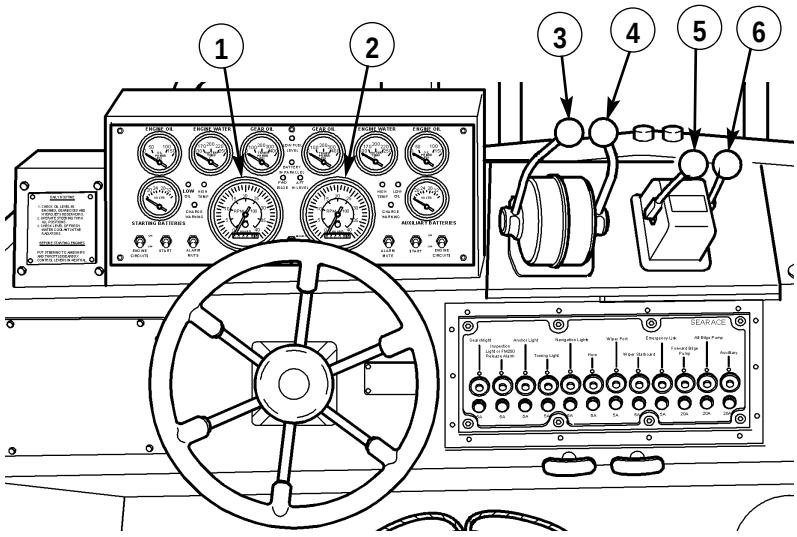
WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

The following instructions are based on the assumption that the boat has its port side toward the berth and the bow is towards the sea. If the boat has its starboard side toward the berth, the procedures are the same except the opposite controls are used.

1. Start engines (WP 0012 00).
2. Position port and starboard THROTTLE/TRANSMISSION control levers (3) and (4) in forward position to start hydrojets. Do not raise engines' rpms.
3. Position SCOOP REVERSE DEFLECTOR control levers (5) and (6) in neutral (no speed) position.



FORWARD MOVEMENT (Contd)

CAUTION

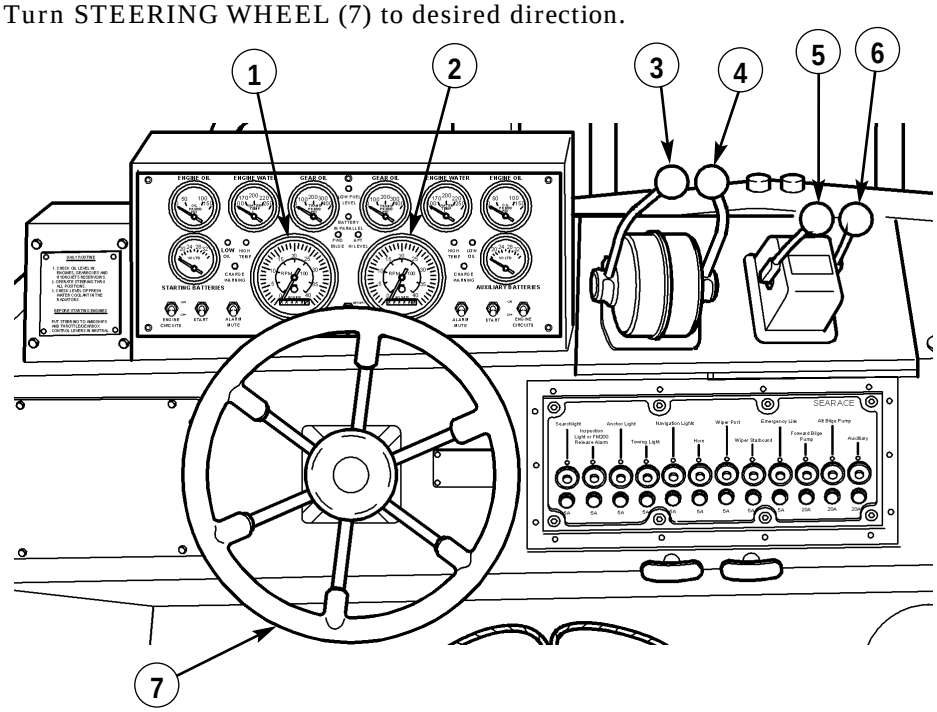
Avoid running over ropes or lines. Ropes and lines can be sucked into hydrojets. Failure to comply may result in damage to hydrojets.

4. Cast off all lines.
5. Center STEERING WHEEL (7).
6. Slowly move port and starboard THROTTLE/TRANSMISSION control levers (3) and (4) forward to raise both engines' rpms until RPM gauges (1) and (2) read 1,200 rpm.
7. Slowly place port and starboard SCOOP REVERSE DEFLECTOR control levers (5) and (6) in full forward position.

NOTE

Mismatch in engine speed or scoop control position will cause the boat to steer to the port or starboard direction when steering wheel is centered.

8. When boat has cleared berth, push port and starboard THROTTLE/TRANSMISSION control levers (3) and (4) slowly forward until both engines' rpms are at desired speed.
9. Turn STEERING WHEEL (7) to desired direction.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

REVERSE MOVEMENT

WARNING

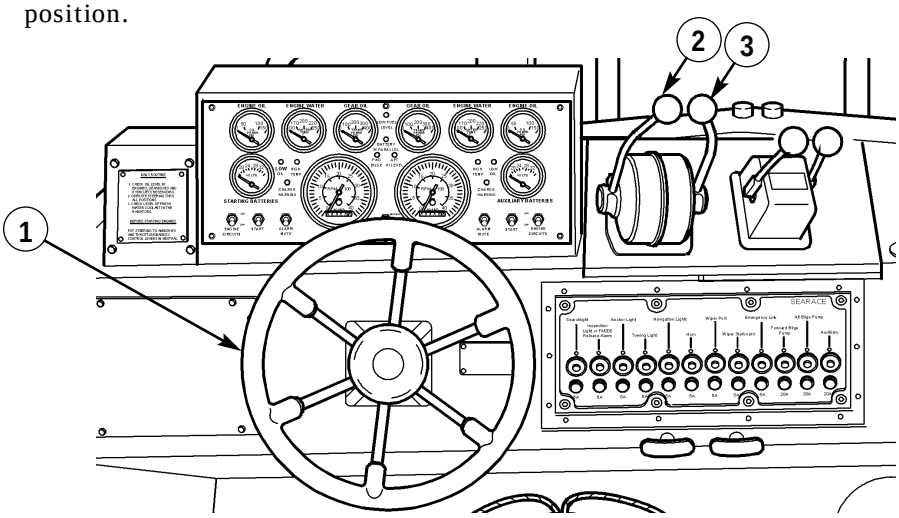
Ensure engine access hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

Operator must be aware of reverse movement speed. Reversing at high speeds or reversing into a heavy current can cause water to flow over the hydrojets and into the aft cockpit (bird bath) and may flood boat. Failure to comply may result in injury or death to personnel and damage to equipment.

NOTE

The following instructions are based on the assumption that the boat is in safe operating area and may perform the following procedures.

1. Start engines (WP 0012 00).
2. Center STEERING WHEEL (1).
3. Position THROTTLE/TRANSMISSION control levers (2) and (3) in forward position.

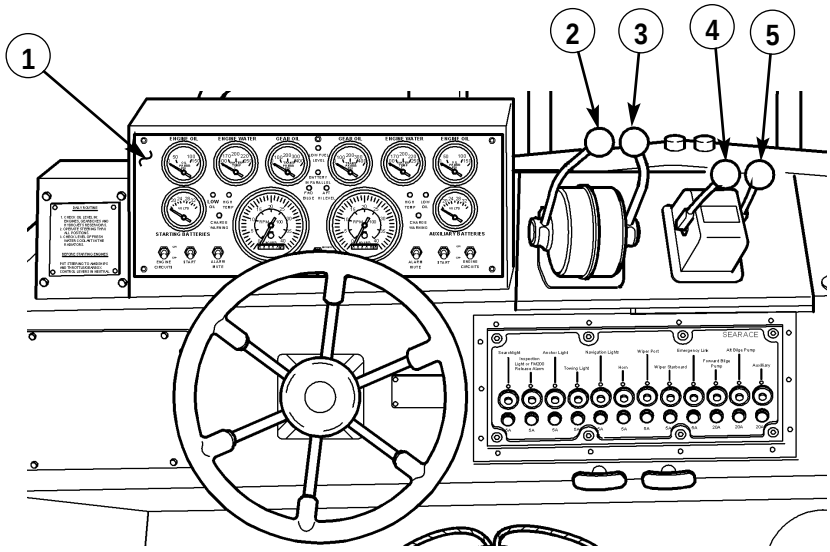


REVERSE MOVEMENT (Contd)

4. Slowly position port and starboard SCOOP REVERSE DEFLECTOR control levers (4) and (5) into neutral position.
5. Move THROTTLE/TRANSMISSION control levers (2) and (3) forward to adjust engine speed to 1200 rpm.
6. Slowly position port and starboard SCOOP REVERSE DEFLECTOR control levers (4) and (5) into reverse position.
7. To control BEB speed in reverse, raise SCOOP REVERSE DEFLECTOR control levers (4) and (5) to decrease reverse speed (push scoop controls forward) and lower SCOOPS control levers (4) and (5) to increase reverse speed (pull scoop controls aft).

NOTE

Turning the steering wheel to the starboard (right) will move the stern to the port (left) and turning the steering wheel to the port (left) will move the stern to the starboard (right).



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OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

REDUCING SPEED, FULL STOP, AND HOLD POSITION

REDUCING SPEED

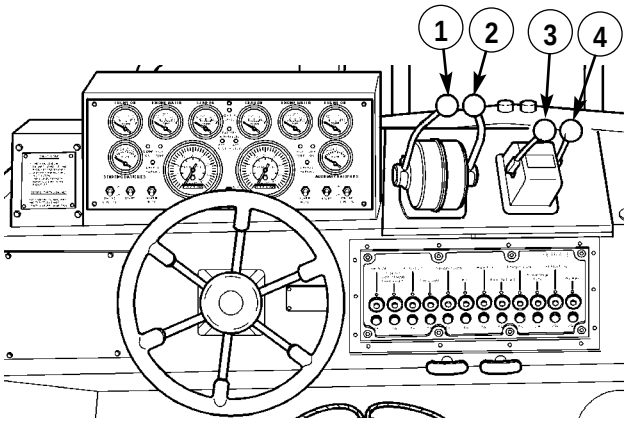
WARNING

Do not use reverse position of scoop reverse deflectors at high engine rpm. Failure to comply may result in injury or death to personnel and damage to equipment.

NOTE

The following instructions are based on the assumption that the boat is in forward movement at a high rate of speed.

1. Reducing speed:
   a. Slowly, pull back on port and starboard THROTTLE/TRANSMISSION control levers (1) and (2).
   b. Slowly, pull back on port and starboard SCOOP REVERSE DEFLECTOR control levers (3) and (4).
2. Reducing speed quickly:
   a. Quickly, pull back on port and starboard THROTTLE/TRANSMISSION control levers (1) and (2).
   b. Quickly, pull back on port and starboard SCOOP REVERSE DEFLECTOR control levers (3) and (4). After both SCOOP REVERSE DEFLECTOR control levers (3) and (4) have been pulled back, increase both engines' rpms port and starboard THROTTLE/TRANSMISSION control levers (1) and (2).



REDUCING SPEED, FULL STOP, AND HOLD POSITION (Contd)

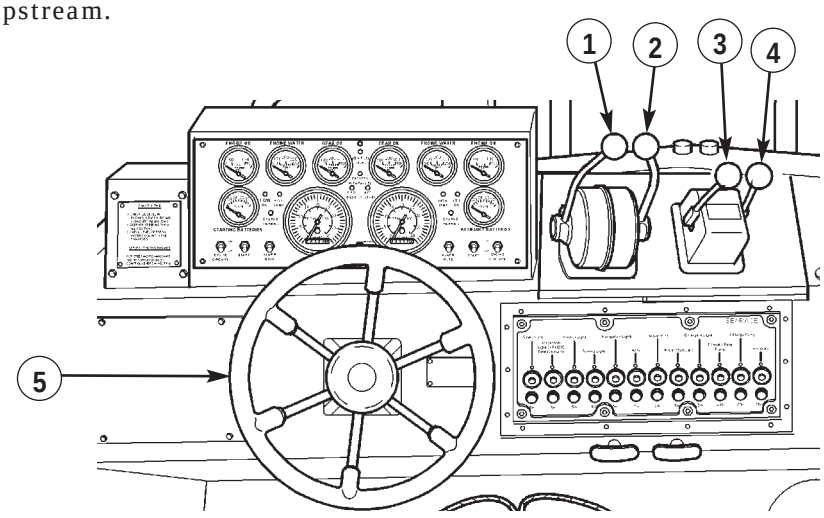
FULL STOP AND HOLDING POSITION (NO FORWARD, REVERSE, OR LATERAL MOVEMENT).

1. Center STEERING WHEEL (5).
2. Identify direction and estimate speed of river current.
3. Identify direction of wind and estimate speed of wind current.
4. Position boat into the wind or current (whichever is strongest).
5. Visually identify a fixed point directly in front of boat (establish bearing).
6. Visually identify fixed points directly to port and starboard.
7. Triangulate your position. Port and starboard fix points delineate forward or reverse movement. Fixed point off bow delineates bearing changes.
8. Using the visual reference points, increase/decrease THROTTLE/TRANSMISSION control levers (1) and (2), and increase/decrease hydrojet SCOOP REVERSE DEFLECTOR control levers (3) and (4) to maintain lateral postion, while making minor adjustments with STEERING WHEEL (5) to maintain bearing.

WARNING

The anchor line must always be tied to the bow. Ensure anchor line is positioned around a bollard to prevent line from rubbing and wearing on topsides of hull. Failure to comply may result in damage to equipment and possible injury to personnel.

9. If anchoring is required, ensure anchor line is tied to the bow and boat is facing upstream.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

POWER TURNS

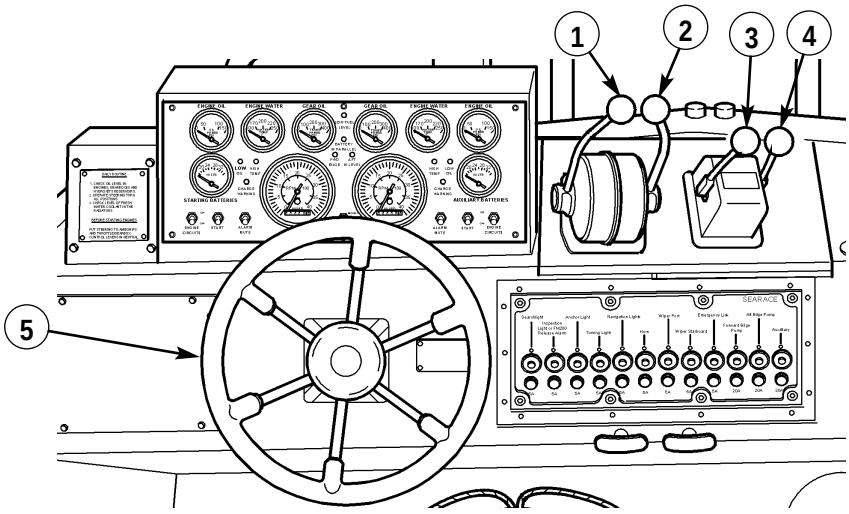
WARNING

Ensure engine access hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

The following instructions are based on the assumption that the boat is in safe operating area and may perform the following procedures.

1. Center STEERING WHEEL (5).
2. Warn all crewmembers of turn.
3. Position THROTTLE/TRANSMISSION control levers (1) and (2) to 1200 rpm.
4. Slowly push SCOOP REVERSE DEFLECTOR control levers (3) and (4) forward.
5. To make a starboard turn, view starboard and aft directions to ensure desired area is clear, turn STEERING WHEEL (5) clockwise.
6. To make port turn, view port and aft directions to ensure desired area is clear, turn STEERING WHEEL (5) counterclockwise.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

PIVOT TURNS

WARNING

Ensure engine access hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

The following instructions are based on the assumption that the boat is in safe operating area and may perform the following procedures.

1. Center STEERING WHEEL (5).
2. Position THROTTLE/TRANSMISSION control levers (1) and (2) to 1200 rpm.
3. Position SCOOP control levers (3) and (4) in full forward position.

NOTE

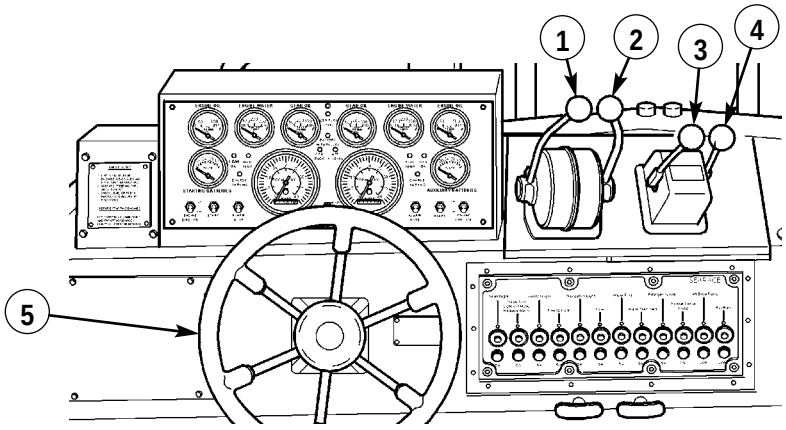
Boat will pivot on its own axis to the port side.

4. For port turn, slowly pull back on port SCOOP REVERSE DEFLECTOR control lever (3), and position lever to full reverse position.

NOTE

Boat will pivot on its own axis to the starboard side.

5. For starboard turn, slowly pull back on starboard SCOOP REVERSE DEFLECTOR control lever (4), and position lever to full reverse position.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

HIGH SPEED MOVEMENT

WARNING

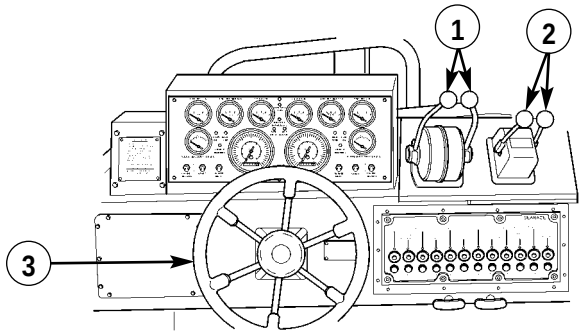
Ensure engine access hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

Never follow directly behind another boat while traveling at high speeds in case lead boat comes to an abrupt stop. Failure to comply may result in injury or death to personnel.

NOTE

Prior to high speed movement with other BEB's, all operators must be thoroughly briefed on navigation plan, surface water conditions and type of boat formation. Basic formations: Wedge (3 boats or more), Echelon Right or Left (2 boats or more) and Line (2 boats or more under 1500 rpms).

1. Center STEERING WHEEL (3).
2. Position engine THROTTLE/TRANSMISSION control levers (1) to the forward position to not raise rpms.
3. Position SCOOP REVERSE DEFLECTOR control levers (2) to full forward position.
4. Visually identify direction of forward movement (visual bearing) and view port and starboard directions for boat traffic and/or obstacles.
5. Warn all occupants of high speed movement.
6. Slowly adjust engine THROTTLE/TRANSMISSION control levers (1) to full forward position.
7. To control direction of movement, turn STEERING WHEEL (3) to port or starboard.
8. Periodically view port, bow, starboard and aft for boat traffic and obstacles.



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OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

HIGH SPEED POWER TURNS

WARNING

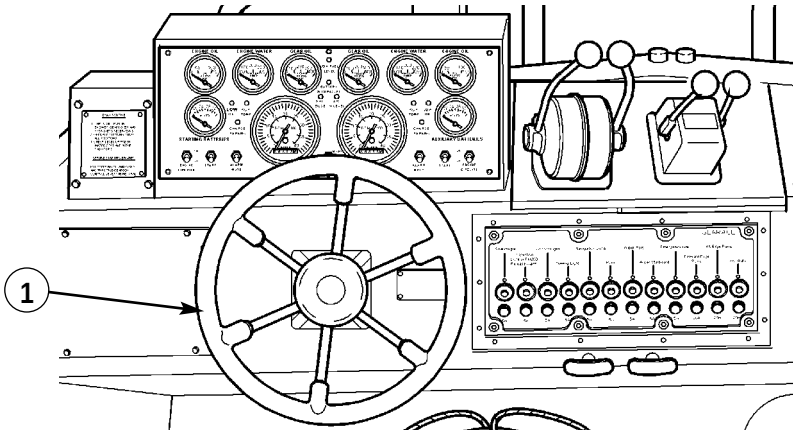
Do not drop (lower) scoop reverse deflectors during high speed movement! Failure to comply may result in injury or death to personnel and damage to equipment.

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

The following instructions are based on the assumption that the boat is in forward movement at a high rate of speed, with engine RPM above 1800.

1. Center STEERING WHEEL.
2. Warn all crewmembers of high speed turn.
3. Commence high speed movement.
4. To make a high speed starboard turn, view starboard and aft directions to ensure desired area is clear, turn STEERING WHEEL (1) clockwise.
5. To make a high speed port turn, view port and aft directions to ensure desired area is clear, turn STEERING WHEEL (1) counterclockwise.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MKII-S

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

HIGH SPEED STOP

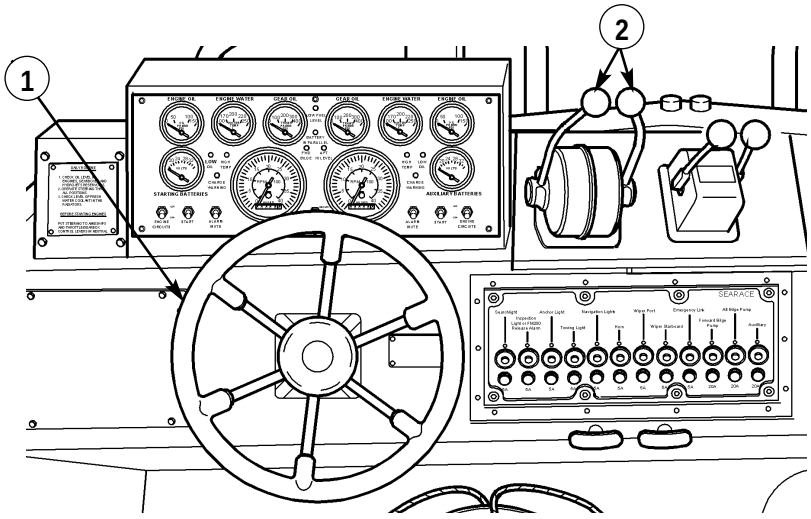
WARNING

Do not drop (lower) scoop reverse deflectors during high speed movement! Failure to comply may result in injury or death to personnel and damage to equipment.

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

High Speed Stop (engine rpms 1800 and above).

1. Center STEERING WHEEL (1).
2. Warn all crewmembers of high speed stop.
3. Grasp both engine THROTTLE/TRANSMISSION control levers (2), rapidly reduce engine rpm by moving both control levers to idle position.
4. Operator must be aware of water flow over hydrojets and into the aft cockpit (bird bath) during high speed stop. To avoid water flow over hydrojets, increase engine rpm speed by slowly moving THROTTLE/TRANSMISSION control levers (2) forward.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

COLLISION AVOIDANCE

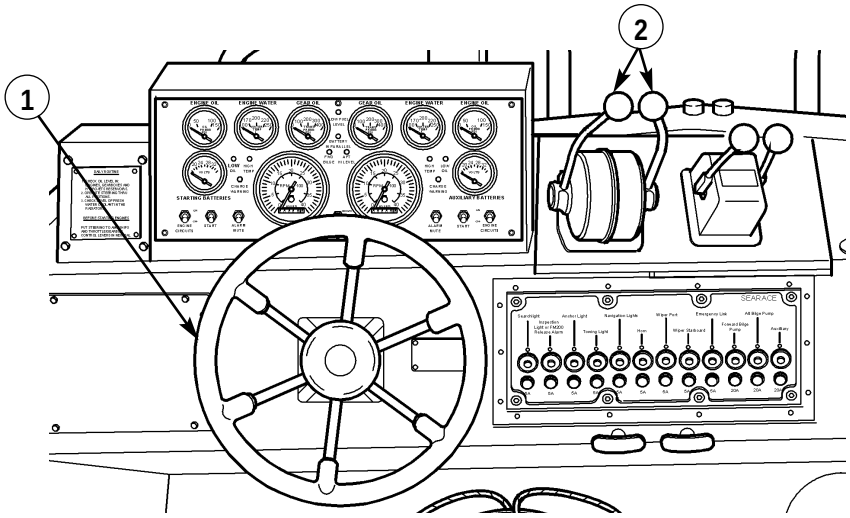
WARNING

Do not drop (lower) scoop reverse deflectors during high speed movement! Failure to comply may result in injury or death to personnel and damage to equipment.

To minimize the possibility of a collision with another watercraft, do not operate in wake. Failure to comply may result in injury or death to personnel and damage to equipment.

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

1. View in direction of avoidance, turn STEERING WHEEL (1) to a clear area away from all other boats or obstacles.
2. Grasp both engine THROTTLE/TRANSMISSION control levers (2), rapidly reduce engine rpm by moving both control levers to idle position at the same time, while turning STEERING WHEEL (1) hard-over to port or starboard direction to avoid a collision.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

CLEARING HYDROJET INLET GRILLS

WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

CAUTION

Use the following procedure only for clearing the hydrojet inlet grills. Do not use this procedure to maneuver the boat, or damage to hydrojets could occur.

NOTE

If heavy debris is in hydrojet intake grill, it may be necessary to repeat the following steps until debris is cleared from hydrojet inlet grills.

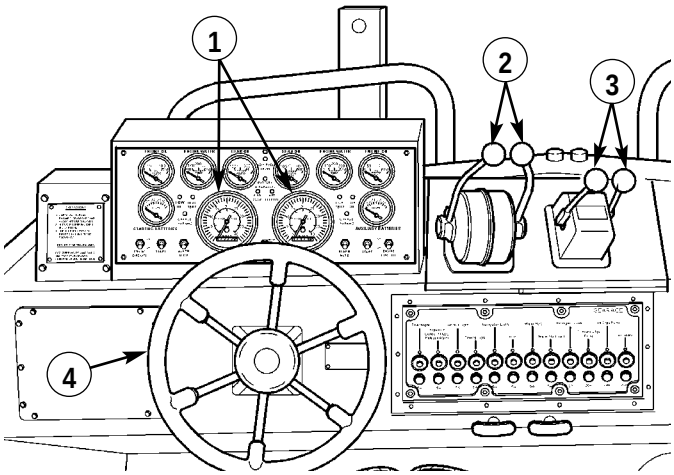
CLEARING HYDROJET INLET GRILLS (Contd)

1. Start engines (WP 0012 00).
2. Place engine THROTTLE/TRANSMISSION control levers (2) in neutral position.
3. Place THROTTLE/TRANSMISSION control levers (2) in forward position at 1,000 rpm.
4. Slowly push SCOOP REVERSE DEFLECTOR control levers (3) fully forward.
5. While viewing RPM gauges (1), position THROTTLE/TRANSMISSION control levers (2) in reverse and quickly raise RPM gauges (1) to read approximately 1,700 rpm for no longer than one or two seconds, then lower rpm to approximately 1,000 rpm.
6. Place THROTTLE/TRANSMISSION control levers (2) in neutral position.
7. Position THROTTLE/TRANSMISSION control levers (2) in the forward position to start the hydrojets.
8. Center steering wheel (4).
9. Increase engine rpm to 1,000 rpm by moving both THROTTLE/TRANSMISSION control levers (2) slowly forward.

NOTE

Any mismatch in engine speed or scoop control position will cause the boat to steer to the port or starboard direction when steering wheel is centered.

10. Slowly push SCOOP REVERSE DEFLECTOR control levers (3) forward to full forward position.
11. To increase forward motion, increase engine rpm speed by moving THROTTLE/TRANSMISSION control levers (2) forward.
12. Adjust THROTTLE/TRANSMISSION control levers (2) until RPM gauges (1) for both engines read equal.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

GETTING UNDERWAY FORWARD FROM BERTH

WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

1. Start engines (WP 0012 00).

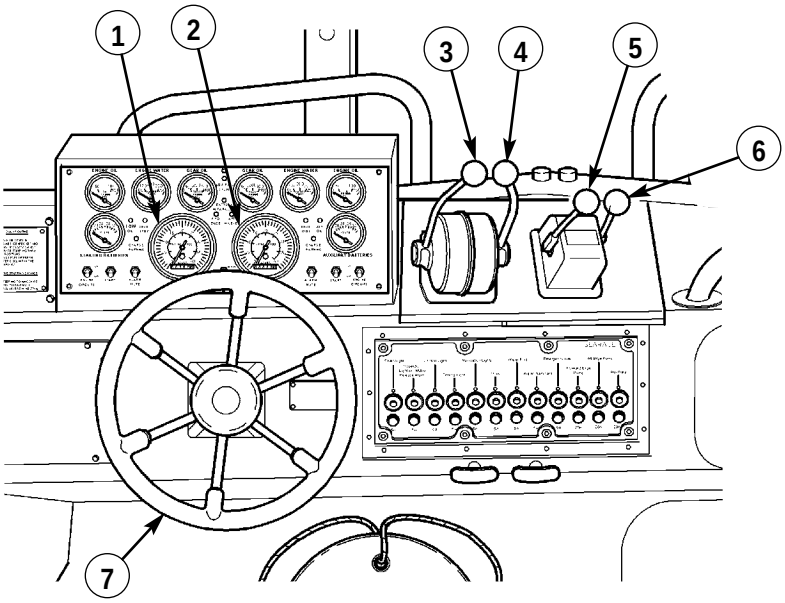
CAUTION

Avoid running the boat over ropes or lines. Ropes and lines can be sucked into hydrojets. Failure to comply may damage hydrojets.

2. Cast off all lines.

GETTING UNDERWAY FORWARD FROM BERTH (Contd)

3. Turn STEERING WHEEL (7) so boat will travel in a straight direction.
4. Push port and starboard THROTTLE/TRANSMISSION control levers (3) and (4) to forward position and raise engine rpm until RPM gauges (1) and (2) read 1,000 rpm.
5. Slowly place port and starboard SCOOP control levers (5) and (6) into forward position.
6. When boat has cleared berth, push port and starboard THROTTLE/TRANSMISSION control levers (3) and (4) slowly forward until both engine rpms are at desired speed.
7. Turn STEERING WHEEL (7) to desired direction.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

GETTING UNDERWAY ASTERN FROM BERTH

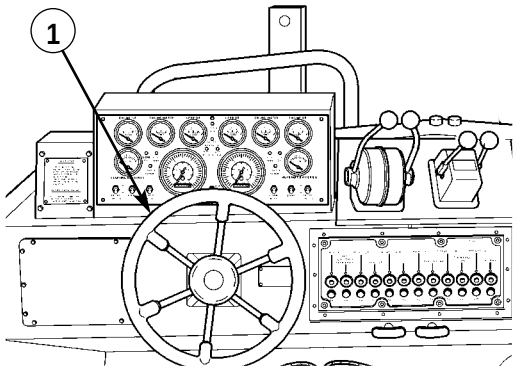
WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

The following procedure is performed with port side toward berth and bow toward sea. If starboard side is toward berth, the procedure is the same except the opposite steering direction and scoop and throttle/transmission controls are used.

1. Start engines (WP 0012 00).



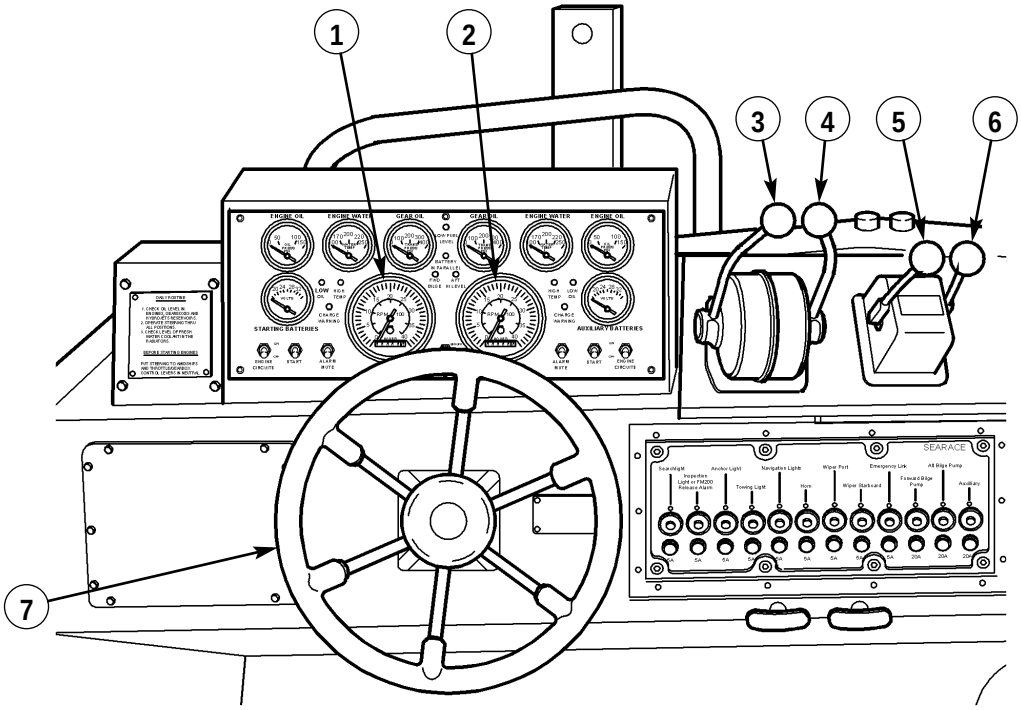
CAUTION

Avoid running the boat over ropes or lines. Ropes and lines can be drawn into hydrojets. Failure to comply may result in damage to hydrojets.

2. Cast off all lines.
3. Turn STEERING WHEEL (1) to starboard direction.

GETTING UNDERWAY ASTERN FROM BERTH (Contd)

4. Place port THROTTLE/TRANSMISSION control levers (3) and (4) into forward position Do not raise engine rpms.
5. Slowly place port SCOOP REVERSE DEFLECTOR control lever (5) into forward position, leaving starboard SCOOP REVERSE DEFLECTOR control lever (6) in neutral position.
6. Push port THROTTLE/TRANSMISSION control lever (3) slowly forward to 1,000 rpm, leaving starboard THROTTLE/TRANSMISSION control lever (4) in neutral position.
7. When boat is clear of berth, push starboard THROTTLE/TRANSMISSION control lever (4) forward until starboard RPM gauge (2) is equal with port RPM gauge (1). Push starboard SCOOP REVERSE DEFLECTOR control lever (6) completely forward. Increase both engine rpms to desired speed.
8. Turn STEERING WHEEL (7) to desired direction.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

FORWARD DOCKING AND BERTHING BOAT

COMING INTO BERTH

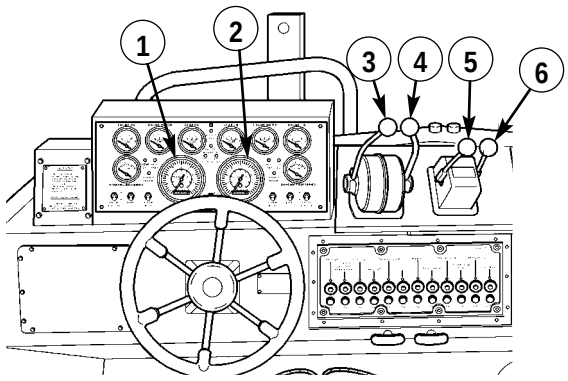
CAUTION

Avoid running over ropes or lines. Ropes and lines can be sucked into hydrojets. Failure to comply may result in damage to hydrojets.

NOTE

Use following instructions if port side berthing is planned. For starboard side use opposite controls.

1. Approach berth against current at slight angle to berth. Position THROTTLE/TRANSMISSION contols (3) and (4) until engine RPM gauges are at approximately 1,000.
2. Decrease engine rpm speed to approximately 1,000.
3. Pull port and starboard SCOOP REVERSE DEFLECTOR control levers (5) and (6) back toward neutral until boat is slowly moving ahead.
4. Move starboard SCOOP REVERSE DEFLECTOR control lever (6) ahead slightly to swing bow to port.
5. Move both SCOOP REVERSE DEFLECTOR controls (5) and (6) toward neutral until boat is slowly moving ahead.
6. When bow touches berth, move both SCOOP REVERSE DEFLECTOR controls (5) and (6) to neutral position.



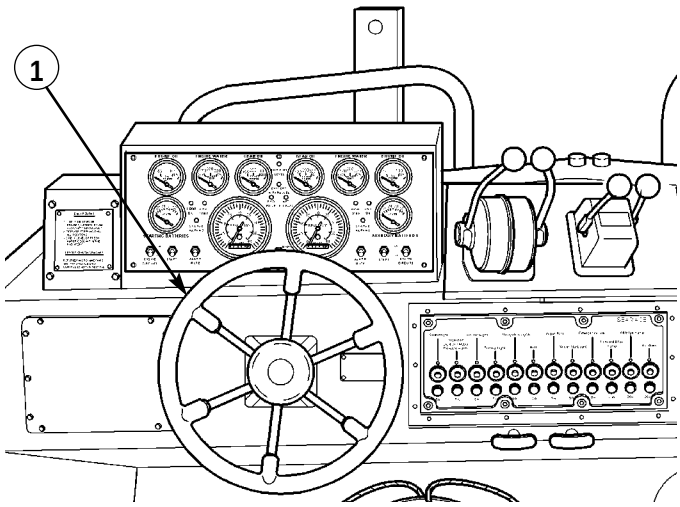
FORWARD DOCKING AND BERTHING BOAT (Contd)

COMING INTO BERTH (Contd)

NOTE

Crewmember stands by side of cab holding onto safety rail on top of cab. If cab is removed, crewmember kneels at side of cockpit holding onto safety rail inside cockpit area.

7. Crewmembers secure lines to appropriate tie-up on berth and to bow bollard on berth side of boat.
8. Reduce engine speed to 750–800 rpm.
9. Turn STEERING WHEEL (1) to starboard and swing stern of boat against berth.
10. Crewmembers secure lines to appropriate tie-up on berth and to stern bollard on berth side of boat.
11. Put transmission control in neutral.
12. Stop engines (WP 0013 00).



FORWARD DOCKING AND BERTHING BOAT (Contd)

BERTHING THE BOAT

CAUTION

Do not beach boat on rock shores. Damage to keel grates and keelcoolers may result.

NOTE

A ramp bay connected to an interior bay may be used for berthing when a boat dock is unavailable.

1. Launch ramp and interior bays (TM 5-5420-278-10 or TM 5-5420-209-12).
2. Connect bays (TM 5-5420-278-10).
3. Anchor connected bays to shore (TM 5-5420-278-10 or TM 5-5420-209-12).

CAUTION

Do not operate boat in water less than 26 inches deep. Damage to hydrojets, keel grates, and keel coolers may result.

4. Follow coming into berth procedures within this work package.
5. Retrieve bays when dock is no longer needed (TM 5-5420-278-10 or TM 5-5420-209-12).

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

DOCKING IN REVERSE

WARNING

Ensure all engine hatches are closed and secured while boat is under operation. Failure to comply may result in injury or death to personnel.

NOTE

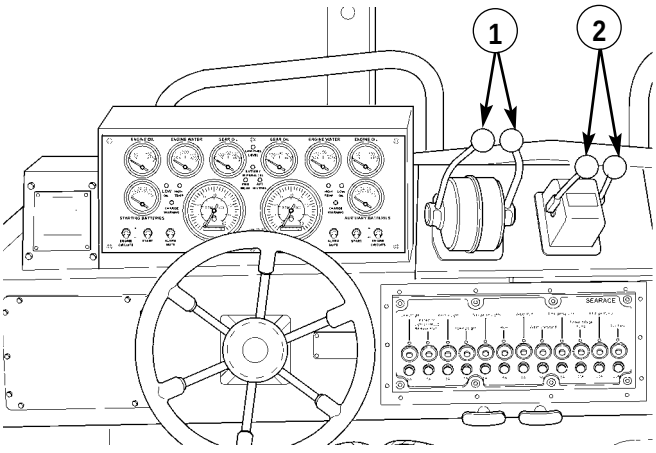
This maneuver is designed for backing boat into position on IBC prior to retrieval.

1. Visually identify water/river current directly behind IBC.
2. Visually identify wind direction and wind current behind IBC.

NOTE

Depending upon the current strength (wind or water), BEB operator may need to maneuver stern of boat upstream of CBT.

3. Maneuver stern of boat to within 2-3 boat lengths inline with CBT and IBC.
4. Adjust engine speed by moving THROTTLE/TRANSMISSION control levers (1) up until 1200 rpm is reached (+/- depending upon current strength).
5. Slowly adjust both SCOOP REVERSE DEFLECTOR control levers (2) to reverse position.



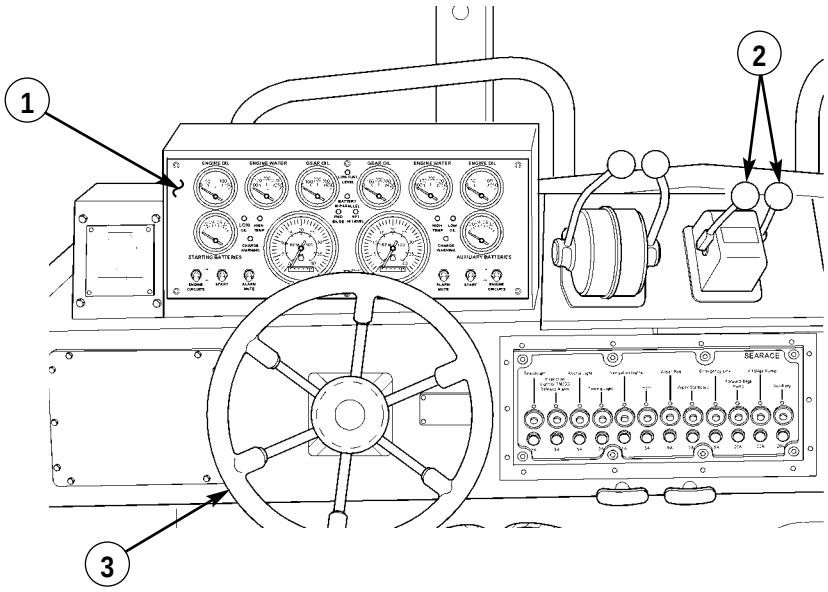
DOCKING IN REVERSE (Contd)

6. To control rate of speed in reverse, raise SCOOP REVERSE DEFLECTOR control levers (2) to decrease reverse speed (adjust scoop reverse deflector controls forward) and lower scoops to increase reverse speed (adjust scoop reverse deflector controls aft).

NOTE

Turning steering wheel to the starboard (right) will move stern to port (left), and turning steering wheel to the port (left) will move stern to starboard (right).

7. To control direction of movement, turn STEERING WHEEL (3) to port or starboard.
8. Maneuver the boat onto the IBC, using stanchions as guides.
9. Periodically scan instrument panel (1) for irregularities.
10. Once boat is positioned on IBC, secure boat with load binder cables and retrieve with CBT. Refer to WP 0011 00.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

TOWING

WARNING

Towing of boats or improvised floating equipment is dangerous and should be attempted only during recovery or emergency operations.

Only use towing line when towing other objects.

Ensure object being towed is properly secured to towline before connecting towline to tow hook. Failure to comply may result in injury or death to personnel or damage to equipment.

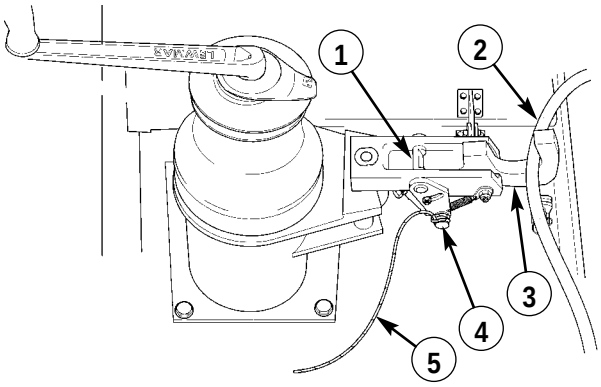
Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

NOTE

Tow hook provides boat with safe towing capability of 4,400 lb (2,000 kg). The tow hook is equipped with a quick-release mechanism for disengagement.

Secure Tow Line

1. Properly secure towline (2) to object to be towed.
2. Install towing hook release line (5) on quick-release boss (4).
3. Engage and secure tow hook (3) under quick-release pin (1).
4. Turn on towing light for night operation. Refer to WP 0004 00.



TOWING (Contd)

Secure Tow Line (Contd)

CAUTION

Ensure towed object is approximately 50 ft (15 m) behind tow boat. Failure to comply may result in damage to equipment.

5. Place towline (1) on tow hook (2).
6. Before towing, move tow boat forward slowly to remove slack from towline. Refer to WP 0015 00.

Detach Tow Line

1. Operator will position scoop reverse deflector controls in neutral position. Refer to WP 0015 00.
2. Remove towline (1) from tow hook (2).
3. Turn off towing light if used. Refer to WP 0004 00.

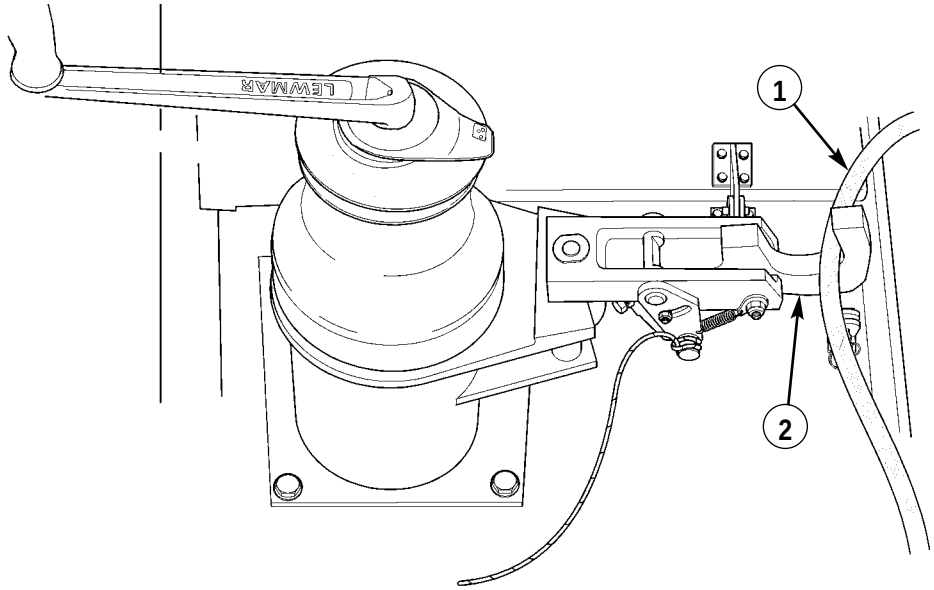
Quick Release of Dangerous Load

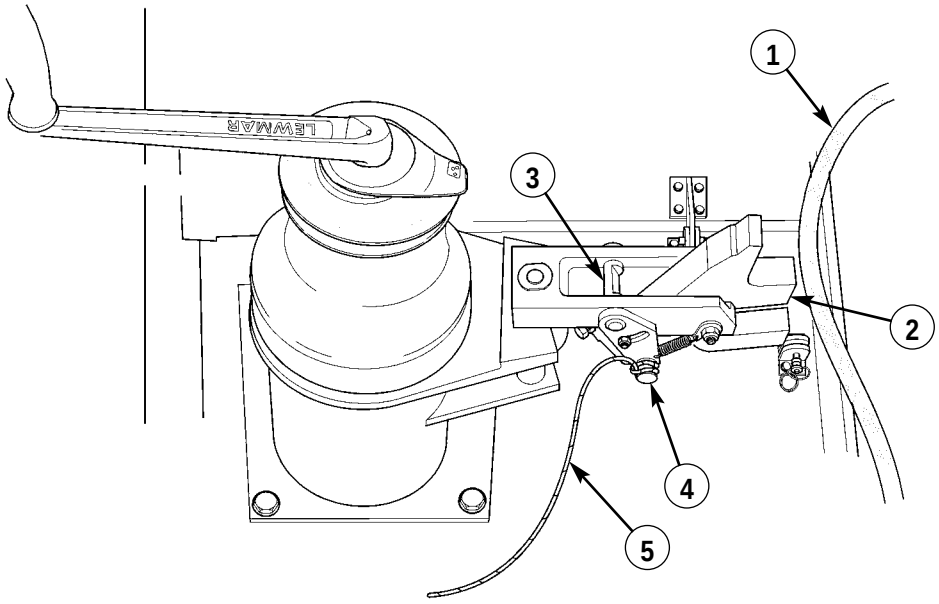
WARNING

Ensure all personnel are clear of lines before pulling tow hook release line. Failure to comply may result in injury or death to personnel.

1. Manually pull towing hook release line (5) connected to quick-release boss (4). If quick-release pin (3) does not release tow hook (2), forcefully pull towing hook release line (4) again.
2. Confirm that towline (1) has released from tow hook (2). If tow hook (2) will not release, cut towline (1).
3. Raise tow hook (2) upward until engaged with quick-release pin (3).
4. Remove towing hook release line (5) from boss (4).
5. Turn off towing light if used. Refer to WP 0004 00.

TOWING (Contd)





END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

RETRIEVING LAUNCHED BRIDGE BAY

WARNING

All personnel must wear approved life jackets and unblouse pants from boots while on the boat. Failure to comply may result in injury or death to personnel.

Do not allow the bay to open up on top of the bow of the boat. Failure to comply may result in injury or death to personnel and damage to boat.

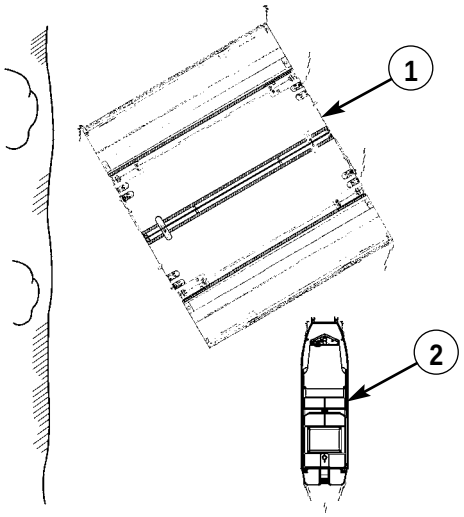
Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

NOTE

The bridge transporter operator is responsible for launching bridge ramp and interior bays as required. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.

Retrieving a bridge bay requires at least one boat operator and two crewmembers per boat.

1. Boat operator positions BEB (2) 10–16 ft (3–5 m) downstream from launching site, with BEB (2) facing upstream in position to catch launched bay (1).



RETRIEVING LAUNCHED BRIDGE BAY (Contd)

WARNING

Crewmembers must hold onto boat safety rails to avoid being thrown overboard when boat bumps bridge bay. Failure to comply may result in injury or death to personnel.

CAUTION

Adjust speed of boat to avoid making initial contact with bay with excessive force. Failure to comply may cause damage to equipment.

2. After bridge bay (1) is completely open, boat operator maneuvers BEB (6) until pushknees (4) are in contact with downstream side of bay (1).

WARNING

Do not position any part of body between bridge bay and boat. Failure to comply may result in injury or death to personnel.

Boat crew should stand well aft of boat operator's forward field of vision. If cab is removed, kneel at side of cockpit and hold onto safety rails inside cockpit area until pushknees touch bay. Failure to comply may result in injury or death to personnel and damage to boat.

3. Crewmembers stand outside of cab holding onto safety rails until pushknees (4) touch bridge bay (1), then crewmembers board bridge bay (1).

WARNING

Minimize amount of boat maneuvering against bridge bay until all transverse upper couplings (roadway connectors/dogbones) are closed. Failure to comply may result in serious injury or death to personnel.

4. Boat operator keeps pushknees (4) in constant contact with bridge bay (1), using enough power to prevent bridge bay (1) from pushing boat downstream or into shallow water.

CAUTION

Ensure each bow line is tight and bridge bay is held firmly against pushknees or bridge bay will tend to tilt toward one side of boat. Failure to comply may result in damage to equipment.

5. Crewmembers connect one bow line (3) to each cleat (2) at downstream side of bridge bay (1).
6. Crewmembers pull bow lines (3) tight and secure them to each bow bollard (5).

RETRIEVING LAUNCHED BRIDGE BAY (Contd)

WARNING

Do not sit, lie, or stand in front of boat push knees at any time while riding on bays. Failure to comply may result in injury or death to personnel.

Do not step, kneel, or lay down over joint between inner pontons (roadway pontons). Failure to comply may result in injury or death to personnel.

Exercise caution when walking near centerline of roadway; the ponton alignment lugs project above the roadway surface on interior bays and constitute a tripping hazard. Failure to comply may result in injury to personnel.

Do not place fingers under longitudinal or transverse upper couplings (roadway connectors/dogbones) when closing them. Failure to comply may result in serious injury to personnel.

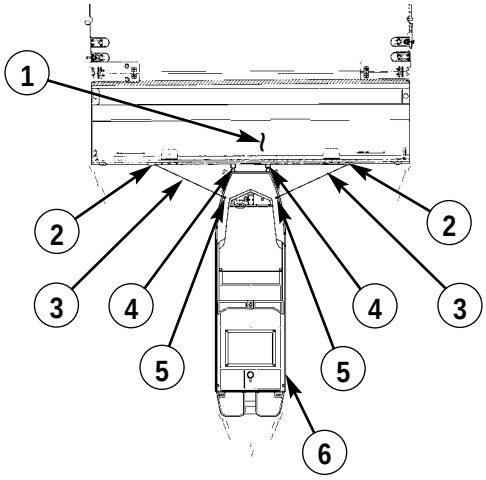
7. Crewmembers secure all ramp or interior bridge bay ponton latches. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.

NOTE

Designated crewmember will assist in maneuvering of bridge bay by using hand signals to communicate with boat operator. Refer to WP 0007 00.

Boat crewmember will stand by to assist in raft or bridge construction when directed by bridge or raft commander.

8. Boat operator maneuvers bridge bay (1) into position for connection of bays. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB) MKII-S

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

RECOVERY OF BRIDGE BAY

WARNING

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment. Failure to comply may result in injury or death to personnel.

Do not get any part of body between the bridge and boat. Failure to comply may result in serious injury or death to personnel.

Crew members will hold onto boat safety rails to avoid being thrown overboard when boat contacts bridge bay. Failure to comply may result in injury or death to personnel.

Do not sit, lie, or stand in front of boat pushknees at any time while riding on bridge bays. Failure to comply may result in injury or death to personnel.

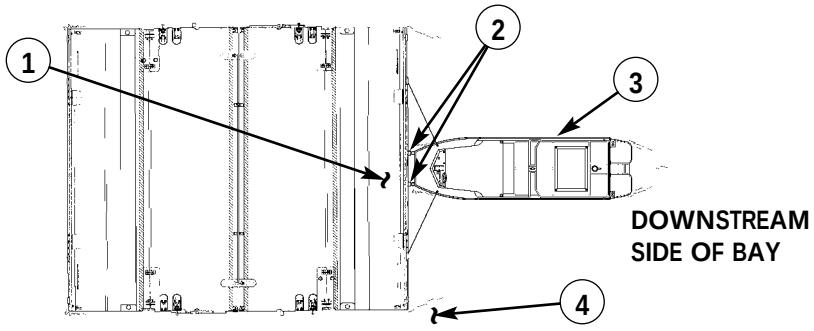
Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

CAUTION

Ensure BEB is positioned downstream of bridge bay during recovery operations; bridge bay may drift downstream. Failure to comply may result damage to equipment.

Adjust speed of boat to avoid making initial contact with bay with excessive force. Failure to comply may cause damage to equipment.

1. Boat operator positions BEB (3) so pushknees (2) contact center of bay's outer ponton (1) from downstream side (4) of bay (1).



RECOVERY OF BRIDGE BAY (Contd)

2. Crew members stand outside of cab holding onto safety rails until pushknees (6) touch bridge bay (1).
3. Boat operator maneuvers BEB (5) so pushknees (6) stay in contact with center of outer portion (7) of bridge bay (1).
4. Crew members connect one bow line (3) to each cleat (2) at downstream side of bridge bay (1).

CAUTION

Ensure each bow line is tight and bridge bay is held firmly against boat pushknees or bridge bay will tend to pull off to one side of boat. Failure to comply may result in damage to equipment.

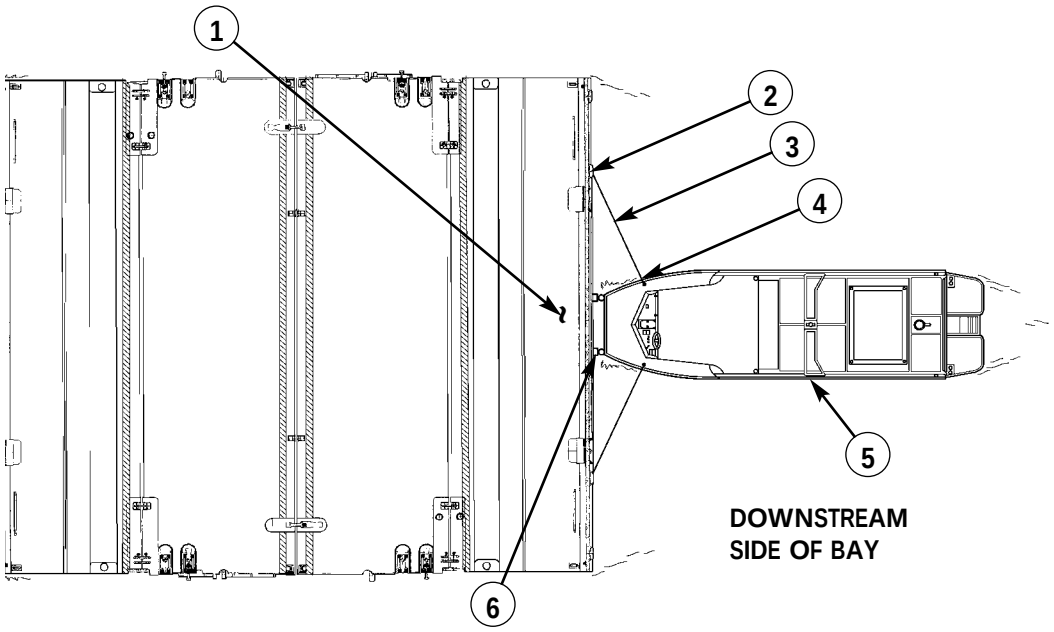
5. Crew members pull bow lines (3) tight, and secure them to each bow bollard (4).

NOTE

Designated crewmember will assist in maneuvering bridge bay by using hand signals to communicate with boat operator. Refer to WP 0007 00.

Boat crewmembers will stand by to assist in raft or bridge disassembly when directed by bridge or raft commander.

6. Crewmembers disconnect bridge bay (1) from bridge or raft assembly. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.



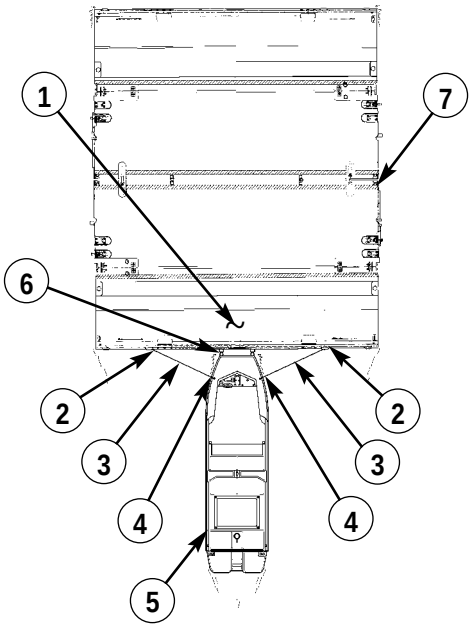
RECOVERY OF BRIDGE BAY (Contd)

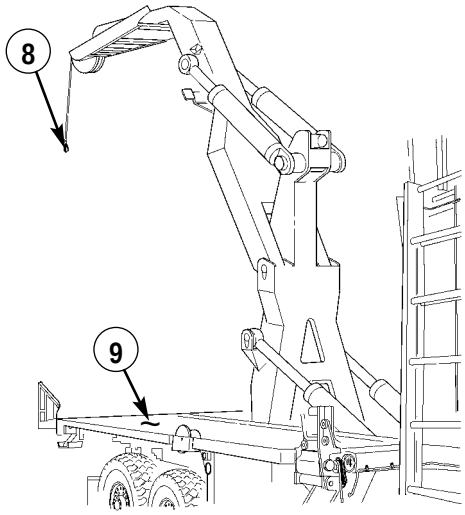
7. Boat operator maneuvers bridge bay (1) to recovery site so that bridge bay (1) is aligned with center line of transporter (9) and is within range of cable hook (8).
8. Crewmembers open all ramps or interior bridge bay ponton latches. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.
9. Crewmember holds open end of cable hook (8) facing away from transporter (9), and connects cable hook (8) to bridge bay lifting lug (lifting eye) (7).
10. Crewmember removes bow lines (3) from cleats (2) and bow bollards (4) and stows bow lines (3).

NOTE

During bridge bay retrieval in fast moving water or strong crosswinds, it may be necessary to position boat with pushknees against downstream outer ponton (bow ponton) to keep bridge bay aligned with transporter.

11. Boat operator maintains position until transporter operator completes retrieval of bridge bay (1).





END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

ANCHORING BRIDGE ASSEMBLY USING BEBS

GENERAL

There are several methods of anchoring bridges. This work package covers a short-term anchoring method that uses a number of boats to hold bridge assembly against river current. For other methods, refer to TM 5-5420-278-10.

Short-Term Anchoring

Short-term anchoring is a temporary method that utilizes BEBs and approach guys (cables) to hold the bridge in place against the force of water current and vehicular traffic.

Positioning of boats and installation of approach guys is accomplished during bridge assembly. Refer to Anchoring of Floating Bridges in TM 5-5420-278-10 or TM 5-5420-209-12 in conjunction with the following instructions.

WARNING

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment on or near water. Failure to comply may result in serious injury or death of personnel.

Hold safety rails to avoid being thrown overboard. Failure to comply may result in injury or death to personnel.

Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

CAUTION

Stop bridge traffic while replacing boats, or damage to equipment may result.

NOTE

Anchoring a bridge will require at least one boat for each three bays of bridge at least one boat operator and one crewmember per boat. Use additional boats for higher currents and when directed.

When anchoring a bridge assembly using BEBs, the fuel consumption of each boat must be checked more frequently.

ANCHORING BRIDGE ASSEMBLY USING BEBS (Contd)

1. Boat operator maneuvers boat (7) into position until pushknees (3) are in contact with the downstream outer pontons (bow pontons) of bridge (2).

NOTE

When more than one boat is required, boats should be evenly spaced along bridge.

2. Crewmembers wait on or near the bow of the boat (7) without blocking the boat operator's view; wait until both pushknees (3) touch the bridge (2).
3. Boat operator, keeps both pushknees (3) in constant contact with the bridge (2).

WARNING

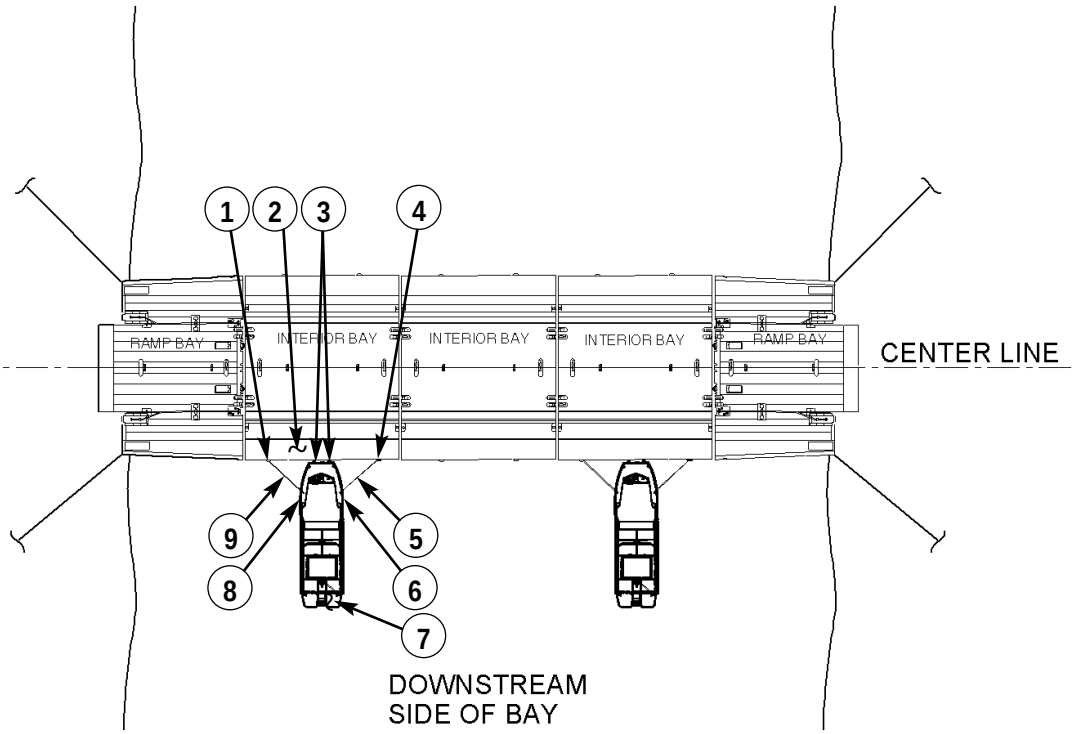
Do not get any part of body between the bridge and boat. Failure to comply may result in serious injury or death to personnel.

CAUTION

Ensure each bow line is tight and boat pushknees are held firmly against the bridge bay; boat will tend to pull off to one side of bridge if bow lines are loose. Failure to comply may result in damage to equipment.

4. Crewmembers secure bow lines (5) and (9) to two nearest outer ponton (bow ponton) cleats (1) and (4) on bridge bay (2). Pull bow lines (5) and (9) tight, and secure them to each bow bollard (6) and (8).
5. Boat operator holds position of bridge on centerline by adjusting the throttle/transmission control levers and scoop reverse deflector control levers. Follow hand signals from bridge commander.

ANCHORING BRIDGE ASSEMBLY USING BEBS (Contd)



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

RAFT ASSEMBLY

Ramp and interior bays may be joined to construct a raft for transporting personnel and equipment across bodies of water. The number of bays required for rafting is dependent upon the Military Load Class (MLC) of traffic to be transported, dimensions of equipment, and current velocity. The number of boats required for safe operation of a particular raft depends upon the type of raft, the MLC of the load, and current velocity. A raft requires the use of two ramp bays and a minimum of three interior bays to enable loading and unloading from either end. A raft requires a minimum of three crewmembers (one raft commander and two assistants), and each BEB will have an operator and a minimum of one crewmember. The raft commander will direct boat operators during raft assembly by use of hand signals (WP 0007 00).

DIFFERENCES BETWEEN MODELS

There are two styles of bridge bays, Improved Ribbon Bridge (IRB) and Improved Float Bridge (IFB) (The IFB is commonly called a Standard Ribbon Bridge (SRB)). The IRB and SRB can be distinguished by looking at the sides where they meet the water. SRB bays are flat. IRB bays are curved. Both bays are handled and assembled in the same manner. The procedures that follow are written for the IRB. Do not mix IRB and SRB bays in a raft. Refer to TM 5-5420-278-10 for operation of the IRB. Refer to TM 5-5420-209-12 for operation of the SRB.

RAFT ASSEMBLY (Contd)

WARNING

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment on or near water. Failure to comply may result in serious injury or death of personnel.

Never intermix IFB (SRB) bays with IRB bays when building rafts. Failure to comply may result in injury or death to personnel and damage to equipment.

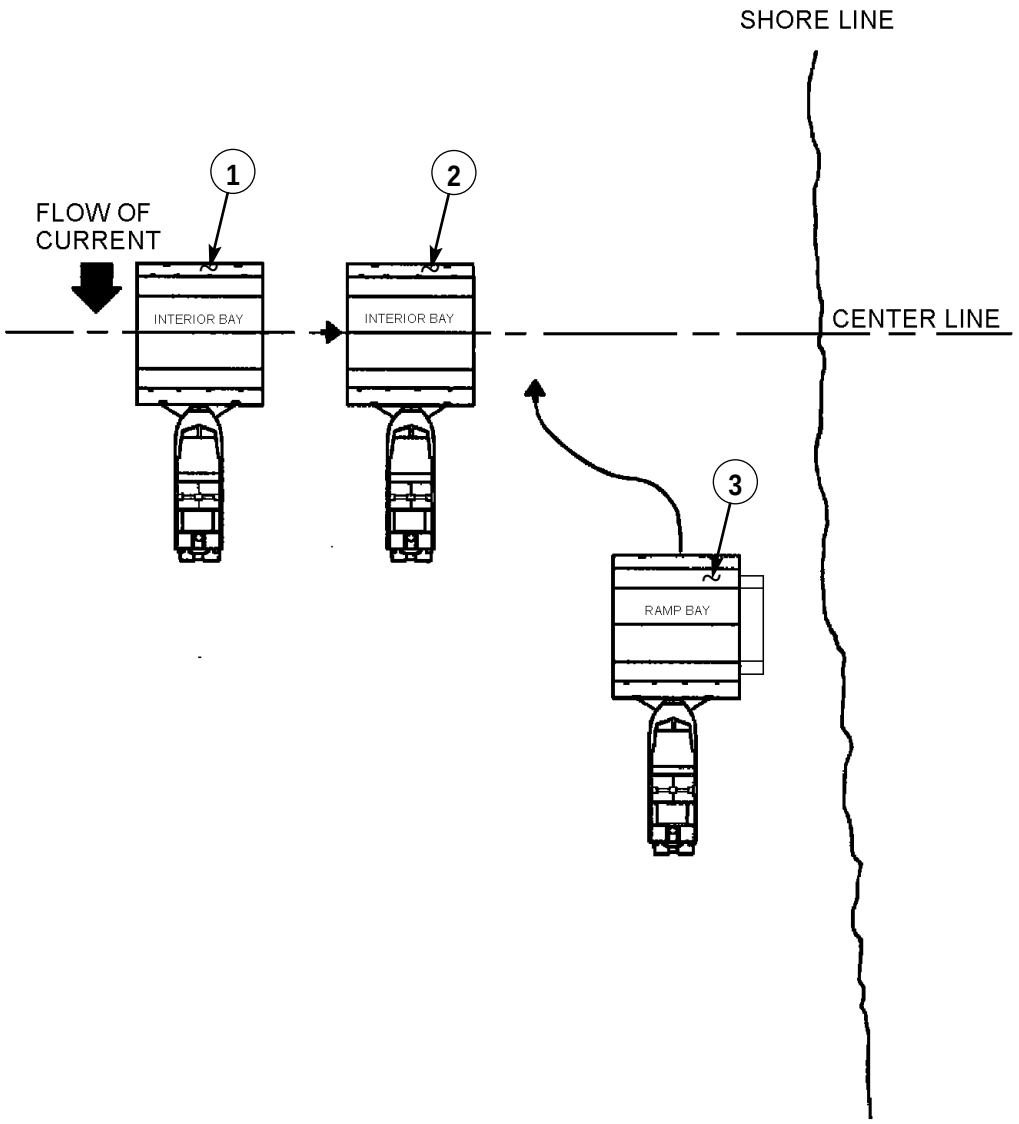
Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

NOTE

Three or more boats are required for raft assembly. Each boat will require one boat operator and two crewmembers.

1. Boat operators and crewmembers retrieve two launched interior bridge bays (1) and (2). Refer to WP 0030 00.
2. One boat operator maintains position of bridge bay (1) while second boat operator maneuvers bridge bay (2) close enough for crew members to use boat hook or bow lines to bring bridge bays (1) and (2) together.
3. Boat operators maintain interior bridge bay (1) in contact with stationary interior bridge bay (2), to center line until crewmembers align and couple interior bridge bays (1) and (2). Refer to TM 5-5420-278-10 or TM 5-5420-209-12.
4. Boat operator holds partially assembled raft in position while ramp bay (3) is added.
5. First boat operator holds partially assembled raft in position while more bridge bays are added.
6. When raft is completed, boats push raft toward shore. Bridge crewmembers anchor ramp bay to shore. Refer to TM 5-5420-278-10 or TM 5-5420-209-12.
7. Secure boats to completed raft assembly per raft commander. Refer to WP 0034 00 for conventional rafting procedures and WP 0035 00 for longitudinal rafting procedures.

RAFT ASSEMBLY (Contd)



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB) MKII-S

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

CONVENTIONAL RAFTING

WARNING

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment on or near water. Failure to comply may result in injury or death to personnel.

Different size rafts require different numbers of boats. At a minimum, one boat is required for every three bays. Use additional boats in rough water, when the current is fast, in bad weather and when directed. Failure to comply may cause injury to personnel or damage to equipment.

Hold safety rails to avoid being thrown overboard. Failure to comply may result in injury or death to personnel.

Ensure all personnel are clear of lines under load. Failure to comply may result in injury or death to personnel.

Reduce speed in rough water and when water washes over the raft. Failure to comply may result in injury to personnel and damage to equipment.

1. Assemble raft. Refer to WP 0033 00.
2. Determine number of boats required for conventional rafting using Boat Requirement table below.

BOAT REQUIREMENT TABLE	
RAFT SIZE	MINIMUM NUMBER OF BOATS REQUIRED
2, 3 Bays	1
4, 5, 6 Bays	2
7 Bays	3

CONVENTIONAL RAFTING (Contd)

WARNING

Do not get any part of body between bridge bays and boat. Failure to comply may result in injury or death to personnel.

Ensure each bowline is tight and bay is held firmly against pushknees or bridge will tend to pull off to side of boat. Failure to comply may result in damage to equipment or injury to personnel.

NOTE

Connecting BEBs to raft assembly can be performed simultaneously or one boat at a time. When more than one boat is required, boat should be evenly spaced along the bridge.

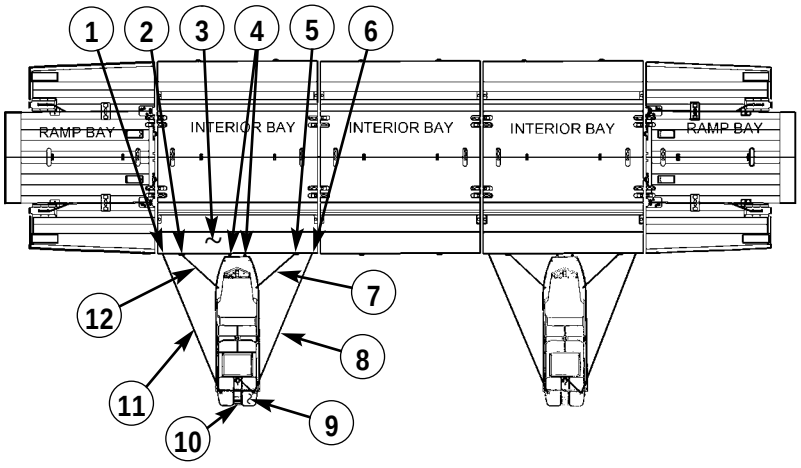
For raft crewmember instructions, refer to TM 5-5420-278-10.

1. Boat operators maneuver required number of boats on downstream side of raft (3). Position each boat to center of interior bays until pushknees (4) contact center of outer ponton (bow ponton) of raft (3).
2. Crewmembers wait on or near bow of boat, without blocking boat operator's view; wait until both pushknees (4) touch bridge (3).

NOTE

Ensure all lines are tight and raft is held firmly against boat pushknees or boat will pull to one side of raft.

3. While boat operators keep both pushknees (4) in contact with raft (3), crewmembers secure bow lines (7) and (12) to the two nearest outer ponton (bow ponton) load receiving pins (2) and (5). Pull bow line tight and secure it to bow bollards.
4. Crewmembers of each boat secure steering lines (8) and (11) to far outer ponton (bow ponton) cleats (6) and (1).
5. Secure steering line (11) to the boat aft bollard.
6. Pull steering line (8) around aft bollard and tighten using capstan (10). Secure remainder of steering line (1) to aft cleats.
7. Once all boats are properly secured to raft (3), boat operators maneuver raft in accordance with hand signals from raft commander.



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CONVENTIONAL RAFTING (Contd)

NOTE

Rafts operating with more than one raft using same loading and unloading sites will follow a figure eight traffic pattern.

6. Follow path shown in Conventional Rafting Figure below. Approach far shore from downstream.

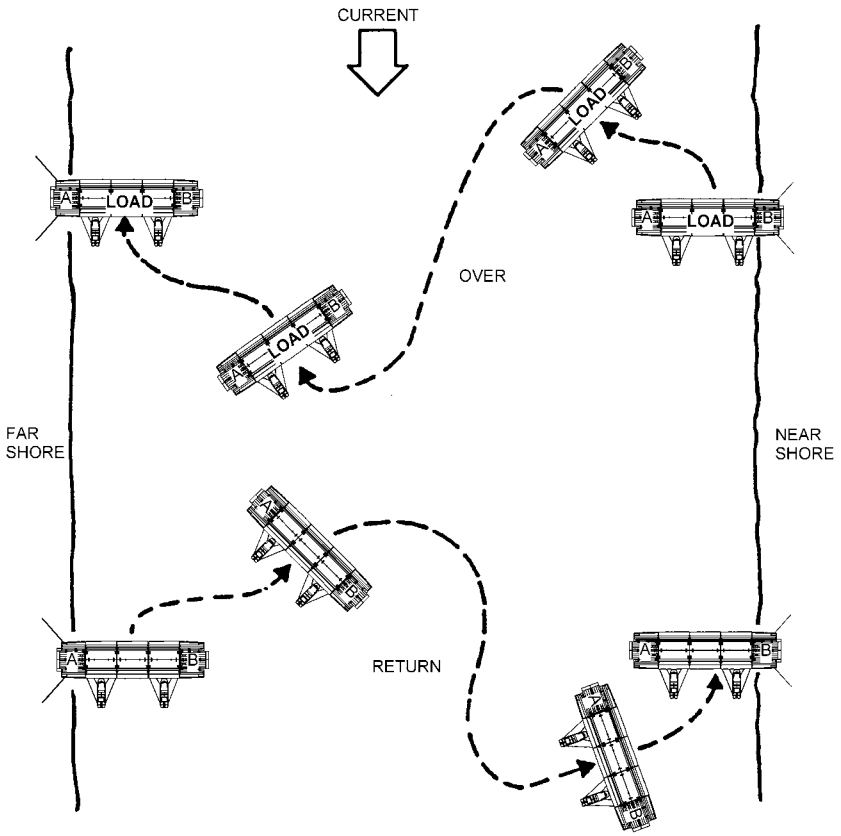
WARNING

Always position controls so boat holds raft against shore during loading and off-loading of traffic. Failure to comply may cause injury to personnel or damage to equipment.

Always secure raft to bank with approach guys during loading and off-loading of traffic. Failure to comply may cause injury to personnel or damage to equipment.

7. Secure raft assembly to shore with approach guys.

Conventional Rafting Figure



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

LONGITUDINAL RAFTING

WARNING

Longitudinal rafting is performed only when water current is 5 ft (1.5 m)/sec or less in loading/unloading areas. Raft commander will determine method of rafting. Failure to comply may result in injury or death to personnel and damage to equipment.

All personnel must wear approved life jackets and unblouse pants from boots while operating equipment on or near water. Failure to comply may result in injury or death to personnel.

Ensure all personel are clear of lines under load. Failure to comply may result in injury or death to personnel.

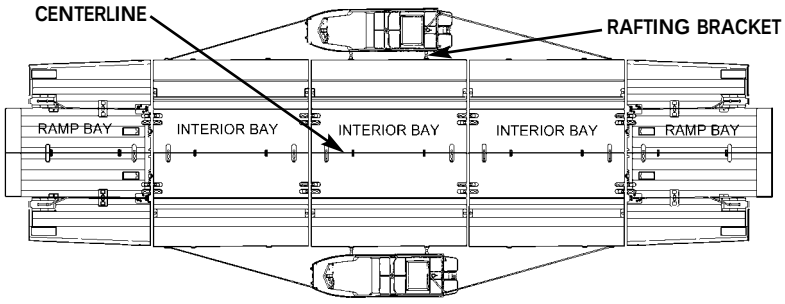
CAUTION

If longitudinal rafting method will be used, rafting brackets are required. IRB and IFB (SRB) rafting brackets are not interchangeable. Failure to comply may result in damage to equipment.

NOTE

A six bay raft will constitute the largest raft size for longitudinal rafting. Longitudinal rafting is performed with two boats regardless of raft size up to six-bay maximum.

1. Assemble raft. Refer to WP 0033 00.
2. Determine center of raft for positioning of rafting brackets at centerline of raft as illustrated below.



Positioning of Rafting Brackets on 5-Bay Raft Assembly.

LONGITUDINAL RAFTING (Contd)

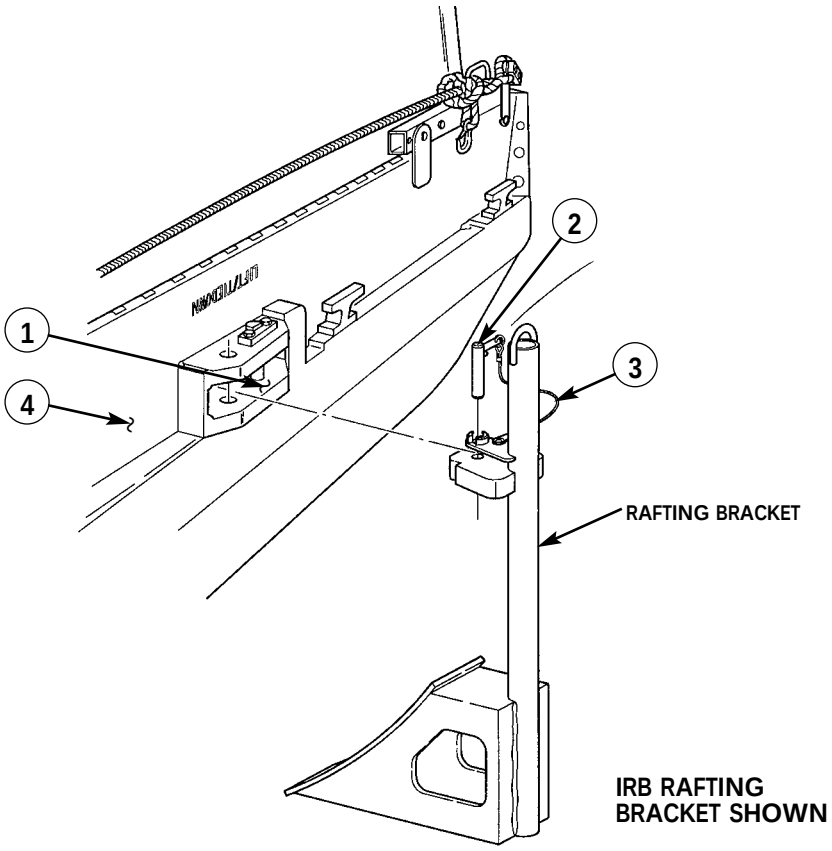
WARNING

Crewmembers must keep hands and feet from between raft and boat when installing rafting brackets. Failure to comply may result in serious injury or death to personnel.

NOTE

Rafting brackets are stowed in the aft cockpit of BEB and will be installed on raft by crewmembers.

3. Crewmembers will remove quick release pin (2) on lanyard (3) from rafting bracket.
4. Align rafting bracket with load receiving pin receptacle (1) on outer ponton of interior bay (4).
5. Install quick release pin (2) on load receiving pin receptacle (1), and rafting bracket. Ensure pin (2) on lanyard (3) is fully seated in rafting bracket.
6. Repeat steps 3 through 5 for installation of remaining three rafting brackets.



IRB RAFTING BRACKET SHOWN

LONGITUDINAL RAFTING (Contd)

7. Position downstream boat (14) against interior bay (15) to hold raft assembly (16) perpendicular to river current.
8. Position upstream boat (8) adjacent to rafting brackets with bow facing near shore at upstream side of raft assembly (16).

NOTE

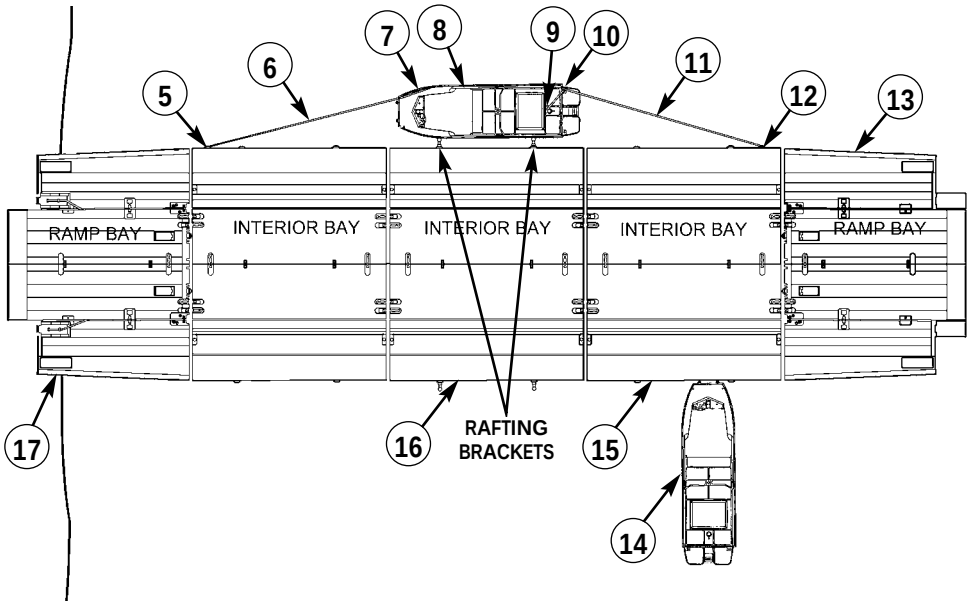
Use 5/8-in. (1.6 cm) manila/nylon rope for all lines.

9. Secure boat (8) to raft (16) by lashing lifting eye shackles to rafting brackets.
10. Connect steering line (6) to interior bay load receiving pin (5) closest to ramp bay (17) and secure line (6) to outside forward bollard (7).
11. Connect steering line (11) to interior bay load receiving pin (12) closest to ramp bay (13). Place steering line (11) around outside aft bollard (10) to capstan (9).

WARNING

The cable drum requires a minimum of three wraps of cable for safety. Failure to comply may result in injury or death to personnel and damage to equipment.

12. Pull steering line (11) tight and wrap it three times around capstan (9). Crank capstan (9) until all slack is removed from steering line (11) and steering line (6). Secure free end of steering line (11) to bollard on opposite side of boat.
13. Once upstream boat's steering lines (6) and (11) are tight, place both scoop reverse deflector control levers in forward position, and hold raft assembly (16) against near shore.
14. Repeat steps 2 through 13 for downstream boat.



LONGITUDINAL RAFTING (Contd)

NOTE

Rafting operations with more than one raft assembly using same loading and unloading sites will follow a figure 8 pattern.

15. Cast off approach guys and maneuver raft in accordance with signals from raft commander. Follow path shown in Longitudinal Rafting Figure below. Approach far shore from downstream.

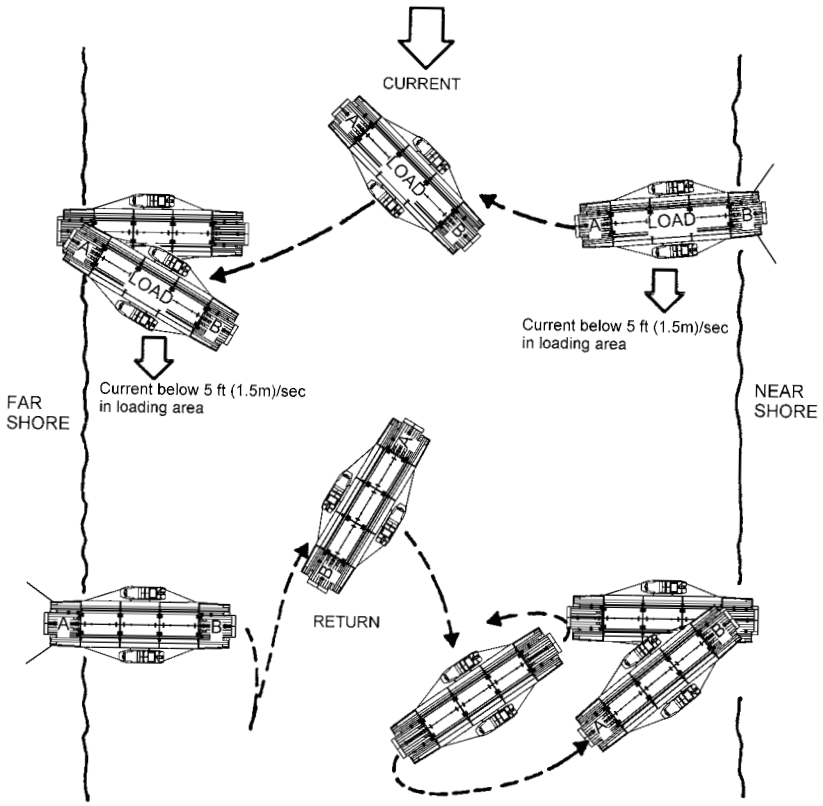
WARNING

Do not get any part of body between bridge bays and boat. Failure to comply may result in injury to personnel.

Ensure each bowline is tight and bay is held firmly against pushknees or bridge will tend to pull off to side of boat. Failure to comply may result in damage to equipment or injury to personnel.

16. Secure raft assembly to shore with approach guys.

Longitudinal Rafting Figure.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

DEPLOYMENT OF BOAT BY HELICOPTER

The BEB may be air transported by CH47 US Army helicopter. Refer to the Transport Data plate mounted on port side of forward cockpit for slinging requirements.

During deployment of boat by helicopter, boat operator will take direction from unit commander and Non Commissioned Officer in Charge (NCOIC).

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

OPERATION UNDER UNUSUAL CONDITIONS

OPERATING BEB WITH ONE PROPULSION SYSTEM

WARNING

Ensure all engine hatches are closed while boat is under operation. Failure to comply may result in injury to personnel.

Do not exceed 2,000 rpms if operating with only one engine. Failure to comply may result in injury to personnel or damage to equipment.

If engine can't be used due to damage, close fuel valve to damaged engine. Failure to comply may result in injury to personnel or damage to equipment.

CAUTION

Check lubrication instructions (WP 0047 00) when operating in extreme cold and change oils as required. Failure to comply may result in damage to equipment.

1. Make necessary steering adjustments to compensate for boat's tendency to turn.
2. Report engine problems to your supervisor immediately.

OPERATION IN EXTREME COLD

1. Notify maintenance to change oil in engines to a viscosity category that matches the ambient temperature when starting from cold. Refer to WP 0047 00.

CAUTION

Never use starting fluid (ether) to assist starting engines. Failure to comply will result in damage to engines.

2. Start engines for normal operation. Refer to WP 0012 00. If engines will not crank or crank slowly with main power switch ON, refer to Starting Engines with Batteries In Parallel or Slave Starting BEB, located in this work package.

WARNING

Ensure all engine hatches are closed while boat is under operation. Failure to comply may result in injury to personnel.

3. Inspect hull frequently for ice damage.

OPERATION UNDER UNUSUAL CONDITIONS (Contd)

OPERATION IN EXTREME COLD (Contd)

CAUTION

Do not run engines in neutral to charge batteries. Failure to comply may result in damage to equipment.

4. Check bilge pumps frequently to ensure pumps and outlets are free of ice. If necessary, notify your supervisor.
5. Operate scoop reverse deflector controls and steering wheel frequently to prevent freeze-up.

CAUTION

In extreme cold, drain raw water from transmission oil cooler immediately after operation. Failure to comply may result in damage to equipment.

6. Drain raw water from transmission oil coolers immediately after operation to prevent freezing. Refer to WP 0049 00.

OPERATION IN SNOW OR ICY CONDITIONS

During bridge construction, operation, and recovery, follow all operating procedures for normal conditions and the following special instructions.

WARNING

Wear gloves when operating or handling metallic equipment that is wet or ice covered, and exercise caution when working on boat and bridge bays where snow or ice exist. Failure to comply may result in injury to personnel.

CAUTION

Do not use rock salt to de-ice boat or bridge bays. Do not chip ice from surfaces with tools. Failure to comply may cause damage to equipment.

1. Remove any snow or ice from boat and bridge equipment before it accumulates.
2. Check fluid levels more frequently. Refer to WP 0047 00.

CAUTION

In extreme cold, drain raw water from transmission oil cooler immediately after operation. Failure to comply may result in damage equipment.

3. Drain raw water from transmission oil coolers immediately after operation to prevent freezing. Refer to WP 0049 00.

OPERATION UNDER UNUSUAL CONDITIONS (Contd)

OPERATION IN RAINY OR HUMID CONDITIONS

Follow all operating procedures for normal conditions and the following special instructions.

1. Monitor current frequently and adjust thrust accordingly when anchoring bridge or raft assembly.
2. Exercise caution when working on boat or bridge where surfaces and equipment may become slippery.
3. Check bilge frequently for water accumulation. Operate fore and aft bilge pumps as necessary. Refer to WP 0004 00.

OPERATION IN HIGH WIND CONDITIONS

Follow all operating procedures for normal conditions and the following special instructions.

1. Monitor current frequently and adjust thrust accordingly when anchoring bridge or raft assembly.
2. Monitor bridge or raft movement and add additional boats as necessary.

OPERATION IN EXTREME HEAT OR DRY CONDITIONS

CAUTION

Check lubrication instructions (WP 0047 00) when operating in extreme heat and change oils as required. Failure to comply may result in damage to equipment.

Follow all operating procedures for normal conditions and the following special instructions.

CAUTION

A very high standard of maintenance is essential to long term operation under conditions of extreme heat. High temperature can cause early failure of systems. Constant checking is necessary to prevent failures.

1. Check fluid levels more frequently. Refer to WP 0047 00.
2. Keep moving parts clean and well lubricated, and ensure aft cockpit air inlets are kept clear to permit cooling. For cleaning instructions, refer to WP 0048 00. For lubrication instructions, refer to WP 0047 00.
3. Engine oil should be changed more frequently. Run engine at idle for approximately 3 to 5 minutes before shutting down. Idling will cool engine faster than a quick shutdown and may prevent damage from remaining engine heat.

OPERATION UNDER UNUSUAL CONDITIONS (Contd)

OPERATION IN EXTREME HEAT OR DRY CONDITIONS (Contd)

5. If operating BEB under load and at high speeds for extended period, observe temperature gauges frequently and idle engines down slowly when stopping. If temperature exceeds normal operating range, idle engines with transmissions in FORWARD until engine temperature is in normal range.
6. Keep engine coolant at recommended level. Refer to WP 0049 00.
7. Do not fill fuel tank above full mark on dipstick to allow room for expansion of fuel. Refer to WP 0049 00.
8. View instrument panel often for irregularities.

WARNING

If NBC exposure is suspected, NBC contaminated filters must be handled and disposed of only by authorized and trained personnel. The unit commander or senior officer in charge of maintenance personnel must ensure that prescribed protective clothing is used, and prescribed safety measures and decontamination procedures (FM 3-5) are followed. The local unit SOP is responsible for final disposal of contaminated air filters. Failure to do this may cause severe injury to personnel.

9. Inspect air cleaners for excess dust. Clean or replace as necessary. Refer to WP 0049 00.

OPERATION IN SALT WATER

1. Always keep hatch covers closed.
2. Keep engine and hydrojet compartments as dry as possible.
3. If available, wash down engines, engine accessories, and bilge with fresh water.
4. Wipe exteriors of engines and engine accessories dry after each operation.
5. Check hull frequently for signs of corrosion. Corrosion is likely to occur at exhaust vents, drain openings, and areas subject to wear. Signs of corrosion and bare spots on painted surfaces should be repaired as soon as possible.
6. Frequently inspect lights, bilge pumps, fire extinguishers, electrical connections, and lines for signs of corrosion or salt accumulation. Clean items as needed with fresh water and wipe dry.

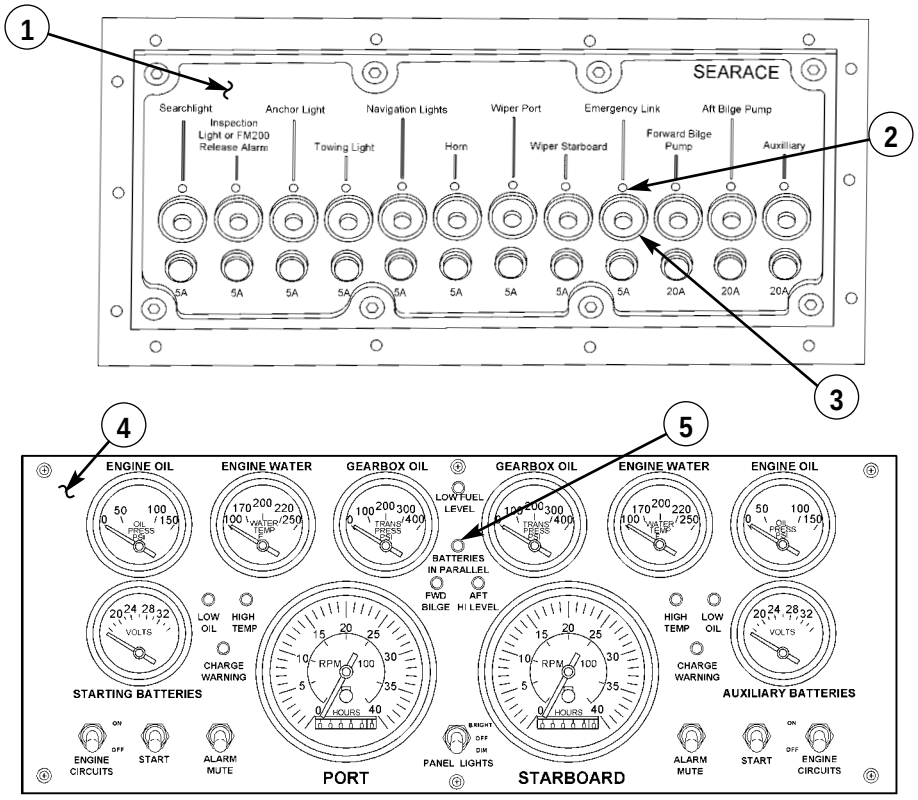
OPERATION UNDER UNUSUAL CONDITIONS (Contd)

STARTING ENGINES WITH BATTERIES IN PARALLEL

NOTE

If Starting Batteries gauge registers low voltage and engine will not crank or cranks slowly, perform step 1 through 5 below.

1. Located on auxiliary switch panel (1), depress Emergency Link button (3) to place starting and auxiliary batteries in parallel.
2. View auxiliary switch panel (1), and ensure Emergency Link indicator light (2) is illuminated.
3. View instrument panel (4), and ensure Batteries In Parallel indicator light (5) is illuminated.
4. Start engine. Refer to WP 0012 00.
5. If engine will not start, refer to Slave Starting BEB, located in this work package.



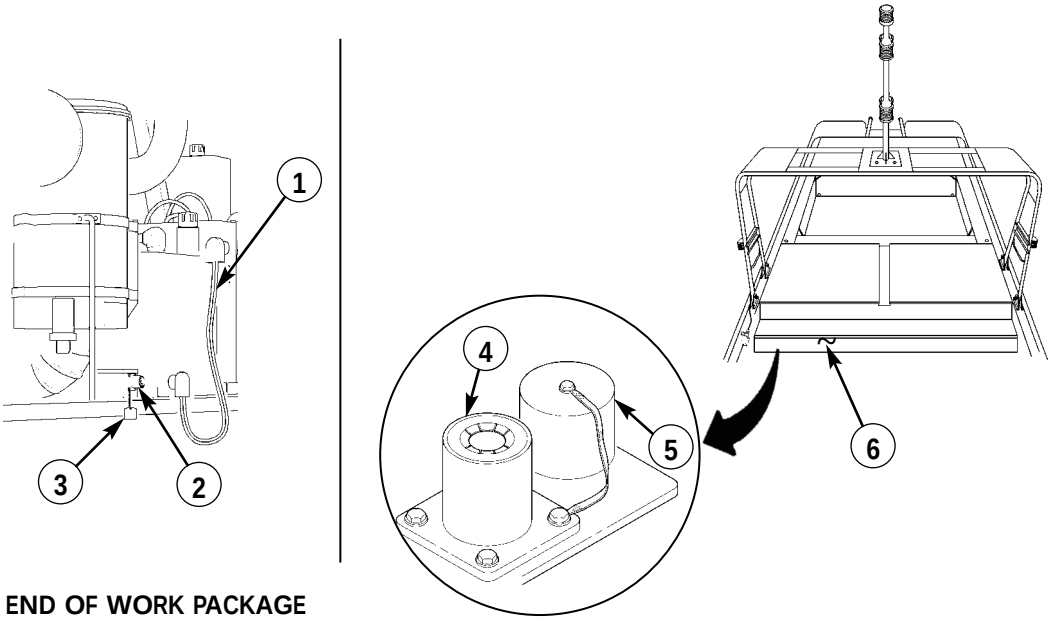
OPERATION UNDER UNUSUAL CONDITIONS (Contd)

SLAVE STARTING BEB

NOTE

When jumping from an external 24V power source, a standard NATO slave receptacle is provided adjacent to the master power switch in the battery compartment. Use a standard NATO slave cable to slave to this receptacle.

1. Acquire NATO slave cable (1) from CBT stowage compartment.
2. Remove NATO slave receptacle dust cap (3) from NATO slave receptacle (2) on CBT.
3. Connect NATO slave cable (1) to NATO slave receptacle (2) on CBT.
4. Open BEB battery compartment (6). Refer to WP 0004 00.
5. Remove NATO slave receptacle dust cap (5) from NATO slave receptacle (4) on BEB.
6. Connect NATO slave cable (1) to NATO slave receptacle (4).
7. Start engines. Refer to WP 0012 00.
8. Disconnect NATO slave cable (1) from NATO slave receptacle (4) and (2), and install dust caps (5) and (3) on receptacles (4) and (2).
9. Close battery compartment. Refer to WP 0004 00.
10. Stow NATO slave cable (1) in CBT stowage compartment.



END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

PERSON IN WATER (PW)/FLOATING OBJECT RETRIEVAL

SAFETY

Safety is always a primary consideration when soldiers are required to work near or over the water. Because the variety of missions being performed around water, and because no two bodies of water are exactly alike, it is difficult to prescribe safety guidelines that can be applied to all situations.

The Department of the Army has therefore instructed that all subordinate commands establish a Standard Operating Procedure (SOP) for water safety. Army Regulation (AR) 385-15 requires that this SOP be based upon the missions required of each respective unit, and on the environmental conditions under which each unit is expected to perform the mission. Some considerations to assist in the formulation of an SOP are provided in subsequent paragraphs.

PERSONNEL

Personnel required to work on or near water should periodically receive drownproofing training. In situations where nonswimmers must work over the water, these personnel should be identified beforehand and paired with a “buddy” who is a strong swimmer.

All personnel required to work over the water should be provided with a Personnel Flotation Device (PFD). Personnel should be inspected prior to waterborne operations to ensure that the PFDs are properly fitted and worn.

Personnel working on or near water should unblouse the trousers from their boots. Overshoes should not be worn when working over the water. All personnel should receive a safety briefing prior to the conduct of waterborne operations. This briefing should explain to personnel any hazards, which might exist around the work site, such as particularly swift currents, shoals, sandbars, or other obstructions in the water, and any dangerous weather conditions such as high winds or low visibility. The briefing can also be used to train or retrain personnel in skills such as the emergency/man overboard drills, watercraft discipline, methods of signaling the safety boat in an emergency, and first aid.

The commander should designate a safety officer who is responsible for the conduct of operations near or over the water. The safety officer’s primary responsibilities are to ensure that the safety SOP is adequate, that all unit personnel are aware of the contents of the SOP.

PERSON IN WATER (PW)/FLOATING OBJECT RETRIEVAL (Contd)

SAFETY BOATS

When conducting operations on water, the commander should always consider designating one of the watercraft as a safety boat. This boat must be large enough and powerful enough to cope with the conditions at the work site. The safety boat should be crewed by at least two persons who are qualified and experienced boat operators. Both crew members should be trained in the correct methods of recovering personnel from the water, basic first aid artificial respiration, and correct radio procedures. A combat life saver and a strong swimmer must be on the safety boat. The safety boat should be equipped, as a minimum, with the items listed:

Anchor and Line

Boat Hook

Ring Buoy and Rope

Combat Lifesaver Bag

Blankets

Radio

Searchlight

The designated safety boat should perform no duties other than to stand by. Safety boat location is usually downstream within a safe distance of the work site. In some situations the commander might be required to designate more than one safety boat.

REACH RECOVERY METHOD

WARNING

In fast moving currents, do not position boat directly downstream in front of overboard person. Overboard personnel may be swept under boat. Failure to comply may result in injury or death to personnel.

Approach overboard person at slow speeds. Failure to comply may result in injury or death to personnel.

1. Shout, “man overboard” and, if available, designate a crewmember to spot the person’s position in the water. The spotter should not take his eyes off the overboard person.
2. Boat operator should take directions from the spotter, maneuver, and hold boat in position. Refer to WP 0017 00.
3. Crewmember may use extendable boat hook to pull overboard person along side of boat.
4. Once person is along side boat, using a two-man lift, grasp person and PFD to raise and secure person aboard boat.
5. If needed, perform first aid (FM 4-25.11) and seek medical attention as soon as possible.

PERSON IN WATER (PW)/FLOATING OBJECT RETRIEVAL (Contd)

THROW RECOVERY METHOD

WARNING

In fast moving currents, do not position boat directly downstream in front of overboard person. Overboard personnel may be swept under boat. Failure to comply may result in injury or death to personnel.

Approach overboard person at slow speeds. Failure to comply may result in injury or death to personnel.

Do not throw ring buoy (life ring) directly at overboard person. Failure to comply may result in injury or death to personnel.

NOTE

This method should be used if overboard person is able to aid in their recovery.

1. Shout, "man overboard" and, if available, designate a crewmember to spot the person's position in the water. The spotter should not take his eyes off the overboard person.
2. Boat operator should take directions from the spotter, maneuver, and hold boat in position. Refer to WP 0017 00.
3. Crewmember may use extendable boat hook to pull overboard person along side of boat.
4. Once person is along side boat, using a two-man lift, grasp person and PFD to raise and secure person aboard boat.
5. If needed, perform first aid (FM 4-25.11) and seek medical attention as soon as possible.

PERSON IN WATER (PW)/FLOATING OBJECT RETRIEVAL (Contd)

JUMP RECOVERY METHOD

WARNING

In fast moving currents do not position boat directly downstream in front of overboard person. Overboard personnel may be swept under boat. Failure to comply may result in injury or death to personnel.

Approach overboard person at slow speeds. Failure to comply may result in injury or death to personnel.

Do not throw ring buoy directly at overboard person. Failure to comply may result in injury or death to personnel.

NOTE

This method should be used if overboard person is unable to aid in their recovery.

1. Shout, “man overboard” and, if available, designate a crewmember to spot the person’s position in the water. The spotter should not take his eyes off the overboard person.
2. Boat operator should take directions from the spotter, maneuver, and hold boat in position. Refer to WP 0017 00.

WARNING

Do not enter dangerous water. Failure to comply may result in injury or death to personnel.

3. Crewmember jumps overboard with ring buoy to aid in the recovery of overboard person.
4. Crewmember positions ring buoy around overboard person, then boat crew pull overboard person along side boat.
5. Once person is along side boat, using a two-man lift, grasp person and PFD to raise and secure person aboard boat.
6. If needed, perform first aid (FM 4-25.11) and seek medical attention as soon as possible.

PERSON IN WATER (PW)/FLOATING OBJECT RETRIEVAL (Contd)

FLOATING OBJECT RETRIEVAL

WARNING

In fast moving currents, do not position boat directly downstream of object. Object may be explosive and could endanger crewmembers and equipment. Failure to comply may result in injury or death to personnel and damage to equipment.

Approach object at slow speeds. Failure to comply may result in injury or death to personnel and damage to equipment.

1. Designate crewmember to spot object.
2. Boat operator should take directions from the spotter, maneuver, and hold boat in position. Refer to WP 0017 00.
3. Crewmember may use extendable boat hook to pull object along side boat.

NOTE

Large objects may require a two man lift or need to be towed, refer to towing (WP 0029 00).

4. Once object is along side boat, lift and secure object aboard boat.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

OPERATION OF SPECIAL PURPOSE KITS

DEPTH SOUNDER OPERATION

NOTE

Routing of depth sounder cable is (cab dependent). Installation is described with cab mounted.

1. Remove two capscrews (5) and lockwashers (4) from depth sounder mounting holes (3).

CAUTION

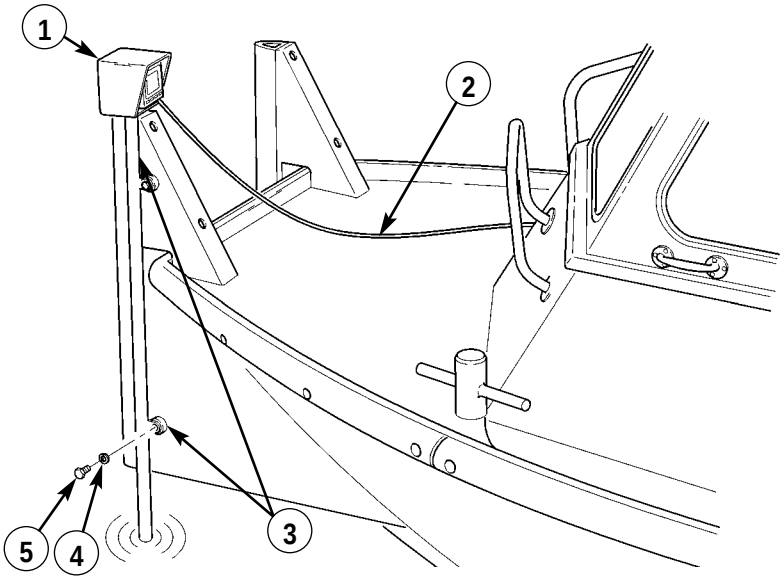
Do not drop depth instrument or depth instrument cable end into water. Failure to comply may result in damage to equipment.

2. Align depth sounder (1) with depth sounder mounting holes (3).
3. Install two lockwashers (4) and cap screws (5) in depth sounder mounting holes (3).

NOTE

Cable routing may be different if cab is not installed.

4. Route depth sounder cable (2) into forward cockpit.



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OPERATION OF SPECIAL PURPOSE KITS (Contd)

INSTALL DEPTH SOUNDER (Contd)

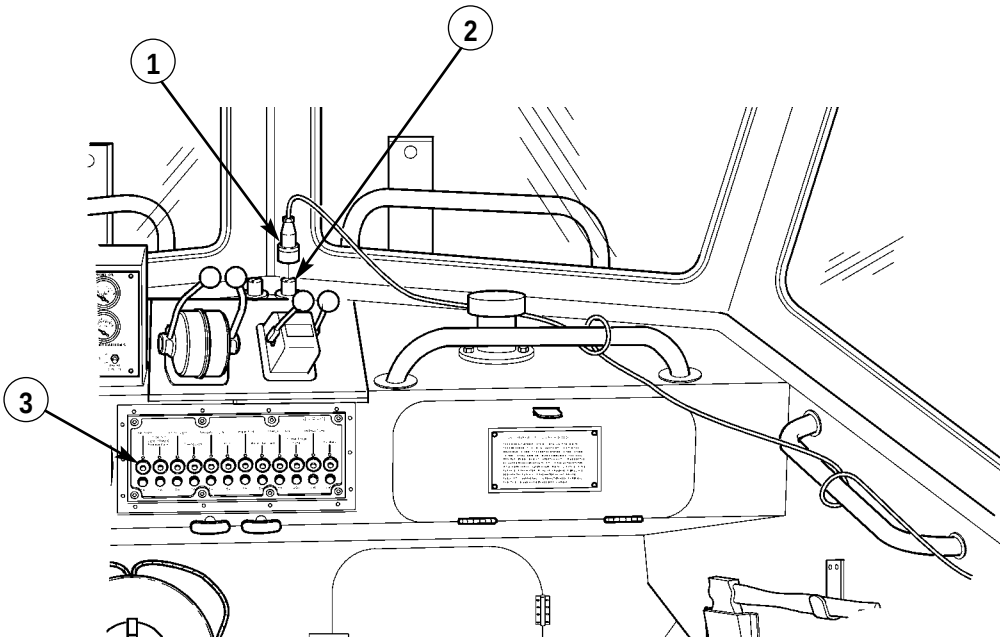
WARNING

Depth instrument cable is routed across bow and connected to cab electrical connector, avoid tripping or stepping on cable. Failure to comply may result in injury to personnel or damage to equipment.

NOTE

Search light cable may need to be removed from cab electrical connector prior to connecting depth instrument cable.

5. Connect depth sounder cable (1) to console electrical connector (2).
6. Push searchlight pushbutton (3) to ON position.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER GENERAL INTRODUCTION

The Simrad IS12 System is a flexible modular series of instruments that offer large, clear displays, easy to operate functions and robust, and weatherproof construction.

DEPTH SOUNDER OPERATION

Water Depth

On power up, the current water depth is shown.

In this example, the depth is displayed in meters (13.9m). The Depth Sounder can display depth in feet or meters. The arrow in the top line of the display indicates the trend (up or down).

NOTE

Refer to Turbulence & Signal Acquisition within this work package for further information on how the depth sounder will behave if the depth signal is lost. As default, the Depth Sounder will display the depth below the transducer.

An offset can be entered so that the display shows either the depth below the keel or the waterline depth. Refer to Off Set within this work package for more details.

Alarms

The Depth Sounder features an audible alarm function that can be set to alert if the water depth falls below or above a specified value. This is a useful function to avoid the boat running aground in shallow water, or straying into deep water.

NOTE

The alarms will sound for 15 seconds when triggered by the alarm condition (unless manually muted), then sound again after a 15 second pause and continue in this pattern until the water depth is once again within the specified parameters.

OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Shallow Alarm

The shallow alarm sounds if the water depth falls below a specified amount, to warn crewmembers boat is about to run aground.

NOTE

While the alarm is on, the (🔔) icon will be shown on the display.

If no key is pressed within 5 seconds, the display will exit to the main screen and any changes will be ignored.

1. If the alarm sounds, press SHALL to mute alarm.

2. Press the SHALL key to access the shallow alarm.
3. If the shallow alarm is OFF, pressing the (-) or (+) (SHALL or DEEP) keys will switch on the alarm at the previously entered value (Min 0.6m/2ft, Max 327ft or (100m).
4. Use the (-) or (+) to adjust the shallow alarm setting in 0.1m (-) or (+) 1ft increments and press (✓) (INFO) to confirm and exit to the main screen.
5. Press and hold the (-) or (+) keys to scroll up and down in 1m/10ft increments.
6. Press (x) (LIGHT) to turn the shallow alarm off.

OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Deep Alarm

The deep alarm will sound if the water depth goes above a specified amount.

NOTE

If no key is pressed within 5 seconds, the display will exit to the main screen and any changes will be ignored.

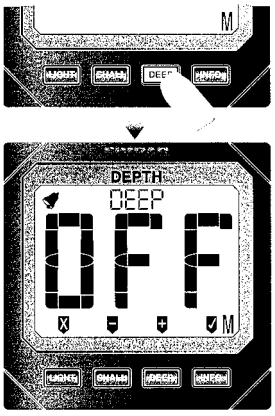
If the alarm sounds, press DEEP to acknowledge and cancel.

The deep alarm cannot be set lower than the shallow alarm, and the shallow alarm cannot be set higher than deep alarm.

1. Press the DEEP key to access the deep alarm.
2. If the deep alarm is OFF, pressing the (-) or (+) (SHALL or DEEP) keys will switch on the alarm at the previously entered value (Min 0.6m/2ft, Max 100m/327ft).
3. Use the (-) or (+) keys to adjust the deep alarm setting in 0.1m or 1ft increments and press (✓) (INFO) to confirm and exit to the main screen.
4. Press and hold the (-) and (+) keys to scroll up and down in 1m / 10ft increments.
5. Press (x) (LIGHT) to turn the deep alarm off.

NOTE

While the alarm is on, the (🔔) icon will be shown on the display.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

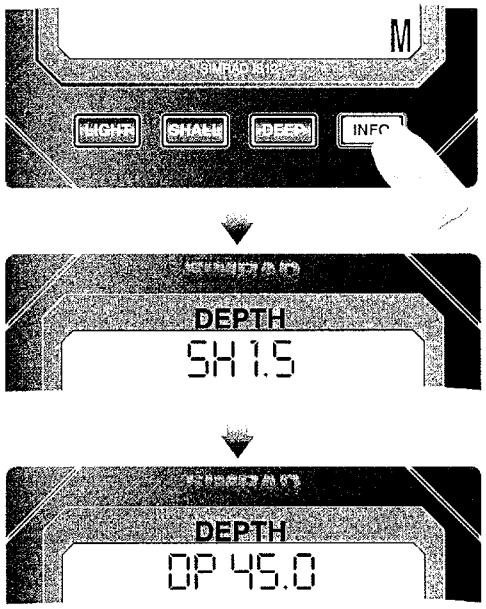
Info Key

Pressing the **INFO** key will cycle through the information that can be shown on the top line of the display.

- Default (DEPTH)
- Shallow alarm setting
- Deep alarm setting

NOTE

The selected information will be displayed permanently on the top line until the INFO key is pressed again.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Backlighting

The Backlighting illuminates the display and the keys, with five levels of brightness.

1. Press the LIGHT key switch to illuminate the backlighting on the display and the large digits will show the current lighting level.

NOTE

Four icons will be shown on the bottom line of the display, corresponding to the four keys (x, -, + and ✓).

2. Press the (+) (DEEP) key to increase the brightness (max 5), (-) (SHALL) to decrease it (min 1), (3) (INFO) to accept the selected brightness or (x) (LIGHT) to turn the backlighting off.

NOTE

The currently selected lighting level will be applied if no key is pressed after five seconds.

While the backlighting is on, the lamp icon (💡) will be shown on the bottom left of the display. The backlighting can either be Local or Network controlled, refer to Local & Network Backlighting within this work package.

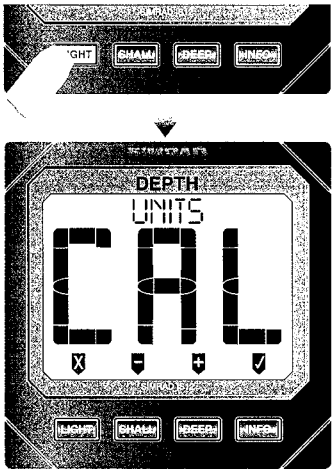
OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Calibration

NOTE

To protect the calibration functions, these are held in a hidden menu.



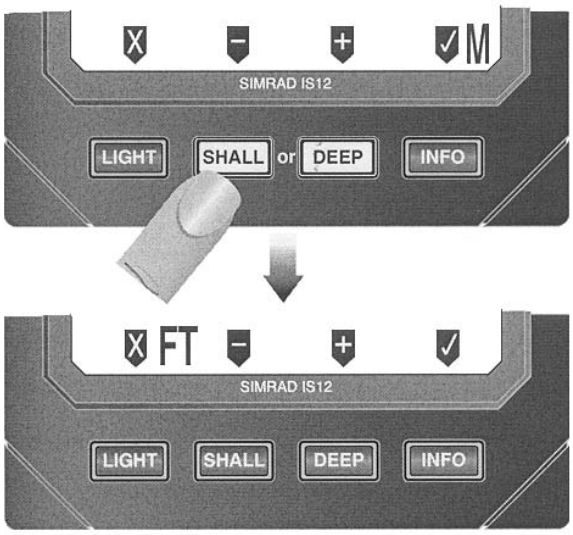
1. To enter calibration mode, press and hold the LIGHT.
2. In calibration mode, pressing the (-) or (+) (SHALL) or (DEEP) keys will cycle through the available calibration options:
   - Units
   - Damping
   - Offset
   - Transducer Off/On
   - Local / Network Backlighting
   - Shop Mode
   - Disabling Remote Control Facility
3. Select the required option and press (✓) to enter. While in the calibration options, the following key functions apply:
   a. To save settings and return to Cal menu press (✓).
   b. To ignore changes and return to Cal menu press (x).
   c. To exit calibration mode at any time, press and hold (x).

OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Selecting Units

1. Enter calibration mode (-) the display will show UNITS CAL.
2. Press (✓) (INFO). The depth units can then be selected (Feet or Meters) by pressing the (-) or (+) keys.
3. Press (✓) to set the selected depth units.
4. Press (x) to exit to the main calibration menu without changes being saved.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

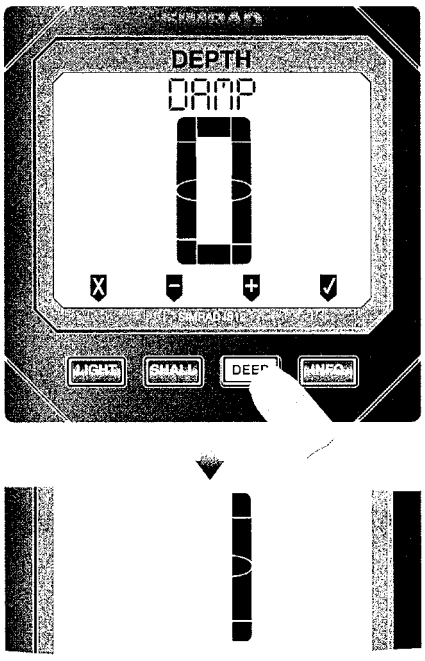
DEPTH SOUNDER OPERATION (Contd)

Damping

NOTE

The Damping function adjusts the update rate of the display. A damping level of 0 (minimum) will cause the display to update rapidly, while a damping level of 4 (maximum) will result in a more stable display, but one that is less frequently updated.

1. Enter calibration mode, press (+) once (the display will show DAMP CAL) and press (✓) (INFO).
2. The damping level can be adjusted using the (-) and (+) keys.
3. To set the selected damping level, press (✓). The display will then return to the main calibration menu.
4. Press (x) to exit to the main calibration menu at any point.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

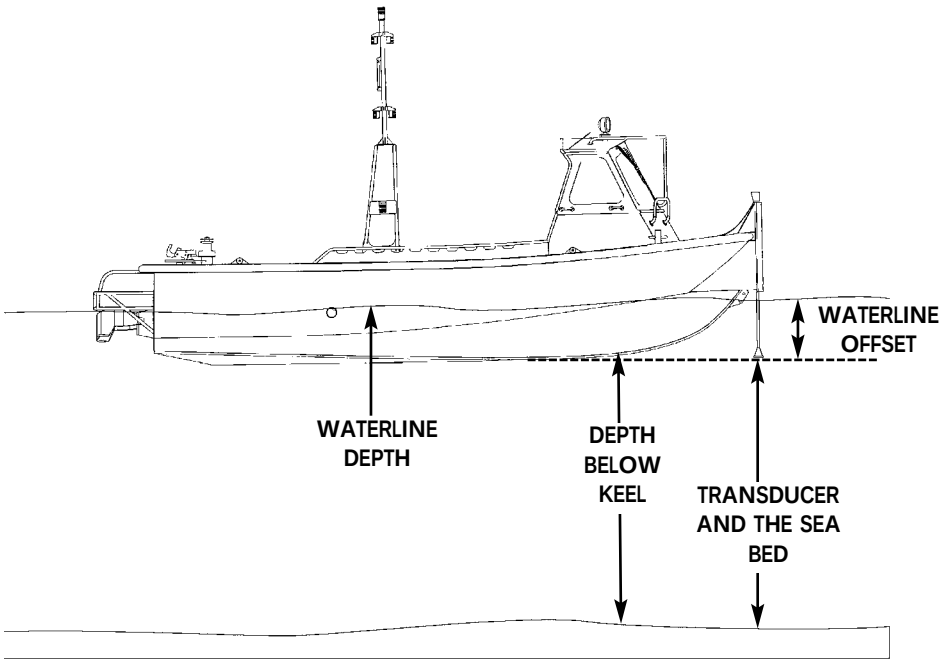
Offset

As screen default, the Depth Sounder displays the water depth between the transducer and the sea bed.

In other circumstances it may be more important to show the waterline depth, that is the total depth of water from the bottom to the surface.

The Depth Sounder allows a keel or waterline offset to be entered, so that the displayed depth will more accurately reflect the depth of water available beneath the boat.

To calculate the offset amount, measure the vertical distance between the bottom of the keel and the bottom of the transducer for a keel offset, or the vertical distance between the surface of the water and the bottom of the transducer for a waterline offset.



OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Offset Contd)

1. To enter the offset, enter calibration mode then press (+) twice (the display will show OFFST CAL) and press (✓).

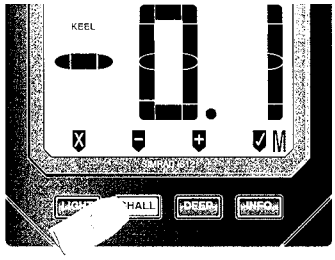
NOTE

The current offset will be displayed - default value 0.0.

Keel Offset

NOTE

Since entering a keel offset is reducing the displayed depth, this is entered using the (+) or (-) key which will adjust the offset in 0.1m /0.1ft decrements. The display will show “KEEL”.



1. To set the selected keel offset, press (✓). The display will then return to the main calibration menu.
2. Press (x) to exit to the main calibration menu at any point.

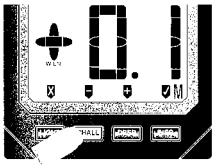
OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Waterline Offset

NOTE

A waterline offset increases the displayed depth, so this is entered using the (+) or (-) key, this adjusts the offset in 0.1m /0.1ft increments. The display will show “W'LN”.



1. To set the selected waterline offset, press (✓). The display will then return to the main calibration menu.
2. Press (x) to exit to the main calibration menu at any point.

Switching Transducer Off / On

NOTE

If the boat uses more than one instrument with a transducer running at a similar frequency, there may be some interference between the two transducers. In this case, the transducer can be switched off. This is also useful to conserve power when depth sounder is not needed.

While the transducer is set to off, the main depth display will show OFF. To turn the transducer to ON again, repeat the above procedure.

1. Enter calibration mode, press (+) x3 (the display will show TRANS CAL) and press (✓).
2. The display will show “On”. To turn the transducer off, press the (-) or (+) key (the display will show “OFF”) and press (✓) to confirm. The display will then return to the main calibration menu.
3. Press (x) to exit to the main calibration menu at any point.

OPERATION OF SPECIAL PURPOSE KITS (Contd)

DEPTH SOUNDER OPERATION (Contd)

Local & Network Backlighting

The Backlighting can be set so that any changes made are duplicated across the system (*Network*), or so that any changes are limited to this specific instrument only (*Local*).

NOTE

The IS12 instruments are set to Networked lighting as default.

Enter calibration mode, press (+) four times (the display will show LIGHT on the top line) and press (✓) (**INFO**).

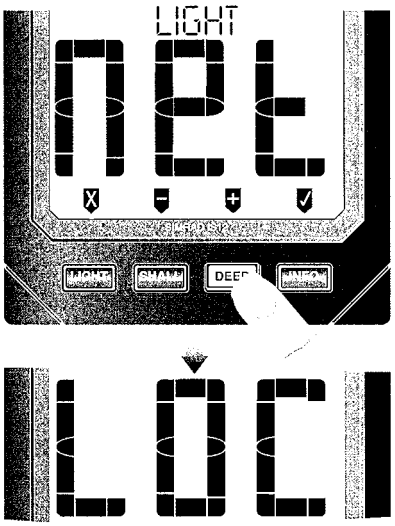
The large digits will show the current setting - NET for Networked or LOC for Local. The setting can be changed using the (-) or (+) keys.

NOTE

Any changes will affect this specific instrument only.

To set the selected backlighting, press (✓). The display will then return to the main calibration menu.

Press (x) to exit to the main calibration menu at any point.



END OF WORK PACKAGE

CHAPTER 3

TROUBLESHOOTING PROCEDURES
BRIDGE ERECTION BOAT (BEB)
MK II-S

TROUBLESHOOTING PROCEDURES

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

INTRODUCTION TO TROUBLESHOOTING

GENERAL

a. The following troubleshooting work packages provide the necessary troubleshooting procedures to diagnose mechanical, hydraulic, and electrical malfunctions for the BEB.

b. The symptom index is used to identify the malfunction and locate the troubleshooting procedure to diagnose the problem.

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

d. Prior to performing any troubleshooting procedure, the following recommendations should be observed:

(1) Isolate the system where the malfunction occurs.

(2) Perform the troubleshooting procedure in the order in which steps are listed.

(3) Consider the possibility that the problem could be simple in origin and may require only a minor adjustment; use common sense.

(4) If a malfunction occurs that is not listed, notify your supervisor.

(5) If a problem cannot be corrected after performing all corrective actions listed for a malfunction, notify your supervisor.

e. If the corrective action is not authorized at the operator's level, operators should provide a brief written description of the problem using Equipment Inspection and Maintenance Worksheet, DA Form 2404 or DA Form 5988-E, and Maintenance Request, DA Form 2407.

END OF WORK PACKAGE

TROUBLESHOOTING PROCEDURES

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

MECHANICAL TROUBLESHOOTING

MECHANICAL TROUBLESHOOTING (Contd)

Engine Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

CAUTION

Never use starting fluid (ether) to assist starting engine. Failure to comply will result in damage to engine.

1. ENGINE WILL NOT CRANK

Step 1. Check position of master switch.

Set master switch to ON position.

Step 2. Check Starting Batteries gauge for 24 volts.

a. If gauge reads less than 24 volts, depress emergency link button on auxiliary switch panel to link auxiliary batteries in parallel.

b. Notify Field maintenance.

Step 3. Check position of engine emergency stop control cables.

a. Push control cable in.

b. Notify Field maintenance.

END OF TESTING

2. ENGINE CRANKS BUT DOES NOT START

Step 1. Check for empty fuel tank.

Fill fuel tank.

Step 2. Check position of engine emergency stop control cables.

a. Push control cable in.

b. Notify Field maintenance.

END OF TESTING

3. ENGINE SHUTS DOWN DURING OPERATION

Step 1. Check for empty fuel tank.

Fill fuel tank.

Step 2. Fuel filter blocked.

Notify Field maintenance.

END OF TESTING

MECHANICAL TROUBLESHOOTING (Contd)

Engine Troubleshooting (Contd).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. ENGINE SPEED AND PERFORMANCE DROP OFF

Step 1. Check fuel level.

Fill fuel tank.

Step 2. Check fuel tank vent for obstruction.

Remove obstruction.

Step 3. Check fuel lines for leaks.

If leaks are found, notify Field maintenance.

END OF TESTING

5. ENGINE SPEED AND PERFORMANCE DROP OFF AND BLACK SMOKE IS EMITTED FROM EXHAUST

Check for clogged air filter. Refer to WP 0049 00.

a. Clean or replace air filter.

b. If problem persists, notify Field maintenance.

END OF TESTING

6. ENGINE WILL NOT SHUT OFF

Step 1. Pull engine emergency stop control cable.

Step 2. Notify Field maintenance.

END OF TESTING

7. SUDDEN LOSS OF OIL PRESSURE

Step 1 Check engine for oil leaks while running.

If oil leak is present, determine location and notify Field maintenance.

Step 2. Check engine oil level. Refer to WP 0049 00.

Fill oil to proper level.

END OF TESTING

MECHANICAL TROUBLESHOOTING (Contd)

Engine Troubleshooting (Contd).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

8. ENGINE COOLANT TEMPERATURE ABOVE NORMAL (ENGINE AUDIBLE ALARM ACTIVATES)

Step 1. Move the boat.

Step 2. Ensure transmissions are in forward position.

Step 3 Check coolant level in reservoir.

If coolant is low, add coolant to proper level. Refer to WP 0049 00.

Step 4. Check cooling system for leaks.

If leaks are found, notify Field maintenance.

Step 5. Notify Field maintenance.

END OF TESTING

Transmission Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

9. LOW TRANSMISSION OIL PRESSURE

Step 1. Check transmission oil level. Refer to WP 0049 00.

Fill oil to proper level.

Step 2. Check raw water filter for blockage and/or damage. Refer to WP 0049 00.

a. Clean raw water filter basket.

b. If damage is present, notify Field maintenance.

END OF TESTING

10. TRANSMISSION WILL NOT ENGAGE

Step 1. Verify throttle/transmission control lever is working properly.

Step 2. Verify transmission cable connection at transmission.

Step 3. If problem persists, notify Field maintenance.

END OF TESTING

MECHANICAL TROUBLESHOOTING (Contd)

Hydrojet Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

11. BOAT VIBRATION FELT WHILE UNDER WAY/LOSS OF THRUST

Step 1. Check for debris in hydrojet intake grill.

Back flush intake grill. Refer to WP 0024 00.

Step 2. Check drive shaft couplings and U-joints for damage.

If driveshaft couplings or U-joints are damaged, notify Field maintenance.

Step 4. Check engine mounting brackets and hardware for tightness.

END OF TESTING

Scupper Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

12. SCUPPERS DO NOT DRAIN WATER FROM BOAT

Inspect scupper drains for blockage or damage.

a. Clean scupper drains.

b. If scupper drains are damaged, notify Field maintenance.

END OF TESTING

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

HYDRAULIC TROUBLESHOOTING

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WP-PAGE
1.	Steering difficult or inoperable	0042 00-1
2.	Scoop reverse deflector does not operate	0042 00-1

Hydraulic Troubleshooting.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. STEERING DIFFICULT OR INOPERABLE

Step 1. Check steering hoses for leaks or damage.

a. Tighten all loose hose fittings.

b. If leaks in hoses are found, notify Field maintenance

Step 2. Check tie rod for loose, missing, or damaged hardware.

If loose, missing, or damaged, notify Field maintenance.

2. SCOOP REVERSE DEFLECTOR DOES NOT OPERATE

Step 1. Check for obstruction or damage.

Remove obstruction or notify Field maintenance if damaged.

Step 2. Check for loose or missing hydraulic pump V-belts.

Notify Field maintenance if belts are loose or missing.

Step 3. Check for low oil level in hydraulic pump. Refer to WP 0049 00.

Add oil to hydraulic pump.

END OF TESTING

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

ELECTRICAL TROUBLESHOOTING

MALFUNCTION NO.	MALFUNCTION	TROUBLESHOOTING WP-PAGE
1.	Electrical system inoperable	0043 00-1
2.	One or both warning lights do not come on . . .	0043 00-2
3.	Individual lights inoperable	0043 00-2
4.	Instrument panel gauge inoperable	0043 00-2
5.	Horn will not sound	0043 00-2
6.	Windshield wipers will not operate	0043 00-2

Electrical Troubleshooting.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ELECTRICAL SYSTEM INOPERABLE

Step 1. Check position of master battery switch.
Set master battery switch to ON position.

Step 2. Check Starting Batteries and Auxiliary Batteries gauges for 24 volts.
If readings are below 24 volts, notify Field maintenance.

Step 3. Check for loose or corroded battery connections and cables.
If loose or corroded connections are found, notify Field maintenance.

END OF TESTING

ELECTRICAL TROUBLESHOOTING (Contd)

Electrical Troubleshooting (Contd).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. ONE OR BOTH WARNING LIGHTS DO NOT COME ON

Step 1. Switch engine circuit switch ON.

If warning lights do not come on, notify Field maintenance.

Step 2. Check for loose or corroded battery connections and cables.

If loose or corroded connections are found, notify Field maintenance.

END OF TESTING

3. INDIVIDUAL LIGHTS INOPERABLE

Step 1. Inspect individual lamps and sockets.

Notify Field maintenance.

END OF TESTING

4. INSTRUMENT PANEL GAUGE INOPERABLE

Check individual gauge for visual damage.

If gauge is damaged, notify Field maintenance.

END OF TESTING

5. HORN WILL NOT SOUND

Check for loose, damaged, or missing connections.

a. Tighten connections if loose.

b. If connections are missing or damaged, notify Field maintenance.

END OF TESTING

6. WINDSHIELD WIPERS WILL NOT OPERATE

Step 1. Verify battery master switch is in the ON position.

Step 2. Check for loose or damaged connections.

Tighten connections if loose or notify Field maintenance if damaged.

Step 3. Check wiper switch circuit breaker.

If circuit breaker will not reset, notify Field maintenance.

END OF TESTING

END OF WORK PACKAGE

CHAPTER 4

MAINTENANCE INSTRUCTIONS/PMCS
BRIDGE ERECTION BOAT (BEB)
MK II-S

MAINTENANCE INSTRUCTIONS/PMCS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

SERVICE UPON RECEIPT

GENERAL

Upon receipt of a new, used, or reconditioned BEB, perform the following steps to determine if the BEB 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 required in Preventive Maintenance Checks and Services (PMCS). Refer to WP 0046 00.
3. Check all Basic Issue Items (BII) to ensure every item is present, in good condition, and properly mounted or stowed. Refer to WP 0051 00.

GENERAL INSPECTION AND SERVICING INSTRUCTIONS

Refer to WP 0046 00 and WP 0047 00 in this manual when servicing, inspecting, and lubricating equipment.

SERVICE UPON RECEIPT (Contd)

GENERAL INSPECTION AND SERVICING INSTRUCTIONS (Contd)

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.

NOTE

When a BEB is delivered to the using organization, the following steps must be completed.

1. Use Skysol 100 to clean all exterior surfaces coated with corrosion preventive compound.
2. Read Processing and Deprocessing Record of Shipping, Storage, and Issue of BEBs and Spare Engines tag (DD Form 1397), and follow all precautions listed. This tag should be attached to steering wheel or battery master switch.

SPECIFIC INSPECTION AND SERVICING INSTRUCTIONS

1. Perform before, during, and after PMCS listed in WP 0046 00.

NOTE

Do not change gear cases or engine oil unless processing tag states that oil is unsuitable for more than 50 hours of operation. If oil is suitable, check oil level WP 0049 00.

2. Lubricate the BEB according to instructions found in WP 0047 00.
3. Schedule semiannual service on DD Form 314 (Preventive Maintenance Schedule and Record Card) or DA form 5986-E (Preventive Maintenance Schedule and Record) if using Unit Level Logistic System (ULLS).
4. Check BEB coolant level and determine if solution is proper for climate. Refer to WP 0049.

END OF WORK PACKAGE

MAINTENANCE INSTRUCTIONS/PMCS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION

GENERAL

To ensure that the boat is ready for operation at all times, inspect it systematically for defects. Correct all defects discovered during operation of the boat as soon as it has completed its mission. Stop any operation which would damage the boat. Record deficiencies and corrective action taken on DA form 2404, Equipment Inspection and Maintenance Worksheet or DA Form 5988-E Equipment Maintenance and Inspection Worksheet (Automated) ITEM NUM column.

A permanent record of services, repairs, and modifications is required. Refer to DA PAM 750-8 for information about the forms and records that are used to record boat maintenance.

CLEANING INSTRUCTIONS AND PRECAUTIONS

Cleaning is a during and after operation service performed by operators to maintain boat readiness. Boat must be kept as clean as possible, depending on the available cleaning equipment and materials and tactical situation.

General Cleaning Precautions

- Perform all cleaning procedures in well-ventilated areas.
- Wear protective gloves, clothing, and respiratory equipment when using caustic, toxic, or flammable cleaning materials.
- Never use diesel fuel or gasoline for cleaning.
- A fire extinguisher must be readily available during all cleaning operations using flammable cleaning materials.

Special Precautions

- Do not allow cleaning materials to come in contact with rub rails or anything rubber.
- Do not allow corrosion-removing cleaning materials to contact painted surfaces.
- Do not steam-clean surfaces.
- Do not use steam or high-pressure air to clean engine compartment or jet drive.

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

CLEANING INSTRUCTIONS AND PRECAUTIONS (Contd)

Cleaning Materials

Refer to TM 9-247 for a detailed description of cleaning compounds, cleaning solvents, and corrosion-removing compounds.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

The Operator/Crew Preventive Maintenance Checks and Services Work Package (WP 0046 00) includes inspection and service procedures that must be performed to maintain the boat and other equipment in good operating condition.

Trouble Spots

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 eye 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 injury to personnel.

NOTE

Dirt, grease, oil, and debris may cover up a serious problem. Clean as you check. Follow precautions printed on container. Use Skysol 100 solvent to clean metal surfaces. Use soap and water to clean rubber and plastic.

Inspection of the following items is required each time PMCS is done. Verify visually that all parts are in good operational condition.

Check boat for dirt, grease, oil, and debris. Use soap and water when cleaning rubber or plastic material.

Check bolts, nuts, and screws visually for looseness, missing, bent, or broken condition. If loose, notify your supervisor.

Check bolt heads for chipped paint, bare metal, or corrosion.

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

Trouble Spots (Contd)

Check welds for loose or chipped paint, corrosion, or cracks/separation where parts are welded together. If weld is broken, notify your supervisor.

Check electric wires and connectors for cracked or broken insulation.

Check hoses and fluid lines for wear, damage, and leaks. Verify clamps and fittings are tight. Wet spots show leaks and a stain around a fitting or connector can mean a leak. Report broken or leaking hoses or lines to your supervisor.

Check control cables and linkages for loose or broken cables, bent or broken rods, and loose connections. Report damaged or broken cables, bent or broken rods, and loose connections to your supervisor.

Check hatches when opening battery, engine, and hydrojet compartment for missing fasteners, hinges, and stays. Report any missing or broken components to your supervisor.

Class Leakage Definition

CAUTION

Equipment operation is allowable with minor leakages (Class I or II) depending on the fluid capacity on the item being inspected. Report problems to your supervisor.

When operating Class I or Class II leaks, continue to check fluid level as required in your PMCS. Verify that current leaks have not become Class III leaks.

Class III leaks should be reported to your supervisor; boat should not be operated with Class III leaks.

Wetness around seals, gaskets, fittings, or connections indicates leakage. A stain also indicates leakage. If a fitting or connector is loose, tighten it. If a fitting or connector is broken or defective, notify your supervisor.

Use the following leak definition as a guide:

Class I— Leakage indicated by wetness or discoloration but not great enough to form drops.

Class II— Leakage great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

Class III— Leakage great enough to form drops that fall from the item being checked/inspected.

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

PMCS TABLE

NOTE

The following items correspond to the table headings in table 1 in Operator/Crew Preventive Maintenance Checks and Services, WP 0046 00.

Item No.

These index numbers correspond to the equipment listed in the Items to Check/Service column. These index numbers are entered in the DA Form 2404 Equipment Inspection and Maintenance Worksheet TM ITEM NO. column, or DA Form 5988-E Equipment Maintenance and Inspection Worksheet (Automated) ITEM NUM column.

Interval

Specifies when a particular procedure is performed.

If equipment fails to operate, perform troubleshooting procedures. Report problems to your supervisor; refer to DA PAM 750-8 for forms and records required to report these conditions.

Before—procedure is performed before the operation of the boats intended mission.

During—procedure is performed when the boat is being operated during its intended mission.

After—procedure is performed when the boat has completed or finished its mission.

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

Item to Check / Service

This column specifies the equipment to be checked, inspected, or serviced.

Procedure

This column includes the check, inspection, and service procedures. Also included are all applicable warnings, cautions, and notes. Tools included with the boat must be used when performing PMCS. In addition to tools, wiping cloths are required to remove dirt and grease from boat surfaces.

References:

WP 0040 00 through WP 0043 00, Troubleshooting Procedures.

DA Form 2404, Equipment Inspection and Maintenance Worksheet or DA Form 5988-E Equipment Maintenance and Inspection Worksheet (Automated) ITEM NUM column—used to report non-reparable item(s) to maintenance personnel

NOTE

The term “ready/available” and “mission capable” have the same definition (i.e; the equipment is on hand and able to perform its combat mission); refer to DA PAM 750-8.

Equipment Not Ready / Available If:

This column of the PMCS indicates that the boat is not able to perform its prescribed mission, it must be reported as not ready/available. Report problems to your supervisor; refer to DA PAM 750-8 for forms and records required to report these conditions.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

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

WARNING

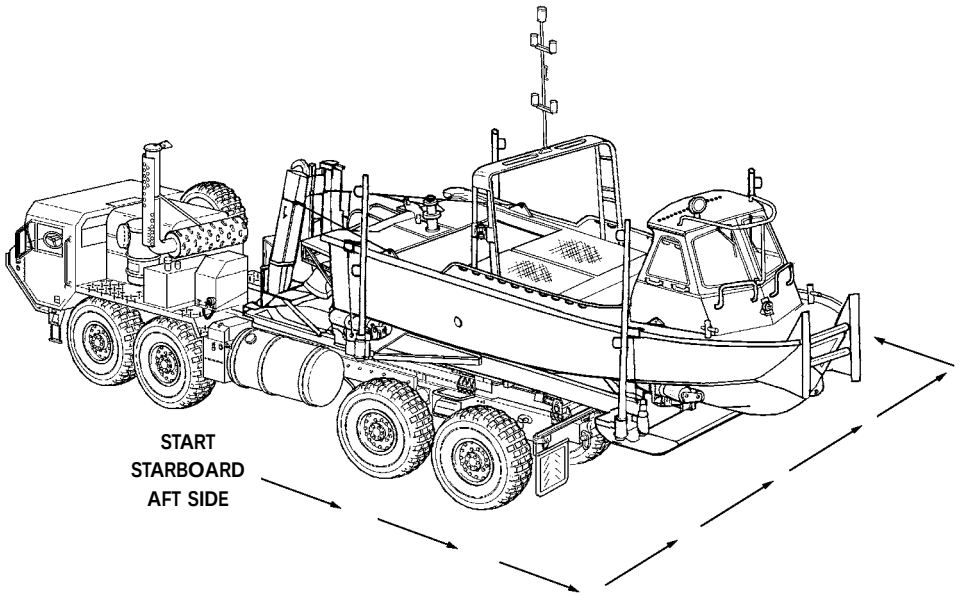
When checking/servicing an item, ensure that all attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may result in injury to personnel or damage to equipment.

CAUTION

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

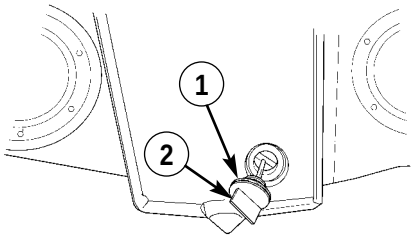
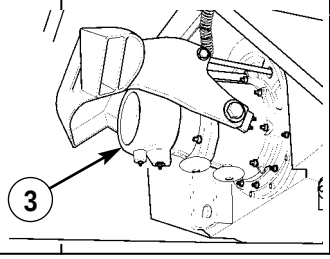
LUBRICATION

Perform lubrication checks and services after completing PMCS. Refer to WP 0047 00.



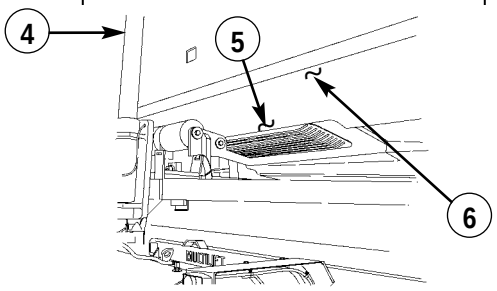
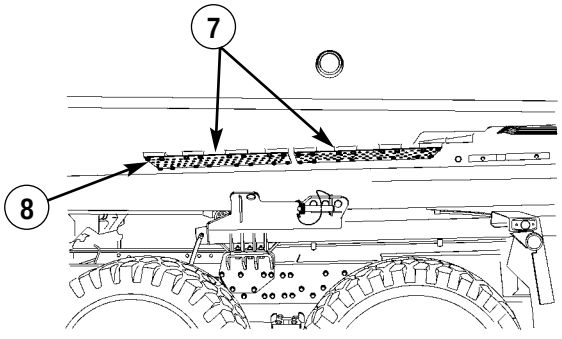
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

Table 1. Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			WARNING Be mindful of all WARNINGS, CAUTIONS, and NOTES while performing PMCS or injury to personnel or damage to equipment may result. NOTE PMCS item numbers 1 through 26 are performed with BEB on Improved Boat Cradle (IBC) on or off truck. If PMCS will be performed with BEB berthed in water, proceed to item number 10. PMCS item numbers 1 through 12 are performed with personnel from outside of boat on the ground.	
1.	Before	Hull drain plug (2) and gasket (1)	Check for missing or damaged drain plug. Install drain plug before launching. 	Drain plug or gasket is missing or damaged.
2.	Before	Port and starboard hydrojet exterior (3) 	a. Check for loose or missing mounting hardware and linkages, and damaged starboard scoop deflector and control rod. b. Check for missing, loose, or damaged mounting plate and mounting hardware.	a. Missing, loose, or damaged. b. Missing, loose, or damaged.

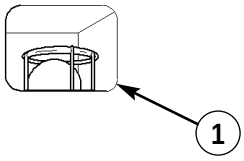
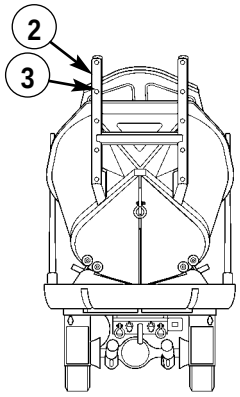
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
3.	Before	Starboard underside hull surface (6), hydrojet grill (5), and rear scupper drain (4)	a. Check for missing, loose, or damaged hydrojet inlet grill. Check for debris in hydrojet inlet.	a. Inlet grill is missing, damaged, or contains debris.
			b. Check for cracks, holes, or damage to bottom of hull.	b. Any break, hole, or damage will let water enter boat.
			c. Check for missing scupper drain ball and debris blocking drain.	
			d. Check for cracks, holes, or damage to hull surface.	d. Any crack, hole, or damage will let water enter boat.
				
4.	Before	Starboard keel cooler cover plates (7) and mounting hardware (8)	Check for missing, loose, or damaged keel cooler cover plates and mounting hardware.	If keel cooler coverplate is missing.
				

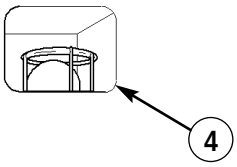
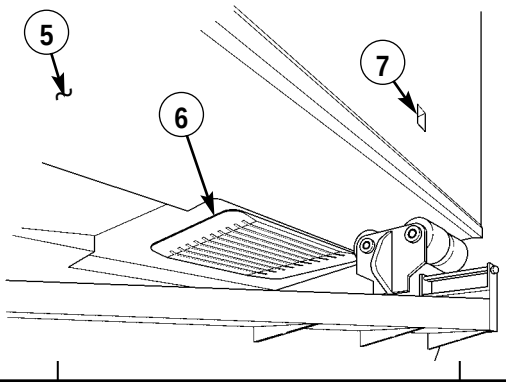
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
5.	Before	Starboard front scupper drain (1)	Check for missing scupper drain ball or debris in blocking drain.  	If scupper ball is missing.
6.	Before	Pushknees mounting hardware (3) and pads (2)	a. Check for missing, loose, or damaged mounting hardware or pads.	a. Any missing, loose, or damaged mounting hardware or pads.
			b. Check for missing, loose, or damaged pads.	b. Any missing, loose, or damaged pads.
			c. Check for missing, loose, or damaged screws or nuts.  	

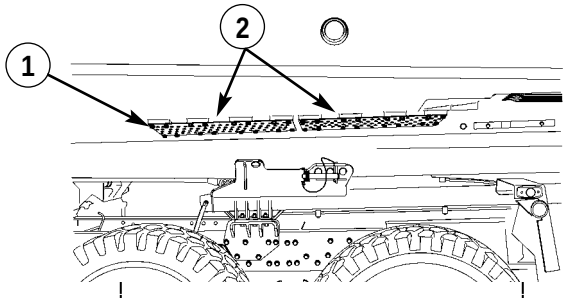
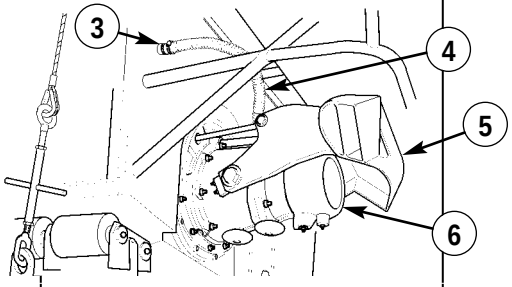
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
7.	Before	Port front scupper drain (4)	Check for missing scupper drain ball or debris in blocking drain. 	If scupper ball is missing.
8.	Before	Port underside hull surface (5), hydrojet grill (6), and rear scupper drain (7)	a. Check for cracks, holes, or damage to under hull surface.	a. Any crack, hole, or damage that will let water in the boat.
			b. Check for missing, loose, or damaged hydrojet inlet grill. Check for debris in hydrojet inlet.	b. Inlet grills missing or damaged.
			c. Check for cracks, holes, or damage to bottom of hull.	c. Any crack, hole, or damage that will let water enter boat.
			d. Check for missing scupper drain ball and debris blocking drain.	d. Any crack or hole that will let water enter boat.
			e. Check for cracks or holes on transom. 	e. Any crack or hole that will let water enter boat.

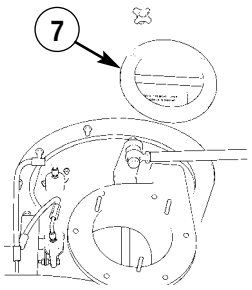
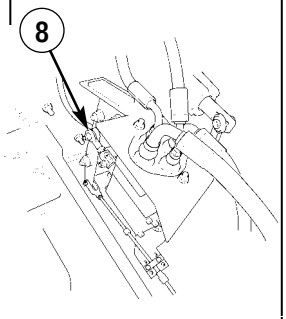
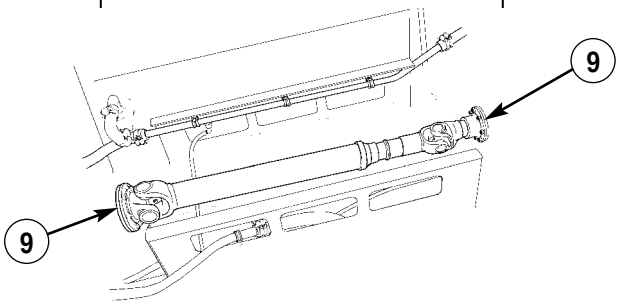
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
9.	Before	Port keel cooler cover plates (2) and mounting hardware (1)	Check for missing, loose, or damaged keel cooler cover plates and mounting hardware.	If keel cooler cover plate is missing.
				
10.	Before	Port and starboard hydrojet water supply hoses (4) and clamps (3)	Check for missing, loose, or damaged water supply hose or clamps.	Hoses and clamps are missing, loose or damaged.
				
			NOTE PMCS item numbers 11 through 14 are performed with hydrojet hatch covers open. PMCS item numbers 11 through 26 are performed with personnel in the boat.	
11.	Before	Port and starboard hydrojets (6) and exterior components	Check hydrojet inspection hatch for damage.	Access hatch missing or inoperable.
12.	Before	Port and starboard hydrojet scoops (5), steering components, and hydrojet inspection cover (7)	a. Check for missing, damaged, or misaligned mechanical components.	a. Missing.

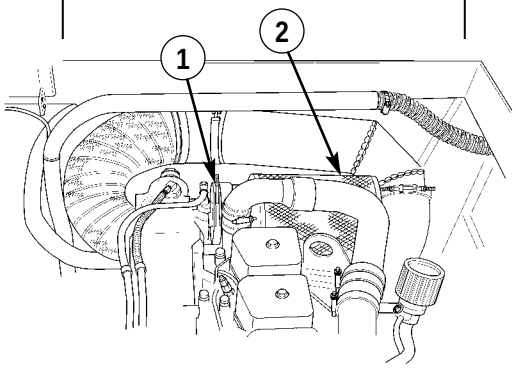
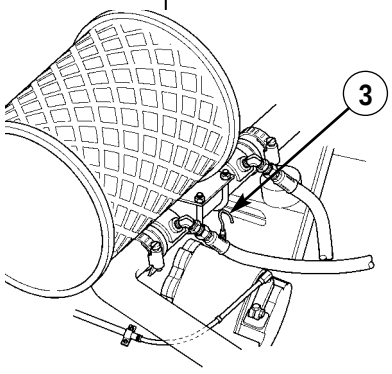
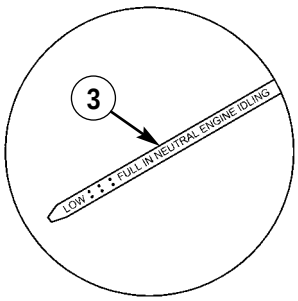
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
12.	Before (Contd)		b. Check for missing, damaged, or leaking hoses and hydraulic fittings.	b. Missing or Class III leak.
			c. Check for frayed or broken hoses, belts, and control cables.	c. Broken.
			d. Check inside hydrojet inspection cover for debris.	d. Cannot clear debris by hand.
			e. Check hydrojet inspection cover for damage.	e. Missing.
13.	Before	Port and starboard hydrojet hydraulic components (8)	a. Check hydraulic control valve, hoses, and fittings for leaks or damage.	a. Any Class III leaks or damage noted.
			b. Check for loose or damaged linkage, control cable, brackets, and mounting hardware.	b. Loose or damaged.
			c. Check reservoir oil level on site glass; if necessary, fill reservoir with oil until oil is at center of site glass.	
			d. Check for leaks.	d. Any Class III leak noted.
			NOTE The cab must be either installed or removed from forward cockpit prior to performing items 14 through 26.	
14.	Before	Port and starboard hydrojet drive shaft flanges (9)	Check for missing, loose, or damaged mounting hardware.	Missing, loose, or damaged.
				

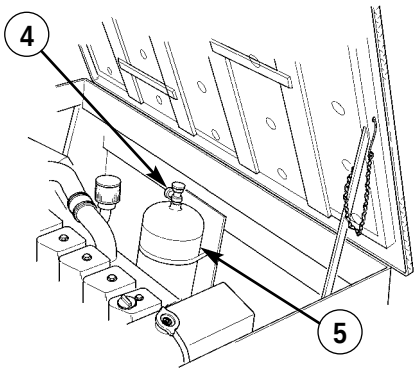
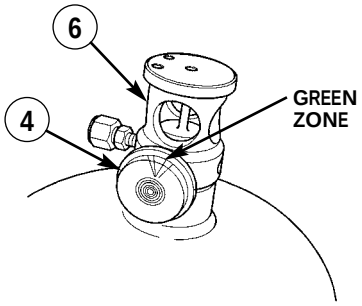
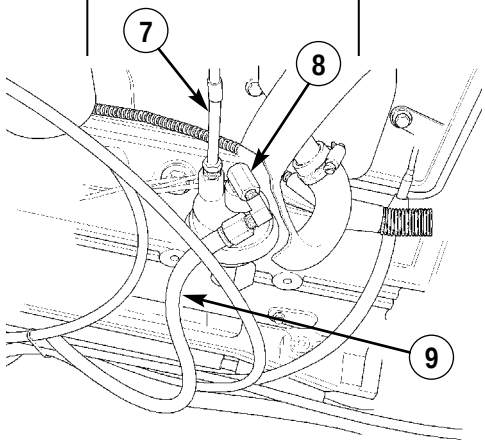
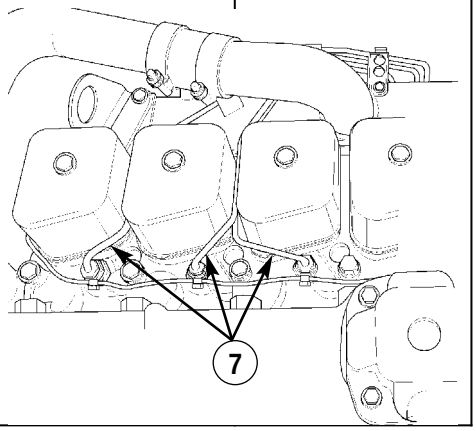
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
15.	Before	Port and starboard engine air cleaners (2) and clamps (1)	CAUTION Do not step on air cleaner or damge to equipment may result. Check for missing, loose, or damaged engine air cleaner and clamps. 	Air cleaner is missing.
16.	Before	Port and starboard transmission oil level dipstick (3) (cold check)	Check oil levels in both transmissions. Oil level must be between low and full marks on dipstick.  	Oil level is below LOW mark.

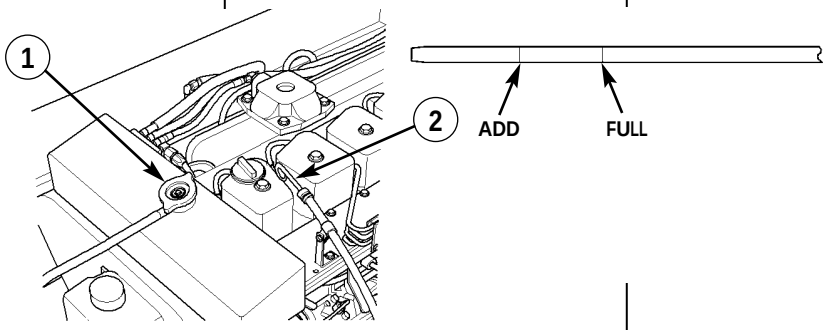
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
17.	Before	Automatic fire extinguisher gauge (4), mounting hardware (5), and sensor receptacle (6)	a. Check for missing, loose, or damaged mounting bracket, clamps, and mounting hardware. b. Check if fire extinguisher is charged by looking at gauge. c. Check for damaged sensor receptacle.	a. Missing, loose, or damaged. b. Gauge is not in green zone. c. Missing or damaged.
		 		
18.	Before	Port and starboard fuel lines (7), hoses (9), and fittings (8)	Check for leaks.	Any fuel leak.
		 		

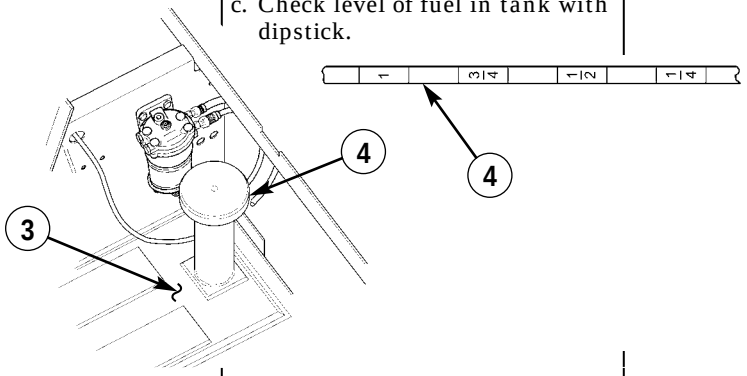
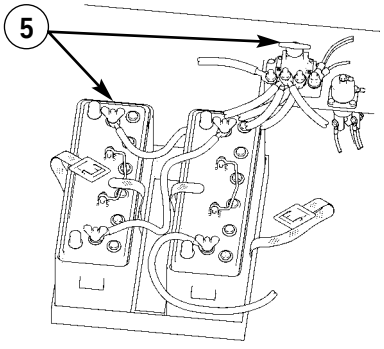
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
19.	Before	Port and starboard cooling system	a. Check for missing, loose, damaged or leaking hoses. b. Check for missing reservoir cap.	a. Class III leaks. b. Missing cap.
20.	Before	Port and starboard coolant level (1)	Check coolant level in reservoir and fill to within 1 in. of top if necessary. Fill coolant as required. Refer to WP 0049 00.	Coolant level is below 1 inch from top of reservoir opening.
21.	Before	Port and starboard engine oil level (2)	Check oil level in both engines. Oil level must be between marks on dipsticks. Fill engine oil as required. Refer to WP 0049 00.	Oil level is below mark.
			 **WARNING** Engines must be shut down before 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 or any open flame near boat when refueling. Clean up spilled fuel as required. Failure to comply may result in injury or death to personnel. **NOTE** Perform items 21 through 24 with engine access hatches closed and battery hatch open.	

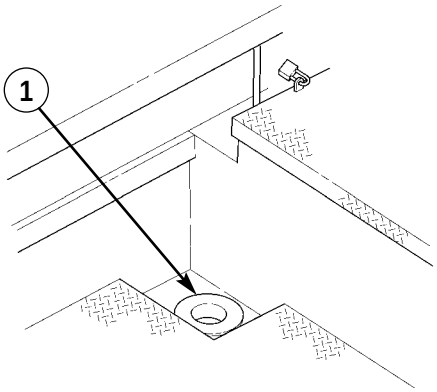
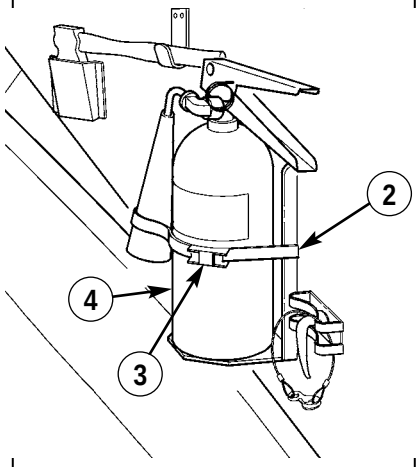
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
22.	Before	Fuel tank (3) and fill cap with dipstick (4)	a. Check battery access hatch. b. Check for missing, loose, or damaged fuel tank or fuel cap. c. Check level of fuel in tank with dipstick. 	a. Missing battery access hatch. b. Missing or damaged.
			NOTE Battery case covers are removed prior to performing steps b and c.	
23.	Before	Batteries and components (5)	a. Check for missing or damaged battery hold down straps. b. Check for missing, loose, or damaged main power switch and battery cables. c. Check for missing, loose, or damaged battery cases, and wingnuts. 	b. Missing, loose, or damaged. c. Missing, loose, or damaged.

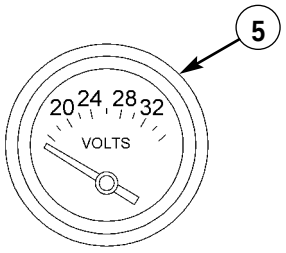
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
24.	Before	Port and starboard forward compartment scupper drains (1)	a. Check for missing, loose, or damaged scupper drains. b. Check for debris in scupper drain collar.	
				
25.	Before	Handheld fire extinguisher (4), mounting bracket (3), and mounting hardware (2)	a. Check for missing, loose, or damaged fire extinguisher, and mounting brackets. b. Check for broken seal or missing safety pin.	a. Missing, loose, or damaged. b. Broken seal or missing safety pin.
				

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:
26.	Before	Electrical system and hydraulic system	Check all systems as follows: a. Open and secure battery hatch and turn master power switch to the ON position. Position the starboard Engine Circuits switch to the ON position. The AUXILIARY BATTERIES gauge (5) will show voltage. b. Press large top button on auxiliary switch panel to turn ON accessories and small button to turn OFF as follows: (1) Push on auxiliary switch; and red indicator will illuminate. Turn OFF.	
		If item will be used		
		If item will be used	(2) Push on EMERGENCY LINK switch; red indicator will illuminate and solenoid will click. Turn OFF.  CAUTION Ensure windshields are clean prior to operating wipers or windshield may become scratched.	
		If item will be used	(3) Push on WIPER STARBOARD switch; red indicator will illuminate and wiper will operate. Turn OFF.	
		If item will be used	(4) Push on WIPER PORT switch; red indicator will illuminate and wiper will operate. Turn OFF.	

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:
26.	Before (Contd)	If item will be used	(5) Push on HORN switch; red indicator will illuminate and horn will sound. Release button and horn will stop.	
		If item will be used	(6) Push on NAVIGATION LIGHT switch; red indicator will illuminate and navigation lights on mast will come on. Turn OFF.	
		If item will be used	(7) Push on TOWING LIGHT switch; red indicator will illuminate and towing lights on mast will come on. Turn OFF.	
		If item will be used	(8) Push on ANCHOR LIGHT switch; red indicator will illuminate and top light on mast will come on. Turn OFF.	
		If item will be used	(9) Push on INSPECTION LIGHT or FM 200; red indicator will illuminate and inspection light will come on. Turn OFF.	
		If item will be used	(10) Push on SEARCHLIGHT switch; red indicator will illuminate and searchlight will come on. Turn OFF.	

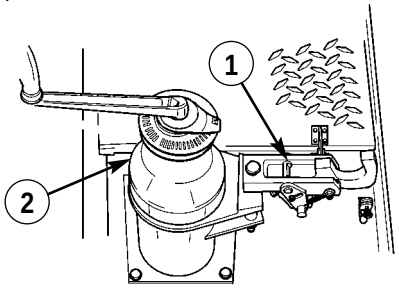
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
26.	Before (Contd)		c. Instrument panel switches and gauges as follows: NOTE Procedure steps in (1) and (2) are to be performed on both engines.	
		Check port and starboard engine circuits	(1) Move STARBOARD/PORT ENGINE CIRCUIT switches to ON position; alarm will sound and red low oil indicator will illuminate. Move alarm mute switch to up position and release. Alarm will stop for 90 seconds, then alarm will come back on. CAUTION Do not leave transmission engaged for more than 30 seconds when boat is out of water. Failure to comply may cause damage to equipment. NOTE Open hydrojet inspection hatches prior to performing step 2.	(1) Engine will not start.
			(2) Move and hold STARBOARD/PORT START switch to up position and start starboard and port engine. Engage starboard/port transmission into forward. Move starboard scoop control lever to reverse position and scoop will lower. Look through diving platform flaps to verify scoop movement. Check all starboard and port engine gauges for proper operation. Check starboard and port gauges and shut down engine.	(2) Engine will not start.

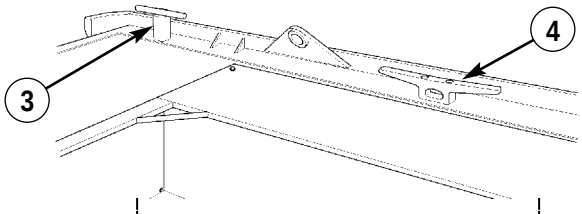
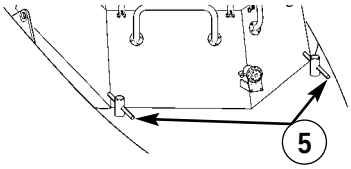
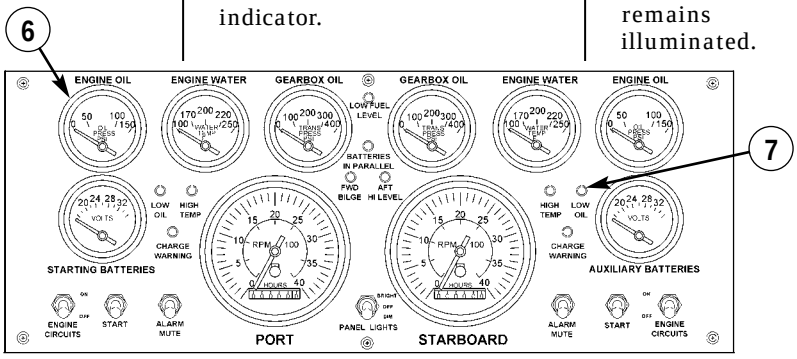
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			WARNING All personnel must wear approved life jackets while on boat. Failure to comply may result in injury or death to personnel. NOTE Perform PMCS items 27 through 34 during operation.	
27.	During	Capstan (2) and tow hook assembly (1)	a. Check for missing, loose, or damaged capstan. b. Check operation of capstan using BII handle in both directions. c. Check tow hook unlock lever for proper operation in lock and unlock positions. d. Check for missing, loose, or damaged bump stop. 	a. Missing or damaged. b. Capstan will not operate.
			NOTE Ensure both hydrojet hatches are closed prior to performing item 28.	
28.	During	Aft cleats (4) and bollards (3)	Check for cracked welds, missing, or loose bollards and aft cleats.	

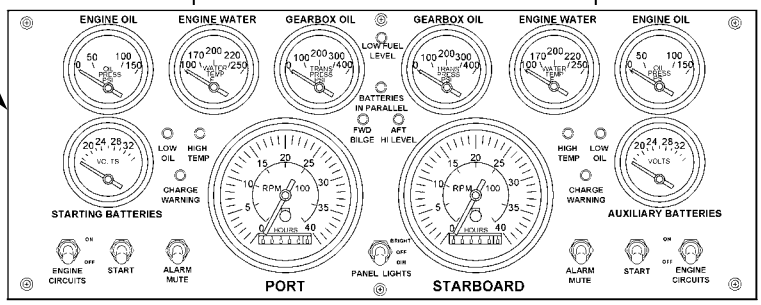
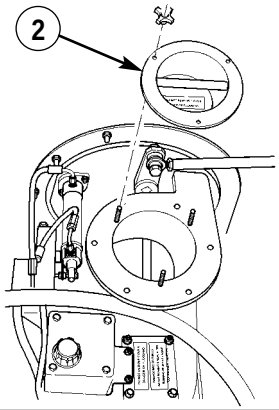
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				
29.	During	Front bollards (5)	Check for missing, loose, cracked, or damaged bollards, lifting eyes, rub rails, and mounting hardware. 	Missing, loose, or damaged.
30.	During	Instrument panel gauges (6) and indicator lights (7)	a. Monitor port and starboard ENGINE WATER temperature, ENGINE OIL temperature, GEARBOX OIL pressure, and STARTING and AUXILIARY BATTERIES volt gauges. b. Monitor FWD and AFT BILGE HI LEVEL indicators. c. Monitor HIGH TEMP, LOW OIL PRESSURE, and CHARGE WARNING indicators. d. Monitor LOW FUEL LEVEL indicator.	a. Any gauge found out of safe operating range or not functioning. b. Either indicator remains illuminated. c. Any indicator remains illuminated. d. Indicator remains illuminated.
				

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

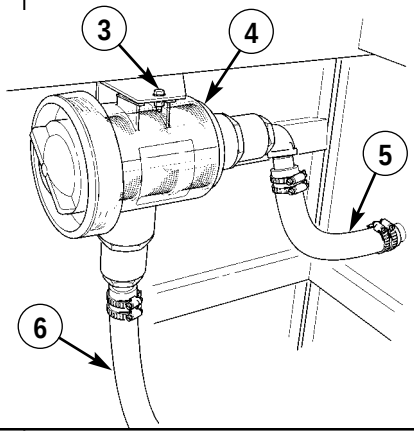
Table 1. Preventive Maintenance Checks and Services (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
31.	During	Powertrain	Be alert for any unusual noise, excessive, vibration, or loose items. Monitor instrument panel gauges (1).	Unusual noise or excessive vibration detected.
		1 		
			WARNING PMCS item numbers 32 through 36 are performed with both engines off. Failure to comply may cause injury to personnel and damage to equipment.	
32.	During	Port and starboard hydrojet inlet inspection covers (2)	a. Clear hydrojet inlet grills if loss of power is evident. Refer to WP 0024 00.	a. Loss of power is evident.
			b. Check for obstructions in both hydrojets by removing inspection covers. Remove debris as necessary.	b. Any debris is found obstructing hydrojet.
			2 	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

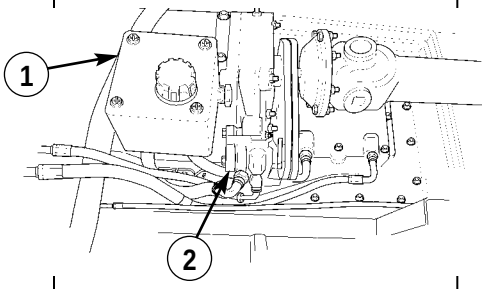
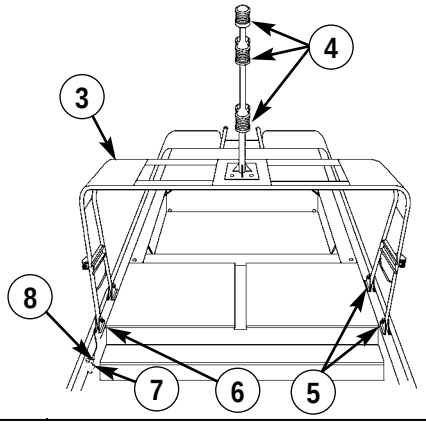
Table 1. Preventive Maintenance Checks and Services (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			CAUTION Strainer is plastic. Use care when disassembling and re-assembling strainer. Verify gasket is present when assembled. Failure to comply may cause damage to equipment. NOTE Item 33 is performed with hydrojet hatches opened and secured.	
33.	During	Port and Starboard raw water strainers (4), hoses (5) and (6), and mounting hardware (3)	a. Check operation of hatches. b. Check for missing, loose, or damaged raw water strainers, supply hoses, or clamps. c. Check for debris in strainers and clean if necessary by removing cover and screen from housing and O-ring seal.	a. Missing, loose, or damaged.
34.	During	Steering scoop and throttle/transmission controls	Be alert to any problem such as hard steering, limited travel, or binding of controls.	Any loss of control is evident.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

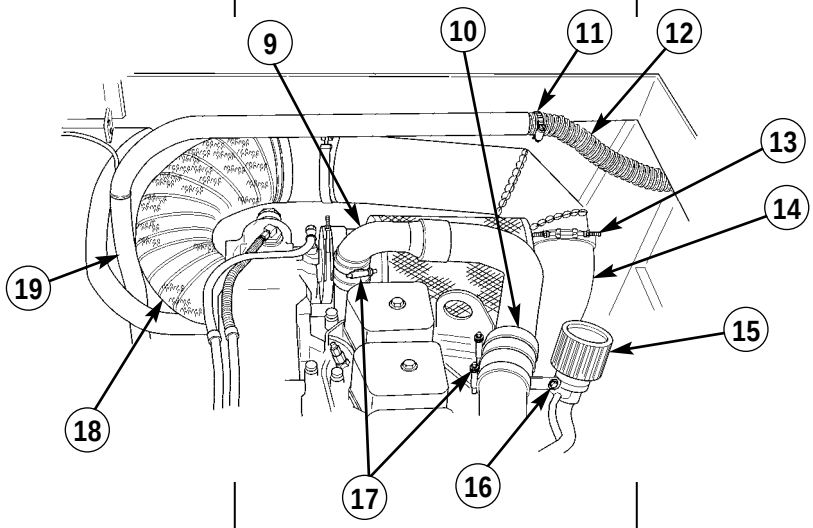
Table 1. Preventive Maintenance Checks and Services (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			NOTE Items 35 and 36 are performed with hydrojet hatches opened and secured.	
35.	After	Port and starboard hydrojet pump unit (2)	a. Check for leaks. b. Check for damaged pump drive belts.	a. Any Class III leaks.
36.	After	Hydrojet hydraulic reservoir (1)	Check fluid levels.	Oil is low or appears milky.
				
37.	After	Mast (3), mast mounting brackets (5), retaining pins (6), lights (4), electrical connector (8), and receptacle (7)	a. Check for missing, loose, or damaged electrical connectors, and receptacles. b. Check for cracked welds, missing, loose, or damaged mast, mast mounting brackets, retaining pins and lights.	b. Mast or lights are damaged or inoperable.
				

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

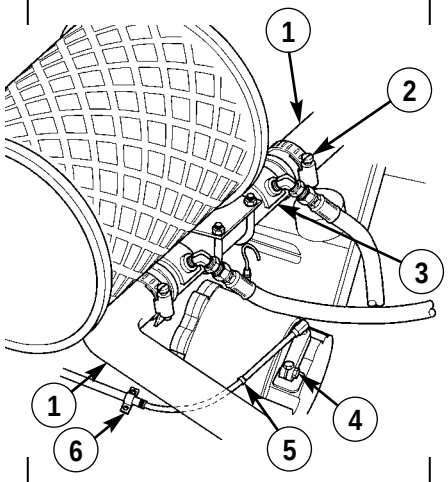
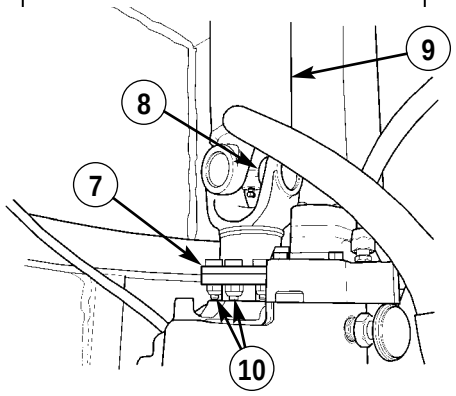
Table 1. Preventive Maintenance Checks and Services (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			NOTE Item Nos. 38 through 49 are performed with engine hatches opened and secured.	
38.	After	Port and starboard engine exhaust elbows (18), hoses (14), tube (19), bilge water discharge hoses (12), and clamps (11)	a. Verify hatches operate. b. Check for missing, loose, or damaged exhaust elbows, tubes, or hoses. c. Check for missing, loose, or damaged bilge water discharge hoses and clamps.	a. Hatch missing. b. Missing, loose, or damaged. c. Missing, loose, or damaged.
39.	After	Port and starboard turbocharger air supply tubes (9), hoses (10), and clamps (17)	Check for loose or damaged air supply tube, hoses, or clamps.	
40.	After	Port and starboard crankcase breather vent elements (15) and hardware (16)	Check for missing, loose, or damaged crankcase breather vent elements, mounting brackets, mounting hardware, hoses, and clamps.	



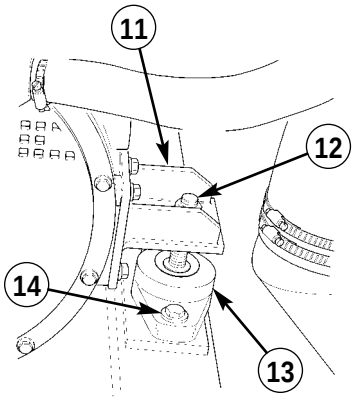
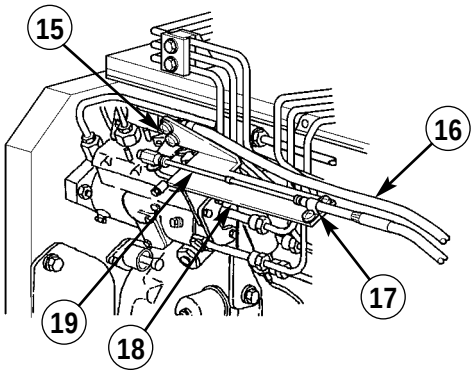
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
41.	After	Port and starboard transmission oil cooler (3), raw water hoses and tubes (1), and clamps (2)	Check for missing, loose, or damaged oil cooler, raw water hoses, tubes, or clamps.	Missing, loose, or damaged or Class III leak.
42.	After	Port and starboard transmission shift cables (5), brackets (6), and mounting hardware (4)	Check for missing, loose, or damaged shift cables, brackets, and mounting hardware. 	Missing, loose, or damaged.
43.	After	Port and starboard transmission drive flange (7), U-joint (8), driveshaft (9), and mounting hardware (10)	Check for missing or loose mounting hardware. 	Missing, loose, or damaged.

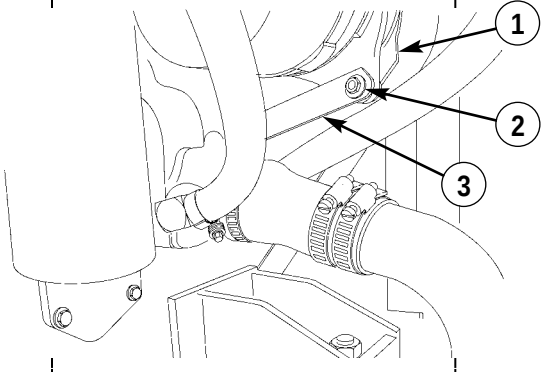
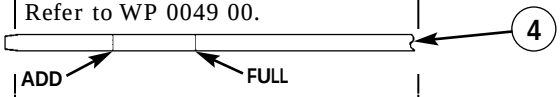
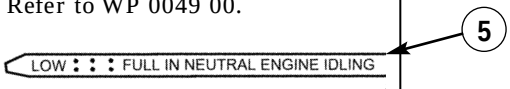
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
44.	After	Port and starboard engine motor mounts (11), insulator mounts (13), screws (14), and locknuts (12)	Check for missing, loose, or damaged engine mounts, insulator mounts, screws, and locknuts. 	Missing, loose, or damaged.
45.	After	Port and starboard fuel injection pump throttle cable (19), stop cable (16), mounting bracket (18), clamps (17), and mounting hardware (15)	a. Check for missing, loose, or damaged throttle cable or stop cable. b. Check for missing, loose, or damaged mounting brackets, clamps, and mounting hardware. 	a. Missing, loose, or damaged. b. Missing, loose, or damaged.

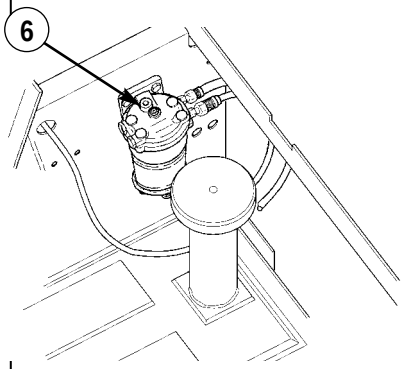
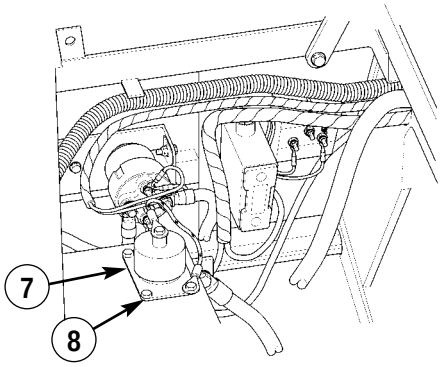
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
46.	After	Port and starboard engine alternator (1), mounting bracket (3), and mounting hardware (2)	Check for missing, loose, or damaged alternator, mounting bracket, mounting hardware.  **CAUTION** Do not overfill engine crankcase. Failure to comply will result in damage to engine.	Missing, loose, or damaged.
47.	After	Port and starboard engine oil level (4)	Check engine oil level. Level should be between marks. If engine oil is low, fill engine oil. Refer to WP 0049 00. 	Oil is low or appears milky.
48.	After	Port and starboard transmission oil level (5)	Check oil levels in transmissions. Oil level must be below FULL mark when hot. If transmission oil is low, fill transmission oil. Refer to WP 0049 00.  **WARNING** Ensure reservoir tank filler caps are not removed when engines are hot. Failure to comply may cause injury to personnel.	Oil is low or appears milky.
49.	After	Port and starboard cooling system	Check coolant level.	Coolant is less than 1 inch below low mark.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

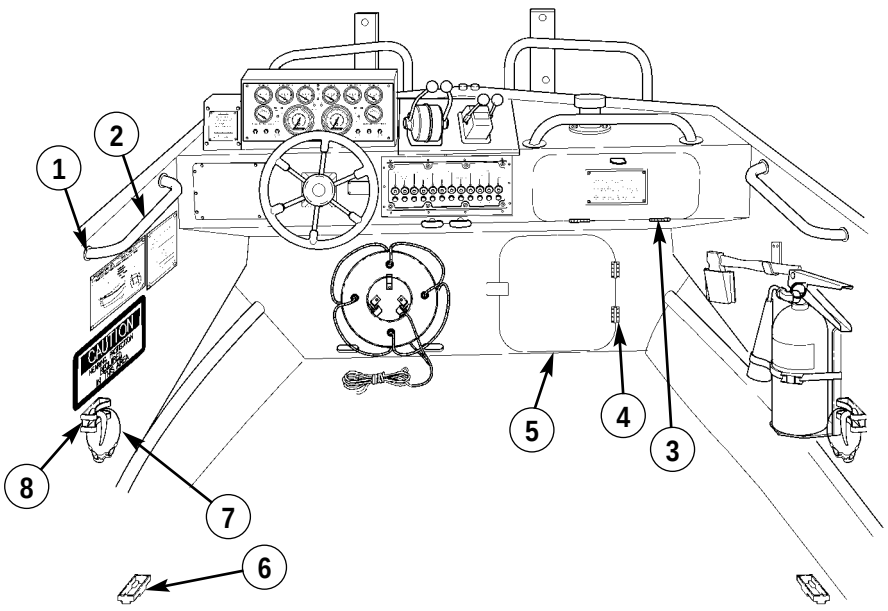
Table 1. Preventive Maintenance Checks and Services (Contd).

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
50.	After	Bilge	Check bilge area for presence of water, oil, fuel, or coolant that will indicate leaks. If leaks are present, notify your supervisor.	
51.	After	Port and starboard fuel water separators (6)	a. Check separating hoses and tubes for damage. b. Drain water as necessary. 	a. Missing, loose, or damaged.
52.	After	NATO slave receptacle (7) and hardware (8)	Check for missing, loose, or damaged NATO slave receptacle, cables, dust cap, and mounting hardware. 	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

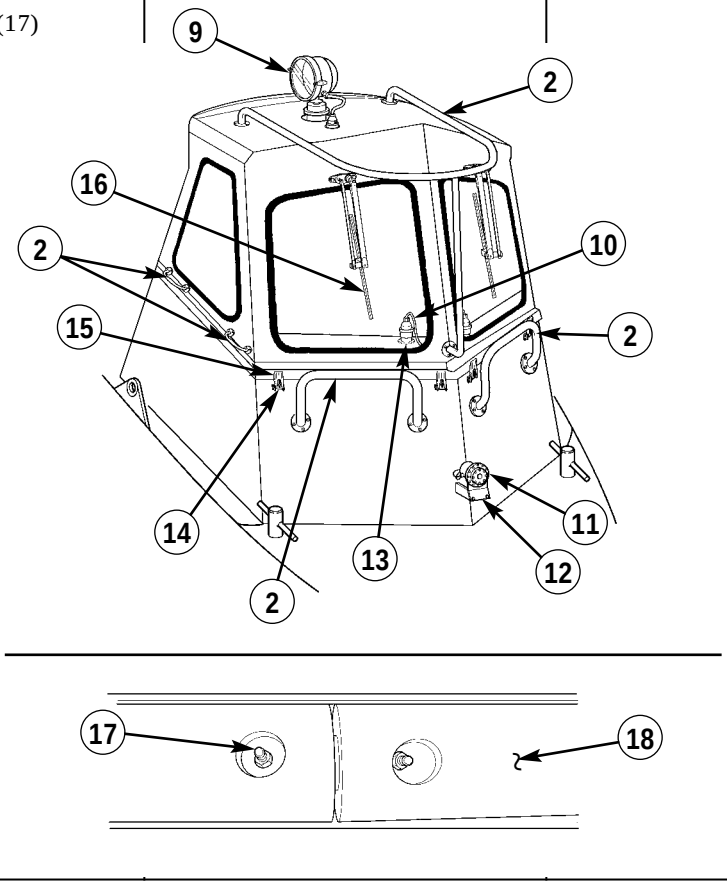
ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
53.	After	Gun base mounts (6), top mounts (8), and safety lanyard (7)	Check for missing, loose, or damaged gun base mounts and hardware.	
54.	After	Handrails (2), and hardware (1), map locker door (3), stowage compartment door (5), hinges (4), and hardware	a. Check for missing, loose, or damaged hand rails or hardware. b. Check for missing, loose, or damaged map locker or stowage door, hinges, or rivets.	Missing, loose, or damaged.



PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

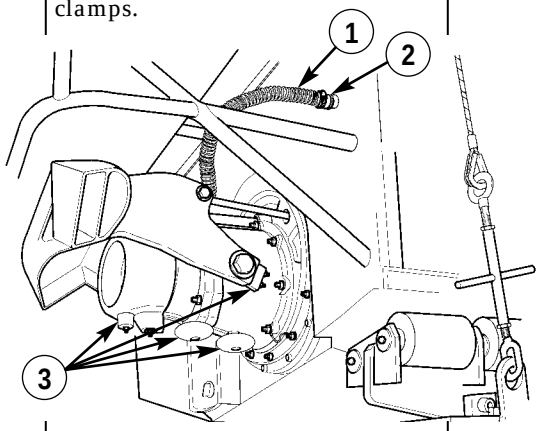
ITEM NO.	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
55.	After	Cab latches (15), catches (14), and mounting hardware	Check for missing, loose, or damaged cab latches, catches, spacers, mounting hardware.	
56.	After	Searchlight (9), receptacle (13), and cab power receptacle (10)	Check for missing, loose, or damaged searchlight, receptacles, and cab power receptacle.	
57. .	After	Wiper blades (16), horn (11), mounting bracket (12), rub rails (18), and mounting hardware (17)	Check for missing, loose, or damaged horn, mounting bracket, rubrails, and mounting hardware.	

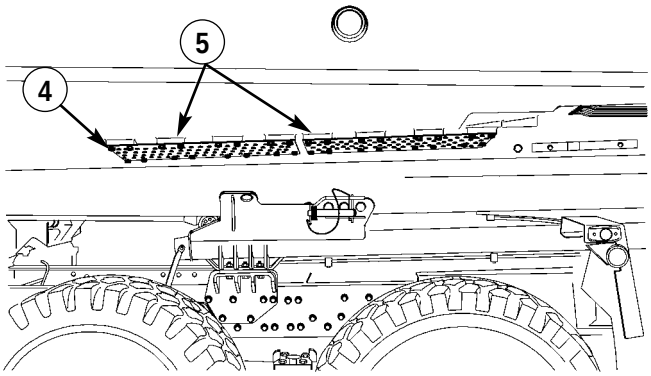


PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Contd)

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

ITEM NO.	INTERVAL	ITEM TO CHECK / SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
58.	After	Hydrojet anodes (3)	Check for missing or damaged anodes. Missing or damaged, notify field maintenance.	Missing, loose, or damaged.
59.	After	Both hydrojet water supply hose (1) and clamps (2)	Check for missing, loose, or damaged water supply hose and clamps.	Missing, loose, or damaged.
60.	After	Keel cooler grates (5) and screws (4)	Check for missing, loose, or damaged keel cooler grates or screws.	If keel cooler grate missing.
61.	After	Hull, diving platform, and pushknees	Check for visual damage.	Any crack, hole or damage that will let water in the boat.





END OF WORK PACKAGE

MAINTENANCE INSTRUCTIONS/PMCS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

LUBRICATION INSTRUCTIONS

GENERAL

The following lubrication instructions are for operator maintenance, and provide the lubrication requirements necessary to support the Bridge Erection Boat (BEB). Refer to Table 1. Use of Lubricants and Table 2. Lubrication Intervals and Locations in this work package for fluid capacities, lubricant requirements, and lubrication points for the BEB.

SERVICE INTERVALS

1. Operator's service intervals are for normal operation of the BEB in moderate temperature, humidity, and atmospheric conditions. The lubrication for the BEB is to be performed at whichever interval occurs first.
2. Check engine oil level in both engines weekly and after each use. If necessary, add engine oil. Refer to WP 0049 00.
3. Check transmission hydraulic reservoir weekly and after each use. If oil level is low, add oil. Refer to WP 0049 00.
4. If operating in extreme heat or cold, notify field maintenance to change oils and lubricants as required.

WARNING

Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal and military regulation. Refer to Army POL, WP 0001 00 for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

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. Use of Lubricants.

APPLICATION	CAPACITY	LUBRICANTS	AMBIENT TEMPERATURE RANGE USAGE
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 OE/HDO-5W-30
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 All Temperatures
Drive Shaft (6) Hydraulic Steering Cylinder (1) Scoop Reverse Cylinder Rod (2) Tie Rod (2) Hydrojet Bearing (2)	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 °C <-46 -40 -34 -29 -23 -18 -12 -7 -1 4 10 16 21 27 32 38 44 49 GAA
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 Arctic
Steering Hydraulic System	2 qt (1.89 L)	Shell Tellus 32	All Temperatures
Scoop Hydraulic Reservoir	4 qt (3.78 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

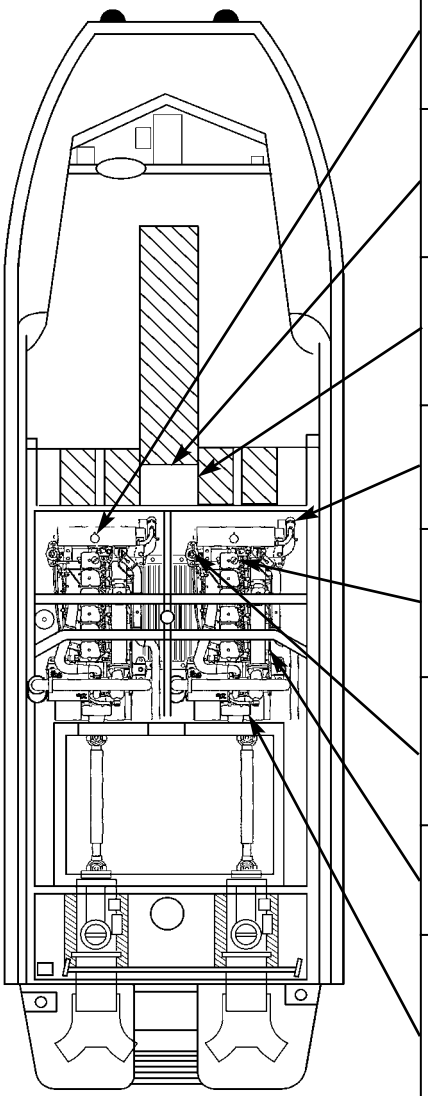
LUBRICATION INSTRUCTIONS (Contd)

Table 2. Lubrication Intervals and Locations.

COMPONENT	INTERVAL
Engine Crankcases	Change oil and oil filter every 3 months or 250 hours.
Engine Oil Filters	Replace at each engine oil change.
Fuel Filter/Water Separator	Replace fuel filter every 6 months or 500 hours.
Transmissions, and clean 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.
Tie rods	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.

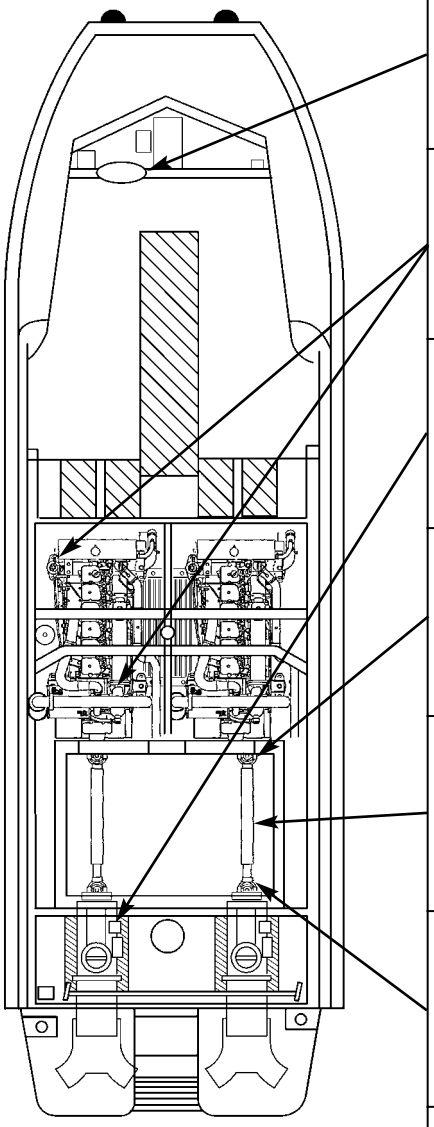


MK II-S

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

LUBRICATION INSTRUCTIONS (Contd)

Table 2. Lubrication Intervals and Locations (Contd).



MK II-S

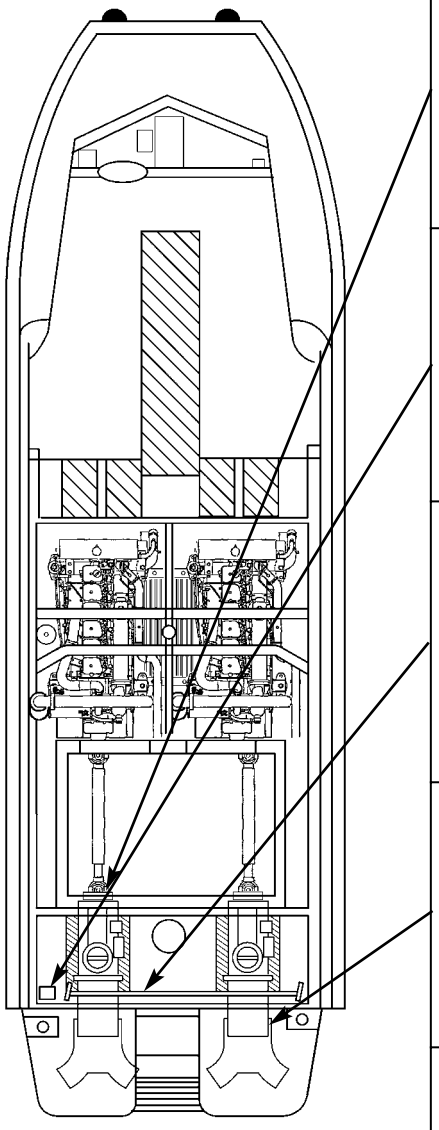
INTERVAL	LUBRICANT	
A/1000	HO	Steering Hydraulic Reservoir (Cap. – 2 qt [1.8 l])
A/1000	OE/HDO	Transmission Drain (Drain and Refill) (Cap. – 1.8 qt [1.7 l])
A/1000	HO	Scoop Hydraulic Reservoir (Drain and Refill) (Cap. Site Glass)
A/1000	GAA	Driveshaft Fittings [A]
A/1000	GAA	Driveshaft Fittings [B]
A/1000	GAA	Driveshaft Fittings [C]

NOTE

Letters in brackets after lubrication entries refer to localized views. See page 8.

LUBRICATION INSTRUCTIONS (Contd)

Table 2. Lubrication Intervals and Locations (Contd).



MK II-S

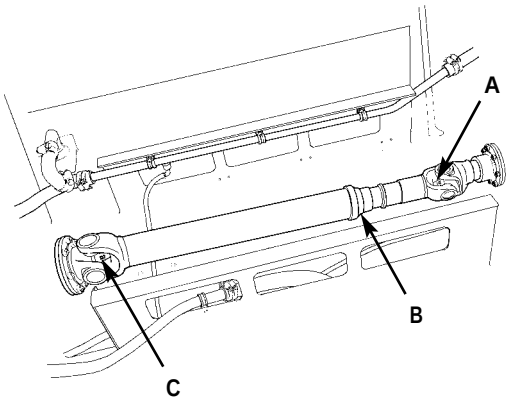
INTERVAL	LUBRICANT	
A/1000	GAA	Hydrojet Bearing Fittings [G]
A/1000	GAA	Steering Hydraulic Cylinder Fitting [E]
A/1000	GAA	Tie Rod Fittings (2) [D]
A/1000	GAA	Scoop Reverse Cylinder Rod Fittings (2) [F]

NOTE
Letters in brackets after lubrication entries refer to localized views. See page 8.

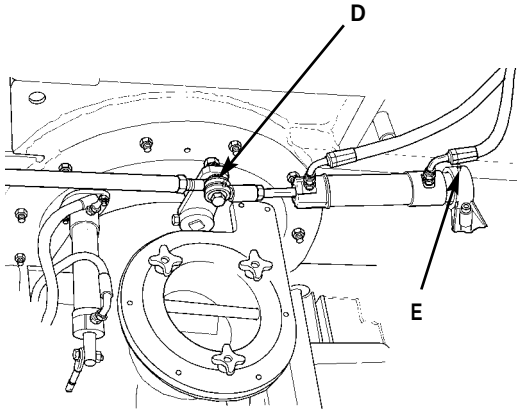
LUBRICATION INSTRUCTIONS (Contd)

Table 2. Lubrication Intervals and Locations (Contd).

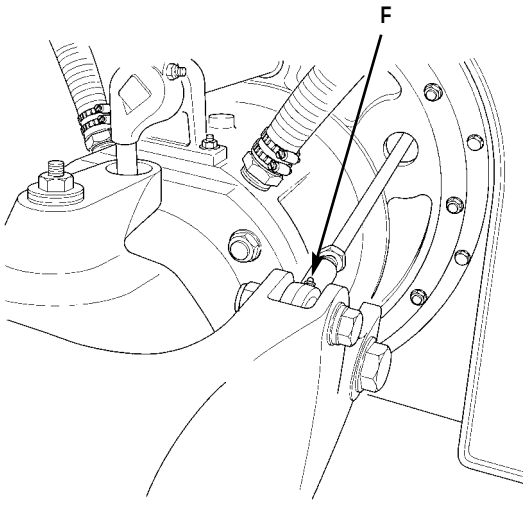
LOCALIZED LUBRICATION POINTS A THROUGH G



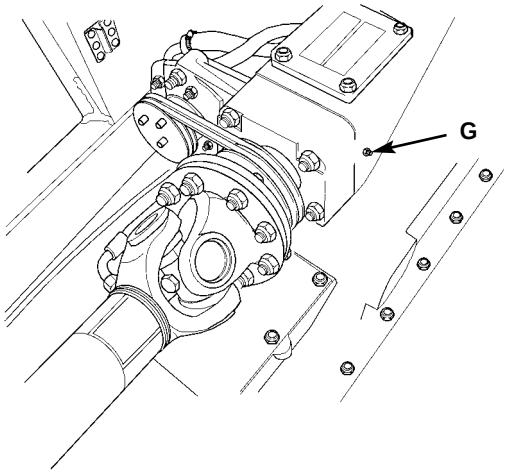
DRIVESHAFT FITTINGS



TIE ROD AND STEERING HYDRAULIC FITTINGS



SCOOP REVERSE CYLINDER FITTING



HYDROJET BEARING FITTING

END OF WORK PACKAGE

MAINTENANCE INSTRUCTIONS/PMCS

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

GENERAL MAINTENANCE

GENERAL

General maintenance instructions for cleaning, painting, placing in service, and preparation for storage or shipment are provided in this work package. Publications that provide additional information on general shop practice techniques and preservation are listed in References, WP 0050 00.

CLEANING

1. **General Instructions.** Cleaning procedures will be the same for the majority of parts and components on the BEB. General cleaning procedures are detailed in steps 2 through 6.
2. **The Importance of Cleaning.** Great care and effort are required in all cleaning operations. The presence of dirt and foreign material is a constant threat to satisfactory equipment operation and maintenance. The following instructions will apply to all cleaning operations:

WARNING

Improper cleaning methods and use of unauthorized cleaning solvents may result in injury to personnel and damage to equipment.

CAUTION

Keep all related parts and components together. Do not mix parts. Failure to comply may result in damage to parts.

a. Clean BEB and IBC as necessary before performing PMCS, lubrication, and maintenance procedures.

b. Hands must be kept clean from grease which can transfer to BEB.

GENERAL MAINTENANCE (Contd)

CLEANING (Contd)

WARNING

Skysol 100 cleaning solvent is combustible. Use mechanical ventilation whenever product is used in a confined space, is heated above ambient temperatures, or is 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.

CAUTION

Before opening reservoir, ensure area around reservoir filler cap is clean. Do not allow dirt, dust, or water to enter reservoir. Failure to do this may cause damage to internal components.

3. **Oil and Grease Covered Surfaces.** Using Skysol 100, clean oil and grease from exterior surfaces of boat prior to cleaning dirt, mud, and debris with soap and water.
4. **Oil Seals and Flexible Hoses.**

CAUTION

Do not allow Skysol 100 to come in contact with seals or flexible hoses. Failure to comply will result in damage to parts.

5. **External Surfaces.** Clean all accessible external surfaces of boat with soap and water and rinse thoroughly. Use power wash pump when cleaning to save time and effort. Refer to task within this work package.

GENERAL MAINTENANCE (Contd)

6. Aluminum Oxidation/Corrosion.

NOTE

All parts subject to corrosion must be lightly oiled after cleaning and prior to storage.

Remove all evidence of corrosion.

PAINTING

BEB unit(s) will require touch-up of painted surfaces periodically. The BEB is Chemical Agent Resistant Coating (CARC) painted. Notify field maintenance if BEB or IBC requires touch-up of painted surfaces.

LOADING AND MOVEMENT OF EQUIPMENT

WARNING

Do not lift a load greater than the rated load capacity of the crane or materiel handling equipment. Failure to comply may result in damage to equipment or possible injury or death to personnel.

All personnel must stand clear of equipment prior to lifting operations or serious injury or death may result.

NOTE

The BEB weighs 9,300 lb (4,218.5 kg). The BEB with IBC weighs a minimum of 11,100 lb (5,035 kg).

1. **Transportation Data Plate.** The transportation data plate is located on the port side of the forward cockpit, describes shipping data as capacities, center of gravity, and lifting points.
2. **Slinging Provisions.** BEB slinging provisions enable lifting of BEB for both normal lift and external lift by helicopter. To lift BEB, connect lifting sling to shackles on helicopter lifting points, each located on four corners of BEB. To lift IBC, with or without BEB, connect sling to lifting eyes on side of IBC frame. When BEB is tied down with IBC, tiedowns are to be attached to BEB and not IBC. Lift points are located in relationship to BEB's center of gravity.
3. **Center of Gravity.** Refer to Shipping Data Plate, WP 0002 00.

GENERAL MAINTENANCE (Contd)

LOADING AND MOVEMENT OF EQUIPMENT (Contd)

4. **Loading and Movement.** For transportability guidance handling and movement of the BEB, refer to TM 743-200-1, Storage and Materials Handling, and TM 55-2200-001-12, Transportability Guidance for Application of Blocking, Bracing, and Tiedown Materials.
   - **a.** When unloading a BEB for shipment or storage, ensure cargo bed, pallet, or ground surface is flat, level, and capable of supporting weight of BEB and IBC. Refer to Equipment Data, WP 0002 00, for weights and dimensions of BEB.
   - **b.** Dunnage should be placed under the IBC during unloading to facilitate tiedown and prevent movement during shipment. Dunnage also prevents damage to bottom of IBC when loading/unloading from ground to transporter.

PREPARATION FOR SHIPMENT AND LIMITED STORAGE

1. **Cleaning.** Protection for BEB and accompanying equipment must be sufficient to protect the material against deterioration and physical damage.

WARNING

Skysol 100 mixture is combustible. Use mechanical ventilation whenever product is used in a confined space, is heated above ambient temperatures, or is 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 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.

NOTE

Prior to application of corrosion preventive compound, surfaces must be cleaned to ensure removal of corrosion, soil, grease, or vehicle acid and alkali residues.

- **a.** Remove all dirt, grease, oil, and other foreign matter from all painted metal surfaces of the BEB by scrubbing with cloths soaked in Skysol 100. Refer to items 2 and 1, WP 0053 00. Use warm water for cleaning rubber parts.

GENERAL MAINTENANCE (Contd)

PREPARATION FOR SHIPMENT AND LIMITED STORAGE (Contd)

WARNING

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

b. Clean exterior surfaces of BEB by power washing with water, to ensure removal of all dirt and foreign matter. After cleaning, allow parts to air dry, use compressed air, or wipe with clean, dry cloths. Refer to item 1, WP 0053 00.

2. **Preservation.** All critical unpainted metal surfaces must be protected during shipment. Coat all unpainted, exposed, or machined metal surfaces on the exterior of the BEB with approved corrosion-preventive compound only. Refer to item 3, WP 0053 00. Equipment protected must be closely watched for signs of corrosion.
3. **Packing.** Pack all Basic Issue Items (BII) and Additional Authorization List (AAL) items to prevent physical damage. Refer to WP 0051 00 and WP 0052 00.
4. **Shipment of Army Documents.** Prepare all Army shipping documents accompanying BEB in accordance with DA Pam 750-8.
5. **Limited Storage Instructions.** Commanders are responsible for ensuring that all BEB units issued or assigned to their command are maintained in a serviceable condition and properly cared for, and that personnel under their command comply with technical instructions. Lack of time, trained personnel, or proper tools may result in a unit being incapable of performing maintenance for which it is responsible. In such cases, unit commanders may, with the approval of major commanders, place a BEB that is beyond the maintenance capability of the unit in administrative storage. For detailed information, refer to AR 750-1.
6. **Storage of New BEB units.**

   (1) If new BEB units are placed in storage at either contractor or Government facilities, before being put in service, the warranty period shall not start until each such BEB is withdrawn from that storage, or until twelve months from the date shown on the Material Inspection and Receiving Report (DD Form 250); whichever occurs first.

   (2) If new BEB units are placed in contractor storage, the contractor shall maintain and exercise such stored BEB units in accordance with the contractor's approved technical manual. Upon removal from storage, and before delivering the BEB units to the Government, the contractor shall exercise and perform all PMCS tasks in accordance with the contractor's approved technical manual.

GENERAL MAINTENANCE (Contd)

PREPARATION FOR SHIPMENT AND LIMITED STORAGE (Contd)

(3) If new BEB units are placed in Government storage, the Government will exercise stored BEB units in accordance with the contractor's approved technical manual. The Government shall notify the contractor before placing each such BEB in storage, and again at the time it is withdrawn. If there are any contractor-caused retrofits that must be applied the the BEB units, the storage time does not start until those retrofits are completed. For short and long term storage instructions, refer to TM 5-1940-322-24.

7. Transport of BEB by C-130 Aircraft. The BEB is transportable by C-130 aircraft. Refer to Marking, Packing, and Shipment of Supplies and Equipment, TM 746-10, for shipping information.

END OF WORK PACKAGE

MAINTENANCE INSTRUCTIONS/PMCS

BRIDGE ERECTION BOAT (BEB)
MKII-S

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

MAINTENANCE PROCEDURES

GENERAL

WARNING

Do not perform maintenance on equipment while in operation. Do not allow vehicles on bridge while performing operator maintenance. Failure to comply may result in injury or death to personnel and damage to equipment.

Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal, and military regulation. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

This section contains operator's level maintenance procedures for the BEB. For operator's level maintenance procedures for the Common Bridge Transporter (CBT), refer to TM 5-5420-234-14&P, or the Improved Boat Cradle (IBC), refer to TM 5-5420-277-14&P.

MAINTENANCE PROCEDURES (Contd)

REMOVE AND INSTALL AIR FILTER

WARNING

If NBC exposure is suspected, NBC contaminated filters must be handled and disposed of only by authorized and trained personnel. The unit commander or senior officer in charge of maintenance personnel must ensure that prescribed protective clothing is used, and prescribed safety measures and decontamination procedures (FM 3-5) are followed. The local unit SOP is responsible for final disposal of contaminated air filters. Failure to do this may cause severe injury to personnel.

NOTE

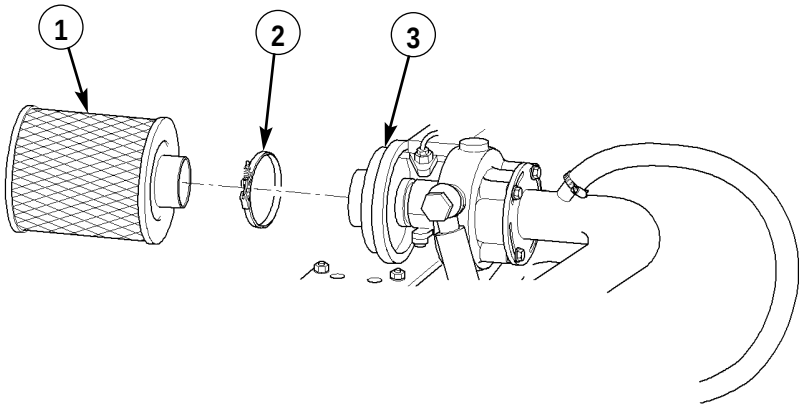
The air cleaners on both engines are replaced the same way. This procedure covers the replacement of one air cleaner.

1. Open engine compartment hatches. Refer to WP 0004 00.
2. Loosen clamp (2) on air inlet (3).
3. Remove air cleaner (1) and clamp (2) from air inlet (3).

NOTE

Inspect air filter while removed from air inlet.

4. Install air cleaner (1) on air inlet (3) with clamp (2).
5. Close engine hatches. Refer to WP 0004 00.



MAINTENANCE PROCEDURES (Contd)

DRAIN RAW WATER FROM TRANSMISSION OIL COOLER

NOTE

The transmission oil coolers on both engines are drained the same way. This procedure covers the draining of one transmission oil cooler.

1. Remove air filter (3). Refer to Remove and Install Air Filter within this work package.

CAUTION

Do not drain raw water into hull. Failure to comply may cause damage to equipment.

2. Remove drain plug (1) from transmission oil cooler (2).

NOTE

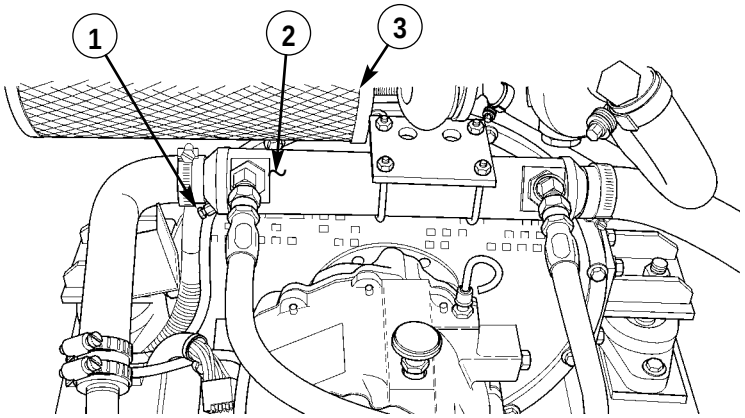
Have container ready to catch water.

3. Catch raw water with suitable container.
4. Install drain plug (1) in transmission oil cooler (2).
5. Install air filter (3). Refer to Remove and Install Air Filter within this work package.

WARNING

Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal, and military regulation. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

6. Dispose of discarded water.



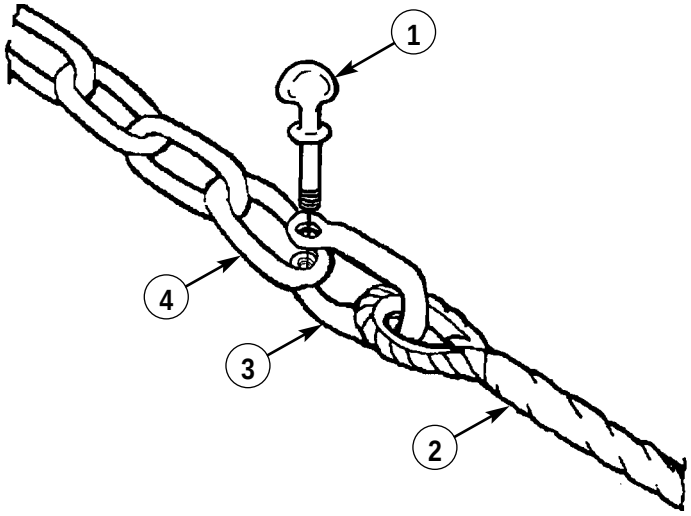
MAINTENANCE PROCEDURES (Contd)

REMOVE/INSTALL ANCHOR SHACKLE

WARNING

Before removing shackles ensure that no tension is applied to any lines connected to shackle. Failure to comply may result in injury or death to personnel.

1. Remove anchor shackle (3) by unscrewing shackle pin (1) from anchor shackle (3) and anchor line (2).
2. Remove anchor shackle (3) from chain (4).
3. Screw shackle pin (1) into anchor shackle (3).
4. Stow remaining hardware. Refer to Location of Basic Issue Items (BII) WP 0005 00.



5. For installation, retrieve hardware. Refer to Location of Basic Issue Items (BII) WP 0005 00.
6. Unscrew shackle pin (1) from anchor shackle (3).
7. Place anchor shackle (3) through last link of chain (4).
8. Align anchor line (2) with anchor shackle (3).
9. Install and screw shackle pin (1) into anchor shackle (3).

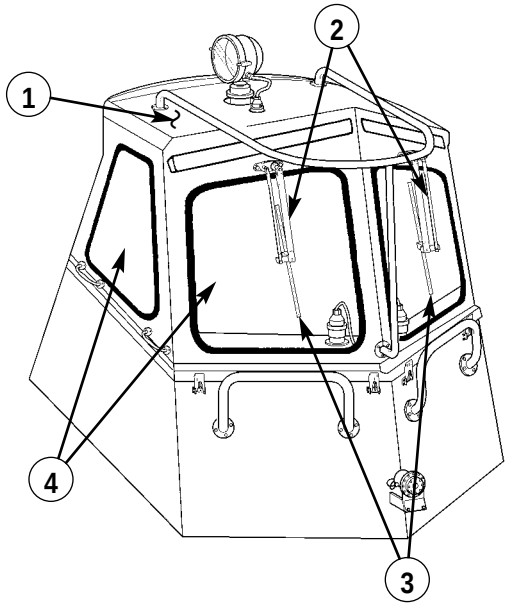
MAINTENANCE PROCEDURES (Contd)

CLEANING WIPER BLADES AND CAB PANELS

CAUTION

Windshields should not be cleaned with abrasive or chemical cleaning compound or solution.

1. Grasp wiper blade arm (2) and gently pull outward approximately 3 in. (76.2 mm).
2. Using soft cloth and soapy water, clean both wiper blades (3). Release wiper blades slowly (3).
3. Using soft cloth and soapy water, clean all cab windows (4).
4. Thoroughly rinse cab (1) with clean water.



MAINTENANCE PROCEDURES (Contd)

REFUELING

WARNING

Diesel fuel is flammable. Do not allow smoking or any open flames near the boat when refueling. Make sure you have metal-to-metal contact between the fuel nozzle and the fuel tank. Failure to comply may result in injury or death to personnel and/or damage to equipment.

CAUTION

Do not use bilge pumps to discard overfilled fuel or oily waste of any type. Spill must be treated as hazardous waste, notify your supervisor for proper clean up procedures.

1. Stop engines. Refer to WP 0013 00.
2. Open battery compartment. Refer to WP 0004 00.
3. Clean off any dirt that could fall into the fuel tank (1).

CAUTION

- Do not place fuel cap dipstick in a dirty area during fueling. Failure to comply may result in damage to equipment.
- Make sure you have metal-to-metal contact between the fuel nozzle and the fuel tank.

4. Remove fuel cap (2).

MAINTENANCE PROCEDURES (Contd)

REFUELING (Contd)

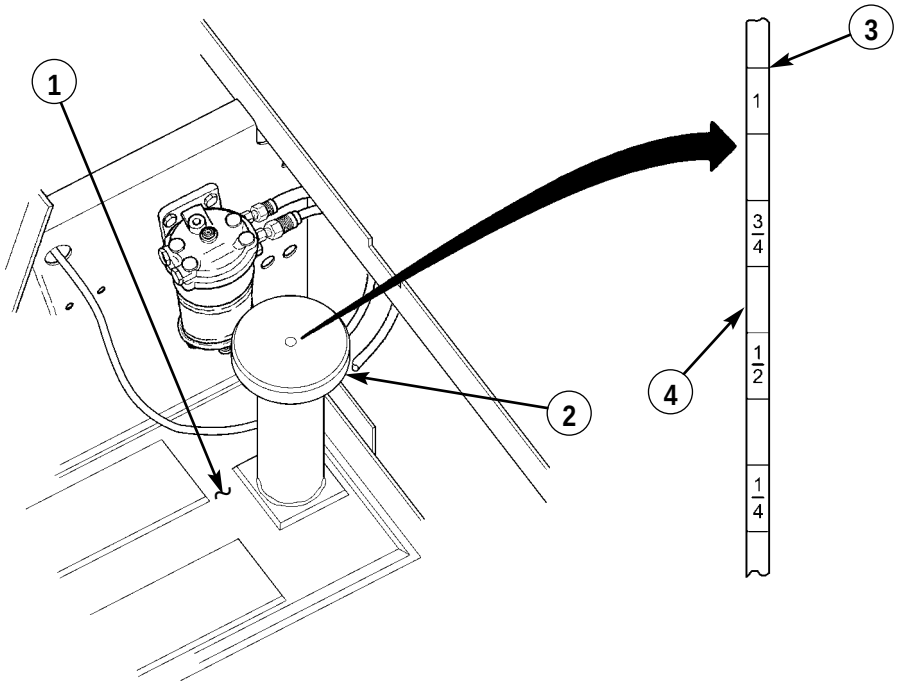
NOTE

To help prevent spills and overflows, pay close attention to the dispensing nozzle while refueling. When refueling you may hear a bubbling sound out of the vent line this is an indication the fuel tank is close to full. Do not exceed a safe refueling rate. If fuel backup and spillage is being experienced, reduce flow rate. Also, when topping off the tank, a reduced flow rate should be used.

In extreme heat, fill fuel tank just below full mark on fuel cap dipstick, this will allow room for fuel expansion.

Do not fill fuel tank above upper NO. 1 full mark on the fuel cap dipstick.

5. Fill fuel tank to upper No. 1 full mark (3) on dipstick (4).
6. Once refueling is complete, remove fuel nozzle and install fuel cap (2).
7. Wipe up any spilled fuel.



MAINTENANCE PROCEDURES (Contd)

CLEANING RAW WATER STRAINER

NOTE

Both raw water strainers are replaced the same way. This procedure covers the replacement of one raw water strainer. For general cleaning and inspection instructions, refer to WP 0048 00.

1. Open hydrojet hatches WP 0004 00.
2. Turn basket (1) left to remove from raw water strainer (3).
3. Remove basket (1), and O-ring (2) from raw water strainer (3).

WARNING

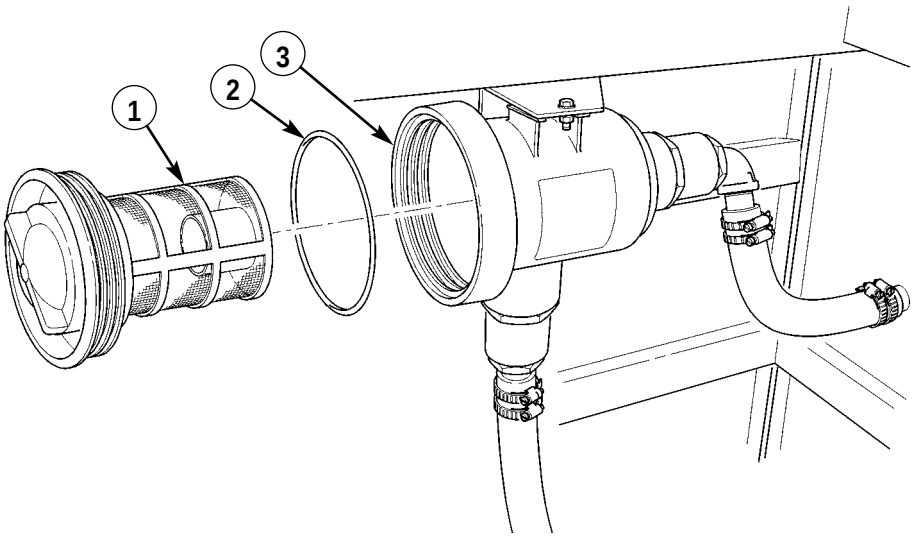
Compressed air source must not exceed 30 psi (207 kPa). Wear approved eye protection when cleaning with compressed air. Failure to comply may result in injury to personnel.

4. Clean basket (1) with compressed air.

CAUTION

Ensure O-ring is not damaged and strainer is not cross-threaded during installation or damage to equipment may result.

5. Inspect basket (1), and O-ring (2) for damage. Replace if damaged.
6. Install O-ring (2) and basket (1) in raw water strainer (3).
7. Close hydrojet hatches WP 0004 00.



MAINTENANCE PROCEDURES (Contd)

DRAIN FUEL WATER SEPARATOR

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 drained the same way. This procedure covers the draining of one fuel water separator. For general cleaning and inspection instructions, refer to WP 0048 00.

1. Open battery compartment hatch WP 0004 00.
2. View fuel water separator (1) for water; if water is present continue with next step.

NOTE

Do not remove drain plug. Plug is designed to drain separator without removing plug from separator.

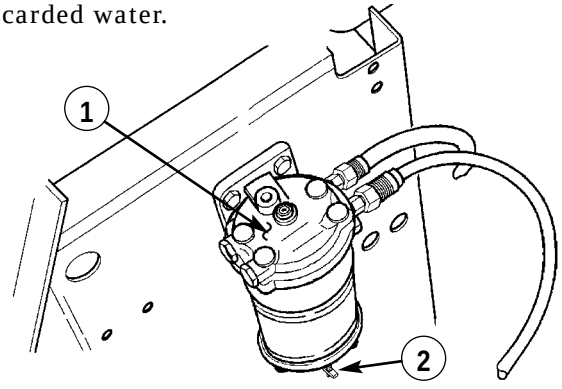
Have container ready to catch fuel.

3. Loosen drain plug (2) by turning left and allow fuel water separator (1) to drain water into suitable container until clean fuel runs out.
4. Tighten drain plug (2) by turning right until fuel water separator (1) is sealed and no drips are present.
5. Close battery compartment hatch WP 0004 00.

WARNING

Accidental or intentional introduction of liquid contaminants into the environment is in violation of state, federal, and military regulation. Refer to Army POL (WP 0001 00) for information concerning storage, use, and disposal of these liquids. Failure to comply may result in damage to environment and health of personnel.

6. Dispose of discarded water.



MAINTENANCE PROCEDURES (Contd)

FILLING COOLANT RESERVOIR

CAUTION

Type 1, ethylene glycol (green), and Type 2, propylene glycol (purple), should never be mixed due to their difference in toxic properties. Failure to comply may result in damage to equipment.

Using antifreeze without mixing it with water can cause high operating temperatures, blockage of cooling system passages, and damage to water pump seals.

NOTE

Both coolant reservoir tanks are filled the same way. This procedure covers the filling of one reservoir tank. For general cleaning and inspection instructions, refer to WP 0048 00.

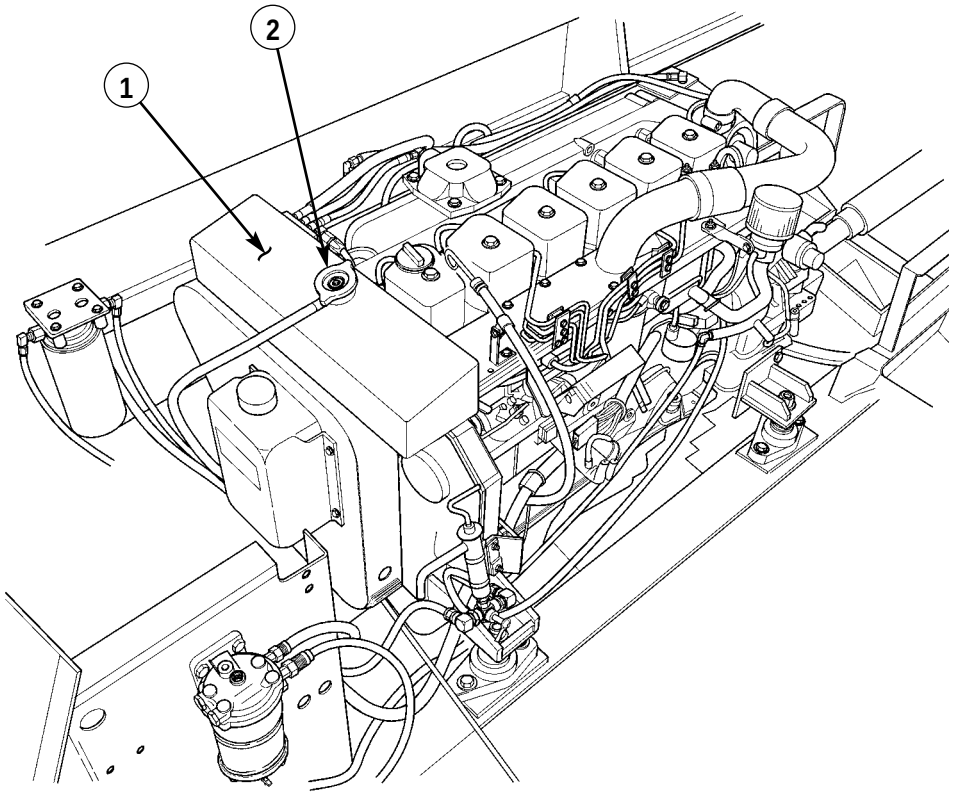
1. Open engine hatches WP 0004 00.

WARNING

Ensure reservoir tank filler caps are not removed when engines are hot. Failure to comply may result in injury to personnel.

2. Remove reservoir tank filler cap (2).
3. Visually check coolant level in reservoir tank (1). Level should be no lower than 1 in. below bottom of filler neck.
4. Fill coolant within 1 in. (25 mm) from bottom of filler neck.
5. Install reservoir tank filler cap (2) to filler neck on reservoir tank (1).
6. Close engine hatches WP 0004 00.

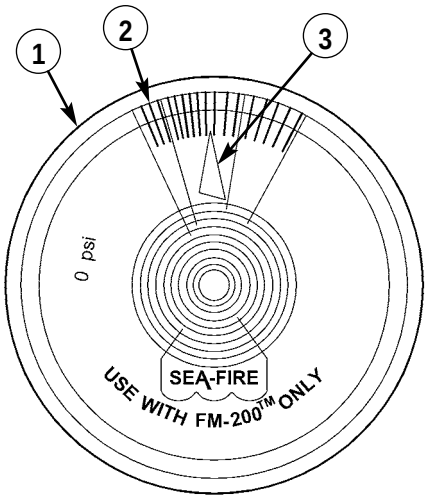
MAINTENANCE PROCEDURES (Contd)



MAINTENANCE PROCEDURES (Contd)

CHECKING FIRE EXTINGUISHERS

1. Check gauge (1) on engine compartment fire suppression system extinguisher (FM 200). Notify field maintenance if yellow indicator (3) is in the red recharge zone (2).



2. Check seal on hand-held fire extinguisher. If seal is broken, notify field maintenance.

FILLING ENGINE OIL

CAUTION

Do not permit dirt, dust, or grit to enter engine oil filler cap or dipstick tube. Internal engine damage will result if engine oil becomes contaminated. Do not overfill engine crankcase. Failure to comply will result in damage to equipment.

To avoid bending dipstick, remove and replace dipsticks slowly. Failure to comply may result in damage to equipment.

NOTE

Both engines are filled the same way. This procedure covers the filling of one engine. For general cleaning and inspection instructions, refer to WP 0048 00. For proper type of lubrication, refer to WP 0047 00.

1. Open engine compartment hatches WP 0004 00.

MAINTENANCE PROCEDURES (Contd)

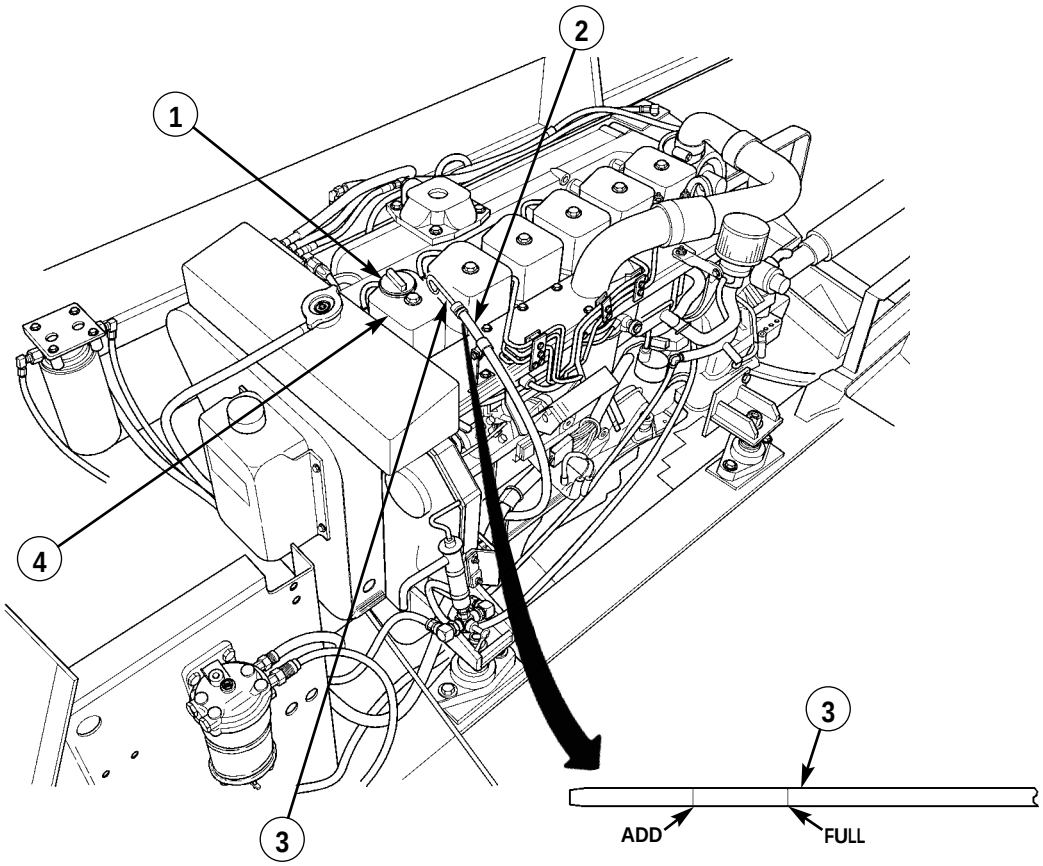
FILLING ENGINE OIL (Contd)

2. Remove engine oil dipstick (3) from dipstick tube (2).
3. Remove engine oil filler cap (1) from valve cover (4).
4. Check that oil is between ADD and FULL marks.

NOTE

If oil is below add mark, add oil. During filling of engine oil, check level on dipstick often to avoid overfilling.

5. Insert and remove dipstick (3) to check oil level.
6. Fill oil level to FULL marks on dipstick (3).
7. Insert dipstick (3) into dipstick tube (2).
8. Install oil filler cap (1) on valve cover (4).
9. Perform steps 2 through 8 for other engine.
10. Close engine compartment access hatches WP 0004 00.



MAINTENANCE PROCEDURES (Contd)

FILLING TRANSMISSION OIL

CAUTION

To avoid bending dipstick, remove and replace dipsticks slowly. Failure to comply may result in damage to equipment.

NOTE

Check transmission oil level with engine running.

1. Open engine compartment hatches WP 0004 00.
2. Remove transmission oil dipstick (2) from dipstick tube (3).
3. Remove transmission oil vent/filler cap (1) from transmission (4).
4. Check that oil is between ADD and FULL marks.

NOTE

If oil level is below add mark, add oil. During filling of transmission, check oil level on dipstick often to avoid overfilling.

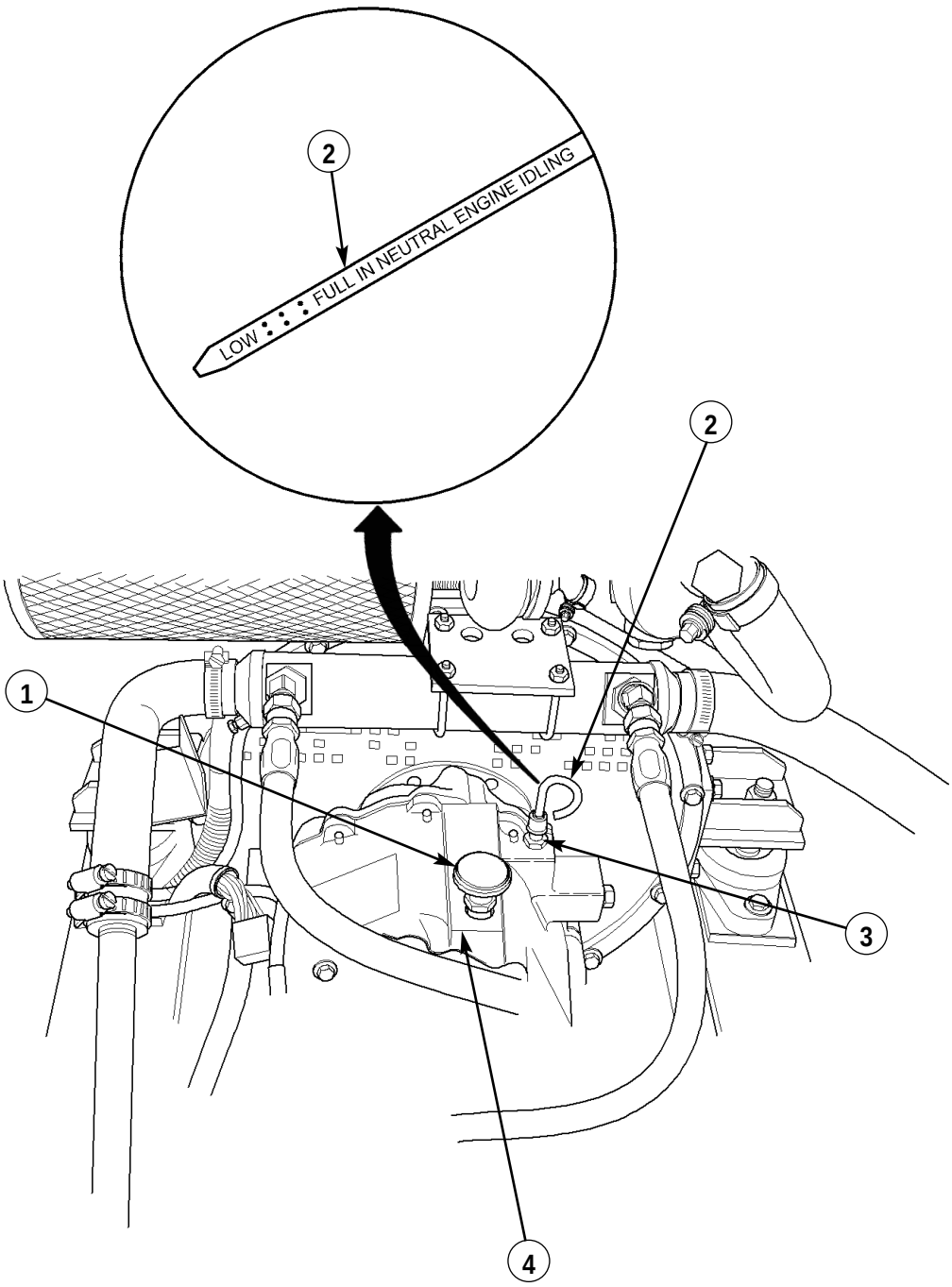
5. Insert and remove dipstick (2) to check oil level.

WARNING

Engine must be off and transmission must be in neutral during filling. Failure to comply may result in injury or death to personnel.

6. Fill oil level to FULL marks on dipstick (2).
7. Insert dipstick (2) on dipstick tube (3).
8. Install transmission oil vent/filler cap (1) on transmission (4).
9. Close engine compartment hatches WP 0004 00.

MAINTENANCE PROCEDURES (Contd)



MAINTENANCE PROCEDURES (Contd)

FILLING HYDROJET RESERVOIR

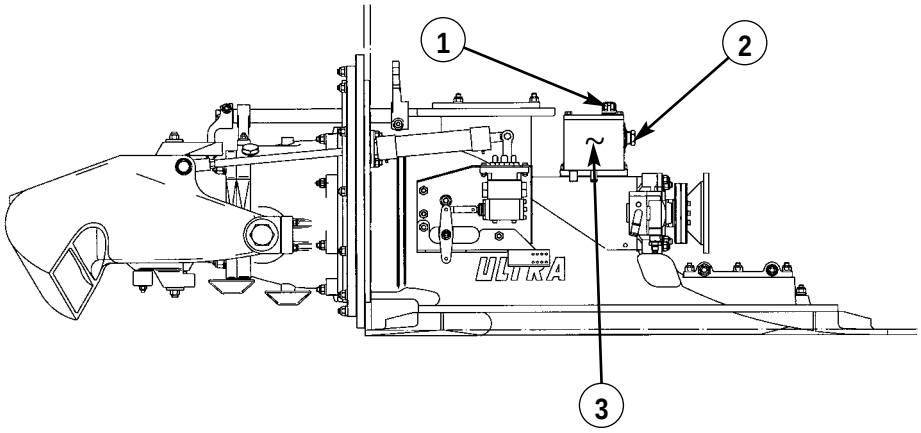
WARNING

Engine must be off and transmission must be in neutral during filling. Failure to comply may result in injury or death to personnel.

NOTE

For proper oil type, refer to WP 0047 00.

1. Open hydrojet compartment hatches WP 0004 00.
2. View sight glass (2) to check oil level in reservoir (3).
3. Remove reservoir fill cap (1) from reservoir (3).
4. Fill oil until oil level reaches center of the sight glass (2).
5. Install fill cap (1) on reservoir (3).
6. Close hydrojet compartment hatches WP 0004 00.



END OF WORK PACKAGE

CHAPTER 5

SUPPORTING INFORMATION

BRIDGE ERECTION BOAT (BEB) MK II-S

SUPPORTING INFORMATION

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

REFERENCES

SCOPE

This work package lists all field manuals, forms, technical manuals, and miscellaneous publications referenced in this manual.

PUBLICATIONS INDEX

The following index should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this manual.

DA Pam 750-8	The Army Maintenance Management System (TAMMS)

FORMS

The following forms pertain to this manual. See DA Pam 25-30 for index of blank forms. See DA Pam 750-8, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to this manual.

DD Form 250	Material Inspection and Receiving Report
DD Form 314	Preventive Maintenance Schedule and Record
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2404/5988-E	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
DA Form 2408-9	Equipment Control Record
SF 361	Transportation Discrepancy Report
SF 364	Report of Discrepancy (ROD)
SF 368	Product Quality Deficiency Report (Category 11)

FIELD MANUALS

FM 3-5	Nuclear, Biological, and Chemical (NBC) Decontamination
FM 5-34	Engineer Field Manual
FM 4-25.11	First Aid

REFERENCES (Contd)

TECHNICAL MANUALS

TM 5-5420-278-10	Operator's Manual for Improved Ribbon Bridge (IRB)
TM 5-5420-277-14&P	Operator's, Unit, Direct Support, and General Maintenance Manual (Including Repair Parts and Special Tools List) for Improved Boat Cradle (IBC)
TM 5-5420-209-12	Operator's and Unit Maintenance Manual, Improved Float Bridge (IFB)
TM 9-2320-279-10	M977 Series, 8 x 8 Heavy Expanded Mobility Tractical Truck (HEMTT) Operator's Manual
TM 9-2330-385-14	Operator's, Unit, Direct Support, and General Support Maintenance Manual for Palletized Load System Trailer (PLST) Model M1076
TM 5-5420-234-14&P	Operator's, Unit, Direct Support, and General Support Manual (Including Repair Parts and Special Tools List), Common Bridge Transporter
TM 9-247	Materials Used for Cleaning, Preserving, Abrading, and Material and Related Materials Including Chemicals Cementing Ordnance
TM 43-0139	Painting Instructions for Field Use
TM 43-1043	Equipment Improvement Report and Maintenance Summary
TM 55-2200-001-12	Transportability Guidance for Applications of Blocking, Bracing, and Tiedown Materials
TM 743-200-1	Storage and Materials Handling
TM 746-10	Marking, Packing, and Shipment of Supplies and Equipment: General Packaging Instructions for Field Use
TM 750-244-6	Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use

TECHNICAL BULLETINS

TB 5-5420-234-15	Warranty Program for the Common Bridge Transporter (CBT)
TB 43-0142	Safety, Inspection and Testing of Lifting Devices
TB 43-0209	Color, Marking, and Camouflage Painting of Military Vehicles
TB 43-0002	Maintenance Federal Supply Class (FSC) 54

OTHER PUBLICATIONS

AR 750-1	Army Materiel Maintenance Policy
ASME Y14.38	Abbreviations & Acronyms
CTA 50-970	Expendable/Durable Items (except Medical, Class V, Repair Parts, and Heraldic Items)
MIL-PRF-2104	Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service
TC 5-210	Military Float Bridging Equipment

END OF WORK PACKAGE

SUPPORTING INFORMATION

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

Section I. INTRODUCTION

SCOPE

This work package lists Components of the End Item (COEI) and Basic Issue Items (BII) for the Bridge Erection Boat (BEB) to help inventory items required for safe and efficient operation. For a list of BII for the Common Bridge Transporter (CBT), refer to TM 5-5420-234-14&P. For a list of BII for the Improved Boat Cradle (IBC), refer to TM 5-5420-277-14&P.

GENERAL

The Components of End Item (COEI) and Basic Issue Items (BII) lists are divided into the following sections:

a. Section II, Components of End Item (COEI). This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III, Basic Issue Items (BII). These are the minimum essential items required to place the BEB in operation. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on Table of Orgainzation and Equipment/Modified Table of Organization and Equipment (TOE/MTOE) authorization of the end item.

EXPLANATION OF COLUMNS

The following provides an explanation of columns found in tabular listings:

a. Column (1)—Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2)—National Stock Number. Indicates the national stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3)—Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the Commercial and Government Entity Code for Manufacturer (CAGEC) for (in parentheses), followed by a part number.

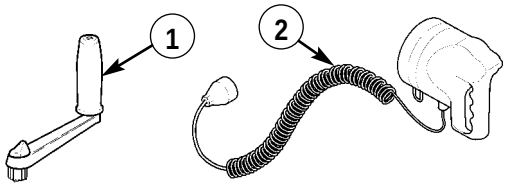
d. Column (4)—Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g.: ea, in., pr).

e. Column (5)—Quantity Required (Qty Rqr). Indicates the quantity of the item authorized to be used with/on the BEB.

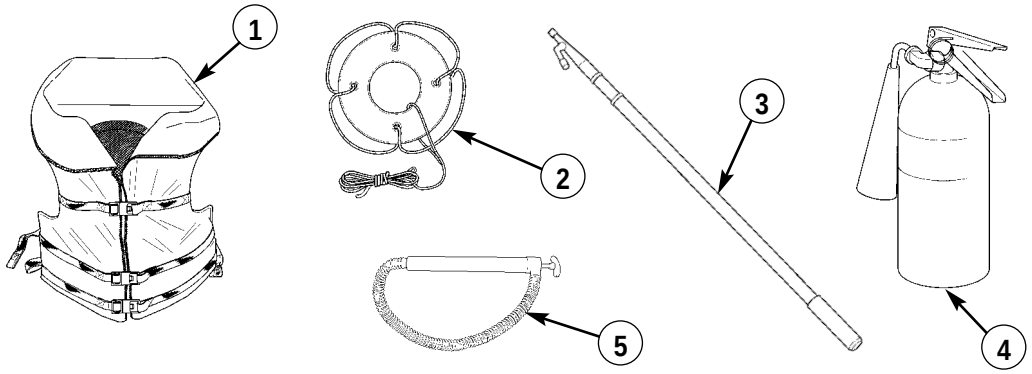
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS (Contd)

Section II. COMPONENTS OF END ITEM

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QUANTITY REQUIRED
1	—	HANDLE: capstan LEWMAR 29141111	BEB	EA	1
2	—	INSPECTION LIGHT: hand held searchlight 02-3313-003	BEB	EA	1



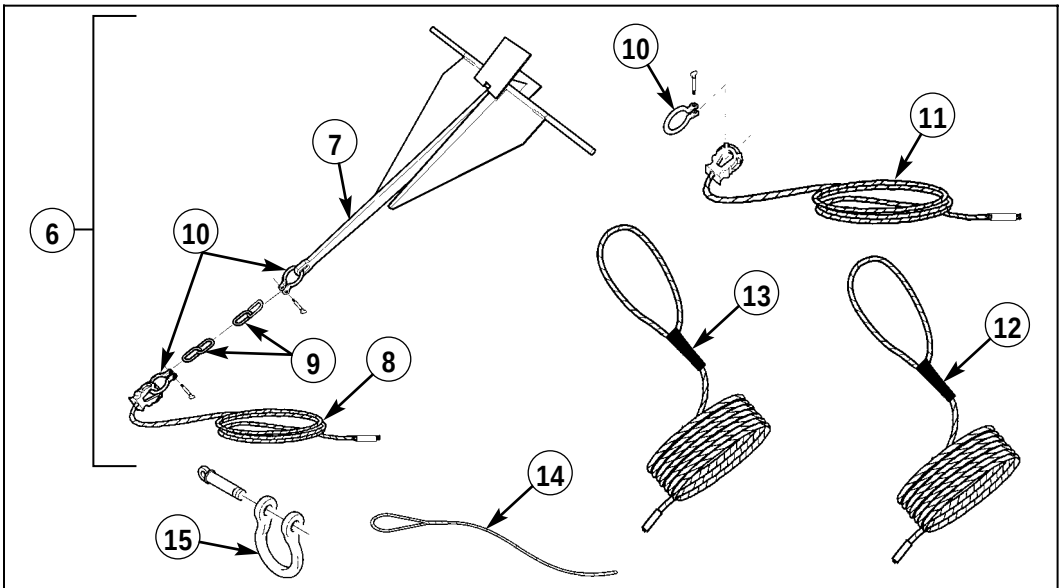
Section III. BASIC ISSUE ITEMS



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QUANTITY REQUIRED
1	4220-01-454-6135	PERSONAL FLOTATION DEVICE: small (63806) 6155-ML-MED	BEB	EA	1
1	4220-01-454-6136	PERSONAL FLOTATION DEVICE: large (63806) 6155-LGE-XLG-E	BEB	EA	2
2	4220-01-418-4700	RING BUOY: C/W 50 ft × 1/2 in. diameter line (97403) 13226EO573	BEB	EA	1
3	2040-01-473-1663	BOAT HOOK: extending (62840) GARELICK 55175	BEB	EA	1
4	4210-00-270-4512	FIRE EXTINGUISHER: portable (06535) M-133-01	BEB	EA	1
5	4320-00-244-9865	BILGE PUMP: portable (ONZ58) MG-1-4-12	BEB	EA	1

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS (Contd)

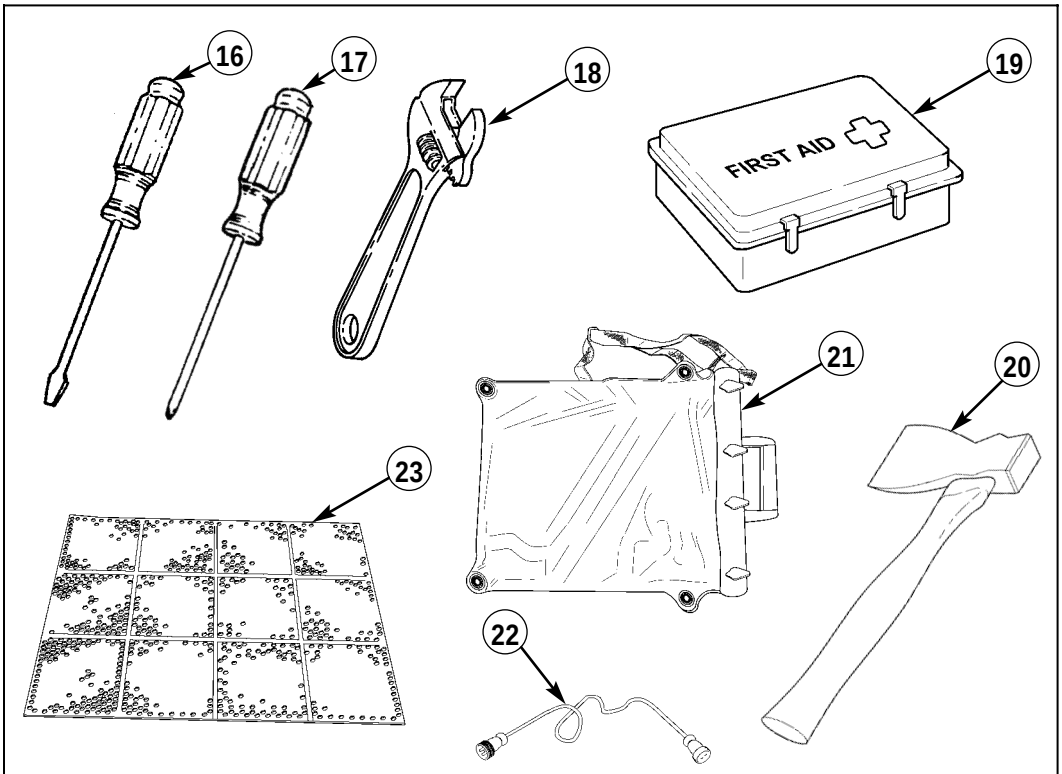
Section III. BASIC ISSUE ITEMS (Contd)



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QUANTITY REQUIRED
6	—	ANCHOR & LINE ASSEMBLY: danforth, 25 lb (K3335) 12492141-5	BEB	EA	1
7	—	ANCHOR: danforth, 25 lb (3HK49) DAN-S1600	BEB	EA	1
8	—	LINE: anchor, 5/8 in. × 100	BEB	EA	1
9	—	CHAIN: anchor (39428) 3457T33	BEB	EA	1
10	—	SHACKLE: anchor and towing line, 1/2 in. screw pin (39428) 3663T42	BEB	EA	3
11	—	LINE: towing, 5/8 in. diameter × 100 ft long (K3335) 12492141-1	BEB	EA	1
12	—	LINE: bow, 5/8 in. diameter × 30 ft long (K3335) 12492141-3	BEB	EA	4
13	—	LINE: steering, 5/8 in. diameter × 60 ft long (K3335) 12492141-4	BEB	EA	2
14	—	LINE: towing hook release, 1/4 in. diameter × 24 in. long (39428) 3836T92	BEB	EA	1
15	—	SHACKLE: hull lifting eye, 7/8 in. screw pin (39428) 3663T45	BEB	EA	4

COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS (Contd)

Section III. BASIC ISSUE ITEMS (Contd)



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC AND PART NUMBER	USABLE ON CODE	(4) U/M	(5) QUANTITY REQUIRED
16	5120-00-222-8852	SCREWDRIVER: flat tip, 1/4 in. (77948) 225498	BEB	EA	1
17	5120-00-234-8912	SCREWDRIVER, phillips #2 (53719) SSDP630	BEB	EA	1
18	5120-00-240-5328	ADJUSTABLE WRENCH: 8 in. (19207) 11655778-3	BEB	EA	1
19	6545-00-922-1200	FIRST AID KIT: 3 in. × 87/32 in. (64616) SC C-6545-IL VOL 2	BEB	EA	1
20	5110-00-555-8868	HATCHET (049W4) 5110-00-555-8868	BEB	EA	1
21	7520-00-599-9618	DOCUMENT POUCH (U4533) AQUA-670	BEB	EA	1
22	—	EXTENSION LEAD, 15 ft., inspection light (K3335) 3051-07E-02-2	BEB	EA	1
23	6530-01-498-4821	MATTING: cockpit (60327) TEK-TOUGH JR 736-RED	BEB	EA	1

END OF WORK PACKAGE

SUPPORTING INFORMATION

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

ADDITIONAL AUTHORIZATION LIST (AAL)

Section I. INTRODUCTION

SCOPE

This work package lists additional items authorized for the support of the Bridge Erection Boat (BEB).

GENERAL

This lists identifies items that do not have to accompany the BEB and that do not have to be turned in with it. These items are authorized by CTA, MTOE, or JTA.

EXPLANATION OF COLUMNS IN THE AAL

Column (1)—National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2)—Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (in parentheses) and the part number.

Column (3)—Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment. These codes are identified below:

Code	Used on
BEB	MK II-S

Column (4)—Unit of Measure (U/M). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5)—Qty Recm. Indicates the quantity recommended.

ADDITIONAL AUTHORIZATION LIST (AAL) (Contd)

Section II. ADDITIONAL AUTHORIZATION LIST (AAL)

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION CAGEC & PART NUMBER	(3) USABLE ON CODE	(4) U/M	(5) QTY RECM
4930-00-288-1511	ADAPTER: grease gun coupling, flexible 14 in. O/A long (0AYB6) G6	BEB	EA	6
6220-01-217-8316	EMERGENCY TOW LIGHTS (45152) 1462290U	BEB	EA	1
1370-00-249-9410	FLARE: pistol (30003) 705 as 100	BEB	EA	1
6260-01-178-5559	LIGHT: chemiluminescent, 6 in. long, red, 12 hour, waterproof (58536) A-A-55134-E	BEB	BX	5
4930-00-253-2478	LUBRICATION GUN: hand lever operated, 14 oz cap, 6,000 PSIG, w/coupling and 6,500 in. extension (36251) 1142	BEB	EA	1
4320-00-542-3347	PUMP UNIT: centrifugal, 125 GPM, 5000 lb proof load (96046) A52109	BEB	EA	1
1670-01-027-2900	SLING: cargo, aerial deliver, web strap type (56646) 38850-00001-044	BEB	EA	1
4030-00-090-5354	SHACKLE: steel, anchor type, 2,130 in. maximum opening width (96906) MS70087-3	BEB	EA	4
4030-00-244-6092	SHACKLE: steel, anchor type, 31,800 lbs proof load, 1,250 in. nominal opening width (80205) NAS1042-12	BEB	EA	4
3940-00-214-7493	SLING AND WIRE ROPE ASSEMBLY (97403) 13218E4318	BEB	EA	1
5210-00-554-7087	TAPE: measuring, fibre, 100 ft, hand crank winding (37163) 406	BEB	EA	3
—	DEPTH SOUNDER: fathometer	BEB	EA	1

ADDITIONAL AUTHORIZATION LIST (AAL) (Contd)

Section II. ADDITIONAL AUTHORIZATION LIST (AAL) (Contd)

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION CAGEC & PART NUMBER	(3) USABLE ON CODE	(4) U/M	(5) QTY RECM
9390-00-753-3208	TAPE: reflective, yellow, pressure sensitive, 1.000 in. wide, 1800 in. long (81346) ASTM-D4956	BEB	EA	4
5120-00-243-1687	UNIVERSAL JOINT: socket wrench, 1-1/2 in. (58536) A-A-2169	BEB	EA	1
5140-00-772-4142	BAG: tool, cotton duck with flap, 10,000 × 20,000 in. (81337) 5-3-62	BEB	EA	1
5120-00-227-7338	SCREWDRIVER: flat tip, heavy duty, steel handle, with wood inserts, 5 in. blade, 9-1/2 in. long (77948) D339	BEB	EA	1
5120-00-234-8912	SCREWDRIVER: cross tip, phillips # 3, plastic handle, 6 in. blade, 10-1/8 in. long (C7127) SSDP63	BEB	EA	1
5120-00-449-8083	WRENCH: adjustable, open end, 9-1/2–10-1/2 in. opening, type 1, class 1 (96508) D710	BEB	EA	1
5120-00-061-8546	HAMMER: hand, machinists ball-peen, 2 lb, type II, class 1, style A (79171) FS432	BEB	EA	1
2590-01-222-7946	CABLE, NATO SLAVE: intervehicular power cable, 12 ft long (19207) 11682379-4	BEB	EA	1
—	CAN: fuel, military, plastic, 5 gal.	BEB	EA	1
7240-00-089-3827	CAN: water, military, plastic, 5 gal. (81349) MIL-C-43613	BEB	EA	1
5340-00-158-3805	PADLOCK SET: (96906) MS35647-10	BEB	EA	1
—	RADIO SET: wireless intercom	BEB	EA	1
—	COMPASS: nautical	BEB	EA	1
7240-00-177-6154	SPOUT: can, gas, flexible with filter screen, 16 in. long (19207) 11677020	BEB	EA	1
2510-01-197-8572	TRAY: water can (19207) 12340155	BEB	EA	1

END OF WORK PACKAGE

SUPPORTING INFORMATION

BRIDGE ERECTION BOAT (BEB)
MK II-S

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

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

SCOPE

This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized by CTA 50-970, Expendable/ Durable Items (except medical, class V, repair parts, and heraldic items).

EXPLANATION OF COLUMNS

a. Column (1)—Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g.: cleaning solvent compound, item 1, WP 0053 00).

b. Column (2)—Level. This column identifies the lowest level of maintenance that requires the listed item.

C—Operator/Crew
O—Field Maintenance

c. Column (3)—National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column (4)—Description. This column indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Commercial and Government Entity Code for Manufacturer (CAGEC) in parentheses followed by the part number.

e. Column (5)—Unit of Measure (U/M). This column indicates the measure used in performing the actual maintenance function. This measure is expressed by a alphabetical abbreviation (e.g., EA, GAL., OZ). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements. Adjust when higher category maintenance requirements are involved.

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Contd)

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGEC & PART NUMBER	(5) UNIT OF MEASURE
1	C	6850-01-381-4423	DRY CLEANING SOLVENT COMPOUND: (0K209) Skysol 100 5-Gallon Can	GAL
2	C	7920-00-044-9281	CLOTH CLEANING: general purpose, white (58536) A-A-59323 10-Pound Box	LB
3	C	8030-00-244-1297	CORROSION PREVENTATIVE COMPOUND: grade II, soft film, (81349) MIL-PRF-16173 1-Gallon Can	GAL
4	C	7930-00-282-9699	DETERGENT: general, liquid, (81349) MIL-PRF-16173 1-Gallon Can	GAL
5	C	9150-01-197-7693 9150-01-197-7690	GREASE: automotive and artillery, (81349) MIL-PRF-10924G 14-Ounce Cartridge 1-3/4-Pound Can	OZ LB
6	C	9150-00-234-5197	LUBRICATING OIL: exposed gear, CW (81348) VV-L-751 5-Pound Can	LB
7	C	9150-00-188-9862	LUBRICATING OIL: engine, OE/HDO 15W40, multipurpose, (81349) MIL-PRF-2104 55-Gallon Drum	GAL
8	C	9150-00-189-6729	LUBRICATING OIL: gear, G80W/90 (81349) M2105-3-80W90 55-Gallon Drum	GAL
9	C	9150-01-336-6589	LUBRICATING OIL, hydraulic, all weather 1-Quart bottle (54527) SHELL TELLUS 32 5-Gallon Container	GAL
10	C	9130-01-031-5816	Fuel, aviation, turbine, all temperature, JP8 (81349) MIL-T-83133 GR JP8 Bulk	BU

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Contd)

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST (Contd)

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGEC & PART NUMBER	(5) UNIT OF MEASURE
11	C		OIL: lubricating gear, G 80W/90 (81349) M2105-3-80W90	
		9150-00-577-5844	5-Gallon Can	GAL
12	C		ANTIFREEZE: permanent, ethylene glycol, -60 °F (-51 °C) inhibited (O-A-548), heavy-duty, green in color, recycled (58536) A-A-52624	
		6850-01-464-9125	1-Gallon Container	GAL
		6850-01-464-9137	5-Gallon Container	GAL
		6850-01-464-9152	55-Gallon Container	GAL
		6850-01-464-9096	55-Gallon Container (Arctic)	GAL
13	C		LUBRICATING OIL: transmission, 30W	
		9150-00-247-0481	(81349) MIL-PRF-2104	GAL
14	C		STRAP: tiedown electrical components, polyamide nylon self locking, black color (81343) NS3367-2-0	
		5975-00-899-4606	1 ea – 100 per box	BX
15			Lubricating Oil, engine, OE/HDO 5W30, arctic condition MIL-PRF-46167 (81343) J2362	
		9150-01-348-1596	55-Gallon Drum	GAL

END OF WORK PACKAGE

GLOSSARY

The following is a list of abbreviations/acronyms and their definitions appearing in this manual. Other terms found in this manual are defined in the paragraph from where they first appear. Refer to ASME Y14.38 for a complete list of standard military abbreviations and acronyms.

AAL — Additional Authorization List
AEPS — Army Electronic Product Support
BEB — Bridge Erection Boat
BII — Basic Issue Items
BX — Box
CAGEC — Commercial and Government Entity Code
CBT — Common Bridge Transporter
cm — centimeter
COEI — Components of End Item
CPC — Corrosion Prevention and Control
EA — Each
ECP — Engineering Change Proposal
EDRS — Electronic Deficiency Reporting System
EEP — Engineer Equipment Park
EIC — End Item Code
EIR — Equipment Improvement Recommendation
ERP — Engineer Regulating Point
FCG — Functional Group Code
FM — Field Maintenance
ft — foot
GAL. — Gallon
GHP — Gallon per Hour
GVWR — Gross Vehicle Weight Rating
HEMTT — Heavy Expanded Mobility Tactical Truck
IBC — Improved Boat Cradle
IFB — Improved Float Bridge
in. — inch
IRB — Improved Ribbon Bridge
kg — kilogram
Kpa — kilopascals
lb — pound
lb-ft — pound foot
LHS — Load Handling System
MAC — Maintenance Allocation Chart
MLC — Military Load Classification
mm — millimeter
MRBC — Multi-Role Bridge Company
N•m — Newton meter
NATO — North Atlantic Treaty Organization
NCOIC — Non-commissioned Officer in Charge
NSN — National Stock Number
ODS — Ozone Depleting Substances
OZ — Ounces
PIW — Person In Water
PLST — Palletized Load System Trailer
PMCS — Preventive Maintenance Checks and Services
POL — Army Petroleum, Oil, and Lubricants
PQDR — Product Quality Deficiency Report
PSI — Pressure Per Square Inch
PTO — Power Take-off
QDR — Quality Deficiency Report
RL — Roll
RPSTL — Repair Parts and Special Tools List
SBCT — Stryker Brigade Combat Team
SLEP — Service Life Extension Program
SMR — Sources, Maintenance, and Recoverability

GLOSSARY (Contd)

SOP — Standard Operating Procedure
SRB — Standard Ribbon Bridge
TAMMS — The Army Maintenance Management System
TM — Technical Manual
TMDE — Test, Measuring, and Diagnostic Equipments
USCSB — United States Combat Support Boat
Vdc — Volts Direct Current
WARCO — Warranty Coordinator
WP — Work Package

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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0608709

Distribution:

To be distributed in accordance with the Initial Distribution Number (IDN) 256874 requirements for TM 5-1940-322-10.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tools Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	DATE: 10 May 2006

TO: *(Forward to proponent of publication or form) (include ZIP code)* AMSTA-LC-LMIT Tech Pubs, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	FROM: *(Activity and location) (include ZIP code)*

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER:	DATE:	TITLE:
TM 5-1940-322-10	10 MAY 2006	OPERATOR'S MANUAL FOR BRIDGE ERECTION BOAT (BEB)

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON *(Provide exact wording of recommended changes, if possible).*
1	0076 0048 0015 0076				1	Item number 1 reads part number 024522600. Should read 4522601. Callout to pump outlet reads 21. Should read 2.

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE, OR TITLE:	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION:	SIGNATURE

TO: *(Forward direct to addressee listed in publication)*	FROM: *(Activity and location) (include ZIP code)*	DATE:
AMSTA-LC-LMIT Tech Pubs, TACOM-RI **1 Rock Island Arsenal** **Rock Island, IL 61299-7630**		

PART II - REPAIR PARTS AND SPECIAL TOOLS LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

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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) = °C • 9 ÷ 5 + 32
Degrees Celsius (C) = °F - 32 • 5 ÷ 9
212° Fahrenheit is equivalent to 100° Celsius
89.96° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius

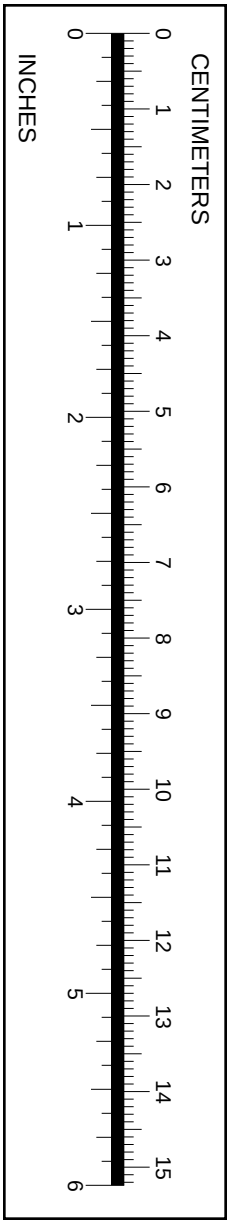
WEIGHTS

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	25.400
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



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