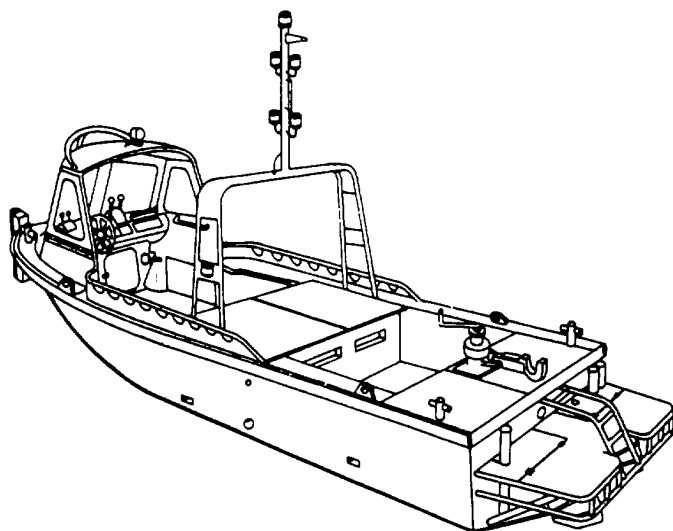


TECHNICAL MANUAL
DIRECT AND GENERAL SUPPORT
MAINTENANCE MANUAL



INTRODUCTION 1-1

DIRECT SUPPORT MAINTENANCE
INSTRUCTIONS 2-1

GENERAL, SUPPORT MAINTENANCE
INSTRUCTIONS 3-1

REFERENCES A-1

EXPENDABLE SUPPLIES AND
MATERIALS LIST B-1

ILLUSTRATED LIST OF
MANUFACTURED ITEMS C-1

**BOAT, BRIDGE ERECTION,
TWIN JET, ALUMINUM HULL
MODEL USCSBMK I
(1940-01-105-5728)**

This copy is a reprint which includes current
pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

10 NOVEMBER 1981

TECHNICAL MANUAL

HEADQUARTERS, DEPARTMENT OF THE ARMY
 HEADQUARTERS, U.S. MARINE CORPS
 WASHINGTON, D.C., 10 November 1981

Direct and General Support Maintenance Manual

BOAT, BRIDGE ERECTION, TWIN JET, ALUMINUM HULL,
 MODELS USCSBMK1 (1940-01-105-5728) AND USCSBMK2 (1940-01-218-9165)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, Headquarters, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Boulevard, St. Louis MO 63120-1798. A reply will be furnished you.

Marine Corps users shall submit NAVMC Form 10772, Recommended Changes to Technical Publications. Send to: Commanding General, Marine Corps Logistics Base (Code 850), Albany, GA 31704-5000.

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	Page
CHAPTER 1 INTRODUCTION	1-1
Section I General Information.....	1-1
Section II Equipment Description.....	1-1
CHAPTER 2 DIRECT SUPPORT MAINTENANCE INSTRUCTIONS	2-1
Section I Repair Parts; Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment.....	2-1
Section II Troubleshooting Procedures	2-1
Section III Direct Support Maintenance Procedures	2-27
CHAPTER 3 GENERAL SUPPORT MAINTENANCE INSTRUCTIONS.....	3-1
APPENDIX A REFERENCES	A-1
APPENDIX B EXPENDABLE SUPPLIES AND MATERIALS LIST	B-1
APPENDIX C ILLUSTRATED LIST OF MANUFACTURED ITEMS.....	C-1
APPENDIX D GLOSSARY.....	D-1
ALPHABETICAL INDEX	I-1
WIRING DIAGRAM (SHEET 1 OF 2).....	FO-1.3
WIRING DIAGRAM..(SHEET 2 OF 2)	FO-1.4

FUEL SYSTEM DIAGRAM FO-2

COOLING SYSTEM DIAGRAM..... FO-3

BUOYANCY MATERIAL GENERAL ARRANGEMENT FO-4

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

- a. Type of Manual: Direct Support and General Support Maintenance.
 - b. Equipment Name and Model Number: Bridge Erection Boat, Twin Jet, Aluminum Hull. The model numbers assigned to this equipment are USCSBMK-1 and USCSBMK-2.
 - c. Purpose of Equipment: Support bridging and amphibious operations. May also be used as a general purpose workboat in support of diving operations and maritime projects, for inland water patrols, and as safety boat for amphibious river crossings.
 - d. Special Limitations on Equipment: When used to ferry troops or cargo, the safe carrying capacity is limited to a maximum of 12 fully equipped men or 4400 pounds (2000 kilograms).
- 1-2. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS). Marine Corps personnel will prepare and maintain records and report forms as prescribed by TM 4700-15/1, Equipment Record Procedures.
- 1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS. If your boat needs improvement, let us know. Send us an Equipment Improvement Recommendation (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. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, Headquarters, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. U.S. Marine Corps users are encouraged to submit EIRs in accordance with 1650.17, or submit Quality Deficiency Reports in accordance with MCO 4855.10. Mail it to us at Commanding General (P840), Marine Corps Logistics Base, Albany, GA 31704-5000. We'll send you a reply.
- 1-4. WARRANTY INFORMATION. The Bridge Erection Boat, USCSBMK1, is warranted by Fairey Allday Marine Limited for 12 months. The Bridge Erection Boat, USCSBMK2 is warranted by American Development Corporation for 12 months. The warranty starts on the date found in block 23 of DA Form 2408-9 in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance supervisor.

Section II. EQUIPMENT DESCRIPTION

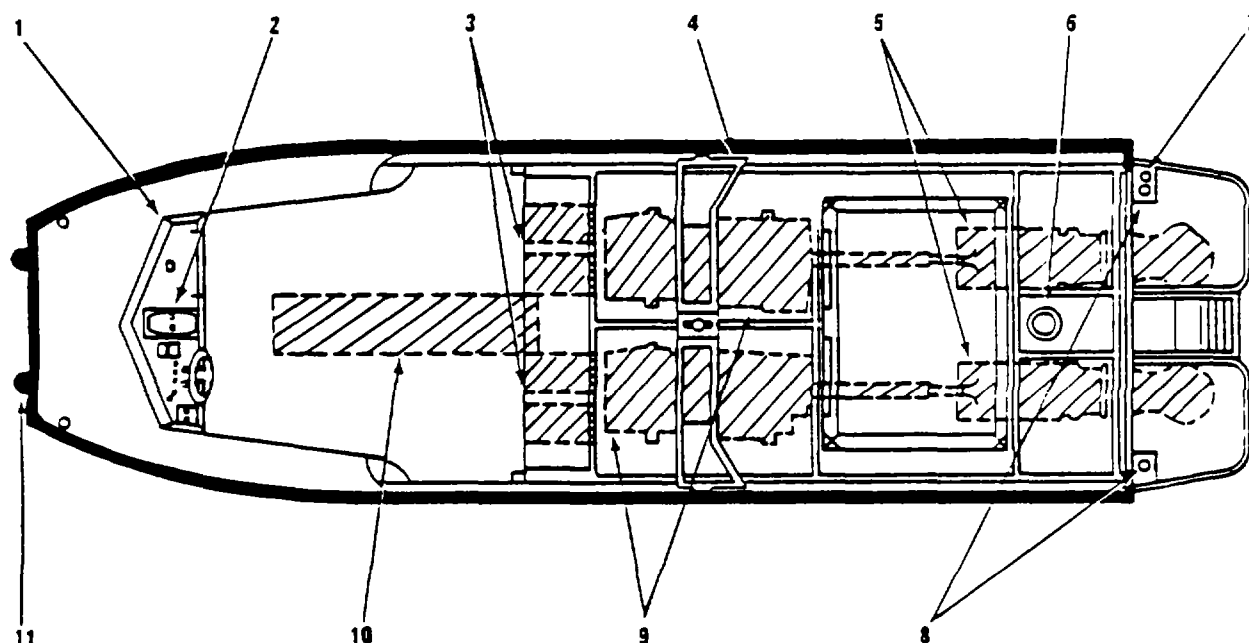
1-5. PURPOSE OF BRIDGE ERECTION BOAT. A transportable, hydrojet propelled, aluminum hull boat designed to maneuver components of floating bridges. The boat can also be used to propel rafts, support diving operations, assist in maritime construction projects, serve as a troop and cargo carrier, and patrol inland waters.

1-6. CAPABILITIES AND FEATURES

- a. Can rotate on its own axis at low engine speeds.
- b. All weather operational.
- c. Transportable by rail, road, and air. (See TB 55-46-1.)
- d. Positive flotation.

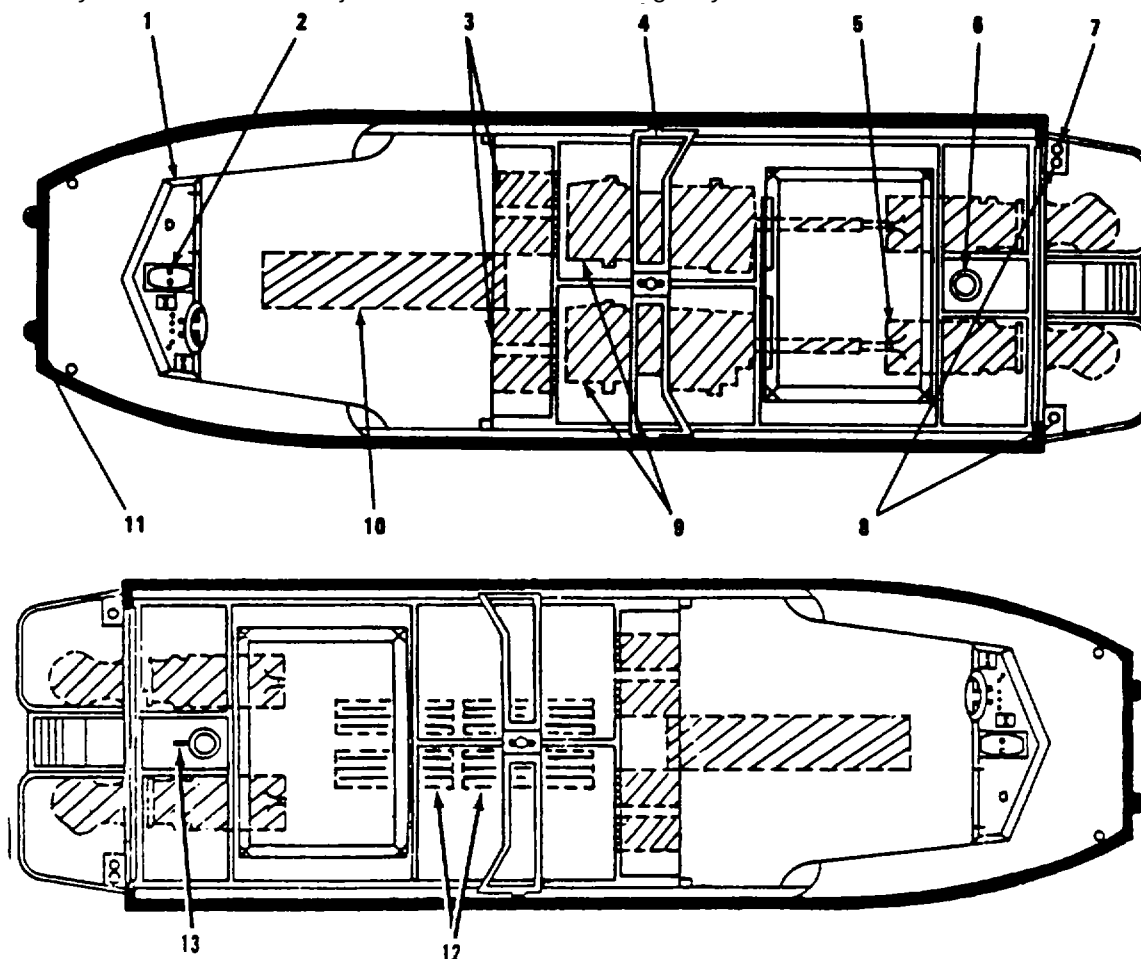
1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

- a. Removable Cab(1). An aluminum frame with windows and aluminum roof that can be attached to the boat to provide protection for the crew during bad weather. The cab is provided with windshield wipers and a place for attaching searchlight.
- b. Control Console (2). Contains all the controls and indicators required for operation of the boat. In addition, it contains a hand-operated bilge pump, a storage compartment for technical manuals, and a storage compartment for life preservers and other gear.



- c. Batteries (3). Provide electrical power for the operation of the boat.
- d. Removable Mast (4). Contains the navigation lights, towing lights, and anchor lights. May be lowered to rest on capstan or removed from the boat when lights are not required.
- e. Hydrojets (5). Consist of diesel engine driven hydrojet propulsion units with directional nozzles and scoops. The propulsion units propel the boat and steer it.
- f. Capstan (6). A two-speed hand-operated winching device used for towing, winching, and other work tasks.

- g. Davit Tube (7) (MK1 only). Allows the attachment of a davit (small crane) to the boat for use in diving operations. Not used in U.S. Army operations.
- h. Beaching Legs (8). Support the boat in an upright position when on a hard surface and not in cradle. The beaching legs are retractable.
- i. Engines (9). Provide power for driving hydrojet units.
- j. Fuel Tank (10). Provides fuel storage capacity for operation of boat.
- k. Pushknees (11). Provides the front of the boat with a flat vertical surface for pushing barges or maneuvering bridge components. The pushknees can be removed.
- l. Keel Coolers (12) (MK2 only). Provide cooling for the engine, transmission, oil, and turbocharged air. Located on the bottom of the boat.
- m. Tow Hook (13). Provides boat with towing capability. Has quick-release mechanism to allow operator to immediately detach boat from object in tow in case of emergency.



EQUIPMENT DATA

WEIGHTS AND DIMENSIONS

Operating

Weight, w/ crew, equipment and fuel	8800 lbs.	(4000 kg)
Length	322.8 in	(820 cm)
Beam	98.0 in	(249 cm)
Height		
w/o cab or mast	77.9 in	(198 cm)
w/ cab	109.8 in	(279 cm)
w/ cab and mast	177.9 in	(452 cm)
Draft		
w/ crew, equipment and fuel	22.0 in	(56 cm)
fully loaded	26.0 in	(66 cm)

Transported

Weight	10800 lbs.	(4909 kg)
Length	326.4 in	(826 cm)
Height w/o cab	96.3 in	(244 cm)
Width	116.3 in	(294 cm)

PERFORMANCE

Speed, w/ crew, equipment and fuel	21.6 knots
Speed, fully loaded	16.2 knots
Maximum load carrying capacity	4400 lbs. (2000 kg)
Towing hook	4400 lbs. (2000 kg)
Turning radius (with scoops at maximum thrust)	
Full speed ahead	2 boat lengths in 15 seconds
Full speed astern	2 boat lengths in 25 seconds
One scoop forward and one scoop in reverse	Standing circle
Fuel consumption (approximate)	
1750 rpm	2.8 gallons/hour (11 liters/hour)
2000 rpm	4.2 gallons/hour (16 liters/hour)
2250 rpm	6.0 gallons/hour (23 liters/hour)
2450 rpm	10.8 gallons/hour (40 liters/hour)
Minimum forward thrust at 2450 rpm	4200 pounds (18.7 kN)
Minimum reverse thrust at 2450 rpm	2200 pounds (9.8 kN)
Maximum safe engine operating speed	
MK1	2800 rpm
MK2	2900 rpm

CAPACITY

Fuel	75 gallons (280 liters)
Oil	
Engine	17-1/2 quarts (16.4 liters)
Transmission	2-1/2 quarts (2.35 liters)
Coolant	
MK1	7-1/5 gallons (27 liters)
MK2	18 gallons (68.1 liters)

ENGINE INSTRUMENT PANEL GAGE READINGS

Tachometer	
Idle speed	650 to 750 rpm
Operating speed	1000 to 2000 rpm
Maximum speed (Under Load)	2500rpm
Engine oil pressure gage	
Idle speed	20 to 30 lb/in ² (1.4 to 2.1 Kp/cm ²)
Operating speed	40 lb/in ² or above (2.8 Kp/cm ²)
Coolant temperature gage (fresh water system)	
Normal	Below 195 °F (90 °C)
Overheating	Above 195 °F (90 °C)
Battery condition meter (engine not running, no electrical load)	
Battery fully charged	25.4 volts or above
Battery half charged	24.6 to 25.4 volts
Battery fully discharged	23.7 volts or below

NOTE

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

Battery condition meter (engine running about 1500 rpm and no electrical load)	
Battery near to fully charged	27.0 to 28.0 volts
Battery partially discharged	24.0 to 27.0 volts
Battery charge low	Below 24.0 volts
Battery condition meter (normal operation)	
Above 24 volts	Alternator output matching or greater than electrical load
Below 24 volts	Load in excess of alternator output
Opening temperature range for thermostat	160° - 170° F

NOMENCLATURE		Boat, Bridge Erection, Twin Jet, Aluminum Hull
HULL		
Manufacturer	MK1	Allday Aluminum Limited, Gosport Hampshire P012 4DT England
	MK2	American Development Corporation (ADCOR) 1930 Hanahan Road North Charleston, SC 29406
Length (overall)		322.8 inches (820 cm)
Width (overall)		98 inches (249 cm)
Height (with cab)		109.8 inches (279 cm)
Height (without cab)		77.9 inches (198 cm)
Weight		8800 lbs. (4000 kg)
Construction		Welded aluminum
ENGINE		
Manufacturer		Sabre Engines Ltd. Ferndown Industrial Estate, Wimborne Dorset, England
Model		212
Maximum rpm (no load)		
MK1		2800 rpm
MK2		2900 rpm
Shaft horsepower		212 @ 2500 rpm $\pm$ 50 1358 lbs. (with trans- mission) (616 kg)
Weight (dry)		6
No. of cylinders		4.125 inches (105 mm)
Bore		4.524 inches (115 mm)
Stroke		363 cubic inches (5.95 liters)
Total displacement		Counterclockwise (as viewed from fly- wheel)
Firing order		1, 5, 3, 6, 2, 4
Compression ratio		14.7 to 1
Compression pressure (min)		300 psig
Valve clearance (hot)		0.018 inch
No. of main bearings		7
Upper main bearings		Grooved, oil feed holes, steel backed aluminum tin liners
Lower main bearings		Groove in center and rear liners only, steel backed alumi- num tin liners
Oil pump		Sliding vane type camshaft driven

Idle speed	650 to 750 rpm
Fresh water capacity	
MK1	7-1/5 gallons (27 liters)
MK2	18 gallons (68.1 liters)
Lubricating oil capacity	17-1/2 quarts (16.4 liters)
Injection pump timing	21° BTDC
Diesel fuel specification	VV-F-800
Lubrication specification	MIL-M-2104

FUEL INJECTOR

Manufacturer	CAV Limited, P.O. Box 36 Warple Way, London, England
Model	49053
Nozzle setting pressure	2999 psig (205 atms)

ALTERNATOR

Manufacturer	CAV Limited, P.O. Box 36 Warple Way, London, England
Model	AC 5
Type	Three-phase, stationary field, revolving armature, self-limiting in current output; current output 17A at 2000 rpm, 22A at 3000 rpm

STARTER MOTOR

Manufacturer	CAV Limited, P.O. Box 36 Warple Way, London, England
Model	CA45

HYDRAULIC MARINE GEAR (TRANSMISSION)

Manufacturer	Warner Gear Division Borg Warner Corp. Muncie, Indiana 47302
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Model	10-18-002
Type	Hydraulically clutched forward- reverse trans- mission
Rotation	Counterclockwise
Forward-reverse selection	Hydraulic fluid direction to clutches by selec- tor valve inside transmission
Front oil pump	Positive displacement gear type (driven at engine speed)
Oil type	Engine oil
Oil pressure (normal)	110.0 to 150.0 pounds per square inch (7.7 to 10.5 Kp/cm ²)
Oil pressure (maximum)	250.0 pounds per square inch (17.5 Kp/cm ²)
Oil temperature (normal)	155° to 165° Fahrenheit (68.3 to 73.8°C)
Regulator valve spring weight	98 to 108 pounds at 1-1/16 inch height (44.5 to 49.1 Kg at 2.7 cm)

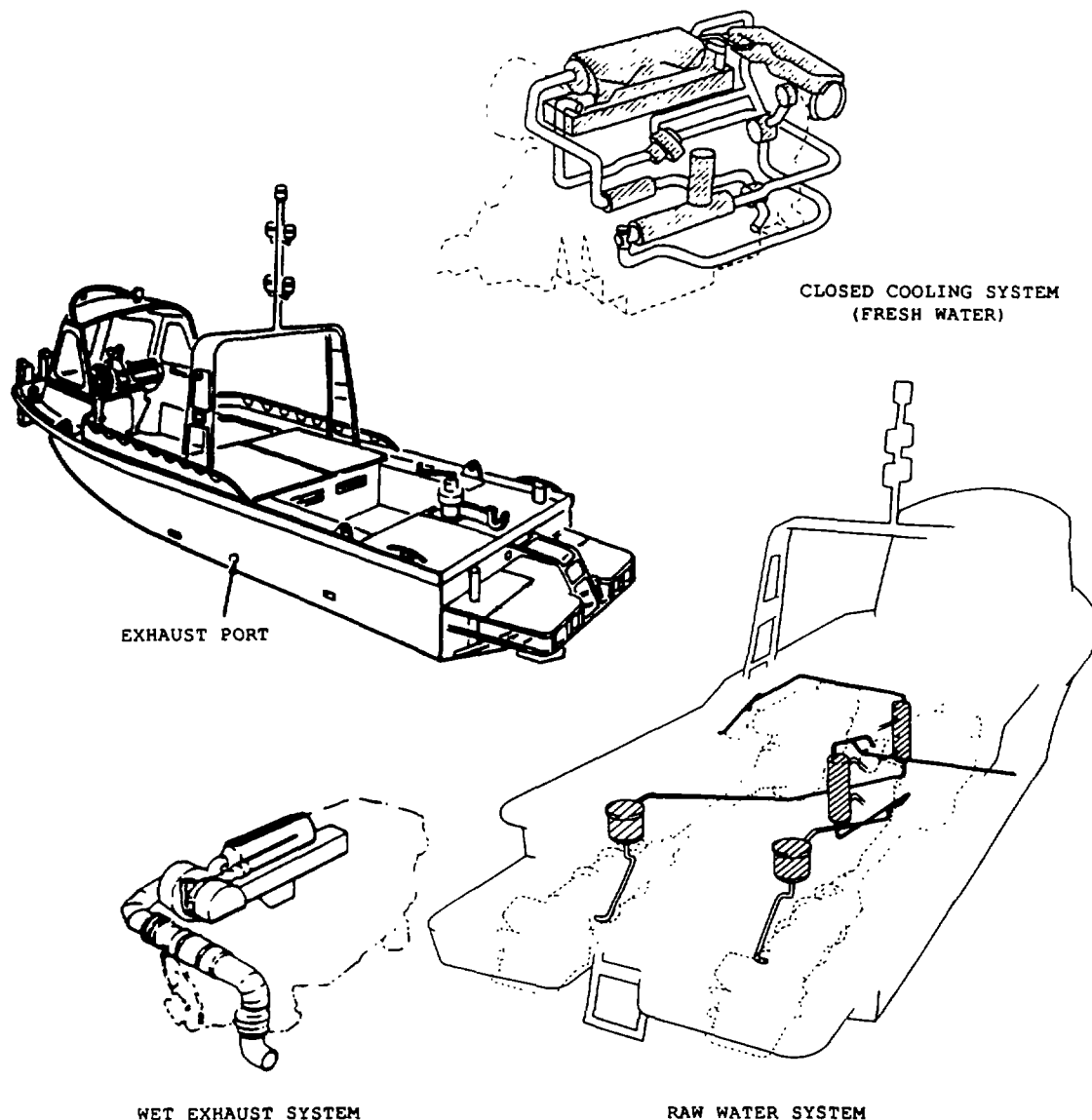
STEERING PROPULSION SYSTEM

Manufacturer	Dowty Hydraulic Units Limited Cheltenham, England
Type	Hydrojet, 12 inch (300 mm) diameter, two stage with scoops for reversing water flow and nozzles that swing through an angle of 40 degrees either side of central position for steering
Steering	Through cable control from helm in front cockpit to steering assembly portion of the hydrojet unit

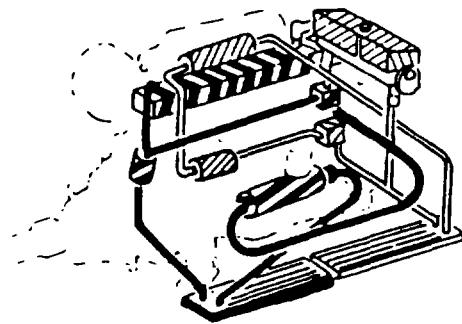
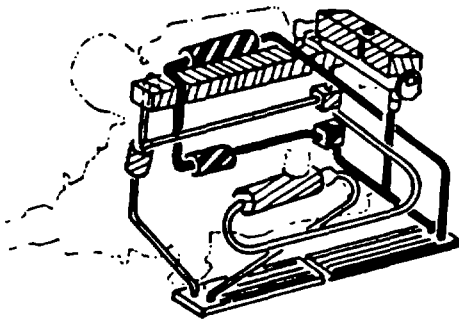
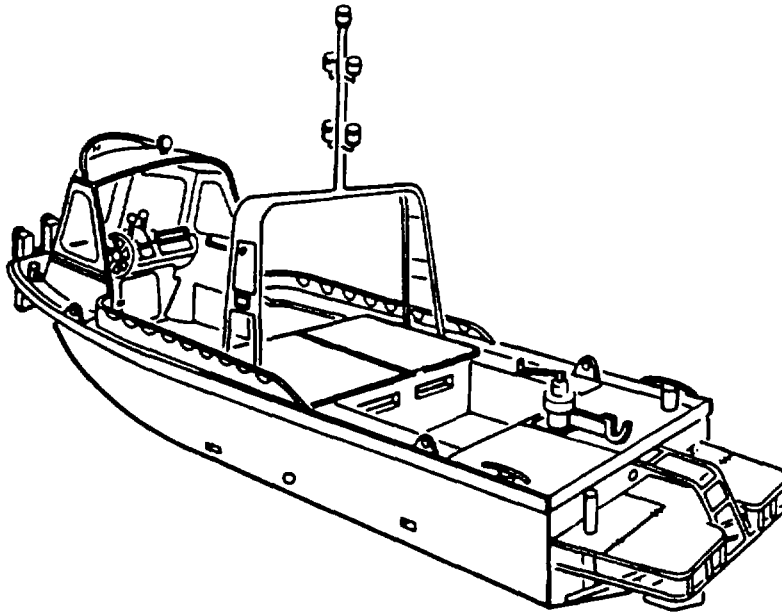
ELECTRICAL SYSTEM (24 Volts Direct Current)	
Batteries	12
Voltage	4
Number	Two batteries are connected in series to give 24-volt output; one pair is used to provide starting power and the second pair to provide all light and bilge pump operation power
Connection	
ACCESSORIES	
Electric bilge pumps	EMPO Pump Co., Inc. Piqua, Ohio 32-30 Heavy-duty enclosed motor-driven impeller
Manufacturer	
Model	Forward pump discharges through vent in transom onto diver's platform
Type	
Discharge venting	Henderson Pumps and Equipment Ltd. 38 Medina Road, Cowes, Isle of Wight, PO 31, 7BZ, England
Manual bilge pump (MK1)	
Manufacturer	Mk V Hand-operated diaphragm pump
Model	
Type	

1-8.1 DIFFERENCES BETWEEN MODELS. There are two models of the Bridge Erection Boat, the MK1 and the MK2. The two models have different engine cooling systems and air-exhaust systems. The MK2 also has several additional features not on the MK1.

- a. MK2. Each MK2 engine uses two dosed cooling systems which share a common reservoir. The MK2 uses a wet exhaust system similar to the MK1. The hydrojet forces raw water into the exhaust system and out the exhaust port on the side of the boat.



- b. Each MK2 engine uses two dosed cooling systems which share a common reservoir. The MK2 uses a wet exhaust system similar to the MK1. The hydrojet forces raw water into the exhaust system and out the exhaust port on the side of the boat.



CLOSED COOLING SYSTEMS

(FRESH WATER)

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