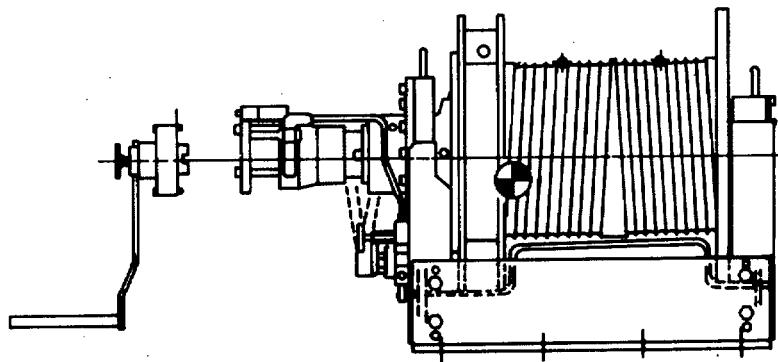
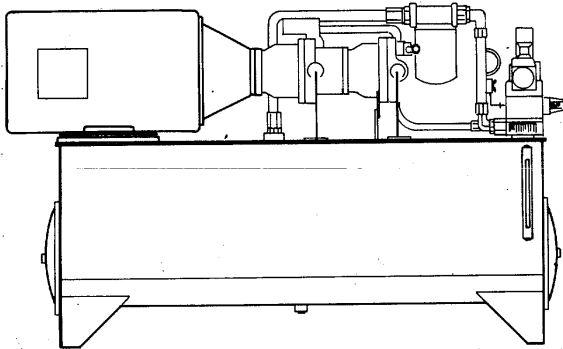


TECHNICAL MANUAL
UNIT, INTERMEDIATE DIRECT
SUPPORT
AND INTERMEDIATE GENERAL
SUPPORT
MAINTENANCE INSTRUCTIONS
BOW RAMP ASSEMBLY
FOR
LANDING CRAFT UTILITY (LCU)
NSN 1905-01-154- 1191

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INSTRUCTIONS**2-1****INTERMEDIATE DIRECT SUPPORT**
MAINTENANCE INSTRUCTIONS**3-1****INTERMEDIATE GENERAL SUPPORT**
MAINTENANCE INSTRUCTIONS**4-1****APPENDIXES****A-1****ALPHABETICAL**
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TECHNICAL MANUAL

No. 55-1905-223-24-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 January 1989

UNIT, INTERMEDIATE DIRECT SUPPORT,
AND INTERMEDIATE GENERAL SUPPORT
MAINTENANCE INSTRUCTIONS
FOR THE
BOW RAMP ASSEMBLY
FOR
LANDING CRAFT UTILITY (LCU) NSN 1905-01-154-1191

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 these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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CHAPTER 1

INTRODUCTION

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Section I. GENERAL INFORMATION

1-1. Scope. The scope of this manual is as follows:

- a. Type of Manual. Unit, intermediate direct support, and intermediate general support maintenance manual.
- b. Name of Equipment. The equipment covered by the manual is the bow ramp winch assembly that is installed aboard the LCU 2000 Class Watercraft. The system is made up of the following components (FIGURE 1-1).
 - (1) Hydraulic Winch Assembly
 - (2) Hydraulic Power Pack Assembly
- c. Purpose of Equipment. The bow ramp winch assembly is used to lower and raise the bow ramp.

1-2. Maintenance Forms, Records, and Reports . Department of the Army forms and procedures used for equipment maintenance are prescribed by DA Pam 738-750, The Army Maintenance Management System.

1-3. Destruction of Army Materiel to Prevent Enemy Use . Refer to TM 750-244-3 for instructions covering the destruction of Army materiel to prevent enemy use.

1-4. Reporting Equipment Improvement Recommendations . If your equipment 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. Put in on an SF 368 (Quality Deficiency Report). Mail it to Commander, U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Blvd., St. Louis, Missouri 63120-1798. We'll send you a reply.

1-5. Preparation for Storage or Shipment . Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the Preventive Maintenance Checks and Services (PMCS) charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness. Disassembly, and repacking of equipment for shipment or short term storage, are covered in paragraph 2-36.

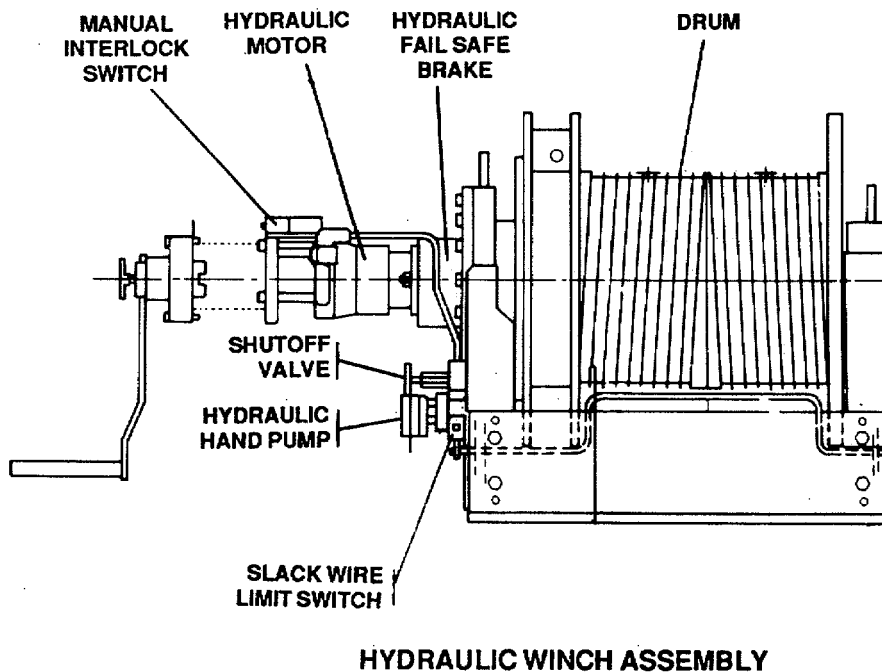
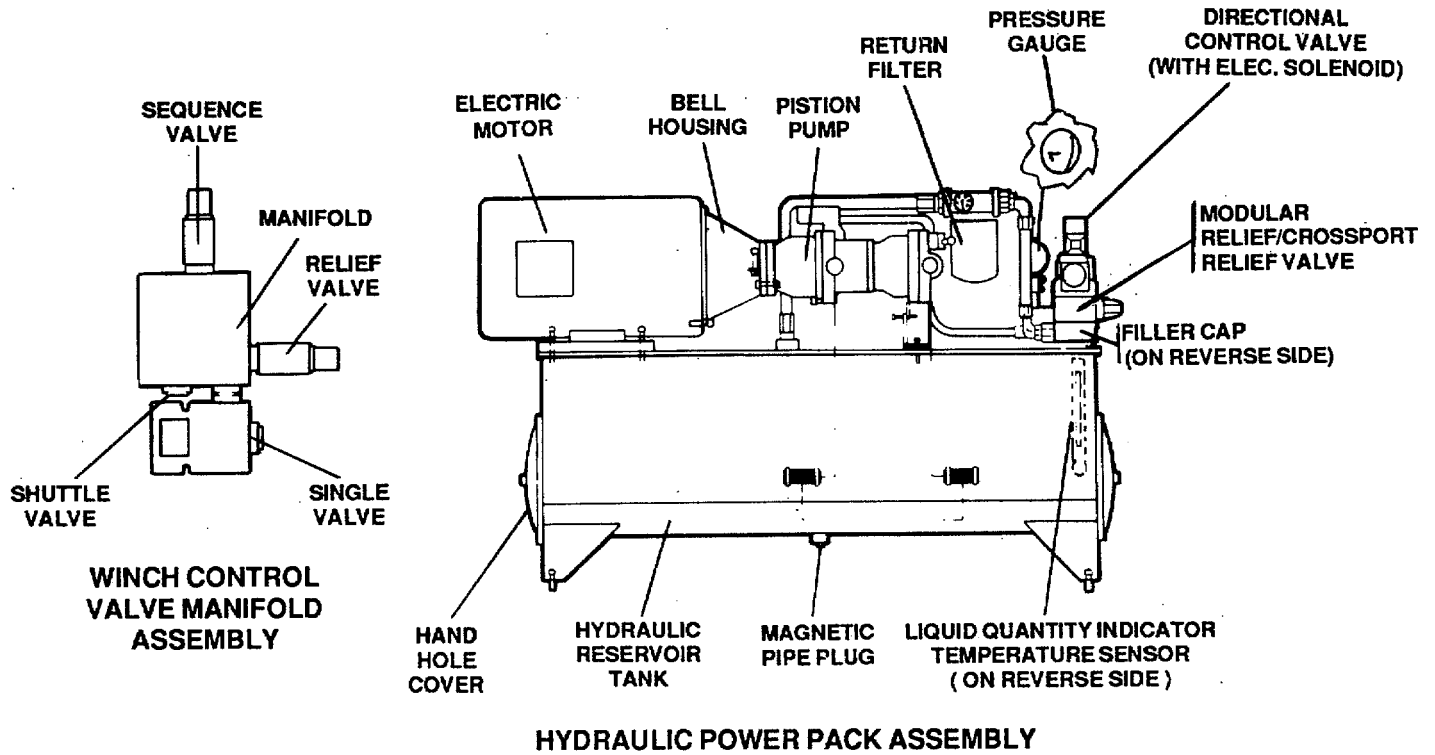


FIGURE 1-1. Bow Ramp Assembly

Section II. EQUIPMENT DESCRIPTION AND DATA

1-6. General Description . The LCU 2000 Class Watercraft bow ramp assembly consists of a winch assembly and a hydraulic power pack assembly. The hydraulic power pack assembly has an electric motor, a drive coupling, a hydraulic pump and reservoir tank, and associated pipes, valves, and gauges. This assembly provides hydraulic motive power to the winch assembly via pipes and valves. The major components of the winch assembly are the emergency handcrank, hydraulic motor, hydraulic brake, brake release pump, gear reducer, and drum. Reference FIGURE 1-1 for major components of the bow ramp assembly.

1-7. Characteristics, Capabilities, and Features . A very broad view of the bow ramp assembly is as follows:

a. Characteristics

- (1) Controls the raising or lowering of bow ramp.
- (2) Controlled from pilot house, forecastle deck and at the winch.

b. Capabilities and Features

- (1) Can operate at any one of three locations.
- (2) When operating from the pilot house control station, all other stations are inoperative.

1-8. Location and Description of Major Components . Both assemblies of the bow ramp assembly are separately located on the forward starboard side of the main deck. The winch control valve manifold assembly is mounted on the starboard bulkhead separately from the hydraulic power pack assembly.

a. Hydraulic Winch Assembly. When the RAISE or LOWER switch is activated, the hydraulic motor energizes the gear reducer which rotates the winch drum. To lower the ramp, the drum unwinds two wire ropes that are connected to one port and one starboard chain. The two chains are secured to the top, outer sides of the ramp. To raise the ramp, the drum winds up the two wire ropes. Deactivating the RAISE and LOWER switch stops the winch. The hydraulic brake and chain stoppers on the two ramp chains, maintain the position of the ramp. During winch operation, loss of electric power or hydraulic fluid or pressure, activates the hydraulic brake to maintain the position of the ramp. An emergency hand crank is used to raise or lower the ramp to the desired position. However, prior to using the emergency hand crank, the hydraulic brake must be released. For this purpose, a brake release pump is part of the winch assembly. One of the winch crew inserts a portable handle into a mounting hole on the brake release pump. The crew member rotates the handle clockwise. This action restores hydraulic pressure and overrides the hydraulic brake. The emergency handcrank is a ratchet type which prevents the load from overrunning the operating during manual operation. It will take approximately 1,450 revolutions of the emergency handcrank to pay out or haul in 25 feet of the two lengths of active wire rope.

b. Hydraulic Power Pack Assembly. Pressing the POWER ON push-button indicator switch starts the electric motor. The electric motor is connected to the

hydraulic pump by a drive coupling. Energized by the drive coupling, the hydraulic pump circulates hydraulic fluid from the reservoir, through valves and pipes to the hydraulic motor of the winch assembly.

1-9. Equipment Data. Reference data for the bow ramp winch assembly is given in Table 1-1. Also see the equipment data given in the operator's manual, TM 55-1905-223-10.

Table 1-1. Bow Ramp Winch Equipment Data

Characteristics	Reference Data														
Winch Assembly	Model FH 5-20														
Type	Force 5														
Dimensions															
Length	47 in														
Length with emergency hand crank installed	62 in														
Width	35 in														
Height	29.50 in														
Weight															
Winch drum	380 lb														
Inboard upright	130 lb														
Outboard upright	100 lb														
Side frames (each)	61 lb														
Hydraulic motor	41 lb														
Automatic brake	16 lb														
Gear reducer	315 lb														
Total	1550 lb														
Winch Safety Factor	5:1 at 22,000 lb combined line pull														
Power Requirements															
Hydraulic Flow	30.50 gpm														
Normal working pressure	2,060 psi														
Maximum working pressure-	3,000 psi														
Electrical	<table><tr><td>Voltages</td><td>120V</td><td>240V</td><td>480V</td><td>600V</td></tr></table>					Voltages	120V	240V	480V	600V					
Voltages	120V	240V	480V	600V											
Limit switches	<table><tr><td>60Hz amps</td><td>60</td><td>30</td><td>15</td><td>12</td></tr><tr><td>brake amps</td><td>6</td><td>3</td><td>1.5</td><td>1.2</td></tr></table>					60Hz amps	60	30	15	12	brake amps	6	3	1.5	1.2
60Hz amps	60	30	15	12											
brake amps	6	3	1.5	1.2											
Environmental															
Operating temperature	-22° F (-30° C) to 140° F (60° C)														
Storage temperature	-22° F (-30° C) to 140° F (60° C)														
Drum Grooving and Spooling	Two 3/4-in dia. lines														
Drum Anchoring	At both outboard ends of drum.														

Table 1-1. Bow Ramp Winch Equipment Data - CONT

Characteristics	Reference Data
Spooling Direction	Towards drum centerline
Drum Capacity, Each Half	25 ft active line plus 3 dead wraps. (Approximately 12 ft for dead wraps and 8 in for line anchor)
Planetary Gear Reducer, 3 stages	234:1 overall reduction
Hydraulic Motor	
Type	Gerotor - through shaft design
Displacement	2.54 cubic in per revolution
Maximum Intermittent Pressure	3,000 psi
Operating Features	
Slack Wire Limitation	Slack wire limit switch
Manual Operation	Safety interlock switch and hydraulic motor bypass valve
Emergency Operation	Drive handle with safety brake/ ratchet
Hydraulic Power Pack Assembly	
Model	21-69069
Manufacturer	MacGregor-Navire (USA), Inc.
Type	Hydraulic
Length	68.50 in
Width	37 in
Height	43 in
Weight	1,550 lb
Winch Control Valve Manifold Assembly	MacGregor-Navire (USA), Inc.
Length	4 in
Width	1.75 in
Height	
Weight	
Hydraulic Requirements	
Flow	30 gpm
Pressure	
Normal	2,060 psi across motor
Maximum	3,000 psi
Motor Seal Drain	400 psi maximum
Hydraulic Brake	
Initial Release	220 psi
Full Release	230 psi
Release Displacement	1.0 cubic in, maximum
Maximum Working Pressure	3,000 psi

Table 1-1. Bow Ramp Winch Equipment Data - CONT

Characteristics	Reference Data
Performance	
At Normal Hydraulic Pressure and Flow	
Line Pull	10,000 lb each line
Line Speed	45 fpm
Manual Operation	Approximately 61 lb with a 14 in handcrank

1-10. Safety, Care, and Handling . Safety precautions must be observed at all times while performing maintenance. General WARNINGS and first-aid data appear in the front of this manual. Review all safety information before starting any task. Carefully read through an entire maintenance procedure before performing any maintenance function. Make sure the task can be done safely. All WARNINGS, CAUTIONS, and NOTES are of great importance to your personal safety and the safety of the equipment.

Section III. PRINCIPLES OF OPERATION

Overview of bow ramp winch assembly.

The Principles of Operation section will tell you basic information about how this assembly works.

1-11. General. The bow ramp is raised and lowered by a single, split-drum, electro-hydraulic winch subsystem and associated wire ropes, chains, stoppers, and sheaves. The winch has a grooved drum of minimum barrel diameter and stowage capacity to handle two wire ropes, one to control each side of the ramp. Each wire rope is led to forecastle deck and rigged with turnbuckles by two chains, each led through a chain sheave in the bow. Stoppers are provided to prevent loss of ramp elevation in the event of wire rope breakage. Stoppers also provide support for the ramp, as required, without stressing wire ropes or the winch during vehicle handling. The winch is fitted with a hydraulic brake. The winch is capable of up to 10,000 lb of line pull at 45 feet per minute on two 3/4 inch wire ropes. A manual interlock switch prevents starting the motor with the emergency hand crank engaged. A slack wire limit switch is provided to prevent excessive slack in the wire rope when unspooling. The winch is remotely controlled from three control stations, one in the pilothouse, one on the forecastle deck and one at the winch. Each control station has a control panel containing toggle switches, push-button indicator switches, and indicator lights. The switches are used to start and stop the electric motor in the winch-assembly and operate the ramp system. Indicator lights indicate subsystem operation status, tension on wire ropes, and high temperature of hydraulic fluid. The pilothouse control station is provided with a power cut-off switch. When operating from the pilothouse control station, all other control stations are inoperative.

CHAPTER 2

UNIT MAINTENANCE INSTRUCTIONS

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Section I. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

2-1. Common Tools and Equipment . For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

2-2. Special Tools, TMDE and Support Equipment . Special tools; test, measurement, and diagnostic equipment; and support equipment requirements are listed and illustrated in the Repair Parts and Special Tools List (RPSTL), TM 55-1905-223-24P. These items are also listed in the Maintenance Allocation Chart (MAC), Appendix B of this manual.

2-3. Repair Parts . Repair parts are listed and illustrated in the repair parts and special tools list (RPSTL) technical manual TM 55-1905-223-24P.

Section II. SERVICE UPON RECEIPT

2-4. Checking Unpacked Equipment . When repair equipment and parts are received, the following inspections are required.

- a. Inspect the equipment for damage incurred during shipment. If the shipment has been damaged, report the damage in accordance with the instructions of DA Pam 738-750.
- b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check to see whether the equipment has been modified.