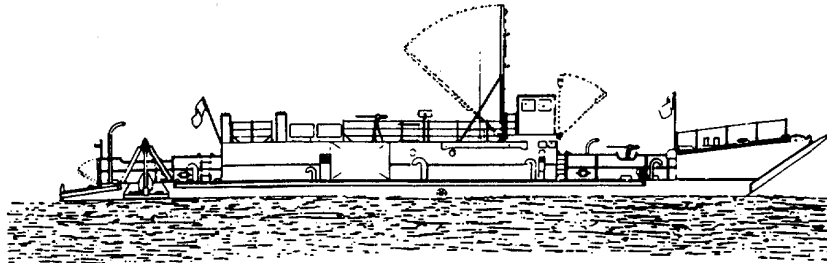


TECHNICAL MANUAL
OPERATOR'S, ORGANIZATIONAL,
DIRECT SUPPORT AND GENERAL SUPPORT
MAINTENANCE MANUAL

**DIRECT SUPPORT
MAINTENANCE
INSTRUCTIONS**

LANDING CRAFT UTILITY
LCU 1667-1670
NSN 1905-00-168-5764



This manual supersedes TM 55-1905-219-14-10, dated 19 September 1980.

HEADQUARTERS, DEPARTMENT OF THE ARMY

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OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
GENERAL SUPPORT MAINTENANCE MANUAL

LANDING CRAFT UTILITY

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake 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, U. S. Army Troop Support Command, ATTN: AMSTR-MPS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

OVERVIEW

The direct support maintenance instructions in this chapter apply to the following:

<u>DESCRIPTION</u>	<u>PARAGRAPH</u>
Main Propulsion Engine and Marine Gear.....	5-3
Electric Power Generation and Distribution	5-28
Bow Ramp and Winch	5-47
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Chapter 3 contains the operator and organizational maintenance instructions for all major equipment.

Chapter 4 contains the operator and organizational maintenance instructions for all auxiliary equipment.

SECTION I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

5-1. GENERAL.

Repair parts, special tools, test, maintenance, diagnostic equipment, (TMDE), and support equipment are listed and illustrated in TM 55-1905-219-34P. All fabricated tools are listed in Appendix H.

SECTION II. TROUBLESHOOTING

5-2. GENERAL TROUBLESHOOTING.

- a. This table lists the common malfunctions which you may find during the operation and maintenance of the landing craft.
- b. You should perform the tests/inspections and corrective actions in the order listed.
- c. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.
- d. Refer to Chapter 3 or 4 for the crew and organizational maintenance procedures.

**Table 5-1. Fuel System-Injector-Incorrect
Fuel Output Troubleshooting.**

MALFUNCTION		
	TEST OR INSPECTION	CORRECTIVE ACTION
1.	Incorrect fuel output.	
	Step 1. Spray tip or orifices partially plugged.	
		Clean the orifices with tool J4298-1 using the proper size wire.
	Step 2. Spray tip orifices enlarged.	
		Replace the spray tip.
	Step 3. Carbon build-up in tip	
		Ream the injector tip with tool J1243.

**Table 5-1. Fuel System-Injector-Incorrect
Fuel Output Troubleshooting (Cont).**

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. Incorrect fuel output (Cont).

Step 4. Worn plunger and bushing.

After the possibility of an incorrect or faulty tip has been eliminated and the injector output still does not fall within its specific limits, replace the plunger and bushing with a new assembly.

NOTE

The fuel output of an injector varies with the use of different spray tips of the same size due to manufacturing tolerances in drilling the tips. If the fuel output does not fall within the specified limits of the Fuel Output Check Table, try changing the spray tip. However, use only a tip specified for the injector being tested.

Step 5. Cracked valve parts.

Replace the cracked parts.

Step 6. Cracked bushing.

Replace the plunger and bushing assembly.

Step 7. Poor lapped surfaces.

Re-lap the sealing surfaces.

Step 8. Foreign material between valve and seat.

Disassemble the injector and clean the parts.

Step 9. Rack and gear not in time.

Assemble the gear with the drill spot mark on the tooth engaged between the two marked teeth of the rack.

**Table 5-2. Fuel System-Injector-Low or High
Valve Opening Pressure Troubleshooting.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Low valve opening pressure.		
	Step 1. Worn or eroded needle valve or valve seat in tip.	Replace the needle valve and tip assembly.
	Step 2. Worn or damaged needle valve quill.	Replace the needle valve and tip assembly.
	Step 3. Worn or damaged needle valve spring seat.	Replace the spring seat.
	Step 4. Worn or broken valve spring.	Replace the valve spring.
	Step 5. Dirt or foreign material in injector.	Disassemble the injector and clean the parts.
2. High valve opening pressure.		
	Step 1. Carbon or foreign material in spray tip.	Carbon in the tip should be removed with tip reamer J9464 which is especially designed and ground for this purpose.
	Step 2. Carbon in tip orifices.	Check the hole size of the spray tip orifices. Then, using tool J4298-1 with the proper size wire, clean the orifices.

**Table 5-3. Fuel System-Injector-Insufficient
Injector Holding Time Troubleshooting.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Insufficient injector holding time troubleshooting.		
Step 1.	Poor bushing to body fit.	Lap the injector body.
Step 2.	Injector nut not tightened to specified torque.	Tighten the nut to a 75-85 lb-ft torque. Do not exceed the specified torque.
Step 3.	Cracked spray tip.	Replace the needle valve and spray tip assembly.
Step 4.	Worn or eroded needle valve.	Replace the needle valve and spray tip assembly.
Step 5.	Worn or eroded needle valve seat in spray tip.	Replace the needle valve and spray tip assembly.
Step 6.	Worn or broken valve spring.	Replace the valve spring.
Step 7.	Worn or damaged valve spring seat.	Replace the valve spring seat.
Step 8.	Defective seal ring.	Replace the seal ring.
Step 9.	Body plug leaks.	Install new body plugs.
Step 10.	Filter gaskets leak.	Replace the filter cap gaskets and tighten the filter caps to 65-75 lb-ft torque.

**Table 5-3. Fuel System-Injector-Insufficient
Injector Holding Time Troubleshooting (Cont).**

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

1. Insufficient injector holding time troubleshooting (Cont).

Step 11. Poor sealing surfaces on fuel fittings.

Clean up the sealing surfaces or replace the filter caps, if necessary. Replace the filter if a cap is replaced.

Step 12. Dirt or foreign material in injector.

Disassemble the injector and clean the parts.

**Table 5-4. Anchor Winch-Slack Puller Fluid Motors
Troubleshooting.**

MALFUNCTION**TEST OR INSPECTION****CORRECTIVE ACTION**

1. External Leakage.

Step 1. Seal failure.

Replace seal.

Step 2. Defective casting.

Replace casting.

2. Leakage from vent port.

Step 1. "O" ring failure

Replace seal.

Step 2. Shaft seal failure.

Replace shaft seal; check pressure in drain line should not exceed 100 psi.

**Table 5-4. Anchor Winch-Slack Puller Fluid Motors
Troubleshooting (Cont).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Leakage at fittings.		
	Step 1. Cracked casting.	Replace.
	Step 2. Defective threads.	Replace.
	Step 3. Damaged "O" ring.	Replace.
	Step 4. Bump on mating surfaces.	Use flat file to make flat surface.
4. Loss in speed under load.		
	Step 1. Low inlet pressure.	Check pressure.
	Step 2. Excessive back-pressure at outlet.	Check pressure.
	Step 3. Scored port plate or end cap.	Relap flat to clean up.
	Step 4. Worn cam ring and vanes.	Replace.
	Step 5. High oil temperature (thins oil).	Use heavier oil; use oil cooler; use open center circuit; adjust relief valve setting.
5. Poor speed control.		
	Step 1. Excessive pump leakage.	Use more efficient pump. Use flow control valve.

**Table 5-4. Anchor Winch-Slack Puller Fluid Motors
Troubleshooting (Cont).**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Motor fails to start turning.		
	Step 1.	Insufficient torque. Increase relief valve pressure setting.
	Step 2	Excessive motor leakage. Check flow from motor outlet if excessive, check shuttle valve in front port plate. Pressure not loading-plate causing plate to move away from rotor.
	Step 3.	Defective "O" ring on O.D. of front port plate. Cam ring worn; replace "O" ring if damaged.
	Step 4.	Insufficient pump delivery. Pump worn.
7. Shaft play.		
	Step 1.	Worn bearings. Replace.
	Step 2.	Hammering coupling on shaft. Coupling bore should be slip fit on shaft.
8. Burst lines on motor housing.		
	Step 1.	Excessive pressure. If high inertia load over runs motor, relief valve protection is required in one or possibly both lines between directional valve and motor. Use closed center valve with caution. Relief valve protection probably required as described above.
9. Excessive noise.		
	Step 1.	Worn or damaged internal parts. Disassemble to remove rotor, vane, cam ring assembly. Inspect for excessive wear. Check condition of faces of port plate and end cap. Rework (lap) or replace if scuffed.

**Table 5-5. Stern Gate and Mast Hydraulic Cylinder
Troubleshooting.**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Excessive side load on piston rod.		
	Step 1.	Misalignment between cylinder and load. Check alignment of rod with load connection at all points in stroke.
2. Contamination in cylinder.		
	Step 1.	Dirty installation (rust scale, chips, sealant, etc.). Clean and flush entire system deburr connections, etc.
	Step 2.	Exceptionally dirty environment. Shield piston rod/bearing area from direct contact with contaminant.
	Step 3.	Worn rod scraper. Replace when rod seals are changed.
3. Impact damage or broken parts.		
	Step 1.	Cushions not properly adjusted. Reference adjustment instructions in this manual.
	Step 2.	Lack of or improperly adjusted speed controls. Add or adjust to reduce piston speed.
	Step 3.	Excessive system pressure. Reduce to minimum required to move load.
4. Seal damage (loss of elasticity, shape, etc.).		
	Step 1.	Excessive temperature in environment or system. Install replacement seals with proper temperature rating.
	Step 2.	Cylinder stored in horizontal position for extended period. Replace seals, store vertically with rod up.

SECTION III. MAINTENANCE INSTRUCTIONS

5-3. MAIN PROPULSION ENGINE AND MARINE GEAR-MAINTENANCE INSTRUCTIONS.

The following is an index to the maintenance instructions.

<u>DESCRIPTION</u>	<u>PARAGRAPH</u>
Propulsion Engine/Marine Gear Removal and Run-In Instructions.....	5-4
Marine Gear	5-5
Engine/Transmission Controls.....	5-6
Variable Speed Mechanical Governor.....	5-7
Blower	5-8
Fuel Injector	5-9
Expansion Tank.....	5-10
Water Manifold	5-11
Thermostat and Housing.....	5-12
Balance Weight Cover and Accessory Drive.....	5-13
Engine Supports, Lifter Brackets and Crankshaft Front Cover.....	5-14
Muffler	5-15
Lube Oil Pump.....	5-16
Lube Oil Pressure Regulator and Relief Valve.....	5-17
Flywheel and Housing.....	5-18
Camshaft and Gear Train	5-19
Cylinder Block	5-20
Hydrostarter.....	5-21
Accumulator	5-22
Hydrostarter Pump (Engine Driven).....	5-23
Hydrostarter Solenoid.....	5-24
Reservoirs and Filters.....	5-25
Hydrostarter Piping (FWD Engine Room).....	5-26
Hydrostarter Piping (AFT Engine Room).....	5-27

5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN MAINTENANCE INSTRUCTIONS.

This task covers:

a. Removal

b. Installation

c. Alignment

INITIAL SETUP:

Test Equipment

NONE

References

FO-1. Machinery-Vehicle Deck
Access

Special Tools

Cutting Tools
Welding Tools
Crane (20 ton)
Miscellaneous chains, etc.
Feeler gauge 0.002 inch
straight edge

Equipment

Condition Condition Description

NONE

Special Environmental Conditions

Do not drain oil into bilges. Use
oil separation and recovery system
to collect oil.

Material/Parts

Engine Oil

Personnel Required

8

General Safety Instructions

Observe normal precautions when
handling heavy equipment.

LOCATION	ITEM	ACTION	REMARKS
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NOTE

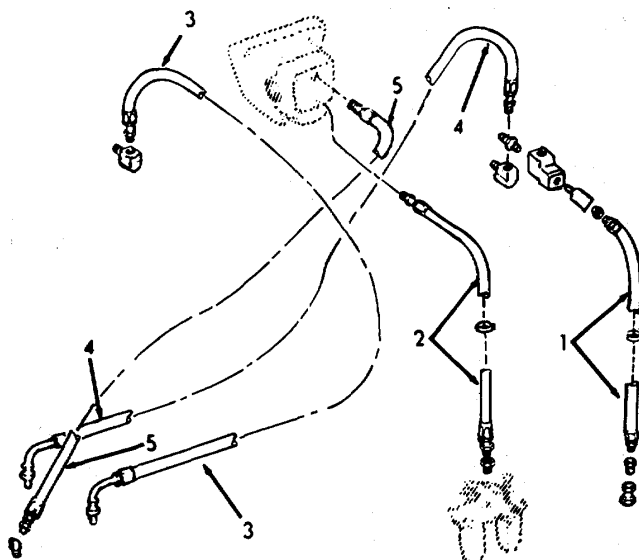
- Propulsion engine weight is 4925 lbs (2145 kg) dry.
- When a heavy boat is dry-docked, it naturally undergoes some bending. Therefore, it is always good practice to unbolt the marine gear coupling to prevent bending of the shaft.

WARNING

- To prevent the possibility of a fire when using cutting or welding equipment, place a crewman above and below the deck with a fire extinguisher.
- Keep clear of the area directly below the deck section being removed.

5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN MAINTENANCE INSTRUCTIONS. (Continued).

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Fuel Lines	a. Supply valves	Close.	
	b. Drain hose (1)	Drain fuel.	Use a suitable container.
	c. Fuel pump input hose (2)	Disconnect at fuel pump.	
	d. Hose to left bank (3)	Disconnect at cylinder head.	
	e. Hose to right bank (4)	Disconnect at cylinder head.	
	f. Hose to fuel pump (5)	Disconnect at fuel pump.	

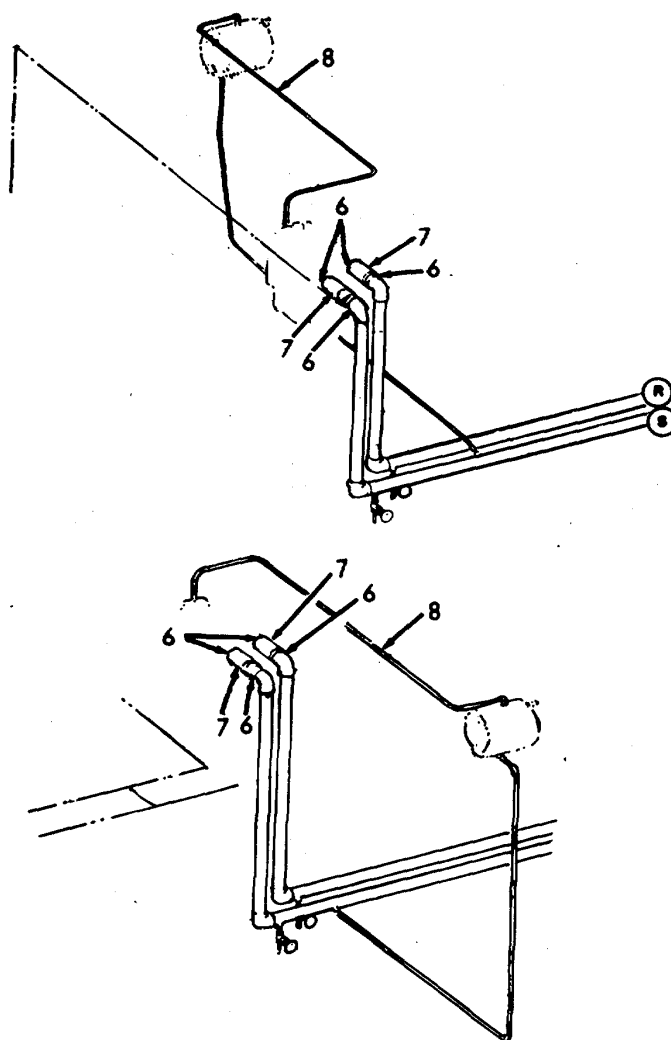


**5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN
MAINTENANCE INSTRUCTIONS. (Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

REMOVAL (Cont)

- | | | |
|------------------|---------------------------------|---------|
| 2. Cooling Lines | a. Hose clamps (6) | Loosen. |
| | b. Hoses (7) | Remove. |
| | c. Tubing to expansion tank (8) | Remove. |

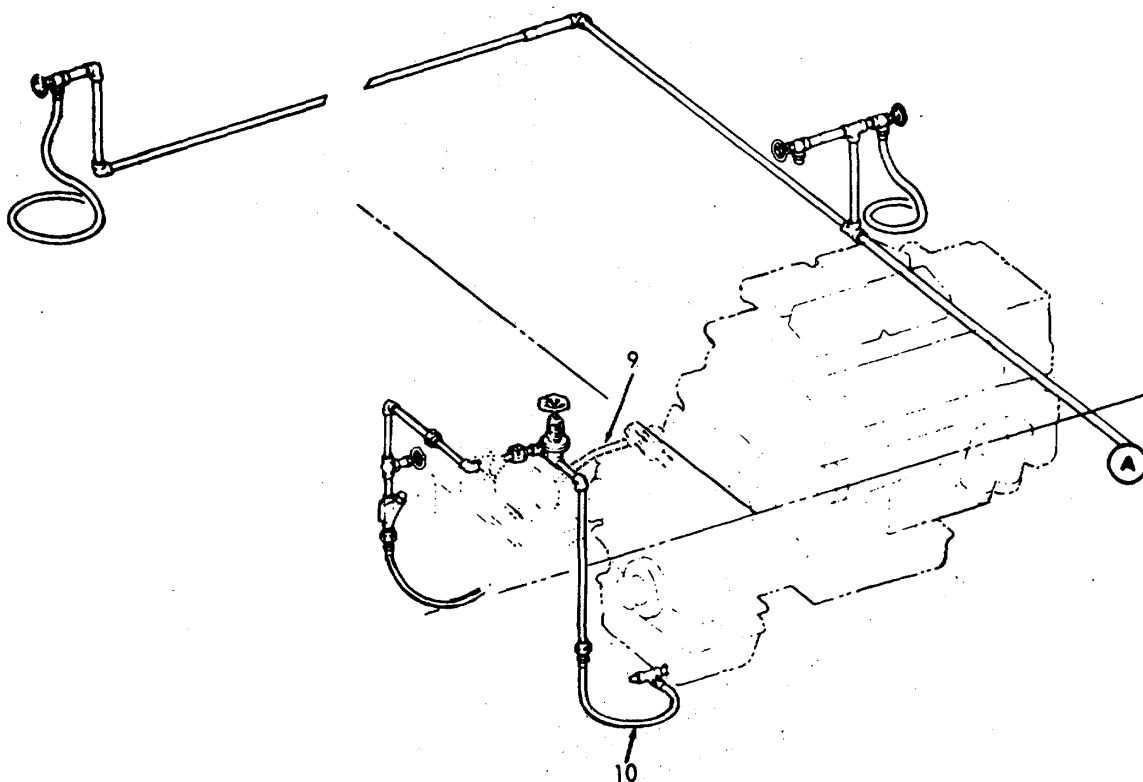


**5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN
MAINTENANCE INSTRUCTIONS. (Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

REMOVAL (Cont)

- | | | |
|--|--------------|---------|
| 3. Marine
Gear
Lube
Oil
Piping | a. Hose (9) | Remove. |
| | b. Hose (10) | Remove. |

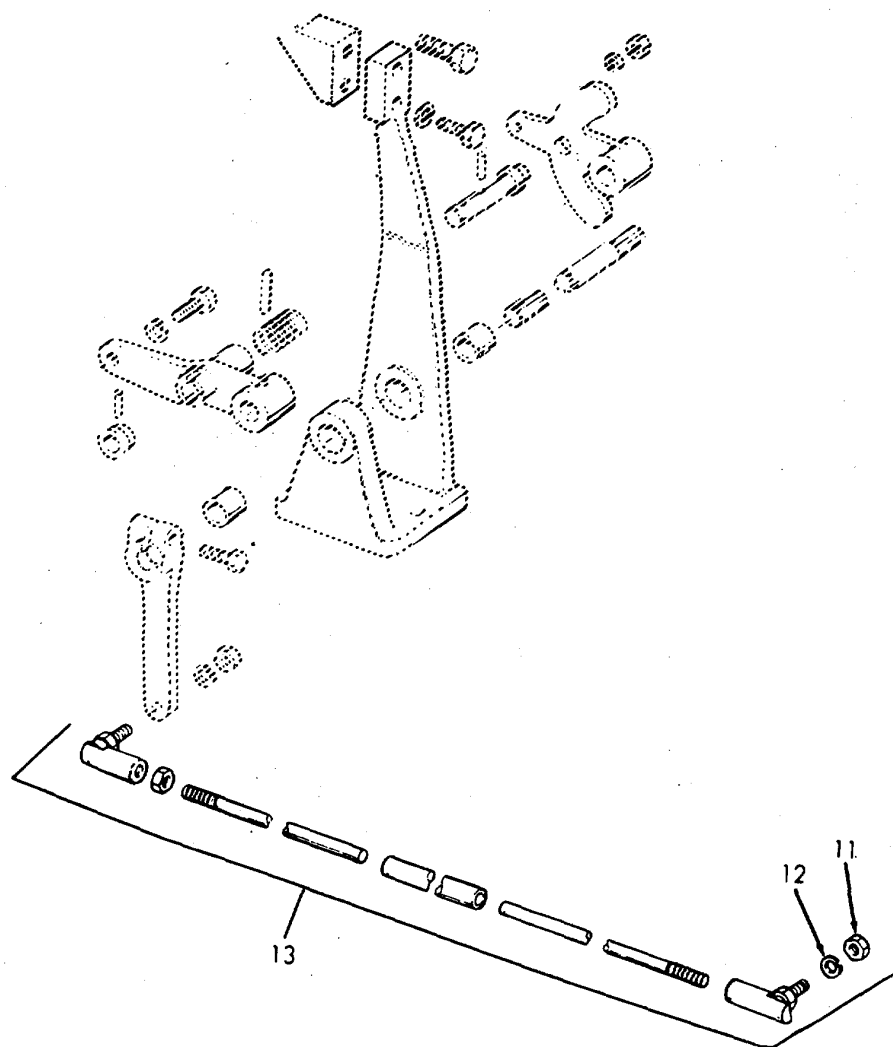


**5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN
MAINTENANCE INSTRUCTIONS. (Continued).**

LOCATION	ITEM	ACTION	REMARKS
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REMOVAL (Cont)

- | | | |
|--------------------------------|--|---------|
| 4. Clutch
Control
Levers | a. Nut (11)
and lock-
washer
(12) | Remove. |
| | b. Control
rod (13) | Remove. |

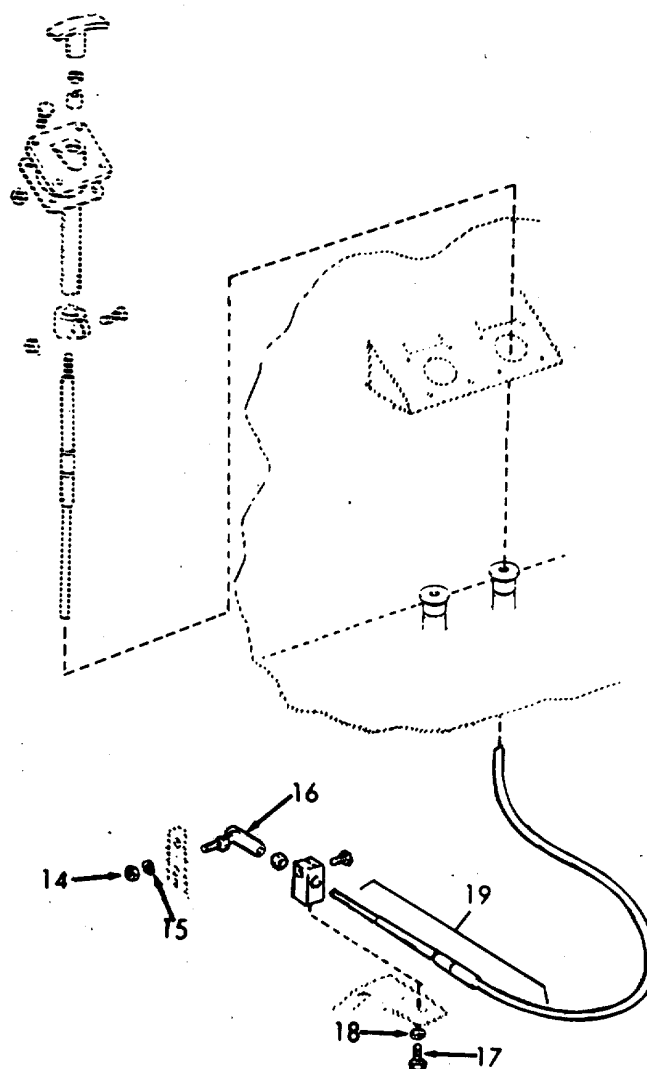


**5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN
MAINTENANCE INSTRUCTIONS. (Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

REMOVAL (Cont)

- | | | |
|----------------------|--|---------|
| 5. Shutdown
Lever | a. Nut (14)
and lock-
washer
(15) | Remove. |
| | b. Ball
joint
(16) | Remove. |
| | c. Screw
(17)
and
lock-
washer
(18) | |
| | d. Control
cable
(19) | |

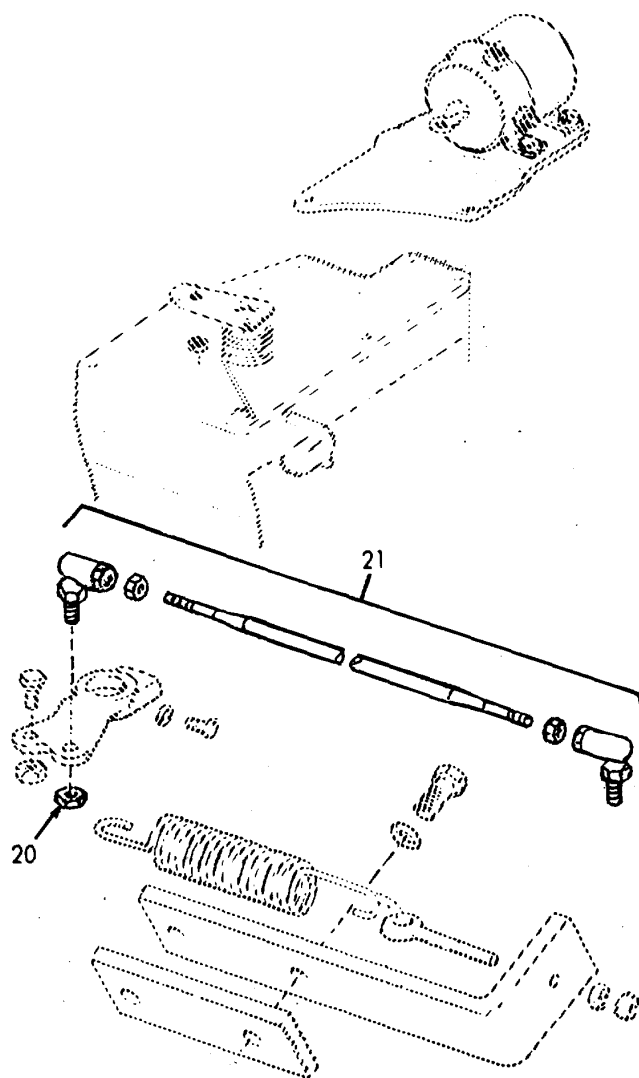


**5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN
MAINTENANCE INSTRUCTIONS. (Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

REMOVAL (Cont)

- | | | |
|---------------------------------|-----------------------------|---------|
| 6. Throttle
Control
Lever | a. Nut (20) | Remove. |
| | b. Control
lever
(21) | Remove. |



5-4. MAIN PROPULSION ENGINE/MARINE GEAR-REMOVAL AND RUN-IN MAINTENANCE INSTRUCTIONS. (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

REMOVAL (Cont)

- | | | |
|---------------------|---|---------|
| 7. Instrument Panel | a. Oil pressure gauge line (22) | Remove. |
| | b. Water temperature gauge line (23) | Remove. |
| | c. Marine gear oil gauge line (24) | Remove. |
| | d. Tachometer (25) and Tag and disconnect. motor wiring | |

