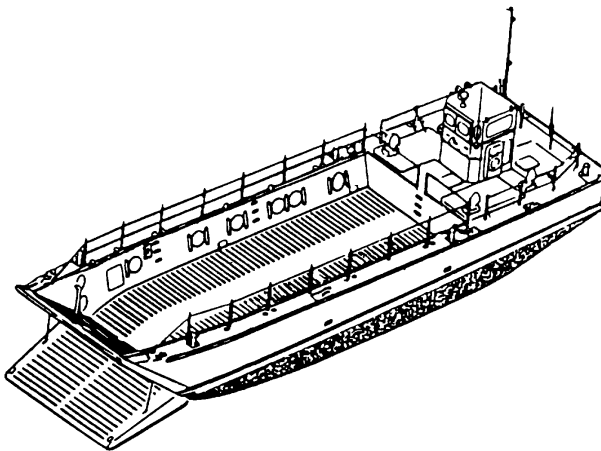


TECHNICAL MANUAL

**OPERATOR, UNIT AND INTERMEDIATE
(DIRECT AND GENERAL SUPPORT)
MAINTENANCE MANUAL**

**LANDING CRAFT, MECHANIZED
STEEL, DED, OVERALL LENGTH 74 FEET,
MOD 1, MARK VIII, NAVY DESIGN LCM-8**

**HULL NUMBERS 8500 THROUGH 8519 (MARINETTE MARINE CORP.)
NSN 1905-01-1690938.**



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APPENDIXES

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**HEADQUARTERS, DEPARTMENT OF THE ARMY
30 June 1989**

OPERATOR, UNIT, AND INTERMEDIATE DIRECT AND GENERAL SUPPORT
MAINTENANCE MANUAL

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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-MCTS, 4300 Goodfellow Boulevard, St Louis, MO 63120-1798 A reply will be furnished directly to you

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CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

- Overview
- Repair Parts and Special Tools
- Maintenance Procedures
- Troubleshooting

6-1. OVERVIEW

This Chapter describes the landing craft repairs and parts replacement that are the responsibility of General Support Maintenance. Maintenance tasks given in previous chapters are not repeated in this Chapter.

SECTION I. REPAIR PARTS AND SPECIAL TOOLS

6-2. REPAIR PARTS

See TM 55-1905-221-P for a listing of repair parts required for maintaining the landing craft.

6-3. SPECIAL TOOLS

Special tools required to perform General Support Maintenance of the Landing Craft are listed and illustrated in Appendix C.

SECTION II. TROUBLESHOOTING

6-4. GENERAL SUPPORT TROUBLESHOOTING

Table 6-1 contains troubleshooting information useful to you in diagnosing and correcting malfunctions or unsatisfactory operation of the landing craft.

- a. The troubleshooting table lists the common malfunctions and unsatisfactory conditions you are most likely to run into.

b. You should first find the malfunction in the table which most closely describes the problem; then perform the test, inspections and corrective actions in the order in which they are listed.

c. This manual cannot list all possible symptoms which may occur. If a condition exists which cannot be resolved by you, notify your supervisor.

d. You should verify the fault before performing troubleshooting.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 6-1. Troubleshooting.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

PROPULSION ENGINE

1. Engine Will Not Turn Over.

Hand crank engine at least one complete revolution. If engine cannot be rotated a complete revolution, internal damage is indicated.

Disassemble engine to determine cause and extent of damage. Refer to paragraphs 5-14, 5-15, 5-18 and 6-23 through 6-29.

2. Cranking Speed Low.

Step 1. Check electric starting motor.

Overhaul starting motor. Refer to paragraph 6-19.

Step 2. Check hydraulic starting system.

Refer to paragraphs 5-13.1 through 5-13.7.

Step 3. Check hydraulic starter motor.

Overhaul starting motor. Refer to paragraph 6-21.

3. Low Compression.

Step 1. Check for worn or broken compression rings.

Overhaul cylinder and replace rings. Refer to paragraph 6-27.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2.	Check for nonfunctioning blower assembly. Overhaul blower. Refer to paragraph 6-35.
4. Governor Hunting (Unstable).		
	Step 1.	Check for faulty linkage to injectors. Adjust linkage. Refer to paragraph 5-14.
	Step 2.	Check for faulty governor. a. Repair governor. Refer to paragraph 5-14. b. Overhaul governor. Refer to paragraph 6-34.
5. Crankcase Pressure Excessive.		
	Step 1.	Check for cylinder blowby. Replace rings, piston or liner. Refer to paragraphs 6-27 and 6-29.
	Step 2.	Check blower mounting gasket for leakage. Replace mounting gasket. Refer to paragraph 6-35.
	Step 3.	Check cylinder block end plate gasket for leakage. Replace end plate gasket. Refer to paragraph 6-29.
6. High Oil Consumption.		
	Step 1.	Check for worn oil control rings. Replace rings. Refer to paragraph 6-27.
	Step 2.	Check for scarred pistons, rings or liners. Replace pistons, rings or liners. Refer to paragraph 6-27.
	Step 3.	Check for leaking blower oil seals. Repair blower. Refer to paragraph 6-35.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Oil Pressure Low.		
	Step 1. Check oil pump.	Overhaul oil pump. Refer to paragraph 6-26.
	Step 2. Check oil pressure regulator.	Replace defective oil pressure regulator.
8. Black Exhaust Smoke (Incompletely Burned Fuel).		
	Step 1. Check for faulty blower.	
	a. Clean liner.	
	b. Clean blower screen obstructions.	
	Step 2. Check for clogged blower screen or dirty cylinder liner parts.	Overhaul blower assembly. Refer to paragraph 6-35.
9. High Engine Coolant Temperature.		
		Check for damaged keel cooler.
	a. Repair keel cooler. Refer to paragraph 6-17.	
	b. Replace keel cooler damaged beyond repair.	Refer to paragraph 6-17.
10. Power Take-Off Assembly (Ramp Hoist Pump Drive) Inoperative.		
	Step 1. Check for worn clutch.	
	a. Repair clutch. Refer to paragraph 6-37.	
	b. Replace clutch damaged beyond repair. Refer to paragraph 6-37.	
	Step 2. Check for defective clutch release mechanism.	Repair clutch release mechanism. Refer to paragraph 6-37.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

- Step 3. Check for broken drive or other internal damage. Overhaul power take-off assembly. Refer to paragraph 6-37.

TRANSMISSION AND TRANSFER GEAR

1. Gear Inoperative (Drive Shaft Does Not Rotate).

Condition A - Selector valve in forward position.

- Step 1. Check for low oil pressure.
Replace defective oil pump relief valve. Refer to paragraph 6-36.
- Step 2. Check for defective oil pump.
Overhaul oil pump. Refer to paragraph 6-36.
- Step 3. Check for defective marine gear dump valve.
Clean, inspect and replace defective parts. Refer to paragraph 6-38.
- Step 4. Check for broken or worn selector valve forward piston seal rings.
Remove and replace forward piston seal rings.
Refer to paragraph 6-38.
- Step 5. Inspect for leaking pilot bearing oil seal.
Remove and replace pilot bearing oil seal.
- Step 6. Check for faulty flywheel.
a. Inspect flywheel and replace loose or missing passage plugs. Refer to paragraph 6-38.
b. Check emergency engagement bolts for tightness. Tighten loose bolts.
- Step 7. Check for damaged drive shaft seal rings.
Replace if worn or damaged. Refer to paragraph 6-28.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 8.	Check for worn forward clutch facings. Replace if worn. Refer to paragraph 6-38.
	Step 9.	Inspect clutch plate for damage. Replace clutch plate if sheared or loose on hub. Refer to paragraph 6-38.
	Step 10.	Inspect reduction gears and bearings for damage. Replace damaged or defective parts. Refer to paragraph 6-38.
Condition B - Selector valve in reverse position.		
	Step 1.	Check for low oil pressure. Replace defective oil pump relief valve. Refer to paragraph 6-36.
	Step 2.	Check for defective oil pump. Overhaul oil pump. Refer to paragraph 6-36.
	Step 3.	Check for defective marine gear dump valve. Clean, inspect and replace defective parts. Refer to paragraph 6-38.
	Step 4.	Check for broken or worn reverse piston seal rings. Remove and replace reverse piston seal rings. Refer to paragraph 6-38.
	Step 5.	Inspect clutch facings. Replace If worn. Refer to paragraph 6-38.
	Step 6.	Check for damaged planetary assembly. Disassemble and replace all damaged or defective parts with new ones.
	Step 7.	Inspect reduction gears and bearings for damage. Replace damaged or defective parts. Refer to paragraph 6-38.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

2. Oil Pressure Low.

Condition A - When selector valve is placed in any position-forward, neutral or reverse.

- Step 1. Check for defective oil pump relief valve.
Replace defective oil pump relief valve. Refer to paragraph 6-38.
- Step 2. Check for defective oil pump.
Overhaul oil pump. Refer to paragraph 6-36.
- Step 3. Check for defective marine gear dump valve.
Clean, inspect and replace defective parts. Refer to paragraph 6-38.

Condition B - When selector valve is placed in forward.

- Step 1. Check for worn or broken forward piston seal rings.
Remove and replace defective forward piston seal rings. Refer to paragraph 6-39.
- Step 2. Check pilot bearing oil seal for leaks.
Remove and replace defective pilot bearing oil seal. Refer to paragraph 6-39.
- Step 3. Check for defective dump valve.
Clean, inspect and replace defective parts. Refer to paragraph 6-39.
- Step 4. Check for faulty flywheel.
 - a. Inspect flywheel and replace loose or missing passage plugs. Refer to paragraph 6-39.
 - b. Check emergency engagement bolts for tightness. Tighten loose bolts. Refer to paragraph 6-39.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

Step 5. Check drive shaft seal rings for damage.

Replace damaged or worn seal rings. Refer to paragraph 6-28.

Condition C - When selector valve is placed in reverse. Check for worn or broken reverse piston seal rings.

Remove and replace reverse piston seal rings. Refer to paragraph 6-39.

3. Geardragging: Drive Shaft Rotates with Selector Valve in Neutral.

Condition A - After moving selector valve from forward to neutral.

Step 1.a. Check for sticking forward clutch plate.

b. Inspect clutch plate for wear.

Replace clutch plate if facings are worn smooth or shows evidence of sticking.

Step 2. Check forward clutch plate for loose or broken facing material.

NOTE

Facing material may lodge between clutch plate and piston or reaction plate. Remove.

Replace clutch plate if facing is worn or broken.

Step 3. Inspect forward piston drive pins for burrs.

NOTE

Burred pins could prevent piston from moving into disengaged position.

Replace burred pins with new ones. Refer to paragraph 6-39.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

Step 4. Check forward piston for flatness.

Replace piston if warped. Refer to paragraph 6-39.

Step 5. Inspect planetary assembly for binding parts.

Overhaul planetary assembly and replace damaged or defective parts. Refer to paragraph 6-39.

Step 6. Inspect dump valves for varnish deposits or foreign material which may prevent valves from functioning properly.

a. Clean parts. Refer to paragraph 6-39.

b. Replace damaged parts. Refer to paragraph 6-39.

Step 7. Inspect drive shaft seal rings for broken rings or wear.

Replace defective parts. Refer to paragraph 6-38.

Condition B - After moving selector valve from reverse to neutral.

Step 1. Inspect reverse clutch plate for wear or signs of over-heating.

Replace defective clutch plate.

Step 2. Check reverse clutch plate for loose or broken facing material.

NOTE

Facing material may lodge between clutch plate and piston or reaction plate. Remove.

Replace clutch plate if facing is worn or broken.

Step 3. Inspect reverse piston drive pins for burrs.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

NOTE

Burred pins could prevent piston ,room moving into disengaged position.

Replace burred pins with new ones. Refer to paragraph 6-39.

Step 4. Check reverse piston for flatness.

Replace piston if warped. Refer to paragraph 6-39.

Step 5. Inspect planetary gear assembly for binding parts.

Overhaul planetary assembly and replace damaged or defective parts. Refer to paragraph 6-39.

4. Gear Slipping or Slow to Engage.

Condition A - With selector valve in forward position.

Step 1. Check for low oil pressure.

Replace defective oil pump relief valve. Refer to paragraph 6-36.

Step 2. Check for defective oil pump.

Overhaul oil pump. Refer to paragraph 6-36

Step 3. Check for defective marine gear dump valve.

Clean, inspect and replace defective parts. Refer to paragraph 6-39.

Step 4. Check for worn or broken forward piston seal rings.

Remove and replace forward piston seal rings.

Refer to paragraph 6-39.

Step 5. Check pilot bearing oil seal for evidence of leaking.

Remove and replace leaking pilot bearing oil seal.

Refer to paragraph 6-39.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 6.	Check for faulty flywheel.
	a.	Inspect flywheel and replace loose or missing passage plugs. Refer to paragraph 6-39.
	b.	Check emergency engagement bolts for tightness. Tighten loose bolts. Refer to paragraph 6-39.
	Step 7.	Check for damaged or defective drive shaft seal rings.
		Replace worn, damaged or defective seal rings.
		Refer to paragraph 6-38.
	Step 8.	Check flatness on forward piston and reaction plate.
		Replace piston and reaction plate if warped.
		Refer to paragraph 6-39.
	Step 9.	Inspect clutch facings for wear.
		Replace clutch plate if facings are badly worn.
		Refer to paragraph 6-39.
	Step 10.	Inspect dump valves for varnish deposits or foreign material which may prevent valves from functioning properly.
	a.	Clean parts. Refer to paragraph 6-39.
	b.	Replace damaged parts. Refer to paragraph 6-39.
Condition B - With selector valve in reverse position.		
	Step 1.	Check for low oil pressure.
		Replace defective oil pump relief valve. Refer to paragraph 6-36.
	Step 2.	Check for defective oil pump.
		Overhaul oil pump. Refer to paragraph 6-36.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
Step 3.	Check for defective marine gear dump valve.	Clean, inspect and replace defective parts. Refer to paragraph 6-39.
Step 4.	Check reaction plate and reverse piston for flatness.	Replace if warped. Refer to paragraph 6-39.
Step 5.	Inspect clutch facings for wear or evidence of over-heating.	Replace clutch plate if worn or shows evidence of overheating. Refer to paragraph 6-39.
ALTERNATOR		
1. Alternator Fails to Charge.		
Step 1.	Test for open isolation diode.	Disassemble alternator and replace defective isolation diode. Refer to paragraph 6-18.
Step 2.	Test for open rotor winding.	Disassemble alternator and verify rotor winding continuity. Replace rotor if open. Refer to paragraph 6-18.
2. Unsteady or Low Charging Rate.		
Step 1.	Test for grounded, shorted or open turns in stator coils.	Disassemble alternator and replace stator. Refer to paragraph 6-18.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

Step 2. Test for grounded or shorted turns in rotor winding.

Disassemble alternator and replace rotor. Refer to paragraph 6-18.

Step 3. Test for shorted or open rectifier diode(s).

Disassemble alternator and test each diode plate for defective diode(s). Replace defective diode(s). Refer to paragraph 6-18.

ELECTRIC STARTING MOTOR

1. Starter Does Not Crank Engine Adequately.

Step 1. Check for worn commutator.

Repair commutator or replace armature if damaged beyond repair. Refer to paragraph 6-19.

Step 2. Test for open field coils on armature.

Disassemble starter and replace open field coils. Refer to paragraph 6-19.

Step 3. Test for open field coils on frame assembly.

Disassemble starter and replace open field coils. Refer to paragraph 6-19.

Step 4. Check for worn bearings.

Disassemble starter, overhaul and replace defective bearings.

STEERING SYSTEM

1. Steering Wheel Difficult to Turn.

Check for trapped dirt in helm unit.

a. Disassemble unit and thoroughly clean all surfaces of spool. Refer to paragraph 6-5.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		b. Replace defective parts as necessary. Refer to paragraph 6-5.
2. Steering Wheel Continues to Turn After Being Started and Released.		
	Check for trapped dirt in helm unit.	
		a. Disassemble unit and thoroughly clean all surfaces of spool. Refer to paragraph 6-5.4.
		b. Replace defective parts as necessary. Refer to paragraph 6-5.4.
3. Steering Wheel Turns but Rudder Does Not.		
	Check for failure of helm unit.	
		a. Disassemble helm unit and clean surfaces of both sections. Refer to paragraph 6-5.4.
		b. Inspect for damaged parts. Refer to paragraph 6-5.4.
		c. Replace parts as required. Refer to paragraph 6-5.4.
4. Steering pump noisy.		
	Step 1. Inspect for air leaks at intake or shaft seal. (Oil in reservoir would probably be foamy).	
		a. Disassemble pump and replace seals. Refer to paragraph 6-5.1.
		b. Make sure all connections are tightened properly.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

Step 2. Check for misalignment of coupling.

a. Disassemble steering pump and inspect shaft seal bearing and other parts for damage.

Refer to paragraph 6-5.1.

b. Replace damaged parts. Refer to paragraph 6-5.1.

c. Realign coupled shafts. Refer to paragraph 6-5.1.

RAMP HOIST HYDRAULIC SYSTEM

1. Winch brake does not release.

Step 1. Check for leaking "O" rings or piston seals.

Disassemble winch and replace "O" rings and seals as required. Refer to paragraph 6-12.

Step 2. Check for s rings or piston seals.

Disassemble winch and replace "O" rings and seals as required. Refer to paragraph 6-12.

Step 2. Check for seized driven and driving plates.

Disassemble winch and repair as required. Refer to paragraph 6-12.

2. Erratic action of winch.

Check for defective relief valve.

Disassemble relief valve and inspect plungers, bushings, and pistons for defects.

Replace defective parts as required. Refer to paragraph 6-12.

Table 6-1. Troubleshooting (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Loss of oil in motor.	Check for defective seal.	Disassemble motor and replace seal. Refer to paragraph 6-12.

SECTION III. MAINTENANCE PROCEDURES

The following is an index to the maintenance procedures.

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6-5. HYDRAULIC STEERING SYSTEM.

GENERAL

See figure 6-1 for diagram of steering system.

a. The hydraulic steering systems use medium pressure hydraulic fluid to actuate cylinders which position the rudders. Hydraulic fluid is supplied by the hydraulic pumps to the helm unit which is the principal metering and directional controlling device. By directing hydraulic fluid to one side or the other of the cylinders they will extend or retract giving the desired position to the rudders.

b. The helm unit and other valves control the direction and volume of flow of hydraulic fluid. The relief valve protects the system by limiting hydraulic fluid pressure. The flow control valve (flow divider) limits the volume of fluid to the valve at which this system is designed to work. The flow control valve (flow divider) divides the hydraulic fluid supplied into two flows (2.5 gpm) to the helm unit, and the remainder returned to the storage tank.

NOTE

- The steering system is designed to be supplied by one pump. Using both pumps will only cause a doubled by-pass flow resulting in excessive heating of hydraulic fluid. The steering system pump discharge valves should be set with one valve open and one valve closed.
- The hydraulic fluid for this system should be a high grade fluid compounded for use in a hydraulic system. Recommended hydraulic fluids are 2135 TH., MIL-L-17672, and 2075 TH., MIL-L-17672.

6-5. HYDRAULIC STEERING SYSTEM (Continued).

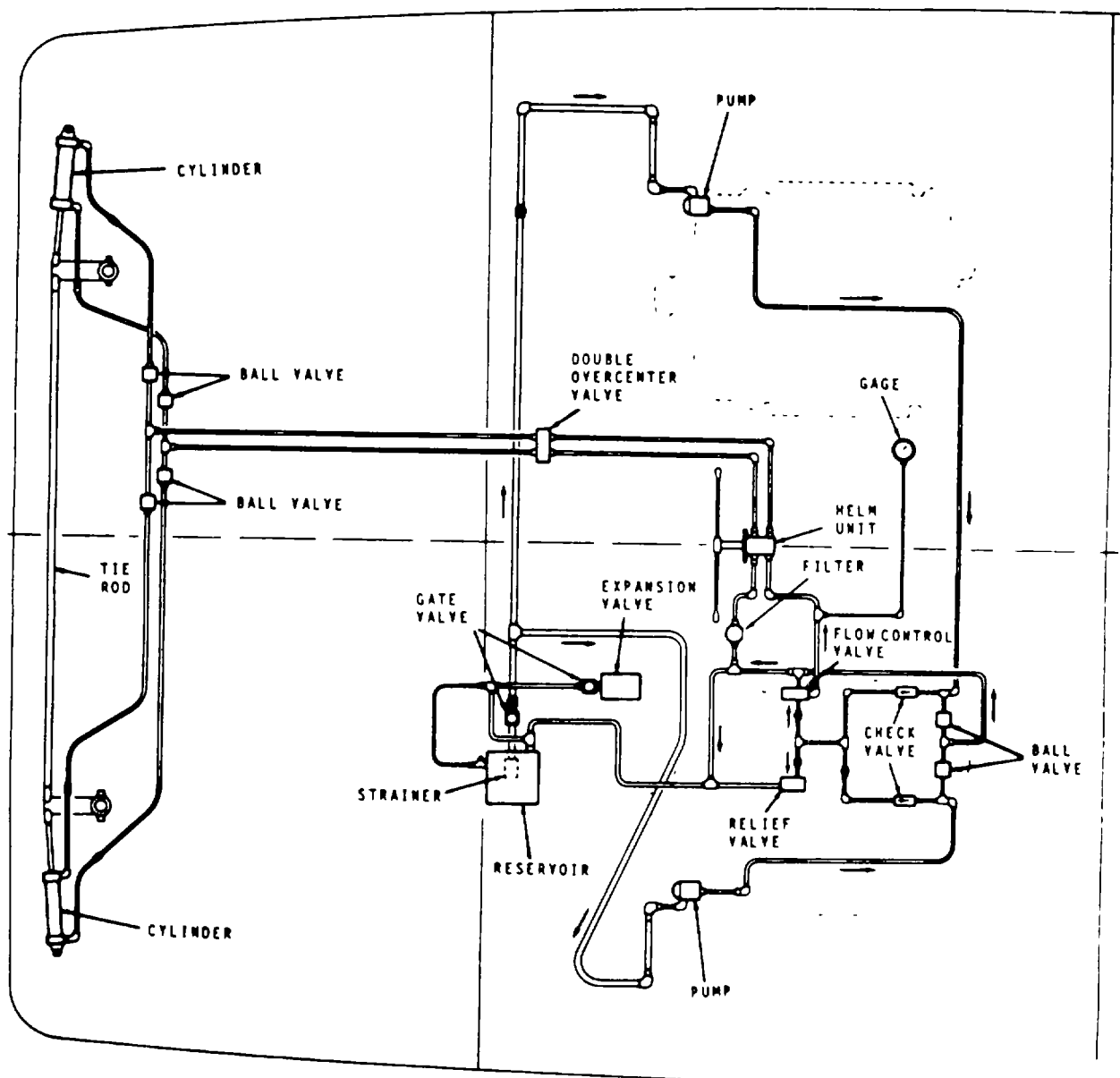


Figure 6-1. Hydraulic Steering System Diagram.

- c. The following is an index of the maintenance instructions.

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