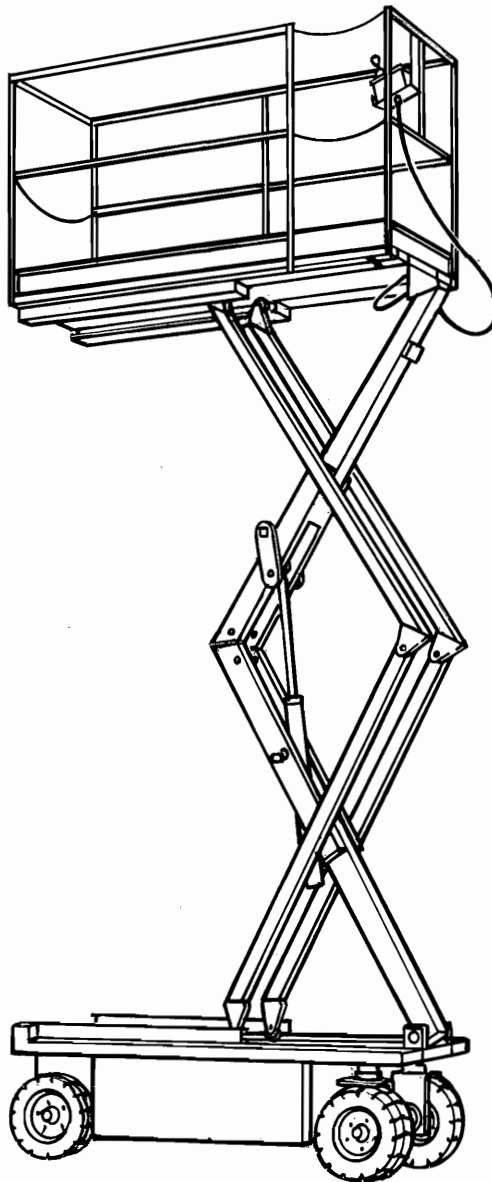


UP-RIGHT INC.

XL-14



SERVICE & PARTS MANUAL

Information here-in, subject to change without notice. When contacting Up-Right for service or parts information, be sure to include the MODEL and SERIAL NUMBERS from the equipment name plate.

MAY 1984

Part No. 60598-00

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1. PLATFORM
2. SCISSOR MECHANISM
3. CHASSIS
4. ENERGY AND POWER MODULE
5. CONTROL CONSOLE

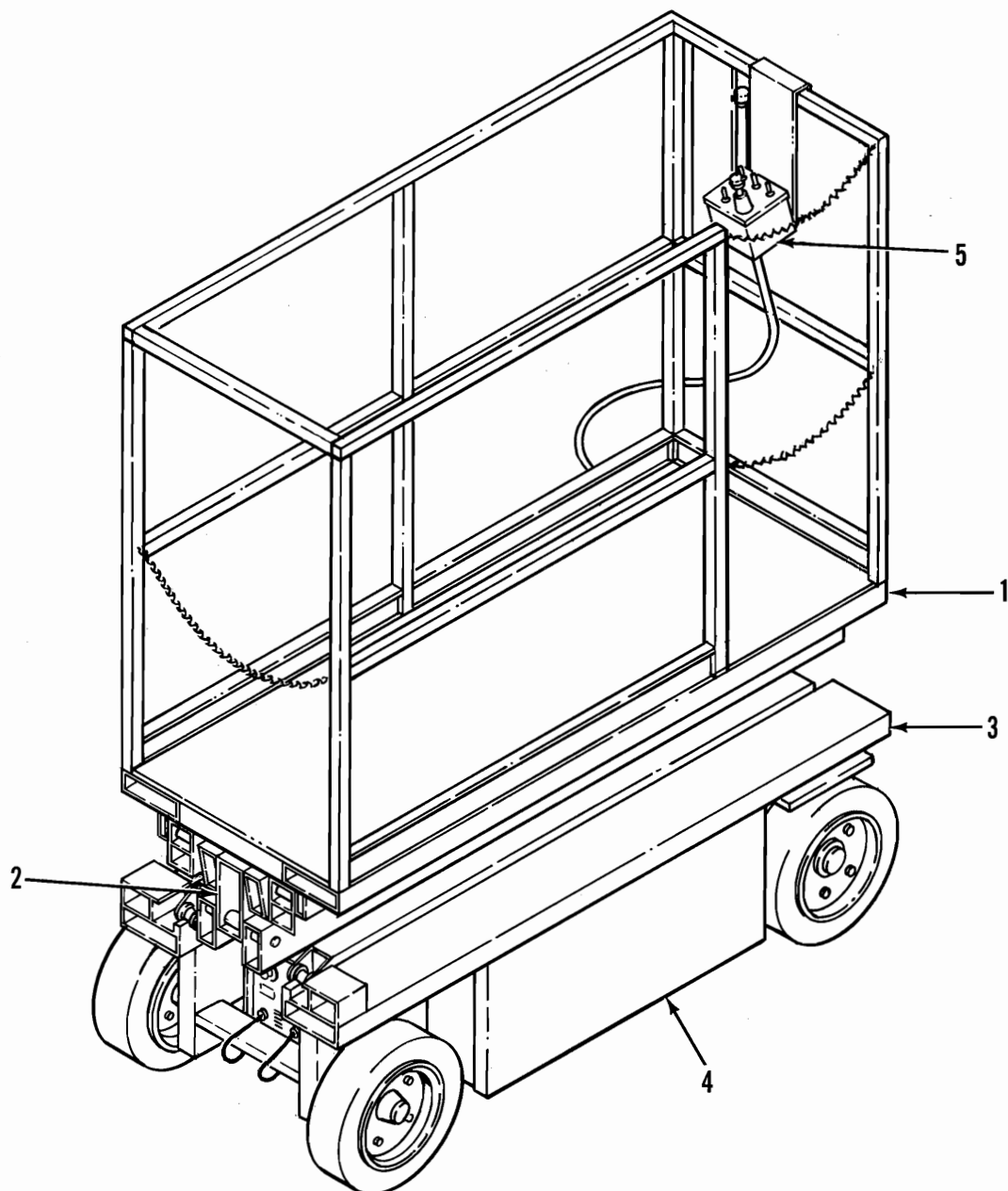


Figure 1-1. XL-14 Work Platform

SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. IDENTIFICATION. This manual describes and illustrates the operation and maintenance instructions for the UP-RIGHT XL14 Work Platform manufactured by Up-Right, Inc., Selma Operations, of Selma, California. (See Figure 1-1).

1-3. PURPOSE. The UP-RIGHT XL-14 Work Platform is designed to be used as a means of elevating maintenance personnel and equipment and to provide a mobile work scaffold. It is designed to provide mobility with the platform in the raised or lowered positions. However, travel with the platform raised more than one foot, is limited to the lowest speed range.

1-4. GENERAL DESCRIPTION.

1-5. COMPONENT ARRANGEMENT. The XL-14 consists of the platform, the scissor mechanism, the energy module, the power module and the chassis.

1-6. LEADING PARTICULARS. Refer to Table 1-1.

Table 1-1. Leading Particulars

Physical Characteristics

Platform Size	2-1/2' X 6-1/2'
Platform Capacity	750 lbs. max. distributed
Platform Height Max.	14 feet
Speed Range (Forward or Reverse)	0.6 to 2 mph
Power Source	2-1/4 hp electric motor

Dimensions

Length	78 inches
Width	30 inches
Height	79 inches
Weight	2280 lbs.

Hydraulic Tank

Capacity	3.25 gallons
--------------------	--------------

Lift System	Single one stage lifting cylinder
-----------------------	--------------------------------------

Surface Speed Platform Lowered	2 mph max.
--	------------

Table 1-1. Leading Particulars (Cont'd)

Surface Speed Platform Raised	0.6 mph
Drive Control	Control stick for direction and speed. Toggle switch for steering.
Drive System	Dual front wheel hydraulic drive.
Tire Size	
Front and Rear	16" diameter solid rubber
Braking System	Spring applied, hydraulic released.
Battery Charger	30 Amp output

1-7. POWER MODULE. The power module, located on the left side of the chassis, contains the electric motor, hydraulic pump and the hydraulic control valves. The electric motor drives the two section hydraulic pump providing hydraulic power to operate all functions of the XL-14 through electrical activation of the control valves.

1-8. ENERGY MODULE. The energy module contains the 24-volt battery pack and the hydraulic reservoir.

SECTION II

SAFETY

2-1. RULES AND PRECAUTIONS.

- a. BEFORE USING THE UP-RIGHT XL-14 thoroughly inspect the machine for damage such as cracked welds or structural members, loose or missing parts or fasteners, hydraulic leaks, damaged cables or hoses, loose wire connections and tire damage. Do not use damaged equipment. DO NOT change operating or safety systems.
- b. Before operating the machine, always survey the work area for surface hazards such as holes, drop-offs, bumps and debris.
- c. Always look UP, down and around for obstructions and electrical conductors.
- d. Distribute all loads evenly on platform. See Specifications for maximum platform loads, DO NOT exceed these loads.
- e. DO NOT elevate the platform unless the machine is level.
- f. DO NOT drive while elevated except on firm level surfaces.
- g. DO NOT operate the machine within 10 feet of electric power lines. THIS MACHINE IS NOT INSULATED.
- h. DO NOT increase platform size.
- i. DO NOT use ladders, scaffolding or any other object to increase working height of platform.
- j. DO NOT sit, stand or climb on guardrail or midrail.
- k. DO NOT climb or jump down from the elevated platform.
- l. DO NOT recharge batteries near sparks or open flame; batteries that are being charged emit highly explosive hydrogen gas.

SECTION III

PREPARATION FOR USE, SHIPMENT AND STORAGE

3-1. PREPARATION FOR USE

WARNING

Stand clear when cutting the metal banding to avoid being cut when the banding snaps back.

- a. Remove the metal banding from the module covers and scissor linkage.
- b. Unpack the control console and plug the cable into the receptacle on the left side of the work platform.
- c. Refer to Figure 3-1 and install the railing assemblies (1, 2, 3 and 8) and secure with capscrews (4), washers (5 and 6) and locknuts (7).

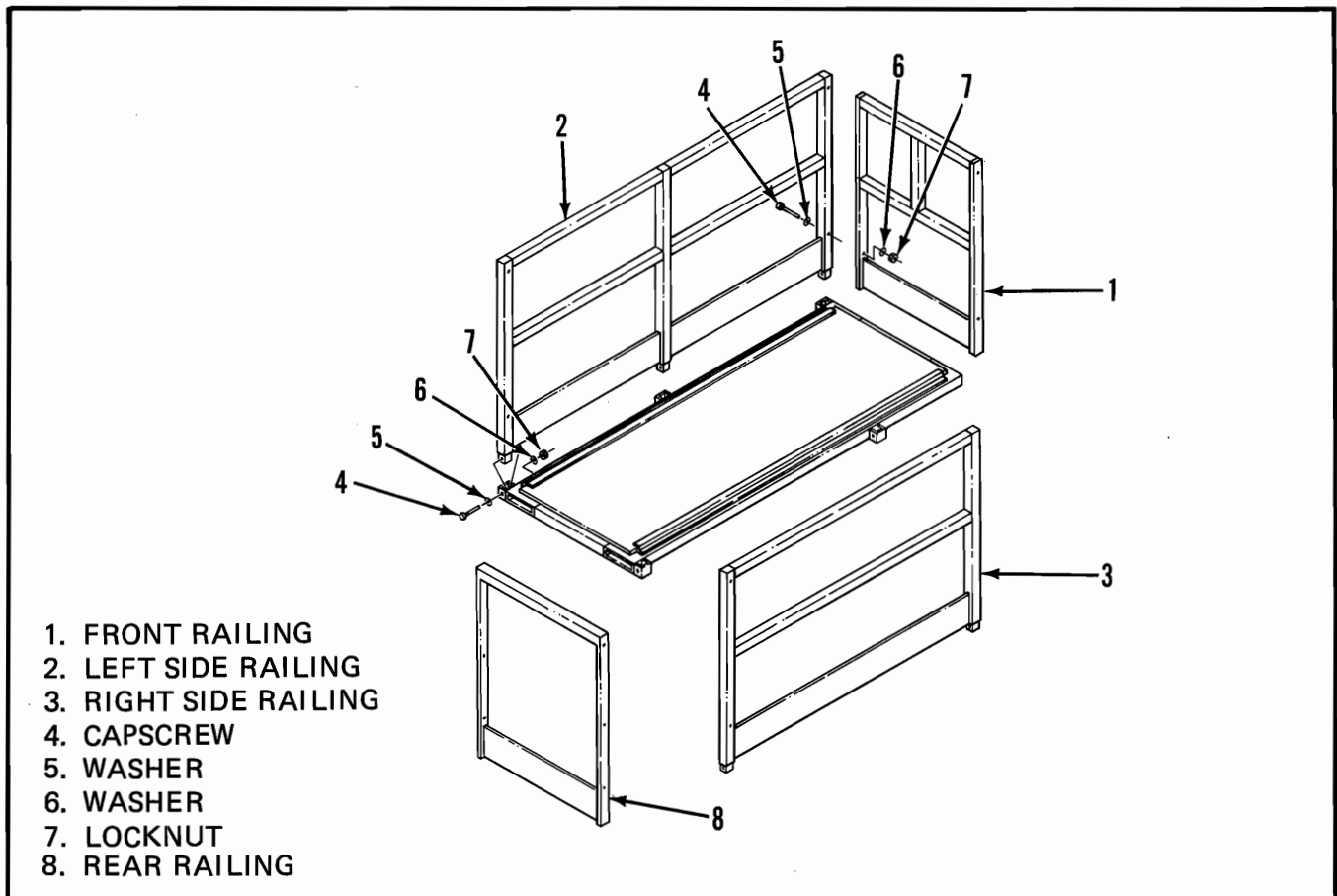


Figure 3-1. Railing Removal and Installation

3-2. PREPARATION FOR SHIPMENT.

- a. Grease all the grease fittings as per the lubrication chart (Figure 5-1).
- b. Fully lower the platform.
- c. Disconnect the battery leads from the batteries and secure them to the chassis.
- d. Unplug and package the control console.
- e. Band the scissor linkage to the frame just behind the front wheels and at the rear wheels.
- f. Refer to Figure 3-1 and remove all the locknuts (7), washers (5 and 6) and capscrews (4) then remove the railing assemblies (1, 2 and 3).
- g. Position the railings flat on the platform and band them together.
- h. For sea shipment, perform preservation per extended storage paragraph 3-4 a.
- i. Place the packaging container on the platform and band into place.

3-3. TRANSPORT

- a. Maneuver the unit into transport position and chock wheels.

NOTE

If forklifting is required, lift from rear of the machine.

- b. Secure the machine to the transport vehicle with chains or straps of adequate load capacity attached to the chassis tie down lugs.

3-4. STORAGE. No preparation for storage is required for normal usage. Regular maintenance per Table 5-1 and Figure 5-1 should be performed. If the unit is to be placed in long term storage (dead storage) use the following preservation procedure.

- a. Preservation.

- (1) Clean painted surfaces. If the paint surface is damaged, repaint.
- (2) Fill the hydraulic tank to operating level.

NOTE

This hydraulic system is filled to the operating level with approved fluid required for operation. Do not drain.

- (3) Coat exposed portions of extended cylinder rods with an approved preservative and wrap with barrier material.

(4) Coat all exposed unpainted metal surfaces with preservative.

b. Batteries.

(1) Disconnect all the battery leads and secure to the chassis. Tape the connectors on the ends of the leads to the chassis.

(2) Remove the batteries and place in alternate service.

SECTION IV

OPERATION INSTRUCTIONS

4-1. THEORY OF OPERATION.

4-2. GENERAL. The electric motor directly drives a two-section hydraulic pump to operate all functions. The oil flow is directed through the use of electrically activated solenoid valves and pressure actuated hydraulic switches.

4-3. DRIVING. When the emergency switch (1, Figure 4-1) is turned "On", it activates the mode switch (2, Figure 4-1) circuit. The mode switch (2, Figure 4-1) is set to "Drive" to render the joystick directional control (8, Figure 4-1) operative. Moving the joystick toward "forward" energizes the dump valve solenoid (4, Figure 4-1) which causes the dump valve (15, Figure 4-2) to close blocking the oil flow. At the same time that circuit energizes forward solenoid (3, Figure 4-1) which moves the forward - reverse valve (2, Figure 4-2) to the forward position. This allows oil to be pumped through the forward - reverse valve (2, Figure 4-2) to the shuttle valve (3, Figure 4-2) which blocks oil flow in one direction sending oil to the drive motors (4, Figure 4-2) in only one direction and at the same time retracts the brake cylinder (5, Figure 4-2). The flow of oil is divided prior to driving the hydraulic motors (4, Figure 4-2) so that each motor receives half the flow. Not all the oil is flowing through the hydraulic motors. Part of the flow bypasses the motor circuit by flowing through a flow restricting needle valve (12, Figure 4-2) to the bypass valve (6, Figure 4-2). This needle valve (12, Figure 4-2) is used to control the creep speed of the unit by limiting the amount of flow permitted to bypass the hydraulic motors (4, Figure 4-2). The "creep speed limit switch" (12, Figure 4-1) is activated while the platform is raised more than one foot. This switch opens the bypass switch circuit preventing the bypass valve (6, Figure 4-2) from closing and blocking flow, therefore limiting the unit to creep speed while the platform is elevated.

Pressure supplied to the motors is also transmitted through a sensing line to shift a pressure switch (8, Figure 4-2) which creates a flow back through the forward - reverse valve (2, Figure 4-2) to the return filter (9, Figure 4-2) and into the hydraulic reservoir (10, Figure 4-2). As the joystick is moved further forward a second circuit is energized activating the bypass solenoid (5, Figure 4-1) which closes the bypass valve (6, Figure 4-2). This causes more flow to be directed to the hydraulic motors which increases the speed of the unit. Setting the speed range switch (13, Figure 4-1) to "High" activates the "series" solenoid (6, Figure 4-1) causing the "series" valve (7, Figure 4-2) to change the flow route for the drive motor oil. Now ALL the flow passes through each drive motor doubling the previous flow rate to achieve the unit's highest speed. In REVERSE, the reverse solenoid (7, Figure 4-1) operates the forward - reverse valve (2, Figure 4-2) to the reverse mode thus causing the oil to flow through the drive motors in the opposite direction as before then to pressure switch (11, Figure 4-2), forward - reverse valve (2, Figure 4-2) and back to the reservoir (10, Figure 4-2). The bypass circuit works the same as in forward. The speed range switch (13, Figure 4-1) performs the same function as in forward but the oil flows in the opposite direction. When the joystick is returned to the neutral position the oil flow to the brake cylinder (5, Figure 4-2) is blocked allowing the spring loaded cylinder to automatically apply the parking brake. The dump valve solenoid (4, Figure 4-1) is de-energized allowing the dump valve (15, Figure 4-2) to open.

To steer, the steering switch (9, Figure 4-1) is held to either "LEFT" or "RIGHT" thus energizing either the left or right steering solenoids (10 and 11, Figure 4-1). Activating the left solenoid operates the steering valve (13, Figure 4-2) to send the oil flow to the right side of the steering cylinder (14, Figure 4-2). As the oil enters the cylinder, that chamber expands causing the cylinder piston to force the oil from the opposing chamber and move the shaft assembly to the left. The oil forced from the steering cylinder passes through the steering valve (13, Figure 4-2) and back to the hydraulic reservoir (10, Figure 4-2).

Steering right sends the oil to left side of the steering cylinder (14, Figure 4-2) forcing the oil from the right side and back to the hydraulic reservoir (10, Figure 4-2).

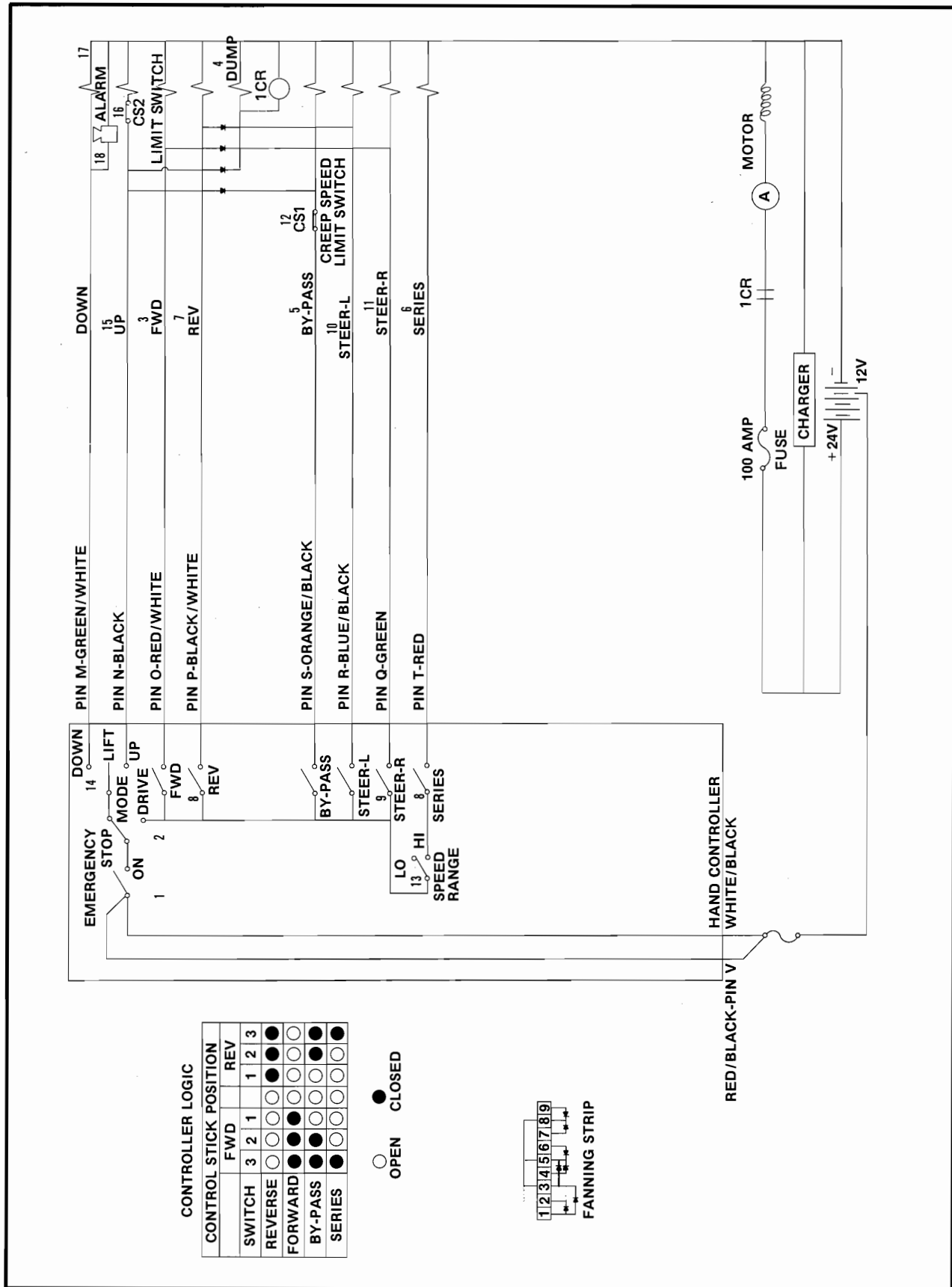


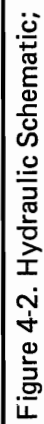
Figure 4-1. Electrical Schematic.

- | | |
|------------------------------|------------------------------|
| 1. EMERGENCY SHUT OFF SWITCH | 10. STEER LEFT SOLENOID |
| 2. MODE SWITCH | 11. STEER RIGHT SOLENOID |
| 3. FORWARD SOLENOID | 12. CREEP SPEED LIMIT SWITCH |
| 4. DUMP SOLENOID | 13. SPEED RANGE |
| 5. BYPASS SOLENOID | 14. LIFT SWITCH |
| 6. SERIES SOLENOID | 15. UP SOLENOID |
| 7. REVERSE SOLENOID | 16. HEIGHT LIMIT SWITCH |
| 8. FORWARD - REVERSE CONTROL | 17. DOWN SOLENOID |
| 9. STEERING SWITCH | 18. DOWN ALARM |

Legend for Figure 4-1

- | | |
|------------------------------------|-----------------------------------|
| 1. HYDRAULIC PUMP | 13. STEERING VALVE |
| 2. FORWARD - REVERSE CONTROL VALVE | 14. STEERING CYLINDER |
| 3. SHUTTLE VALVE | 15. DUMP VALVE |
| 4. HYDRAULIC DRIVE MOTORS | 16. UP VALVE |
| 5. BRAKE CYLINDER | 17. LIFT CYLINDER |
| 6. BYPASS VALVE | 18. CHECK VALVE |
| 7. SERIES VALVE | 19. DOWN VALVE |
| 8. PRESSURE SWITCH | 20. FLOW RESTRICTING NEEDLE VALVE |
| 9. RETURN FILTER | 21. EMERGENCY LOWERING VALVE |
| 10. HYDRAULIC RESERVOIR | 22. VELOCITY FUSE |
| 11. PRESSURE SWITCH | 23. STEERING RELIEF VALVE |
| 12. FLOW RESTRICTING NEEDLE VALVE | 24. DRIVE/LIFT RELIEF VALVE |

Legend for Figure 4-2



4-4. RAISING AND LOWERING PLATFORM. Positioning the mode switch (2, Figure 4-1) to "LIFT" energizes the lift switch (14, Figure 4-1). Positioning the lift switch to "UP" energizes the dump solenoid (4, Figure 4-1) closing the dump valve (15, Figure 4-2), and the bypass solenoid (5, Figure 4-1) closing the bypass valve (6, Figure 4-2). The up solenoid (15, Figure 4-1) is also energized operating the up valve (16, Figure 4-2) to open the passage for oil to enter the lift cylinder.

When the platform reaches its maximum height a limit switch (16, Figure 4-1) opens the electrical circuit de-energizing the up solenoid (15, Figure 4-1). Returning the lift switch to neutral, de-energizes the bypass and dump solenoids allowing the bypass and dump valves to open. The check valve (18, Figure 4-2) prevents the oil from flowing back out of the cylinder. Positioning the lift switch to "DOWN" energizes the down solenoid (17, Figure 4-1) which opens the down valve (19, Figure 4-2) allowing the oil to escape back to the reservoir (10, Figure 4-2). With the down solenoid circuit energized, the down alarm (18, Figure 4-1) is also energized. The rate of descent of the platform is regulated by a flow restricting needle valve (20, Figure 4-2). As a safety feature, the lift cylinder has a velocity fuse (22, Figure 4-2) which trips stopping the descent if the rate of descent is too fast. The emergency lowering valve (2, Figure 4-2) provides a means to bypass the check valve (18, Figure 4-2) and manually lower the platform. In addition, each hydraulic circuit has a preset hydraulic pressure relief valve. The steering system is limited by a 1000 psi relief valve (23, Figure 4-2), the drive and lift circuits are limited by a 2950 psi relief valve (24, Figure 4-2).

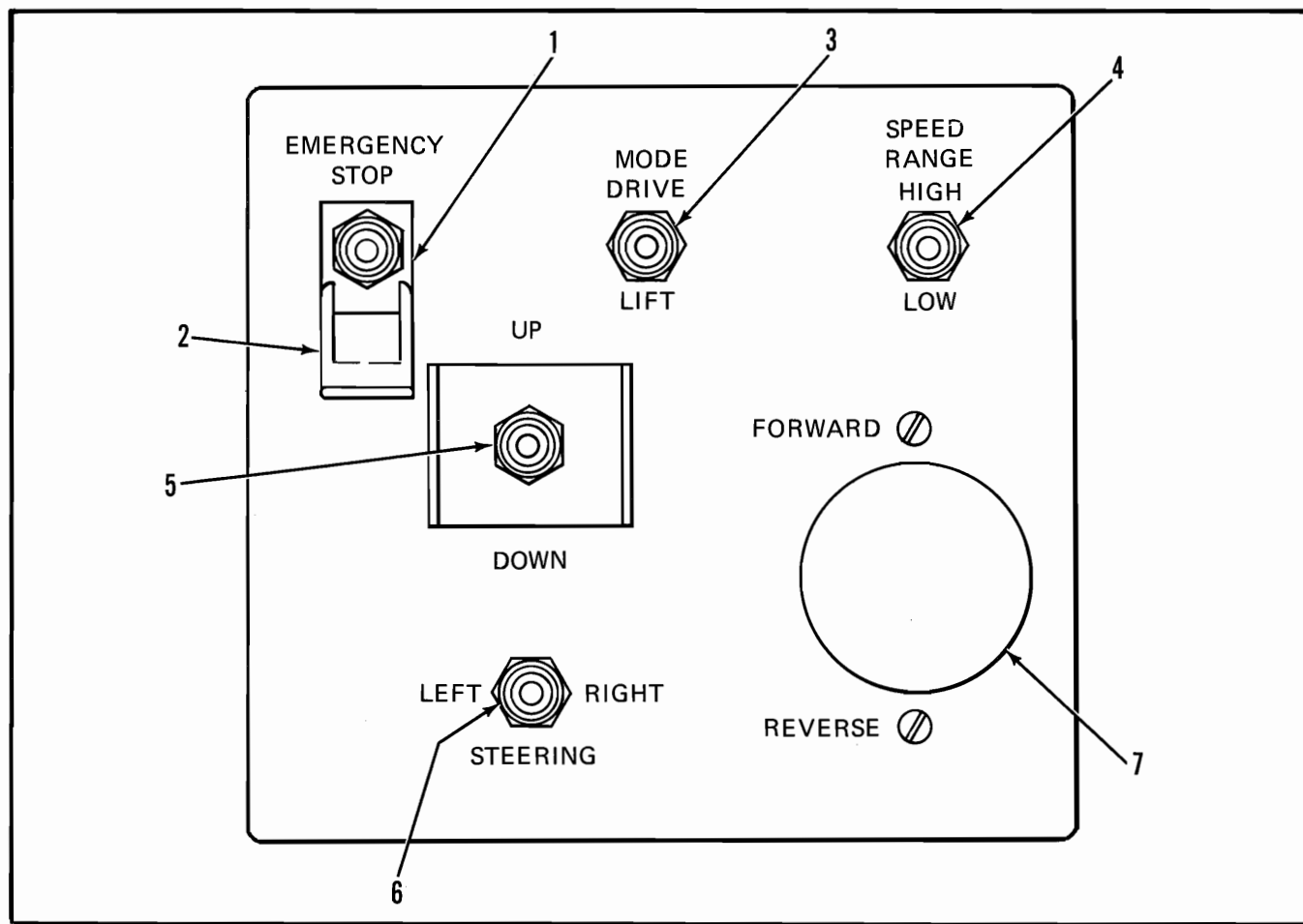


Figure 4-3. Controls & Indicators (View 1 of 3)

4-5. CONTROLS AND INDICATORS. The controls and indicators for operation of the Maintenance Work Platform are shown in Figure 4-3. The name and function of each control and indicator are listed in Table 4-1. The index numbers in the figure correspond to the index numbers in the table. The operator should know the location of each control and indicator and have a thorough knowledge of the function and operation of each before attempting to operate the unit.

Table 4-1. Controls and Indicators

INDEX NUMBER	NAME	FUNCTION
1	EMERGENCY STOP SWITCH	A two position toggle switch. Position the switch on (down) to energize the electrical circuits. Position the switch to off (up) to shut down all electrical circuits, except the lift switch DOWN function, inoperative.
2	SWITCH GUARD (Emergency Stop)	Normally open. When closed, the switch guard automatically positions the EMERGENCY STOP switch to off (up).
3	MODE SWITCH	A two position toggle switch. DRIVE position sends electrical power to the joystick (7) control and the STEERING switch (6). LIFT position sends electrical power to the lift (UP, DOWN) switch (5).
4	SPEED RANGE SWITCH	A two position toggle switch. Provides the platform operator with two speed ranges, in forward or reverse.
5	UP/DOWN SWITCH	A three position toggle switch controls the lift function. Push the switch to UP to raise the platform to the desired height then release the switch. Push the switch to DOWN to lower the platform to the desired level then release the switch.
6	STEERING SWITCH	A three position toggle switch that is normally centered. Push the switch to LEFT to steer left, RIGHT to steer right. Although the switch is self-centering, the steering system is not. The wheels must be steered back to straight. Observe the tires while maneuvering the unit to assure proper direction.

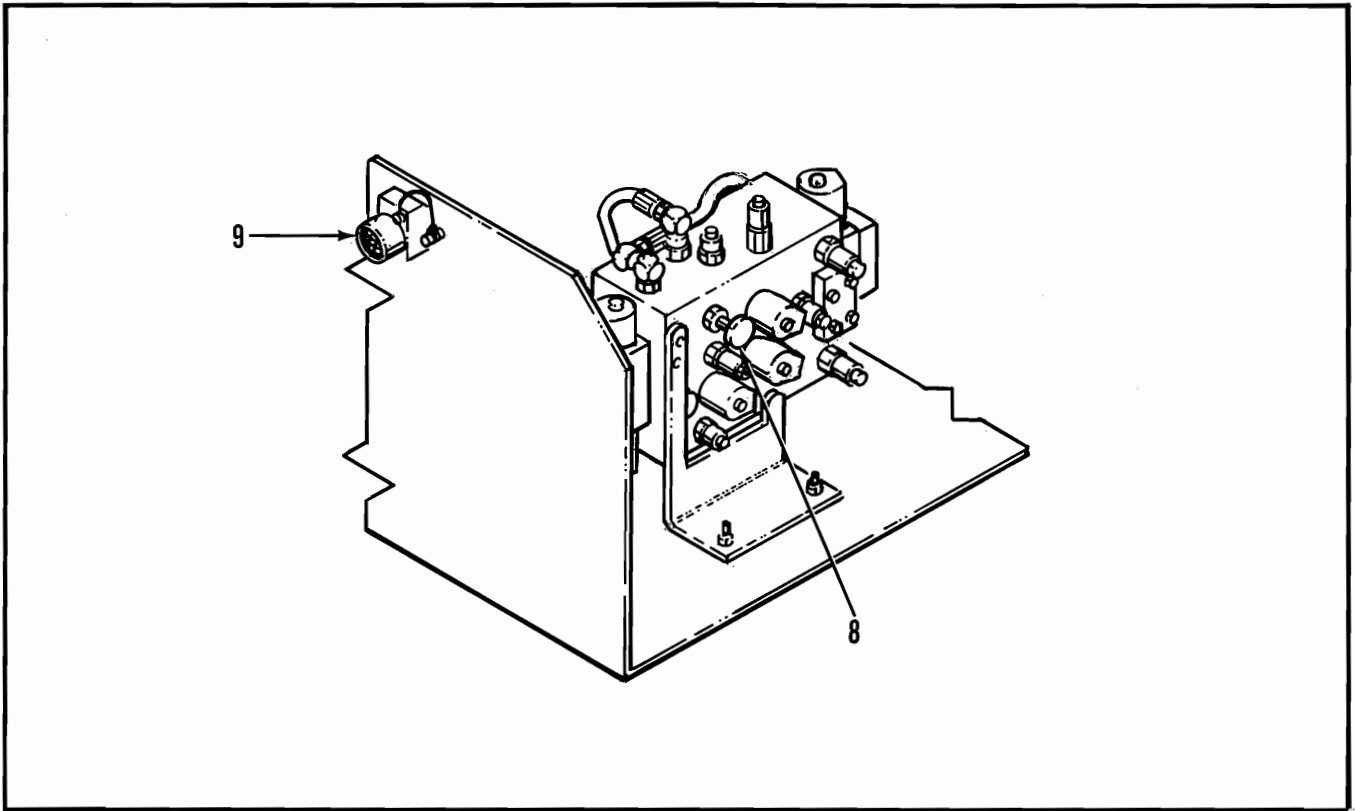


Figure 4-3. Controls & Indicators (View 2 of 3)

Table 4-1. Controls and Indicators (Cont'd)

INDEX NUMBER	NAME	FUNCTION
7	FORWARD - REVERSE control with locking collar	<p>Normally locked in neutral by the collar. A joystick control. Pull up on the locking collar then push forward to move the unit forward. With the unit platform lowered, the further the joystick is moved away from neutral the higher the speed in either forward or reverse. Pull up on the locking collar and pull back to travel backward. The SPEED RANGE switch (4) position determines the platform's maximum speed as the joystick is operated through its range of travel. There are no detents felt as the joystick is operated. The difference in travel is the only indication that the speed range has shifted.</p> <p>When the platform is raised more than one foot, the unit will only travel at its slowest pace or</p>

Table 4-1. Controls and Indicators (Cont'd)

INDEX NUMBER	NAME	FUNCTION
7 (Cont'd)	FORWARD - REVERSE control with locking collar (Cont'd)	"creep speed". When released, the joystick auto- matically returns to neutral.
8	EMERGENCY DOWN VALVE	Open the valve by turning the knob counterclock- wise to lower the platform. Once the platform is down, close the valve by turning clockwise. The platform cannot be raised until the valve is closed.
9	ALARM (Platform Lowering)	Emits an audible alarm signal while the platform is lowering when the Lift switch on the control console is used to lower the platform. If the EMERGENCY LOWERING VALVE (8) is used to do the lowering, the alarm will not function.

46. OPERATING PROCEDURES.

47. PREOPERATIONAL CHECK

WARNING

Do not perform service on machine with the platform elevated.

- a. Carefully inspect the entire machine for damage such as cracked welds or structural members, loose or missing parts, oil leaks, damaged cables or hoses, loose connections and tire damage.
- b. Before operating the machine, survey the work ahead for surface hazards such as holes, drop-offs, bumps and debris.
- c. Check in ALL directions for obstructions and electrical conductors.
- d. Remove the battery box and hydraulic manifold covers and inspect for damage and missing parts.
- e. Remove the cap from the hydraulic reservoir and check the level of the oil with the platform fully lowered.
- f. Check the fluid level in the batteries.

WARNING

Look up and around for obstructions prior to operating the lift function.

WARNING

DO NOT operate the machine within 10 feet of any electrical power lines.
THIS MACHINE IS NOT INSULATED.

DO NOT elevate the platform unless the machine is on firm level ground.

DO NOT enter the scissor linkage while the platform is elevated.

g. Raise the platform and visually inspect the scissor linkage, rollers, lift cylinder, cables and hoses for damage or erratic operation. Check for missing or loose parts.

h. Lower the platform partially and check operation of the audible lowering alarm.

i. Reach through the access hole in the hydraulic manifold cover and open the emergency lowering valve to check for proper operation. Once the platform is fully lowered, close the valve.

4-8. TRAVEL (PLATFORM LOWERED).

a. Check that the EMERGENCY STOP switch (1) on the control console is in the "ON" position.

b. Set the mode switch (3) to "DRIVE".

c. Set the speed range switch (4) to "LOW" or "HIGH".

d. Pull up the locking collar to release joystick (7) from the neutral position. SLOWLY move the joystick forward and backward to check for speed and directional control.

e. Move the steering switch (6) to LEFT then RIGHT to check for steering control.

4-9. LIFTING PLATFORM

WARNING

Look up and around for obstructions before performing the lifting function.

DO NOT elevate the platform unless the machine is level.

DO NOT operate this machine within 10 feet of any electrical power lines. THIS MACHINE IS NOT INSULATED.

DO NOT perform service on the machine with the platform elevated, unless properly blocked.

a. If necessary, drive the machine to an unobstructed area to allow for full platform elevation.

b. Position the mode switch (3) to "LIFT".

c. Push the lift switch (5) to "UP" and hold there to elevate the platform.

WARNING

NEVER enter the scissor linkage while the platform is elevated.

d. When the work task is completed, lower the platform by holding the lift switch (5) in the "DOWN" position until the platform is fully lowered.

- e. At this time the unit may be driven to another work sight or back to storage.

4-10. TRAVEL WITH PLATFORM ELEVATED.

NOTE

The unit will travel no faster than "creep speed" with the platform elevated.

- a. If travel with the platform elevated is anticipated, check the surface to be traversed prior to being elevated.

WARNING

Distribute all loads evenly on platform.

DO NOT exceed unit's specified load limits.

DO NOT attach overhanging loads or increase platform size.

DO NOT use ladders, scaffolding or any other object to raise work height.

DO NOT sit, stand or climb on guardrails.

- b. Check the clearance above, below and to the sides of both the platform and the chassis.

WARNING

Travel only on hard, level, smooth surfaces.

- c. Set the mode switch (3) to "DRIVE".

- d. Set the speed range switch (4) to "LOW".

- e. Pull up the locking collar on the joystick (7) and slowly move the joystick in the desired direction.

WARNING

Before switching directions, double check that the route is clear of obstructions.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. INSPECTION

5-2. GENERAL. The complete inspection consists of periodic visual and operational checks, together with all necessary minor adjustments to assure proper performance.

5-3. PERIODIC INSPECTION. The periodic inspection chart, Table 5-1, is arranged according to lapsed time, between inspections. The inspection requirements are to be fulfilled by operating and maintenance personnel.

Table 5-1. Periodic Inspection and Maintenance

COMPONENT	INSPECTION or SERVICE	INTERVAL						
		EACH SHIFT	125 hr	250 hr	500 hr	1000 hr	2000 hr	Other
Battery System	Check electrolyte level	X						
	Check specific gravity	X						
	Clean exterior	X						
	Clean the terminals			X				
	Check battery cable condition	X						
	Charge batteries	X						
Hydraulic Oil	Check oil level	X				X		Climate Change
	Drain and replace oil							
Hydraulic Oil Filter	Change filter			X				
Hydraulic Control Valves	Check for leaks		X					
	Check hose connections		X					
Hydraulic Hoses	Check connections		X					
	Check for exterior wear		X					
Emergency Hyd System	Open the emergency down valve		X					
Control Console	Check switches operation		X					
	Check cable plug		X					

Table 5-1. Periodic Inspection and Maintenance (Cont'd)

COMPONENT	INSPECTION or SERVICE	INTERVAL						
		EACH SHIFT	125 hr	250 hr	500 hr	1000 hr	2000 hr	Other
Control Cable	Check the connector plugs Check the exterior of the cable for pinching, binding or rubbing damage	X X						
Platform Deck and Rails	Check fasteners for tightness Check welds for cracks Check condition of deck	X X X						
Tires	Check for damage	X						
Hydraulic Pump	Wipe clean Check for leaks at mating surfaces Check for hose fitting leaks Check mounting bolts for tightness Check the drive coupling for tightness and proper alignment		X X X X	X				
Drive Motors	Check for operation and leaks		X					
Steering System	Check locknuts for security Grease pivot pins Check steering cylinder for leaks or looseness		X X	X				
Rear Wheel Bearings	Check wheel assembly for play Repack wheel bearings Replace wheel bearings and seals		X			X	X	
Scissor Linkage	Inspect for structural cracks Check pivot points for wear Check the pivot pin retainer bolts for tightness Check the roller tracks for wear and deformation Check scissor arms for bending	X	X	X X X				

Table 5-1. Periodic Inspection and Maintenance (Cont'd)

COMPONENT	INSPECTION or SERVICE	INTERVAL						
		EACH SHIFT	125 hr	250 hr	500 hr	1000 hr	2000 hr	Other
Chassis	Check component mountings for tightness Check welds for cracks Check hoses for pinch or rubbing points			X X X				
Lift Cylinder	Check the cylinder rod for gouges or scoring Check mounting pin pivot bolts for tightness Inspect for leaks Inspect the pivot points for wear		X X X					
Entire Unit	Check fasteners for tightness Check for corrosion, remove and repaint Check for and repair collision damage			X X	X			

5-4. LUBRICATION. Refer to the lubrication chart (Figure 5-1) for the location of items that require lubrication service.

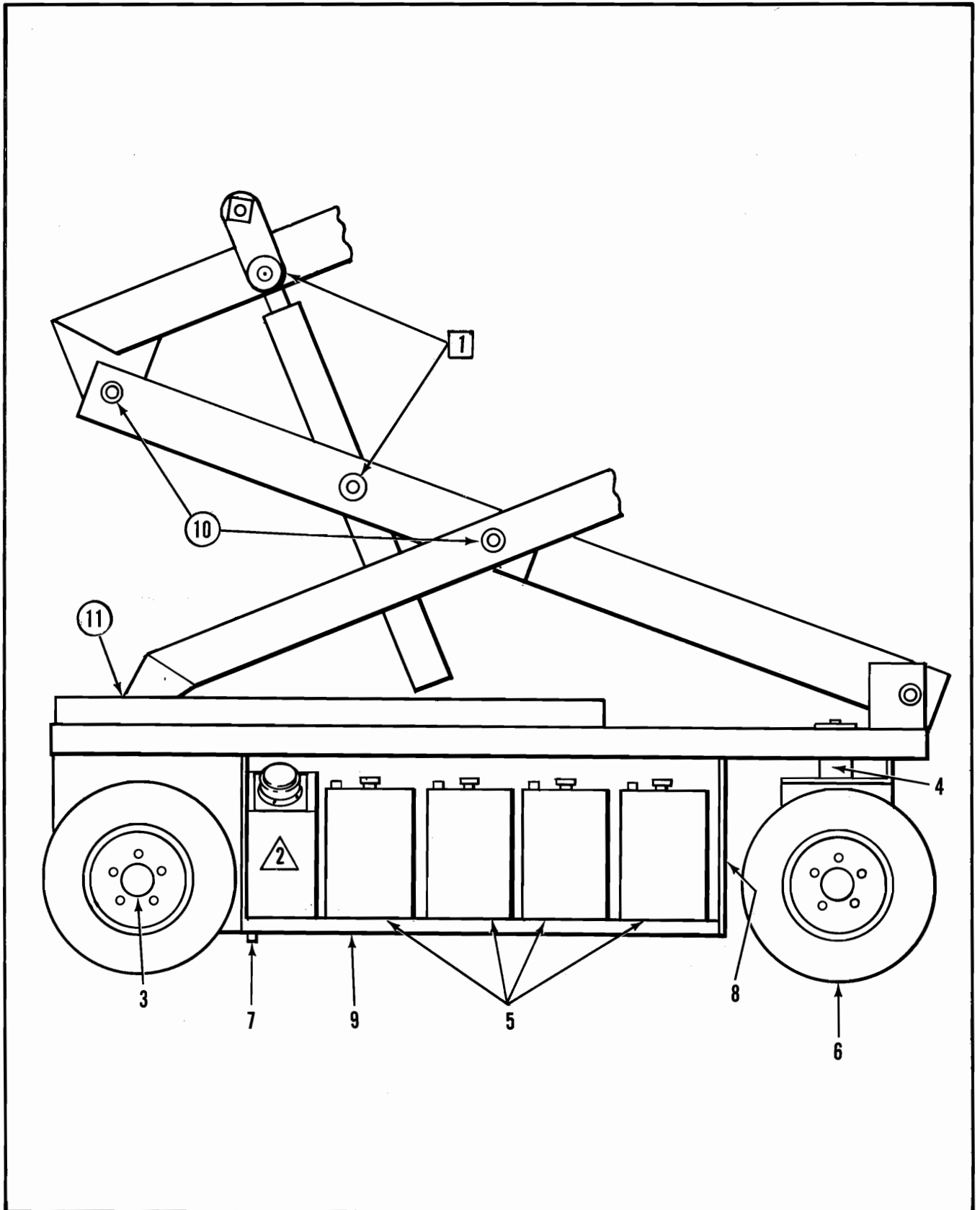





Figure 5-1. Periodic Service and Lubrication Chart

1. GREASE FITTINGS
2. HYDRAULIC OIL RESERVOIR
3. REAR WHEEL HUBS
4. STEERING PIVOTS
5. BATTERIES
6. HYDRAULIC DRIVE MOTORS
7. HYDRAULIC RESERVOIR DRAIN
8. CONTROL VALVE BLOCK
9. HYDRAULIC PUMP
10. SCISSOR JOINTS
11. TRACK WHEELS

-  Grease
 Hydraulic Oil
 Motor Oil, SAE 30W, Weekly

Legend for Figure 5-1

5-5. TROUBLESHOOTING. See Table 5-2 for a listing of troubles, probable causes and remedies for problems that may be encountered during operation of the mobile lift platform.

Table 5-2. Troubleshooting

TROUBLE	PROBABLE CAUSE	REMEDY
Unit will not drive.	1. Drive circuit solenoid valve malfunction.	Test solenoid, replace if defective.
	2. Control cable defective.	Test cable, replace if defective.
	3. Mode switches defective.	Test switches, replace if defective.
	4. Ruptured hydraulic hose.	Replace hose.
	5. Joystick control malfunction.	Replace if defective.
	6. Circuit relief valve malfunctioning.	Test relief, replace if defective.

Table 5-2. Troubleshooting (Cont'd)

TROUBLE	PROBABLE CAUSE	REMEDY
Unit will not drive. (Cont'd)	7. Hydraulic pump defective.	Test pump pressure and delivery, replace if not serviceable.
	8. Hydraulic motors defective.	Test hydraulic pressure. If normal replace the motors.
Unit will not drive full speed.	1. Series valve solenoid malfunction.	Test solenoid, replace if defective.
	2. Bypass valve malfunction.	Test solenoid, replace if defective.
	3. Joystick control malfunction.	Test the control, replace if defective.
	4. Hydraulic motors worn.	Inspect the motors, replace if not serviceable.
	5. Hydraulic pump worn.	Check pump pressure and delivery, replace if not serviceable.
	6. Circuit relief valve stuck open.	Check relief valve, replace if defective.
Platform will not lower.	1. Blown fuse.	Locate electrical short then replace fuse.
	2. Down valve solenoid coil defective.	Test coil, replace if defective.
	3. Control cable defective.	Check cable, replace if defective.
	4. Down console switch defective.	Check switch, replace if defective.
	5. Mode switch defective.	Check switch, replace if defective.
Platform starts to lower then stops.	1. Hydraulic cylinder internal fuse blown (oil too high viscosity).	Raise platform slightly. Allow hydraulic oil to warm up, then lower platform.
Unit will not steer left. (Lift function operative.)	1. Open circuit in control cable.	Test cable for continuity, replace if defective.

Table 5-2. Troubleshooting (Cont'd)

TROUBLE	PROBABLE CAUSE	REMEDY
Unit will not steer left. (Lift function operative.) (Cont'd)	<ol style="list-style-type: none"> Steering valve malfunction. Mechanical damage. Steering switch defective. Mode switch defective. Circuit relief valve stuck open. Hydraulic pump defective. (Platform will not elevate. 	<p>Test valve, replace if not serviceable.</p> <p>Replace damaged parts.</p> <p>Replace switch.</p> <p>Replace switch.</p> <p>Inspect the relief valve, replace if defective.</p> <p>Check pump flow and pressure, replace if necessary.</p>
Unit will not steer right. (Lift function operative.)	<ol style="list-style-type: none"> Control cable defective. Steering switch defective. Mode switch defective. Steering valve not shifting. Mechanical damage. Circuit relief valve stuck open. Lift valve stuck or defective. (Platform lifts when steering.) 	<p>Test cable, replace if defective.</p> <p>Replace switch.</p> <p>Replace switch.</p> <p>Test the valve, if defective replace it.</p> <p>Replace damaged parts.</p> <p>Check the valve, replace if defective.</p> <p>Test valve, replace if defective.</p>
All console controls inoperative.	<ol style="list-style-type: none"> Control cable unplugged. Blown fuse. 	<p>Connect cable.</p> <p>Find short. Replace fuse.</p>
Platform will not elevate.	<ol style="list-style-type: none"> Manual lowering valve open. Platform overloaded. Ruptured hydraulic hose. Lift valve solenoid malfunction. 	<p>Close valve.</p> <p>Observe maximum load rating.</p> <p>Replace the hose and check relief valve setting.</p> <p>Test solenoid and replace if defective.</p>

Table 5-2. Troubleshooting (Cont'd)

TROUBLE	PROBABLE CAUSE	REMEDY
Platform will not elevate. (Cont'd)	5. Maximum height limit switch malfunction.	Test switch and wiring. Replace if defective.
	6. Circuit relief valve stuck open.	Replace the relief valve.
	7. Lift switch on control console defective.	Test switch, replace if defective.
	8. Mode switch defective.	Test the switch, replace if defective.
	9. Lift valve defective.	Repair or replace valve.
	10. Hydraulic pump defective.	Check for pressure and delivery. Repair or replace if defective.
	11. Down valve stuck open.	Remove and inspect the valve for sticky operation or damaged o-rings. Repair or replace if unserviceable.

5-6. HYDRAULIC OIL AND FILTER (Figure 5-2).

- a. Operate the work platform to bring the hydraulic oil up to normal operating temperature.
- b. Provide a suitable container to catch the drained oil.

CAUTION

The hydraulic oil may be of sufficient temperature to cause burns. Wear leather or equivalent gloves when handling hot oil.

- c. Remove the drain plug (3) and allow all oil to drain.

NOTE

It may be necessary to remove the filler cap (4) to break any vacuum that may develop as the oil drains.

- d. Reinstall the drain plug (3).
- e. Unthread the filter (2) from the filter head.

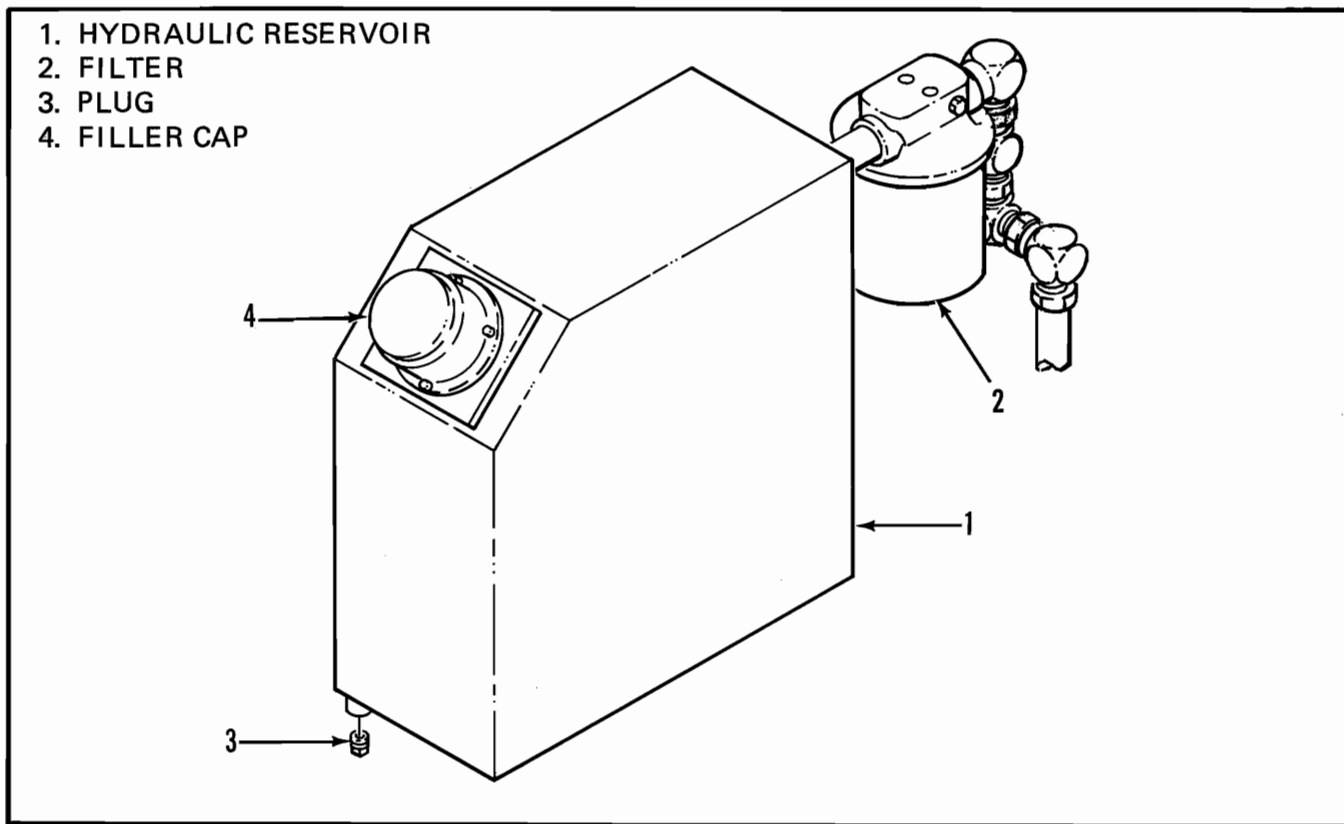


Figure 5-2. Hydraulic Oil Tank and Filter

- f. Apply a thin film of clean oil to the gasket of the replacement filter.
- g. Thread the replacement filter onto the filter head until the gasket makes contact then rotate the filter $\frac{3}{4}$ of one turn further.
- h. Fill the hydraulic reservoir with the specified hydraulic oil.

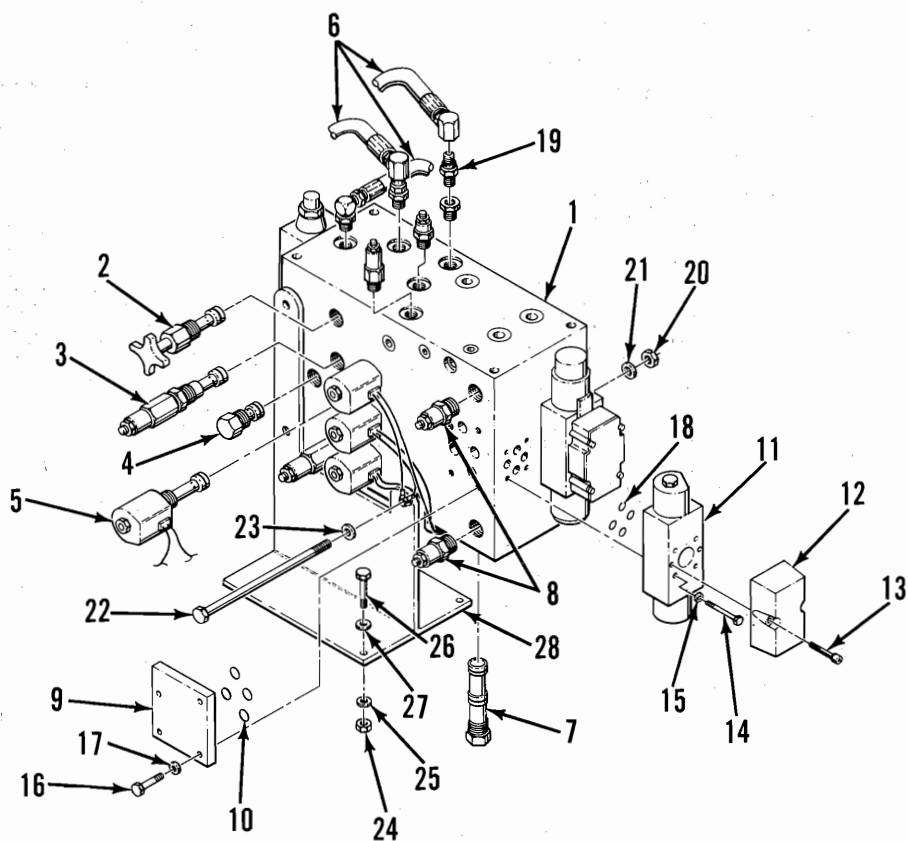
5-7. HYDRAULIC MANIFOLD (Figure 5-3).

- a. General. It is not necessary to remove the manifold to perform all maintenance procedures. A determination should be made prior to beginning maintenance as to whether or not the manifold should be removed.
- b. Disassembly.

NOTE

Mark all components as they are removed so as not to confuse their location during assembly.

- (1) Unscrew the needle valve (2), relief valve (3), check valve (4), counterbalance valves (8) and the shuttle valve (7).



1. MANIFOLD
2. NEEDLE VALVE
3. RELIEF VALVE
4. CHECK VALVE
5. SOLENOID VALVE
6. HYDRAULIC HOSES
7. SHUTTLE VALVE
8. COUNTERBALANCE VALVE
9. ADAPTER BLOCK
10. O-RING
11. DIRECTIONAL CONTROL VALVE
12. COVER
13. CAPSCREW
14. CAPSCREW
15. LOCKWASHER

16. CAPSCREW
17. LOCKWASHER
18. O-RING
19. MALE FITTING
20. NUT
21. LOCKWASHER
22. CAPSCREW
23. FLATWASHER
24. NUT
25. LOCKWASHER
26. CAPSCREW
27. FLATWASHER
28. BRACKET

Figure 5-3. Hydraulic Manifold

(2) Tag and disconnect the electrical leads to the solenoid valves (5) then unscrew them from the manifold.

(3) Remove the capscrews (13) to remove the covers (12) to allow access to the capscrews (14) and lockwashers (15).

(4) Tag and disconnect the electrical leads to the directional control valves (11) then remove the capscrews and lockwashers (14 and 15), the valve (11) and o-rings (18).

(5) Tag and disconnect the hydraulic hoses (6) then unscrew the male fittings (19).

(6) Unscrew any remaining valves and hydraulic hoses, and disconnect any remaining electrical connections.

(7) Remove the capscrews (16), lockwashers (17), adapter block (9) and o-rings (10).

c. Removal.

(1) Remove the nuts (20), lockwashers (21), capscrews (22), and flat washers (23) to release the manifold (1) from the mounting bracket (28).

(2) Remove the nuts (24), lockwashers (25), capscrews (26), and flat washers (27) to release the mounting bracket (28) from the power module.

d. Cleaning and Inspection.

(1) Mark the location of each plug then remove the plugs.

(2) Wash the manifold in degreaser to eliminate all contaminant build-up then blow out all passages with filtered compressed air.

(3) Check the manifold for cracks, thread damage and scoring where valve mechanisms slide against internal surfaces.

(4) Check each valve mechanism for thread damage, torn or cracked o-rings and proper operation.

(5) Check the mounting bracket (28) for stress cracks.

(6) Replace parts found not serviceable.

(7) Replace o-rings (10 and 18).

e. Installation and Assembly.

(1) Position the mounting bracket (28) in place on the manifold (1) and secure with capscrews (22), flat washers (23), lockwashers (21) and nuts (20) then install any plugs that were removed for cleaning.

(2) Position the manifold and mounting bracket assembly on the power module and install the capscrews (26), flat washers (27), lockwashers (25) and nuts (24).

(3) Install the solenoid valves (5) and connect their electrical leads.

(4) Position the replacement o-rings (18) in place and install the directional control valves (11). Secure with capscrews (14) and lockwashers (15), then install the covers (12) and capscrews (13). Connect their electrical leads.

(5) Position replacement o-rings (10) in place and install the adapter block (9). Secure with capscrews (16) and lockwashers (17).

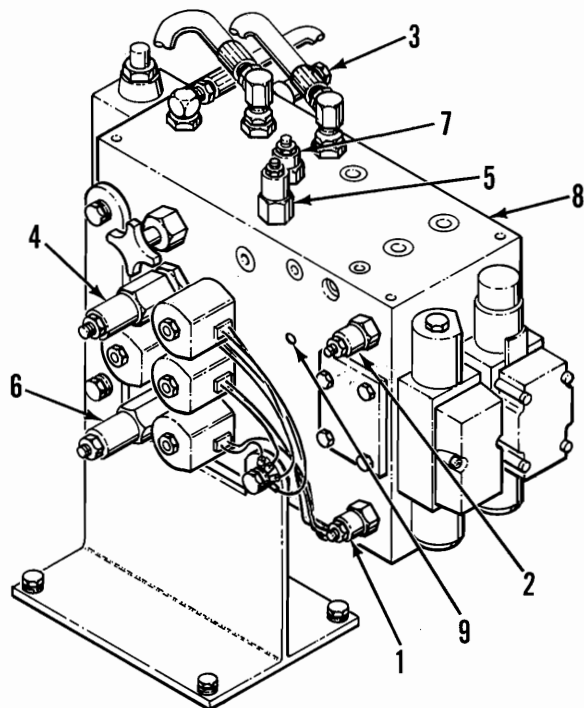
(6) Install the shuttle valve (7), check valve (4), relief valve (3) and needle valve (2).

(7) Install the male fittings (19) then connect the hydraulic hoses (6).

(8) Connect any remaining hydraulic hoses.

(9) Operate each hydraulic function through its entire range of travel several times to expel any air trapped in the system.

(10) Check for proper operation, and leaks.



1. COUNTERBALANCE VALVE (FORWARD)
2. COUNTERBALANCE VALVE (REVERSE)
3. STEERING RELIEF VALVE
4. LIFT CIRCUIT RELIEF VALVE
5. MAIN PUMP RELIEF VALVE
6. DESCENT RATE ADJUSTMENT VALVE
7. NEEDLE VALVE (BY-PASS FLOW RATE ADJUSTMENT)
8. HYDRAULIC MANIFOLD
9. GAUGE PORT PLUG

Figure 5-4. Hydraulic Pressure Adjustment

5-8. SETTING HYDRAULIC PRESSURES.

NOTE

Check the hydraulic pressures whenever the manifold, pump or relief valves have been serviced or replaced.

a. Main Pump Relief Valve.

(1) Disconnect the lift cylinder hose (2) from the lift cylinder and install 0-5 GPM flow meter, 0-3000 psi pressure gauge and needle valve test set with a hose to return the oil to the tank.

(2) Operate the hydraulic system 10 to 15 minutes to warm the oil.

(3) Refer to Figure 5-4 and loosen the locknut on the lift circuit relief valve (4).

(4) Screw the adjusting screw IN until it bottoms, to increase that valve's pressure setting high enough to render that valve inoperative, causing the main relief valve (5) to open first.

(5) Position the mode switch to LIFT.

(6) Position the lift switch to UP and hold it there.

(7) Observe the pressure gauge as the needle valve is closed.

(8) Loosen the locknut on the main relief valve (5) and screw the adjusting screw OUT to reduce that valve's pressure setting to 2500 p.s.i.

(9) Slowly screw the adjusting screw of the main relief valve (5) IN to increase the pressure to 2950 p.s.i. then lock the adjusting screw with the lock nut.

(10) Refer to the following paragraph 5-8b. and reset the lift circuit relief valve.

(11) Release the lift switch, then remove the test set from the lift circuit hose.

(12) With the platform fully lowered check the hydraulic fluid level and replace any lost during the test.

(13) Operate the lift function to expel any trapped air and check for leaks.

b. Lift Circuit Relief Valve.

(1) Remove the gauge port plug (9, Figure 5-4) and install a 3000 p.s.i. pressure gauge, or if the main relief valve has just been adjusted leave the test set connected but remove the return line hose from the test set and connect the test set to the hose leading to the lift cylinder.

(2) Operate the hydraulic system 10 to 15 minutes to warm the hydraulic oil.

- (3) Position a 750 lb. load centered on the platform.
- (4) Position the mode switch to LIFT.
- (5) Position the lift switch to UP and hold it there and observe the pressure gauge.
- (6) Loosen the locknut on the lift circuit relief valve (4) and screw the adjusting screw OUT to lower the pressure setting to 2000 p.s.i.

WARNING

If the platform starts to raise, backing the pressure to 2000 p.s.i. will cause the platform to lower.

(7) Observe the pressure gauge as the adjustment screw of the relief valve (4) is screwed IN. As the pressure increases to approximately 2950 p.s.i. the platform should start to lift. Lock the adjustment screw with the locknut just as the platform starts to rise. This pressure setting limits the lifting capability of the unit to 750 lbs.

NOTE

The pressure setting may vary as much as 200 p.s.i. either way from 2950 p.s.i.

- (8) Release the lift switch.
- (9) Remove the pressure gauge from the gauge port and install plug or remove the test set from the lift circuit and reconnect the hose to the lift cylinder.
- (10) Operate the lift circuit again to expel air trapped in the system and check for leaks.

c. Steering Relief Valve.

- (1) Disconnect the hydraulic hose to the steering cylinder and install a 0-5 GPM flow meter, 0-3000 psi pressure gauge and needle valve test set. Attach the disconnected hose to the other end of the test set to complete the circuit.
- (2) Operate the hydraulic system 10 to 15 minutes to warm the hydraulic oil.
- (3) Position the mode switch to DRIVE.
- (4) Position the steer switch to LEFT and hold it there. Observe the pressure gauge as the steer cylinder bottoms.
- (5) The gauge should read 1000 p.s.i. with the cylinder bottomed. If not, loosen the locknut on the steering relief valve (3, Figure 5-4).
- (6) Back the adjustment screw OUT until the pressure drops to 900 p.s.i. then slowly turn the screw IN to raise the pressure to 1000 p.s.i. Lock the screw with the locknut.

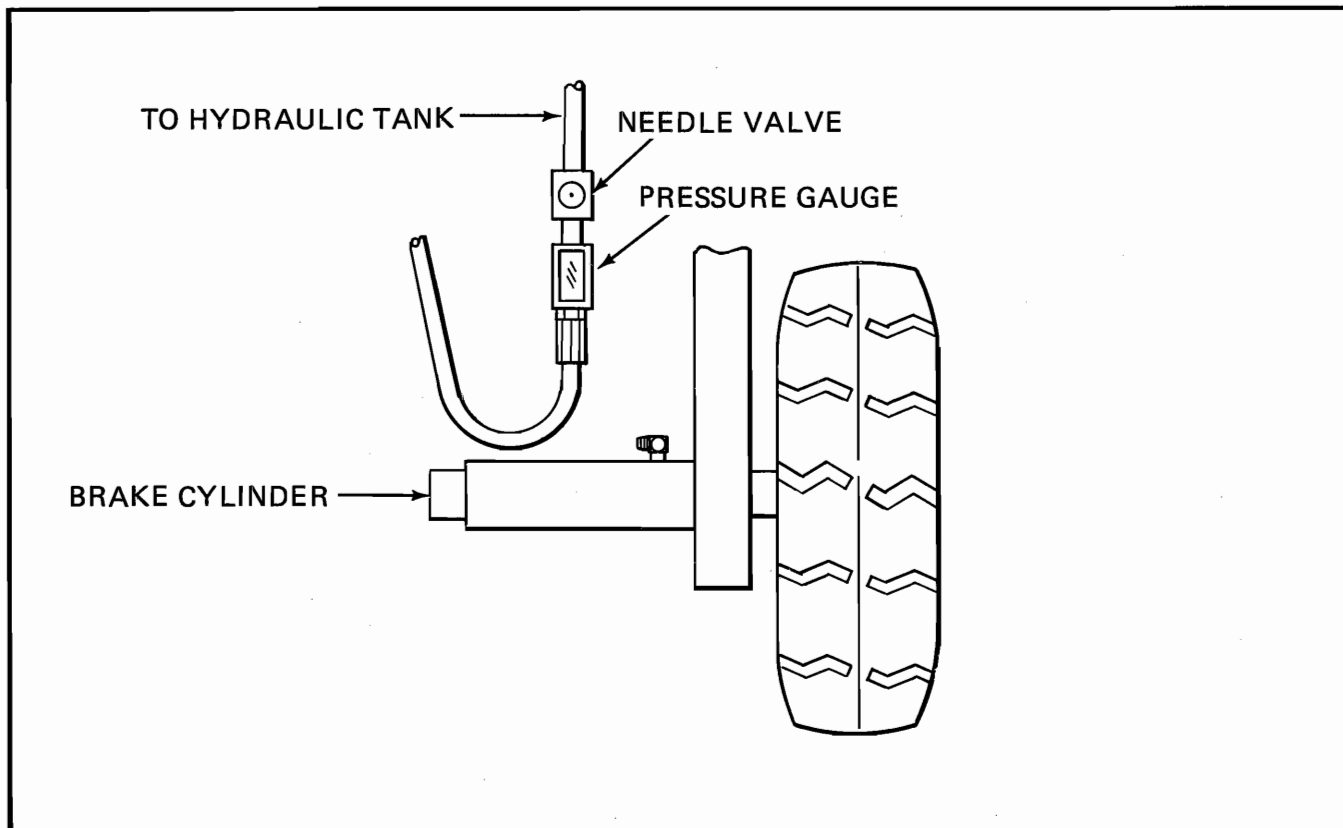


Figure 5-5. Counterbalance Valve

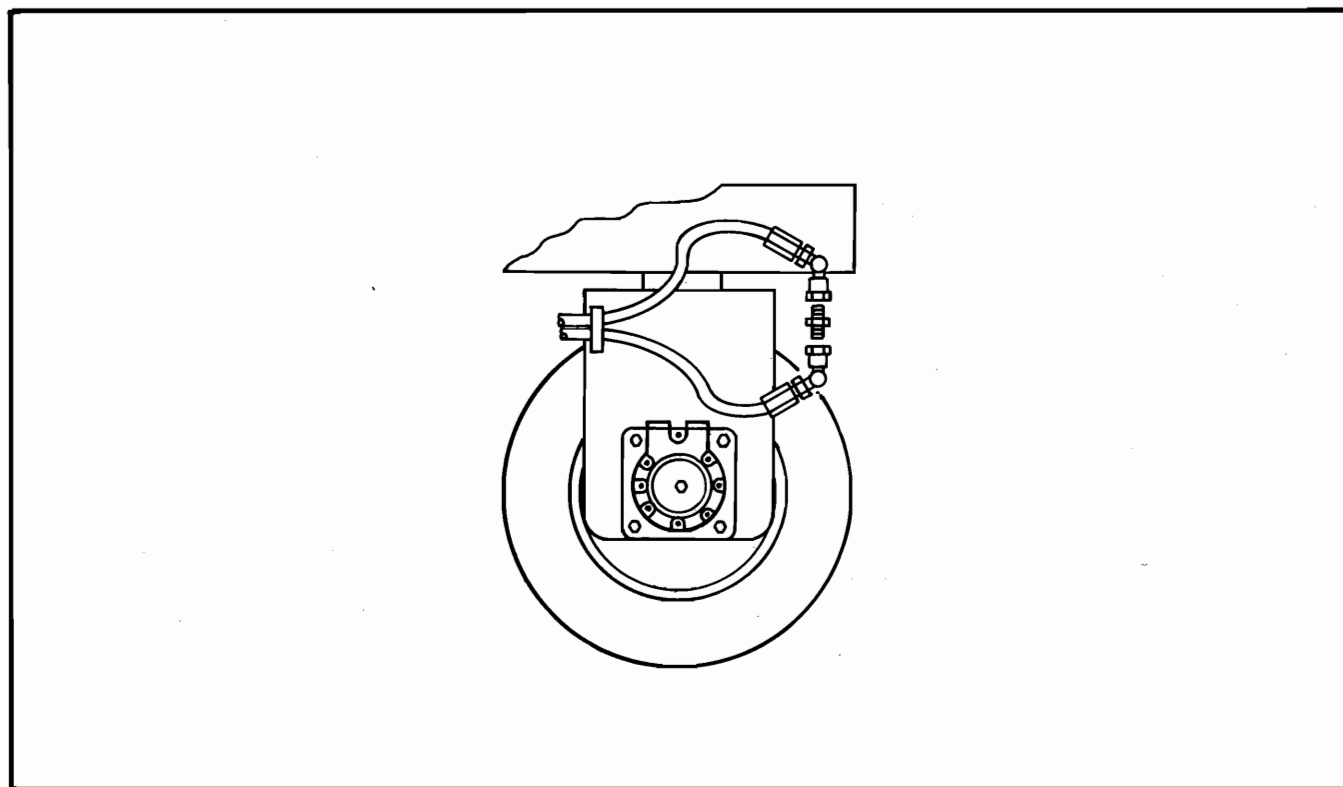


Figure 5-6. Counterbalance Valve

(7) Release the steering switch and remove the test set from the steering circuit.

(8) Reconnect the steering cylinder hose and operate the steering system to expel trapped air and check for leaks.

d. Counterbalance Valve.

(1) Disconnect the hydraulic hose from the brake cylinder and connect a pressure gauge and needle valve with a return line to the hydraulic tank (Figure 5-5).

(2) Disconnect the two hydraulic hoses to each drive motor and connect them together thus, by-passing the drive motors (Figure 5-6).

(3) Remove the adjusting caps from the counterbalance valves (1 and 2, Figure 5-4).

(4) Operate the hydraulic system 10 to 15 minutes to warm the hydraulic oil.

(5) Position the mode switch to DRIVE.

(6) Position the joystick to FORWARD.

(7) Close the needle valve on the brake hose.

(8) Adjust the REVERSE counterbalance valve (2, Figure 5-4) by turning the adjustment screw OUT until the pressure gauge indicates 2000 p.s.i. then slowly turn the screw IN until the gauge indicates 1500 p.s.i. Lock adjustment with locking cap.

(9) Position the joystick control to REVERSE.

(10) Adjust the FORWARD counterbalance valve by turning the adjustment screw OUT to achieve 2000 p.s.i. then slowly turning the screw IN to reach 1500 p.s.i. Lock the adjustment with the lock cap.

(11) Return the joystick to NEUTRAL.

(12) Reconnect the hoses to the drive motors.

(13) Remove the gauge and needle valve from the brake circuit and reconnect the hose to the brake cylinder. Bleed the brake cylinder of trapped air.

(14) Operate the drive system and check for leaks.

5-9. HYDRAULIC PUMP.

a. Removal (Figure 5-7).

NOTE

If the hydraulic tank has not been drained, provide a means of plugging hose assembly (1) to prevent fluid loss.

- (1) Disconnect the hose assemblies (1, 2 and 3) and plug them.
- (2) Loosen the setscrews (4 and 5) then slide the three piece coupling (6) toward the motor as far as possible.
- (3) Remove the nuts (7) and lockwashers (8) to free the pump (9) from the mount.
- (4) As the pump (9) is maneuvered away from the mount, slide the coupling off the pump shaft. Take care to retain the key (10).

b. Disassembly and Inspection (Figure 5-8).

NOTE

Prepare a clean work surface on which to disassemble the hydraulic pump. (A clean sheet of paper makes an excellent disposable top.)

- (1) Remove the eight hex bolts (2) in an alternating pattern from side to side.
- (2) Separate the rear gear housing (3) from the rest of the pump assembly taking care not to damage the gasket (4).
- (3) Withdraw the idler shaft (5), and examine the shaft for pitting, discoloration or other signs of excessive wear. Check the teeth of the gear (7) for surface irregularities or cracks, check the sides for scoring.

NOTE

If worn, the gears (16 and 21) must be replaced as a set.

- (4) If the shaft (9) is worn, remove the bearings (23) from the gear housings (3 and 26) using a suitable puller and install replacements.
- (5) Remove the snap rings (6) from the idler shaft (9) and slide the gear (7) off the shaft taking care to retain the pin (8).
- (6) Slide the gear (10) off the shaft (19) and remove the key (13).
- (7) Separate the gear housing (26) from the stator (11) taking care not to damage the gasket (12).
- (8) Withdraw the idler shaft assembly (14) and examine the shaft for surface irregularities, discoloration or scoring. Check the gears (16 and 21) for pitting, discoloration, scoring or other signs of excessive wear.

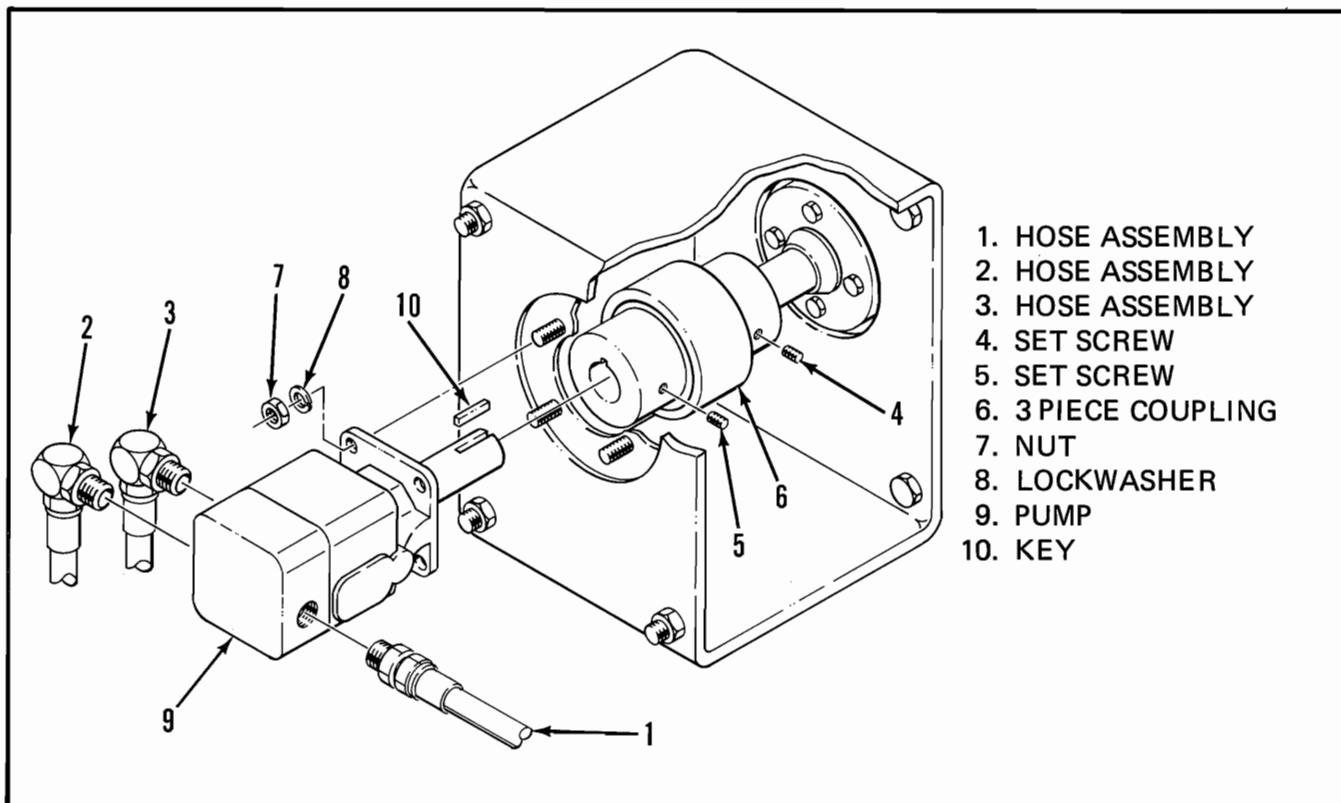


Figure 5-7. Hydraulic Pump Removal

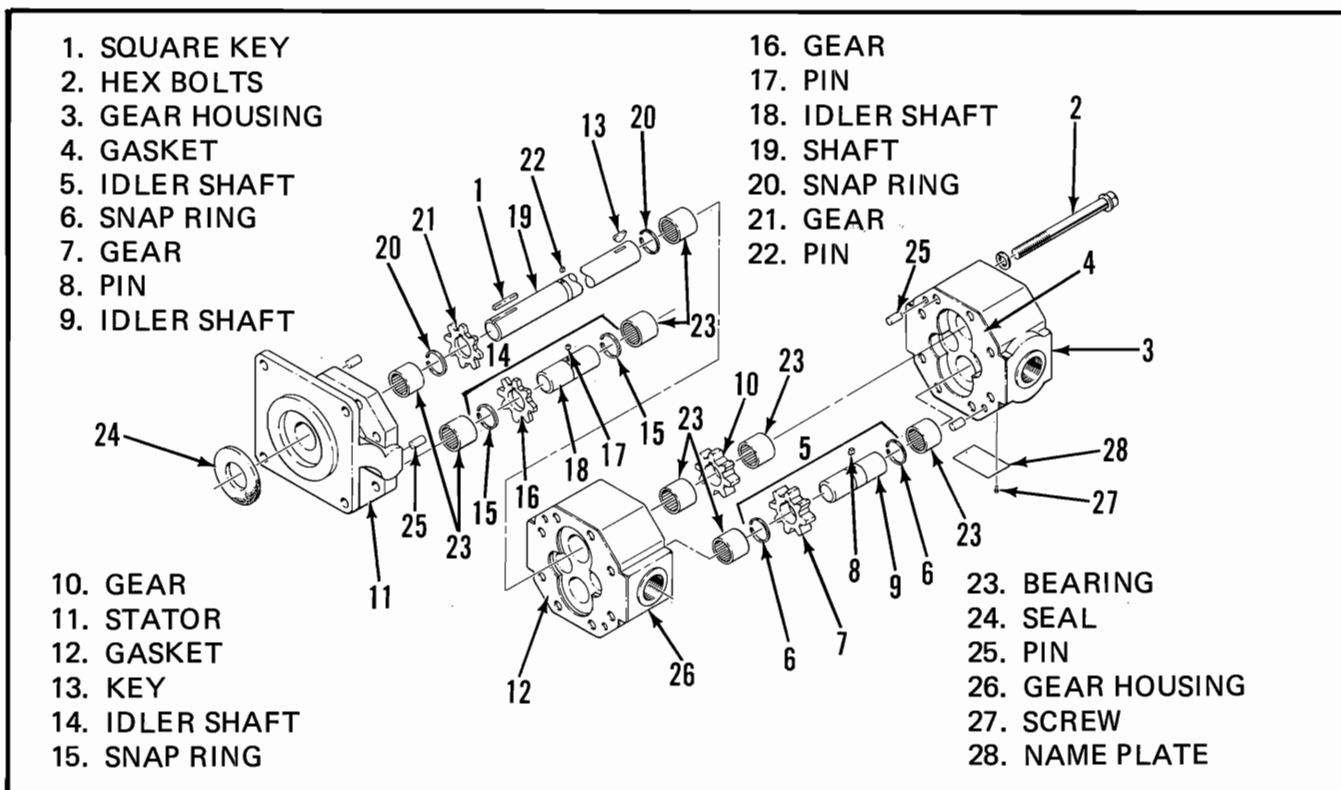


Figure 5-8. Hydraulic Pump Disassembly

NOTE

If worn, the gears (7 and 10) must be replaced as a set.

(9) Remove the snap rings (15) from the idler shaft (18) then slide the gear (16) from the shaft taking care to retain the pin (17).

(10) If the shaft ends are worn, remove the bearings (23) from the stator (11) and gear housing (26) using a suitable puller and install replacements.

(11) Remove the snap rings (20) from the shaft (19) and slide the gear (21) off the shaft taking care to retain the pin (22).

(12) If the seal (24) requires replacement, use a puller to remove it and press in replacement.

c. Assembly.

(1) Press seal (24) into the stator then lubricate the seal with grease.

(2) Install the bearings (23) within the stator, the gear housings (26) and (3) and lubricate with clean hydraulic oil.

(3) Assemble the shaft (19), pin (22), gear (21) and snap rings (20).

(4) Wrap the key slot end of the shaft (19) with cellophane to protect the seal (24) then slide the shaft assembly through the stator (11).

(5) Assemble the idler shaft (18), pin (17), gear (16) and snap rings (15).

(6) Position the idler shaft assembly (14) in the stator (11).

(7) Position a gasket (12) on the face of the stator (11) using the pins (25) to locate the gasket.

(8) Assemble the gear housing (26) onto the stator assembly.

(9) Install the key (24) in the shaft (19) then slide the gear (10) onto the shaft, over the key (24), against the face of the gear housing (26).

(10) Assemble the idler shaft (9), pin (8), gear (7) and snap rings (6), then position the assembly on the gear housing (26) with the gears (7 and 10) meshed.

(11) Position a gasket (4) on the face of the gear housing (3) using the pins (25) as locators.

(12) Install the gear housing (3) onto the rest of the pump assembly and secure with hex bolts (2), tightening them in small increments and alternating from side to side.

1. MOUNTING PLATE
2. LOCKNUT
3. DRIVE MOTOR
4. SHAFT KEY
5. CAPSCREW
6. HUB
7. HUB NUT
8. WHEEL
9. CAPSCREWS
10. COTTER PIN

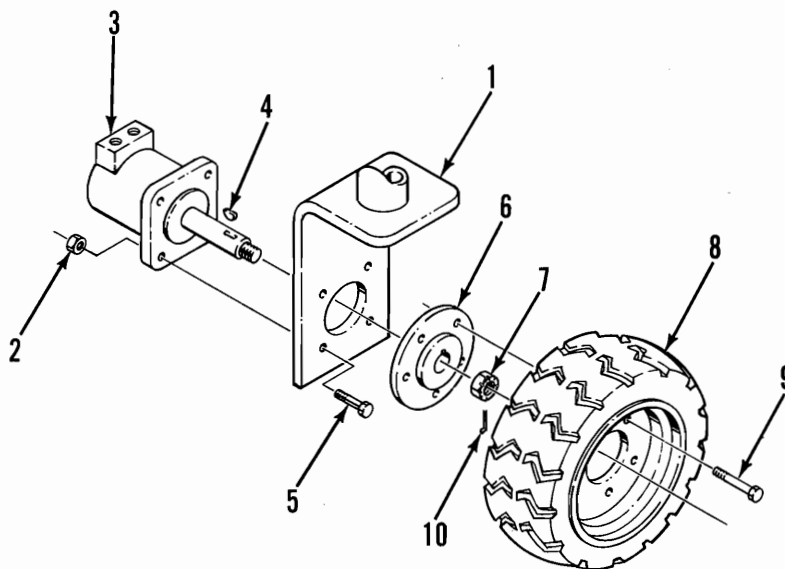


Figure 5-9. Drive Motor Removal

5-10. HYDRAULIC DRIVE MOTORS AND HUBS.

a. Removal (Figure 5-9).

- (1) Park the machine on firm level ground then block the wheels to prevent the machine from rolling.
- (2) Loosen the wheel cap screws (9) on the front corner to be raised.
- (3) Use a 1.5 ton capacity jack to raise the desired front corner.

WARNING

Position blocks under the raised corner to prevent the machine from falling if the jack fails.

- (4) Remove the wheel cap screws (9) and wheel (8).
- (5) Remove the cotter pin (10), locknut (7), hub (6) and the shaft key (4).

NOTE

Before disconnecting hoses, thoroughly clean off all outside dirt around fittings. (After disconnecting hoses and before removing

NOTE (Cont'd)

from vehicle, IMMEDIATELY plug port holes.) Finish cleaning and drying assembly before placing on work bench.

(6) Tag, disconnect and plug the hose assemblies to prevent foreign material from entering.

(7) Remove the locknuts (2), capscrews (5) and drive motor (3) from the mounting plate (1).

b. Disassembly, Inspection and Assembly.

NOTE

Make sure that a clean work bench or table is used. (A piece of clean paper makes an excellent disposable top.) All parts should be cleaned separately in clean solvent and blown dry with air to avoid nicks and burrs.

(1) Refer to Figure 5-10. Place the drive motor on a clean, flat surface with the cover (15) face down.

(2) Remove the seal retainer snap ring (1).

(3) Using two screwdrivers, remove the seal retainer (3) using the slot provided.

(4) Remove the dust seal (2), quad ring (5) and back-up ring (4) and discard.

(5) Remove the seal ring (6) from the groove in the body bore and discard.

CAUTION

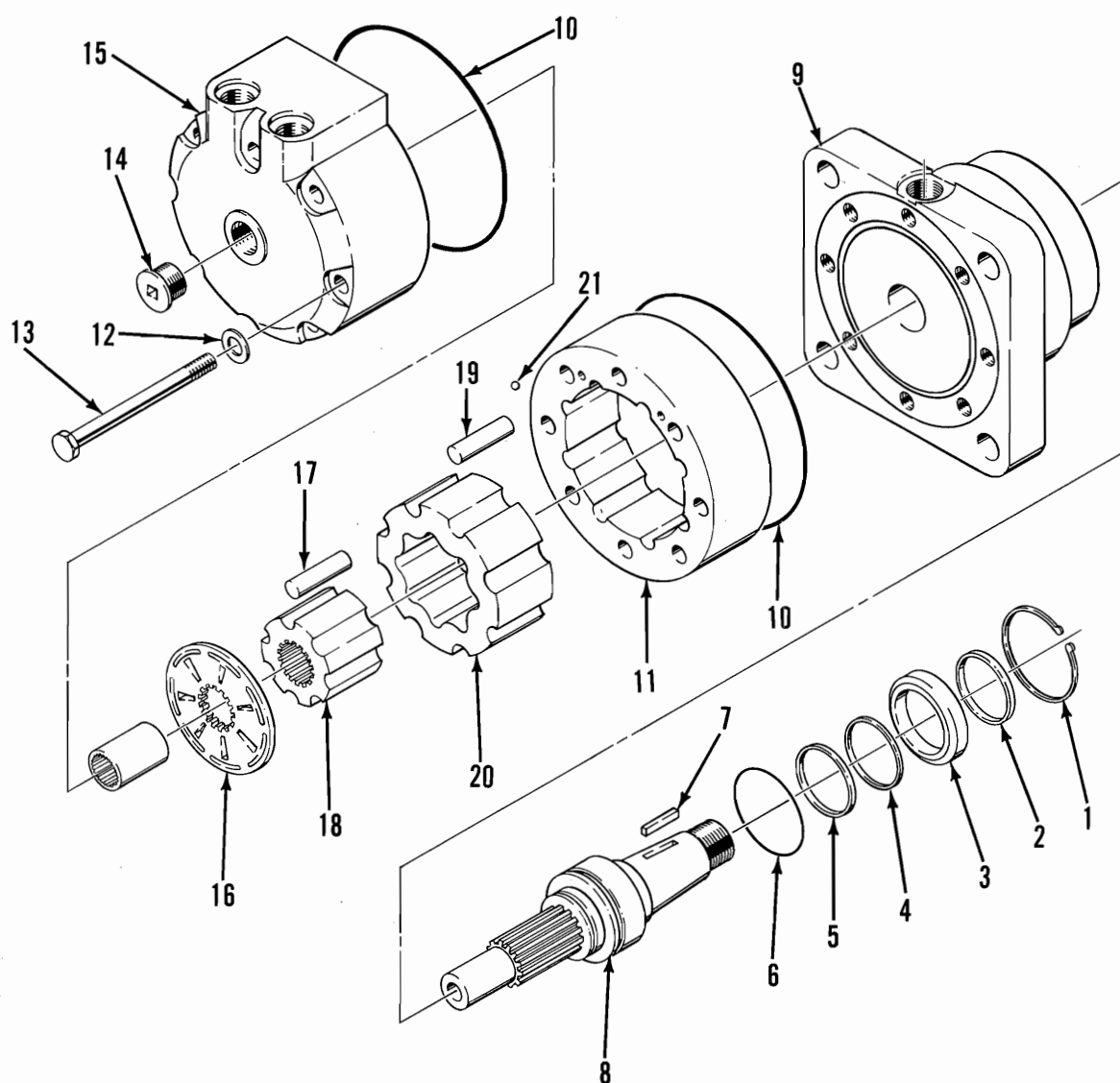
When pulling the shaft vertically, DO NOT rotate the shaft or move the motor. The internal timing can be altered if the parts are disturbed.

(6) Remove the shaft assembly (8).

NOTE

If the shaft assembly cannot be removed easily, vise grips can be clamped to the shaft end and, by tapping on the grips, the shaft assembly will come out.

(7) Check the shaft assembly for wear at the cover bearing and seal areas. If excessive wear is apparent, replace the shaft assembly.



1. SNAP RING
2. SEAL
3. SEAL RETAINER
4. BACK-UP RING
5. QUAD RING
6. SEAL RING
7. KEY
8. SHAFT
9. MOTOR BODY
10. SEAL RING
11. LOCATING RING
12. WASHER

13. CAPSCREW
14. PLUG
15. COVER
16. ROTARY VALVE
17. INNER ROLLER
18. INNER MEMBER
19. LOCATING RING
ROLLER
20. OUTER CONTOUR
MEMBER
21. CHECK BALL

Figure 5-10. Drive Motor

WARNING

DO NOT attempt to remove the heavy duty snap rings which hold the tapered bearings on the shaft. The bearing assembly cannot be serviced in the field.

- (8) SLOWLY lower the small end of the shaft assembly (8) into the motor body (9).

NOTE

If the shaft stops without going all the way in, pull the shaft out 1/4 inch and rotate one or two degrees to engage the external shaft spline with the internal spline. This will allow the shaft to enter easily.

- (9) Lubricate and install a replacement seal ring (6) into the body (9) bore groove.
- (10) Install a replacement back-up ring (4) and quad ring (5) in the seal retainer (3).
- (11) Install dust seal (2) into seal retainer (3) with rubber lip facing outward.
- (12) Install seal retainer (3) in the body and the seal retainer snap ring (1).
- (13) Clamp the motor body (9) in a vise with the shaft assembly (8) facing down.
- (14) Remove the eight capscrews (13) and seal washers (12).

(15) Remove the cover (15), the cover seal ring (10), rotary valve (16), check balls (21), IGR assembly (17 thru 22) and square ring seal (10). Discard the seal ring and square ring seal.

CAUTION

DO NOT drop these parts while handling.

(16) Remove the eight locating ring rollers (19), the outer contour member (20), the seven inner rollers (17) and the inner member (18) from the locating ring (22). Inspect for pits and wear marks. If wear is evident, replace the IGR assembly (17 thru 22).

- (17) Lubricate the square ring seal (10) with oil and install in the body (9).
- (18) Install the inner member (18) on the shaft (8).
- (19) Install the outer contour member (20) over the inner member (18).

(20) Install the seven inner rollers (17) between the inner member (18) and the outer contour member (20).

- (21) Install the locating ring (22) on the body (9) with the check ball holes facing upward. Align

the eight capscrew holes in the locating ring (22) with the capscrew holes in the body (9). The holes will align in one position only.

CAUTION

DO NOT dislodge the body square ring seal (10) while aligning the locating ring (22) to the body (9).

(22) Install the eight locating ring rollers (19) between the locating ring (22) and the outer contour member (20).

(23) Check that the clearance between the inner rollers (17) and the outer contour member (20) does not exceed .015 inches.

(24) Install the rotary valve (16) on the shaft (8) such that the seven inner rollers (17) cannot be seen through the slots on the rotary valve.

(25) Install the two check balls (21) in the locating ring (22).

(26) Lubricate the cover seal ring (10) with hydraulic oil and install in the cover (15).

(27) Install the cover (15) on the shaft end and align the capscrew holes.

(28) Install the eight capscrews (13) with seal washers (12) in the capscrew holes. Torque the capscrews to 30 ft. lb.

c. Installation.

(1) Refer to Figure 5-9 and position the drive motor (3) on the mounting plate (1) and secure with capscrews (5) and locknuts (2).

(2) Remove the plugs from the hose assemblies and connect to the drive motor (3).

(3) Install the shaft key (4), hub (6) and locknut (7). Torque the locknut to 350 to 400 ft. lb. Install the cotter pin (10).

(4) Install the wheel (8) with capscrews (9) onto the hub (6). Torque to 40 ft. lb.

(5) Lower the jack and remove. Operate the drive system and check for leaks.

5-11. REAR WHEEL BEARINGS (Figure 5-11).

a. Removal.

NOTE

The following applies to both rear wheels except the brake cylinder must be removed on the right side. (See 5-12a.)

1. CAP
2. COTTER PIN
3. HUB NUT
4. WASHER
5. BEARING CONE
6. HUB ASSEMBLY
7. GREASE SEAL
8. BEARING CONE
9. BEARING CUP
10. AXLE

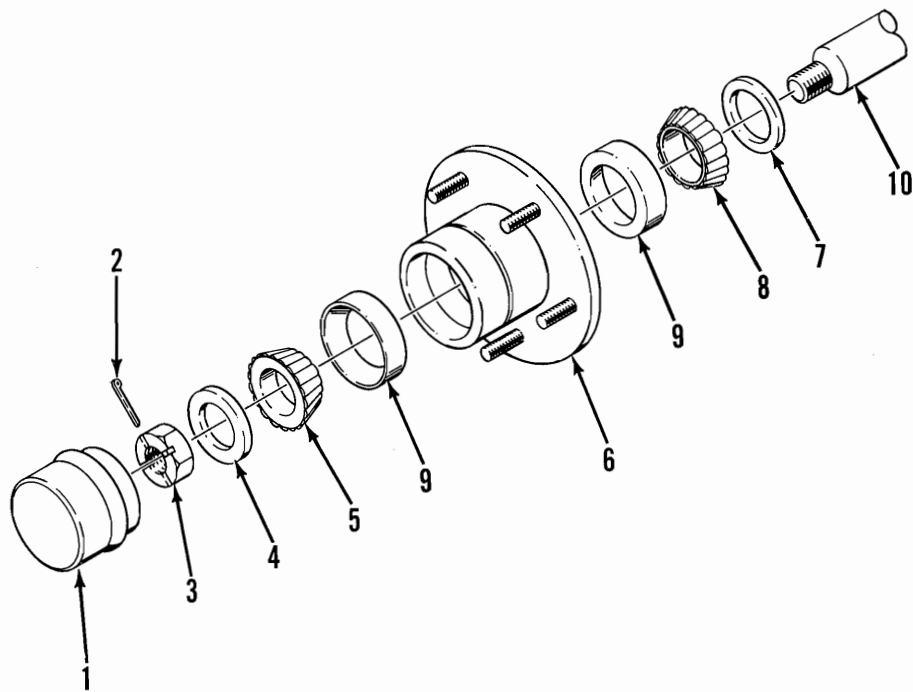


Figure 5-11. Rear Wheel Bearings.

- (1) Remove the wheel lug nuts then raise the rear of the unit until the rear tires are off the ground.
- (2) Install support blocks to prevent the unit from falling if the jack fails.
- (3) Remove the rear wheels.
- (4) Remove the cap (1).
- (5) Straighten the cotter pin (2) then withdraw it from the axle (10) and hub nut (3).
- (6) Remove the hub nut (3) and washer (4).
- (7) Slide the entire hub assembly (6) from the spindle (10) and place on clean surface.
- (8) Remove the bearing cone (5) and place on clean surface.
- (9) Remove the grease seal (7) thus allowing the bearing cone (8) to be removed.

NOTE

At this point, examine the bearing cups (9). If they are smooth, shiny and free of pits or any surface irregularities, DO NOT remove them.

(10) If the cups (9) require replacement, remove them by tapping around the circumference of the inside surface of the cups from the opposite side using a long drift.

b. Installation.

(1) Position the replacement cup (9) over the opening in the hub (6) then position the worn cup over the replacement so that the bearing surfaces face each other. Use the old cup as a drift to work the replacement into position by tapping evenly around the circumference.

(2) Apply a liberal coating of grease to the bearing surface of each cup.

(3) Pack the bearing cone (8) with the recommended grease and position it within the rear bearing cup (9) in the hub (6) then install the grease seal (7) again using the worn bearing cup as a drift.

(4) Apply a thin film of grease to the axle (10) to protect the grease seal (7) then slide the hub assembly (6) onto the axle (10).

(5) Pack the bearing cone (5) with the recommended grease and slide it onto the axle (10) until it seats in the outer bearing cup (9).

(6) Install the washer (4) and hub nut (3). Tighten the hub nut (3), while rotating the hub assembly, until the hub drags then back the nut to the first slot that aligns with the cotter pin hole in the axle (10).

(7) Install the cotter pin (2) and bend the end up over the hub nut (3) and axle (10).

(8) Install the cap (1) and wheel/tire assemblies. Torque the lug nuts to 40 ft. lbs.

5-12. BRAKE CYLINDER (Figure 5-12).

a. Removal.

(1) Block the wheels to prevent the unit from rolling once the brake is removed.

(2) Disconnect the hose assembly (1) and cap the opening to prevent foreign material from entering.

(3) Remove the capscrews (2) and lockwashers (3) to remove the cylinder from the chassis.

b. Disassembly.

NOTE

Prepare a clean work area on which to service the internal parts.

(1) Remove the snap ring (5) and withdraw the shaft (11) and all attached components from the cylinder barrel (4).

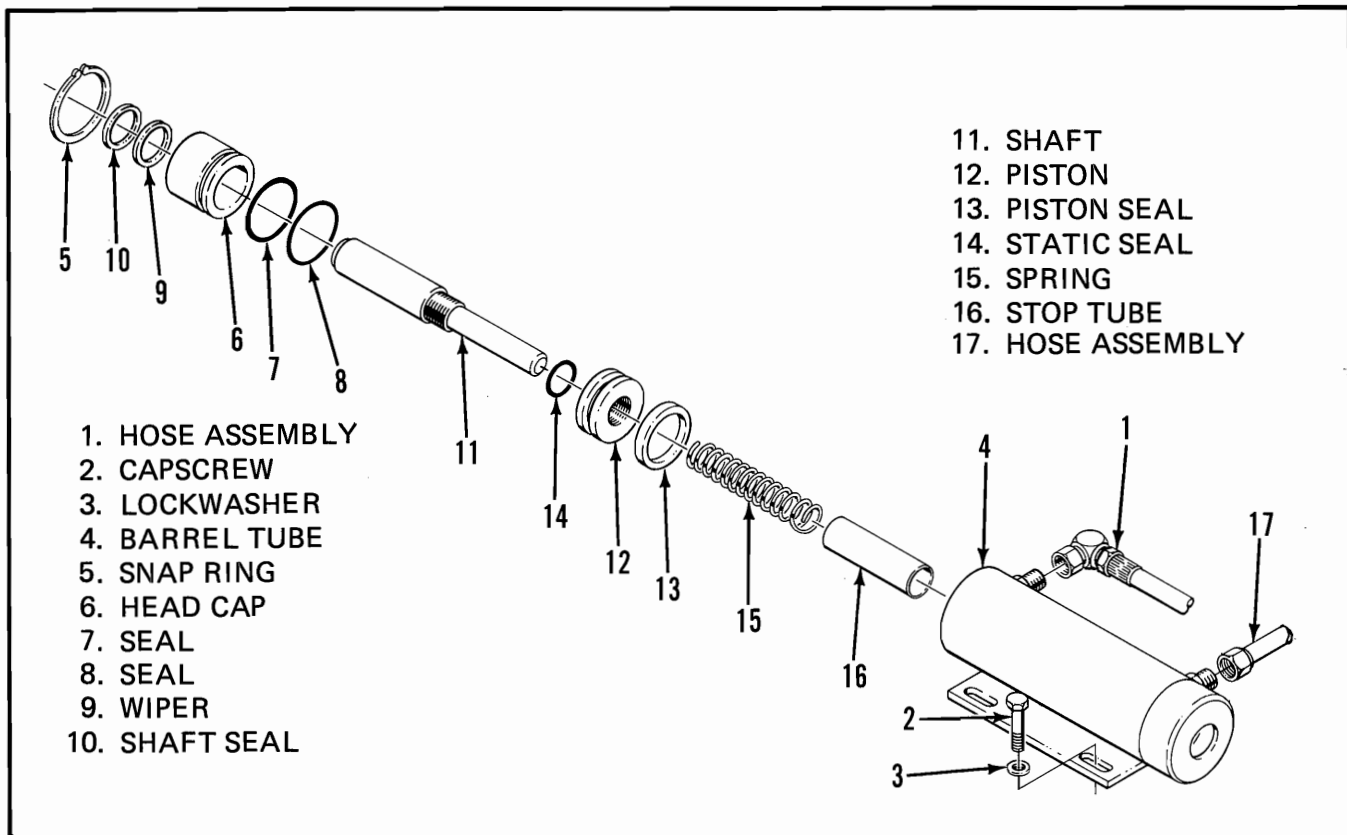


Figure 5-12. Brake Cylinder

(2) Remove the head cap (6) from the shaft (11) then remove the wiper (9), shaft seal (10) and seals (7 and 8) from the head cap.

(3) Unscrew the piston (12) from the shaft (11) and remove the static seal (14). Remove the piston seal (13) from the piston (12).

(4) Remove the spring (15) and stop tube (16) from the barrel (4).

c. Cleaning and Inspection.

(1) Clean all metal parts in solvent and blow dry with filtered compressed air.

(2) Check all thread parts for stripped or damaged threads.

(3) Check the bearing surfaces; inside of the head cap (6), outer edge surface of the piston (12), inside of the cylinder barrel (4) and the shaft (11) for signs of scoring or excessive wear.

(4) Check the spring for cracks.

(5) Replace any parts found not serviceable.

(6) Replace all seals.

d. Assembly and Installation.

- (1) Install the piston seal (13) on the piston (12) then assemble the static seal (14), shaft (11) and piston assembly (12).
- (2) Position the spring (15) and stop tube (16) on the shaft assembly.
- (3) Lubricate the seal (13) with clean hydraulic fluid then, install the shaft assembly in the cylinder barrel (4).
- (4) Install the seals (7 and 8) on the head cap (6).
- (5) Install the shaft seal (10) and wiper (9) within the head cap (6).
- (6) Lubricate both the seals (7 and 8) and the shaft seal and wiper (10 and 9) with clean hydraulic fluid then install the head cap (6) onto the shaft (11) and into the barrel (4).
- (7) Secure with snap ring (5).
- (8) Position the brake cylinder assembly on the chassis so that the shaft (11) fully engages the brake disc yet the shaft must clear the brake disc once retracted. Secure with capscrews (2) and lock-washers (3).
- (9) Connect the hose assembly (1).
- (10) Operate the brake retract circuit and check that the shaft clears the brake disc and check for leaks.

5-13. STEERING CYLINDER (Figure 5-13).

a. Removal.

- (1) Disconnect the hose assemblies from the fittings and immediately cap the openings to prevent foreign material from entering.
- (2) Remove the cotter pins and clevis pins.
- (3) Remove the locknuts and capscrews to remove the cylinder assembly.

b. Disassembly.

- (1) Remove the tie rod nuts (6), tie rods (7) and end plates (8).
- (2) Remove the headcaps (9) from the barrel tube (13).
- (3) Withdraw the entire shaft assembly from either end of the barrel tube (13).
- (4) Remove the rod wipers (1), rod seals (2) and static o-rings (3) from the head caps (9).

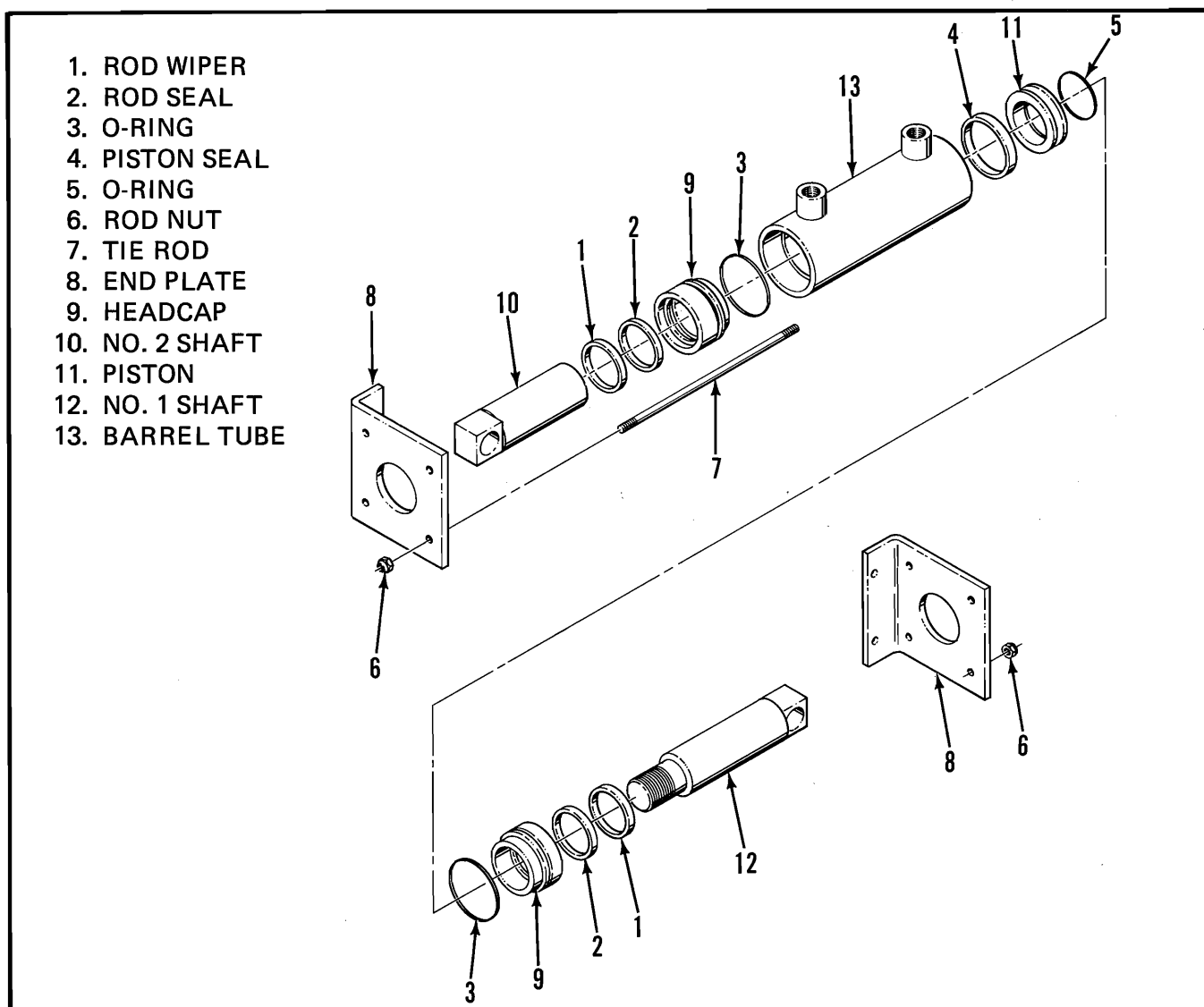


Figure 5-13. Steering Cylinder

(5) Discard all the seals.

(6) Unscrew the No. 1 shaft (12) from the No. 2 shaft (10) and remove the piston (11).

(7) Remove the piston seal (4) and static o-ring (5) from the piston (11).

(8) Discard the static o-ring and piston seal.

c. Cleaning and Inspection.

(1) Wash all the metal parts in clean solvent and blow dry with filtered compressed air.

(2) Inspect all the threaded components for stripped or damaged threads.

(3) Check the inside surface of the barrel tube (13) for scoring or excessive wear.

(4) Check the piston (11) and head caps (9) for scoring or excessive wear.

(5) Inspect the surface of both shafts (10 and 12) for scoring or excessive wear.

(6) Replace any parts found not serviceable.

(7) Replace all seals and o-rings.

d. Assembly and Installation.

(1) Install a replacement piston seal (4) and static o-rings (5) on the piston (11).

(2) Install the piston (11) on the No. 1 shaft (12).

(3) Thread the No. 2 shaft (10) onto the No. 1 shaft (12) and tighten securely.

(4) Lubricate the piston seal (4) and install the shaft assembly in the barrel tube (13).

(5) Lubricate and install replacement rod seals (2) and static o-rings (3) on the head caps (9).

(6) Lubricate and install replacement rod wipers (1) in the head caps (9).

(7) Install the head caps (9) in the barrel tube (13).

(8) Install the end plates (8), tie rods (7) and tie rod nuts (6) and tighten securely.

(9) Position the cylinder assembly on the chassis and secure with capscrews (18) and locknuts (17).

(10) Install the clevis pins (15) and cotter pins (16).

(11) Connect the hose assemblies to the fittings (14).

(12) Operate the steering circuit several times throughout its entire range of travel to expel trapped air and check for leaks.

5-14. LIFT CYLINDER.

a. Removal.

(1) Remove the platform floorboard.

(2) Refer to Figure 5-14 and remove the nuts (7) and plates (9).

(3) Slip the threaded rod (9) and clevis pin (10) to one side to allow bracket (2) to swing free. Lower the bracket (2) and repeat same procedure for opposite side.

(4) Provide a suitable container to catch the draining hydraulic fluid then, disconnect the hydraulic hose (7) and fitting from the base of the lift cylinder (4) and plug hose to prevent foreign material from entering.

(5) Attach a suitable hoisting device and sling to the top of the lift cylinder (3).

(6) Remove the lift cylinder (3), threaded rod (9), cylinder pin (10) and spacers (11) from the collar (12) to a prepared work area.

b. Disassembly.

(1) Refer to Figure 15, unscrew and withdraw the barrel tube (2) from the mount tube (6).

(2) Unscrew the clevis rod (14) from the rod tube (4).

(3) Withdraw the rod tube (4) from the mount tube (6).

(4) Remove the bleeder screw (13) to remove the bleeder ball (12) from the clevis rod (14).

(5) Remove the static o-ring (8) from the clevis rod (14) and discard.

(6) Remove the piston wear ring (1) and stop ring (5) from the rod tube (4) and discard.

(7) Remove the static o-ring (7), rod wear ring (9), rod seal (10) and rod wiper (11) from the mount tube (6) and discard.

(8) Do not remove the velocity fuse (3) unless replacement is necessary.

c. Cleaning and Inspection.

(1) Clean all the metal parts in clean solvent and blow dry with filtered compressed air.

(2) Check all threaded parts for stripped or damaged threads.

(3) Check the mating surfaces of the mount tube (6), barrel tube (2) and rod tube (4) for excessive wear or scoring.

(4) Replace all parts found not serviceable.

(5) Replace all seals and o-rings.

a. Assembly.

(1) Lubricate and install the static o-ring (7), rod wear ring (9), rod seal (10) and rod wiper (11) in the mount tube (6).

(2) Install the piston wear ring (1) and stop ring (5) on the rod tube (4).

(3) Lubricate and insert the rod tube (4) through the bottom of the mount tube (6).

1. HYDRAULIC HOSE
2. BRACKET
3. LIFT CYLINDER
4. PIVOT PIN
5. BEARING
6. SNAP RING
7. NUT
8. PLATE
9. THREADED ROD
10. CYLINDER PIN
11. SPACERS
12. COLLAR

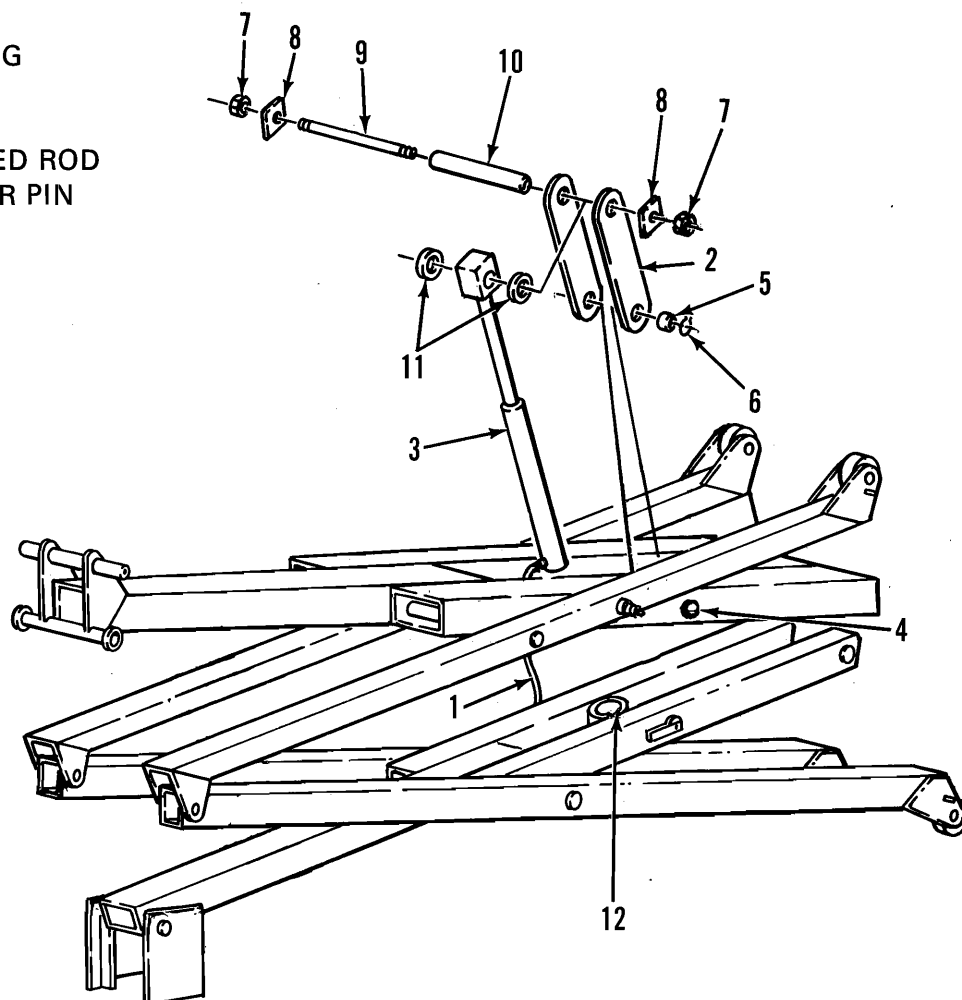


Figure 5-14. Lift Cylinder Removal

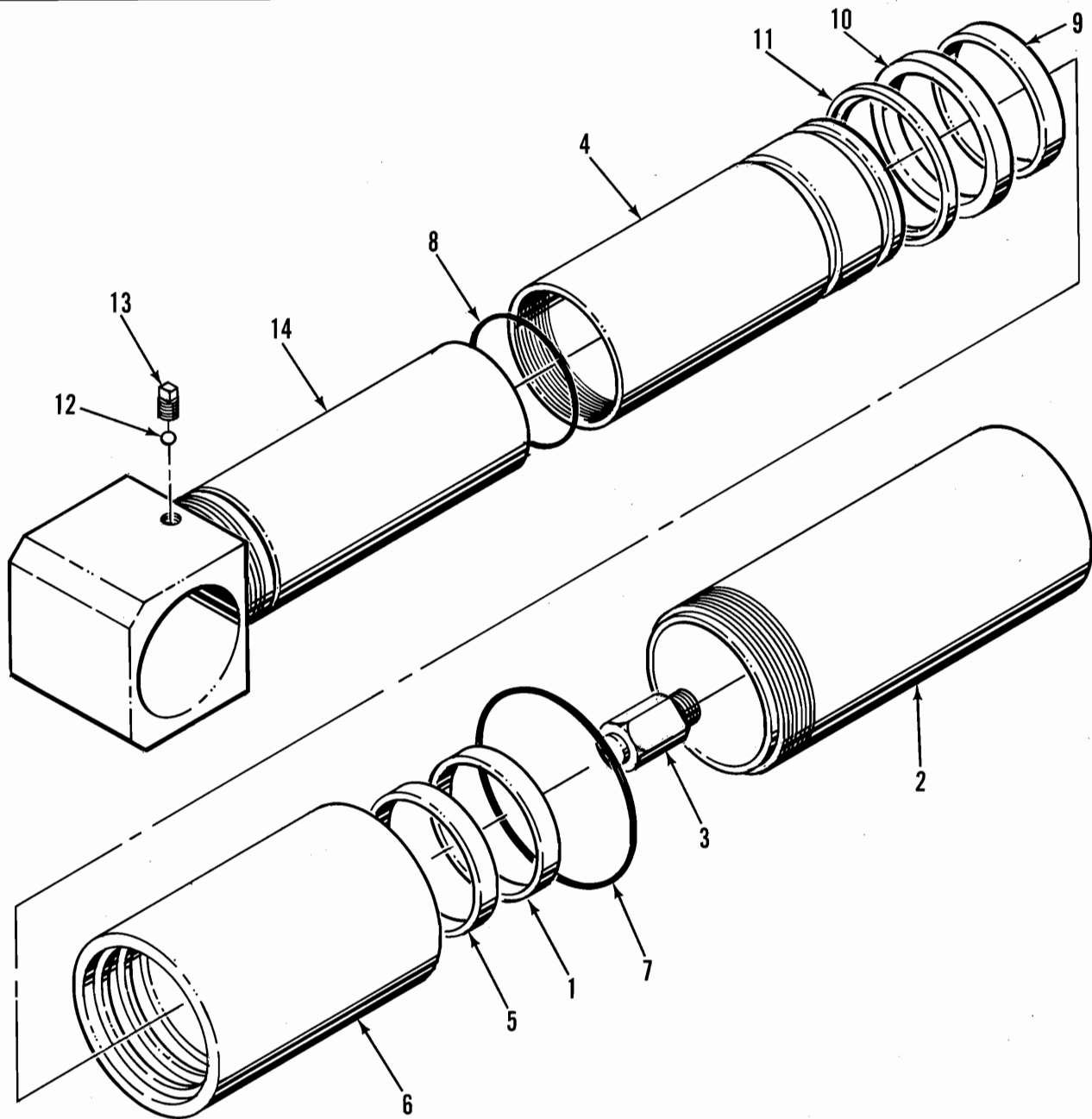


Figure 15. Lift Cylinder

(4) Lubricate and install the static o-ring (8) on the clevis rod (14).

(5) Thread the clevis rod (14) into the rod tube (4) and tighten securely.

(6) Lubricate the inside surface of the barrel tube (2) and slide over the rod tube (4). Thread the barrel tube (2) into the mount tube (6) and tighten securely.

(7) Install the bleeder ball (12) and bleeder screw (13). Do not tighten the bleeder screw.

c. Installation.

NOTE

Lubricate the cylinder pin (10) prior to installation.

(1) Refer to Figure 5-14 and assemble the lift cylinder (3), cylinder pin (10), spacers (11), and threaded rod (9).

(2) Attach a suitable hoisting device and sling to the top of the lift cylinder assembly, and position the cylinder over the collar (12) then, lower the lift cylinder through the collar.

(3) Connect the hydraulic hose (1).

(4) Slide the cylinder pin (10) and threaded rod (9) to one side. Raise the bracket (2), of the opposite side, into position. Slide the cylinder pin and rod through the bracket a sufficient distance to allow the other bracket (2) to be raised into place. Center the cylinder pin and rod then install the plates (8) and nuts (7).

(5) Operate the hydraulic lift circuit with the bleeder screw (13, Figure 5-15) loose to allow trapped air to escape the lift cylinder. Once hydraulic fluid flows continuously from bleed port, tighten the bleeder screw. Check for leaks.

(6) Install the platform floorboard.

(7) Test with weight at rated platform load to check system operation.

5-15. ELECTRIC MOTOR.

NOTE

Brush replace is necessary if brush is damaged or worn to a length less than 5/8 inches, measures on the short side of brush. When replacement is required, replace all brushes.

a. Removal.

(1) Refer to Figure 5-16 and remove the brush access cover (1).

(2) Lift the brush spring (2) end upwards to slide brush (3) out of the holder (4).

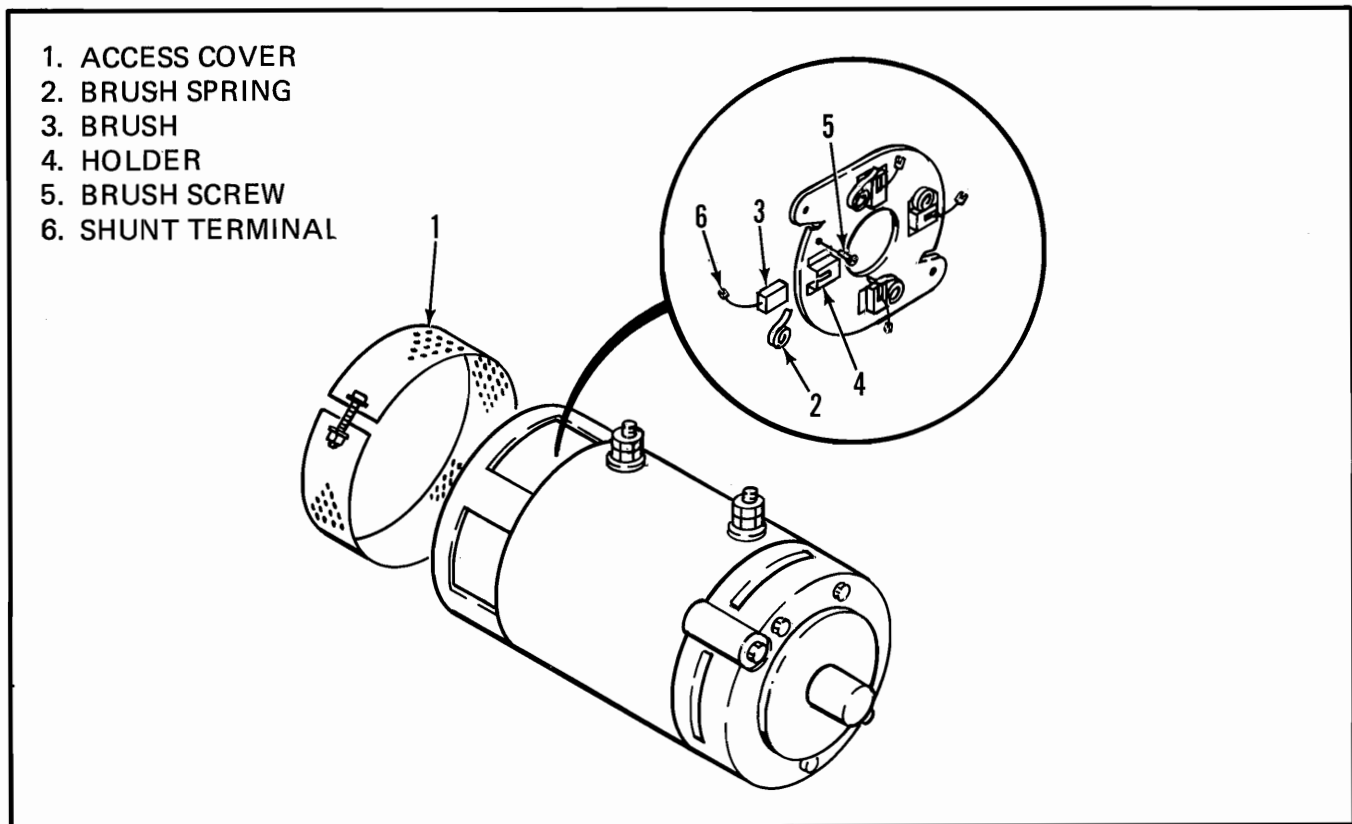


Figure 5-16. Electric Motor

(3) Loosen the brush screw (5) to remove the brush shunt terminal (6) and brush (3).

b. Installation.

(1) Lift the brush spring (2) end upwards and slide the replacement brush (3) into the holder.

(2) Reconnect the brush shunt terminal (6) and tighten the brush screw (5).

(3) Check the position of the brush (3) to ensure that the brush shunt will travel down the holder (4) slot as the brush wears.

NOTE

Motor failure will occur if the brush shunt cannot travel freely in the brush holder (4) slot. Adjust if necessary.

Ensure that only the insulated portion of the brush shunt (6) contacts the motor end shield or brush access cover (1) when reinstalled.

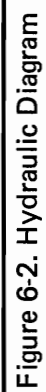
(4) Install the brush access cover (1).

SECTION VI

DIAGRAMS

Figure No.	INDEX Title	Page
6-1	Electrical Diagram	6-2
6-2	Hydraulic Diagram	6-3

Figure 6-1. Electrical Diagram



SECTION VII

MAINTENANCE PARTS LIST

7-1. GENERAL. The Maintenance Parts List contains a parts listing of the complete unit divided into its assemblies, sub-assemblies and detail parts. Each assembly is followed by its component parts indented to show their relationship to the assembly.

7-2. EXPLANATION OF COLUMNS IN MAINTENANCE PARTS LIST.

7-3. FIGURE AND INDEX NUMBER COLUMN. The figure and index numbers correlate each parts list to its appropriate illustration. The first number in this column on each page of listings indicates the figure number of the associated illustration. The following numbers, preceded by a dash, correspond to the index numbers of each part on the illustration.

7-4. PART NUMBER COLUMN. This column contains the manufacturer's part number for each item listed.

7-5. DESCRIPTION COLUMN. This column contains the manufacturer's nomenclature for each assembly or part. Each part description is indented to show relationship. Reference to next higher assembly or detail parts breakdown follow the description where applicable.

7-6. QUANTITY REQUIRED COLUMN. This column contains the quantity required for each assembly in the next higher assembly and for each detail part in an assembly.

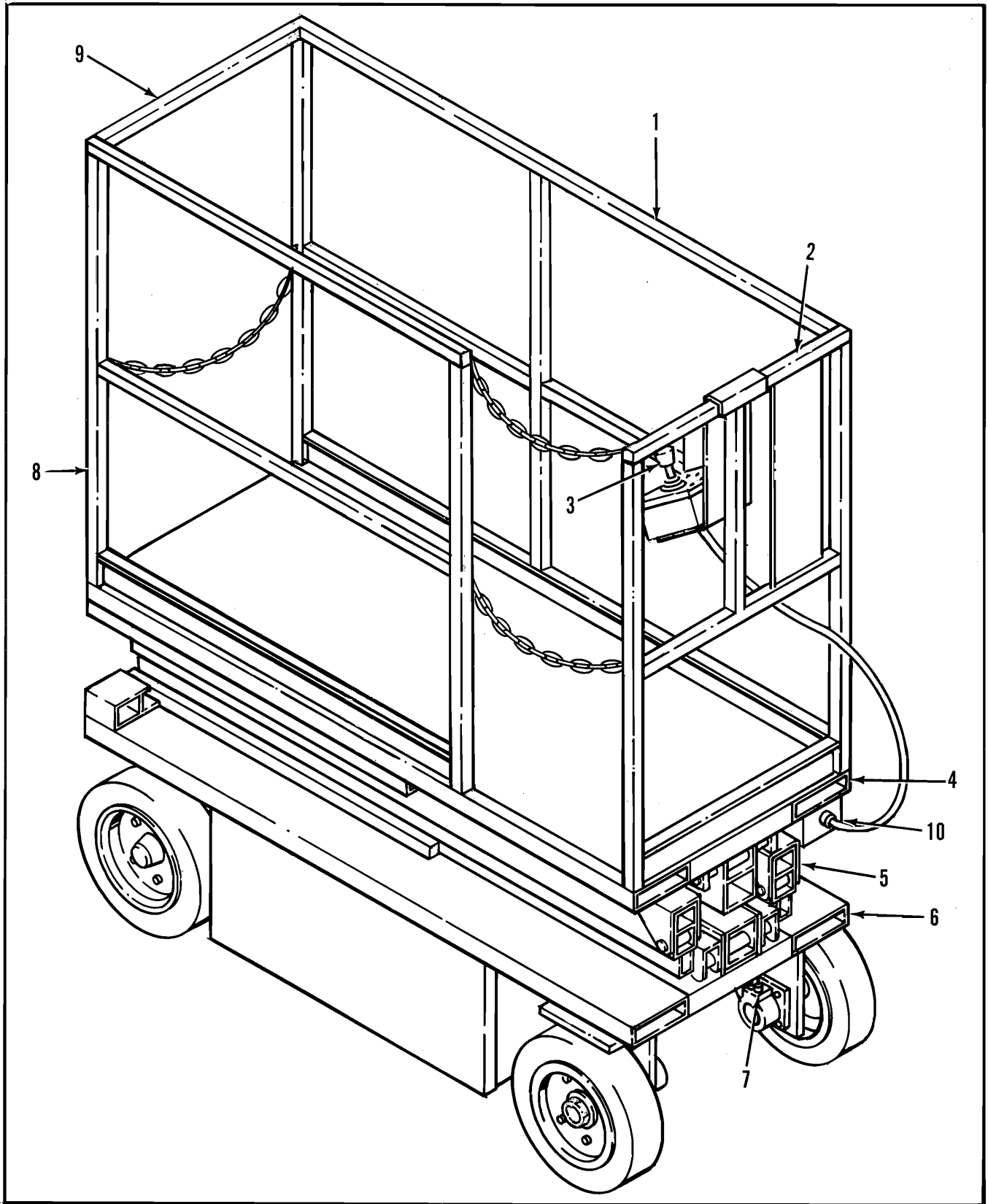


Figure 7-1. Work Platform Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-1	60700-000-00	WORK PLATFORM ASSY	
-1	60815-000-00	. WELDMENT, GUARDRAIL LH	1
-2	61346-000-00	. WELDMENT, GUARDRAIL, FRONT.	1
-3	60704-000-00	. ASSY, CONTROLLER (See Figure 7-11)	1
-4	60811-000-00	. WELDMENT, PLATFORM	1
-5	60702-000-00	. ASSY, SCISSORS (See Figure 7-9)	1
-6	60701-000-00	. ASSY, CHASSIS (See Figure 7-2)	1
-7	60706-000-00	. HOSE PACKAGE (See Figure 7-12)	1
-8	61347-000-00	. WELDMENT, GUARDRAIL RH	1
-9	60899-000-00	. WELDMENT, GUARDRAIL, REAR	1
-10	60866-000-00	. LINKAGE CABLE ASSY	1

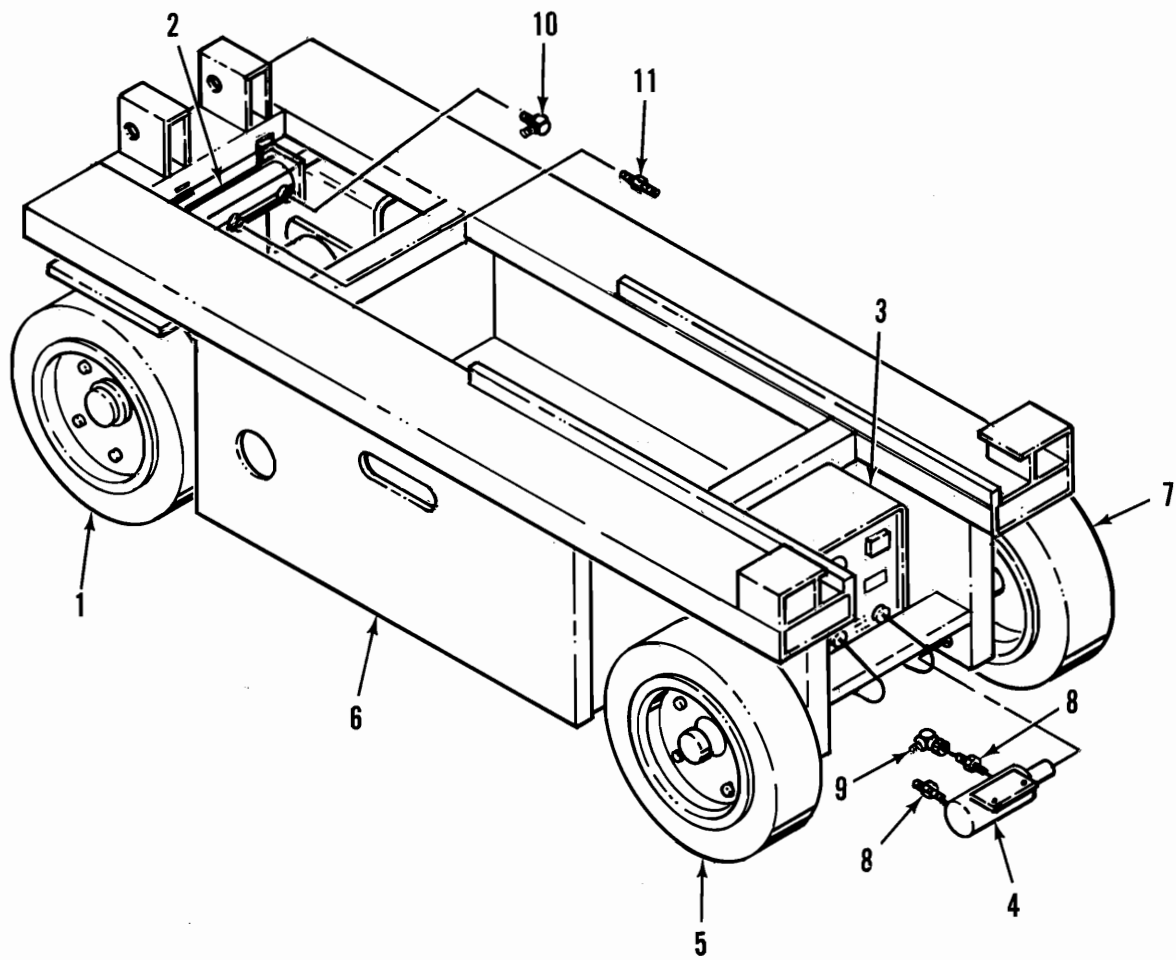


Figure 7-2. Chassis Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-2	60701-000-00	CHASSIS ASSY	
-1	NO NUMBER	. ASSY, WHEEL MOTOR HUB (See Figure 7-8)	2
-2	12802-000-00	. CYLINDER, STEERING (See Figure 7-3)	1
-3	12749-000-00	. CHARGER, BATTERY	1
-4	60211-000-00	. CYLINDER, BRAKE (See Figure 7-4)	1
-5	NO NUMBER	. SPINDLE/HUB ASSY, RH (See Figure 7-14)	1
-6	NO NUMBER	. ASSY, MODULE (See Figure 7-5)	1
-7	NO NUMBER	. SPINDLE/HUB ASSY, LH (See Figure 7-15)	1
-8	11939-010-00	. FITTING	2
-9	11937-003-00	. FITTING	1
-10	11940-006-00	. FITTING	1
-11	11939-006-00	. FITTING	1

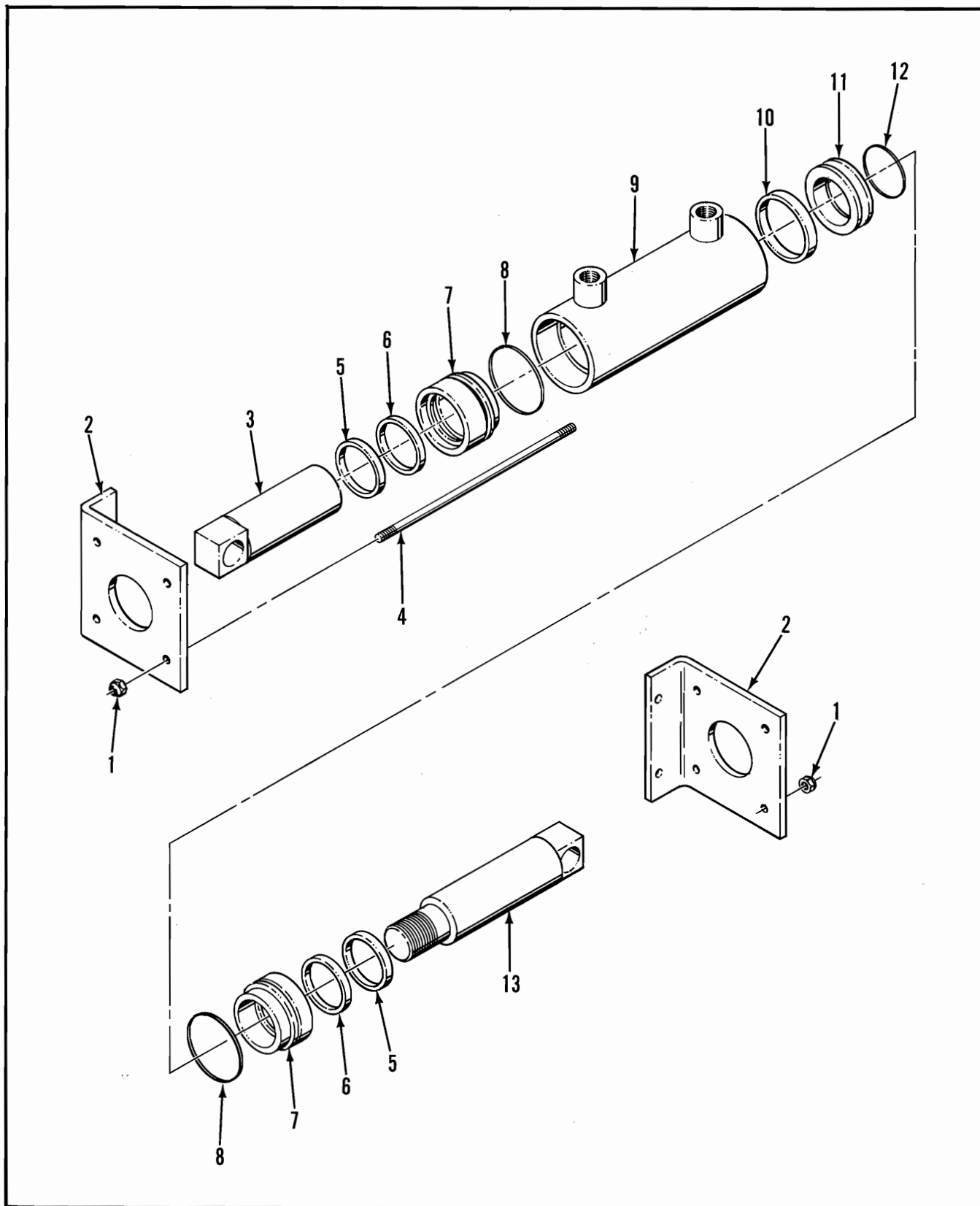


Figure 7-3. Steering Cylinder

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-3	12802-000-00	CYLINDER, STEERING	
-1	11248-005-00	. 5/16 - 18, UNC LOCKNUT	8
-2	12802-008-00	. PLATE, END	2
-3	12802-010-00	. SHAFT	1
-4	12802-007-00	. RODS, TIE	4
-5	12802-001-00	. WIPER, ROD	2
-6	12802-002-00	. SEAL, ROD	2
-7	12802-009-00	. HEADCAP	2
-8	12802-003-00	. O-RING, STATIC	2
-9	12802-013-00	. TUBE, BARREL	1
-10	12802-004-00	. SEAL, PISTON	1
-11	12802-011-00	. PISTON	1
-12	12802-005-00	. O-RING, STATIC	1
-13	12802-012-00	. SHAFT	1
	12802-014-00	. KIT, SEAL (Includes items 5, 6, 8, 10 and 12)	

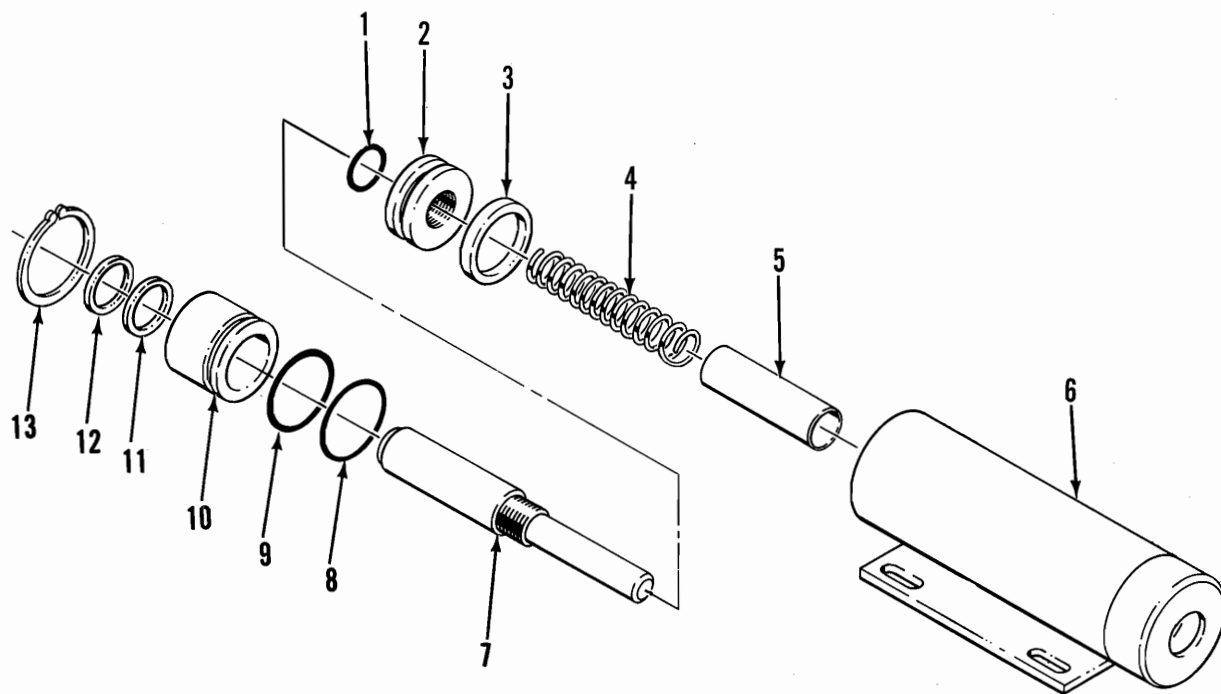


Figure 7-4. Brake Cylinder

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-4	60211-000-00	CYLINDER, BRAKE	
-1	60211-005-00	. SEAL, STATIC	1
-2	60211-004-00	. PISTON	1
-3	60211-006-00	. SEAL, PISTON	1
-4	60211-003-00	. SPRING, RETURN	1
-5	60211-002-00	. TUBE, STOP	1
-6	60211-001-00	. BARREL ASSY	1
-7	60211-007-00	. SHAFT	1
-8	60211-008-00	. SEAL, STATIC	1
-9	60211-009-00	. SEAL, STATIC	1
-10	60211-010-00	. HEADCAP	1
-11	60211-012-00	. SEAL SHAFT	1
-12	60211-013-00	. WIPER	1
-13	60211-011-00	. RING, SNAP	1
	60211-014-00	. KIT, SEAL (Items 1, 3, 9, 10, 12 & 13)	

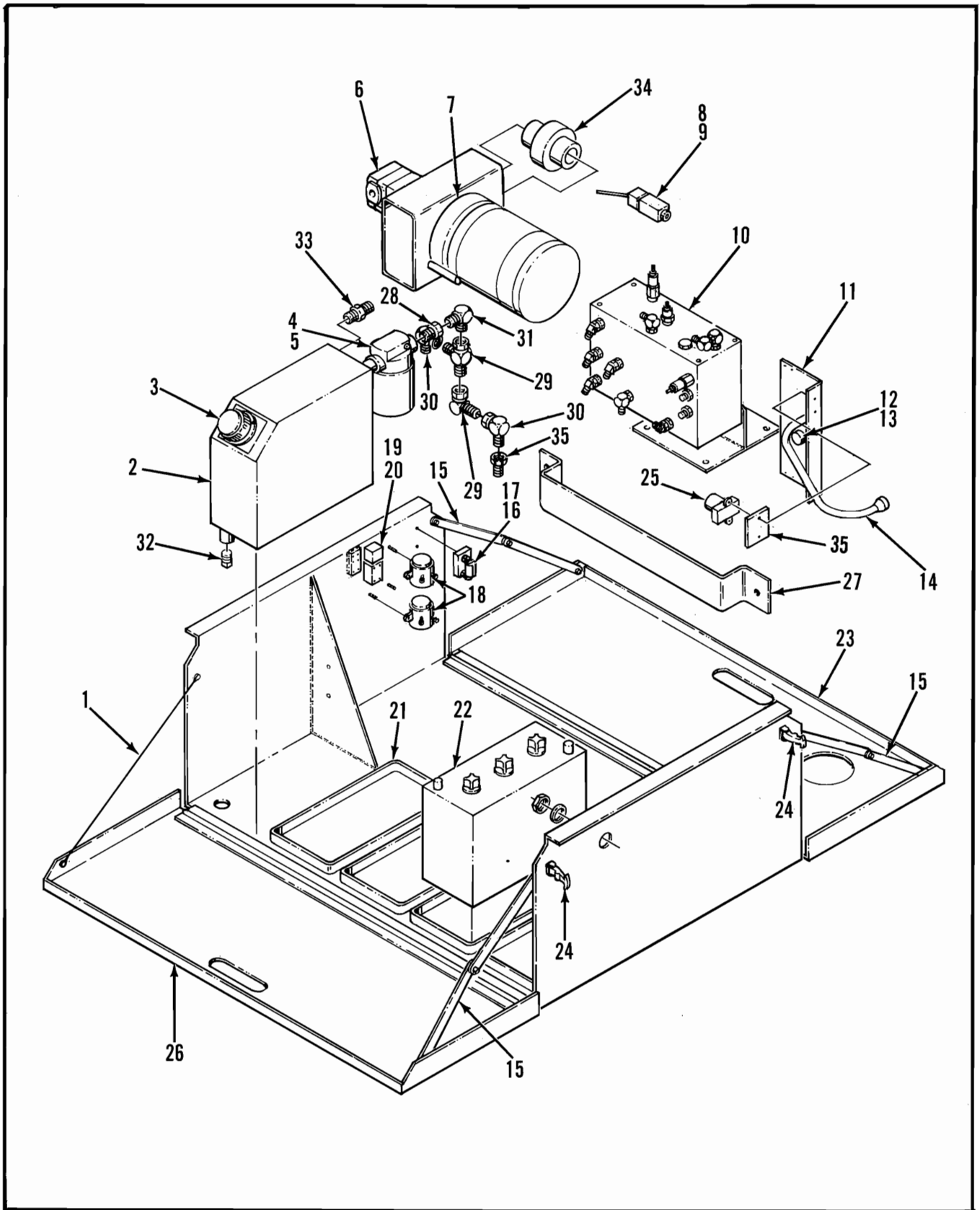


Figure 7-5. Module Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-5	NO NUMBER	MODULE ASSY	
-1	60840-000-00	. LANYARD ASSY	1
-2	60797-000-00	. TANK, HYDRAULIC	1
-3	05963-000-00	. . BREATHER, FILTER	1
-4	05154-001-00	. FILTER ASSY	1
-5	05154-002-00	. . ELEMENT, FILTER, SPIN-ON	1
-6	NO NUMBER	. PUMP ASSY, HYDRAULIC (See Figure 7-6)	1
-7	05975-000-00	. MOTOR, ELECTRIC (See Figure 7-16)	1
-8	29859-001-00	. SWITCH, LIMIT	1
-9	12844-001-00	. ARM, ACTUATOR	1
-10	60714-000-00	. CONTROL ASSY, VALVE (See Figure 7-7)	1
-11	60712-000-00	. PANEL ASSY, ELECTRICAL	1
-12	29704-015-00	. . FUSE, AGC 15 A	1
-13	29701-000-00	. . HOLDER, FUSE	1
-14	28800-002-00	. . RECEPTACLE	1
-15	08710-000-00	. ASSY, BRACE	3
-16	12751-000-00	. HOLDER, FUSE	1
-17	12750-000-00	. FUSE	1
-18	60711-000-00	. SOLENOID ASSY	1
-19	29859-001-00	. SWITCH, LIMIT	1
-20	29860-000-00	. ARM, ACTUATOR	1
-21	08689-000-00	. TRAY, BATTERY	4
-22	11674-003-00	. BATTERY, 6V 250 A	4
-23	60808-000-00	. COVER, LH	1
-24	08783-002-00	. LATCH	4
-25	05409-000-00	. BUZZER	1
-26	60802-000-00	. COVER, RH	1
-27	60820-000-00	. STRAP	1
-28	11923-009-00	. FITTING	1
-29	20733-002-00	. FITTING	2
-30	11937-003-00	. FITTING	2
-31	11940-014-00	. FITTING	1
-32	21305-006-00	. PLUG, MAGNETIC	1
-33	11939-021-00	. FITTING	1
-34	60205-000-00	. COUPLING	1
-35	14693-001-00	. FITTING	1

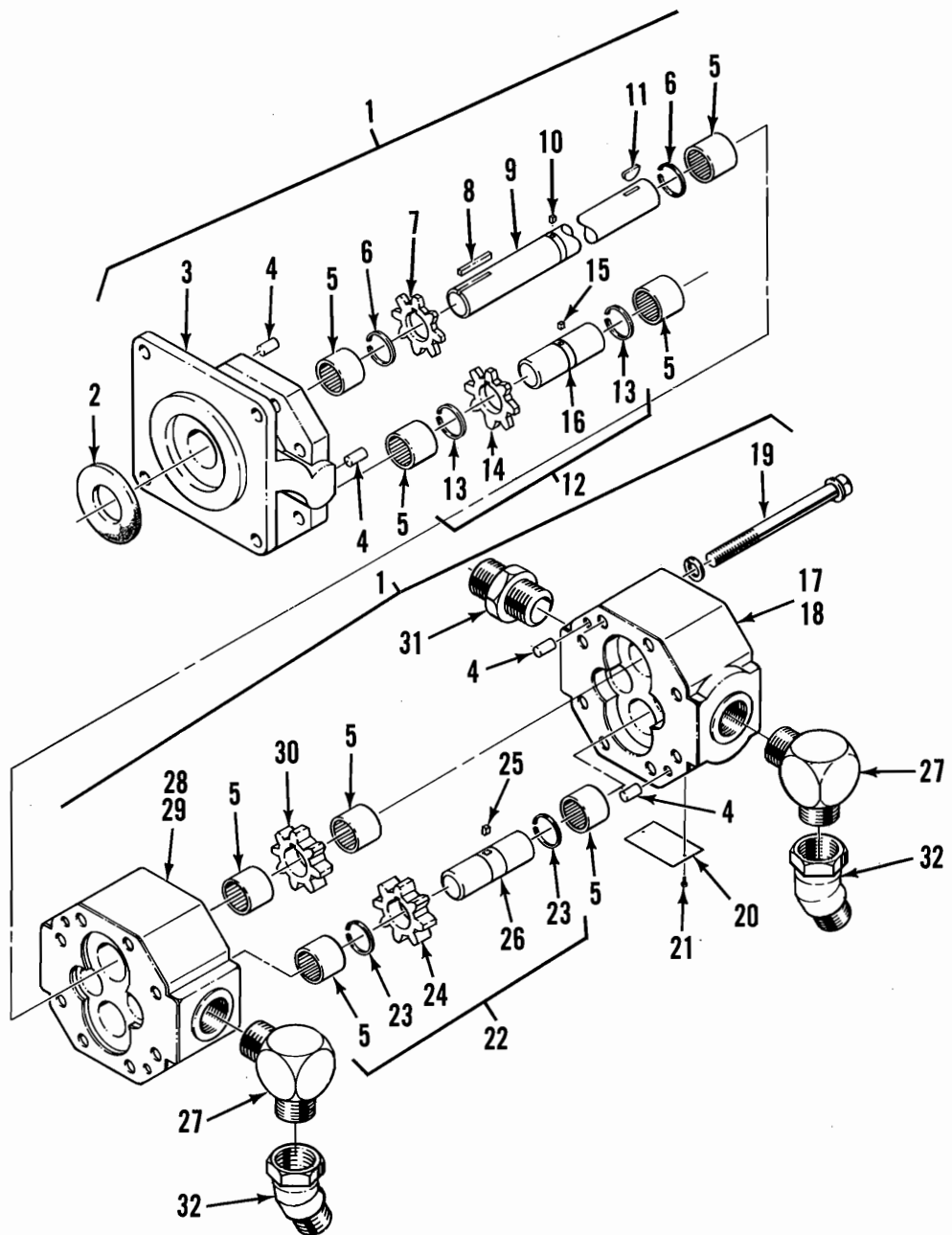


Figure 7-6. Hydraulic Pump Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-6	NO NUMBER	HYDRAULIC PUMP ASSY	
-1	60104-000-00	. PUMP HYDRAULIC	1
-2	60104-001-00	. . SEAL, OIL	1
-3	60104-002-00	. . STATOR	1
-4	60104-003-00	. . PIN	4
-5	60104-004-00	. . BEARING	8
-6	60104-005-00	. . RING, SNAP	2
-7	60104-006-00	. . GEAR	1
-8	60104-007-00	. . KEY	1
-9	60104-008-00	. . SHAFT KIT	1
-10	60104-009-00	. . PIN	1
-11	60104-010-00	. . KEY	1
-12	60104-011-00	. . SHAFT ASSY, IDLER	1
-13	60104-005-00	. . . RING, SNAP	2
-14	60104-006-00	. . . GEAR	1
-15	60104-009-00	. . . PIN	1
-16	60104-012-00	. . . SHAFT, IDLER	1
-17	60104-013-00	. . HOUSING, GEAR	1
-18	60104-014-00	. . GASKET	1
-19	60104-015-00	. . SCREW, CAP	8
-20	60104-016-00	. . PLATE, NAME	1
-21	60104-017-00	. . SCREW, DRIVE	2
-22	60104-018-00	. . SHAFT ASSY, IDLER	1
-23	60104-005-00	. . . RING, SNAP	2
-24	60104-019-00	. . . GEAR	1
-25	60104-009-00	. . . PIN	1
-26	60104-020-00	. . . SHAFT, IDLER	1
-27	11934-004-00	. FITTING	2
-28	60104-021-00	. . HOUSING, GEAR	1
-29	60104-022-00	. . GASKET	1
-30	60104-019-00	. . GEAR	1
-31	11941-012-00	. FITTING	1
-32	11932-003-00	. FITTING	2

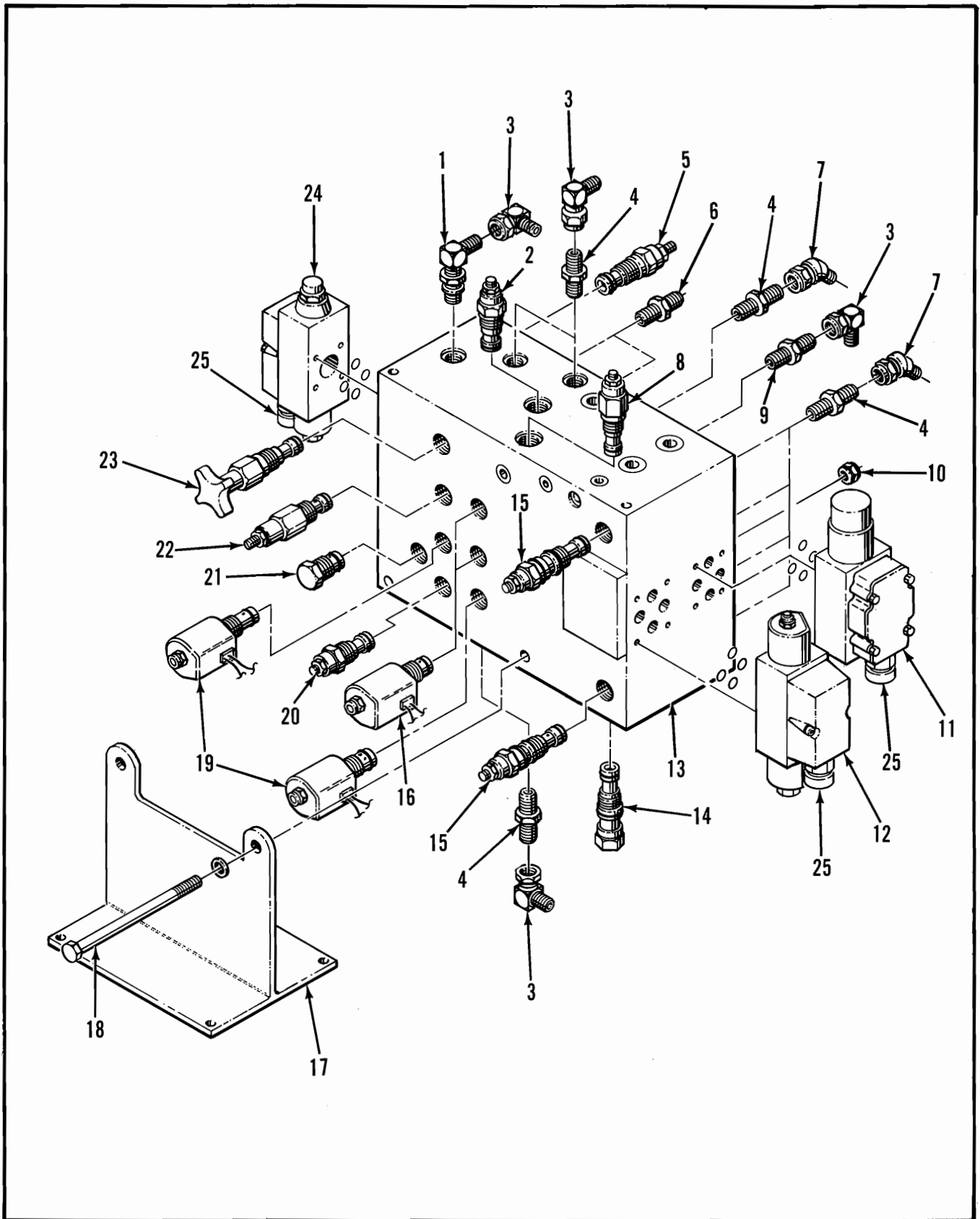


Figure 7-7. Control Valve Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-7	60714-000-00	CONTROL VALVE ASSY	
-1	11934-004-00	. FITTING, ELBOW, O-RING BOSS	1
-2	60387-000-00	. VALVE, NEEDLE CARTRIDGE	1
-3	11937-003-00	. FITTING, ELBOW	4
-4	11941-009-00	. FITTING, STRAIGHT, O-RING BOSS	7
-5	60391-000-00	. VALVE, CARTRIDGE, RELIEF	1
-6	11941-005-00	. FITTING, STRAIGHT, O-RING BOSS	2
-7	11932-003-00	. FITTING, ELBOW	5
-8	60294-000-00	. VALVE, CARTRIDGE, MAIN RELIEF	1
-9	11941-002-00	. FITTING, STRAIGHT, O-RING BOSS	1
-10	11248-006-00	. NUT, HEX, SELF-LOCK	2
-11	60286-000-00	. VALVE, CONTROL	1
-12	60284-000-00	. VALVE, DIRECTIONAL CONTROL	1
-13	60392-000-00	. BLOCK, VALVE MANIFOLD	1
-14	60198-000-00	. VALVE, CARTRIDGE, SHUTTLE	1
-15	60289-000-00	. VALVE, CARTRIDGE, COUNTERBALANCE	2
-16	60296-000-00	. VALVE, SOLENOID	2
-17	60858-000-00	. MOUNT, VALVE	1
-18	11254-040-00	. SCREW, CAP	2
-19	60291-000-00	. VALVE, SOLENOID	2
-20	60199-000-00	. VALVE, CARTRIDGE, RESTRICTOR	1
-21	60290-000-00	. VALVE, CHECK	1
-22	60390-000-00	. VALVE, CARTRIDGE, RELIEF	1
-23	60388-000-00	. VALVE, CARTRIDGE	1
-24	60389-000-00	. VALVE, DIRECTIONAL CONTROL	1
-25	29925-000-00	. CONNECTOR, CABLE	3

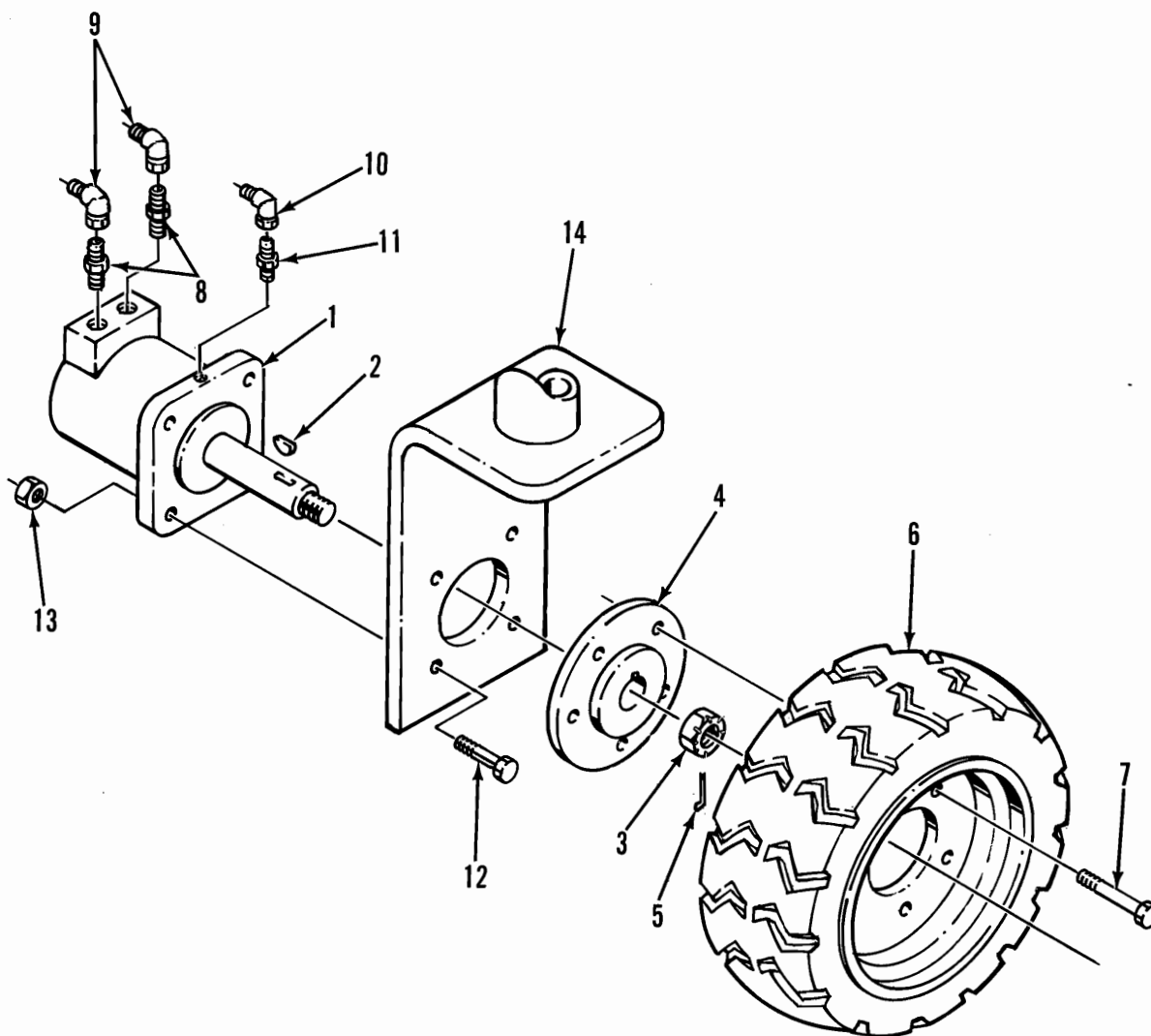


Figure 7-8. Wheel Motor/Hub Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-8	NO NUMBER	WHEEL MOTOR/HUB ASSEMBLY	
-1	12795-000-00	. MOTOR, HYD (See Figure 7-16)	1
-2	12795-001-00	. . KEY (See Figure 7-16)	REF
-3	12795-002-00	. . NUT, SLOTTED (See Figure 7-16)	REF
-4	60737-000-00	. HUB	1
-5	11753-012-00	. PIN, COTTER	1
-6	05107-000-00	. ASSY WHEEL	1
-7	11468-000-00	. STUD BOLT	5
-8	11941-013-00	. FITTING	2
-9	11932-003-00	. FITTING	2
-10	11932-001-00	. FITTING	1
-11	11941-001-00	. FITTING	1
-12	11256-018-00	. CAP SCREW	4
-13	11248-008-00	. LOCK NUT	4
-14	60731-000-00	WHEEL MOTOR/HUB ASSEMBLY LH . SPINDLE WELDMENT LH	
-14	60732-000-00	WHEEL MOTOR/HUB ASSEMBLY RH . SPINDLE WELDMENT RH	

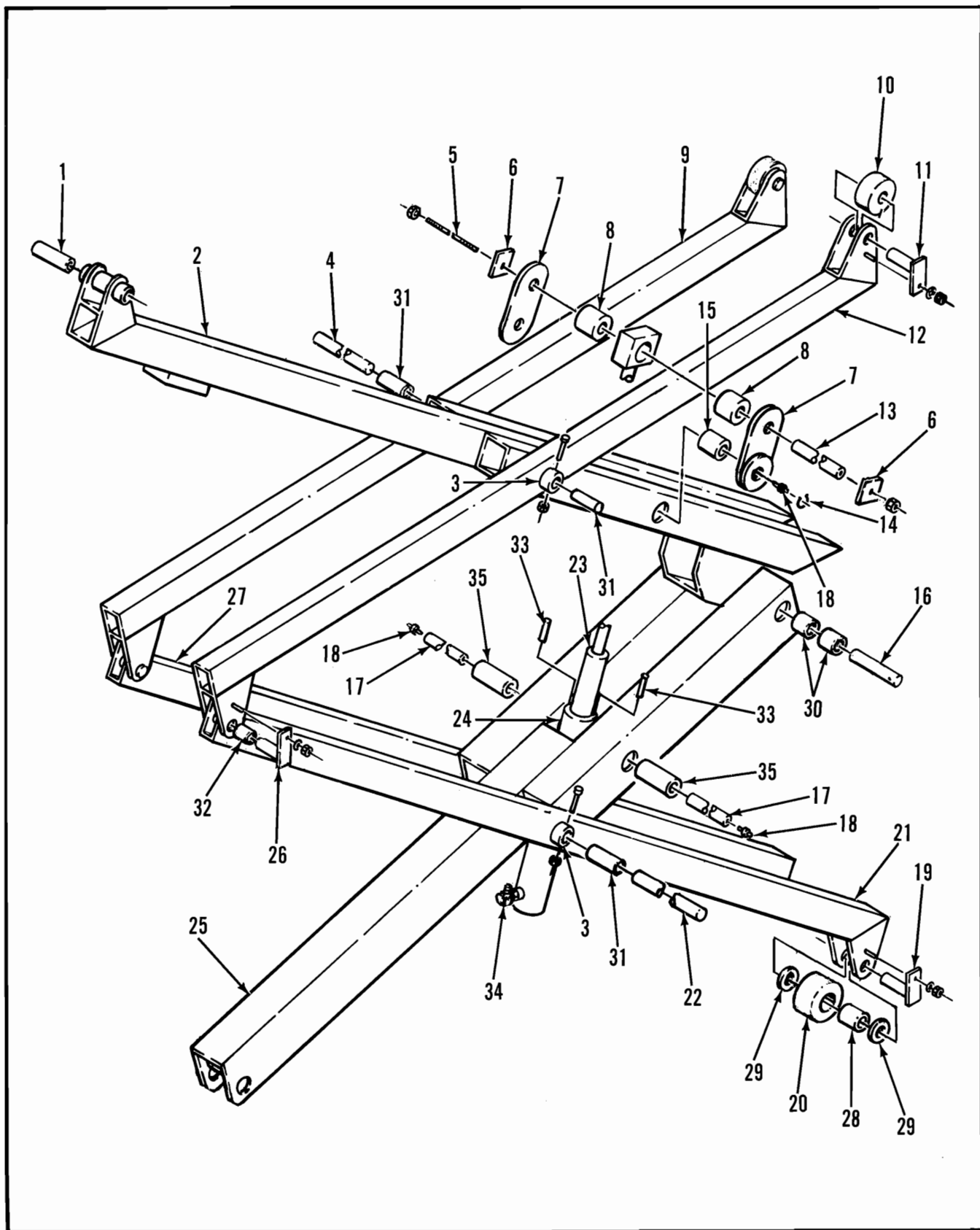


Figure 7-9. Scissors Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-9	60702-000-00	SCISSORS ASSY	
-1	27931-033-00	. BEARING	2
-2	60744-000-00	. TOP WELD, SCISSORS FRAME	1
-3	60782-000-00	. RETAINER	2
-4	60774-000-00	. PIN	1
-5	16755-011-00	. ROD, THREADED	1
-6	60006-000-00	. WASHER	2
-7	60844-000-00	. WELDMENT, PLATE	2
-8	18407-002-00	. TUBE	2
-9	60764-000-00	. ARM WELD, UPPER RIGHT	1
-10	60832-000-00	. WHEEL ASSY, UPPER	2
-11	60854-000-00	. WELDMENT, PIN	2
-12	60761-000-00	. ARM WELD, UPPER LEFT	1
-13	60781-000-00	. PIN, CYLINDER	1
-14	11764-027-00	. RING, RETAINING	2
-15	60845-000-00	. BEARING	2
-16	60773-000-00	. PIN	1
-17	60846-000-00	. PIN	2
-18	13336-011-00	. FITTING, GREASE	4
-19	60788-000-00	. WELDMENT, PIN	2
-20	60880-000-00	. WHEEL, LOWER	2
-21	60767-000-00	. ARM WELD, LOWER LEFT	1
-22	60775-000-00	. PIN	1
-23	12794-000-00	. CYLINDER, LIFT (See Figure 7-10)	1
-24	60780-000-00	. COLLAR	1
-25	60753-000-00	. BOTTOM WELD, SCISSORS FRAME	1
-26	60430-000-00	. WELDMENT, PIN	2
-27	60766-000-00	. ARM WELD, LOWER RIGHT	1
-28	27931-012-00	. BEARING	2
-29	19926-294-00	. WASHER	4
-30	27931-030-00	. BEARING	4
-31	27931-031-00	. BEARING	4
-32	27931-013-00	. BEARING	2
-33	60431-001-00	. PIN - DRIVE LOCK	2
-34	11934-007-00	. FITTING	1
-35	60890-000-00	. BEARING	2

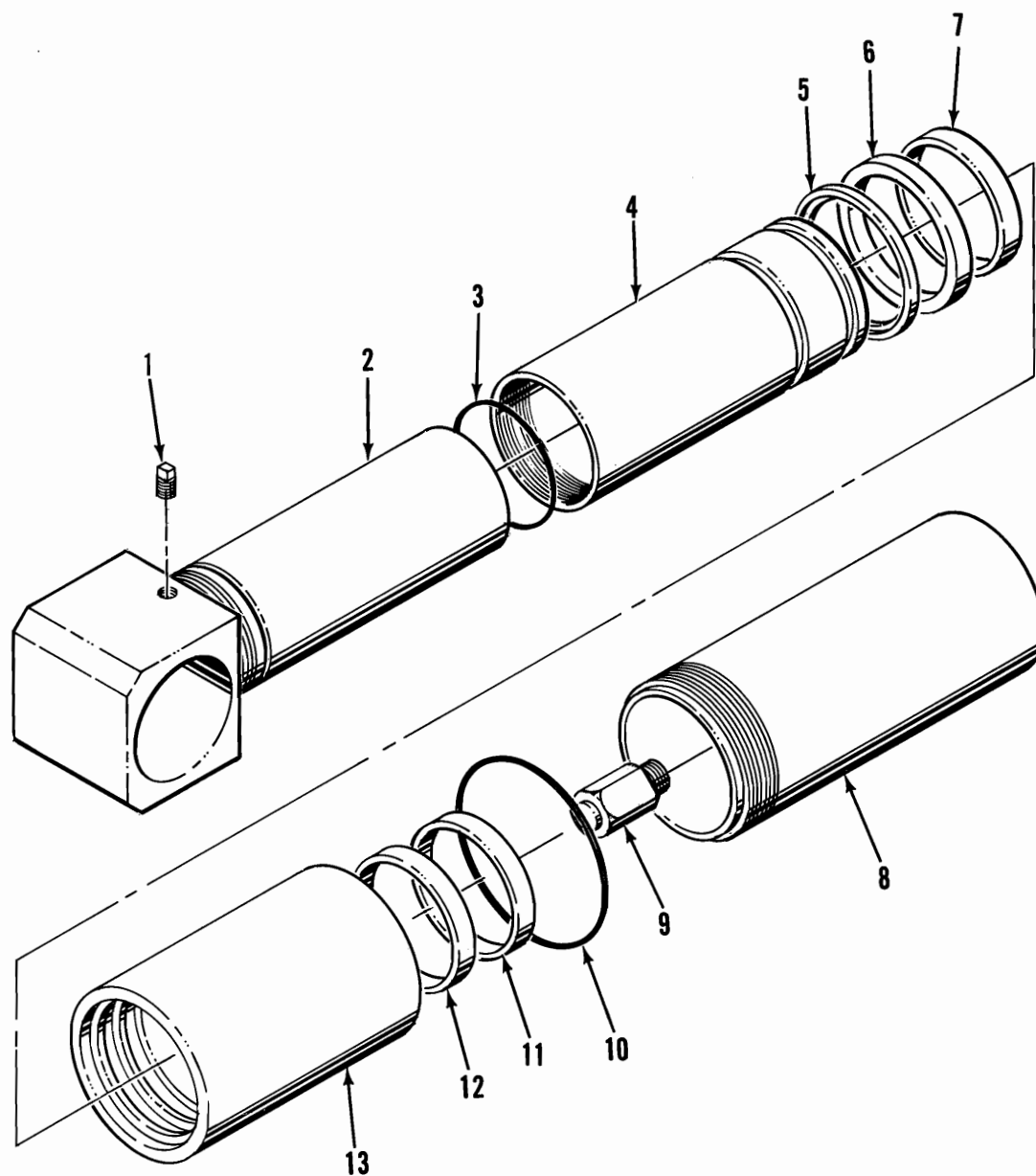


Figure 7-10. Lift Cylinder

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-10	12794-000-00	CYLINDER, LIFT	
-1	12794-014-00	. SCREW, BLEEDER	1
-2	12794-012-00	. ROD, CLEVIS	1
-3	12794-008-00	. O-RING	1
-4	12794-004-00	. TUBE, ROD	1
-5	12794-011-00	. WIPER, ROD	1
-6	12794-010-00	. SEAL, ROD	1
-7	12794-009-00	. RING, WEAR	1
-8	12794-002-00	. TUBE, BARREL	1
-9	12794-003-00	. FUSE, VELOCITY	1
-10	12794-007-00	. O-RING, STATIC	1
-11	12794-001-00	. RING, WEAR, PISTON	1
-12	12794-005-00	. RING, STOP	1
-13	12794-006-00	. TUBE, MOUNT	1
	12794-013-00	. KIT, SEAL (Includes items 3, 5, 6, 7, 10 and 11)	

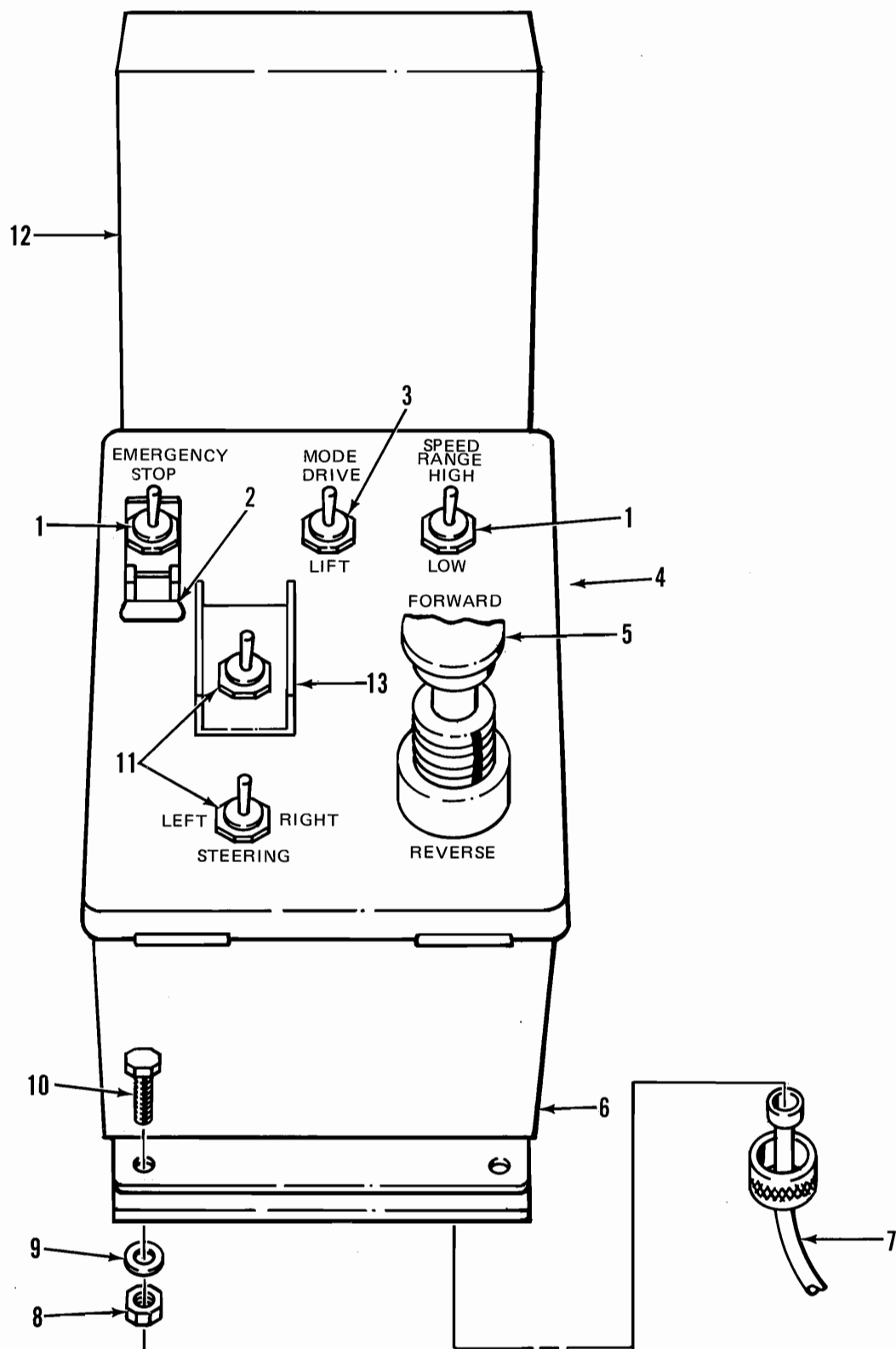


Figure 7-11. Controller Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-11	60704-000-00	CONTROLLER ASSEMBLY	1
-1	29871-000-00	. SWITCH, TOGGLE, MICRO	2
-2	29936-006-00	. GUARD, SWITCH, TOGGLE	1
-3	12797-000-00	. SWITCH, MICRO	1
-4	60834-000-00	. DECAL, CONTROLLER	1
-5	12799-000-00	. CONTROLLER	1
-6	60807-000-00	. CONTROL BOX	1
-7	60707-000-00	. ASSEMBLY, CABLE (See Figure 7-18)	1
-8	11248-004-00	. NUT, HEX, ESNA, 1/4" - 20 UNC	4
-9	11240-004-00	. WASHER, FLAT, STD 1/4"	4
-10	11252-008-00	. CAPSCREW, HEX - HEAD, 1/4" - 20 UNC	4
-11	12798-000-00	. SWITCH, MICRO	2
-12	60809-000-00	. HANGER, WELDMENT	1
-13	08271-000-00	. GUARD, SWITCH, TOGGLE	1

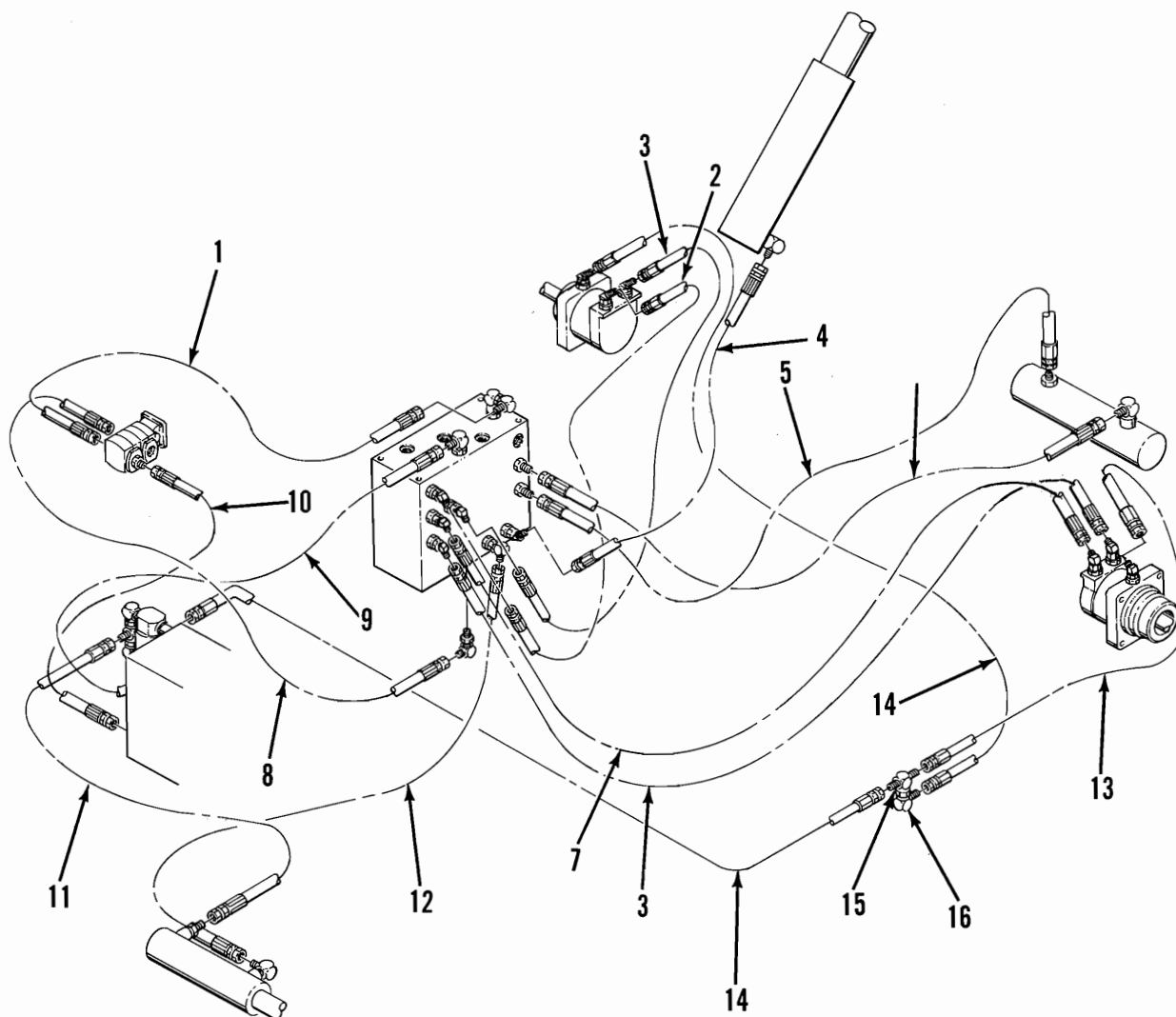


Figure 7-12. Hose Package

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-12	60706-000-00	HOSE PACKAGE	
-1	60861-005-00	. HOSE ASSY, HYDRAULIC	1
-2	60889-002-00	. HOSE ASSY, HYDRAULIC	1
-3	60889-003-00	. HOSE ASSY, HYDRAULIC	2
-4	60861-004-00	. HOSE ASSY, HYDRAULIC	1
-5	60861-007-00	. HOSE ASSY, HYDRAULIC	1
-6	60861-008-00	. HOSE ASSY, HYDRAULIC	1
-7	60889-001-00	. HOSE ASSY, HYDRAULIC	1
-8	60861-006-00	. HOSE ASSY, HYDRAULIC	1
-9	60861-009-00	. HOSE ASSY, HYDRAULIC	1
-10	60862-001-00	. HOSE ASSY, HYDRAULIC	1
-11	60861-010-00	. HOSE ASSY, HYDRAULIC	1
-12	60861-011-00	. HOSE ASSY, HYDRAULIC	1
-13	61351-002-00	. HOSE ASSY, HYDRAULIC	2
-14	61351-001-00	. HOSE ASSY, HYDRAULIC	1
-15	20032-001-00	. FITTING	1
-16	11937-001-00	. FITTING	1

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-13	60705-000-00	DECALS	
	03610-000-00	. DECALS, OPERATING INSTR. TUBE	1
	05221-000-00	. DECAL, BATTERY FLUID	4
	05225-000-00	. DECAL, DANGER, HYDROGEN GAS	1
	05651-003-00	. DECAL, MAX. PLATFORM LOAD	4
	08176-000-00	. DECAL, FUSE	2
	08838-000-00	. DECAL, 6V 250 AMP HRS	4
	27992-000-00	. DECAL, CAUTION DO NOT ADJUST	1
	27993-000-00	. DECAL, LOWER PLATFORM	2
	60838-000-00	. DECAL, UP-RIGHT	4
	60839-000-00	. DECAL, XL-14	4
	60841-000-00	. DECAL, FORKLIFT	4
	60856-000-00	. DECAL, TERMINAL STRIP	1
	60857-000-00	. DECAL, GROUND	1
	05223-000-00	. DECAL, EMERGENCY DOWN VALVE	1
	60864-000-00	. DECAL, DANGER	1
	60865-000-00	. DECAL -BEFORE OPERATING	1

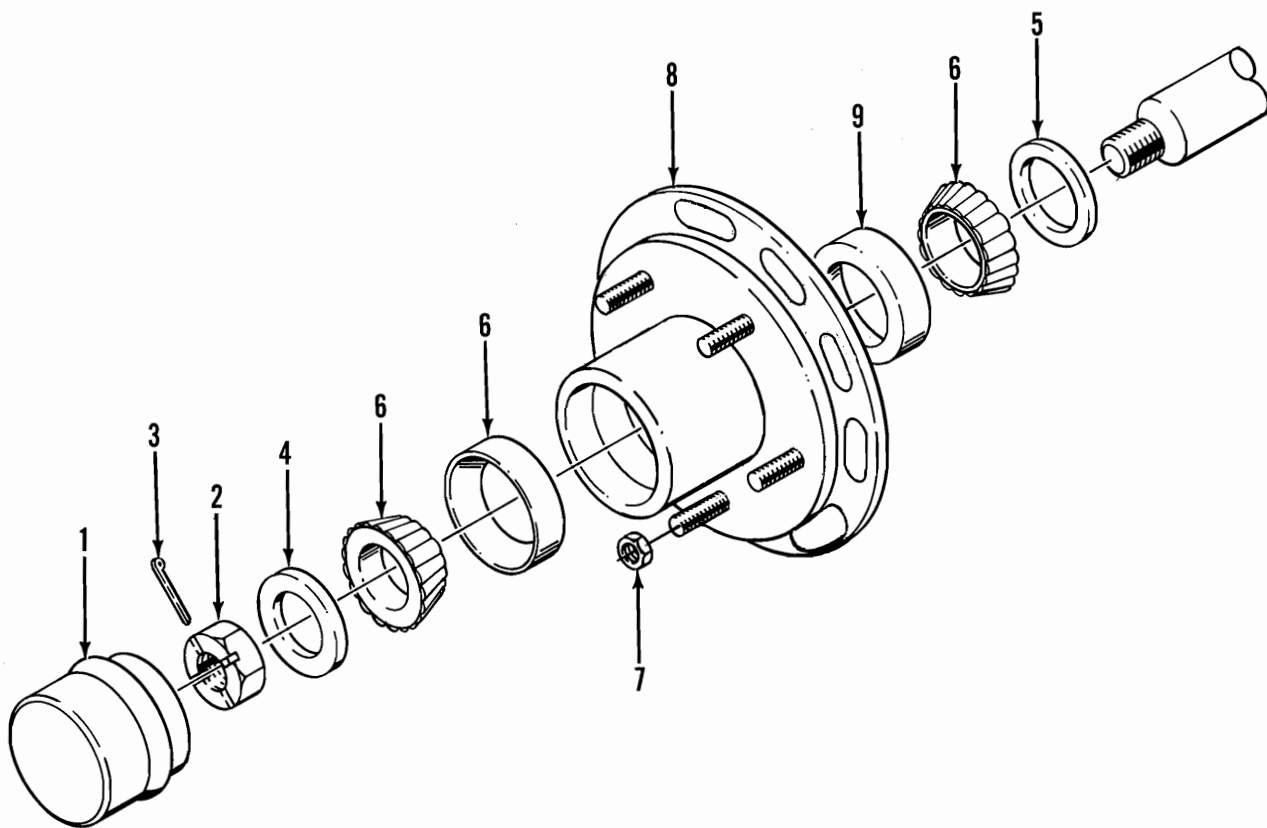


Figure 7-14. RH Spindle/Hub Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-14	NO NUMBER	RH SPINDLE/HUB ASSY	
-1	05078-000-00	. CAP, DUST	1
-2	11274-016-00	. NUT, CASTLE, 1-14 UNF	1
-3	11753-012-00	. PIN, COTTER	1
-4	11239-016-00	. WASHER, FLAT, ASTM A325 1" Dia.	1
-5	05104-000-00	. SEAL, GREASE	1
-6	11775-011-00	. CONE, BEARING	2
-7	05104-000-00	. NUT, WHEEL	5
-8	60742-000-00	. HUB & ROTOR WELDMENT	1
-9	11776-004-00	. CUP, BEARING	2

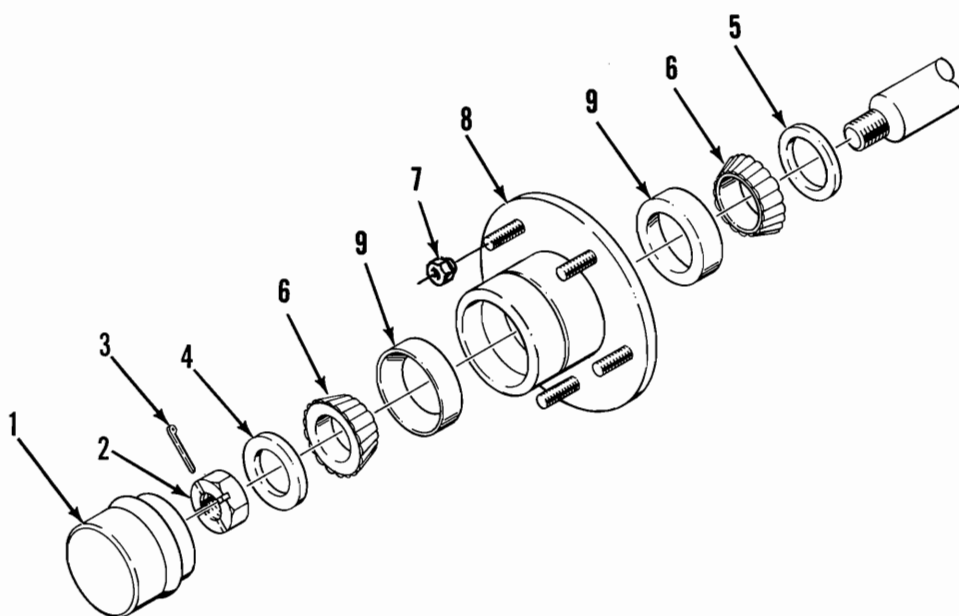


Figure 7-15. LH Spindle/Hub Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-15	NO NUMBER	LH SPINDLE/HUB ASSY	
-1	05078-000-00	. CAP, DUST	1
-2	11274-016-00	. NUT, CASTLE, 1-14 UNF	1
-3	11753-012-00	. PIN, COTTER	1
-4	11239-016-00	. WASHER, FLAT, ASTM A325 1" Dia.	1
-5	05104-000-00	. SEAL, GREASE	1
-6	11775-011-00	. CONE, BEARING	2
-7	05104-000-00	. NUT, WHEEL	5
-8	05100-001-00	. HUB	1
-9	11776-004-00	. CUP, BEARING	2

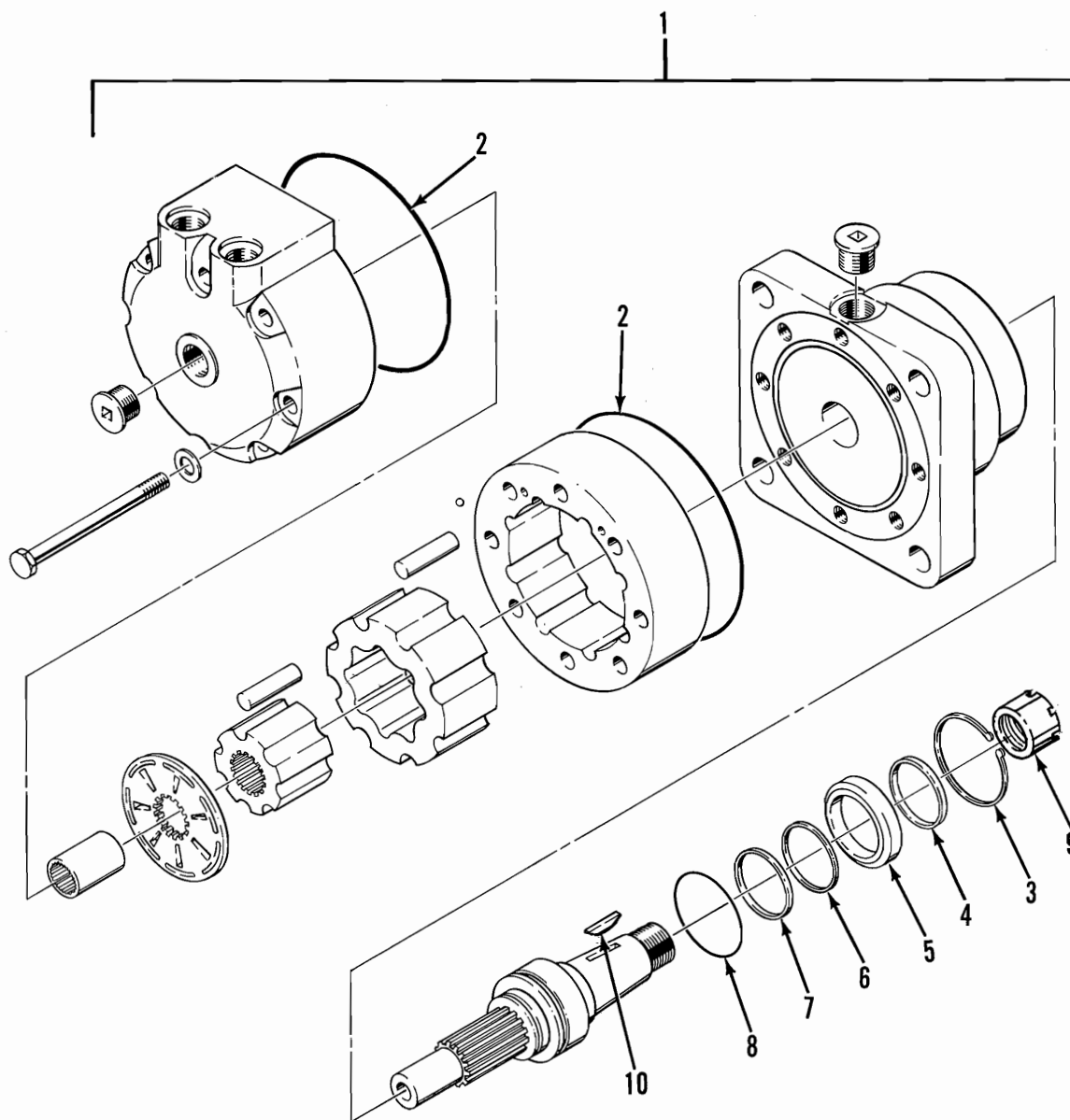


Figure 7-16. Drive Motor

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-16	12795-000-00	MOTOR ASSEMBLY, HYDRAULIC	
-1	12795-003-00	. SEAL KIT, BODY (Items 2 thru 8)	1
-2	12795-004-00	. . SEAL, SQUARE RING	2
-3	12795-005-00	. . SEAL, SNAP RING	1
-4	12795-006-00	. . SEAL, DUST	1
-5	12795-007-00	. . RETAINER	1
-6	12795-008-00	. . RING, BACK UP	1
-7	12795-009-00	. . SEAL, QUAD RING	1
-8	12795-010-00	. . SEAL, O-RING	1
-9	12795-002-00	. . NUT SLOTTED	1
-10	12795-001-00	. . KEY	1

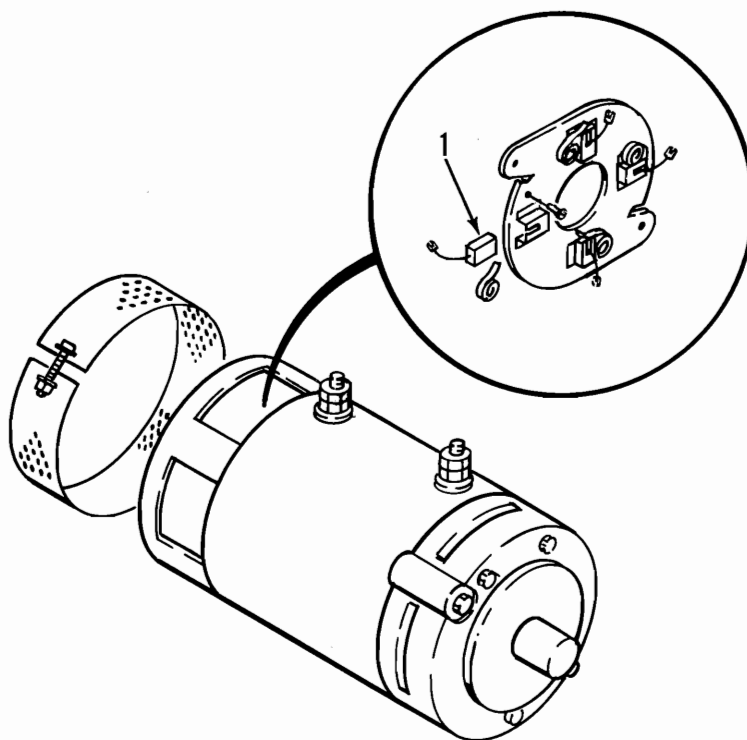


Figure 7-17. Electric Motor

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-17 -1	05975-000-00 05975-001-00	MOTOR, ELECTRIC, GE 58C49JB353 . BRUSH	4

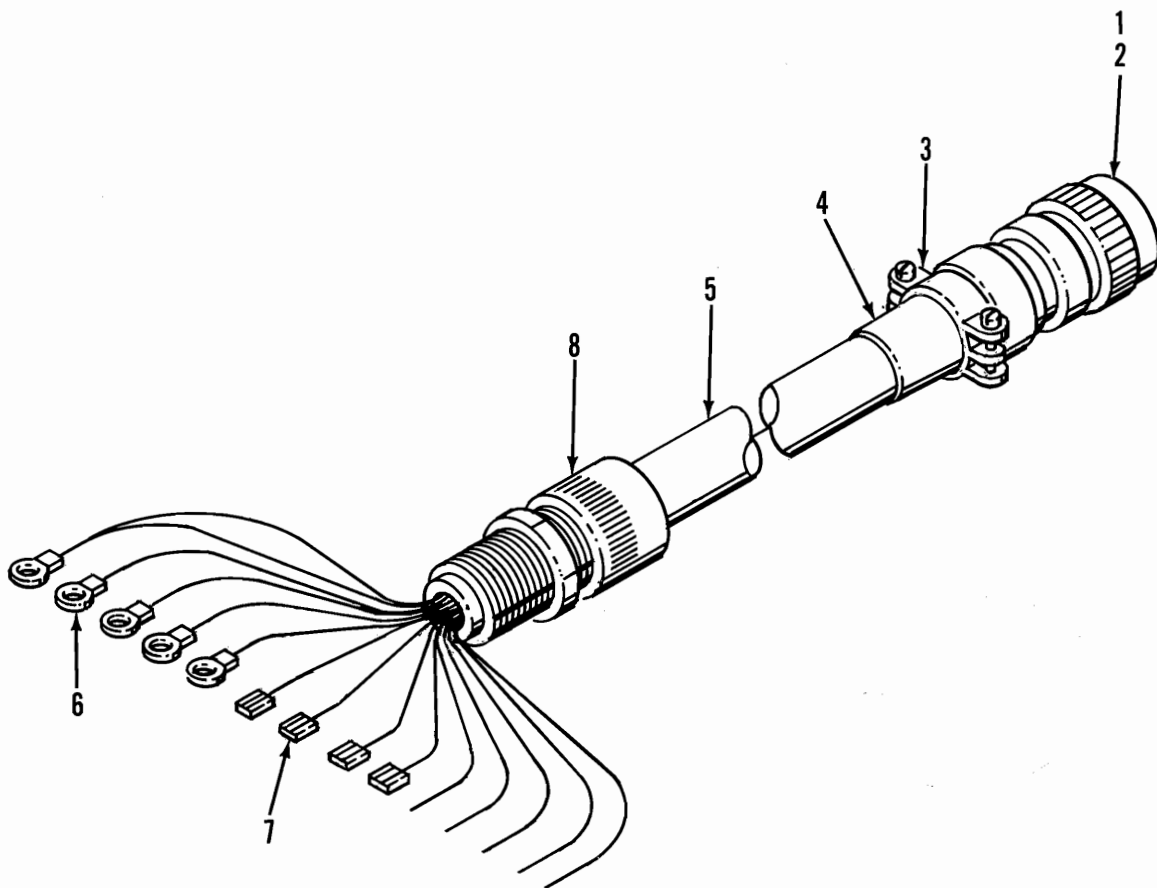


Figure 7-18. Cable Assembly

ITEM NO.	PART NO.	DESCRIPTION	QTY REQ'D
7-18	60707-000-00	CABLE ASSEMBLY	
-1	28800-001-00	. CONNECTOR, PLUG	1
-2	28800-004-00	. PIN, CONTACT	15
-3	29904-008-00	. CLAMP ASSEMBLY	1
-4	29904-010-00	. BOOT	1
-5	60214-099-00	. CABLE, 16 GAUGE	AR
-6	29601-013-00	. RING, TERMINAL	4
-7	29615-002-00	. TERMINAL, PUSH	4
-8	29925-003-00	. FITTING	1
-9	29601-019-00	. RING, TERMINAL	1