1020/1021H25

IOWA MOLD TOOLING CO., INC.

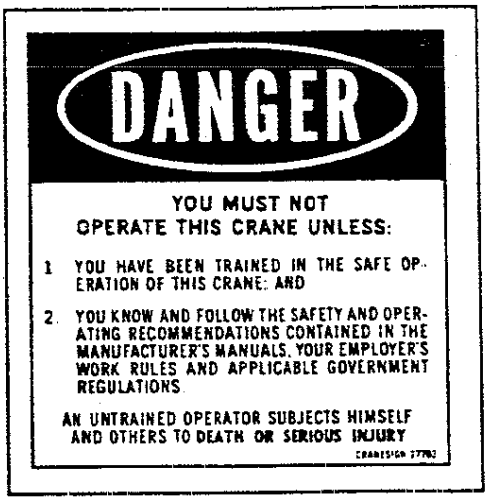
INSTRUCTIONS PARTS LISTS

ACCIDENT PREVENTION SIGNS FOR TELESCOPING AND ARTICULATING CRANES

Help promote essential safety practices for operator and crew

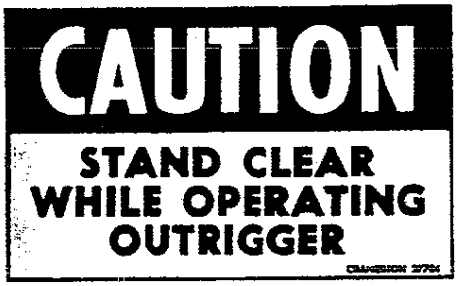
Available from members of the Manufacturers of Telescoping and Articulating Cranes Council

Cranesign No. 27701 lists operating practices which contribute to the proper operation of cranes. One is recommended for each control station to be applied in line-of-sight visibility of crane operator. Approx. size: 4-1/8 in. x 5-1/2 in.

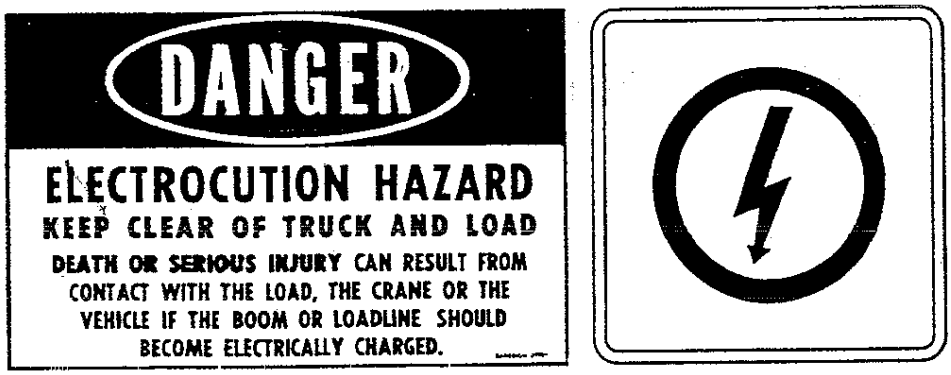


Cranesign No. 27703 warns that a crane should be operated only by trained experienced personnel having complete knowledge of information in equipment's manuals and all applicable work rules. One is recommended for each control station to be applied in line-of-sight visibility of crane operator. Approx. size: 4-5/8 in. x 4-3/4 in.

Cranesign No. 27702 emphasizes danger of electrocution present when operating a crane near charged electrical conductors. One is recommended for each control station to be applied in line-of-sight visibility of crane operator. Approx. size: 4-1/2 in. x 6-1/4 in.



Cranesign No. 27704 cautions personnel in vicinity of crane to stay away from the outriggers while they are being operated. One is recommended for each outrigger and applied on outrigger where readily visible by anyone nearby. Approx. size: 2-1/2 in. x 4 in.



Cranesign No. 27705 displays the international symbol for electricity and warns of danger from an electrically charged vehicle, crane or load. Four are recommended (one for each side and one for each end of vehicle) to be applied in locations which are readily visible to ground personnel. Approx. size: 5-1/4 in. x 13-1/4 in.

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LIST OF TABLES

This manual is provided to acquaint you with the operation of your IMT truck-mounted, hydraulic, articulating crane, and supply you with the information necessary for proper equipment maintenance.

Three means are used throughout this manual to gain the attention of operating and service personnel. They are NOTES, CAUTIONS and WARNINGS and are defined as follows:

NOTE

A NOTE is used to either convey additional information or to provide further emphasis for a previous point.

CAUTION

A CAUTION is used when there is the strong possibility of damage to the equipment or premature equipment failure.

WARNING

A WARNING is used when there is the potential for personal injury or death.

It is the user's responsibility to maintain and operate this unit in a manner that will result in the safest working conditions possible.

In addition, it is also the user's responsibility to be aware of existing Federal, State and Local codes and regulations regarding the safe use and maintenance of this unit. Listed below are two publications that the user should thoroughly read and understand.

ANSI B30.15 - 1973
MOBILE HYDRAULIC CRANES
The American Society of Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, N. Y. 10017

USAS B30.5 - 1968
CRAWLER, LOCOMOTIVE AND TRUCK CRANES
The American Society of Mechanical Engineers
United Engineering Center
345 Est 47th Street
New York, N. Y. 10017

Warranty of this unit will be void on any part of the unit subjected to misuse due to overloading, abuse, lack of maintenance or unauthorized modifications. No warranty - verbal, written or implied - other than the official published IMT new machinery and equipment warranty will be valid with this unit.

Treat this equipment with respect and service it regularly. These two things can add up to a safer working environment and longer equipment life.

Iowa Mold Tooling Co., Inc.
500 Hwy 18 West, Garner, Ia 50438
515-923-3711
Call toll free 1-800-247-5958

GENERAL

Reach (from centerline of rotation)	(7.6 m)	25'-0"
Lifting Height	(11 m)	36'-0"
Weight of crane	(2,621.3 kg.)	5,780 lbs.
Outrigger Span	(4.6 m)	15'-0"
Optimum Pump Capacity (each)	(45.4 l/min.)	10 Gal/min.
Oil Reservoir Capacity	(98.4 l)	26 US Gals.
*Mounting Space Required	(91.4 cm)	36"
Storage Height (Based on 41" truck frame)	(3.91 m)	12'-10"

*Does not include allowance for truck cab or body clearance.

PERFORMANCE CHARACTERISTICS

Rotation (6.45 Rad.) 370°	30 Sec.
Main Boom Elevation (-.37 to +1.26 Rad.) -20° to +72°	18 Sec.
Secondary Boom Elevation (2.96 Rad.) 174°	20 Sec.
Outrigger Extension	44 Sec.

LIFTING CAPACITY

(7.62 m) 25'-0"	(1905 kg.)	4,200 lbs.

HYDRAULIC SYSTEM

Open-center, full-pressure system with dual pump having 10 U.S. gal./minute (45.4 liter/minute) flow from each section at 2350 PSI (161.7 kg/sq. cm.). Eight spool, stack-type control valve with middle inlet (4 spools for crane functions, 2 spools for the function of an attachment such as a fork lift and 2 spools for the outrigger functions). The system includes a hydraulic reservoir, 25-micron suction line filters, 25-micron return line filter, pump and valve. The pump is mounted to the truck PTO adapter.

Included in the hydraulic system is an overload protection feature that will limit the lifting capacity of the crane to the rated load. Any attempt to exceed the rated load will result in nullifying that crane function.

CYLINDER HOLDING VALVES

The cylinder holding sides of all cylinders are equipped with integral-mounted holding and/or counter-balance valves to prevent sudden cylinder rod movement in case of hose or other hydraulic failure. The outriggers have positive pilot-operated valves that will open only upon pilot pressure controlled by operator's control valve. The main and secondary cylinders have pilot-operated counter-balance valves which hold the load but allow the flow to be feathered while cylinder is loaded. If a hose breaks, the only oil loss will be that in the hose.

CYLINDERS

	Bore	Stroke
Main	(16.5 cm) 6-1/2"	(77.5 cm) 30-1/2"
Secondary	(15.2 cm) 6"	(101.4 cm) 41"
Outriggers	(15.2 cm) 6"	(74.3 cm) 29-1/4"

ROTATION SYSTEM

Turntable bearing powered with a high-torque hydraulic motor through a spur-gear reducer assembly. An integral-mounted hydraulic brake assures pin point stopping and prevents load drift.

CONTROL SYSTEMS

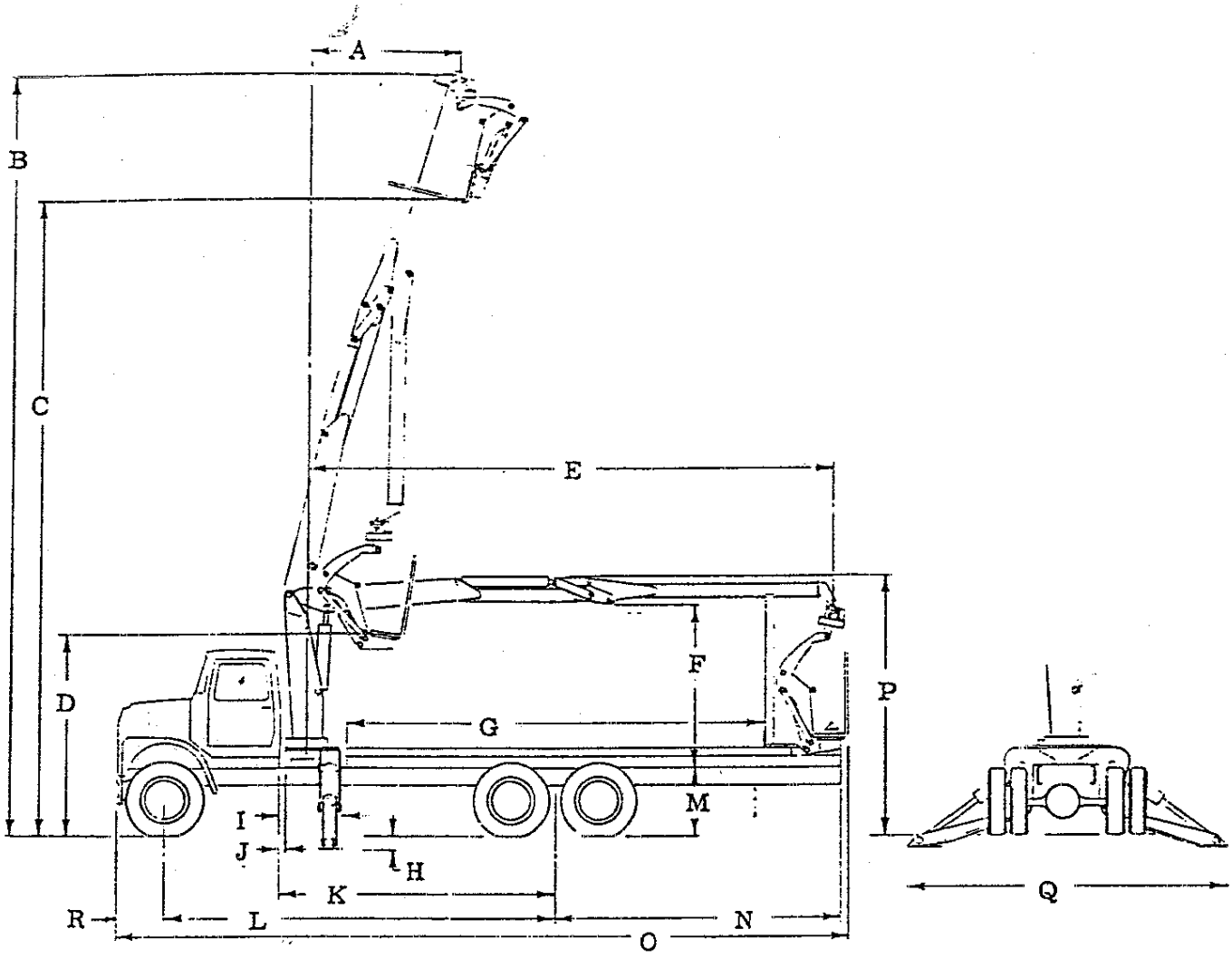
Dual Manual Controls - Standard

Chair Mount Controls - Optional

MINIMUM CHASSIS SPECIFICATIONS

Body Style		Conventional Cab
Wheel Base	(6.05 m)	238"
Cab to Axle	(4.37 m)	172"
Frame Section Modulus	(426 cc)	26 cu. in.
R B M	(16,135 kg-m)	1,400,000 in. lbs.
Front Axle	4,990 kg.)	11,000 lbs.
Rear Axle	(15,422 kg.)	34,000 lbs.

In addition to these specifications, heavy-duty electrical and cooling systems are required. It is recommended that the vehicle be equipped with an electric engine tachometer, auxiliary brake lock and power steering. If diesel engine is utilized, a variable governor shall be required.



LOCATION	DIMENSION	LOCATION	DIMENSION
A	7'-8" (2.36 m)	J	3" (7.62 cm)
B	36'-0" (10.97 m)	K	172" (4.37 m)
C	30'-0" (9.14 m)	L	238" (6.05 m)
D	9'-8" (2.94 m)	M	41" (1.04 m)
E	25'-0" (7.62 m)	N	11'-8" (3.56 m)
F	7'-10" (2.39 m)	O*	34'-10" (10.62 m)
G	19'-10" (6.06 m)	P	12'-10" (3.91 m)
H	4" to 6" (10.1 to 15.2 cm)	Q	15'-0" (4.57 m)
I	3'-0" (0.91 m)	R*	27" (0.67 m)

This length is based on an LNT 9000 Ford chassis. The overall length (O) may be critical in states which limit the overall length to 35'-0" (10.67 m).

Section 2. CRANE DESCRIPTION

2-1. GENERAL

This section describes the major assemblies that are available with the crane. Figure B-1 illustrates the location of the assemblies.

2-2. BASE AND OUTRIGGERS

The base provides the means to mount the crane to the truck chassis and employs 400° (6.98 Rad.) rotation through a ring-and-pinion type spur gear train. The outriggers fold out and down to a maximum span of 15 feet for crane stabilization.

2-3. MAST

The mast provides the necessary elevation for crane operation as well as a hinge point for the main boom.

2-4. MAIN BOOM

The main boom will swing through a full 92° (1.63 Rad.) from -20 to +72° (-0.37 Rad. to +1.26 Rad.). It is raised and lowered through the use of one double-acting hydraulic cylinder.

2-5. SECONDARY BOOM

The secondary boom will swing through a full 174° (2.96 Rad.). It is raised through the use of a double-acting hydraulic cylinder.

2-6. CONTROLS

The crane may be operated from either side of the base or from an optional operator's station at the top of the mast.

2-7. HYDRAULIC KITS

The crane hydraulics consist of double-braided pressure hoses, return hoses, filters, control valve bank and all necessary hydraulic fittings.

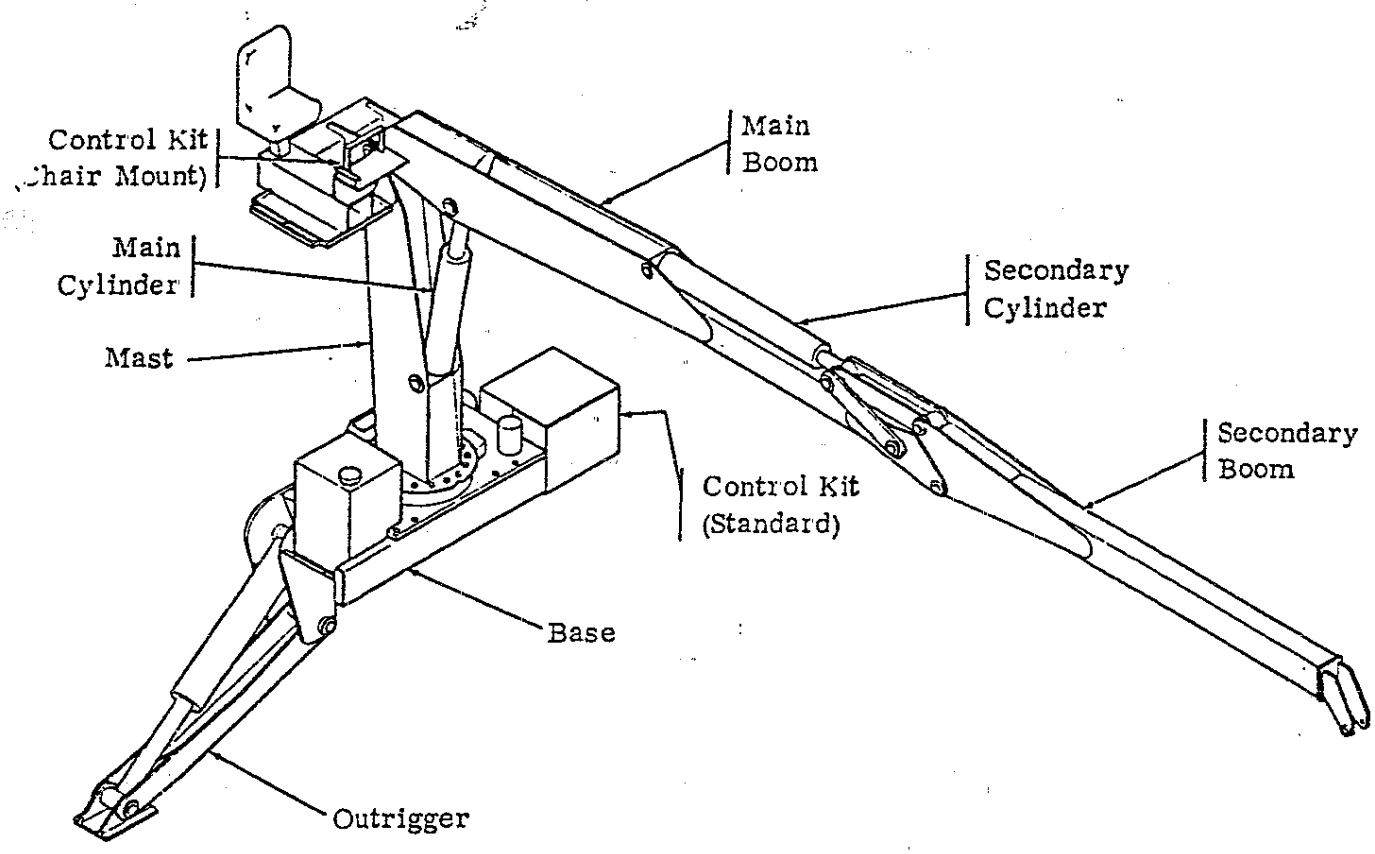


Figure B-1. 1025 Crane Group

Section 3. INSTALLATION

3-1. GENERAL

These instructions are intended as a guide to assist you with your particular installation. We cannot cover every make, model and year of truck manufactured worldwide, so these instructions will provide only general information. Use this section for what it was intended - a guide.

3-2. CHASSIS PREPARATION

Prior to installing the crane, there are certain steps that must be taken to ensure proper installation.

1. Inspect the carrier vehicle to make certain it meets the minimum chassis specifications (refer to Table C-1).

2. Chassis frame must be clear of all obstructions immediately behind the cab for a distance of at least 36" (91.4 cm). Space will be available for gas tanks, etc. after the crane is installed.

NOTE

The actual distance will be determined by the height of the truck cab. In order to provide clearance for the mast, the higher the cab, the greater the distance.

3. Install the PTO according to the PTO manufacturers instructions (refer to Paragraph 3-2-2 or 3-2-4).

4. Install the pump (Paragraph 3-2-3). Make sure that the pump rotates in the proper direction and tighten the pump mounting bolts (Figure C-4).

5. Install the suction-line filter below the top of the truck frame and within 48" (121.9 cm) of the pump (Figure C-2). Locate it so the vacuum gauge can be read and the filter easily serviced.

6. If rivet heads are raised on the top of the frame, install a 3/8" x 3" (0.95 cm x 7.6 cm) bar strip as a frame flange spacer to provide a flat mounting surface (Figure C-2). Tack weld the spacer to the frame along the edge of the frame.

WARNING

Do not weld across the frame because it can seriously damage the frame.

7. Spray paint all unpainted surfaces.

3-2-1. FRAME REINFORCEMENT

If chassis does not meet minimum RBM requirements (Table C-1) it must be fishplated.

CAUTION

IMT does not recommend the use of any chassis not meeting the specifications in Table C-1. These instructions are included for those users who insist on using a chassis not meeting RBM requirements.

NOTE

Use the same type of material as in the truck frame.

1. Strip truck frame of all steps, tanks, etc. which are attached between the front of the rear-spring hanger and the back of the front-spring hanger.

2. Clamp a 3/8" thick x 12" wide (0/95 cm x 30.4 cm) plate to the outside of the truck frame channel full length between the front-spring hanger and the rear-spring hanger. Use heavy-duty "C" clamps to secure the plate tight against the frame.

3. Where possible, drill the plate and install the original bolts.

TABLE C-1. MINIMUM CHASSIS SPECIFICATIONS

Body Style	Conventional Cab
Wheel Base	238" (6.05 m)
Cab to Axle	172" (4.37 m)
Frame Section Modulus	26 cu. in. (426 cc)
R B M	1,400,000 in. lbs. (16,135 kg-m)
Front Axle	11,000 lbs. (4,990 kg.)
Rear Axle	34,000 lbs. (15,442 kg.)

In addition to these specifications, heavy-duty electrical and cooling systems are required. It is recommended that the vehicle be equipped with an electric engine tachometer, auxiliary brake lock and power steering. If diesel engine is utilized, a variable governor shall be required.

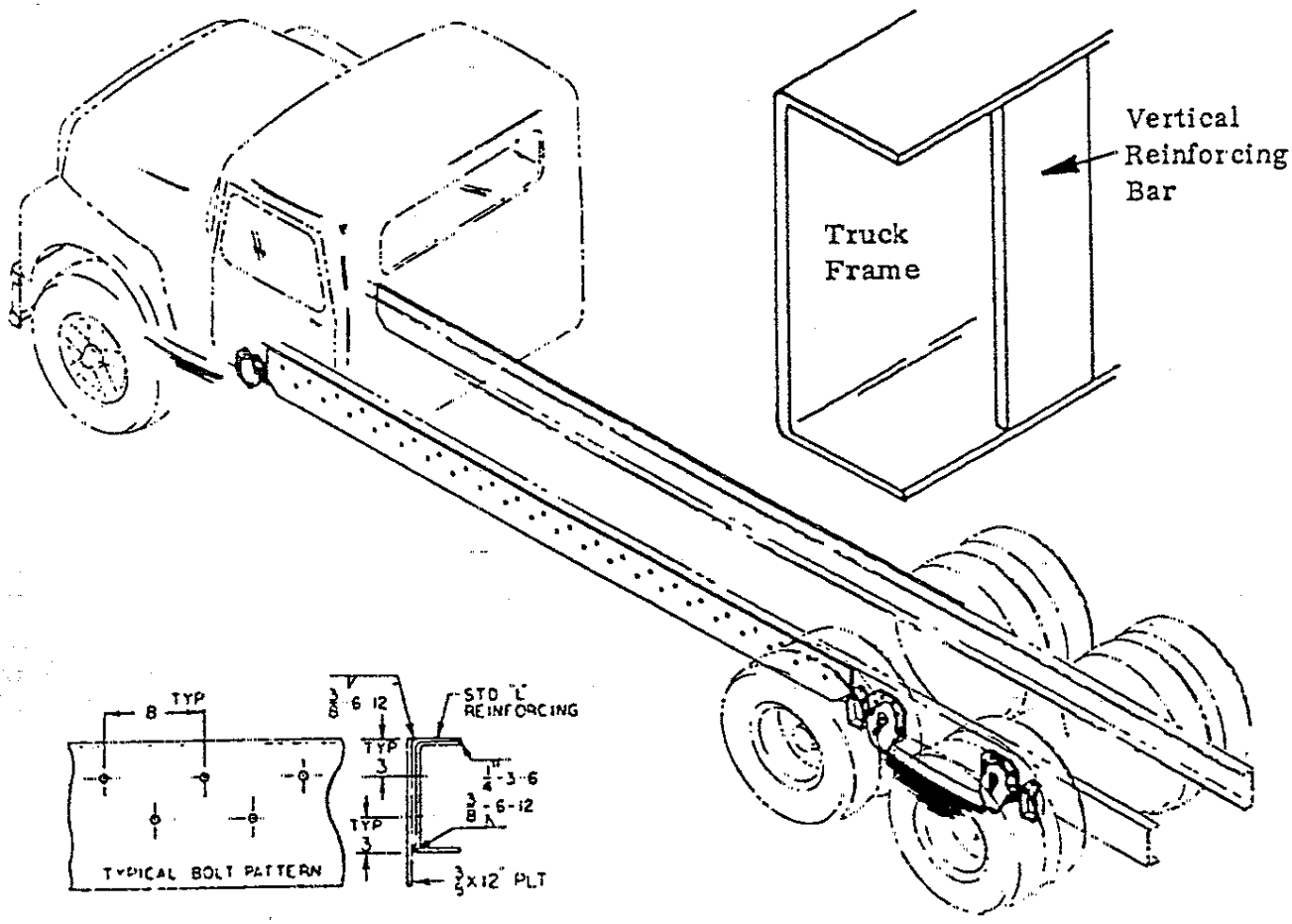


Figure C-1. Frame Reinforcement

NOTE

Some bolts may have to be longer to compensate for the added thickness of the plate. Make certain that the bolts are the same grade as those being replaced.

4. Weld fishplate to "L" reinforcing angles (Figure C-1). Use a 3/8" fillet weld for 6" (14.2 cm) and then skip 12" (28.4 cm).

WARNING

Do not weld on high-tensile frames. The heat generated by welding can cause structural damage to the frame resulting in frame failure. Bolt fishplate to frame using pattern in Figure C-1. Use 3/4-10 grade 6 or 8 bolts, hardened flat washers both sides and self-locking nuts. Torque to 280 ft. lbs. (38.72 kg-m) for grade 6 or 296 ft. lbs. (40.93 kg-m) for grade 8.

5. Reinforce the frame flange by tack welding four flat bar strips vertically as shown in Figure C-2. The front pair should be centered inside both frame channels 7-1/2" (19 cm) behind the cab and another pair centered 28-1/2" (72 cm) behind those. These bars will help to prevent frame flange collapse.

3-2-2. PTO INSTALLATION

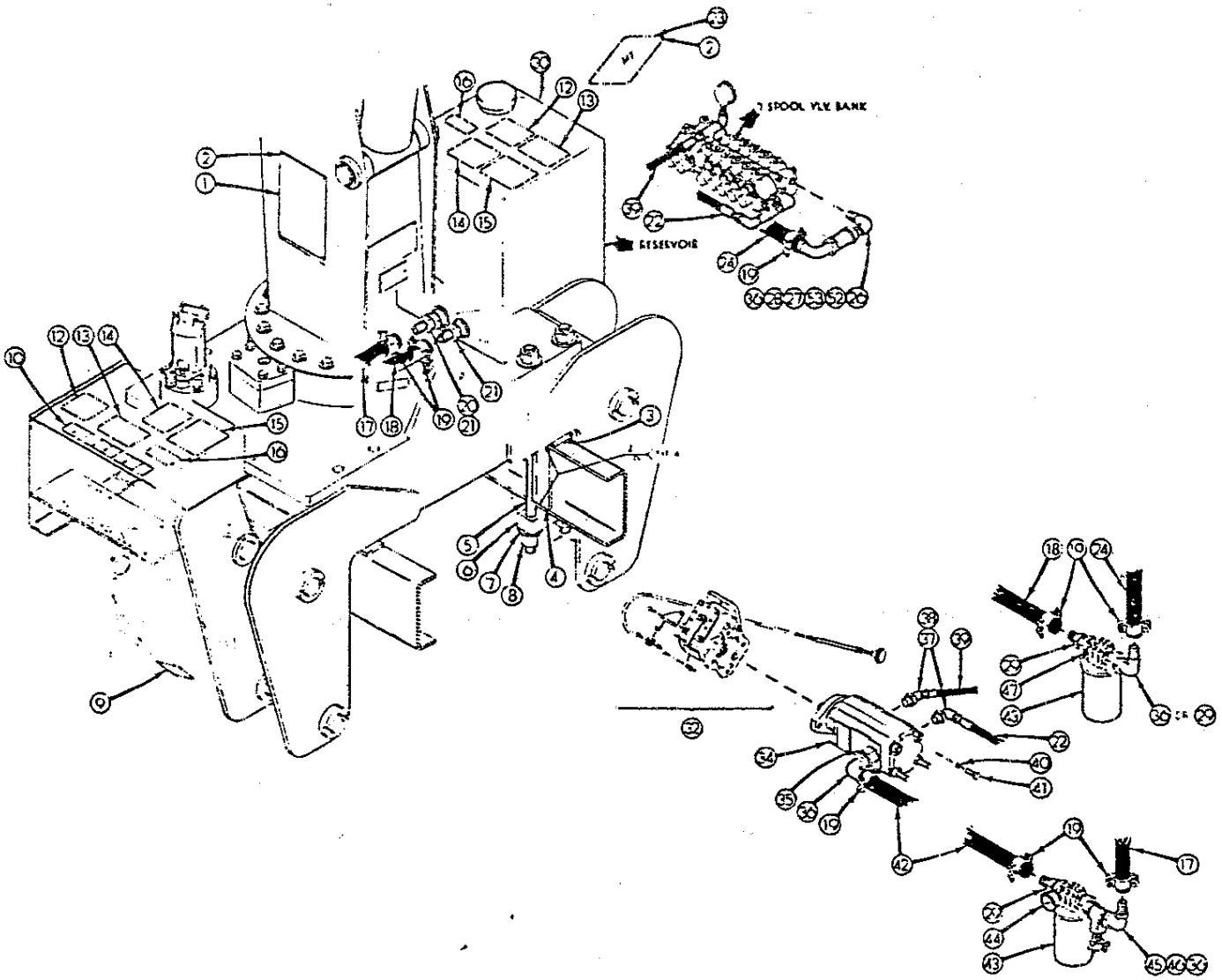
Power take-off manufacturers provide specific installation instructions on their products. These instructions should be followed when installing a PTO. The following steps are a guide in this application.

1. If the vehicle is new, drain the transmission oil into a clean container for reuse. If the vehicle is used, properly dispose of the oil.

2. Temporarily install the PTO with the proper gaskets and only two studs. Snug the PTO down and check the backlash for a maximum allowance of 1/32" to 1/16" (0.8 mm to 1.6 mm). If the backlash exceeds this amount, remove the gaskets and check backlash again until it is correct.

NOTE

It may be necessary to remove and modify the exhaust pipe to provide clearance for the PTO.



Item No.	Description	Qty	Item No.	Description	Qty	Item No.	Description	Qty
1.	Capacity Placard	2	19.	Hose Clamp	3	39.	1/2" ID Pressure Hose	1
2.	Pop Rivet	16	20.	Reducer Bushing	1	40.	Lock Washer	2
3.	Frame Flange Spacer	2	21.	Barbed Nipple	2	41.	Screw	2
4.	Frame Reinforcement Bar	4	22.	1/2" ID Pressure Hose	1	42.	1-1/4" ID Suction Hose	1
5.	Tie-Down Stud	8	23.	IMT Diamond	2	43.	Filter	2
6.	Clamping Plate	4	24.	1-1/4" ID Return Hose	1	44.	Vacuum Gauge	1
7.	Flat Washer	16	26.	Nipple	1	45.	Nipple	1
8.	Lock Nut	16	27.	Reducer Bushing	1	46.	Gate Valve	1
9.	Stabilizer Down Warning	2	28.	Coupling	1	47.	Plug	1
10.	Left Control Decal	1	29.	Barbed Nipple	3	48.	Filter Mounting Bracket	2
12.	Operation Caution	2	30.	Right Control Decal	1	49.	Screw	6
13.	Operation Warning	2	32.	PTO	1	50.	Lock Nut	2
14.	Operation Danger	2	34.	Hydraulic Pump	1	51.	Lock Washer	4
15.	Electrocution Hazard	2	35.	Adapter with O-Ring	1	52.	90° Elbow	1
16.	Oil Level Caution	2	36.	90° Barbed Nipple	4	53.	Nipple	1
17.	1-1/4" ID Suction Hose	1	37.	Adapter with O-Ring	2			
18.	1-1/4" ID Return Hose	1	38.	90° Street Elbow	2			

For a more complete description, refer to the PARTS section of this manual.

Figure C-2. Crane Installation

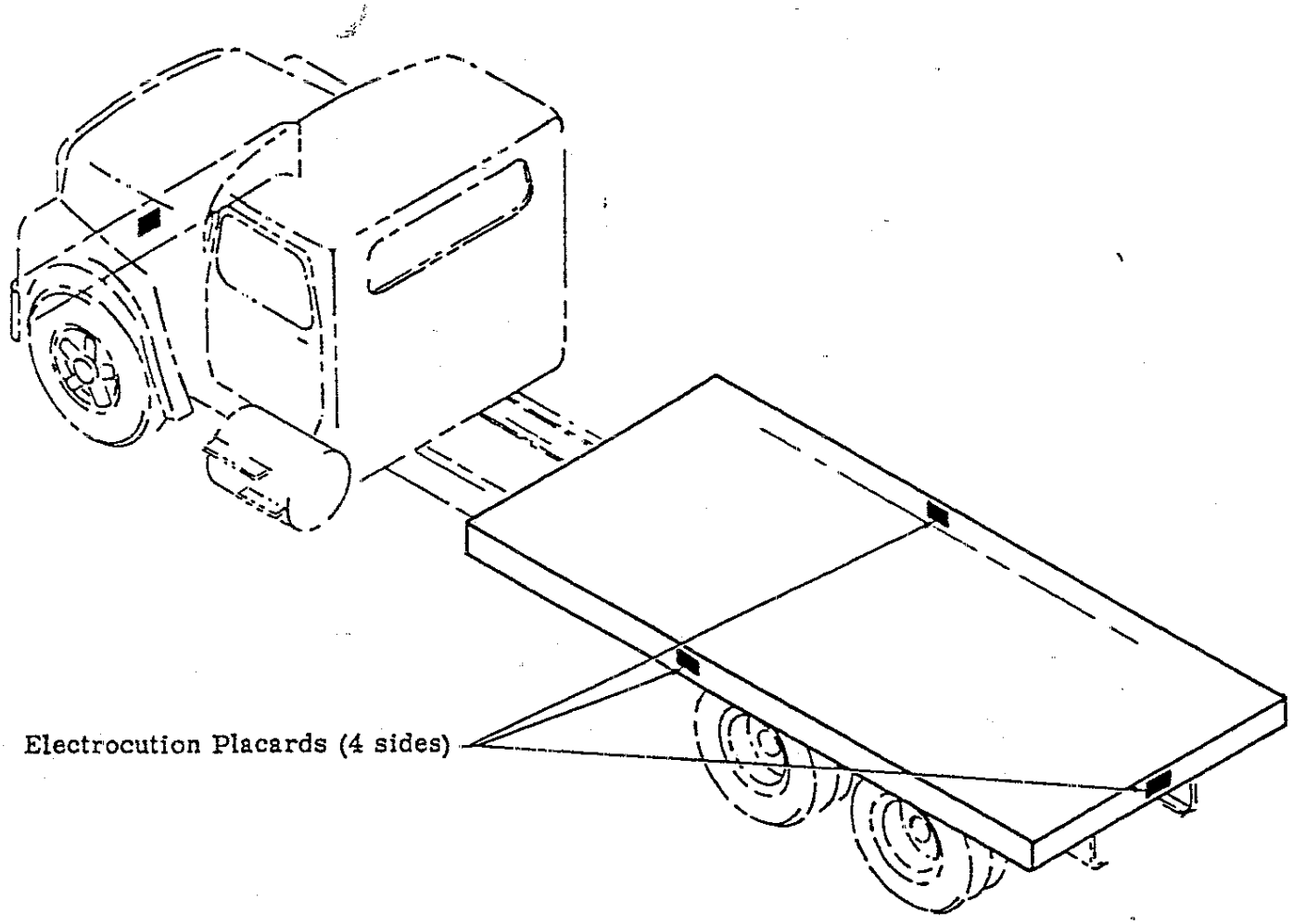


Figure C-3. Electrocution Hazard Decal Placement

3. Remove PTO and apply Permatex* to gaskets. If the holes for the studs are tapped through the transmission housing, apply Permatex to the studs and tighten them down. Make certain that the studs do not interfere with the transmission gears.

CAUTION

Avoid contact of Permatex with automatic transmission fluid.

4. Install the PTO and gaskets. Torque the nuts to 30-35 ft. lbs. (4.14 - 4.84 kg-m) for a 6-bolt PTO, 45-50 ft. lbs. (6.22 - 6.91 kg-m) for 8-bolt PTO's. Check the backlash again.

5. Install the shifter cable to suit conditions. Always allow a slight overshift on lever or knob to make certain PTO is fully engaged.

CAUTION

Avoid sharp bends in the shifter cable. All bends should have a minimum 6" radius. Tighter bends cause difficult operation of the shifter cable.

6. Replace the transmission oil. If the PTO is located below the transmission oil level, an additional quantity of oil will be required.

7. Start the engine, engage the PTO and allow it to run for 5 to 10 minutes. Check for leaks, unusual noise and proper operation.

8. Re-torque the mounting bolts.

3-2-3. PUMP INSTALLATION

Install the pump as follows:

1. Check pump rotation and bolt the pump to the PTO. Torque the mounting bolts (refer to the Torque Data Chart in the Appendix).

2. Install the adapters in the pump inlet and outlet. Use a thread sealer and adequately tighten fittings to prevent leaks.

3-2-4. DRIVELINE APPLICATION

The pump can be driven with a drive line as an optional method to the one given in Paragraphs 3-2-2 and 3-2-3. The following steps are a guide in this application.

1. Install the PTO (refer to Paragraph 3-2-2).

2. Loosely bolt the pump mounting bracket to the adjustable bracket.

*Registered trademark of Permatex Co.; Kansas City, Kansas.

3. Bolt the adjustable bracket to the truck frame at a point that will not exceed 48" (122 cm) from the PTO and will not cause a joint angle greater than 8° (0.14 Rad.).

4. Check pump rotation and install pump, pump end yoke and PTO end yoke.

5. Size, cut and weld the driveline to the necessary length. Ensure driveline balance. Allow 1" (2.5 cm) extra for PTO end yoke.

6. Install driveline, lock set screws and lubricate U-joints.

7. Ensure all mounting bolts are tight.

3-3. CRANE INSTALLATION

1. Use a lifting device capable of lifting the weight of the crane - 5780 lbs. (2,621 kg). Attach the lifting device to the lift bracket welded to the top of the main boom. Lift the crane, move the chassis into position under the crane and lower the crane onto the chassis in the desired position. Allow sufficient room between the crane and cab for mast rotation. Check for front to rear alignment.

2. Install the tie rods, clip bars, hardened flat washers and self-locking nuts to secure the crane base to the chassis. Power wrench the nuts tight.

CAUTION

Do not attempt to apply the same torque to the tie rod and self-locking nut as shown in the Torque Data Chart in the Appendix. Do not exceed 200 ft. lbs. (28 kg-m). Exceeding this torque value could damage either the chassis or crane base.

Power wrenching is not recommended until the lead thread of the insert is engaged by hand turning.

3-3-1. HYDRAULIC INSTALLATION

To install the hydraulic hoses, fittings, etc.:

1. Plumb the suction line filter as shown in Figure C-2.

2. Install the 1-1/4" suction hose between the reservoir outlet port and the suction line filter. Tighten the hose clamps.

3. Install the 1-1/4" suction hose between the suction-line filter and the pump inlet. Tighten the hose clamps.

4. Install the 1/2" pressure hose between the pump outlet and the inlet port on the valve bank.

5. Fill the hydraulic oil reservoir to the "FULL" mark.

6. Open the gate valve at the suction-line filter.

7. Start the vehicle engine and engage the PTO. Allow the system to run for about five minutes and then check the vacuum gauge on the suction-line filter (it should read less than 8" of mercury pull).

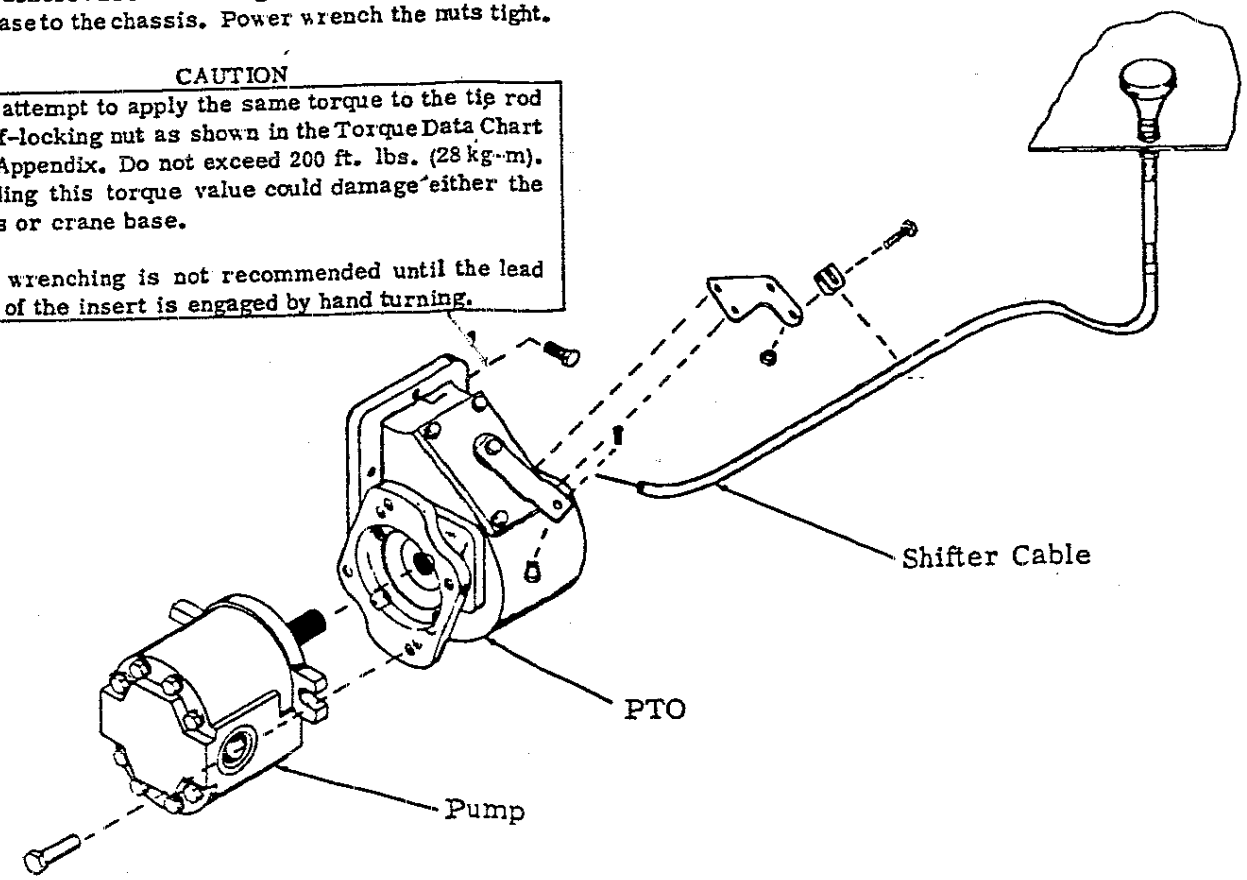


Figure C-4. PTO and Pump Installation

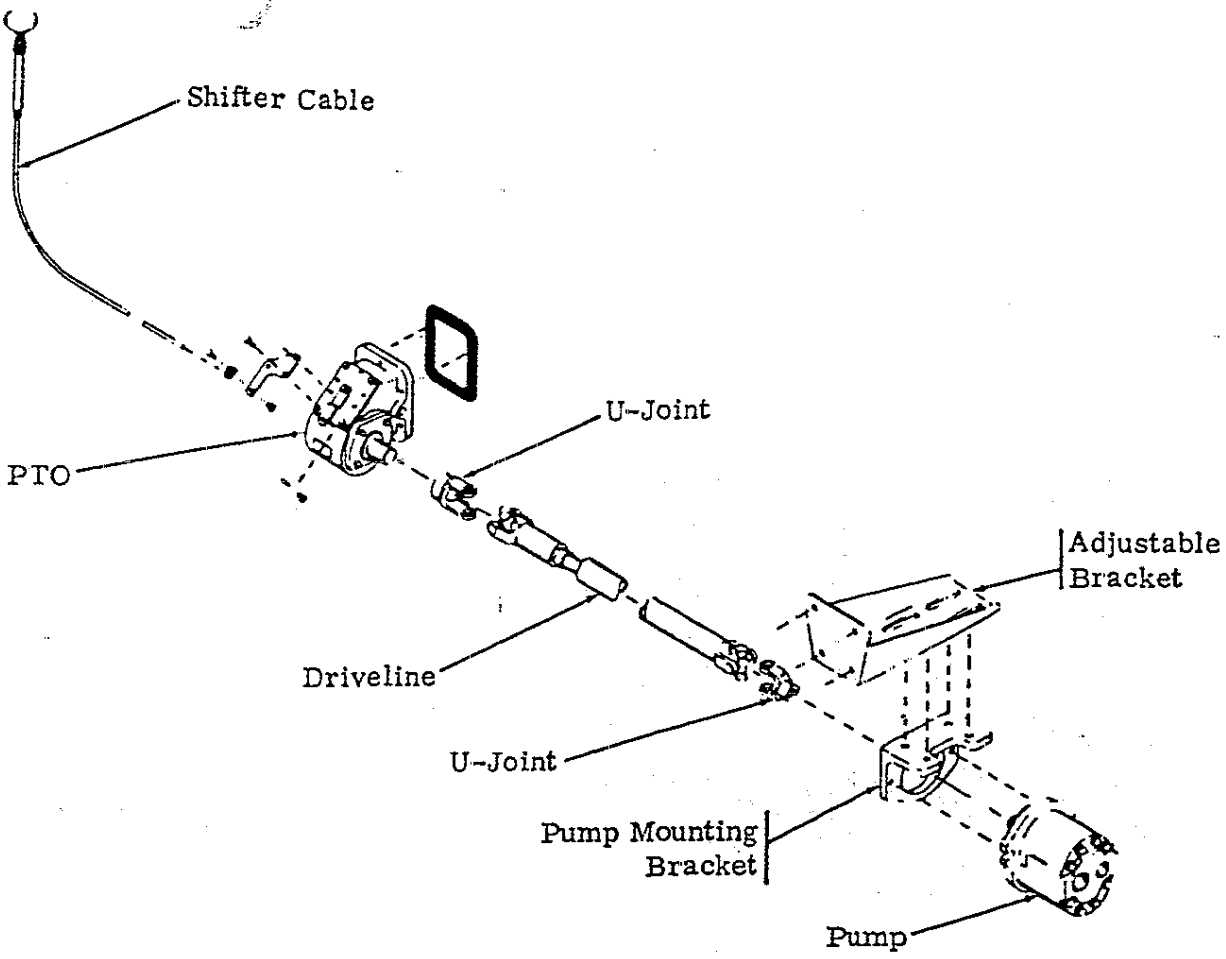


Figure C-5. Driveline Application

3-3-2. MANUAL THROTTLE CONTROL

1. Using the throttle control bracket as a drill template, locate and drill two (2) 1/4" diameter holes as shown in Figure C-6. Install the 5/16-18 self-tapping screws.

2. Assemble the throttle control to the bracket.

3. Route the cable under the truck cab and up behind the engine along the fire wall. Secure the cable to the frame members under the cab.

4. The cable should come toward the throttle linkage in a straight line to avoid binding (Figure C-7).

5. Anchor the cable housing to either the firewall or engine.

6. Drill a hole in the throttle linkage large enough to accomodate the wire core of the throttle cable.

NOTE

In some cases, the throttle linkage will already have a hole that is suitable for use.

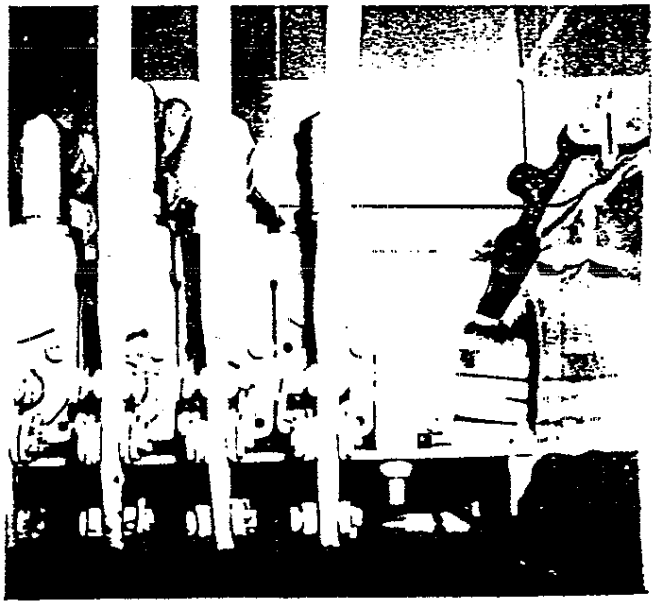


Figure C-6. Throttle Control Knob Installation

7. Slip the wire core through the hole in the throttle linkage and install the cable anchor.

NOTE

It will probably be necessary to cut the wire core and cable housing to length. The housing will always be shorter than the wire core.

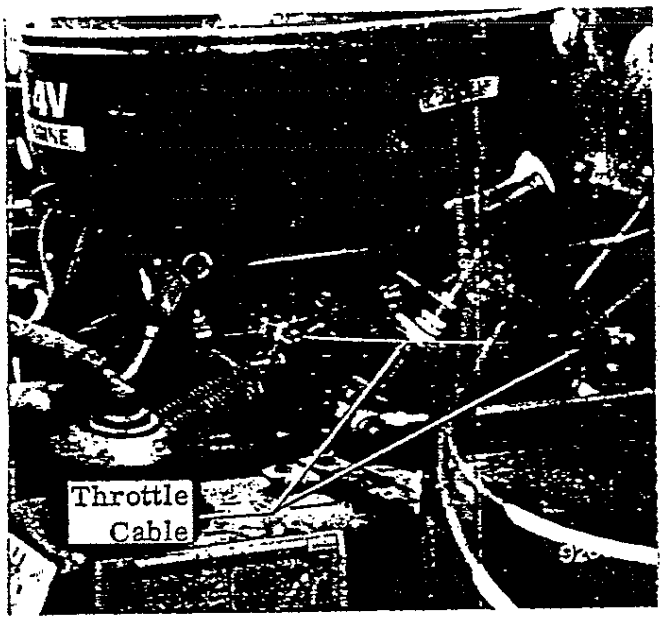


Figure C-7. Underhood Throttle Control Installation

3-4. ELECTRICAL INSTALLATION

3-4-1. ENGINE SPEED INSTALLATION

To install the engine speed control, proceed as follows (refer to Section 8 for the parts list):

1. Fabricate a bracket to adapt the cylinder mounting bracket to the vehicle engine. The bracket should align the center of the cylinder with the appropriate point on the throttle linkage. To find the appropriate point on the linkage, first determine whether the cylinder is to pull or push the linkage.

2. Determine which fittings are required to operate the throttle linkage - assemble as shown in Section 8.

3. Install the solenoid on the firewall of the vehicle.

4. Install the toggle switch under the dashboard. Route a wire from the "hot" (battery +) side of the ignition switch to the toggle switch. Connect the other side of the switch to one of the leads on the solenoid.

NOTE

It won't make any difference which lead the wire is connected to.

5. Drill a 15/32" hole at the operator's station and install the toggle switch.

6. Connect the other solenoid lead to the toggle switch at the operator's station.

7. Connect the other side of the switch to a good ground point.

8. Install the hoses and fittings between the solenoid and air brake manifold and the solenoid and air cylinder. Connecting the hose to the side of the cylinder will retract the cylinder when the solenoid is activated. Connect the hose to the end of the cylinder to extend the cylinder when the solenoid is activated.

3-4-2. AUXILIARY LIGHTING INSTALLATION

Install the light kit as follows (refer to Section 8 for the parts list):

1. Select a location near the operator's station for the switch bracket. Using the switch bracket as a template, drill two (2) 5/16" diameter holes. Install the bracket with the bolts, washers and nuts provided.

2. Using the light guard bracket as a template, locate and drill two (2) 5/16" diameter holes in the top of the main boom. Tap the holes - 3/8-16 thread.

3. Install the bracket on top of the main boom with the bolts and washers provided. Install the lamps on the brackets.

4. Strip about 3/4" (1.9 cm) of insulation from each of the lamp pigtails. Cut the 60" yellow wire in half and strip 3/4" (1.9 cm) of insulation from each end.

5. With the butt splices, connect a yellow wire to each of the lamp pigtails. Twist the opposite end of the yellow wires together and, with a butt splice, connect them to the 240" yellow wire.

6. Slide the loom over the yellow wire as far as it can go. Tape the loom to the yellow wires.

7. Route the loom down through the mast and base and over to the light switch. Cut the wire and loom to the proper length.

CAUTION

Make certain there is sufficient slack in the loom to allow for the full operating range of the crane's main boom.

8. Strip off 1/2" (1.3 cm) of insulation and install a crimp-on terminal. Fasten the terminal to the light switch.

9. Strip 1/2" (1.3 cm) of insulation from both ends of the black wire. Install a crimp-on terminal and connect it to the switch.

10. The other end of the wire may be connected to the main power terminal of the remote control junction box or the hot side (battery +) of the ignition switch.

Section 4. OPERATION

4-1. GENERAL

The crane is relatively simple to operate, however, prior to any work at job sites, the operator should thoroughly familiarize himself with the control operations, load limits and proper operating procedures and practices for the unit. In addition, practice job operations should be performed by the operator before putting the unit to a task. The operator's understanding of emergency measure execution is essential; he should be prepared to take emergency action at any time.

4-2. CONTROLS

4-2-1. VEHICLE CONTROLS

Power Take-Off Manual Shift Control - Transmission mounted, manual PTO's are usually installed with the shifting control knob located near the steering column. To engage the PTO, the knob is pulled out. To disengage the PTO, the knob is pushed in.

NOTE

In order to shift the PTO in either direction, the truck transmission must be in neutral and the clutch pedal depressed.

CAUTION

Power Take-Off should always be disengaged prior to moving the carrier vehicle.

Hand Brake - Securely set the hand brake prior to unit operation.

4-2-2. UNIT CONTROLS

The unit is equipped with dual control stations - one at each side of the vehicle. All controls have placards (Figure D-1) which indicate operating directions for the crane function desired. A hand throttle control is located at the driver's side only and provides engine speed control.

Main Boom - Push lever to lower and pull lever to raise.

Secondary Boom - Push lever to lower and pull lever to raise.

Rotation - Push lever for counterclockwise rotation and pull lever for clockwise rotation.

Stabilizers - Push lever to extend and pull lever to retract.

Hand Throttle - Rotate knob counterclockwise to increase engine speed and clockwise or push to lower engine speed to idle.

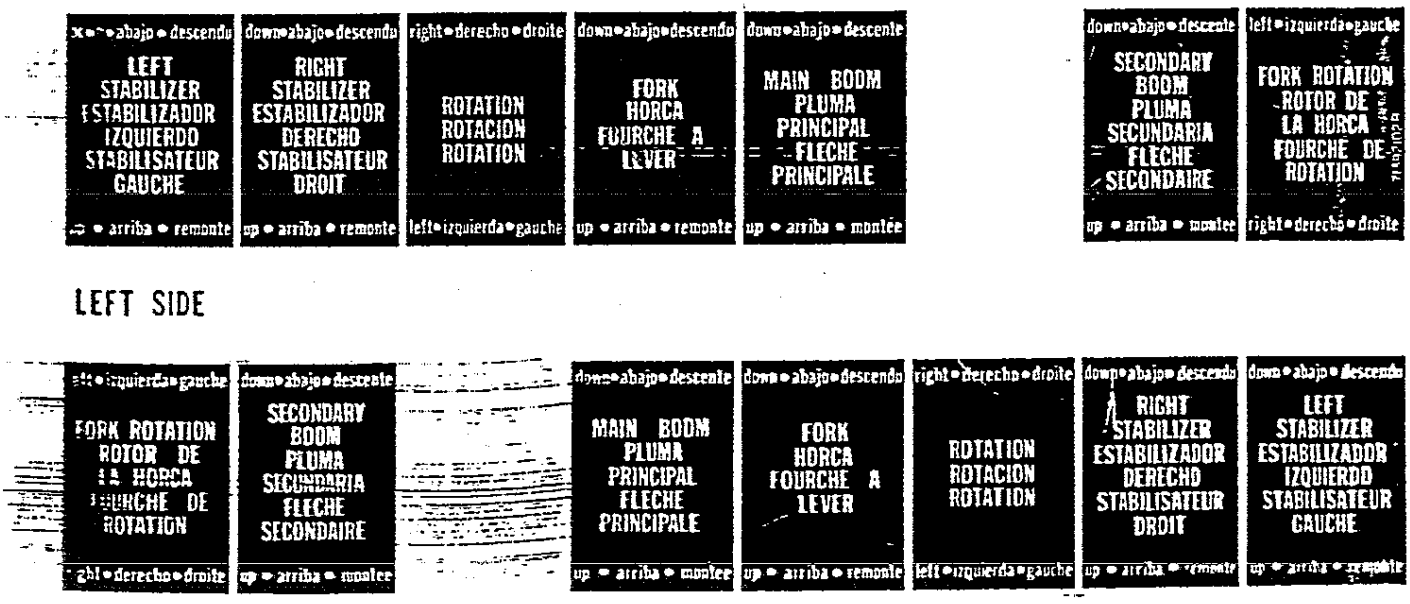


Figure D-1. Standard Crane Control Decals

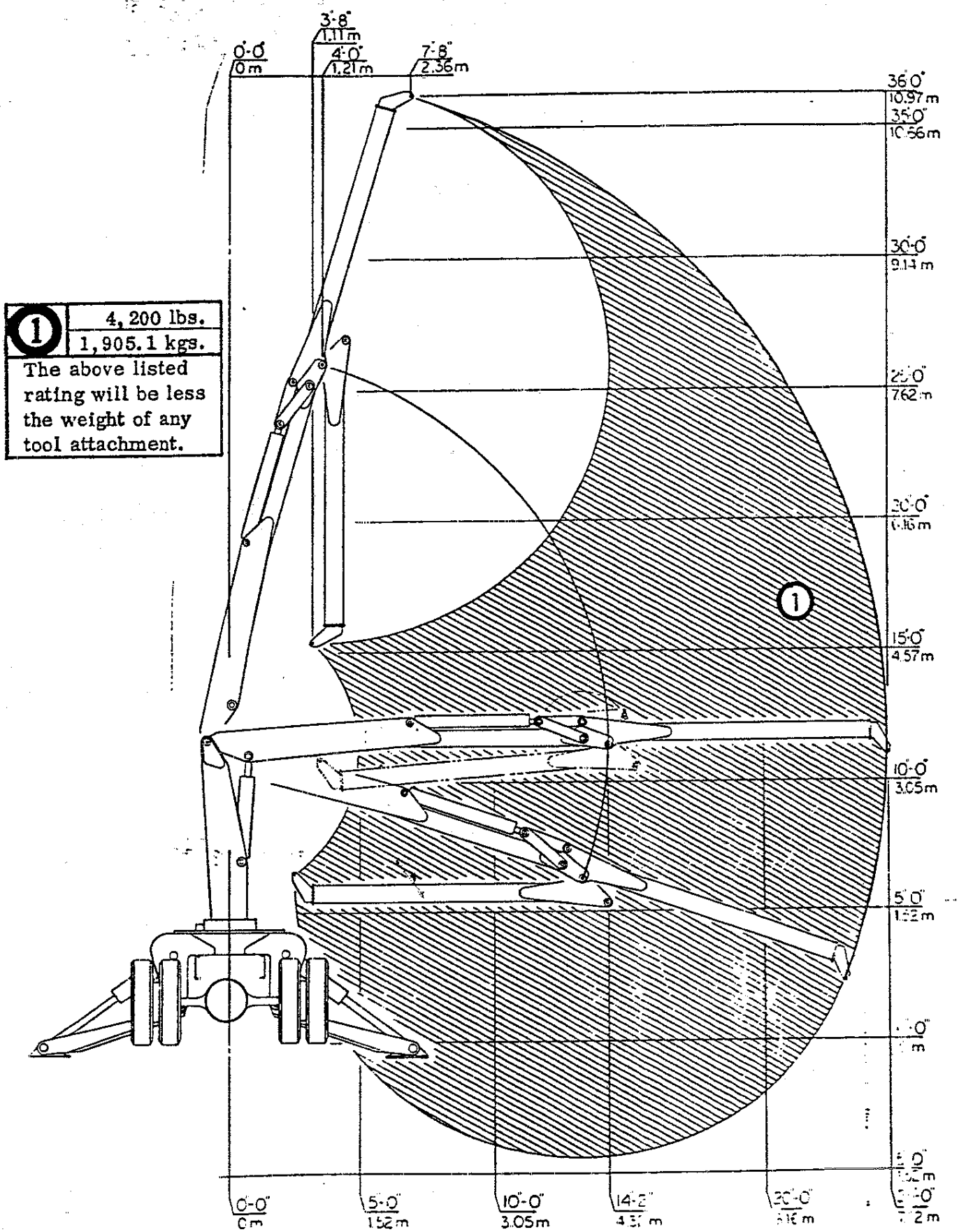
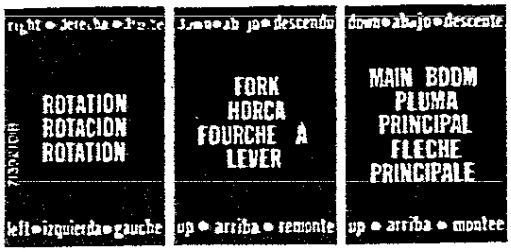


Figure D-3. Capacity Chart



Operator's Station

Crane Base

Figure D-2. Chair-Mount Crane Control Decals

4-3. SAFETY FACTORS

Three important factors in the safe operation of the unit are a competent operator, mechanical soundness of the unit and absolute assurance that the unit is not loaded to exceed its maximum rated capacities. The safety precautions contained in this section should be read carefully and observed at all times during unit operation.

4-3-1. LOAD LIMITS

The crane is designed to give satisfactory service if operated within maximum allowable load specifications stated on the unit's capacity placard (Figure D-3). The placard should be studied before lifting operations are started. Overloading may result in potentially serious safety hazards and shortened service life of the unit - exceeding the stated load limit for a given radius of operation can cause tipping or structural failure.

4-3-2. EQUIPMENT INSPECTION

Before operating the unit, always perform the safety checks outlined below. These procedures are vital to the detection of equipment malfunction and damage which may be potential safety hazards.

Structural Soundness - Inspect the unit for damaged members and loose nuts or bolts.

Hydraulic Oil Supply - With the crane in the stored position - all cylinders retracted - check oil level.

Leakage - Examine all visible hydraulic hoses for frays and blisters. Look for signs of lubricating or hydraulic oil leakage.

Controls - Make a short test for proper control operation.

Repairs - Before putting the unit into service, correct all observed defects and malfunctions.

This equipment check should be performed before every operation and as a periodic preventive maintenance cedure.

CAUTION

This equipment inspection does not satisfy the requirements of the Inspection Check List table in Section 5.

4-3-3. WORK STATION POSITIONING

The best location for the working unit is on firm, level and dry pavement or ground close to the job. Overhead obstructions on the work side of the unit should be avoided as much as possible.

Wheel chocks should be used when parking unit on a slope. If parking on a curbed roadway, turn front wheels toward curb when parked with the front of truck downgrade, and away from curb with rear of truck downgrade. At the work site, the vehicle should be parked with the grade. When cross-grade parking is necessary, restrict the load to compensate for the increased tipping risk.

4-3-4. POWER LINE PROXIMITY

Except where the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the crane have been erected to prevent physical contact with the lines cranes shall not be operated proximate to, under, over, by or near power lines only in accordance with the following:

1. For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.

2. For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or use twice the length of the line insulator, but never less than 10 feet.

3. In transit with no load and boom lowered, the clearance shall be a minimum of four feet.

4. It is recommended that a person be designated to observe the clearance and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.

Before the commencement of operations near electrical lines, the person responsible for the job shall notify the owners of the lines or their authorized representative providing them with all pertinent information and requesting their cooperation.

Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line.

Exceptions to this procedure, if approved by the owner of the electrical lines, may be granted by the administrative or regulatory authority if the alternate procedure provides sufficient protection and is set forth in writing.

ANSI B30.15 - 1973, Paragraph 15-3.4.2

In addition to the above mentioned safety measures, the operator must take into account sag, sway and deflection factors in allowing for proper clearances.

4-4. OPERATION

4-4-1. OPERATING RESTRICTIONS

Listed below are important points to remember while operating this unit.

1. ALWAYS depress the clutch pedal before engaging or disengaging the PTO.

2. NEVER swing a load so it passes over people.

3. ALWAYS stabilize the unit before attempting any lifting operations.

4. NEVER rotate the crane too fast with a load.

5. ALWAYS cycle the controls a few times to purge the air trapped in the cylinders and hoses before attempting a lifting operation.

6. NEVER operate the crane too close to a power line.

7. ALWAYS have a clear view of the work area.

8. NEVER exceed the rated lifting capacity.

9. ALWAYS repair any defects before placing the unit in service.

10. NEVER leave the operator's station with a load suspended in the air.

11. ALWAYS disengage the PTO before moving the carrier vehicle.

12. NEVER side-load the boom by dragging a load from the side.

4-4-2. ENGINE SPEED REGULATION

The delivery rate of the hydraulic pump determines the operating speed of the crane. In order for the crane to function at speeds stated in the Specifications, the pump must operate at the speed required for the proper delivery rate (required pump speed). To determine the required pump speed, it is necessary to know the rated capacity of the pump, the pump speed required for the rated capacity and the required delivery rate for proper crane performance. In the formula below:

C = Rated Pump Capacity

D = Delivery Rate Required for Proper Crane Performance.

RPM = Pump Speed Required for Rated Pump Capacity

$\frac{D}{C} \times RPM$ = Required Pump Speed

EXAMPLE

$\frac{D\ (9\ GPM)}{C\ (17\ GPM)} \times RPM\ (2000)$ = Required Pump Speed (1385)

To determine the engine RPM necessary for required pump speed, the required pump speed is divided by the engine to PTO ratio (PTO ratio is generally specified as a percentage (%) of engine speed).

$$\frac{\text{Required Pump Speed}}{\text{PTO Ratio (\%)}} = \text{Required Engine Speed (RPM)}$$

EXAMPLE

$$\frac{\text{Required Pump Speed (1385)}}{\text{PTO Ratio (70\%)}} = 1980 \text{ RPM}$$

When the engine to PTO ratio and pump capacity are not known, the information may be obtained from a local IMT dealer or from Iowa Mold Tooling Co., Inc. direct. To determine an unknown PTO ratio, it will be necessary to know the PTO and transmission model numbers as well as the make, model and year of truck. When the ratio is obtained, compute the proper engine speed. To obtain the proper pump capacity, it is necessary to know the make and model of the pump. Once the information has been obtained and the calculations made, enter the data on page 7-2.

Efficient operation of the unit is dependent upon proper pump speed. When operation is too slow, always check the pump speed when diagnosing the cause. An electric engine tachometer with accurate calibration may be used to check engine speed.

4-4-3. LOAD LIFTING

Capacity placards are located on both sides of the mast just above the operator's station. The structural capacities and permissible radii of operation stated on these placards should be carefully studied and strictly adhered to during equipment operation. All indicated placard loads include weight added by optional equipment - rotors, winches, etc. - and consideration must be given to this weight in load assessment.

NOTE

Capacity placards are intentionally located near the operator to assure ready reference in determining when a load can or cannot be handled.

Load limit information on the capacity placard is formulated on 85% of tipping.

NOTE

"Tipping" is defined as a tire breaking contact with the ground. In the de-rated zone of the stability chart, attempting to lift 100% of the rated load will result in "tipping" - lift only a percentage of the load as specified by Z% and Z_1% of the stability chart. Reducing the load in the de-rated zone will keep the vehicle's stability at 85% of tipping.

It must be understood that all load ratings are dependent upon compliance with the following:

1. The unit has been correctly installed on a factory aproved truck.
2. A satisfactory stability test has been performed.
3. The intended operation is to be carried out on level, solid footing with proper outrigger placement.

Each stated capacity is directly related to the radius of a given operation. The radius is measured from the load line to the center of rotation on the horizontal plane.

4-4-4. STABILITY RATINGS

Capacity ratings project unit stability to no more than 85% of tipping provided:

1. The vehicle on which the unit is mounted complies with factory requirements.
2. Factory installation instructions are followed when the unit is mounted on a vehicle.
3. Counter weight sufficient to supplement vehicle weight has been installed and meets factory specifications.
4. Tire inflation pressures meet requirements stipulated in the TIRE INFLATION TABLE in the APPENDIX.
5. The outriggers are in use, making proper contact with firm, level footing.

WARNING

The minimum curb weights shown do not ensure the unit will be stable. Actual stability ratings will be obtained from the initial start-up and testing procedures.

Stability rating for the crane mounted behind the cab on a conventional chassis with a 238" (605.5 cm) wheelbase and 172" (436.9 cm) cab-to-axle dimension is shown below (Table D-1). These specifications will provide complete 360° rotation stability based upon 85% tipping factor. Stability ratings for a rear-mounted crane will differ.

TABLE D-1. AXLE WEIGHTS

Front	(5,352 kgs.) 11,800 lbs.
Rear	(9,979 kgs.) 22,000 lbs.
Total	(15,331 kgs.) 33,800 lbs.

4-4-5. TASK PERFORMANCE

To operate the crane:

1. Position the crane as close to the job as possible on a firm, dry and level surface. Avoid overhead obstructions on the work side of the unit.
2. Set the auxiliary brake.
3. Depress the clutch pedal, shift the transmission into neutral and engage the PTO.
4. Operate the throttle control to achieve the proper engine speed (refer to Paragraph 4-4-2).

Refer to Page 7-10 for stability test procedure.

NOTE

The values given in the gray area are based on actual vehicle stability and do not take the front axle rating into consideration. Due to the capacity rating of the front axle, the loading 75° either side of the centerline over the cab must be severely restricted.

BOOM IN STORED POSITION (no payload) ACTUAL WEIGHTS

Front Axle: _____ lb.

Rear Axle: _____ lb.

Total: _____ lb.

DIMENSIONAL DATA

A: _____ in.

B: _____ in.

C: _____ in.

D: _____ in.

E: _____ in.

F _____ in.

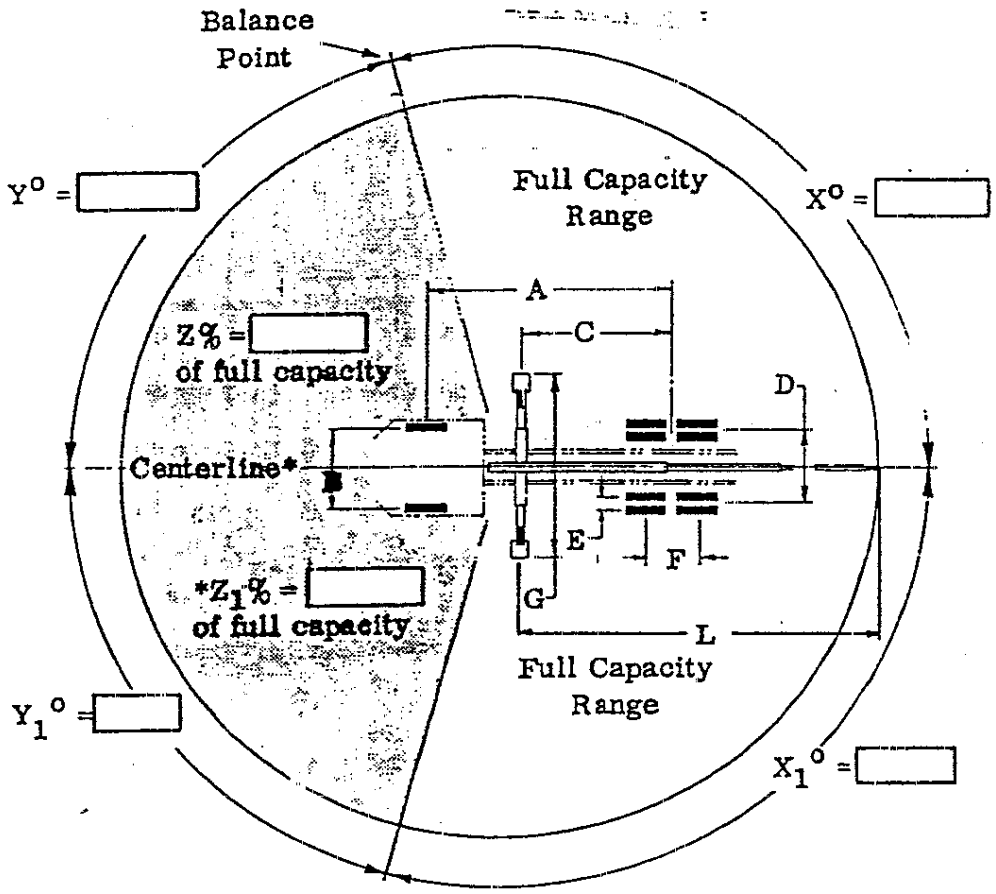
G: _____ in.

L: _____ ft.

X^o: _____ °

Y^o: _____ °

Z%: _____ %



= Derated Load Capacity (Z% or Z_1%)

Reach (per capacity chart)	Full Rated Load	x	Z% / 100	Z_1% / 100	= Derated Load for Z%	Derated Load for Z_1%
		x			=	
		x			=	
		x			=	
		x			=	
		x			=	

Figure D-4. Stability Chart

5. Extend and lower outriggers until firm ground contact is made. On soft ground, use bearing pads to retard sinking.

6. Raise the main boom.

7. Any of the functions may be operated to manipulate the crane to pick up a load.

4-5. SHUTDOWN

1. Rotate the crane until the boom is centered over the chassis.

2. Lower the main boom until the secondary boom rests on the boom support.

3. Raise and retract the outriggers.

4. Disengage the throttle control.

5. Depress the clutch pedal and disengage the PTO.

6. Release the auxiliary brake.

5-1. GENERAL

Proper maintenance on a regular schedule is essential to keep your unit operating at peak efficiency. This section outlines required maintenance information and service intervals. Personnel responsible for care of the unit should familiarize themselves with the service intervals and types of maintenance operations to be performed.

5-2. LUBRICATION

Maintaining the proper lubrication schedule will vary with climatic conditions and the amount of use the unit receives. The lubrication schedule (Table E-1) is intended to serve for a normal work load and moderate weather variance. Periods of heavy use would shorten service intervals.

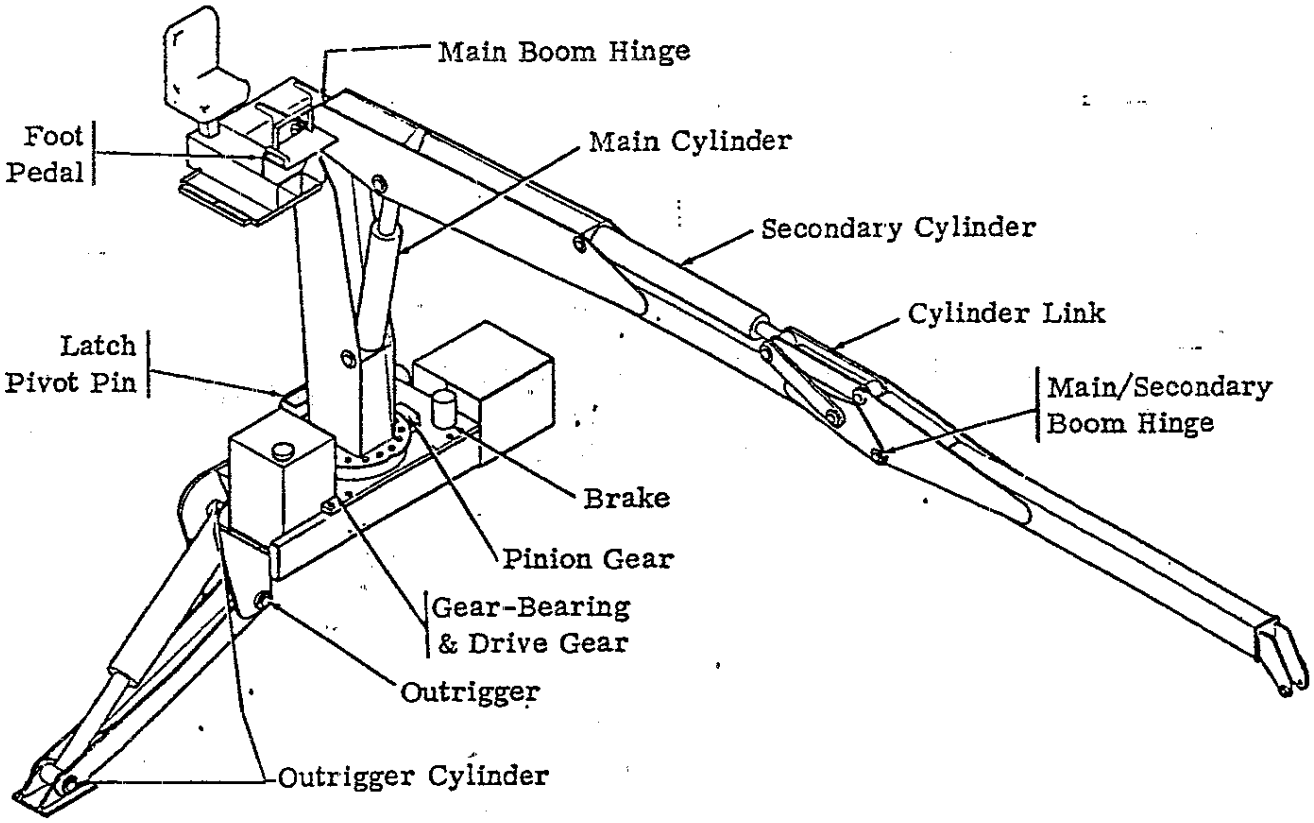


Figure E-1. Lubrication Points

TABLE E-1. LUBRICATION SCHEDULE

Application Point	Lubrication Product	Application Means	Interval
Pinion & Drive Gears	Shell Alvania 2EP or	Hand Grease Gun or	Weekly
Rotation Brake			
Gear-Bearing	Shell Retinax "A" or	Pneumatic Pressure	
Main, Secondary & Outrigger Cylinders	Equivalent	Gun	
Main, Secondary & Outrigger Hinge Pin			
Cylinder Link			
Rotation Foot Pedal			
Latch Pivot Pin			
Power Take-Off or Transmission	EP-90 Gear Oil	Fill to Check Plug	Monthly

5-3. HYDRAULIC SYSTEM

5-3-1. HYDRAULIC FLUID SPECIFICATIONS

Minimum viscosity specifications for hydraulic oil to be used in the crane are given in Table E-2. Any major oil company can supply products which meet these requirements.

Oils selected by the user for this class of equipment, in addition to meeting viscosity requirements, should have the following additives:

1. Anti-foam Inhibitors
2. Anti-oxidant Inhibitors
3. Rust Resistant Additives
4. Anti-wear Additives

At the time the crane leaves the factory, it is filled with Type "A" ATF.

To check the hydraulic reservoir oil level:

1. Operate the crane until the system is warmed up. Make certain that air is purged from the system (Paragraph 5-3-4).
2. Disengage the PTO to stop the hydraulic pump.
3. Remove the cap on the reservoir and visually check the oil level. The level should be near the top of the fill screen.

NOTE

Some cranes are equipped with a sight gauge in the side of the reservoir.

5-3-2. HYDRAULIC OIL DETERIORATION

Contamination of the hydraulic oil by solvents, water, dust or other abrasives will result in premature breakdown of the oil's antifoam, lubrication, anti-rust and viscosity properties. Prolonged exposure to water or high operating temperatures (above 180°F) will cause an increase in the oxidation rate, producing varnish-forming materials and sludge in the oil.

Periodically, a sample of the hydraulic oil in the system should be drawn off and its condition checked for breakdown. To check oil quality:

1. Place oil sample in a clean glass.
2. Smell oil to detect a burnt or rancid odor.
3. Examine the oil for a cloudy or dark color.
4. Allow the sample to stand for several minutes and inspect it for water which will settle to the bottom. Water can result from a leak in the system or condensation due to temperature extremes.

When any of these conditions is observed, the system should be purged and filled with new oil.

5-3-3. HYDRAULIC SYSTEM PURGING

The oil should be changed in the reservoir and complete system after 800 hours of operation (or every six months, whichever occurs first) and after pump or other major hydraulic component failure.

Purging the system requires a new oil supply sufficient to completely fill the reservoir, lines, cylinders, etc., and an extra quantity for loss during this procedure. To minimize oil loss during this process, operate the truck engine at a low RPM.

During purging, new oil is supplied to the pump suction line through the reservoir fill cap and old oil is drained from the valve bank return hose.

Two operators are required during the purging operation: one to operate the crane controls and the other to regulate pump output (engine speed).

CAUTION

Do not allow the reservoir oil level to drop below 1/3 capacity during this operation.

TABLE E-2. HYDRAULIC FLUID SPECIFICATIONS

Ambient Temperature Range	0-90	Below 32	32-90	Above 90
Minimum Pour Point, °F	-30	-25	+10	+10
Maximum Viscosity, SSU @ 0°F	4000	4000	---	---
Minimum Viscosity, SSU @ 100°F	140-195	100-130	150-200	200-315
Minimum Viscosity, SSU @ 210°F	48	41	43	47
Minimum Viscosity Index	139	90	90	90

Arctic conditions present special requirements which are not within the scope of this table and must be given special consideration and individual analysis. Consult your oil supplier for the proper fluid for working under these severe conditions. In addition, electric hydraulic oil reservoir heaters are available to improve operation at extremely low temperatures.

1. Locate the unit in an area which provides solid, level footing and space to accomodate the full operating range of the crane.

2. Stabilize the unit with the outriggers. Move the crane to either side of the truck and extend the main, secondary and extension cylinders.

3. Disengage the PTO, drain the hydraulic oil reservoir, remove the suction line filter and drain all hoses. Disconnect the pressure hose from the pump, drain and reassemble. Replace the suction line filter element (Paragraph 5-3-5-3) and reassemble system.

NOTE

The method of waste oil disposal is left to the discretion of service personnel.

4. Remove the reservoir return line and direct the flow into a sump or waste container. Plug the drain port on the reservoir and fill with new oil.

NOTE

Be thoroughly familiar with the following steps and be prepared to perform them in an uninterrupted sequence or stop the engine at the end of each step. If this is not done, excessive oil waste will occur.

5. Start the truck engine, depress the clutch, shift the transmission into neutral and engage the PTO. Rotate the crane 90°, lower the secondary boom to the lowest position and lower the main boom.

6. Rotate the crane toward the rear center of the vehicle, raise the outriggers and kill the engine.

7. All components of the system are now purged. Replace the return line filter cartridge and reinstall the return line on the reservoir.

8. Check the reservoir oil level and add oil to the "FULL" mark.

5-3-4. PURGING AIR FROM THE SYSTEM

Air that is trapped in the cylinder will cause an erratic, "bumpy" motion. To expel the air, hold the affected control open after the function has "bottomed out". Move the function in the opposite direction and again hold the control open. Attempt to operate the crane in the normal manner to determine if the air has been purged.

5-3-5. HYDRAULIC COMPONENTS

5-3-5-1. System Relief Pressure

System relief pressure is factory-set at 2350 PSI (165.2 kg/sq. cm.). However, with time the spring may weaken and lower the system relief pressure. When this occurs, the relief valve unloads more often than it should with the rated load and causes the oil to overheat. To check the system relief pressure:

1. Start the truck engine, depress the clutch pedal, shift the transmission into neutral and engage the PTO. Allow the system to idle until it is warmed up.

2. Raise either outrigger until the cylinder is fully retracted. Continue to hold the valve open and read the pressure on the pressure gauge. A pressure reading of less than 2350 PSI (165.2 kg/sq. cm.) should be corrected. Refer to paragraph 6-2-5.

5-3-5-2. Cylinder Holding Capabilities

The cylinders are equipped with holding valves that prevent sudden movement of the cylinder rods in the event of a hydraulic hose or other hydraulic component failure. The valve is non-adjustable and failure is unlikely. However, if a malfunction is suspected, it may be checked in the following manner.

1. With a full rated load, extend the cylinder in question and kill the engine.

2. Operate the valve to retract the cylinder. If the cylinder "creeps", replace the valve. If the cylinder does not "creep", the valve is serviceable.

5-3-5-3. Filter Element Replacement

The unit contains a 25-micron suction line filter and a 25-micron return line filter (Figure E-2) for removal of contaminating particles. To avoid residue accumulation in the reservoir and to protect hydraulic system components - valves, pump, cylinders, etc. - they must have the filter elements replaced after 50 hours of new-unit operation and every 200 hours thereafter. Periodically check the vacuum gauge reading on the suction line filter for a reading greater than 8" of mercury pull. If the gauge reads higher than 8", it could damage the pump due to pump cavitation. In addition, the filter elements should be replaced 50 hours after the repair of a major hydraulic component.

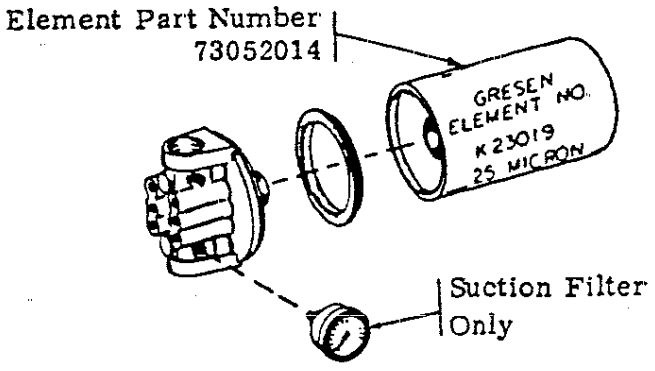


Figure E-2. Hydraulic Filter

To change filter cartridges:

1. Kill the engine.

2. Replace the cartridge with a new one ensuring proper rubber seal seating and tightening as much as possible with both hands.

NOTE

When changing the suction line filter, always close the gate valve at the reservoir first.

4. Open the gate valve, engage the PTO and test the system for leaks.

5-4. PERIODIC INSPECTION

The following inspection check list is designed to assist you in keeping the vehicle and crane unit in safe operating condition. Items which apply to the unit should be checked before unit operation and the carrying vehicle should be inspected before moving the equipment.

TABLE E-3. INSPECTION CHECK LIST

ITEM	DESCRIPTION	FREQUENCY		
		Daily	Weekly	Monthly
	VEHICLE CHECK LIST			
Battery	Inspect for correct fluid level. In hot, dry weather, increase inspection frequency.			
Engine oil	Check for proper level. Make sure oil level on dipstick us above "ADD" mark.			
Brakes (service & parking)	Operate both systems to assure positive, efficient functioning.			
Radiator	Inspect coolant level. Check for anti-freeze protection in cold weather.			
Safety equipment, warning signals & lights.	Inspect all devices and lights for proper operation.			
Suspension	Check for broken or weak springs.			
Tires & wheels	Inspect tires for bruises, cuts and proper inflation. Check for loose wheel stud nuts, bent wheels and mud lumps or stones between dual wheels.			
	UNIT CHECK LIST			
Walk-around inspection	Visually inspect unit on all sides for hydraulic leaks, loose parts and obvious damage to external structural members.			
Mounting bolts	Inspect and check torque - power-wrench tight.			
Rotation system	Check for excessive backlash (play) between the pinion gear and gear-bearing. Normal variation is not to exceed 1/8" - 3/16"			
Structural damage	Inspect all structural members for broken welds and fatigue cracks. Check booms for structural defects such as bends, weld cracks or dents.			
Power-take-off	Check for transmission lubrication. Check security of mounting bolts, leakage and correct alignment.			
Controls	Check for excessive wear of components and contamination by lubricants or other foreign matter.			
Leakage	Check for oil leaks in rotation system.			
Rotation system mounting bolts	Check bolt torque on top and bottom of gear-bearing (refer to Torque Data Chart in the APPENDIX).			
Crane hook	Check for deformation or cracks. For hooks with cracks or having more than 15% in excess of normal throat opening or more than 10° from the plane of the unbent hook must be discarded.			
Electrical	Check auxiliary lighting, etc. for proper functioning.			
	Check for signs of excessive deterioration, dirt and moisture accumulation.			
Hydraulic reservoir	Check for proper oil level.			
Hydraulic oil	Check quality of hydraulic oil.			

TABLE E-3. INSPECTION CHECK LIST (Continued)

ITEM	DESCRIPTION	FREQUENCY		
		Daily	Weekly	Monthly
UNIT CHECK LIST (Continued)				
Hydraulic hose	Visually check for evidence of leakage at the hose surface or its function with the metal end couplings.	■		
	Check for blistering or abnormal deformation. Check for excessive abrasion or scrubbing on the hose.		■	
Pump & motor	Check for loose bolts, leaks at joints between sections, shaft seal leaks, unusual noise or vibration, loss of operating speed and excessive heating of oil.			■
Hydraulic filter	Check vacuum gauge reading with engine running and PTO engaged. A vacuum of 8" of mercury or higher indicates an obstructed filter.	■		
Control valves	Check for leaks, cracks in housing and improper return of spool to neutral position.	■		
● Cylinders	Check for leaks, scored, nicked or dented rods, dented case, deformed rod-pin boss and rust on rod.			■
● Holding valves	Conduct a holding test with loaded boom to assure proper operation of holding valve.		■	

Written, dated and signed inspection reports and records shall be made monthly on critical items in use such as brakes, crane hooks, wire ropes, hydraulic cylinders and hydraulic relief pressure valves. Records shall be kept where readily available.

A copy of ANSI B30.15 - 1973 may be obtained by contacting the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017.

● Safety related - critical item.

ANSI B30.15 - 1973

5-4-1. CRANE INSPECTION

Every three months or more often when equipment is subjected to heavy use, the following inspections should be performed in addition to the preceeding routine Inspection Check List.

5-4-1-1. Main and Secondary Booms

1. Check structural defects evidenced in weld cracks dents or bends.
2. Check slide pads for wear.
3. Check main, secondary and extension boom cylinder pins for proper installation. Check pivot pin bushings for excessive wear.

5-4-1-2. Mainframe

1. Check control valve bank and all other fittings for oil leaks and tightness.
2. Check all roll pins and lock rings on main pin assemblies for proper installation.
3. Check torque on all unit mounting bolts - should be power-wrench tight (not more than 200 ft. lbs.).
4. Check for loose bolts, fatigue cracks or corroded structural members.

5-4-1-3. Mast and Rotation System

1. Check mast housing for cracks.
2. Check for proper rotation function by making several stop-start operations. Maximum allowable free-play at mast front should be 1/8" - 3/16"
3. Check for proper gear mesh in turntable gear-bearing. Check motor and gear mounting bolts for tightness.
4. Check bolt torque of mast mounting bolts - should be 300 ft. lbs. (41 kg-m) for 3/4" bolts.

5-4-1-4. Hydraulic System

1. Cylinders:
   A. Check rods for damage such as scarring, nicks, dents and rust on out-of-service units.
   B. Check for leaks at weld joints and rod seals. Check for drift indicating leakage around piston rings or defective holding valve.

C. Check cylinder barrel for dents.

2. Hydraulic Pump:

A. Check for leaks at shaft seal and section joints.

B. Check for drop in operating speed.

C. Check hydraulic oil for excessive heating.

D. Check bolts and fasteners for tightness. Note any unusual vibration or noise.

3. Hydraulic Control Valves:

A. Check spools for sticking and failure to return to a neutral position.

B. Inspect for leaks at joints and spools.

C. Make sure relief valve reaches correct pressure setting.

D. Inspect valve housing for cracks.

5-4-1-5. Underdrive and Pump

1. Inspect for proper transmission gear to PTO engagement.

2. When supplied, inspect driveline "U" joints for securing cap tightness and adequate lubrication.

3. Check mounting bolts on pump and PTO for tightness.

6-1. GENERAL

This section includes disassembly, repair and assembly instructions for many of the components on the crane.

6-2. HYDRAULIC SYSTEM

Certain procedures involving the hydraulic system require special consideration for proper functioning and service life of the unit. These steps are to be taken whenever a hydraulic component is disconnected.

1. ALWAYS relieve internal hydraulic pressure before proceeding with the repair.

2. NEVER allow foreign matter - dirt, water, metal particles, etc. - to enter the hydraulic system through the open connection. Seal the connection as completely as possible. If dirt does get in, a filter element change is required after about 50 hours of operation (Paragraph 5-3-5-3).

3. ALWAYS cycle all of the controls after completing a repair. This will eliminate air that is trapped in the cylinders, hoses, spool valves, etc. and avoid "bumpy", erratic behavior during actual working conditions.

4. ALWAYS check for hydraulic leaks after a repair. A high-pressure leak is hazardous and must be repaired before putting the unit to work.

6-2-1. CYLINDERS

The following list of tools will be a definite asset in the disassembly and repair of IMT cylinders:

1. Spanner wrench - Part number 3Y140510. Fits all IMT cylinders.

2. Needle-nose pliers - For removal and replacement of seals.

3. Ice pick or sharp awl - For removal and replacement of seals.

4. Plastic hammer - Used with the spanner wrench for head and piston installation.

6-2-1-1. Main and Secondary Cylinder Removal

The main and secondary cylinders are of the same type; therefore, the same disassembly and repair instructions apply to both. To remove the cylinders:

1. Support the crane with the mast and boom at a 90° angle and the secondary and extension booms parallel to the ground.

2. Kill the engine.

3. Relieve the internal hydraulic pressure (cycle the controls a few times).

4. Disconnect the hydraulic hoses from the cylinder.

CAUTION

Get help when removing the cylinder. Avoid dropping the cylinder and causing an injury or damaging the cylinder.

5. Remove the rod end pin.

   A. Remove the retaining ring and machinery bushing.

   B. Hold the cylinder up and drive out the rod end pin.

6. Remove the base end pin in the same manner as the rod end pin.

6-2-1-2. Outrigger Cylinder Removal

1. Start the truck engine and engage the PTO. Extend the affected outrigger out and down until the pad is resting on an 8-inch thick block. Kill the engine.

2. Remove the rod end pin.

CAUTION

It may be necessary to retract the cylinder slightly to relieve the pressure exerted on the pin. Any attempt to force the pin at this time may damage the pin or bushings.

3. Wrap a chain hoist or cable around the rod between the cylinder case and the pin boss. Wrap the chain or cable in a rag to protect the plated, machined surfaces on the rod. Slowly retract the rod.

4. Raise the rod-end of the cylinder to a vertical position. Disconnect the hydraulic hoses from the cylinder port block.

5. Wrap a second chain or cable around the cylinder case just in front of the port block (between the port block and the cylinder head).

6. Take up the slack in both hoists, remove the base end pin and lift the cylinder.

To install the cylinder:

1. Lower the cylinder into position until the base-end pin boss lines up with the hole on the base. Make certain the port block is toward the outrigger arm and not facing upward. Install the pin bushing and groove pin.

2. Raise the rod end to a vertical position and connect the hydraulic hoses to the port block.

3. Lower the cylinder to a horizontal position. Extend and retract the rod one complete cycle to evacuate air in the system. Check for leaks.

4. Lower the cylinder and extend the rod until the pin boss lines up with the hole on the outrigger leg. Install the pin, bushing and groove pin.

6-2-1-3. Cylinder Disassembly

CAUTION

If solvent is used to clean the internal cylinder components, all traces of solvent must be removed. Any residual will damage the seals.

WARNING

Do not use compressed air to assist in withdrawing the piston/rod assembly. The use of compressed air may result in propelling the piston/rod assembly out of the cylinder and may cause serious injury or death.

NOTE

If the cylinder is being repaired due to a worn seal, we recommend replacing all components found in a seal kit. The small additional expense may save you expensive equipment-down time in the future.

1. Thoroughly wash the exterior of the cylinder case. Blow dry with compressed air.

NOTE

After the case has been washed, proceed with disassembly in a clean environment, i. e. one that is free of dust and dirt.

3. Place the cylinder on a flat surface near a vise. Slip a pin through the pin boss and clamp the pin in the vise (Figure F-1).

CAUTION

Do not clamp the cylinder in the vise. It may damage the cylinder.

4. Unscrew the head (Figure F-2) in a clockwise direction with the spanner wrench. Withdraw the head from the cylinder case.

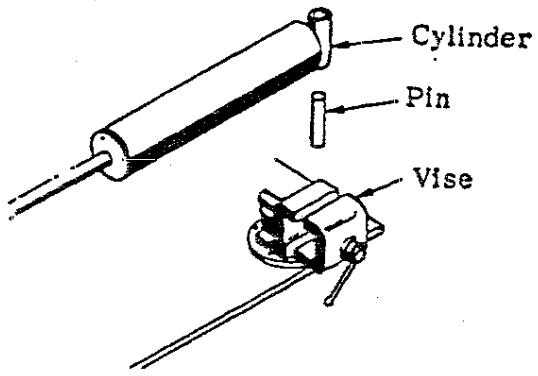


Figure F-1. Securing Cylinder

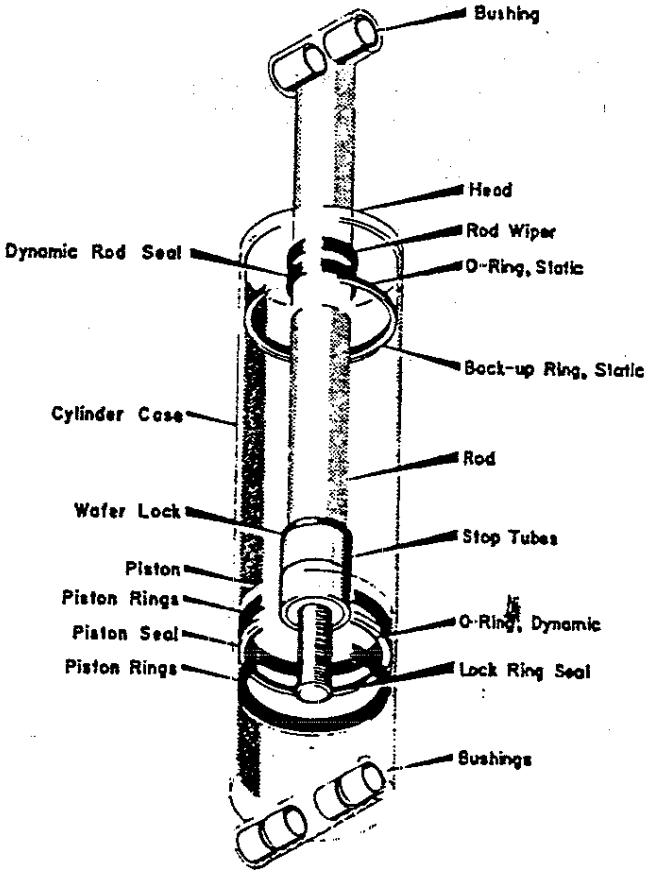


Figure F-2. Cylinder Layout

5. Secure the rod pin boss in the same manner as the base pin boss (Figure F-1).

6. Unscrew the piston from the rod with a spanner in the same manner as the head.

CAUTION

Do not clamp the machined surface of the rod in the vise. Damage to the rod will result.

7. Remove the wafer-lock and the stop tubes from the rod. The wafer-lock was crushed to secure it and will have to be broken to remove it.

CAUTION

Make certain that the rod is not damaged during removal of the wafer-lock.

8. Slide the head off the rod.

9. Inspect the cylinder interior and the rod for dents nicks, scratches, etc. and replace if necessary.

CAUTION

Failure to replace a damaged rod or cylinder may result in leaks and poor performance. Further equipment down-time will occur to remedy this problem.

NOTE

Further work should be done in a warm environment- 70° F (21°C) or warmer. This makes the seals more flexible and easier to work with.

10. Work a slack section into the head seal static o-ring and pick it up out of the groove (Figure F-3). Lift the static back-up out of its groove with the needle-nose pliers.

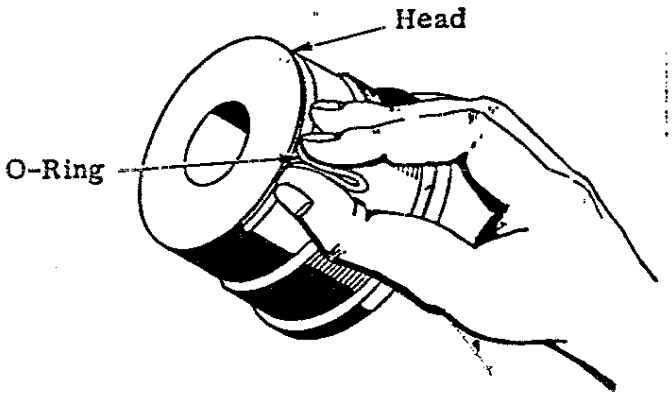


Figure F-3. O-Ring Removal

11. Pinch the lip of the rod wiper with the needle-nose pliers and pull it out of the head.

12. Position the head with the top of the head up and puncture the dynamic rod seal with the ice pick or awl. Pry it out of the groove and push it on through the head (Figure F-4).

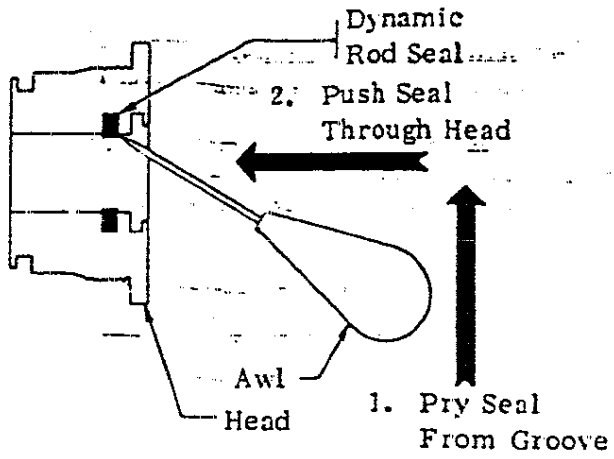


Figure F-4. Dynamic Rod Seal Removal

13. Spread the piston rings, slip them over the land and off the end of the piston nearest to the ring.

14. Carefully lift the dynamic piston seal out of the groove with a thin blade such as a putty knife blade. Take care not to nick the edges of the groove. Twist and break the seal.

CAUTION

Damaging the edges of the groove is likely to cause premature seal failure.

15. Prick the companion o-ring with a pin or needle and lift it out of the groove. Roll it off the end of the piston.

16. Pry the lock ring from its seat in the bottom of the piston.

17. Clean the piston, head, rod and cylinder case. Dress any nicks and gouges in the head and piston that may have occurred during disassembly.

6-2-1-4. Cylinder Assembly

NOTE

Use all of the seals in the seal kit. It may save you expensive down-time in the near future.

1. Install the companion o-ring. Make certain it is free of twists.

2. Slide the piston seal carefully into position.

CAUTION

Work the piston seal carefully into position from the top of the piston using the assembly groove. Do not attempt it from the bottom of the piston - you may stretch the seal and render it useless.

3. Slide the piston rings over the lands and allow them to snap into position in the grooves.

NOTE

Power-down and power-out outrigger cylinders do not use the metal piston rings. They use the dynamic piston seal only.

4. Carefully press the lock ring into position.

5. Install the static back-up and the o-ring. Make certain there are no twists in the o-ring.

6. Position the head with the rod wiper pocket "up". Grasp the dynamic rod seal with the needle-nose pliers (Figure F-5).

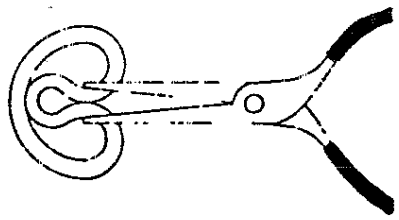


Figure F-5. Dynamic Rod Seal Installation

CAUTION

Do not apply too much pressure to the rod seal or you may cut it with the needle-nose pliers.

7. Insert the dynamic rod seal into the head and allow it to snap into position. Use your fingers to help it if necessary.

8. Install the rod wiper.

9. Lubricate the inside diameter of the head with a non-fibrous bearing grease such as Lubriplate*.

10. Carefully slide the head onto the rod. Make certain that the rod wiper does not catch on the rod when it is first started. Slide the head all of the way onto the rod and up to the pin boss.

11. Slide the wafer-lock and stop tubes onto the rod.

12. Lubricate the entire threaded area of the rod and the inside of the piston with non-fibrous bearing grease.

13. Secure the rod as shown in Figure F-1 and screw the piston onto the rod by hand. You should be able to get the piston almost all the way onto the rod before using the spanner wrench.

CAUTION

Check to make certain that the lock ring stays in position. It must remain in position or leaks may occur resulting in poor performance.

14. Torque the piston onto the rod at 250 ft. lbs (35 kg-m). Impact the wrench three times with a heavy plastic hammer while maintaining the torque (Figure F-6).

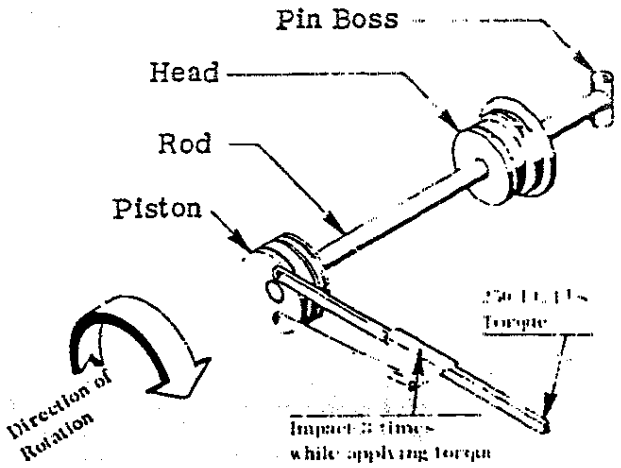


Figure F-6. Piston/Rod Assembly

15. Generously lubricate the outside diameter of both the head and piston with non-fibrous bearing grease. Also lubricate the threads and beveled area of the top of the cylinder case.

16. With a side-to-side or up-and-down motion, work the piston into the cylinder and past the threads and beveled area of the top of the cylinder case.

17. Slide the piston into the cylinder. With a rotating motion, work the o-ring and the back-up ring past the threads and hand tighten the cylinder head.

18. Secure the cylinder (Figure F-1) and torque the head in the same manner as the piston.

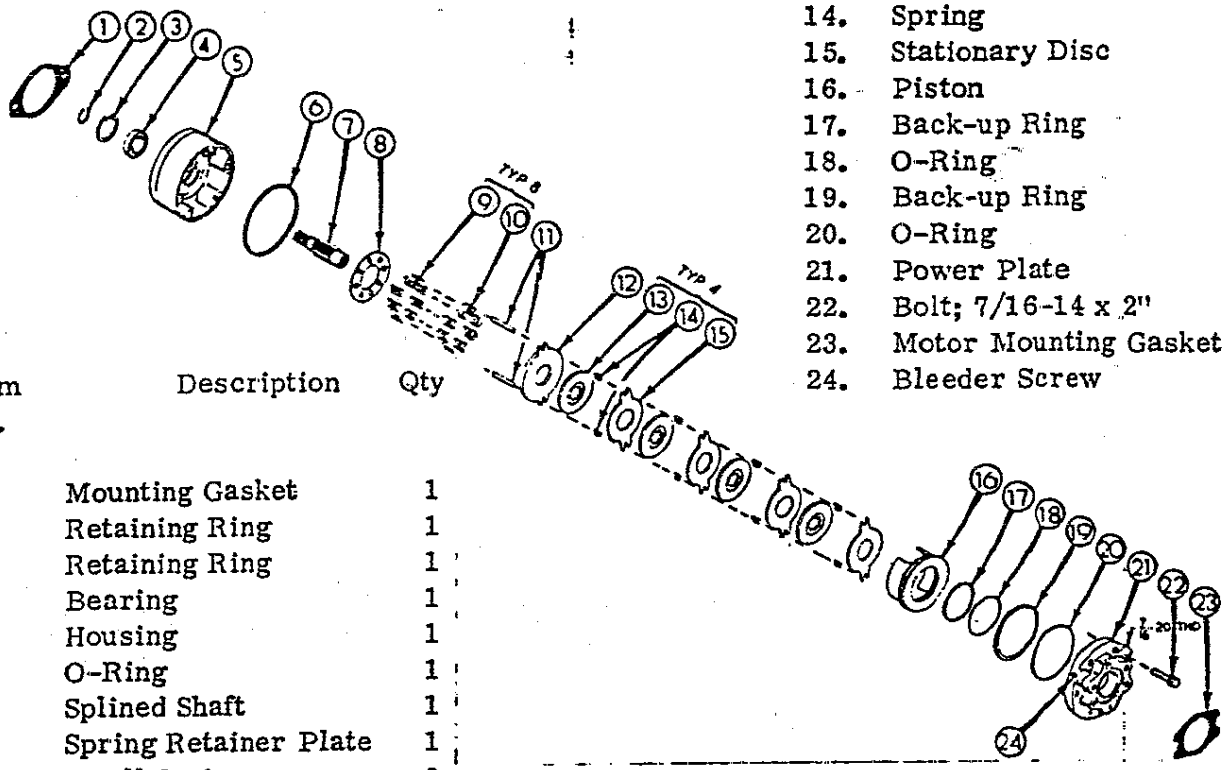
19 Install the holding valves and their o-rings. Make certain that the o-rings are in good condition and properly positioned.

6-2-2. HYDRAULIC BRAKE REPAIR

To repair the hydraulic brake:

1. Disconnect and cap the hydraulic hoses to the motor and brake.

*Lubriplate is a registered trademark of Fiske Brothers Refining Co., Newark, New Jersey



Item No.	Description	Qty
1.	Mounting Gasket	1
2.	Retaining Ring	1
3.	Retaining Ring	1
4.	Bearing	1
5.	Housing	1
6.	O-Ring	1
7.	Splined Shaft	1
8.	Spring Retainer Plate	1
9.	Small Spring	8
10.	Large Spring	8
11.	Torque Pin	2
12.	Primary Disc	1
13.	Rotating Disc	4
14.	Spring	8
15.	Stationary Disc	4
16.	Piston	1
17.	Back-up Ring	1
18.	O-Ring	1
19.	Back-up Ring	1
20.	O-Ring	1
21.	Power Plate	1
22.	Bolt; 7/16-14 x 2"	4
23.	Motor Mounting Gasket	1
24.	Bleeder Screw	1

Figure F-7. Hydraulic Brake Repair

2. Remove the bolts (2) securing the motor to the brake and remove the motor. The motor must be lifted straight up off the brake and may require the use of a pry bar or large common screwdriver.

3. Remove the bolts (2) securing the brake to the base of the crane. Lift the brake straight up off the drive gear.

4. Plug the hydraulic port on the brake and thoroughly wash the exterior with warm, soapy water and blow dry with compressed air.

CAUTION

If the hydraulic port isn't plugged, the brake must be serviced immediately. Failure to comply may result in rust inside the brake.

5. Remove the bolts holding the brake housing together.

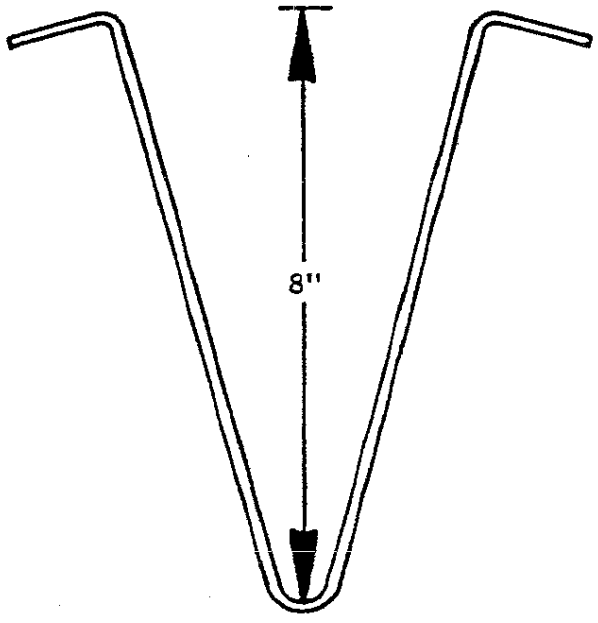


Figure F-8. Brake Assembly Tool

CAUTION

The brake is spring-loaded. When the bolts are removed, it may separate by itself and parts may be lost.

6. Lift the piston, rotation discs and stationary discs out of the brake housing.

7. Remove the large retaining ring and push the shaft and bearing out of the bottom housing.

8. Replace any excessively worn discs and all o-rings and back-up rings.

To assemble the brake:

1. Install the springs and torque pins in the bottom of the brake housing.

CAUTION

Make certain the discs are clean and free of oil or other contaminants.

2. Install a stationary disc, spring and rotation disc in the sequence specified. The spring slides over the torque pins as do the slots in the stationary discs. Continue until all discs and springs are in position.

NOTE

Due to spring pressure, the stack of discs is higher than the walls of the brake housing. A second person will be needed for the following operations.

3. Bend a coat hanger or other stiff wire as shown in Figure F-9. Insert the tips of the hanger in through the shaft opening in the bottom housing until the tips of the hanger extend above the stack of discs. Spread the tips and pull the stack of discs down into the bottom housing. This will keep the springs and stationary discs aligned on the torque pins.

4. Have another person install the piston and top housing while holding tension on the hanger. Start all four bolts before releasing the hanger tension but do not tighten the bolts.

5. Install the shaft and bearing through the bottom housing. Wiggle the shaft back and forth while rotating it back and forth until the rotation discs are lined up and will slide over the shaft.

NOTE

If the bolts were over-tightened in step 4, it will make alignment of the shaft more difficult.

6. Install the large retaining ring to secure the bearing.

7. Evenly tighten the four bolts and torque to the appropriate value (refer to the Torque Data Chart in the Appendix).

8. Install the brake and rotation motor on the crane base. Connect the hydraulic hoses.

9. Start the engine, engage the PTO and make several start/stop operations. Swing the crane at least five times in both directions to purge the air in the system.

10. Check the hydraulic reservoir level with all cylinders retracted and fill if necessary.

6-2-3. CONTROL VALVE REPAIR

To disassemble the valve section:

1. Remove the section from the valve bank.

2. Remove the load check plugs (Figure F-12).

NOTE

Some valve sections have relief valves instead of load check plugs. Remove the relief valves.

3. Remove the two fillister head screws securing the handle bracket to the body.

4. Remove the screws securing the bonnet to the valve body.

5. Carefully slide the spool with spring and spring collars out of the valve body.

CAUTION

Do not damage the machined surfaces of the spool or valve body.

6. Remove the screw securing the spring and spring collars to the spool. Use a screwdriver blade in the handle slot of the spool to keep it from rotating.

CAUTION

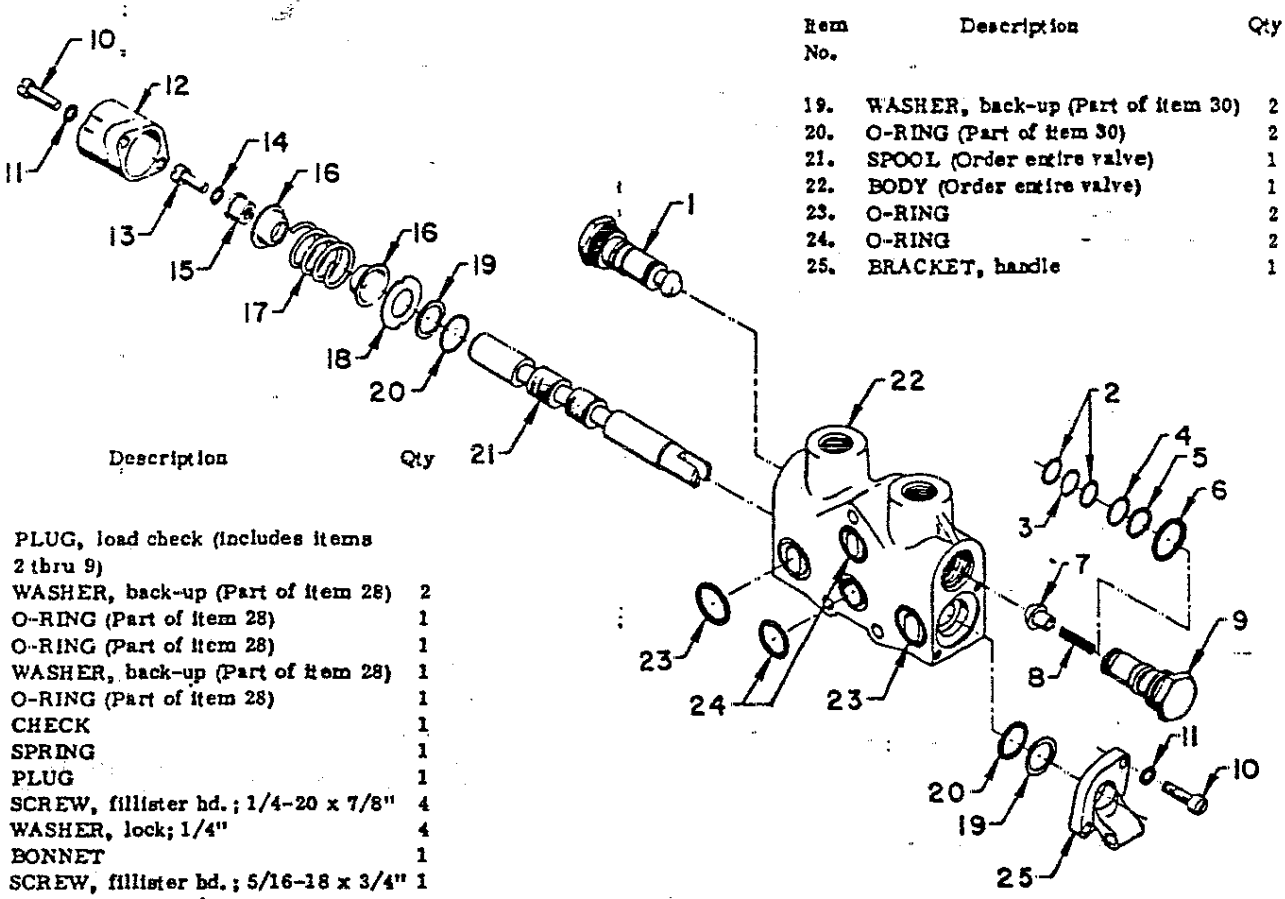
Do not clamp the spool in a vise – it may damage the spool surface.

7. Remove and discard all seals and o-rings.

8. Thoroughly wash all parts in clean solvent such as trichloroethane and blow dry with a low pressure air hose.

WARNING

Use only in a well-ventilated area. Incoordination and impaired judgement may occur at vapor exposures from 500 ppm – 1000 ppm. Dizziness, drowsiness, loss of consciousness and even death can occur at increasing levels of exposure. When involved in fire, trichloroethane emits highly toxic and irritating fumes.



Item No.	Description	Qty
1.	PLUG, load check (includes items 2 thru 9)	
2.	WASHER, back-up (Part of Item 28)	2
3.	O-RING (Part of Item 28)	1
4.	O-RING (Part of Item 28)	1
5.	WASHER, back-up (Part of Item 28)	1
6.	O-RING (Part of Item 28)	1
7.	CHECK	1
8.	SPRING	1
9.	PLUG	1
10.	SCREW, fillister hd.; 1/4-20 x 7/8"	4
11.	WASHER, lock; 1/4"	4
12.	BONNET	1
13.	SCREW, fillister hd.; 5/16-18 x 3/4"	1
14.	WASHER, lock; 5/16"	1
15.	COLLAR	1
16.	COLLAR, spring	2
17.	SPRING	1
18.	PLATE, retainer	1
19.	WASHER, back-up (Part of Item 30)	2
20.	O-RING (Part of Item 30)	2
21.	SPOOL (Order entire valve)	1
22.	BODY (Order entire valve)	1
23.	O-RING	2
24.	O-RING	2
25.	BRACKET, handle	1

Figure F-9. Control Valve Service

CAUTION

Before proceeding, check that all parts are dry. Any residual solvent may damage the seals.

9. Prepare an oil bath of SAE 10 oil. Soak all parts in oil prior to assembly.

CAUTION

Handle spool with extreme care. Contamination or damage to the surface of the spool will prevent it from functioning properly.

1. Assemble the spool, spring and spring anchors.

2. Install the back-up washers and o-rings in the valve body. Install the retainer plate.

3. Slide the spool assembly into the body and install the bonnet.

4. Install the handle bracket.

5. Assemble the seals on the load check plugs and install the plugs.

6. Install the valve section in the valve bank.

7. Test operate the system.

8. If the valve section has a relief valve:

   A. Hold the control open until the function bottoms out.

   B. Continue to hold the control open and check the reading on the pressure gauge.

   C. Add or take out shims as necessary to Achieve the proper relief pressure. Adding shims increases the pressure.

6-2-4. RELIEF VALVE ADJUSTMENT

The relief valve is provided to prevent the user from placing too much strain on the hydraulic components. The hydraulic system of the crane is set to operate at 2350 PSI with an optimum oil flow of 10 GPM from each of the pump sections.

WARNING

Setting the relief pressure higher than 2350 PSI is an unsafe practice and should not be attempted. Excessive relief pressure may damage equipment. Only an authorized IMT representative shall adjust the relief pressure and then re-seal the relief valve. A broken seal on the relief valve will void the warranty on the crane.

6-2-5. NON-REPAIRABLE COMPONENTS

The following hydraulic components are considered to be non-repairable and must be replaced if defective.

1. Counter-balance holding valves
2. Hydraulic rotation motor
3. Winch motor
4. Rotator motor

6-3. BEARINGS

6-3-1. TURNTABLE GEAR-BEARING

1. Raise the secondary and main booms to a point where they are parallel with the ground. Support the crane in this position.

WARNING

If you use a hoist to support the crane, make certain that the hoist is capable of lifting the crane.

2. With power off, cycle the controls a few times to relieve internal hydraulic pressure.

WARNING

If a holding valve is defective, the boom may lower when the hose is disconnected.

3. Disconnect the hydraulic hoses at the spool valves. Mark the hoses to identify their locations on the valve bank for later assembly.
4. With crane in a fully supported position, remove the 18 bolts around the base of the mast.
5. Carefully lift the crane while simultaneously feeding the hydraulic hoses up through the base. Set the crane aside where it won't be in the way.

CAUTION

Do not lift the crane too quickly or damage to the hoses may result.

6. The turntable gear-bearing is now exposed. Remove the drain plug from the reservoir and drain the oil.

CAUTION

Hydraulic hoses from the PTO must be disconnected before attempting to turn the base upside down.

7. Turn the base upside down.
8. Disconnect the lubrication line from the gear-bearing.
9. Remove the 23 bolts securing the gear-bearing to the base. Support the gear during this operation to make certain the gear doesn't fall.
10. Thoroughly clean the top of the base and bottom of the gear-bearing. The mating surfaces must be clean and dry - no oil or grease. Install the gear-bearing with the ball loading plug located next to the pinion gear (Figure F-13). Install the bolts and hardened steel flat washers using Loctite 262* on bolt threads (refer to instructions on container).
11. Check the backlash between the gear-bearing and pinion gear (Figure F-13) with a feeler gauge. Allowable backlash is 0.025 - 0.050". Shift the gear-bearing to adjust the backlash.
12. Torque the gear-bearing mounting bolts to 500 ft. lbs. Make certain the backlash is still within tolerance.
13. Assemble the crane to the base the reverse of disassembly.
14. Start the unit and slowly cycle all of the controls to evacuate air trapped in the hydraulic system. Simultaneously, check for leaks.
15. Check the fluid level in the reservoir and fill if necessary.

6-3-2. PINION GEAR AND DRIVE GEAR BUSHINGS

To remove the pinion gear bushings:

1. Rotate the crane until the notch on the mast base plate is positioned over the pinion gear.
2. Remove the pinion gear cover.
3. Locate and remove the retaining ring on the bottom of the pinion gear under the base.
4. Lift the pinion gear up and out of the intermediate gear. Slide the intermediate gear out of the way.
5. Install the bearing removal tool as shown in Figure F-14.

NOTE

The newer cranes have the top bushing machined flat on one side. If the top bushing is not flat on one side, it will have to be notched in order to clear the gear-bearing. Use a chisel to cut the bushing.

*Registered trademark of Loctite Corp.; Newington, CT

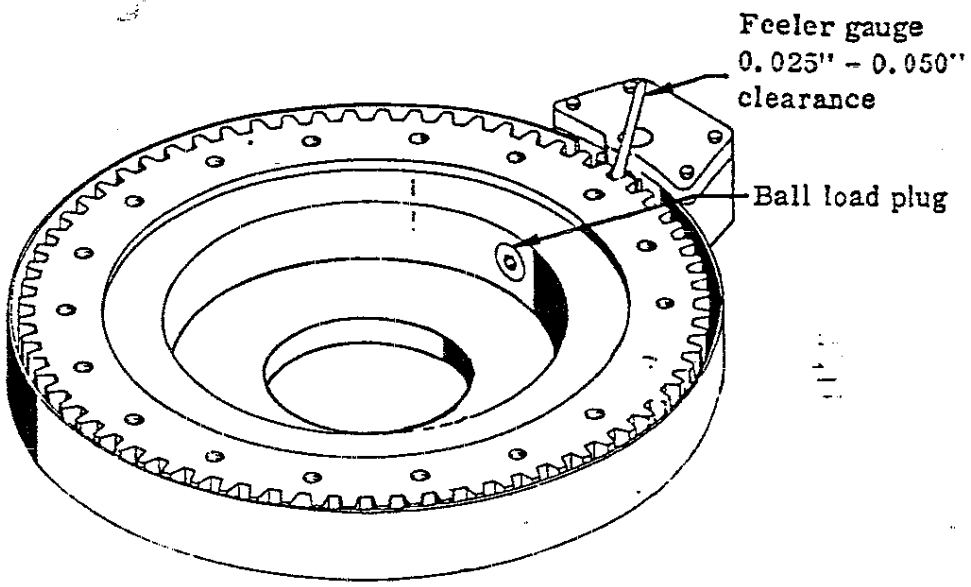


Figure F-10. Gear-Bearing Installation

6. Apply power to pull the bushings up and out of the base.

NOTE

Power may be supplied by a simple hand pump or by an air-over-hydraulic intensifier pump.

7. To install the bushings, assemble the tool as shown in Figure F-15. The flat side of the ring bushing set and top bushing fits against the gear-bearing. A spacer is installed and then the hydraulic jack.

8. Apply power to press the bushings into place.

9. Install the pinion gear and intermediate gear. Install the retaining ring on the bottom of the pinion gear. Lubricate the pinion gear.

10. Install the pinion gear cover.

To remove the drive gear bushings:

1. Disconnect the hydraulic hoses and remove the rotation motor.

2. Remove the grease plate on the bottom of the drive gear.

3. Install the tool as shown in Figure F-14. Apply power to pull the bushings and gear upward.

4. Reassemble the tool as shown in Figure F-15. Press the new gear and bushings into place.

5. Install the grease plate and rotation motor. Lubricate the drive gear.

6. Connect the hydraulic hoses to the motor.

7. Start the engine, engage the PTO and test actuate the rotation motor. Check for leaks.

8. Rotate the crane at least five times in both directions to purge the air trapped in the rotation motor.

6-3-3. CYLINDER PIN BUSHINGS

1. Remove the cylinder (refer to the appropriate paragraph).

2. Press the bushings out of the boss with a hydraulic press and install the new bushings.

3. Install the cylinder.

6-3-4. BOOM HINGE PIN BUSHINGS

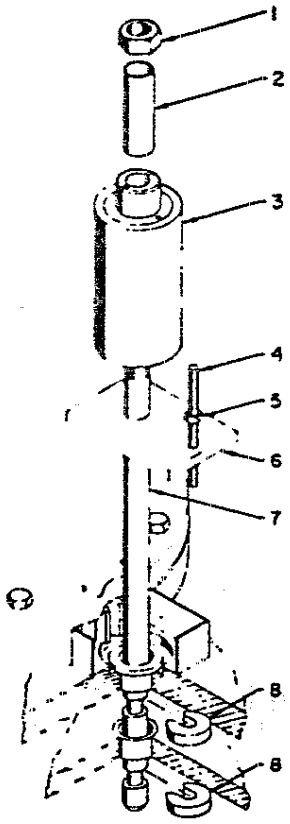
1. Disconnect the hydraulic hoses to functions that are located beyond the defective bushing (i. e. disconnect the extension cylinder hydraulic hoses to service the secondary/main boom hinge pin).

2. Support the boom(s) that are to be removed. Use an overhead lifting device that is capable of supporting the load.

3. Remove any cylinder pins that secure the boom.

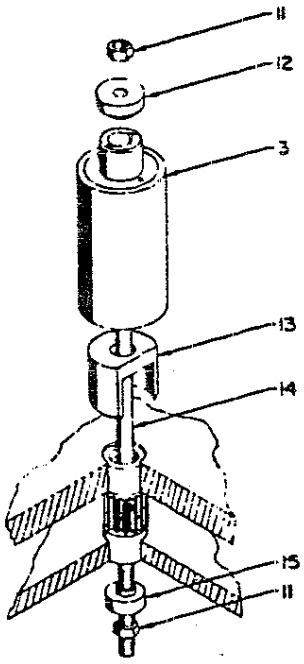
4. Remove the retaining ring and machinery bushing from the hinge pin. Drive the pin out.

5. Use a hydraulic press to press the bushings out of the pin boss.



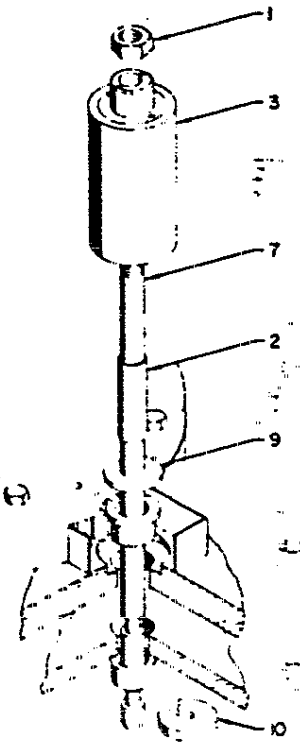
Pinion Gear

Item No.	Description
1.	NUT; 1-1/4 - 7
2.	SPACER
3.	JACK, hydraulic
4.	ROD; 1/2-13 x 6"
5.	NUT; 1/2-13
6.	PLATE
7.	ROD; 1-1/4"
8.	RING, slotted
11.	NUT; 3/4-10
12.	RING, alignment
13.	SPACER, cupped
14.	ROD; 3/4"
15.	RING, pull



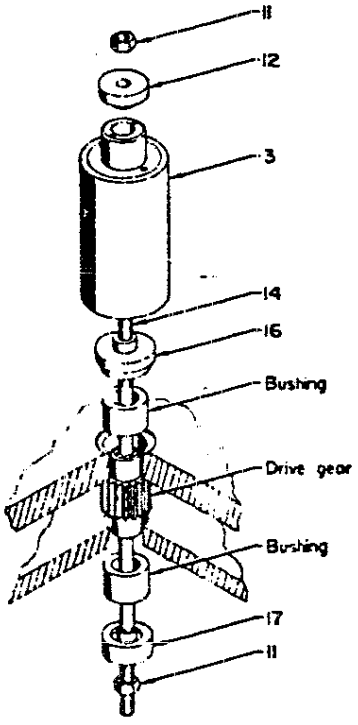
Drive Gear

Figure F-11. Pinion Gear and Drive Gear Bushing Removal



Pinion Gear

Item No.	Description
1.	NUT; 1-1/4 - 7
2.	SPACER
3.	JACK, hydraulic
9.	RING, installation
10.	RING, slotted
11.	NUT; 3/4-10
12.	RING, alignment
14.	ROD; 3/4"
16.	RING, upper bushing
17.	RING, lower bushing



Drive Gear

Figure F-12. Pinion Gear and Drive Gear Bushing Installation

6-4. TROUBLESHOOTING

Table F-1 is intended as a quick reference in diagnosing on-the-job malfunctions. Care has been taken to list the possible causes in the most likely order of occurence.

TABLE F-1. TROUBLESHOOTING CHART

Symptom	Possible Defect
Controls fail to respond	1. The PTO is not engaged - paragraph 4-2-1. 2. Hydraulic oil supply is low - fill. 3. Hydraulic pressure line is ruptured - replace. 4. Hydraulic pump is faulty - replace. 5. Relief valve is set incorrectly - paragraph 6-2-4.
Operation slow down	1. Hydraulic oil supply is low - fill reservoir. 2. Hydraulic pump is running at reduced speed - paragraph 4-4-2. 3. Relief valve is set too low - paragraph 6-2-4. 4. Pump or cylinder worn - paragraph 6-2-1. 5. Pump is slipping due to excessive oil temperature. This is a factor which will increase with worn components - paragraph 5-3-2. 6. Filters are dirty - paragraph 5-3-5-3. 7. Obstruction in holding valve - paragraph 5-3-5-2
Boom drifts when loaded and controls neutralized	1. Hydraulic oil bypassing piston seal - paragraph 6-2-1. 2. Main or secondary holding valves are defective or contaminated - paragraph 5-3-5-2.
Unusual noise in operation	1. Cavitation due to low hydraulic oil supply - fill reservoir. 2. Loading is excessive - paragraph 4-3-1. 3. Suction line restricted or collapsed - replace. 4. Suction line filter is clogged - paragraph 5-3-5-3. 5. Relief valve is set too low - paragraph 6-2-4. 6. Relief valve is damaged - replace.
Outriggers fail to retract	1. Cylinder is defective - paragraph 6-2-1. 2. Hydraulic lines are restricted or ruptured - replace.
Outriggers yield or drift	1. Hydraulic lines leak - replace. 2. Internal bypass in cylinder - paragraph 6-2-1. 3. Defective holding valve - paragraph 5-3-5-2.

Section 7. INSPECTION & TEST

This section is reprinted exactly as it appears in Form 99900004, Inspection and Test Report form. Disregard those items which do not apply to this crane.

Serial Number	Model Number	Work Order Number

GENERAL CRANE INFORMATION

Crane Description: _____

_____

List of Options

1. _____ 2. _____

3. _____ 4. _____

Special Crane Modifications

1. _____ 2. _____

3. _____ 4. _____

IMT PART NUMBERS

Ext. Cyl.: _____	Sec. Cyl.: _____	Main Cyl.: _____
OR Cyl.: _____	P-O OR Cyl.: _____	3rd Ext.: _____
2nd Ext.: _____	1st Ext.: _____	Sec.: _____
Main: _____	Mast: _____	Base: _____
OR: _____	P-O OR: _____	Other: _____

VENDOR'S INFORMATION

	Manufacturer	Model	Serial Number
Turntable Rotation Motor			
Safety Hook			
Turntable Gear Bearing			
Pinion Gear			
Intermediate Gear			
Drive Gear			

OPTIONAL EQUIPMENT VENDOR'S INFORMATION

	Manufacturer	Model	Serial Number
Winch			
Winch Motor			
Auger			
Auger Motor			
Log Grapple			
Pallet Fork			
Remote Control			
Other:			

CHASSIS INFORMATION

Make: _____ Model: _____ VIN: _____

Wheelbase: _____" Cab/Axle: _____" Transmission _____

GAWR Front: _____ lbs. GAWR Rear: _____ lbs. GVWR: _____ lbs.

PTO Mfr.: _____ PTO Model: _____ PTO %: _____

Pump Mfr.: _____ Pump Model: _____ Capacity: _____ GPM

Required Pump Speed _____ Required Pump Output: _____

Required Engine Speed (Required Pump Speed/PTO %): _____

Tire Size: _____ Ply: _____ Pressure: _____ PSI

Frame Reinforced by IMT? Yes ☐ No ☐

Suspension Upgraded by IMT? Yes ☐ No ☐

Power Source (if other than PTO drive): _____

Accessories: _____

_____

Date: _____ Tested By: _____

TABLE 1. PRE-OPERATION INSPECTION (on IMT test vehicle)

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Inspect and lube all points (refer to chart in service manual)			
Check all hydraulic lines for: 1. sharp corners and kinks 2. abrasions & chafing 3. tightness of fittings 4. leaks			
Check all pins for proper installation (refer to service manual)			
Check all crane bolts for proper installation & tightness (refer to Torque Data Chart on back cover)			
Visually inspect all welds for cracks, holes, etc.			
Inspect all crane members for proper installation, alignment & workmanship			

TABLE 2. OPERATING TEST (on IMT test vehicle)

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Engage power take-off			
Position & lower outriggers			

TABLE 2. OPERATING TEST (on IMT test vehicle) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Slowly operate unit through all motions. Check hoses, cylinders & all structural members for proper operation.			
Place crane under full rated load at proper distance from centerline of rotation. Raise load to +30°. * 1. Shut off engine 2. Actuate each valve bank function to assure operation of holding valves			
Restart engine & extend & retract extension cylinder under full rated load. * 1. Repeat five times with main boom in various positions 2. Note crane operation & system pressure variation during each cycle.			Pressure Range Min. _____ Max. _____ 1. _____ _____ 2. _____ _____ 3. _____ _____ 4. _____ _____ 5. _____ _____
Raise & lower secondary boom under full rated load. * 1. Repeat five times with main boom in various positions 2. Note crane operation & system pressure variation during each cycle.			Pressure Range Min. _____ Max. _____ 1. _____ _____ 2. _____ _____ 3. _____ _____ 4. _____ _____ 5. _____ _____

*Note: Maintain test vehicle stability at all times.

TABLE 2. OPERATING TEST (on IMT test vehicle) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
With secondary cylinder at full stroke, raise & lower main boom under full rated load.* 1. Repeat five times under different rated loads 2. Note crane operation & variation in system pressure during each cycle.			Pressure Range Min._____ Max._____ 1. _____ _____ 2. _____ _____ 3. _____ _____ 4. _____ _____ 5. _____ _____
Remove load from crane, reposition outriggers to provide 5° slope from horizontal. 1. Position crane at maximum horizontal reach 2. Put maximum load on crane, with load close to ground.* 3. Rotate crane through full cycle.* 4. Repeat rotation cycle five times, note operation of crane and system pressure variation during each cycle			Pressure Range Min._____ Max._____ 1. _____ _____ 2. _____ _____ 3. _____ _____ 4. _____ _____ 5. _____ _____
Recheck all welds for stress cracks.			

FURTHER COMMENTS	RECOMMENDED CORRECTIVE ACTION
1._____	_____
2._____	_____
3._____	_____

*Note: Maintain test vehicle stability at all times.

TABLE 2. OPERATING TEST (on IMT test vehicle) Continued

FURTHER COMMENTS	RECOMMENDED CORRECTIVE ACTION
4.	
5.	
6.	
7.	

Total time spent on OPERATING TEST: _____ hrs.

TABLE 3. PRE-OPERATION INSPECTION (truck mounted)

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
PTO shifting cable for efficient operation			
Engine speed control for proper operation			
PTO mounting bolts for tightness (refer to Torque Data Chart on back cover)			
Level of transmission grease			
Underdrive hoses for breaks, leaks, etc.			
Routing of underdrive hoses for kinks, sharp bends, muffler or tail pipe contact			
Proper pump installation (refer to service manual)			

TABLE 3. PRE-OPERATION INSPECTION (truck mounted) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Proper crane installation (refer to service manual)			
All bolts for proper tightness (refer to Torque Data Chart on back cover)			
Perform checks outlined in Table 1			
Fill oil reservoir (all cylinders retracted)			
Placard placement (refer to service manual)			
Suction line gate valve at reservoir open			

TABLE 4. OPERATING TEST (truck mounted)

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Start vehicle engine			
Proper operation and installation of tachometer			
Engage PTO			
Set engine RPM for optimum pump speed			
Position & lower outriggers			
Slowly operate unit through all motions. Check hoses, cylinders & all structural members for operation			

TABLE 4. OPERATING TEST (truck mounted) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Bypass all functions (hold handle open), check each function for relief pressure			
1. Left outrigger			_____PSI
2. Right outrigger			_____PSI
3. Rotation			_____PSI
4. Main			_____PSI
5. Secondary			_____PSI
6. Extension			_____PSI
7. Option 1 (_____)			_____PSI
8. Option 2 (_____)			_____PSI
Cross check each function relief setting with proper relief valve specifications			
Check operation of pump by timing the extend side of each function - under no load (± 2 Sec.)			Expected Time / Observed Time
1. Left outrigger			_____Sec. _____Sec.
2. Right outrigger			_____Sec. _____Sec.
3. Rotation			_____Sec. _____Sec.
4. Main			_____Sec. _____Sec.
5. Secondary			_____Sec. _____Sec.
6. Extension			_____Sec. _____Sec.
7. Option 1 (_____)			_____Sec. _____Sec.
8. Option 2 (_____)			_____Sec. _____Sec.

TABLE 4. OPERATING TEST (truck mounted) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Operate each function under full rated load. Note speed and operation of each function			
With crane booms at 30° above horizontal, kill the engine, operate each function checking for drift			

FURTHER COMMENTS	RECOMMENDED CORRECTIVE ACTION
1.	
2.	
3.	
4.	
5.	
6.	
7.	

STABILITY TEST (to 85% of Tipping)

INSTRUCTIONS

1. If crane is front mount, refer to Figure 1. If crane is rear mount, refer to Figure 2.

2. On the appropriate figure, fill out items A through L.

3. The testing area must be a flat, hard surface (ideally concrete, but asphalt or hard packed gravel is acceptable). Only authorized testing personnel will be in or near the test area. SAE J765a specifies the test surface must be within 1% of level.

4. Position and lower outriggers until the weight of the crane has been removed from the truck springs.

5. Extend the crane to full horizontal position, centered over the rear of the truck.

6. From the capacity placard, determine the rated load at the maximum horizontal reach. Place a weight equal to 118% of that rated load at the maximum horizontal reach - "L". Keep the load close to the ground to avoid excessive tipping.

L = _____ ft.

7. Slowly start rotating the load counterclockwise. Through every 5° increment, check whether all vehicle tires remain in contact with the testing surface.

8. If at any point through the rotation cycle, any one of the vehicle tires starts to break contact with the test surface, the rotation should be stopped and the position of the crane noted - "X°". This is the balance point which determines 85% of tipping for the rated load.

X° = _____ °

9. If the balance point has been reached during the rotation cycle, the crane position (X°) should be noted on the appropriate figure. This is the area where the crane maintains stability (85% of tipping) under full capacity. Determine "Y°".

$Y^\circ = 180^\circ - X^\circ =$ _____ °

10. After the balance point has been reached, the extension boom should be retracted until all tires are again in full contact with the test surface.

11. Continue rotating the boom after stability has been regained. Again, watch all vehicle tires for a point of instability. If a point of instability re-occurs (one of the vehicle tires breaks contact with test surface), retract the extension boom until stability is regained.

12. Repeat this cycle through a full 180° of arc.

13. At the end of the 180° arc, physically measure the existing horizontal distance from the centerline of rotation to centerline of the load - "K".

K = _____ ft.

14. To determine the per cent of full capacity in the derated zone, divide the remaining horizontal distance (K) by the original maximum horizontal distance (L). Multiply this figure by 100.

$\frac{K}{L} \times 100 =$ _____ %

15. The derated per cent of full capacity (Z) obtained in Step 14 should be entered on the appropriate figure. In the derated zone, each individual capacity on the capacity placard must be multiplied by the derated per cent of full capacity (Z). The reduced capacities maintain 85% of tipping in the derated zone.

16. If the crane is a side mount, repeat the stability test by rotating the crane clockwise through 180° of arc to find $X_1°$, $Y_1°$ and Z_1%.

$X_1°$: _____

$Y_1°$: _____

Z_1%: _____

17. The figures obtained indicate the stability range of that particular truck and crane combination.

18. Rotate the crane at least five times utilizing the completed figure to ensure the rating is accurate.

19. Before shipout, the truck with the crane in the stowed position must be weighed.

Front Axle: _____ lbs.

Rear Axle: _____ lbs.

Total: _____ lbs.

20. Make certain that all information has been recorded on the appropriate figure.

21. The information must also be recorded in the service manual.

22. Record the total length of time to test the crane (total crane test and inspection time should approximate 4 hours - 1979 SAE J765a). _____ hours.

Where applicable, this stability test conforms to SAE J765a, ANSI B30.15 and USAS B30.5.

BOOM IN STORED POSITION (no payload) ACTUAL WEIGHTS

Front Axle: _____ lb.

Rear Axle: _____ lb.

Total: _____ lb.

This stability chart conforms to SAE standards

LEGEND
$Z\%$ or $Z_1\% = 100 \times \frac{K}{r}$
$Y^o = 180^o - X^o$
$Y_1{}^o = 180^o - X_1{}^o$

DIMENSIONAL DATA:

A: _____ in.

B: _____ in.

C: _____ in.

D: _____ in.

E: _____ in.

F _____ in.

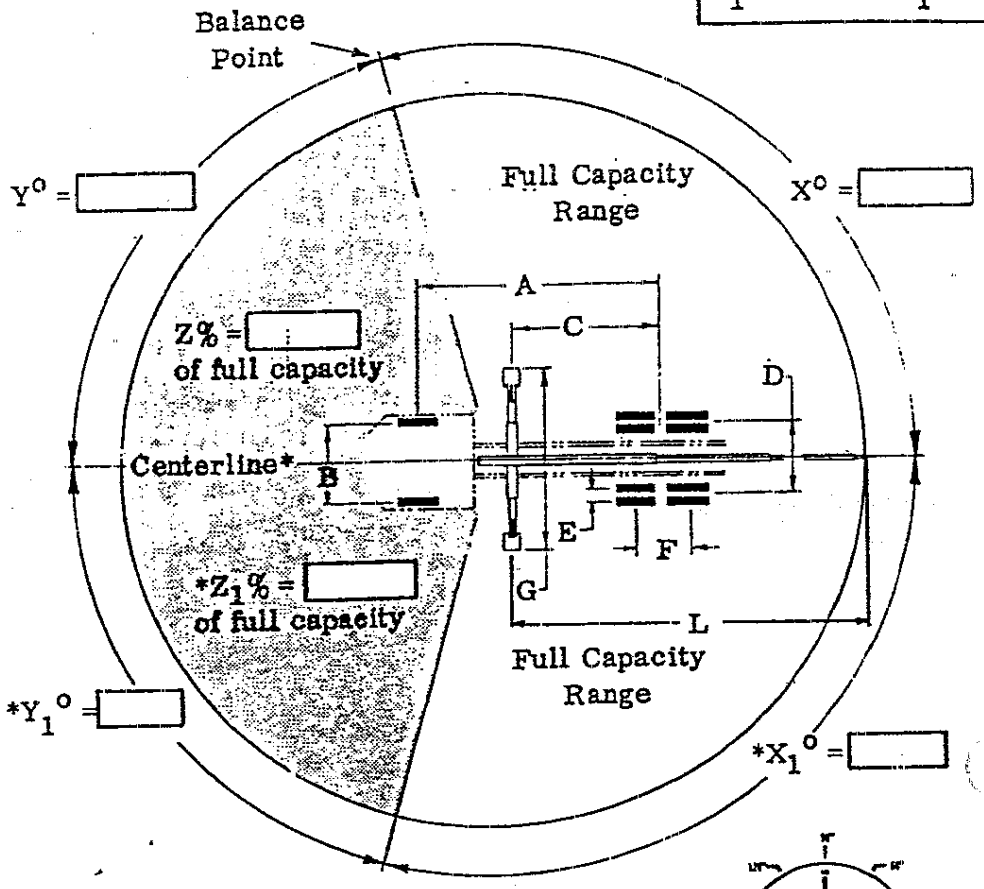
G: _____ in.

L: _____ ft.

X^o: _____ ^{o}

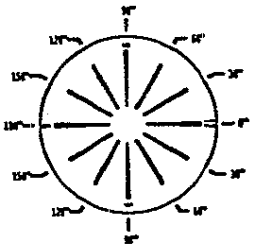
Y^o: _____ ^{o}

Z%: _____ %



*Side-mount. On center-mount cranes $X_1{}^o = X^o$; $Y_1{}^o = Y^o$; and $Z_1\% = Z\%$.

[ ] = Derated Load Capacity ($Z\%$ or $Z_1\%$)



Reach (per capacity chart)	Full Rated Load	x	$\frac{Z\%}{100}$	$\frac{Z_1\%}{100}$	= Derated Load for $Z\%$	Derated Load for $Z_1\%$
_____	_____	x	_____	_____	= _____	_____
_____	_____	x	_____	_____	= _____	_____
_____	_____	x	_____	_____	= _____	_____
_____	_____	x	_____	_____	= _____	_____
_____	_____	x	_____	_____	= _____	_____

FIGURE 1. STABILITY CHART (Behind the cab mounted Crane)

BOOM IN STORED POSITION (no payload) ACTUAL WEIGHTS

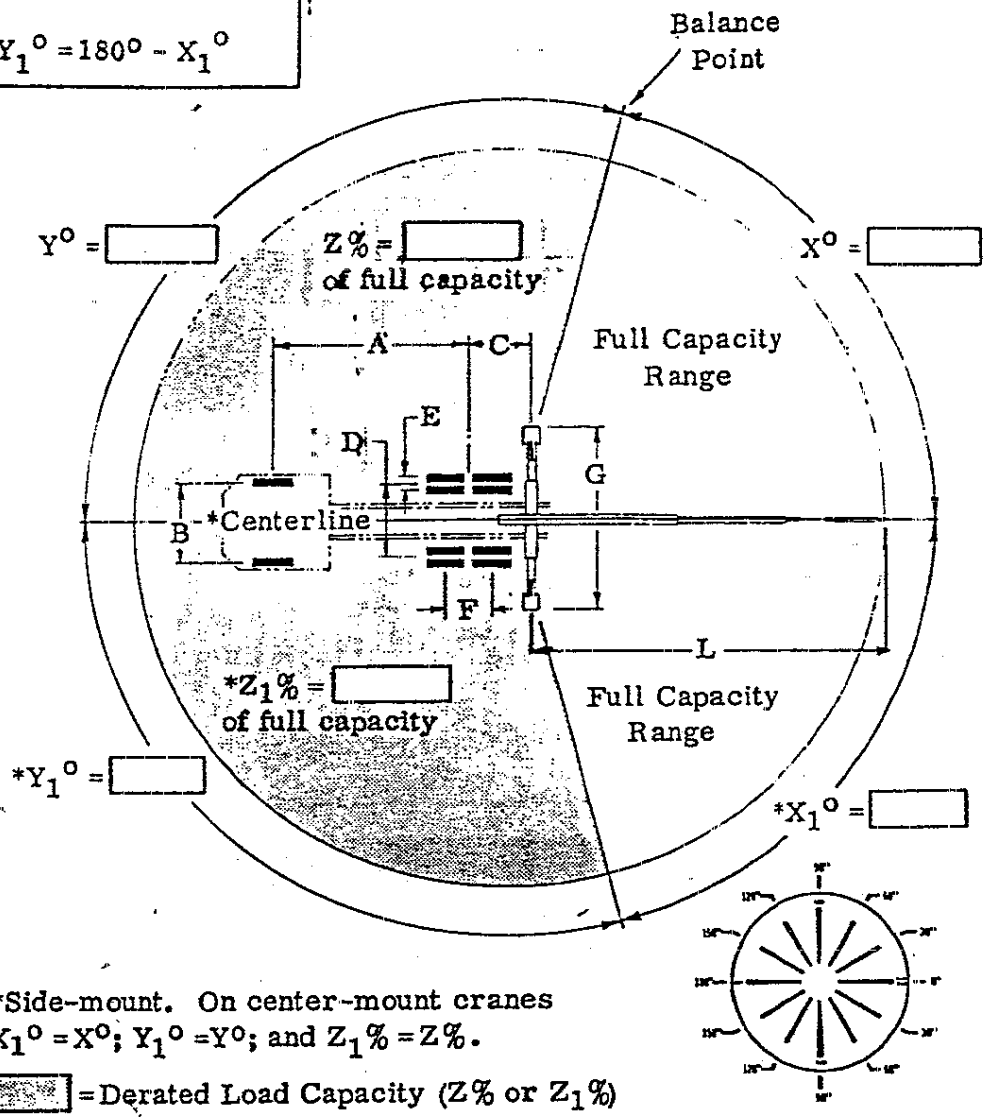
Front Axle: _____ lb.

Rear Axle: _____ lb.

Total: _____ lb.

LEGEND
$Z\%$ or $Z_1\% = 100 \times \frac{K}{L}$
$Y^o = 180^o - X^o$
$Y_1{}^o = 180^o - X_1{}^o$

This stability chart conforms to SAE standards



DIMENSIONAL DATA

A: _____ in.

B: _____ in.

C: _____ in.

D: _____ in.

E: _____ in.

F: _____ in.

G: _____ in.

L: _____ ft.

X°: _____ °

Y°: _____ °

Z%: _____ %

*Side-mount. On center-mount cranes $X_1{}^o = X^o$; $Y_1{}^o = Y^o$; and $Z_1\% = Z\%$.

[ ] = Derated Load Capacity ($Z\%$ or $Z_1\%$)

Reach (per capacity chart)	Full Rated Load	x	$\frac{Z\%}{100}$	$\frac{Z_1\%}{100}$	= Derated Load for $Z\%$	Derated Load for $Z_1\%$
		x			=	
		x			=	
		x			=	
		x			=	
		x			=	

FIGURE 2. STABILITY CHART (Rear-mounted Cranes)

Section 8. PARTS

8-1. GENERAL

This section contains the parts lists for the assemblies used on the crane.

8-2. CRANE IDENTIFICATION

Every unit has an identification placard (Figure H-1) attached to the mast. When ordering parts, communicating warranty information or referring to the unit in correspondence, always include the assigned serial number and model number. All inquiries should be addressed to Iowa Mold Tooling Co., Inc.; 500 Highway 18 West; Garner, Iowa 50438 or telephone (515) 923-3711.

8-3. CYLINDER IDENTIFICATION

The crane has a cylinder identification placard (Figure H-2) attached to the mast. To ensure proper replacement parts are received, it is necessary to specify a complete number/letter sequence for any part request. Part numbers may be cross checked by comparing the stamped identification of the cylinder base porting blocks against the information stamped on the placard.

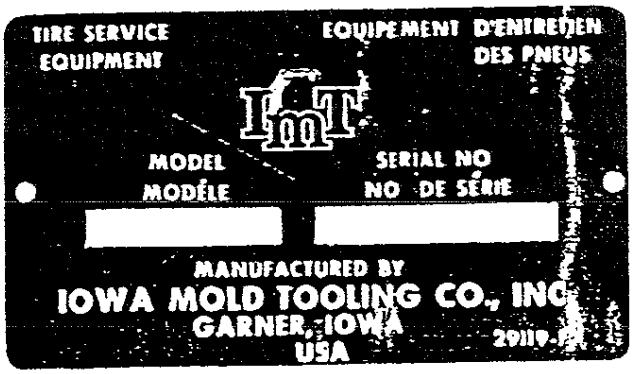


Figure H-1. Crane Serial Number Placard

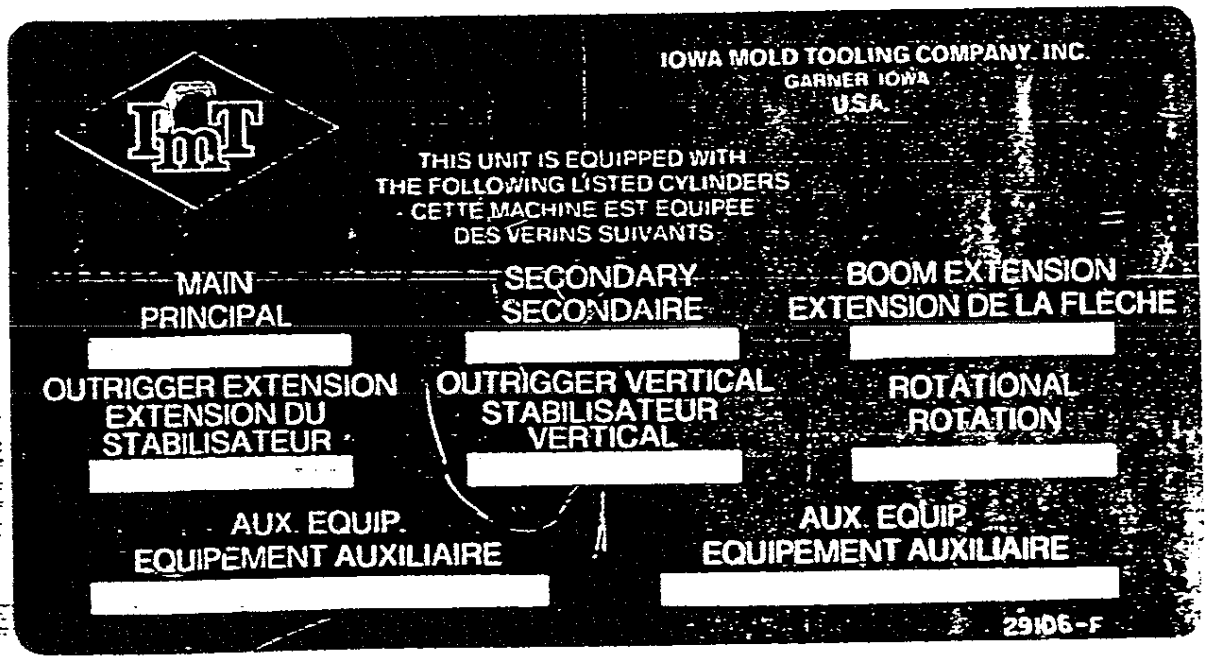


Figure H-2. Cylinder Identification Placard

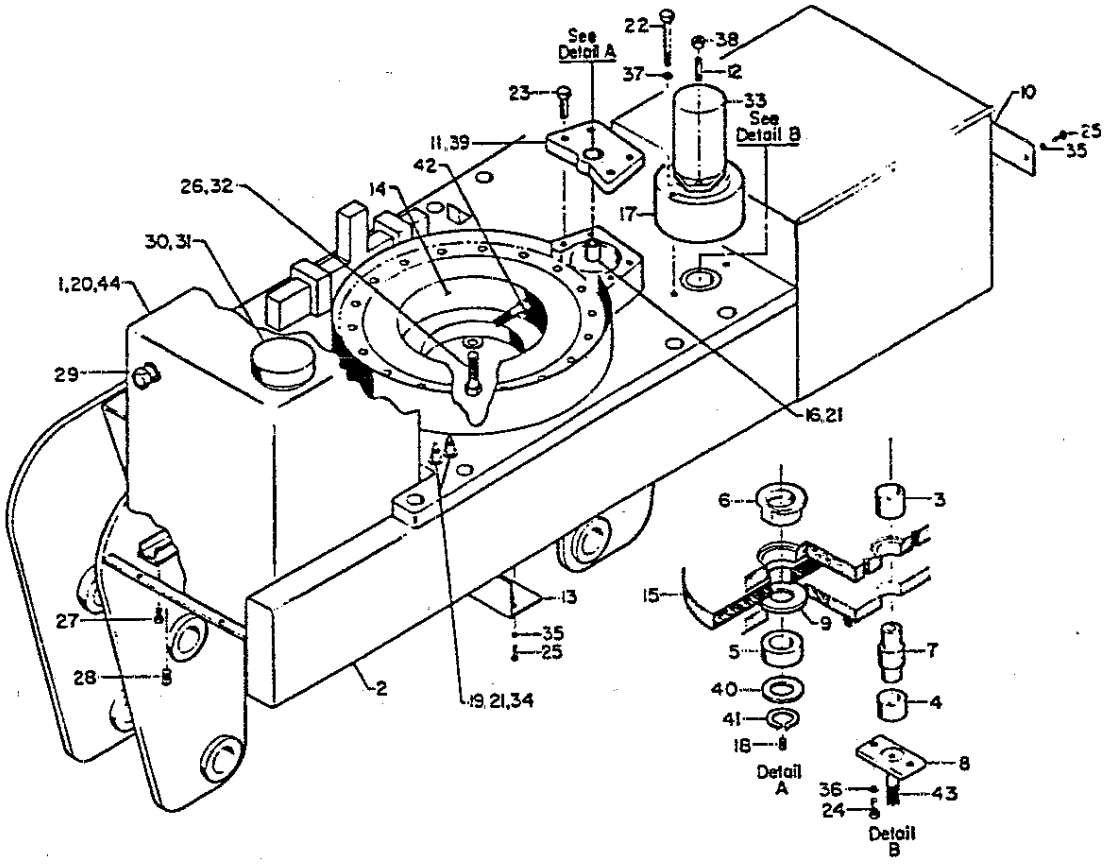


Figure H-3. Base and Outrigger - Sheet 1 of 2 (Part Number 41703528)

Item No.	Part No.	Description	Qty
1.	52703541	RESERVOIR	1
2.	52703542	BASE	1
3.	60020120	BUSHING	1
4.	60020121	BUSHING	1
5.	60020122	BUSHING	1
6.	60020124	BUSHING	1
7.	71056074	GEAR, drive	1
8.	60010844	PLATE, grease	1
9.	60020123	WASHER, thrust	1
10.	60103367	COVER	1
11.	60105964	PLATE, pinion support	1
12.	60106032	STUD, brake	2
13.	60106193	GUARD, gear	1
14.	71056055	GEAR, turntable	1
15.	71056072	GEAR, intermediate	1
16.	71056073	GEAR, pinion	1
17.	71056088	BRAKE, hydraulic	1
18.	72053240	PLUG, pipe; 1/8" npt hollow hex	1
19.	72053301	COUPLING; 1/8" npt	2
20.	72053378	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1
21.	72053508	ZERK; 1/8" npt	3
22.	72601037	SCREW; 9/16-12 x 4-1/2" gr. 5 hex	2
23.	72601144	SCREW; 9/16-12 x 2" gr. 8 hex	4
24.	72060092	SCREW; 1/2-13 x 1-1/4" hex hd.	2
25.	72060004	SCREW; 1/4-20 x 1" hex hd.	4
26.	72601148	SCREW; 7/8-9 x 3" gr. 8 hex	23
27.	72060833	SCREW; 5/16-18 x 3" self-tap	6
28.	73052001	PLUG, magnetic; 3/4" npt	1
29.	72532261	GAUGE, sight	1
30.	73014671	CAP, fill	1
31.	73141276	SCREEN, reservoir fill	1
32.	72063115	WASHER, hardened; 7/8"	23
33.	73051223	MOTOR, hydraulic	1
34.	72063004	WASHER, wrt.; 7/16"	2
35.	72063049	WASHER, lock; 1/4"	4
36.	72063053	WASHER, lock; 1/2"	2
37.	72063054	WASHER, lock; 9/16"	2
38.	72062080	NUT, lock; 1/2-13	2
39.	60020169	BUSHING	1
40.	72063039	BUSHING, machy.; 2" x 10 ga.	1
41.	72066095	RING, retaining; 2"	1
42.	73731171	EXTENSION, grease; 23-1/4"	1
43.	73731173	EXTENSION, grease; 35-1/4"	1
44.	72531550	NIPPLE, barbed; 1-1/4"	1

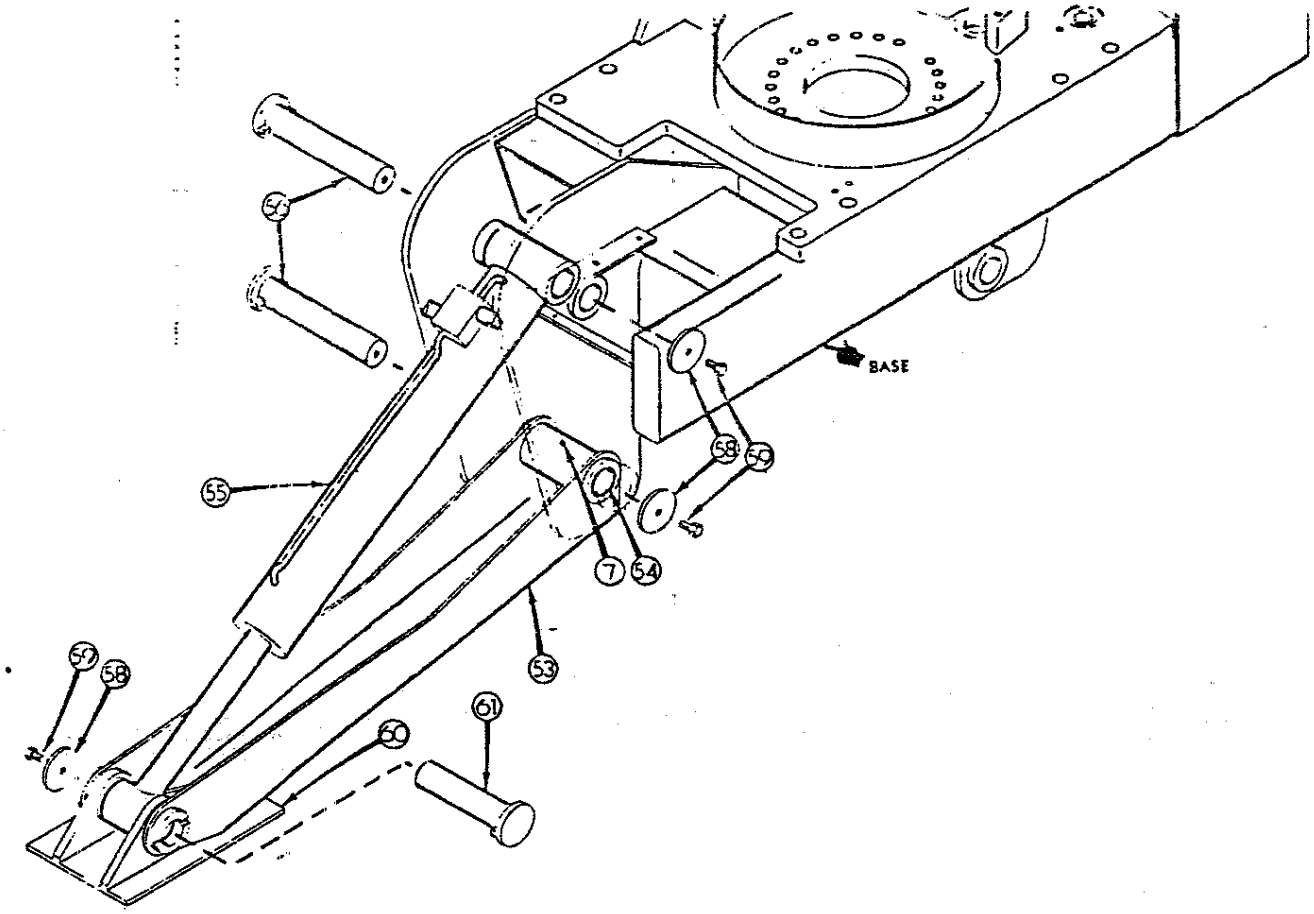


Figure H-4. Base and Outrigger - Sheet 2 of 2 (Part Number 41703528)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
7.	72053508	ZERK; 1/8" npt	2	58.	60106332	PLATE, retainer	6
53.	52703540	LEG, outrigger	2	59.	72060137	SCREW; 5/8-11 x 1" hex hd.	6
54.	7BF81225	BUSHING	8 Ref.	60.	52701412	PAD, outrigger	2
55.	3C283800	CYLINDER, outrigger	2	61.	52703694	PIN, cylinder & leg/pad	2
56.	52703695	PIN, cylinder & leg/base	4				

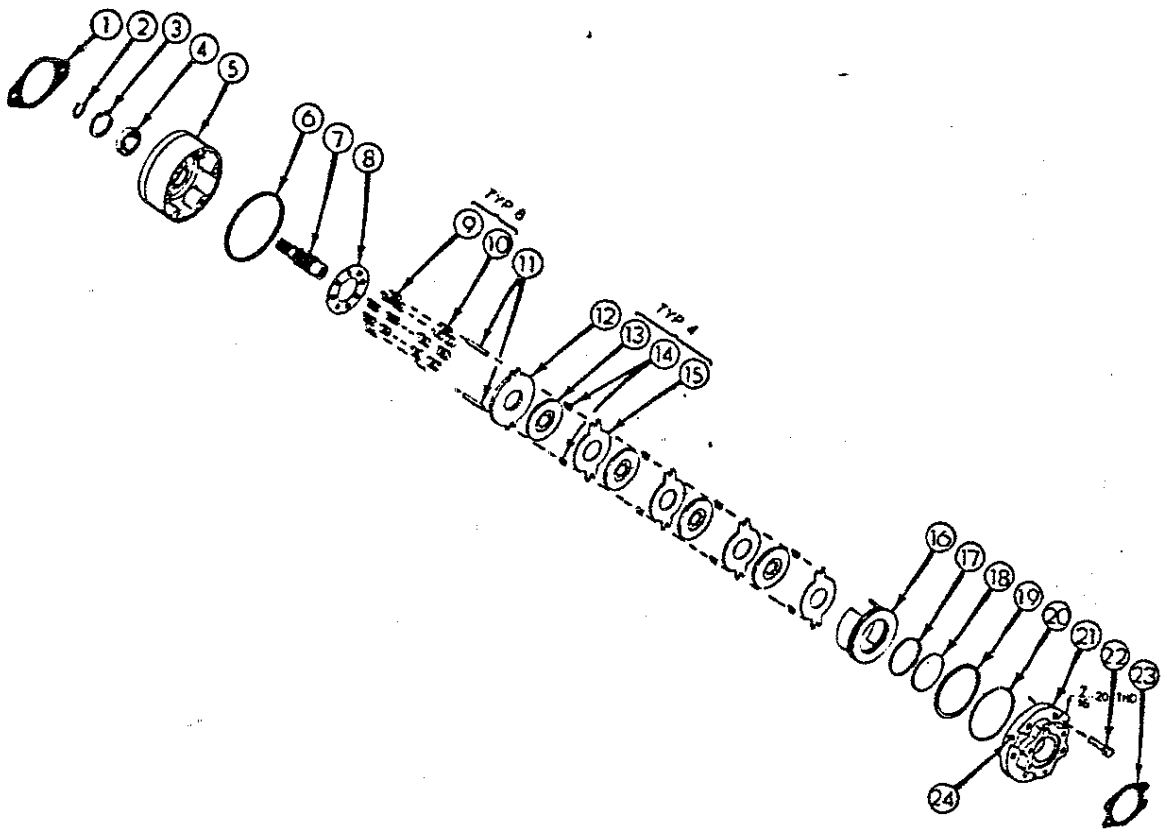
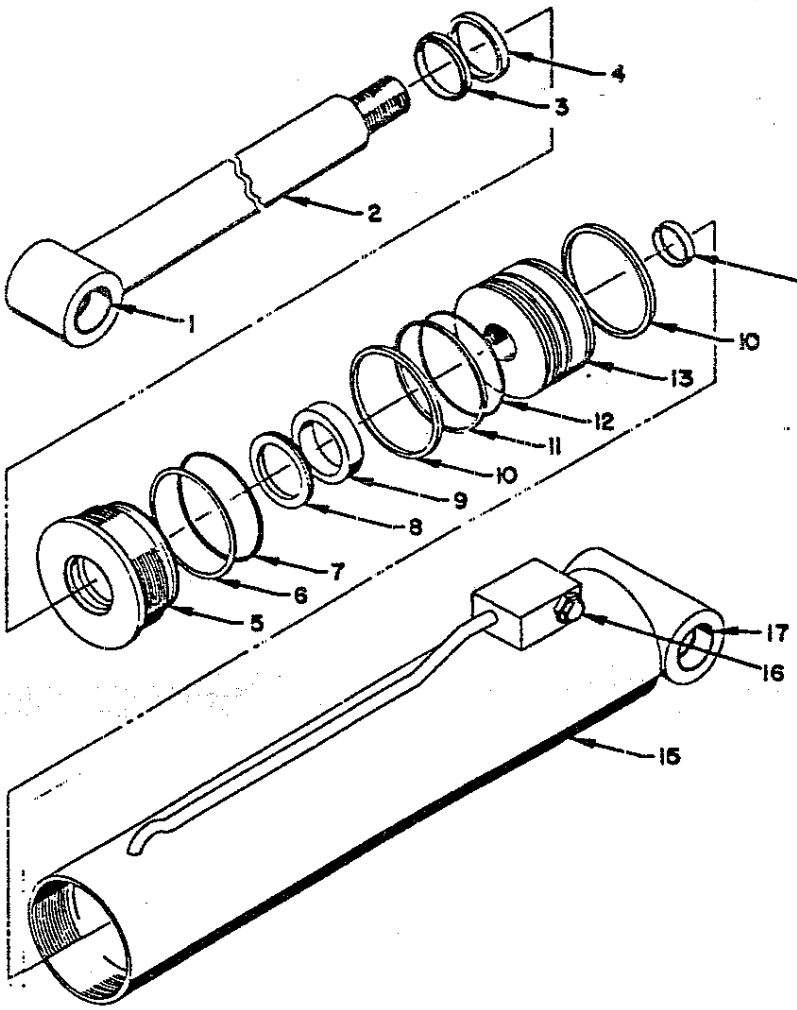


Figure H-5. Hydraulic Rotation Brake (Part Number 71056088)

Item No.	Part No.	Description	Qty
1.	76391497	GASKET, mounting	1
2.	72066140	RING, retaining	1
3.	72066150	RING, retaining	1
4.	70055115	BEARING	1
5.	70141891	HOUSING	1
6.	7Q072165	O-RING	1
7.	70141883	SHAFT, splined	1
8.	70142304	PLATE, spring retainer	1
9.	70141880	SPRING, compression; small	8
10.	70141881	SPRING, compression; large	8
11.	70141882	PIN, torque	2
12.	70141884	DISC, primary	1
13.	70141885	DISC, rotating	4
14.	70141887	SPRING	8
15.	70141886	DISC, stationary	4
16.	70141888	PISTON	1
17.	7Q10P236	RING, back-up	1
18.	7Q072236	O-RING	1
19.	7Q10P248	RING, back-up	1
20.	7Q072248	O-RING	1
21.	70141890	PLATE, power	1
22.	72601159	BOLT; 7/16-14 x 2"	4
23.	76391498	GASKET, motor mounting	1
24.	70141889	SCREW, bleeder	1



NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components in the seal kit. This may save expensive down-time in the immediate future.

Item No.	Part No.	Description	Qty
1.	7BF81225	BUSHING	4
2.	4G283800	ROD	1
3.	7R14P030	*WIPER, rod	1
4.	7R546030	*SEAL, rod	1
5.	6H060030	HEAD	1
6.	7Q10P358	*RING, back-up	1
7.	7Q072358	*O-RING	1
8.	6A025030	*RING, wafer lock	1
9.	6C075030	TUBE, stop	1
10.	7T651060	*RING, piston	2
11.	7T66P060	*SEAL, piston	1
12.	7Q072253	*O-RING	1
13.	6I060200	PISTON	1
14.	7T61N200	*SEAL, lock ring	1
15.	4C283801	CASE, cylinder	1
16.	73054304	VALVE, counter balance	2
17.	7BF81225	BUSHING	
18.	72053507	ZERK; 1/4" str. thd.	
19.	7PNPXT02	PLUG, pipe; 1/8" npt	

*Part of seal kit (Part Number 9C242432)

Figure H-6. Outrigger Cylinder (Part Number 3C283S00)

Item No.	Part No.	Description	Qty
1.	73054304	VALVE, complete (includes item 2 thru 6)	1
2.	7Q073912	O-RING	1
3.	7Q072018	O-RING	1
4.	7Q072016	O-RING	1
5.	7Q10P018	RING, back-up	1
6.	7Q10P016	RING, back-up	2

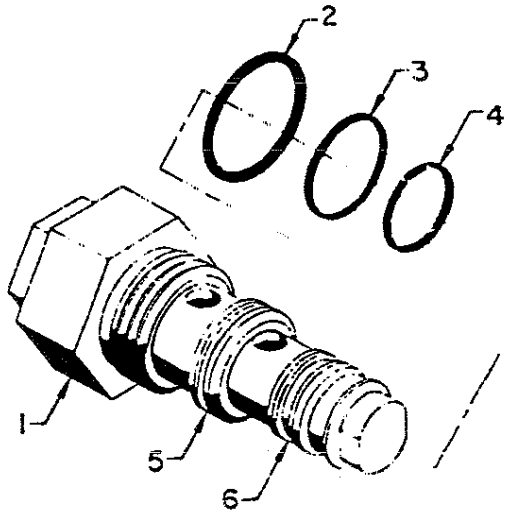


Figure H-7. Counter Balance Holding Valve (Part Number 73054304)

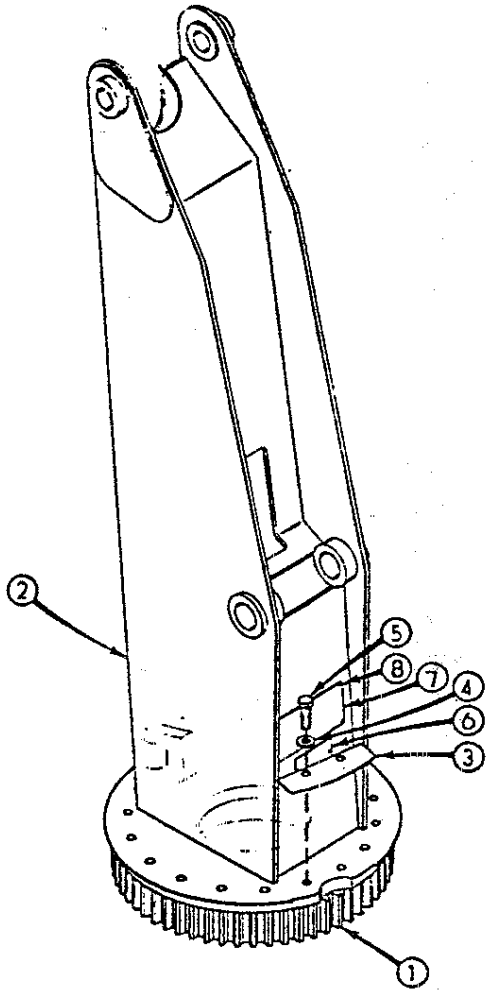


Figure H-8. Mast (Part Number 41702749)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	71056055	GEAR-BEARING, turntable	1 Ref.	5.	72060467	SCREW; 3/4-16 x 2-1/2" gr. 8 hex hd.	18
2.	52702753	MAST	1	6.	71029119	PLACARD, serial number	1
3.	60104247	COVER, pinion gear	1	7.	71029106	PLACARD, cylinder ID	1
4.	72063116	WASHER, hardened flat; 3/4"	18	8.	72066340	RIVET, pop; 1/8"	6

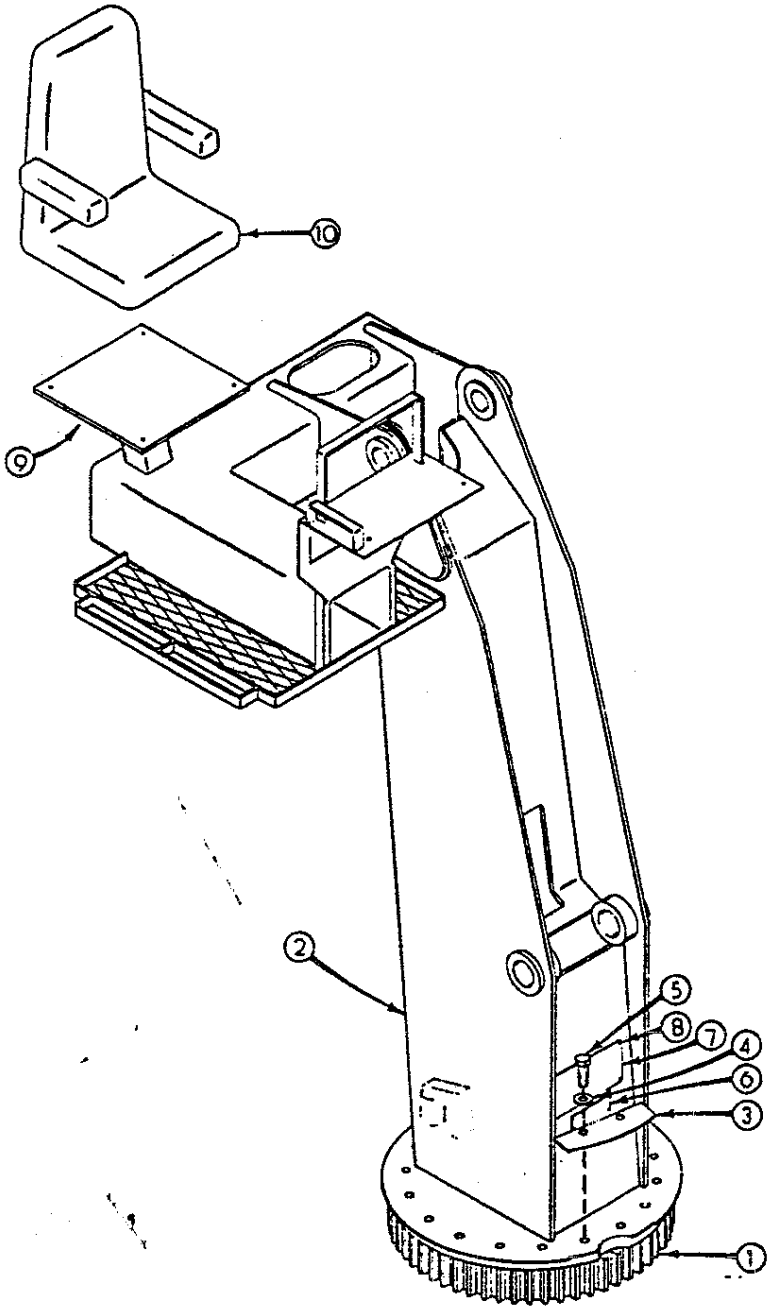


Figure H-9. Mast with Chair (Part Number 41702807)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	71056055	GEAR-BEARING, turntable	1 Ref.	6.	71029119	PLACARD, serial number	1
2.	52702808	MAST	1	7.	71029106	PLACARD, cylinder ID	1
3.	60104247	COVER, pinion gear	1	8.	72066340	RIVET, pop; 1/8"	6
4.	72063116	WASHER, hardened flat; 3/4"	18	9.	72060097	SCREW, seat adjusting	1
5.	72060467	SCREW; 3/4-16 x 2-1/4" gr. 8 hex hd.	18	10.	70073143	CHAIR with mounting hardware	1

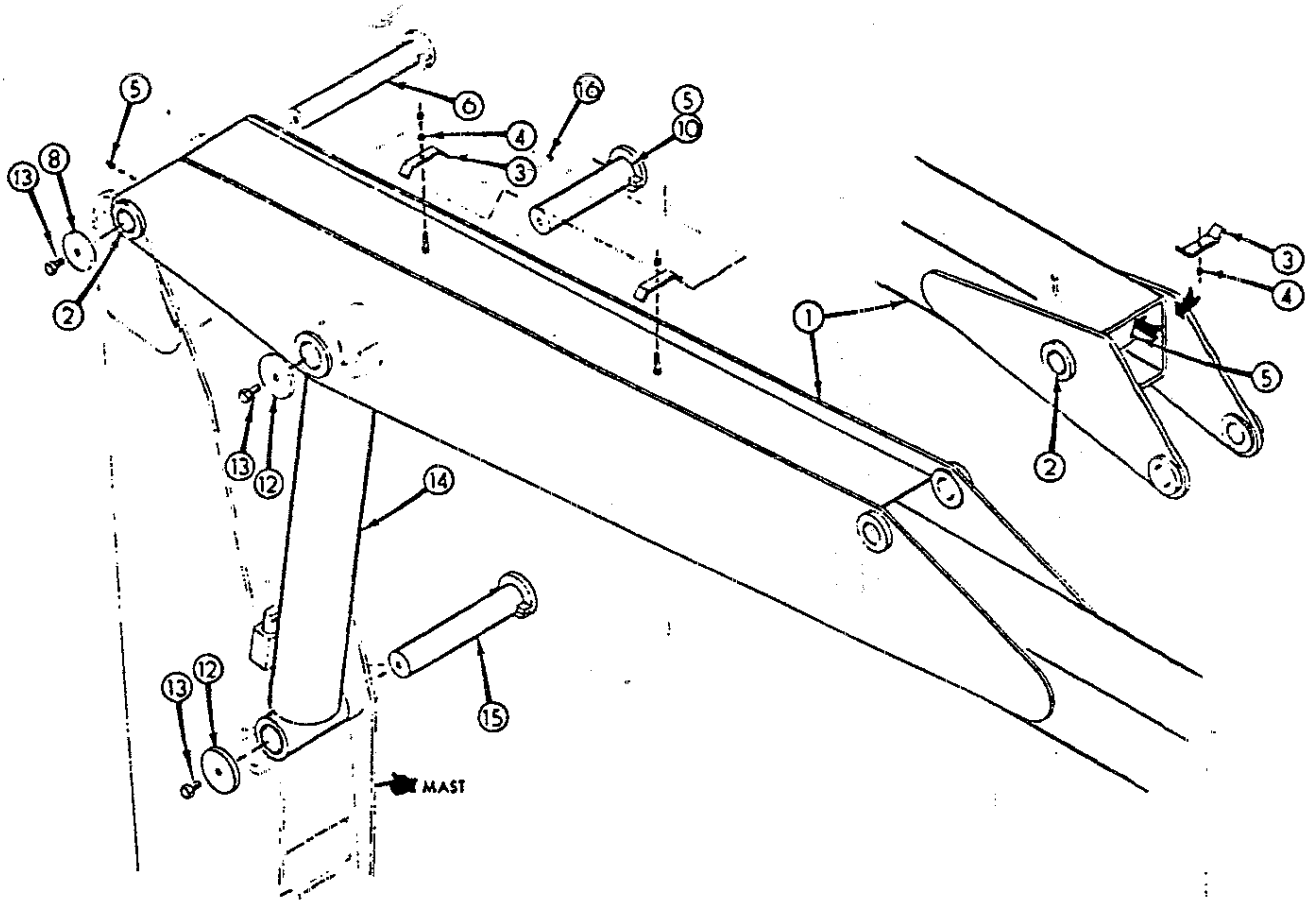
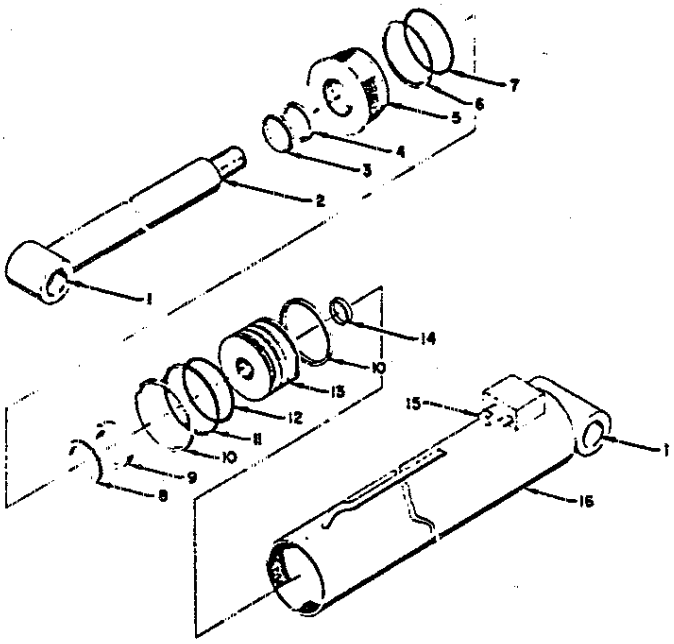


Figure H-10. Main Boom (Part Number 41702751)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702754	BOOM, main	1	10.	52703757	PIN, main cyl./main boom	1
2.	7BF82020	BUSHING	8 Ref.	12.	60106332	PLATE, retainer	2
3.	60010118	CLAMP, hose	3	13.	72060137	SCREW; 5/8-11 x 1" hex hd.	3
4.	72062103	NUT, lock; 3/8-16	4	14.	3C009910	CYLINDER, main	1
5.	72053508	ZERK; 1/8" npt	7	15.	52703746	PIN, main cyl./mast	1
6.	52703715	PIN, main boom/mast	1	16.	52702468	GUARD, hose	1
8.	60106331	PLATE, retainer	1				



DIMENSIONS	
Bore	6-1/2"
Stroke	30-1/2"
Rod Dia.	3"
Pin Dia.	2-1/2"
C-C Closed	45-1/4"

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components in the seal kit. This may save expensive down-time in the immediate future.

Figure H-11. Main Cylinder Part Number 3C009910)

Item No.	Part No.	Description	Qty
1.	7BF81225	BUSHING	8
2.	4G009910	ROD	1
3.	7R14P030	*WIPER, rod	1
4.	7R546030	*SEAL, rod	1
5.	6H065030	HEAD	1
6.	7Q1[illegible]P361	*RING, back-up	1
7.	7Q072361	*O-RING	1
8.	6A025030	*RING, wafer lock	1
9.	6C075030	TUBE, stop	1
10.	7T651065	*RING, piston	2
11.	7T66P065	*SEAL, piston	1
12.	7Q072257	*O-RING	1
13.	61065200	PISTON	1
14.	7T61N200	*SEAL, lock ring	1
15.	73054242	VALVE, counter balance	1
16.	4C009911	CASE, cylinder	1
17.	7PNPXT02	PLUG, pipe; 1/8" npt	3

*Part of seal kit (Part Number 9C262432)

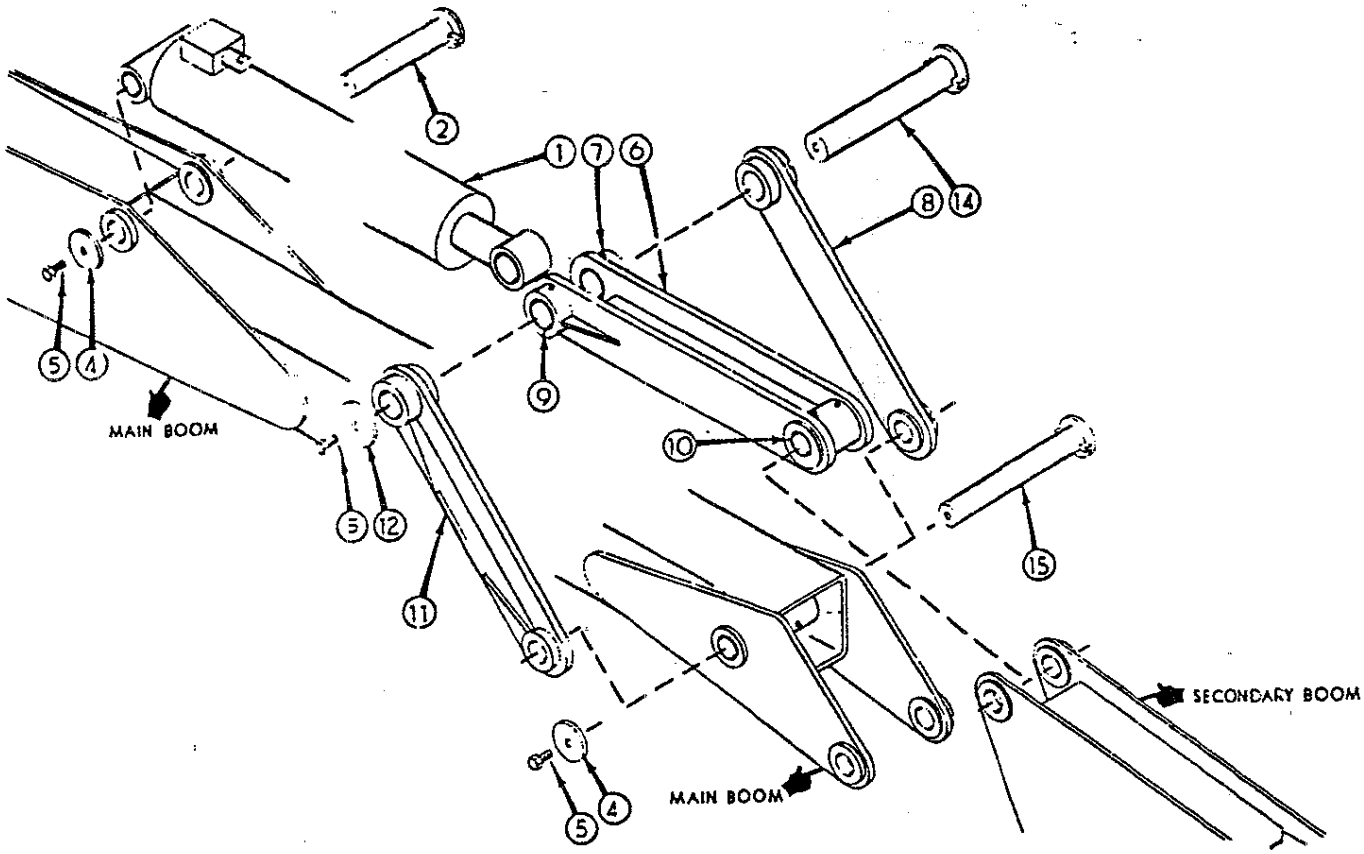


Figure H-12. Secondary Boom - Sheet 1 of 2 (Part Number 41702751)

Item No.	Part No.	Description	Qty
1.	3C017910	CYLINDER, secondary	1
2.	52703747	PIN, secondary cyl./main boom	1
4.	60106331	PLATE, retainer	2
5.	72060137	SCREW; 5/8-11 x 1" hex hd.	3
6.	52702756	LINK, cylinder	1
7.	72053508	ZERK; 1/8" npt	4
8.	52702758	LINK, left hand	1
9.	7BF81025	BUSHING	2 Ref.
10.	7BF81020	BUSHING	4 Ref.
11.	52702757	LINK, right hand	1
12.	60106332	PLATE, retainer	1
14.	52703745	PIN, linkage/cylinder	1
15.	52703744	PIN, linkage/main boom	1

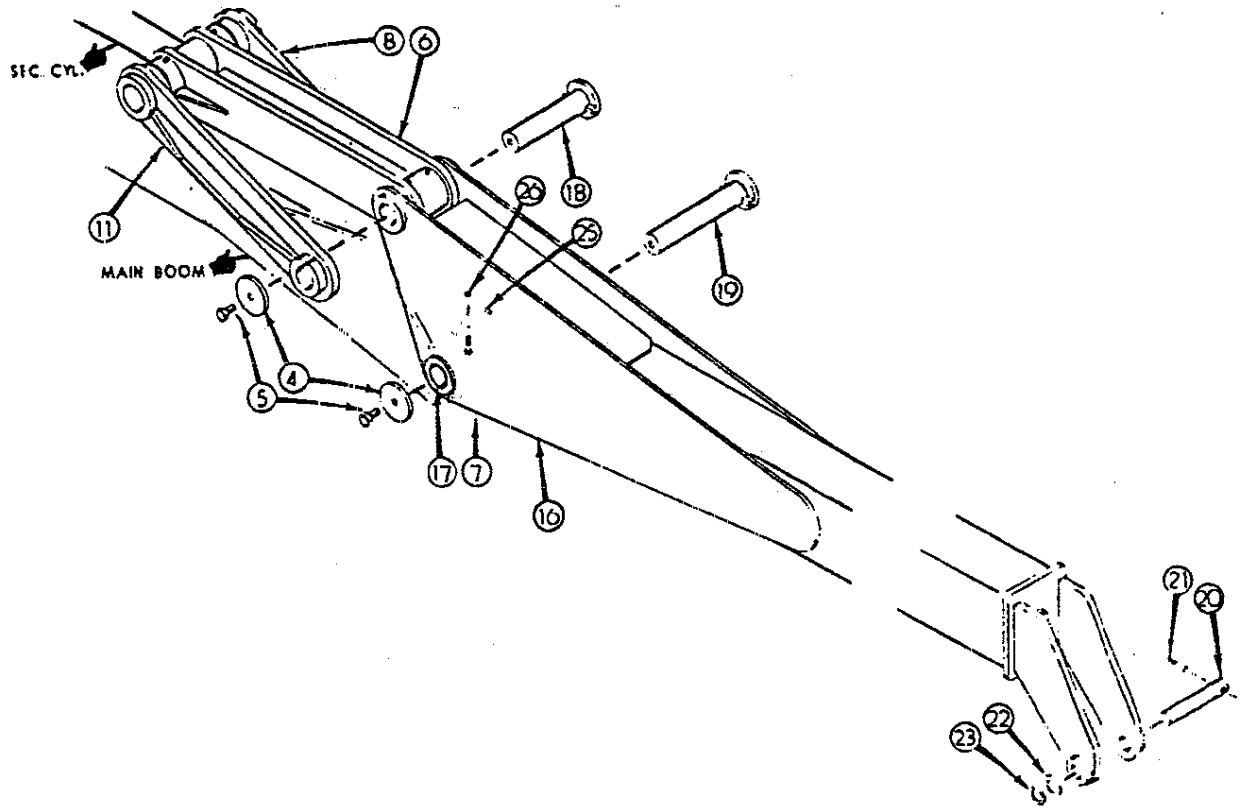
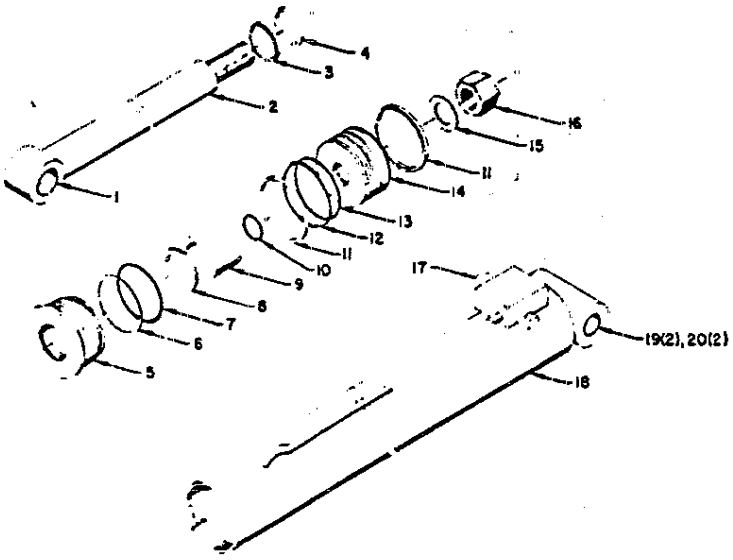


Figure H-13. Secondary Boom - Sheet 2 of 2 (Part Number 41702751)

Figure H-13. Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
4.	60106331	PLATE, retainer	2	18.	52703748	PIN, secondary/cyl. link	1
5.	72060137	SCREW; 5/8-11 x 1" hex hd.	2	19.	52703747	PIN, main/secondary	1
6.	52702756	LINK, cylinder	1 Ref.	20.	60105445	PIN, stinger/rotor	1
7.	72053509	ZERK; 1/8" npt	2	21.	72061157	PIN, grooved; 1/2" x 2-1/2"	1
8.	52702758	LINK, left hand	1 Ref.	22.	72063035	BUSHING, machy.; 1-1/4" x 10 ga.	1
11.	52702757	LINK, right hand	1 Ref.	23.	72066129	RING, retaining	
16.	52702755	BOOM, secondary	1	25.	60010318	CLAMP, hose (inside boom)	
17.	TBF81520	BUSHING	4 Ref.	26.	72062103	NUT, lock; 3/8-16	1



DIMENSIONS	
Bore	6"
Stroke	41"
Rod Dia.	3"
Pin Dia. (Rod)	2-1/2"
Pin Dia. (Case)	2"
C-C Closed	59-7/8"

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components in the seal kit. This may save expensive down-time in the immediate future.

Figure H-14. Secondary Cylinder (Part Number 3C017910)

Item No.	Part No.	Description	Qty
1.	7BF81225	BUSHING	1
2.	4G017911	ROD	1
3.	7R14P030	*WIPER, rod	1
4.	7R546030	*SEAL, rod	1
5.	6H060030	HEAD	1
6.	7Q10P358	*SEAL, back-up	1
7.	7Q072358	*O-RING	1
8.	6A025030	*RING, wafer lock	1
9.	6C300030	TUBE, stop	1
10.	7Q072227	*O-RING	1
11.	7T65I0[illegible]0	*RING, piston	2
12.	7T66P060	*SEAL, piston	1
13.	7Q072253	*O-RING	1
14.	6D60200	PISTON	1
15.	72063016	WASHER, wrt.; 2"	1
16.	72062144	NUT; 2-12	1
17.	73054242	VALVE, counter balance	2
18.	4C017911	CASE	1
19.	7BF81220	BUSHING	2
20.	7BF82020	BUSHING	2

*Part of seal kit (Part Number 9X242432)

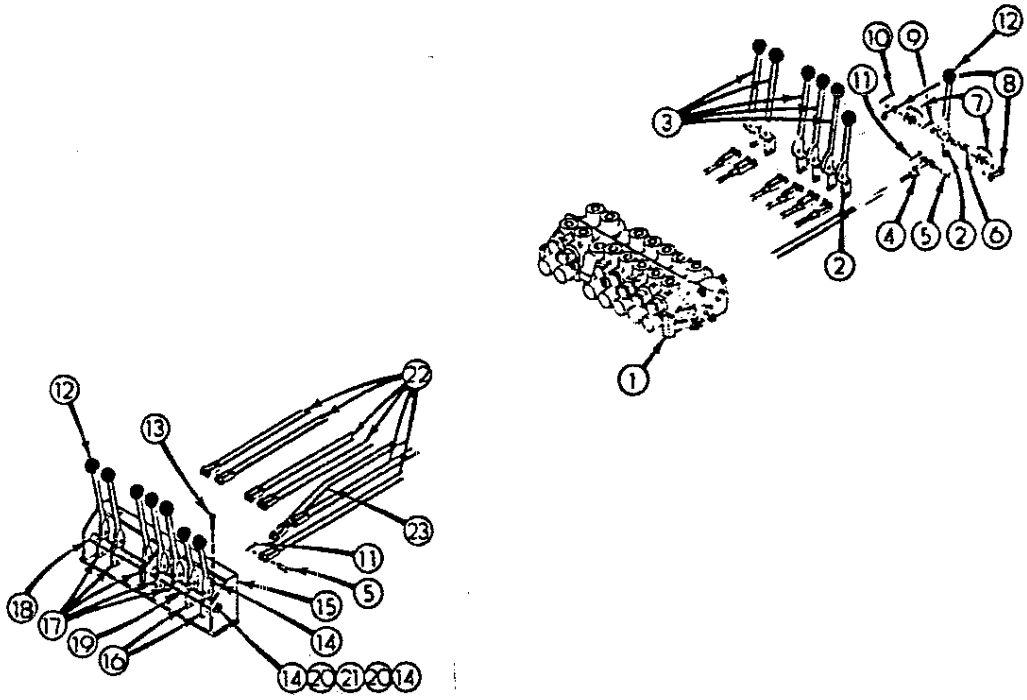


Figure H-15. Standard Control Kit (Part Number 90702873)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	51703554	VALVE BANK; 7-spool	1 Ref.	13.	72060025	SCREW; 5/16-18 x 1" hex hd.	2
2.	70141983	LEVER, valve control; short	2	14.	72062109	NUT, lock; 5/16-18	4
3.	70141982	LEVER, valve control; long	5	15.	52703569	VALVE BANK, dummy	1
4.	52702018	LINK, control, male	7	16.	70141985	LEVER, dummy control; short	2
5.	72066338	PIN, clevis	14	17.	70141984	LEVER, dummy control; long	5
6.	72066337	PIN, valve/lever	7	18.	60030045	SPACER; short	6
7.	72063001	WASHER, wrt.; 1/4"	28	19.	60030046	SPACER; long	6
8.	71055003	LINK, connecting	7	20.	72063062	WASHER, wrt.; 5/16"	2
9.	72066336	PIN, cotter	7	21.	60M6240	ROD	1
10.	72066335	PIN, cotter	7 Ref.	22.	52702016	LINK, control, female	6
11.	72066168	PIN, cotter	14	23.	52702017	LINK, control, bent female	1
12.	71039096	KNOB, lever	14				

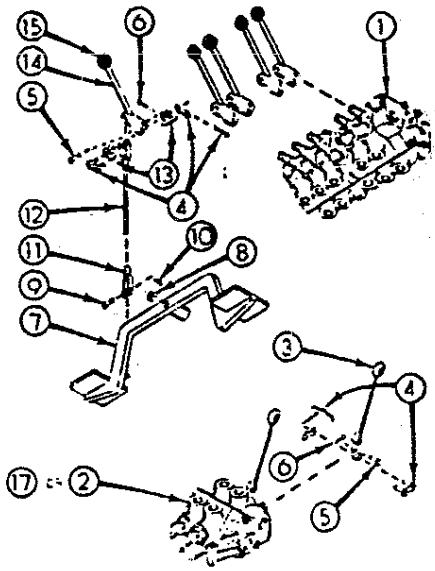
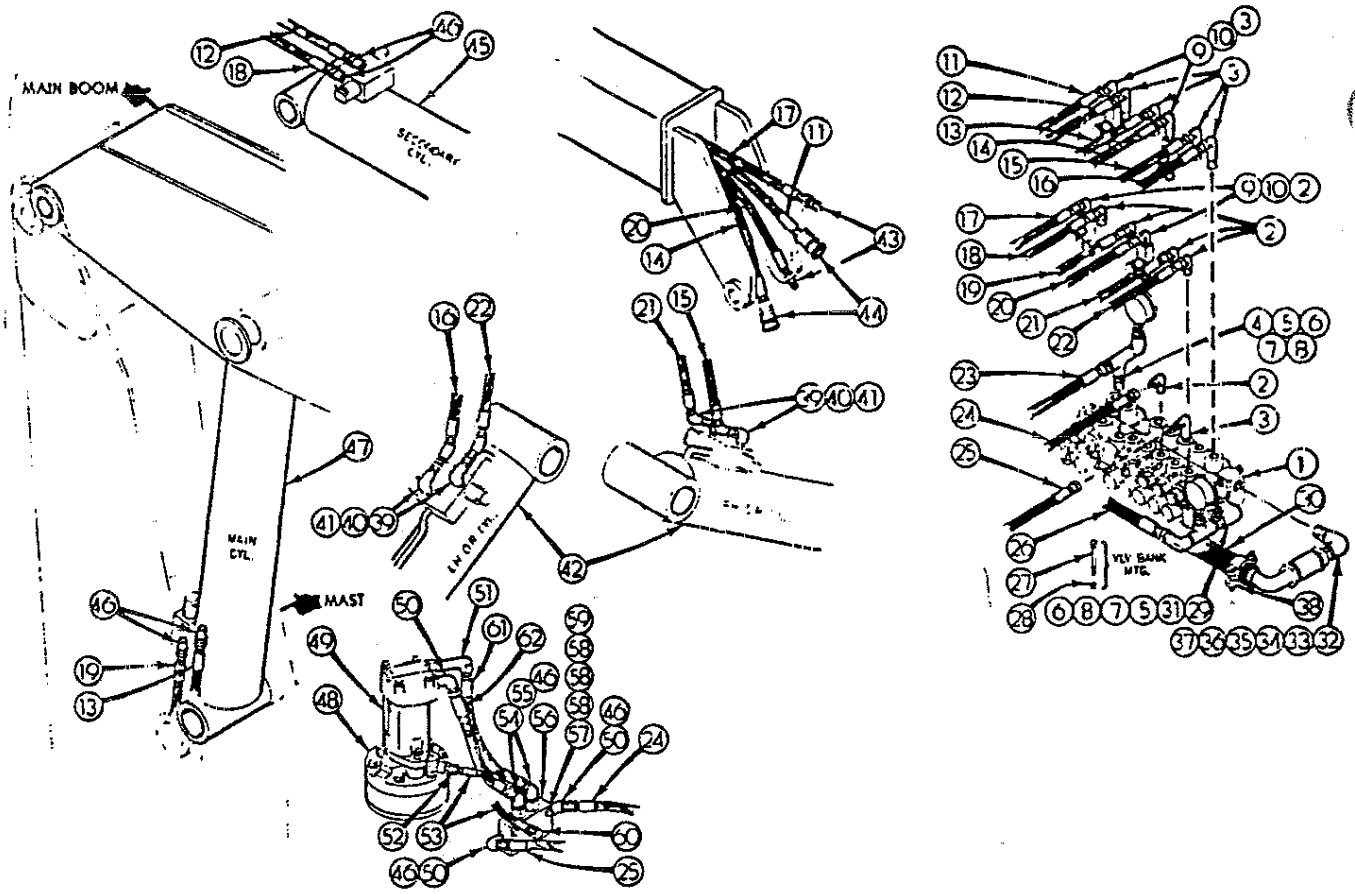


Figure H-16. Control Kit with Chair (Part Number 90702836)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	51702952	VALVE BANK; 5-spool	1 Ref.	10.	72066168	PIN, cotter	2
2.	51703555	VALVE BANK; 2-spool	1 Ref.	11.	71058002	CLEVIS	2
3.	73014848	LEVER, control valve	2	12.	60102876	LINK	1
4.	71058003	LINK, connecting	7	13.	72063001	WASHER, wrt.; 1/4"	20
5.	72066337	PIN	7	14.	52701560	LEVER, control valve	5
6.	72066336	PIN, cotter	7	15.	71039096	KNOB, lever	5
7.	52701270	PEDAL, foot, rotation	1	16.	--	NOT USED	-
8.	72062080	NUT, lock; 1/2-13	1	17.	--	NOT USED	-
9.	72066338	PIN, clevis	2	18.	72053508	ZERK; 1/8" npt (foot pedal)	1



Parts List

Figure H-17. Standard Hydraulic Kit (Part Number 91702752)
For Cranes Manufactured Prior to 1-1-82

Item No.	Part No.	Description	Qty
1.	51703554	VALVE BANK; 7-spool	1
2.	72531420	ELBOW, 90°; 3/8" npt(m) x 3/4-16 JIC	7
3.	72532515	ELBOW, extra-long 90°; 3/8" npt(m) x 3/4-16 JIC	7
4.	72053725	NIPPLE; 1/2" npt	1
5.	72053612	TEE; 1/2" npt	2
6.	72531133	ELBOW, street, 90°; 1/2" npt	2
7.	72531530	BUSHING, reducer; 1/2" npt(m) x 1/4" npt(f)	2
8.	73054003	GAUGE, pressure; 0-5000 PSI	2
9.	72053723	NIPPLE; 3/8" npt	4
10.	73054139	VALVE, flow control; 3/8"	4
11.	51703567	HOSE; 3/8" x 468" lg.	1
12.	51703004	HOSE; 3/8" x 228" lg.	1
13.	51703125	HOSE; 3/8" x 80" lg.	1
14.	51703567	HOSE; 3/8" ID x 468" lg.	1
15.	51703125	HOSE; 3/8" ID x 80" lg.	1
16.	51703125	HOSE; 3/8" ID x 80" lg.	1
17.	51703567	HOSE; 3/8" ID x 468" lg.	1
18.	51703004	HOSE; 3/8" ID x 228" lg.	1
19.	51703125	HOSE; 3/8" ID x 80" lg.	1
20.	51703567	HOSE; 3/8" ID x 468" lg.	1
21.	51703125	HOSE; 3/8" ID x 80" lg.	1
22.	51703125	HOSE; 3/8" ID x 80" lg.	1
23.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
24.	51703448	HOSE; 3/8" ID x 11" lg.	1
25.	51703447	HOSE; 3/8" ID x 18" lg.	1
26.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
27.	72060033	SCREW; 5/16-18 x 3" hex hd.	3
28.	72062109	NUT, lock; 5/16-18	3
29.	72053556	ELBOW, street, 90°; 3/4" npt	1
30.	60035297	HOSE; 1-1/4" ID x 74" lg.	1 Ref.
31.	72053726	NIPPLE, reducer; 3/4" npt x 1/2" npt	1
32.	72053558	NIPPLE; 3/4" npt	1
33.	72531102	ELBOW, 90°; 3/4" npt	1
34.	72053558	NIPPLE; 3/4" npt	1 Ref.
35.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1 Ref.
36.	72053307	COUPLING; 1-1/4" npt	1 Ref.
37.	72532346	NIPPLE, barbed; 1-1/4" 90°	1 Ref.
38.	72066516	CLAMP, hose; 1-1/4"	1 Ref.
39.	72531132	ELBOW, street, 90°; 3/8" npt	4
40.	72053642	SWIVEL; 3/8" npt(m x f)	4
41.	72053563	ELBOW, street, 45°; 3/8" npt	4
42.	3C283800	CYLINDER, outrigger	2
43.	72053542	COUPLER; 3/8"	2
44.	72053540	COUPLER; 3/8"	2
45.	3C017910	CYLINDER, secondary	1 Ref.
46.	72053644	SWIVEL, reducer; 1/2" npt(m) x 3/8" npt(f)	8
47.	3C009910	CYLINDER, main	1 Ref.
48.	71056088	BRAKE, hydraulic	1 Ref.
49.	73051223	MOTOR, hydraulic	1 Ref.
50.	72053755	ELBOW, 90°; 1/2" npt(m) x 7/8-14 str. thd.	3
51.	72531116	ELBOW, long 90°; 1/2" npt(m) x 3/4-16 str. thd.	1
52.	72053786	ADAPTER, swivel; 7/16-20 str. thd. x 1/4" npt(f)	1
53.	51703379	HOSE; 1/4" ID x 16" lg.	1
54.	72053744	ADAPTER with o-ring	2
55.	72053522	ELBOW, street, 45°; 1/2" npt	2
56.	73054370	VALVE, counter balance	1
57.	72060054	SCREW; 3/8-16 x 3" hex hd.	2
58.	72063002	WASHER, wrt.; 5/16"	6
59.	72062103	NUT, lock; 3/8-16	2
60.	72532149	ELBOW, 90°; 1/4" npt x 7/16-20 str. thd.	1
61.	51703444	HOSE; 3/8" ID x 14" lg.	1
62.	51703445	HOSE; 3/8" ID x 12" lg.	1

Parts Drawing

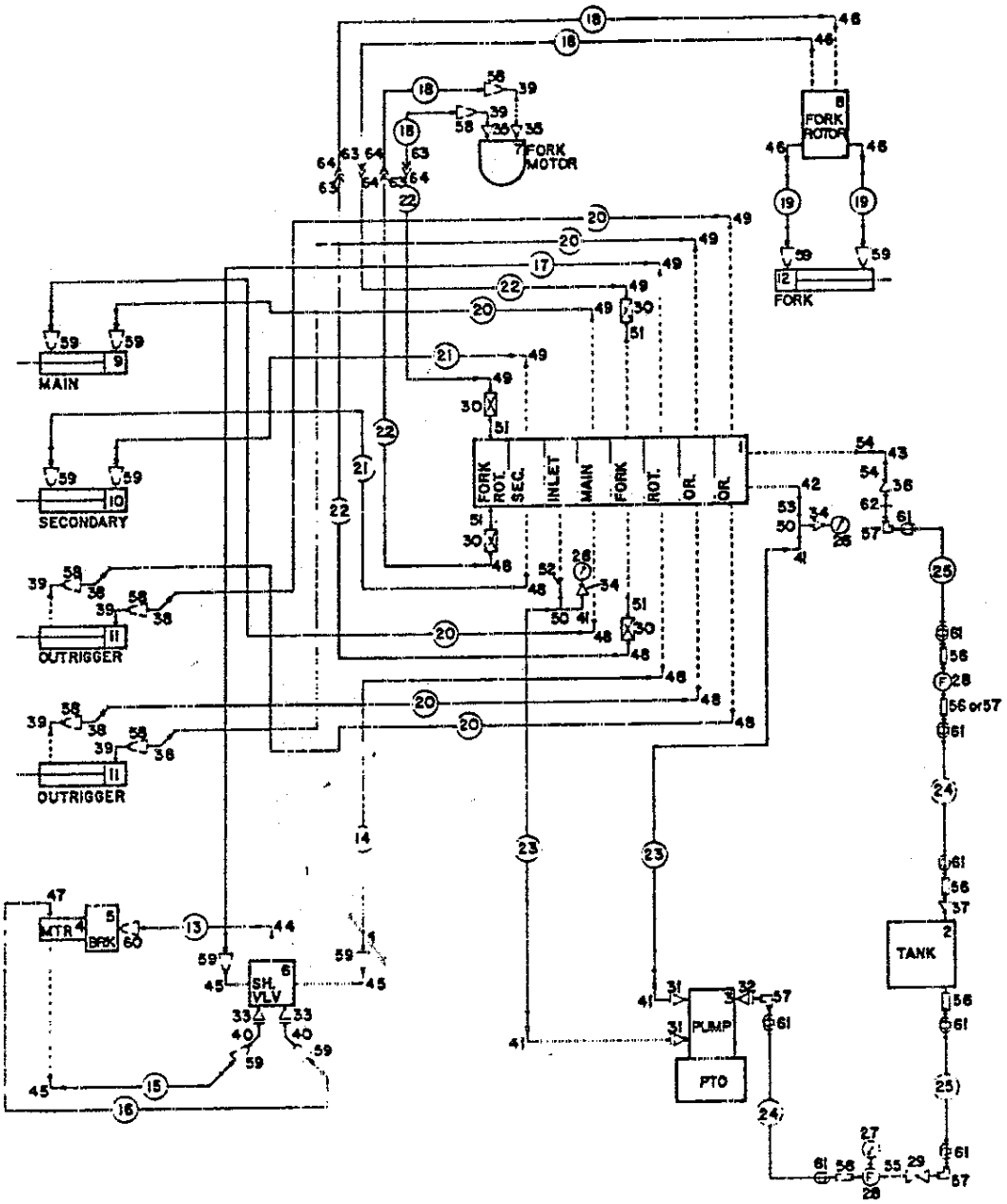
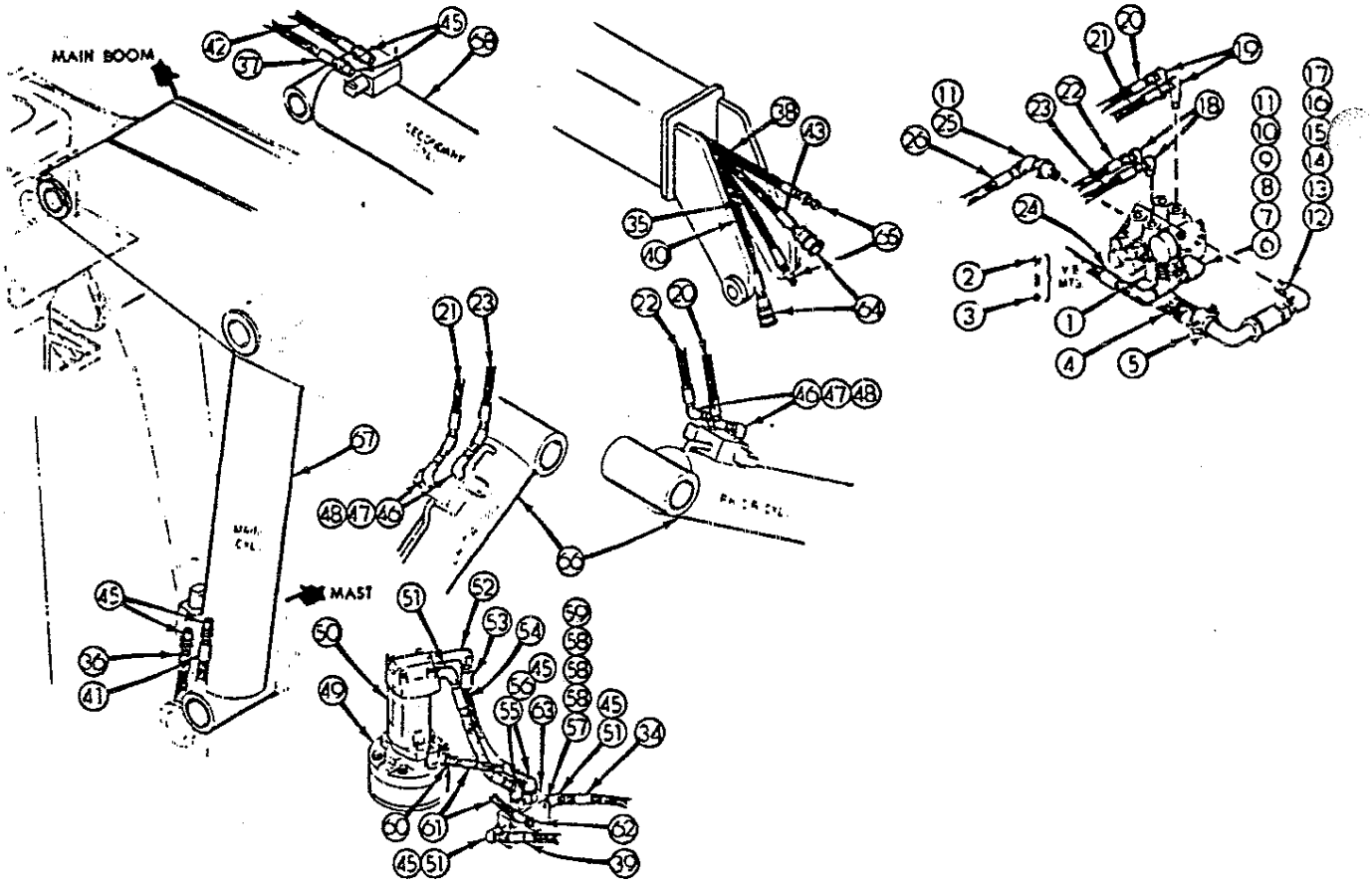


Figure H-18. Standard Hydraulic Schematic for Cranes Manufactured Prior to 1-1-82

Parts List

Item No.	Part No.	Description	Qty
1.	51703554	VALVE BANK	1
2.	52703541	RESERVOIR	1
3.	--	PUMP, hydraulic	1 Ref.
4.	73051223	MOTOR, hydraulic rotation	1
5.	71056068	BRAKE, hydraulic rotation	1
6.	72054370	VALVE, counter balance	1
7.	73051030	MOTOR, fork rotation	1
8.	71057012	ROTATOR, fork	1
9.	3C009910	CYLINDER, main	1
10.	3C017910	CYLINDER, secondary	1
11.	3C283600	CYLINDER, outrigger	2
12.	3B189612	CYLINDER, fork	1
13.	51703379	HOSE; 1/4" ID x 16" lg.	1
14.	51703448	HOSE; 3/8" ID x 11" lg.	1
15.	51703445	HOSE; 3/8" ID x 12" lg.	1
16.	51703444	HOSE; 3/8" ID x 14" lg.	1
17.	51703447	HOSE; 3/8" ID x 18" lg.	1
18.	51703030	HOSE; 3/8" ID x 20" lg.	4
19.	51703394	HOSE; 3/8" ID x 48" lg.	2
20.	51703125	HOSE; 3/8" ID x 80" lg.	6
21.	51703004	HOSE; 3/8" ID x 228" lg.	2
22.	51703567	HOSE; 3/8" ID x 468" lg.	4
23.	51703354	HOSE; 1/2" ID x 72" lg.	2
24.	60035574	HOSE; 1-1/4" ID x 48" lg.	2
25.	60035297	HOSE; 1-1/4" ID x 74" lg.	2
26.	73054003	GAUGE, pressure; 0-5000 PSI	2
27.	70048031	GAUGE, vacuum	1
28.	73052012	FILTER	2
29.	73054130	VALVE, gate; 1-1/4"	1
30.	73054139	VALVE, flow control	4
31.	72053749	ADAPTER with o-ring	
32.	72053753	ADAPTER with o-ring	1
33.	72053744	ADAPTER with o-ring	2
34.	72531830	BUSHING, reducer; 1/2" npt(m) x 1/4" npt(f)	2
35.	72531823	BUSHING, reducer; 1/2" npt(m) x 3/8" npt(f)	2
36.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1
37.	72053378	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1
38.	72053563	ELBOW, street, 45°; 3/8"	4
39.	72531132	ELBOW, street, 90°; 3/8" npt	6
40.	72053522	ELBOW, street, 45°; 1/2" npt	2
41.	72531133	ELBOW, street, 90°; 1/2" npt	4
42.	72053556	ELBOW, street, 90°; 3/4" npt	1
43.	72531102	ELBOW, 90°; 3/4" npt	1
44.	72532149	ELBOW, 90°; 1/4" with o-ring	1
45.	72053755	ELBOW with o-ring, 90°; 1/2"	3
46.	72532151	ELBOW with o-ring, 90°	4
47.	72531116	ELBOW with o-ring, long 90°; 1/2"	1
48.	72531420	ELBOW, 90°; 3/8" npt(m) x 3/4-16 JIC	7
49.	72532515	ELBOW, extra-long 90°; 3/8" npt(m) x 3/4-16 JIC	7
50.	72053612	TEE; 1/2" npt	2
51.	72053723	NIPPLE; 3/8" npt	4
52.	72053725	NIPPLE; 1/2" npt	1
53.	72053728	NIPPLE, reducer; 3/4" x 1/2" npt	1
54.	72053558	NIPPLE; 3/4" npt	2
55.	72053211	NIPPLE, close; 1-1/4" npt	1
56.	72531550	NIPPLE, barbed; 1-1/4"	5
57.	72532346	NIPPLE, barbed, 90°; 1-1/4"	4
58.	72053642	SWIVEL; 3/8" npt	6
59.	70053644	SWIVEL, reducer; 1/2" npt(m) x 3/8" npt(f)	10
60.	72053786	SWIVEL with o-ring; 1/4" npt(f) x 7/16-20 JIC	1
61.	72066516	CLAMP, hose; 1-1/4"	8
62.	72053307	COUPLING; 1-1/4" npt	1
63.	72053542	COUPLER, quick disconnect; 3/8"(m)	4
64.	72053540	COUPLER, quick disconnect; 3/8"(f)	4

Parts Drawing



Parts List

Figure H-19. Chair-Mount Hydraulic Kit - Sheet 1 of 2 (Part Number 91703370)
For Cranes Manufactured Prior to 1-1-82

Item No.	Part No.	Description	Qty
1.	51703555	VALVE BANK; 2-spool	1
2.	72060033	SCREW; 5/16-18 x 3" hex hd.	3
3.	72062109	NUT, lock; 5/16-18	3
4.	60035296	HOSE; 1-1/4" ID x 74" lg.	1 Ref.
5.	72066516	CLAMP, hose; 1-1/4"	1 Ref.
6.	72053556	ELBOW, street, 90°; 3/4" npt	1
7.	72053726	NIPPLE, reducer; 3/4" npt x 1/2" npt	1
8.	72053612	TEE; 1/2" npt	1
9.	72531830	BUSHING, reducer; 1/2" npt(m) x 1/4" npt(f)	1
10.	73054003	GAUGE, pressure; 0 - 5000 PSI	1
11.	72531133	ELBOW, street, 90°; 1/2" npt	2
12.	72053558	NIPPLE; 3/4" npt	1
13.	72531102	ELBOW, 90°; 3/4" npt	1
14.	72053558	NIPPLE; 3/4" npt	1 Ref.
15.	72053150	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1 Ref.
16.	72053307	COUPLING; 1-1/4" npt	1 Ref.
17.	72532346	NIPPLE, barbed, 90°; 1-1/4"	1 Ref.
18.	72531420	ADAPTER, 90°; 3/8" npt(m) x 3/4-16 JIC	2
19.	72532515	ELBOW, extra-long 90°; 3/8" npt(m) x 3/4-16 JIC	2
20.	51703125	HOSE; 3/8" ID x 80" lg.	1
21.	51703125	HOSE; 3/8" ID x 80" lg.	1
22.	51703125	HOSE; 3/8" ID x 80" lg.	1
23.	51703125	HOSE; 3/8" ID x 80" lg.	1
24.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
25.	73073023	ADAPTER, power-beyond	1
26.	51703577	HOSE; 1/2" ID x 162" lg.	1
34.	51703346	HOSE; 3/8" ID x 186" lg.	1
35.	51703576	HOSE; 3/8" ID x 414" lg.	1
36.	51703346	HOSE; 3/8" ID x 186" lg.	1
37.	51703001	HOSE; 3/8" ID x 78" lg.	1
38.	51703576	HOSE; 3/8" ID x 414" lg.	1
39.	51703346	HOSE; 3/8" ID x 186" lg.	1
40.	51703576	HOSE; 3/8" ID x 414" lg.	1
41.	51703346	HOSE; 3/8" ID x 186" lg.	1
42.	51703001	HOSE; 3/8" ID x 78" lg.	1
43.	51703576	HOSE; 3/8" ID x 414" lg.	1
45.	72053644	SWIVEL, reducer; 1/2" npt(m) x 3/8" npt(f)	8
46.	72531132	ELBOW, street, 90°; 3/8" npt	4
47.	72053642	SWIVEL; 3/8" npt	4
48.	72053563	ELBOW, street, 45°; 3/8" npt	4
49.	71056068	BRAKE, hydraulic	1 Ref.
50.	73051223	MOTOR, hydraulic	1 Ref.
51.	72053755	ELBOW, 90°, with o-ring; 1/2"	3
52.	72531116	ELBOW, extra-long 90°; 1/2" npt x 7/8-14 Str. Thd.	1
53.	51703444	HOSE; 3/8" ID x 14" lg.	1
54.	51703445	HOSE; 3/8" ID x 12" lg.	1
55.	72053744	ADAPTER with o-ring	2
56.	72053522	ELBOW, street, 45°; 1/2" npt	2
57.	72060054	SCREW; 3/8-16 x 3" hex hd.	2
58.	72063002	WASHER, wrt.; 5/16"	6
59.	72062103	NUT, lock; 3/8-16	2
60.	72053786	ADAPTER, swivel; 1/4" npt(f) 7/16-20 str. thd.	1
61.	51703379	HOSE; 1/4" ID x 16" lg.	1
62.	72532149	ELBOW with o-ring; 1/4"	1
63.	73054370	VALVE, counter balance	1
64.	72053540	COUPLER; 3/8" npt	2
65.	72053542	COUPLER, insert; 3/8"	2
66.	3C283800	CYLINDER, outrigger	2 Ref.
67.	3C009910	CYLINDER, main	1 Ref.
68.	3C017910	CYLINDER, secondary	1 Ref.

Parts Drawing

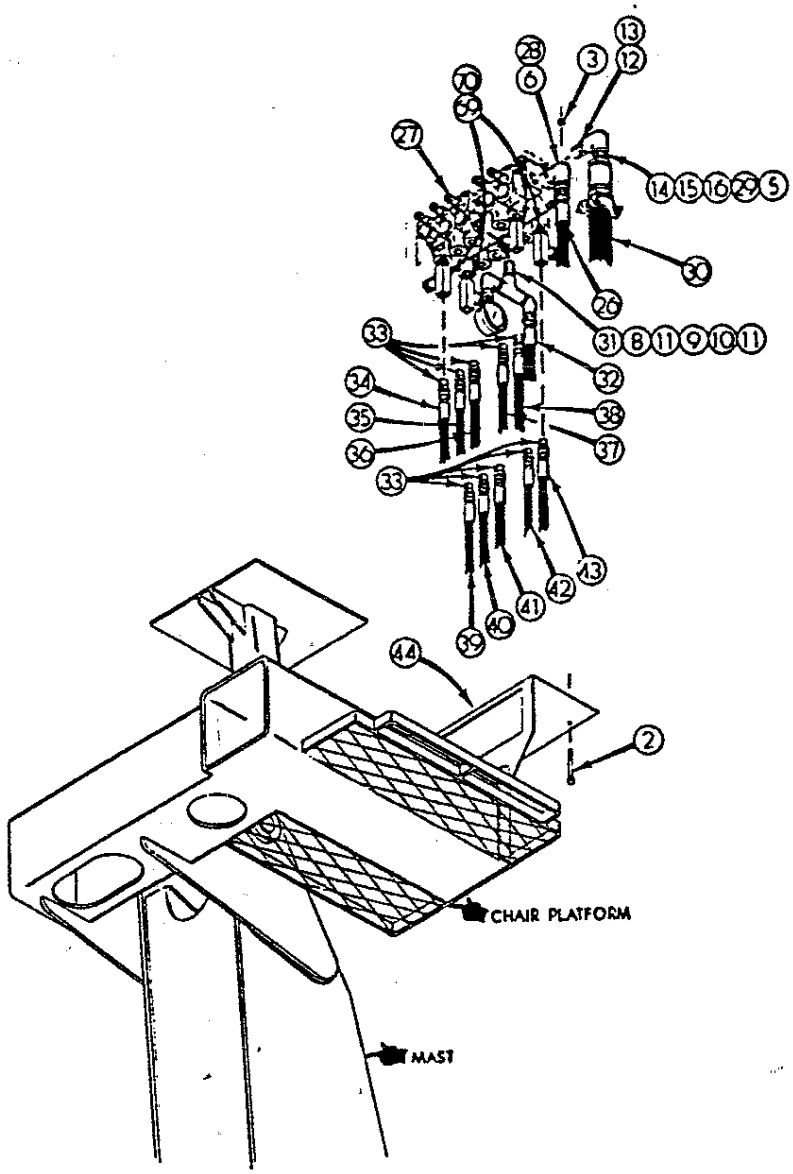
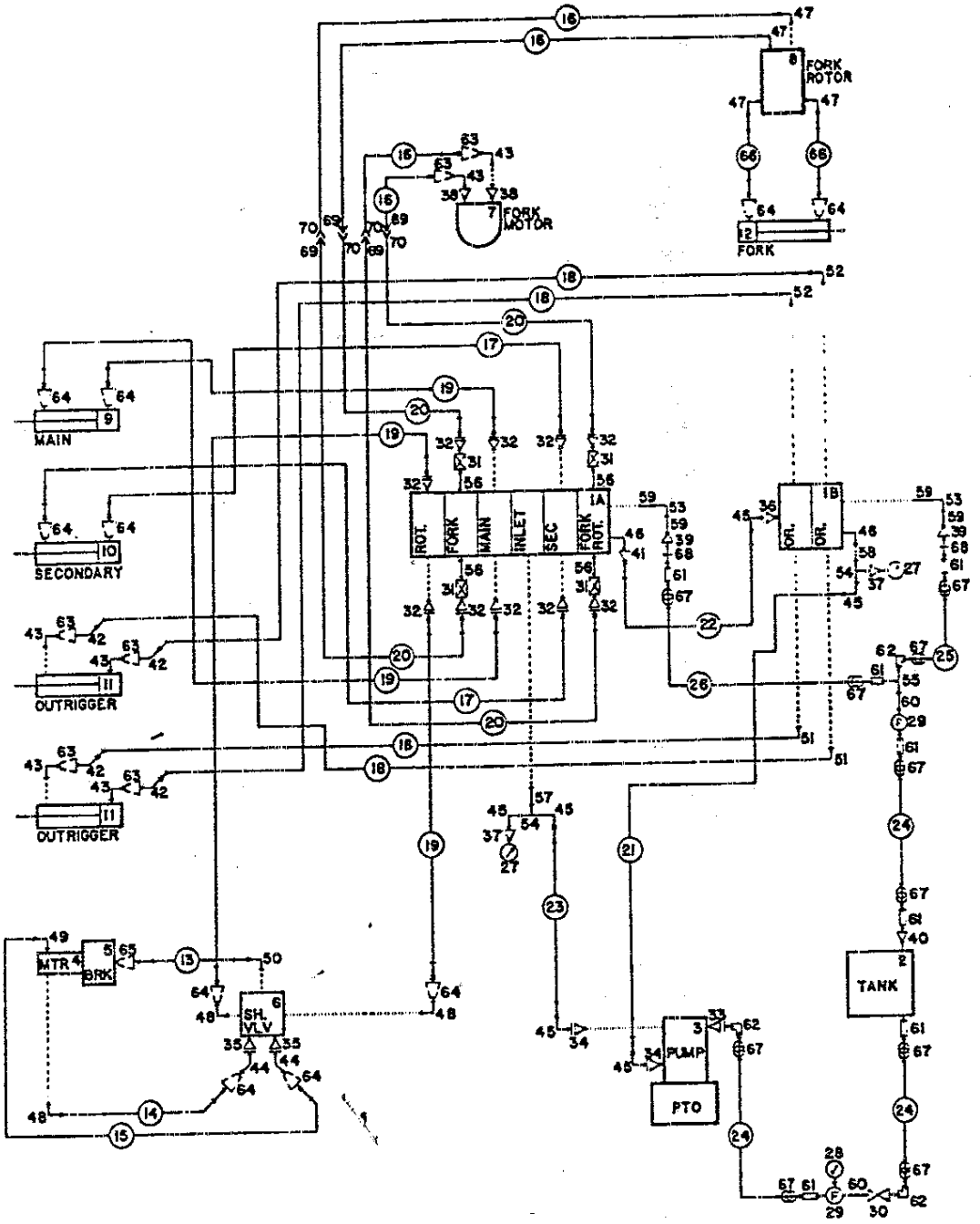


Figure H-20. Chair-Mount Hydraulic Kit - Sheet 2 of 2 (Part Number 91703370)
For Cranes Manufactured Prior to 1-1-82

Item No.	Part No.	Description	Qty
2.	72060033	SCREW; 5/16-18 x 3" hex hd.	3
3.	72062109	NUT, lock; 5/16-18	3
5.	72066516	CLAMP, hose; 1-1/4"	1 Ref.
6.	72053556	ELBOW, street, 90°; 3/4" npt	1
8.	72053612	TEE; 1/2" npt	1
9.	72531830	BUSHING, reducer; 1/2" npt(m) x 1/4" npt(f)	1
10.	73054003	GAUGE, pressure; 0-5000 PSI	1
11.	72531133	ELBOW, street, 90°; 1/2" npt	2
12.	72053558	NIPPLE; 3/4" npt(m)	1
13.	72531102	ELBOW, 90°; 3/4" npt	1
14.	72053558	NIPPLE; 3/4" npt	1 Ref.
15.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1 Ref.
16.	72053307	COUPLING; 1-1/4" npt	1 Ref.
26.	51703557	HOSE; 1/2" x 162" lg.	1 Ref.
27.	51702952	VALVE BANK; 5-spool	1
28.	72531833	BUSHING, reducer; 3/4" npt(m) x 1/2" npt(f)	1
29.	72531550	NIPPLE, barbed; 1-1/4"	1 Ref.
30.	60035586	HOSE; 1-1/4" ID x 144" lg.	1 Ref.
31.	72053725	NIPPLE; 1/2" npt	1
32.	51703417	HOSE; 1/2" ID x 192" lg.	1 Ref.
33.	72053670	ADAPTER; 3/8" npt(m) x 3/4-16 JIC	10
34.	51703346	HOSE; 3/8" ID x 186" lg.	1 Ref.
35.	51703576	HOSE; 3/8" ID x 414" lg.	1 Ref.
36.	51703346	HOSE; 3/8" ID x 186" lg.	1 Ref.
37.	51703001	HOSE; 3/8" ID x 78" lg.	1 Ref.
38.	51703576	HOSE; 3/8" ID x 414" lg.	1 Ref.
39.	51703346	HOSE; 3/8" ID x 186" lg.	1 Ref.
40.	51703576	HOSE; 3/8" ID x 414" lg.	1 Ref.
41.	51703346	HOSE; 3/8" ID x 186" lg.	1 Ref.
42.	51703001	HOSE; 3/8" ID x 78" lg.	1 Ref.
43.	51703576	HOSE; 3/8" ID x 414" lg.	1 Ref.
44.	71392101	PLACARD, control	1 Ref.
69.	72053723	NIPPLE; 3/8" npt	4
70.	73054139	VALVE, flow control	4



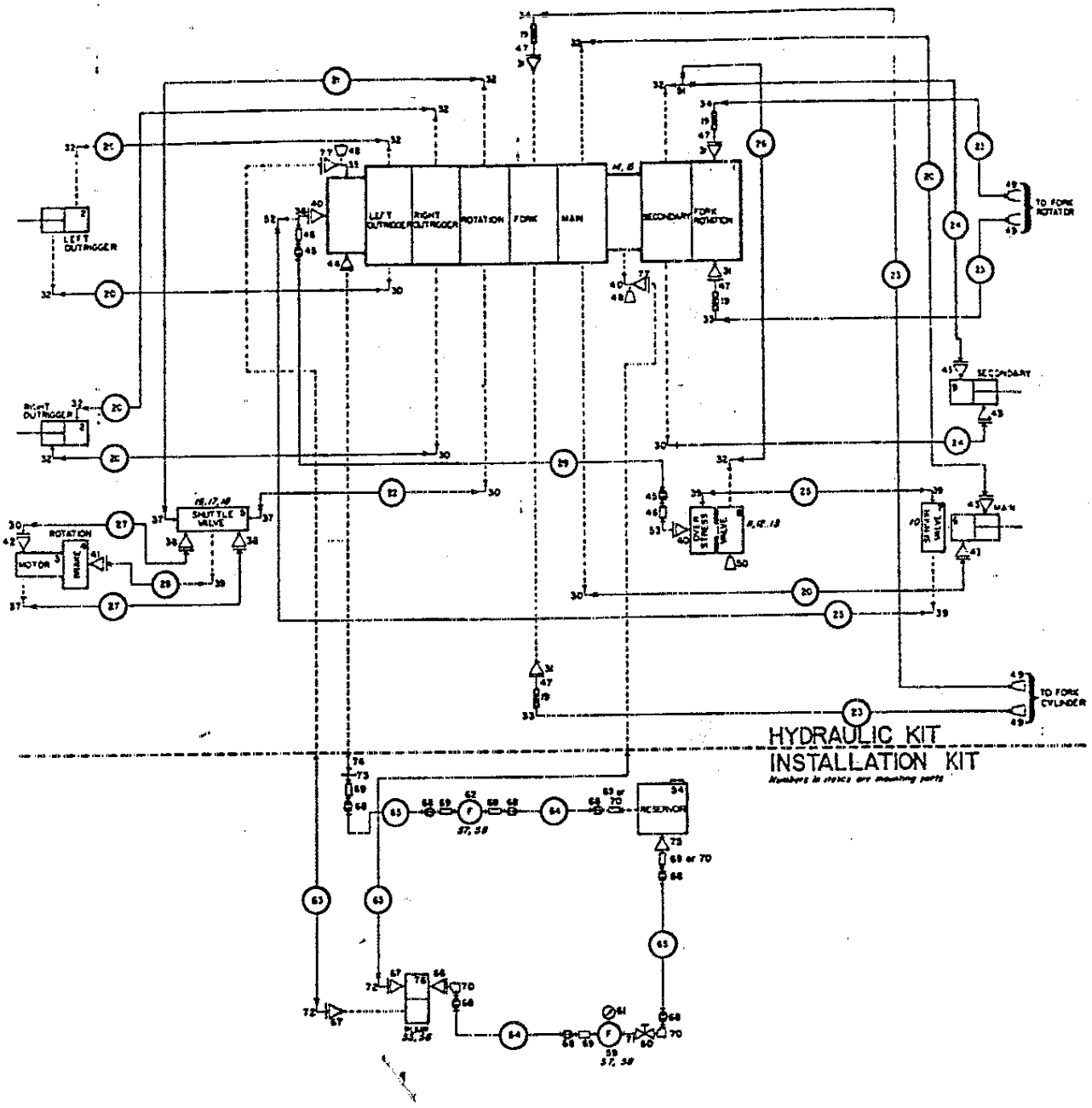
Parts List

Figure H-21. Chair-Mount Hydraulic Schematic for Cranes Manufactured Prior to 1-1-82

1025 Chair-Mount Hydraulic Schematic

Item No.	Part No.	Description	Qty
1.	51702952	VALVE BANK	1
1B	51703555	VALVE BANK	1
2.	52703541	RESERVOIR	1
3.	--	PUMP, hydraulic	1 Ref.
4.	73051223	MOTOR, hydraulic rotation	1
5.	71056058	BRAKE, hydraulic rotation	1
6.	73054370	VALVE, counter balance	1
7.	73051030	MOTOR, fork rotation	1
8.	71057012	ROTATOR, fork	1
9.	3C009910	CYLINDER, main	1
10.	3C017910	CYLINDER, secondary	1
11.	3C283800	CYLINDER, outrigger	2
12.	3B189612	CYLINDER, fork	1
13.	51703379	HOSE; 1/4" ID x 16" lg.	1
14.	51703445	HOSE; 3/8" ID x 12" lg.	1
15.	51703444	HOSE; 3/8" ID x 14" lg.	1
16.	51703030	HOSE; 3/8" ID x 20" lg.	4
17.	51703001	HOSE; 3/8" ID x 78" lg.	2
18.	51703125	HOSE; 3/8" ID x 80" lg.	4
19.	51703346	HOSE; 3/8" ID x 186" lg.	4
20.	51703576	HOSE; 3/8" ID x 414" lg.	4
21.	51703354	HOSE; 1/2" ID x 72" lg.	1
22.	51703577	HOSE; 1/2" ID x 162" lg.	1
23.	51703417	HOSE; 1/2" ID x 192" lg.	1
24.	60035574	HOSE; 1-1/4" ID x 48" lg.	3
25.	60035297	HOSE; 1-1/4" ID x 74" lg.	1
26.	60035556	HOSE; 1-1/4" ID x 144" lg.	1
27.	73054003	GAUGE, pressure; 0-5000 PSI	2
28.	70048031	GAUGE, vacuum	1
29.	73052012	FILTER	2
30.	73054130	VALVE, gate; 1-1/4"	1
31.	73054139	VALVE, flow control	4
32.	72053670	ADAPTER; 3/8" npt(m) x 3/4-16 JIC	10
33.	72053753	ADAPTER with o-ring	1
34.	72053749	ADAPTER with o-ring	2
35.	72053744	ADAPTER with o-ring	2
36.	73073023	ADAPTER, power beyond	1
37.	72531530	BUSHING, reducer; 1/2" npt(m) x 1/4" npt(f)	2
38.	72531823	BUSHING, reducer; 1/2" npt(m) x 3/8" npt(f)	2
38.	72531823	BUSHING, reducer; 1/2" npt(m) x 3/8" npt(f)	2
39.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	2
40.	72053378	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1
41.	72531833	BUSHING, reducer; 3/4" npt(m) x 1/2" npt(f)	1
42.	72053563	ELBOW, street, 45°; 3/8" npt	4
43.	72531132	ELBOW, street, 90°; 3/8" npt	6
44.	72053522	ELBOW, street, 45°; 1/2" npt	2
45.	72531133	ELBOW, street, 90°; 1/2" npt	6
46.	72053556	ELBOW, street, 90°; 3/4" npt	2
47.	72532151	ELBOW with o-ring, 90°	4
48.	72053755	ELBOW with o-ring, 90°; 1/2"	3
49.	72531116	ELBOW, extra long 90°; 1/2"	1
50.	72532149	ELBOW with o-ring, 90°; 1/4"	1
51.	72531420	ELBOW, 90°; 3/8" npt(m) x 3/4-16 JIC	2
52.	72532515	ELBOW, extra-long 90°; 3/8" npt(m) x 3/4-16 JIC	2
53.	72531102	ELBOW, 90°; 3/4" npt	2
54.	72053612	TEE; 1/2" npt	2
55.	72053606	TEE; 1-1/4" npt	1
56.	72053723	NIPPLE; 3/8" npt	4
57.	72053725	NIPPLE; 1/2" npt	1
58.	70052726	NIPPLE, reducer; 3/4" x 1/2" npt	1
59.	72053558	NIPPLE; 3/4" npt	4
60.	72053211	NIPPLE, close; 1-1/4" npt	2
61.	72531550	NIPPLE, barbed; 1-1/4"	7
62.	72532346	NIPPLE, barbed, 90°; 1-1/4"	3
63.	72053642	SWIVEL; 3/8" npt(m x f)	6
64.	72053644	SWIVEL, reducer; 1/2" npt(m) x 3/8" npt(f)	10
65.	72053786	SWIVEL; 1/4" npt(f) x 7/16-20 JIC	1
66.	51703394	HOSE; 3/8" ID x 84" lg.	2
67.	72066516	CLAMP, hose; 1-1/4"	10
68.	72053307	COUPLING; 1-1/4" npt	2
69.	72053542	COUPLER, quick disconnect; 3/8"(m)	4
70.	72053540	COUPLER, quick disconnect; 3/8"(f)	4

Parts Drawing

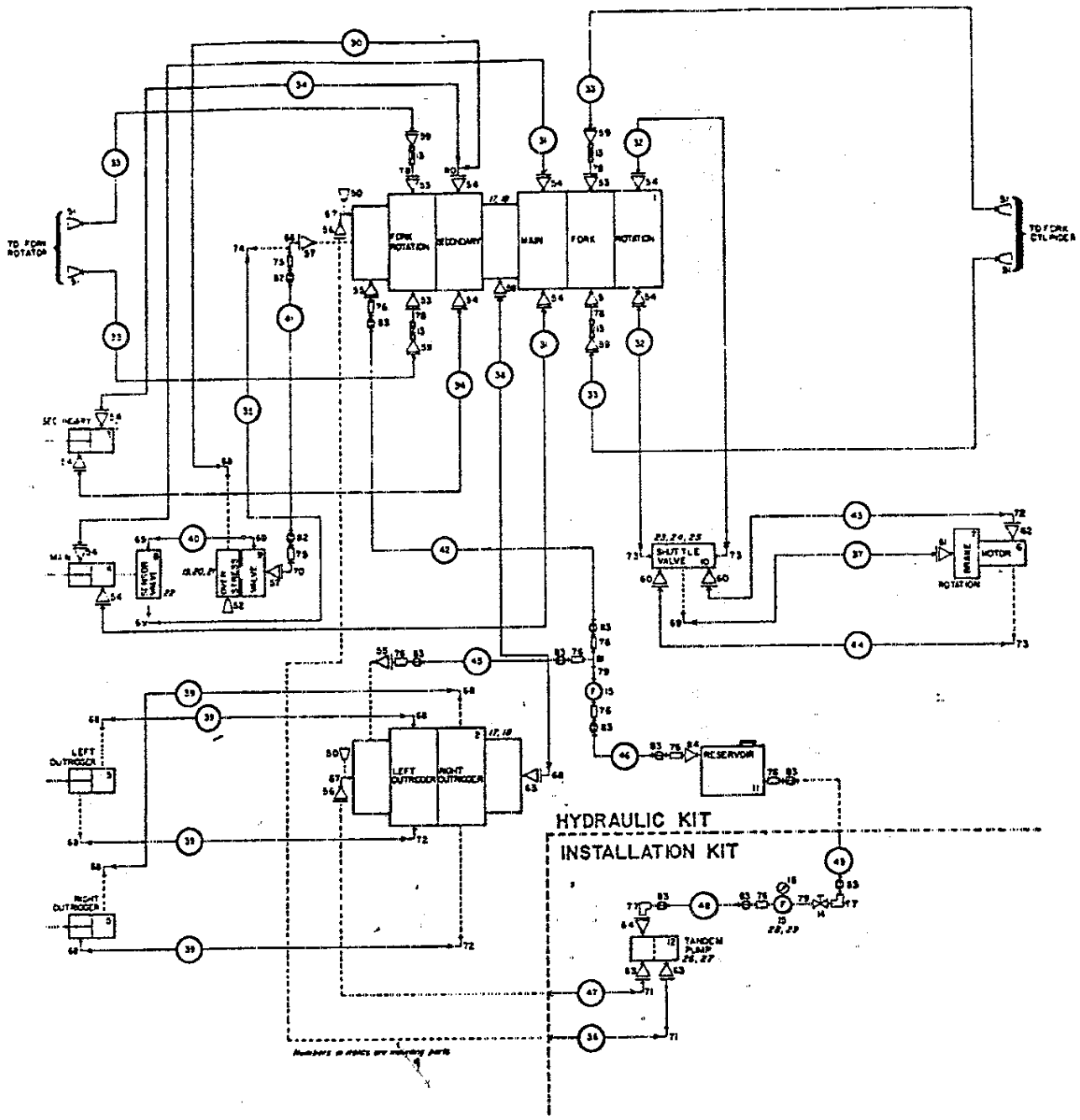


Parts List

Figure H-22. Standard Hydraulic Kit (Part Number 91704287)
For Cranes Manufactured After 1-1-82

Item No.	Part No.	Description	Qty
1.	51704248	VALVE BANK	1
2.	3C283801	CYLINDER, outrigger	2
3.	73051223	MOTOR, hydraulic rotation	1
4.	71056088	BRAKE, rotation	1
5.	73054370	VALVE, shuttle	1
6.	3C009910	CYLINDER, main	1
7.	73054425	VALVE, sensor	1
8.	73054424	VALVE, overstress	1
9.	3C017911	CYLINDER, secondary	1
10.	72060733	SCREW; 5/16-18 x 1-1/4" soc. hd.	4
11.	72060049	SCREW; 3/8-16 x 1-3/4" hex hd.	2
12.	72062002	NUT; 3/8-16	2
13.	72063051	WASHER, lock; 3/8"	2
14.	72060033	SCREW; 5/16-18 x 3" hex hd.	3
15.	72062109	NUT, lock; 5/16-18	3
16.	72060054	SCREW; 3/8-16 x 3" hex hd.	2
17.	72063003	WASHER, wrt.; 3/8"	6
18.	72062103	NUT, lock; 3/8-16	2
19.	73054139	VALVE, flow control	4
20.	51704298	HOSE; 3/8" ID x 80" lg.	6
21.	51703283	HOSE; 3/8" ID x 9" lg.	1
22.	51703704	HOSE; 3/8" ID x 12" lg.	1
23.	51704292	HOSE; 3/8" ID x 468" lg.	4
24.	51703606	HOSE; 3/8" ID x 228" lg.	2
25.	51703543	HOSE; 1/4" ID x 80" lg.	2
26.	51703863	HOSE; 3/8" ID x 14" lg.	1
27.	51703862	HOSE; 3/8" ID x 13-1/4" lg.	2
28.	51703876	HOSE; 1/4" ID x 8-1/2" lg.	1
29.	60035230	HOSE; 3/4" ID x 8" lg.	1
30.	72532666	ELBOW, extra-long 90°; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	6
31.	72053740	ADAPTER; 3/4-16 str. thd. (m) x 3/8" npt(f)	4
32.	72053763	ELBOW, 90°; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	10
33.	72532515	ELBOW, extra-long 90°; 3/8" npt(m) x 3/4-16 JIC(m)	2
34.	72531420	ELBOW, 90°; 3/8" npt(m) x 3/4-16 JIC(m)	2
35.	60106322	ELBOW, 90°; 1-1/16" str. thd. (m) x 7/8-14 JIC(m) x 1/4" npt(f)	1
36.	60106199	ELBOW, street, 90°; 3/4" npt(m x f) x 1/4" npt(f)	1
37.	72053764	ELBOW, 90°; 7/8-14 str. thd. (m) x 3/4-16 JIC(m)	3
38.	72532359	ADAPTER; 7/8-14 str. thd. (m) x 3/4-16 JIC(m)	2
39.	72053758	ELBOW, 90°; 7/16-20 str. thd. (m) x 7/16-20 JIC(m)	4
40.	72053747	ADAPTER; 1-1/16" str. thd. (m) x 3/4" npt(f)	3
41.	72532351	ADAPTER; 7/16-20 str. thd. (m) x 7/16-20 JIC(m)	
42.	72531206	ADAPTER; 7/8-14 str. thd. (m) x 3/4-16 str. thd. (f)	1
43.	72532358	ADAPTER; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	4
44.	72053747	ADAPTER; 1-1/16" str. thd. (m) x 3/4" npt(f)	1
45.	72066000	CLAMP, hose; #12	2
46.	72053458	NIPPLE, barbed; 3/4"	2
47.	72053723	NIPPLE; 3/8" npt	4
48.	72532659	PLUG; 1/4" npt	2
49.	72532679	PLUG; 3/4-16 JIC(m)	4
50.	72532141	PLUG; 3/4-16 str. thd.	1
51.	72532657	TEE, swivel nut run	1
52.	72531412	ELBOW, 90°; 1/4" npt(m) x 7/16-20 JIC(m)	1
53.	72053285	ELBOW, street, 3/4" npt	1
54.	52703541	RESERVOIR	1
55.	72060092	SCREW; 1/2-13 x 1-1/4" hex hd.	2
56.	72063053	WASHER, lock; 1/2"	2
57.	72060000	SCREW; 1/4-20 x 1/2" hex hd.	4
58.	72063049	WASHER, lock; 1/4"	4
59.	73052012	FILTER, suction	1
	73052014	ELEMENT, filter; 25-micron	Ref.
60.	73054130	VALVE, gate; 1-1/4"	1
61.	70048031	GAUGE, vacuum	1
62.	73052012	FILTER, return	
	73052014	ELEMENT, filter; 25-micron	
63.	51703703	HOSE; 1/2" ID x 72" lg.	
64.	60035574	HOSE; 1-1/4" ID x 48" lg.	
65.	60035297	HOSE; 1-1/4" ID x 74" lg.	2
66.	72053753	ADAPTER; 1-5/8" str. thd. (m) x 1-1/4" npt(f)	1
67.	72053750	ADAPTER; 1-5/16" str. thd. (m) x 3/4" npt(f)	2
68.	72066516	CLAMP, hose; 1-1/4"	
69.	72531550	NIPPLE, barbed; 1-1/4"	
70.	72532346	NIPPLE, barbed, 90°; 1-1/4"	3
71.	72053211	NIPPLE, close; 1-1/4" npt	1
72.	72531422	ELBOW, 90°; 3/4" npt(m) x 3/4-16 JIC(m)	2
73.	72053489	COUPLER, reducer; 1-1/4" npt(f) x 3/4" npt(f)	1
74.	72053558	NIPPLE; 3/4" npt	1
75.	72053388	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1
76.	--	PUMP	1
77.	72532669	ADAPTER; 7/8-14 JIC(f) x 3/4-16 JIC(m)	2

Parts Drawing



Parts List

Figure H-23. Chair-Mount Hydraulic Kit (Part Number 91704286)
For Cranes Manufacture After 1-1-82

Item No.	Part No.	Description	Qty
1.	51704289	VALVE BANK; 5-spool	1
2.	51704288	VALVE BANK; 2-spool	1
3.	3C017911	CYLINDER, secondary	1
4.	3C009910	CYLINDER, main	1
5.	3C283801	CYLINDER, outrigger	2
6.	73051223	MOTOR, hydraulic rotation	1
7.	71056068	BRAKE, rotation	1
8.	73054425	VALVE, sensor	1
9.	73054424	VALVE, overstress	1
10.	73054370	VALVE, shuttle	1
11.	52703541	RESERVOIR	1
12.	--	PUMP	1
13.	73054139	VALVE, flow control	4
14.	73054130	VALVE, gate; 1-1/4"	1
15.	73052012	FILTER	2
	73052014	ELEMENT, filter; 25-micron	Ref.
16.	70048031	GAUGE, vacuum	1
17.	72060033	SCREW; 5/16-18 x 3" hex hd.	6
18.	72062109	NUT, lock; 5/16-18	6
19.	72060049	SCREW; 3/8-16 x 1-3/4" hex hd.	2
20.	72062002	NUT; 3/8-16	2
21.	72063051	WASHER, lock; 3/8"	2
22.	72060733	SCREW; 5/16-18 x 1-1/4" soc. hd.	4
23.	72060054	SCREW; 3/8-16 x 3" hex hd.	2
24.	72063003	WASHER, wrt.; 3/8"	6
25.	72062103	NUT, lock; 3/8-16	2
26.	72060092	SCREW; 1/2-13 x 1-1/4" hex hd.	2
27.	72063053	WASHER, lock; 1/2"	2
28.	72060000	SCREW; 1/4-20 x 1/2" hex hd.	4
29.	72063049	WASHER, lock; 1/4"	4
30.	51704295	HOSE; 1/4" ID x 186" lg.	1
31.	51704293	HOSE; 3/8" ID x 186" lg.	2
32.	51704293	HOSE; 3/8" ID x 186" lg.	2
33.	51704296	HOSE; 3/8" ID x 414" lg.	4
34.	51704297	HOSE; 3/8" ID x 78" lg.	2
35.	51703543	HOSE; 1/4" ID x 80" lg.	1
36.	51703613	HOSE; 1/2" ID x 192" lg.	1
37.	51703876	HOSE; 1/4" ID x 8-1/2" lg.	1
38.	51704294	HOSE; 1/2" ID x 162" lg.	1
39.	51704298	HOSE; 3/8" ID x 80" lg.	4
40.	51703543	HOSE; 1/4" ID x 80" lg.	1
41.	60035236	HOSE; 3/4" ID x 12" lg.	1
42.	60035586	HOSE; 3/4" ID x 144" lg.	1
43.	51703862	HOSE; 3/8" ID x 13-1/4" lg.	1
44.	51703704	HOSE; 3/8" ID x 12" lg.	1
45.	60035297	HOSE; 1-1/4" ID x 74" lg.	1
46.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
47.	51703703	HOSE; 1/2" ID x 72" lg.	1
48.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
49.	60035297	HOSE; 1-1/4" ID x 72" lg.	1
50.	72532659	PLUG, pipe; 1/4" npt	2
51.	72532679	PLUG; 3/4-16 JIC	4
52.	72532141	PLUG; 3/4-16 str. thd.	1
53.	72053740	ADAPTER; 3/4-16 str. thd. (m) x 3/8" npt(f)	4
54.	72532358	ADAPTER; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	1
55.	72053747	ADAPTER; 1-1/16" str. thd. (m) x 3/4" npt(f)	2
56.	72532669	ADAPTER; 7/8-14 JIC(f) x 3/4-16 JIC(m)	2
57.	72053747	ADAPTER; 1-1/16" str. thd. (m) x 3/4" npt(f)	3
58.	72532360	ADAPTER; 1-1/16" str. thd. (m) x 3/4-16 JIC(m)	1
59.	72053670	ADAPTER; 3/8" npt(m) x 3/4-16 JIC(m)	1
60.	72532359	ADAPTER; 7/8-14 str. thd. (m) x 3/4-16 JIC(m)	2
61.	72532351	ADAPTER; 7/16-20 str. thd. (m) x 7/16-20 JIC(m)	1
62.	72531206	ADAPTER; 7/8-14 str. thd. (m) x 3/4-16 str. thd. (f)	1
63.	72053750	ADAPTER; 1-5/16" str. thd. (m) x 3/4" npt(f)	2
64.	72053753	ADAPTER; 1-5/8" str. thd. (m) x 1-1/4" npt(f)	1
65.	73731243	ADAPTER, power beyond	1
66.	60106199	ELBOW, 90°; 3/4" npt(m x f) x 1/4" npt(f)	1
67.	60106322	ELBOW, 90°; 1-1/16" str. thd. (m) x 7/8-14 JIC(m) x 1/4" npt(f)	
68.	72053763	ELBOW, 90°; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	
69.	72053758	ELBOW, 90°; 7/16-20 str. thd. (m) x 7/16-20 JIC(m)	4
70.	72053285	ELBOW, street, 90°; 3/4" npt	1
71.	72531422	ELBOW, 90°; 3/4" npt(m) x 3/4-16 JIC(m)	2
72.	72532666	ELBOW, extra-long 90°; 3/4-16 str. thd. (m) x 3/4-16 JIC(m)	2
73.	72053764	ELBOW, 90°; 7/8-14 str. thd. (m) x 3/4-16 JIC(m)	3
74.	72531412	ELBOW, 90°; 7/16-20 JIC (m) x 1/4" npt(m)	1
75.	72053458	NIPPLE, barbed; 3/4"	2
76.	72531550	NIPPLE, barbed; 1-1/4"	8
77.	72532346	NIPPLE, barbed, 90°; 1-1/4"	2
78.	72053723	NIPPLE; 3/8" npt	1
79.	72053211	NIPPLE, close; 1-1/4" npt	2
80.	72532657	TEE, swivel nut run	1
81.	72053606	TEE; 1-1/4" npt	1
82.	72066000	CLAMP, hose; #12	2
83.	72066516	CLAMP, hose; 1-1/4"	10
84.	72053388	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1

Parts Drawing

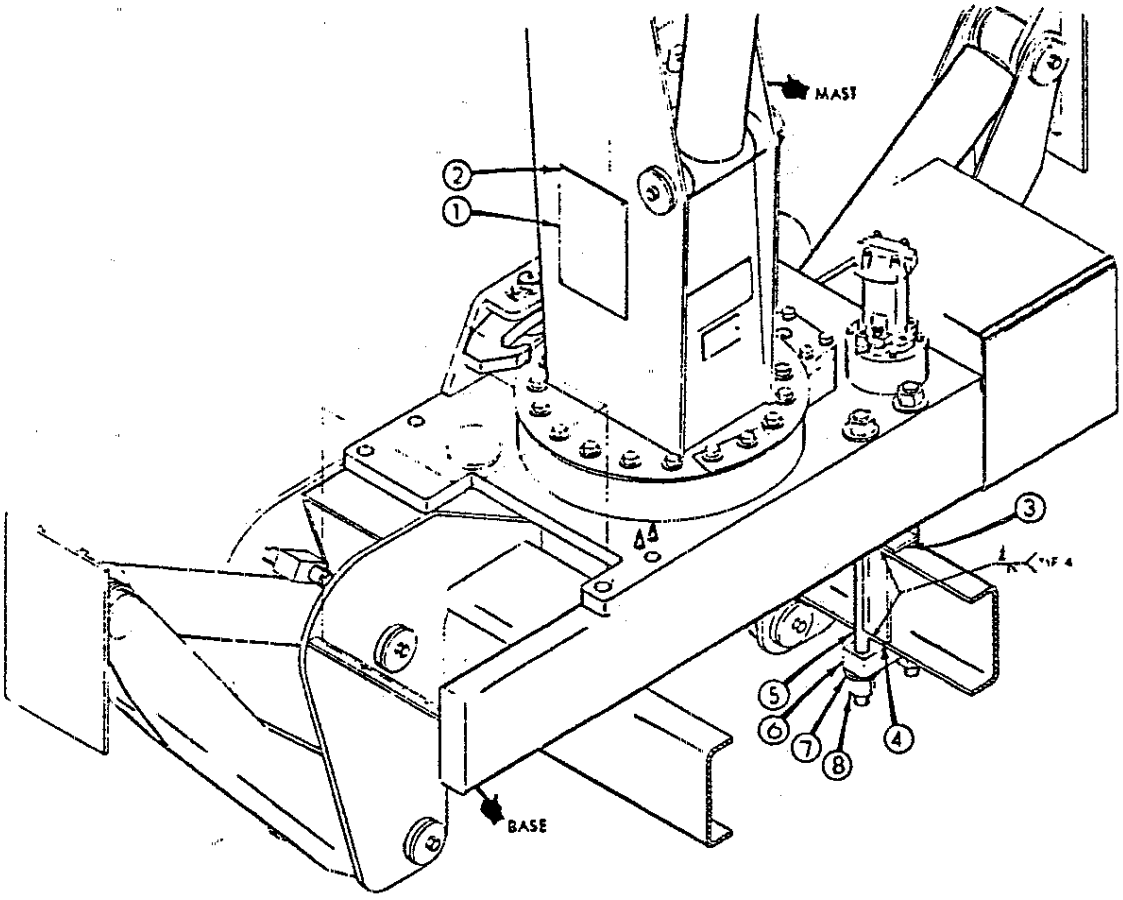


Figure H-24. Standard Installation Kit - Sheet 1 of 3 (Part Number 93702773)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	70029226	PLACARD, capacity	2	5.	71014847	STUD; 1-1/4 - 7 x 28" lg.	8
2.	72066340	RIVET, pop; 1/8"	8	6.	60010665	PLATE, clamp	4
3.	60103563	SPACER, frame flange	2	7.	72063012	WASHER, wrt.; 1-1/4"	16
4.	60103562	BAR, frame reinforcement	4	8.	72062142	NUT, lock; 1-1/4" - 7	16

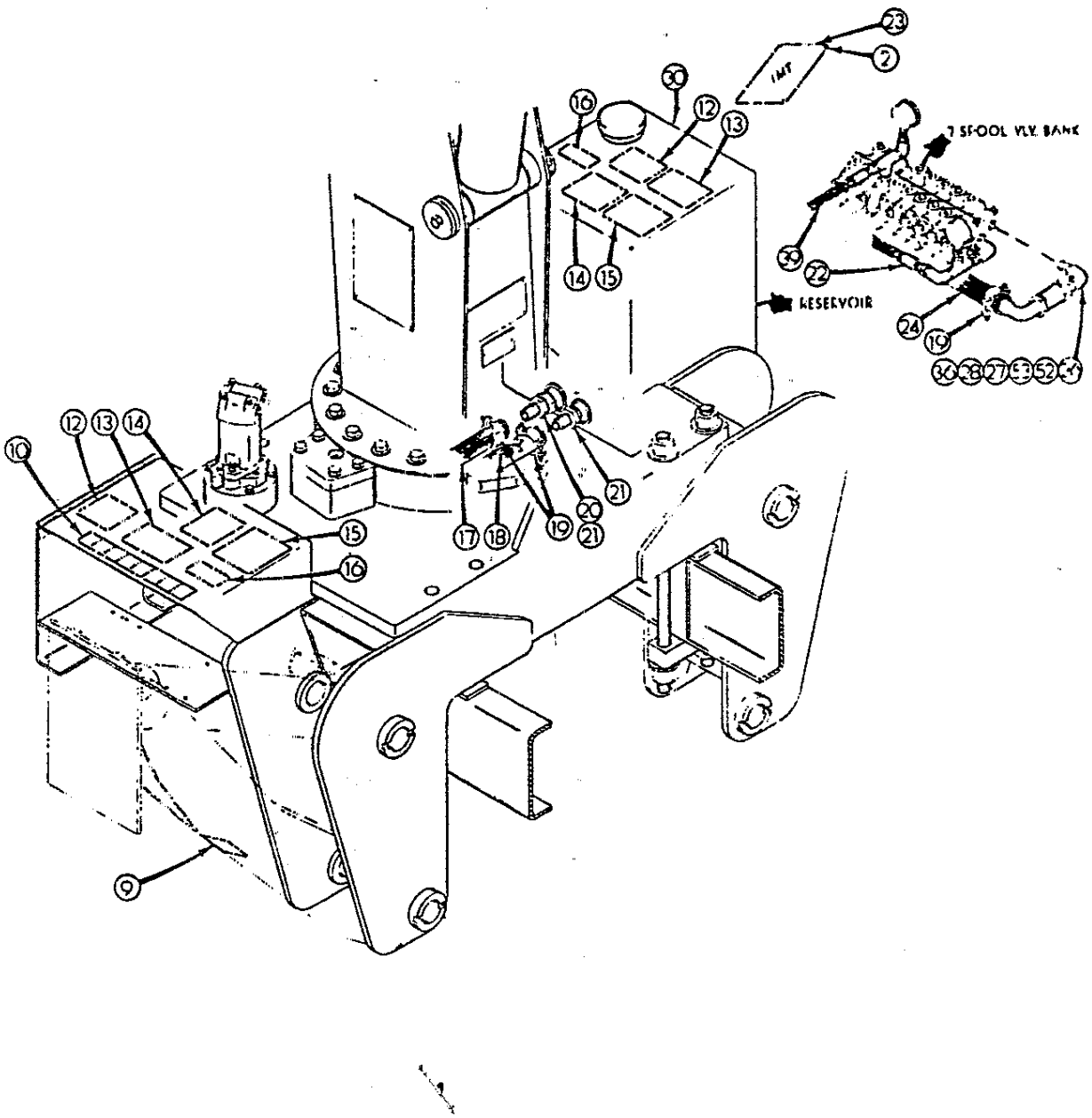


Figure H-25. Standard Installation Kit - Sheet 2 of 3 (Part Number 93702773)

Item No.	Part No.	Description	Qty
2.	72066340	RIVET, pop; 1/8"	8
9.	71039129	DECAL, stabilizer down warning	2
10.	71392102	DECAL, left hand control	1
12.	70391390	DECAL, operation caution	2
13.	70391583	DECAL, operation warning	2
14.	70391392	DECAL, operation danger	2
15.	70391391	DECAL, electrocution hazard	2
16.	71039134	DECAL, oil level caution	2
17.	60035297	HOSE; 1-1/4" ID x 74" lg.	1
18.	60035574	HOSE; 1-1/4" ID x 44" lg.	1
19.	72066516	CLAMP, hose; 1-1/4"	3
20.	72053378	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1 Ref.
21.	72531550	NIPPLE, barbed; 1-1/4"	2 Ref.
22.	51703384	HOSE; 1/2" ID x 72" lg.	1
23.	70029252	PLACARD, IMT diamond	2
24.	60035297	HOSE; 1-1/4" ID x 74" lg.	1
26.	72053558	NIPPLE; 3/4" npt	1 Ref.
27.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1
28.	72053307	COUPLING; 1-1/4" npt	1
30.	71392103	DECAL, right hand control	1
36.	72532346	NIPPLE, barbed; 1-1/4" 90°	1
39.	51703384	HOSE; 1/2" ID x 72" lg.	1
52.	72531102	ELBOW, 90°; 3/4" npt	1 Ref.
53.	72053558	NIPPLE; 3/4" npt	1

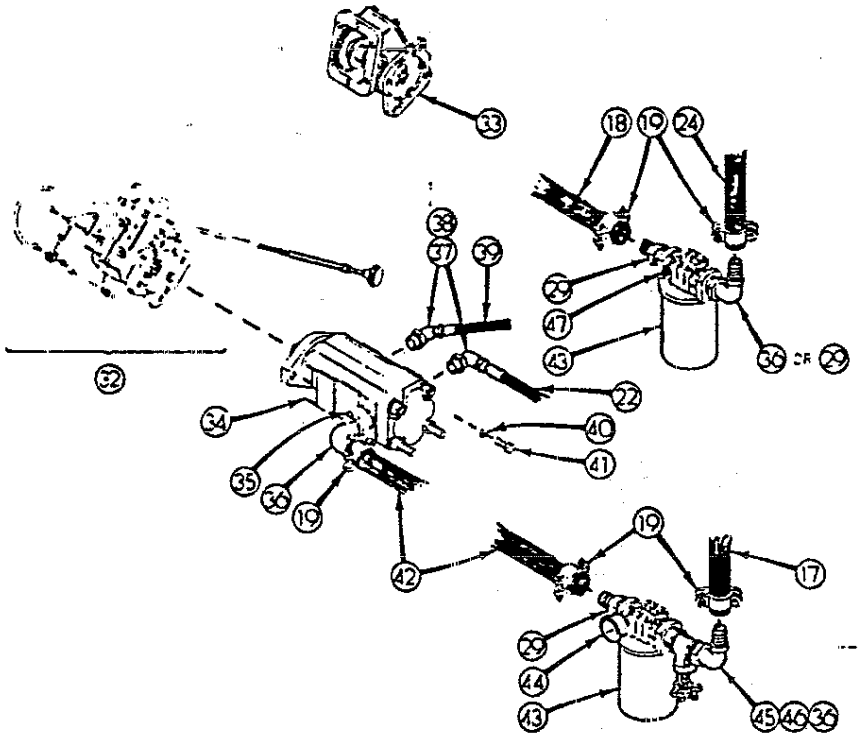


Figure H-26. Standard Installation Kit - Sheet 3 of 3 (Part Number 93702773)

Item No.	Part No.	Description	Qty
17.	60035297	HOSE; 1-1/4" ID x 74" lg.	1 Ref.
18.	60035574	HOSE; 1-1/4" ID x 48" lg.	1 Ref.
19.	72066516	CLAMP, hose; 1-1/4"	5
22.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
24.	60035297	HOSE; 1-1/4" ID x 74" lg.	1 Ref.
29.	72531550	NIPPLE, barbed; 1-1/4"	3
32.	---	PTO, left hand	1 Ref.
33.	---	PTO, right hand	1 Ref.
34.	---	PUMP, hydraulic	1 Ref.
35.	72053753	ADAPTER with o-ring	1
36.	72532346	NIPPLE, barbed, 90°; 1-1/4"	3
37.	72053749	ADAPTER with o-ring	2
38.	72531133	ELBOW, street, 90°; 1/2" npt	2
39.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
40.	72063053	WASHER, lock; 1/2"	2
41.	72060092	SCREW; 1/2-13 x 1-1/4" hex hd.	2
42.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
43	73052012	FILTER	2
44.	70048031	GAUGE, vacuum	1
45.	72053211	NIPPLE, close; 1-1/4" npt	1
46.	73054130	VALVE, gate; 1-1/4"	1
47.	72053245	PLUG; 1/4" npt	1
48.	60103870	BRACKET, filter mounting	2
49.	72060025	SCREW; 5/16-18 x 1" hex hd.	6
50.	72062109	NUT, lock; 5/16-18	2
51.	72063050	WASHER, lock; 5/16"	4

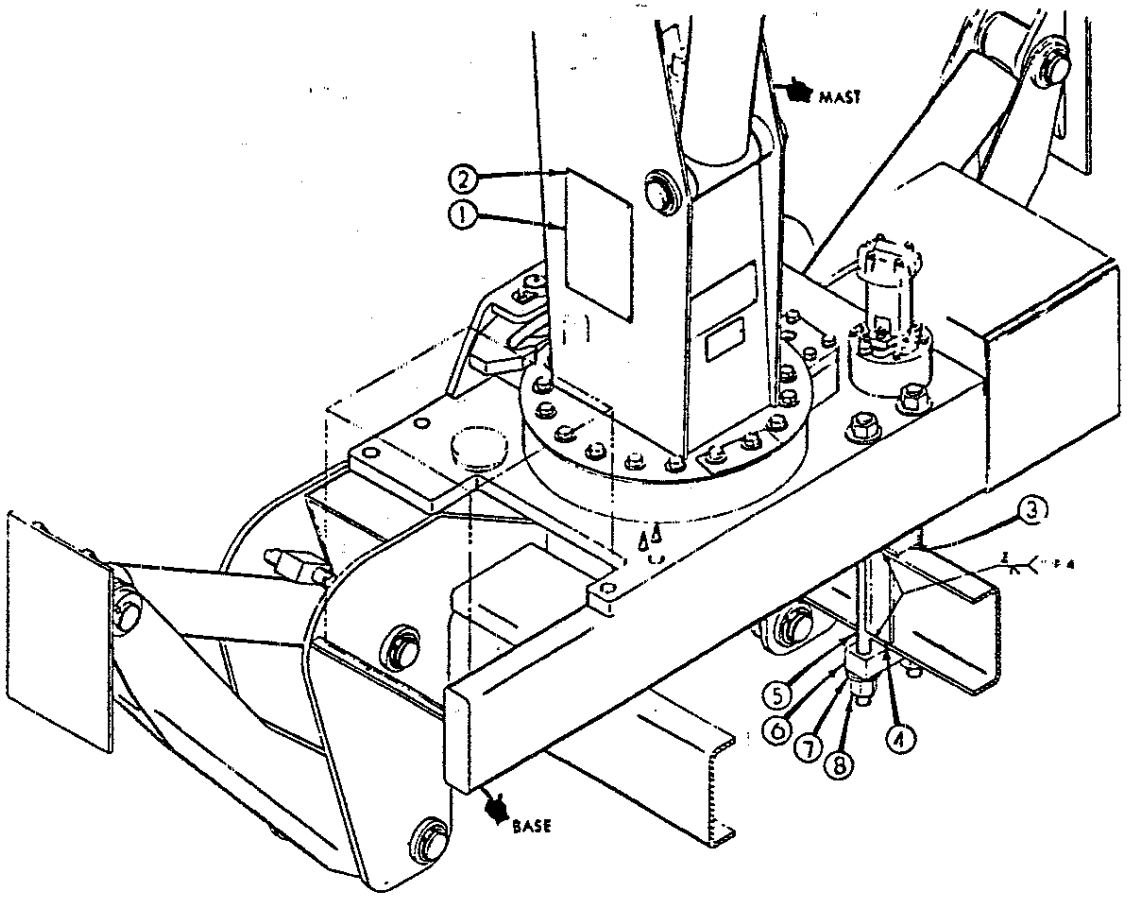


Figure H-27. Chair-Mount Installation Kit - Sheet 1 of 4 (Part Number 93703551)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	70029226	PLACARD, capacity	2	5.	71014847	STUD; 1-1/4 - 7 x 3[illegible] lg.	[illegible]
2.	72066340	RIVET, pop; 1/8"	8	6.	60010665	PLATE, clamp	4
3.	60103563	SPACER, frame flange	2	7.	72063012	WASHER, wrt.; 1-1 [illegible]"	16
4.	60103562	BAR, frame reinforcement	4	8.	72062142	NUT, lock; 1-1 4 - 7	16

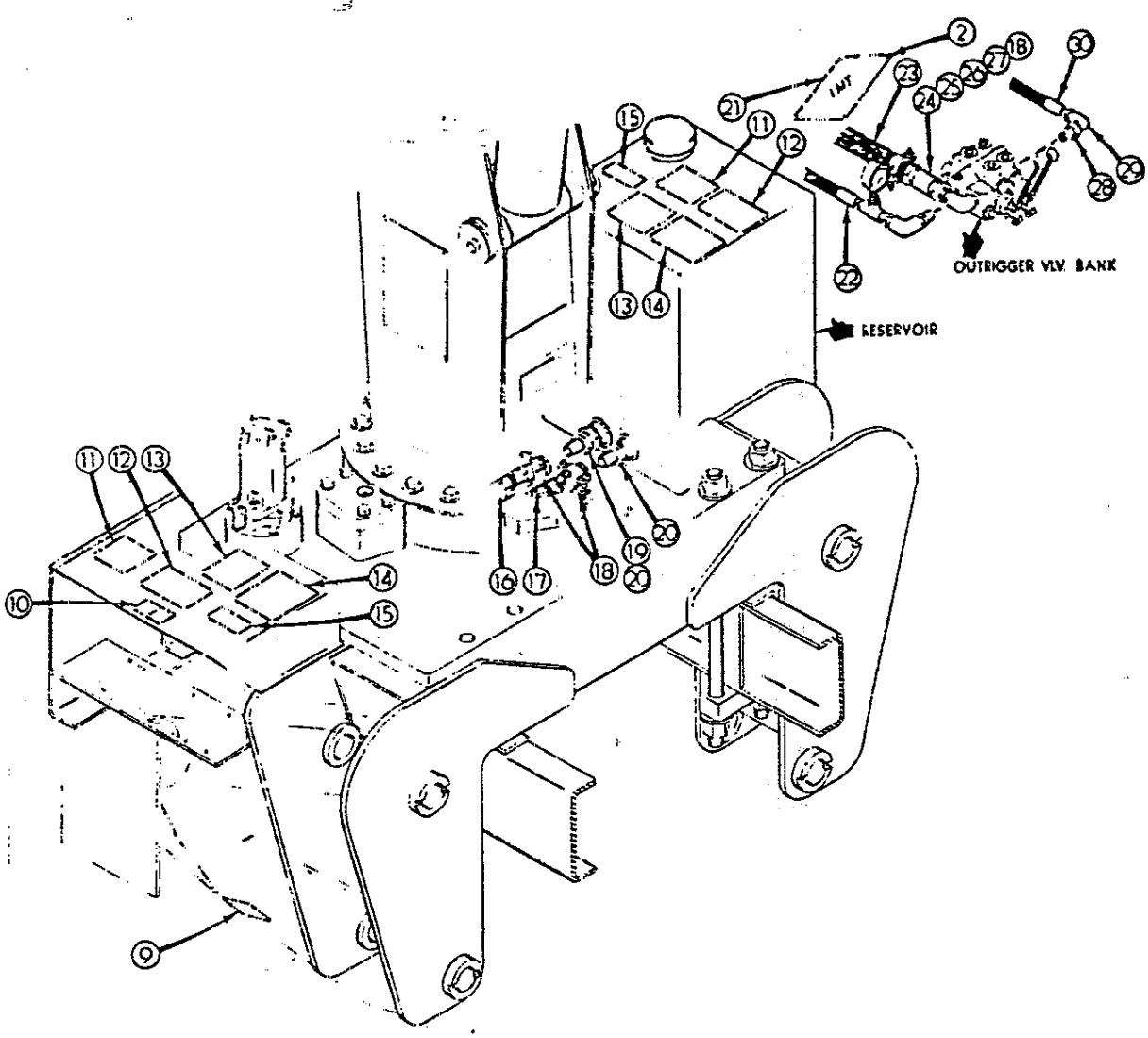


Figure H-28. Chair-Mount Installation Kit - Sheet 2 of 4 (Part Number 93703551)

Item No.	Part No.	Description	Qty
2.	72066340	RIVET, pop; 1/8"	8
9.	71039129	DECAL, stabilizer down warning	2
10	71392100	DECAL, outrigger control	1
11.	70391390	DECAL, operation caution	2
12.	70391583	DECAL, operation warning	2
13.	70391382	DECAL, operation danger	2
14.	70391391	DECAL, electrocution hazard	2
15.	71039134	DECAL, oil level caution	2
16.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
17.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
18.	72066516	CLAMP, hose; 1-1/4"	3
19.	72053378	BUSHING, reducer; 1-1/2" npt(m) x 1-1/4" npt(f)	1 Ref.
20.	72531550	NIPPLE, barbed; 1-1/4"	2 Ref.
21.	70029252	PLACARD, IMT diamond	2
22.	51703384	HOSE; 1/2" ID x 72" lg.	1
23.	60035297	HOSE; 1-1/4" ID x 74" lg.	1
24.	72053558	NIPPLE; 3/4" npt	1
25.	72053180	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1
26.	72053307	COUPLING; 1-1/4" npt	1
27.	72531550	NIPPLE, barbed; 1-1/4"	1
28.	73073023	ADAPTER, power beyond	1
29.	72531133	ELBOW, street, 90°; 1/2" npt	1
30.	51703577	HOSE; 1/2" ID x 162" lg.	1

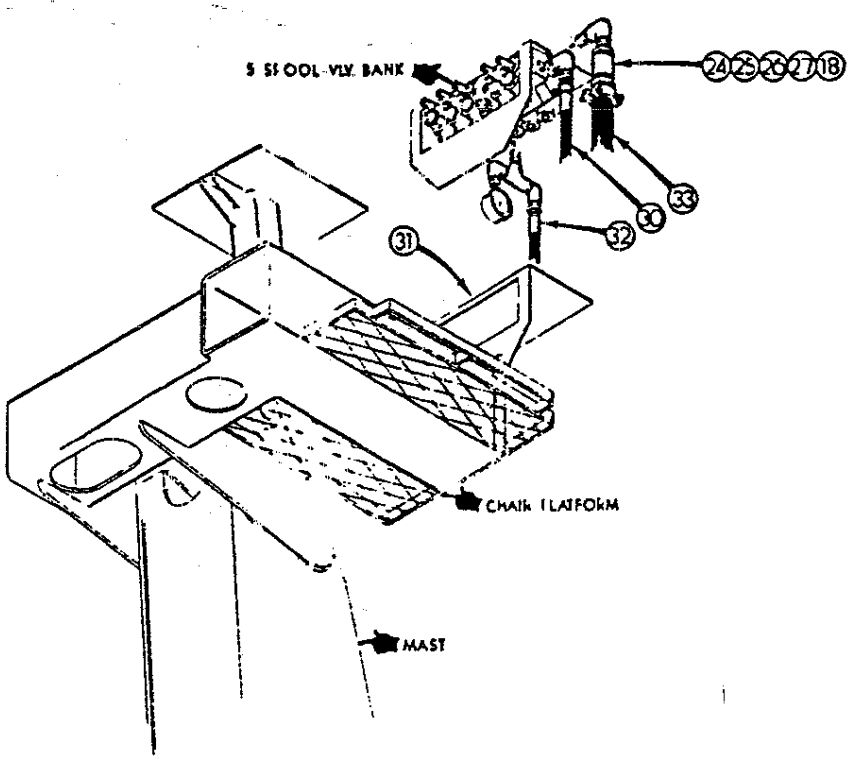


Figure H-29. Chair-Mount Installation Kit - Sheet 3 of 4 (Part Number 93703551)

Item No.	Part No.	Description	Qty
18.	72066516	CLAMP, hose; 1-1/4"	1
24.	72053558	NIPPLE, hex; 3/4" npt	1
25.	72053160	BUSHING, reducer; 1-1/4" npt(m) x 3/4" npt(f)	1
26.	72053807	COUPLING; 1-1/4" npt	1
27.	72531550	NIPPLE, barbed; 1-1/4"	1
30.	51703577	HOSE; 1/2" ID x 102" lg.	1 Ref.
31.	71392101	DECAL, control	1
32.	51703417	HOSE; 1/2" ID x 192" lg.	1
33.	60035586	HOSE; 1-1/4" ID x 144" lg.	1

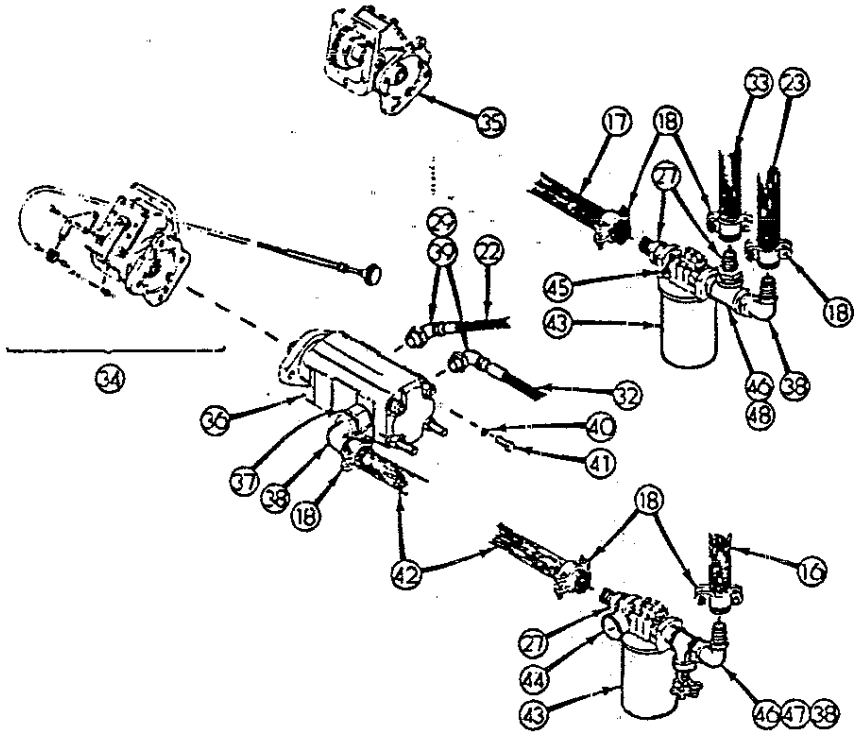


Figure H-30. Chair-Mount Installation Kit - Sheet 4 of 4 (Part Number 93703551)

Item No.	Part No.	Description	Qty
16.	60035574	HOSE; 1-1/4" ID x 48" lg.	1 Ref.
17.	60035574	HOSE; 1-1/4" ID x 48" lg.	1 Ref.
18.	72066516	CLAMP, hose; 1-1/4"	6
22.	51703384	HOSE; 1/2" ID x 72" lg.	1 Ref.
23.	60035297	HOSE; 1-1/4" ID x 74" lg.	1 Ref.
27.	72531550	NIPPLE, barbed; 1-1/4"	3
29.	72531133	ELBOW, street, 90°; 1/2" npt	2
32.	51703417	HOSE; 1/2" ID x 192" lg.	1 Ref.
33.	60035586	HOSE; 1-1/4" ID x 144" lg.	1 Ref.
34.	--	PTO, left hand	1 Ref.
35.	--	PTO, right hand	1 Ref.
36.	--	PUMP, hydraulic	1 Ref.
37.	72053753	ADAPTER with o-ring	1
38.	72532346	NIPPLE, barbed, 90°; 1-1/4"	3
39.	72053749	ADAPTER with o-ring	2
40.	72063053	WASHER, lock; 1/2"	2
41.	72060092	SCREW; 1/2-13 x 1-1/4" hex hd.	2
42.	60035574	HOSE; 1-1/4" ID x 48" lg.	1
43.	73052012	FILTER	2
44.	70048031	GAUGE, vacuum	1
45.	72053245	PLUG; 1/4" npt	1
46.	72053211	NIPPLE, close; 1-1/4" npt	2
47.	73054130	VALVE, gate; 1-1/4"	1
48.	72053606	TEE; 1-1/4" npt	1
49.	60103870	BRACKET, filter mounting	2
50.	72060025	SCREW; 5/16-18 x 1" hex hd.	6
51.	72062109	NUT, lock; 5/16-18	2
52.	72063050	WASHER, lock; 5/16"	4

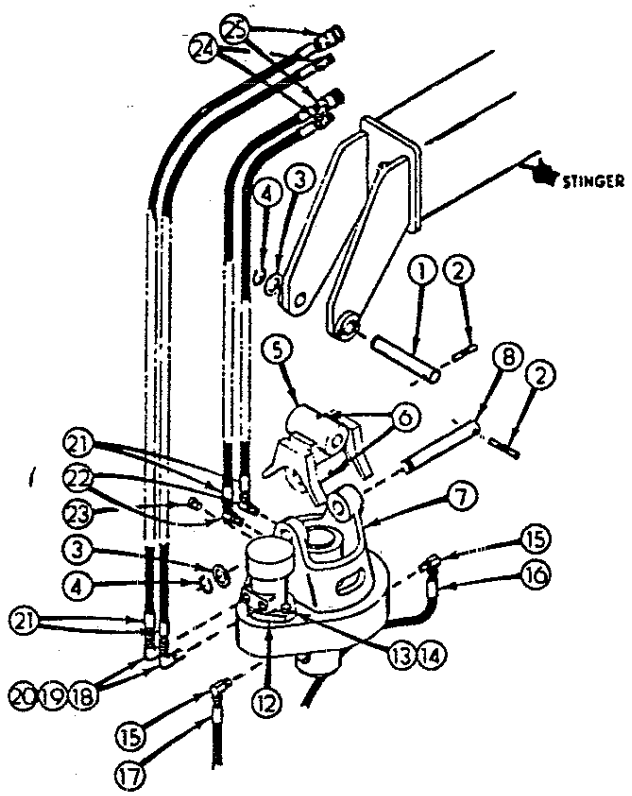


Figure H-31. Wallboard Fork Coupling with Rotator (Part Number 40701339)

Item No.	Part No.	Description	Qty
1.	60103761	PIN, stinger/link	1
2.	72661159	PIN, grooved; 1/2" x 3"	2
3.	72063035	BUSHING, machy.; 1-1/4" x 10 ga.	2
4.	72066129	RING, retaining	2
5.	52702977	LINK, swivel	1
6.	72053508	ZERK; 1/8" npt	2
7.	71057012	ROTOR, hydraulic	1
8.	60103120	PIN, link/rotor	1
12.	73051030	MOTOR, hydraulic	1
13.	72063053	WASHER, lock; 1/2"	2
14.	72060794	SCREW; 1/2-13 x 1-1/4" shcs	2
15.	72532151	ELBOW, 90°, with o-ring	2 Ref.
16.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.
17.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.
18.	72531823	BUSHING, reducer; 1/2" npt(m) x 3/8" npt(f)	1 Ref.
19.	72531132	ELBOW, street, 90°; 3/8" npt	1 Ref.
20.	72053642	SWIVEL; 3/8" npt	1 Ref.
21.	51703030	HOSE; 3/8" ID x 20" lg.	1 Ref.
22.	72532151	ELBOW, 90°, with o-ring	1 Ref.
23.	72532141	PLUG with o-ring	1 Ref.
24.	72053542	INSERT, male; 3/8"	1 Ref.
25.	72053540	COUPLER; 3/8"	1 Ref.

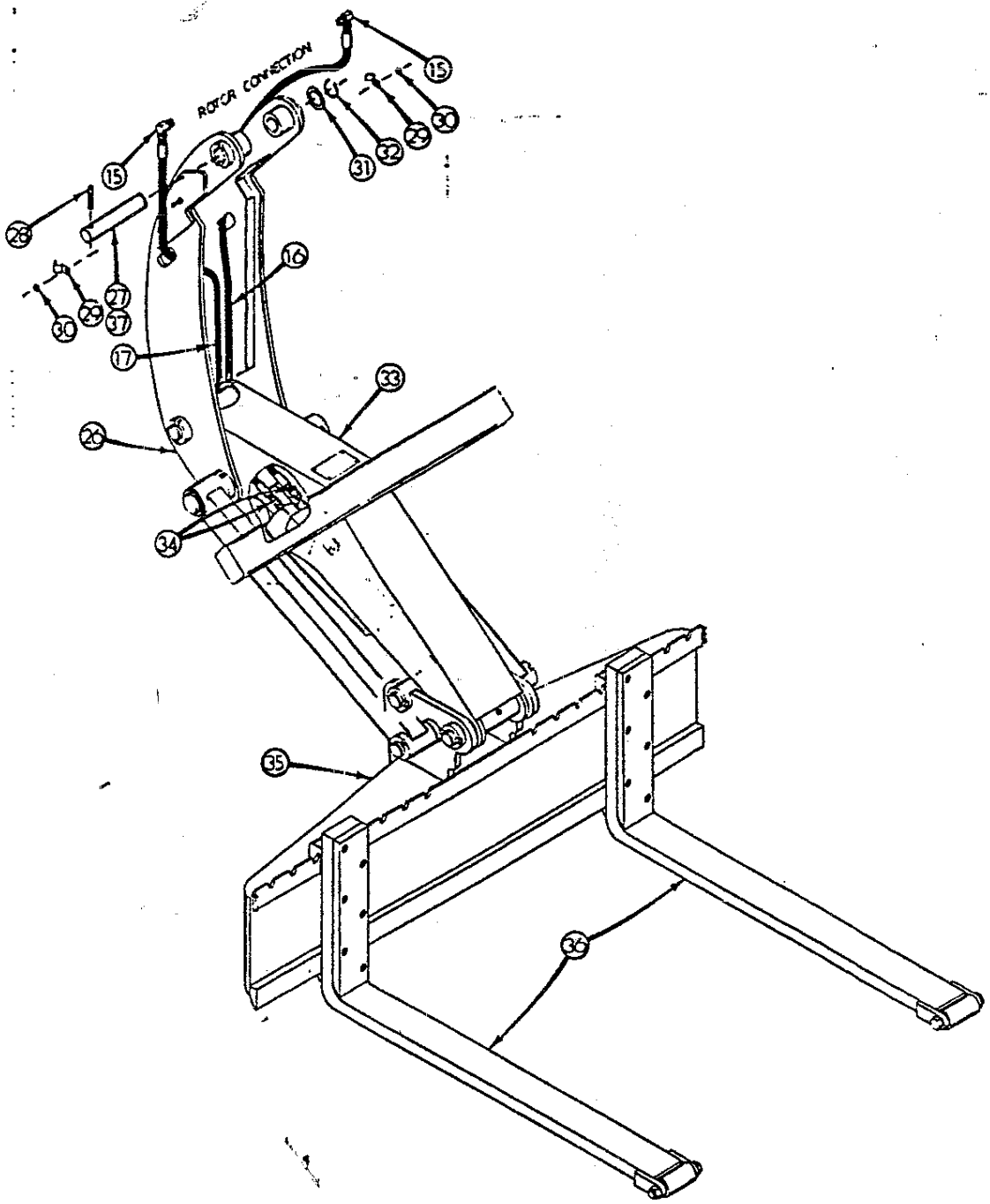


Figure H-32. 60" Wide Wallboard Fork (Part Number 20902004)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	40701339	COUPLING with rotor (not shown)	1	30.	72062109	NUT, lock; 5/16-18	1 Ref.
15.	72532151	ELBOW, 90°, with o-ring	1 Ref.	31.	72063035	BUSHING, machy.; 1¼"x10 ga.	1 Ref.
16.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.	32.	72066129	RING, retaining	1 Ref.
17.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.	33.	40701350	ARM, secondary	1
26.	41701340	ARM, upper	1	34.	72053644	SWIVEL, red. 1/2" x 3/8" npt	1 Ref.
27.	60105994	PIN, fork/rotor	1 Ref.	35.	40701361	BODY	1
28.	72661157	PIN, grooved; 1/2" x 2-1/2"	1 Ref.	36.	40701385	FORK	1
29.	77044079	CLAMP; 1/2"	1 Ref.	37.	91701388	KIT, hydraulic	1

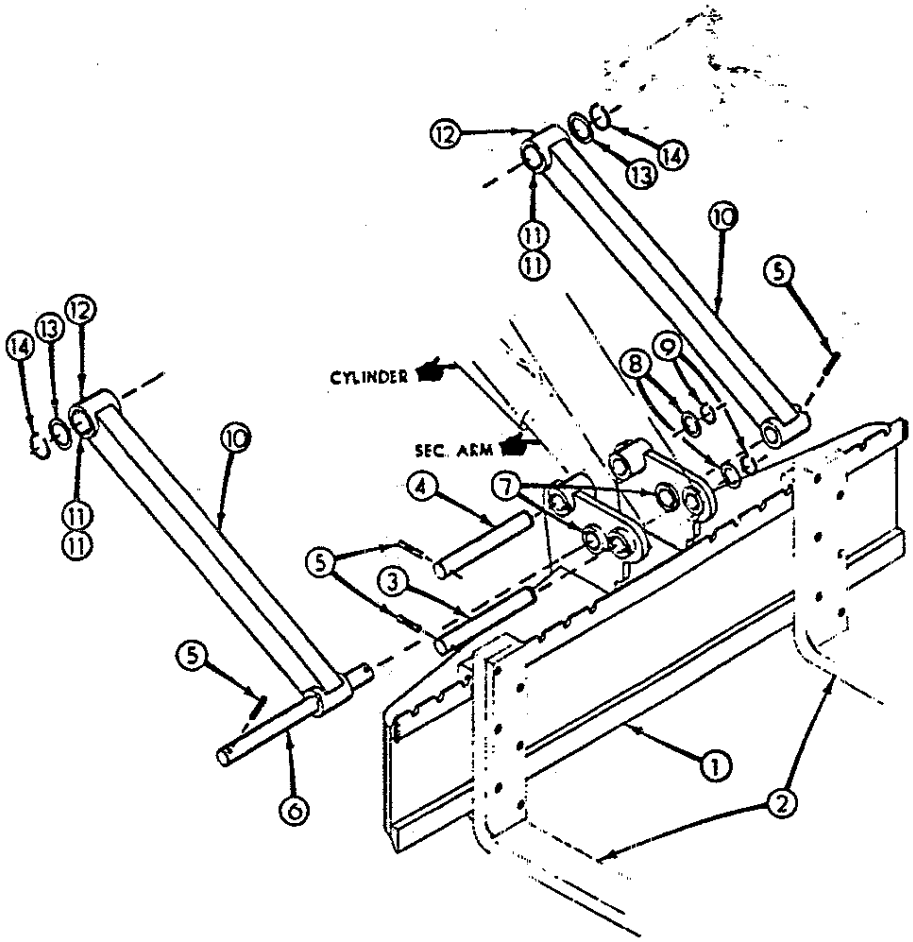


Figure H-33. 60" Wallboard Fork Body (Part Number 41701361)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52701362	BODY; 60" wide	1	8.	72063037	BUSHING, machy.; 1-1/2" x 10 ga.	2
2.	40701385	FORK	1 Ref.	9.	72066132	RING, retaining	2
3.	60103022	PIN, secondary arm/body	1	10.	52701353	LINK	2
4.	60103808	PIN, cylinder/body	1	11.	7BF81020	BUSHING, link	4 Ref.
5.	72661159	PIN, grooved; 1/2" x 3"	4	12.	72053508	ZERK; 1/8" npt	2
6.	60103019	PIN, link/body	1	13.	72063039	BUSHING, machy.; 2" x 10 ga.	2
7.	7BF81215	BUSHING, body	2 Ref.	14.	72066136	RING, retaining	2

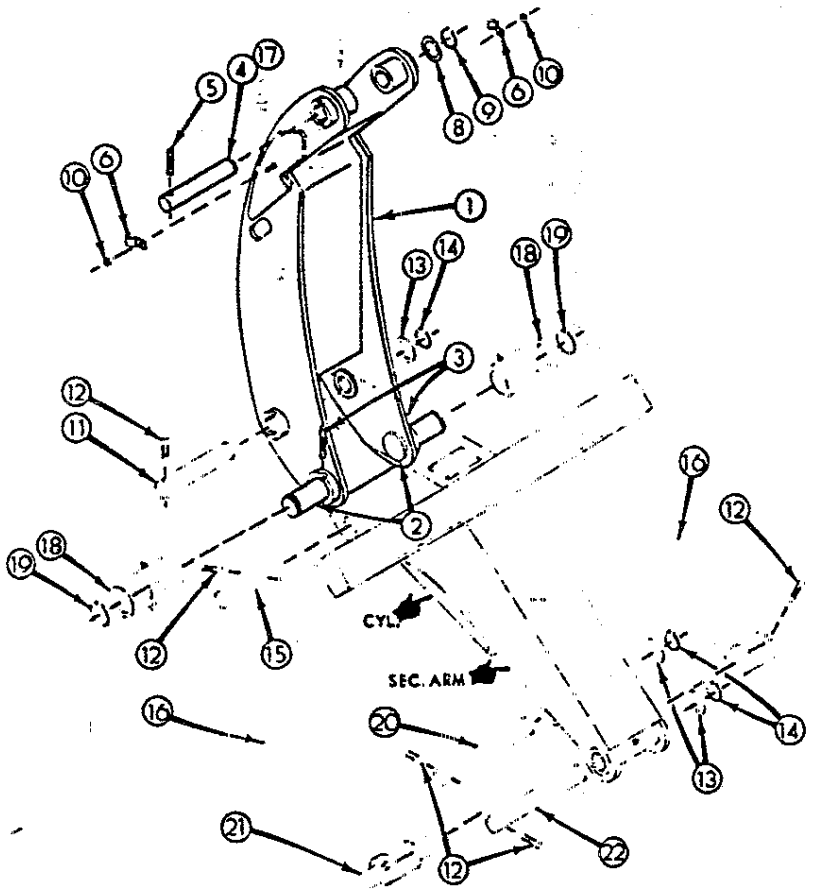


Figure H-34. Wallboard Fork Upper Arm (Part Number 41701340)

Item No.	Part No.	Description	Qty
1.	52701341	ARM, upper	1
2.	60103014	PIN, link	2
3.	72661159	PIN, grooved; 1/2" x 3"	2
4.	60105994	PIN, fork/rotor	1
5.	72661157	PIN, grooved; 1/2" x 2-1/2"	1
6.	77044079	CLAMP; 1/2"	2
8.	72063035	BUSHING, machy.; 1½" x 10 ga.	1
9.	72066129	RING, retaining	1
10.	72062109	NUT, lock; 5/16-18	2
11.	60103809	PIN, secondary arm/upper arm	1 Ref.
12.	72661159	PIN, grooved; 1/2" x 3"	1 Ref.
13.	72063037	BUSHING, machy.; 1½" x 10 ga.	1 Ref.
14.	72066132	RING, retaining	1 Ref.
15.	60103021	PIN, cylinder/secondary arm	1 Ref.
16.	52701353	LINK	1 Ref.
17.	72053508	ZERK; 1/8" npt	1
18.	72063039	BUSHING, machy.; 2" x 10 ga.	1 Ref.
19.	72066136	RING, retaining	1 Ref.
20.	60103808	PIN, cylinder/body	1 Ref.
21.	60103019	PIN, link/body	1 Ref.
22.	60103022	PIN, secondary arm/body	1 Ref.

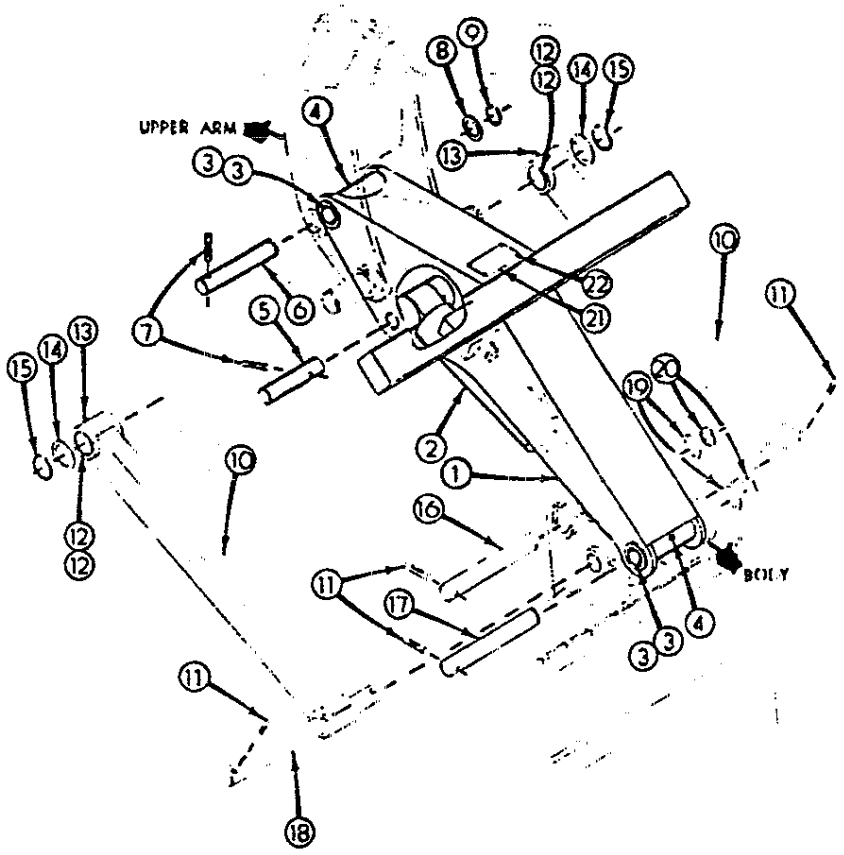


Figure H-35. Wallboard Fork Secondary Arm (Part Number 40701350)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52701351	ARM, secondary	1	12.	7BF81020	BUSHING, link	1 Ref.
2.	3B189611	CYLINDER	1	13.	72053508	ZERK; 1/8" npt	1 Ref.
3.	7BF81215	BUSHING, arm	4 Ref.	14.	72063039	BUSHING, machy; 2" x 10 ga.	1 Ref.
4.	72053508	ZERK; 1/8" npt	2	15.	72066136	RING, retaining	1 Ref.
5.	60103021	PIN, cylinder/secondary arm	1	16.	60103808	PIN, cylinder/body	1 Ref.
6.	60103809	PIN, sec. arm/ upper arm	1	17.	60103022	PIN, secondary arm/body	1 Ref.
7.	72661159	PIN, grooved; 1/2" x 3"	2	18.	60103019	PIN, link/body	1 Ref.
8.	72063037	BUSHING, machy.; 1½" x 10 ga.	1	19.	72063037	BUSHING, machy.; 1½" x 10 ga.	1 Ref.
9.	72066132	RING, retaining	1	20.	72066132	RING, retaining	1 Ref.
10.	52701353	LINK	1 Ref.	21.	71029119	PLACARD, serial number	1
11.	72661159	PIN, grooved; 1/2" x 3"	1 Ref.	22.	72066340	RIVET, pop; 1/8"	4

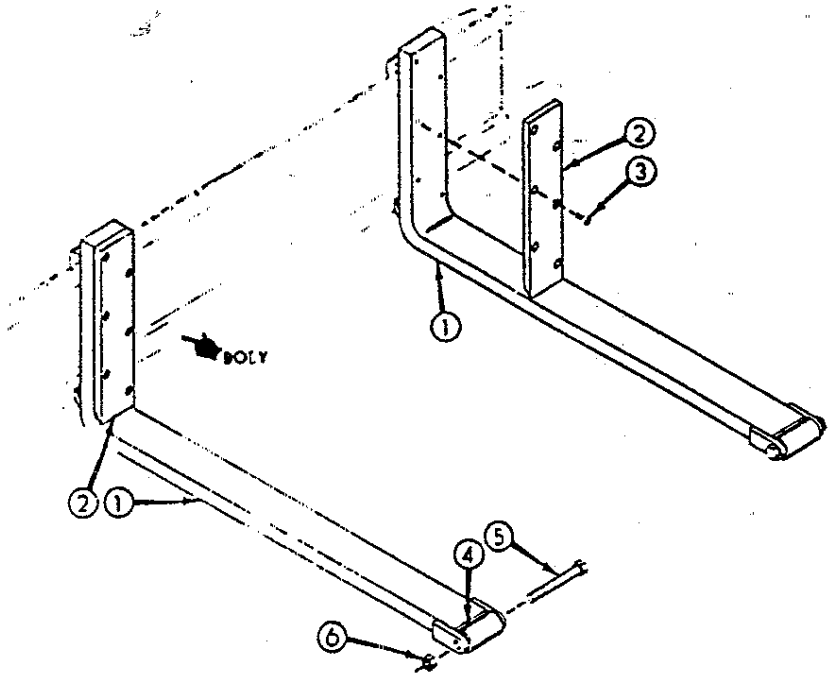


Figure H-36. Fork Tines (Part Number 40701385)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52701366	TINE, fork	2	4.	60030012	ROLLER	2
2.	60030042	PAD	2	5.	72060193	SCREW; 3/4-10 x 6" hex hd.	2
3.	72060752	SCREW; 3/8-16 x 3/4" shcs	12	6.	72062114	NUT, lock; 3/4-10	2

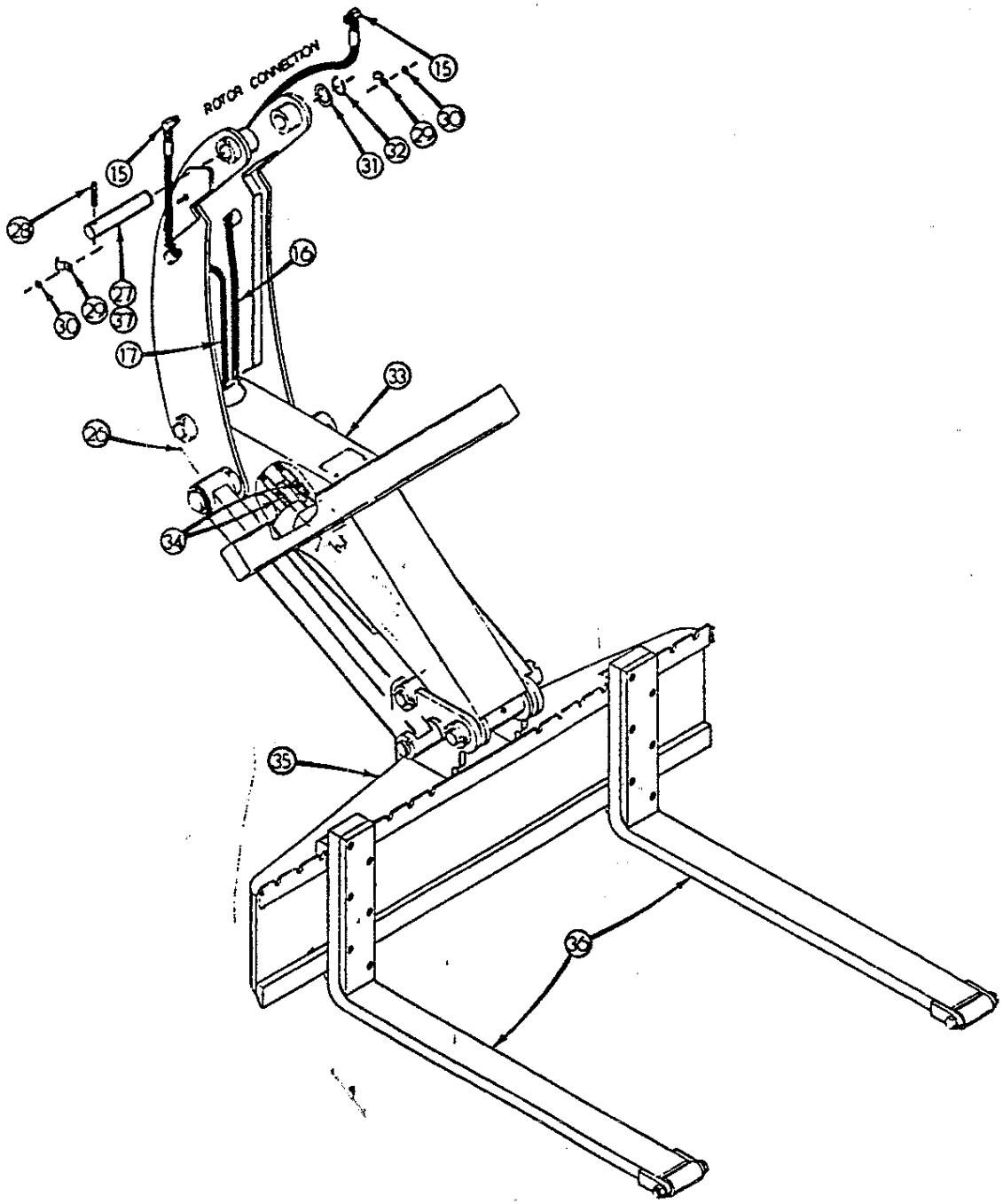


Figure H-37. 72" Wide Wallboard Fork (Part Number 20902007)

Item No.	Part No.	Description	Qty
1	40701339	COUPLING with rotor (not shown)	1
15.	72532151	ELBOW, 90°, with o-ring	1 Ref.
16.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.
17.	51703394	HOSE; 3/8" ID x 48" lg.	1 Ref.
26.	40701340	ARM, upper	1
27.	60105994	PIN, fork/rotor	1 Ref.
28.	72661157	PIN, grooved; 1/2" x 2-1/2"	1 Ref.
29.	77044079	CLAMP; 1/2"	1 Ref.
30.	72062109	NUT, lock; 5/16-18	1 Ref.
31.	72063035	BUSHING, machy.; 1¼" x 10 ga.	1 Ref.
32.	72066129	RING, retaining	1 Ref.
33.	40701350	ARM, secondary	1
34.	72053644	SWIVEL, reducer; 1/2" npt(m) x 3/8" npt(f)	1 Ref.
35.	40702077	BODY; 72" wide	1
36.	40701385	FORK	1
37.	917013b8	KIT, hydraulic	1

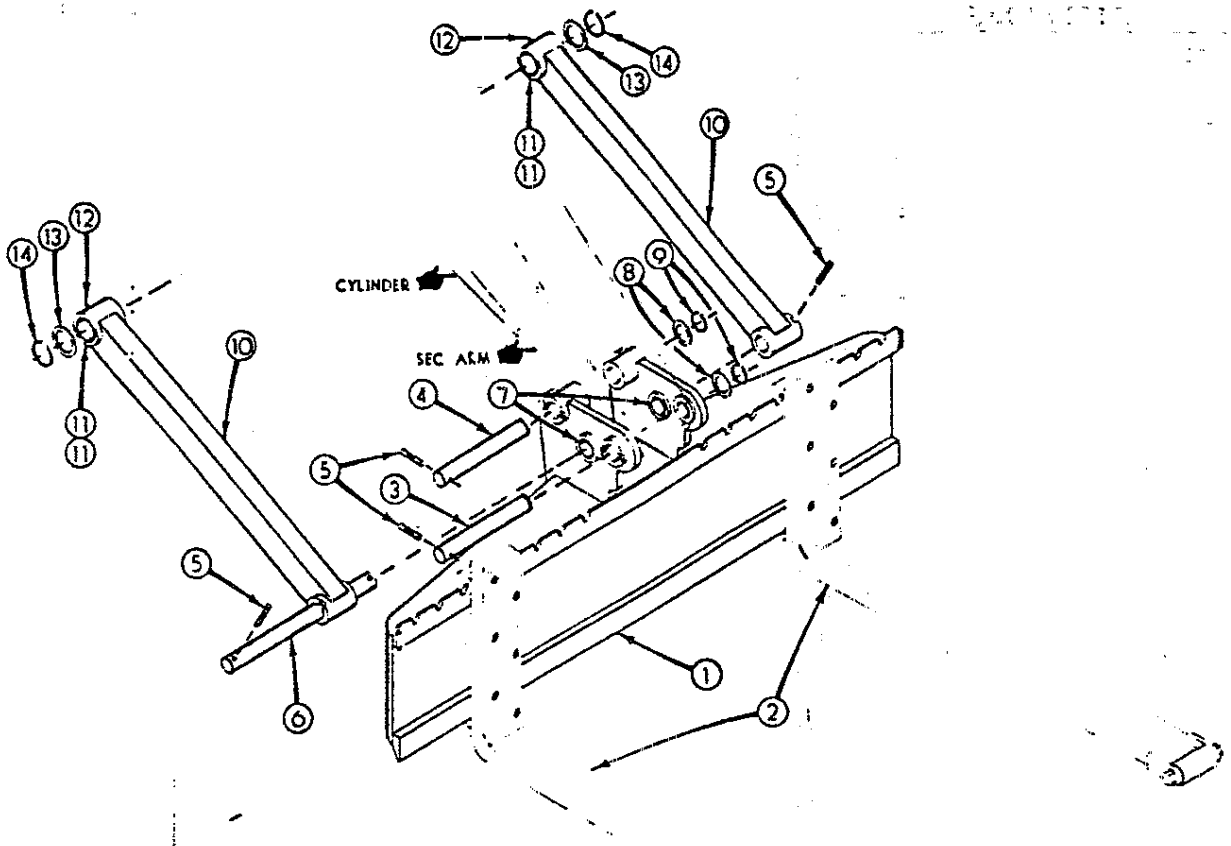
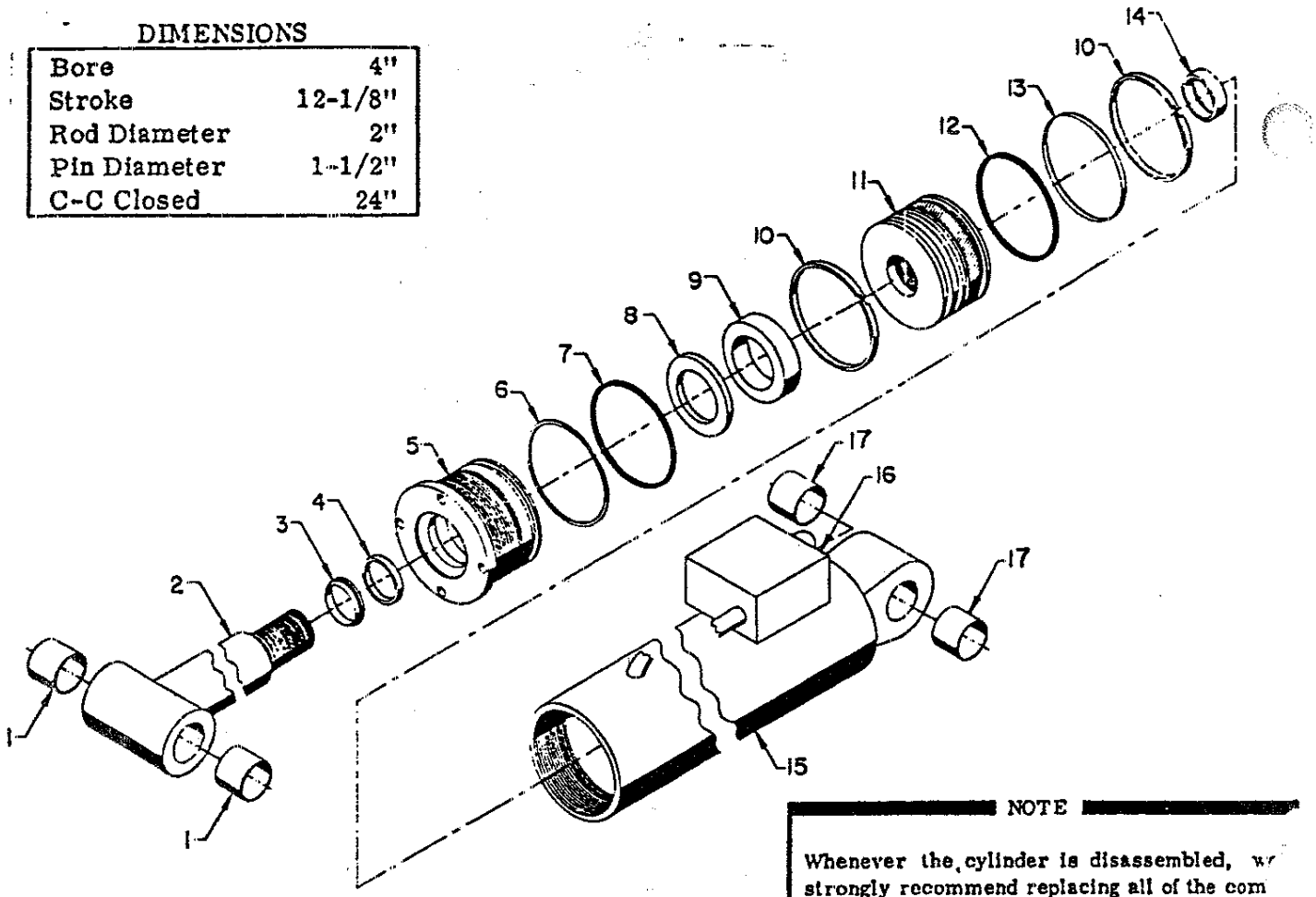


Figure H-38. 72" Wallboard Fork Body (Part Number 40702077)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702076	BODY; 72" wide	1	8.	72063037	BUSHING, machy.; 1½" x 10 ga.	2
2.	40701385	FORK	1 Ref.	9.	72066132	RING, retaining	2
3.	60103022	PIN, sec. arm/body	1	10.	52701353	LINK	2
4.	60103808	PIN, cylinder/body	1	11.	7BF81020	BUSHING, link	4 Ref.
5.	72661159	PIN, grooved; 1/2" x 3"	4	12.	72053508	ZERK; 1/8" npt	2
6.	60103019	PIN, link/body	1	13.	72063039	BUSHING, machy.; 2" x 10 ga.	2
7.	7BF81215	BUSHING, body	2 Ref.	14.	72066136	RING, retaining	2

DIMENSIONS	
Bore	4"
Stroke	12-1/8"
Rod Diameter	2"
Pin Diameter	1-1/2"
C-C Closed	24"



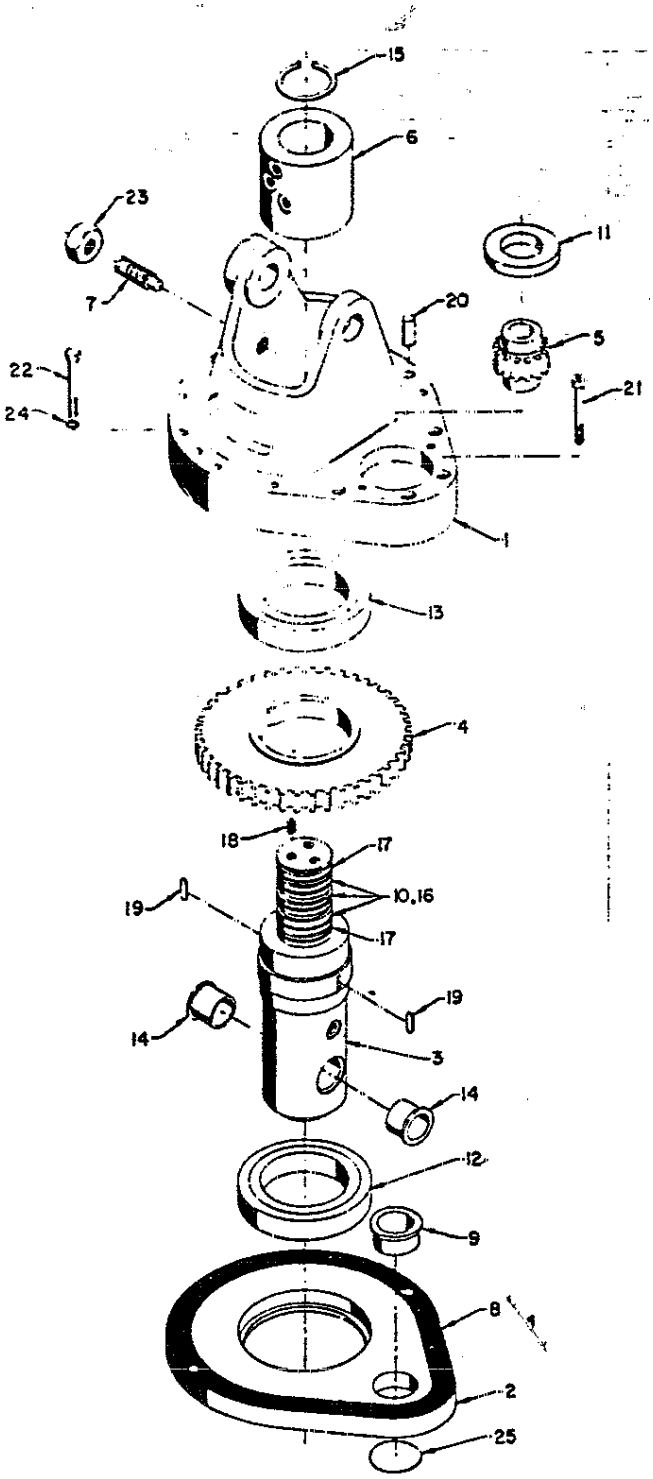
NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components in the seal kit. This may save expensive down-time in the immediate future.

Figure H-39. Wallboard Fork Cylinder (Part Number 3B189611)

Item No.	Part No.	Description	Qty
1.	7BF81215	BUSHING	2
2.	4G189610	ROD	1
3.	7R14P020	*WIPER, rod	1
4.	7R546020	*SEAL, rod, dynamic	1
5.	6H040020	HEAD	1
6.	7Q10P342	*RING, back-up, static	1
7.	7Q072342	*O-RING, static	1
8.	6A025020	*WAFER LOCK	1
9.	6C075020	TUBE, stop	1
10.	7T65I040	*RING, piston	2
11.	6I040143	PISTON	1
12.	7Q072153	*O-RING, companion	1
13.	7T66P040	*SEAL, piston, dynamic	1
14.	7T61N143	*SEAL, lock ring	1
15.	4B189610	CASE	1
16.	73054242	VALVE, counter balance	1
17.	7BF81015	BUSHING	2

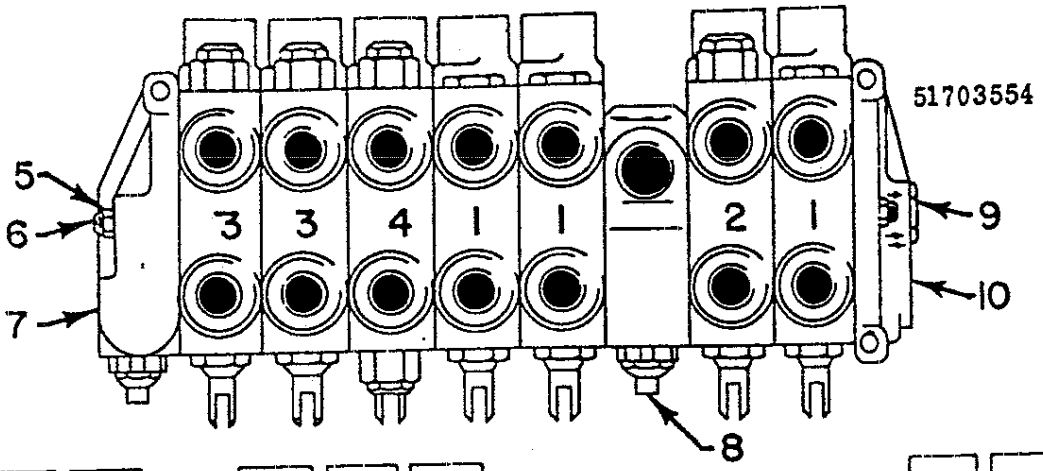
*Part of seal kit (Part Number 9C161623)

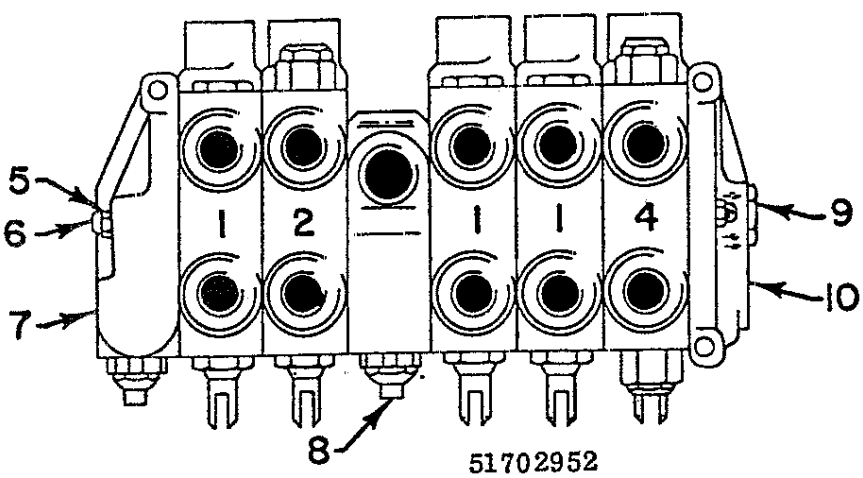


Item No.	Part No.	Description	Qty
1.	71141601	HOUSING	1
2.	71141609	*PLATE, cover	1
3.	71141603	SHAFT	1
4.	71056212	GEAR, main	1
5.	71056229	*GEAR, pinion	1
6.	71141605	SLEEVE, swivel	1
7.	72060954	SCREW, set; 3/4-10NC x 2-1/2"	1
8.	76391387	GASKET	1
9.	71024236	*BUSHING, flange	1
10.	76391386	SEAL	3
11.	71024237	*BUSHING, input gear	1
12.	70055093	BEARING, ball	1
13.	70055094	BEARING, ball	1
14.	71141606	BUSHING, flange	2
15.	72066103	RING, retaining	1
16.	7Q072137	O-RING	3
17.	7Q072225	O-RING	2
18.	72053241	PLUG, pipe; 1/4" npt	3
19.	71141607	KEY	2
20.	71141607	DOWELL; 1/2" x 1-1/4"	2
21.	72060757	SCREW, shcs; 3/8-16 x 2-1/2"	4
22.	72060054	SCREW, hex hd.; 3/8-16 x 3" Gr. 5	9
23.	72062007	NUT; 3/4-10	1
24.	72063051	LOCK WASHER; 3/8"	9
25.	72661124	*PLUG, expansion	1
26.			

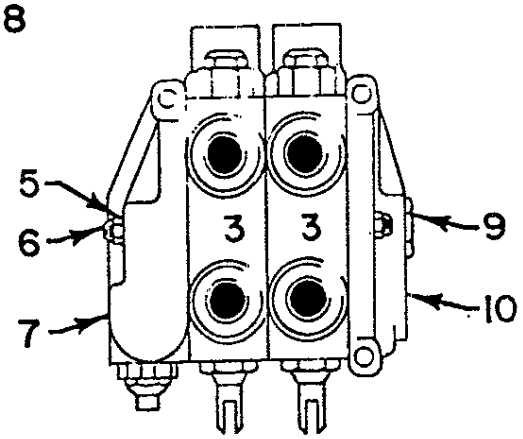
*Used to update old style rotators to the new design.

Figure H-40. Wallboard Fork Rotator (Part Number 71057012)





51702952



51703555

Item No.	Part No.	Description	Quantity		
			51703555	51702952	51703554
1.	73054009	VALVE SECTION with double load-check plugs (includes item below)	0	3	3
	73054010	PLUG, load check			
2.	73054430	VALVE SECTION with one load-check plug and one 1500 PSI relief valve (includes items below)	0	1	1
	73054010	PLUG, load check			
	73054007	VALVE, relief; 1500 PSI			
3.	73054445	VALVE SECTION with one load-check plug and one 1000 PSI relief valve (includes items below)	2		2
	73054010	PLUG, load check			
	73054430	VALVE, relief; 1000 PSI			
4.	73054383	VALVE SECTION with double 1500 PSI relief valve (includes item below)	0	1	1
	73054007	VALVE, relief; 1500 PSI			
5.	72052002	NUT; 3/8-16	6	6	6
6.	73014629	STUD; 2-spool*	3	0	0
	73014595	STUD; 6-spool*	0	3	6
	73014596	STUD; 8-spool*	0	0	3
7.	73054417	INLET with 2300 PSI relief valve (includes item below)	1	1	1
	73024101	VALVE, relief; 2300 PSI			
8.	73054249	VALVE, mid-inlet with 2300 PSI relief valve (includes item below)	0	1	1
	73024101	VALVE, relief; 2300 PSI			
9.	73073022	PLUG	0	1	1
10.	73014604	CAP, end	1	1	1
11.	70072021	O-RING; large (between sections - not shown)	6	6	6
12.	70072019	O-RING; small (between sections - not shown)	6	6	6

*For purposes of specifying stud length, the mid-inlet section - item 8 - is considered a tool.

Figure H-41. Valve Bank Configurations

TABLE I-1. TORQUE DATA CHART

GRADE BOLT	SAE GRADE 1 OR 2	SAE GRADE 5	SAE GRADE 6	SAE GRADE 8
MARKING				
DEFINITION	INDETERMINATE QUALITY	MINIMUM COMMERCIAL QUALITY	MEDIUM COMMERCIAL QUALITY	BEST COMMERCIAL QUALITY
MATERIAL	LOW CARBON STEEL	MEDIUM CARBON STEEL TEMPERED	MEDIUM CARBON STEEL Q & T	MEDIUM CARBON ALLOY STEEL Q & T
MINIMUM TENSILE STRENGTH	64,000 PSI 44,998,400 kg/sq. m	105,000 PSI 73,825,500 kg/sq. m	133,000 PSI 93,512,300 kg/sq. m	150,000 PSI 105,465,000 kg/sq. m

BOLT SIZE		RECOMMENDED TORQUE VALUES							
Fraction	mm	Ft. Lbs.	kg-m	Ft. Lbs.	kg-m	Ft. Lbs.	kg-m	Ft. Lbs.	kg-m
1/4	6.35	5	.69	7	.96	10	1.38	10.5	1.45
5/16	7.92	9	1.24	14	1.93	19	2.62	22	3.04
3/8	9.52	15	2.07	25	3.46	34	4.70	37	5.12
7/16"	11.09	24	3.32	40	5.53	55	7.61	60	8.30
1/2	12.70	37	5.12	60	8.30	85	11.76	92	12.72
9/16	14.27	53	7.33	88	12.17	120	16.60	132	18.26
5/8	15.87	74	10.23	120	16.60	167	23.10	180	24.89
3/4	19.05	120	16.60	200	27.66	280	38.72	296	40.94
7/8	22.22	190	26.28	302	41.77	440	60.85	473	65.42
1	25.40	282	39.00	466	64.45	660	91.28	714	98.75

In using the torque data in the chart above, the following rules should be observed:

1. Manufacturer's particular specifications should be consulted when provided.
2. When multiple tapered tooth (shakeproof) are employed, the torque should be increased by 20%.
3. All torque measurements are given in foot-pounds.
4. The information in the chart is pertinent to lightly lubricated coarse and fine thread fasteners.
5. To convert measurement to inch-pounds, multiply by 12.

Definite tire inflation pressures are established for each tire size depending upon the load imposed on the tires. For greater stability, riding comfort and prolonged tire life, tires should be inflated for the loads carried. The "Load and Inflation Table" shown below, indicates the proper inflation pressures.

TABLE I-2. TIRE LOAD AND INFLATION PRESSURES

SINGLE TIRES FOR TRUCKS IN HIGHWAY SERVICE

Tire Size	Load Range	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
		50	55	60	65	70	75	80	85	90	95	
7.00-20	D	2100	2260	2390	2530	2670	2790					
7.00-20	E	2100	2260	2390	2530	2670	2920	3030	3150			
7.50-20	D	2360	2530	2680	2840	2990	3110					
7.50-20	E	2360	2530	2680	2840	2990	3140	3270	3410	3530		
8.25-20	E	2800	3010	3190	3370	3560	3730	3890	4050			
8.25-20	F	2800	3010	3190	3370	3560	3730	3890	4050	4210	4350	4500
9.00-20	E		3560	3770	4000	4210	4410	4610				
9.00-20	F		3560	3770	4000	4210	4410	4610	4790	4970	5150	
10.00-20	F			4290	4530	4770	4990	5220	5430			
10.00-20	G			4290	4530	4770	4990	5220	5430	5640	5840	6040
11.00-20	F			4670	4940	5200	5450	5690	5920			
11.00-20	G			4670	4940	5200	5450	5690	5920	6140	6370	6590
11.00-22	F			4960	5240	5520	5790	6040	6290			
11.00-22	G			4960	5240	5520	5790	6040	6290	6530	6770	7000

DUAL TIRES FOR TRUCKS IN HIGHWAY SERVICE

Tire Size	Load Range	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
		40	45	50	55	60	65	70	75	80	85	90
7.00-20	D	1840	1980	2100	2220	2340	2450					
7.00-20	E	1840	1980	2100	2220	2340	2450	2560	2660	2760		
7.50-20	D	2070	2220	2350	2490	2620	2750					
7.50-20	E	2070	2220	2350	2490	2620	2750	2870	2990	3100		
8.25-20	E	2460	2640	2800	2960	3120	3270	3410	3550			
8.25-20	F	2460	2640	2800	2960	3120	3270	3410	3550	3690	3820	3950
9.00-20	E		3120	3310	3510	3690	3870	4040				
9.00-20	F		3120	3310	3510	3690	3870	4040	4200	4360	5420	
10.00-20	F			3760	3970	4180	4380	4580	4760			
10.00-20	G			3760	3970	4180	4380	4580	4760	4950	5120	5300
11.00-20	F			4100	4330	4560	4780	4990	5190			
11.00-20	G			4100	4330	4560	4780	4990	5190	5390	5590	5780
11.00-22	F			4350	4600	4840	5080	5300	5520			
11.00-22	G			4350	4600	4840	5080	5300	5520	5730	5940	6140

Tire and Rim Association Standard Tire Loads at Various Inflation Pressures. Load range letters and corresponding ply rating (D=8 ply, E=10 ply, F=12 ply and G=14 ply).