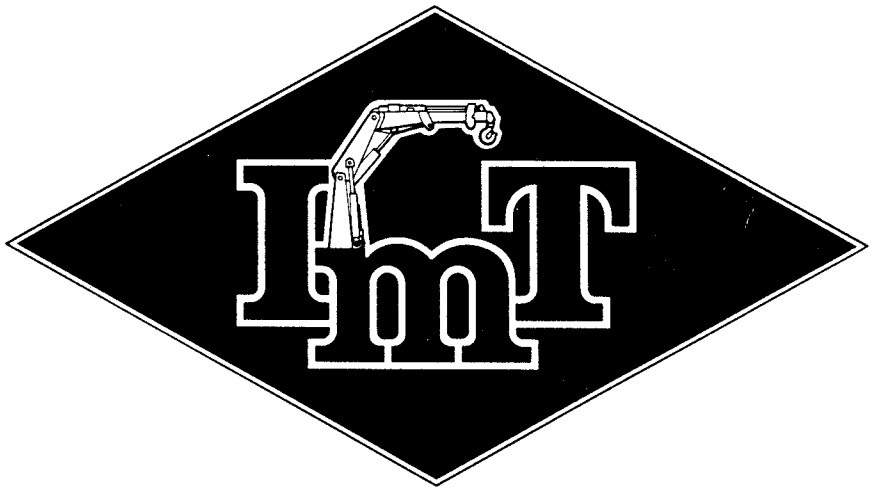
99900286

1449 TIREHAND



IOWA MOLD TOOLING CO., INC.
500 HWY 18 WEST, GARNER, IA 50438
515·923·3711

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Section 1. SPECIFICATIONS

Tire-Size Capacity	Narrow Base Tire - 18.00 x 25 thru 24.00 x 49 Wide Base Tire - 26.5 x 25 thru 38 39
Weight Capacity	3,500 lbs
Weight Capacity	3,500 lbs.
Clamping Span	44" to 104"
Body Rotation	350 °
Clamp Pad Rotation	120 °
Weight of Tirehand	2,202 lbs.
Center of Gravity of Tirehand from vehicle pin connections	28"
Center of Gravity of Tirehand and a 3500 lb. tire (at centerline of pad) from vehicle pin connections	61"
Clamping Safety Lock	Pilot Operated Holding Valves
Hydraulics	Four (4) Function Control
Counterweight	As required for stability
Lifting Height	Provided by carrier vehicle
Controls	Cab mounted
Rotation Systems	Spur-gear drive

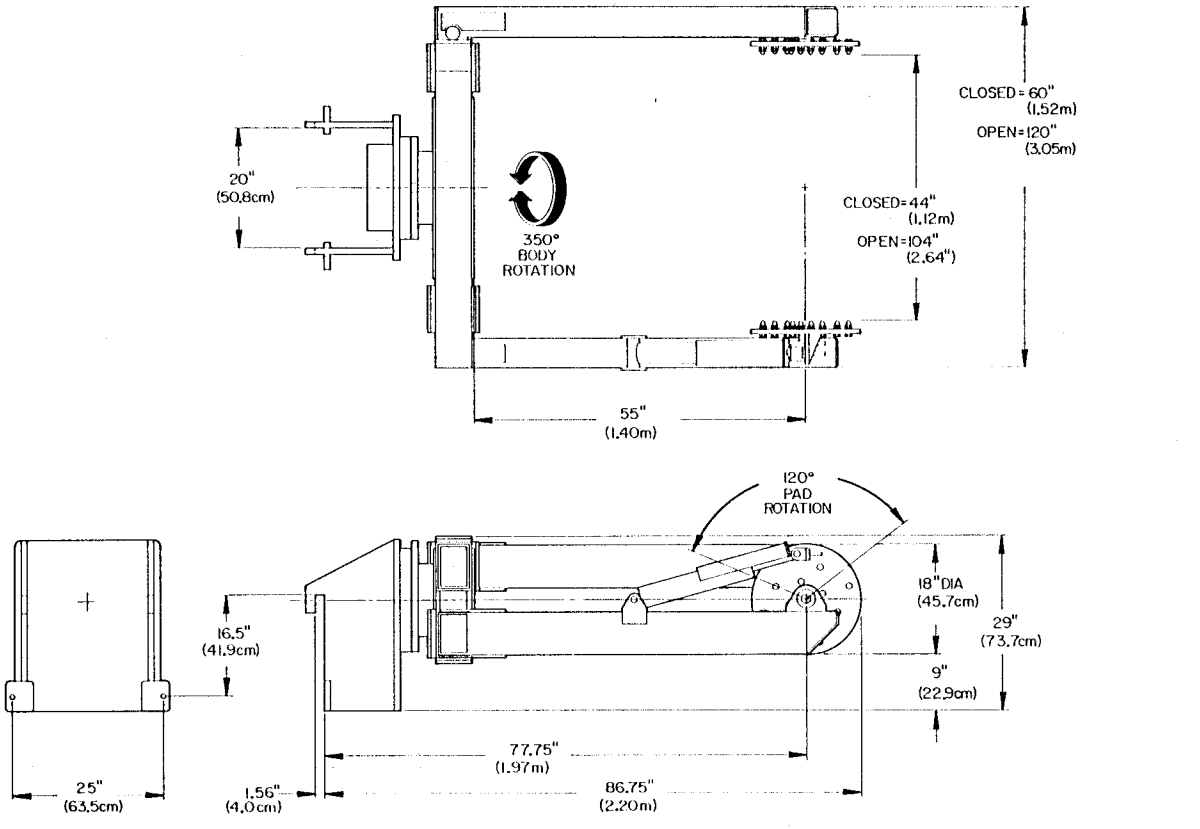


Figure A-1. Geometric Configuration

Section 2. INSTALLATION

2-1. GENERAL

Since each installation of the 1449 TIREHAND is a unique situation, this section will deal only in general instructions. Carefully read and completely understand this section before beginning the installation.

2-2. VALVE BANK INSTALLATION

Carefully examine the interior of the cab of the carrier vehicle for the best possible location of the valve bank. During this inspection, consider:

1. Ease of operation
2. Ease of installation
3. Lack of interference with other controls or components of the loader.

NOTE

Unless specified otherwise, the term "LOADER" can mean either a front-end loader or a fork lift.

Having decided the best location for the valve bank, either fabricate a bracket for mounting the valve bank or bolt the valve bank directly to the instrument panel or bulkhead panel of the loader. Bear in mind that whichever method is selected, the valve bank should be held rigid and must be accessible to the hydraulic hoses. Install the valve bank.

2-3. TIREHAND INSTALLATION

The 1449 TIREHAND may be installed on any front-end loader or forklift having sufficient lifting capacity and stability. Usually the TIREHAND is equipped with a base unless the customer specifies otherwise. The base is specifically designed to interface with a particular type of leader. This base is pinned to the carrier vehicle and the TIREHAND sub-base, in turn, is pinned to the base through the side-shift shafts riding on linear bushings. Again, it must be emphasized - each installation is unique.

1. Pin the TIREHAND to the loader.
2. Check all fittings for adequate lubrication.
3. Test operate the carrier vehicle for vertical freedom of movement. If there is a point at which the TIREHAND or loader may be damaged by raising or lowering the TIREHAND, install stop blocks to prevent the loader from damaging itself or the TIREHAND.

2-4. HYDRAULIC INSTALLATION

If necessary, cut a hole in the cab to provide a means for routing the hoses between the valve bank and the TIREHAND. Depending on the loader, the TIREHAND may or may not have a SIDESHIFT function. If the base is equipped with sideshift cylinders, install the hoses. Otherwise, plug the ports on the valve bank and remove the handles if a 4-section valve bank is supplied.

2-5. TESTING

Raise the TIREHAND until the clearance is sufficient to allow operation of all TIREHAND functions. Test operate all functions and check for leaks.

WARNING

Stay clear of all pinch points while operating this unit. Failure to comply may result in a serious injury or even death.

NOTE

If the motion of the TIREHAND is bumpy or erratic, it indicates the presence of air in the system. Purge the air from the system.

Test the unit at rated capacity and note the points of instability. Add counterweights as necessary.

If the loader is articulated, make certain that none of the TIREHAND hoses interfere with the steering. Check all hose routing for exposure to excessive abrasion.

Section 3. OPERATION

3-1. GENERAL

Every TIREHAND has an identification placard (Figure C-1) fastened to the unit between the clamping arms. When ordering parts, communicating warranty information or referring to the unit in correspondence, always include the assigned serial and model numbers. All inquiries should be addressed to Iowa Mold Tooling Co., Inc.; 500 Hiway 18 West; Garner, Iowa 50438 or telephone (515) 923-3711.

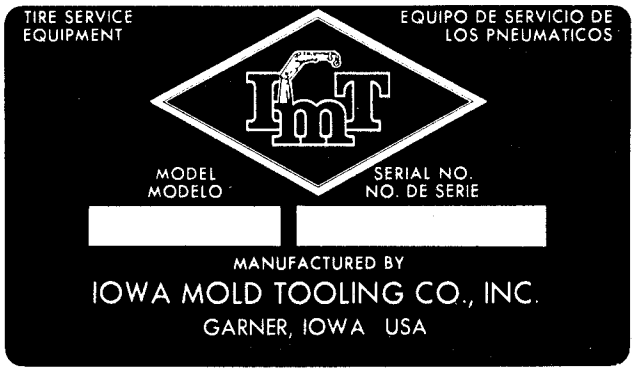


Figure C-1. Serial Number Placard

3-2. 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 capacity. The safety precautions contained in this section should be read and observed at all times during operation.

3-2-1. LOAD LIMITS

The TIREHAND is designed to give satisfactory service if operated within maximum allowable load limits of 3,500 lbs. (1587 kgs.). Overloading the unit may result in potentially serious safety hazards and shortened service life of the unit - exceeding the stated load limit can cause tipping or structural failure.

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

3-2-2. 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 and loose nuts or bolts.

Hydraulic Oil Supply - Check oil level in the hydraulic oil reservoir and fill if necessary.

Leakage - Examine all visible hoses for frays, blisters and signs of excessive wear. 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 defects and malfunctions.

This equipment check should be performed before every work task and as a periodic preventive maintenance check.

3-2-3. WORK STATION POSITIONING

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

Care should be taken to assure that all personnel are clear of the work area before starting operation.

At job sites where terrain is graded or unfirm, unit operation should be restricted to compensate for reduced stability.

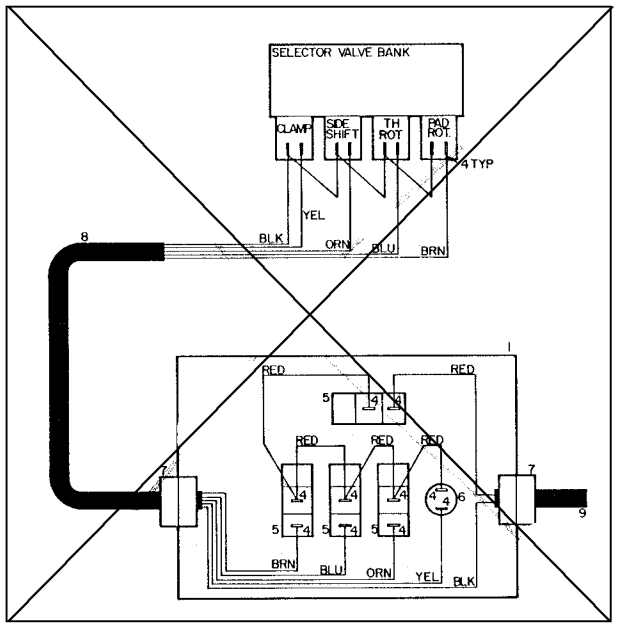
WARNING

The operator should be alert at all times for the presence of personnel in the work area. Operations should be suspended until the work area is cleared.

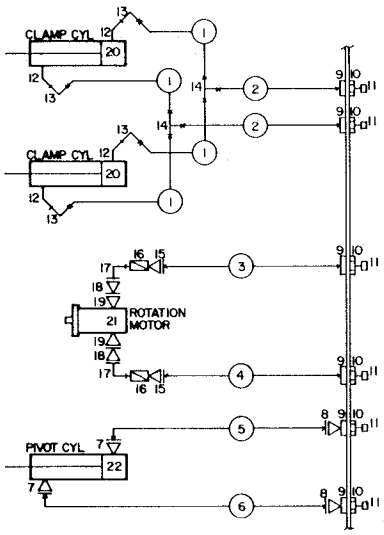
3-3. OPERATOR TRAINING

The TIREHAND is designed for operator simplicity. Prior to operating the unit at job sites, the operator should be thoroughly familiar with control operation, prescribed operating procedures and safety precautions. In addition, the operator should be prepared to take any necessary remedial action in an emergency situation.

Item No.	Part No.	Description	Qty.
1.	60111300	JIC box, 1449	1.
2.	70392549	Decal, Control	1.
3.	70392695	Decal, Selector valve	1.
4.	77040186	Terminal, 1/4", 16-14Ga.	18.
5.	77041345	Switch, Single throw, toggle	4.
6.	77041347	Switch, Double throw, momentary	1.
7.	77044018	Strain relief, 1/2	2.
8.	89044108	Cable, 18Ga./8 wire	24'
9.	89044188	Cable, 14Ga./2 wire	13'



(90707628) Control Kit



Item No.	Part No.	Description	Qty.
1.	51704206	Hose assembly, 3/8 x 28	4.
2.	51704448	Hose assembly, 3/8 x 19	2.
3.	51703701	Hose assembly, 3/8 x 10	1.
4.	51703704	Hose assembly, 3/8 x 12	1.
5.	51703544	Hose assembly, 1/4 x 114	1.
6.	51705364	Hose assembly, 1/4 x 128	1.
7.	72532351	Adapter, 7/16-20 str. thd. (m) x 7/16-20 JIC (m)	2.
8.	72532665	Adapter, 7/16-20 JIC (m) x 3/4-16 JIC (f)	2.
9.	72532672	Union, Bulkhead, 37° JIC 3/4-16	6.
10.	72531708	Nut, Bulkhead, 37° JIC 3/4-16	6.
11.	72532675	Cap, Steel, 3/4 JIC	6.
12.	72053777	Elbow, 3/4-16 str. thd. (m) x 3/4-16 JIC (m) 45°	4.
13.	72532658	Elbow, 3/4-16 JIC (m) x 3/4-16 JIC (f) 90°	4.
14.	72531205	Tee, 3/4 JIC (m) x 1/2 tube	2.
15.	72053670	Adapter, 3/8 npt (m) x 3/4-16 JIC (m)	2.
16.	73054139	Valve, Needle, 3/8 npt (f)	2.
17.	72053563	Elbow, Steel, 3/8 npt (mf) 45°	2.
18.	72053723	Adapter, 3/8 npt (m) x 3/8 npt (m)	2.
19.	72053743	Adapter, 7/8-14 str. thd. (m) x 3/8 npt (f)	2.
20.	3B309511	Cylinder, Clamp	2.
21.	60106042	Motor, Rotation	1.
22.	3B022850	Cylinder, Pivot	1.

Hydraulic Kit (91705523)

Figure B-1. Hydraulic Installation

3-4. CONTROLS

The controls for the TIREHAND and the carrier vehicle are located in the cab of the loader.

3-4-1. VEHICLE CONTROLS

The vehicle is equipped with controls which enable the operator to raise, lower and tilt the TIREHAND.

3-4-2. UNIT CONTROLS

The controls for the TIREHAND are located in the cab of the carrier vehicle. Their function and operation is as follows:

CLAMP - Move the function switch to Clamp/Release and move the hydrostatic control to operate.

WARNING

Attempting to use the clamping action of the TIREHAND to seat the bead of the tire is a hazardous practice and should not be attempted.

SIDE SHIFT - Move the function switch to Side Shift left/right, move the hydrostatic control to operate

ROTATION - Move the function switch to Rotation CW/CCW and move the hydrostatic control to operate.

NOTE

Speed and direction are controlled by the vehicle hydrostatic control.

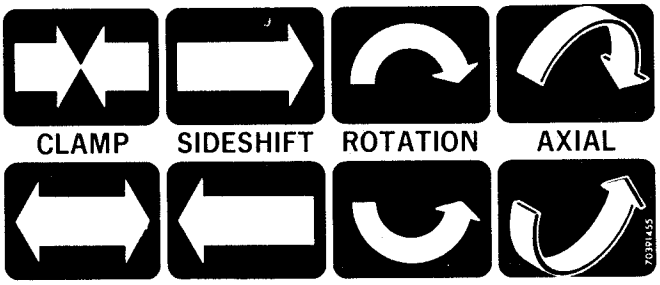


Figure C-2. Control Decal

PAD ROTATION - Move the function switch to Axial (pad rotation) and move the hydrostatic control to operate.

NOTE

Direction of pad rotation is as seen from the operators station with the "TOP" decal pointing up. Rotating the TIREHAND 180° (3.14 Rad.) will result in causing the pads to rotate in a direction opposite to that shown on the control decal (see illustrations).

3-5. TASK PERFORMANCE

Prior to operating this unit, thoroughly familiarize yourself with the operating restrictions and requirements. To initiate operation:

1. Manuever the vehicle into a position which provides proper orientation of the TIREHAND to the tire with the loader boom at the proper elevation.

2. Position the opened hand in order to properly grasp the tire.

WARNING

Make certain personnel are clear before continuing.

3. Advance the loader, manipulate the controls to perform the desired function and grasp the tire.

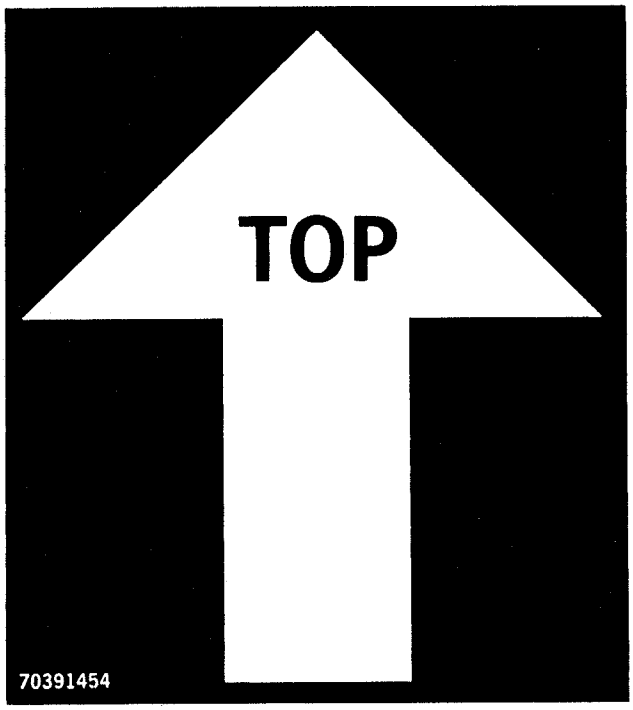


Figure C-3. "TOP" Decal

Section 4. MAINTENANCE

4-1. GENERAL

Proper maintenance on a regular schedule is essential to keep your unit operating efficiently. Outlined in this section are proper maintenance procedures and necessary service intervals. Personnel responsible for unit upkeep should become familiar with frequency and type of maintenance required and perform these tasks at the recommended intervals.

4-2. LUBRICATION

Maintaining the proper lubrication schedule will vary with climatic conditions and use frequency. The lubrication chart is intended to serve as a schedule for a normal work load and moderate weather variance. Periods of heavy use would shorten service intervals.

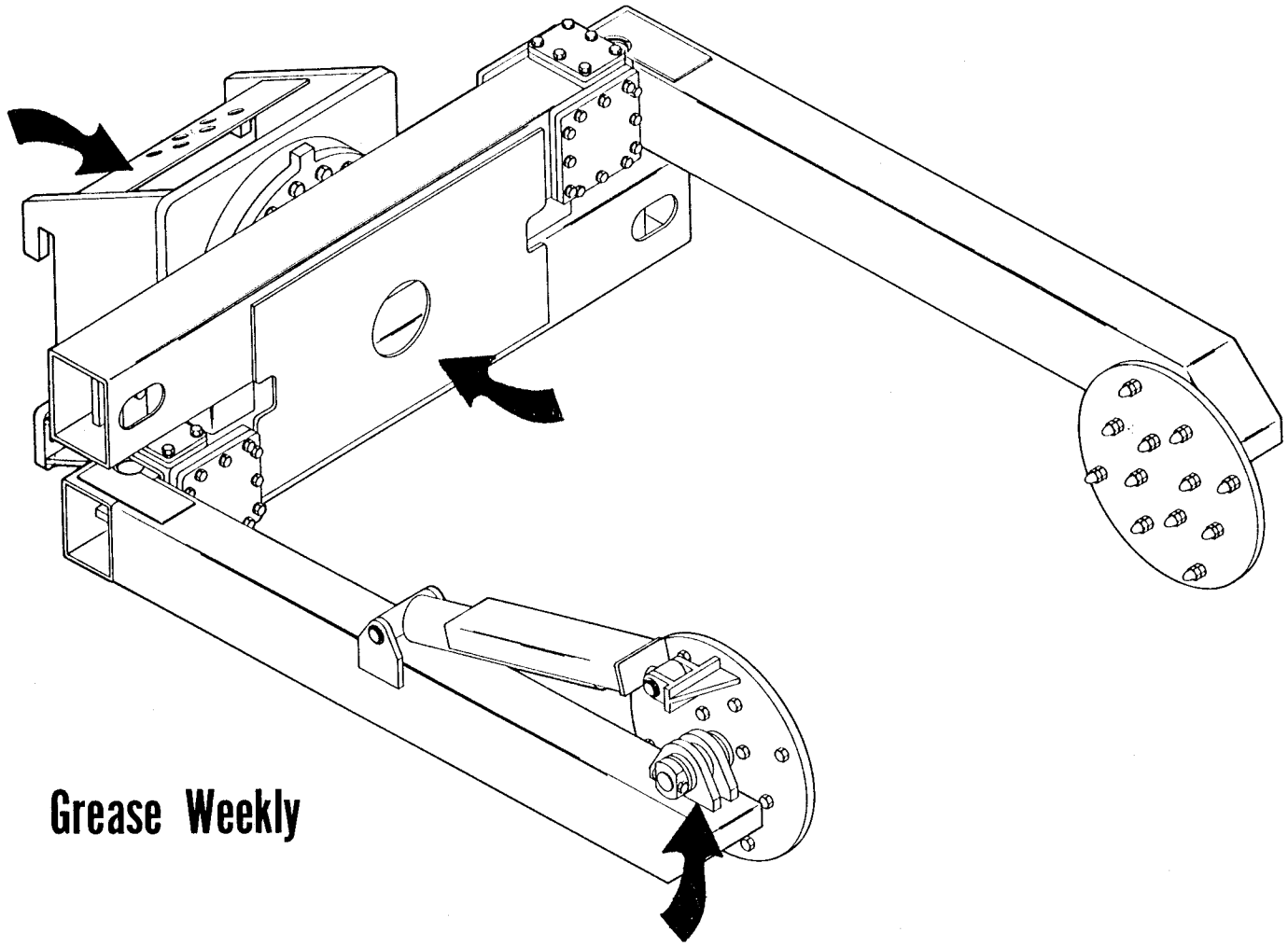


Figure D-1. Lubrication Points

TABLE D-1. LUBRICATION CHART

APPLICATION POINT	LUBRICATION PRODUCT	APPLICATION MEANS	INTERVAL
Carrier Boom Pivot Points	Shell Alvania 2EP	Hand Grease Gun	Weekly
Linear Bushings (4)			
Hinge Pins (8)	or Shell Retinax "A"	or Pneumatic	
Claw Gear-Bearings (2)			
Claw Drive Gears (2)	or Equivalent	Pressure Gun	
Claw Pinion Gears (2)			
Clamp Cylinders (2)			
Body Gear-Bearing			
Body Drive Gear			
Body Pinion Gear			

4-3. HYDRAULIC SYSTEM

4-3-1. HYDRAULIC FLUID SELECTION

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

Oils selected for use with this class of equipment, in addition to meeting viscosity specifications, should have the following additives:

1. Antifoam Inhibitors
2. Antioxidant Inhibitors
3. Rust Resistant Additives
4. Antiwear Additives

4-3-2. HYDRAULIC FLUID SPECIFICATIONS

Table D-2 states oil specifications for a full range of operating temperatures encountered in the temperate zones. Arctic conditions present special requirements which are not in the scope of this chart and must be analyzed individually. Consult your oil supplier for the proper hydraulic fluids for working under these severe conditions. Electric reservoir heaters are available to improve operation at extremely low temperatures.

4-3-3. HYDRAULIC FLUID DETERIORATION

Contamination of the hydraulic fluid by solvents, water, dust or other abrasives will cause deterioration of the fluid. Sustained presence of these impurities will result in premature breakdown of antifoam, lubrication and anti-rust and viscosity properties. Introduction of water to the system and operation at high temperatures (above 180°F) will result in an increase in the oil oxidation rate. Oxidation produces varnish-forming materials and sludge in the oil. Operating the system on a sustained basis with contaminated oil or broken down oil will increase wear and the efficient service life of the unit can be significantly shortened. Periodically, draw off a sample of the oil and check the oil for breakdown. To check oil quality:

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

TABLE D-2. HYDRAULIC FLUID SPECIFICATIONS

Ambient Temperature Range, °F	0 - 90	Below 32	32 - 90	Above 90
Minimum Pour Point, °F	-30	-25	+10	+10
Maximum Viscosity, SSU @ 0°F	4,000	4,000	---	---
Minimum Viscosity, SSU @ 100°F	140 - 190	100 - 130	150 - 200	200 - 315
Minimum Viscosity, SSU @ 210°F	48	41	43	47
Minimum Viscosity Index	139	90	90	90

When any of these conditions is observed, the system should be purged and filled with new oil. In addition, the oil should be changed in the reservoir and complete system:

1. After every 800 hours of operation or every six months, whichever occurs first.
2. After pump or other major hydraulic component failure.

4-3-4. HYDRAULIC SYSTEM PURGING

Purging the hydraulic system requires a new oil supply sufficient to completely fill the reservoir, lines, cylinders, etc., and an extra allowance for loss during this operation. To reduce oil loss during this process, operate the vehicle engine at a reduced speed. In purging, new oil is supplied to the pump pressure line and old oil is discharged from the reservoir return line. Two operators will be required during this procedure - one to operate the controls and the other to regulate pump flow (engine speed).

CAUTION

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

Purging is accomplished as follows:

1. Locate the unit in an area that provides solid, level footing and space to accomodate the full operating range of the unit. Shift the loader into neutral.

2. Raise the loader's boom approximately 5 feet above ground level. Operate the SIDE SHIFT function fully in one direction.

3. With the TIREHAND right side up, rotate it so that it is 30° off the horizontal position. Extend the clamping arms full stroke.

4. Kill the engine, drain the hydraulic reservoir and remove the suction hose and the hose to the pump. Drain and reassemble.

NOTE

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

5. Disconnect the reservoir return line and direct the discharge into a sump or waste container. Plug the return line port on the reservoir and fill the reservoir with clean oil (refer to Paragraph 4-3-1).

NOTE

Be thoroughly familiar with the following steps and 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.

6. Start the engine and engage the pump if necessary. With the return line directed into a sump (step 5), retract the clamping arms, rotate pads and operate side shift full stroke. Rotate the TIREHAND back to the horizontal position. Stop the engine.

7. Reconnect the return line to the reservoir port and change the return filter. All components of the TIREHAND are now purged.

8. Check the reservoir oil level and add oil as required.

NOTE

This section covered the TIREHAND purging. The loader's hydraulic system is covered in the manufacturer's service manual.

4-3-5. PURGING TRAPPED AIR

Air may be introduced into the hydraulic system either through a leak in the system or due to disconnecting a hydraulic component for servicing. Air in the system will cause erratic operation and must be corrected.

To purge air from the system, fully extend and retract the affected cylinder(s) several times. At the end of the stroke, hold the control valve open about 10-15 seconds longer. Continue extending and retracting the cylinder until operation is smooth and continuous.

4-3-6. FILTER ELEMENT REPLACEMENT

NOTE

Some of the loaders may not be equipped with both a suction and return line filter. On those vehicles, it is our policy to install filters. These instructions apply only to those vehicles which require IMT installed filters. On those vehicles equipped with suction and return line filters by the manufacturer, refer to the manufacturer's instructions.

To avoid residue accumulation in the reservoir and to protect hydraulic components - valves, cylinders, motors and pumps - the filters must be serviced on a regular basis. They must be changed after the initial 50 hours of new unit operation and every 200 hours thereafter. To change filter elements:

1. Close the gate valve and remove the filter element.
2. Install the new filter ensuring proper rubber seal seating and tighten as much as possible using both hands.
3. Open the gate valve and check for leaks.

CAUTION

Pump failure can result if the shutoff (gate) valve is left closed.

TABLE D-3. PREVENTIVE MAINTENANCE CHECKLIST

Item	Description	Frequency
Walk around	Visually inspect unit on all sides for hydraulic leaks, loose parts and obvious damage to external structural members	Daily
Cylinders	Check for securing pins on cylinders and attached members for proper installation.	Monthly
Hydraulic hoses and fittings	Inspect hose surfaces and metal end coupling junctions for oil leakage. Check outer hose coverings for blistering, excessive wear or flattening.	Daily
Rotation Systems	Check for excessive backlash (play) in rotational stops. Normal variation is not to exceed 1/8" to 3/16".	Weekly
Structural damage	Inspect all structural members for broken welds or fatigue cracks. Check carrier vehicle boom(s) for structural defects - bends, weld cracks or dents.	Monthly
Counter-balance valves	Conduct a holding test with loaded TIREHAND to assure proper operation of counter-balance valves on both clamping cylinders.	Weekly
Reservoir	With all cylinders retracted, check fluid level.	Daily
Oil Leaks	Inspect all valves and cylinders for signs of leakage.	Monthly

4-4. PREVENTIVE MAINTENANCE

The preventive maintenance check list (Table D-3) is designed to assist you in keeping your TIREHAND in efficient operating condition. Items in this section apply to the TIREHAND only. The loader should also be inspected periodically (refer to the manufacturer's service manual).

4-5. REGULAR INSPECTION

Every three months or more often when the equipment is subjected to heavy use, the following inspections should be performed in addition to the preventive maintenance check list.

4-5-1. TIREHAND ARM ASSEMBLIES

1. Check for structural defects evidenced in weld cracks, dents or bends.
2. Check cylinder holding valves.
3. Check cylinders for leaks.
4. Check both internal and external clamping arm bearings for wear and lubrication.
5. Check operating timing - both clamping arms should function together at the same rate of motion.

4-5-2. AXIAL PAD ROTATION

1. Check for structural defects.
2. Check motors for leaks.
3. Check disc bearings located on support shafts.
4. Check all pins and their retainers.

4-5-3. HYDRAULIC SYSTEM

4-5-3-1. Cylinders

1. Check rods for damage such as scarring, nicks and dents and check for rust on out-of-service units.
2. Check for leaks at weld joints and rod seals.
3. Check for drift indicating leakage around piston.
4. Check cylinder barrel for dents and cracks.

4-5-3-2. Hydraulic Pump

1. Check for leaks at shaft seal and section joints.
2. Check for a drop in operating speed.
3. Check hydraulic oil for excessive heating.
4. Check bolts and fasteners for tightness and note unusual vibration or noise.

4-5-3-3. Hydraulic Control Valves

1. Check spools for sticking and failure to return to neutral position. Inspect for leaks at joints and spools.
2. Inspect valve housing for cracks.
3. Make certain relief valve reaches the proper relief setting.

4-5-3-4. Hydraulic Reservoir and Hoses

1. Check filters for clogged elements.
2. Check oil level in reservoir.
3. Check all hoses for damage.

4-5-4. CARRIER BOOM AND CYLINDERS

1. Check for structural defects evidenced in weld cracks, dents or bends.
2. Check all pins and their retainers on loader boom and cylinders.
3. Check cylinder rods for damage and check for leaks.

4-5-5. SIDE SHIFT ASSEMBLY

1. Check cylinders for leaks and damage.
2. Check linear bushings for damage and lubrication.
3. Check for structural defects.
4. Check cylinder retaining pins.

4-5-6. ROTATION ASSEMBLY

1. Check gear box for proper anchoring and bolt torque.
2. Check turntable gear-bearing bolt torque.
3. Check for pinion gear/gear-bearing backlash.

Section 5. PARTS

5-1. GENERAL

This section contains the exploded parts drawings with accompanying parts list for the assemblies used on the TIREHAND. These drawings are intended to be used for ordering parts only.

5-2. CYLINDER IDENTIFICATION

To ensure proper replacement parts are received, it is necessary to specify a complete number/letter sequence for any part request. You must use the number stamped on the cylinder case when ordering parts.

5-3. WELDMENT IDENTIFICATION

Each of the major weldments bears a stamped part number. Anytime a major weldment is replaced, you must specify the complete part number as stamped on the weldment. The locations of the part numbers are as shown in Figure E-2.

5-4. ORDERING REPAIR PARTS

When ordering replacement parts:

1. Give the serial number of the unit.
2. Give the model number of the unit.
3. Specify the complete part number. When ordering cylinder parts or one of the main weldments, always give the stamped part number.
4. Give a complete description of the part.
5. Specify the quantity required.

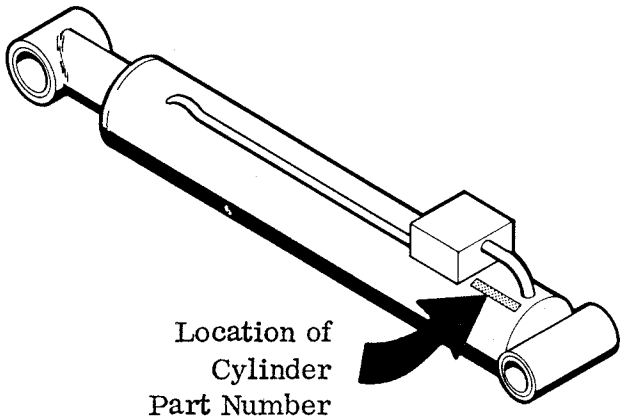


Figure E-1. Cylinder Part Number Location

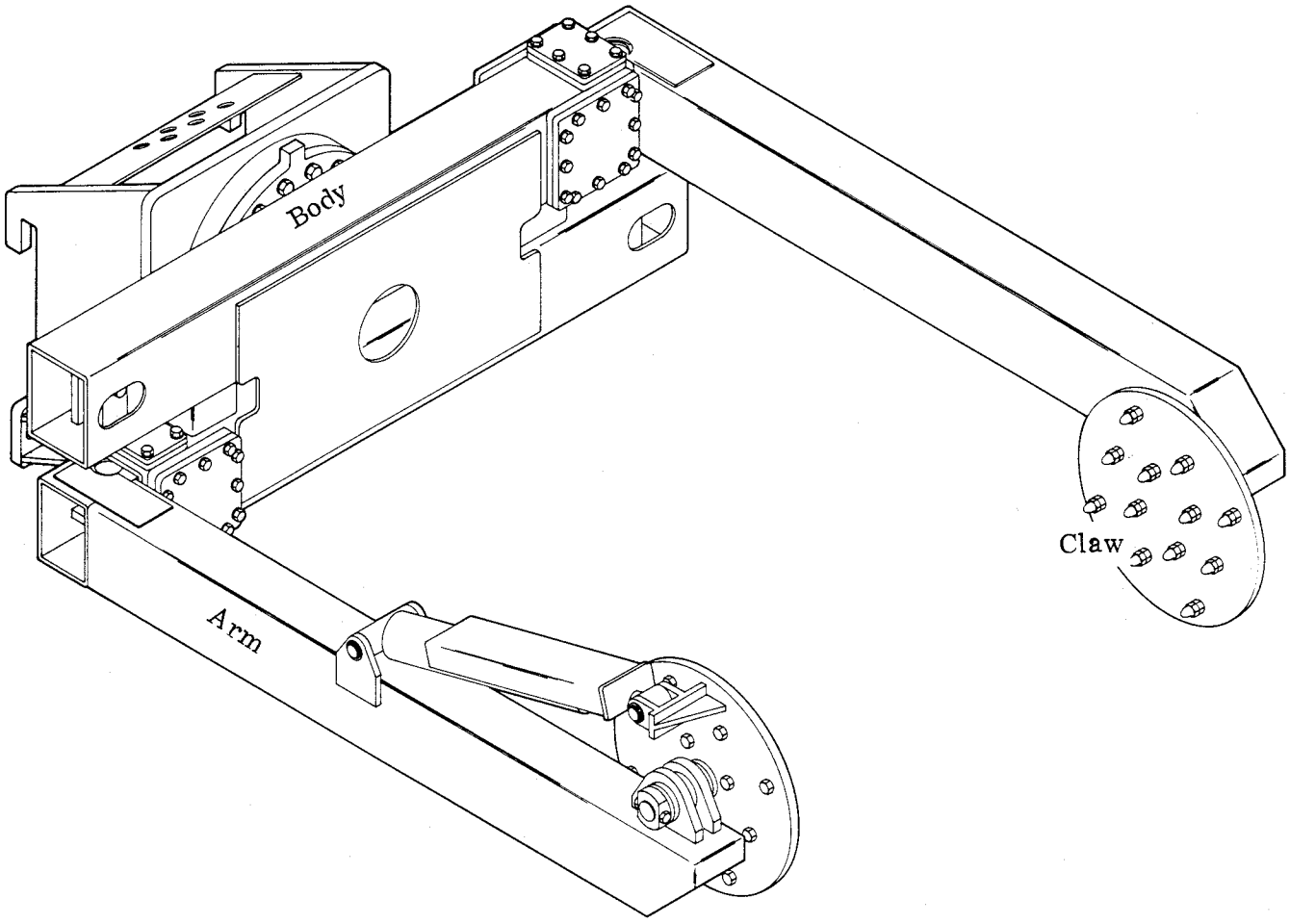
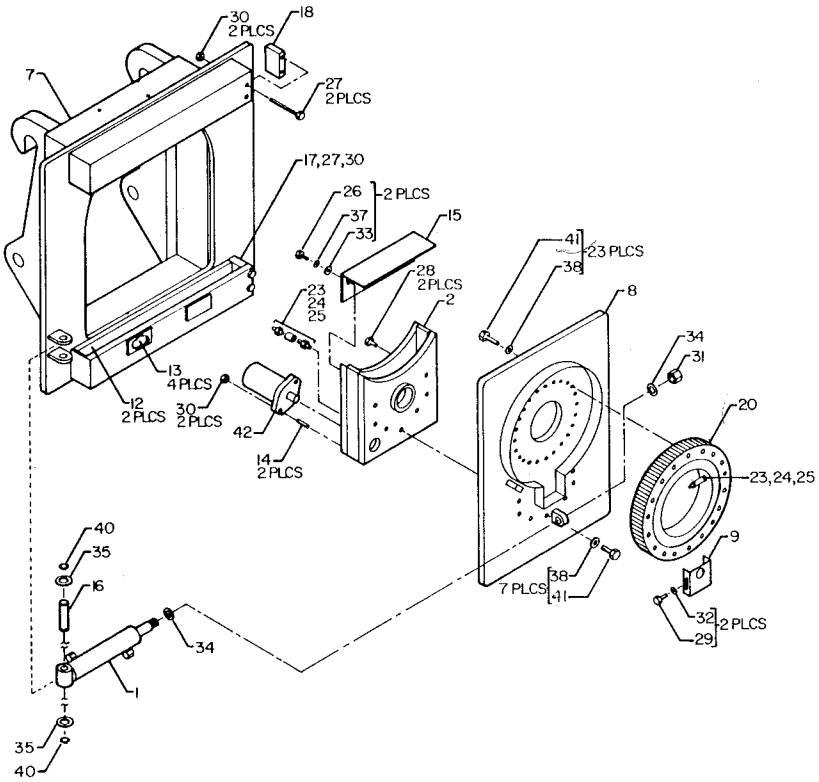
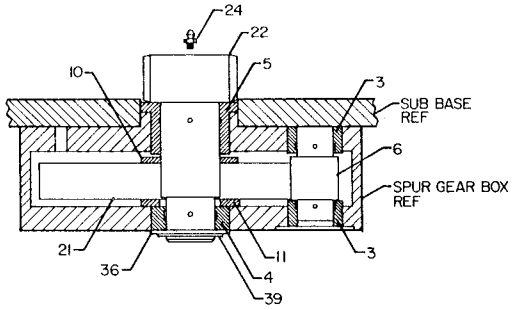


Figure E-2. Weldment Part Number Location

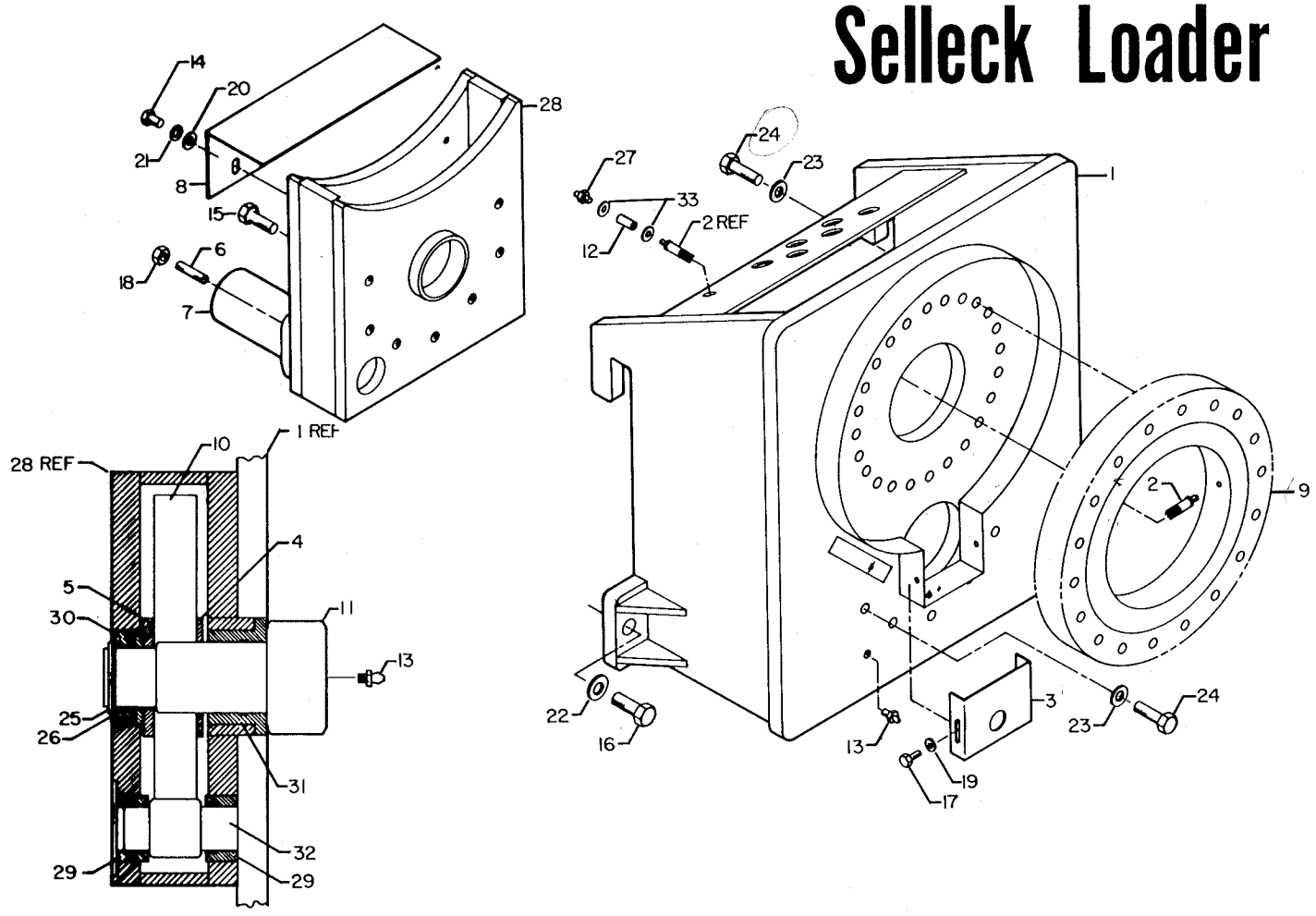
IT-28 Loader





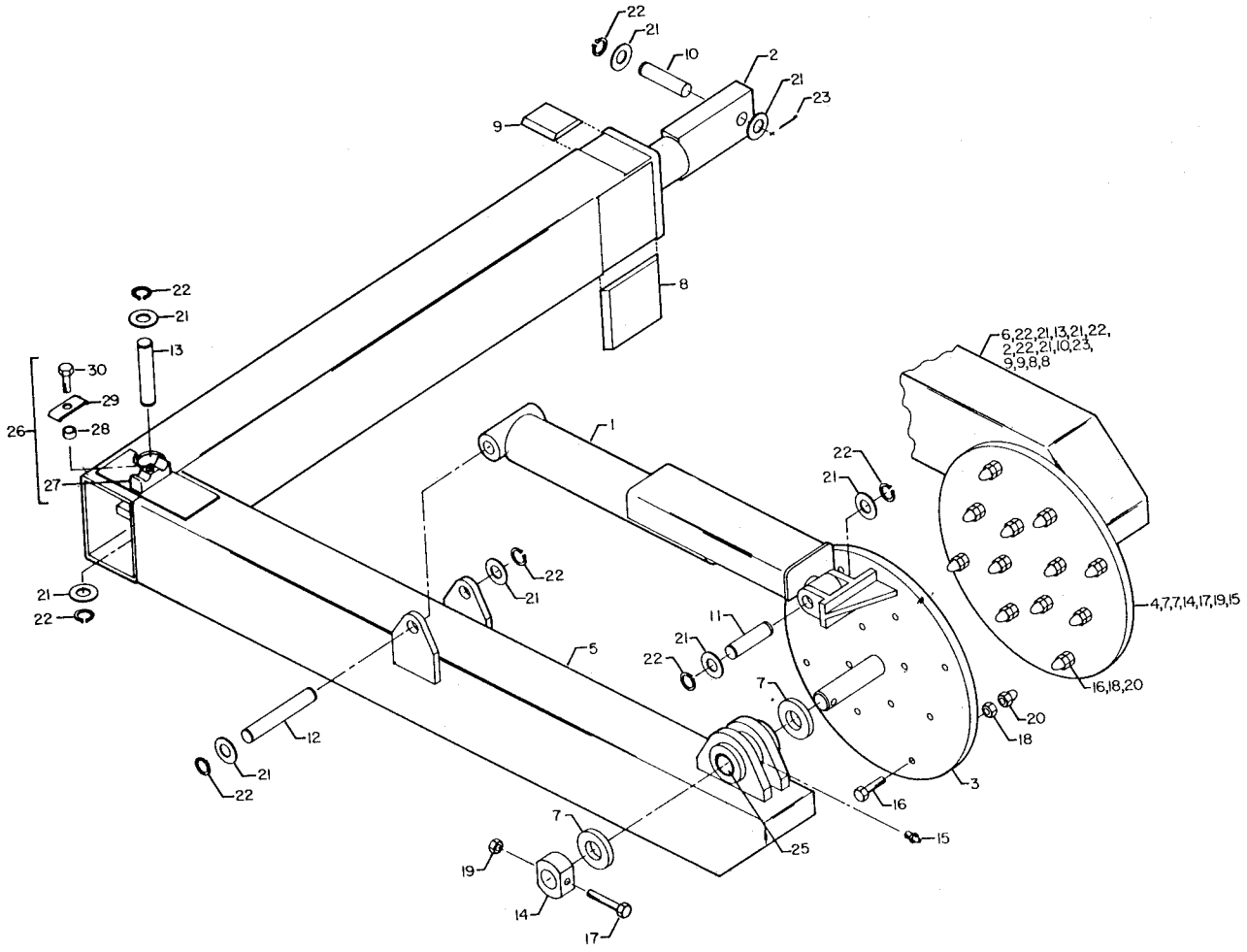
Item No.	Part No.	Description	Qty.
1.	3B160870	Cylinder, Sideshift	1.
2.	51703654	Gear Box	1.
3.	60020180	Bushing, (part of 2)	2.
4.	60020181	Bushing, (part of 2)	1.
5.	60020182	Bushing, (part of 2)	1.
6.	60106309	Gear, Drive (modified) (part of 2)	1.
7.	52707383	Base-weldment	1.
8.	52707386	Sub base-weldment	1.
9.	60010235	Cover, Pinion gear	1.
10.	60020033	Thrust washer	1.
11.	60020123	Thrust washer	1.
12.	60030128	Slide pad	2.
13.	60030129	Wear pad	4.
14.	60106032	Stud, 1/2-13 x 2	2.
15.	60108431	Cover, Gear box	1.
16.	60110998	Pin, Type A, 1 x 4 3/8	1.
17.	60110999	Retainer plate, brg.	1.
18.	60111000	Retainer plate, brg.	1.
19.	70392524	Decal, Rotate/grease (near TTGB zerk)	1.
20.	~~71056062~~	Gear, TRNTBL brg.	1.
21.	71056264	Gear, INTMD	1.
22.	71056265	Gear, Pinion	1.
23.	72053301	Coupling, Blk. 1/8	2.
24.	72053508	Zerk, npt. 1/8	3.
25.	72053719	Adapter, 1/8 npt. (m) x 1/8 npt. (m)	2.
26.	72060091	Cap screw, 1/2-13 x 1 Gr. 5	2.
27.	72060102	Cap screw, 1/2-13 x 5 1/2 Gr. 5	4.
28.	72060147	Cap Screw, 5/8-11 x 1 Gr. 5	7.
29.	72060833	Screw, Self tapping, 5/16-18 x 3/4	2.
30.	72062080	Nut, 1/2-13 self locking	6.
31.	72062114	Nut, 3/4-10 self locking	1.
32.	72063002	Washer, 5/16 W flat	2.
33.	72063005	Washer, 1/2 W flat	2.
34.	72063008	Washer, 3/4 W flat	2.
35.	72063034	Mach. bushing, 1 x 10Ga. NR	2.
36.	72063039	Mach. bushing, 2 x 10Ga. NR	1.
37.	72063053	Washer, 1/2 Lock	2.
38.	72063119	Washer, 5/8 W flat H	30.
39.	72066095	Retaining ring, Ext. 2 std	1.
40.	72066125	Retaining ring, Ext. 1 HD	2.
41.	72601481	Cap screw, 5/8-11 x 2 F-911	30
42.	73051384	Motor, Hydraulic	1.

Figure E-3. Base (Part Number 40707384)



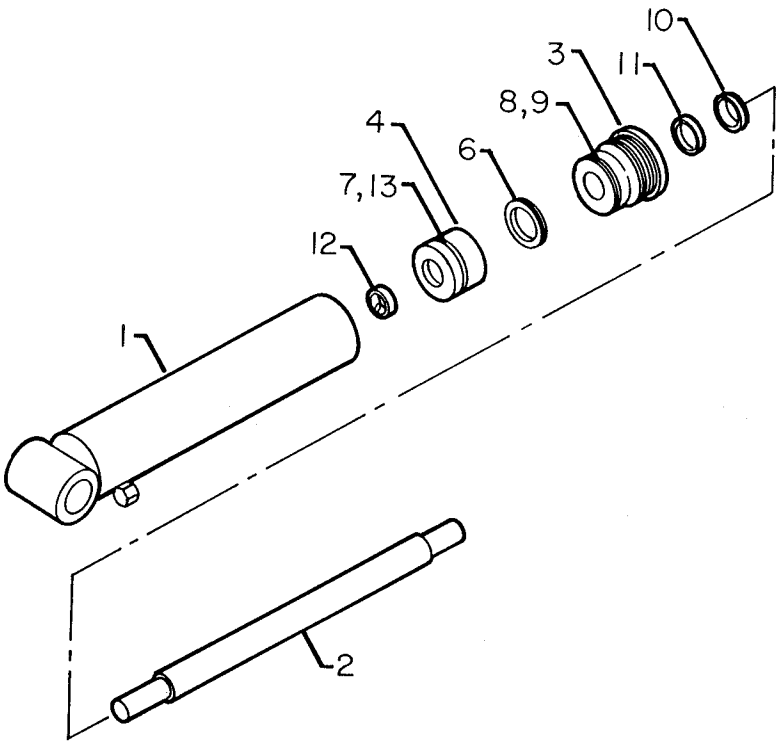
Item No.	Part No.	Description	Qty.
1.	52705532	Base	1.
2.	53000703	Grease extension, 20"	1.
3.	60010235	Cover, Pinion gear	1.
4.	60020033	Thrust washer	1.
5.	60020123	Thrust washet, Brz	1.
6.	60106032	Stud, 1/2-13 x 2	2.
7.	73051384	Motor, Hydraulic	1.
8.	60108431	Cover	1.
9.	71056062	Turntable gear bearing (incl. 27)	1.
10.	71056264	Gear, Intermediate	1.
11.	71056265	Gear, Pinion	1.
12.	72053301	Coupling, 1/8	1.
13.	72053508	Zerk, 1/8	2.
14.	72060091	Cap screw, 1/2-13 x 1 Gr 5	2.
15.	72060147	Cap screw, 5/8-11 x 1 Gr 5	7.
16.	72060206	Cap screw, 3/4-10 x 2 Gr 8	2.
17.	72060833	Screw, Self tapping 5/16-18 x 3/4	2.
18.	72062080	Nut, Lock, 1/2-13	2.
19.	72063002	Washer, Wrought, 5/16	2.
20.	72063005	Washer, Wrought, 1/2	2.
21.	72063053	Loskwasher, 1/2	2.
22.	72063116	Washer, Flat, 3/4 Gr 8	2.
23.	72063119	Washer, Flat, 5/8 Gr 8	30.
24.	72601481	Cap screw, 5/8-11 x 2 F-911	30.
25.	72066095	Retaining ring, 2" Std	1.
26.	72063039	Mach. Bushing, 2 x 10Ga. NR	1.
27.	72053508	Zerk, 1/8 (part 0f 9)	Ref
28.	51703654	Gear box, (incl. 29-32)	1.
29.	60020180	Bushing, (part of 28)	Ref
30.	60020181	Bushing, (part of 28)	Ref
31.	60020182	Bushing, (part of 28)	Ref
32.	60106309	Gear, Drive, (part of 28)	Ref
33.	72063003	Washer, Wrought, 3/8	2.
34.	70392524	Decal, Grease/rotate (near TTGB zerk)	1.

Figure E-4. Base (Part Number 40705525)



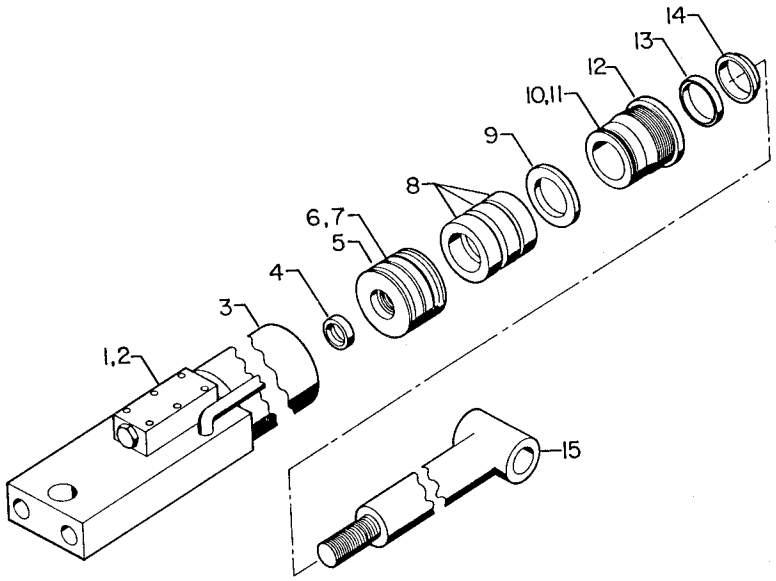
Item No.	Part No.	Description	Qty.
1.	3B022850	Cylinder, Pivot	1.
2.	3B309511	Cylinder, Clamp	2.
3.	52705520	Pad	1.
4.	52705521	Pad	1.
5.	52705529	Arm, Lower (incl. 2 item 25, item 26)	1.
6.	52705530	Arm, Upper (incl. 2 item 25)	1.
7.	60020206	Thrust washer, 1 1/2 x 3 x 3/8	4.
8.	60030077	Wear pad, 3/8 x 5 7/8 x 5	4.
9.	60030112	Wear pad, 3/8 x 2 7/8 x 3	4.
10.	60101905	Pin, Type B, 1 x 4 1/8	2.
11.	60104979	Pin, Type A, 1 x 3 3/4	1.
12.	60106065	Pin, Type A, 1 x 6 5/8	1.
13.	60106968	Pin, Type A, 1 x 5 1/8	2.
14.	60108429	Retainer, Pad	2.
15.	72053508	Zerk, 1/8	2.
16.	72060095	Cap screw, 1/2-13 x 2 Gr5	24.
17.	72060097	Cap screw, 1/2-13 x 3 Gr5	2.
18.	72062004	Nut, Hex 1/2-13	24.
19.	72062107	Nut, Hex ctr lk 1/2-13	2.
20.	72062134	Nut, Acorn 1/2-13, high	24.
21.	72063034	Mach. Bushing, 1 x 10Ga.	12.
22.	72066125	Retaining ring, Ext 1' HD	10.
23.	72066187	Cotter pin, 5/32 x 1 1/2	2.
24.			
25.	7BF81215	Bushing, (part of 5 and 6)	4Ref
26.	51704014	Hose clamp assembly (part of 5) (incl. 27-30)	1Ref
27.	60106741	Body-clamp, (part of 26)	1Ref
28.	60106742	Spacer-clamp (part of 26)	1Ref
29.	60106744	Bar-clamp (part of 26)	1Ref
30.	72060093	Cap screw, 1/2-13 x 1 1/2 Gr5 (part of 26	1Ref

Figure E-5. Clamp (Part Number 40705524)



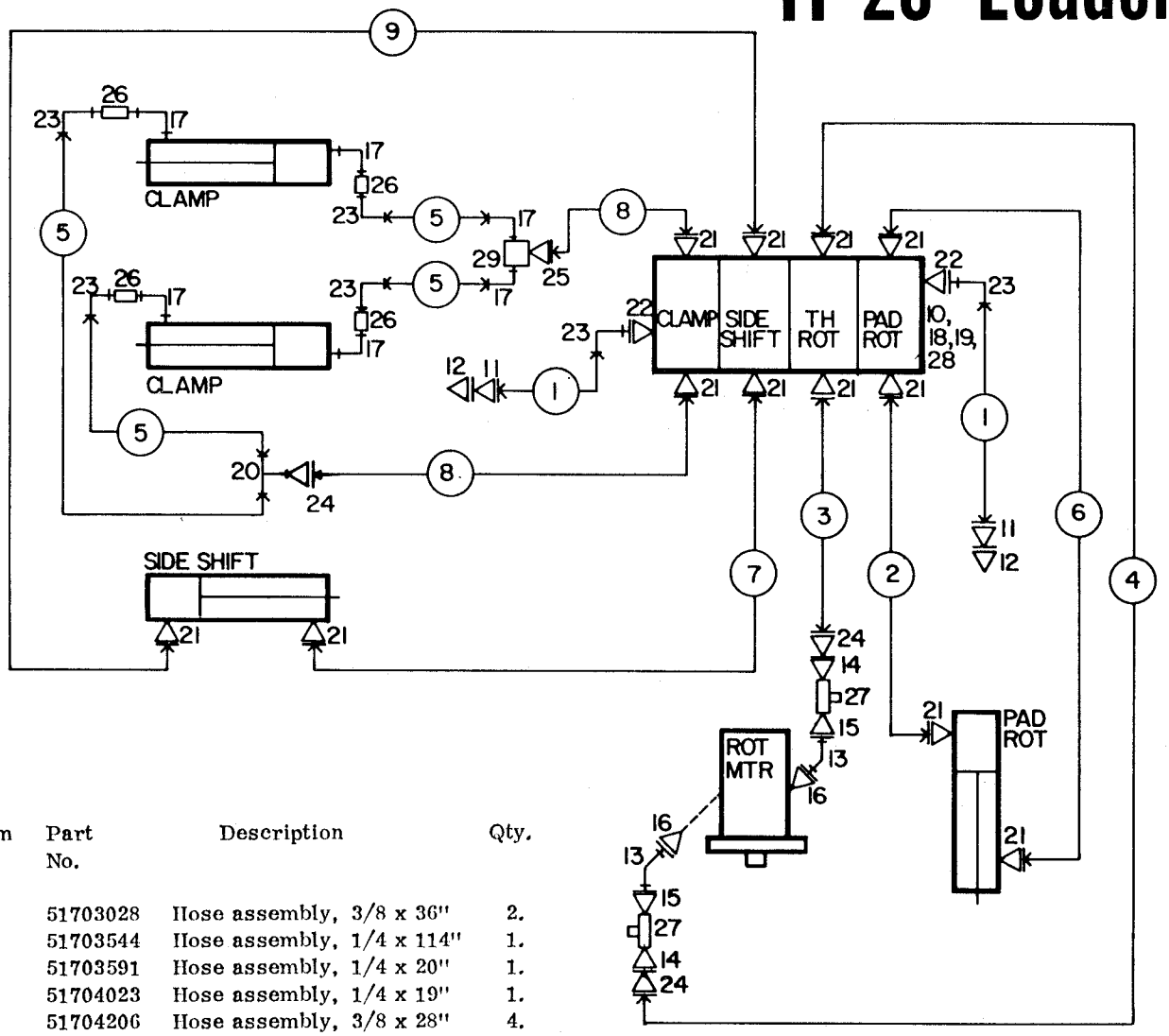
Item No.	Part No.	Description	Qty.
1.	4B160870	Case assembly	1.
2.	5G160870	Rod	1.
3.	6H020012	Head	1.
4.	6I020075	Piston	1.
5.	9B081012	Seal kit, (incl. 6-13)	1.
6.	6A025012	Ring, Wafer-lock (part of 5)	1 Ref
7.	7Q072129	O-ring (part of 5)	1 Ref
8.	7Q072224	O-ring (part of 5)	1 Ref
9.	7Q10P224	Ring, Back-up (part of 5)	1 Ref
10.	7R14P012	Wiper, Rod (part of 5)	1 Ref
11.	7R546012	Seal, Rod (part of 5)	1 Ref
12.	7T61N075	Seal, Lock ring (part of 5)	1 Ref
13.	7T66P020	Seal, Piston (part of 5)	1 Ref

Figure E-6. Sideshift Cylinder (Part Number 3B160870)



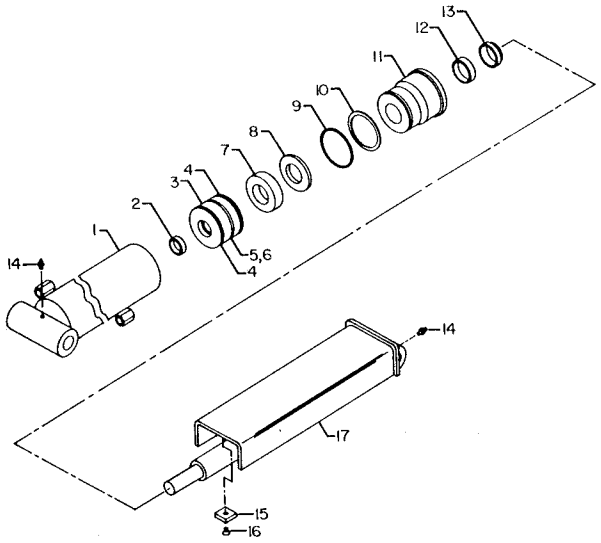
Item No.	Part No.	Description	Qty.
1.	73054004	Valve	1.
2.	72060708	Screw, 1/4-20 x 1 1/4 SH	6.
3.	4B309511	Case assembly	1.
4.	7T61N087	Seal, Lock ring	1.
5.	6I025087	Piston	1.
6.	7Q072137	O-ring	1.
7.	7T66P025	Seal, Piston	1.
8.	6C057015	Tube, Stop	3.
9.	6A025015	Ring, Wafer lock	1.
10.	7Q072228	O-ring	1.
11.	7Q10P228	Ring, Back-up	1.
12.	6H025015	Head	1.
13.	7R546015	Seal, Rod	1.
14.	7R14P015	Wiper, Rod	1.
15.	4G309510	Rod assembly	1.
16.	7PNPXT02	Plug, 1/8 npt NS	4.
17.	9B101214	Seal kit, (incl. 4, 6, 7, 9, 10, 11, 13, 14)	Ref

Figure E-7. Clamp Cylinder (Part Number 3B309511C)



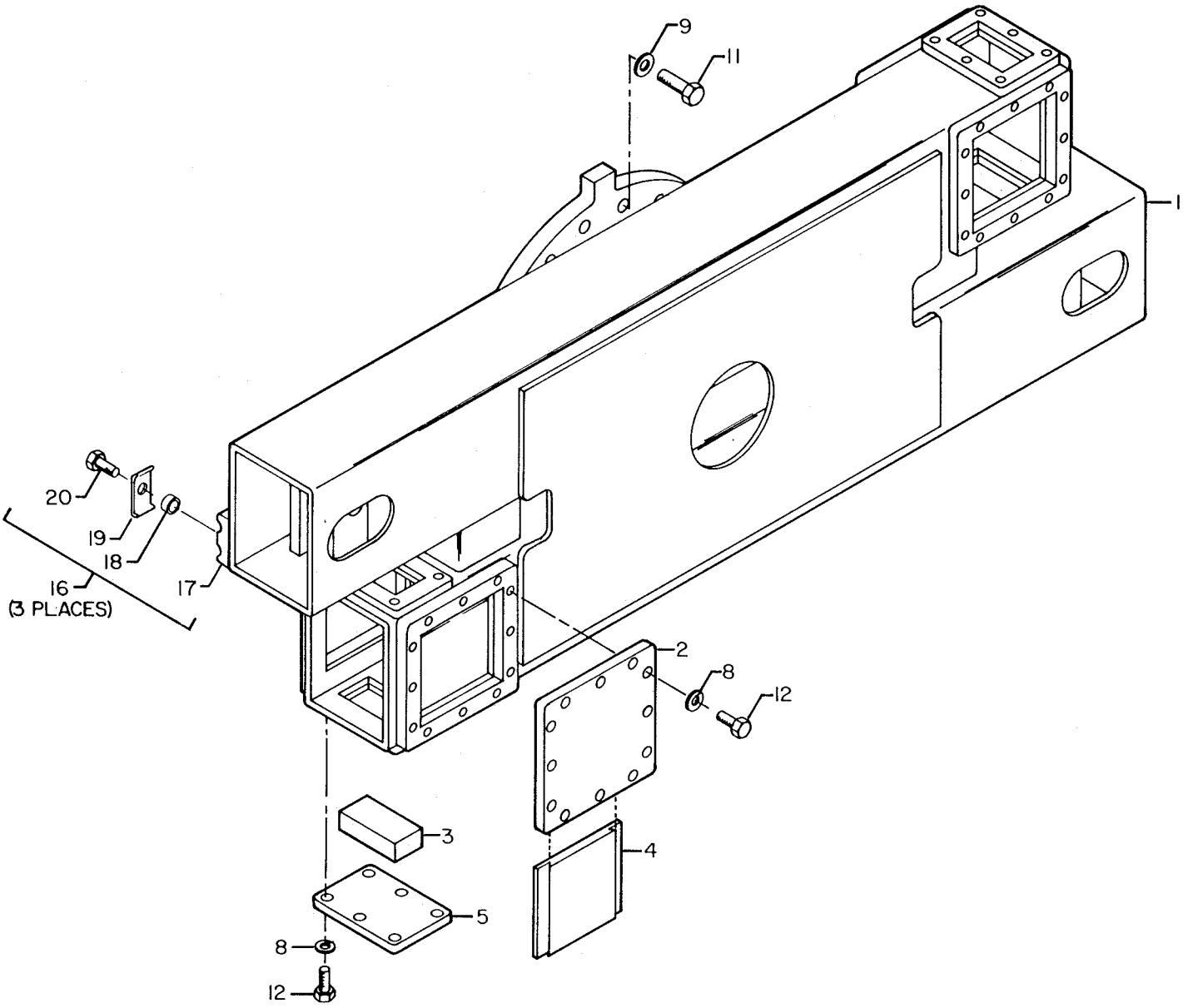
Item No.	Part No.	Description	Qty.
1.	51703028	Hose assembly, 3/8 x 36"	2.
2.	51703544	Hose assembly, 1/4 x 114"	1.
3.	51703591	Hose assembly, 1/4 x 20"	1.
4.	51704023	Hose assembly, 1/4 x 19"	1.
5.	51704206	Hose assembly, 3/8 x 28"	4.
6.	51705364	Hose assembly, 1/4 x 128"	1.
7.	51705732	Hose assembly, 1/4 x 52"	1.
8.	51705733	Hose assembly, 1/4 x 24"	2.
9.	5170 6233	Hose assembly, 1/4 x 43"	1.
10.	60025661	Valve block, Selector	1.
11.	72053540	Coupler-disc, 3/8 npt (f)	2.
12.	72053542	Nipple-disc, 3/8 npt (f)	2.
13.	72053563	Elbow, Street stl. 3/8 x 45°	2.
14.	72053670	Adapter, 3/8 npt (m) x 3/4 JIC (m)	2.
15.	72053723	Adapter, 3/8 npt (m) x 3/8 npt (m)	2.
16.	72053743	Adapter, 7/8 str. thd. (m) x 3/8 npt (f)	2.
17.	72053763	Elbow, 3/4 str. thd. (m) x 3/4 JIC (m) 90°	6.
18.	72060033	Cap screw, 5/16-18 x 3 Gr 5	2.
19.	72063002	Washer, Wrought, 5/16	2.
20.	72531205	Tee, 3/4-16 JIC (m) x 1/2 tube	1.
21.	72532351	Adapter, 7/16 str. thd (m) x 7/16 JIC (m)	12.
22.	72532358	Adapter, 3/4 str. thd. (m) x 3/4 JIC (m)	2.
23.	72532658	Elbow, 3/4 JIC (m) x 3/4 JIC (f) swivel	6.
24.	72532665	Adapter, 7/16 JIC (m) x 3/4 JIC (f)	3.
25.	72532792	Adapter, 3/4 str. thd. (m) x 7/8 JIC (m)	1.
26.	72532980	Pressure switch, 3/4 JIC (f) in-line	2.
27.	73054139	Valve, Needle, 3/8 npt (f)	2.
28.	73054613	Valve, Solenoid	4.
29.	73054614	Flow Div. /Comb.	1.

Figure E-8. Hydraulic Kit



Item No.	Part No.	Description	Qty.
1.	4C022850	Case assembly	1.
2.	7T61N106	Seal, Lock ring	1.
3.	6I030106	Piston	1.
4.	7T65I030	Ring, Piston	2.
5.	7Q072145	O-ring	1.
6.	7T66P030	Seal, Piston	1.
7.	6C075015	Tube, Stop	1.
8.	6A025015	Ring, Wafer lock	1.
9.	7Q072334	O-ring	1.
10.	7Q10P334	Ring, Back-up	1.
11.	6H030015	Head	1.
12.	7R546015	Seal, Rod	1.
13.	7R14P015	Wiper, Rod	1.
14.	72053508	Zerk, 1/8	2.
15.	5F022850	Wear pad	1.
16.	72060868	Screw, 1/4-20 x 1/2 FlHd	1.
17.	4G022850	Rod assembly w/protector	1.
18.	9C121217	Seal kit, (incl. 2, 4-6, 8-10, 12, 13)	Ref

Figure E-9. Rotation Cylinder (Part Number 3B022850)



Item No.	Part No.	Description	Qty.
1.	52705518	Body	1.
2.	52705519	Retaining plate, Wear pad	4.
3.	60030110	Wear pad, 2 x 4 x 1 3/32	4.
4.	60030111	Wear pad, 1/2 x 5 7/8 x 5 1/2	4.
5.	60108419	Retaining plate, Wear pad	4.
6.	70029119	Placard, Ser. Nbr. NS	1.
7.			
8.	72063053	Lockwasher, 1/2	72.
9.	72063127	Washer, Flat 5/8	18.
10.	72661216	Gripnail, 1/8 NS	2.
11.	72601481	Cap screw, 5/8-11 x 2 F-911	18.
12.	72601272	Cap screw, 1/2-13 x 1 1/8 Gr 8	72.
13.			
14.			
15.			
16.	51704014	Hose clamp assembly, (part of 1) (incl 17-20	3Ref
17.	60106741	Body-clamp, (part of 16)	3Ref
18.	60106742	Spacer-clamp, (part of 16)	3Ref
19.	60106744	Bar-clamp, (part of 16)	3Ref
20.	72060093	Cap screw, 1/2-13 x 1 1/2 Gr 5, (part of 16)	3Ref

Figure E-10 Body (Part Number 40705522)

Section 6. REPAIR

To repair the cylinders and control valves, refer to Volume 1, Operation, Maintenance and Repair of the crane manual.

1. Paragraph 3-2 lists some of the precautions that are necessary when working on the hydraulic system.

2. Paragraphs 3-2-1-4 and 3-2-1-5 provide instructions on cylinder disassembly and repair.

3. Paragraph 3-2-3 provides instructions on control valve repair.

4. Paragraph 3-3 pertains to bearing and bushing removal and installation. When using these instructions, substitute the word "TIREHAND" for the word "crane".

In all cases, pay particular attention to the CAUTIONS and WARNINGS contained in those paragraphs.