IMTCO

1230 WALLBOARD CRANE

JUNE 1977

1100 st	Aug. 77	1005 Oct 86
2150 nd	Feb. 78	
3010 rd	Oct. 79	
4010 th	May 80	
5010 th	Jan. 83	
6005 th	Aug. 83	
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9010 th	Mar. 86	

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INTRODUCTION

This manual is provided to acquaint you with the operation of your IMTCO 1230 Wallboard truck mounted, articulating hydraulic crane and supply you with the information necessary for proper equipment maintenance.

The service life, performance and efficiency of the unit depends upon close adherence to operation and service procedures described in this manual. Operators of this unit and those responsible for service should thoroughly familiarize themselves with these maintenance instructions.

If information is required which is beyond the scope of this manual, please contact your IMTCO distributor or the IMTCO Customer Service Department.

When placing parts orders or requesting assistance please refer to the information below.

TO BE COMPLETED BY DEALER

Chassis Information

Make_____ Model_____ Serial No._____

Transmission Model_____ Serial No._____

P.T.O. Ratio_____ Make_____

Crane and Pump Information

Crane Serial No._____ Model_____ Selector Valve_____

Pump Make_____ Model_____ Serial No._____

Accessories and Options_____

_____

_____

WARRANTY

PRODUCTS MANUFACTURED BY IOWA MOLD TOOLING CO., INC. ARE WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP, UNDER PROPER USE, APPLICATION AND MAINTENANCE IN ACCORDANCE WITH IMTCO'S WRITTEN RECOMMENDATIONS, INSTRUCTIONS AND SPECIFICATIONS, FOR A PERIOD OF NINETY (90) DAYS FROM THE DATE OF SHIPMENT TO THE END USER. IMTCO'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO, AND THE SOLE REMEDY FOR ANY SUCH DEFECT SHALL BE THE REPAIR OR REPLACEMENT (AT IMTCO'S OPTION) OF UNALTERED PARTS RETURNED TO IMTCO, FREIGHT PREPAID, AND PROVEN TO HAVE SUCH DEFECT, PROVIDED SUCH DEFECT OCCURS WITHIN THE 90 DAY WARRANTY PERIOD AND IS REPORTED WITHIN FOURTEEN (14) DAYS OF ITS OCCURENCE.

THIS IS THE ONLY AUTHORIZED IMTCO WARRANTY AND IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS, OR OF ANY OTHER OBLIGATIONS ON THE PART OF IMTCO. WARRANTY CLAIMS MUST BE SUBMITTED AND SHALL BE PROCESSED IN ACCORDANCE WITH IMTCO'S ESTABLISHED WARRANTY CLAIM PROCEDURE. IN NO EVENT WILL IMTCO BE LIABLE FOR BUSINESS INTERRUPTIONS, LOSS OF SALES AND/OR PROFITS, PERSONAL INJURY, COSTS OF DELAY OR FOR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSSES, COSTS OR DAMAGES.

OPERATION INFORMATION

CRANE IDENTIFICATION

Every IMTCO crane has an identification placard of the type shown below attached to its mast assembly. When ordering parts, communicating warranty information or referring to unit in correspondence always include the assigned serial and model numbers. All inquiries should be addressed to Iowa Mold Tooling Co., Inc. Garner, Iowa 50438 or telephone (515) 923-2827.

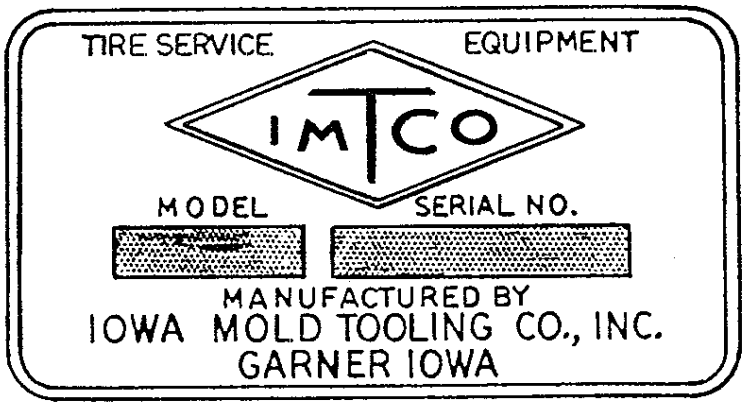


Fig. A-1

CONTROL INFORMATION

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 depressed.

HAND BRAKE: Prior to unit operation the vehicle hand brake should be securely set.

C A U T I O N
Power Take-Off should always be disengaged before driving the vehicle

UNIT CONTROLS

This unit is equipped with outrigger controls located at the base on vehicle driver's side. Crane controls are located at crane seat position with a control placard as shown in Fig. A-2. Control operation is as follows:

SWING: Push for clockwise and pull for counter-clockwise rotation.

FORK: Push for downward and pull for upward motion.

MAIN: Push to lower and pull to raise.

SECONDARY: Push to lower and pull to raise.

FORK ROTATION: Push for counter-clockwise and pull for clockwise rotation.

EXTENSION: Push to extend and pull to retract.

STABILIZERS: Push to lower and pull to raise.

C A U T I O N
Prior to operating the crane, stabilizers must be lowered to a firm footing. The main boom must be raised to allow adequate clearance before any other crane function can be initiated.

CW	DOWN	DOWN	DOWN	CCW	OUT
SWING	FORK	MAIN BOOM	SECONDARY BOOM	ROTATION	EXTENSION BOOM
CCW	UP	UP	UP	CW	IN

Fig. A-2

1230 WALLBOARD CRANE GROUP

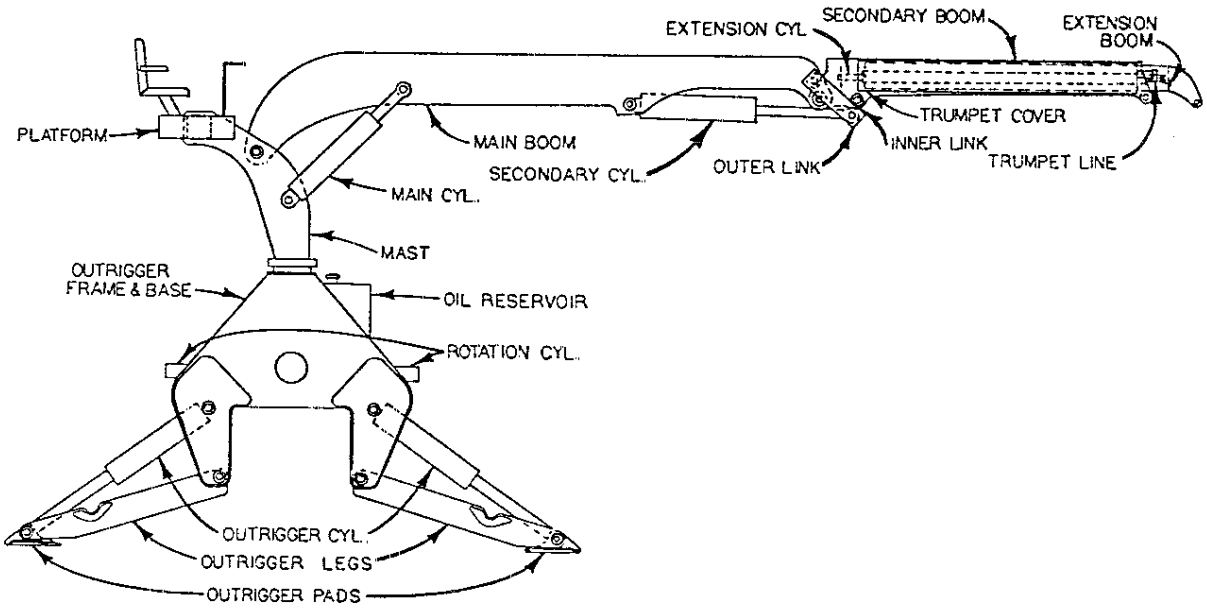


Fig. A-3

OPERATING INSTRUCTIONS

The IMTCO 1230 Wallboard 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 limitations, prescribed operating procedures and safety precautions applicable to the unit. In addition, simulated job operations should be performed by the operator before putting the unit to a work task. The operator's understanding of emergency measure execution is essential; he should be prepared to take remedial action at any time.

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 specified capacities. The safety precautions contained in this section should be read carefully and observed at all times during unit operation.

LOAD LIMITS

The IMTCO 1230 Wallboard crane is designed to give satisfactory service if operated within maximum allowable load specifications stated on the unit's capacity placard. Potentially serious safety hazards and shortened service life of the unit can be the results of overloading.

The capacity placard should be studied before lifting operations are carried out. Exceeding stated load limit for a given radius can cause tipping or structural failure.

Warranty of 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 IMTCO new machinery and equipment warranty will be valid with this unit.

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.

1. STRUCTURAL SOUNDNESS. Inspect unit for damaged members and loose nuts and bolts.

2. HYDRAULIC OIL SUPPLY. Check oil level in hydraulic reservoir and fill to dipstick "full" mark it it is low.

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

4. CONTROLS. Make short test for proper control operation.

5. 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 procedure.

WORK STATION POSITIONING

The optimum location for the working unit is on firm, level and dry pavement or ground in close job proximity. Overhead obstructions on the work side of the unit should be avoided a nearly as possible.

Wheel chocks should be used when parking unit on a slope. If parking on curbed roadway, turn front wheels toward curb. At work site the vehicle should be parked with the grade. When across grade parking is necessary, restricted operation will be required to compensate for increased tipping risk due to the shortened fulcrum point of stabilizers.

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 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.

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

BEGINNING OPERATION

To initiate unit operation:

1. Choose a unit operating location with two factors considered. The vehicle position should permit, if possible, total task performance without repositioning and the terrain should be firm, dry and level for proper stabilization throughout the operation.

2. Securely set the truck hand brake and set any auxiliary device, if supplied. Adjacent to curbing, turn front wheels in to further secure the vehicle. Wheel chocks should be firmly placed.

3. Shift truck into neutral, keep clutch depressed if transmission is mechanical and pull out the power take-off knob to engage the system.

4. Accelerate engine to proper operating speed using the optional throttle control; electric or hydraulic.

5. Allow the system to idle at operating speed with all controls at neutral until the hydraulic system reaches operating temperature. Hydraulic reservoir should be warm to touch.

6. Outriggers should be extended until firm ground contact is made. Do not hold controls open to point of jacking action. When stabilizing the unit on soft ground bearing pads should be used to retard sinking and provide blocks to insure firm contact when operating on sloping terrain. Correct all defects in stabilization system before continuing.

W A R N I N G
Do not operate crane until the vehicle is firmly stabilized.

7. Several precautions should be taken in actuating the hydraulic controls on the unit. Before actual work begins put each control through one complete test cycle. To prevent shock loading no control operation should begin with a full open position. Sudden stops and starts stress equipment unduly and can shorten equipment life. When maximum speed is desired controls should be actuated slowly and acceleration achieved smoothly.

ENGINE SPEED REGULATION

It is important to understand all units with manual controls are equipped with dual pumps having an optimum oil flow of 16 and 16 GPM @ 2300 psi. These pumps will be sized and supplied as per vehicle transmission requirement. The following information pertains to units having optional electrical controls.

The speed of the hydraulic pump dictates the speed of the operating unit. In order for the unit to function at speeds stated in the specifications the pump must operate at optimum speed.

To determine the engine speed required for operation, the pump requirement - optimum - is divided by engine to PTO ratio of the truck. When the engine to PTO ratio is not known, this informatio

may be obtained from a local IMTCO dealer or distributor or IOWA MOLD TOOLING CO., INC. direct. To find the ratio it will be necessary to know the PTO and transmission model numbers as well as the make, model and year of the truck. When this information is obtained, compute the proper engine speed as shown in the following examples:

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

PUMP SIZE	RECOMMENDED PTO RATIO	
13 GPM	100% to 140%	$\frac{\text{Optimum Speed (2000 RPM)}}{100\% \quad (1.00)}$ =2000 RPM
17 GPM	75% to 100%	$\frac{\text{Optimum Speed (1500 RPM)}}{75\% \quad (.75)}$ =2000 RPM
24 GPM	55% to 75%	$\frac{\text{Optimum Speed (1100 RPM)}}{55\% \quad (.55)}$ =2000 RPM

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 tachometer with accurate calibration may be used to check engine speed.

LOAD LIFTING

Capacity placards are located on unit mainframe near the operator stations. The structural capacities and permissible radii of operation stated on these placards should be carefully studied and strictly adhered to during equipment operation.

NOTE: Capacity placards are specifically located for close proximity to the operator. This is to assure ready reference in determining when a load can or cannot be handled.

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

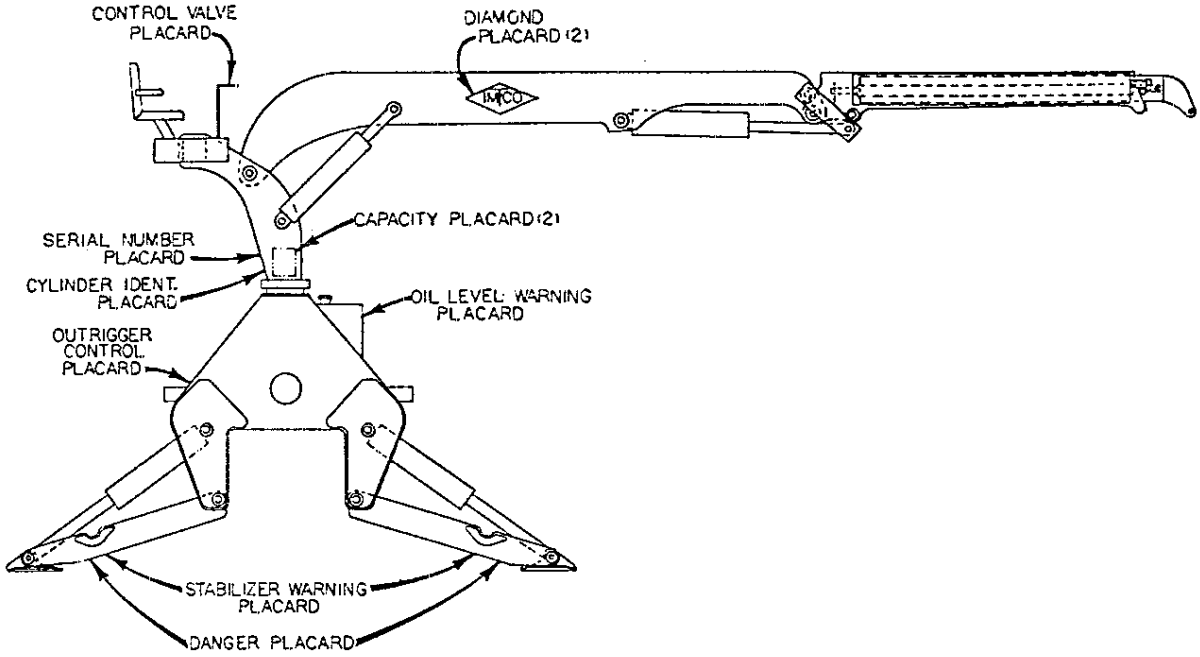
It is implicit in all load ratings that the following conditions have been met:

1. The unit has been correctly installed on a factory approved 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.

It should be understood that each stated capacity is directly related to the radius of a given operation. The radius is measured from center of rotation to load line on the horizontal plane.



PLACARD PLACEMENT

Fig. A-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 specifications.

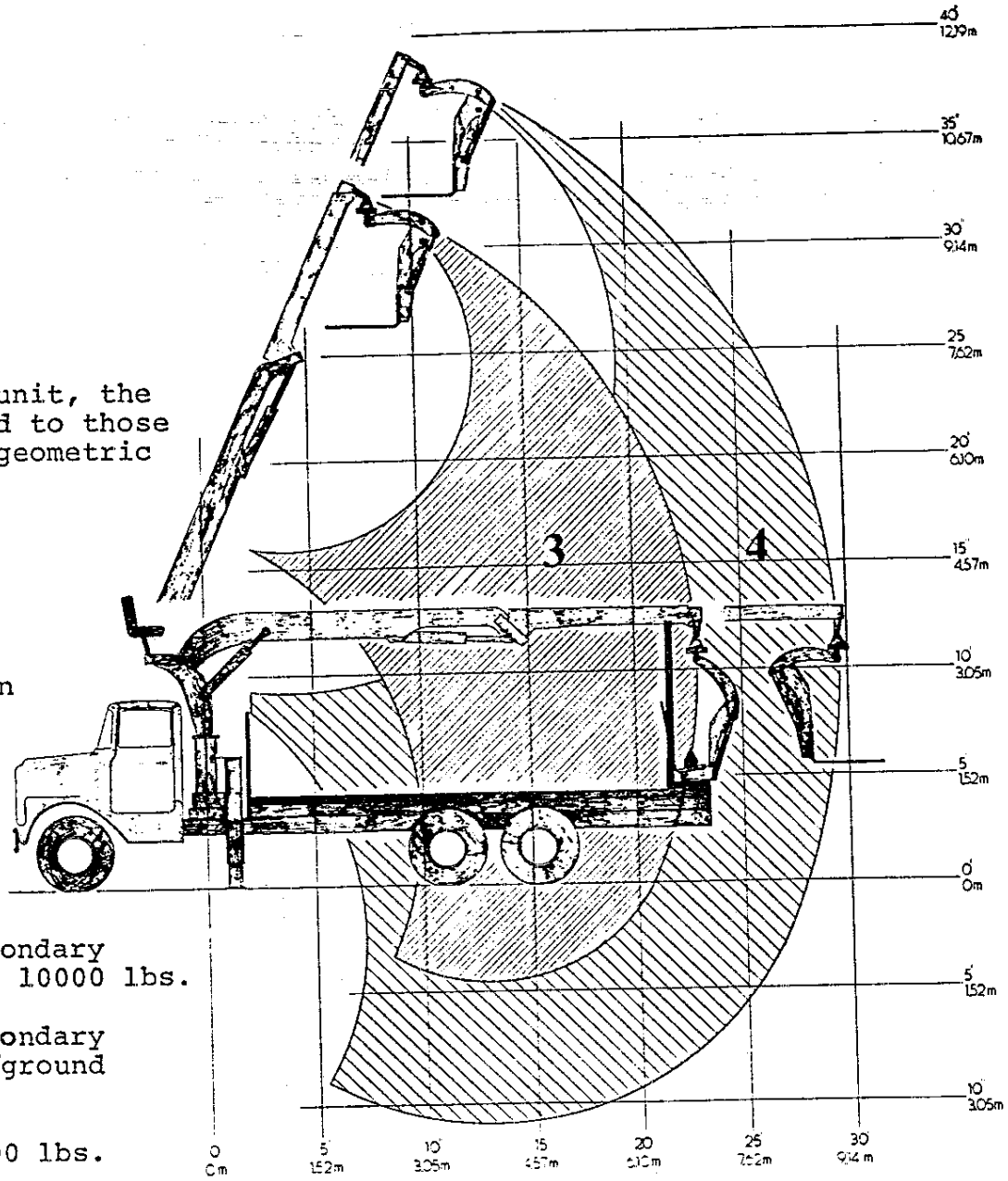
2. Factory installation instructions are adhered to when unit is mounted on vehicle.

3. Counter weight sufficient to supplement vehicle weight has been installed and meets factory requirements.

4. Tire inflation pressures meet requirements stipulated in "Tire Inflation Table".

LOAD CAPACITY CHART

When operating the unit, the load will be limited to those shown within their geometric ranges.



Live load at boom position

1. Lower boom w/secondary at less tha 90°. 10000 lbs.
2. Lower boom w/secondary perpendicular w/ground 8400 lbs.
3. Extension in 5100 lbs.
4. Extension out 4250 lbs.

* Loads include Fork Weight of 1000 lbs.

Fig. A-5

5. The outriggers are in use, making proper contact with firm level footing.

The "Load Capacity Chart" ratings depend upon compliance with the curb weights coupled with truck size. Adherence to minimum chassis specifications and/or requirements is necessary to obtain and maintain safe stabilization.

STABILITY CHART

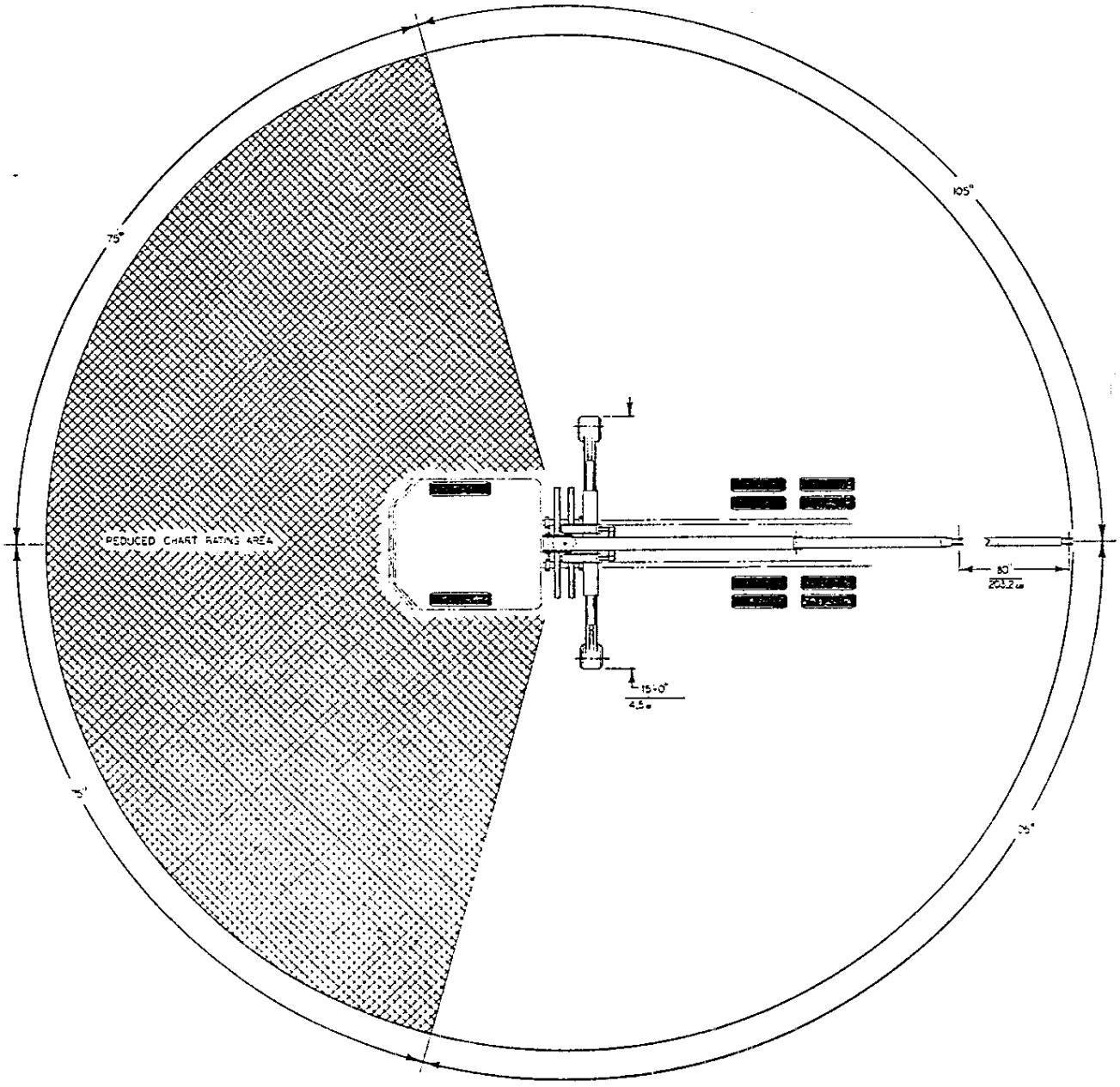


Fig. A-6

W A R N I N G
The minimum curb weights shown do not insure the unit will be stable. Actual stability ratings will be obtained from the initial start up and testing procedures.

CONVENTIONAL CAB

Stability rating for an IMTCO 1230 Wallboard crane mounted on a conventional chassis with a 238" wheel base and a 172" cab-to-axle dimension shown below. These specifications will provide complete 360° rotation stability based upon 85% tipping factor without capacity chart restrictions. Required axle weights are as follows:

Front Axle	11,000 lbs.
Rear Axle	15,100 lbs.
Total Weight	26,100 lbs.

OPERATION SHUT DOWN

Proper shut down procedure is:

1. Stow the crane to the rear, centered over chassis.
2. Retract the outriggers.
3. Disengage the power take-off prior to travel.

SPECIFICATIONS & OPERATING CHARACTERISTICS

REACH - (From Centerline Rotation)	(9.22 m)	30'-3"
EXTENSION	(203.2 cm)	80"
LIFTING HEIGHT	(10.82 m)	33'-6"
WEIGHT OF CRANE	(4218 kgs)	9300#
OUTRIGGER SPAN	(4.6 m)	15'-0"
OPTIMUM PUMP CAPACITY	(60.6 & 60.6 l)	16 & 16 US
OIL RESERVOIR CAPACITY	(148 liters)	39 US
MOUNTING SPACE REQ'D	(90.2 cm)	35½"
STORAGE HEIGHT	(3.89 m)	12'-9"

(Based on 41" (104.1 cm) truck frame height).

DESIGN FACTORS

Materials	3/1
Pins & Hydraulics	4/1

*PERFORMANCE CHARACTERISTICS

ROTATION - (360°)	30 Sec.
MAIN BOOM ELEVATION - (-28° to +66°)	30 Sec.
SECONDARY BOOM ELEVATION - (165°)	19 Sec.
EXTENSION - (80")--(203.2 cm)	11 Sec.
OUTRIGGER EXTENSION	10 Sec.

LIFTING CAPACITY

(From Centerline Rotation)

(2.74 m)	9'-0"	6350 kg	14,000#
(3.96 m)	13'-0"	4536 kg	10,000#
(4.34 m)	14'-3"	3810 kg	8,400#
(6.96 m)	22'-10"	2313 kg	5,100#
(9.22 m)	30'-3"	1928 kg	4,250#

The above listed ratings will be less 1000# (454 kgs) when Wallboard Fork attachment is employed.

HYDRAULIC SYSTEM

Open centered, full pressure system that requires 16 & 16 GPM (60.6 & 60.6 liters) optimum pump oil flow @ 2300 psi (161.7 kgs/sq. cm). Six spool stack type control valve with tandem split flow section provided at seat control and outrigger controls are located at a base station. System includes - hydraulic oil reservoir, two suction line filters, tandem pump, control valve, return line filter.

POWER SOURCE

Integral mounted hydraulic pump and PTO application. Other standard power sources may be utilized.

NOTE: * Times specified for performance characteristics are optimum conditions and may vary due to carrying vehicles optional transmission equipment.

CYLINDERS

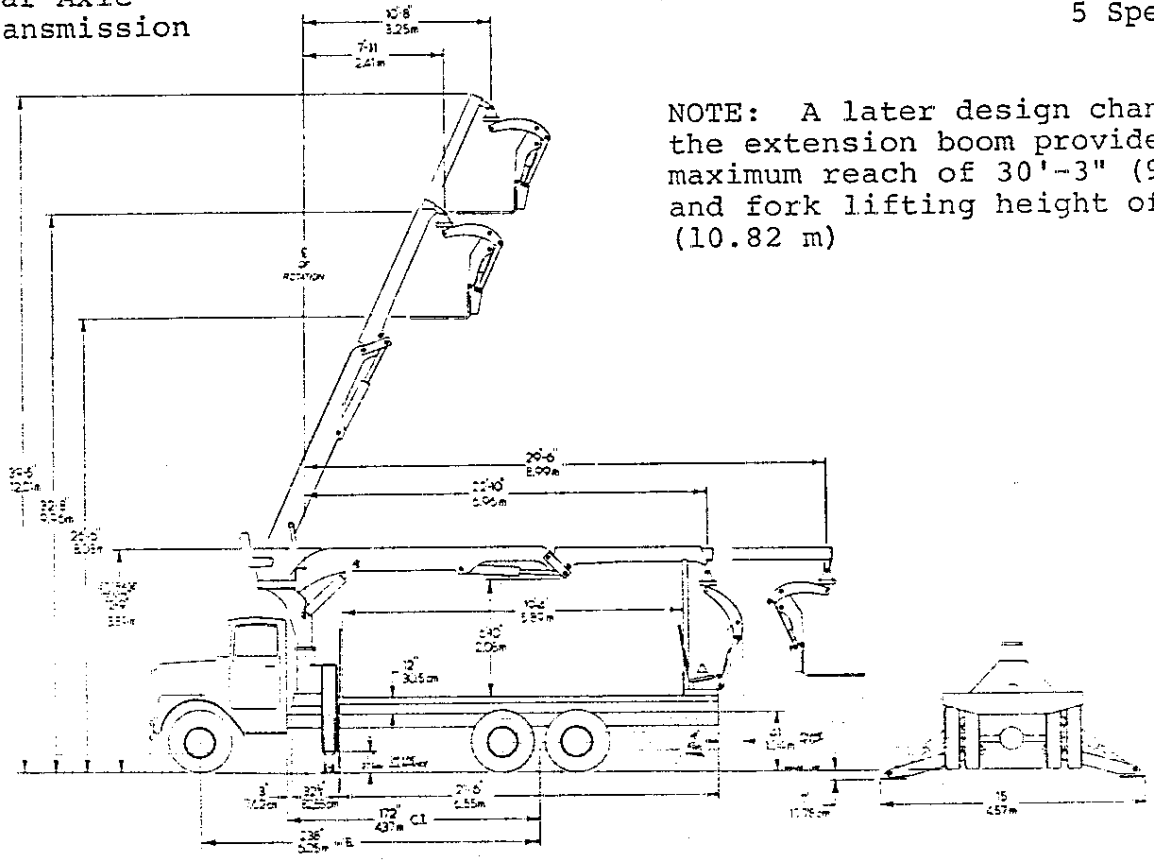
MAIN	(15.2 cm)	6" Bore	(64.8 cm)	25½" Stroke
SECONDARY	(16.5 cm)	6½" Bore	(69.9 cm)	27½" Stroke
EXTENSION	(7.6 cm)	3" Bore	(203.2 cm)	80" Stroke
OUTRIGGERS	(16.5 cm)	6½" Bore	(71.8 cm)	28¼" Stroke
ROTATION	(10.2 cm)	4" Bore	(76.8 cm)	30¼" Stroke

ROTATION SYSTEM

Rack and pinion style with power supplied by four single acting hydraulic cylinders, two for each direction.

MINIMUM CHASSIS SPECIFICATIONS

Body Style	Conventional Cab	
Wheel Base	(605 cm)	238"
Cab to Axle	(437 cm)	172"
Frame Section Modulus	(426 cc)	26 cu. in.
R B M	(19,178 kgs-m)	1,664,000 in/lbs
Front Axle	(4990 kgs)	11,000 lbs.
Rear Axle	(15,422 kgs)	34,000 lbs.
Transmission		5 Speed



NOTE: A later design change of the extension boom provides a maximum reach of 30'-3" (9.22 m) and fork lifting height of 33'-6" (10.82 m)

Fig. A-7

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

OPTIONAL EQUIPMENT

OPTIONAL REMOTE CONTROL UNIT

An optional remote control unit includes a 35' (10.7 m) umbilical cord and plug assembly which allows removal and storage to provide security when unit is unattended. Fig. B-1 shows unit control placard which illustrates function operation. For hydraulic schematic see Fig. D-11, page 4-15 and electrical schematic, see Fig. C-8, page 3-9.

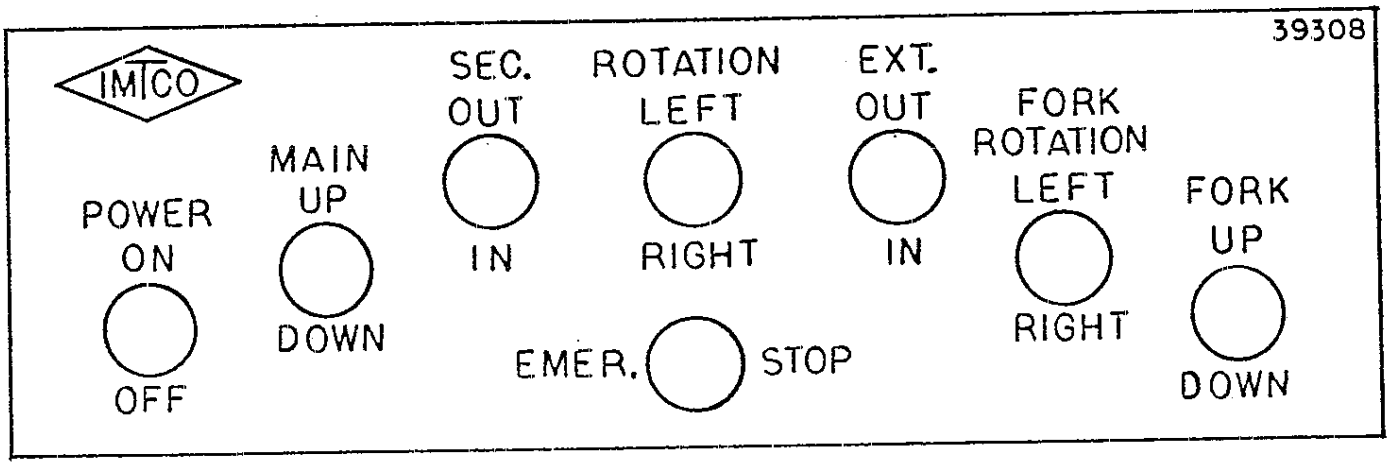


Fig. B-1

HAND THROTTLE

A vernier type hand throttle control can be mounted so that an operator will have access from control valve side of the crane. Counterclock-wise adjustment of the control knob slowly increases truck engine speed to desired level. Deactivation is accomplished by pushing button located at knob's center.

HYDRAULIC THROTTLE CONTROL

Engine acceleration is accomplished by hydraulic pressure derived from main pressure hose leading from pump to crane control valve. Upon actuation of a crane function the throttle control will be automatically engaged, raising the engine speed to a predetermined rate. This option will not be supplied on diesel engines unless they are equipped with a variable governor system.

ELECTRIC THROTTLE CONTROL

An electric throttle control can be employed with a 1230 Wallboard crane. The throttle will be increased to a predetermined speed by actuation of an electric solenoid connected to vehicle accelerator linkage. This option will not be supplied on diesel engines unless it is equipped with a variable governor system.

400° ROTATION

400° rotation system is available in place of standard 360° rotation. This option is especially desirable for rear mounted units. Parts necessary for this option are shown in Fig. D-7, page 4-7.

HIGH GROUND CLEARANCE OUTRIGGER ASSEMBLY

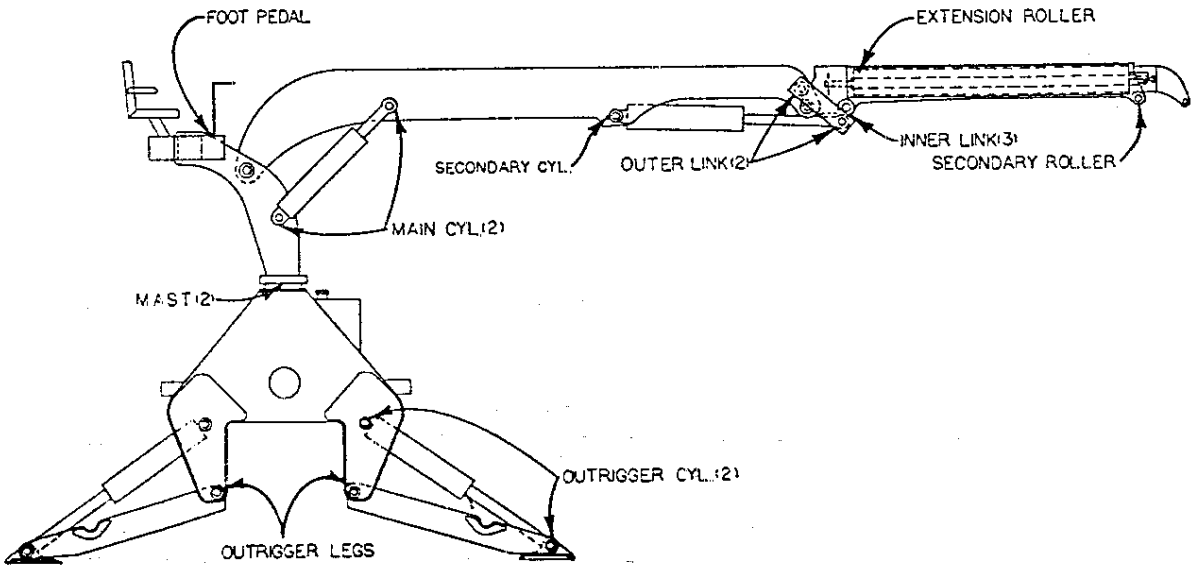
Outriggers providing 6" more ground clearance than those specified on page 1-11, are available as an option on original equipment only. This option is required on rear mounted units.

MAINTENANCE

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

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.



LUBRICATION CHART

Fig. C-1

LUBRICATION CHART			
APPLICATION POINT	LUBRICATION PRODUCT	APPLICATION MEANS	INTERVAL
MAST HOUSING	Shell Alvania 2EP or Shell Retinax "A" or equivalent	Hand grease gun or pneumatic pressure gun	Monthly
MAIN & SECONDARY CYLINDERS			
MAIN, SECONDARY & OUTRIGGER PINS			
EXTENSION BOOM ROLLERS			
FORK PINS			
POWER TAKE-OFF OR TRANSMISSION	EP 90 Gear Oil	Fill to check plug	Monthly
ROTATION GEAR CASE			

HYDRAULIC SYSTEM

OIL SELECTION: Minimum viscosity specifications for hydraulic oil to be used in the IMTCO 1230 Wallboard crane are given in the table provided in this section. Any major oil company can supply products which meet these requirements.

Oils selected by user for 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

OIL SPECIFICATIONS: The chart on the following page 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 given individual analysis. Consult your oil supplier for the proper fluids for working under these severe conditions. In addition, electric hydraulic oil reservoir heaters are available to improve operations at extremely low temperatures.

HYDRAULIC OIL SPECIFICATIONS				
Ambient Temperature Range, ^{o}F	0-90	Below 32	32-90	Above 90
Max. Pour Point, ^{o}F	-30	-25	+10	+10
Max. Viscosity, SSU @ $0^{o}F$	4000	4000	-	-
Min. Viscosity, SSU @ $100^{o}F$	140-195	100-130	150-200	200-315
Min. Viscosity, SSU @ $210^{o}F$	48	41	43	47
Min. Viscosity Index	139	90	90	90

HYDRAULIC OIL DETERIORATION

Contamination by entry of solvents, water and dust or other abrasives will cause deterioration of the system's hydraulic oil. Sustained presence of these impurities will result in premature breakdown in antifoam, lubrication, anti-rust and viscosity properties. An increase in the oil oxidation rate will result from water and operation at high temperatures (above $180^{o}F$). Oxidation produces varnish forming materials and sludge in the oil.

The hydraulic system which is operated on a sustained basis with contaminated or broken down oil will be subject to an increased component wear rate which can significantly shorten the efficient unit life.

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

1. Place oil sample in clean glass.

2. Smell oil to detect a burnt or rancid odor.

3. Visually examine the sample for a cloudy or dark color.

4. After a standing period of several minutes, inspect sample for water which will settle to the bottom of glass if present. Water can result from a system leak or condensation due to temperature extremes.

When any condition described above is observed, the system should be purged and filled with new oil.

The hydraulic oil should be changed in the reservoir and complete system:

1. After every 800 hours of operation or every six months, which ever occurs first.

2. After pump or other major hydraulic omponent failure

HYDRAULIC SYSTEM PURGING

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

In purging, new oil is supplied to the pump pressure line and an escape flow is provided for old oil from the reservoir return line.

Two operators will be required, one to operate the controls and another to regulate pump flow, during the follow procedure:

W A R N I N G
During this operation do not allow reservoir level to drop below 1/3 capacity.

1. Initiate drainage by locating unit in an area which provides solid, level footing and space to accommodate full operating range of crane.

2. Extend outriggers out and down to full stroke. Move crane to maximum, extended, horizontal position on either side and close fork to folded position. Kill engine.

3. Disengage PTO, drain hydraulic oil reservoir, remove suction line filter and drain hoses. Disconnect pressure hoses from pump, drain and reassemble. Install new cartridge and reassemble filter.

NOTE: Mode of waste disposal is left to the discretion of service personnel in this discussion of system drainage.

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

NOTE: Personnel should thoroughly familiarize themselves with the following steps and be prepared to perform them in uninterrupted sequence or stop engine at the end of each function. If this is not done, excessive new oil waste will occur.

5. Start truck engine and engage PTO. Rotate the crane full travel horizontally, retract extension boom, elevate main boom to full height and lower secondary boom to lowest position, open fork and rotate it three revolutions.

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

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

8. Check oil level and add oil to "full" mark if needed.

HYDRAULIC COMPONENTS

FILTER REPLACEMENT

This unit's hydraulic system contains two filters: a 25 micron suction line filter to strain out large contaminating particles and a 25 micron return line filter for removal of system particles. To avoid residue accumulation in the reservoir and protect hydraulic components - valves, pump, cylinders, etc. - these filters must be serviced on a regular basis.

The filters should be replaced after the first 50 hours of new unit operation and approximately every 200 service hours thereafter. In addition to this service schedule, the suction line filter is equipped with a danger coded vacuum gauge. This gauge should be checked daily when operating unit. If it reads 8 inches of mercury pull, the suction line filter must be replaced to be effective. When the suction line filter requires changing, the return line filter should also be replaced.

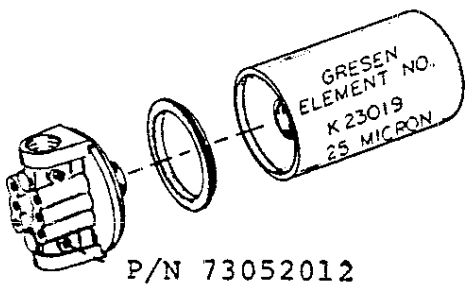
To change filter cartridges:

1. Shut gate valve and remove filter cartridges.

2. Replace with new cartridges insuring proper rubber seal seating and tightening as much as possible with both hands.

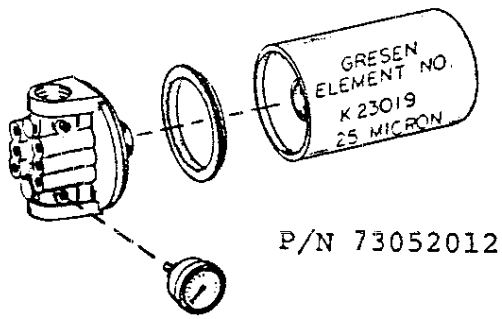
3. Open gate valve and test system for leaks.

W A R N I N G
Pump failure can result if shut-off valve is left closed.



RETURN FILTER

Fig. C-2



SUCTION FILTER

Fig. C-3

COUNTER BALANCE HOLDING VALVES

Each main and secondary cylinder is equipped with a counter balance holding valve, Fig. C-5. The function of this valve is to maintain component position in event of hydraulic failure and to meter oil flow for feathered motion while lowering under load.

This valve is not field repairable; it can be repaired and re-adjusted at the factory. Settings are 3,000 psi and 0.125" gap adjustment. If valve malfunction is suspected, it may be checked by the procedure outlined below:

1. Place boom in horizontal position subjected to any rated load; disengage PTO; actuate control handle and observe any boom drift. If drift occurs continue with step 2.

2. Place crane in a fully supported mode. Do this either by lowering secondary, main and extension booms until their respective cylinders are completely bottomed out or fully support suspected member by an overhead crane or other lifting device.

3. Be prepared for reasonable oil drainage from cylinder in question.

4. Remove cartridge valve and inspect internal porting for contamination.

5. Remove any contaminants and reinstall.

6. Repeat test described in item #1.

If drift occurs on second test one of two conditions may exist. The valve may be internally damaged, requiring replacement, or cylinder may have internal bypass.

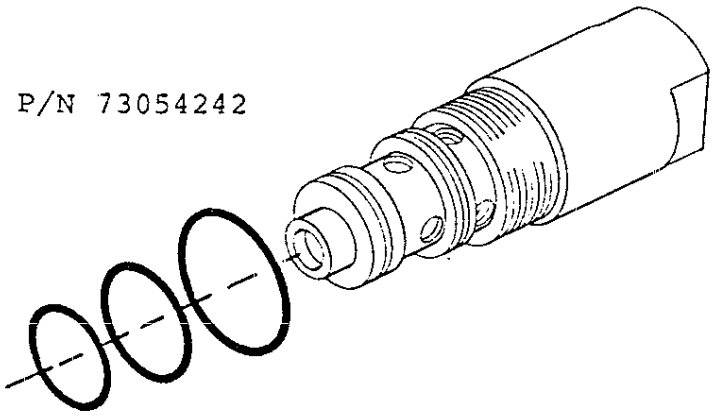


Fig. C-4

HOLDING VALVES

The fork, extension and outrigger cylinders are all equipped with locking holding valves. The function of these valves is to insure against extensive damage due to load release in the event of hydraulic hose or other down stream component failure.

These valves, as supplied, are of a nonadjustable, nonserviceable type. Little reason exists for failure of this type valve but if valve malfunction is suspected, it may be checked in the procedure outlined below:

1. Place crane in a fully supported mode. Do this either by lowering secondary, main and extension booms until their respective cylinders are completely bottomed out or fully support suspected member by an overhead crane or other lifting device.

2. Be prepared for reasonable oil drainage from cylinder in question.

3. Remove the six Allen head valve mounting cap screws.

4. Lift holding valve off, taking care not to loosen O-Ring seals and introduce dirt to cylinder base.

5. Check smallest end port for dirt plug and remove if necessary.

6. Using small screw driver carefully test actuate plunger through center port. If plunger is free, the valve should be operable.

7. Install new valve if it is required.

8. If old valve is to remain in use, reinstall taking care to insure O-Ring seals are placed properly and are dirt free. Also be sure small pilot port is located at rod end of cylinder.

9. Tighten six mounting bolts evenly.

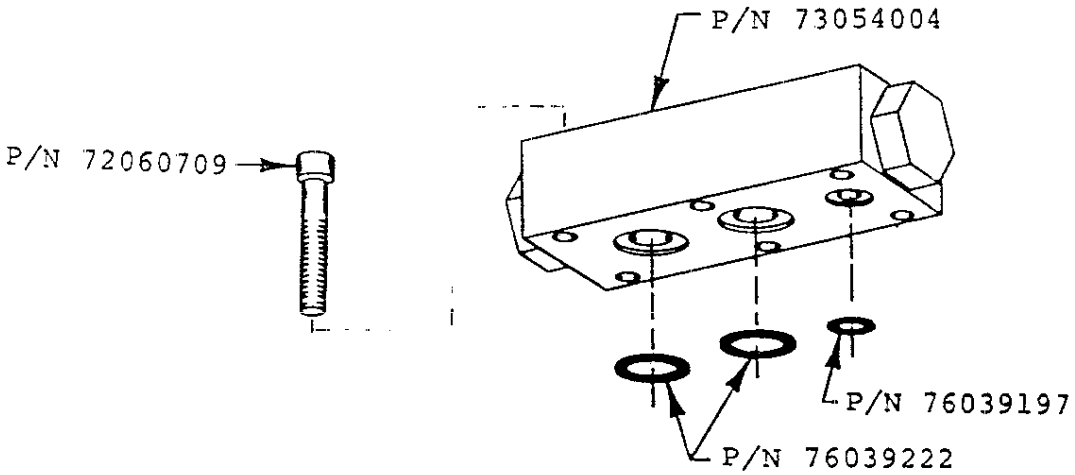


Fig. C-5

RELIEF VALVE ADJUSTMENT

The 1230 Wallboard crane hydraulic system is set to operate at 2350 to 2400 psi with an optimum oil flow of 16 plus 16 gallons per minute. If unit pressure is below specifications noted, the following procedure is recommended:

1. Engage PTO and set engine speed at rate required to provide 13 gallons per minute.

2. Read pressure on gauge located at main control valve.

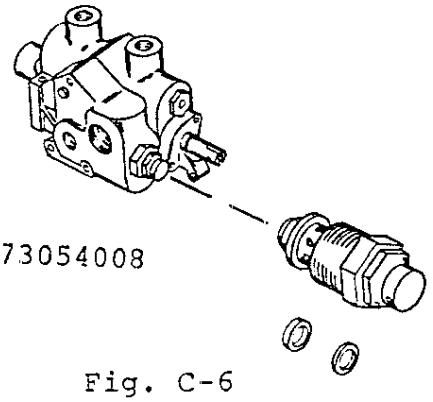
3. If low, shut off engine and remove relief plug. Install one 0.010 inch shim which will provide a 125 psi increase.

4. Reinstall relief valve plug and start engine. If pressure has not increased by the stated 125 psi increment, the malfunction indicates pump slippage.

5. If 125 psi increment is achieved, add shims required to bring pressure up to the required 2350 psi minimum.

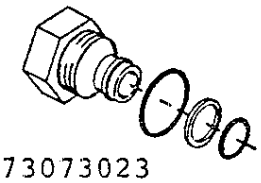
POWER BEYOND PLUG

Hydraulic power for an auxiliary function can be obtained by insertion of a power beyond plug as shown below: Remove Items #4 and #5 shown in figure D-19, page 4-33. Install plug taking care that two gasket seals are in place or function pressure will be lost. Install high pressure hose to auxiliary function control valve.



P/N 73054008

Fig. C-6



P/N 73073023

Fig. C-7

HYDRAULIC SCHEMATIC

Two hydraulic schematics are shown in the PARTS SECTION, page 4-11 and 4-15. Refer to the application that illustrates your unit and its options.

ELECTRICAL SCHEMATIC

Shown in Fig. C-8 below, is the Electric Schematic for the optional Electric Remote Control System.

PLUG PIN NO	WIRE COLOR	WIRE NO
1	BLACK/ORANGE	16
2	BLACK/GREEN	15
3	BLACK/RED	14
4	BLACK/WHITE	13
5	WHITE / GREEN	12
6	WHITE / BLUE	11
7	RED / BLACK	10
8	WHITE / RED	8
9	WHITE / BLACK	7
10	BLACK/BLUE	9
11	WHITE	2
12	RED	4
13	GREEN	5
14	ORANGE	6
15	BLUE	3
16	BLACK	1

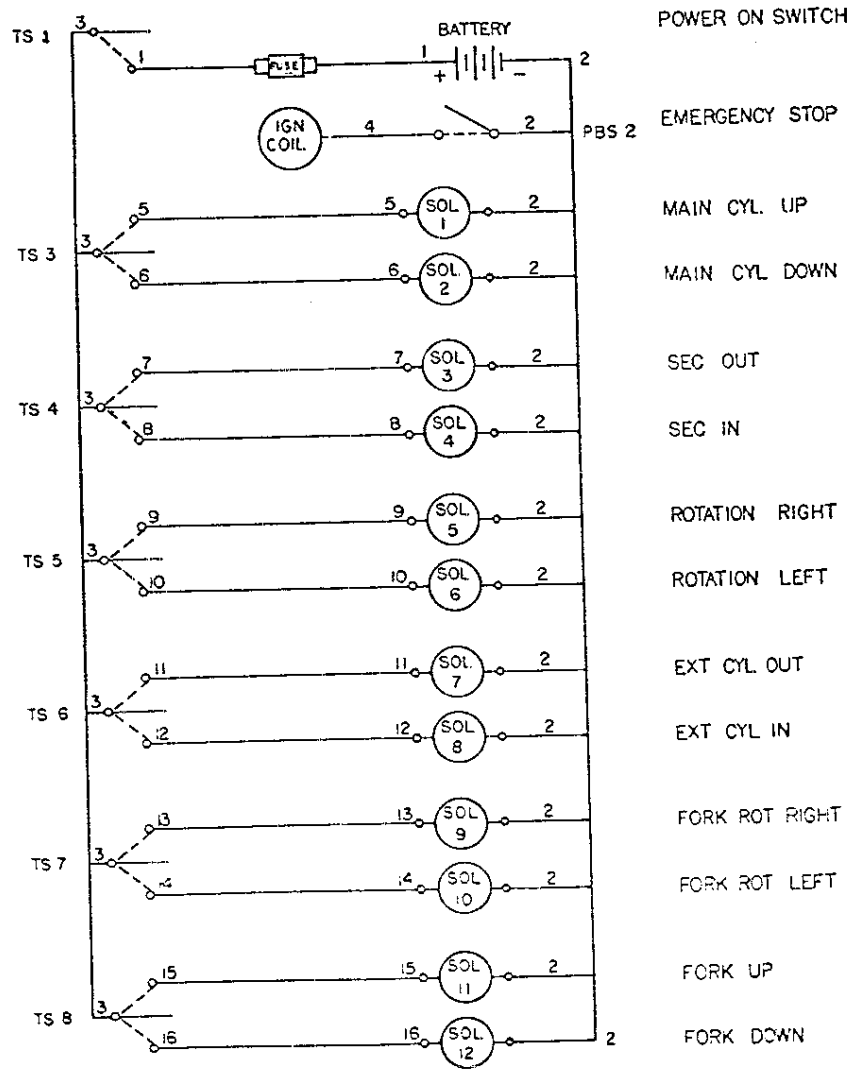


Fig. C-8

PREVENTIVE MAINTENANCE

The following inspection check list is designed to assist you in keeping the vehicle and crane unit is 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.

VEHICLE CHECK LIST				
Item	Description	Frequency		
		Daily	Weekly	Monthly
Battery	Inspect for correct fluid level. In hot, dry weather increase inspection frequency.		X	X
Engine Oil	Check for proper level. Make sure oil level on dipstick is above "add oil" mark.	X		
Brakes (Service & Parking)	Operate both systems to assure positive, efficient functioning.	X		
Radiator	Inspect coolant level. Check for antifreeze protection in cold weather.	X		
Safety Equipment Warning Signals & Lights	Inspect all devices and lights for proper operation.	X		
Suspension	Inspect for broken or weak springs.	X		
Tires & Wheels	Inspect tires for bruises, cuts and proper inflation. Check for loose wheel stud nuts, mud lumps or stones between dual wheels and bent wheels.	X		

UNIT CHECK LIST				
Walk Around Inspection	Visually inspect unit on all sides for hydraulic leaks, loose parts and obvious damage to external structural members.	X		

Items	Description	Frequency		
		Daily	Weekly	Monthly
Cylinders	Check securing pins on cylinders and booms for proper installation. Check for proper installation of bolts securing outrigger cylinders.			X
Hydraulic Hoses & Fittings	Inspect hose surfaces and metal and coupling junctions for oil leakage. Check outer hose coverings for blistering, excessive wear or flattening.	X		
Hydraulic Reservoir	With all cylinders retracted check fluid level in reservoir.	X		
Load Hook	Check load hook pin for proper installation. Inspect hook twist exceeding 10 degrees from normal opening. Check for throat opening spread exceeding 15 percent of normal.	X		
Mounting	Inspect and check torque. Permissible torque range requires 760 ft. lbs.			X
Oil Leaks	Inspect all valves and cylinders for signs of leakage.			X
Power Take-Off	Check for sufficient transmission lubrication. Check security of mounting bolts, leakage and correct alignment.		X	
Rotation System	Check for excessive back lash(play) in horizontal rotational stops. normal variation at the mast location is not to exceed 1/8-3/16 inch.		X	
Structural Damage	Inspect all structural members for broken welds or fatigue cracks. Check booms for structural defects such as bends, weld cracks or dents.			X

Item	Description	Frequency		
		Daily	Weekly	Monthl
Locking Valve	Conduct a holding test with loaded boom to assure proper operation of pilot actuated holding valve on main, secondary and extension.		X	

REGULAR INSPECTION

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

MAIN AND SECONDARY BOOMS

1. Check structural defects evidenced in weld cracks, dents, or bends.

2. Check boom rollers for wear.

3. Check main and secondary boom cylinder pins for proper installation and worn pivot pin bushings.

MAINFRAME

1. Check control valve 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 to range of 760 ft. lbs.

4. Check for loose bolts, fatigue cracks or corroded structural members.

MAST AND ROTATION SYSTEM

1. Check mast housing for cracks.

2. Check for proper rotation function by making several start-stop operations. Maximum allowable free-play at mast front should be 1/8" to 3/16".

3. Check for leakage around cylinder mounting plates. Check rotation cylinder mounting bolts for tightness.

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.

   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 and note unusual vibrations or noise.

3. Hydraulic Control Valves

   A. Check spools for sticking and failure to return to neutral position. Inspect for leaks at joints and spools.

   B. Inspect valve housing for cracks.

   C. Make sure relief valve reaches correct pressure setting.

UNDERDRIVE AND PUMP

1. Inspect for proper transmission gear to PTO engagement.

2. When supplied, inspect drive line U-joints for securing cap screw tightness and adequate lubrication.

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

TROUBLE SHOOTING

The following chart is designed for quick reference in diagnosing on the job malfunctions. Care has been taken to list the possible causes in the most likely order of occurrence.

Malfunction	Possible Defect
Controls fail to respond	1. The PTO is not engaged. 2. Hydraulic oil supply is low. 3. Hydraulic pressure line is ruptured. 4. Suction line shutoff valve is obstructed. 5. Hydraulic pump is faulty. 6. Relief valve is set incorrectly.
Operation slow down	1. Hydraulic oil supply is low. 2. Hydraulic pump is operating at a reduced speed. 3. Relief valve is set too low. 4. Pump or cylinder is worn. 5. Pump is slipping due to excessive oil temperature. This is a factor which will increase with worn components. 6. Filters are dirty. 7. Valve spools are inoperative. 8. Obstruction has occurred in boom holding valve.
Rotation control slowed or erratic	1. Color flow valves closed. 2. Rotation cylinder packing is worn. 3. Rotation gears are locked or damaged. 4. Rack support is loose or the bushing is worn.

MALFUNCTION	Possible Defect
Boom drifts when loaded and controls neutralized.	1. Hydraulic oil is bypassing at piston seal. 2. Main, secondary or extension cylinder holding valves are defective or contaminated.
Unusual noise in operation	1. Cavitation is occurring due to low hydraulic oil supply. 2. Loading is excessive. 3. Restriction or collapse of suction line has occurred. 4. Bypass settings on relief valve are too low. 5. Relief valve is damaged. 6. Valve closure is obstructed due to particle accumulation.
Outriggers fail to retract	1. Control valve spool is inoperative. 2. Cylinder or check valve is defective. 3. Hydraulic lines are restricted or ruptured.
Outriggers yield or drift	1. Hydraulic lines are ruptured. 2. Internal bypass is occurring in cylinders. 3. Oil passing internally through holding valve.

PARTS

CYLINDER IDENTIFICATION

Every IMTCO 1230 Wall Board Crane has a cylinder identification tag as shown in Fig. D-1 attached to the mast assembly. Be sure to specify in any parts request a complete letter-number sequence to insure correct identification.

Parts numbers for cylinders are included in this section on the cylinder parts list pages. Cross reference cylinder tag number with appropriate parts page cylinder number when ordering replacement parts.

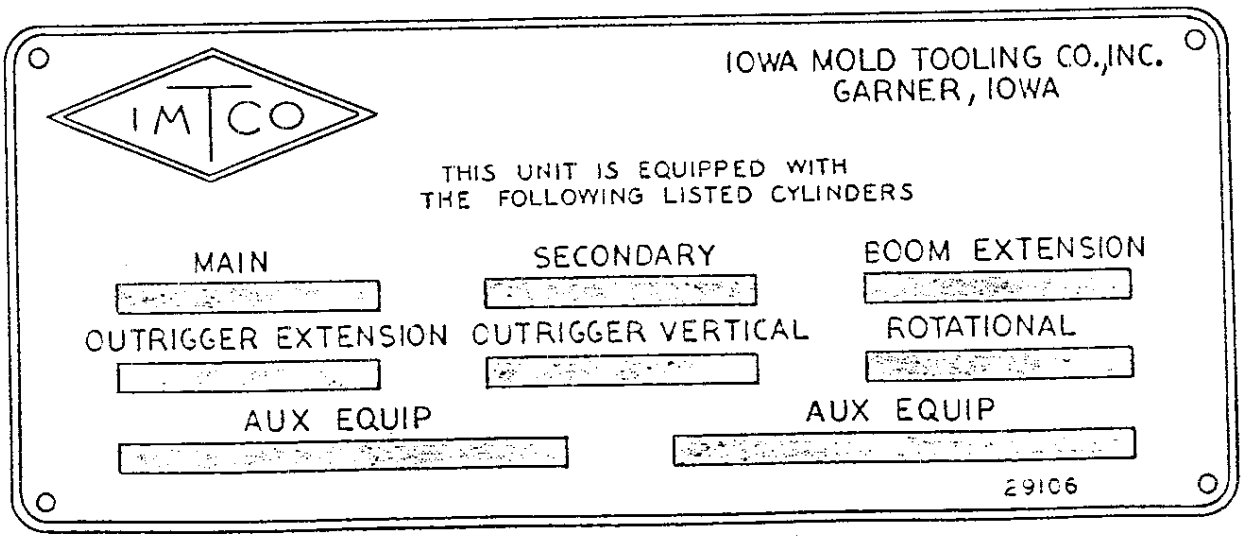


Fig. D-1

IM STYLE

IMTCO P/N 3C152512

MAIN CYLINDER W/CARTRIDGE VALVE

Bore - 6" Stroke - 25½" Rod Dia.- 3" Pin Size, Base End - 2-3/4"

Pin Size, Rod End - 2-3/4" c-c Closed - 40-3/4"

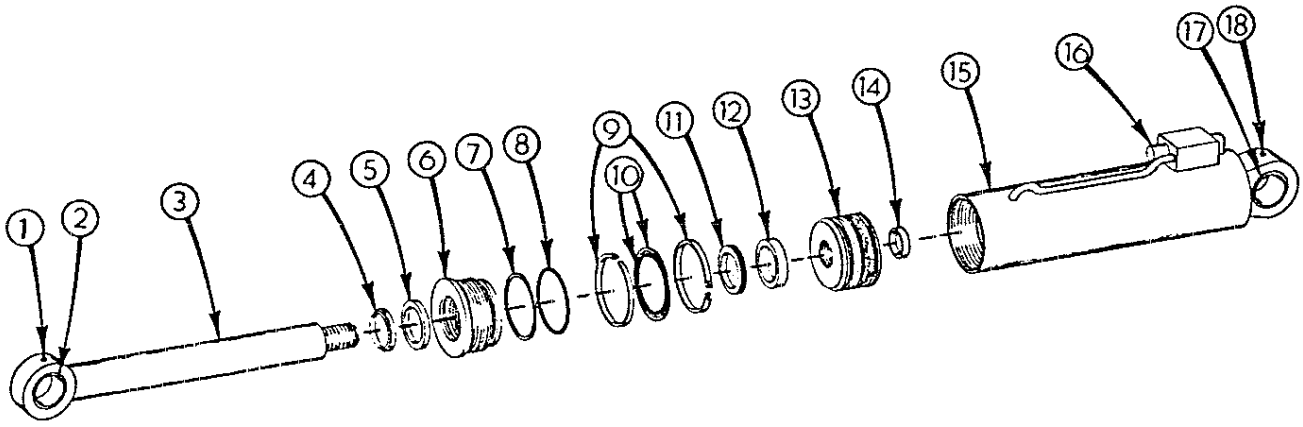


Fig. D-2

REF. NO.		IMTCO P/N	DESCRIPTION
1		72053506	Zerk
2		71024103	Bushing
3		4G325413	Rod Assy.
4	*	7R14P030	Rod Wiper
5		7R546030	Rod Seal, Dynamic
6		6H060030	Head
7	*	7Q10P358	Back-Up Ring
8	*	7Q07X358	Head Static O-Ring
9	*	7T65I060	Piston Ring
10	*	7T66P060	Sirvon Ring, Dynamic Psn. Seal
	*	7Q07X253	Psn. O-Ring, Companion
11	*	6A025030	Wafer Lok
12		6C075030	Stop Tube
13		6I060200	Piston
14	*	7T61N200	Seal Lok
15		4C152511	Case Assy.
16		73054242	Cartridge Valve
17		71024103	Bushing
18		72053506	Zerk
		9C242432	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit not sold seperately.

IM STYLE

IMTCO P/N 3C152512

SECONDARY CYLINDER W/CARTRIDGE VALVE

Bore - 6½" Stroke - 27½" Rod Dia. - 3" Pin Size,Base End - 2-3/4"

Pin Size, Rod End - 2-3/4" c-c Closed - 43½"

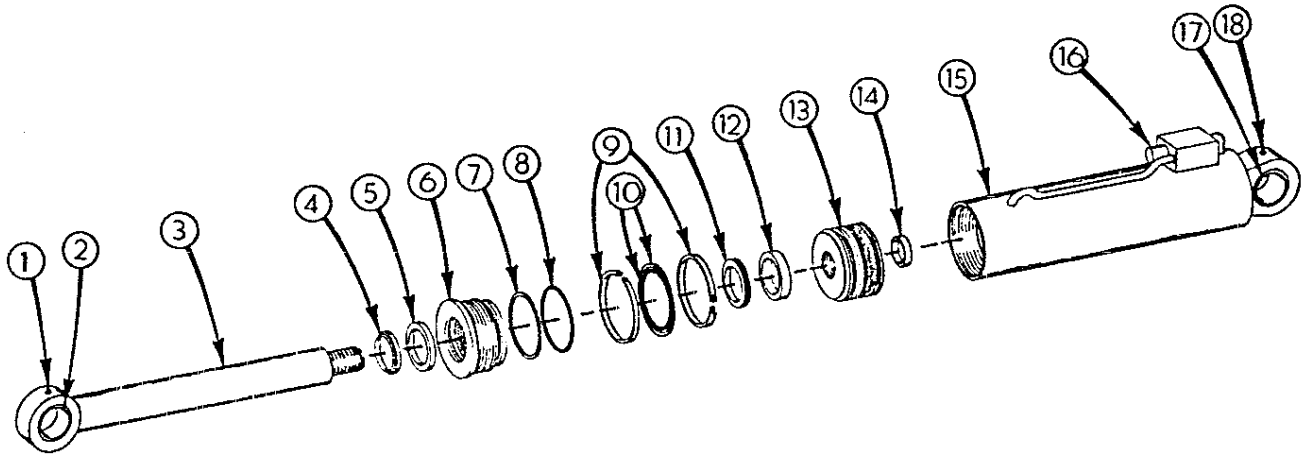


Fig. D-3

REF. NO.		IMTCO P/N	DESCRIPTION
1		72053508	Zerk
2		71024103	Bushing
3		4G326413	Rod Assy.
4	*	7R14P030	Rod Wiper
5		7R546030	Rod Seal, Dynamic
6		6H065030	Head
7	*	7Q10P361	Back-Up Ring
8	*	7Q07X361	Head Static O-Ring
9	*	7T65I065	Piston Ring
10	*	7T66P065	Sirvon Ring, Dynamic Psn. Seal
	*	7Q07X257	Psn. O-Ring, Companion
11	*	6A025030	Wafer Lok
12		6C075030	Stop Tube
13		6I065200	Piston
14	*	7T61N200	Seal Lok
15		4C326413	Case Assy.
16		73054242	Cartridge Valve
17		71024103	Bushing
18		72053508	Zerk
		9C262432	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit Not Sold Separately.

IM STYLE

IMTCP P/N 3C263512

OUTRIGGER CYLINDER

Bore - 6½" Stroke - 29¼" Rod Dia. - 3½" Pin Size,Base End - 2½"

Pin Size, Rod End - 2½" c-c Closed - 42-1/8"

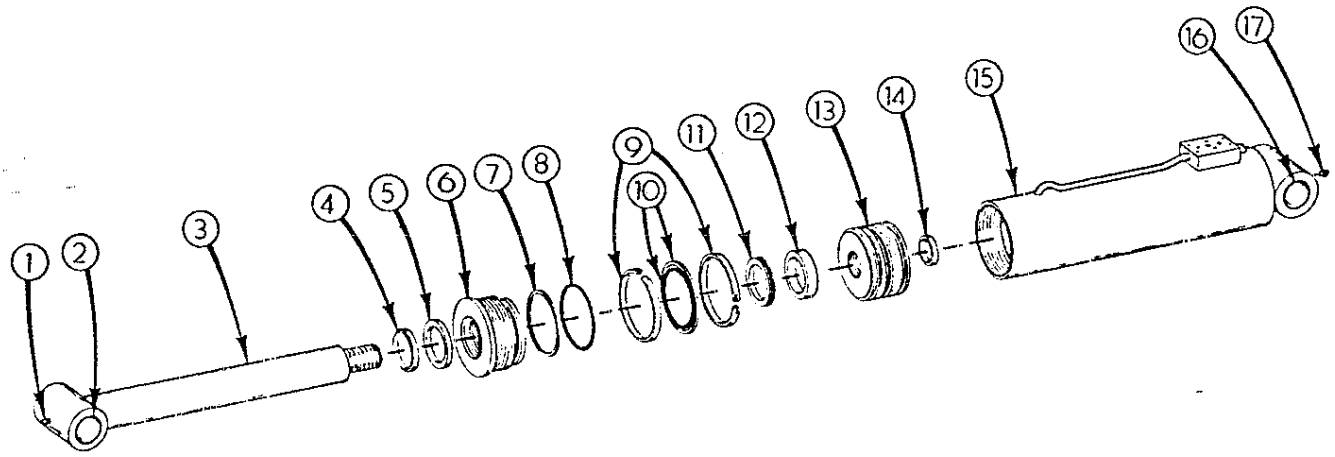


Fig. D-4

REF. NO.		IMTCO P/N	DESCRIPTION
1		72053508	Zerk
2		7BF81225	Bushing
3		4G263510	Rod Assy.
4	*	7R14P035	Rod Wiper
5	*	7R546035	Rod Seal, Dynamic
6		6H065035	Head
7	*	7010P361	Back-Up Ring
8	*	7007X361	Head Static O-Ring
9	*	7T65I065	Piston Ring
10		7T66P065	Sirvon Ring, Dynamic Psn. Seal
		7Q07X257	Psn. O-Ring, Companion
11		6A025030	Wafer Lok
13		6I065200	Piston
14	*	7T61N200	Seal Lok
15		4C263511	Case Assy.
16		7BF81225	Bushing
17		72053508	Zerk
		9C262832	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit Not Sold Separately.

IM STYLE

IMTCO P/N 3X335412

ROTATION CYLINDER - STD.

Bore - 4" Single Acting

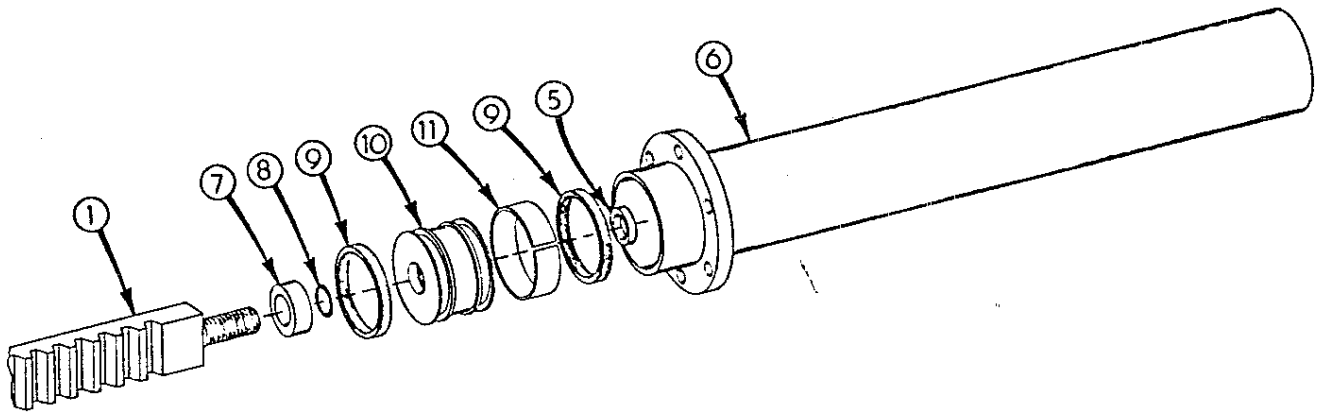


Fig. D-5

REF. NO.		IMTCO P/N	DESCRIPTION
1		51701241	Rack Assy.
5	*	7T61N143	Seal Lok
6		4B335410	Case Assy.
7		6C335430	Stop Tube
8	*	7Q07X127	O-Ring
9	*	7R246035	Piston Seal, "U" Cup
10		6I335430	Piston
11	*	7T2N8040	Wear Ring
		9X016023	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit not Sold Separately.

IM STYLE

IMTCO P/N 3B319510

EXTENSION CYLINDER

Bore - 3" Stroke - 80" Rod Dia. - 2" Pin Sized,Base End - 1"

Pin Size, Rod End - 1" c-c Closed - 102½"

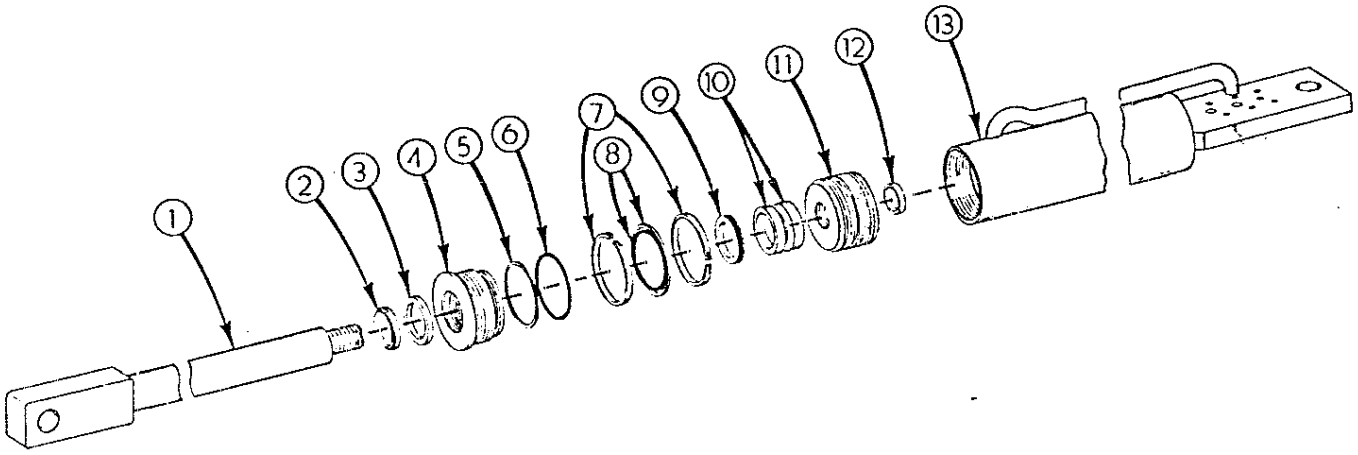


Fig. D-6

REF. NO.		IMTCO P/N	DESCRIPTION
1		4G319510	Rod Assy
2	*	7R14P020	Rod Wiper
3		7R546020	Rod Seal, Dynamic
4		6H030020	Head
5	*	7Q10P334	Back-Up Ring
6	*	7Q07X334	Head Static O-Ring
7	*	7T65I030	Piston Ring
8	*	7T66P030	Sirvon Ring, Dynamic Psn. Seal
	*	7Q07X145	Psn. O-Ring, Companion
9	*	6A025020	Wafer Lok
10		6C300020	Stop Tube
11		6I030106	Piston
12	*	7T61N106	Seal Lok
13		4B319510	Case Assy.
		9C121617	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit not Sold Seperately.

IM STYLE

IMTCO P/N 3X013710

ROTATION CYLINDER - 400°

4" Bore - Single Acting

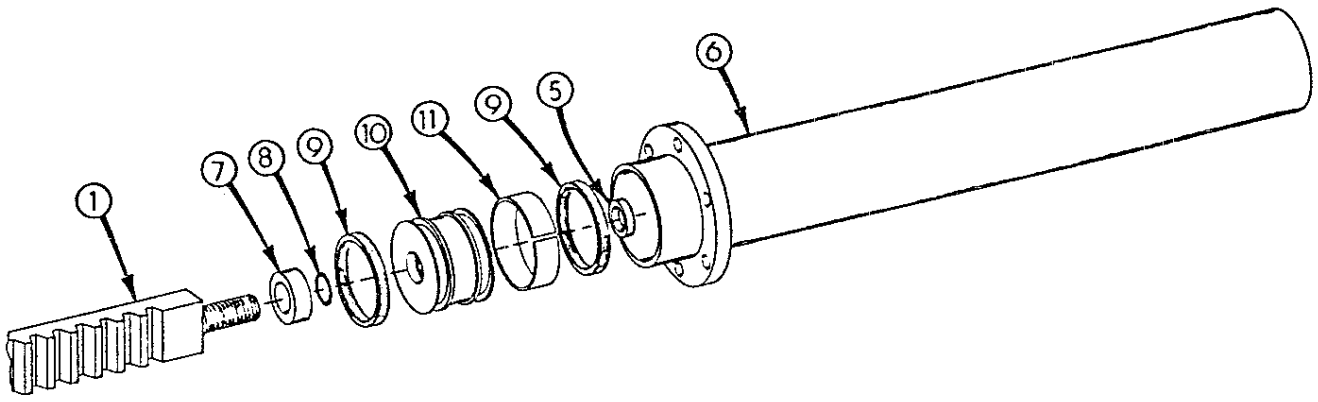


Fig. D-7

REF. NO.	IMTCO P/N	DESCRIPTION
1	51701527	Rack Assy.
5 *	7T61N143	Seal Lok Ring
6	4B013710	Case Assy.
7	6C335430	Stop Tube
8 *	7Q07X127	O-Ring
9 *	7R246035	Piston Seal, "U" Cup
10	6I335430	Piston
11 *	7T2N8040	Wear Ring
	9X016023	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit Not Sold Separately.

IM STYLE

IMTCO P/N 3C152512

FORK CYLINDER W/CARTRIDGE VALVE

Bore - 4" Stroke - 12 1/8" Rod Dia.-2" Pin Size,Base End - 1½"

Pin Size, Rod End - 1½" c-c Closed - 24"

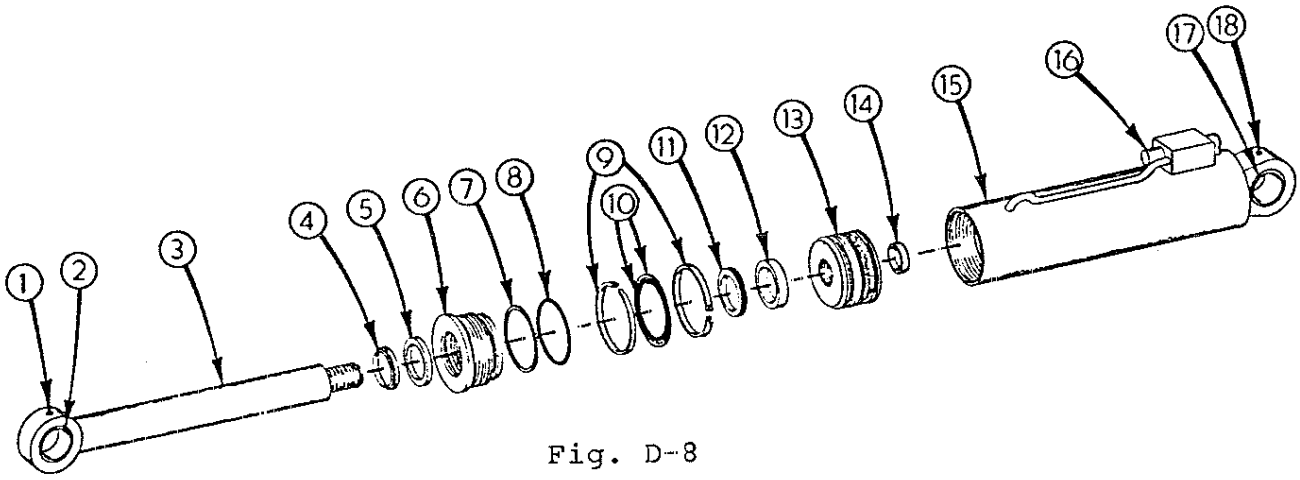


Fig. D-8

REF. NO.		IMTCO P/N	DESCRIPTION
1		72053508	Zerk
2		7BF81215	Bushing
3		4G189610	Rod Assy.
4	*	7R14P020	Rod Wiper
5		7R546020	Rod Seal, Dynamic
6		6H040020	Head
7	*	7Q10P342	Back-Up Ring
8	*	7Q07X342	Head Static O-Ring
9	*	7T65I040	Piston Ring
10	*	7T66P040	Sirvon Ring, Dynamic Psn. Seal
	*	7Q07X153	Psn. O-Ring, Companion
11	*	6A025020	Wafer Lok
12		6C075020	Stop Tube
13		6I040143	Piston
14	*	7T61N143	Seal Lok
15		4B189610	Case Assy.
16		73054242	Cartridge Valve
17		71024103	Bushing
18		72053508	Zerk
		9C161623	Seal Kit

NOTE: * Included in Seal Kit.
Parts in Seal Kit Not Sold Separately.

80" TRUMPET LINE ASSEMBLY (CURRENT)

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	3T213461	80" Trumpet Line	1
2	72053240	1/8" NPT Pipe Plug	2

80" TRUMPET LINE ASSEMBLY (OBSOLETE)

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	3T209861	80" Trumpet Line	1
2	72053240	1/8" NPT Pipe Plug	2

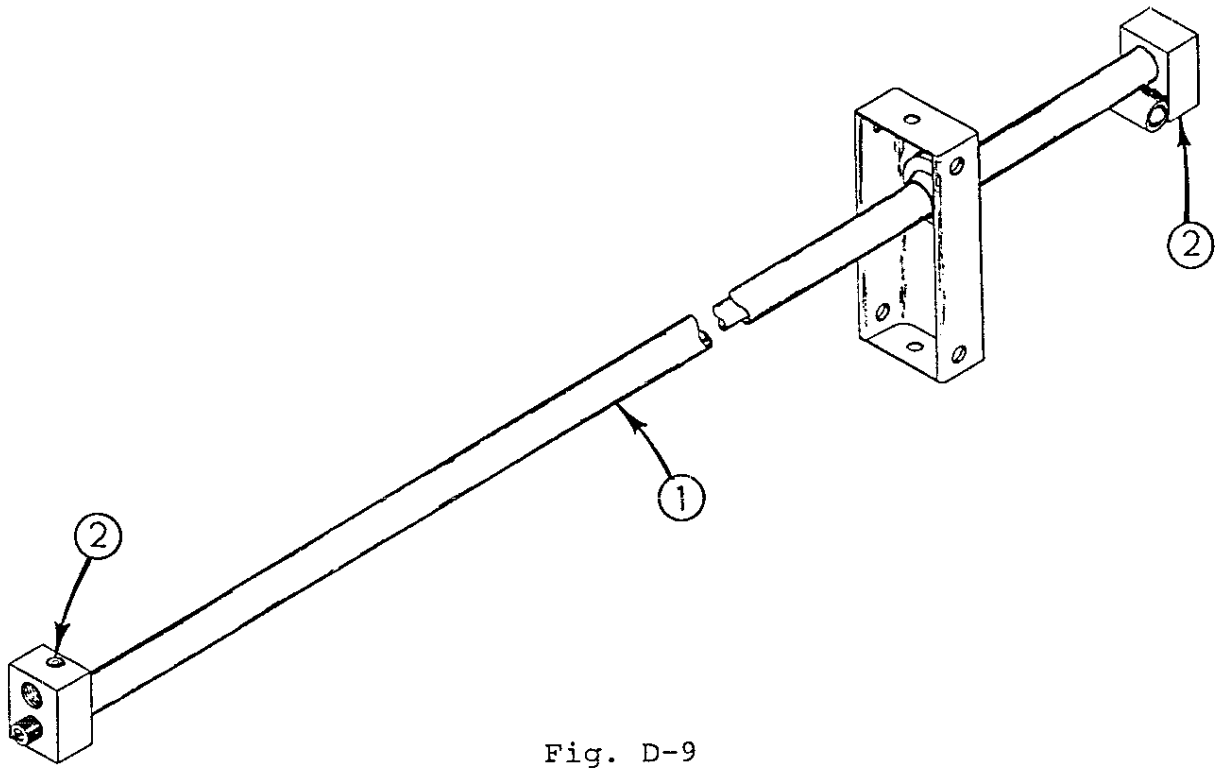


Fig. D-9

STANDARD HYDRAULIC SCHEMATIC

IMTCO P/N 41701321

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	60035259	Hose, 3/8" 100R2 x 36" Long	2
2	72531151	Hose Fitting, 3/8"	46
3	72531829	Reducer Bushing, 1/2 to 3/8	2
4	72053471	Coupling, ½" Stl.	2
5	72531185	Hose Fitting, ½" Swivel	20
6	60035260	Hose, ½"100R2 x 20'-6" Lg.	2
7	73054004	Safety (Holding) Valve	3
8	3B319510	Extension Cylinder	1
9	3C263512	Outrigger Cylinder	2
10	72531123	Street Elbow, 3/8 x 45°	4
11	60035118	Hose, 3/8"100R2 x 6' Lg.	4
12	73054242	Cartridge Valve	3
13	3C326613	Secondary Cylinder	1
14	60035261	Hose, 1/2"100R2 x 18' Lg.	2
15	3C152612	Main Cylinder	2
16	72053612	Tee, ½"	4
17	72053099	Nipple, ½ x 7	2
18	72053097	Nipple, ½ x 5	2
19	72531101	Elbow, ½"	4
20	60035241	Hose, ½" 100R2 x 28" Long	4
21	60035231	Hose, ½" 100R2 x 6'-6" Long	2
22	3X335412	Slewing Cylinder	4
23	72053515	Elbow Male Ferulok Fitting	4
24	71014976	Hydraulic Slewing Tube	1
25	71014978	Hydraulic Slewing Tube	1
26	72053516	Male Connector Ferulok Fitting	6
27	72532282	Coupling, 3/8" Stl.	1
28	71014977	Hydraulic Slewing Tube	1
29	72053611	Tee, 3/8"	2
30	71014739	Hydraulic Slewing Tube	1
31	71014741	Hydraulic Slewing Tube	1
32	72053642	Swivel, 3/8"	20
33	60035155	Hose, 3/8" 100R2 x 14' Long	2
34	72532151	Adapter Elbow Str. Thd.w/O-Ring Swivel	2
35	60035262	Hose, 3/8" 100R2 x 30"	4
36		Hydraulic Motor, D7M-9	1
37	72531829	Reducer Bushing, 1/2 to 3/8	2
38	73073164	Hydraulic Swivel	1
39	72532141	Plug, Str. Thd w/O-Ring	2
40	3T213461	Trumpet Line, 80"	2
41	72053657	Swivel, 3/8" Female	10
42	60035242	Hose, Twin Line 3/8 x 6'Long	2
43	60035239	Hose, 3/8" 100R2 x 8'-6" Long	4
44	60035117	Hose, 3/8" 100R2 x 21' Long	4
45	72531393	Hose Fitting, Female Swivel JIC - 3/8" Hose 1/2" Tube	4
46	72053492	Hose Fitting, Female Swivel JIC - 1/2" Hose 1/2" Tube	6

STANDARD HYDRAULIC SCHEMATIC

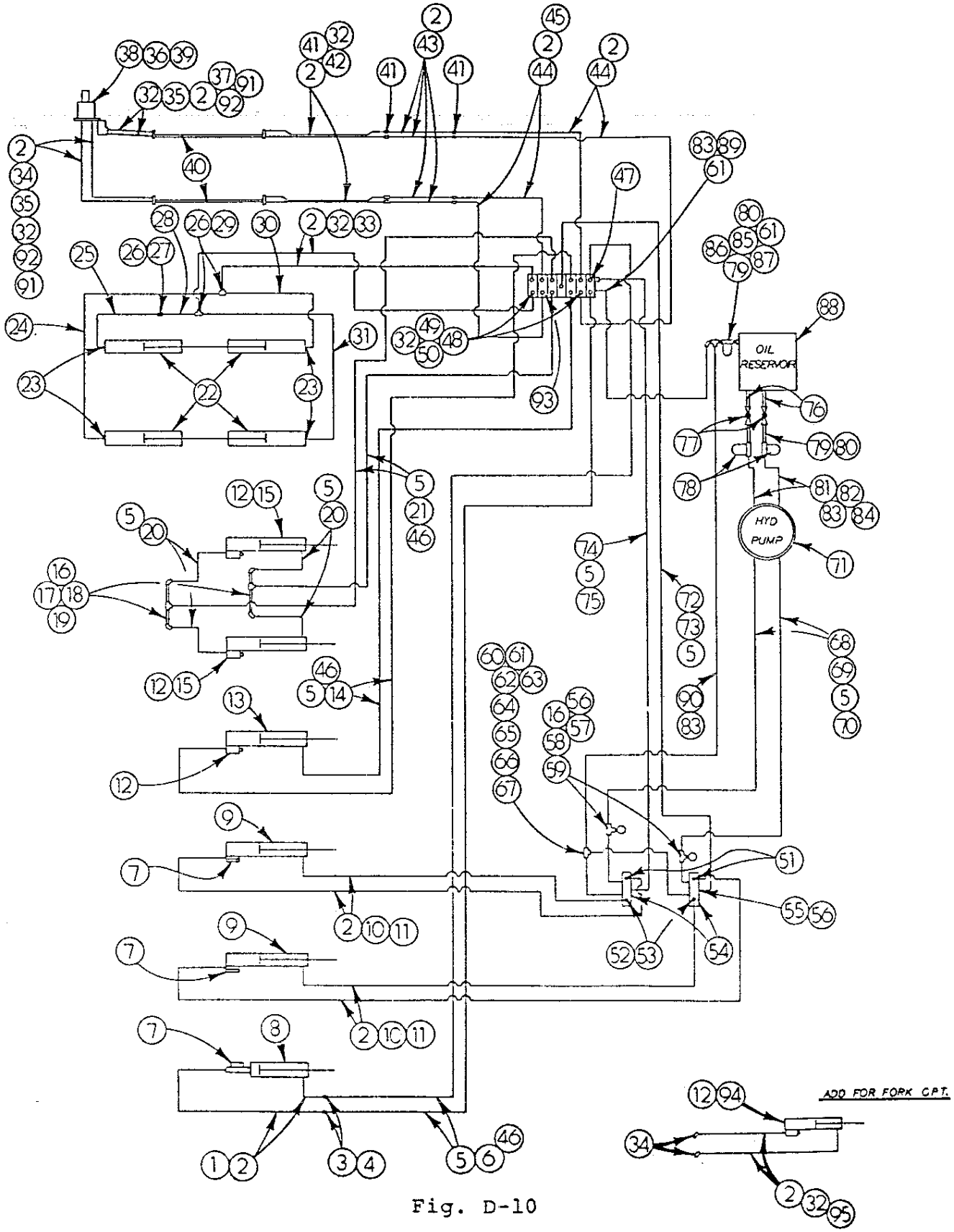


Fig. D-10

STANDARD HYDRAULIC SCHEMATIC

IMTCO P/N 41701321

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
47	72532359	Adapter, Str. Thd. w/O-Ring Male JIC-7/8-14 x 3/4-16 1/2" Tube	8
48	72053743	Adapter, Str. Thd. w/O-Ring 7/8-14 x 3/8" NPT	4
49	72053723	Nipple, 3/8" Hex	4
50	73054139	Color Flow Valve, 3/8"	4
51	72531132	Street Elbow, 3/8" x 90°	2
52	72531100	Elbow, 3/8"	2
53	72053051	Nipple, 3/8" x 2	2
54	73073273	Gresen CP 4-Way Valve Assy. 1 Spool	2
55	73073023	Power Beyond Adapter	2
56	72531133	Street Elbow, ½" x 90°	2
57	72053725	Nipple, ½" Hex	2
58	72531830	Reducer Bushing, 1/2 to 1/4	2
59	73054003	Pressure Gauge, 5000 PSI	2
60	72053317	Coupling, 1¼"	1
61	72531550	Barbed Nipple, 1¼"	4
62	72531836	Reducer Bushing, 1¼" to 3/4"	1
63	72053141	Nipple, 3/4" x Close	2
64	72053556	Street Elbow, 3/4" x 90°	3
65	72053749	Tee, 3/4"	1
66	72531187	Hose Fitting, 3/4" Swivel	2
67	60035039	Hose, 3/4" 100R2 x 24" Long	1
68	72053749	Adapter, Str. Thd. w/O-Ring, ½"	2
69	72531133	Street Elbow, ½" x 90°	2
70	60035093	Hose, ½" 100R2 x 6' Lg.	1
71	73051032	Hydraulic Pump Tandem	1
72	60035191	Hose, ½" 100R2 x 16' Lg.	1
73	72531833	Reducer Bushing, 3/4" to 1/2"	1
74	72531835	Reducer Bushing, 1" to ½"	1
75	60035190	Hose, ½" 100R2 x 15' Lg.	2
76	72053218	Nipple, 1¼" x 10	2
77	73054225	Gate Valve, 1¼"	2
78	73052012	Suction Filter	4
79	72053211	Nipple, 1¼" x Close	3
80	72531135	Street Elbow, 1¼" x 90°	2
81	72532346	Barbed Nipple, 1¼" x 90°	2
82	72053753	Adapter, Str. Thd. w/O-Ring, 1¼"	6
83	72066516	Hose Clamp, #20 P.H.	2
84	60035200	Hose, 1¼" Wire Braid x 7' Lg.	4
85	72066001	Hose Clamp, #24	1
86	72053615	Tee, 1¼"	1
87	73052012	Return Filter	1
88	52701380	Oil Reservoir	1
89	60035263	Hose, 1¼" Wire Braid x 16'-6" Lg.	1
90	60035264	Hose, 1¼" Red Ortac x 7' Lg.	4
91	72531100	Elbow, 3/8" x 90°	2
92	72053052	Nipple, 3/8" x 2½"	1
93	73073604	25P 4 Way Valve Assy. w/Inlet Section-6 Spool	

ADD FOR FORK OPTION

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
2	72531151	Hose Fitting, 3/8"	4
12	73054242	Cartridge Valve	1
32	72053642	Swivel, 3/8"	2
34	72532151	Adapter, Elbow Str. Thd w/O-Ring Swivel	2
94	3B189610	Fork Cylinder	1
95	60035175	Hose, 3/8 100Rl x 48" Lg.	2

HYDRAULIC SCHEMATIC WITH REMOTE CONTROL

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	3B319510	Extension Cylinder	1
2	73054004	Holding (Safety) Valve	3
3	60035259	Hose, 3/8 100R2 x 36" Lg.	2
4	72531151	Hose Fitting, 3/8"	48
5	72531829	Reducer Bushing, 1/2 - 3/8	12
6	72053471	Coupling, ½" Stl.	2
7	72531185	Hose Fitting, ½" Swivel	27
8	60035266	Hose, ½" 100R2 x 27'-6" Lg.	2
9	3C263512	Outrigger Cylinder	2
10	72531123	Street Elbow, 3/8" x 45°	4
11	60035118	Hose, 3/8" 100R2 x 6' Lg.	4
12	72053642	Swivel, 3/8"	28
13	60035265	Hose, ½" 100R2 x 21'-6"	2
14	73054242	Cartridge Valve	3
15	3C326613	Secondary Cylinder	1
16	3C152612	Main Cylinder	2
17	60035241	Hose, ½" 100R2 x 28" Lg.	4
18	72053612	Tee, ½"	4
19	72053099	Nipple, ½" x 7	2
20	72053097	Nipple, ½" x 5	2
21	72531101	Elbow, ½"	7
22	60035267	Hose, ½" 100R2 x 11'	2
23	3X335412	Slewing Cylinder	4
24	72053515	Elbow, Male Ferulok Fitting	4
25	71014976	Hydraulic Slewing Tube	1
26	71014978	Hydraulic Slewing Tube	1
27	72532282	Coupling, 3/8" Stl.	1
28	72053516	Male Connector Ferulok Fitting	8
29	71014977	Hydraulic Slewing Tube	1
30	72053611	Tee, 3/8"	2
31	60035120	Hose, 3/8" 100R2 x 22"	2
32	71014739	Hydraulic Slewing Tube	1
33	71014741	Hydraulic Slewing Tube	1
34	72532151	Adapter Elbow Str.Thd W/O-Ring, Swivel	2
35	60035262	Hose, 3/8" 100R2 x 30"	4
36	72531100	Elbow, 3/8" x 90°	9
37	72053052	Nipple, 3/8" x 2½"	2
38	73073164	Hydraulic Swivel	1
39	73051030	Hydraulic Motor, D7M-9	1
40	72532141	Plug, Str. Thd. w/O-Ring	2
41	3T213461	Trumpet Line, 80"	2
42	72053657	Swivel, 3/8" Female	10
43	60035242	Hose, Twin Line 3/8" x 6'Lg.	2
44	60035239	Hose, 3/8" 100R2 x 8'-6" Lg.	4
45	60035268	Hose, 3/8" 100R1 x 25'Lg.	4
46	72531133	Street Elbow, 3/8"	6
47	72531133	Street Elbow, 1/2"	8
48	60103220	Hydraulic Tube	1

HYDRAULIC SCHEMATIC WITH REMOTE CONTROL

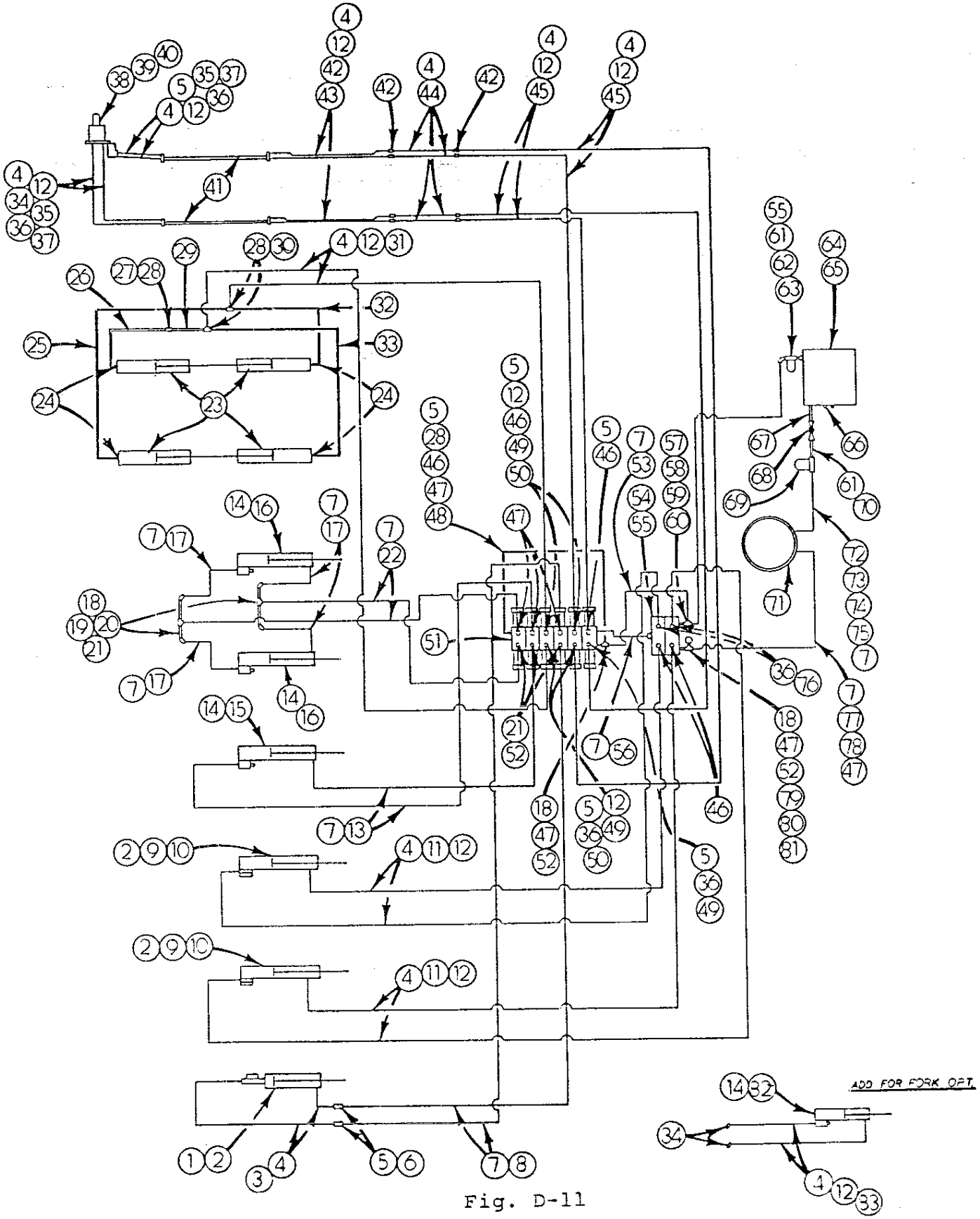


Fig. D-11

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
49	72053723	Nipple, 3/8" Hex	7
50	73054139	Color Flow Valve, 3/8"	4
51	72073275	Waterman 6 Spool Valve Bank	1
52	72053725	Nipple, 1/2" Hex	5
53	60035269	Hose, ½" 100R2 x 20" Lg.	1
54	73073034	CP 4 Way Valve Assy 2 Spool	1
55	73073023	Power Beyond Adapter	1
56		Hose, ½" 100R2 x	1
57	72053555	Tee, 3/4"	1
58	72531833	Reducer Bushing, 3/4 to 1/2	1
59	72053556	Street Elbow, 3/4" x 90°	2
60	72053141	Nipple, 3/4" x Close	1
61	72053211	Nipple, 1¼" x Close	2
62	73052012	Return Filter	1
63	72531836	Reducer Bushing, 1¼" to 3/4"	1
64	52701380	Oil Reservoir	1
65	72052001	Pipe Plug, 3/4" Magnetic	1
66	72053417	Pipe Plug, 1¼"	1
67	72053218	Nipple, 1¼" x 10	1
68	73054225	Gate Valve, 1¼"	1
69	73052012	Suction Filter	1
70	72531135	Street Elbow, 1¼" x 90°	1
71		Hydraulic Pump	1
72	72532346	Barbed Nipple, 1¼" x 90°	1
73	72053753	Adapter, Str.Thd. w/O-Ring, 1¼"	1
74	72066516	Hose Clamp, #20 P.H.	1
75	60035200	Hose, 1¼" Wire Braid x 7' Lg.	1
76	72053051	Nipple, 3/8" x 2"	2
77	72053749	Adapter, Str.Thd. w/O-Ring, ½"	1
78	60035093	Hose, ½" 100R2 x 6' Lg.	1
79	72531830	Reducer Bushing, ½" to ¼"	1
80	72053533	Street Elbow, ¼" x 45°	1
81	73054003	Pressure Gauge, 5000 PSI	1

ADD FOR FORK OPTION

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
4	72531151	Hose Fitting, 3/8"	4
12	72053642	Swivel, 3/8"	2
14	73054242	Cartridge Valve	1
34	72532151	Adapter, Elbow Str.Thd w/O-Ring,Swivel	2
82	3B189610	Fork Cylinder	1
83	60035175	Hose, 3/8 100R1 x 48" Lg.	2

BASE AND OUTRIGGER ASSEMBLY

IMTCO P/N 41701260

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	72063049	Lock Washer, ¼"	16
2	72060004	Cap Screw, ¼-20 x 1	8
3	72060012	Cap Screw, ¼-20 x 3	8
4	52701375	Weldm't, Ladder	2
5	52701412	Weldm't, Outrigger Pad	2
6	60102226	Pin, Outrigger Pad	2
7	72063040	Machy Bushing, 2½ x 10 Ga NR	10
8	72066103	Retainer Ring, 2½"	10
9	72066317	Roll Pin, ½ x 4	2
10	52701024	Weldm't, Outrigger Leg	2
11	3C263512	Outrigger Cylinder	2
12	60102227	Pin, Outrigger Frame	4
13	72053508	Zerk, 1/8" NPT	2
14	60103204	Tension Bar	1
15	72062009	Nut, 1-8	4
16	72060092	Cap Screw, ½-13 x 1¼	36
17	72063053	Lock Washer, ½"	36
18	72053515	Male Elbow, Ferulok	4
19	3X335412	Slewing Cylinder	4
20	71014978	Hydraulic Slewing Tube	1
21	71055001	Thrust Bearing	1
22	51701241	Rack Assy, Slewing	2
23	72532282	Coupling, 3/8" (Stl)	1
24	72053516	Male Connector, Ferulok	6
25	72531360	Zerk, 1/8"NPT x 45°	1
26	71014977	Hydraulic Slewing Tube	1
27	72053611	Tee, 3/8"	2
28	60010003	Bearing Seat Ring	1
29	72053415	Pipe Plug, 3/4" Sq. Hd.	1
30	73073273	CP-4 Way Valve Assy Gresen 1 Spool	2
31	72060033	Cap Screw, 5/16-18 x 3	6
32	72062001	Nut, 5/16-18	6
33	72063050	Lock Washer, 5/16"	6
34	73014848	Control Handle, Gresen	2
35	70058003	Connector Link, Gresen	2
36	70066337	Pin, Gresen	2
37	70066336	Cotter Pin, Gresen	2
38	72063001	Washer, ¼"	10
39	71014739	Hydraulic Slewing Tube	1
40	71014741	Hydraulic Slewing Tube	1
41	72066509	Exhaust Clamp, 5½"	4
42	60102864	Mtg. Plate, Valve Bank	1
43	52701245	Weldm't, Rack Support	2
44	60020020	Wear Plate, Rack Support	2
45	72060705	Cap Screw, ¼-20 x 3/4 Soc. Hd.	4
46	71014976	Hydraulic Slewing Tube	1
47	76039075	O-Ring, Slewing Cylinder Mtg.	6
48	73052001	Magnetic Pipe Plug, 3/4" NPT	2

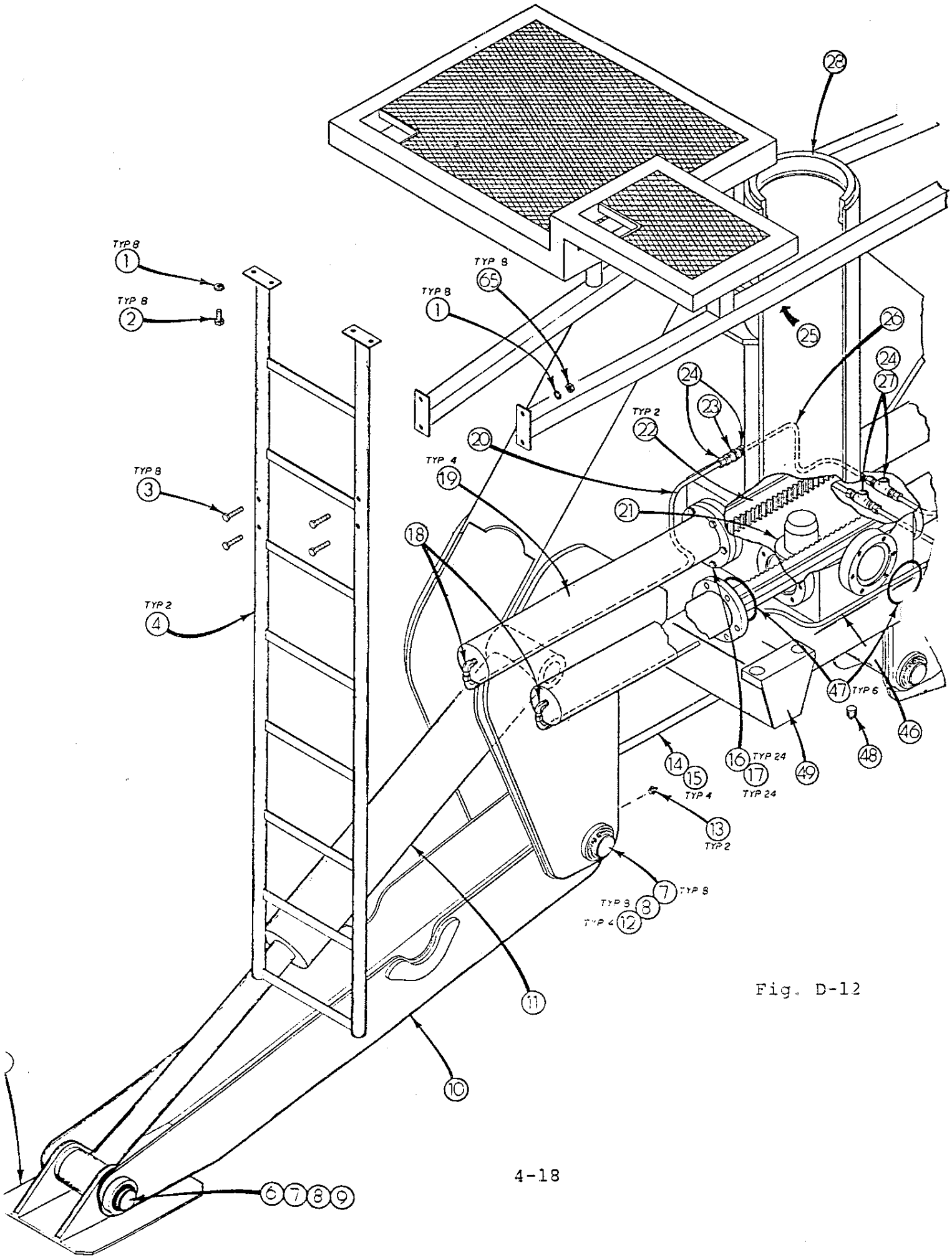

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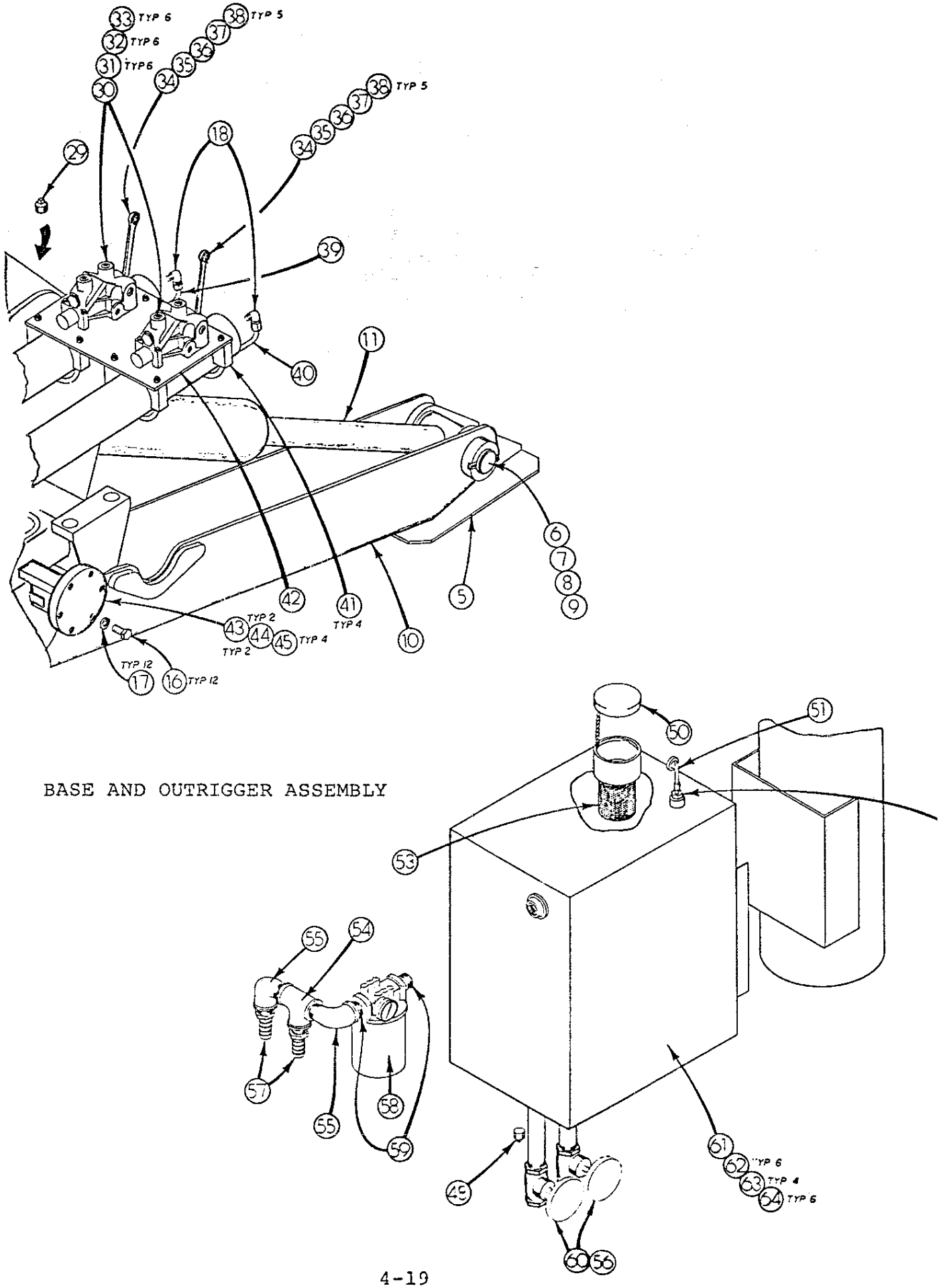
Fig. D-12



BASE AND OUTRIGGER ASSEMBLY

BASE AND OUTRIGGER ASSEMBLY CONT.

IMTCO P/N 41701260

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
49	52701261	Weldm't, Base	1
50	73014671	Fill Cap, Wisco	1
51	73073010	Dipstick Assy.	1
52	51070864	Adapter, Dipstick	1
53	70024133	Fill Screen, Wisco	1
54	72053615	Tee, 1¼"	1
55	72531135	Street Elbow, 1¼ x 90°	2
56	72053218	Nipple, 1¼ x 10	2
57	72531550	Barbed Nipple, 1¼"	2
58	73052010	Return Filter	1
59	72053211	Nipple, 1¼ x Close	2
60	73054225	Gate Valve, 1¼"	
61	52701380	Weldm't, Oil Reservoir	1
62	72060046	Cap Screw, 3/8-16 x 1	6
63	72062002	Nut, 3/8-16	4
64	72063051	Lock Washer, 3/8"	6
65	72062000	Nut, ¼"-20	8

MAIN BOOM ASSEMBLY

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	71024099	Bushing, 3¼ OD x 2.768ID x 9-3/4"Lg.	1
2	72053508	Zerk, 1/8" NPT	1
3	52070079	Weldm't, Main Boom	1
4	72066106	Retainer Ring, 2-3/4"	4
5	72063043	Machy. Bushing, 2-3/4" x 10 Ga. WR	4
6	60010117	Pin, Sec.Cyl. Base End	1
7	3C326413	Secondary Cylinder	1
8		Cartridge Valve	1
9	72053506	Zerk, 3/16" Press Fit	4
10	71024098	Bushing, 3¼OD x 2.768ID x 1½" Lg.	4
11	60010014	Outer Link	2
12	72060572	Set Screw, 5/16-18 x 3/4" Soc. Hd.	8
13	72060581	Set Screw, 3/8-16 x 3/4" Soc. Hd.	2
14	60010343	Pin, Outer Link	1

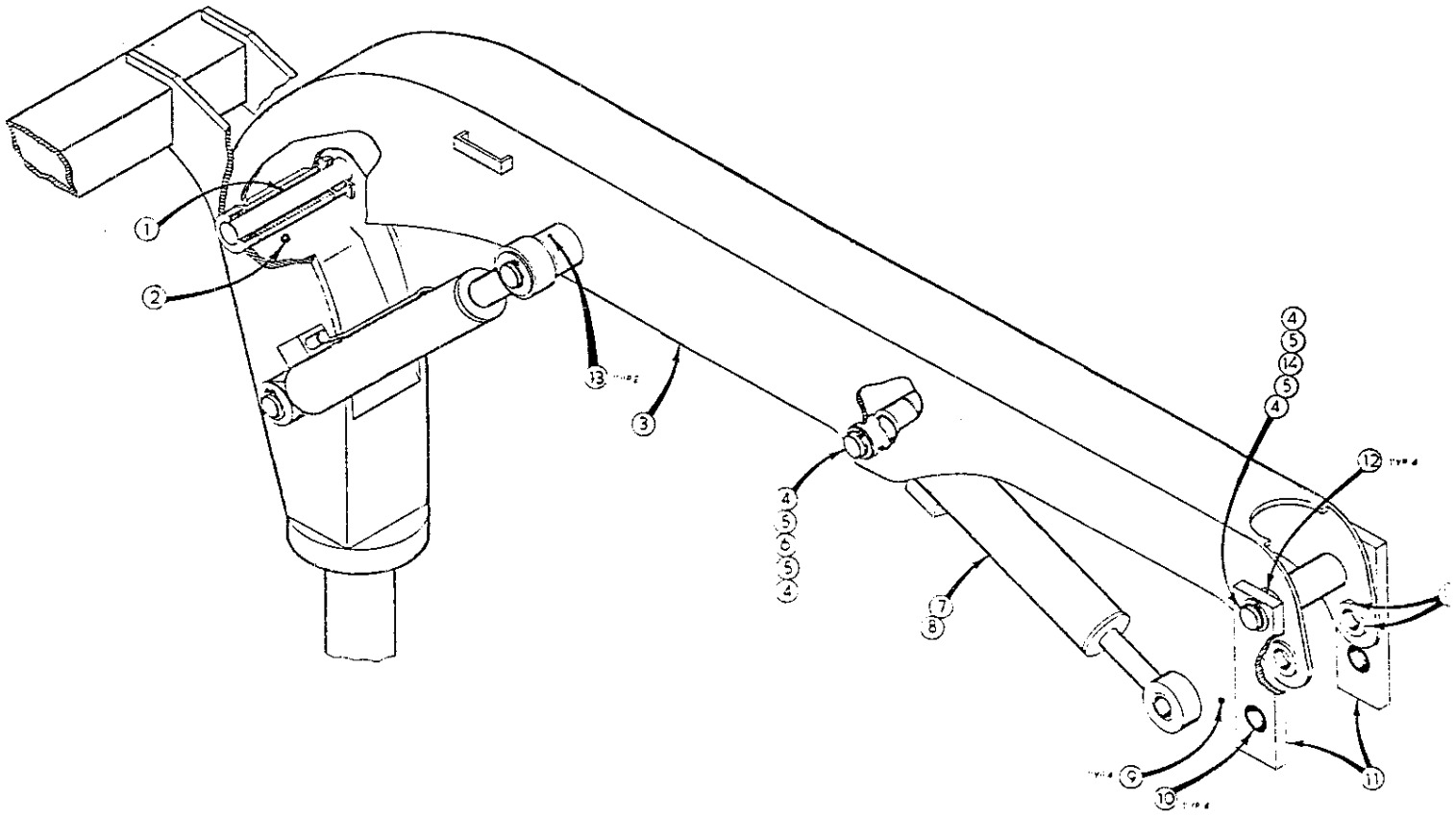


Fig. D-13

MAST ASSEMBLY

IMTCO P/N 41701271

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	3C152512	Main Cylinder	2
2	73054242	Counter Balance Valve	2
3	60010114	Pin - Main Cylinder	2
4	72066106	Retainer Ring, 2-3/4"	4
5	72063043	Machy Bushing, 2-3/4 x 10 Ga.WR	4
6	72060832	Set Screw, 5/16-18 x 3/4 Half Dog Soc.Hd.	2
7	60020002	Bushing - Mast	1
8	52701496	Weldm't - Mast	1
9	60010115	Pin - Main/Mast	1
10	60010291	Lock Plate	1
11	72060794	Cap Screw, 1/2-13 x 1-1/4 Soc. Hd.	3
12	70073143	Chair-Cabmaster w/Mtg. Hdwe.	1
13	72060097	Cap Screw, 1/2-13 x 3	1
14	72062004	Nut, 1/2-13	4
15	52701270	Weldm't - Foot Pedal	1
16	72053508	Zerk, 1/8" NPT	1
17	52701559	Weldm't - Control Handle	5
18	72058003	Connecting Link	6
19	72066337	Pin, Gresen	6
20	72066336	Cotter Pin, Gresen	6
21	72063001	Washer, 1/4"	30
22	52701560	Weldm't - Rotational Control Lever	1
23	70039298	Decal - Controls	1
24	52701319	Rotational Connector Link	1
25	71058002	Clevis - Finished End Yoke	1
26	72060096	Cap Screw, 1/2-13 x 2-1/2	3
27	72062004	Nut, 1/2-13	3
28	72063053	Lock Washer	3
29	73073604	25P Valve Assy w/inlet Section,6 Spool	1

MAST ASSEMBLY

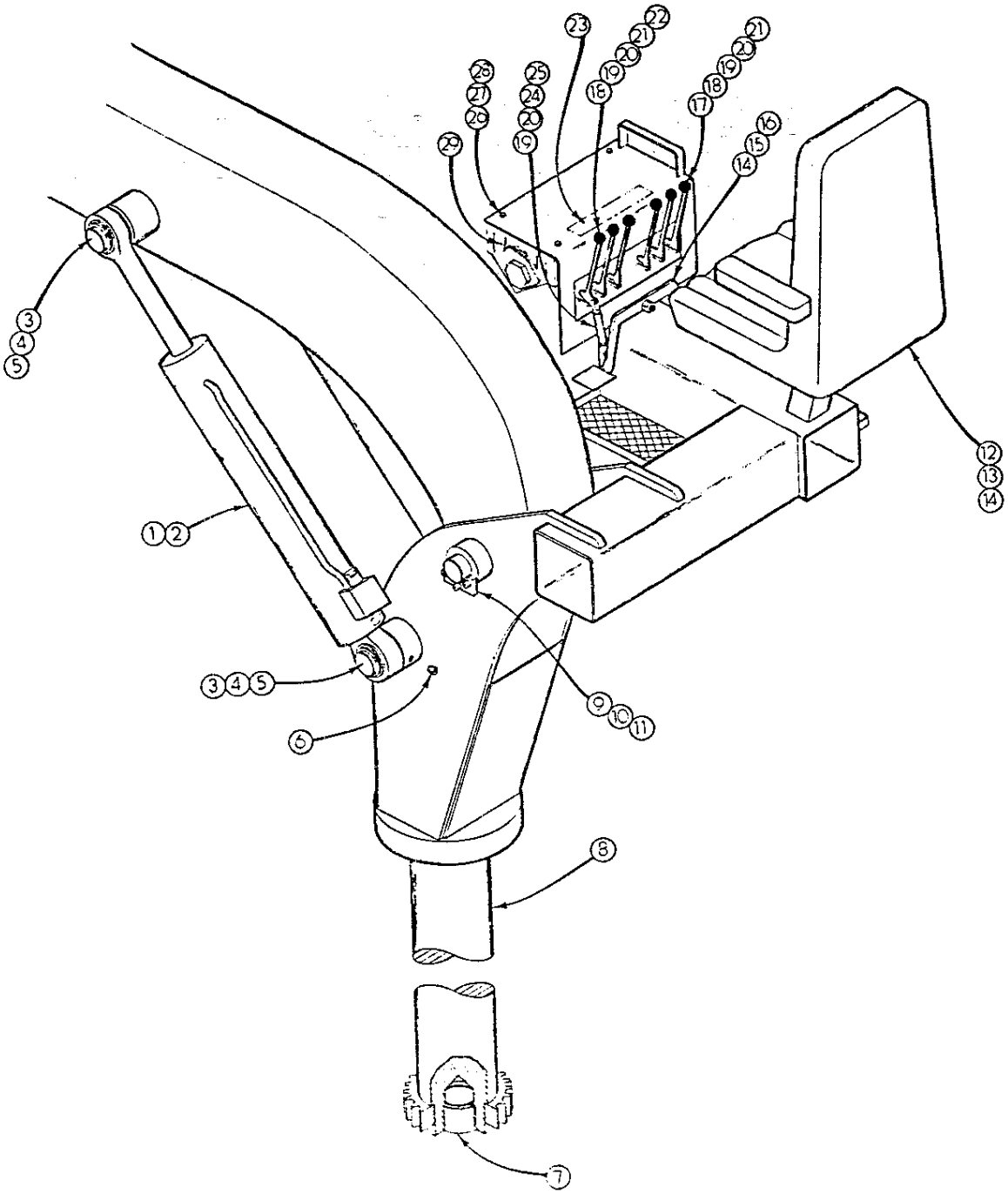
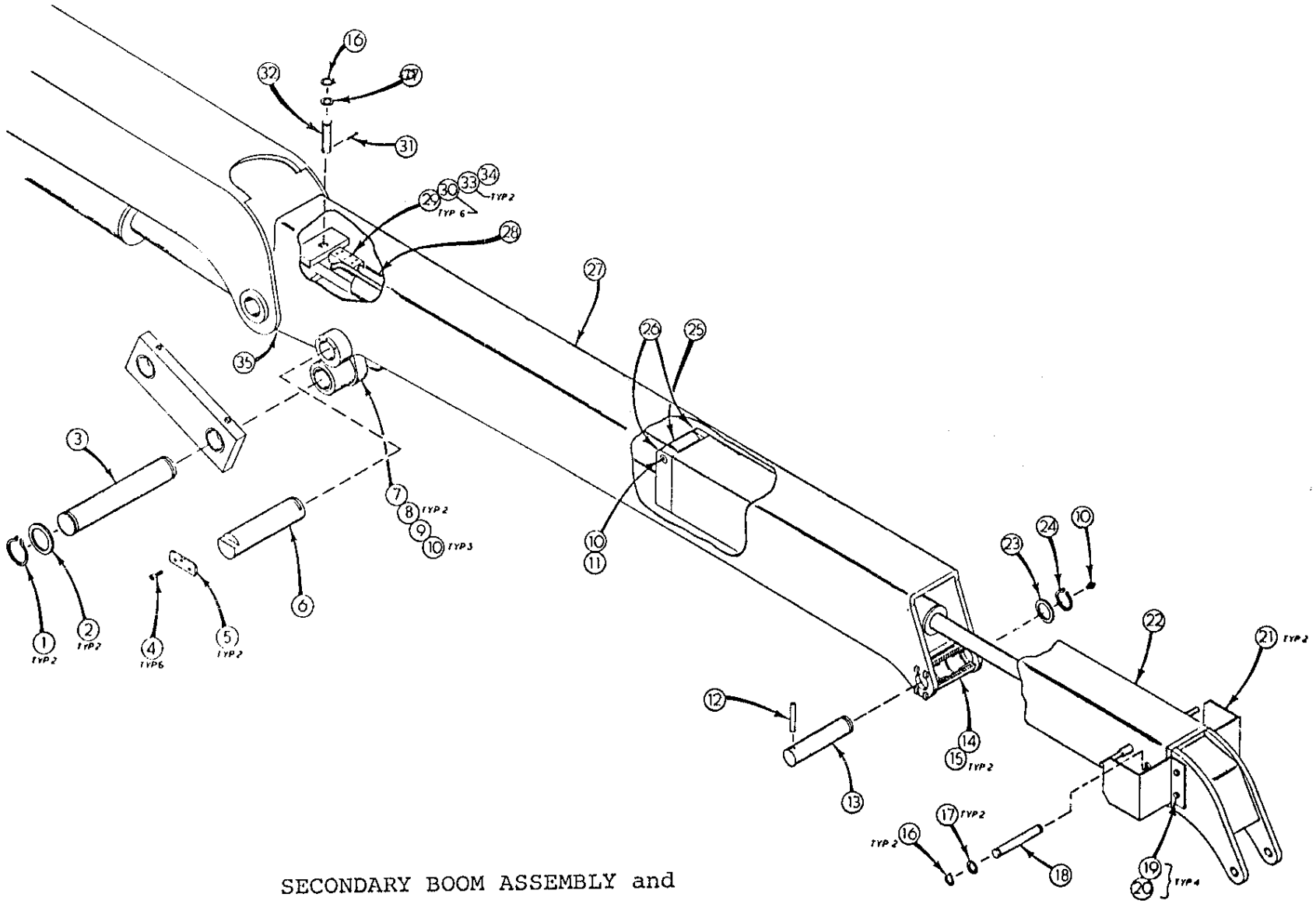


Fig. D-14

SECONDARY BOOM ASSEMBLY and IMTCO P/N 41701269

EXTENSION BOOM ASSEMBLY IMTCO P/N 41 2

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	72066106	Retainer Ring, 2-3/4"	2
2	72063043	Machy Bushing, 2-3/4 x 10 Ga. WR	2
3	60010343	Pin, Sec./Outer Link	1
4	72060754	Cap Screw, 3/8-16 x 1¼ Soc. Hd.	6
5	60010362	Lock Plate, Sec. Boom	2
6	60010346	Pin, Sec./Inner Link	1
7	52070017	Weldm't, Inner Link	1
8	60020108	Bushing, Inner Link	2
9	60020109	Bushing, Inner Link	1
10	72053508	Zerk, 1/8" NPT	5
11	60102208	Pin, Extension Roller	1
12	72066317	Roll Pin, 1/2 x 4	1
13	60010688	Pin, Sec. Roller	1
14	60010687	Roller, Sec. Boom	1
15	7BF82020	Bushing, FM Steel	2
16	72066125	Retainer Ring, 1"	3
17	72063034	Machy Bushing, 1 x 10 Ga. NR	3
18	60101874	Pin, Ext. Cylinder (Rod End)	1
19	72060044	Cap Screw, 3/8-16 x 3/4	4
20	72063051	Lock Washer, 3/8"	4
21	60103234	Guard, Trumpet End	2
22	52701481	Weldm't, Ext. Boom	1
23	72063039	Machy Bushing, 2 x 10 Ga. NR	1
24	72066136	Retainer Ring, 2"	1
25	60020087	Roller, Ext. Boom	1
26	72060858	Set Screw, 3/8-16 x 3/4 Half Dog Soc.Hd.	2
27	52701404	Weldm't, Sec. Boom	1
28	3B319510	Extension Cylinder	1
29	73054004	Safety (Holding) Valve	1
30	72060709	Cap Screw, ¼-20 x 1½ Soc. Hd.	6
31	72066194	Cotter Pin, 3/16 x 1½	1
32	60101905	Pin, Ext. Cylinder (Base End)	1
33	76039222	O-Ring (Large)	2
34	76039197	O-Ring (Small)	1
35	60020112	Bushing, Sec. Boom	1



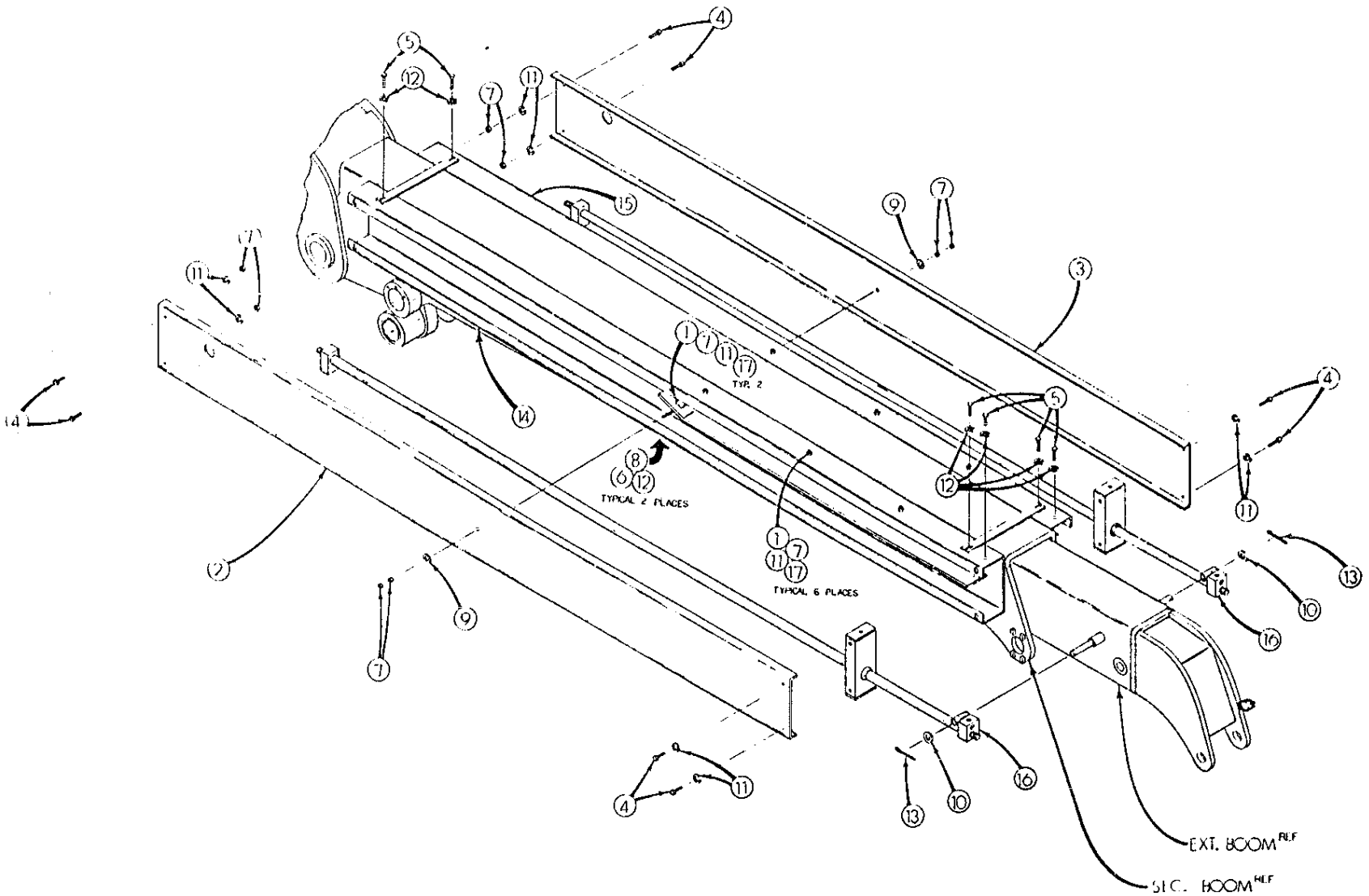
SECONDARY BOOM ASSEMBLY and
EXTENSION BOOM ASSEMBLY

Fig. D-14

TRUMPET INSTALLATION

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	60103278	Hose Clamp	8
2	60103318	R.H. Cover, Trumpet	1
3	60103319	L.H. Cover, Trumpet	1
4	72060000	Cap Screw, ¼-20 x ½ US Hex	8
5	72060042	Cap Screw, 3/8-16 x ½ US Hex	6
6	72060046	Cap Screw, 3/8-16 x 1 US Hex	2
7	72062000	Nut, ¼-20 USS Hex	16
8	72062002	Nut, 3/8-16 USS Hex	2
9	72063001	Washer, ¼" Wraught	2
10	72063007	Washer, 5/8" Wraught	2
11	72063049	Lock Washer, ¼"	16
12	72063051	Lock Washer, 3/8"	8
13	72066185	Cotter Pin, 5/32 x 1	2
14	52701508	Weldm't, Trumpet Guard R.H.	1
15	52701509	Weldm't, Trumpet Guard L.H.	1
16	3T213461	Trumpet	2
17	72060006	Cap Screw, ¼"-16 x 1½ US Hex	8

NOTE: THIS TRUMPET ASSY. WAS USED ON ALL UNITS BUILT PRIOR TO JUNE 1, 1977. SEE NEXT PAGE FOR LATER UNITS.



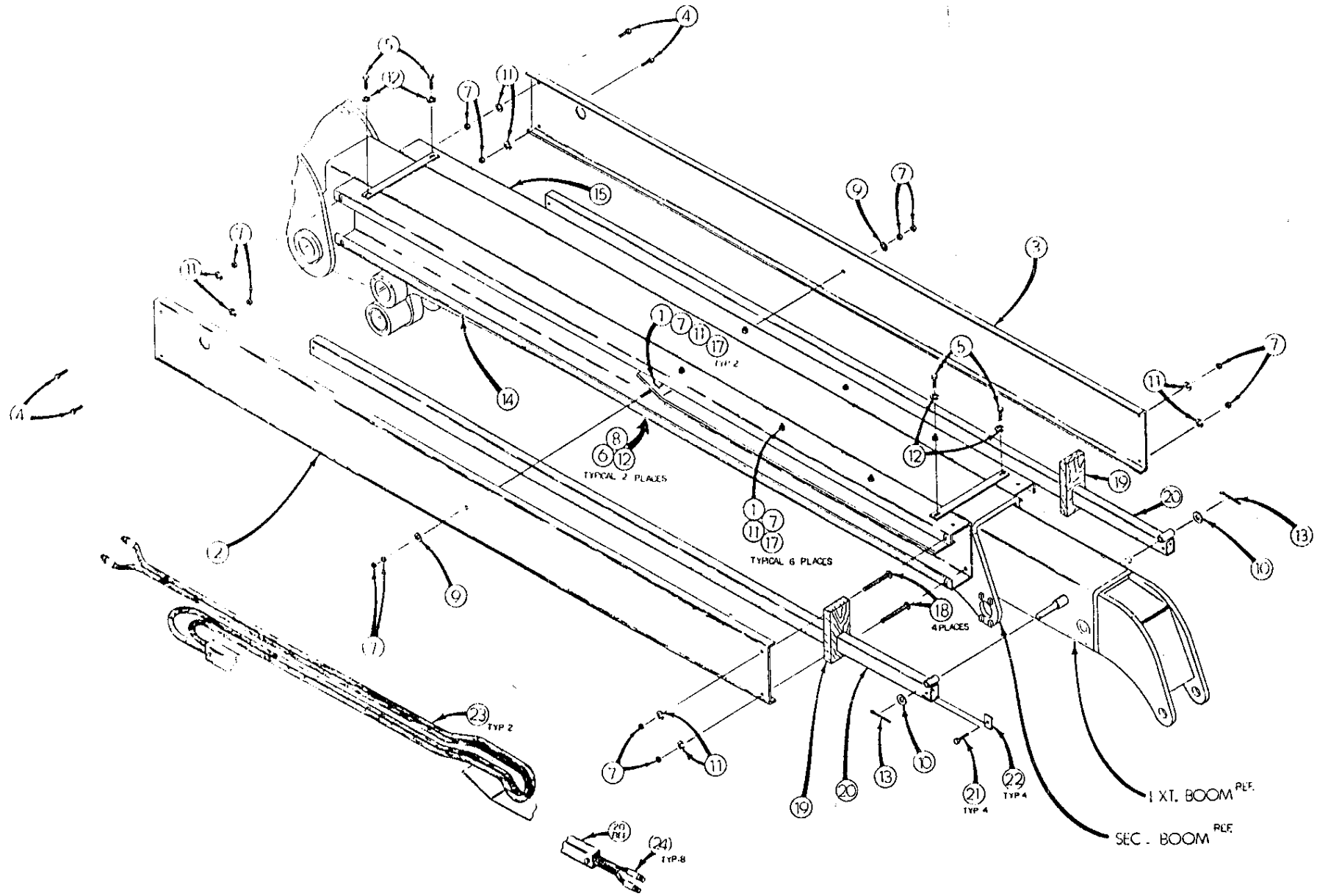
TRUMPET INSTALLATION

Fig. D-15

TRUMPET GUARD ASSEMBLY

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	60103278	Hose Clamp	8
2	60103318	R.H. Cover, Trumpet	1
3	60103319	L.H. Cover, Trumpet	1
4	720 6000	Cap Screw, ¼-20 x ½ US Hex	4
5	72060042	Cap Screw, 3/8-16 x ½ US Hex	4
6	72060046	Cap Screw, 3/8-16 x 1 US Hex	2
7	72062000	Nut, ¼-20 USS Hex	20
8	72062002	Nut, 3/8-16 USS Hex	2
9	72063001	Washer, ¼ Wraught	2
10	72063007	Washer, 5/8 Wraught	2
11	72063049	Lock Washer, ¼	16
12	72063051	Lock Washer, 3/8	6
13	72066185	Cotter Pin, 5/32 x 1	2
14	52701508	Weldm't, Trumpet Guard, RH	1
15	52701509	Weldm't, Trumpet Guard, LH	1
17	7206006	Cap Screw, ¼-20 x 1½ US Hex	8
18	72060014	Cap Screw, ¼-20 x 2½ US Hex	4
19	60035298	Wood Block	2
20	52701712	Weldm't, Trumpet Tube	2
21	72060004	Cap Screw, ¼-20 x 1	4
22	60103567	Hose Clamp	4
23	89039100	Hyd. Hose, 3/8 100R2 (22½ ft.) Hi Press	4
24	72531151	Hose Fittings, 3/8, W.H. 06U-106	8

NOTE: THIS TRUMPET ASSY. WAS USED ON ALL UNITS BUILD AFTER JUNE 1, 1977. SEE PAGE 4-26 FOR PRIOR UNITS.



TRUMPET GUARD ASSEMBLY

Fig. D-16

GRESEN CONTROL VALVE PARTS LIST

REF. NO.	IMTCO P/N	DESCRIPTION
1	73029144	Bonnet
2	72060821	Screw
3	72063063	Lock Washer
4	72060822	Cap Screw
5	72063064	Lock Washer
6	73141015	Spool Collar
7	73141016	Stop Collar
8	73141017	Centering Spring
9	73141018	4 Way .001 Over Spool
10	73141019	Check Plug
11	73141020	Spring
12	73141021	Check Poppet
13	73141022	Cap Control
14	72060823	Screw, Hex Soc.
15	72063063	Lock Washer
16	73141023	Flow Adjuster
17	73141024	Back Up Washer
18	73141025	Control Spring
19	76039062	O-Ring Seal
20	73141026	Check Spring
21	73141027	Back Up Washer
22	76039071	O-Ring Seal
23	73141028	Control Piston
24	73141029	Relief Poppet
25	73141030	Meter Sleeve
26	76039063	Section Seal O-Ring (Small)
27	76039064	Section Seal O-Ring (Large)
28	76039083	O-Ring Seal

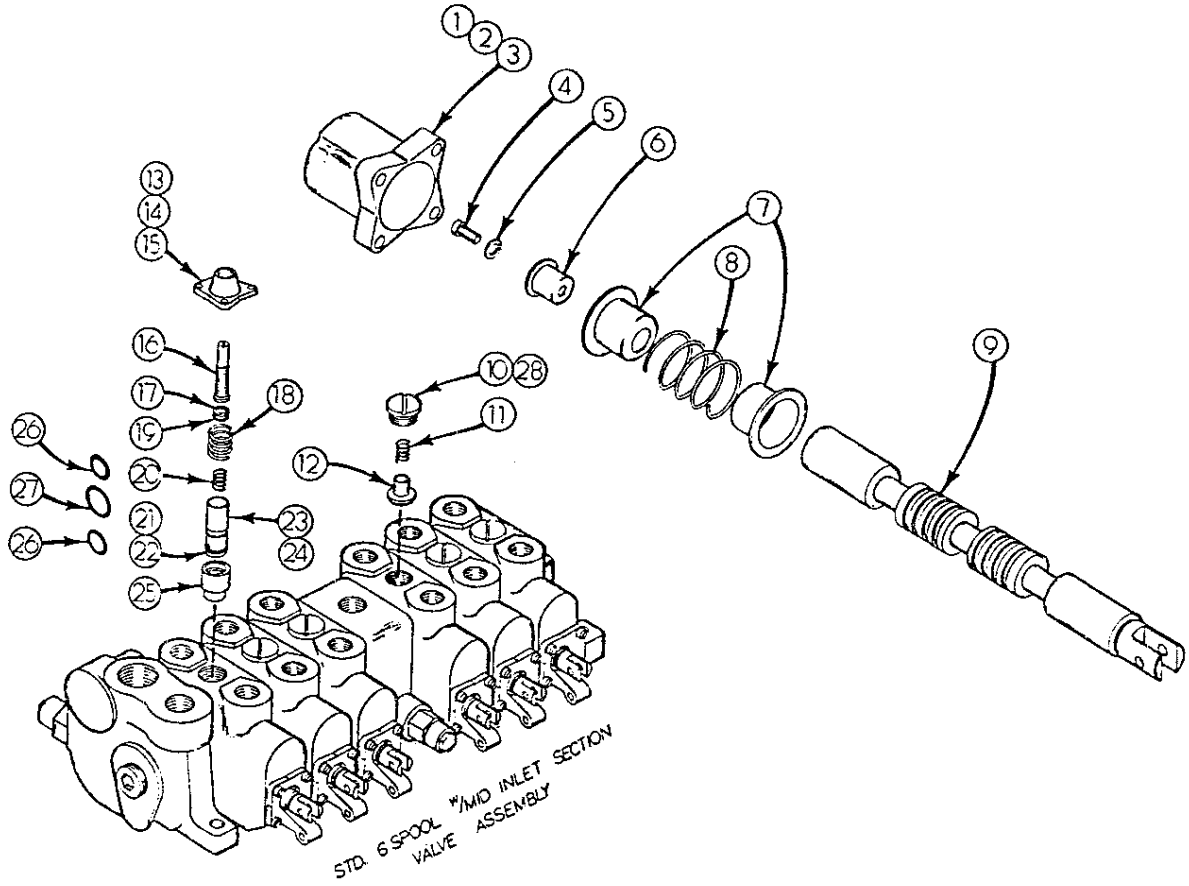


Fig. D-17

REMOTE CONTROL SYSTEM

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	72073275	Waterman 6 Spool Valve Bank	1
2	72053725	Nipple, ½" Hex	4
3	72531101	Elbow, ½" x 90°	3
4	72531829	Reducer Bushing, ½ to 3/8	8
5	72053723	Nipple, 3/8" Hex	7
6	72531100	Elbow, 3/8" x 90°	3
7	72053642	Swivel, 3/8"	4
8	73054139	Color Flow, 3/8"	4
9	60035269	Hose, ½" 100R2 x 20"	1
10	72531185	Hose Fitting, ½" Swivel	4
11	72531133	Street Elbow, ½"	6
12	60035269	Hose, ½" 100R2 x 20"	1
13	72053516	Adapter, 3/8" Ferulok Fitting	2
14	60103220	Hydraulic Tube	1
15	72531132	Street Elbow, 3/8" x 90°	4
16	72053612	Tee, ½"	1
17	89044057	24 Wire Cable, 6' Lg.	1
18	89044039	3 Wire Cable, 14 Ga.	AR
19	77044018	Strain Relief Connector, ½"	1
20	72060023	Cap Screw, 5/16-18 x 3/4"	4
21	72053050	Lock Washer, 5/16"	4
22	72062001	Nut, 5/16-18 Hex	4
23	77044017	Strain Relief Connector, 1"	2
24	77044040	Receptacle with Cap	1
25	77044041	Male Plug, 16 Prong	1
26	77044042	16 Wire Cable x 35' Lg.	1
27	77041005	Momentary Contact Switch	1
28	77041006	Toggle Switch, Double Throw	6
29	77044004	Toggle Switch, Single Throw	1
30	72053306	Coupling, 1"	1
31	52701467	Remote Control Handle, 8 Function	1
32	60103213	Cover, Remote Control Handle	1
33	72061003	Self Tapping Screw, #6 x ½	10
34	60101424	Cover, Electrical Box	1
35	52070681	Electrical Box	1
36	70039308	Decal, Remote Control	1

REMOTE CONTROL SYSTEM

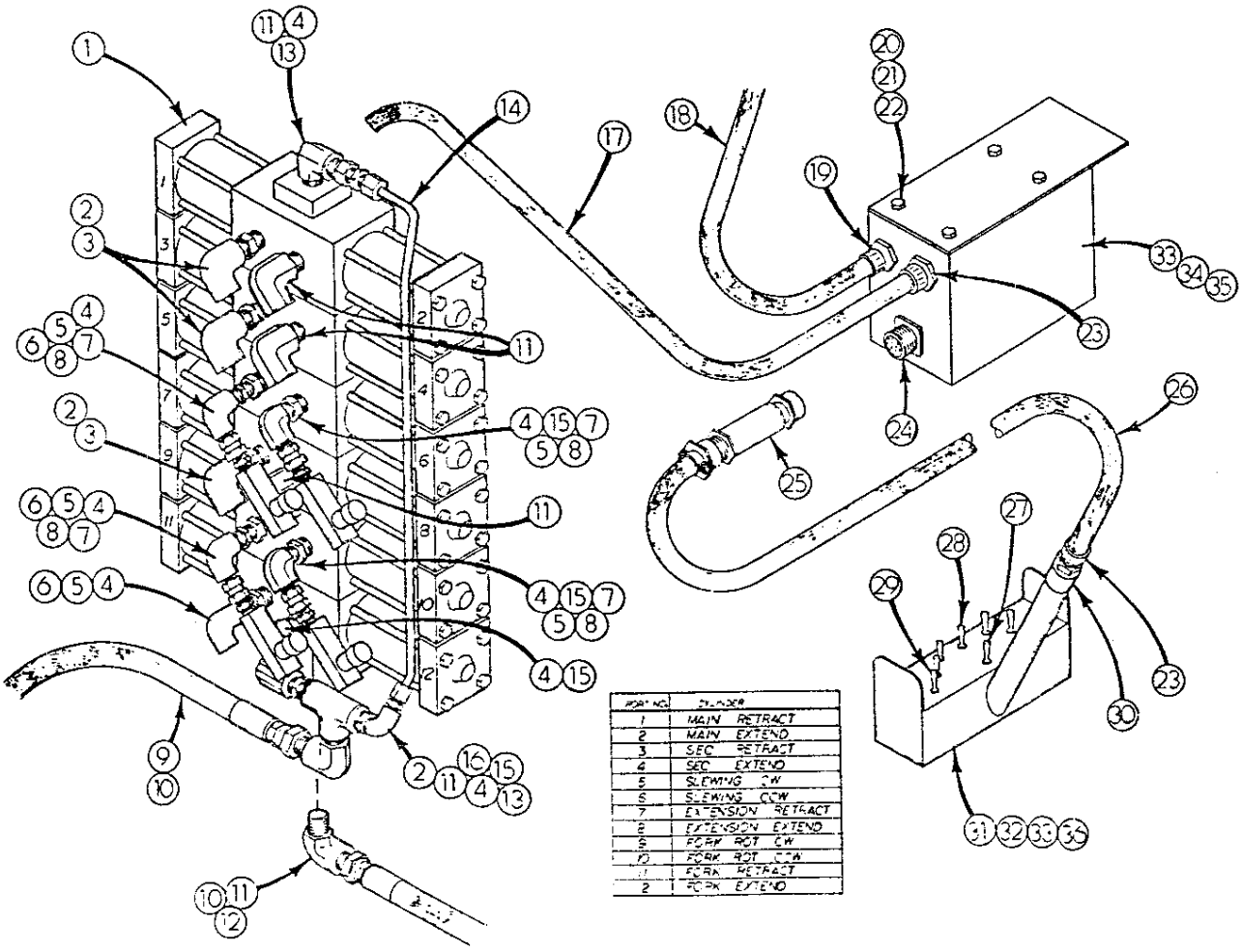


Fig. D-18

WALL BOARD FORK

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
1	72532151	Adapter Elbow w/O-Ring, Swivel	2
2	52701341	Weldm't - Upper Arm	1
3	72066315	Roll Pin, ½ x 3	9
4	60103012	Pin, Rotor/Upper Arm & Upper Arm/Sec.Arm	2
5	60103014	Pin, Link/Upper Arm	2
6	60103021	Pin, Cylinder Base End	1
7	7BF81020	Bushing, Stl. FM	4
8	72053508	Zerk, 1/8" NPT	4
9	72063039	Machy Bushing, 2 x 10 Ga. NR	2
10	72066095	Retainer Ring, 2"	2
11	52701353	Weldm't, Link	2
12	60103022	Pin, Cyl./Body & Sec./Body	2
13	3B189610	Cylinder, Wall Board Fork	1
14	73054242	Cartridge Valve	1
15	70024164	Bushing, Body	2
16	60103019	Pin, Link/Body	1
17	72063035	Machy Bushing, 1¼ x 10 Ga. NR	2
18	72066084	Retainer Ring, 1¼"	2
19	60035175	Hose	2
20	72531151	Hose Fitting, 3/8"	4
21	7BF81215	Bushing, Stl. FM	4
22	52701351	Weldm't, Secondary Arm	1
23	72063037	Machy Bushing, 1½" x 10 Ga. NR	2
24	72066088	Retainer Ring, 1½"	2
25	81030011	Pad, Delrin	2
26	72060915	Cap Screw, 3/8-16 x 1 Flat Hd.	20
27	52701362	Weldm't, Body	1
28	52701386	Weldm't, Fork	2
29	72063030	Machy Bushing, 3/4 x 10 Ga. NR	4
30	60103062	Pin, Roller	2
31	83030012	Roller	2
32	72066074	Retainer Ring, 3/4"	4
33	72053642	Swivel, 3/8"	2

WALL BOARD FORK

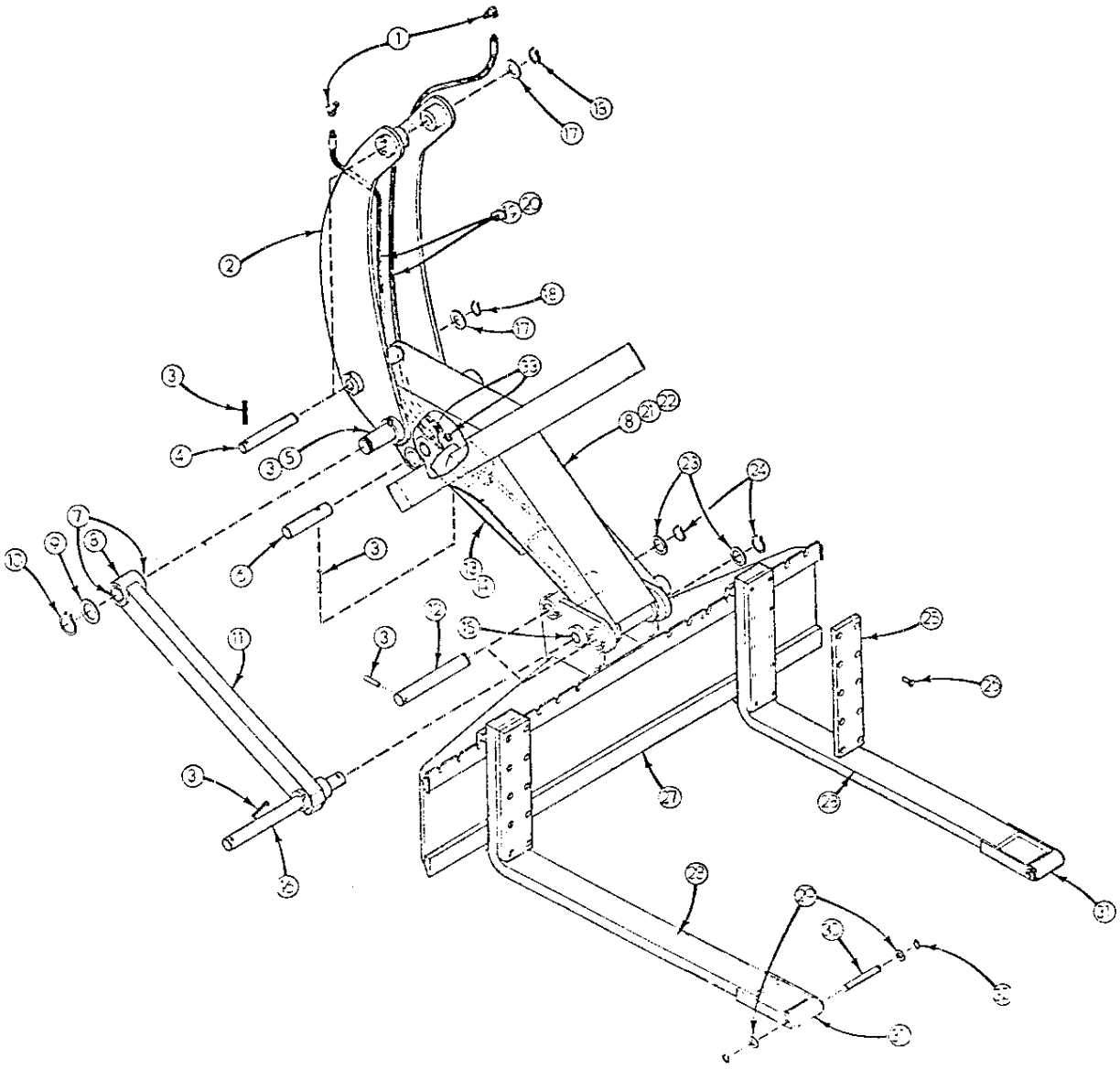


Fig. D-19

GRESEN CONTROL VALVE PARTS LIST

REF. NO.	IMTCO P/N	DESCRIPTION
1	73014691	1/32" Orifice
2	73014693	5/32" Orifice
3	73014692	Orifice Retainer
4	76039083	Seal, O-Ring
5	73014593	Std. Outlet Conversion Plug
6	76039082	Seal, O-Ring
7	73029056	Body
8	73034020	Ring, Piston
9	73014617	Poppet, Relief
10.	73014588	Spring, 2201-3000 PSI Crack
11	73014618	Shim, .040"
	73014619	Shim, .020"
	73014620	Shim, .010"
12	76039070	Seal, O-Ring
13	73024101	Cap, Relief
14	73029051	Bonnet
15	72060831	Screw, Fill Hd. 5/16 x 3/4
16	72063055	Lock Washer
17	73014597	Collar, Spool
18	73014606	Collar, Spring
19	73014589	Spring, Return
20	73014591	Retainer, Plate Washer
21	73034022	Washer, Back-Up
22	76039087	Seal, Spool
23	76039087	Seal, Spool
24	73034022	Washer, Back-Up
25	73014591	Retainer, Plate Washer
26	73029053	Bracket, Die Cast
27	73029047	Plug, Lift Check
28	76039070	Seal, O-Ring
29	73014616	Washer, Back-Up Outer
30	76039071	Seal, O-Ring, Outer
31	73034019	Washer, Back-Up, Inner
32	76039072	Seal, O-Ring
33	73014587	Spring, Lift Check
34	73014602	Poppet, Lift Check
35	76039226	O-Ring
36	76039228	O-Ring

GRESEN CONTROL VALVE

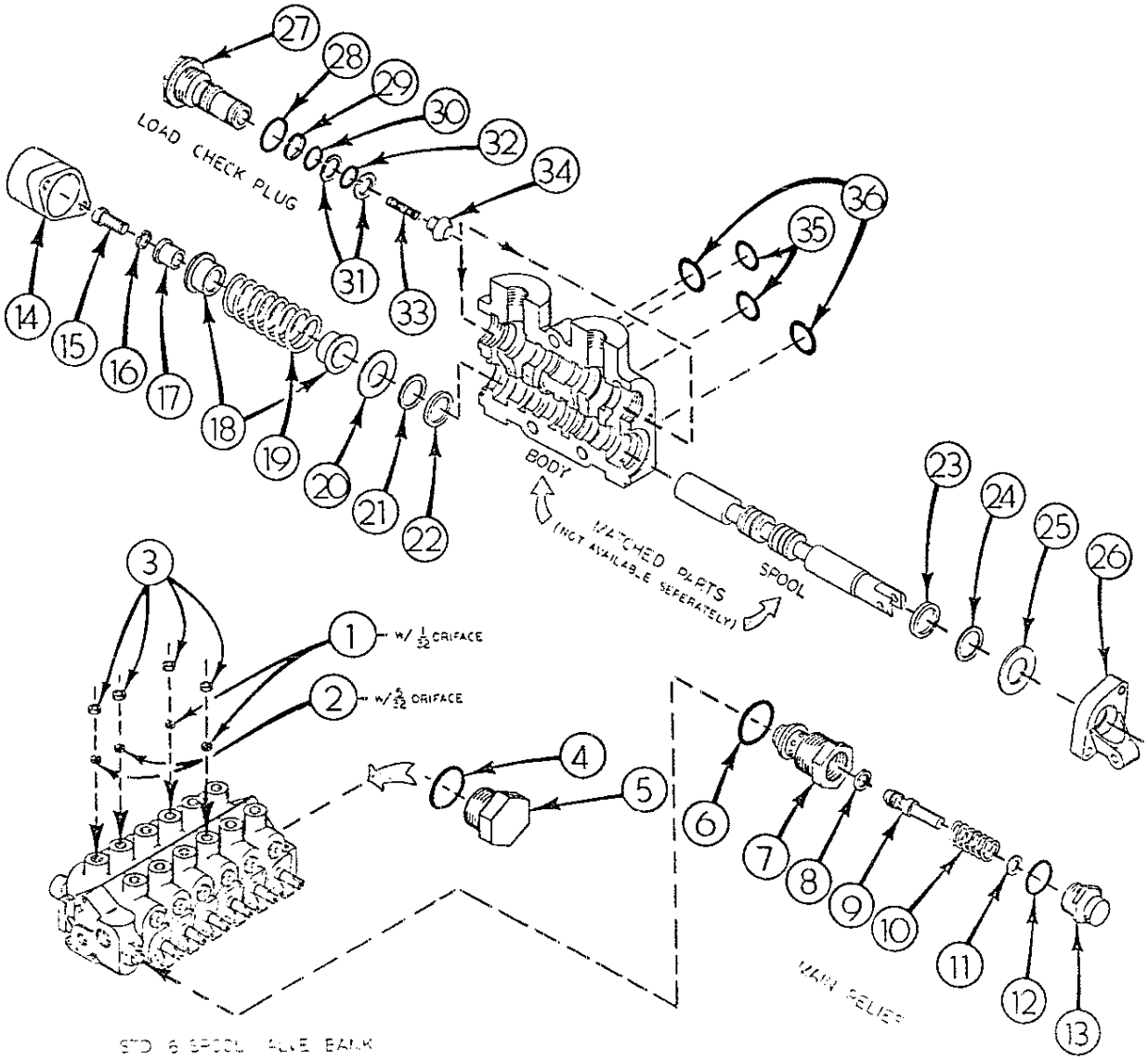


Fig. D-20

HYDRAULIC ROTOR ASSEMBLY

REF. NO.	IMTCO P/N	DESCRIPTION	NO. REQ'D
38	72063035	Machy Bushing, 1¼ x 10 Ga. NR	2
39	72066084	Retainer Ring, 1¼"	2
44	72532139	Plug, 7/16-20 Str.Thd. w/O-Ring(OSPO-4)	1
46	60103099	Pin - Ext. Boom/Rotor	1
45	73073164	Hydraulic Swivel (GP#D-101-00001-1)	1
47	73051030	Hydraulic Motor, D5M-9 (2 Bolt)	1
48	72063053	Lock Washer, ½"	2
49	72060092	Cap Screw, ½-13 x 1¼	2

NOTE: For parts and hoses (1, 2, 3, 4, 5, 6, 8, 9, 10, 42, 43) See Hydraulic Schematic.

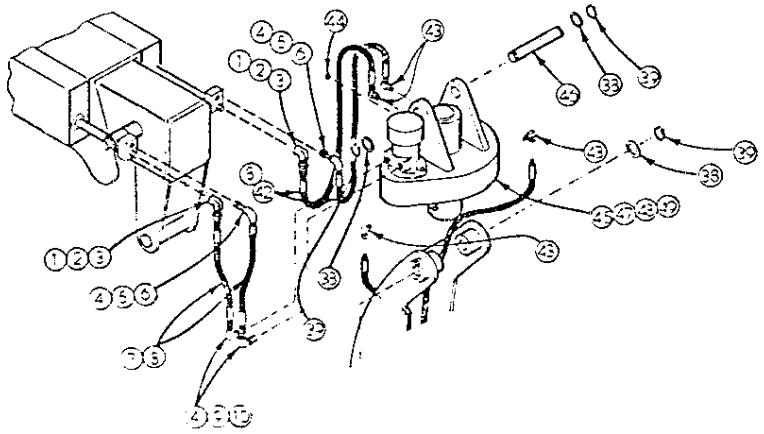


Fig. D-21

INSTALLATION

CHASSIS PREPARATION

1. Inspect carrier vehicle to assure compliance with listed requirements shown under "Minimum Chassis Requirements", page 1-13.
2. Chassis frame must be clear of all obstructions immediately behind the cab for 40" (101.6 cm). Space may be available for gas tanks, etc., after crane is installed. Some modification of hanger brackts may be required.
3. Install PTO in accordance with manufacturer's instructions (See Fig. E-5 or Fig. E-6, pages 5-5 or 5-6).
4. Install pump, insure that correct rotation is employed. See Hydraulic Pump (Fig. D-8, page 4-8). For dual pump correct rotation is required since this pump is not reversable.
5. Replace transmission grease and check for leaks.
6. Suction filters can be and most generally mounted directly onto the oil reservoir. If not, install suction filter by select location at a point approximately 20" (50.8 cm) behind cab and within 48" (122 cm) high of PTO-Pump location. Filter must be below top of chassis frame and should be accessable for servicing.
7. If rivets protrude thru top of frame flange, install ¼" x 3" (0.64 cm x 7.6 cm) flat bar strip on top of frame flange to provide a flat mounting surface. Tack weld along edge of frame, do not weld across the flange.
8. Refer to Tire Inflation Chart (page 5-11) and inflate tires to correct pressure.
9. Spray paint all unpainted steel surfaces.

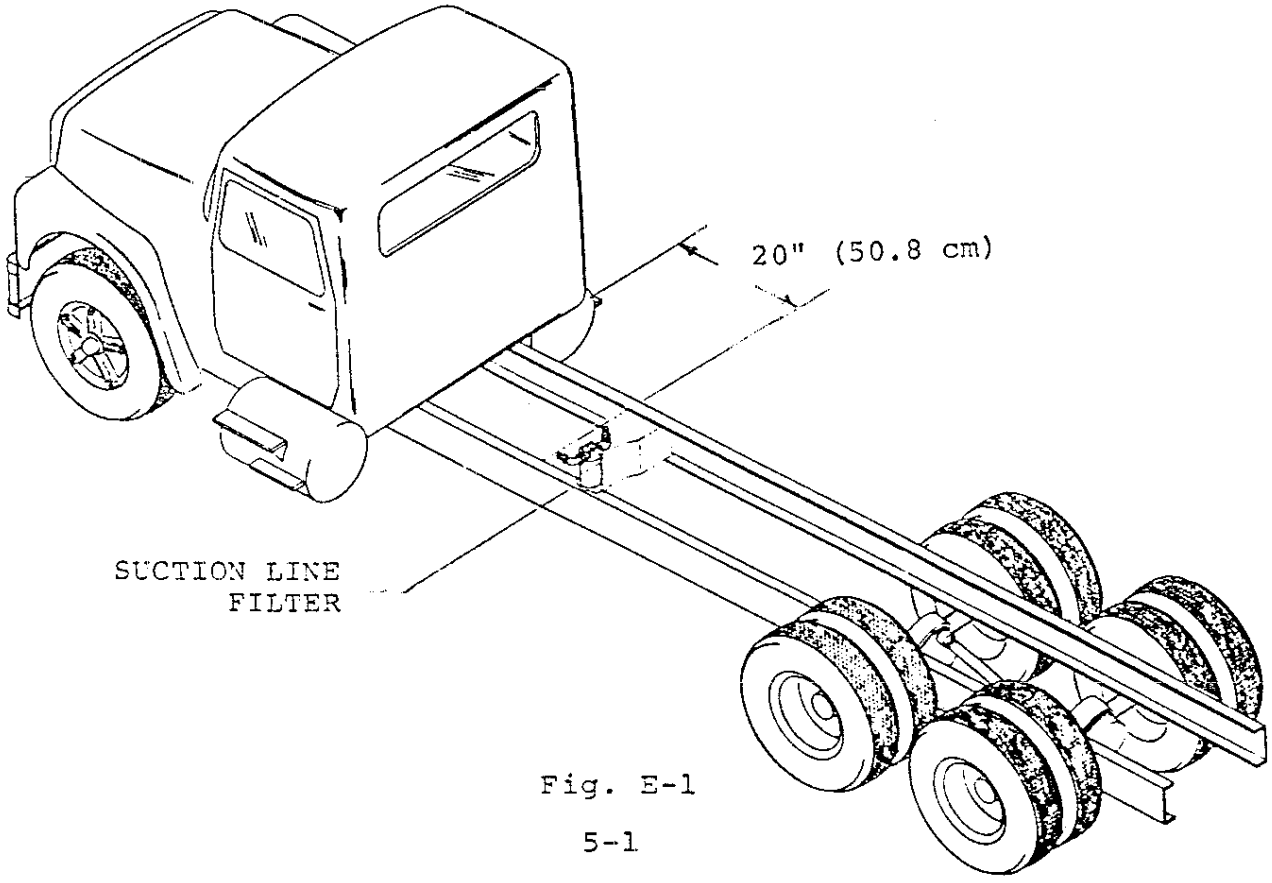


Fig. E-1

CHASSIS FRAME REINFORCEMENT

1. If chassis frame does not meet minimum section modulus or R B M requirements it must be fishplated.
2. Use the same material as in the frame.
3. Strip frame of all steps, tanks, etc. which are attached from the back of the front spring hanger to the front of the rear spring hanger.
4. Clamp 3/8" x 12" plate to both sides from a point directly behind the rear front spring hanger to a point directly in front of the foreward rear spring hanger. Use heavy duty C-clamps and secure the plates tightly to the frame.
5. Drill and reinstall all original bolts possible.
6. Weld fishplate and "L" reinforcing angles as shown below.

W A R N I N G
Do not weld on high tensile frames. Bolt fishplate utilizing bolt pattern below. Use 3/4"-8 NC Grade 6 or 8 bolts, hardened flat washers both sides and self locking nuts. Torque according to specifications on Torque Data page.

7. Paint fishplate and all welds black.

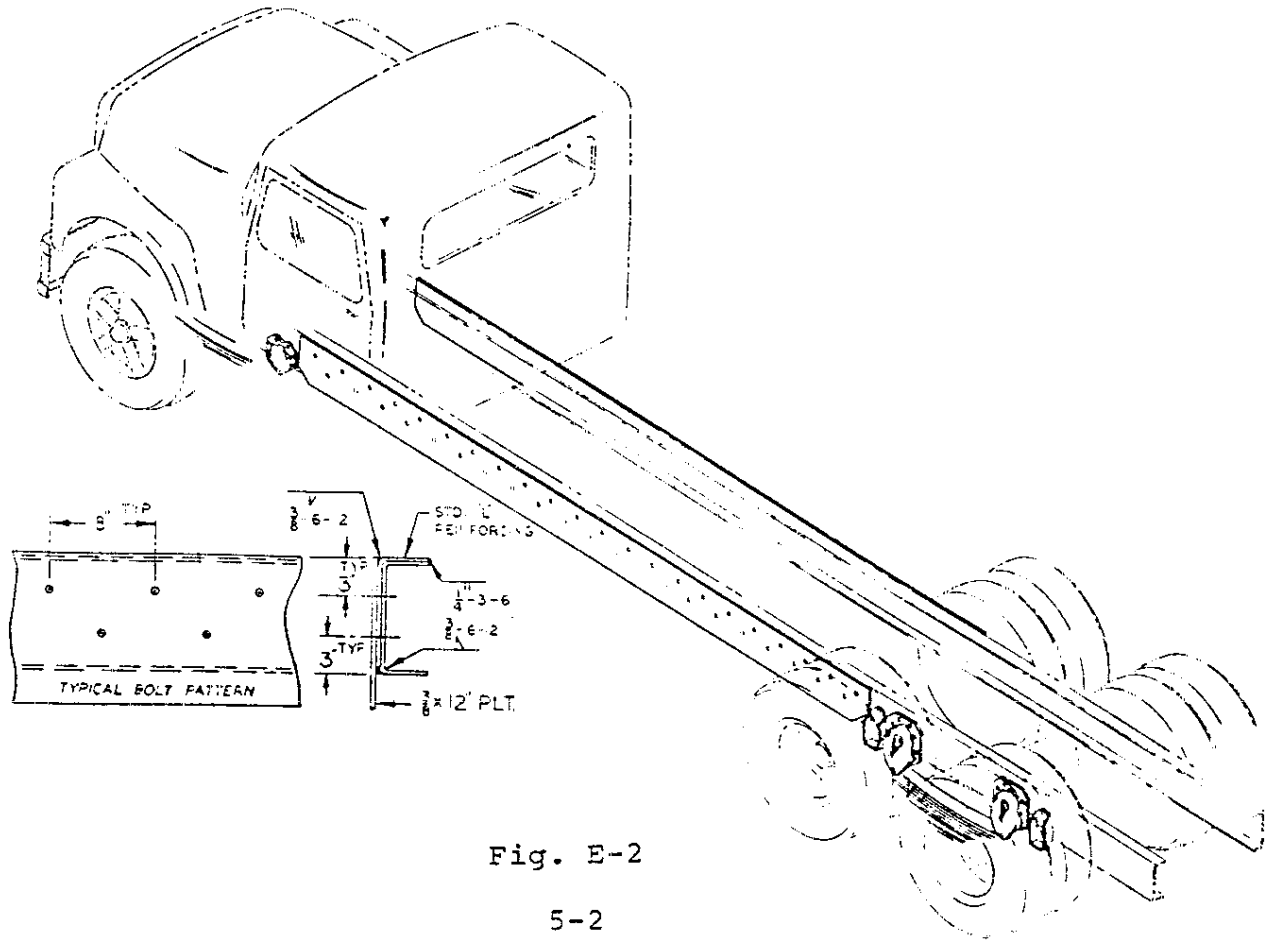


Fig. E-2

INSTALLING BASIC CRANE ASSEMBLY

1. Reinforce frame flanges by tack welding 4 each 3/8" x 3" (0.95 cm x 7.6 cm) flat bar strips vertically as shown below. Front pair should be centered approximately at a point 6" (15.2cm) behind cab and another pair centered 30" (76 cm)behind those. These bars will prevent frame flange collapse.
2. Employ adequate lifting devise; attach lifting hook to eye supplied on top of main boom. Raise crane, move chassis under and lower crane into desired location upon chassis. Check for front to rear alignment.
3. Install mounting bolts, clip bars, lock washers, and nuts to secure crane to chassis. Torque all eight bolts to 740 ft.lbs. or 102.3 kg-m.

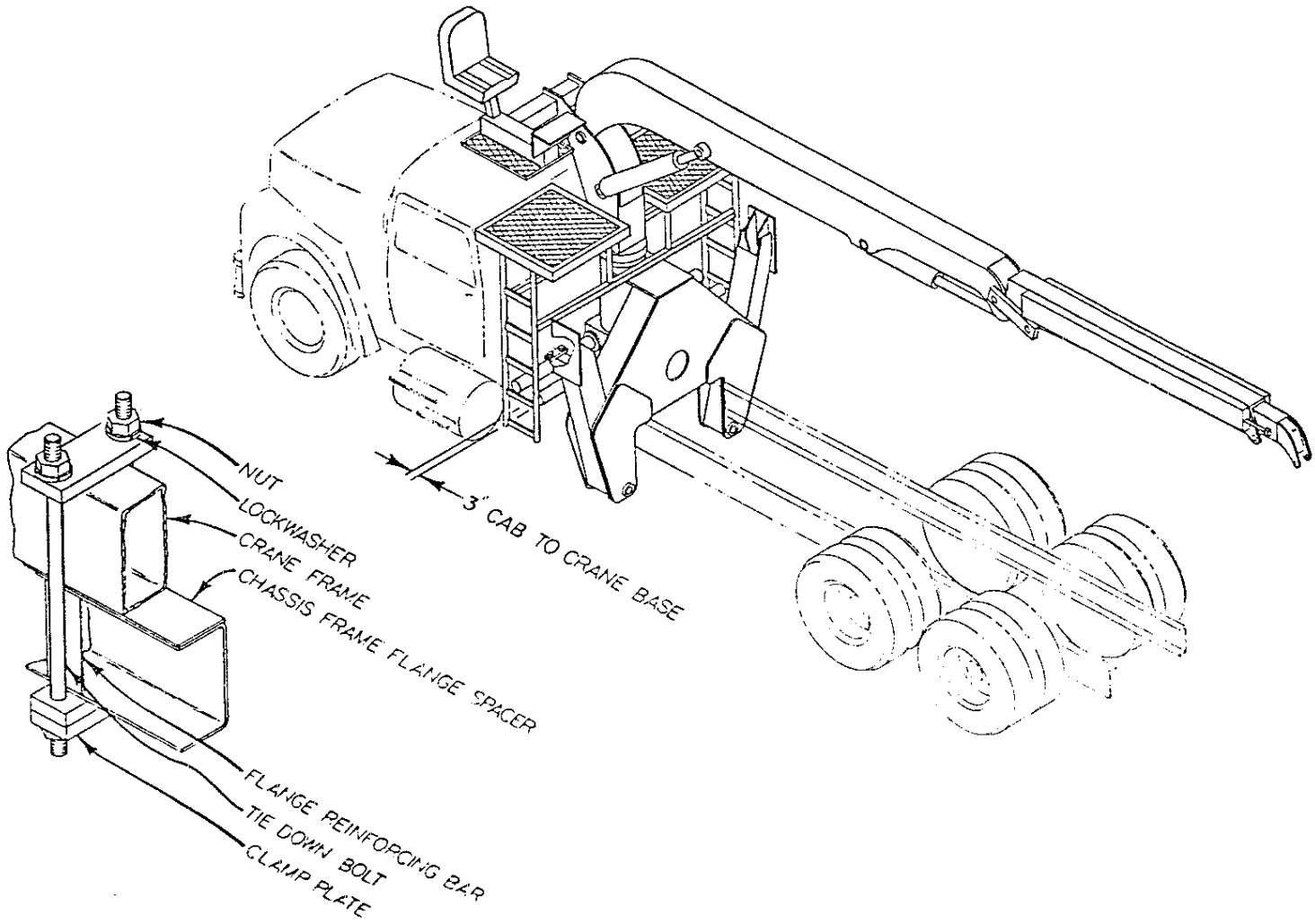


Fig. E-3

HYDRAULIC CONNECTIONS

1. Install suction hose between oil reservoir and filter
2. Install suction hose between filter and pump.
3. Install pressure hose between pump and control valve input port.
4. All fittings should be properly treated with a good sealant material and are to be adequately tightened to prevent leaks.
5. Open gate valve located at suction port on oil reservoir and fill tank with oil. See oil specifications on page 3-3.
6. Check unit for leaks.
7. Start engine, engage PTO and charge system with oil.
8. Check oil reservoir and refill as necessary.
9. Test unit in accordance to Structural and Stability Test form pages 5-8 and 5-9.
10. At the conclusion of test procedures, re-inspect and completely check all lubrication points. See Lubrication Chart page 3-2.
11. Make all final adjustments and corrections.
12. Paint unit as required.
13. Insure all operation placards are in place. See Fig. A-4 page 1-8.

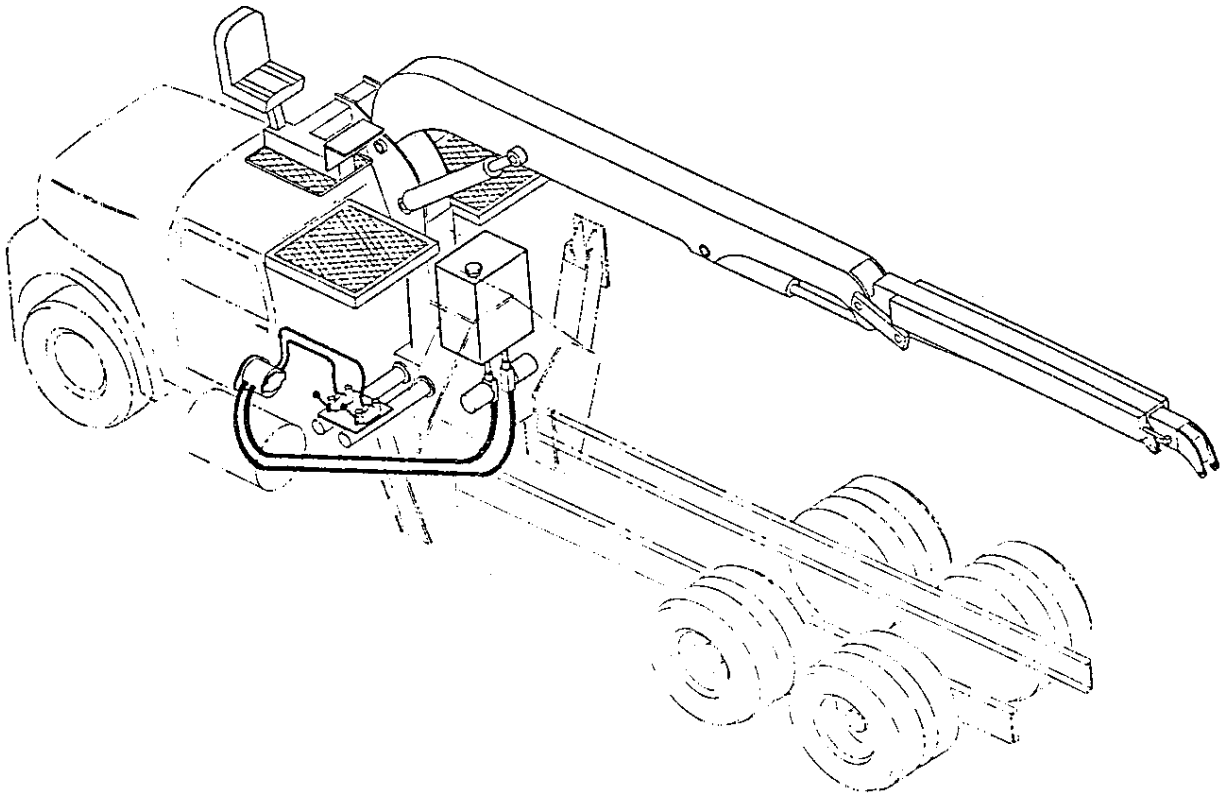


Fig. E-4

POWER TAKE-OFF INSTALLATION

Power take-off manufacturers provide installation specifications pertinent to individual products. These specifications should be adhered to when installing a PTO. The following steps are a guide in this application:

1. Drain transmission oil into a clean container for reuse if vehicle is new. If vehicle is used dispose of the oil.

2. Temporarily install PTO with proper gaskets and only two studs. Check backlash for a maximum allowance of 1/32" to 1/16".

3. Remove PTO, apply Perma-Tex to gaskets, install remaining studs, PTO, bronze seal washers and nuts. Make sure all nuts are tightened evenly and securely. Recheck backlash.

4. Install operation cable to suit conditions.

5. Replace transmission oil.

NOTE: The application shown is the one normally employed by IMTCO. If a driveline is utilized, employ standard practices pertinent to that application. When mounting a dual pump, the rear must be supported by a bracket secured to the chassis transmission.

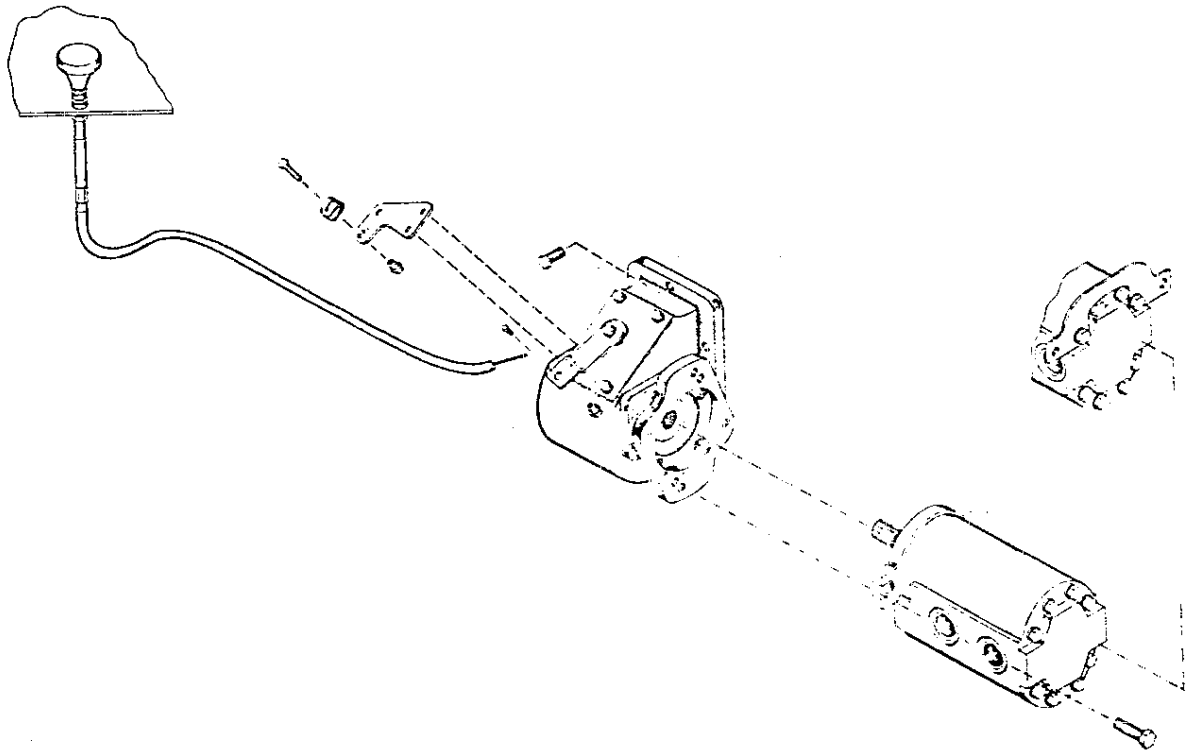


Fig. E-5

DRIVELINE POWER APPLICATION

The pump can be driven as shown below as an optional method to that shown on the previous page. The following steps are a guide in this application.

1. Install PTO as discussed on page 5-5.
2. Loosely bolt pump mounting bracket Item "A" to adjustable bracket Item "B".
3. The adjustable bracket is to be bolted to chassis frame at a point that will provide that the driveline will not exceed 48" (122 cm) and the joint angle will not be greater than 8°.
4. Check pump rotation, see page 5-7, and install pump, pump end yoke and the PTO end yoke.
5. Size, cut, and weld driveline at choosen length. Insure driveline balance. Allow 1" (2.54 cm) in slip yoke.
6. Install driveline, lock set screws, and lubricate joints.
7. Insure all mounting bolts are tight.

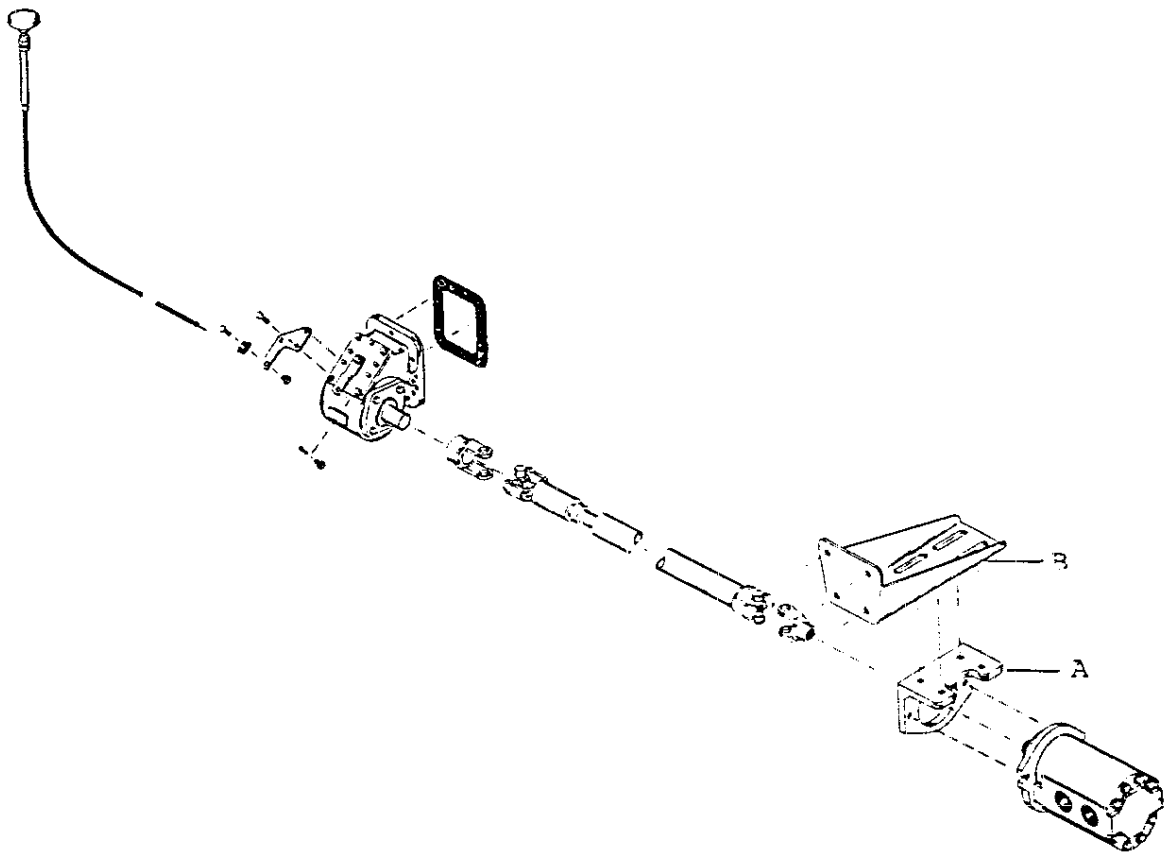


Fig. E-6

HYDRAULIC PUMP

Shown below is a parts breakdown for the pump used to power the 1230 wallboard crane with electric remote controls only. We do not recommend that this pump be rebuilt in case of failure. It should be replaced with a new pump. If, however, you elect to repair the pump, parts are numbered and IMTCO will supply replacement parts if requested. In making a parts order please refer to pump model number on your unit and the item number in the pump parts list.

When installing the pump it may be necessary, in an emergency, to reverse its rotation. It is not recommended practice, but if necessary the following procedure may be used:

1. Remove bolts shown as Item #6.
2. Back off Item #5.
3. Remove Items #4, 3, and 2.
4. Remove Item #1 and rotate 180° side to side. Do not turn fore to aft.
5. Insure seal on Item #1 is in place and properly fitted to its slot.
6. Replace Items #1, 2, 3, and 4.
7. Rotate Item #5 so that large fitting #7 is opposite side as originally located.
8. Replace bolts, Item #6, and torque from 28 to 32 ft. lbs.
9. Pump is now ready to install.

NOTE: If, when the pump is engaged, it will not hold its pressure at 2300 psi and falls as low as 1500 - 1600 psi, the seal in Item #1 is misplaced and will require correction or replacement.

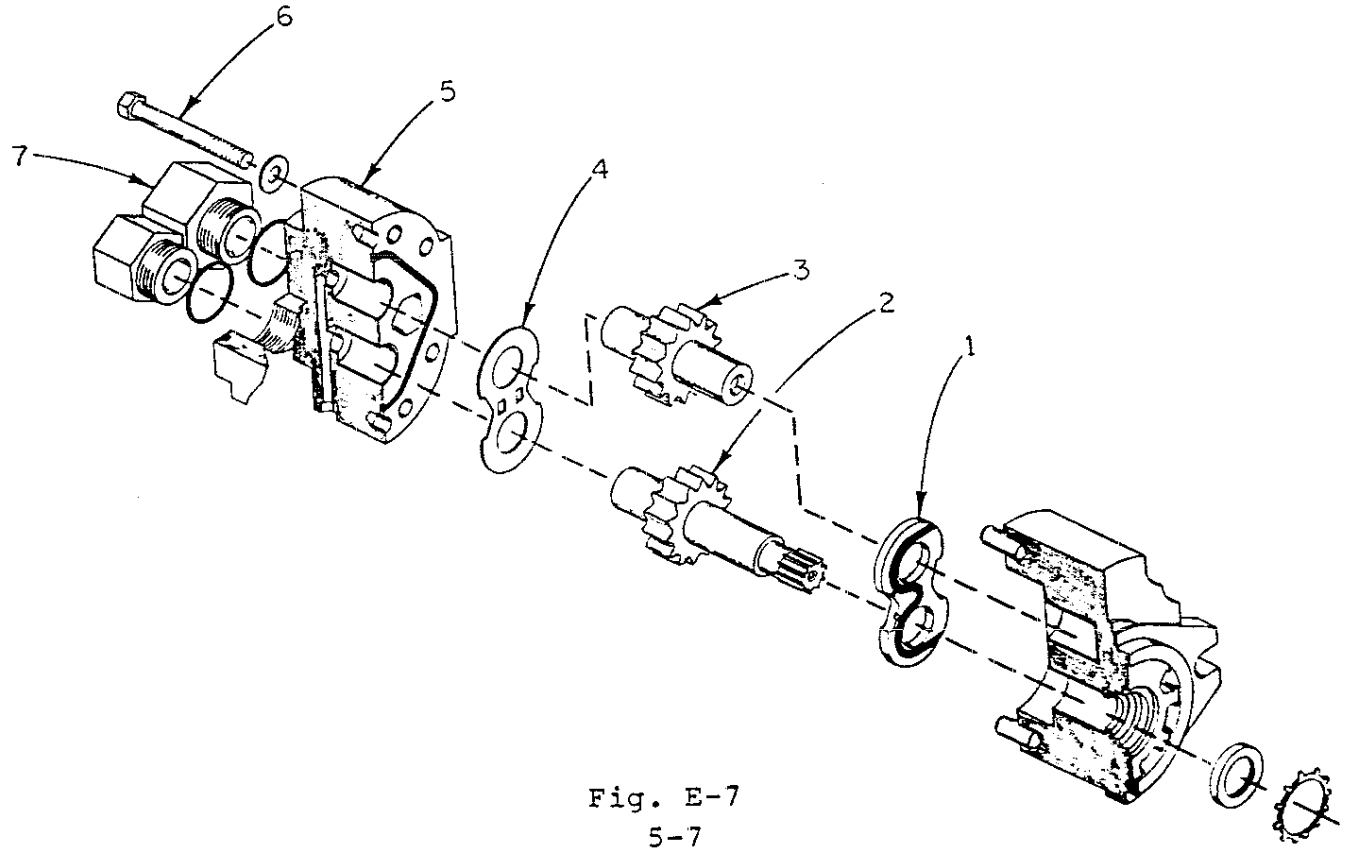


Fig. E-7

STRUCTURAL AND STABILITY TEST FORM

1230 WALLBOARD

CHASSIS INFORMATION

Make_____ Model_____ Serial Number_____

W/B_____ C/A_____ Transmission_____

GAWR-FRT_____ GAWR-Rear_____ GVWR_____

PTO Model_____ PTO %_____

Pump Model_____ Pump Rotation_____

Unit Model_____ Unit Serial Number_____

Order Number_____ Date_____

Prior to placing unit into service the following test must be performed.

INSPECTION & TEST CHECK

A) Power Take-Off shifting cable for efficient operation

B) PTO mounting bolts

C) Transmission grease

D) Underdrive hoses for brakes

E) Routing of hoses - no kinks, muffler or tail pipe contact

F) All pins and retainer parts

G) Mounting bolts for tightness

H) Lubricate all necessary lube points - check chart

I) Fill oil reservoir

J) Shut off valve open

OPERATING TEST

1) Slowly operate unit through all motions. Check hoses, cylinders, and all structural parts for proper operation.

2) Check placards to insure correctness.

3) With full rated load - 4250# (1928 kg) @ 30'-3" (9.22 m), including weight of fork (1000# (454 kg) - and booms at 30° above horizontal position check holding valves, shut engine off and open control valves, one at a time, starting with secondary down, main down, extension at retract and outrigger down. No function drift should occur.

4) Restart engine extend & retract extension boom five times for proper operation.

5) Raise and lower secondary boom five times.

6) Raise and lower main boom five times.

7) Rotate, close & open fork five times.

8) Check stability by lowering the rated load - 4250# (1928 kg) @30'-3" (9.22m) - to a low practical position. Rotate crane very slowly while constantly observing vehicle wheels for contact with ground.

   a) Note % rated load stability
   b) Position of stability (360° or portion thereof)

9) If unit is stable, rotate complete cycle five times.

10) Time unit functions for speed, record & compare with those shown in ( ) below:

Extension----------	11 Sec.	Rotation----------	30 Sec.
Main----------	30 Sec.	Outriggers--------	10 Sec.
Secondary----------	19 Sec.	Fork Fold---------	6 Sec.

11) Give unit final inspection, note & correct deficiencies.

DEALER OR INSTALLATION AGENT

I HAVE TESTED THIS UNIT AS DESCRIBED ABOVE & HEREBY RELEASE IT FOR SERVICE

DATE_____ S/N_____

NAME_____

TORQUE DATA

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	MED. CARBON ALLOY STEEL Q & T
MIN. TENSILE STRENGTH	64 000 P.S.I. 44 998 400 kgs/sq m	105 000 P.S.I. 73 825 500 kgs/sq m	133 000 P.S.I. 93 512 300 kgs/sq m	150 000 105 465 000 kgs/sq m

BOLT SIZE		RECOMMENDED TORQUE VALUES							
FRAC.	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	3.45	34	4.7	37	5.11
7/16	11 09	24	3.31	60	8.29	55	7.6	60	
1/2	12.7	37	5.11	60	8.29	85	11.75	92	12.72
9/16	14.27	53	7.32	88	12.17	120	16.59	132	18.25
5/8	15.87	74	10.23	120	16.59	167	23	180	24.89
3/4	19.05	120	16 59	200	27.66	280	38.72	296	4093
7/8	22.22	190	26.27	302	41.76	440	6085	473	65.41
1"	25.4	282	39	466	64.45	660	91 27	714	9: 7

Fig. E-8

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 whould be increased by 20%.

3. All torque measurement values are given in foot-pounds.

4. The information in the chart is pertinent to lightly lubricated course and fine thread fasteners.

5. To convert measurement in inch pounds multiply by 12

TIRE INFLATION CHART

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.

TIRE LOAD AND INFLATION TABLES

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

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	100
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	3140					
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	5426	
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

MANUFACTURER'S LIMITED WARRANTY

WARRANTY COVERAGE - Products manufactured by Iowa Mold Tooling Co., Inc. (IMT) are warranted to be free from defects in material and workmanship, under proper use, application and maintenance in accordance with IMT's written recommendations, instructions and specifications as follows:

1. Ninety (90) days; labor on IMT workmanship from the date of delivery to the end user.

2. One (1) year; original IMT parts from the date of delivery to the end user.

IMT's obligation under this warranty is limited to, and the sole remedy for any such defect shall be the repair or replacement (at IMT's option) of unaltered parts returned to IMT, freight prepaid, provided such defect occurs within the above stated warranty period and is reported within fourteen (14) days of its occurrence.

IMPLIED WARRANTY EXCLUDED - This is the only authorized IMT warranty and is in lieu of all other express or implied warranties or representations, including any implied warranties of merchantability or fitness for any particular purpose or of any other obligations on the part of IMT.

ITEMS EXCLUDED - The manufacturer gives no warranty on any components or parts purchased by the manufacturer, and such components as are covered only by the warranties of their respective manufacturers.

WARRANTY CLAIMS - Warranty claims must be submitted and shall be processed in accordance with IMT s established warranty claim procedure.

WARRANTY SERVICE - Warranty service will be performed by any IMT distributor authorized to sell new IMT products of the type involved or by any IMT Service Center authorized to service the type of product involved or by IMT in the event of direct sales made by IMT. At the time of requesting warranty service, the purchaser must present evidence of the date of delivery of the product. The purchaser shall pay any premium for overtime labor requested by the purchaser, any charge for making service calls and for transporting the equipment to the place where warranty work is performed.

WARRANTY VOIDED - All obligations of IMT under this Warranty shall be terminated: (1) if service other than normal maintenance or normal replacement of service items is performed by someone other than an authorized IMT dealer, (2) if product is modified or altered in ways not approved by IMT.

PURCHASER S RESPONSIBILITY - This Warranty covers only defective material and workmanship. It does not cover depreciation or damage caused by normal wear, accident, improper protection in storage, or improper use. The purchaser has the obligation of performing the care and maintenance duties discussed in IMT s written recommendations, instructions and specifications. Any damage which results because of purchaser's failure to perform such duties shall not be covered by this warranty. The cost of normal maintenance and normal replacement of service items such as filters, belts, etc. shall be paid by the purchaser.

CONSEQUENTIAL DAMAGES - The only remedies the purchaser has in connection with the breach or performance of any warranty on IMT products are those set forth above. In no event will the dealer, IMT or any company affiliated with IMT, be liable for business interruptions, loss of sales and/or profits, rental of substitute equipment, costs of delay or for any other special, indirect, incidental or consequential losses, costs or damages.

REPRESENTATIONS EXCLUDED - IMT products are subject to no expressed, implied or statutory warranty other than herein set forth, and no agent, representative or distributor of the manufacturer has any authority to alter the terms of this warranty in any way whatsoever or to make any representations or promises, express or implied, as to the quality or performance of IMT products other than those set forth above.

CHANGE IN DESIGN - IMT reserves the right to make changes in design or improvements upon its products without imposing any obligation upon itself to install the same upon its products theretofore manufactured.

Effective January, 1

One manual is provided with each piece of new equipment and additional manuals may be obtained at a nominal price.

IOWA MOLD TOOLING CO., INC.

500 Highway 18 West•Garner, Iowa 50438

Phone: (515) 923-3711

Form No. 99900103
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MADE IN USA