

# 515 MANUAL



# WARRANTY

IOWA MOLD TOOLING CO., INC. WARRANTS NEW MACHINERY AND EQUIPMENT, SO FAR AS THE SAME IS OF ITS OWN MANUFACTURE, AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE, ON A TWELVE MONTH PRO-RATA BASIS, FROM DATE OF SHIPMENT FROM THE FACTORY. THE OBLIGATION OF IOWA MOLD TOOLING CO., INC. UNDER THIS WARRANTY BEING LIMITED, HOWEVER, TO FURNISHING OR REPAIRING, ON A TWELVE MONTH PRO-RATA BASIS, F.O.B. ITS WORKS, A SIMILAR PART OF ITS OWN MANUFACTURE, WHICH, WITHIN TWELVE MONTHS FROM DATE OF STARTING AND NOT MORE THAN ONE YEAR AFTER DATE OF SHIPMENT OF MACHINERY, IS PROVED TO HAVE BEEN DEFECTIVE AT THE TIME IT WAS SHIPPED, PROVIDED THE PURCHASER HAS GIVEN IOWA MOLD TOOLING CO., INC. IMMEDIATE WRITTEN NOTICE UPON THE DISCOVERY OF SUCH DEFECT. IOWA MOLD TOOLING CO., INC. SHALL HAVE THE OPTION OF REQUIRING THE RETURN OF THE DEFECTIVE MATERIAL (TRANSPORTATION PREPAID) TO ESTABLISH THE CLAIM.

# 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 inquires should be addressed to Iowa Mold Tooling Co., Inc., Garner, Iowa 50438 or telephone (515) 923-2827.

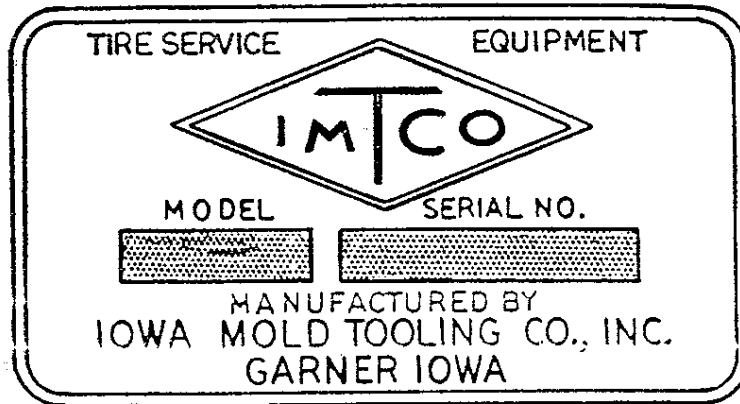


Fig. A-1

## 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.

### CAUTION

Power Take-off should always be disengaged before driving the vehicle.

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

### UNIT CONTROLS

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

Some units will be provided with a triple dual selector valve which removes outrigger control handles from main control bank and allows for optional equipment installation. Due to optional equipment considerations, controls can vary in placement and/or location but operation is basically as follows:

MAIN BOOM: Push lever to lower and pull lever to raise.

SECONDARY BOOM: Push lever to lower and pull lever to raise.

EXTENSION BOOM: Push lever to extend and pull lever to retract.

ROTATION: Pull lever for counterclock-wise motion and push lever for clock-wise rotation.

STABILIZERS: Push lever to extend and pull lever to retract.

HAND THROTTLE: Rotate knob counterclock-wise to increase speed and rotate clock-wise or push to lower engine speed to idle.

#### CAUTION

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.

## 515 CRANE GROUP

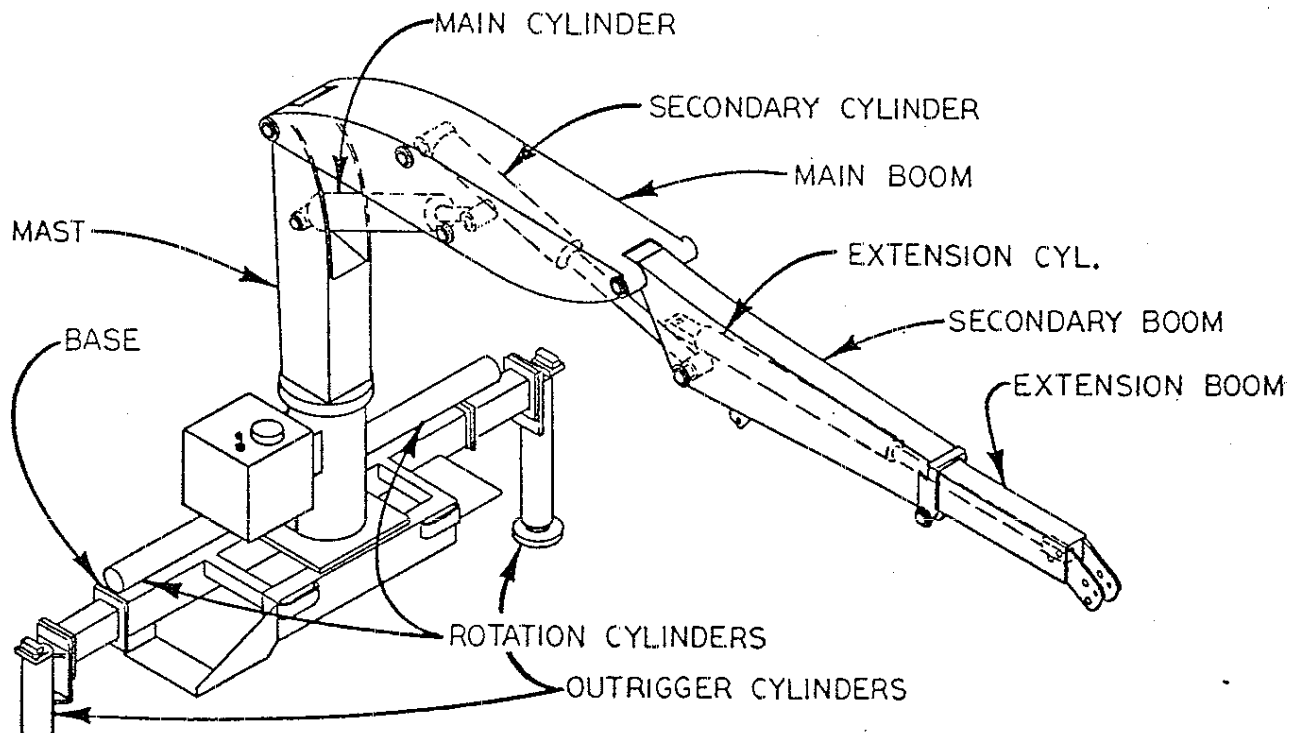


Fig. A-2

# OPERATING INSTRUCTIONS

## OPERATOR TRAINING

The IMTCO 515 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 515 crane is designed to give satisfactory service if operated within the 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 or bolts.
2. HYDRAULIC OIL SUPPLY. Check oil level in hydraulic

reservoir and fill to dipstick 'full' mark if 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 as 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 unit hand throttle control.
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.

#### WARNING

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

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 speed requirement -700 RPM- is divided by engine to PTO ratio of the truck. When the engine to PTO ratio is not known this information 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:

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

$$\frac{700 \text{ RPM}}{50\% (.50)} = 1400 \text{ RPM}$$

$$\frac{700 \text{ RPM}}{70\% (.70)} = 1000 \text{ RPM}$$

$$\frac{700 \text{ RPM}}{90\% (.90)} = 780 \text{ RPM}$$

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

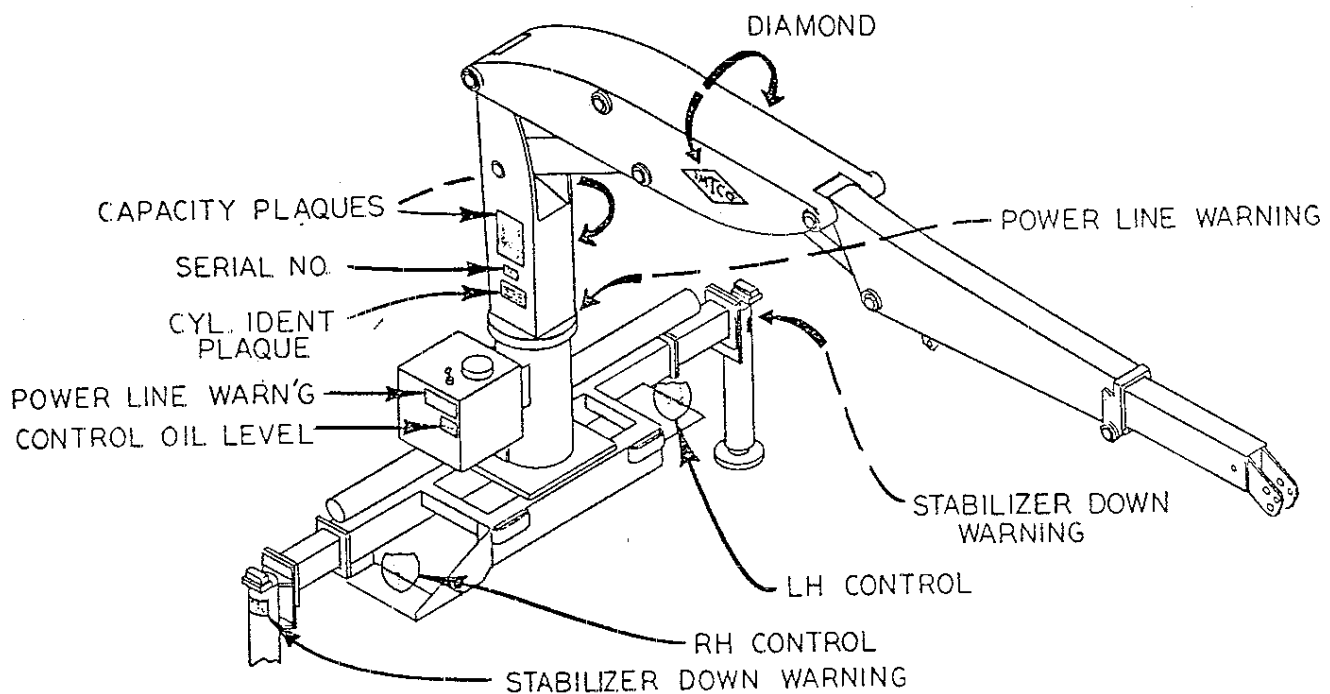


Fig. A-3

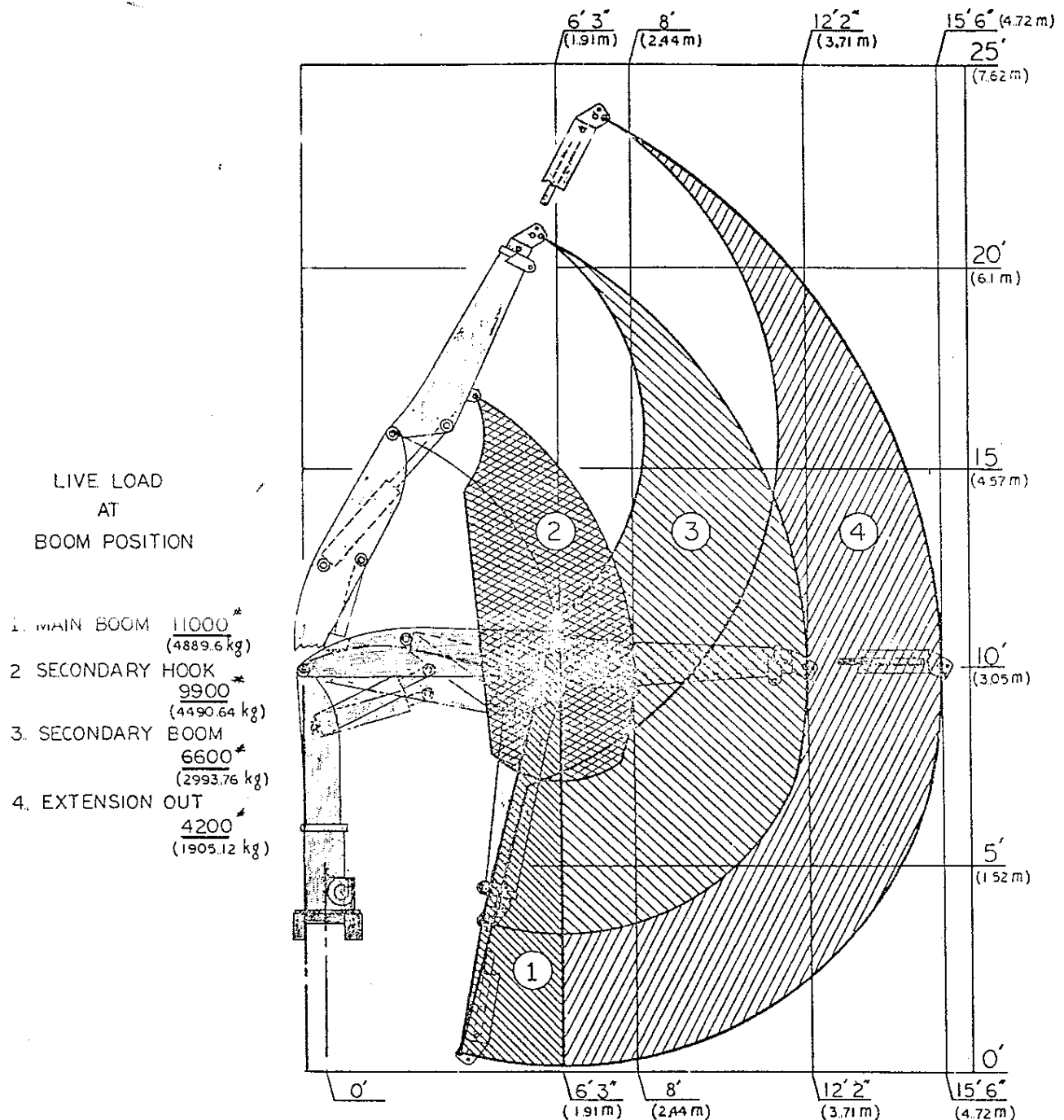
### STABILITY RATINGS

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

MODEL 515



WHEN OPERATING THE UNIT, THE LOAD WILL BE LIMITED TO THOSE SHOWN WITHIN THEIR GEOMETRIC RANGES. ACTUAL REACH FROM CENTERLINE OF ROTATION IS  $5\frac{3}{4}$ " (146.05 mm) LESS THAN SHOWN ON CHART.

Fig. A-4

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.

#### WARNING

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.

## STABILITY CHART

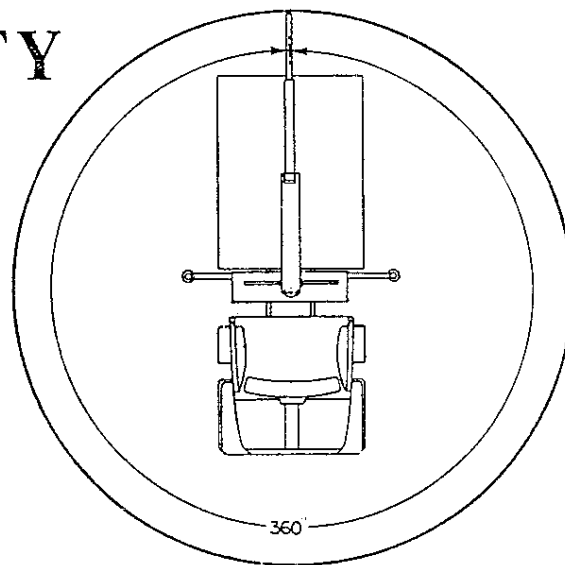


Fig. A-5

#### CONVENTIONAL CAB

Stability rating for an IMTCO 515 crane mounted on a conventional chassis with a 165" or 174" wheel base and a 102" 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 - - - - -	6,700 lbs.
Rear Axle - - - - -	8,800 lbs.
Total Weight - - - - -	15,500 lbs.

#### CAB OVER ENGINE

If a cab over engine vehicle is employed, lifting capacity will be lowered to 70% of capacity chart over front 140° of swing. Chassis wheel base required is 135" and a cab-to-axle measurement of 108" will be necessary. Minimum vehicle weights are shown below and provide an 85% tipping factor rating.

Front Axle - - - - -	8,000 lbs.
Rear Axle - - - - -	6,200 lbs.
Total Weight - - - - -	14,200 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.

# 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.

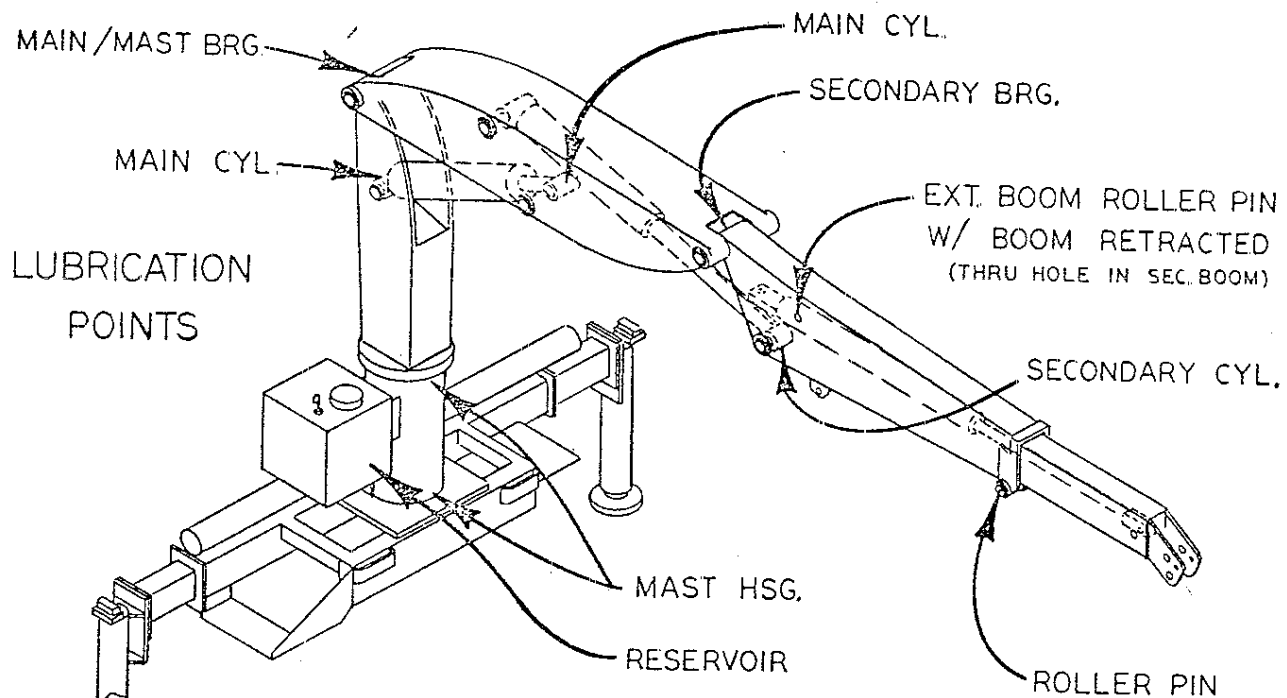


Fig. B-1

### LUBRICATION CHART

APPLICATION POINT	LUBRICATION PRODUCT	APPLICATION MEANS	INTERVAL
MAST HOUSING	Shell Alvania	Hand grease	Monthly
MAIN CYLINDER	2EP or	gun or	
MAIN & SECONDARY BOOM PINS	Shell Retinax	pneumatic	
EXTENSION BOOM ROLLERS	"A" or	pressure	
SECONDARY CYLINDER	equivalent	gun	
POWER TAKE-OFF OR TRANSMISSION	EP 90 Gear oil	Fill to check plug	Monthly

### HYDRAULIC SYSTEM

OIL SELECTION: Minimum viscosity specifications for hydraulic oil to be used in the IMTCO 515 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, °F	0-90	Below 32	32-90	Above 90
Max. Pour Point, °F	-30	-25	+10	+10
Max. viscosity, SSU @ 100°F	4000	4000	-	-
Min. Viscosity, SSU @ 100°F	140-195	100-130	150-200	200-315
Min. Viscosity, SSU @ 210°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°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 break down. 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, whichever occurs first.
2. After pump or other major hydraulic component 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 following procedure:

### WARNING

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. 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.

6. Rotate crane toward rear center of vehicle, raise outriggers 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.

### FILTER REPLACEMENT

This unit's hydraulic system contains two filters: a 25 micron suction line filter to strain out large contaminating particles and a 10 micron return line filter for removal of smaller 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.

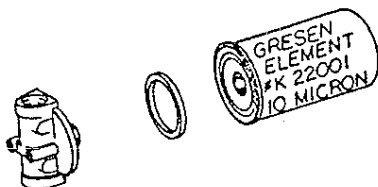
The filters should be replaced after the first 50 hours of new unit operation and approximately every 200 service hours thereafter. In addition to this service schedule, the suction line filter is equipped with a danger coded vacuum gauge. This gauge should be checked daily when operating unit. If it 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.

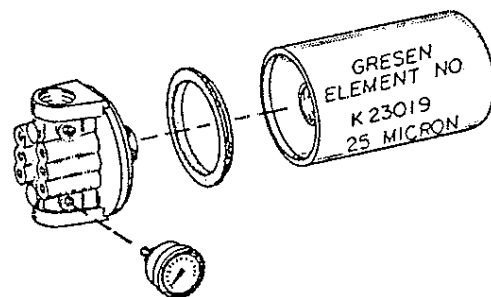
#### WARNING

Pump failure can result if shut-off valve is left closed.



RETURN FILTER

Fig. B-2



SUCTION FILTER

Fig. B-3

## HOLDING VALVES

The main, secondary, extension and outrigger cylinders are all equipped with locking holding valves. The function of these valves is to insure against extensive damage or operator injury 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.

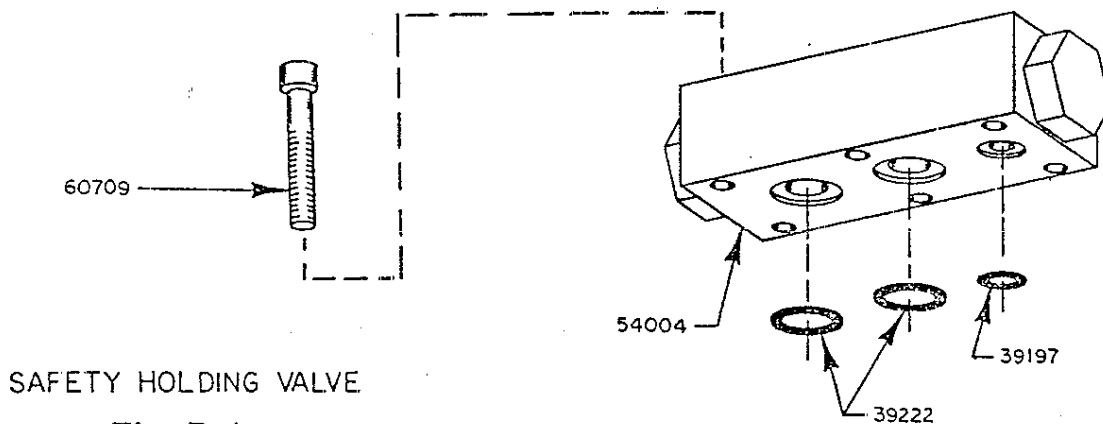


Fig. B-4

## RELIEF VALVE ADJUSTMENT

The 515 crane hydraulic system is set to operate at 2350 to 2400 psi with an optimum oil flow of 6 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 6 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.

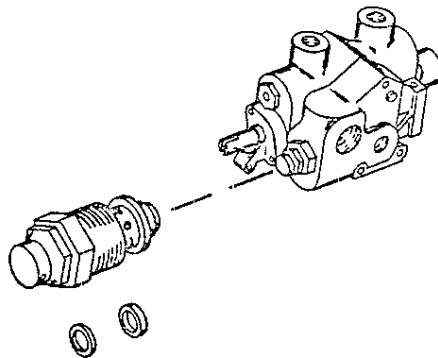


Fig. B-5

## POWER BEYOND PLUG

Hydraulic power for an auxillary function can be obtained by insertion of a power beyond plug as shown below. Remove Items #4 and #5 shown in figure C-7, page 3-7. Install plug taking care that two gasket seals are in place or function pressure will be lost. Install high pressure hose to auxillary function control valve. Order P/N - 73023.

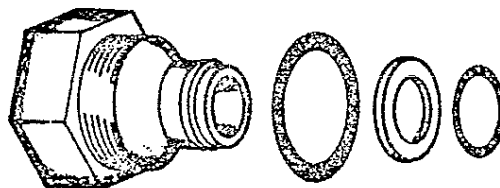


Fig. B-6

# HYDRAULIC SCHEMATIC

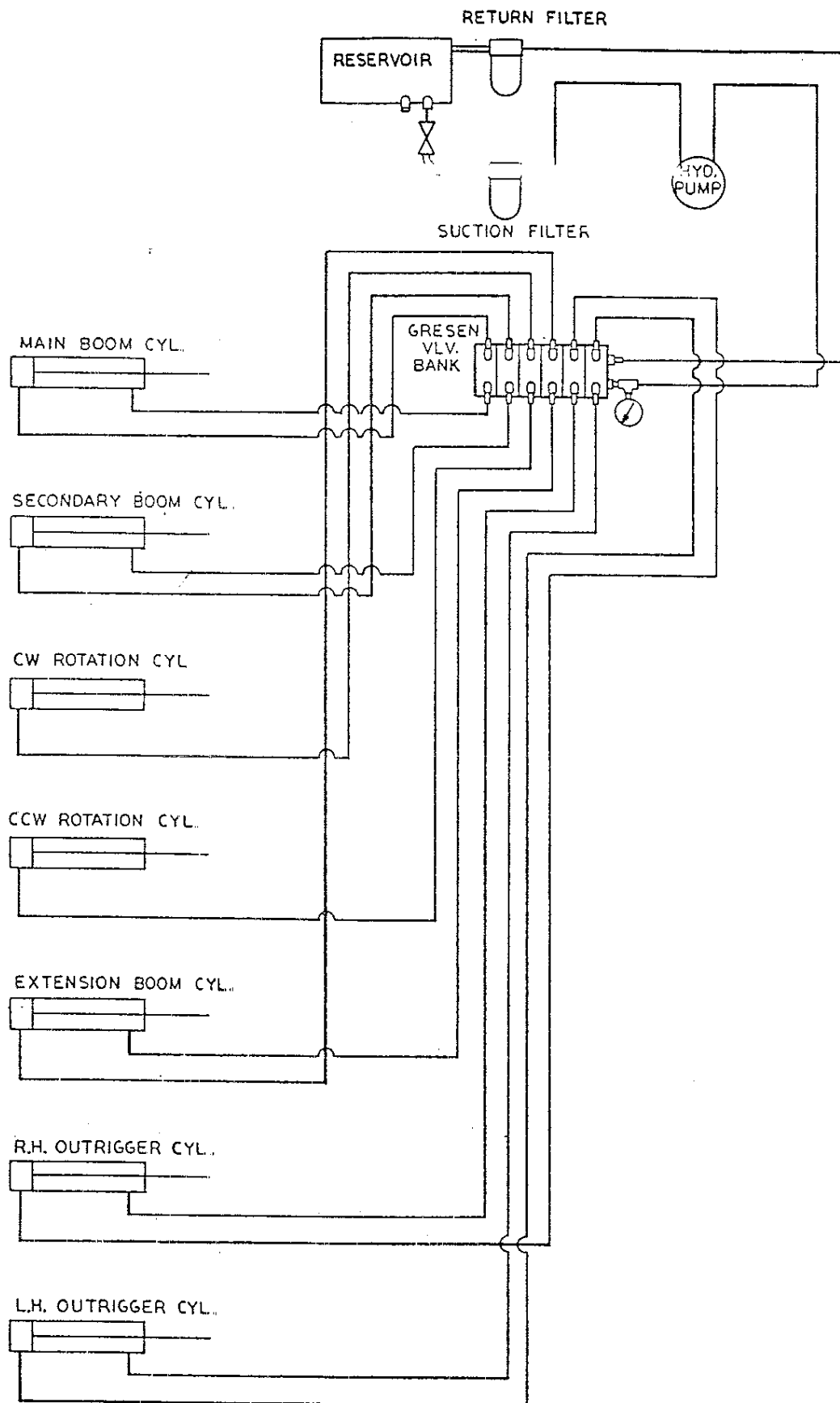


Fig. B-7

# PREVENTIVE MAINTENANCE

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

## 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 dip stick 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		
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Item	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 end 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 for hook twist exceeding 10 degrees from normal opening. Check for throat opening spread exceeding 15 percent of normal.	X		
Mounting Bolts	Inspect and check torque. Permissible torque range requires 280-460 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	Monthly
Safety 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 280-460 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 pools 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	<ol style="list-style-type: none"><li>1. The PTO is not engaged.</li><li>2. Hydraulic oil supply is low.</li><li>3. Hydraulic pressure line is ruptured.</li><li>4. Suction line shutoff valve is obstructed.</li><li>5. Hydraulic pump is faulty.</li><li>6. Relief valve is set incorrectly.</li></ol>
Operation slow down	<ol style="list-style-type: none"><li>1. Hydraulic oil supply is low.</li><li>2. Hydraulic pump is operating at a reduced speed.</li><li>3. Relief valve is set too low.</li><li>4. Pump or cylinder is worn.</li><li>5. Pump is slipping due to excessive oil temperature. This is a factor which will increase with worn components.</li><li>6. Filters are dirty.</li><li>7. Valve spools are inoperative.</li><li>8. Obstruction has occurred in boom holding valve.</li></ol>
Rotation control slowed or erratic	<ol style="list-style-type: none"><li>1. Internal port orifices are clogged.</li><li>2. Rotation cylinder packing is worn.</li><li>3. Rotation gears are locked or damaged.</li><li>4. Rack support is loose or the bushing is worn.</li></ol>

Malfunction	Possible Defect
Boom drifts when loaded and controls neutralized.	<ol style="list-style-type: none"> <li>1. Hydraulic oil is bypassing at piston seal.</li> <li>2. Main, secondary or extension cylinder holding valves are defective or contaminated.</li> </ol>
Unusual noise in operation.	<ol style="list-style-type: none"> <li>1. Cavitation is occurring due to low hydraulic oil supply.</li> <li>2. Loading is excessive.</li> <li>3. Restriction or collapse of suction line has occurred.</li> <li>4. Bypass settings on relief valve are too low.</li> <li>5. Relief valve is damaged.</li> <li>6. Valve closure is obstructed due to particle accumulation.</li> </ol>
Outriggers fail to retract.	<ol style="list-style-type: none"> <li>1. Control valve spool is inoperative.</li> <li>2. Cylinder or check valve is defective.</li> <li>3. Hydraulic lines are restricted or ruptured.</li> </ol>
Outriggers yield or drift.	<ol style="list-style-type: none"> <li>1. Hydraulic lines are ruptured.</li> <li>2. Internal bypass is occurring in cylinders.</li> </ol>

## SPECIFICATIONS & OPERATING CHARACTERISTICS

REACH - (from Centerline Rotation) - - - -	(4.58 m)	15' - 1/4"
EXTENSION - - - - -	(1.02 m)	3' - 4"
LIFTING - - - - -	(7.21 m)	23' - 8"
WEIGHT OF CRANE - - - - -	(1470 kg)	3240 lbs.
OUTRIGGER SPAN - - - - -	(3.3 m)	10' - 10"
OPTIMUM PUMP CAPACITY - - - - -	(22.7 liters)	6 U.S. gal.
OIL RESERVOIR CAPACITY - - - - -	(34.1 liters)	9 U.S. gal.
MOUNTING SPACE REQ'D - - - - -	(58.4 cm)	23"
STORAGE HEIGHT - - - - -	(3.4 m)	11' - 2"
(Based on 39" (99.1 cm) truck frame height)		

### SAFETY FACTORS

Materials - - - - -	3/1
Pins & Hydraulics - - - - -	4/1

## PERFORMANCE CHARACTERISTICS

ROTATION (360°) - - - - -	30 Sec.
MAIN BOOM ELEVATION (-11° to +62°) - - - - -	24 Sec.
SECONDARY BOOM ELEVATION (100°) - - - - -	20 Sec.
EXTENSION (40") - - - - - (1.02 m) - - - - -	14 Sec.
OUTRIGGER EXTENSION - - - - -	11 Sec.

### LIFTING CAPACITY (From Centerline Rotation)

(1.77 m) 5' - 9 3/4" - - - - -	(4,989 kg) - - - - -	11,000#
(2.29 m) 7' - 6 1/4" - - - - -	(4,491 kg) - - - - -	9,900#
(3.56 m) 11' - 8 1/4" - - - - -	(2,994 kg) - - - - -	6,600#
(4.58 m) 15' - 1/4" - - - - -	(1,905 kg) - - - - -	4,200#

## HYDRAULIC SYSTEM

Open centered, full pressure system that requires 6 GPM optimum oil flow @ 2300 psi. Six spool stack type control valve with dual operational handles located at both sides for convenient operation. System includes, hydraulic oil reservoir, suction line filter, pump, control valve, return line filters.

## POWER SOURCE

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

## CYLINDERS

MAIN - - - - -	(15.24 cm) 6" Bore	(45.72 cm) 18" Stroke
SECONDARY - - - - -	(12.7 cm) 5" Bore	(59.06 cm) 23 1/4" Stroke
EXTENSION - - - - -	(7.62 cm) 3" Bore	(101.6 cm) 40" Stroke
ROTATION - - - - -	(10.16 cm) 4" Bore	
OUTRIGGERS - - - - -	(10.16 cm) 4" Bore	(54.61 cm) 21 1/2" Stroke

## MINIMUM CHASSIS SPECIFICATIONS

Body Style	Conventional Cab	Tilt Cab
Wheel Base	165" to 174"	135"
Cab to Axle	102"	108"
Frame Section Modulus	23 cubic inches	23 cubic inches
R B M	856,000 inch pounds	856,000 inch pounds
Front Axle	7,000 pounds	7,000 pounds
Rear Axle	15,000 pounds	15,000 pounds
Transmission	4 speed	4 speed

In addition to these specifications, heavy duty electrical and cooling systems and dual wheels are required. It is recommended that the vehicle be equipped with an electric engine tachometer, auxiliary brake lock, power steering and a five speed, in lieu of four speed, transmission.

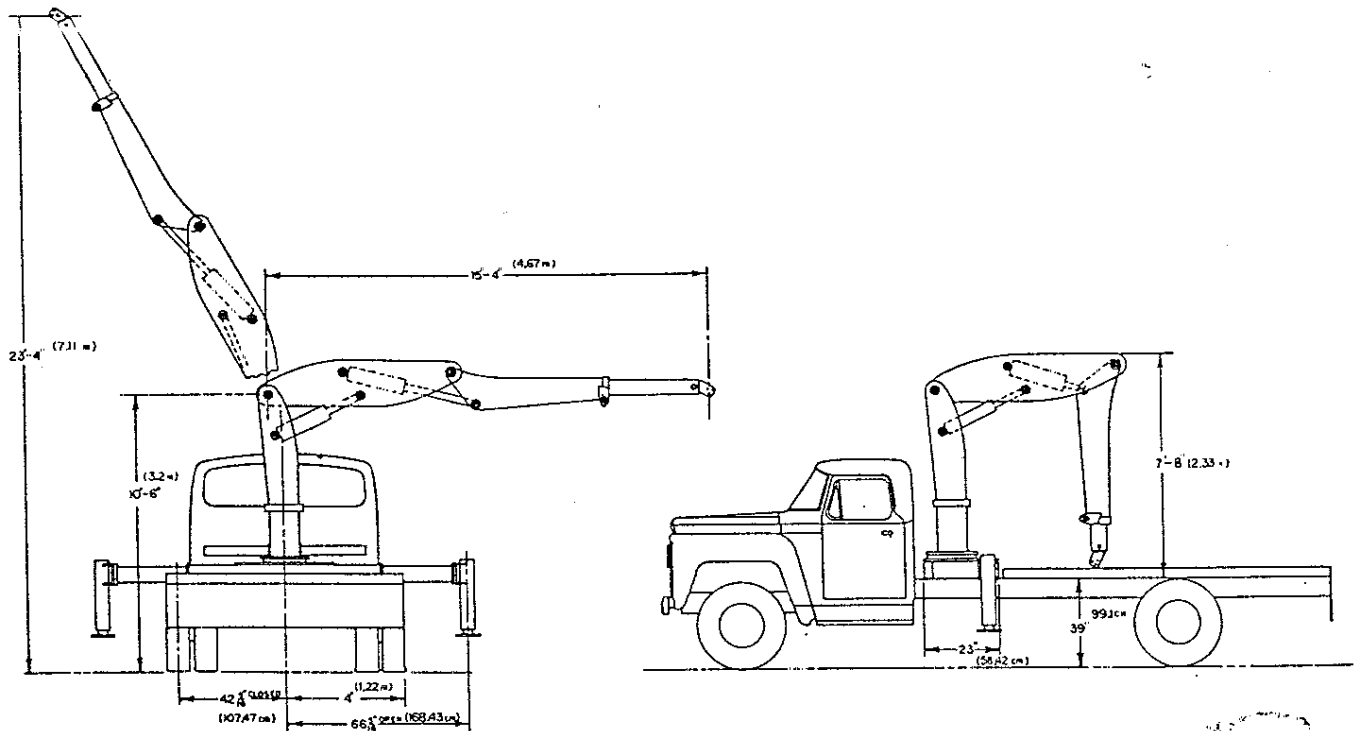


Fig. B-8

# PARTS

Every IMTCO 515 crane has a cylinder identification tag as shown below attached to the mast assembly.

The numbers stamped will begin with the letters IM or SD. The cylinders shown on the following pages are of the IM style. If your unit has SD cylinders, we can supply parts as necessary when the parts request is accompanied by the correct identification letter-number sequence.


		IOWA MOLD TOOLING CO., INC. GARNER, IOWA	
THIS UNIT IS EQUIPPED WITH THE FOLLOWING LISTED CYLINDERS			
MAIN	SECONDARY	BOOM EXTENSION	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
OUTRIGGER EXTENSION	OUTRIGGER VERTICAL	ROTATIONAL	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
AUX EQUIP	AUX EQUIP		
<input type="text"/>	<input type="text"/>		
			29106

Fig. C-1

Cyl. Use Slewing - 515

See NOTE below

Bore 4" Single Acting

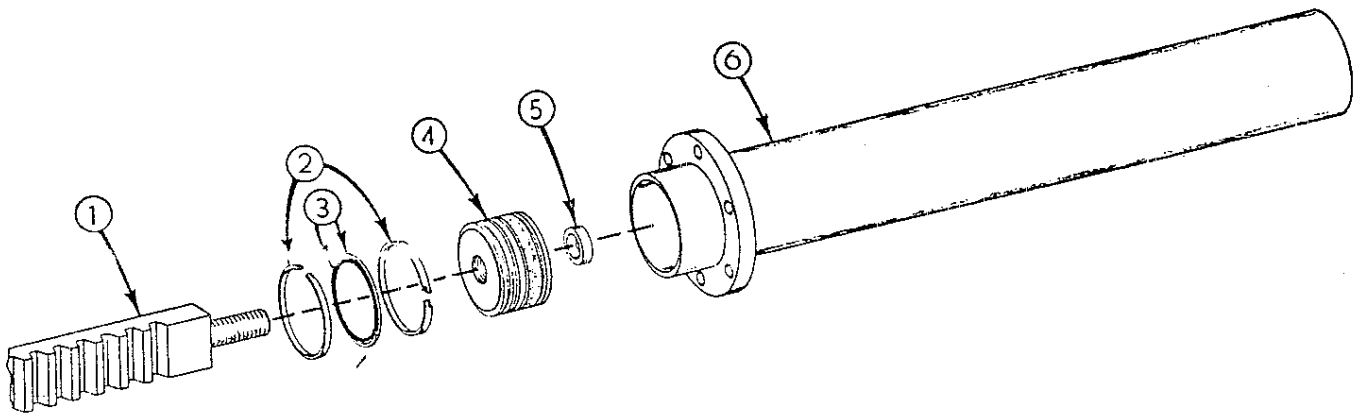


Fig. C-3

Ref. No.	IMTCO P/N	Description
1	See Note #1 & 2	Rack Assy.
2	141303	Piston Ring
3	34105	Sirvon Ring, Dyn. Psn. Seal
	39505	Psn. O-Ring, Companion
4	29204	Piston
5	34050	Seal Lok
6	73266	Case
		Seal Kit (Not Shown)

## NOTE:

1. For 515, use 73105
2. For 515 rack assy., use stinger #14804

IMTCO P/N 50077

Cyl. Use 515 Main

Bore 6 Stroke 18" Rod Dia. 3" Pin Size, Base End 2"

Pin Size, Rod End 2" c-c Closed 34 1/2"

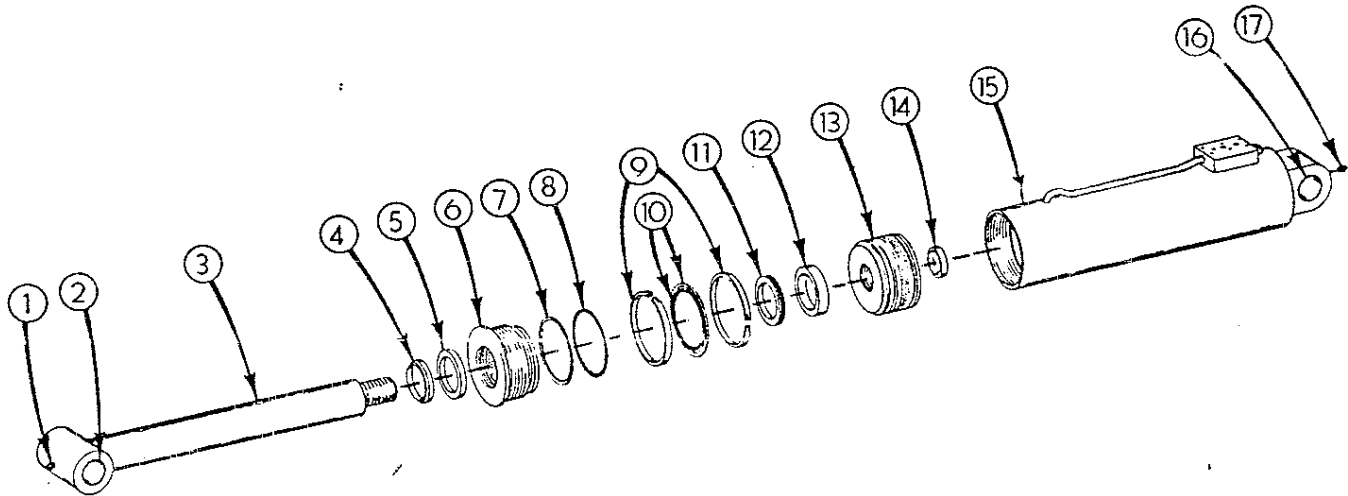


Fig. C-2

Ref. No.	IMTCO P/N	Description
1	53506	Zerk
2	14765	Bushing
	14766	Bushing
3	73522	Rod
4	39407	Rod Wiper
5	39466	Rod Seal, Dynamic
6	29411	Head
7	34158	Back-Up Ring
8	39523	Head Static Seal
9	141307	Piston Ring
10	34108	Sirvon Ring, Dyn. Psn. Seal
	39511	Psn. O-Ring, Companion
11	29606	Wafer Lok
12	141006	Stop Tube
	- - -	Stop Tube
13	29208	Piston
14	34056	Seal Lok
15	73223	Case
16	14765	Bushing (2 required)
	- - -	Bushing
17	53506	Zerk
	39555	Seal Kit (Not Shown)



IMTCO P/N 50069

Cyl. Use Extension: 515

Bore 3" Stroke 40" Rod Dia. 1 3/4" Pin Size, Base End 1"

Pin Size, Rod End 1" c-c Closed 58 3/4"

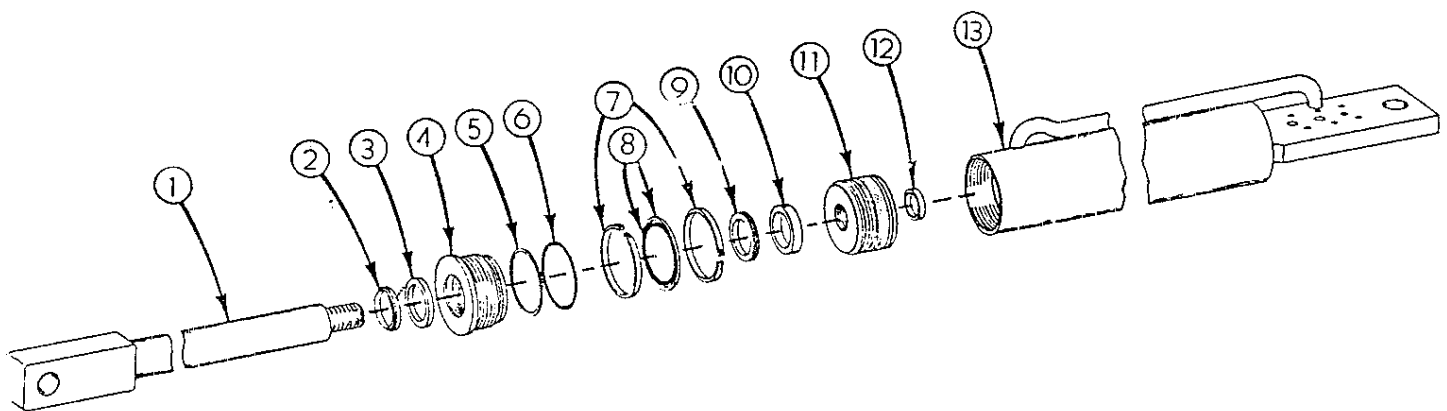


Fig. C-4

Ref. No.	IMTCO P/N	Description
1	73516	Rod
2	39403	Rod Wiper
3	39462	Rod Seal, Dynamic
4	29402	Head
5	34153	Back-Up Ring
6	39518	Head Static Seal
7	141301	Piston Ring
8	34103	Sirvon Ring, Dyn. Psn. Seal
	39503	Psn. O-Ring Companion
9	29602	Wafer Lok
10	141002	Stop Tube (3 required)
	- -	Stop Tube
11	29202	Piston
12	34052	Seal Lok
13	73217	Case
	39552	Seal Kit (Not Shown)

Cyl. Use Outrigger - 515

Bore 4" Stroke 21 1/2" Rod Dia. 3" c-c Closed 30 3/8"

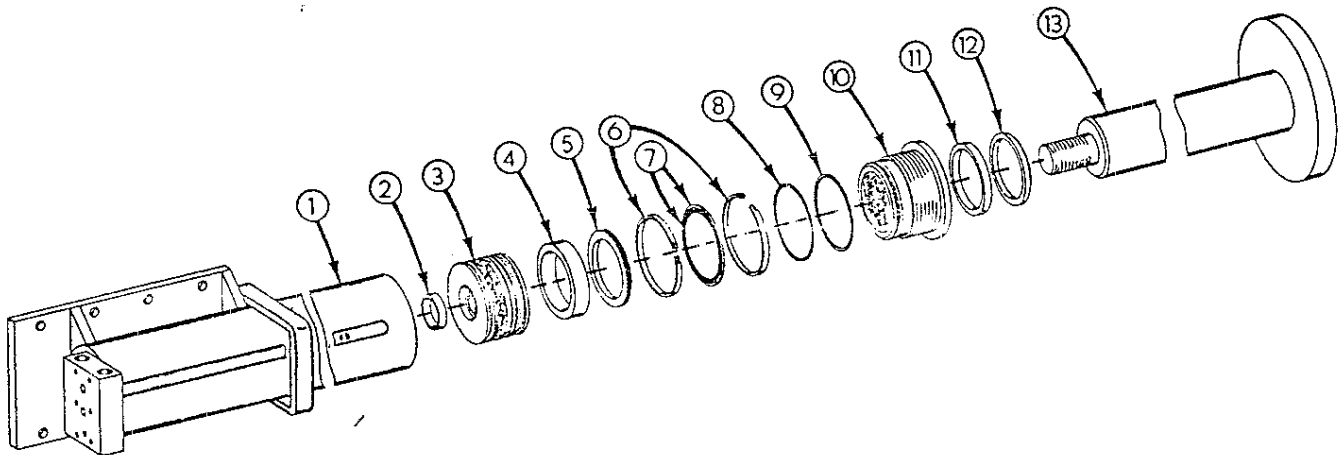


Fig. C-5

Ref. No.	IMTCO P/N	Description
1	73219	Case
2	34054	Seal Lok
3	29204	Piston
4	141006	Stop Tube
	- - -	Stop Tube
5	29606	Wafer Lok
6	141303	Piston Ring
7	34105	Sirvon Ring, Dyn. Psn. Seal
	39505	O-Ring, Companion
8	39520	Head Static Seal
9	34155	Back-Up Ring, Static
10	29407	Head
11	39466	Rod Seal, Dynamic
12	39400	Rod Wiper
13	73519	Rod
	39553	Seal Kit (Not Shown)

Ref. No. (Fig. C-7)	IMTCO P/N	Description
1	14691	1/32" Orifice
2	14693	5/32" Orifice
3	14692	Orifice Retainer
4	39083	Seal, O-Ring
5	14593	Std. Outlet Conversion Plug
6	39082	Seal, O-Ring
7	29056	Body
8	14617	Poppet, Relief w/Piston Ring #34020
9	14588	Spring, 2201-3000 PSI Crack
10	14618	Shim, .040"
	14619	.020"
	14620	.010"
11	39070	Seal, O-Ring
12	24101	Cap, Relief
13	29051	Bonnet
14	60831	Screw, Fill Hd 5/16 x 3/4
15	63055	Lockwasher
16		
17	14597	Collar, Spool
18	14606	Collar, Spring
19	14589	Spring, Return
20	14591	Retainer, Plate Washer
21	34022	Washer, Back-up
22	39087	Seal, Spool
23	39087	Seal, Spool
24	34022	Washer, Back-up
25	14591	Retainer, Plate Washer
26	29053	Bracket, Die Cast
27	29047	Plug, Lift Check
28	39070	Seal, O-Ring
29	14616	Washer, Back-up Outer
30	39071	Seal, O-Ring, Outer
31	34019	Washer, Back-up, Inner
32	39072	Seal, O-Ring
33	14587	Spring, Lift Check
34	14602	Poppet, Lift Check

Fig. C-8

REF NO.	IMTCO P/N	DESCRIPTION	QUANTITY
1	70088	LH Outrigger Arm-Weldment	1
2	70138	Weldm't- Lock Pin	2
3	70140	Hose Holder	4
4	70154	Weldm't-RH Outrigger Arm	1
5	70163	" -Long Lever	3
6	70165	" -Control Link	5
7	70166	" -Slewing Lever	1
8	70168	" -Control Lever, Long	3
9	70187	Rack Assembly	1
10	70744	Weldm't-Main Boom	1
11	70745	" -Sec. Boom	1
12	70753	" -Ext. Boom	1
13	70754	" -Base	1
14	70760	" -Reservoir	1
15	70761	" -Mast	1
16	70853	" -Rack Support	1
17	70861	" -5 Spool Control Fram (OP)	1
18	70865	" -Bent Link	1
19	73016	Hook Assembly	1
20	73083	5 Spool Valve Bank (Optional)	1
21	10004	Ext. Pin (Roller)	1
22	10118	Hose Clamp	4
23	10239	Chain (32 Links) (28" Lg)	2
24	10351	Lock Pin Spring	2
25	101617	Pin, Main Cyl. Mast	1
26	101618	Pin, Main/Mast	1
27	101619	Pin, Main and Sec. Cyl's	2
28	101620	Pin, Main/Sec.	1
29	101621	Pin, Sec. Cyl.	1
30	101623	Pin, Sec. Roller	1
31	101633	Cover Plate	1
32	101860	Rod-Control (5 Spool) Optional	1
33	101863	Shield (5 Spool) Optional	1
34	101864	Hold Down Plate	4
35	101865	Installation Plate	4
36	101867	Dipstick Adaptor	1
37	101868	Dipstick Adaptor Sleeve	1
38	101870	Dipstick	1
39	101871	Hyd. Tube	1
40	101872	Hyd. Tube	1
41	101905	Ext. Cyl. Pin Butt End	1
42	101906	Ext. Cyl. Pin Rod End,	1
43	101968	Roller, Sec. Boom	1

Fig. C-8

REF NO.	IMTCO P/N	DESCRIPTION	QUANTITY
44	101989	Roller, Ext. Boom	1
45	14052	1"-8 x 24 3/4 Stud	8
46	14671	Cap	1
47	14691	1/32 Hex Oraface	2
48	14692	Retainer	4
49	14693	5/32 Oraface - Hex	2
50	14755	FM Bushing	4
51	14758	FM Bushing	2
52	14765	FM Bushing	2
53	14766	FM Bushing	6
54	20020	Wear Plate	1
55	20065	Thrust Washer	1
56	20066	Bushing	1
57	24133	Oil Fill Screen	1
58	29106	Cyl. ID Plate	1
59	29112	515 Load Limit Chart	2
60	35011	1/4" Hose-Main Cyl 8'-6" Lg to V.B.	2
61	35012	1/4" Hose-Sec Cyl V.B. 9'-6" Lg to #79	2
62	35013	1/4" Hose-Slewing Tube 18" Lg to V.B.	1
62A	35013	1/4" Hose-Slewing Tube 20"	1
63	35014	1/4" Hose-Optional	1
64	35015	1/4" Hose-Optional	1
65	35016	1/4" Hose-Outrigger Cyl LH 6'-0"	1
65A	35016	1/4" Hose-Outrigger Cyl RH 9'-6"	1
66	35017	1" Hose-Res. to Lg. Filter	1
67	35018	1" Hose-Lg Filter to Pump	1
68	35019	1/2" Hose-Pump to V.B.	1
69	35020	1/2" Hose-V.B. to Sm Filter	1
70	35021	1/4" Hose Ext Cyl to V.B., 16'-0"	2
71	35058	1/4" Hose Sec. Cyl to #69, 14" Lg	2
72	39096	1" Blk Ball-6 Spool	12
73	39128	Powerline Warning Decal	2
74	39129	Stabilizer Warning Decal	2
75	39133	18" Diamond IMTCO Decal	2
76	39134	Oil Level, Caution Decal	1
77	39135	LH Valve Bank Control, 515 Decal	1
78	39136	RH Control, 515 Decal	1
79	50001	Ext. Cyl	1
80	50014	Outrigger Cylinder	2
81	50022	Slewing Tube	2
82	50044	Main Cylinder	1
83	50045	Secondary Cylinder	1
84	51000	13 Gallon Pump	1
85	52000	Hyd. Filter ( Small )	1

Fig. C-8

REF. NO.	IMTCO P/N	DESCRIPTION	QUANTITY
86	52001	3/4" NPT Magnetic Plug	1
87	52004	Large Filter	1
88	53090	1/2" NPT Close Nipple	1
89	10354	Clamp Plate	4
90	53185	1" NPT Close Nipple	1
91	53416	1" Pipe Plug	1
92	53424	1/2" NPT Plug	1
93	53451	3/8-1/8" Steel Ferulok Ftng-Male Elbow	2
94	53499	1/4-7/16 M/Pipe/Male JIC 37° Std	12
95	53506	3/16 Press Fit Zerk	6
96	53508	1/8 NPT Zerk	9
97	53752	Adaptor W/O-Ring	1
98	53749	Adaptor W/O-Ring	1
99	53517	1/4" Hex Nipple	2
100	53533	1/4" 45° St. Elbow	2
101	53556	3/4-90° St. Elbow	2
102	53558	3/4" Hex Nipple	1
103	53563	3/8-45° St. Elbow	4
104	53655	1/4-1/4 F/F Swivel	2
105	531099	1/4"-90° Elbow	2
106	531101	1/4"-90° St. Elbow	1
107	531131	1/4"-90° St. Elbow	3
108	531132	3/8-90° St. Elbow	6
109	531133	1/2-90° St. Elbow	1
110	53286	1"-90° St. Elbow, Blk	1
111	531178	1/4" NPT Swivel Fitting	20
112	531185	1/2 NPT Swedge Swivel Fitting	2
113	531245	1/4-1/4 Male Connector	2
114	531833	3/4-1/2 Red. Bushing	1
115	10368	Control Rod	1
116	532123	Swivel Hose Fitting 23930-4-4	6
117	52130	Swivel Hose Fitting 24130-4-4	6
118	532138	3/8-1/4 Red. Bushing	12
119	54001	1" Gate Valve	1
120	54004	Holding Valve	5
121	54034	1/4" Color Flow F400-B11	1
122	54035	Selector Valve SK-166 (Optional)	1
123	60832	5/16-18 x 3/4 Pt Set Screw	2
124	58002	End Yoke	6
125	58003	Conn. Link	6
126	60033	5/16-18 x 3 US Hex Cap Screw	3
127	60042	3/8-16 x 1/2 US Hex Cap Screw	4
128	60046	3/8-16 x 1 US Hex Cap Screw	4
129	60048	3/8-16 x 1 1/2 US Hex Cap Screw	4
130	60050	3/8-16 x 2 US Hex Cap Screw	4

Fig. C-8

REF. NO.	IMTCO P/N	DESCRIPTION	QUANTITY
131	60093	1/2-13 x 1 1/2 US Hex Cap Screw	12
132	60095	1/2-13 x 2 US Hex Cap Screw	12
133	60150	5/8-11 x 1 3/4 US Hex Cap Screw	2
134	60263	1 1/4-7 x 5 1/2 US Hex Cap Screw	1
135	60564	1/4-20 x 1 1/2 SC Hd Cap Screw	30
136	60836	1/4-20 x 3/4 Fl Soc Hd Screw	2
137	61001	#8 x 1/2 Self Tapping Screw	4
138	62001	5/16-18 USS Hex Nut	3
139	62002	3/8-16 USS Hex Nut	12
140	62004	1/2-13 USS Hex Nut	12
141	62036	5/16-24 USS Hex Nut	6
142	62075	1"-8 High Strength Nut A-235	16
143	62082	1 1/4-7 Castled Nut	1
144	63034	1" x 10 Ga. Washer N.R.	4
145	63037	1 1/2" x 10 Ga. Washer N.R.	1
146	63039	2" x 10 Ga. Washer N.R.	7
147	63051	3/8 Std. Lock Washer	13
148	63053	1/2 Std. Lock Washer	24
149	66001	#24 Hose Clamp	4
50	101428	Shield (6 Spool)	1
151	66125	Retainer Ring 5160-98 (External)	3
152	66132	Retainer Ring 5160-150 (External)	1
153	66136	Retainer Ring 5160-200 (External)	7
154	66185	5/32 x 1 Cotter Pin	3
155	66197	3/16 x 2 1/2 Cotter Pin	2
156	66317	1/2 x 4 Spring Pin	6
157	66335	Special Long Cotter Pin 929-001	6
158	66336	Special Short Cotter Pin 086-001	12
159	66337	Pin - Gresen 1857-001	6
160	66338	Pin, 1/4 x 1 Liedzke	6
161	70864	Dipstick Ass'y - Adaptor	1
162	63003	3/8" Wraught Washer	4
163	531549	#16 1" Barbed Nipple	2
164	63001	1/4" Wraught Washer	30
165	63007	5/8" Wraught Washer	2
166	63058	1" Std. Lock Washer	8
167	63050	5/16 Std. Lock Washer	3
168	63055	5/8 Std. Lock Washer	2
169	73011	6 Spool Valve Bank	1
170	70167	Weldm't - Lever V.B. Short	2
171	70162	Weldm't - Short Lever	2
172	70164	Control Frame (6 Spool)	1
173	53469	1/4-18 F/F Adaptor	2

# INSTALLATION

Prior to installation of crane upon chassis, the vehicle must be inspected to insure that it meets or exceeds minimum chassis requirements found on page 2-16.

NOTE: All vehicles that do not meet minimum R B M will require fish plate or other form of reinforcement.

## WARNING

Minimum chassis requirements do not insure unit stability in all possible crane positions and load capacities. However, the crane must be installed in accordance with factory requirements which include start up and complete stability testing. Forms for these tests are included in the last section of this manual and must be completed to ascertain unit installation integrity and stability factors. Counterweight may be required to maintain full crane load capacity stability.

## INSTALLATION SEQUENCE

1. Inspect and prepare chassis to receive crane.
  - A. Install Power take-off according to manufacturer's instructions.
  - B. Refill transmission oil to proper level.
  - C. Install integral mounted pump. Care should be taken to insure pump is of proper rotation. See pages 4-3 and 4-4 for PTO and pump mounting instructions.
2. Fish plate frame if required. See page 4-5.
3. Reinforce frame flanges at crane mounting bolt locations to prevent flange distortion.
  - A. Allow 3 inch clearance behind cab and front side of crane frame.
  - B. Use 1/4" x 3" bar stock, securely tack weld to outermost edge of frame flange.
4. Install suction line filter.
  - A. Choose a clear area in the proximate location at the rear of cab.
  - B. Fabricate a bolt-on bracket for attachment to frame or frame cross member bar.



- C. Insure that filter can be serviced after equipment installation.
- D. Install suction hose from filter to pump.
- 5. Install frame rivet spacer bar on top of frame.
  - A. Use 1/4" x 3" x 25" flat bar with rivet clearance holes on frame for crane to rest upon.
  - B. Care should be taken not to score frame across its flanges.
- 6. Place crane on vehicle at chosen location.
  - A. Install mounting bolts, clip bars, lock washers and nuts. Torque bolts to 466 ft. lbs.
- 7. Connect hydraulic hoses.
  - A. Install short suction hose from oil reservoir to suction filter.
  - B. Install pressure hose from pump high pressure side to control valve.
  - C. Check all connections for tightness.
  - D. Open suction line gate valve on reservoir and fill tank with oil. See oil specifications on page 2-3.
- 8. Install other equipment such as body, compressor, etc. The weight of these items will be needed to check unit stability.
- 9. Start-up and initial check out procedure.
  - A. Refer to operating instructions on page 1-3.
  - B. Refer to start up and stability test forms found at the back of the manual.

#### HYDRAULIC PUMP

Shown below is a parts breakdown for the pump used to power the 515 crane. 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 a 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 over 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.

CAUTION

We do not recommend this procedure and it should be resorted to only in an emergency.

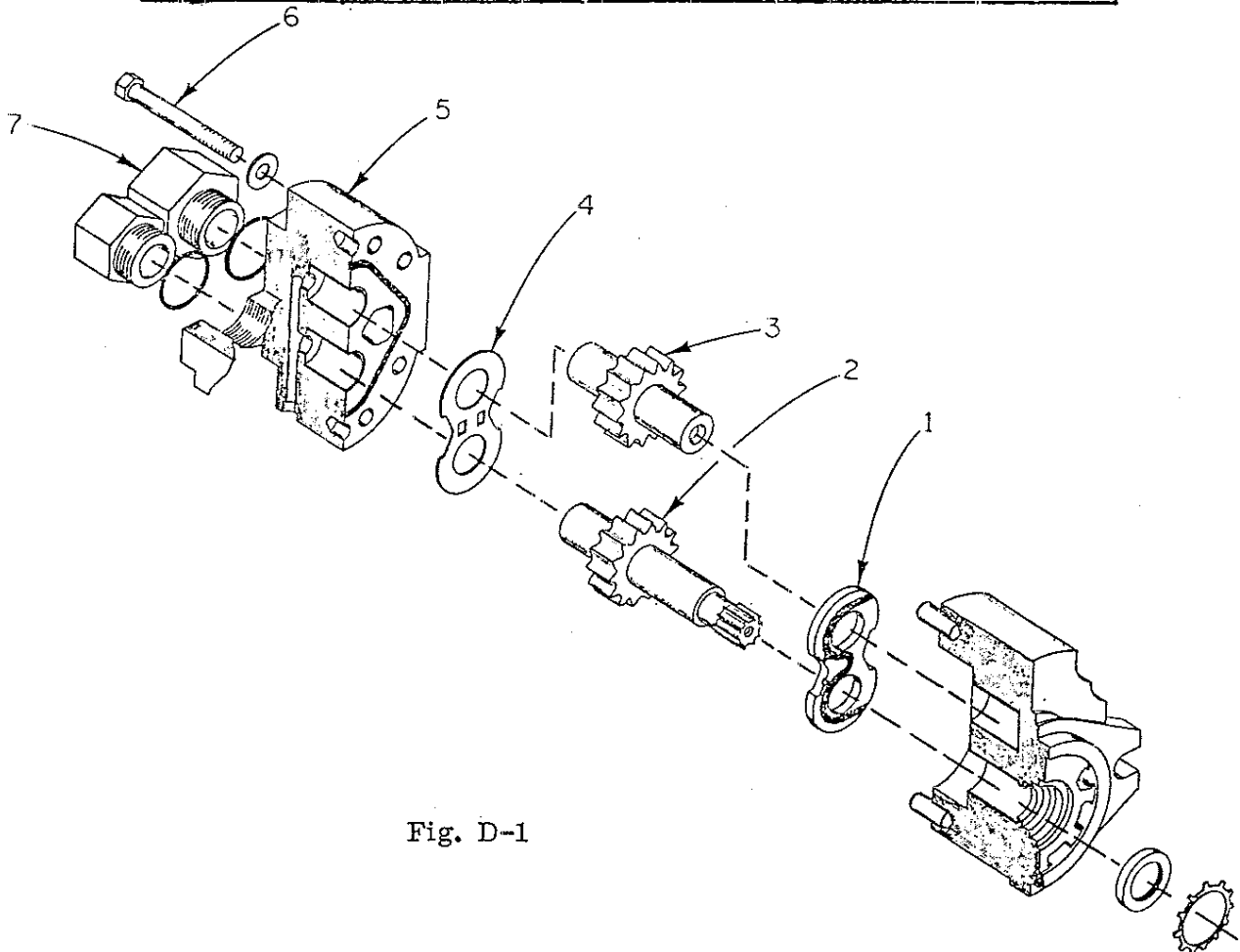


Fig. D-1

# CONTROL VALVE

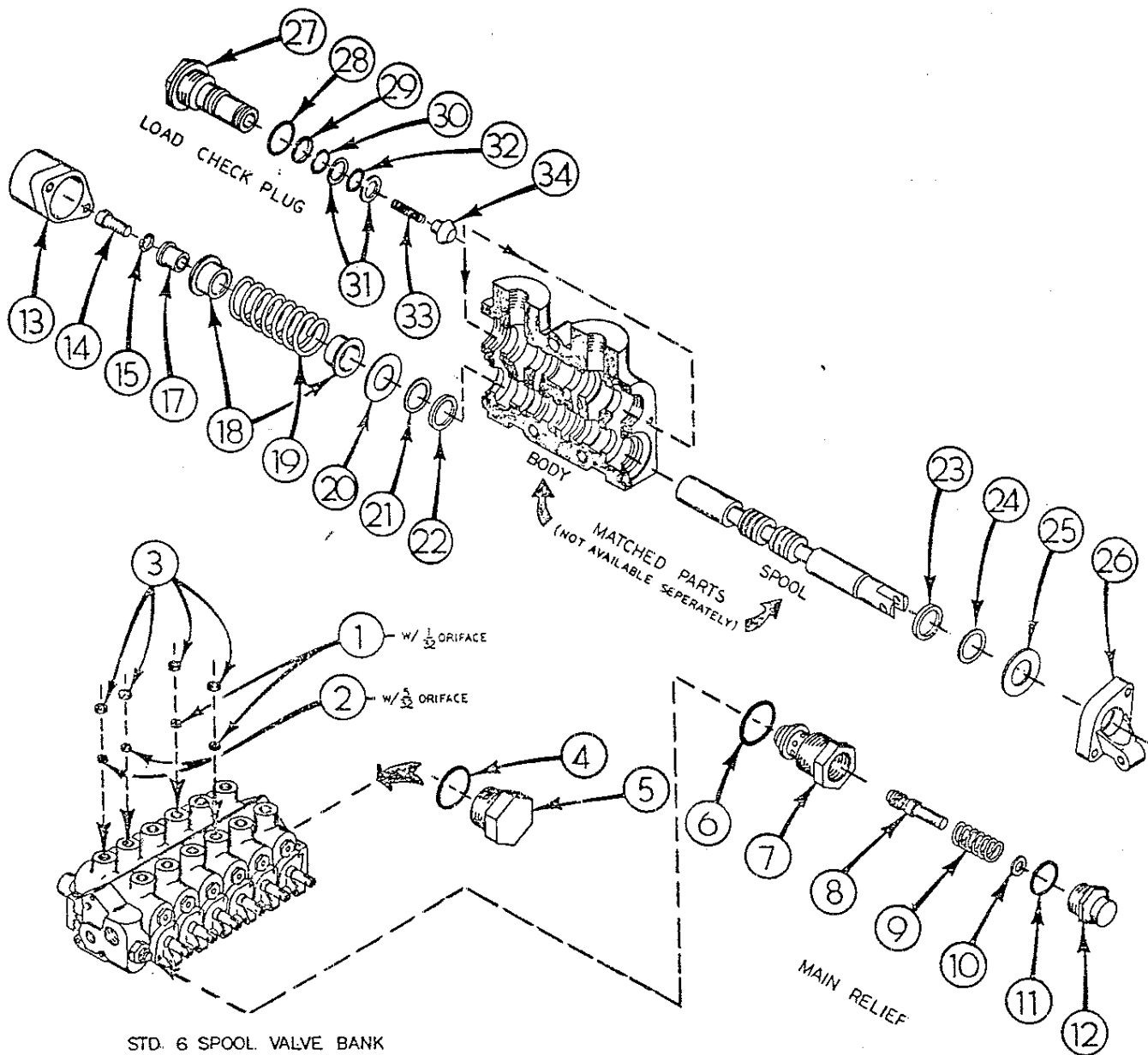


Fig. C-7

IMTCO P/N 50075

Cyl. Use 515 Secondary

Bore 5" Stroke 23 1/4" Rod Dia. 2 1/2" Pin Size, Base End 2"

Pin Size, Rod End 2" c-c Closed 34"

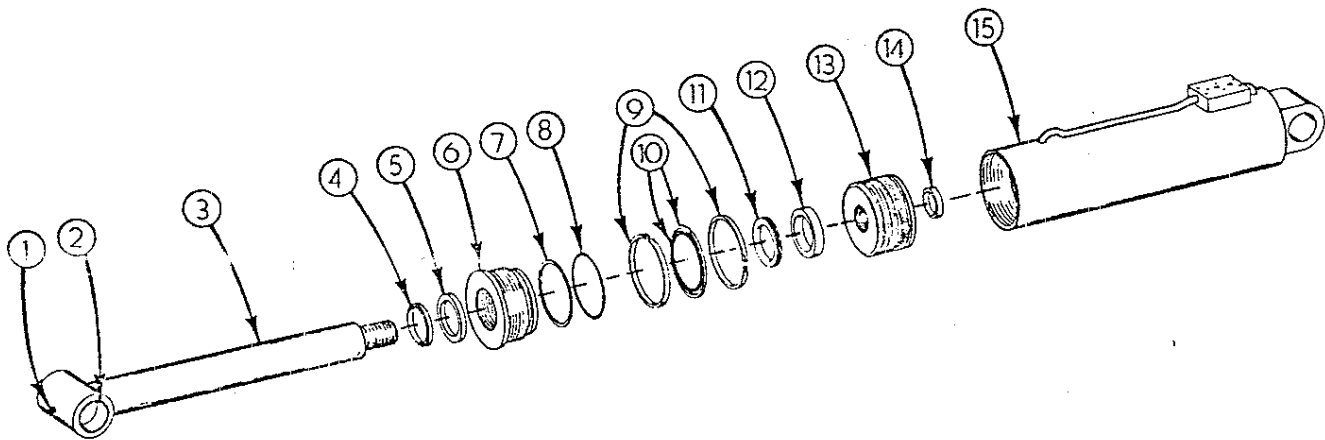


Fig. C-6

Ref. No.	IMTCO P/N	Description
1	53506	Zerk
2	14765	Bushing
	14766	Bushing
3	73523	Rod
4	39406	Rod Wiper
5	39465	Rod Seal, Dynamic
6	29409	Head
7	34157	Back-Up Ring
8	39522	Head Static Seal
9	141305	Piston Ring
10	34107	Sirvon Ring, Dyn. Psn. Seal
	39 507	Psn. O-Ring, Companion
11	29605	Wafer Lok
12	- -	Stop Tube
	- -	Stop Tube
13	29207	Piston
14	34055	Seal Lok
15	73224	Case
	39554	Seal Kit (Not Shown)

## 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.

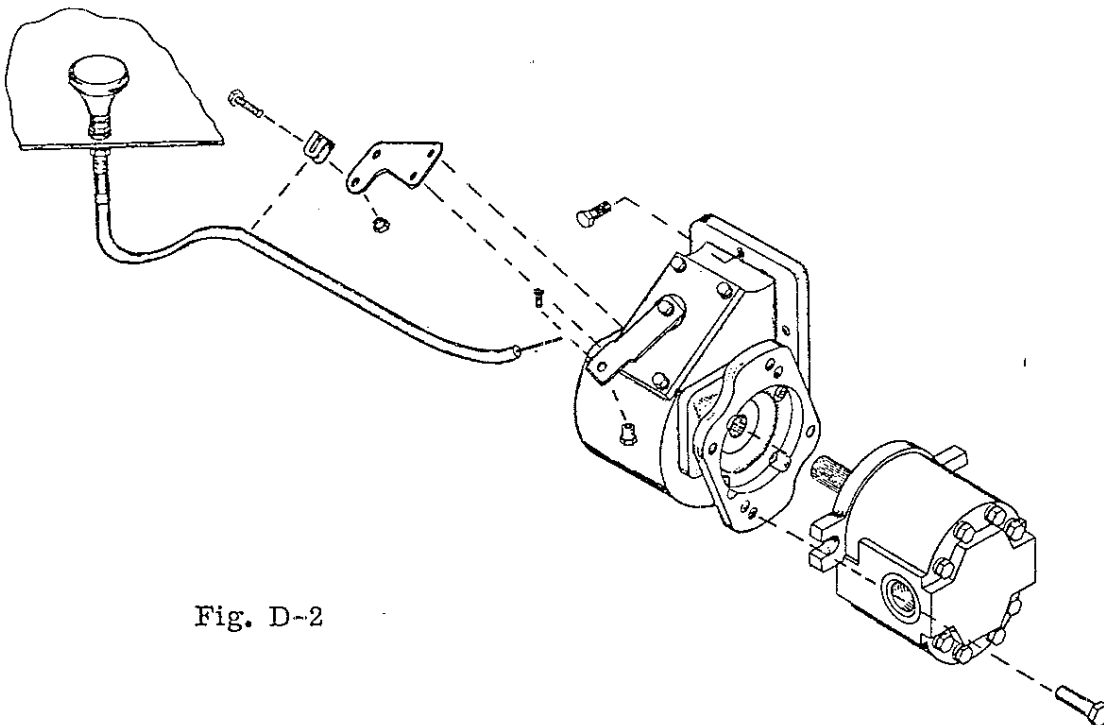


Fig. D-2

## 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 is 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  $\frac{3}{8}$ " x 12" plate to both sides from a point directly behind the rear front spring hanger to a point directly in front of the forward 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.

### WARNING

Do not weld on high tensile frames. Bolt fishplate utilizing bolt pattern below. Use  $\frac{3}{4}$ "-8NC 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.

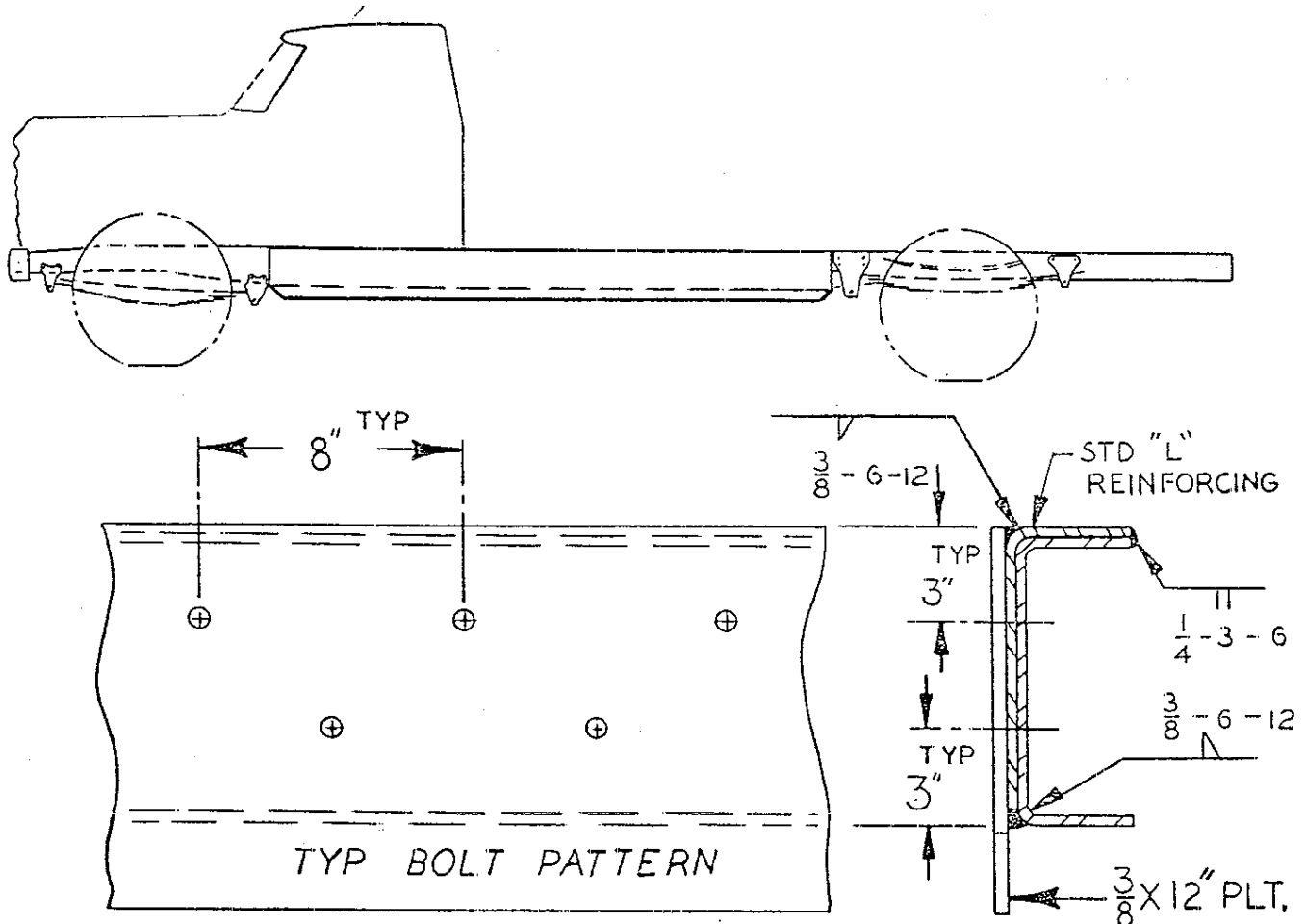


Fig. D-3

## TORQUE DATA





GRADE BOLT	SAE GRADE 1 OR 2	SAE GRADE 5	SAE GRADE 6	SAE GRADE 8					
MARKING									
DEFINITION	INDETERMINATE QUALITY	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 P.S.I. 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
$\frac{1}{4}$	6.35	5	.69	7	.96	10	1.38	10.5	1.45
$\frac{5}{16}$	7.92	9	1.24	14	1.93	19	2.62	22	3.04
$\frac{3}{8}$	9.52	15	2.07	25	3.45	34	4.7	37	5.11
$\frac{7}{16}$	11.09	24	3.31	60	8.29	55	7.6	60	8.29
$\frac{1}{2}$	12.7	37	5.11	60	8.29	85	11.75	92	12.72
$\frac{9}{16}$	14.27	53	7.32	88	12.17	120	16.59	132	18.25
$\frac{5}{8}$	15.87	74	10.23	120	16.59	167	23	180	24.89
$\frac{3}{4}$	19.05	120	16.59	200	27.66	280	38.72	296	40.93
$\frac{7}{8}$	22.22	190	26.27	302	41.76	440	60.85	473	65.41
1"	25.4	282	39	466	64.45	660	91.27	714	98.74

Fig. D-4

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

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

# 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	5420	
10.00-20	F			3760	3970	4180	4380	4580	4760			
10.00-20	G			3760	3970	4180	4380	4580	4760	4950	5120	5300
11.00-20	F			4100	4330	4560	4780	4990	5190			
11.00-20	G			4100	4330	4560	4780	4990	5190	5390	5590	5780
11.00-22	F			4350	4600	4840	5080	5300	5520			
11.00-22	G			4350	4600	4840	5080	5300	5520	5730	5940	6140



## STRUCTURAL AND STABILITY TEST FORM

### 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 (4200# @ 15'-4") 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) Check stability by lowering the rated load, 4200#, 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)
- 8) If unit is stable, rotate complete cycle five times.
- 9) Time unit functions for speed, record & compare with those shown in ( ) below

Extension	(14 sec.)	Rotation	(30 sec.)
Main	(24 sec.)	Outriggers	(11 sec.)
Secondary	(20 sec.)		
- 10) Give unit final visual 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 \_\_\_\_\_