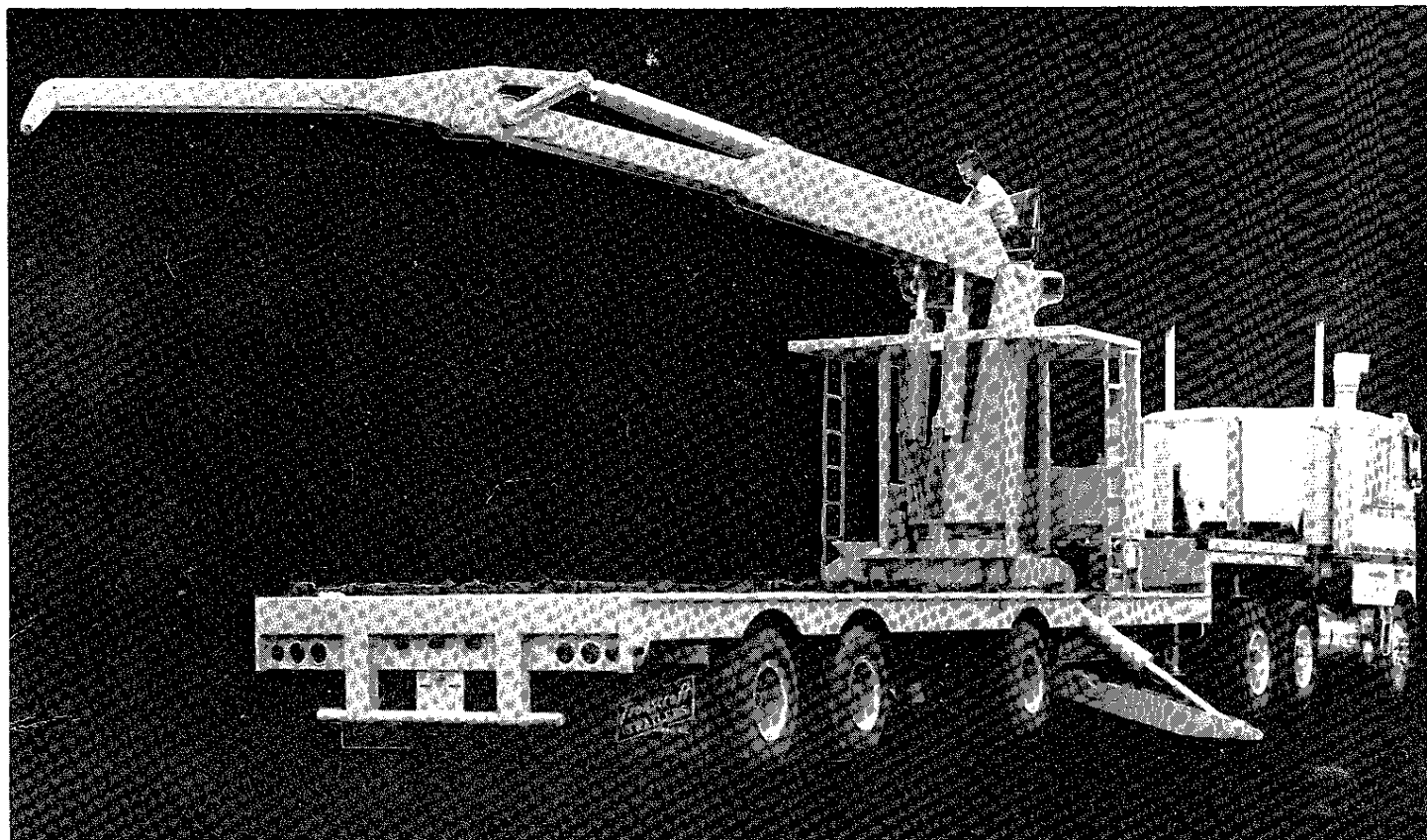


# IMT's 1424 CRANE



**MANUFACTURED EXCLUSIVLY FOR**



**BY**

**IOWA MOLD TOOLING CO., INC.**

**INSTRUCTIONS**



**PARTS LISTS**

# ACCIDENT PREVENTION SIGNS FOR TELESCOPING AND ARTICULATING CRANES

Help promote essential safety practices for operator and crew

## CAUTION

1. INSPECT VEHICLE AND CRANE INCLUDING OPERATION, PRIOR TO USE DAILY.
2. DO NOT USE THIS EQUIPMENT EXCEPT ON SOLID, LEVEL SURFACE WITH OUTRIGGERS PROPERLY EXTENDED AND CRANE MOUNTED ON FACTORY-RECOMMENDED TRUCK.
3. BEFORE OPERATING THE CRANE, REFER TO MAXIMUM LOAD (CAPACITY) CHART ON CRANE FOR OPERATING (LOAD) LIMITATIONS.
4. OPERATE ALL CONTROLS SLOW AND SMOOTH TO AVOID DAMAGE TO CRANE OR INJURY TO PERSONNEL.
5. DO NOT OPERATE, WALK OR STAND BENEATH BOOM OR A SUSPENDED LOAD.
6. FOR TRAVEL, BOOM MUST BE IN STOWED POSITION.

CRANESIGN 27701

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

## CAUTION

**STAND CLEAR  
WHILE OPERATING  
OUTRIGGER**

CRANESIGN 27704

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

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

## DANGER

**YOU MUST NOT  
OPERATE THIS CRANE UNLESS:**

1. YOU HAVE BEEN TRAINED IN THE SAFE OPERATION OF THIS CRANE; AND
2. YOU KNOW AND FOLLOW THE SAFETY AND OPERATING RECOMMENDATIONS CONTAINED IN THE MANUFACTURER'S MANUALS, YOUR EMPLOYER'S WORK RULES AND APPLICABLE GOVERNMENT REGULATIONS

AN UNTRAINED OPERATOR SUBJECTS HIMSELF  
AND OTHERS TO DEATH OR SERIOUS INJURY

CRANESIGN 27703

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

## DANGER

**THIS MACHINE IS NOT INSULATED  
ELECTROCUTION HAZARD**

MAINTAIN SAFE CLEARANCES FROM ELECTRICAL LINES AND APPARATUS. YOU MUST ALLOW FOR BOOM SWAY, ROCK OR SAG AND ELECTRICAL LINE AND LOADLINE SWAYING

THIS LIFTING DEVICE DOES NOT PROVIDE PROTECTION FROM CONTACT WITH OR PROXIMITY TO AN ELECTRICALLY CHARGED CONDUCTOR

YOU MUST MAINTAIN A CLEARANCE OF AT LEAST 10 FEET BETWEEN ANY PART OF THE CRANE, LOADLINE OR LOAD AND ANY ELECTRICAL LINE OR APPARATUS CARRYING UP TO 50,000 VOLTS. ONE FOOT ADDITIONAL CLEARANCE IS REQUIRED FOR EVERY ADDITIONAL 30,000 VOLTS OR LESS

DEATH OR SERIOUS INJURY WILL RESULT FROM  
CONTACT OR INADEQUATE CLEARANCE

CRANESIGN 27702

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

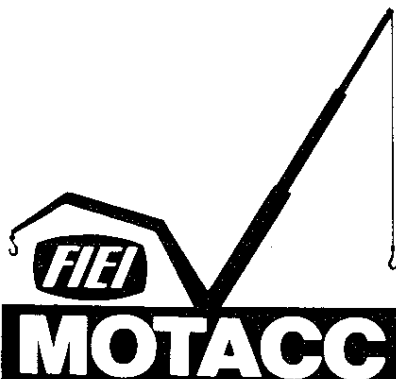
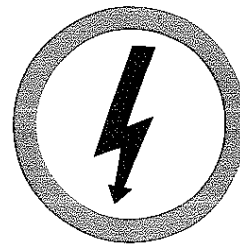
## DANGER

**ELECTROCUTION HAZARD  
KEEP CLEAR OF TRUCK AND LOAD**

**DEATH OR SERIOUS INJURY CAN RESULT FROM  
CONTACT WITH THE LOAD, THE CRANE OR THE  
VEHICLE IF THE BOOM OR LOADLINE SHOULD  
BECOME ELECTRICALLY CHARGED.**

CRANESIGN 27705

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



**MFRS. OF TELESCOPING AND  
ARTICULATING CRANES COUNCIL**

A Council of the Farm and Industrial Equipment Institute  
410 North Michigan Avenue Chicago, Illinois 60611 Telephone: 312/321-1470

## TABLE OF CONTENTS

Paragraph	Title	Page
SECTION 1. GENERAL		
1-1.	Introduction . . . . .	1-1
1-2.	Ordering Information . . . . .	1-1
SECTION 2. OPERATION		
2-1.	Crane Identification . . . . .	2-1
2-2.	Control Information . . . . .	2-1
2-2-1.	Vehicle Controls . . . . .	2-1
2-2-2.	Unit Controls . . . . .	2-1
2-3.	Operation . . . . .	2-1
2-3-1.	Safety Factors . . . . .	2-1
2-3-1-1.	Load Limits . . . . .	2-3
2-3-1-2.	Equipment Inspection . . . . .	2-3
2-3-1-3.	Work Station Positioning . . . . .	2-3
2-3-1-4.	Power Line Proximity . . . . .	2-3
2-3-2.	Beginning Operation . . . . .	2-3
2-3-2-1.	Engine Speed Regulation . . . . .	2-4
2-3-2-2.	Load Lifting . . . . .	2-5
2-3-2-3.	Stability Ratings . . . . .	2-6
2-3-3.	Operation Shutdown . . . . .	2-6
2-3-4.	Swing Brake . . . . .	2-6
SECTION 3. SPECIFICATIONS		
3-1.	General . . . . .	3-1
3-2.	Performance Characteristics . . . . .	3-1
3-3.	Lifting Capacity (From Centerline of Rotation) . . . . .	3-1
3-4.	Hydraulic System . . . . .	3-1
3-5.	Cylinder Holding Valves . . . . .	3-1
3-6.	Cylinders . . . . .	3-1
3-7.	Rotation System . . . . .	3-1
3-8.	Carrier Vehicle Specifications . . . . .	3-1
SECTION 4. MAJOR ASSEMBLIES		
SECTION 5. PERIODIC MAINTENANCE		
5-1.	General . . . . .	5-1
5-2.	Lubrication . . . . .	5-1
5-3.	Hydraulic System . . . . .	5-2
5-3-1.	Hydraulic Oil Deterioration . . . . .	5-2
5-3-2.	Hydraulic System Purging . . . . .	5-2

## TABLE OF CONTENTS (Continued)

Paragraph	Title	Page
5-3-3.	Hydraulic Components . . . . .	5-3
5-3-3-1.	Filter Replacement . . . . .	5-3
5-3-3-2.	Counter Balance Holding Valves . . . . .	5-3
5-3-3-3.	Valve Port Orifices . . . . .	5-4
5-3-3-4.	Relief Valve Adjustment . . . . .	5-5
5-3-3-5.	Power Beyond Adapter . . . . .	5-6
5-4.	Preventive Maintenance . . . . .	5-6
5-4-1.	Regular Inspection . . . . .	5-7
5-4-1-1.	Main and Secondary Booms . . . . .	5-7
5-4-1-2.	Mainframe . . . . .	5-7
5-4-1-3.	Mast and Rotation System . . . . .	5-7
5-4-1-4.	Hydraulic System . . . . .	5-7

### SECTION 6. PARTS

6-1.	Cylinder Identification . . . . .	6-1
------	-----------------------------------	-----

### SECTION 7. REPAIR

7-1.	Hydraulic System . . . . .	7-1
7-1-1.	Cylinders . . . . .	7-1
7-1-1-1.	Main and Secondary Cylinder Removal . . . . .	7-1
7-1-1-2.	Cylinder Disassembly . . . . .	7-1
7-1-1-3.	Cylinder Assembly . . . . .	7-3
7-1-1-4.	Cylinder Installation . . . . .	7-4
7-1-1-5.	Outrigger Cylinder Installation . . . . .	7-4
7-1-2.	Non-Repairable Components . . . . .	7-5
7-2.	Bearings . . . . .	7-5
7-2-1.	Turntable Gear Bearing . . . . .	7-5
7-2-2.	Pinion Gear and Drive Gear Bushings . . . . .	7-5
7-2-3.	Cylinder Pin Bushings . . . . .	7-6
7-2-4.	Boom Hinge Pin Bushings . . . . .	7-6
7-3.	Troubleshooting . . . . .	7-6
7-4.	Hydraulic Schematic . . . . .	7-6

### SECTION 8. INSTALLATION

### SECTION 9. APPENDIX

### SECTION 10. INSPECTION & TEST REPORT

# LIST OF ILLUSTRATIONS

Figure	Title	Page
B-1.	Identification Placard . . . . .	2-1
B-2.	Control Placard . . . . .	2-2
B-3.	1424 Crane Group . . . . .	2-2
B-4.	Load Capacity Chart . . . . .	2-5
B-5.	Stability Chart . . . . .	2-7
C-1.	Geometric Configuration . . . . .	3-2
E-1.	Lubrication Points . . . . .	5-1
E-2.	Suction Line Filter (Part Number 73052012) . . . . .	5-4
E-3.	Return Line Filter (Part Number 73052012) . . . . .	5-4
E-4.	Large Counter Balance Holding Valve . . . . .	5-4
E-5.	Small Counter Balance Holding Valve . . . . .	5-4
E-6.	Valve Port Orifice . . . . .	5-4
E-7.	Relief Valve Adjustment . . . . .	5-5
E-8.	Power Beyond Adapter . . . . .	5-5
F-1.	Cylinder ID . . . . .	6-1
F-2.	Base and Outrigger Assembly (Part Number 41702143) . . . . .	6-3
F-3.	Outrigger Cylinder (Part Number 3C323910) . . . . .	6-4
F-4.	Small Counter Balance Holding Valve (Part Number 73054304) . . . . .	6-5
F-5.	Large Counter Balance Holding Valve (Part Number 73054242) . . . . .	6-5
F-6.	Mast Assembly (Part Number 41702144) . . . . .	6-6
F-7.	Main Boom Assembly (Part Number 41702145) . . . . .	6-7
F-8.	Main Cylinder (Part Number 3C360710) . . . . .	6-8
F-9.	Secondary Boom Assembly (Part Number 41702146) . . . . .	6-9
F-10.	Secondary Cylinder (Part Number 3C219812) . . . . .	6-10
F-11.	Control Kit (Part Number 90703114) . . . . .	6-11
F-12.	Rotational (Swing) Brake (Part Number 71056088) . . . . .	6-12
F-13.	Electric/Pneumatic Throttle Control (Part Number 31702944) . . . . .	6-13
F-14.	Valve Spool Assembly . . . . .	6-14
F-15.	Hydraulic Schematic . . . . .	6-15
F-16.	Old-Style Outrigger Cylinder (Part Number 3C263513) with Conversion Kit (Part Number 9X324910) . . . . .	6-17
F-17.	Bushing Removal and Installation Tool (Part Number 92091200) . . . . .	6-18
G-1.	Securing Cylinder . . . . .	7-2
G-2.	Cylinder Layout . . . . .	7-2
G-3.	O-Ring Removal . . . . .	7-3
G-4.	Dynamic Rod Seal Removal . . . . .	7-3
G-5.	Rod Seal Installation . . . . .	7-4
G-6.	Piston/Rod Assembly . . . . .	7-4
G-7.	Bearing Removal . . . . .	7-6
G-8.	Bearing Installation . . . . .	7-7
H-1.	Typical Installation . . . . .	8-1
J-1.	Corrected Stability Chart . . . . .	10-10

# LIST OF TABLES

Table	Title	Page
D-1.	Major Assemblies . . . . .	4-1
E-1.	Lubrication Information . . . . .	5-2
E-2.	Hydraulic Oil Specifications . . . . .	5-3
E-3.	Relief Valve Adjustment . . . . .	5-5
E-4.	Inspection Check List . . . . .	5-6
G-1.	Troubleshooting Chart . . . . .	7-8
I-1.	Tire Load and Inflation Pressure . . . . .	9-1
I-2.	Torque Data . . . . .	9-2
J-1.	Pre-Operation Inspection . . . . .	10-2
J-2.	Operating Test . . . . .	10-3

# SECTION 1. GENERAL

## 1-1. INTRODUCTION

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

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

### NOTES

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

### CAUTIONS

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

### WARNINGS

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

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

## 1-2. ORDERING INFORMATION

When placing orders or requesting assistance, refer to the information below

### TO BE COMPLETED BY DEALER

#### Chassis Information:

Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

Transmission Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

PTO Ratio: \_\_\_\_\_ Make: \_\_\_\_\_

#### Crane and Pump Information:

Serial No.: \_\_\_\_\_ Model: \_\_\_\_\_ Selector Valve: \_\_\_\_\_

Pump Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

Accessories and Options: \_\_\_\_\_

## SECTION 2. OPERATION

### 2-1. CRANE IDENTIFICATION

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

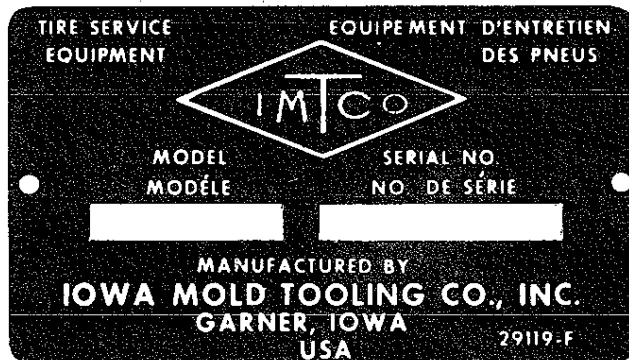


Figure B-1. Identification Placard

### 2-2. CONTROL INFORMATION

#### 2-2-1. Vehicle Controls

The vehicle controls will be determined by the type of auxilliary engine selected to drive the tandem pump. Any engine may be used that is capable of driving the tandem pump at a speed sufficient to supply 16 GPM per pump section at 2350 PSI.

#### 2-2-2. Unit Controls

The unit is equipped with outrigger controls located on the base on the left side of the crane. Crane controls are located at the operator's station in front of the seat with a control placard as shown in Figure B-2. Control operation is as follows:

1. **SWING** — either foot pedal or control lever located at the operator's station. Provides 400° of rotation. A brake is utilized to provide a more positive stopping action. **Push** the lever for clockwise swing and **pull** for counterclockwise.
2. **MAIN** — control lever located at the operator's station. **Pull** to raise the boom and **push** to lower.
3. **SECONDARY** — control lever located at the operator's station. **Pull** to raise the boom and **push** to lower.

4. **CURB SIDE OUTRIGGER/STREET SIDE OUTRIGGER** — control levers located at the operator's station. **Push** to lower and **pull** to raise outriggers.
5. **FORK ROTATION** — control lever located at the operator's station. Incorporates a flow control valve which may be adjusted to increase or decrease the speed of rotation. **Push** for counterclockwise rotation and **pull** for clockwise. Screw the adjusting rod in to slow down the rate of rotation.
6. **RED GRAPPLE** — control lever located at operator's station. It is connected to a pressure relief valve which will unload at a pre-determined pressure setting. This prevents over-stressing the grapple. the lever to move the grapple out and **pull** to move it in.
7. **GREEN GRAPPLE** — control lever located at the operator's station. It is connected to a pressure relief valve which will unload at a pre-determined pressure setting. This prevents over-streeting the grapple. **Push** the lever to move the grapple out and **pull** to move it in.

### 2-3. OPERATION

The crane is relatively simple to operate. However, prior to any work at job sites, the operator should thoroughly familiarize himself with the control operations, load 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.

#### 2-3-1. 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.



CLOCKWISE	DOWN
SWING	MAIN
COUNTERCLOCKWISE	UP

DOWN	DOWN	DOWN
SECONDARY	CURB SIDE OUTRIGGER	STREET SIDE OUTRIGGER
UP	UP	UP

COUNTERCLOCKWISE	OUT	OUT
FORK ROTATION	RED GRAPPLE	GREEN GRAPPLE
CLOCKWISE	IN	IN

Figure B-2. Control Placard

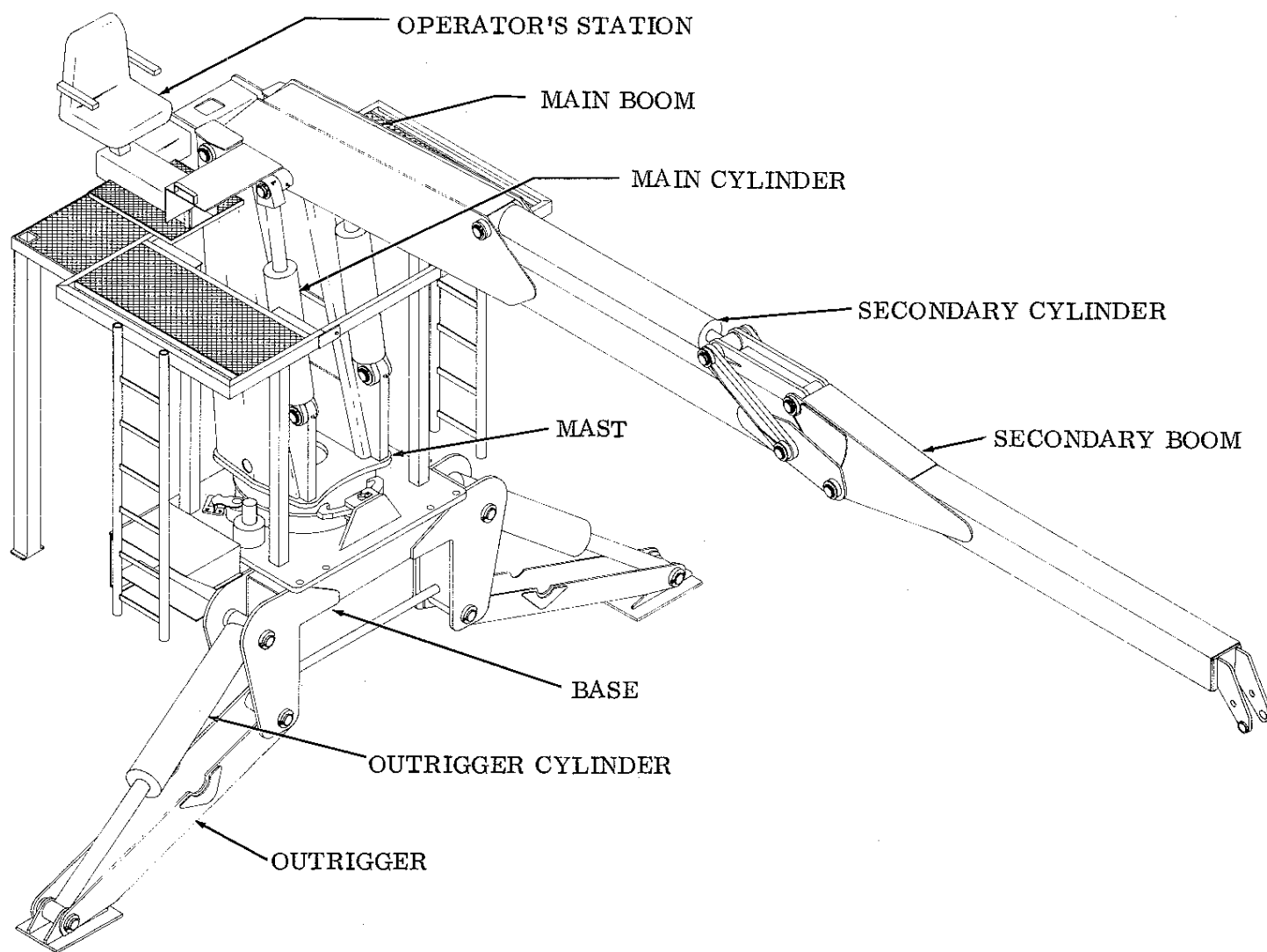


Figure B-3. 1424 Crane Group

### 2-3-1-1. Load Limits

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

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

### 2-3-1-2. Equipment Inspection

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

**STRUCTURAL SOUNDNESS** - Inspect the unit for damaged members and loose nuts or bolts.

**HYDRAULIC OIL SUPPLY** - Check oil level in hydraulic oil reservoir and fill if required.

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

**CONTROLS** - Make a short test for proper operation.

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

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

### 2-3-1-3. Work Station Positioning

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

Wheel chocks should be used when parking unit on a slope. At the work site, the vehicle should be parked with the grade. When cross-grade parking is necessary, restricted operation will be required to compensate for increased tipping risk.

### 2-3-1-4. Power Line Proximity

Except where the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the crane have been erected to prevent physical contact with the lines, cranes shall 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 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 clearances.

### 2-3-2. Beginning Operation

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

1. NEVER swing a load so it passes over people.
2. ALWAYS stabilize the unit before attempting any lifting operation.
3. NEVER rotate the crane too fast with a load.
4. ALWAYS cycle the controls a few times to purge the air trapped in the cylinders and hoses before attempting a lifting operation.
5. NEVER operate the crane too close to power lines.
6. ALWAYS have a clear view of the work area.
7. NEVER operate the crane prior to checking for proper operation of the rotational brake.
8. ALWAYS repair any defects before using the unit.
9. NEVER exceed the rated lifting capacity of the unit.
10. NEVER leave the operator's station with a load suspended in the air.
11. ALWAYS lower the operator's seat before moving the vehicle.

Unit operation is accomplished as follows:

1. Choose a unit operating location with two factors considered: 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. Wheel chocks should be firmly placed.
3. Start the engine and engage the pump.
4. Climb up to the operator's station, put the seat into position and activate the SPEED CONTROL switch (if applicable). Allow the system to idle at operating speed with all controls at neutral until the hydraulic system reaches operating temperature—the hydraulic reservoir should be warm to the touch.

5. Outriggers should be extended until firm ground contact is made. Do not hold controls open to the point of jacking action. When stabilizing the unit on soft ground, bearing pads should be used to retard sinking and provide blocks to ensure firm contact when operating on sloping terrain

#### — WARNING —

Do not operate the crane until the vehicle is firmly stabilized.

6. 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 avoid 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
7. Raise the main boom first before initiating any other control functions.
8. Lower the secondary and rotate the fork until the fork is aligned with the spool.
9. Clamp the fork tines until the load is secured. Raise the secondary and through the use of SECONDARY, MAIN, SWING and ROTATION controls, manipulate the load to the desired location.
10. If the operator must leave the operator's station, turn "OFF" the SPEED CONTROL by turning off the switch. This will save wear and tear on the engine and pump assemblies.

### 2-3-2-1. 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 optimum pump speed is divided by the engine to output shaft gear reduction (if any).

$$\frac{\text{Optimum Pump Speed (RPM)}}{\text{Engine/Output Shaft Gear Reduction (\%)}} = \text{Required Engine Speed (RPM)}$$

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.

### 2-3-2-2. Load Lifting

Capacity placards are located on the main boom 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. All indicated placard loads include weight added by optional equipment - rotors, winches, etc. - and consideration must be given to this weight in load assessment.

#### NOTE

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

Load limit information 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 trailer.
- 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

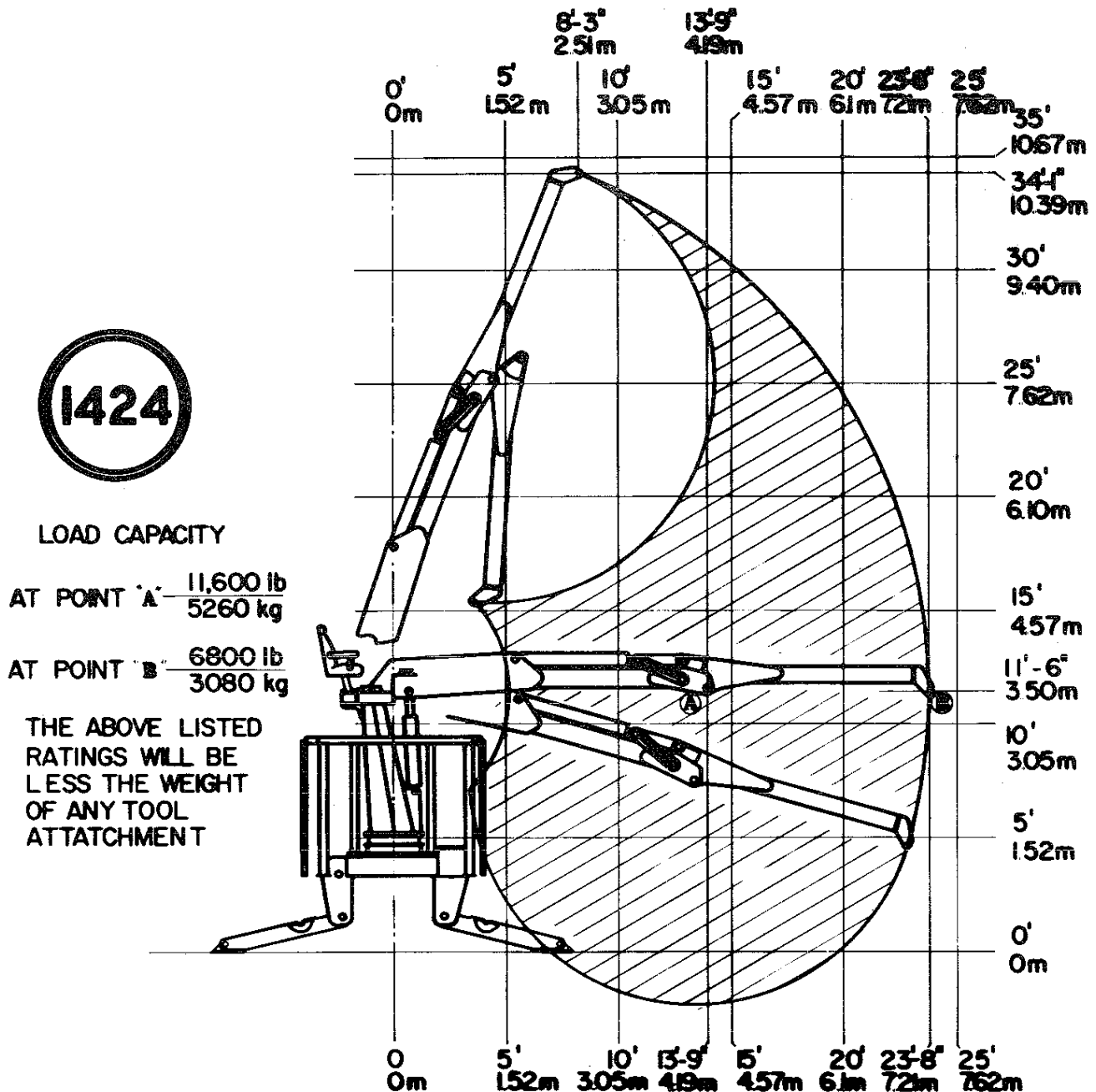


Figure B-4. Load Capacity Chart

### 2-3-2-3. 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 followed 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" in the appendix
5. The outriggers are in use making proper contact with firm level footing

### 2-3-3. Operation Shutdown

Proper shutdown procedure is as follows:

1. Raise the secondary boom, rotate the fork and lower the main boom until the fork is in position on the fork rest.
2. Tilt the operator's seat down. This will keep the overall height under the legal limit of 13'-6"
3. Insert the fork retaining pin to secure the fork to the fork rest
4. Raise the stabilizers to the stowed position.

5. Turn 'OFF' the throttle control

6. Turn "OFF" the engine.

### 2-3-4. Swing Brake

A brake is provided at the base of the crane swing motor. Its function is to provide positive stopping action of the crane swing when the control lever is released. When the SWING lever is actuated, both the brake and swing motor are pressurized which engages the motor and disengages the brake. When the lever is released internal spring pressure engages the brake.

The counter balance sequence valve on the hoses to the swing motor provides back pressure which causes the smooth functioning of the brake and eliminates brake "grabbing".

#### CAUTION

Do not tamper with the settings of the counter balance sequence valve. Closing the valve may result in damaging the swing motor seals. Opening the valve too much increases back pressure and causes the brake to "grab"

#### WARNING

Always check the brake for proper functioning prior to attempting to swing a load. Brake failure will allow the swing to continue unchecked.

#### CAUTION

Fast stops will severely shorten the service life of the brake.

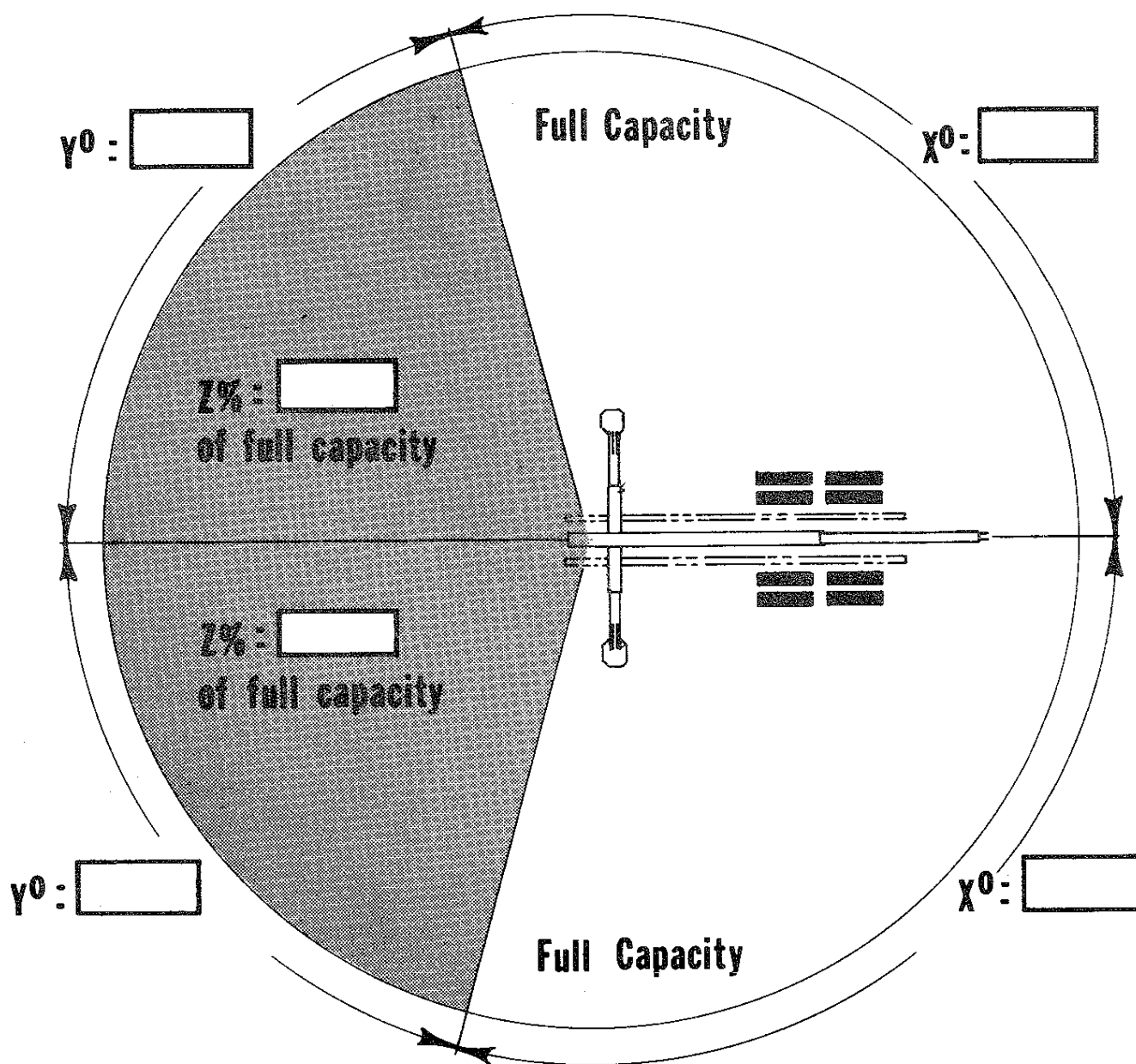


Figure B-5. Stability Chart

## SECTION 3. SPECIFICATIONS

### 3-1. GENERAL

REACH (from centerline of rotation)	(7.21 m)	23'-8"
LIFTING HEIGHT	(12.67 m)	34'-1"
WEIGHT OF CRANE	(4224.8 kg)	9,320 lbs.
OUTRIGGER SPAN	(4.53 m)	14'-10"
OPTIMUM PUMP CAPACITY (each)	(60.0 & 60.6 liter/min)	16 & 16 gal/min
OIL RESERVOIR CAPACITY	(189.4 liter)	50 U.S. gal.
*MOUNTING SPACE REQUIRED	(103.9 cm)	41"
STORAGE HEIGHT	(4.06 m)	13'-4"

(based on 40" (102 cm) trailer frame height)

\*Plus approximately 24" (61 cm) for ladder & engine assembly if required.

### 3-2. PERFORMANCE CHARACTERISTICS

ROTATION (400°) (6.81 Rad.)	25 Sec.
MAIN BOOM ELEVATION (-17° to +69°) (-.30 Rad. to +1.20 Rad.)	18 Sec.
SECONDARY BOOM ELEVATION (148°) (2.58 Rad.)	32 Sec.
OUTRIGGER EXTENSION	16 Sec.

### 3-3. LIFTING CAPACITY (From Centerline of Rotation)

(4.19 m) 13'-9"	(5250 kg)	11 600 lbs.
(7.21 m) 23'-8"	(3080 kg)	6,800 lbs.

### 3-4. HYDRAULIC SYSTEM

Open-center full pressure system with dual pump having 16 U.S. Gal. per minute flow from each section at 2300 PSI (161.7 kg/sq. cm.). Eight-spool stack valve type control valve with 2 middle inlets: 3 spools for crane functions, 3 spools for the function of an attachment such as a reel lift and 2 spools to operate right and left outriggers. The system includes a hydraulic oil reservoir, 25-micron suction line filters, 25-micron return line filter, pump and valve. The pump is mounted to an auxiliary engine drive package. An extra outrigger control valve is located at ground level.

### 3-5. CYLINDER HOLDING VALVES

The cylinder holding sides of all cylinders are equipped with integral mounted counter balance holding valves to prevent sudden cylinder rod movement in case of a hose or other hydraulic failure. The valves are pilot operated which hold the load but allow the flow to be "feathered" while cylinder is loaded and provides overload protection by relieving oil when the secondary boom overpowers the main boom or vice versa. If a hose breaks, the only oil loss will be that in the hose.

### 3-6. CYLINDERS

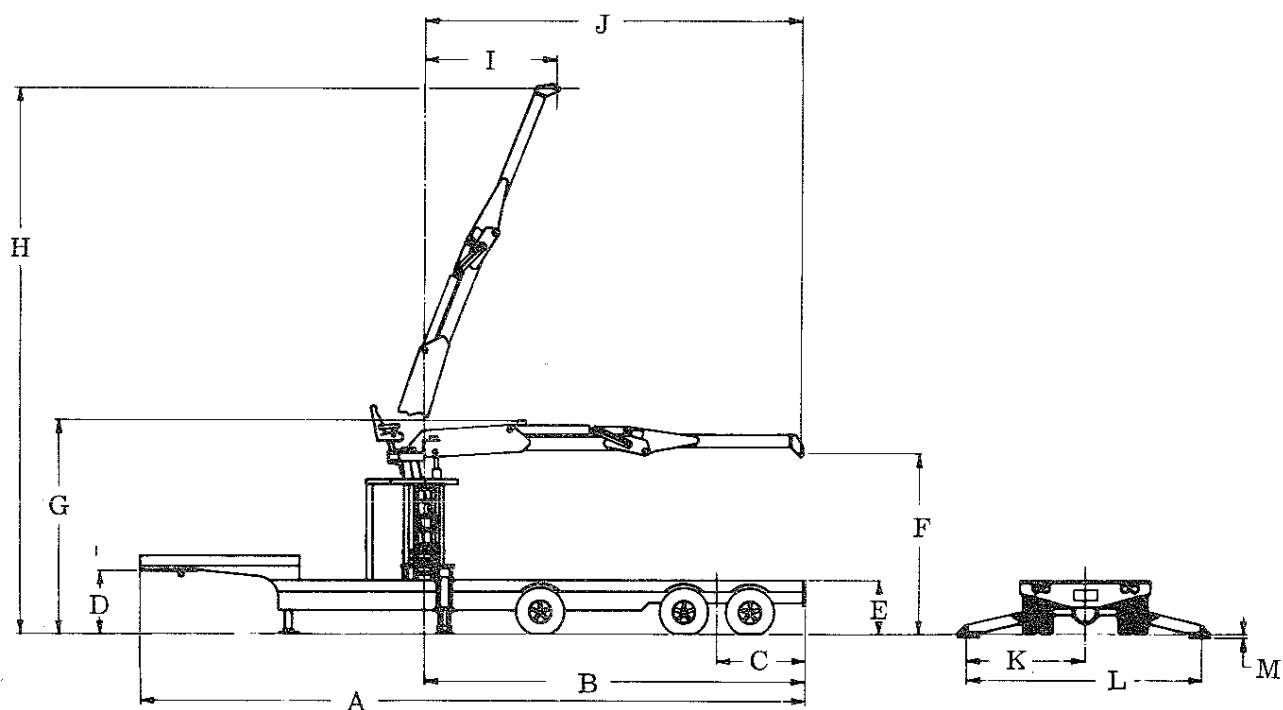
MAIN	(15.2 cm)	6" Bore	(66 cm)	26" Stroke
SECONDARY	(16.5 cm)	6½" Bore	(121.9 cm)	48" Stroke
OUTRIGGERS	(16.5 cm)	6½" Bore	(74.3 cm)	29¼" Stroke

### 3-7. ROTATION SYSTEM

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

### 3-8. CARRIER VEHICLE SPECIFICATIONS

Carrier vehicle is a specially designed trailer that shall be approved by the factory.



LOCATION	DIMENSION
A	42' (12.8 m)
B	24'-2" (7.37 m)
C	67" (170 cm)
D	48" (122 cm)
E	40" (102 cm)
F	11'-6" (3.5 m)
G	13'-4" (4.06 m)

LOCATION	DIMENSION
H	34'-1" (10.39 m)
I	8'-3" (2.51 m)
J	23'-8" (7.23 m)
K	7'-5" (2.26 m)
L	14'-10" (4.52 m)
M	2" (5.1 cm)

Figure C-1. Geometric Configuration



## SECTION 4. MAJOR ASSEMBLIES

Table D-1 lists the standard components and options available with the 1424 crane.

TABLE D-1. MAJOR ASSEMBLIES

Description	Part Number	Page
Base and Outrigger Assembly . . . . .	41702143 . . . . .	6-3
Mast Assembly . . . . .	41702144 . . . . .	6-6
Main Boom Assembly . . . . .	41702145 . . . . .	6-7
Secondary Boom Assembly . . . . .	41702146 . . . . .	6-9
Control Kit . . . . .	90703114 . . . . .	6-11
Electric/Pneumatic Throttle Control . . . . .	31702944 . . . . .	6-13
Hydraulic Assembly . . . . .	91703173 . . . . .	6-15

## SECTION 5. PERIODIC MAINTENANCE

### 5-1. GENERAL

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

### 5-2. LUBRICATION

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

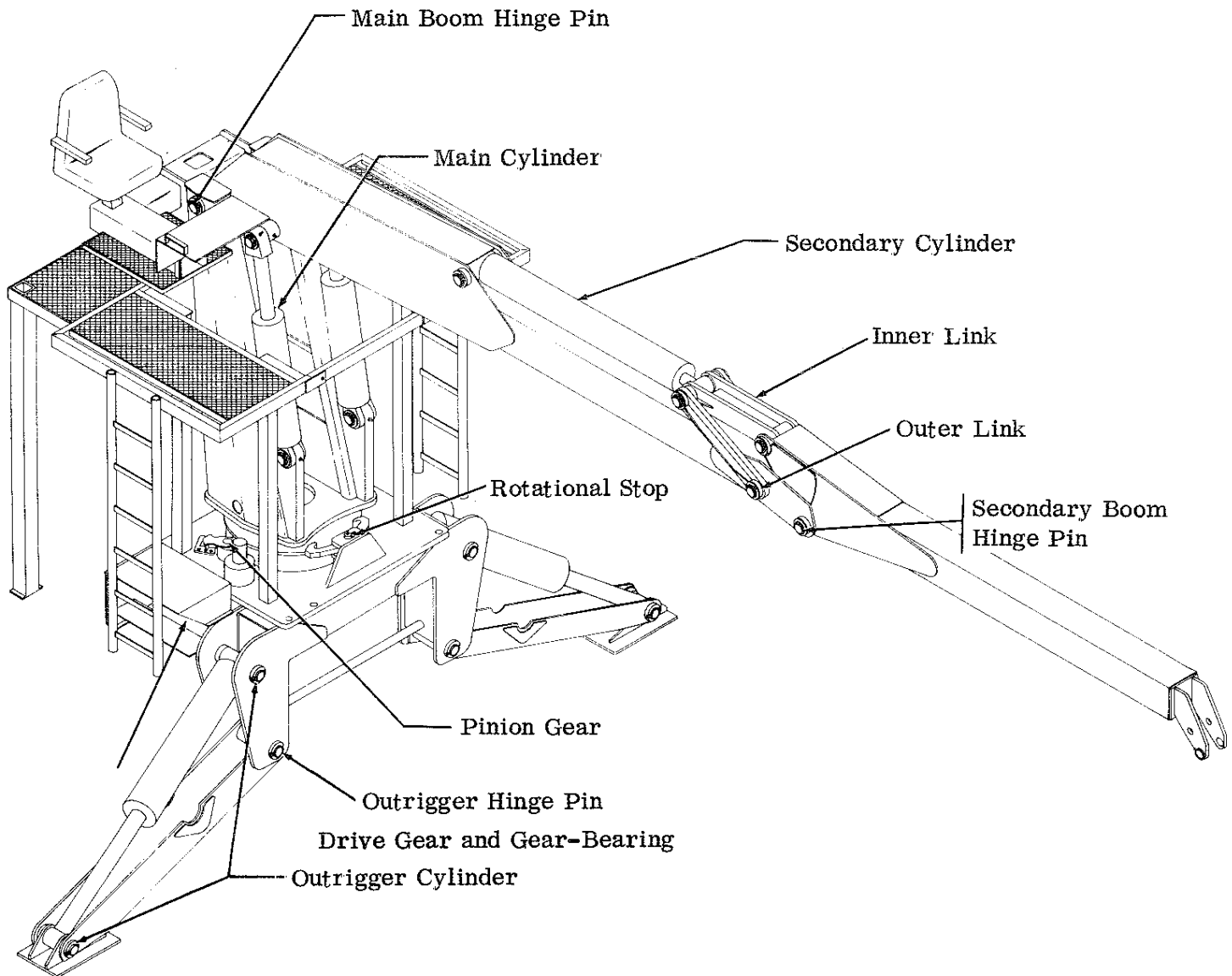


Figure E-1. Lubrication Points

**TABLE E-1. LUBRICATION INFORMATION**

APPLICATION POINT	LUBRICATION PRODUCT	APPLICATION MEANS	INTERVAL
PINION AND DRIVE GEARS	Shell Alvanis 2EP  or  Shell Retinax "A"  or Equivalent	Hand Grease	Weekly
GEAR-BEARING			
MAIN SECONDARY AND OUTRIGGER CYLINDERS		Gun	
MAIN AND SECONDARY BOOM HINGE PINS		or Pneumatic	
INNER AND OUTER LINKS		Pressure Gun	
ROTATIONAL STOP			
OUTRIGGER HINGE			
POWER TAKE-OFF OR TRANSMISSION	EP 90 Gear Oil	Fill to Check Plug	Monthly

### 5-3. HYDRAULIC SYSTEM

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

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

- |                           |                             |
|---------------------------|-----------------------------|
| 1. Antifoam inhibitors    | 3. Rust resistant additives |
| 2. Antioxidant inhibitors | 4. Antiwear additives       |

**OIL SPECIFICATIONS:** Table E-2 provides oil specifications for a full range of operating temperatures encountered in the temperate zones. Arctic conditions present special requirements which are not within the scope of the table and must be given special consideration and individual analysis. Consult your oil supplier for the proper fluid for working under these severe conditions. In addition, electric hydraulic oil reservoir heaters are available to improve operation at extremely low temperatures.

#### 5-3-1. Hydraulic Oil Deterioration

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

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

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

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

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

#### 5-3-2. Hydraulic System Purging

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

During purging, new oil is supplied to the pump suction line via the reservoir, and old oil is drained from the reservoir return line.

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

TABLE E-2 HYDRAULIC OIL SPECIFICATIONS

Ambient temperature range	11-90	Below 32	32-90	Above 90
Min. Pour Point, °F	-40	-25	-10	+10
Max. Viscosity SSU @ 100 F	4000	4000		
Min. Viscosity SSU @ 100 F	140-195	130-140	150-200	200-315
Min. Viscosity SSU @ 210 F	48	43-43	43	47
Min. Viscosity Index	139	90	90	90

**CAUTION**

DO NOT allow reservoir to drop below 1/3 capacity during purging

1. Locate the unit in an area which provides solid, level footing and space to accommodate the full range of the crane.
2. Extend the outriggers out and down to full stroke. Move the crane to maximum extended, horizontal position on either side and close fork to the clamped position. Kill the engine.
3. Disengage the pump, drain the hydraulic oil reservoir, remove the suction line filter cartridges and drain all hoses. Disconnect the pressure hoses from the pump, drain and reassemble. Replace the suction line filter cartridges (refer to Paragraph 5-3-3-1) and reassemble.

**NOTE**

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

4. Disconnect the return hose at the return filter inlet and direct the flow into a sump or waste container. Close the return line ball valve and plug the drain port on the reservoir. Refill the reservoir with new oil.

**NOTE**

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

5. Start the engine and engage the PTO. Rotate the crane 90° of travel horizontally, elevate the main boom to full height, lower the secondary boom to the lowest position, open the fork and rotate it three revolutions.
6. Rotate crane toward rear center of vehicle, raise outriggers and kill engine.

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

8. Check oil level and add oil to full mark.

**5-3-3. Hydraulic Components****5-3-3-1. Filter Replacement**

This unit's hydraulic system contains three filters: two 25-micron suction line filters (Figure E-2) to remove large contaminating particles and a 25-micron return line filter (Figure E-3) for removal of system particles. To avoid residue accumulation in the reservoir and to 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 hours thereafter. In addition to this service schedule, the suction line filters are equipped with a danger coded vacuum gauge. This gauge should be checked daily while operating the unit. If it reads 8 inches of mercury pull, the suction line filter cartridge must be replaced to be effective. When the suction line filter cartridges require changing, the return line filter cartridge should also be replaced.

To change filter cartridges:

1. Kill the engine.
2. Shut the gate valves and remove the filter cartridges.
3. Replace with new cartridges ensuring proper rubber seal seating and tighten as much as possible with both hands.
4. Open the gate valves and test the system for leaks.

**CAUTION**

Failure to open the shut-off valves may result in pump failure.

**5-3-3-2. Counter Balance Holding Valves**

There are two types of counter balance holding valves used on the crane: the large one (Figure E-4) is used on the main and secondary cylinder and the small one (Figure E-5) is used on the outrigger cylinders—two on each cylinder.

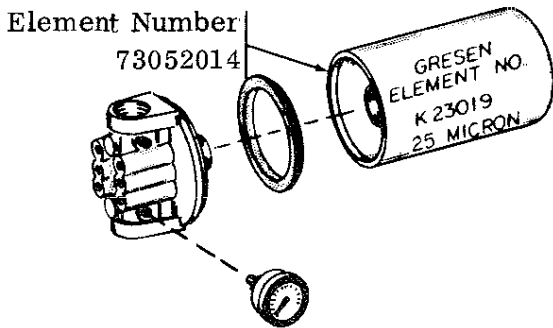


Figure E-2. Suction Line Filter (Part Number 73052012)

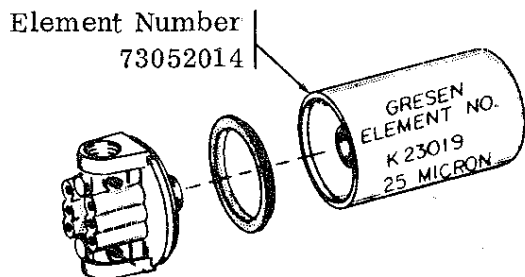


Figure E-3. Return Line Filter (Part Number 73052012)

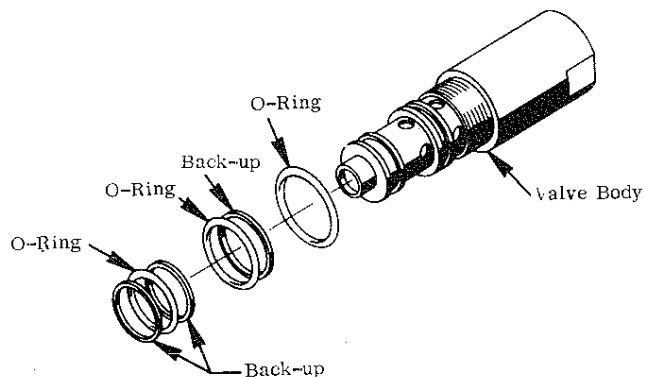


Figure E-4. Large Counter Balance Holding Valve

The valve is non-adjustable and failure is unlikely. However, if a malfunction is suspected, it may be checked in the following manner:

1. Extend the cylinder in question and kill the engine. Check to see if the cylinder "creeps". If not, the valve is serviceable.

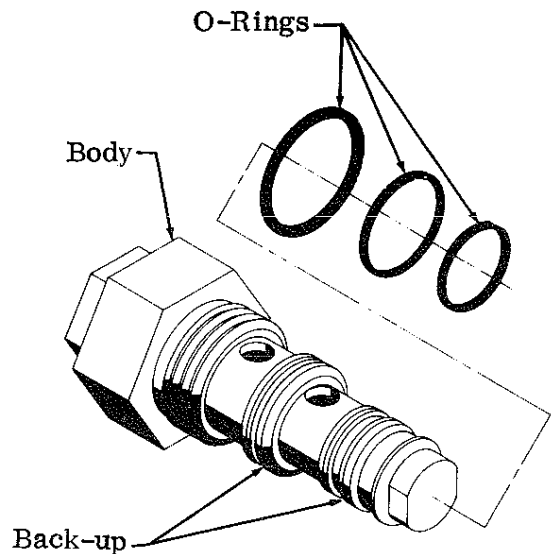
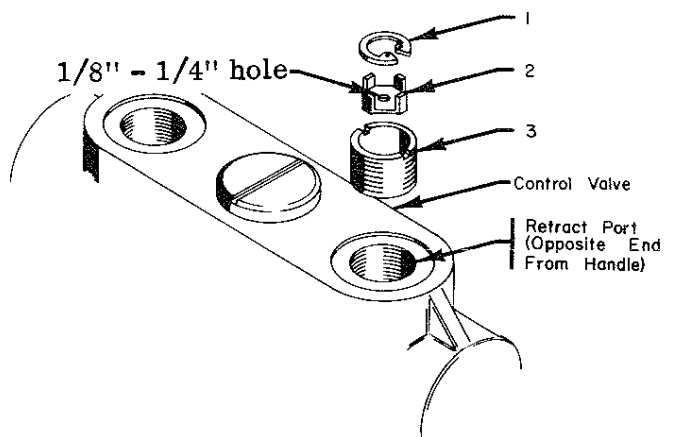


Figure E-5. Small Counter Balance Holding Valve

### 5-3-3.3. Valve Port Orifices

A valve port orifice (Figure E-6) may be installed on the cylinder base side of the control valve. The purpose of the orifice is to slow descent of the crane under a load. Back pressure is maintained to prevent erratic holding valve action. It is mounted with the slot side of the plate located upward in the control valve. Orifice size is usually 1/16" to 3/32" and is used for main, secondary and extension cylinders.



Item No.	Part No.	Description
1.	72066019	RING, retaining
2.	73141591	PLATE, orifice
3.	73141590	BODY, orifice

Figure E-6. Valve Port Orifice

### 5-3-3.4. Relief Valve Adjustment

Four relief valves are used to prevent the user from placing too much strain on the hydraulic components. The locations, functions and pressure settings of the relief valves are listed in Table E-3. If the function pressure is less than shown, the following procedure is recommended:

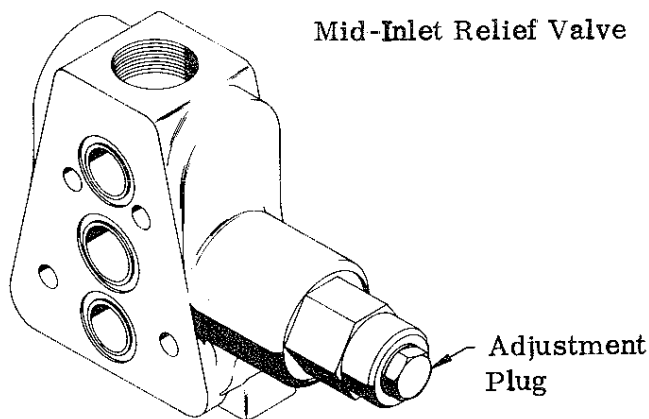
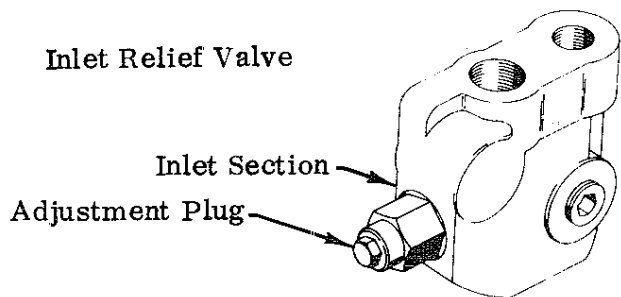


Figure E-7. Relief Valve Adjustment

1. Engage the pump and set the engine speed at a rate required to provide 16 gallons per minute (refer to Paragraph 2-3-2-1).
2. Activate one of the affected controls until the cylinder is either fully extended or retracted.

#### CAUTION

Do not fully extend either outrigger cylinder. Outriggers must be fully retracted.

#### NOTE

An incorrect setting on the left outrigger relief valve will affect the setting on the SWING, FORK or MAIN functions and the right outrigger relief valve will affect SECONDARY and ROTATION. Check the setting of the outrigger relief valves before attempting to test any other function.

#### NOTE

SWING will unload at 1800 PSI due to an anti-cavitation device. Do not use the SWING function to test the mid-inlet relief valve.

3. Check the reading on the pressure gauge at the outrigger valve (refer to Table E-3). The control valve must be held open while taking the reading.
4. The mid-inlet and inlet valve section relief valves are adjusted by removing the adjustment plug and turning the adjustment screw with a slotted screwdriver—clockwise to increase and counter-clockwise to decrease.
5. Start the engine and recheck the relief valve setting. If it hasn't changed, the malfunction indicates pump slippage.

#### NOTE

If a function other than the OUTRIGGER function is being tested, it could indicate an incorrect pressure setting on the outrigger relief valve.

6. Continue until the pressure setting is correct.

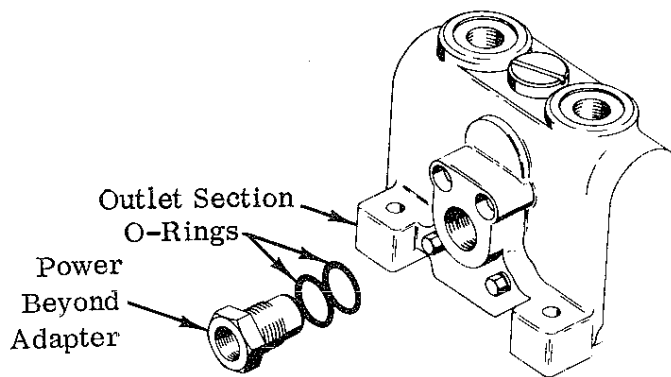


Figure E-8. Power Beyond Adapter

TABLE E-3. RELIEF VALVE ADJUSTMENT

LOCATION	FUNCTION	PRESSURE
Left outrigger control valve	Left outrigger	2450 - 2500 PSI
Right outrigger control valve	Right outrigger	2450 - 2500 PSI
Mid-inlet valve section	Swing, Main	2350 - 2400 PSI
Inlet valve section	Fork rotation	2350 - 2400 PSI
Mid-inlet valve section	Secondary, Outriggers	2350 - 2400 PSI
Green grapple relief valve	Green & Red Grapple	900 PSI

### 5-3-3-5. Power Beyond Adapter

Hydraulic power for an auxilliary function can be obtained by insertion of a power beyond adapter (Figure E-8). Install the adapter making certain that the two gasket seals are in place or function pressure will be lost. Install a high pressure hose to the auxilliary function control valve. Order part number 73054385.

### 5-4. 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.

#### CAUTION

Failure to comply with these instructions may result in excessive wear and premature failure of the unit resulting in expensive repairs and down-time.

**TABLE E-4. INSPECTION CHECK LIST**

VEHICLE CHECK LIST				
ITEM	DESCRIPTION	FREQUENCY		
		Daily	Weekly	Monthly
Battery	Inspect for correct fluid level. In hot dry weather increase inspection frequency.			
Engine Oil	Check for proper level. Make sure oil level on dip stick is above "add" mark.			
Brakes	Operate system to assure positive efficient functioning.			
Radiator	Inspect coolant level. Check for antifreeze protection in cold weather.			
Safety Equipment Warning Signals and Lights	Inspect all devices and lights for proper operation.			
Suspension	Check for broken or weak springs.			
Tires and Wheels	Inspect tires for bruises, cuts and proper inflation. Check for loose wheel stud nuts, bent wheels and mud lumps or stones between dual wheels.			
UNIT CHECK LIST				
Walk Around Inspection	Visually inspect unit on all sides for hydraulic leaks, loose parts and obvious damage to external structural members.			
Cylinders	Check securing pins on cylinders and booms for proper installation. Check for proper installation of pins securing outrigger cylinders.			
Hydraulic Hoses and Fittings	Inspect hose surfaces and metal end coupling junctions for oil leakage. Check outer hose coverings for blistering, excessive wear or flattening.			
Hydraulic Reservoir	With all cylinders retracted, check fluid level in reservoir.			
Mounting Bolts	Inspect and check torque. Refer to the Torque Data Table in the Appendix for the torque values for a particular grade and size of bolt.			
Rotation System	Check for excessive back lash (play) in horizontal rotation stops. Normal variation at the mast location is not to exceed 1/8 - 3/16 inch.  Check gear mesh and bolt torque (296 ft. lbs.) of turntable bearing.			
Oil Leaks	Inspect all valves and cylinders for signs of leakage.			

**TABLE E-4. INSPECTION CHECK LIST (cont.)**

UNIT CHECK LIST (cont.)				
ITEM	DESCRIPTION	FREQUENCY		
		Daily	Weekly	Monthly
Structural Damage	Inspect all structural members for broken welds or fatigue cracks. Check booms for structural defects such as bends, weld cracks or dents.			
Holding Valve	Conduct a holding test with loaded boom to assure proper operation of holding valve.			

#### 5-4-1. 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 Inspection Check List.

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

- 1 Check for structural defect 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.

##### 5-4-1-2. 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 tightness on all unit mounting bolts. Power-wrench tight.
- 4 Check for loose bolts, fatigue cracks or corroded structural members.

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

- 1 Check mast housing for cracks.
- 2 Check for proper rotation function by making several start-stop operations. Maximum allowable free-play at mast front should be 1/8" to 3/16".
- 3 Check for proper gear mesh in turntable bearing. Check motor and gear mounting bolts for tightness.

#### 5-4-1-4. Hydraulic System

##### 1 Cylinders

- A Check rods for damage such as scarring, nicks, dents and rust on out of service units.
- B Check for leaks at weld joints and rod seals. Check for drift indicating leakage around piston.
- 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 vibration or noise.

##### 3 Hydraulic Control Valves

- A Check spools for sticking and failure to return to a neutral position.  
Inspect for leaks at joints and spools.
- B Inspect valve housing for cracks.
- C Make sure relief valve reaches correct pressure setting.



## SECTION 6. PARTS

### 6-1. CYLINDER IDENTIFICATION

Every IMT crane has a cylinder identification tag as shown in Figure F-1 attached to the mast assembly

To ensure proper replacement part procurement, it is necessary to specify a complete number/letter sequence

for any part request. Part numbers may be cross checked by comparing the stamped identification of cylinder base with corresponding placard cylinder identification.

IOWA MOLD TOOLING COMPANY, INC. JANUARY 1984 USA		
THIS UNIT IS EQUIPPED WITH THE FOLLOWING LISTED CYLINDERS (LETTER MATCH IDENTIFIED BY TECHNICAL UNIT)		
MAIN PRINCIPAL	SECONDARY SECONDAIRE	BOOM EXTENSION EXTENSION DE LA FLECHE
OUTRIGGER EXTENSION EXTENSION DU STABILISATEUR	OUTRIGGER VERTICAL STABILISATEUR VERTICAL	ROTATIONAL ROTATION
AUX. EQUIP EQUIPEMENT AUXILIAIRE	AUX. EQUIP EQUIPEMENT AUXILIAIRE	

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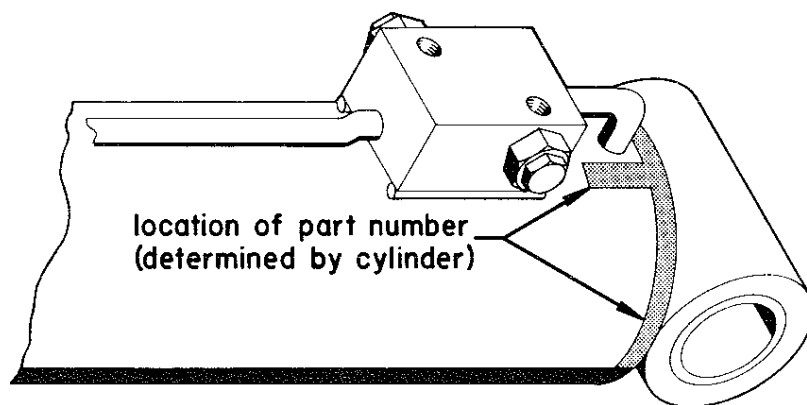


Figure F-1. Cylinder ID

Parts  
Drawing



Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702168	BASE	1	33.	72601037	BOLI; 9/16-12 x 4-1/2"	2
2.	52701024	LEG, outrigger	2	34.	72601145	BOLI; 7/8-9 x 2-3/4"	23
3.	52701412	PAD, outrigger	2	35.	72060795	BOLI; 1/2-13 x 1-1/2"	2
4.	52702138	SUPPORT, pinion gear	1	36.	72063053	LOCK WASHER; 1/2"	5
5.	60103729	GUARD, gear	1	37.	72066427	LOCK WASHER; 5/8"	4
6.	60103728	COVER, access hole	1	38.	72063111	LOCK WASHER; 9/16"	2
7.	60010844	PLATE, grease	1	39.	72063049	LOCK WASHER; 1/4"	4
8.	3C323910	CYLINDER, outrigger	2	40.	72063115	WASHER, hardened steel; 3/4"	23
9.	60102226	PIN	2	41.	--	NOI USED	-
10.	60102227	PIN	4	42.	72066535	CLAMP, cable; 3/8"	1
11.	70056188	GEAR-BEARING, turntable	1	43.	72531826	BUSHING, reducer; 1/4" npt(m)	1
12.	71056072	GEAR, intermediate	1			x 1/8" npt(f)	1
13.	71056074	GEAR, drive	1	44.	72053301	COUPLING; 1/8" npt	1
14.	71056073	GEAR, pinion	1	45.	73731173	EXIENSION, grease	2
15.	60020163	BUSHING, pinion gear support	1	46.	52702172	PLATFORM, ladder	1
16.	60020124	BUSHING, pinion gear, upper	1	47.	52702174	LADDER	2
17.	60020122	BUSHING, pinion gear, lower	1	48.	60104283	TUBE, removable	1
18.	60020123	WASHER, thrust, pinion gear	1	49.	72060052	BOLT, hex hd.; 3/8-16 x 2-1/2"	10
19.	60020120	BUSHING, drive gear, upper	1	50.	72062103	NUT, hex; 3/8-16	10
20.	60020121	BUSHING, drive gear, lower	1	51.	52702134	LATCH	1
21.	72063039	BUSHING, machy.; 2" x 10 ga.	6	52.	60104242	PIN, latch	1
22.	72063040	BUSHING, machy.; 2-1/2" x 10 ga.	1	53.	60104238	REIAINER, latch	1
23.	7BF81225	BUSHING	8	54.	60104241	HOUSING, detent	1
24.	72066136	RING, retaining; 2"	1	55.	60104239	FOLLOWER, latch	1
25.	72066103	RING, retaining; 2-1/2"	6	56.	70141491	SPRING	1
26.	72661163	PIN, groove; 1/2" x 4"	6	57.	72066444	BALL; 9/16" dia.	1
27.	72053508	ZERK; 1/8" npt	6	58.	72053506	ZERK; 3/16" press fit	1
28.	73051223	MOTOR, hydraulic	1	59.	72060091	BOLT; 1/2-13 x 1"	1
29.	71056088	BRAKE, hydraulic	1	60.	60105964	COVER, pinion gear support	1
30.	72060006	BOLT; 1/4-20 x 1-1/2"	4	61.	72601144	BOLT; 9/16-12 x 2"	4
31.	72060093	BOLI; 1/2-13 x 1-1/2"	2	62.	72063117	WASHER, hardened steel; 9/16"	4
32.	72060179	BOLI; 5/8-11 x 1-3/4"	4	63.	60020169	BUSHING	1

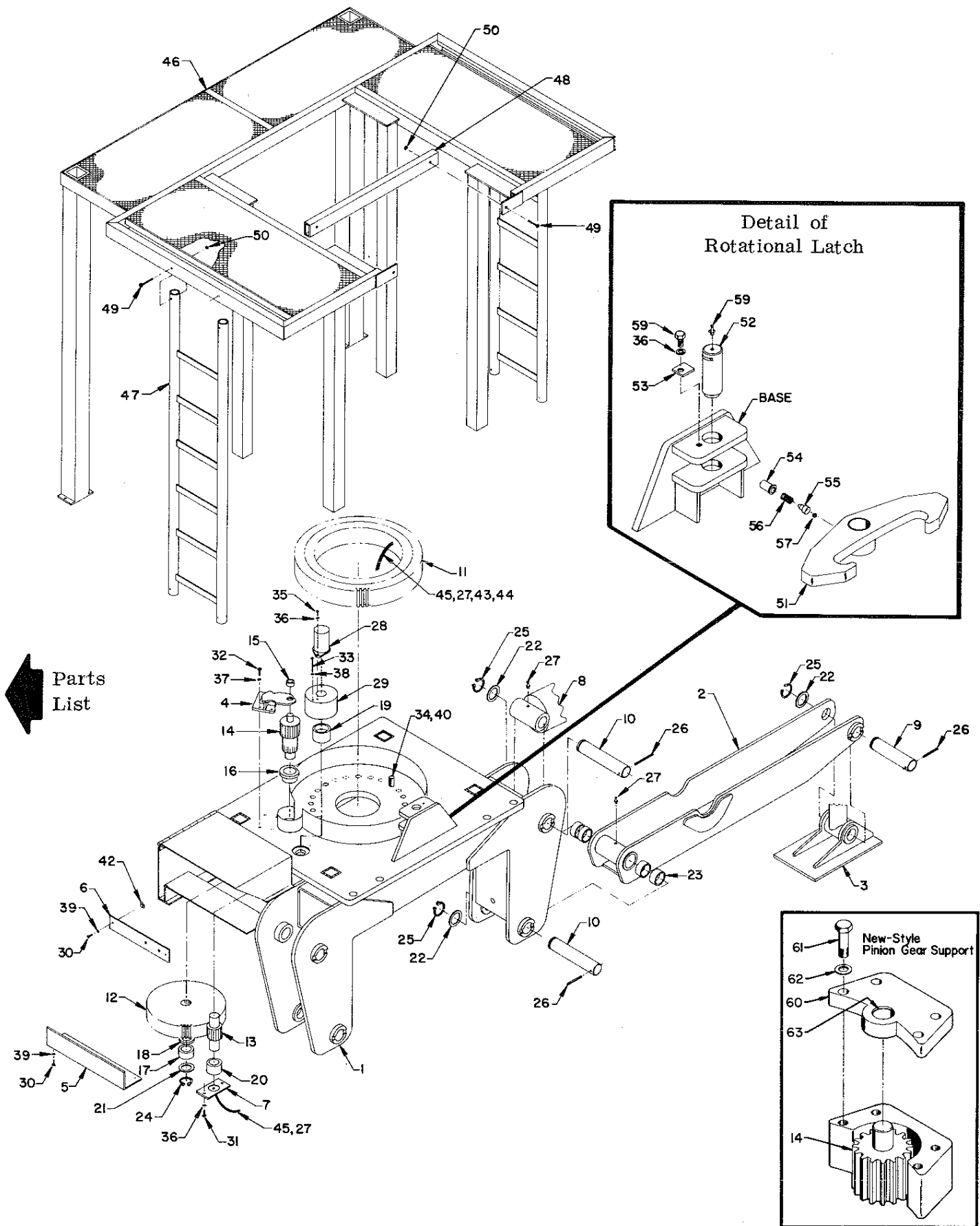


Figure F-2. Base and Outrigger Assembly (Part Number 41702143)

# NOTE

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

## DIMENSIONS

Bore	6-1/2"
Stroke	29-1/4"
Rod Diameter	3-1/2"
Pin Diameter	2-1/2"
C-C Closed	42-1/8"

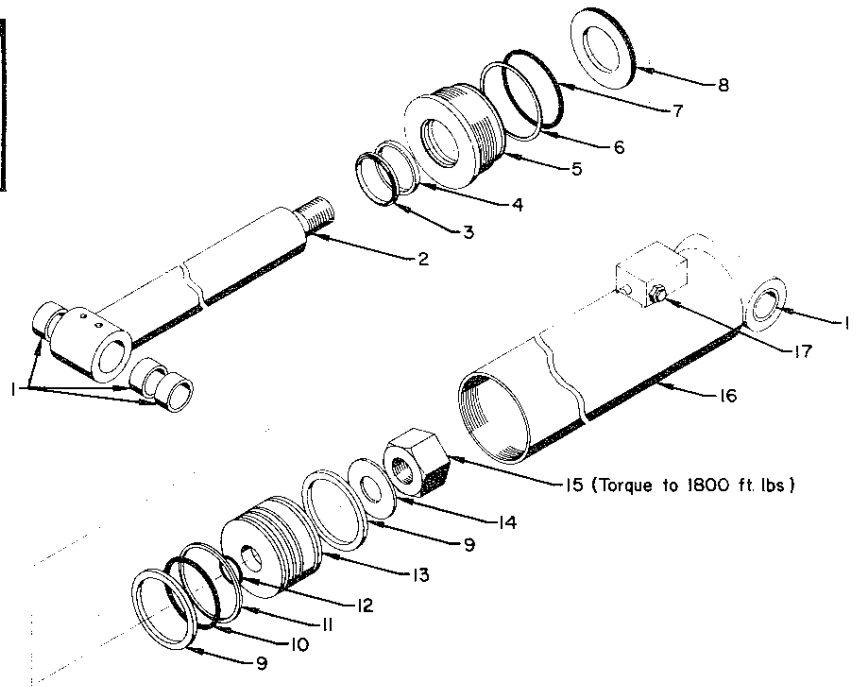


Figure F-3. Outrigger Cylinder (Part Number 3C323910)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	7BF81225	BUSHING	7	11.	7I66P065	*SEAL, piston	1
2.	4G323910	ROD	1	12.	7Q072227	*O-RING, static	1
3.	7R14P035	*WIPER, rod	1	13.	6IX65200	PISTON	1
4.	7R546035	*SEAL, rod	1	14.	72063016	WASHER	1
5.	6H065035	HEAD	1	15.	72062144	NUT	1
6.	7Q10P361	*BACK-UP, static	1	16.	4C263511	CASE	1
7.	7Q072361	*O-RING, static	1	17.	73054304	VALVE, counterbalance	2
8.	6A025035	*WAFER-LOCK	1				
9.	7I65I065	*RING, piston	2				
10.	7Q072257	*O-RING, companion	1				
						*Part of seal kit (Part Number 9X262832)	

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

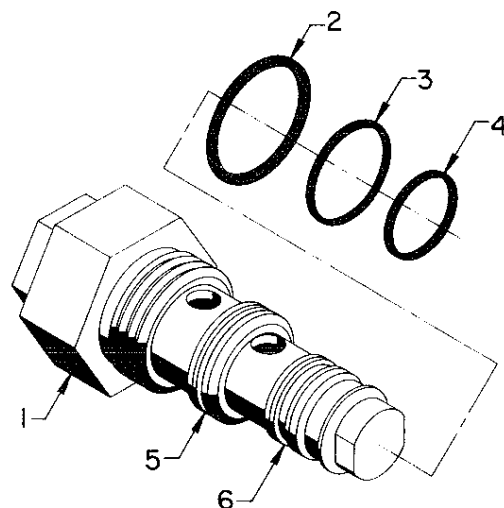
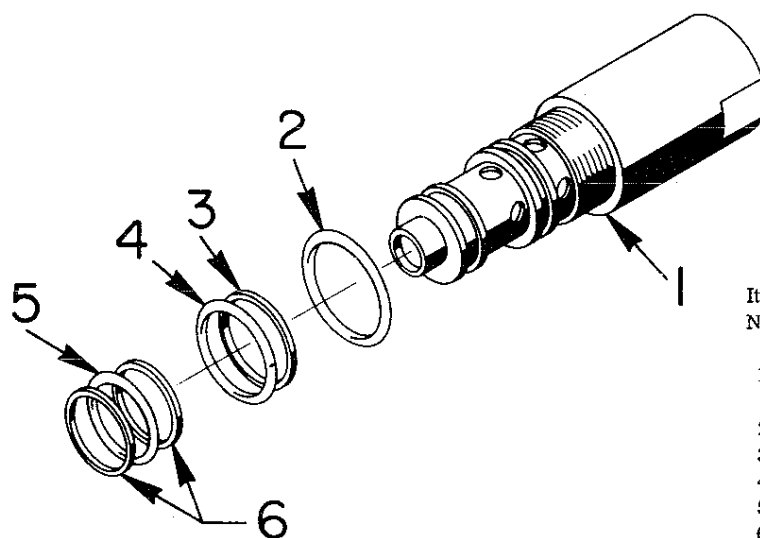


Figure F-4. Small Counter Balance Holding Valve (Part Number 73054304)



Item No.	Part No.	Description	Qty
1.	--	BODY, valve (not a replacement part)	1
2.	7Q072215	O-RING	1
3.	7Q10P021	RING, back-up	1
4.	7Q072021	O-RING	1
5.	7Q072020	O-RING	1
6.	7Q10P020	RING, back-up	1

Figure F-5. Large Counter Balance Holding Valve (Part Number 73054242)

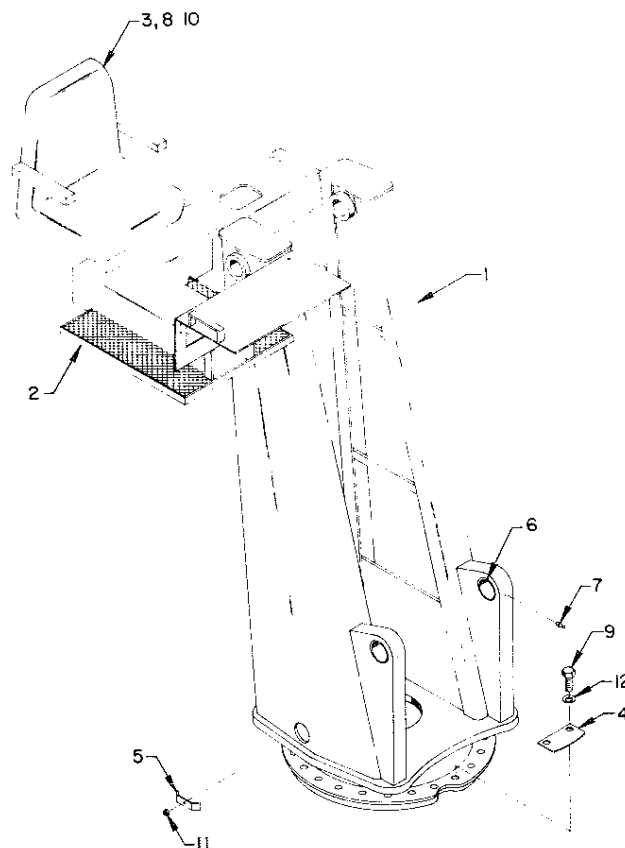


Figure F-6. Mast Assembly (Part Number 41702144)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702169	MASI	1	9.	72060208	BOLT; 3/4-10 x 2-1/2" grade 8	18
2.	52702173	PLAIFORM, chair	1	10.	72062004	NUT; 1/2-13	1
3.	70073143	CHAIR	1	11.	72062103	NUT; 3/8-16	2
4.	60104246	COVER	1	12.	72063116	WASHER, hardened steel; 3/4"	18
5.	60010118	CLAMP	1	13.	71029106	PLACARD, cylinder ID (not shown)	1
6.	7BF81225	BUSHING	2	14.	71029115	PLACARD, serial number (not shown)	1
7.	72053508	ZERK; 1/8" npt	2	15.	72066340	RIVET, pip; 1/8" (not shown)	8
8.	72060097	BOLT; 1/2-13 x 3"	1				

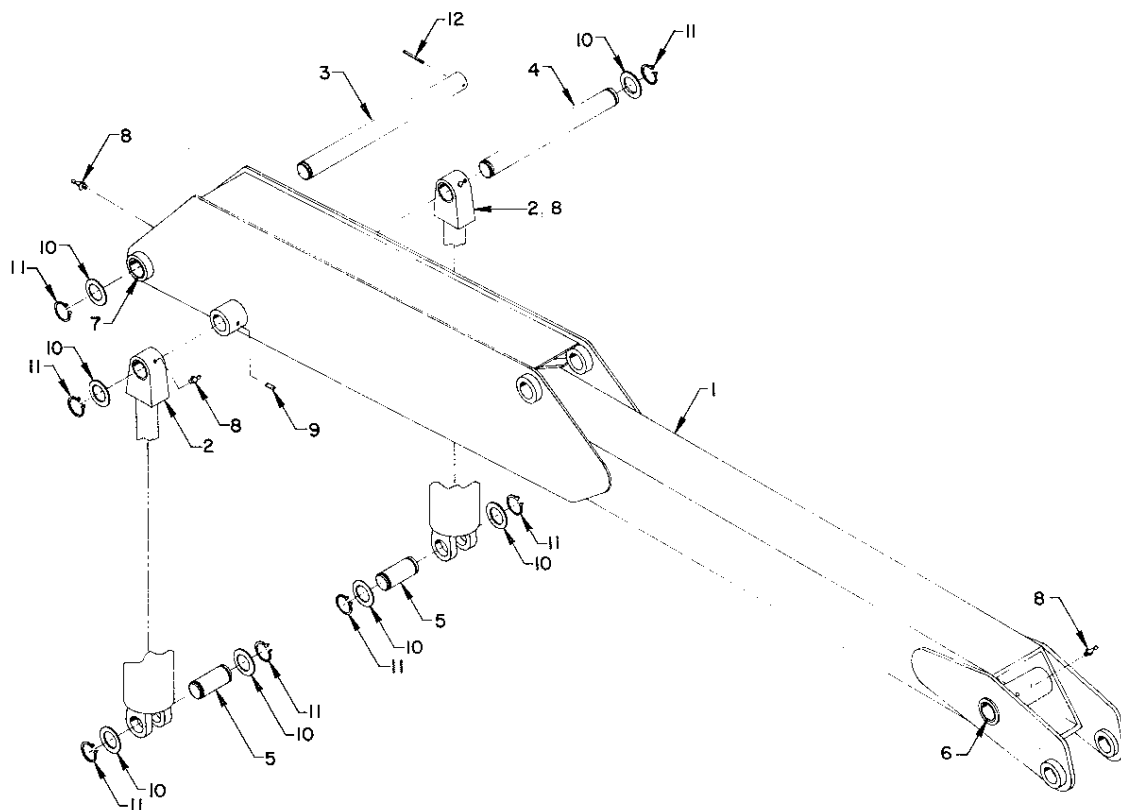
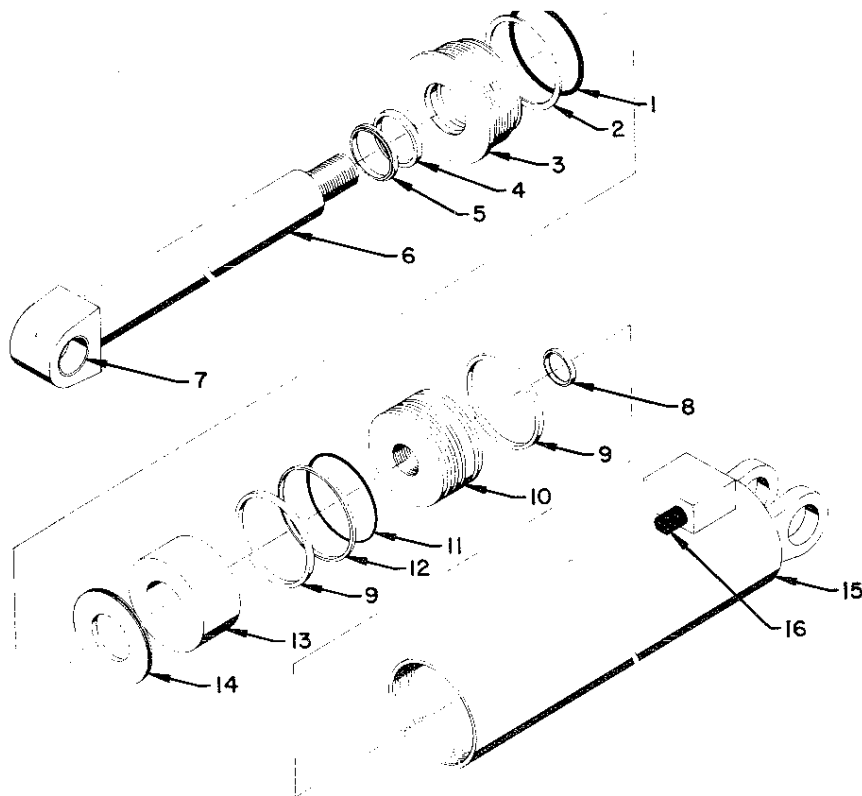


Figure F-7. Main Boom Assembly (Part Number 41702145)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702170	BOOM, main	1	7.	7BF81225	*BUSHING (new-style)	8
2.	3C360710	CYLINDER, main	2		7BF81225	*BUSHING (old-style)	4
3.	60104022	PIN	1	8.	72053508	ZERK; 1/8" npt	5
4.	60104021	PIN	1	9.	72060578	SCREW, set; 3/8-16 x 3/8" soc. hd.	2
5.	60104020	PIN	2	10.	72063040	BUSHING, machy.; 2-1/2" x 10 ga.	7
6.	60020167	*BUSHING (new-style)	3	11.	72066103	RING, retaining; 2-1/2"	7
7.	60020127	*BUSHING (old-style)	1	12.	72661163	PIN, groove; 1/2" x 4"	1

\*New-style shown. To convert to new-style, refer to EB-14. Contact IMI's Customer Service Department



DIMENSIONS	
Bore	6"
Stroke	26"
Rod Diameter	3"
Pin Diameter	2-1/2"
C-C Closed	48-1/2"

Figure F-8. Main Cylinder (Part Number 3C360710)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	7Q072358	*O-RING	1	10.	6I060020	PISTON	1
2.	7Q10P358	*RING, back-up	1	11.	7Q072253	*O-RING	1
3.	6H060030	HEAD	1	12.	7T66P060	*SEAL, piston	1
4.	7R546030	*SEAL, rod	1	13.	6C300030	IUBE, stop	1
5.	7R14P030	*WIPER, rod	1	14.	6A025030	*RING, wafer-lock	1
6.	4G360710	ROD	1	15.	4C360710	CASE, cylinder	1
7.	7BF81225	BUSHINGS	2	16.	73054242	VALVE, counter balance	1
8.	7T61N200	*SEAL, lock ring	1				
9.	7I65I060	*RING, piston	2				
				*Part of seal kit (Part Number 9C242432)			



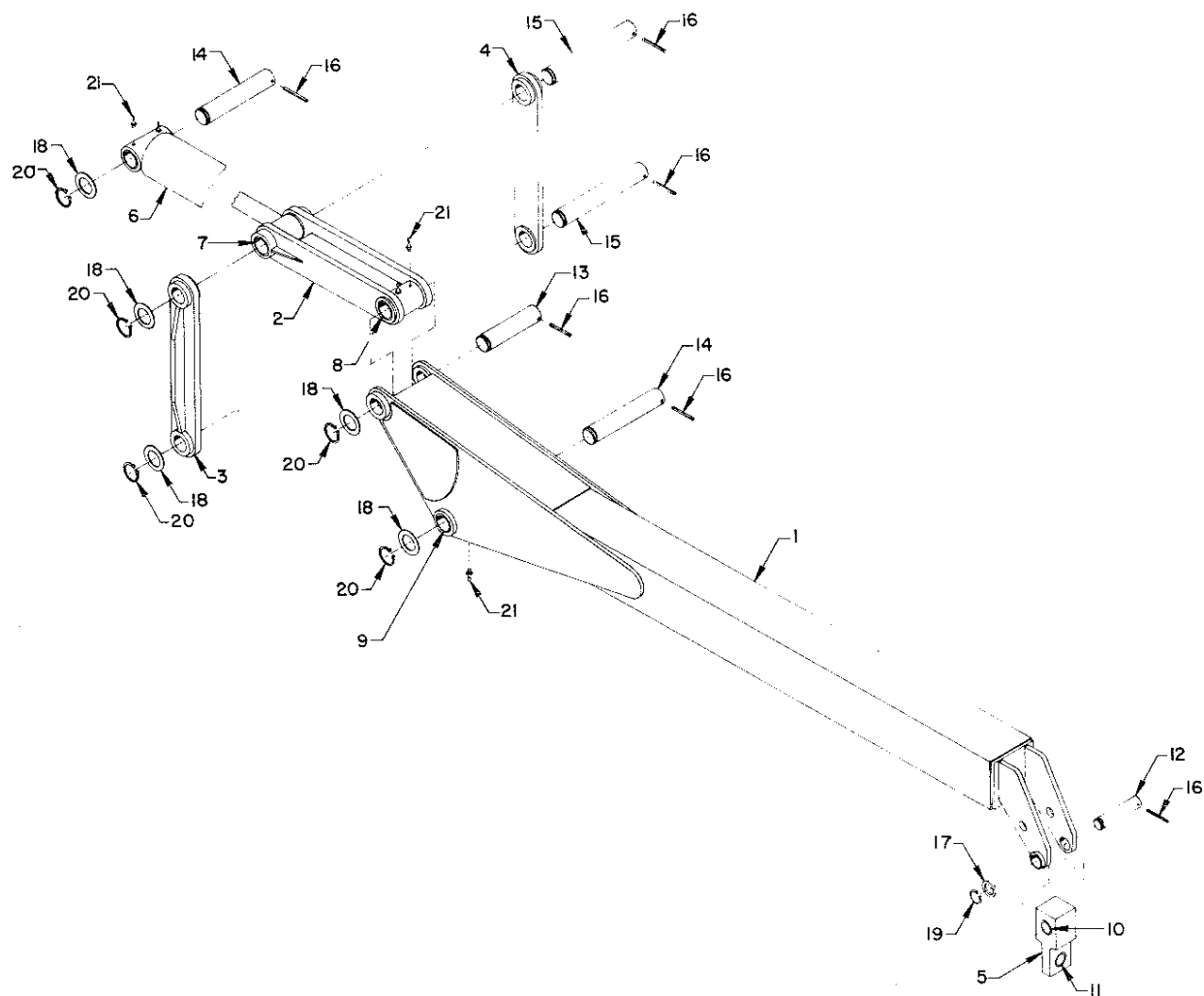
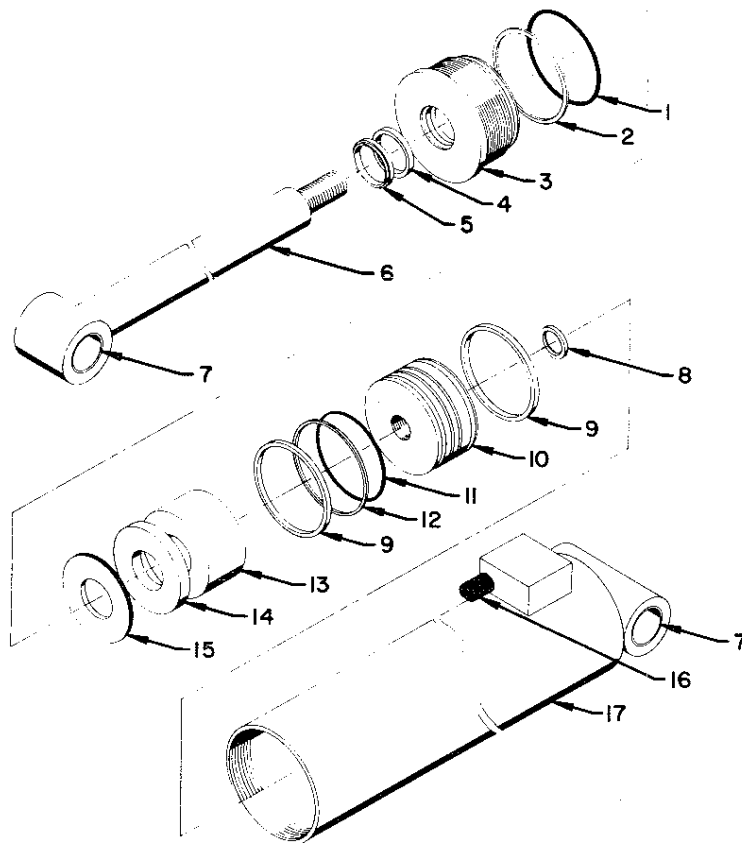


Figure F-9. Secondary Boom Assembly (Part Number 41702146)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	52702171	BOOM, secondary	1	11.	60020156	BUSHING	1
2.	52701945	LINK, inner	1	12.	60105924	PIN; 1-3/4" x 8-1/16"	1
3.	52701943	LINK, outer	1	13.	60102226	PIN; 2-1/2" x 10-11/16"	1
4.	52701944	LINK, outer slotted	1	14.	60103017	PIN; 2-1/2" x 14"	2
5.	60105607	LINK, universal	1	15.	60103016	PIN; 2-1/2" x 17"	2
6.	3C219812	CYLINDER, secondary	1	16.	72661163	PIN, groove; 1/2" x 4" lg.	6
7.	60020140	BUSHING	2	17.	72063100	BUSHING, machy.; 1-3/4" x 10 ga.	1
8.	60020165	*BUSHING (new-style)	3	18.	72063040	BUSHING, machy.; 2-1/2" x 10 ga.	5
	60020139	*BUSHING (old-style)	2	19.	72066092	RING, retaining; 1-3/4"	1
9.	60020166	*BUSHING (new-style)	3	20.	72066103	RING, retaining; 2-1/2"	5
	60020141	*BUSHING (old-style)	1	21.	72053508	ZERK; 1/8" npt	11
10.	60020157	BUSHING	1				

\*New-style shown. To convert to new-style, refer to EB-14. Contact IMI's Customer Service Department.



DIMENSIONS	
Bore	6-1/2"
Stroke	48"
Rod Diameter	2-1/2"
Pin Diameter	2-1/2"
C-C Closed	65-1/2"

Figure F-10. Secondary Cylinder (Part Number 3C219812)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	7Q072361	*O-RING	1	11.	7Q072257	*O-RING	1
2.	7Q10P361	*RING, back-up	1	12.	7T66P065	*SEAL, piston	1
3.	6H065025	HEAD	1	13.	6C300025	TUBE, stop; 3"	1
4.	7R546025	*SEAL, rod	1	14.	6C075025	TUBE, stop; 3/4"	1
5.	7R14P025	*WIPER, rod	1	15.	6A025025	*RING, wafer-lock	1
6.	4G219812	ROD	1	16.	73054242	VALVE, counter balance	1
7.	7BF81225	BUSHING	7	17.	4C219812	CASE, cylinder	1
8.	7T61N218	*SEAL, lock ring	1				
9.	7I65I065	*RING, piston	2				
10.	6I065218	PISTON	1				

\*Part of seal kit (Part Number 9C262035)

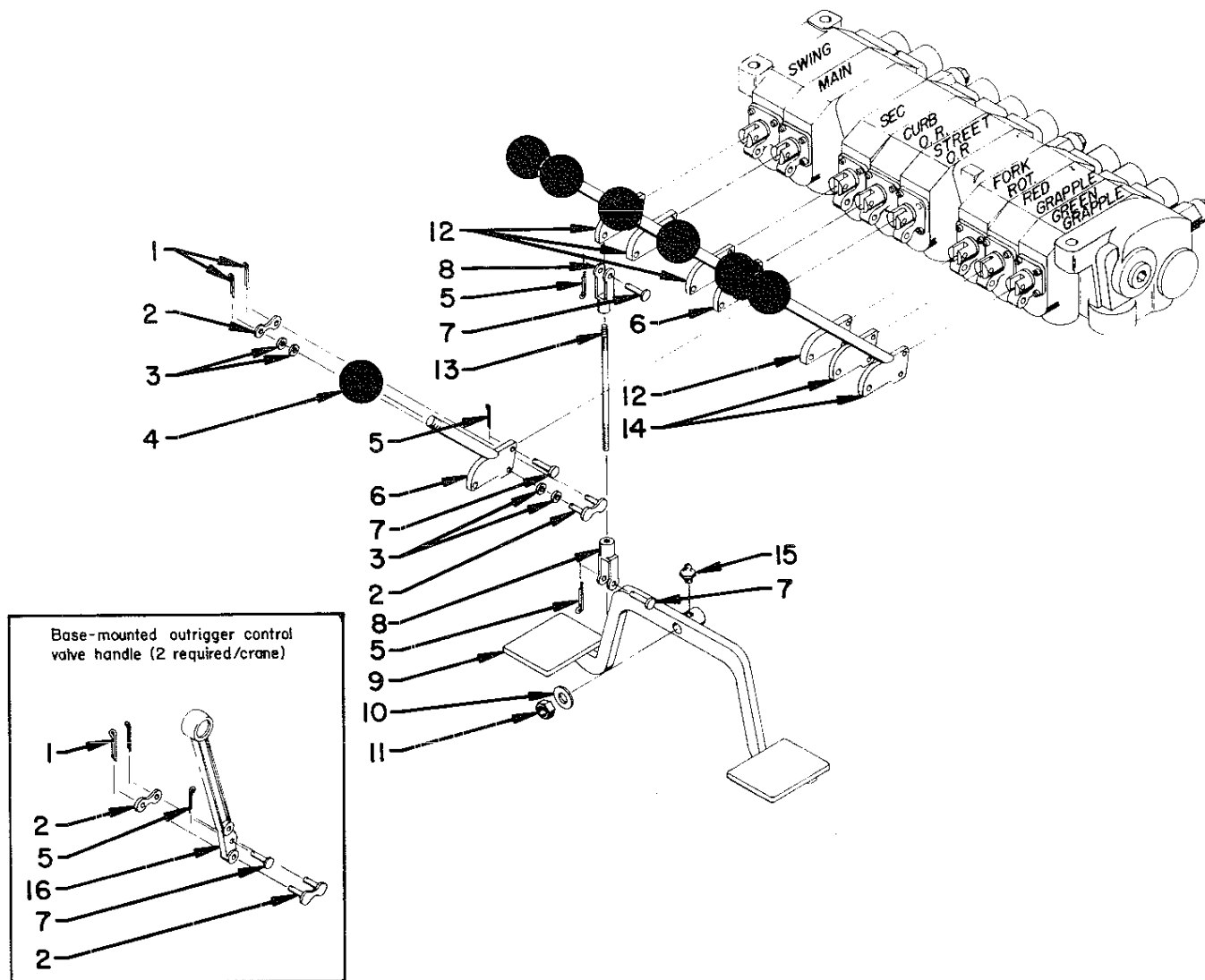


Figure F-11. Control Kit (Part Number 90703114)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	72066336	PIN, cotter	20	9.	52701270	PEDAL, swing	1
2.	71058003	LINK, connecting	10	10.	72063005	WASHER, wrt.; 1/2"	1
3.	72063001	WASHER, wrt.; 1/4"	32	11.	72062080	NUT, self-locking	1
4.	71039096	KNOB, control	8	12.	52701560	LEVER, control	4
5.	72066337	PIN, cotter	12	13.	60102876	LINK, swing	1
6.	52703345	LEVER, control	2	14.	52703344	LEVER, control	2
7.	72066338	PIN	12	15.	72053508	ZERK; 1/8" npt	1
8.	71058002	CLEVIS	2	16.	73014848	HANDLE, outrigger control	2

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	72066150	RING, retaining	1	14.	70141888	PISION	1
2.	72066140	RING, retaining	1	15.	7Q10P236	RING, back-up	1
3.	70055115	BEARING, ball	1	16.	7Q072236	O-RING	1
4.	70141891	HOUSING	1	17.	7Q10P248	RING, back-up	1
5.	7Q072165	O-RING	1	18.	7Q072248	O-RING	1
6.	70141881	SPRING, compression	1	19.	70141889	SCREW, bleeder	1
7.	70141880	SPRING, compression	8	20.	--	NOT USED	-
8.	70141882	PIN, torque	2	21.	70141890	PLATE, power	1
9.	70141883	SHAFT, splined	1	22.	72063004	LOCK WASHER	4
10.	70141884	DISC, primary	1	23.	72060066	BOLT	4
11.	70141885	DISC, rotation	4	24.	76391497	GASKET, base	1
12.	70141886	DISC, stationary	4	25.	76391498	GASKET, motor	1
13.	70141887	SPRING, compression	8				

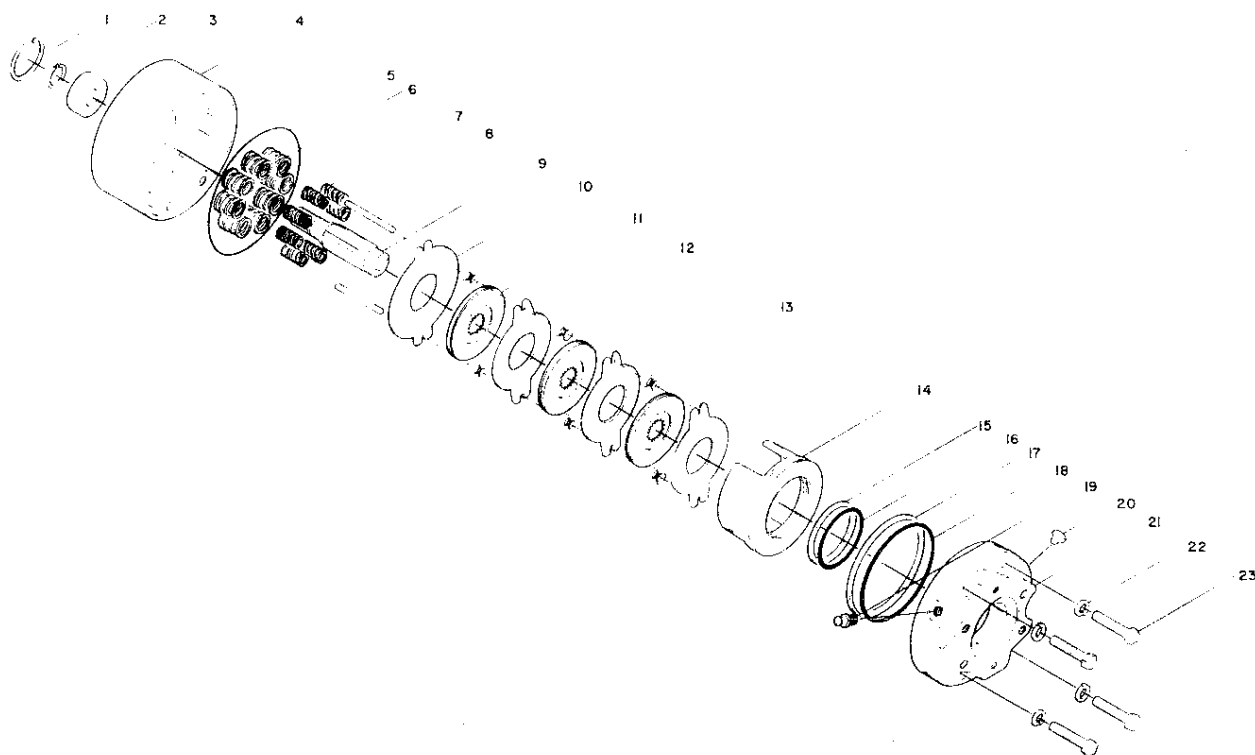


Figure F-12. Rotational (Swing) Brake (Part Number 71056088)

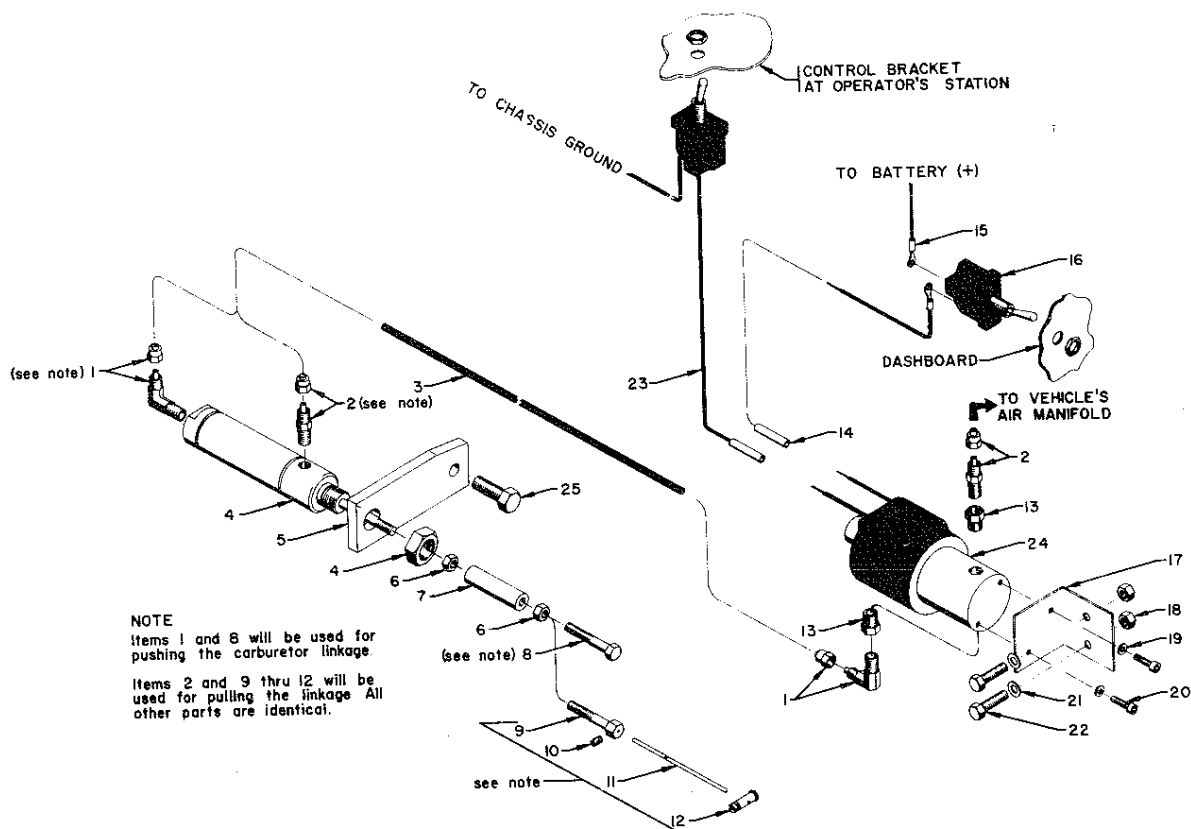


Figure F-13. Electric/Pneumatic Throttle Control (Part Number 31702944)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	72531746	FITTING, tube; 90°	2	14.	77040048	SPLICE, butt; 14 ga.	2
2.	72531731	FITTING, tube; straight	2	15.	77040000	TERMINAL, eye; 14 ga.	2
3.	89034176	TUBE; 1/4	36"	16.	<b>77041004</b>	SWITCH	2
4.	73054250	CYLINDER	1	17.	60105567	BRACKET, solenoid mounting	1
5.	60105568	BRACKET, cylinder mounting	1	18.	72062000	NUT; 1/4-20	2
6.	72062056	NUT; 5/16-24	2	19.	72063047	WASHER, lock; #10	2
7.	60104269	COUPLER	1	20.	72060669	SCREW, soc. hd.; 10-32 x 5/8 lg.	2
8.	72060294	BOLT; 5/16-24 x 1-1/4 lg.	1	21.	72063049	WASHER, lock; 1/4"	2
9.	60104268	BOLT, special	1	22.	72060004	BOLT; 1/4-20 x 1" lg.	2
10.	72060537	SCREW, set	1	23.	89044001	WIRE; 14 ga.	240"
11.	89058745	CABLE	24	24.	77041178	SOLENOID; 12 vdc	1
12.	72066377	ANCHOR, cable	1	25.	--	BOLT (part of carrier vehicle)	Ref.
13.	72531826	BUSHING, red.; 1/4" npt(m) x 1/8" npt(f)		26.	77041056	FUSE, inline; 20 amp.	1
				27.	60044043	LOOM; 5/16" x 20 ft.	1

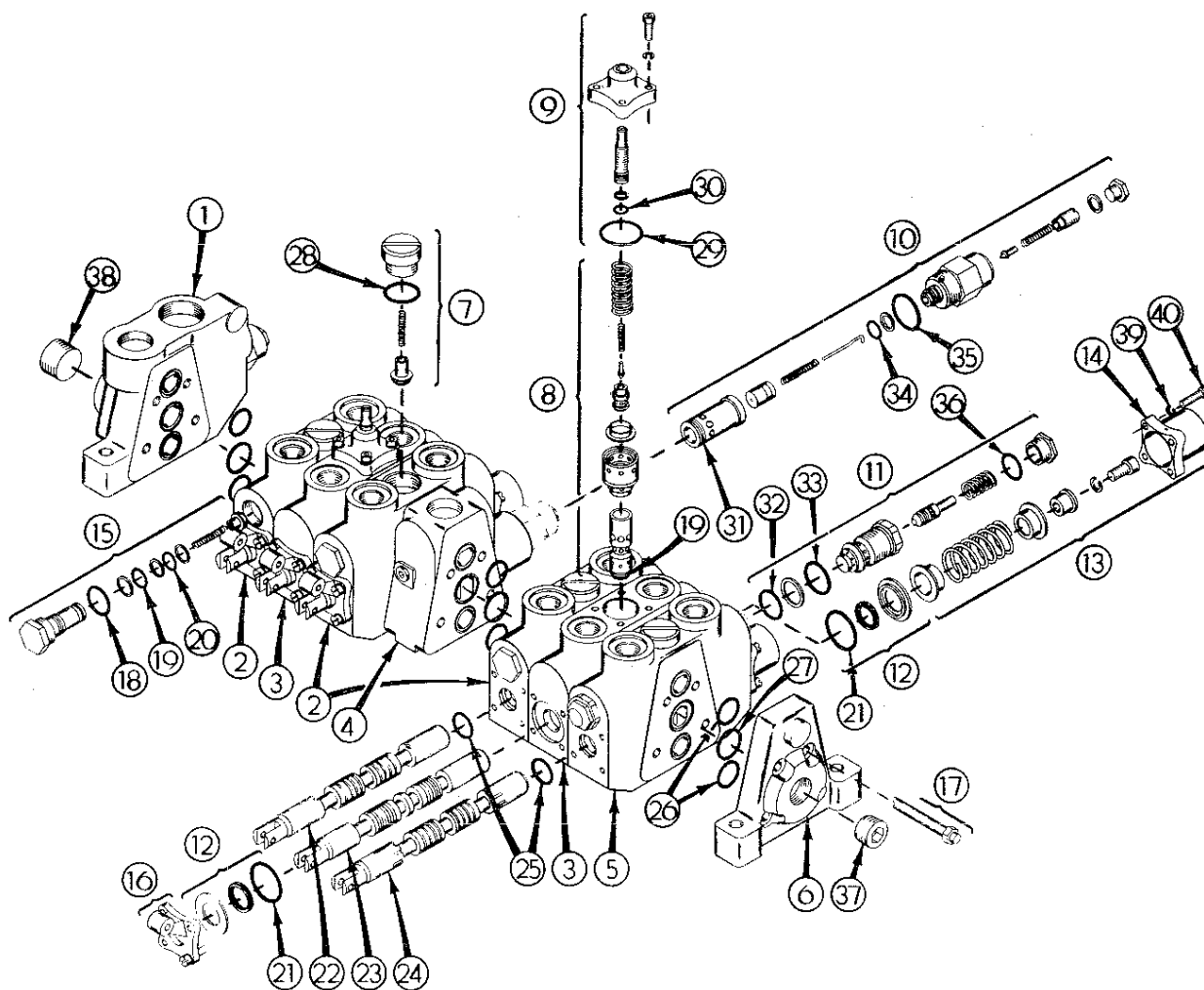


Figure F-14. Valve Spool Assembly

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	73054410	COVER	1	23.	--	SPOOL (not available separately - order item 2)	Ref.
2.	73054411	SECTION, valve, 4-way	3	24.	--	SPOOL w/bleed grooves (not available separately - order item 5)	Ref.
3.	73054405	SECTION, valve, 4-way	2	25.	7Q072212	O-RING	8
4.	73054407	SECTION, mid-inlet valve	1	26.	7Q072021	O-RING	16
5.	73054408	SECTION, valve, w/bleed spool	1	27.	7Q072024	O-RING	4
6.	73142254	PLATE, cover	1	28.	7Q072215	O-RING	4
7.	73054409	CHECK, load	4	29.	7Q072028	O-RING	2
8.	94074023	CONTROL, flow	2	30.	7Q072012	O-RING	2
9.	94074022	OPERATOR, knob	2	31.	7Q072020	O-RING	2
10.	73054348	RELIEF (set at 2350 PSI @ 13 GPM)	2	32.	7Q072022	O-RING	2
11.	73054398	RELIEF (set at 2350 PSI)	2	33.	7Q072023	O-RING	2
12.	94074024	KIT, plate and seal	4	34.	7Q072111	O-RING	2
13.	73054412	KIT, spool positioner	6	35.	7Q072122	O-RING	2
14.	73029144	BONNET, positioner	6	36.	7Q072116	O-RING	2
15.	73054010	CHECK, load	6	37.	72053395	PLUG, pipe; 3/4" npt	1
16.	94074025	BRACKET, handle	6	38.	72053396	PLUG, pipe; 1" npt	1
17.	94074026	KIT, stud and nut	4	39.	72063049	LOCK WASHER; 1/4"	24
18.	7Q072117	O-RING	6	40.	72601140	SCREW, fillister hd.; 1/4-20 x 1"	24
19.	7Q072016	O-RING	8				
20.	7Q072015	O-RING	6				
21.	7Q072127	O-RING	4				
22.	--	SPOOL (not available separately - order item 2)	Ref.				

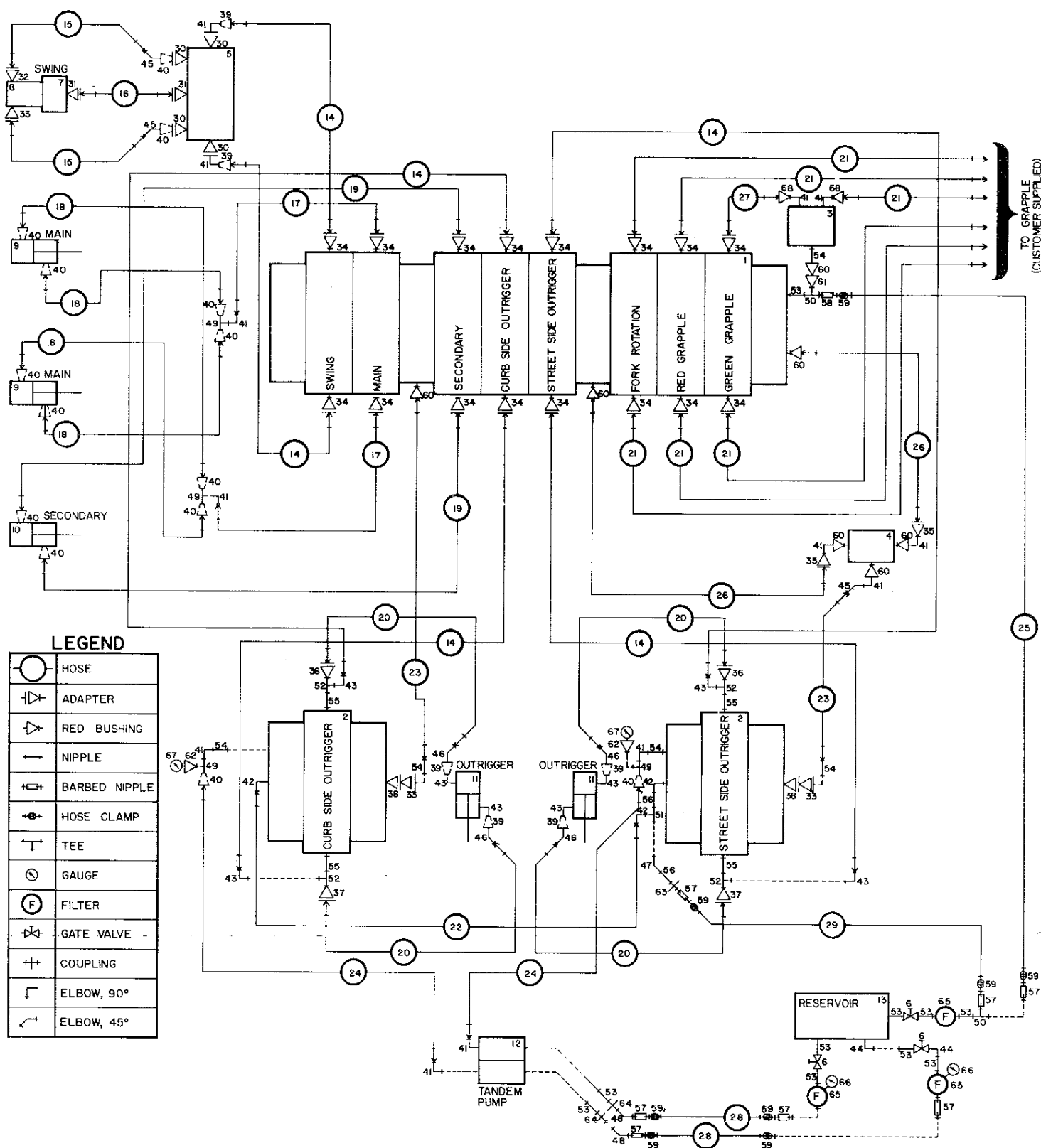


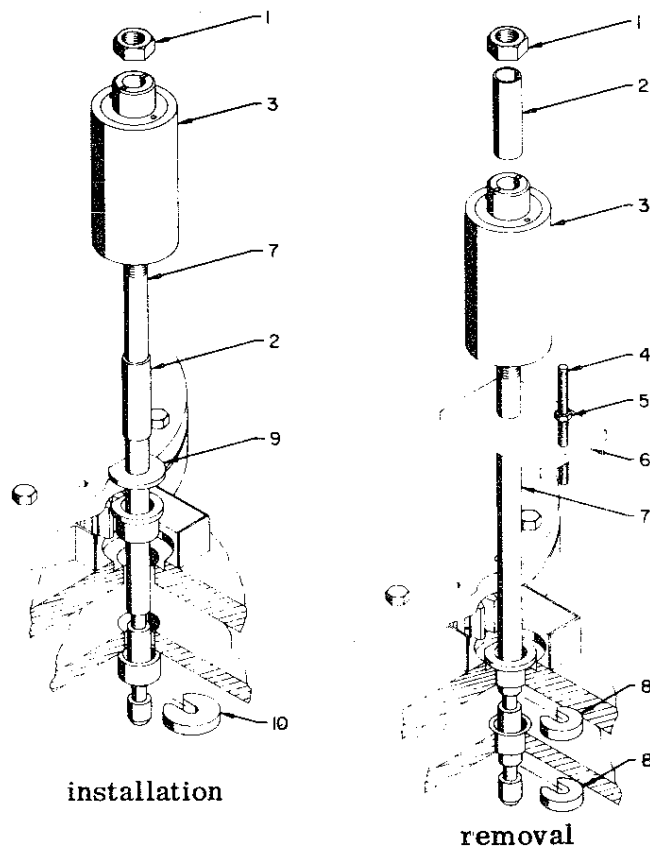
Figure F-15. Hydraulic Schematic

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	51702951	VALVE BANK; 8-function	1	36.	72531420	ADAPTER; 3/8" npt(m)	
2.	51702932	VALVE, outrigger	2			x 3/4-16 JIC	2
3.	--	VALVE, relief	Ref.	37.	72532515	ADAPTER, 90° long; 3/8" npt(m)	
4.	73054161	VALVE, flow divider	1			x 3/4-16 JIC	2
5.	73054370	VALVE, counter-balance	1	38.	73073023	ADAPTER, power beyond	2
6.	73054225	VALVE, gate; 1-1/4"	3	39.	72053642	SWIVEL; 3/8" npt	6
7.	71056088	BRAKE, rotation	1	40.	72053643	SWIVEL; 1/2" npt(m x f)	14
8.	73051223	MOTOR, rotation	1	41.	72531133	ELBOW, street, 90°; 1/2" npt	13
9.	3C360710	CYLINDER, main	2	42.	72053556	ELBOW, street, 90°; 3/4" npt	3
10.	3C219812	CYLINDER, secondary	1	43.	72531132	ELBOW, street, 90°; 3/8" npt	8
11.	3C324912	CYLINDER, outrigger	2	44.	72053327	ELBOW, street, 90°; 1-1/4" npt	2
12.	73051XXX	PUMP	Ref.	45.	72053522	ELBOW, street, 45°; 1/2" npt	3
13.	52701853	RESERVOIR	1	46.	72053563	ELBOW, street, 45°; 3/8" npt	4
14.	51703158	HOSE; 3/8" x 180"	6	47.	72053535	ELBOW, street, 45°; 3/4" npt	1
15.	51703182	HOSE; 3/8" x 16"	2	48.	72053175	ELBOW, street, 45°; 1-1/4" npt	2
16.	51702866	HOSE; 1/4" x 11"	1	49.	72053612	IEE; 1/2" npt	4
17.	51703127	HOSE, main	2	50.	72053606	IEE; 1-1/4" npt	2
18.	51703126	HOSE; 1/2" x 50'	4	51.	72053555	IEE; 3/4" npt	1
19.	51703128	HOSE, secondary	2	52.	72053963	IEE; 3/8" npt	4
20.	51703001	HOSE, outrigger	4	53.	72053211	NIPPLE, close; 1-1/4" npt	10
21.	51703122	HOSE, grapple	6	54.	72053726	NIPPLE, reducer; 3/4" x 1/2" npt	5
22.	51703159	HOSE, return	1	55.	72053723	NIPPLE, pipe; 3/8" npt	4
23.	51703156	HOSE, pressure	2	56.	72053141	NIPPLE; 3/4" npt	2
24.	51703086	HOSE, pump to valve bank	2	57.	72532346	NIPPLE, barbed, 90°; 1-1/4"	7
25.	60035560	HOSE; 1-1/4" return	1	58.	72531550	NIPPLE, barbed; 1-1/4"	1
26.	51703060	HOSE, flow divider to valve	2	59.	72066516	CLAMP, hose	8
27.	51703049	HOSE, green grapple to relief valve	1	60.	72531833	BUSHING, reducer; 3/4" npt(m)	
28.	60035XXX	HOSE, suction As Required				x 1/2" npt(f)	7
29.	60035XXX	HOSE, return As Required		61.	72531836	BUSHING, reducer; 1-1/4" npt(m)	
30.	72053744	ADAPTER, straight; 1/2" npt(f)				x 3/4" npt(f)	1
		x 7/8-14	4	62.	72531830	BUSHING, reducer; 1/2" npt(m)	
31.	72532149	ADAPTER, 90° swivel; 1/4" npt				x 1/4" npt(f)	2
		x 7/16-20	2	63.	72053489	COUPLING, reducer; 1-1/4"	
32.	72531116	ADAPTER, 90° long; 1/2" npt				x 3/4" npt	1
		x 7/8-14 JIC	1	64.	72053307	COUPLING; 1-1/4" npt	2
33.	72053755	ADAPTER, 90°; 1/2" npt	3	65.	73052012	FILIER	3
		x 3/4-16 JIC	3	66.	73048031	GAUGE, vacuum	2
34.	72532359	ADAPTER	16	67.	73054003	GAUGE, pressure; 0-5000 PSI	2
35.	72053671	ADAPTER; 3/4" npt(m) x		68.	72531823	BUSHING, reducer; 1/2" npt(m)	
		3/4-16 JIC	2			x 3/8" npt(f)	2



Parts  
Drawing





### Parts list for pinion gear bushing removal and installation.

Item No.	Part No.	Description	Qty
1.	72062011	NUT; 1-1/4 - 7	1
2.	60105358	SPACER	1
3.	73073134	JACK, hydraulic	1
4.	60105497	ROD; 1/2-13 x 6" lg.	1
5.	72062004	NUT; 1/2-13	1
6.	60105496	PLATE	1
7.	60102775	ROD	1
8.	60102779	RING, slotted	2
9.	60102778	RING, installation	1
10.	60102780	RING, slotted	1

### Pinion Gear

### Drive Gear

### Parts list for drive gear bushing removal and installation.

Item No.	Part No.	Description	Qty
3.	73073134	JACK	1
11.	72062007	NUT; 3/4-10	2
12.	60102782	RING, alignment	1
13.	60102776	SPACER, cupped	1
14.	60102777	ROD	1
15.	60102781	RING, pull	1
16.	60102783	RING, upper bushing	1
17.	60102784	RING, lower bushing	1

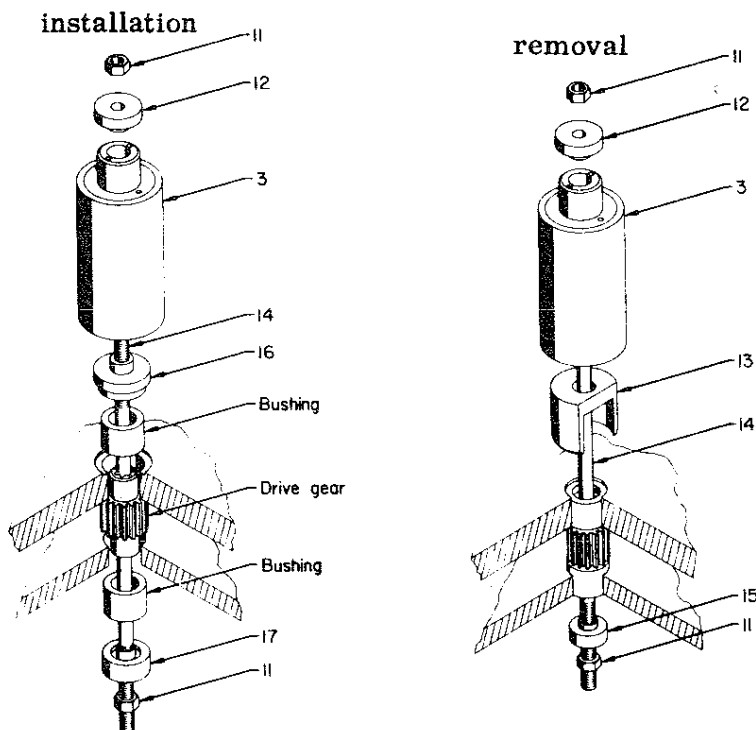


Figure F-16. Bushing Removal and Installation Tool (Part Number 92091200)

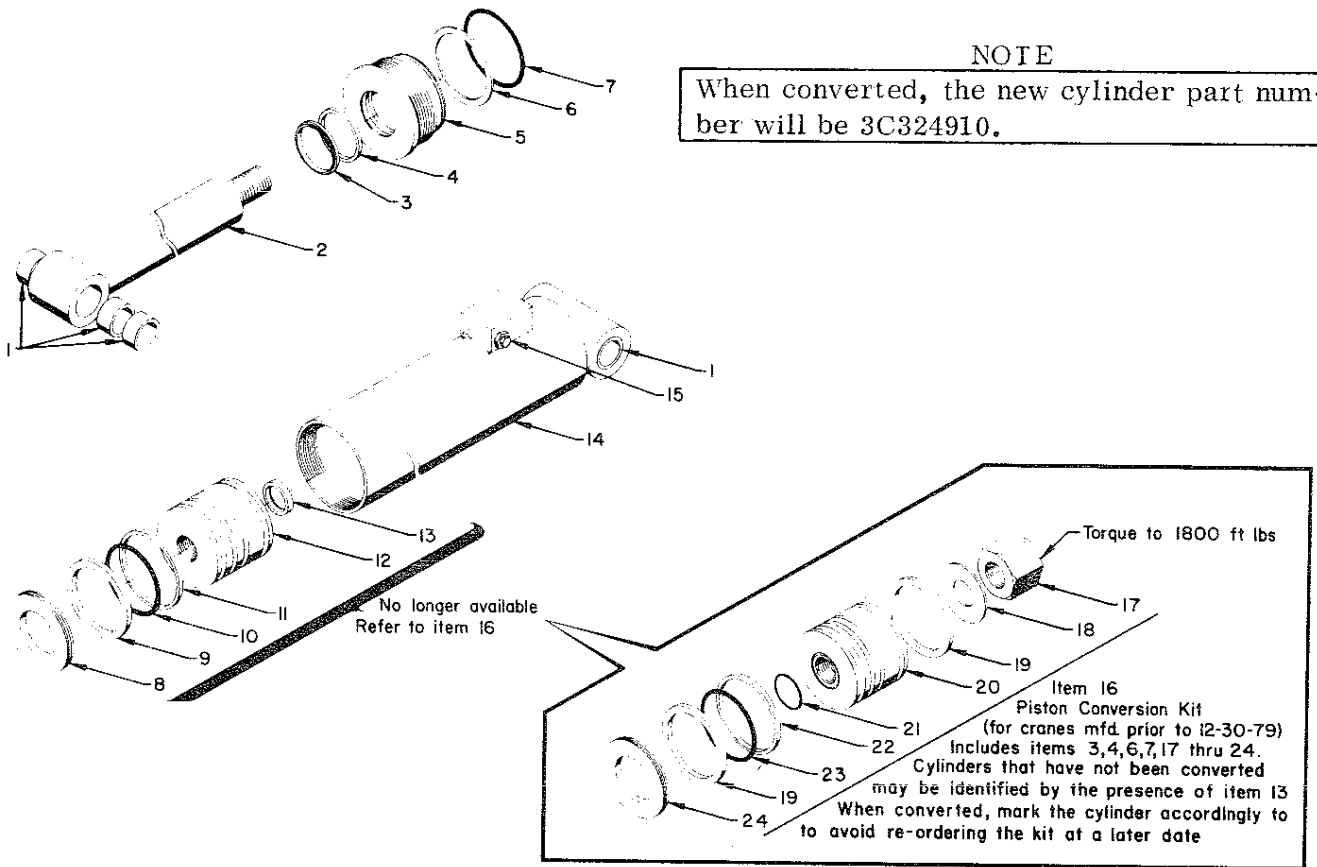


Figure F-17. Old-Style Outrigger Cylinder (Part Number 3C263513) with Conversion Kit (Part Number 9X324910)

Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1.	7BF81225	BUSHING	7	16.	9X324910	KIT, conversion (includes items 3, 4, 6, 7 and 17 thru 24)	1
2.	4G263510	ROD	1	17.	72062144	***NUT	1
3.	7R14P035	*WIPER, rod	1	18.	72063016	***WASHER	1
4.	7R546035	*SEAL, rod	1	19.	7I65I065	*RING, piston	2
5.	6H065035	HEAD	1	20.	6IX65202	***PISTON	1
6.	7Q10P361	*RING, back-up	1	21.	7Q072231	*O-RING	1
7.	7Q072361	*O-RING	1	22.	7I66P065	*SEAL, piston	1
8.	**	WAFER-LOCK	1	23.	7Q072257	*O-RING	1
9.	**	RING, piston	2	24.	6A025200	*WAFER-LOCK	1
10.	**	O-RING	1				
11.	**	SEAL, piston	1				
12.	**	PISTON	1				
13.	**	SEAL, lock ring	1				
14.	4C263512	CASE	1				
15.	73054304	VALVE, counter balance	1				

\*Part of seal kit (Part Number 9X318915).  
 \*\*No longer available - order item 16.  
 \*\*\*Part of conversion kit - order item 16 unless the cylinder is already converted.

## SECTION 7. REPAIR

This section includes disassembly, repair and assembly instructions for many of the components on the IMT 1424 crane.

### 7-1. HYDRAULIC SYSTEM

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

1. ALWAYS relieve internal hydraulic pressure before proceeding with the repair.
2. NEVER allow foreign matter - dirt, water, metal particles, etc. - to enter the hydraulic system through the open connection. Seal the connection as completely as possible. If dirt does get in, a filter change is required after about 50 hours of operation.
3. ALWAYS cycle all of the controls after completing a repair. This will eliminate air that is trapped in the cylinders, hoses, spool valves, etc., and avoid erratic bumpy behavior during actual working conditions.
4. ALWAYS check for hydraulic leaks after a repair. A high pressure leak is hazardous and must be repaired before putting the unit to work.

#### 7-1-1. Cylinders

The cylinders are all of the same type; therefore, the same disassembly and repair instructions apply to all. Check the PARTS section for specific information. The following list of tools will be a definite asset in the disassembly and repair of all IMT cylinders:

1. Spanner wrench-IMT Part Number 3Y140510. Fits all IMT cylinders.
2. Needle-nose pliers - For removal and replacement of seals.
3. Ice pick or sharp awl - For removal and replacement of seals.
4. Plastic hammer - Used with the spanner wrench for head and piston installation.

##### 7-1-1-1. Main and Secondary Cylinder Removal

These removal instructions pertain to the main and secondary cylinders only. For removal and installation instructions for the outrigger cylinders, refer to Paragraph 7-1-1-5.

1. Support the crane with the mast and boom at a 90° angle and the secondary cylinder fully retracted.

2. Kill the engine.
3. Relieve the internal hydraulic pressure (cycle the controls a few times).
4. Disconnect the hydraulic hoses from the cylinder.

#### WARNING

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

5. Remove the rod end pin.
  - A. Remove the retainer and bushing.
  - B. Hold the cylinder up and drive out the rod end pin.
6. Remove the base end pin in the same manner as the rod end pin.
7. Carefully lower the cylinder.

##### 7-1-1-2. Cylinder Disassembly

#### CAUTION

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

#### WARNING

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

#### NOTE

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

1. Thoroughly wash the exterior of the cylinder case.

#### NOTE

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

2. Remove the holding valve.
3. Place the cylinder on a flat surface near a vise. Slip a pin through the pin boss and clamp the pin in a vise (Figure G-1).

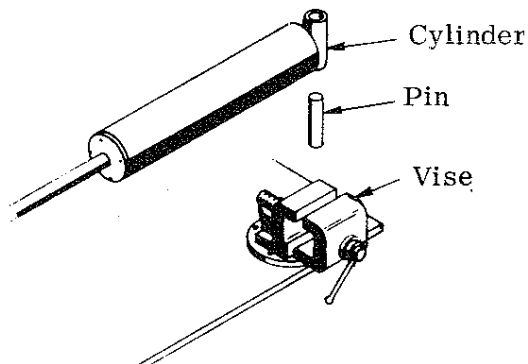


Figure G-1. Securing Cylinder

**CAUTION**

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

4. Unscrew the head (No. 4, Figure G-2) in a counter-clockwise direction with the spanner wrench. Withdraw the head from the cylinder case.
5. Secure the rod pin boss in the same manner as the cylinder pin boss (Figure G-1).
6. Unscrew the piston (No. 8, Figure G-2) from the rod with a spanner in the same manner as the head.

**CAUTION**

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

**NOTE**

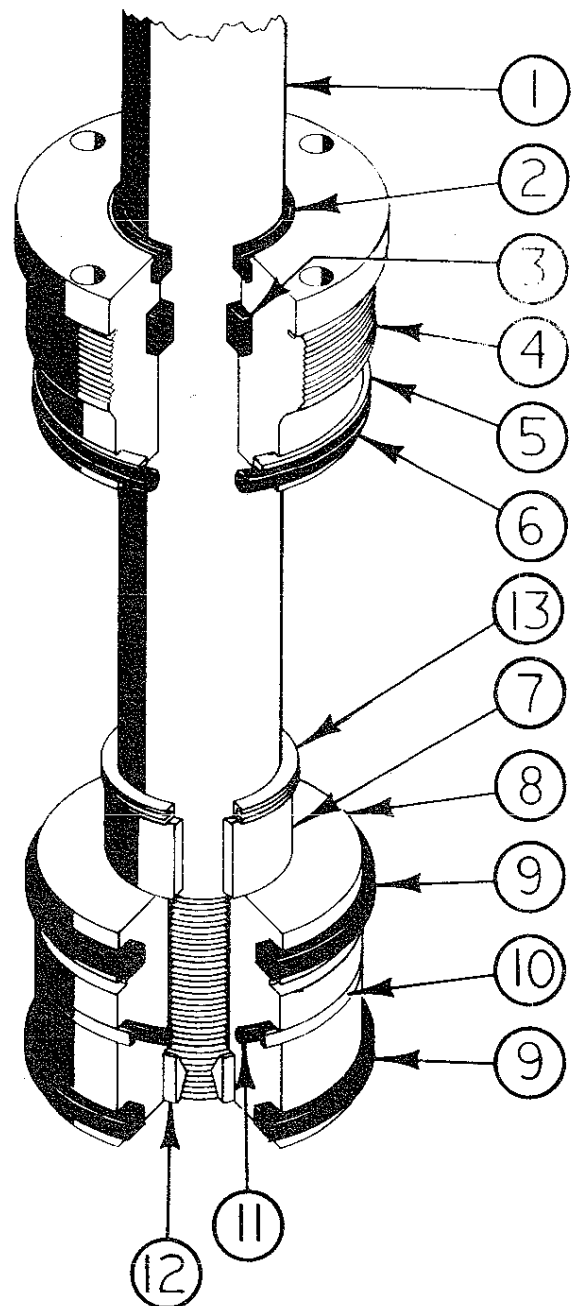
A nut secures the piston on the outrigger cylinders.

7. Remove the wafer-lock (No. 13) and the stop tubes (No. 7) from the rod. The wafer-lock was crushed to secure it and will have to be broken to remove it.

**CAUTION**

Make certain that the rod isn't damaged during removal of the wafer lock.

8. Slide the head (No. 4) off the rod.
9. Inspect the cylinder interior and the rod for dents, nicks, scratches, etc. and replace if necessary.



1. Rod
2. Wiper
3. Dynamic Rod Seal
4. Head
5. Static Back-up
6. Static O-Ring
7. Stop Tube
8. Piston
9. Piston Rings
10. Dynamic Piston Seal
11. Companion O-Ring
12. Lock Ring
13. Wafer Lock

Figure G-2. Cylinder Layout

### CAUTION

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

### NOTE

Further work should be done in a warm environment (70 F or warmer). This makes the seals easier to work with.

- 10 Work a slack section into the head seal static o-ring (No. 6) and pick it up out of the groove (Figure G-3). Lift the static back-up out of its groove with the needle-nose pliers.

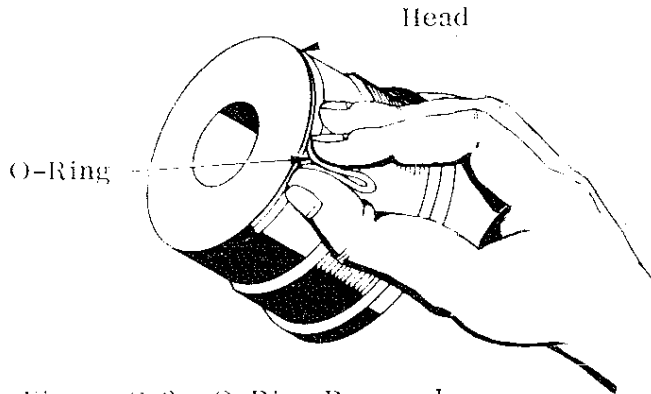


Figure G-3. O-Ring Removal

- 11 Pinch the lip of the rod wiper (No. 2) with the needle-nose pliers and pull it out of the head.
- 12 Position the head with the top of the head up and puncture the dynamic rod seal (No. 3) with the ice pick. Pry it out of the groove and push it on through the head (Figure G-4).

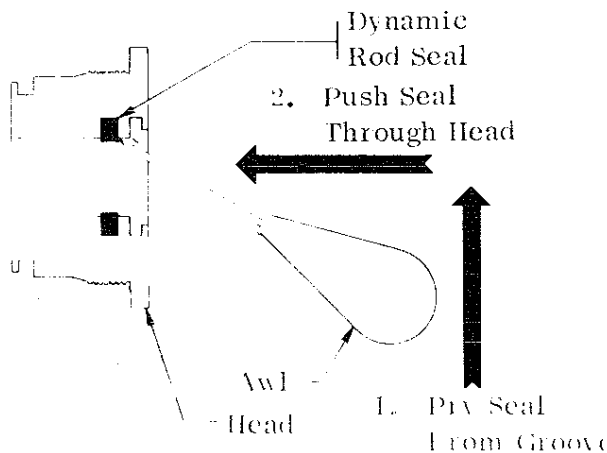


Figure G-4. Dynamic Rod Seal Removal

- 13 Spread the piston rings (No. 9), slip them over the land and off the end of the piston nearest to the ring.
- 14 Carefully lift the dynamic piston seal (No. 10) out of the groove with a thin blade such as a putty knife blade. Take care not to nick the edges of the groove. Twist and break the seal.

### CAUTION

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

- 15 Prick the companion o-ring with a pin or needle and lift it out of the groove. Roll it off the end of the piston.
- 16 Pry the lock ring (No. 12) from its seat in the bottom of the piston.
- 17 Clean the piston, head, rod and cylinder. Dress any nicks and gouges in the head and piston that may have occurred during disassembly.

### 7-1-1-3. Cylinder Assembly

### CAUTION

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

- 1 Install the companion o-ring (No. 11, Figure G-2). Make certain it is free of twists.
- 2 Slide the piston seal (No. 10) carefully into position.

### CAUTION

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

- 3 Slide the piston rings (No. 9) over the lands and allow them to snap into the grooves.
- 4 Carefully press the lock ring (No. 12) into position.
- 5 Install the static back-up (No. 5) and the o-ring (No. 6). Make certain there are no twists.
- 6 Position the head with the rod wiper pocket up. Grasp the dynamic rod seal (No. 3) with the needle-nose pliers (Figure G-5).

### CAUTION

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

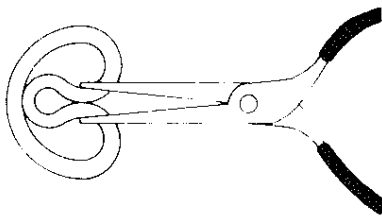


Figure G-5. Rod Seal Installation

- 7 Insert the dynamic rod seal into the head and allow it to snap into position. Use your fingers to help it if necessary.
- 8 Install the rod wiper (No. 2)
- 9 Generously lubricate the inside diameter of the head with a non-fibrous bearing grease such as Lubriplate
- 10 Carefully slide the head onto the rod. Make certain that the rod wiper (No. 2) does not catch on the rod when it is first started. Slide the head all of the way onto the rod and up to the pin boss
- 11 Slide the wafer-lock (No. 13) and stop tubes (No. 7 - if applicable) onto the rod
- 12 Lubricate the entire threaded area of the rod and the inside diameter of the piston with non-fibrous bearing grease
- 13 Secure the rod as shown in Figure G-1 and screw the piston onto the rod by hand. You should be able to get the piston almost all the way onto the rod before using the spanner wrench

#### CAUTION

Check to make certain that the lock ring (No. 12) stays in position. It must remain in position or leaks may occur resulting in poor performance.

- 14 Torque the piston onto the rod at 250 ft. lbs. of torque. Impact the wrench three times with a heavy plastic hammer while maintaining the torque (Figure G-6)
- 15 Generously lubricate the outside diameter of both the head and piston with non-fibrous bearing grease. Also lubricate the threads and beveled area of the top of the cylinder case.
- 16 With a side-to-side or up-and-down motion, work the piston into the cylinder and past the threads and beveled area of the top of the cylinder case.
- 17 Slide the piston into the cylinder. With a rotating motion, work the o-ring (No. 6) and the back-up (No. 5) past the threads and hand tighten the cylinder head.

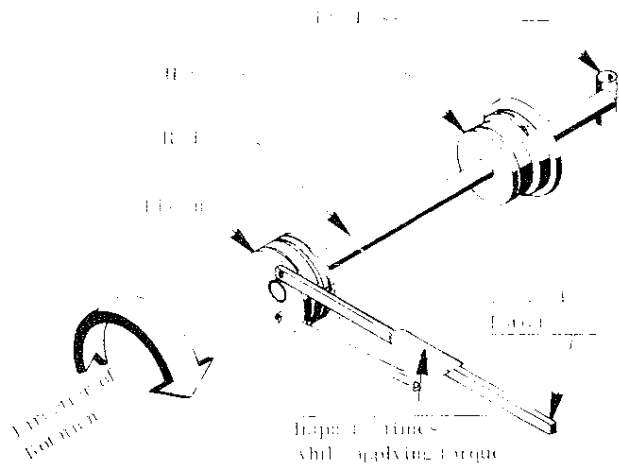


Figure G-6. Piston/Rod Assembly

- 18 Secure the cylinder (Figure G-1) and torque the head in the same manner as the piston (Step 14 Figure G-6)
- 19 Install the holding valves and their o-rings. Make certain that the o-rings are in good condition and properly positioned

#### 7-1-1-4. Cylinder Installation

- 1 Raise the cylinder until one of the pin bosses lines up with its hole on the crane boom. Drive a pin through the pin boss
- 2 Raise the other end of the cylinder until it lines up and insert the pin
- 3 Install the bushings and retaining rings
- 4 Connect the hydraulic hoses
- 5 Start the engine and engage the PTO
- 6 Cycle the controls until the crane operates smoothly. This will evacuate the air in the system
- 7 Check for hydraulic leaks and repair if necessary.

#### 7-1-1-5. Outrigger Cylinder Removal and Installation

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

#### CAUTION

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

3. Wrap a chain hoist or cable around the rod between the cylinder case and the pin boss. Wrap the chain or cable in a rag to protect the plated, machined surfaces on the rod. Slowly retract the rod.
4. Raise the rod end of the cylinder to a vertical position. Disconnect the hydraulic hoses from the cylinder port block.
5. Wrap a second chain or cable around the cylinder case just in front of the port block (between the port block and the cylinder head).
6. Take up the slack in both hoists, remove the base end pin and lift the cylinder.

To install the cylinder:

1. Lower the cylinder into position until the base end pin boss lines up with the hole on the base. Make certain the port block is toward the base and not facing upward. Install the pin, bushing and roll pin.
2. Raise the rod end to a vertical position and connect the hydraulic hoses to the port block.
3. Lower the cylinder to a horizontal position. Extend and retract the rod one complete cycle to evacuate air in the system. Check for leaks.
4. Lower the cylinder and extend the rod until the pin boss lines up with the hole on the outrigger leg. Install the pin, bushing and roll pin.

### 7-1-2. Non-repairable Components

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

1. Hydraulic rotation motor
2. Spool valves
3. Hydraulic pump
4. Hydraulic brake.

## 7-2. BEARINGS

### 7-2-1. Turntable Gear Bearing

1. Raise the secondary boom to a 90° angle relative to the mast. Support the crane in this position.

#### WARNING

If you use a hoist to support the crane, make certain that the hoist is capable of lifting the crane (9320 lbs. — 4224.8 kg.)

2. With power off, cycle the controls a few times to relieve internal hydraulic pressure.
3. Disconnect the hydraulic hoses at the spool valves. Mark the hoses to identify their location on the spool valves for later assembly.

4. With crane in a fully supported position, remove the eighteen bolts around the base of the mast.
5. Carefully lift the crane while simultaneously feeding the hydraulic hoses through the base. Set the crane aside where it won't be damaged.

#### CAUTION

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

6. The turntable gear bearing is now exposed. Turn the base upside down after unbolting it from the truck frame.

#### CAUTION

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

7. Disconnect the lubrication line from the gear-bearing.
8. Remove the twenty-three bolts fastening the turntable gear bearings to the base. Support the gear during this operation to make certain the gear doesn't fall out.
9. Replace the gear-bearing and assemble the crane the reverse of disassembly.

#### NOTE

A new gear-bearing is available from Iowa Mold Tooling Co. Inc.; 500 Highway 18 West; Garner, Iowa; 50438; Attn: Customer Service. Be sure and specify, model number and serial number of crane.

10. Torque all of the gear-bearing bolts to the proper torque value (7/8" bolts, 500 ft. lbs. - 3/4" bolts, 300 ft. lbs.).
11. Start the unit and slowly cycle all of the controls to evacuate air trapped in the hydraulic system. Simultaneously check for hydraulic leaks.

### 7-2-2. Pinion Gear and Drive Gear Bushings

1. Remove the pinion gear cover or the drive motor depending on which bushing is to be replaced.
2. Install the optional bearing removal tool as shown (Figure G-7). Apply power to pull the bushings upward.
3. To install the bushings, assemble the unit as shown (Figure G-8) and apply power to press the bushings into position.

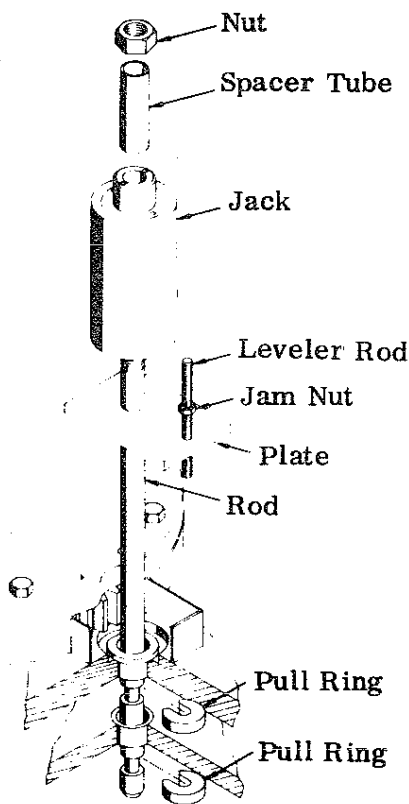
#### NOTE

Hydraulic power can be supplied to the bearing removal tool by two different means: a simple hydraulic hand pump or an air-over-hydraulic intensifier pump.

4. If the hydraulic motor was removed (drive gear bushing replacement), the hydraulic system must be cycled to evacuate trapped air.

### 7-2-3. Cylinder Pin Bushings

1. Remove the cylinder (refer to paragraph 7-1-1, Cylinders)
2. Remove the boom hinge pins in the same manner as the cylinder pins
3. Press the bushings out of the hole with a hydraulic press and install new bushings.
4. Assemble the crane the reverse of disassembly



Pinion Gear Bushing Removal

### 7-2-4. Boom Hinge Pins and Bushings

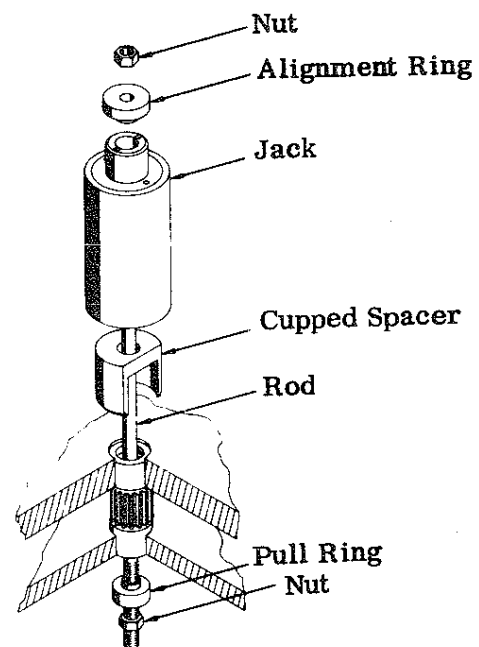
Follow the same procedure listed in paragraph 7-2-3 in this section.

## 7-3. TROUBLESHOOTING

Table G-1 is intended 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.

## 7-4. HYDRAULIC SCHEMATIC

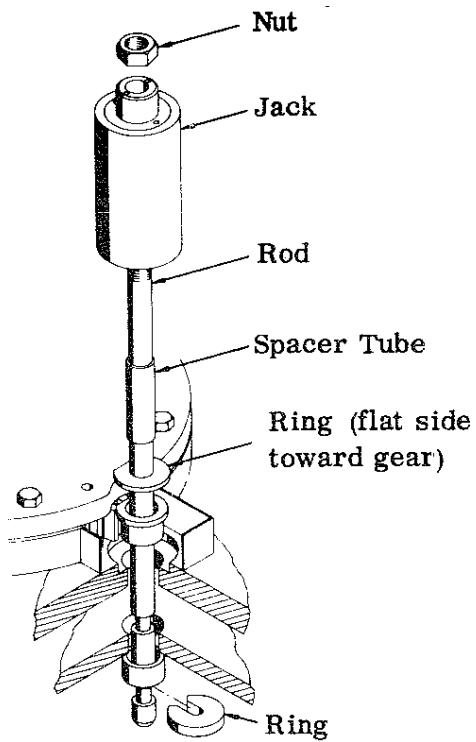
The hydraulic schematic for the crane is shown in the PARTS section.



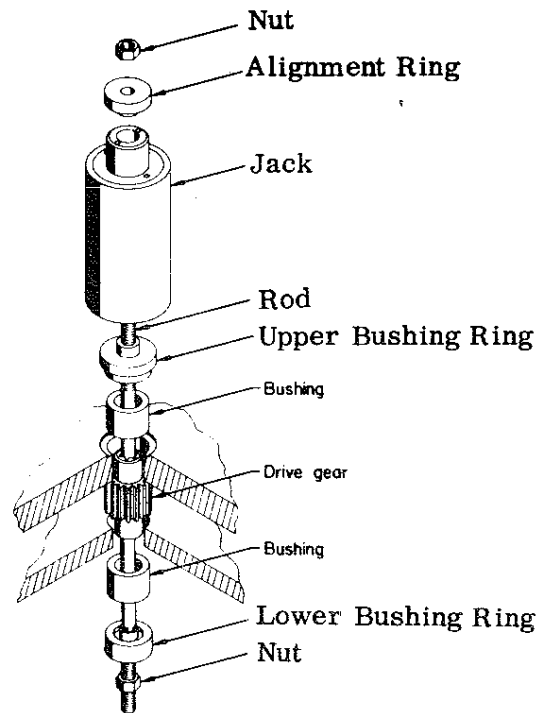
Drive Gear Bushing Removal

Figure G-7. Bearing Removal





Pinion Gear Bushing Installation



Drive Gear Bushing Installation

Figure G-8. Bearing Installation

TABLE G-1. TROUBLESHOOTING CHART

MALFUNCTION	POSSIBLE DEFECT
Controls fail to respond	<ol style="list-style-type: none"> <li>1. Hydraulic oil supply is low.</li> <li>2. Hydraulic pressure line is ruptured</li> <li>3. Suction line shut-off valves are obstructed</li> <li>4. Hydraulic pump is faulty.</li> <li>5. 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>
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 or secondary 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. Suction line filter is clogged and requires replacement</li> <li>5. Bypass settings on relief valve are too low.</li> <li>6. Relief valve is damaged.</li> <li>7. 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> <li>3. Oil passing through holding valve.</li> </ol>
Boom jumps or bounces when lowered under load	<ol style="list-style-type: none"> <li>1. Check cylinder base side port of control valve and install orifice (see Section 5, Valve Port orifice).</li> </ol>

## SECTION 8. INSTALLATION

Because of the specialized nature of the IMT 1424 crane, each installation must be considered unique. Therefore, all IMT 1424 cranes must be factory installed on a specially designed, factory-approved trailer.

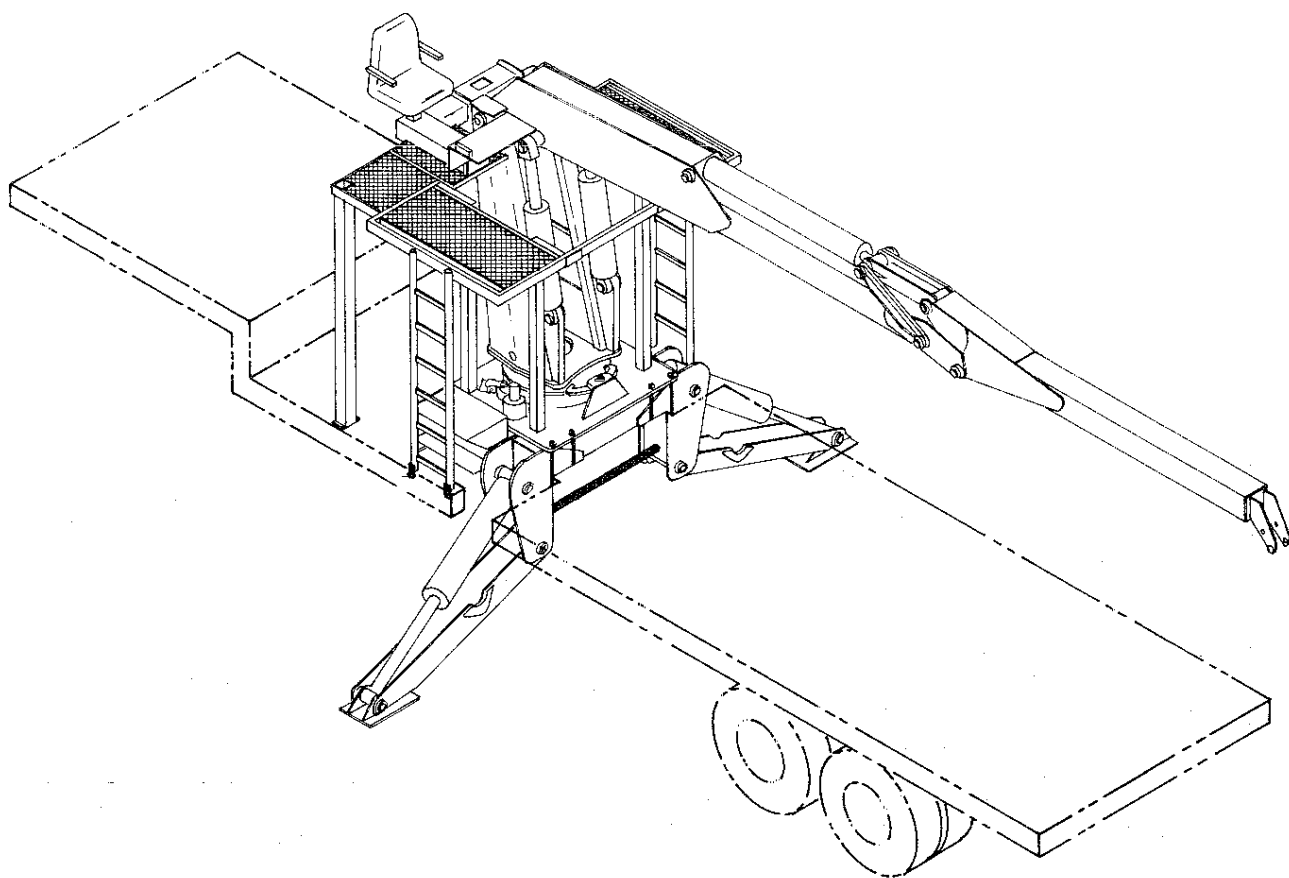


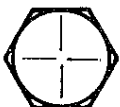



Figure H-1. Typical Installation

## SECTION 9. APPENDIX

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

TABLE I-1. TIRE LOAD AND INFLATION PRESSURE												
SINGLE TIRES FOR TRUCKS IN HIGHWAY SERVICE												
Tire Size	Load Range	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
		50	55	60	65	70	75	80	85	90	95	
7.00-20	D	2100	2260	2390	2530	2670	2790					
7.00-20	E	2100	2260	2390	2530	2670	2920	3030	3150			
7.50-20	D	2360	2530	2680	2840	2990	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	1500
9.00-20	E		3560	3770	4000	4210	4410	4610				
9.00-20	F		3560	3770	4000	4210	4410	4610	4790	4970	5150	
10.00-20	F			4290	4530	4770	4990	5220	5430			
10.00-20	G			4290	4530	4770	4990	5220	5430	5640	5840	6040
11.00-20	F			4670	4940	5200	5450	5690	5920			
11.00-20	G			4670	4940	5200	5450	5690	5920	6140	6370	6590
11.00-22	F			4960	5240	5520	5790	6040	6290			
11.00-22	G			4960	5240	5520	5790	6040	6290	6530	6770	7000
DUAL TIRES FOR TRUCKS IN HIGHWAY SERVICE												
Tire Size	Load Range	TIRE LOAD LIMITS AT VARIOUS INFLATION PRESSURES										
		40	45	50	55	60	65	70	75	80	85	90
7.00-20	D	1840	1980	2100	2220	2340	2450					
7.00-20	E	1840	1980	2100	2220	2340	2450	2560	2660	2760		
7.50-20	D	2070	2220	2350	2490	2620	2750					
7.50-20	E	2070	2220	2350	2490	2620	2750	2870	2990	3100		
8.25-20	E	2460	2640	2800	2960	3120	3270	3410	3550			
8.25-20	F	2460	2640	2800	2960	3120	3270	3410	3550	3690	3820	3950
9.00-20	E		3120	3310	3510	3690	3870	4040				
9.00-20	F		3120	3310	3510	3690	3870	4040	4200	4360	5420	
10.00-20	F			3760	3970	4180	4380	4580	4760			
10.00-20	G			3760	3970	4180	4380	4580	4760	4950	5120	5300
11.00-20	F			4100	4330	4560	4780	4990	5190			
11.00-20	G			4100	4330	4560	4780	4990	5190	5390	5590	5780
11.00-22	F			4350	4600	4840	5080	5300	5520			
11.00-22	G			4350	4600	4840	5080	5300	5520	5730	5940	6140
Tire and Rim Association Standard Tire Loads at Various Inflation Pressures. Load range letters and corresponding ply rating (D=8 ply, E=10 ply, F=12 ply and G=14 ply).												

TABLE I-2. 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 psi (44,998,400 kgs/sq m)		105,000 psi (73,835,500 kgs/sq m)		133,000 psi (93,512,300 kgs/sq m)		150,000 psi (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	11	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	8.29
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	40.93
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

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

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

## SECTION 10. INSPECTION & TEST REPORT

Date: \_\_\_\_\_ Work Order No: \_\_\_\_\_

Tested By (signature): \_\_\_\_\_

Completed  
At Factory

### CRANE INFORMATION

Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

#### Cylinder Serial Numbers

Main: \_\_\_\_\_ Secondary: \_\_\_\_\_

Outrigger: \_\_\_\_\_ Tool: \_\_\_\_\_

Completed  
at Factory

### CHASSIS INFORMATION

Make: \_\_\_\_\_ Model: \_\_\_\_\_ Type: \_\_\_\_\_

VIN: \_\_\_\_\_ GAWR: \_\_\_\_\_ Wheel Size: \_\_\_\_\_

Tire Size: \_\_\_\_\_ Ply: \_\_\_\_\_ Pressure: \_\_\_\_\_ PSI

Power Source: \_\_\_\_\_ Gear Reduction: \_\_\_\_\_

Pump Model: \_\_\_\_\_ GPM: \_\_\_\_\_ Optimum Speed: \_\_\_\_\_

Engine Speed: optimum pump speed/gear reduction (%): \_\_\_\_\_

Accessories: \_\_\_\_\_

Completed  
at Factory

TABLE J-1. PRE-OPERATION INSPECTION

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Engine speed control for proper operation.			
Oil level of auxiliary engine crankcase			
Hoses for breaks, leaks, etc.			
Routing of hoses for kinks, sharp bends, muffler or tailpipe contact.			
Proper pump installation			
All bolts for proper tightness (refer to Table I-2)			
Inspect and lube all points (refer to Figure E-1)			
Check all hydraulic lines for: <ol style="list-style-type: none"> <li>1. Sharp corners and kinks</li> <li>2. Abrasions &amp; chafing</li> <li>3. Tightness of fittings</li> <li>4. Leaks</li> </ol>			
Check all pins for proper installation			
Check all crane bolts for proper installation and tightness (refer to Table I-2)			

TABLE J-1. PRE-OPERATION INSPECTION (Continued)

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS & CORRECTIONS
Visually inspect all welds for cracks, holes, etc.			
Inspect all crane members for proper installation, alignment & workmanship			
Fill oil reservoir (all cylinders retracted)			
Placard placement			
Suction line gate valve at reservoir open			

TABLE J-2. OPERATING TEST

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS & CORRECTIONS
Start auxiliary engine			
Proper operation and installation of tachometer			
Set engine RPM for optimum pump speed			
Position & lower outriggers			
Slowly operate unit through all motions - check hoses, cylinders & all structural members for operation			



TABLE J-2. OPERATING TEST (Continued)

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

TABLE J-2. OPERATING TEST (truck mounted) Continued

INSTRUCTIONS	PASS	FAIL	OBSERVATIONS AND CORRECTIONS
Operate each function under full rated load. Note speed and operation of each function			
With crane booms at 30° above horizontal, kill the engine, operate each function checking for drift			
FURTHER COMMENTS		RECOMMENDED CORRECTIVE ACTION	
1. _____		_____	
2. _____		_____	
3. _____		_____	
4. _____		_____	
5. _____		_____	
6. _____		_____	
7. _____		_____	

Completed  
by Installer

# STABILITY TEST

## INSTRUCTIONS

1. If crane is rear mount, refer to Figure 1. If crane is mounted behind the cab, refer to Figure 2.

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

3. The testing area must be a flat, hard surface (ideally concrete, but asphalt or hard packed gravel is acceptable). Only authorized testing personnel will be in or near the test area.

4. Position and lower outriggers until the

weight of the crane has been removed from the truck springs.

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

6. Place full rated load on crane at the maximum horizontal distance (L = \_\_\_\_\_ ft.). Keep the load close to the ground to avoid excessive tipping.

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

8. If at any point through the rotation cycle, any one of the vehicle tires starts to break contact with the test surface, the rotation should be stopped and the position of the crane noted as  $X^0$  (balance point).  $X^0 =$  \_\_\_\_\_ $^0$ .

9. If the balance point has been reached during the rotation cycle, the crane position ( $X^0$ ) should be noted on the appropriate figure. This is the area where the crane maintains stability under full capacity. Determine Y.  $Y = 180^0 - X^0 =$  \_\_\_\_\_ $^0$ .

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

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

12. Repeat this cycle through a full  $180^0$  of arc.

13. At the end of the  $180^0$  arc, physically measure the existing horizontal distance from the centerline of rotation to centerline of the load. Note distance (K).  $K =$  \_\_\_\_\_ft.

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

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

15. The derated per cent of full capacity (Z) obtained in Step 14 should be entered on the appropriate figure.

16. If the crane is a side mount, repeat the stability test by rotating the crane clockwise through  $180^0$  arc to find  $X_1^0$  \_\_\_\_\_ $^0$ ,  $Y_1^0$  \_\_\_\_\_ $^0$  and  $Z_1$  \_\_\_\_\_%.

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

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

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

Front Axle: \_\_\_\_\_lb.

Rear Axle: \_\_\_\_\_lb.

Total: \_\_\_\_\_lb.

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

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

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

This stability chart conforms to SAE standards

LEGEND
$Z\% = 100 \times \frac{K}{L}$
$Y^\circ = 180^\circ - X^\circ$

# DIMENSIONAL DATA

A: \_\_\_\_\_ in.

B: \_\_\_\_\_ in.

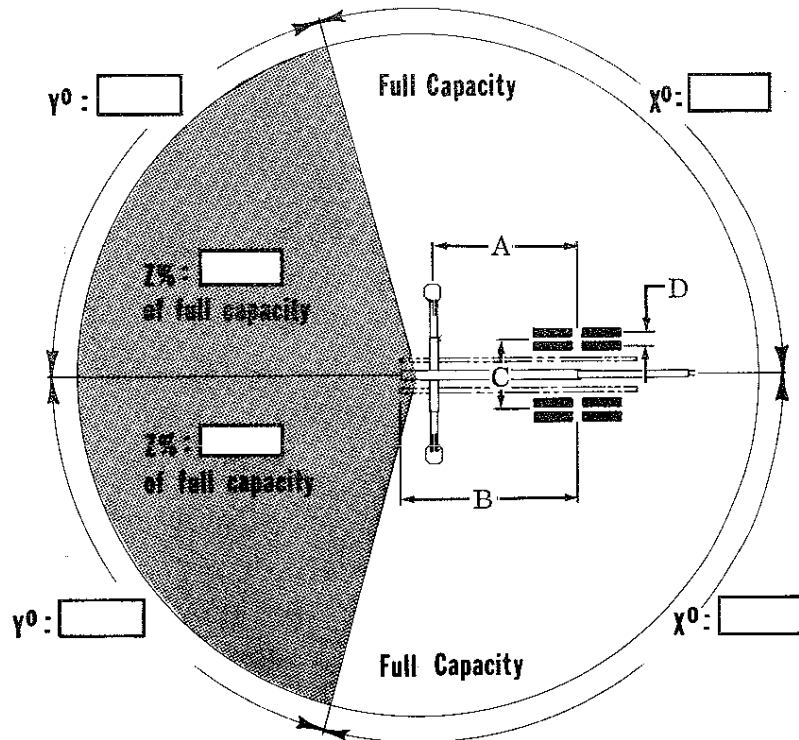
C: \_\_\_\_\_ in.


D: \_\_\_\_\_ in.

$X^\circ$ : \_\_\_\_\_ °

$Y^\circ$ : \_\_\_\_\_ °

$Z\%$ : \_\_\_\_\_ %



 = Derated Load Capacity ( $Z\%$ )

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





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