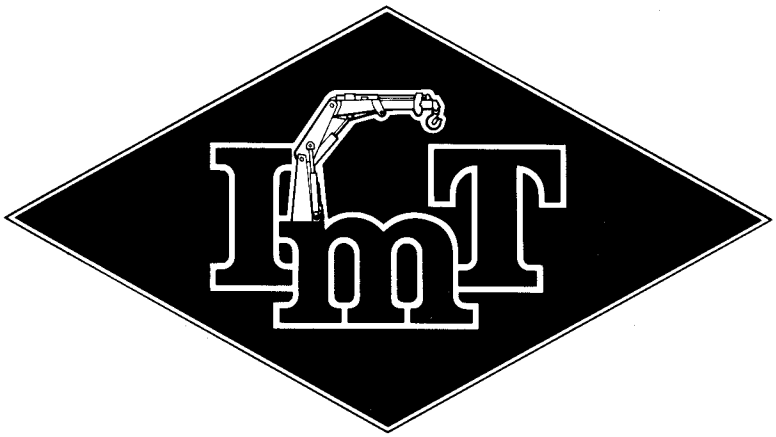
421FB CRANE



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

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Continued)

Introduction - Read Carefully!

This volume deals with information applicable to your particular crane. For operating, maintenance and repair instructions, refer to Volume 1, *OPERATION, MAINTENANCE AND REPAIR*. Volume 1 contains the following information:

SECTION 1. OPERATION
SECTION 2. MAINTENANCE
SECTION 3. REPAIR
SECTION 4. INSTALLATION - CHASSIS PREPARATION
SECTION 5. APPENDIX

We recommend that Volume 2, *PARTS AND SPECIFICATIONS* be kept in a safe place in the office.

This manual is provided to assist you with ordering parts for your IMT truck-mounted articulating crane. It also contains additional instructions regarding your particular installation.

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

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

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

ANSI/ASME B30.5-1982
MOBILE AND LOCOMOTIVE CRANES
The American Society of Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, NY 10017

Three means are used throughout this manual to gain the attention of personnel. They are NOTE's, CAUTION's and WARNING's and are defined as follows:

NOTE

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

CAUTION

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

WARNING

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

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

Section 1. SPECIFICATIONS

1—1. GENERAL

Crane Rating	(5.39 ton-meters)	39,000 ft-lbs.
Reach (from centerline of rotation)	(6.53 m)	21'-5"
Extension	(114.3 cm/129.5 cm)	45"/51"
* Lifting Height	(9.40 m)	30'-10"
Crane Weight	(1,361 kg.)	3,000 lbs.
Outrigger Span	(3.30 m)	10'-10"
Optimum Pump Capacity	(26.5 liters/min)	7 U.S. Gal./Min.
Oil Reservoir Capacity	(56.67 liters)	15 U.S. Gal.
Mounting Space Required	(76.2 cm)	30"
* Storage Height	(3.17 m)	10'-5"
Design Factors - Pins and Hydraulics	4/1	4/1

* Based on 39" (99 cm) truck frame height.

1—2. PERFORMANCE CHARACTERISTICS

Rotation - 370° (6.46 Rad.)	30 Seconds
Inner Boom Elevation - -20° to +72° (-0.35 Rad. to +1.26 Rad.)	15 Seconds
Outer Boom Elevation - 125° (2.18 Rad.)	17 Seconds
Single Stage Extension Cylinder - 45" (114.3 cm)	12 Seconds
Two Stage Extension Cylinder (optional)	
1st Stage - 45" (114.3 cm)	21 Seconds
2nd Stage - 51" (129.5 cm)	10 Seconds
Power-Down Outrigger Extension - 21" (53 cm)	8 Seconds
Power-Out Outrigger Extension - 34" (86.4 cm)	5 Seconds

1—3. LIFTING CAPACITY (from centerline of rotation)

(2.82 m) 9'-3"	(1,905 kg.)	4,200 lbs.
(4.09 m) 13'-5"	(1,315 kg.)	2,900 lbs.
(5.23 m) 17'-2"	(1,020 kg.)	2,250 lbs.
(6.53 m) 21'-5"	(816 kg.)	1,800 lbs.

1—4. HYDRAULIC SYSTEM

Open-centered, full-pressure system that requires 7 GPM (26.5 liters/min.) optimum oil flow at 2350 PSI (165.2 kg/sq. cm). Six-spool, stack-type control valve with dual operational handles located at both sides for convenient operation. System includes oil reservoir, suction line filter, pump, control valve, return line filter and all necessary hoses and fittings.

1—5. POWER SOURCE

Integral-mounted hydraulic pump and PTO application. Other standard power sources may be utilized. Minimum power required is 12 horsepower.

1—6. CYLINDER HOLDING VALVES

The holding sides of all cylinders are equipped with integral-mounted holding and/or counter-balance valves to prevent sudden cylinder collapse in case of hose or other hydraulic failure. The outrigger cylinders have positive, pilot-operated valves that will open only upon command.

The inner, outer and extension cylinders have counter-balance valves. The counter-balance valve serves several functions. First, it is a holding valve. Secondly, it is so constructed that it will control the lowering function and allow that motion to be feathered while under load. Finally, if a hose breaks, the only oil loss will be that in the hose.

1—7. ROTATION SYSTEM

Turntable bearing powered by a high-torque hydraulic motor through a ring-and-pinion type spur gear train (total gear reduction is 43.1 to 1).

1—8. CYLINDERS

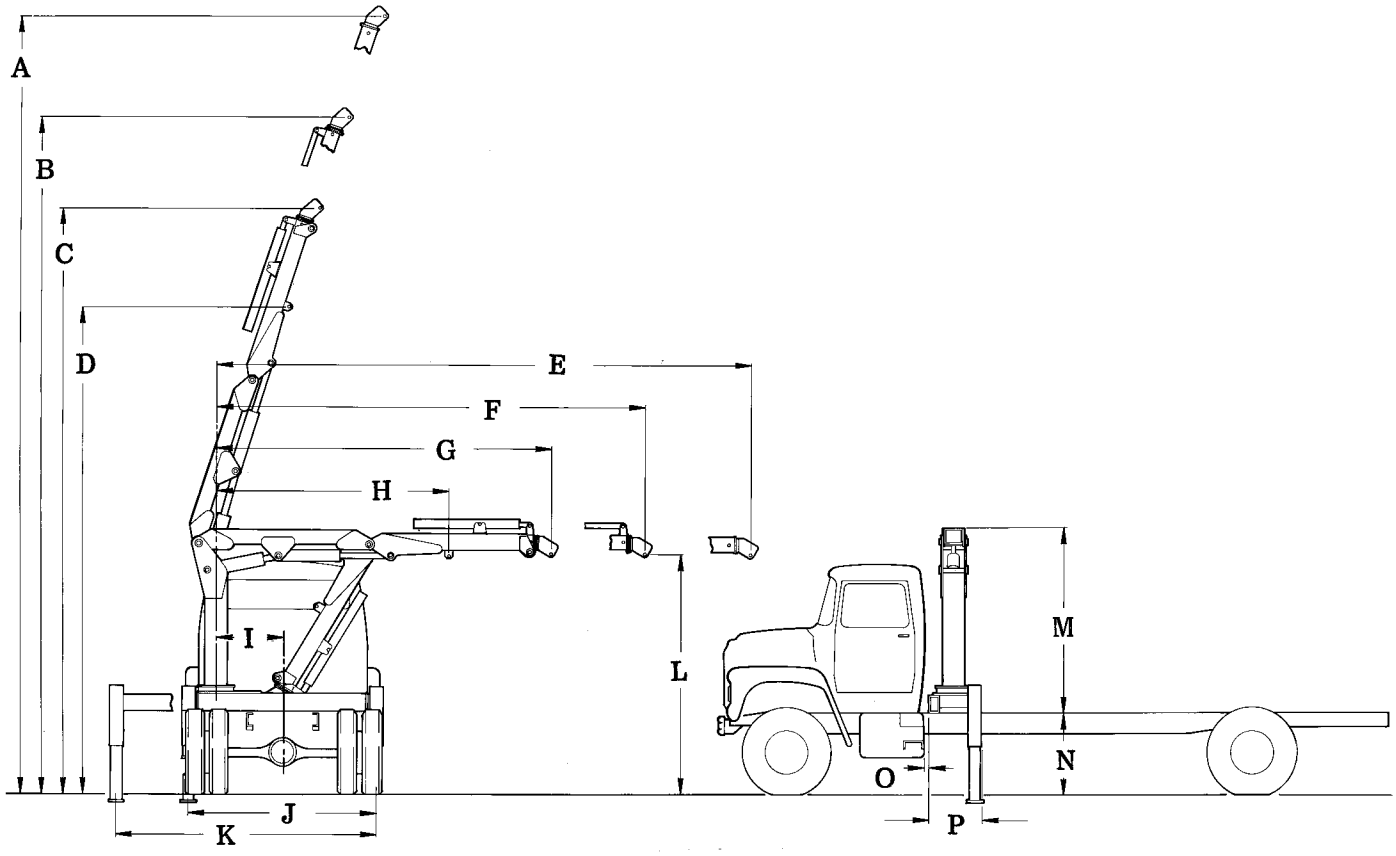
	Bore	Stroke
Inner Cylinder	(12.7 cm) 5"	(48.9 cm) 19-1/4"
Outer Cylinder	(12.7 cm) 5"	(54.6 cm) 21-1/2"
Extension - single stage	(7.6 cm) 3"	(114.3 cm) 45"
Extension - two stage (optional)		
1st stage	(10.2 cm) 4"	(114.3 cm) 45"
2nd stage	(6.4 cm) 2-1/2"	(129.5 cm) 51"
Power-Down Outrigger Cylinder	(6.3 cm) 2-1/2"	(53.3 cm) 21"
Power-Out Outrigger Cylinder	(5.1 cm) 2"	(86.4 cm) 34"

1—9. MINIMUM CHASSIS SPECIFICATIONS

Body Style	Conventional Cab	Conventional Cab
Wheel Base	(419.1 cm to 444.5 cm)	175"
Cab to Axle	(259.1 cm)	102"
* Frame Section Modulus	(229.5 cc)	14 cu. in.
R B M	(7,837 kg-m)	680,000 in-lbs.
Front Axle	(3,175 kg.)	7,000 lbs.
Rear Axle	(6,804 kg.)	15,000 lbs.
Transmission	4-speed	4-speed

* Frame material is 50,000 PSI minimum.

In addition to these specifications, heavy-duty electrical and cooling systems and dual rear wheels are required. It is recommended that the vehicle be equipped with an electric engine tachometer, auxiliary brake lock, power steering and a 5-speed transmission in lieu of a 4-speed.

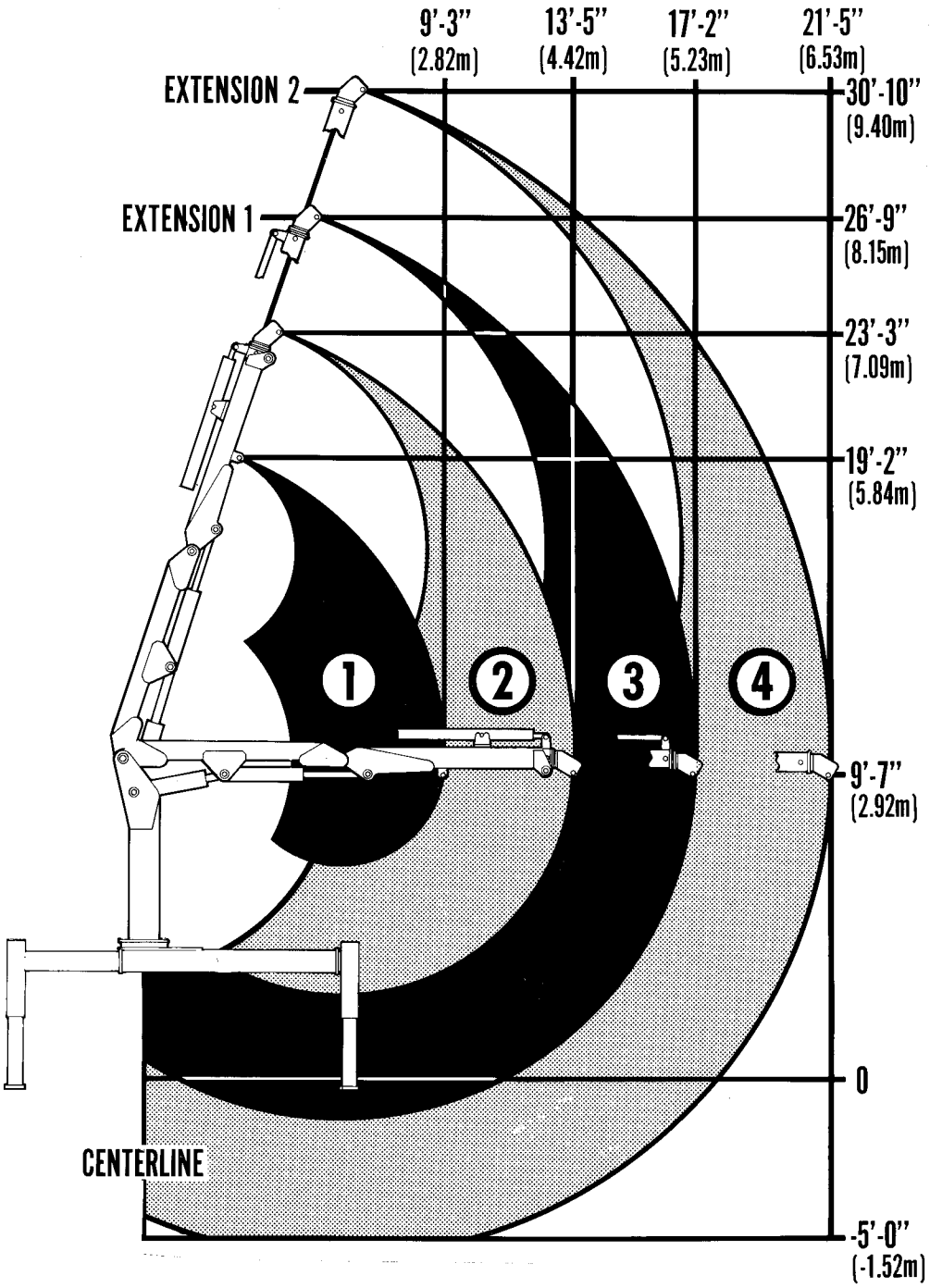


DIMENSIONS

A	30'-10" (9.40 m)
B	26'-9" (8.15 m)
C	23'-3" (7.09 m)
D	19'-2" (5.84 m)
E	21'-5" (6.53 m)
F	17'-2" (5.23 m)
G	13'-5" (4.42 m)
H	9'-3" (2.82 m)

I	32" (81.3 cm)
J	7'-5" (2.26 m)
K	10'-10" (3.30 m)
L	9'-7" (2.92 m)
M	7'-3" (2.21 m)
N	39" (2.21 m)
O	3" (7.6 cm)
P	25" (63.5 cm)

Figure A-1. Geometric Configuration



RANGE	REACH	CAPACITY	RANGE	REACH	CAPACITY
1	9'-3"	4,200 lbs.	3	17'-2"	2,250 lbs.
	(2.82 m)	(1,905 kg.)		(5.23 m)	(1,020 kg.)
2	13'-5"	2,900 lbs.	3	21'-5"	1,800 lbs.
	(4.09 m)	(1,315 kg.)		(6.53 m)	(816 kg.)

Figure A-2. Capacity Chart

Section 2. CRANE DESCRIPTION

2—1. GENERAL

The 421 crane is designed primarily for use as a material-handling crane. This section describes the major assemblies on this crane and Figure B-1 illustrates their location.

2—2. BASE

The base provides the means for mounting the crane on the truck chassis. It incorporates the 370° (6.46 Rad.) rotation mechanism and the outriggers. The outriggers are powered by double-acting hydraulic cylinders to provide stabilization during crane operation - maximum span is 10'-10" (3.30m).

2—3. MAST

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

2—4. INNER BOOM

The inner boom will swing through a full 92° (1.61 Rad.) from -20° to +72° (-0.35 Rad. to +1.26 Rad.). It is raised and lowered through the use of a single, double-acting hydraulic cylinder.

2—5. OUTER BOOM

The outer boom will swing through 125° (2.18 Rad.). It is raised and lowered through the use of a double-acting hydraulic cylinder mounted under the inner boom. The outer boom also provides storage for the extension boom in the retracted position.

2—6. EXTENSION BOOM

The two-stage extension boom increases the operating range from 13'-5" (4.42m) to 21'-5" (6.53m).

2—7. CONTROLS

There are two sets of controls on the standard crane - one on each side - located on the base of the crane. It utilizes a 6-section valve bank for the standard crane.

2—8. HYDRAULICS

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

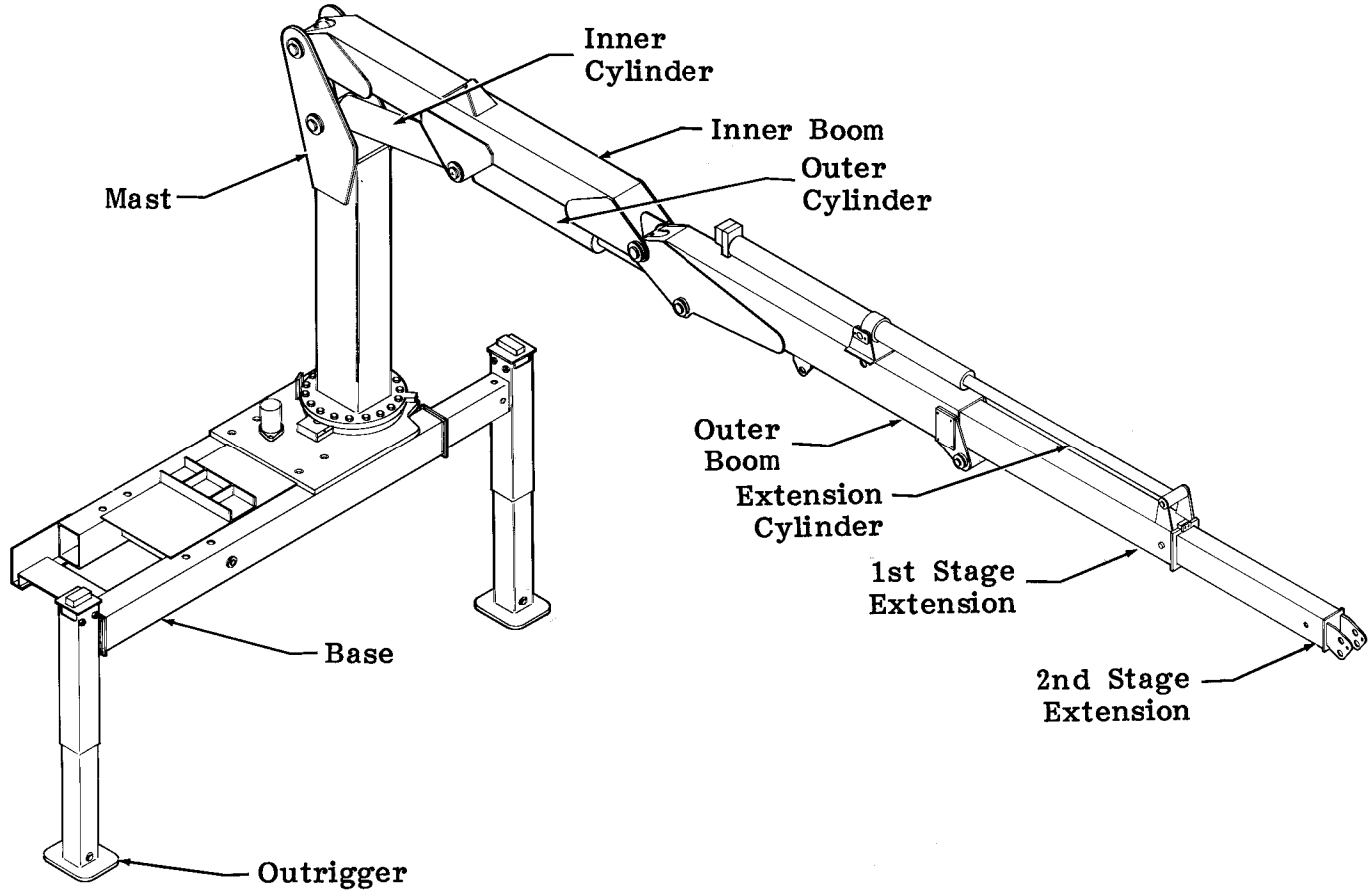


Figure B-1. 421 Crane Group

Section 3. INSTALLATION

3—1. GENERAL

This section contains specific instructions for the installation of your crane. Prior to installing the crane and hydraulic components, make sure the chassis is ready to receive the crane (refer to Section 5, Installation - Chassis Preparation in Volume 1.

3—2. CRANE INSTALLATION

To install the crane on the chassis:

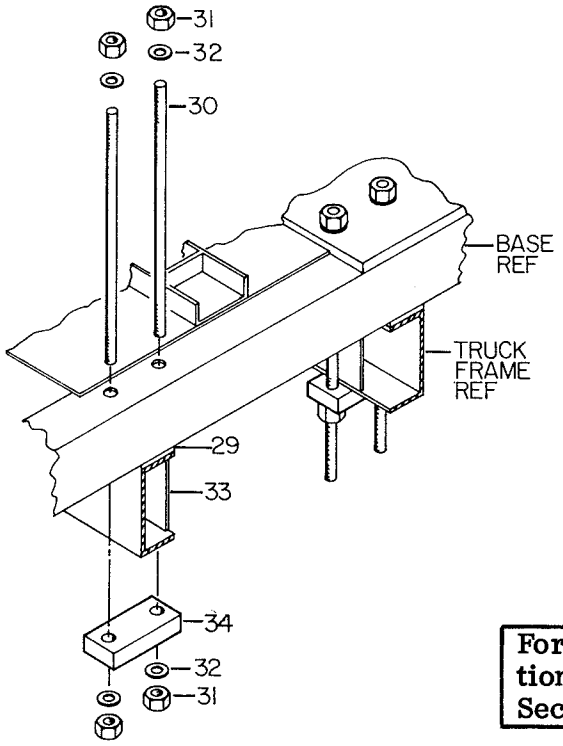
1. Use a lifting device capable of lifting the weight of the crane - 3,000 lbs. (1,361 kg). Attach the lifting device to the lift bracket welded to the top of the inner boom. Lift the crane, move the chassis into position under the crane and lower the crane into position on the chassis. Allow sufficient room between the crane and cab - at least 3" (7.6 cm). Check for front-to-rear alignment.
2. Install the tie rods, clamp plates, lock nuts and hardened flat washers to secure the crane base to the chassis (Figure C-1). Power wrench the nuts tight.

WARNING

Do not attempt to apply the same torque to the tie rod and self-locking nuts as shown in the Torque Data Chart in the APPENDIX in Volume 1. Do not exceed 200 ft. lbs. (28 kg-m). Exceeding this torque value could damage either the chassis or crane base.

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

3. Touch up paint on crane and chassis as necessary.



Item No.	Description
29.	SPACER
30.	STUD, tie-down
31.	NUT, lock
32.	WASHER, Hi-Star
33.	BAR, flange reinforcing
34.	PLATE, clamp

NOTE

For a complete list of part numbers and part descriptions, refer to the installation kit parts drawing in Section 4 of this manual.

Figure C-1. Crane Installation

3—3. HYDRAULIC INSTALLATION

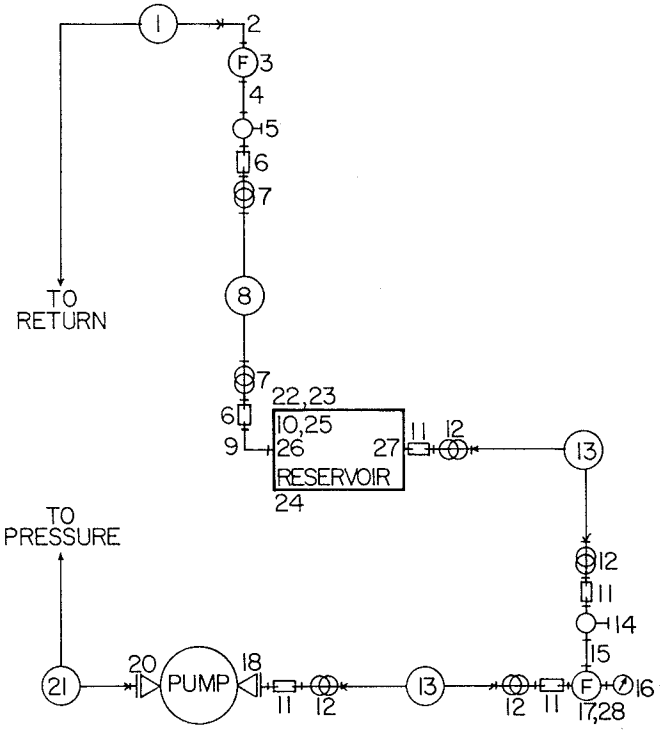
To install the hydraulic hoses, fittings, etc.:

1. Plumb the suction line filter as shown in Figure C-2.
2. Install the suction hose between the suction line filter and the pump inlet. Tighten the hose clamps.
3. Install the pressure hose between the pump outlet and the inlet port on the valve bank.
4. Install the return line between the reservoir return line filter and valve bank (if applicable).
5. Fill the hydraulic oil reservoir.
6. Open the gate valve at the suction line filter.

CAUTION

Failure to open the gate valve will result in a dry running pump which may damage the pump.

7. Open the return gate valve.
8. Start the vehicle engine and engage the PTO. Allow the system to run for about five minutes and then check the vacuum gauges on the suction-line filter (should read 8" or less of mercury). If the vacuum reading is too high, check to make certain that the gate valve are open. If the gate valve are open, check for a collapsed or restricted suction line.
9. Check for leaks and repair if necessary.



Item No.	Description
1.	HOSE
2.	ELBOW, 90°
3.	FILTER, return
4.	NIPPLE, close
5.	VALVE, gate
6.	NIPPLE, barbed
7.	CLAMP, hose
8.	HOSE
9.	ELBOW, street, 90°
10.	RESERVOIR
11.	NIPPLE, barbed
12.	CLAMP, hose
13.	HOSE
14.	VALVE, gate
15.	NIPPLE, close
16.	GAUGE, pressure
17.	FILTER, suction
18.	ADAPTER, pump
19.	PUMP
20.	ADAPTER, pump
21.	HOSE
22.	SCREEN, reservoir fill
23.	CAP, fill
24.	PLUG, magnetic
28.	BRACKET, oil filter

NOTE

For a complete list of part numbers and part descriptions, refer to the installation kit parts drawing in Section 4 of this manual.

Figure C-2. Hydraulic Installation

Section 4. PARTS LIST

4—1. GENERAL

This section contains the exploded parts drawings with the accompanying parts list for the assemblies used on this crane. These drawings are intended to be used in conjunction with the instructions found in the REPAIR section in Volume 1. For optional equipment such as winches and remote controls, refer to the appropriate service manual.

WARNING

Do not attempt to repair any component without reading the information contained in the REPAIR section in Volume 1. Pay particular attention to the WARNING's, CAUTION's and NOTE's contained in that section. Failure to comply with these instructions may result in damage to the equipment, an injury or even death.

4—2. CRANE IDENTIFICATION

Every crane has an identification placard (Figure D-1) attached to the mast or one of the booms in a prominent location. 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 directed to Iowa Mold Tooling Co., Inc.; 500 Highway 18 West; Garner, Iowa 50438; telephone: (515) 923-3711 or TWX 910-523-6930. In Canada; IMT Cranes Canada, Ltd.; Orillia, Ontario; telephone: (705) 325-7458.

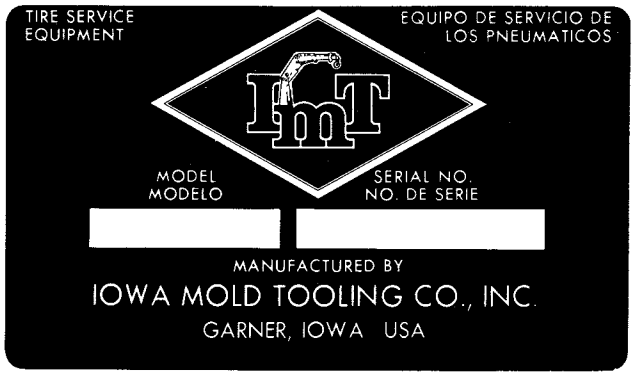


Figure D-1. Serial Number Placard

4—3. CYLINDER IDENTIFICATION

The crane has a cylinder identification placard (Figure D-2) attached to the mast. To ensure proper replacement parts are received, it is necessary to specify a complete number/letter sequence for any part request. Part numbers may be cross checked by comparing the stamped identification of the cylinder case (Figure D-3) against the information stamped on the placard. You must use the part number stamped on the cylinder case when ordering parts.

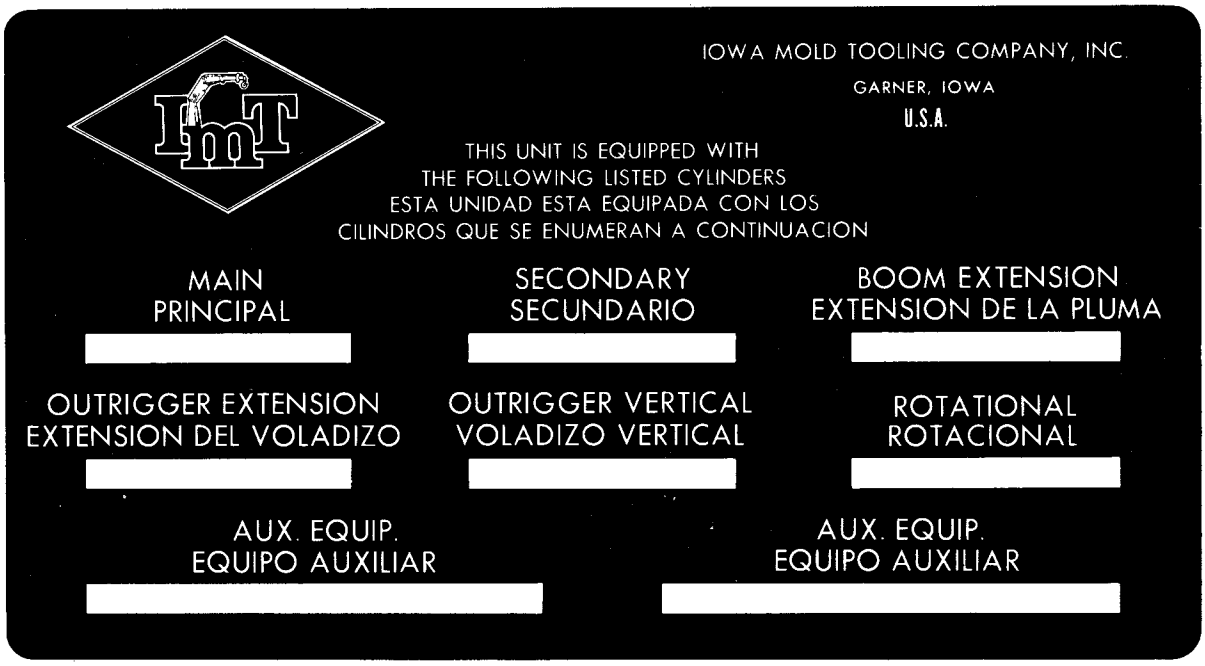


Figure D-2. Cylinder Identification Placard

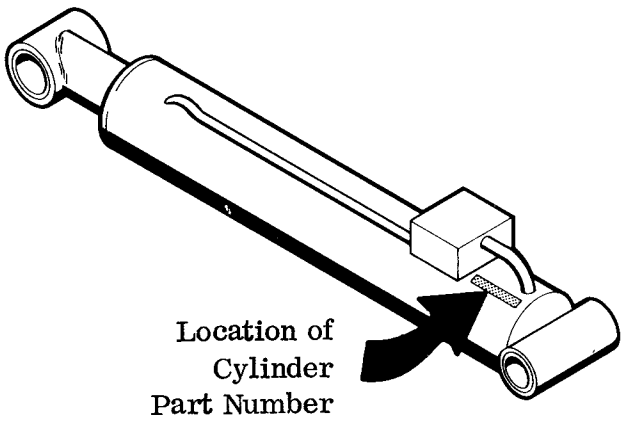


Figure D-3. Cylinder Part Number Location

4—4. WELDMENT IDENTIFICATION

Each of the major weldments - base, mast, inner boom, outer boom, extension boom and outrigger weldments - bear a stamped part number. Any time a major weldment is replaced, you must specify the complete part number as stamped on the weldment. The locations of the part numbers are shown in Figure D-4.

4—5. ORDERING REPAIR PARTS

When ordering replacement parts:

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

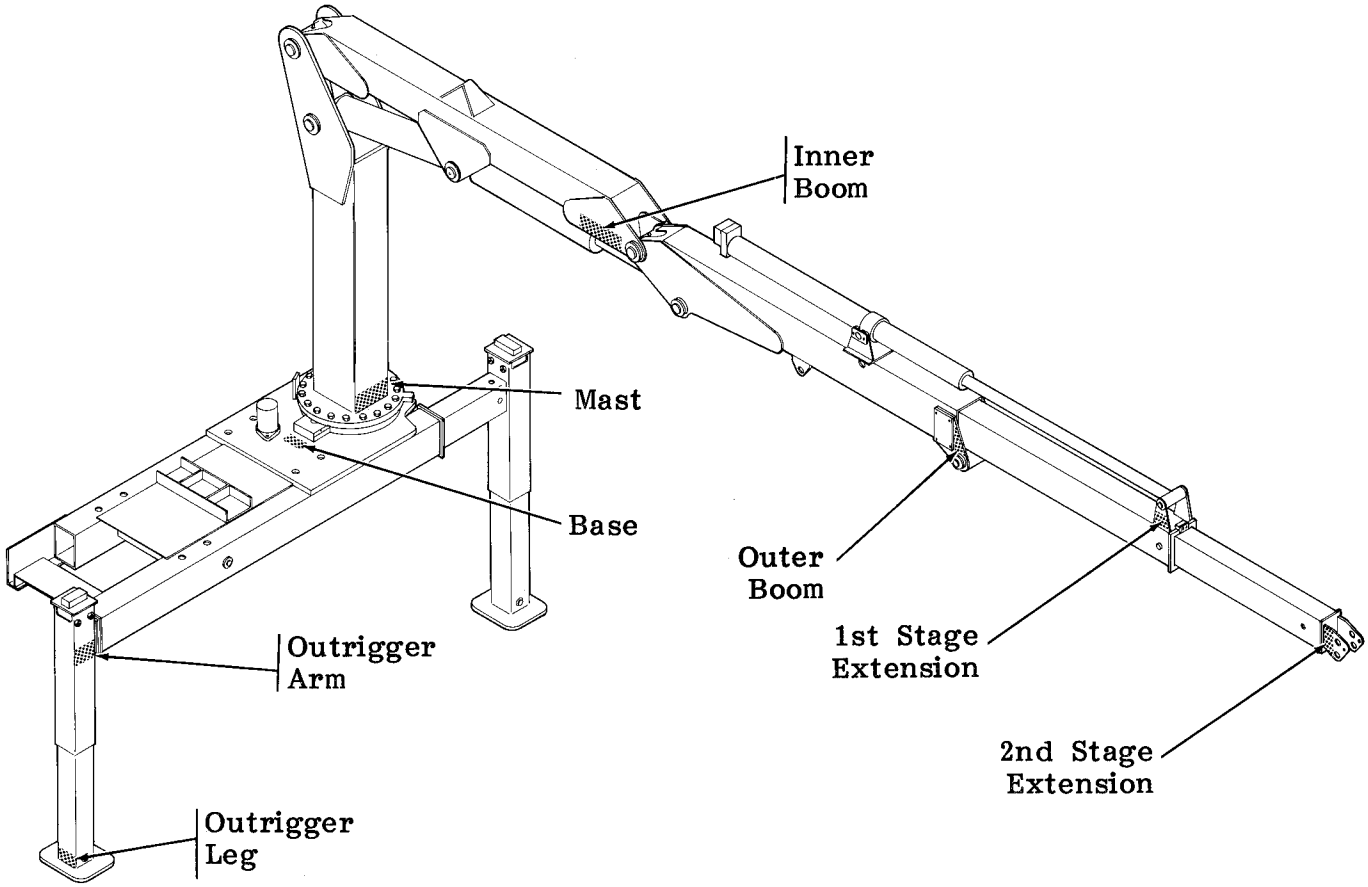


Figure D-4. Weldment Part Number Location

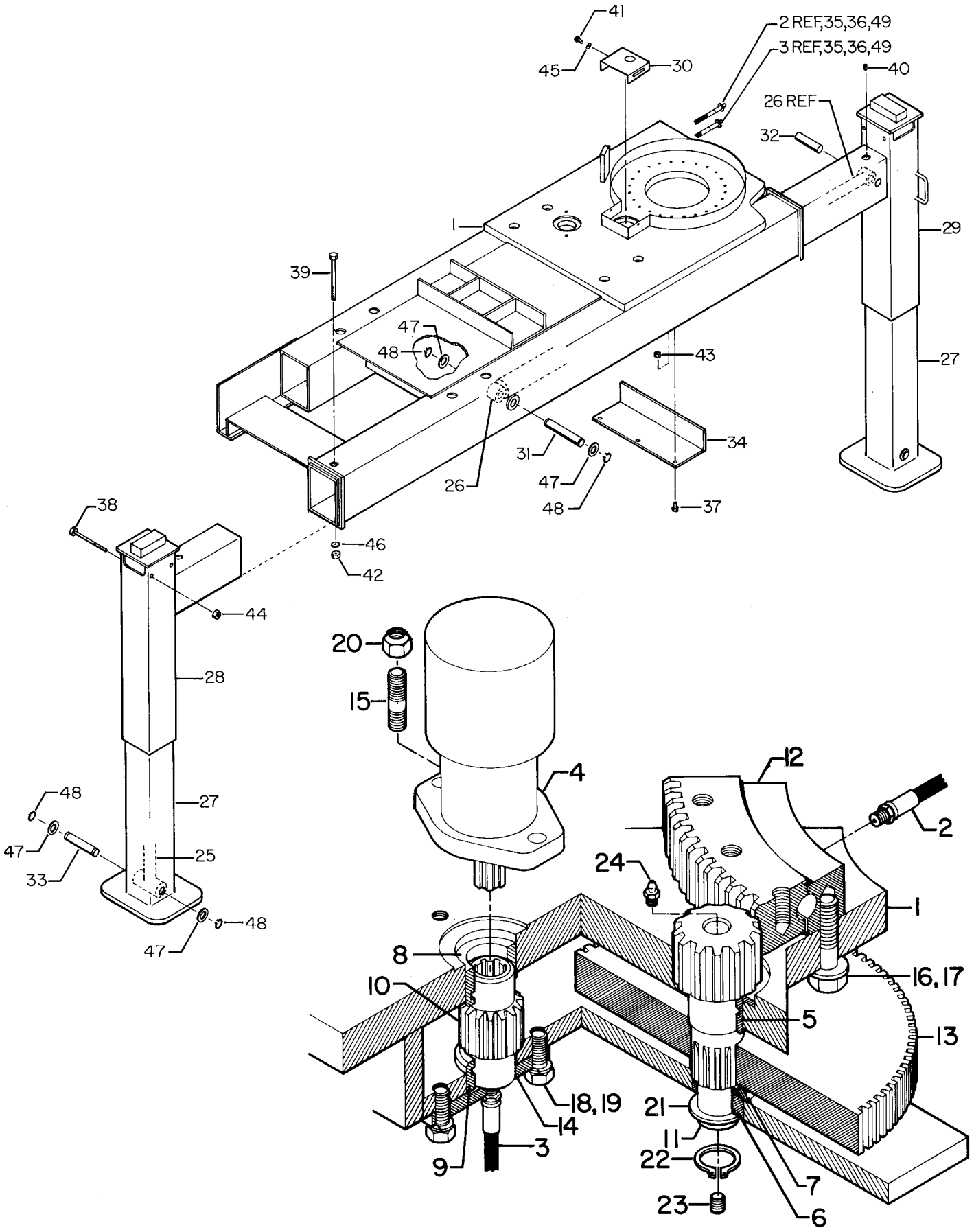


Figure D-5. Base and Outriggers (Part Number 41705016)

Item No.	Part No.	Description	Qty
1.	52705019	BASE	1
2.	53000702	EXTENSION, grease; 17" lg.	1
3.	53000711	EXTENSION, grease; 23"	1
4.	73051384	MOTOR, rotation	1
5.	60020114	BUSHING, upper pinion gear	1
6.	60020154	BUSHING, lower pinion gear	1
7.	60104694	SPACER, pinion gear	1
8.	60020115	BUSHING, upper drive gear	1
9.	60020116	BUSHING, lower drive gear	1
10.	71056011	GEAR, drive	1
11.	71056010	GEAR, pinion	1
12.	71056062	GEAR-BEARING, turntable	1
13.	71056012	GEAR, intermediate	
14.	60010844	PLATE, grease	1
15.	60106032	STUD; 1/2-13 x 2"	2
16.	72060151	SCREW; 5/8-11 x 2" gr. 8	24
17.	72063119	WASHER, wrt.; 5/8" gr. 8	24
18.	72060794	SCREW; 1/2-13 x 1-1/4" soc. hd.	2
19.	72063053	WASHER, lock; 1/2"	2
20.	72062080	NUT, lock; 1/2-13	2
21.	72063035	BUSHING, machy.; 1-1/4" x 10 ga.	1
22.	72066084	RING, retaining; 1-1/4"	1
23.	72053240	PLUG; 1/8" npt hollow hex	1
24.	72053508	ZERK; 1/8" npt	1
25.	3B166820	CYLINDER, power down outrigger	2
26.	3B241801	CYLINDER, power out outrigger	1
27.	52704868	LEG, outrigger	2
28.	52705010	ARM, outrigger	1
29.	52705011	ARM, outrigger (adjustable)	1
30.	60010235	COVER, pinion gear	1
31.	60106065	PIN	1
32.	60106066	PIN	1
33.	60106968	PIN	2
34.	60107167	COVER, gear	1
35.	72053301	COUPLING; 1/8" npt	2
36.	72053508	ZERK; 1/8" npt	2
37.	72060046	SCREW; 3/8-16 x 1" hex hd.	3
38.	72060102	SCREW; 1/2-13 x 5-1/2" hex hd.	4
39.	72060164	SCREW; 5/8-11 x 8" hex hd.	1
40.	72060579	SCREW, set; 3/8-16 x 1/2" soc. hd.	1
41.	72060833	SCREW; 5/16-18 x 3/4" hex hd.	2
42.	72062091	NUT, lock; 5/8-11	1
43.	72062103	NUT, lock; 3/8-16	3
44.	72062107	NUT, lock; 1/2-13	4
45.	72063002	WASHER, wrt.; 5/16"	2
46.	72063007	WASHER, wrt.; 5/8"	1
47.	72063034	BUSHING, machy.; 1" x 10 ga.	6
48.	72066125	RING, retaining; 1"	6
49.	72063004	WASHER, wrt.; 7/16"	2

WARNING

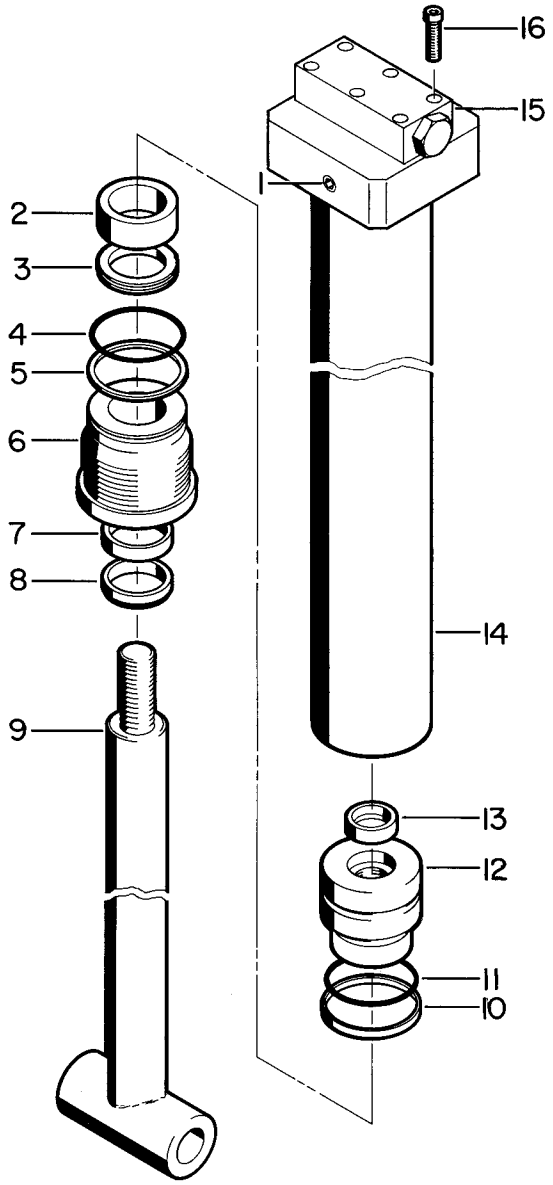
Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatigue causing serious injury or death.

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

Bore	2-1/2"
Stroke	21"
C-C Closed	29-9/16"
Rod Diameter	1-1/2"
Pin Diameter	1"



Item No.	Part No.	Description	Qty
1.	7PNPXT02	PLUG, pipe; 1/8" npt	3
2.	6C075015	TUBE, stop	1
3.	6A025015	* RING, wafer lock	1
4.	7Q072228	* O-RING	1
5.	7Q10P228	* RING, back-up	1
6.	6H025015	HEAD	1
7.	7R546015	* SEAL, rod	1
8.	7R14P015	* WIPER, rod	1
9.	4G166820	ROD	1
10.	7T66P025	* SEAL, piston	1
11.	7Q072137	* O-RING	1
12.	6I025087	PISTON	1
13.	7T61N087	* SEAL, lock ring	1
14.	4B166820	CASE, cylinder	1
15.	73054004	VALVE, locking holding	1
16.	72060708	SCREW; 1/4-20 x 1-1/4" soc. hd.	6

* Part of Seal Kit (Part Number 9B101214)

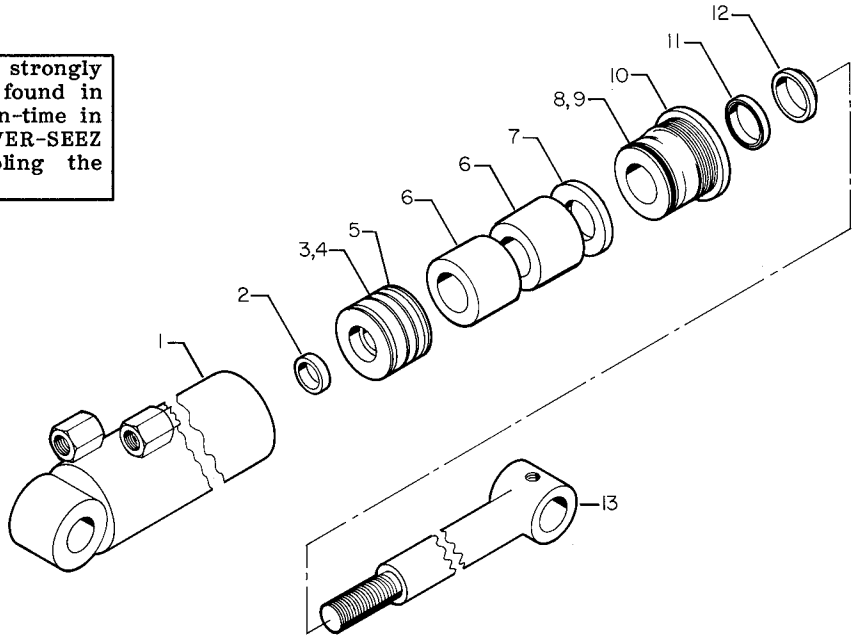
Figure D-6. Power-Down Outrigger Cylinder (Part Number 3B166820)

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

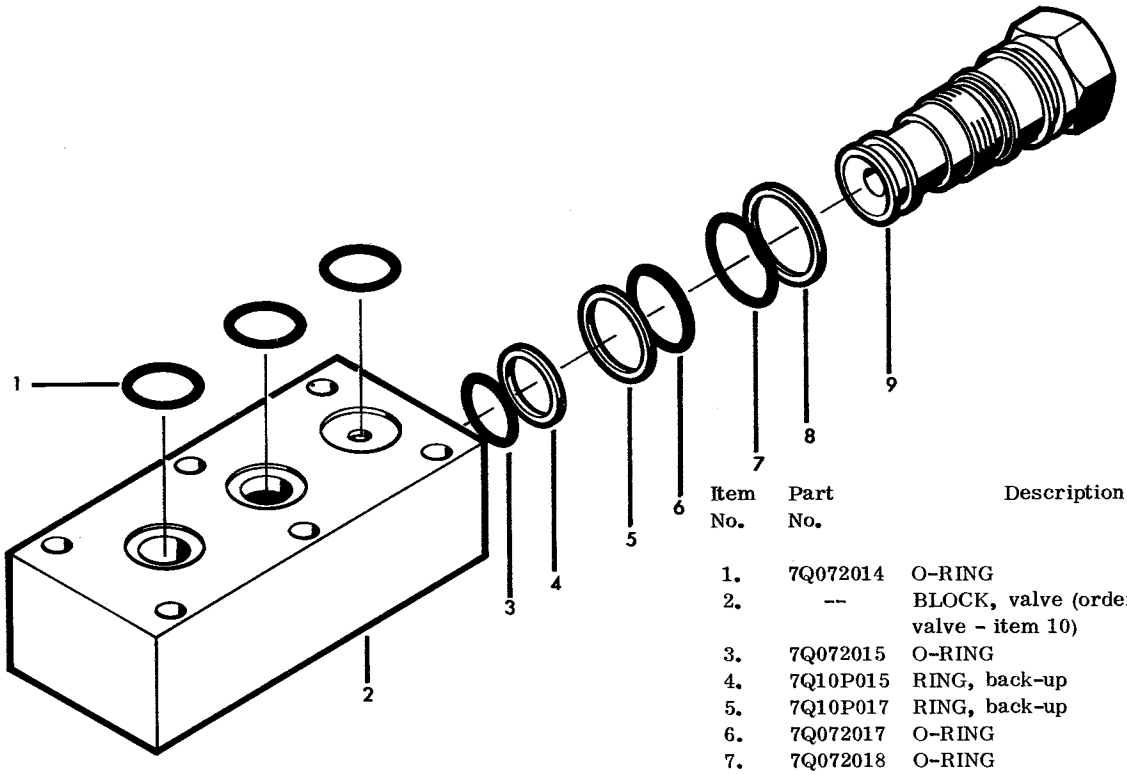
Bore	2"
Stroke	34"
C-C Closed	49-7/8"
Rod Diameter	1-1/4"
Pin Diameter	1"



Item No.	Part No.	Description	Qty
1.	4B241801	CASE, cylinder	1
2.	7T61N075	* SEAL, lock ring	1
3.	7T66P020	* SEAL, piston	1
4.	7Q072129	* O-RING	1
5.	6I020075	PISTON	1
6.	6C300012	TUBE, stop	2
7.	6A025012	* RING, wafer lock	1
8.	7Q10P224	* RING, back-up	1
9.	7Q072224	* O-RING	1
10.	6H020012	HEAD	1
11.	7R546012	* SEAL, rod	1
12.	7R14P012	* WIPER, rod	1
13.	4G241800	ROD	1

* Part of Seal Kit (Part Number 9B081012)

Figure D-7. Power-Out Outrigger Cylinder (Part Number 3B241801)



Item No.	Part No.	Description	Qty
1.	7Q072014	O-RING	3
2.	--	BLOCK, valve (order complete valve - item 10)	1
3.	7Q072015	O-RING	1
4.	7Q10P015	RING, back-up	1
5.	7Q10P017	RING, back-up	1
6.	7Q072017	O-RING	1
7.	7Q072018	O-RING	1
8.	7Q10P018	RING, back-up	1
9.	--	BODY, valve (order complete valve - item 10)	1
10.	73054004	VALVE, complete (includes items 1 thru 9)	1

Figure D-8. Locking Holding Valve (Part Number 73054004)

Item No.	Part No.	Description	Qty
1.	52701152	MAST	1
2.	60104540	COVER, pinion gear	1
3.	70029119	PLACARD, serial no. (not shown)	1
4.	--	NOT USED	-
5.	72060151	SCREW; 5/8-11 x 2" gr. 8	18
6.	72063119	WASHER, wrt.; 5/8" gr. 8	18
7.	72066340	RIVET, pop; 1/8"	2

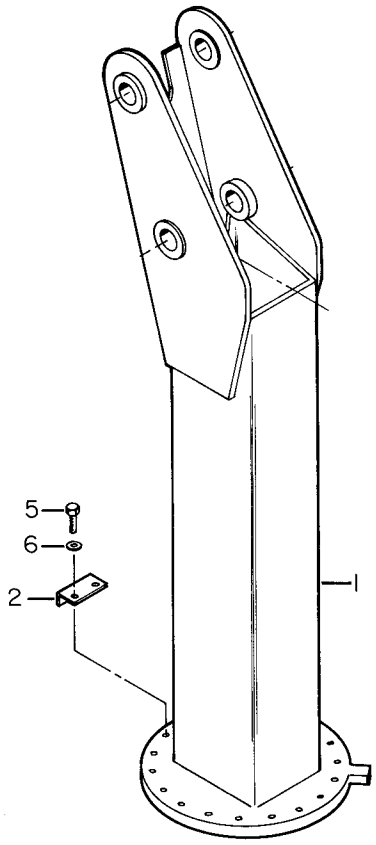


Figure D-9. Mast (Part Number 41701134)

Item No.	Part No.	Description	Qty
11.	3C078712	CYLINDER, inner	1
12.	52701155	BOOM, inner	1
13.	60020131	BUSHING	2
14.	60102319	PIN	1
15.	60102529	PIN	1
16.	60103798	PIN	1
17.	72053508	ZERK; 1/8" npt	3
18.	72063039	BUSHING, machy.; 2" x 10 ga.	3
19.	72066136	RING, retaining; 2"	3
20.	72661159	PIN, groove; 1/2" x 3"	3

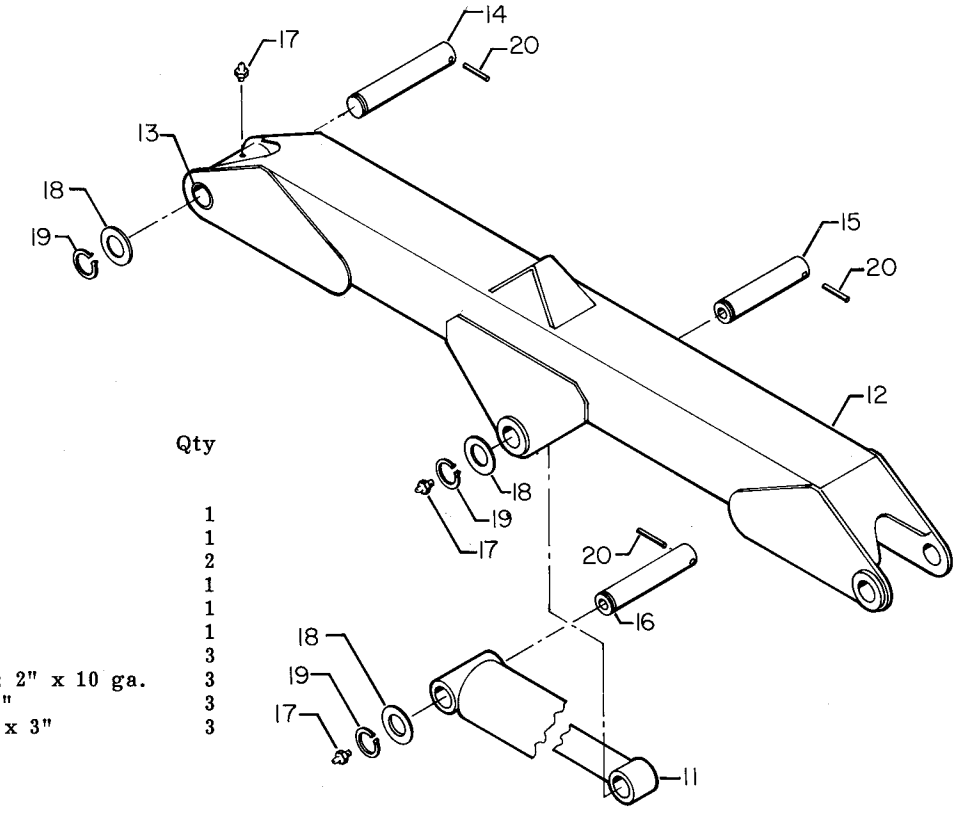


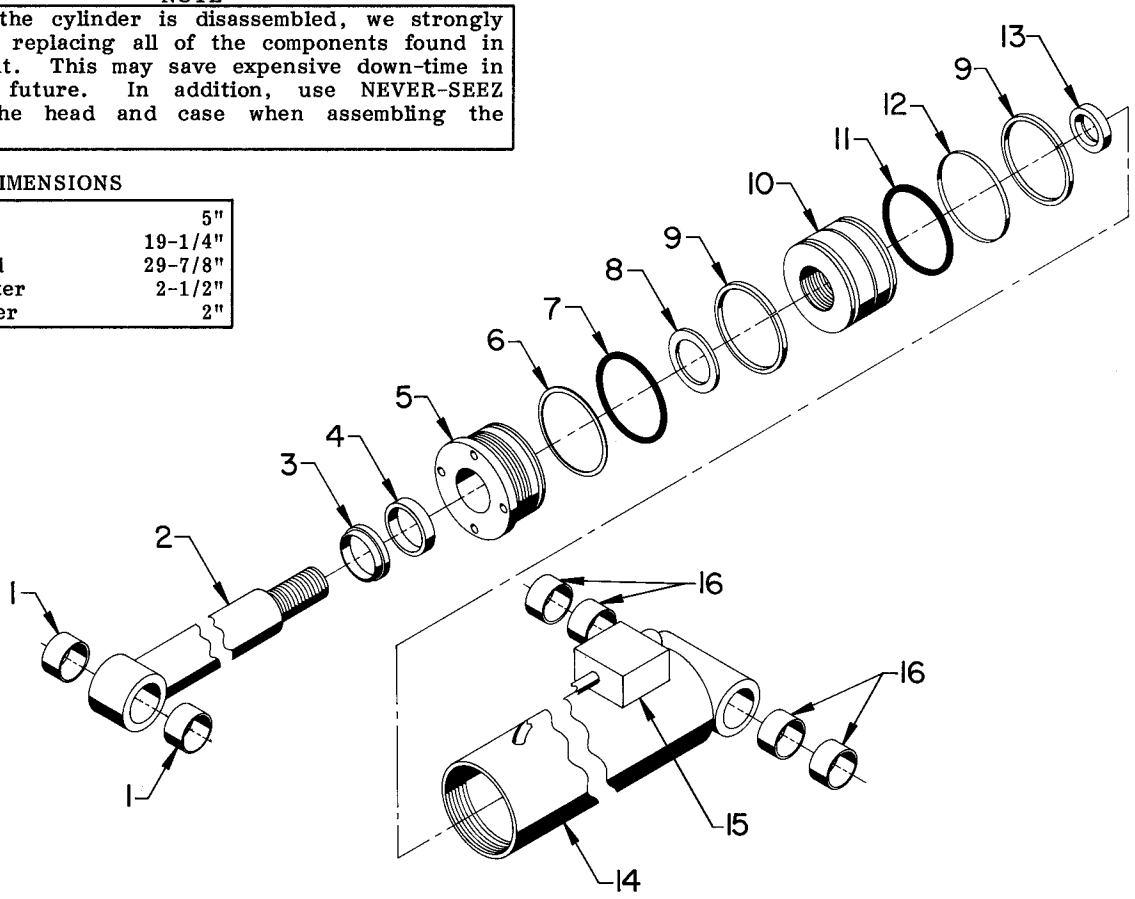
Figure D-10. Inner Boom (Part Number 41701135)

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

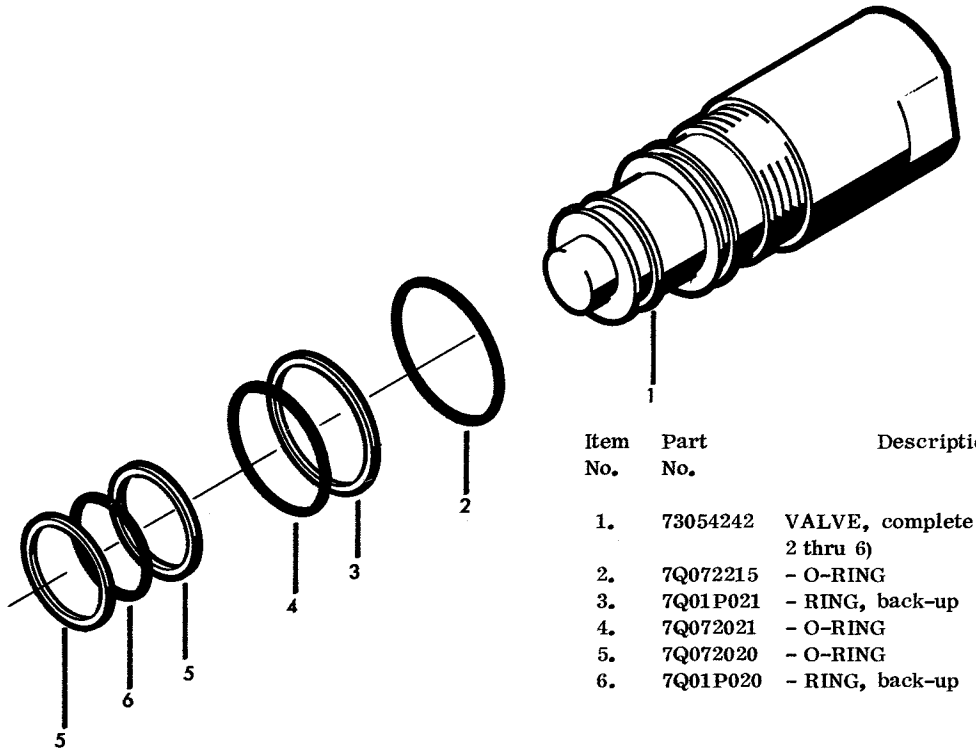
Bore	5"
Stroke	19-1/4"
C-C Closed	29-7/8"
Rod Diameter	2-1/2"
Pin Diameter	2"



Item No.	Part No.	Description	Qty
1.	7BF81020	BUSHING	2
2.	4G078710	ROD	1
3.	7R14P025	* WIPER, rod	1
4.	7R546025	* SEAL, rod	1
5.	6H050025	HEAD	1
6.	7Q10P350	* RING, back-up	1
7.	7Q072350	* O-RING	1
8.	6A025025	* RING, wafer lock	1
9.	7T65I050	* RING, piston	2
10.	6I050181	PISTON	1
11.	7Q072157	* O-RING	1
12.	7T66P050	* SEAL, piston	1
13.	7T61N181	* SEAL, lock ring	1
14.	4C078711	CASE, cylinder	1
15.	73054242	VALVE, counter-balance	1
16.	7BF81220	BUSHING	4
17.	7PNPXT02	PLUG; 1/8" npt (not shown)	3

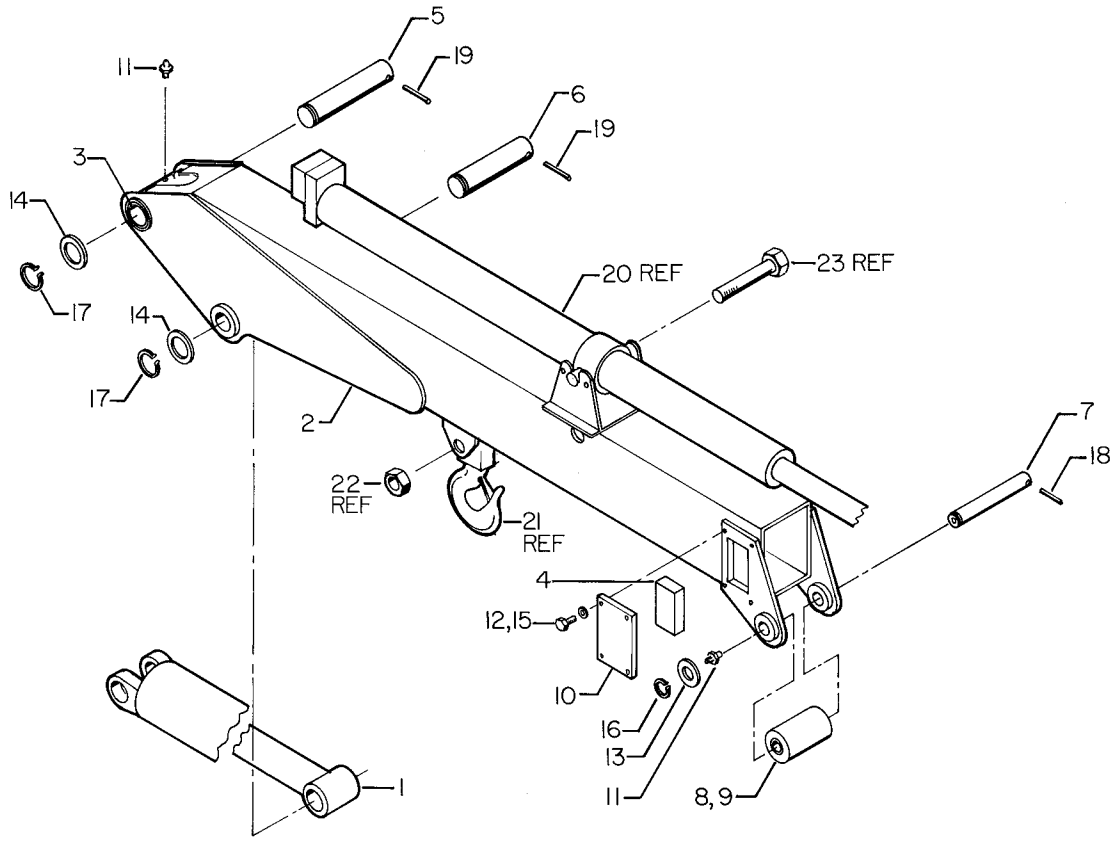
* Part of Seal Kit (Part Number 9C202029)

Figure D-11. Inner Boom Cylinder (Part Number 3C078712)



Item No.	Part No.	Description	Qty
1.	73054242	VALVE, complete (includes items 2 thru 6)	
2.	7Q072215	- O-RING	1
3.	7Q01P021	- RING, back-up	1
4.	7Q072021	- O-RING	1
5.	7Q072020	- O-RING	1
6.	7Q01P020	- RING, back-up	2

Figure D-12. Counter-Balance Valve (Part Number 73054242)



Item No.	Part No.	Description	Qty
1.	3C081712	CYLINDER, outer	1
2.	52701157	BOOM, outer	1
3.	60020131	BUSHING	2
4.	60030015	PAD, wear	2
5.	60102200	PIN; 2" x 9-9/16"	1
6.	60102324	PIN; 2" x 8-3/8"	1
7.	60102558	PIN; 1-1/4" x 8-13/16"	1
8.	60102559	ROLLER	1
9.	60020126	BUSHING	4
10.	60103463	PLATE, retainer	2
11.	72053508	ZERK, grease; 1/8"	2
12.	72060002	SCREW; 1/4-20 x 3/4" hex hd.	8
13.	72063035	BUSHING, machy.; 1-1/4" x 10 ga.	1
14.	72063039	BUSHING, machy.; 2" x 10 ga.	2
15.	72063049	WASHER, lock; 1/4"	8
16.	72066129	RING, retaining; 1-1/4"	1
17.	72066136	RING, retaining; 2"	2
18.	72661157	PIN, groove; 1/2" x 2-1/2"	1
19.	72661159	PIN, groove; 1/2" x 3"	2
20.	--	* CYLINDER, extension	Reference
21.	52701716	HOOK	1
22.	72062073	NUT, lock; 1-1/4 - 7"	1
23.	72060238	SCREW; 1-1/4 - 7 x 6" hex hd.	1

* Not a part of this assembly - shown for reference only

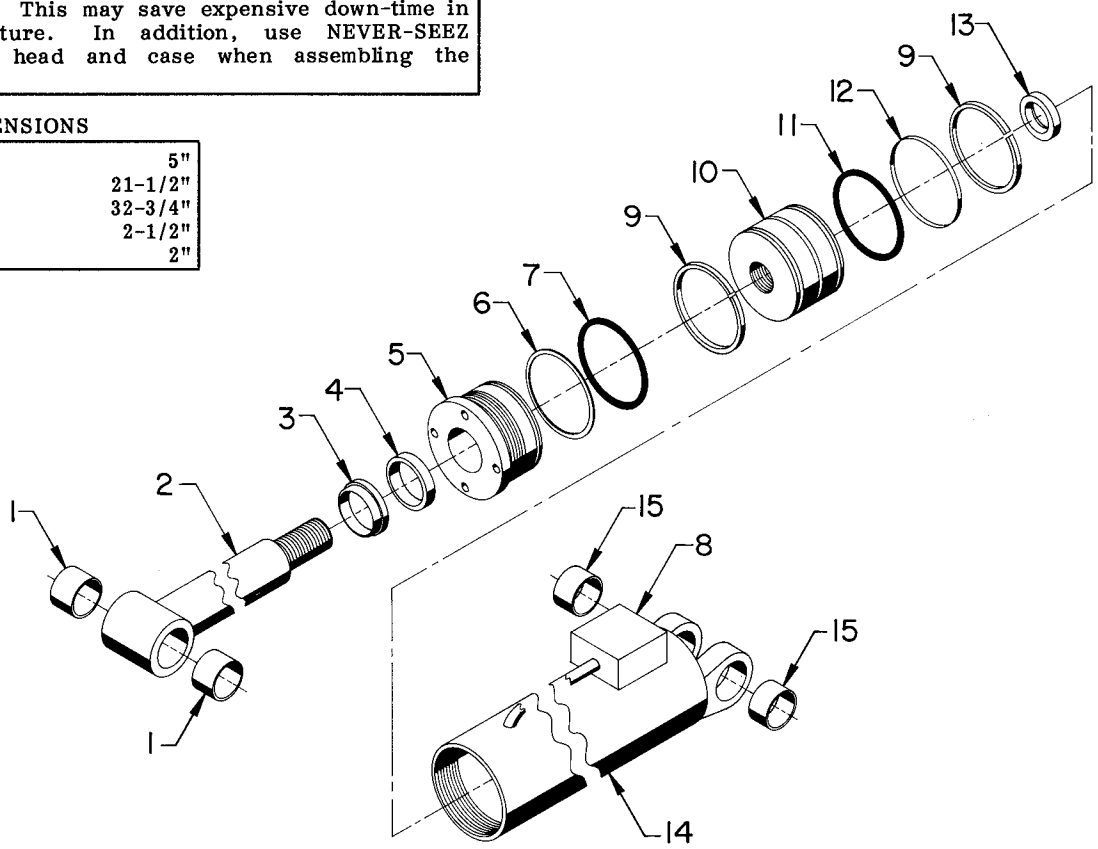
Figure D-13. Outer Boom — 1 Hydraulic/1 Manual (Part Number 41701136)

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

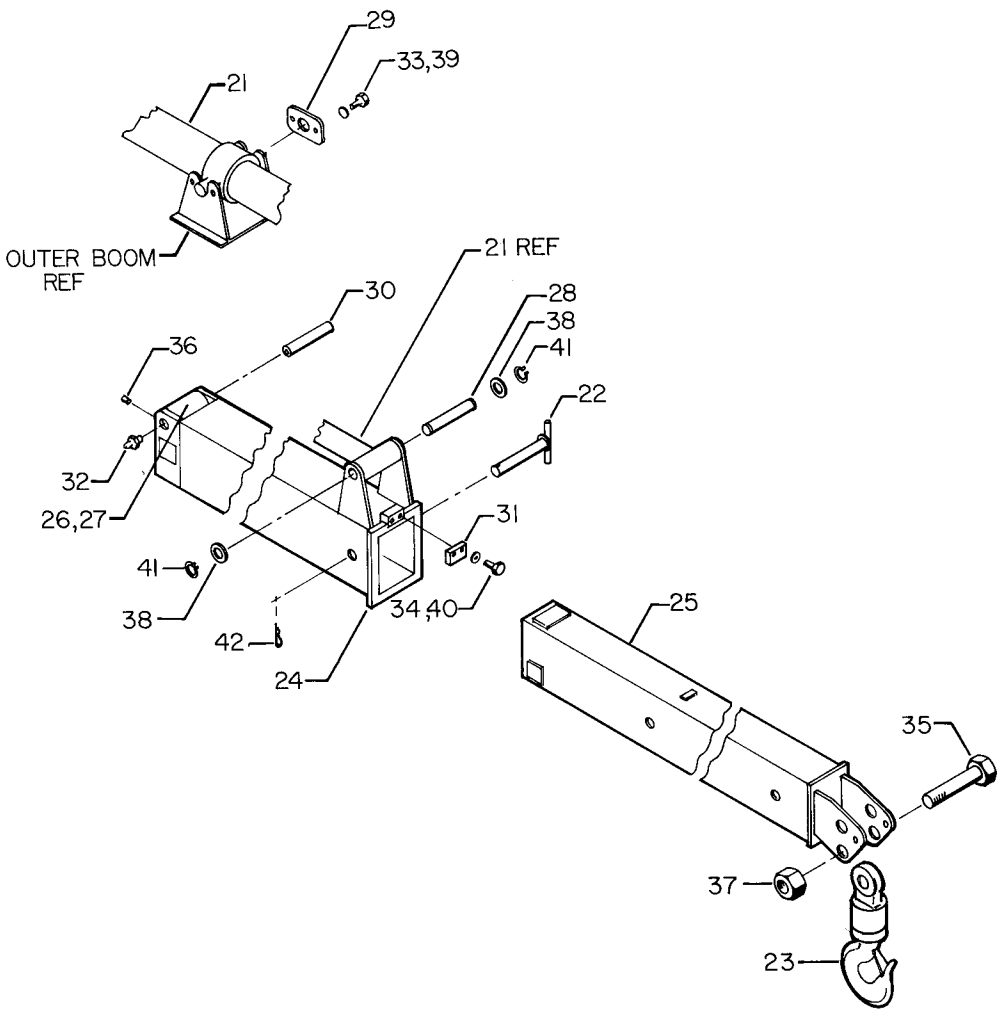
Bore	5"
Stroke	21-1/2"
C-C Closed	32-3/4"
Rod Diameter	2-1/2"
Pin Diameter	2"



Item No.	Part No.	Description	Qty
1.	7BF81520	BUSHING	2
2.	4G081710	ROD	1
3.	7R14P025	* WIPER, rod	1
4.	7R546025	* SEAL, rod	1
5.	6H050025	HEAD	1
6.	7Q10P350	* RING, back-up	1
7.	7Q072350	* O-RING	1
8.	73054242	VALVE, counter-balance	1
9.	7T65I050	* RING, piston	2
10.	6I050181	PISTON	1
11.	7Q072157	* O-RING	1
12.	7T66P050	* SEAL, piston	1
13.	7T61N181	* SEAL, lock ring	1
14.	4C081711	CASE, cylinder	1
15.	7BF81220	BUSHING	2
16.	7PNPXT02	PLUG; 1/8" npt (not shown)	3

* Part of Seal Kit (Part Number 9A202029)

Figure D-14. Outer Cylinder (Part Number 3C081712)



Item No.	Part No.	Description	Qty
21.	3B048611	CYLINDER, extension	1
22.	52070152	PIN	1
23.	70731055	HOOK	1
24.	52705014	BOOM, 1st stage extension	1
25.	52705015	BOOM, 2nd stage extension	1
26.	60010172	ROLLER	1
27.	60020037	BUSHING	1
28.	60101906	PIN	1
29.	60102341	PLATE, lock	2
30.	60102540	PIN	1
31.	60107294	STOP, stroke	1

Item No.	Part No.	Description	Qty
32.	72053508	ZERK, grease; 1/8" npt	1
33.	72060046	SCREW; 3/8-16 x 1" hex hd.	4
34.	72060091	SCREW; 1/2-13 x 1" hex hd.	2
35.	72060238	SCREW; 1-1/4 - 7 x 6" hex hd.	1
36.	72060559	SCREW, set; 1/4-20 x 1/2" soc. hd.	2
37.	72062073	NUT, lock; 1-1/4 - 7	1
38.	72063033	BUSHING, machy.; 1" x 14 ga.	2
39.	72063051	WASHER, lock; 3/8"	4
40.	72063053	WASHER, lock; 1/2"	2
41.	72066125	RING, retaining; 1"	2
42.	72066145	PIN, hair	1

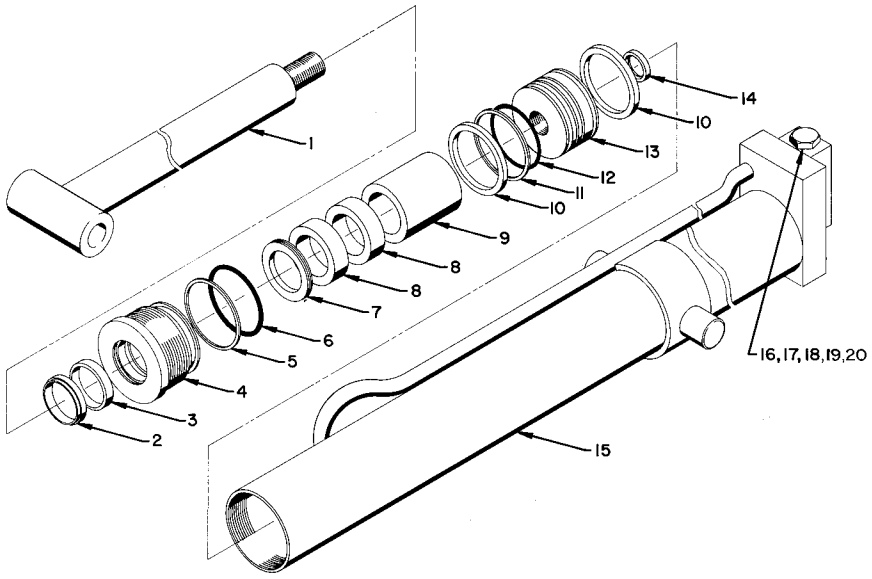
Figure D-15. Extension Boom — 1 Hydraulic/1 Manual (Part Number 41705013)

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

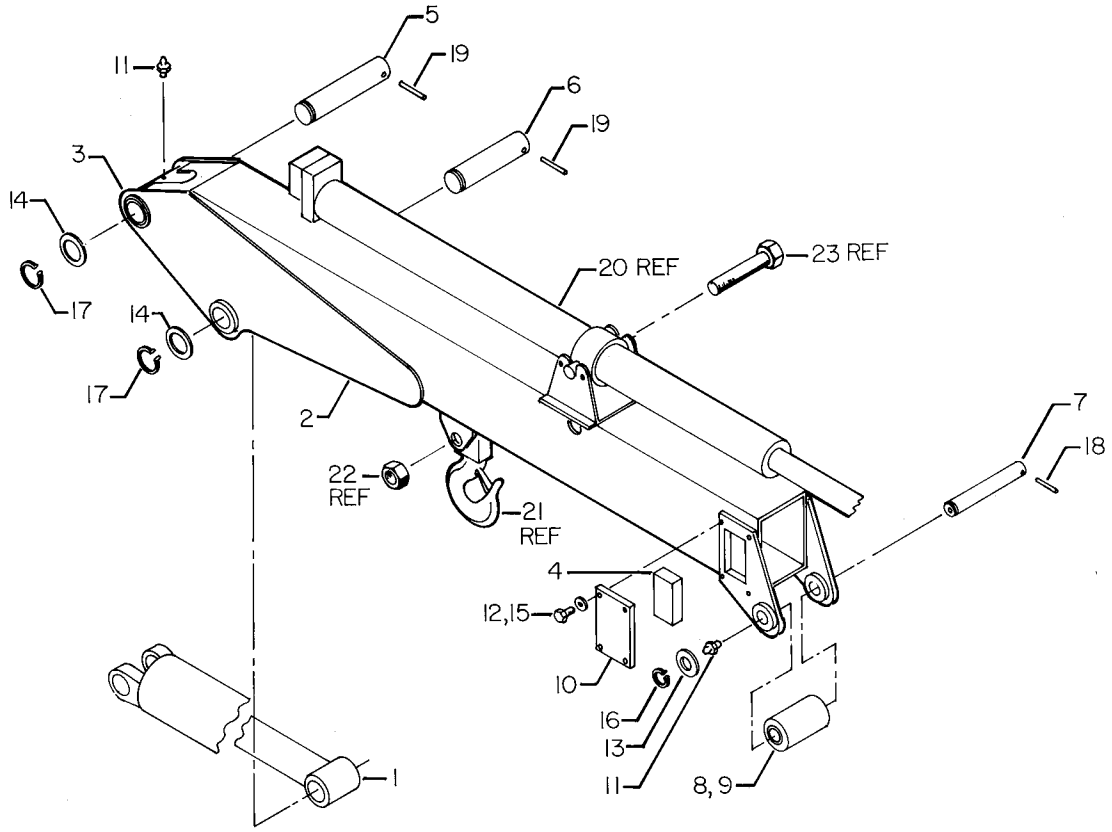
Bore	3"
Stroke	45"
C-C Closed	25-1/16"
Rod Diameter	2"
Pin Diameter	1"



Item No.	Part No.	Description	Qty
1.	4G048610	ROD	1
2.	7R14P020	* WIPER, rod	1
3.	7R546020	* SEAL, rod	1
4.	6H030020	HEAD	1
5.	7Q10P334	* RING, back-up	1
6.	7Q072334	* O-RING	1
7.	6A025020	* RING, wafer lock	1
8.	6C075020	TUBE, stop	2
9.	6C300020	TUBE, stop	1
10.	7T65I030	* RING, piston	2
11.	7T66P030	* SEAL, piston	1
12.	7Q072145	* O-RING	1
13.	6I030106	PISTON	1
14.	7T61N106	* SEAL, lock ring	1
15.	4B048611	CASE, cylinder	1
16.	73054004	VALVE, safety locking	1
17.	72060708	SCREW; 1/4-20 x 1-1/4" shcs	6
18.	7PNPXT02	PLUG; 1/8" npt (not shown)	1
19.	7PNPXT06	PLUG; 3/8" npt (not shown)	2
20.	7PNPXT04	PLUG, 1/4" npt (not shown)	1

* Part of Seal Kit (Part Number 9C121617)

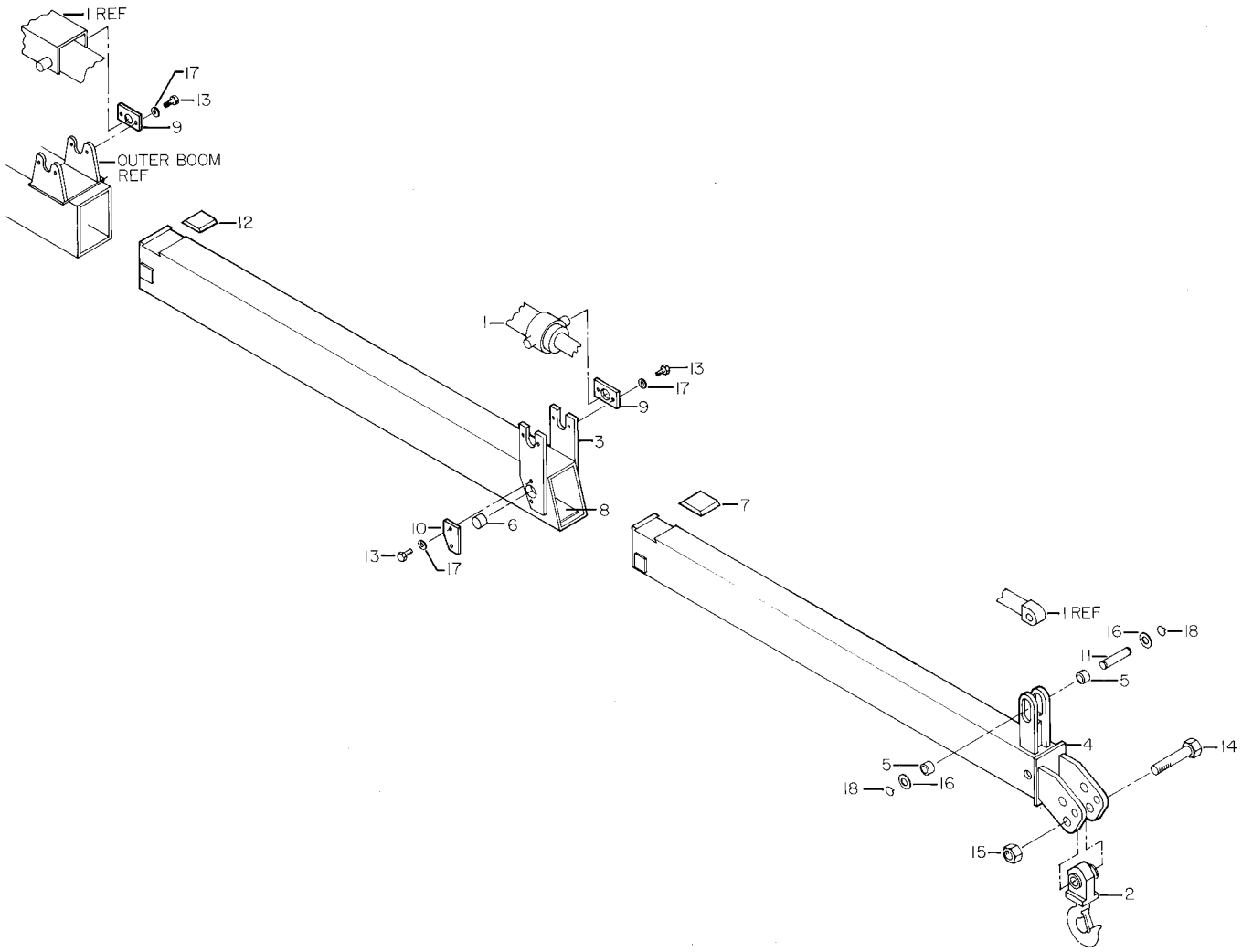
Figure D-16. Extension Cylinder (Part Number 3B048611)



Item No.	Part No.	Description	Qty
1.	3C081712	CYLINDER, outer boom	1
2.	52705248	BOOM, outer	1
3.	60020131	BUSHING	2
4.	60030015	PAD, wear	2
5.	60102200	PIN; 2" x 9-9/16"	1
6.	60102324	PIN; 2" x 8-3/8"	1
7.	60102558	PIN; 1-1/4" x 8-13/16"	1
8.	60102559	ROLLER	1
9.	60020126	BUSHING	4
10.	60103463	PLATE, retainer	2
11.	72053508	ZERK, grease; 1/8" npt	2
12.	72060002	SCREW; 1/4-20 x 3/4" hex hd.	8
13.	72063035	BUSHING, machy.; 1-1/4" x 10 ga.	1
14.	72063039	BUSHING, machy.; 2" x 10 ga.	2
15.	72063049	WASHER, lock; 1/4"	8
16.	72066129	RING, retaining; 1-1/4"	1
17.	72066136	RING, retaining; 2"	2
18.	72661157	PIN, groove; 1/2" x 2-1/2"	1
19.	72661159	PIN, groove; 1/2" x 3"	2
20.	--	* CYLINDER, extension	Reference
21.	52701716	* HOOK	Ref.
22.	72062073	* NUT, lock; 1-1/4 - 7	Ref.
23.	72060238	* SCREW; 1-1/4 - 7 x 6" hex hd	Ref.

* Not a part of this assembly - shown for reference only.

Figure D-17. Outer Boom — 2 Hydraulic (Part Number 41705247)



Item No.	Part No.	Description	Qty
1.	3K095850	CYLINDER, telescoping	1
2.	70731055	HOOK	1
3.	52705249	BOOM, extension, 1st stage	1
4.	52705712	BOOM, extension, 2nd stage	1
5.	60020197	ROLLER, bronze	2
6.	60030007	PAD, wear	2
7.	60030064	PAD, wear, beveled	1
8.	60030065	PAD, wear	1
9.	60102341	PLATE, lock	4
10.	60102649	PLATE, retaining	2
11.	60104028	PIN	1
12.	60030127	PAD, wear	1
13.	72060046	SCREW; 3/8-16 x 1" hex hd.	12
14.	72060238	SCREW; 1-1/4 - 7 x 6" hex hd.	1
15.	72062073	NUT, lock; 1-1/4 - 7	1
16.	72063033	BUSHING, machy.; 1" x 14 ga.	2
17.	72063051	WASHER, lock; 3/8"	12
18.	72066125	RING, retaining; 1"	2

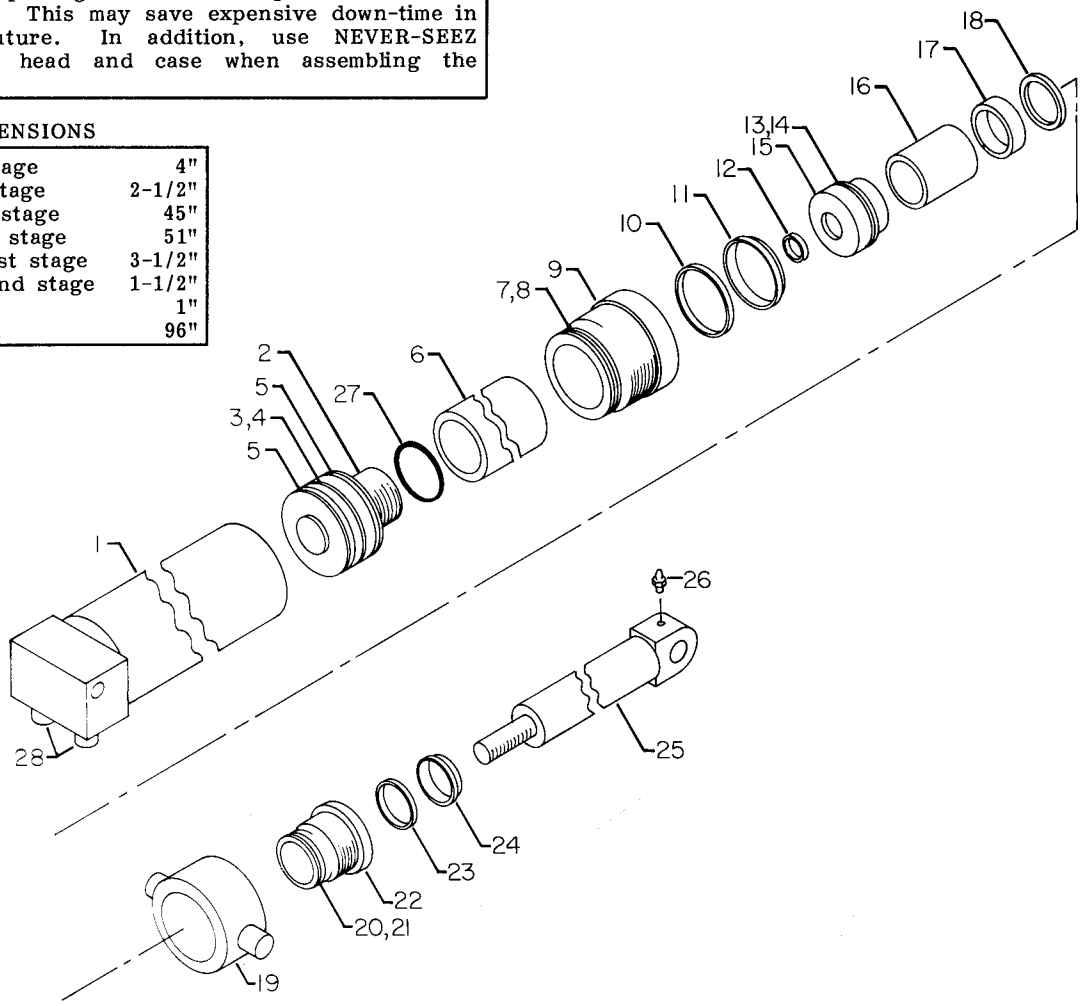
Figure D-18. Extension Boom — 2 Hydraulic (Part Number 41705714)

NOTE

Whenever the cylinder is disassembled, we strongly recommend replacing all of the components found in the seal kit. This may save expensive down-time in the near future. In addition, use NEVER-SEEZ between the head and case when assembling the cylinder.

DIMENSIONS

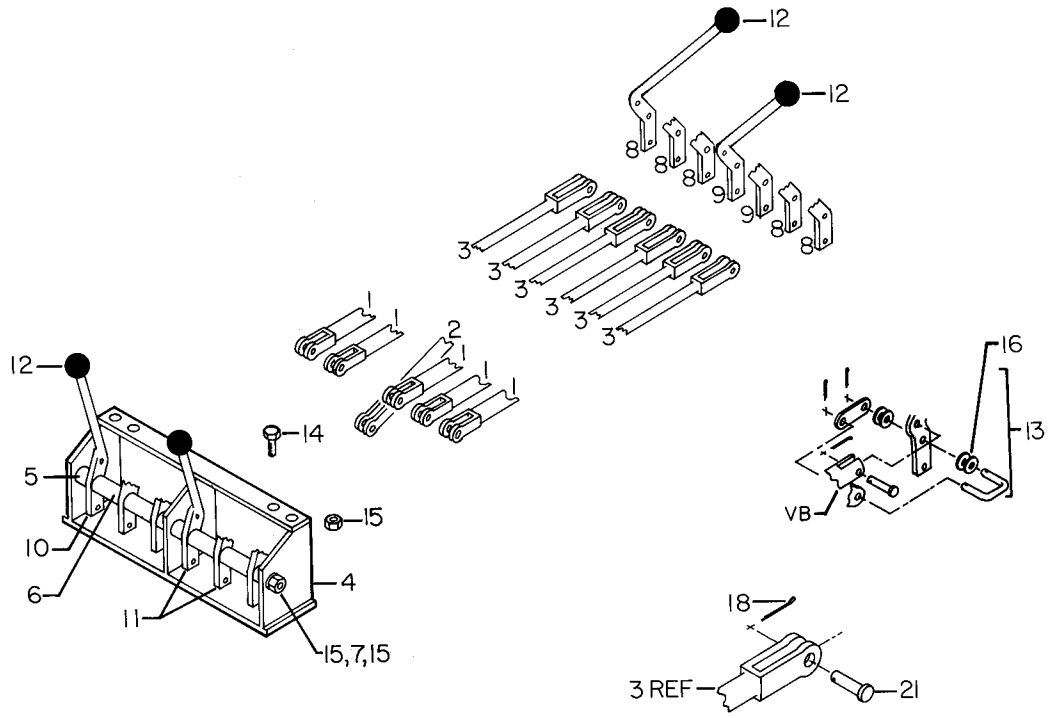
Bore - 1st stage	4"
Bore - 2nd stage	2-1/2"
Stroke - 1st stage	45"
Stroke - 2nd stage	51"
Rod Dia. - 1st stage	3-1/2"
Rod Dia. - 2nd stage	1-1/2"
Pin Diameter	1"
C - C Closed	96"



Item No.	Part No.	Description	Qty
1.	4K095850	CASE, cylinder	1
2.	6I095850	PISTON	1
3.	7Q072153	* O-RING	1
4.	7T66P040	* SEAL, piston	1
5.	7T65I040	* RING, piston	2
6.	4H095850	CASE, inner	1
7.	7Q072342	* O-RING	1
8.	7Q10P342	* RING, back-up	1
9.	6H112820	HEAD	1
10.	7R546035	* SEAL, rod	1
11.	7R14P035	* WIPER, rod	1
12.	7T61N087	* RING, seal lock	1
13.	7Q072137	* O-RING	1
14.	7T66P025	* SEAL, piston	1
15.	6I025087	PISTON	1
16.	6C300015	TUBE, stop	1
17.	6C075015	TUBE, stop	1
18.	6A025015	* RING, wafer lock	1
19.	4FG09585	RING, mounting	1
20.	7Q072228	* O-RING	1
21.	7Q10P228	* RING, back-up	1
22.	6H271511	HEAD	1
23.	7R546015	* SEAL, rod	1
24.	7R14P015	* WIPER, rod	1
25.	4G095850	ROD	1
26.	72053507	ZERK, grease	1
27.	7Q072151	* O-RING	1
28.	73054242	VALVE, counter-balance; 25-GPM	2
29.	7PNPXT02	PLUG; 1/8" npt	8

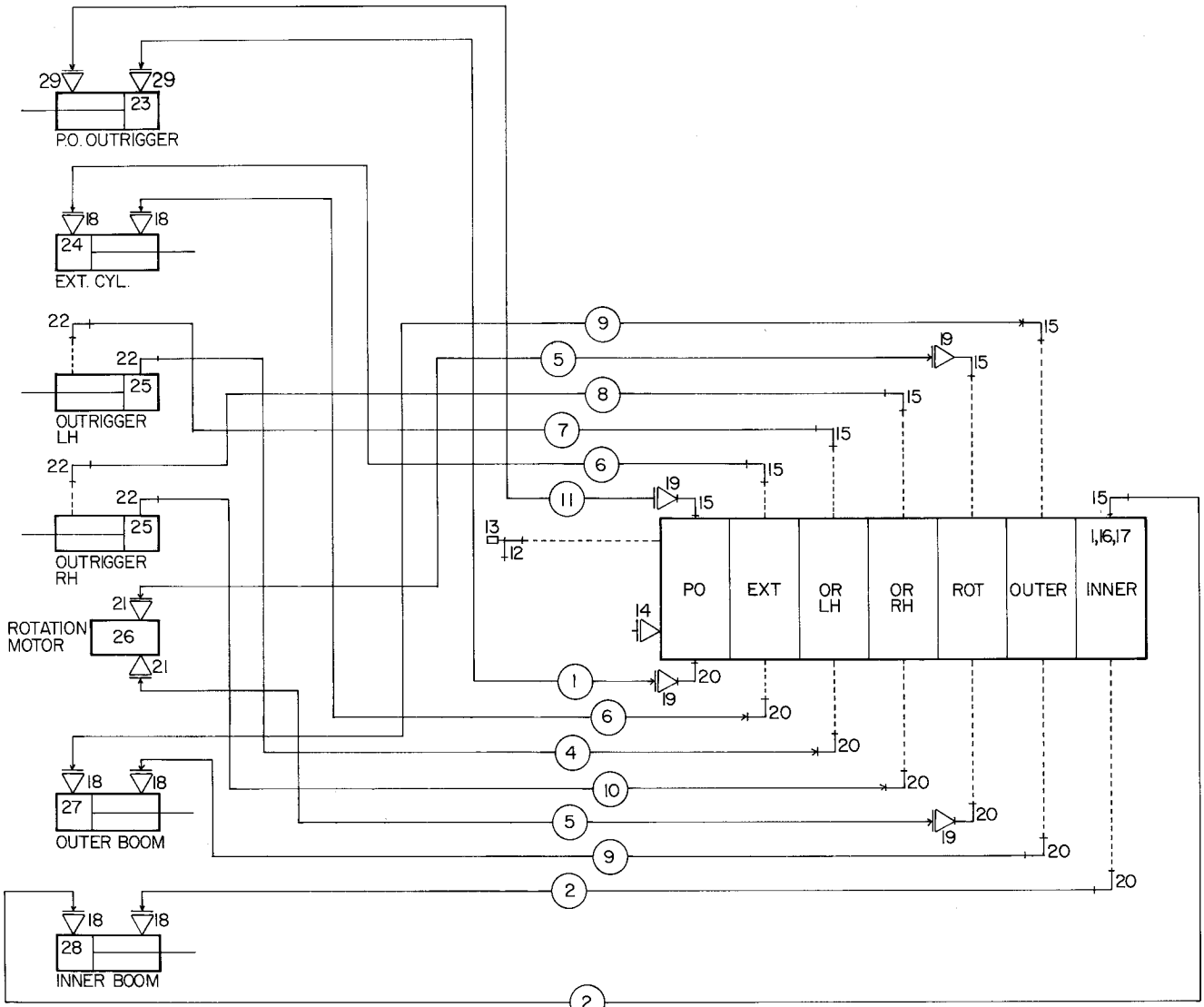
* Part of seal kit (Part Number 9X095850)

Figure D-19. Telescoping Extension Cylinder (Part Number 3K095850)



Item No.	Part No.	Description	Qty
1.	52702016	ROD, control, female	5
2.	52702017	ROD, control, bent female	1
3.	52702018	ROD, control, male	6
4.	52702740	VALVE BANK, dummy	1
5.	60030045	SPACER; 5/8"	4
6.	60030046	SPACER; 1-1/2"	4
7.	60105502	ROD, dummy valve bank	1
8.	60025237	HANDLE, valve bank; long	5
9.	60025236	HANDLE, valve bank; short	2
10.	70141984	HANDLE, dummy; long	4
11.	70141985	HANDLE, dummy; short	2
12.	71039096	KNOB; 1-1/2"	13
13.	94731839	LINK & PIN KIT	7
14.	72060025	SCREW; 5/16-18 x 1" hex hd.	2
15.	72062109	NUT, lock; 5/16-18	4
16.	72063001	WASHER, wrt.; 1/4"	28
17.	----	NOT USED	-
18.	72066168	PIN, cotter; 3/4" lg.	12
19.	----	NOT USED	-
20.	----	NOT USED	-
21.	72066338	PIN, clevis	12

Figure D-20. 7-Function Control Kit (Part Number 90705026)

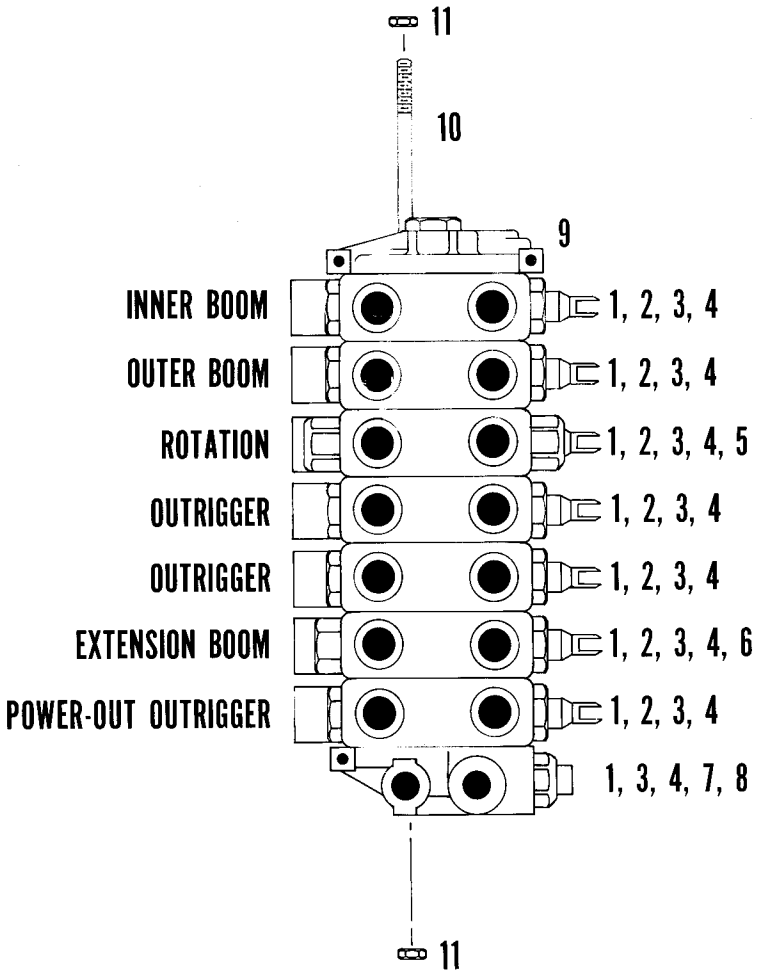


Item No.	Part No.	Description	Qty
1.	51704278	HOSE; 1/4" ID x 38" lg.	1
2.	51703588	HOSE; 3/8" ID x 150" lg.	2
3.	51703617	VALVE BANK	1
4.	51703661	HOSE; 3/8" ID x 36" lg.	1
5.	51705365	HOSE; 1/4" ID x 60" lg.	2
6.	51703607	HOSE; 3/8" ID x 261" lg.	2
7.	51704029	HOSE; 3/8" ID x 32" lg.	1
8.	51704031	HOSE; 3/8" ID x 126" lg.	1
9.	51704033	HOSE; 3/8" ID x 210" lg.	2
10.	51705077	HOSE; 3/8" ID x 132" lg.	1
11.	51706028	HOSE; 1/4" ID x 34" lg.	1
12.	60106322	ELBOW, pressure gauge	1
13.	72053245	PLUG; 1/4" npt	1
14.	72053747	ADAPTER; 1-1/16" str. thd.(m) x 3/4" npt(f)	1
15.	72053763	* ELBOW, 90°; 3/4-16 str. thd.(m) x 3/4-16 JIC(m)	7
16.	72060026	SCREW; 5/16-18 x 1-1/4" hex hd.	3
17.	72062109	NUT, lock; 5/16-18	3
18.	72532358	** ADAPTER; 3/4-16 str. thd.(m) x 3/4-16 JIC(m)	6
	72532740	** ELBOW, 90° swivel; 3/4-16 str. thd.(m) x 3/4-16 JIC(m)	
19.	72532665	ADAPTER; 7/16-20 JIC(m) x 3/4-16 JIC(f)	4
20.	72532666	ELBOW, extra-long 90°; 3/4-16 str. thd.(m) x 3/4-16 JIC(m)	7
21.	72532685	ADAPTER; 7/8-14 str. thd.(m) x 7/16-20 JIC(m)	2
22.	72532779	ELBOW, extra-long 90°; 9/16-18 str. thd.(m) x 3/4-16 JIC(m)	4
23.	3B241801	* CYLINDER, power-out outrigger	1
24.	3B048611	* CYLINDER, 1-stage extension	1
	3K095850	* CYLINDER, 2-stage extension	1
25.	3B166820	* CYLINDER, power-down outrigger	2
26.	73051384	* MOTOR, crane rotation	1
27.	3C081712	* CYLINDER, outer boom	1
28.	3C078712	* CYLINDER, inner boom	1
29.	72532351	ADAPTER; 7/16-20 str. thd.(m) x 7/16-20 JIC(m)	2

* These items are not a part of the hydraulic kit and are shown for reference only.

** Use 72532358 adapter with 1-stage extension cylinder and 72532740 swivel elbow with 2-stage extension cylinder.

Figure D-21. Hydraulic Kit (Part Number 91705079 — 1-Stage Extension Cylinder and 91705844 — 2-Stage Extension Cylinder)



Item No.	Part No.	Description	Qty
1.	73054432	SECTION, valve (includes item 2)	7
2.	73054010	PLUG, load check	* 2
3.	7Q072021	O-RING, large (between sections)	* 4
4.	7Q072019	O-RING, small (between sections)	* 4
5.	73054516	RELIEF, port; 1300 PSI	** 2
6.	73054007	RELIEF, port; 1800 PSI	** 1
7.	73731424	COVER, end, left hand	1
8.	73024101	CAP, relief	1
9.	73054442	COVER, end, right hand	1
10.	73014596	STUD	3
11.	72062037	NUT; 3/8-16	6

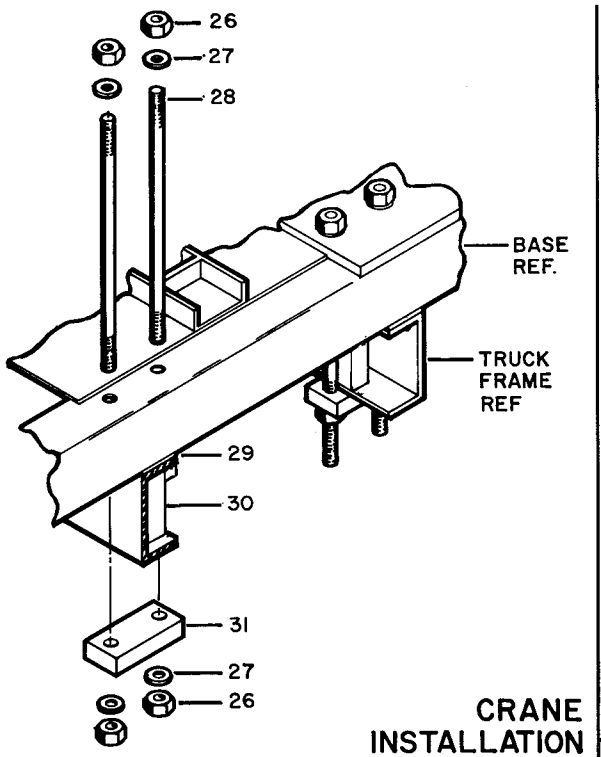
* Quantity shown is the quantity required for each section.

** When ordering replacement valve sections, remove the load check plugs (item 2) and install the port reliefs.

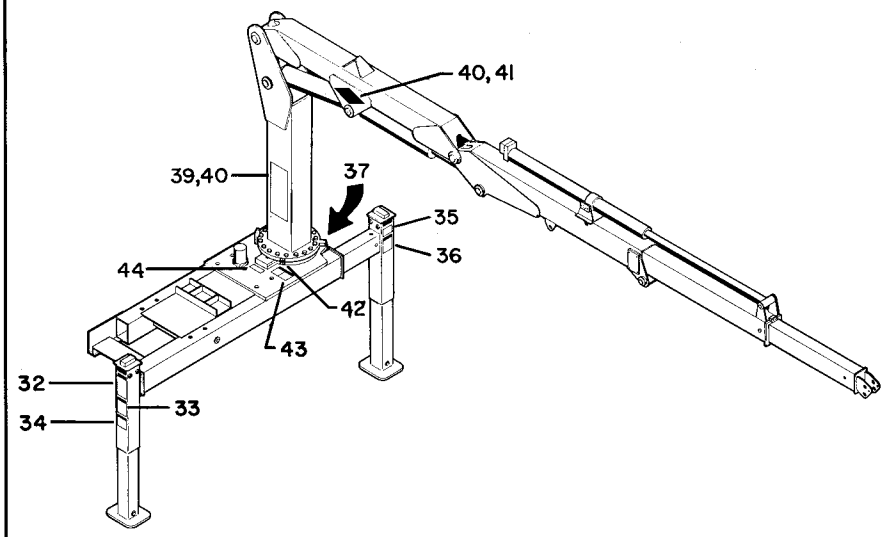
Figure D-22. Valve Bank (Part Number 51703617)

Item No.	Part No.	Description	Qty
1.	70048031	GAUGE, vacuum	1
2.	51703945	HOSE; 3/4" ID x 17" lg.	1
3.	60035820	HOSE; 3/4" ID x 108" lg.	1
4.	60035829	HOSE; 1-1/4" ID x 48" lg.	2
5.	51704812	HOSE; 1/2" ID x 96" lg.	1
6.	73052000	FILTER, return	1
7.	73052012	FILTER, suction	1
8.	73054129	VALVE, gate; 3/4"	1
9.	73054130	VALVE, gate; 1-1/4"	1
10.	72532507	ELBOW, 90°; 3/4" npt(m) x 1-1/16" JIC(m)	1
11.	72053556	ELBOW, street, 90°; 3/4" npt	1
12.	72053141	NIPPLE, close; 3/4" npt	1
13.	72053453	NIPPLE, barbed; 3/4"	2
14.	72531550	NIPPLE, barbed; 1-1/4"	4
15.	72053211	NIPPLE, close; 1-1/4" npt	1
16.	72066000	CLAMP, hose; #12	2
17.	72066516	CLAMP, hose; #20	4
18.	52701834	RESERVOIR	1
19.	73141276	SCREEn, reservoir fill	1
20.	73014671	CAP, reservoir fill	1
21.	73052001	PLUG, magnetic; 3/4" npt Sq. Hd.	1
22.	73051xxx	PUMP	1
23.	7205xxxx	ADAPTER, pump inlet	1
24.	7205xxxx	ADAPTER, pump outlet	1
25.	60103870	BRACKET, oil filter	1
26.	72062141	NUT, lock; 1" - 8	16
27.	72063066	WASHER, Hi-Star; 1"	16
28.	71014053	STUD, tie down	8
29.	60103563	SPACER, frame flange	2
30.	52706660	SUPPORT, frame reinforcing	4
31.	60010354	CLAMP, plate	4
32.	71039129	DECAL, stabilizer warning	2
33.	70391391	DECAL, electrocution hazard	2
34.	70391392	DECAL, operation danger	2
35.	71039134	DECAL, oil level caution	2
36.	70391390	DECAL, operation caution	2
37.	71039169	DECAL, curb-side control	1
38.	71039168	DECAL, street-side control *	1
39.	71392525	PLACARD, capacity	2
40.	72066340	RIVET, pop; 1/8"	20
41.	70029252	PLACARD, IMT Diamond	2
42.	71392365	DECAL, rotation alignment	1
43.	70391583	DECAL, stowing instructions	1
44.	70392524	DECAL, rotation greasing	1
45.	70391612	DECAL, grease weekly, left *	4
46.	70391613	DECAL, grease weekly, right *	5
47.	70391393	DECAL, electrocution danger *	4
48.	70392108	DECAL, "SUCTION" *	1
49.	70392109	DECAL, "RETURN" *	1

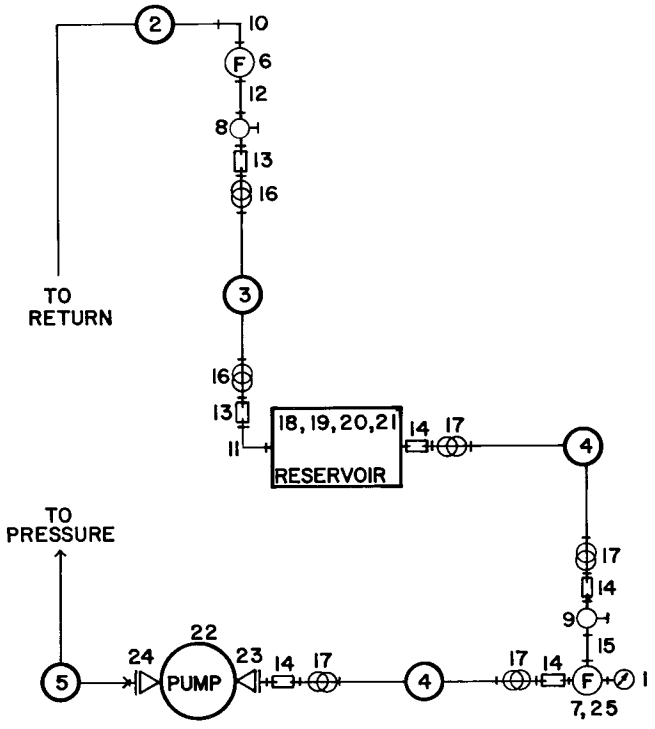
* Not shown



CRANE INSTALLATION



DECALS



HYDRAULICS

Figure D-23. Installation Kit (Part Number 93706119)