Volume 2
Parts and Specifications
Model 6016 Crane

IOWA MOLD TOOLING CO., INC.
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515-923-3711
PRODUCT SUPPORT FAX: 515-923-2424

MANUAL PART NUMBER 99900739
LAST REVISED: 03-29-96

INTRODUCTION

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

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 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
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 VERY 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.

Read and familiarize yourself with the IMT OPERATOR'S CRANE SAFETY MANUAL before operating or performing any maintenance on your crane.

Section 1. MODEL 6016 CRANE SPECIFICATIONS

1-1. GENERAL

	6016-1H	6016-1H1M
CRANE RATING	60,000 ft-lbs 8.4 ton-meters	60,000 ft-lbs 8.4 ton-meters
REACH - from centerline f rotation	16'-0" 4.88m	20'-0" 6.10m
HYDRAULIC EXTENSION	60" 152.4cm	60" 152.4cm
MANUAL EXTENSION	---	48" 121.9cm
LIFTING HEIGHT - from base of crane	18'-5" 5.61m	22'-4" 6.81m
WEIGHT OF CRANE	1790 lbs 771 kg	1915 lbs 869 kg
OUTRIGGER SPAN (required option) crane side from centerline of chassis	90" 228.6cm	90" 228.6cm
opposite crane side from centerline of chassis	48" 121.9cm	48" 121.9cm
STORAGE HEIGHT - crane only	40-1/2" 102.9cm	40-1/2" 102.9cm
MOUNTING SPACE REQUIRED (crane base)	19" x 27-1/2" 48.3cm x 69.9cm	19" x 27-1/2" 48.3cm x 69.9cm
TIE-DOWN BOLT PATTERN	14-3/4" x 14-3/4" 37.5cm x 37.5cm on center	14-3/4" x 14-3/4" 37.5cm x 37.5cm on center
HORIZONTAL CENTER OF GRAVITY - from centerline of rotation	26" 66.0cm	26" 66.0cm
VERTICAL CENTER OF GRAVITY - from bottom of crane base	18" 45.7cm	18" 45.7cm
OPTIMUM PUMP CAPACITY	10 U.S. Gallons/minute 38 liters/minute	10 U.S. Gallons/minute 38 liters/minute
SYSTEM PRESSURE	3000 PSI 207 bar	3000 PSI 207 bar
ROTATIONAL TORQUE	7375 ft-lbs 1020 kg-m	7375 ft-lbs 1020 kg-m

IOWA MOLD TOOLING CO., INC.
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1-2. PERFORMANCE CHARACTERISTICS

ROTATION: 450° (7.85 Rad.)	42 seconds
LOWER BOOM ELEVATION: -10° to +80° (-0.17 Rad. to +1.40 Rad.)	11 seconds
EXTENSION CYLINDER: 60" (152.4cm)	8 seconds

1-3. POWER SOURCE

Integral-mounted hydraulic pump and PTO application. Other standard power sources may be used - minimum power required is 22 horsepower based on 10 GPM at 3000 PSI (38 liters/min. at 207 bar).

1-4. 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 to 1.

1-5. CYLINDER HOLDING VALVES

The base end of the extension cylinder is equipped with a pilot operated locking holding valve to prevent sudden cylinder collapse in the event of a hose breakage or other hydraulic component failure.

The extend side of the lower boom cylinder is equipped with a counter balance valve. The counter balance valve serves several functions. First, it is a holding valve. Secondly, it is designed to control the speed at which the lowering function operates, and allows that motion to be metered under load. Finally, it prevents the loss of an excess amount of oil in the event of a hose failure. Only the oil in the hose, at the time of the failure, will be lost.

1-6. CAPACITY ALERT SYSTEM

A pressure switch mounted on the extend side of the lower boom cylinder and connected electrically to the lift side of the winch, the extend side of the extension boom and the down side of the lower boom provides the capacity alert system. If the operator attempts to lift a load exceeding the rated capacity of the crane, the winch lift, extension out and lower boom down functions will not operate. To relieve the situation, the winch may be lowered or the extension boom retracted.

1-7. WINCH

The winch is powered by means of a hydraulic motor driving a 27:1 worm gear arrangement with a mechanical brake. Maximum single line lifting capacity of the winch, achieved on the second layer of wire rope, is 5500 lbs (2495 kgs). Maximum two-part line winch capacity is 10,400 lbs (4717 kgs). The winch is equipped with 100 ft. (30.5 m) 7/16 in. (1.1 cm) 6 x 25 FW PRF RRL IWRC XIPS wire rope. Nylon sheaves are located at the tip of the extension boom. The ratio of winch drum and sheave pitch diameter to wire rope diameter is 18.7:1 for the winch drum and 18:1 for the load block and boom tip sheave. An anti-two block device is included to prevent the lower block or hook assembly from coming in contact with the boom sheave assembly.

SINGLE LINE SPEED
1st Layer - 25 ft/min
2nd Layer - 27 ft/min
3rd Layer - 30 ft/min

1-8. HYDRAULIC SYSTEM

The hydraulic system is an open center, full pressure system requiring maximum flow of 10 GPM (38 liters/min.) at 3000 psi (207 bar). It is equipped with a four section, electric remote, stack type control valve with a 30 ft. (9.14 m) control cable. The system includes a seperate hydraulic oil reservoir, suction line filter, return line filter and control valve.

1-9. MINIMUM CHASSIS SPECIFICATIONS

BODY STYLE	Conventional Cab	Conventional Cab
WHEEL BASE	154"	391cm
CAB TO AXLE	84"	213cm
FRAME SECTION MODULUS	$12"^3$	196.7cc
RBM	600,000 in-lbs	6913 kg-meter
FRONT AXLE RATING	7000 lbs	3175 kg
REAR AXLE RATING	17500 lbs	7938 kg
GROSS VEHICLE RATING	24500 lbs	11113 kg
TRANSMISSION	5 speed	5 speed

In addition to these specifications, heavy duty electrical and cooling systems are required. It is recommended that the vehicle be equipped with an engine tachometer, auxiliary brake lock, and power steering.

IMT reserves the right to change specifications or designs without notice.

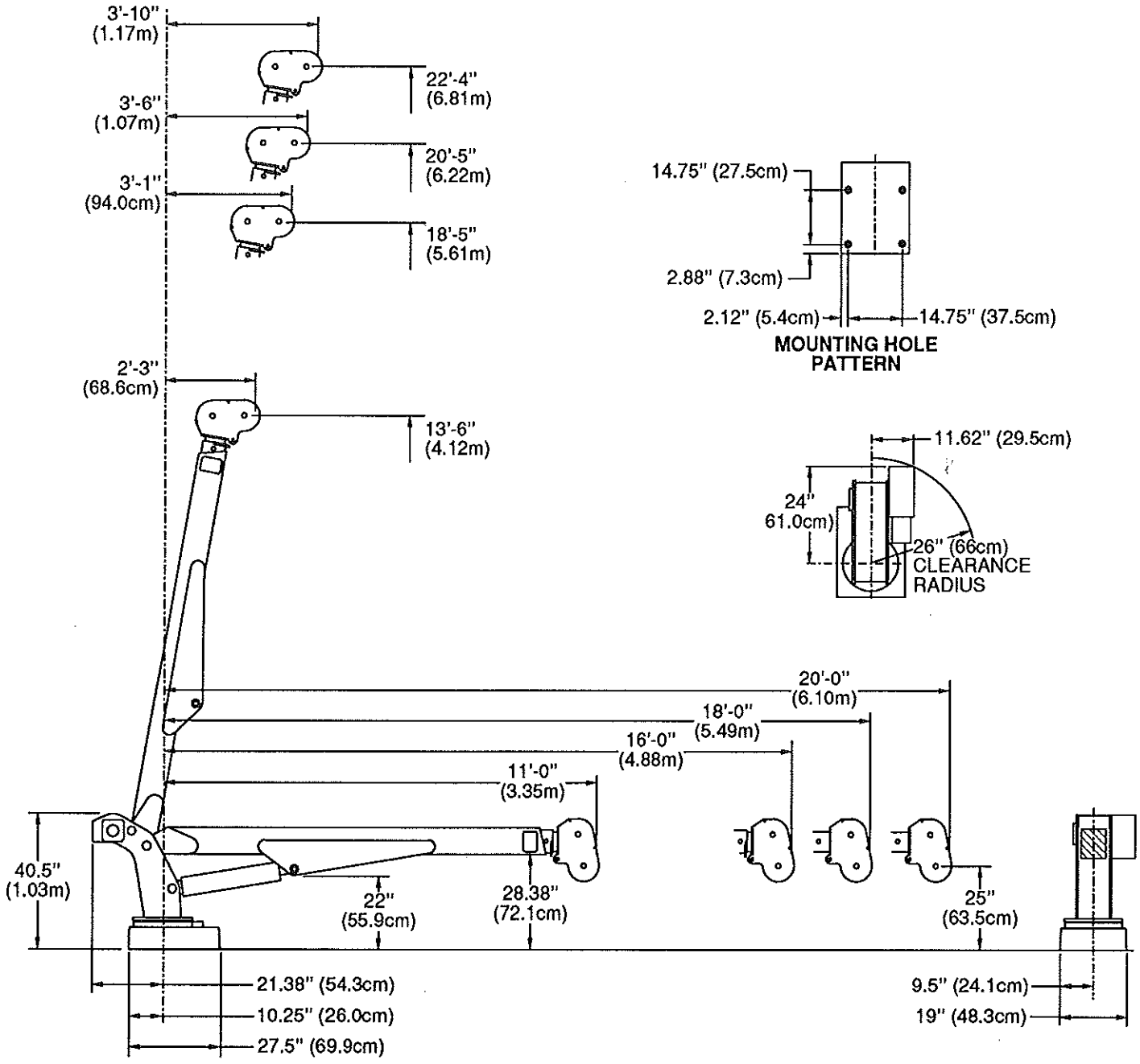


Figure A-1. GEOMETRIC CONFIGURATION

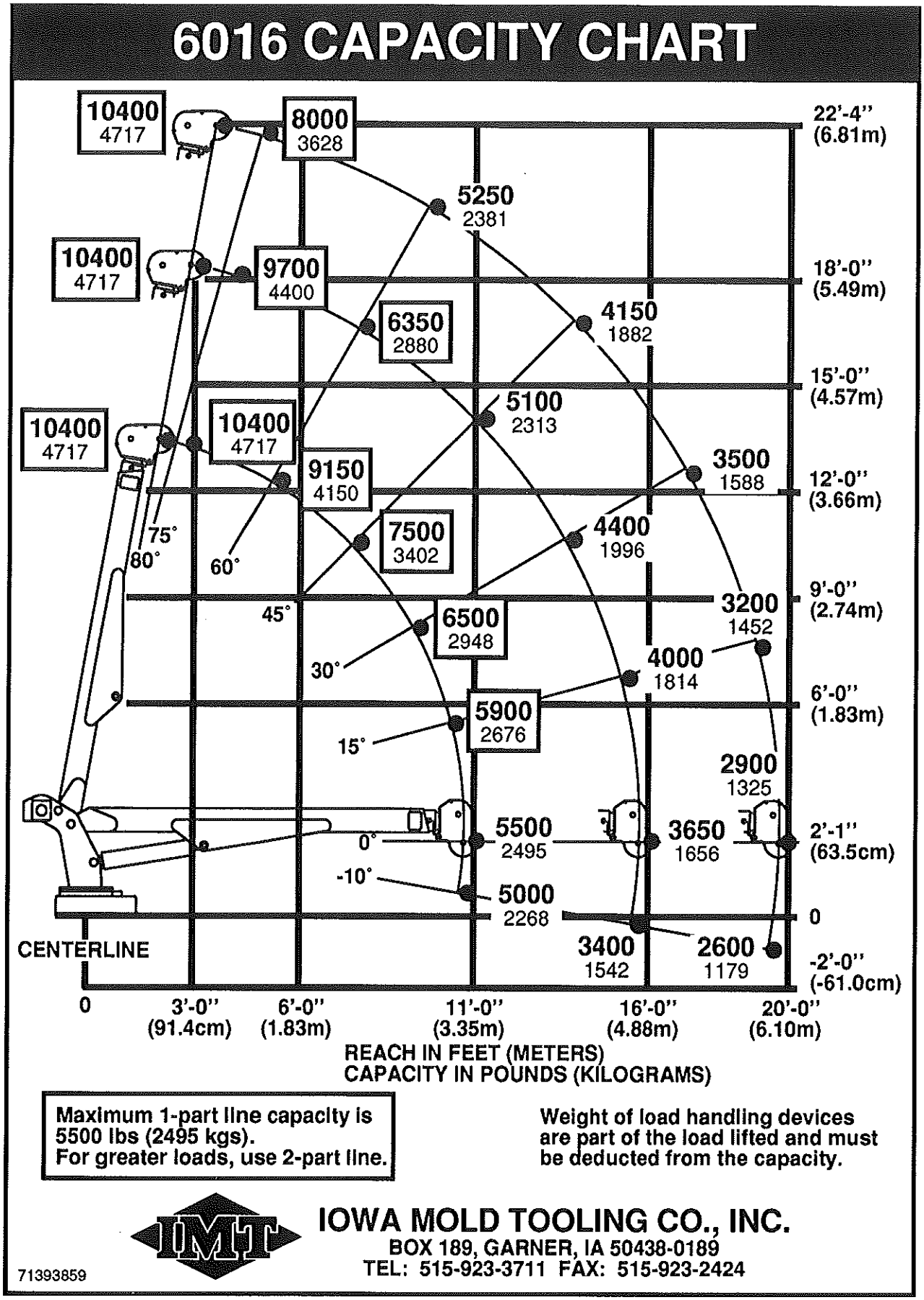


Figure A-2. 6016-1H & 6016-1H1M CAPACITY CHART

Section 2. CRANE DESCRIPTION

2-1. GENERAL
The 6016 Crane is designed primarily for use as a mechanics crane. This section describes the major assemblies on this crane and Figure B-1. illustrates their locations.

2-2. BASE
The base provides the means for mounting the crane to the truck chassis. It incorporates a 450° (7.85 Rad.) rotation mechanism.

2-3. MAST
The mast provides necessary elevation for crane operation, as well as a hinge point for the lower boom. It houses the 43:1 ring-and-pinion type spur gear train.

2-4. LOWER BOOM
The lower boom will swing through a full 90° (1.57 Rad.), from -10° to +80° (-0.17 to +1.40 Rad). It is raised and lowered through the use of a double acting hydraulic cylinder.

2-5. EXTENSION BOOM
The single stage extension boom increases the operating range from 11'-0'' (3.35m) to 16'-0'' (4.88m). The two stage extension boom (one hydraulic stage, one manual stage) increases the operating range from 11'-0'' (3.35Rad.) to 20'-0'' (6.10m).

2-6. CONTROLS
The crane is operated remotely with a four function remote control unit on a 30 foot (9.14m) cable. In an overload condition, the winch up and extension out functions are inoperative. Those funtions can be reversed to eliminate the overload condition.

2-7. HYDRAULICS
The crane hydraulic system consists of a control valve, reservoir, filters, pressure and return hoses, and all necessary fittings.

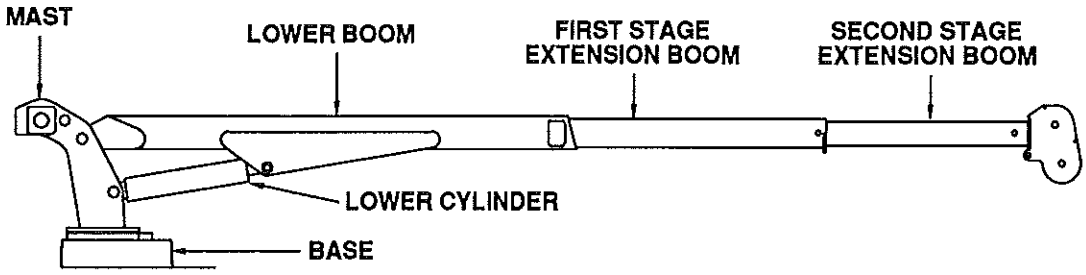


Figure B-1. 6016 CRANE GROUP

INSTALLATION

GENERAL

This section contains specific instructions for the installation of your crane. Prior to installing the crane and hydraulic components, make sure that the chassis is ready to receive the crane (refer to Section 5, Volume 1). Reinforce the chassis frame, as necessary, and install the PTO and pump.

Each installation may vary in components used. It is important to use hoses of proper length, pumps of correct size, and PTO's of adequate speed.

CRANE INSTALLATION

In addition to meeting Minimum Chassis Specifications in Section 1, there must be sufficient room for mounting the crane and the platform must be strong enough to support the crane and rated load. Install the 6016 crane only on an IMT designed and approved truck body. The body must be designed to sustain the forces imposed by the crane when lifting the full rated load. In addition, an IMT designed body is designed to take full advantage of the standard reservoir placement. This reservoir is installed in the cargo area of the body. Before attempting to install the crane, the body must be installed.

To install the crane:

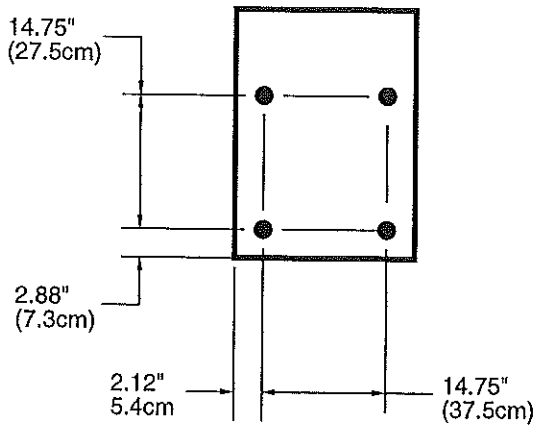
1. Use a lifting device capable of lifting the weight of the crane, 1,915 lbs. (869kg.). Attach the lifting device to the lift brackets of the crane. The lift brackets are located on both sides of the lower boom, approximately 30 inches from the mast hinge. Lift the crane, apply a bead of waterproof compound, such as silicon based caulk, to the bottom of the base. Move the chassis under the crane and lower the crane into the desired position.

2. Install the mounting tie rods, washers, and nuts to secure the crane base to the truck body (see Figure below).

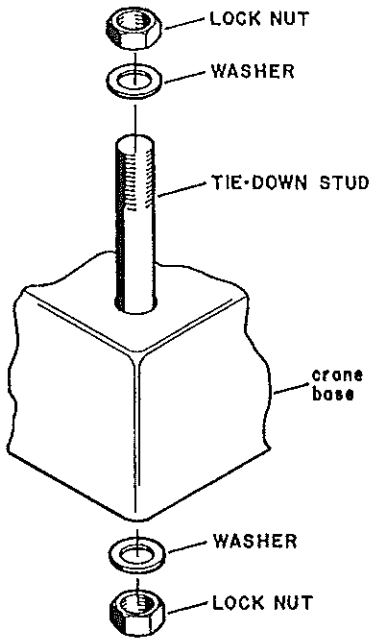
CAUTION

Do not attempt to apply the same torque to the self locking nuts and tie rods as shown in the Torque Data Chart. Do not exceed 200 ft- lbs. Exceeding the stated torque of 200 ft- lbs. (28 kg-m) may damage either the crane base or the body.

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



MOUNTING HOLE PATTERN

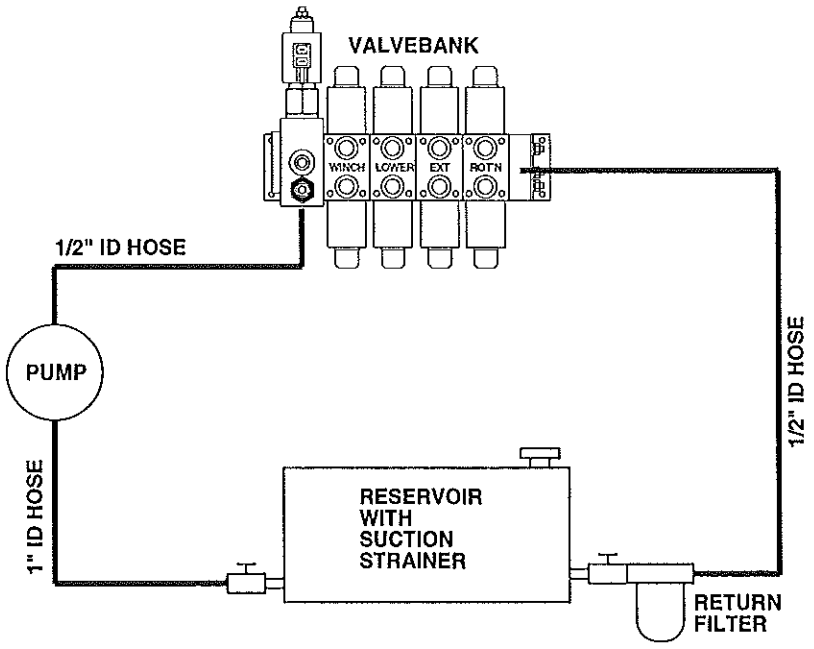


CRANE INSTALLATION

HYDRAULIC INSTALLATION

Before installation, see installation kit drawing in the parts section for specific hydraulic components.

1. Install the gate valve to the suction port, and the return filter to the return port of the standard reservoir with a 1-1/4 to 3/4" reducer bushing, 3/4" pipe nipples and 3/4" gate valve.
2. Install the 1" diameter hose between the pump and the suction filter, using barbed nipples and hose clamps. See figure below.
3. Install the 1/2" diameter hose between the pump and the valve bank inlet section.
4. Install the 1/2" diameter hose between the valve bank outlet section and the reservoir.
5. Fill the hydraulic reservoir (refer to Volume 1 for hydraulic oil specifications).
6. Check all connections for leaks.
7. Start the vehicle engine and test each crane function individually. Conduct a visual inspection to make certain that there are no leaks and that everything is operating properly.
8. Check the oil level in the reservoir and add oil if necessary.



HYDRAULIC INSTALLATION

Section 4. PARTS LIST

4-1. GENERAL

This section contains the exploded parts drawings and accompanying parts lists 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, refer to the appropriate manual, or consult your IMT sales reprsentative.

WARNING

DO NOT ATTEMPT TO REPAIR ANY COMPONENT WITHOUT READING THE INFORMATION CONTAINED IN THE REPAIR SECTION IN VOLUME 1. PAY PARTICULAR ATTENTION TO STATEMENTS MARKED WARNING, CAUTION, OR NOTE IN THAT SECTION. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE EQUIPMENT, PERSONAL INJURY, OR DEATH.

4-2. CRANE IDENTIFICATION

Every IMT crane has an identification placard (Figure D-1) attached to the mast or to one of the booms in a prominent location. When ordering parts, communicating warranty information, or referring to the unit in correspondence, always include the serial number and model number. All inquiries should be directed to:

Iowa Mold Tooling Co., Inc.
Box 189, Garner, IA 50438-0189
Telephone: 515-923-3711
Product Support Fax: 515-923-3674

or

IMT Cranes Canada, Ltd.
385 West Street South
Orillia, Ontario, L3V 5H2, Canada
Telephone: 705-325-7458
Fax: 705-325-7624

4-3. CYLINDER IDENTIFICATION

To insure that the proper cylinder replacement parts are recieved, it is necessary to specify the complete number/letter sequence for any part requested. Part numbers must be verified by checking the number stamped on the cylinder case (Figure D-2) against the information included in the service manual. You must include the part number stamped on the cylinder case when ordering parts.

4-4. WELDMENT IDENTIFICATION

Each of the major weldments, base, mast, lower boom, extension boom, and outriggers, have a part number stamped on them. Any time one of the weldments is to be replaced, it is necessary to specify the complete part number as stamped on that weldment. The location of the part numbers are shown in Figure D-3.

4-5. ORDERING REPAIR PARTS

When ordering replacement parts it is important to follow the steps as outlined below.

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.

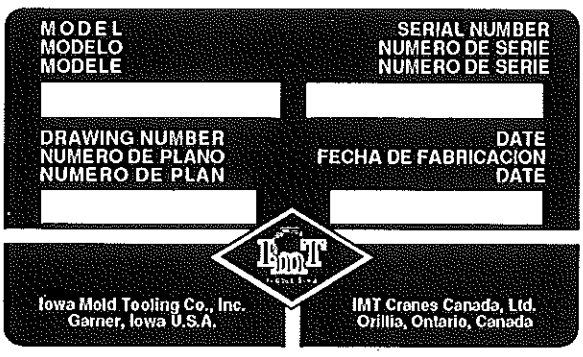


Figure D-1. SERIAL NUMBER PLACARD

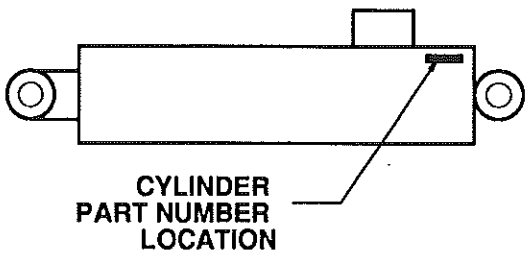


Figure D-2. CYLINDER PART NUMBER LOCATION

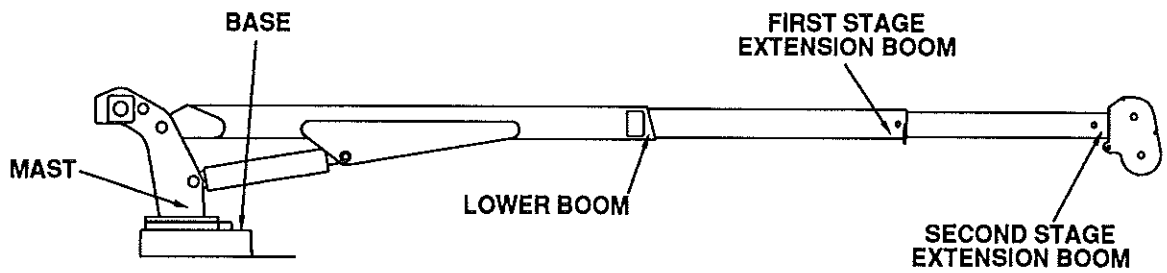
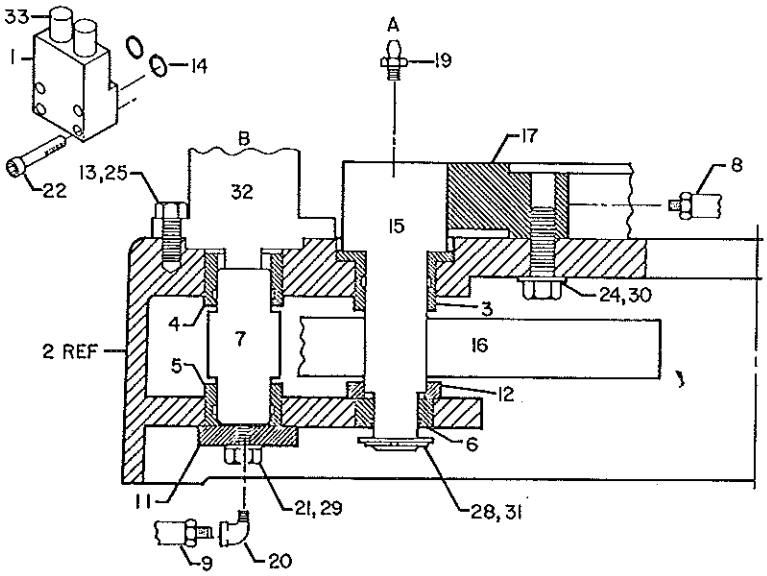
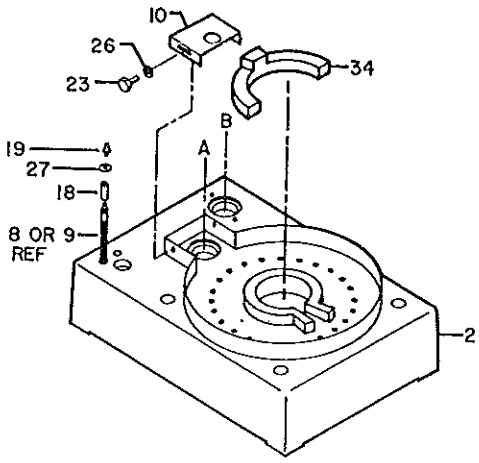


Figure D-3. WELDMENT PART NUMBER LOCATION



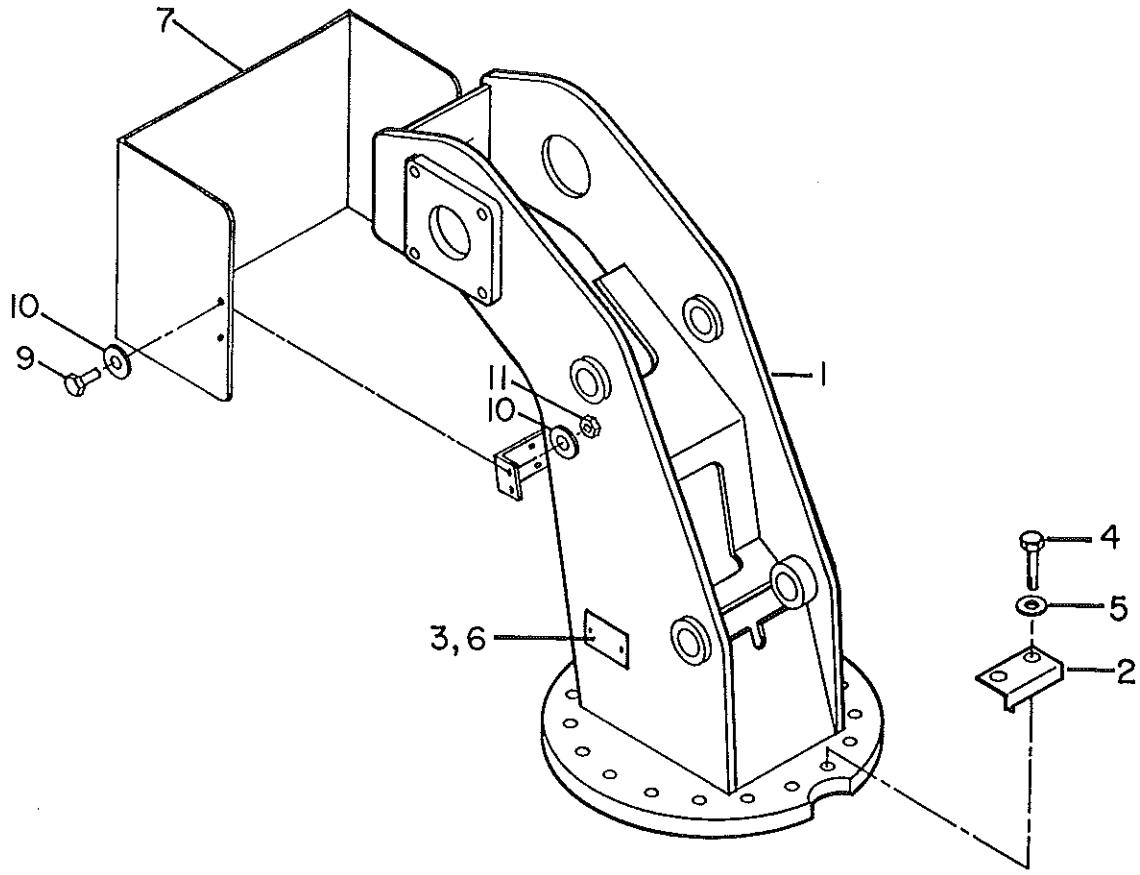
ITEM	PART NO.	DESCRIPTION	QTY
1.	5V151830	MOTOR BLOCK	1
2.	52707658	BASE (INCL: 3 - 7)	1
3.	60020114	BUSHING (PART OF 2)	1REF
4.	60020115	BUSHING (PART OF 2)	1REF
5.	60020116	BUSHING (PART OF 2)	1REF
6.	60020154	BUSHING (PART OF 2)	1REF
7.	71056011	DRIVE GEAR (PART OF 2)	1REF
8.	53000704	GREASE EXTENSION 34"	1
9.	53000715	GREASE EXTENSION 18"	1
10.	60010235	PINION GEAR COVER	1
11.	60010844	GREASE PLATE	1
12.	60104694	SPACER	1
13.	60106032	STUD 1/2-13 X 2	2
14.	7Q072112	O-RING	2
15.	71056010	PINION GEAR	1
16.	71056012	INTERMEDIATE GEAR	1
17.	71056389	TURNTABLE BEARING	1
18.	72053301	COUPLING 1/8NPT	2
19.	72053508	GREASE ZERK 1/8NPT	3
20.	72053589	STREET ELBOW 1/8NPT 90°	1
21.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	2
22.	72060738	CAP SCR 5/16-18X2-1/2 SH	4
23.	72060833	SCR 5/16-18X3/4 HHSLFTPG	2
24.	72060931	CAP SCR 5/8-11X2-3/4 HHGR8	24
25.	72062080	NUT 1/2-13 LOCK	2
26.	72063002	WASHER 5/16 WRT	2
27.	72063003	WASHER 3/8 WRT	2
28.	72063035	MACH BUSHING 1-1/4 X 10GA	1
29.	72063053	WASHER 1/2 LOCK	2
30.	72063119	WASHER 5/8 FLAT HARD GR8	24
31.	72066084	RETAINING RING 1-1/4 STD EXT	1
32.	73051004	HYDRAULIC MOTOR	1
33.	73054538	CARTRIDGE - C'BAL VALVE	2
34.	71143519	ROTATION SLIDE - 450°	1



WARNING

ANY TIME THE GEAR-BEARING BOLTS HAVE BEEN REMOVED, THEY MUST BE REPLACED WITH NEW BOLTS OF IDENTICAL GRADE AND SIZE. FAILURE TO REPLACE GEAR-BEARING BOLTS MAY RESULT IN BOLT FAILURE DUE TO METAL FATIGUE CAUSING SERIOUS INJURY OR DEATH.

Figure D-4. BASE ASSEMBLY (41707659)

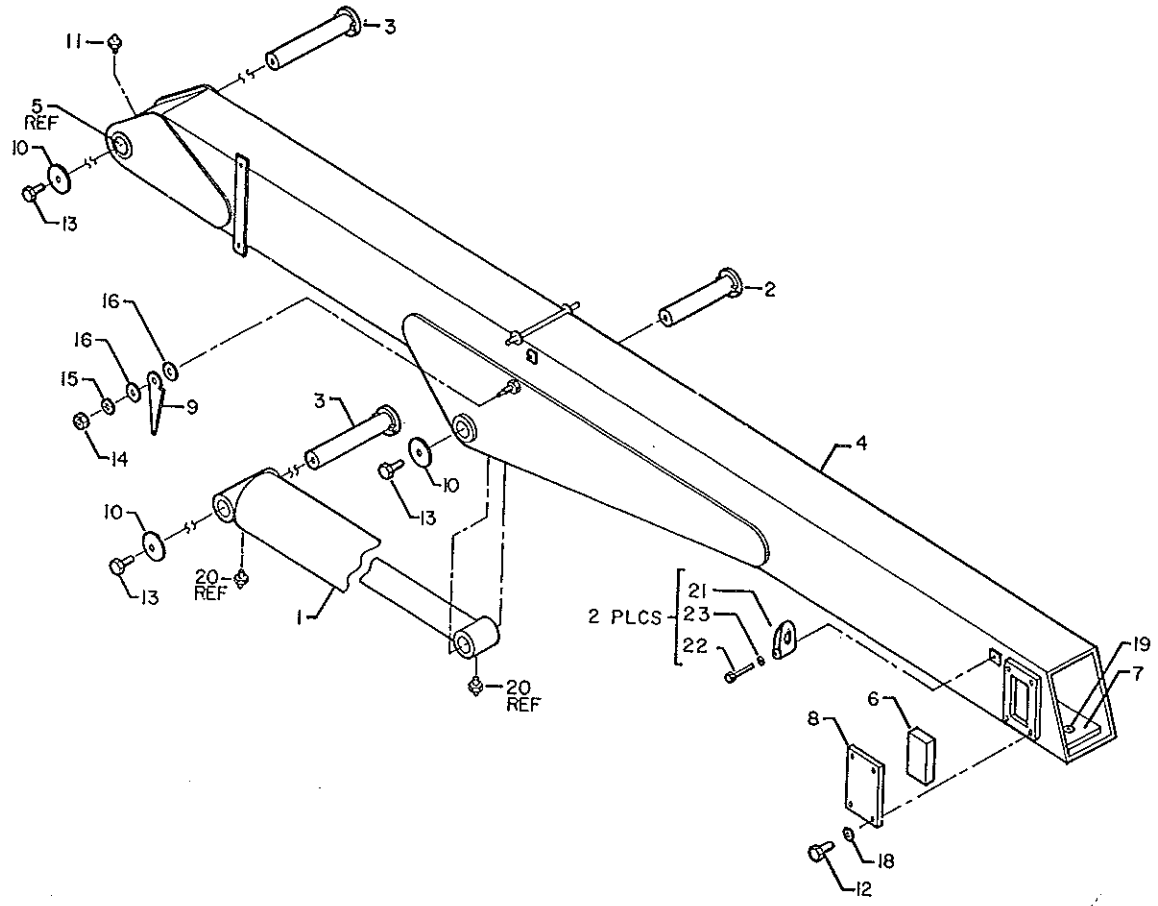


ITEM	PART NO.	DESCRIPTION	QTY
1.	52712157	MAST	1
2.	60104540	PINION COVER	1
3.	70029119	SERIAL NUMBER PLACARD	1
4.	72060931	CAP SCR 5/8-11X2-3/4 HHGR8	18
5.	72063119	WASHER 5/8 FLAT HARD GR8	18
6.	72066340	POP RIVET 1/8	2
7.	60119127	COVER	1
9.	72060004	CAP SCR 1/4-20X1 HHGR5	4
10.	72063001	WASHER 1/4 WRT	8
11.	72062104	NUT 1/4-20 LOCK	4

WARNING

ANYTIME THE GEAR-BEARING BOLTS HAVE BEEN REMOVED, THEY MUST BE REPLACED WITH NEW BOLTS OF IDENTICAL GRADE AND SIZE. FAILURE TO REPLACE GEAR-BEARING BOLTS MAY RESULT IN BOLT FAILURE DUE TO METAL FATIGUE, CAUSING SERIOUS INJURY OR DEATH.

Figure D-5. MAST ASSEMBLY (41712184)

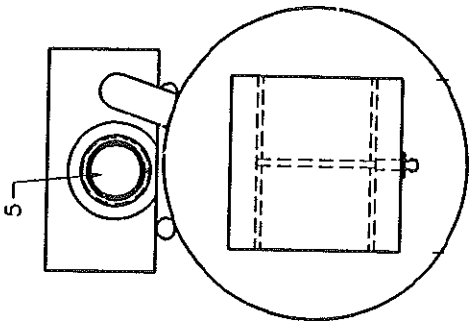


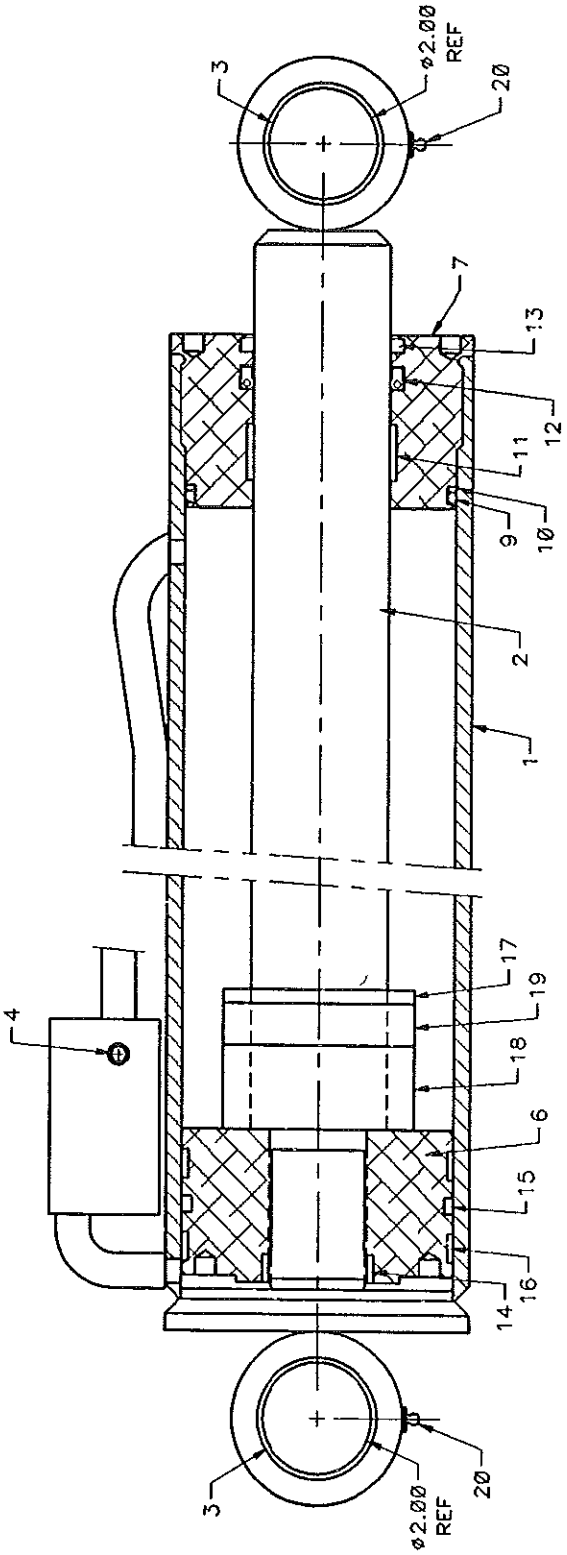
ITEM	PARR NO.	DESCRIPTION	QTY
1.	3C038940	CYLINDER (INCL. 20)	1
2.	52703748	PIN	1
3.	52703747	PIN	2
4.	52712159	LOWER BOOM (INCL: 5)	1
5.	7BF81520	BUSHING (PART OF 4)	4REF
6.	60030015	WEAR PAD	2
7.	60030139	WEAR PAD	1
8.	60103463	RETAINER PLATE	2
9.	60105544	ANGLE INDICATOR	2
10.	60106331	PIN RETAINER PLATE 3-1/2"	3
11.	72053508	GREASE ZERK 1/8 NPT	1
12.	72060023	CAP SCR 5/16-18X3/4 HHGR5	8
13.	72060147	CAP SCR 5/8-11X1 HHGR5	3
14.	72062103	NUT 3/8-16 LOCK	2
15.	72063003	WASHER 3/8 WRT	2
16.	72063005	WASHER 1/2 WRT	4
18.	72063050	WASHER 5/16 LOCK	8
19.	72601043	CAP SCR 3/8-16X3/4 FLH SOC	2
20.	72053507	GREASE ZERK 1/4-28 (PART OF 1)	2REF
21.	70034381	CORD GUIDE	2
22.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
23.	72063049	WASHER 1/4 LOCK	2

NOTE

ANY TIME THE PIN RETAINER PLATE BOLTS HAVE BEEN REMOVED, APPLY LOCTITE 262 TO THE THREADS BEFORE REASSEMBLY.

Figure D-6. LOWER BOOM ASSEMBLY (41712180)





NOTE

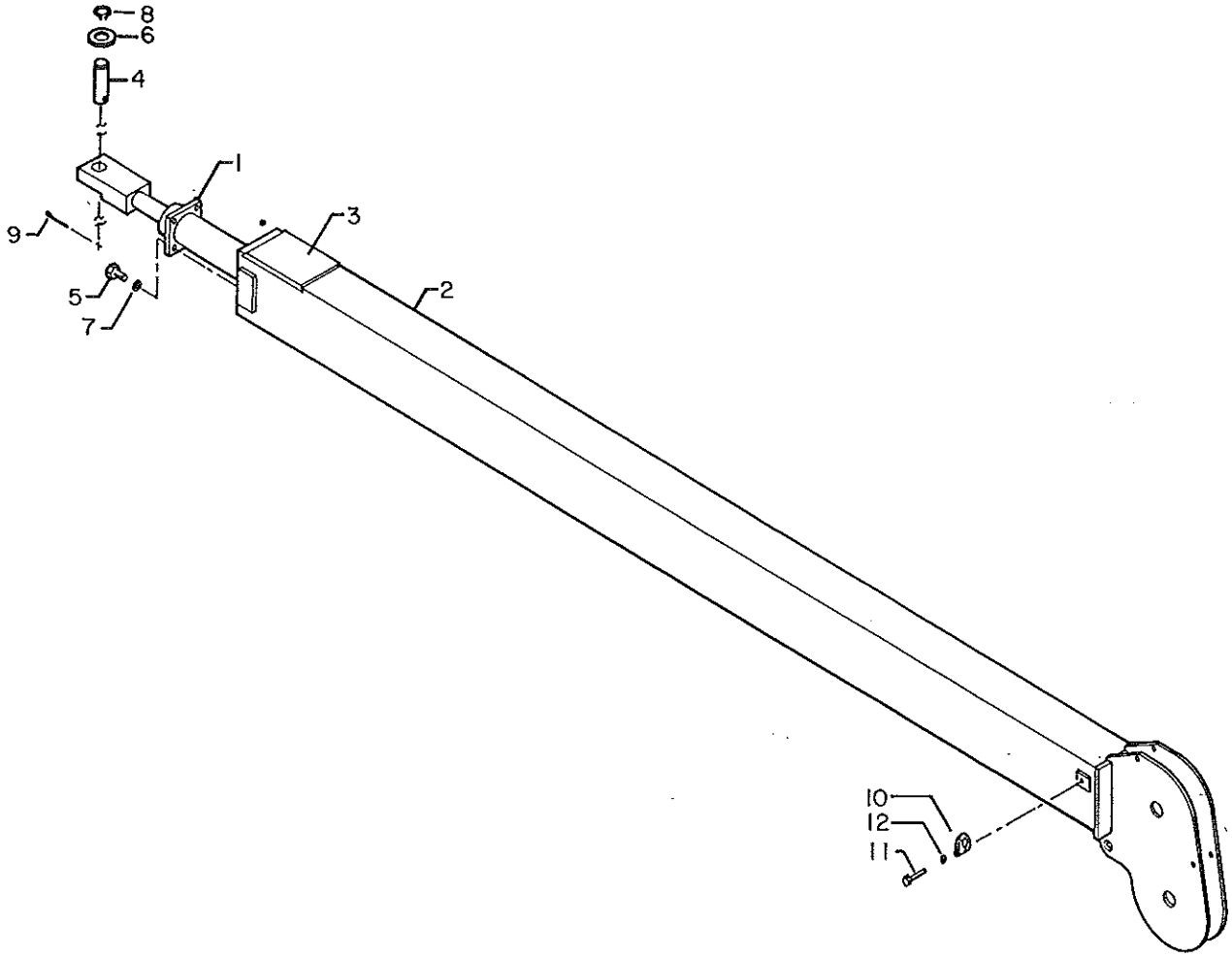
IT IS RECOMMENDED THAT ALL COMPONENTS OF THE SEAL KIT BE REPLACED WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.

APPLY "LUBRIPLATE #630-2" MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

APPLY "NEVER-SEEZ" REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO CYLINDER HEAD AND CASE THREADS.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4C038940	CASE ASM (INCL: 3,4,20)	1
2.	4G038940	ROD ASM (INCL: 3,20)	1
3.	7BF81520	BUSHING (PART OF 1 & 2)	6REF
4.	7PNPXT02	PLUG 1/8NPT (PART OF 1)	3REF
5.	73054242	COUNTERBALANCE VALVE 25GPM	1
6.	6I503181	PISTON	1
7.	6H050025	HEAD	1
8.	9B043920	SEAL KIT (INCL: 9-17)	1
9.	7Q072350	O-RING (PART OF 8)	1REF
10.	7Q10P350	BACKUP RING (PART OF 8)	1REF
11.	7T2N8027	WEAR RING (PART OF 8)	1REF
12.	7R546025	U-CUP (PART OF 8)	1REF
13.	7R14P025	ROD WIPER (PART OF 8)	1REF
14.	7T61N181	LOCK RING (PART OF 8)	1REF
15.	7T66P500	PISTON SEAL (PART OF 8)	1REF
16.	7T2N4050	WEAR RING (PART OF 8)	2REF
17.	6A025025	WAFER LOCK (PART OF 8)	1REF
18.	6C150025	STOP TUBE	1
19.	6C075025	STOP TUBE	1
20.	72053507	GREASE ZERK (PART OF 1 & 2)	2REF

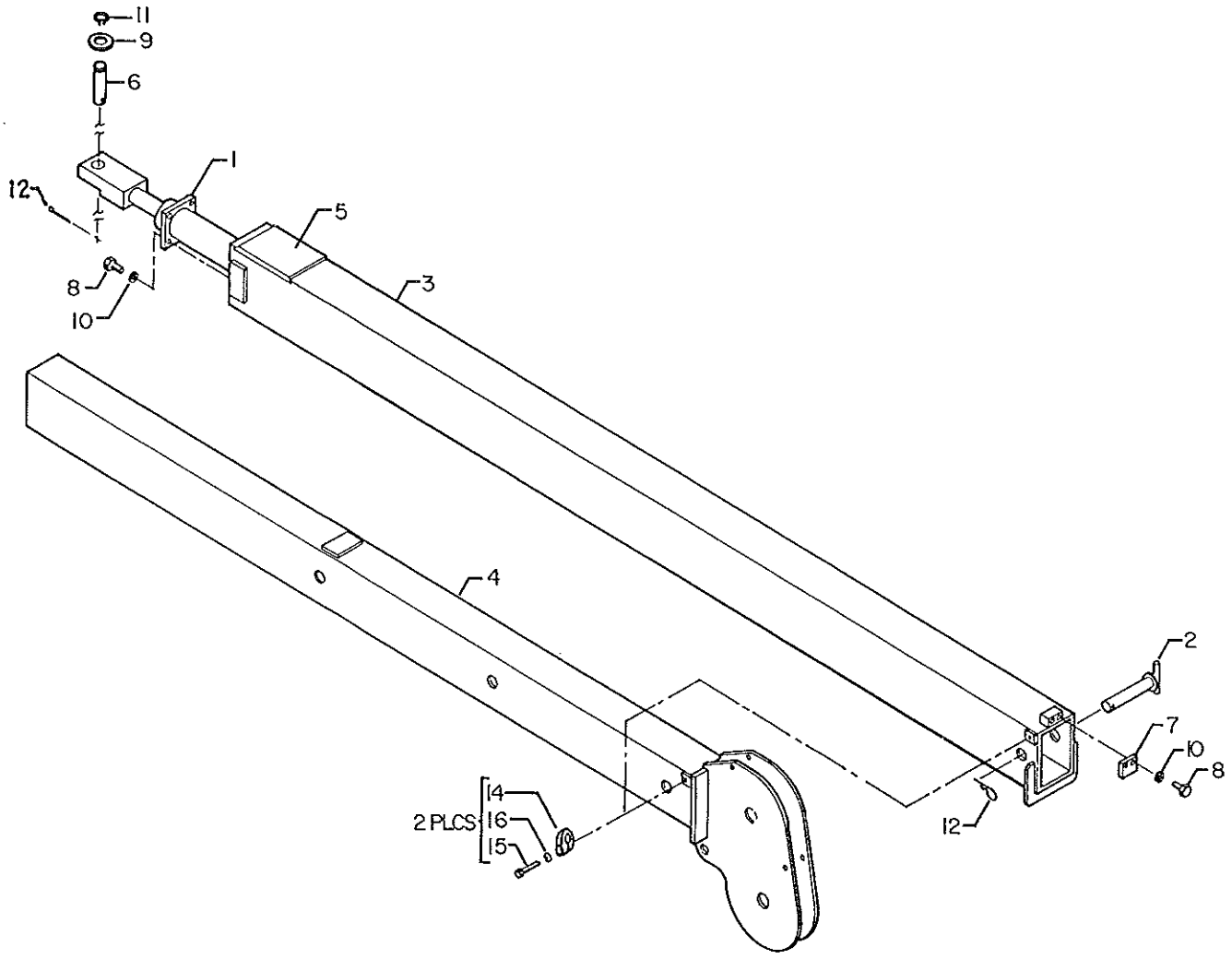
Figure D-7. LOWER BOOM CYLINDER (3C038940)



ITEM	PART NO.	DESCRIPTION	QTY
1.	3B309820	EXTENSION CYLINDER	1
2.	52707725	EXTENSION BOOM	1
3.	60030189	WEAR PAD	1
4.	60101905	PIN	1
5.	72060092	CAP SCREW 1/2-13 X 1-1/4 HH GR5	4
6.	72063034	MACH BUSHING 1 X 10GA	1
7.	72063053	WASHER 1/2 LOCK	4
8.	72066125	RETAINING RING 1" HD EXT	1
9.	72066145	HAIR PIN .19	1
10.	70034381	CORD GUIDE	1
11.	72060006	CAP SCREW 1/4 X 1-1/2 HH GR5	1
12.	72063049	WASHER 1/4 LOCK	1

NOTE:
CORD GUIDE (70034381) SHOULD BE INSTALLED WITH GUIDE HOLE UP.

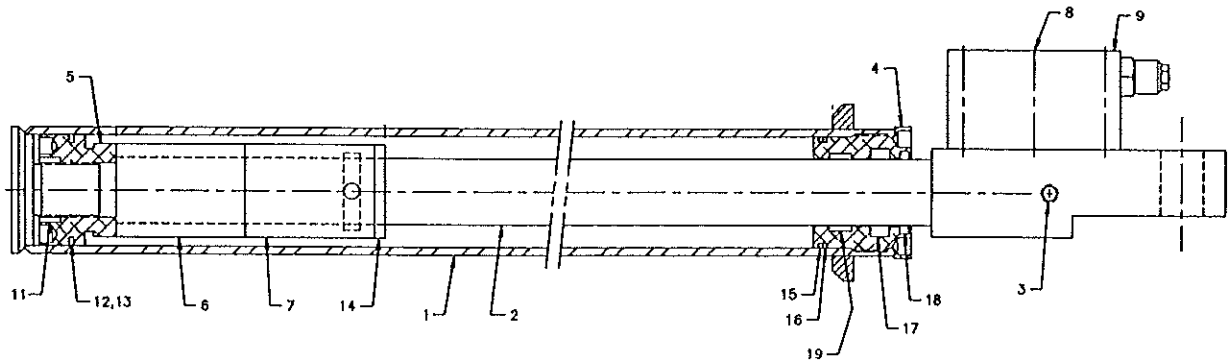
Figure D-8. EXTENSION BOOM ASSEMBLY 16' (41707662)



ITEM	PART NO.	DESCRIPTION	QTY
1.	3B309820	EXTENSION CYLINDER	1
2.	52070152	PIN	1
3.	52707723	1ST STAGE EXT BOOM	1
4.	52707724	2ND STAGE EXT BOOM	1
5.	60030189	WEAR PAD	1
6.	60101905	PIN	1
7.	60107294	STROKE STOP PLATE	1
8.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	6
9.	72063034	MACH BUSHING 1X10GA	1
10.	72063053	WASHER 1/2 LOCK	6
11.	72066125	RETAINING RING 1 HD EXT	1
12.	72066145	HAIR PIN .19	2
14.	70034381	CORD GUIDE	2
15.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
16.	72063049	WASHER 1/4 LOCK	2

NOTE:
CORD GUIDE (70034381) SHOULD BE INSTALLED WITH GUIDE HOLE UP.

Figure D-9. EXTENSION BOOM ASSEMBLY 20' (41707663)



NOTE

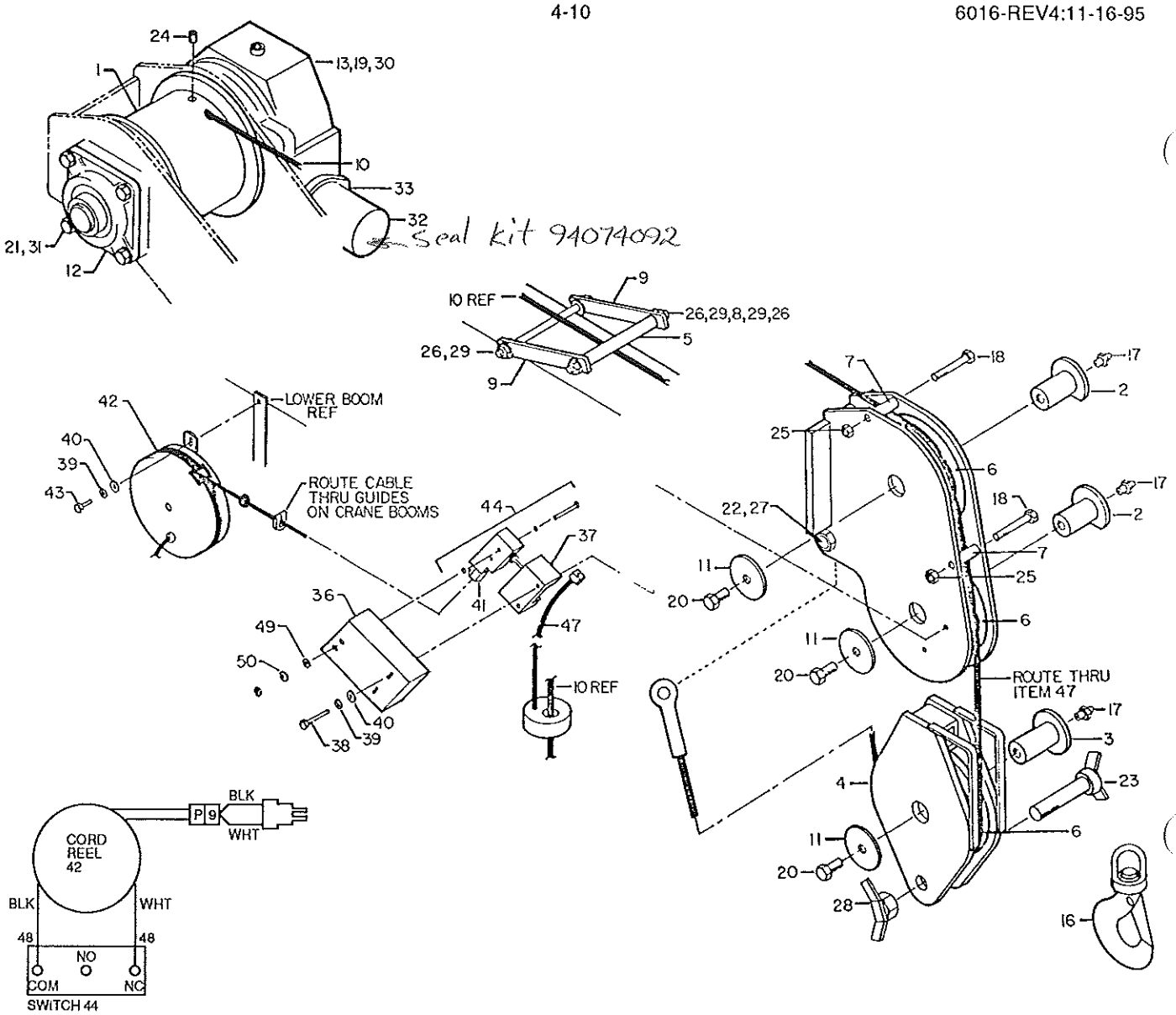
IT IS RECOMMENDED THAT ALL COMPONENTS OF THE SEAL KIT BE REPLACED WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.

APPLY "LUBRIPLATE #630-2" MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

APPLY "NEVER-SEEZ" REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO CYLINDER HEAD AND CASE THREADS.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B309820	CASE ASM (INCL:3)	1
2.	4H309820	ROD ASM	1
3.	7PNPXT02	PIPE PLUG 1/8NPT (PART OF 1)	3REF
4.	6H025015	HEAD	1
5.	6IX02512	PISTON	1
6.	6C300015	STOP TUBE	1
7.	6C309820	STOP TUBE	1
8.	72060713	CAP SCR 1/4-20X2-1/2 SH	6
9.	73054900	HOLDING VALVE	1
10.	9B101220	SEAL KIT (INCL:11-19)	1
11.	7T61N125	LOCK RING (PART OF 10)	1REF
12.	7T66P025	PISTON SEAL (PART OF 10)	1REF
13.	7Q072137	O-RING (PART OF 10)	1REF
14.	6A025015	WAFER LOCK (PART OF 10)	1REF
15.	7Q072228	O-RING (PART OF 10)	1REF
16.	7Q10P228	BACKUP RING (PART OF 10)	1REF
17.	7R546015	U-CUP (PART OF 10)	1REF
18.	7R14P015	ROD WIPER (PART OF 10)	1REF
19.	7T2N8015	WEAR RING (PART OF 10)	1REF

Figure D-10. EXTENSION CYLINDER (3B309820)



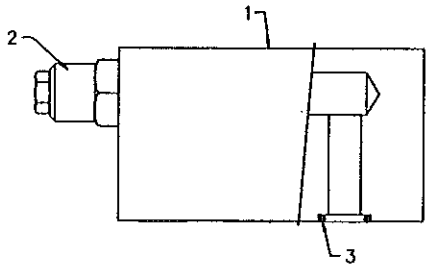
ITEM	PART NO.	DESCRIPTION	QTY
1.	52712162	WINCH DRUM	1
2.	52707730	PIN	2
3.	52707731	PIN	1
4.	52707735	SNATCH BLOCK	1
5.	60030108	ROLLER - CABLE GUIDE	1
6.	60030255	SHEAVE	3
7.	60102596	SPACER	2
8.	60105538	STUD- CABLE GUIDE	1
9.	60105540	CABLE GUIDE SIDE BAR	2
10.	70580089	CABLE 7/16 x 100' IWRC-XIP	1
11.	60109337	PIN RETAINER PLATE 3"	3
12.	70055117	BEARING, FLANGE	1
13.	70570198	WINCH	1
16.	70732882	SWIVEL HOOK W/LATCH	1
17.	72053508	ZERK 1/8 NPT	3
18.	72060893	CAP SCR 3/8-16X3-1/4 HHGR5	2
19.	72060921	CAP SCR 1/2-13X3-3/4 HHGR5	4
20.	72060147	CAP SCR 5/8-11X1 HHGR5	3
21.	72060148	CAP SCR 5/8-11X1-1/4 HHGR5	4
22.	72060217	CAP SCR 7/8-9X4 HHGR5	1
23.	52712181	PIN	1
24.	72060596	SET SCREW 1/2-13X3/4 SH	1
25.	72062103	NUT 3/8-16 LOCK	2
26.	72062080	NUT 1/2-13 LOCK	4
27.	72062120	NUT 7/8-9 LOCK	1
28.	52712183	RETAINER 3/4-10 HEX	1

ITEM	PART NO.	DESCRIPTION	QTY
29.	72063005	WASHER 1/2 WRT	4
30.	72063053	WASHER 1/2 LOCK	4
31.	72063055	WASHER 5/8 LOCK	4
32.	73051513	HYDRAULIC MOTOR	1
33.	72060064	CAP SCR 7/16-14X1-1/2 HHGR5	2
36.	60113593	COVER	1
37.	60113594	MOUNTING BLOCK	1
38.	72060008	CAP SCR 1/4-20X2 HHGR5	2
39.	72063049	WASHER 1/4 LOCK	4
40.	72063001	WASHER 1/4 FLAT	4
41.	77044468	STRAIN RELIEF	1
42.	51713168	CORD REEL	1
43.	72060000	CAP SCR 1/4-20X1/2 HHGR5	2
44.	77041291	SWITCH	1
45.	77040047	TERMINAL	1
46.	77040186	TERMINAL	1
47.	52709413	ANTI 2-BLOCK CABLE	1
48.	77040051	TERMINAL	2
49.	72063098	WASHER .16 FLAT	2
50.	72063047	WASHER #10 LOCK	2

NOTE

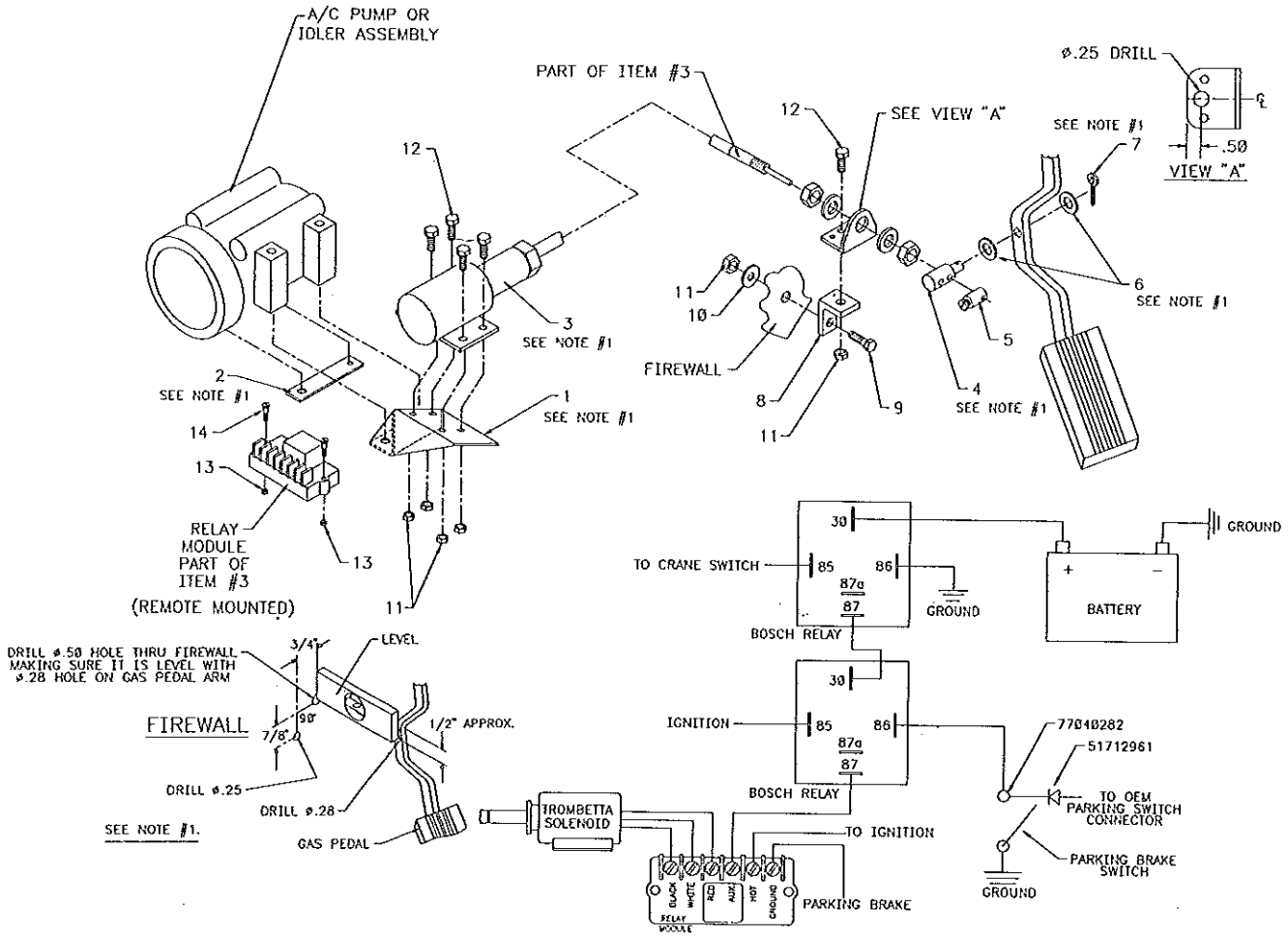
ANYTIME THE PIN RETAINER BOLTS HAVE BEEN REMOVED, APPLY LOCTITE 262 TO THE THREADS BEFORE REASSEMBLY.

Figure D-11. WINCH/CABLE/HOOK KIT - GEAR PRODUCTS WINCH (41712179)



ITEM	PART NO.	DESCRIPTION	QTY
1.	5V245940	VALVE BODY	1
2.	73054661	COUNTERBALANCE VALVE	1
3.	7Q072112	O-RING	3

Figure D-12. LOCKING HOLDING VALVE (73054900)

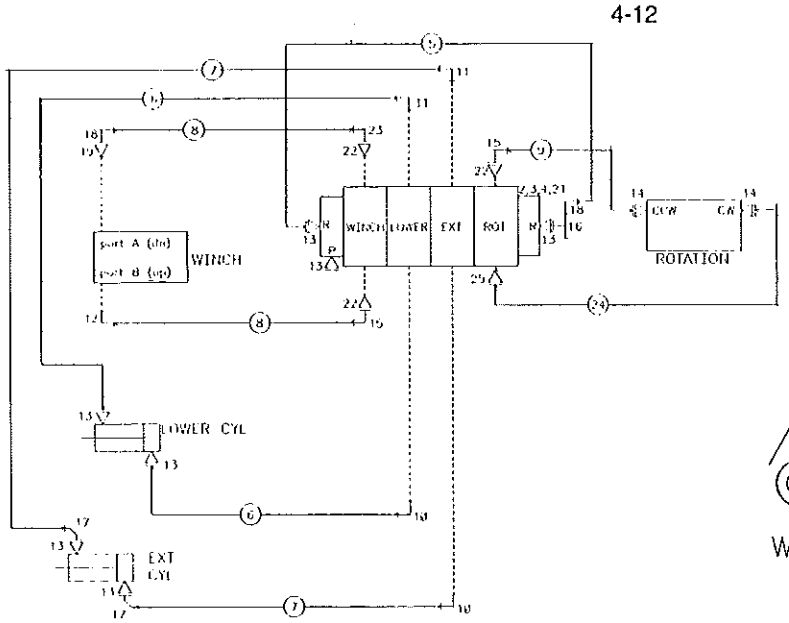


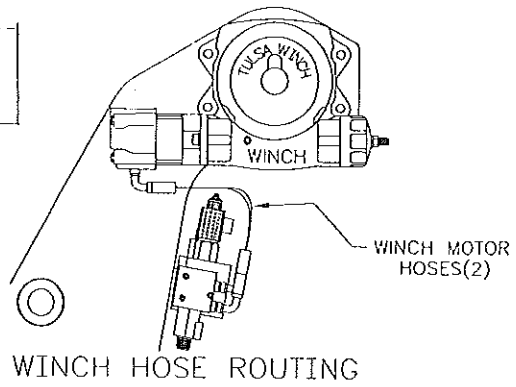
ITEM	PART NO.	DESCRIPTION	QTY
1.	52712864	*SPD CTRL BRACKET	1
2.	60118144	*SHIM-AC OR IDLER	1
3.	77041479	*SOLENOID W/CABLE	1
4.	60113812	*CONNECTOR	1
5.	72066377	CABLE STOP	1
6.	72063000	*WASHER 3/16 WRT	2
7.	72066168	*COTTER PIN 3/32X3/4	1
8.	60118524	LINKAGE BRACKET	1
9.	72060004	CAP SCR 1/4-20X1 HHGR5	1
10.	72063001	WASHER 1/4 WRT	1
11.	72062104	NUT 1/4-20 LOCK	6
12.	72060002	CAP SCR 1/4-20X3/4 HHGR5	5
13.	72062106	NUT #10-24 LOCK	2
14.	72060638	MACH SCR #10-24X1 RDHD	2
15.	77040051	TERMINAL #8 SPRSPD 16-14GA	8
16.	77040053	TERMINAL 1/4 RING 12-10GA	1
17.	77040052	TERMINAL 3/8 RING 12-10GA	1
18.	89044371	CABLE 14GA 3WIRE	40"
19.	77040048	BUTT CONNECTOR 16-14GA	3
20.	77040186	TERMINAL 1/4 FSLPON 16-14GA	4
21.	89044371	CABLE 14GA 3WIRE	20'
22.	89044232	WIRE 14GA RED	6'
23.	89044235	WIRE 14GA WHT	4'
24.	70394092	DECAL-BRK/CMPRSR (DASH)	1
25.	77041251	RELAY	2
26.	51712961	DIODE-BRK/CMPRSR	1
27.	77040282	TERMINAL PIGBAC 16-14GA 1/4	1
28.	99900817	INSTALLATION DRAWING	1

* NOTE 1. USED ONLY ON FORD 7.3L TURBO-DIESEL (DIRECT INJECTION) INSTALLATIONS.

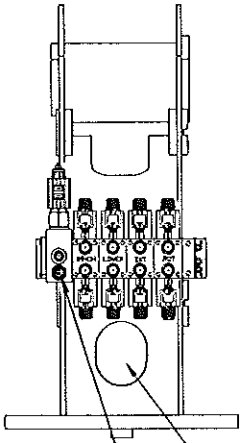
THIS KIT REPLACES 31705270, EFFECTIVE 12-05-94

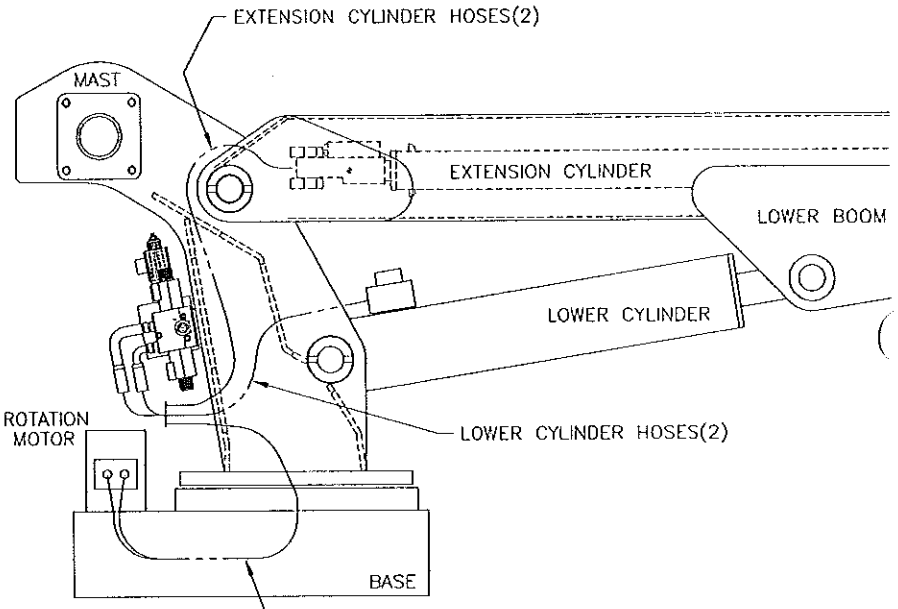
Figure D-12A. OPTION-THROTTLE CONTROL-TROMBETTA (31712707)





WINCH HOSE ROUTING

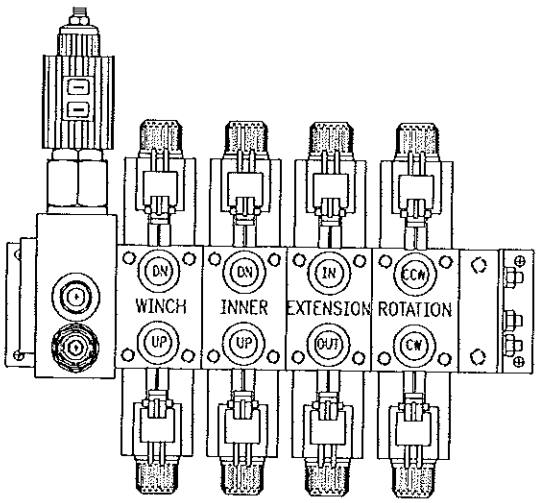




ALL HOSES EXCEPT WINCH HOSES ARE ROUTED THRU CENTER OF MAST

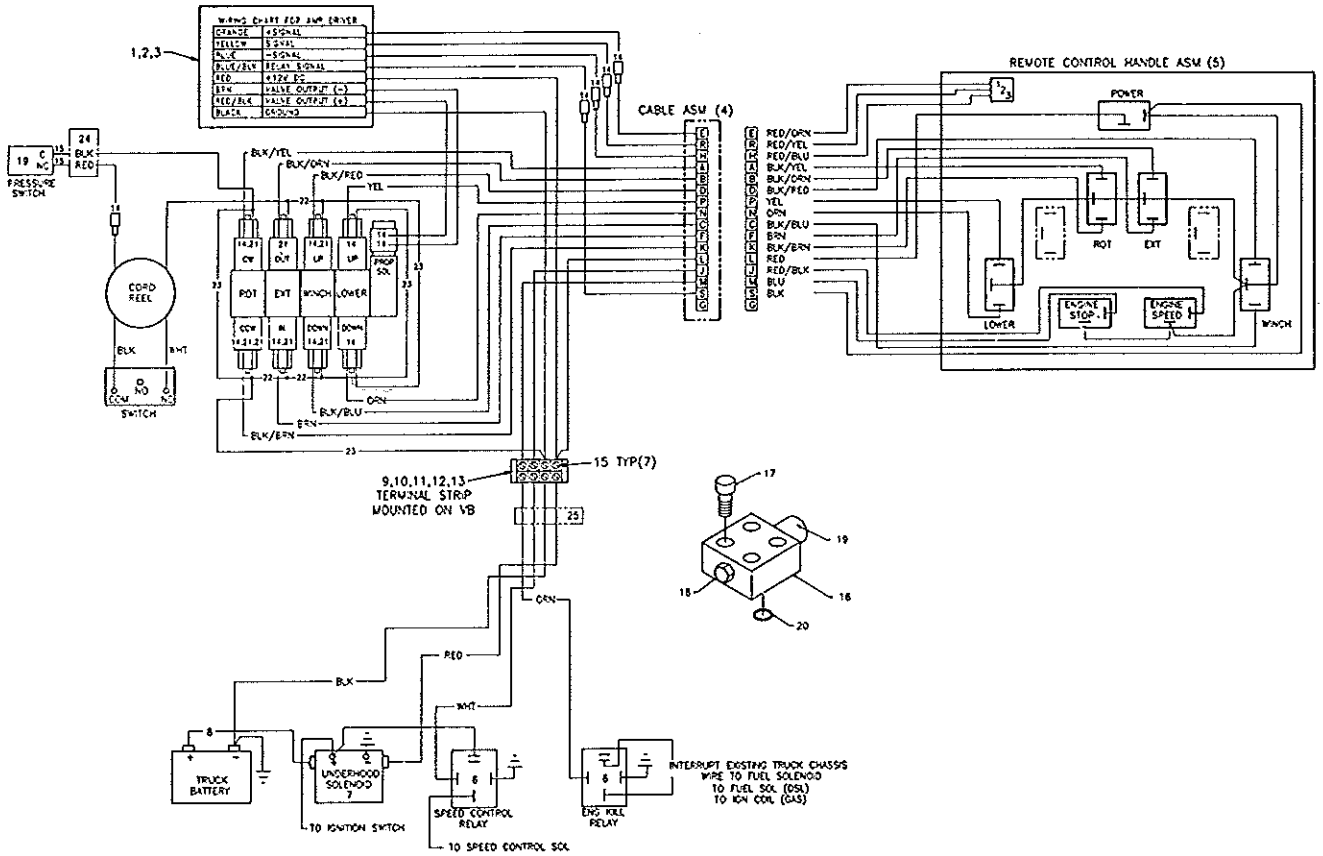
SET VALVE BANK SYSTEM PRESSURE AT 3000 PSI

ITEM	PART NO.	DESCRIPTION	QTY
1.	51713275	VALVEBANK 4-SECT FAUVER (INCL:10,11,13,15,16,21-23,25)	1
2.	72060005	CAP SCR 1/4-20X1-1/4 HHGR5	4
3.	72062104	NUT 1/4-20 LOCK	4
4.	72063001	WASHER 1/4 WRT	4
5.	51394212	HOSE ASM 1/2X15 FJ #8#8 (PART OF 20)	1REF
6.	51392462	HOSE ASM 3/8X27 FF #8#8 (PART OF 20)	2REF
7.	51394231	HOSE ASM 3/8X36FF #8#8(PART OF 20)	2REF
8.	51392464	HOSE ASM 3/8X23FF #6#8(PART OF 20)	2REF
9.	51394224	HOSE ASM 1/4X59FF #4#6(PART OF 20)	1REF
10.	72053763	ELBOW #8MSTR #8MJIC 90°(PART OF 1)	2REF
11.	72532666	ELBOW #8MSTR #8MJIC XLG(PART OF 1)	2REF
12.	72053764	ELBOW #10MSTR #8MJIC 90°	1
13.	72532358	ADAPTER #8MSTR #8MJIC (3 PART OF 1)	3REF
14.	72532351	ADAPTER #4MSTR #4MJIC	2
15.	72532700	ELBOW #6MSTR #6MJIC XLG (PART OF 1)	2REF
16.	72532671	TEE #8JIC SWVL NUT RUN(PART OF 1)	1REF
17.	72532670	ELBOW #8MJIC #8FJIC 45°	2
18.	72532658	ELBOW #8MJIC #8FJIC SWVL	2
19.	72532359	ADAPTER #10MSTR #8MJIC	1
20.	51713153	HOSE KIT (INCL:5-9,24)	1
21.	73733057	VALVEBANK (PART OF 1)	1REF
22.	72533052	ADAPTER #8MSTR #6FSTR(PART OF 1)	3REF
23.	72053760	ELBOW #6MSTR #6MJIC 90°(PART OF 1)	1REF
24.	51394226	HOSE ASM 1/4X60 FJ #4#4(PART OF 20)	1REF
25.	72532792	ADAPTER #8MSTR #4MJIC (PART OF 1)	1REF



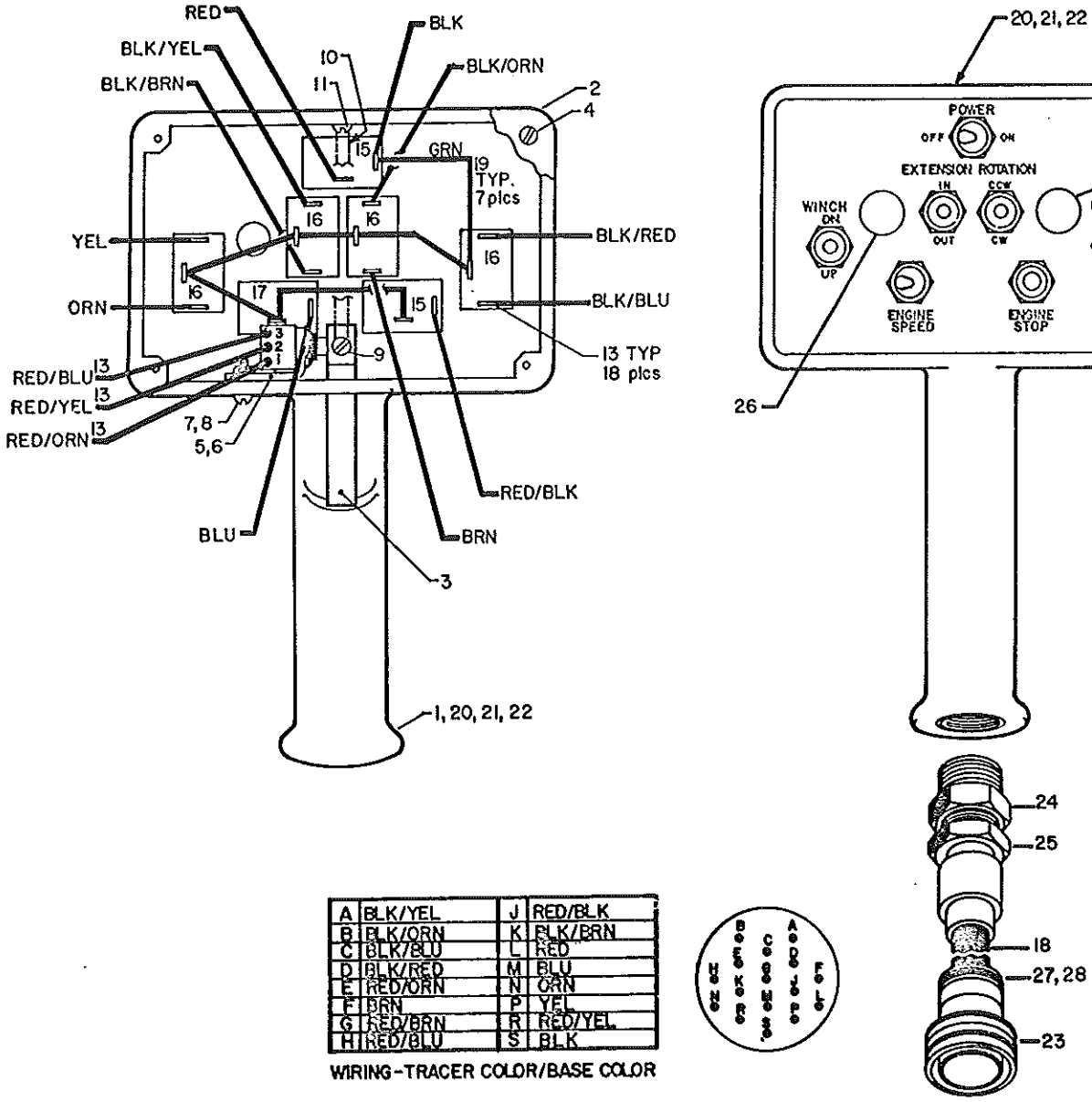
VALVEBANK ORIENTATION

Figure D-13. HYDRAULIC KIT - PROPORTIONAL RC - FAUVER VB (91712185)



ITEM	PART NO.	DESCRIPTION	QTY
1.	77041390	AMP DRIVER	1
2.	72060703	CAP SCR 1/4-20X1/2 SH	2
3.	72063049	WASHER 1/4 LOCK	4
4.	51707980	CABLE ASM	1
5.	51707752	HANDLE ASM	1
6.	77041251	RELAY	2
7.	77041237	SOLENOID 12V	1
8.	51704784	CABLE ASM #1WIRE X 6"	1
9.	77044341	TERMINAL BLOCK-4 CONTACTS	12
10.	60111832	MOUNTING PLATE-TERM STRIP	1
11.	72061009	SHT MTL SCR #6X3/4 PH	2
12.	60111833	SPACER	2
13.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
14.	77040186	TERMINAL 1/4 FSLPON	14
15.	77040051	TERMINAL #8 SPRSPADE	9
16.	60025221	MANIFOLD-CAPACITY ALERT	1
17.	72060731	CAP SCR 5/16-18X3/4 SH	4
18.	72532140	PLUG 9/16STR HH STL	1
19.	77041476	PRESSURE SWITCH 3100PSI	1
20.	7Q072015	O-RING	1
21.	77040282	TERM 1/4TAB PIGBAC 16-14GA	7
22.	89044231	WIRE 14GA X 3" GRN	3
23.	89044231	WIRE 14GA X 10" GRN	4
24.	89044188	CABLE 14GA/2WIRE X 3'	1
25.	89044034	CABLE 14GA/4WIRE X 35'	1

Figure D-14. REMOTE CONTROL KIT (90712186)

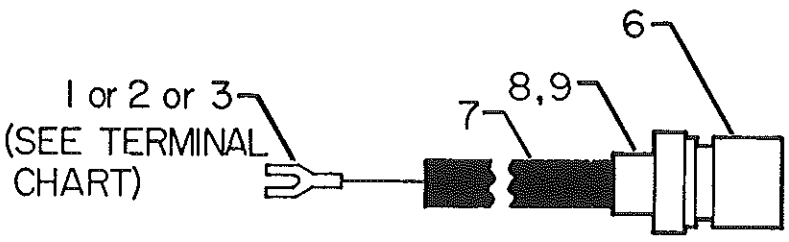


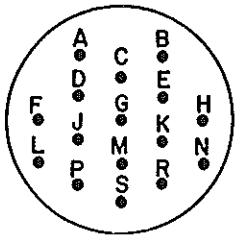
A	BLK/YEL	J	RED/BLK
B	BLK/ORN	K	BLK/BRN
C	BLK/BLU	L	RED
D	BLK/RED	M	BLU
E	RED/ORN	N	ORN
F	BRN	P	YEL
G	RED/BRN	R	RED/YEL
H	RED/BLU	S	BLK

WIRING-TRACER COLOR/BASE COLOR

ITEM	PART NO.	DESCRIPTION	QTY
1.	60111140	HANDLE	1
2.	70034306	CONTROL HANDLE BACK PLATE	1
3.	60111141	TRIGGER	1
4.	72061009	SHT MET SCR #6X3/4 PANHD	4
5.	51707507	POTENTIOMETER ASM	1
6.	60111142	MOUNTING BRACKET	1
7.	72060636	CAP SCR #10-24X3/4 RDHD	2
8.	72062106	NUT #10-24	2
9.	72060669	CAP SCR #10-32X5/8 SH	1
10.	70143223	SPRING	1
11.	72061000	SHT MTL SCR #6X1/2 PH	1
12.	70392696	DECAL - REMOTE CONTROL	1
13.	77040186	TERMINAL	21
15.	77041345	TOGGLE SWITCH SPST	2
16.	77041346	TOGGLE SWITCH SPDT	4
17.	77041347	TOGGLE SWITCH - MOMENTARY	1
18.	89044116	CABLE 16-WIRE 18 GA X 360 "	1
19.	60045031	WIRE 18 GA X 4 GREEN	6
20.	70392862	DECAL - ELECTROCUTION HAZARD	1
21.	70029119	PLACARD - IDENTIFICATION	1
22.	72066340	POP RIVET 1/8	2
23.	77044170	CONNECTOR 16-PIN	1
24.	72531833	BUSHING 3/4 NPT X 1/2 NPT	1
25.	77044096	CORD GRIP	1
26.	70392785	PLUG 1/2	2
27.	77044147	CABLE CLAMP	1
28.	70393308	RUBBER BUSHING	1

Figure D-15. REMOTE CONTROL HANDLE ASSEMBLY (51707752)



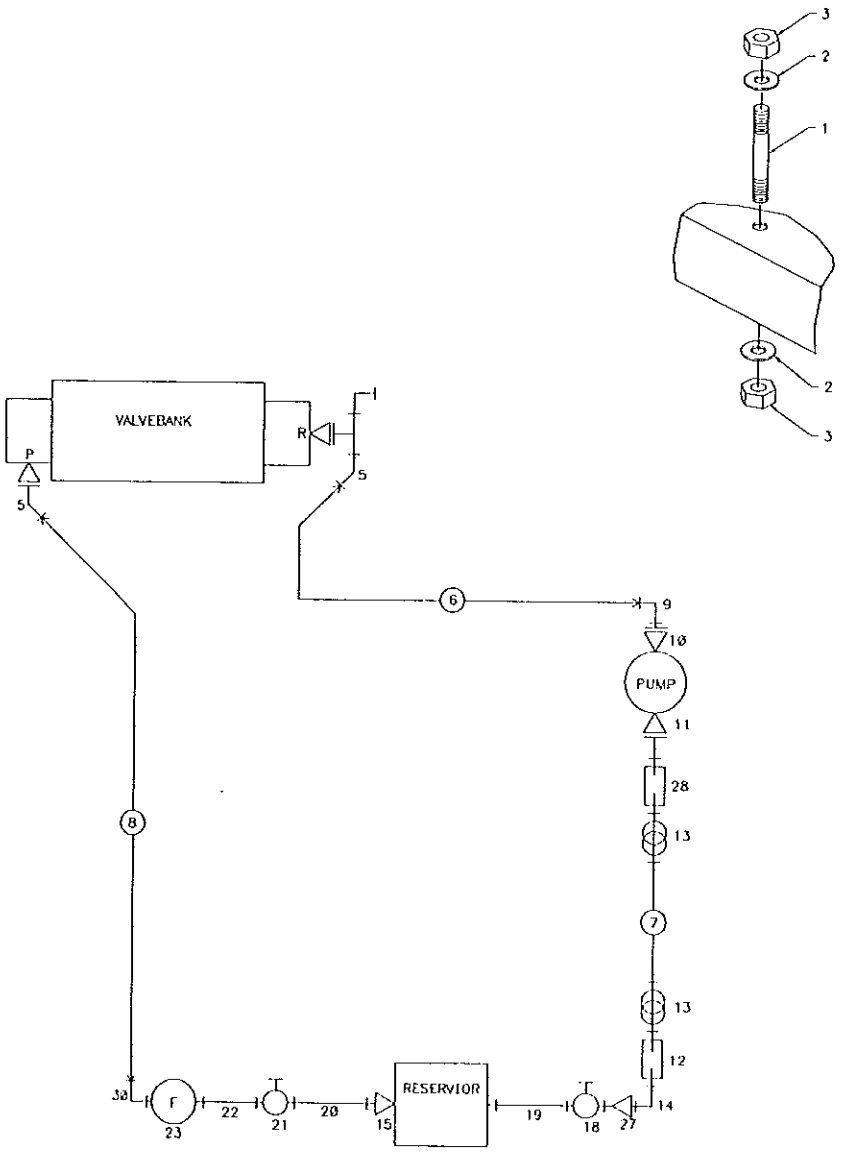


TERMINAL CHART

	COLOR.	TERMINAL ITEM NO.
A	BLACK/YELLOW	3
B	BLACK/ORANGE	3
C	BLACK/BLUE	3
D	BLACK/RED	3
E	RED/ORANGE	1
F	BROWN	3
G	RED/BROWN	3
H	RED/BLUE	1
J	RED/BLACK	2
K	BLACK/BROWN	3
L	RED	2
M	BLUE	2
N	ORANGE	3
P	YELLOW	3
R	RED/YELLOW	1
S	BLACK	1

ITEM	PART NO.	DESCRIPTION	QTY
1.	77040047	TERMINAL 1/4TAB MSLPON	4
2.	77040051	TERMINAL #8 STUD	3
3.	77040186	TERMINAL FSLPON	9
6.	77044409	RECEPTACLE 16 PIN	1
7.	89044116	CABLE 18GA/16WIRE	72"
8.	77044147	CORD GRIP	1
9.	70393308	RUBBER BUSHING	1

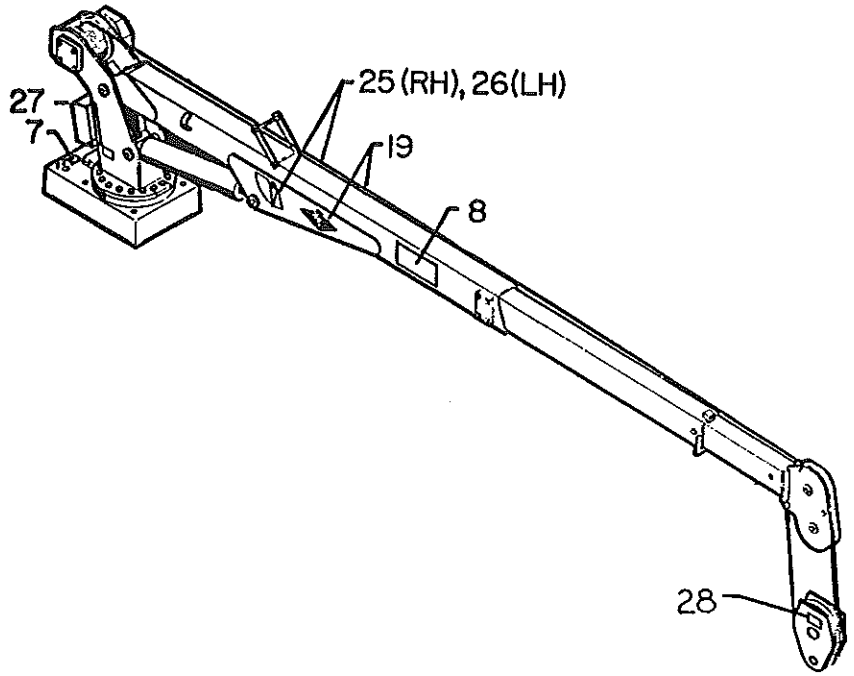
Figure D-16. CABLE ASSEMBLY 18GA/16WIRE X 72" (51707980)



ITEM	PART NO.	DESCRIPTION	QTY
1.	60106481	STUD 1X12-1/2	4
2.	72063066	WASHER 1" HIGH STRENGTH	8
3.	72062141	NUT 1-8 STL INSERT	8
5.	72532670	ELBOW #8MJIC #8FJIC 45°	2
6.	51704458	HOSE ASM 1/2X252 FF	1
7.	89039481	HOSE 1" 100R4	4FT
8.	51703613	HOSE ASM 1/2X192 FF	1
9.	72053763	ELBOW 3/4MSTR 3/4MJIC 90°	1
10.		ADAPTER (PER PUMP)	1REF
11.		ADAPTER (PER PUMP)	1REF
12.	72532470	BARBED NIPPLE 1MPT	1
13.	72066515	HOSE CLAMP 1" 2-BOLT	2

ITEM	PART NO.	DESCRIPTION	QTY
14.	72053286	STREET ELBOW 1NPT	1
15.	72531836	REDUCER BUSHING 1-1/4 X 3/4NPT	1
18.	73054130	GATE VALVE 1-1/4NPT	1
19.	72053216	NIPPLE 1-1/4NPT X 6	1
20.	72053146	NIPPLE 3/4NPT X 6	1
21.	73054129	GATE VALVE 3/4NPT	1
22.	72053141	NIPPLE 3/4NPT X CLOSE	1
23.	73052000	RETURN FILTER	1
27.	72053377	REDUCER BUSHING 1-1/4 X 1NPT	1
28.	72531195	BARBED NIPPLE 1NPT 1HOSE 45°	1
30.	72531427	ELBOW 3/4MPT 1-1/16MJIC 90°	1

Figure D-17. INSTALLATION KIT (93707664)

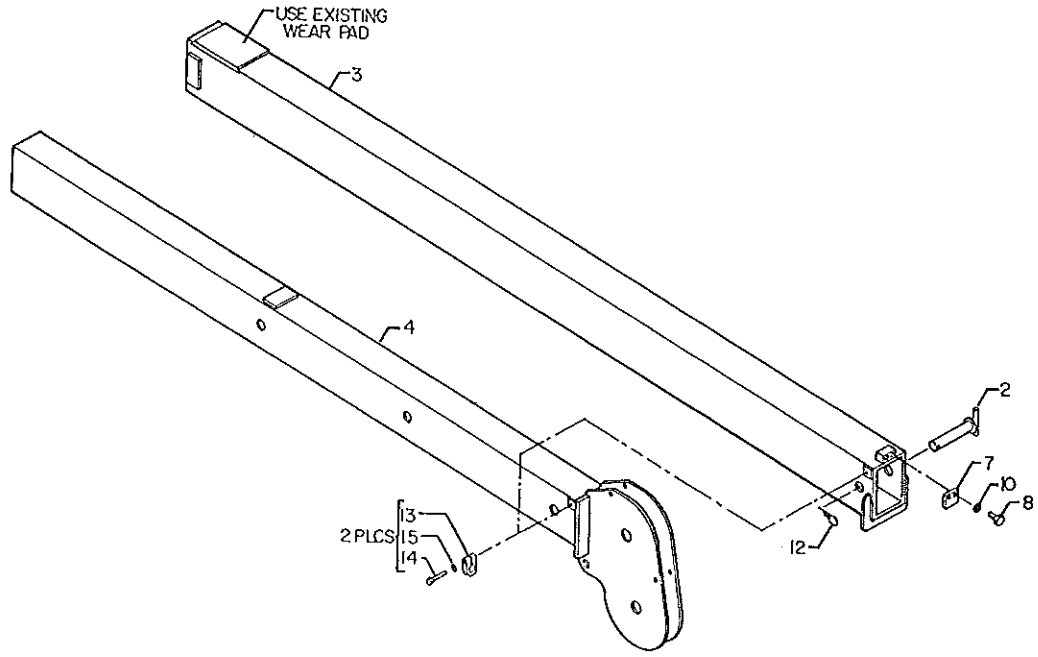


DECAL PLACEMENT

ITEM NO.	LOCATION
6,9,10,11,12,13,16, 17,20,21,22,23,24, 27	AT OR NEAR REMOTE CONTROL STORAGE POINT
1,14	ONE ON EACH OUTRG.
15,18	ONE ON EACH SIDE OF CARRIER VEHICLE
7	AT TURNTABLE GREASE ZERKS
2,3	AT ALL GREASE ZERKS
5	ON RESERVOIR AT THE RETURN LINE
4	ON RESERVOIR AT THE SUCTION LINE
29	INSIDE VB COVER

ITEM	PART NO.	DESCRIPTION	QTY
1.	70391598	DECAL-WARNING OUTRIGGER	2
2.	70391612	DECAL-GREASE WEEKLY LH	5
3.	70391613	DECAL-GREASE WEEKLY RH	2
4.	70392108	DECAL-SUCTION LINE	1
5.	70392109	DECAL-RETURN LINE	1
6.	70392213	DECAL-CAUTION WASH/WAX	1
7.	70392524	DECAL-ROTATE/GREASE	1
8.	70393858	DECAL-6016 IDENTIFICATION	2
9.	70392813	DECAL-DANGER ELECTROCUTION	1
10.	70392814	DECAL-DANGER TRAINING	1
11.	70392815	DECAL-DANGER OPERATION	1
12.	70392861	DECAL-DANGER 2-BLOCKING	1
13.	70392863	DECAL-DANGER HOIST PERS	1
14.	70392864	DECAL-DANGER OR STAND CLEAR	2
15.	70392865	DECAL-DANGER ELECTROCUTION	4
16.	70392866	DECAL-DANGER OPER COND	1
17.	70392867	DECAL-DANGER OR MOVING	1
18.	70392868	DECAL-DANGER LOADLINE	4
19.	70029251	DECAL-IMT DIAMOND	2
20.	70392888	DECAL-DANGER RESTRICTION	1
21.	70392889	DECAL-DANGER RC ELECTRO	1
22.	70392891	DECAL-DANGER DRIVELINE	1
23.	70392982	DECAL-CONTACT IMT	1
24.	71039134	DECAL-CAUTION OIL LEVEL	1
25.	71391522	DECAL-ANGLE CHART RH	1
26.	71391523	DECAL-ANGLE CHART LH	1
27.	71393859	CAPACITY CHART	2
28.	70393860	DECAL-LOAD BLOCK RATING	2
29.	70394166	DECAL-MANUAL OPERATION	1

Figure D-18. DECAL KIT (95712187)

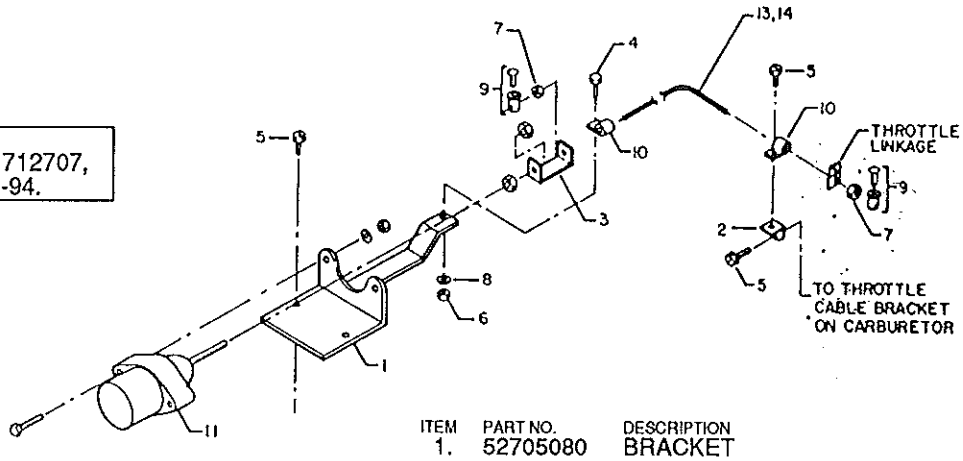


ITEM	PART NO.	DESCRIPTION	QTY
2.	52070152	PIN	1
3.	52707723	EXTENSION BOOM - 1ST STAGE	1
4.	52707724	EXTENSION BOOM - 2ND STAGE	1
7.	60107294	STROKE STOP PLATE	1
8.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	2
10.	72063053	WASHER 1/2 LOCK	2
12.	72066145	HAIR PIN 3/16	1
13.	70034381	CORD GUIDE	2
14.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
15.	72063049	WASHER 1/4 LOCK	2

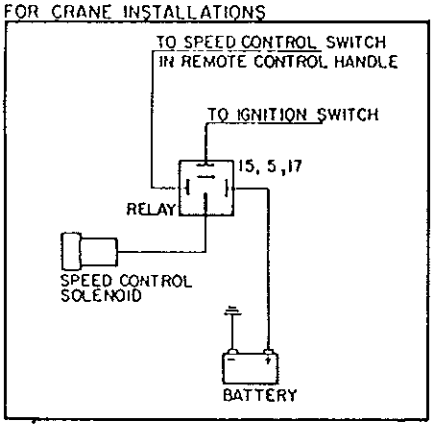
Figure D-19. CONVERSION KIT - 6016 TO 6016-20' (95709041)

NOTE

REPLACED BY 31712707, EFFECTIVE 12-05-94.



FOR CRANE INSTALLATIONS



ITEM	PART NO.	DESCRIPTION	QTY
1.	52705080	BRACKET	1
2.	60106760	LINKAGE BRACKET	1
3.	60108086	PLUNGER BRACKET	1
4.	72060002	CAP SCREW 1/4-20 X 3/4 HH GR5	5
5.	72061004	SHT MET SCREW #14 X 3/4 SLT	5
6.	72062000	NUT 1/4-20 HEX	5
7.	72062093	NUT #8-32 HEX	2
8.	72063049	WASHER 1/4 LOCK	5
9.	72066377	CABLE STOP	2
10.	72066523	CLAMP	2
11.	73054654	SOLENOID VALVE 12V	1
13.	89058892	CASING	3.5'
14.	89058934	CABLE	4'
15.	77041251	RELAY	1
16.	89044233	WIRE 14GA BROWN	20'
17.	77040186	TERMINAL	4
18.	60103535	SWITCH BRACKET (NOT SHOWN)	2
19.	77041345	TOGGLE SWITCH (NOT SHOWN)	2

Figure D-20. THROTTLE CONTROL - SYNCHRO START (31705270)

ITEM	PART NO.	DESCRIPTION	QTY
1.	52703440	RESERVOIR, 12 GAL.	1
2.	72053415	PLUG, 3/4 NPT	1
3.	72532261	PLUG, SIGHT GAUGE, 3/4 NPT	1
4.	73014671	CAP, FILL	1
5.	73141276	SCREEN, FILL NECK	1
6.	72060046	CAP SCREW, 3/8 X 1 GR5	6
7.	72062103	NUT, SELF LOCKING, 3/8	6
8.	73052012	SUCTION FILTER	1*
9.	72053211	PIPE NIPPLE	1*

* ITEMS 8 & 9 ARE SHIPPED LOOSE.

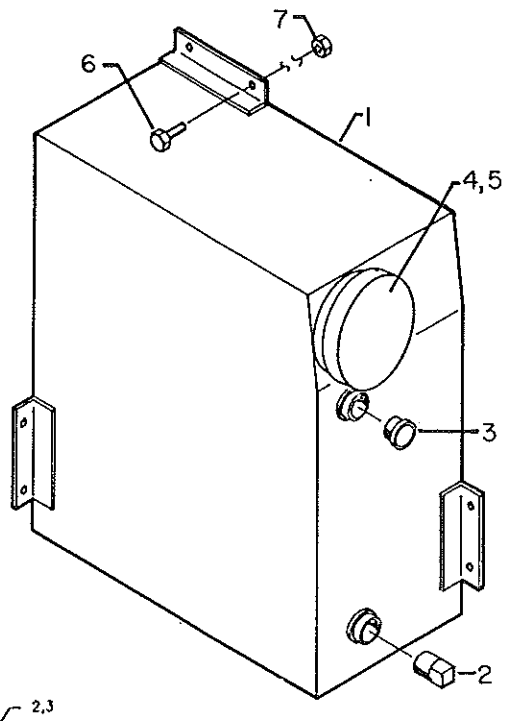
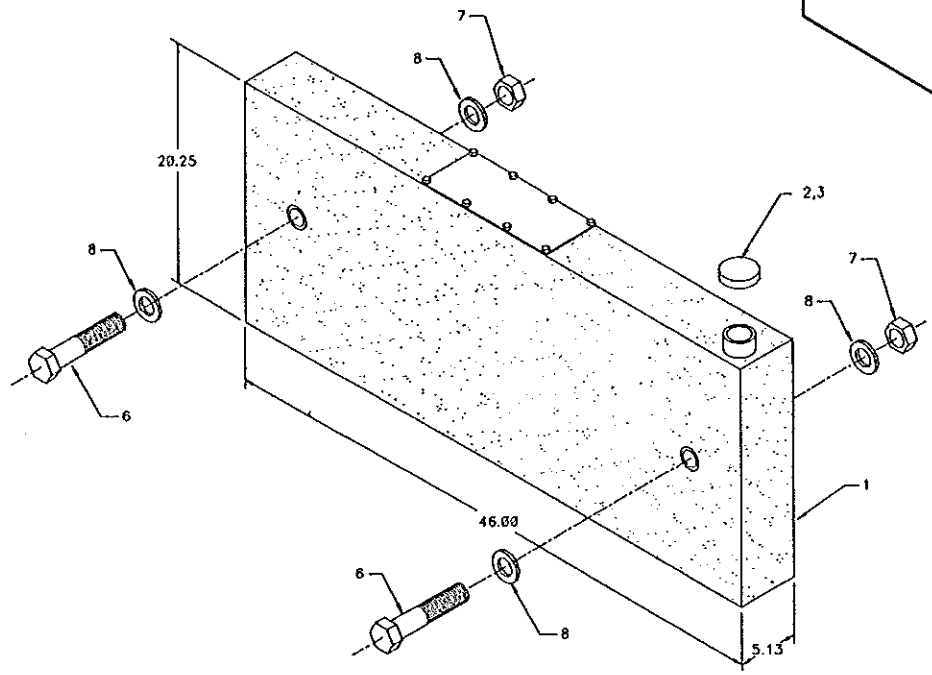
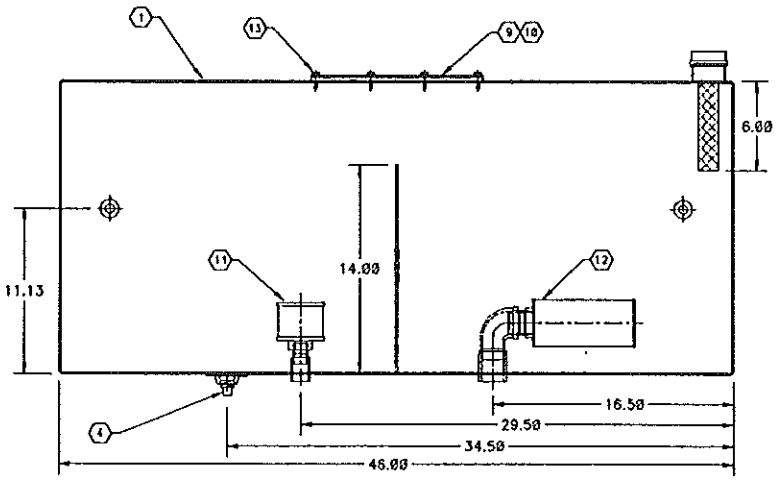
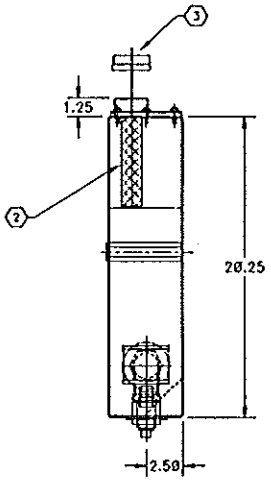


Figure D-21. OPTIONAL RESERVOIR (51709256)

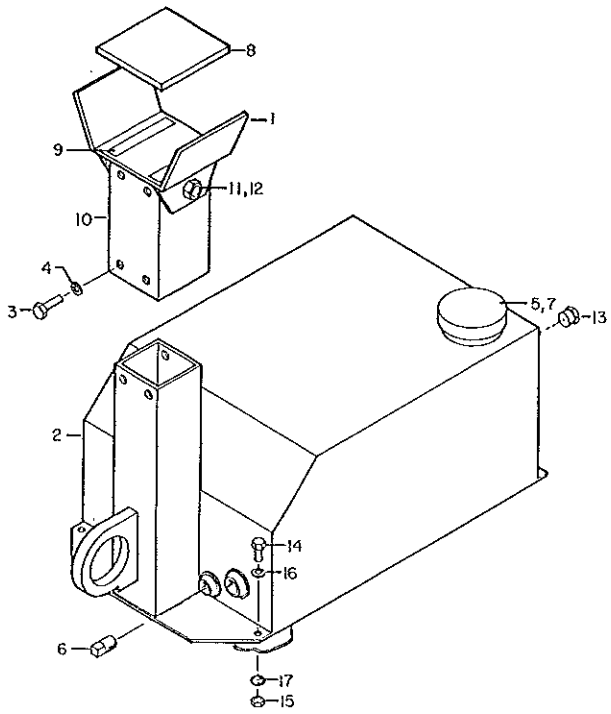






ITEM	PART NO.	DESCRIPTION	QTY
1.	51711432	RESERVOIR WELDMENT	1REF
2.	70142482	FILL NECK STRAINER	1REF
3.	70142483	FILL CAP	1REF
4.	72053503	PIPE PLUG 3/4NPT SQHD	1REF
6.	72060104	CAP SCR 1/2-13X6-1/2 HHGR5	2
7.	72062080	NUT 1/2-13 LOCK	2
8.	72063005	WASHER 1/2 WRT	8
9.	76394152	GASKET 1/4X4-5/8X11-5/8	1
10.	60119158	COVER PLATE	1
11.	70733058	DIFFUSER-33 GAL 3/4NPT	1
12.	70733059	STRAINER-20GPM 1-1/4NPT	1
13.	72061151	SCR 1/4X1 SLFTPG W/SEAL	10
	51711433	RESERVOIR ASM (INCL:1-4)	1REF

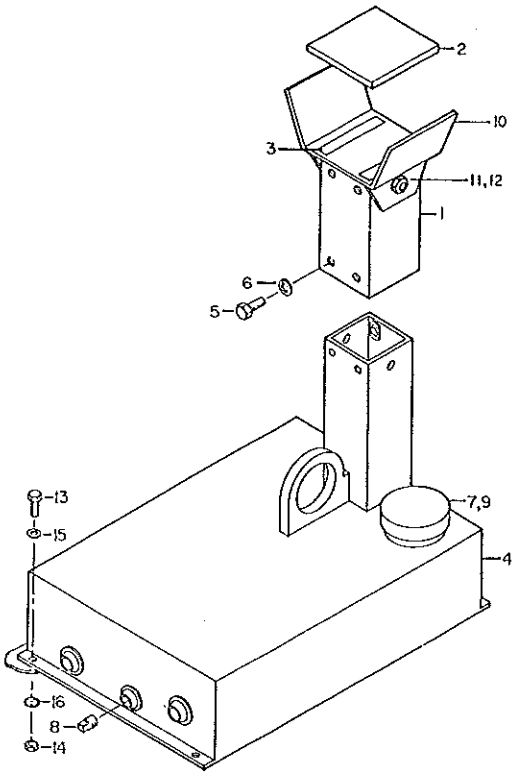
Figure D-22. OPTIONAL 18-GALLON RESERVOIR (51707798)



ITEM	PART NO.	DESCRIPTION	QTY
1.	52705061	SADDLE	1
2.	52706909	RESERVOIR, 20 GAL.	1
3.	72060092	CAP SCREW, 1/2 X 1 1/4 GR5	4
4.	72063053	WASHER, LOCK, 1/2	4
5.	73014671	CAP, FILL	1
6.	73052001	PLUG, MAGNETIC, 3/4 NPT	1
7.	73141276	SCREEN, FILL NECK	1
8.	60030162	PAD, WEAR	1
9.	70086054	TAPE	12"
10.	60109252	TUBE, SADDLE	1
11.	72060195	CAP SCREW, 3/4 X 7 GR5	1
12.	72062114	NUT, SELF LOCKING, 3/4	1
13.	72532261	PLUG, SIGHT GAUGE, 3/4	1
14.	72060046	CAP SCREW, 3/8 X 1 GR5	4
15.	72062103	NUT, SELF LOCKING, 3/8	4
16.	72063003	WASHER, FLAT, 3/8	4
17.	76392821	SEAL, THREAD, 3/8	4
18.	73052012	SUCTION FILTER	1*
19.	72053211	PIPE NIPPLE	1*

* ITEMS 18 & 19 ARE SHIPPED LOOSE.

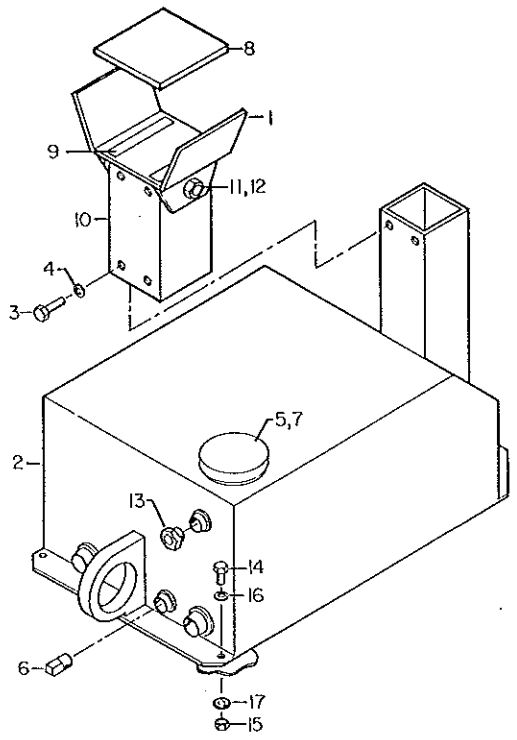
Figure D-23. OPTIONAL BOOM SUPPORT/ RESERVOIR ASSEMBLY (51706910)



ITEM	PART NO.	DESCRIPTION	QTY
1.	60109252	TUBE, SADDLE	1
2.	60030162	PAD, WEAR	1
3.	70086054	TAPE	12"
4.	52704207	RESERVOIR	1
5.	72060092	CAP SCREW, 1/2 X 1 1/4 GR5	4
6.	72063053	WASHER, LOCK, 1/2	4
7.	73014671	CAP, FILL	1
8.	73052001	PLUG, 3/4 NPT	1
9.	73141276	SCREEN, FILL NECK	1
10.	52705061	SADDLE	1
11.	72060195	CAP SCREW, 3/4 X 7	1
12.	72062114	NUT, LOCK, 3/4	1
13.	72060046	CAP SCREW, 3/8 X 1 GR5	4
14.	72062103	NUT, SELF LOCKING, 3/8	4
15.	72063003	WASHER, FLAT, 3/8	4
16.	76392821	SEAL, THREAD, 3/8	4
17.	73052012	SUCTION FILTER	1*
18.	72053211	PIPE NIPPLE	1*

* ITEMS 17 & 18 ARE SHIPPED LOOSE.

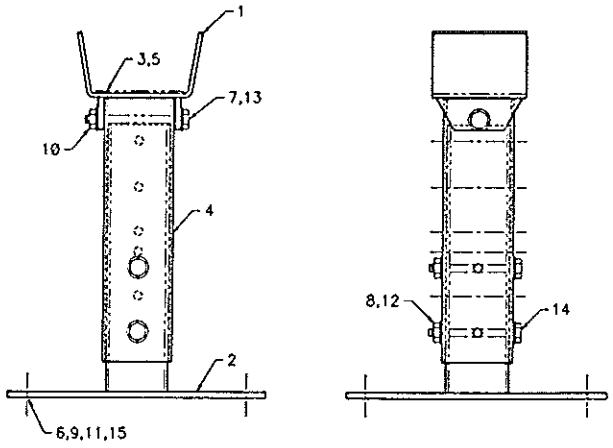
Figure D-24. OPTIONAL BOOM SUPPORT/RESERVOIR ASSEMBLY (51705060)



ITEM	PART NO.	DESCRIPTION	QTY
1.	52705061	SADDLE	1
2.	52707399	RESERVOIR, 20 GAL.	1
3.	72060092	CAP SCREW, 1/2 X 1 1/4 GR5	4
4.	72063053	WASHER, LOCK, 1/2	4
5.	73014671	CAP, FILL	1
6.	73052001	PLUG, MAGNETIC, 3/4 NPT	1
7.	73141276	SCREEN, FILL NECK	1
8.	60030162	PAD, WEAR	1
9.	70086054	TAPE	12"
10.	60109252	TUBE, SADDLE	1
11.	72060195	CAP SCREW, 3/4 X 7 GR5	1
12.	72062114	NUT, SELF LOCKING, 3/4	1
13.	72532261	PLUG, SIGHT GAUGE, 3/4	1
14.	72060046	CAP SCREW, 3/8 X 1 GR5	4
15.	72062103	NUT, SELF LOCKING, 3/8	4
16.	72063003	WASHER, FLAT, 3/8	4
17.	76392821	SEAL, THREAD, 3/8	4
18.	73052012	SUCTION FILTER	1*
19.	72053211	PIPE NIPPLE	1*

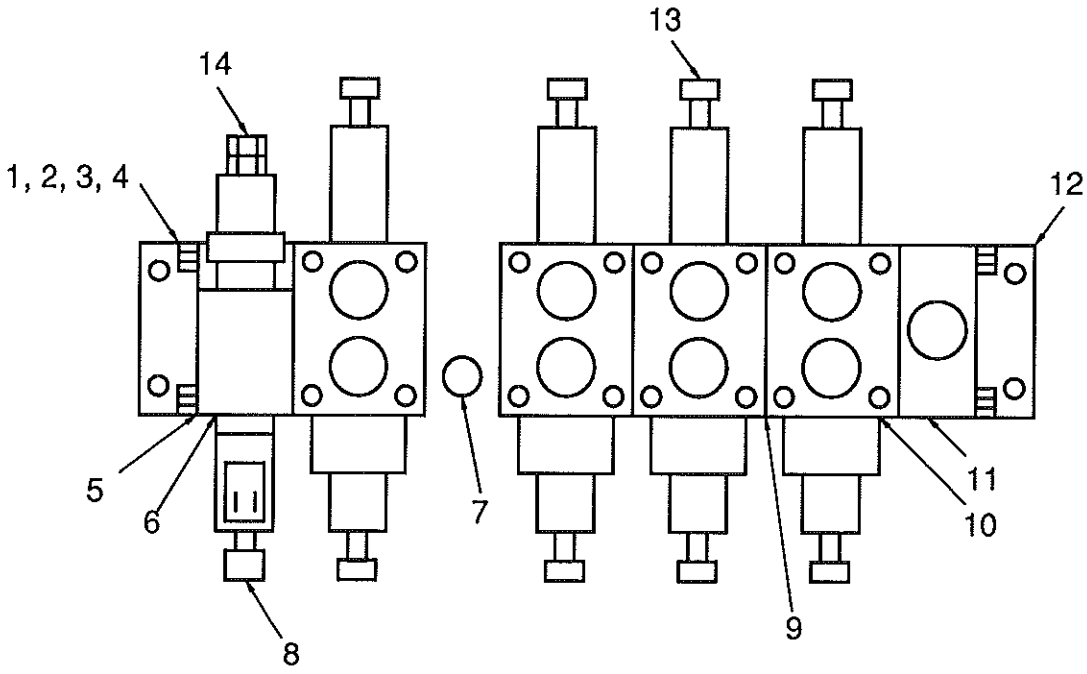
* ITEMS 18 & 19 ARE SHIPPED LOOSE.

Figure D-25. OPTIONAL BOOM SUPPORT/ RESERVOIR ASSEMBLY (51709333)



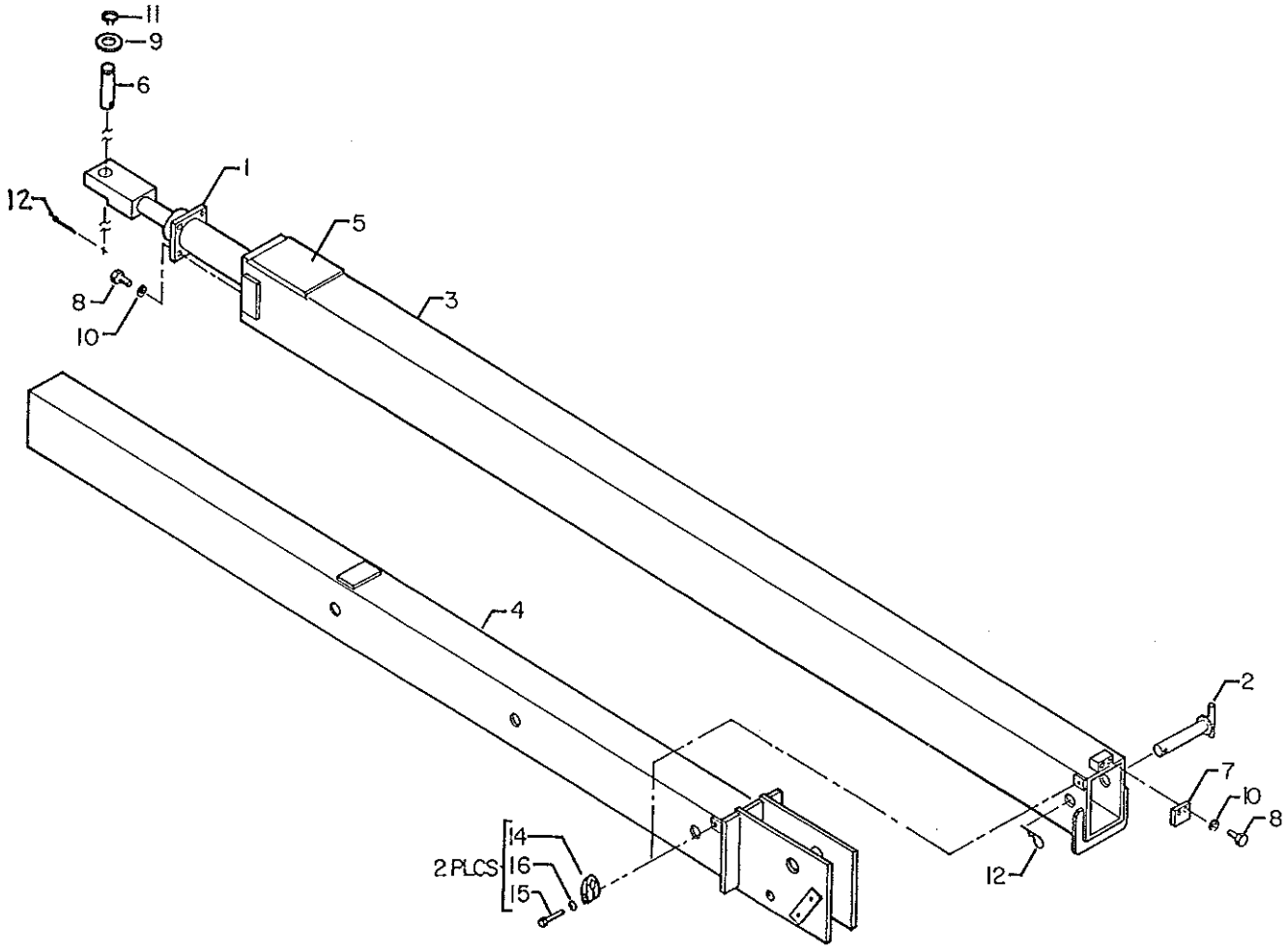
ITEM	PART NO.	DESCRIPTION	QTY
1.	52705061	SADDLE	1
2.	52708159	PEDESTAL	1
3.	60030162	WEAR PAD	1
4.	60112040	TUBE	1
5.	70086054	TAPE 1" STRUCTURAL	1FT
6.	72060047	CAP SCR 3/8-16X1-1/4 HHGR5	4
7.	72060195	CAP SCR 3/4-10X7 HHGR5	1
8.	72062080	NUT 1/2-13 LOCK	2
9.	72062103	NUT 3/8-16 LOCK	4
10.	72062114	NUT 3/4-10 LOCK	1
11.	72063003	WASHER 3/8 WRT	4
12.	72063005	WASHER 1/2 WRT	4
13.	72063008	WASHER 3/4 WRT	2
14.	72601297	CAP SCR 1/2-13X5-3/4	2
15.	76392821	WASHER 3/8 BONDED	4

Figure D-26. OPTIONAL BOOM SUPPORT ASSEMBLY (51708161)



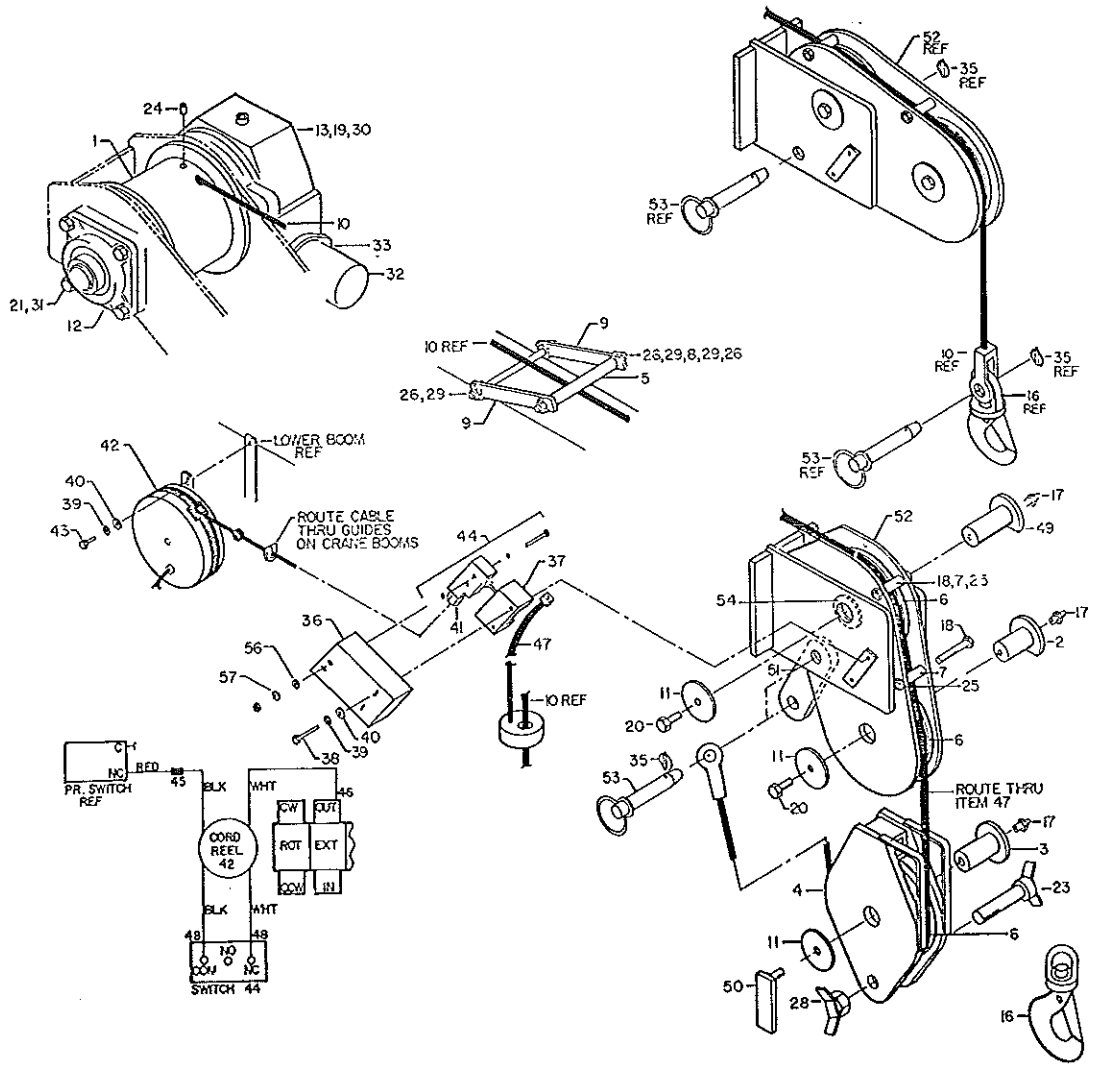
ITEM	PART NO.	DESCRIPTION	QTY
1.	94732143	TIE ROD ASM	1
2.	70143596	TIE ROD	4
3.	72062036	NUT	8
4.	72063050	LOCK WASHER	8
5.	94732144	INLET ASM	1
6.	60025914	INLET BLOCK	1
7.	76393090	O-RING	10
8.	73054624	PROPORTIONAL SOLENOID	1
9.	70143595	O-RING PLATE	5
10.	73054690	VALVE SECTION WITH COIL	4
11.	60025915	OUTLET BLOCK	1
12.	70143597	MOUNTING FOOT	2
13.	77041385	COIL - 10 VOLT	8
14.	73054623	RELIEF - 2500PSI	1

Figure D-27. VALVEBANK - 4 SECTION (73732131)



ITEM	PART NO.	DESCRIPTION	QTY
1.	3B309820	EXTENSION CYLINDER	1
2.	52070152	PIN	1
3.	52707723	1ST STG EXT BOOM	1
4.	52709456	2ND STG EXT BOOM	1
5.	60030189	WEAR PAD	1
6.	60101905	PIN	1
7.	60107294	STROKE STOP	1
8.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	6
9.	72063034	MACH BUSHING 1X10GA NR	1
10.	72063053	WASHER 1/2 LOCK	6
11.	72066125	RETAINING RING 1" HD EXT	1
12.	72066145	HAIN PIN .19	2
14.	70034381	CORD GUIDE	2
15.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
16.	72063049 .	WASHER 1/4 WRT	2

Figure D-28. EXTENSION BOOM ASSEMBLY-20' WITH FLIP SHEAVE (41709440)



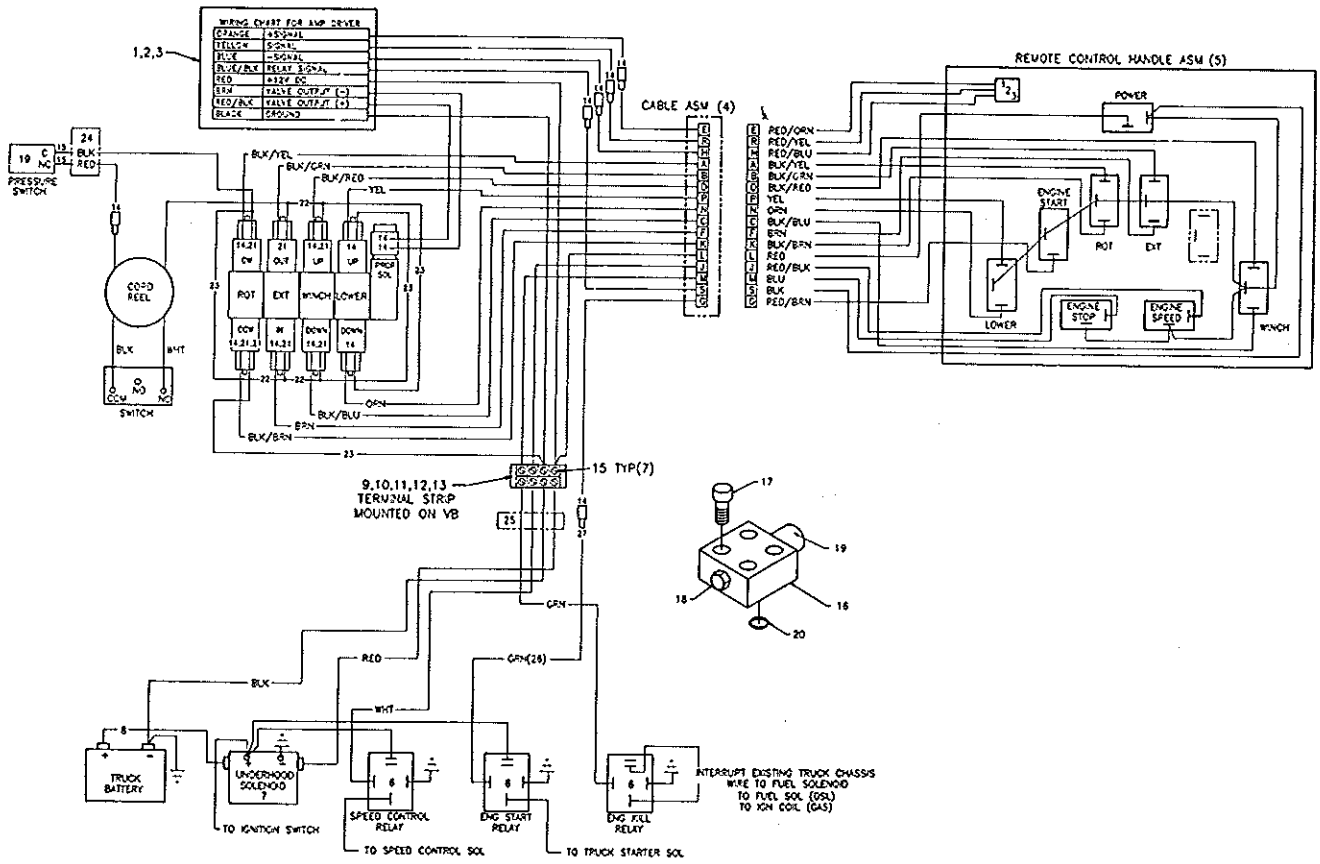
ITEM	PART NO.	DESCRIPTION	QTY
1.	52712162	WINCH DRUM	1
2.	52707730	PIN	1
3.	52707731	PIN	1
4.	52707735	SNATCH BLOCK	1
5.	60030108	ROLLER - CABLE GUIDE	1
6.	60030255	SHEAVE	3
7.	60102596	SPACER	2
8.	60105538	STUD- CABLE GUIDE	1
9.	60105540	CABLE GUIDE SIDE BAR	2
10.	70580089	CABLE 7/16 x 100' IWRC-XIP	1
11.	60109337	PIN RETAINER PLATE 3"	3
12.	70055117	BEARING, FLANGE	1
13.	70570198	WINCH	1
16.	70732882	SWIVEL HOOK W/LATCH	1
17.	72053508	ZERK 1/8 NPT	3
18.	72060893	CAP SCR 3/8-16X3-1/4 HHGR5	2
19.	72060921	CAP SCR 1/2-13X3-3/4 HHGR5	4
20.	72060147	CAP SCR 5/8-11X1 HHGR5	2
21.	72060148	CAP SCR 5/8-11X1-1/4 HHGR5	4
23.	52712181	PIN	1
24.	72060596	SET SCREW 1/2-13X3/4 SH	1
25.	72062103	NUT 3/8-16 LOCK	2
26.	72062080	NUT 1/2-13 LOCK	4
28.	52712183	RETAINER 3/4-10 HEX	1
29.	72063005	WASHER 1/2 WRT	4
30.	72063053	WASHER 1/2 LOCK	4
31.	72063055	WASHER 5/8 LOCK	4
32.	73051513	HYDRAULIC MOTOR	1
33.	72060064	CAP SCR 7/16-14X1-1/2 HHGR5	2

ITEM	PART NO.	DESCRIPTION	QTY
35.	72661367	PIN-QUICK	2
36.	60113593	COVER	1
37.	60113594	MOUNTING BLOCK	1
38.	72060008	CAP SCR 1/4-20X2 HHGR5	2
39.	72063049	WASHER 1/4 LOCK	4
40.	72063001	WASHER 1/4 FLAT	4
41.	77044468	STRAIN RELIEF	1
42.	70732193	CORD REEL	1
43.	72060000	CAP SCR 1/4-20X1/2 HHGR5	2
44.	77041291	SWITCH	1
45.	77040047	TERMINAL	1
46.	77040186	TERMINAL	1
47.	52709413	ANTI 2-BLOCK CABLE	1
48.	77040051	TERMINAL	2
49.	52709438	PIN	1
50.	52709458	WING BOLT	1
51.	60113679	LINK	1
52.	52709455	FLIP SHEAVE	1
53.	72661365	PIN W/HANDLE	2
54.	72063037	MACH BUSHING 1-1/2 10GA	2
56.	72063098	WASHER .16 FLAT	2
57.	72063047	WASHER #10 LOCK	2

NOTE

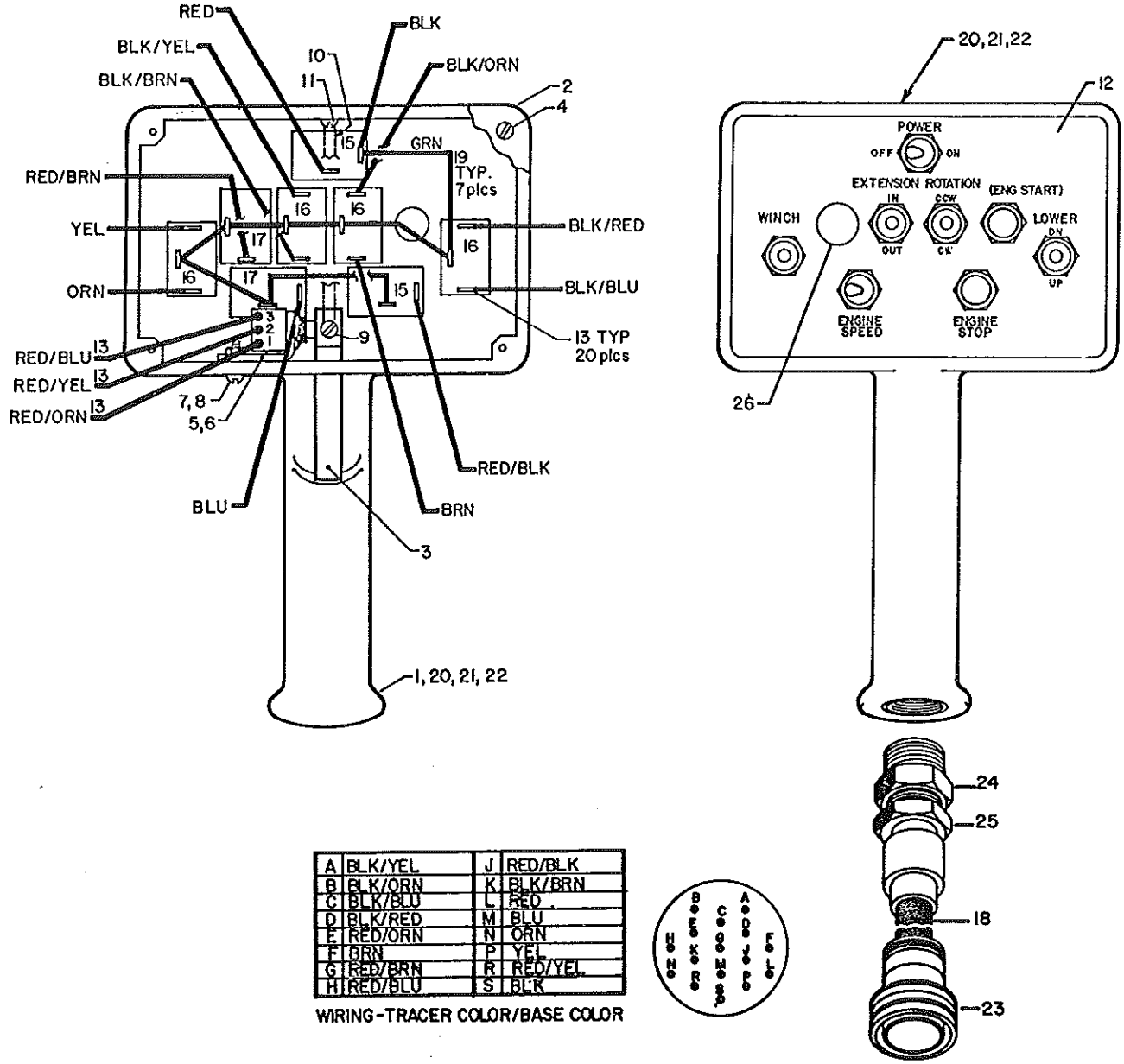
ANYTIME THE PIN RETAINER BOLTS HAVE BEEN REMOVED, APPLY LOCTITE 262 TO THE THREADS BEFORE REASSEMBLY.

Figure D-29. WINCH/CABLE/HOOK KIT-FLIP SHEAVE (31712207)



ITEM	PART NO.	DESCRIPTION	QTY
1.	77041390	AMP DRIVER	1
2.	72060703	CAP SCR 1/4-20X1/2 SH	2
3.	72063049	WASHER 1/4 LOCK	4
4.	51707980	CABLE ASM	1
5.	51707981	HANDLE ASM	1
6.	77041251	RELAY	3
7.	77041237	SOLENOID 12V	1
8.	51704784	CABLE ASM #1WIRE X 6"	1
9.	77044341	TERMINAL BLOCK-4 CONTACTS	12
10.	60110131	MOUNTING PLATE-TERM STRIP	1
11.	72061009	SHT MTL SCR #6X3/4 PH	2
12.	60118077	SPACER	2
13.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
14.	77040186	TERMINAL 1/4 FSLPON	15
15.	77040051	TERMINAL #8 SPRSPADE	9
16.	60025221	MANIFOLD-CAPACITY ALERT	1
17.	72060731	CAP SCR 5/16-18X3/4 SH	4
18.	72532140	PLUG 9/16STR HH STL	1
19.	77041476	PRESSURE SWITCH 3100PSI	1
20.	7Q072015	O-RING	1
21.	77040282	TERM 1/4TAB PIGBAC 16-14GA	7
22.	89044231	WIRE 14GA X 3" GRN	3
23.	89044231	WIRE 14GA X 10" GRN	4
24.	89044188	CABLE 14GA/2WIRE X 3'	1
25.	89044034	CABLE 14GA/4WIRE X 35'	1
26.	89044231	WIRE 14GA GRN X 35'	1
27.	77040047	TERMINAL MSLPON 1/4TAB	1

Figure D-30. REMOTE CONTROL KIT WITH ENGINE START (90712209)



A	BLK/YEL	J	RED/BLK
B	BLK/ORN	K	BLK/BRN
C	BLK/BLU	L	RED
D	BLK/RED	M	BLU
E	RED/ORN	N	ORN
F	BRN	P	YEL
G	RED/BRN	R	RED/YEL
H	RED/BLU	S	BLK

WIRING-TRACER COLOR/BASE COLOR

ITEM	PART NO.	DESCRIPTION	QTY
1.	60111140	HANDLE	1
2.	70034306	CONTROL HANDLE BACK PLATE	1
3.	60111141	TRIGGER	1
4.	72061009	SHT MET SCR #6X3/4 PANHD	4
5.	51707507	POTENTIOMETER ASM	1
6.	60111142	MOUNTING BRACKET	1
7.	72060636	CAP SCR #10-24X3/4 RDHD	2
8.	72062106	NUT #10-24	2
9.	72060669	CAP SCR #10-32X5/8 SH	1
10.	70143223	SPRING	1
11.	72061000	SHT MTL SCR #6X1/2 PH	1
12.	70392696	DECAL - REMOTE CONTROL	1
13.	77040186	TERMINAL	23
15.	77041345	TOGGLE SWITCH SPST	2
16.	77041346	TOGGLE SWITCH SPDT	4
17.	77041347	TOGGLE SWITCH-MOMENTARY	2
18.	89044116	CABLE 16-WIRE 18 GA X 360 "	1
19.	60045031	WIRE 18 GA X 4 GREEN	7
20.	70392862	DECAL - ELECTROCUTION HAZARD	1
21.	70029119	PLACARD - IDENTIFICATION	1
22.	72066340	POP RIVET 1/8	2
23.	77044170	CONNECTOR 16-PIN	1
24.	72531833	BUSHING 3/4 NPT X 1/2 NPT	1
25.	77044096	CORD GRIP	1
26.	70392785	PLUG 1/2	2

Figure D-31. REMOTE CONTROL HANDLE (51707981)

Section 5. PROPORTIONAL REMOTE CONTROLS

5-1. GENERAL

This section is provided to help the operator and the installer become familiar with proportional remote controls. It discusses the theory of operation, installation, and troubleshooting.

5-2. OPERATION

The speed at which a crane operates is directly related to the amount of oil supplied to its main control valve. The proportional remote control feature regulates the amount of oil that is made available to the main control valve, thereby controlling the speed of operation. This is accomplished by means of an electrically controlled hydraulic system consisting of a remote control, an amp driver, and a flow control. An increase in signal voltage to the amp driver causes it to provide higher signal voltage to the flow control solenoid. Higher signal voltage at the flow control solenoid causes it to limit the flow of oil allowed to bypass to the reservoir. Limiting the amount of oil that is bypassed forces more oil downstream, thus increasing the speed of operation.

5-3. REMOTE CONTROL

The remote control allows the operator to control the crane remotely. It provides the housing for the switches that control which crane function, or functions, are to be activated. It also houses the potentiometer and trigger assembly that actually provide the signal voltage to the amp driver. It is connected to the main control valve and the amp driver through a 30 foot cable. The function switches in the remote control are simple on/off switches and have no effect on the speed of the function. The speed of the function selected is controlled only by the trigger, therefore, if two functions are selected at the same time, when the trigger is pulled, the speed of both functions will increase.

5-4. AMP DRIVER

The amp driver is an electronic device used to take the signal that it receives from the trigger in the remote control, and subsequently provide a signal voltage to the flow control solenoid. It is often mounted to the mast of the crane, but may be mounted in an alternate location.

5-5. FLOW CONTROL

The flow control may either be an integral part of the inlet on the main control valve, or a separate valve body, depending on the crane model. Its purpose is to regulate the amount of oil flow to the main control valve. In the normal state, the flow control will direct the flow of oil to the reservoir. Its operation is completely dependent on a variation in signal voltage from the amp driver. As the signal voltage from the amp driver increases, the flow control begins to limit the flow of oil being bypassed, which causes a greater flow directed upstream to the main control valve. Inversely, when the signal voltage from the amp driver begins to drop, the flow control will let more oil bypass to the reservoir, resulting in lesser flow upstream to the main control valve.

5-6. GENERAL INSTALLATION

Refer to the parts drawings in Section 4 for your particular proportional remote control system. The installer must be familiar with the information relating to the IMT crane that is to be installed, before attempting to make that installation. Electrical contacts must be clean and free of oil or other contaminants. Proper ground must be established. This will be accomplished by connecting a 12-gauge (minimum) wire from the ground point of the electrical system to a 5/16 inch self tapping screw installed in the truck frame.

5-7. AMP DRIVER REPLACEMENT

The purpose of this paragraph is to familiarize repair and maintenance personnel with amp driver replacement on cranes produced prior to 1-1-90. Prior to 1-1-90, the amp driver used on all IMT proportional remote control cranes was part number 77041329. After that date, the amp driver was changed to part number 77041390.

NOTE

THE DRAWINGS IN THIS MANUAL ARE SHOWN WITH THE CURRENT PRODUCTION AMP DRIVER, PART NUMBER 77041390. FOR DRAWINGS WITH THE 77041329 AMP DRIVER, REFER TO MANUAL PART NUMBER 99900256.

5-7-1. AMP DRIVER IDENTIFICATION

Identifying the amp driver used on your crane can be accomplished either by the serial number of the crane, or by determining the material that the enclosure is constructed of. The 77041329 amp driver is housed in a steel enclosure which mounts directly to the crane. The 77041390 amp driver is housed in a cast aluminum or plastic enclosure, which is mounted on an aluminum mounting plate. The aluminum mounting plate, in turn, attaches to the crane.

5-7-2. AMP DRIVER INSTALLATION

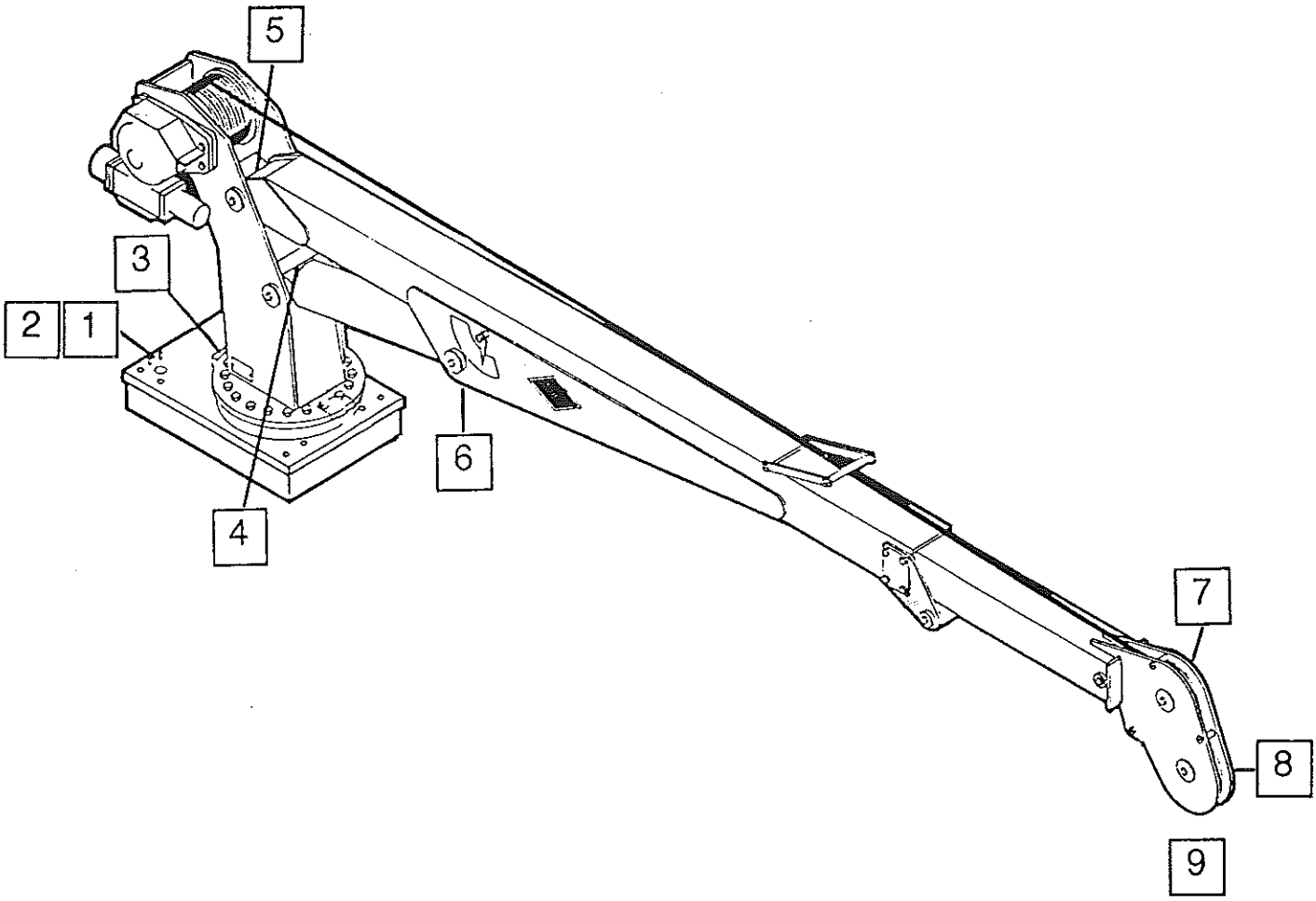
To replace an old style amp driver with a current model:

1. Clearly mark each electrical wire in a manner that can be identified later, and disconnect the 12VDC power source.
2. Disconnect the marked electrical wiring, and remove the amp driver.
3. Install the new amp driver using the same
4. Drill a 1/4" diameter hole in either bottom corner of the enclosure to allow moisture condensation to escape.
5. Using the electrical schematic for your crane (see previous pages), connect the wiring as indicated.
6. Check all connections to make certain that they are correct. Reconnect the 12VDC power source.

Figure E-1. TROUBLESHOOTING CHART

SYMPTOM	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
CRANE WILL NOT FUNCTION	NO POWER TO REMOTE CONTROL	CHECK CONNECTIONS TO 12VDC SOURCE. CHECK FUSE IN POWER WIRE.
	NO POWER TO FLOW CONTROL	CHECK CONNECTIONS BETWEEN AMP DRIVER AND FLOW CONTROL. CHECK POLARITY OF AMP DRIVER POWER LEADS. CHECK FUSE IN AMP DRIVER.
	FLOW CONTROL MALFUNCTION	CHECK TORQUE ON FLOW CONTROL SOLENOID. REMOVE FLOW CONTROL AND TEST. REPLACE AS NEEDED.
	VALVE SPOOL NOT SHIFTING	CHECK TIE BOLT TORQUE. REPLACE IF NEEDED.
	PUMP FAILURE	CHECK FLOW/PRESSURE. REPLACE IF NEEDED.
CRANE NOT PROPORTIONAL	FLOW CONTROL MALFUNCTION	CHECK TORQUE ON FLOW CONTROL SOLENOID. REMOVE FLOW CONTROL AND TEST. REPLACE AS NEEDED. CHECK VOLTAGE VARIANCE TO SOLENOID.
	TRIGGER POTENTIOMETER ADJUSTED INCORRECTLY	SET ENGINE AT HIGH SPEED CONTROL SETTING. SET ON ROTATION FUNCTION. ADJUST TRIGGER POT CCW UNTIL CRANE BEGINS TO ROTATE.
CRANE OPERATION NOT SMOOTH	AIR IN THE SYSTEM	BLEED HYDRAULICS AS NEEDED. CRANES WITH IN-LINE FLOW CONTROLS MUST BE BLED AT VALVE.
TRIGGER FUNCTION REVERSED	WIRING AT AMP DRIVER REVERSED	REVERSE THE WIRING TO AMP DRIVER AT TRIGGER IN REMOTE CONTROL.
Q1 IS CRACKED AND/OR DISCOLORED	IMPROPER WIRING	POWER SOURCE POLARITY IS REVERSED. CORRECT WIRING, REPLACE AMP DRIVER.
AMP DRIVER OUTPUT IS 0	IMPROPER WIRING	CHECK CONTINUITY IN THE + SIGNAL (ORANGE) CIRCUIT.
	MOISTURE IN AMP DRIVER	OPEN THE ENCLOSURE AND BLOW DRY. CHECK BOTTOM 1/4" HOLE FOR BLOCKAGE.
	AMP DRIVER HAS FAILED	POWER SOURCE POLARITY IS REVERSED. CORRECT AS NEEDED.
AMP DRIVER OUTPUT IS 1VDC AND WILL NOT VARY	IMPROPER WIRING	CHECK CONTINUITY IN THE SIGNAL(WHITE) CIRCUIT.
AMP DRIVER OUTPUT IS 12VDC AND WILL NOT VARY	IMPROPER WIRING	CHECK CONTINUITY IN THE -SIGNAL (BLUE) CIRCUIT.

Section 6. REFERENCE



ITEM	LOCATION DESCRIPTION	LUBRICANT	FREQUENCY
1.	TURNTABLE/BEARING GREASE EXTENSION *ROTATE CRANE WHILE GREASING	SHELL ALVANIA 2EP OR SHELL RETINAX "A"	WEEKLY
2.	DRIVE GEAR GREASE EXTENSION		
3.	PINION GEAR		
4.	LOWER CYLINDER BASE		
5.	MAST/LOWER BOOM HINGE PIN		
6.	LOWER CYLINDER ROD		
7.	UPPER SHEAVE PIN		
8.	LOWER SHEAVE PIN		
9.	SNATCH BLOCK PIN		

NOTE: All application points must be greased weekly under normal work loads and moderate weather conditions. Under severe operating conditions, lubrication should be performed more frequently. See Volume 1; Operation, Maintenance and Repair for additional lubrication requirements.

Figure F-1. GREASE ZERK LOCATIONS AND LUBRICANT REQUIREMENTS

TORQUE DATA CHART

FINE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (FT-LB)	SAE J429 GRADE 5 PLATED (FT-LB)	SAE J429 GRADE 8 PLAIN (FT-LB)	SAE J429 GRADE 8 PLATED (FT-LB)
5/16-24	0.3125	19	14	27	20
3/8-24	0.3750	35	26	49	35
7/16-20	0.4375	55	41	78	58
1/2-20	0.5000	90	64	120	90
9/16-18	0.5625	120	90	170	130
5/8-18	0.6250	170	130	240	180
3/4-16	0.7500	300	225	420	315
7/8-11	0.8750	445	325	670	500
1-12	1.0000	645	485	995	745
1 1/8-12	1.1250	890	670	1445	1085
1 1/4-12	1.2500	1240	930	2010	1510
1-3/8-12	1.3750	1675	1255	2710	2035
1 1/2-12	1.5000	2195	1645	3560	2670

COARSE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE SAE J429 GRADE 5 PLAIN (FT-LB)	SAE J429 GRADE 5 PLATED (FT-LB)	SAE J429 GRADE 8 PLAIN (FT-LB)	SAE J429 GRADE 8 PLATED (FT-LB)
5/16-18	0.3125	17	13	25	18
3/8-16	0.3750	31	23	44	33
7/16-14	0.4375	49	37	70	52
1/2-13	0.5000	75	57	105	80
9/16-12	0.5625	110	82	155	115
5/8-11	0.6250	150	115	220	160
3/4-10	0.7500	265	200	375	280
7/8-9	0.8750	395	295	605	455
1-8	1.0000	590	445	910	680
1 1/8-7	1.1250	795	595	1290	965
1 1/4-7	1.2500	1120	840	1815	1360
1-3/8-6	1.3750	1470	1100	2380	1780
1 1/2-6	1.5000	1950	1460	3160	2370

When using the torque data in the charts above, the following rules should be observed.

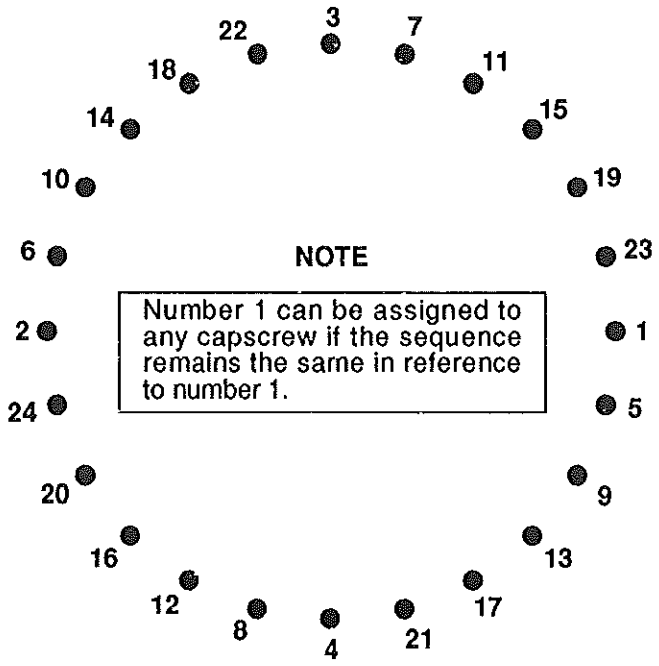
1. Bolt manufacturer's particular specifications should be consulted when provided.
2. Flat washers of equal strength must be used.
3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.
4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.
5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size. Once a bolt has been torqued to 75% of its proof load and then removed, the torque coefficient may no longer be the same as when the bolt was new thus giving indeterminate clamp loads after torquing. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatique causing serious injury or DEATH.

Figure F-2. TORQUE DATA CHART

Refer to the diagram below for proper tightening/torqueing sequence of the turntable bearing to the crane base and crane mast. The total quantity of cap screws varies dependent on crane model.



TIGHTENING PROCEDURE:

1. Refer to the Torque Data Chart to determine the proper torque value to apply to the size of capscrew used.

2. Follow the tightening sequence shown in the diagram. Note that the quantity of capscrews may differ from the diagram, but the sequence must follow the criss-cross pattern as shown in the diagram.

3. Torque all capscrews to approximately 40% of the specified torque value, by following the sequence. (EXAMPLE: .40 x 265 FT-LBS = 106 FT-LBS)

4. Repeat Step 3, but torqueing all capscrews to 75% of the specified torque value. Continue to follow the tightening sequence. (EXAMPLE: .75 x 265 FT-LBS = 199 FT-LBS)

5. Using the proper sequence, torque all capscrews to the listed torque value as determined from the Torque Data Chart.

Figure F-3. TURNTABLE BEARING FASTENER TIGHTENING SEQUENCE

Before a bearing is removed from a crane for inspection, one of the following conditions should be evident:

1. Metal particles present in the bearing lubricant.
2. Increased drive power required to rotate the crane.
3. Noise emitting from the bearing during crane rotation.
4. Rough crane rotation.
5. Uneven or excessive wear between the pinion gear and turntable gear.

If none of the above conditions exists, the bearing is functioning properly and need not be replaced. But, if one or more of the above conditions exists, inspection may be required. Limits are measured in "TILT" which is dependent on the internal clearances of the bearing. TILT is the most practical determination of a bearings internal clearance once mounted on a crane.

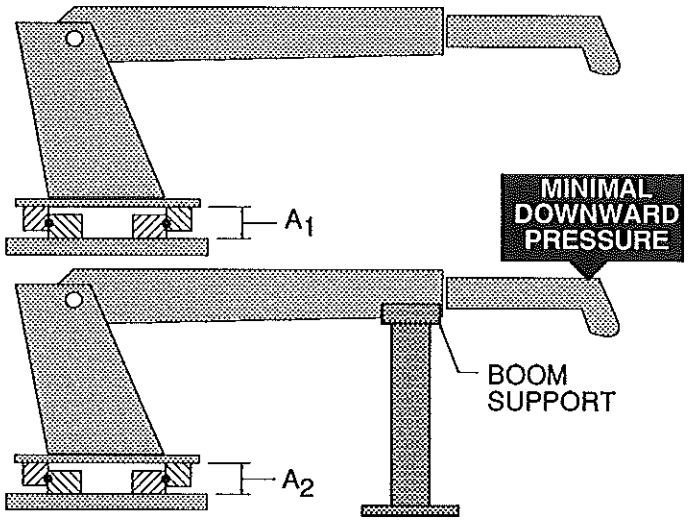
Periodic readings indicating a steady increase in TILT may be an indicator of bearing wear. Note that a bearing found to have no raceway cracks or other structural irregularities should be reassembled and returned to service.

TEST PROCEDURE

STEP 1.
With the crane horizontal and fully extended, measure between the top and bottom mounting surfaces of the turntable bearing (A_1), using a dial indicator for accuracy.

STEP 2.
Reverse the load by applying minimal downward pressure on the boom while the boom is in the boom support or on a solid surface. Again measure A_2.

STEP 3.
Subtract A_1 from A_2 to determine tilt and compare the result with the accompanying chart.



COMPARISON CHART - MODEL TO MEASURED TILT DIMENSION

NOTE					
THE FIGURES LISTED IN THIS CHART ARE SERVICE GUIDELINES AND DO NOT, IN THEMSELVES, REQUIRE THAT THE BEARING BE INSPECTED. IF THERE IS REASON TO SUSPECT AN EXCESS OF BEARING WEAR AND THE MEASURED TILT DIMENSION EXCEEDS THE DIMENSION LISTED, REMOVE THE BEARING FOR INSPECTION.	**IMT CRANE OR TIREHAND MODEL**	814 1007 1014 2010 215 2015 2109 2815 3016 315A 320H 3515 3617 3625 421 425 6016 TH7 BODY ROT'N TH1449A BODY ROT'N TH15A CLAMP TH1836A CLAMP TH2551 CLAMP TH2557 CLAMP TH2557A CLAMP	4817 4825 516 525 5826 6014 6425 725 7020 7025 8025 8031 TH10 BODY ROT'N TH12 BODY ROT'N	32018 32030 HAWK-H1150 HAWK-H1150TL HAWK-H4961	9616 9825 9831 10020 10025 1216 1325 1331 13031 13034 13426 14018 14048 14126 15033 1725 18026 20017 TH1836 BODY ROT'N TH1836A BODY ROT'N TH2551 BODY ROT'N TH2557 BODY ROT'N TH2557A BODY ROT'N
	BALL DIA. (REF)	.875" (22mm)	1.00" (25mm)	1.18" - 1.25" (30 - 32mm)	1.75" (44mm)
	TILT DIM. (A_1 - A_2)	**.060" (1.524mm)**	**.070" (1.778mm)**	**.075" (1.905mm)**	**.090" (2.286mm)**

Figure F-4. TURNTABLE BEARING INSPECTION FOR REPLACEMENT

Spare Parts List

This spare parts list does not necessarily indicate that the items can be expected to fail in the course of a year. It is intended to provide the user with a stock of parts sufficient to keep the unit operating with no down-time waiting for parts. Obviously, there may be part failures not covered by this list.

The item numbers shown on this list correspond to those on the figure listed.

FIGURE	ITEM	PART NO.	DESCRIPTION	QTY
D-4. BASE ASSEMBLY (41707659)				
	3	60020114	BUSHING	1
	4	60020115	BUSHING	1
	5	60020116	BUSHING	1
	6	60020154	BUSHING	1
	7	71056011	DRIVE GEAR	1
	15	71056010	PINION GEAR	1
	16	71056012	INTERMEDIATE GEAR	1
	17	71056389	TURNTABLE BEARING	1
	32	73051004	HYDRAULIC MOTOR	1
	33	73054538	COUNTERBALANCE VALVE CARTRIDGE	2
	24	72060931	CAP SCREW 5/8-11 X 2-3/4 HH GR8	24
	30	72063119	WASHER 5/8 FLAT HARDENED GR8	24
D-5. MAST ASSEMBLY (41712184)				
	4	72060931	CAP SCREW 5/8-11 X 2-3/4 HH GR8	18
	5	72063119	WASHER 5/8 FLAT HARDENED GR8	18
D-6. LOWER BOOM ASSEMBLY (41712180)				
	5	7BF81520	BUSHING	4
	6	60030015	WEAR PAD	2
	7	60030139	WEAR PAD	1
D-7. LOWER BOOM CYLINDER (3C038940)				
	3	7BF81015	BUSHING	6
	5	73054242	COUNTERBALANCE VALVE	1
	8	9B043920	SEAL KIT	1
D-8. EXTENSION BOOM ASSEMBLY 16' (41707662)				
	3	60030189	WEAR PAD	1
D-9. EXTENSION BOOM ASSEMBLY 20' (41707663)				
	5	60030189	WEAR PAD	1
D-10. EXTENSION CYLINDER (3B309820)				
	9	73054004	VALVE	1
	10	9B101220	SEAL KIT	1
D-11. WINCH/CABLE/HOOK KIT (41712179)				
	6	60030255	SHEAVE	3
	12	70055117	FLANGE BEARING	1
	16	70732882	HOOK	1
	32	73051513	HYDRAULIC MOTOR	1
D-12. LOCKING HOLDING VALVE (73054900)				
	2	73054661	COUNTERBALANCE VALVE	1
	3	7Q072112	O-RING	3
D-14. REMOTE CONTROL KIT (90712186)				
	1	77041390	AMP DRIVER	1
	6	77041251	RELAY 12VDC	2
	7	77041237	SOLENOID 12VDC 150A	1
	19	77041476	PRESSURE SWITCH 3100 PSI	1
	20	7Q072015	O-RING	1
D-15. REMOTE CONTROL HANDLE ASSEMBLY (51707752)				
	5	51707507	POTENTIOMETER ASSEMBLY	1
	15	77041345	TOGGLE SWITCH SPST	2
	16	77041346	TOGGLE SWITCH SPDT	4
	17	77041347	TOGGLE SWITCH - MOMENTARY	1
REF		70048149	SUCTION FILTER ELEMENT	6
REF		73052006	RETURN FILTER ELEMENT	2

Section 8. FLIP-UP BOOM SHEAVE

8-1. GENERAL

This section contains information regarding the operation of the Flip-up boom sheave which is an available option on the 6016-20' Crane only. Refer to Figure H-1 for parts reference.

8-2. SINGLE-PART LINE OPERATION

To position the crane for single-line operation:

1. Disconnect the cable wedge socket (item 14) from the boom tip dead end link (item 51) by removing the other pin and keeper (items 53 and 35).

2. Remove the link by removing the other pin and keeper (items 53 and 35)and rotate the flip sheave weldment (item 52) to the horizontal position and insert one of the retaining pins and keepers (items 53 and 35) through the lower hole in the boom tip.

3. Remove the two-part line snatch block (item 4) by removing the sheave (item 6) which is held in place by the pin (item 3), retainer plate (item 11) and wing bolt (item 50).

4. After the cable is freed from the snatch block, reassemble the sheave and snatch block. Store the snatch block assembly (items 3, 4 and 6) and the dead end link (item 51) in the chassis cab or a body compartment, if available.

5. Locate the 3-ton hook (item 55) which is stored separately on the chassis. Connect the hook to the cable wedge socket using the pin and keeper (items 53 and 35).

The crane should now be in position for single-part line operation. Note that no change in mounting of the anti two-blocking system is required.

8-3. TWO-PART LINE OPERATION

To position the crane for two-part line operation:

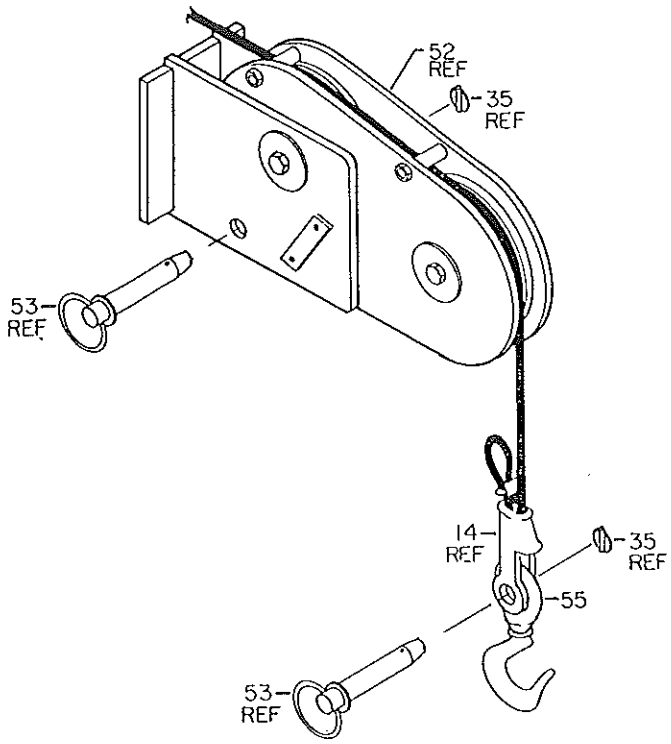
1. Disconnect the 3-ton hook (item 55) from the cable wedge socket (item 14) by removal of the pin and keeper (items 53 and 35). Store the hook in the chassis cab or a body compartment if available.

2. Locate the two-part line snatch block assembly (items 3, 4 and 6) and cable dead end link (item 51) which are stored separately on the chassis.

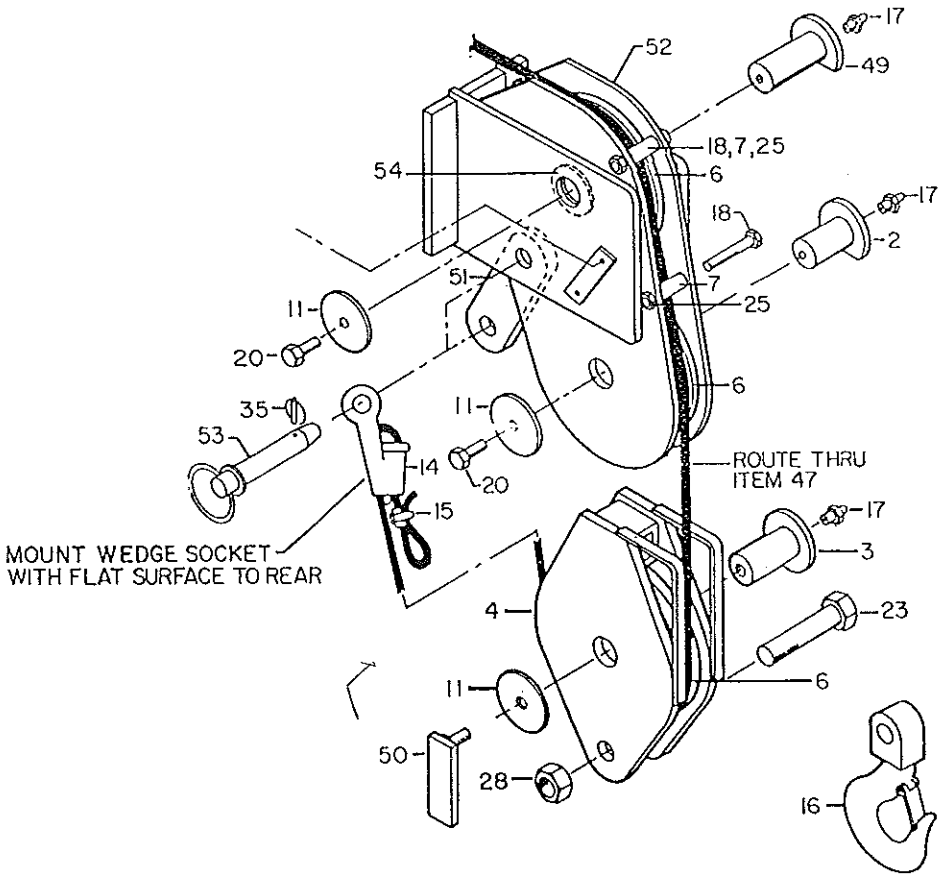
3. Remove the pin and keeper (items 53 and 35) from the boom tip and rotate the flip sheave weldment (item 52) to the vertical position. Position the dead end link (item 51) in position with the sheave weldment (item 52) and insert the pin and keeper (items 53 and 35).

4. Disassemble the snatch block assembly (items 3, 4 and 6) and string the cable through and reassemble the snatch block. Connect the cable wedge socket (item 14) to the dead end link (item 51) by using the other pin and keeper (items 53 and 35).

The crane should now be in position for two-part line operation. Note that no changes in mounting of the anti two-blocking system is required.



SINGLE-PART LINE OPERATION



TWO-PART LINE OPERATION

Figure H-1. FLIP-UP BOOM SHEAVE OPTION

Section 9.

O.S.H.A. Crane Inspection Requirements

O.S.H.A. 1926.550 requires employers to perform daily and monthly inspections and to maintain the results of inspections for each hoisting machine and piece of equipment. It also requires a thorough annual inspection of hoisting machinery. This ispection is to be made by a competent person, or by a government or private agency recognized by the U. S. Department of Labor. Records of the dates and results of inspections for each hoisting machine and piece of equipment must also be maintained by the employer. The following inspections are to be performed on Iowa Mold Tooling Co., Inc. truck-mounted hydraulic cranes in order to comply with O.S.H.A. Regulation 1926.550.

TO BE FILLED IN BY OWNER OF CRANE
CRANE SERIAL NO:
DATE LAST INSPECTED:
NEXT INSPECTION DUE:
INSPECTED BY:

TO BE FILLED IN BY A COMPETENT PERSON, OR BY A GOVERNMENT OR PRIVATE AGENCY RECOGNIZED BY THE U.S. DEPT OF LABOR		
DATE INSPECTED:		
IS THE UNIT OPEATIONAL?	YES ☐	NO ☐
SIGNATURE		

INSTRUCTIONS

All inspections listed below should be performed as the schedule indicates. It is not necessary to record daily inspections but they must be verified and recorded monthly. The inspections listed on this form do not eliminate or replace any other prescribed maintenance or inspections which may be referenced in other manuals pertaining to your equipment. A copy of this completed form should remain with the applicable unit at all times.

INSPECTIONS TO BE PERFORMED BY EMPLOYER

ITEM	DESCRIPTION	FREQUENCY			INSP. RESULT		REPAIRED?		DATE INSPECTED
		DAILY	WEEKLY	MONTHLY	ACCEPT	REJECT	YES(Y) NO(N)	DATE	
HYDRAULIC SYSTEM LEAKS	Visually inspect hoses, hyd tubes and fittings for hydraulic leaks.								
LOOSE PARTS	Check for the presence of loose parts, missing fasteners and safety guards.								
STRUCTURAL DAMAGE	Visually examine crane for broken welds, cracks, deficiencies, bends and dents.								
ROTATION SYSTEM LEAKS	Visually check rotation system motor, brake, and connections for leaks.								
WIRE ROPE	Check for conditions outlined in "Wire Rope Inspection".								
ELECTRICAL-REMOTE CONTROL OPTION	Operate remote control to check for proper operation.								
ELECTRIC-LIGHTS AND OPTIONS	Operate lights and other electrical devices to check for proper operation.								
HYDRAULIC FLUID LEVEL	Visually check hydraulic fluid level of reservoir.								
CONTROL VALVES-LEAKS / CRACKS	Visually examine control valves for leaks, cracks or other deficiencies.								
CONTROL VALVES-OPERATION	Operate control valves to check for smooth operation of each function and possible excessive wear of valves.								
ANTI-TWO BLOCKING DEVICE	Test the Anti-Two Blocking Device as described in "Anti-Two Blocking Device Inspection".								

CONTINUED ON FOLLOWING PAGE

INSPECTIONS TO BE PERFORMED BY EMPLOYER (continued)

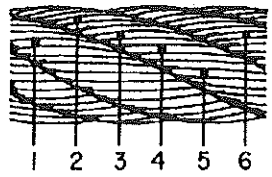
ITEM	DESCRIPTION	FREQUENCY			INSP. RESULT		REPAIRED?		DATE INSPECTED
		DAILY	WEEKLY	MONTHLY	ACCEPT	REJECT	YES(Y) NO(N)	DATE	
CRANE HOOK	Visually examine hook for enlarged throat opening, twist and presence of safety latch. Also check for conditions outlined in "Hook Inspection".								
ELECTRICAL SYSTEM WEAR	Check for deterioration of parts, the presence of dirt or moisture near contacts, and worn or frayed wiring.								
HYDRAULIC HOSE WEAR	Visually examine all hydraulic hoses and fittings for possible blistering, abrasions, cuts, cracking or deterioration.								
HOLDING VALVES-LOAD TEST	Perform a load holding test with loaded boom. See "Holding Valve Inspection".								
POWER TAKE-OFF	Check transmission for proper lubrication, signs of leakage, alignment and PTO mounting bolt torque.								
ROTATION SYSTEM	Check torque of both upper and lower rotation gear bearing mounting bolts.								
ALL FASTENERS	Visually examine all fasteners (screws, nuts & retaining rings) for looseness, deformation and corrosion.								
STRUCTURAL DAMAGE	Visually examine crane for any broken welds, cracks, structural deficiencies, bends or dents.								
CONTROLS	Check all controls for excessive wear, cleanliness and proper functioning.								
ROTATION SYSTEM MOUNTING BOLTS	Check torque of both upper and lower rotation gear bearing mounting bolts.								
HYDRAULIC FLUID	Check quality of hydraulic fluid and for the presence of water.								
PUMP & MOTOR	Check for loose fasteners, unusual noise, vibration, reduced operating speed and excessive heating.								
HYDRAULIC CYLINDERS	Visually examine all cylinders for leaks; scored, nicked or dented rods; dented case, deformed pin boss, and corrosion.								
WINCH, SHEAVES & DRUM	Check for cracks, and worn or damaged sheaves. Visually examine winch drum for irregularities.								
DECALS	Visually examine the crane for the presence of all warning decals, instructional decals and capacity charts. Inspect all decals for legibility.								

WIRE ROPE INSPECTION

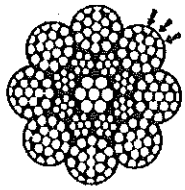
Wire rope with any of the deficiencies shown below shall be removed and replaced immediately.

A. Corrosion can be cause for replacement. Any development of corrosion must be noted and monitored closely.

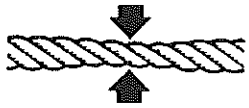
B. When there are either 3 broken wires in one strand or a total of six broken wires in all strands in any one rope lay.



C. When flat spots on the outer wires appear and those outside wires are less than 2/3 the thickness of the unworn outer wire.

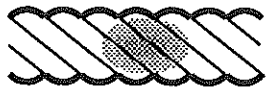


D. When there is a decrease of diameter indicating a core failure.

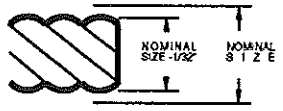


E. When kinking, crushing, birdcaging or other distortion occurs.

F. When there is noticeable heat damage (discoloration) of the rope by any means.



G. When the diameter is reduced from nominal size by 1/32" or more.



H. If a broken wire protrudes or loops out from the core of the rope.

HOOK INSPECTION

Hooks having any of the listed deficiencies shall be removed from service unless a qualified person approves their continued use and initiates corrective action. Hooks approved for continued use shall be subjected to periodic inspection.

A. DISTORTION

Bending / Twisting

A bend or twist exceeding 10° from the plane of the unbent hook.

Increased Throat Opening

HOOK WITHOUT LATCH: An increase in throat opening exceeding 15% (Or as recommended by the manufacturer)

HOOK WITH LATCH: An increase of the dimension between a fully-opened latch and the tip section of the hook exceeding 8% (Or as recommended by the manufacturer)

B. WEAR

If wear exceeds 10% of the original sectional dimension. (Or as recommended by the manufacturer)

C. CRACKS, NICKS, GOUGES

Repair of cracks, nicks, and gouges shall be carried out by a designated person by grinding longitudinally, following the contour of the hook, provided that no dimension is reduced more than 10% of its original value. (Or as recommended by the manufacturer) (A qualified person may authorize continued use if the reduced area is not critical.)

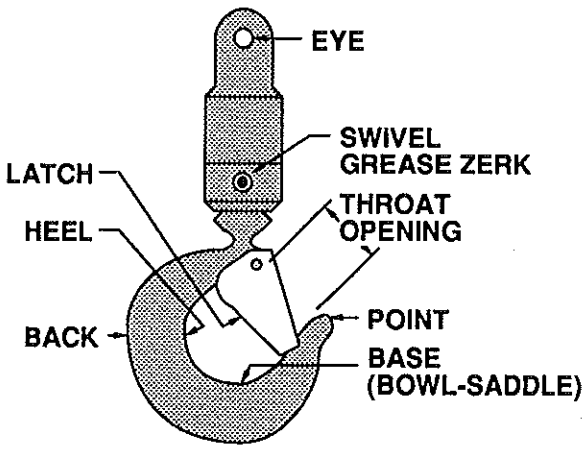
D. LATCH

Engagement, Damage & Malfunction

If a latch becomes inoperative because of wear or deformation, and is required for the service involved, it shall be replaced or repaired before the hook is put back into service. If the latch fails to fully close the throat opening, the hook shall be removed from service or "moused" until repairs are made.

E. HOOK ATTACHMENTS & SECURING MEANS

If any indication of distortion, wear, cracks, nicks or gouges are present, unless a qualified person authorizes their use. (Or as recommended by the manufacturer)



HOLDING VALVE INSPECTION

The cylinders are equipped with holding valves that prevent sudden movement of the cylinder rods in the event of a hydraulic hose or other hydraulic component failure. The valve is checked in the following manner:

1. With a full rated load, extend the cylinder in question and kill the engine.

2. Operate the control valve to retract the cylinder. If the cylinder "creeps", replace the holding valve. If the cylinder does not "creep", the valve is serviceable.

ANTI-TWO BLOCKING DEVICE INSPECTION (See Vol. 1, Operation, Maintenance and Repair for a complete description)

The anti two block system should be checked daily as follows:

1. Examine flexible rod and weight to insure free unrestricted mechanical operation

2. Examine cord for damage, cuts or breaks. Grasp cord and pull to check operation of cord reel. The cord should retract on reel when released.

3. Start vehicle, engage PTO and slowly winch loadline up until anti-two block weight comes in contact with the hook end of the loadline cable. At the moment the weight is fully supported, a marked difference in winch operation should be noted. At this point, the winch up function should become very sluggish or non-functioning and have very little pull capability. Slowly increase truck engine speed while simultaneously actuating the winch up function. The winch characteristics should remain sluggish with little or no tensioning of the cable. If operation other than as described occurs, stop immediately and investigate. Failure to do so will risk damage to the cable or the crane.

If all is well at this point, actuate the boom extend function slowly, and gradually increase to full actuation. Once again the function should be sluggish or non-existent with no tightening of the winch cable. If operation other than described occurs, stop immediately and reverse the function.

The final check involves actuating both the winch up and extend functions together and checking for proper operation of the anti two blocking circuit. Once again, start slowly and stop if it appears the cable is being tensioned.

If the anti two block function appears to be functioning normally, winch the cable down until the sensing weight swings free.

TORQUE DATA CHART

COARSE THREAD BOLTS

SIZE (DIA-TPI)	BOLT DIA (INCHES)	TIGHTENING TORQUE			
		 SAE J429 GRADE 5		 SAE J429 GRADE 8	
		PLAIN (FT-LB)	PLATED (FT-LB)	PLAIN (FT-LB)	PLATED (FT-LB)
5/16-18	0.3125	17	13	25	18
3/8-16	0.3750	31	23	44	33
7/16-14	0.4375	49	37	70	52
1/2-13	0.5000	75	57	105	80
9/16-12	0.5625	110	82	155	115
5/8-11	0.6250	150	115	220	160
3/4-10	0.7500	265	200	375	280
7/8-9	0.8750	395	295	605	455
1-8	1.0000	590	445	910	680
1 1/8-7	1.1250	795	595	1290	965
1 1/4-7	1.2500	1120	840	1815	1360
1-3/8-6	1.3750	1470	1100	2380	1780
1 1/2-6	1.5000	1950	1460	3160	2370

When using the torque data in the charts above, the following rules should be observed.

1. Bolt manufacturer's particular specifications should be consulted when provided.

2. Flat washers of equal strength must be used.

3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.

4. Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress ability, such as Never-Seez compound graphite and oil, molybdenum disulphite, collodial copper or white lead are applied, multiply the torque values in the charts by the factor .90. The use of Loctite does not affect the torque values listed above.

5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

Anytime a gear-bearing bolt is removed, it must be replaced with a new bolt of the identical grade and size. Once a bolt has been torqued to 75% of its proof load and then removed, the torque coefficient may no longer be the same as when the bolt was new thus giving indeterminate clamp loads after torquing. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatique causing serious injury or DEATH.