

Volume 2
Parts and Specifications
2200 Series Crane

IOWA MOLD TOOLING CO., INC.

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PRODUCT SUPPORT FAX: 515-923-2424

MANUAL PART NUMBER 99900292

LAST REVISED: 02-03-97

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 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 B30.22
ARTICULATING BOOM 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.

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Section 1. SPECIFICATIONS- 2200 SERIES CRANE

1-1. GENERAL

2200 SERIES CRANE

	1H	1H1M
*CRANE RATING (ANSI B30.22)	22,080 ft-lbs	22,080 ft-lbs
*MAXIMUM CRANE RATING	22,080 ft-lbs	22,080 ft-lbs
HORIZONTAL REACH from centerline of rotation	15'-0"	18'-0"
HYDRAULIC EXTENSION	3'-0"	3'-0"
MANUAL EXTENSION	NONE	3'-0"
VERTICAL REACH from mounting surface	20'-1"	23'-1"
VERTICAL REACH from ground / 34" frame ht.	23'-1"	25'-11"
CRANE WEIGHT	1200 lbs	1260 lbs
OUTRIGGER SPAN	9'-5"	9'-5"
OUTRIGGER PADS	7-1/2" diameter	7-1/2" diameter
CRANE STORAGE HEIGHT from mounting surface	5'-5"	5'-5"
CRANE STORAGE HEIGHT from ground / 34" frame ht.	8'-3"	8'-3"
**MOUNTING SPACE REQUIRED	22"	22"
ROTATIONAL TORQUE	3690 ft-lbs	3690 ft-lbs
OPTIMUM PUMP CAPACITY	5 GPM	5 GPM
SYSTEM OPERATING PRESSURE	2500 PSI	2500 PSI
OIL RESERVOIR CAPACITY	7 gallons	7 gallons
HOOK APPROACH - HORIZONTAL from centerline of rotation	26"	26"
HOOK APPROACH - VERTICAL from mounting surface	4'-5"	4'-5"

* Maximum Crane Rating (ft-lbs) is defined as that rated load (lbs) which when multiplied by its respective distance (ft) from centerline of rotation gives the greatest ft-lb value.

ANSI B30.22 Crane Rating (ft-lbs) = With all extensions retracted and inner plus outer boom in a horizontal position, rated load (lbs) X respective distance (ft) from centerline of rotation = nominal ft-lb value.

** Allow an additional 4" between the cab and crane base for swing clearance.

1-2. PERFORMANCE CHARACTERISTICS

ROTATION:	400°	60 seconds
INNER BOOM ELEVATION:	-48° to +76°	20 seconds
OUTER BOOM ARTICULATION:	142°	30 seconds
EXTENSION:	36"	10 seconds
OUTRIGGER CYLINDER:	18"	

1-3. POWER SOURCE

Integral mounted hydraulic pump and PTO application. Other standard power sources may be used. Minimum power required is 10 horsepower.

1-4. CYLINDER HOLDING VALVES

The load holding side of all hydraulic cylinders are equipped with integral holding valves, or counter balance valves. Their function is to prevent sudden cylinder collapse in case of hose failure, or other hydraulic failure. The counter balance valve serves several functions. First, it is a holding valve. Secondly, it controls the retract, or lowering function, allowing controlled lowering of the load. Finally, if a hose breaks, the only oil loss will be that in the hose.

1-5. ROTATION SYSTEM

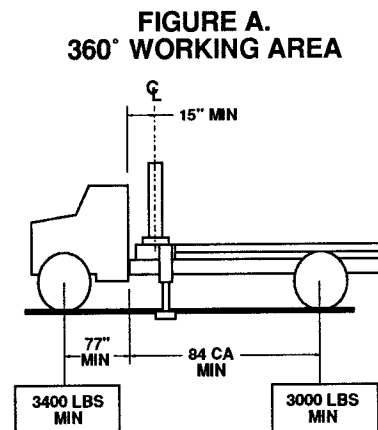
Rotation of the crane is accomplished through a turntable bearing with external worm gear, powered by a high torque hydraulic motor through a self-locking work. Total gear reduction is 63:1.

1-6. HYDRAULIC SYSTEM

The hydraulic system is an open center, full pressure system, requiring 5 GPM oil flow, at 2500 PSI. There are ix spool, stack type control valves, single operational control handles located at left side of the crane for convenient operation. System includes hydraulic oil reservoir, suction line filter, pump, 6-section control valvebank, return line filter and all hoses and fittings.

1-7. MINIMUM CHASSIS SPECIFICATIONS - For Standard 2200 Series Crane

Crane Mount	Behind Cab
Crane Working Area	360°
Chassis Style	Conventional Cab
Front Axle Rating (GAWR)	4000 lbs
Rear Axle Rating (GAWR)	Single Axle 7000 lbs
Wheelbase	161"
Cab-to-axle	84"
Outigger Width Required	9'-5"
RBM	290,000 in-lbs
Frame Section Modulus	8 in ³
Frame Yield Strength	36,000 psi
Minimum Finished Unit Weight To Maintain Vehicle Stability	
Front Axle	* 3400 lbs
Rear Axle	* 3000 lbs
Total Finished Unit Wt.	6400 lbs



* Allows lifting full capacity load in a 360° arc when crane is installed immediately behind the cab. Great care should be taken when swinging the load from rear of vehicle to front of vehicle since the front axle springs will compress, thus affecting the levelness of the vehicle.

NOTES:

1. GAWR means Gross Axle Weight Rating and is dependent on all components of the vehicle such as axles, tires, wheels, springs, brakes, steering and frame strength meeting the manufacturer's recommendations. Always specify GAWR when purchasing a truck.
2. Minimum axle requirements may increase with use of diesel engines, longer wheelbase or service bodies. Contact the factory for further information.
3. Weight distribution calculations are required to determine final axle loading.
4. All chassis and crane combinations must be stability tested to ensure stability per ANSI B30.22

IMT reserves the right to change specifications and design without notice.

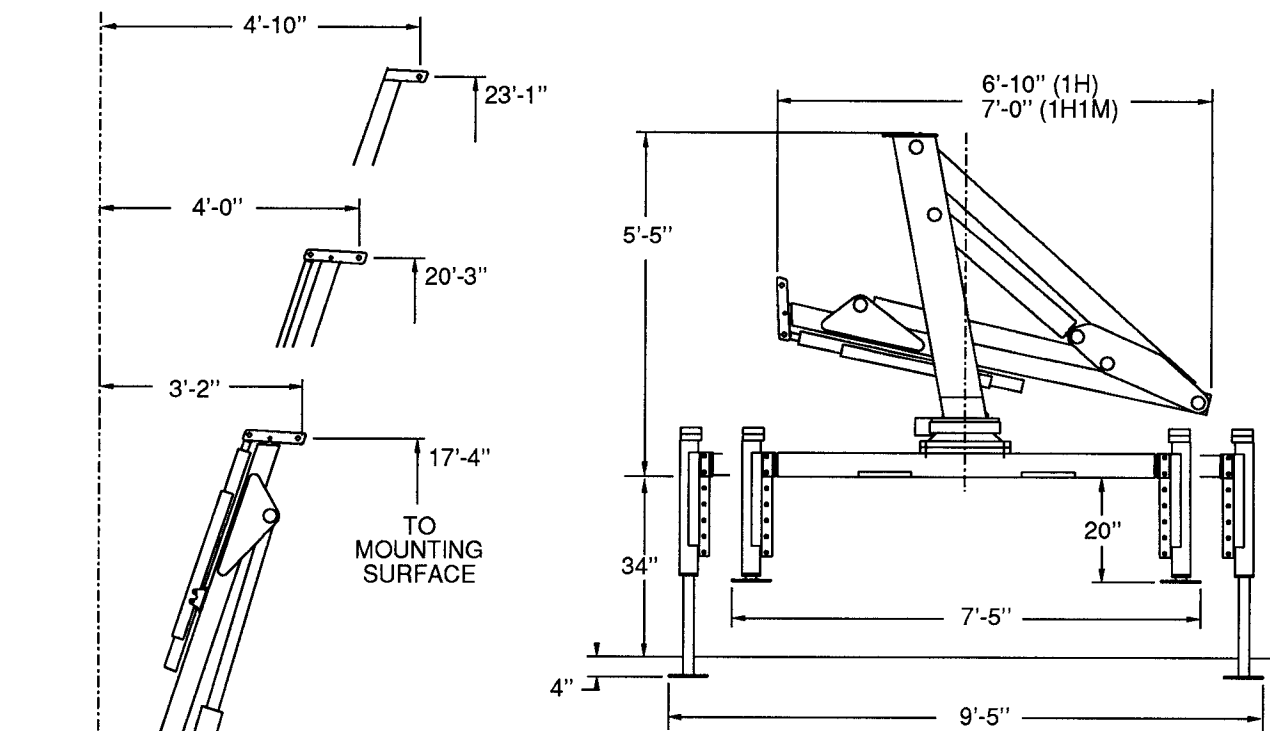


Figure A-1.
STOWED POSITION AND OUTRIGGER DIMENSIONS

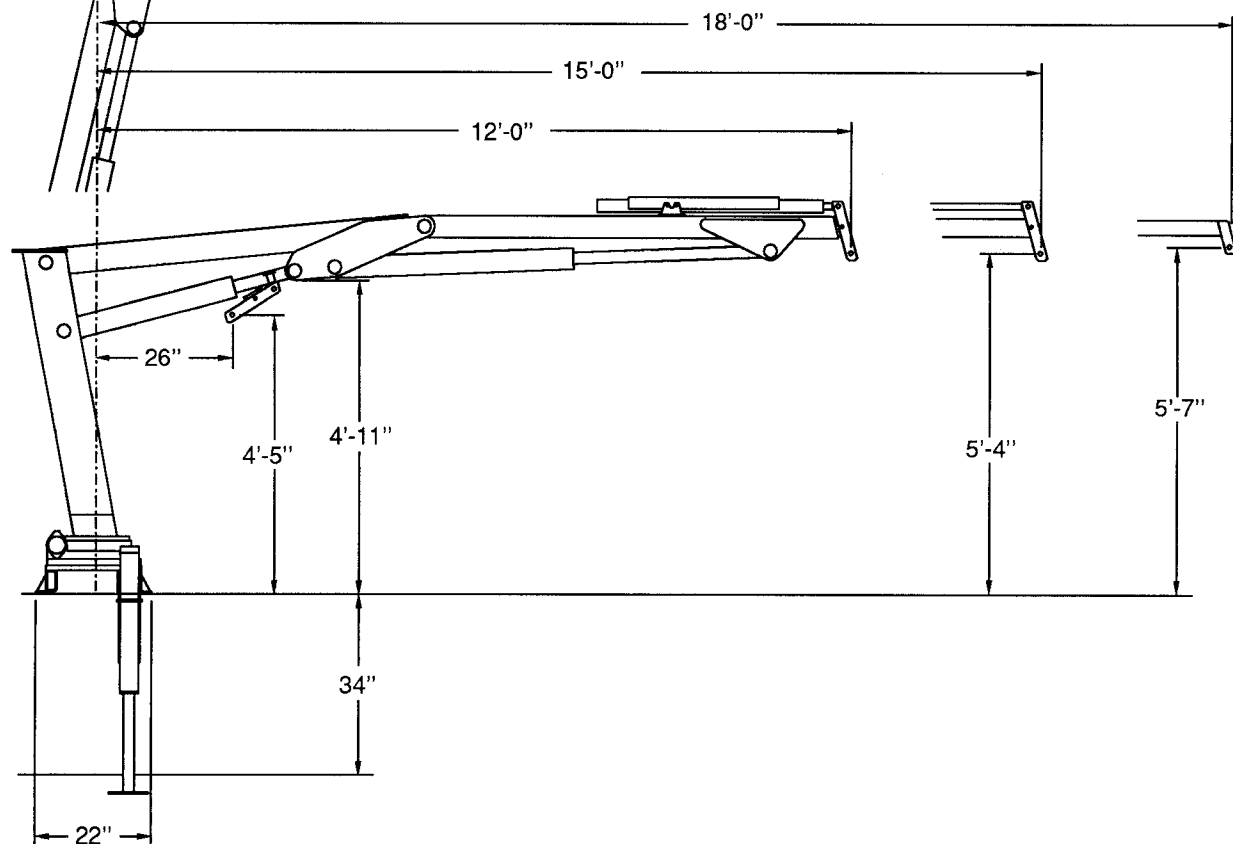


Figure A-2. GEOMETRIC CONFIGURATION

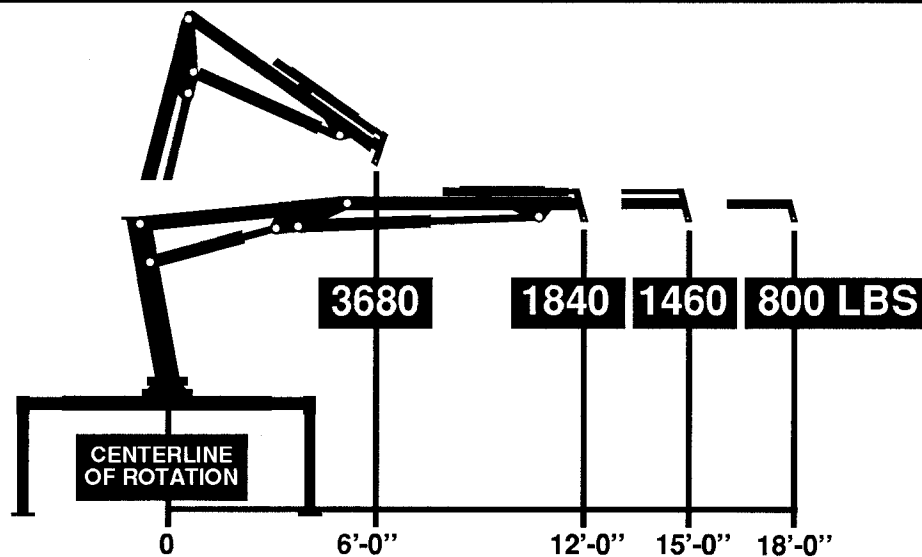
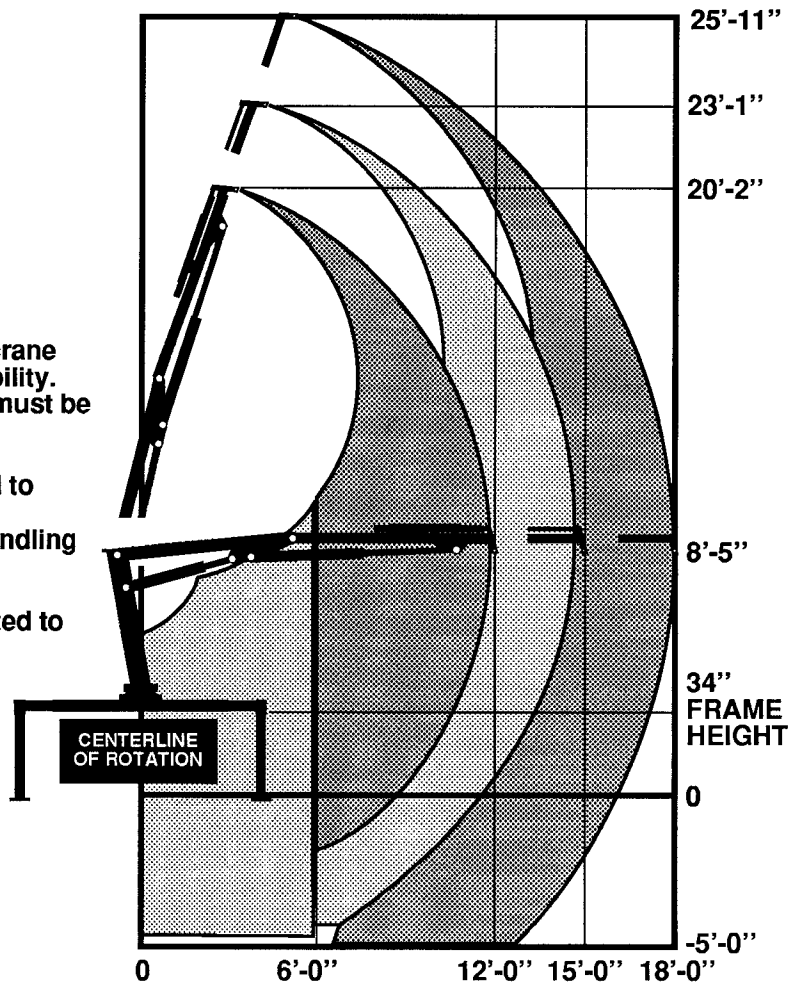
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Capacities through geometric range are limited to those shown in horizontal position.



2200 Series Crane

- Loads shown are based on crane structural or hydraulic capability. Before lift is made, stability must be checked per SAE J765A.
- Working loads will be limited to those shown. Deduct the weight of load handling devices.
- Winch lifting capacity is limited to those shown. Maximum 2500 LBS for 1-part line.



71393862

Figure A-3. CAPACITY CHART

Section 2. CRANE DESCRIPTION

2-1. GENERAL

This section describes the major assemblies that are available with this crane. Figure B-1 illustrates the locations of the assemblies.

2-2. BASE

The base provides a platform for mounting the crane to a truck. It incorporates the 400° rotation mechanism and outriggers. The outriggers provide stabilization during crane operation.

2-3. MAST

The mast provides the necessary elevation for crane operation as well as a hinge point for the inner boom. The mast consists of a vertical weldment connected to the base to allow the crane to fold into the figure 4 configuration for travel.

2-4. INNER BOOM

The inner boom will swing through a full 124° from -48° to +76°. It is raised and lowered through the use of a double-acting hydraulic cylinder.

2-5. OUTER BOOM

The outer boom will swing through a full 142°. The boom is raised and lowered with a double-acting hydraulic cylinder mounted under the inner and outer hinge point. It also provides storage for the extension boom in the retracted position.

2-6. EXTENSION BOOMS

This crane uses a one-stage hydraulic extension for an additional 36'' of reach.

2-7. CONTROLS

The control for all hydraulic functions is provided by a remote control handle coupled electrically to the hydraulic valve.

2-8. HYDRAULICS

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

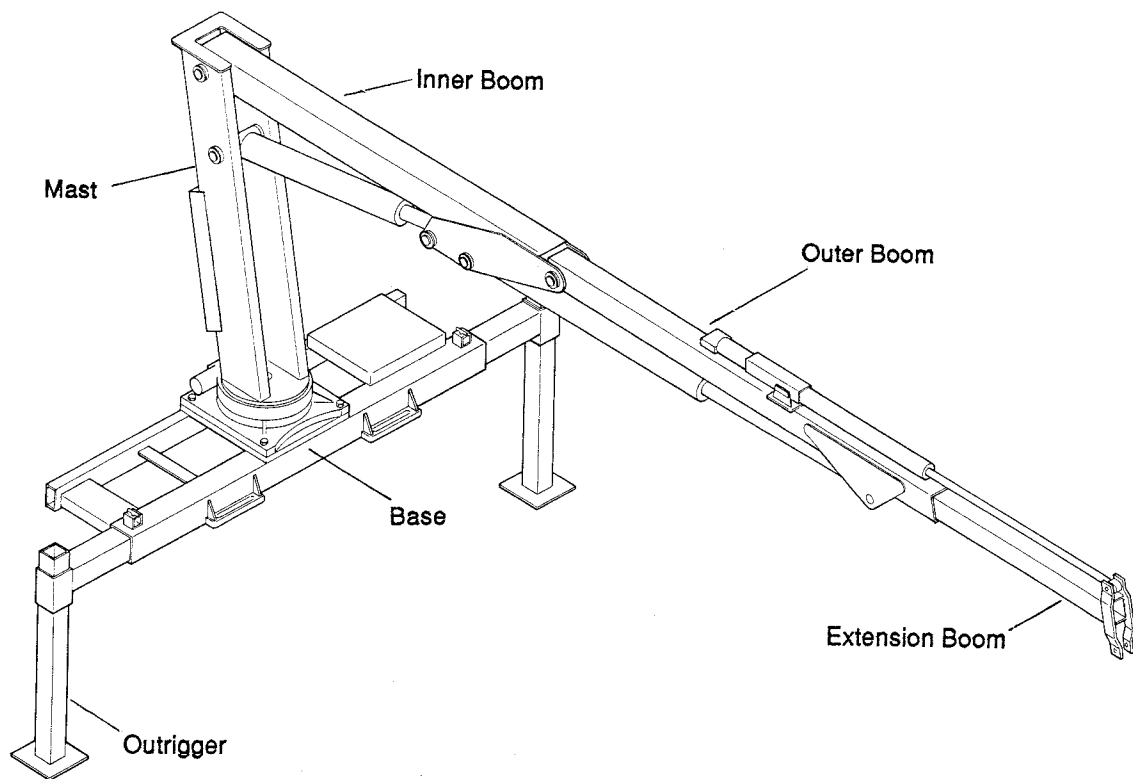


Figure B-1. MAJOR CRANE COMPONENTS

Section 3. INSTALLATION

3-1. GENERAL

This section contains specific instruction 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-1,200 lbs. Use a sling or chain around the inner cylinder pin bosses on the inner boom. Secure the lifting device to prevent slippage and lift the crane. Move the carrier vehicle into position under the crane and lower the crane into position on the chassis.

Allow sufficient room between the crane and cab for mast rotation - at least 4". Check for front to rear alignment.

2. Position the shear plates under the crane base and bolt them snugly to the crane base. Clamp the shear plates to the truck frame and drill the shear plate mounting holes using the shear plate as a template. Use a 1/4" drill for a pilot hole and then remove the shear plates. Finish drilling with a 9/16" drill.

3. Install the shear plates on the truck chassis - bolts should be only 1/2 turn more than finger tight. Install 3/4-10 x 3-1/2" hex head bolts through crane base and shear plate mounting blocks. Use 3/4" flat washers and locknuts. Torque to 226 ft-lbs.

4. Torque the 1/2-13 x 1-1/2" hex head bolts that secure the shear plates to the truck chassis at 90 ft-lbs.

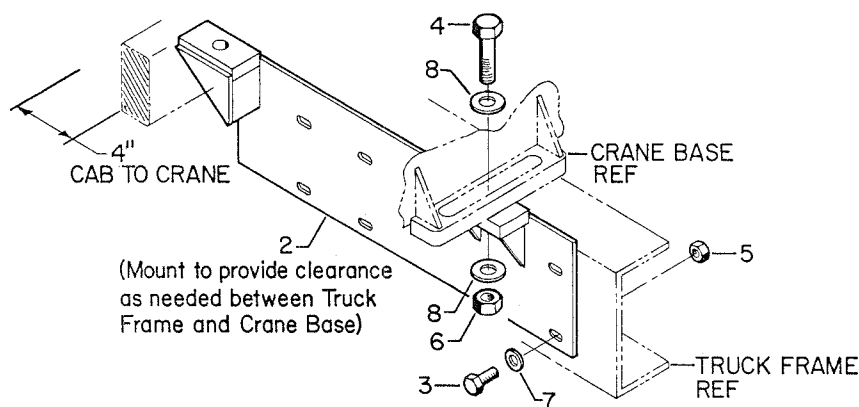
5. Install the tie rods, clamp plates, hardened washers and lock nuts to secure the crane base to the chassis (Figure C-1). Power wrench the nuts tight.

CAUTION

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. 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.

6. See the installation kits in the Parts section for specific part numbers.



ITEM	DESCRIPTION	QTY
2.	Shear Plate	2
3.	Cap Screw 1/2-13 x 1-1/2	16
4.	Cap Screw 3/4-10 x 3-1/2	4
5.	Nut 1/2-13 Lock	16
6.	Nut 3/4-10 Lock	4
7.	Washer 1/2 Hardened	16
8.	Washer 3/4 Hardened	8

Figure C-1. CRANE INSTALLATION

3-3. HYDRAULIC INSTALLATION

To install the hydraulic hoses, fittings, etc.:

1. Install the hydraulic reservoir on the crane base.
2. Plumb the suction-line filter as shown in the hydraulic kit.
3. Install the 3/4" suction hose between the suction-line filter and the pump inlet. tighten the hose clamps.
4. Install the 3/8" pressure hoses between the pump outlet and the inlet port on the valve bank.
5. Install the return filter and gate valves on the reservoir. Install the 1/2" hose between the valve bank and return filter.
6. Fill the hydraulic reservoir to the "FULL" mark.

7. Open the gate valve at the suction-line filter.

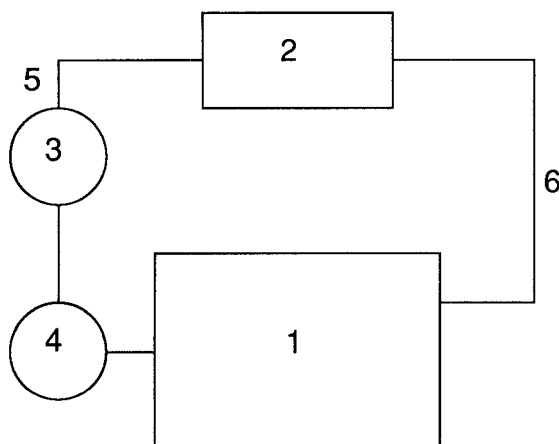
CAUTION

FAILURE TO OPEN THE GATE VALVE WILL RESULT IN A DRY RUNNING PUMP WHICH MAY DAMAGE THE PUMP.

8. Open the return gate valve.

9. Start the vehicle's engine and engage the PTO. Allow the system to run for about five minutes and then check the vacuum gauge on the suction-line filter (it should read 8" mercury or less). If the vacuum reading is too high, check to make certain that the gate valve is opened completely. If the valve is fully opened, check for a collapsed or restricted suction line.

10. Cycle all hydraulic functions. Check for leaks, and refill the reservoir if necessary.



ITEM	DESCRIPTION
1.	Oil Reservoir
2.	Valve Bank
3.	Pump
4.	Suction Filter
5.	Pressure Hose
6.	Return Hose

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. When ordering parts, communicating warranty information or referring to the unit in correspondence, always include the assigned serial and model numbers. All inquiries should be addressed to:

Iowa Mold Tooling Co., Inc.
Box 189, Garner, IA 50438-0189
Telephone: 515-923-3711
Product Support Fax: 515-923-2424

or

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

MODEL MODELO MODELE	SERIAL NUMBER NUMERO DE SERIE NUMERO DE SERIE
DRAWING NUMBER NUMERO DE PLANO NUMERO DE PLAN	DATE FECHA DE FABRICACION DATE
	
Iowa Mold Tooling Co., Inc. Garner, Iowa U.S.A.	IMT Cranes Canada, Ltd. Orillia, Ontario, Canada

4-3. CYLINDER IDENTIFICATION

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 on the cylinder case (Figure D-2) against the information contained in this manual. You must use the part number stamped on the cylinder case when ordering parts.

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-3.

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.

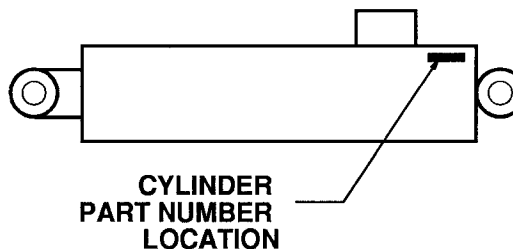


Figure D-1. SERIAL NUMBER PLACARD

Figure D-2. CYLINDER PART NUMBER LOCATION

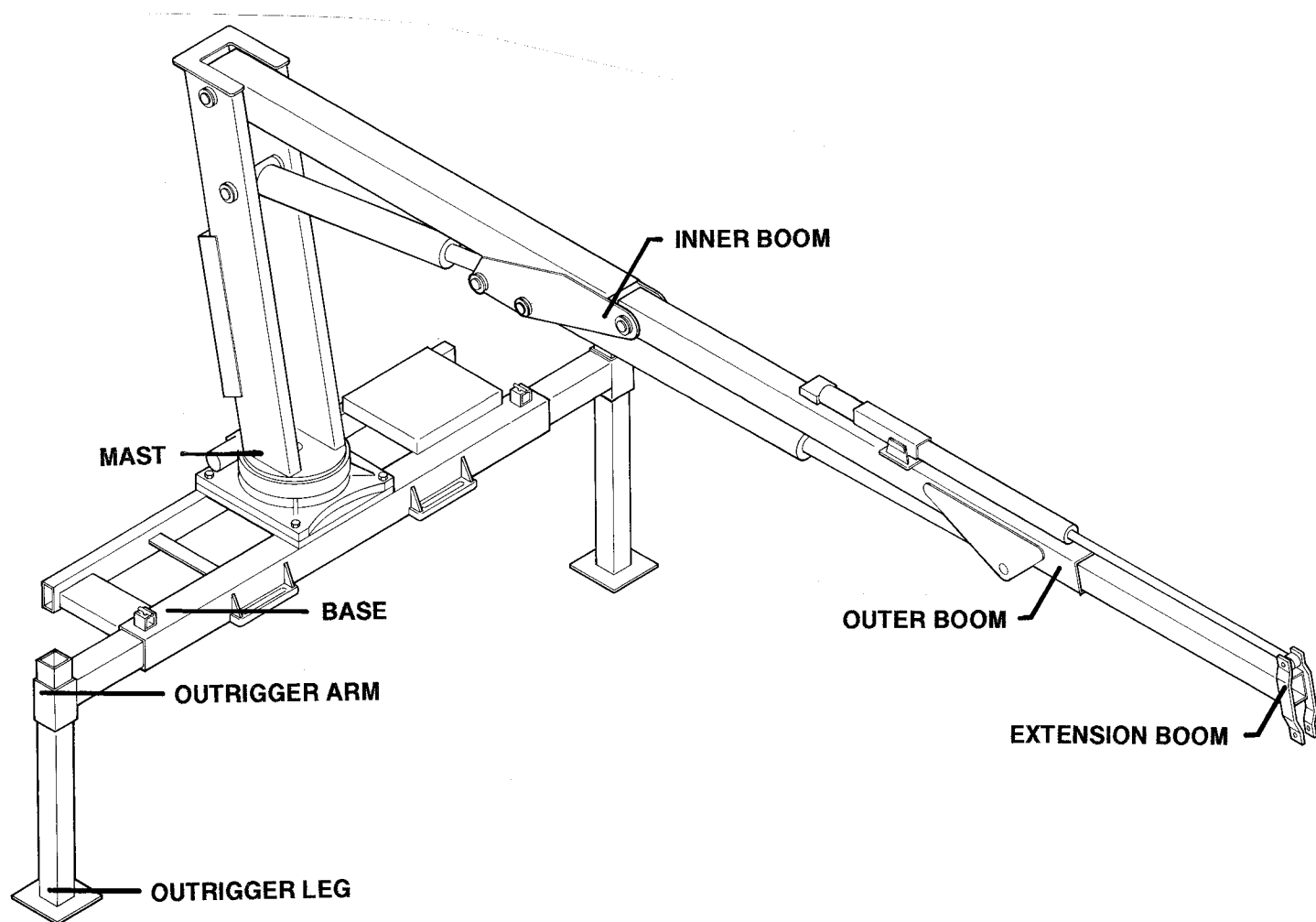
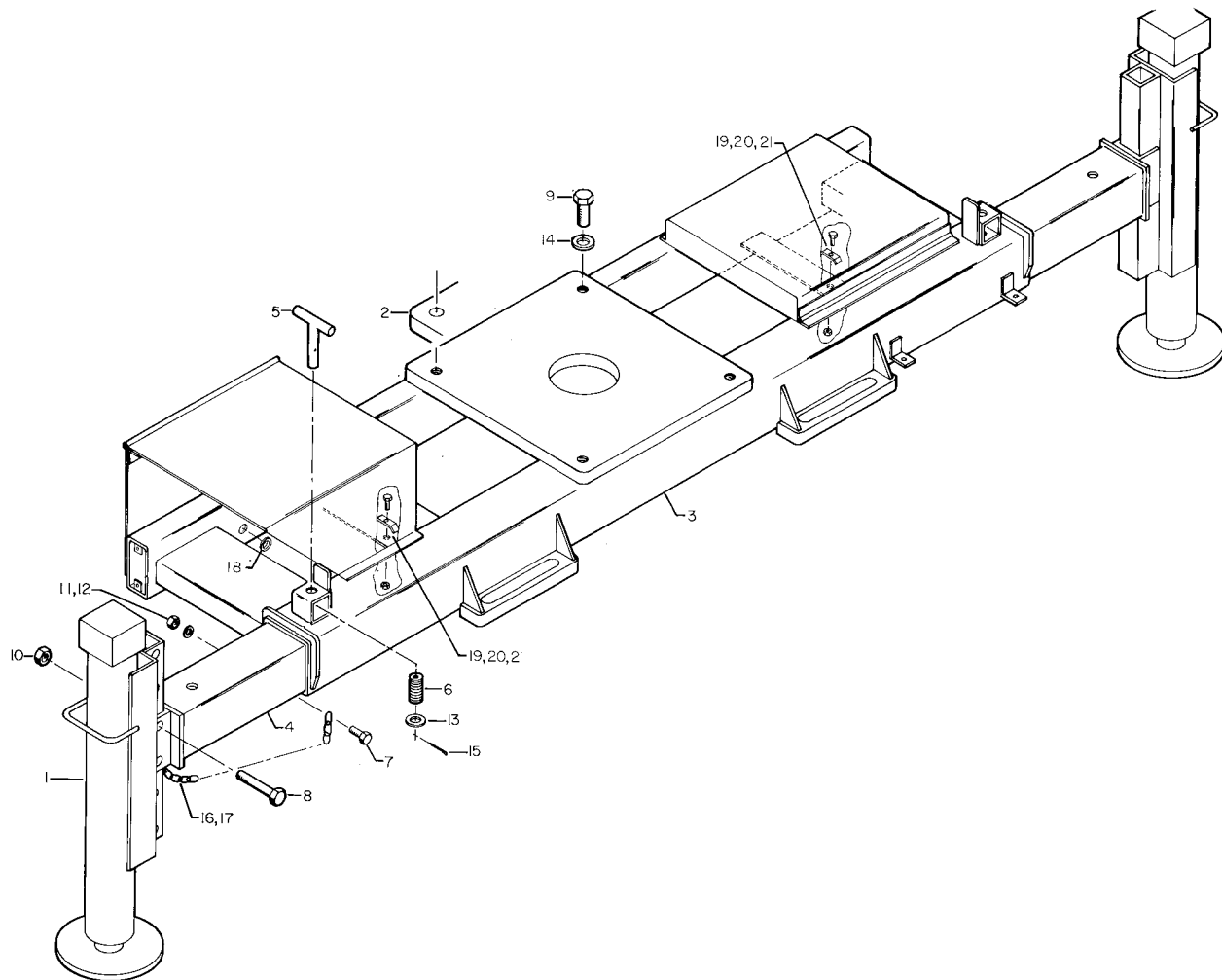


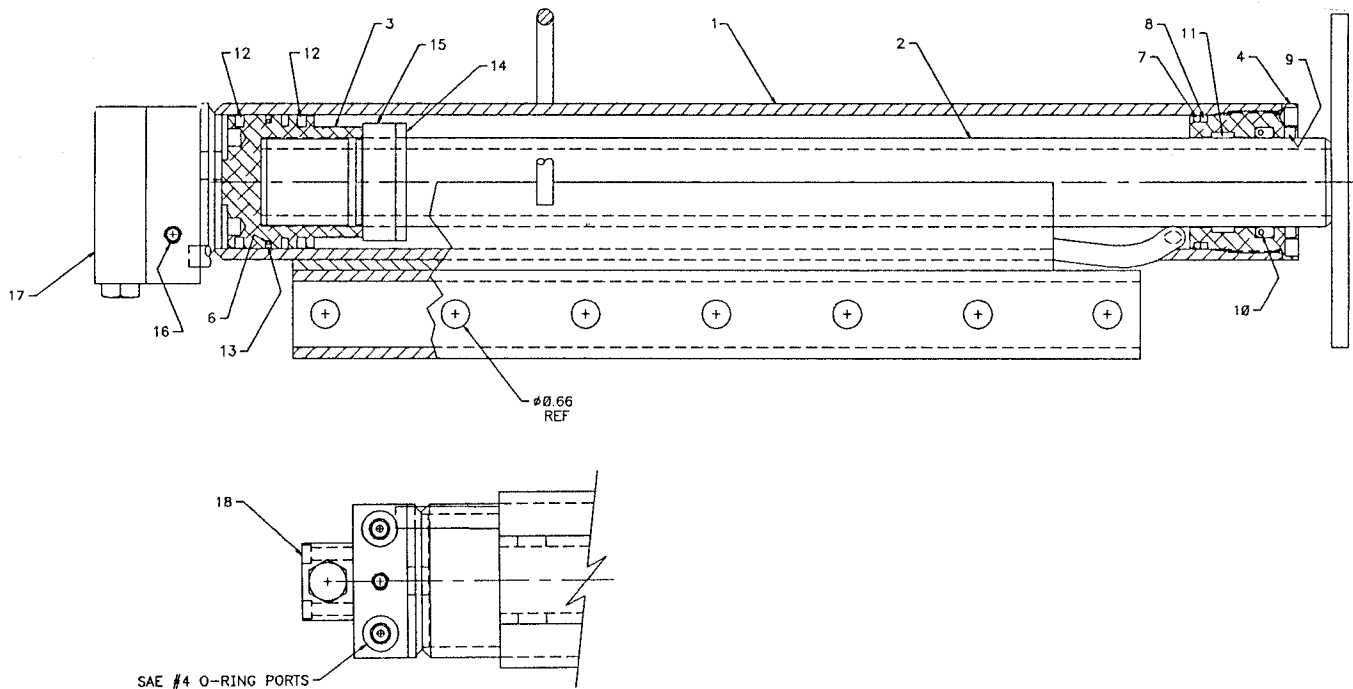
Figure D-3. WELDMENT PART NUMBER LOCATIONS



ITEM	PART NO.	DESCRIPTION	QTY
1.	3B061850	POWER DOWN CYLINDER	2
2.	41704555	BASE	1
3.	52705596	BASE	1
4.	52705597	ARM	2
5.	52070138	"T" PIN	2
6.	60010351	SPRING	2
7.	72060025	CAP SCR 5/16-18 X 1 HH GR5	2
8.	72060155	CAP SCR 5/8-11 X 3-1/2 HH GR5	4
9.	72060185	CAP SCR 3/4-10 X 2 HH GR5	4
10.	72062091	NUT 5/8-11 LOCK	4
11.	72062109	NUT 5/16-13 LOCK	2
12.	72063002	WASHER 5/16 WRT	2
13.	72063027	WASHER 5/8 WRT	2
14.	72063056	WASHER 3/4 LOCK	4
15.	72066185	COTTER PIN .16 X 1	2
16.	60108597	CHAIN	2
17.	70058060	LINK	2
18.	76392613	GROMMET 5/8	1
19.	60103278	HOSE CLAMP	2
20.	72060006	CAP SCR 1/4-20X1-1/2 HHGR5	2
21.	72062104	NUT 1/4-20 LOCK	2

Figure D-4. BASE AND POWER DOWN OUTRIGGER ASSEMBLY (41705591)

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NOTE

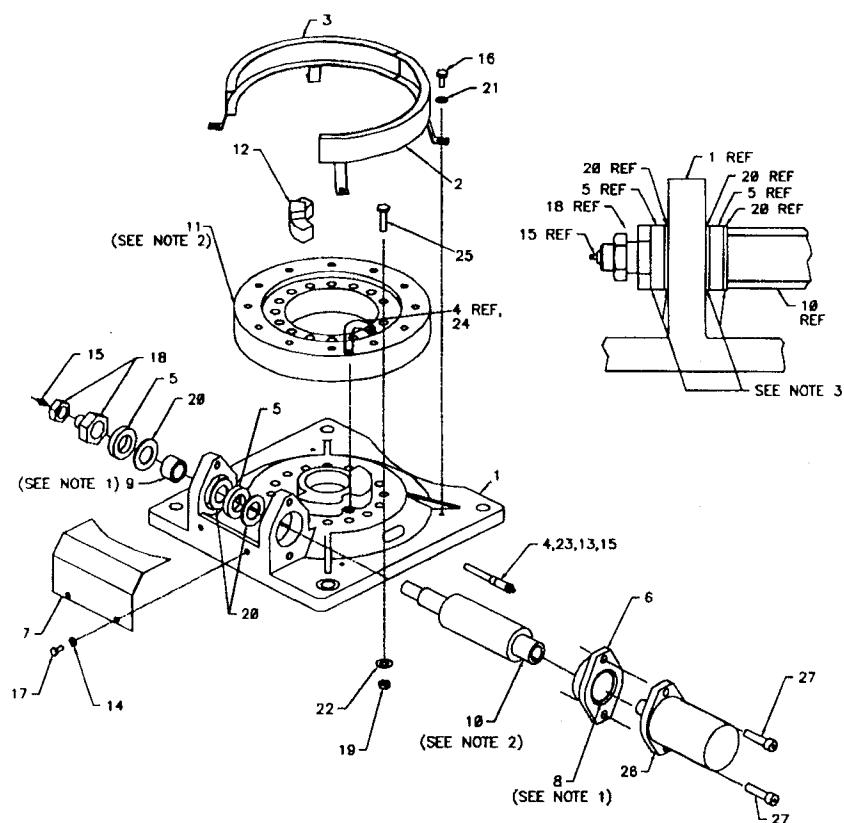
IT IS RECOMMENDED THAT ALL COMPONENTS OF THE SEAL KIT BE REPLACED WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.

APPLY "LUBRIPLATE #630-2" MEDIUM HEAVY, MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

USE "NEVER-SEEZ" OR EQUIVALENT BETWEEN THE HEAD AND THE CASE WHEN ASSEMBLING THE CYLINDER.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B061850	CASE (INCL: 16)	1
2.	4H061850	ROD	1
3.	6IX06185	PISTON	1
4.	6H030020	HEAD	1
5.	9X061850	SEAL KIT (INCL:6-14)	1
6.	7Q072145	O-RING (PART OF 5)	1REF
7.	7Q072334	O-RING (PART OF 5)	1REF
8.	7Q10P334	BACK-UP RING (PART OF 5)	1REF
9.	7R14P020	ROD WIPER (PART OF 5)	1REF
10.	7R546020	ROD SEAL (PART OF 5)	1REF
11.	7T2N4022	WEAR RING-ROD (PART OF 5)	1REF
12.	7T65I030	PISTON RING (PART OF 5)	2REF
13.	7T66P030	PISTON SEAL (PART OF 5)	1REF
14.	6A025020	WAFFER LOCK (PART OF 5)	1REF
15.	6C075020	STOP TUBE	1
16.	7PNPXT02	PIPE PLUG 1/8NPT (PART OF 1)	4REF
17.	73054004	VALVE	1
18.	72060708	CAP SCR 1/4-20X1-1/4 SH	6

Figure D-6. POWER DOWN CYLINDER (3B061850)



ITEM	PART NO.	DESCRIPTION	QTY
1.	51704551	BASE	1
2.	52713750	TURNTABLE GUARD-LH	1
3.	52713751	TURNTABLE GUARD-RH	1
4.	60030086	TUBING	1
5.	60030116	THRUST BEARING	2
6.	60107543	SUPPORT PLATE	1
7.	60107617	COVER	1
8.	70055147	BEARING	1
9.	70055148	BEARING	1
10.	70056307	WORM GEAR	1
11.	71056308	TURNTABLE-BEARING	1
12.	71142535	SLIDE	1
13.	72053301	COUPLING 1/8NPT	1
14.	72063050	WASHER 5/16 LOCK	2
15.	72053508	ZERK 1/8NPT	2
16.	72060000	CAP SCR 1/4-20X1/2 HHGR5	4
17.	72060023	CAP SCR 5/16-18X3/4 HHGR5	2
18.	72062251	NUT 7/8-9 LOCK 2-PC GR8	1
19.	72062162	NUT 9/16-12 HEX GR8	15
20.	72063161	WASHER 1-1/8	3
21.	72063049	WASHER 1/4 LOCK	4
22.	72063117	WASHER 9/16 FLAT GR8	15
23.	72531731	ADAPTER 18MPT 1/4TUBE	1
24.	72531746	ADAPTER 1/8MPT 1/4TUBE 90°	1
25.	72601313	CAP SCR 9/16-12X3-1/2 HH GR8	15
26.	73051482	HYDRAULIC MOTOR	1
27.	72601486	CAP SCR 1/2-13X1-3/4 SH	2

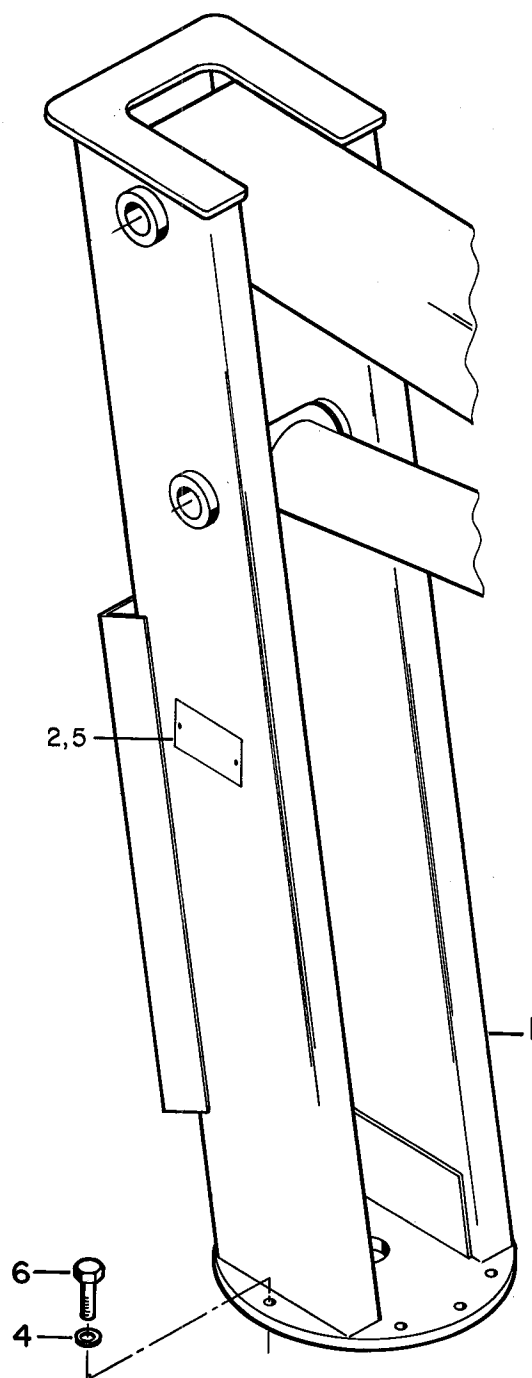
WARNING

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.

NOTE

1. Bearings must be packed with grease at assembly.
2. Apply Molub-Alloy 936 to turntable bearing and worm teeth at assembly.
3. Initial lubrication of both sides of thrust bearings is required at the time of assembly.
4. Approved lubricants are Slip Plate, Lubri-Plate, or other lubricants containing graphite or MSO_2 .

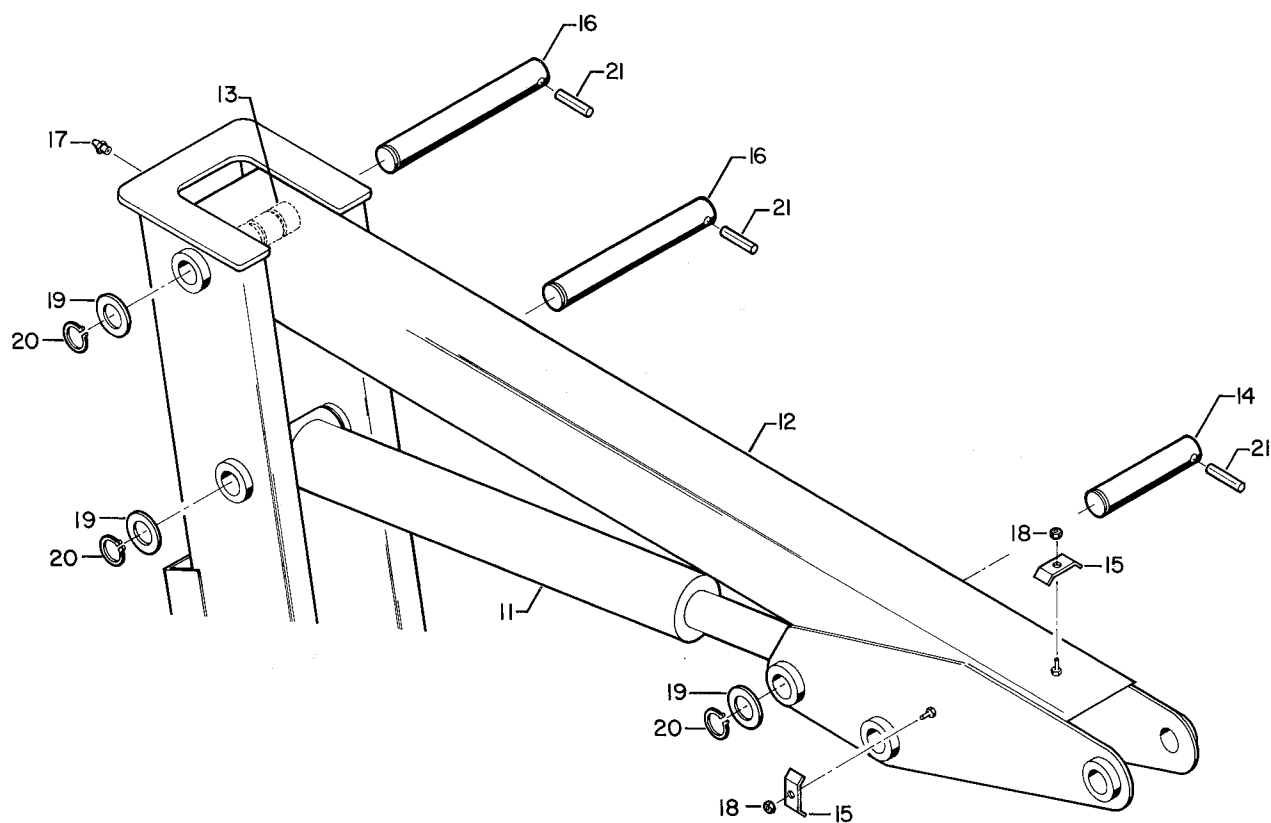
Figure D-7. BASE ASSEMBLY (41704555)

**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.

ITEM	PART NO.	DESCRIPTION	QTY
1.	52704893	MAST	1
2.	70029119	SERIAL NUMBER PLACARD	1
4.	72063117	WASHER 9/16 FLAT GR8	8
5.	72066340	RIVET 1/8	2
6.	72601144	CAP SCR 9/16-12 X 2 HH GR8	8

Figure D-8. MAST ASSEMBLY (41704872)



ITEM	PART NO.	DESCRIPTION	QTY
11.	3B191910	INNER CYLINDER	1
12.	52704892	INNER BOOM (INCL: 13)	1
13.	7BF81215	BUSHING (PART OF 12)	4REF
14.	60102397	PIN	1
15.	60103278	HOSE CLAMP	2
16.	60107911	PIN	2
17.	72053508	ZERK 1/8NPT	1
18.	72062109	NUT 5/16-18 LOCK	2
19.	72063037	MACH BUSHING 1-1/2 X 10GA	3
20.	72066132	RETAINING RING 1-1/2 EXT HD	3
21.	72661157	GROOVE PIN 1/2 X 2-1/2	3

Figure D-9. INNER BOOM ASSEMBLY (41704873)

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 AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

USE "NEVER-SEEZ" OR EQUIVALENT BETWEEN THE HEAD AND THE CASE WHEN ASSEMBLING THE CYLINDER.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B191910	CASE (INCL:3,4&5)	1
2.	4G191910	ROD (INCL:4&5)	1
3.	7PNPXT02	PIPE PLUG 1/8NPT (PART OF 1)	3REF
4.	7BF81215	BUSHING (PART OF 1&2)	6REF
5.	72053507	ZERK (PART OF 1&2)	2
6.	6H040022	HEAD	1
7.	6I040143	PISTON	1
8.	6C075022	STOP TUBE	1
9.	6C200022	STOP TUBE	1
10.	73054304	VALVE	1
11.	9C161823	SEAL KIT (INCL:12-21)	1
12.	7T61N143	LOCK RING SEAL (PART OF 11)	1REF
13.	7T66P040	PISTON SEAL (PART OF 11)	1REF
14.	7Q072153	O-RING (PART OF 11)	1REF
15.	7T65I040	PISTON RING (PART OF 11)	2REF
16.	6A025022	WAFFER LOCK (PART OF 11)	1REF
17.	7Q072342	O-RING (PART OF 11)	1REF
18.	7Q10P342	BACK-UP RING (PART OF 11)	1REF
19.	7R546022	ROD SEAL (PART OF 11)	1REF
20.	7R14P022	ROD WIPER (PART OF 11)	1REF
21.	7T2N8025	ROD WEAR RING (PART OF 11)	1REF

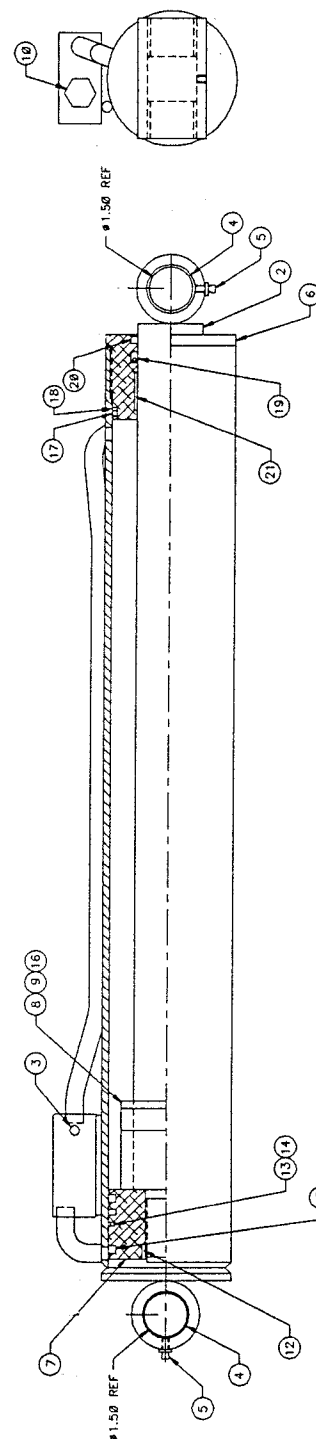
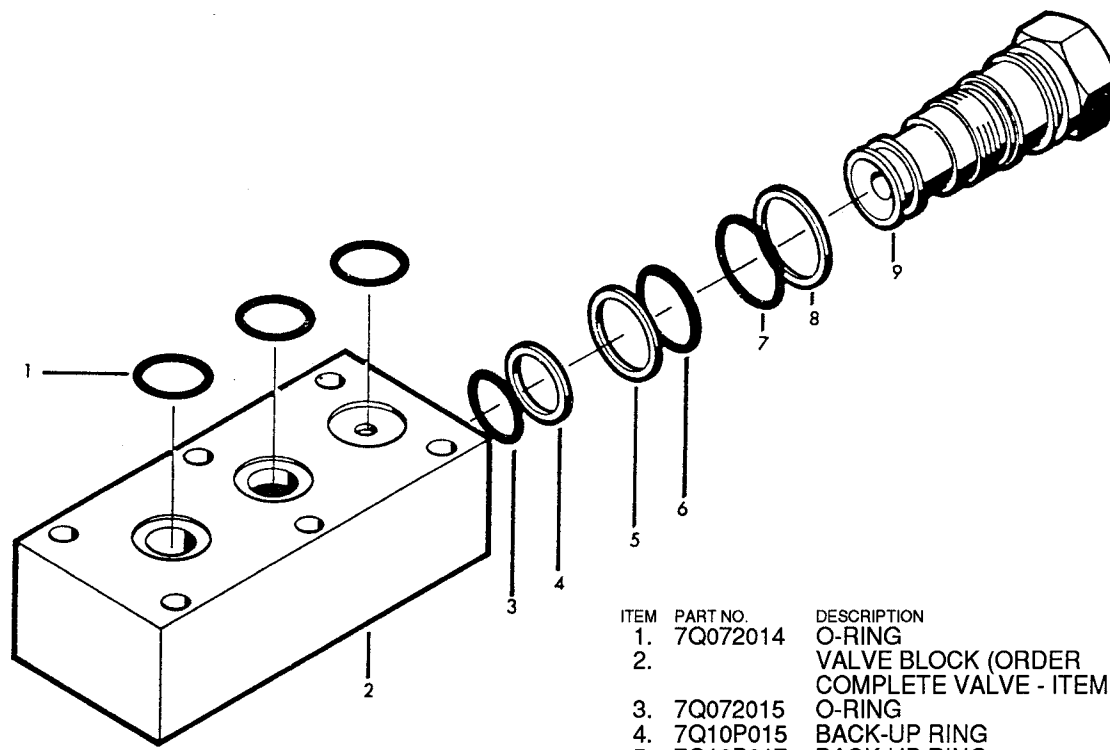
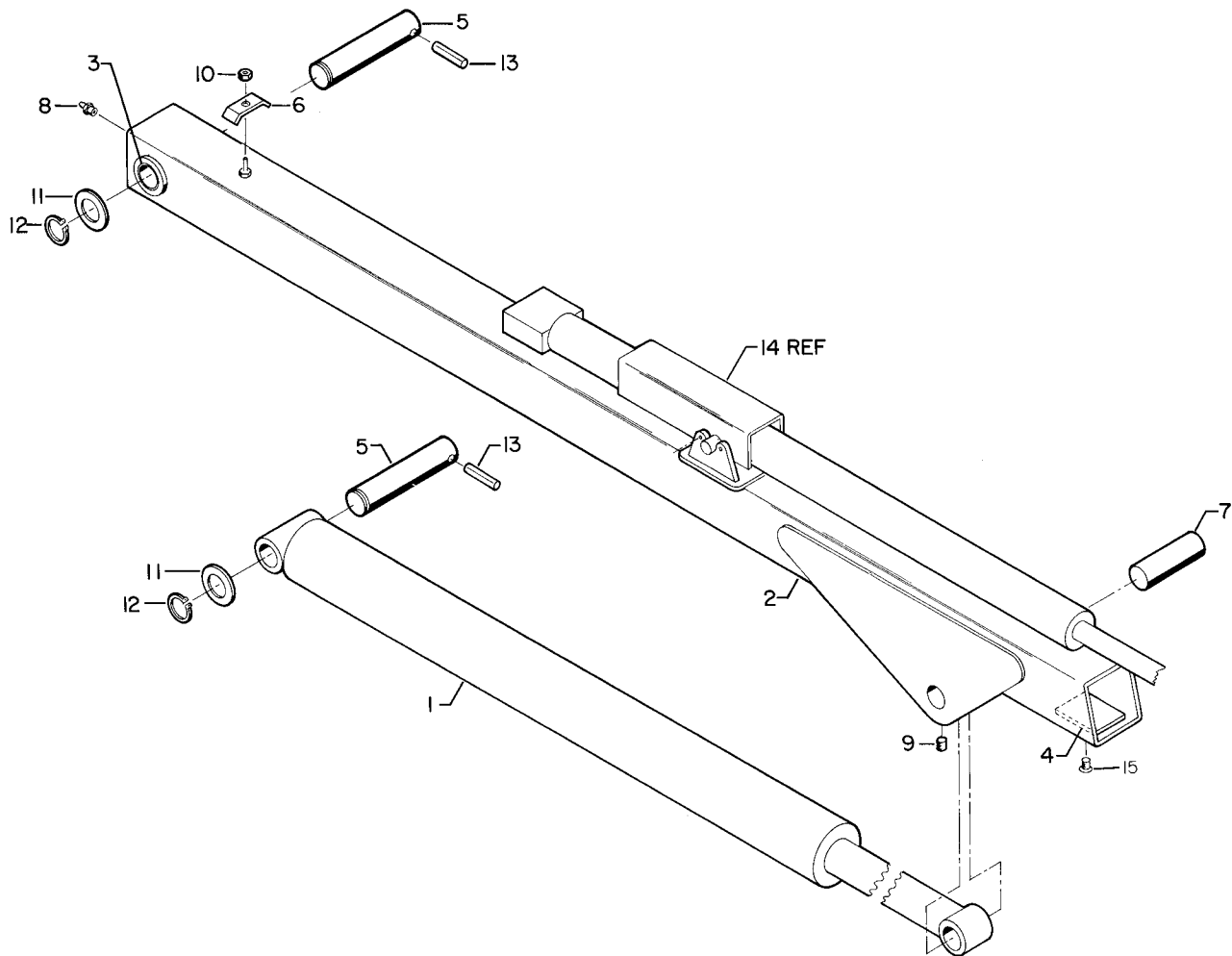


Figure D-10. INNER CYLINDER (3B191910)



ITEM	PART NO.	DESCRIPTION	QTY
1.	7Q072014	O-RING	3
2.		VALVE BLOCK (ORDER COMPLETE VALVE - ITEM 10)	1
3.	7Q072015	O-RING	1
4.	7Q10P015	BACK-UP RING	1
5.	7Q10P017	BACK-UP RING	1
6.	7Q072017	O-RING	1
7.	7Q072018	O-RING	1
8.	7Q10P018	BACK-UP RING	1
9.		VALVE BODY (ORDER COMPLETE VALVE - ITEM 10)	1
10.	73054004	VALVE (INCL: 1- 9)	1

Figure D-11. LOCKING/HOLDING VALVE (73054004)



ITEM	PART NO.	DESCRIPTION	QTY
1.	3B101830	OUTER CYLINDER	1
2.	52704894	OUTER BOOM (INCL: 3)	1
3.	7BF81015	BUSHING (PART OF 2)	4REF
4.	60030154	WEAR PAD	1
5.	60102397	PIN	2
6.	60103278	CLAMP, HOSE	1
7.	60107901	PIN	1
8.	72053508	ZERK, 1/8 NPT	1
9.	72060569	SET SCR 5/16-18 X 3/8 SH	2
10.	72062109	NUT 5/16-18 LOCK	1
11.	72063037	MACH BUSHING 10GA X 1-1/2	2
12.	72066132	RETAINING RING 1-1/2	2
13.	72661157	GROOVE PIN 1/2 X 2-1/2	2
14.	3B108830	EXT. CYLINDER	1REF
15.	72601026	CAP SCR 3/8-16 X 1/2 FLH SOC	1

Figure D-13. OUTER BOOM ASSEMBLY (41704875)

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 AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

USE "NEVER-SEEZ" OR EQUIVALENT BETWEEN THE HEAD AND THE CASE WHEN ASSEMBLING THE CYLINDER.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B101830	CASE (INCL: 18,19,21)	1
2.	4G101830	ROD (INCL: 18 & 20)	1
3.	6I035125	PISTON	1
4.	6H035022	HEAD	1
5.	6C300022	STOP TUBE	1
6.	9C141820	SEAL KIT (INCL: 7-16)	1
7.	6A025022	WAFFER LOCK (PART OF 6)	1REF
8.	7Q072151	O-RING (PART OF 6)	1REF
9.	7Q072338	O-RING (PART OF 6)	1REF
10.	7Q10P338	BACK-UP RING (PART OF 6)	1REF
11.	7R14P022	ROD WIPER (PART OF 6)	1REF
12.	7R546022	ROD SEAL (PART OF 6)	1REF
13.	7T248025	ROD WEAR RING (PART OF 6)	1REF
14.	7T61N125	LOCK RING SEAL (PART OF 6)	1REF
15.	7T65I035	PISTON RING (PART OF 6)	2REF
16.	7T66P035	PISTON SEAL (PART OF 6)	1REF
17.	73054304	C-BALANCE VALVE 10GPM	1
18.	72053507	ZERK (PART OF 1 & 2)	2REF
19.	7BF81215	BUSHING (PART OF 1)	2REF
20.	7BF81015	BUSHING (PART OF 2)	2REF
21.	7PNPXT02	PIPE PLUG 1/8 NPT (PART OF 1)	3REF

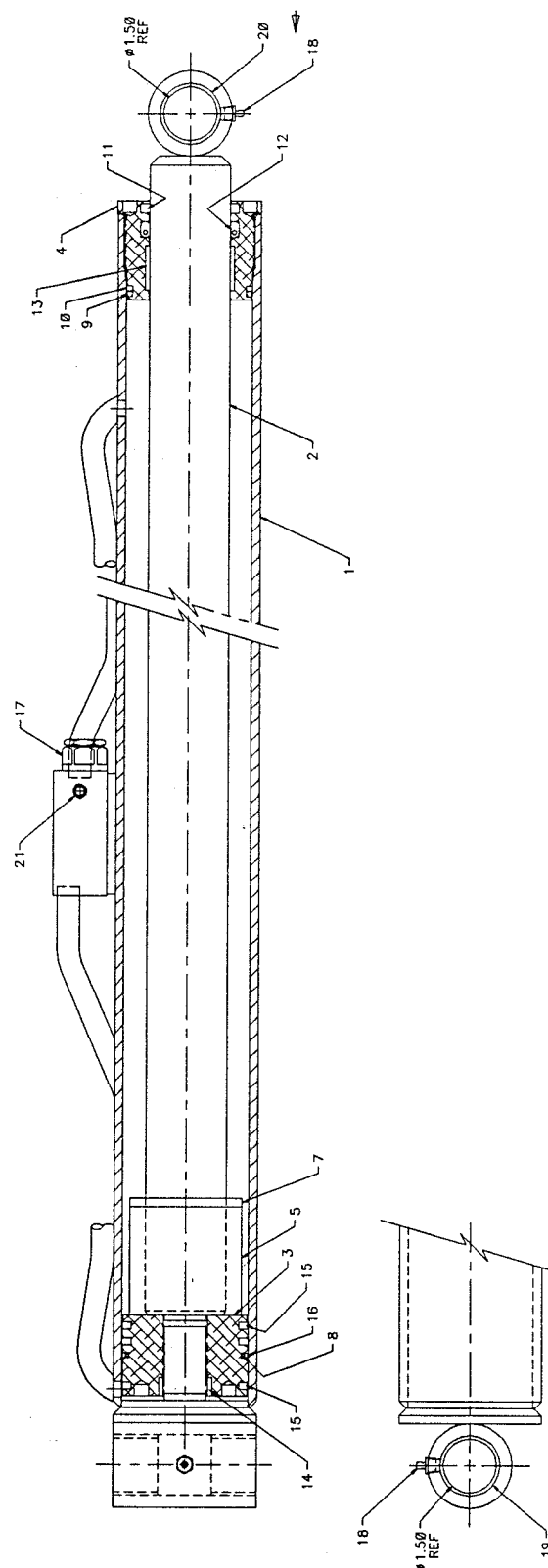
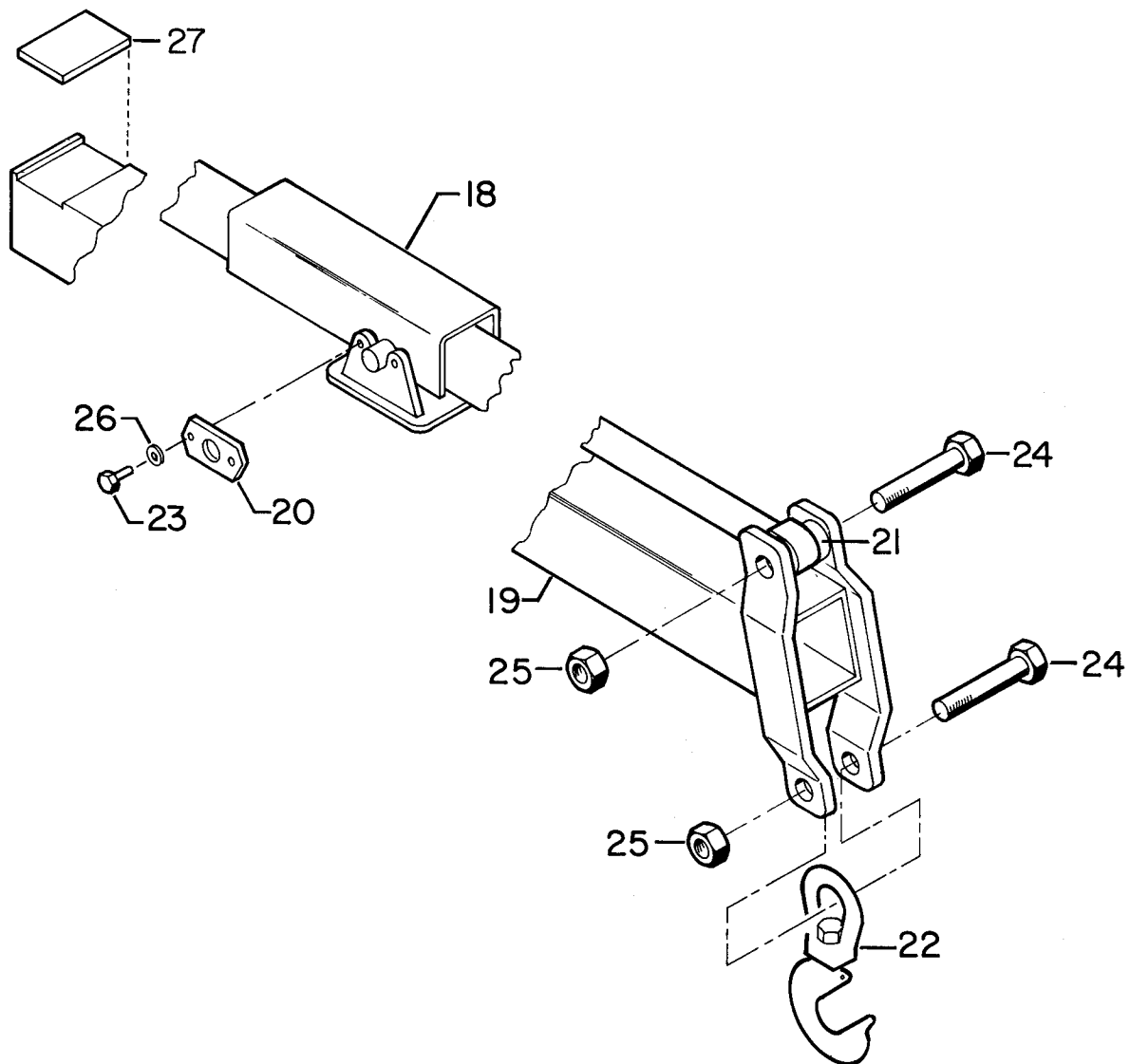


Figure D-14. OUTER CYLINDER (3B101830)



ITEM	PART NO.	DESCRIPTION	QTY
18.	3B108830	EXTENSION CYLINDER	1
19.	52704896	EXTENSION BOOM	1
20.	60107922	LOCK PLATE	2
21.	60107967	SLEEVE	2
22.	71073920	HOOK - 3 TON	1
23.	72060044	CAP SCR 3/8-16 X 3/4 HH GR5	4
24.	72060189	CAP SCR 3/4-10 X 4 HH GR5	2
25.	72062114	NUT 3/4-10 LOCK	2
26.	72063051	WASHER 3/8 LOCK	4
27.	60030153	WEAR PAD	1

Figure D-15. EXTENSION BOOM ASSEMBLY (41704876)

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 AND HEAD GLANDS, LOCK RING AND ROD THREADS BEFORE ASSEMBLY.

USE "NEVER-SEEZ" OR EQUIVALENT BETWEEN THE HEAD AND THE CASE WHEN ASSEMBLING THE CYLINDER.

ITEM	PART NO.	DESCRIPTION	QTY
1.	4B108830	CASE ASM (INCL:17)	1
2.	4G108830	ROD	1
3.	6I020075	PISTON	1
4.	6H020012	HEAD	1
5.	6C300012	STOP TUBE	1
6.	9B081012	SEAL KIT (INCL:7-15)	1
7.	6A025012	WAFER LOCK (PART OF 6)	1REF
8.	7Q072129	O-RING (PART OF 6)	1REF
9.	7Q072224	O-RING (PART OF 6)	1REF
10.	7Q10P224	O-RING (PART OF 6)	1REF
11.	7R14P012	ROD WIPER (PART OF 6)	1REF
12.	7R546012	ROD SEAL (PART OF 6)	1REF
13.	7T2N8012	WEAR RING (PART OF 6)	1REF
14.	7T61N075	LOCK RING SEAL (PART OF 6)	1REF
15.	7T66P020	PISTON SEAL (PART OF 6)	1REF
16.	73054304	C'BALANCE VALVE 10GPM	1
17.	7PNPXT02	PLUG 1/8NPT (PART OF 1)	3REF

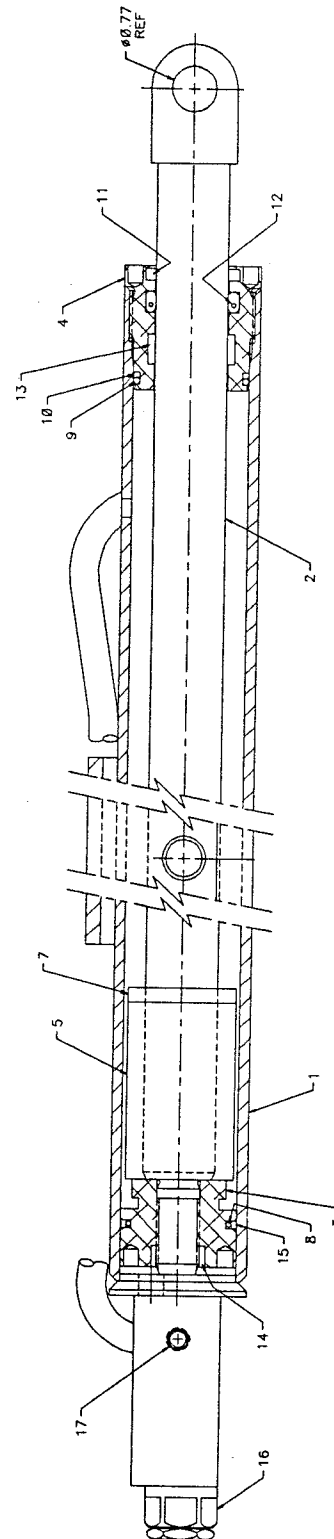
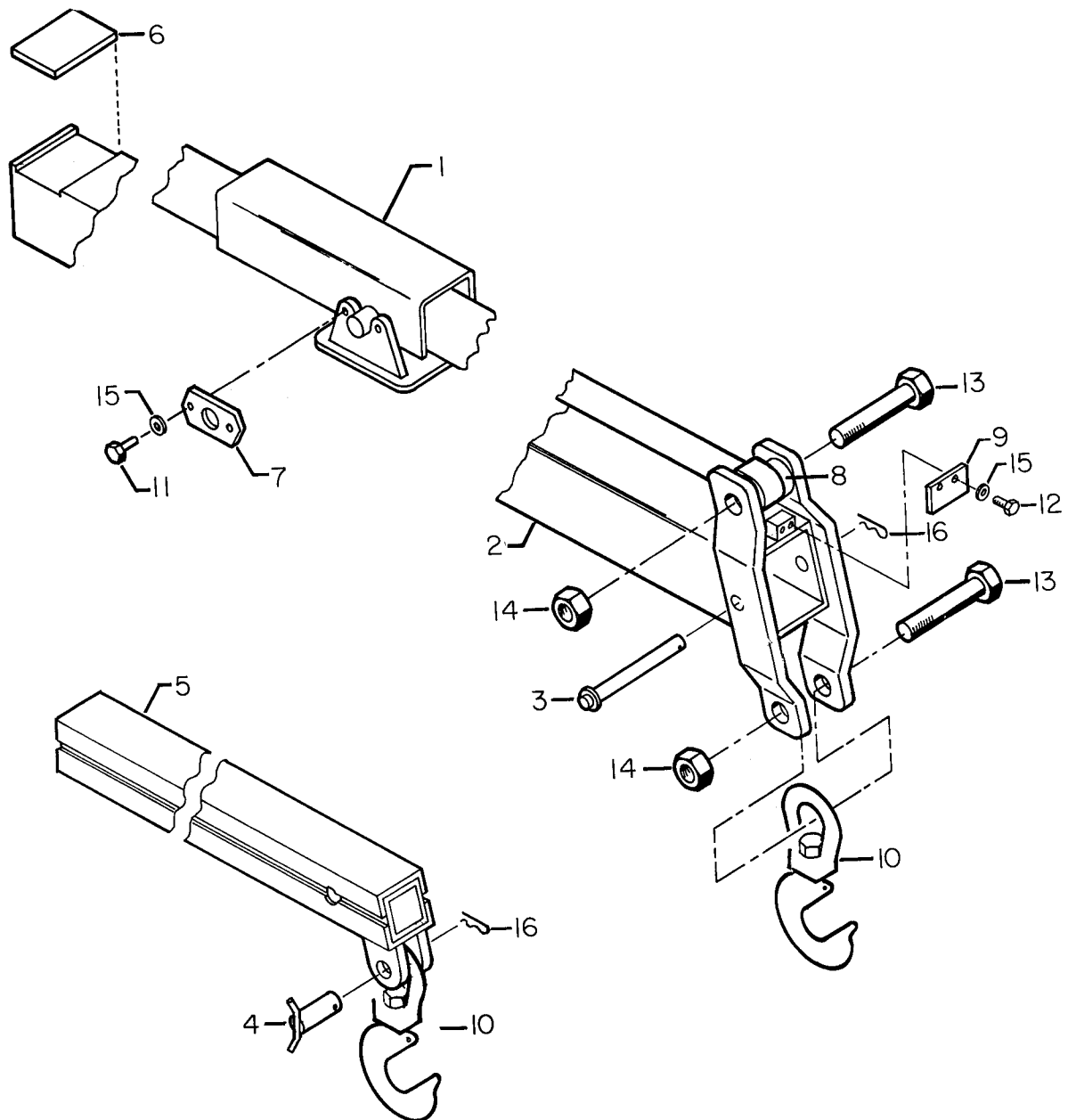
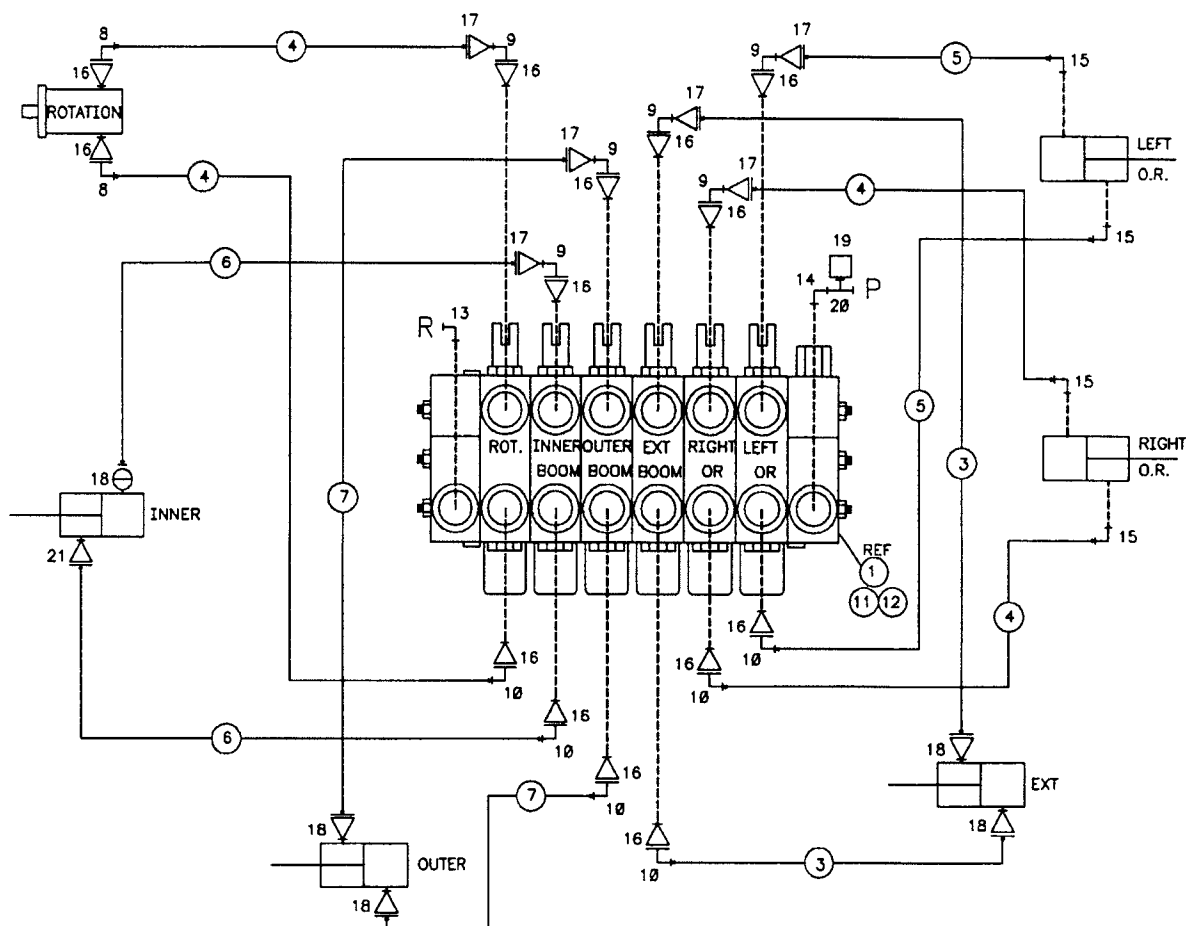


Figure D-16. EXTENSION CYLINDER (3B108830)



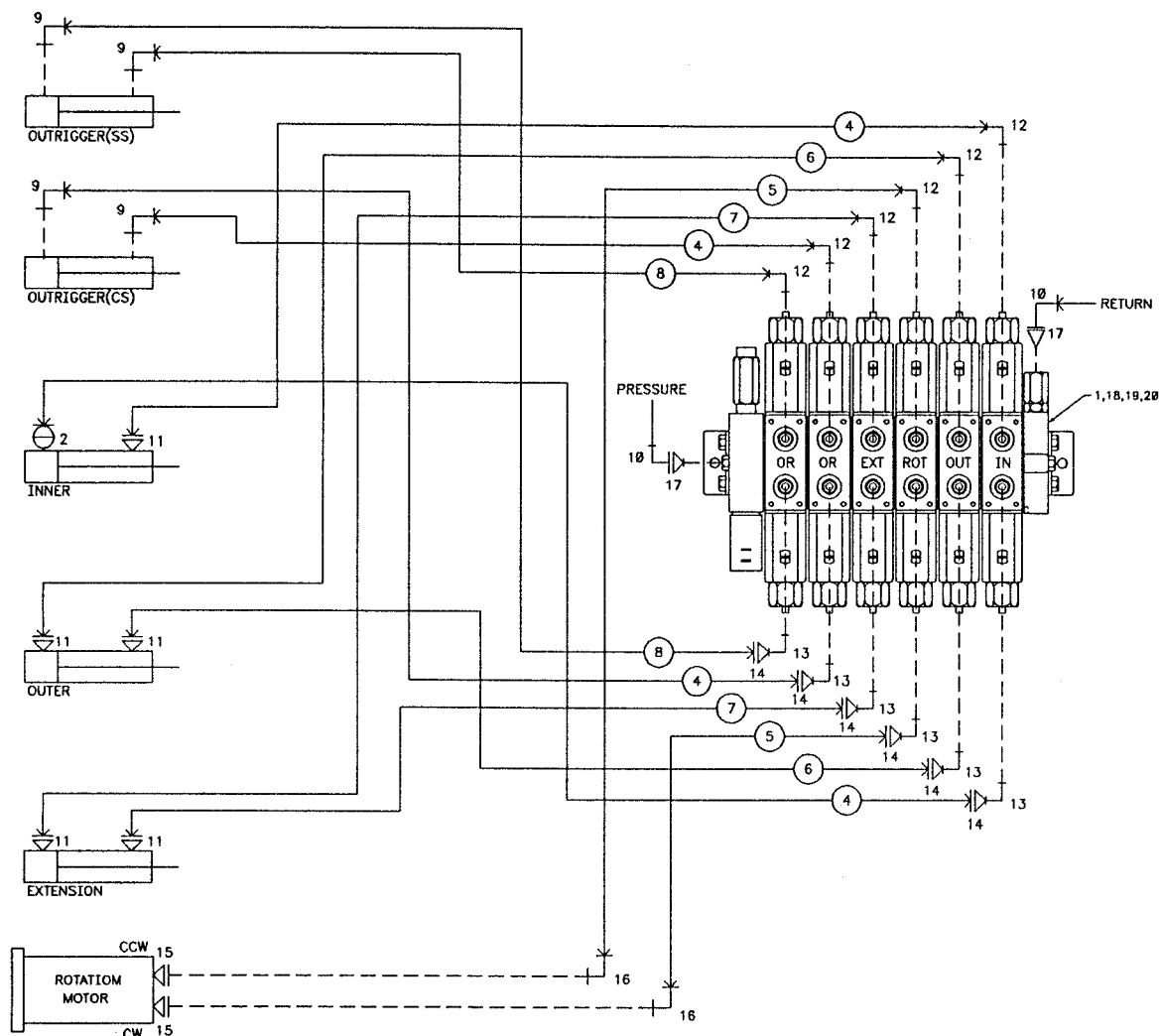
ITEM	PART NO.	DESCRIPTION	QTY
1.	3B108830	EXTENSION CYLINDER	1
2.	52704896	EXTENSION BOOM	1
3.	52707008	PIN	1
4.	52707009	PIN	1
5.	52707012	EXTENSION BOOM	1
6.	60030153	WEAR PAD	1
7.	60107922	CYLINDER LOCK PLATE	2
8.	60107967	SLEEVE	2
9.	60110361	STRIKE STOP BAR	1
10.	71073920	HOOK - 3TON	2
11.	72060044	CAP SCR 3/8-16 X 3/4 HH GR5	4
12.	72060046	CAP SCR 3/8-16 X 1 HH GR5	2
13.	72060189	CAP SCR 3/4-10 X 4 HH GR5	2
14.	72062114	NUT 3/4-10 LOCK	2
15.	72063051	WASHER 3/8 LOCK	6
16.	72066144	HAIR PIN	2
17.	70392653	CAPACITY PLACARD	2

Figure D-17. 1H1M EXTENSION BOOM (41707023)



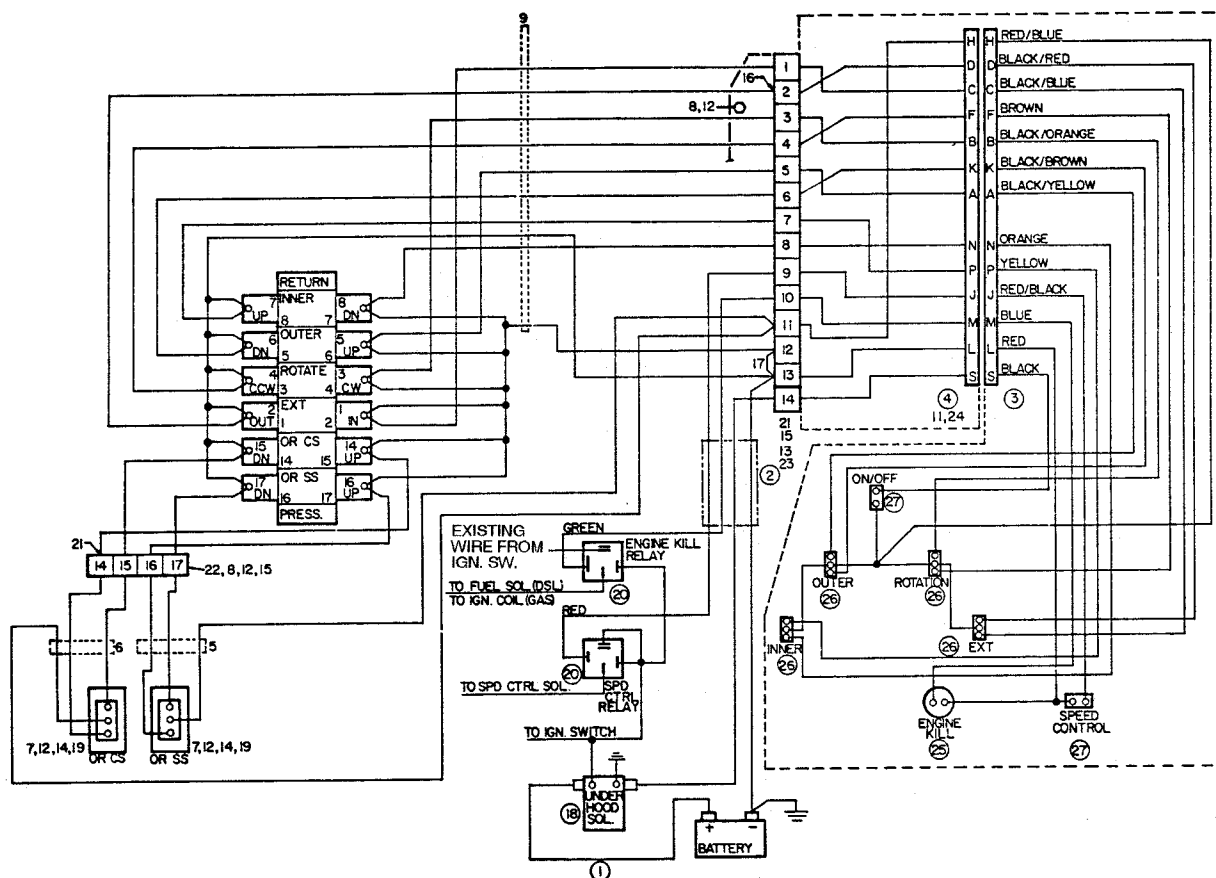
ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1.	70731682	VALVEBANK	1	12.	72062109	NUT 5/16-18 LOCK	3
2.	51712469	HOSE KIT (INCL:3-7)	1	13.	72053764	ELBOW #10MSTR #8MJIC 90°	1
3.	51393972	HOSE ASM 1/4X207 #4F#4F	2REF	14.	72053763	ELBOW #8MSTR #8MJIC	1
4.	51393973	HOSE ASM 1/4X87 #4F#4F	4REF	15.	72053758	ELBOW #4MSTR #4MJIC 90°	4
5.	51393971	HOSE ASM 1/4X57 #4F#4F	2REF	16.	72532722	ADAPTER #10MSTR #6FSTR	14
6.	51394316	HOSE ASM 1/4X197 #4F#4F	2REF	17.	72532707	ADAPTER #4MJIC #6MJIC	6
7.	51393977	HOSE ASM 1/4X33 #4F#4F	2REF	18.	72532351	ADAPTER #4MSTR #4MJIC	5
8.	72532985	ELBOW #6MSTR #4MJIC 45°	2	19.	72532675	CAP 3/4JIC	1
9.	72532700	ELBOW #6MSTR #6MJIC XLG	6	20.	72532657	TEE 3/4JIC SWVL NUT RUN	1
10.	72532699	ELBOW #6MSTR #4MJIC 90°	6	21.	73054487	FLOW RESTRICTOR	1
11.	72060026	CAP SCR 5/16-18X1-1/4 HHGR5	3	22.	71392255	DECAL-CTRL SS	1

Figure D-18. HYDRAULIC KIT - 6 SECTION MANUAL WITH PTO DRIVE (91705594)



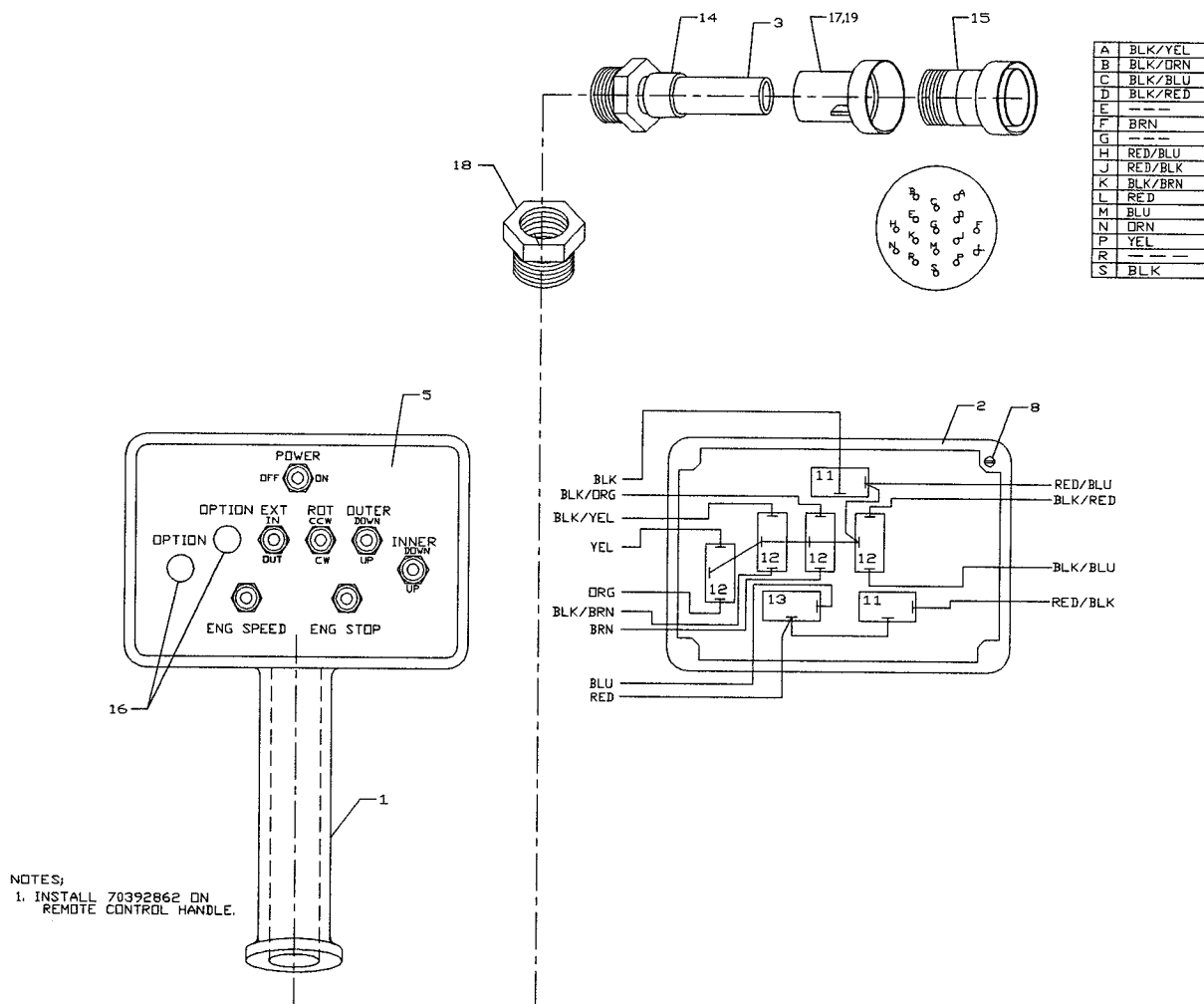
ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1.	51707021	VALVEBANK	1	11.	72532351	ADAPTER #4MSTR #4MJIC	5
2.	73054487	FLOW RESTRICTOR	1	12.	72532699	ELBOW #6MSTR #4MJIC 90°	6
3.	51712468	HOSE KIT (INCL:4-8)	1	13.	72532700	ELBOW #6MSTR #6MJIC XLG	6
4.	51393973	HOSE ASM 1/4X87 #4F#4F	4REF	14.	72532707	ADAPTER #4MJIC #6MJIC	6
5.	51393970	HOSE ASM 1/4X19 #4F#4F	2REF	15.	72532722	ADAPTER #10MSTR #6FSTR	2
6.	51393969	HOSE ASM 1/4X192 #4F#4F	2REF	16.	72532985	ADAPTER #6MSTR #4MJIC 45°	2
7.	51393968	HOSE ASM 1/4X210 #4F#4F	2REF	17.	72532357	ADAPTER #6MSTR #8MJIC	2
8.	51393967	HOSE ASM 1/4X56 #4F#4F	2REF	18.	72060025	CAP SCR 5/16-18X1 HHGR5	2
9.	72053758	ELBOW #4MSTR #4MJIC 90°	4	19.	72062109	NUT 5/16-18 LOCK	2
10.	72532670	ELBOW #8MJIC #8FJIC 45°	2	20.	72063002	WASHER 5/16 WRT	2

Figure D-19. HYDRAULIC KIT - 6 SECTION REMOTE WITH PTO DRIVE (91707025)



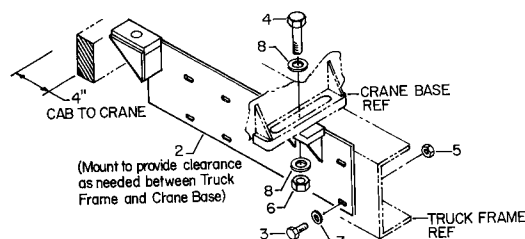
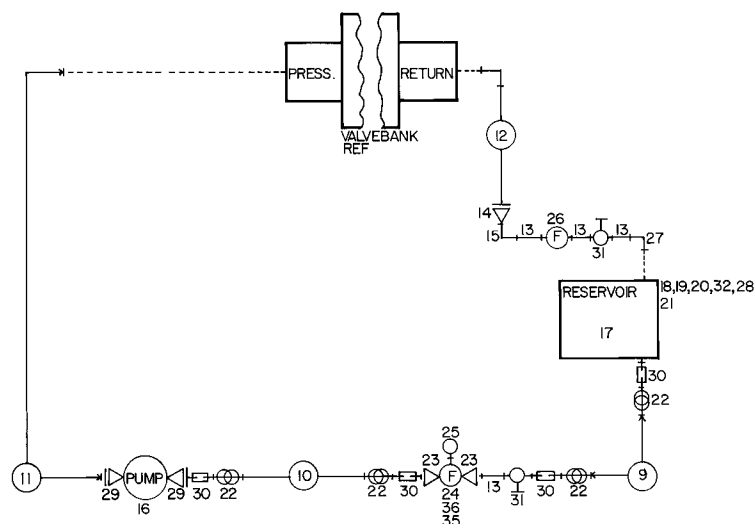
ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1.	51704784	CABLE ASM #1 WIRE X 6"	1	15.	72066525	CLAMP	2
2.	51704993	CABLE ASM 16GA/4WIRE X 150	1	16.	77040051	TERMINAL	12
3.	51707027	HANDLE ASM	1	17.	77040130	JUMPER BAR	1
4.	51707028	CABLE ASM 18GA/16WIRE X 52	1	18.	77041237	SOLENOID 12V 150A	1
5.	51707029	CABLE ASM 16GA/3WIRE X 46	1	19.	77041346	TOGGLE SWITCH - DBL THRW	2
6.	51707030	CABLE ASM 16GA/3WIRE X 90	1	20.	77041251	RELAY 12V	2
7.	52707014	SWITCH MTG PLATE	2	21.	77044309	TERMINAL BLOCK - 14 CONT	1
8.	60105825	TERMINAL BLOCK MTG	1	22.	77044341	TERMINAL BLOCK - 4 CONT	1
9.	70034060	TIE	12	23.	60111699	TERMINAL BLOCK MTG	1
11.	72060004	CAP SCR 1/4-20 X 1 HH GR5	2	24.	72062104	NUT 1/4-20 LOCK	2
12.	72060002	CAP SCR 1/4-20 X 3/4 HH GR5	8	25.		PUSH BUTTON SWITCH	1REF
13.	72061009	SCR #6 X 3/4 PH SHT MET	4	26.		TOGGLE SWITCH DT	4REF
14.	72063049	WASHER 1/4 LOCK	4	27.		TOGGLE SWITCH ST	2REF

Figure D-20. CONTROL KIT-6 FUNCTION/PTO DRIVE (90707024)



ITEM	PART NO.	DESCRIPTION	QTY
1.	60111140	HANDLE	1
2.	70034306	BACK PLATE	1
3.	89044116	CABLE 18GA/12WIRE X 300"	1
4.	89044214	WIRE 18GA GREEN	1.62'
5.	70393262	DECAL - REMOTE CONTROL	1
6.	70392862	DECAL - DANGER RC ELEC SM	1
7.	70029119	SERIAL NO. PLACARD	1
8.	72061009	SCR #6 X 3/4 PH SHT MET	4
9.	72066340	RIVET 1/8NPT	2
10.	77040186	TERMINAL	18
11.	77041345	TOGGLE SWITCH - SGL THRW	2
12.	77041346	TOGGLE SWITCH - DBL THRW	4
13.	77041347	TOGGLE SWITCH - MOMENTARY	1
14.	77044096	CORD GRIP	1
15.	77044170	CONNECTOR - 16 PIN	1
16.	70392785	PLUG 1/2	2
17.	77044147	CORD GRIP	1
18.	72531833	REDUCER BUSHING 3/4 1/2	1
19.	70393308	RUBBER BUSHING	1

Figure D-21. REMOTE HANDLE ASSEMBLY - 6 FUNCTION PTO WITH SPEED (51707027)



ITEM	PART NO.	DESCRIPTION	QTY
2.	52712213	SHEAR PLATE	2
3.	72060117	CAP SCR 1/2-13 X 1-1/2 HH GR8	16
4.	72060188	CAP SCR 3/4-10 X 3-1/2 HH GR5	4
5.	72062232	NUT 1/2-13 TOP LOCK	16
6.	72062140	NUT 3/4-10 LOCK	4
7.	72063132	WASHER 1/2 FLAT HARDENED	16
8.	72063116	WASHER 3/4 FLAT GR8	8
9.	60035816	HOSE 3/4 X 20	1
10.	60035810	HOSE 3/4 X 30	1
11.	51703692	HOSE ASM 3/8 X 82	1
12.	51705063	HOSE ASM 1/2 X 50	1
13.	72053141	PIPE NIPPLE 3/4NPT X CLOSE	4
14.	72053671	ADAPTER 3/4MNPT X 3/4MJIC	1
15.	72053325	ELBOW 3/4FNPT 90°	1
16.		PUMP	REF
17.	52705598	RESERVOIR	1
18.	73034393	BREATHER	1
19.	73052001	PLUG 3/4 MAGNETIC SQHD	1
20.	72062103	NUT 3/8-16 LOCK	4
21.	72063003	WASHER 3/8 WRT	4
22.	72066514	HOSE CLAMP 3/4	4
23.	72531836	REDUCER BUSHING 1-1/4 X 3/4	2
24.	73052012	SUCTION FILTER (INCL: 25)	1
25.	70048031	VACUUM GAUGE (PART OF 24)	1 REF
26.	73052000	RETURN FILTER	1
27.	72053285	ELBOW 3/4NPT 90°	1
28.	72532261	SIGHT GAUGE 3/4 NPT	1
29.		ADAPTER	REF
30.	72531548	BARBED NIPPLE 3/4NPT	4
31.	73054129	GATE VALVE 3/4NPT	2
32.	72060046	CAP SCR 3/8-16 X 1 HH GR5	4
35.	60103870	OIL FILTER BRACKET	1
36.	72060025	CAP SCR 5/16-18 X 1 HH GR5	2

Figure D-22. INSTALLATION KIT - 6 FUNCTION MANUAL/PTO DRIVE (93705592)

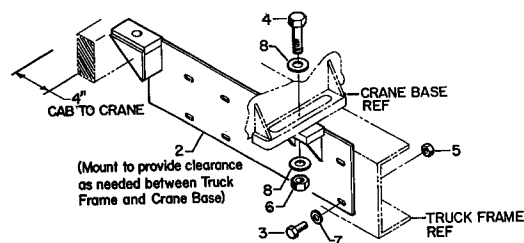
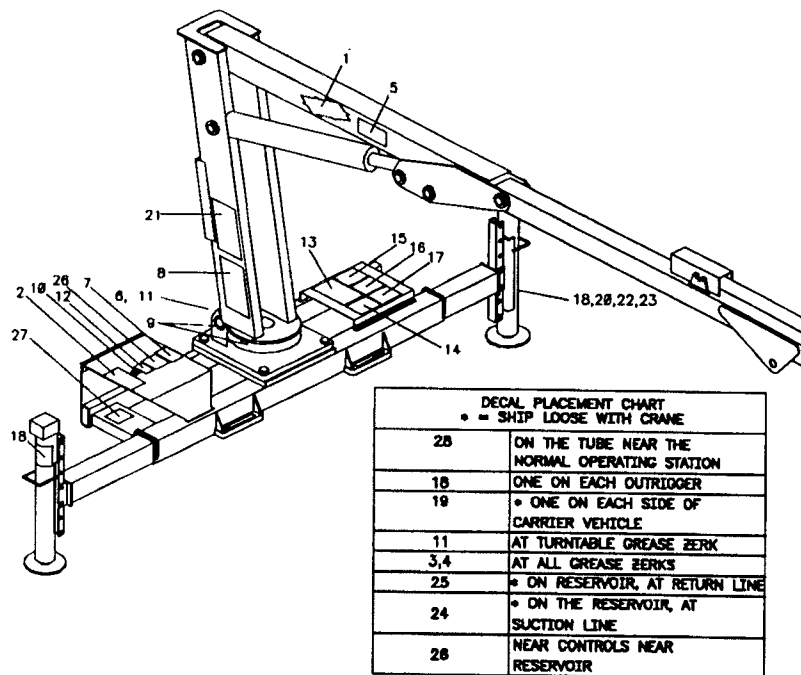
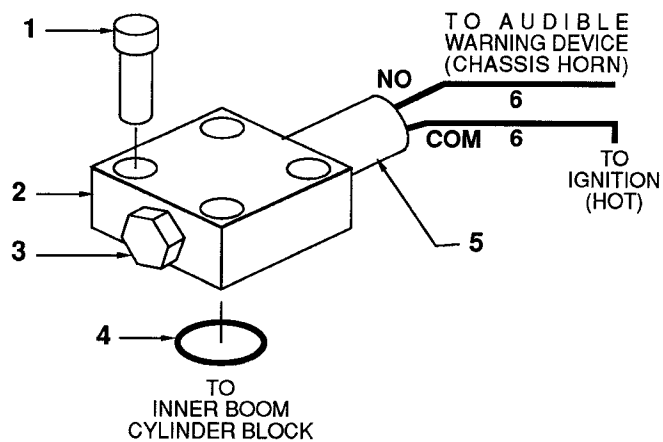


Figure D-23. INSTALLATION KIT - 6 FUNCTION REMOTE/PTO DRIVE (93707038)



ITEM	PART NO.	DESCRIPTION	QTY
1.	70029251	PLACARD - IMT DIAMOND	2
2.	71392255	DECAL-CTRL SS (HYD KIT)	REF
3.	70391612	DECAL - GREASE WKLY LEFT	3
4.	70391613	DECAL - GREASE WKLY RIGHT	5
5.	71393824	DECAL - 2200 SERIES IDENT	2
6.	70392399	DECAL - LUBRICATE WORM	1
7.	71039134	DECAL - CAUTION OIL LEVEL	1
8.	71393768	PLACARD - CAPACITY	2
9.	71392365	DECAL - ALIGN CRANE	1
10.	70392213	DECAL - CAUTION WASH/WAX	1
11.	70392524	DECAL - ROTATE CRANE/GREASE	1
12.	70392982	DECAL - CONTACT IMT	1
13.	70392813	DECAL - DANGER ELECTROCUTION	1
14.	70392814	DECAL - DANGER OPERATOR	1
15.	70392815	DECAL - DANGER OPERATION	1
16.	70392866	DECAL - DANGER OPER COND	1
17.	70392888	DECAL - DANGER OPER RESTRICT	1
18.	70392864	DECAL - DANGER OUTRG STD CLR	2
19.	70392865	DECAL - DANGER ELECTROCUTION	4
20.	70392867	DECAL - DANGER OUTRG MOVING	1
21.	70392889	DECAL - DANGER RC ELECTRO LG	1
22.	70392890	DECAL - DANGER STOW/UNFOLD	1
23.	70392891	DECAL-DANGER DRIVELINE	1
24.	70392108	DECAL-SUCTION LINE	1
25.	70392109	DECAL-RETURN LINE	1
26.	70394189	DECAL-RECOMMENDED HYD OIL	1
27.	71392257	DECAL-OUTRIGGER PWR DOWN SS	1
28.	70391583	DECAL - SETUP/STOW INSTRUCT	1

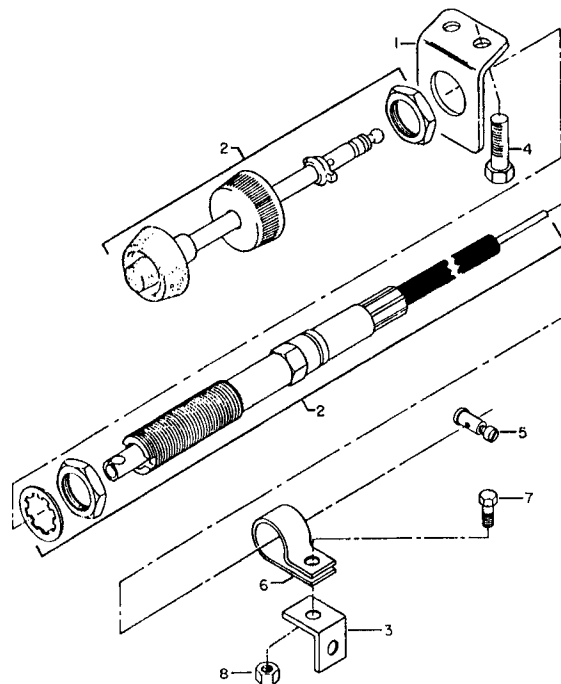
Figure D-24. DECAL KIT (95712500)

**NOTE**

This capacity alert system consists of a pressure switch mounted on the lift side of the inner boom lift cylinder which senses hydraulic pressure. It is to be connected electrically (by the customer) to an audible warning device such as the truck chassis horn, using 14-gauge wire.

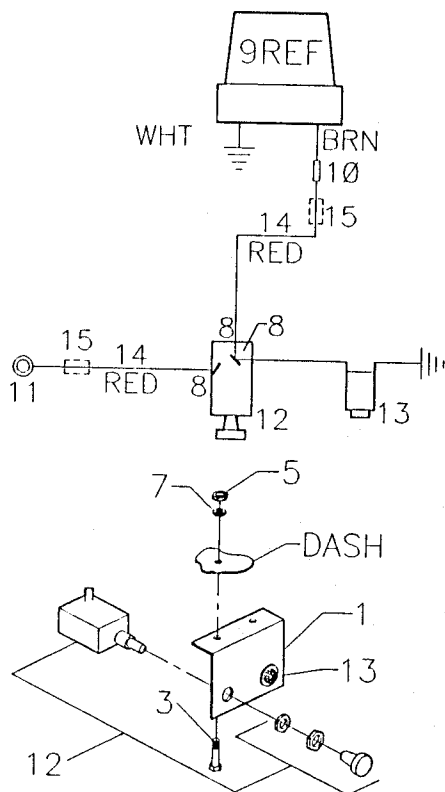
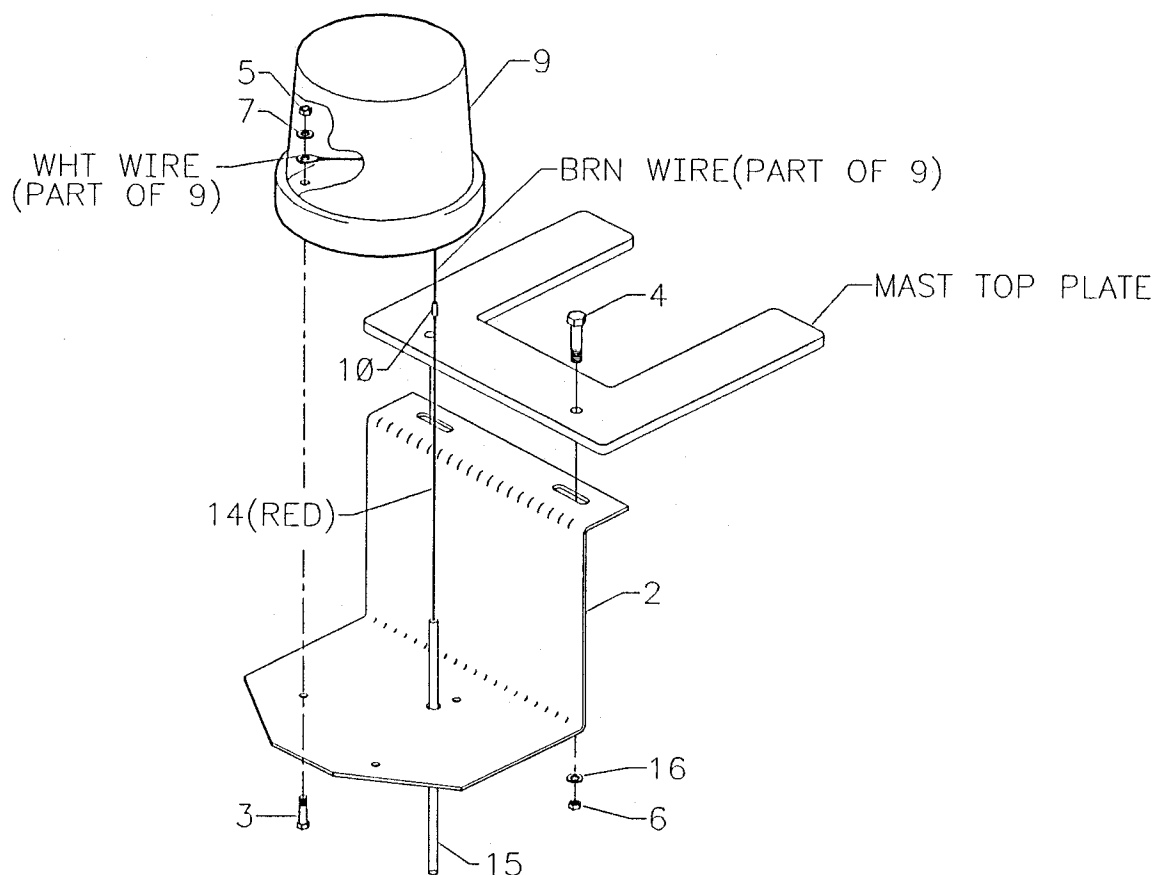
ITEM	PART NO.	DESCRIPTION	QTY
1.	72060731	CAP SCR 5/16-18X3/4 SH	4
2.	60025221	MANIFOLD	1
3.	72532140	PLUG 9/16-18 STR THD HH	1
4.	7Q072015	O-RING	1
5.	77041283	PRESSURE SWITCH	1
6.	89044188	WIRE-14GA	
		(Customer Supplied)	REF
7.	99900118	INSTALLATION DWG	1

Figure D-25. CAPACITY ALERT KIT - AUDIBLE (31705698)



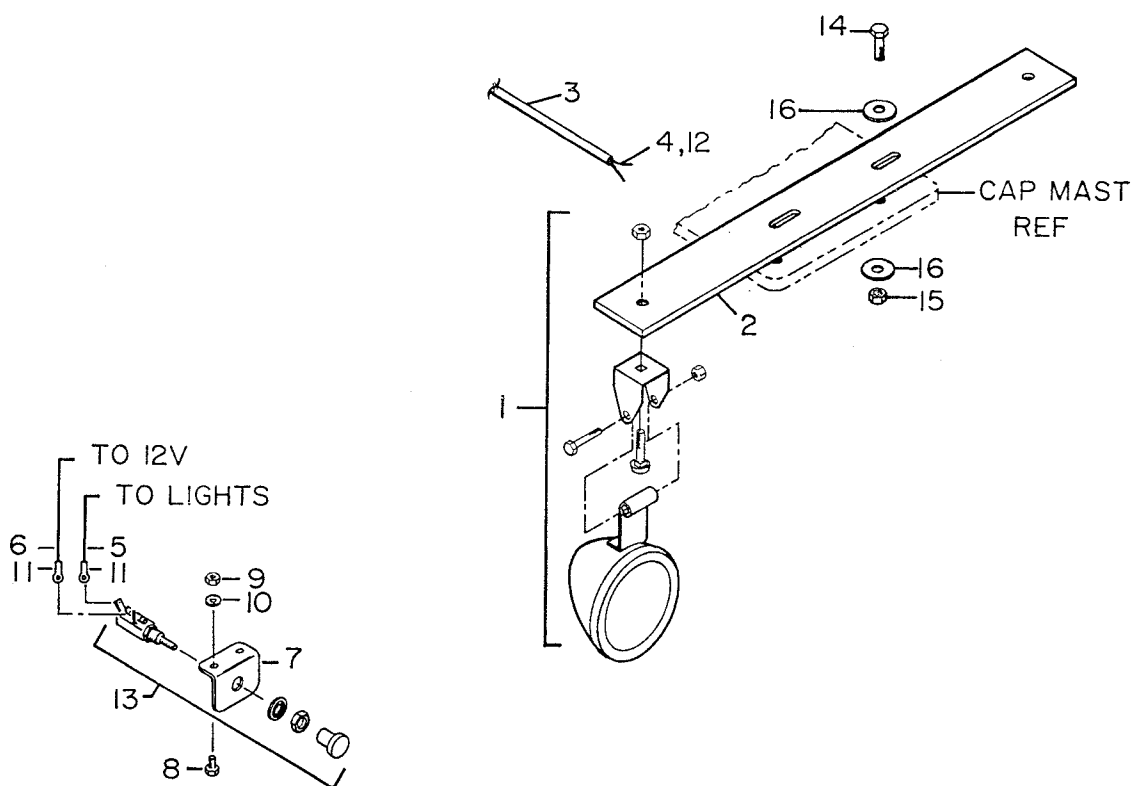
ITEM	PART NO.	DESCRIPTION	QTY
1.	60105400	MOUNTING BRACKET	1
2.	70058067	THROTTLE CONTROL	1
3.	60118524	LINKAGE BRACKET	1
4.	72060962	SCR 5/16-18X1 HH SLFTPG	2
5.	72066377	CABLE STOP	1
6.	72066523	CLAMP	1
7.	72060636	MACH SCR #10-24X3/4 RDHD	2
8.	72062106	NUT #10-24 LOCK	2

THROTTLE CONTROL KIT-MANUAL 18' (31702746)



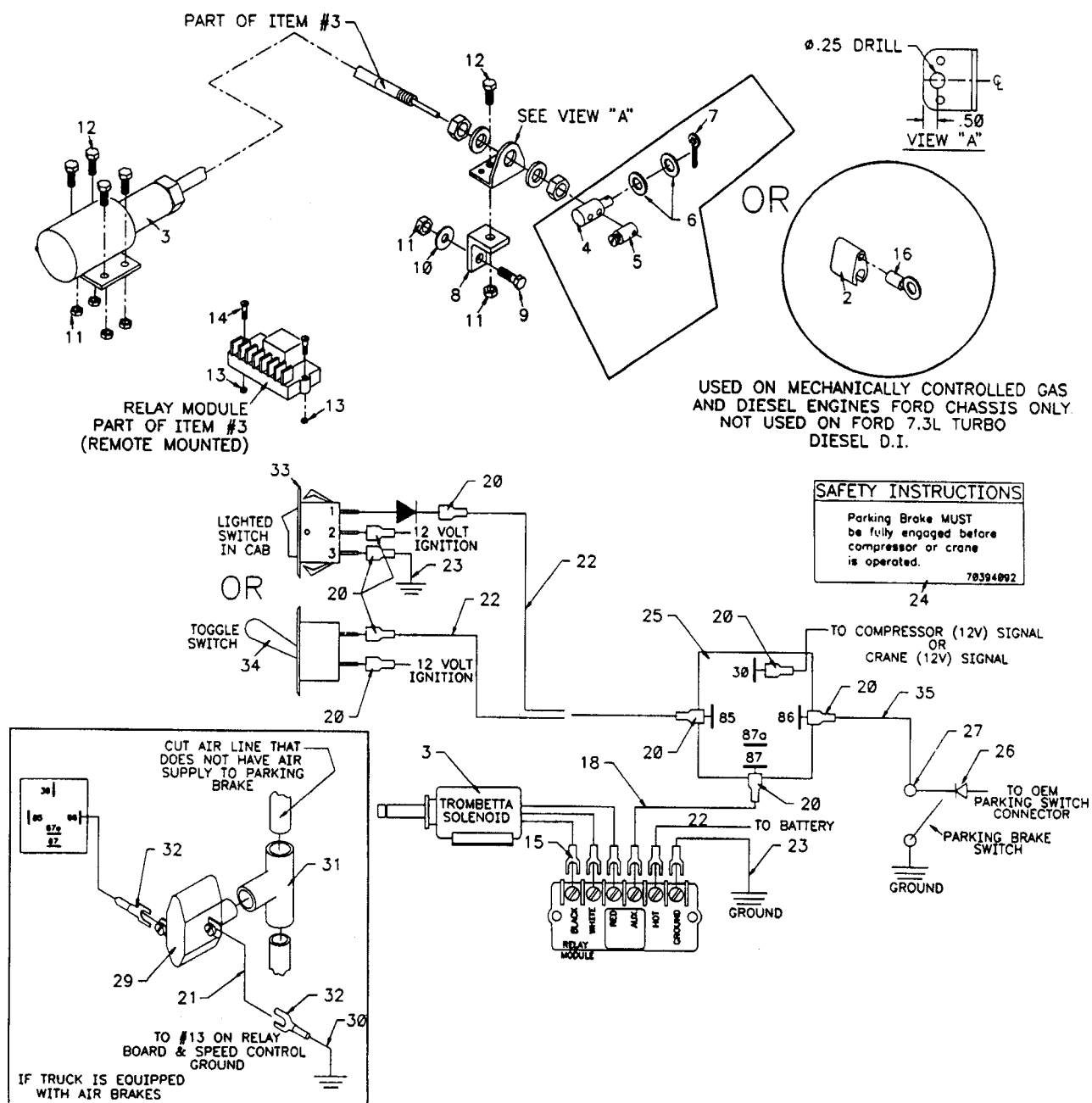
ITEM	PART NO.	DESCRIPTION	QTY
1.	60103464	DASH BRACKET	1
2.	60116337	BRACKET-LOW MOUNT	1
3.	72060004	CAP SCR 1/4-20X1 HH GR5	5
4.	72060048	CAP SCR 3/8-16X1-1/2 HH GR5	2
5.	72062000	NUT 1/4-20 HEX	5
6.	72062002	NUT 3/8-16 HEX	2
7.	72063049	WASHER 1/4 LOCK	5
8.	77040000	TERMINAL RING #10 16-14GA	3
9.	77040013	BEACON LIGHT-AMBER	1
10.	77040048	BUTT CONNECTOR 16-14GA	1
11.	77040053	TERMINAL RING 1/4 12-10GA	1
12.	77041014	SWITCH-PUSH/PULL W/FUSE	1
13.	77042001	INDICATOR LIGHT-RED	1
14.	89044001	WIRE 14GA	18FT
15.	89044056	LOOM .31 ID	18FT
16.	72063051	WASHER 3/8 LOCK	2

Figure D-27. BEACON LIGHT KIT-LOW MOUNT (51710948)



ITEM	PART NO.	DESCRIPTION	QTY
1.	77040281	FLOODLIGHT-12V CHROME	2
2.	60113425	LIGHT BRACKET	1
3.	89044351	LOOM	18FT
4.	60030049	SPIRAL WRAP	2
5.	89044274	WIRE 14GA BLK	36FT
6.	60045056	WIRE 14GA X 36" BLK	1
7.	60103535	SWITCH BRACKET 1-HOLE	1
8.	72060004	CAP SCR 1/4-20X1 HHGR5	2
9.	72062000	NUT 1/4-20 HEX	2
10.	72063049	WASHER 1/4 LOCK	2
11.	77040000	TERMINAL #10 STUD 16-14GA	2
12.	77040048	BUTT CONNECTOR 16-14GA	2
13.	77041014	SWITCH PUSH/PULL W/20A FUSE	1
14.	72060048	CAP SCR 3/8-16X1-1/2 HHGR5	2
15.	72062103	NUT 3/8-16 HEX	2
16.	72063003	WASHER 3/8 WRT	4

Figure D-28. FLOODLIGHT KIT-CHROME (51708400)

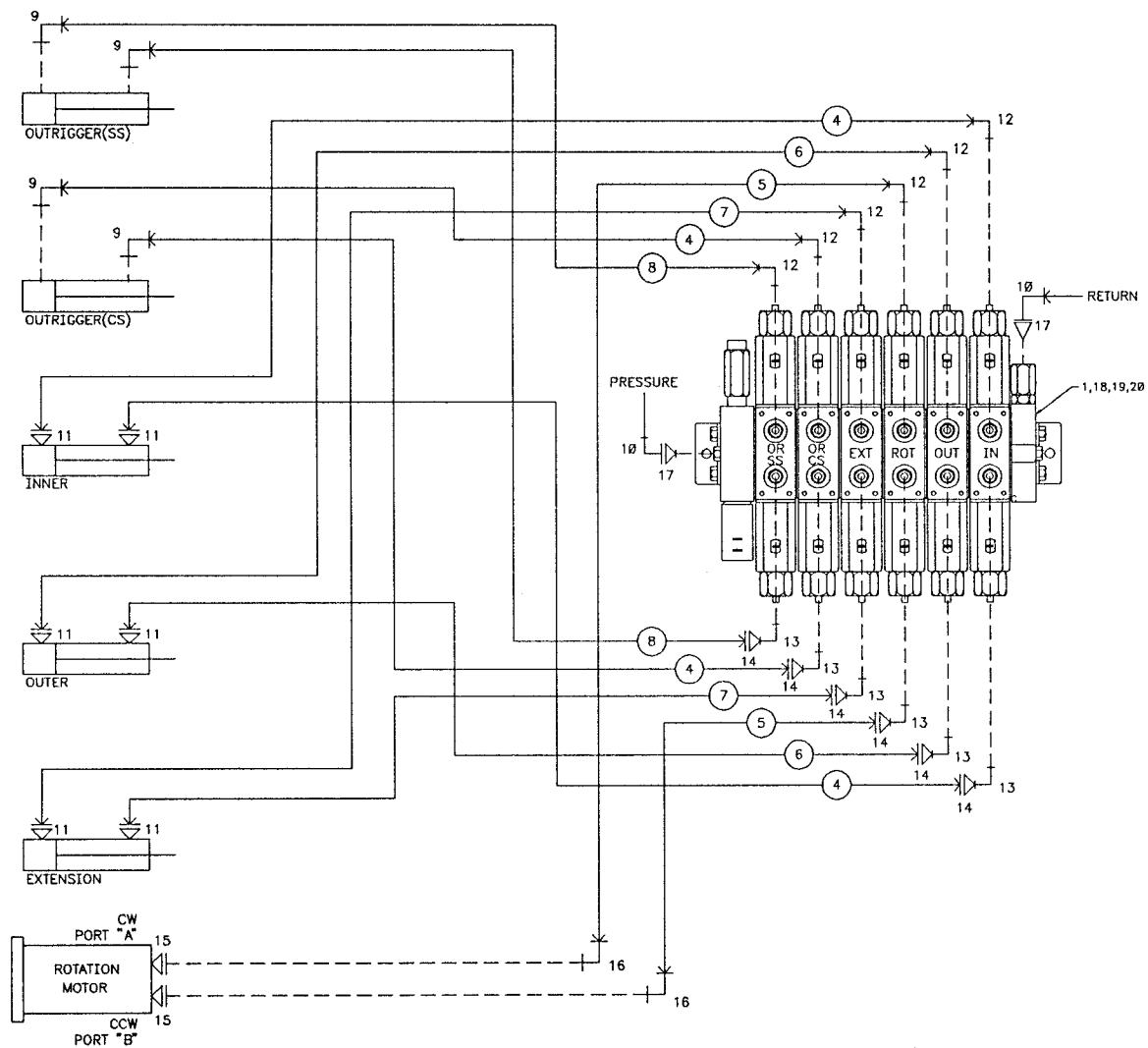


ITEM	PART NO.	DESCRIPTION	QTY
2.	77040283	CABLE END	1
3.	77041479	SOLENOID W/CABLE	1
4.	60113812	CABLE CONNECTOR-KILL SW	1
5.	72066377	CABLE STOP	1
6.	72063000	WASHER 3/16 WRT	2
7.	72066168	COTTER PIN 3/32 X 3/4	1
8.	60118524	LINKAGE BRACKET	1
9.	72060004	CAP SCR 1/4-20X1 HHGR5	1
10.	72063001	WASHER 1/4 WRT	1
11.	72062104	NUT 1/4 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 #8SPRSPD 16-14GA	8
16.	77040053	TERMINAL 1/4STUD 12-10GA	2
17.	77040052	TERMINAL 3/8STUD 12-10GA	2
18.	89044371	CABLE 14GA 3WIRE X 40	1

ITEM	PART NO.	DESCRIPTION	QTY
19.	77040048	BUTT CONNECTOR 16-14GA	3
20.	77040186	TERMINAL 1/4FSLPON 16-14GA	7
21.	89044371	CABLE 14GA 3WIRE X 240	1
22.	89044232	WIRE 14GA RED X 240	1
23.	89044235	WIRE 14GA WHT X 48	1
24.	70394092	DECAL-CAUTION BRK/COMP	1
25.	77041251	RELAY-P&B	1
26.	51712961	PROTECTOR-DIODE BRK/COMP	1
27.	77040282	TERMINAL 1/4PIGBAC 16-14GA	1
28.	88800817	INSTALLATION DRAWING	1
29.	77041008	PRESSURE SWITCH	*1
30.	89044235	WIRE 14GA WHT X 60	*1
31.	72533495	TEE 3/8NPT BRASS	*1
32.	77040051	TERMINAL #18SPADE 16-14GA	*2
33.	51713190	PROTECTOR-DIODE MASTER SW	1
34.	77041386	SWITCH-SGL POLE	1
35.	89044274	WIRE 14GA BLK X 48	1

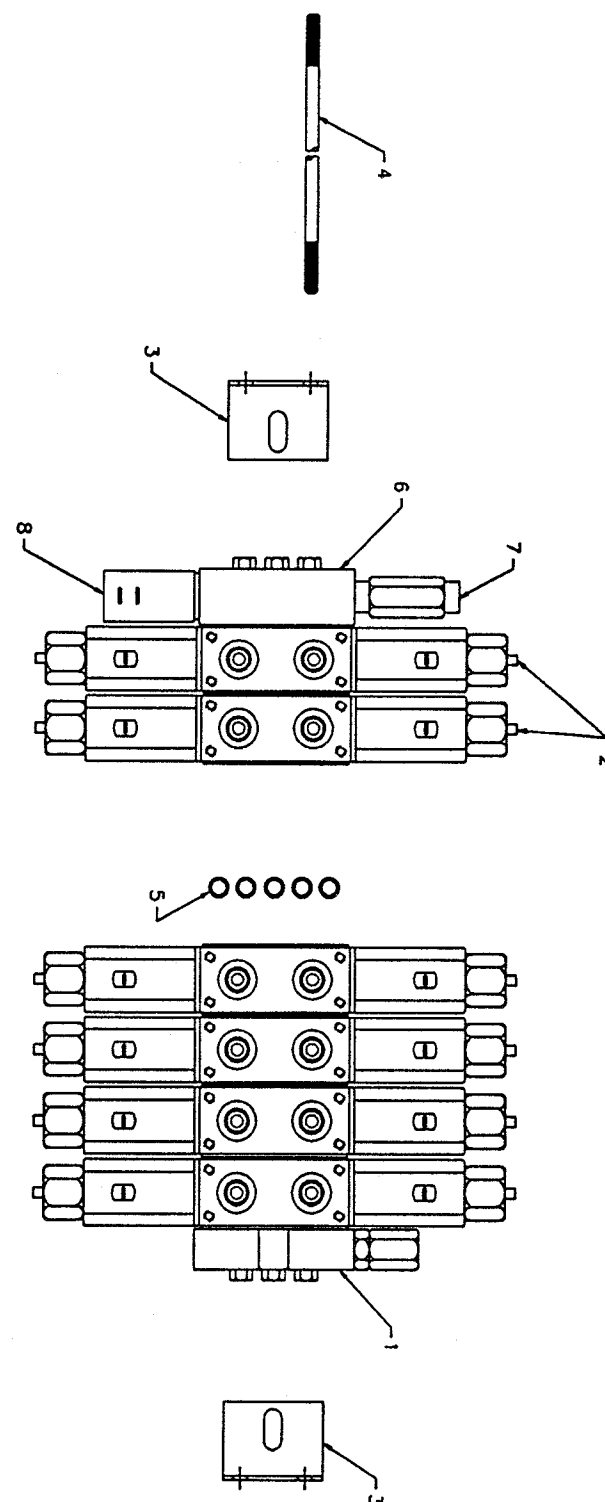
* USED WITH AIR BRAKES ONLY

TROMBETTA SOLENOID ENGINE THROTTLE CONTROL KIT (93091419) ALL MECHANICALLY CONTROLLED DIESEL OR GAS ENGINES ONLY



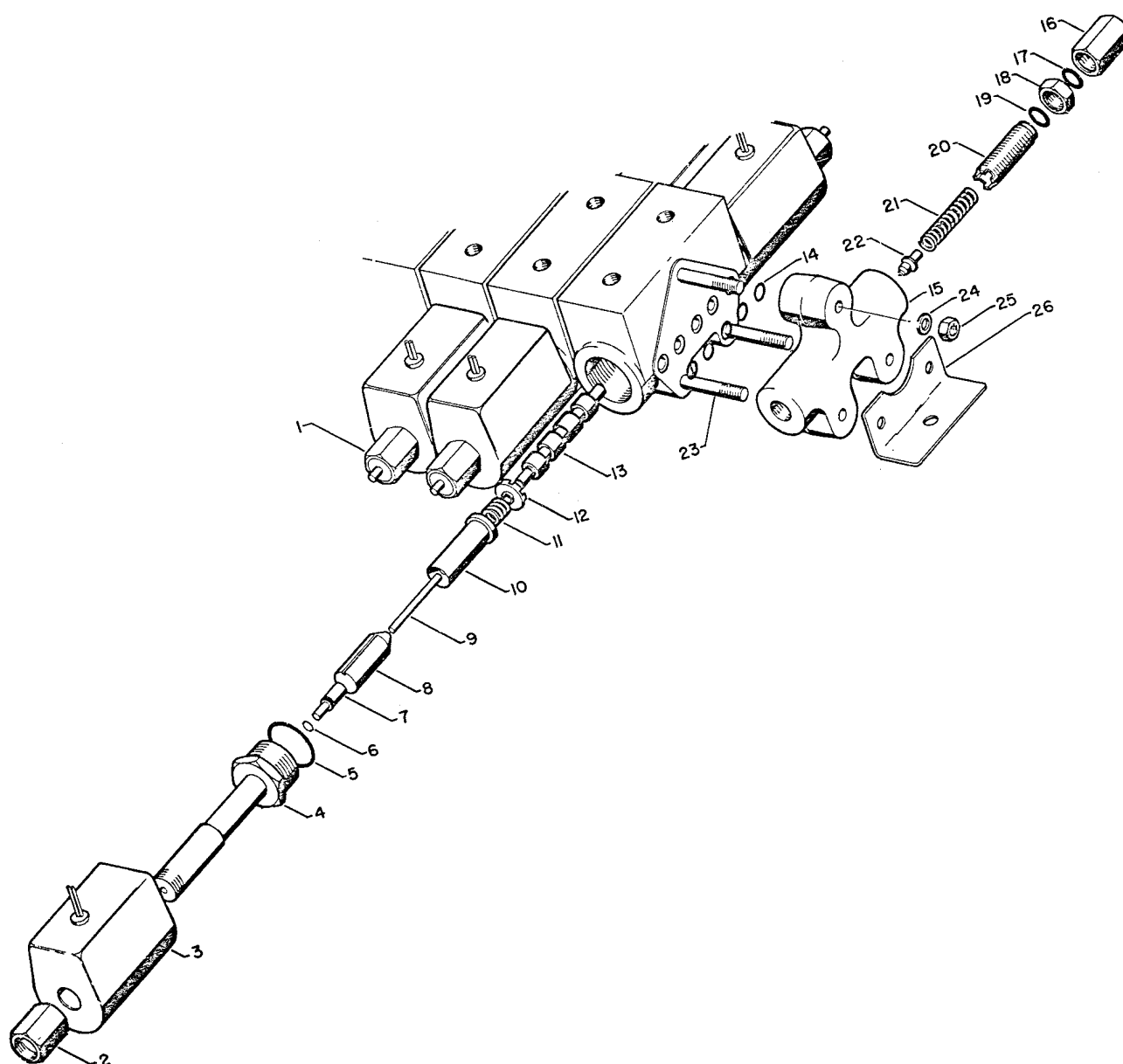
ITEM	PART NO.	DESCRIPTION	QTY
1.	51712764	VALVEBANK	1
3.	51712468	HOSE KIT (INCL:4-8)	1
4.	51393973	HOSE ASM 1/4X87 #4F #4F	4REF
5.	51393970	HOSE ASM 1/4X19 #4F #4F	2REF
6.	51393969	HOSE ASM 1/4X192 #4F #4F	2REF
7.	51393968	HOSE ASM 1/4X210 #4F #4F	2REF
8.	51393967	HOSE ASM 1/4X56 #4F #4F	2REF
9.	72053758	ELBOW #4MSTR #4MJIC 90°	4
10.	72532670	ELBOW #8MJIC #8FJIC 45°	2
11.	72532351	ADAPTER #4MSTR #4MJIC	6
12.	72532699	ELBOW #6MSTR #4MJIC 90°	6
13.	72532700	ELBOW #6MSTR #6MJIC 90° XLG	6
14.	72532707	ADAPTER #4MJIC #6FJIC	6
15.	72532722	ADAPTER #10MJIC #6FSTR	2
16.	72532985	ELBOW #6MSTR #4MJIC 45°	2
17.	72532357	ADAPTER #6MSTR #8MJIC	2
18.	72060025	CAP SCR 5/16-18X1 HHGR5	2
19.	72062109	NUT 5/16 LOCK	2
20.	72063002	WASHER 5/16 WRT	2

Figure D-30. HYDRAULIC KIT 6-SECTION PROPORTIONAL REMOTE PTO (91712766)



ITEM	PART NO.	DESCRIPTION	QTY
1.	73073772	VALVEBANK 4-SECT W/RELIEF	1
2.	73054077	VALVE SECTION	2
3.	60110376	MOUNTING BRACKET	2
4.	60105648	STUD 5/16-18X14-1/4	3
5.	7Q072012	O-RING	10
6.	60025669	INLET	1
7.	73054628	RELIEF VALVE	1
8.	73054624	SOLENOID VALVE 2WAY 8GPM	1

Figure D-31. VALVEBANK ASM 6-SECTION PROPORTIONAL (51712764)



94014962 TUBE ASSEMBLY INCLUDES ITEMS 4-10

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1.	73054077	VALVE SECTION (INCL:2-14)	4	16.	**	RELIEF VALVE ADJ CAP	1REF
2.	73014950	NUT	*1REF	17.	**	O-RING	1REF
3.	77041016	COIL 12VDC	*2REF	18.	**	JAM NUT	1REF
4.	73014958	TUBE	*2REF	19.	**	O-RING	1REF
5.	7Q072113	O-RING	*2REF	20.	**	ADJUSTMENT ROD	1REF
6.	7Q072008	O-RING	*2REF	21.	**	SPRING	1REF
7.	73014957	BUTTON	*2REF	22.	**	NEEDLE	1REF
8.	73014956	PLUNGER	*2REF	23.	73014960	TIE ROD	3
9.	73014954	PIN	*2REF	24.	72063002	WASHER 5/16	6
10.	73014955	PLUG	*2REF	25.	72062001	NUT 5/16-18	6
11.	73014953	SPRING	*2REF	26.	73014959	BRACKET	2
12.	73014952	SPRING RETAINER	*2REF				
13.	51014951	SPOOL & BODY (MATCHED SET)	*1REF				
14.	7Q072012	O-RING	*5REF				
15.	73014948	INLET (INCL:16-22)	1				

* INDICATES QUANTITY PER VALVE SECTION.

** NOT AVAILABLE SEPARATELY. IMT DOES NOT RECOMMEND REPAIR OR ADJUSTING OF FACTORY SET RELIEF PRESSURE.

Figure D-32. VALVEBANK (73073772)

ITEM	PART NO.	DESCRIPTION	QTY
1.	51712488	VALVEBANK-7 SECT	1
2.	51712485	HOSE ASM 1/4X158 #4F #4F	2
3.	51705262	HOSE ASM 1/4X60 #4F #4F	4
4.	51712484	HOSE ASM 1/4X140 #4F #4F	2
5.	72532699	ELBOW #6MSTR #4MJIC 90°	8
6.	72532351	ADAPTER #4MSTR #4MJIC	6
7.	72532722	ADAPTER #10MSTR #6FSTR	2
8.	72532357	ADAPTER #6MSTR #8MJIC	1
9.	72053762	ELBOW #6MSTR #8MJIC 90°	1
10.	72532985	ELBOW #6MSTR #4MJIC 45°	2
11.	72063186	WASHER 3/8 FLT	2
12.	72062103	NUT 3/8-16 LOCK	2
13.	72060047	CAP SCR 3/8-16X1-1/4 HHGR5	2

NOTE: REMAINING 3 SECTIONS TO BE PLUMBED BY CUSTOMER.

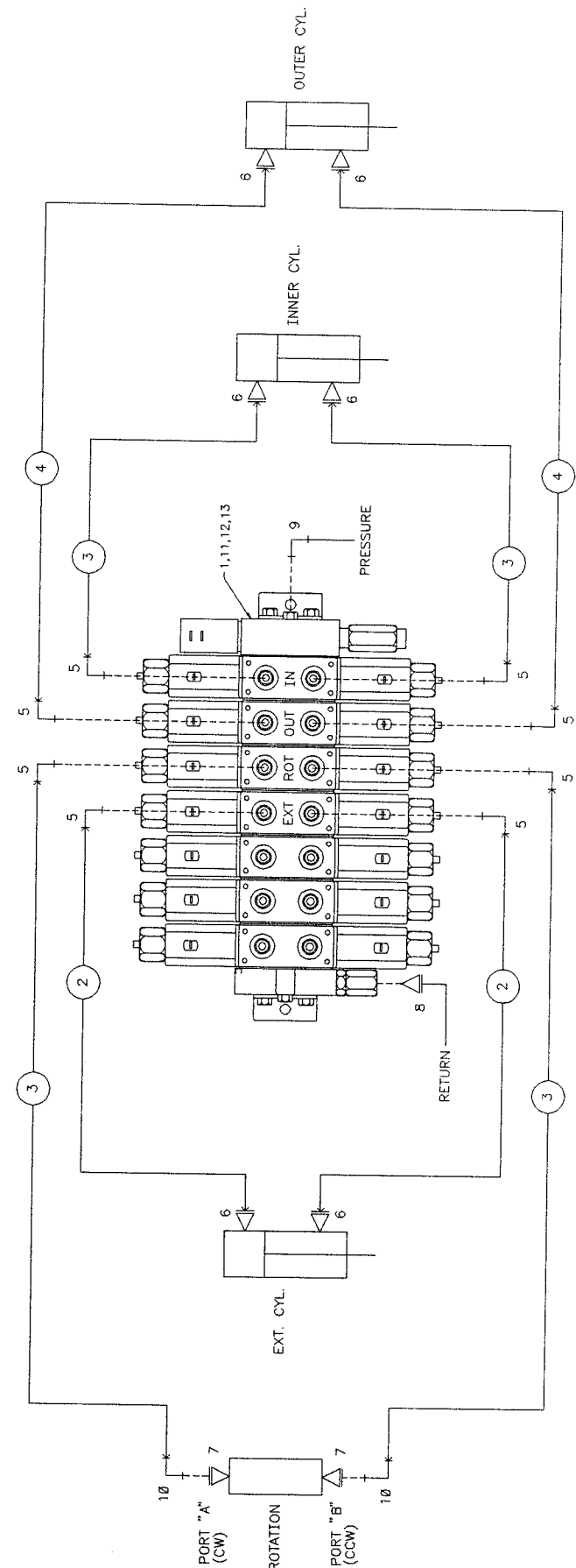
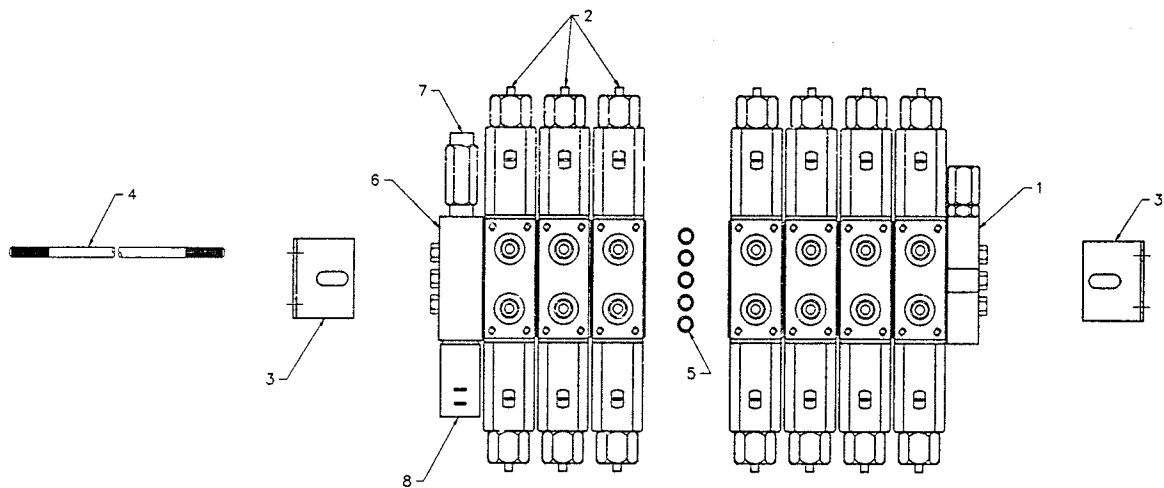
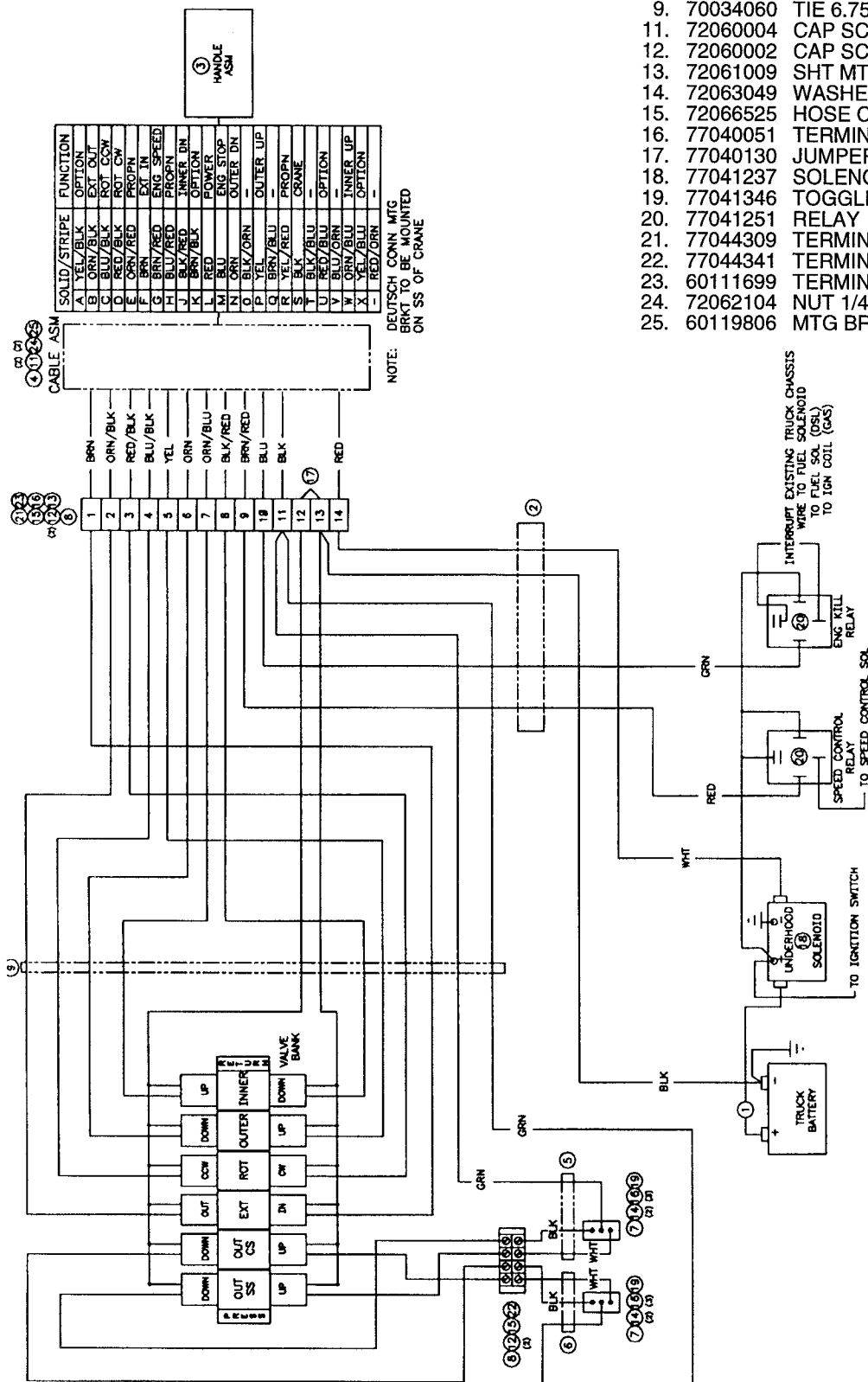


Figure D-33. HYDRAULIC KIT-7 SECTION STATIONARY MOUNT (91712489)



ITEM	PART NO.	DESCRIPTION	QTY
1.	73073772	VALVEBANK (SEE DWG)	1
2.	73054077	VALVE SECTION	3
3.	60110376	MOUNTING BRACKET	2
4.	60110377	STUD 5/16-18X13-1/2	3
5.	7Q072012	O-RING	15
6.	60025669	INLET	1
7.	73054628	RELIEF VALVE	1
8.	73054624	SOLENOID VALVE 8GPM 10V	1

Figure D-34. VALVEBANK-7 SECTION MINI PACK (51712488)

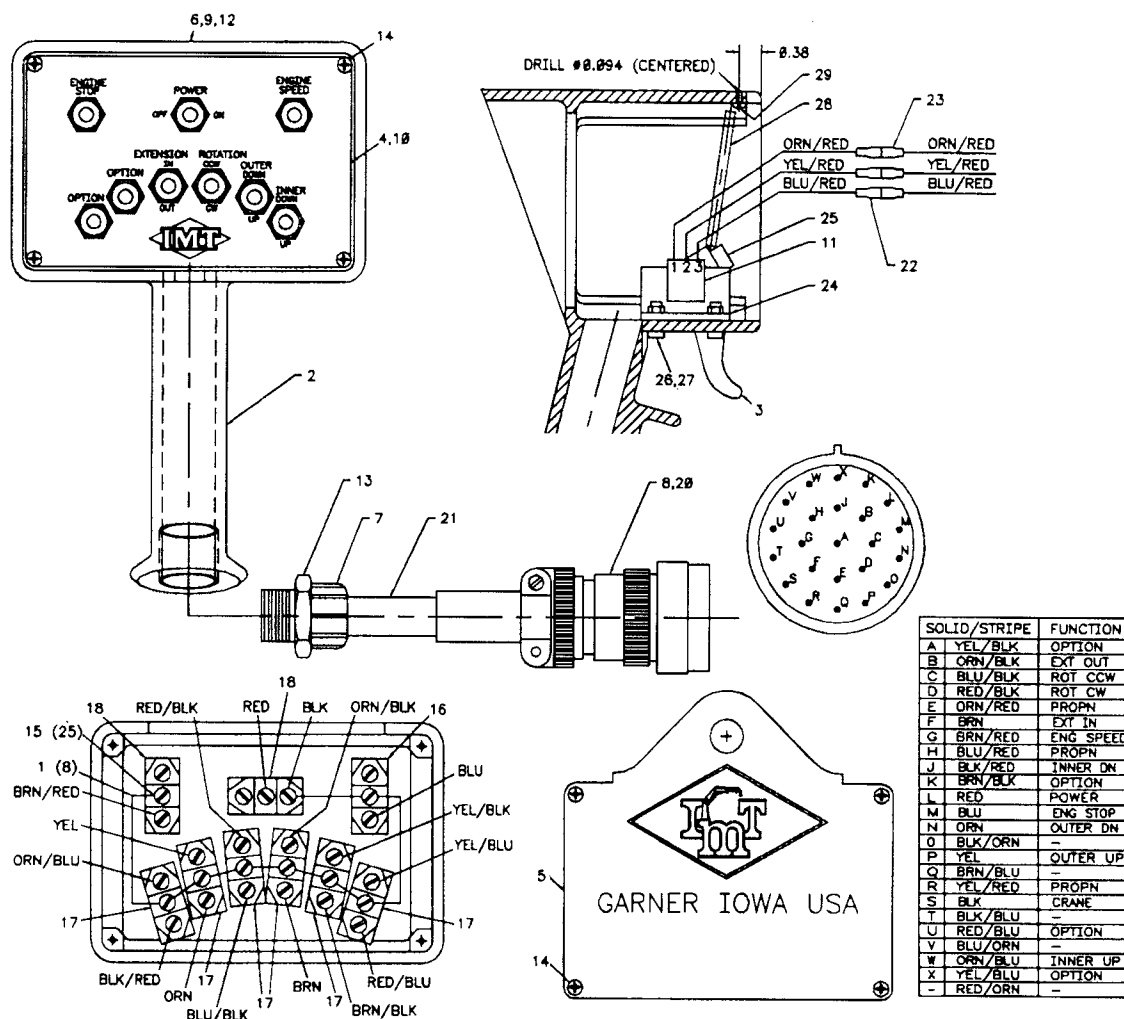


ITEM	PART NO.	DESCRIPTION	QTY
1.	51704784	CABLE ASM #1WIRE X 6	1
2.	51704993	CABLE ASM 16GA/4WIRE X 150	1
3.	51713430	HANDLE ASM	1
4.	51713559	CABLE ASM 18GA/24WIRE X 52	1
5.	51707029	CABLE 16GA/3WIRE X 46	1
6.	51707030	CABLE 16GA/3WIRE X 90	1
7.	52707014	MTG PLATE	2
8.	60105825	TERMINAL BLOCK MTG BAR	1
9.	70034060	TIE 6.75	12
11.	72060004	CAP SCR 1/4-20X1 HHGR5	2
12.	72060002	CAP SCR 1/4-20X3/4 HHGR5	8
13.	72061009	SHT MTL SCR #6X3/4 PH	4
14.	72063049	WASHER 1/4 LOCK	4
15.	72066525	HOSE CLAMP	2
16.	77040051	TERMINAL #8 SPRSPD 16-14GA	12
17.	77040130	JUMPER BAR	1
18.	77041237	SOLENOID 12V 150A	1
19.	77041346	TOGGLE SWITCH DT	2
20.	77041251	RELAY	2
21.	77044309	TERMINAL BLOCK-14	1
22.	77044341	TERMINAL BLOCK-4	1
23.	60111699	TERMINAL MTG BLOCK	1
24.	72062104	NUT 1/4-20 LOCK	2
25.	60119806	MTG BRACKET	1

Figure D-35. REMOTE CONTROL KIT-6 FUNCTION PTO (90713552)

ITEM	PART NO.	DESCRIPTION	QTY
1.	77041390	AMP DRIVER	1
2.	72060703	CAP SCR 1/4-20X1/2 SH	
3.	72063049	WASHER 1/4 LOCK	2
4.	77044309	TERMINAL BLOCK-14	2
5.	60105825	TERMINAL BLOCK MTG	2
6.	72066525	HOSE CLAMP	2
7.	77040130	JUMPER BAR	1
8.	51713565	CABLE ASM 18GA/24WIRE X 90	1
9.	51713564	HANDLE ASM	1
10.	77041251	RELAY	1
11.	77041237	SOLENOID 12V 150A	1
12.	51704784	CABLE ASM #1WIRE X 6	1
13.	72060002	CAP SCR 1/4-20X3/4 HHGR5	2
14.	72061009	SHT MTL SCR #6X3/4 PH	4
15.	77040051	TERMINAL #8 SPRSPD 16-14GA	37
16.	77040186	TERMINAL 1/4 FSLPON 16-14GA	2
17.	72060004	CAP SCR 1/4-20X1 HHGR5	2
18.	72062104	NUT 1/4-20 LOCK	2
19.	60119806	MTG BRACKET	1

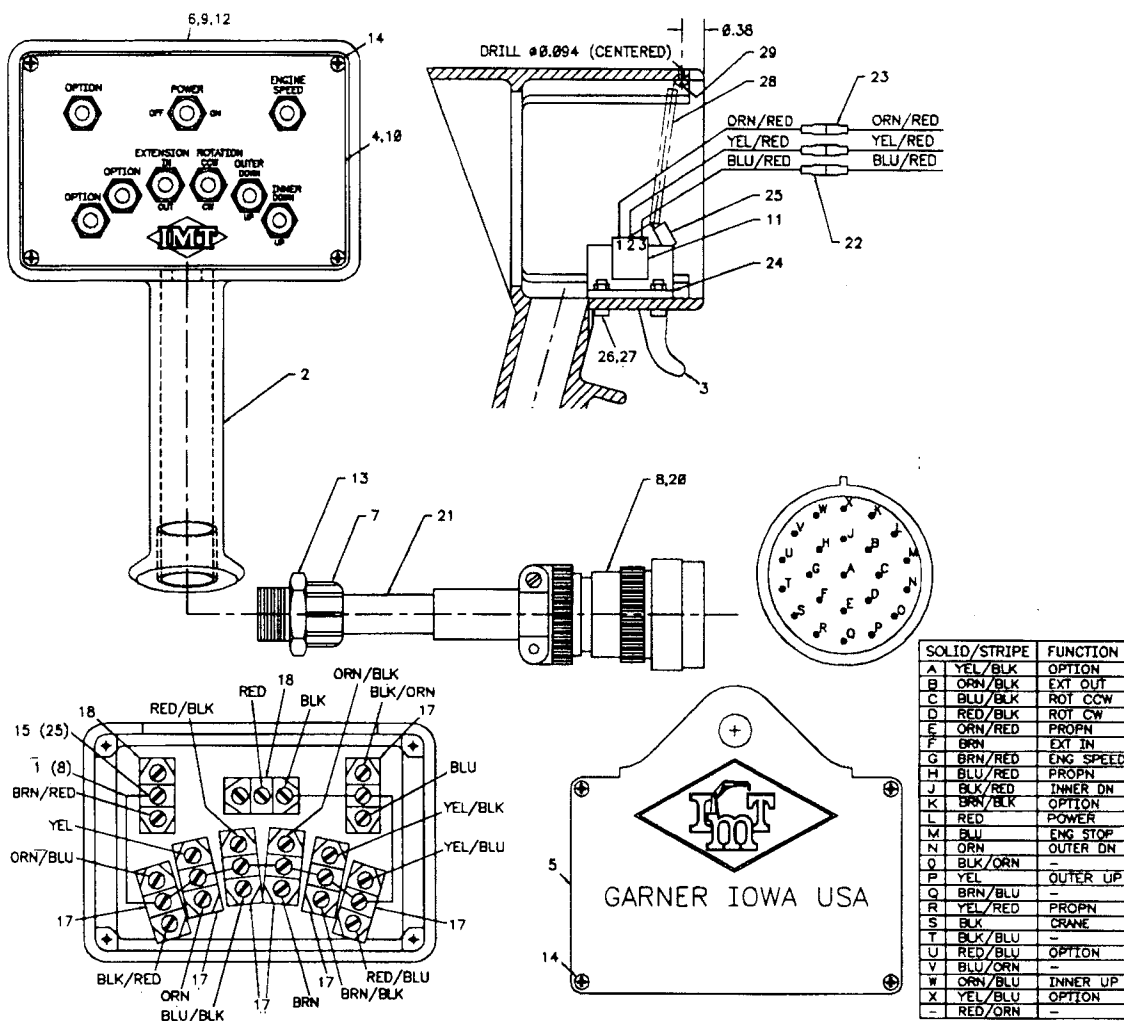




ITEM	PART NO.	DESCRIPTION	QTY
1.	60045031	WIRE 18GA GRN X 4	8
2.	60119335	CONTROL HANDLE	1
3.	60111141	TRIGGER	1
4.	60119277	COVER-RC	1
5.	70034306	BACK COVER-RC	1
6.	70029119	SER NO PLACARD	1
7.	77044096	CORD GRIP	1
8.	77044621	PIN	23
9.	70392862	DECAL-DGR RC ELECTRO SM	1
10.	71394283	DECAL-RC HANDLE	1
11.	51707507	POTENTIOMETER ASM(INCL 22)	1
12.	72066340	POP RIVET	2
13.	72531833	REDUCER BUSHING 3/4-1/2NPT	1
14.	72061009	SHT MTL SCR #6X3/4 PH	8

ITEM	PART NO.	DESCRIPTION	QTY
15.	77040051	TERMINAL #8 SPRSPD 16-14GA	25
16.	77040371	TOGGLE SWITCH SPST	1
17.	77040372	TOGGLE SWITCH SPDT	6
18.	77040373	TOGGLE SWITCH SPST	2
20.	77044579	CONNECTOR	1
21.	89044100	CABLE 18GA/24WIRE X 30FT	1
22.	77040047	TERMINAL (PART OF 22)	3REF
23.	77040186	TERMINAL 1/4 FSLPON 16-14GA	3
24.	60111142	MTG BRACKET	1
25.	72060669	CAP SCR #10-32X5/8 SH	1
26.	72060636	CAP SCR #10-24X3/4 SH	2
27.	72062106	NUT #10-24 LOCK	2
28.	70143223	SPRING	1
29.	72061000	SHT MTL SCR #6X1/2 PH	1

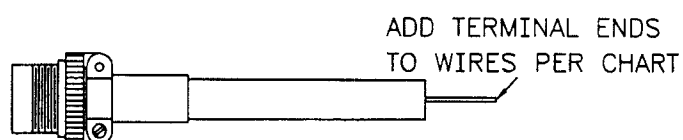
Figure D-37. REMOTE HANDLE ASM-6 FUNCTION (51713430)



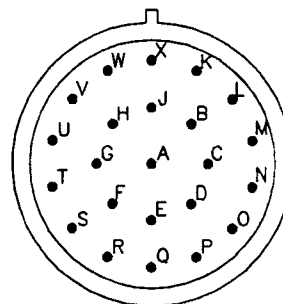
ITEM	PART NO.	DESCRIPTION	QTY
1.	60045031	WIRE 18GA GRN X 4	8
2.	60119335	CONTROL HANDLE	1
3.	60111141	TRIGGER	1
4.	60119277	COVER-RC	1
5.	70034306	BACK COVER-RC	1
6.	70029119	SER NO PLACARD	1
7.	77044096	CORD GRIP	1
8.	77044621	PIN	23
9.	70392862	DECAL-DGR RC ELECTRO SM	1
10.	70394203	DECAL-RC HANDLE	1
11.	51707507	POTENTIOMETER ASM(INCL 22)	1
12.	72066340	POP RIVET	2
13.	72531833	REDUCER BUSHING 3/4-1/2NPT	1
14.	72061009	SHT MTL SCR #6X3/4 PH	8

ITEM	PART NO.	DESCRIPTION	QTY
15.	77040051	TERMINAL #8 SPRSPD 16-14GA	25
17.	77040372	TOGGLE SWITCH SPDT	7
18.	77040373	TOGGLE SWITCH SPST	2
20.	77044579	CONNECTOR	1
21.	89044100	CABLE 18GA/24WIRE X 30FT	1
22.	77040047	TERMINAL (PART OF 22)	3REF
23.	77040186	TERMINAL 1/4 FSLPON 16-14GA	3
24.	60111142	MTG BRACKET	1
25.	72060669	CAP SCR #10-32X5/8 SH	1
26.	72060636	CAP SCR #10-24X3/4 SH	2
27.	72062106	NUT #10-24 LOCK	2
28.	70143223	SPRING	1
29.	72061000	SHT MTL SCR #6X1/2 PH	1

Figure D-38. REMOTE HANDLE ASM-7 FUNCTION STATIONARY MOUNT(51713564)

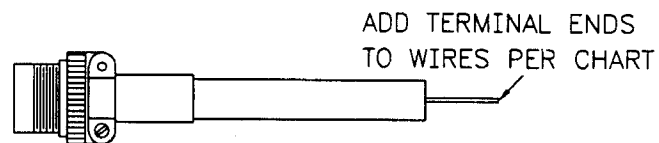


SOLID/STRIPE	TERM	ITEM NO
A YEL/BLK	-	-
B ORN/BLK	3	-
C BLU/BLK	3	-
D RED/BLK	3	-
E ORN/RED	-	-
F BRN	3	-
G BRN/RED	3	-
H BLU/RED	-	-
J BLK/RED	3	-
K BRN/BLK	-	-
L RED	3	-
M BLU	3	-
N ORN	3	-
O BLK/ORN	-	-
P YEL	3	-
Q BRN/BLU	-	-
R YEL/RED	-	-
S BLK	3	-
T BLK/BLU	-	-
U RED/BLU	-	-
V BLU/ORN	-	-
W ORN/BLU	3	-
X YEL/BLU	-	-
- RED/ORN	-	-

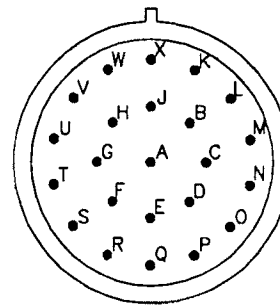


ITEM	PART NO.	DESCRIPTION	QTY
1.	89044100	CABLE 18GA/24WIRE	52"
3.	77040051	TERMINAL #8 SPRSPD 16-14GA	12
4.	77044620	CONNECTOR	1
5.	77044580	SOCKET	23
7.	77044667	PLUG-CAP	1

Figure D-39. CABLE ASM 18GA/24WIRE X 52 (51713559)

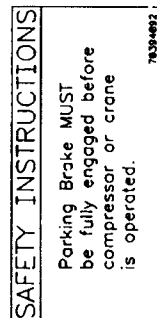


SOLID/STRIPE	TERM	ITEM NO
A YEL/BLK		3
B ORN/BLK		3
C BLU/BLK		3
D RED/BLK		3
E ORN/RED		3
F BRN		3
G BRN/RED		3
H BLU/RED		3
J BLK/RED		3
K BRN/BLK		3
L RED		3
M BLU		3
N ORN		3
O BLK/ORN		3
P YEL		3
Q BRN/BLU		-
R YEL/RED		3
S BLK		3
T BLK/BLU		-
U RED/BLU		3
V BLU/ORN		-
W ORN/BLU		3
X YEL/BLU		3
- RED/ORN		-



ITEM	PART NO.	DESCRIPTION	QTY
1.	89044100	CABLE 18GA/24WIRE	52"
3.	77040051	TERMINAL #8 SPRSPD 16-14GA	20
4.	77044620	CONNECTOR	1
5.	77044580	SOCKET	23
7.	77044667	PLUG-CAP	1

Figure D-40. CABLE ASM 18GA/24WIRE X 90 (51713565)



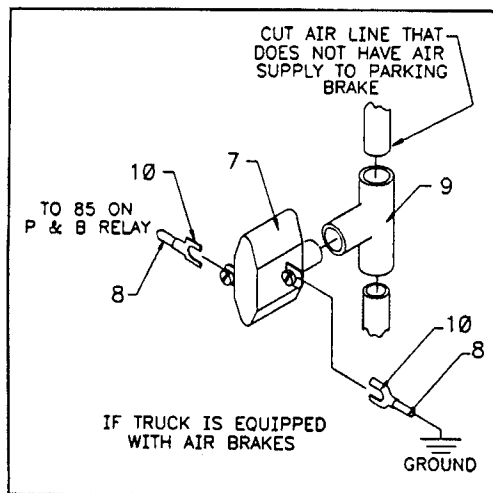
- | ITEM | PART NO. | DESCRIPTION | QTY |
|------|----------|-----------------------------|-----|
| 1. | 89044235 | WIRE 14GA WHT | 6FT |
| 2. | 77041251 | P&B RELAY | 1 |
| 3. | 77044580 | SOCKET | 2 |
| 4. | 77040186 | TERMINAL 1/4 FSLPON 16-14GA | 4 |
| 5. | 79085317 | CONTACT REMOVAL TOOL | 1 |
| 6. | 70394092 | DECAL-CAUTION BRK/COMP | 1 |
| 7. | 77041008 | PRESSURE SWITCH | *1 |
| 8. | 89044235 | WIRE 14GA WHT | 5FT |
| 9. | 72533495 | TEE 3/8NPT BRASS | *1 |
| 10. | 77040051 | TERMINAL #18 SPADE 16-14GA | *2 |

CONTINUED ON FOLLOWING PAGE

ELECTRONIC THROTTLE CONTROL KIT (93091608-1) CATERPILLAR MODELS 3116, 3126, 3176B & 3406E

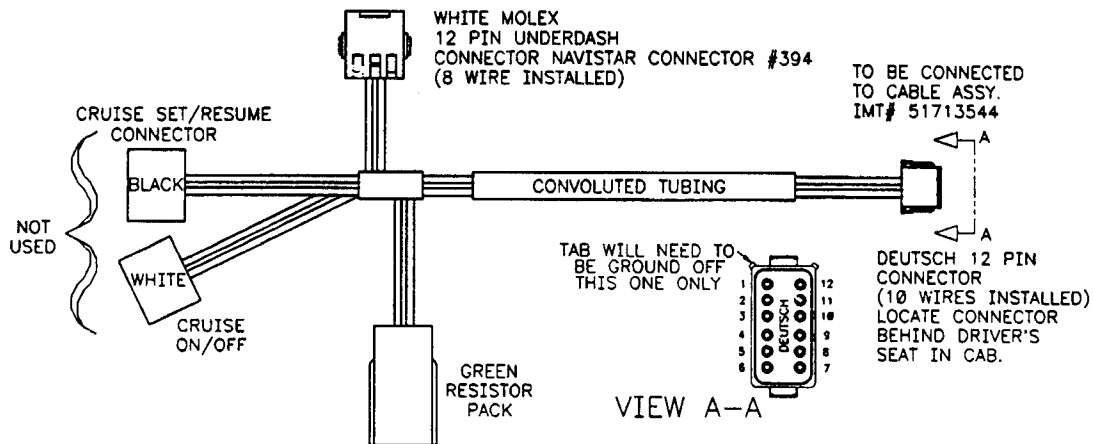
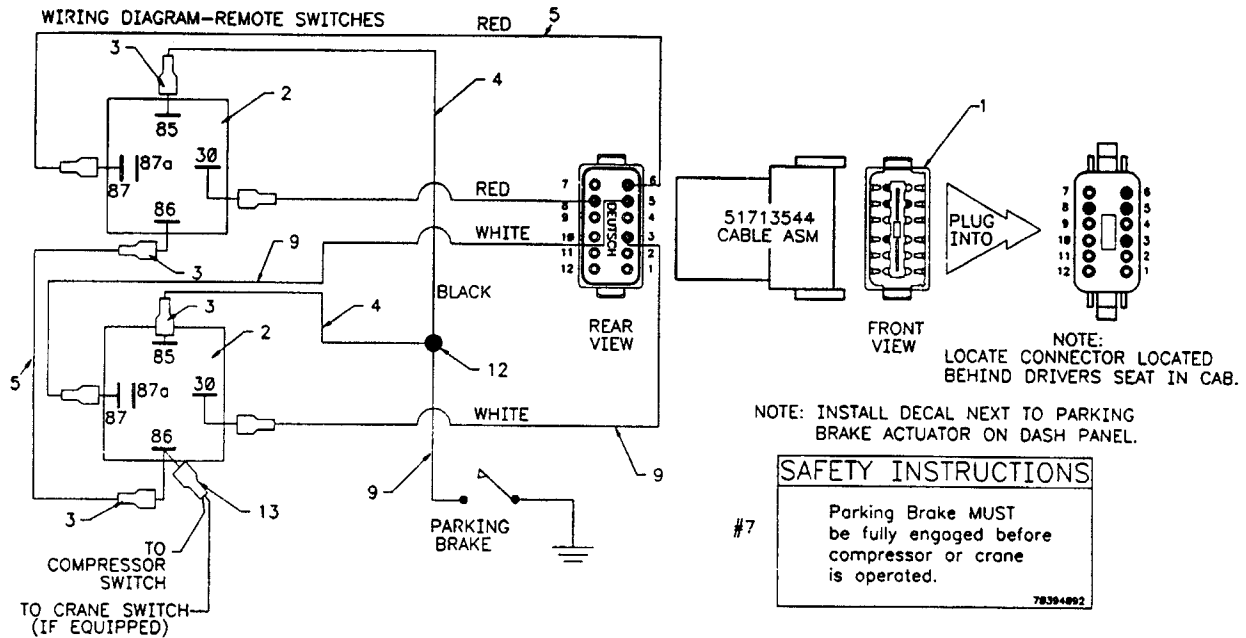
DEDICATED PTO PARAMETERS	NEW VALUES	AVAILABLE RANGE/OPTIONS	DEFAULT
PTO CONFIGURATION	REMOTE SWITCH	REMOTE SWITCHES, CAB SWITCHES, REMOTE THROTTLE, OFF	OFF
PTO TOP ENGINE LIMIT	1250 RPM *	600 TO 2120 RPM	2120 RPM
PTO ENGINE RPM SET SPEED	1250 RPM *	LOW IDLE-PTO TEL	Ø RPM
PTO TO SET SPEED	YES	YES	NO
PTO CAB THROTTLE RPM LIMIT	TEL	PTO TEL	TEL
IDLE/PTO RPM RAMP RATE	500 RPM/SEC.	5 TO 1000 RPM/SEC	50 RPM/SEC

* VALUES TO BE DETERMINED BY
END USER. (MUST BE THE SAME)



HAVE AUTHORIZED CATERPILLAR® DEALER USE
MP51 PRO-LINC 9000 TO CHANGE THE ABOVE ECM
PARAMETERS FROM DEFAULT TO NEW VALUES
TO ENABLE PROPER ENGINE IDLE CONTROL.

**ELECTRONIC THROTTLE CONTROL KIT (93091608-2)
CATERPILLAR MODELS 3116, 3126, 3176B & 3406E**



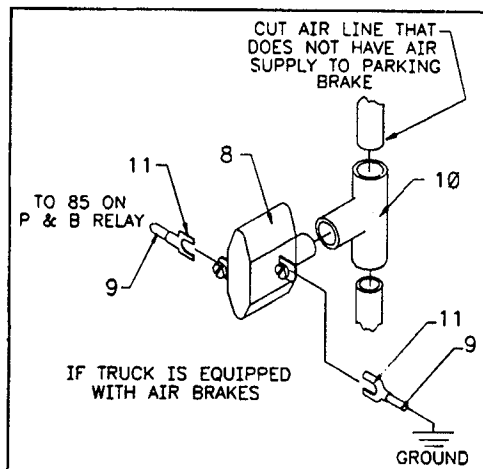
ITEM #6 INTERFACE CABLE ASSEMBLY FOR NAVISTAR ELECTRONIC THROTTLE SHOWN HERE.
PART NO.: 77044666

ITEM	PART NO.	DESCRIPTION	QTY
1.	51713544	CABLE ASM 12-PIN (SEE DWG)	1
2.	77041251	P&B RELAY	2
3.	77040186	TERMINAL 1/4 FSLPON 16-14GA	4
4.	89044274	WIRE 14GA BLK X 12	2
5.	89044232	WIRE 14GA RED X 12	1
6.	77044666	CABLE ASM-NAVISTAR	1
7.	70394092	DECAL-CAUTION BRK/COMP	1
8.	77041008	PRESSURE SWITCH	*1
9.	89044235	WIRE 14GA WHT X 60	1
10.	72533495	TEE 3/8NPT BRASS	*1
11.	77040051	TERMINAL #18 SPADE 16-14GA	*2
12.	77040049	BUTT CONNECTOR 12-10GA	1
13.	77040282	TERMINAL 1/4 PIGBAC 16-14GA	1

* USED WITH AIR BRAKES ONLY.

CONTINUED ON FOLLOWING PAGE

ELECTRONIC THROTTLE CONTROL KIT (93091609-1) NAVISTAR MODELS T444E & T466E



PROGRAMMABLE PARAMETER SETTINGS FOR PRESET ENGINE SPEED CONTROL.

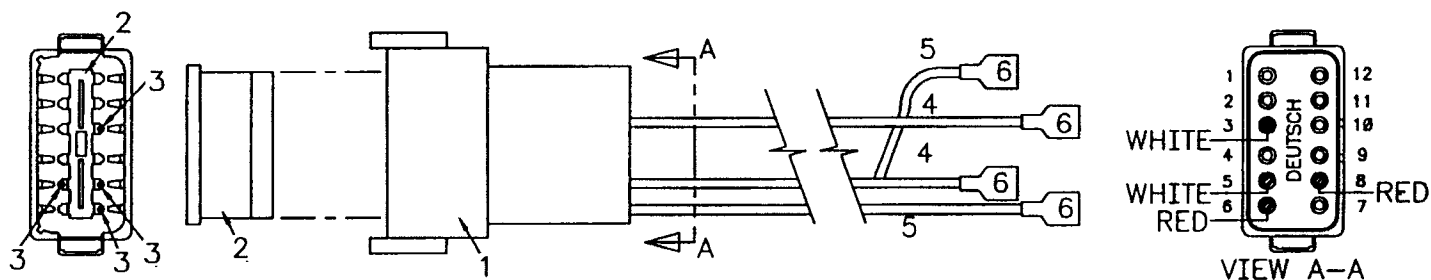
USE MPSI PRO-LINK 9000 • AUTHORIZED NAVISTAR® DEALER.

SERVICE TOOL NAME	PARAMETER SETTING
PTO MODE	IN-CAB AND REMOTE
IN-CAB PTO MODE	PRESET
DISABLE CAB CONTROLS	YES
SET SWITCH SPEED	PROGRAM AS REQUIRED USER TO DETERMINE RPM SELECTION
RESUME SWITCH SPEED	SAME AS SET SWITCH SPEED
ENGINE RAMP RATE	500 RPM/SEC.

NOTICE:

SALES CODE 12VVS & 12VWV MUST BE ORDERED AND INSTALLED ON TRUCK PRIOR TO INSTALLING IMT # 93091609 SPEED CONTROL KIT.

ELECTRONIC THROTTLE CONTROL KIT (93091609-2) NAVISTAR MODELS T444E & T466E

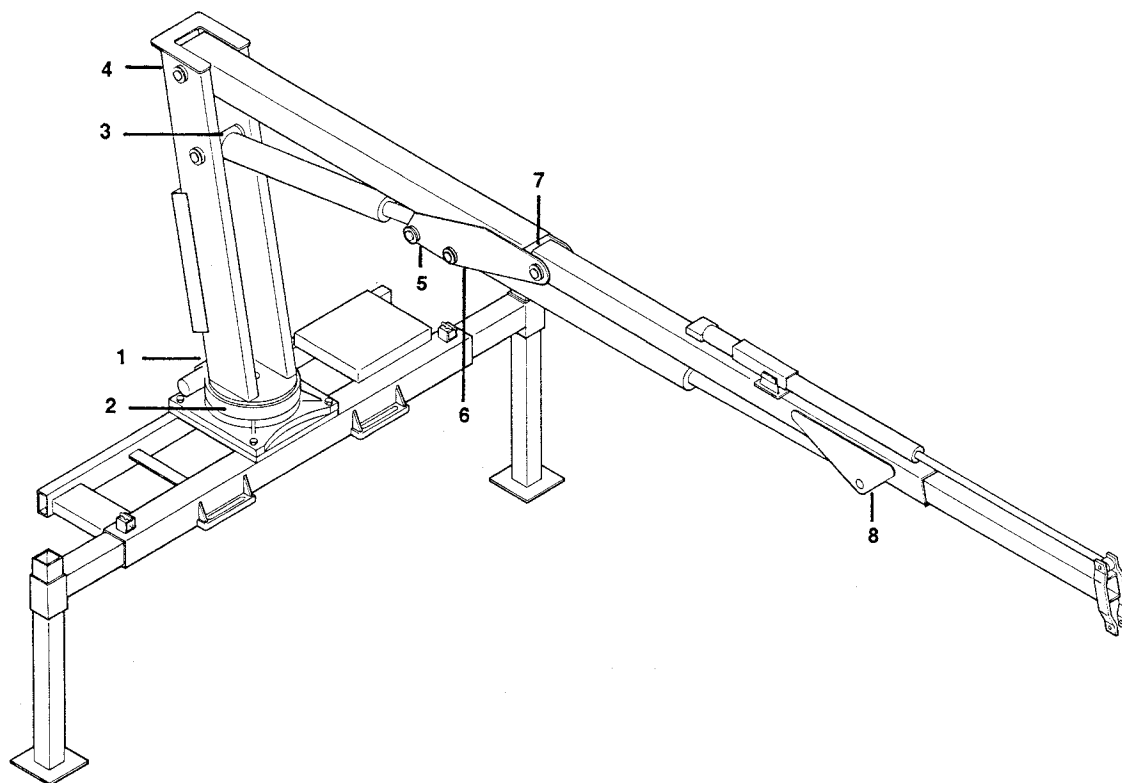


ITEM	PART NO.	DESCRIPTION	QTY
1.	77040381	RECEPTACLE 12-WAY	1
2.	77040379	WEDGELOCK	1
3.	77044621	PIN	4
4.	89044397	WIRE 16GA WHT X 26	2
5.	89044400	WIRE 16GA RED X 26	2
6.	77040186	TERMINAL 1/4 FSLPON 16-14GA	4

THIS ASSEMBLY USED ON 93091609

CABLE ASSEMBLY-12 PIN (51713544)

Section 5. REFERENCE



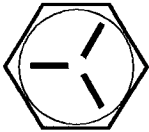

ITEM	LOCATION DESCRIPTION	LUBRICANT	FREQUENCY
1.	WORM GEAR GREASE ZERK	SHELL ALVANIA 2EP OR SHELL RETINAX "A"	WEEKLY
2.	TURNTABLE/BEARING GREASE EXTENSION *ROTATE CRANE WHILE GREASING		
3.	INNER CYLINDER BASE		
4.	MAST/INNER BOOM HINGE PIN		
5.	INNER CYLINDER ROD		
6.	OUTER CYLINDER BASE		
7.	OUTER/INNER BOOM HINGE PIN		
8.	OUTER CYLINDER ROD		

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 E-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		 SAE J429 GRADE 8	
		PLAIN (FT-LB)	PLATED (FT-LB)	PLAIN (FT-LB)	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		 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.

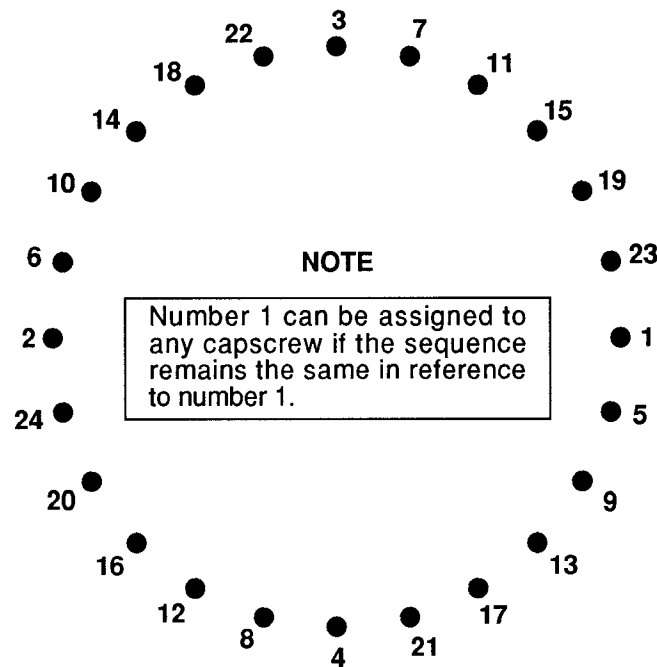
1. Bolt manufacturer's particular specifications should be consulted when provided.
2. Flat washers of equal strength must be used.
3. All torque measurements are given in foot-pounds. To convert to inch-pounds, multiply by 12.
4. Torque values specified are for bolts with residual oils or no special 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 fatigue causing serious injury or DEATH.

Figure E-2. TORQUE DATA CHART

Refer to the diagram below for proper tightening/torquing 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 cap screw used.
2. Follow the tightening sequence shown in the diagram. Note that the quantity of cap screws may differ from the diagram, but the sequence must follow the criss-cross pattern as shown in the diagram.
3. Torque all cap screws to approximately 40% of the specified torque value, by following the sequence. (EXAMPLE: $.40 \times 265 \text{ FT-LBS} = 106 \text{ FT-LBS}$)
4. Repeat Step 3, but torquing all cap screws to 75% of the specified torque value. Continue to follow the tightening sequence. (EXAMPLE: $.75 \times 265 \text{ FT-LBS} = 199 \text{ FT-LBS}$)
5. Using the proper sequence, torque all cap screws to the listed torque value as determined from the Torque Data Chart.

Figure E-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 bearing's 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.

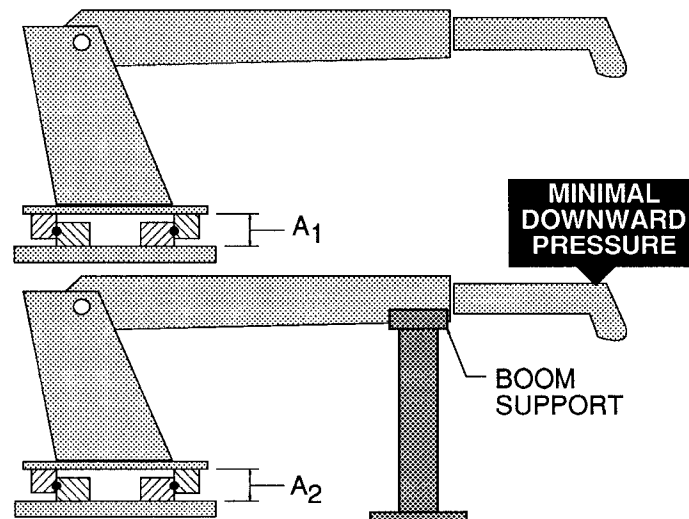
With the crane horizontal and fully extended, measure between the top and bottom mounting surfaces of the turntable bearing (A_1), using a dial indicator for accuracy.

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 3000 SERIES 3016 315A 320H 3515 3617 3625 421 425 5016 TH7 BODY ROT'N TH1449A BODY ROT'N TH15A CLAMP TH1836A CLAMP TH2551 CLAMP TH2557 CLAMP TH2557A CLAMP	4817 4825 516 525 5800 SERIES 6014 6425 725 7020 7025 8025 8031 TH10 BODY ROT'N TH12 BODY ROT'N	32018 32000 SERIES HAWK-H1150 HAWK-H1150TL HAWK-H4961	9616 9800 SERIES 10020 10025 1216 1325 1331 13031 13034 13426 14018 14000 SERIES 14126 15000 SERIES 1725 18000 SERIES 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. (A₁ - A₂)	.060" (1.524mm)	.070" (1.778mm)	.075" (1.905mm)	.090" (2.286mm)

Figure E-4. TURNTABLE BEARING INSPECTION FOR REPLACEMENT

Spare Parts List

1-Year Supply

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 the item numbers on the Figure listed.

FIGURE	ITEM	PART NO.	DESCRIPTION	QTY
D-4. BASE & POWER OUT OUTRIGGER ASSEMBLY (41705591)				
	6.	60010351	SPRING	2
D-5. BASE & POWER OUT OUTRIGGER ASSEMBLY-REMOTE (41707022)				
	6.	60010351	SPRING	2
D-6. POWER DOWN CYLINDER (3B061850)				
	5.	9X061850	SEAL KIT	2
	17.	73054004	VALVE	2
D-7. BASE ASSEMBLY (41704555)				
	8.	70055147	BEARING	1
	9.	70055148	BEARING	1
	10.	70056307	WORM GEAR	1
	11.	71056308	TURNTABLE GEAR BEARING	1
	19.	72062162	NUT 9/16-12 HEX GR8	15
	22.	72063117	WASHER 9/16 GR8	15
	25.	72601313	CAP SCR 9/16-12X3-1/2 HHGR8	15
	26.	73051482	HYDRAULIC MOTOR	1
D-8. MAST ASSEMBLY (41704872)				
	4.	72063117	WASHER 9/16 FLAT GR8	8
	6.	72601144	CAP SCR 9/16-12X2 HHGR8	8
D-9. INNER BOOM ASSEMBLY (41704873)				
	13.	7BF81215	BUSHING	4
D-10. INNER CYLINDER (3B191910)				
	4.	7BF81215	BUSHING	6
	10.	73054304	VALVE	1
	11.	9C161823	SEAL KIT	1
D-13. OUTER BOOM ASSEMBLY (41704875)				
	3.	7BF81015	BUSHING	4
	4.	60030154	WEAR PAD	1
D-14. OUTER CYLINDER (3B101830)				
	6.	9C141820	SEAL KIT	1
	17.	73054304	VALVE	1
	19.	7BF81215	BUSHING	2
	20.	7BF81015	BUSHING	2
D-15. EXTENSION BOOM ASSEMBLY 1H (41704876)				
	22.	71073920	HOOK 3-TON	1
	27.	60030153	WEAR PAD	1
D-16. EXTENSION CYLINDER (3B108830)				
	6.	9B081012	SEAL KIT	1
	16.	73054304	VALVE	1
D-17. EXTENSION BOOM ASSEMBLY 1H1M (41707023)				
	6.	60030153	WEAR PAD	1
	10.	71073920	HOOK 3-TON	1
D-20. CONTROL KIT-6 FUNCTION/PTO (90707024)				
	18.	77041237	SOLENOID 12V 150A	1
	19.	77041006	TOGGLE SWITCH-DBL THROW	2
	20.	77041251	RELAY 12V	2
D-21. REMOTE HANDLE ASSEMBLY-6 FUNCTION PTO (51707027)				
	11.	77041345	TOGGLE SWITCH-SGL THROW	2
	12.	77041346	TOGGLE SWITCH-DBL THROW	4
	13.	77041347	TOGGLE SWITCH-MOMENTARY	1
		73052012	SUCTION FILTER	6
		73052000	RETURN FILTER	6



Section 6.

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 inspection 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 <input type="checkbox"/> NO <input type="checkbox"/>
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

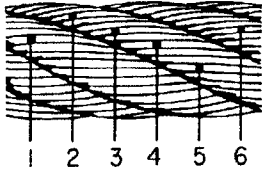
ITEM	DESCRIPTION	FREQUENCY			INSP. RESULT		REPAIRED?		DATE INSPECTED
		DAILY	WEEKLY	MONTHLY	ACCEPT	REJECT	YES(Y) NO(N)	DATE	
HYDRAULIC SYSTEM LEAKS	Visually inspect hoses, hyd tubes and fittings for hydraulic leaks.								
LOOSE PARTS	Check for the presence of loose parts, missing fasteners and safety 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".								

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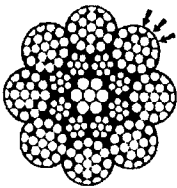
WIRE ROPE INSPECTION

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

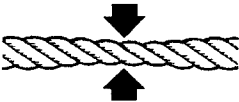
- A. Corrosion can be cause for replacement. Any development of corrosion must be noted and monitored closely.
- B. When there are either 3 broken wires in one strand or a total of six broken wires in all strands in any one rope lay.



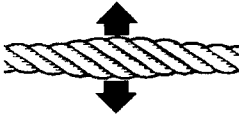
- C. When flat spots on the outer wires appear and those outside wires are less than 2/3 the thickness of the unworn outer wire.



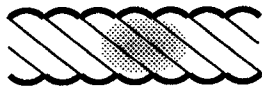
- D. When there is a decrease of diameter indicating a core failure.



- 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.)

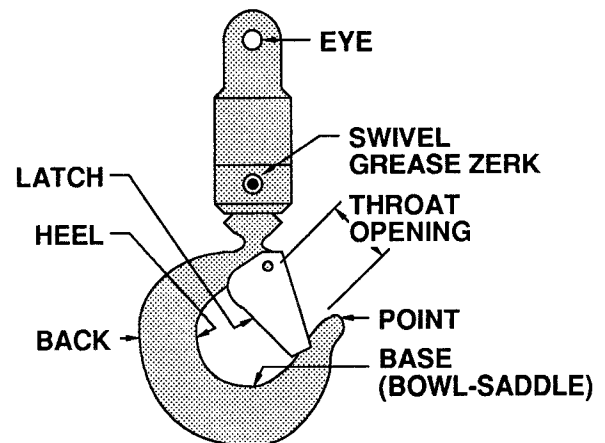
D. LATCH

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.

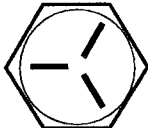

If all is well at this point, actuate the boom extend function slowly, and gradually increase to full actuation. Once again the function should be sluggish or non-existent with no tightening of the winch cable. If operation other than described occurs, stop immediately and reverse the function.

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, colloidal 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 fatigue causing serious injury or DEATH.

The information within this manual has been compiled and checked but errors do occur. To provide our customers with a method of communicating those errors we have provided the Manual Change Request form below. In addition to error reporting, you are encouraged to suggest changes or additions to the manual which would be of benefit to you. We cannot guarantee that these additions will be made but we do promise to consider them. When completing the form, please write or print clearly. Submit a copy of the completed form to the address listed below.

MANUAL CHANGE REQUEST

DATE	PRODUCT MANUAL	2200 Series Crane	MANUAL PART NO.	99900292-4/94
SUBMITTED BY				
COMPANY				
ADDRESS				
CITY, STATE, ZIP				
TELEPHONE				

☐ ERROR FOUND

LOCATION OF ERROR (page no.): _____

DESCRIPTION OF ERROR: _____

☐ REQUEST FOR ADDITION TO MANUAL

DESCRIPTION OF ADDITION: _____

REASON FOR ADDITION: _____

MAIL TO: IOWA MOLD TOOLING Co., Inc.
Box 189,
Garner IA 50438-0189
ATTN: Technical Publications

LIMITED WARRANTY

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

1. Ninety (90) days; labor on IMT workmanship from the date of shipment to the end user.
2. One (1) year; original IMT parts from the date of shipment to the end user.

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

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

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

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

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

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

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

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

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

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

Effective January, 1985

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IOWA MOLD TOOLING CO., INC.

BOX 189, GARNER, IA 50438-0189

TEL: 515-923-3711

PRODUCT SUPPORT FAX: 515-923-2424