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Manual # 99904560

# 2017 Crane Parts & Specifications

Rev. Date 20100331



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## Revisions

DATE	LOCATION	DESCRIPTION
20100330	73733481, 99903557	ECN 11211 - Update elec system for engine start function on OTR product line.



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## CHAPTER 1

# Introduction

### GENERAL

This manual will help you operate your IMT crane correctly and safely. The manual does not replace any government regulations, safety codes or insurance carrier requirements. Read and understand the manual and all safety procedures for this crane prior to operation.

### WARNING

FAILURE TO READ, UNDERSTAND AND FOLLOW ANY SAFETY PROCEDURES FOR THIS EQUIPMENT MAY RESULT IN DEATH, SERIOUS INJURY, OR EQUIPMENT DAMAGE.

Use caution and common sense. Refer to ANSI/ASME B30.22, the standard for Mobile and Locomotive Cranes, for more information on crane design and test criteria. (Contact American Society of Mechanical Engineers at [www.asme.org](http://www.asme.org) for information on ANSI/ASME B30.22.) Crane operators must also be familiar with OSHA 29CFR, Subpart N, Article 1926.550 and CAL-OSHA Title 8, Article 93 (California).

### CRANE AND SAFETY EQUIPMENT MODIFICATIONS

Do not modify your crane with anything other than IMT approved equipment. If in doubt, contact IMT prior to making modifications. DO NOT alter or modify any safety device! All safety devices must be inspected, tested and maintained in proper working condition.

Decals regarding crane safety and operation are safety equipment and must be maintained. Decals must be kept clean and legible.

### OWNER RESPONSIBILITIES

The owner must maintain and operate this unit for the safest working conditions possible. He must follow existing Federal, State, and Local codes and regulations governing the safe use and maintenance. He must make sure anyone involved in equipment operation understands how to operate and maintain the crane safely. Contact IMT or your IMT distributor for clarification.

## MANUAL STRUCTURE

Throughout this manual, three means are used to highlight information. They are NOTES, CAUTIONs and WARNINGs and are defined as follows:

### NOTE

A NOTE adds additional information or provides emphasis.

### CAUTION

A CAUTION indicates the strong possibility of equipment damage or premature equipment failure.

### WARNING

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

### WARRANTY

The equipment warranty on 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 is valid with this unit.

### NOTICE TO THE OWNER / USER

If the crane is involved in a property damage accident, contact your IMT distributor immediately and provide them with the details of the accident and the serial number of the equipment. If an accident involves personal injury, immediately notify your distributor and IMT Technical Support at:

IOWA MOLD TOOLING CO., INC.  
500 HWY 18 WEST  
GARNER, IA 50438  
641 - 923 - 3711

## CHAPTER 2

# Specifications

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## Specifications

GENERAL SPECIFICATIONS	
CRANE RATING* (ANSI B30.22)	199,538 ft-lb (27.59 tm)
MAXIMUM CRANE RATING**	200,000 ft-lb (27.65 tm)
HORIZONTAL REACH (From centerline of rotation)	17'-0" (5.18 m)
HYDRAULIC EXTENSION	40" (101.6 cm)
MANUAL EXTENSION	None
VERTICAL REACH (From mounting surface)	24'-11" (7.6 m)
VERTICAL REACH (From ground/ 41" frame height)	28'-4" (8.64 m)
CRANE WEIGHT	7,630 lb (3,460 kg)
OUTRIGGER SPAN	15'-0" (4.57 m)
OUTRIGGER PADS	12" x 19" (30.5 cm x 48.2 cm)
CRANE STORAGE HEIGHT (with 12" flat-bed body - from mounting surface)	8'-9" (2.67 m)
CRANE STORAGE HEIGHT (with 12" flat-bed body - from ground / 41" frame height)	12'-2" (3.71 m)
MOUNTING SPACE REQUIRED (Allow 4" between the truck cab and crane base for swing clearance)	36" (0.91 m)
ROTATIONAL TORQUE	24,150 ft-lb (3.33 tm)
OPTIMUM PUMP CAPACITY	16 U.S gpm (60.6 l/min)
SYSTEM OPERATING PRESSURE	2,500 psi (172.4 bar)
OIL RESERVOIR CAPACITY	26 U.S. gallons (98.4 l)
HOOK APPROACH - HORIZONTAL (from centerline of rotation)	5'-8" (1.73 m)
HOOK APPROACH - VERTICAL (from mounting surface)	10'-11" (3.33 m)
*Note: ANSI B30.22 Crane Rating (ft-lb) is the rated load (lb) with all extensions retracted and the inner and outer booms in a horizontal position, multiplied by the respective distance (ft) from the centerline of rotation.	
** Maximum crane rating (ft-lb) is the rated load (lb) multiplied by the respective distance (ft) from centerline of rotation with all extensions retracted and lower boom in horizontal position.	

PERFORMANCE CHARACTERISTICS		
CRANE ROTATION WITH TIREHAND	370°	70 seconds
INNER BOOM ELEVATION	-25° to + 70°	28 seconds
OUTER BOOM ARTICULATION	113°	24 seconds
EXTENSION BOOM	40" (102 cm)	10 seconds
OUTRIGGER EXTENSION	29-1/4" (74.3 cm)	32 seconds

## POWER SOURCE

Integral mounted hydraulic pump and PTO application. Other standard power sources may be used. Minimum power required is 28 horsepower.

## CYLINDER HOLDING VALVES

The holding sides of all cylinders are equipped with integral-mounted counterbalance valves to prevent sudden cylinder collapse in case of hose or other hydraulic failure. The extension and outrigger cylinders have double holding valves.

The counterbalance 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.

## ROTATION SYSTEM

Crane rotation is accomplished through a turntable bearing powered by a high torque hydraulic motor through a ring and pinion type spur gear train. A spring loaded brake is supplied between the drive gear and motor, providing rotational and parking brake action.

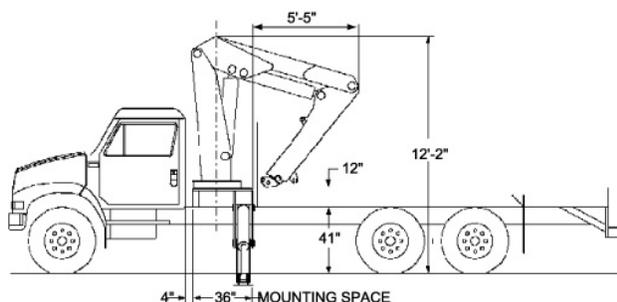
## HYDRAULIC SYSTEM (PTO DRIVEN)

The hydraulic system is an open-centered, full-pressure system that requires 16 GPM (60.6 liters/min.) optimum oil flow at 2,500 psi (172.4 bar). Eleven spool, stack-type control valves, including six functions for standard crane controls, two functions for optional tirehand articulation, and three functions for optional hydraulic out-and-down auxiliary outrigger system are supplied. The optional valve sections will be plugged if not utilized. Dual operational handles for the six standard crane functions are located at both sides of the crane for convenient operation. The hydraulic system includes a hydraulic oil reservoir, suction-line filter, return-line filter, control valvebank, and all hoses and fittings.

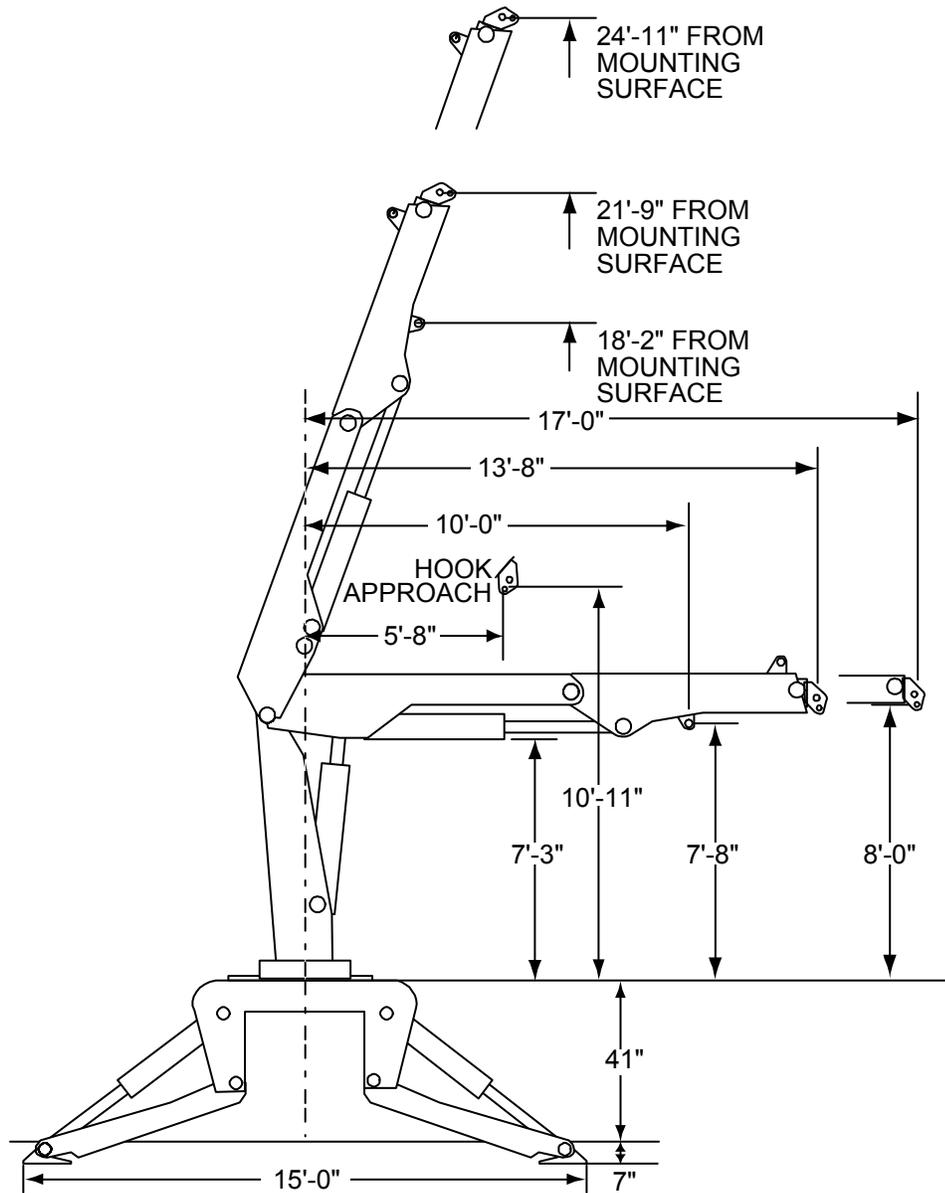
*IMT reserves the right to change specifications and design without notice.*

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## Stowed Position and Mounting Dimensions



# Geometric Configuration



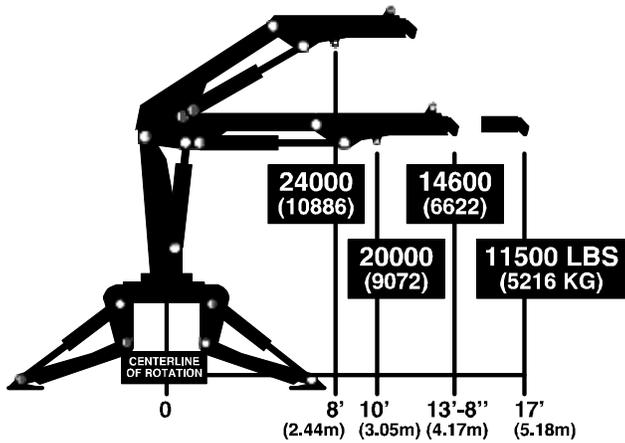
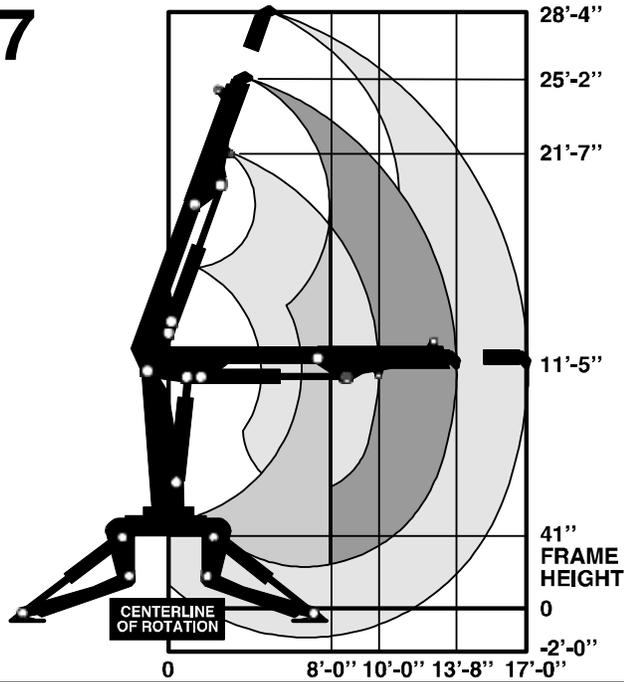
# Capacity Chart

IOWA MOLD TOOLING CO., INC. ● BOX 189 ● GARNER ● IA ● 50438 ● 641-923-3711  
 Capacities through geometric range are limited to those shown in horizontal position.



- 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.

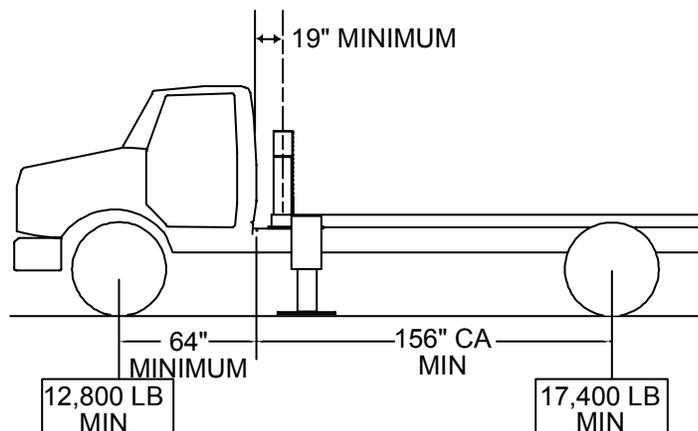
**MODEL  
20017  
CRANE**



71029374

## Minimum Chassis Specifications

Crane Mount	Behind Cab
Crane Working Area	360°
Chassis Style	Conventional Cab
Front Axle Rating (GAWR)	16,000 lb (7,260 kg)
Rear Axle Rating (GAWR)	Tandem Axle (40,000 lb) (18,144 kg)
**Wheelbase (Recommended)	220"
**Cab-to-axle (Recommended)	156"
Outrigger Width Required	15'-0"
RBM (Recommended)	3,300,000 in-lb
Frame Section Modulus	30 in <sup>3</sup>
Frame Yield Strength	100,000 psi
Minimum Finished Unit Weight	
To Maintain Vehicle Stability	
Front Axle	* 12,800 lb
Rear Axle	* 17,400 lb
Total Finished Unit Wt.	30,200 lb
* Allows lifting full capacity load in 360° arc when crane is installed immediately behind 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.	
** Based on IMT's recommended chassis. All other applications to be approved by IMT.	



### 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.

CHAPTER 3

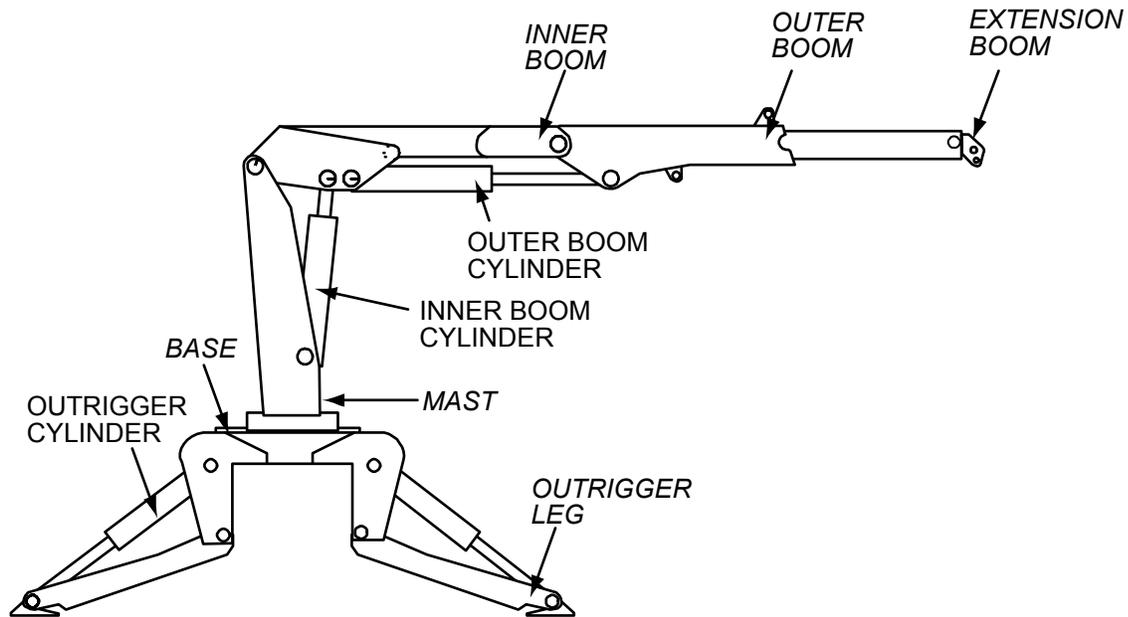
# Crane Reference

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- Recommended Spare Parts ..... 16
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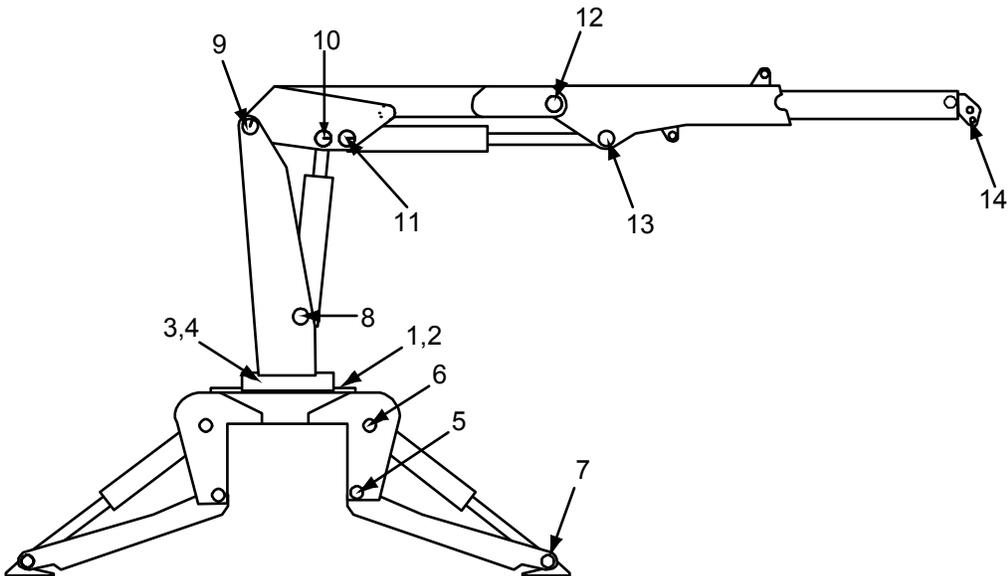
## Crane Assemblies & Weldment Part Numbers



**NOTES:**

- 1 The names of the crane assemblies are indicated on the crane graphic.
- 2 The weldments that make up the crane are stamped with the weldment part numbers. The weldment part number locations are indicated on the assemblies with names written in italics.

# 20017 Grease Zerk Locations



ITEM	LOCATION DESCRIPTION	LUBRICANT	FREQUENCY
1.	Turntable/Bearing Grease Extension (Rotate Crane While Greasing.)	Shell Alvania 2EP	Weekly
2.	Drive Gear Grease Extension		
3.	Pinion Gear	or	
4.	Pinion Cover	Shell Retinax "A"	
5.	Base/Outrigger Leg Hinge Pin		
6.	Outrigger Cylinder Base		
7.	Outrigger Cylinder Rod		
8.	Inner Cylinder Base		
9.	Mast/Inner Boom Hinge Pin		
10.	Inner Cylinder Rod Pin		
11.	Outer Cylinder Base		
12.	Inner Boom / Outer Boom Hinge Pin		
13.	Outer Cylinder Rod		
14.	Any Tirehand Attachment		

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 the Volume 1: Operation, Maintenance and Repair for additional lubrication requirements.

## Recommended Spare Parts

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 the minimal down-time waiting for parts. There may be parts failures not covered by this list. Parts not listed are considered as not being Critical or Normal Wear items during the first year of operations and you need to contact the distributor or manufacturer for availability.

Assembly Designation	Item #	Part #	Description	Quantity	Code
41704444	BASE & OUTRIGGER ASM				
	5	60020124	BUSHING	1	W
	6	60020122	BUSHING	1	W
	7	60020123	THRUST WASHER	1	W
	8	60020120	BUSHING	1	W
	9	60020121	BUSHING	1	W
	11	71056073	PINION GEAR	1	C
	25	71056374	BRAKE	1	W
	43	70034295	BEARING	1	W
	44	7BF81225	BUSHING	8	W
	61	60030176	WEAR PAD	2	W
3C323911	OUTRIGGER CYLINDER				
	3	6H065035	HEAD	1	W
	7	7BF81225	BUSHING	6	W
	9	73054304	VALVE 10GPM	4	C
	14	6IX65200	PISTON	1	W
	19	7BF81225	BUSHING	8	W
	20	9X262832	SEAL KIT	2	W
41704437	INNER BOOM ASM				
	5	60020192	BUSHING	3	W
3D216821	INNER CYLINDER				
	6	6I080243	PISTON	1	W
	10	6HX80040	HEAD	1	W
	14	60020190	BUSHING	3	W
	15	60020189	BUSHING	2	W
	16	73054242	VALVE 25GPM	1	C
	18	9C323239	SEAL KIT	1	W
41704439	OUTER BOOM ASM				
	6	60020195	BUSHING	2	W
	7	60030028	WEAR PAD	1	W
	8	60030032	WEAR PAD	2	W
	9	60030074	WEAR PAD	1	W
	17	60030245	WEAR PAD	1	W
3C221820	OUTER CYLINDER				
	4	6H075035	HEAD	1	W
	5	6I075218	PISTON	1	W
	6	73054242	VALVE 25GPM	1	C
	7	9C302835	SEAL KIT	1	W

Assembly Designation	Item #	Part #	Description	Quantity	Code
	18	60020193	BUSHING	2	W
	20	60020194	BUSHING	2	W
41704440	EXTENSION BOOM ASM				
	21	60030071	WEAR PAD	1	W
	22	60030072	WEAR PAD	2	W
3B223820	EXTENSION CYLINDER				
	4	73054304	VALVE 10GPM	2	C
	5	6H040025	HEAD	1	W
	6	6I040143	PISTON	1	W
	7	9C162023	SEAL KIT	1	W
93704445	INSTALLATION KIT				
		70048148	SUCTION FILTER	4	P
		73052014	RETURN FILTER	4	P

## 20017 Crane Installation

This section contains specific instructions for the installation of your crane. Prior to installing the crane and hydraulic components, make sure the chassis is ready to receive the crane (refer to VOLUME 1, Installation).

### CRANE MOUNTING

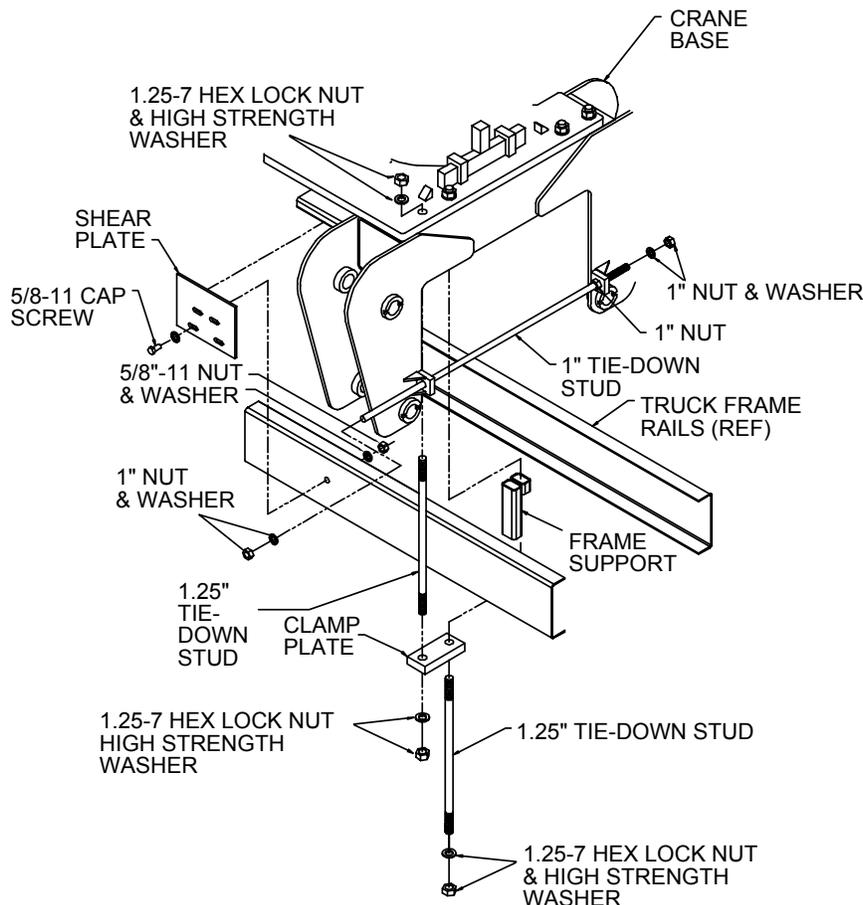
- 1 See SPECIFICATIONS in Section 1 for crane weight. Using an overhead hoist and fabric slings of adequate capacity, lift the crane about a foot to see if the crane is adequately balanced. If not, lower hoist and adjust slings. Re-check balance and re-position crane until mounting surface is level.
- 2 Install the truck frame support so that the tie-down studs pass through the supports (See figure). Cut the support to the inside dimensions of the truck frame. Allow about 1/16" extra. Grind the end of the support to fit inside the frame channel. Use a hammer to drive it into position if necessary.
- 3 Allow sufficient clearance between the cab and crane base, at least 4" (10.2cm). Position the crane on the chassis per the applicable installation drawing, centering the mounting slots over the truck frame rails. While holding crane with hoist, start mounting hardware per figure below. Note position of support weldments on truck frame. Hand tighten nuts. Observe underside of crane base. No clearance between base and frame is allowed.
- 4 Torque the 1 1/4"-7 UNC Grade 5 mounting hardware to 840 ft-lb (116 kg-m). When torquing the mounting hardware follow these precautions:
  - a) Never use lock washers.
  - b) Use hardened washers under the turning element, whether the turning element is the nut or the head of the bolt.

- c) Torque values specified are with residual oils or without special lubricants applied to the threads. If special lubricants are used, such as Never-Seize compound graphite and oil, molybdenum disulphite colloidal copper or white lead, reduce torque values 10%. Torque values for threaded fasteners are not affected with the use of Loctite.
- d) Do not use rusty fasteners. The rust will alter torque values significantly.

**CAUTION**

DO NOT ATTEMPT TO APPLY THE SAME TORQUE TO THE TIE ROD AND SELF-LOCKING NUTS AS SHOWN IN THE TORQUE DATA CHART. DO NOT EXCEED 840 FT. LBS. (116 KG-M). EXCEEDING THIS TORQUE VALUE COULD DAMAGE EITHER THE CHASSIS OR CRANE BASE. POWER WRENCHING IS NOT RECOMMENDED UNTIL THE LEAD THREAD OF THE NUT INSERT IS ENGAGED BY HAND TURNING.

- 5 Install the tie-plate (see figure) on the truck chassis. Drill four holes using the plate as a template and install the bolts and lock nuts. Torque the bolts to 200 ft-lb (28 kg-m). Weld the tie-plate to the crane base with 3/8" continuous fillet weld.
- 6 Install the two tension bars with nuts and washers as shown. Tighten the outside nuts first to about 200 ft-lb (28 kg-m) to preload the tension bar. Then tighten the inner nuts to 466 ft-lb (65 kg-m).
- 7 Touch up paint on crane and chassis as necessary.



## 20017 Hydraulic Installation

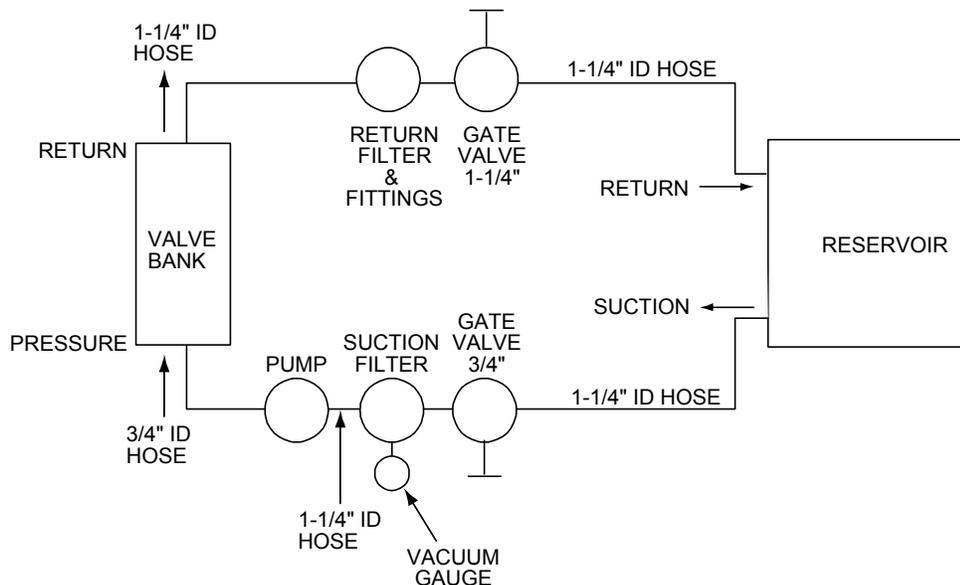
To install the hydraulic hoses, fittings, etc.:

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

### CAUTION

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

- 7 Open the return gate valve.
- 8 Start the vehicle'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.
- 9 Cycle all hydraulic functions. Check for leaks, and refill the reservoir if necessary.



## 20017 Winch Troubleshooting

POSSIBLE CAUSE	PROBABLE CURE
<b>WINCH WON'T LIFT HEAVY LOADS</b>	
Too much load	Rig to reduce loading on winch.
Low or no gearbox oil.	Check oil level. Add oil if necessary.
Motor inlet pressure is less than specifications with load stalled.	Test hydraulic pump.
Motor inlet pressure is too high with load stalled.	Find and remove source of restriction.
Brake should engage in payout direction only.	Run winch with no load in both directions. System pressure should be slightly higher in payout direction.
Check flow to winch motor with winch under load.	Test pump if not to specifications.
Check end play in worm.	If greater than 0.030", inspect worm bearings for wear. Replace if necessary.
<b>WINCH WON'T HOLD LOAD</b>	
Brake may need adjustment.	Turn adjusting screw clockwise 1/4 turn at a time. Re-test winch.
Brake disks may be worn.	Inspect and replace if necessary. Adjust and retest.
Cam clutch in brake may be installed incorrectly.	Reverse clutch and retest.
Journal on worm where cam clutch runs may be galled or worn.	Inspect and replace worm if necessary.
<b>WINCH RUNS TOO SLOW</b>	
System may have low flow.	Install flow meter in system and test under load. If flow is below specifications, inspect pump.
Motor worn out.	Replace motor.
<b>WINCH WILL NOT RUN UNDER NO LOAD (RELIEF VALVE OPENS WITHOUT WINCH TURNING)</b>	
Motor seized up.	Remove motor from winch and test if operable. If not, replace motor.
Worm and gear set damaged.	Repair gearbox.

## CHAPTER 4

# Parts

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## Parts Information

### 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 maintenance and repair manuals for this crane family. For optional equipment such as winches and remote controls, refer to the appropriate service manual.

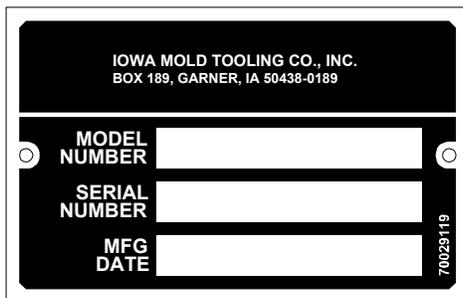
### WARNING

DO NOT ATTEMPT TO REPAIR ANY COMPONENT WITHOUT READING THE INFORMATION CONTAINED IN THE REPAIR SECTION. 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.

### CRANE IDENTIFICATION

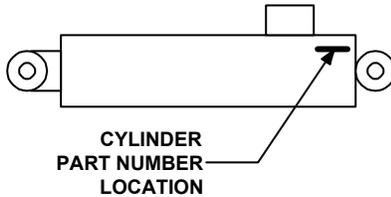
Every IMT crane has an identification placard (see figure). This placard is attached to the inner boom, mast, or crane base. When ordering parts, communicating warranty information, or referring to the unit in correspondence, always include the serial number and model numbers. Address all inquiries to your authorized IMT distributor or to:

Iowa Mold Tooling Co., Inc.  
Box 189, Garner, IA 50438-0189  
Telephone: 641-923-3711  
Technical Support Fax: 641-923-2424



## CYLINDER IDENTIFICATION

To insure proper replacement parts are received, it is necessary to specify the complete number/letter sequence for any part requested. Part numbers may be cross checked by comparing the stamped identification on the cylinder case (See figure below) against the information contained in the service manual. You must include the part number stamped on the cylinder case when ordering parts.



## 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 the Crane Reference Section.

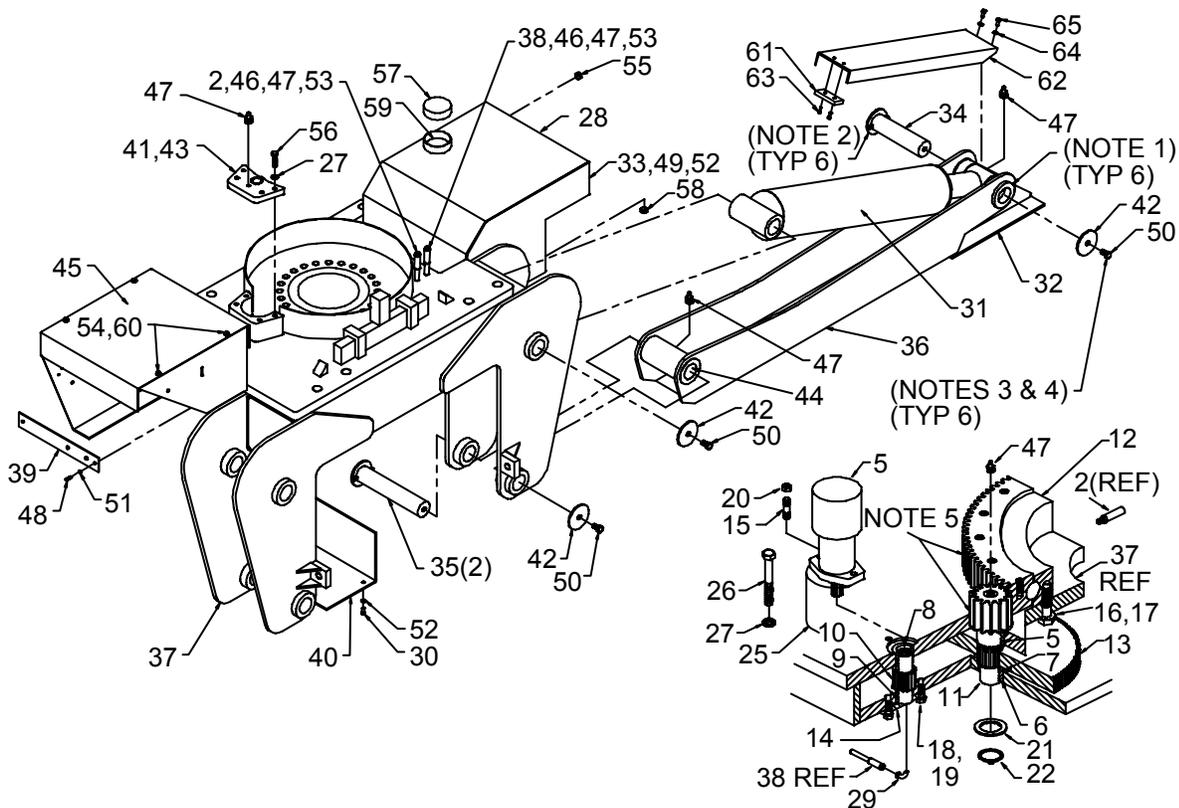
## ORDERING REPAIR PARTS

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.

# Base, Mast & Boom Assemblies & Cylinders

## Base & Outrigger Assembly (41704444)



### WARNING:

- 1 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 DEATH OR SERIOUS INJURY.

### NOTES:

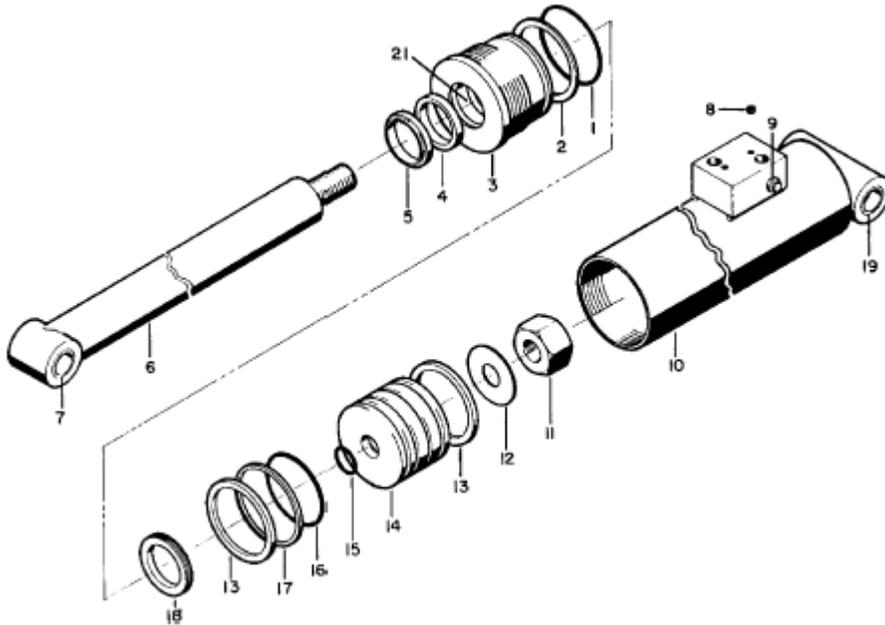
- 1 APPLY NEVER-SEEZ TO COLLAR I.D.
- 2 APPLY NEVER-SEEZ TO PIN AT PIN CAP, NOT TO EXCEED THE WIDTH OF THE COLLAR.
- 3 IF REQUIRED, SHIM PIN RETAINING PLATES FLUSH (-0/+0.06) WITH OUTSIDE OF COLLAR USING 0.75 FLAT WASHERS AS REQUIRED.
- 4 CLEAN/PRIMER ALL PIN RETAINING PLATE CAP SCREWS. APPLY A SERVICEABLE THREAD LOCKER TO A MINIMUM OF THREE THREADS. TORQUE 0.75-10 (GR5 PLATED) PIN RETAINING PLATE CAP SCREWS TO 200 FT-LB, AND 0.63-11 (GR5 PLATED) PIN RETAINING PLATE CAP SCREWS TO 115 FT-LB.
- 5 APPLY MOBILTAC 375NC LUBRICANT (OR EQUIVALENT) TO THE EXTERNAL TEETH OF THE TURNTABLE BEARING AND PINION GEAR.
- 6 IF THE CRANE DOES NOT GET A RESERVOIR ASSEMBLY (ITEM #28), USE 52710798 (WELDMENT COVER)

- 7 THE "HIGH FRAME" VERSION OF THE BASE AND OUTRIGGER ASSEMBLY (41706881) IS IDENTICAL TO THE STANDARD BASE AND OUTRIGGER ASSEMBLY (41704444) EXCEPT FOR THE BASE WELDMNT (ITEM #37, 52704449) WHICH IS 52706880.
- 8 TURNTABLE BEARING BACKLASH 0.008"/0.013" (0.203 - 0.330 mm).

<b>41704444 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	99903611	INSTRUCTIONS, HYD SHUTDOWN PROCESS	1REF
2.	53000710	GREASE EXTENSION 29"	1
4.	73051223	MOTOR	1
5.	60020124	BUSHING (PART OF 37)	1REF
6.	60020122	BUSHING (PART OF 37)	1REF
7.	60020123	THRUST WASHER	1
8.	60020120	BUSHING (PART OF 37)	1REF
9.	60020121	BUSHING (PART OF 37)	1REF
10.	71056074	DRIVE GEAR (PART OF 37)	1REF
11.	71056073	PINION GEAR	1
12.	70055167	GEAR BEARING (FROM 6/94)	1
	REF 70056188	GEAR BEARING (TO 5-31-94/SERIAL #20017F249056)	1
13.	71056072	INTERMEDIATE GEAR	1
14.	60010844	GREASE PLATE	1
15.	60106032	STUD 1/2-13X2	2
16.	72601472	CAP SCR 7/8-9X4-1/2 HHGR8 (FROM 6/94)	23
REF	72601148	CAP SCR 7/8-9X3 HHGR8 (5-31-94/SERIAL #20017F249056)	23
17.	72063115	WASHER 7/8 HARD	23
18.	72060092	CAP SCR 1/2-13X1-1/4 HHGR5	2
19.	72063053	WASHER 1/2 LOCK	2
20.	72062080	NUT 1/2-13 LOCK	2
21.	72063039	MACH BUSHING 2" X 10GA	1
22.	72066095	RETAINING RING 2" EXT STD	1
25.	71056374	BRAKE	1
26.	72601037	CAP SCR 9/16-12X4-1/2 HHGR8	2
27.	72063117	WASHER 9/16 HARD	6
28.	51707855	RESERVOIR ASM (INCL:33,55,57-59)	1REF
29.	72053281	STREET ELBOW 1/8NPT 90°	1
30.	72060023	CAP SCR 5/16-18X3/4 HHGR5	2
31.	3C323911	OUTRIGGER CYLINDER	2
32.	52701412	OUTRIGGER PAD	2
33.	52703357	RESERVOIR (PART OF 28)	1REF
34.	52703694	PIN	2
35.	52703695	PIN	4
36.	52703775	OUTRIGGER LEG	2
37.	52704449	BASE (INCL:5,6,8-10)	1
38.	53000713	GREASE EXTENSION 36"	1
39.	60103728	COVER	1
40.	60103729	GUARD	1
41.	60105964	PINION GEAR SUPPORT	1

41704444 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
42.	60106332	RETAINER	6
43.	70034295	BEARING (PART OF 41)	1REF
44.	7BF81225	BUSHING (PART OF 36)	8REF
45.	60118801	VB COVER-TOP	1
46.	72053301	COUPLING 1/8NPT	2
47.	72053508	ZERK 1/8NPT	8
48.	72060002	CAP SCR 1/4-20X3/4 HHGR5	2
49.	72060021	CAP SCR 5/16-18X1/2 HHGR5	6
50.	72060147	CAP SCR 5/8-11X1 HHGR5	6
51.	72063049	WASHER 1/4 LOCK	2
52.	72063050	WASHER 5/16 LOCK	8
53.	72063003	WASHER 3/8 WRT	2
54.	72063002	WASHER 5/16 WRT	4
55.	72532261	SIGHT GAUGE 3/4 (PART OF 28)	1REF
56.	72601144	CAP SCR 9/16-12X2 HHGR8	4
57.	73014671	FILL CAP (PART OF 28)	1REF
58.	73052001	PLUG 3/4NPT SQHD MAGNETIC (PART OF 28)	1REF
59.	73141276	FILL SCREEN (PART OF 28)	1REF
60.	72060833	SCR, THD CUT .31-18X.75 HWH-1	4
61.	60030176	WEAR PAD	2
62.	52706739	CYLINDER GUARD	2
63.	72060836	CAP SCR 1/4-20X3/4 FLTHD	4
64.	72063051	WASHER 3/8 LOCK	4
65.	72060044	CAP SCR 3/8-16X3/4 HHGR5	4
REV. K 20061220			

## Outrigger Cylinder (3C323911)



### NOTES:

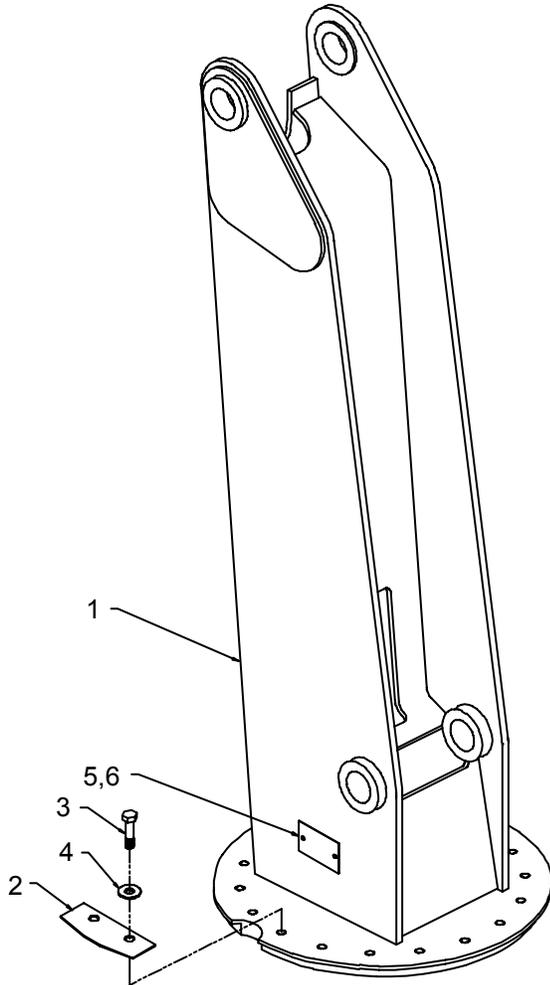
- 1 REPLACE ALL COMPONENTS OF THE SEAL KIT WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.
- 2 APPLY REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO THREADS ON CYLINDER HEAD ONLY. KEEP AWAY FROM ALL SEALS.
- 3 APPLY "LUBRIPLATE" NO. 630-2 MEDIUM HEAVY, MULTI-PURPOSE LUBRICANT, TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

### 3C323911 PART LIST

ITEM	PART #	DESCRIPTION	QUANTITY
1.	7Q072361	O-RING (PART OF 20)	1REF
2.	7Q10P361	BACK-UP RING (PART OF 20)	1REF
3.	6H065035	HEAD	1
4.	7R546035	ROD SEAL (PART OF 20)	1REF
5.	7R14P035	ROD WIPER (PART OF 20)	1REF
6.	4G323910	ROD (INCL: 7)	1
7.	7BF81225	BUSHING (PART OF 6)	3REF
8.	7PNPXT02	PLUG 1/8NPT (PART OF 10)	4REF
9.	73054304	VALVE 10GPM	2
10.	4C263513	CASE (INCL: 8 & 19)	1
11.	72062144	NUT 2" BUTRESS	1
12.	72063016	WASHER	1
13.	7T65I065	PISTON RING (PART OF 20)	2REF
14.	6IX65200	PISTON	1

<b>3C323911 PART LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
15.	7Q072227	O-RING (PART OF 20)	1REF
16.	7Q072257	O-RING (PART OF 20)	1REF
17.	7T66P065	PISTON SEAL (PART OF 20)	1REF
18.	6A025035	WAFER-LOCK (PART OF 20)	1REF
19.	7BF81225	BUSHING (PART OF 10)	4REF
20.	9X262832	SEAL KIT(INCL:1,2,4,5,13,15-18&21)	1
21.	7T2N2X37	WEAR RING (PART OF 21)	1REF
REV 20070613			

## Mast Assembly (41704436)



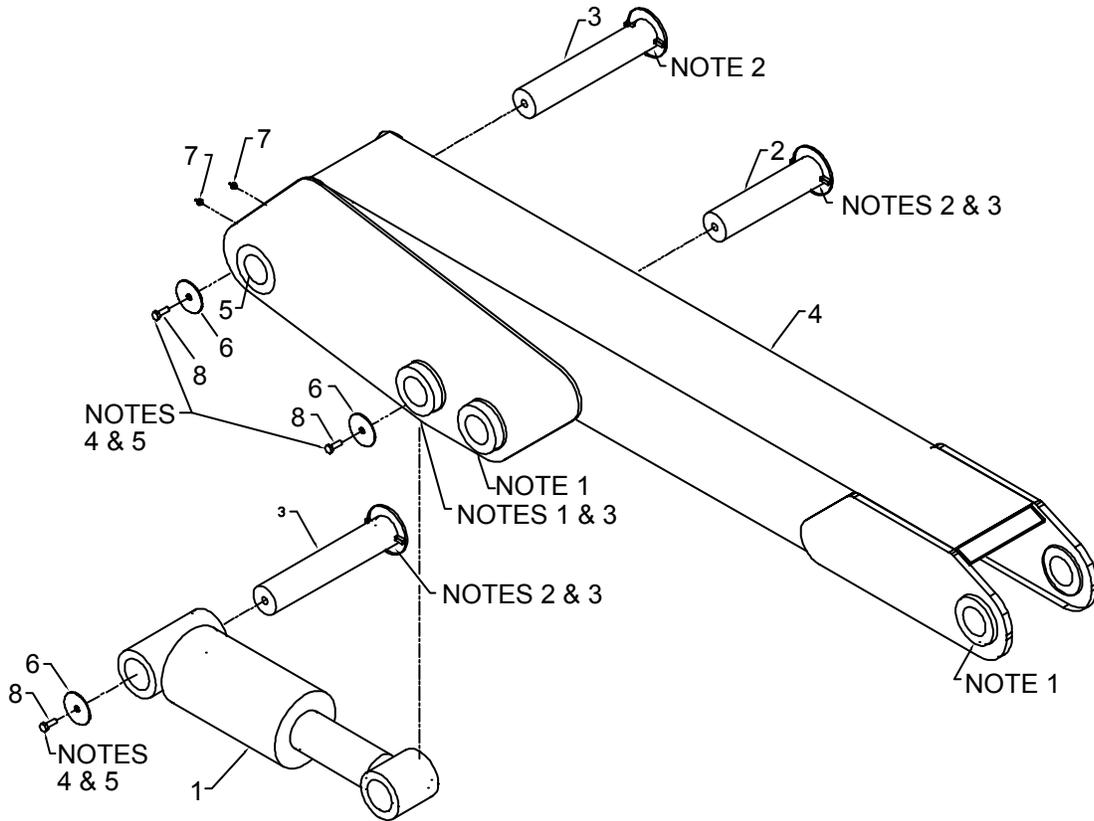
### WARNING

- 1 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 DEATH OR SERIOUS INJURY.

#### 41704436 PARTS LIST

ITEM	PART #	DESCRIPTION	QUANTITY
1.	52704409	MAST WELDMENT	1
2.	60104246	COVER, PINION GEAR	1
3.	72601648	CAP SCR .75-10 X 4.50 HHGR8Z	18
4.	72063116	WASHER .75 FLAT	18
5.	70029119	PLACARD-SERIAL NUMBER	1
6.	72661638	TACK-METAL	2
REV. F 20070614			

# Inner Boom Assembly (41704437)

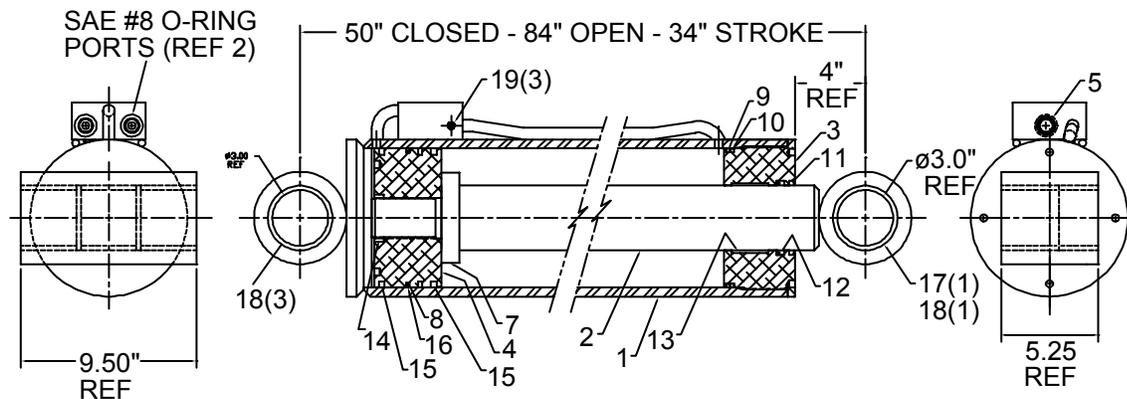


**NOTES:**

- 1 APPLY NEVER-SEEZ TO COLLAR ID.
- 2 APPLY NEVER-SEEZ TO PIN AT PIN CAP, NOT TO EXCEED THE WIDTH OF THE COLLAR.
- 3 IT IS IMPERATIVE THAT NEVER-SEEZ BE APPLIED IN SUCH A MANNER THAT IT DOES NOT COME IN CONTACT WITH ANY GAR-MAX BEARING.
- 4 IF REQUIRED, SHIM PIN RETAINING PLATES FLUSH (-0/+0.06) WITH OUTSIDE OF COLLAR USING 0.75 FLAT WASHERS AS REQUIRED.
- 5 CLEAN/PRIME ALL PIN RETAINING PLATE CAP SCREWS. APPLY A SERVICEABLE THREAD LOCKER TO A MINIMUM OF THREE THREADS. TORQUE 3/4-10 PIN RETAINING PLATE CAP SCREWS TO 200 FT-LB; 9/16-11 PIN RETAINING CAP SCREWS TO 115 FT-LB.

<b>41704437 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	3D216821	CYLINDER	1
2.	52704421	PIN	1
3.	52704420	PIN	2
4.	52704424	BOOM-MAIN WELDMENT (INCL 5)	1
5.	60020192	BUSHING-BRONZE 3.0 X 3.5 X 3.75 (PART OF 4)	3REF
6.	60106681	RETAINER PLATE	3
7.	72053508	ZERK-NPT 0.12	2
8.	72060182	CAP SCR .75-10 X 1.25 HHGR5Z	3
REV. C 1998			

## Inner Cylinder (3D216821)



CYLINDER DATA	
EXTENDED	50.24 IN <sup>2</sup> , 7.39 GAL
RETRACTED	37.68 IN <sup>2</sup> , 5.55 GAL
CASE	Ø9.00 X 8.00 B X 43.13 LONG
ROD	Ø4.00 X 43.63 LONG
DRY WEIGHT	422 LB
TEST PRESSURE	3000 PSI
OPERATING PRESSURE	2300 PSI

**NOTES:**

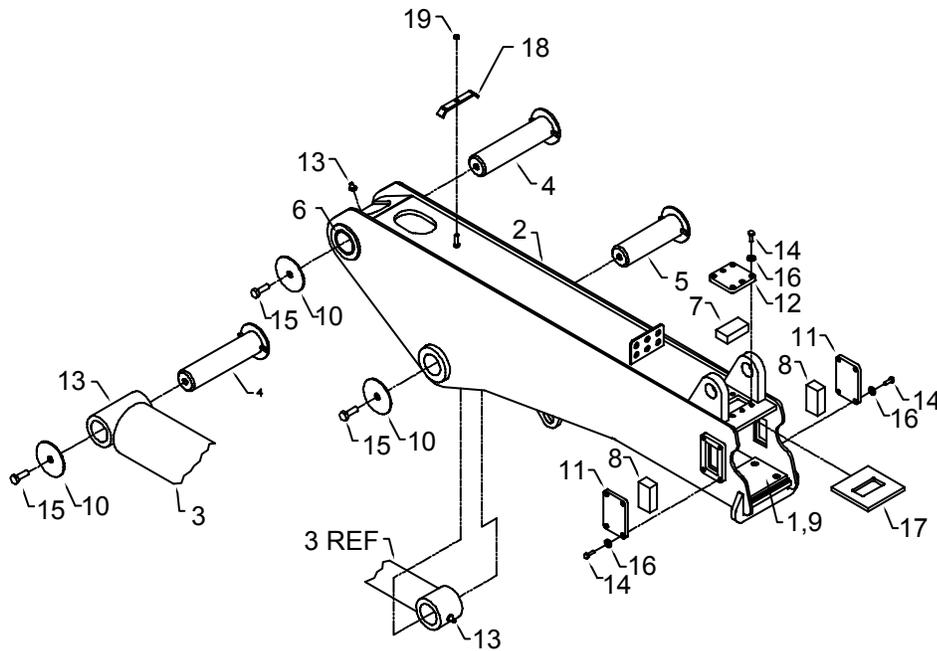
- 1 REPLACE ALL COMPONENTS OF THE SEAL KIT WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.
- 2 APPLY REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO THREADS ON CYLINDER HEAD ONLY. KEEP AWAY FROM ALL SEALS.
- 3 APPLY "LUBRIPLATE" NO. 630-2 MEDIUM HEAVY, MULTI-PURPOSE LUBRICANT, TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

**3D216821 PARTS LIST**

ITEM	PART #	DESCRIPTION	QUANTITY
1.	4D216821	CASE (INCL: 17, 18, 19)	1
2.	4G216820	ROD (INCL: 18)	1
3.	6HX80040	HEAD	1
4.	6I080243	PISTON	1
5.	73054242	VALVE 25GPM	1
6.	9C323239	SEAL KIT (INCL:7-16)	1
7.	6A025040	WAFER LOCK (PART OF 6)	1REF
8.	7Q072263	O-RING (PART OF 6)	1REF
9.	7Q072443	O-RING (PART OF 6)	1REF
10.	7Q10P443	BACK-UP RING (PART OF 6)	1REF
11.	7R14P040	ROD WIPER (PART OF 6)	1REF
12.	7R546040	ROD SEAL (PART OF 6)	1REF
13.	7T2N2X42	ROD WEAR RING (PART OF 6)	1REF
14.	7T61N243	LOCK-RING SEAL (PART OF 6)	1REF
15.	7T65I080	PISTON RING (PART OF 6)	2REF
16.	7T66P080	PISTON SEAL (PART OF 6)	1REF

<b>3D216821 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
17.	70034285	BEARING (FROM 5-1-98)	1REF
18.	70034441	BEARING (FROM 5-1-98)	4REF
19.	7PNPXT02	PLUG 1/8NPT (PART OF 1)	3REF
REF	60020190	BUSHING (PART OF CASE ASM) (TO 5-1-98)	3REF
REF	60020189	BUSHING (PART ROD ASM) (TO 5-1-98)	2REF
REV C 1998			

## Outer Boom Assembly (41704439)

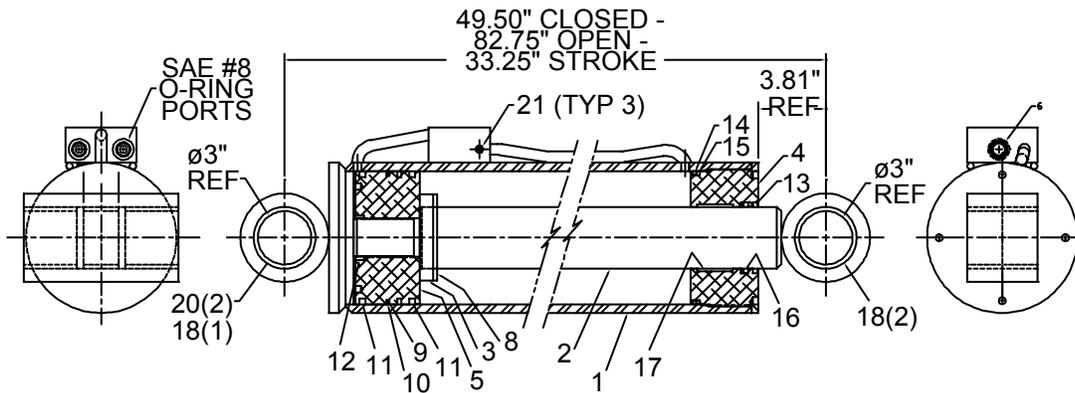


**NOTE:**

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

41704439 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	72601043	CAP SCREW .38-16 X .75 FLH SOC	4
2.	52704456	OUTER BOOM WELDMENT	1
3.	3C221820	CYLINDER, HYDRAULIC (OUTER)	1
4.	52704421	PIN	2
5.	52704422	PIN	1
6.	60020195	BUSHING	2
7.	60030028	PAD, WEAR	1
8.	60030032	PAD, WEAR	2
9.	60030074	PAD, WEAR	1
10.	6006681	PLATE, RETAINER	3
11.	60107438	PLATE, RETAINER	2
12.	60107442	PLATE, RETAINER	1
13.	72053508	ZERK, GREASE .13	3
14.	72060092	CAP SCR .50 - 13 X 1.25 HHGR5	14
15.	72060182	CAP SCR .75-10 X 1.25 HHGR5	3
16.	72063053	LOCK WASHER .50	14
17.	60030245	PAD, WEAR	1
18.	60103305	CLAMP, HOSE	1
19.	72062103	NUT .38-16 HEX NYLOC ZINC	1
REV. C 1998			

## Outer Cylinder (3C221820)



3C221820 CYLINDER DATA	
EXTENDED	44.16 IN <sup>2</sup> , 6.36 GAL
RETRACTED	34.54 IN <sup>2</sup> , 4.97 GAL
CASE	ø8.50 X 7.54 B X 41.88 LONG
ROD	ø3.50 X 43.12 LONG
DRY WEIGHT	378 LB
TEST PRESSURE	3000 PSI
OPERATING PRESSURE	2300 PSI

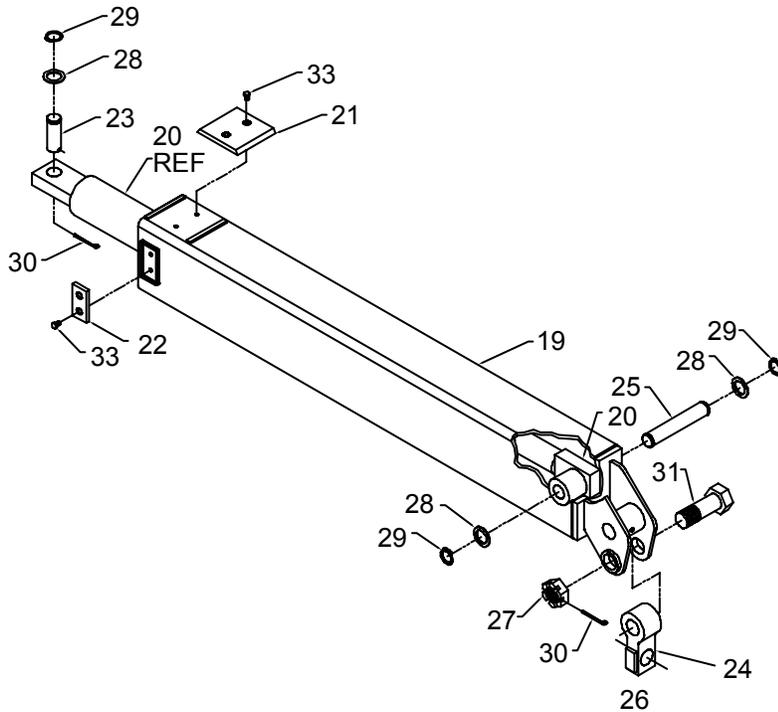
**NOTES:**

- 1 REPLACE ALL COMPONENTS OF THE SEAL KIT WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.
- 2 APPLY REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO THREADS ON CYLINDER HEAD ONLY. KEEP AWAY FROM ALL SEALS.
- 3 APPLY "LUBRIPLATE" NO. 630-2 MEDIUM HEAVY, MULTI-PURPOSE LUBRICANT, TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

3C221820 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	4C221820	CASE ASM -7.54 BORE X 45.31 LG (INCL 18,20,21)	1
2.	4G221820	ROD ASM (INCL 18)	1
3.	6C075035	STOP TUBE	1
4.	6H075035	HEAD	1
5.	6I075218	PISTON	1
6.	73054242	COUNTERBALANCE VALVE	1
7.	9C302835	SEAL KIT (INCL 8-17)	1
8.	6A025035	WAFER LOCK (PART OF 7)	1REF
9.	7Q072261	O-RING (PART OF 7)	1REF
10.	7T66P075	PISTON SEAL (PART OF 7)	1REF
11.	7T65I075	PISTON RING (PART OF 7)	1REF
12.	7T61N218	LOCK RING (PART OF 7)	1REF
13.	7R14P035	ROD WIPER (PART OF 7)	1REF

<b>3C221820 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
14.	7Q072441	O-RING (PART OF 7)	1REF
15.	7Q10P441	BACKUP RING (PART OF 7)	1REF
16.	7R546035	U-CUP LOADED (PART OF 7)	1REF
17.	7T2N2X37	WEAR RING-ROD (PART OF 7)	1REF
18.	70034285	BEARING, GAR-MAX (PART OF 1 & 2)	1REF
20.	70034441	BEARING, GAR-MAX (PART OF 1)	2REF
21.	7PNPXT02	PLUG-PIPE SOC HD TAPED .12 (PART OF 1)	3REF
REV B 1998			

## Extension Boom Assembly (41704440)

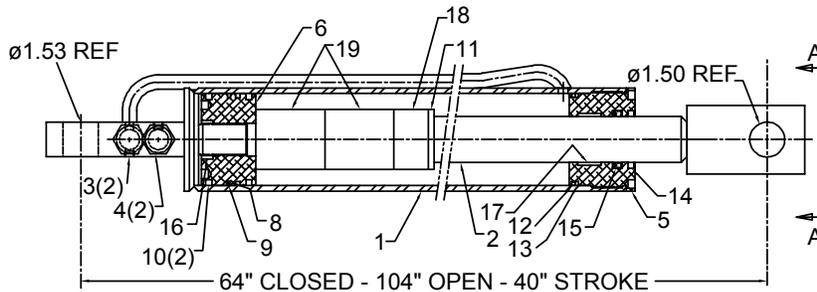


**NOTES:**

- 1 EXTENSION CYLINDER PORT TUBE MUST BE INSTALLED "DOWN" WHEN CYLINDER IS INSTALLED.

PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
19.	52704423	EXTENSION BOOM WELDMENT	1
20.	3B223820	CYLINDER	1
21.	60030071	WEAR PAD	1
22.	60030072	WEAR PAD	2
23.	60102096	PIN-TYPE B 1.50 X 3.94	1
24.	52709464	SWIVEL LINK	1
25.	60105321	PIN-TYPE A 1.50 X 8.44	1
26.	70731508	HOOK-SWIVEL (NOT SHOWN)	1
27.	72062135	NUT 1.75-5 SLOTTED PLAIN	1
28.	72063037	MACHINERY BUSHING 1.5 X 10 GA NR	3
29.	72066132	RETAINING RING-EXT 1.50 HD	3
30.	72066198	COTTER PIN .19X 3 PLAIN	2
31.	60106250	BOLT-HOOK 1.75-5 X 9"	1
33.	72601026	CAP SCR .38-16 X .50 FLH SOCP	6
REV. C 1997			

## Extension Cylinder (3B223820)



3B223820 CYLINDER DATA	
EXTENDED	12.69 IN <sup>2</sup> , 2.20 GAL
RETRACTED	7.78 IN <sup>2</sup> , 1.35 GAL
CASE	ø4.50 X 4.02 B X 57.88 LONG
ROD	ø2.50 X 58.88 LONG
DRY WEIGHT	148 LB
TEST PRESSURE	3000 PSI
OPERATING PRESSURE	2300 PSI

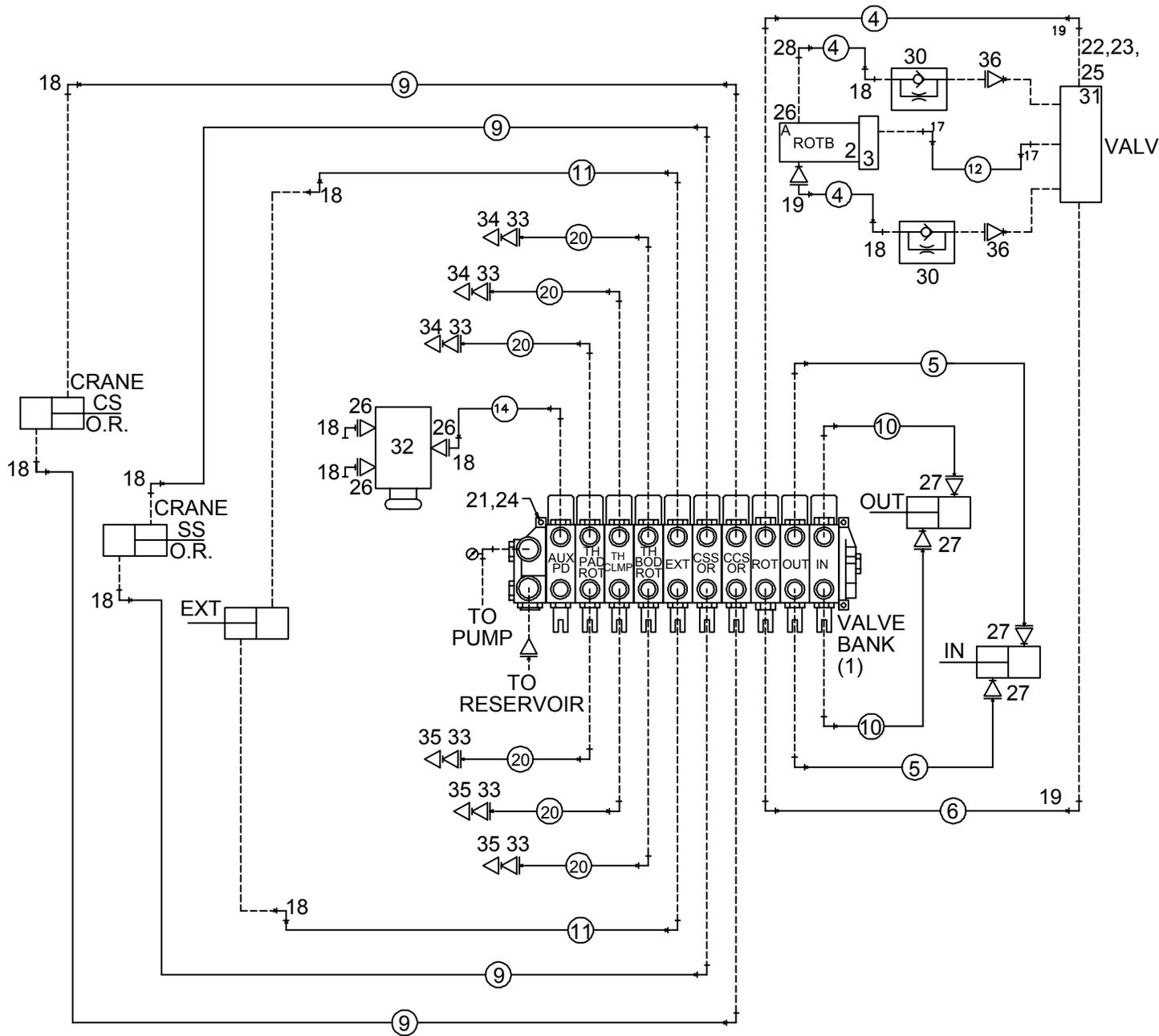
**NOTES:**

- 1 REPLACE ALL COMPONENTS OF THE SEAL KIT WHENEVER THE CYLINDER IS DISASSEMBLED. THIS WILL REDUCE FUTURE DOWNTIME.
- 2 APPLY REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO THREADS ON CYLINDER HEAD ONLY. KEEP AWAY FROM ALL SEALS.
- 3 APPLY "LUBRIPLATE" NO. 630-2 MEDIUM HEAVY, MULTI-PURPOSE LUBRICANT, TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

3B223820 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	4B223820	CASE ASM (INCL 3)	1
2.	4G223820	ROD ASSEMBLY	1
3.	7PNPXT02	PIPE PLUG (PART OF 1)	2REF
4.	73054304	VALVE-CBAL 10 GPM	2
5.	6H040025	HEAD	1
6.	6I040143	PISTON	1
7.	9C162023	SEAL KIT	REF
8.	7Q072153	O-RING	1
9.	7T66P040	PISTON SEAL	1
10.	7T65I040	PISTON RING	2
11.	6A025025	WAFER LOCK	1
12.	7Q072342	O-RING	1
13.	7Q10P342	BACKUP RING	1
14.	7R14P025	ROD WIPER	1
15.	7R546025	U-CUP LOADED	1
16.	7T61N143	LOCK RING	1
17.	7T2N8027	WEAR RING	1
18.	6C150025	STOP TUBE	1
19.	6C300025	STOP TUBE	2
REV B 1997			

# Hydraulics

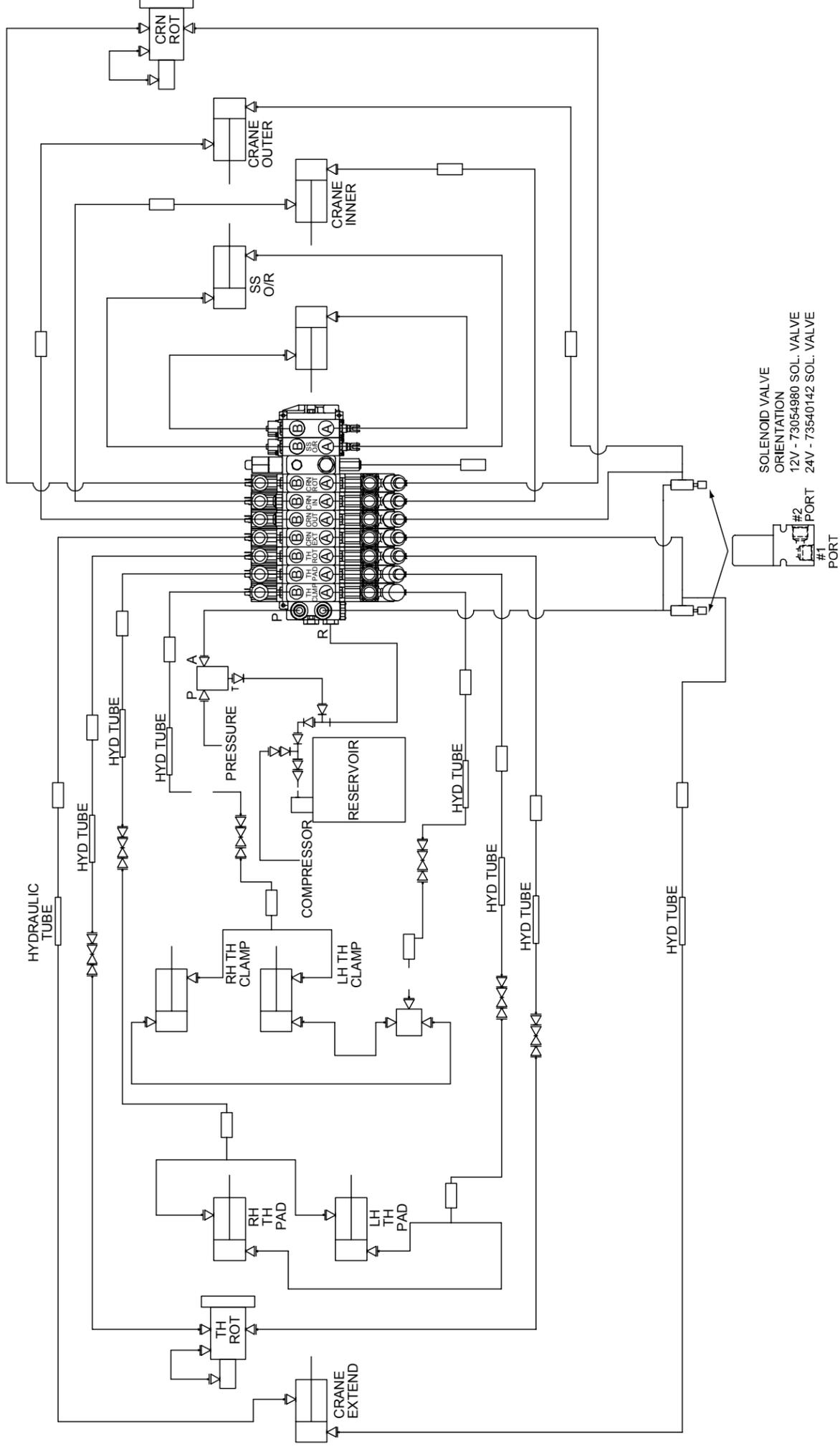
## Hydraulic Schematic, Manual (91704442)



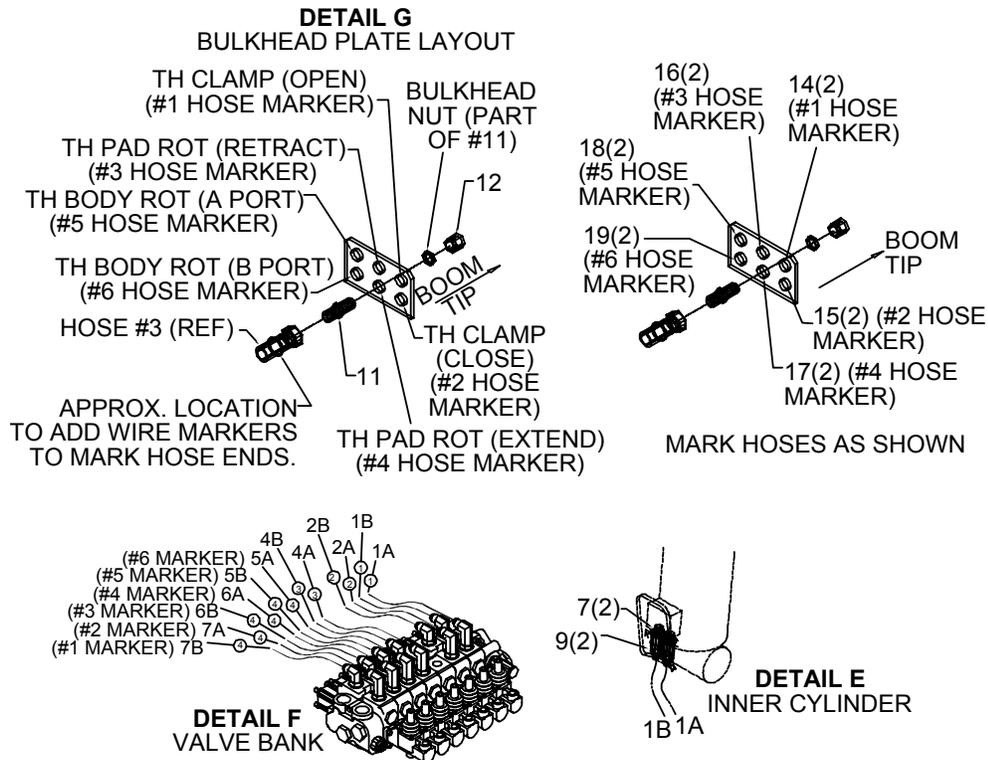
91704442 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51710120	VALVEBANK (NO RADIO)	REF
	51719464	VALVEBANK (12V RADIO)	REF
	73733389	VALVEBANK (24V RADIO)	REF
2.	73051223	MOTOR	REF
3.	71056088	BRAKE	REF
4.	51394424	HOSE ASM 3/8X12 FF	3*REF
5.	51394428	HOSE ASM 1/2X75 FF	2*REF
6.	51394425	HOSE ASM 3/8X15 FF	1*REF
9.	51394426	HOSE ASM 3/8X87 FF	4*REF
10.	51394429	HOSE ASM 1/2X177 FF	2*REF
11.	51394430	HOSE ASM 1/2X255 FJ	2*REF
12.	51394347	HOSE ASM 1/4X11-1/2 FF	1*REF
14.	51703729	HOSE ASM 3/8X24 FF (MAY VARY)	1
17.	72053758	ELBOW #4MSTR #4MJIC 90°	2
18.	72053763	ELBOW #8MSTR #8MJIC 90°	11
19.	72053764	ELBOW #10MSTR #8MJIC 90°	3
20.	51394427	HOSE ASM 3/8X303 FF	6*REF
21.	72060033	CAP SCR 5/16-18X3 HHGR5	3
22.	72060054	CAP SCR 3/8-16 X 3 HHGR5	2
23.	72062103	NUT 3/8-16 LOCK	2
24.	72062109	NU 5/16-18 LOCK	3
25.	72063003	WASHER 3/8 WRT	2
26.	72531206	ADAPTER #10MSTR #8FSTR	4
27.	72532358	ADAPTER #8MSTR #8MJIC	4
28.	72532666	ELBOW #8MSTR#8MJIC 90° XLG	1
29.	51713827	HOSE KIT (INCL:ITEMS W/*)	1
30.	73054921	VALVE-FLOW CONTROL	2
31.	73054370	COUNTERBALANCE VALVE	1
32.	73054420	SELECTOR VALVE	1
33.	72053670	ADAPTER 3/8MPT #8MJIC	6
34.	72533101	DISCONNECT COUPLER3/8FPT	3
35.	72533102	DISCONNECT NIPPLE 3/8FPT	3
36.	72532728	UNION #8MSTR #8MSTR	2
* NOTE: HOSE SIZE MAY VARY.			
REV. K 20070620			

# Hydraulic Schematic, Radio

(Reference drawing 91715845)



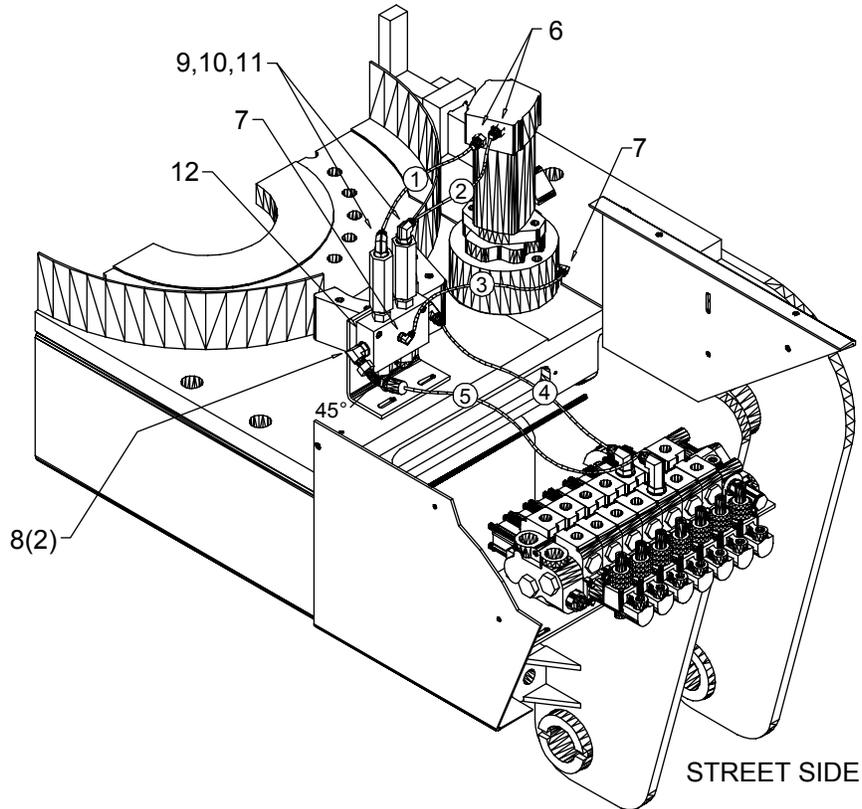
## Hydraulic Kit, Crane/Tirehand (99903032)



### 99903032 PARTS LIST

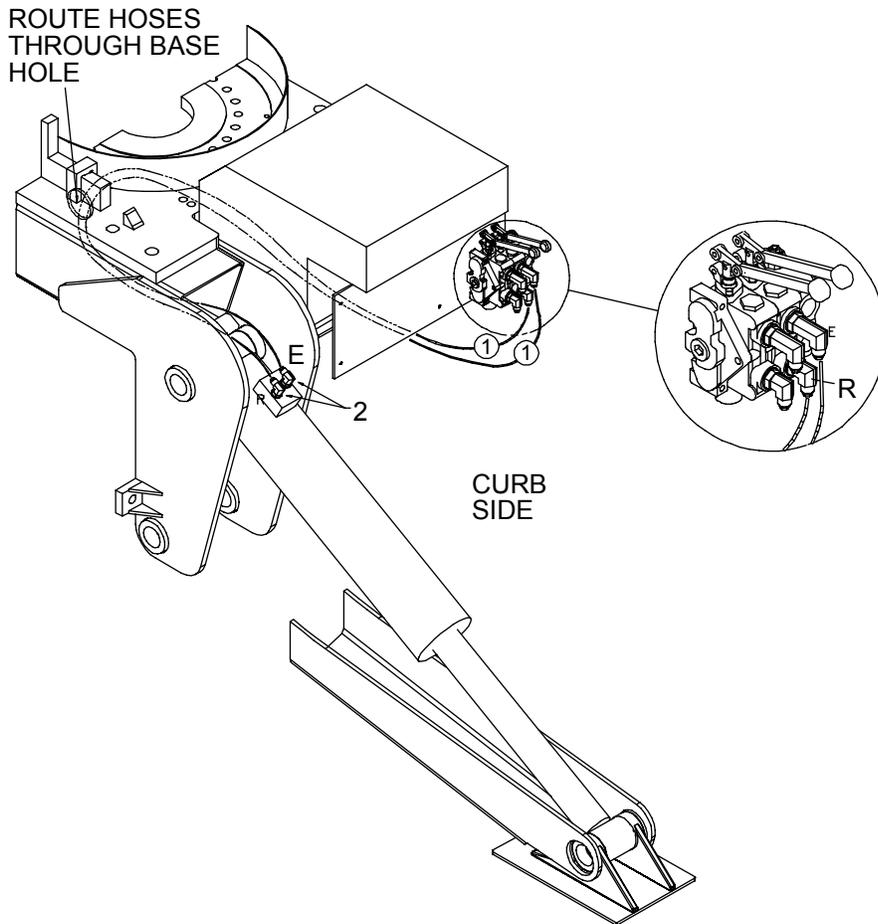
ITEM	PART #	DESCRIPTION	QUANTITY
	51715091	HOSE KIT (INCLUDES 1-5)	1
1.	51395195	HOSE-FF 1/2 X 103 OAL (8-8)	2REF
2.	51395196	HOSE-FF 1/2 X 69 OAL (8-8)	6REF
3.	51395197	HOSE-FF 3/8 X 223 OAL (8-8)	6REF
4.	51395194	HOSE-FJ 1/2 X 190 OAL (8-8)	2REF
5.	51395198	HOSE-FF 3/8 X 69 OAL (8-8)	6REF
6.	73054921	VALVE-FLOW CONTROL	2
7.	72532358	ADAPTER-M STR/M JIC #8 #8	6
8.	72533566	SWIVEL-MJIC/MJIC #8 INLINE	10
9.	72532980	ADAPTER-PR SW IN-LINE JIC 3/4X16	2
10.	72533304	ADAPTER-#8 MALE O-RING #8 FEMALE	2
11.	72533373	UNION-BULKHEAD 37DEG 3/4 JIC	6
12.	72532675	CAP-JIC STL 3/4 THREAD	6
13.	72053763	ELBOW-MSTR/90/MJIC #8 #8	2
14.	70145798	WIRE MARKERS	2
15.	70145831	WIRE MARKERS	2
16.	70145832	WIRE MARKERS	2
17.	70145833	WIRE MARKERS	2
18.	70145834	WIRE MARKERS	2
19.	70145835	WIRE MARKERS	2
REV 1998			

## Hydraulic Kit, Crane Rotation (99903033)



99903033 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
	51715071	HOSE KIT	1
1.	51395200	HOSE-FF 3/8 X 12 OAL (8-8)	1REF
2.	51395207	HOSE-FF 3/8 X 10 OAL (8-8)	1REF
3.	51395208	HOSE-FF 1/4 X 16 OAL (4-4)	1REF
4.	51395201	HOSE-FF 3/8 X 15 OAL (8-8)	1REF
5.	51395209	HOSE-FI 3/8 X 20 OAL (8-8)	1REF
6.	72532359	ADAPTER-#10 MSTR/ #8 MJIC	2
7.	72053758	ELBOW-#4MSTR/90/#4MJIC	2
8.	72053764	ELBOW-#10MSTR/90/#8MJIC	2
9.	72532728	UNION#8MSTR/#8MSTR	2
10.	73054921	VALVE-FLOW CONTROL PRESSURE COMP	2
11.	72053763	ELBOW-#8MSTR/90/#8MJIC	2
12.	73054370	VALVE-C-BAL	1REF
REV 1998			

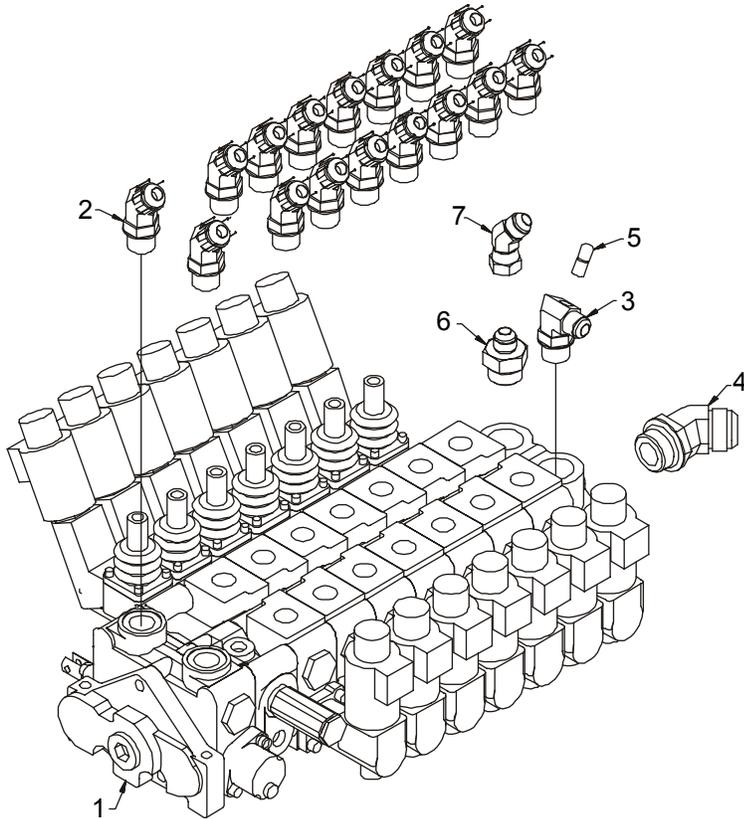
## Hydraulic Kit, Curbside Outrigger (99903035)



99903035 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51395304	HOSE-FF 3/8 X 93 OAL (8-8) (PART OF 51715072 HOSE KIT)	2REF
2.	72053763	ELBOW-#8MSTR/90/#8MJIC	2
REV 1998			

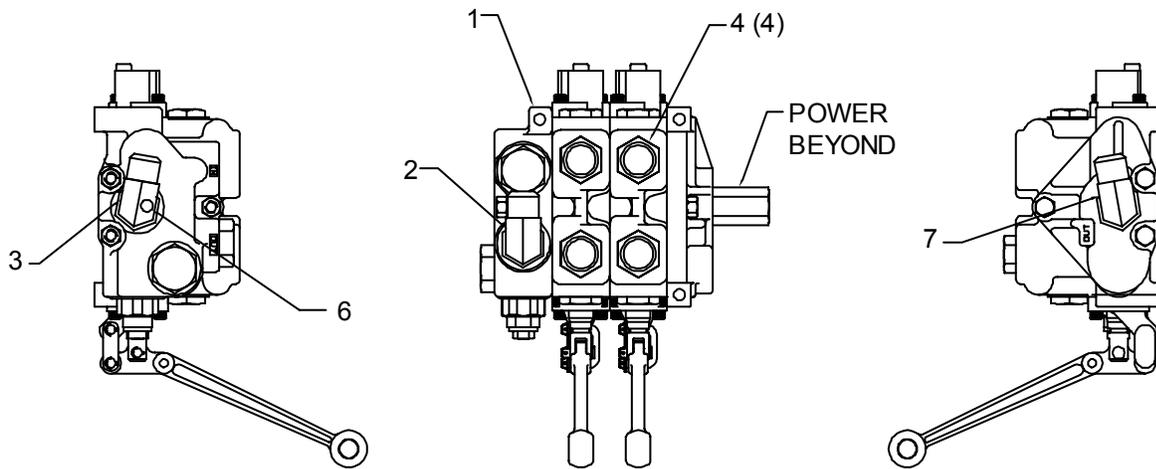
## Controls-Radio

### Valve Bank, Radio (51719464)



51719464 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	73733415	VALVEBANK (12V)	1
	73733891	VALVEBANK (24V)	1
REF	77041641	COIL (12V)	14
REF	77041673	COIL (24V)	14
2.	72053778	ELBOW #10MSTR #8MJIC 45°	16
3.	60107995	ELBOW-PR GUGE MOD RH	1
4.	72533651	ADPTR #12MSTR #16MJIC 45°	1
5.	72532987	NIPPLE-DISC 1/4 DIAGN W/CAP	1
6.	72532360	ADPTR #12MSTR #8MJIC	1
7.	72532670	ELBOW #8MJIC #8FJIC 45°	1

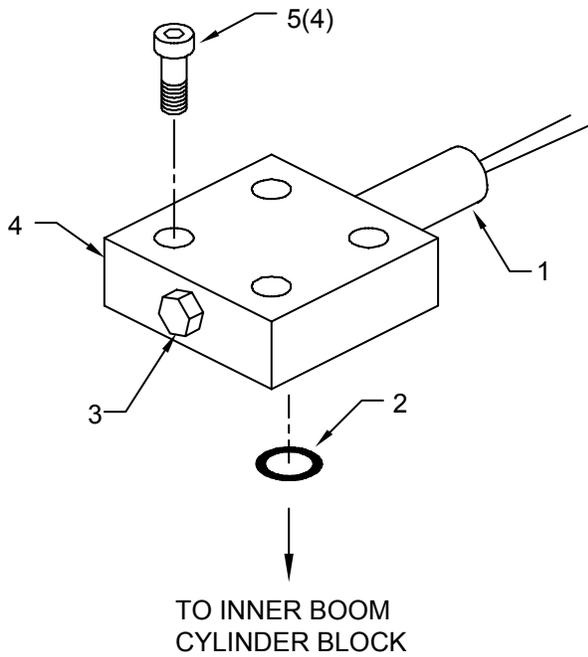
## Valve Bank, Outrigger (51715470)



51715470 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	70733329	VALVE BANK, 2-SECT	1
2.	72053767	ELBOW #12MSTR #12MJIC	1
3.	60114669	ELBOW, PRESS GUAGE LH	1
4.	72532364	ADPTR #8MSTR #12MJIC	4
6.	72532987	NIPPLE, DISC 1/4 W/CAP	2
7.	60107995	ELBOW, PRESS GUAGE RH	1

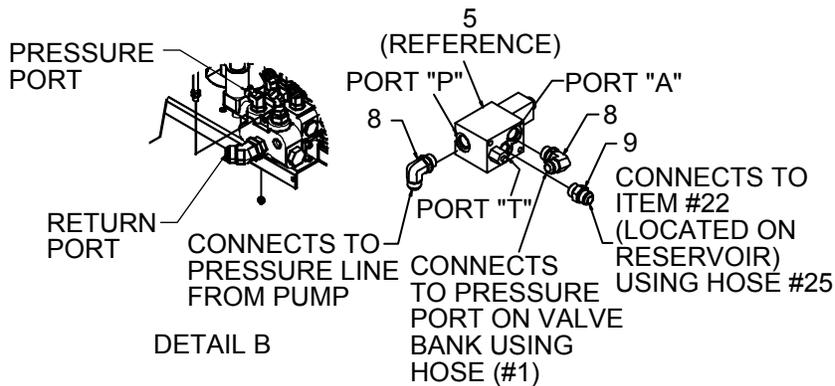
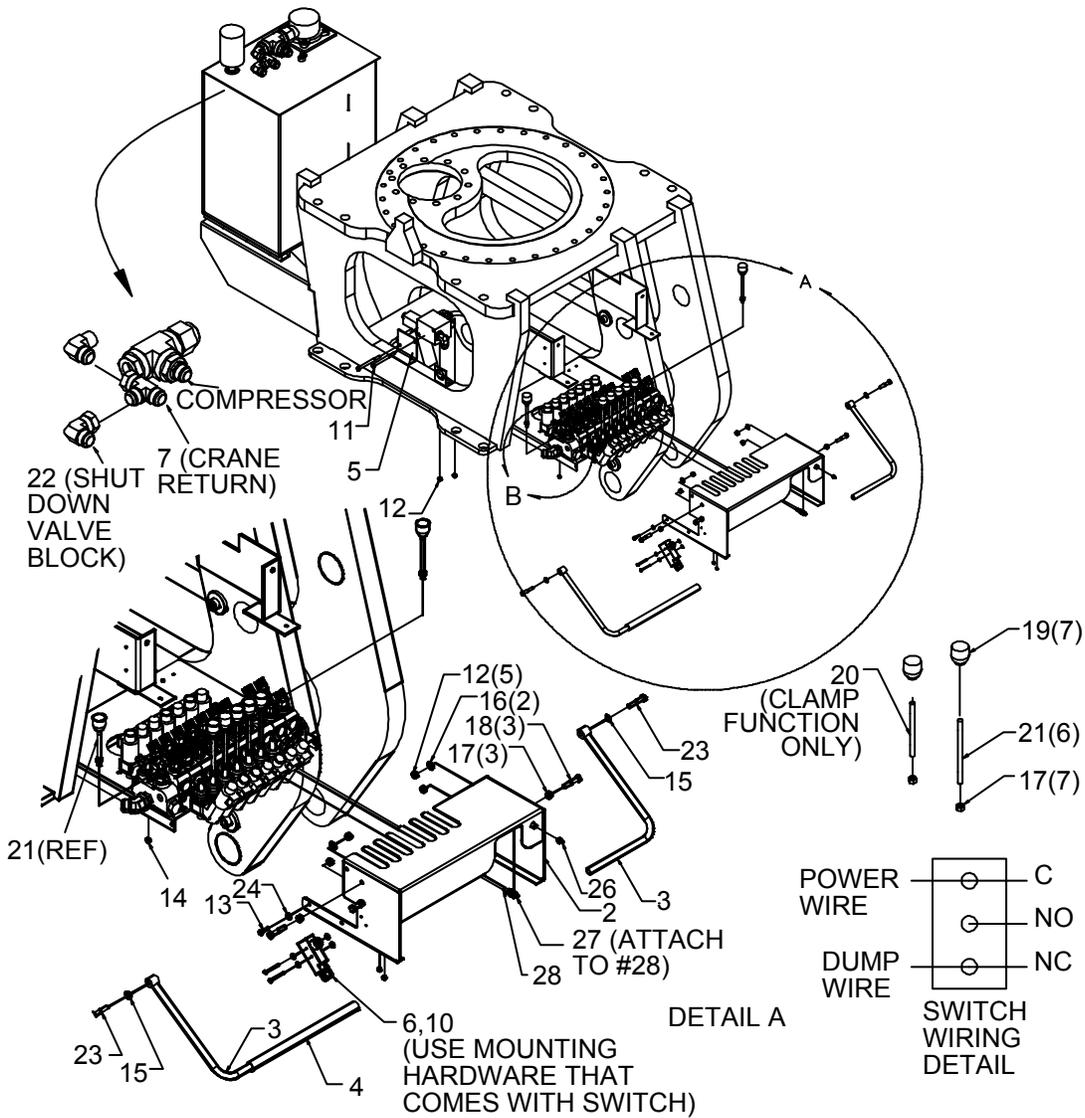
Note: Used for radio controls only. Mounted curbside.

## Capacity Shutdown Kit, Radio (31717514)



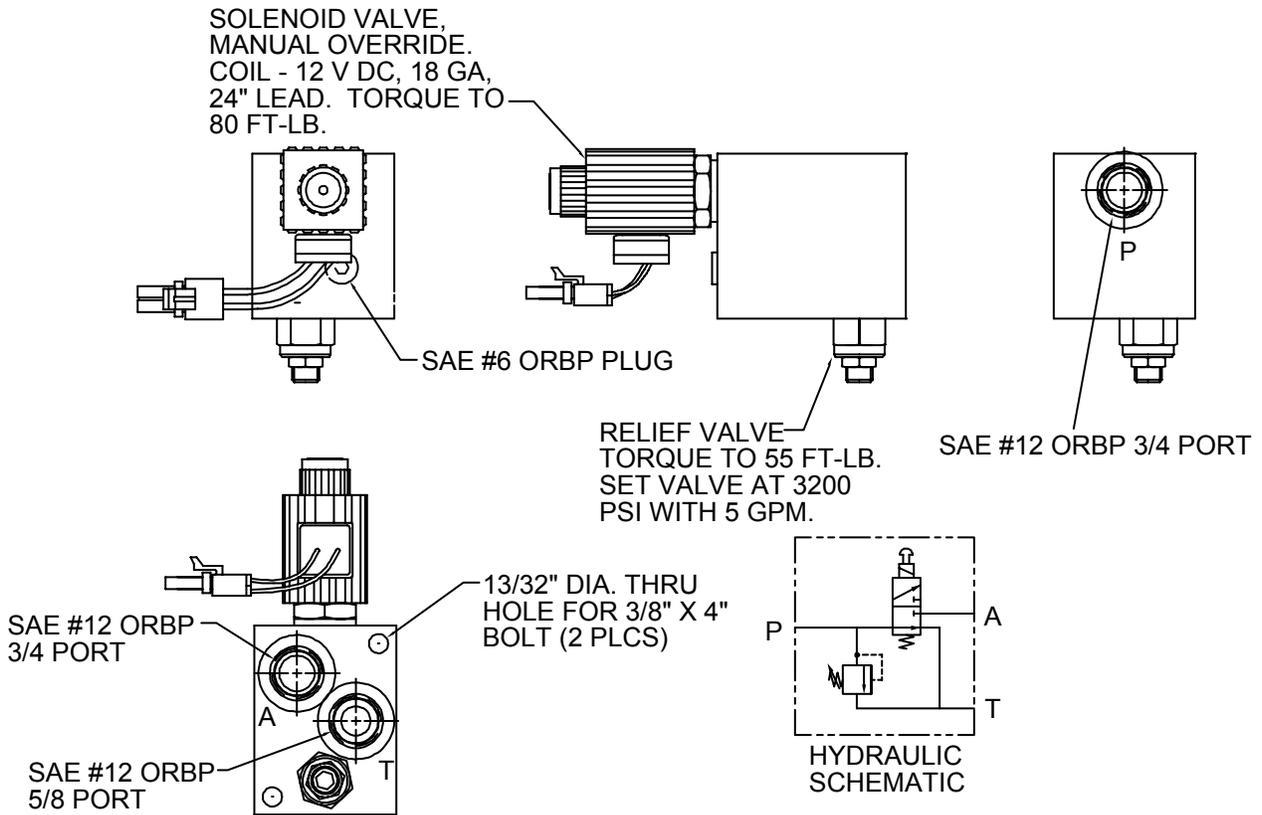
31717514 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	77041543	PRESSURE SWITCH, 2800 PSI NORMALLY CLOSED	1
2.	7Q072015	O-RING 9/16 X 11/16 X 1/16	1
3.	72532140	PLUG-STR HEX HS STL 9/16	1
4.	60025221	MANIFOLD-CAP ALERT	1
5.	72060731	CAP SCR 5/16-18 X 3/4 SH Z	4
REV. A 2002			

# Hydraulic Shutdown Kit, Radio (99903465)



99903465 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51396300	HOSE-FF .75X 36.00 OAL(12-12)	1REF
2.	52718583	COVER WLDMT-20017	1
3.	52713782	HANDLE-HYD SHUTDOWN	2
4.	60120092	TUBE-RD .75IDX 1.00ODX 15.50	1
5.	73055278	VALVE ASM-REL/SOL HYD SHUTD (12V)	1
	73055298	VALVE ASM-REL/SOL HYD SHUTD (24V)	1
6.	77041459	SWITCH-LIMIT	1
7.	72533000	TEE-SWVL NUT RUN JIC 16	1
8.	72053767	ELBOW-M STR/90/M JIC 12 12	2
9.	72532366	ADPTR-M STR/M JIC 12 12	1
10.	77044468	CONNECTOR- .50 STR RLF .12-.25	1
11.	72060057	CAP SCR .38-16X 4.50 HH GR5 Z	2
12.	72062103	NUT .38-16 HEX NYLOC ZINC	7
13.	72060004	CAP SCR .25-20X 1.00 HH GR5 Z	4
14.	72062104	NUT .25-20 HEX NYLOC ZINC	4
15.	72063215	WASHER-BELLVILLE .38 SS	2
16.	72063003	WASHER .38 W FLAT ANSI B27.2Z	2
17.	72062002	NUT .38-16 HEX ZINC	10
18.	72060052	CAP SCR .38-16X 2.50 HH GR5 Z	3
19.	70146062	KNOB-CNTRL HANDLE	7
20.	60124863	HANDLE-GRESEN V20 VB 5.00 LG	1
21.	60124864	HANDLE-GRESEN V20 VB 6.00 LG	6
22.	72532971	ELBOW-M JIC/F JIC SW 16 16	1
23.	72060051	CAP SCR .38-16X 2.25 HH GR5 Z	2
24.	72063001	WASHER .25 W FLAT ANSI B27.2Z	4
25.	51396303	HOSE-FJ .75X 61.00 OAL(16-12)	1REF
26.	72053508	ZERK-NPT .12 (PART OF HYD KIT)	1REF
27.	72053638	ADPTR-MPT/FPT SWVL .12 .12 (PART OF HYD KIT)	1REF
28.	53000718	GREASE EXT-55.00 OAL 53.00 HOSE (PART OF HYD KIT)	1REF
REV 20080318			

## Relief Valve Assembly, 12V Radio (73055278)



### REFERENCE PARTS FOR SERVICE:

Coil - 77041456  
Solenoid valve - 73054980

## Relief Valve Assembly, 24V Radio (73055298)

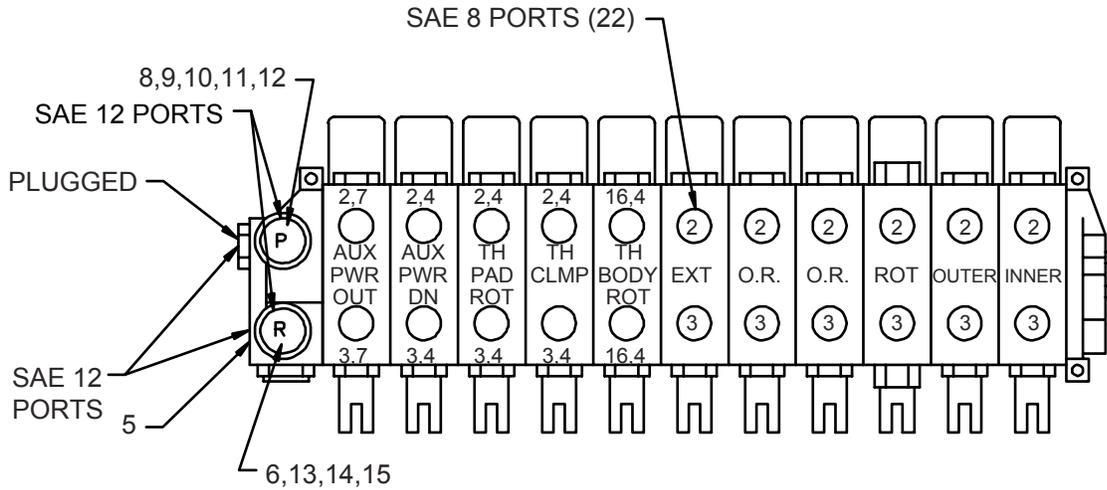
Reference drawing 73055278.

### REFERENCE PARTS FOR SERVICE:

Coil - 77040463  
Solenoid valve - 73540142

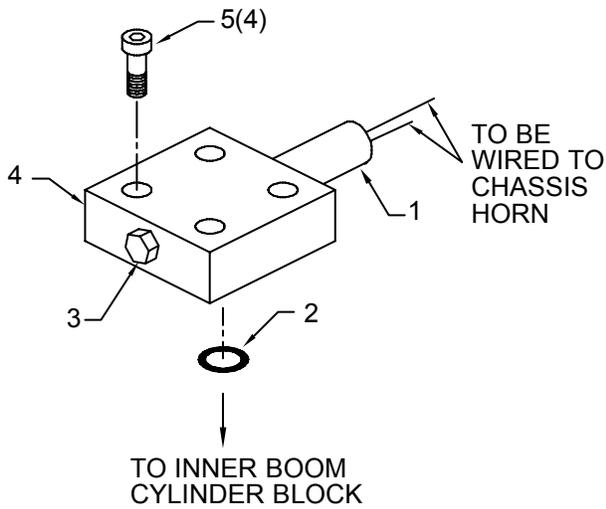
# Controls-Manual

## Valvebank, Manual (51710120)



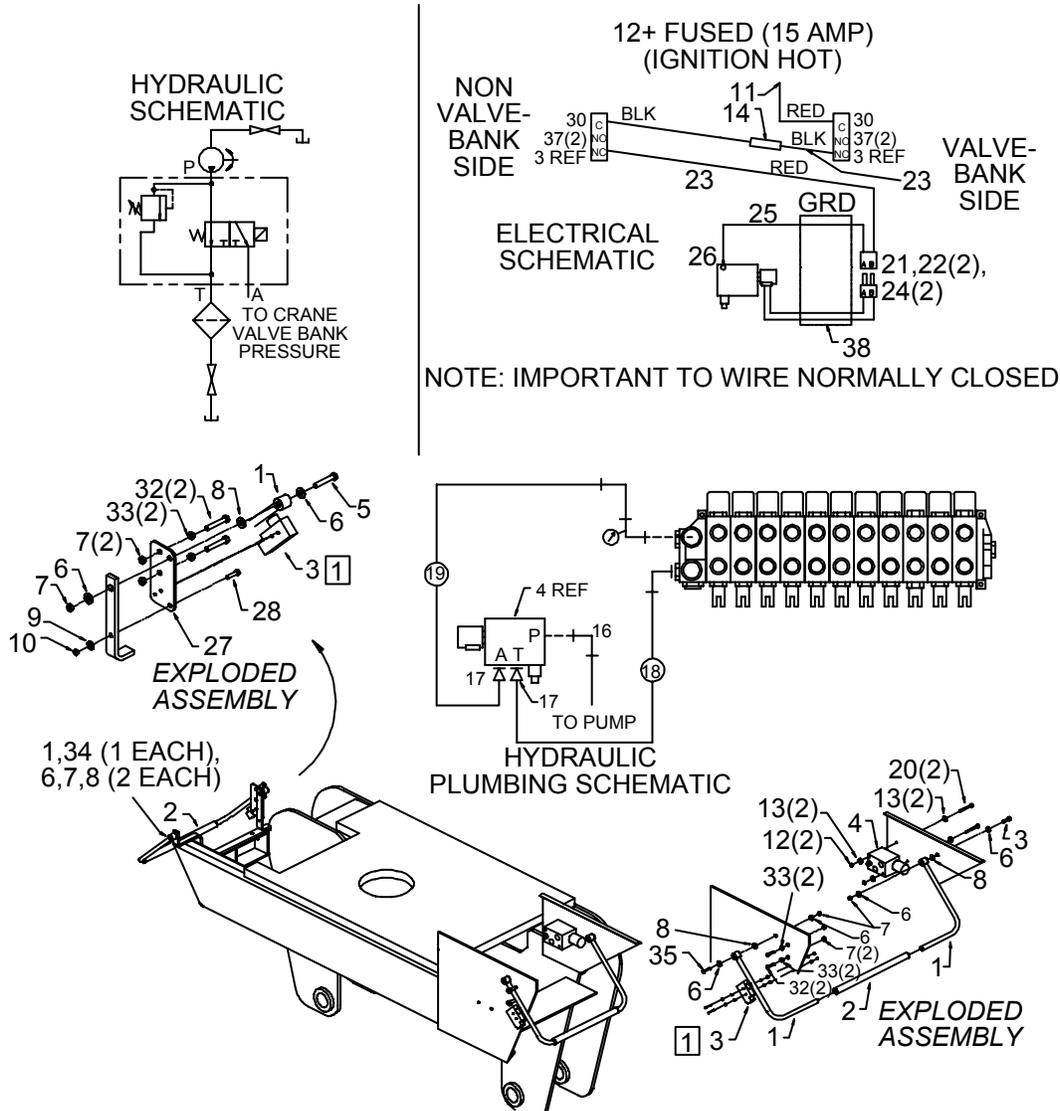
51710120 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	70732486	VALVEBANK 11-SECTION	1
2.	72053763	ELBOW 3/4MSTR 3/4MJIC 90°	10
3.	72532666	ELBOW3/4MSTR3/4MJIC 90°XLG	10
4.	72532675	CAP 3/4JIC STL	8
5.	72053767	ELBOW #12MSTR #12MJIC 90°	1
6.	72053747	ADAPTER #12MSTR 3/4FPT	1
7.	72532665	ADAPTER #4MJIC #8FJIC	2
8.	60107995	ELBOW=PR GAUGE MODIFIED	1
9.	72053533	ELBOW 1/4STR 45°	1
10.	73054435	PRESSURE GAUGE	1
11.	72053517	ADAPTER 1/4MPT 1/4MPT HEX	1
12.	72053469	COUPLING 1/4NPT	1
13.	72053558	ADAPTER 3/4MPT 3/4MPT HEX	1
14.	72073436	REDUCER COUPLING1"-3/4"NPT	1
15.	72532834	BEAD NIPPLE 1MPT 1-1/4HOSE 90°	1
16.	72532728	UNION-M STR/M STR 8 8	2
REV. E 20081114			

## Capacity Shutdown Kit, Manual (31717169)



31717169 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	77041652	PRESSURE SWITCH, 2800 PSI, NORMALLY OPEN	1
2.	7Q072015	O-RING	1
3.	72532140	PLUG 9/16-STR HH	1
4.	60025221	MANIFOLD	1
5.	72060731	CAP SCREW 5/16-18X3/4 SH ZINC	4
REV. A 20020701			

# Hydraulic Shutdown Kit, Manual (31713789)



**NOTES (SEE REFERENCE IN BOX):**

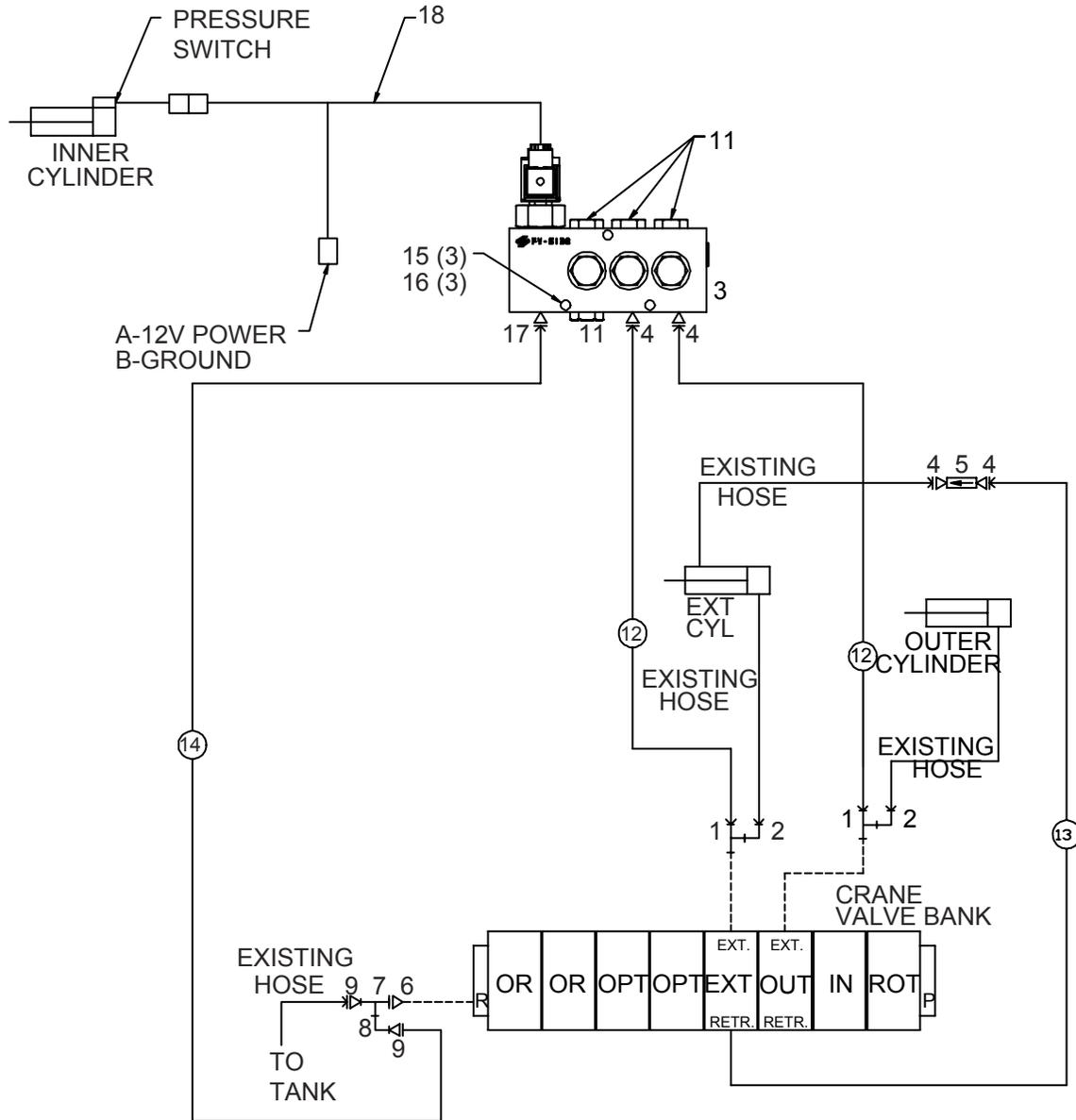
- 1 USE FASTENERS INCLUDED.

**31713789 PARTS LIST**

ITEM	PART #	DESCRIPTION	QUANTITY
1.	52713782	HANDLE	4
2.	60120549	TUBE	2
3.	77041459	LIMIT SWITCH	2
4.	73055278	VALVE ASM	1
5.	72060052	CAP SCR 3/8-16X2-1/2 HHGR5	1
6.	72063003	WASHER 3/8 WRT	8
7.	72062103	NUT 3/8-16 LOCK	8

31713789 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
8.	72063215	WASHER 3/8 BELLEVILLE SS	4
9.	72063001	WASHER 1/4 WRT	1
10.	72062104	NUT 1/4-20 LOCK	1
12.	72062109	NUT 5/16-18 LOCK	4
13.	72063002	WASHER 5/16 WRT	4
16.	72053767	ELBOW #12MSTR #12MJIC 90°	1
17.	72532366	ADAPTER #12MSTR #12MJIC	2
18.	51395012	HOSE 3/4X25 FF #12#12	1
19.	51395013	HOSE 3/4X21 FZ #12#12	1
20.	72060038	CAP SCR 5/16-18X4-1/2 HHGR5	2
21.	77044573	CONNECTOR	1
22.	77044552	TERMINAL MALE 18-20GA	2
23.	89044188	CABLE-14AWG DUPLX	12FT
24.	70394069	SEAL-CABLE CONNECTOR	2
25.	89044274	WIRE 14GA BLK	2FT
26.	77040052	TERMI-RING I .38STUD 12-10GA	1
27.	60120438	BRACKET	1
28.	72060004	CAP SCR 1/4-20X1 HHGR5	1
30.	77044468	STRAIN RELIEF 1/2	2
32.	72060050	CAP SCR 3/8-16X2 HHGR5	4
33.	72062002	NUT 3/8-16 HEX	4
34.	72060030	CAP SCR5/16-18X2-1/4HHGR5Z	1
35.	72060031	CAP SCR 5/16-18X2 HHGR5	2
37.	77040051	TERM #8STUD 16-14GA	4
38.	89034048	SPIRAL WRAP-CLEAR	3FT
REV. H 20081118			

## Hydraulic Overload Kit, 2-Function, Manual (51717130)

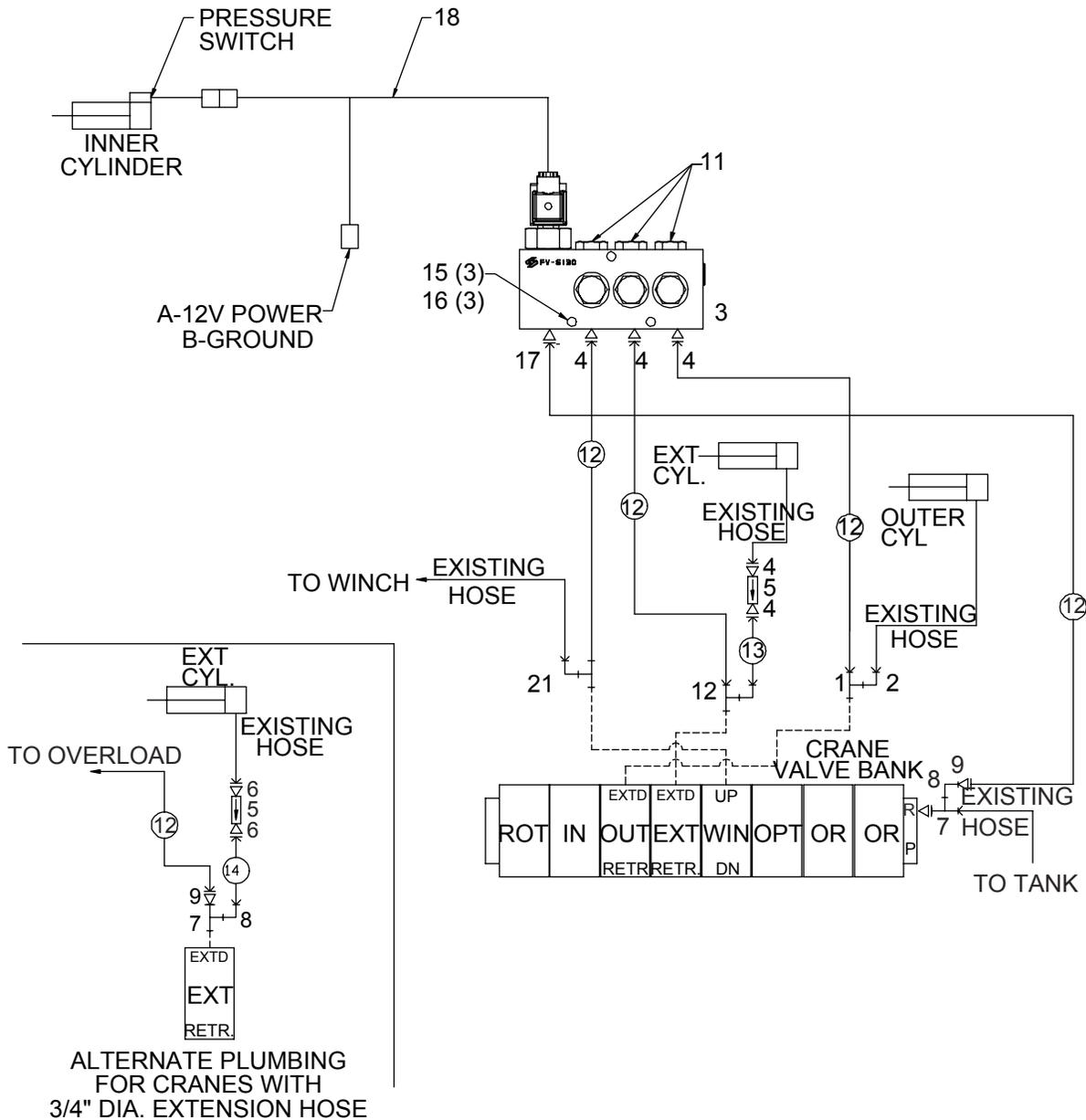


**NOTES:**

- 1 THE OVERLOAD SYSTEM FUNCTIONS SUCH THAT WHEN THE INNER CYLINDERS ARE OVERLOADED, THE PRESSURE SWITCH WILL ACTIVATE THE SOLENOID DUMP VALVE(S), THUS DUMPING OIL TO "TANK" AND PREVENTING THE OUTER CYLINDER EXTEND, EXTENSION CYLINDER EXTEND, OR WINCH UP FUNCTIONS.
- 2 IN AN OVERLOAD CONDITION, OUTER BOOM EXTEND, EXTENSION CYLINDER EXTEND, AND WINCH UP FUNCTIONS ARE SHUT DOWN.
- 3 INSTALL A RELIEF VALVE (73054426 - 700 PSI) IN THE EXTEND LINE OF THE EXTENSION CYLINDER SO THE CYLINDER WILL NOT EXTEND WHEN THE DUMP SYSTEM IS ACTIVATED.
- 4 USE HYDRAULIC OVERLOAD KIT IN CONJUNCTION WITH THE ELECTRIC CAPACITY ALERT KIT.

51717130 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	72532657	TEE #8JIC SWVL NUT RUN	2
2.	72532658	ELBOW #8MJIC #8FJIC	2
3.	73540085	VALVE BLOCK ASM	1
4.	72532358	ADAPTER #8MSTR #8MJIC	4
5.	73054426	VALVE-ADJ RELIEF	1
6.	72053676	ADAPTER 3/4MPT #12MJIC	1
7.	72532950	TEE-SWIVEL NUT RUN JIC#12	1
8.	72532696	ELBOW-#12MJIC #12FJIC SW	1
9.	72532972	ADPTR-#8MJIC#12FJIC	2
11.	72532141	PLUG STR HEX HD STL 3/4 THD	4
12.	51703863	HOSE ASM-FF 3/8 X 14	2
13.	51706239	HOSE ASM-FF 1/2 X 5	1
14.	51704914	HOSE ASM-FF 3/8 X 60	1
15.	72060034	CAP SCR 5/16-18 X 3.25 HH	3
16.	72062109	NUT 5/16-18 HEX NYLOC ZINC	3
17.	72532360	ADPTR-#12MSTR #8MJIC	1
18.	77441025	HARNES-OVERLOAD	1
REV. A 20020206			

## Hydraulic Overload Kit, 3-Function, Manual (51717128)

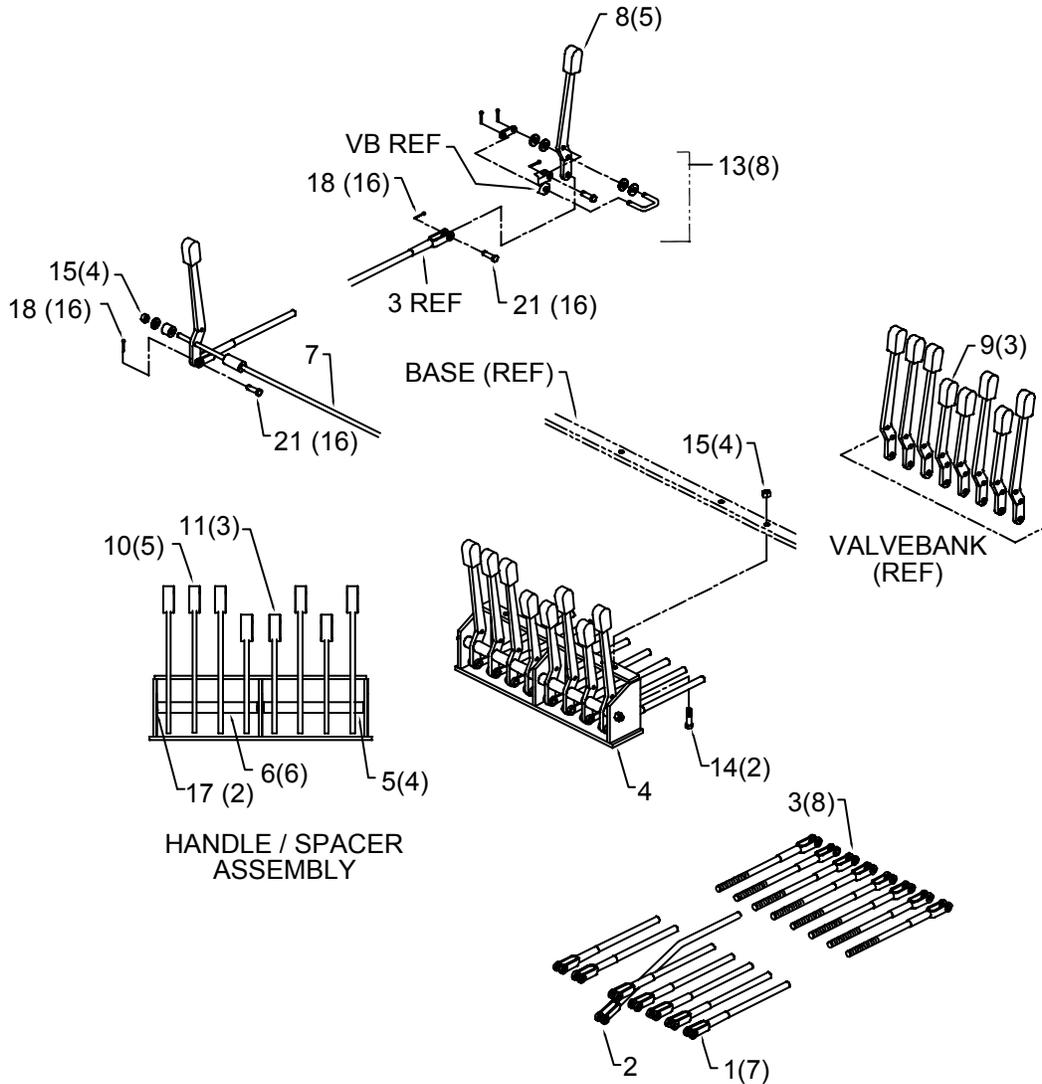


**NOTES:**

- 1 THE OVERLOAD SYSTEM FUNCTIONS SUCH THAT WHEN THE INNER CYLINDERS ARE OVERLOADED, THE PRESSURE SWITCH WILL ACTIVATE THE SOLENOID DUMP VALVE(S), THUS DUMPING OIL TO "TANK" AND PREVENTING THE OUTER CYLINDER EXTEND, EXTENSION CYLINDER EXTEND, OR WINCH UP FUNCTIONS.
- 2 IN AN OVERLOAD CONDITION, OUTER BOOM EXTEND, EXTENSION CYLINDER EXTEND, AND WINCH UP FUNCTIONS ARE SHUT DOWN.
- 3 INSTALL A RELIEF VALVE (73054426 - 700 PSI) IN THE EXTEND LINE OF THE EXTENSION CYLINDER SO THE CYLINDER WILL NOT EXTEND WHEN THE DUMP SYSTEM IS ACTIVATED.

51717128 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	72532657	TEE #8JIC SWVL NUT RUN	3
2.	72532658	ELBOW #8MJIC #8FJIC	3
3.	73540085	VALVE BLOCK ASM	1
4.	72532358	ADAPTER #8MSTR #8MJIC	5
5.	73054426	VALVE-ADJ RELIEF	1
6.	72532366	ADAPTER #12MSTR #12MJIC	2
7.	72532950	TEE-SWIVEL NUT RUN JIC#12	2
8.	72532696	ELBOW-#12MJIC #12FJIC SW	2
9.	72532972	ADPTR-#8MJIC#12FJIC	2
11.	72532141	PLUG STR HEX HD STL 3/4 THD	3
12.	51703863	HOSE ASM-FF 3/8 X 14	4
13.	51706239	HOSE ASM-FF 1/2 X 5	1
14.	51704914	HOSE ASM-FF 3/8 X 60	1
15.	72060034	CAP SCR 5/16-18 X 3.25 HH	3
16.	72062109	NUT 5/16-18 HEX NYLOC ZINC	3
17.	72532360	ADPTR-#12MSTR #8MJIC	1
18.	77441025	HARNES-OVERLOAD	1
REV. A 20020206			

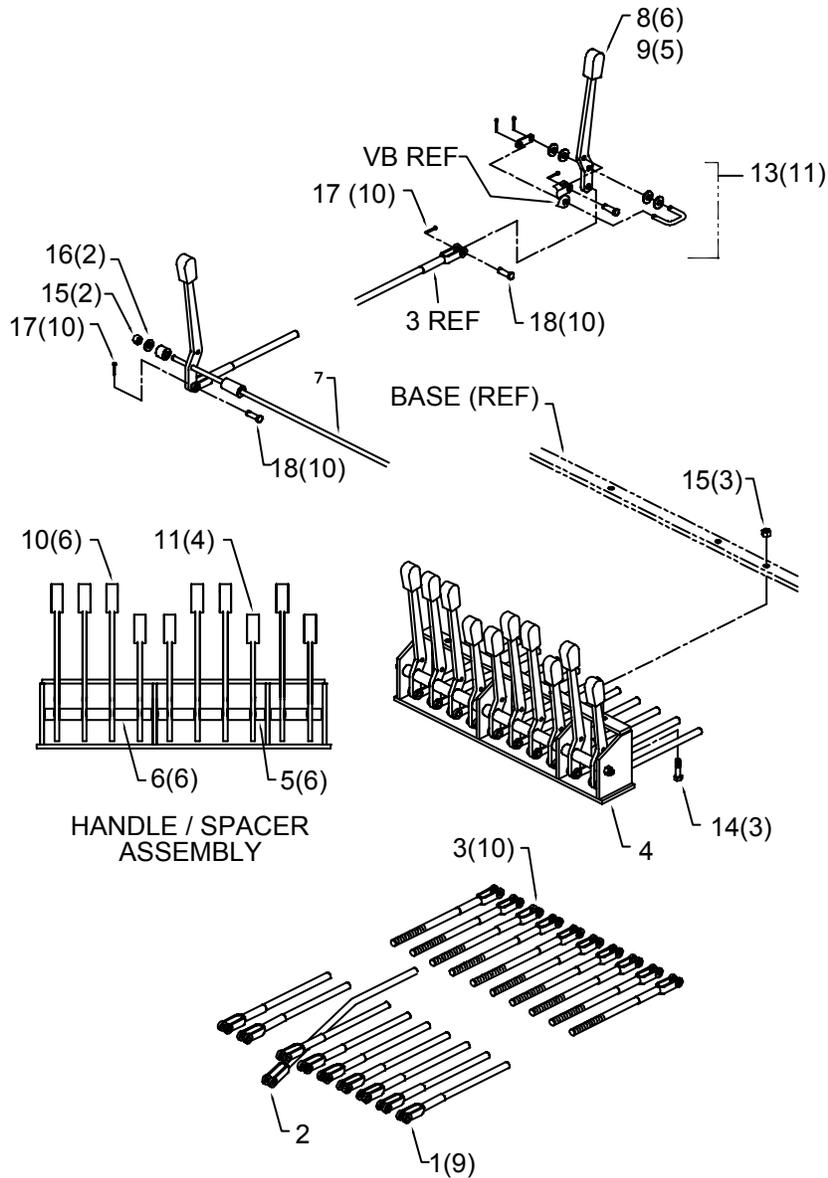
## Control Kit, 8-Function, Manual (90704441)



90704441 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	52702016	CONTROL ROD - FEMALE	7
2.	52702017	CONTROL ROD - FEMALE BENT	1
3.	52702018	CONTROL ROD - MALE	8
4.	52702777	VALVEBANK	1
5.	60030045	SPACER 5/8	4
6.	60030046	SPACER 1-1/2	6
7.	60105503	ROD	1
8.	70141982	CONTROL HANDLE - VALVEBANK LONG	5
9.	70141983	CONTROL HANDLE - VALVEBANK SHORT	3
10.	70141984	CONTROL HANDLE - CURBSIDE LONG	5

<b>90704441 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
11.	70141985	CONTROL HANDLE - CURBSIDE SHORT	3
13.	94731839	LINK & PIN KIT	8
14.	72060025	CAP SCR 5/16-18 X 1 HH GR5	2
15.	72062109	NUT 5/16-18 LOCK	4
17.	72063002	WASHER 5/16 WRT	2
18.	72066168	COTTER PIN	16
21.	72066338	CLEVIS PIN	16
REV. C 1997			

## Control Kit, 11-Function, Manual (90710603)



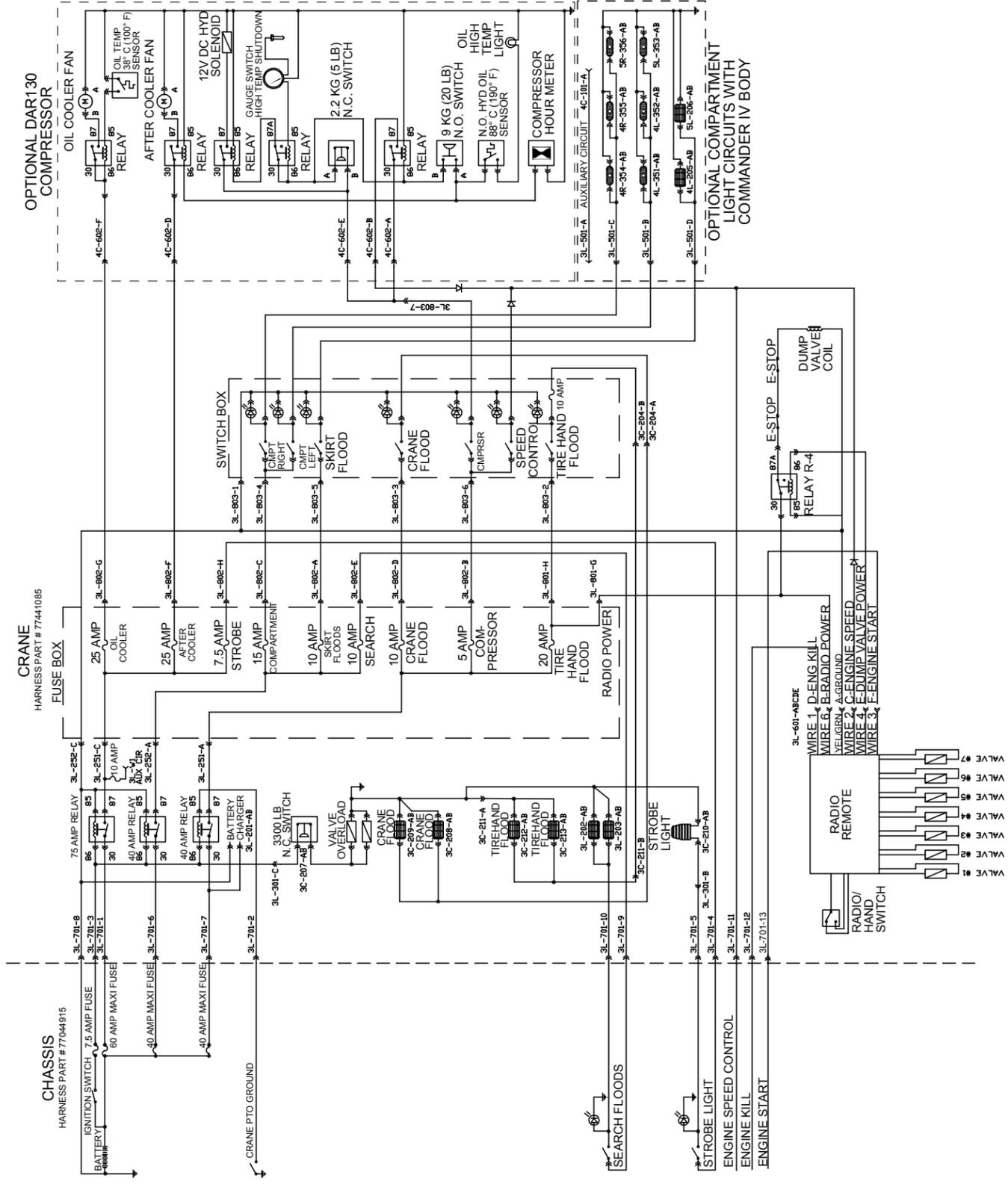
**NOTE:**

- 1 AUXILIARY POWER OUT OUTRIGGER FUNCTION IS CONTROLLED FROM THE VALVEBANK SIDE ONLY. THERE IS NO CROSS CONTROL FOR THIS FUNCTION.

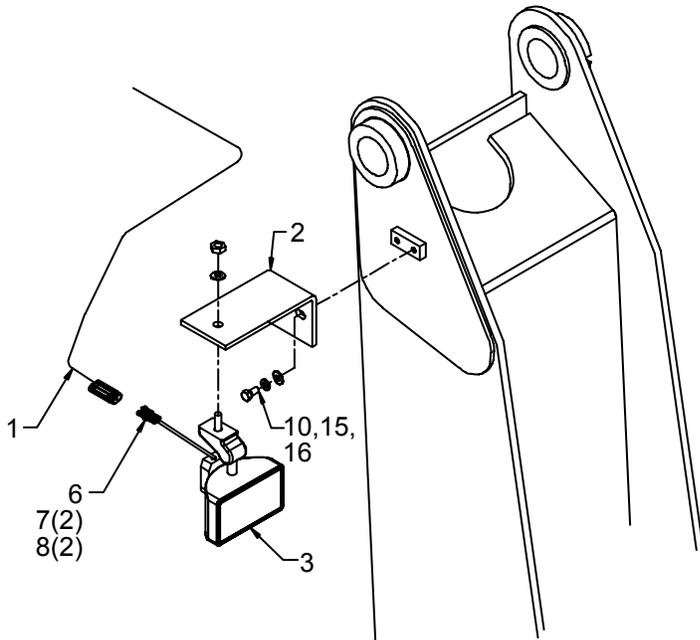
90710603 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	52702016	CONTROL ROD-FEMALE	9
2.	52702017	CONTROL ROD-BENT FEMALE	1
3.	52702018	CONTROL ROD-MALE	10
4.	52710602	DUMMY VALVEBANK	1
5.	60030045	SPACER 5/8	7
6.	60030046	SPACER 1-1/2	6
7.	60115353	DUMMY VB ROD	1
8.	70141982	CONTROL HANDLE-LONG-VB	6
9.	70141983	CONTROL HANDLE-SHORT-VB	5
10.	70141984	CONTROL HANDLE-LONG-DVB	6
11.	70141985	CONTROL HANDLE-SHORT-DVB	4
13.	94731839	LINK & PIN KIT	11
14.	72060025	CAP SCR 5/16-18X1 HH GR5	3
15.	72062109	NUT 5/16-18 LOCK	5
16.	72063002	WASHER 5/16 WRT	2
17.	72066168	COTTER PIN	20
18.	72066338	CLEVIS PIN	20
REV. B 1996			

# Electrical

Electrical Schematic (99903557)

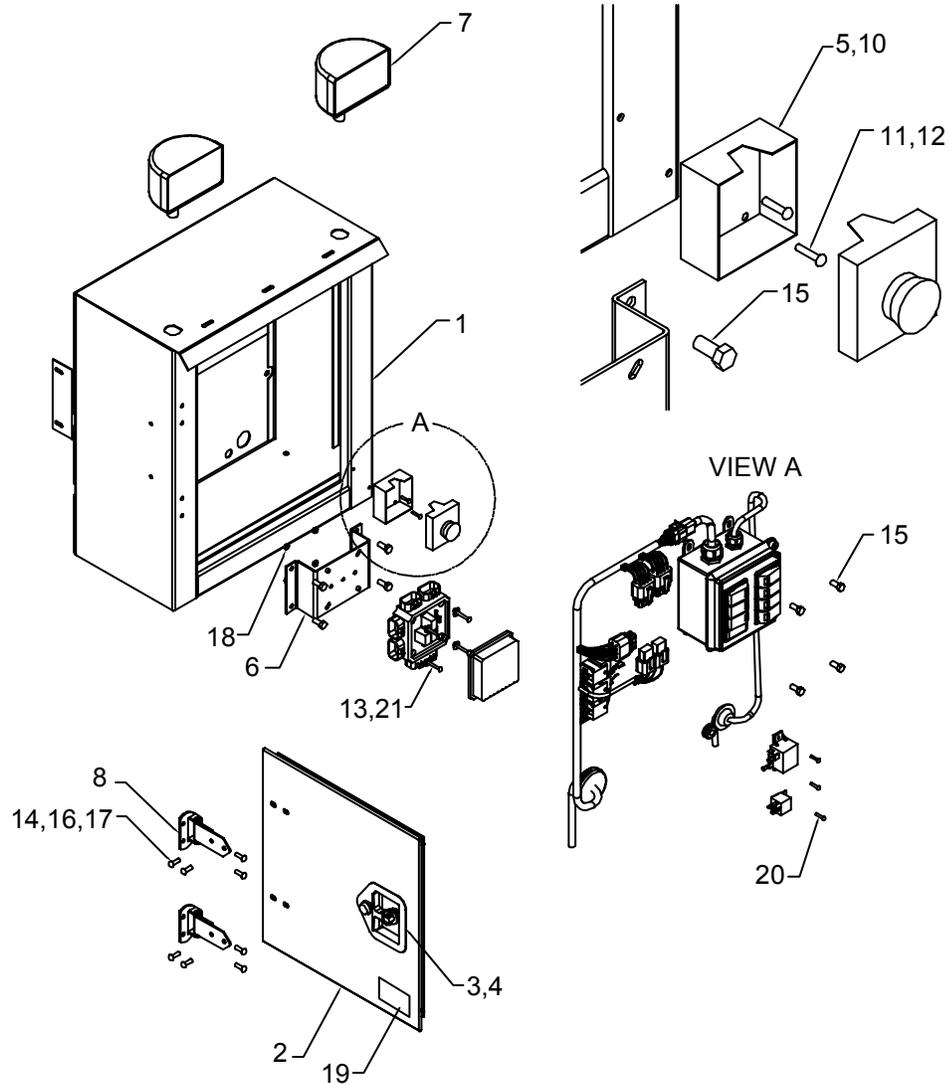


## Light Kit (51717977)



51717977 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51717219	HARNESS-OTR CRANE (MANUAL)	1
1.	77441197	HARNESS-OTR CRANE (RADIO)	1
2.	60113428	LIGHT BRACKET	2
3.	77040424	FLOODLIGHT, TOP MNT	2
6.	77044574	CONN, PACKARD FEM 2-WAY WP	2
7.	77044550	TERM-FEM 18-20 GA WP	4
8.	70394069	SEAL, CABLE CONN	4
10.	72060044	CAP SCR 3/8-16 X 3/4 HHGR5Z	4
15.	72063051	WASHER 3/8 LOCK ZINC	4
16.	72063003	WASHER .38 W FLAT	4
REV. A 20070820			

## Electrical Control Cabinet (41718269)

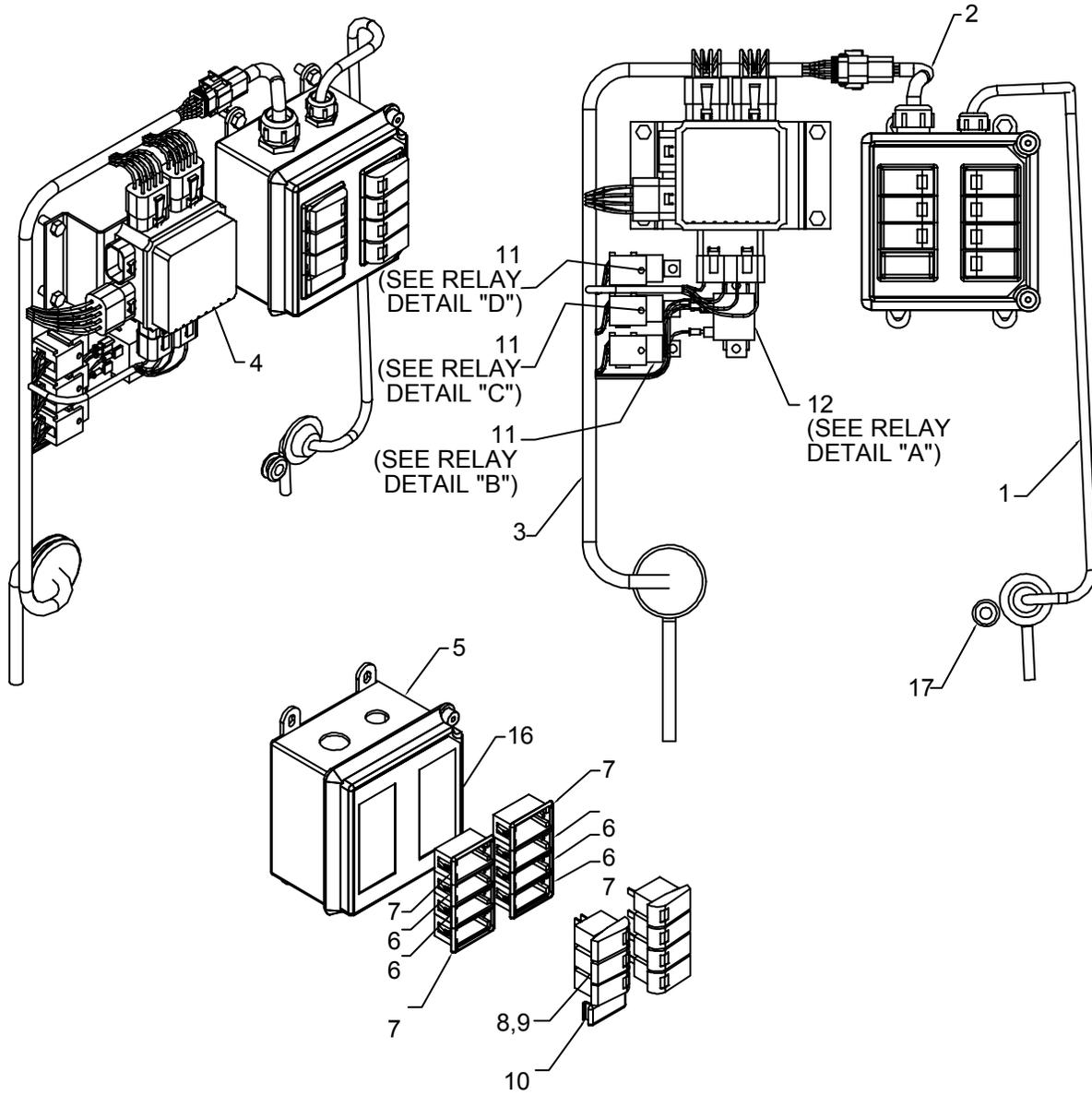


### NOTES:

- 1 INSTALL WEATHERSTRIP (ITEM #9) AROUND DOOR OPENING.
- 2 INSTALL DUAL-LOCK FASTENER (ITEM #19) INSIDE LEFT SIDE WALL OF CABINET. USE ITEM #19 TO MOUNT RADIO REMOTE CONTROL CHARGER. (USE 2 STRIPS ON CABINET WALL AND 2 STRIPS ON CHARGER).

41718269 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	41721887	CABINET WELDMENT (WAS 52715880)	1
2.	52713707	DOOR WELDMENT	1
3.	72661470	LATCH ASM, 1-PT	1
4.	76393253	GASKET, LATCH W/STUDS	1
5.	77041486	SWITCH, E-STOP	1
6.	60121574	BRACKET, FUSE/RELAY BOX	1
7.	77040424	LIGHT, WORK LAMP	2
8.	72661383	HINGE, SS 10-GA	2
9.	89393637	WEATHERSTRIP, 1/2X1/2 TRIMLOC	5.5'
10.	77044468	CONNECTOR 1/2" STR REL .12-.25	1
11.	72601725	SCR-MACH 6-32 1/2 RDH PHLPS	2
12.	72601726	NUT 6-32 HEX NYLOC	2
13.	72060643	SCR-MACH 10-24 X 1.50 RDH SST	4
14.	72601652	SCR-MACH 1/4-20X3/4 TRHTORXSS	8
15.	72061004	SCR-SHT MET 14X3/4 SLT HEXZ	8
16.	72062194	NUT-SS 1/4-20 NYLOC	6
17.	72062264	NUT-1/4-20 WELD TP2120	2
18.	72062053	NUT 10-24 HEX ZINC	4
19.	70396515	DECAL-WARNING-NO STORE IN E-CABINET	1
20.	72060835	SCR-SELF TAP 8-18 3/4 HHZINC	5
21.	72063166	WASHER SS 1/4 WRT 18-8 5/8 OD	4
REV. C 20080903			

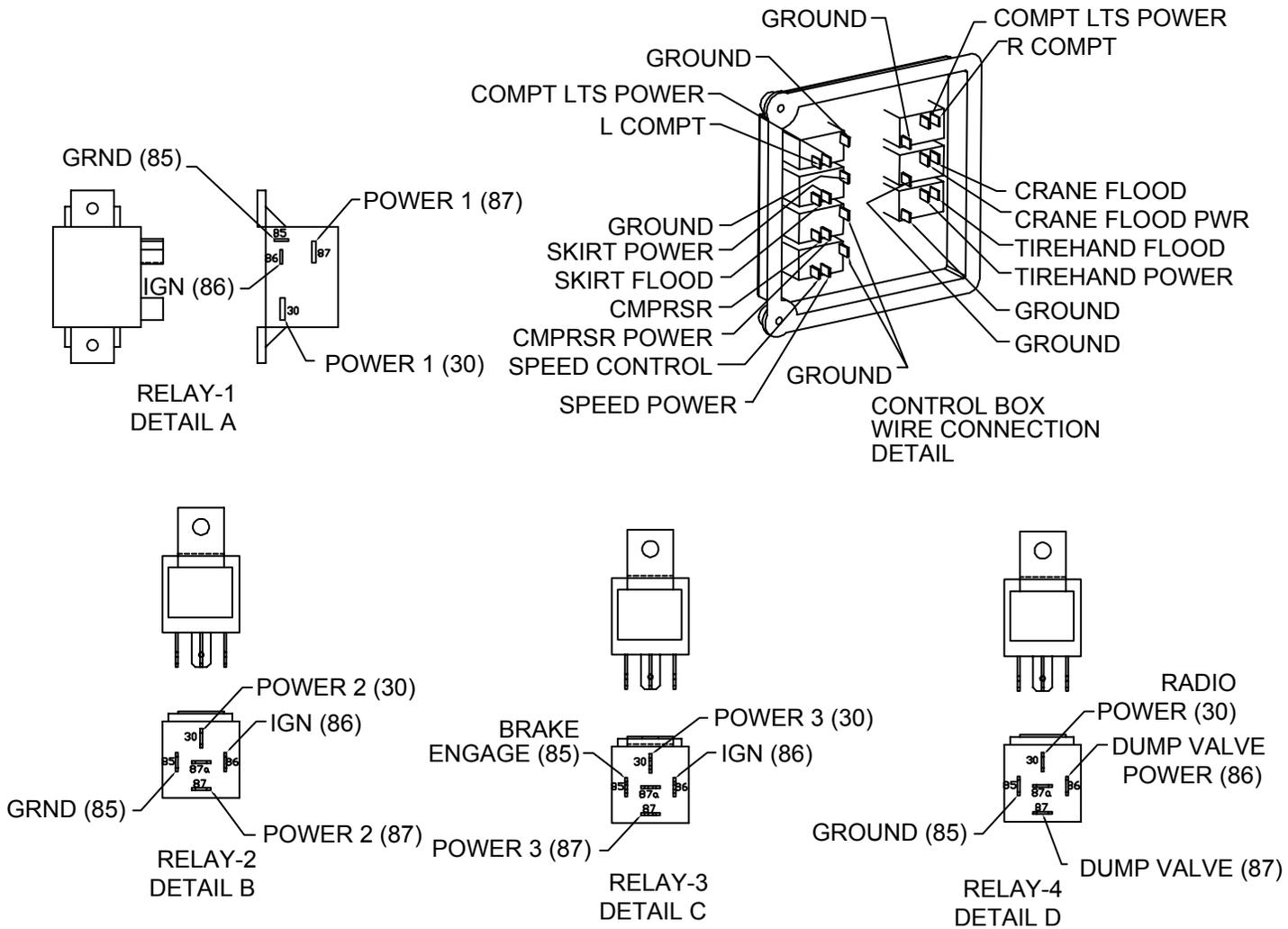
# Electrical Control Box Assembly (41718269-2)



**NOTE:**

1 FOR COMPLETE WIRING CONNECTIONS, SEE WIRING SCHEMATIC.

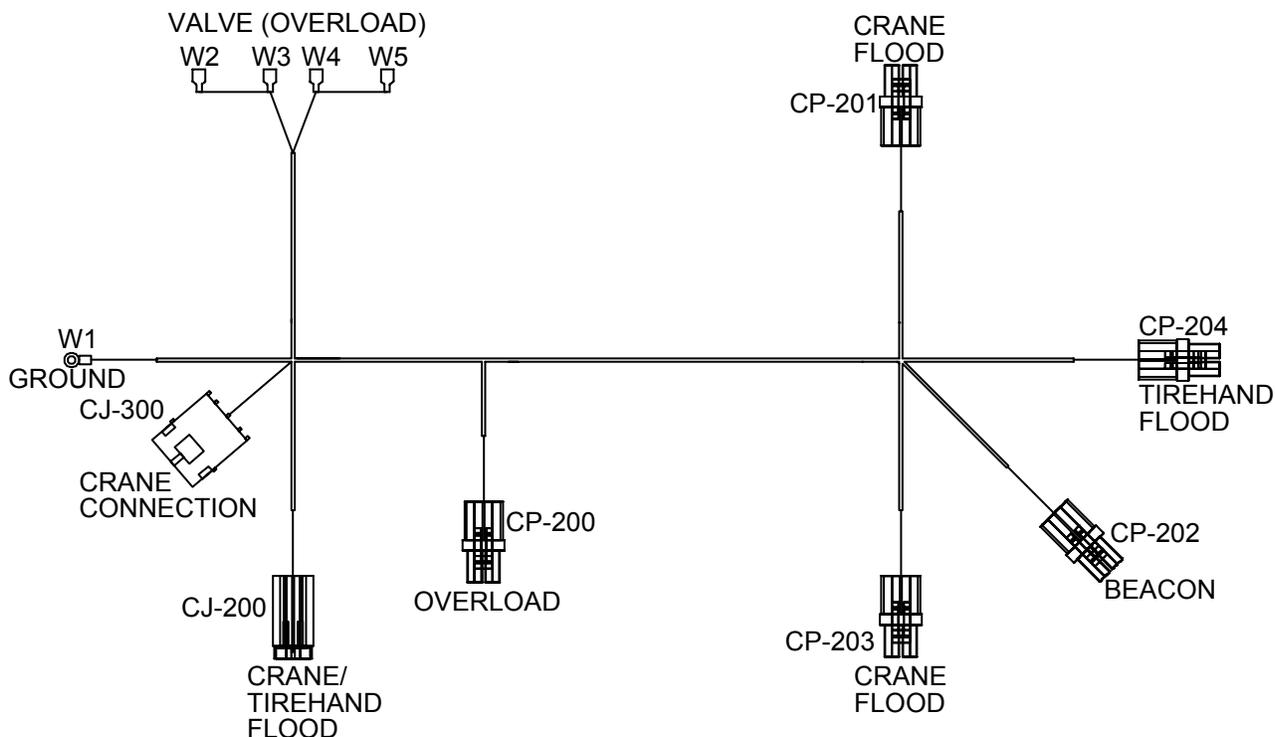
41718269 DRAWING



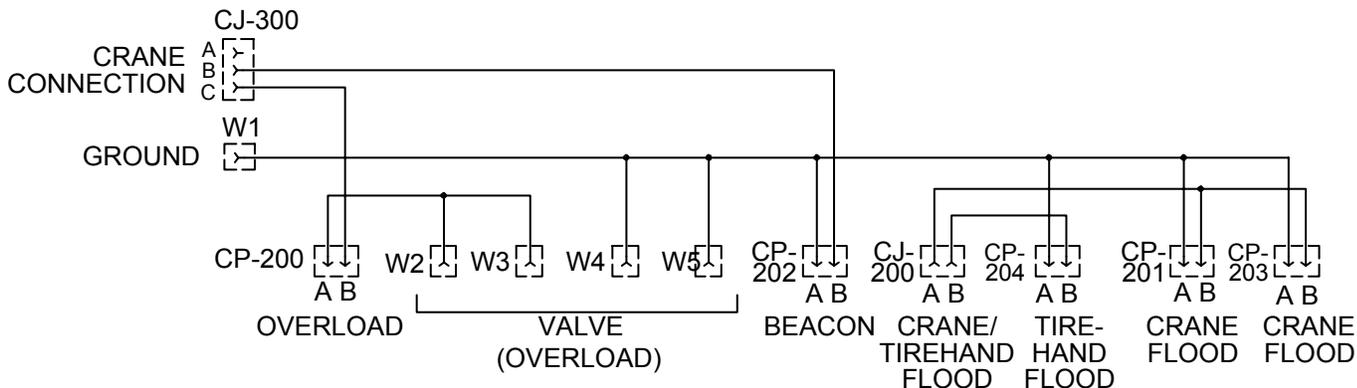
41718269-2 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	77044919	HARNESS, SWITCH BOX OUT	1
2.	77441086	HARNESS, SWITCH BOX IN	1
3.	77441085	HARNESS, CRANE POWER	1
4.	77044935	FUSE/RELAY BOX	1
5.	77044797	SWITCH BOX	1
6.	77041504	SWITCH, ROCKER MTG PAN MID	4
7.	77041502	SWITCH, ROCKER MTG PAN END	4
8.	77041500	SWITCH, ROCKER BODY (12V)	7
	77041672	SWITCH, ROCKER BODY (24V)	7
9.	77041499	SWITCH, ROCKER RED ACT.	7
10.	77041571	SWITCH, ROCKER PLUG	1
11.	77041251	RELAY, 40 AMP (12V)	3
	77041674	RELAY, 20 AMP (24V)	

<b>41718269-2 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
12.	77040391	RELAY, 12V DC 75 AMP (12V)	1
	77040455	RELAY, 24V DC 50 AMP (24V)	1
13.	77044573	CONNECT., PKRD M 2-WAY WP	1
14.	77044552	TERMINAL, MALE 18-20 GA WP	2
15.	70394069	SEAL, CABLE CONNECTOR	2
16.	70395669	DECAL, OTR LIGHT SWITCH	1
17.	76391200	RUBBER GROMMET, 9/16	1

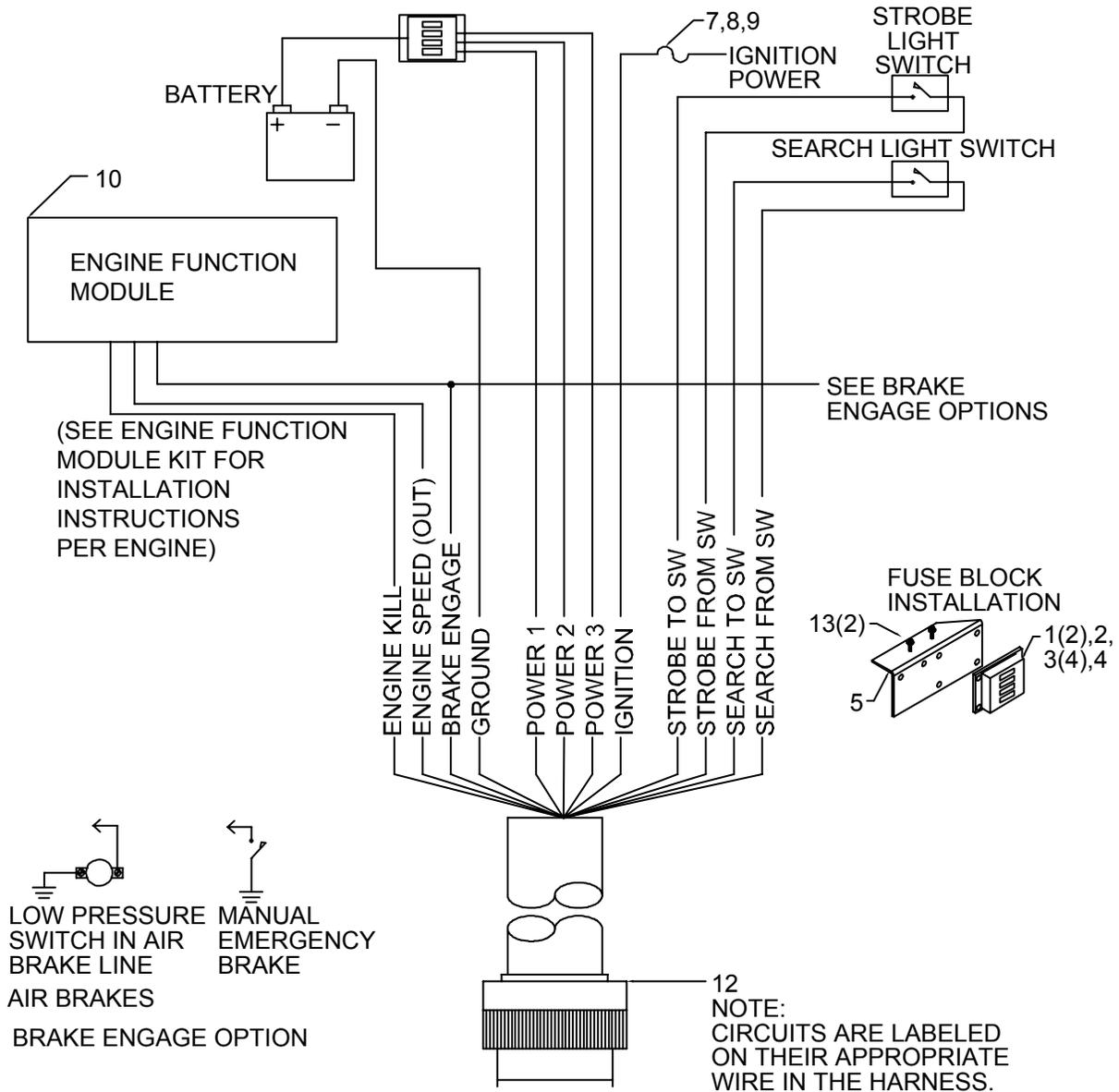
## Harness, Crane Mast/Radio Control, 12V (77441197)



### SCHEMATIC



# Chassis Wiring (99903160)

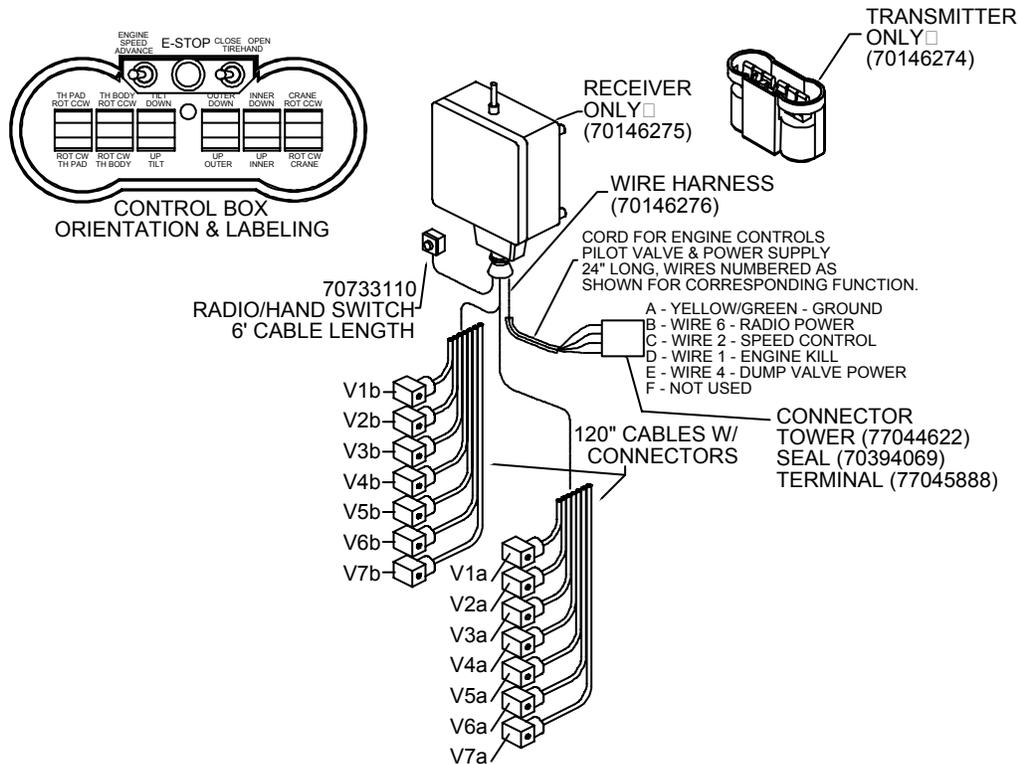


## 99903160 PARTS LIST

ITEM	PART #	DESCRIPTION	QUANTITY
1.	77041616	FUSE-MAXI 40 AMP (12V)	2
	77044635	FUSE-MAXI 20 AMP (24V)	2
2.	77041678	FUSE BLOCK- 4 POSITION	1
3.	72060835	SCREW-SELF-TAP #8-18 X 3/4 HHZ	4
4.	77041619	FUSE-MAXI 60 AMP (12V)	1
	77044635	FUSE-MAXI 30 AMP (24V)	1
5.	60251088	BRKT-RELAY & MAXI FUSE BLK	1

99903160 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
6.	77441110	CABLE POWER RED #6X16	1
7.	77041606	FUSE AGC 7.5	1
8.	77044691	FUSE HOLDER	1
9.	77040048	TERM-BUTT CONN	6
10.	51717388	KIT-EFM (12V ONLY)	1
11.	70145421	HEAT SHRINK (NOT SHOWN)	12"
12.	77044915	HARNESS	1
13.	72061739	SCR-TEK 12-14 X 1.0 HWH (N/S)	2

# Radio Remote Kit - Nova (73733481)

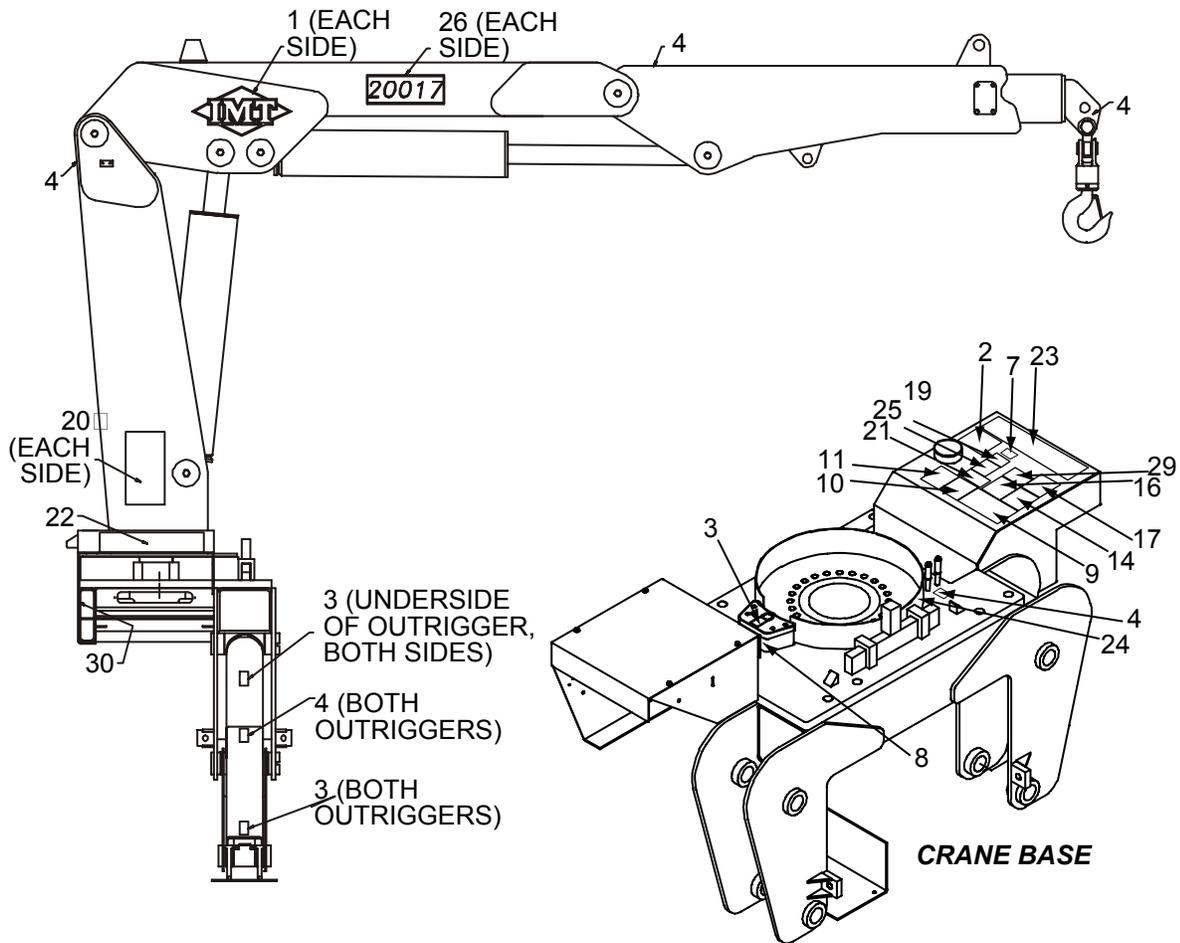


NOTES:	LABEL	CONTROLLED FUNCTION
1) SPARE PARTS - BATTERY CHARGER (70733290) (NOT SHOWN), AND 2 BATTERIES (77042092) (NOT SHOWN).	V1a	TIREHAND CLAMP - OPEN
	V1b	TIREHAND CLAMP - CLOSE
	V2a	TIREHAND PAD ROTATION - CLOCKWISE
	V2b	TIREHAND PAD ROTATION - COUNTER-CLOCKWISE
2) SOLENOID ACTUATOR SPECIFICATIONS: 12VDC OPERATING VOLTAGE; 7.5 OHMS PROPORTIONAL COIL RESISTANCE AT 68° F (20° C); 6.5 OHMS ON-OFF COIL RESISTANCE; PWM, 50 HZ FREQUENCY SIGNAL.	V3a	TIREHAND BODY ROTATION - CLOCKWISE
	V3b	TIREHAND BODY ROTATION - COUNTER-CLOCKWISE
3) TIREHAND CLAMP LOCKOUT IS REQUIRED FOR ACTIVATION OF CLAMP PADDLE. MOMENTARY SWITCH.	V4a	TILT-UP
	V4b	TILT-DOWN
4) THE OVERALL APPEARANCE OF THE TRANSMITTER MAY VARY. SWITCHES AND PADDLES WILL BE LABELED AS SHOWN.	V5a	OUTER CYLINDER EXTEND - UP
	V5b	OUTER CYLINDER RETRACT - DOWN
	V6a	INNER CYLINDER EXTEND - UP
	V6b	INNER CYLINDER RETRACT - DOWN
	V7a	CRANE ROTATION - CLOCKWISE
	V7b	CRANE ROTATION - COUNTER-CLOCKWISE
		* ALL CONNECTORS WILL BE SET-UP AND LABELED AS SHOWN.
	* ALL CABLES ARE 120" LONG.	

To convert 73733890 radio remote control from 12V to 24V, move the harness on the back of the transmitter to the 24V location.

# Miscellaneous

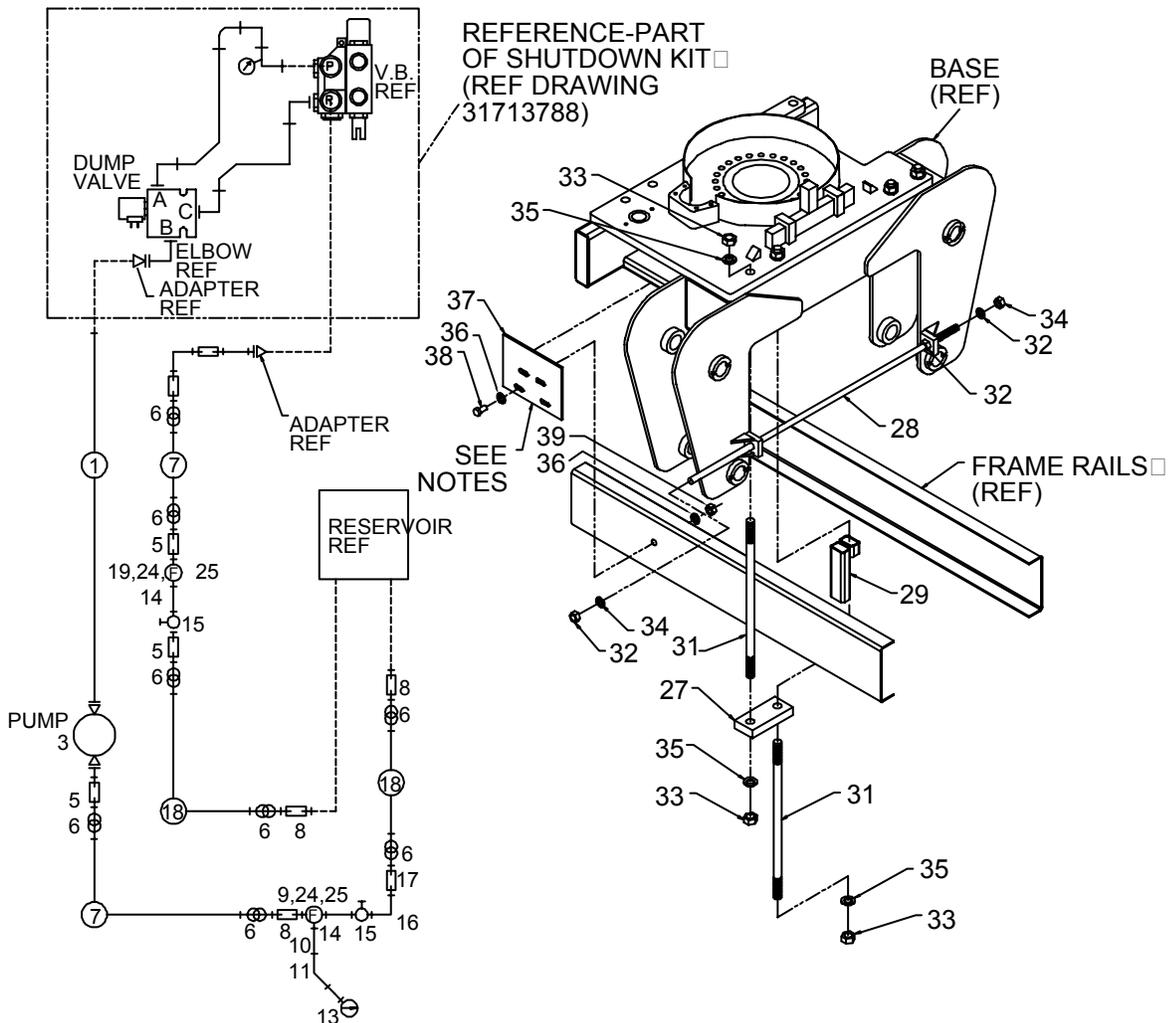
## Decal Kit (95708880)



DECAL PLACEMENT (IF NOT SHOWN IN DRAWINGS)	
ITEM NUMBER	LOCATION
13, 28	ONE ON EACH SIDE OF CARRIER VEHICLE
6	ON RESERVOIR AT RETURN LINE
5	ON RESERVOIR AT SUCTION LINE
12, 15	ONE ON THE UNDERSIDE OF EACH OUTRIGGER NEAR PAD
9, 10, 11, 14, 16, 17, 21, 29	ONE EACH ON THE HOSEREEL CABINET DOOR
31	UNDER SERIAL NUMBER TAG

<b>95700880 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	70029252	PLACARD - IMT DIAMOND	2
3.	70391612	DECAL-GREASE WEEKLY LEFT	5
4.	70391613	DECAL-GREASE WEEKLY RIGHT	6
5.	70392108	DECAL-SUCTION LINE	1
6.	70392109	DECAL-RETURN LINE	1
7.	70392213	DECAL-CAUTION WASH/WAX	1
8.	70392524	DECAL-ROTCRANE/GREASE	1
9.	70392813	DECAL-DANGER ELECTROC'N	2
10.	70392814	DECAL-DANGER OPERATOR	2
11.	70392815	DECAL-DANGER OPERATION	2
12.	70392864	DECAL-DGR OUTR STD CLR	2
13.	70392865	DECAL-DANGER ELECTROC'N	4
14.	70392866	DECAL-DANGER OPER COND	2
15.	70392867	DECAL-DGR OUTR MOVING	2
16.	70392888	DECAL-DGR OPER RESTRICT	2
17.	70392890	DECAL-DGR STOW/UNFOLD	2
18.	70392891	DECAL-DANGER DRIVELINE	2
19.	70392982	DECAL-CONTACT IMT	1
20.	71029374	CAPACITY PLACARD	2
21.	71039134	DECAL-CAUTION OIL LEVEL	2
22.	70394090	DECAL-CTRL SS	1
23.	70394091	DECAL-CTRL CS	1
24.	71392365	DECAL-ALIGN CRANE	1
25.	70394189	DECAL-RECOMMEND HYD OIL	1
26.	70392211	DECAL-IDENTIFICATION	2
28.	70392868	DECAL-DANGER CR LOADLINE	4
29.	70392863	DECAL-DANGER HOIST PERS	2
30.	71393878	DECAL-SELECTOR VALVE	1
31.	70395323	DECAL-ASME/ANSI B30.22	1

# Installation Kit (93704445)



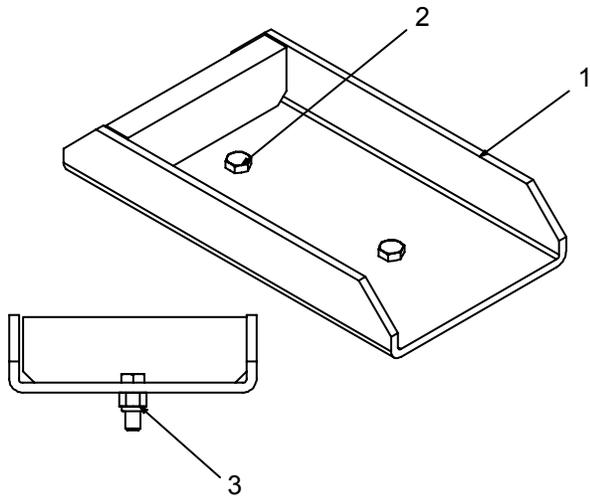
**NOTES:**

- 1 WELD ITEM #37, SHEAR PLATE, TO BASE AS SHOWN WITH A 3/8 BUTT WELD.
- 2 DRILL  $\varnothing 0.812$  HOLES AS REQUIRED TO BOLT ITEM #37 SHEAR PLATE TO FRAME RAILS.
- 3 NOT ALL PARTS ARE SHOWN FOR CLARITY.
- 4 (1) WASHER FOR INSIDE AND (1) WASHER FOR OUTSIDE OF FRAME.

93704445 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51704808	HOSE ASM 3/4 X 72	1
3.		PUMP	REF
5.	72532346	BARB NIPPLE 1-1/4 90°	3
6.	72661642	HOSE CLAMP 1-1/4 (was 72661642)	8
7.	60035829	HOSE 1-1/4 100R4 X 48	2
8.	72531550	BARB NIPPLE 1-1/4	3
9.	73052012	SUCTION FILTER	1

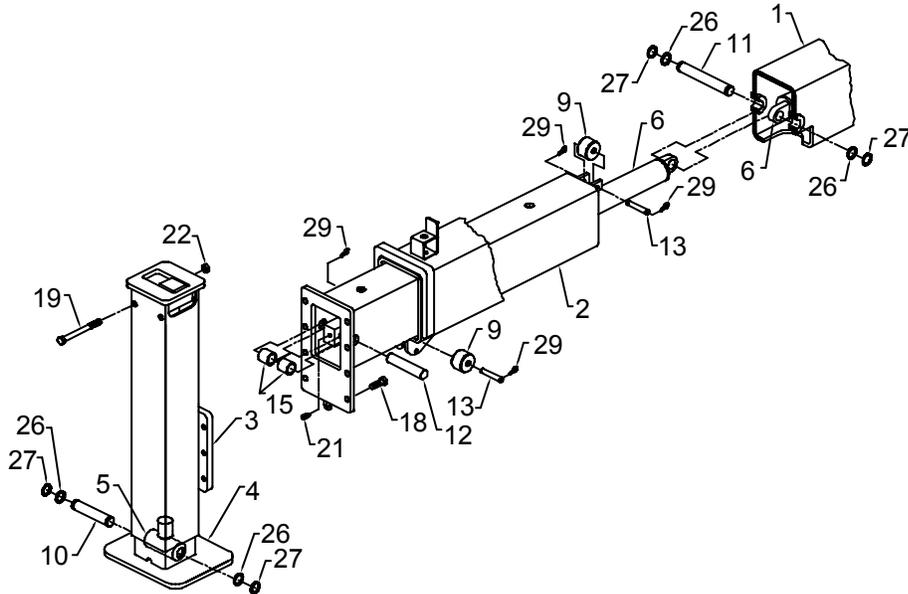
<b>93704445 PARTS LIST</b>			
ITEM	PART #	DESCRIPTION	QUANTITY
10.	72053458	BARB NIPPLE 3/4	1
11.	72053533	ST ELBOW 1/4 90°	1
13.	70048031	VACUUM GAUGE	1
14.	72053211	PIPE NIPPLE 1-1/4XCL	2
15.	73054130	GATE VALVE 1-1/4	1
16.	72053287	ST ELBOW 3/4MPT	1
17.	72531196	BARB NIPPLE 1-1/4 45°	2
18.	60035832	HOSE 1-1/4 100R4 X 38	2
19.	73052091	RETURN FILTER	1
24.	60103870	OIL FILTER BRACKET	2
25.	72060025	CAP SCR 5/16-18 X 1 HH GR5	4
27.	60128960	CLAMP PLATE (WAS 60010665)	4
28.	60103204	TENSION BAR	2
29.	52706660	SUPPORT	4
31.	71014847	TIE-DOWN STUD 1-1/4 X 30	8
32.	72062009	NUT 1-8 HEX	8
33.	72062142	NUT 1-1/4-7 LOCK	16
34.	72063058	WASHER 1" LOCK	4
35.	72063067	WASHER 1-1/4	16
36.	72063119	WASHER 5/8	16
37.	60105107	TIE PLATE	2
38.	72060931	CAP SCR 5/8-11X2-3/4 HHGR8	8
39.	72062091	NUT 5/8-11 LOCK	8

## Saddle Kit (31704684)



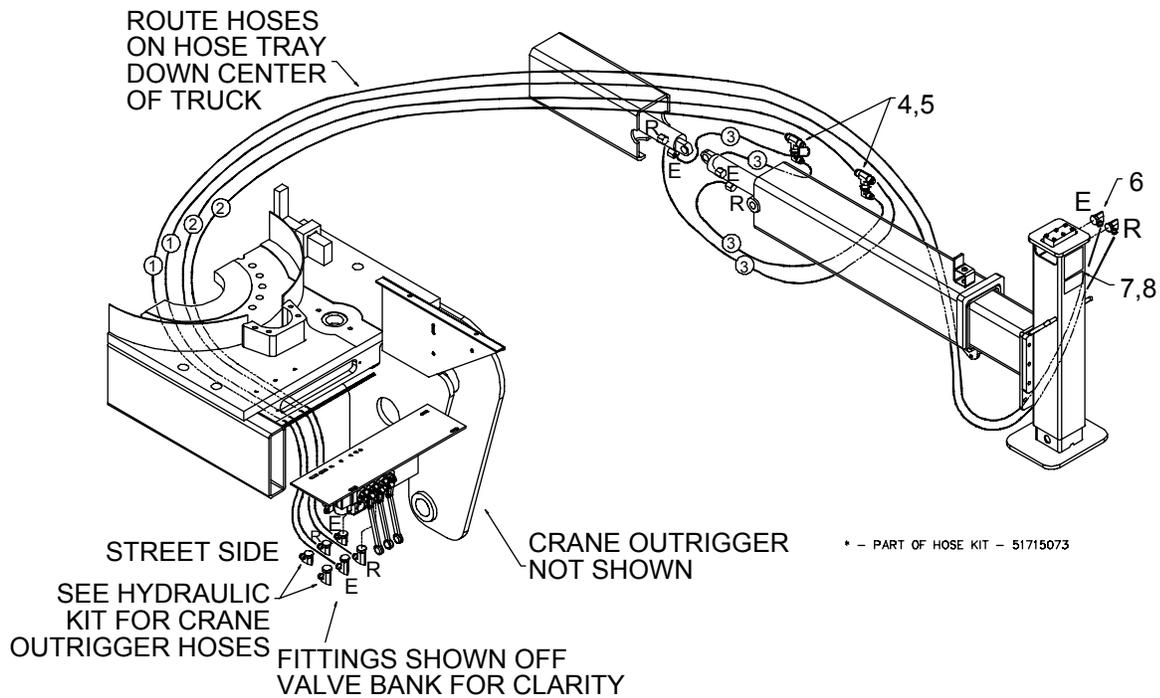
31704684 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	52704685	SADDLE	1
2.	72060093	CAP SCREW .50-13 X 1.5 HHGR5Z	2
3.	72062080	NUT .50-13 HEX NYLOC	2

## Auxiliary Outrigger Kit, PO/PD Radio (31714072-1)



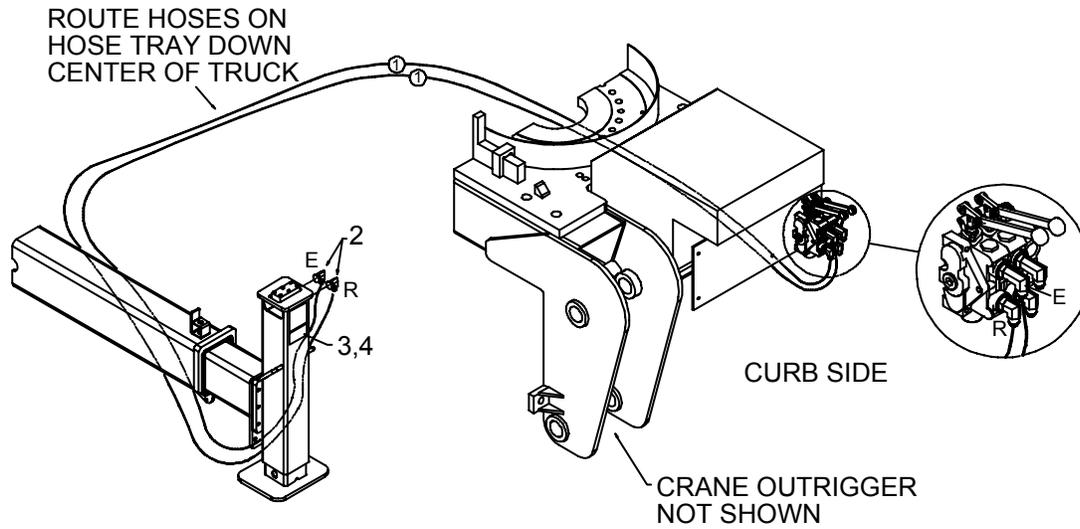
31714072 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	52704109	HOUSING	1
2.	52701065	ARM	2
3.	52710122	SLEEVE	2
4.	52704868	LEG	2
5.	71411891	CYLINDER POWER DOWN	2
6.	3B210522	CYLINDER POWER OUT	2
9.	60030053	ROLLER	4
10.	60106968	PIN	2
11.	60103202	PIN	1
12.	60106281	PIN	2
13.	60106314	PIN	4
15.	60106380	SPACER	4
18.	72060795	CAP SCR 1/2-13X1-1/2 SH	12
19.	72060102	CAP SCR 1/2-13X5-1/2 HH	4
21.	72060581	SET SCR 3/8-16X3/4 SH	2
22.	72062107	NUT 1/2-13 CTR LOCK	4
26.	72063034	BUSHING 1X10GA	6
27.	72066125	RETAINING RING 1" HD	6
28.	71392277	DECAL-OUTRGPO(NOT SHOWN)	2
29.	72066178	COTTER PIN 1/8X1	8
30.	71392257	DECAL-OUTRG PD (NOT SHOWN, CUT IN HALF)	1
64.	60114701	ANGLE-OUTRG MTG RH	2
66.	72060186	CAP SCR 3/4-10X2-1/2	12
67.	72062114	NUT-3/4-10 SELF LOCKING	12

## Auxiliary Outrigger Kit, PO/PD Street Side (31714072-2)



31714072 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51395212	HOSE-FF .38 X 339" OAL (8-8)	2REF
2.	51395157	HOSE-FF .25X287.5" (4-4)	2REF
3.	51395158	HOSE-FF .25 X 14.5 (4-4)	4REF
4.	72532690	ELBOW - MJIC / FJIC SW #4 #4	2
5.	72532768	TEE-MJIC .44-20 .25 TUBE	2
6.	72532779	ELBOW-MSTR/MJIC XLG #6 #8	2
7.	70392864	DECAL-DANGER OUTRIGGER, STAND CLEAR	1
8.	70392867	DECAL-DANGER OUTRGR MOVING	1
9.	51715073	HOSE KIT (INCL 1-3)	REF
REV B 2000			

## Auxiliary Outrigger Kit, PO/PD Curb Side (31714072-3)



31714072-3 PARTS LIST			
ITEM	PART #	DESCRIPTION	QUANTITY
1.	51395213	HOSE-FF .38 X 348 OAL (8-8)	2REF
2.	72532779	ELBOW-MSTR/MJIC XLG #6 #8	2
3.	70392864	DECAL-DANGER O/R STAND CLEAR	1
4.	70392867	DECAL-DANGER O/R (MOVING)	1
5.	51715073	HOSE KIT (INCL. 1)	REF
REV. B 2000			



## CHAPTER 5

# General Reference

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# Inspection Checklist

## NOTICE:

The user of this form is responsible for determining that these inspections satisfy all applicable regulatory requirements.

OWNER/COMPANY:	TYPE OF INSPECTION (circle one):			
CONTACT PERSON:	DAILY	MONTHLY	QUARTERLY	ANNUAL
CRANE MAKE & MODEL:	DATE INSPECTED:			
CRANE SERIAL NUMBER:	HOURMETER READING (if applicable):			
UNIT I.D. NUMBER:	INSPECTED BY (print):			
LOCATION OF UNIT:	SIGNATURE OF INSPECTOR:			

### TYPE OF INSPECTION

#### NOTES:

Daily and monthly inspections are to be performed by a "designated" person, who has been selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

Quarterly and annual inspections are to be performed by a "qualified" person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training and experience has successfully demonstrated the ability to solve or resolve problems related to the subject matter and work.

One hour of normal crane operation assumes 20 complete cycles per hour. If operation exceeds 20 cycles per hour, inspection frequency should be increased accordingly.

Consult Operator / Service Manual for additional inspection items, service bulletins and other information.

Before inspecting and operating crane, crane must be set up away from power lines and leveled with outriggers fully extended.

**DAILY (D):** Before each day of operation, those items designated with a (D) must be inspected. This inspection need not be recorded unless a deficiency (8 ) is found. If the end user chooses to record all daily inspections and those daily inspections include the monthly inspection requirements, there would be no need for a separate monthly inspection.

**MONTHLY (M):** Monthly inspections or 100 hours of normal operation (which ever comes first) includes all daily inspections plus items designated with an (M). This inspection must be recorded.

**QUARTERLY (Q):** Every three to four months or 300 hours of normal operation (which ever comes first) includes all daily and monthly inspection items plus items designated with a (Q). This inspection must be recorded.

**ANNUAL (A):** Each year or 1200 hours of normal operation (which ever comes first) includes all items on this form which encompasses daily, monthly and quarterly inspections plus those items designated by (A). This inspection must be recorded.

**INSPECTION CHECKLIST STATUS KEY:**

S = Satisfactory	R = Recommendation (should be considered for corrective action)
X = Deficient (must be corrected prior to operation)	NA = Not Applicable

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS (S,R,X,NA)
D	1	Labels	All load charts, safety & warning labels, and control labels are present and legible.	
D	2	Crane	Check all safety devices for proper operation.	
D	3	Controls	Control mechanisms for proper operation of all functions, leaks and cracks.	
D	4	Station	Control and operator's station for dirt, contamination by lubricants, and foreign material.	
D	5	Hydraulic System	Hydraulic system (hoses, tubes, fittings) for leakage and proper oil level.	
D	6	Hook	Presence and proper operation of hook safety latches.	
D	7	Rope	Proper reeving of wire rope on sheaves and winch drum.	
D	8	Pins	Proper engagement of all connecting pins and pin retaining devices.	
D	9	General	Overall observation of crane for damaged or missing parts, cracked welds, and presence of safety covers.	
D	10	Operation	During operation, observe crane for abnormal performance, unusual wear (loose pins, wire rope damage, etc.). If observed, discontinue use and determine cause and severity of hazard.	
D	11	Remote Ctrl	Operate remote control devices to check for proper operation.	
D	12	Electrical	Operate all lights, alarms, etc. to check for proper operation.	
D	13	Anti 2-Block	Operate anti 2-block device to check for proper operation.	
D	14		Other (Per customer requirements)	
D	15		Other (Per customer requirements)	
M	16	Daily	All daily inspection items.	
M	17	Cylinders	Visual inspection of cylinders for leakage at rod, fittings, and welds. Damage to rod and case.	
M	18	Valves	Holding valves for proper operation.	
M	19	Valves	Control valves for leaks at fittings and between stations.	
M	20	Valves	Control valve linkages for wear, smoothness of operation, and tightness of fasteners.	
M	21	General	Bent, broken, or significantly rusted/corroded parts.	
M	22	Electrical	Electrical systems for presence of dirt, moisture, and frayed wires.	
M	23	Structure	All structural members for damage.	
M	24	Welds	All welds for breaks and cracks.	
M	25	Pins	All pins for proper installation and condition.	
M	26	Hardware	All bolts, fasteners and retaining rings for tightness, wear and corrosion.	
M	27	Wear Pads	Presence of wear pads.	
M	28	Pump & Motor	Hydraulic pumps and motors for leakage at fittings, seals, and between sections.	
M	29	PTO	Transmission/PTO for leakage, abnormal vibration, and noise.	
M	30	Hyd Fluid	Quality of hydraulic fluid and presence of water.	

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS (S,R,X,NA)
M	31	Hyd Lines	Hoses & tubes for leakage, abrasion damage, blistering, cracking, deterioration, fitting leakage, and secured properly.	
M	32	Hook	Load hook for abnormal throat distance, twist, wear, and cracks.	
M	33	Rope	Condition of load line.	
M	34	Manual	Presence of operator's manual with unit.	
M	35		Other	
Q	36	Daily	All daily inspection items.	
Q	37	Monthly	All monthly inspection items.	
Q	38	Extensions	Condition of wear pads.	
Q	39	Rotation Sys	Rotation bearing for proper torque of all accessible mounting bolts.	
Q	40	Hardware	Base mounting bolts for proper torque.	
Q	41	Structure	All structural members for deformation, cracks and corrosion.	
	42		• Base	
	43		• Outrigger beams and legs	
	44		• Mast	
	45		• Inner Boom	
	46		• Outer Boom	
	47		• Extension(s)	
	48		• Jib boom	
	49		• Jib extension(s)	
	50		• Other	
Q	51	Hardware	Pins, bearing, shafts, gears, rollers, and locking devices for wear, cracks, corrosion and distortion.	
	52		• Rotation bearing(s)	
	53		• Inner boom pivot pin(s) and retainer(s)	
	54		• Outer boom pivot pin(s) and retainer(s)	
	55		• Inner boom cylinder pin(s) and retainer(s)	
	56		• Outer boom cylinder pin(s) and retainer(s)	
	57		• Extension cylinder pin(s) and retainer(s)	
	58		• Jib boom pin(s) and retainer(s)	
	59		• Jib cylinder pin(s) and retainer(s)	
	60		• Jib extension cylinder pin(s) and retainer(s)	
	61		• Boom tip attachment	
	62		• Other	
Q	63	Hyd Lines	Hoses, fittings and tubing for proper routing, leakage, blistering, deformation and excessive abrasion.	
	64		• Pressure line(s) from pump to control valve	
	65		• Return line(s) from control valve to reservoir	
	66		• Suction line(s) from reservoir to pump	
	67		• Pressure line(s) from control valve to each function	
	68		• Load holding valve pipe(s) and hose(s)	
	69		• Other	
Q	70	Pumps, PTO's & Motors	Pumps, PTO's & motors for loose bolts/fasteners, leaks, noise, vibration, loss of performance, heating & excess pressure.	
	71		• Winch motor(s)	
	72		• Rotation motor(s)	
	73		• Other	
Q	74	Valves	Hydraulic valves for cracks, spool return to neutral, sticking spools, proper relief valve setting, relief valve failure.	
	75		• Main control valve	

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS
				(S,R,X,NA)
	76		• Load holding valve(s)	
	77		• Outrigger or auxiliary control valve(s)	
	78		• Other valves (per customer requirements)	
	79		• Other (per customer requirements)	
Q	80	Cylinders	Hydraulic cylinders for drifting, rod seal leakage and leakage at welds. Rods for nicks, scores and dents. Case for damage. Case and rod ends for damage and abnormal wear.	
	81		• Outrigger cylinder(s)	
	82		• Inner boom cylinder(s)	
	83		• Outer boom cylinder(s)	
	84		• Extension cylinder(s)	
	85		• Rotation cylinder(s)	
	86		• Jib lift cylinder(s)	
	87		• Jib extension cylinder(s)	
	88		• Other (per customer requirements)	
Q	89	Winch	Winch, sheaves and drums for damage, abnormal wear, abrasions and other irregularities.	
Q	90	Hyd Filters	Hydraulic filters for replacement per maintenance schedule.	
A	91	Daily	All daily inspection items.	
A	92	Monthly	All monthly inspection items.	
A	93	Quarterly	All quarterly inspection items.	
A	94	Hyd Sys	Hydraulic fluid change per maintenance schedule.	
A	95	Controls	Control valve calibration for correct pressure & relief valve settings.	
A	96	Valves	Safety valve calibration for correct pressure & relief valve settings.	
A	97	Valves	Valves for failure to maintain correct settings.	
A	98	Rotation Sys	Rotation drive system for proper backlash clearance & abnormal wear, deformation and cracks.	
A	99	Lubrication	Gear oil change in rotation drive system per maintenance schedule.	
A	100	Hardware	Check tightness of all fasteners and bolts, using torque specifications on component drawings or torque chart.	
A	101	Wear Pads	Wear pads for excessive wear.	
A	102	Loadline	Loadline for proper attachment to drum.	

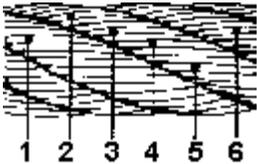




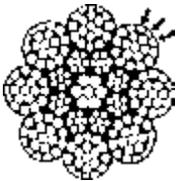
# Wire Rope Inspection & Replacement

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

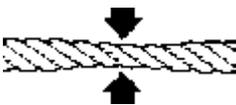
- a Corrosion can be cause for replacement. Any development of corrosion must be noted and monitored closely.
- b When there are either three broken wires in one strand or a total of six broken wires in all strands in any one rope lay.



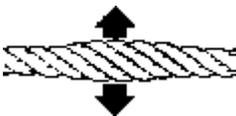
- c When flat spots on the outer wires appear and those outside wires are less than 2/3 the thickness of the unworn outer wire.



- 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" (0.8 mm) or more.



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



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## 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).

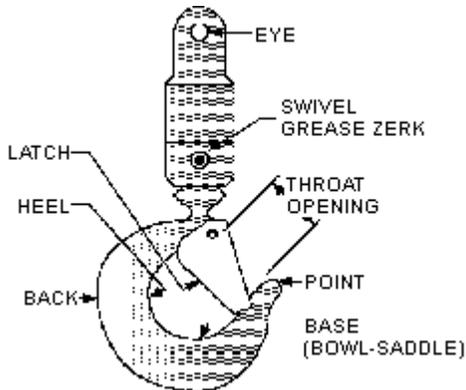
### d LATCH

#### 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 wired closed (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).



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## 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.

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## Anti-Two-Block Device Inspection

(See the operation, maintenance, and repair manual for this crane 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.
- 4** 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.
- 5** If the anti-two-block function appears to be functioning normally, winch the cable down until the sensing weight swings free.

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## Thread Torques

### WARNING

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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.

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When using the torque data in the torque charts, 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.

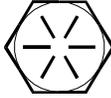
## FINE THREAD TORQUE CHART (ENGLISH)

TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 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	0.375	35	26	49	35
7/16-20	0.4375	55	41	78	58
1/2-20	0.5	90	64	120	90
9/16-18	0.5625	120	90	170	130
5/8-18	0.625	170	130	240	180
3/4-16	0.75	300	225	420	315
7/8-11	0.875	445	325	670	500
1-12	1	645	485	995	745
1 1/8-12	1.125	890	670	1445	1085
1 1/4-12	1.25	1240	930	2010	1510
1 3/8-12	1.375	1675	1255	2710	2035
1 1/2-12	1.5	2195	1645	3560	2670

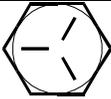
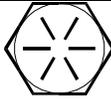
## COARSE THREAD TORQUE CHART (ENGLISH)

TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 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	0.375	31	23	44	33
7/16-14	0.4375	49	37	70	52
1/2-13	0.5	75	57	105	80
9/16-12	0.5625	110	82	155	115
5/8-11	0.625	150	115	220	160
3/4-10	0.75	265	200	375	280
7/8-9	0.875	395	295	605	455
1-8	1	590	445	910	680
1 1/8-7	1.125	795	595	1290	965
1 1/4-7	1.25	1120	840	1815	1360
1 3/8-6	1.375	1470	1100	2380	1780
1 1/2-6	1.5	1950	1460	3160	2370

## FINE THREAD TORQUE CHART (METRIC)

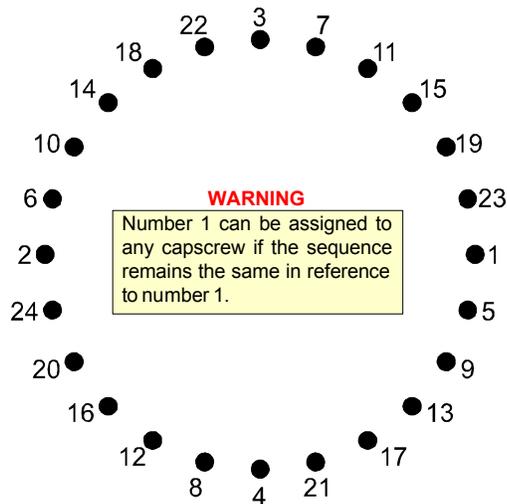
TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 SAE J429 GRADE 5		 SAE J429 GRADE 8	
		PLAIN (KG-M)	PLATED (KG-M)	PLAIN (KG-M)	PLATED (KG-M)
5/16-24	0.3125	3	2	4	3
3/8-24	0.375	5	4	7	5
7/16-20	0.4375	8	6	11	8
1/2-20	0.5	12	9	17	12
9/16-18	0.5625	17	12	24	18
5/8-18	0.625	24	18	33	25
3/4-16	0.75	41	31	58	44
7/8-11	0.875	62	45	93	69
1-12	1	89	67	138	103
1 1/8-12	1.125	123	93	200	150
1 1/4-12	1.25	171	129	278	209
1 3/8-12	1.375	232	174	375	281
1 1/2-12	1.5	304	228	492	369

## COARSE THREAD TORQUE CHART (METRIC)

TIGHTENING TORQUE					
SIZE (DIA-TPI)	BOLT DIA. (INCHES)	 SAE J429 GRADE 5		 SAE J429 GRADE 8	
		PLAIN (KG-M)	PLATED (KG-M)	PLAIN (KG-M)	PLATED (KG-M)
5/16-18	0.3125	2	2	3	2
3/8-16	0.375	4	3	6	5
7/16-14	0.4375	7	5	10	7
1/2-13	0.5	10	8	15	11
9/16-12	0.5625	15	11	21	16
5/8-11	0.625	21	16	30	22
3/4-10	0.75	37	28	52	39
7/8-9	0.875	55	41	84	63
1-8	1	82	62	126	94
1 1/8-7	1.125	110	82	178	133
1 1/4-7	1.25	155	116	251	188
1 3/8-6	1.375	203	152	329	246
1 1/2-6	1.5	270	210	438	328

## Turtable Bearing Thread Tightening Sequence

Refer to the turntable bearing thread tightening 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 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:  $.40 \times 265 \text{ FT-LB} = 106 \text{ FT-LB}$ )  
 (EXAMPLE-METRIC:  $.40 \times 36 \text{ KG-M} = 14.4 \text{ KG-M}$ )
- 4 Repeat Step 3, but torquing all capscrews to 75% of the specified torque value. Continue to follow the tightening sequence.  
 (EXAMPLE:  $.75 \times 265 \text{ FT-LB} = 199 \text{ FT-LB}$ )  
 (EXAMPLE-METRIC:  $.75 \times 36 \text{ KG-M} = 27 \text{ KG-M}$ )
- 5 Using the proper sequence, torque all capscrews to the listed torque value as determined from the Torque Data Chart.

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## Turtable Bearing Inspection for Replacement

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.

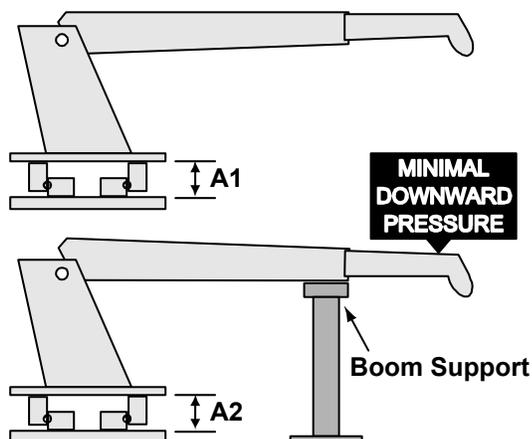
If none of the listed conditions exists, the bearing is functioning properly and need not be replaced. But, if one or more of the above conditions exists, inspection may be required. Limits are measured in "TILT" which is dependent on the internal clearances of the bearing. TILT is the most practical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

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## Turtable Bearing Tilt Test

- 1 With the crane horizontal and fully extended, measure between the top and bottom mounting surfaces of the turntable bearing (A1), using a dial indicator for accuracy.
- 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 A2.
- 3 Subtract A1 from A2 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, Loader or Tirehand Model	1007	5200	16000	9800
	1014	5200R	32018	12916
	1014A	5217	32027	13031
	1015	5800	32030	13034
	2015/2020	7020	T30	14000
	2109	7025	T40	15000
	3000	7200		18000
	3816/3820	7415		20017
	3016/3020	9000		8000L
	421/425	TH10 BODY		H1200
	4300	ROT'N		H1200RR
	5016/5020	TH14 BODY		T50
	6016/6020	ROT'N		TH2551B BODY
	TH7 BODY ROT'N			ROT'N
	TH1449 BODY			TH2557B BODY
	ROT'N			ROT'N
	TH15B CLAMP			TH2557A BODY
TH2551B CLAMP			ROT'N	
TH2557A CLAMP				
Ball Dia. (Ref)	.875" (22 mm)	1.00" (25 mm)	1.18 - 1.25" (30-32 mm)	1.75" (44 mm)
Tilt Dim. (A-A)	.060" (1.524 mm)	.070" (1.778 mm)	.075" (1.905 mm)	.090" (2.286 mm)