0000EZH2:99901215: 20020606

CRANE PARTS MANUAL

E-Z HAULER SERIES 2

Crane manufactured exclusively for
S.D.P. MANUFACTURING, INC.
by
IOWA MOLD TOOLING CO., INC.

S. D. P. Manufacturing, Inc.
537 W. Walnut - PO Box 44
Albany, IN 47320
TEL: 765-789-6213
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MANUAL PART NUMBER 99901215

REVISIONS LIST

DATE	LOCATION	DESCRIPTION OF CHANGE
-	-	-
		ECN#8698
20010720	2-6	- REPLACED DRAWING 41714914 WITH 41716736
	2-8	DRAWING REVISED, DELETED #'S 2 (70580119), 4(60119011), AND 5(70145201)
	2-10	DRAWING REVISED, ADDED #6(72532657) AND 9(72533720) REVISED #'S 19 (29 WAS 27), 20 (WAS 51394248, 30 WAS 26), 21 (QTY WAS 1), 22 (QTY WAS 1),
	2-12	DRAWING REVISED
	2-13	#1 - 51716729 WAS 51715039, DRAWING REVISED
	2-14	DRAWING REVISED
	2-15	DRAWING REVISED - DELETED #1 (77040280), #4 WAS 77040281, #6 QTY WAS 24", #10 QTY WAS 12"
	2-19	REPLACED DRAWING 51715039 WITH 51716729
20011107	2-6,13,14,15,19	ECN 8796 - LIGHT KIT CONNECTIONS, REVISED 3RD EXTENSION BOOM EAR.
20011120	2-15	ADDED ITEM 7 - 77044574
20011204	2-13	BOM CHANGE ON 90714916-1
20020416	1-3,4; 2-5, 8, 9,11,12, 14, 16, 19-21	ECN 8898 - ADDED 2H OPTION
20020530	2-8,11	ECN 8918 - REVS TO 41717166 EXT BOOM ASM, 3B290010 CYLINDER
20020606	1-5,6	ADDED SPARE PARTS LIST TO MANUAL

INTRODUCTION

This manual is provided to assist you with ordering parts for your crane. It also contains additional information which will be useful to you in maintaining this equipment.

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

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

In addition, it is also the user's responsibility to be aware of existing Federal, State and Local codes and regulations governing the safe use and maintenance of this unit.

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

NOTE

A NOTE IS USED TO EITHER CONVEY ADDITIONAL INFORMATION OR TO PROVIDE FURTHER EMPHASIS FOR A PREVIOUS POINT.

CAUTION

A CAUTION IS USED WHEN THERE IS THE VERY STRONG POSSIBILITY OF DAMAGE TO THE EQUIPMENT OR PREMATURE EQUIPMENT FAILURE.

WARNING

A WARNING IS USED WHEN THERE IS THE POTENTIAL FOR PERSONAL INJURY OR DEATH.

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

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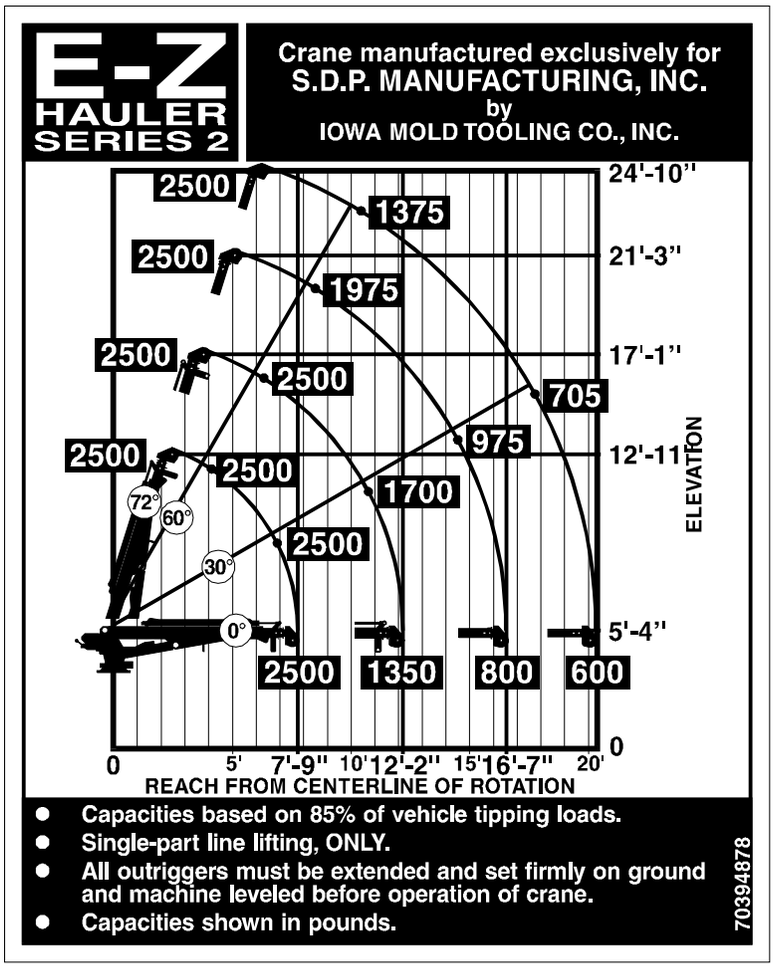
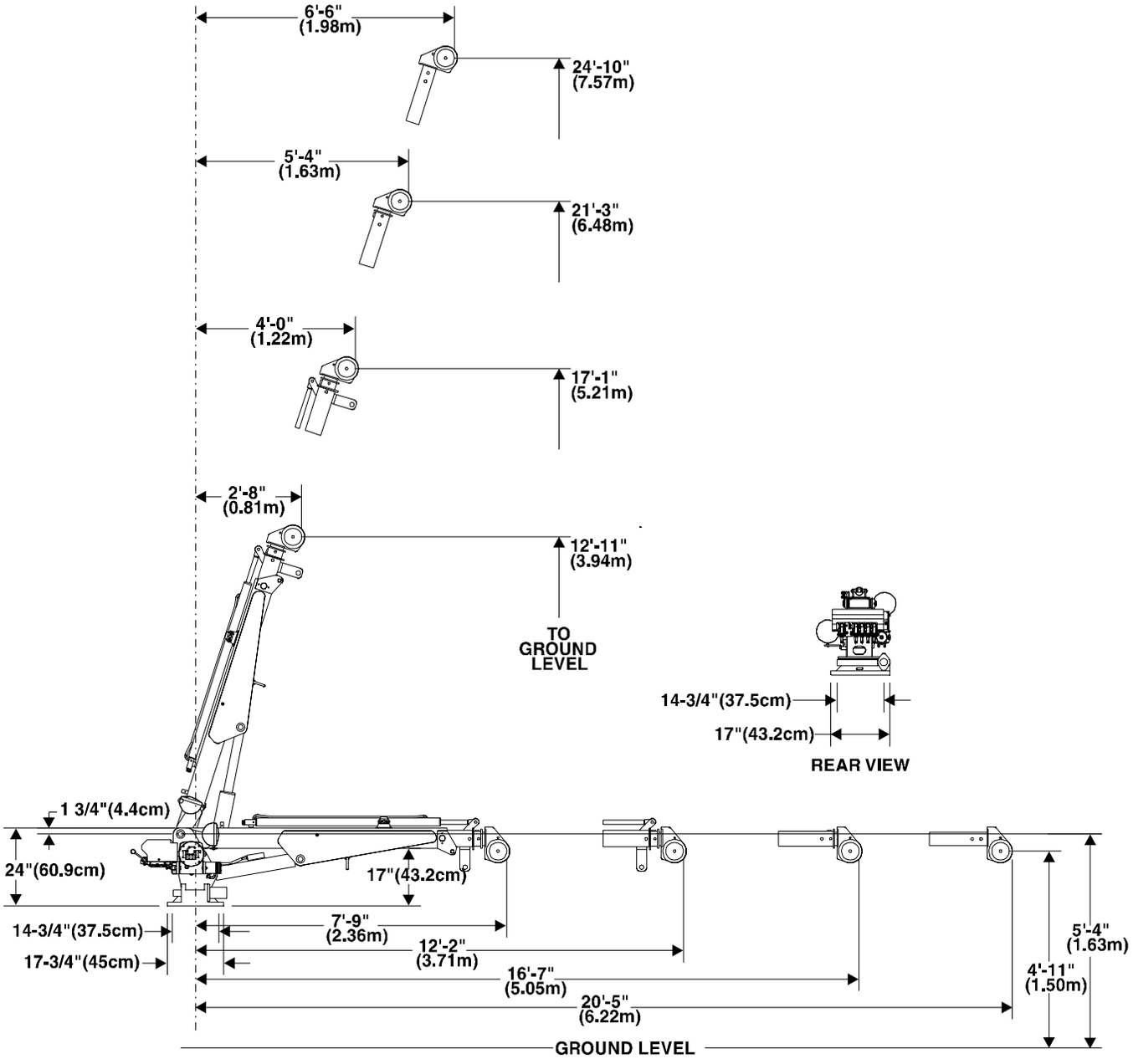
SECTION 1. SPECIFICATIONS



CAPACITY CHART

GEOMETRIC CONFIGURATION



SPECIFICATIONS - EZ HAULER II

DESCRIPTION	MODEL 2H
CRANE RATING	19,375 ft-lb
REACH (From centerline of rotation)	20’-2”
HYDRAULIC EXTENSIONS (2)	53.0” and 53.0”
MANUAL EXTENSION	44.6”
LIFTING HEIGHT FROM BASE OF CRANE	24’-11”
WEIGHT OF CRANE	1070#
MOUNTING SPACE REQUIRED (crane base)	17” X 17.75”
TIE-DOWN BOLT PATTERN	14.75” X 14.75” on center

PERFORMANCE CHARACTERISTICS

ROTATION	400 degrees	48 seconds
LOWER BOOM ELEVATION	0-72 degrees	13 sec. extension, 9 sec. retraction
EXTENSION BOOMS (total time)	53.0” + 51.75”	25 sec. extension, 19 sec retraction

CYLINDERS	BORE	STROKE
LOWER BOOM CYLINDER	3.5”	18.0”
FIRST EXTENSION CYLINDER	2.5”	53.0”
SECOND EXTENSION CYLINDER	2.0”	51.75”

ROTATION SYSTEM

Turntable bearing with an external worm gear powered by a high-torque hydraulic motor through a self-locking worm.

CYLINDER HOLDING VALVES

The base ends (extend sides) of the lower boom and extension cylinders are equipped with integral-mounted counter-balance valves to prevent sudden cylinder collapse in the event of a hose breakage or other hydraulic component failure.

The counter-balance valve on the lower cylinder 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 excessive amount of oil in the event of a hose failure.

EXCESSIVE LOAD LIMITING SYSTEM (ELLS)

Overloading of the crane is limited by the ELLS. This is done by disarming the crane functions that can produce overload. Functions controlled by the ELLS are winch up, extension out and lower boom down. To relieve the overload, the operator may set the load down (winch down) or retract the extension booms (extension in).

WINCH

The winch is powered by a hydraulic motor through a 38:1 worm gear with a mechanical brake. Only single line is permitted. Maximum single line capacity is 2500 lbs. The winch is equipped with 3/8” diameter synthetic fiber rope.

HYDRAULIC SYSTEM

The five section crane valve bank is operated by a radio remote control with manual handles for a back-up system.

Manual levers are provided for operating the carrier.

RECOMMENDED SPARE PARTS LIST

1 YEAR SUPPLY
EZ-HAULER 2 CRANE

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 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	PART NUMBER	DESCRIPTION	QUANTITY	CODE
41704555 BASE ASM - 2015/2109				
(Models 1H 1M and 2H)	60030116	THRUST BEARING	1	W
	70055147	BEARING	1	W
	70055148	BEARING	1	W
	70056307	WORM GEAR	1	W
	72062162	NUT	15	W
	72063117	WASHER	15	W
	72601313	CAP SCREW	15	W
	89086159	MOLUB-ALLOY		
41714915 MAST ASSEMBLY				
(Models 1H 1M and 2H)	72063117	WASHER	12	W
	72601144	CAP SCREW	12	W
41714912 LOWER BOOM ASSEMBLY				
(Model 1H 1M)	7BF81215	BUSHING	4	W
	60030007	WEAR PAD	2	W
	60030083	WEAR PAD	1	W
41717168 LOWER BOOM ASSEMBLY				
(Model 2H)	60123770	WEAR PAD	1	W
	60123777	WEAR PAD	2	W
	60123794	ROLLER	1	W
3B144820 LOWER BOOM CYLINDER				
(Models 1H 1M and 2H)	7BF81015	BUSHING	4	W
	73054304	VALVE 10 GPM	1	C
	7BF81215	BUSHING	2	W
	9C141420	SEAL KIT	1	W
41714914 EXTENSION BOOM ASSEMBLY				
(Model 1H 1M)	60030081	WEAR PAD	1	W
41717166 EXTENSION BOOM ASSEMBLY				
(Model 2H)	60124348	WEAR PAD	1	W
	60123768	WEAR PAD	2	W
	60123769	WEAR PAD	2	W
	60123795	SLIDER	1	W
3B278940 EXTENSION CYLINDER				
(Model 1H 1M)	73054304	C'BAL VALVE 10GPM	1	W
	9B081012	SEAL KIT	1	W

RECOMMENDED SPARE PARTS LIST, CONTINUED

ASSEMBLY DESIGNATION	PART NUMBER	DESCRIPTION	QUANTITY	CODE
3B290010 FIRST STAGE EXTENSION CYLINDER				
(Model 2H)	6HD25015	HEAD	1	W
	6ID25125	PISTON	1	W
	73054304	CBAL VALVE	1	W
	9D101220	SEAL KIT	1	W
3B291010 SECOND STAGE EXTENSION CYLINDER				
(Model 2H)	6HD20012	HEAD	1	W
	6ID20075	PISTON	1	W
	9D081012	SEAL KIT	1	W
41714913 (Model 1H 1M) and 41717183 (Model 2H) WINCH/HOOK KIT				
	70732870	HOOK	1	W
	70055142	BEARING	1	W
31714910 LIGHT KIT				
(Models 1H 1M and 2H)	77040281	FLOODLIGHT 12V	2	W

SECTION 2. PARTS LIST

2-1. GENERAL

This section contains the exploded parts drawings and accompanying parts lists for the assemblies used on the crane.

WARNING

PAY PARTICULAR ATTENTION TO STATEMENTS MARKED WARNING, CAUTION, OR NOTE. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO THE EQUIPMENT, PERSONAL INJURY, OR DEATH.

2-2. CRANE IDENTIFICATION

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

S. D. P. Manufacturing, Inc.
537 W. Walnut - PO Box 44
Albany, IN 47320
Telephone: 765-789-6213
FAX: 765-789-6253

2-3. CYLINDER IDENTIFICATION

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

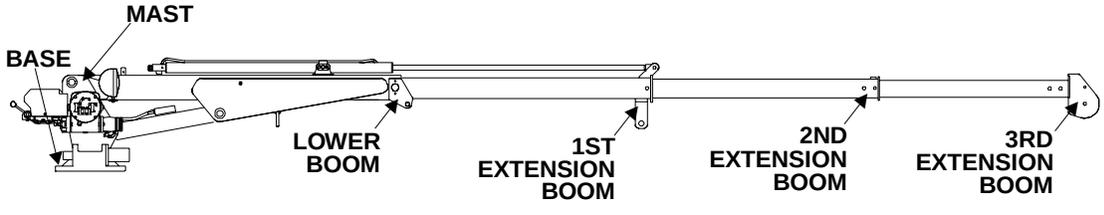
2-4. WELDMENT IDENTIFICATION

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

2-5. ORDERING REPAIR PARTS

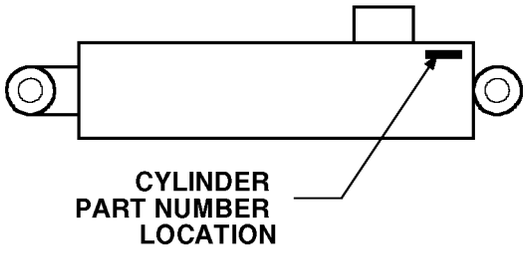
When ordering replacement parts it is important to follow the steps as outlined below.

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



WELDMENT PART NUMBER LOCATIONS

SERIAL NUMBER PLACARD



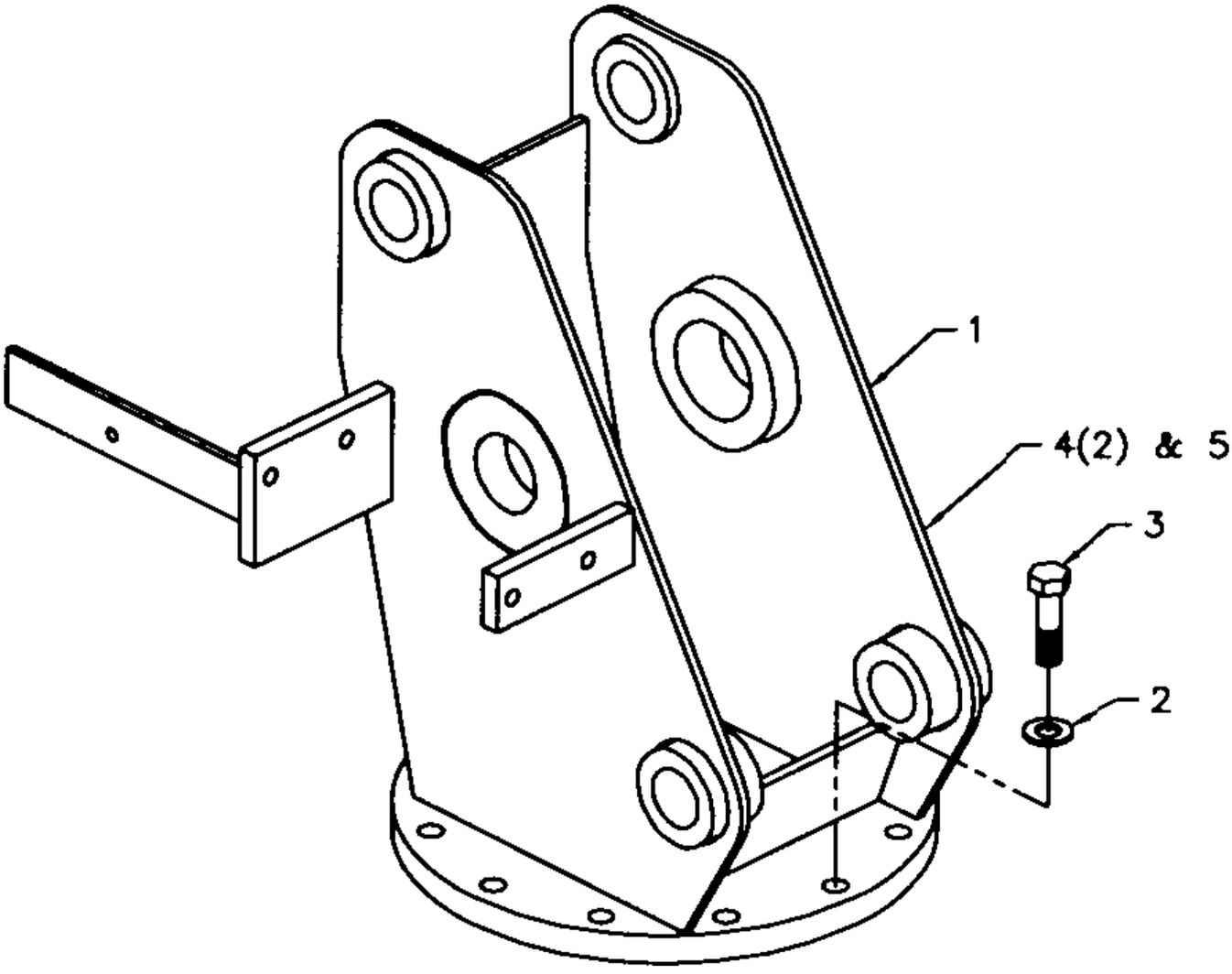
CYLINDER PART NUMBER LOCATION

MAST ASM (41714915)

ITEM	PART NO.	DESCRIPTION	QTY
1.	52714736	MAST	1
2.	72063117	WASHER 9/16 FLAT HARD	12
3.	72601144	CAP SCR 9/16-12X2 HHGR8	12
4.	72066340	POP RIVET AL 1/8X3/8 GRIP	2
5.	70394879	DECAL-SERIAL NO EZ-HAUL	1

WARNING

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



BASE ASM (41704555)

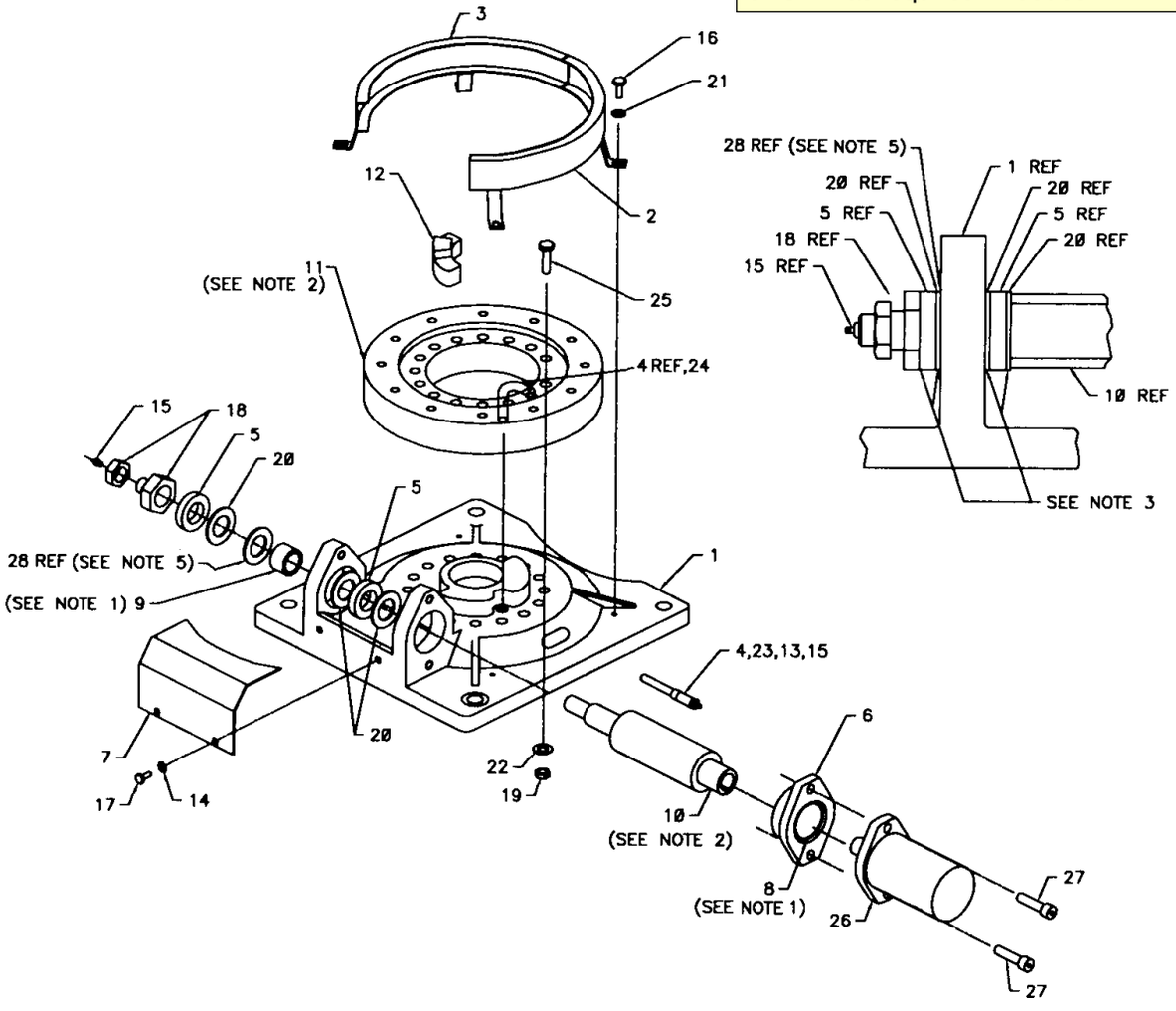
ITEM	PART NO.	DESCRIPTION	QTY
1.	51704551	BASE	1
2.	52713750	TURNTABLE GUARD-LH	1
3.	52713751	TURNTABLE GUARD-RH	1
4.	60030086	TUBING	1
5.	60030116	THRUST BEARING	2
6.	60107543	SUPPORT PLATE	1
7.	60107617	COVER	1
8.	70055147	BEARING	1
9.	70055148	BEARING	1
10.	70056307	WORM GEAR	1
11.	71056308	TURNTABLE-BEARING	1
12.	71142535	SLIDE	1
13.	72053301	COUPLING 1/8NPT	1
14.	72063050	WASHER 5/16 LOCK	2
15.	72053508	ZERK 1/8NPT	2
16.	72060000	CAP SCR 1/4-20X1/2 HHGR5	4
17.	72060023	CAP SCR 5/16-18X3/4 HHGR5	2
18.	72062251	NUT 7/8-9 LOCK 2-PC GR8	1
19.	72062162	NUT 9/16-12 HEX GR8	15
20.	72063161	WASHER 1-1/8	3
21.	72063049	WASHER 1/4 LOCK	4
22.	72063117	WASHER 9/16 FLAT GR8	15
22.	72531731	ADAPTER 18MPT 1/4TUBE	1
24.	72531746	ADAPTER 1/8MPT 1/4TUBE 90°	1
25.	72601313	CAP SCR 9/16-12X3-1/2 HHGR8	15
26.	73051482	HYDRAULIC MOTOR	1
27.	72601486	CAP SCR 1/2-13X1-3/4 SH	2
28.	60121433	SHIM 2.25X1.81X16GA	REF

WARNING

Any time the gear-bearing bolts have been removed, they must be replaced with new bolts of identical grade and size. Failure to replace gear-bearing bolts may result in bolt failure due to metal fatigue causing serious injury or death.

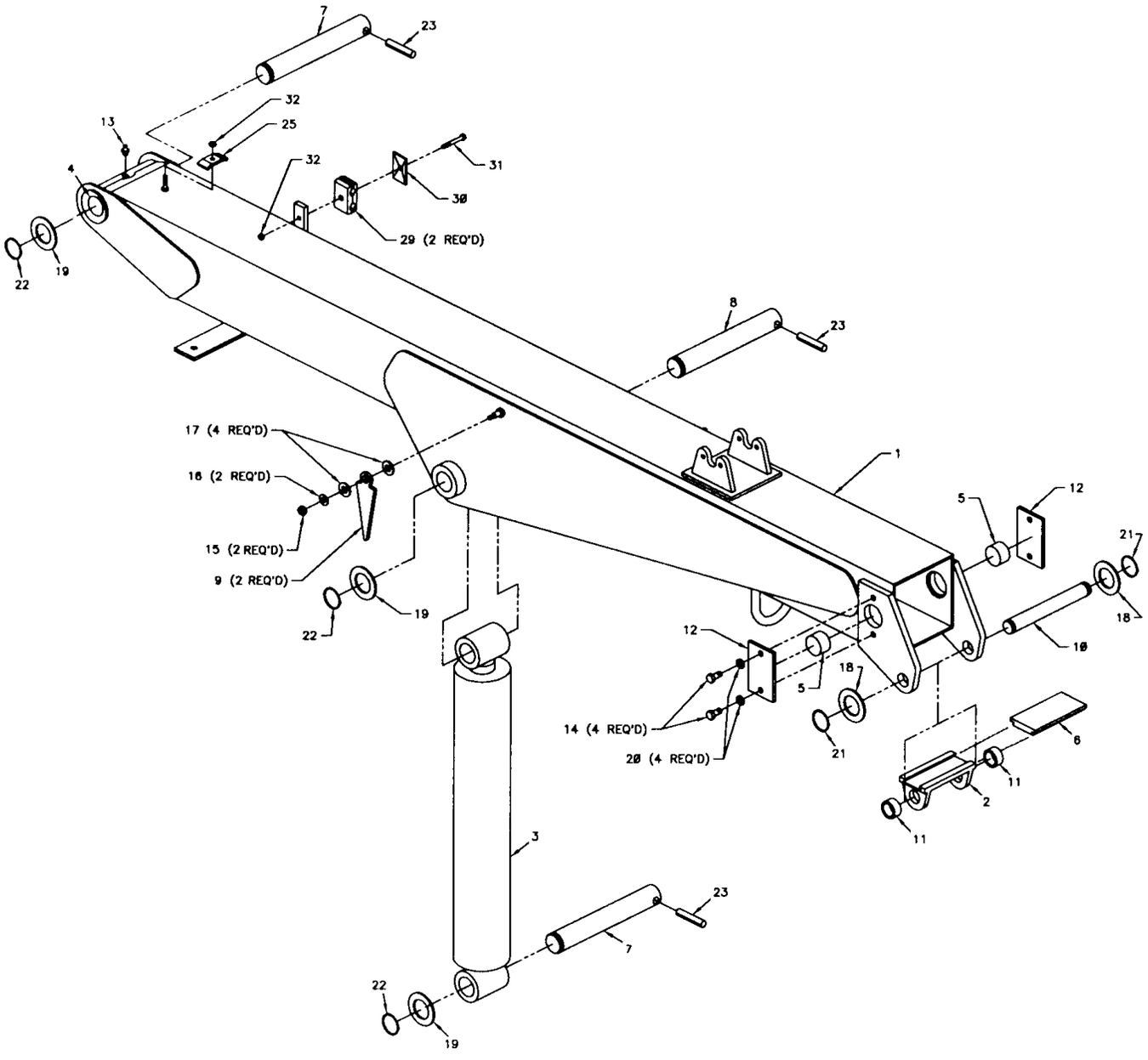
NOTE

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



LOWER BOOM ASM (41714912)

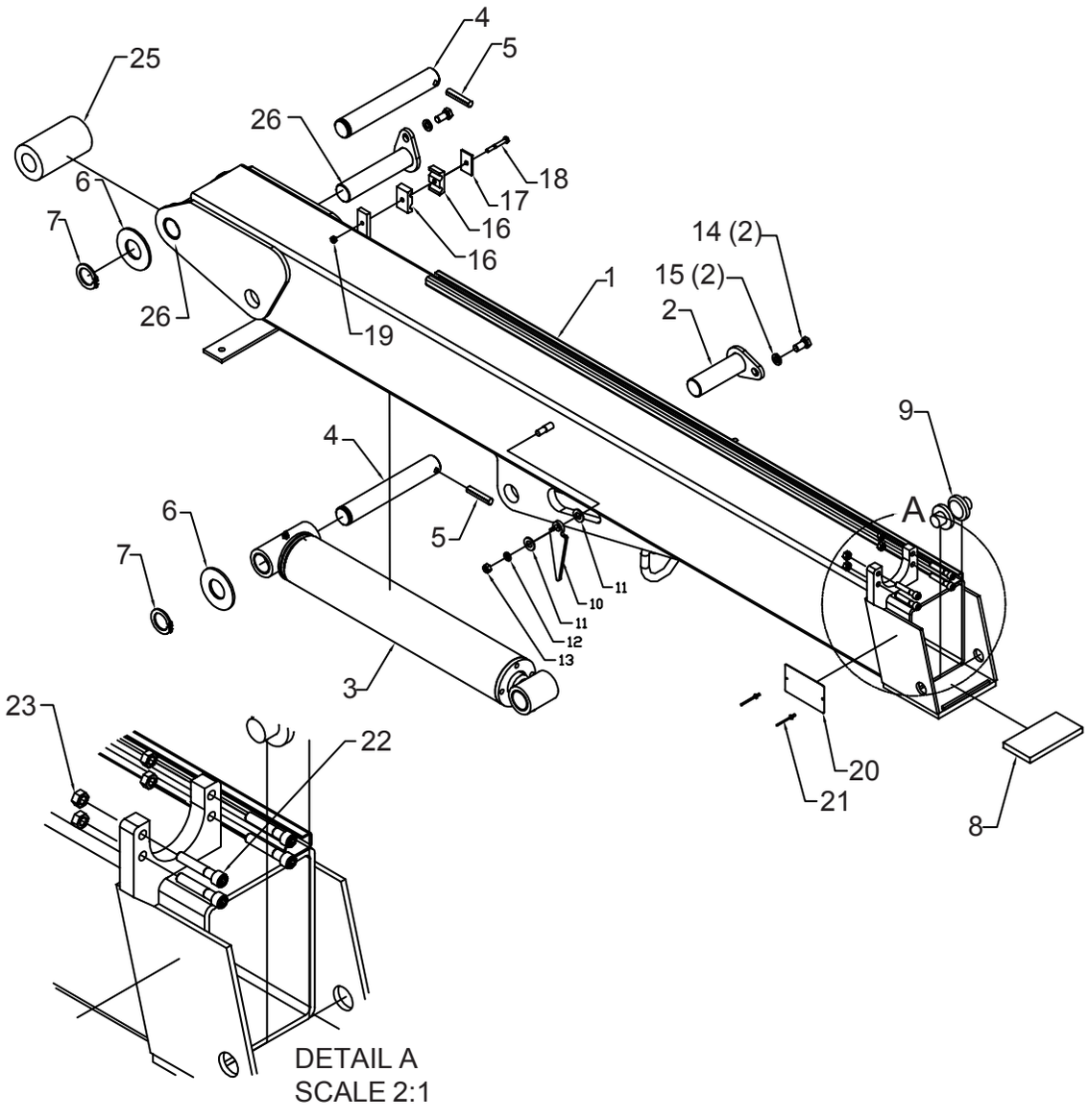
ITEM	PART NO.	DESCRIPTION	QTY
1.	52714936	LOWER BOOM (INCL:4)	1
2.	52704549	TRUNNION	1
3.	3B144820	LOWER CYLINDER	1
4.		BUSHING (PART OF 1)	4REF
5.	60030007	WEAR PAD	2
6.	60030083	WEAR PAD	1
7.	60102376	PIN	2
8.	60102388	PIN	1
9.	60105544	ANGLE INDICATOR	2
10.	60105749	PIN	1
11.	60107538	PIPE	2
12.	60107550	LOCK PLATE	2
13.	72053508	ZERK 1/8NPT	1
14.	72060044	CAP SCR 3/8-16X3/4 HHGR5	4
15.	72062103	NUT 3/8-16 LOCK	2
16.	72063003	WASHER 3/8 WRT	2
17.	72063005	WASHER 1/2 WRT	4
18.	72063034	MACH BUSHING 1X10GA	2
19.	72063037	MACH BUSHING 1-1/2X10GA	3
20.	72063051	WASHER 3/8 LOCK	4
21.	72066125	RETAINING RING 1" EXT HD	2
22.	72066132	RETAINING RING 1-1/2 EXT HD	3
23.	72661157	GROOVE PIN 1/2X2-1/2	3
24.	72066340	POP RIVET 1/8	2
25.	60103278	HOSE CLAMP	1
26.	70029119	SERIAL NUMBER PLACARD	1
29.	70034402	CLAMP TUBE	2
30.	70143829	COVER PLATE	1
31.	72060008	CAP SCR 1/4-20X2 HHGR5	1
32.	72062104	NUT 1/4-20 LOCK	2



MODEL 2H ONLY

LOWER BOOM ASM - 2H (41717168)

1.	52717160	WELDMENT-LOWER BOOM	1
2.	52717178	PIN	1
3.	3B144820	CYLINDER	1
4.	60102376	PIN	2
5.	72661157	GRV PIN	2
6.	72063037	MACH BUSHING	2
7.	72066132	RETAINING RING	2
8.	60123770	WEAR PAD	1
9.	60123777	WEAR PAD	2
10.	60105544	PLATE-ANGLE PLASTIC	2
11.	72063005	WASHER 1/2 FLAT	4
12.	72063003	WASHER 3/8 FLAT	2
13.	72062103	NUT 3/8-16 HEX NYLOC	2
14.	72060091	CAP SCR 1/2-13 X 1.00 HH GR5Z	2
15.	72063053	WASHER 1/2 LOCK	2
16.	70034402	CLAMP-TWIN TUBE 5/8 OD	1
17.	70143829	COVER PLATE	1
18.	72060008	CAP SCR 1/4-20 X 2.00 HH GR5Z	1
19.	72062104	NUT 1/4-20 HEX NYLOC	1
20.	70029119	PLACARD - S/N	1
21.	72066340	POP RIVET 1/8 X 3/8	2
22.	72060756	CAP SCR 3/8-16 X 2.00 SH	4
23.	72062103	NUT 3/8-16 HEX NYLOC	4
24.	52717194	PIN	1
25.	60123794	ROLLER	1
26.	70034464	BEARING, GAR-MAX	2REF



LOWER BOOM CYLINDER (3B144820)

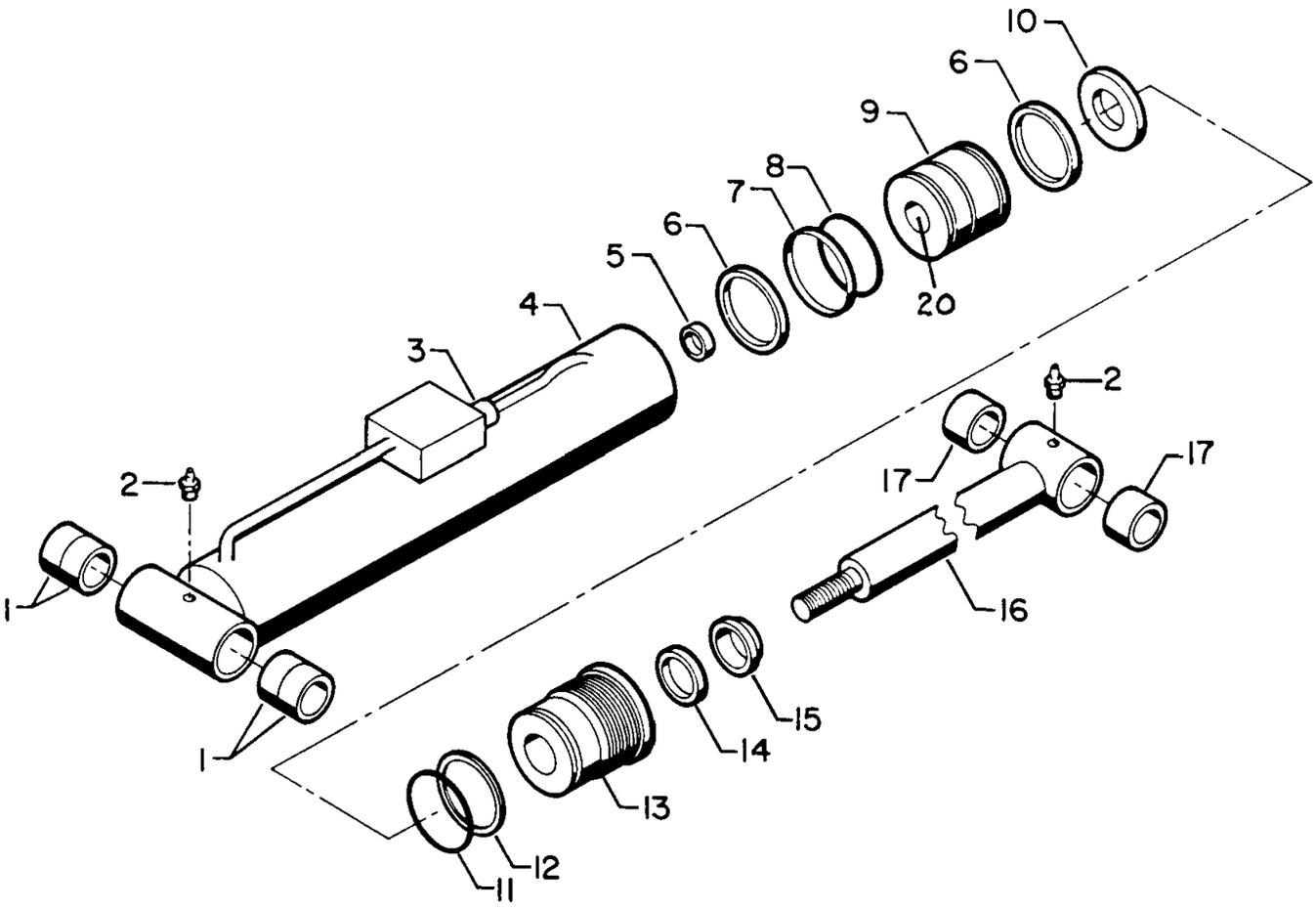
ITEM	PART NO.	DESCRIPTION	QTY
1.	7BF81015	BUSHING (PART OF 4)	4REF
2.	72053507	ZERK 1/4-28 (PART OF 4 & 16)	2REF
3.	73054304	VALVE 10GPM	1
4.	4B144820	CASE (INCL:1,2,18)	1
5.	7T61N125	LOCK RING SEAL (PART OF 19)	1REF
6.	7T65I035	PISTON RING (PART OF 19)	2REF
7.	7T66P035	PISTON SEAL (PART OF 19)	1REF
8.	7Q072151	O-RING (PART OF 19)	1REF
9.	6I035125	PISTON	1
10.	6A025017	WAFER LOCK (PART OF 19)	1REF
11.	7Q072338	O-RING (PART OF 19)	1REF
12.	7Q10P338	BACK-UP RING (PART OF 19)	1REF
13.	6H035017	HEAD	1
14.	7R546017	ROD SEAL (PART OF 19)	1REF
15.	7R14P017	ROD WIPER (PART OF 19)	1REF
16.	4G144820	ROD (INCL:2,17)	1
17.	7BF81215	BUSHING (PART OF 16)	2REF
18.	7PNPXT02	PLUG 1/8NPT (PART OF 4)	4REF
19.	9C141420	SEAL KIT (INCL:5-8,10-12,14,15)	1
20.	7T2N8020	WEAR RING (PART OF 19)	1REF

NOTE

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

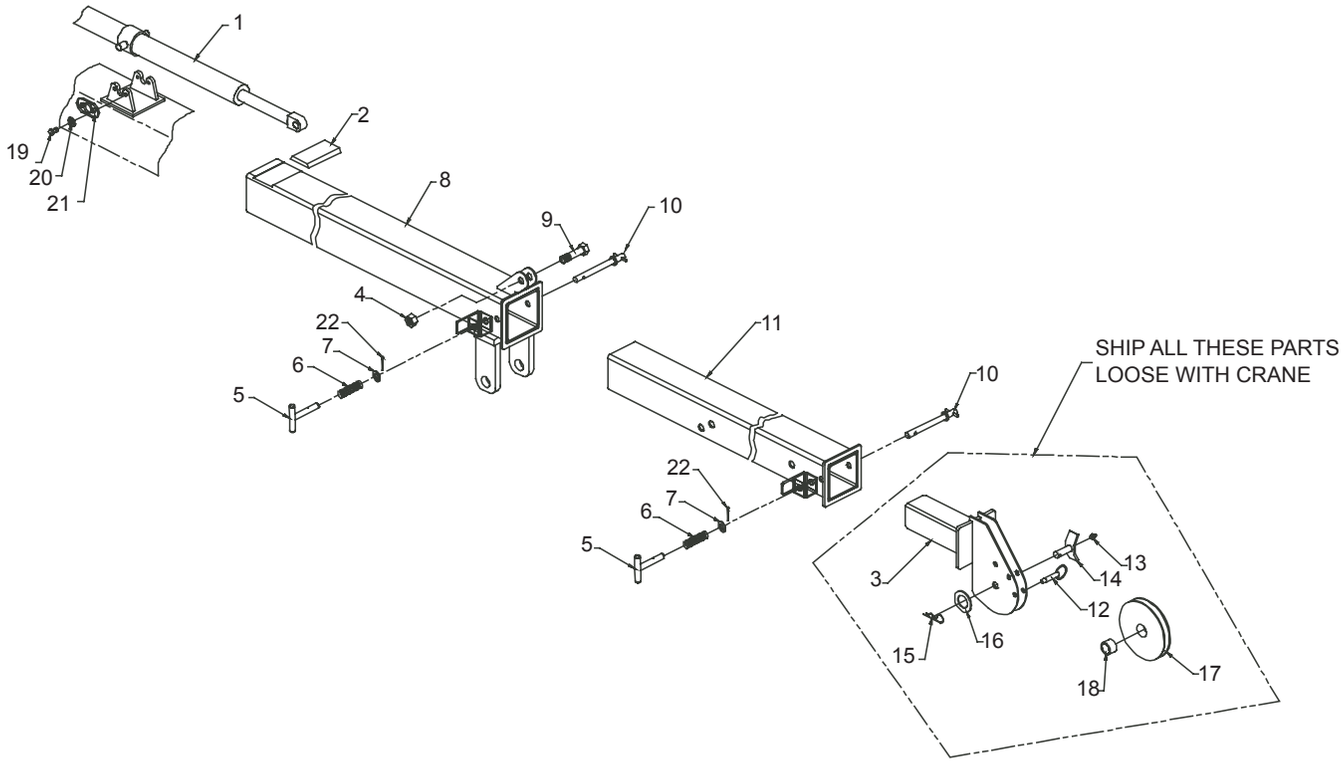
APPLY “LUBRIPLATE #630-2” MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

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



EXTENSION BOOM ASM (41716736)

ITEM	PART NO.	DESCRIPTION	QTY
1.	3B278940	EXTENSION CYLINDER	1
2.	60030081	WEAR PAD	1
3.	52716726	3RD STG EXT BOOM	1
4.	72062114	NUT 3/4-10 LOCK	1
5.	52070138	PIN-WLDMT	2
6.	60010351	SPRING T-PIN	2
7.	72063027	MACH BUSHING	2
8.	52716724	BOOM-EXT WLDMT 1ST STAGE	1
9.	72060187	CAP SCR 3/4-10X3 HHGR5	1
10.	71731799	QUICK RELEASE PIN 5/8X5	2
11.	52716725	2ND STG EXT BOOM	1
12.	71731462	QUICK RELEASE PIN 1/2	1
13.	72053508	ZERK 1/8NPT	1
14.	52704255	PIN	1
15.	72066145	HAIR PIN .19	1
16.	72063030	MACH BUSHING 3/4X10GA NR	1
17.	60030082	SHEAVE (INCL:18)	1
18.		BEARING (PART OF 17)	1REF
19.	72060044	CAP SCR 3/8-16X3/4 HHGR5	4
20.	72063051	WASHER 3/8 LOCK	4
21.	60107922	LOCK PLATE	2
22.	72066185	COTTER PIN	2



MODEL 2H ONLY

EXTENSION BOOM ASM - 2H (41717166-1)

1.	52717163	WELDMENT - 2ND BOOM	1
2.	52717164	WELDMENT - 1ST BOOM	1
3.	3B290010	CYLINDER	1
4.	3B291010	CYLINDER	1
5.	60124348	WEAR PAD- RC NYL	1
6.	60123767	WEAR PAD HOLDER - 2H	1
7.	60123768	WEAR PAD	2
8.	60123769	WEAR PAD	2
9.	72601784	BOLT, SHOULDER 1/2 X 3/4	4
10.	72060794	CAP SCR 1/2-13 X 1.25 SH PLAIN	4
11.	72063053	WASHER 1/2 LOCK	4
12.	72062114	NUT 3/4-10 HEX NYLOC ZINC	1
13.	72060187	CAP SCR 3/4-10 X 3.00 HH GR5	1
14.	72060734	CAP SCR 5/16-18 X 1.5 SH PLAIN	4
15.	72062109	NUT 5/16-18 HEX NYLOC	4
16.	52716726	EXT BOOM	1
17.	52704255	PIN	1
18.	71731462	PIN-QUICK RELEASE	1
19.	72063030	MACH BUSHING 3/4 X 10	1
20.	72066145	HAIR PIN 3/16	1
21.	60030082	SHEAVE 7.00	1
22.		BEARING	1REF
23.	52070138	PIN	1
24.	60010351	SPRING - T PIN	1
25.	72063027	MACH BUSHING 5/8 X 14 GA NR	1
26.	72066185	COTTER PIN .16 X 1.00 PLAIN	1
27.	72533186	ADPTR-#6MFACE #6MSTR	2
28.	72533535	ADPTR #6MFACE #8MSTR	2
29.	71731799	PIN	1
30.	72053508	ZERK 1/8 NPT	1
31.	70034382	CAP-GREASE	1
32.	60123795	SLIDER	1
33.	72601779	CAP SCR 5/16 -18 X 1/2 FLH	2
34.	70146441	TUBE-EXT CYL	1
35.	70146442	TUBE-EXT CYL	1
36.	52717248	WELDMENT-WEAR PAD	1
37.	71732054	PIN-QUICK RLSE	1
38.	72062106	NUT #10-24 HEX NYLOC ZINC	4
39.	72066535	HOSE CLAMP 3/8 VINYL	2
40.	60124364	WEAR PAD	2
41.	72062293	NUT 1.00-14 HEX ZINC JAM	2
42.	72063132	WASHER 1/2 FLAT	4

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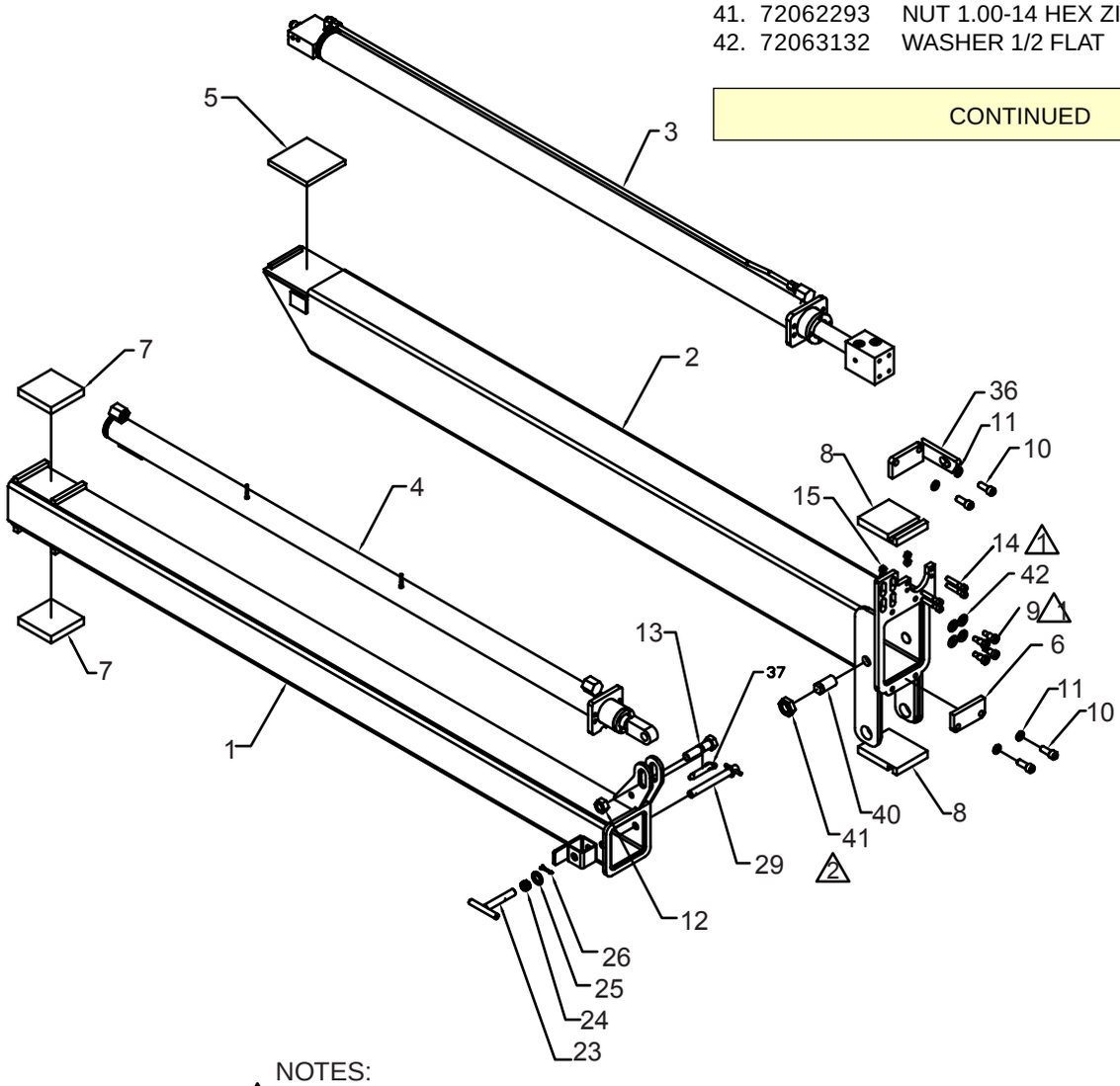
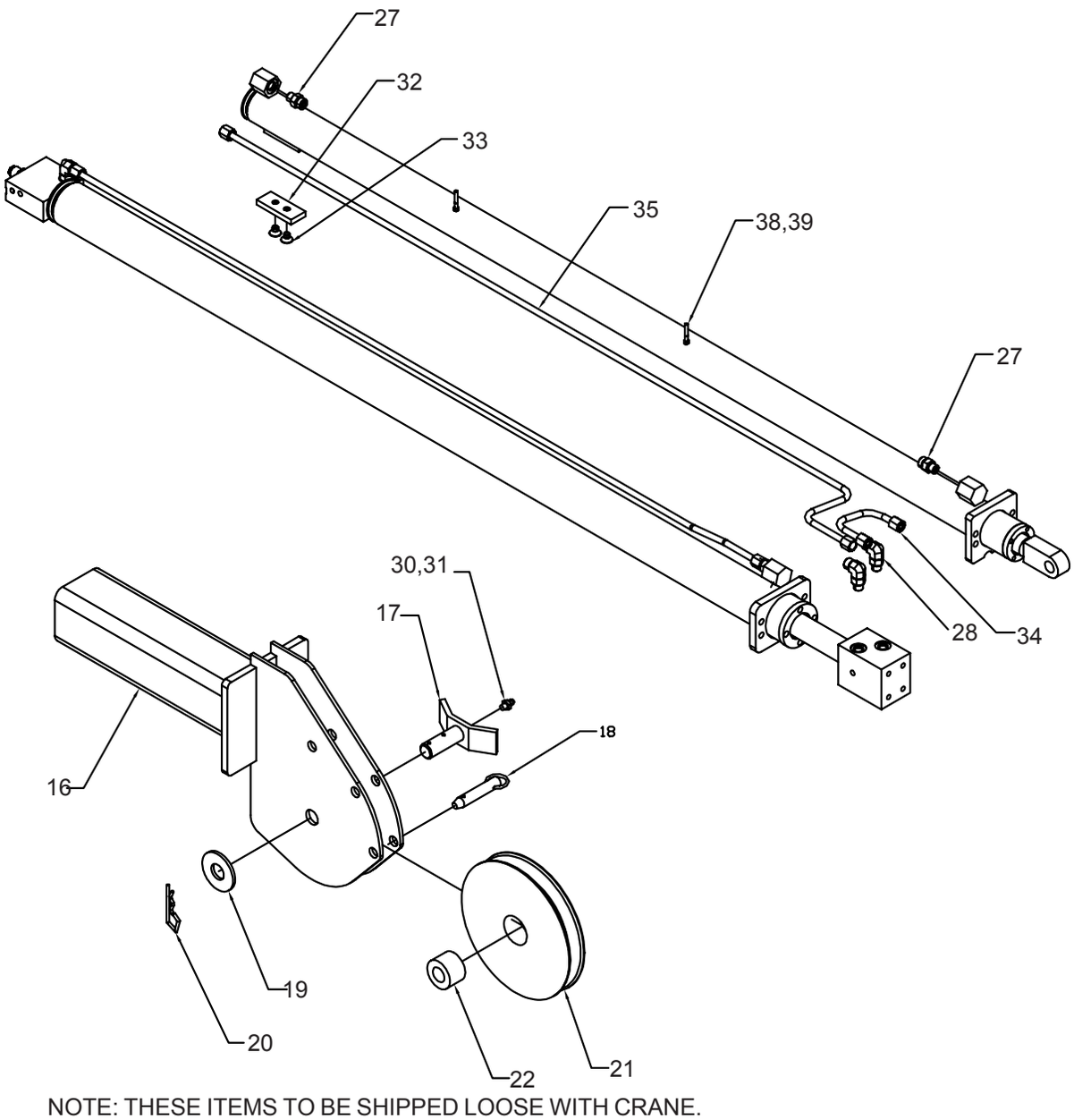


NOTES:
1 USE SERVICEABLE THREAD LOCK ON BOLTS.
2 TORQUE NUTS TO 25 FT-LB.

MODEL 2H ONLY

EXT BOOM ASM - 2H (41717166-2)

PARTS LIST ON PREVIOUS PAGE



NOTE: THESE ITEMS TO BE SHIPPED LOOSE WITH CRANE.

EXTENSION CYLINDER (3B278940)

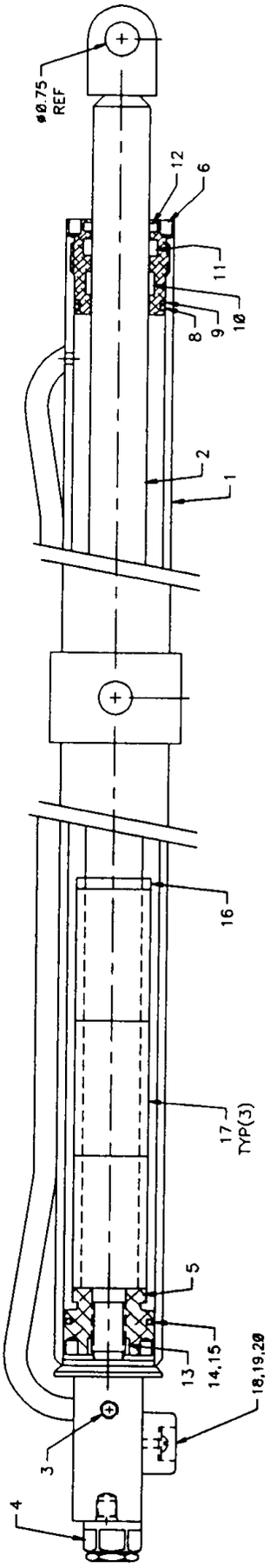
ITEM	PART NO.	DESCRIPTION	QTY
1.	4B278940	CASE ASM (INCL:3)	1
2.	4G138820	ROD ASM	1
3.	7PNPXT02	PLUG 1/8NPT (PART OF 1)	3REF
4.	73054304	C'BALANCE VALVE 10GPM	1
5.	6I020075	PISTON	1
6.	6H020012	HEAD	1
7.	9B081012	SEAL KIT (INCL:8-16)	1
8.	7Q072224	O-RING (PART OF 7)	1REF
9.	7Q10P224	BACKUP RING (PART OF 7)	1REF
10.	7T2N8012	WEAR RING (PART OF 7)	1REF
11.	7R546012	U-CUP SEAL (PART OF 7)	1REF
12.	7R14P012	ROD WIPER (PART OF 7)	1REF
13.	7T61N075	LOCK RING (PART OF 7)	1REF
14.	7Q072129	O-RING (PART OF 7)	1REF
15.	7T66P020	PISTON SEAL (PART OF7)	1REF
16.	6A025012	WAFER LOCK (PART OF 7)	1REF
17.	6C300012	STOP TUBE 3"	3
18.	70392190	RUBBER BUMPER	1
19.	72060636	MACH SCR #10-24X3/4 RDHD	1
20.	72063123	WASHER #10 WRT	1

NOTE

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

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

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



MODEL 2H ONLY

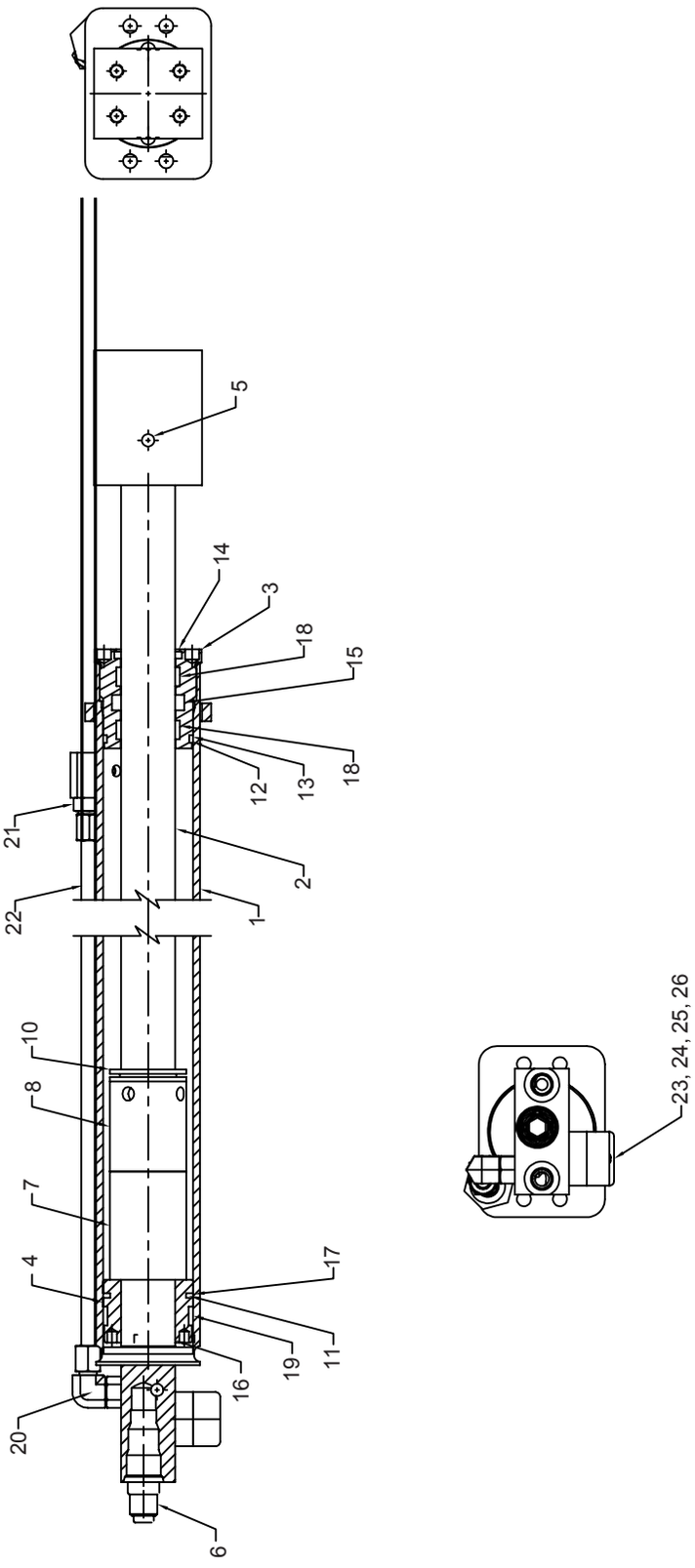
EXTENSION CYLINDER - 2H (3B290010)

1.	4B290010	CASE ASSEMBLY	1
2.	52717179	ROD ASM (INCL. 5)	1
3.	6HD25015	HEAD	1
4.	6ID25125	PISTON	1
5.	7PNPXT02	PIPE PLUG 1/8 NPT	1REF
6.	73054304	VALVE	1
7.	6C300015	STOP TUBE	1
8.	6C210013	STOP TUBE	1
9.	9D101220	SEAL KIT (INCL. 10-19)	1
10.	6A025015	WAFER LOCK	1REF
11.	7Q072137	O-RING	1REF
12.	7Q072228	O-RING	1REF
13.	7Q10P228	BACKUP RING	1REF
14.	7R14P015	ROD WIPER	1REF
15.	7R546015	U-CUP SEAL - ROD 1.5 X 2.00	1REF
16.	7T61N125	LOCK RING-NYLON 1.25	1REF
17.	7T66P025	PISTON SEAL-DYNAMIC	1REF
18.	7T2NX417	WEAR RING	2REF
19.	7T2N4025	WEAR RING	1REF
20.	72053760	ELBOW #6MSTR #6MJIC 90°	1
21.	72532355	ADPTR-#6MSTR #6MJIC	1
22.	70146439	TUBE ASM - HYD EXT CYL	1
23.	70392190	BUMPER-RUBBER	1
24.	72060639	SCR-MACH 10-24 X 1-1/4 RDH	1
25.	72063000	WASHER 1/8 FLAT	1
26.	60120895	SPACER-UHMW	1

NOTE

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

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



MODEL 2H ONLY

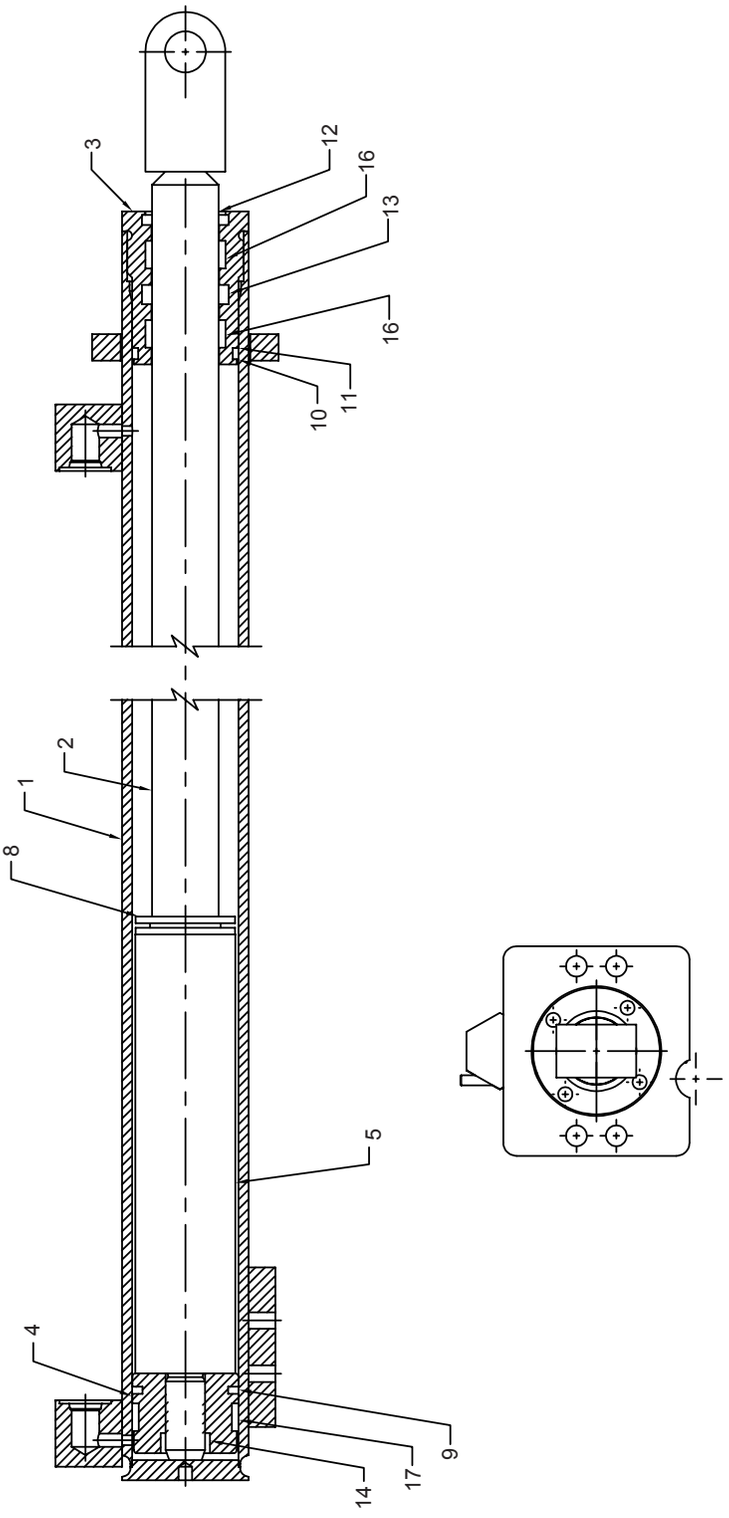
EXTENSION CYLINDER - 2H (3B291010)

1.	4B291010	CASE ASSEMBLY	1
2.	4G291010	ROD ASM	1
3.	6HD20012	HEAD	1
4.	6ID20075	PISTON	1
5.	6C825012	STOP TUBE	1
7.	9D081012	SEAL KIT (INCL. 8-17)	1
8.	6A025015	WAFER LOCK	1REF
9.	7Q072129	O-RING	1REF
10.	7Q072224	O-RING	1REF
11.	7Q10P224	BACKUP RING	1REF
12.	7R14P012	ROD WIPER	1REF
13.	7R546012	U-CUP	1REF
14.	7T61N075	LOCK RING-NYLON 3/4	1REF
15.	7T66P020	PISTON SEAL-DYNAMIC	1REF
16.	7T2NX415	WEAR RING	2REF
17.	7T2N4020	WEAR RING	1REF

NOTE

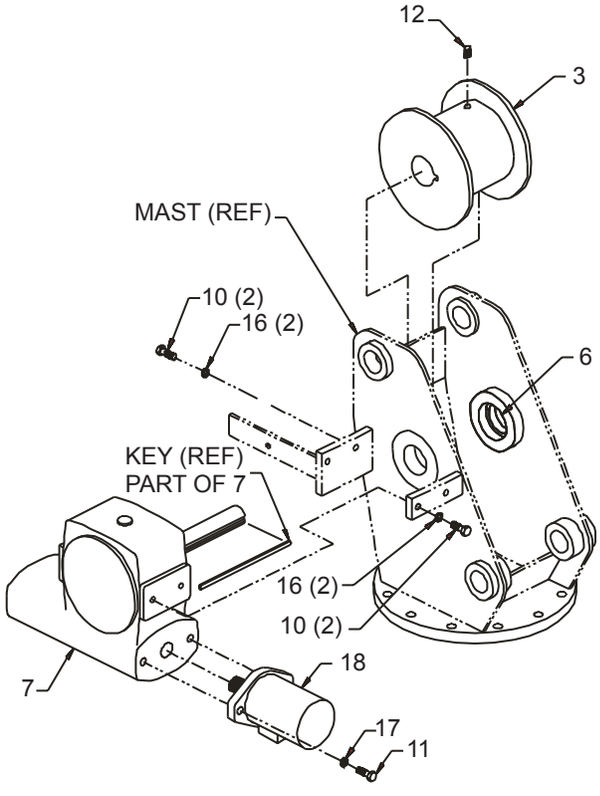
APPLY “LUBRIPLATE #630-2” MEDIUM HEAVY,MULTI-PURPOSE LUBRICANT OR EQUIVALENT TO ALL PISTON, HEAD GLAND, AND HOLDING VALVE SEALS, NYLON LOCK RING, CAST IRON PISTON RINGS, AND ROD STINGER THREADS.

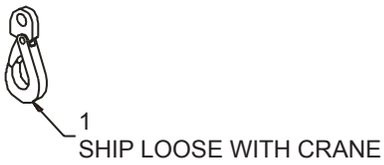
APPLY “NEVER-SEEZ” REGULAR GRADE ANTI-SEIZE AND LUBRICATING COMPOUND TO CYLINDER HEAD AND CASE THREADS.



WINCH/CABLE/HOOK KIT (41714913)

ITEM	PART NO.	DESCRIPTION	QTY
1.	70732870	HOOK	1
3.	60025211	DRUM	1
6.	70055142	BEARING	1
7.	71057987	WINCH	1
10.	72060046	CAP SCR 3/8-16X1 HHGR5	4
11.	72060063	CAP SCR 7/16-14X1-1/4 HHGR5	2
12.	72060579	SET SCR 3/8-16X1/2 SH	1
16.	72063051	WASHER 3/8 LOCK	4
17.	72063052	WASHER 7/16 LOCK	2
19.	73051690	HYDRAULIC MOTOR	1

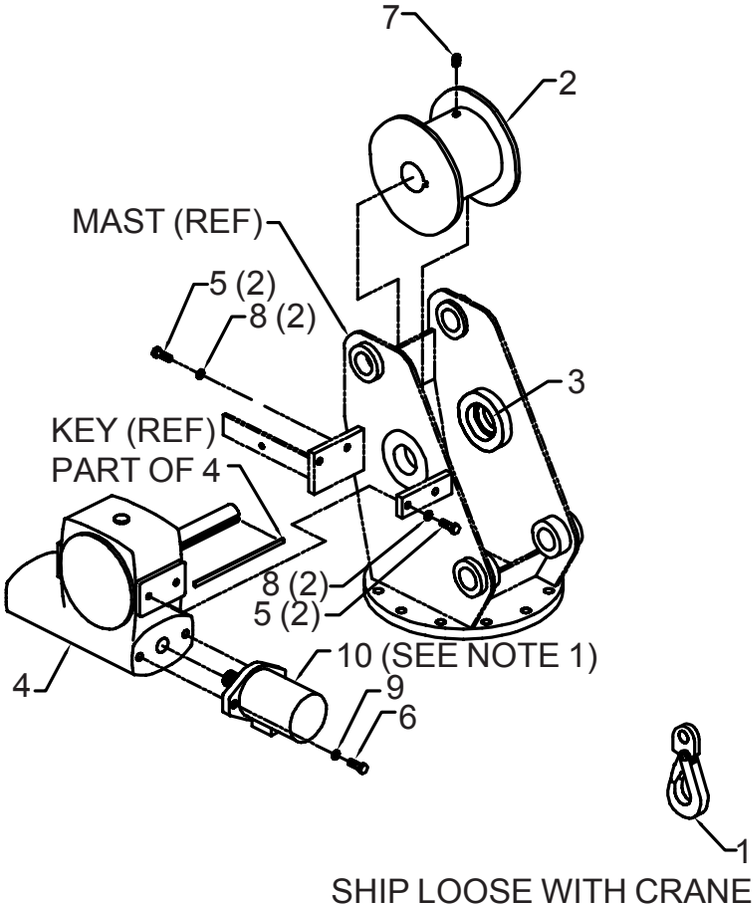




MODEL 2H ONLY

WINCH/CABLE/HOOK KIT -2H (41717183)

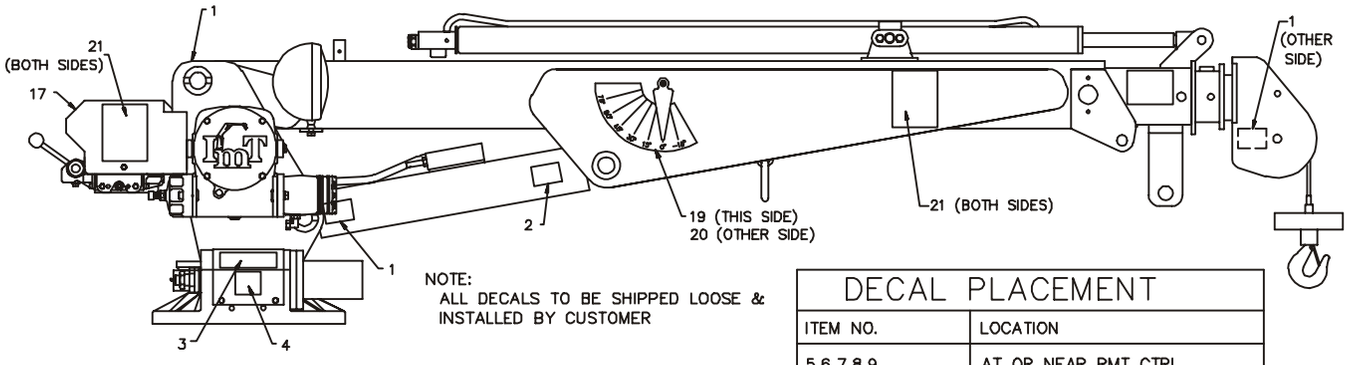
1.	70732870	HOOK-POSITIVE LOCK (SHIPPED LOOSE W/CRANE)	1
2.	60123778	WINCH DRUM	1
3.	70055142	BEARING	1
4.	71057987	WINCH	1
5.	72060046	CAP SCR 3/8-16 X 1.00 HH GR5Z	4
6.	72060063	CAP SCR7/16-14 X 1.25 HH GR5Z	2
7.	72060579	SET SCR 3/8-16 X 1.2 SOC	1
8.	72063051	WASHER 3/8 LOCK	4
9.	72063052	WASHER 7/16 LOCK	2
10.	73051690	HYDRAULIC MOTOR	4



NOTE: MAKE SURE THE WINCH MOTOR (C103-1033) IS NOT SWITCHED WITH THE ROTATION MOTOR.

DECAL KIT (95714989)

1.	70391612	DECAL-GREASE WKLY LEFT	9
2.	70391613	DECAL-GREASE WKLY RIGHT	5
3.	70392399	DECAL-LUBRICATE WORM	1
4.	70392524	DECAL-ROT CRANE/GREASE	1
5.	70394444	DECAL-DANGER ELECTRO	1
6.	70392814	DECAL-DGR OPER TRAINING	1
7.	70392815	DECAL-DANGER OPERATION	1
8.	70392861	DECAL-DANGER 2-BLOCKING	1
9.	70392863	DECAL-DGR HOISTING PERSON	1
10.	70392864	DECAL-DGR OUTRG STD CLR	2
11.	70392866	DECAL-DANGER OPER COND	1
12.	70392867	DECAL-DGR OUTRG MOVING	2
13.	70392868	DECAL-DGR CR LOADLINE	1
14..	70392888	DECAL-DGR OPER RESTRICT	1
15.	70394189	PLACARD-MOBILOIL RSRVR	1
16.	70394443	DECAL-DGR FREEFALL BOOM	1
17.	70395023	DECAL-EZHAULER2 CONTROL	1
18.	71039134	DECAL-CAUTION OIL LEVEL	1
19.	71391522	DECAL-ANGLE CHART RH	1
20.	71391523	DECAL-ANGLE CHART LH	1
21.	71394878	CAPACITY PLACARD	4



NOTE:
ALL DECALS TO BE SHIPPED LOOSE & INSTALLED BY CUSTOMER

DECAL PLACEMENT	
ITEM NO.	LOCATION
5,6,7,8,9, 11,12,14,18	AT OR NEAR RMT CTRL STORAGE POINT.
10	ONE ON EACH OUTRIGGER.
13	ONE ON EACH SIDE OF CARRIER VEHICLE.
15	AT OR NEAR THE HYDRAULIC RESERVOIR.
16	AT OR NEAR THE MANUAL BOOM EXT. RETENTION MECHANISM.

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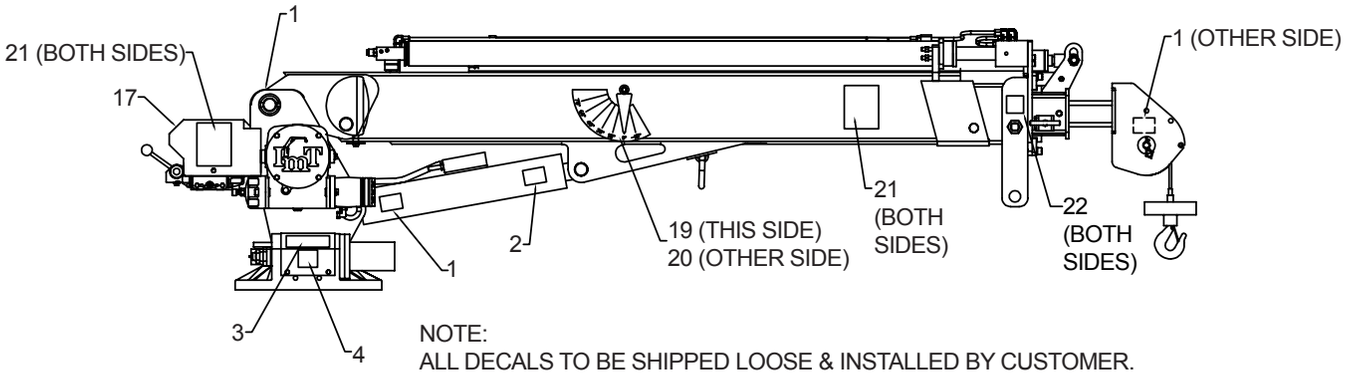
MODEL 2H ONLY

DECAL KIT - 2H (95717593)

1.	70391612	DECAL-GREASE WKLY LEFT	9
2.	70391613	DECAL-GREASE WKLY RIGHT	5
3.	70392399	DECAL-LUBRICATE WORM	1
4.	70392524	DECAL-ROT CRANE/GREASE	1
5.	70394444	DECAL-DANGER ELECTRO	1
6.	70392814	DECAL-DGR OPER TRAINING	1
7.	70392815	DECAL-DANGER OPERATION	1
8.	70392861	DECAL-DANGER 2-BLOCKING	1
9.	70392863	DECAL-DGR HOISTING PERSON	1
10.	70392864	DECAL-DGR OUTRG STD CLR	2
11.	70392866	DECAL-DANGER OPER COND	1
12.	70392867	DECAL-DGR OUTRG MOVING	2
13.	70392868	DECAL-DGR CR LOADLINE	1
14..	70392888	DECAL-DGR OPER RESTRICT	1
15.	70394189	PLACARD-MOBILOIL RSRVR	1
16.	70394443	DECAL-DGR FREEFALL BOOM	1
17.	70395023	DECAL-EZHAULER2 CONTROL	1
18.	71039134	DECAL-CAUTION OIL LEVEL	1
19.	71391522	DECAL-ANGLE CHART RH	1
20.	71391523	DECAL-ANGLE CHART LH	1
21.	71394878	CAPACITY PLACARD	4
22.	71396200	DECAL-TORQUE 25 FT-LB	2



NOTE:
ALL DECALS TO BE SHIPPED LOOSE & INSTALLED BY CUSTOMER.

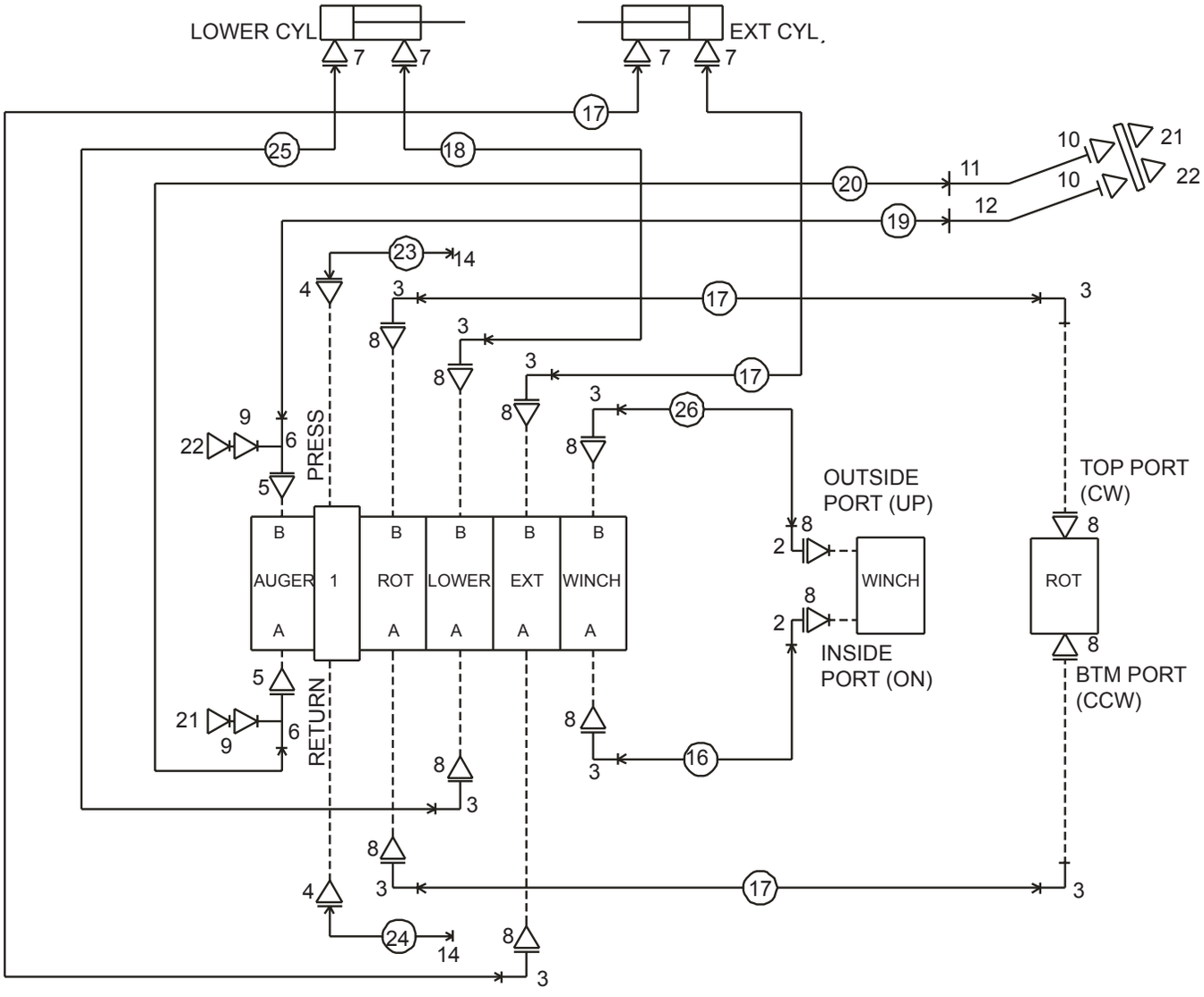
DECAL PLACEMENT	
ITEM NO.	LOCATION
5,6,7,8,9, 11,12,14,18	AT OR NEAR REMOTE CONTROL STORAGE POINT.
10	ONE ON EACH OUTRIGGER
13	ONE ON EACH SIDE OF CARRIER VEHICLE.
15	AT OR NEAR HYDRAULIC RESERVOIR.
16	AT OR NEAR MANUAL BOOM EXT. RETENTION MECHANISM.

HYDRAULIC KIT-5 SECTION PTO (91714906-1)

ITEM	PART NO.	DESCRIPTION	QTY
1.	51715040	VALVEBANKASM	1
2.	72532699	ELBOW 9/16MSTR 7/16MJIC 90°	2
3.	72532985	ELBOW #6MSTR #4MJIC 45°	10
4.	72532360	ADPTR #12MSTR #8MJIC SWVL	2
5.	72532359	ADAPTER #10MSTR #8MJIC	2
6.	72532657	TEE-SWVL NUT RUN JIC 8	2
7.	72532351	ADAPTER #4MSTR #4MJIC	4
8.	72532722	ADAPTER #10MSTR #6FSTR	12
9.	72533720	ADPTR-MPT/F JIC SWVL .50 8	2
10.	72533430	UNION-BULKHEAD #8MJIC 1/2	2
11.	70145767	TUBE ASM 5/8X39-1/2 4-BEND	1

CONTINUED

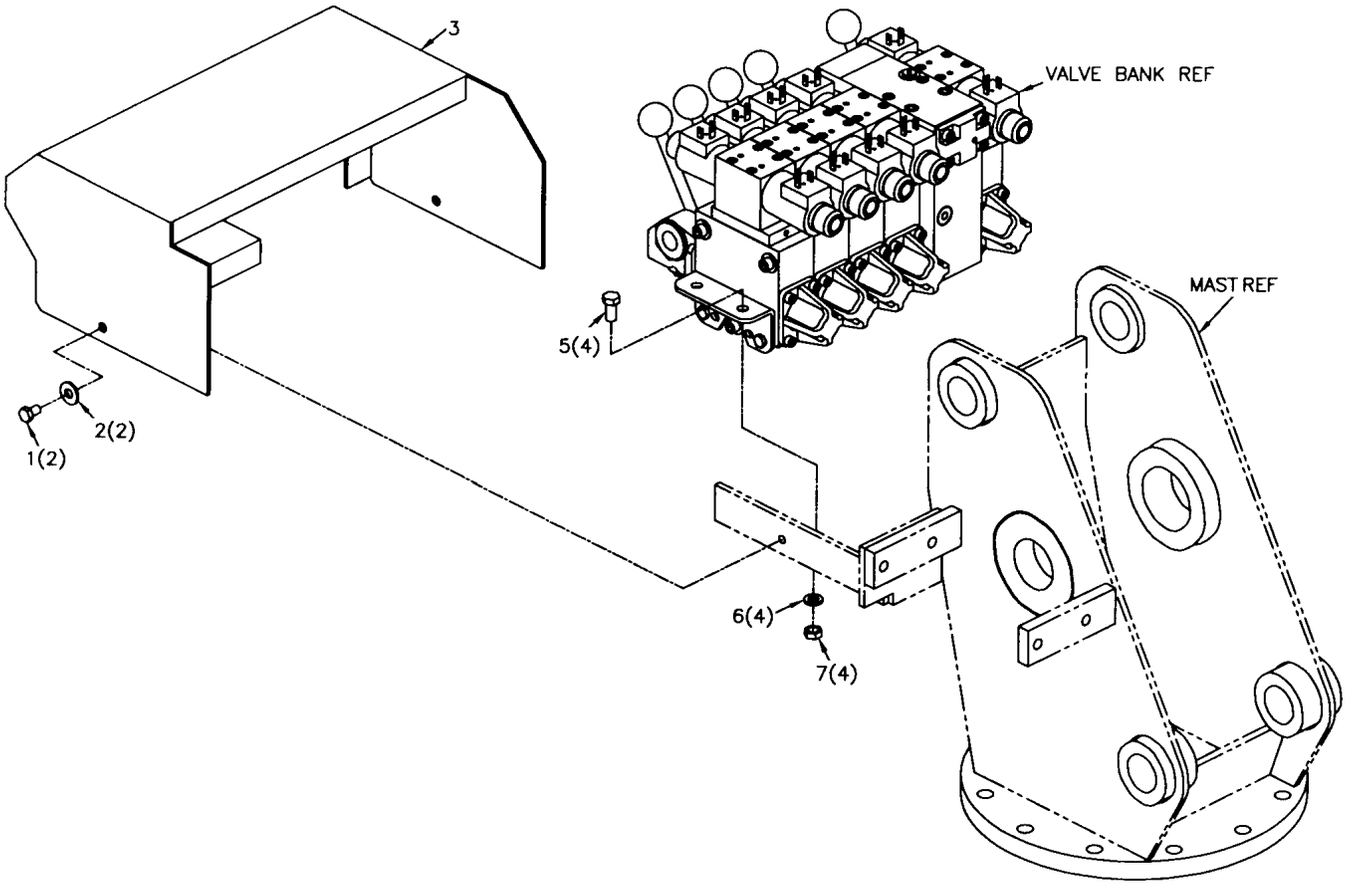
12.	70145768	TUBE ASM 5/8X42-1/4 4-BEND	1
14.	72053810	PIPE CAP 1/2NPT	2
15.	51714838	HOSE KIT (INCL:16-20,23-26)	1
16.	51395627	HOSE ASM 1/4X17.5 #4F#4F	1REF
17.	51393942	HOSE ASM 1/4X35 #4F#4F	4REF
18.	51394939	HOSE ASM 1/4X29 #4F#4F	1REF
19.	51394937	HOSE ASM 1/2X29 #8F#8Z	1REF
20.	51396017	HOSE ASM 1/2X30 #8F#8J	1REF
21.	72533465	DISC COUPLER 1/2FPT	2
22.	72533466	DISC NIPPLE 1/2FPT	2
23.	51394108	HOSE ASM 1/2X23 #8A#8Z	1REF
24.	51394938	HOSE ASM 1/2X27 #8A#8J	1REF
25.	51394940	HOSE ASM 1/4X31 #4F#4F	1REF
26.	51395626	HOSE ASM 1/4X16.5 #4F #4F	1REF



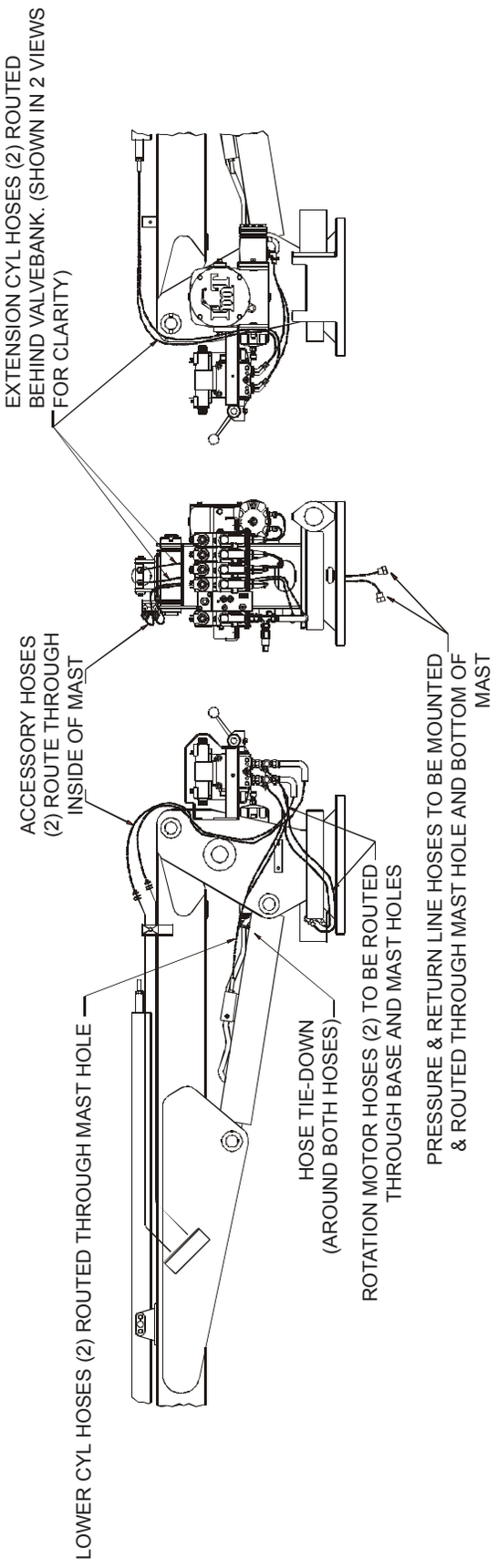
HYDRAULIC KIT-5 SECTION PTO (91714906-2)

CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
1.	72060021	CAP SCR 5/16-18X1/2 HHGR5	2
2.	72063002	WASHER 5/16W FLAT	2
3.	60121185	COVER-VB	1
5.	72060046	CAP SCR 3/8-16X1 HHGR5	4
6.	72063051	WASHER 3/8 LOCK	4
7.	72062103	NUT 3/8-16 LOCK	4



HYDRAULIC KIT-5 SECTION PTO (91714906-3)



MODEL 2H ONLY

HYDRAULIC KIT-2H (91717249-1)

1.	51715040	VB ASM - ELEC CONN	1
2.	72532699	ELBOW #6MSTR #4MJIC 90°	2
3.	72532985	ELBOW #6MSTR #4MJIC 45°	8
4.	72532360	ADPTR #12MSTR #8MJIC SW	2
5.	72532359	ADPTR #10 MSTR #8 MJIC	2
6.	72532657	TEE-#8 JIC SWIVEL NUT RUN	2
7.	72532351	ADPTR #4MSTR #4MJIC	2
8.	72532722	ADPTR #10 MSTR #6 FSTR	12
9.	72533720	ADPTR 1/2 MPT #8FJIC SWVL	2
10.	72533430	UNION BLKHD #8MJIC 1/2 MPT	2
11.	70145767	HYDRAULIC TUBE ASM	1
12.	70145768	HYDRAULIC TUBE ASM	1
13.	72532355	ADPTR #6MSR #6MJIC	2
14.	72053810	CAP PIPE BLK 1/2	2
15.	51717250	HOSE KIT (INCL. 16-20,23-27)	1
16.	51395627	HOSE FF 1/4X17.5 OAL 4-4	1REF
17.	51393942	HOSE-FF 1/4X35.00 OAL 4-4	2REF
18.	51394939	HOSE-FF 1/4X29.00 OALD 4-4	1REF
19.	51396136	HOSE-FZ 1/2 X 31.00 OAL 8-8	1REF
20.	51396017	HOSE-FJ 1/2 X 30.00 OAL 8-8	1REF
21.	72533465	COUPLER-DISC 1/2 FPT	2
22.	72533466	NIPPLE-DISC 1/2 FPT	2
23.	51394108	HOSE-AZ 1/2 X 27.00 OAL 8-8	1REF
24.	51394938	HOSE-AI 1/2 X 27.00 OAL 8-8	1REF
25.	51394940	HOSE-FF 1/4 X 31.00 OAL 4-4	1REF
26.	51395626	HOSE-FF 1/4 X 16.50 OAL 4-4	1REF
27.	51396135	HOSE-FF 3/8 X 35.00 OAL 6-6	2REF
28.	72053776	ELBOW #6 MSTR #6MJIC 45°	2
27.	60350075	SLEEVE-HOSE (SEE 91717249-3)	1

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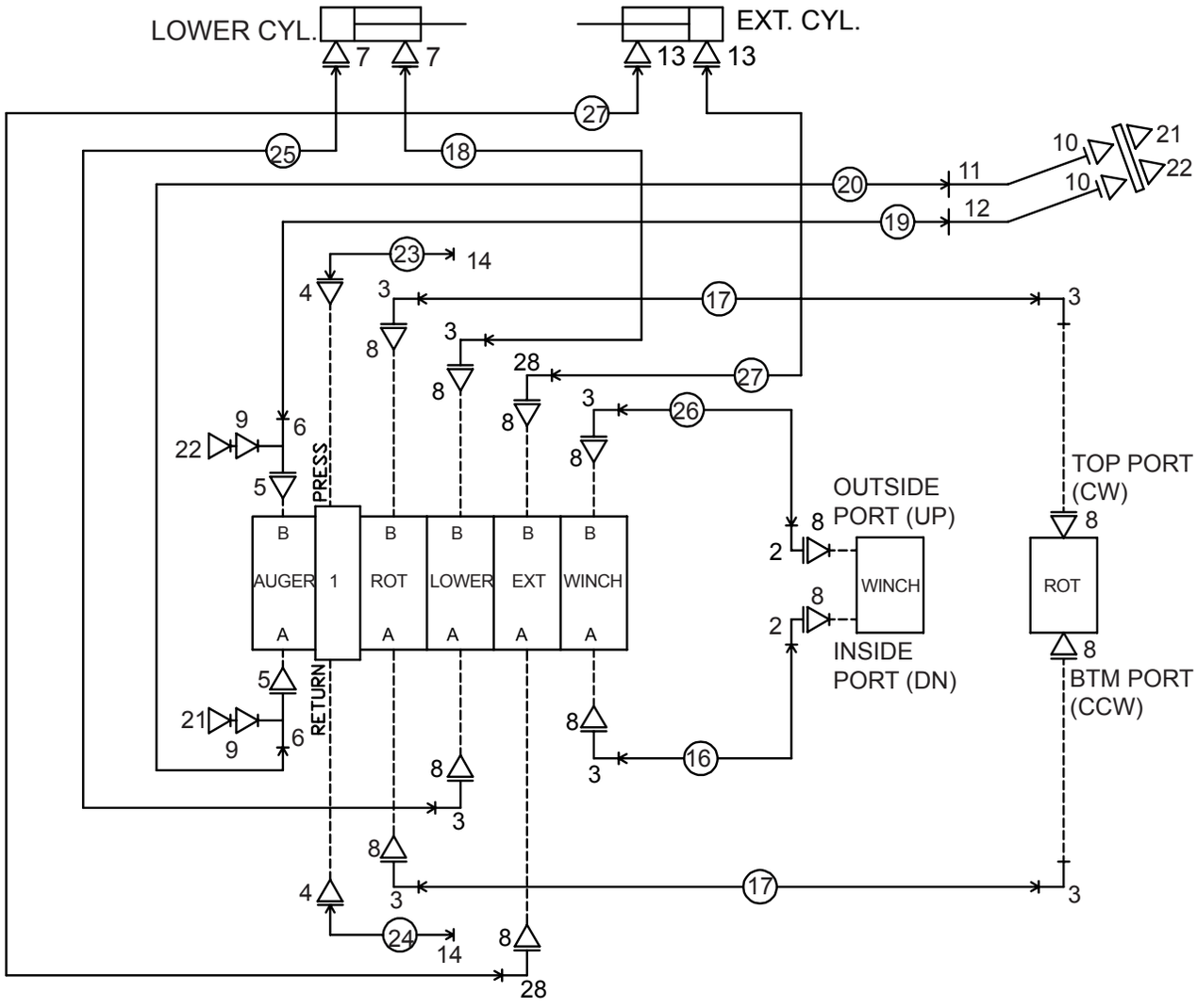
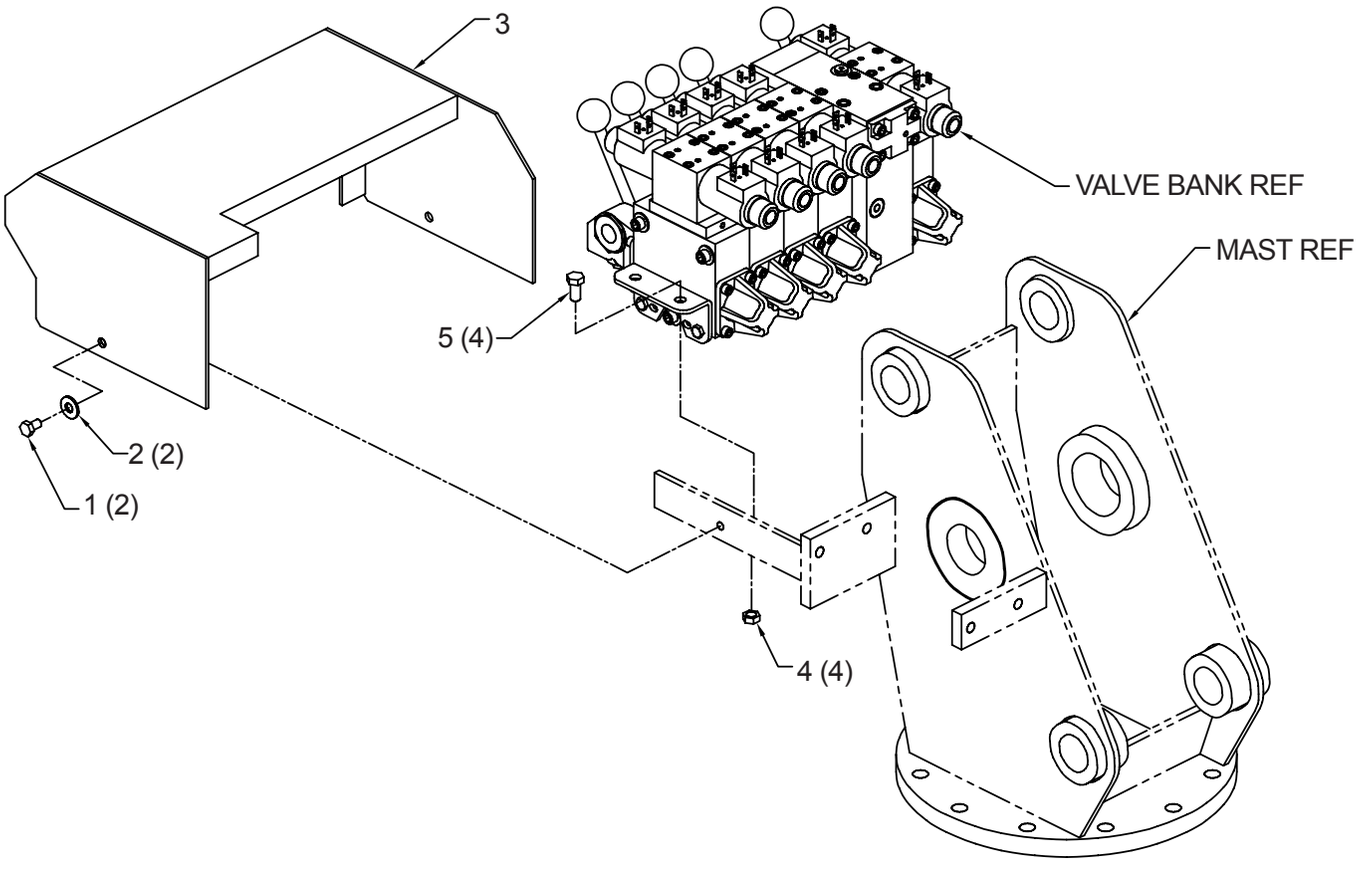


MODEL 2H ONLY

HYDRAULIC KIT-2H (91717249-2)

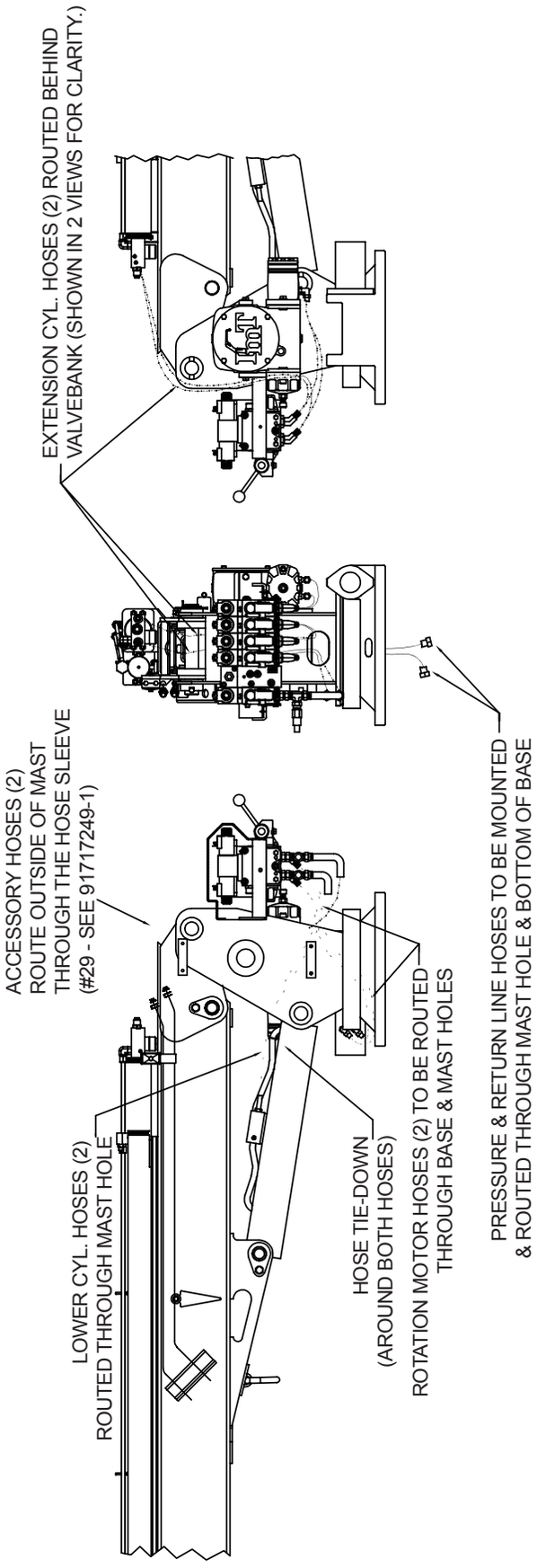
1.	72060021	CAP SCR 5/16-18 X 1/2 HH GR5Z	2
2.	72063050	WASHER 5/16 LOCK	2
3.	60121185	VALVE BANK COVER	1
4.	72062103	NUT 3/8-16 HEX NYLOC ZINC	4
5.	72060046	CAP SCR 3/8-16 X 1.00 HH GR5	4

CONTINUED



MODEL 2H ONLY

HYDRAULIC KIT-2H (91717249-3)



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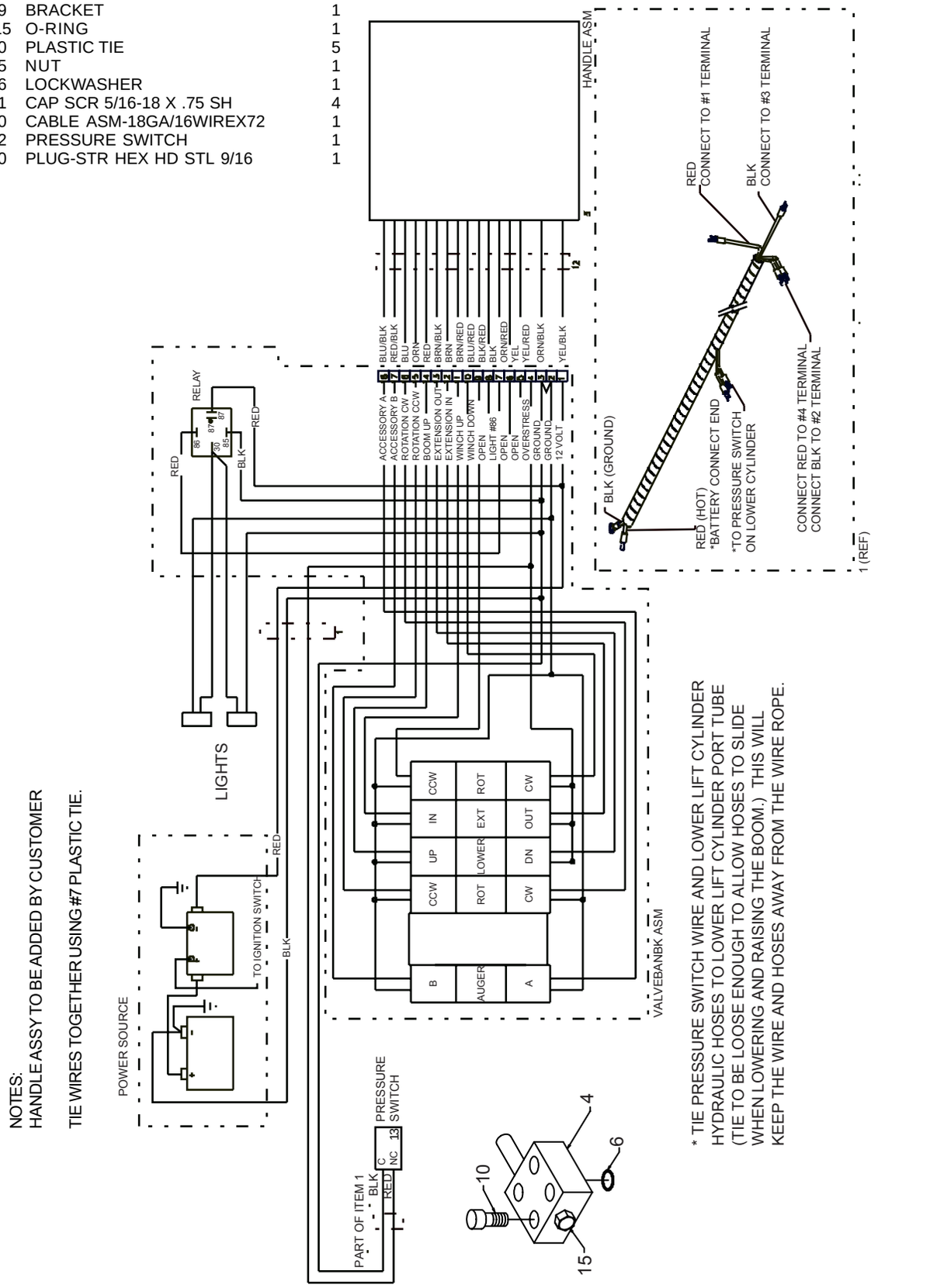
CONTROL KIT - PROP'L (90714916-1)

CONTINUED

ITEM	PART NO.	DESCRIPTION	QTY
1.	51716729	CABLE ASM	1
3.		HANDLE ASM-(SUPPLIED BY CUST)	1REF
4.	60025221	MANIFOLD	1
5.	60119299	BRACKET	1
6.	7Q072015	O-RING	1
7.	70034060	PLASTIC TIE	5
8.	77044645	NUT	1
9.	77044646	LOCKWASHER	1
10.	72060731	CAP SCR 5/16-18 X .75 SH	4
12.	51715270	CABLE ASM-18GA/16WIREX72	1
13.	77041222	PRESSURE SWITCH	1
15.	72532140	PLUG-STR HEX HD STL 9/16	1

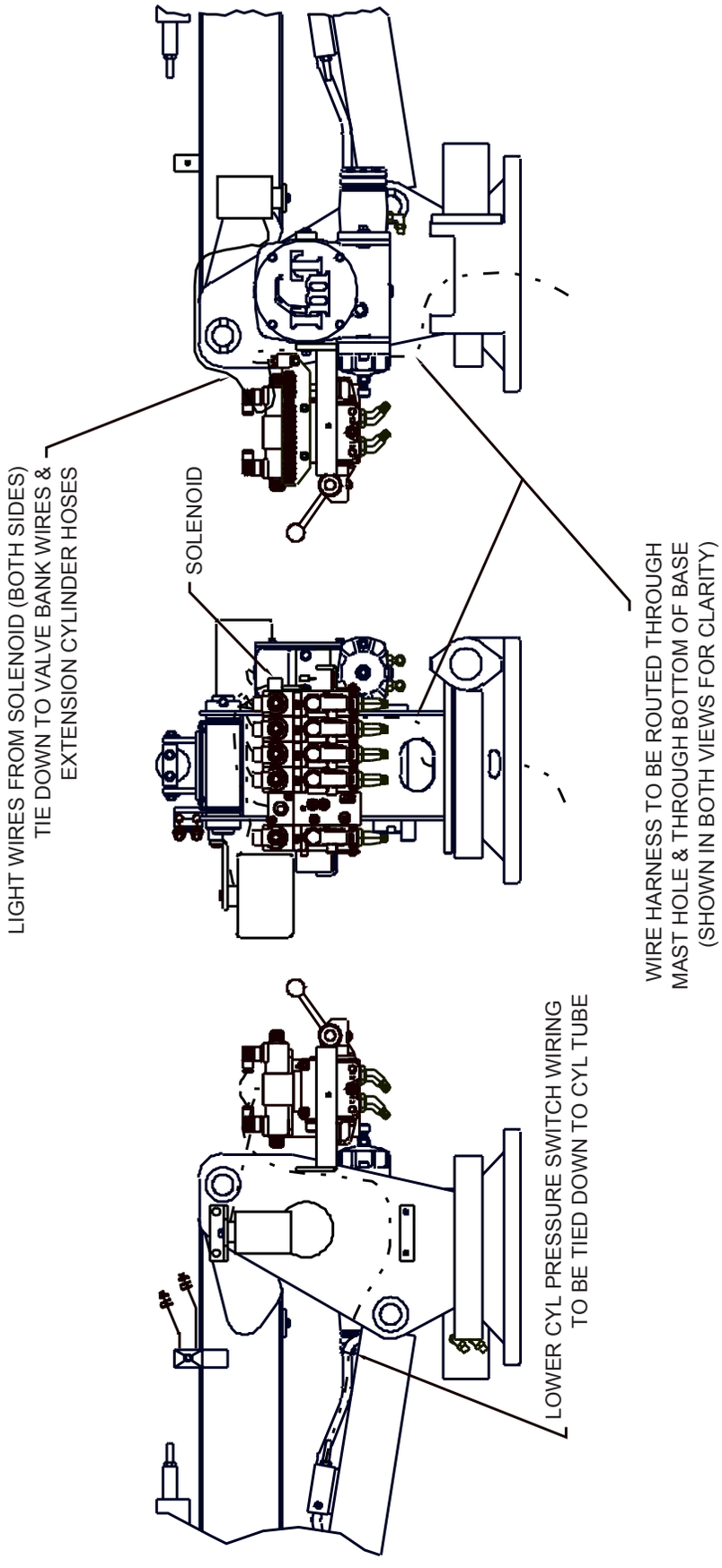


NOTES:
HANDLE ASSY TO BE ADDED BY CUSTOMER

TIE WIRES TOGETHER USING #7 PLASTIC TIE.

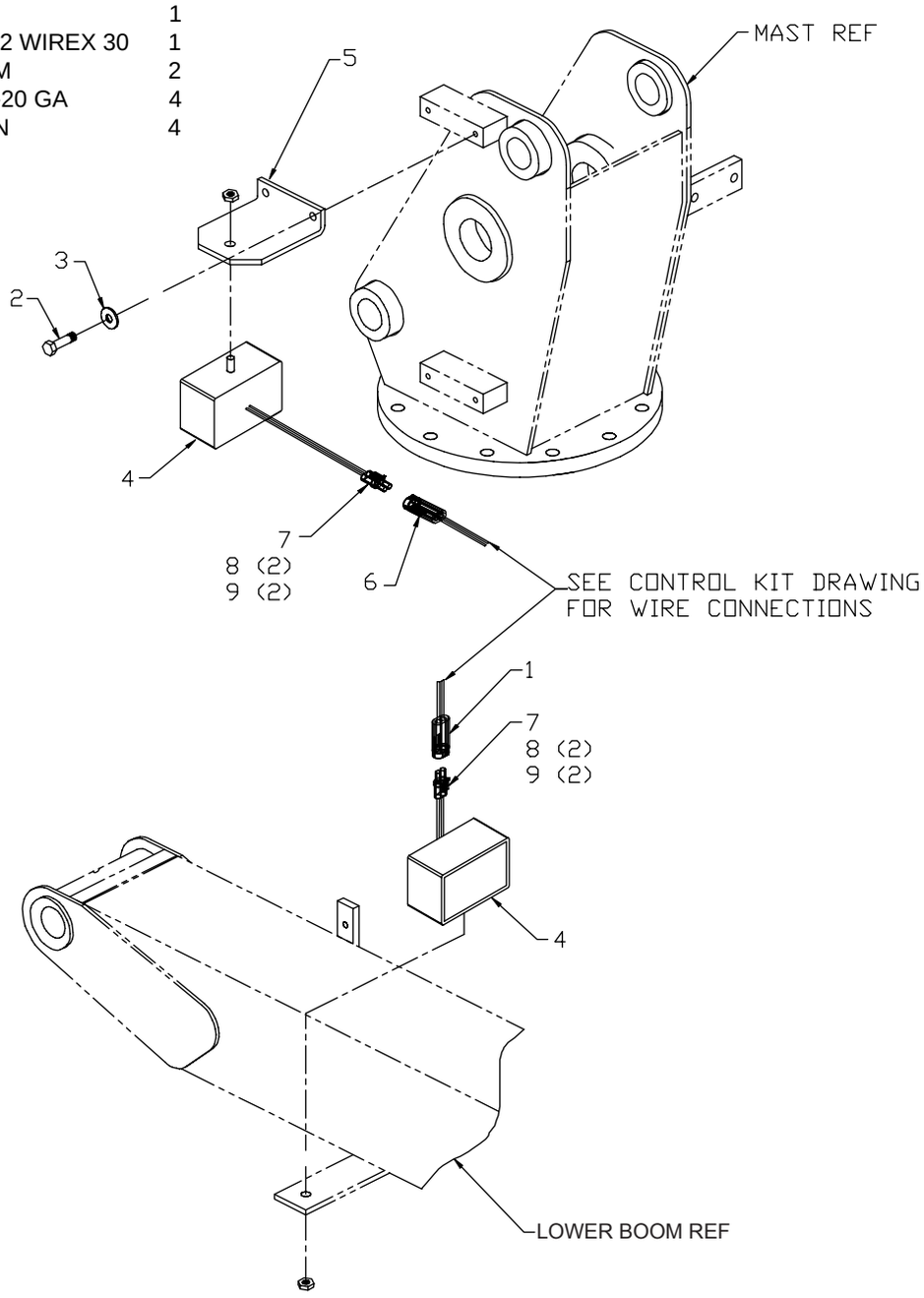
* TIE PRESSURE SWITCH WIRE AND LOWER LIFT CYLINDER HYDRAULIC HOSES TO LOWER LIFT CYLINDER PORT TUBE (TIE TO BE LOOSE ENOUGH TO ALLOW HOSES TO SLIDE WHEN LOWERING AND RAISING THE BOOM.) THIS WILL KEEP THE WIRE AND HOSES AWAY FROM THE WIRE ROPE.

CONTROL KIT-PROP'L (90714916-2)



LIGHT KIT (31714910)

ITEM	PART NO.	DESCRIPTION	QTY
1.	51717161	CABLE ASM 14GA/2 WIRE X 36	1
2.	72060023	CAP SCR 5/16-18X3/4 HHGR5	2
3.	72063050	WASHER 5/16 LOCK	2
4.	77040424	FLOOD LIGHT 12V	2
5.	60117598	LIGHT BRACKET	1
6.	51717162	CABLE ASM 14GA/2 WIREX 30	1
7.	77044574	CONN-TOWER FEM	2
8.	77044550	TERM-FEMALE 18-20 GA	4
9.	70394069	SEAL CABLE CONN	4



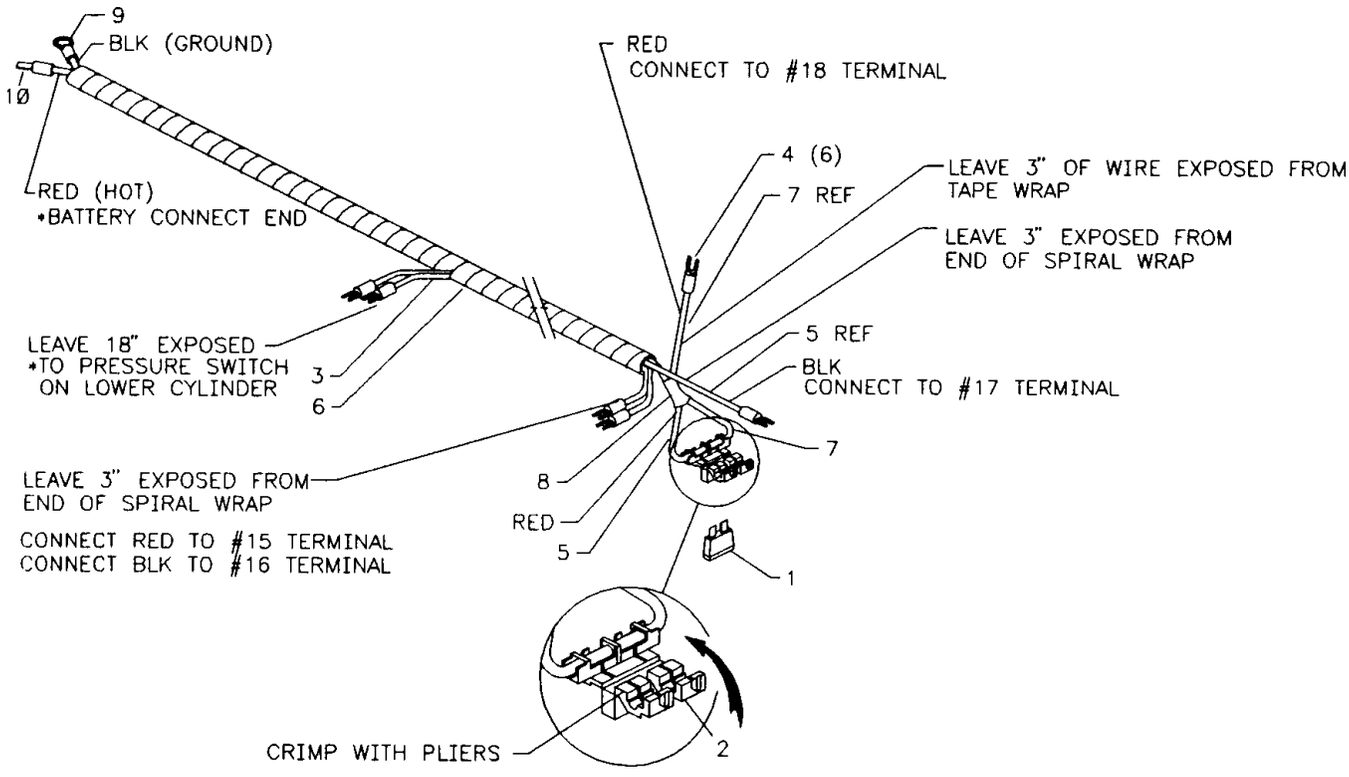
MANUFACTURING NOTES:
WIRING OF FLOODLIGHTS

A) Right Hand Side / Winch Drive Side Light
- Route wire/loom (from light) behind existing anti-two block reel bracket and along the top of the lower boom. Wire tie it to one of of the extension cylinder hoses.
- Continue to route wire. Wire tie it into existing valve bank wire harness and route it across underneath the terminal block to left side of crane.

b) Left Hand Side Light
- Route wire/loom (from light) directly to back of mast. Route it underneath the terminal block and wire tie/ wrap into wire from right side light and connect the two light wires into the relay.

CABLE ASM-PRESSURE SWITCH OVERSTRESS (51713006)

ITEM	PART NO.	DESCRIPTION	QTY
1.	77041158	FUSE-ATO	1
2.	77041488	FUSE HOLDER	1
3.	89044188	CABLE 14GA DUPLEX	43"
4.	77040051	TERMINAL-#8SPRSPD 16-14GA	6
5.	89044188	CABLE 14GA DUPLEX	84"
6.	89034049	SPIRAL WRAP-BLK	84"
7.	89044232	WIRE 14GA RED	5"
8.		TAPE-ELECTRICIANS	AR
9.	77044651	TERMINAL-3/8STUD 16-14GA	1
10.	77040186	TERMINAL 1/4FSLPON	1

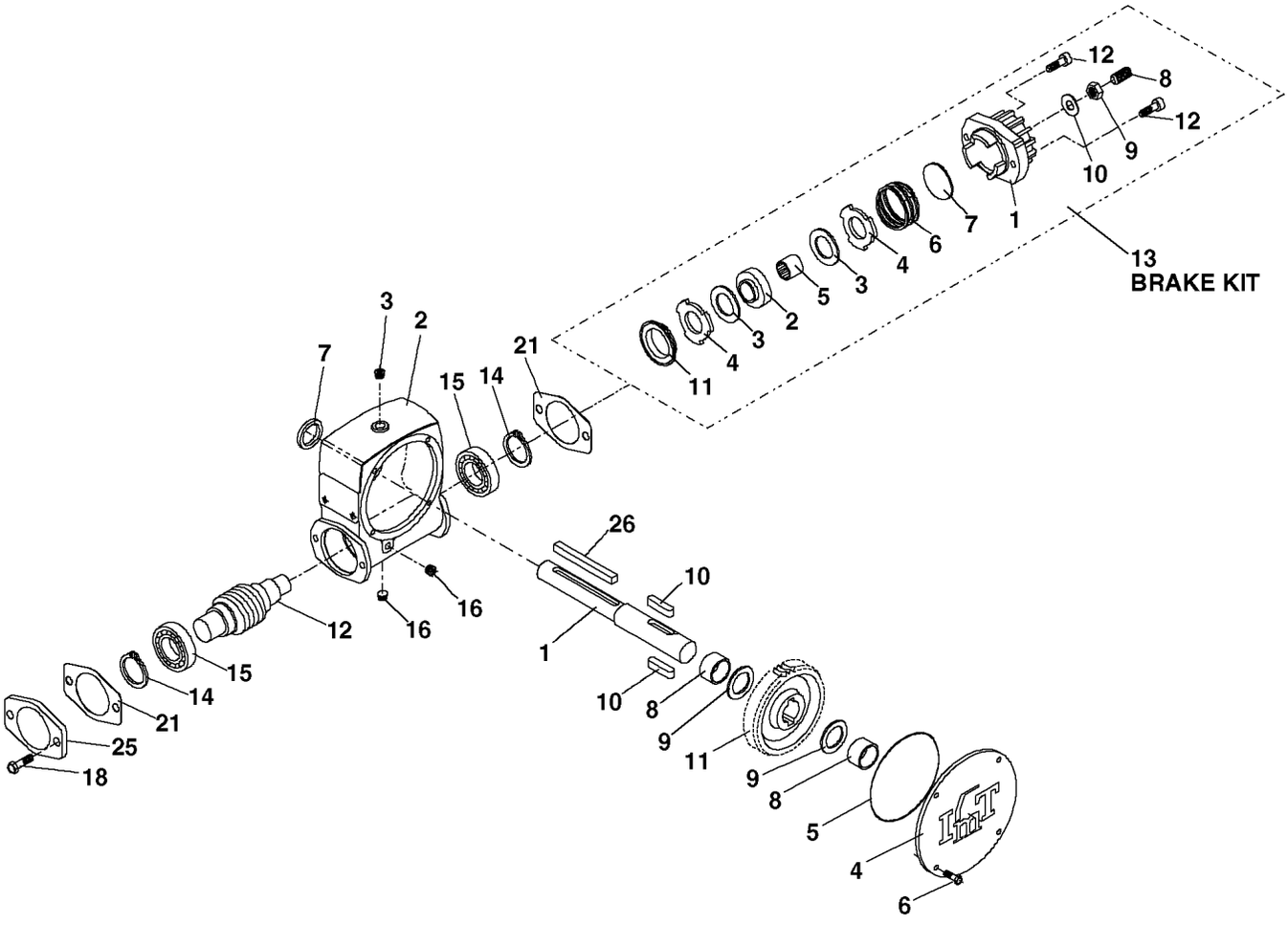


WINCH REPLACEMENT PARTS (71057987)

ITEM	PART NO.	DESCRIPTION	QTY
1.	70143943	SHAFT-OUTPUT	1
2.	70143672	HOUSING	1
3.	70048142	BUSHING & BREATHER KIT 3/8	1
4.	70145277	COVER	1
5.	76393174	O-RING	1
6.	72601568	CAP SCREW	4
7.	76393173	OIL SEAL	1
8.	70143670	BUSHING	2
9.	70143669	WASHER	2
10.	70143668	KEY	2
11.	70056428	GEAR-SR	1
12.	70056427	WORM-SR	1
13.	70732542	BRAKE KIT (INCL:27-38)	1
14.	72661348	RETAINING RING	2
15.	70055202	BALL BEARING	2
16.	70143865	PIPE PLUG	2
17.	72601567	CAP SCREW	2
21.	76393171	GASKET	2
25.	—	PROTECTOR (DISCARD)	1
26.	70143944	KEY	1
27.	70143664	*FRICTION DISC	2REF
28.	70143665	*BRAKE HUB	1REF
29.	70143662	*CAM CLUTCH	1REF
30.	70143661	*SPRING	1REF
31.	70143660	*THRUST WASHER	1REF
32.	70143666	*BRAKE HOUSING	1REF
33.	72601565	*CAP SCREW-SOC HD	2REF
34.	76393172	*WASHER-SEAL	1REF
35.	72601722	*LOCKNUT-SEAL	1REF
36.	72601723	*SET SCREW	1REF
37.	70143659	*BRAKE SPACER	1REF
38.	70143663	*STATOR PLATE	2REF

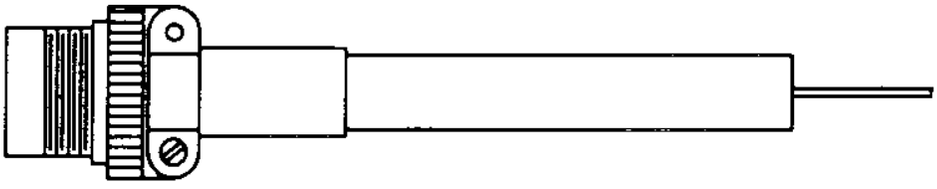
* PART OF ITEM 13.

GEAR RATIO: 38:1
OUTPUT TORQUE: 19800 IN-LBS
MAX INPUT TORQUE: 983 IN-LBS
MAX INPUT SPEED: 400 RPM
INSTALLED WEIGHT: 41 LBS



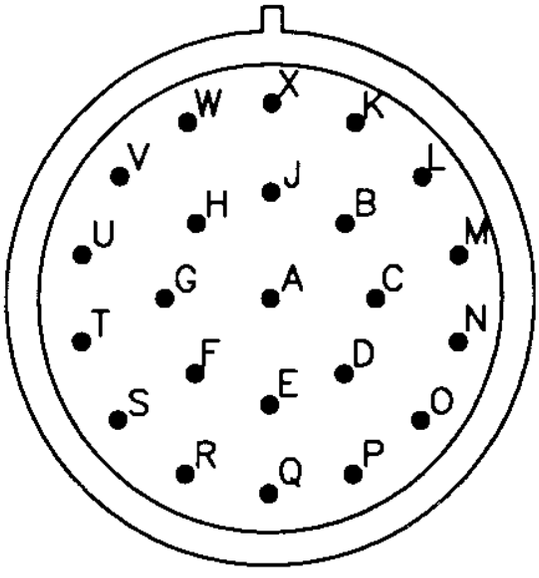
CABLE ASM-18GA/16WX72.00 JIC (51715270)

ITEM	PART NO.	DESCRIPTION	QTY
1.	89044116	CABLE 18GA/16WIRE	72”
2.	77044668	PLUG-SEAL	7
3.	77040051	TERM #8SPRSPD 16-14GA	16
4.	77044620	CONNECTOR	1
5.	77044580	SOCKET	16



ADD TERMINAL ENDS TO WIRES PER CHART

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



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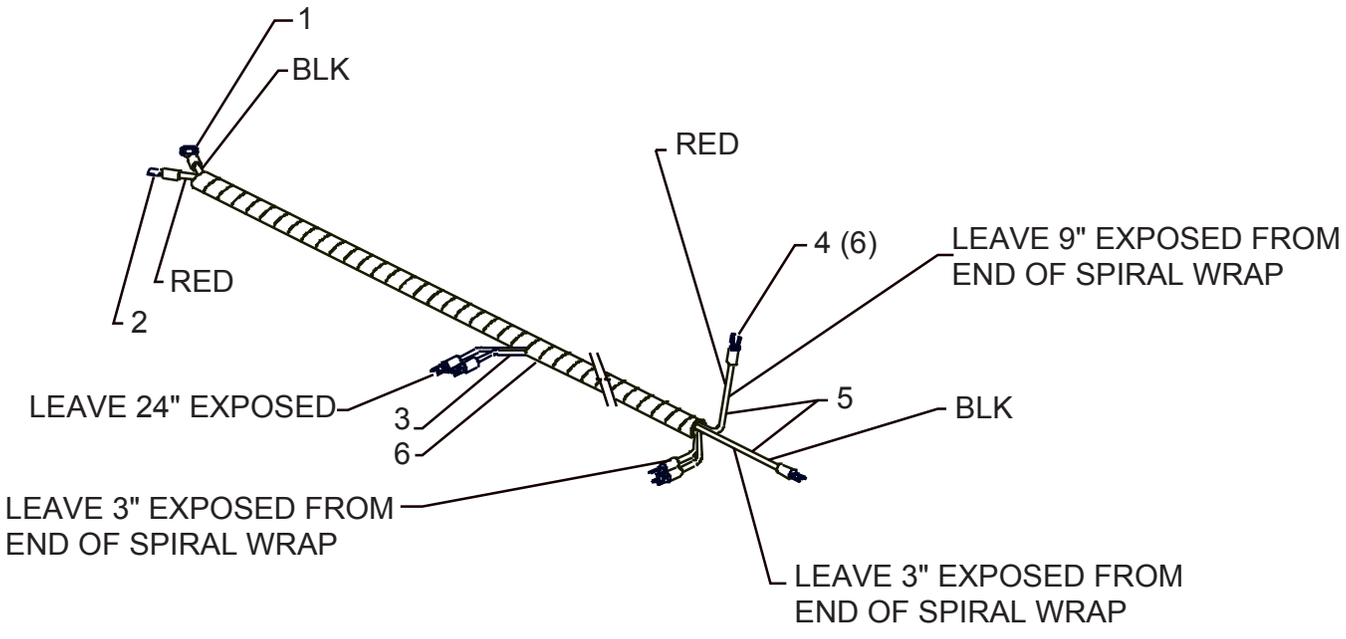
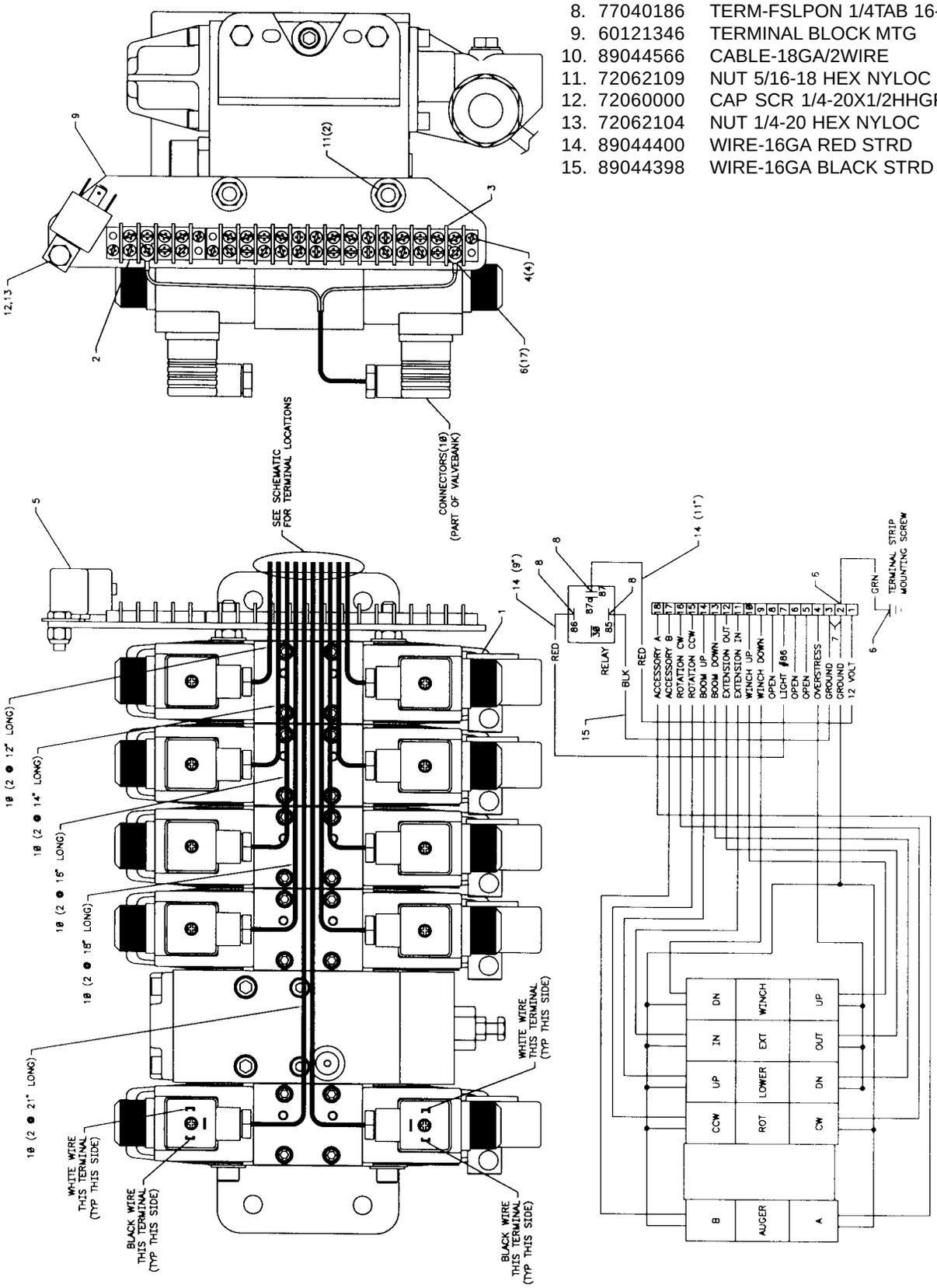
CABLE ASM-PRESS SW/ OVERSTRESS (51716729)

ITEM	PART NO.	DESCRIPTION	QTY
1.	77044651	TERM-RING .38 STUD 16-14 GA	1
2.	77040186	TERM-FSLPON I .25TAB 16-14	1
3.	89044188	CABLE-14AWG DUPLEX	42”
4.	77040051	TERM-SPRSPADE I #8 16-14	6
5.	89044188	CABLE-14AWG DUPLEX	78”
6.	89034049	SPIRAL WRAP-BLACK	72”



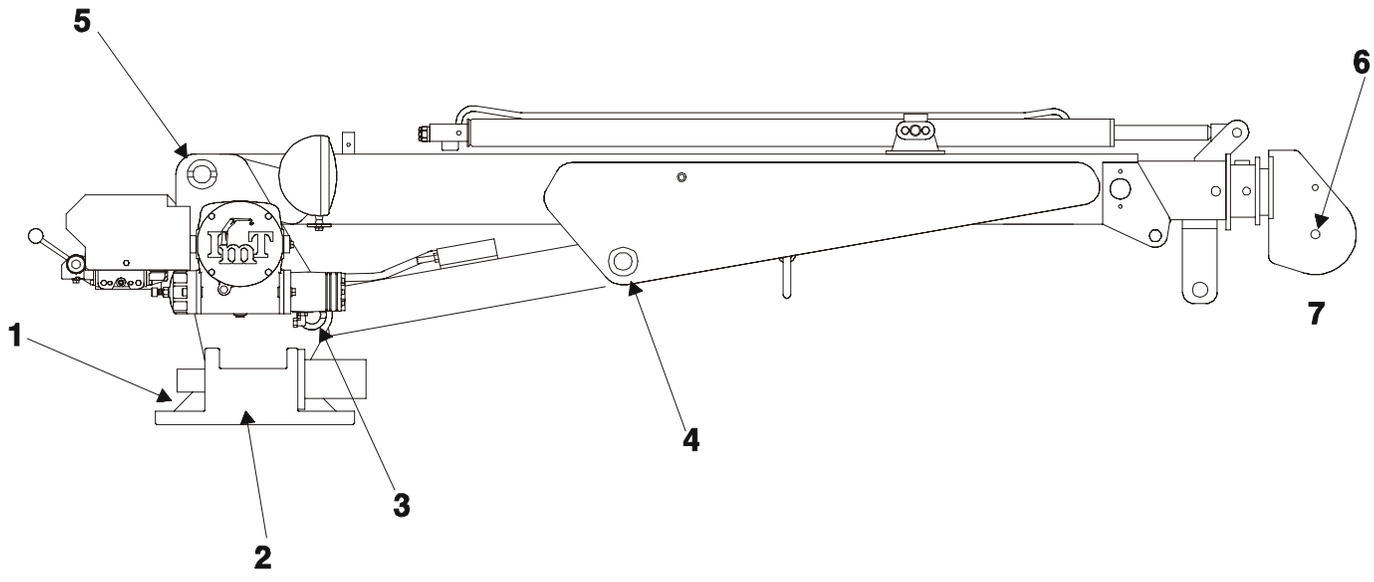
VALVEBANK ASM (51715040)

ITEM	PART NO.	DESCRIPTION	QTY
1.	70733304	VB-5SEC PROP	1
2.	77044341	TERMINAL BLOCK-4 CONTACT	1
3.	77044309	TERMINAL BLOCK-14 CONTACT	1
4.	72061009	SCR-SHT MET #6X3/4PH	4
5.	77041251	RELAY-P&B	1
6.	77040051	TERM-SPRSPADE I #8 16-14	19
7.	77040130	JUMPER BAR-TERMINAL	1
8.	77040186	TERM-FSLPON 1/4TAB 16-14GA	3
9.	60121346	TERMINAL BLOCK MTG	1
10.	89044566	CABLE-18GA/2WIRE	162”
11.	72062109	NUT 5/16-18 HEX NYLOC	2
12.	72060000	CAP SCR 1/4-20X1/2HHGR5Z	1
13.	72062104	NUT 1/4-20 HEX NYLOC	1
14.	89044400	WIRE-16GA RED STRD	20”
15.	89044398	WIRE-16GA BLACK STRD	9”



SECTION 3. REFERENCE

GREASE ZERK LOCATIONS & LUBRICANT REQUIREMENTS



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

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

TORQUE DATA CHART - DOMESTIC

FINE THREAD BOLTS

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

COARSE THREAD BOLTS

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

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

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

2. Flat washers of equal strength must be used.

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

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

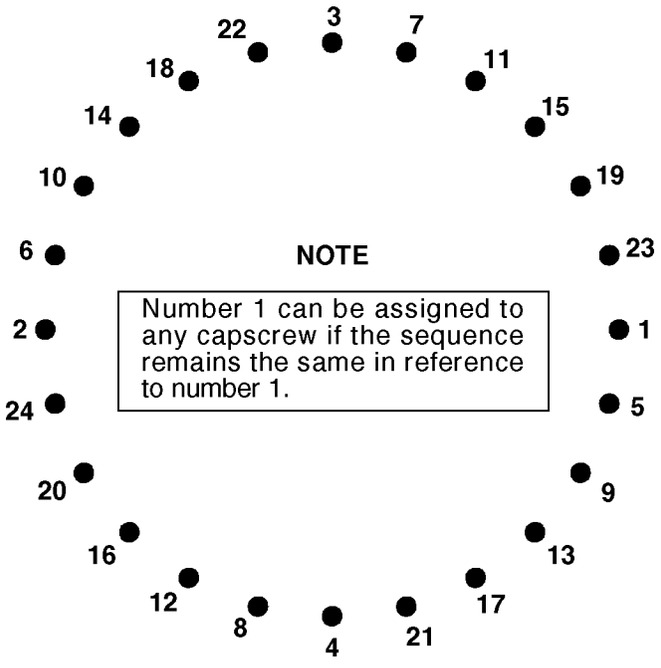
5. Torque values for socket-head capscrews are the same as for Grade 8 capscrews.

WARNING

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

TURNTABLE BEARING FASTENER TIGHTENING SEQUENCE

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



TIGHTENING PROCEDURE:

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

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

3. Torque all capscrews to approximately 40% of the specified torque value, by following the sequence.
   (EXAMPLE: .40 x 265 FT-LBS = 106 FT-LBS)
   (EXAMPLE-METRIC: .40 x 36 KG-M = 14.4 KG-M)

4. Repeat Step 3, but torqueing all capscrews to 75% of the specified torque value. Continue to follow the tightening sequence.
   (EXAMPLE: .75 x 265 FT-LBS = 199 FT-LBS)
   (EXAMPLE-METRIC: .75 x 36 KG-M = 27 KG-M)

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

NOTES

NOTICE

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

Inspection Checklist

CRANES

1

REV: 5-14-98

OWNER/COMPANY	*TYPE OF INSPECTION (check one)* ☐ *DAILY (if deficiency found)* ☐ *QUARTERLY* ☐ *MONTHLY* ☐ *ANNUAL*
CONTACT PERSON	*DATE INSPECTED*
CRANE MAKE & MODEL	*HOUR METER READING (if applicable)*
CRANE SERIAL NUMBER	*INSPECTED BY (print)*
UNIT I.D. NUMBER	*SIGNATURE OF INSPECTOR*
LOCATION OF UNIT	

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 (✘) is found.

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 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.

✔ = SATISFACTORY
✘ = DEFICIENCY (must be corrected prior to operation)
R = RECOMMENDATION (should be considered for corrective action)
NA = NOT APPLICABLE

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS ✔ , ✘ R, NA
D	1	Labels	All load charts, safety & warning labels, & control labels are present and legible.	
D	2		Check all safety devices for proper operation.	
D	3	Controls	Control mechanisms for proper operation of all functions, leaks & cracks.	
D	4	Station	Control and operator's station for dirt, contamination by lubricants, & foreign materials.	
D	5	Hyd System	Hydraulic system (hoses, tubes & fittings) for leakage & proper oil level.	
D	6	Hook	Presence & proper operation of hook safety latches.	
D	7	Rope	Proper reeving of wire rope on sheaves & winch drum.	
D	8	Pins	Proper engagement of all connecting pins & pin retaining devices.	
D	9	General	Overall observation of crane for damaged or missing parts, cracked welds & 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 & determine cause & severity of hazard.	
D	11	Remote Ctrls	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-Blocking	Operate anti 2-blocking device to check for proper operation.	
D	14		Other	
D	15		Other	

Inspection Checklist — CRANES — 2

✔ = SATISFACTORY
✘ = DEFICIENCY (must be corrected prior to operation)
R = RECOMMENDATION (should be considered for corrective action)
NA = NOT APPLICABLE

FREQUENCY	ITEM	KEY	INSPECTION DESCRIPTION	STATUS ✔ , ✘ R, NA
M	16	Daily	All daily inspection items.	
M	17	Cylinders	Visual inspection of cylinders for leakage at rod, fittings & welds. Damage to rod & case.	
M	18	Valves	Holding valves for proper operation.	
M	19	Valves	Control valve for leaks at fittings & between sections.	
M	20	Valves	Control valve linkages for wear, smoothness of operation & tightness of fasteners. Relief valve for proper pressure settings.	
M	21	General	Bent, broken or significantly rusted/corroded parts.	
M	22	Electrical	Electrical systems for presence of dirt, moisture & frayed wires.	
M	23	Structure	All structural members for damage.	
M	24	Welds	All welds for breaks & cracks.	
M	25	Pins	All pins for proper installation & condition.	
M	26	Hardware	All bolts, fasteners & retaining rings for tightness, wear & corrosion	
M	27	Wear Pads	Condition of wear pads.	
M	28	Pump & Motor	Hydraulic pumps & motors for leakage at fittings, seals & between sections. Check tightness of mounting bolts.	
M	29	PTO	Transmission/PTO for leakage, abnormal vibration & noise, alignment & mounting bolt torque.	
M	30	Hyd Fluid	Quality of hydraulic fluid and for presence of water.	
M	31	Hyd Lines	Hoses & tubes for leakage, abrasion damage, blistering, cracking, deterioration, fitting leakage & secured properly.	
M	32	Hook	Load hook for abnormal throat distance, twist, wear & cracks.	
M	33	Rope	Condition of load line.	
M	34	Manual	Presence of operator's manuals with unit.	
M	35		Other	
M	36		Other	
Q	37	Daily	All daily inspection items.	
Q	38	Monthly	All monthly inspection items.	
Q	39	Rotation Sys	Rotation bearing for proper torque of all mounting bolts.	
Q	40	Hardware	Base mounting bolts for proper torque.	
Q	41	Structure	All structural members for deformation, cracks & corrosion.	
	42		● Base	
	43		● Outrigger beams & 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, bearings, shafts, gears, rollers, & locking devices for wear, cracks, corrosion & distortion.	
	52		● Rotation bearing(s)	
	53		● Inner boom pivot pin(s) & retainer(s)	
	54		● Outer boom pivot pin(s) & retainer(s)	
	55		● Inner boom cylinder pin(s) & retainer(s)	
	56		● Outer boom cylinder pin(s) & retainer(s)	
	57		● Extension cylinder pin(s) & retainer(s)	
	58		● Jib boom pin(s) & retainer(s)	
	59		● Jib cylinder pin(s) & retainer(s)	
	60		● Jib extension cylinder pin(s) & retainer(s)	
	61		● Boom tip attachments	
	62		● Other	
Q	63	Hyd Lines	Hoses, fittings & tubing for proper routing, leakage, blistering, deformation & 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	

Inspection Checklist — CRANES — 3

FREQUENCY	ITEM	KEY	✔ = SATISFACTORY ✘ = DEFICIENCY (must be corrected prior to operation) R = RECOMMENDATION (should be considered for corrective action) NA = NOT APPLICABLE INSPECTION DESCRIPTION	STATUS ✔, ✘ R, NA
Q	70	Pumps & Motors	Pumps & 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, relief valve failure.	
	75		● Main control valve	
	76		● Load holding valve(s)	
	77		● Outrigger or auxiliary control valve(s)	
	78		● Other	
	79		● Other	
Q	80	Cylinders	Hydraulic cylinders for drifting, rod seal leakage & leakage at welds. Rods for nicks, scores & dents. Case for damage. Case & rod ends for damage & 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	
Q	89	Winch	Winch, sheaves & drums for damage, abnormal wear, abrasions & 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 pressures & relief valve settings	
A	96	Valves	Safety valve calibration for correct pressures & 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 & cracks.	
A	99	Lubrication	Gear oil change in rotation drive system per maintenance schedule.	
A	100	Hardware	Check tightness of all fasteners and bolts.	
A	101	Wear Pads	Wear pads for excessive wear.	
A	102	Loadline	Loadline for proper attachment to drum.	

Deficiency / Recommendation / Corrective Action Report

DATE	OWNER	UNIT I.D. NUMBER

GUIDELINES

A. A deficiency (✘) may constitute a hazard. ✘ must be corrected and/or faulty parts replaced before resuming operation.

B. Recommendations (***R***) should be considered for corrective actions. Corrective action for a particular recommendation depends on the facts in each situation.

C. Corrective actions (***CA***), repairs, adjustments, parts replacement, etc. are to be performed by a qualified person in accordance with all manufacturer's recommendations, specifications and requirements.

NOTE: *Deficiencies (✘) listed must be followed by the corresponding corrective action taken (**CA**).*

✘ = DEFICIENCY ***R*** = RECOMMENDATION ***CA*** = CORRECTIVE ACTION TAKEN

✘, R, CA	ITEM #	EXPLANATION	DATE CORRECTED

Deficiency / Recommendation / Corrective Action Report (cont) 4

✘, R, CA	ITEM #	EXPLANATION	DATE CORRECTED

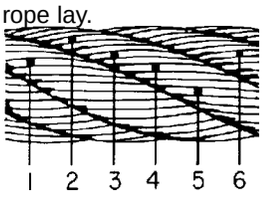
If additional space is required, reproduce this page and attach to this report.

WIRE ROPE INSPECTION

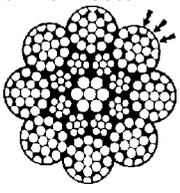
Wire rope with any of the deficiencies shown below shall be removed and replaced immediately.

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

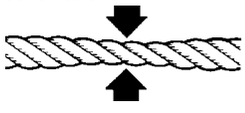
B. When there are either 3 broken wires in one strand or a total of six broken wires in all strands in any one rope lay.



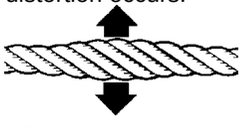
C. When flat spots on the outer wires appear and those outside wires are less than 2/3 the thickness of the unworn outer wire.



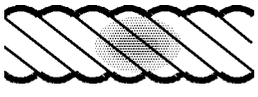
D. When there is a decrease of diameter indicating a core failure.



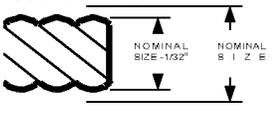
E. When kinking, crushing, birdcaging or other distortion occurs.



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



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



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

HOOK INSPECTION

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

A. DISTORTION

Bending / Twisting

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

Increased Throat Opening

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

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

B. WEAR

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

C. CRACKS, NICKS, GOUGES

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

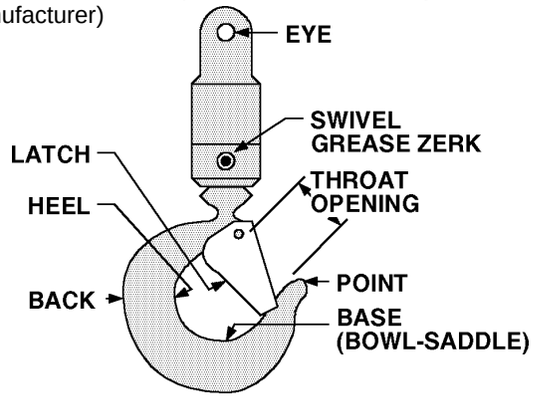
D. LATCH

Engagement, Damage & Malfunction

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

E. HOOK ATTACHMENTS & SECURING MEANS

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



HOLDING VALVE INSPECTION

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

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

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

ANTI-TWO BLOCKING DEVICE INSPECTION

(See Vol. 1, Operation, Maintenance and Repair for a complete description)

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

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

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

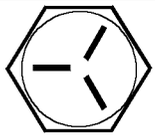
3. Start vehicle, engage PTO and slowly winch loadline up until anti-two block weight comes in contact with the hook end of the loadline cable. At the moment the weight is fully supported, a marked difference in winch operation should be noted. At this point, the winch up function should become very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

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

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

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

COARSE THREAD BOLTS

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

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

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

2. Flat washers of equal strength must be used.

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

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

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

WARNING

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