CLINCHER®

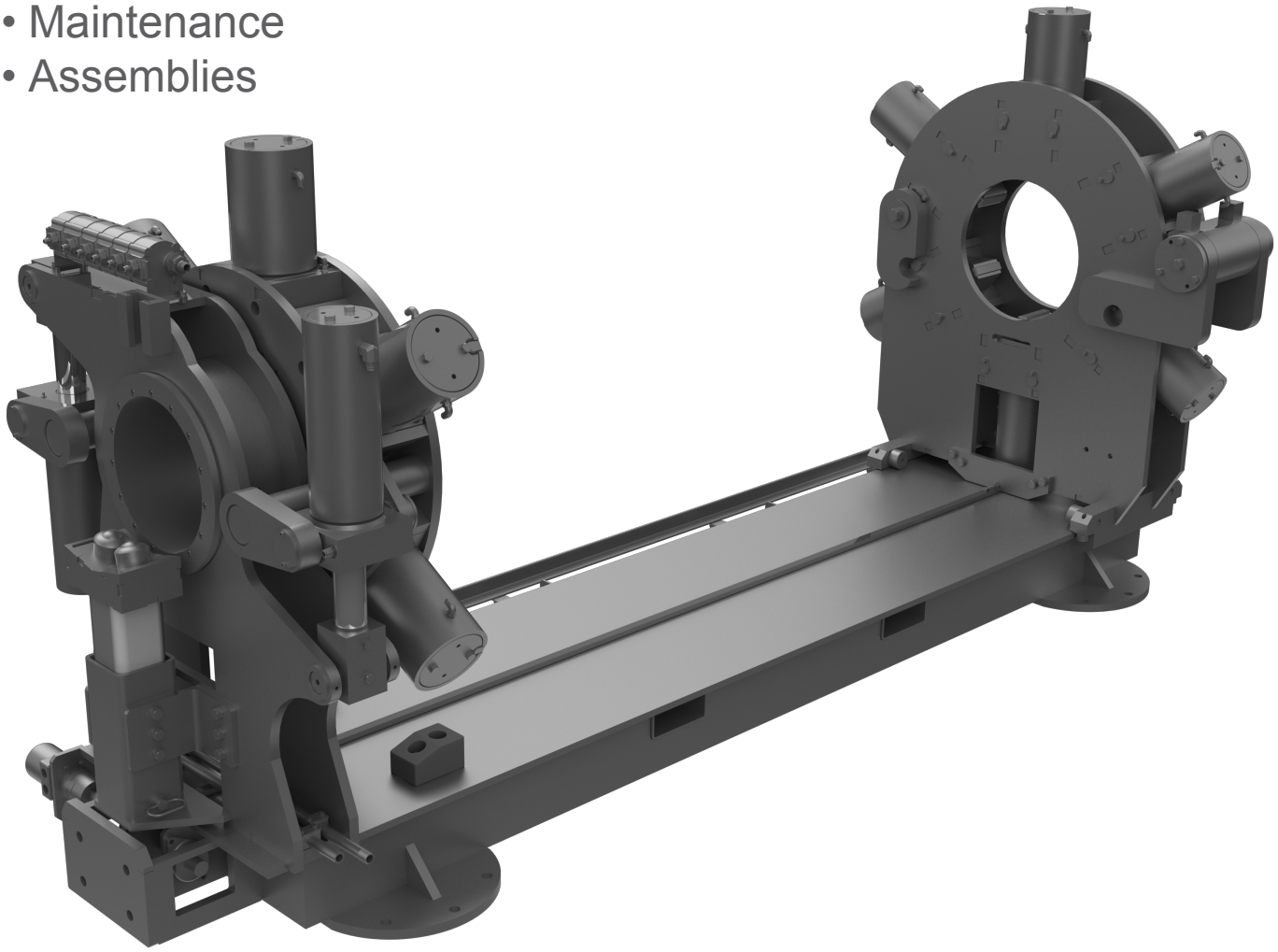
TECHNICAL MANUAL

RP3514

14” (35.5cm) 190K ft-lbs

Make / Break Unit

- Specifications
- Operation
- Maintenance
- Assemblies



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MCCOY
MOVING GLOBAL ENERGY FORWARD

Table of Contents

SECTION I

GENERAL DESCRIPTION:

Your **CLINCHER®** Make/Break unit is a rugged, self-contained, ratchet type unit designed to accurately make-up or break-out the threaded connections on tubular components such as oil and gas well drilling tools, casing, tubing, and similar equipment. The unit will accurately make-up and break-out thread connections without damage to the thread.

RECOMMENDED SAFETY GUIDELINES

The safety guidelines that follow are recommended by Superior Manufacturing & Hydraulics, and are in no way intended to supersede the specific health and safety regulations and guidelines of our client's workplace. Workplace rules and regulations are the responsibility of the client.

A. Work Apparel
To ensure employee safety, it is recommended that the following PPE (Personal Protective Equipment) be worn when using and working around hydraulic equipment:

1. Eye Protection (safety glasses)
To avoid risk of eye damage due to:
- fracture/failure of die inserts under load
- fracture/failure of tool under load
- failure of hydraulic hose or component under pressure

2. Ear Protection (ear plugs)
To prevent hearing damage due to:
- electric motor and hydraulic systems noise
- sudden and loud noises that may occur during the work process

3. Head Protection (hard hat)
To reduce danger due to:
- overhead cranes and hooks
- fracture/failure of die inserts under load
- fracture/failure of tool under load

4. Hand Protection (leather gloves)
To avoid danger due to:
- metal slivers on the tool or dies produced during the work process
- chemicals used during the work process
- failure of hydraulic hose or components under pressure

5. Foot Protection (steel-toed boots)
To prevent injury due to:
- falling or rolling work pieces

SECTION II

INSTALLATION:

CAUTION: Before lifting the unit with a forklift, the tailstock must be moved to its maximum extended position along the bed of the unit to assure the equipment remains balanced during the lifting process.

1. Inspect unit carefully for shipping damage or missing parts.
2. Position unit on a fairly flat and level floor leaving sufficient clearance on both ends to allow the insertion and removal of the longest tools expected to be serviced.
3. Anchor the unit in place.
4. Clean hydraulic hoses and quick disconnects.
5. Attach all hoses that connect the control console to the Make/Break Unit.
6. Fill hydraulic reservoir with recommended hydraulic fluid filtered using 3 micron filter system. Filler cap/breather is accessible on left side of unit. Level indicator may be viewed through a window in front.
7. Verify suction valve is open if present.
8. Fill pump case with filtered hydraulic oil before connecting power.
9. **CAUTION:** Check that main power supply matches name plate rating on motor in control console. Use of an incompatible power source will result in equipment damage and will void warranty.
10. Connect power supply.
11. Check motor rotation by jogging start/stop switch quickly. Reference the rotation plaque attached to the power unit. If rotation is incorrect, switch any two-phase wires at motor starter.

START UP:

1. Ensure both pressure relief valves are fully rotated counterclockwise to reduce pressure to minimum.
2. Start motor and check for oil leaks in console. Hold torque lever in make or break position and adjust Clamp Pressure Control until system pressure reads 1,000 psi. Cycle all valves fully several times to completely purge all air from the system.
3. Check Make/Break Unit and Hydraulic Power Unit for leaks.
4. Check reservoir for proper fluid levels. Add filtered hydraulic fluid if level is below sight glass when all cylinders are extended. Fill until fluid level reaches midpoint in sight glass. If fluid level is below sight glass level, unit will not operate.

SECTION III

OPERATION

The E-Stop is located on the control console, and must be pulled out for the unit to operate. Locate the start button on the motor starter. Push to start main drive motor.

1. Position control levers to neutral position.
2. Start the motor.
3. Move torque control lever in either direction until the Tailstock ratchets to limit. Continue to hold torque control lever in this position while setting required torque with the torque adjustment control.
4. To adjust the center hydraulic control levels, move either lever up or down, then adjust the relief valve marked 'Clamp Pressure' to adjust the pressure of the jaw movement in or out.
5. Position work-piece near center of Headstock, shift the Headstock Clamp / Unclamp lever to the Clamp position. Headstock Clamp / Unclamp control lever must be left in the 'Clamp' position while work-piece is in machine.
6. Position Tailstock as close as possible to tong, allowing required space for thread travel. **CAUTION:** If adequate space is not left to accommodate thread travel, the backup will contact the tong, potentially damaging the equipment or tubular connection. Such damage is not covered by the warranty.
7. Ratchet Tailstock in preparation for makeup or breakout. Shift Tailstock Clamp / Unclamp lever into Clamp position.
8. Using Make Up / Break Out control lever, apply make-up or break-out torque. Repeat as required, leaving Headstock cylinders clamped onto work-piece while releasing and ratcheting Tailstock only.

MAKE-UP

When making up connections, the Tailstock will stop ratcheting when selected torque has been applied. To ensure that torque has been applied, make sure that the Tailstock stops before it reaches its travel limit.

BREAK-OUT

After breaking connection, continue ratcheting until gauges indicate little resistance to rotation. This assures the operater that the connection may be easily disassembled when removed from the unit.

SECTION IV

MAINTENANCE

DAILY:

1. With all clamp cylinders fully extended, check hydraulic reservoir oil level on sight glass on front of console. Fill with filtered hydraulic fluid if needed until level reaches midpoint on sight glass.
2. Inspect die inserts. Clear any debris from around clamp cylinders.

WEEKLY:

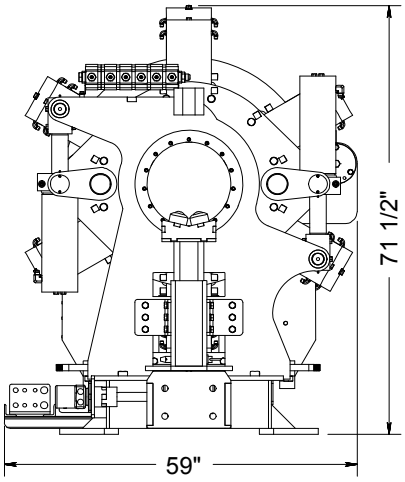
1. Remove dies and inspect jaw retainer bolt torque. Torque should be set to 180 ft-lbs.

MONTHLY:

1. Grease fittings.

ANNUALLY (or following any system repair):

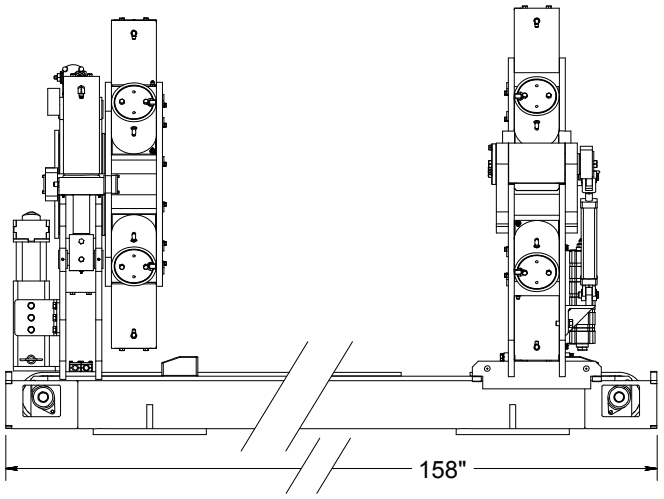
1. Drain and clean hydraulic reservoir. Analyze contamination / quality status of hydraulic oil (with the use of an analysis kit or by other third party means). Filter / replace oil as required.
2. Remove and clean suction strainer.
3. Refill reservoir with new filtered hydraulic oil.



SECTION V

HYDRAULIC POWER UNIT

The hydraulic power unit incorporates a number of pressure control and relief valves. These valves are correctly adjusted and set prior to shipment from our factory.
CAUTION: Adjusting internal relief valves or pump compensator settings will void warranty.

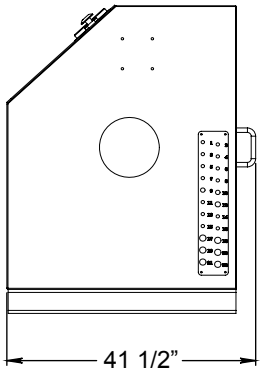


SECTION VI

SPECIFICATIONS

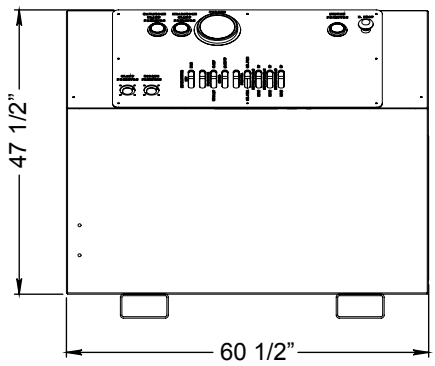
Console / Power Unit:

Electric Motor:	50 Horsepower, 480 Volt, 3 phase, 60 Hertz
Hydraulic Oil:	AW-68
Hyd. Oil Capacity:	90 gal.
Overall Length:	60 1/2”
Overall Width:	41 1/2”
Overall Height:	47 1/2”
Weight (approx.):	3,000 lbs.



Make / Break Unit (12’ skid without accessories):

Max. Torque:	190,000 ft-lbs
Handle Length:	21 1/2”
Overall Length:	158”
Overall Width:	59”
Overall Height:	71 1/2”
Weight (approx.):	8,000 lbs.



CHUCKING CAPACITIES
Headstock: 3 1/2” to 13 1/2” Diameter
Tailstock: 3 1/2” to 17 1/2” Diameter

TORQUE CAPACITY
Make-up 160,000 foot pounds / Break-out 190,000 foot pounds

LUBRICATION SPECIFICATIONS

Use an EP synthetic grease that meets or exceeds the following specifications: (Used in tong case)

Type	High Temp MP
NLGI Consistency Grade	1
Color	Medium Green
Lithium Complex Soap, wt%	Non Soap
Serv. Temperature	0 Deg. F – 450 Deg. F
Base Oil Viscosity: @ 100º F @ 200º F	1300 SUS 89 SUS
Viscosity Index	77
Penetration, dmm Worked *ASTM D 217*	325-340
Dropping Point, ºF *ASTM D 566*	500 ±
Rust Protection, 5% SSW	N/A
Water Washout %wt loss @ 175ºF	N/A
Timken, OK Load, lbs	50
Bomb Oxidation 100 hrs @ 210ºF, psi drop	N/A
Applications	High & Low Speed Bearings, Wheel Bearings, Pumps, Gears, Lubrication

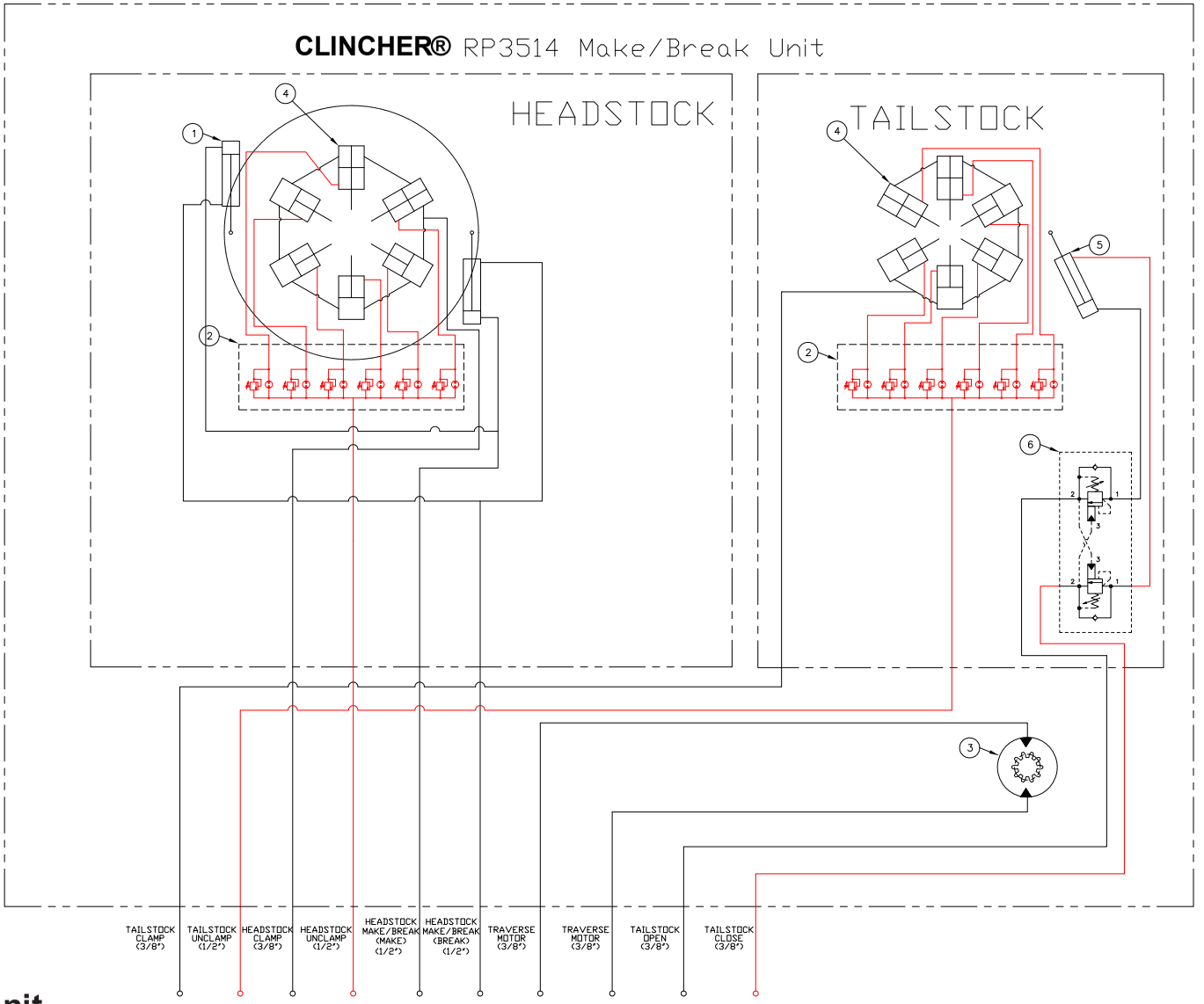
Use an EP synthetic grease that meets or exceeds the following specifications: (Used as bearing grease)

Type	N/A
NLGI Consistency Grade	2
Color	Blue
Lithium Complex Soap, wt%	14
Serv. Temperature	N/A
Base Oil Viscosity: @ 40ºC, cSt *ASTM D 445* @ 100ºC, cSt	150 14.5
Viscosity Index	N/A
Penetration, dmm Worked, 60X *ASTM D 217*	280
Dropping Point, ºF *ASTM D 2265*	450+
Rust Protection, 5% SSW *ASTM D 5969*	Pass
Water Washout %wt loss @ 175ºF *ASTM D 1264*	6.8
Timken, OK Load, lbs *ASTM D 2509*	45
Bomb Oxidation 100 hrs @ 210ºF, psi drop *ASTM D 942*	5 max
Applications	Industrial application where a high temperature/multipurpose extreme pressure grease is needed, Trailers

Use a premium quality hydraulic fluid that meets or exceeds the following specifications:

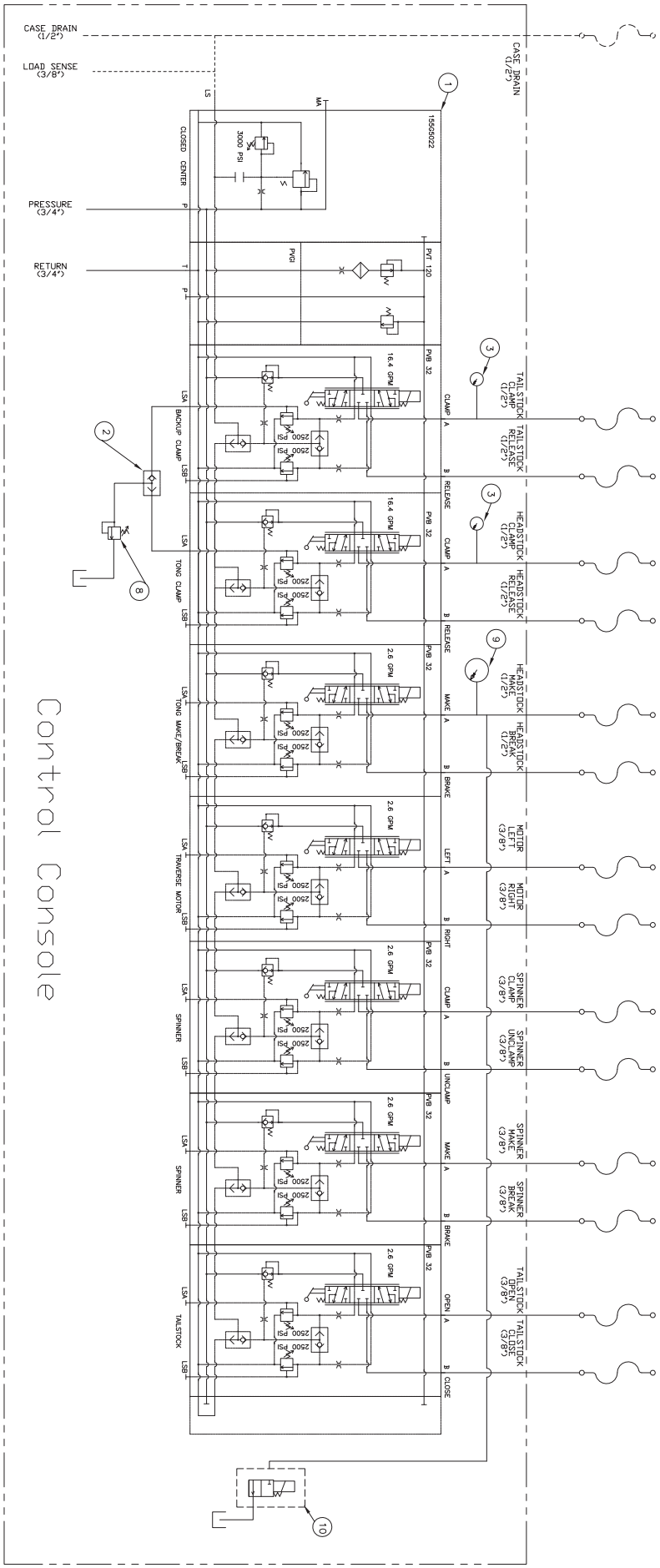
Humble Hydraulic H		68
ISO Viscosity Grade		68
Base Oil Viscosity: *ASTM D 445*	cSt @ 40ºC cSt @ 100ºC	65.0 8.5
Viscosity Index – *ASTM D 2270*		95
Pour Point – *ASTM D 97*		-9
Flash Point – *ASTM D 92*	C(ºF)	222 (432)
Demulsibility – *ASTM D 1401*		41/39/0 (20)
Vickers 104C (IP281)		Pass
Vickers M-2950-S		Quality Level
Vickers I-286-S		Quality Level
TOST – *ASTM D 943*		2000+

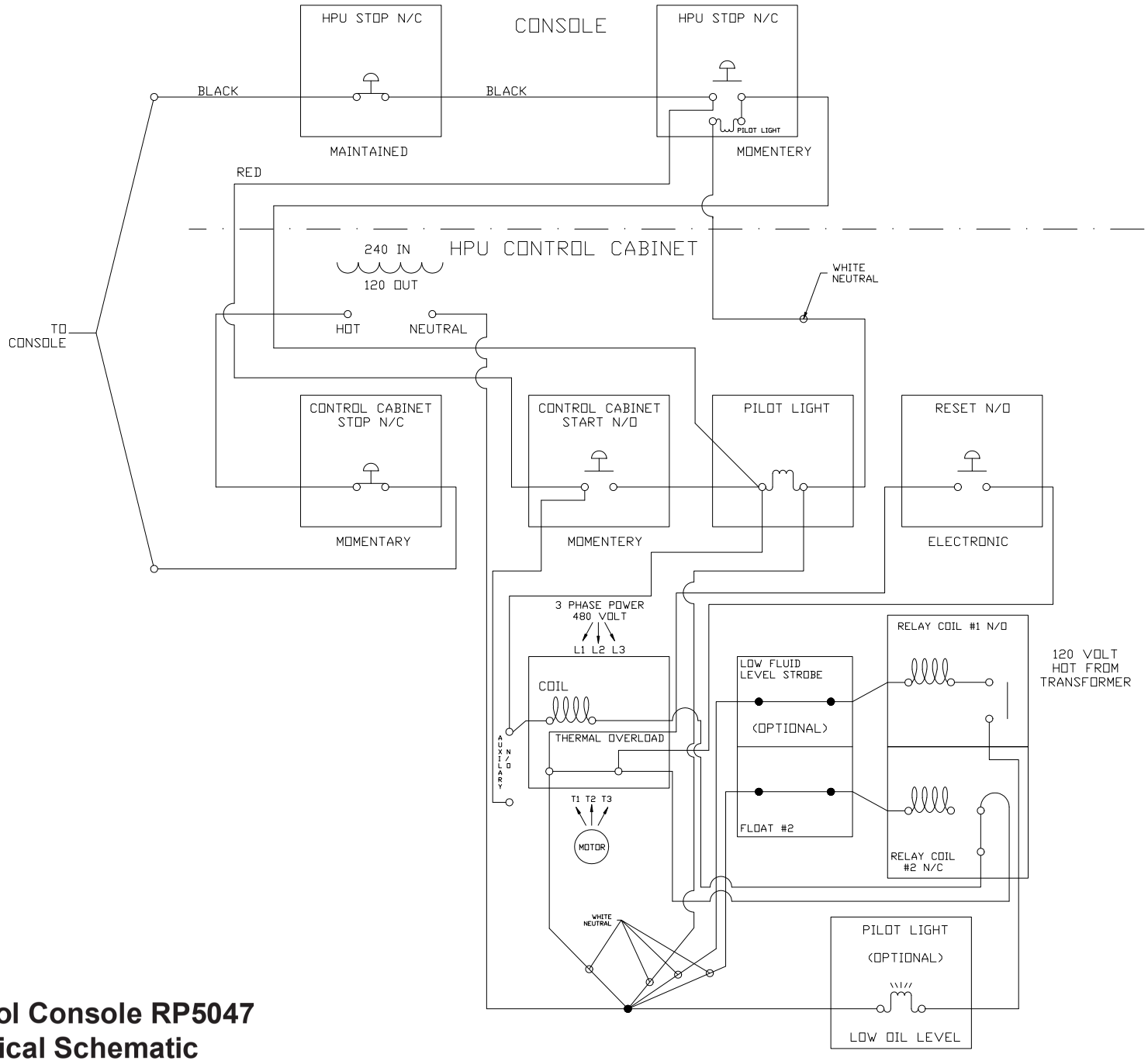
ITEM NO.	QTY.	DESCRIPTION	PART NUMBER
1	2	MAKE/BREAK CYLINDER	209-3000-1
2	2	FLOW DIVIDER	330-3500
3	1	HYDRAULIC MOTOR, SINGLE	511-3000
4	12	CLAMP CYLINDER	400-3000-1
5	1	BACKUP DOOR CYLINDER	333-3500
6	1	DUAL COUNTERBALANCE VALVE	340-3500



Make / Break Unit
Hydraulic Schematic

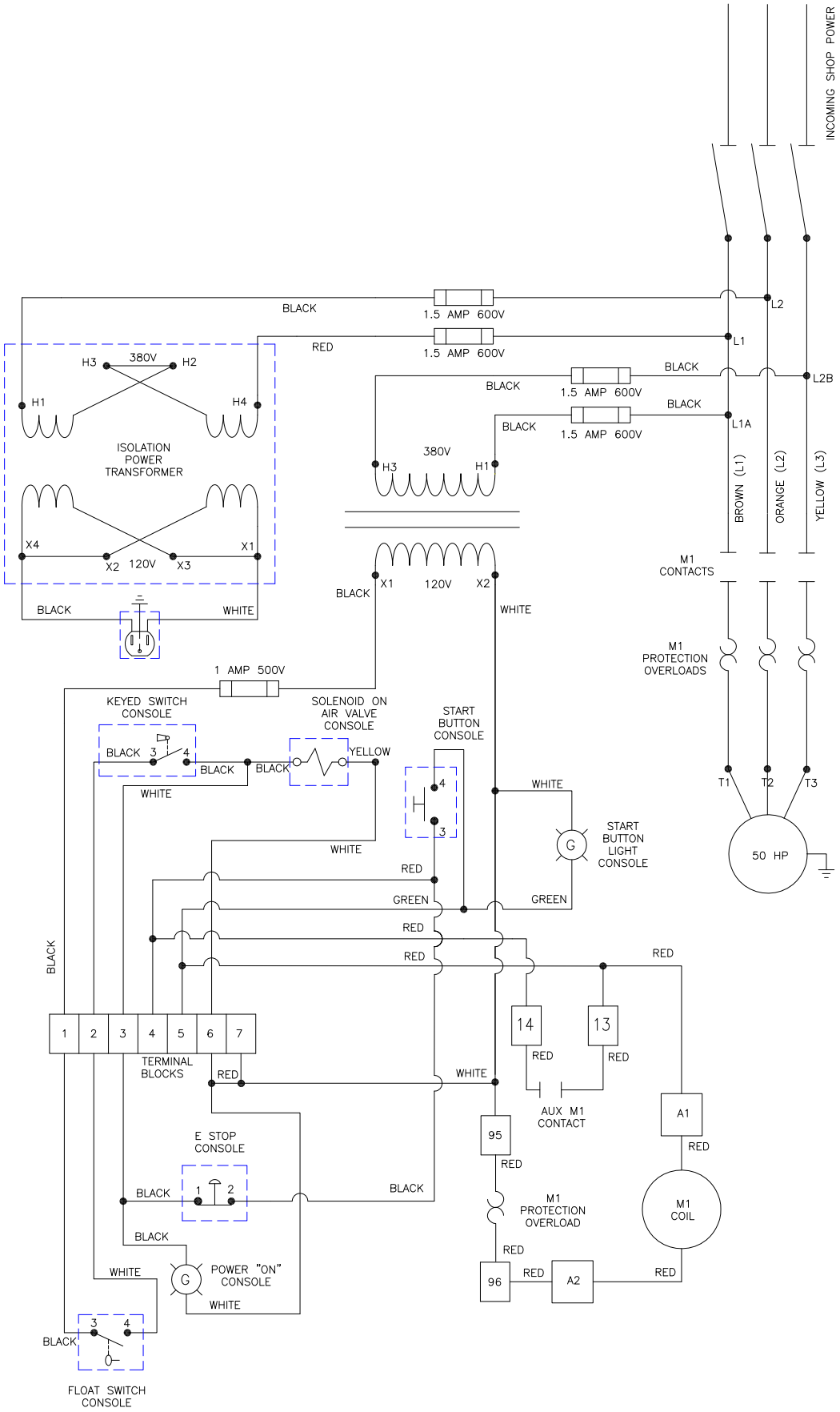
Control Console
Hydraulic Schematic

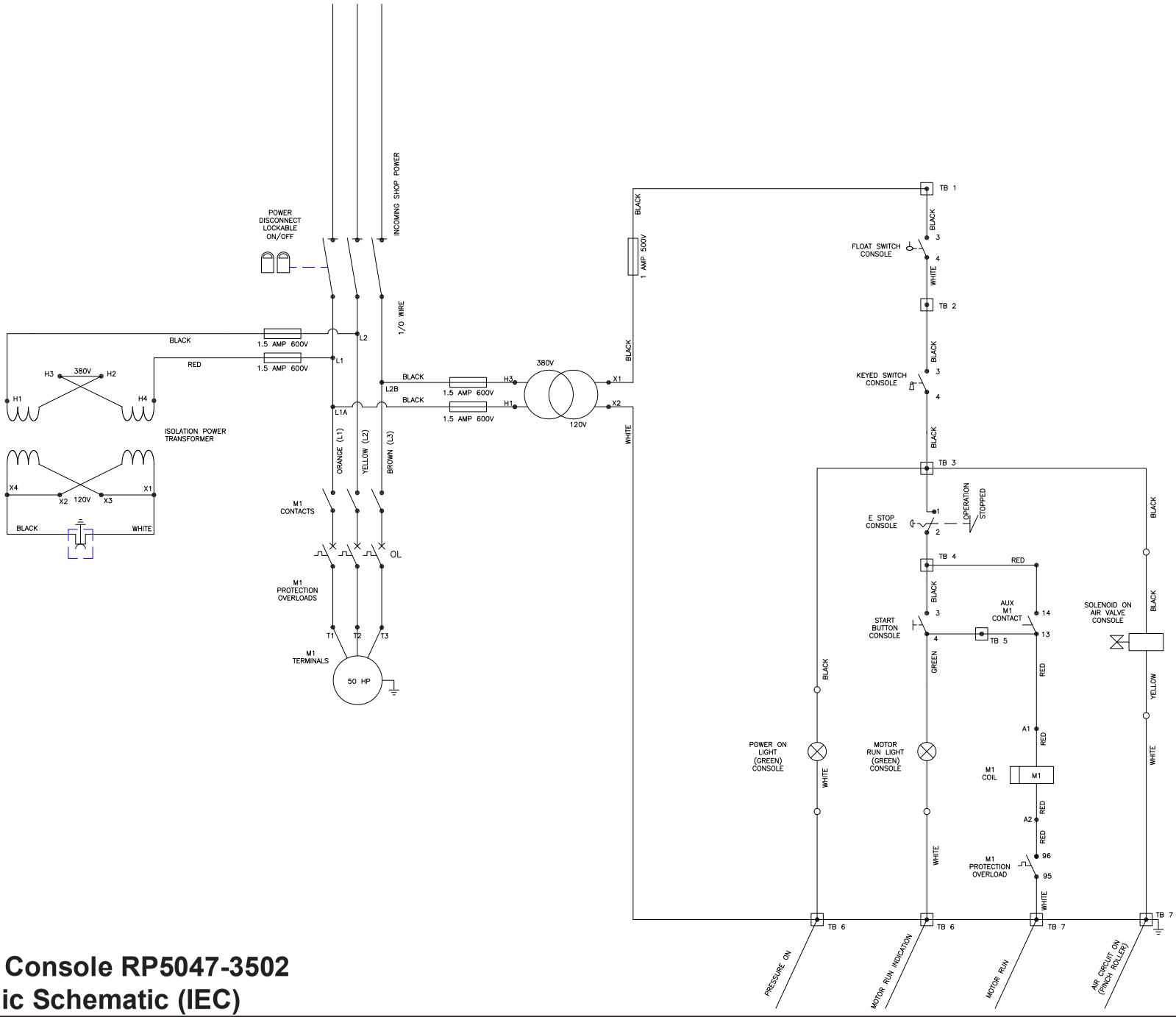




Control Console RP5047
Electrical Schematic

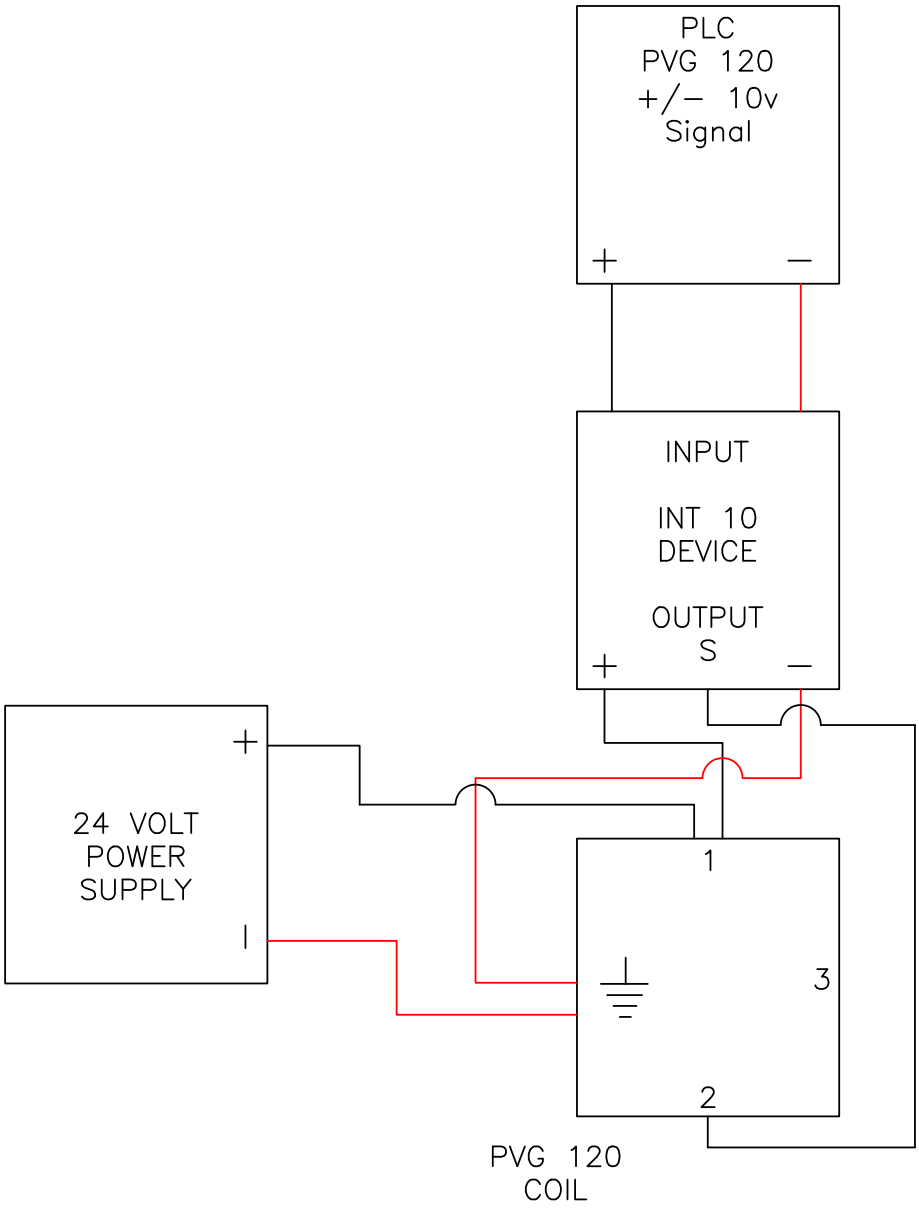
Control Console RP5047-3502
Hydraulic Schematic (ANSI)



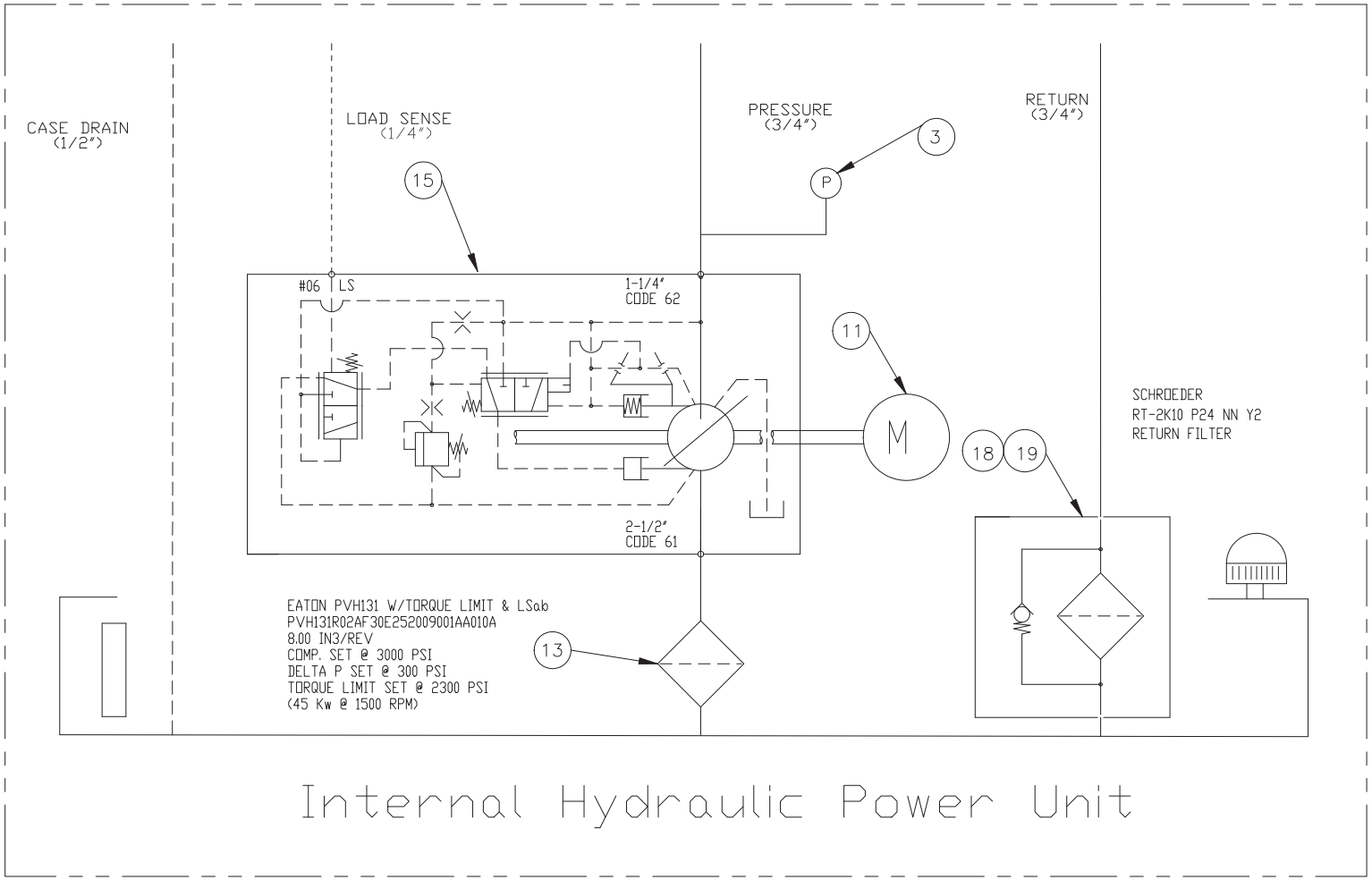


Control Console RP5047-3502
Hydraulic Schematic (IEC)

Electric Proportional Schematic



ITEM NO.	QTY.	DESCRIPTION	PART NUMBER	LOCATION
3	2	2-1/2" PRESSURE GAUGE, 0-3000	133-6500	CONSOLE/POWER UNIT
11	1	ELECTRIC MOTOR	PU5060-S1	CONSOLE/POWER UNIT
13	1	SUCTION STRAINER	SS-2-100-3	CONSOLE/POWER UNIT
15	1	HYDRAULIC PUMP	7003638	CONSOLE/POWER UNIT
18	1	FILTER HEAD	P563268	CONSOLE/POWER UNIT
19	1	FILTER ELEMENT	P562207	CONSOLE/POWER UNIT



Power Unit
Hydraulic Schematic

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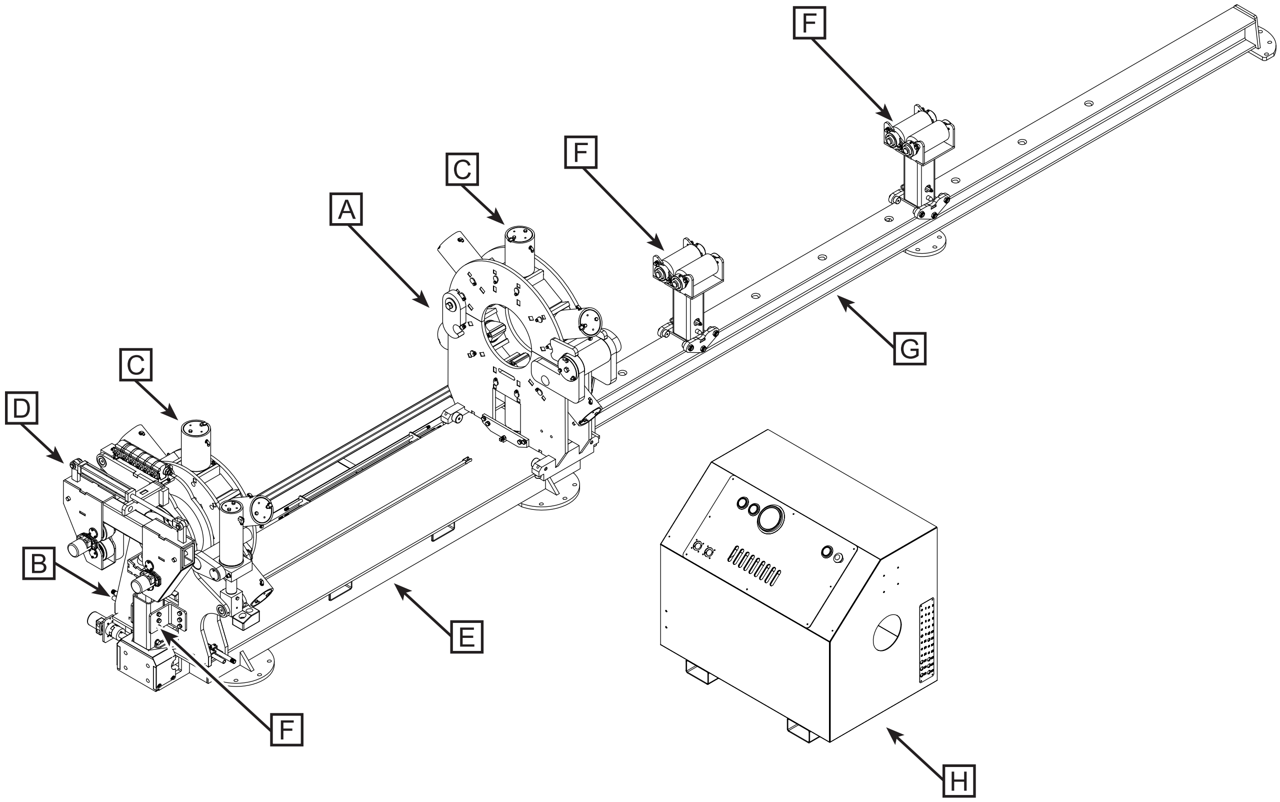
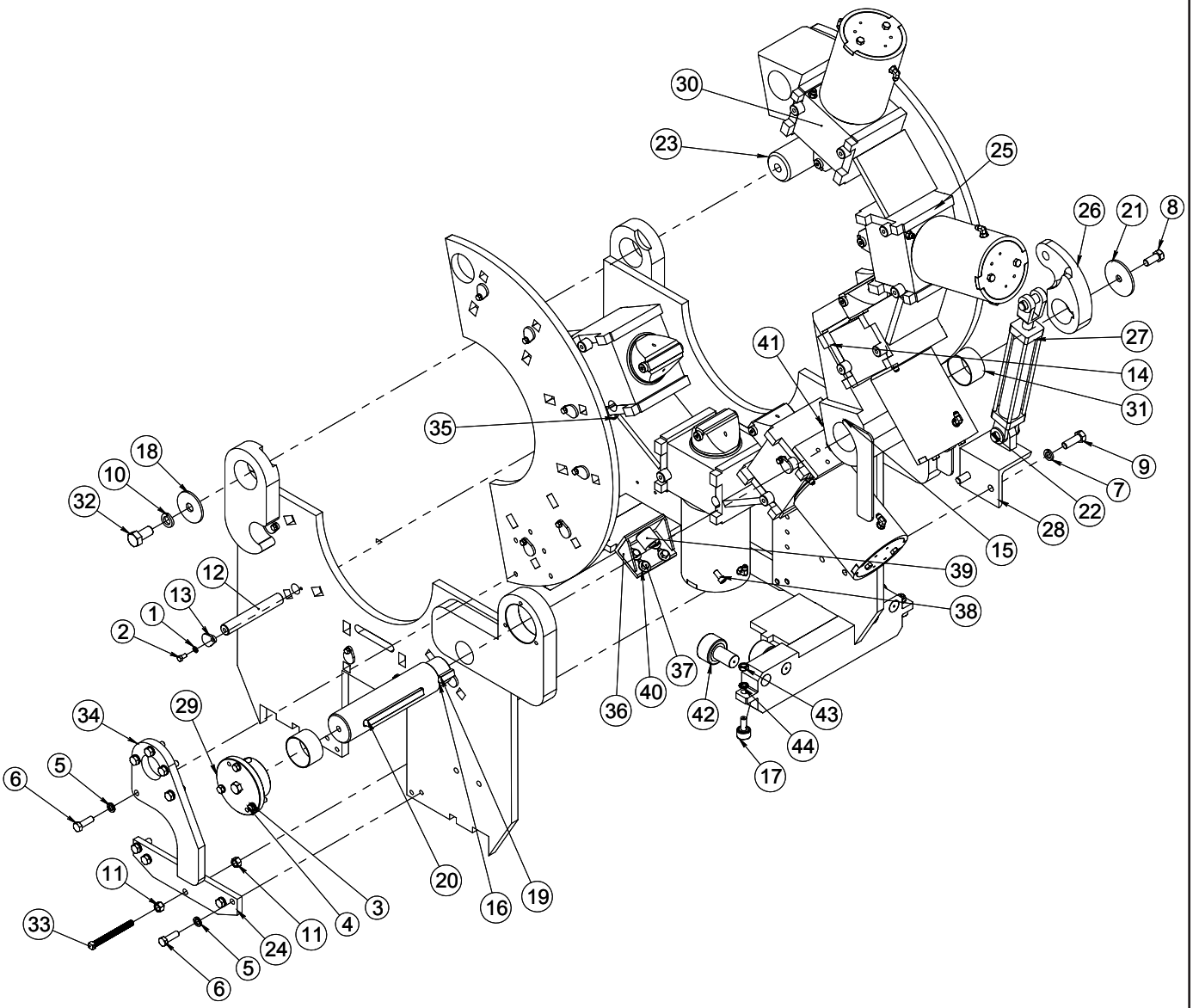
CLINCHER® RP3514

Make/Break Unit (Shown with Accessories)

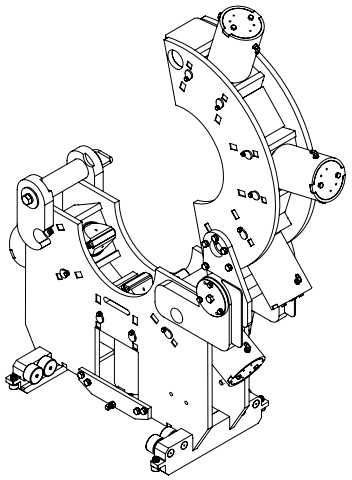


For third party component documentation used within this unit, please contact McCoy Drilling & Completions.

300-3500-1
Tailstock Assembly

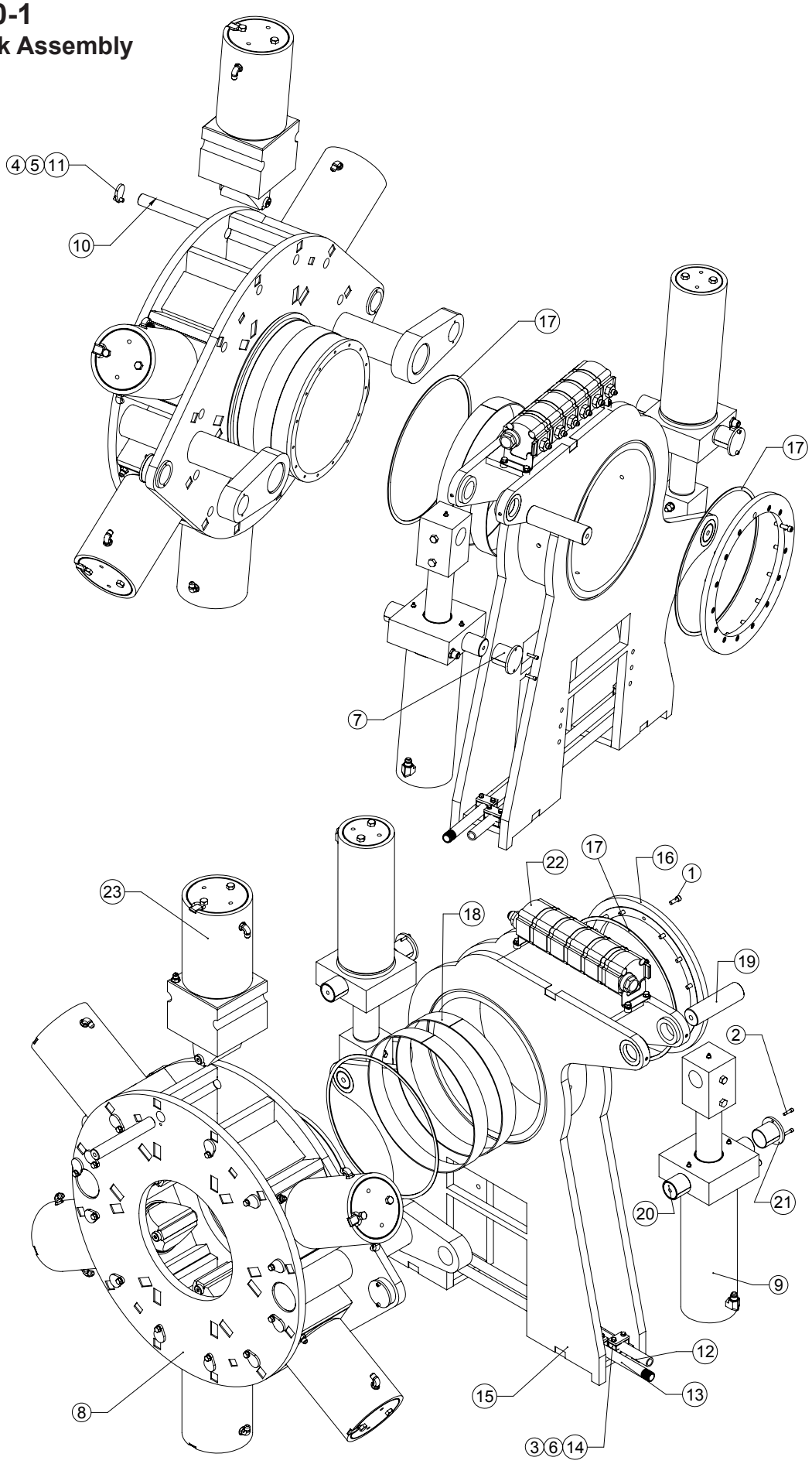


300-3500-1
Tailstock Assembly

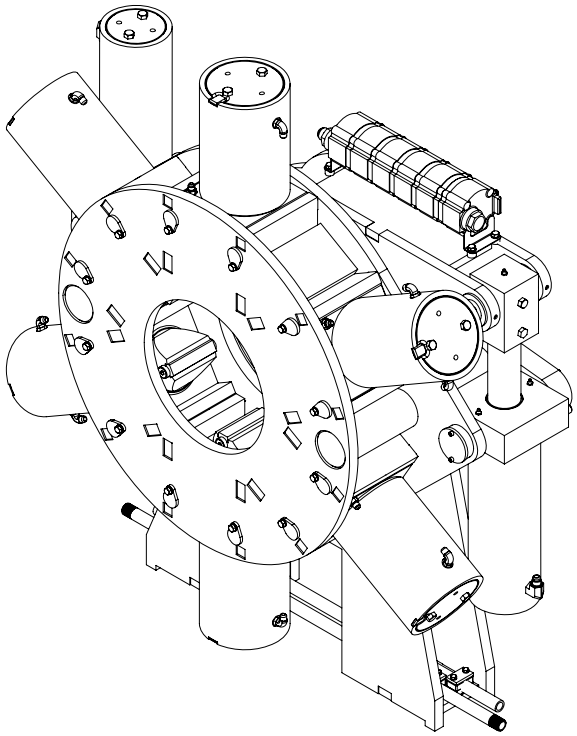


Item #	Qty.	Part Number	Part Name
1	12	1027	WASHER, LOCK 3/8"
2	12	1046	HHCS 3/8-16 X 3/4
3	3	1103	1/2" LOCKWASHER
4	3	1112-A	1/2"-13 x 2" HHCS
5	18	1151	5/8 LW
6	18	1160	5/8-11 x 2 HHCS
7	2	1171	3/4" LOCKWASHER
8	2	1173	3/4"-10 x 1 3/4" HHCS
9	2	1174	3/4"-10 X 2 1/4" HHCS
10	1	1218	1" LW
11	4	194	5/8-11 NC NUT (194)
12	12	222-3500	HEADSTOCK PIN
13	12	222B-3500	CYLINDER PIN RETAINER
14	1	300A-3500	TAILSTOCK TOP SECTION WELDMENT
15	1	300B-3500	TAILSTOCK LOWER SECTION WELDMENT
16	1	303A-3500-1	KEYED HINGE PIN
17	4	303D-3000-1	1 1/2" CAM FOLLOWER
18	1	303J-3500	LOCKING PIN RETAINER CAP
19	1	303L-3500	2" KEY STOCK
20	1	303M-3500	8 1/2" KEY STOCK
21	1	308-3500	PIN COVER
22	2	309-3000	1" X 3" CLEVIS PIN
23	1	322-3500	LOCKING PIN WELDMENT
24	2	325-3500	CHAIN MOUNT
25	1	330-3500	DELTA POWER 6 PORT FLOW DIVIDER
26	1	331-3500	CYLINDER LINKAGE
27	1	333-3500	2" TAILSTOCK CYLINDER
28	1	334-3500	CYLINDER MOUNT
29	1	336A-3500	CLOSED HINGE PIN CAP
30	6	400-3000-1	CLAMP CYLINDER ASSEMBLY
31	2	56DU32	3 1/2" DU BEARING
32	1	74044	HHCS 1"-8 X 2"
33	2	507A-3000	CHAIN ATTACHMENT
34	2	332-3500-02	DOOR STOP PLATE
35	1	518-3000	BULKHEAD PLATE
36	1	303P-3500	Stopper Angle Iron Weldment
37	4	1110	1/2"-13 x 1" HHCS
38	1	246	1/2-13 x 1 SHCS
39	1	300-3500-1-03	ELASTOMETRIC DIE SPRING
40	4	1102	1/2" FLAT WASHER
41	1	1101	NUT, HEX, 1/2-13
42	8	303D-3000-2	3 IN. CAM FOLLOWER WITH HEAVY STUD
43	4	1150	5/8"-18 JAM NUT
44	4	310EL-3500	5/8 IN. LOCKWASHER; WEDGE LOCK

200-3500-1
Headstock Assembly

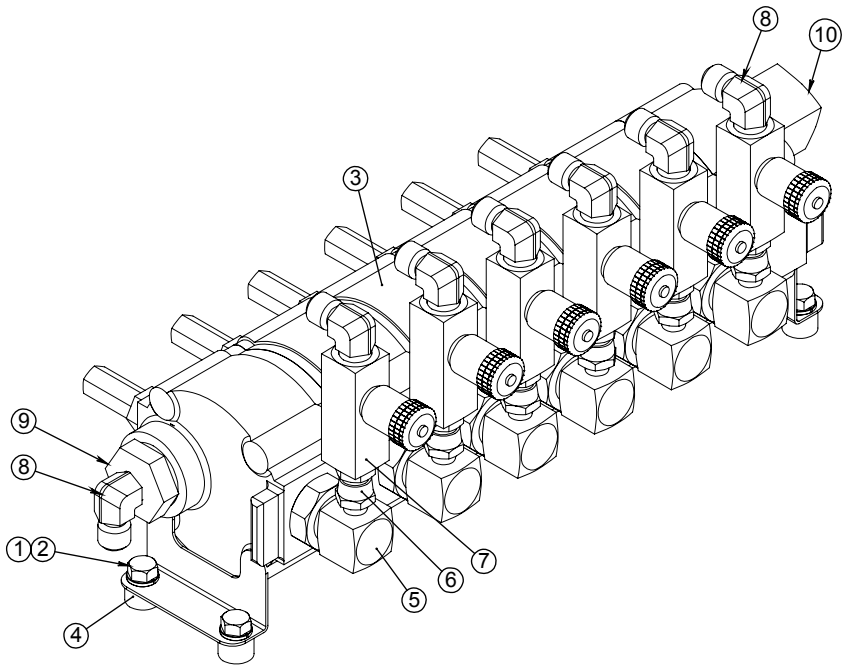


200-3500-1
Headstock Assembly



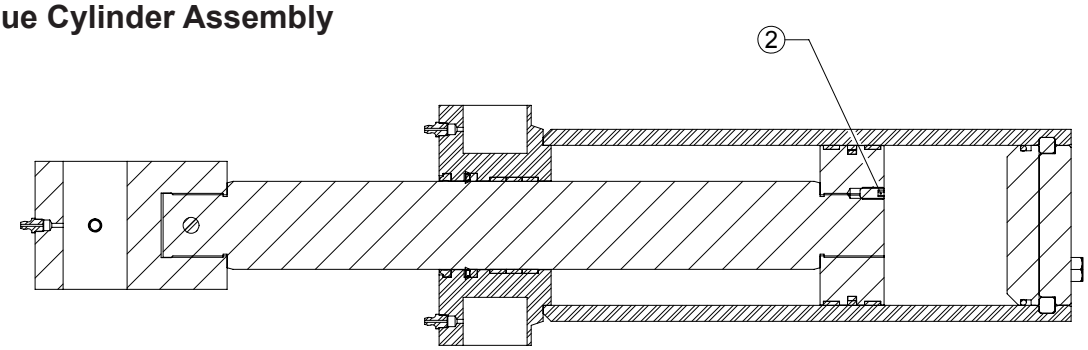
Item #	Qty.	Part Number	Part Name
1	15	1041	3/8-16x1 1/4 SHCS
2	8	1009	SHCS 1/4"-20 X 1"
3	8	101	1/4" LOCKWASHER
4	12	1027	WASHER, LOCK 3/8"
5	12	1046	HHCS 3/8-16 X 3/4
6	8	110	1/4"-20 X 2 1/4" HHCS
7	4	32DU32	2" x 2" GARLOCK BUSHING
8	1	200-3500	HEADSTOCK WELDMENT
9	2	209-3000-1	TORQUE CYLINDER ASSEMBLY
10	12	222-3500	HEADSTOCK PIN
11	12	222B-3500	CYLINDER PIN RETAINER
12	1	223-3500	MAKE/BREAK SUPPLY LINE
13	1	224-3500	MAKE/BRAKE RETURN LINE
14	4	225-3500	HOSE CLAMP
15	1	301-3500	MAKE/BREAK WELDMENT
16	1	306-3500	HEADSTOCK END CAP
17	2	307C-3500	INNER BRONZE BEARING
18	2	207D-3000	NYLON BEARING
19	2	315-3500	MAKE/BREAK PIN
20	4	317-3500	MAKE/BREAK TRUNION PIN
21	4	320B-3500	HEADSTOCK CYLINDER PIN COVERS
22	1	330-3500	DELTA POWER 6 PORT FLOW DIVIDER
23	6	400-3000-1	CLAMP CYLINDER ASSEMBLY

330-3500
Flow Divider Assembly

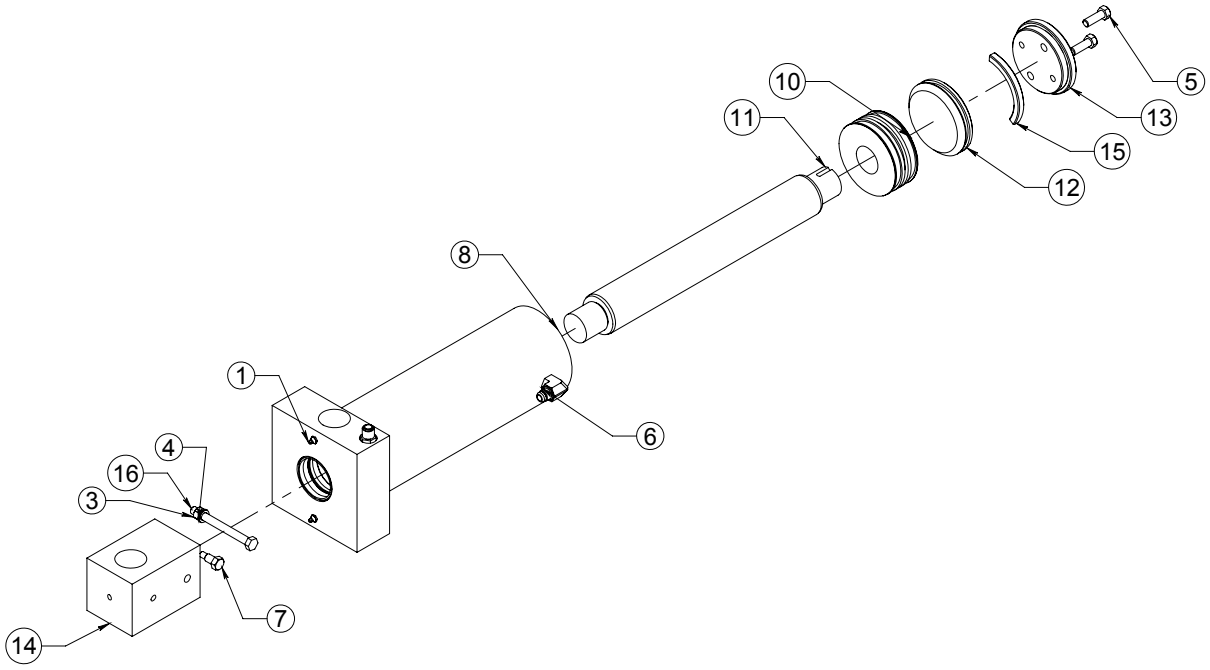


ITEM	QTY	P/N	DESCRIPITION
1	4	1027	LOCKWASHER 3/8" GR8
2	4	1046	HHCS 3/8"-16 X 3/4" GR8
3	1	RP14S3500-1001-S1	DELTA FLOW DIVIDER
4	4	BUC4085-S7	BUC4000 B/U VALVE LEG
5	6	6801-06-12	3/8" MJIC X 3/4" MORING X 90 DEGREE
6	6	6-6F6X-S	3/8 MNPT X 3/8 FJIC SWIVEL ADAPTER
7	6	1800	PARKER FLOW CONTROL F600S 3/8" MNPT
8	7	1577-A	3/8 MNPT X MJIC FORGED 90
9	1	6405-16-6-0	1"M-ORING BOSS X 3/8 FNPT
10	1	RP6801-NWO-08-16	1" MORB X 1/2" MJIC 90 DEG

209-3000-1
Torque Cylinder Assembly

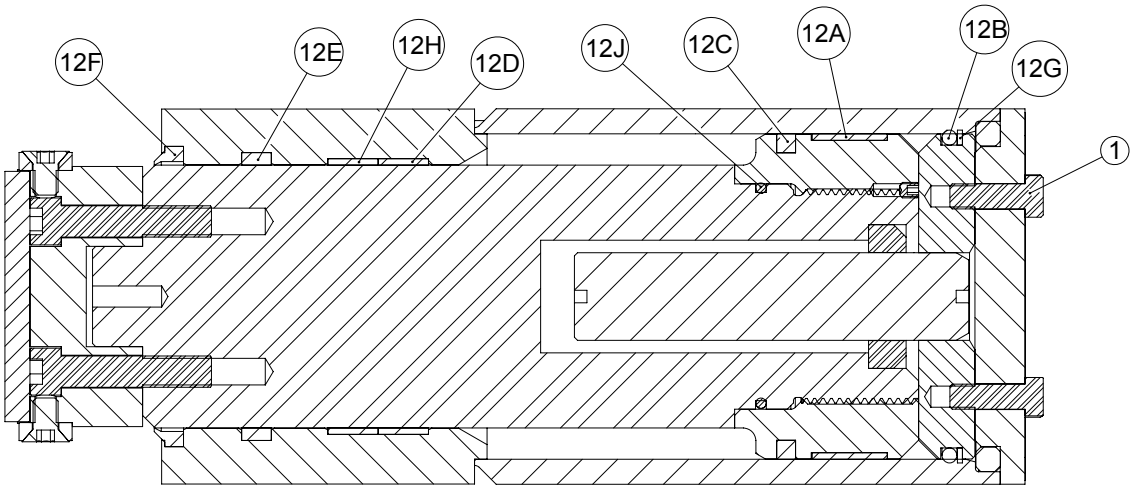


SECTION A-A
SCALE 1 : 6

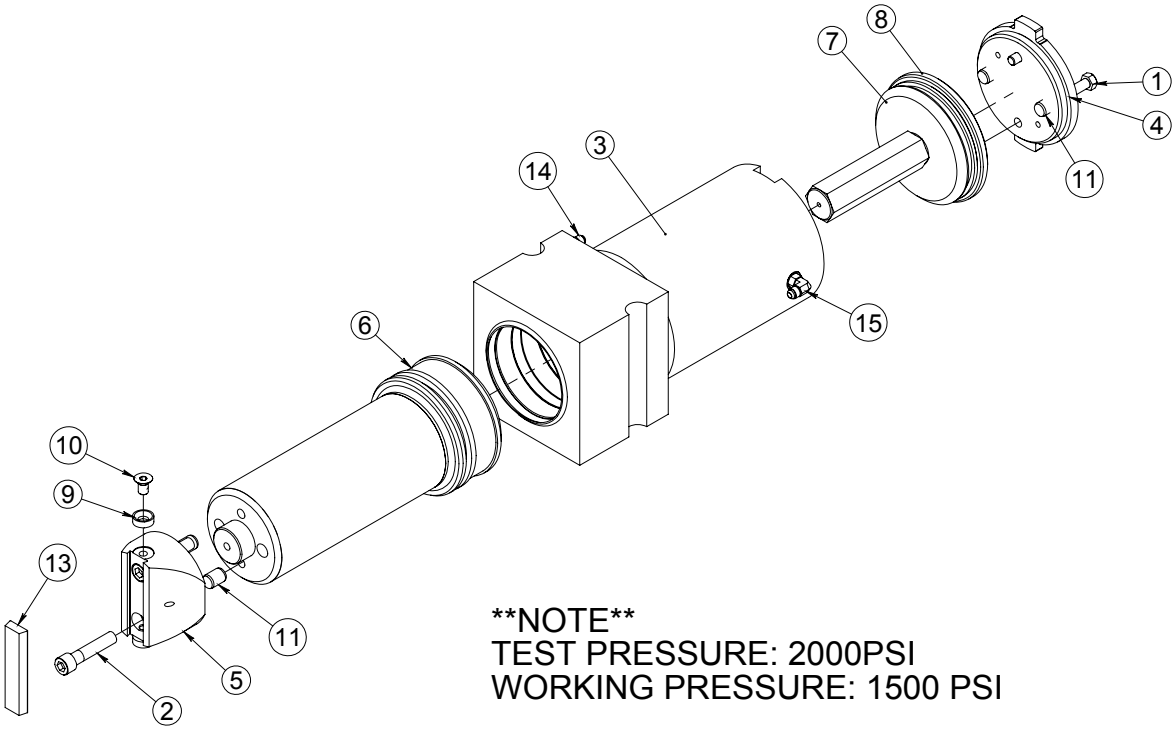


Item #	Qty.	Part Number	Part Name
1	3	1001	1/8 NPT ZERT
2	1	1033	3/8"-16 X 3/4" SET SCREW
3	1	1101	NUT, HEX, 1/2-13
4	1	1103	1/2" LOCKWASHER
5	2	1112	1/2"-13 x 1 1/2" HHCS
6	1	1626	90 1/2" MNPT X MJIC/ FG
7	2	214A-3000	MODIFIED 1/2"-13 x 1 1/4" HHCS
8	1	209-3000	TORQUE CYLINDER WELDMENT
9	1	209C-3000	MAKE/BREAK SEAL KIT
10	1	210-3000	MAKE/BRAKE PISTON
11	1	211-3000	CYLINDER ROD
12	1	212-3000	MAKE/BRAKE CYLINDER GLAND
13	1	213-3000	MAKE/BREAK CYLINDER END CAP
14	1	214-3000	CYLINDER ROD EYE
15	3	218-3000	MAKE/BRAKE SPLIT RING
16	1	X2-79	1/2"-13 X 5" HHCS

400-3000-1
Clamp Cylinder Assembly

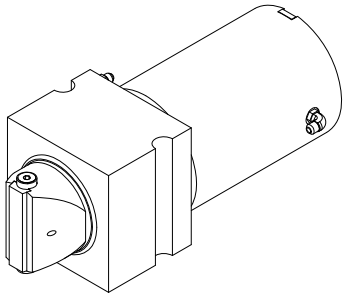


SECTION A-A
SCALE 1 : 4



NOTE
TEST PRESSURE: 2000PSI
WORKING PRESSURE: 1500 PSI

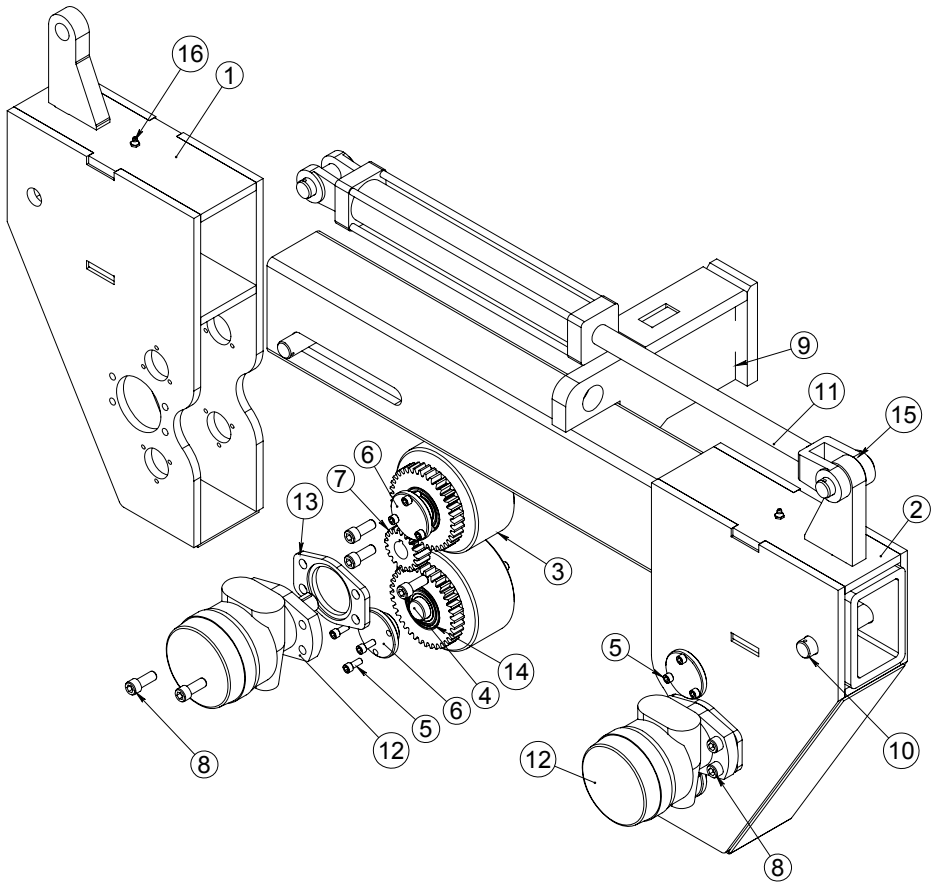
400-3000-1
Clamp Cylinder Assembly



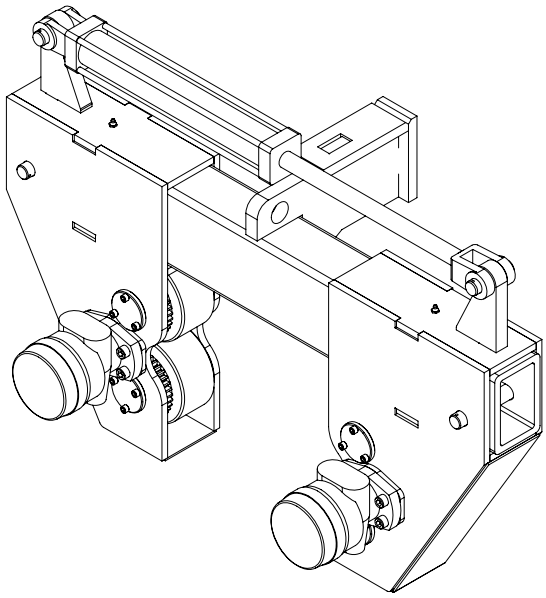
Item #	Qty.	Part Number	Part Name
1	2	1112	1/2"-13 x 1 1/2" HHCS
2	2	260	5/8-11 x 3 SHCS
3	1	400-3000	CYLINDER BLOCK HOUSING WELDMENT
4	1	401-3000-02	END PLATE
5	1	402-3000	STANDARD JAW HOLDER
6	1	403A-3000-2	PISTON ASSEMBLY
7	1	404-3000	SEAL PLATE WELDMENT
8	1	405-3000	SPLIT RING
9	2	408-3000	1/2" WASHER
10	2	91253B	SHCS Flat 1/2"-13 x 7/8"
11	4	400-3001	DOWEL PIN, 3/4" X 1" LG
12	1	400C-3000	SEAL KIT
13	1	DTI1602	1.250W X .500T X 5.000L
14	1	1717	3/8 MJIC X O-RING BOSS ADAPTER STRAIGHT
15	2	1687	3/8" O-RING x 3/8" MJIC ELBOW

SEALS KIT		
12A	W65001500	WEAR BAND
12B	BN70437	O-RING
12C	PS1800-104	PISTON SEAL
12D	W55001000	WEAR BAND
12E	2500-5250-562	ROD SEAL
12F	D-5250	WIPER SEAL
12G	8-436	O-RING BACK UP
12H	W55001000	WEAR BAND
12J	2-346	O-RING

001-3000-1
Two Motor Hydraulic Spinner Wrench Assembly

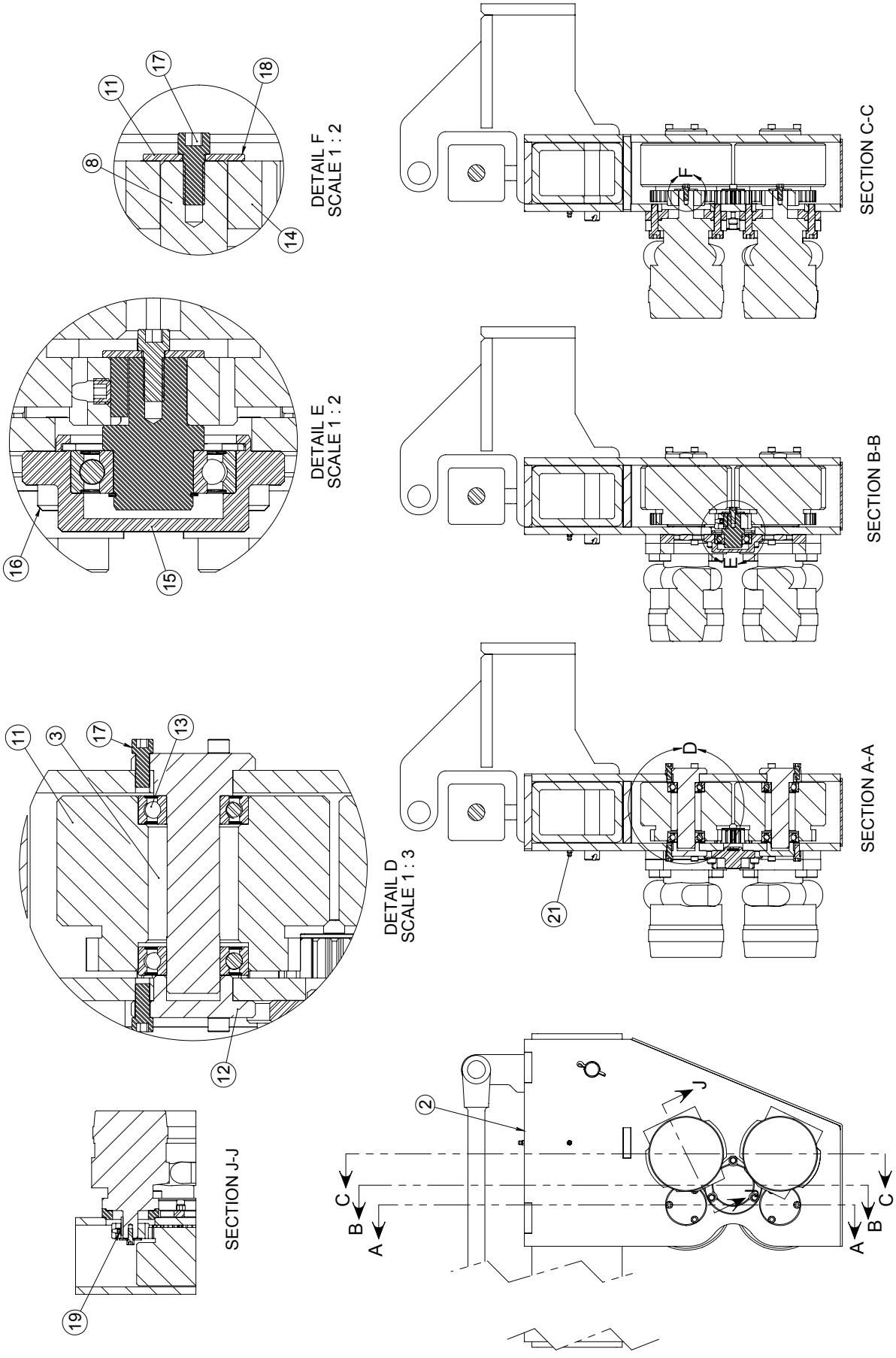


001-3000-1
Two Motor Hydraulic Spinner Wrench Assembly

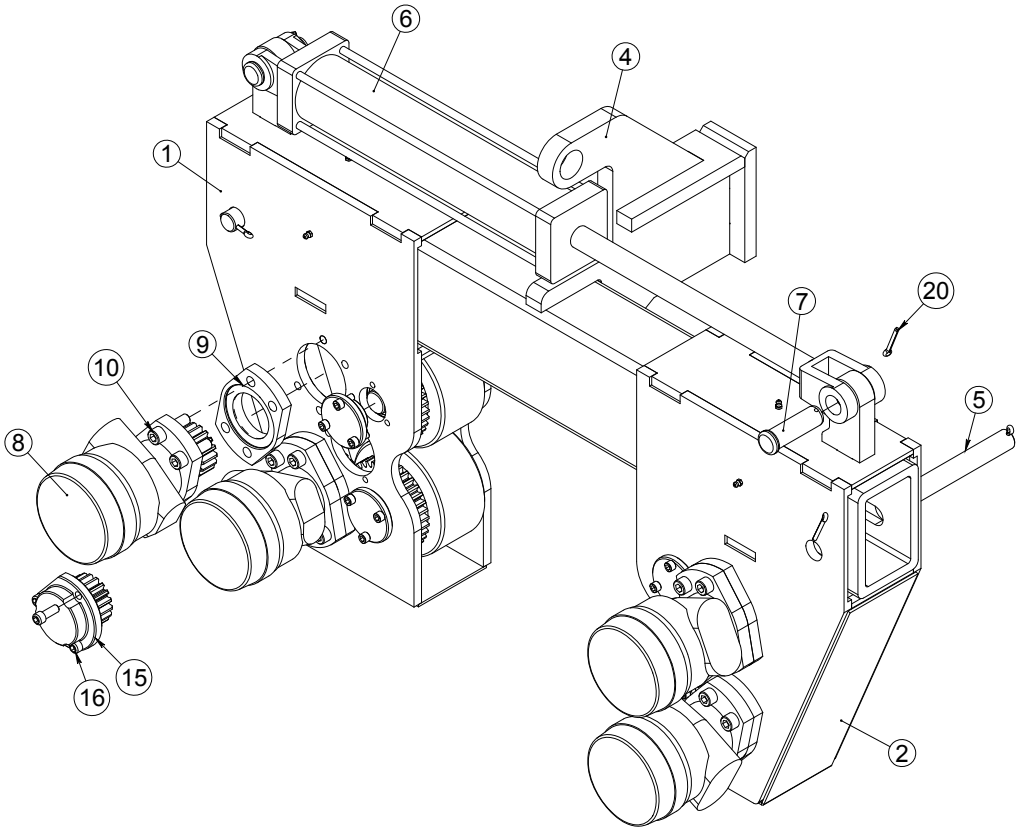


Item #	Qty.	Part Number	Part Name
1	1	101L-3000	LEFT SLIDE BOX WELDMENT
2	1	101R-3000	RIGHT SLIDE BOX WELDMENT
3	4	102-3000	SPINNER ROLLER
4	4	103-3000	SPINNER ROLLER SHAFT
5	24	1035	SHCS 5/16-18 x 3/4"
6	4	104-3000	SPINNER ROLLER SHAFT CAP
7	2	105-3000	SPINNER MOTOR DRIVE GEAR
8	10	1106	SHCS 1/2"-13 X 1 1/4"
9	1	200-3000	SPINNER WRENCH WELDMENT
10	2	202-3000	CYLINDER PIN
11	1	303-3000	SPINNER WRENCH HYDRAULIC CYLINDER
12	2	304-3000	SPINNER HYDRAULIC MOTOR
13	2	304A-3000	MOTOR MOUNT PLATE
14	8	305-3000	SPINNER ROLLER BEARING
15	2	309-3000	1" X 3" CLEVIS PIN
16	2	1001	1/8 NPT ZERT

001-3000-2
Four Motor Hydraulic Spinner Wrench Assembly

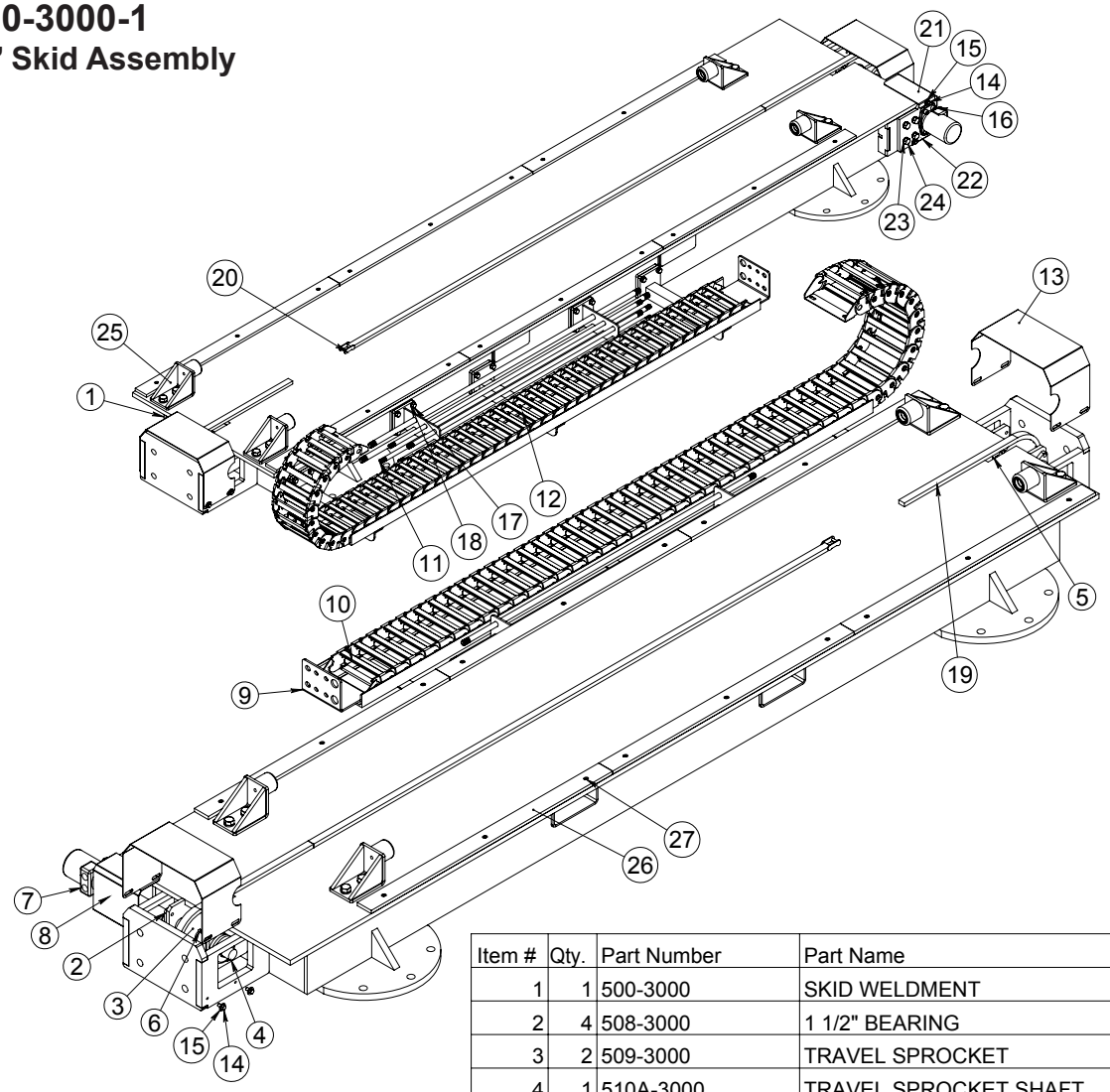


001-3000-2
Four Motor Hydraulic Spinner Wrench Assembly



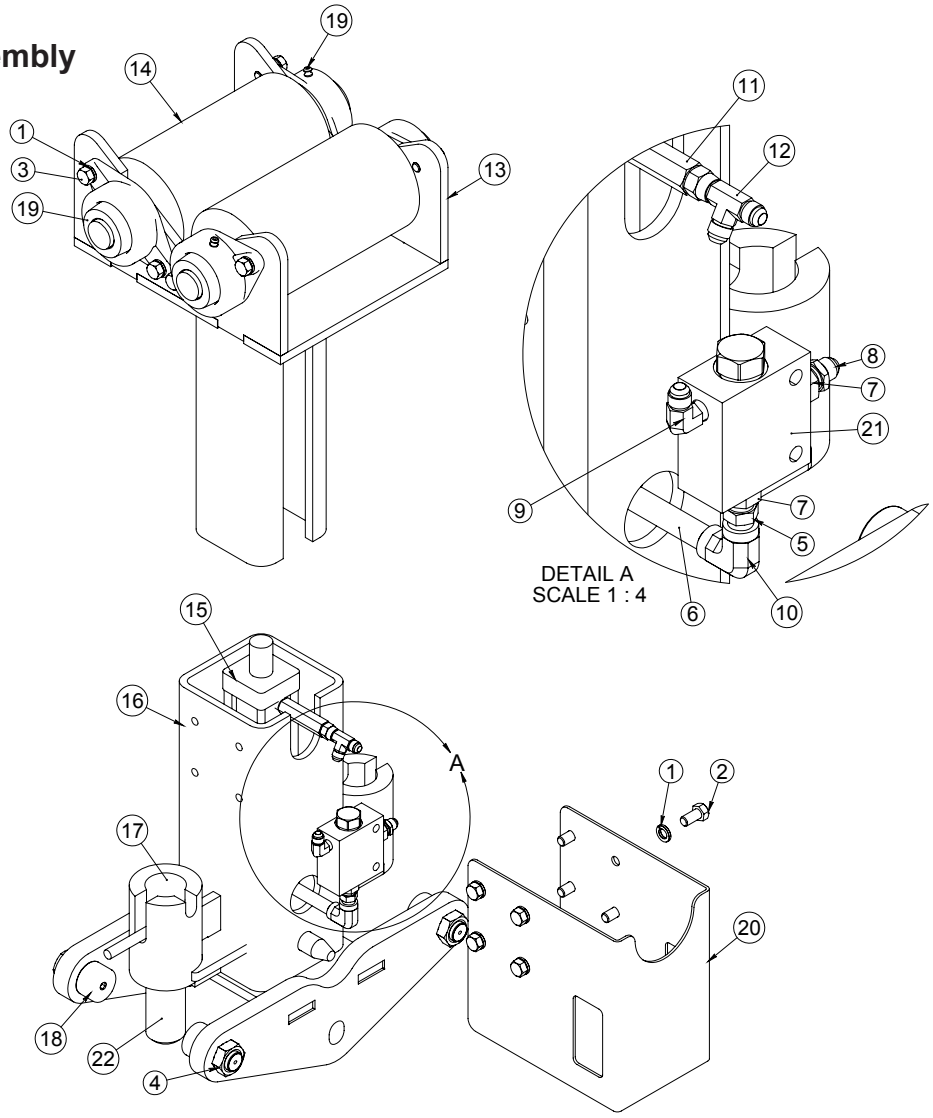
Item #	Qty.	Part Number	Part Name
1	1	101L-3000-01	LEFT SLIDE BOX WELDMENT
2	1	101R-3000-01	RIGHT SLIDE BOX WELDMENT
3	4	103-3000	SPINNER ROLLER SHAFT
4	1	200-3000-01	SPINNER WRENCH WELDMENT
5	2	202-3000	CYLINDER PIN
6	1	303-3000-01	SPINNER WRENCH HYDRAULIC CYLINDER
7	2	309-3000	1" X 3" CLEVIS PIN
8	4	304-3000	SPINNER HYDRAULIC MOTOR
9	4	304A-3000-01	MOTOR MOUNT PLATE
10	16	1107	1/2"-13 X 1 3/4" SHCS
11	4	102-3000	SPINNER ROLLER
12	4	104-3000	SPINNER ROLLER SHAFT CAP
13	8	305-3000	SPINNER ROLLER BEARING
14	4	105-3000	SPINNER MOTOR DRIVE GEAR
15	2	105A-3000	IDLER GEAR ASSEMBLY; F/ SPINNER
16	6	1041	3/8-16x1 1/4 SHCS
17	28	1035	SHCS 5/16-18 x 3/4"
18	4	105-3000-05	RETAINER F/ IDLER GEAR
19	4	1028	3/8"-16 x 1/4" SET SCREW
20	6	1005	COTTER PIN 3/16 X 1 1/2
21	6	1257	1/4 DRIVE ZERT

500-3000-1
12’ Skid Assembly



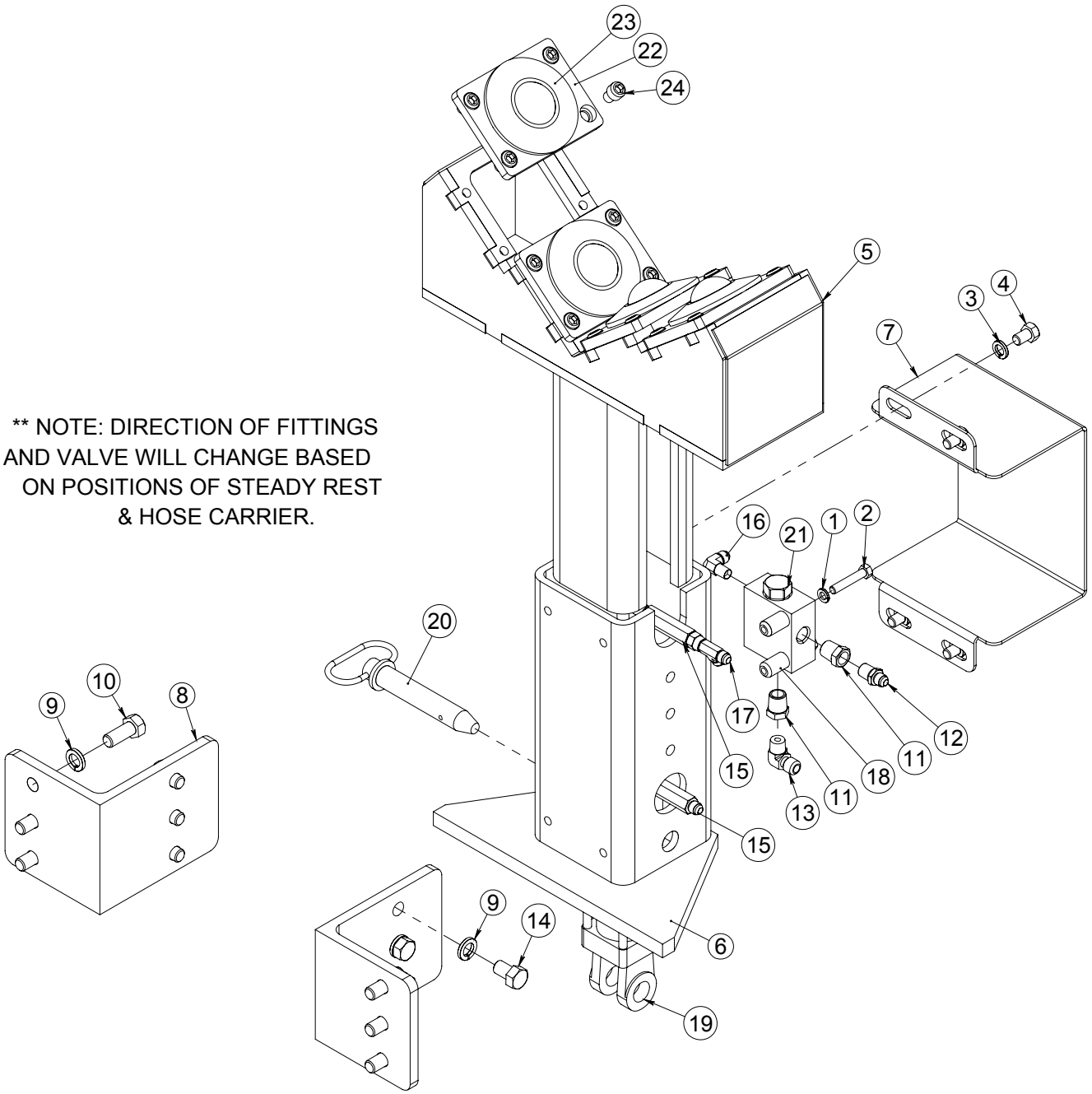
Item #	Qty.	Part Number	Part Name
1	1	500-3000	SKID WELDMENT
2	4	508-3000	1 1/2" BEARING
3	2	509-3000	TRAVEL SPROCKET
4	1	510A-3000	TRAVEL SPROCKET SHAFT
5	1	510B-3000	TRAVEL SPROCKET SHORT SHAFT
6	3	510C-3000	TRAVERSE SPROCKET KEY
7	1	511-3000	TRAVEL MOTOR
8	1	515-3000	1 1/2" X 1" FLEIXABLE SHAFT COUPLING
9	1	522-3000	BULKHEAD PLATE
10	1	550-3000	HOSE TRAX
11	1	524-3000-1	TUBE LINE WELDMENT
12	1	521-3000-1	HOSE RACK WELDMENT
13	2	530-3500	SPROCKET COVER
14	10	1046	HHCS 3/8-16 X 3/4
15	10	1025	3/8 FLAT WASHER
16	4	246	1/2-13 x 1 SHCS
17	20	1110	1/2"-13 x 1" HHCS
18	20	1103	1/2" LOCKWASHER
19	3	556-7000	10' TRAVEL CHAIN
20	1	80CL	MASTERLINK 80C/L
21	1	531-3500	COUPLING COVER
22	1	529-3000	MOTOR MOUNT PLATE
23	4	1151	5/8 LW
24	4	1156	5/8"-11 X 1 1/4" HHCS
25	4	540-3000-01	BUMPER ASSEMBLY
26	6	501-3000-1	CAM FOLLOWER ROLLER PLATE
27	18	1041	3/8-16x1 1/4 SHCS

900-3000-2
Support Stand Assembly

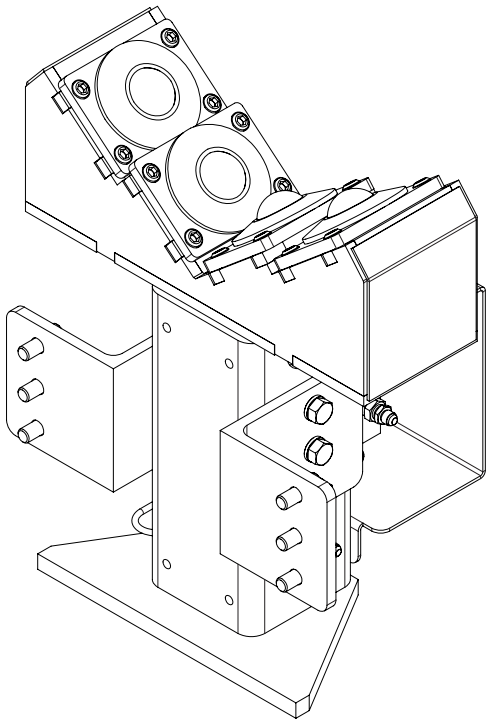


Item #	Qty.	Part Number	Part Name
1	16	1103	1/2" LOCKWASHER
2	8	1110	1/2"-13 x 1" HHCS
3	8	1111	1/2"-13 x 1 1/4" HHCS
4	4	1323	1-14 NYLOCK JAM NUT (1323)
5	1	1457	3/8" HEX NIPPLE
6	1	1488	3/8" X 4-1/2" PIPE NIPPLE
7	2	1491	REDUCER BUSHING 1/2" X 3/8"
8	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
9	1	1576-A	1/4" MNPT x 3/8" MJIC ELBOW
10	1	1580	90 3/8" F X F NPT
11	1	2404-LL-06-06	3/8" MJIC X 3/8" MNPT ST. EXTRA LONG
12	1	6 R6X-S	3/8" FJIC X 3/8" MJIC RUN TEE
13	1	901-3000	TOP SUPPORT WELDMENT
14	2	901A-3000-1	RED ROLLER
15	1	901D-3000-2	2" BORE CYLINDER WITH 8" STROKE
16	1	902-3000	BOTTOM SUPPORT WELDMENT
17	1	902B-3000-1	1" X 7 3/4" HITCH PIN
18	4	902D-3000-1	1 3/4" CAM FOLLOWER W/ 1" STUD
19	4	508-3000	1 1/2" SUPPORT STAND BEARING
20	1	905-3000	SUPORT STAND VALVE COVER
21	1	BUC5524	PILOT OPERATOR CHECK VALVE
22	1	9112-7000-01	LOCKING PIN WELDMENT

1120-3000
Headstock Support Rest Assembly

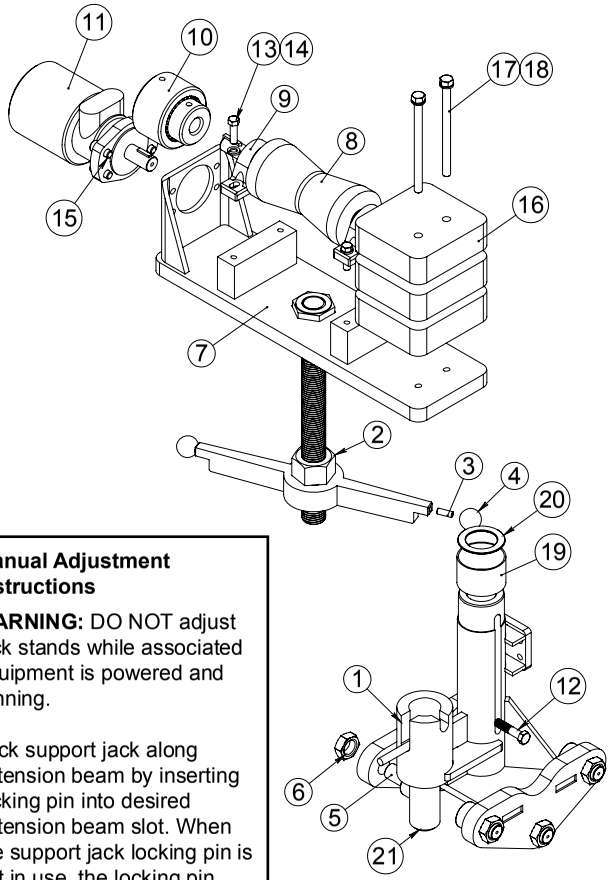


1120-3000
Headstock Support Rest Assembly



Item #	Qty.	Part Number	Part Name
1	2	1027	WASHER, LOCK 3/8"
2	2	1050	HHCS 3/8"-16 X 2"
3	4	1103	1/2" LOCKWASHER
4	4	1109	1/2"-13 x 1" HHCS
5	1	1109-3000-01	TOP SECTION WELDMENT
6	1	1110-3000	BOTTOM SECTION WELDMENT
7	1	1111-3000	SUPPORT REST VALVE COVER
8	2	1115-3000	MOUNT ANGLE
9	12	1151	5/8 LW
10	6	1157	5/8"-11 X 1 1/2" HHCS
11	2	1491	REDUCER BUSHING 1/2" X 3/8"
12	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
13	1	1577-A	90 3/8" MNPT X 3/8" MJIC
14	6	196	HHCS 5/8"-11 X 1"
15	2	2404-LL-06-06	3/8" MJIC X 3/8" MNPT ST. EXTRA LONG
16	1	6 CTX	1/4" MNPT X 3/8" MJIC MALE ELBOW
17	1	6 R6X-S	3/8" FJIC X 3/8" MJIC RUN TEE
18	2	73179	VALVE LEG
19	1	901D-3000	2" BORE CYLINDER WITH 6" STROKE
20	1	902B-3000-3	1" X 4 3/4" HITCH PIN
21	1	BUC5524	PILOT OPERATOR CHECK VALVE
22	4	903-3000-5	ROLLER MOUNTING PLATE
23	4	CB2008	HEAVY DUTY BALL TRANSFER UNIT
24	16	246A	1/2-13 x .625 SHCS

900-3000-4
Manually Adjusted Support Jack Assembly

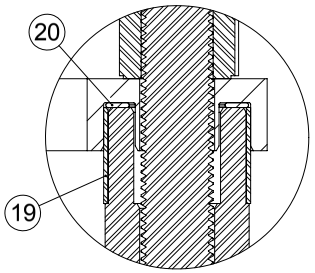


Manual Adjustment Instructions

WARNING: DO NOT adjust jack stands while associated equipment is powered and running.

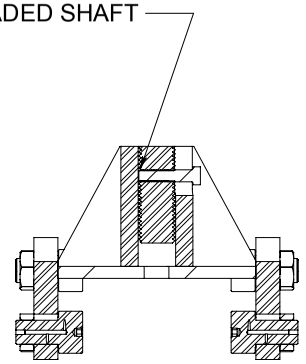
1. Lock support jack along extension beam by inserting locking pin into desired extension beam slot. When the support jack locking pin is not in use, the locking pin handle should be inserted into the short rest slot to prevent the locking pin from contacting the extension beam.

2. Spin vertical adjustment handle to achieve desired support jack height.

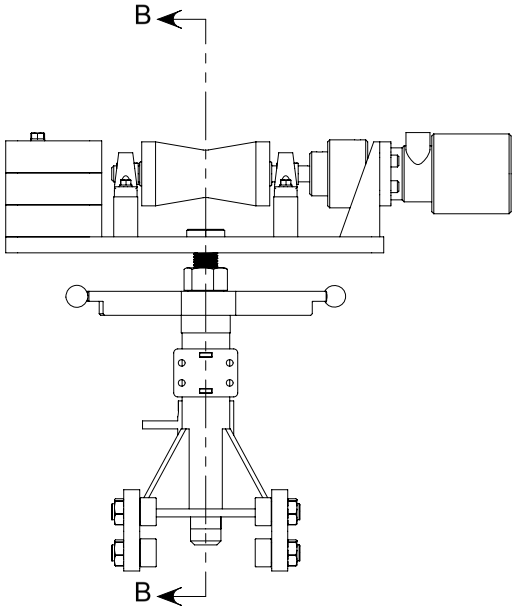


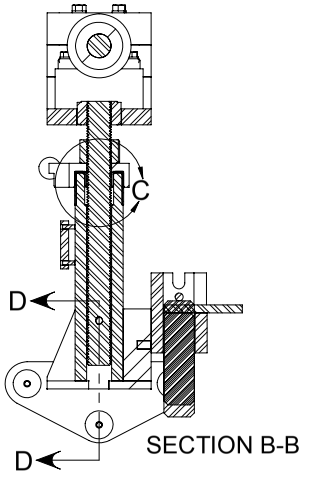
DETAIL C
SCALE 1 : 4

ENSURE BOLT DOES NOT PROTRUDE THROUGH BACK END OF THREADED SHAFT



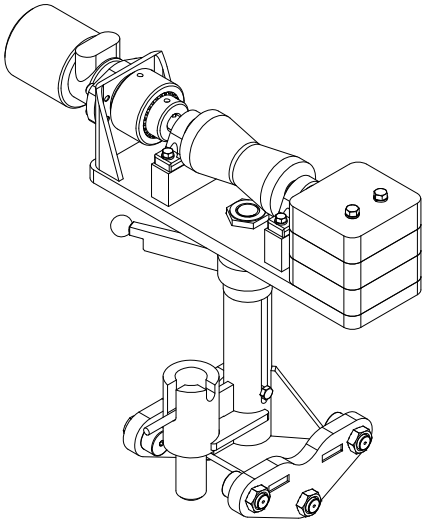
SECTION D-D
SCALE 1 : 8





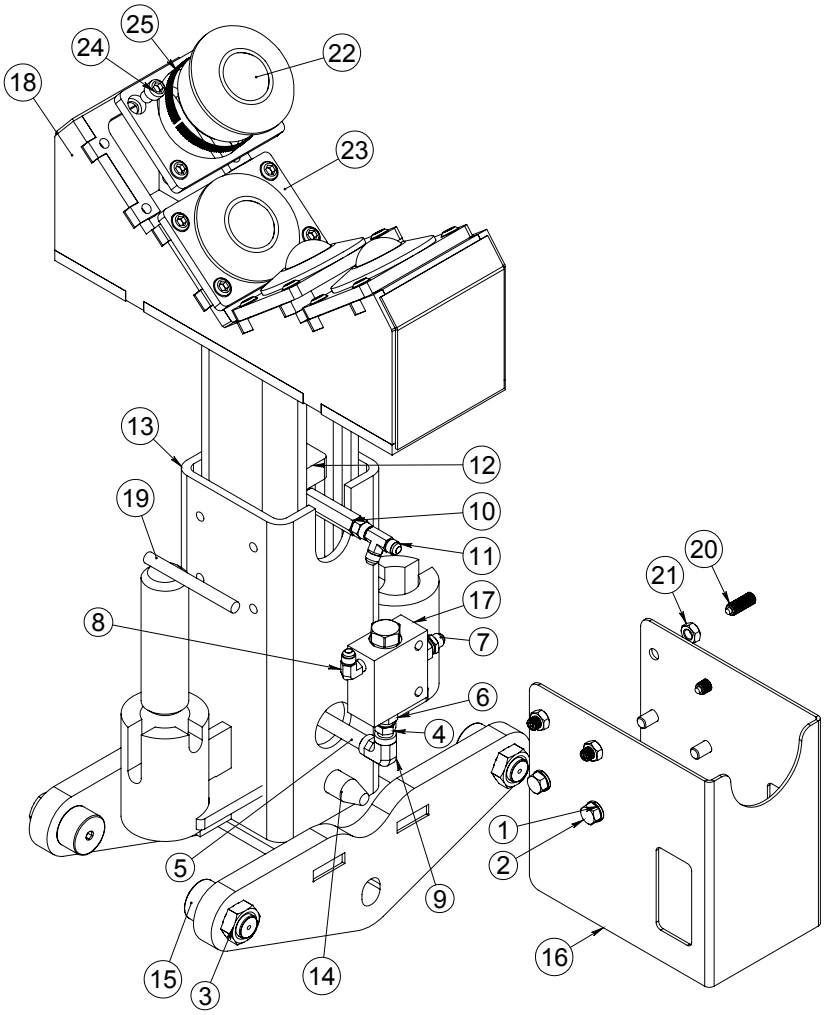
SECTION B-B

900-3000-4
Manually Adjusted Support Jack Assembly

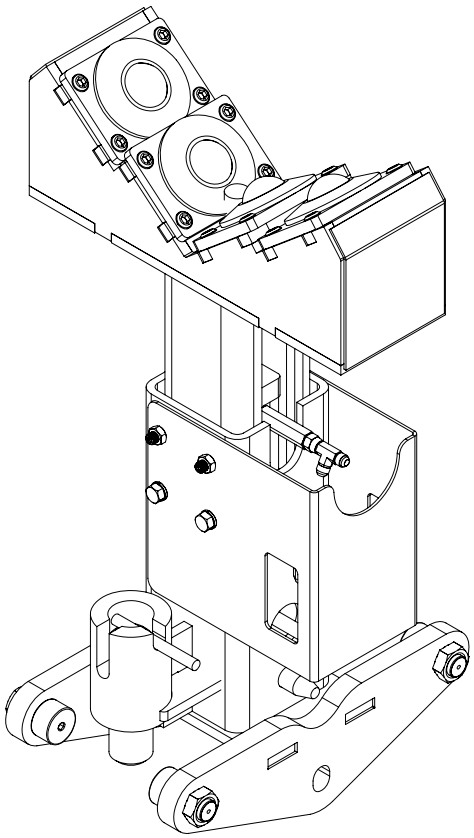


Item #	Qty.	Part Number	Part Name
1	1	902-3000-02	ROLLER WELDMENT
2	1	903-3000	ADJUSTER WELDMENT
3	2	1030	3/8-16 X 1" SET SCREW
4	2	55071	KNOB 3/8-16THD
5	6	902D-3000-1	1 3/4" CAM FOLLOWER W/ 1" STUD
6	6	1323	1-14 NYLOCK JAM NUT (1323)
7	1	907-3000	UPPER WELDMENT FOR ROLLER ASSY.
8	1	CB7006-02	SMALL V-ROLLER WITH 1" ROLLER SHAFT
9	2	1922	1" PILLOW BLOCK BEARING
10	1	909-7018	1" SPLINE COUPLING
11	1	VB1029	HYDRAULIC MOTOR - 45.5 cu. inch/rev.
12	1	91247A721	1/2" X 2 1/4" HHCS
13	4	156	7/16"-14 X 1 1/2" HHCS
14	4	1081	7/16" LOCKWASHER
15	4	246	1/2-13 x 1 SHCS
16	3	909-3000	BALLAST
17	2	X2-87	HHCS 1/2"-13 X 7"
18	2	1103	1/2" LOCKWASHER
19	1	46DU32	GARLOCK BUSHING
20	1	910-3000	THRUST WASHER
21	1	9112-7000-01	LOCKING PIN WELDMENT

900-3000-5
Hydraulic Rolling Tool Support Jack Assembly

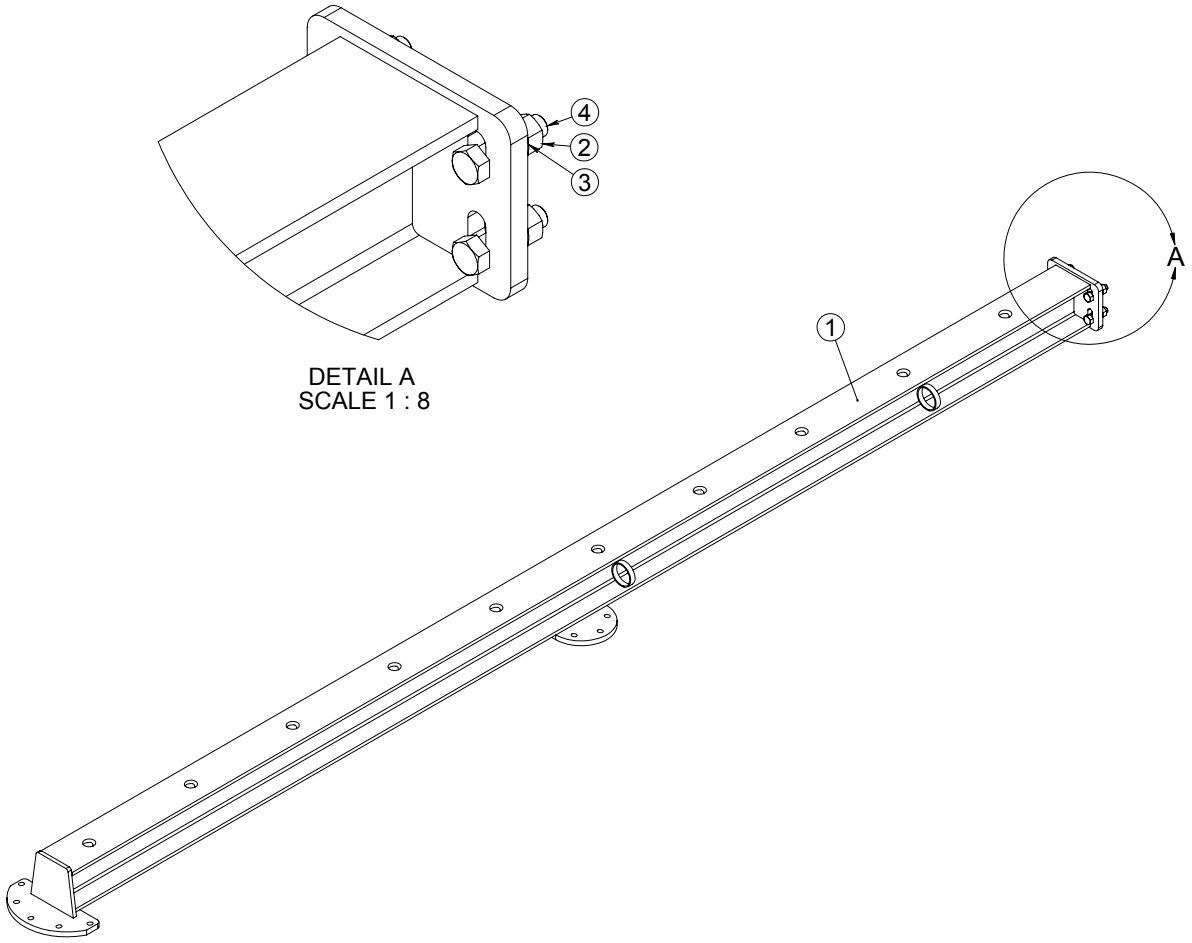


900-3000-5
Hydraulic Rolling Tool Support Jack Assembly



Item #	Qty.	Part Number	Part Name
1	4	1103	1/2" LOCKWASHER
2	4	1110	1/2"-13 x 1" HHCS
3	4	1323	1-14 NYLOCK JAM NUT (1323)
4	1	1457	3/8" HEX NIPPLE
5	1	1488	3/8" X 4-1/2" PIPE NIPPLE
6	2	1491	REDUCER BUSHING 1/2" X 3/8"
7	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
8	1	1576-A	1/4" MNPT x 3/8" MJIC ELBOW
9	1	1580	90 3/8" F X F NPT
10	1	2404-LL-06-06	3/8" MJIC X 3/8" MNPT ST. EXTRA LONG
11	1	6 R6X-S	3/8" FJIC X 3/8" MJIC RUN TEE
12	1	901D-3000-2	2" BORE CYLINDER WITH 8" STROKE
13	1	902-3000	BOTTOM SUPPORT WELDMENT
14	1	902B-3000-1	1" X 7 3/4" HITCH PIN
15	4	902D-3000-1	1 3/4" CAM FOLLOWER W/ 1" STUD
16	1	905-3000	SUPORT STAND VALVE COVER
17	1	BUC5524	PILOT OPERATOR CHECK VALVE
18	1	1109-3000-01	TOP SECTION WELDMENT
19	1	9112-7000-01	LOCKING PIN WELDMENT
20	4	901-3000-5	SET SCREW; BRASS TIP; 1/2-13 X 1.25 IN.
21	4	1118-a	1/2"-13 JAM NUT
22	4	CB2008	HEAVY DUTY BALL TRANSFER UNIT
23	4	903-3000-5	ROLLER MOUNTING PLATE
24	16	246A	1/2-13 x .625 SHCS
25	4	CB2011	FIXING CLIP FOR BALL TRANSFER UNIT

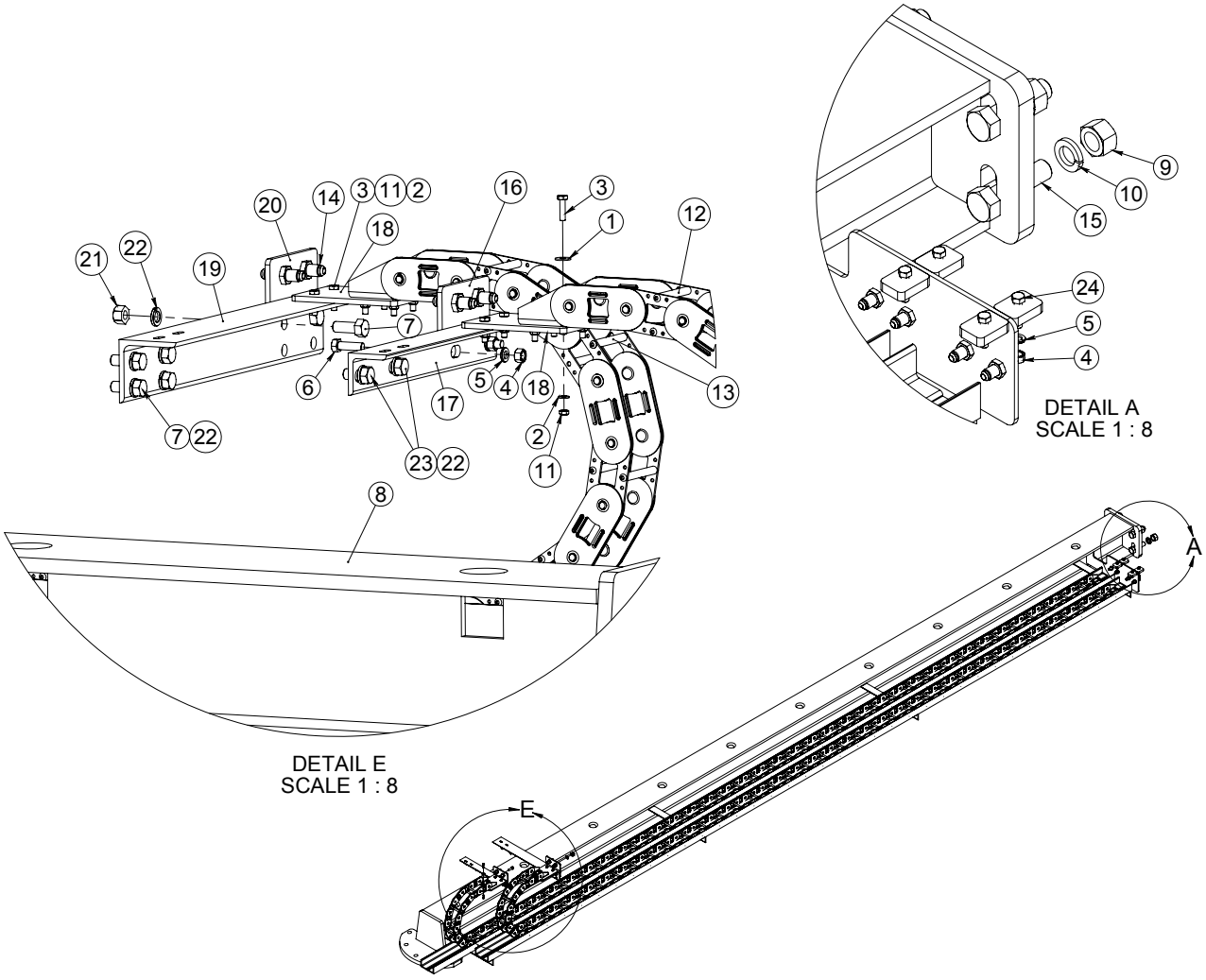
1150-3000-1
20’ Extension Beam Assembly



DETAIL A
SCALE 1 : 8

Item #	Qty.	Part Number	Part Name
1	1	1150-3000	20 FEET EXTENSION BEAM WELDMENT
2	4	1210	1"-8 NUT GR. 8
3	4	1218	1" LW
4	4	74053	1"-8 X 3 3/4" HHCS

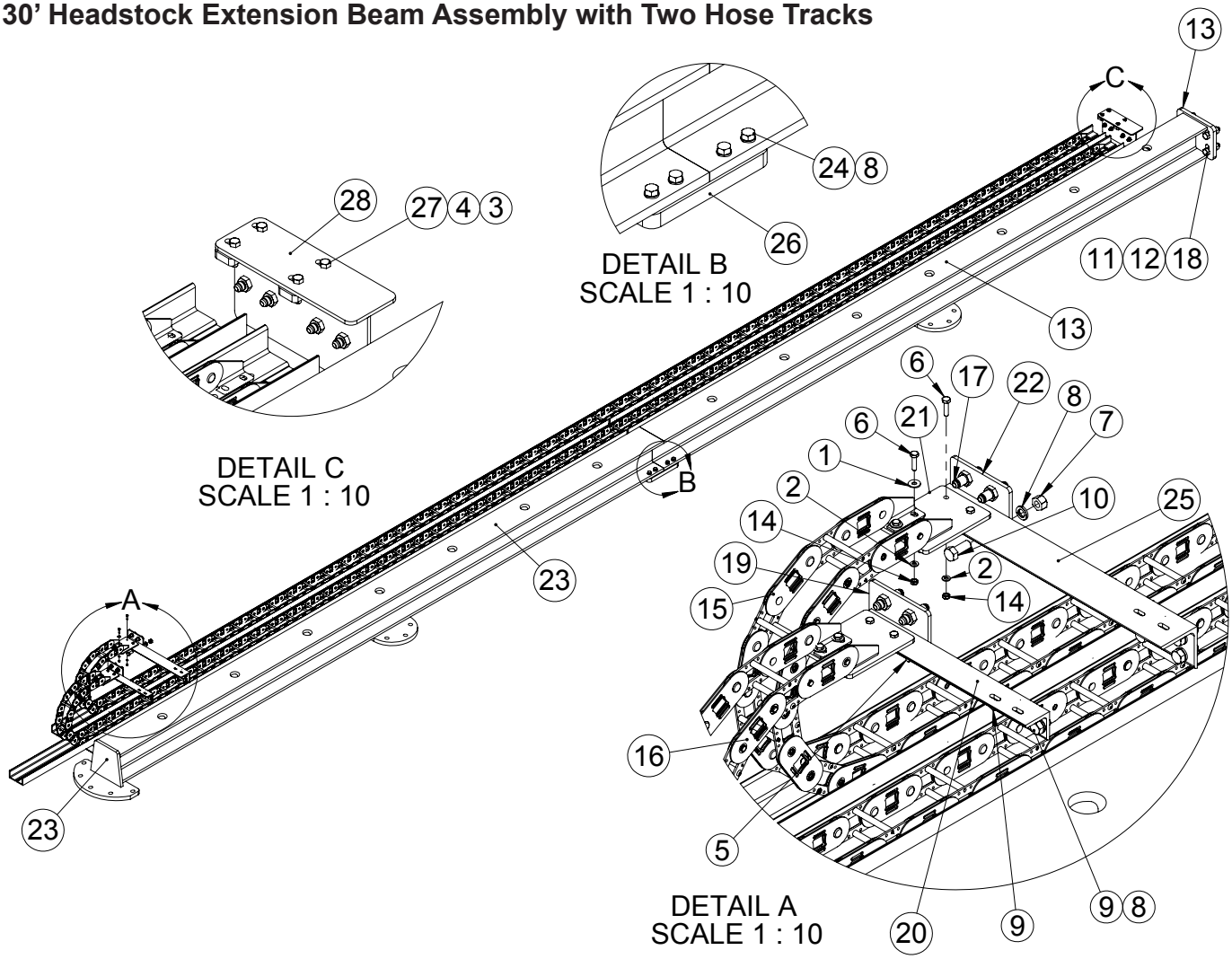
1150-3000-3
20’ Extension Beam Assembly with Hose Track



Item #	Qty.	Part Number	Part Name
1	8	1008-B2	1/4" FLATWASHER
2	11	101	1/4" LOCKWASHER
3	12	105	1/4"-20 X 1" HHCS GR8
4	6	1024	3/8-16 NUT (1024)
5	6	1027	WASHER, LOCK 3/8"
6	2	1048	3/8"-16 X 1 1/4" HHCS
7	6	1111	1/2"-13 x 1 1/4" HHCS
8	1	1150-3000-01	20 FEET EXTENSION BEAM WELDMENT WITH HOSE TRACK
9	4	1210	1"-8 NUT GR. 8
10	4	1218	1" LW
11	12	212	1/4-20 NYLOCK NUT
12	1	550D-3000-09	INNER HOSE CARRIER
13	1	550D-3000-10	OUTER HOSE CARRIER
14	8	6 WTX-WLN-S	3/8" BULKHEAD UNION CONNECTOR
15	4	74053	1"-8 X 3 3/4" HHCS
16	1	921-3000	BULKHEAD WITH 3/8" MOUNT HOLE
17	1	922-3000-S1	14 3/4" BULKHEAD PLATE EXTENDER
18	2	924-3000	HOSE TRACK MOUNT PLATE
19	1	902-3000-S4	20 1/2" BULKHEAD EXTENDER
20	1	926-3000	BULKHEAD PLATE
21	2	1101	NUT, HEX, 1/2-13
22	8	1103	1/2" LOCKWASHER
23	2	1110	1/2"-13 x 1" HHCS
24	4	1049	3/8"-16 X 1 1/2" HHCS

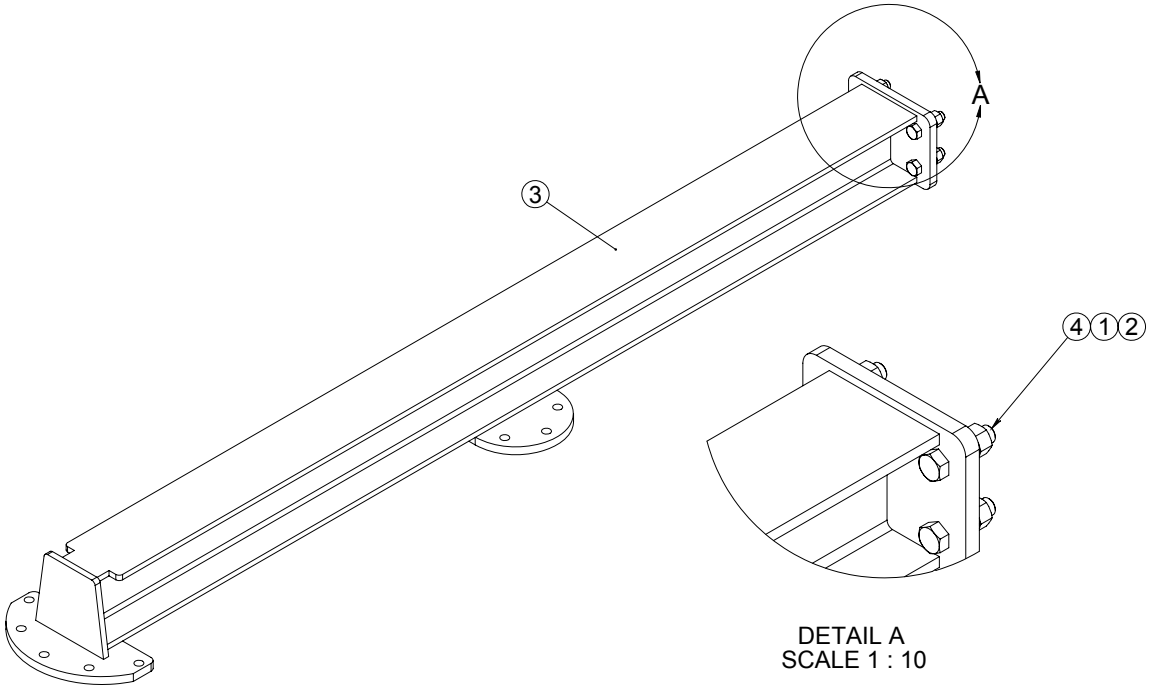
1750-3000-4

30’ Headstock Extension Beam Assembly with Two Hose Tracks



Item #	Qty	Part Number	Part Name
1	8	1008-B2	1/4" FLATWASHER
2	12	101	1/4" LOCKWASHER
3	6	1024	3/8-16 NUT (1024)
4	6	1027	WASHER, LOCK 3/8"
5	2	1048	3/8"-16 X 1 1/4" HHCS
6	12	105	1/4"-20 X 1" HHCS GR8
7	2	1101	NUT, HEX, 1/2-13
8	16	1103	1/2" LOCKWASHER
9	2	1109	1/2"-13 x 1" HHCS
10	6	1111	1/2"-13 x 1 1/4" HHCS
11	4	1210	1"-8 NUT GR. 8
12	4	1218	1" LW
13	1	1750A-3000-05	15 FEET EXTENSION BEAM WELDMENT WITH 2 HOSE TRACKS
14	12	212	1/4-20 NYLOCK NUT
15	1	550D-3000-08	OUTER HOSE CARRIER
16	1	550D-3000-07	INNER CABLE CARRIER
17	8	6 WTX-WLN-S	3/8" BULKHEAD UNION CONNECTOR
18	4	74053	1"-8 X 3 3/4" HHCS
19	1	921-3000	BULKHEAD WITH 3/8" MOUNT HOLE
20	1	922-3000-S1	14 3/4" BULKHEAD PLATE EXTENDER
21	2	924-3000	HOSE TRACK MOUNT PLATE
22	1	926-3000	BULKHEAD PLATE
23	1	1750B-3000-05	15 FEET EXTENSION BEAM WELDMENT WITH 2 HOSE TRACK
24	8	171	1/2"-13 x 1 3/4" HHCS
25	1	902-3000-S4	20 1/2" BULKHEAD EXTENDER
26	1	1750-3000-02S18	EXTENSION BEAM FOOT
27	4	1049	3/8"-16 X 1 1/2" HHCS
28	1	TM3021-01S9	GUARD PLATE

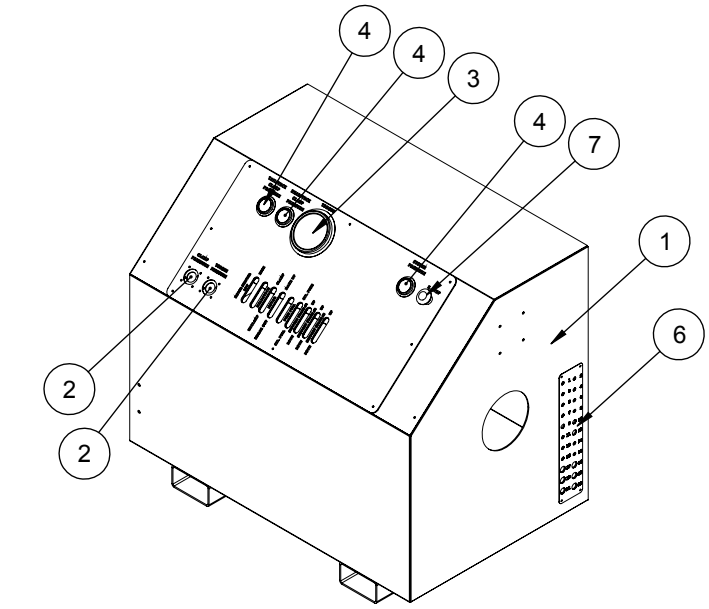
1750-3000-1
10’ Headstock Extension Beam Assembly

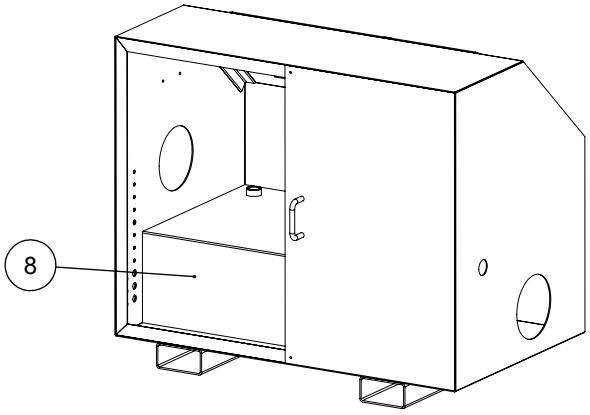


DETAIL A
SCALE 1 : 10

Item #	Qty.	Part Number	Part Name
1	4	1210	1"-8 NUT GR. 8
2	4	1218	1" LW
3	1	1750-3000	10' HEADSTOCK EXTENSION BEAM WELDMENT
4	4	74053	1"-8 X 3 3/4" HHCS

RP5047
Control Console / Power Unit Assembly





Item #	Qty.	Part Number	Part Name
1	1	100-6500	CONSOLE WELDMENT
2	2	130-6500	PRESSURE CONTROL VALVE
3	1	132-6500	0-1000 PSI GAUGE
4	3	133-6500	0-3000 PSI GAUGE
5	1	150-7000-16	TOP COVER PLATE
6	1	152-6500	BULKHEAD COVER
7	1		STOP BUTTON
8	1		ELECTRIC POWER UNIT

TROUBLE SHOOTING

HYDRAULIC SYSTEM

Hydraulic Pump Making Excessive Noise:

Problem	Solution
A) Restricted or clogged intake line	Clean line, check for contamination.
B) Contaminated fluid	Flush system change fluid.
C) Restricted vent	Clean or replace air vent.
D) Air in fluid	Check for leaks and be certain fluid suction in tank is well below hydraulic fluid in reservoir.
E) Damaged or worn parts	Repair or replace damaged parts, check fluid for contamination.
F) Excessive RPM (I/C engines only)	Check PTO, gears and recommended speed to assure proper pump is in-stalled for operation.
G) Increased friction	Make sure pump has been assembled using correct torque valves.
H) Damaged or worn relief valve	Replace relief valve.
I) Damaged or worn check valve	Replace check valve.
J) Restricted discharge	Check to make sure relief valve is set to proper pressure.
K) Valve system restricted	Inspect and repair or replace defective parts, check system for contamination.
L) High operating temp	Check for low hydraulic oil level, inspect and replace dirty oil filters, check for restrictions to return circuit

Excessive Wear to Hydraulic Components:

Problem	Solution
A) Fluid contamination	Flush fluid system, replace with new fluid.
B) Components misaligned	Inspect and realign
C) High operating pressures	Gauge and set to proper pressure.
D) Exhausted fluid (depletion of additives)	Flush fluid system, replace with new fluid.
E) Air in fluid	Check for leaks, and be certain fluid suction in tank is well below hydraulic fluid in reservoir.

TROUBLE SHOOTING

HYDRAULIC TONG SECTION

Problem	Solution
A) Shortened bearing life	Check alignment, insure proper lubrication to non-sealed bearings.

Slow Tong Speed:

Problem	Solution
A) Restricted supply line	Verify proper hi/low speed setting. Clear supply line and check intake on reservoir.
B) Low fluid level	Add fluid to proper volume.
C) Air leak	Locate and repair leak.
D) Pump speed insufficient	Assure proper pump speed for application.
E) Damaged or worn equipment	Isolate pump and check pressure to determine whether motor or pump is defective. Repair or replace defective part.
F) Pump not primed	Check fluid viscosity and restrictions of intake line. Replace fluid if inadequate for operating temperature.
G) Low or no flow from supply line	Check to assure couplings are securely fastened.

Insufficient Torque:

Problem	Solution
A) Relief valve malfunctioning	Relief set too low, broken valve spring, contamination or defective seals.
B) Damaged or worn pump parts	Inspect, repair or replace.
C) Slow pump speed	Assure proper pump speed for application.
D) Improper system fluid	Check fluid viscosity and replace fluid if inadequate for operating temperature.
E) Directional control valve set improperly	Check relief and directional control valve. Neutral should return slightly to reservoir.
F) Damage to motor	Inspect, repair or replace.
G) Restriction of supply line, excessive back pressure	Check to assure couplings are securely fastened.
H) Defective gauge or load cell	Inspect, repair or replace. Assure unit has been calibrated to proper arm length. NOTE: When using **CLINCHER®** integral backup system, it is the length of backup arm, NOT the tong arm length.

TROUBLE SHOOTING

Failure to Grip Tubulars:

	Problem	Solution
A)	Jaws move out from neutral, but fail to penetrate	Inspect size of both the die holder and dies. Verify range at console and replace with dies compatible with tubular range.
B)	Jaws fail to move out of neutral	Inspect and replace defective cylinders for debris or damage. Remove rust and debris from jaws, and jaw pockets. Repair, replace and lubricate as needed.
C)	Tong will not release from tubular	Confirm system pressure is adequate to unlock valve. Inspect Directional Control Valves.
D)	Motor runs but Tong does not rotate	Inspect and replace defective chain, sprocket or gear reducer.
E)	Tong binds under light load	Inspect and replace defective parts. Damaged hub or bearings.
F)	Tong rotates while control lever is in neutral	Replace control valve.
G)	Hydraulic fluid leaking from motor	Repair or replace motor. Verify case drain is open to reservoir.
H)	Clamping cylinders are not synchronized	Resync by fully retracting and extending through several cycles. Inspect damaged lines & fittings, check for other restrictions. Individually check each cylinder for fluid leakage. Replace flow divider.

HYDRAULIC BACKUP SYSTEM

Backup Fails to Hold Tubular:

	Problem	Solution
A)	Incorrect die for size tubular	Check pipe O.D. and match die size to pipe O.D.
B)	Dies have material compacted in tooth area	Clean dies with wire brush and inspect for worn teeth. Replace with new dies if necessary.
C)	Power unit pressure set incorrectly	Inspect relief valve on power unit to make sure enough system pressure is being delivered to backup.
D)	Counter balance valve not holding pressure	Remove side plates on backup. Bench test and replace the counter balance valve defective.
E)	Internal leakage in backup cylinder	Disconnect lines and bench test cylinder. Repair or replace as necessary.
F)	Jaws will not retract	Counter balance valve is stuck. Replace counter balance valve.
G)	External leakage of cylinder	Repair or replace cylinder.
H)	Control valve set to neutral, but jaws extend	Inspect control valve for damage and/or incorrect spool. Repair or replace as necessary.

TROUBLESHOOTING

	Problem	Solution
I)	Excessive hydraulic leaks	The presence of some hydraulic oil on hydraulic cylinder rods and swivels is expected and required to lubricate rod seals. Continuous dripping or stream indicates a failure. If failure is suspected, replace all cylinder seals.
J)	Die insert slippage and breakage	Ensure clamping pressure is adequate. Ensure holder and dies are appropriate for pipe size. Ensure dies are aligned with pipe centerline. Ensure dies are not gripping on tooljoint hardbanding.

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