CLINCHER®

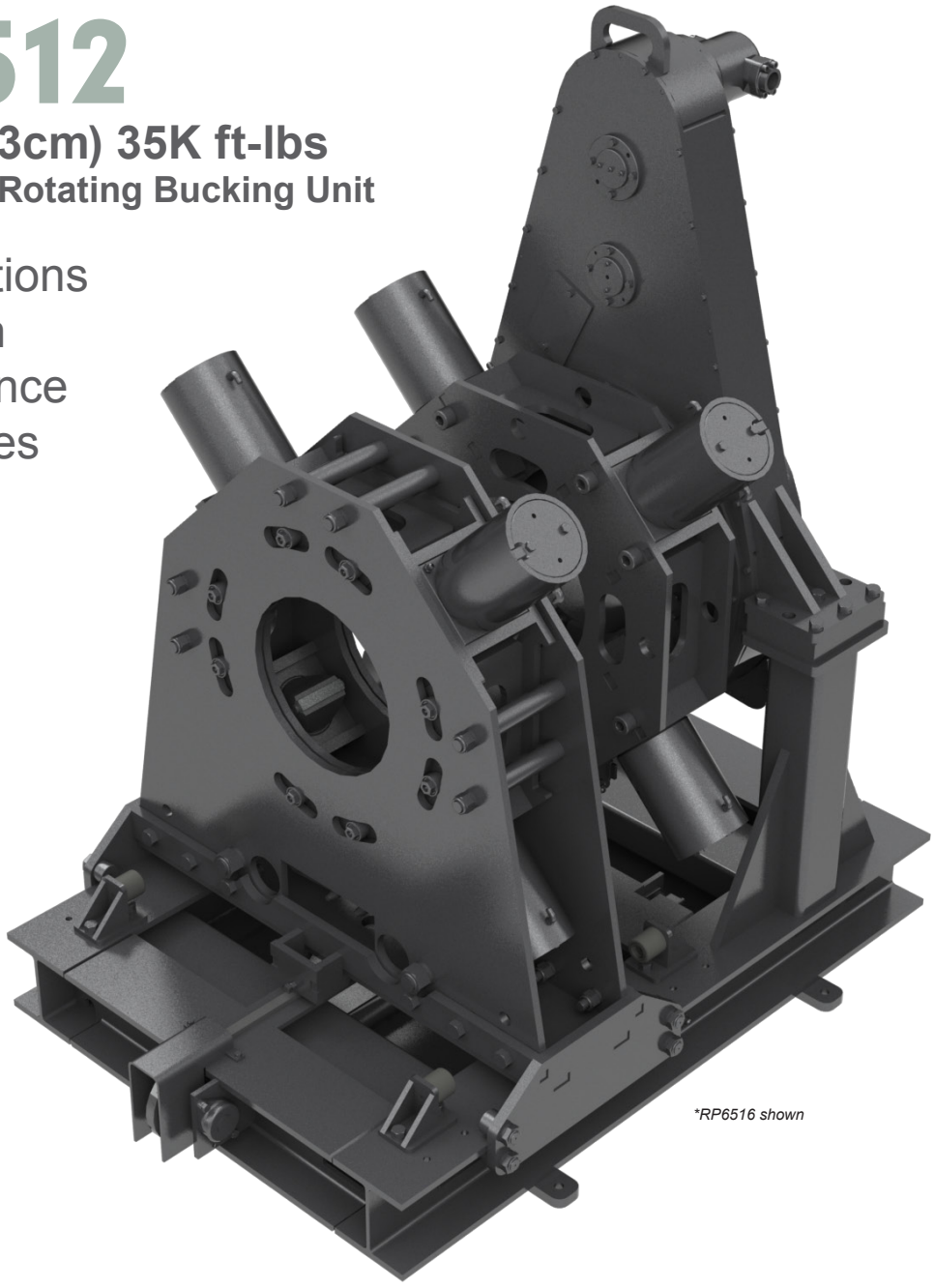
TECHNICAL MANUAL

RP6512

12 3/4” (32.3cm) 35K ft-lbs

Continuously Rotating Bucking Unit

- Specifications
- Operation
- Maintenance
- Assemblies



*RP6516 shown

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MCCOY
MOVING GLOBAL ENERGY FORWARD

Table of Contents

SECTION I

GENERAL DESCRIPTION:

Your **CLINCHER®** Bucking Unit is a rugged, self-contained, continuously rotating 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 McCoy Drilling & Completions, 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 Bucking 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 back Backup Clamp Cylinder control lever in Open/Retract 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 Bucking 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. Start the motor.
2. Move Tong Make Up / Break Out lever in either direction until the power tong completes a rotation.
3. Hold Tailstock Clamp / Unclamp lever in the Unclamp position and adjust Clamp Pressure Control until system pressure reads 1,000 psi. Cycle all levers fully several times to completely purge all air from the system.
4. Position work-piece near center of Headstock, shift the Tailstock Clamp / Unclamp lever to the Clamp position. Tailstock Clamp / Unclamp control lever must be left in the 'Clamp' position while work-piece is in machine.
5. 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.
6. Shift Headstock Clamp / Unclamp lever into Clamp position.
7. Using Tong Make Up / Break Out control lever, apply make-up or break-out torque, then rotate headstock.

MAKE-UP

When making up connections, set relief valve to proper setting before rotating headstock.

BREAK-OUT

Set relief valve to proper setting before rotating headstock.

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:

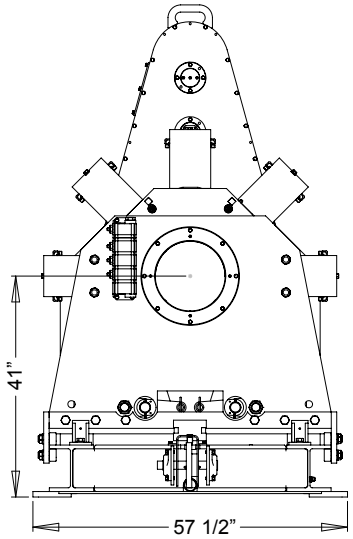
1. Remove dies and inspect jaw retainer bolt torque. Torque should be set to 180 ft-lbs.

MONTHLY:

1. Grease fittings.

ANNUALLY (or following any system repair):

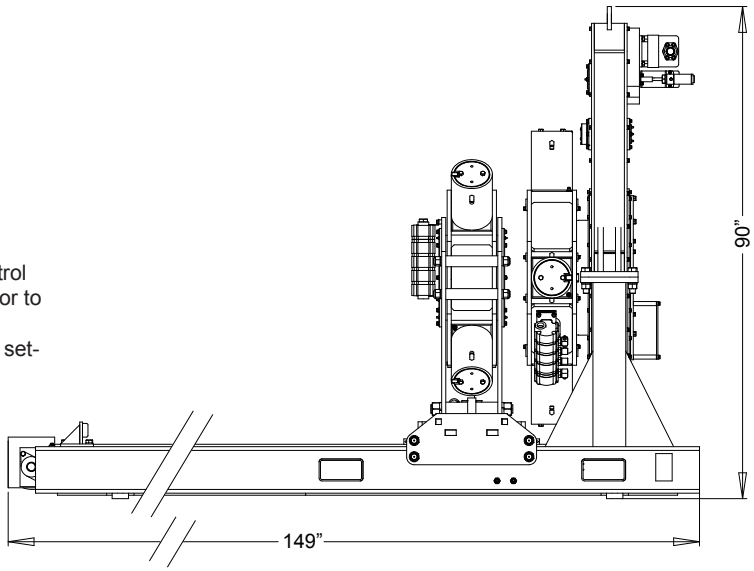
1. Drain and clean hydraulic reservoir. Analyze contamination / quality status of hydraulic oil (with the use of an analysis kit or by other third party means). Filter / replace oil as required.
2. Remove and clean suction strainer.
3. Refill reservoir with new filtered hydraulic oil.



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.

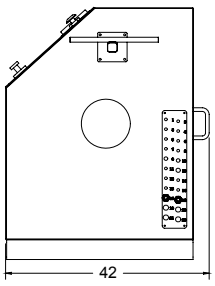


SECTION VI

SPECIFICATIONS

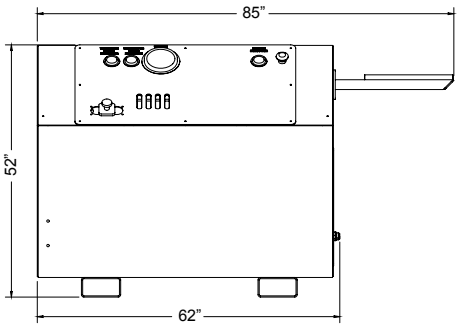
Console / Power Unit:

Electric Motor:	50 Horsepower, 480 Volt, 3 phase, 60 Hertz
Hydraulic Oil:	AW-68
Hyd. Oil Capacity:	90 gal.
Overall Length:	42”
Overall Width:	85”
Overall Height:	52”
Weight (approx.):	3,000 lbs.



Bucking Unit:

Max. Torque:	35,000 ft-lbs
Handle Length:	24”
Overall Length:	149”
Overall Width:	57 1/2”
Overall Height:	90”
Weight (approx.):	8000 lbs.



CHUCKING CAPACITIES
2 3/8” to 12 1/4” Diameter

TORQUE CAPACITY
Make-up 35,000 foot pounds / Break-out 35,000 foot pounds

LUBRICATION SPECIFICATIONS

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

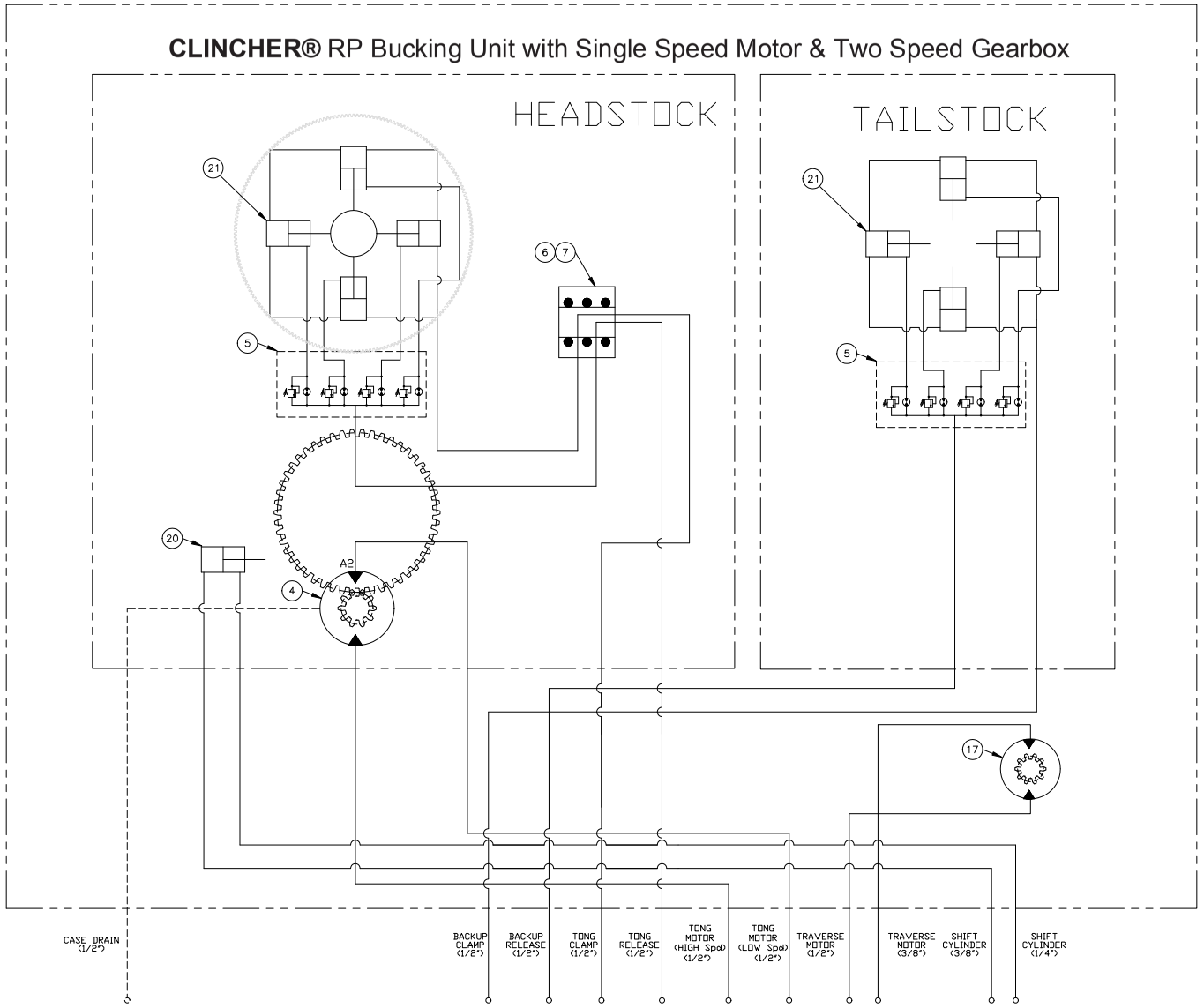
Type	High Temp MP
NLGI Consistency Grade	1
Color	Medium Green
Lithium Complex Soap, wt%	Non Soap
Serv. Temperature	0 Deg. F – 450 Deg. F
Base Oil Viscosity: @ 100º F @ 200º F	1300 SUS 89 SUS
Viscosity Index	77
Penetration, dmm Worked *ASTM D 217*	325-340
Dropping Point, ºF *ASTM D 566*	500 ±
Rust Protection, 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)

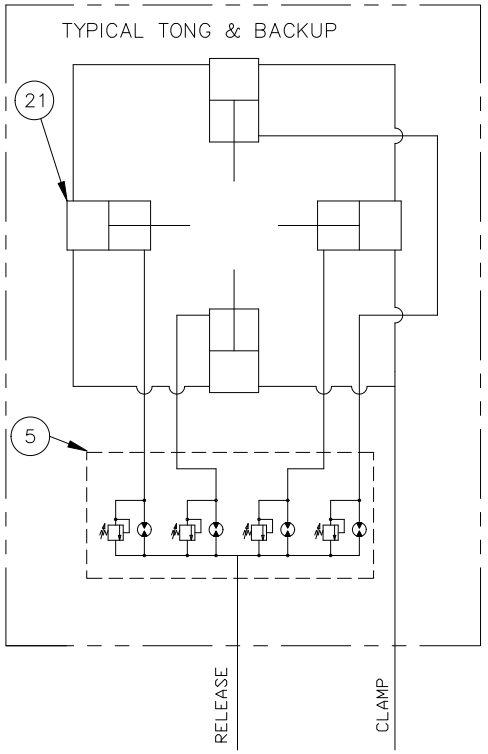
Type	N/A
NLGI Consistency Grade	2
Color	Blue
Lithium Complex Soap, wt%	14
Serv. Temperature	N/A
Base Oil Viscosity: @ 40ºC, cSt *ASTM D 445* @ 100ºC, cSt	150 14.5
Viscosity Index	N/A
Penetration, dmm Worked, 60X *ASTM D 217*	280
Dropping Point, ºF *ASTM D 2265*	450+
Rust Protection, 5% SSW *ASTM D 5969*	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+

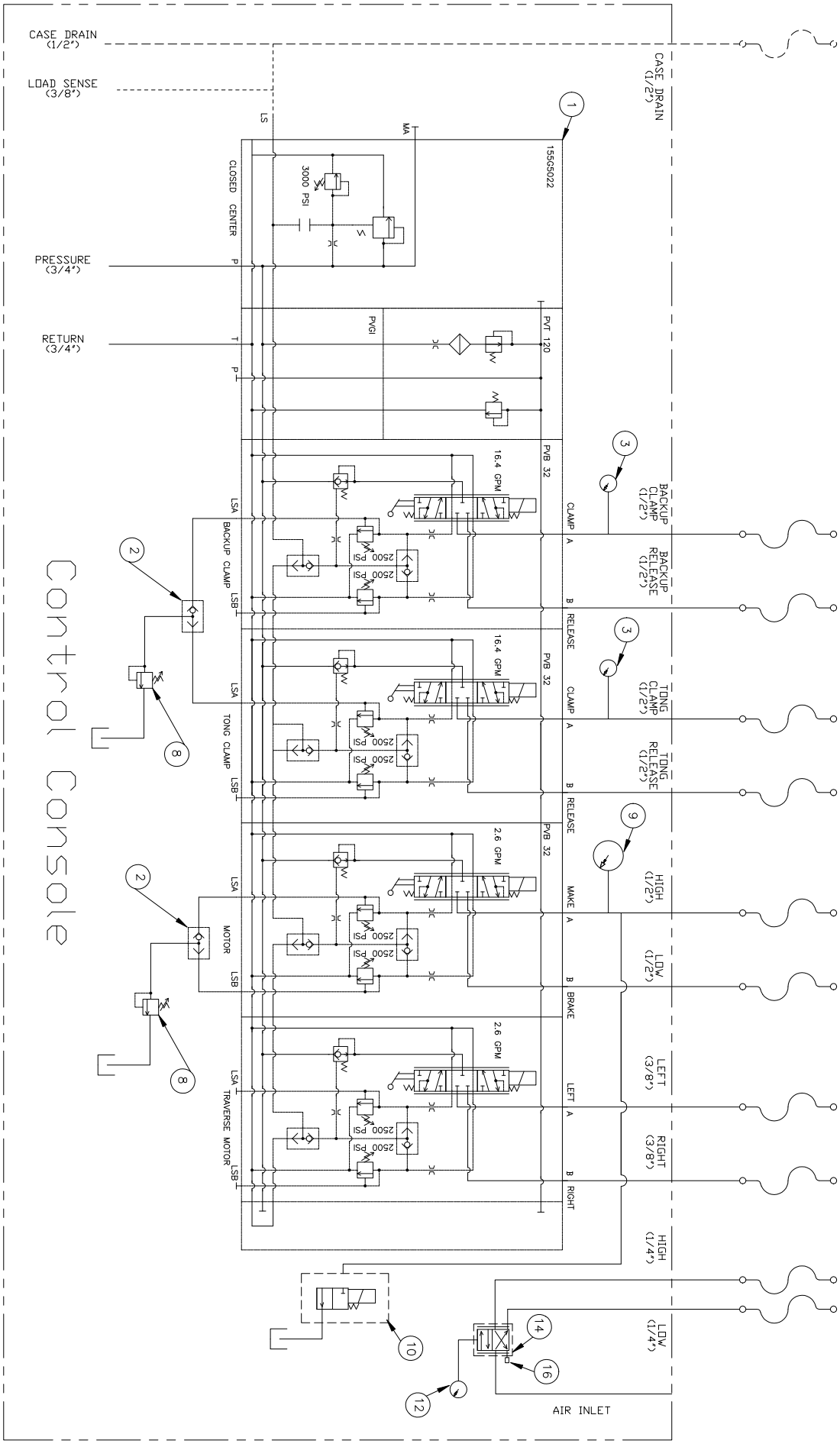


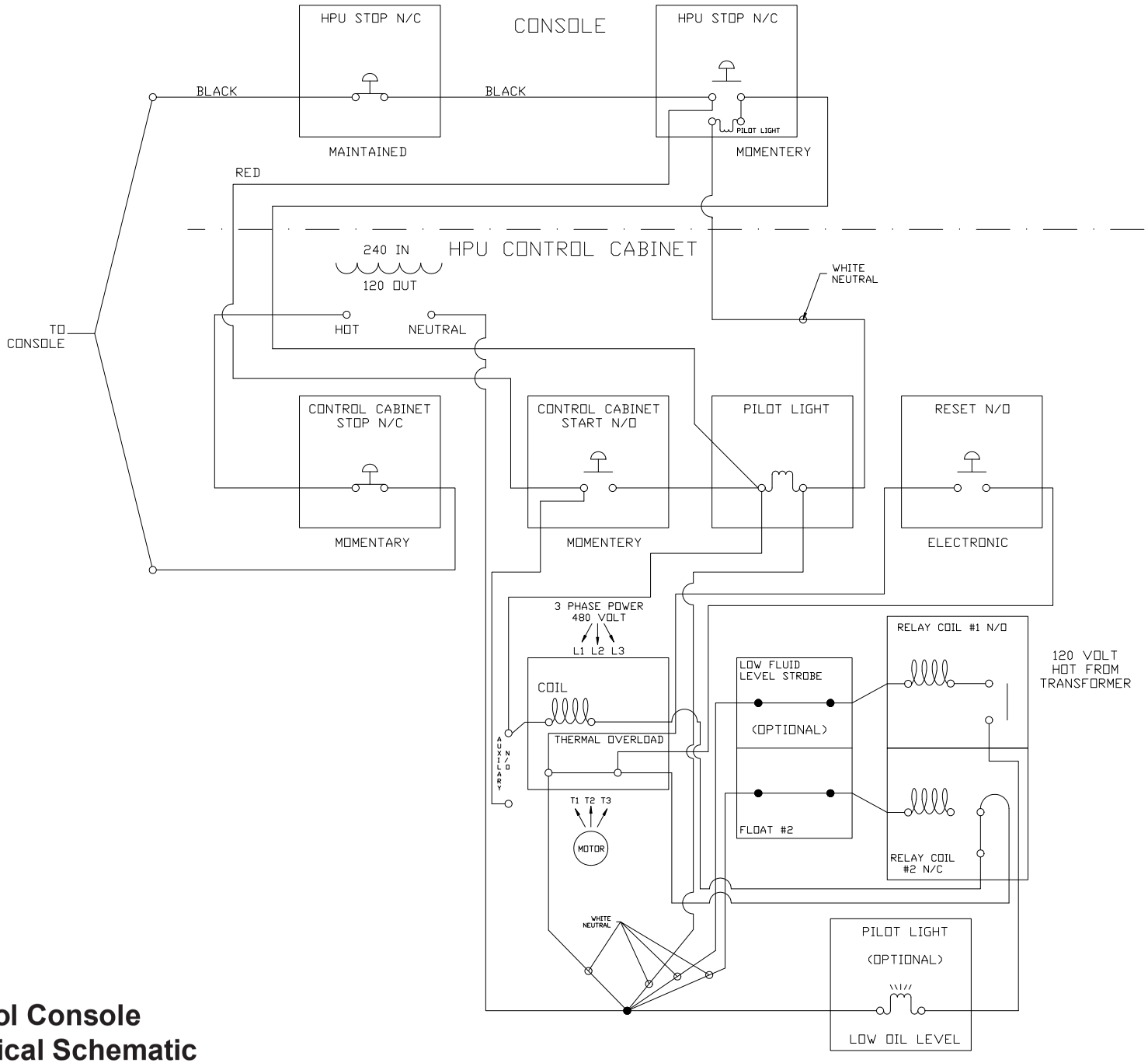
ITEM NO.	QTY.	DESCRIPTION	PART NUMBER
1	3	PVG 32 VALVE CONTROLS	157BXXXX
2	2	SHUTTLE VALVE	LSV1-6T-N
4	1	HYDRAULIC MOTOR, SINGLE	235-6500
5	2	FLOW DIVIDER	330-6500
6	1	HYDRAULIC SWIVEL	228-6500-165
7	3	ROTARY SEALS (3 PCS = 1 SET)	238-6500
8	2	RELIEF VALVE	R1E02-2512-A1
9	1	6" PRESSURE GAUGE, 0-3000	132-6500
10	1	DUMP VALVE SOLENOID VALVE NOR. CLOSED	148-6500
12	1	AIR PRESSURE GAUGE	149-6500
14	1	AIR VALVE	146-6500
16	1	AIR MUFFLER	147-6500
17	1	TRAVERSE MOTOR (OPTIONAL)	143-6500
20	1	AIR CYLINDER W/ GEAR SHIFT	234-6500
21	8	CLAMP CYLINDER	400-3000-1



Bucking Unit
Hydraulic Schematic

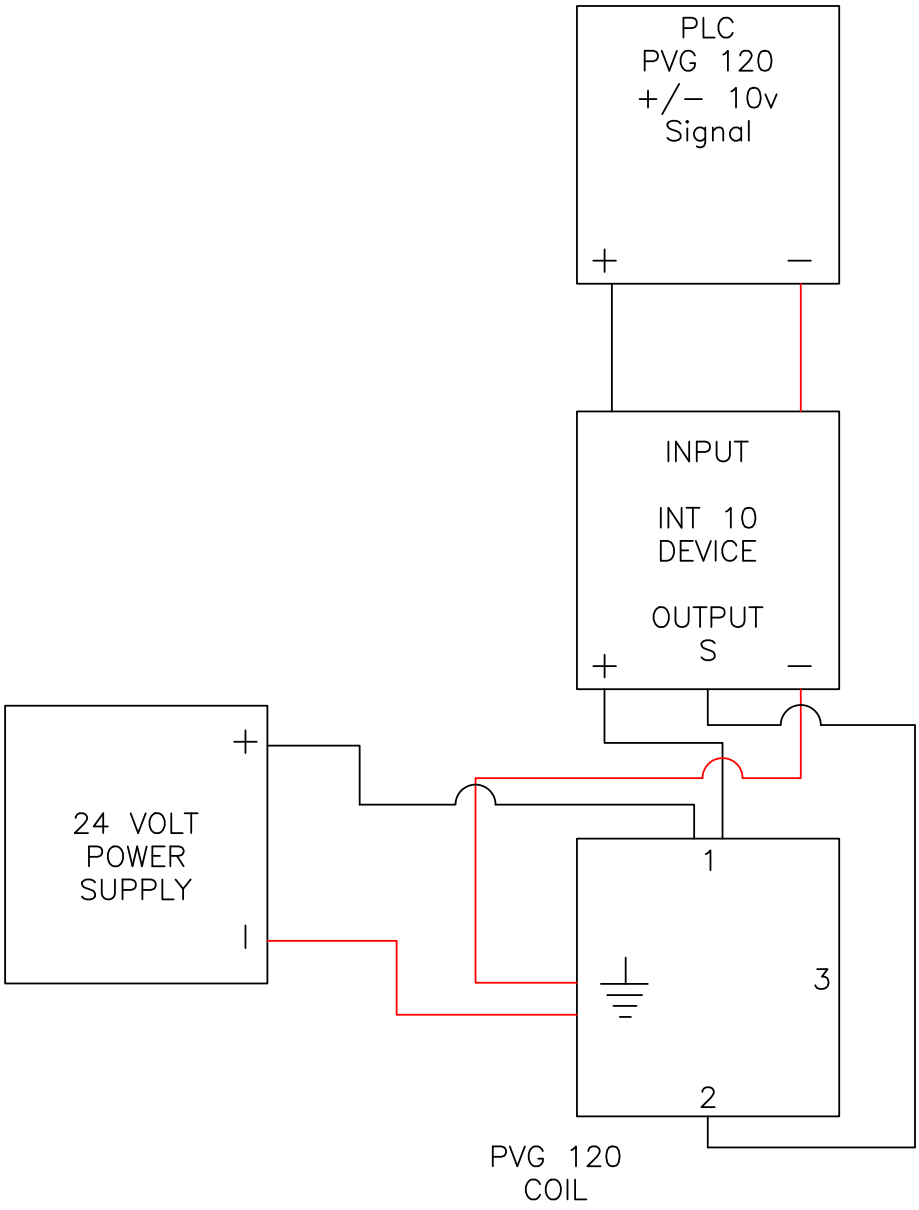
Control Console
Hydraulic Schematic



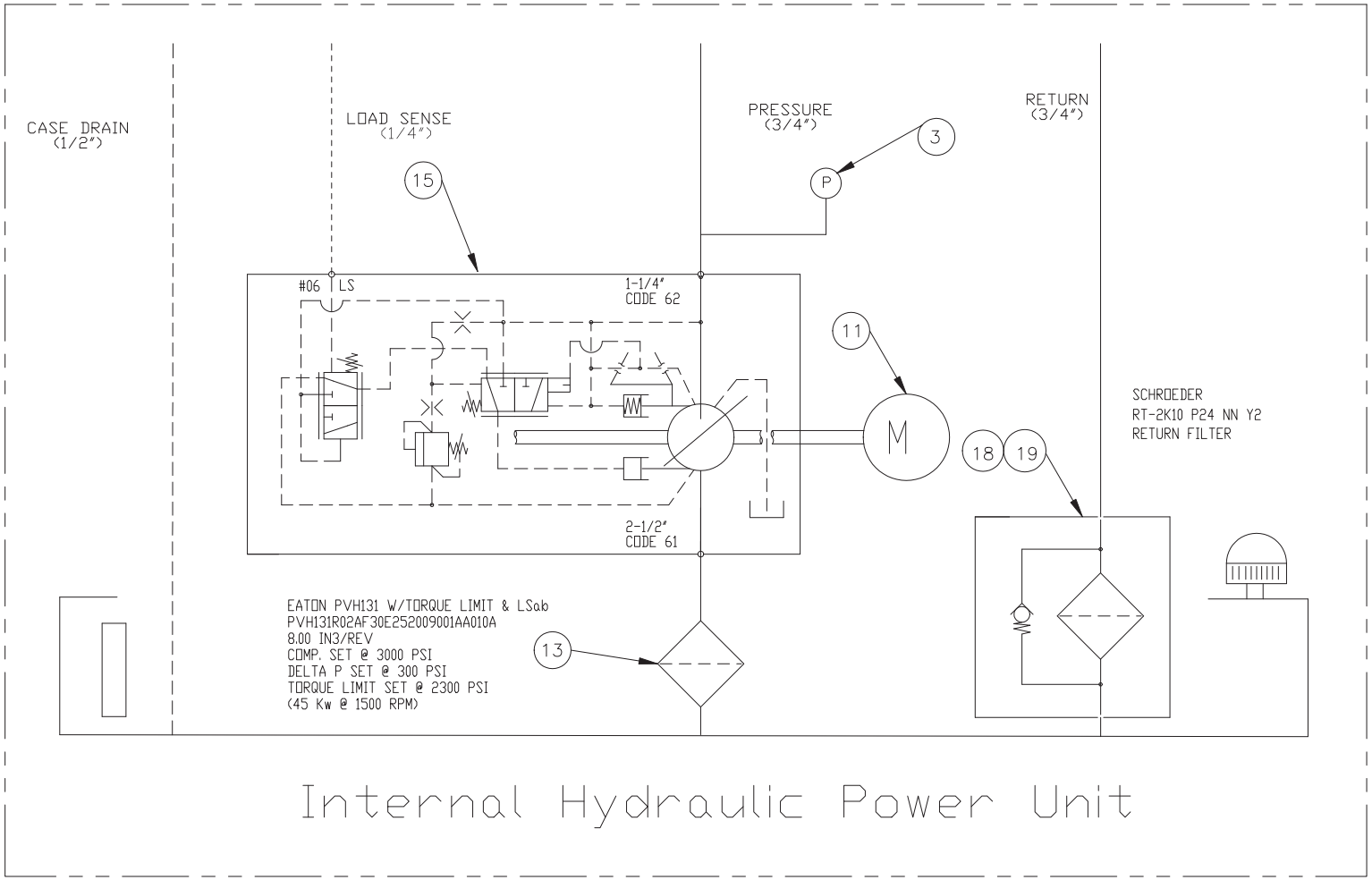


Control Console
Electrical Schematic

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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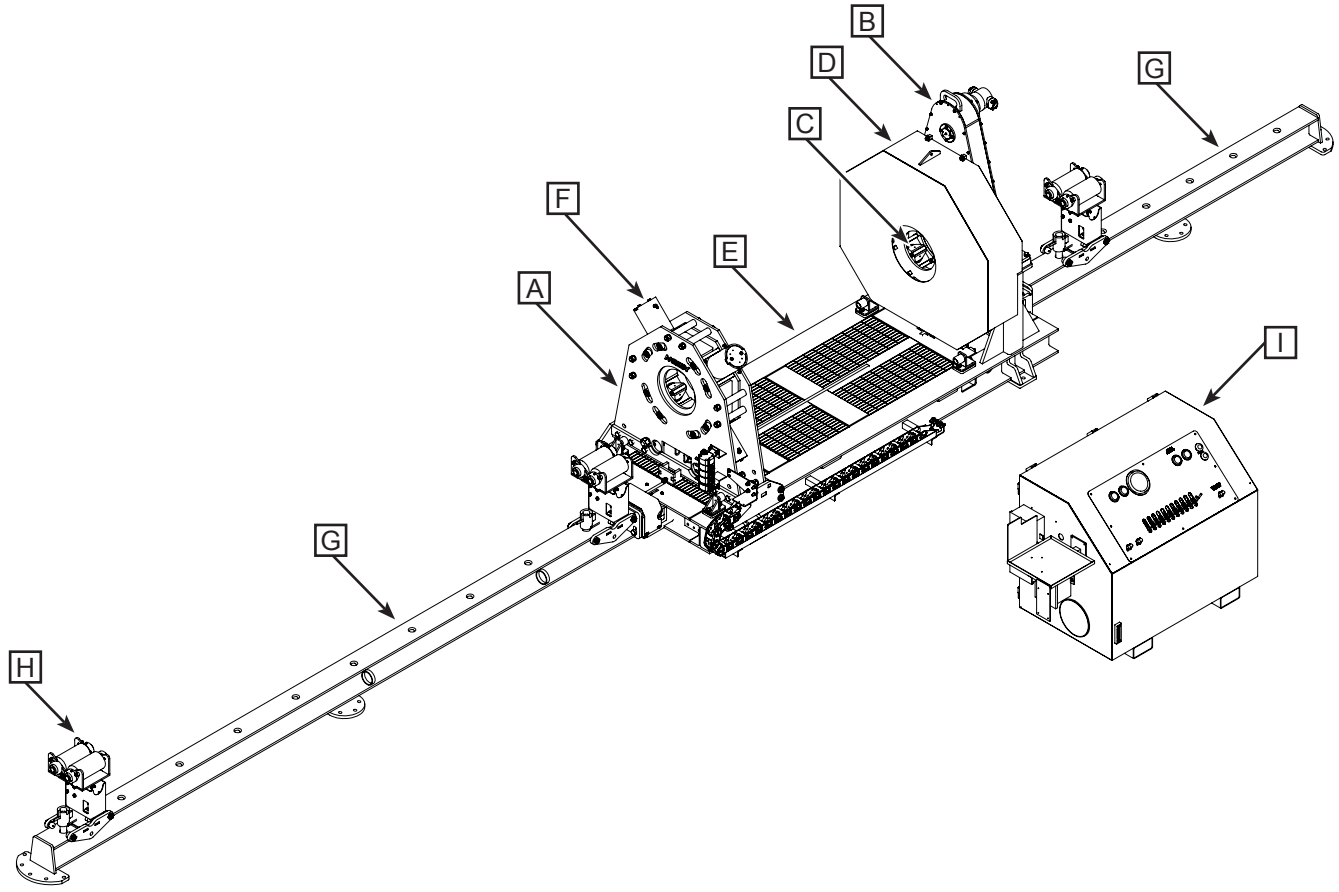
CLINCHER® RP6512

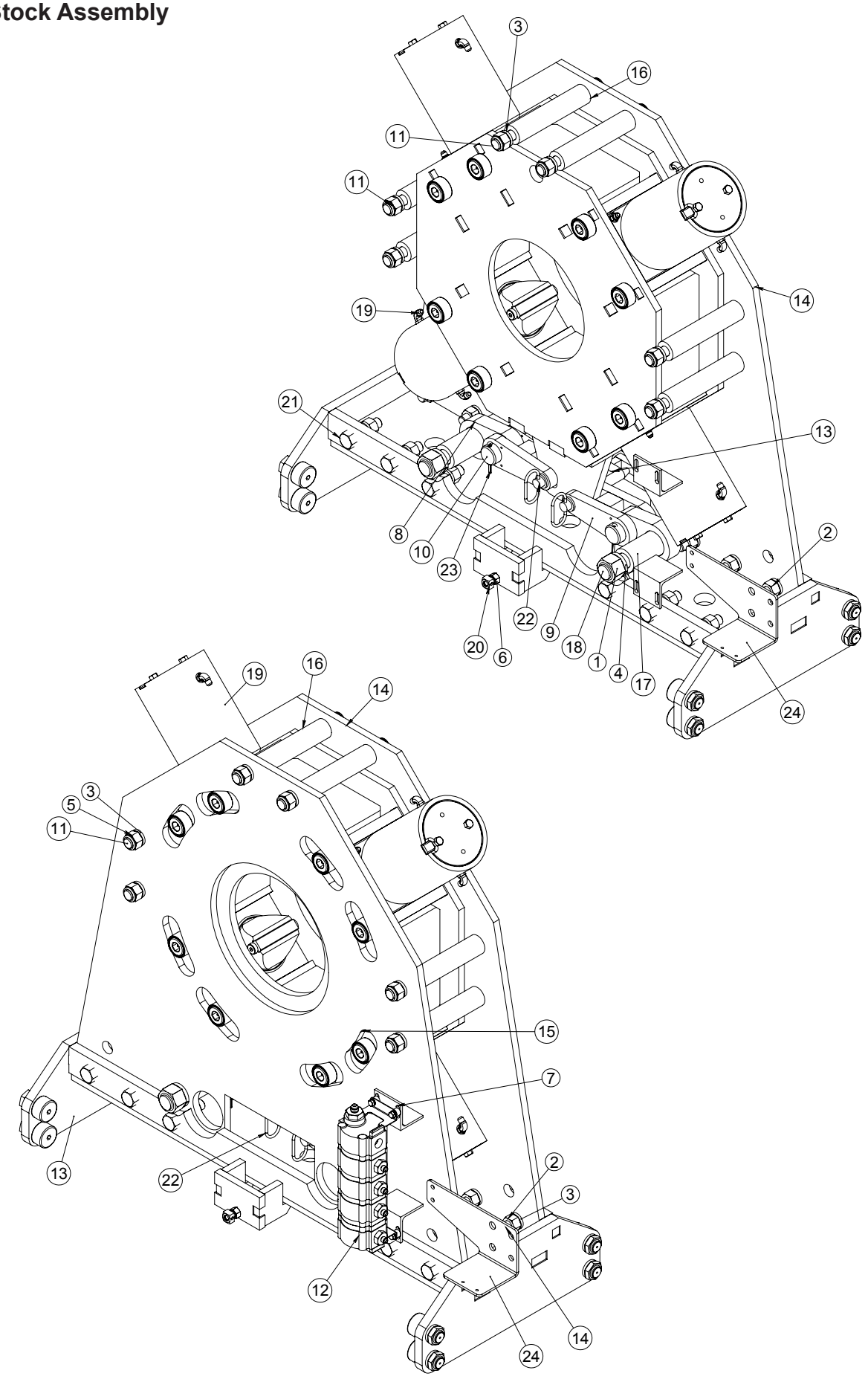
Continuously Rotating Bucking Unit

(shown with optional accessories)

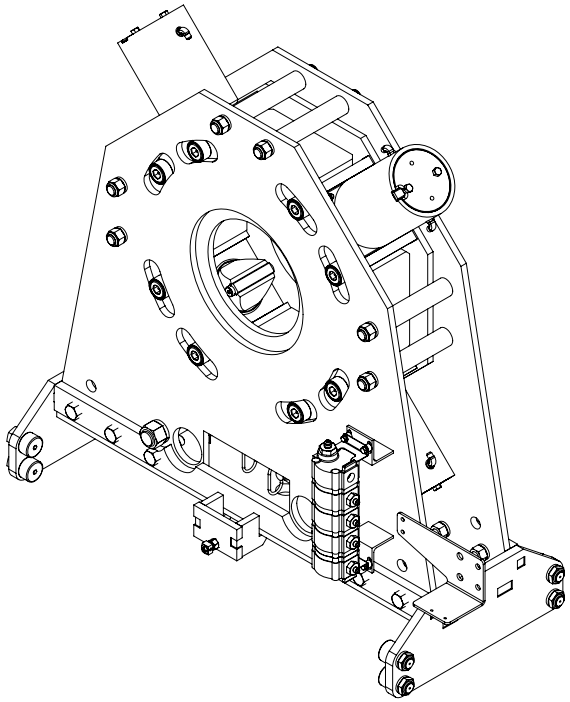


For third party component documentation used within this unit, please contact McCoy Drilling & Completions.

300-6500-12
Tail Stock Assembly



300-6500-12
Tail Stock Assembly



Item #	Qty.	Part Number	Part Name
1	4	1187	1 1/2-6 HEX NUT
2	12	1210	1"-8 NUT GR. 8
3	24	1218	1" LW
4	4	1223	1 1/2" LOCKWASHER
5	12	1224-B	1"-8 NYLOC NUT
6	4	194	5/8-11 NC NUT (194)
7	2	251-6500	FLOW DIVIDER MOUNT ANGLE
8	2	302-6500	LOAD CELL BRACKET
9	2	303-6500	LOADCELL BRACKET WELDMENT
10	2	303B-6500	LOAD CELL DEAD PIN
11	6	320-6500	TAILSTOCK SPACER BOLTS
12	1	330-6500	DELTA POWER 6 PORT FLOW DIVIDER
13	1	350-6500-1	CARRIAGE ASSEMBLY
14	1	355B-6500-12	OUTER TAILSTOCK SIDE PLATE
15	1	355A-6500-12	TAILSTOCK SIDE PLATE
16	6	356-6500	TAILSTOCK SPACER TUBE
17	2	359-6500	LOADCELL SPACER ROD
18	2	360-6500	LOADCELL SPACER BOLT
19	1	372-6500-12	12 3/4" TAILSTOCK VISE ASSEMBLY
20	2	570-3000	MODIFIED CHAIN ATTACHMENT
21	12	74053	1"-8 X 3 3/4" HHCS
22	2	902B-3000-1	1" X 7 3/4" HITCH PIN
23	2	PH-PIN 3	COTTER PIN 1/4 X 1 1/2
24	1	518-6000-01	BULKHEAD PLATE

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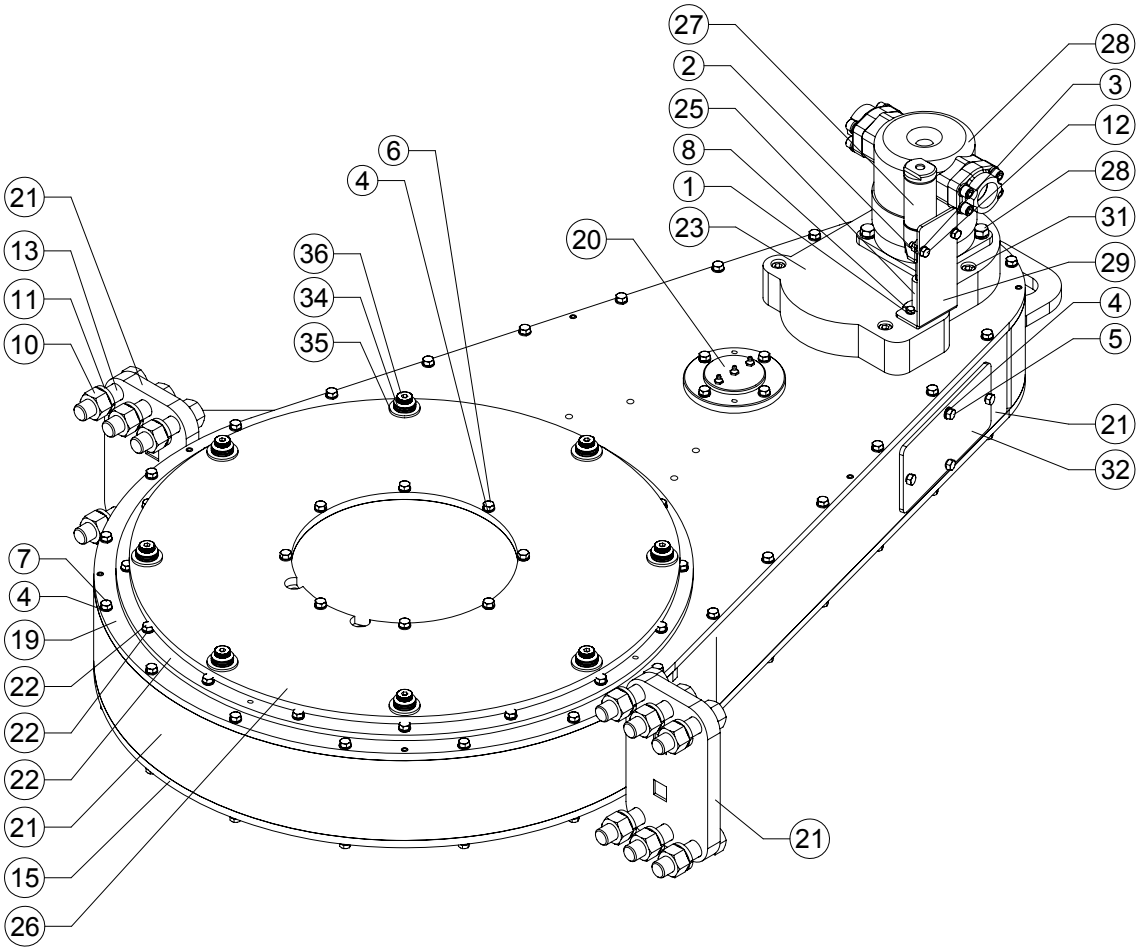
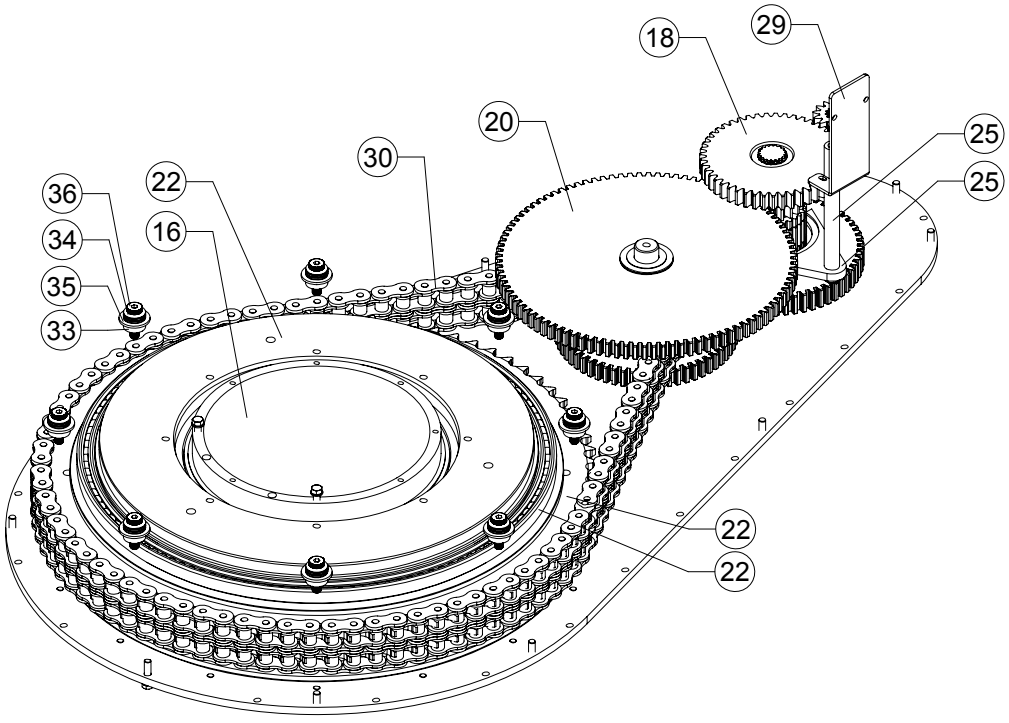
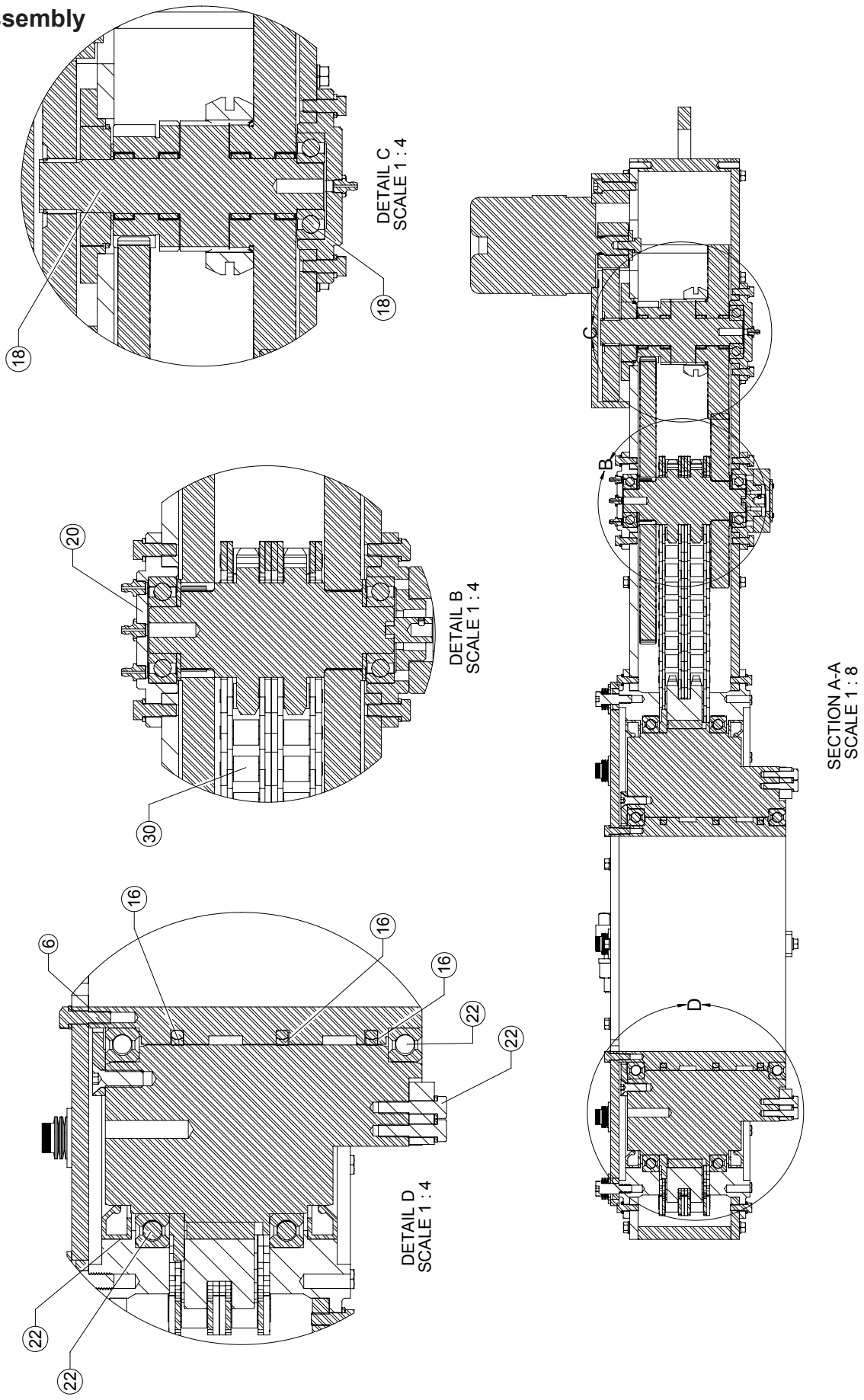
200A-6500-12
Tong Assembly





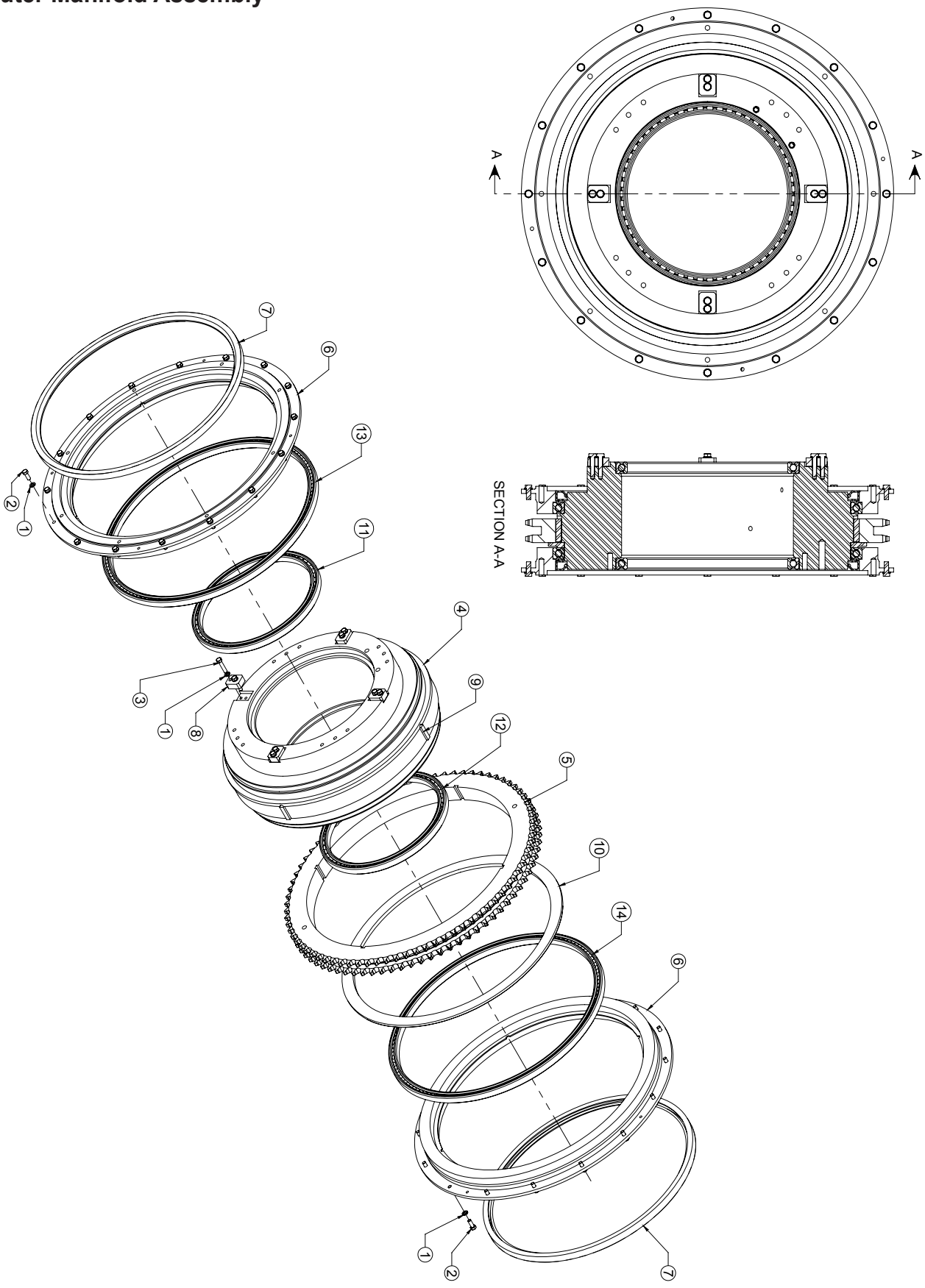
200A-6500-12
Tong Assembly



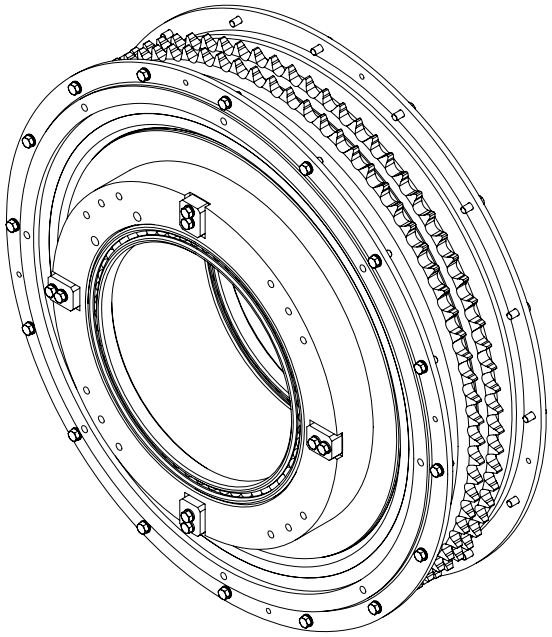
200A-6500-12
Tong Assembly

Item #	Qty.	Part Number	Part Name
1	2	101	1/4" LOCKWASHER
2	2	1023-A	5/16-18 HEX NUT
3	2	1023-B	5/16 LOCKWASHER
4	57	1027	WASHER, LOCK 3/8"
5	4	1046	HHCS 3/8-16 X 3/4
6	8	1048	3/8"-16 X 1 1/4" HHCS
7	48	1049	3/8"-16 X 1 1/2" HHCS
8	2	105	1/4"-20 X 1" HHCS GR8
9	8	1132	SCHCS 1/2"-13 X 1 1/2"
10	12	1210	1"-8 NUT GR. 8
11	12	1218	1" LW
12	2	122	5/16" X 1" HHCS
13	12	1291	1"-8 X 4" HHCS
14	18	1309	DOWELL PIN 3/8" x 1-1/4"
15	1	201A-6500	BOTTOM HOUSING LID
16	1	2010-6500	12 3/4" INNER MANIFOLD ASSEMBLY
17	1	2013-6500	12 3/4" MANIFOLD RETAINER RING
18	1	2015-6500-1	CLUTCH GEAR ASSEMBLY
19	1	202A-6500	TOP HOUSING LID
20	1	2020-6500-1	PINION GEAR ASSEMBLY
21	1	203-6500	HEADSTOCK MIDBODY
22	1	204-6500-12	OUTER MANIFOLD ASSEMBLY
23	1	216-6500	MOTOR MOUNT
24	1	217-6000	ORING RETAINER
25	1	220-6500-1	SHIFTING COLLAR ASSEMBLY
26	1	230-6500-12	COVER PLATE RETAINER
27	1	234-6500	AIR CYLINDER WITH BRACKET
28	1	235-6000-1	DRIVE GEAR ASSEMBLY
29	1	239-6500	CYLINDER MOUNT BRACKET
30	1	247-6500	DOUBLE STRAND ROLLER CHAIN
31	9	249	1/2"-13 X 2" SHCS
32	1	283-6500	SHIFTER WINDOW COVER
33	8	230A-6500-12	POLYURETHANE SPACER
34	40	230B-6500-12	5/8" BELLEVILLE WASHER
35	8	230C-6500-12	5/8" FLAT WASHER
36	8	91259A794	5/8" X 1" SHOULDER SCREW
37	4	1112	1/2”-13 x 1 1/2” HHCS
38	4	1103	1/2” LOCKWASHER
39	1	3100-6500	12 3/4” ROTATING HEAD GUARD
40	1	250-6500-12	HEAD STOCK ASSEMBLY

204-6500-12
Outer Manifold Assembly

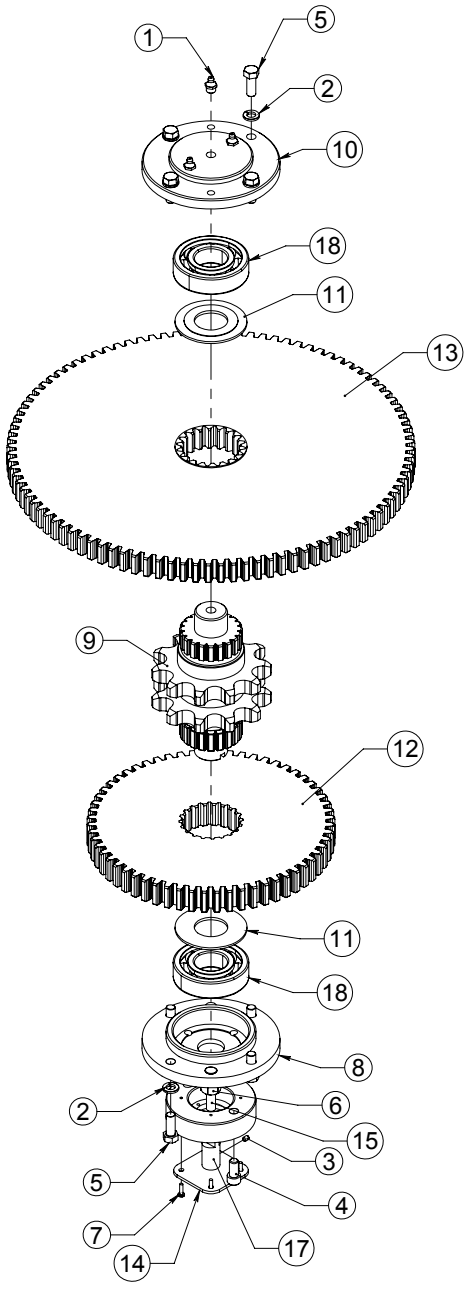


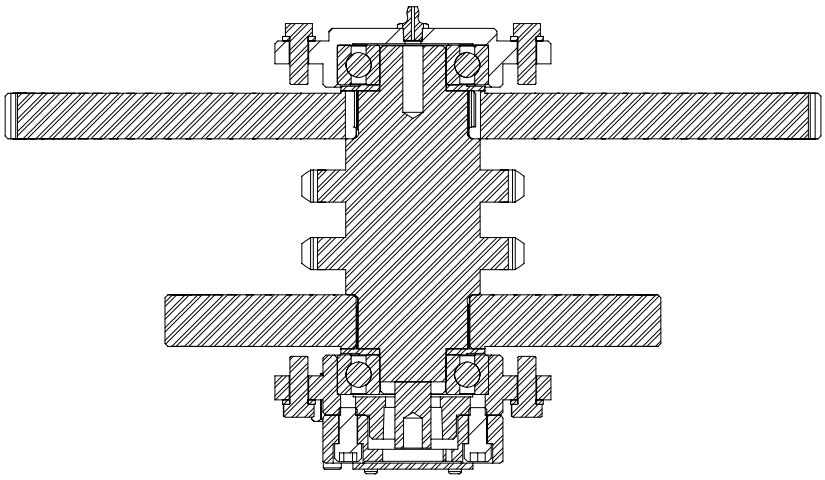
204-6500-12
Outer Manifold Assembly



Item #	Qty.	Part Number	Part Name
1	40	1027	WASHER, LOCK 3/8"
2	32	1047	3/8"-16 X 1" HHCS
3	8	141	3/8"-16 X 1 3/4" HHCS
4	1	2011-6500	12 3/4" OUTER MANIFOLD
5	1	204B-6500	SPROCKET
6	2	204C-6500	FINAL DRIVE BEARING CAP
7	2	204E-6500	GARLOCK OIL SEAL (21238-4305)
8	4	225-6500	MANIFOLD KEY
9	4	227A-6500	MANIFOLD KEY
10	1	269-6500	SPROCKET SPACER
11	1	SG140-CPO	14" RADIAL CONTACT THIN SECTION BEARING
12	1	SG140-XPO	14" FOUR CONTACT THIN SECTION BEARING
13	1	SG250-CPO	25" THRUST THIN SECTION BEARING
14	1	SG250-XPO	25" FOR CONTACT THIN SECTION BEARING

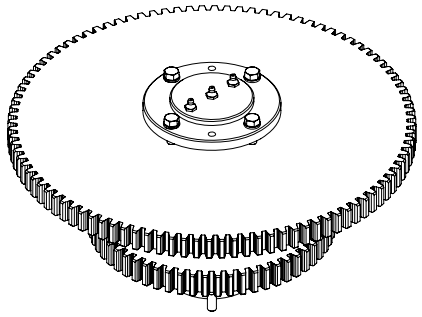
2020-6500-1
Pinion Gear Assembly





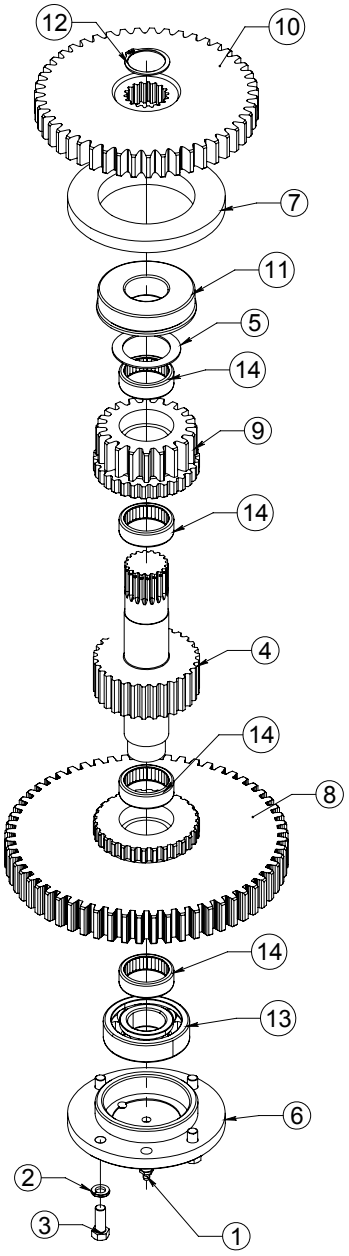
SECTION A-A
SCALE 1 : 4

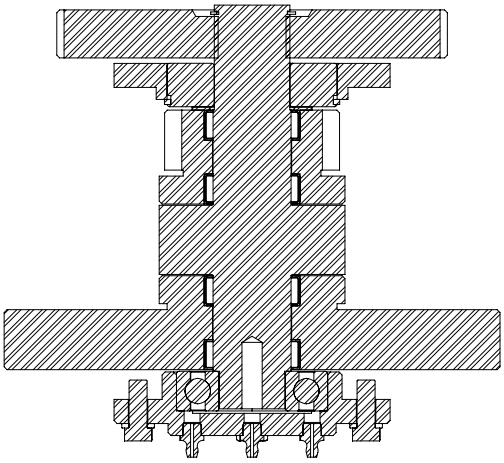
2020-6500-1
Pinion Gear Assembly



Item #	Qty.	Part Number	Part Name
1	3	1001	1/8 NPT ZERT
2	8	1027	WASHER, LOCK 3/8"
3	1	1034	#10-32 X 1/4" SET SCREW
4	2	1040-A	3/8-16 x 3/4 SHCS
5	8	1047	3/8"-16 X 1" HHCS
6	1	1101	NUT, HEX, 1/2-13
7	4	1276-B	#6-32 X 3/8" MACHINE SCREW
8	1	2017-6500	BOTTOM PINION BEARING CAP
9	1	2020-6500	PINION SPROCKET
10	1	2023-6500	PINION BEARING CAP
11	2	2024-6500	PINION GEAR SPACER
12	1	207-6500	HIGH PINION GEAR
13	1	208-6500	LOW PINION GEAR
14	1	40034	COVER PLATE
15	1	51031	ENCODER COUPLING MOUNT
16	1	51075	ENCODER MOUNTING PLATE
17	1	55144	ENCODER COUPLING
18	2	6307	1-1/2" BEARING

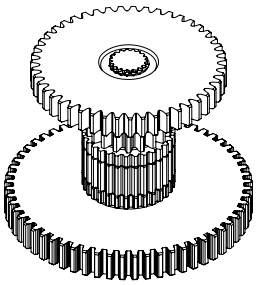
2015-6500-1
Clutch Gear Assembly





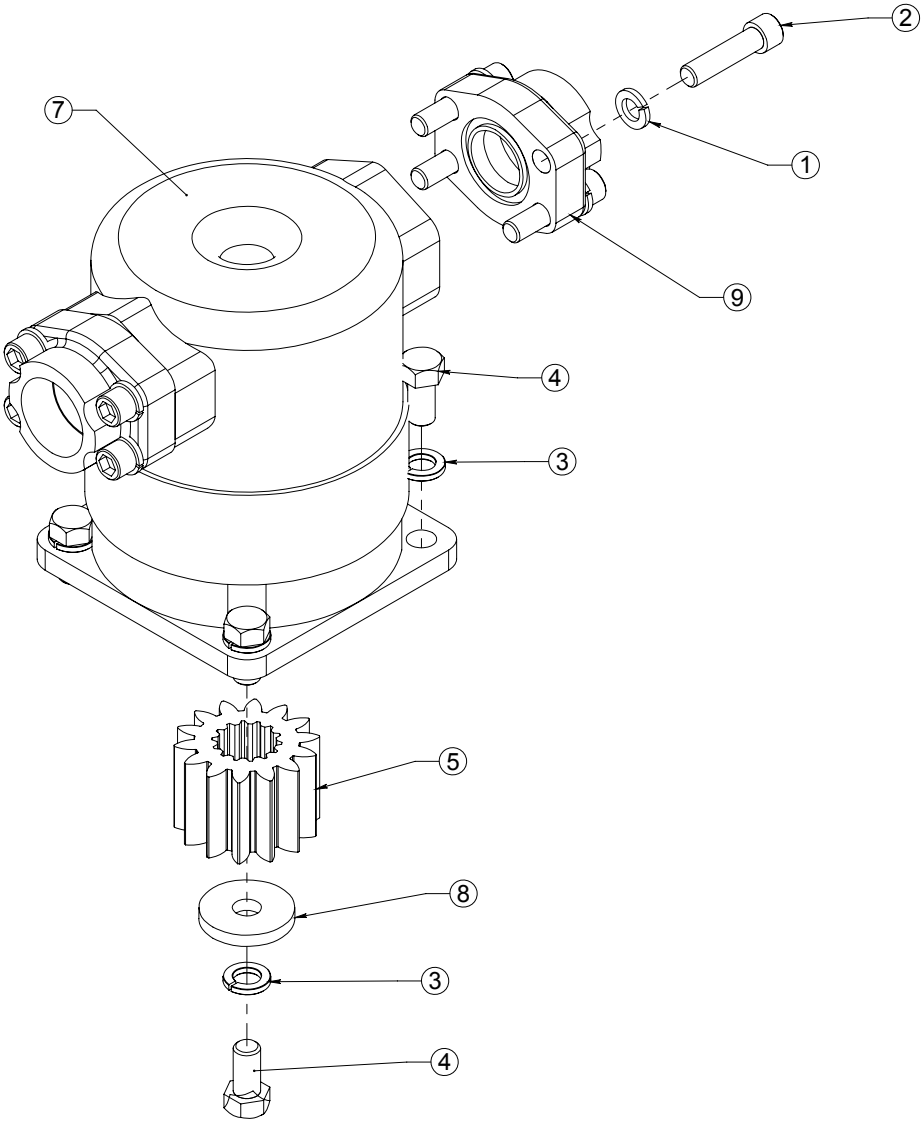
SECTION A-A

2015-6500-1
Clutch Gear Assembly

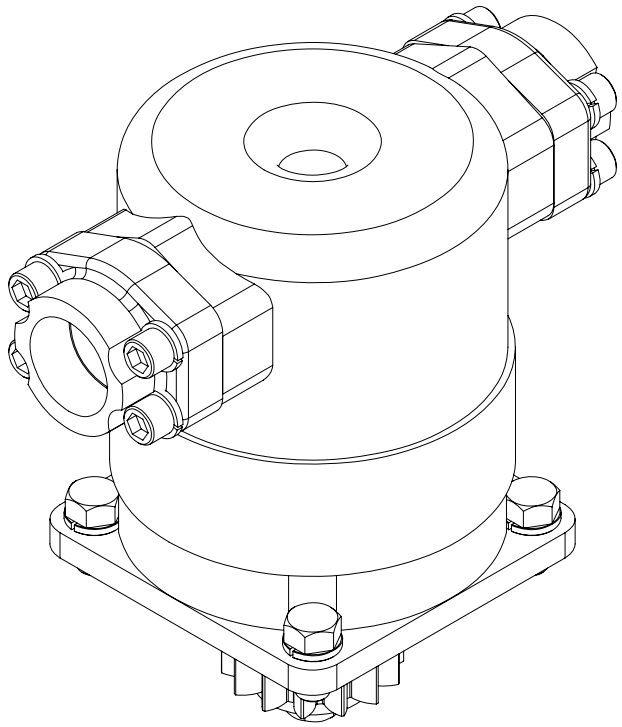


Item #	Qty.	Part Number	Part Name
1	3	1001	1/8 NPT ZERT
2	4	1027	WASHER, LOCK 3/8"
3	4	1047	3/8"-16 X 1" HHCS
4	1	2015-6500	CLUTCH SHAFT
5	1	2015A-6500	CLUTCH WASHER
6	1	2015B-6500	BOTTOM CLUTCH SHAFT BEARING CAP
7	1	2016-6500	TOP CLUTCH BEARING CAP
8	1	209-6500	HIGH CLUTCH GEAR
9	1	210-6500	LOW CLUTCH GEAR
10	1	211-6500	CLUTCH DRIVE GEAR
11	1	308-ZZNR	1-1/2" DEEP GROOVE BALL BEARING
12	1	3100-156	EXTERNAL RETAINING RING
13	1	6307	1-1/2" BEARING
14	4	B-2610	TIMKEN NEEDLE BEARING

235-6000-1
Drive Gear Assembly

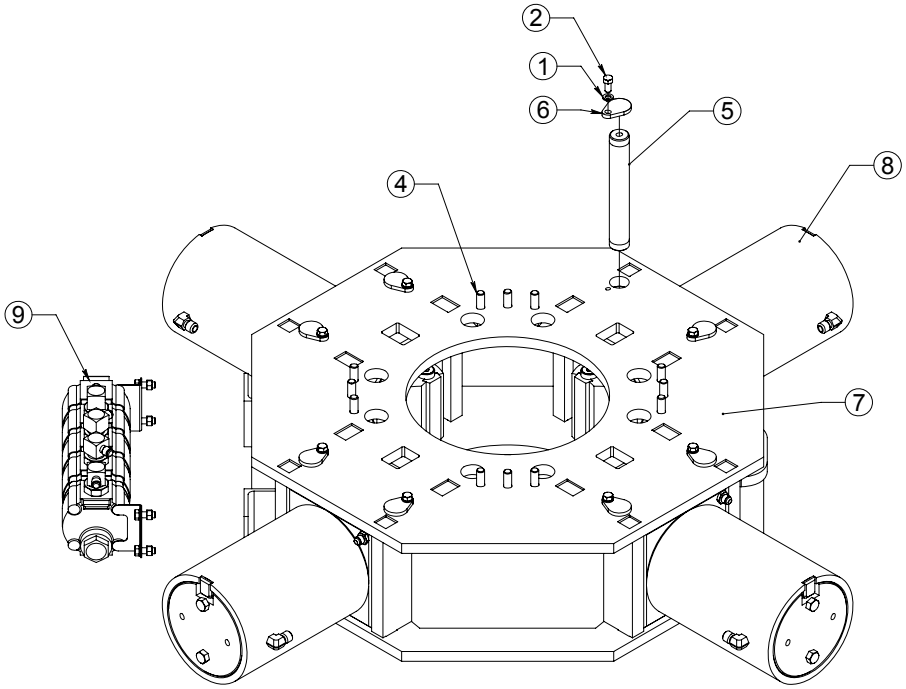


235-6000-1
Drive Gear Assembly

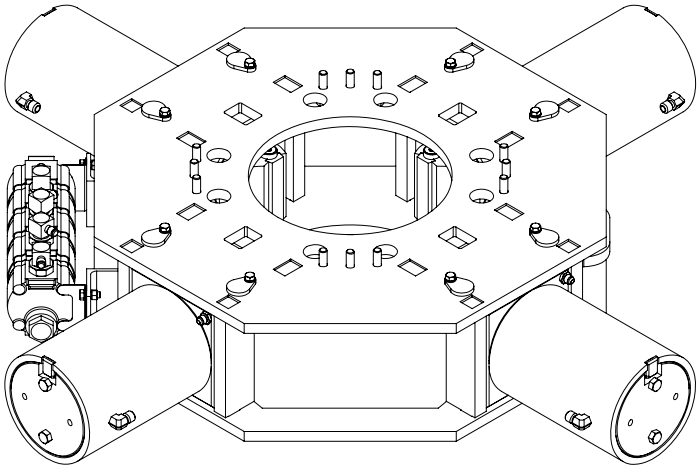


Item #	Qty.	Part Number	Part Name
1	8	1081	7/16" LOCKWASHER
2	8	1084	7/16"-14 x 1 3/4" SHCS
3	5	1103	1/2" LOCKWASHER
4	5	1110	1/2"-13 x 1" HHCS
5	1	212-5000-14T	MOTOR DRIVE GEAR (SPLINED)
6	2	2-222	O-RING
7	1	235-6500	1 SPEED 15 cu.inch MOTOR
8	1	235A-6500	MOTOR DRIVE GEAR RETAINER
9	2	W43-20-20U	1-1/4" FLANGE

250-6500-12
Head Stock Vise Assembly

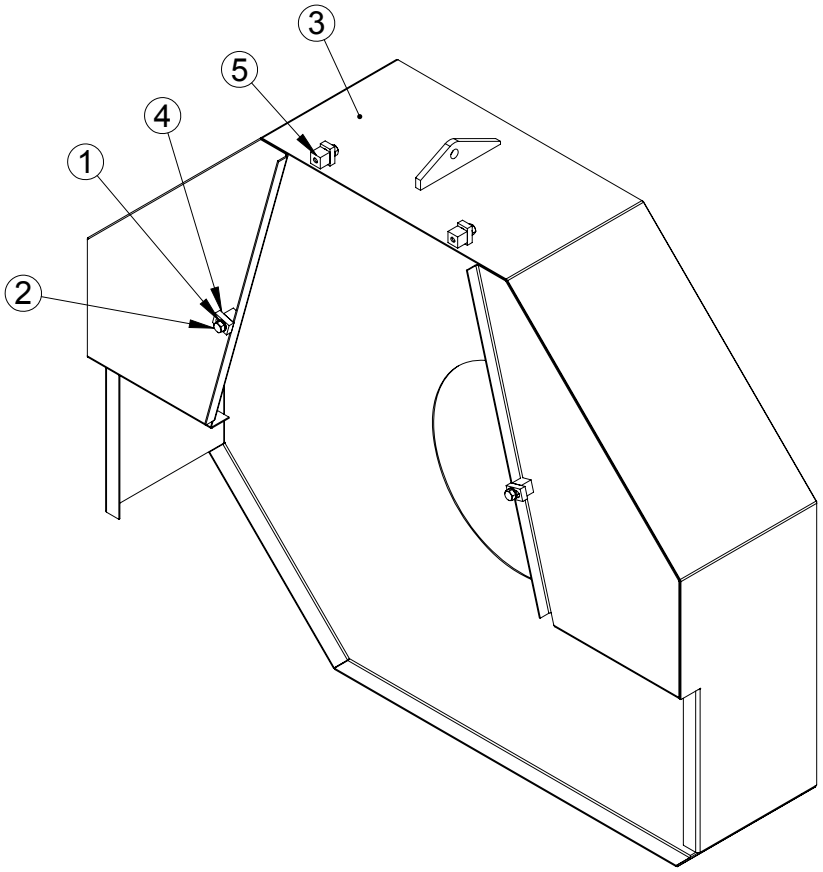


250-6500-12
Head Stock Vise Assembly



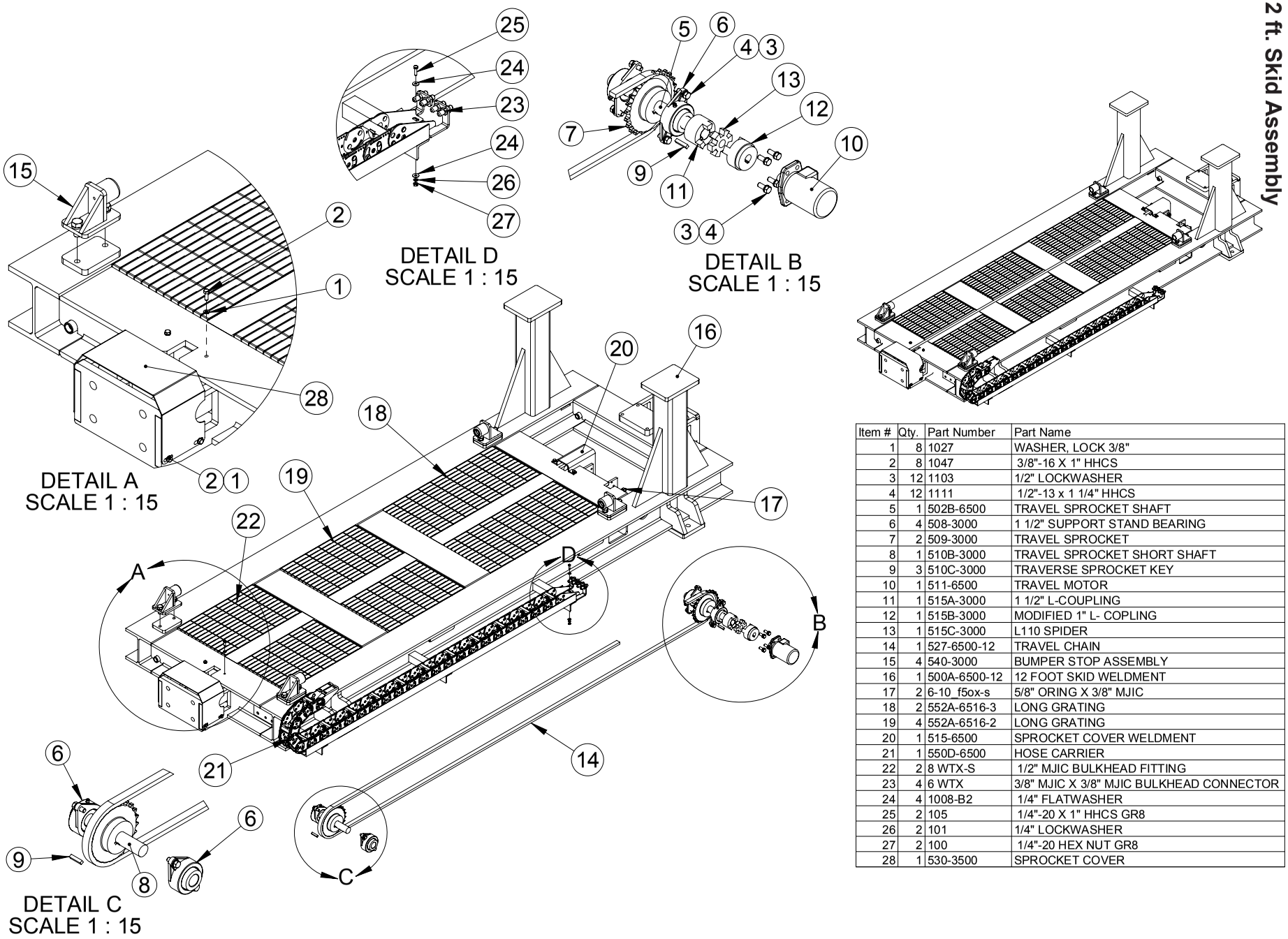
Item #	Qty.	Part Number	Part Name
1	16	1027	WASHER, LOCK 3/8"
2	16	1046	HHCS 3/8-16 X 3/4
3	12	1103	1/2" LOCKWASHER
4	12	1112-A	1/2"-13 x 2" HHCS
5	8	222-6500	HEADSTOCK PIN
6	16	222B-3500	CYLINDER PIN RETAINER
7	1	240-6500-12	12 3/4" HEADSTOCK VISE WELDMENT
8	4	400-3000-1	CLAMP CYLINDER ASSEMBLY
9	1	291-6500	HEADSTOCK FLOW DIVIDER ASSEMBLY

3000-6500-02
Rotating Head Guard Assembly



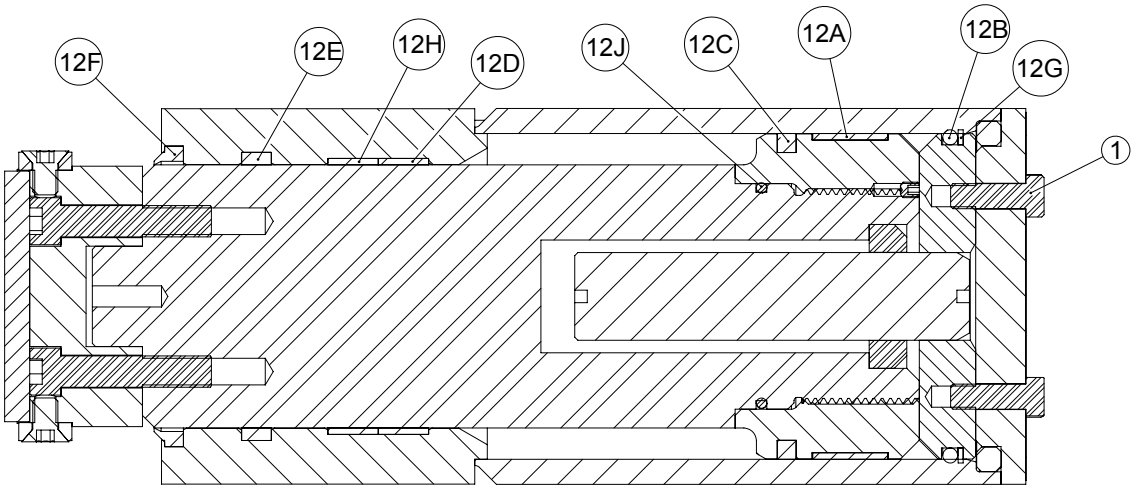
Item #	Qty.	Part Number	Part Name
1	4	1103	1/2" LOCKWASHER
2	4	1112	1/2"-13 x 1 1/2" HHCS
3	1	3100-6500-02	16" ROTATING HEAD GUARD WELDMENT
4	2	3105-6500	1/2" MOUNT TAB
5	2	3105A-6500	1" MOUNT TAB

500-6500-12
12 ft. Skid Assembly

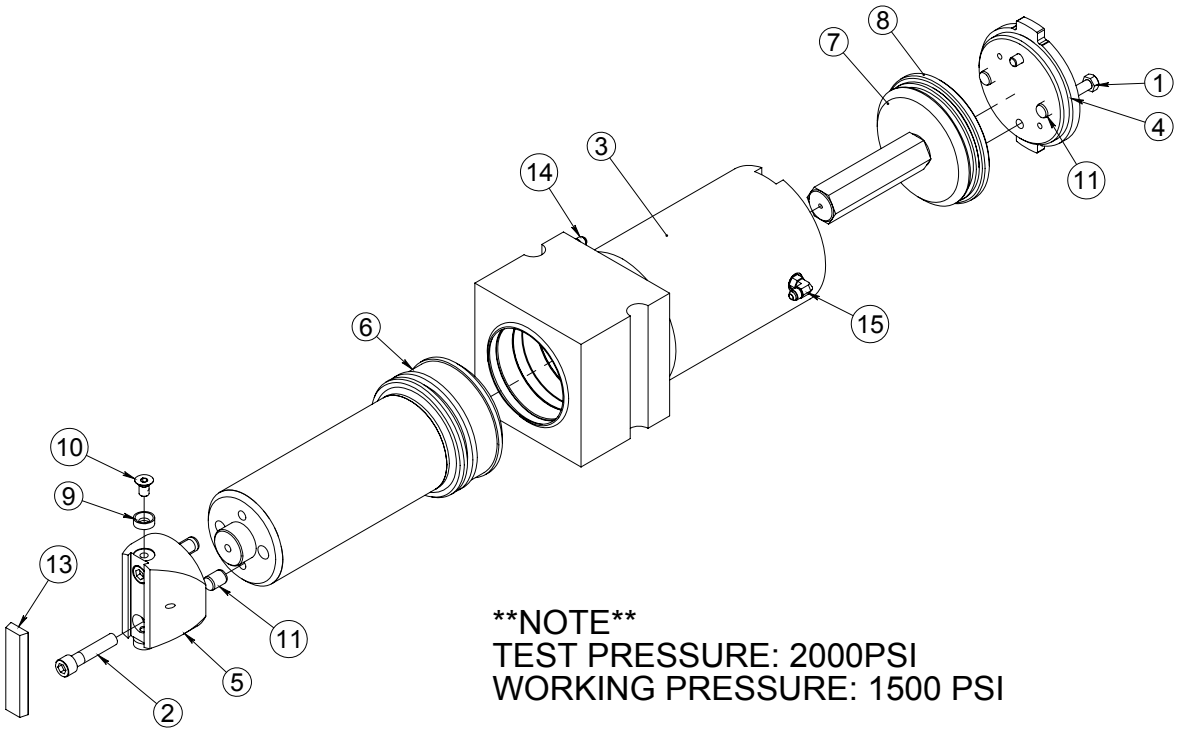


Item #	Qty.	Part Number	Part Name
1	8	1027	WASHER, LOCK 3/8"
2	8	1047	3/8"-16 X 1" HHCS
3	12	1103	1/2" LOCKWASHER
4	12	1111	1/2"-13 x 1 1/4" HHCS
5	1	502B-6500	TRAVEL SPROCKET SHAFT
6	4	508-3000	1 1/2" SUPPORT STAND BEARING
7	2	509-3000	TRAVEL SPROCKET
8	1	510B-3000	TRAVEL SPROCKET SHORT SHAFT
9	3	510C-3000	TRAVERSE SPROCKET KEY
10	1	511-6500	TRAVEL MOTOR
11	1	515A-3000	1 1/2" L-COUPLING
12	1	515B-3000	MODIFIED 1" L- COPLING
13	1	515C-3000	L110 SPIDER
14	1	527-6500-12	TRAVEL CHAIN
15	4	540-3000	BUMPER STOP ASSEMBLY
16	1	500A-6500-12	12 FOOT SKID WELDMENT
17	2	6-10_f5ox-s	5/8" ORING X 3/8" MJIC
18	2	552A-6516-3	LONG GRATING
19	4	552A-6516-2	LONG GRATING
20	1	515-6500	SPROCKET COVER WELDMENT
21	1	550D-6500	HOSE CARRIER
22	2	8 WTX-S	1/2" MJIC BULKHEAD FITTING
23	4	6 WTX	3/8" MJIC X 3/8" MJIC BULKHEAD CONNECTOR
24	4	1008-B2	1/4" FLATWASHER
25	2	105	1/4"-20 X 1" HHCS GR8
26	2	101	1/4" LOCKWASHER
27	2	100	1/4"-20 HEX NUT GR8
28	1	530-3500	SPROCKET COVER

400-3000-1
Clamp Cylinder Assembly

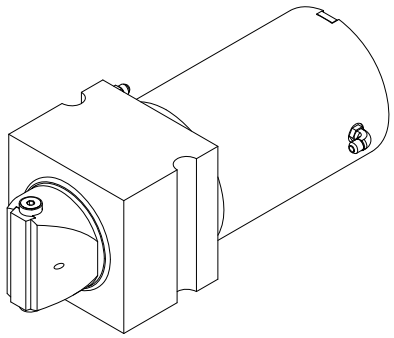


SECTION A-A
SCALE 1 : 4



NOTE
TEST PRESSURE: 2000PSI
WORKING PRESSURE: 1500 PSI

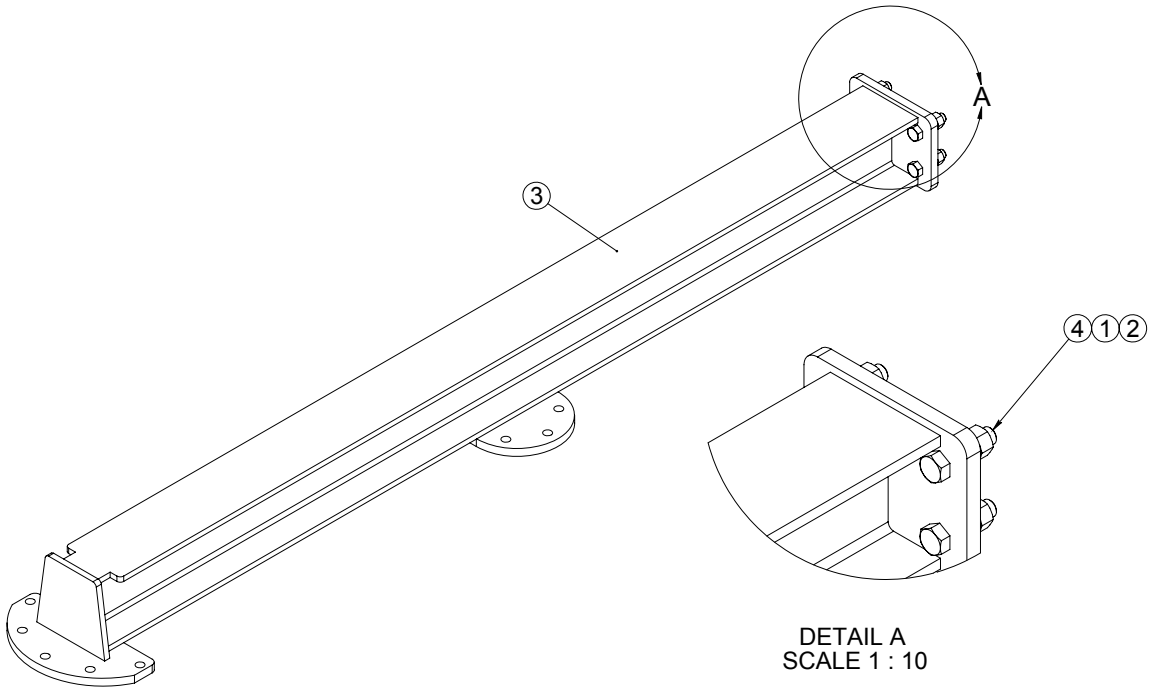
400-3000-1
Clamp Cylinder Assembly



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

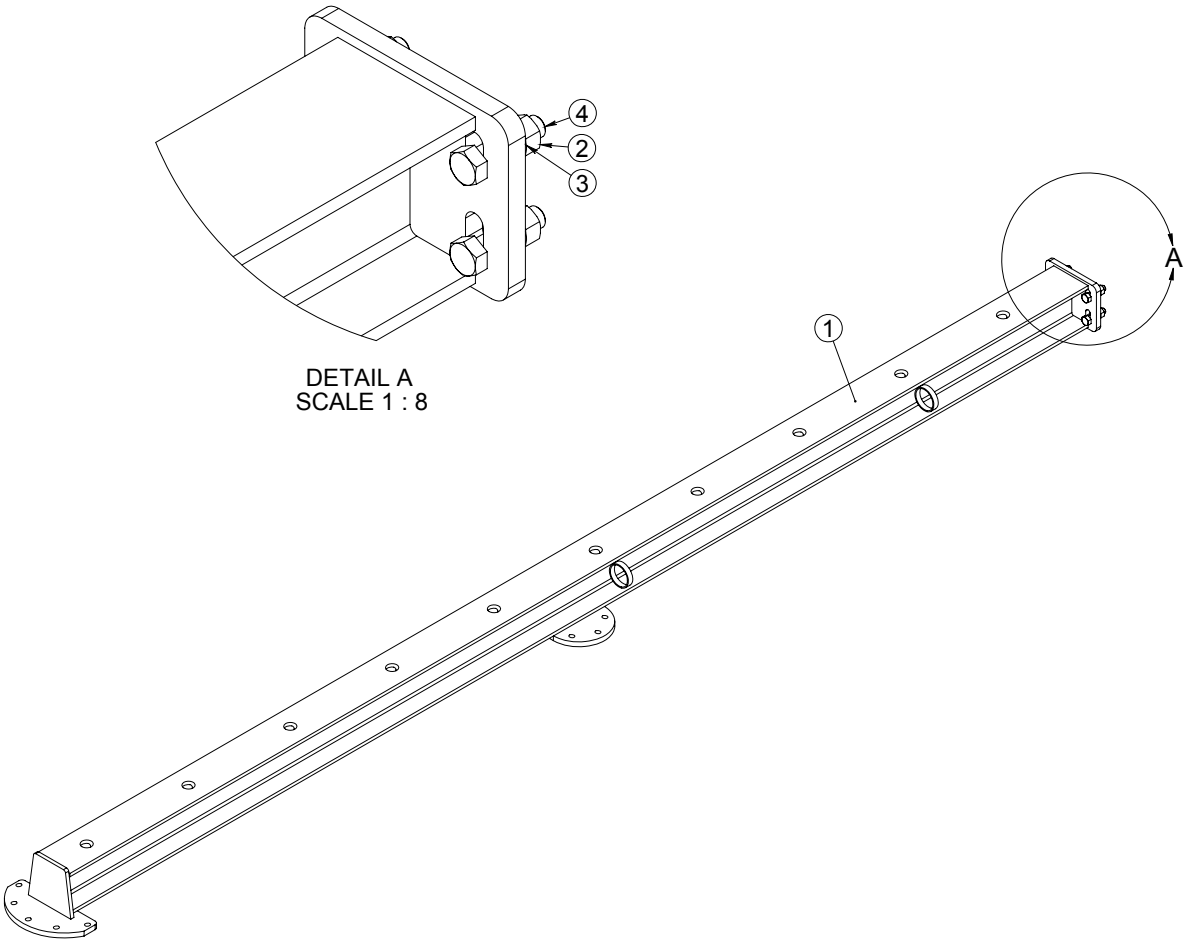
1750-3000-1
10’ Head Stock Extension Beam Assembly



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

1150-3000-1
20’ Tail Stock 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

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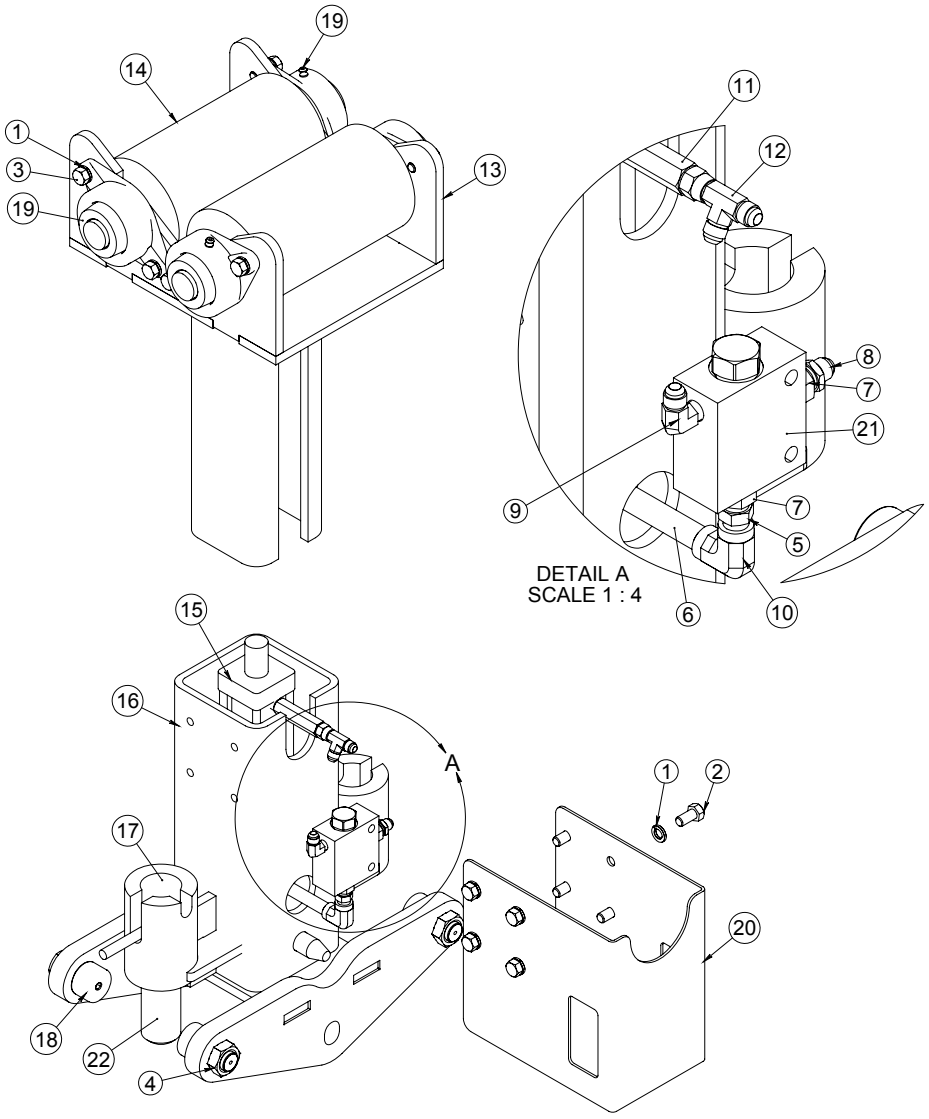
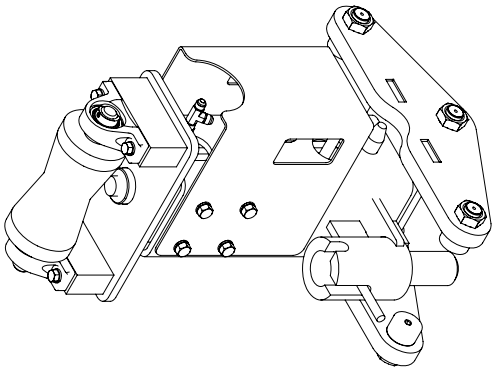
900-3000-2
Hydraulic Support Jack Assembly

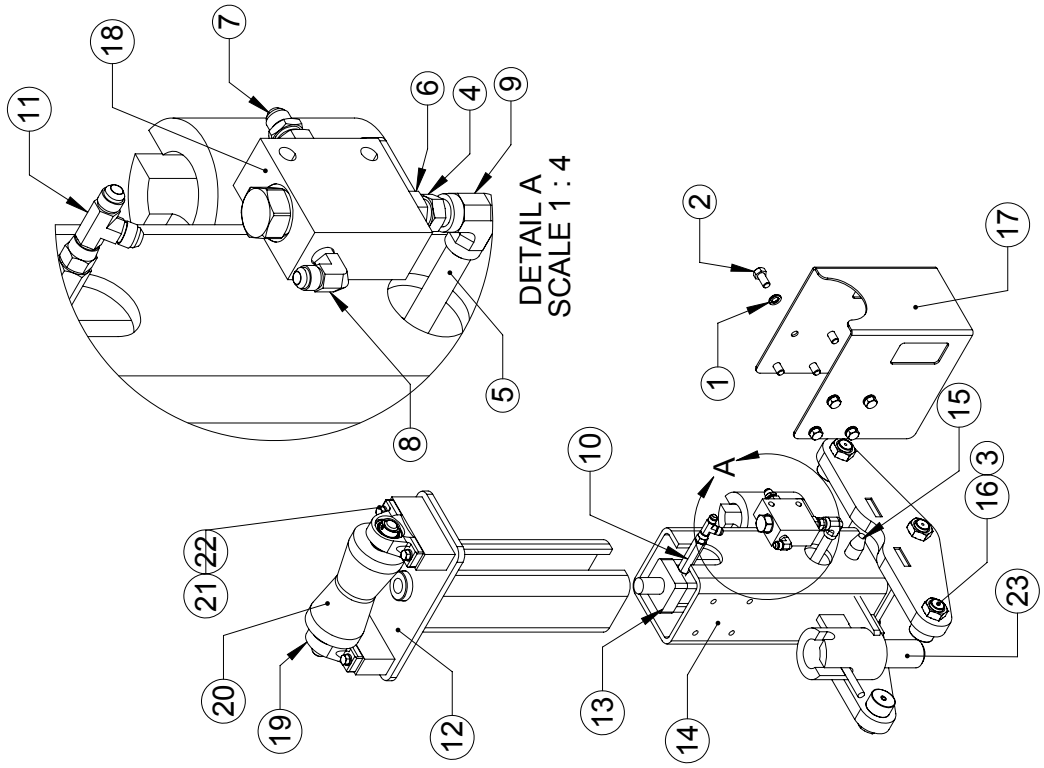


Item #	Qty.	Part Number	Part Name
1	16	1103	1/2" LOCKWASHER
2	8	1110	1/2"-13 x 1" HHCS
3	8	1111	1/2"-13 x 1 1/4" HHCS
4	4	1323	1-14 NYLOCK JAM NUT (1323)
5	1	1457	3/8" HEX NIPPLE
6	1	1488	3/8" X 4-1/2" PIPE NIPPLE
7	2	1491	REDUCER BUSHING 1/2" X 3/8"
8	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
9	1	1576-A	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

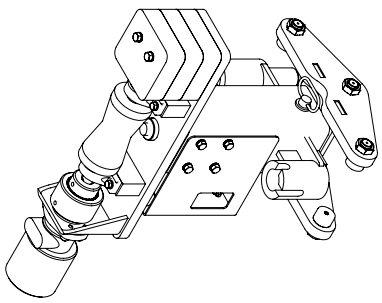
900-3000-6
Hydraulic Support Jack Assembly



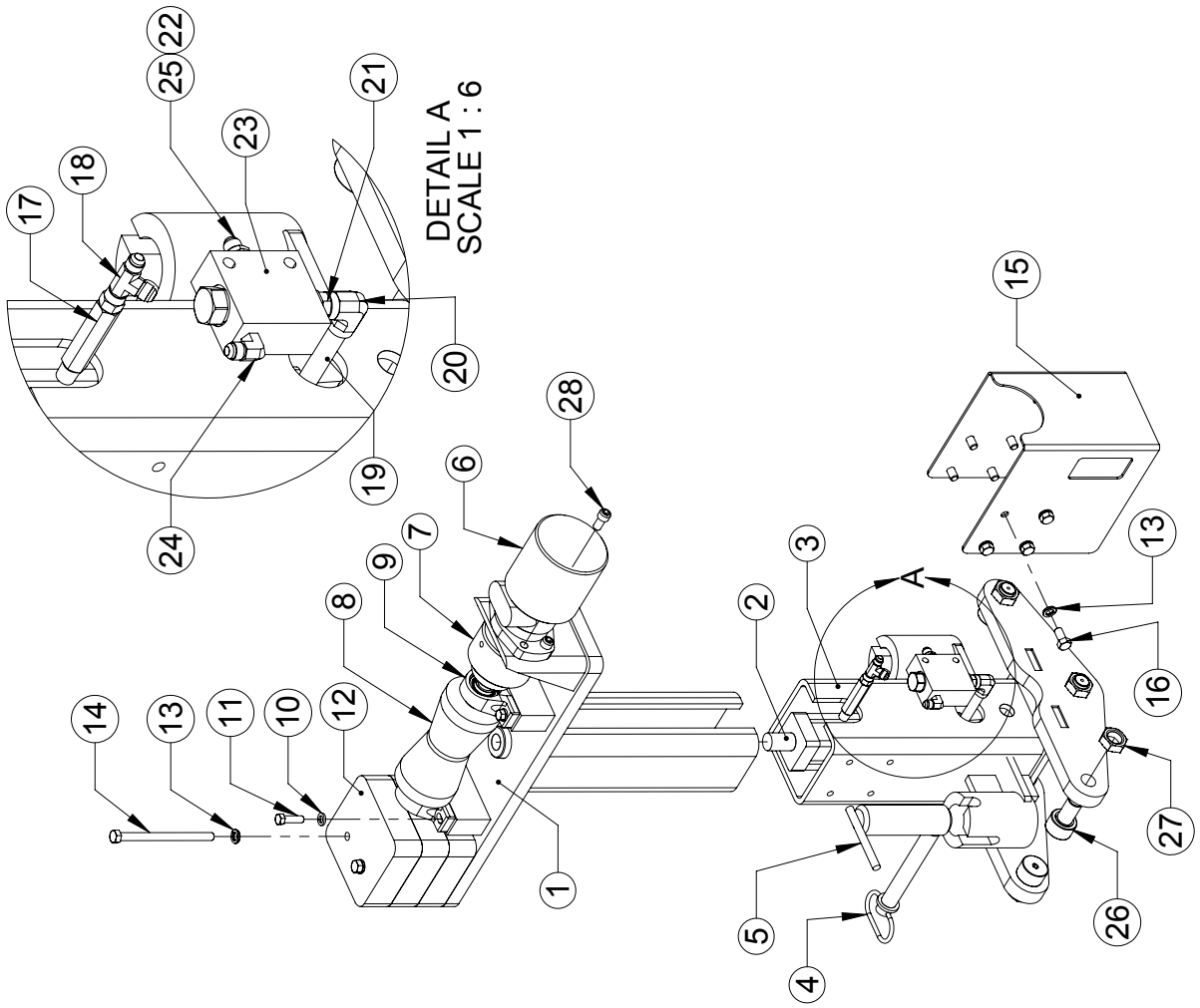
Item #	Qty.	Part Number	Part Name
1	8	1103	1/2" LOCKWASHER
2	8	1110	1/2"-13 x 1" HHCS
3	6	1323	1-14 NYLOCK JAM NUT (1323)
4	1	1457	3/8" HEX NIPPLE
5	1	1488	3/8" X 4-1/2" PIPE NIPPLE
6	2	1491	REDUCER BUSHING 1/2" X 3/8"
7	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
8	1	1576-A	1/4" MNPT x 3/8" MJIC ELBOW
9	1	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	901-3000-01	TOP SUPPORT WELDMENT
13	1	901D-3000-2	2" BORE CYLINDER WITH 8" STROKE
14	1	902-3000	BOTTOM SUPPORT WELDMENT
15	1	902B-3000-1	1" X 7 3/4" HITCH PIN
16	6	902D-3000-1	1 3/4" CAM FOLLOWER W/ 1" STUD
17	1	905-3000	SUPORT STAND VALVE COVER
18	1	BUC5524	PILOT OPERATOR CHECK VALVE
19	2	1922	1" PILLOW BLOCK BEARING
20	1	CB7006-03M	IDLER PINCH ROLLER
21	4	156	7/16"-14 X 1 1/2" HHCS
22	4	1081	7/16" LOCKWASHER
23	1	9112-7000-01	LOCKING PIN WELDMENT



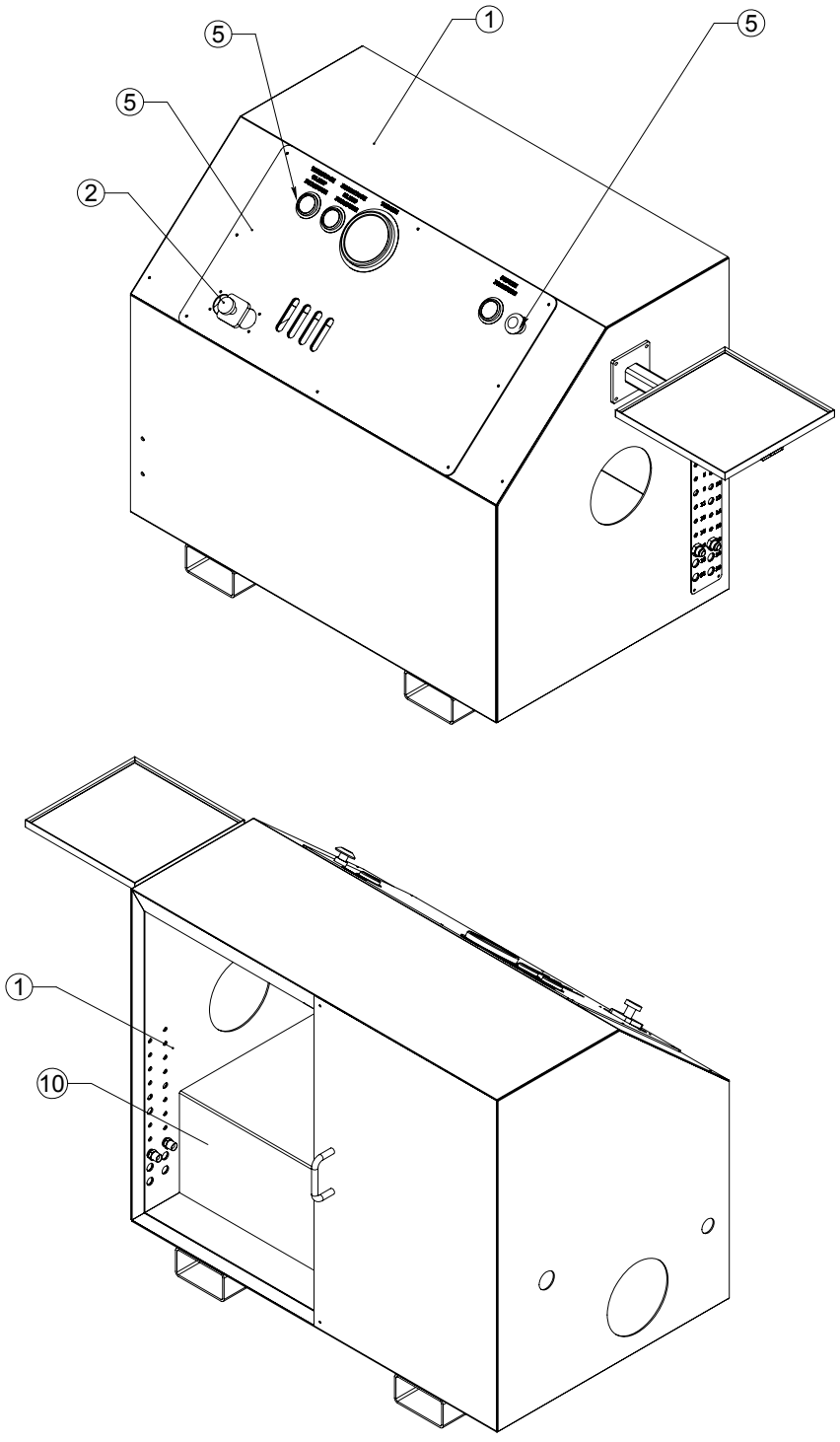
900-3000-8
Hydraulic Support Jack Assembly



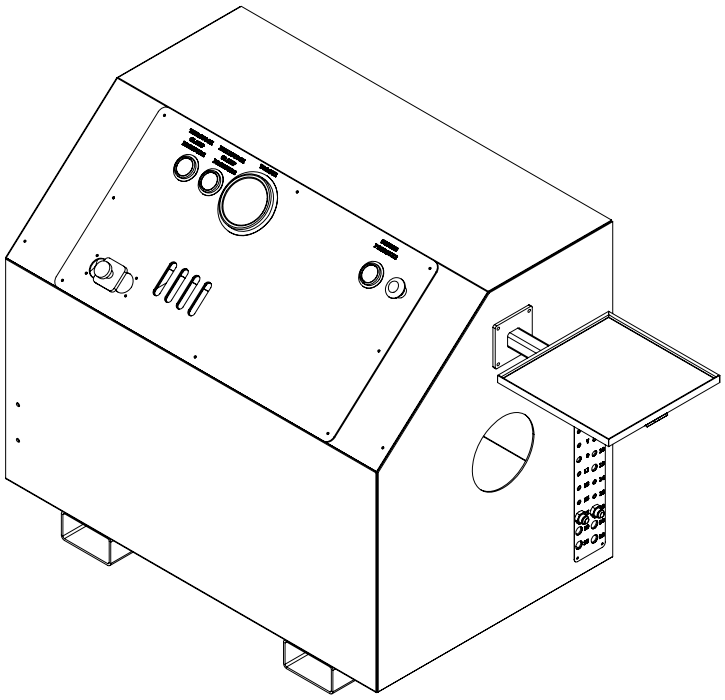
Item #	Qty.	Part Number	Part Name
1	1	907-3000-01	WELDMENT SUPPORT TOP
2	1	901D-3000-2	2" BORE CYLINDER WITH 8" STROKE
3	1	902-3000	BOTTOM SUPPORT WELDMENT
4	1	902B-3000-1	1" X 7 3/4" HITCH PIN
5	1	9112-7000-01	LOCKING PIN WELDMENT
6	1	VB1029	HYDRAULIC MOTOR - 45.5 cu. inch/rev.
7	1	909-7018	1" SPLINE COUPLING
8	1	CB7006-02M	MOLDED ROLLER
9	2	1922	1" PILLOW BLOCK BEARING
10	4	1081	7/16" LOCKWASHER
11	4	156	7/16"-14 X 1 1/2" HHCS
12	3	909-3000	BALLAST
13	10	1103	1/2" LOCKWASHER
14	2	X2-87	HHCS 1/2"-13 X 7"
15	1	905-3000	SUPORT STAND VALVE COVER
16	8	1110	1/2"-13 x 1" HHCS
17	1	2404-LL-06-06	3/8" MJIC X 3/8" MNPT ST. EXTRA LONG
18	1	6 R6X-S	3/8" FJIC X 3/8" MJIC RUN TEE
19	1	1488	3/8" X 4-1/2" PIPE NIPPLE
20	1	1580	90 3/8" F X F NPT
21	1	1457	3/8" HEX NIPPLE
22	2	1491	REDUCER BUSHING 1/2" X 3/8"
23	1	BUC5524	PILOT OPERATOR CHECK VALVE
24	1	1576-A	1/4" MNPT x 3/8" MJIC ELBOW
25	1	1570	3/8" MNPT X 3/8" MJIC STRAIGHT
26	6	902D-3000-1	1 3/4" CAM FOLLOWER W/ 1" STUD
27	6	1323	1-14 NYLOCK JAM NUT (1323)
28	4	246	1/2-13 x 1 SHCS



100-6500-1
Control Console / Power Unit Assembly



100-6500-1
Control Console / Power Unit Assembly



Item #	Qty.	Part Number	Part Name
1	1	100-6500	CONSOLE WELDMENT
2	1	130-6500	PRESSURE CONTROL VALVE
3	1	132-6500	0-1000 PSI GAUGE
4	3	133-6500	0-3000 PSI GAUGE
5	1	150-6500	TOP COVER PLATE
6	1	Stop Button	
7	1	CLEBU1210-01	TORQUE COMPUTER MOUNT (EXTENDED)
8	2	12 WFTX-S	3/4" BULKHEAD CONNECTOR MNPT
9	1	152-6500	BULKHEAD COVER
10	1		POWER UNIT

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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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