MONSTER HAWK™

Hydraulically Driven Mechanical Rolling System

Tube & Pipe Cleaners ○ Tube Testers ○ Tube Plugs ○ Tube Removal ○ Tube Installation

Operation and Maintenance Instructions

www.elliott-tool.com

ELLIOTT TOOL TECHNOLOGIES

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing this Elliott product. More than 100 years of experience have been employed in the design and manufacture of this control, representing the highest standard of quality, value and durability. Elliott tools have proven themselves in thousands of hours of trouble-free field operation.

If this is your first Elliott purchase, welcome to our company; our products are our ambassadors. If this is a repeat purchase, you can rest assured that the same value you have received in the past will continue with all of your purchases, now and in the future.

The Monster Hawk has been designed for the following types of equipment:

Heat Exchangers

Condensers

Chillers

If you have any questions regarding this product, manual or operating instructions, please call Elliott at +1 800 332 0447 toll free (USA only) or +1 937 253 6133, or fax us at +1 937 253 9189 for immediate service.

SAFETY GUIDELINES

Read and save all instructions. Before use, be sure everyone using this machine reads and understands this manual, as well as any labels packaged with or attached to the machine.

⚠ WARNING

To reduce the risk of injury, always unplug your machine before performing any maintenance. Contact Elliott for all repairs.

- Know Your Elliott Tool. Read this manual carefully to learn your tool's application and limitations as well as the potential hazards specific to this tool.
- Keep Work Area Clean and Well Lit. Cluttered, dark work areas invite accidents.
- Dress Properly. Do not wear loose clothing or jewelry. Wear a protective hair covering to contain long hair. It is recommended that the operator wear safety glasses with side shields or a full face shield eye protection. Gloves and water repellant, nonskid footwear are also recommended. Keep hands and gloves away from moving parts.
- Use Safety Equipment. Everyone in the work area should wear safety goggles or glasses with side shields complying with current safety standards. Wear hearing protection during extended use, respirator for a confined space and a dust mask for dusty operations. Hard hats, face shields, safety shoes, respirators, etc. should be used when specified or necessary. Keep a fire extinguisher nearby.
- Keep Bystanders Away. Bystanders should be kept at a safe distance from the work area to avoid distracting the operator.
- Use The Right Tools. Do not force a tool or attachment to do a job or operate at a speed it was not designed for.
- Use Proper Accessories. Use Elliott accessories only. Be sure accessories are properly installed and maintained.
- Check for Damaged Parts. Inspect guards and other parts before use. Check for misalignment, binding of moving parts, improper mounting, broken parts or any other conditions that may affect operation. If abnormal noise or vibration occurs, turn the tool off immediately and have the problem corrected before further use. Do not use a damaged tool. Tag damaged tools "Do Not Use" until repaired. A damaged part should be properly repaired or replaced by an Elliott service facility. For all repairs, insist on only identical replacement parts.

SAFETY GUIDELINES

Read and save all instructions. Before use, be sure everyone using this machine reads and understands this manual, as well as any labels packaged with or attached to the machine.

- Keep Hands Away from All Moving Parts.
- Do Not Overreach. Maintain Control. Keep proper footing and balance at all times.
- Stay Alert. Watch what you are doing, and use common sense. DO NOT use a tool when you are tired, distracted or under the influence of drugs, alcohol or any medication causing decreased control.
- Unplug Tool. Unplug tool when it is not in use, before changing accessories or performing recommended maintenance.
- Maintain Tool Carefully. Keep tools sharp and clean for best and safest performance. Follow instructions for lubrication, maintenance and changing accessories. For more information see “Maintenance” section.
- Store Idle Tools. When not is use, store your tool in a dry, heated, secured place. For more information see “Maintenance” section.
- Maintain Labels and Nameplates. These carry important information and will assist you in ordering spare and replacement parts. If unreadable or missing, contact an Elliott service facility for a replacement.

RECEIVING & INSTALLATION

Uncrating
Remove the machine from any protective wrapping/crating using the hoist ring located above the hydraulic pump or fork lift pockets. Always enter the forklift pockets from the backside of the machine to protect the control panel from damage. The arm should always be locked into position and secured prior to transporting.

Assembly
The Monster Hawk should be delivered with the power head removed from the arm. Connect the power head to the swivel rod located on the end of the arm and tighten the hex nut on the swivel rod threads. Remove the plugs from the ends of the (4) hydraulic hoses on the arm, and caps from the (4) hydraulic fittings on underside of the power head. Match the labeled hose with the corresponding labeled fitting.

Utility Hook-Up
The Monster Hawk requires an air supply of 90 psi at 10 cfm. A filter/regulator is supplied as standard. The regulator should be set to 90 psi max.

Install the appropriate plug on the power supply cable located on the side of the electrical panel. Turn the lockout handle on the front of the electrical panel to 'ON'.

Start-Up
Always engage the caster locks located on (2) casters near the machine's push handle prior to operating, attaching tooling, or performing maintenance on the machine.

GENERAL INFORMATION

The power head is intended to hold and drive Elliott tube expanders (sold separately), and is to be used only for such purpose.

The counter balance arm is intended to hold the expansion power head unit supplied with this machine, and is to be used only for such purpose.

Pressure Regulator
The Monster Hawk uses a cable air cylinder, which is controlled by the pressure regulator, to counter balance the weight of the arm and power head mounted to the arm. Once set, the arm will be balanced and remain vertically static when the force of the air supply equals the weight of the arm. The arm can then manually be moved and it will remain at this vertical position.

⚠ WARNING

WARNING: When adjusting the pressure regulator, turn slowly to avoid sudden rise or fall of the arm.

GENERAL INFORMATION

The Monster Hawk contains several components intended for the safety of the operator.

Safety Shut-Off Control Valve
Located at the top of the column on the backside of the cable cylinder. This is a pilot-controlled valve that opens when an air supply of at least 45 psi is supplied to the pilot. When pressure drops below this the valve shuts and air cannot enter or escape from the cable cylinder.

Relief Valve
Located at the top of the column on the side of the cable cylinder. This valve relieves the pressure inside the cable cylinder, which is necessary since the cable cylinder is equipped with the safety shut-off control valve which could hold air pressure inside the cylinder. It is important to use this relief valve prior to maintenance of any of the pneumatic components, especially the cable cylinder, or when storing the machine for extended periods of time.

Arm Locking Mechanism
Located on the transporting handle. This is a spring plunger that prevents the arm from pivoting out of position or raising in the event the pressure regulator dial on the control panel is inadvertently turned. The arm should be lowered and locked when the machine is not in use or being transported.

Check Valve
Located at the underside of the control panel. In the event that the air supply is suddenly removed the check valve will allow the system to maintain its current pressure and prevent the arm from dropping.

⚠ WARNING

WARNING: If the arm is manually moved or the controls on the control panel are adjusted prior to the air supply being re-connected the system will lose its pressure and the arm may fall rapidly.

OPERATION INSTRUCTIONS

Always engage the caster locks when the machine is not being transported.

Prior to each use of the machine, please review and complete the “Before Each Use” maintenance steps located in the Maintenance Section.

Prior to connecting the main air supply, ensure the following:

1. The arm locking mechanism on the machine’s push handle is engaged.
2. The regulator on the front control panel (controls the counter balance cable cylinder) is rotated fully in the counter-clockwise direction to its ‘OFF’ position.
3. The valve at the main air supply inlet is off (the handle is turned to the horizontal position 90° to the line).

⚠ WARNING

WARNING: Failure to do the above could result in component failure, damage to the machine, or bodily injury.

Connect the main air supply.

⚠ WARNING

WARNING: Ensure the regulator at the main air inlet is set to a max of 90 psi. Failure to do so could result in component failure, damage to the machine, or bodily injury.

Supply air to the system by opening the valve at the main air supply inlet. To do this, rotate the handle to its vertical position parallel to the line.

Disengage the arm locking mechanism by retracting the ‘L’ handle and turning into the resting open position. Swing the arm out from under the handle toward the front of the machine.

To raise the arm, SLOWLY turn the pressure regulator dial on the control panel clockwise until the arm starts to rise. Once the arm starts to elevate, stop turning the dial to hold the arm’s position.
NOTE: Typically, the required setting will be between 45-65 psi.

If the arm continues to rise, SLOWLY turn the dial slightly in the counter-clockwise direction until the arm stops and maintains its position. The arm can now be manually moved into its desired vertical position.

OPERATION INSTRUCTIONS

To lower the arm via the dial on the control panel, turn the dial SLOWLY in the counter-clockwise direction until the arm starts to lower.
NOTE: If the dial is turned too quickly while lowering the arm, the arm may stop and maintain its position. This is because the safety shut-off valve has engaged before all of the air could bleed from the cable cylinder and back through the pressure regulator on the control panel. To re-engage it and continue to lower the arm, turn the dial slowly in the clockwise direction to slightly raise the arm then repeat the process to lower.

Expanders
Locate the appropriate expander based on tube size, expansion range, expansion length, etc., for installation onto the power head. Insert the expander into the front flange by first sliding the mandrel and lube spacer through the front flange, then threading the cage into the front bearing shoulder (left-hand threads).
NOTE: It is acceptable to tighten the cage by hand at this point as it will tighten itself during the expansion process.

The mandrel can now be connected. Slide the spring-loaded outer sleeve back on the quick chuck assembly, insert the mandrel drive fully and rotate clockwise. Release the sleeve, making sure it fully extends back into position.

⚠ CAUTION

CAUTION: If replacing expander during use, it may be hot. Use caution when touching expander components.

Lubrication
The Monster Hawk has been supplied with a lubrication system that automatically supplies lubricant to the expander through each expansion stroke. With each expander stroke 1.25ml (0.25 tsp) – 2.50ml (0.50 tsp) of lubricant is deposited depending on the tube size. The lubricator can accommodate a wide variety of lubricants including those with viscosities in excess of equivalent 10W oil. Elliott recommends the P8395 or P8784 series water or petroleum based lubricants for use with the system.

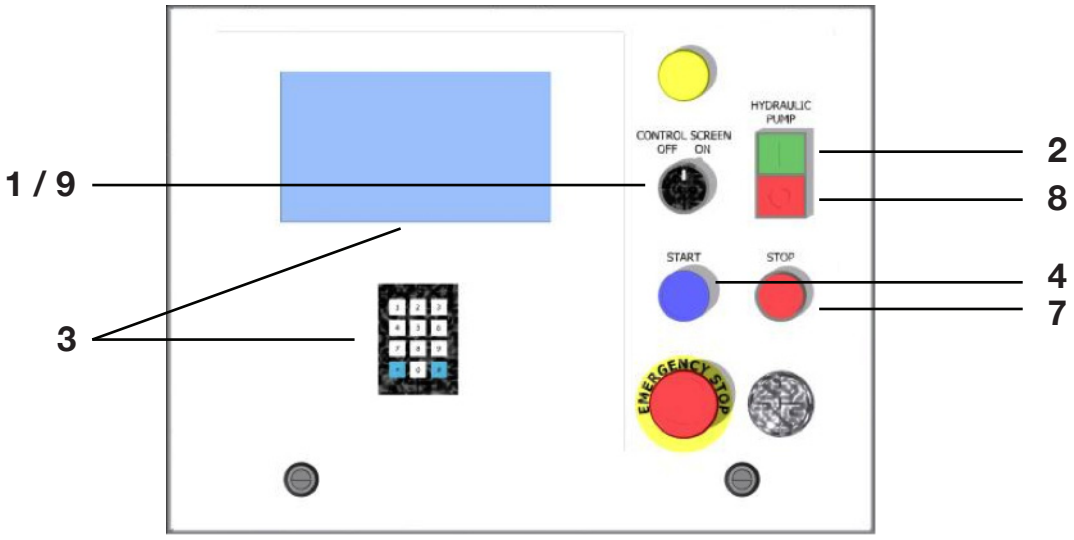
NOTE: The pressure relief valve is factory set to 175 psi. If lubricant is leaking from the rear of relief valve then either the setting has been changed or the lubricant used is too thick. The plug next to the relief valve can be removed and temporarily replaced with a pressure gauge to reset the valve to 175 psi.

If the lubrication system is to be used, a shut-off valve is located under the lubricator on the power head. To open, rotate the valve so the handle is parallel to the line. Locate the reservoir tank inside the housing panel above the machine's push handle. Fill the tank with the desired lubricant. An in-line primer bulb is supplied to prime the lubrication line. Squeeze the primer bulb several times until the lubricant is seen exiting the front of the cage or around the rolls. It is recommended to repeat the priming process after each expander change.

If at any time lubrication is not desired simply turn the shut-off valve off. It may take a several strokes for the lubricant to stop flowing.

OPERATION INSTRUCTIONS

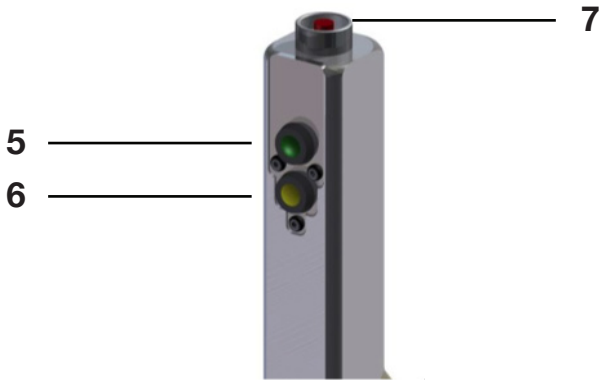
Controls
Locate the control panel on the front of the machine and follow the steps below to set up the machine for the expansion process.



1. **Control Screen 'OFF/ON'** (Selector Switch) - Turn to 'ON'. The display screen will power up.
2. **Hydraulic Pump** (Pushbutton) – Press the upper green pushbutton to turn the hydraulic pump on.
   NOTE: Upon initial setup jog the pump motor once, and verify the pump motor is rotating in the same directions as the arrow tag on the motor. If the direction is incorrect, reverse (2) of the (3) motor leads, and recheck the rotation.
3. **Control Screen/Keypad** – Enter the desired torque value into the display screen. Using the keypad:
   a. Press the '#' key
   b. Enter a torque value between 5.0 - 70.0. The decimal will remain stationary with the number inputs rolling from right to left. For example, '5.0' ft-lbs enter '5-0, '12.0' ft-lbs enter '1-2-0', '45.5' ft-lbs enter '4-5-5'.
   c. Press the '#' key once more to submit the value.
4. **Start** (Pushbutton) – Press to start the mandrel rotation.

Insert the expander into the tube.
NOTE: ONLY ADVANCE THE MANDREL WHILE INSIDE A TUBE. Failure to do so could allow the rolls to break from inside the cage and result in tool failure and harm to the operator and any bystanders.
Locate the handle on the power head and follow the steps below to begin the expansion process.

OPERATION INSTRUCTIONS



5. **Cycle Run** (Pushbutton [green]) – Press and hold throughout the expansion process. When pressed the mandrel will advance, achieve the desired torque, and will automatically retract to its backmost position. Once it stops the button can be released. NOTE: A torque value must be entered into the display screen in order for the cycle run button to work.
6. **Mandrel Retract** (Pushbutton [yellow]) – Press to manually retract the mandrel to its backmost position. This should be used if the cycle run button is let go prior to the full retraction of the mandrel. The mandrel should be in this position prior to the expander entering each tube to ensure the rolls have dropped to their minimum expanding diameter.

If the required torque value is unknown, measure the expanded ID and adjust the torque as needed by repeating steps 3 – 5. Once the expansion process is complete the machine can be shut down.

7. **Stop** (Pushbutton) – Once the expansion process is complete, press to stop the mandrel rotation. NOTE: The 'Stop' pushbutton on the control panel can also be pressed to stop the mandrel rotation.
8. **Hydraulic Pump** (Pushbutton) – Press the lower red pushbutton to turn the hydraulic pump off.
9. **Control Screen** (Selector Switch) - Turn to 'OFF'. The display screen will power down.

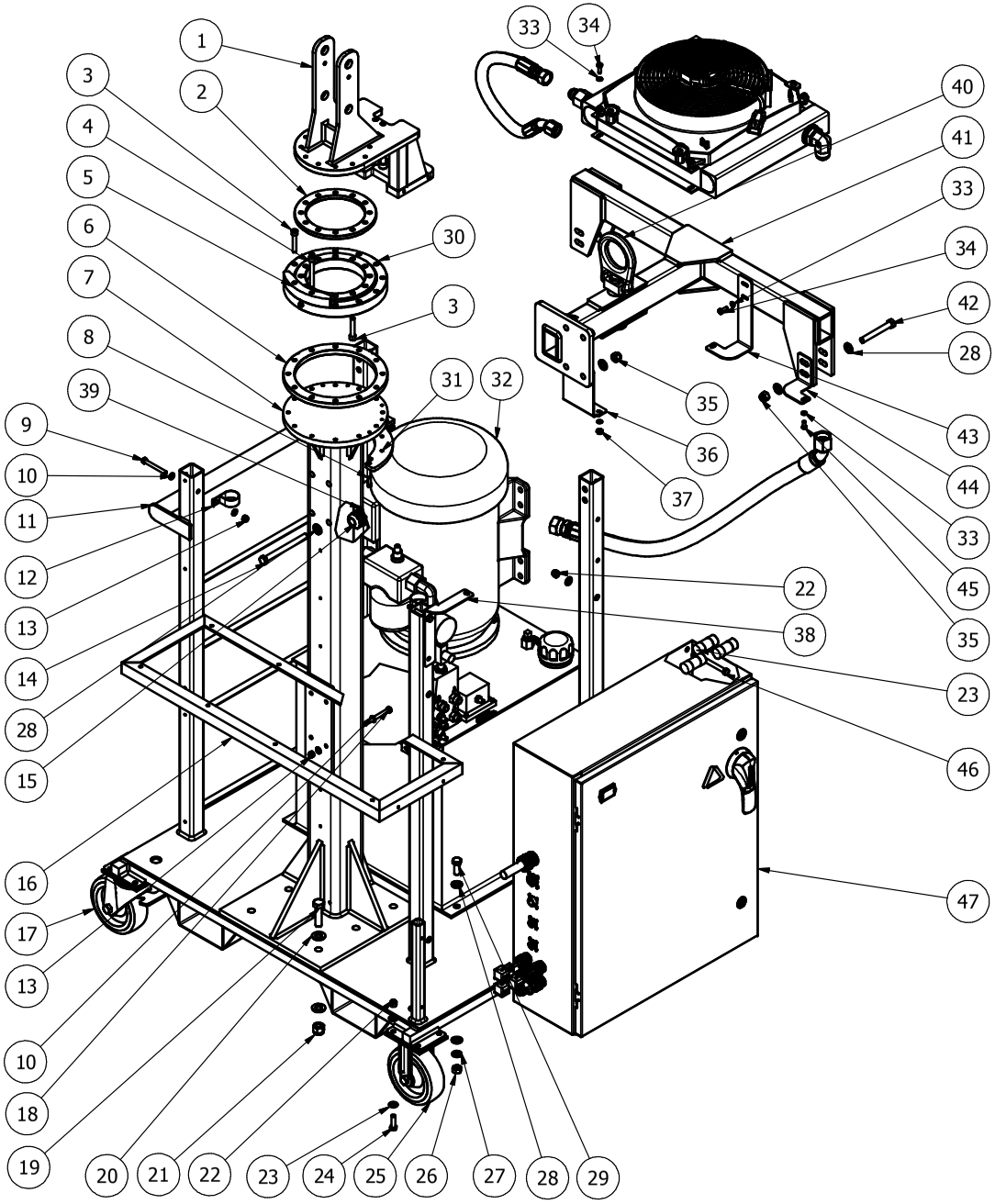
The mandrel advance feed rate has a 2-speed adjustment valve. This valve is located inside the housing panel under the machine's push handle. Rotate the lever up for the 'high' feed rate, down for the 'low' feed rate. The flow control valve located next to the feed rate ball valve will control the 'low' feed rate only. NOTE: By design, the 'low' feed rate cannot exceed the 'high' feed rate.

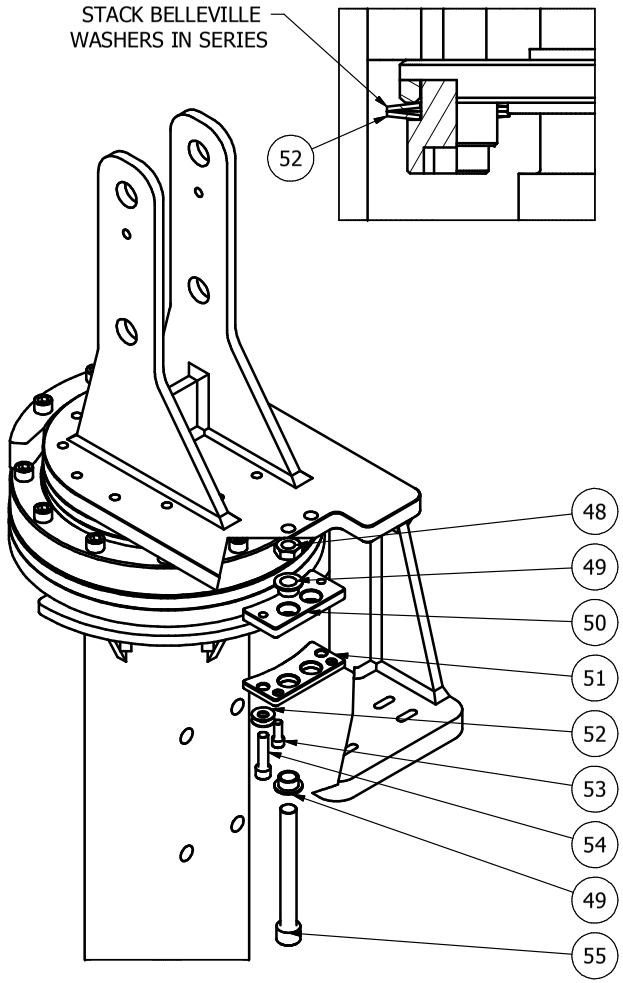
TECHNICAL INFORMATION

Monster Hawk Specifications	
Horizontal Radius Reach	7’
Minimum Vertical Reach	24”
Maximum Vertical Reach	84”
Working Area/Footprint	91” height
	42.5” width (base)
	42.0” depth (base)
Unit Weight	1,690 lbs.
Hydraulic Pump Electric Motor	15 HP
Hydraulic Oil Tank Capacity	20 gallon
Min/Max Torque	5 ft-lbs / 70 ft-lbs

Spares & Accessories Kit
Contact your Elliott representative
for Recommended Spares Kits.

PARTS LISTS & DIAGRAMS - PXS230





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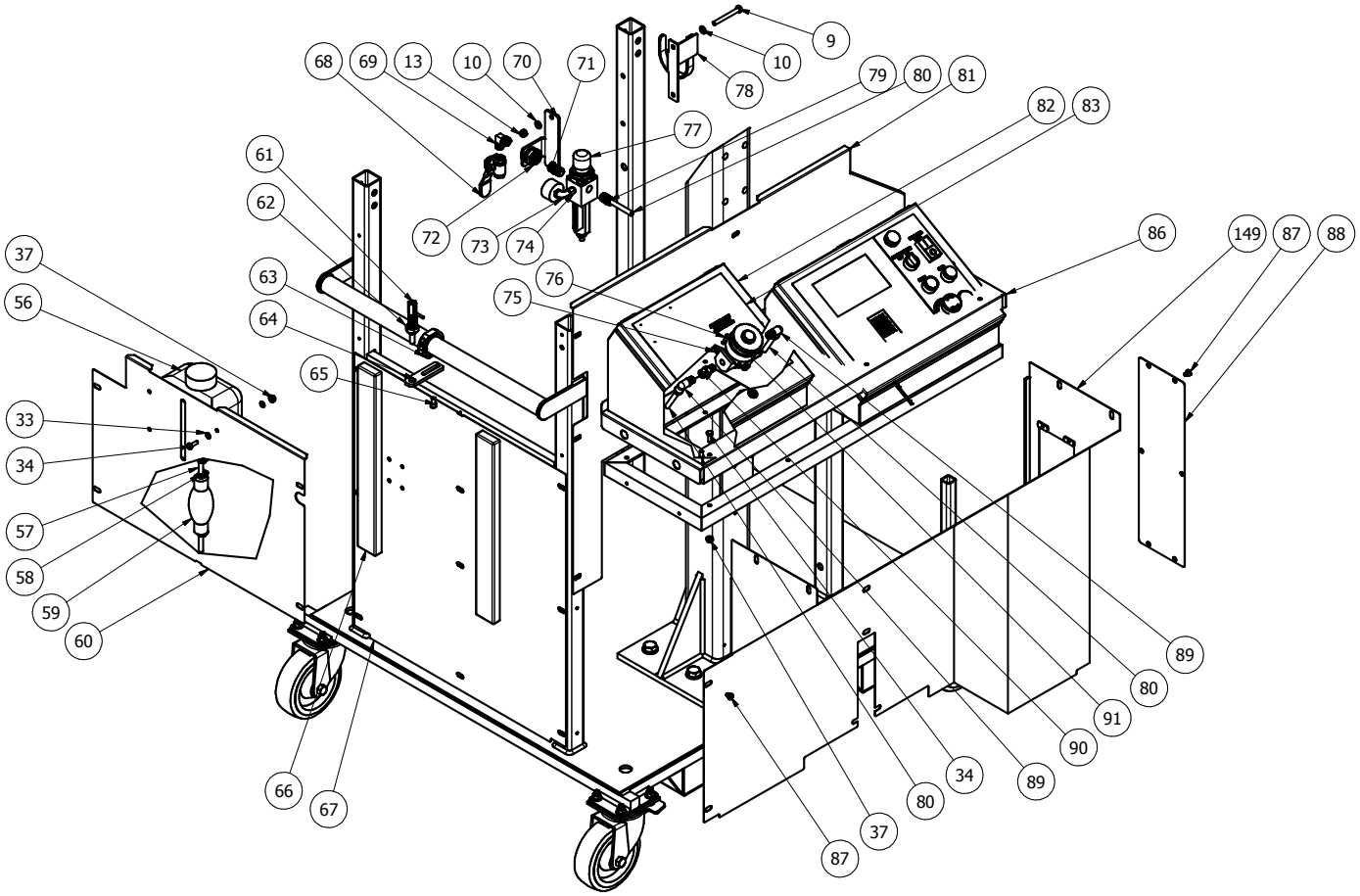

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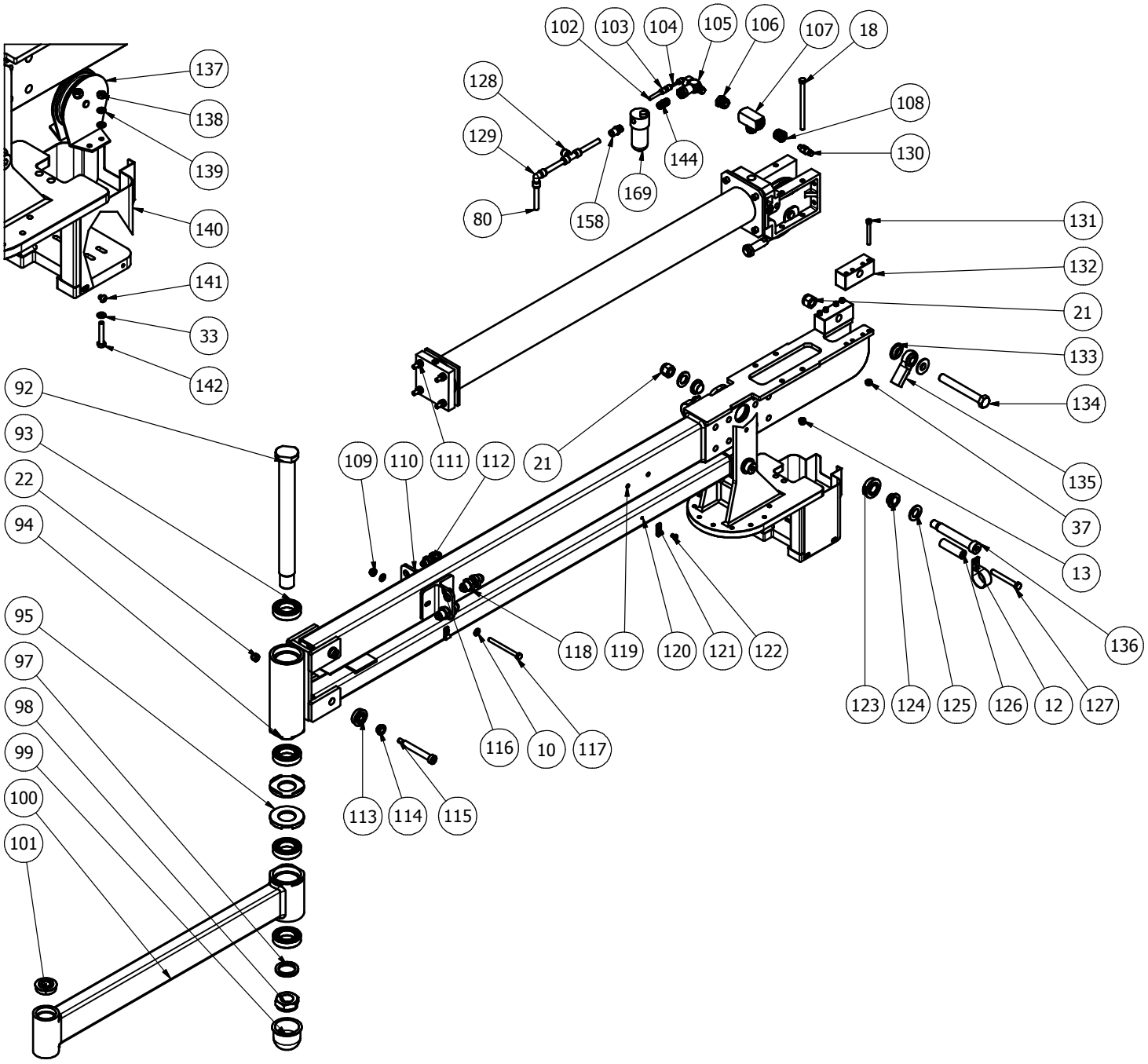

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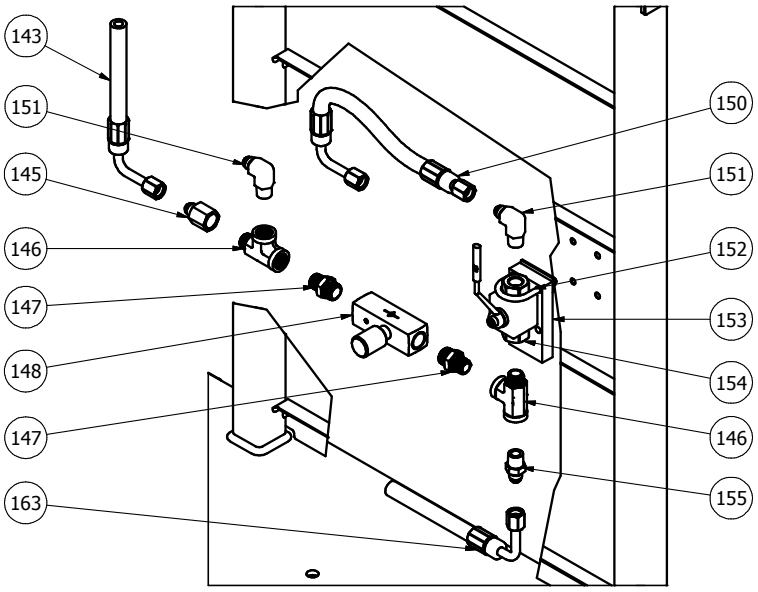
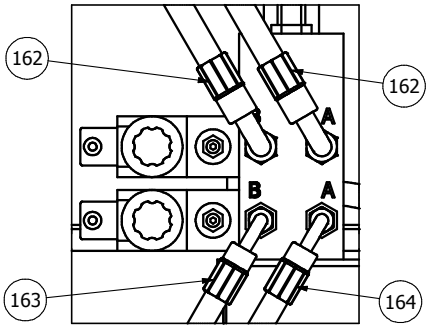
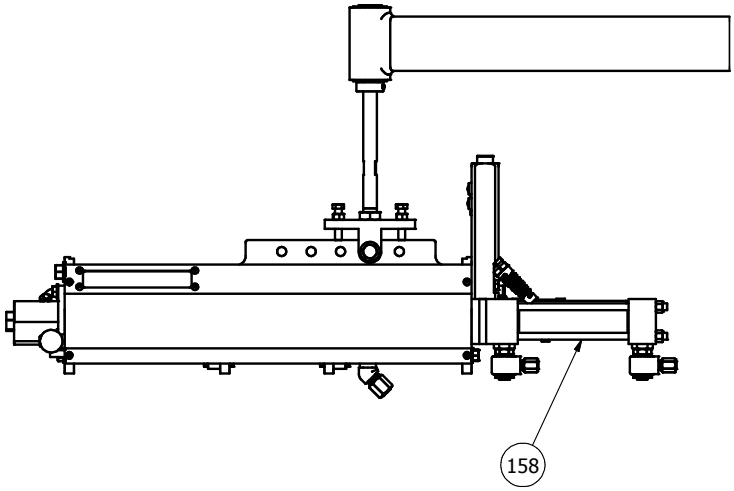
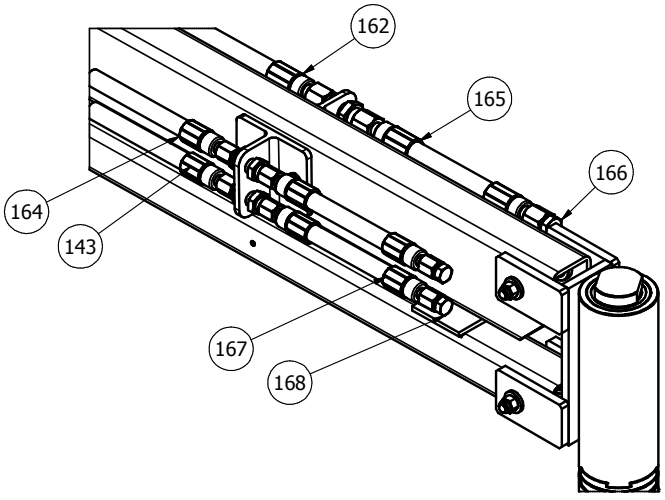








PARTS LISTS & DIAGRAMS - PXS230

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	PX220P	SWIVEL
2	1	PX221P	UPPER SPACING RING
3	22	P8302-92	SOCKET HEAD CAP SCREW, 3/8-16 X 2
4	2	P8302-95	SOCKET HEAD CAP SCREW, 3/8-16 X 3
5	1	PX228P	SWIVEL STOP
6	1	PX222P	LOWER SPACING RING
7	1	PX227P	COLUMN ASSEMBLY
8	7	P8302-26	SOCKET HEAD CAP SCREW, 1/4-20 X 3/4
9	5	130BM	HEX HEAD CAP SCREW, 5/16-18 X 2-3/4
10	22	132B	WASHER, 5/16
11	1	PX320P	BASE ASSEMBLY
12	4	41-8863T81	1-1/2" CABLE CLIP
13	13	546U	ELASTIC LOCKNUT, 5/16-18
14	4	130EV	HEX HEAD CAP SCREW, 1/2-13 X 5-1/2
15	1	PX330	CORD GRIP
16	1	PX302P	CONSOLET BRACKET
17	2	PX310	SWIVEL CASTER
18	8	130BU	HEX HEAD CAP SCREW, 5/16-18 X 5
19	6	130GK	HEX HEAD CAP SCREW, 5/8-11 X 2-1/4
20	12	132H	WASHER, 5/8
21	9	546CC	ELASTIC LOCKNUT, 5/8-11
22	22	546V	ELASTIC LOCKNUT, 3/8-16
23	40	132C	WASHER, 3/8, SAE
24	16	130CF	HEX HEAD CAP SCREW, 3/8-16 X 1-1/4
25	2	PX311	RIGID CASTER
26	4	171EE	HEX NUT, 1/2-13
27	4	133B	LOCK WASHER, 1/2
28	24	132Q	WASHER, 1/2
29	4	130EF	HEX HEAD CAP SCREW, 1/2-13 X 1-1/4
30	1	41-6651K14	SLEWING RING BEARING
31	1	PX225P	FRICTION BRAKE
32	1	PX312	HYDRAULIC PUMP PACKAGE

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
33	24	132A	WASHER, 1/4
34	16	130AC	HEX HEAD CAP SCREW, 1/4-20 X 3/4
35	8	546X	ELASTIC LOCKNUT, 1/2-13
36	1	PX324P	COOLER BRACKET
37	22	546D	ELASTIC LOCKNUT, 1/4-20
38	1	PX325P	COOLER BRACKET
39	1	41-7513K243	LOCK NUT
40	1	41-3046T64	HOIST RING
41	1	PX230P	HANGER BRACKET
42	4	130ER	HEX HEAD CAP SCREW, 1/2-13 X 3-3/4
43	1	PX323P	COOLER BRACKET
44	1	PX322P	COOLER BRACKET
45	2	131B	HEX HEAD CAP SCREW, M6 X 1.0 X 14MM
46	4	130CL	HEX HEAD CAP SCREW, 3/8-16 X 2-1/2
47	1	PX500-230	230V ELECTRICAL CABINET
48	2	170EE	HEX JAM NUT, 1/2-13
49	4	41-2706T25	SLEEVE BEARING
50	1	PX223P	UPPER BRAKE PLATE
51	1	PX224P	LOWER BRAKE PLATE
52	4	579-46	BELLEVILLE SPRING
53	2	P8302-5	SOCKET HEAD CAP SCREW, 1/4-20 X 5/8
54	2	P8302-104	SOCKET HEAD CAP SCREW, 5/16-18 X 1-1/4
55	2	P8302-193	SOCKET HEAD CAP SCREW, 1/2-13 X 4-1/2
56	1	PX611	TANK
57	240"	PX613	3/8" TUBING
58	4	41-5388K14	HOSE CLAMP
59	1	PX615	PRIMER BULB
60	1	PX309P	UPPER SIDE PANEL
61	1	41-3403A18	SPRING PLUNGER
62	1	170G	HEX JAM NUT, 5/8-11
63	1	PX316	COLLAR
64	1	PX315P	LOCK BRACKET

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
65	2	P8302-65	SOCKET HEAD CAP SCREW, 5/16-18 X 1/2
66	2	41-21705T45	BUMPER
67	1	PX308P	LOWER SIDE PANEL
68	1	41-4628K82	BALL VALVE
69	1	41-50785K124	ELBOW, 3/8
70	1	PX314P	REGULATOR BRACKET
71	1	41-5485K23	HEX NIPPLE, 3/8
72	1	41-50785K274	BULKHEAD FITTING, 3/8
73	1	41-4429K159	STREET ELBOW, 1/8
74	1	41-50785K25	ADAPTER, 1/8
75	4	546W	ELASTIC LOCKNUT, #10-24
76	4	P8597-11	BUTTON HEAD CAP SCREW, #10-24 X 5/8
77	1	41-4910K82	FILTER/REGULATOR
78	1	PX326P	HANGER
79	1	41-51025K185	MALE PIPE STRAIGHT
80	204	41-5156K88	3/8" TUBING
81	1	PX301P	UPPER FRONT PANEL
82	1	PX601	CONTROL PANEL
83	1	PX603	PANEL NAMEPLATE
84	1	PX400	CONTROL PANEL
86	1	PX307P	CONSOLET BRACKET COVER
87	38	577-6	PAN HEAD MACHINE SCREW, 1/4-20 X 3/8
88	1	PX317P	COVER
89	2	41-51025K142	MALE PIPE SWIVEL
90	1	41-7768K22	CHECK VALVE
91	1	ETR5003	REGULATOR
92	1	PX205P	PIN
93	4	41-5972K365	BEARING
94	1	PX201P	ARM LINK
95	2	PX202	FRICTION PLATE

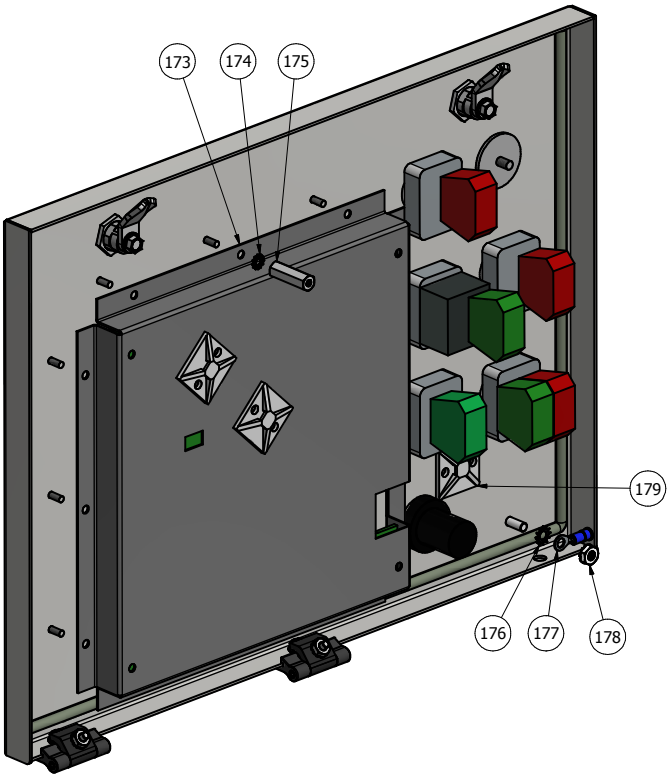
PARTS LISTS & DIAGRAMS - PXS230

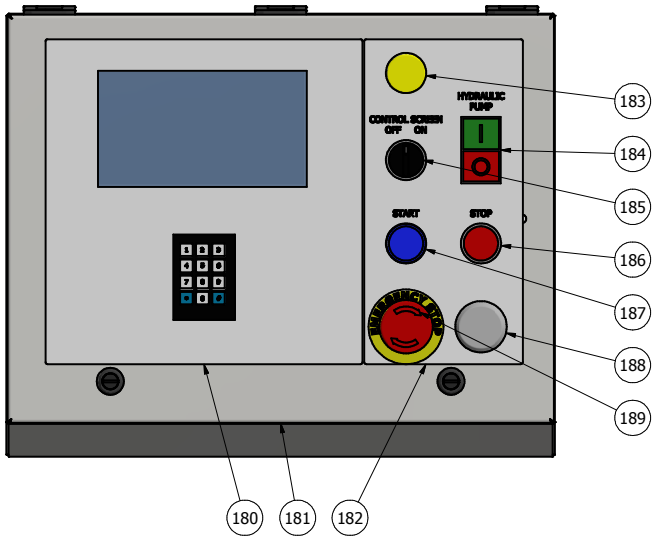
PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
97	1	41-98035A113	WASHER
98	1	546BB	ELASTIC LOCKNUT, 1-1/4-7
99	1	41-9267K17	CAP
100	1	PX204P	OUTER ARM
101	2	41-6384K369	BEARING
102	4.5	41-5156K87	1/4" TUBING
103	1	41-5779K353	REDUCING CONNECTOR
104	2.5	41-5156K86	5/32" TUBING
105	1	41-62395K72	SAFTEY SHUT-OFF CONTROL VALVE
106	1	41-4429K422	REDUCER BUSHING, 1/2 X 1/4
107	1	41-50785K324	TEE FITTING, 1/2
108	1	04301-14	REDUCER BUSHING, 1/2 X 1/8
109	2	546C	ELASTIC LOCKNUT, 5/16-18
110	1	PX501P	BULKHEAD BRACKET
111	1	PX209	CABLE CYLINDER
112	2	43-6WTXWLNS	BULKHEAD UNION
113	4	41-6384K363	BEARING
114	4	41-2938T11	BRONZE SLEEVE BEARING
115	2	539U	SHOULDER SCREW, 3/8-16 X 3-1/4
116	1	PX503P	BULK HEAD BRACKET
117	2	130BQ	HEX HEAD CAP SCREW, 5/16-18 X 3-1/2
118	2	43-8WTXWLNS	BULKHEAD UNION
119	1	PX207P	UPPER ARM
120	1	PX206P	LOWER ARM
121	4	41-8863T12	1/4" CABLE CLIP

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
122	4	P8597-15	BUTTON HEAD CAP SCREW, 1/4-20 X 3/8
123	4	41-6384K367	BEARING
124	4	41-2934T54	BRONZE SLEEVE BEARING
125	4	132K	WASHER, 3/4
126	2	41-92415A928	SPACER
127	2	130CN	HEX HEAD CAP SCREW, 3/8-16 X 3
128	1	41-5779K671	TEE FITTING
129	1	41-5779K26	ELBOW FITTING
130	1	ETR5009	RELIEF VALVE
131	8	P8302-51	SOCKET HEAD CAP SCREW, 1/4-20 X 2-1/4
132	2	PX208P	CABLE MOUNT BRACKET
133	2	41-95034A600	ROD END SPACER
134	1	130GU	HEX HEAD CAP SCREW, 5/8-11 X 5
135	1	41-4444T241	ROD END
136	2	539S	SHOULDER SCREW, 5/8-11 X 4
137	1	41-3099T42	PULLEY
138	4	171A	HEX NUT, 1/4-20
139	4	133F	LOCK WASHER, 1/4
140	1	PX304P	PULLEY GUARD
141	4	P8597-53	BUTTON HEAD CAP SCREW, 1/4-20 X 1/4
142	4	130AG	HEX HEAD CAP SCREW, 1/4-20 X 1-1/2
143	1	PX349	104" HYDRAULIC HOSE, 3/8
144	1	41-5485K22	HEX NIPPLE, 1/4
145	1	PX342	FEMALE CONNECTOR, 6-6
146	2	PX341	MALE RUN TEE, 3/8

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
147	2	PX343	STRAIGHT MALE PIPE ADAPTOR, 8-3/8
148	1	PX344	FLOW CONTROL VALVE
149	1	PX305P	LOWER FRONT PANEL
150	1	PX347	13" HYDRAULIC HOSE, 3/8
151	2	PX340	MALE ELBOW, 6-6
152	2	41-3201T51	U-BOLT
153	1	PX361	SPACING BLOCK
154	1	PX346	BALL VALVE
155	1	PX345	MALE CONNECTOR, 6-6
158	1	41-5779K116	STRAIGHT FITTING
162	2	PX352	98" HYDRAULIC HOSE, 1/2
163	1	PX348	53" HYDRAULIC HOSE, 3/8
164	1	PX350	134" HYDRAULIC HOSE, 3/8
165	2	PX353	78" HYDRAULIC HOSE, 1/2
166	2	43-8PNTX-S	PLUG, JIC
167	2	PX351	78" HYDRAULIC HOSE, 3/8
168	2	43-6PNTX-S	PLUG, JIC
169	1	41-4268K13	LUBRICATOR
170	1	41-2182A24	LEVEL (NOT SHOWN)
171	5	PX313	HYDRAULIC OIL, 5 GAL (NOT SHOWN)
172	1	PX125	TRANSDUCER CABLE (NOT SHOWN)

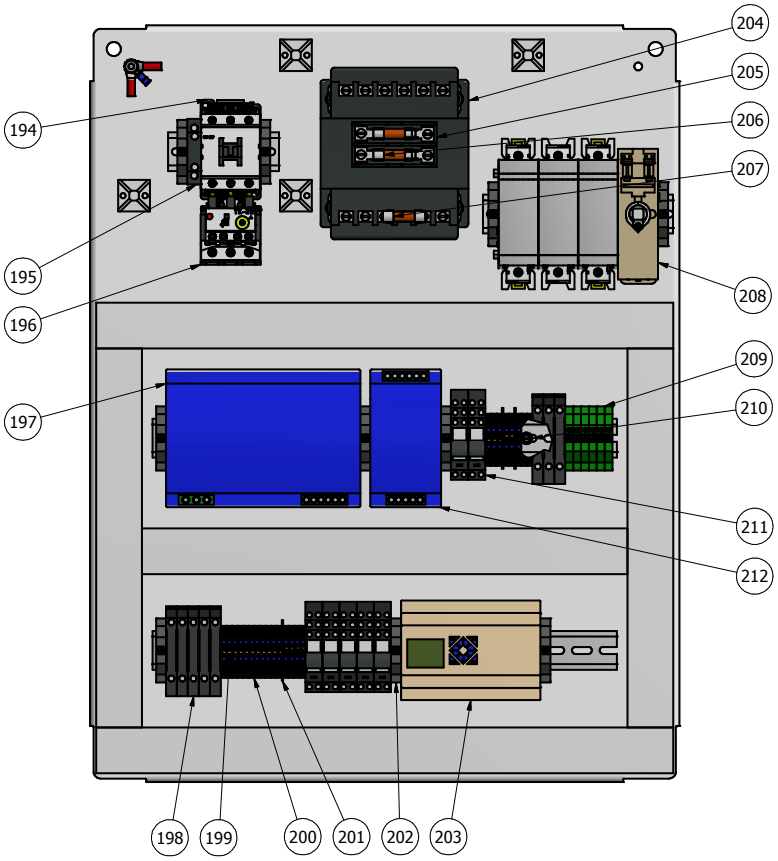
PARTS LISTS & DIAGRAMS - PXS230

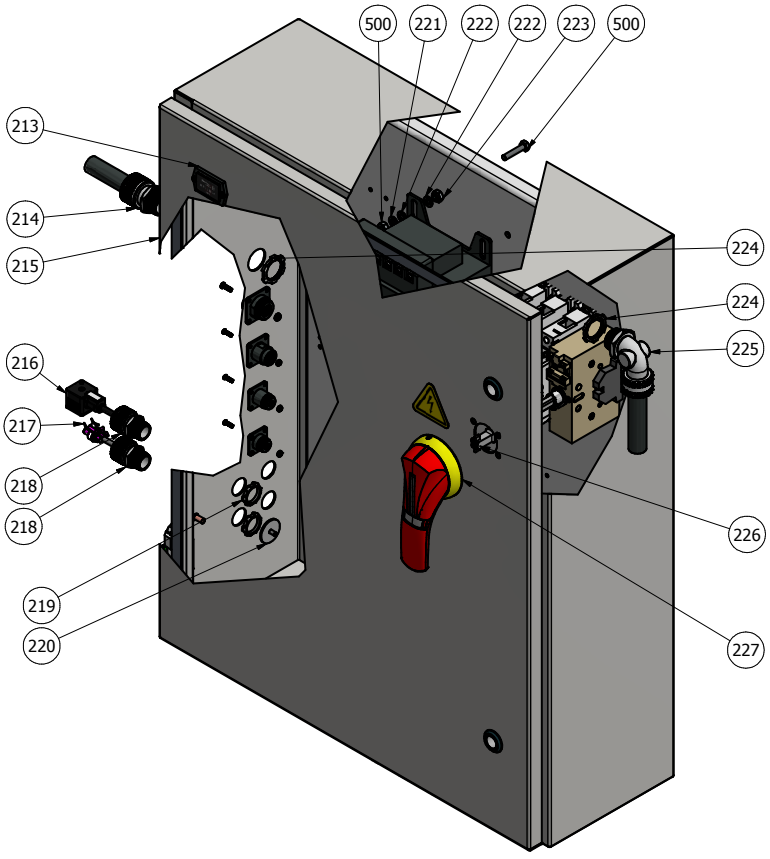




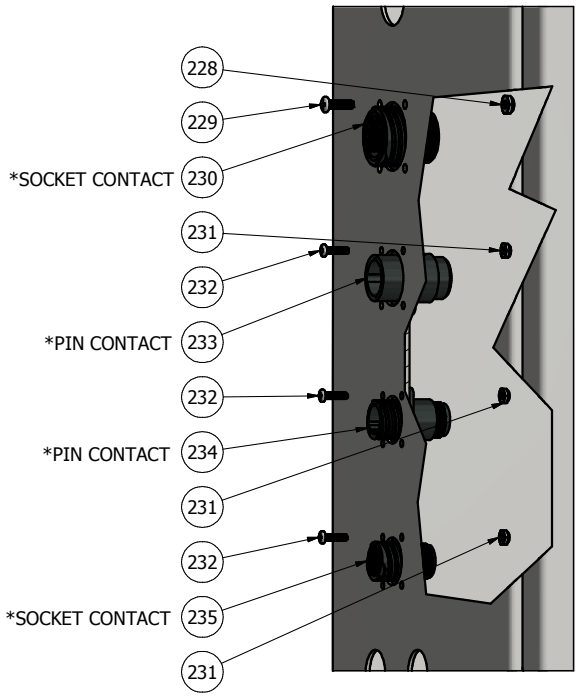
PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
173	1	PTR413-80F	DISPLAY MODULE
174	12	595-2	EXTERNAL TOOTH LOCK WASHER, #6
175	12	41-91780A247	STANDOFF, #6-32
176	2	595-1	EXTERNAL TOOTH LOCK WASHER, #10
177	2	07119-4	INSULATED RING
178	2	594-4	HEX KEPS NUT, #10-32
179	5	PTR410	CABLE TIE MOUNT
180	1	PX403	DISPLAY COVER
181	1	PX414	ENCLOSURE
182	1	PX404	LEGEND PLATE
183	1	PX405	INDICATOR LIGHT
184	1	PX407	PUSHBUTTON
185	1	PX406	SELECTOR SWITCH
186	1	PX409	PUSHBUTTON
187	1	PX408	PUSHBUTTON
188	1	PX412	HOLE SEAL, 22mm
189	1	PX410	E-STOP PUSHBUTTON
190	1	PX411	CONTROL SCREEN CABLE (NOT SHOWN)
191	1	PX415-4	CONNECTOR (NOT SHOWN)
192	1	PX415-3	CABLE CLAMP (NOT SHOWN)
193	11	PX415-5	CONTACT, PIN (NOT SHOWN)

PARTS LISTS & DIAGRAMS - PXS230





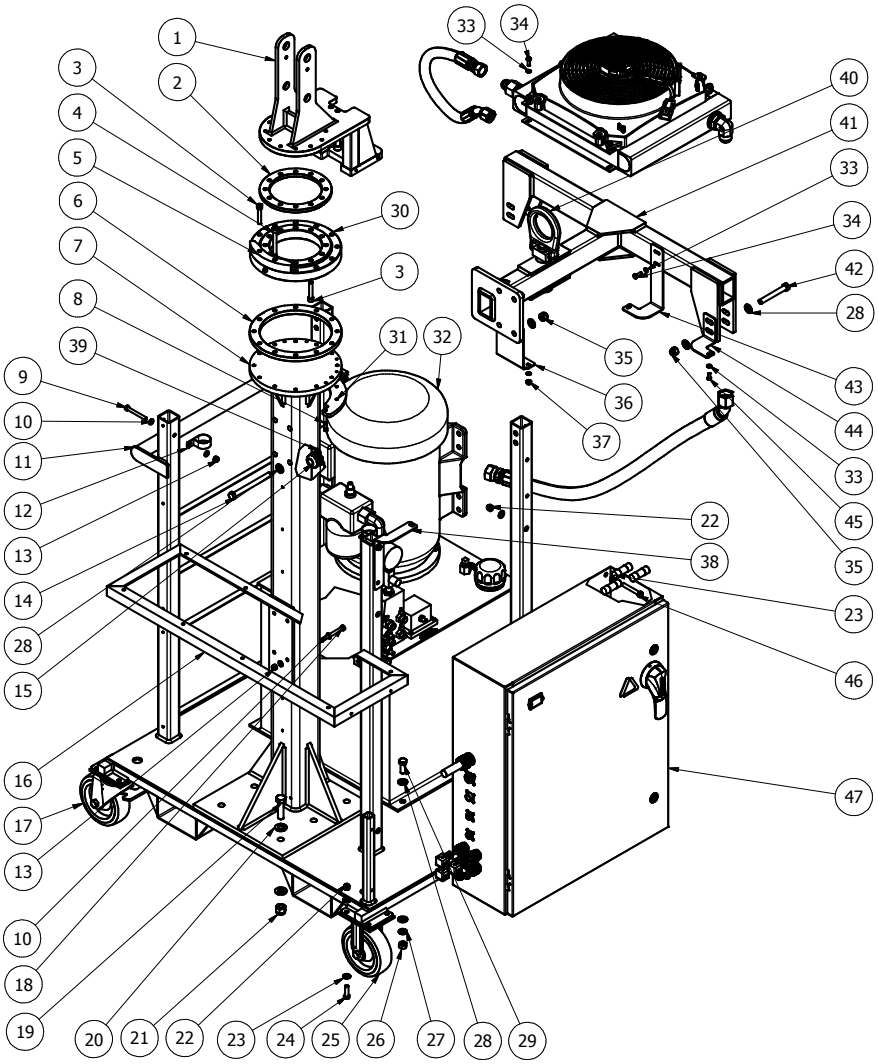
PARTS LISTS & DIAGRAMS - PXS230

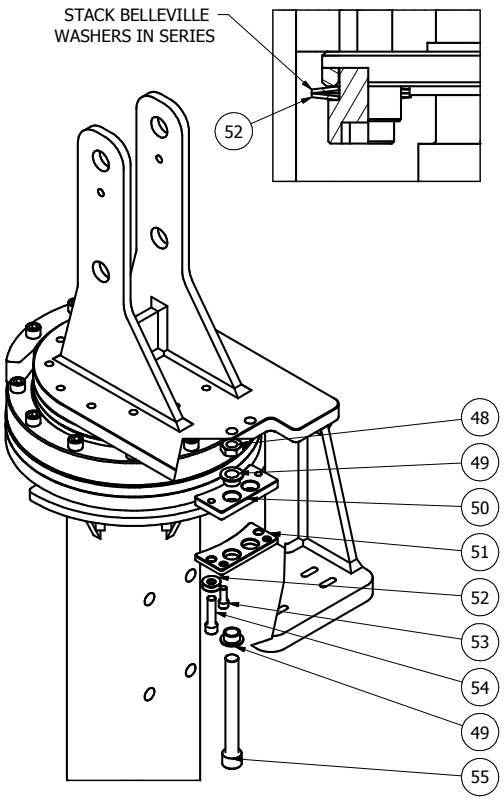


PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
194	1	PX529	MOTOR STARTING CONTACTOR
195	1	PX531	AUXILIARY CONTACT
196	1	PX530-3242	OVERLOAD RELAY
197	1	PX523	24VDC POWER SUPPLY, 480W
198	8	ETR6508	FUSE HOLDER
199	4	PTR407	JUMPER, 24 POLE
200	23	PTR420	TERMINAL BLOCK
201	3	ETR6421	SPACER
202	10	ETR6510	END BRACKET
203	1	PX513	PLC, 24VDC/RELAY
204	1	PX525	CONTROL TRANSFORMER
205	1	PX528	PRIMARY FUSE KIT
206	2	598ATQR4	4-AMP FUSE
207	1	598TRM5	5-AMP FUSE
208	1	PX526	FUSIBLE DISCONNECT
209	6	ETR6509	GROUNDING TERMINAL BLOCK
210	20	41-90096A827	THREAD-CUTTING SCREW, #10-32
211	7	PX524	RELAY W/ SOCKET
212	1	PX512	24VDC POWER SUPPLY, 240W
213	1	PTR408	HOUR METER, 24VDC
214	1	PX515	CORD GRIP
215	1	PX510	ENCLOSURE
216	3	PX535	VALVE CABLE
217	1	PX536	CONNECTOR, FEMALE
218	4	ETR6422	CORD GRIP

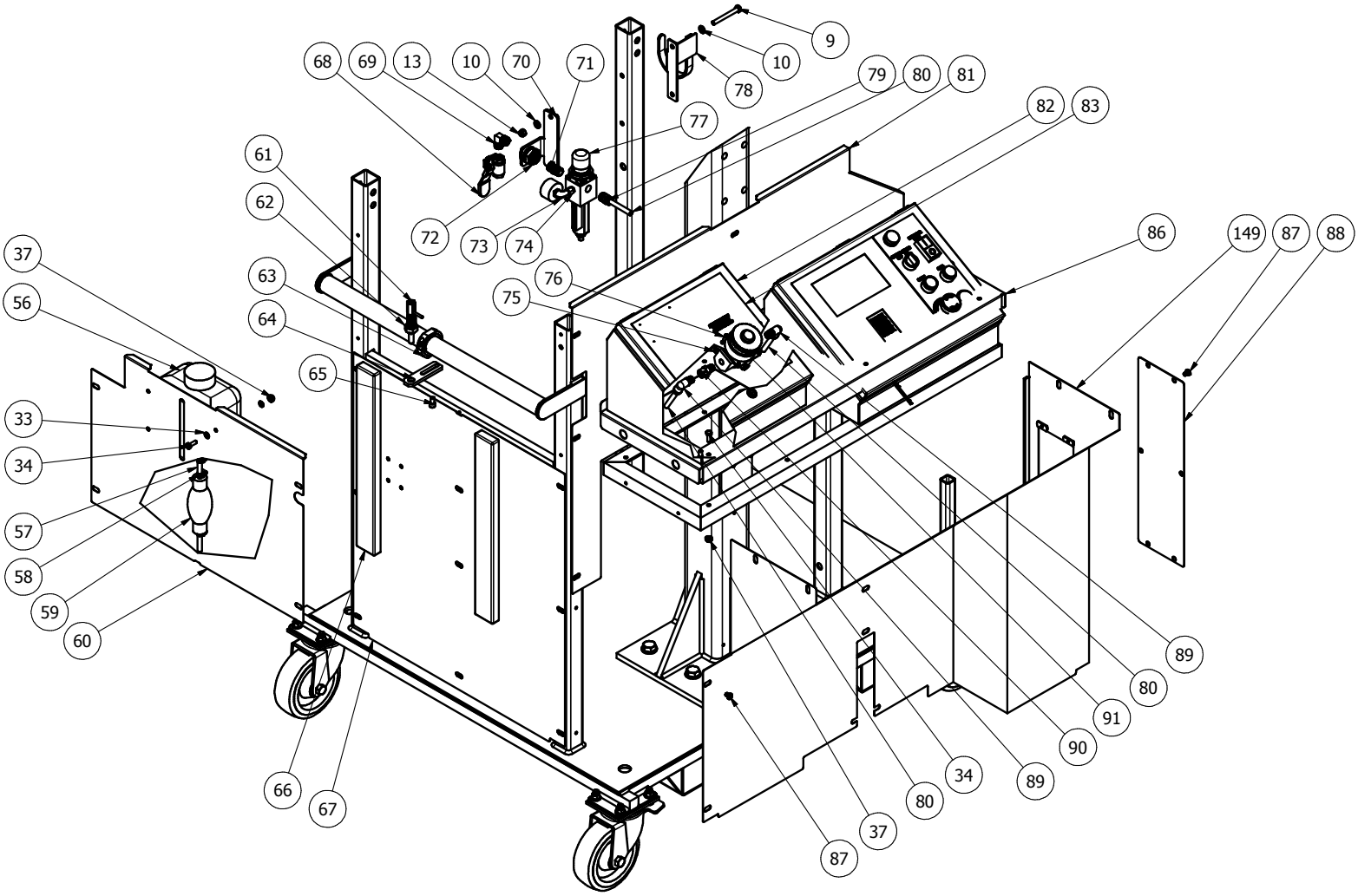
PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
219	4	M5631D14	LOCK NUT, 1/2
220	1	PX412	HOLE SEAL, 22mm
221	4	133F	LOCK WASHER, 1/4
222	8	132A	WASHER, 1/4
223	4	546D	ELASTIC LOCKNUT, 1/4-20
224	2	PX517	LOCK NUT, 3/4
225	1	PX514	CORD GRIP
226	1	PX527	SHAFT
227	1	PX502	HANDLE
228	4	546E	ELASTIC LOCKNUT, #6-32
229	4	577-12	PAN HEAD MACHINE SCREW, #6-32 X 1/2
230	1	PX518	FLANGE MOUNT RECEPTACLE, REV SOCKET
231	12	546G	ELASTIC LOCKNUT, #4-40
232	12	577-13	PAN HEAD MACHINE SCREW, #4-40 x 7/16
233	1	PX519	FLANGE MOUNT RECEPTACLE, SOCKET
234	1	PX520	FLANGE MOUNT RECEPTACLE, SOCKET
235	1	PX521	FLANGE MOUNT RECEPTACLE, REV SOCKET
236	3	598AJT50	50-AMP FUSE (NOT SHOWN)
237	5	598-1G	FUSE, 1A (NOT SHOWN)
238	1	598-4G	FUSE, 4A (NOT SHOWN)
239	1	598-8G	FUSE, 8A (NOT SHOWN)
240	1	598-15G	FUSE, 15A (NOT SHOWN)
241	15	PX127-5	CONTACT, SOCKET (NOT SHOWN)
242	8	PX415-5	CONTACT, PIN (NOT SHOWN)

PARTS LISTS & DIAGRAMS - PXS460

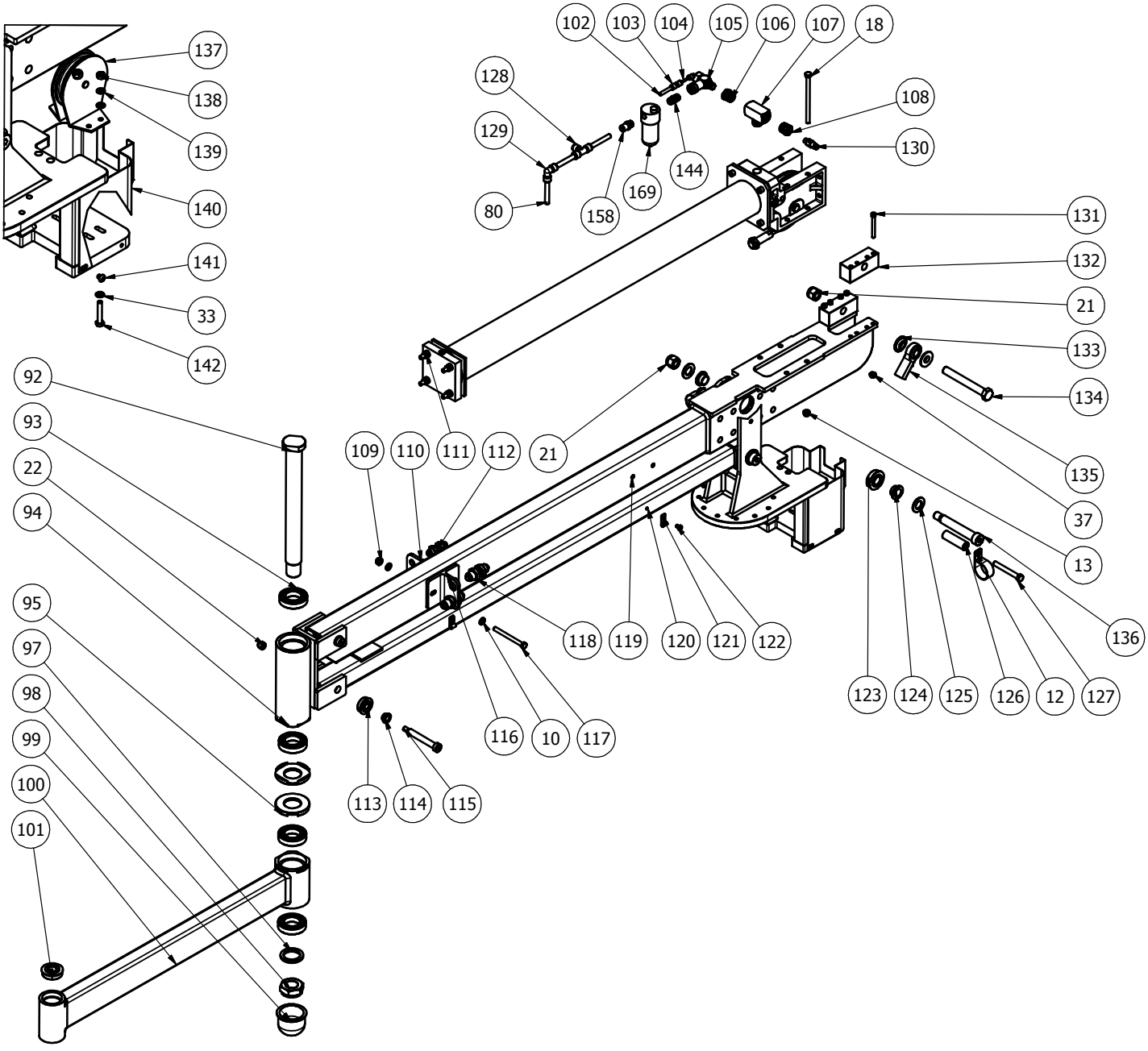




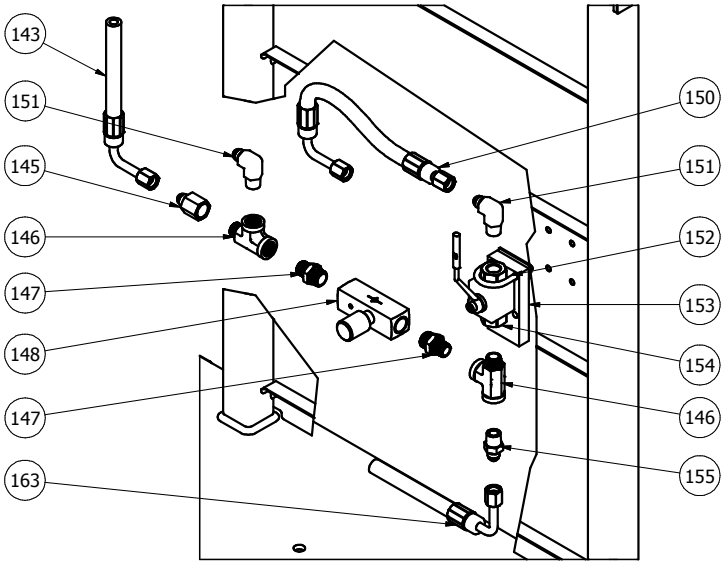
PARTS LISTS & DIAGRAMS - PXS460

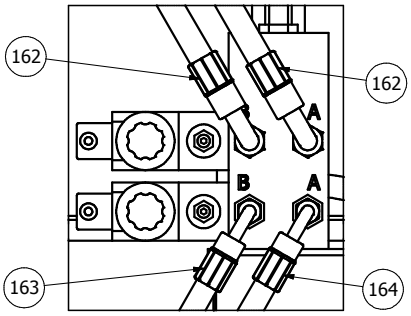


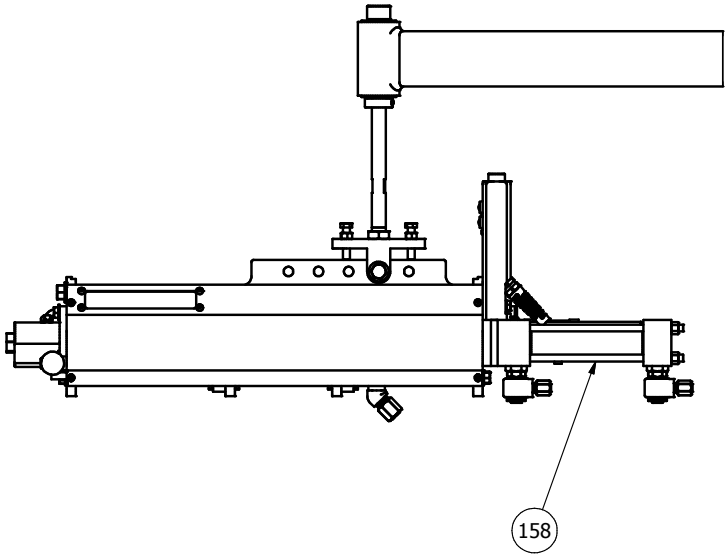
PARTS LISTS & DIAGRAMS - PXS460

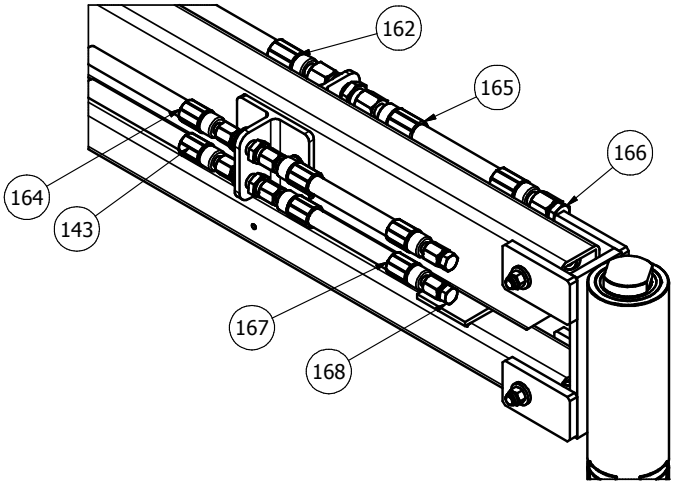


PARTS LISTS & DIAGRAMS - PXS460









PARTS LISTS & DIAGRAMS - PXS460

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	PX220P	SWIVEL
2	1	PX221P	UPPER SPACING RING
3	22	P8302-92	SOCKET HEAD CAP SCREW, 3/8-16 X 2
4	2	P8302-95	SOCKET HEAD CAP SCREW, 3/8-16 X 3
5	1	PX228P	SWIVEL STOP
6	1	PX222P	LOWER SPACING RING
7	1	PX227P	COLUMN ASSEMBLY
8	7	P8302-26	SOCKET HEAD CAP SCREW, 1/4-20 X 3/4
9	5	130BM	HEX HEAD CAP SCREW, 5/16-18 X 2-3/4
10	22	132B	WASHER, 5/16
11	1	PX320P	BASE ASSEMBLY
12	4	41-8863T81	1-1/2" CABLE CLIP
13	13	546U	ELASTIC LOCKNUT, 5/16-18
14	4	130EV	HEX HEAD CAP SCREW, 1/2-13 X 5-1/2
15	1	PX330	CORD GRIP
16	1	PX302P	CONSOLET BRACKET
17	2	PX310	SWIVEL CASTER
18	8	130BU	HEX HEAD CAP SCREW, 5/16-18 X 5
19	6	130GK	HEX HEAD CAP SCREW, 5/8-11 X 2-1/4
20	12	132H	WASHER, 5/8
21	9	546CC	ELASTIC LOCKNUT, 5/8-11
22	22	546V	ELASTIC LOCKNUT, 3/8-16
23	40	132C	WASHER, 3/8, SAE
24	16	130CF	HEX HEAD CAP SCREW, 3/8-16 X 1-1/4
25	2	PX311	RIGID CASTER
26	4	171EE	HEX NUT, 1/2-13
27	4	133B	LOCK WASHER, 1/2
28	24	132Q	WASHER, 1/2
29	4	130EF	HEX HEAD CAP SCREW, 1/2-13 X 1-1/4
30	1	41-6651K14	SLEWING RING BEARING
31	1	PX225P	FRICTION BRAKE

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
32	1	PX312	HYDRAULIC PUMP PACKAGE
33	24	132A	WASHER, 1/4
34	16	130AC	HEX HEAD CAP SCREW, 1/4-20 X 3/4
35	8	546X	ELASTIC LOCKNUT, 1/2-13
36	1	PX324P	COOLER BRACKET
37	22	546D	ELASTIC LOCKNUT, 1/4-20
38	1	PX325P	COOLER BRACKET
39	1	41-7513K243	LOCK NUT
40	1	41-3046T64	HOIST RING
41	1	PX230P	HANGER BRACKET
42	4	130ER	HEX HEAD CAP SCREW, 1/2-13 X 3-3/4
43	1	PX323P	COOLER BRACKET
44	1	PX322P	COOLER BRACKET
45	2	131B	HEX HEAD CAP SCREW, M6 X 1.0 X 14MM
46	4	130CL	HEX HEAD CAP SCREW, 3/8-16 X 2-1/2
47	1	PX500-460	230V ELECTRICAL CABINET
48	2	170EE	HEX JAM NUT, 1/2-13
49	4	41-2706T25	SLEEVE BEARING
50	1	PX223P	UPPER BRAKE PLATE
51	1	PX224P	LOWER BRAKE PLATE
52	4	579-46	BELLEVILLE SPRING
53	2	P8302-5	SOCKET HEAD CAP SCREW, 1/4-20 X 5/8
54	2	P8302-104	SOCKET HEAD CAP SCREW, 5/16-18 X 1-1/4
55	2	P8302-193	SOCKET HEAD CAP SCREW, 1/2-13 X 4-1/2
56	1	PX611	TANK
57	240"	PX613	3/8" TUBING
58	4	41-5388K14	HOSE CLAMP
59	1	PX615	PRIMER BULB
60	1	PX309P	UPPER SIDE PANEL
61	1	41-3403A18	SPRING PLUNGER
62	1	170G	HEX JAM NUT, 5/8-11

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
63	1	PX316	COLLAR
64	1	PX315P	LOCK BRACKET
65	2	P8302-65	SOCKET HEAD CAP SCREW, 5/16-18 X 1/2
66	2	41-21705T45	BUMPER
67	1	PX308P	LOWER SIDE PANEL
68	1	41-4628K82	BALL VALVE
69	1	41-50785K124	ELBOW, 3/8
70	1	PX314P	REGULATOR BRACKET
71	1	41-5485K23	HEX NIPPLE, 3/8
72	1	41-50785K274	BULKHEAD FITTING, 3/8
73	1	41-4429K159	STREET ELBOW, 1/8
74	1	41-50785K25	ADAPTER, 1/8
75	4	546W	ELASTIC LOCKNUT, #10-24
76	4	P8597-11	BUTTON HEAD CAP SCREW, #10-24 X 5/8
77	1	41-4910K82	FILTER/REGULATOR
78	1	PX326P	HANGER
79	1	41-51025K185	MALE PIPE STRAIGHT
80	204	41-5156K88	3/8" TUBING
81	1	PX301P	UPPER FRONT PANEL
82	1	PX601	CONTROL PANEL
83	1	PX603	PANEL NAMEPLATE
84	1	PX400	CONTROL PANEL
86	1	PX307P	CONSOLET BRACKET COVER
87	38	577-6	PAN HEAD MACHINE SCREW, 1/4-20 X 3/8
88	1	PX317P	COVER
89	2	41-51025K142	MALE PIPE SWIVEL
90	1	41-7768K22	CHECK VALVE
91	1	ETR5003	REGULATOR
92	1	PX205P	PIN
93	4	41-5972K365	BEARING
94	1	PX201P	ARM LINK
95	2	PX202	FRICTION PLATE

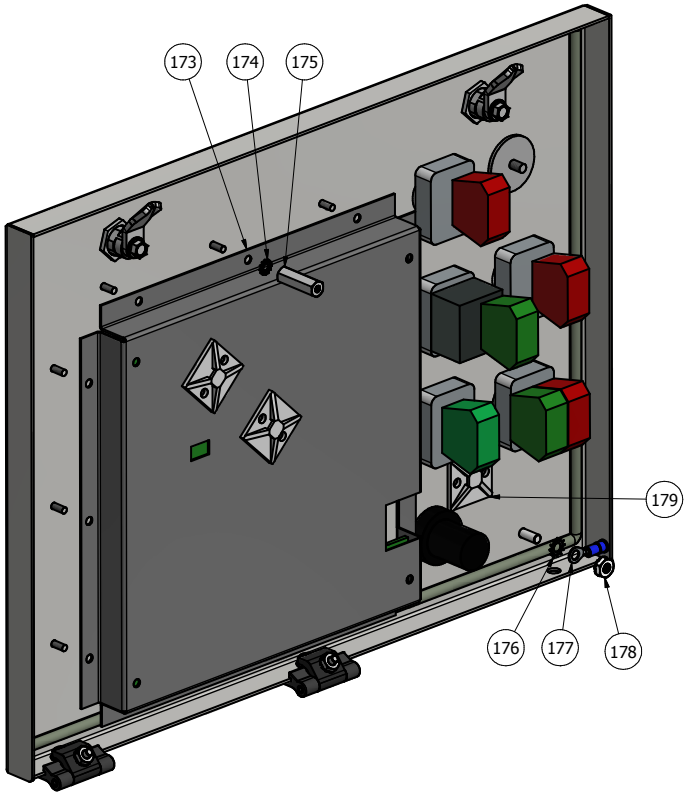
PARTS LISTS & DIAGRAMS - PXS460

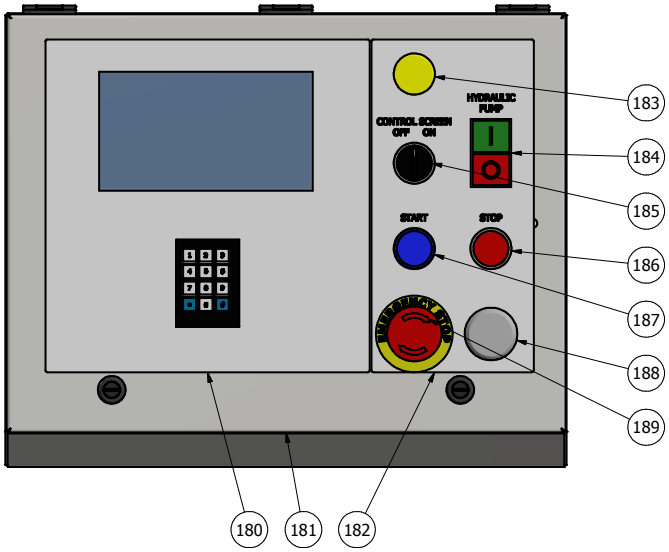
PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
97	1	41-98035A113	WASHER
98	1	546BB	ELASTIC LOCKNUT, 1-1/4-7
99	1	41-9267K17	CAP
100	1	PX204P	OUTER ARM
101	2	41-6384K369	BEARING
102	4.5	41-5156K87	1/4" TUBING
103	1	41-5779K353	REDUCING CONNECTOR
104	2.5	41-5156K86	5/32" TUBING
105	1	41-62395K72	SAFTEY SHUT-OFF CONTROL VALVE
106	1	41-4429K422	REDUCER BUSHING, 1/2 X 1/4
107	1	41-50785K324	TEE FITTING, 1/2
108	1	04301-14	REDUCER BUSHING, 1/2 X 1/8
109	2	546C	ELASTIC LOCKNUT, 5/16-18
110	1	PX501P	BULKHEAD BRACKET
111	1	PX209	CABLE CYLINDER
112	2	43-6WTXWLNS	BULKHEAD UNION
113	4	41-6384K363	BEARING
114	4	41-2938T11	BRONZE SLEEVE BEARING
115	2	539U	SHOULDER SCREW, 3/8-16 X 3-1/4
116	1	PX503P	BULK HEAD BRACKET
117	2	130BQ	HEX HEAD CAP SCREW, 5/16-18 X 3-1/2
118	2	43-8WTXWLNS	BULKHEAD UNION
119	1	PX207P	UPPER ARM
120	1	PX206P	LOWER ARM

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
121	4	41-8863T12	1/4" CABLE CLIP
122	4	P8597-15	BUTTON HEAD CAP SCREW, 1/4-20 X 3/8
123	4	41-6384K367	BEARING
124	4	41-2934T54	BRONZE SLEEVE BEARING
125	4	132K	WASHER, 3/4
126	2	41-92415A928	SPACER
127	2	130CN	HEX HEAD CAP SCREW, 3/8-16 X 3
128	1	41-5779K671	TEE FITTING
129	1	41-5779K26	ELBOW FITTING
130	1	ETR5009	RELIEF VALVE
131	8	P8302-51	SOCKET HEAD CAP SCREW, 1/4-20 X 2-1/4
132	2	PX208P	CABLE MOUNT BRACKET
133	2	41-95034A600	ROD END SPACER
134	1	130GU	HEX HEAD CAP SCREW, 5/8-11 X 5
135	1	41-4444T241	ROD END
136	2	539S	SHOULDER SCREW, 5/8-11 X 4
137	1	41-3099T42	PULLEY
138	4	171A	HEX NUT, 1/4-20
139	4	133F	LOCK WASHER, 1/4
140	1	PX304P	PULLEY GUARD
141	4	P8597-53	BUTTON HEAD CAP SCREW, 1/4-20 X 1/4
142	4	130AG	HEX HEAD CAP SCREW, 1/4-20 X 1-1/2
143	1	PX349	104" HYDRAULIC HOSE, 3/8
144	1	41-5485K22	HEX NIPPLE, 1/4

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
145	1	PX342	FEMALE CONNECTOR, 6-6
146	2	PX341	MALE RUN TEE, 3/8
147	2	PX343	STRAIGHT MALE PIPE ADAPTOR, 8-3/8
148	1	PX344	FLOW CONTROL VALVE
149	1	PX305P	LOWER FRONT PANEL
150	1	PX347	13" HYDRAULIC HOSE, 3/8
151	2	PX340	MALE ELBOW, 6-6
152	2	41-3201T51	U-BOLT
153	1	PX361	SPACING BLOCK
154	1	PX346	BALL VALVE
155	1	PX345	MALE CONNECTOR, 6-6
158	1	41-5779K116	STRAIGHT FITTING
162	2	PX352	98" HYDRAULIC HOSE, 1/2
163	1	PX348	53" HYDRAULIC HOSE, 3/8
164	1	PX350	134" HYDRAULIC HOSE, 3/8
165	2	PX353	78" HYDRAULIC HOSE, 1/2
166	2	43-8PNTX-S	PLUG, JIC
167	2	PX351	78" HYDRAULIC HOSE, 3/8
168	2	43-6PNTX-S	PLUG, JIC
169	1	41-4268K13	LUBRICATOR
170	1	41-2182A24	LEVEL (NOT SHOWN)
171	5	PX313	HYDRAULIC OIL, 5 GAL (NOT SHOWN)
172	1	PX125	TRANSDUCER CABLE (NOT SHOWN)

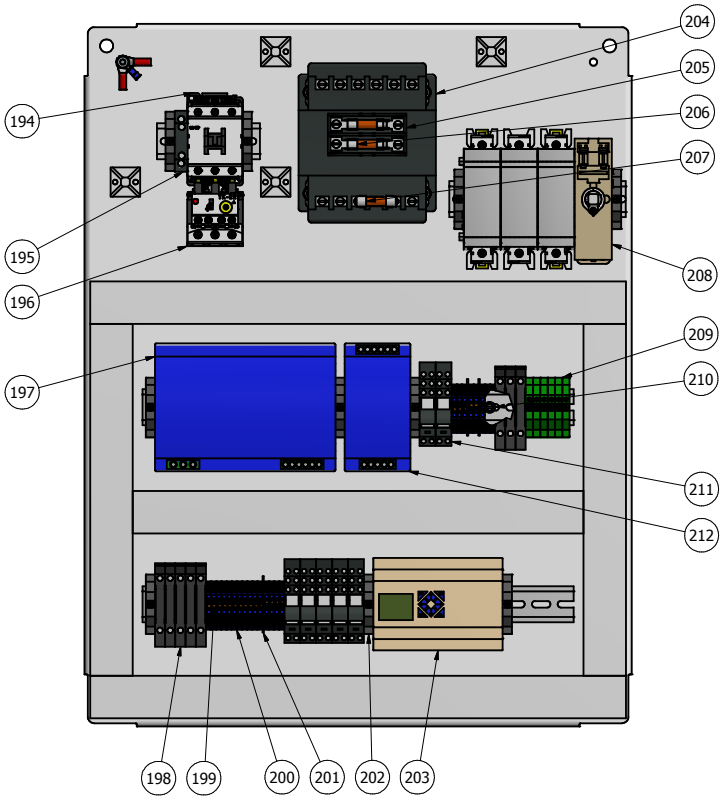
PARTS LISTS & DIAGRAMS - PXS460

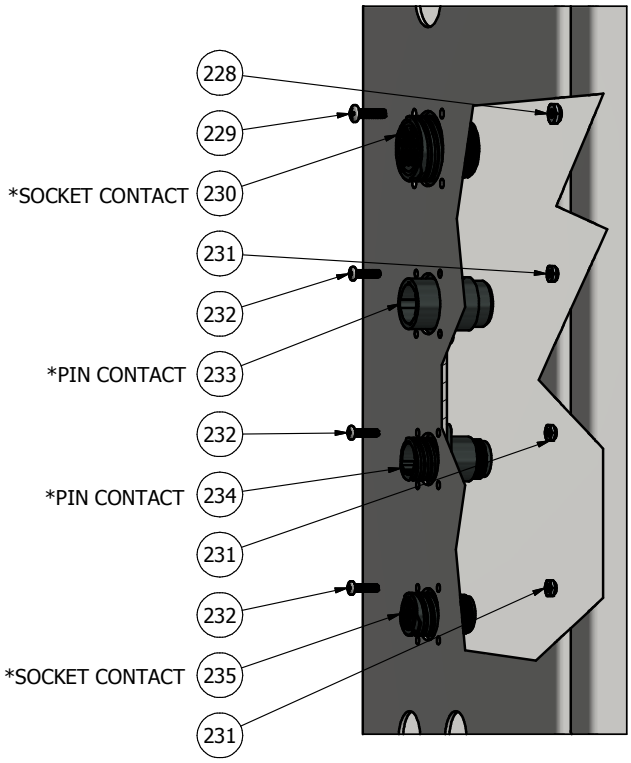


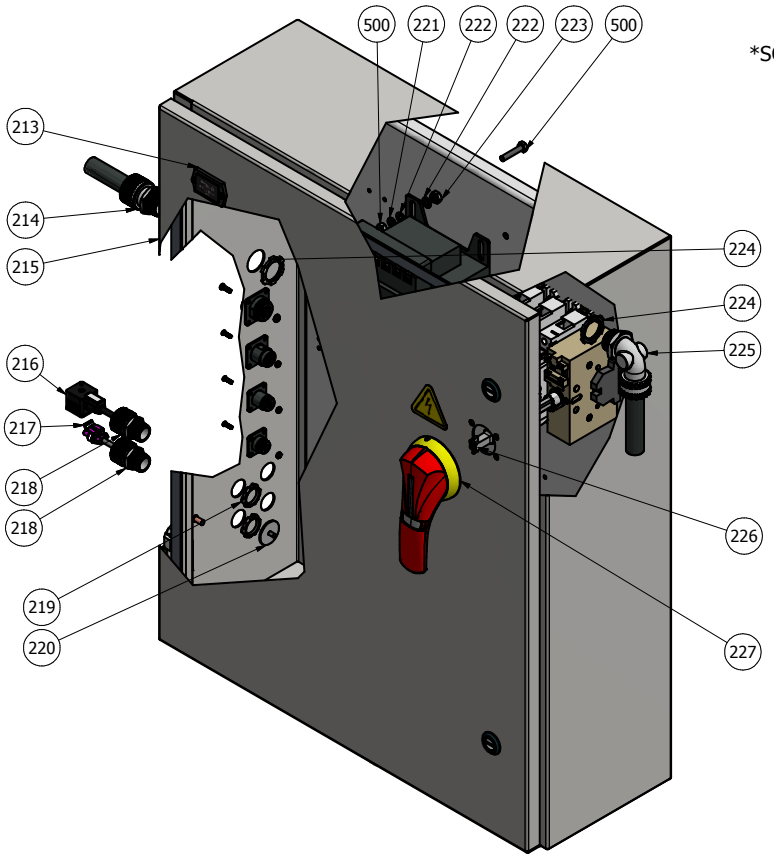


PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
173	1	PTR413-80F	DISPLAY MODULE
174	12	595-2	EXTERNAL TOOTH LOCK WASHER, #6
175	12	41-91780A247	STANDOFF, #6-32
176	2	595-1	EXTERNAL TOOTH LOCK WASHER, #10
177	2	07119-4	INSULATED RING
178	2	594-4	HEX KEPS NUT, #10-32
179	5	PTR410	CABLE TIE MOUNT
180	1	PX403	DISPLAY COVER
181	1	PX414	ENCLOSURE
182	1	PX404	LEGEND PLATE
183	1	PX405	INDICATOR LIGHT
184	1	PX407	PUSHBUTTON
185	1	PX406	SELECTOR SWITCH
186	1	PX409	PUSHBUTTON
187	1	PX408	PUSHBUTTON
188	1	PX412	HOLE SEAL, 22mm
189	1	PX410	E-STOP PUSHBUTTON
190	1	PX411	CONTROL SCREEN CABLE (NOT SHOWN)
191	1	PX415-4	CONNECTOR (NOT SHOWN)
192	1	PX415-3	CABLE CLAMP (NOT SHOWN)
193	11	PX415-5	CONTACT, PIN (NOT SHOWN)

PARTS LISTS & DIAGRAMS - PXS460





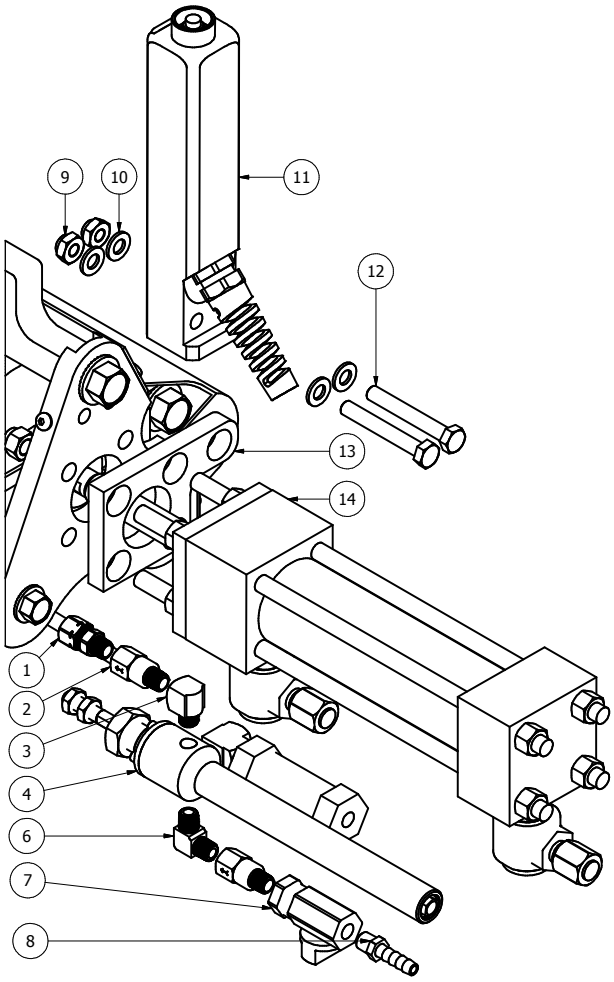


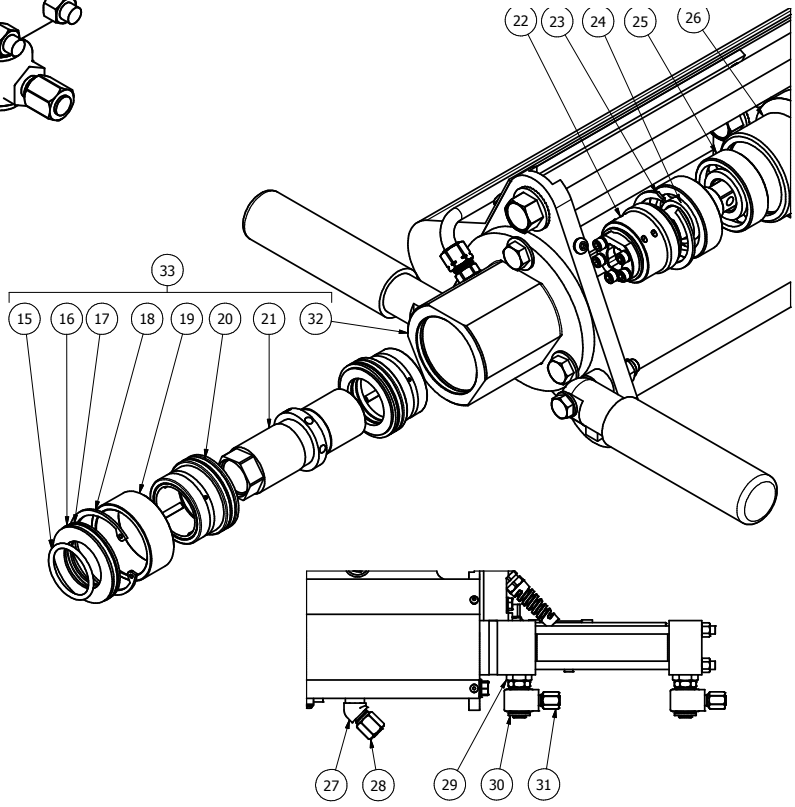
PARTS LISTS & DIAGRAMS - PXS460

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
194	1	PX529	MOTOR STARTING CONTACTOR
195	1	PX531	AUXILIARY CONTACT
196	1	PX530-1826	OVERLOAD RELAY
197	1	PX523	24VDC POWER SUPPLY, 480W
198	8	ETR6508	FUSE HOLDER
199	4	PTR407	JUMPER, 24 POLE
200	23	PTR420	TERMINAL BLOCK
201	3	ETR6421	SPACER
202	10	ETR6510	END BRACKET
203	1	PX513	PLC, 24VDC/RELAY
204	1	PX525	CONTROL TRANSFORMER
205	1	PX528	PRIMARY FUSE KIT
206	2	598ATQR4	4-AMP FUSE
207	1	598TRM5	5-AMP FUSE
208	1	PX541	FUSIBLE DISCONNECT
209	6	ETR6509	GROUNDING TERMINAL BLOCK
210	20	41-90096A827	THREAD-CUTTING SCREW, #10-32
211	7	PX524	RELAY W/ SOCKET
212	1	PX512	24VDC POWER SUPPLY, 240W
213	1	PTR408	HOUR METER, 24VDC
214	1	PX515	CORD GRIP
215	1	PX510	ENCLOSURE
216	3	PX535	VALVE CABLE
217	1	PX536	CONNECTOR, FEMALE
218	4	ETR6422	CORD GRIP

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
219	4	M5631D14	LOCK NUT, 1/2
220	1	PX412	HOLE SEAL, 22mm
221	4	133F	LOCK WASHER, 1/4
222	8	132A	WASHER, 1/4
223	4	546D	ELASTIC LOCKNUT, 1/4-20
224	2	PX517	LOCK NUT, 3/4
225	1	PX514	CORD GRIP
226	1	PX527	SHAFT
227	1	PX502	HANDLE
228	4	546E	ELASTIC LOCKNUT, #6-32
229	4	577-12	PAN HEAD MACHINE SCREW, #6-32 X 1/2
230	1	PX518	FLANGE MOUNT RECEPTACLE, REV SOCKET
231	12	546G	ELASTIC LOCKNUT, #4-40
232	12	577-13	PAN HEAD MACHINE SCREW, #4-40 x 7/16
233	1	PX519	FLANGE MOUNT RECEPTACLE, SOCKET
234	1	PX520	FLANGE MOUNT RECEPTACLE, SOCKET
235	1	PX521	FLANGE MOUNT RECEPTACLE, REV SOCKET
236	3	598AJT30	30-AMP FUSE (NOT SHOWN)
237	5	ETR6527	FUSE, 1A (NOT SHOWN)
238	1	598-4G	FUSE, 4A (NOT SHOWN)
239	1	598-8G	FUSE, 8A (NOT SHOWN)
240	1	598-15G	FUSE, 15A (NOT SHOWN)
241	15	PX127-5	CONTACT, SOCKET (NOT SHOWN)
242	8	PX415-5	CONTACT, PIN (NOT SHOWN)

PARTS LISTS & DIAGRAMS - PXS100

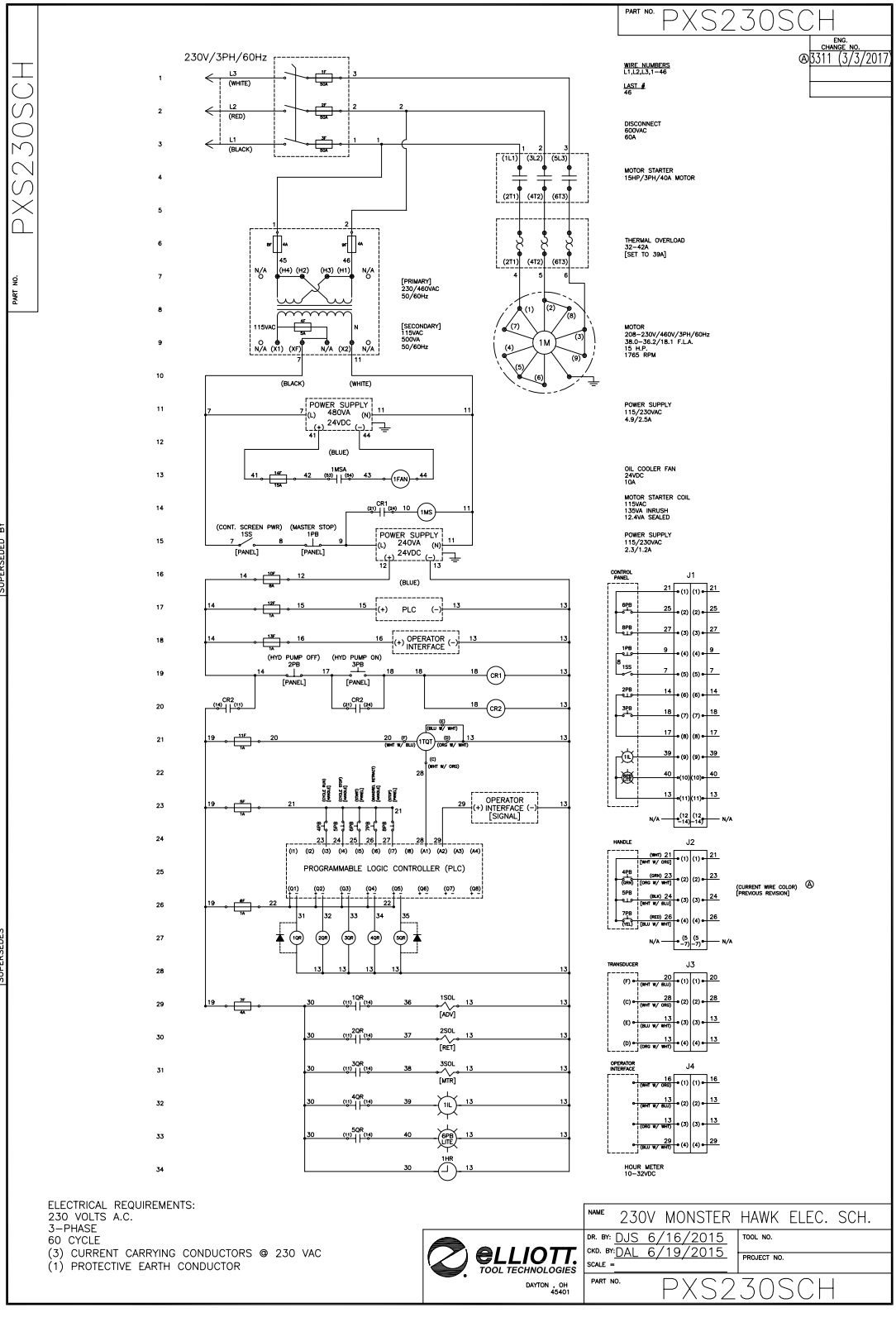




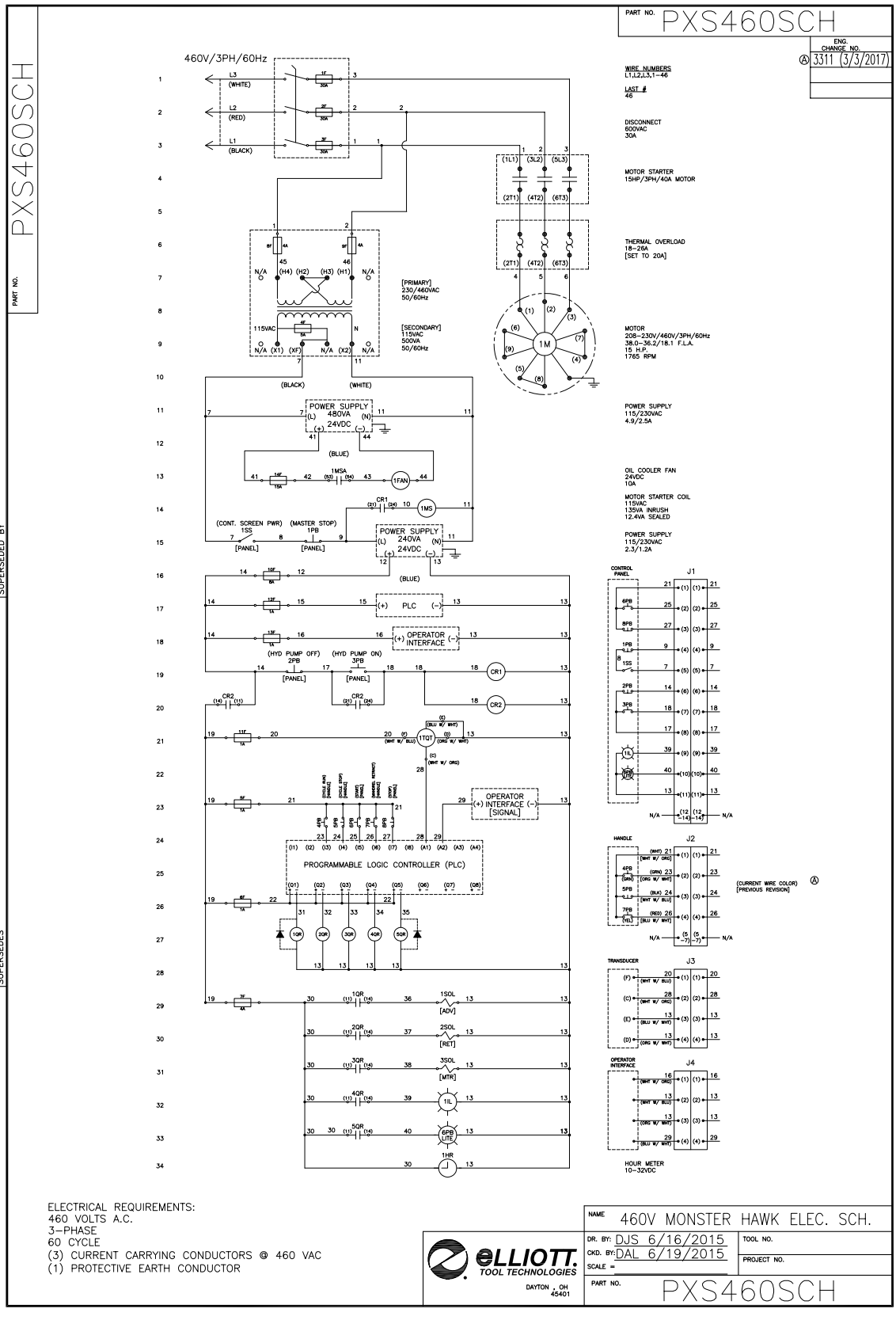
PARTS LISTS & DIAGRAMS - PXS100

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	41-5220K67	COMPRESSION TUBE FITTING
2	2	41-7768K65	CHECK VALVE
3	1	41-50785K41	STREET ELBOW, 1/8
4	1	PX610	LUBRICATOR
6	1	41-50785K122	ELBOW, 1/8
7	1	41-4112T52	BALL VALVE
8	1	41-5346K13	HOSE BARB ADAPTER
9	2	546C	ELASTIC LOCKNUT, 5/16-18
10	8	132B	WASHER, 5/16
11	1	PX162	CONTROL HANDLE ASSEMBLY
12	4	130BK	HEX HEAD CAP SCREW, 5/16-18 X 2-1/4
13	1	PX182L	CYLINDER SPACER
14	1	PX103	HYDRAULIC CYLINDER
15	2	P8310-030AV	O-RING
16	1	P8309-132	O-RING, AS568 - 132
17	1	PX218L2	SEALING DISC
18	1	41-99142A585	RETAINING RING
19	1	PX122L2	FRONT BEARING BUSHING
20	2	PX133	BEARING
21	1	PX124L2	FRONT BEARING SHOULDER
22	1	PX198	QUICK CHUCK ASSEMBLY
23	1	PX113	RETAINING RING
24	1	PX126	REAR BEARING SHOULDER
25	2	41-6680K15	ANGULAR CONTACT BEARING
26	1	PX146P	REAR HOUSING ASSEMBLY

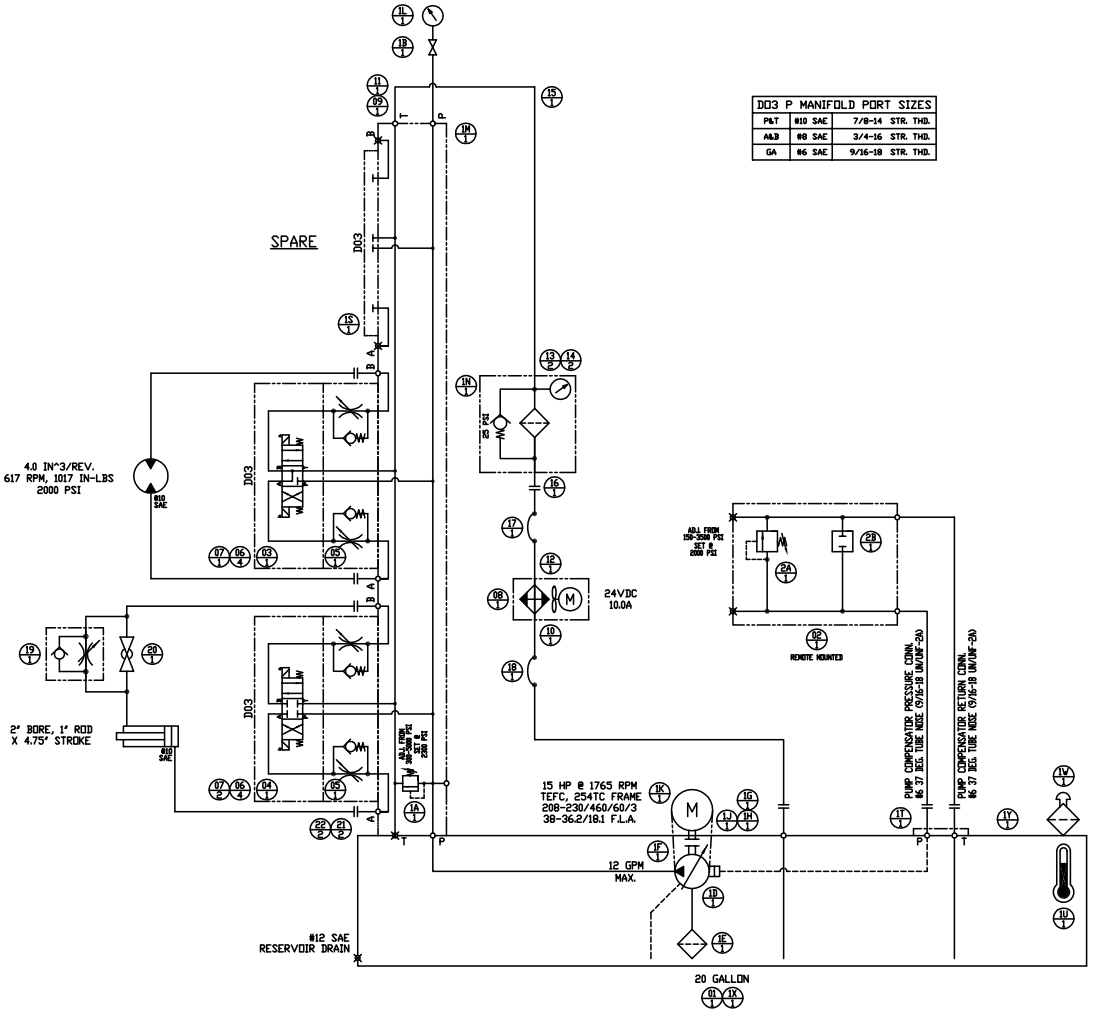
ELECTRICAL SCHEMATIC - PXS230



ELECTRICAL SCHEMATIC - PXS460



SCHEMATIC - PXSHYD



SCHEMATIC - PXSHYD

ITEM	DESCRIPTION	PART NUMBER	MFG.	QTY.
01	POWER UNIT, 20 GALLON VERTICAL (CONSISTING OF:)	V2F12PM33PN	PARKER	1
1A	VALVE, CARTRIDGE RELIEF	RAH101S50	PARKER	1
1B	VALVE, NEEDLE	N400S	PARKER	1
1C	.	.	.	.
1D	PUMP, PISTON	APVP3336R2VM21	PARKER	1
1E	STRAINER, SUCTION	875035-20	PARKER	1
1F	ADAPTOR, MOTOR/PUMP	875344	PARKER	1
1G	HUB, PUMP COUPLING (7/8" B. X 1/4" KEY)	M40002808	MAGNALOY	1
1H	HUB, MOTOR COUPLING (1 5/8" B. X 3/8" KEY)	M40012012	MAGNALOY	1
1J	INSERT, COUPLING	M470N	MAGNALOY	1
1K	MOTOR, 15 HP @ 1765 RPM, TEFC "C" FACE, 254TC FRAME, 208-230/460/3/60	.	BALDOR	1
1L	GAUGE, 5000 PSI PRESSURE	875053-5000	PARKER	1
1M	MANIFOLD, D03 3 STATION W/RELIEF CAV.	AD03P032S/C	DAMAN	1
1N	FILTER, RETURN (ELEMENT #936708Q)	40CN110QEBM2KS164	PARKER	1
1P	.	.	.	.
1R	.	.	.	.
1S	PLATE, D03 COVER	AD03CPP	DAMAN	1
1T	PLATE, REMOTE COMPENSATOR COVER	876377	PARKER	1
1U	GAUGE, SIGHT LEVEL/TEMPERATURE	875033-05	PARKER	1
1V	.	.	.	.
1W	ASSEMBLY, FILLER BREATHER	875034	PARKER	1
1X	RESERVOIR, 20 GALLON VERTICAL	876335-02	PARKER	1
1Y	PLATE, RESERVOIR TOP	876376-02	PARKER	1
02	BODY, REMOTE COMPENSATOR	-	ETT	1
2A	VALVE, UNIVERSAL RELIEF	205746N-25	PARKER	1
2B	PLUG, P08-2 CAVITY	P08-2	PARKER	1
03	VALVE, D03 4 WAY 3 POSITION DIRECTIONAL, A&B TO T NEUTRAL CONDITION, 24VDC WITH DIN CONN.	D1VW004CNJW	PARKER	1
04	VALVE, D03 4 WAY 3 POSITION DIRECTIONAL, A.P.B. NEUTRAL CONDITION, 24VDC WITH DIN CONN.	D1VW001CNJW	PARKER	1
05	VALVE, D03 SANDWICH DUAL FLOW CONTROL	FM2DDSN	PARKER	2
06	SCREW, SOCKET HEAD CASP, #10-24 THD. X 3" LONG	.	ETT	8
07	-	-	-	-
*08	HEAT EXCHANGER, AIR/OIL (24VDC)	SVB3-24S-JE-22	EMMEGI	1
09	ADAPTOR, SAE TO SAE STR. THD.	10-12 F5OG5-S	PARKER	1
10	ELBOW, MALE, 1" BSPP TO 1" TUBE	16 C4QMX-S	PARKER	1
11	CONNECTOR, STR. THD., #12 SAE TO 1" TUBE	16-12 F5OX-S	PARKER	1
12	REDUCER, TUBE, 1" TO 3/4" TUBE	16-12 TRTX-S	PARKER	1
13	NUT, 1" TUBE	16 BTX-S	PARKER	3
14	SLEEVE, 1" TUBE	16 TX-S	PARKER	2
15	TUBE, 1" O.D. X .065" WALL STN. STL. (FEET)	-	ETT	1
16	CONNECTOR, STR. THD., #16 SAE TO 3/4" TUBE	12-16 F5OX-S	PARKER	1
*17	HOSE, 3/4" I.D. (FEET- 30 3/8" CUT OFF LENGTH)	422-12	PARKER	3
17A	STRAIGHT, FEMALE SWIVEL	10643-12-12	PARKER	1
17B	ELBOW, 45 DEG. FEMALE SWIVEL	13473-12-12	PARKER	1
*18	HOSE, 1" I.D. (FEET- 32 1/2" CUT OFF LENGTH)	422-16	PARKER	3
18A	STRAIGHT, FEMALE SWIVEL	10643-16-16	PARKER	1
18B	ELBOW, 45 DEG. FEMALE SWIVEL	13473-16-16	PARKER	1
19	VALVE, IN-LINE FLOW CONTROL	F820S	PARKER	1
20	BALL VALVE, 2-WAY	-	ETT	1
21	CONNECTOR, STR. THD.	6-8 F5OX-S	PARKER	2
22	CONNECTOR, STR. THD.	8 F5OX-S	PARKER	2

MAINTENANCE INSTRUCTIONS

⚠ WARNING

To reduce the risk of injury, always unplug all utility connections to machine before performing any maintenance. Contact Elliott for all repairs.

Before Each Use

1. Inspect the air supply line filter/regulator.
    a.) Regulator should be set at 90 psi max.
    b.) Inspect the filter, clean and/or replace filter and drain bowl as necessary.
2. Check hydraulic oil level, add as necessary.
    a.) Recommend premium quality hydraulic oil with a viscosity range between 150-250 SSU (30-50 cst.) at 100°F (38°C). Normal operating viscosity range between 80-1000 SSU (17-180 cst.). Maximum start-up viscosity is 4000 SSU (1000 cst.).
3. Inspect hydraulic oil filter.
    a.) Check the filter indicator located on the top of the filter housing for a dirty element condition and replace filter as necessary.
4. Inspect all air lines.
    a.) Check for loose hydraulic connections.
    b.) Check for cracks or other damage and replace as necessary.
5. Inspect all hydraulic lines.
    a.) Check for loose air connections.
    b.) Check for cracks or other damage and replace as necessary.
6. Inspect the cable on the cable cylinder mounted on top of the arm.
    a.) Check for cracks in the outer casing and replace cable as necessary.
    b.) Check for fraying cable strands and replace cable as necessary.
7. Inspect for loose or missing bolted connections.
    a.) Tighten and replace as necessary.

MAINTENANCE INSTRUCTIONS

Periodically

Maximum 1 month intervals

1. Grease rod end connecting the cable to the arm.
2. Grease bearings in the power head.

Maximum 1 year intervals

1. Inspect casters.
    a.) Grease through the grease fittings located at the axles, and the swivel bearings located on the swivel casters.
2. Grease slewing ring bearing located on the top of the column.

Maximum 1,000 hr intervals

1. Change hydraulic oil, maximum 1,000 hr intervals.
    a.) Recommend premium quality hydraulic oil with a viscosity range between 150-250 SSU (30-50 cst.) at 100°F (38°C). Normal operating viscosity range between 80-1000 SSU (17-180 cst.). Maximum start-up viscosity is 4000 SSU (1000 cst.).

See the included hydraulic power unit Installation and Maintenance Manual for further maintenance information.

ADJUSTMENT & REPAIR

Repair kits and seal sets are available for the cable cylinder.

Prior to performing any repairs, especially to the pneumatic components such as air cylinders, relieve the air pressure from the system:

1. Lower the arm manually to its lowest position.
2. Engage the locking mechanism on the push handle into the power head swivel rod.
3. Slowly rotate the regulator dial on the control panel in the counter-clockwise direction to its 'OFF' position.
4. Turn the air supply valve off. This will also vent air pressure in the system.
5. Disconnect the air supply.
6. Relieve the pressure from the cable cylinder by pressing in the relief valve located at the top of the cable cylinder. If repairs are to be performed to the cable cylinder relieve ALL of the air.

The bearings in the arm are pre-greased and do not require lubrication. If the bearings feel worn replace as necessary.

TROUBLESHOOTING GUIDE

Control screen will not turn on

1. The main power cable is not connected to a power source.
    a.) Connect cable to a power source; see the label located on the electrical cabinet.
2. The disconnect handle on the front of the electrical cabinet is turned to ‘OFF’.
    a.) Turn the handle to ‘ON’.
3. The controls display selector switch is set to ‘OFF’.
    a.) Turn the control screen selector switch to ‘ON’.
4. The Emergency Stop button has been pressed.
    a.) Twist the knob clockwise and release.
5. The controls panel power cord has become disconnected.
    a.) To the left of the electrical cabinet is a removable panel to gain access to and re-attach the power cord plug to the electrical cabinet.

The mandrel will not advance when pressing the cycle run [green] button on the handle

1. A torque value has not been entered into the controls display screen.
    a.) Enter the desired torque value and pres #.
2. The Programmable Logic Controller (PLC) inside the electrical cabinet is not receiving a signal from the control screen.
    a.) To the left of the electrical cabinet is a removable panel to gain access to. Re-attach the control screen signal plug to the electrical cabinet.
    b.) Open the lid to the control panel and re-attach the signal plug to the control screen module.
    c.) Replace the control screen module.
3. The PLC inside the electrical cabinet is not receiving a signal from the handle controls.
    a.) To the left of the electrical cabinet is a removable panel to gain access to. Re-attach the handle cable plug to the electrical cabinet.

TROUBLESHOOTING

The mandrel feeds partially into the tube and stops, neither feeding in nor retracting automatically

1. The tube is spinning inside the tube sheet.

    a.) The tube needs to be stationary when expanding in order for the rolls to properly rotate about the tube and expand it. Hold the tube while expanding via a second operator on the opposite end, or push the power head slightly to one side. This will induce enough resistance to get the tube to create metal-to-metal contact with the tube sheet to continue expanding. Allow the expander to center itself within the tube once the tube begins to hold on its own.

The mandrel continues to feed into the tube without the torque being reached.

1. The transducer cable has become disconnected at the transducer.

    a.) Re-attach the cable at the transducer.

2. The transducer cable has become disconnected at the electrical cabinet.

    a.) To the left of the electrical cabinet is a removable panel to gain access to. Re-attach the transducer cable plug to the electrical cabinet.

WARRANTY

Should any part, of Seller's own manufacture, prove to have been defective in material or workmanship when shipped (as determined by Seller), Seller warrants that it will, at its sole option, repair or replace said part f.o.b., point of manufacture, provided that Buyer notifies, in writing, of such defect within twelve (12) months from date of shipment from the manufacturing plant.

On request of Seller, the part claimed to be defective will be returned, transportation, insurance, taxes and duties prepaid, to the factory where made, for inspection. Any item, which has been purchased by Seller, is warranted only to the extent of the original manufacturer's warranty to Seller.
Seller shall not be liable for any damages or delays caused by defective material or workmanship.

No allowance will be made for repairs or alterations made by others without Seller's written consent or approval. If repairs or alterations are attempted without Seller's consent, Seller's warranty is void.

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Seller's total liability is limited to the lower of the cost of repair or replacement.

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Contact Us

Elliott Tool offers a complete line of precision tube tools to meet your needs. Contact us or your local support.

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