



USER MANUALS AND PRODUCT INFORMATION

STONEAGE CONTACT INFORMATION

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ABXS-3L HOSE TRACTOR USER MANUAL

LWPS LIGHTWEIGHT POSITIONER USER MANUAL

CONTROLLER & POWER HUB USER MANUAL

Our global support teams are here to help.



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COLOR CODE CHART FOR MANUALS:

ABXS-3L USER MANUAL

CTRL & PHA USER MANUAL

LWPS-100 USER MANUAL

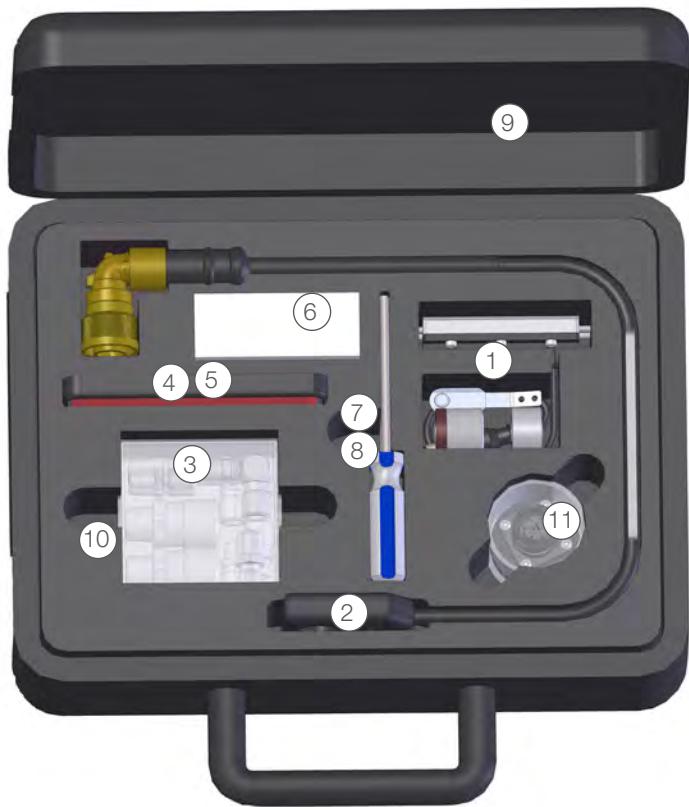
*SEE FOLLOWING PAGES
FOR ALL CASE CONTENTS

#	PART NUMBER AND DESCRIPTION	QTY
1	ABX 115-12 GUIDE TUBE, .459 ID	3
2	ABX 116-12 GUIDE TUBE, .546 ID	3
3	ABX 117-12 GUIDE TUBE, .674 ID	3
4	ABX 119-12 GUIDE TUBE, .745 ID	3
5	ABXS-3L BELT TRACK DRIVE HOSE TRACTOR, SENTINEL	1
6	ABXS 628 SPARE PARTS KIT, 3LS AND LWPS W IPOD	1
7	CBL E020F-1RB6PP CABLE FOR CONTROLLER	1
8	CBL E050F-1RB3RP POWER CABLE 50FT	1
9	CBL EA15F-1RB6PP-2PL10-1PL5 CABLE ASSY FOR ABXS TRACTOR	1
10	CTRL-101 CONTROLLER	1

11	GPT 071-3LS 3LS AND LWPS CHEST	1
12	GPT 108-S 3LS COLLET AND HOSE STOP KIT	1
13	GPT 310 TOOL BAG, 18IN	2
14	LWP 621 QUICK CLAMP KIT, 4 PCS	1
15	LWP 622 PLATE CLAMP KIT, 2 PCS	1
16	LWPS-100-6 LWP SENTINEL W RAILS	1
17	PH-A0302A00C20 POWER HUB	1
18	PHA 112 SHIELD	
19	CAM 410-XX POWER SUPPLY 12V AC-DC	1
20	PHA 520 POWER SUPPLY 12V DC-DC	1
21	PT 641 PRESSURE TRANSDUCER & FITTINGS KIT	1

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#	PART NUMBER AND DESCRIPTION	ABXS 628 (W IPOD)	ABXS 628-NI (NO IPOD)
1	ABXS 150 LANCE POSITION SENSOR	1	1
2	ABXS 161 HOSE CRIMP AND HOSE STOP SENSOR PUCK	1	1
3	ABXS 611 SPARES FITTING KIT, PL	1	1
4	EE AC-IP-0001 IPOD TOUCH, RED, 32GB	1	-
5	EE AC-IP-0002 IPOD WATERPROOF CASE, BLACK	1	-
6	EE AC-IP-0003 IPOD USB CHARGER	1	-
7	GPT 022-187-B HEX KEY, .187IN, STANDARD L BALL END	1	1
8	GPT 024-T10 TORX DRIVER, T10	1	1
9	GPT 081 COLLET KIT CASE WITH PLAIN FOAM INSERTS	1	1
10	GPT 340.1.2 SPARE PARTS BOX FOAM LAYER 1	1	1
11	LWPS 130-K SPARE LWPS SENSOR ASSEMBLY	1	1



#	PART NUMBER AND DESCRIPTION	QTY.
1	ABX 171-297 HOSE STOP COLLET, .297	1
2	ABX 171-328 HOSE STOP COLLET, .328	1
3	ABX 171-406 HOSE STOP COLLET, .406	1
4	ABX 171-438 HOSE STOP COLLET, .438	1
5	ABX 171-460 HOSE STOP COLLET, .460	1
6	ABX 171-484 HOSE STOP COLLET, .484	1
7	ABX 171-516 HOSE STOP COLLET, .516	1
8	ABX 171-547 HOSE STOP COLLET, .547	1
9	ABX 171-594 HOSE STOP COLLET, .594	1
10	ABX 171-625 HOSE STOP COLLET, .625	1

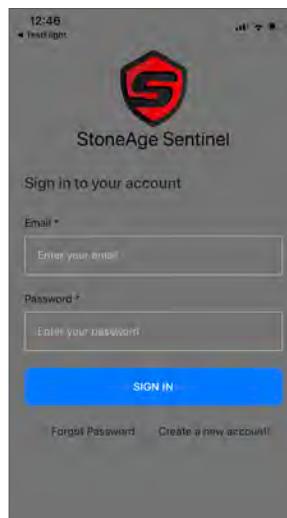
11	GPT 023-140 HEX DRIVER, 9/64"	1
12	GPT 081COLLET KIT CASE WITH PLAIN FOAM INSERTS	1
13	GPT 300.2.2-001 FOAM, 2L/3L & CHS, LAYER 2, COLLET BOX SECTION	1
14	HSS 121-27-34 HOSE BEAK HOSE STOP ASSEMBLY, .27-.34	3
15	HSS 121-34-42 HOSE BEAK HOSE STOP ASSEMBLY, .34-.42	3
16	HSS 121-42-50 HOSE BEAK HOSE STOP ASSEMBLY, .42-.50	3
17	HSS 121-50-56 HOSE BEAK HOSE STOP ASSEMBLY, .50-.56	3
18	HSS 121-56-61 HOSE BEAK HOSE STOP ASSEMBLY, .56-.61 (LONG)	3
19	PL 684 COLLET AND HOSE STOP REFERENCE TRIFOLD	1



#	PART NUMBER AND DESCRIPTION	QTY
1	AF 060-MP9 ADAPTER, 9/16 MALE TYPE M TO 9/16 MALE MP, 22k	3
2	AF 061-MP9 ADAPTER, 3/4 MALE TYPE M TO 9/16 MALE MP	3
3	AF 063-MP12 ADAPTER, 1.00 MALE TYPE M TO 3/4 MALE MP, 22k	3
4	AF 064-MP12 ADAPTER, 1-5/16 MALE TYPE M TO 3/4 MALE MP, 22k	1
5	AF 070-MP9 GLAND, 9/16 MP	2
6	AF 076-MP9 PLUG, 9/16 MP	2
7	GPT 081COLLET KIT CASE WITH PLAIN FOAM INSERTS	1
8	GPT 345 FOAM SET, PT CASE	1
9	PT-100-ABXS-3L-MP ASSY, PRESSURE MONITORING	1

UPDATING THE CONTROLLER FIRMWARE

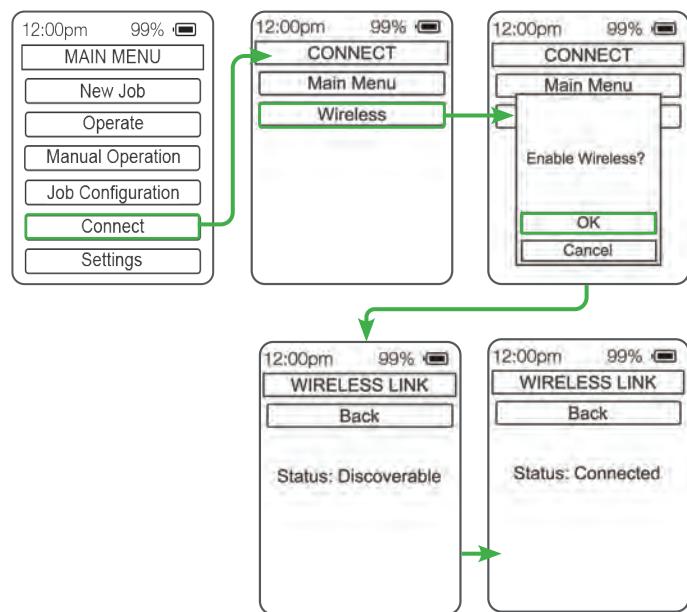
1. Ensure the **iPod touch®** is connected to the internet.
2. Sign in on the **iPod touch®**



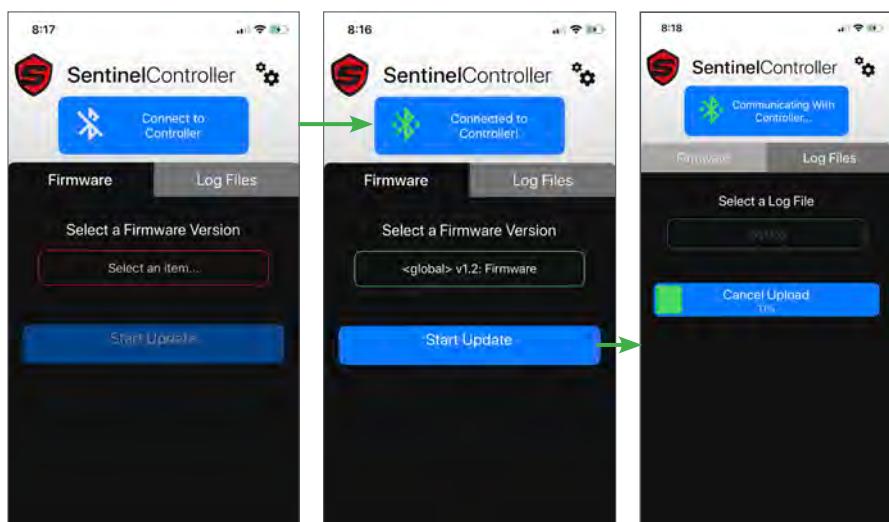
3. Turn on the Sentinel Controller
4. From the **Main Menu**, using the left joystick, scroll down and select **Connect**.
5. Select **Wireless** from the **Connect** menu.
6. Click **OK** on the **Enable Wireless?** pop-up.

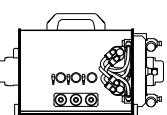
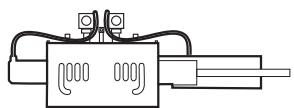
If your Controller now says **Status: Discoverable**, the Controller is ready to connect to the iPod.

When the Controller says **Status: Connected**, it is connected to the Ipod.

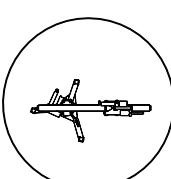
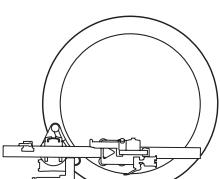
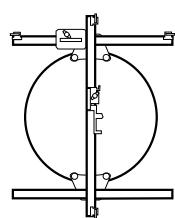


7. Click **Connect to Controller** button. The screen will say **Connecting** then **Connected**. The Bluetooth logo will turn green.
8. Select the **Firmware version** and **Start Update**.
9. When the update is complete, the Operator can return to the Controller.



SYSTEM CABLE BUNDLES

15 FT (4.5m) HOSE TRACTOR CABLE BUNDLE
(CBL EA15F-1RB6PP-2PL10-1PL5)

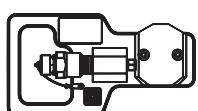


15 FT (4.5m) POSITIONER CABLE BUNDLE
(CBL EA15F-1RB6PP-2PL5)
2 BUNDLES REQUIRED

90° TO POSITIONER



20 FT (6m) CONTROLLER CABLE
(CBL E020F-1RB6PP)

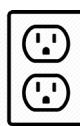


20 FT (6m) CONTROLLER CABLE
(CBL E020F-1RB6PP)

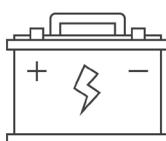
POWER CABLES

The Power Hub can be connected using the 12v AC-DC or the 12v DC-DC supply. Both are available in US or EU versions.

12V AC-DC US OR EU POWER SUPPLY
(CAM 410-XX)
FOR OUTLET



OR

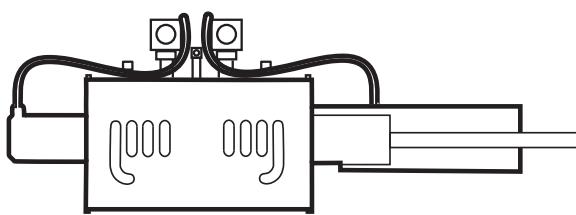


12V DC-DC US OR EU POWER SUPPLY
(PHA 520-001)
FOR BATTERY

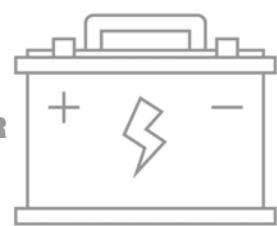


50 FT (15m) POWER CABLE EXTENSION
(CBL E050F-1RB3RP)

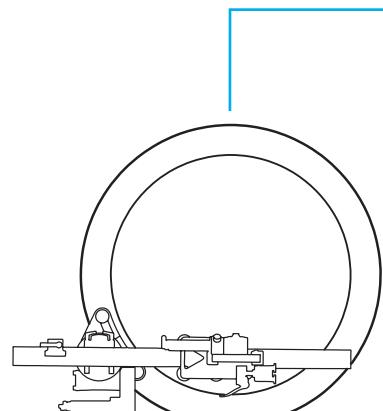
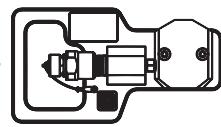
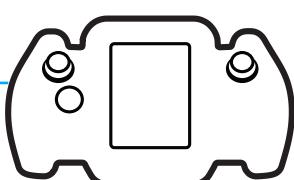
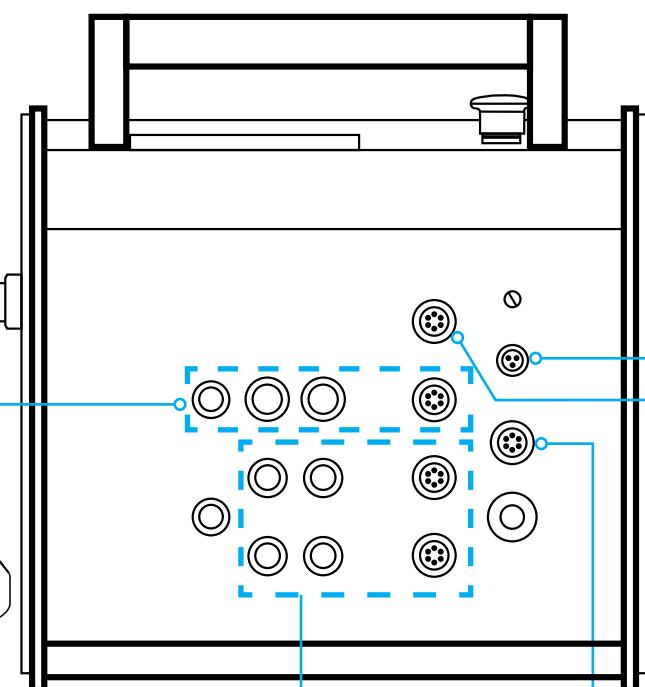
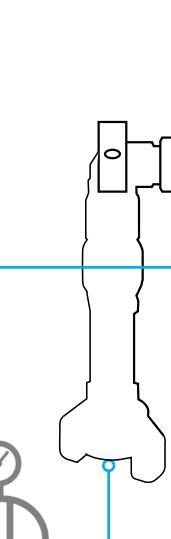
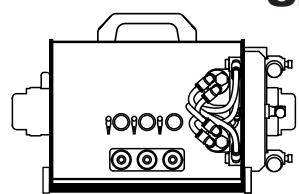




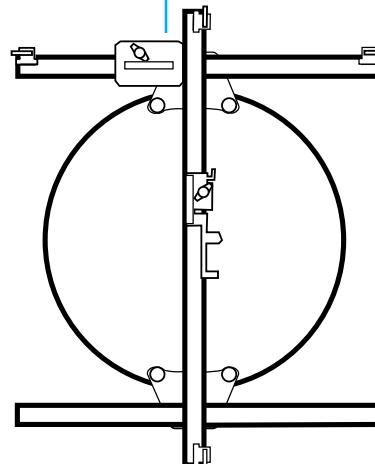
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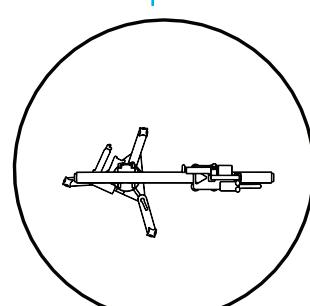
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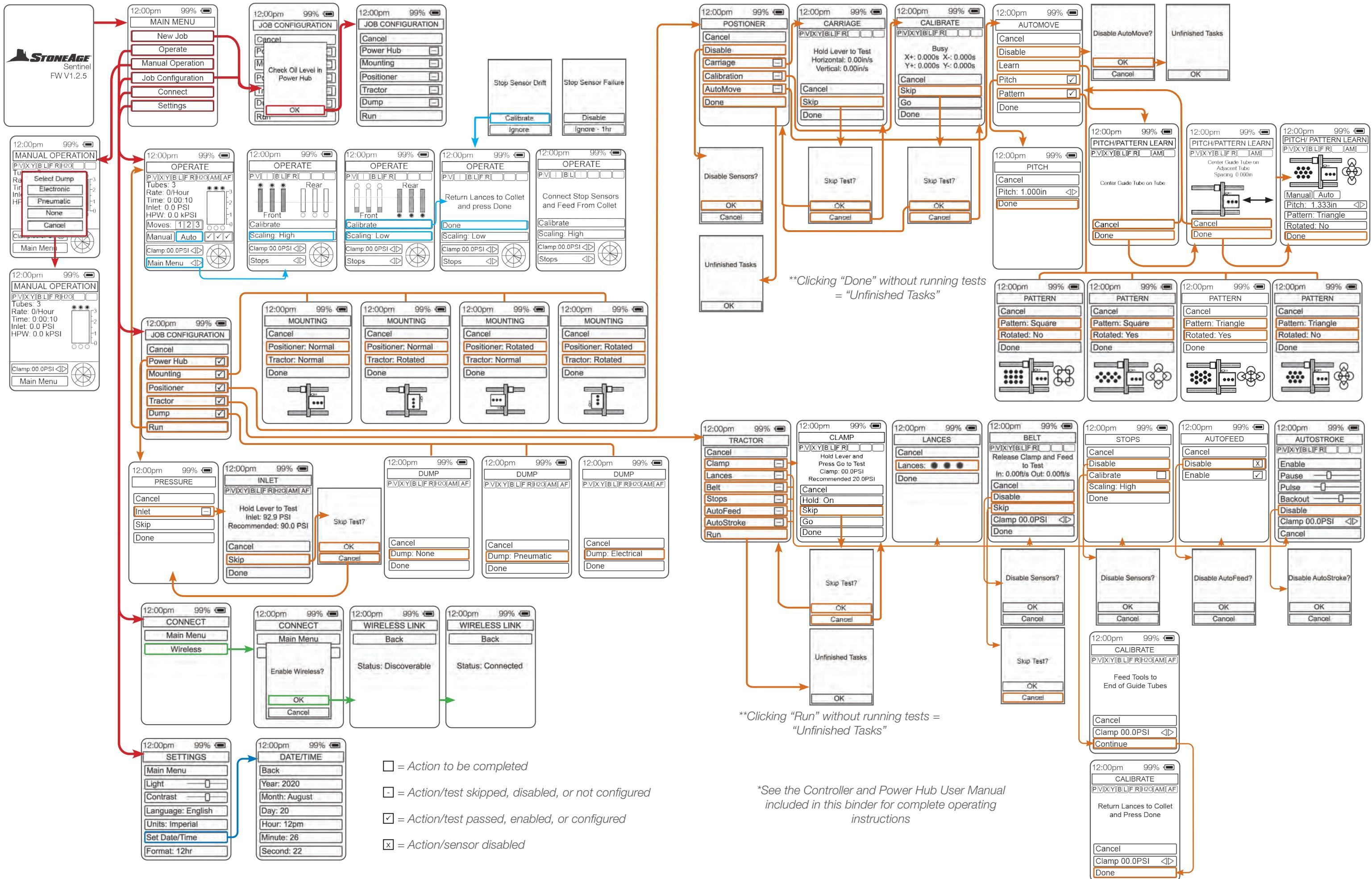


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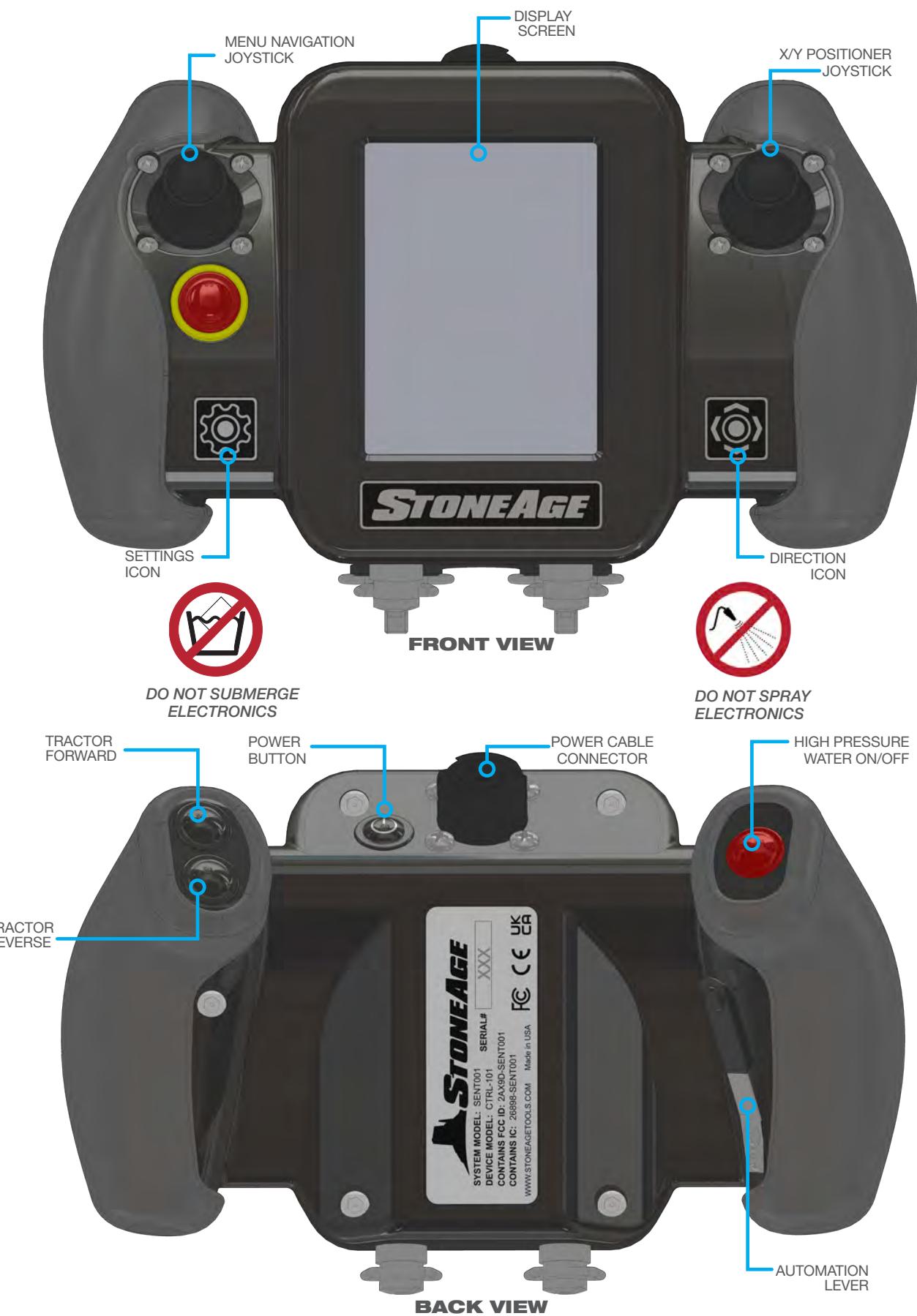
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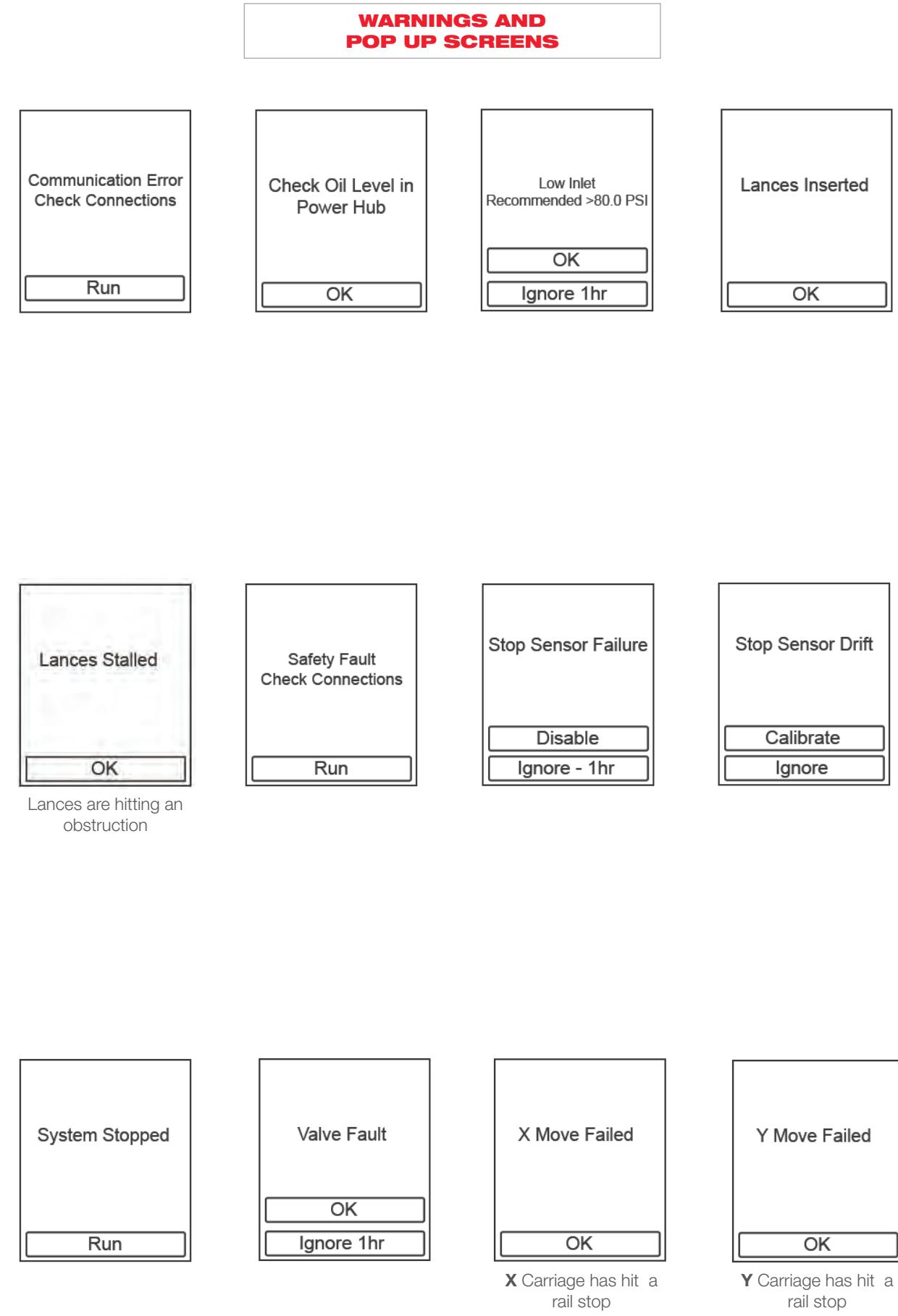


CONTROLLER (CTRL-101) FUNCTION OVERVIEW

See the CTRL and PH User Manual included in this binder for complete instructions

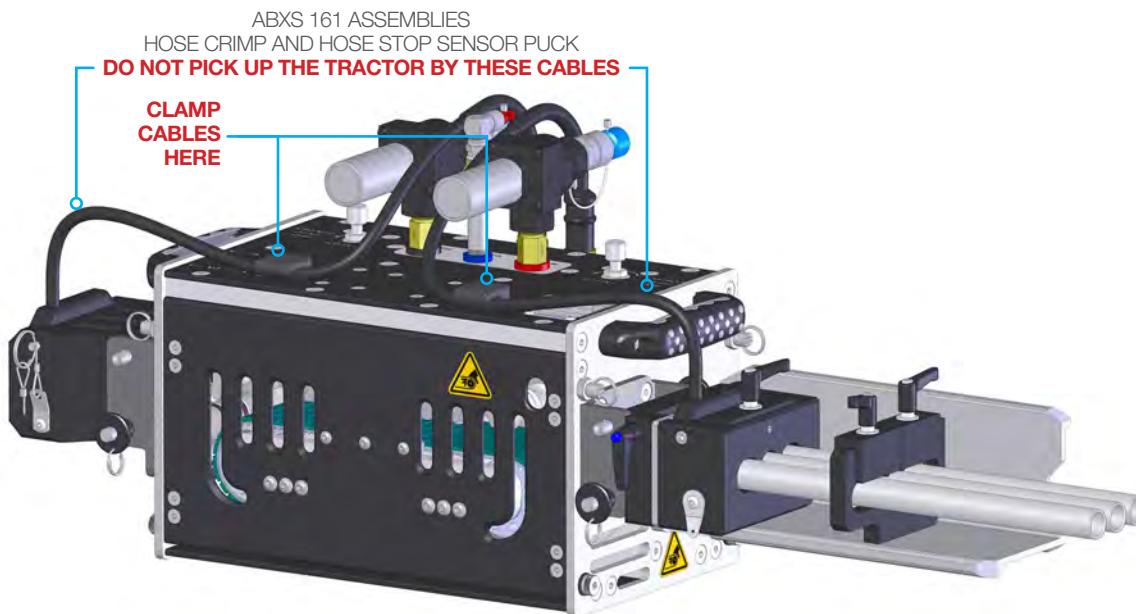


CONTROLLER FUNCTION & SCREEN MAP

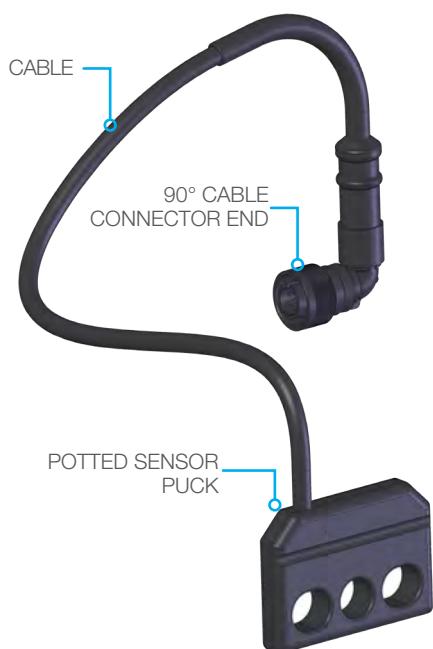


ABXS-3L TRACTOR AND ABXS 160 HOSE GUIDE ASSEMBLY:

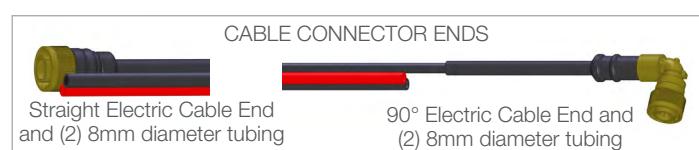
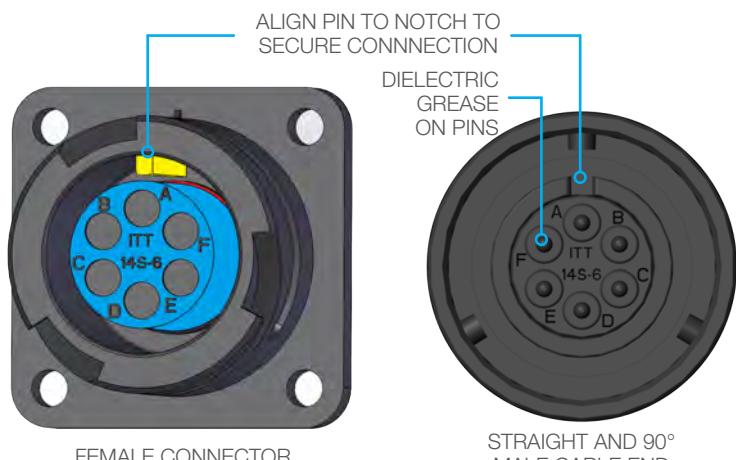
- **DO NOT PICK UP, LIFT, OR CARRY THE ABXS-3L TRACTOR BY THE 161 CABLE(S).** If the assembly is stuck under a heavy object, remove the heavy object instead of pulling on the cable to free the assembly.
- **DO NOT USE TOOLS OR CRIMPS WITH SHARP EDGES.** This will cause damage to the potting compound on the pucks.
- **DO NOT YANK OR TUG LANCES AND TOOLS OUT OF THE TRACTOR.** Never jerk lances to free the tools if they are stuck.
- **ALIGN PIN ON FEMALE CONNECTOR TO NOTCH ON MALE CABLE END.**
- **COAT PINS ON MALE CONNECTOR WITH DIELECTRIC GREASE.** Make sure that dielectric grease does not come in contact with parts that have conformal coating.
- **INSPECT ALL HOSES, LANCES, AND ACCESSORIES FOR DAMAGE PRIOR TO USE.** Do not use hoses and/or lances that have damage to the outer covering (including broken or exposed wires). Only high quality hoses intended for waterblast applications should be used as high pressure hoses. All hoses and lances should be inspected and operated as required by waterjet industry guidelines, including those in the WaterJet Technology Association's Industry Best Practices for the Use of High Pressure Waterjetting Equipment (2nd Edition, January 2021).



ABXS 161 HOSE CRIMP AND HOSE STOP SENSOR PUCK



CABLE END AND CONNECTOR ALIGNMENT

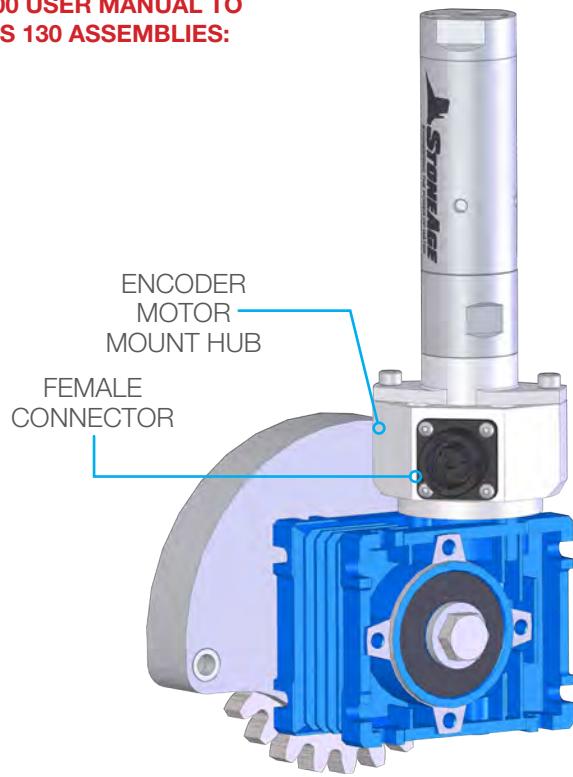


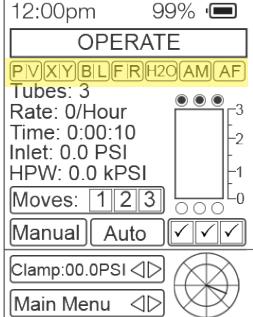
LWPS 130 POSITIONER ASSEMBLIES:

- **DO NOT LIFT POSITIONERS BY THEIR ELECTRICAL CABLES.** 90° cable-end connectors are particularly vulnerable to damage when inappropriately stressed. Lifting heavy parts with a cable can damage the LWPS 130 connector by shearing the alignment pin and breaking the adhesive seal between the rubber boot and connector. It can also damage the cable and potentially cause damage and inaccessible broken conductors and short circuits.
- **DO NOT ATTEMPT TO ROTATE THE SMALL KNULED SECTION OR ELBOW OF THE 90° CABLE-END CONNECTOR, ESPECIALLY WITH TOOLS.** Attempting to rotate the cable-end connector by these parts when it is connected to a LWPS 130 assembly can damage the LWPS 130 connector by shearing the alignment pin and breaking the adhesive seal between the rubber boot and connector.
- **DO NOT USE HIGH PRESSURE WATER TO CLEAN THE POSITIONERS.** Using high pressure water to spray down the positioner, especially in or around the connector, can force water and residual chemicals into the Encoder Motor Hub and damage the circuit board, rubber seals, and cause corrosion.
- **DO NOT USE BRAKE CLEANER TO CLEAN ON OR NEAR ELECTRONIC COMPONENTS.** The solvents used in brake cleaners can damage rubbers, adhesive materials, plastics, and electronic coatings.
- **CLEAN STRONG CHEMICAL SOLVENTS OFF OF STONEAGE EQUIPMENT,** with clean low pressure water at regular intervals to prevent damage to sensitive components.
- **CLEAN ELECTRIC CONNECTORS WITH A CONTACT CLEANER DESIGNED FOR USE WITH ELECTRIC AND ELECTRONIC COMPONENTS.** StoneAge recommends WD-40 Specialist Contact Cleaner, CRC QD Contact Cleaner, or CRC QD Electronic Cleaner.
- **ALWAYS ALIGN AND TIGHTEN THE LARGE KNULED KNOB OF THE 90° CABLE-END CONNECTOR BY HAND UNTIL IT CLICKS INTO PLACE.** If the connector is too difficult to fully connect by hand, users should check for interference (debris, bent cable-end connector body, bent cable-end connector pins, etc.). Applying too much torque to the large knurled knob can cause damage to one or both connectors.
- **KEEP DIELECTRIC GREASE AWAY FROM PARTS WITH A CONFORMAL COATING AS IT WILL CAUSE DAMAGE TO THE COATING.** Dielectric grease won't prevent the ingress of water and chemicals into the Encoder Motor Mount Hub, but it may be applied in small quantities to the electrical connectors to inhibit corrosion if necessary. Several dielectric greases contain siloxanes that can damage the conformal coating on circuit boards.
- **ALWAYS FOLLOW THE ASSEMBLY PROCEDURES IN THE LWPS-100 USER MANUAL TO ENSURE PROPER INSTALLATION AND ORIENTATION OF THE LWPS 130 ASSEMBLIES:**

- Locate connector alignment pin away from the blue gearbox
- Apply Loctite retaining compound to screws
- Torque screws in an X pattern to 14 in-lbf

The LWPS 130 assemblies are assembled and clocked to ensure the 90° cable-end connectors point along the body of the air motors, away from the box rails. Installing the assemblies in a different orientation will prevent sensors on the circuit board from detecting the magnet and cause the Sentinel system to fail to recognize proper positioners movement, potentially causing serious damage to the positioners.



Problem	Resolution Steps
“Communications Error” 	<ul style="list-style-type: none"> Verify all unused electrical connections on tractor and PH are capped such that they cannot get wet. One by one remove each cable from PH (except the Controller cable) and check if error is cleared after each removal. Check status icons at the top of the Operation screen on the Controller. Look for an empty icon box. This may indicate which component has the error. A wet electrical connector could cause a short in system. If an electrical connector has gotten wet, blow the connection with compressed air and wipe with a clean dry rag to remove as much water as possible. Inspect electrical connectors to ensure they have not been damaged. Replace faulty sensor or cable. Note that if a replacement is not available, the component can be disconnected from the PH, and the operator can continue with a reduced functionality. For example, if a fault in the tractor subsystem results in loss of communication, the tractor can be disconnected from the PH and the operator will not be able to use AutoFeed, but will be able to continue to use AutoMove as long as the positioner sensors are still functional.
“Lances Stalled” 	<ul style="list-style-type: none"> Tool has hit a plug in the tubes. If issue is consistent verify no plugs have been hit Check magnet rollers inside tractor, if magnets are separated from rollers problem will persist. Turn off Autostroke in Job Configuration>Tractor>Autostroke>Disable
Status Bar Issues 	<ul style="list-style-type: none"> Loose Connection, Faulty Cable or Faulty Sensor (IF all are missing Possible water ingress on Controller or Faulty Controller cable and/or Connection) Short in System on any component (<i>go through trouble shooting steps for Communication Error</i>) Redo New Job setup, some components may need to register again if communication was lost. One by one remove each cable from PH (except Controller cable) and check if error is cleared after each removal. Check connections for water ingress (blow out any water in connections, use dielectric grease) Check status icons in Operate screen on Controller, that may indicate the component that has an error.
“X/Y Not Found”	<ul style="list-style-type: none"> If the position has been lost and the system is not sure which motor is assigned to X or Y, driving the system in either direction should help register them correctly. If this doesn't fix the error message, go through the troubleshooting steps for the “Communications Error”. If any of the cables have a short, this can cause the error even though the X/Y sensors and cables are functional. Go through the troubleshooting steps for the “Communications Error”. When the message states both X and Y are not found, it is because the system hasn't registered those sensors. If X is found and Y is not or vice versa, go through the troubleshooting steps for the “Communications Error”

TROUBLESHOOTING

“Safety Error”	<ul style="list-style-type: none"> • This may be caused by damaged or wet connectors. The solution is to disconnect the electrical connections, dry them with low pressure air and reconnect them. <i>High pressure could force water passed the connector seal.</i> • Trouble shooting- Disconnect the electrical connections from the Power Hub, X and Y Positioners and Tractor. Squeeze the Automation Lever. If the error is continues after disconnecting, the fault is either in the Controller cable or it's connections, or the Power Hub. Trying another controller cable can eliminate that cable as a fault. If the error is cleared, reconnect each connection individually and test again until the fault re-appears. This would indicate a faulty cable or connection. • If the fault is not in the cables it could be a faulty Controller and will need to be replaced.
Cannot Maintain Air Pressure at Clamp Cylinders	<ul style="list-style-type: none"> • Make sure the push to lock fitting at the tractor is fastened properly. The first click locks the hose into the fitting and the second click seals the connection.
Positioner moves the wrong distance when using AutoMove	<ul style="list-style-type: none"> • Verify that the Mounting and Positioner/AutoMove settings match the type of tube face being cleaned. • Go back to the setup menu and check the variables that affect the movement of the positioner; <ol style="list-style-type: none"> 1. Pitch 2. Pattern 3. Rotated Pattern 4. Rotated Tractor 5. Rotated Positioner 6. Number of Moves
Auto Stroke works intermittently or when it should not	<ul style="list-style-type: none"> • Check the Lance Postion sensor that is used for AutoStoke. With the system completely de-energized, open the belt-side door of the tractor, the Lance Position sensor is located to the left of the belt. • Check that the rollers and sensor are clear of debris and can rotate freely. • Check that the magnet is connected to the roller. • See the CTRL-101 and Power Hub User Manual for detailed instructions on how to set each of the Autostroke functions.
Guide tubes are not always aligned with tubes after movement. This may occur when using long guide tubes.	<ul style="list-style-type: none"> • Make sure the umbilicals (system connections) and flex lances (HP hoses) are “free floating” when indexing. • Make sure nothing is pulling sideways on the tractor. • If using a Hose Containment device, make sure that the snout is not pulling on the tractor
Distance between tube face and guides is increasing	<ul style="list-style-type: none"> • Make sure the Quick Release Clamp on the Vertical Carriage is securely tensioned to Guide Tube Assembly. • When mounting the Guide Tube Assembly make sure to lift the backside of the Tractor a little bit, this will make sure the Guide Tube Assembly is completely parallel with the Vertical Carriage. Since most of the weight is behind the Vertical Carriage the Tractor and Guide Tube Assembly can be hanging in the Vertical Carriage but not completely secured. • Always make sure before operating, to pull down on the Tractor with both hands and try to pull it back from the Lightweight Positioner and tilt the back of the Tractor upwards to make sure there is no play.
Difficulties getting the air hoses out of the push to connect fittings	<ul style="list-style-type: none"> • To be sure all hoses are securely fastened to the push to lock fittings feel for two clicks. The first click locks the hose into the fitting and the second click seals the connection.
Difficulties in connecting the electrical connectors.	<ul style="list-style-type: none"> • Using just a little bit of grease on the INSIDE of the ring will prevent corrosion and it will make the turning of the ring smooth and easy. • Make sure there is a “click” when installing to ensure they are fully tightened and waterproof.



AUTOBOX® (ABXS-3L) HOSE TRACTOR WITH SENTINEL TECHNOLOGY USER MANUAL

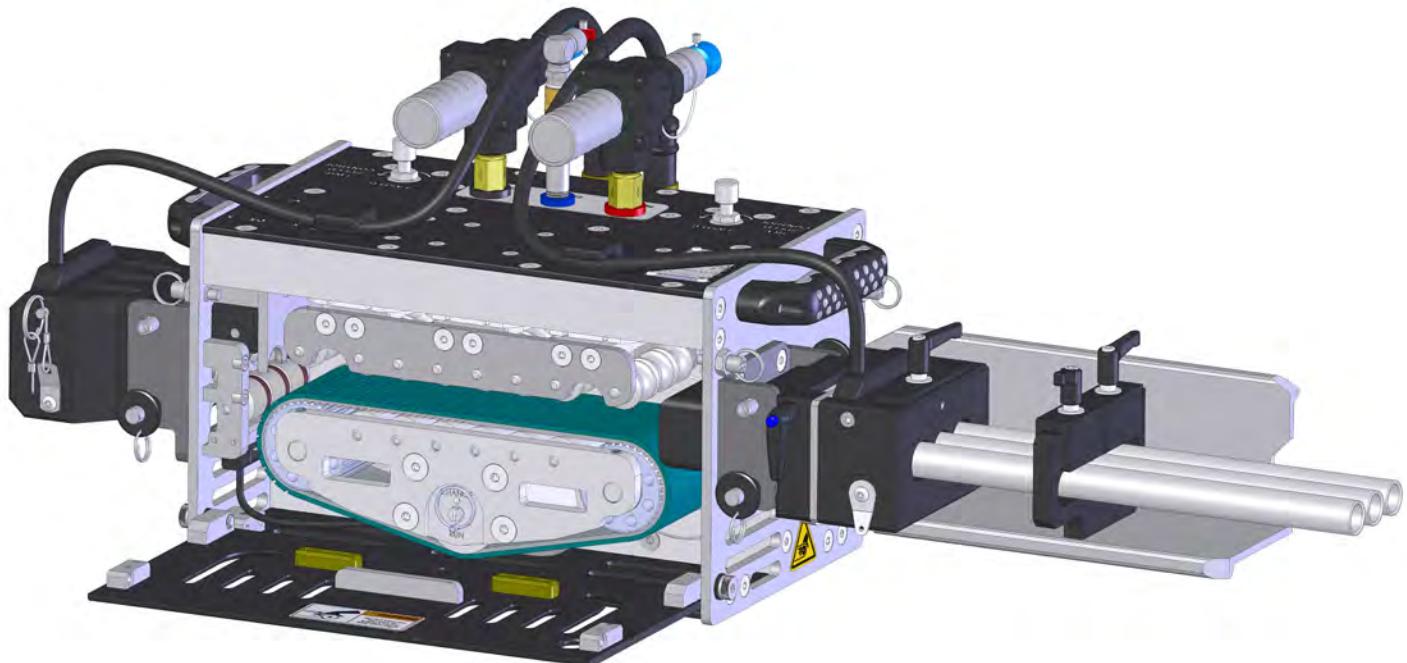


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MANUFACTURER'S INFORMATION

StoneAge Inc.
466 S. Skyline Drive
Durango, CO 81303, USA
Phone: 970-259-2869
Toll Free: 866-795-1586
www.stoneagetools.com

This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s). Updated manuals can be downloaded at: <https://www.stoneagetools.com/manuals>

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3274 KE Heinenoord
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DESCRIPTION OF EQUIPMENT AND INTENDED USE

The new AUTOBOX® ABXS-3L Hose Tractor design keeps all the same field proven features and adds integrated sensing technology.

The ABXS-3L Hose Tractor is designed to automatically feed lances and optimize cleaning with integrated, user-adjustable, speed controls. It also tracks lance position in the tube and detects and clears blockages. The Hose Tractor utilizes a heavy-duty synchronous belt with a durable polyurethane cover to control the rate at which the hoses and Banshee tools are advanced or retracted inside the tubes.

This Hose Tractor was developed for "Hands Free" heat exchanger tube cleaning applications. It is recommended it be used with the StoneAge® Banshee line of self-rotary waterblast tools.

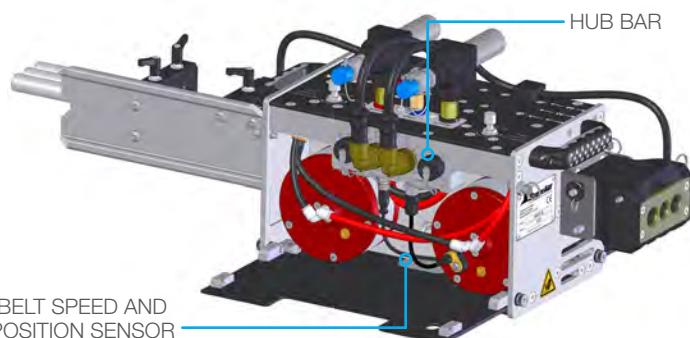
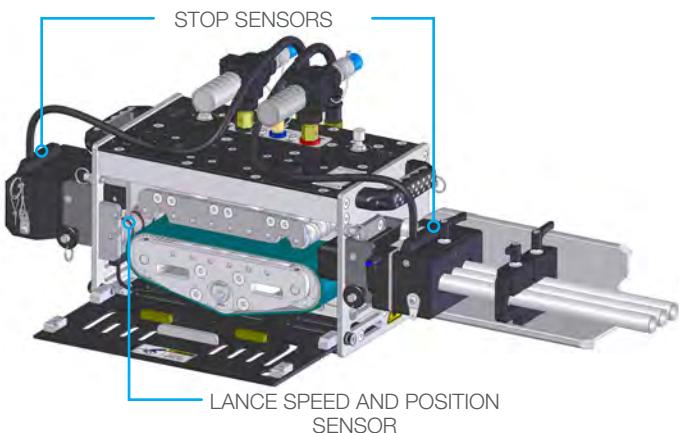
The ABXS-3L Hose Tractor was designed to accommodate up to three simultaneous flex lances ranging in size from 3/2 to 8/4 matched with the appropriate BN9.5, BN13, BN15, or BN18 size Banshee.

The guide assembly provides anti-withdrawal protection, and precise tube pitch adjustment.

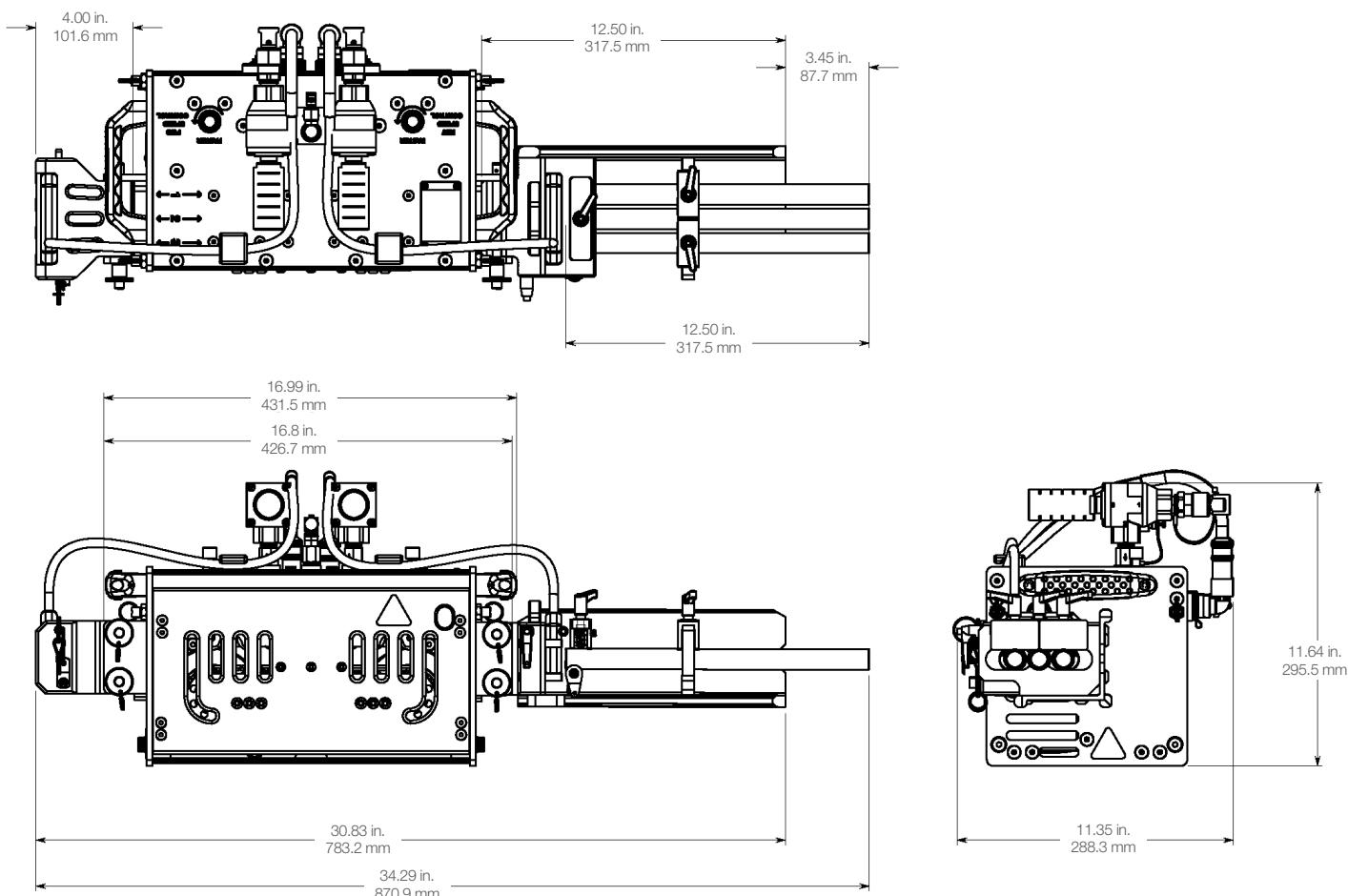
NEW FEATURES:

HOSE TRACTOR (ABXS-3L) WITH HOSE GUIDE (ABXS 160)

- Stop Sensors
 - Proprietary design
 - Reliably senses footballs and all hose crimps
 - Wear indicating rings
 - Replaceable 17-4 SS wear plate and anti-withdrawal collets
 - Contactless design
 - Easily removable sensor unit for maintenance and replacement
- Hub Bar
 - Integrated into ABXS frame Durable bayonet style external connectors Sealed and factory pressurized
- Lance Speed and Position Sensor
 - Independent suspension allows each lance to be detected separately
 - Flat knurled rollers for traction and accuracy
 - Pneumatic idlers pressurized from clamp circuit
 - Contactless magnetic sensor
 - Easily removable sensor unit for maintenance and replacement
- Belt Speed and Position Sensor
 - Heavy-duty sealed sensor
 - Integrated into air motor for durability
 - Single mounting screw, easily replaced



HOSE TRACTOR (ABXS-3L)		Imperial	Metric
Weight:	Without rear block, guide, and pins	52.6 lbs	24 kg
	With rear block, stop sensor, pins, NO GUIDE	56.4 lbs	26 kg
	Complete; with 3 guide tubes, collet, and, stop sensors	68.2 lbs	31 kg
Dimensions:	Tractor (only)	11.35 x 11.64 x 16.99 in.	288.3 x 295.5 x 431.5 mm
	Tractor with Hose Guide and 12 in. guide tubes	11.35 x 11.64 x 34.29 in	288.3 x 295.5 x 870.9 mm
Feed Rate: <i>dependent upon application and hose size</i>		0.3 - 3.0 ft/sec	91 - 914 mm/sec
Push/Pull Force		15 -150 lbs (5-75 lbs per lance)	7-68 kg (2-23 kg per lance)
System Air Consumption		50 cfm at 100 psi	1416 lpm at 6,8 bar
Manway Access:		18 in.	457 mm
HOSE GUIDE ASSEMBLY (ABXS 160)			
Weight:	With guide tubes and stop sensor, NO COLLET	11 lbs	5 kg
	Without collet or guide tubes, WITH STOP SENSOR	8 lbs	3.6 kg
Dimensions:		5.39 x 4.8 x 12.5 in.	137 x 122 x 317.5 mm
Pitch Adjustment Range (Dual)		5/8 - 5.0 in.	16 - 127 mm
Pitch Adjustment Range (Triple)		5/8 - 2.5 in.	16 - 64 mm
CONTROLLER (CTRL-101) AND POWER HUB (PH-A0302A00C20)		For detailed up to date information on these components. https://www.stoneagetools.com/assets/pdf/manuals	
LIGHTWEIGHT POSITIONER (LWPS-100-X)		For detailed up to date information on these components. https://www.stoneagetools.com/assets/pdf/manuals	





EC DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge Netherlands BV
Reedijk 7Q
3274 KE Heinenoord
Netherlands
Sander de Korte, Customer Service Manager

Declare that:

AutoBox® Hose Tractor (ABXS-3L)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

EU- Machinery Directive (2006/42/EC)

EU- RoHS Directive (2011/65/EU)

EU- EMC Directive (2014/30/EU)

EN ISO 12100:2010 (e) Safety of machinery – General principles for design – Risk assessment and risk reduction

EN ISO 4414:2010 (en) Pneumatic Fluid Power – General rules and safety requirements for systems and components

EN 55011:2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

EN 60204-1:2018 Safety of machinery– Electrical equipment of machines

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Technical File for AutoBox® Hose Tractor (ABXS-3L) is maintained at:

StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Engineering Manager.

The Technical File is available through the Authorized Representative.

This Declaration of Conformity is issued under the exclusive responsibility of StoneAge Incorporated.



StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

09/29/21
Date





UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge UK
Unit 3
Crucible Business Park
Woodbury Lane
Norton
Worcester
Worcestershire, WR5 2DQ
United Kingdom
Steve Ellis, Managing Director StoneAge UK

Declare that:

AutoBox® Hose Tractor (ABXS-3L)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

S.I. 2008:1597 - Supply of Machinery (Safety) Regulations 2008

S.I. 2012:3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

S.I. 2016:1091 - Electromagnetic Compatibility Regulations 2016

S.I. 2008:1597 Safety of machinery – General principles for design – Risk assessment and risk reduction

S.I. 2008:1597 Pneumatic Fluid Power – General rules and safety requirements for systems and components

S.I. 2016:1091 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

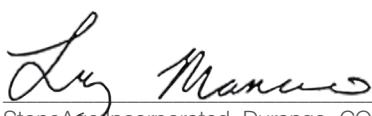
S.I. 2016:1091 Safety of machinery– Electrical equipment of machines

S.I. 2016:1091 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonized Standard for Electromagnetic Compatibility

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StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Engineering Manager.
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StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

09/29/21
Date



WARNING AND SAFETY INSTRUCTIONS

OPERATOR TRAINING

Managers, Supervisors, and Operators MUST be trained in Health and Safety Awareness of High-pressure Water Jetting and hold a copy the Water Jetting Association (WJA) Code of Practice, or equivalent (see www.waterjetting.org.uk).

Operators MUST be trained to identify and understand all applicable standards for the equipment supplied. Operators should be trained in manual handling techniques to prevent bodily injury.

StoneAge has designed and manufactured this equipment considering all hazards associated with its operation. StoneAge assessed these risks and incorporated safety features in the design. StoneAge **WILL NOT** accept responsibility for the results of misuse.

IT IS THE RESPONSIBILITY OF THE INSTALLER/OPERATOR to conduct a job specific risk assessment prior to use. Job specific risk assessment MUST be repeated for each different set up, material, and location.

The risk assessment MUST conform to the Health and Safety at Work Act 1974 and other relevant Health and Safety legislation.

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Use of Personal Protective Equipment (PPE) is dependent on the working pressure of water and the cleaning application. Managers, Supervisors, and Operators MUST carry out a job specific risk assessment to define the exact requirements for PPE. See Protective Equipment for Personnel (Section 6) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment for additional information.

Hygiene - Operators are advised to wash thoroughly after all waterjetting operations to remove any waterblast residue which may contain traces of harmful substances.

First aid provision - users MUST be provided with suitable first aid facilities at the operation site.

SAFETY LABEL DEFINITIONS

The AUTOBOX® (ABXS-3L) Hose Tractor has the potential to cause serious injury if fingers, hair, or clothing become caught between the hose rollers or drive belts. Be sure to head the Hand Entanglement Roller Labels.

DO NOT OPERATE WITH THE DOORS OPEN. ENSURE THAT ALL FOUR DOOR PINS ARE SECURED PRIOR TO OPERATION.



Operators MUST read, understand, and follow the Operational and Training Requirements (Section 7.0) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment, or equivalent.

Operators MUST read, understand, and follow the Warnings, Safety Information, Assembly, Installation, Connection, Operation, Transport, Handling, Storage, and Maintenance Instructions detailed in this manual.

The risk assessment MUST consider potential material or substance hazards including:

- Aerosols
- Biological and microbiological (viral or bacterial) agents
- Combustible materials
- Dusts
- Explosion
- Fibers
- Flammable substances
- Fluids
- Fumes
- Gases
- Mists
- Oxidizing Agents

PPE may include:

- **Eye protection:** Full face visor
- **Foot protection:** Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- **Hand protection:** Waterproof gloves
- **Ear protection:** Ear protection for a minimum of 85 dBA
- **Head protection:** Hard hat that accepts a full face visor and ear protection
- **Body protection:** Multi-layer waterproof clothing approved for waterjetting
- **Hose protection:** Hose shroud
- **Respiratory protection:** May be required; refer to job specific risk assessment

Maximum operating air pressure is 100 psi (6.8 bar). Never exceed 125 psi (8.6 bar) supply pressure. Exceeding 125 psi (8.6 bar) supply pressure may result in injury to the Operator and/or damage to the equipment.



WARNING AND SAFETY INSTRUCTIONS

⚠️ WARNING

Operations with this equipment can be potentially hazardous. Caution MUST be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate if damaged, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Users of the AUTOBOX® (ABXS-3L) Hose Tractor MUST be trained and/or experienced in the use and application of high pressure technology and cleaning, as well as all associated safety measures, according to the WJTA Recommended Practices for the use of High pressure Water jetting Equipment.
- The Lightweight Positioner must be securely fastened to the tube bundle, and the Guide Assembly and Tractor must be securely fastened to the Lightweight Positioner prior to operation.
- An anti-withdrawal device (back-out preventer) MUST be used at all times. The back-out prevention device is the Hose Stop Collet located within the Hose Guide Assembly. StoneAge offers several different size Hose Stop Collets. The Collet Size Reference guide is located on the Hose Guide Assembly.
- The Controller should be located in a safe location where the Operator has good visibility of the tool entering the exchanger tubes. The AUTOBOX® (ABXS-3L) Hose Tractor and Controller MUST be supervised at all times and should never be left unattended.
- Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the AUTOBOX® (ABXS-3L) Hose Tractor will release the hose and may create a dangerous runaway hose condition, which can result in severe injury and/or death.
- Always de-energize the system before opening the door to service or replace any parts. Failure to do so can result in severe injury and/or death.
- When moving the AUTOBOX® (ABXS-3L) Hose Tractor lift with care to prevent bodily injury.
- Do not operate the AUTOBOX® (ABXS-3L) Hose Tractor while either side door is open.

PRE-RUN SAFETY CHECK

Refer to WJTA-IMCA's, Recommended Practices For The Use Of High pressure Waterjetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

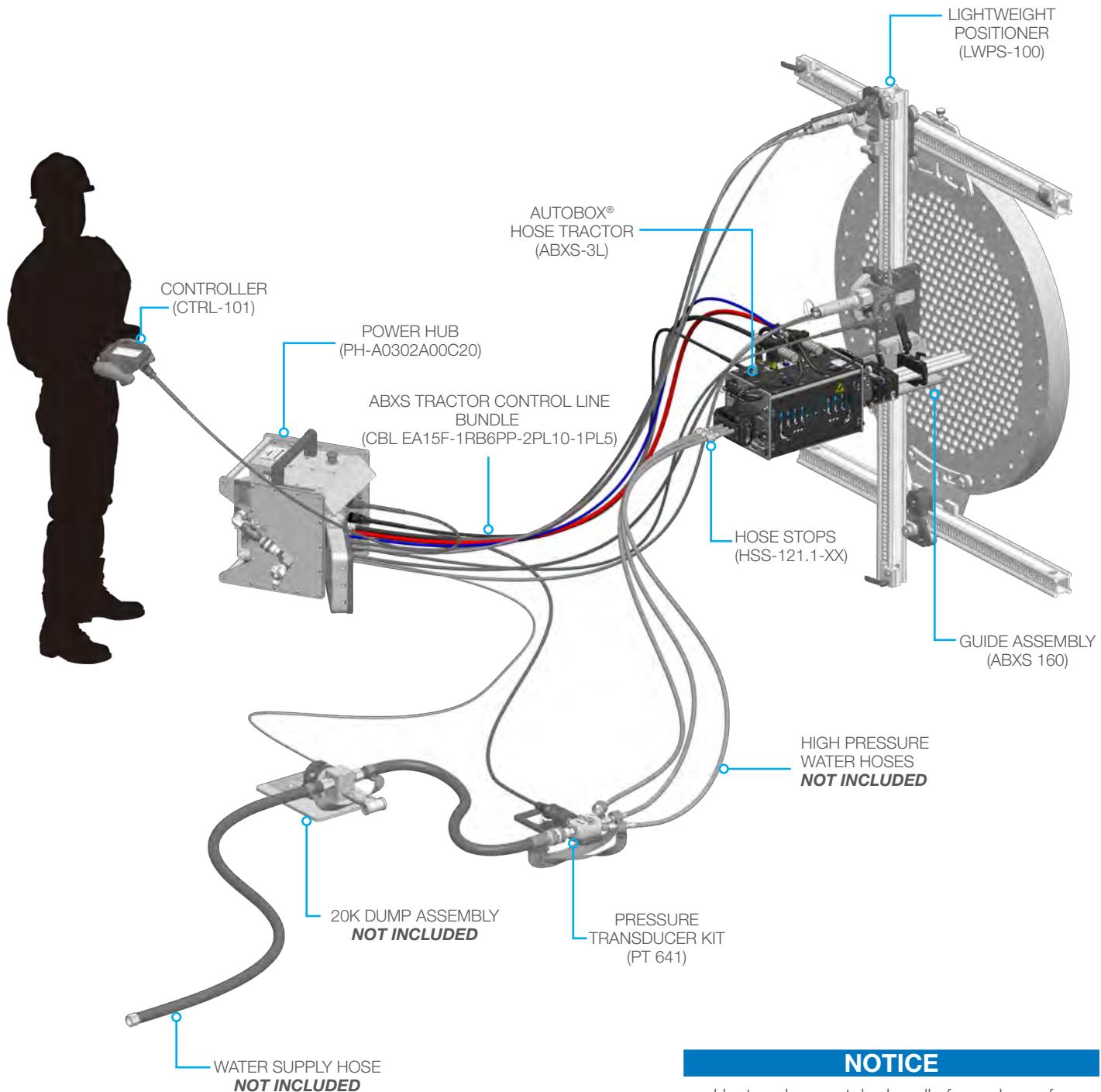
- Complete a job specific risk assessment and act on the resulting actions.
- Adhere to all site specific safety procedures.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Ensure the work place is free of unnecessary objects (e.g. loose parts, hoses, tools).
- Ensure all Operators are using the correct Personal Protective Equipment (PPE).
- Check that the air hoses are properly connected and tight.
- Check all hoses, lances, and accessories for damage prior to use. Do not use damaged items. Only high quality hoses intended for waterblast applications should be used as high pressure hoses.
- Check all high pressure threaded connections for tightness.

• *Ensure that an anti-withdrawal device (back-out preventer), whip checks (hose whips), and the appropriate hose stop collet are installed and set up properly. They must be verified, secured, tested, and performance confirmed before operating at high pressure.*****

- Ensure the doors of the AUTOBOX® (ABXS-3L) Hose Tractor are closed and securely latched.
- Test the Controller before operating the AUTOBOX® (ABXS-3L) Hose Tractor with high pressure water to verify the control valves move the hose in the intended direction, and that the high pressure dump valve and hose clamp are working properly.
- Ensure that Operators never connect, disconnect, or tighten hoses, adapters, or accessories with the high pressure water pump unit running.
- Ensure no personnel are in the hydroblasting zone.

FULL SYSTEM ASSEMBLY - OVERVIEW

AUTOBOX® (ABXS-3L) HOSE TRACTOR AND (ABXS 160) HOSE GUIDE SHOWN IN THE SYSTEM ASSEMBLY



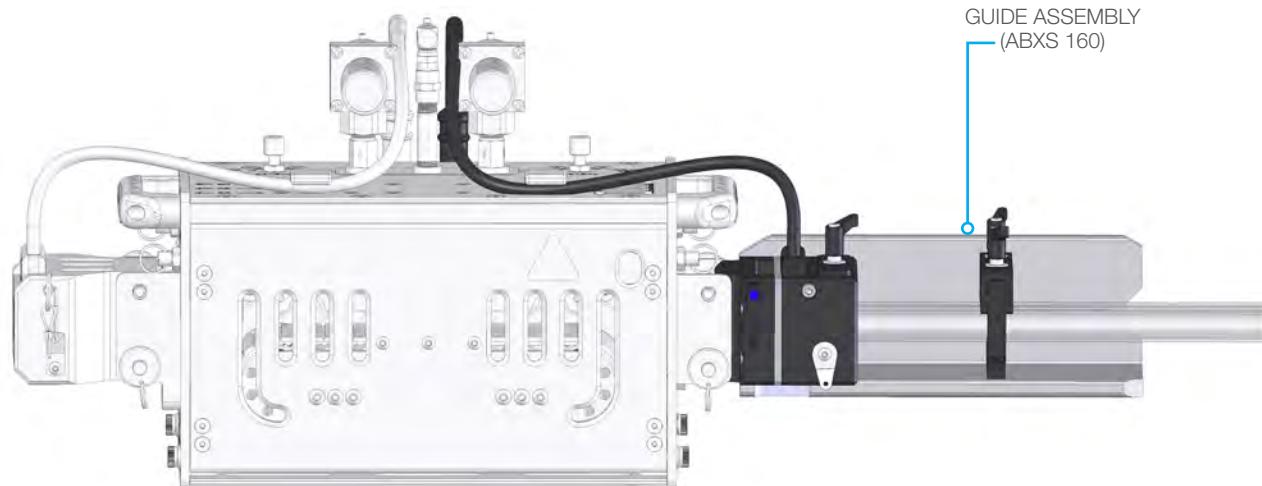
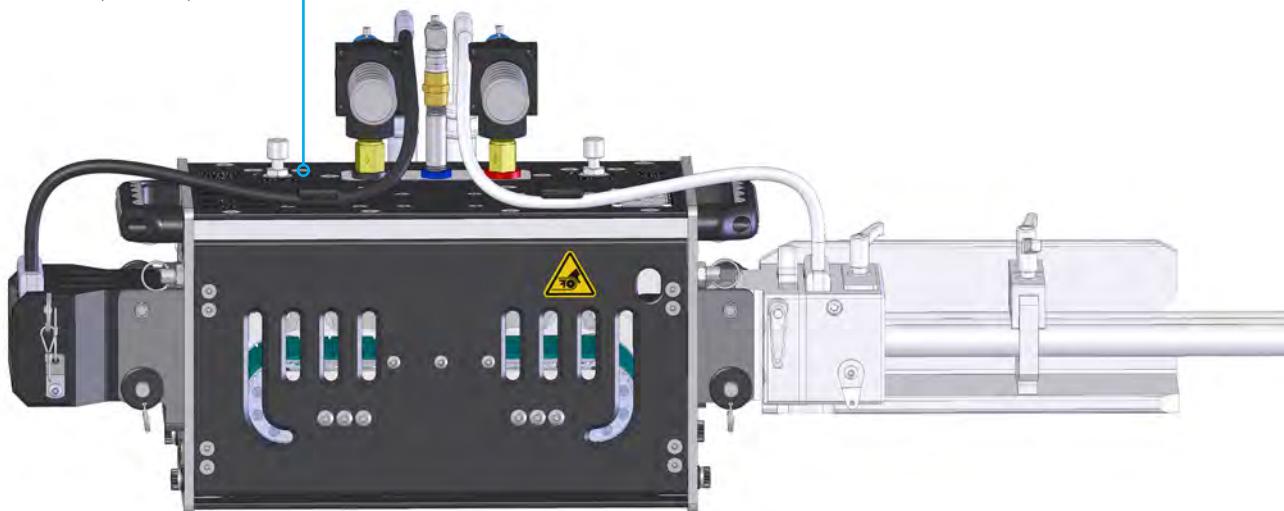
NOTICE

Heat exchanger tube bundle face, shown for graphic representation only. NOT included in assembly.

**AUTOBOX® (ABXS-3L) HOSE TRACTOR WITH
HOSE GUIDE AND CONTROL LINE BUNDLE**

AUTOBOX® HOSE TRACTOR
(ABXS-3L)

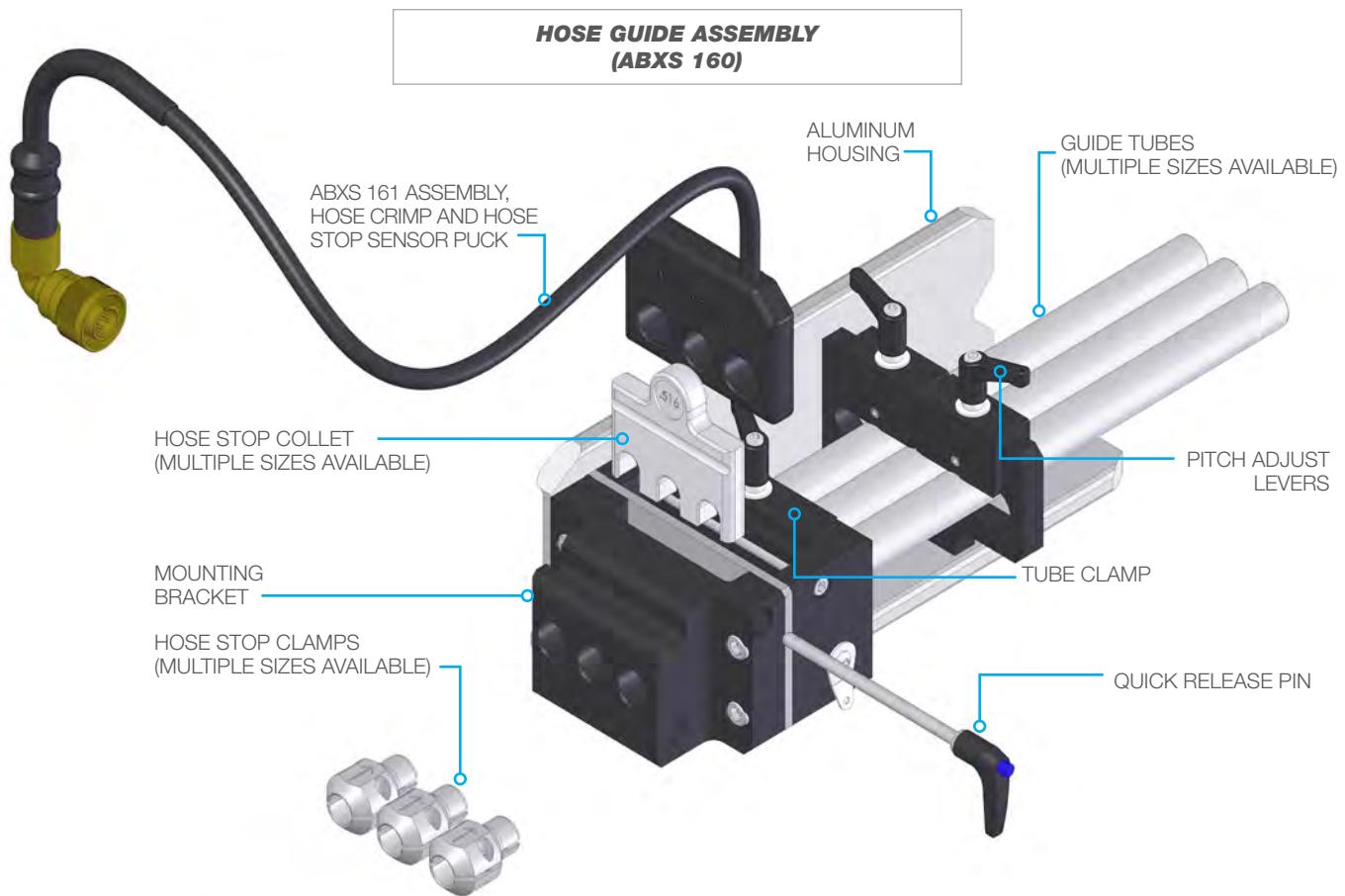
SEE THE PART DIAGRAM SECTION IN THIS MANUAL
FOR DETAILED PART INFORMATION



15FT (4.5m) ABXS TRACTOR CONTROL LINE BUNDLE
(CBL EA15F-1RB6PP-2PL8-1PL5)



HOSE GUIDE ASSEMBLY (ABXS 160) - OVERVIEW



StoneAge (SA) PART NUMBER COLLET AND HOSE STOP REFERENCE CHART

HOSE O.D.	SPIR STAR	PARKER	COLLET SIZE	COLLET PART NUMBER	HOSE STOP SIZE	HOSE STOP PART NUMBER
.27-.41 in (7 mm - 10 mm)	3/2	2240D-02	.297 in. / 7.5 mm	ABX 171-297	.27-.34 / 7-9 mm	HSS 121-27-34
	3/4, 4/2	2240D-025, 2440D-02	.328 in. / 8.3 mm	ABX 171-328	.27-.34 / 7-9 mm	HSS 121-27-34
	3/6, 5/2	2240D-03	.406 in. / 10.3 mm	ABX 171-406	.34-.42 / 9-11 mm	HSS 121-34-42
.44-.50 in (11 mm - 13 mm)	4/4	2448D-025	.438 in. / 11.1 mm	ABX 171-438	.34-.42 / 9-11 mm	HSS 121-34-42
	4/6, 5/4		.460 in. / 11.7 mm	ABX 171-460	.42-.50 / 11-13 mm	HSS 121-42-50
	6/2	2240D-04, 2640D-025	.484 in. / 12.3 mm	ABX 171-484	.42-.50 / 11-13 mm	HSS 121-42-50
	6/4	2440D-04, 2740D-025	.516 in. / 13.1 mm	ABX 171-516	.50-.56 / 13-14 mm	HSS 121-50-56
.52-.61 in (13 mm - 16 mm)	5/6, 8/2	2240D-05, 2740D-03	.547 in. / 13.9 mm	ABX 171-547	.50-.56 / 13-14 mm	HSS 121-50-56
	5/6H, 8/4		.594 in. / 15.1 mm	ABX 171-594	.56-.61 / 14-16 mm	HSS 121-56-61
		2440D-05	.625 in. / 15.9 mm	ABX 171-625	.56-.61 / 14-16 mm	HSS 121-56-61

StoneAge (SA) PART NUMBER GUIDE TUBE REFERENCE CHART

GUIDE TUBE	BANSHEE	INSIDE DIAMETER, LENGTH
ABX 115-12	BN9.5	.459 in / 11.7 mm, 12.5 in. / 318 mm
ABX 115-36	BN9.5	.459 in / 11.7 mm, 36 in. / 914 mm
ABX 116-12	BN13	.546 in / 13.9 mm, 12.5 in. / 318 mm
ABX 116-36	BN13	.546 in / 13.9 mm, 36 in. / 914 mm
ABX 117-12	BN15	.674 in / 17.1 mm, 12.5 in. / 318 mm
ABX 117-36	BN15	.674 in / 17.1 mm, 36 in. / 914 mm
ABX 119-12	BN18	.745 in / 18.9 mm, 12.5 in. / 318 mm
ABX 119-36	BN18	.745 in / 18.9 mm, 36 in. / 914 mm

HOSE GUIDE ASSEMBLY

1. Select the appropriate Guide Tube size and length for the application from the chart at the bottom of the previous page.
 - The length of the Guide Tubes for an exchanger bundle with no channel head is 12.5 in. (318 mm).
 - A deeper channel head will require extended Guide Tubes. The depth of the channel head added to the 12.5 in. (318 mm) length will give the desired tube length.
 - Longer guide tubes are available if required for use with channel heads.

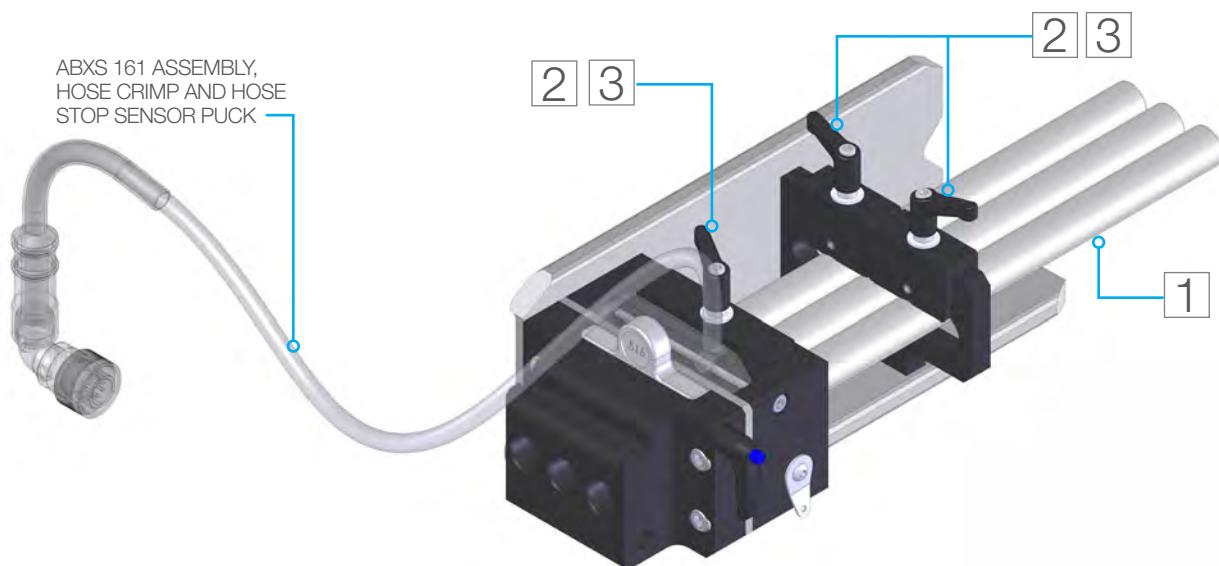
NOTICE

The Banshee tool should not have excessive clearance if the correct length Guide Tube size is used.

2. To remove the existing Guide Tubes, loosen the Tube Clamp Lever and the two Pitch Adjust Levers, located on top of the Guide Assembly. After selecting the appropriate Guide Tubes, install the Guide Tubes into the Guide Assembly.
3. Secure the Guide Tubes by tightening the Tube Clamp Lever and Pitch Adjust Levers, when the desired pitch has been set.
4. Select the appropriate Collet and Hose Stops from the chart on the previous page and reserve them for future Hose and Collet installation instructions in this manual.

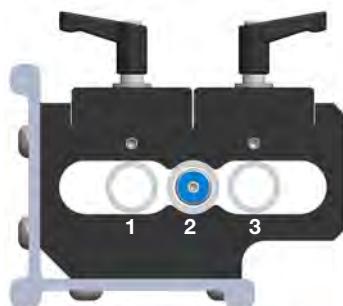
WARNING

Appropriate size Collet selection is **CRITICAL** to ensuring proper backout prevention of the tool. Use the chart on the previous page to select the proper Collet and Hose Stop sizes per hose diameter. Always confirm backout prevention performance before operating the system at high pressure.

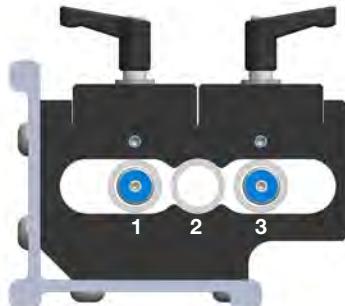


1, 2, or 3 HOSE LOADING POSITIONS

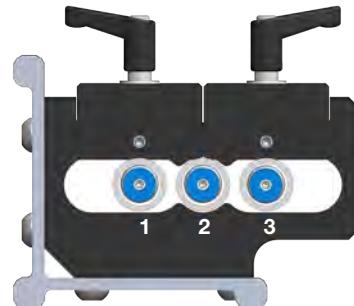
The AUTOBOX® (ABXS-3L) Hose Tractor can be used as a 1, 2, or 3 Lance tool. The diagrams below show which Guide Tubes to load for best performance. The numbered positions correspond with the indicator markings on the top of the Hose Tractor and the identifiers in the Controller interface.



SINGLE HOSE LOAD



DUAL HOSE LOAD

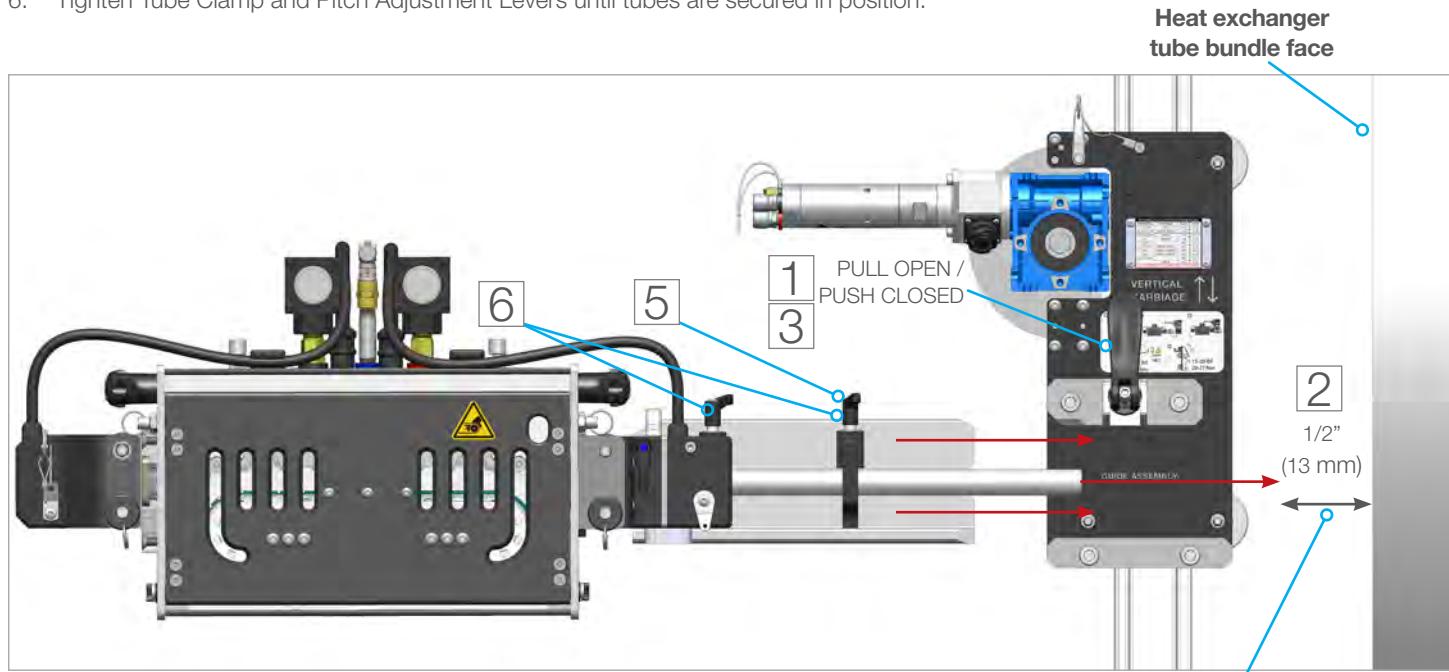


TRIPLE HOSE LOAD

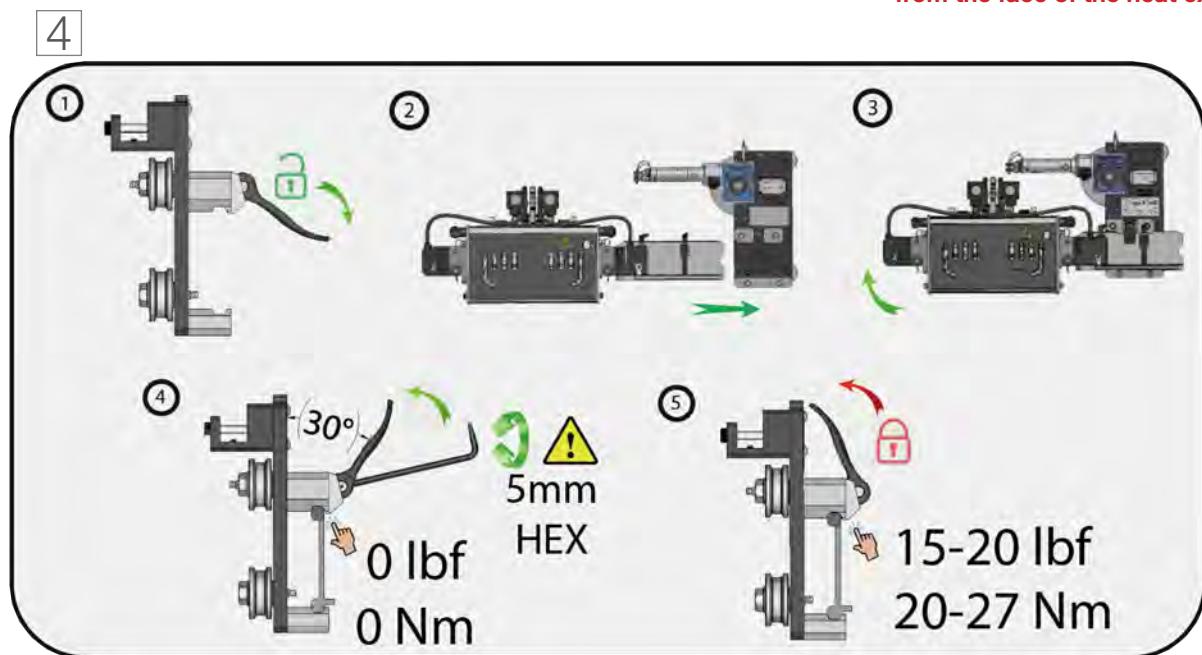
HOSE GUIDE ASSEMBLY TO LIGHTWEIGHT POSITIONER SET UP

ATTACH GUIDE ASSEMBLY TO LIGHTWEIGHT POSITIONER

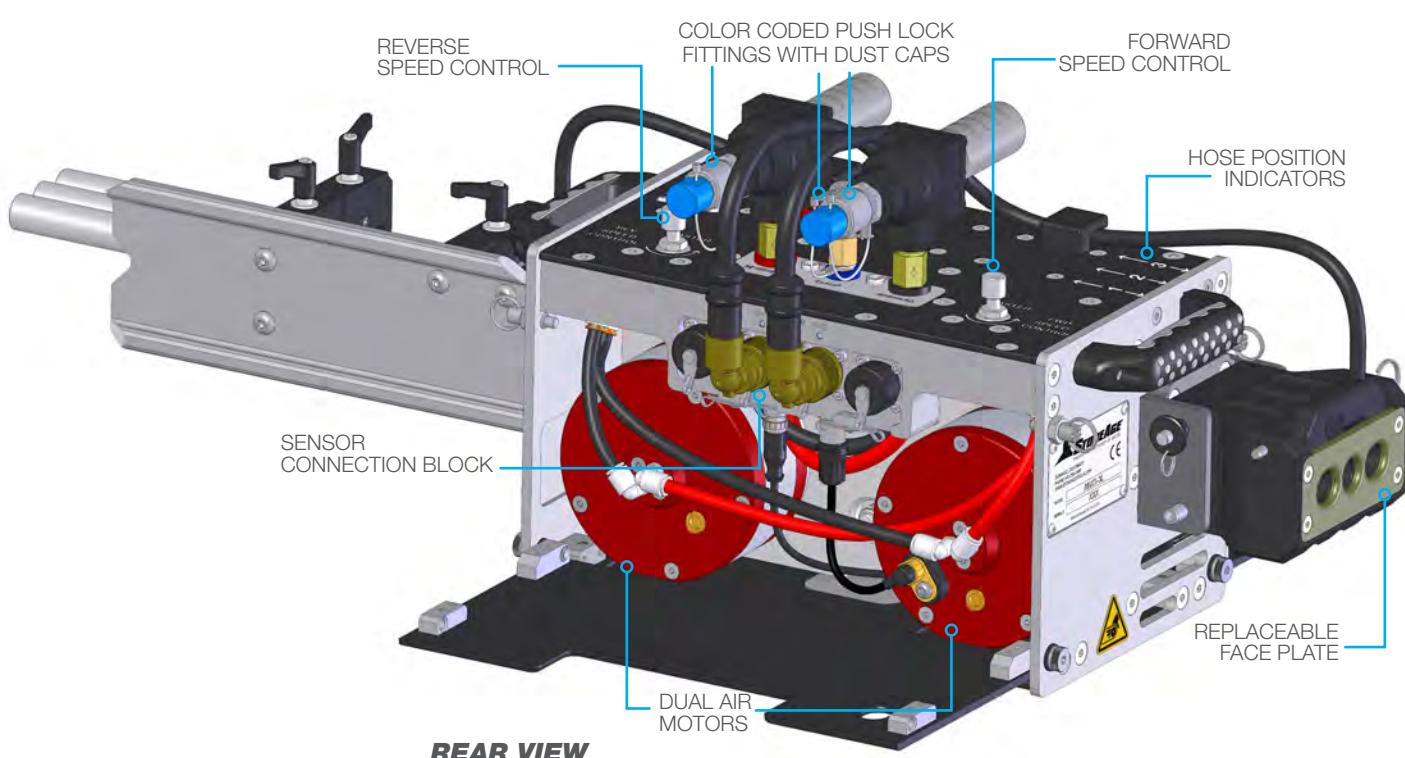
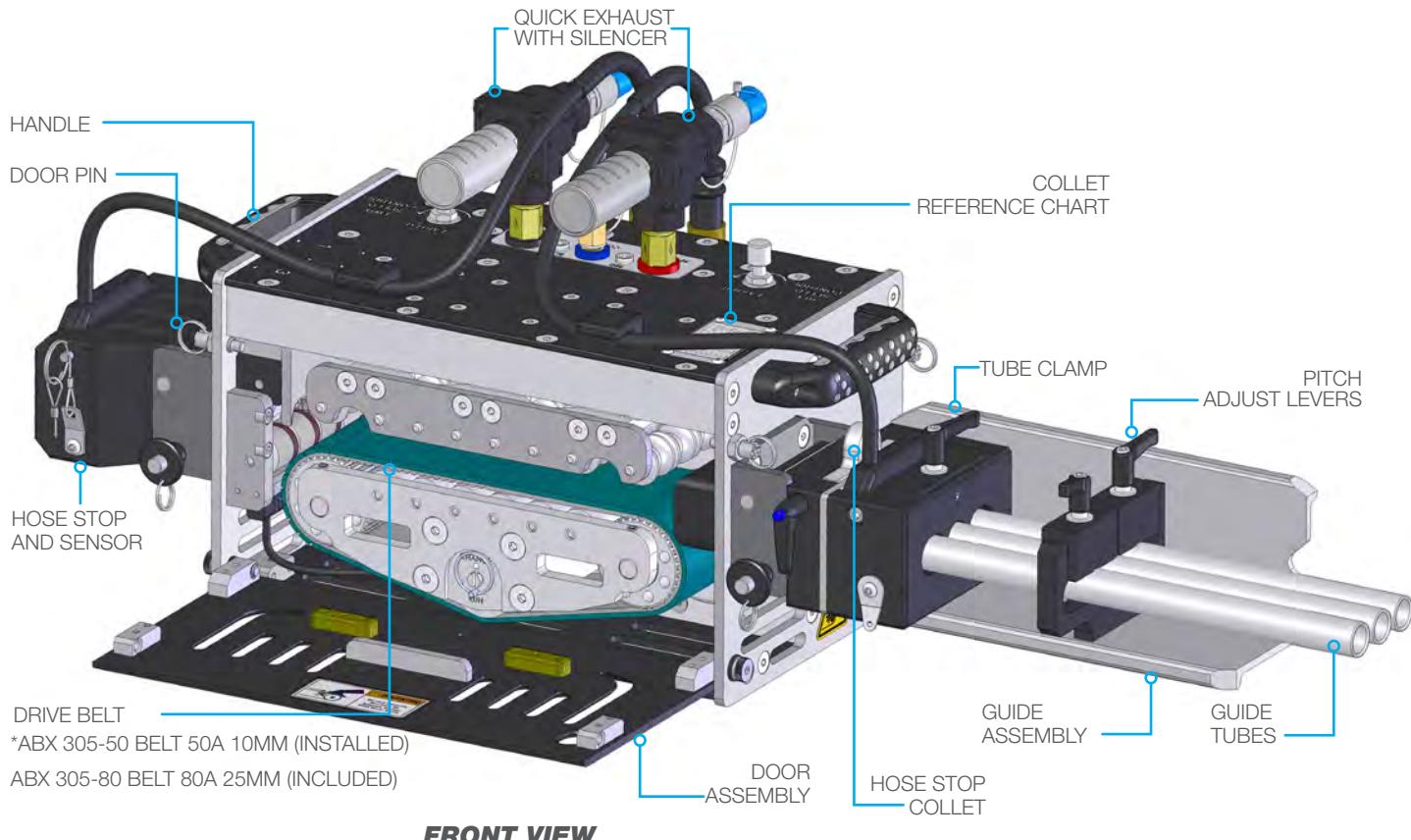
1. Pull to open the Clamp Handle on the Vertical Carriage and slide the Tractor/Guide Tube Assembly into the Clamp Mount.
2. Leave 1/2" (13mm) between the end of the Guide Tube and the face of the exchanger.
3. Lock the Clamp Handle in place when the assembly is in position.
4. If the Clamp Handle feels too loose or too tight, it can be adjusted with a 5mm Allen Key. Follow the instructions on the decal on the Vertical Drive. (Also shown below)
5. Loosen the Pitch Adjustment Levers and adjust the guide tubes until they are in line with pitch of the tubes in the bundle.
6. Tighten Tube Clamp and Pitch Adjustment Levers until tubes are secured in position.



Adjust position until the Guide Tube is approximately 1/2 in. (13 mm) away from the face of the heat exchanger.



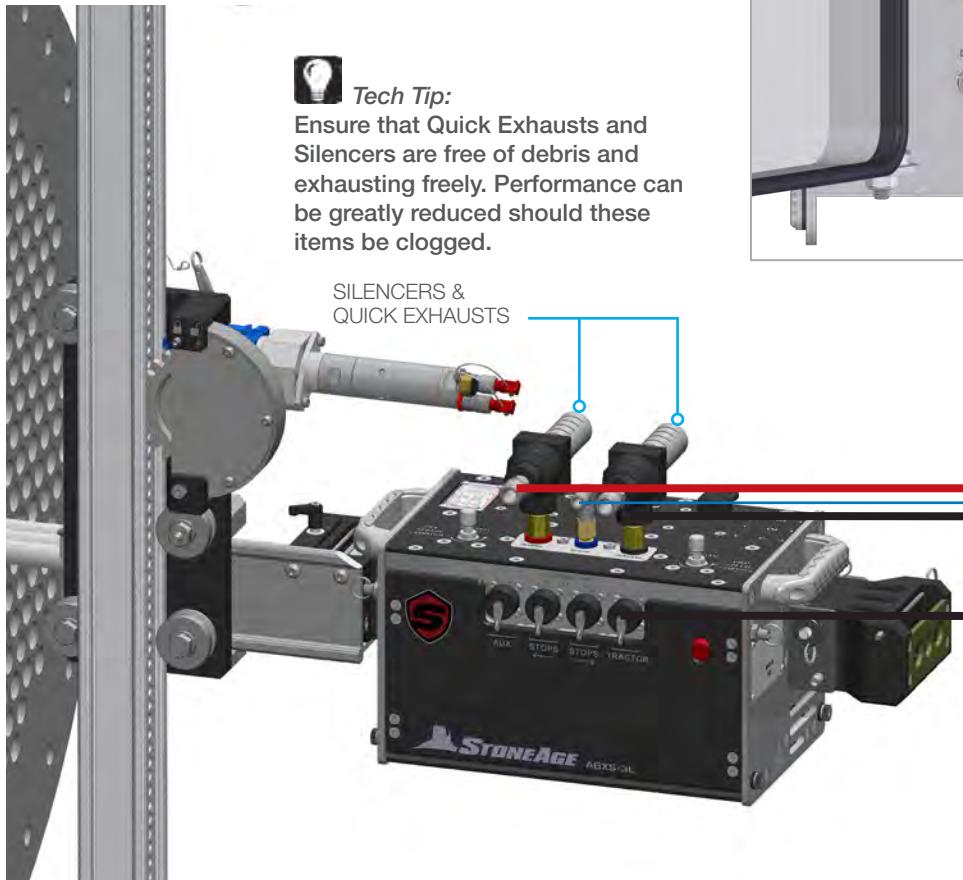
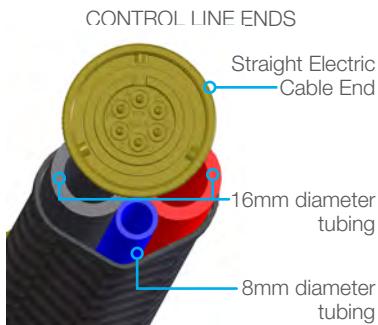
**AUTOBOX® HOSE TRACTOR
(ABXS-3L)**



HOSE TRACTOR CONNECTIONS TO POWER HUB

PNEUMATIC SUPPLY LINE CONNECTIONS

1. Remove the dust caps from the fittings on the AUTOBOX® (ABXS-3L) Hose Tractor.
2. **Connect the Hose Bundle to the Power Hub**
Match the colored tubing to the corresponding color coded fittings under the “Tractor” label. Connect the Pot Plug to the receptacle marked “Tractor” and listen for a click. This ensures it is water tight.
3. **Blow out all Pneumatic Lines**
Turn the Main Air Supply on. Use the Controller to activate the Forward, Reverse, and Clamp functions. ***Use of dirty or contaminated pneumatic hoses will cause component damage and malfunction***



NOTICE

For Detailed Instructions and Setup of the Controller and Power Hub Assemblies, see the Controller and Power User Manual.

<https://www.stoneagetools.com/assets/pdf/manuals/>

DOOR

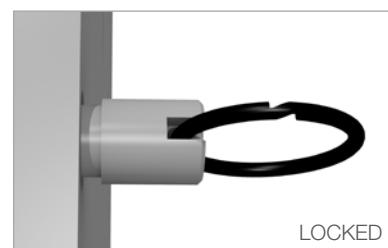
Always run the AUTOBOX® (ABXS-3L) Hose Tractor with the doors closed and locked.

DOOR PIN

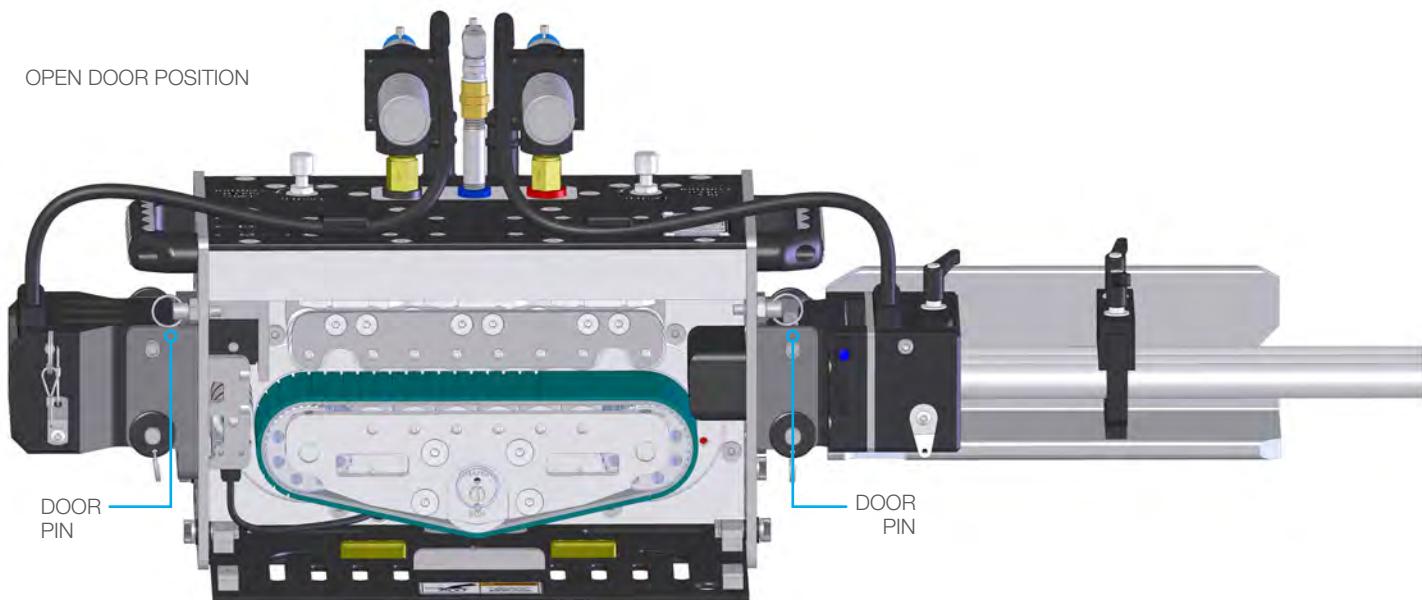
The Door Pin is a spring plunger with a pull ring. To unlock the door, pull and twist the pull ring. To close and lock the door, pull and twist the pull ring, then release it into the groove of the pin. Verify the pin engages the door fully.

**CAUTION**

Make sure to lock both doors on each side of the Hose Tractor before operating AUTOBOX® (ABXS-3L) Hose Tractor.



OPEN DOOR POSITION



CLOSED DOOR POSITION



HIGH PRESSURE HOSE LENGTH AND COLLET INSERTION

HIGH-PRESSURE HOSE

- The AUTOBOX® (ABXS-3L) Hose Tractor is designed to be used with Parker Pro-Lance® and/or Spir Star Blast-Pro® hose ends. Standard hose ends may not fit into Hose Tractor and/or Guide Tubes. **NOTE: MAXIMUM hose end diameter must NOT exceed .74 in. (19 mm)**
- Only high quality hoses intended for waterblast applications should be used as high-pressure hoses. Pressure rating of high-pressure hoses **MUST NEVER** be exceeded.

NOTICE

Do not use a shrouded hose or hose with a steel protective cover. This will cause severe damage to the Drive Belt and Idlers.

- Verify that the high-pressure hose is properly installed in the back-out preventer. Operate the high-pressure hose and waterjet tool at full pressure to test the clamp force. Proper clamp force will provide good control of the hose in forward and reverse directions, and keep the hoses synchronized at full retract and full extend positions.
- HOSE LENGTHS** There are a many varieties of tube bundles that will require additional hose length to be considered. This should be verified prior to ordering high pressure hose for each job. The calculation below determines the additional length necessary to keep the assembly from lifting off the ground during operation. Provide the tube bundle length and use the calculation below to determine the total hose length.

A (Tube Bundle Length in inches / mm) +

B (Total Length of components in inches / mm) +

C (Recommended Additional Connection Length in / mm)

=

D (Total required Length of hose in inches /mm)

EXAMPLE: The hose length equation for a 20ft (6096 mm) tube bundle with ABXS-3L, Hose Guide, and Lightweight Positioner would be as follows;

STANDARD: (20ft x 12 in/ft) + 32.9 in + 39 in = **311.9 in.**

METRIC: 6096 mm + 836 mm + 991 mm = **7922 mm**

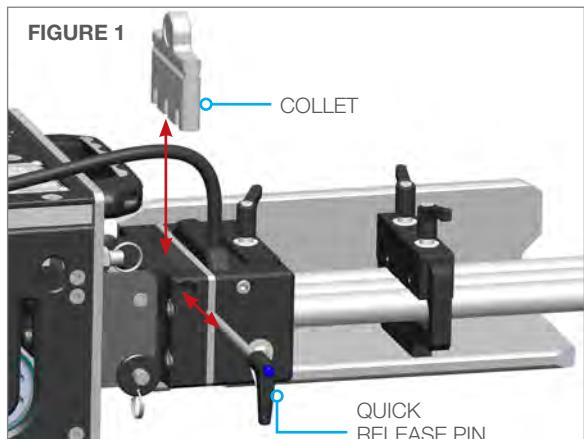
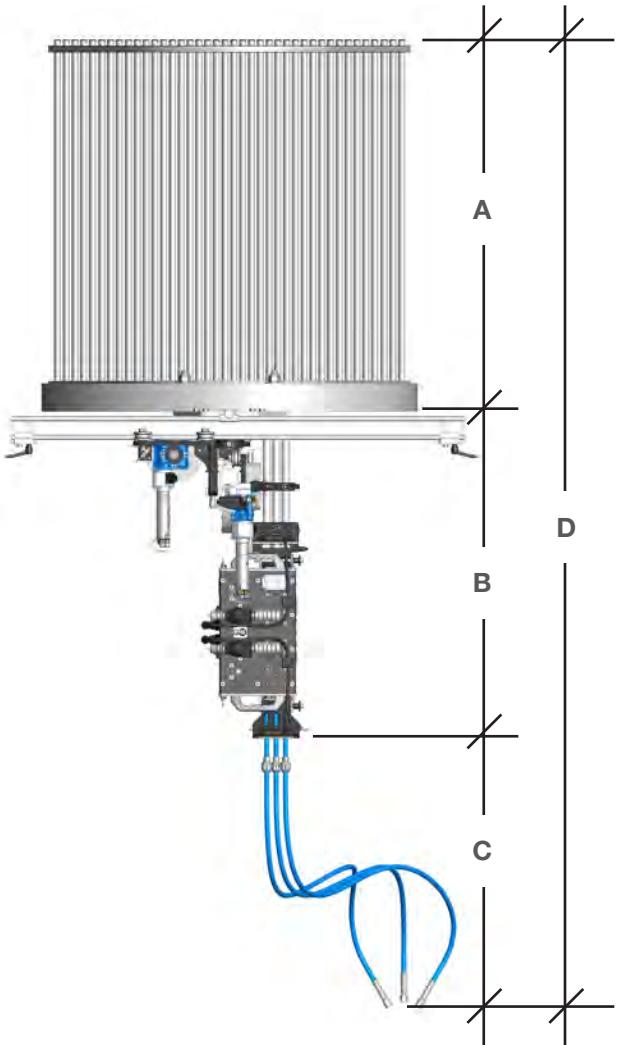
B (TOTAL COMPONENT LENGTH)	C (RECOMMENDED ADDITIONAL CONNECTION LENGTH)
ABX-3L-V2, Hose Guide, and Lightweight Positioner = 32.9 in / 836 mm	39 in / 991 mm

COLLET INSERTION

Remove Quick Release Pin and pull out existing Collet. Select the appropriate Collet size for the diameter of the hoses. (See the "Recommended Collets For Common Hose Sizes" plaque on the top plate of the AUTOBOX® (ABXS-3L) Hose Tractor.) (**Figure 1**)

⚠ WARNING

Appropriate size Collet selection is **CRITICAL** to ensuring proper anti-withdrawal prevention of the tool. See "Recommended Collets For Common Hose Sizes" plaque on the top plate of the ABXS-3L Tractor or the side of the vertical carriage on the Lightweight Positioner.



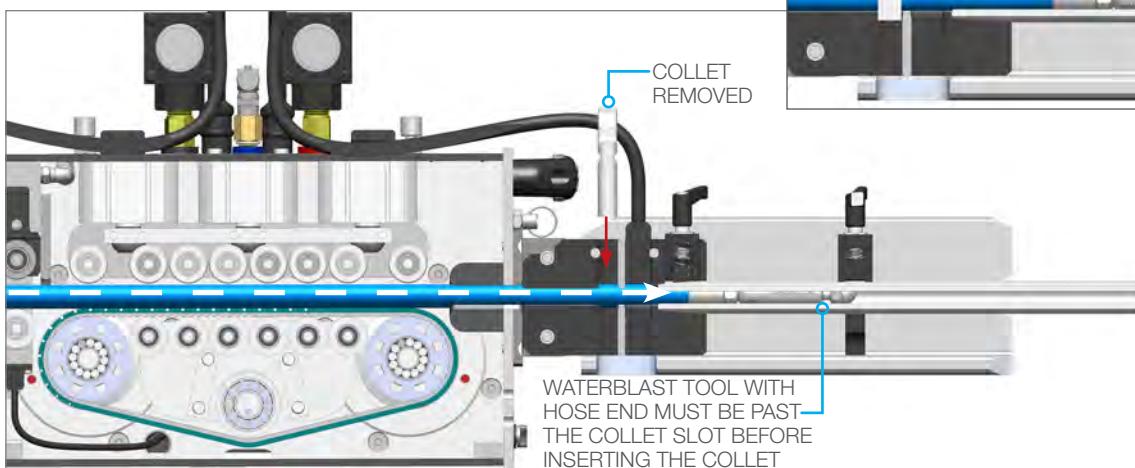
HOSE AND HOSE STOP INSTALLATION

HOSE AND HOSE STOP INSTALLATION

1. The **HOSE CLAMP PRESSURE REGULATOR** on the Controller MUST BE TURNED TO ZERO pressure to make room for the hoses to be installed. Use the left Joystick on the Controller to highlight the Clamp Pressure setting. Then move the left Joystick left or right to decrease or increase the pressure.



2. Insert the hoses, equipped with the waterblast tools, into the mounting bracket on the side of the AUTOBOX® (ABXS-3L) Hose Tractor until the engage the Drive Belt. Slightly increase the pressure on the **HOSE CLAMP PRESSURE REGULATOR** to extend the clamp rollers and clamp the hoses.
3. When the waterjet tools pass the Collet slot, install the Collet and quick release pin.



4. Pull on the hoses from the back of the AUTOBOX® (ABXS-3L) Hose Tractor to ensure that the Collet does not allow the waterblast tool back out of the Guide or Hose Tractor.
5. To install hose stops, drive waterblast tools through the exchanger until the tips are 1-2" (25-51 mm) past the end of the tube bundle. Loosely install the stop with the arrows pointing to the tractor, then push them toward the mounting bracket and tighten in place.

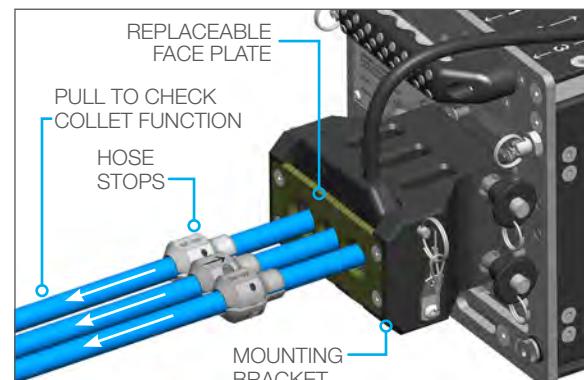
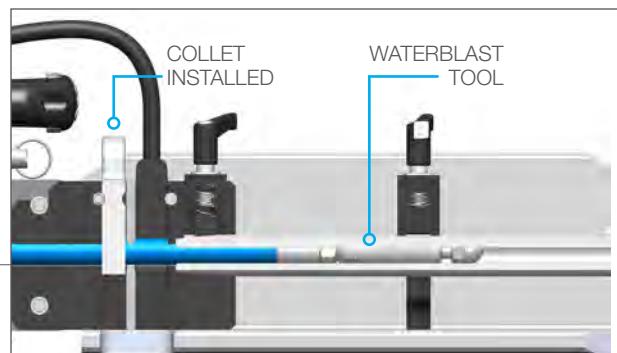
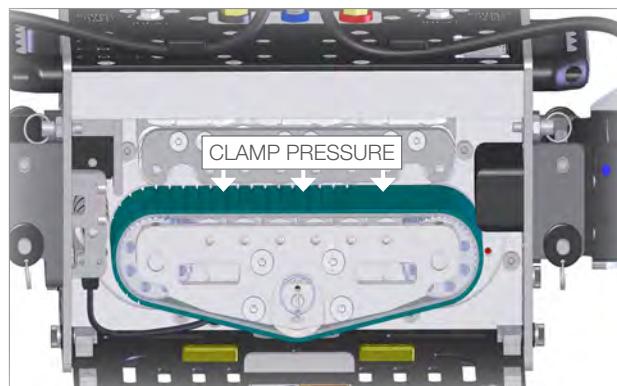
NOTICE

If the Wear Indicator Grooves on the Replaceable Face Plate are gone, continued long-term operation will significantly reduce the life of the rear stop sensor.

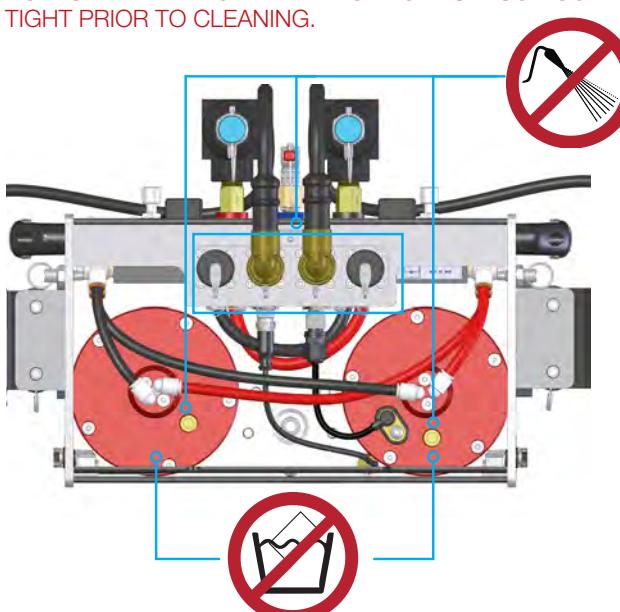
WARNING

Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the AUTOBOX® (ABXS-3L) Hose Tractor will release the hose and may create a dangerous runaway hose condition, which can result in severe injury and/or death.

Crush Hazard. Keep hands, hair, and clothing clear of all moving parts. Contact with moving parts can result in severe injury.



HOSE TRACTOR (ABXS-3L) MAINTENANCE

Maintenance Item	Frequency	Maintenance Required
Drive Belt (See Belt Replacement instructions in this manual)	After each use	<p>The Belts are very durable and should last several hundred hours. However, it is recommended to inspect the Belt for wear and/or cracks at the completion of each job. Replacement is required when the Belt is damaged. If the performance of the belt is not functioning well for the conditions, try replacing it with the alternate durometer belt (included).</p> <p>NOTICE</p> <p>Operation with a severely damaged belt will result in excessive damage to the Idler rollers and drive sprockets.</p>
All components the hoses pass through, particularly face and guide plates.	After each use	<p>Most wear parts are made from durable materials and should have a very long life. However, as wear occurs the rounded edges could become sharp and damage hoses. Any components showing excessive wear should be replaced.</p> <p>If the ABXS 183-001 face plate is not replaced in a timely manner, it will result in damage and/or premature failure of the rear stop sensor. See next page</p>
FWD, REV, LFT, RGT, UP, DOWN fittings	After each use	<p>Apply a small amount of air tool oil directly into FWD, REV, LFT, RGT, UP, DOWN fittings. Then, briefly operate the controls at slow speed for a short duration in each direction to coat the interior parts of the motor. Install the dust caps onto all fittings to keep moisture and dirt out.</p> <p>NOTICE</p> <p>Do not add oil to the Clamp (CLP) fitting, as oil may accumulate in the air cylinders and prevent them from fully retracting.</p>
ABXS-3L (Inside)	After each use	<p>When storing the unit, use compressed air to blow out any residual debris and moisture. Use mild, soapy, low pressure, water to clean the machine in order to remove corrosive materials.</p> <p>DO NOT SPRAY WATER DIRECTLY AT OR SUBMERGE THE AIR MOTOR BREather PORTS OR ELECTRONIC COMPONENTS. MAKE SURE ALL DUST CAPS ARE IN PLACE AND ELECTRICAL SENSOR CONNECTIONS ARE TIGHT PRIOR TO CLEANING.</p> 

Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the AUTOBOX® (ABXS-3L) Hose Tractor and Controller.

STORAGE, TRANSPORTATION, AND HANDLING

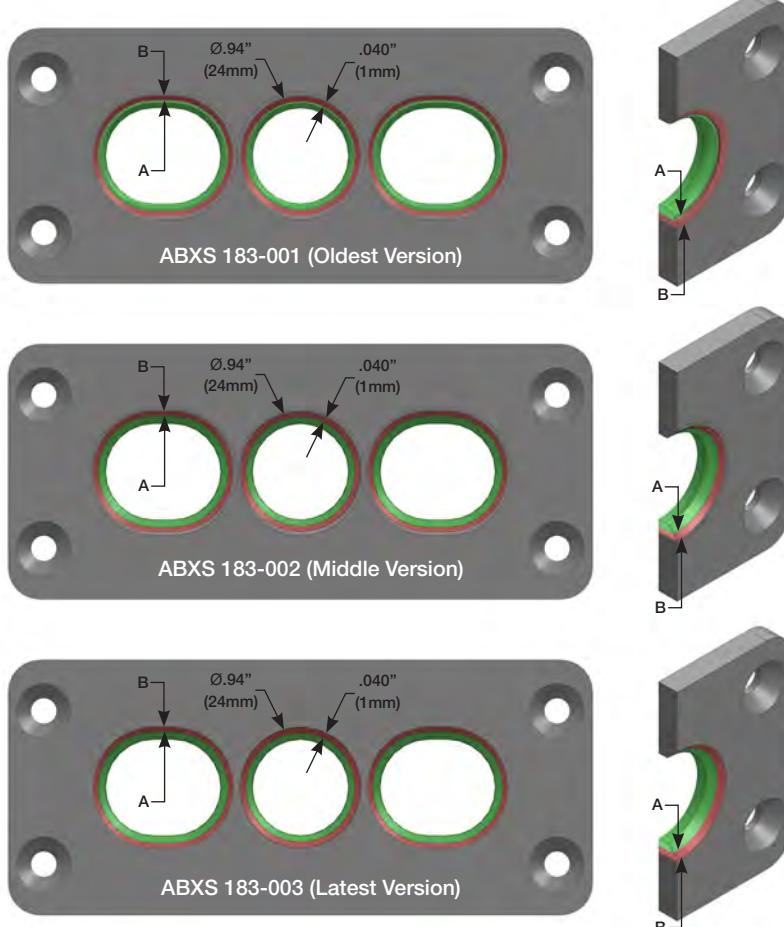
The AUTOBOX® (ABXS-3L) Hose Tractor should be stored upright in a job box between jobs. When moving the AUTOBOX® (ABXS-3L) Hose Tractor, lift with care to prevent bodily injury.

ABXS 183-00X FACE PLATE WEAR INDICATORS

The Wear Indicators on the Face Plates are to inform operators that excessive wear is occurring. Continued long-term operation will significantly reduce the life of the rear stop sensor. There are three versions of the ABXS 183-00X Face Plates and they are all backwards compatible with the only difference being the type of Wear Indicator. **The wear indicators are colored in the diagrams for clarity.*

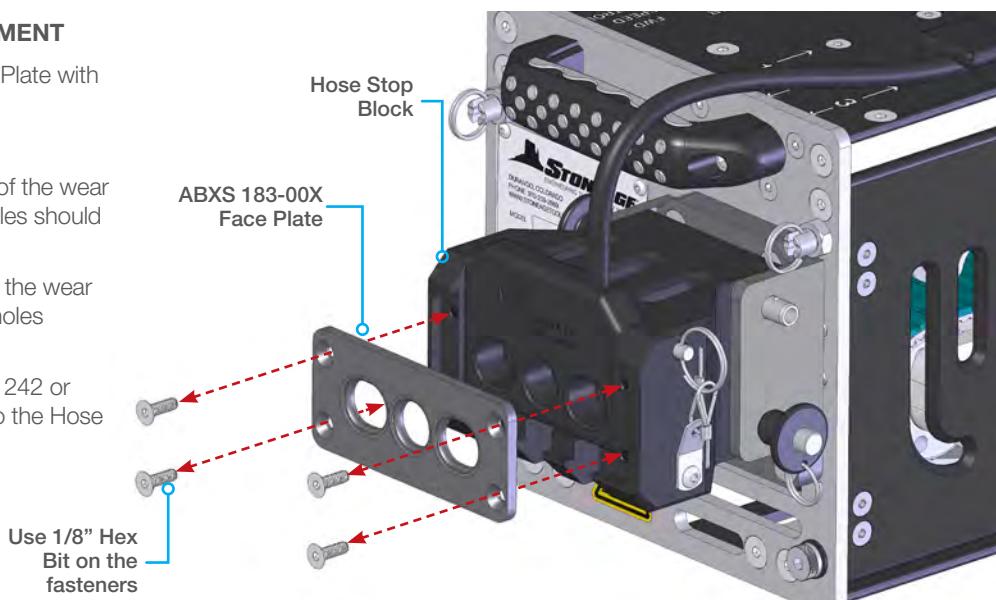
A. The *inner boundary* of the **'red zone'** indicates severe wear has occurred and that the plate needs to be replaced as soon as practical.

B. The *outer boundary* of the **'red zone'** indicates excessive wear has occurred and the plate needs to be replaced immediately as CONTINUED OPERATION VOIDS WARRANTY.



ABXS 183-00X FACE PLATE REPLACEMENT

1. Remove the 4 fasteners from the Face Plate with a 1/8" Hex Bit.
2. Remove the Face Plate.
3. Rotate the Face Plate 180° if one side of the wear indicators is worn. The countersunk holes should be facing out as shown.
4. Install a new Face Plate if both sides of the wear indicators are worn. The countersunk holes should be facing out as shown.
5. Coat the 4 fasteners with Blue Loctite® 242 or equivalent then fasten the Face Plate to the Hose Stop Block.



DRIVE BELT REPLACEMENT

⚠ WARNING

Always de-energize the system before servicing or replacing any parts. Failure to do so can result in severe injury and/or death. Keep hands, hair, and clothing clear of rotating parts.

 **TECH TIP:** If the performance of the belt is not functioning well for the conditions, try replacing it with an alternate durometer belt.

BELTS INCLUDED:

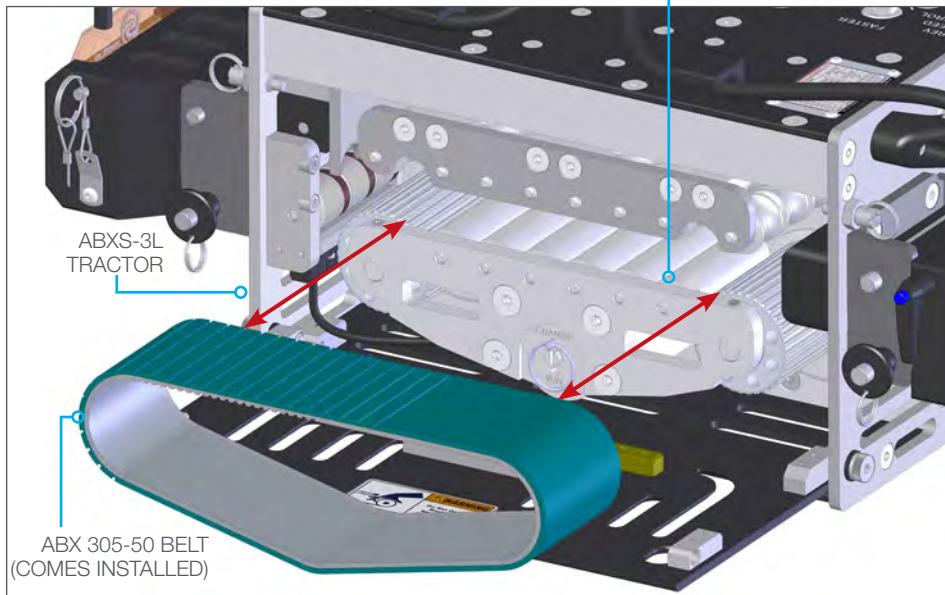
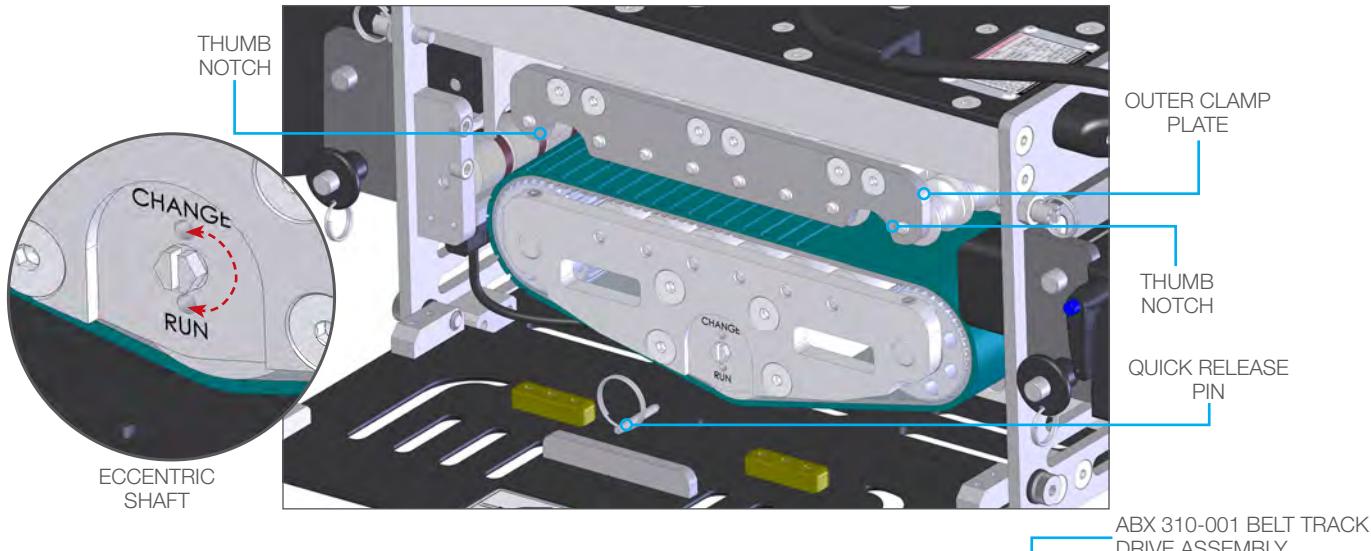
ABX 305-50 Green
(50 durometer – softest – better grip, but fastest wear)
ABX 305-80 Black
(80 durometer – hardest – most durable, but most slip)

BELT OPTIONAL:

ABX 305-70 Green
(70 durometer – medium)

TO REPLACE THE BELT:

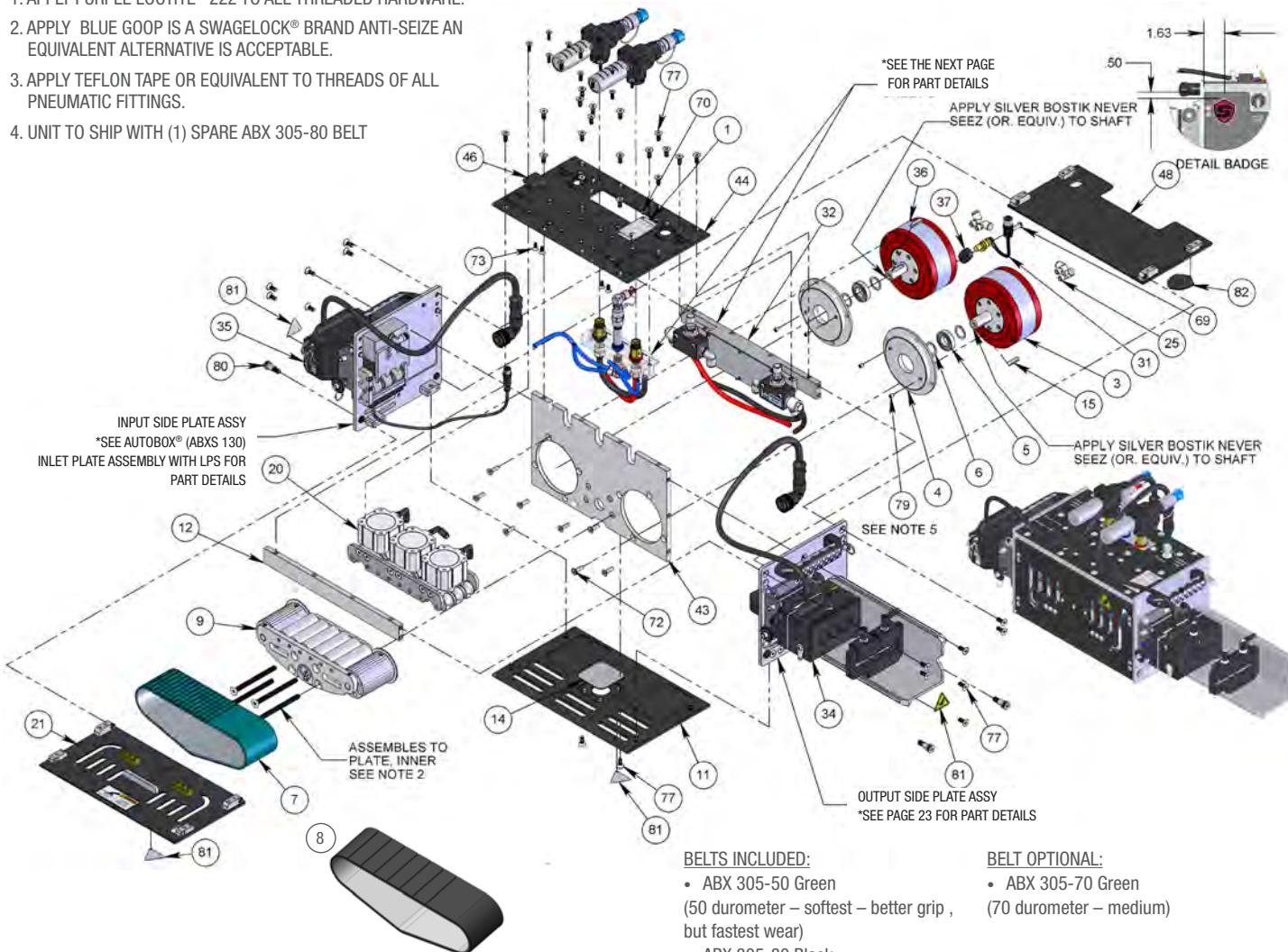
1. Pull out the Quick Release Pin on the front of the ABX 310-001 Belt Track Drive Assembly.
2. Use a flat head screwdriver to rotate the Eccentric Shaft 180° in either direction. This will release tension on the Drive Belt Assembly.
3. Install pin into the "CHANGE" position so it does not get misplaced, and to ensure the tension idler is in the correct position before removing the belt.
4. Place thumbs on the top of the belt into the notches of the Outer Clamp Plate. Place fingers under the Drive Belt and light squeeze in the shape of the tensioned Drive Belt. Then pull the Drive Belt out from the ABX-3L-V2 Tractor.
5. Slide the old Drive Belt off and discard. Slide the new Drive Belt on in a similar manner.
6. Rotate the Eccentric Shaft 180° in either direction to properly tension the Drive Belt.
7. Move the Quick Release Pin to the "RUN" position.



AUTOBOT[®] (ABXS-3L) HOSE TRACTOR

NOTE:

1. APPLY PURPLE LOCTITE[®] 222 TO ALL THREADED HARDWARE.
2. APPLY BLUE GOOP IS A SWAGELOCK[®] BRAND ANTI-SEIZE AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
3. APPLY TEFLON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.
4. UNIT TO SHIP WITH (1) SPARE ABX 305-80 BELT



BELTS INCLUDED:

- ABX 305-50 Green
(50 durometer – softest – better grip, but fastest wear)
- ABX 305-80 Black
(80 durometer – hardest – most durable, but most slip)

BELT OPTIONAL:

- ABX 305-70 Green
(70 durometer – medium)

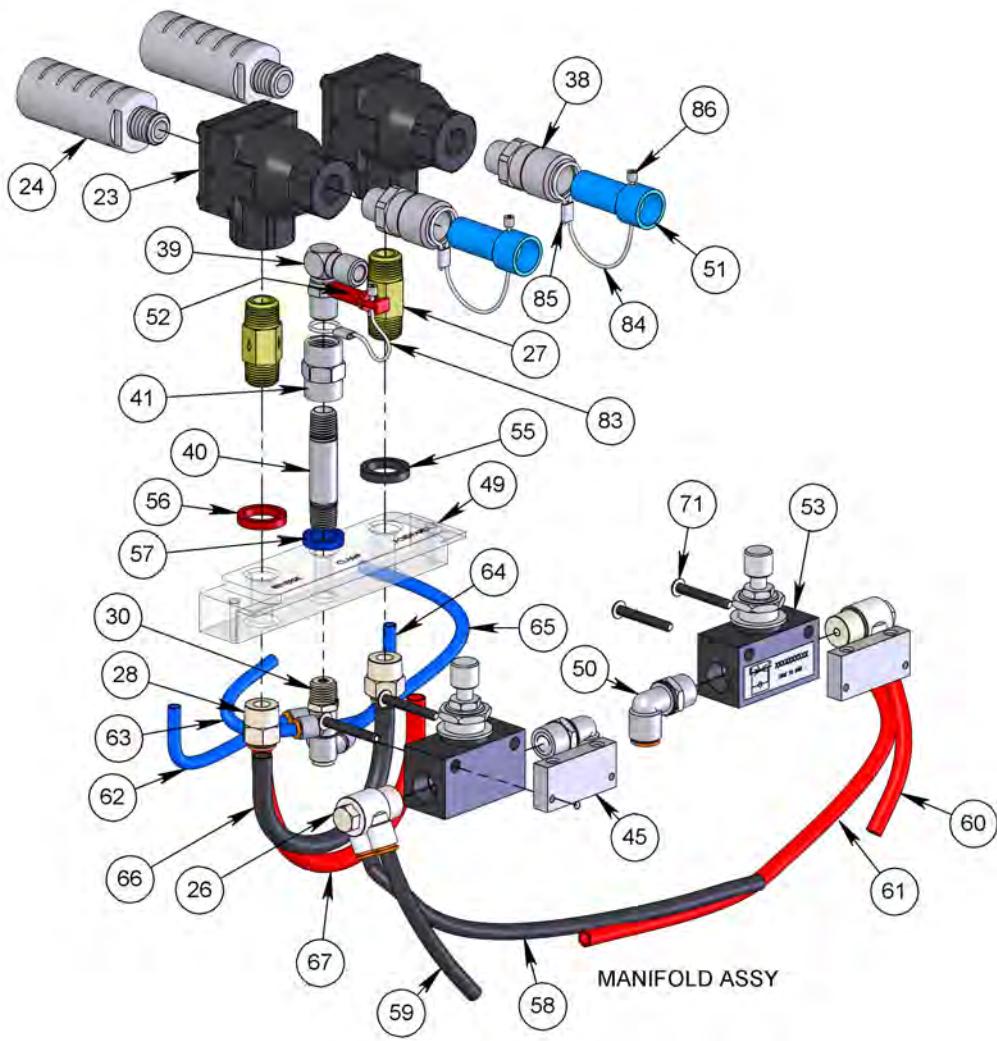
#	PART NUMBER	QTY
1	ABX 139 COLLET REFERENCE PLATE	1
3	ABX 250 AIR MOTOR, GLOBE	1
4	ABX 252 PLATE, AIR MOTOR BEARING	2
5	ABX 257 MOTOR BEARING 19MM X 37MM X 9MM	2
6	ABX 258 SHIM WASHER	4
7	ABX 305-50 BELT, 50A 10mm Sipe	1
8	ABX 305-80 BELT, 80A 25mm Sipe	1
9	ABX 310-001 BELT TRACK DRIVE ASSY BOTTOM	1
11	ABX 343 PLATE, BOTTOM	1
12	ABX 345 STIFFENER, TOP PLATE	1
14	ABX 348 COVER	1
15	ABX 353 KEY, MODIFIED	2

20	ABX 360-001 BELT TRACK DRIVE ASSY TOP	1
21	ABX 370-001 DOOR ASSY	1
25	ABX 391 FTG, ELBOW SWIVEL 90 BSPT2M PL8MMF	4
31	ABXS 105 SENSOR ASSY, SPEED AND DIRECTION	1
32	ABXS 110 ASSY, CONNECTOR BAR	1
34	ABXS 160 GUIDE ASSEMBLY, 3L SENTINEL	1
35	ABXS 180 ASSY, HOSE STOP	1
36	ABXS 251 AIR MOTOR, GLOBE	1
37	ABXS 252 PLATE, SPACER	1
43	ABXS 340 PLATE, INNER	1
44	ABXS 344 PLATE, TOP	1
46	ABXS 349 BLOCK, CABLE CLAMP	2

48	ABXS 380 ASSY, GUARD	1
61	GPTB 8MM-PUR95A-RD TUBE 2 M8 RD (12 IN)	1
62	GPTB 0250-PUR95A-BL TUBE 1 PL4 BL (4.5 IN)	1
63	GPTB 0250-PUR95A-BL TUBE 2 PL4 BL (4 IN)	1
64	GPTB 0250-PUR95A-BL TUBE 3 PL4 BL (4.5 IN)	1
69	GSB 3M6-20-1.0 BHCS M6x1.0 x 20 SS	1
70	GSB 313-0075 BHCS 6-32 x .19 SS	8
72	GSF 3M6-20-1.00 FHCS M6x1.00 x 20 SS	8
73	GSF 319-02 FHCS 10-24 x .50 SS	4
77	GSF 325-025 FHCS .25-20 x .62 SS	46
79	GSS 3M6-1.0-8CU SET SCREW, CUP PT SS	4
81	PL 162 WARNING DECAL, PINCH POINT	4
82	PL 300-2 PIDPLATES S-BADGE, 2 IN., COLOR	1

PART DIAGRAM

AUTOBOX® (ABXS-3L) HOSE TRACTOR
MANIFOLD AND CONNECTOR BAR ASSEMBLY

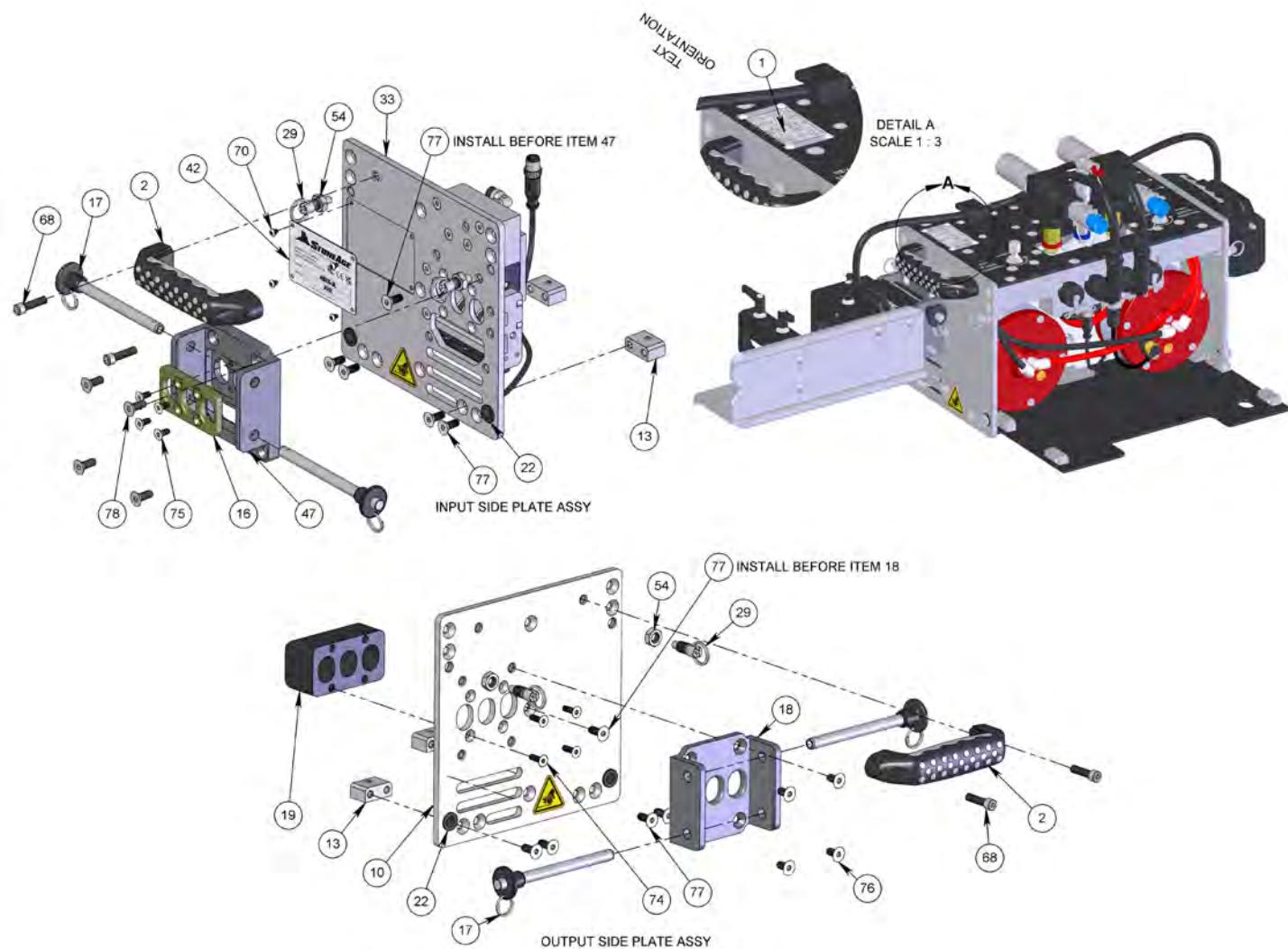


#	PART NUMBER	QTY
23	ABX 382 QUICK EXHAUST VALVE, P6	2
24	ABX 383 SILENCER, P6	2
26	ABX 392 FTG, MANIFOLD 90 P6M 2XPL5	2
27	ABX 394 FTG, INLINE FILTER P6M P6M	2
28	ABX 397 FTG, ADAPTER P6M PL6	2
30	ABXS 102 FTG, MANIFOLD 90 P4M 4XPL4	1
38	ABXS 270 FTG, ADAPTER P6M PL10 EISELE	2
39	ABXS 274 FTG, ELBOW SWIVEL 90 P4M PL5 EISELE	1
40	ABXS 284 FTG, NIPPLE P4M P4M X 2.50 SS	1
41	ABXS 285-SS FTG, STRAIGHT COUPLING P4F SS	1

45	ABXS 346 PLATE, FLOW CONTROL	2
49	ABXS 386 AIR MANIFOLD	1
50	CB 352 FTG, ELBOW SWIVEL 90 P6M PL6	2
51	CB 474 FTG, STEM PLUG PL10 MODIFIED	2
52	CB 499 FTG, STEM PLUG PL5 MODIFIED	1
53	CB 528 FLOW CONTROL VALVE, P6	2
55	GP 011-BK ID WASHER, RUBBER, MED, BLACK	1
56	GP 011-R ID WASHER, RUBBER, MED, RED	1
57	GP 013-B ID WASHER, RUBBER, SMALL, BLUE	1
58	GPTB 8MM-PUR95A-BK TUBE 2 M8 BK (11.5 IN)	1
59	GPTB 8MM-PUR95A-BK TUBE 1 M8 BK (4.5 IN)	1
60	GPTB 8MM-PUR95A-RD TUBE 1 M8 RD (4.5 IN)	1

61	GPTB 8MM-PUR95A-RD TUBE 2 M8 RD (12 IN)	1
62	GPTB 0250-PUR95A-BL TUBE 1 PL4 BL (4.5 IN)	1
63	GPTB 0250-PUR95A-BL TUBE 2 PL4 BL (4 IN)	1
64	GPTB 0250-PUR95A-BL TUBE 3 PL4 BL (4.5 IN)	1
65	GPTB 0250-PUR95A-BL TUBE 4 PL4 BL (8.5 IN)	1
66	GPTB 0375-PUR95A-BK TUBE 1 PL6 BK (8 IN)	1
67	GPTB 0375-PUR95A-RD TUBE 1 PL6 RD (8.5 IN)	1
83	SRT 209.1.1 WIRE ROPE FOR ABXS PL5 (CUT TO 5.25IN)	1
84	SRT 209.1.1 WIRE ROPE FOR ABXS PL10 (CUT TO 6.75IN)	2
85	SRT 209.1.3 ALUMINUM SLEEVE	3
86	SRT 209.1.4 ALUMINUM STOP SLEEVE	3

AUTOBOX® (ABXS-3L) HOSE TRACTOR
INSIDE AND OUTSIDE PLATE ASSEMBLIES

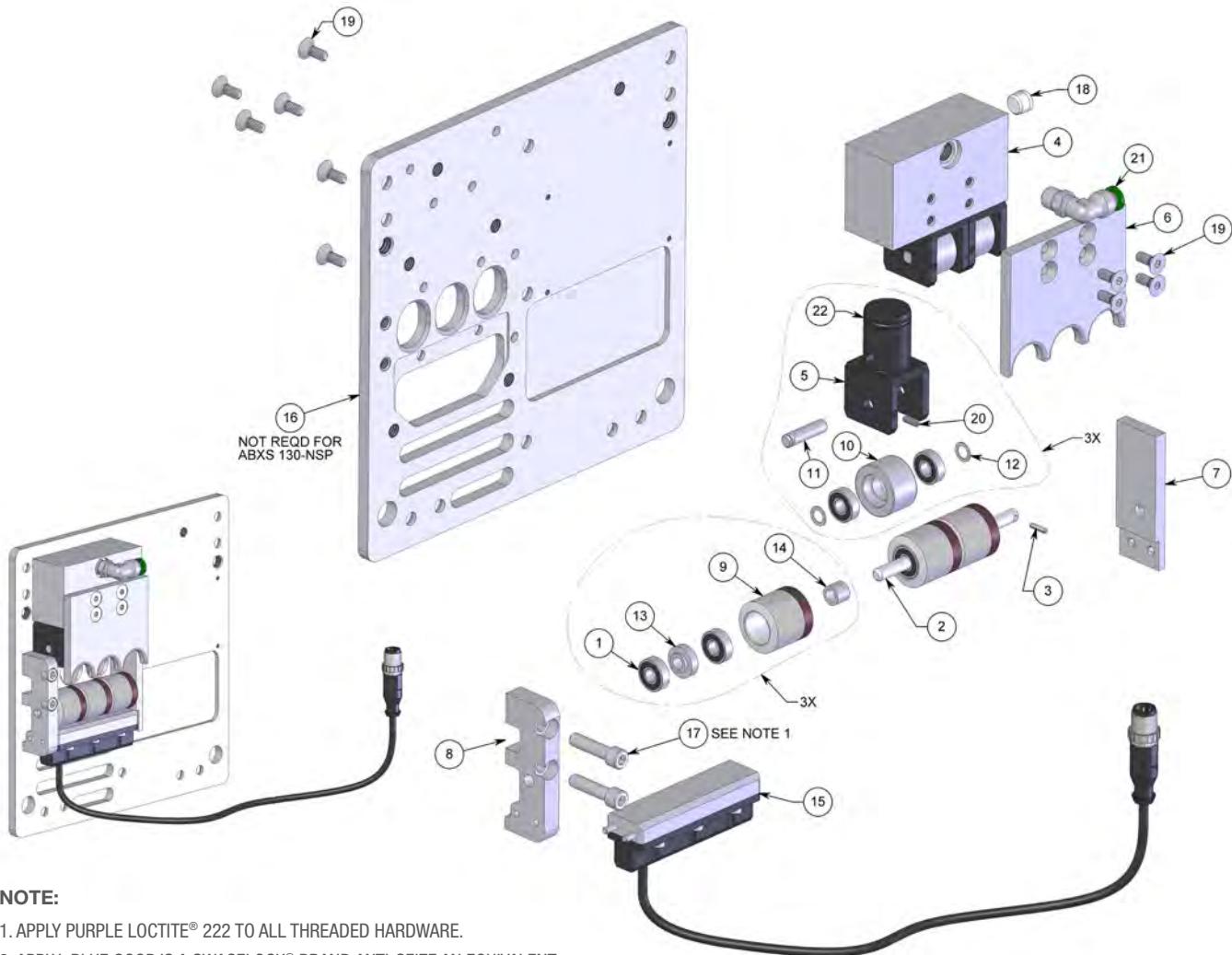


#	PART NUMBER	QTY
1	ABX 139 COLLET REFERENCE PLATE	1
2	ABX 215 PULL HANDLE GREY	2
10	ABX 342 SIDE PLATE OUTLET	1
13	ABX 347 BLOCK, SUPPORT	4
16	ABX 355 HOSE GUIDE PLATE INNER	1
17	ABX 356 QUICK PIN 17-4 SS .38 X 3.75	4
18	ABX 358 MOUNTING BRACKET, OUTLET	1
22	ABX 375 BUSHING, PEEK .375 ID X .375 LG	4
29	ABX 566-001 SPRING PLUNGER ASSY	4
33	ABXS 130 INLET PLATE ASSY WITH LPS	1

42	ABXS 303 PLATE, SERIAL FCC CE	1
47	ABXS 357 MOUNTING BRACKET, INLET	1
54	GN 337-HJ NUT, HEX JAM .37-16 SS	4
68	GS 325-035 SHCS .25-20 X .88 SS	4
69	GSB 3M6-20-1.0 BHCS M6x1.0 x 20 SS	1
70	GSB 313-0075 BHCS 6-32 x .19 SS	8
74	GSF 319-025 FHCS 10-24 x .62 SS	16
75	GSF 319-0175 FHCS 10-24 x .44 SS	4
76	GSF 325-02 FHCS .25-20 x .50 SS	4
77	GSF 325-025 FHCS .25-20 x .62 SS	46
78	GSF 325-0275 FHCS .25-20 x .69 SS	4

PART DIAGRAM

AUTOBOX® (ABXS 130)
INLET PLATE ASSEMBLY WITH LPS



NOTE:

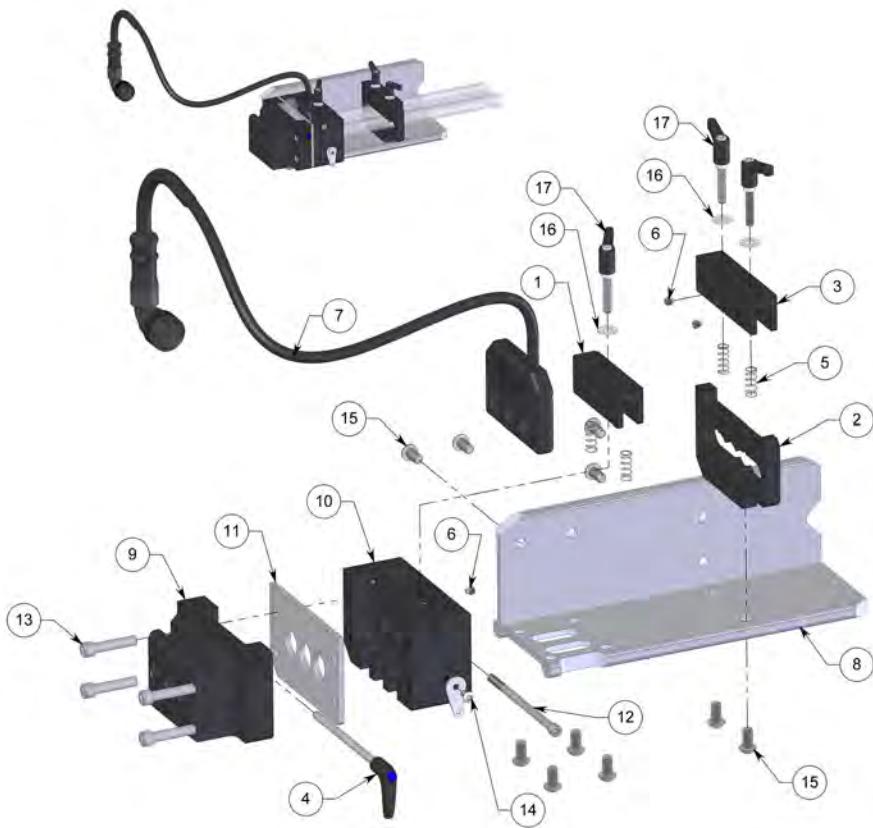
1. APPLY PURPLE LOCTITE® 222 TO ALL THREADED HARDWARE.
2. APPLY BLUE GOOP IS A SWAGELOCK® BRAND ANTI-SEIZE AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
3. APPLY TEFLON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.
4. UNIT TO SHIP WITH (1) SPARE ABX 305-80 BELT

#	PART NUMBER	ABXS 130	ABXS 130-NSP
1	ABX 326 PERMANENTLY LUBRICATED STAINLESS STEEL BALL BEARING, SEALED, TRADE NUMBER R4-2RS, FOR 1/4" SHAFT DIAMETER	12	12
2	ABX 330 SHAFT, IDLER	1	1
3	ABX 332 SPRING PIN, 3/32 X 3/4 OAL (18-8 SS)	1	1
4	ABXS 133 CAP, PISTON	1	1
5	ABXS 134 YOKE, IDLER	3	3
6	ABXS 135 YOKE SUPPORT	1	1
7	ABXS 137 SIDE PLATE INNER	1	1
8	ABXS 138 SIDE PLATE OUTER	1	1
9	ABXS 141 ASSY, LPS MAGNET ROLLER	3	3
10	ABXS 142 ROLLER, IDLER	3	3

11	ABXS 143 SHAFT, IDLER	3	3
12	ABXS 145 SHIM WASHER, SS .020	6	6
13	ABXS 147 SPACER, .28	3	3
14	ABXS 148 SPACER, .31	3	3
15	ABXS 150 ASSY, LANCE POSITION SENSOR	1	1
16	ABXS 341-001 SIDE PLATE INLET	1	-
17	BC 053 SHCS .25-20 X 1.00 SS	2	2
18	GP 025-P2SS HEX SOCKET PLUG, 1/8 NPT, SS	1	1
19	GSF 319-02 FHCS 10-24 X .50 SS	10	10
20	GSS 304-40-37CO SET SCREW, CONE PT 4-40 X .37 SS	3	3
21	HRS 563 FTG, ELBOW SWIVEL 90 P2M PL4	1	1
22	SM 016 O-RING	3	3

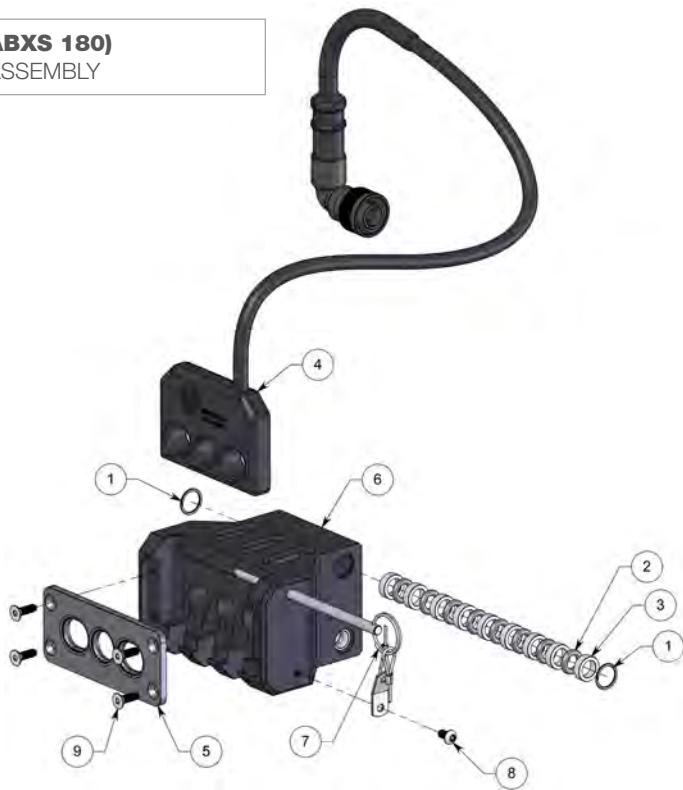
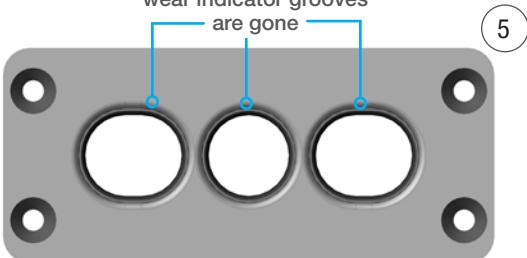
AUTOBOX® (ABXS 160)
GUIDE ASSEMBLY

#	PART NUMBER	QTY
1	ABX 177 REAR CLAMP CHANNEL	1
2	ABX 178 PITCH CLAMP PLATE	1
3	ABX 179 PITCH CLAMP CHANNEL, HALF	2
4	ABX 181 PIN, QR, .250 DIA X 4.00 L, WITH LANYARD	1
5	ABX 182 SPRING, COMPRESSION	4
6	ABX 183 SCREW, SET, EXTENDED POINT	3
7	ABXS 161 ASSY, HOSE CRIMP AND HOSE STOP SENSOR PUCK	1
8	ABXS 175 BOX SECTION, SENTINEL	1
9	ABXS 176 SPLIT COLLET BLOCK, TRACTOR SIDE	1
10	ABXS 177 SPLIT COLLET BLOCK, GUIDE TUBE SIDE	1
11	ABXS 178 DIVIDER PLATE .1875	1
12	GS 325-18 SHCS .25-20 X 4.50 SS	1
13	GS 331-06 SHCS .31-18 X 1.50 SS	4
14	GSB 319-015 BHCS 10-24 X .38 SS	1
15	GSB 331-025 BHCS .31-18 X .62 SS	10
16	GW 325-F WASHER, FLAT .25 SS	3
17	SRT 557 ADJUSTABLE HANDLE .25-20 X 1.19	3


AUTOBOX® (ABXS 180)
HOSE STOP ASSEMBLY

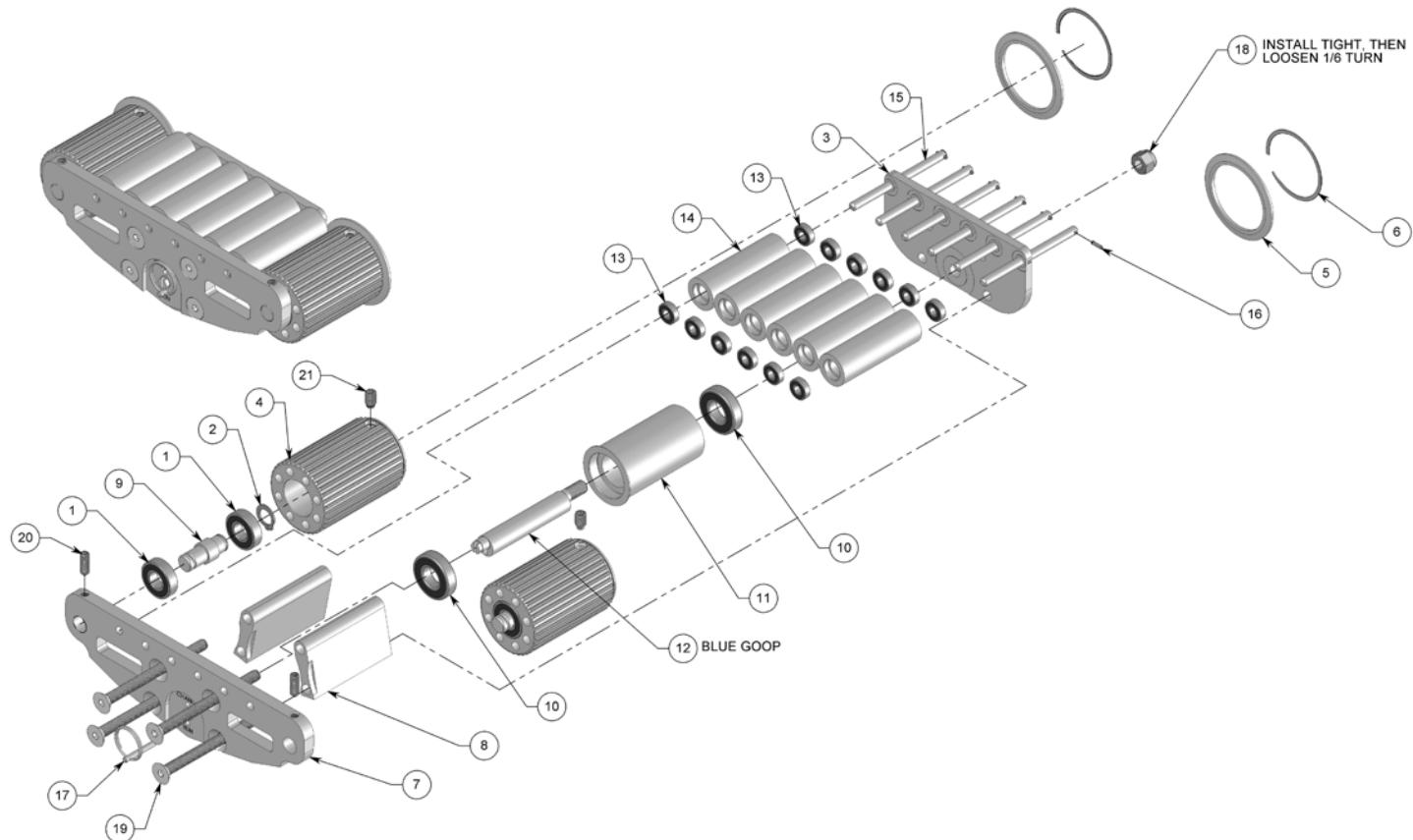
#	PART NUMBER	QTY
1	ABX 230 RING, SPIRAL INTERNAL RETAINER SS (BORE Ø 0.625 X .035 THICK)	4
2	ABX 294 ORING, SHOCK ABSORBING	16
3	ABX 352 SPACER, O-RING	18
4	ABXS 161 ASSY, HOSE CRIMP AND HOSE STOP SENSOR PUCK	1
5	ABXS 183-001 PLATE, FACE	1
6	ABXS 186 BLOCK, HOSE STOP	1
7	ABXS 187 QUICK RELEASE PIN W LANYARD	1
8	GSB 319-015 BHCS 10-24 X .38 SS	1
9	GSF 319-025 FHCS 10-24 X .62 SS	4

Replace this plate when any part of the wear indicator grooves are gone



PART DIAGRAM

AUTOBOX® (ABX 310-001)
BELT TRACK DRIVE ASSEMBLY

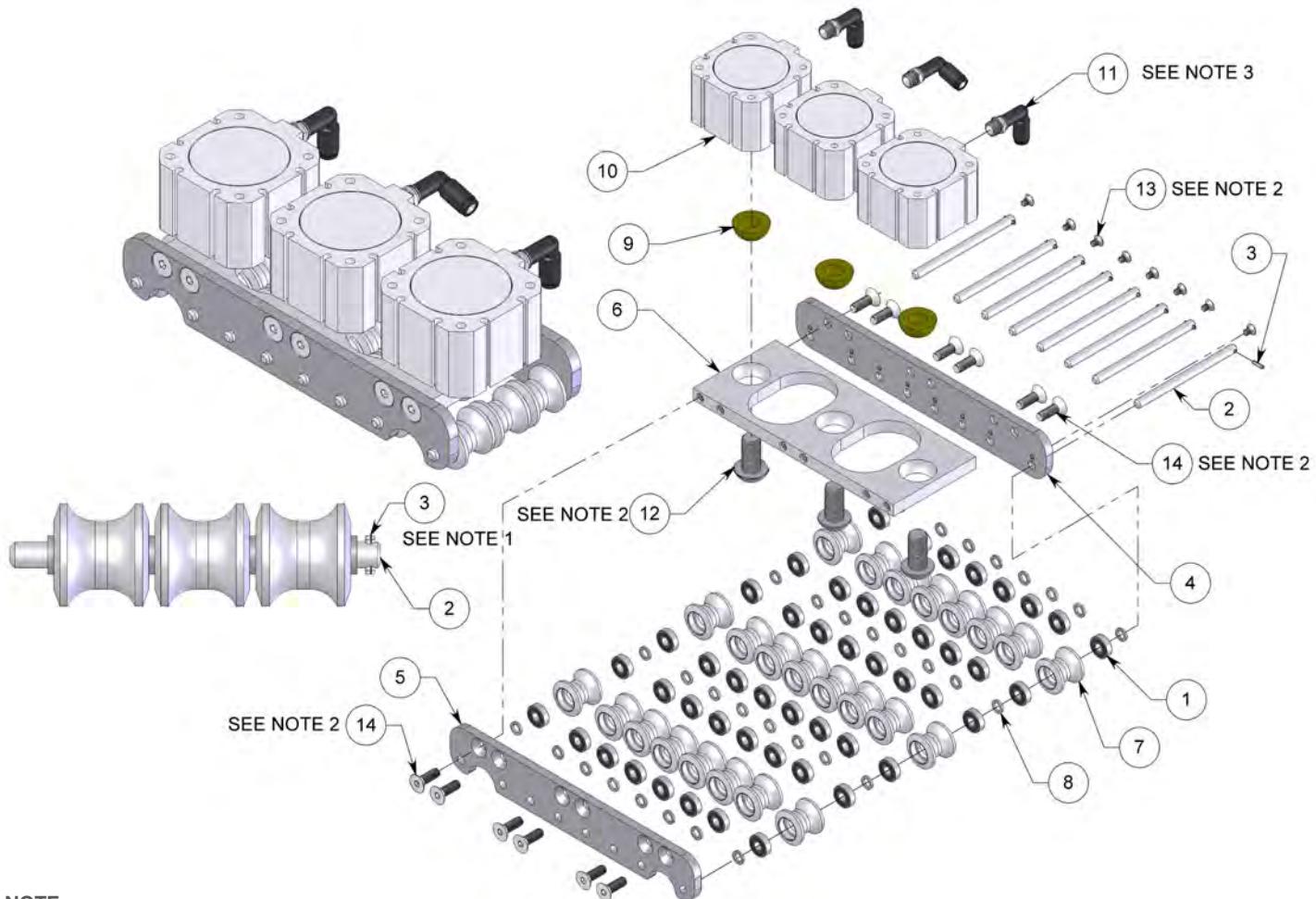


NOTE:

1. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
2. BLUE GOOP IS A SWAGELOCK® BRAND ANTI-SEIZE AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.

#	PART NUMBER	QTY.
1	ABX 228 BEARING .500 ID X 1.125 OD SEALED PERMALUBE	4
2	ABX 267 RETAINING RING, SL EXTERNAL SS	2
3	ABX 311-001 PLATE, BELT INNER	1
4	ABX 314 DRIVE SPROCKET 36T-AT5	2
5	ABX 315 SPROCKET FLANGE	2
6	ABX 316 RETAINING RING, FLANGE 2.00 EXT LIGHT DUTY	2
7	ABX 317-001 PLATE, SIDE	1
8	ABX 318 BLOCK, BELT DRIVE	2
9	ABX 320 STUB SHAFT, DRIVE ROLLER	2
10	ABX 322 BEARING R10, PERMALUBE	2

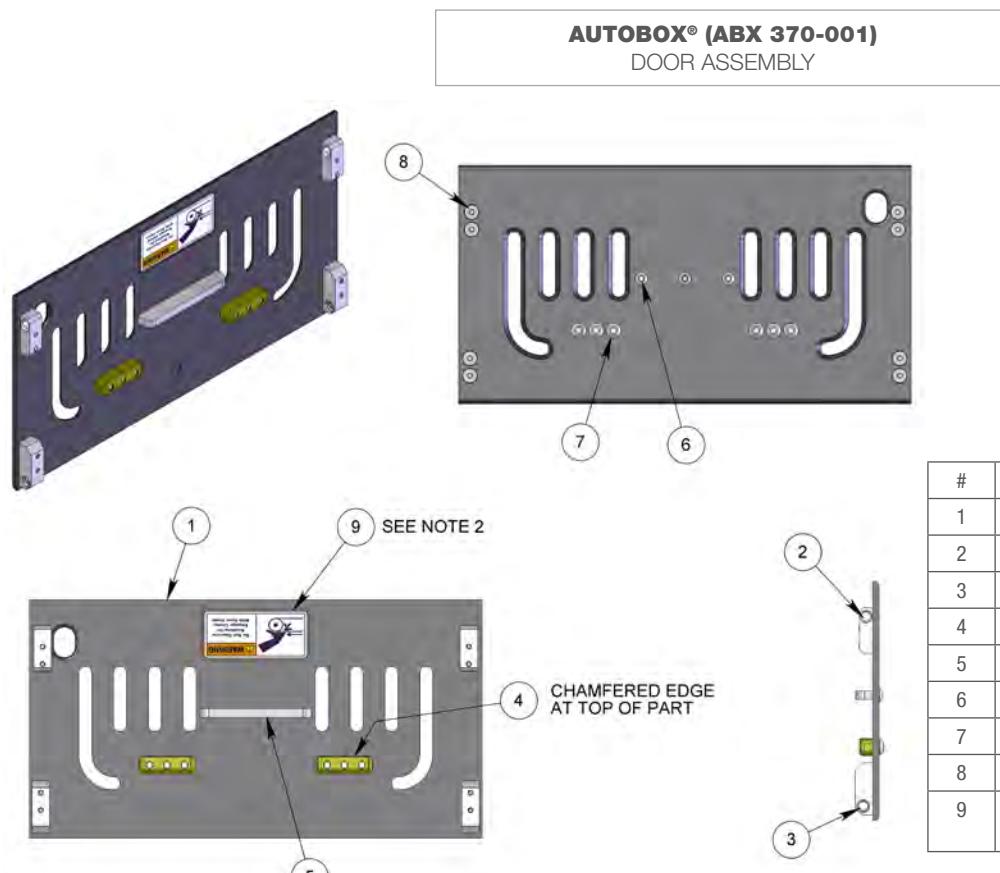
11	ABX 323 IDLER, TENSIONING	1
12	ABX 324 ECCENTRIC SHAFT	1
13	ABX 326 R4 PERMA LUBE BEARING	12
14	ABX 327 ROLLER, BELT	6
15	ABX 330 SHAFT, IDLER	6
16	ABX 332 SPRING PIN, .094 X .375	6
17	ABX 333 QUICK RELEASE PIN .156 X .8 LG	1
18	GN 337-L NYLOK NUT SS	1
19	GSF 331-16 FHCS .31-18 X 4.00 SS	4
20	GSS 325-20-75CO SET SCREW, CONE PT SS	2
21	GSS 331-18-50DP SET SCREW, DOG PT SS	2

AUTOBOX® (ABX 360-001)
 BELT TRACK DRIVE ASSEMBLY
**NOTE:**

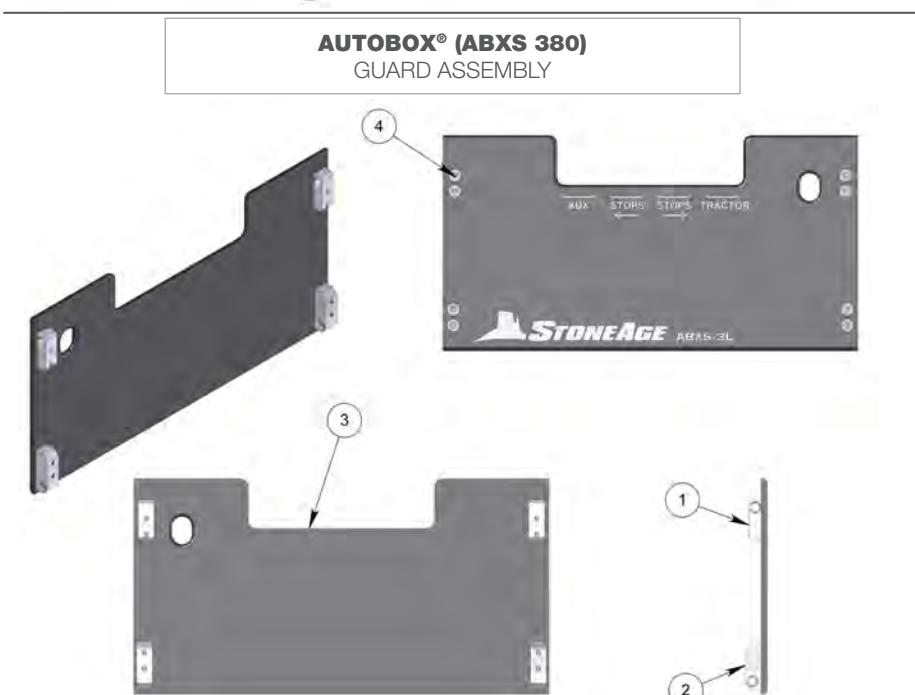
1. CENTER PIN WHEN INSTALLING SHAFT
2. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
3. APPLY TEFLON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.

#	PART NUMBER	QTY.
1	ABX 326 R4 PERMA LUBE BEARING	48
2	ABX 330 SHAFT, IDLER	8
3	ABX 332 SPRING PIN, .094 X .375	8
4	ABX 361 PLATE, CLAMP INSIDE	1
5	ABX 362 PLATE, CLAMP OUTSIDE	1
6	ABX 364-001 PLATE, CLAMP	1
7	ABX 366 ROLLER, HOSE	24
8	ABX 367 SHIM WASHER	32
9	ABX 377 SPHERICAL BALL	3
10	ABX 385 SMC AIR CYL NCQ8A200-062S	3
11	ABX 387 FTG, ELBOW SWIVEL LONG 90 P2M PL4	3
12	GSB 350-04 BHCS .50-13 X 1.00 SS	3
13	GSF 316-01 FHCS .16-32 X .25 SS	8
14	GSF 325-03 FHCS .25-20 X .75 SS	12

PART DIAGRAM

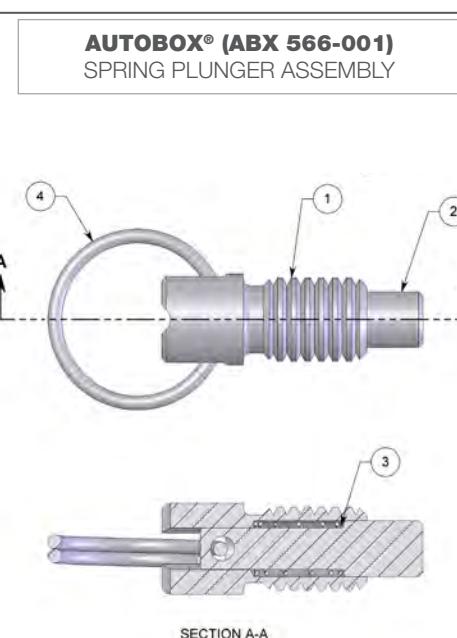


#	PART NUMBER	QTY.
1	ABX 371-001 DOOR	1
2	ABX 372 PIN PLATE, DOOR	2
3	ABX 373 PIVOT PLATE, DOOR	2
4	ABX 374 PLATE, WEDGE	2
5	ABX 376 PLATE, BELT GUIDE	1
6	GSB 319-02 BHCS 10-24 X .50 SS	3
7	GSB 325-02 BHCS .25-20 X .50 SS	6
8	GSF 319-0225 FHCS .19-24 X .56 SS	8
9	PL 164 WARNING, DOOR OPEN CLAMP ENGAGED	1



#	PART NUMBER	QTY.
1	ABX 372 PIN PLATE, DOOR	2
2	ABX 373 PIVOT PLATE, DOOR	2
3	ABXS 381 GUARD	1
4	GSF 319-0225 FHCS .19-24 X .56 LG SS	8

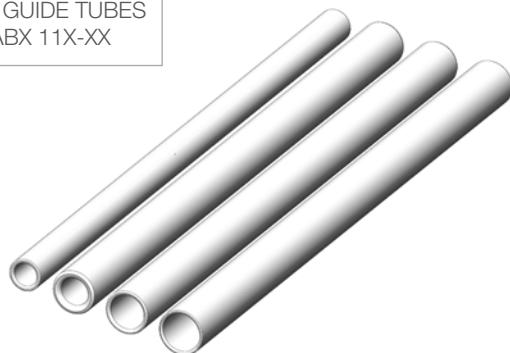
NOTE:
APPLY PURPLE LOCTITE® 222 TO ALL THREADED HARDWARE.



#	PART NUMBER	QTY.
1	ABX 566.1-001 BODY	1
2	ABX 566.2-001 PIN	1
3	ABX 566.3-001 SPRING	1
4	ABX 566.4-001 RING	1

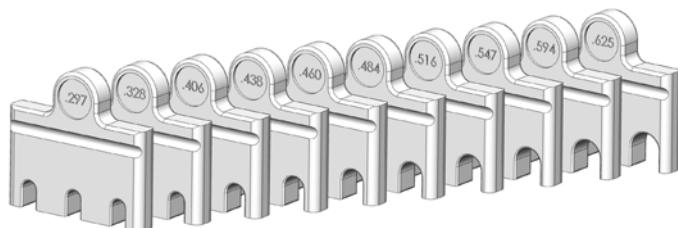
AUTOBOX® ABXS-3L HOSE GUIDE ASSEMBLY ACCESSORIES
GUIDE TUBES, COLLETS, ANTI-TWIST CLAMPS AND HOSE STOPS

ABX GUIDE TUBES
ABX 11X-XX



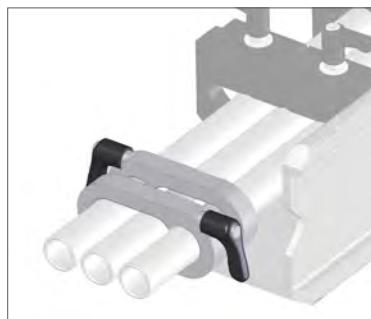
StoneAge (SA) PART NUMBER GUIDE TUBE REFERENCE CHART			
GUIDE TUBE	BANSHEE	INSIDE DIAMETER, LENGTH	QTY
ABX 115-12	BN9.5	.459 in / 12 mm, 12.5 in. / 318 mm	3
ABX 115-36	BN9.5	.459 in / 12 mm, 36 in. / 914 mm	3
ABX 116-12	BN13	.546 in / 14 mm, 12.5 in. / 318 mm	3
ABX 116-36	BN13	.546 in / 14 mm, 36 in. / 914 mm	3
ABX 117-12	BN15	.674 in / 17 mm, 12.5 in. / 318 mm	3
ABX 117-36	BN15	.674 in / 17 mm, 36 in. / 914 mm	3
ABX 119-12	BN18	.745 in / 19 mm, 12.5 in. / 318 mm	3
ABX 119-36	BN18	.745 in / 19 mm, 36 in. / 914 mm	3

HOSE STOP COLLETS
ABX 171-XX



StoneAge (SA) PART NUMBER COLLET REFERENCE CHART		
PART NUMBER	DESCRIPTION	QTY
ABX 171-297	HOSE STOP COLLET .297 in. / 8 mm	1
ABX 171-328	HOSE STOP COLLET .328 in. / 8 mm	1
ABX 171-406	HOSE STOP COLLET .406 in. / 10 mm	1
ABX 171-438	HOSE STOP COLLET .438 in. / 11 mm	1
ABX 171-460	HOSE STOP COLLET .460 in. / 12 mm	1
ABX 171-484	HOSE STOP COLLET .484 in. / 12 mm	1
ABX 171-516	HOSE STOP COLLET .516 in. / 13 mm	1
ABX 171-547	HOSE STOP COLLET .547 in. / 14 mm	1
ABX 171-594	HOSE STOP COLLET .594 in. / 15 mm	1
ABX 171-625	HOSE STOP COLLET .625 in. / 16 mm	1

GUIDE TUBE
ANTI-TWIST CLAMPS
ABX 140-XX



StoneAge (SA) PART NUMBER ANTI-TWIST CLAMP REFERENCE CHART

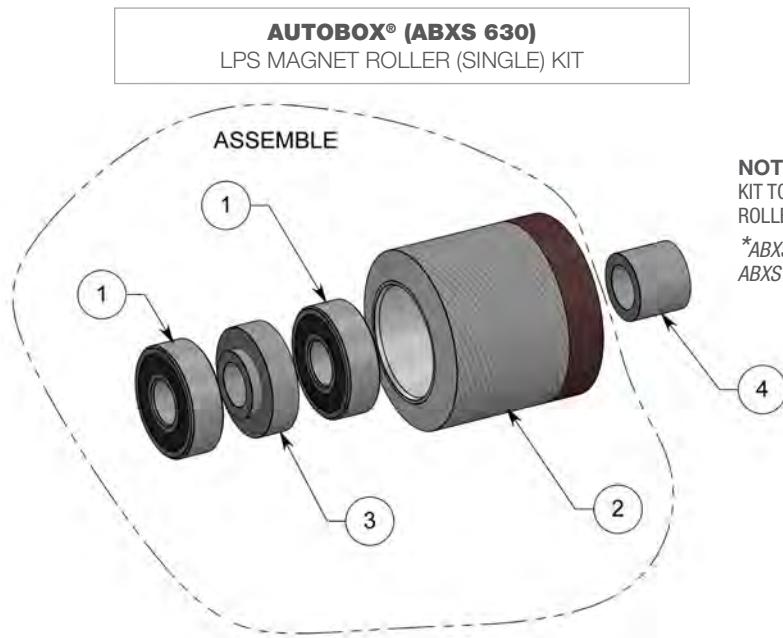
PART NUMBER	DESCRIPTION	QTY
ABX 140-625	GUIDE TUBE ANTI-TWIST CLAMP .625	2
ABX 140-840	GUIDE TUBE ANTI-TWIST CLAMP .840	2
ABX 140-875	GUIDE TUBE ANTI-TWIST CLAMP .875	2

HOSE STOP CLAMPS
HS 121-XX-XX



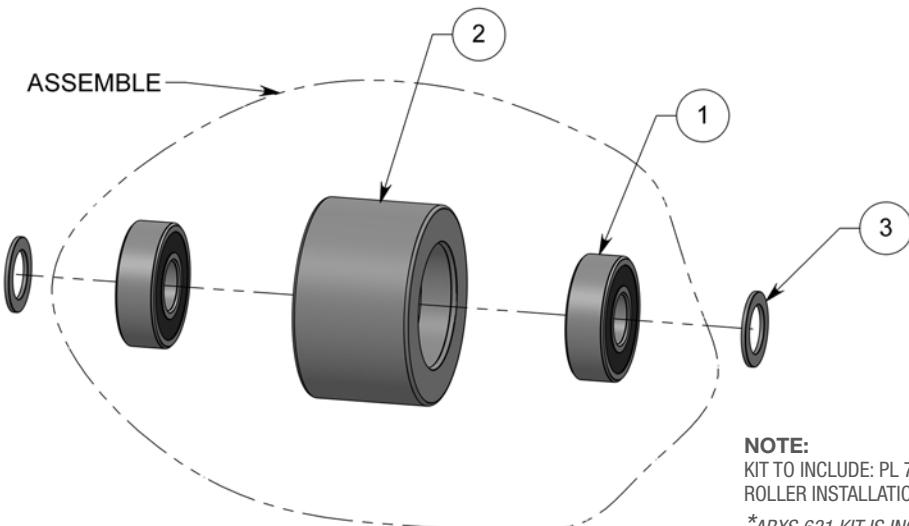
StoneAge (SA) PART NUMBER HOSE STOP REFERENCE CHART		
PART NUMBER	DESCRIPTION	QTY
HSS 121-27-34	HOSE STOP CLAMP ASSEMBLY, .27-34	3
HSS 121-34-42	HOSE STOP CLAMP ASSEMBLY, .34-42	3
HSS 121-42-50	HOSE STOP CLAMP ASSEMBLY, .42-.50	3
HSS 121-50-56	HOSE STOP CLAMP ASSEMBLY, .50-56	3
HSS 121-56-61	HOSE STOP CLAMP ASSEMBLY, .56-61	3

PART DIAGRAM



NOTE:
KIT TO INCLUDE: PL 699 LPS MAGNET
ROLLER INSTALLATION DIAGRAM.
**ABXS 630 KIT IS INCLUDED IN THE
ABXS 628-XX SPARE PARTS KIT*

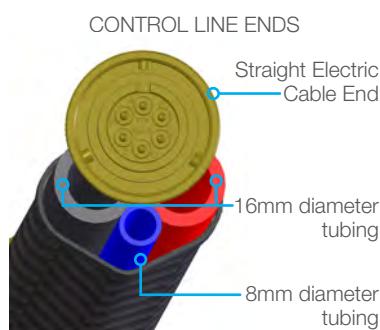
#	PART NUMBER / DESCRIPTION	QTY
1	ABX 326 PERMANENTLY LUBRICATED STAINLESS STEEL BALL BEARING, SEALED, TRADE NUMBER R4-2RS, FOR 1/4" SHAFT DIAMETER	2
2	ABXS 141 ASSY, LPS MAGNET ROLLER	1
3	ABXS 147 SPACER, .28	1
4	ABXS 148 SPACER, .31	1



NOTE:
KIT TO INCLUDE: PL 700 LPS IDLER
ROLLER INSTALLATION DIAGRAM.
**ABXS 631 KIT IS INCLUDED IN THE
ABXS 628-XX SPARE PARTS KIT*

#	PART NUMBER / DESCRIPTION	QTY
1	ABX 326 PERMANENTLY LUBRICATED STAINLESS STEEL BALL BEARING, SEALED, TRADE NUMBER R4-2RS, FOR 1/4" SHAFT DIAMETER	2
2	ABXS 142 ROLLER, IDLER	1
3	ABXS 145 SHIM WASHER, SS .020	2

AUTOBOX® (CBL EA15F-1RB6PP-2PL10-1PL5)
15FT ABXS TRACTOR CABLE ASSEMBLY



#	PART NUMBER / DESCRIPTION	QTY	OAL EACH
1	CBL EA15F-1RB6PP-2PL10-1PL5.1 LABEL	1	
2	EA15F.1 WIRE, 1X4 PAIR, 24 (7/32" AWG COPPER ALLOY, .011" POLYPLEFIN	1	15'
3	EE CN-RB-PF6PS-14S-0001 PLUG, POT AND HEATSHRINK ENDBELL	2	
4	GPHS 1100-OLE-A-BK HEAT SHRINK, 1.1" ID, BLACK	2	5"
5	GPSL 0750-NYL-G-BK HOSE BUNDLE SLEEVE	1	11'-5"
6	GPTB 8MM6-PUR95A-BL 8MM OD X 6MM ID URETHANE TUBING, BLUE	1	15'-6"
7	GPTB 16MM11-PUR95A-BK 16MM OD X 11MM ID URETHANE TUBING, BLACK	1	14'-8"
8	GPTB 0500-PUR95A-RD 16MM OD X 11MM ID URETHANE TUBING, RED	1	14'-8"

TERMS AND CONDITIONS

1. Acceptance of Terms and Conditions. Receipt of these Terms and Conditions of Sale ("Terms and Conditions") shall operate as the acceptance by StoneAge, Inc. ("Seller") of the order submitted by the purchaser ("Buyer"). Such acceptance is made expressly conditional on assent by Buyer to these Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of these Terms and Conditions (including inconsistencies between Buyer's purchase order and this acceptance) is given by Buyer to Seller promptly on receipt hereof.

Seller desires to provide Buyer with prompt and efficient service. However, to individually negotiate the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, the product(s) furnished by Seller are sold only according to the terms and conditions stated herein and with the terms and conditions stated in any effective StoneAge Dealer Agreement or StoneAge Reseller Agreement, if applicable. Notwithstanding any terms and conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to these Terms and Conditions unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's terms and conditions.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for the product(s) shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of the product(s), and the collection of which Seller is or may be responsible to provide to any governmental authority, unless acceptable exemption certificates are provided by Buyer in accordance with applicable law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the product(s) being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. SELLER MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE PERFORMANCE OF ANY PRODUCT EXCEPT AS SET FORTH IN THE STONEAGE LIMITED WARRANTY PROVIDED WITH THE PRODUCT.

4. Delivery. Seller is not obligated to make delivery by a specified date, but will always use its best efforts to make delivery within the time requested. The proposed shipment date is an estimate. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. UNDER NO CIRCUMSTANCES SHALL SELLER HAVE ANY LIABILITY WHATSOEVER FOR LOSS OF USE OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM DELAY REGARDLESS OF THE REASON(S).

All product(s) will be shipped F.O.B. point of origin, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance costs from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the product(s). Buyer shall bear all risk of loss commencing with the shipment or distribution of the product(s) from Seller's warehouse. Order shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No product(s) may be returned without securing written approval from Seller.

5. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement relating to the subject matter hereof and cannot be supplemented or amended without Seller's prior written approval.

6. Omission. Seller's waiver of any breach or Seller's failure to enforce any of these Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every term and condition hereof.

7. Severability. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

8. Disputes. Seller and Buyer shall attempt in good faith to promptly resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Seller and Buyer shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the Seller and Buyer.

9. Governing Law. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state.

10. Jurisdiction and Venue. Seller and Buyer agree that the state or federal courts located within the City and County of Denver, Colorado shall have sole and exclusive jurisdiction over any litigation concerning any dispute arising under these Terms and Conditions not otherwise resolved pursuant to Section 9 as well as any alleged defects of any Products or damages sustained as a result of such alleged defects. Seller and Buyer further agree that should any litigation be commenced in connection with such a dispute, it shall only be commenced in such courts. Seller and Buyer agree to the exclusive jurisdiction of such courts and neither will raise any objection to the jurisdiction and venue of such courts, including as a result of inconvenience.

11. Attorney's Fees. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or mediation.

STONEAGE TRADEMARK LIST

View the list of StoneAge's trademarks and service marks and learn how the trademarks should be used. Use of StoneAge trademarks may be prohibited, unless expressly authorized.

<http://www.StoneAgetools.com/trademark-list/>

STONEAGE PATENT DATA

View the list of StoneAge's current U.S. patent numbers and descriptions.

<http://www.sapatents.com>

STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

<http://www.stoneagetoools.com/terms>

<http://www.stoneagetoools.com/warranty>

Warranties set forth herein extend only to End-Users, meaning customers acquiring, or that have previously acquired, a product manufactured by StoneAge ("Product") for their own use and not for resale, either directly from StoneAge Inc. ("StoneAge") or from a StoneAge Authorized Dealer or Reseller ("Dealer"). No warranty of any kind or nature is made by StoneAge beyond those expressly stated herein.

1. LIMITED WARRANTY PERIOD. Subject to the limitations and conditions hereinafter set forth, StoneAge warrants its Product to be free from defects in workmanship and material for a period of one (1) year from the date of purchase by the End-User, provided that the end of the limited warranty period shall not be later than eighteen (18) months from the date of shipment of the Product to the Dealer or the End-User by StoneAge ("Limited Warranty Period"). All replacement parts which are furnished under this Limited Warranty and properly installed shall be warranted to the same extent as the original Product under this Limited Warranty if, and only if, the original parts were found to be defective within the original Limited Warranty Period covering the original Product. Replacement parts are warranted for the remainder of the original Limited Warranty Period. This Limited Warranty does not cover any component part of any Product not manufactured by StoneAge. Any such component part is subject exclusively to the component manufacturer's warranty terms and conditions.

2. LIMITED WARRANTY COVERAGE. StoneAge's sole obligation under this Limited Warranty shall be, at StoneAge's option and upon StoneAge's inspection, to repair, replace or issue a credit for any Product which is determined by StoneAge to be defective in material or workmanship. StoneAge reserves the right to examine the alleged defective Product to determine whether this Limited Warranty is applicable, and final determination of limited warranty coverage lies solely with StoneAge. No statement or recommendation made by a StoneAge representative, Dealer or agent to End-User shall constitute a warranty by StoneAge or a waiver or modification to any of the provisions hereof or create any liability for StoneAge.

3. WARRANTY SERVICE PROVIDERS. Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at www.stoneagetools.com/service. Unauthorized service, repair or modification of the Product or use of parts not approved by StoneAge will void this Limited Warranty. StoneAge reserves the right to change or improve the material and design of the Product at any time without notice to End-User, and StoneAge is not obligated to make the same improvements during warranty service to any Product previously manufactured.

4. WARRANTY EXCLUSIONS. This Limited Warranty does not cover, and StoneAge shall not be responsible for the following, or damage caused by the following: (1) any Product that has been altered or modified in any way not approved by StoneAge in advance in writing; (2) any Product that has been operated under more severe conditions or beyond the rated capacity specified for that Product; (3) depreciation or damage caused by normal wear and tear, failure to follow operation or installation instructions, misuse, negligence or lack of proper protection during storage; (4) exposure to fire, moisture, water intrusion, electrical stress, insects, explosions, extraordinary weather and/or environmental conditions including, but not limited to lightning, natural disasters, storms, windstorms, hail, earthquakes, acts of God or any other force majeure event; (5) damage to any Product caused by any attempt to repair, replace, or service the Product by persons other than StoneAge authorized service representatives; (6) costs of normal maintenance parts and services; (7) damage sustained during unloading, shipment or transit of the Product; or (8) failure to perform the recommended periodic maintenance procedures listed in the Operator's Manual accompanying the Product.

5. REQUIRED WARRANTY PROCEDURES. To be eligible for warranty service, the End-User must: (1) report the Product defect to the entity where the Product was purchased (i.e. StoneAge or the Dealer) within the Limited Warranty Period specified in this Limited Warranty; (2) submit the original invoice to establish ownership and date of purchase; and (3) make the Product available to a StoneAge authorized service representative for inspection to

determine eligibility for coverage under this Limited Warranty. This Limited Warranty shall not extend to any person or entity who fails to provide proof of original purchase from StoneAge or a Dealer. No Product may be returned for credit or adjustment without prior written permission from StoneAge.

6. DISCLAIMER OF IMPLIED WARRANTIES AND OTHER REMEDIES. EXCEPT AS EXPRESSLY STATED HEREIN (AND TO THE FULLEST EXTENT ALLOWED UNDER APPLICABLE LAW), STONEAGE HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL WARRANTIES, REPRESENTATIONS OR PROMISES AS TO THE QUALITY, PERFORMANCE OR FREEDOM FROM DEFECT OF THE PRODUCT COVERED BY THIS LIMITED WARRANTY. STONEAGE FURTHER DISCLAIMS ALL IMPLIED INDEMNITIES.

7. LIMITATION OF LIABILITY. End-User specifically acknowledges that the Product may be operated at high speeds and/or pressures, and that as such it may be inherently dangerous if not used correctly. End-User shall familiarize itself with all operation materials provided by StoneAge and shall at all times use and require its agents, employees and contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. In no event shall StoneAge be responsible for any injuries to persons or property caused directly or indirectly by the operation of the Product if End-User or any agent, employee, or contractor of End-User: (1) fails to use all necessary and appropriate safety devices, guards and proper safe operating procedures; (2) fails to maintain in good working order such safety devices and guards; (3) alters or modifies the Product in any way not approved by StoneAge in advance in writing; (4) allows the Product to be operated under more severe conditions or beyond the rated capacity specified for the Product; or (5) otherwise negligently operates the Product. End-User shall indemnify and hold StoneAge harmless from any and all liability or obligation incurred by or against StoneAge, including costs and attorneys' fees, to or by any person so injured.

TO THE FULL EXTENT ALLOWED BY APPLICABLE LAW, STONEAGE SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF GOODWILL, DIMINUTION OF VALUE, WORK STOPPAGE, INTERRUPTION OF BUSINESS, RENTAL OF SUBSTITUTE PRODUCT, OR OTHER COMMERCIAL LOSS EVEN TO THE EXTENT SUCH DAMAGES WOULD CONSTITUTE DIRECT DAMAGES), WITH RESPECT TO THE COVERED STONEAGE PRODUCT, OR OTHERWISE IN CONNECTION WITH THIS LIMITED WARRANTY, REGARDLESS OF WHETHER STONEAGE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IT IS UNDERSTOOD THAT STONEAGE'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE, OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE END-USER FOR THE PRODUCT. STONEAGE'S MAXIMUM LIABILITY SHALL NOT EXCEED, AND END-USER'S REMEDY IS LIMITED TO EITHER (1) REPAIR OR REPLACEMENT OF THE DEFECTIVE WORKMANSHIP OR MATERIAL OR, AT STONEAGE'S OPTION, (2) REFUND OF THE PURCHASE PRICE, OR (3) ISSUANCE OF A CREDIT FOR THE PURCHASE PRICE, AND SUCH REMEDIES SHALL BE END-USER'S ENTIRE AND EXCLUSIVE REMEDY.

YOU, THE END-USER, UNDERSTAND AND EXPRESSLY AGREE THAT THE FOREGOING LIMITATIONS ON LIABILITY ARE PART OF THE CONSIDERATION IN THE PRICE OF THE STONEAGE PRODUCT YOU PURCHASED.

Some jurisdictions do not allow the limitation or exclusion of liability for certain damages, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction. If any provisions of this Limited Warranty is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.



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LIGHTWEIGHT POSITIONER (LWPS-100-X) USER MANUAL

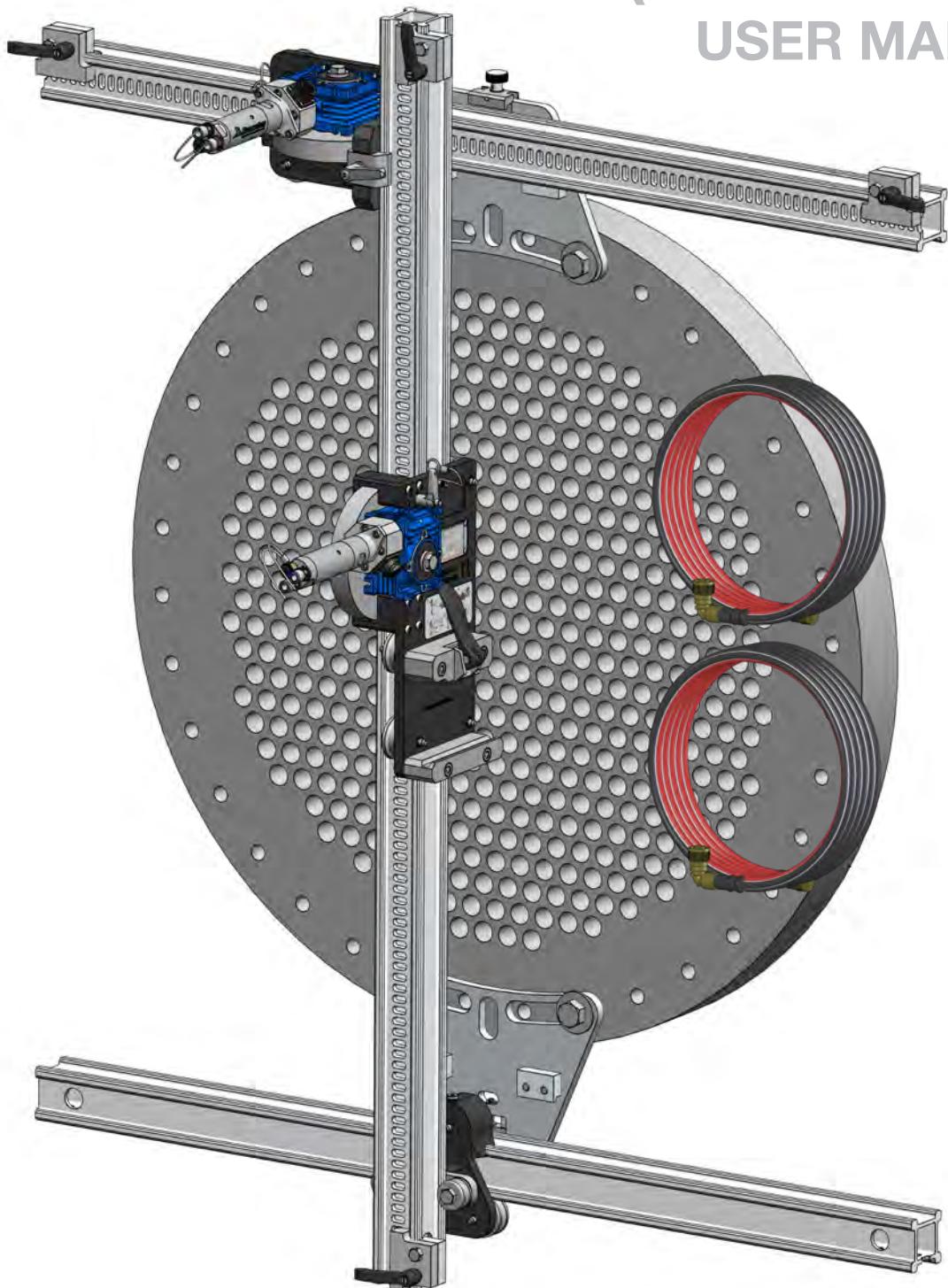


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sales-eu@stoneagetools.com

This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s). Updated manuals can be downloaded at: <https://www.stoneagetools.com/manuals>

SPECIFICATIONS		
	Imperial	Metric
Full Positioner Weight	120 lbs	54.4 kg
Vertical Carriage Weight	17 lbs	7.7 kg
Horizontal Carriage Weight	15.4 lbs	7 kg
Idler Carriage Weight	4.4 lbs	2 kg
Dimensions without extensions	6 x 6 ft	1829 x 1829 mm
Cleaning Window Dimensions for 6ft Rail Configuration	See diagram below table	
Optional Rail Extension lengths	2, 4, and 6 ft	607, 1219, and 1829 mm

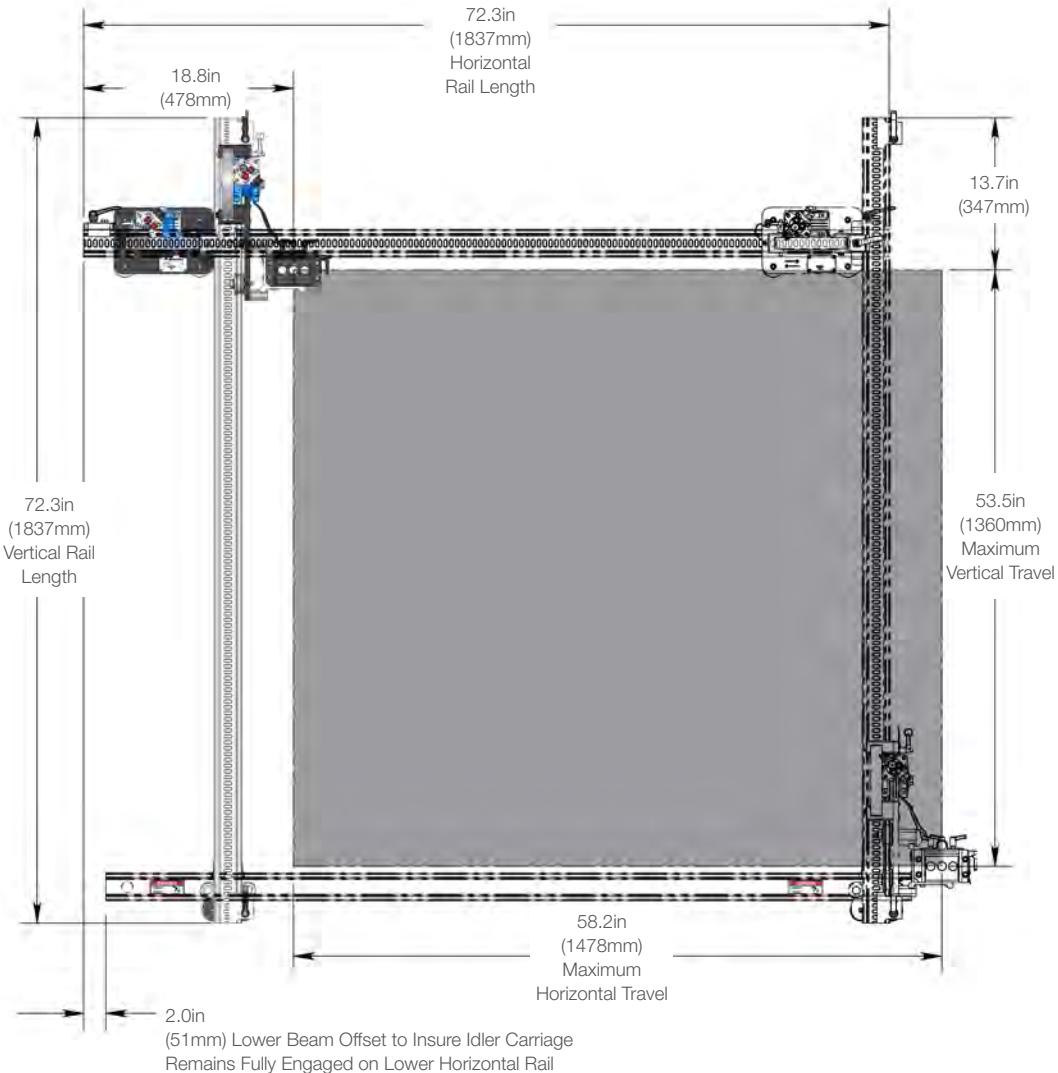
DESCRIPTION OF EQUIPMENT AND INTENDED USE

The Lightweight Positioner can be mounted to a variety of heat exchanger tube bundles and has pneumatic powered horizontal and vertical drives. It is intended to be used with these AUTOBOX® Hose Tractors;

- ABXS-3L (3 Lance with Sentinel Technology)
- ABX-3L (3 Lance)
- ABX-2L-B (2 Lance Belt Drive)
- ABX-PRO (Single Lance)

KEY FEATURES:

- Better positioning accuracy - reduced backlash and clearance across the system
- Completely tool free setup and operation
- Drives locked in place by a pin for visual confirmation of engagement
- Highly accurate position encoding
- Reduced component size and weight
- Larger usable window size
- Push-to-Connect fittings
- Metric hardware and tube sizes
- Sensor can be replaced in minutes
- Same sensor used in both drives
- Carriages are interchangeable with LWP-500
- Rail scraper on idler carriage
- Utilizes field proven stainless steel air motors





EC DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge Europe
Reedijk 7Q
3274 KE Heinenoord
Netherlands
Bob Van Wordragen, Operations Manager StoneAge NL

Declare that:

Light Weight Positioner (LWPS-100-X)
for mounting and positioning hose tractors to heat exchangers.

Is compliant with the following Directives and Standards:

EU- Machinery Directive (2006/42/EC)

EU- RoHS Directive (2011/65/EU)

EU- EMC Directive (2014/30/EU)

EN ISO 12100:2010 (e) Safety of machinery – General principles for design – Risk assessment and risk reduction

EN ISO 4414:2010 (en) Pneumatic Fluid Power – General rules and safety requirements for systems and components

EN 55011:2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

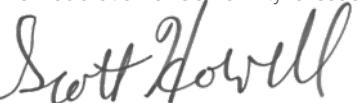
EN 60204-1:2018 Safety of machinery- Electrical equipment of machines

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Technical File for Light Weight Positioner (LWPS-100-X) is maintained at: StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Director of Engineering and Technology. The Technical File is available through the Authorized Representative.

This Declaration of Conformity is issued under the exclusive responsibility of StoneAge Incorporated.



StoneAge Incorporated, Durango, CO, USA

Scott Howell, New Product Introduction Manager

09/29/2021

Date





UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge UK
Unit 3
Crucible Business Park
Woodbury Lane
Norton
Worcester
Worcestershire, WR5 2DQ
United Kingdom
Steve Ellis, Managing Director StoneAge UK

Declare that:

Light Weight Positioner (LWPS-100-X)
for mounting and positioning hose tractors to heat exchangers.

Is compliant with the following Directives and Standards:

S.I. 2008:1597 - Supply of Machinery (Safety) Regulations 2008

S.I. 2012:3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

S.I. 2016:1091 - Electromagnetic Compatibility Regulations 2016

S.I. 2008:1597 Safety of machinery – General principles for design – Risk assessment and risk reduction

S.I. 2008:1597 Pneumatic Fluid Power – General rules and safety requirements for systems and components

S.I. 2016:1091 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

S.I. 2016:1091 Safety of machinery– Electrical equipment of machines

S.I. 2016:1091 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonized Standard for Electromagnetic Compatibility

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Scott Howell, New Product Introduction Manager

09/29/21
Date



WARNING AND SAFETY INSTRUCTIONS

OPERATOR TRAINING

Managers, Supervisors, and Operators MUST be trained in Health and Safety Awareness of High-pressure Water Jetting and hold a copy the Water Jetting Association (WJA) Code of Practice, or equivalent (see www.waterjetting.org.uk).

Operators MUST be trained to identify and understand all applicable standards for the equipment supplied. Operators should be trained in manual handling techniques to prevent bodily injury.

StoneAge has designed and manufactured this equipment considering all hazards associated with its operation. StoneAge assessed these risks and incorporated safety features in the design. StoneAge **WILL NOT** accept responsibility for the results of misuse.

IT IS THE RESPONSIBILITY OF THE INSTALLER/OPERATOR to conduct a job specific risk assessment prior to use. Job specific risk assessment MUST be repeated for each different set up, material, and location.

The risk assessment MUST conform to the Health and Safety at Work Act 1974 and other relevant Health and Safety legislation.

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Use of Personal Protective Equipment (PPE) is dependent on the working pressure of water and the cleaning application. Managers, Supervisors, and Operators MUST carry out a job specific risk assessment to define the exact requirements for PPE. See Protective Equipment for Personnel (Section 6) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment for additional information.

Hygiene - Operators are advised to wash thoroughly after all waterjetting operations to remove any waterblast residue which may contain traces of harmful substances.

First aid provision - users MUST be provided with suitable first aid facilities at the operation site.

SAFETY LABEL DEFINITION

The Lightweight Positioner (LWPS-100-X) has the potential to cause serious injury if fingers, hair, or clothing become caught between the rollers and the rails.

Operators MUST read, understand, and follow the Operational and Training Requirements (Section 7.0) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment, or equivalent.

Operators MUST read, understand and follow the Warnings, Safety Information, Assembly, Installation, Connection, Operation, Transport, Handling, Storage, and Maintenance Instructions detailed in this manual.

The risk assessment MUST consider potential material or substance hazards including:

- Aerosols
- Biological and microbiological (viral or bacterial) agents
- Combustible materials
- Dusts
- Explosion
- Fibers
- Flammable substances
- Fluids
- Fumes
- Gases
- Mists
- Oxidizing Agents

PPE may include:

- **Eye protection:** Full face visor
- **Foot protection:** Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- **Hand protection:** Waterproof gloves
- **Ear protection:** Ear protection for a minimum of 85 dBA
- **Head protection:** Hard hat that accepts a full face visor and ear protection
- **Body protection:** Multi-layer waterproof clothing approved for waterjetting
- **Hose protection:** Hose shroud
- **Respiratory protection:** May be required; refer to job specific risk assessment



WARNING AND SAFETY INSTRUCTIONS

⚠ WARNING

Operations with this equipment can be potentially hazardous. Caution MUST be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

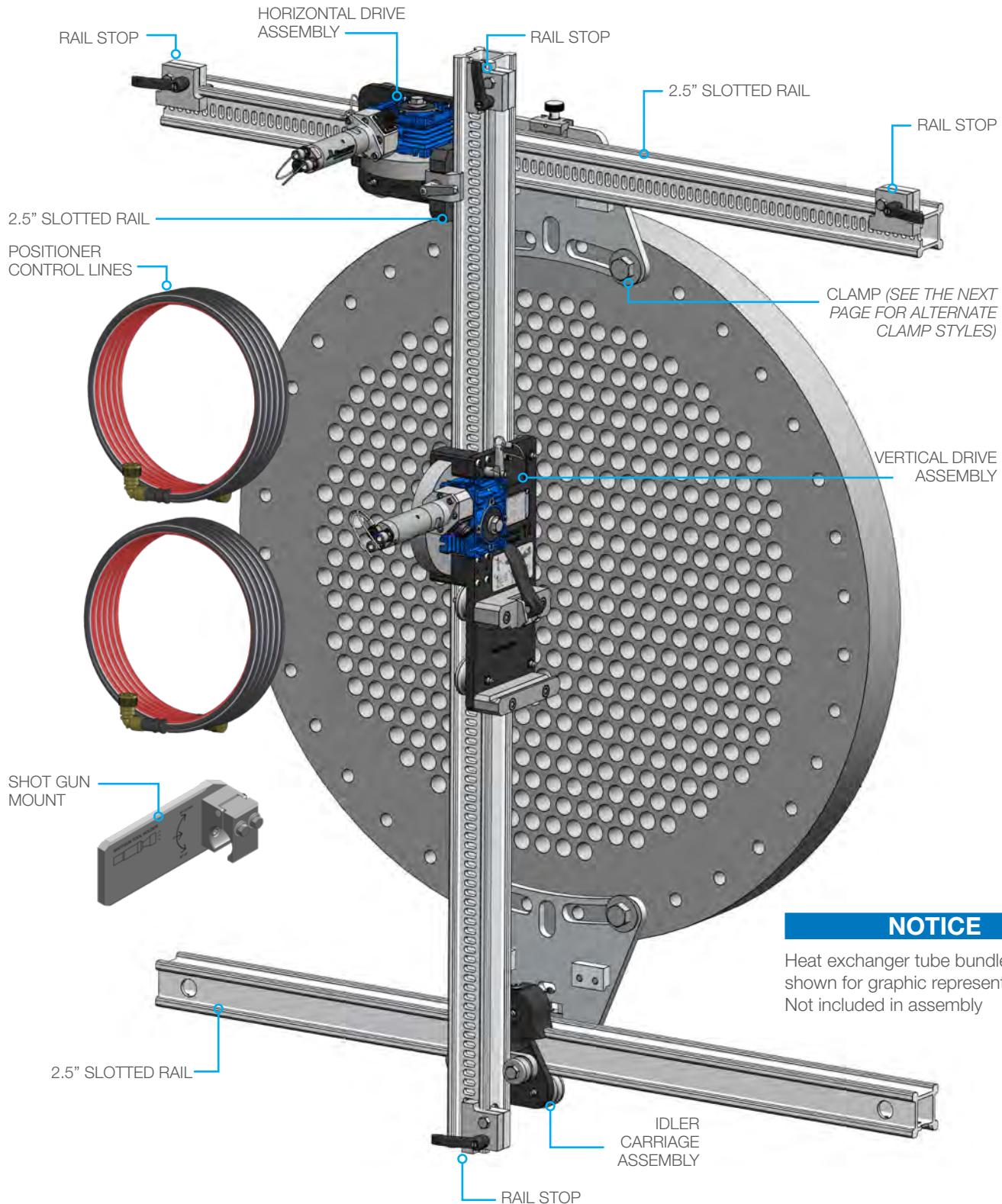
- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate if damaged, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Users of the Lightweight Positioner (LWPS-100-X) MUST be trained and/or experienced in the use and application of high-pressure technology and cleaning, as well as all associated safety measures, according to the WJTA Recommended Practices for the use of High-pressure Waterjetting Equipment.
- An anti-withdrawal device (back-out preventer) MUST be used at all times. The back-out prevention device is the Hose Stop Collet located within the Hose Guide Assembly. StoneAge offers several different size Hose Stop Collets. The Collet Size Reference guide is located on the Hose Guide Assembly.
- The Control Box should be located in a safe location where the Operator has good visibility of the pipe and hose. The Lightweight Positioner (LWPS-100-X) and Control Box MUST be supervised at all times and should never be left unattended.
- Always de-energize the system before servicing or replacing any parts. Failure to do so can result in severe injury and/or death.
- When moving the Lightweight Positioner (LWPS-100-X) lift with care to prevent bodily injury.

PRE-RUN SAFETY CHECK

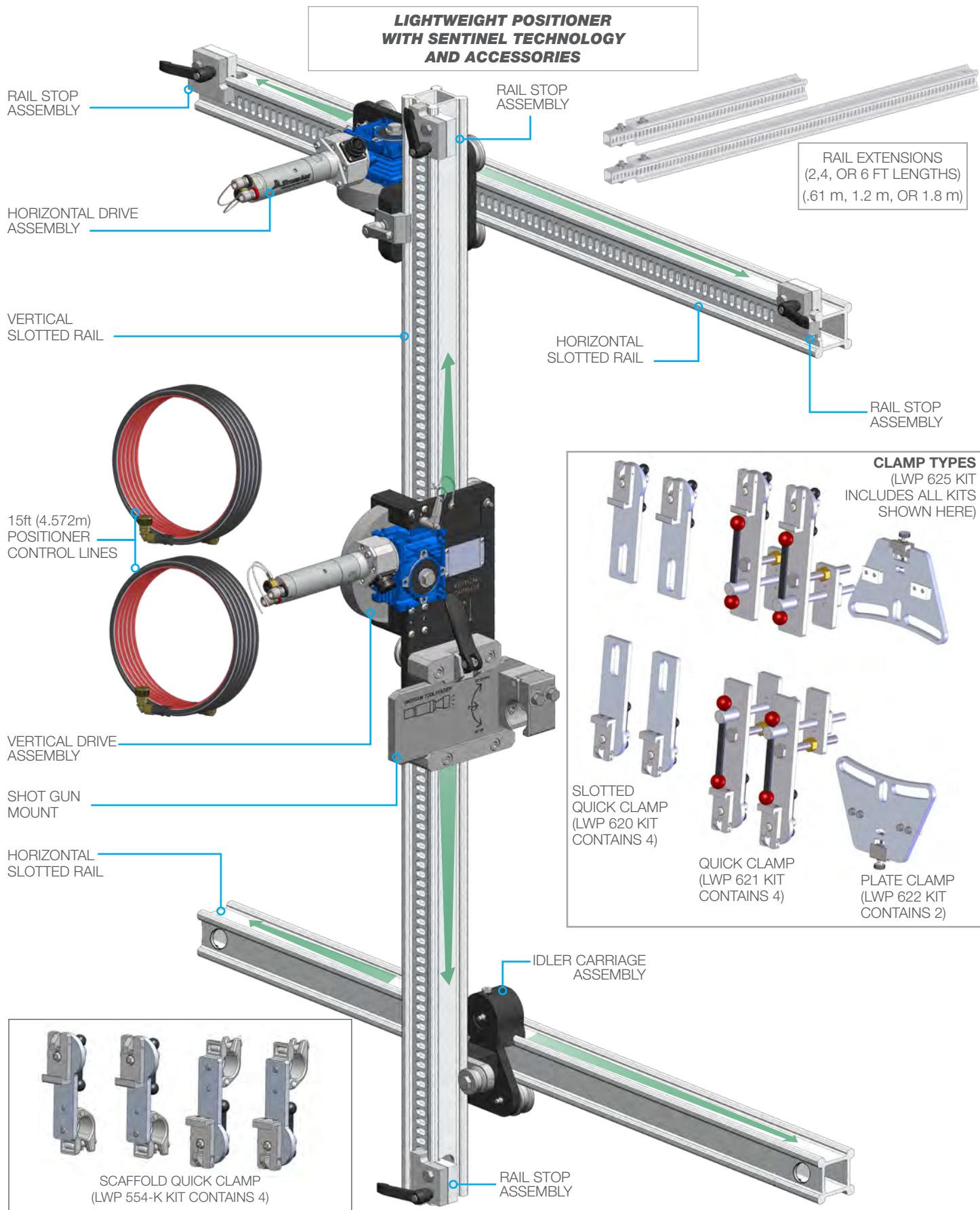
Refer to WJTA-IMCA's, Recommended Practices For The Use Of High-pressure Waterjetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

- Complete a job specific risk assessment and act on the resulting actions.
- Adhere to all site specific safety procedures.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Ensure the work place is free of unnecessary objects (e.g. loose parts, hoses, tools).
- Ensure all Operators are using the correct Personal Protective Equipment (PPE).
- Check that the air hoses are properly connected and tight.
- Check all hoses and accessories for damage prior to use. Do not use damaged items. Only high quality hoses intended for waterblast applications should be used as high-pressure hoses.
- Check all high-pressure threaded connections for tightness.
- ****Ensure that a anti-withdrawal device (back-out preventer), whip checks (hose whips), and all other applicable safety devices are installed and set-up properly.****
- Ensure the doors of the Lightweight Positioner (LWPS-100-X) are closed and securely latched.
- Test the Control Box before operating the Lightweight Positioner (LWPS-100-X) with high-pressure water to verify the control valves move the hose in the intended direction, and that the dump valve and hose clamp are working properly.
- Ensure that Operators never connect, disconnect, or tighten hoses, adapters, or accessories with the high-pressure water pump unit running.
- Ensure no personnel are in the hydroblasting zone.

LIGHTWEIGHT POSITIONER ASSEMBLY (LWPS-100-X)



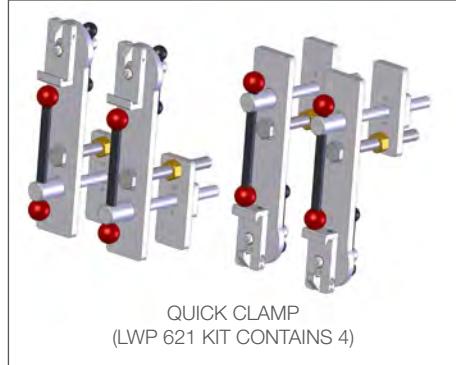
LIGHTWEIGHT POSITIONER - OVERVIEW



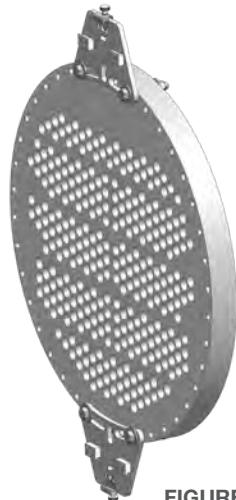
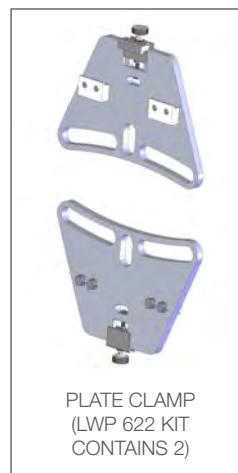
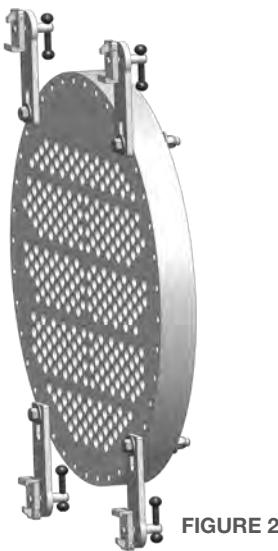
LIGHTWEIGHT POSITIONER CLAMP STYLES

CLAMP SELECTION is dependent upon the heat exchanger geometry, bolt holes, hole spacing, and flange accessibility.

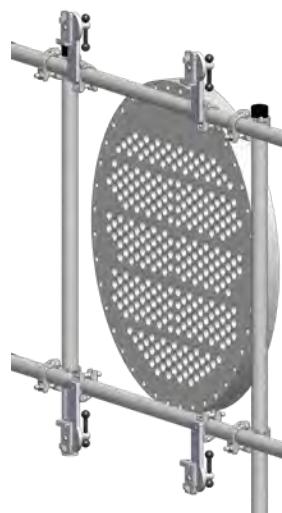
QUICK CLAMPS (LWP 518) are for use with heat exchanger flanges that provide a robust clamping surface or if flange holes are inaccessible. Align clamps on the surface of the flange to maximize flange engagement to clamps. (Figure 1)



SLOTTED QUICK (LWP 552) AND PLATE CLAMPS (LWP 519) are for use with heat exchanger flanges that have easily accessible bolt holes. Use quick clamps or plate clamps, depending on the spacing of the hole pattern. (Figures 1 & 3)



SCAFFOLD QUICK CLAMPS (LWP 554) are for use with scaffolding in situations where they may be no way to clamp directly onto the heat exchanger. (Figure 4)



LIGHTWEIGHT POSITIONER STEP BY STEP SET-UP

NOTICE

Heat exchanger tube bundle face, shown for graphic representation only. Not included in assembly

1. Mount the appropriate frame **Positioner Clamps** to the tube bundle as shown in Figure 1. (Shown with Plate Clamps) Positioner Clamps should be Parallel to the direction of the tube rows. **(Figure 1)**

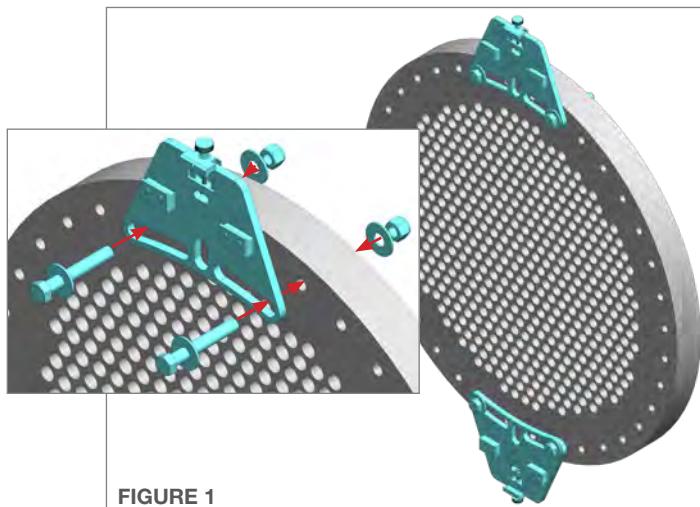


FIGURE 1

2. Loosen the **Rail Clamp Tensioner** on the top **Positioner Clamp** and insert the **Top Rail (slots facing out)** into the upper rail clamps. Tighten the **Rail Clamp Tensioner** securing the rail to the **Positioner Clamp**. Check Rail Clamp bolts to ensure they are secured to the tube bundle flange. **(Figure 2)**

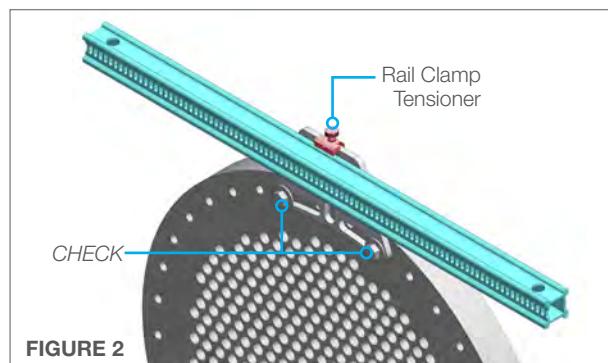


FIGURE 2

3. Loosen the **Rail Clamp Tensioner** on the bottom **Positioner Clamp** and insert the **Lower Rail** *with the slots facing down*, into the lower rail clamps. It is not critical that this rail is aligned as precisely as the top rail, but it should be close to parallel with the top rail for best performance. Tighten the **Rail Clamp Tensioner** securing the rail to the **Positioner Clamp**. Check Rail Clamp bolts to ensure they are secured to the tube bundle flange. **(Figure 3)**

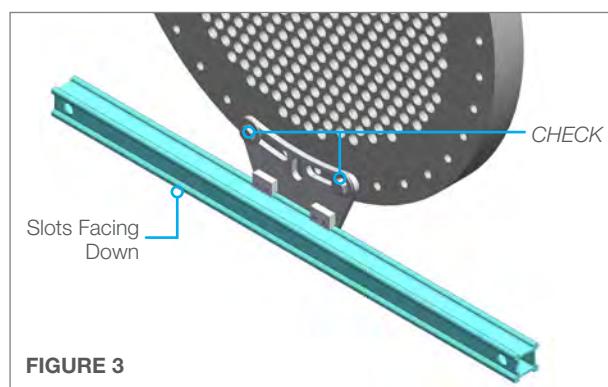


FIGURE 3

4. Remove the **Quick Release Pin** from the *locked*

position, pull back on the air motor to lift the gear, and insert the **Quick Release Pin** into the *unlocked* position. This will allow the **Horizontal Drive Carriage** to slide onto the rail without pneumatic power. Center the carriage on the top rail, pull out the **Quick Release Pin**, let the gear drop into place and verify the gear is engaging the slotted rail correctly. Replace the **Quick Release Pin** into the *locked* position. **(Figures 4 & 5)**

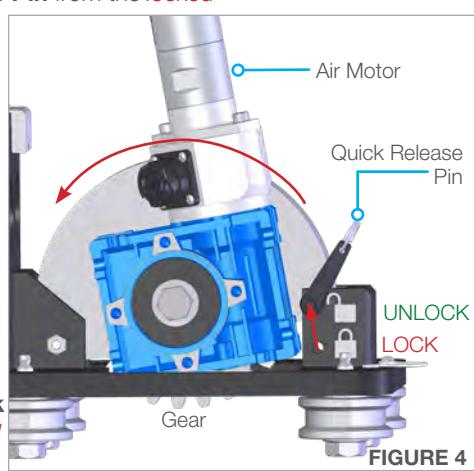


FIGURE 4

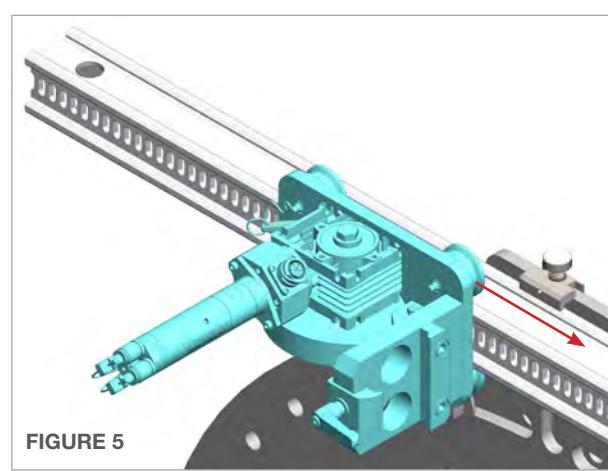


FIGURE 5

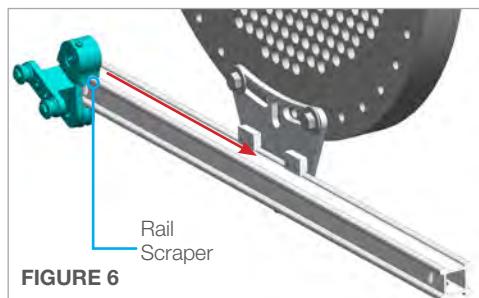
LIGHTWEIGHT POSITIONER SET-UP

- Angle the **Idler Carriage** as shown to allow the Idler Carriage to engage with the lower rail properly. Rotate it back to the vertical position and slide it towards the lower Rail Clamp. (**Figure 6**)



TECH TIP:

The rail scraper is spring loaded to fit closely against the rail to remove debris ahead of the idler roller. Pulling up on the rail scraper or tilting the idler carriage during installation will increase clearance and simplify installation.



- Loosen the **Rail Clamp Handle** on the Horizontal Drive. Align the Idler Carriage on the lower rail so the Vertical Rail can slide into it. Slide the **Vertical Rail** with **(slots facing out)** down through the Horizontal Drive clamp and between the rollers on the idler carriage. Adjust the position of the vertical rail as required and secure the rail in place by tightening the **Rail Clamp Handle** on the Horizontal Drive. (**Figure 7**)

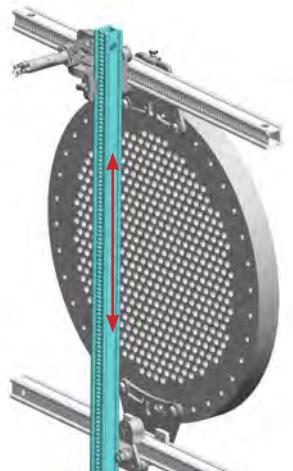
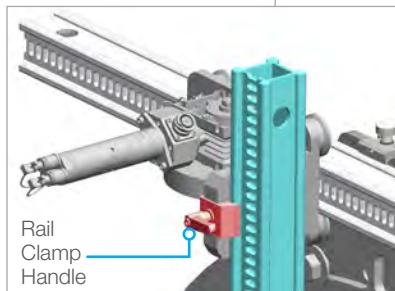


FIGURE 7

- Remove the **Quick Release Pin** from the *locked* position, pull back on the air motor to lift the gear, and insert the **Quick Release Pin** into the *unlocked* position. This will allow the **Vertical Drive Carriage** to slide onto the rail without pneumatic power. Center the carriage on the vertical rail, pull out the **Quick Release Pin**, let the gear drop into place and verify the gear is engaging the slotted rail correctly. Replace the **Quick Release Pin** into the *locked* position. (**Figures 8 & 9**)

CAUTION

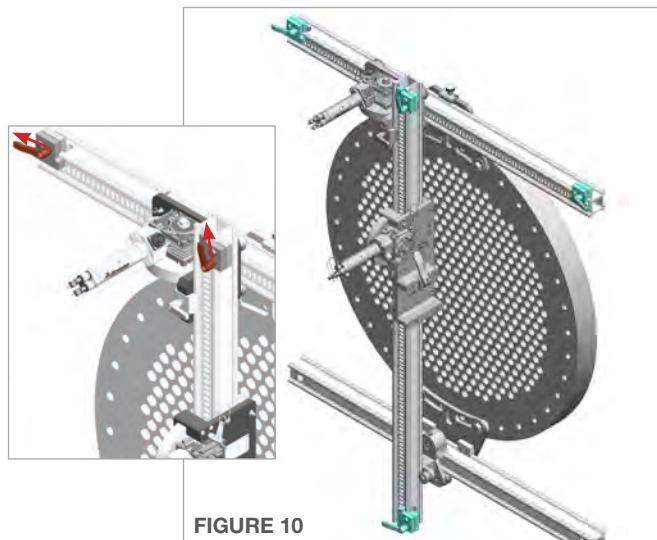
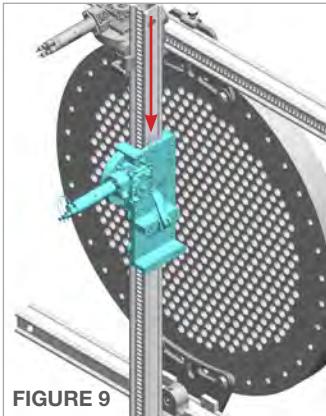
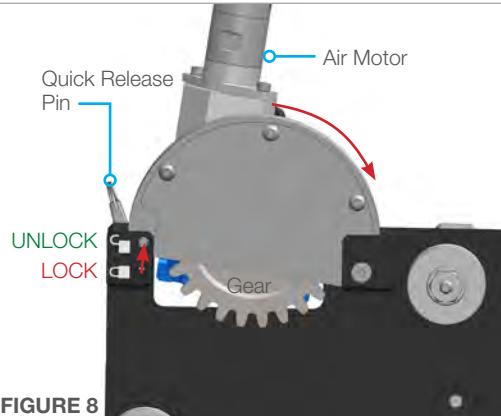
Verify the Positioner Clamps and Rail Clamps are securely fastened and both drive carriages are securely engaged and the pinned in the locked position.

Never unlock the vertical drive once the guide assembly and tractor are installed, as it may result in the carriage slipping down the vertical rail and may cause damage and/or injury.

- Loosen the handles on the four **Rail Stops** and slide one onto both ends of the top horizontal rail and both ends of the vertical rail. Rotate all the handles so they face away from Horizontal and Vertical Drives (as shown) and ensure that they are securely fastened. (**Figure 10**)

WARNING

Failure to secure the Rail Clamps properly could result in the carriages driving off the rails. This may create a hazardous situation resulting in serious injury or death.



LIGHTWEIGHT POSITIONER CONNECTIONS TO THE POWER HUB

CONTROL LINE CONNECTIONS

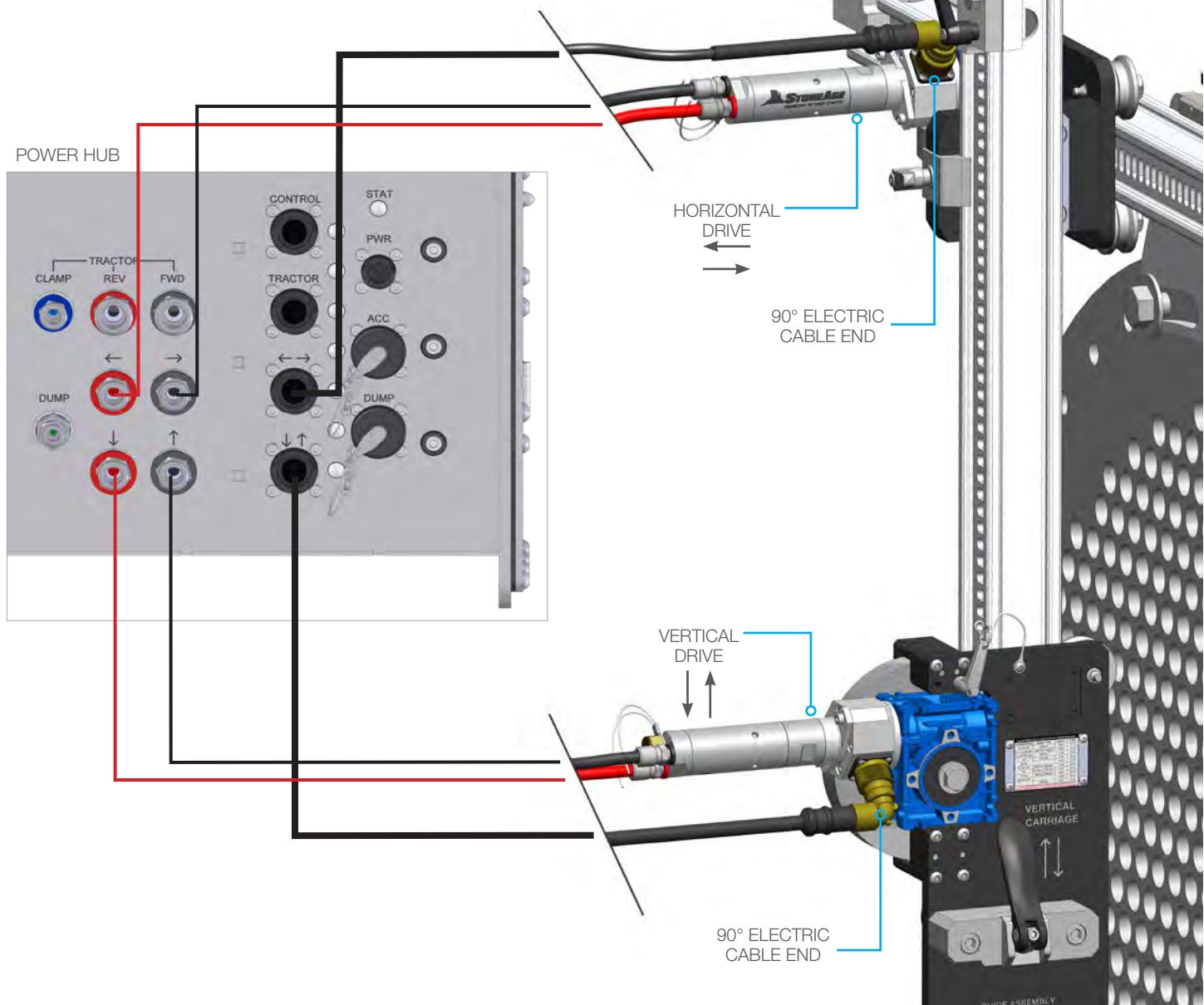
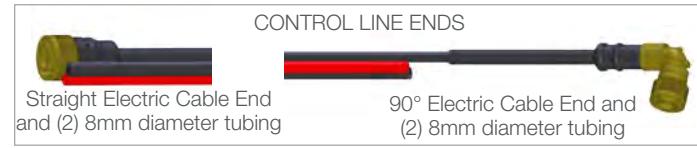
1. Remove the dust caps from all fittings of the Horizontal and Vertical Drives.
2. **Connect control lines to the front of the Power Hub**
 - Two Straight Electric Cable Ends (↓↑, ←→)
 - Two 8mm diameter tubing for the Horizontal Drive (←→)
 - Two 8mm diameter tubing for the Vertical Drive. (↓↑)
3. **Blow out all control lines. Use of dirty or contaminated pneumatic hoses will cause component damage and malfunction**

4. Connect control lines to the Horizontal Drive

- Connect the two 8mm diameter tubing from the Power Hub (←→) to the corresponding color coded fittings on the Horizontal Drive.
- Connect the 90° Pot Plug from the Power Hub (←→) to the receptacle on the sensor.

5. Connect control lines to the Vertical Drive

- Connect the two 8mm diameter tubing from the Power Hub (↓↑) to the corresponding color coded fittings on the Vertical Drive.
- Connect the 90° Pot Plug from the Power Hub (↓↑) to the receptacle on the sensor.

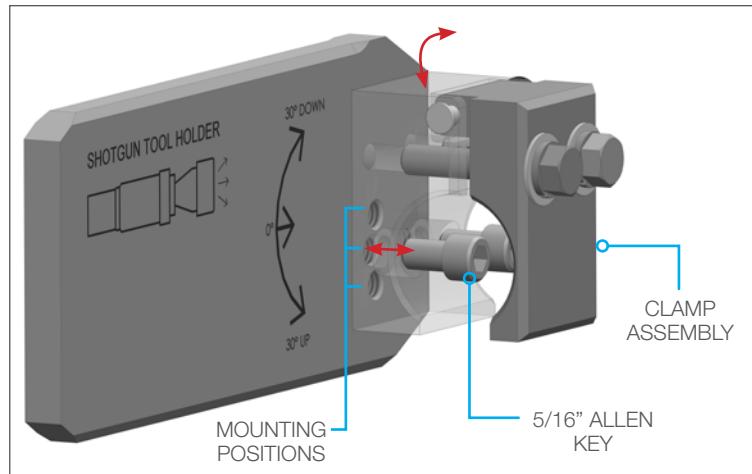


SHOTGUN MOUNT INSTALLATION

INSTALL SHOTGUN MOUNT (FOR USE WITH BARRACUDA OR SPITFIRE TOOL)

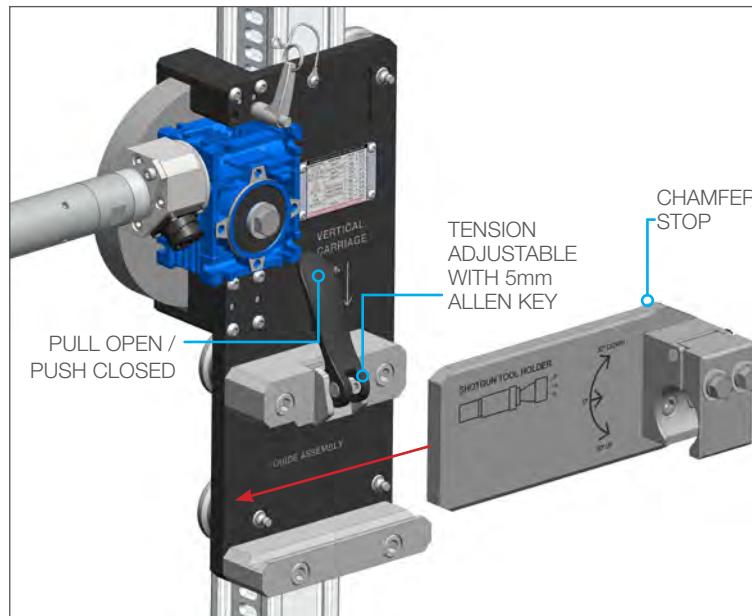
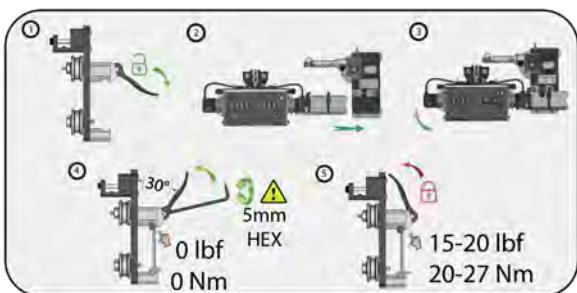
1. Set the desired Clamp Angle.

- The Clamp Assembly on the Shotgun Mount can be rotated 30° Up or Down by removing the two SHCS Screws with a 5/16" Allen Key, rotating the Clamp into the desired position, and fastening the Screws in the desired location.
- Make sure these screws are tightened before operation.**



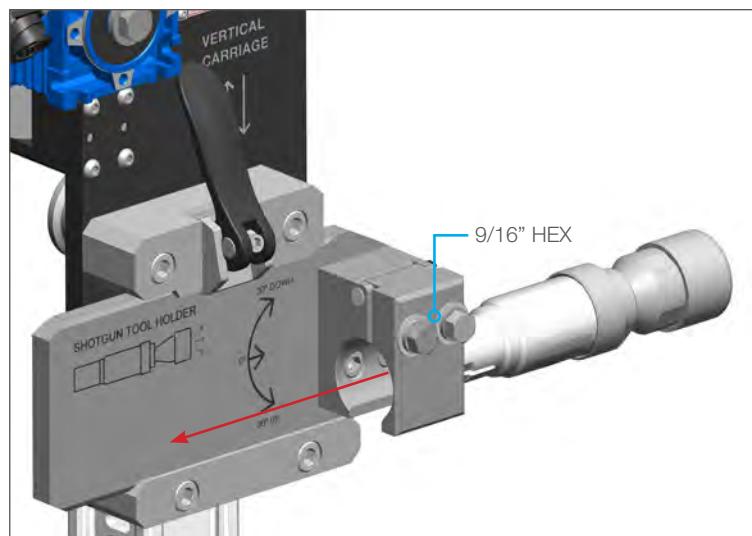
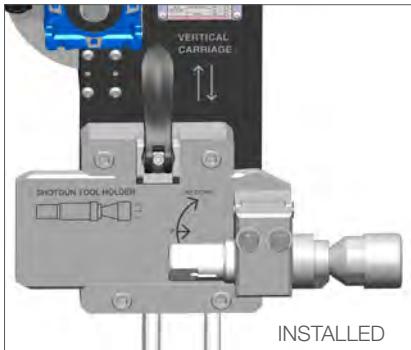
2. Install Shotgun Mount onto the Vertical Carriage.

- Pull to open the Clamp Handle on the Vertical Carriage and slide the Shotgun Mount in back to front.
- The mount will stop when it reaches the chamfers at the front. This is a safety feature.
- Lock the Clamp Handle in place when the mount is in position.
- If the Clamp Handle feels too loose or too tight, it can be adjusted with a 5mm Allen Key. Follow the instructions on the decal on the Vertical Drive.



3. Fasten the Shotgun tool in the Clamp.

- Loosen the two Hex Bolts on the Clamp with a 9/16" Hex Wrench.
- Slide the tool in back to front and securely tighten the Hex Bolts.



Maintenance Item	Frequency	Maintenance Required
Forward, reverse, and clamp fittings	Before each use	Inspect threads for wear or damage.
Carriage rollers	Every 100 Hours of use	Lubricate Zerks on all Carriage Rollers using any multipurpose NLGI 2 grease.
Vertical and Horizontal Rails	As Needed	Inspect for wear that would allow Carriage Rollers to slip off. Replace Rail as needed.
Quick Release Handles	When loose or too tight	5mm hex to tighten. When it's set correctly it should take 15-20lbs of force to close the lever

Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the Lightweight Positioner.

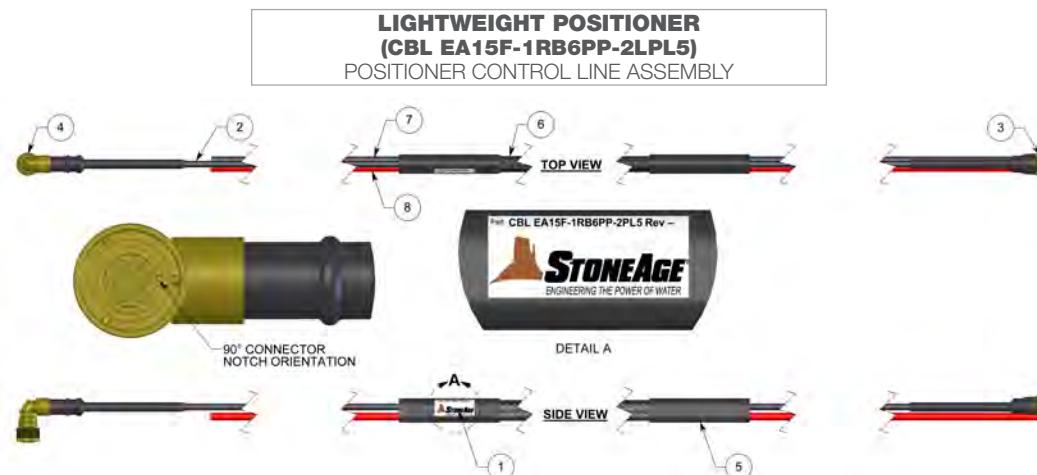
STORAGE, TRANSPORTATION, AND HANDLING

Return the plugs into all push connect fittings to keep water away from the connectors during cleaning. Use mild soapy water to clean the machine in order to remove corrosive materials. Before storing the unit, use compressed air to lightly blow off debris and moisture. Apply a small amount of air tool oil directly into the Horizontal and Vertical Drive fittings. Then, briefly operate the controls at slow speed for a short duration in each direction to coat the interior parts of the motor. Install the dust caps onto all fittings to keep moisture and dirt out.

**DO NOT SPRAY WATER DIRECTLY AT OR SUBMERGE THE AIR MOTOR BREather PORTS OR ELECTRONIC COMPONENTS.
MAKE SURE ALL DUST CAPS ARE IN PLACE AND ELECTRICAL SENSOR CONNECTIONS ARE TIGHT PRIOR TO CLEANING.**

The Lightweight POSITIONER (LWPS-100-X), can be broken down into smaller components that should be stored in a clean and dry area.

PARTS DIAGRAM

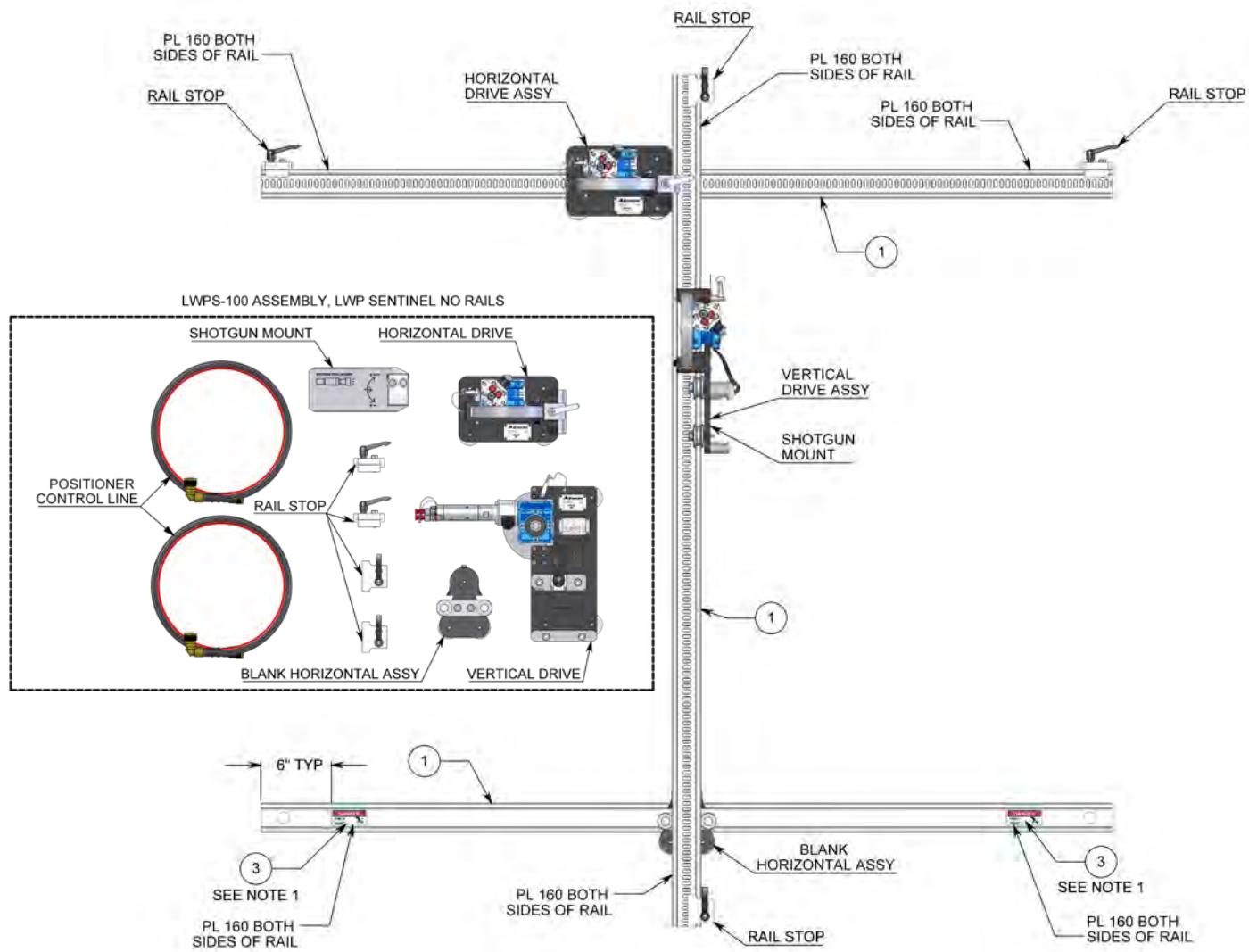


#	PART NUMBER	QTY	OAL EACH
1	CBL EA15F-1RB6PP-2PL6.1 LABEL	1	
2	CBL EA15F.1 WIRE, 1X4 PAIR, 24 (7/32" AWG COPPER ALLOY, .011" POLYPLEFIN	1	15'-0"
3	EE CN-RB-PF6PS-14S-0001 PLUG, POT AND HEATSHRINK ENDBELL	1	
4	EE CN-RB-PF6PS-14S-0001 PLUG, 90 DEG POT AND HEATSHRINK ENDBELL	1	
5	GPHS 1100-OLE-A-BK HEAT SHRINK, 1.1" ID, BLACK	2	5"
6	GPSL 0750-NYL-G-BK HOSE BUNDLE SLEEVE	1	11'-4"
7	GPTB 8MM6-PUR95A-BK 8MM OD X 6MM ID URETHANE TUBING, BLACK	1	14'-2"
8	GPTB 8MM6-PUR95A-RD 8MM OD X 6MM ID URETHANE TUBING, RED	1	14'-2"

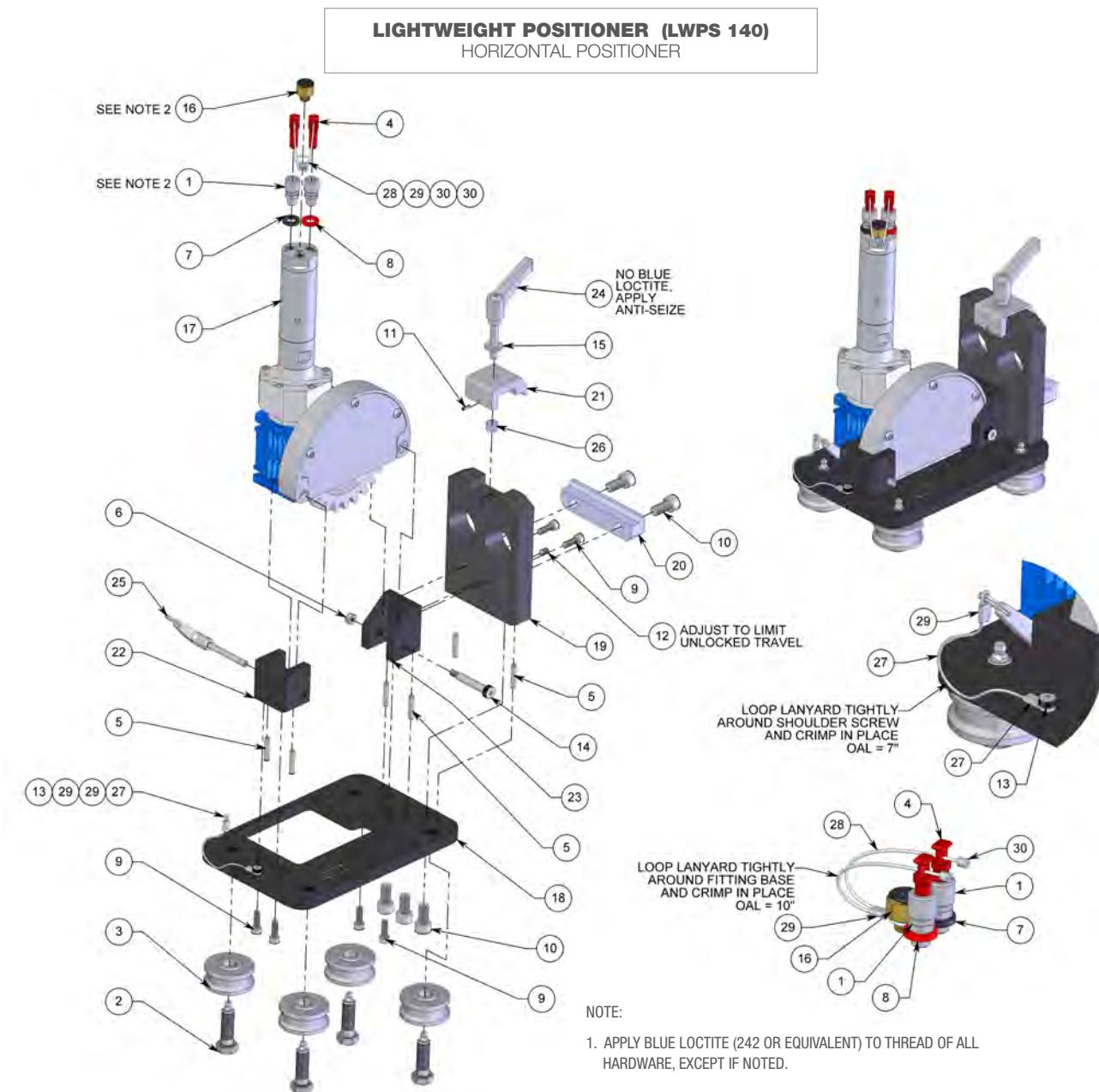
PIN	WIRE	
A	BROWN / BROWN WHITE	12V
B	GREEN WHITE	485-B
C	GREEN	485-A
D	BLUE / BLUE WHITE	GND
E	ORANGE	SFT-A
F	ORANGE WHITE	SFT-B

PARTS DIAGRAM

LIGHTWEIGHT POSITIONER ASSEMBLY (LWPS-100-X)



#	PART NUMBER	QTY
1	BU 002-6-001 2.5" BOX RAIL EXTRUSION, SLOTTED	3
2	LWPS-100 ASSEMBLY, LWP SENTINEL NO RAILS	1
3	PL 160 WARNING PINCH POINT 1.25 X 3.0 DECAL	12

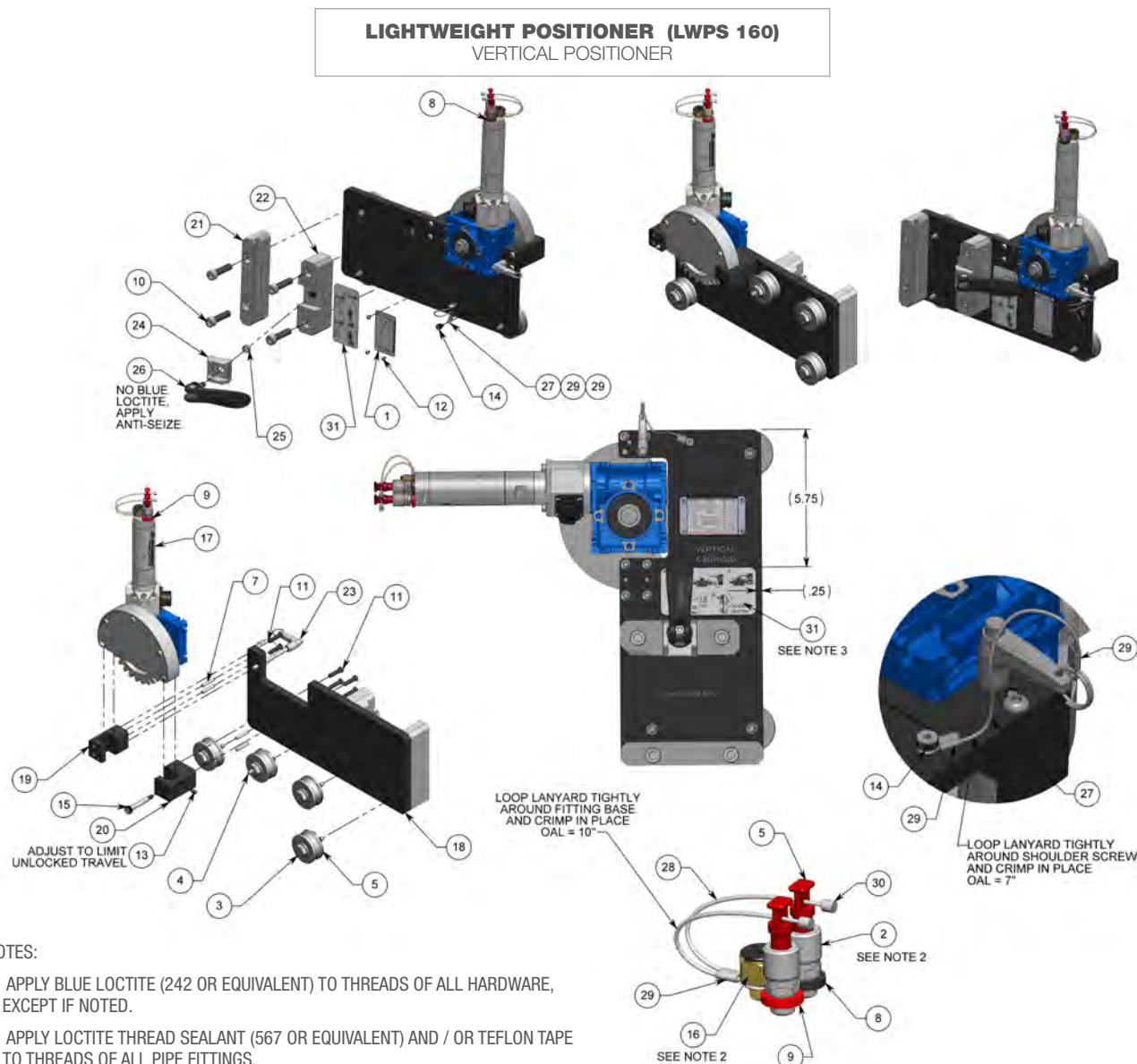


#	PART NUMBER	QTY
1	ABXS 277 FTG, ADAPTER P2M PL5 EISELE	2
2	BR 051-1.5-0 AXLE-ZERK	4
3	BR 055-SS ROLLER ASSY	4
4	CB 499 FTG, STEM PLUG PL5 MODIFIED	2
5	GDP 3M5-26 PIN, DOWEL M5 x 26 SS	6
6	GN 3M6-1.0-L NUT, NYLOK M6x1.0 SS	1
7	GP 014-BK ID WASHER, RUBBER, EXTRA SMALL, BLACK	1
8	GP 014-R ID WASHER, RUBBER, EXTRA SMALL, RED	1
9	GS 3M6-18-1.0 SHCS M6x1.0 x 18 SS	6
10	GS 3M10-20-1.5 SHCS M10x1.5 x 20 SS	5

11	GSP 3M3-10 SLOTTED SPRING PIN M3 X 10 SS	1
12	GSS 3M6-1.0-10CU SET SCREW, CUP PT M6x1.0 x 10 SS	1
13	GSSH M5-4-SS SHOULDER SCREW M5 X 4 SS	1
14	GSSH M8-40-SS SHOULDER SCREW M8 X 40 SS	1
15	GW 525-F WASHER, FLAT .25	1
16	LWP 557 FTG, EXHAUST PROTECTOR P2M	1
17	LWPS 110 ASSY, GEAR DRIVE	1
18	LWPS 141 PLATE, HORIZONTAL CARRIAGE	1
19	LWPS 143 PLATE, RAIL BASE	1

20	LWPS 144 CLAMP, RAIL	1
21	LWPS 145 JAW, ADJUSTABLE CLAMP	1
22	LWPS 148 MOUNT, HORIZONTAL GEAR LEFT	1
23	LWPS 149 MOUNT, HORIZONTAL GEAR RIGHT	1
24	LWPS 151 LEVER, HAND SS	1
25	LWPS 152 PIN, QUICK-RELEASE .25 X 1.75	1
26	PROP 335 SPRING, COMPRESSION	1
27	SRT 209.1.1 WIRE ROPE FOR LWPS 140 (CUT TO 7IN)	1
28	SRT 209.1.1 WIRE ROPE FOR LWPS AIR MOTOR (CUT TO 10IN)	1
29	SRT 209.1.3 ALUMINUM SLEEVE	3
30	SRT 209.1.4 ALUMINUM STOP SLEEVE	2

PARTS DIAGRAM



NOTES:

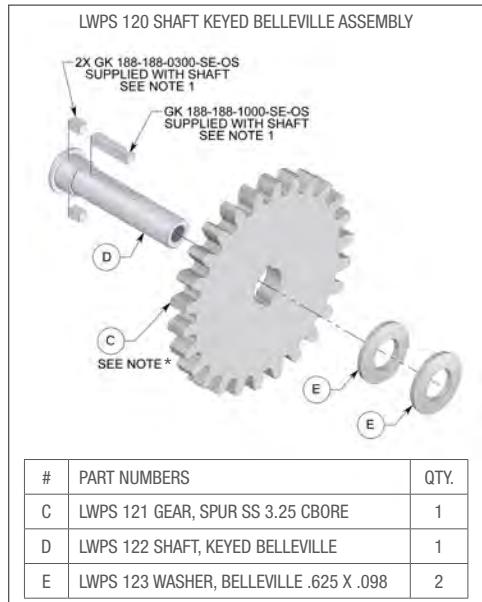
1. APPLY BLUE LOCTITE (242 OR EQUIVALENT) TO THREADS OF ALL HARDWARE, EXCEPT IF NOTED.
2. APPLY LOCTITE THREAD SEALANT (567 OR EQUIVALENT) AND / OR TEFLON TAPE TO THREADS OF ALL PIPE FITTINGS.
3. CLEAN SURFACE WITH ISOPROPYL ALCOHOL BEFORE INSTALLING DECAL. LOCATE APPROX. WHERE SHOWN.

#	PART NUMBER	QTY
1	ABX 139 COLLET REFERENCE PLATE	1
2	ABXS 277 FTG, ADAPTER P2M PL5 EISELE	2
3	BR 051-1.5-0 AXLE-ZERK	3
4	BR 052-1.5 AXLE-ZERK	1
5	BR 055-SS ROLLER ASSY	4
6	CB 499 FTG, STEM PLUG PL5 MODIFIED	2
7	GDP 3M5-26 PIN, DOWEL M5 X 26 SS	4
8	GP 014-BK ID WASHER, RUBBER, EXTRA SMALL, BLACK	1
9	GP 014-R ID WASHER, RUBBER, EXTRA SMALL, RED	1
10	GS 3M10-40-1.5 SHCS M10X1.5 X 40 SS	4

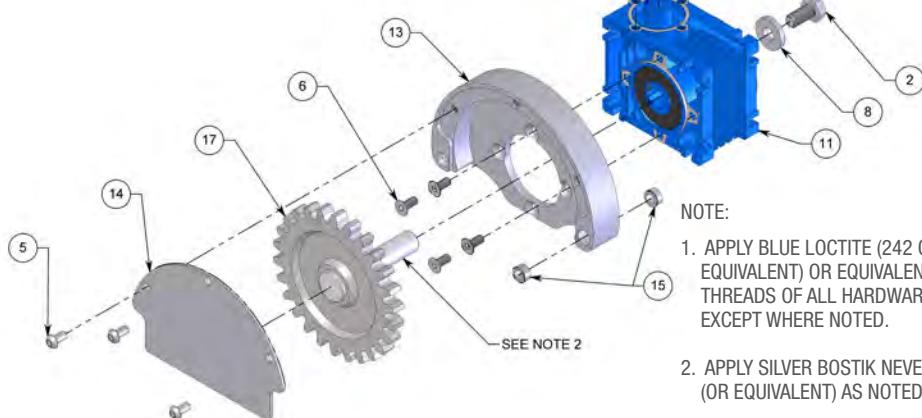
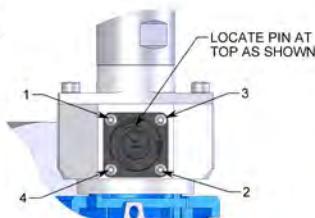
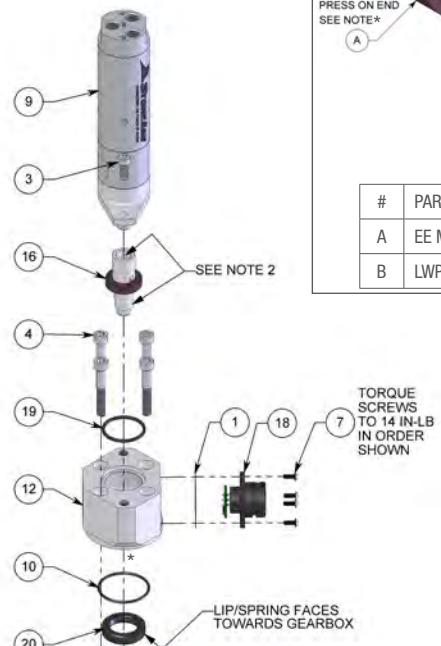
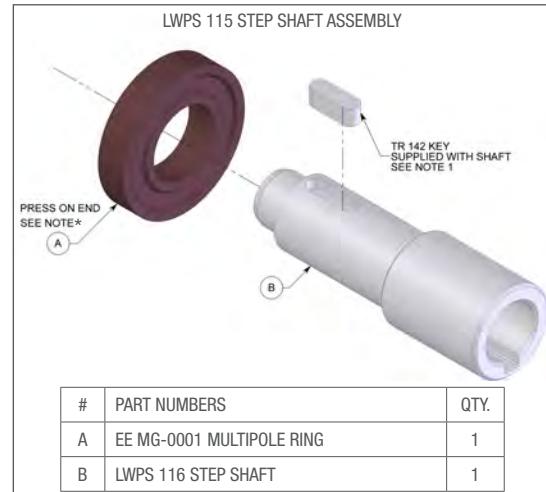
11	GSB 3M6-25-1.0 BHCS M6X1.0 X 25 SS	6
12	GSB 313-0075 BHCS 6-32 X .19 SS	4
13	GSS 3M6-1.0-10CU SET SCREW, CUP PT M6X1.0 X 10 SS	1
14	GSSH M5-4-SS SHOULDER SCREW M5 X 4 SS	1
15	GSSH M8-40-SS SHOULDER SCREW M8 X 40 SS	1
16	LWP 557 FTG, EXHAUST PROTECTOR P2M	1
17	LWPS 110 ASSY, GEAR DRIVE	1
18	LWPS 161 PLATE, VERTICAL CARRIAGE	1
19	LWPS 163 MOUNT, VERTICAL GEAR LEFT	1
20	LWPS 164 MOUNT, VERTICAL GEAR RIGHT	1

21	LWPS 166 CLAMP, LOWER RAIL	1
22	LWPS 167 CLAMP, UPPER RAIL	1
23	LWPS 171 PIN, QUICK-RELEASE .25X2.75	1
24	PROP 334 TAB, CLAMP	1
25	PROP 335 SPRING, COMPRESSION	1
26	PROP 336 HANDLE ASSY	1
27	SRT 209.1.1 WIRE ROPE FOR LWPS 160 (CUT TO 7IN)	1
28	SRT 209.1.1 WIRE ROPE FOR LWPS AIR MOTOR (CUT TO 10IN)	1
29	SRT 209.1.3 ALUMINUM SLEEVE	3
30	SRT 209.1.4 ALUMINUM STOP SLEEVE	2
31	PL 211 LWPS CLAMP DECAL	1

LIGHTWEIGHT POSITIONER (LWPS 110) GEAR DRIVE ASSEMBLY



* APPLY LOCTITE RETAINING COMPOUND (680 OR EQUIVALENT) TO COMPONENTS AS NOTED. BE SURE AND SET MAGNET BEFORE KEY. BE SURE TO SET KEY AND MAGNET COMPLETELY AND SECURELY WHILE LETTING LOCTITE CURE FOR 5 HRS. WIPE EXCESS LOCTITE (ESPECIALLY SHAFT).



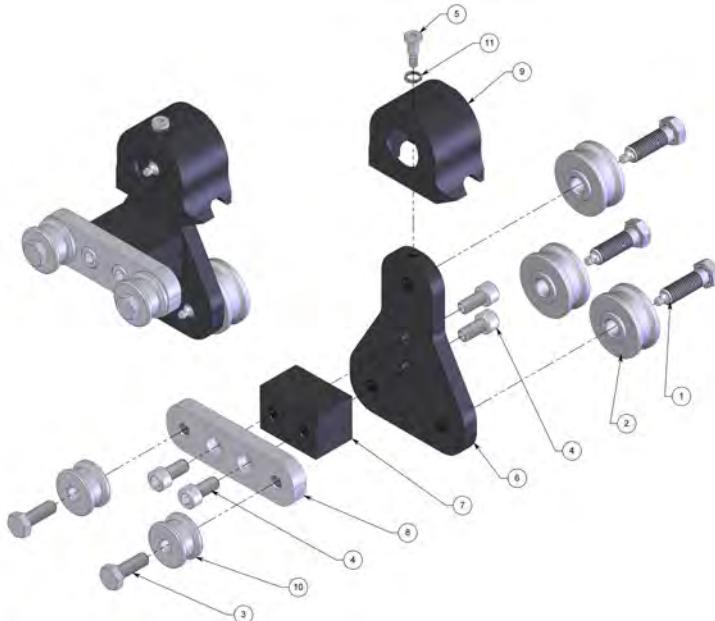
#	PART NUMBER	QTY
1	EE CN-RB-G-14S-F-AX GASKET, CONNECTOR	1
2	GB 3M10-20-1.25 BOLT, HEX M10x1.25 x 20 SS	1
3	GS 3M5-14-0.8 SHCS M5x0.8 x14 SS	2
4	GS 3M6-40-1.0 SHCS M6x1.0 x 40 SS	4
5	GSB 3M6-12-1.0 BHCS M6x1.0 x 12 SS	3
6	GSF 3M6-14-1.00 FHCS M6x1.00 x 14 SS	4

7	GTB 3M3-8-0.5 BHTS M3x0.5 x 8 Torx SS	4
8	GW 3M10-F WASHER, FLAT M10x4mm	1
9	LWP 520-001 AIR MOTOR, SS, W/ FLANGE, LUBE FREE	1
10	LWP 538 O-RING	1
11	LWP 550 MOTOVARIO GEARBOX	1
12	LWPS 111 HUB, ENCODER MOTOR MOUNT	1
13	LWPS 112 PLATE, DRIVE SPROCKET	1

14	LWPS 113 COVER, GEAR	1
15	LWPS 114 SLEEVE BEARING, OIL-IMPREGNATED	2
16	LWPS 115 ASSY, STEP SHAFT	1
17	LWPS 120 ASSY, SHAFT KEYED BELLEVILLE	1
18	LWPS 130 ASSY, LWPS SENSOR BOARD	1
19	LWPS 133 O-RING, DOUBLE SEAL X-PROFILE	1
20	SL 010 SEAL	1

PARTS DIAGRAM

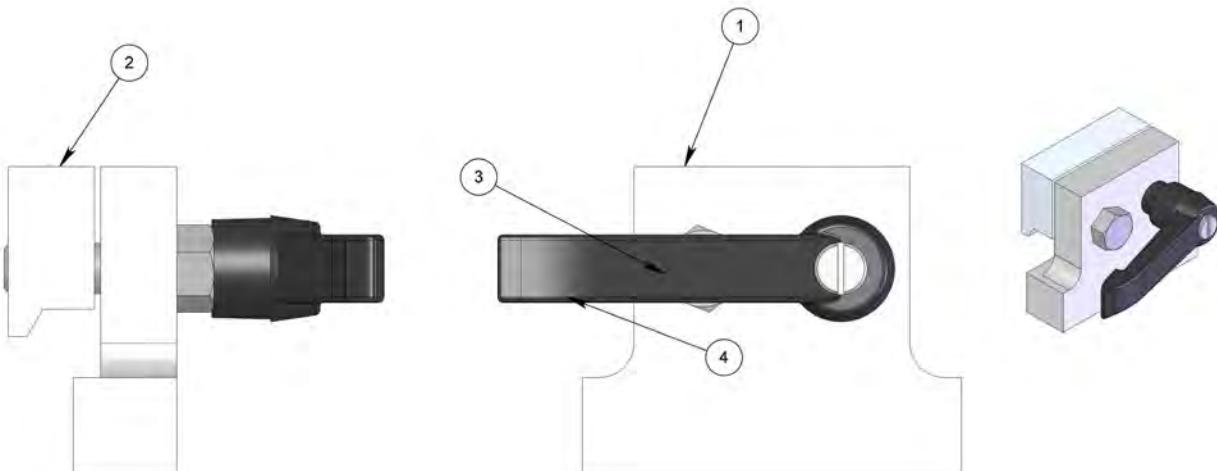
LIGHTWEIGHT POSITIONER (LWPS 180) IDLER CARRIAGE ASSEMBLY



#	PART NUMBER	QTY
1	BR 051-1.5-0 AXLE-ZERK	3
2	BR 055-SS ROLLER ASSY	3
3	GB 3M10-30-1.5 BOLT, HEX M10x1.5 X 30 SS	2
4	GS 3M10-20-1.5 SHCS M10x1.5 x 20 SS	4
5	GSSH M8-12-SS SHOULDER SCREW M8 X 12 SS	1

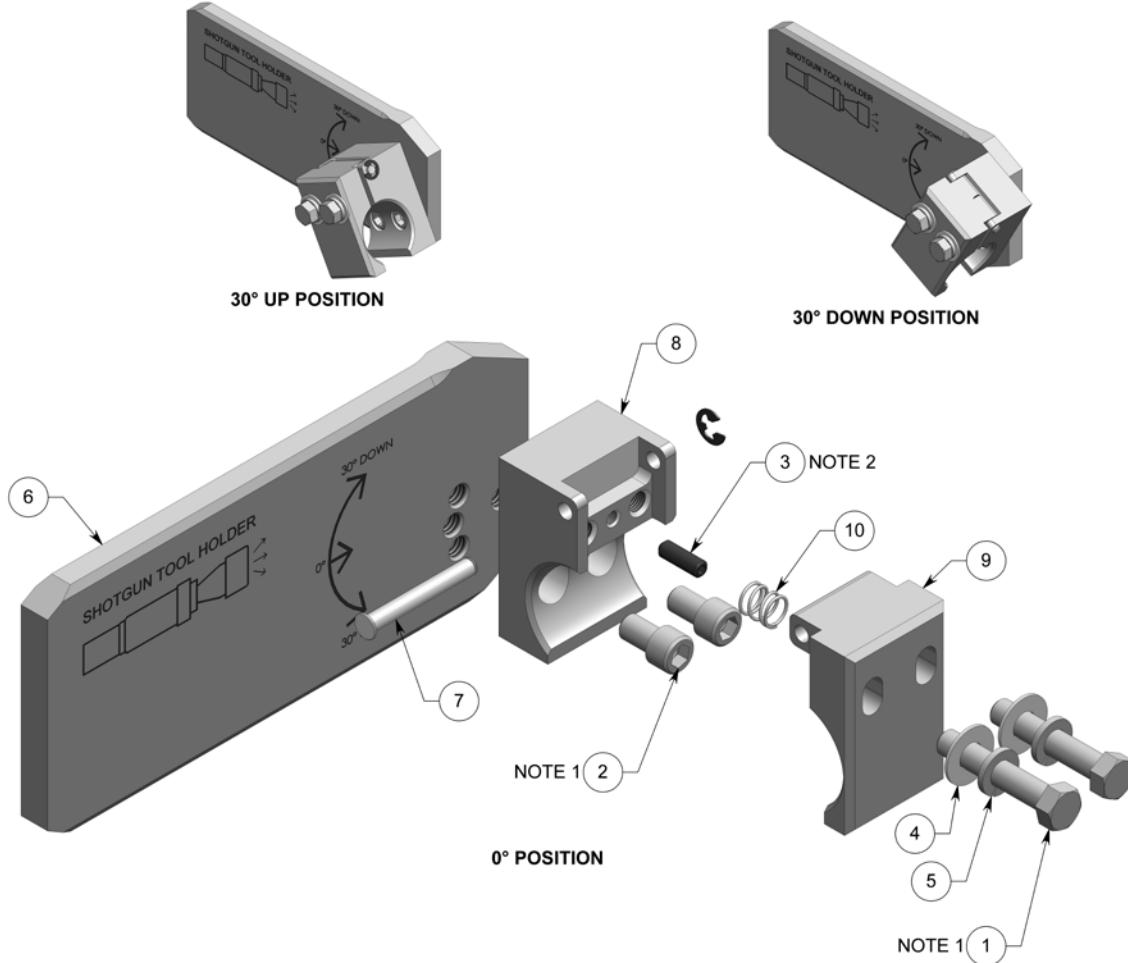
6	LWPS 181 PLATE, IDLER CARRIAGE	1
7	LWPS 182 BLOCK, SPACER	1
8	LWPS 183 PLATE, GUIDE	1
9	LWPS 185 SCRAPER, RAIL	1
10	LWPS 186 STUD, VERTICAL RAIL GUIDE	2
11	LWPS 188 SPRING, WAVE	1

LIGHTWEIGHT POSITIONER (BU 152) RAIL STOP ASSEMBLY



#	PART NUMBER	QTY.
1	BU 149 PLATE, RAIL STOP	1
2	BR 060 RAIL CLAMP	1
3	GB 537-05 BOLT, HEX .37-16 X 1.25	1
4	BU 151 HANDLE	1

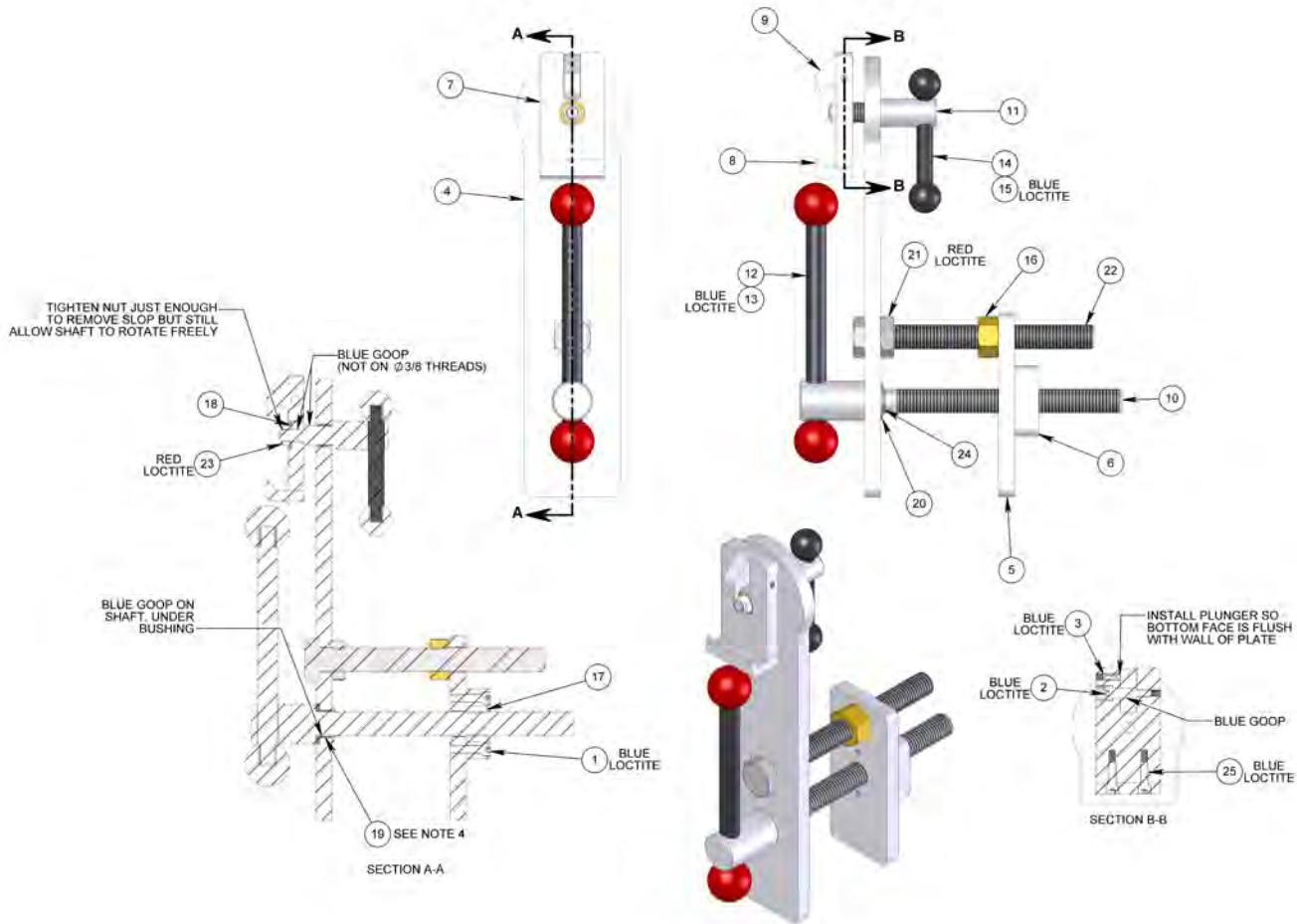
LIGHTWEIGHT POSITIONER (LWPS 220)
SHOT GUN MOUNT ASSEMBLY



#	PART NUMBER	QTY
1	GB 337-08 BOLT, HEX .37-16 X 2.00 SS	2
2	GS 337-025 SHCS .37-16 X .62 SS	2
3	GSS 525-20-75CU SET SCREW, CUP PT .25-20 X .75	1
4	GW 337-F WASHER, FLAT .37 SS	2
5	GW 337-L WASHER, LOCK .37 SS	2
6	LWPS 221 MOUNT, SHOTGUN	1
7	SRT 579 CLEVIS PIN, SS WITH E-RING	1
8	SRT 582 VERTICAL BOTTOM PIPE CLAMP	1
9	SRT 583 VERTICAL TOP PIPE CLAMP	1
10	SRT 586 SMALL CLAMP SPRING	1

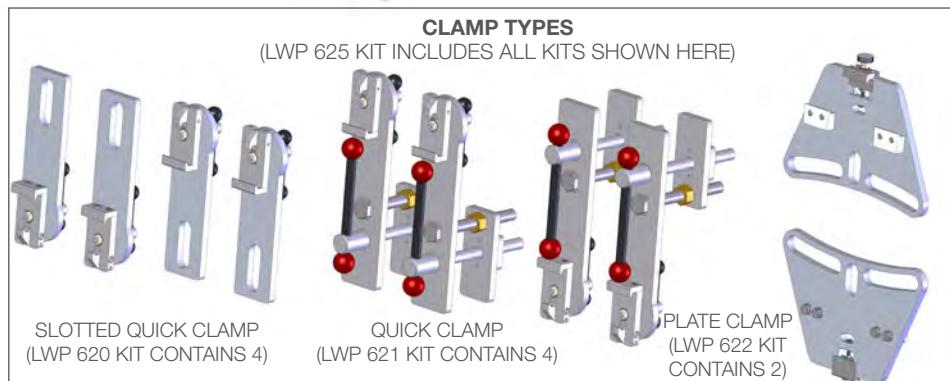
PARTS DIAGRAM

LIGHTWEIGHT POSITIONER (LWP 518) SLOTTED QUICK CLAMP ASSEMBLY



NOTE:

1. BLUE GOOP IS A SWAGELOK BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
2. BLUE LOCTITE: PN: 242 OR EQUIVALENT
3. RED LOCTITE: PN: 262 OR EQUIVALENT
4. IF SHAFT DOES NOT SLIDE THROUGH BUSHING EASILY, REAM BUSHING ID TO SHAFT OD $+.005/.001$.

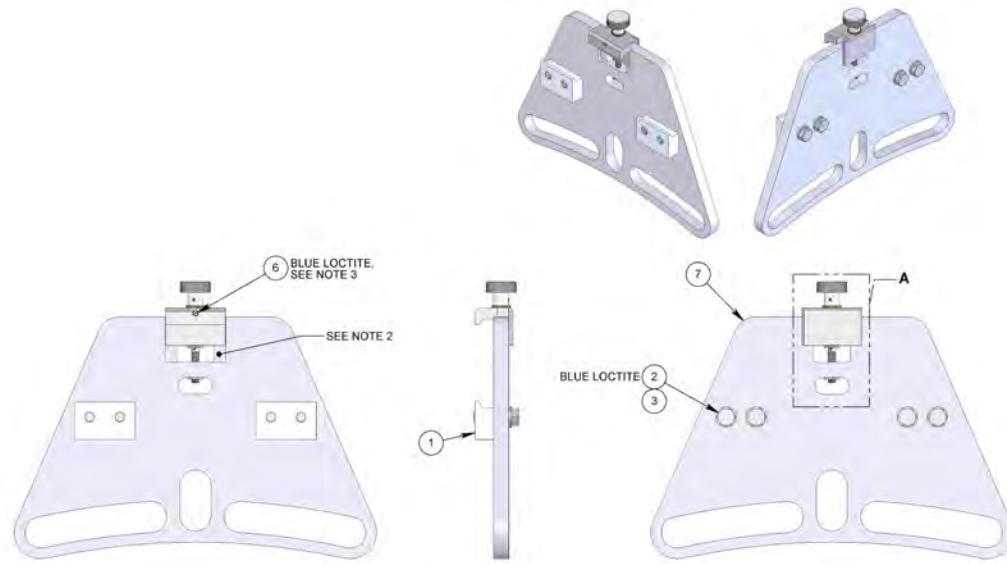


#	PART NUMBER	QTY.
1	BC 053 SHCS .25-20 x 1.00 SS	2
2	GSSH 0312-0750-SS SHOULDER SCREW	1
3	LWP 517 BALL NOSE SPRING PLUNGER	1
4	LWP 521 QUICK CLAMP BASE PLATE	1
5	LWP 522 FLANGE CLAMP PLATE	1
6	LWP 523 NUT CAP	1
7	LWP 524 RAIL CLAMP PLATE	1
8	LWP 525 STATIC RAIL CLAMP	1

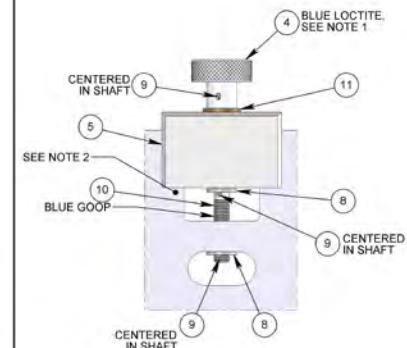
9	LWP 526 QUICK RAIL CLAMP FINGER	1
10	LWP 527 FLANGE CLAMP SCREW	1
11	LWP 528 RAIL CLAMP SHAFT	1
12	LWP 529 FLANGE CLAMP LEVER	1
13	LWP 530 FLANGE CLAMP KNOB	2
14	LWP 531 RAIL CLAMP LEVER	1
15	LWP 532 RAIL CLAMP KNOB	2
16	LWP 533 NUT, BRASS, 3/4-10	1
17	LWP 534 NUT, SQUARE, 3/4-10	1
18	LWP 535 THRUST WASHER	1

19	LWP 545 FLANGED BUSHING	1
20	LWP 547 SHIM	1
21	LWP 548 FLANGED NUT	1
22	LWP 555 BOLT, 3/4-10 X 7.00L, FULLY THREADED	1
23	SRT 333 NYLOCK HEX JAM NUT SS THIN	1
24	SRT 537 RETAINING RING	1
25	TB 050 SHCS .25-20 x .75 SS	2

LIGHTWEIGHT POSITIONER (LWP 519)
PLATE CLAMP ASSEMBLY



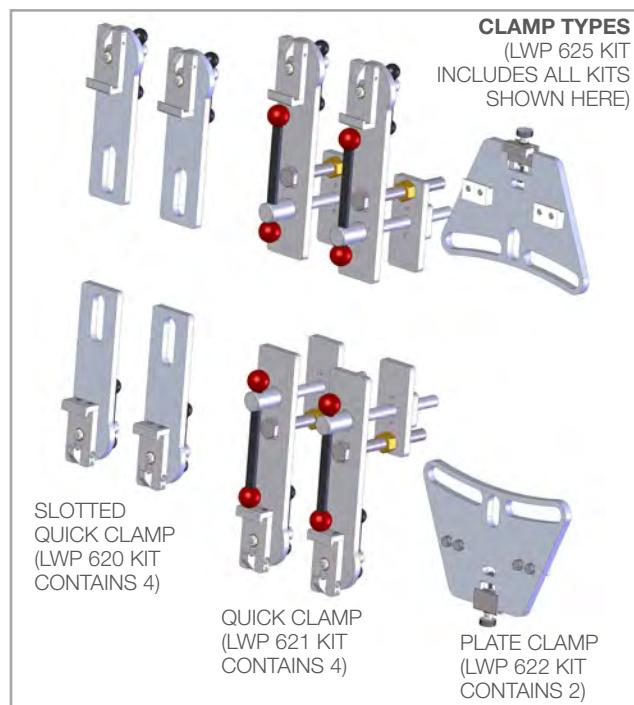
ALSO SOLD AS LWP 623
PLATE CLAMP SCREW
ASSEMBLY KIT



NOTE:

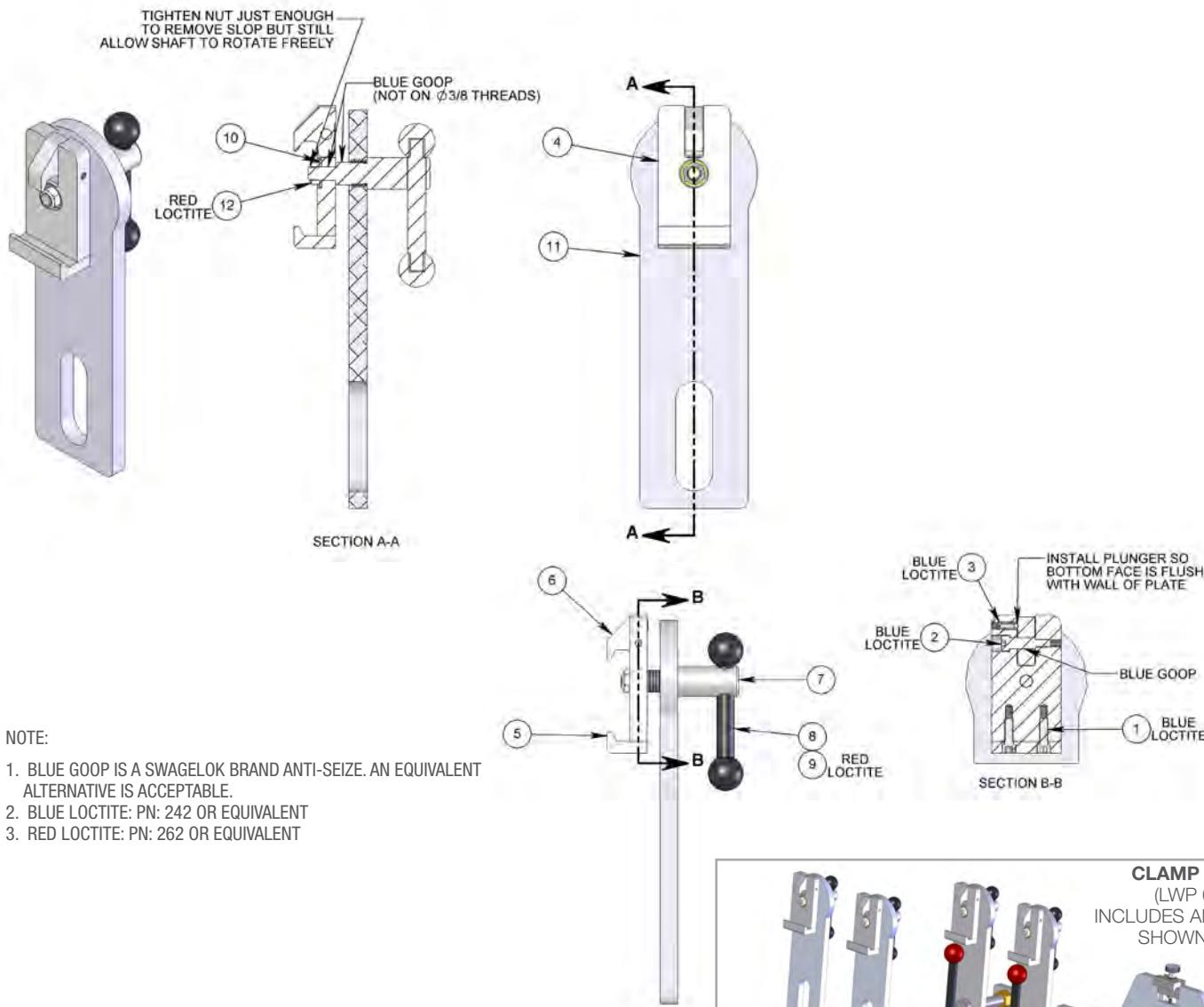
1. BEFORE INSTALLING KNOB, INSTALL MIDDLE SPRING PIN & ADJACENT FLAT WASHER. APPLY A THIN LAYER OF GENERAL PURPOSE GREASE TO UNTHEADED SECTION OF SHAFT THEN INSTALL SHAFT UP THROUGH SLIDE CLAMP. THREAD KNOB ON SHAFT AS FAR AS POSSIBLE WHILE STILL ALLOWING SHAFT TO FREELY ROTATE, THEN BACK OFF TO FIRST SPOT FOR SPRING PIN INSTALLATION.
2. APPLY A THIN LAYER OF GENERAL PURPOSE GREASE TO ALL SURFACES OF PLATE THAT CLAMP WILL SLIDE ON
3. THREAD PLUNGER IN SO BALL ENGAGES DETENTS IN SHAFT.
DO NOT ALLOW BODY OF PLUNGER TO TOUCH SHAFT.
4. BLUE GOOP IS A SWAGELOK BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
5. BLUE LOCTITE: PN: 242 OR EQUIVALENT

#	PART NUMBER	QTY.
1	BR 060 RAIL CLAMP	2
2	GB 337-05 BOLT, HEX HEAD, STAINLESS, 3/8-16 UNC X 1.250L	4
3	GW 337-L WASHER, LOCK, 3/8", STAINLESS	4
4	LWP 536 MODIFIED KNOB	1
5	LWP 537 SLIDE CLAMP	1
6	LWP 539 BALL NOSE SPRING PLUNGER	1
7	LWP 540 PLATE CLAMP BASE PLATE	1
8	LWP 541 FLAT WASHER	2
9	LWP 543 SPRING PIN	3
10	LWP 544 CLAMP SHAFT	1
11	LWP 549 BRONZE THRUST BUSHING	1



PARTS DIAGRAM

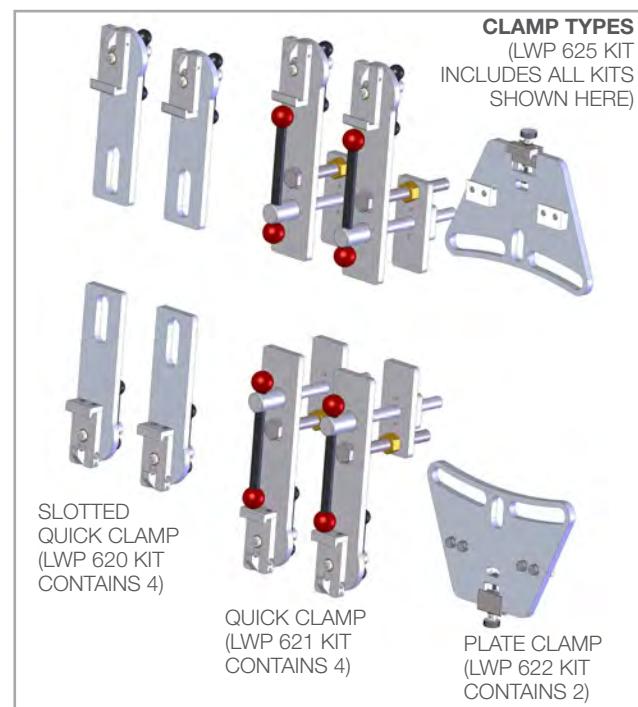
LIGHTWEIGHT POSITIONER (LWP 552) SLOTTED QUICK CLAMP ASSEMBLY



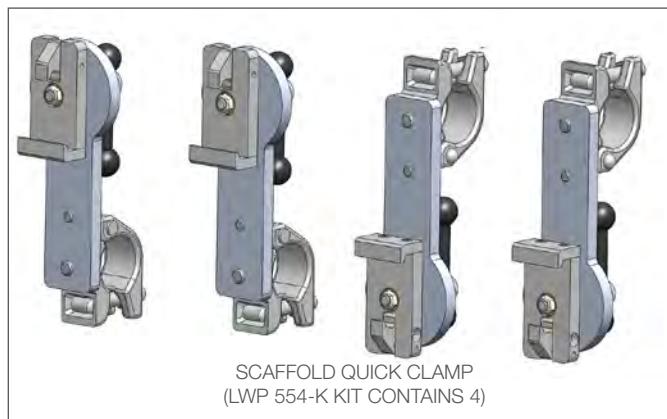
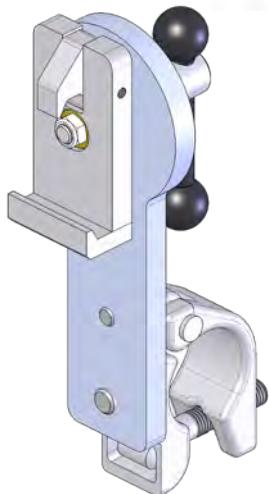
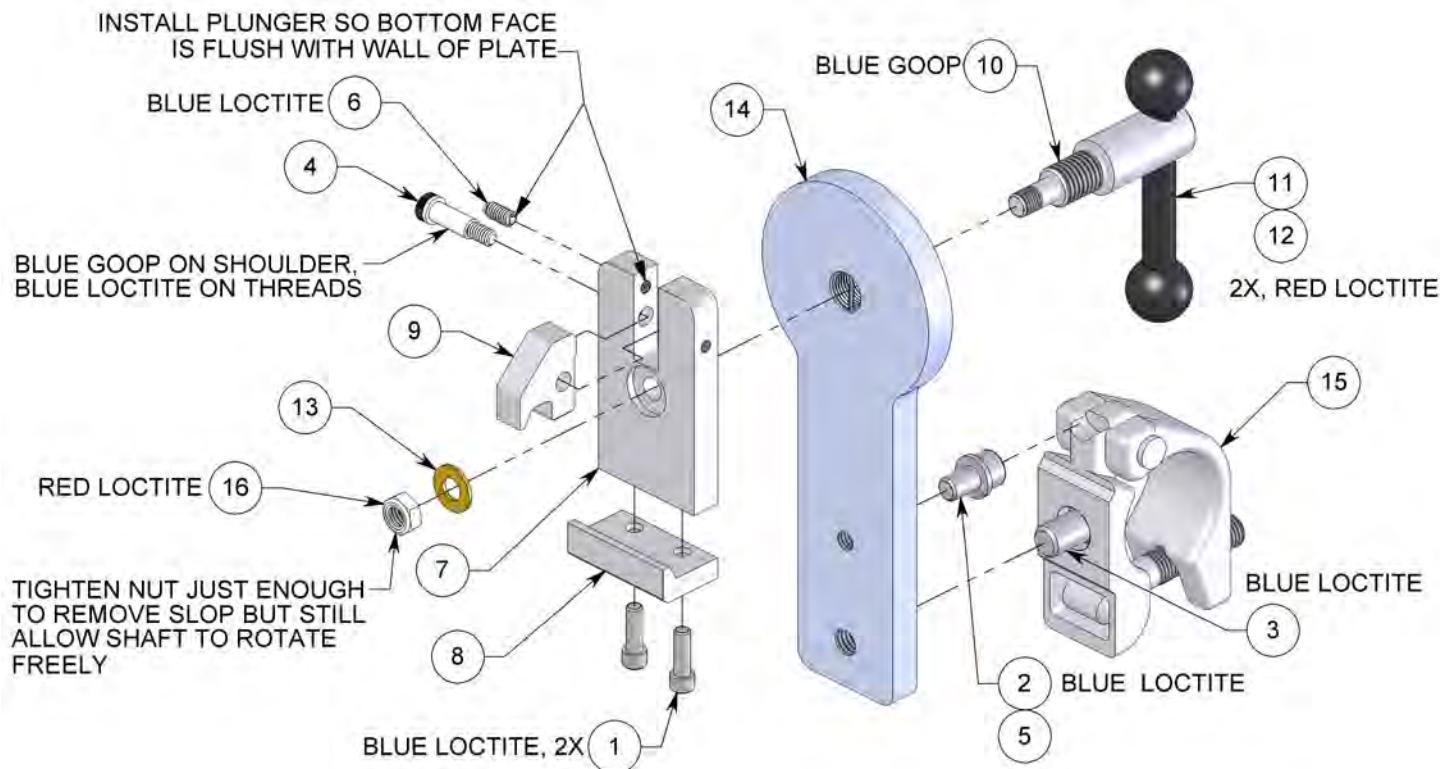
NOTE:

1. BLUE GOOP IS A SWAGELOK BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
2. BLUE LOCTITE: PN: 242 OR EQUIVALENT
3. RED LOCTITE: PN: 262 OR EQUIVALENT

#	PART NUMBER	QTY.
1	GS 325-03 SCREW, SHC, STAINLESS, 114-20 UNC X 0.750L	2
2	GSSH 0312-0750-SS SHOULDER SCREW	1
3	LWP 517 BALL NOSE SPRING PLUNGER	1
4	LWP 524 RAIL CLAMP PLATE	1
5	LWP 525 STATIC RAIL CLAMP	1
6	LWP 526 QUICK RAIL CLAMP FINGER	1
7	LWP 528 RAIL CLAMP SHAFT	1
8	LWP 531 RAIL CLAMP LEVER	1
9	LWP 532 RAIL CLAMP KNOB	2
10	LWP 535 THRUST WASHER	1
11	LWP 551 SLOTTED QUICK CLAMP BASE PLATE	1
12	SRT 333 NYLOCK HEX JAM NUT SS THIN	1



LIGHTWEIGHT POSITIONER (LWP 554)
SCAFFOLD QUICK CLAMP ASSEMBLY

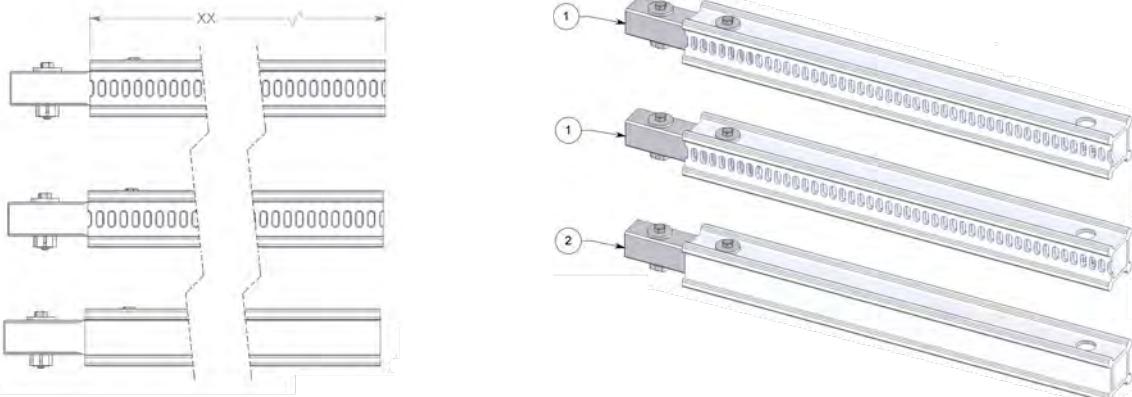


#	PART NUMBER	QTY
1	GS 325-03 SCREW, SHC, STAINLESS, 114-20 UNC X 0.750L	2
2	GS 337-025 SCREW, SHC, STAINLESS, 318-16 UNC X 0.625L	1
3	GSF 350-04 SCREW, FHSC, STAINLESS, 112-13 UNC X 1.000L	1
4	GSSH 0312-0750-SS SHOULDER SCREW, 5/16 DIA, 3/4 L, SS	1
5	GW 337-L WASHER, LOCK, 3/8", STAINLESS	1
6	LWP 517 BALL NOSE SPRING PLUNGER	1
7	LWP 524 RAIL CLAMP PLATE	1
8	LWP 525 STATIC RAIL CLAMP	1

9	LWP 526 QUICK RAIL CLAMP FINGER	1
10	LWP 528 RAIL CLAMP SHAFT	1
11	LWP 531 RAIL CLAMP LEVER	1
12	LWP 532 RAIL CLAMP KNOB	2
13	LWP 535 THRUST WASHER	1
14	LWP 553 SCAFFOLD QUICK CLAMP BASE PLATE	1
15	LWP 559 MODIFIED SCAFFOLD CLAMP	1
16	SRT 333 NYLOCK HEX JAM NUT SS THIN	1

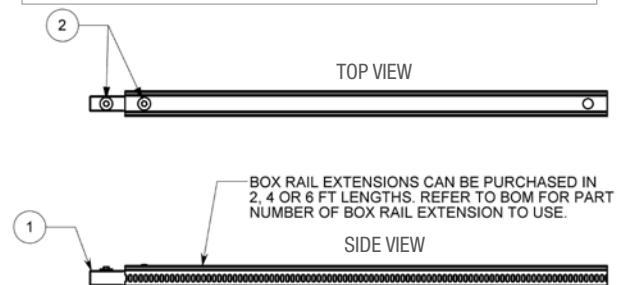
PARTS DIAGRAM

LIGHTWEIGHT POSITIONER (LWP 582-XX-V2) COMPLETE WINDOW, 2.5IN. BOX RAIL EXTENSION KIT



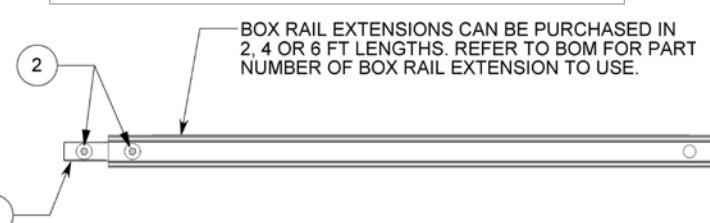
#	PART NUMBER	2FT/QTY.	4FT/QTY.	6FT/QTY.
1	LWP 580-XX-001 2.5IN BOX RAIL EXTENSION KIT, SLOTTED (CAN BE PURCHASED SEPARATELY SEE BELOW)	2	2	2
2	LWP 581-XX-001 2.5IN BOX RAIL EXTENSION KIT (CAN BE PURCHASED SEPARATELY SEE BELOW)	1	1	1

LIGHTWEIGHT POSITIONER (LWP 580-XX-001) 2.5IN. BOX RAIL EXTENSION KIT, SLOTTED



#	PART NUMBER	DESCRIPTION	LWP 580-2 QTY.	LWP 580-4 QTY.	LWP 580-6 QTY.
1	BR 006-2.5-001	2.5" SPLICE TUBE	1	1	1
2	BR 008-2.5-001	2.5" WEDGE BOLT ASSEMBLY	2	2	2
3	BU 002-2-001	2.5" BOX RAIL EXTENSION	1	-	-
4	BU 002-4-001	2.5" BOX RAIL EXTENSION	-	1	-
5	BU 002-6-001	2.5" BOX RAIL EXTENSION	-	-	1

LIGHTWEIGHT POSITIONER (LWP 581-XX-001) 2.5IN. BOX RAIL EXTENSION KIT, NOT SLOTTED



#	PART NUMBER	DESCRIPTION	LWP 581-2 QTY.	LWP 581-4 QTY.	LWP 581-6 QTY.
1	BR 006-2.5-001	2.5" SPLICE TUBE	1	1	1
2	BR 008-2.5-001	2.5" WEDGE BOLT ASSEMBLY	2	2	2
3	BR 002-02-001	2.5" BOX RAIL EXTENSION	1	-	-
4	BR 002-04-001	2.5" BOX RAIL EXTENSION	-	1	-
5	BR 002-06-001	2.5" BOX RAIL EXTENSION	-	-	1

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TERMS AND CONDITIONS

1. Acceptance of Terms and Conditions. Receipt of these Terms and Conditions of Sale ("Terms and Conditions") shall operate as the acceptance by StoneAge, Inc. ("Seller") of the order submitted by the purchaser ("Buyer"). Such acceptance is made expressly conditional on assent by Buyer to these Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of these Terms and Conditions (including inconsistencies between Buyer's purchase order and this acceptance) is given by Buyer to Seller promptly on receipt hereof.

Seller desires to provide Buyer with prompt and efficient service. However, to individually negotiate the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, the product(s) furnished by Seller are sold only according to the terms and conditions stated herein and with the terms and conditions stated in any effective StoneAge Dealer Agreement or StoneAge Reseller Agreement, if applicable. Notwithstanding any terms and conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to these Terms and Conditions unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's terms and conditions.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for the product(s) shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of the product(s), and the collection of which Seller is or may be responsible to provide to any governmental authority, unless acceptable exemption certificates are provided by Buyer in accordance with applicable law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the product(s) being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. SELLER MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE PERFORMANCE OF ANY PRODUCT EXCEPT AS SET FORTH IN THE STONEAGE LIMITED WARRANTY PROVIDED WITH THE PRODUCT.

4. Delivery. Seller is not obligated to make delivery by a specified date, but will always use its best efforts to make delivery within the time requested. The proposed shipment date is an estimate. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. UNDER NO CIRCUMSTANCES SHALL SELLER HAVE ANY LIABILITY WHATSOEVER FOR LOSS OF USE OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM DELAY REGARDLESS OF THE REASON(S).

All product(s) will be shipped F.O.B. point of origin, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance costs from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the product(s). Buyer shall bear all risk of loss commencing with the shipment or distribution of the product(s) from Seller's warehouse. Order shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No product(s) may be returned without securing written approval from Seller.

5. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement relating to the subject matter hereof and cannot be supplemented or amended without Seller's prior written approval.

6. Omission. Seller's waiver of any breach or Seller's failure to enforce any of these Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every term and condition hereof.

7. Severability. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

8. Disputes. Seller and Buyer shall attempt in good faith to promptly resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Seller and Buyer shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the Seller and Buyer.

9. Governing Law. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state.

10. Jurisdiction and Venue. Seller and Buyer agree that the state or federal courts located within the City and County of Denver, Colorado shall have sole and exclusive jurisdiction over any litigation concerning any dispute arising under these Terms and Conditions not otherwise resolved pursuant to Section 9 as well as any alleged defects of any Products or damages sustained as a result of such alleged defects. Seller and Buyer further agree that should any litigation be commenced in connection with such a dispute, it shall only be commenced in such courts. Seller and Buyer agree to the exclusive jurisdiction of such courts and neither will raise any objection to the jurisdiction and venue of such courts, including as a result of inconvenience.

11. Attorney's Fees. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or mediation.

STONEAGE TRADEMARK LIST

View the list of StoneAge's trademarks and service marks and learn how the trademarks should be used. Use of StoneAge trademarks may be prohibited, unless expressly authorized.

<http://www.StoneAgetools.com/trademark-list/>

STONEAGE PATENT DATA

View the list of StoneAge's current U.S. patent numbers and descriptions.

<http://www.sapatents.com>

STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

<http://www.stoneagetoools.com/terms>

<http://www.stoneagetoools.com/warranty>

WARRANTY

Warranties set forth herein extend only to End-Users, meaning customers acquiring, or that have previously acquired, a product manufactured by StoneAge ("Product") for their own use and not for resale, either directly from StoneAge Inc. ("StoneAge") or from a StoneAge Authorized Dealer or Reseller ("Dealer"). No warranty of any kind or nature is made by StoneAge beyond those expressly stated herein.

1. LIMITED WARRANTY PERIOD. Subject to the limitations and conditions hereinafter set forth, StoneAge warrants its Product to be free from defects in workmanship and material for a period of one (1) year from the date of purchase by the End-User, provided that the end of the limited warranty period shall not be later than eighteen (18) months from the date of shipment of the Product to the Dealer or the End-User by StoneAge ("Limited Warranty Period"). All replacement parts which are furnished under this Limited Warranty and properly installed shall be warranted to the same extent as the original Product under this Limited Warranty if, and only if, the original parts were found to be defective within the original Limited Warranty Period covering the original Product. Replacement parts are warranted for the remainder of the original Limited Warranty Period. This Limited Warranty does not cover any component part of any Product not manufactured by StoneAge. Any such component part is subject exclusively to the component manufacturer's warranty terms and conditions.

2. LIMITED WARRANTY COVERAGE. StoneAge's sole obligation under this Limited Warranty shall be, at StoneAge's option and upon StoneAge's inspection, to repair, replace or issue a credit for any Product which is determined by StoneAge to be defective in material or workmanship. StoneAge reserves the right to examine the alleged defective Product to determine whether this Limited Warranty is applicable, and final determination of limited warranty coverage lies solely with StoneAge. No statement or recommendation made by a StoneAge representative, Dealer or agent to End-User shall constitute a warranty by StoneAge or a waiver or modification to any of the provisions hereof or create any liability for StoneAge.

3. WARRANTY SERVICE PROVIDERS. Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at www.stoneagetools.com/service. Unauthorized service, repair or modification of the Product or use of parts not approved by StoneAge will void this Limited Warranty. StoneAge reserves the right to change or improve the material and design of the Product at any time without notice to End-User, and StoneAge is not obligated to make the same improvements during warranty service to any Product previously manufactured.

4. WARRANTY EXCLUSIONS. This Limited Warranty does not cover, and StoneAge shall not be responsible for the following, or damage caused by the following: (1) any Product that has been altered or modified in any way not approved by StoneAge in advance in writing; (2) any Product that has been operated under more severe conditions or beyond the rated capacity specified for that Product; (3) depreciation or damage caused by normal wear and tear, failure to follow operation or installation instructions, misuse, negligence or lack of proper protection during storage; (4) exposure to fire, moisture, water intrusion, electrical stress, insects, explosions, extraordinary weather and/or environmental conditions including, but not limited to lightning, natural disasters, storms, windstorms, hail, earthquakes, acts of God or any other force majeure event; (5) damage to any Product caused by any attempt to repair, replace, or service the Product by persons other than StoneAge authorized service representatives; (6) costs of normal maintenance parts and services; (7) damage sustained during unloading, shipment or transit of the Product; or (8) failure to perform the recommended periodic maintenance procedures listed in the Operator's Manual accompanying the Product.

5. REQUIRED WARRANTY PROCEDURES. To be eligible for warranty service, the End-User must: (1) report the Product defect to the entity where the Product was purchased (i.e. StoneAge or the Dealer) within the Limited Warranty Period specified in this Limited Warranty; (2) submit the original invoice to establish ownership and date of purchase; and (3) make the Product available to a StoneAge authorized service representative for inspection to

determine eligibility for coverage under this Limited Warranty. This Limited Warranty shall not extend to any person or entity who fails to provide proof of original purchase from StoneAge or a Dealer. No Product may be returned for credit or adjustment without prior written permission from StoneAge.

6. DISCLAIMER OF IMPLIED WARRANTIES AND OTHER REMEDIES. EXCEPT AS EXPRESSLY STATED HEREIN (AND TO THE FULLEST EXTENT ALLOWED UNDER APPLICABLE LAW), STONEAGE HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL WARRANTIES, REPRESENTATIONS OR PROMISES AS TO THE QUALITY, PERFORMANCE OR FREEDOM FROM DEFECT OF THE PRODUCT COVERED BY THIS LIMITED WARRANTY. STONEAGE FURTHER DISCLAIMS ALL IMPLIED INDEMNITIES.

7. LIMITATION OF LIABILITY. End-User specifically acknowledges that the Product may be operated at high speeds and/or pressures, and that as such it may be inherently dangerous if not used correctly. End-User shall familiarize itself with all operation materials provided by StoneAge and shall at all times use and require its agents, employees and contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. In no event shall StoneAge be responsible for any injuries to persons or property caused directly or indirectly by the operation of the Product if End-User or any agent, employee, or contractor of End-User: (1) fails to use all necessary and appropriate safety devices, guards and proper safe operating procedures; (2) fails to maintain in good working order such safety devices and guards; (3) alters or modifies the Product in any way not approved by StoneAge in advance in writing; (4) allows the Product to be operated under more severe conditions or beyond the rated capacity specified for the Product; or (5) otherwise negligently operates the Product. End-User shall indemnify and hold StoneAge harmless from any and all liability or obligation incurred by or against StoneAge, including costs and attorneys' fees, to or by any person so injured.

TO THE FULL EXTENT ALLOWED BY APPLICABLE LAW, STONEAGE SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF GOODWILL, DIMINUTION OF VALUE, WORK STOPPAGE, INTERRUPTION OF BUSINESS, RENTAL OF SUBSTITUTE PRODUCT, OR OTHER COMMERCIAL LOSS EVEN TO THE EXTENT SUCH DAMAGES WOULD CONSTITUTE DIRECT DAMAGES), WITH RESPECT TO THE COVERED STONEAGE PRODUCT, OR OTHERWISE IN CONNECTION WITH THIS LIMITED WARRANTY, REGARDLESS OF WHETHER STONEAGE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IT IS UNDERSTOOD THAT STONEAGE'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE, OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE END-USER FOR THE PRODUCT. STONEAGE'S MAXIMUM LIABILITY SHALL NOT EXCEED, AND END-USER'S REMEDY IS LIMITED TO EITHER (1) REPAIR OR REPLACEMENT OF THE DEFECTIVE WORKMANSHIP OR MATERIAL OR, AT STONEAGE'S OPTION, (2) REFUND OF THE PURCHASE PRICE, OR (3) ISSUANCE OF A CREDIT FOR THE PURCHASE PRICE, AND SUCH REMEDIES SHALL BE END-USER'S ENTIRE AND EXCLUSIVE REMEDY.

YOU, THE END-USER, UNDERSTAND AND EXPRESSLY AGREE THAT THE FOREGOING LIMITATIONS ON LIABILITY ARE PART OF THE CONSIDERATION IN THE PRICE OF THE STONEAGE PRODUCT YOU PURCHASED.

Some jurisdictions do not allow the limitation or exclusion of liability for certain damages, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction. If any provisions of this Limited Warranty is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

NOTES

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1-866-795-1586 • www.STONEAGETOOLS.com

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CONTROLLER (CTRL-101) WITH POWER HUB (PH-A0302A00C20)

USER MANUAL

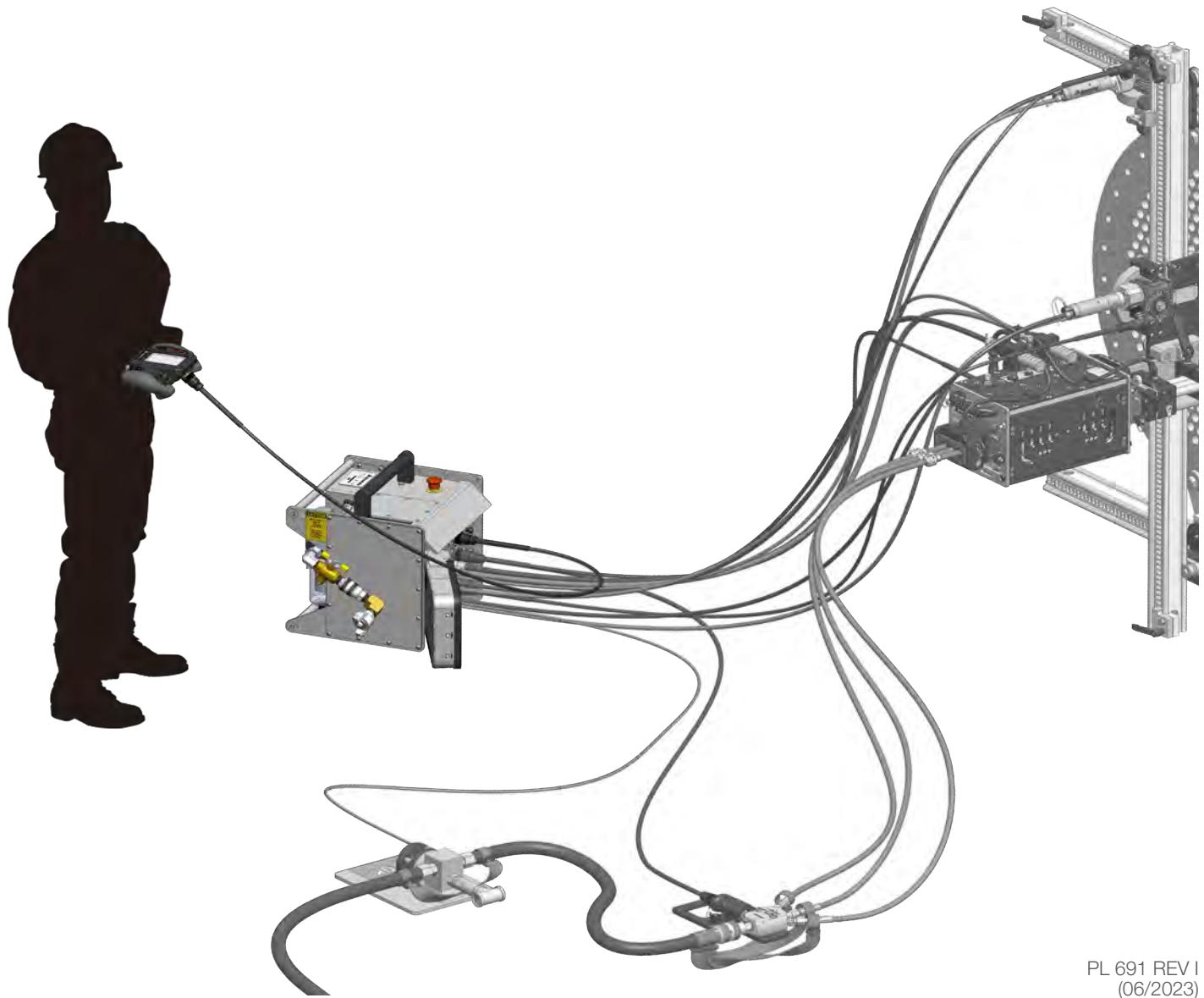


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Woodbury Lane
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Worcester
Worcestershire, WR5 2DQ
United Kingdom
+44 (0) 1684 892065
sales-eu@stoneagetools.com

This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s). Updated manuals can be downloaded at: <https://www.stoneagetools.com/manuals>

SPECIFICATIONS

CONTROLLER (CTRL-101)	Imperial	Metric
Weight	1.45 lbs	.66 kg
Dimensions	8.875 x 2.75 x 5.188 in.	225 x 70 x 132 mm
POWER HUB (PH-A0302A00C20)		
Weight	37 lbs	16.8 kg
Dimensions	16.1x14.53x15.12 in	409 x 369 x 384 mm
Power supply	12V AC-DC US OR EU Or 12V DC-DC US OR EU	
Maximum Air Consumption:	50 cfm at 100 psi	1416 lpm at 6,8 bar
Maximum Air Supply Pressure	125 psi	8,6 bar
System Air Consumption	100 psi	6,8 bar
Recommended Operational Temperature	20 ° to 140 °F Do not exceed 160 °F	-6 ° to 60 °C Do not exceed 71 °C

DESCRIPTION OF EQUIPMENT AND INTENDED USE

The CTRL-101 Controller is designed to function with the ABXS-3L Hose Tractor and it's integrated sensing technology. The Controller is small, lightweight, and intuitive in it's operation. There is an emphasis on ergonomic design for operators wearing PPE. The Controller is designed to withstand harsh job conditions and collects job performance data.

The PH-A0302A00C20 Power Hub is a centralized Power Hub for electric-air conversion. It Seamlessly drives air motors in the tractor and positioner. It is rugged and lightweight and compatible with all pumps.

KEY FEATURES:

Controller (CTRL-101)

- Optimized for use while standing: Angled screen puts wrists in natural position
- Comfort grip, video game inspired design and operable with gloves.
- Thumbs operate joysticks, Index fingers operate trigger buttons, and Left fingers grip Automation lever.

Power Hub (PH-A0302A00C20)

- Sealed and Separated Design: Electronics Side & Pneumatic Side
- Purpose Built Enclosure: Seam welded aluminum
- E-Stop: Cuts supply power
- Door: Covers fittings and connectors, eliminates caps and plugs
- Controller Storage: Location for controller, prevent damage
- Valve Access Hatch: Easier troubleshooting/ service of valves
- Integrated FRL: Aid in valve pack and air motor life
- Quick Connect on Air Supply: Chane and easy access to supply hose fitting
- Bulkhead NPT fittings: externally change damaged PTC fittings
- Short Circuit Protection: On all supply side connections, automatically resets



EC DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge Netherlands BV
Reedijk 7Q
3274 KE Heinenoord
Netherlands
Sander de Korte, Customer Service Manager StoneAge NL

Declare that:

Sentinel System Controller (CTRL-101)
for the operation of high pressure water cleaning of system parts

Is compliant with the following Directives and Standards:

EU- Machinery Directive (2006/42/EC)

EU- RoHS Directive (2011/65/EU)

EU- EMC Directive (2014/30/EU)

EU- Radio Directive (2014/53/EU)

EN ISO 12100:2010 (e) Safety of machinery – General principles for design – Risk assessment and risk reduction

EN ISO 4414:2010 (en) Pneumatic Fluid Power – General rules and safety requirements for systems and components

EN 55011:2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

EN 60204-1:2018 Safety of machinery- Electrical equipment of machines

ETSI EN 300 328 V2.2.1 (2019-04) Wide band transmission systems Data transmission equipment operating in the 2,4 GHz band;
Harmonised Standard for access to radio spectrum

ETSI EN 301 489-1 V2.2.3 (2019-11) Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility

The Technical File for Sentinel System Controller (CTRL-101) is maintained at:

StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Engineering Manager.

The Technical File is available through the Authorized Representative.

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StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

09/29/2021

Date





UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge UK
Unit 3
Crucible Business Park
Woodbury Lane
Norton
Worcester
Worcestershire, WR5 2DQ
United Kingdom
Steve Ellis, Managing Director StoneAge UK

Declare that:

Sentinel System Controller (CTRL-101)
for the operation of high pressure water cleaning of system parts

Is compliant with the following Directives and Standards:

S.I. 2008:1597 - Supply of Machinery (Safety) Regulations 2008

S.I. 2012:3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

S.I. 2016:1091 - Electromagnetic Compatibility Regulations 2016

S.I. 2017:1206 - Radio Equipment Regulations 2017

S.I. 2008:1597 Safety of machinery – General principles for design – Risk assessment and risk reduction

S.I. 2008:1597 Pneumatic Fluid Power – General rules and safety requirements for systems and components

S.I. 2016:1091 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

S.I. 2016:1091 Safety of machinery- Electrical equipment of machines

S.I. 2017:1206 Wideband transmission systems Data transmission equipment operating in the 2,4 GHz band;
Harmonised Standard for access to radio spectrum

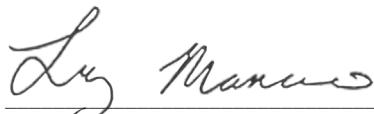
S.I. 2016:1091 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements;
Harmonised Standard for ElectroMagnetic Compatibility

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Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge Netherlands BV
Reedijk 7Q
3274 KE Heinenoord
Netherlands
Sander de Korte, Customer Service Manager StoneAge NL

Declare that:

Power Hub (PH-A0302A00C20)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

EU- Machinery Directive (2006/42/EC)

EU- RoHS Directive (2011/65/EU)

EU- EMC Directive (2014/30/EU)

EN ISO 12100:2010 (e) Safety of machinery – General principles for design – Risk assessment and risk reduction

EN ISO 4414:2010 (en) Pneumatic Fluid Power – General rules and safety requirements for systems and components

EN 55011:2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

EN 60204-1:2018 Safety of machinery- Electrical equipment of machines

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Technical File for Power Hub (PH-A0302A00C20) is maintained at:

StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Engineering Manager.
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Liz Mancuso, Director of Engineering

09/29/2021

Date





UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge UK
Unit 3
Crucible Business Park
Woodbury Lane
Norton
Worcester
Worcestershire, WR5 2DQ
United Kingdom
Steve Ellis, Managing Director StoneAge UK

Declare that:

Power Hub (PH-A0302A00C20)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

S.I. 2008:1597 - Supply of Machinery (Safety) Regulations 2008

S.I. 2012:3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

S.I. 2016:1091 - Electromagnetic Compatibility Regulations 2016

S.I. 2008:1597 Safety of machinery – General principles for design – Risk assessment and risk reduction

S.I. 2008:1597 Pneumatic Fluid Power – General rules and safety requirements for systems and components

S.I. 2016:1091 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

S.I. 2016:1091 Safety of machinery- Electrical equipment of machines

S.I. 2016:1091 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements;
Harmonised Standard for Electromagnetic Compatibility

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Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

StoneAge Netherlands BV
Reedijk 7Q
3274 KE Heinenoord
Netherlands
Sander de Korte, Customer Service Manager StoneAge NL

Declare that:

Pressure Transducer (PT-100-ABXS-3L-MP)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

EU- Machinery Directive (2006/42/EC)

EU- RoHS Directive (2011/65/EU)

EU- EMC Directive (2014/30/EU)

EN ISO 12100:2010 (e) Safety of machinery – General principles for design – Risk assessment and risk reduction

EN ISO 4414:2010 (en) Pneumatic Fluid Power – General rules and safety requirements for systems and components

EN 55011:2009 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

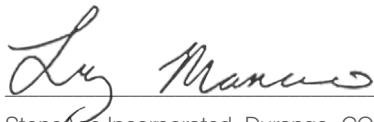
EN 60204-1:2018 Safety of machinery– Electrical equipment of machines

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Technical File for Pressure Transducer (PT-100-ABXS-3L-MP) is maintained at:

StoneAge Incorporated, 466 South Skylane Drive, Durango, CO 81303, USA and was compiled by the Engineering Manager.
The Technical File is available through the Authorized Representative.

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Authorized Representative:

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Unit 3
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Worcester
Worcestershire, WR5 2DQ
United Kingdom
Steve Ellis, Managing Director StoneAge UK

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S.I. 2012:3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

S.I. 2016:1091 - Electromagnetic Compatibility Regulations 2016

S.I. 2008:1597 Safety of machinery – General principles for design – Risk assessment and risk reduction

S.I. 2008:1597 Pneumatic Fluid Power – General rules and safety requirements for systems and components

S.I. 2016:1091 Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

S.I. 2016:1091 Safety of machinery– Electrical equipment of machines

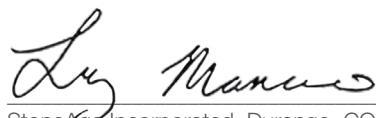
S.I. 2016:1091 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility

The Technical File for Pressure Transducer (PT-100-ABXS-3L-MP) is maintained at:

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StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

09/29/21
Date





Regulatory Compliance and Safety Information for StoneAge Sentinel System USA & Canada Compliance

Manufacturer: StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
US (866)-795-1586
www.stoneagetools.com

Declare that: Sentinel System (SENT001)

Is compliant with the following:

FCC Part 15, Subpart B / ICES-003 Unintentional Emissions Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules and Industry Canada ICES-003. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15, Subpart C / RSS-210 Intentional Emissions Interference Statement

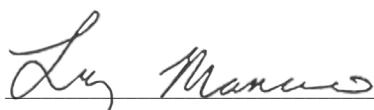
Compliance of this equipment is confirmed by the following certification numbers that are placed on the equipment:

Notice: The term "FCC ID:" and "IC" before the certification number signifies that FCC and Industry Canada technical specifications were met.

FCC ID: 2AX9D-SENT001

IC ID: 26898-SENT001

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StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

03/29/21

Date





Regulatory Compliance and Safety Information for StoneAge Sentinel System USA & Canada Compliance

Manufacturer: StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
US (866)-795-1586
www.stoneagetoools.com

Declare that: Sentinel System (SENT001)
Is compliant with the following:

FCC Part 15, Subpart B / ICES-003 Unintentional Emissions Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules and Industry Canada ICES-003. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC rules and Industry Canada ICES-003. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15, Subpart C / RSS-210 Intentional Emissions Interference Statement

Compliance of this equipment is confirmed by the following certification numbers that are placed on the equipment:

Notice: The term "FCC ID:" and "IC" before the certification number signifies that FCC and Industry Canada technical specifications were met.

CONTAINS FCC ID: 2AX9D-SENT001

CONTAINS IC ID: 26898-SENT001

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StoneAge Incorporated, Durango, CO, USA
Liz Mancuso, Director of Engineering

03/29/21

Date



RF Radiation Exposure Statement

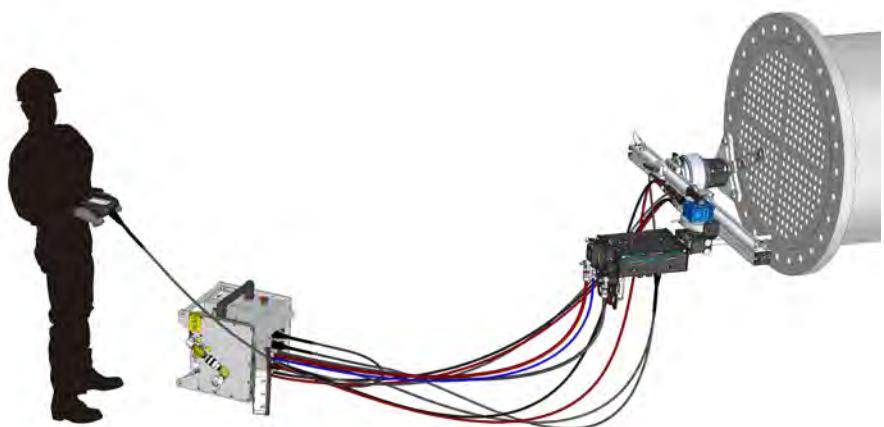
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

- The equipment should only be used or installed at locations where there is normally at least a 20cm separation between the antenna and all persons.
- This transmitter must not be co-located or operation in conjunction with any other antenna or transmitter.
- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

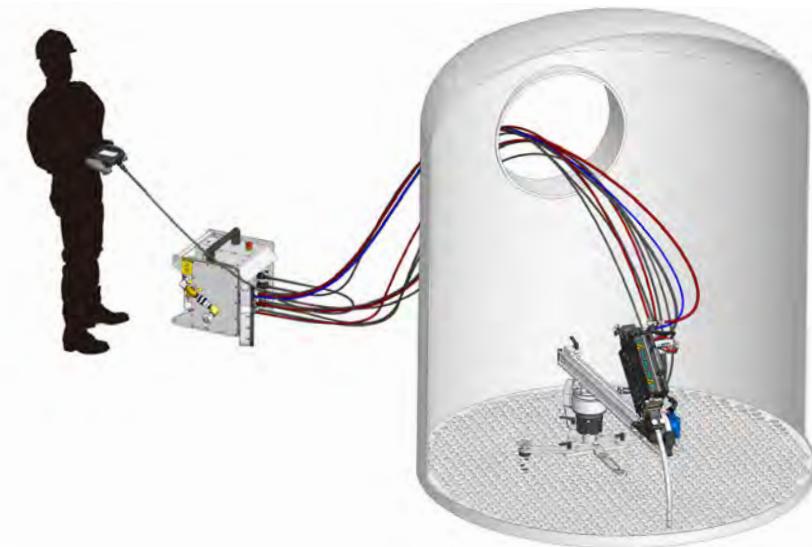
FULL SYSTEM ASSEMBLY - OVERVIEW

**CONTROLLER (CTRL-101) AND
POWER HUB (PH-A0302AOOC20)**
SHOWN IN APPLICATIONS

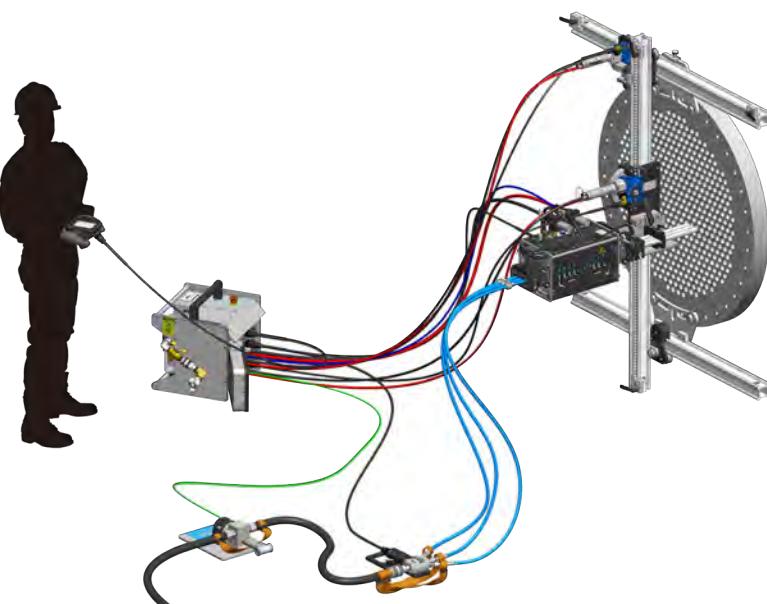
**ABXS-1L SYSTEM WITH
COMPASS POSITIONER**



**ABXS-1L SYSTEM WITH
CONFINED SPACE KIT**

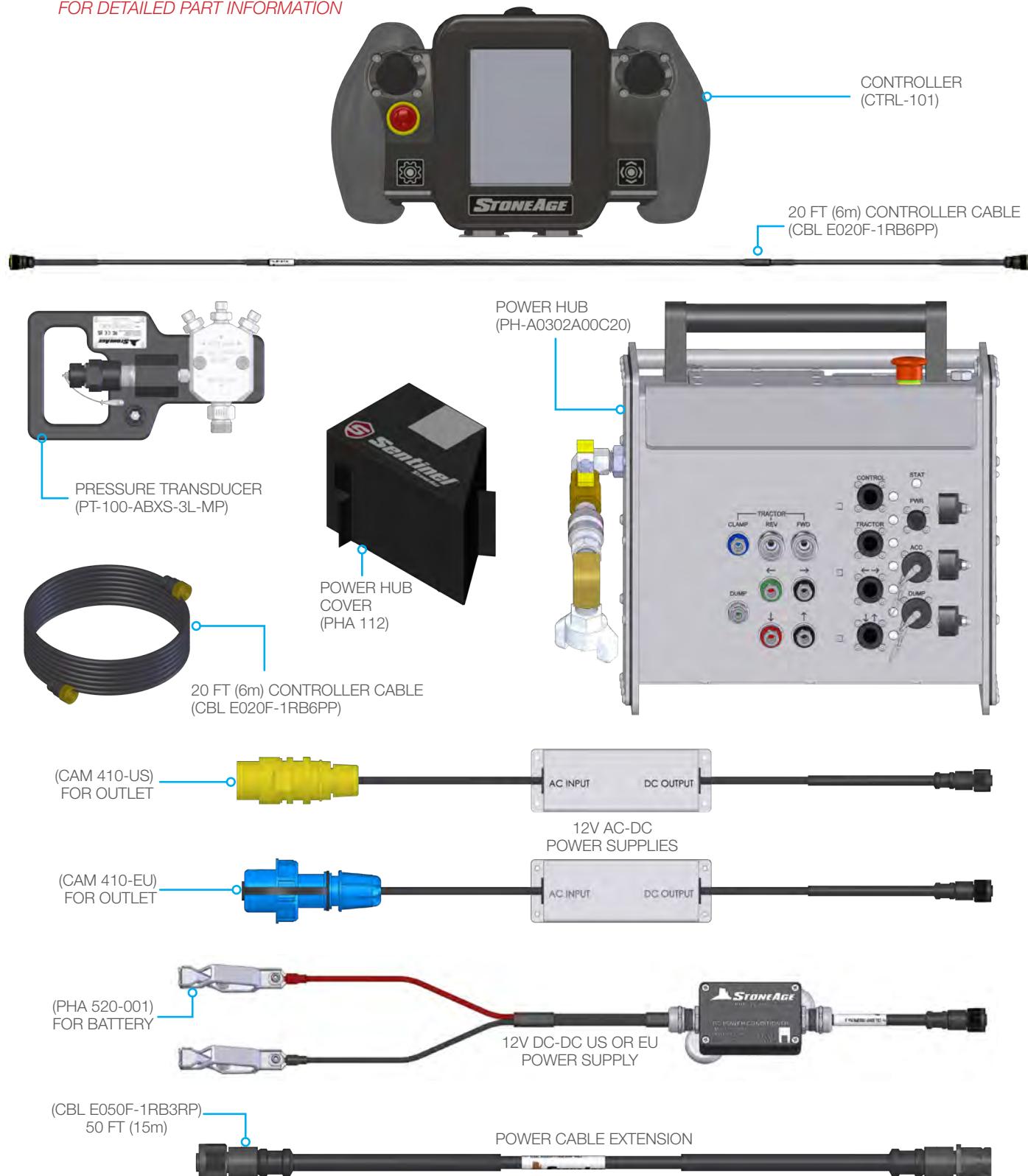


**ABXS-3L SYSTEM WITH
LIGHTWEIGHT POSITIONER**



CONTROLLER (CTRL-101) AND POWER HUB (PH-A0302A00C20) WITH PRESSURE TRANSDUCER AND POWER CONNECTORS

SEE THE PART DIAGRAM SECTION IN THIS MANUAL
FOR DETAILED PART INFORMATION



WARNING AND SAFETY INSTRUCTIONS

OPERATOR TRAINING

Managers, Supervisors, and Operators MUST be trained in Health and Safety Awareness of High-pressure Water Jetting and hold a copy of the Water Jetting Association (WJA) Code of Practice, or equivalent (see www.waterjetting.org.uk).

Operators MUST be trained to identify and understand all applicable standards for the equipment supplied. Operators should be trained in manual handling techniques to prevent bodily injury.

StoneAge has designed and manufactured this equipment considering all hazards associated with its operation. StoneAge assessed these risks and incorporated safety features in the design. StoneAge **WILL NOT** accept responsibility for the results of misuse.

IT IS THE RESPONSIBILITY OF THE INSTALLER/OPERATOR

to conduct a job specific risk assessment prior to use. Job specific risk assessment MUST be repeated for each different set up, material, and location.

The risk assessment MUST conform to the Health and Safety at Work Act 1974 and other relevant Health and Safety legislation.

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

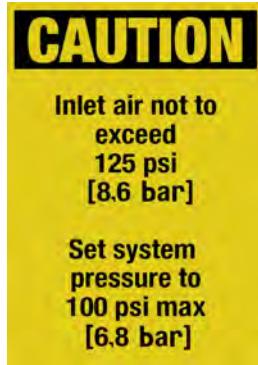
Use of Personal Protective Equipment (PPE) is dependent on the working pressure of water and the cleaning application. Managers, Supervisors, and Operators MUST carry out a job specific risk assessment to define the exact requirements for PPE. See Personal Protective Equipment (Section 5) of WJTA-IMCA's, Industry Best Practices For The Use Of High-pressure Waterjetting Equipment for additional information.

Hygiene - Operators are advised to wash thoroughly after all waterjetting operations to remove any waterblast residue which may contain traces of harmful substances.

First aid provision - users MUST be provided with suitable first aid facilities at the operation site.

SAFETY LABEL DEFINITIONS

Maximum operating air pressure is 100 psi (6.8 bar). Never exceed 125 psi (8.6 bar) supply pressure. Exceeding 125 psi (8.6 bar) supply pressure may result in injury to the Operator and/or damage to the equipment



Operators MUST read, understand, and follow the Operational and Training Requirements (Section 6.0) of WJTA-IMCA's, Industry Best Practices For The Use Of High-pressure Waterjetting Equipment, or equivalent.

Operators MUST read, understand and follow the Warnings, Safety Information, Assembly, Installation, Connection, Operation, Transport, Handling, Storage, and Maintenance Instructions detailed in this manual.

The risk assessment MUST consider potential material or substance hazards including:

- Aerosols
- Biological and microbiological (viral or bacterial) agents
- Combustible materials
- Dusts
- Explosion
- Fibers
- Flammable substances
- Fluids
- Fumes
- Gases
- Mists
- Oxidizing Agents

PPE may include:

- **Eye protection:** Full face visor
- **Foot protection:** Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- **Hand protection:** Waterproof gloves
- **Ear protection:** Ear protection for a minimum of 85 dBA
- **Head protection:** Hard hat that accepts a full face visor and ear protection
- **Body protection:** Multi-layer waterproof clothing approved for waterjetting
- **Hose protection:** Hose shroud
- **Respiratory protection:** May be required; refer to job specific risk assessment

WARNING AND SAFETY INSTRUCTIONS

⚠ WARNING

Operations with this equipment can be potentially hazardous. Caution MUST be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system. The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate until repaired. Make sure all threaded connections are tight and free of leaks.
- Users of the Controller and Power Hub MUST be trained and/or experienced in the use and application of high-pressure technology and cleaning, as well as all associated safety measures, according to the WJTA Recommended Practices for the use of High-pressure Water jetting Equipment.
- The Controller and Power Hub should be located in a safe location where the operator has good visibility of the exchanger and Hose Tractor. The AUTOBOX® ABXS-3L MUST be supervised at all times and should never be left unattended.
- Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the ABXS-3L Hose Tractor will release the hose and may create a dangerous runaway hose condition, which can result in severe injury and/or death.
- Always de-energize the system before performing service or replacing any parts. Failure to do so can result in severe injury and/or death.
- When moving any components within the ABXS-3L and Control System, lift with care to prevent bodily injury.

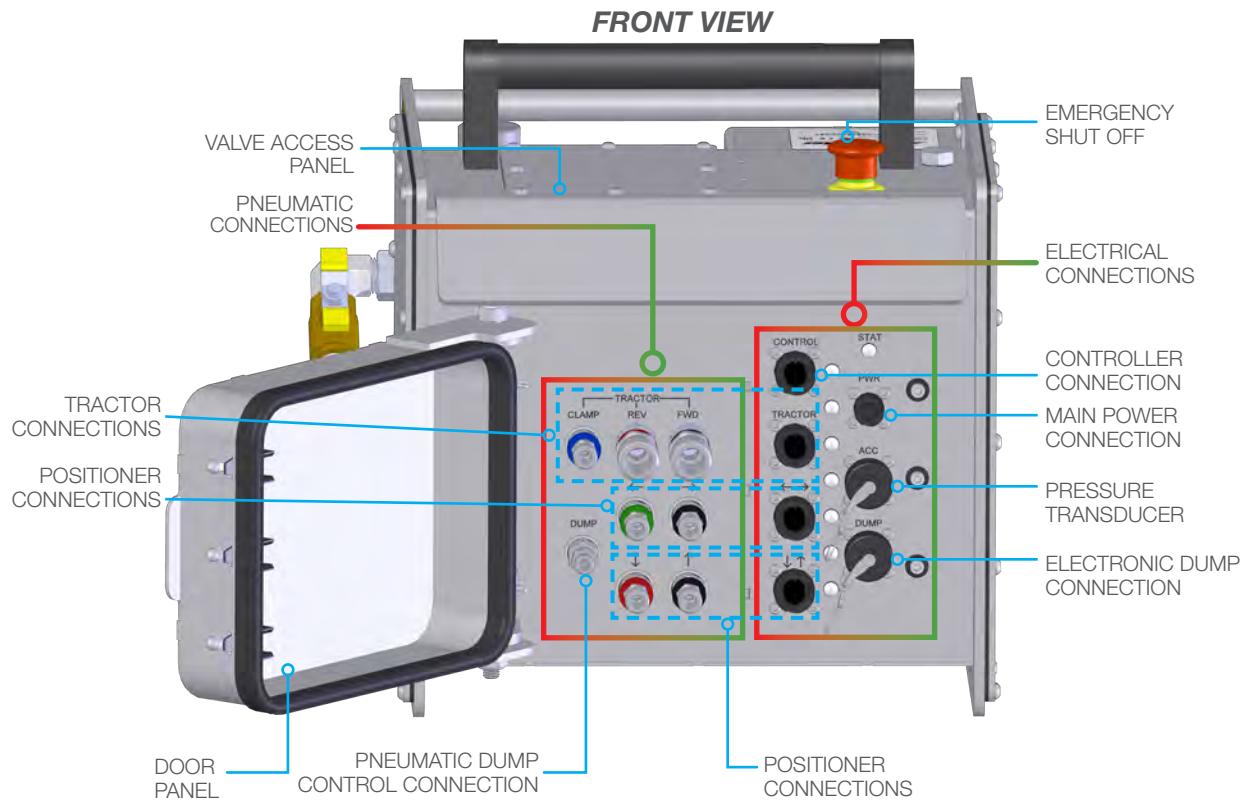
PRE-RUN SAFETY CHECK

Refer to WJTA-IMCA's, Recommended Practices For The Use Of High-pressure Water jetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

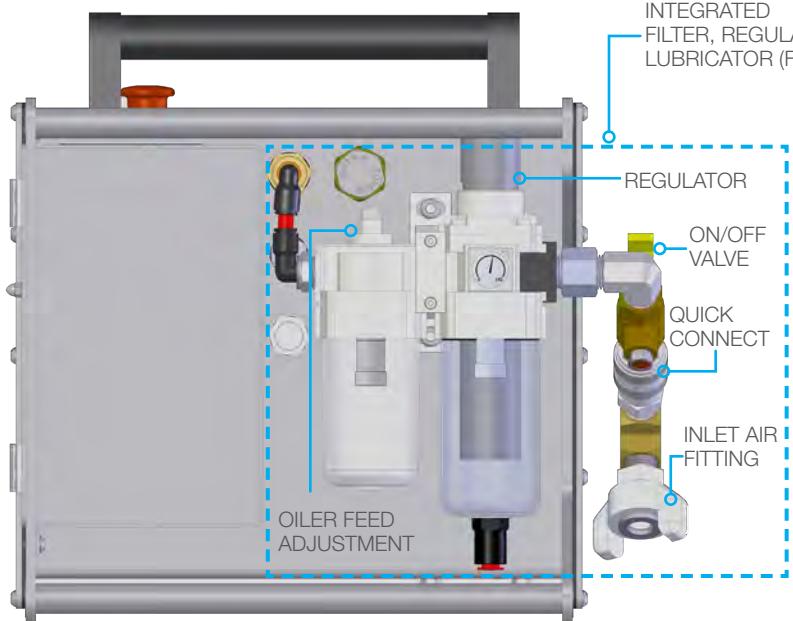
- Complete a job specific risk assessment and act on the resulting actions.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Adhere to all site safety procedures.
- Ensure no personnel are in the waterblasting zone.
- Ensure the work place is free of unnecessary objects (e.g. loose parts, hoses, tools).
- Ensure all operators are using the correct Personal Protective Equipment (PPE).
- Ensure that an anti-withdrawal device (back-out preventer), whip checks (hose whips), and all other applicable safety devices are installed and set-up properly.
- Check that the air hoses are properly connected and tight.
- Check all hoses and accessories for damage prior to use. Do not use damaged items. Only high quality hoses intended for waterblast applications should be used as high-pressure hoses.
- Ensure that operators never connect, disconnect, or tighten hoses, adapters, or accessories with the high-pressure water pump unit running.
- Test the Control Box before operating with high-pressure water to verify the control valves move the hose in the intended direction, and that the dump valve is working properly.
- Check all threaded air fitting connections for tightness.

POWER HUB - OVERVIEW

**POWER HUB (PH-A0302A00C20)
FUNCTION OVERVIEW**
(NOT INCLUDED WITH ABXS-3L TRACTOR)



BACK VIEW



SIDE VIEW

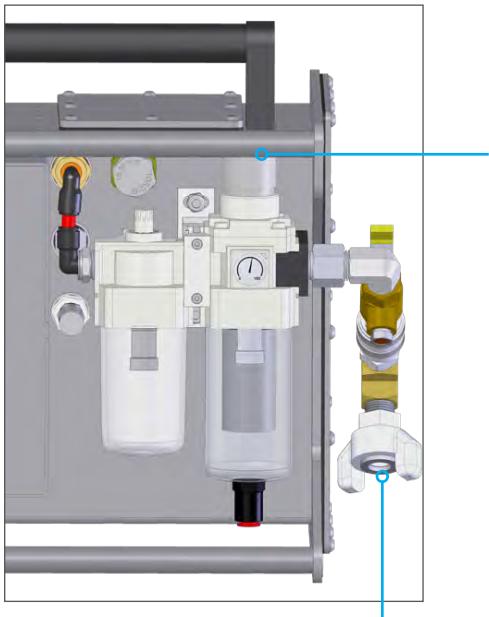


AIR SUPPLY AND LUBRICATOR SETTING

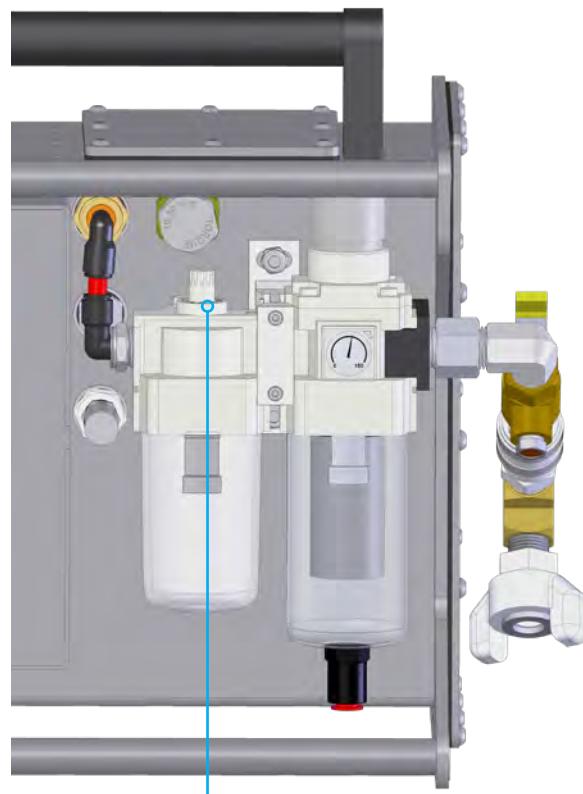
1. The Controller is supplied with a twist claw style inlet coupling (Chicago style) located on the side of the FRL Assembly. Connect a compatible compressed air line (not included) according to the Manufacturer's instructions.
2. Using the regulator adjust the operating air pressure to 100 psi (6,8 bar) for the application.

WARNING

Maximum operating air pressure is 100 psi (6,8 bar). Never exceed 125 psi (8,6 bar) supply pressure. Exceeding 125 psi (8,6 bar) supply pressure may result in injury to the Operator and/or damage to the equipment.

**AIR SUPPLY FITTING**

A universal **AIR SUPPLY FITTING** (Chicago style) is located on the FRL. Connect a compatible compressed air line (not included) according to the Manufacturer's instructions.

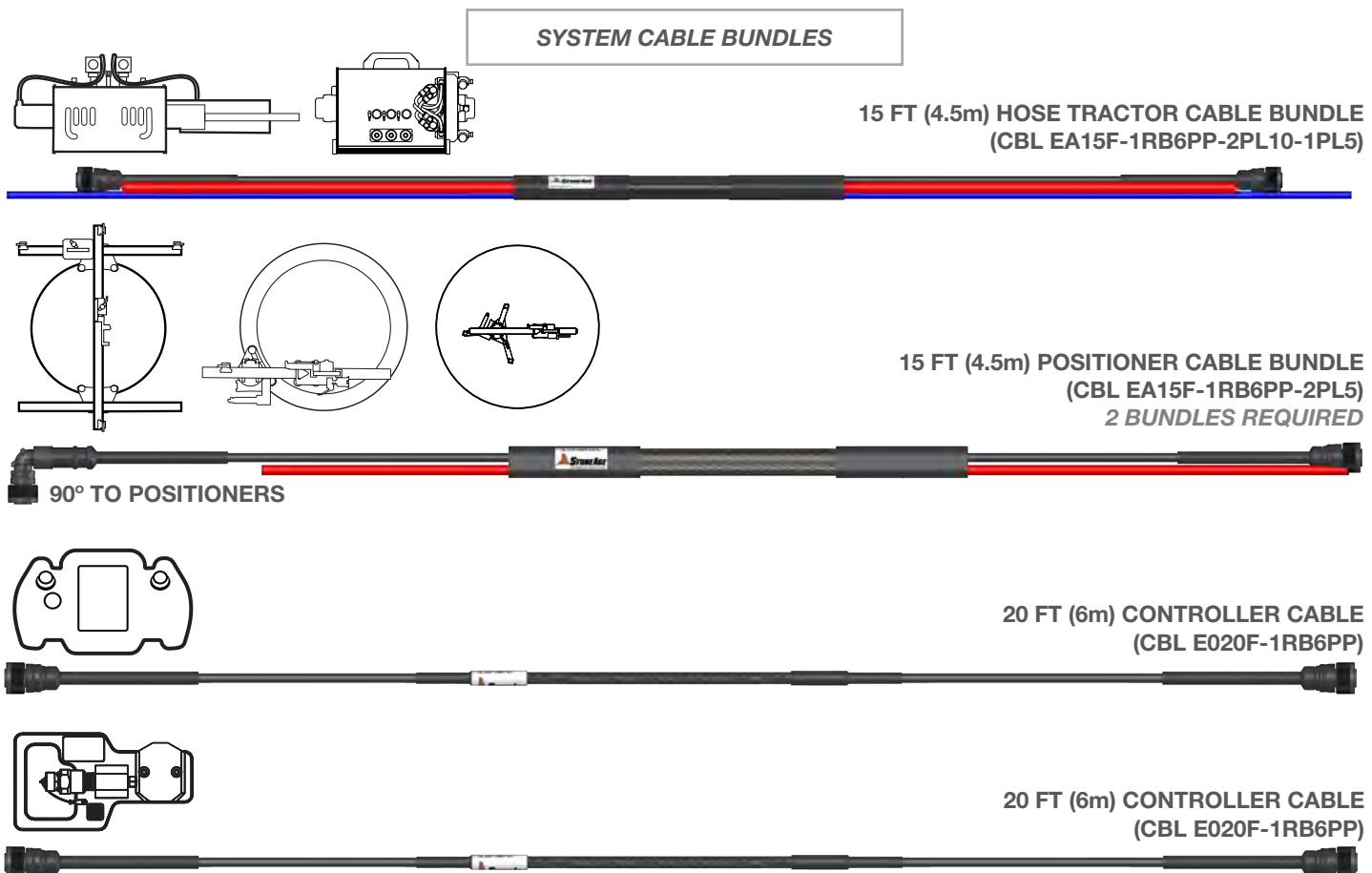
**PNEUMATIC DUMP CONTROL FITTING AND LINE**

A **MOMENTARY PNEUMATIC DUMP CONTROL** is located on the Controller panel and can be set up to control an air actuated dump valve. To utilize the toggle, the end user will need to install 1/4 in. O.D. tubing (not included) between the **PNEUMATIC DUMP CONTROL FITTING** and the pneumatic dump valve.



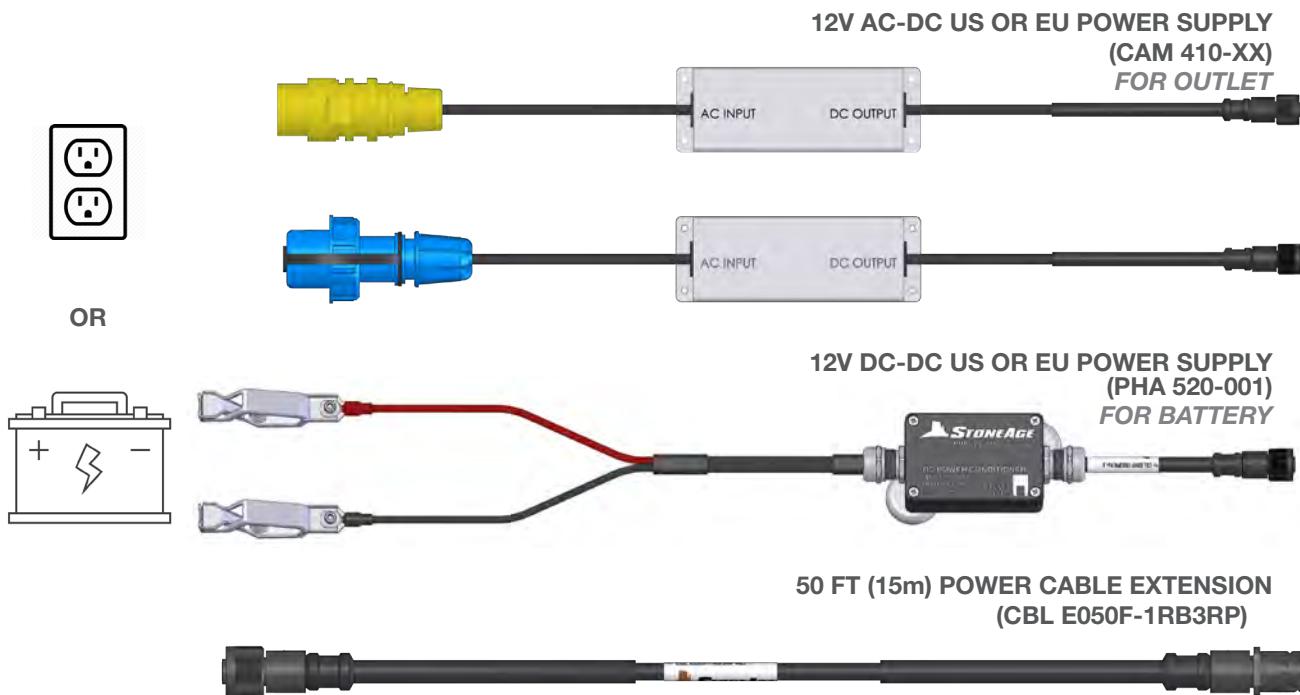
POWER HUB FRONT VIEW

SYSTEM CABLE CONNECTORS AND CABLE BUNDLES

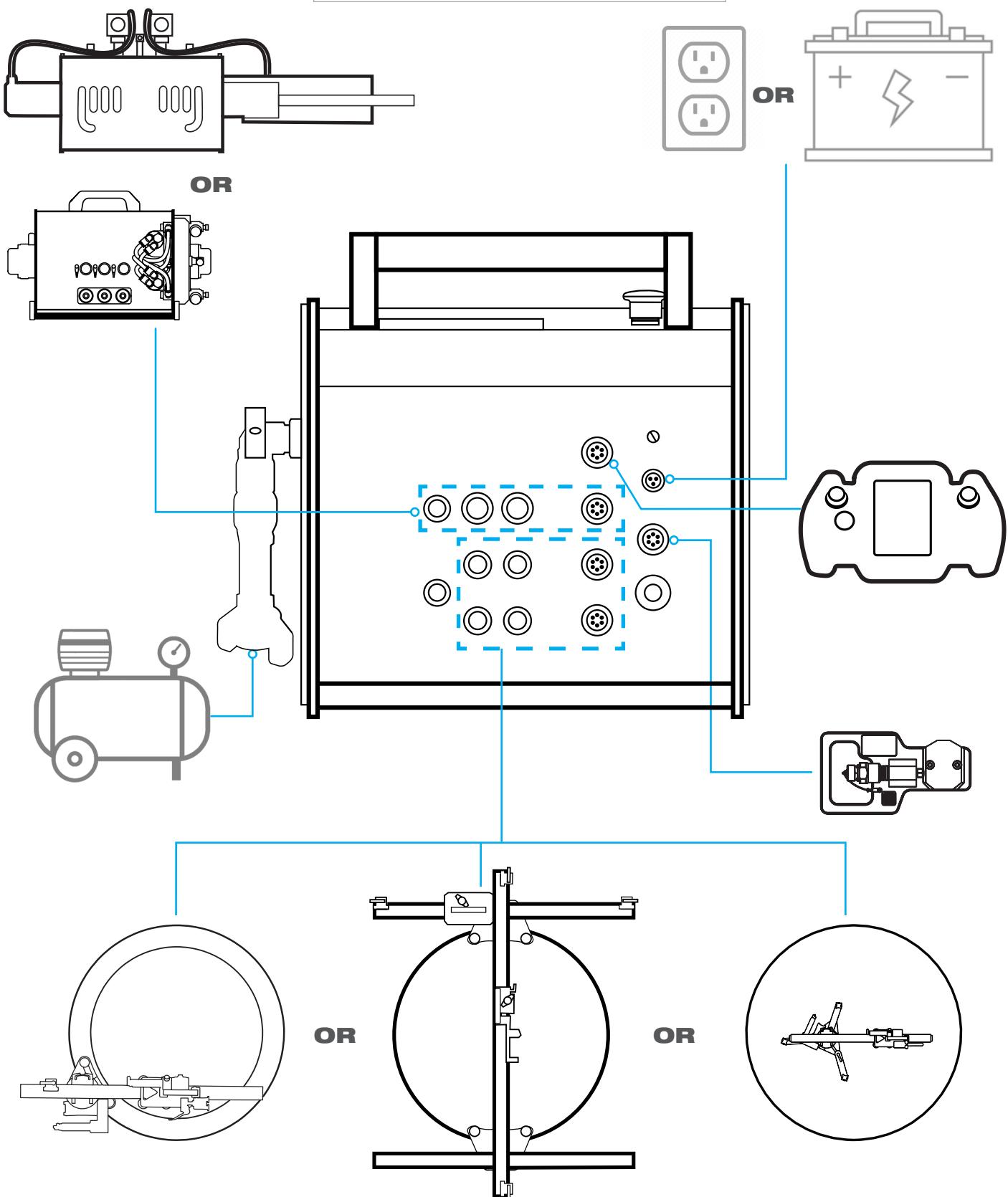


POWER CABLES

The Power Hub can be connected using the 12v AC-DC or the 12v DC-DC supply. Both are available in US or EU versions.

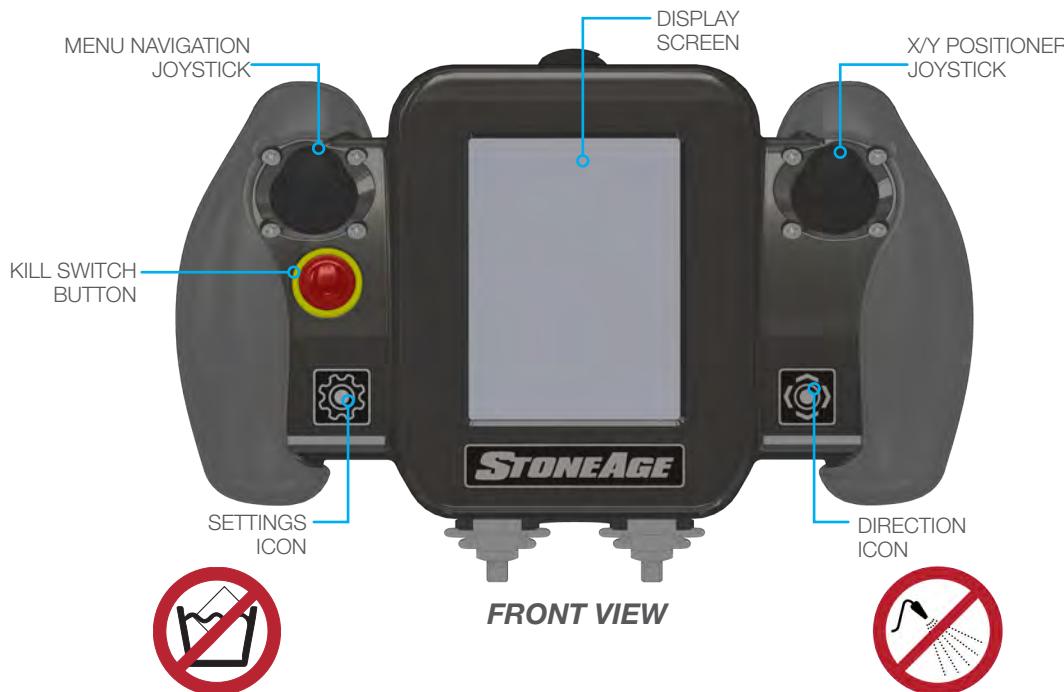


SYSTEM CONNECTION OVERVIEW



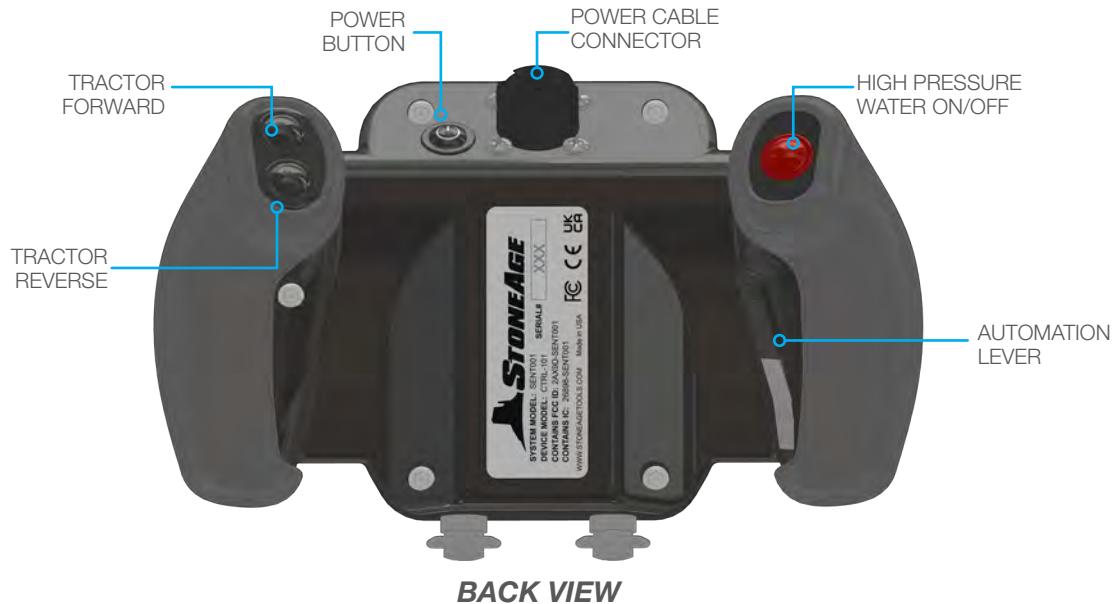
CONTROLLER - OVERVIEW

CONTROLLER (CTRL-101) FUNCTION OVERVIEW



DO NOT SUBMERGE
ELECTRONICS

DO NOT SPRAY
ELECTRONICS



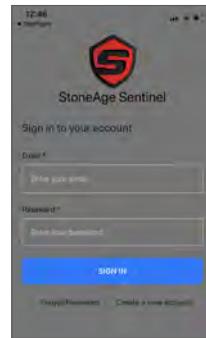
20FT (6m) CONTROLLER CABLE (CBL E020F-1RB6PP REV-)



UPDATING THE CONTROLLER FIRMWARE AND LOG UPLOAD

UPDATING THE CONTROLLER FIRMWARE

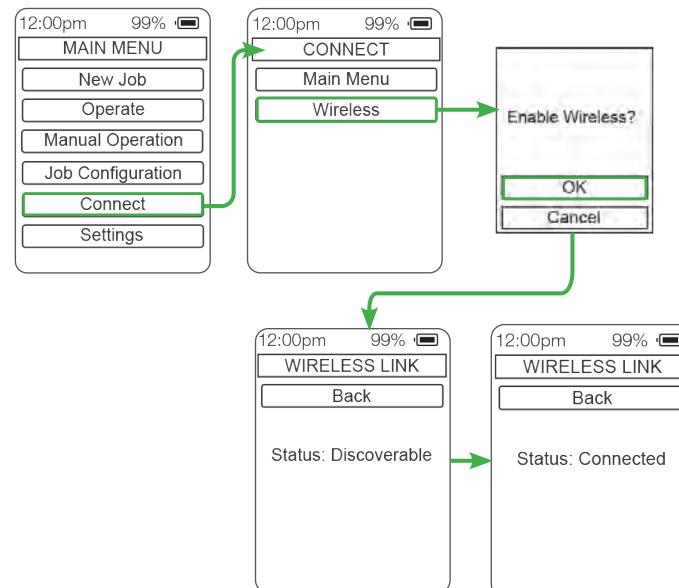
1. Ensure the **iPod touch®** is connected to the Internet.
2. Sign in on the **iPod touch®**



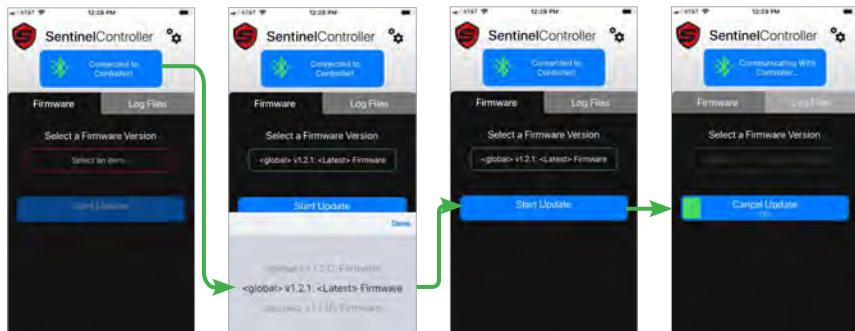
3. Turn on the Sentinel Controller
4. From the **Main Menu**, using the left joystick, scroll down and select **Connect**.
5. Select **Wireless** from the **Connect** menu.
6. Click **OK** on the **Enable Wireless** pop-up.

If your Controller now says **Status: Discoverable**, the Controller is ready to connect to the **iPod touch®**.

When the Controller says **Status: Connected**, it is connected to the **iPod touch®**.

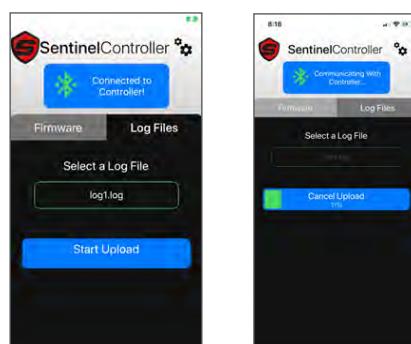


7. On the **iPod touch®**, click **Connect to Controller** button. The screen will say **Connecting** then **Connected**. The Bluetooth logo will turn green.
8. Select the latest **Firmware version** and **Start Update**
9. When the update is complete, the Controller will restart and then it will be available for use with the new firmware.



LOG UPLOADING

1. To begin, connect the controller to the ios device as shown in the Firmware Upgrade section.
2. Tap on the 'Log Files' tab.
3. Select a log file from the drop down.
4. Tap 'Start Upload'. A progress bar will appear. When the log successfully uploads, it will be removed from the controller. You may now view the visualized Job Log on Sentinel Link!

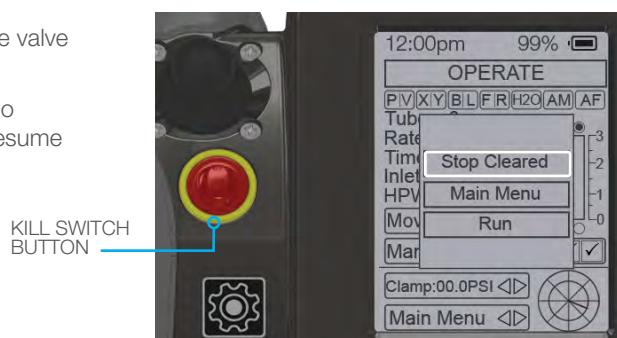


iPod touch® is a trademark of Apple Inc., registered in the U.S. and other countries

OPERATION

SAFETY FEATURE

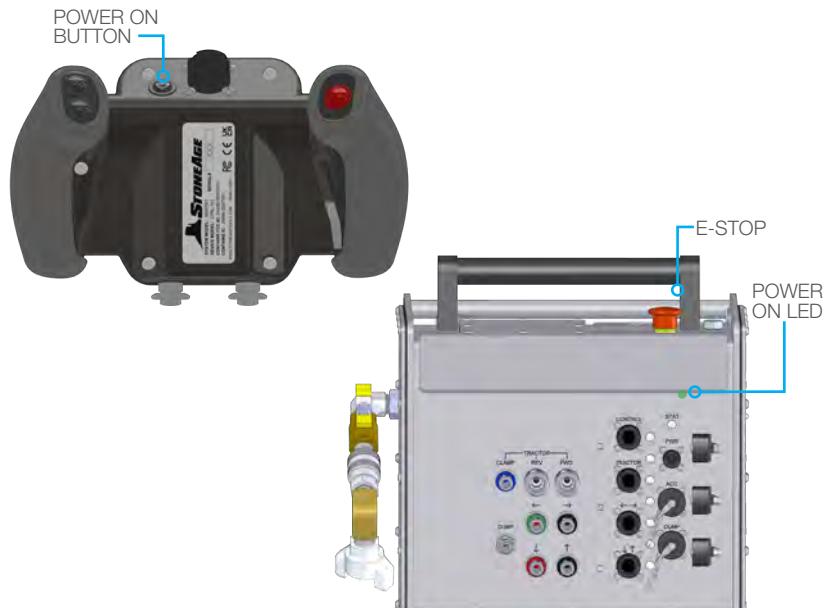
1. The KILL SWITCH directly cuts power to the valve pack in the Power Hub.
2. Use the center button on the Left Joystick to return to the main menu, or select Run to resume the last operation.



POWERING ON

These instructions assume that all connections have been made between the Power Hub, Lightweight Positioner, Autobox Tractor, and Hand Held Controller. It also assumes that the Power Hub has been plugged in and it has been hooked up to an air supply. The Power Hub can be connected to US and European power (50-60Hz 90-260vac) with AC supply or 10-14 VDC with the DC power supply. Connect directly to a battery on the pump or air compressor.

1. Release the E-STOP on the Power Hub.
2. Look for the LED power lights to come on to verify the Power Hub is operational.
3. Press the ON Button on the Controller.
4. The StoneAge logo will appear then change to the MAIN MENU.



MAIN MENU

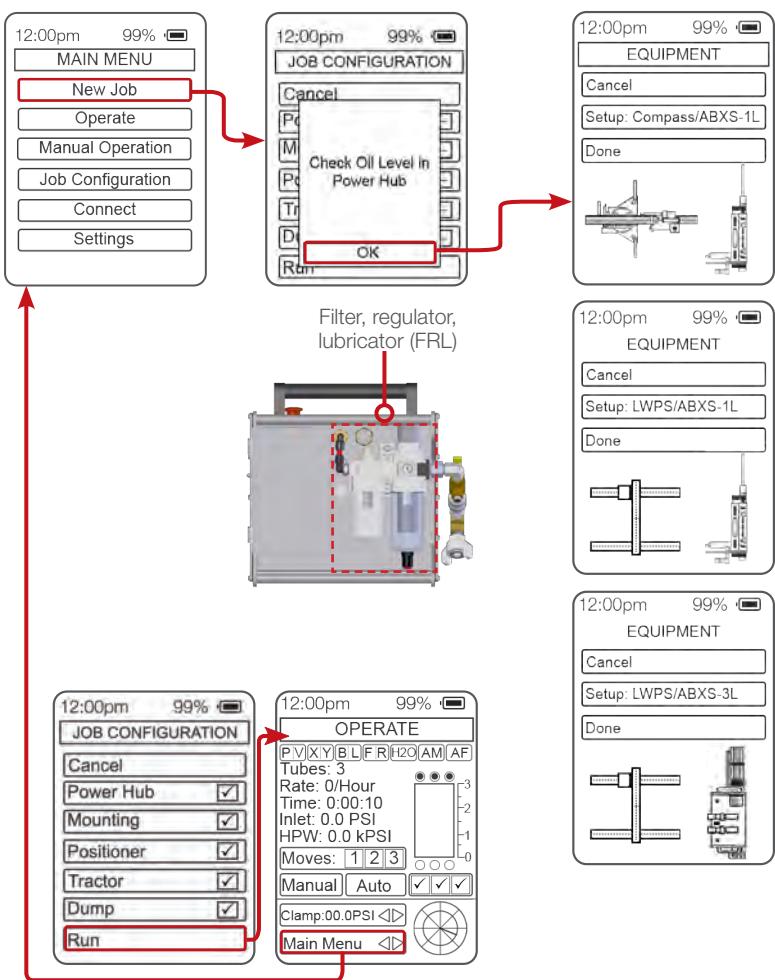
- The MAIN MENU will come up first. From the MAIN MENU, you can select any of the sub menus with the left Joystick, by scrolling and pressing down on the Joystick. This will ask you to verify the Lubricant Level in the Power Hub.
- **New Job** assumes the **Job Configuration task list** has been completed.
- **Operate** will take the user directly into operation mode and assumes the **Job Configuration task list** has been completed.
- **Job Configuration** is the menu that allows the user to set up and test the system components prior to operation.
- **Connect** allows a bluetooth connection for updating the Firmware of the unit.
- **Settings** is the menu for user preferences; Back light, Contrast, Language, Units of measure, Date/ Time, Hour Format.



NEW JOB

From the Main Menu select **New Job**. The following instruction assumes that the **Job Configuration** has been completed. The **Job Configuration** is complete when all tests have been completed and the boxes all have check marks. If any of the boxes have a dash mark, it indicates that the set-up for that item has been skipped/unfinished. If the **Job Configuration** has not been completed, skip ahead to the **Job Configuration** section for a complete instruction.

1. Select **New Job** and the “Check Oil Level in Power Hub” pop-up will come up to remind the user to check the lubricant level in FRL (Filter, Regulator, Lubricator) on the Power Hub before every job.
2. Clicking **OK** on the pop-up, brings up the **Equipment** selection screen.
3. Scroll to **Setup** and select one of the three options. (*Compass/ABXS-1L*, *LWP/ABXS-1L*, *LWP/ABXS-3L*.)
4. Clicking **Done** takes the operator to the **Job Configuration** screen.
5. Selecting **Run** on the **Job Configuration** screen takes the user to the **Operate** screen.
6. Selecting **Run** on the **Job Configuration** screen takes the user to the **Operate** screen.



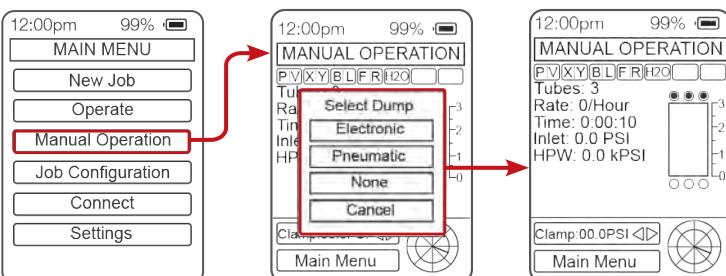
NOTICE

If the **Compass/ABXS-1L Equipment** is selected, the **Mounting** check box on the **Job configuration** screen will already be checked. There will also be an extra configuration setup step in the **Calibration** menu in the **Positioner** screen in the steps to follow.

MANUAL OPERATION

Manual Operation will allow the user to run the system in full manual mode. There are no automatic functions on the screen as on the **Operate** screen. This is useful when not using the Sentinel Sensors.

1. Select the type of dump or none and the **Manual Operation** screen will come up. See the screen descriptions in the **Operate** section below.

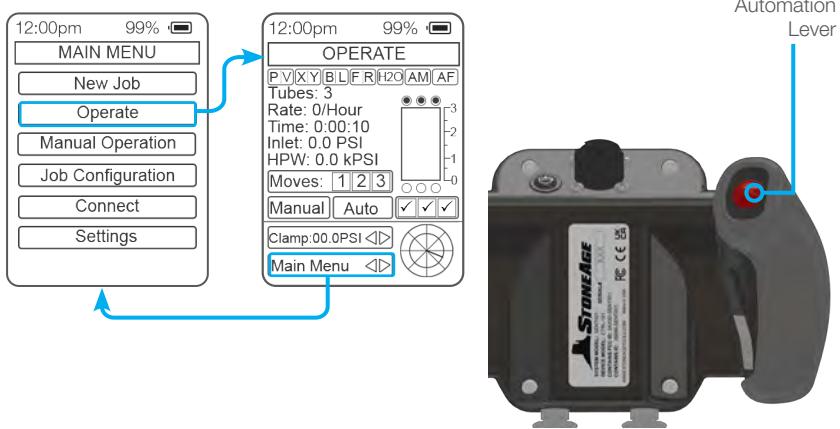


OPERATION

OPERATE

Operate is the main interface that the Operator will use to run the system

1. The **Operate** screen can be accessed from the **Main Menu** or from **Run** at the bottom of **Job Configuration** or **Tractor screen**.
2. Use the left joystick to scroll to then push it down to select and deselect.
3. The **Automation Lever** on the back of the Controller must be held in to operate the system.



Tubes = How many have been cleaned

Rate = Tubes cleaned per hour

Time = How long the job has been running

Inlet = Air Pressure

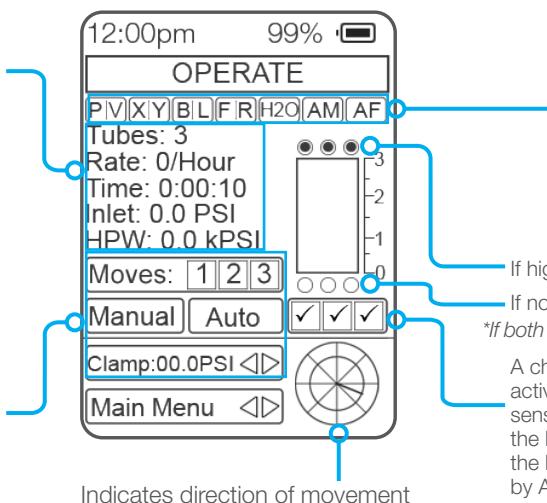
HPW = High Pressure Water Transducer

Moves = Quantity of tubes moved in an automatic move

Manual = Allows user to move lances and positioner manually

Auto = Moves selected amount of tubes. Nudging the right joystick will allow the Operator to make micro moves in any direction.

Clamp = Amount of downward pressure placed on the hoses inside the tractor



PV= Power Hub/Valve

XY= X Positioner/Y Positioner

BL= Belt/Lance

FR= Forward/Reverse

H2O= Water

AM= AutoMove

AF= AutoFeed

*If the indicator box is blank, check the connections.

If highlighted, Lances are retracted

If not highlighted, Lances are in the tubes

*If both are not highlighted, Lances are in the tubes

A check mark indicates the stop sensor is active. If there is an "X" in the box, the stop sensor is inactive. The Operator may disable the lance by unchecking a box in the case that the lance is blocked. The lance will be ignored by AutoStroke and allow the other lances to proceed normally.

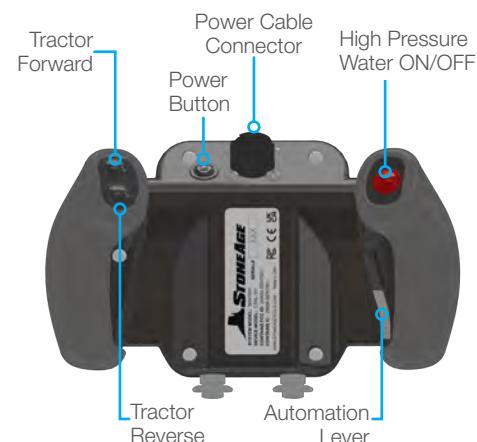
OPERATION

The CLAMP function controls the drive belt traction. It is recommended to operate the clamp pressure as low as possible without excessive slippage. Optimal clamp pressure is achieved when the Drive Belt slips at a slow rate of speed after hitting the hose stops (forward) or the Collet engages the hose crimp (reverse). It is recommended to use hoses supplied with the secondary crimp so the (anti-withdrawal protection) Collet does not impact.

CLAMP PRESSURE MUST NOT EXCEED;

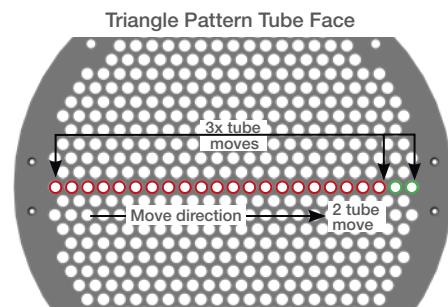
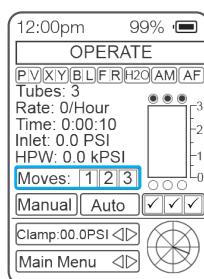
100 PSI for 3 Hoses, 66 PSI for 2 Hoses, and 33 PSI for 1 Hose

1. Hold the **Automation Lever** in and use the left Joystick to set the Clamp PSI.
2. In **Manual** mode, center on the first set of tubes to be cleaned, select the number of **Moves**, then select **Auto** mode.
3. Hold the **Automation Lever** in and test the **High Pressure water On/OFF** button
4. Press the **Tractor Forward** button to feed the lances into the first 3 tubes.
5. Withdraw the lances by using the **Tractor Reverse** button. This will record 3 tubes in the "Tube Count."
6. Tap the right Joystick in the direction of the next tubes to be cleaned and it will automatically advance the number of "Moves" selected on the screen.
7. Continue to move 3 and clean 3 until either the end of the

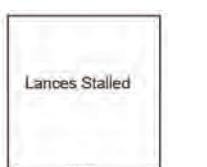


row is reached or there is a different number of moves left to complete the row. If there is a different number of moves, as in this case. Change the **Moves** to the number that is needed to complete the row. In this case, it is 2.

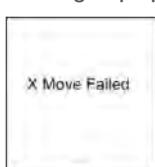
8. Tap the right Joystick to the last tubes and finish cleaning the row.
9. Tap the right Joystick up or down to move to a new row of the tubes. The positioner will automatically move up, down, or diagonal by the same Pitch that it moved in the horizontal direction.
10. For the triangle pattern, tap the joystick up or down in the diagonal direction and straight up and down for square.
11. Repeat the horizontal row cleaning method until complete.



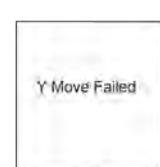
Potential Warning Pop up Screens



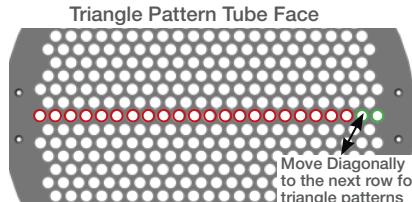
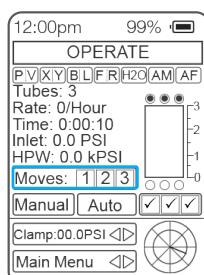
Lances are hitting an obstruction



X Carriage has hit a rail stop



Y Carriage has hit a rail stop



Square Pattern Tube Face



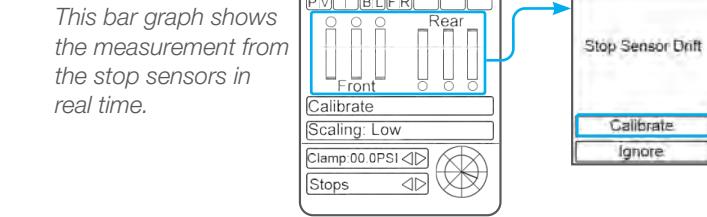
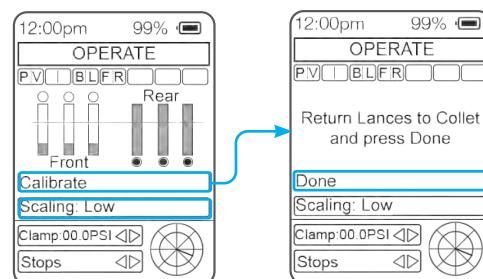
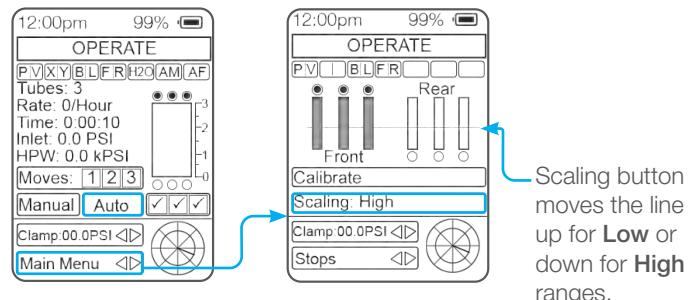
OPERATION

*OPTIONAL SCALING FUNCTION

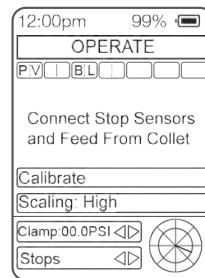
The Scaling function is a preset based on the temperature of the high pressure water. **High** is the default and allows for a larger signal change before the sensors actuate. This can be helpful if the system experiences larger temperature swings due to heated water or recirculated supply water. The **Low** setting may be helpful if the sensors are recalibrated while they are hot, or for troubleshooting. Both High and Low settings function the same, with the exception of the threshold value at which the system is triggered and adjusted.

1. From the **Operate** screen, select the **Auto** function.
2. To get to the **Scaling** menu option, from the **Operate** screen, scroll down to the **Main Menu** button at the bottom and nudge the left joystick to the left or right.
3. Another **Operate** screen will appear. Scroll down to **Scaling** and chose **High** or **Low** based on the high pressure water temperature.
4. The **Calibrate** option will allow for recalibrating the stop sensors from the **Operate** Screen. Press **Done** when completed to return to **Operate**.
5. The “*Stop Sensor Drift*” message will appear when the solid bars start to reach the ends of the rectangles. Selecting **Calibrate** will return to the **Operate** screen and instruct to “Return the Lances to Collet and press **Done**”. This will clear the error message. The Operator may also chose **Ignore** and keep running.

This bar graph shows the measurement from the stop sensors in real time.



6. If the Stop Sensors have become disconnected, the “*Connect Stop Sensors and Feed From Collet*” message will come up.



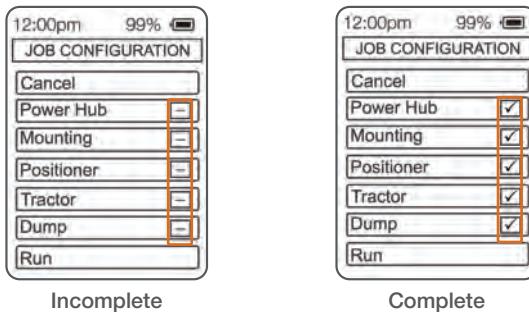
7. The “*Stop Sensor Failure*” message will appear when a stop sensor fails to function. The Operator may chose **Disable** to clear the message and continue with a non functioning stop sensor or chose **Ignore - 1hr** and keep running.

JOB CONFIGURATION

Job Configuration is the base menu for setting job parameters and testing each segment of the system.

The boxes on the right side of **Job Configuration** have a dash mark that indicates that the set-up for that item has been skipped/unfinished. **Job Configuration** is complete when all boxes have check marks.

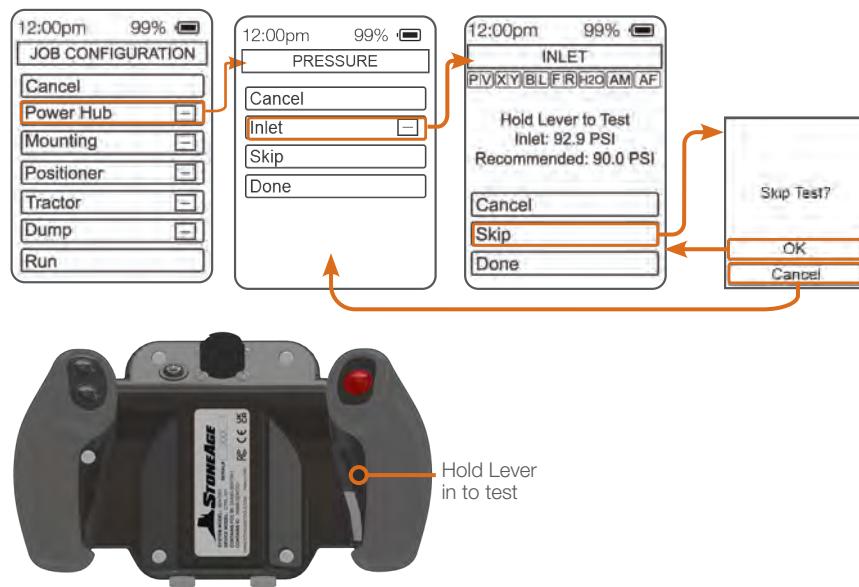
The following instructions will go through each configuration task in the **Job Configuration** menu in consecutive order.



*A Skipped Test =
a complete task or ✓

JOB CONFIGURATION - POWER HUB

1. **Power Hub** tests the system for recommended inlet pressure.
2. Use the left joystick to scroll to Power Hub, then push down on it to select.
3. Scroll down and select Inlet.
4. Hold the Automation Lever in to test and select Done when the test is complete to return to the Job Configuration screen.
5. If the Operator selects Skip on any system test, the Skip Tasks screen will pop up. Click OK will return to the Job Configuration screen. A dash mark will remain in the box to the right of Power Hub. This is the process for any of the tests that are skipped/unfinished.
6. Scroll down to the next selection to continue Job Configuration setup.

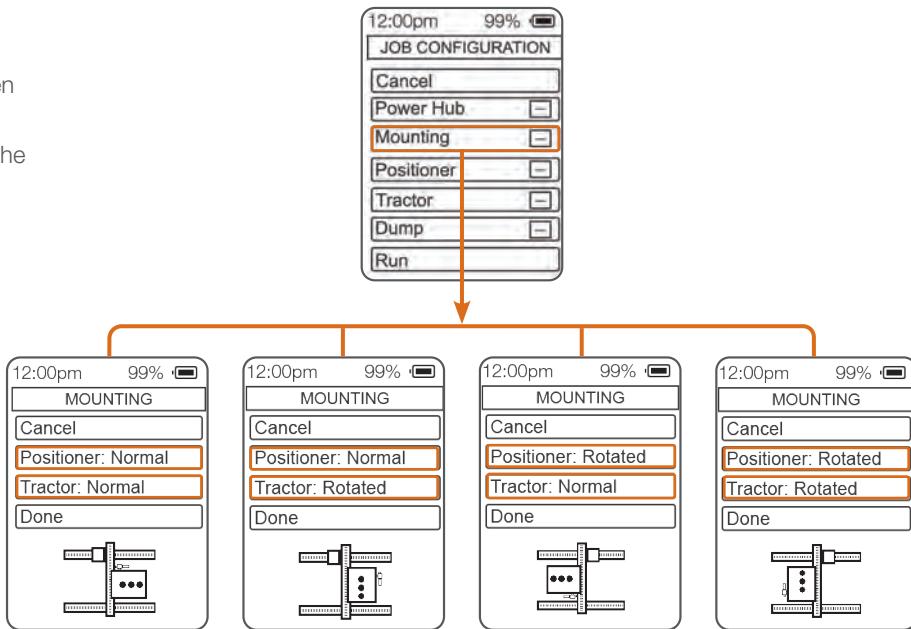


JOB CONFIGURATION - MOUNTING

The **Mounting** setup screen configures both the Tractor and Positioner mounting positions. See the table for possible mounting combinations.

1. Use the left joystick to scroll to **Mounting**, then push down on it to select.
2. Scroll down and select **Positioner**, then use the left joystick to select **Normal** or **Rotated**.
3. Repeat the process to select the **Tractor** position.
4. When the **Positioner** and **Tractor** have been set, select **Done** to return to the **Job Configuration** menu.

Mounting Configurations	
Positioner	Tractor
Normal	Normal
Normal	Rotated
Rotated	Normal
Rotated	Rotated



OPERATION

JOB CONFIGURATION - DETERMINE PITCH AND PATTERN

(DO THIS BEFORE CONFIGURING THE AUTOMOVE FUNCTION)

Before operating the Sentinel System, the operator needs a measurement of the tube pitch and a determination tube pattern type (triangle or square). This is required to properly set up the AutoMove function.

1. To manually measure the tube pitch we recommend the use of digital calipers for the most accurate measurement. The use of a tape measure or ruler will also work.
2. There are a variety of ways to measure pitch;
3. Measure two tubes Center to Center or Edge to Edge. The example to the right would be 1.5 inches.
4. For higher precision;
5. Measure across full row of tubes (or choose ten or whatever)
6. Count the number of tubes
7. Divide the Measurement by the number of tubes – 1
8. Length/Number of Tubes -1 = Pitch
9. The more samples that are taken and averaged, the more precise the Pitch measurement.
10. The tube patterns on the diagrams to the right are indicated in blue. The Square and Triangle are shown but there are also Rotated Square and Rotated Triangle patterns to choose from. See the pattern chart on the next page for a complete list of pattern options.

JOB CONFIGURATION - POSITIONER FOR LWP

IF USING THE COMPASS/ABXS-1L, SKIP TO JOB CONFIGURATION - CALIBRATION FOR THE ABXS-1L CALIBRATION STEPS.

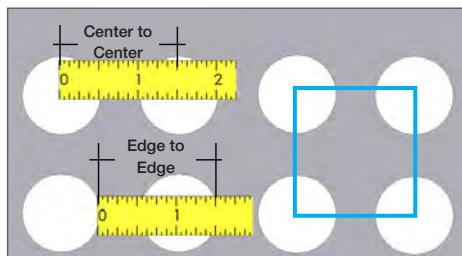
The **Positioner** setup menu displays the following functions;

- Disable Positioner sensors
- Test the Positioner Carriages
- Calibration of the X/Y movement
- AutoMove setup for pitch and tube patterns

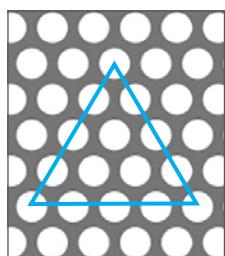
If the Operator selects **Skip** on any system test, the Unfinished Tasks screen will pop up. Clicking **OK** will return to the **Positioner** screen. A dash mark will remain in the box to the right of skipped item indicating that it has not been tested. This is the process for any of the tests that are skipped/unfinished.

1. If the Operator chooses **Disable**, the Positioner sensors will be turned off.
2. To test the Carriage, use the left joystick to scroll to **Carriage**, then push down on it to select. Hold the Automation Lever and move horizontally then vertically to test. Select **Done** when the test is complete. To skip the test and leave the task unfinished, select **Skip** and select **Ok**, the select **Ok** on the Unfinished Task pop up.
3. Scroll down and select **Calibration**. Hold the Automation Lever in and select **Go** to test. Select **Done** when the test is complete. To skip the test and leave the task unfinished, select **Skip** and select **Ok**, the select **Ok** on the Unfinished Task pop up.

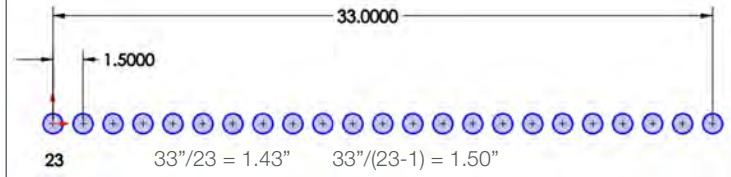
Square Tube Pattern



Triangle Tube Pattern

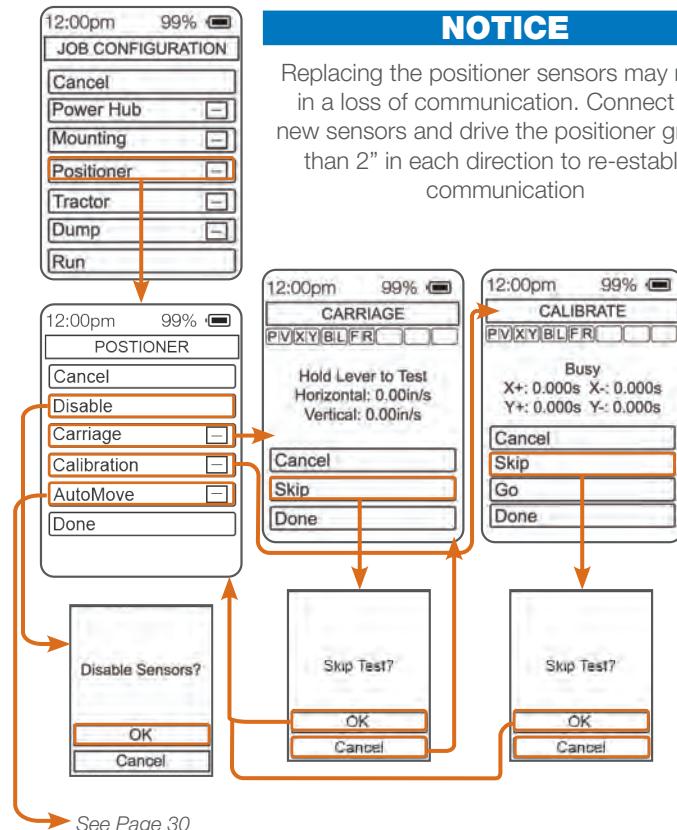


Length/(Number of Tubes -1) = Pitch



NOTICE

Replacing the positioner sensors may result in a loss of communication. Connect the new sensors and drive the positioner greater than 2" in each direction to re-establish communication



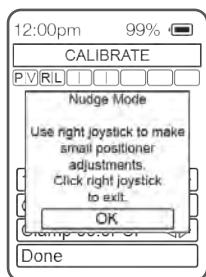
JOB CONFIGURATION - POSITIONER CALIBRATION FOR THE COMPASS/ABXS-1L

The **Positioner** setup menu is the same one used for the ABXS-3L but will have a different set of steps if the Operator has previously selected the *Compass/ABXS-1L* in the Equipment screen. Follow the Calibration procedure below to properly calibrate the *Compass/ABXS-1L*.

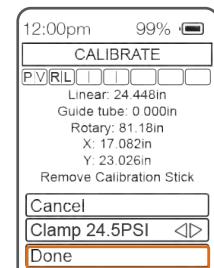
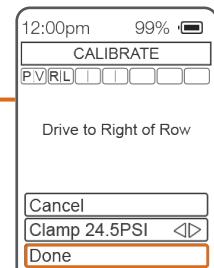
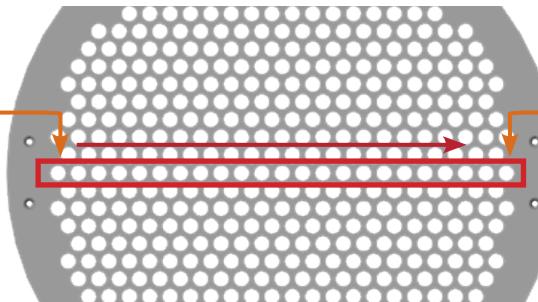
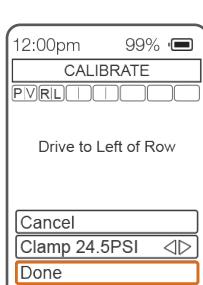
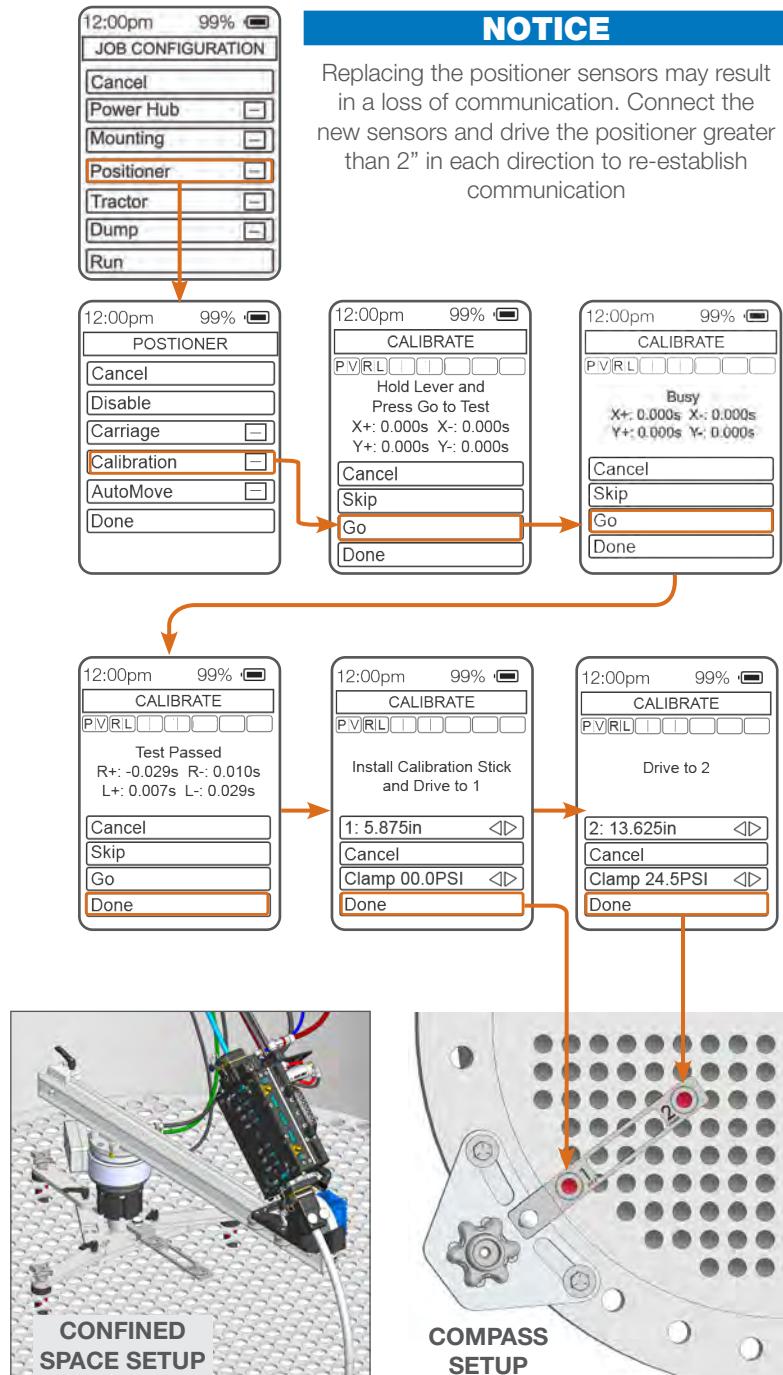
1. From the **Job Configuration** screen, scroll down and select **Positioner**.
2. From the **Positioner** screen, scroll down and select **Calibration**.
3. Hold the Automation Lever in and select **GO** in the **Calibrate** screen and the screen should now read "Busy".
4. When the screen reads "**Test Passed**", select **Done**.
5. Install the **Calibration Stick** onto the Mounting Plate. See the diagrams below.
6. Follow the screen instruction and Drive to position 1 on the **Calibration Stick** then select **Done**.

NOTICE

Nudge Mode allows the Operator to move the guide tube in smaller increments to make alignment to the configuration stick easier.



7. Follow the screen instruction and Drive to position 2 on the **Calibration Stick** then select **Done**.
8. Follow the screen instruction and Drive to the far **Left** tube on the longest row of the tube face, then select **Done**. See diagram below.
9. Follow the screen instruction and Drive to the far **Right** tube on the longest row of the tube face, then select **Done**. See diagram below.
10. The results will show up on the Calibrate screen. Selecting **Done** will go back the Positioner Screen.



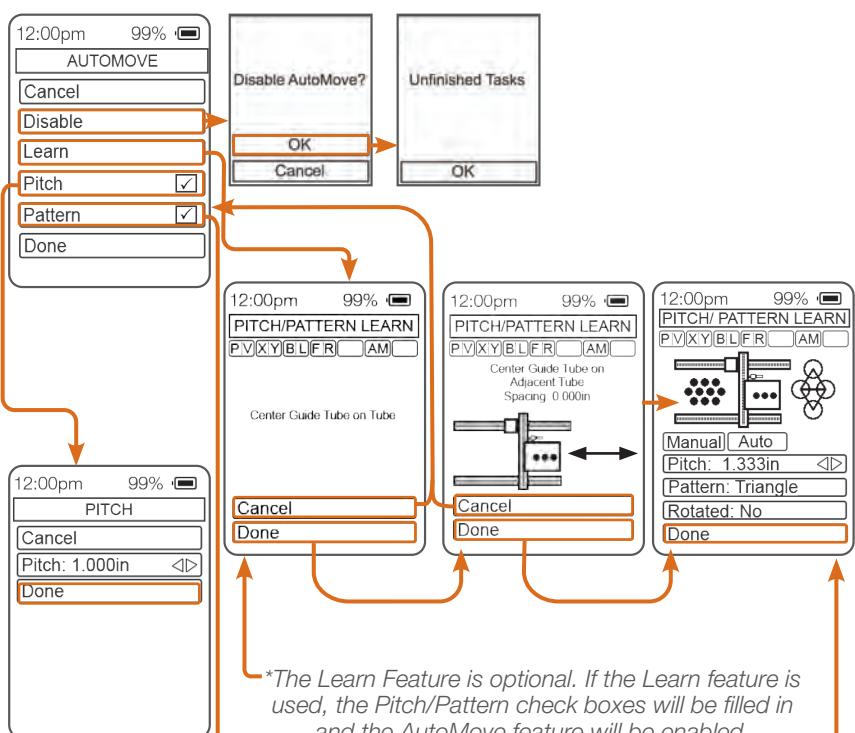
Calibration Results

OPERATION

JOB CONFIGURATION - POSITIONER - AUTOMOVE

- From the **Positioner** screen, select **AutoMove**. If the Operator chooses **Disable**, AutoMove will be turned off.
- Learn** will allow the user measure the Pitch using the Controller. Select **Learn** from the **AutoMove** screen and follow the instruction to "Center Guide Tube on Tube". Click **Done** to move to the next screen. Follow the instruction to "Center Guide Tube on and Adjacent Tube". A measurement will come up in "Spacing". Click **Done** to move to the next screen. From here select **Manual** or **Auto** and check to make sure the selected Pattern and Rotation match the exchanger to be cleaned.
- Pitch** allows the user to manually enter the Pitch measurement described on the previous page. Click on Pitch and move the left joystick side to side to increase or reduce the number, then click **Done** to return to the **AutoMove** menu.
- Pattern** allows the user to manually enter the Pattern. Move the left joystick side to side to select Square or Triangle, then scroll down to select Rotated Yes or No. Select **Done** to return to the **AutoMove** menu.
- When the **Pitch** and **Pattern** have been set, select **Done** to return to the **AutoMove** menu and select **Done** again to return to the **Positioner** menu.
- If all settings in the **Positioner** menu are complete, select **Done** to return to the **Job Configuration** screen to begin the **Tractor** configuration.

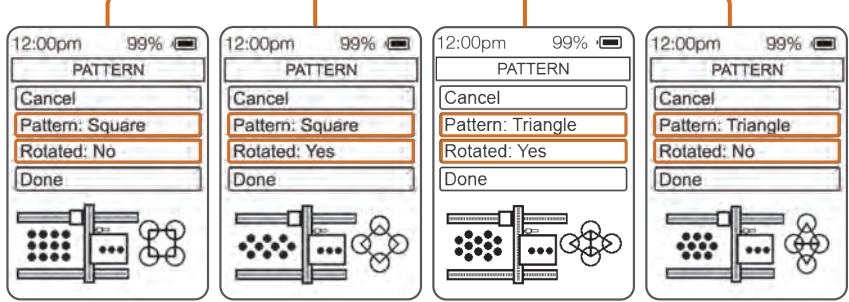
Pattern Configurations				
Pattern	Square	Square	Triangle	Triangle
Rotated	No	Yes	Yes	No
Screen Icon				



*The Learn Feature is optional. If the Learn feature is used, the Pitch/Pattern check boxes will be filled in and the AutoMove feature will be enabled.

Making adjustments using the nudge/manual control of the positioner will update the measure pitch value.

The further the operator drives from the starting point, the more accurate the measurement.

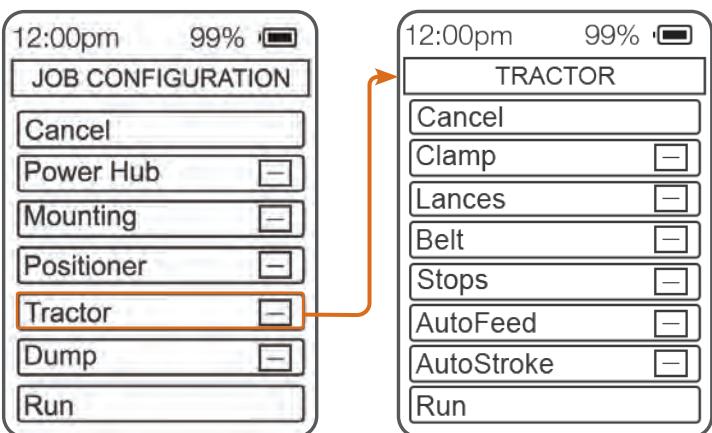


JOB CONFIGURATION - TRACTOR

The **Tractor** setup menu displays the following functions:

- Clamp pressure testing
- Number of Lances
- Belt feed speed testing and clamp pressure setting
- Hose Stop sensor testing and calibration
- AutoFeed enable/disable
- AutoStroke enable/disable and preference settings

If the Operator selects **Skip** on any system test, the **Unfinished Tasks** screen will pop up. Clicking **OK** will return to the **Tractor** screen. A dash mark will remain in the box to the right of skipped item indicating that it has not been tested. This is the process for any of the tests that are skipped/unfinished.



JOB CONFIGURATION - TRACTOR CONTINUED...

The **Tractor** setup menu displays the following functions:

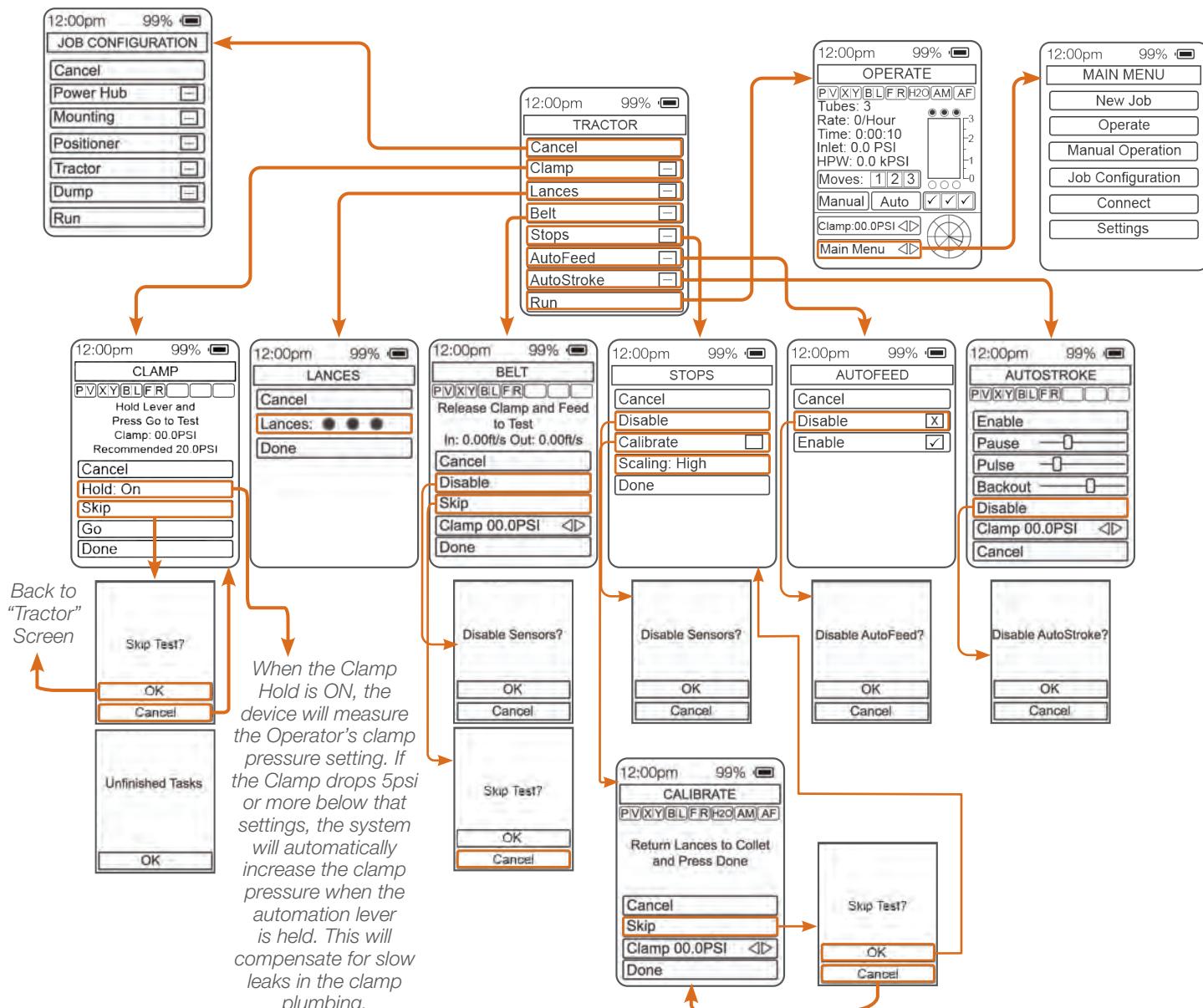
- Clamp pressure testing
- Number of Lances
- Belt feed speed testing and clamp pressure setting
- Hose Stop sensor testing and calibration
- AutoFeed enable/disable
- AutoStroke enable/disable and preference settings (See the next page for detailed Autostroke function explanations)

If the Operator selects **Skip or Disable** on any system test, the **Unfinished Tasks** screen will pop up. Clicking **OK** or **Done** will return to the **Tractor** menu. A dash mark will remain in the box to the right of skipped or disabled item indicating that it has not been tested or enabled. This is the process for any of the tests that are skipped/ unfinished.

Work down the Tractor menu until all tests are complete. Each test screen will instruct the Operator as to how perform the test.

CLAMP PRESSURE MUST NOT EXCEED; 100 PSI
for 3 Hoses, 66 PSI for 2 Hoses, and 33 PSI for 1 Hose

Selecting **Run** will take the Operator to the **Operate** screen.
Selecting **Cancel** will return to the **Job Configuration** menu.



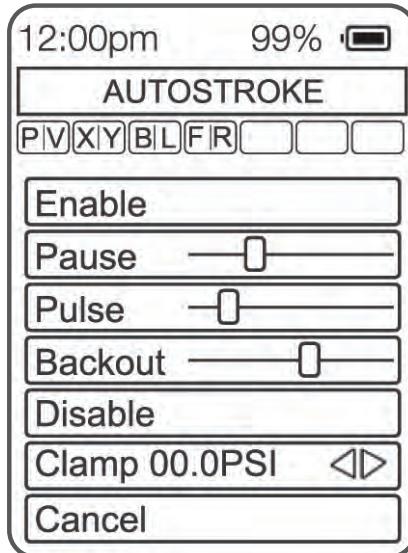
**Clicking "Run" without running tests =
"Unfinished Tasks"

OPERATION

JOB CONFIGURATION - TRACTOR - AUTOSTROKE

The **Autostroke** has the 4 functions. All functions are set by decreasing or slide bar to the left, and increasing or slide bar to the right.

- 1. Enable or Disable (On or Off)** - When Enabled, the Autostroke will actuate after hitting a blocked tube or whenever a lance/lances stop(s) feeding. The stall will be set at approximately 1 second. This is a firmware setting and not adjustable. There is no exit from the Settings screen but to Enable or Disable AutoStroke. To save a change from initial setup you will have to Enable the Autostroke.
- 2. Pause** - This setting controls the Pause in between each pulse once the AutoStroke has actuated. Hard Chocked/Heavy debris will benefit from longer pauses.
- 3. Pulse** - This sets how far the lances will feed forward each time. This is a critical setting to allow the head of the tool to continue to rotate and possibly clear the blockage.
- 4. Backout** - This sets how far the lances are withdrawn from the actuated stop position of the AutoStroke feature. Short tubes will generally use a short backout, long tubes will have a longer backout. Hard chocked/heavy debris tubes will benefit from a longer backout to help flush and prevent hydraulic'ing.



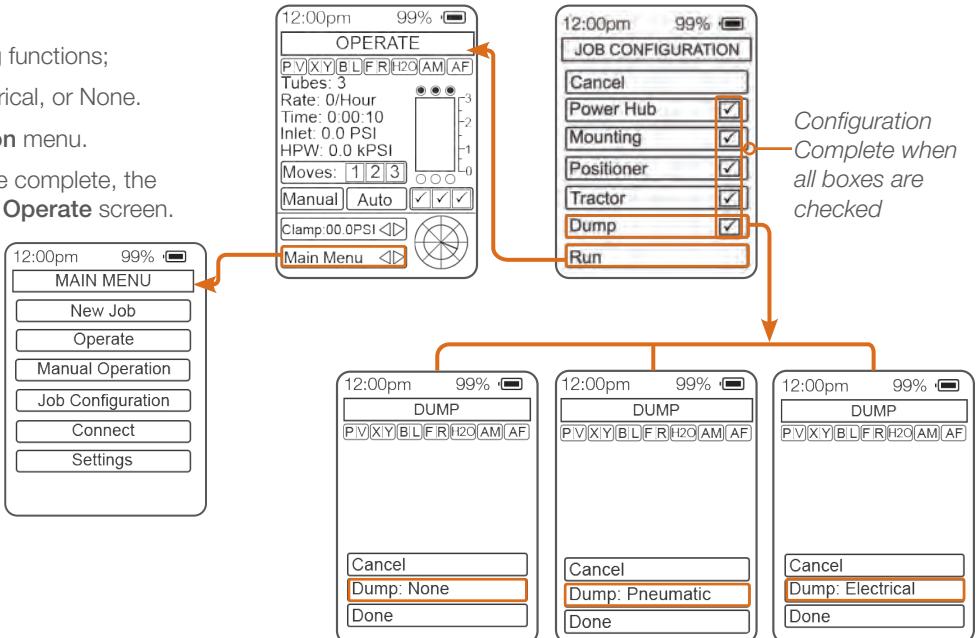
JOB CONFIGURATION - DUMP

The **Dump** setup menu displays the following functions:

- Select type of dump, Pneumatic, Electrical, or None.

Click **Done** to return to the **Job Configuration** menu.

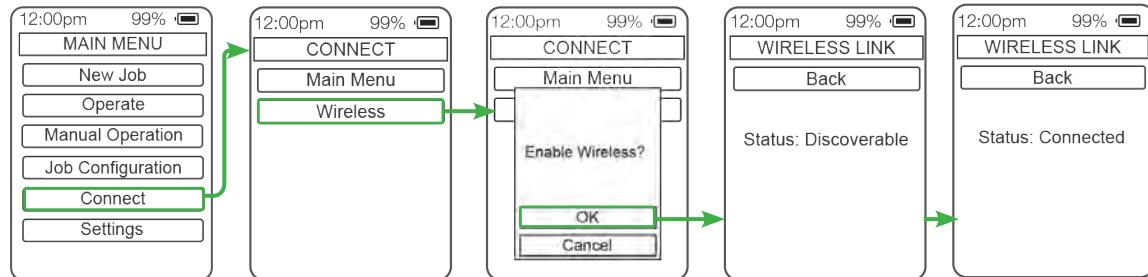
If all tasks in the **Job Configuration** menu are complete, the Operator can select **Run** to go directly to the **Operate** screen.



CONNECT

The **Connect** menu allows the user to turn on the wireless function on the Controller and allow the unit to be discoverable.

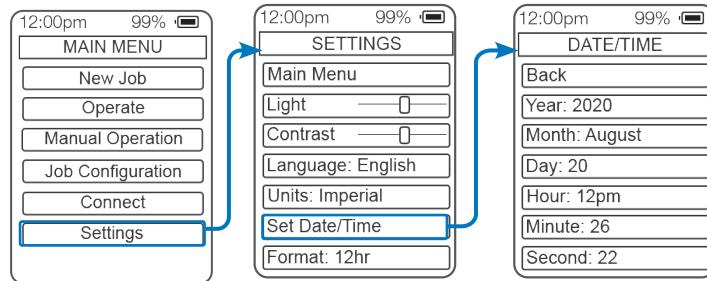
This function is used when updating Firmware. See “Firmware Update Instructions” for more information.



SETTINGS

Settings is the menu that allows the Operator to set up user preferences;

- Back light
- Contrast
- Language
- Units of measure
- Date/Time
- Hour Format



CONTROLLER AND POWER HUB MAINTENANCE

Maintenance Item	Frequency	Maintenance Required
POWER HUB Lubricant level of Filter Regulator, Lubricator	Before and After EVER 8 HOURS OF USE	Use SAE#10 or ISO VG32 Tool Oil (StoneAge Part Number GP 041). Using oils that are not intended for air tool systems may cause malfunction and/or component damage. <i>The oil level should never be below end end of tube inside the bowl</i>
POWER HUB Lubricant level of Filter Regulator, Lubricator	Cessation of oil dripping thrthe sight dome	If both air and oil are kept clean, and the oil level is never allowed below end of tube in the bowl, the lubricator should provide long periods of unattended service. Cessation of oil dripping through the sight dome, irrespective of knob adjustment, is an indication that cleaning is necessary. To clean, it is not necessary to remove lubricator from the line. De-pressurize and disassemble. In most instances, cleaning is needed only in the oil metering area. Pull off adjusting knob, unscrew sight dome assembly, remove inner drip spout and clean with household soap. PLASTIC BOWLS AND SIGHT DOME MUST BE CLEANED WITH HOUSEHOLD SOAP ONLY.
POWER HUB Lubricant level of Filter Regulator, Lubricator	Intermittent Adjustments	The adjustment knob is factory set so that, when turned fully clockwise, no oil is delivered to the venturi for atomization, and the equipment is not being lubricated. To adjust the oil drip rate, turn on the air, start flow and set knob to obtain the desired drip rate, which is visible through the sight dome. As a start, one to two drops per minute is suggested, correct lubrication is a matter of experience and demand. Clockwise rotation of knob decreases oil feed rate. To check lubrication, hold thumbnail or a mirror near the equipment exhaust. A heavy film indicates over-lubrication and the drip rate should be reduced by turning knob to a lower setting.
CONTROLLER Battery	Every 6 months	Charge the battery every 6 months to prevent battery damage.
CONTROLLER Buttons and Joysticks	When damaged	Return to StoneAge dealer for replacement.
CONTROLLER Error messages or Pop Ups	As needed	See the back of the Controller Map Insert in the Sentinel Binder for more information
ALL ELECTRONIC SYSTEM COMPONENTS	Always	DO NOT SPRAY CONTROLLER OR ANY ELECTRONIC COMPONENTS. MAKE SURE ALL DUST CAPS ARE IN PLACE AND ELECTRICAL SENSOR CONNECTIONS ARE TIGHT PRIOR TO CLEANING.



Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the POWER HUB (PH-A0302A00C20) and Controller (CTRL-101)

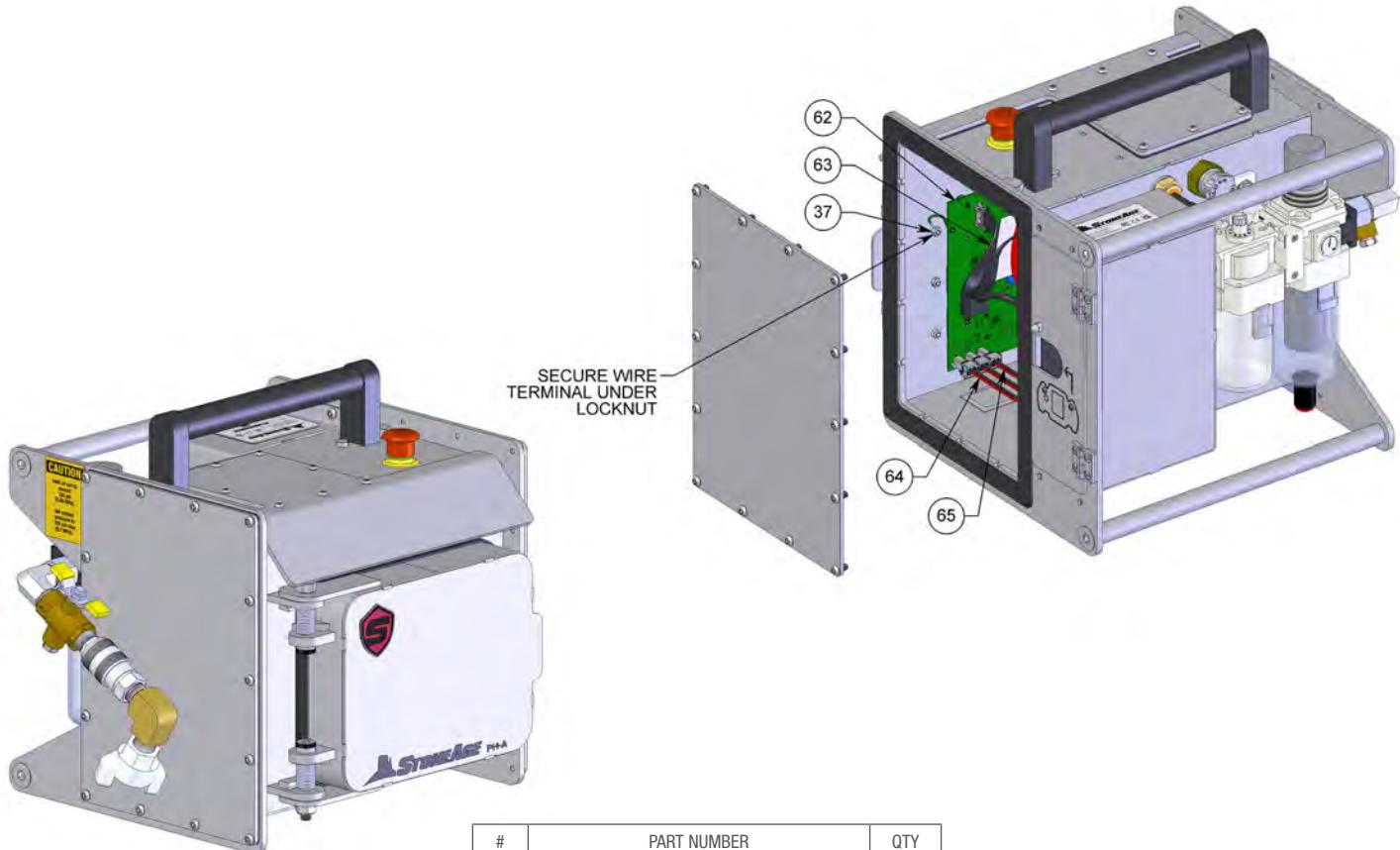
STORAGE, TRANSPORTATION, AND HANDLING

Before storing the Controller or Power Hub, wash with a sponge and warm soapy water, then let air dry. Do NOT pressure wash components. Treat the Controller like a cell phone. Extended storage should be maintained in moderate temperatures, between 40F and 80F.

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PART DIAGRAM

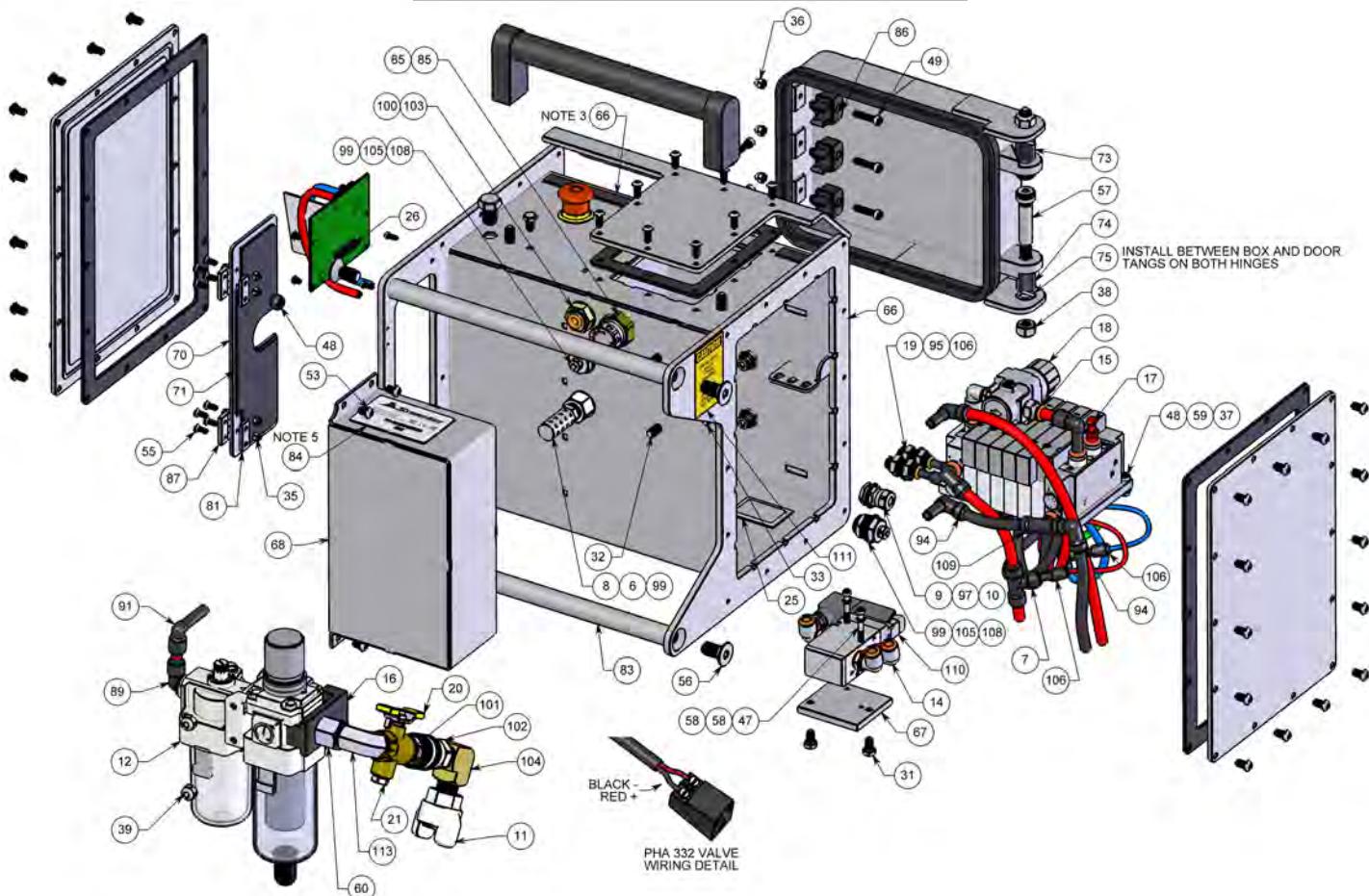
POWER HUB (PH-A0302A00C20)
CONTINUED NEXT TWO PAGES



#	PART NUMBER	QTY
37	GN 3M5-0.8-L NUT, NYLOK M5 X 0.8 SS	5
62	PHA 105 ASSY, POWERHUB MANIFOLD BOARD	1
63	PHA 106 ASSU, ,AMOPF; TP VDB CABLE	1
64	PHA 107 CABLE, JUMP	1
65	PHA 108 CABLE, E-STOP	1



POWER HUB (PH-A0302A00C20)
CONTINUED..

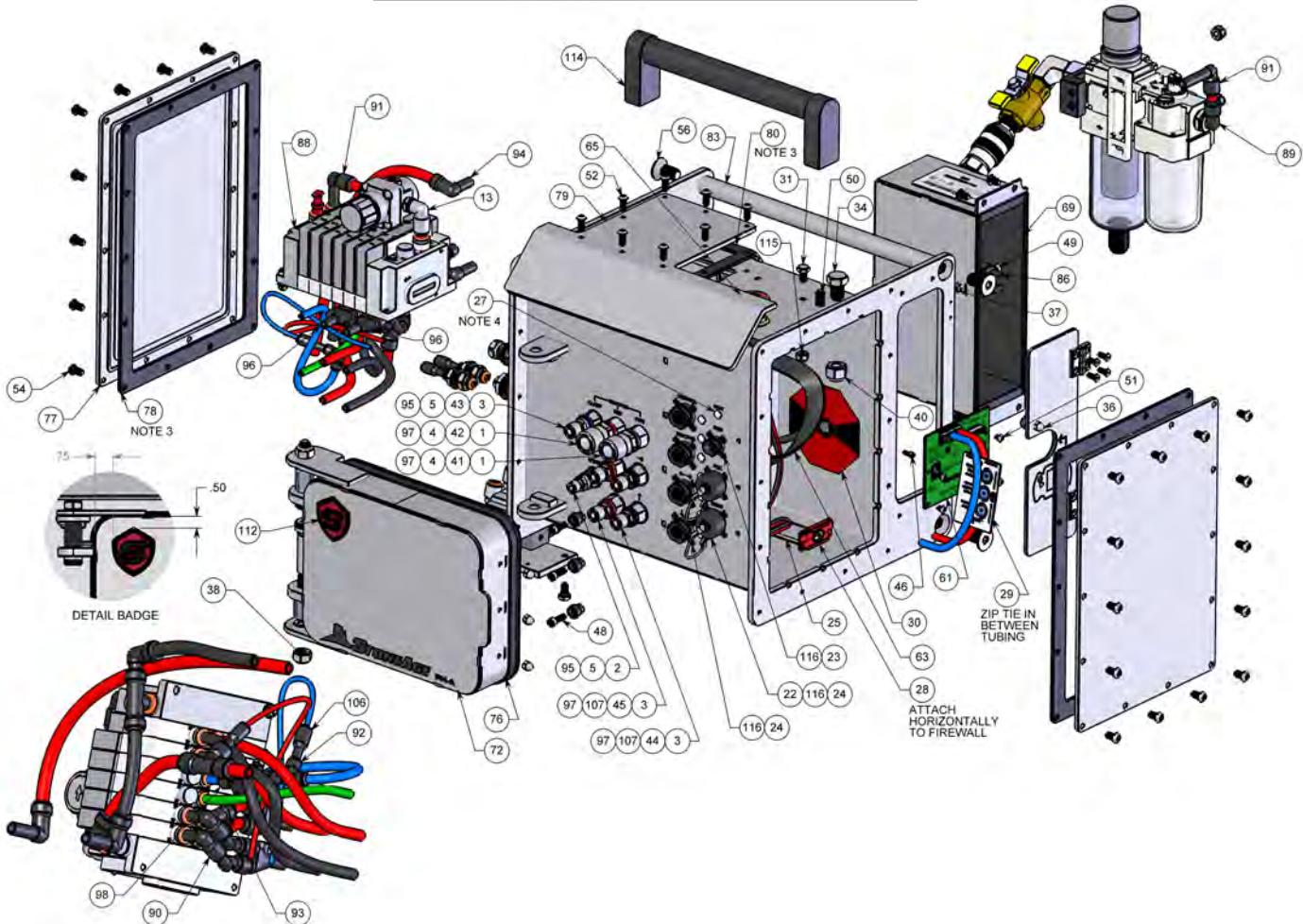


#	PART NUMBER	QTY
6	AST 229 FTG, BULKHEAD ADAPTER P6F PL6	1
7	AST 328 FTG, TEE REDUCING PL6 PL4	1
8	BR 154 MUFFLER P6	1
9	CAM 211-001 CABLE GLAND BULKHEAD	1
10	CAM 271 JAM NUT M16	1
11	CB 114 INLET FITTING W/ PIN	1
12	CB 312-OPP OPPOSITE GEN3 FRL WITH Y400T-D BRACKET	1
14	CB 352 FTG, ELBOW SWIVEL 90 P6M PL6	3
15	CB 354 FTG, ADAPTER P4M PL6	1
16	CB 395 FRL BRACKET	1
17	CB 481.1 FTG, STEM PLUG PL6	1
18	CB 778 PRESSURE REGULATOR, 70 PSI	1
19	CB 790 FTG, BULKHEAD UNION PL4 PL4	2
20	CB 792 VALVE, AUTODRAIN, P8	1
21	DB 026 BREATHER, SINTERED BRONZE, P4	1
25	EE DZ-0.25-0001 DESCANT BAG .25oz 1.5 X 2.12	4
26	EE HD-MXMG-RM34S-00 HEADER, RECEPTACLE	1
31	GB 325-02-SEAL BOLT, HEX SEALING .25-20 X .50 SS	3
32	GB 331-03-SEAL BOLT, HEX SEALING .31-18 X .75 SS	2
33	GB 331-025-SEAL BOLT, HEX SEALING .31-18 X .62 SS	2
35	GN 3M4-0.7-L NUT, NYLOK M4x0.7 SS	4
36	GN 3M5-0.8-A NUT, ACORN M5x0.8 SS	4

37	GN 3M5-0.8-L NUT, NYLOK M5x0.8 SS	5	83	PHA 160 GUARD, ROD	2
38	GN 3M10-1.5-L NUT, NYLOK M10x1.5 SS	2	84	PHA 166 ASSY, FCC CE SERIAL PLATE W TAPE	1
39	GN 331-L NUT, NYLOK .31-18 SS	2	85	PHA 170 ASSY, OVERPRESSURE PROTECTION, 15 PSI	1
47	GS 3M4-40-0.7 SHCS M4x0.7 x 40 SS	2	86	PHA 210 DOOR LOCK	4
48	GS 3M5-18-0.8 SHCS M5x0.8 x 18 SS	5	87	PHA 215 HINGE	2
49	GS 3M5-25-0.8 SHCS M5x0.8 x 25 SS	4	89	PHA 305 FTG, ELBOW SWIVEL 90 P8M PL6	1
53	GSB 3M6-10-1.0 BHCS M6-1.0 x 10 SS	4	91	PHA 308 FTG, STEM ELBOW LONG 90 PL6M PL6F	2
55	GSF 3M4-12-0.7 FHCS M4x0.7 x 12 SS	8	94	PHA 312 FTG, STEM ELBOW 90 PL6M PL6F	4
56	GSF 3M12-25-1.75 FHCS M12x1.75 x 25 SS	4	95	PHA 314 FTG, DOWTY WASHER 14X22X1.5	4
57	GSSH M12-50-SS SHOULDER SCREW M12 X 50 SS	2	97	PHA 316 FTG, DOWTY WASHER 16X28X1.5	7
58	GW 3M4-L WASHER, LOCK M4 SS	4	99	PHA 320 FTG, DOWTY WASHER 20X28X1.5	3
59	GW 319-F WASHER, FLAT #10 SS	1	100	PHA 322 FTG, DOWTY WASHER 22X30X2	1
60	ML 077-P8 BUSHING P8M P8F	1	101	PHA 323 FTG, QD PLUG .50IN P8M	1
66	PHA 110 WELDMENT, BOX	1	102	PHA 324 FTG, QD SOCKET .50IN P8M	1
67	PHA 111 PLATE, VALVE MOUNT	1	103	PHA 325 FTG, BULKHEAD UNION PL6	1
68	PHA 120 WELDMENT, CONTROLLER BOX	1	104	PHA 326 FTG, ELBOW 90 P8F P8F	1
69	PHA 125 ASSY, CONTROLLER BOX FOAM	1	105	PHA 327 FTG, BULKHEAD COUPLING P2F BRASS	2
70	PHA 130 DOOR, CONTROLLER	1	106	PHA 328 FTG, STEM ADAPTER PL4M PL2F	4
71	PHA 131 FOAM, CONTROLLER DOOR	1	108	PHA 330 RELIEF VENT, P2 5PSI	2
73	PHA 141 TORSION SPRING, RIGHHAND	1	109	PHA 331 FTG, STEM TEE INLINE PL6	1
74	PHA 142 TORSION SPRING, LEFTHAND	1	110	PHA 332 VALVE, SHUTOFF	1
75	PHA 143 SHIM, DOOR PTFE	2	111	PL 156-125 CAUTION INLET AIR, 125 MAX	1
81	PHA 155 SPACER, HINGE	2	113	SBT 292.1 FTG, ELBOW 90 P8M P8M	1

PART DIAGRAM

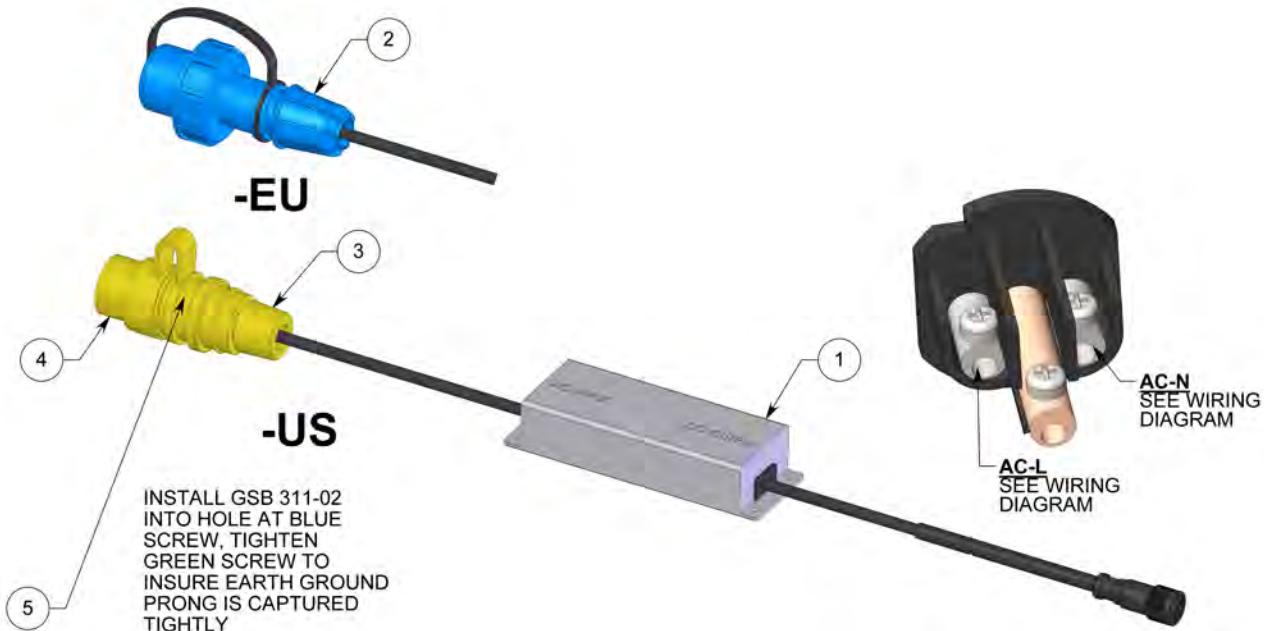
POWER HUB (PH-A0302A00C20) CONTINUED..



#	PART NUMBER	QTY
1	ABXS 270 FTG, ADAPTER P6M PL10 EISELE	2
2	ABXS 272 FTG, ADAPTER P4M PL4 EISELE	1
3	ABXS 273 FTG, ADAPTER P4M PL5 EISELE	5
4	AST 220 FTG, BULKHEAD ADAPTER P6F PL5	2
5	AST 221 FTG, BULKHEAD ADAPTER P4F PL4	2
13	CB 351 FTG, ELBOW SWIVEL 90 P4M PL6	1
22	EE CN-RB-CF-14S CAP, RECEPTACLE W LANYARD	2
23	EE CN-RB-G-10SL-R-AX GASKET, 10SL REAR MOUNT, ALU-FLEX	1
24	EE CN-RB-G-14S-R-AX GASKET, 14S REAR MOUNT, ALU-FLEX	6
25	EE DZ-0.25-0001 DESICCANT BAG .25oz 1.5 X 2.12	4
27	EE LT-LP-0001 LIGHT PIPE W LOCKWASHER AND NUT	8
28	EE SR-DNT-0001 DROP-N-TELL, 100G RESETTABLE	1
29	EE SR-HMD-0001 HUMIDITY INDICATOR	1
30	EE SR-SHD-0001 SHOCKDOT, 50G	1
31	GB 325-02-SEAL BOLT, HEX SEALING .25-20 X .50 SS	3
34	GB 350-03-SEAL BOLT, HEX SEALING .50-13 X .75 SS	1
36	GN 3M5-0.8-A NUT, ACORN M5x0.8 SS	4
37	GN 3M5-0.8-L NUT, NYLOK M5x0.8 SS	5
38	GN 3M10-1.5-L NUT, NYLOK M10x1.5 SS	2
40	GN 350-L NUT, NYLOK .50-13 SS	

41	GP 011-BK ID WASHER, RUBBER, MED, BLACK	1	78	PHA 151 GASKET, LID	2
42	GP 011-R ID WASHER, RUBBER, MED, RED	1	79	PHA 153-001 LID, VALVE ACCESS BENT	1
43	GP 013-B ID WASHER, RUBBER, SMALL, BLUE	1	80	PHA 154 GASKET, VALVE ACCESS LID	1
44	GP 013-BK ID WASHER, RUBBER, SMALL, BLACK	2	83	PHA 160 GUARD, ROD	2
45	GP 013-R ID WASHER, RUBBER, SMALL, RED	2	86	PHA 210 DOOR LOCK	4
46	GS 3M3-10-0.5-SEAL SHCS, SEALING M3x0.5 X 10 SS	2	88	PHA 220 SMC VALVE PACK	1
48	GS 3M5-18-0.8 SHCS M5x0.8 x 18 SS	5	89	PHA 305 FTG, ELBOW SWIVEL 90 P8M PL6	1
49	GS 3M5-25-0.8 SHCS M5x0.8 x 25 SS	4	90	PHA 306 FTG, STEM ELBOW LONG 90 PL5M PL5F	2
50	GS 3M8-20-1.25-SEAL SHCS, SEALING M8x1.25 x 20 SS	2	91	PHA 308 FTG, STEM ELBOW LONG 90 PL6M PL6F	2
51	GSB 3M4-6-0.7 BHCS M4x0.7 x 6 SS	4	92	PHA 310 FTG, STEM TEE PL4M 2xPL4	1
52	GSB 3M5-14-0.8-SEAL BHCS, SEALING M5x0.8 x 14 SS	8	93	PHA 311 FTG, STEM ELBOW 90 PL5M PL5F	2
54	GSB 3M6-12-1.0 BHCS M6x1.0 x 12 SS	28	94	PHA 312 FTG, STEM ELBOW 90 PL6M PL6F	4
56	GSF 3M12-25-1.75 FHCS M12x1.75 x 25 SS	4	95	PHA 314 FTG, DOWTY WASHER 14X22X1.5	4
61	PHA 103 ASSY, VALVE DRIVER BOARD	1	96	PHA 315 FTG, STEM WYE PL5	2
63	PHA 106 ASSY, MANIFOLD TO VDB CABLE	1	97	PHA 316 FTG, DOWTY WASHER 16X24X1.5	7
65	PHA 108 CAMLE WITH E-STOP SWITCH	1	98	PHA 317 VALVE, FLOW CONTROL PL4	1
69	PHA 125 ASSY, CONTROLLER BOX FOAM	1	106	PHA 328 FTG, STEM ADAPTER PL4M PL2F	4
72	PHA 140 WELDMENT, DOOR	1	107	PHA 329 FTG, BULKHEAD P4F PL5	4
76	PHA 145 GASKET, DOOR	1	112	PL 300-2 PIDPLATES S-BADGE, 2 IN., COLOR	1
77	PHA 150 LID, BOX ENDS	2	114	SRT 423 PULL HANDLE	1
			115	TB 044.1 NUT, NYLON .25-20 SS	1
			116	TR130 236 SHCS M4X0.7 X 8 LG	28

CAM 410-XX
AC POWER SUPPLY (US, EU)



PLUG TERMINAL (US)	PLUG TERMINAL (EU)	AC INPUT WIRE COLOR	FUNCTION
WHITE SCREW	AC-N	BLUE	AC NEUTRAL
YELLOW SCREW	AC-L	BROWN	AC LIVE
GREEN SCREW	N/A	INSTALL SCREW	N/A

#	PART NUMBER	CAM 410-US/QTY	CAM 410-EU/QTY
1	CAM 410.1 ASSY, AC POWER SUPPLY	1	1
2	EE CN-PWR-P2P-0001PLUG, WATERPROOF, FIELD WIRABLE AC (EU)	-	1
3	EE CN-PWR-P3P-0001 PLUG, WATERPROOF, FIELD- WIRABLE AC, US	1	-
4	EE CN-PWR-P3P-0001.1 CAP, WATERPROOF, US	1	-
5	GSB 311-02 BHCS 4-40 x .50 SS	1	-

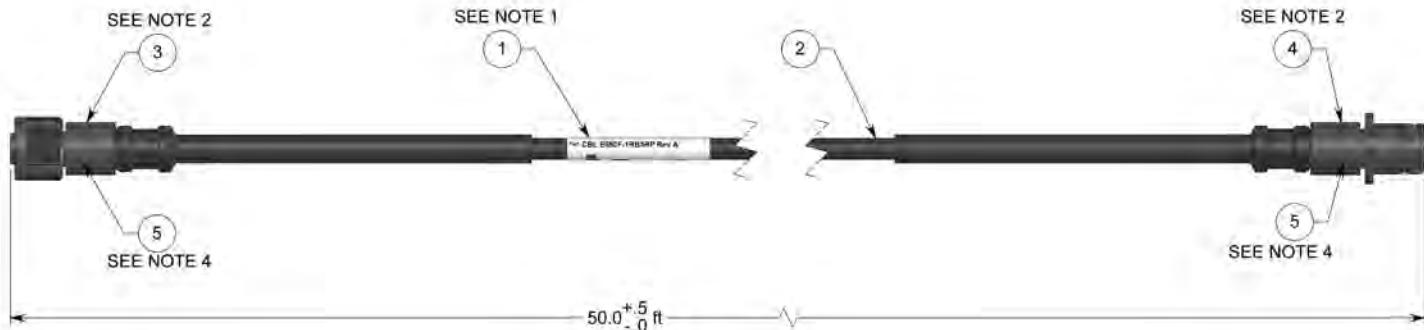
PHA 520-001
POWER SUPPLY 12V DC-DC



PART DIAGRAM

POWER CABLE (CBL E050F-1RB3RP) 50 FT POWER CABLE

PIN	WIRE
A	BLACK
B	NONE
C	WHITE

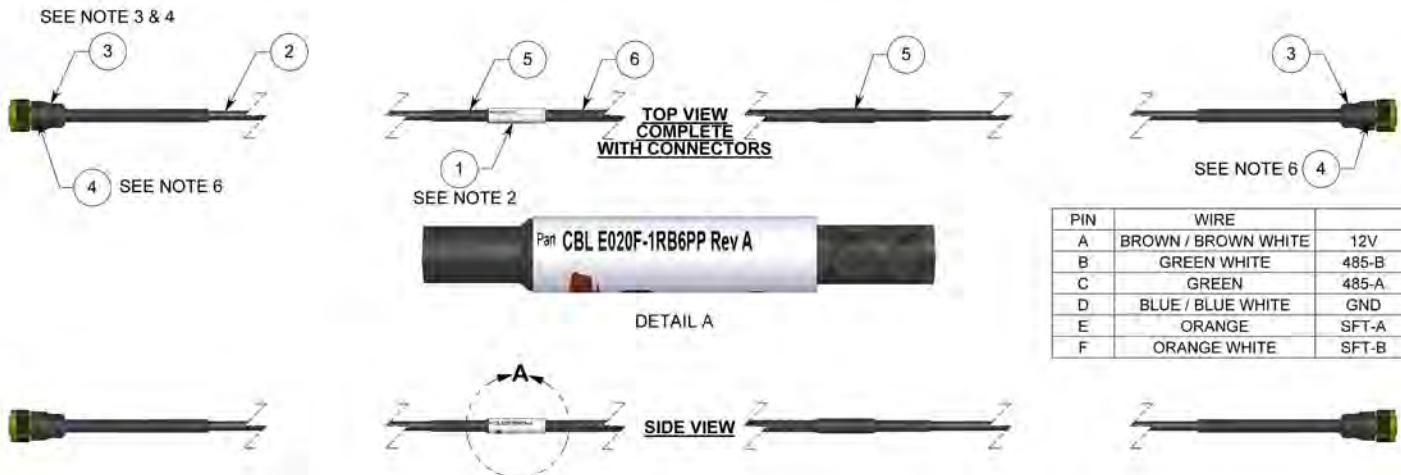


NOTES:

1. WRAP LABEL WITH DURABLE COVER THAT WRAPS CABLE AT LEAST 2X.
2. FILL CONNECTORS WITH POTTING COMPOUND.
3. ASSEMBLY SHALL BE RoHS COMPLIANT.
4. INSTALL CABLE TIE APPROX 3/16" FROM END OF JACKET, ENSURE CABLE TIE IS INSIDE OF END BELL BY 1/4" MIN.

#	PART NUMBER	QTY
1	CBL E050F-1RB3RP.1 LABEL	1
2	CBL E050F.1 WIRE	1
3	EE CN-RB-PF3SS-10SL PLUG, POT AND HEATSHRINK ENDBELL	1
4	EE CN-RB-RM3PS-10SL RECEPTACLE, POT AND HEATSHRINK ENDBELL	1
5	GPCT 100-10-04-5.5-BK CABLE TIE, NYLON PLASTIC, .10W X .04T X 5.5 OAL -BLACK	2

CONTROLLER CABLE (CBL E020F-1RB6PP) 20 FT CONTROLLER CABLE



PIN	WIRE	
A	BROWN / BROWN WHITE	12V
B	GREEN WHITE	485-B
C	GREEN	485-A
D	BLUE / BLUE WHITE	GND
E	ORANGE	SFT-A
F	ORANGE WHITE	SFT-B

NOTES:

1. PULL AND STRAIGHTEN MESH UNTIL SNUG AROUND TUBES & WIRE BEFORE ADDING HEAT SHRINK. (APP. CUT LENGTH 15' 7") ENSURE TUBES LIE UNIFORM AND NOT TWISTED. BUNDLE TO MAINTAIN NATURAL CURL.
2. WRAP LABEL WITH DURABLE COVER THAT WRAPS HEAT SHRINK AT LEAST 2X.
3. MAY NEED TO ADD SECOND CONNECTOR AFTER PULLING CABLE THRU SLEEVE AND HEAT SHRINK OF BUNDLE.
4. FILL CONNECTORS WITH POTTING COMPOUND.
5. ASSEMBLY SHALL BE RoHS COMPLIANT.
6. INSTALL CABLE TIE APPROX 3/16" FROM END OF JACKET, ENSURE CABLE TIE IS INSIDE OF END BELL BY 1/4" MIN.

#	PART NUMBER	QTY	OAL EACH
1	CBL E020F-1RB6PP.1 LABEL	1	
2	CBL EA20F.1 WIRE, 1X4 PAIR, 24 (7/32" AWG COPPER ALLOY, .011" POLYPLEFIN	1	20'
3	EE CN-RB-PF6PS-14S-0001 PLUG, POT AND HEATSHRINK ENDBELL	2	
4	GPCT 100-10-04-5.5-BK CABLE TIE, NYLON PLASTIC, .10W X .04T X 5.5 OAL -BLACK	2	
5	GPHS 0630-OLE-A-BK MOISTURE SEAL HEAT-SHRINK, 0.63" ID BEFORE, BLACK	2	4"
6	GPSL 0500-NYL-G-BK HOSE BUNDLE SLEEVE	1	16'-10"

CONTROLLER (CTRL-101)
CONTROLLER ASSEMBLY



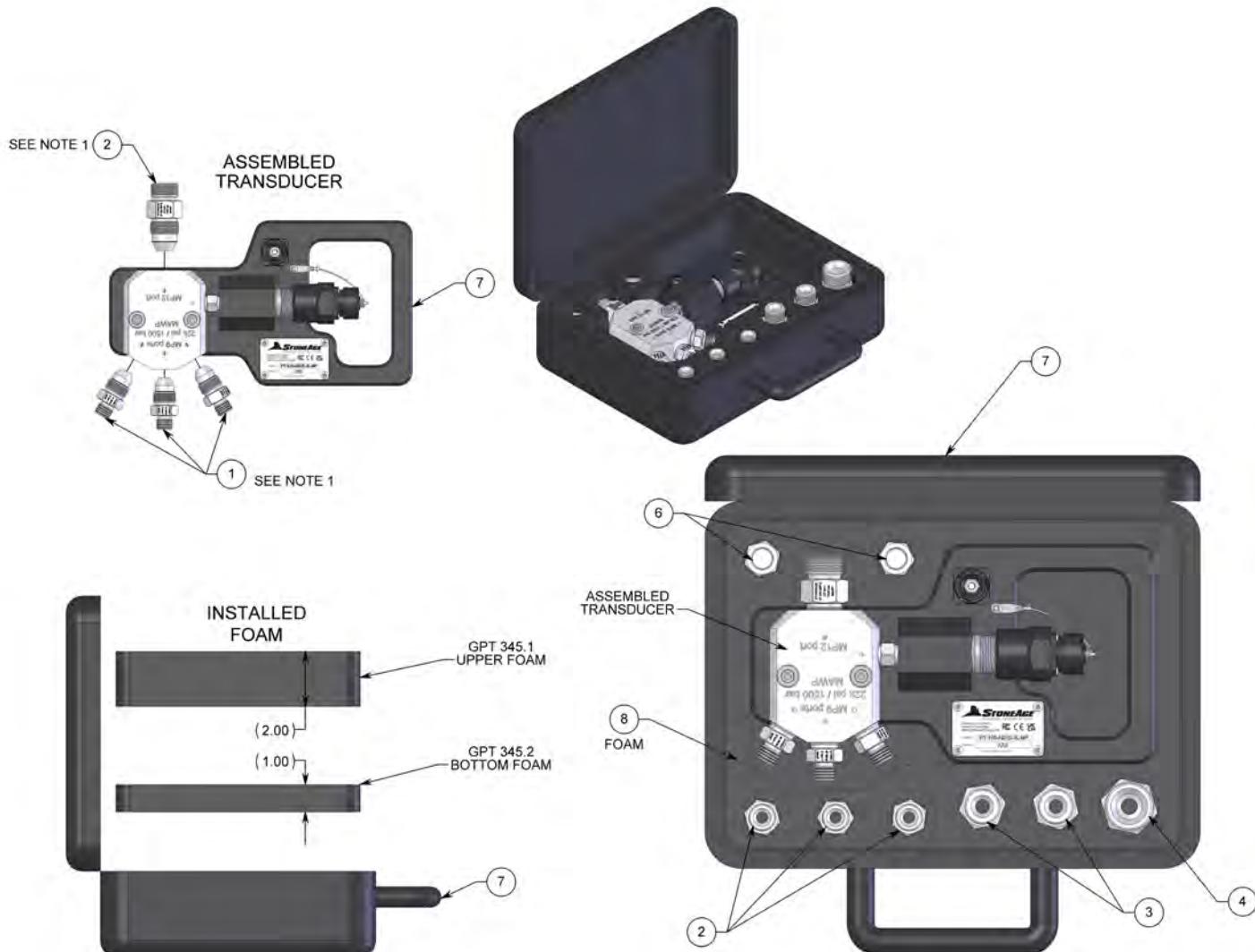
PART DIAGRAM

PRESSURE TRANSDUCER (PT-100-ABXS-3L-MP)
PRESSURE TRANSDUCER ASSEMBLY AND CABLE



#	PART NUMBER	QTY
1	AF 078-H4H4 HEX NIPPLE, H4H4	1
2	CBL E020F-1RB6PP CABLE ASSY, CONTROLLER	1
3	EE CN-RB-CF-14S CAP, RECEPTACLE W LANYARD	1
4	EE CN-RB-G-14S-F-AX GASKET, CONNECTOR	1
5	GN 3M6-1.0-L NUT, NYLOK M6x1.0 SS	1
6	GS 3M6-18-1.0 SHCS M6x1.0 x 18 SS	5
7	GSB 3M4-6-0.7 BHCS M4x0.7 x 6 SS	1
8	GSB 313-0075 BHCS 6-32 x .19 SS	4
9	GSLH 3M10-50-1.5 SHCS, LOW HD M10x1.5 x 50 SS	2
10	GTB 3M3-8-0.5 BHTS, TORX M3x0.5 x 8 SS	4
11	PT 103 PLATE, SERIAL FCC AND CE	1
12	PT 110 PLATE, BASE	1
13	PT 115 COVER, PRESSURE TRANSDUCER	1
14	PT 120 COUPLING, PRESSURE TRANSDUCER	1
15	PT 125 CYLINDER, CAP RETAINER	1
16	PT 160-1500 ASSY, PRESSURE TRANSDUCER BOARD 1500 BAR	1
17	PT 350-3000 TRANSDUCER, PRESSURE 3000 BAR	1
18	PT 369-MP12 Y MANIFOLD, MP12 3XMP9, H4	1

PRESSURE TRANSDUCER (PT 641)
PRESSURE TRANSDUCER AND FITTINGS KIT



1. APPLY BLUE GOOP (SWAGELOK BRAND ANTI-SEIZE OR EQUIV.) TO THREADS WHERE NOTED.

#	PART NUMBER	QTY
1	AF 060-MP9 ADAPTER, 9/16 MALE TYPE M TO 9/16 MALE MP, 22k	3
2	AF 061-MP9 ADAPTER, 3/4 MALE TYPE M TO 9/16 MALE MP	3
3	AF 063-MP12 ADAPTER, 1.00 MALE TYPE M TO 3/4 MALE MP, 22k	3
4	AF 064-MP12 ADAPTER, 1-5/16 MALE TYPE M TO 3/4 MALE MP, 22k	1
5	AF 070-MP9 GLAND, 9/16 MP	2
6	AF 076-MP9 PLUG, 9/16 MP	2
7	GPT 081 COLLET KIT CASE WITH PLAIN FOAM INSERTS	1
8	GPT 345 FOAM SET, PT CASE	1
9	PT-100-ABXS-3L-MP ASSY, PRESSURE MONITORING	1

TERMS AND CONDITIONS

1. Acceptance of Terms and Conditions. Receipt of these Terms and Conditions of Sale ("Terms and Conditions") shall operate as the acceptance by StoneAge, Inc. ("Seller") of the order submitted by the purchaser ("Buyer"). Such acceptance is made expressly conditional on assent by Buyer to these Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of these Terms and Conditions (including inconsistencies between Buyer's purchase order and this acceptance) is given by Buyer to Seller promptly on receipt hereof.

Seller desires to provide Buyer with prompt and efficient service. However, to individually negotiate the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, the product(s) furnished by Seller are sold only according to the terms and conditions stated herein and with the terms and conditions stated in any effective StoneAge Dealer Agreement or StoneAge Reseller Agreement, if applicable. Notwithstanding any terms and conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to these Terms and Conditions unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's terms and conditions.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for the product(s) shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per pricelist in effect at the time of shipment. Prices are subject to increase for inclusion of any and all taxes which are applicable and which arise from the sale, delivery or use of the product(s), and the collection of which Seller is or may be responsible to provide to any governmental authority, unless acceptable exemption certificates are provided by Buyer in accordance with applicable law. Buyer shall pay all charges for transportation and delivery and all excise, order, occupation, use or similar taxes, duties, levies, charges or surcharges applicable to the product(s) being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. SELLER MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE PERFORMANCE OF ANY PRODUCT EXCEPT AS SET FORTH IN THE STONEAGE LIMITED WARRANTY PROVIDED WITH THE PRODUCT.

4. Delivery. Seller is not obligated to make delivery by a specified date, but will always use its best efforts to make delivery within the time requested. The proposed shipment date is an estimate. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. UNDER NO CIRCUMSTANCES SHALL SELLER HAVE ANY LIABILITY WHATSOEVER FOR LOSS OF USE OR FOR ANY DIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM DELAY REGARDLESS OF THE REASON(S).

All product(s) will be shipped F.O.B. point of origin, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance costs from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the product(s). Buyer shall bear all risk of loss commencing with the shipment or distribution of the product(s) from Seller's warehouse. Order shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No product(s) may be returned without securing written approval from Seller.

5. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement relating to the subject matter hereof and cannot be supplemented or amended without Seller's prior written approval.

6. Omission. Seller's waiver of any breach or Seller's failure to enforce any of these Terms and Conditions at any time, shall not in any way affect, limit or waive Seller's right thereafter to enforce and compel strict compliance with every term and condition hereof.

7. Severability. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

8. Disputes. Seller and Buyer shall attempt in good faith to promptly resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Seller and Buyer shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the Seller and Buyer.

9. Governing Law. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state.

10. Jurisdiction and Venue. Seller and Buyer agree that the state or federal courts located within the City and County of Denver, Colorado shall have sole and exclusive jurisdiction over any litigation concerning any dispute arising under these Terms and Conditions not otherwise resolved pursuant to Section 9 as well as any alleged defects of any Products or damages sustained as a result of such alleged defects. Seller and Buyer further agree that should any litigation be commenced in connection with such a dispute, it shall only be commenced in such courts. Seller and Buyer agree to the exclusive jurisdiction of such courts and neither will raise any objection to the jurisdiction and venue of such courts, including as a result of inconvenience.

11. Attorney's Fees. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or mediation.

STONEAGE TRADEMARK LIST

View the list of StoneAge's trademarks and service marks and learn how the trademarks should be used. Use of StoneAge trademarks may be prohibited, unless expressly authorized.

<http://www.StoneAgetools.com/trademark-list/>

STONEAGE PATENT DATA

View the list of StoneAge's current U.S. patent numbers and descriptions.

<http://www.sapatents.com>

STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

<http://www.stoneagetoools.com/terms>

<http://www.stoneagetoools.com/warranty>

Warranties set forth herein extend only to End-Users, meaning customers acquiring, or that have previously acquired, a product manufactured by StoneAge ("Product") for their own use and not for resale, either directly from StoneAge Inc. ("StoneAge") or from a StoneAge Authorized Dealer or Reseller ("Dealer"). No warranty of any kind or nature is made by StoneAge beyond those expressly stated herein.

1. LIMITED WARRANTY PERIOD. Subject to the limitations and conditions hereinafter set forth, StoneAge warrants its Product to be free from defects in workmanship and material for a period of one (1) year from the date of purchase by the End-User, provided that the end of the limited warranty period shall not be later than eighteen (18) months from the date of shipment of the Product to the Dealer or the End-User by StoneAge ("Limited Warranty Period"). All replacement parts which are furnished under this Limited Warranty and properly installed shall be warranted to the same extent as the original Product under this Limited Warranty if, and only if, the original parts were found to be defective within the original Limited Warranty Period covering the original Product. Replacement parts are warranted for the remainder of the original Limited Warranty Period. This Limited Warranty does not cover any component part of any Product not manufactured by StoneAge. Any such component part is subject exclusively to the component manufacturer's warranty terms and conditions.

2. LIMITED WARRANTY COVERAGE. StoneAge's sole obligation under this Limited Warranty shall be, at StoneAge's option and upon StoneAge's inspection, to repair, replace or issue a credit for any Product which is determined by StoneAge to be defective in material or workmanship. StoneAge reserves the right to examine the alleged defective Product to determine whether this Limited Warranty is applicable, and final determination of limited warranty coverage lies solely with StoneAge. No statement or recommendation made by a StoneAge representative, Dealer or agent to End-User shall constitute a warranty by StoneAge or a waiver or modification to any of the provisions hereof or create any liability for StoneAge.

3. WARRANTY SERVICE PROVIDERS. Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at www.stoneagetools.com/service. Unauthorized service, repair or modification of the Product or use of parts not approved by StoneAge will void this Limited Warranty. StoneAge reserves the right to change or improve the material and design of the Product at any time without notice to End-User, and StoneAge is not obligated to make the same improvements during warranty service to any Product previously manufactured.

4. WARRANTY EXCLUSIONS. This Limited Warranty does not cover, and StoneAge shall not be responsible for the following, or damage caused by the following: (1) any Product that has been altered or modified in any way not approved by StoneAge in advance in writing; (2) any Product that has been operated under more severe conditions or beyond the rated capacity specified for that Product; (3) depreciation or damage caused by normal wear and tear, failure to follow operation or installation instructions, misuse, negligence or lack of proper protection during storage; (4) exposure to fire, moisture, water intrusion, electrical stress, insects, explosions, extraordinary weather and/or environmental conditions including, but not limited to lightning, natural disasters, storms, windstorms, hail, earthquakes, acts of God or any other force majeure event; (5) damage to any Product caused by any attempt to repair, replace, or service the Product by persons other than StoneAge authorized service representatives; (6) costs of normal maintenance parts and services; (7) damage sustained during unloading, shipment or transit of the Product; or (8) failure to perform the recommended periodic maintenance procedures listed in the Operator's Manual accompanying the Product.

5. REQUIRED WARRANTY PROCEDURES. To be eligible for warranty service, the End-User must: (1) report the Product defect to the entity where the Product was purchased (i.e. StoneAge or the Dealer) within the Limited Warranty Period specified in this Limited Warranty; (2) submit the original invoice to establish ownership and date of purchase; and (3) make the Product available to a StoneAge authorized service representative for inspection to

determine eligibility for coverage under this Limited Warranty. This Limited Warranty shall not extend to any person or entity who fails to provide proof of original purchase from StoneAge or a Dealer. No Product may be returned for credit or adjustment without prior written permission from StoneAge.

6. DISCLAIMER OF IMPLIED WARRANTIES AND OTHER REMEDIES. EXCEPT AS EXPRESSLY STATED HEREIN (AND TO THE FULLEST EXTENT ALLOWED UNDER APPLICABLE LAW), STONEAGE HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY AND ALL WARRANTIES, REPRESENTATIONS OR PROMISES AS TO THE QUALITY, PERFORMANCE OR FREEDOM FROM DEFECT OF THE PRODUCT COVERED BY THIS LIMITED WARRANTY. STONEAGE FURTHER DISCLAIMS ALL IMPLIED INDEMNITIES.

7. LIMITATION OF LIABILITY. End-User specifically acknowledges that the Product may be operated at high speeds and/or pressures, and that as such it may be inherently dangerous if not used correctly. End-User shall familiarize itself with all operation materials provided by StoneAge and shall at all times use and require its agents, employees and contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. In no event shall StoneAge be responsible for any injuries to persons or property caused directly or indirectly by the operation of the Product if End-User or any agent, employee, or contractor of End-User: (1) fails to use all necessary and appropriate safety devices, guards and proper safe operating procedures; (2) fails to maintain in good working order such safety devices and guards; (3) alters or modifies the Product in any way not approved by StoneAge in advance in writing; (4) allows the Product to be operated under more severe conditions or beyond the rated capacity specified for the Product; or (5) otherwise negligently operates the Product. End-User shall indemnify and hold StoneAge harmless from any and all liability or obligation incurred by or against StoneAge, including costs and attorneys' fees, to or by any person so injured.

TO THE FULL EXTENT ALLOWED BY APPLICABLE LAW, STONEAGE SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES (INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF GOODWILL, DIMINUTION OF VALUE, WORK STOPPAGE, INTERRUPTION OF BUSINESS, RENTAL OF SUBSTITUTE PRODUCT, OR OTHER COMMERCIAL LOSS EVEN TO THE EXTENT SUCH DAMAGES WOULD CONSTITUTE DIRECT DAMAGES), WITH RESPECT TO THE COVERED STONEAGE PRODUCT, OR OTHERWISE IN CONNECTION WITH THIS LIMITED WARRANTY, REGARDLESS OF WHETHER STONEAGE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IT IS UNDERSTOOD THAT STONEAGE'S LIABILITY, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE, OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE END-USER FOR THE PRODUCT. STONEAGE'S MAXIMUM LIABILITY SHALL NOT EXCEED, AND END-USER'S REMEDY IS LIMITED TO EITHER (1) REPAIR OR REPLACEMENT OF THE DEFECTIVE WORKMANSHIP OR MATERIAL OR, AT STONEAGE'S OPTION, (2) REFUND OF THE PURCHASE PRICE, OR (3) ISSUANCE OF A CREDIT FOR THE PURCHASE PRICE, AND SUCH REMEDIES SHALL BE END-USER'S ENTIRE AND EXCLUSIVE REMEDY.

YOU, THE END-USER, UNDERSTAND AND EXPRESSLY AGREE THAT THE FOREGOING LIMITATIONS ON LIABILITY ARE PART OF THE CONSIDERATION IN THE PRICE OF THE STONEAGE PRODUCT YOU PURCHASED.

Some jurisdictions do not allow the limitation or exclusion of liability for certain damages, so the above limitations and exclusions may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction. If any provisions of this Limited Warranty is held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

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