StoneAge®
ENGINEERING THE POWER OF WATER

AUTOBOX® (ABX-2L)
USER MANUAL

CE

PL602 REV C
(05/2015)

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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).

SPECIFICATIONS

ABX-2L Hose Tractor Weight:	42 lbs (19.05 kg) (ABX-2L box only)
ABX-2L Hose Tractor Size:	7.2 in. wide x 8.3 in. Tall x 16.7 in. Long (183 mm wide x 211 mm Tall x 424 mm Long)
Maximum Feed Rate:	3.0 ft/sec (914 mm/sec)
Minimum Feed Rate:	0.2 ft/sec (61 mm/sec)
Maximum Push/Pull Force:	60 lbs (30 lbs per lance) (27.2 kg, 13.6 kg per lance)
Mininimum Push/Pull Force:	10 lbs (5 lbs per lance) (4.5 kg)
Manway Access:	18 in. (457 mm)
Lightweight Positioner Weight:	120 lbs (54.4 kg) (Includes 6ft rails, horiz., vert., and idler carriage, and 4 clamps)
Guide Assembly Weight:	10 lbs (4.5 kg)
Pitch Adjustment Range:	5/8-2.4 in. (16 mm- 61 mm)
Control Box Weight:	43 lbs (19.5 kg) (Includes Control Box, FRL, and stand)
Maximum Air Supply Pressure:	140 psi (0.97 MPa)
System Operating Pressure:	100 psi (0.70 MPa)
Recommended Operational Temperature Range	-20 °F to 140 °F (-29 °C to 60 °C)

DESCRIPTION OF EQUIPMENT AND INTENDED USE

The ABX-2L System consists of the ABX-2L Hose Tractor, Control Box, Guide Assembly, and Lightweight Positioner. This system was developed for "Hands Free" heat exchanger tube cleaning applications. It is recommended to be used with StoneAge's Banshee line of self-rotary waterblast tools.

The ABX-2L System was designed to accommodate two simultaneous flex lances ranging in size from 3/2 to 8/4 matched with the appropriate BN9.5, BN13, BN15, or BN18 size Banshees.

The ABX-2L Hose Tractor utilizes six synchronized drive rollers to control the rate at which the hose and Banshee tools are advanced or retracted inside the tube.

The Guide Assembly provides anti-withdrawal protection, and precise tube pitch adjustment. The Lightweight Positioner can be mounted to a variety of heat exchanger tube bundles and has pneumatic powered horizontal and vertical drives.

The Control Box is small and lightweight with an emphasis on ergonomics. The ABX-2L system was designed with simplicity, safety, lightweight components, durability, and reliability in mind. It can be easily carried to the jobsite and setup in minutes.

The AUTOBOX® (ABX-2L) must not be put into service within the European Community ("EC") until the final machinery into which it is to be incorporated has been declared in conformity with the Machinery Directive and all other applicable EC Directives.

KEY FEATURES:

Lightweight Positioner
- Modular, lightweight design
- Quick install drive carriages
- Utilizes 2.5 in. (6 mm) box rail
- Stainless Steel air motors
- Variety of clamp and bolt-on attachment options are available

Guide Assembly
- Compact and lightweight design
- Turn knob control provides precise pitch adjustment
- Quick change guide tubes are common material
- 17-4 SS hose stop collets

ABX-2L Hose Tractor
- Six powered drive rollers ensure traction in all operating conditions
- Quick change drive rollers (two sizes).
- Lightweight and compact design
- Can be used in dual or single lance applications
- Quick pin attachment to guide assembly
- Hinged side doors for easy access to rollers and drive components
- Independent forward/reverse speed controls

Control Box
- Small, lightweight, ergonomic design that includes a portable stand and filter-regulator-lubricator assembly
- Tractor controls: forward/reverse hose feed and clamp pressure
- Positioner controls: left/right and up/down
- Pneumatic dump control switch

CE DECLARATION OF INCORPORATION
OF PARTLY COMPLETED MACHINERY

We: StoneAge, Inc. 466 South Skylane Drive Durango, CO 81303, USA

Declare that this “partly completed machinery” supplied with this declaration:

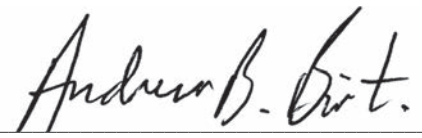
Equipment: AUTOBOX® Hose Tractor

Model name: ABX-2L Is in accordance with the following Directives: and

- is designed and manufactured solely as a non-functional component to be incorporated into a machine requiring completion;
- must not be put into service within the European Community (“EC”) until the final machinery into which it is to be incorporated has been declared in conformity with the Machinery Directive and all other applicable EC Directives; and
- is designed and manufactured to comply with the 2006/42/EC Essential Health and Safety Requirements of the Machinery Directives and the relevant parts of the following specifications:

  EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction

I hereby declare that the equipment named above has been tested and found to comply with the relevant sections of the above referenced specifications and directives.

Signed  Date 03/03/2015

Andrew Birt

Independent Dealer Manager

StoneAge, Inc., Worcester, UK

The technical file for the AUTOBOX® Hose Tractor (ABX-2L) User Manual is maintained at: StoneAge, Inc. 466 South Skylane Drive, Durango, CO 81303, USA

CE

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.

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.

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 RESPONSIBILTY 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.

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

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.

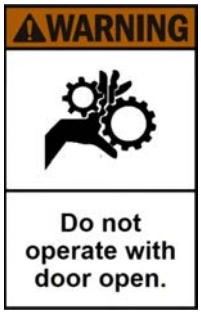
PPE may include:

- **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

SAFETY LABEL DEFINITION

The ABX-2L Hose Tractor has the potential to cause serious injury if fingers, hair, or clothing become caught between the hose rollers or drive belts.

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



Maximum operating pressure is100 psi (0.7 MPa). Never exceed 140 psi (0.97 MPa) supply pressure. Exceeding 140 psi (0.97 MPa) supply pressure may result in injury to the Operator and/or damage to the equipment.

⚠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.

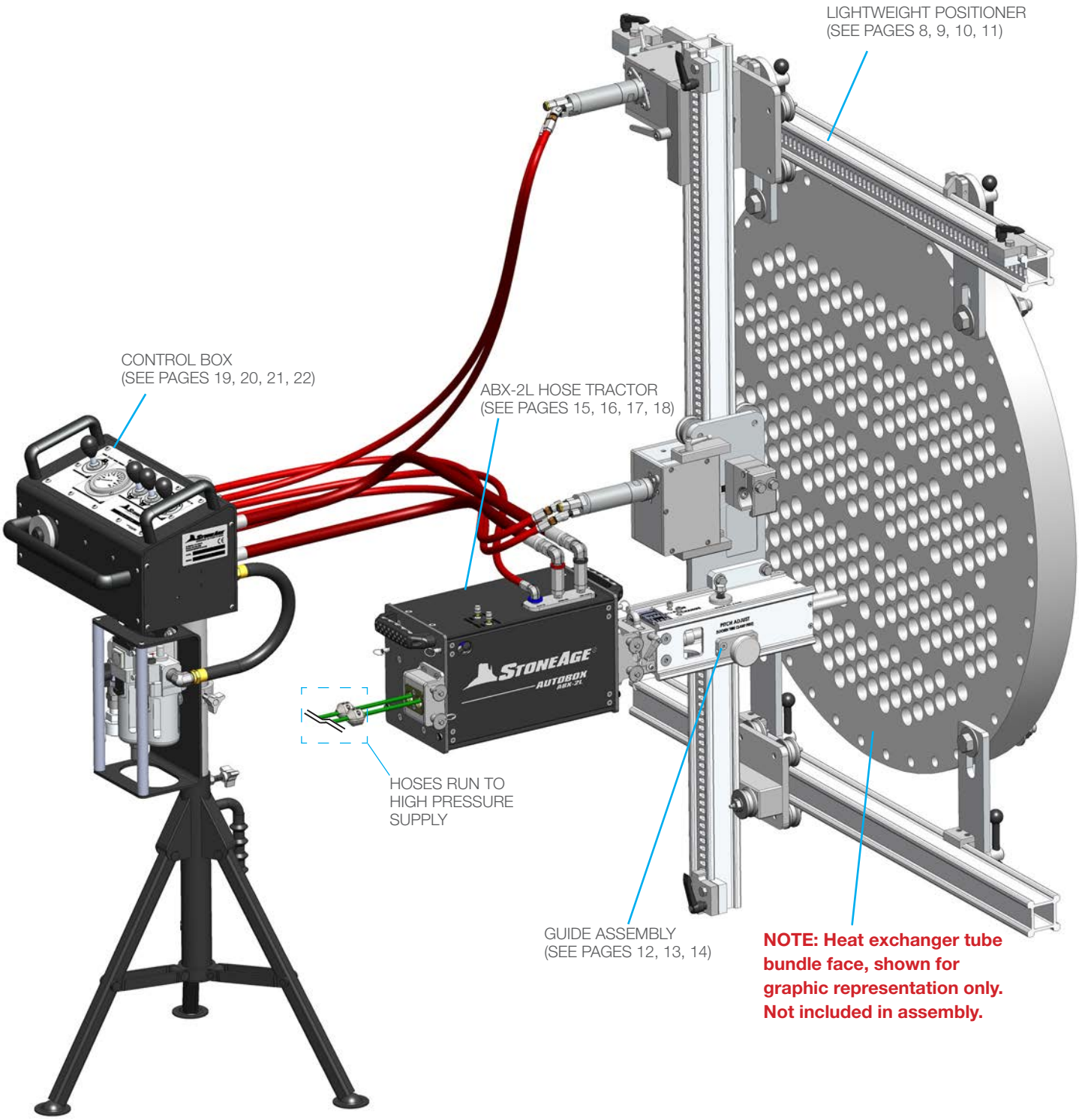
- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate if damaged, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Users of the ABX-2L 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 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 ABX-2L Hose Tractor and Control Box MUST be supervised at all times and should never be left unattended.
- Test the Control Box before operating the ABX-2L Hose Tractor 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.
- Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the ABX-2L 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 ABX-2L Hose Tractor lift with care to prevent bodily injury.
- Do not operate the ABX-2L Hose Tractor while either side door is open.

PRE-RUN SAFETY CHECK

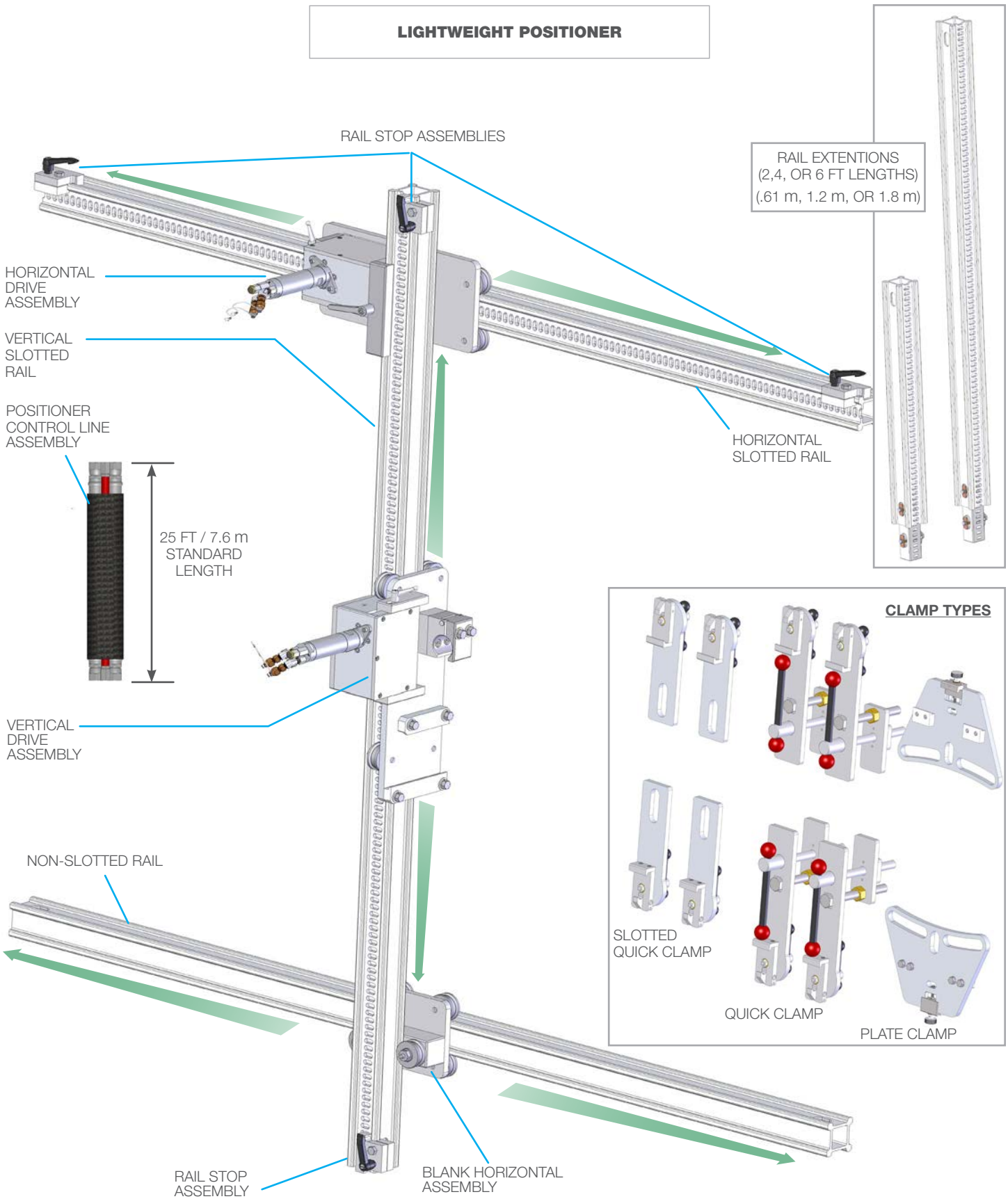
Refer to WJTA-IMCA's, Recommended Practices For The Use Of High-pressure Waterjetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

- 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 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 ABX-2L Hose Tractor are closed and securely latched.
- Test the Control Box before operating the ABX-2L Hose Tractor 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, adaptors, or accessories with the high-pressure water pump unit running.
- Ensure no personnel are in the hydroblasting zone.

LIGHTWEIGHT POSITIONER, GUIDE ASSEMBLY, ABX-2L HOSE TRACTOR AND CONTROL BOX SYSTEM ASSEMBLY



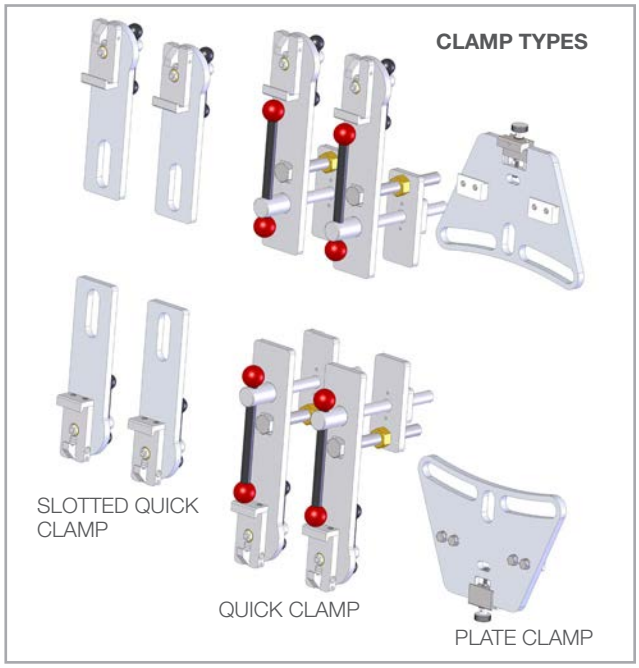
LIGHTWEIGHT POSITIONER - OVERVIEW



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

QUICK CLAMPS
Use if heat exchanger flange provides 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 2)

SLOTTED QUICK AND PLATE CLAMPS
Use if heat exchanger flange has bolt holes that are easily accessible. Use quick clamps or plate clamps, depending on the spacing of the hole pattern. (Figures 1 & 3)



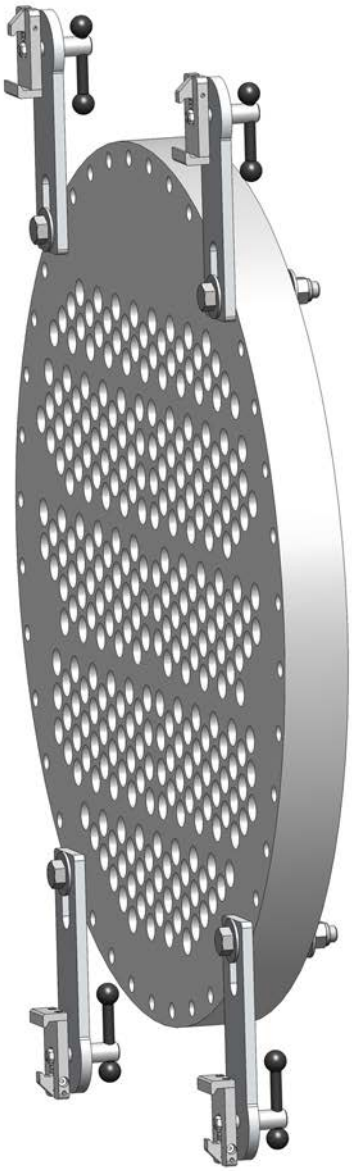


FIGURE 1

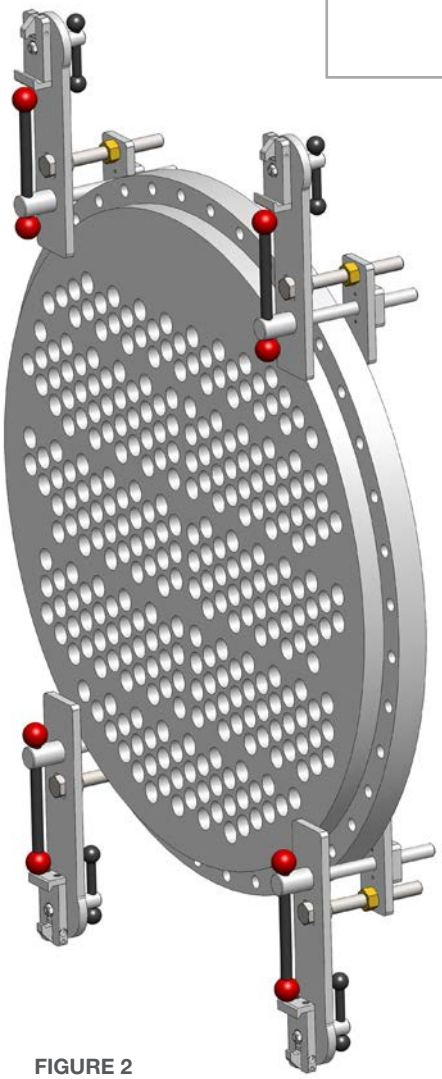


FIGURE 2

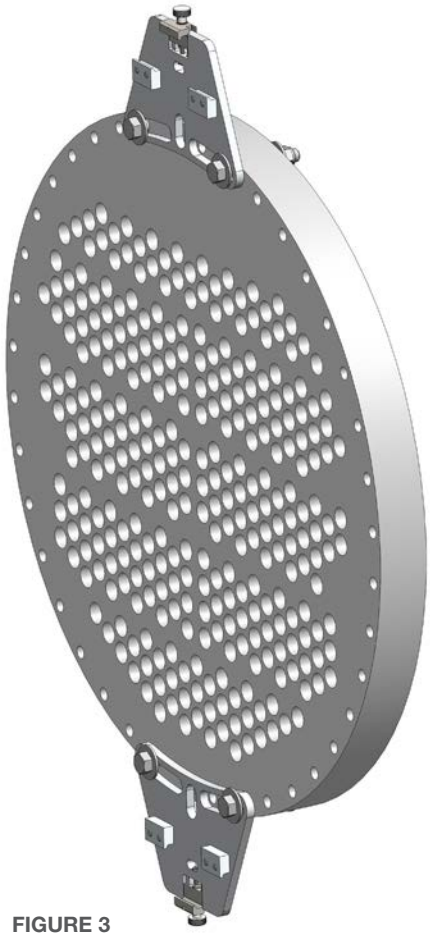


FIGURE 3

LIGHTWEIGHT POSITIONER STEP BY STEP SET-UP

1. Mount the appropriate frame **Positioner Clamps** to the tube bundle as shown on the previous page. (Shown in Figure 1 with Slotted Quick Clamps) Positioner Clamps should be aligned horizontally with the direction of the tube rows. **(Figure 1)**

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

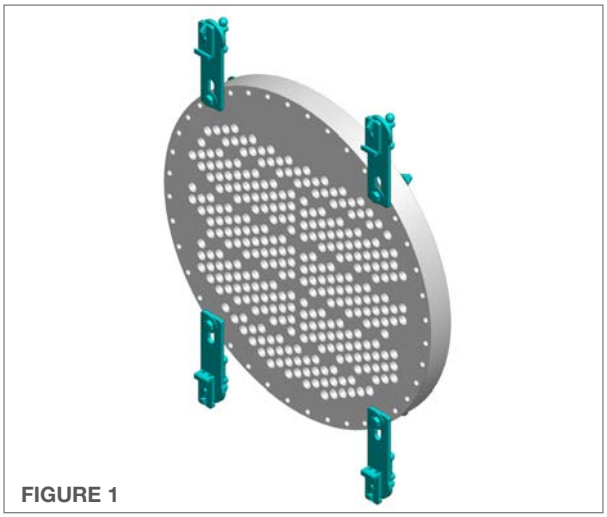


FIGURE 1

2. Insert the **Top Rail (slots facing out)** into the upper mounting brackets. If the rail is not closely aligned with the tube rows, loosen one of the upper mounting brackets and adjust until the top rail is parallel with the horizontal tube rows. Tighten the clamps securing the rail to the mounting brackets, and ensure upper mounting brackets are securely clamped or bolted to the tube bundle flange. **(Figure 2)**

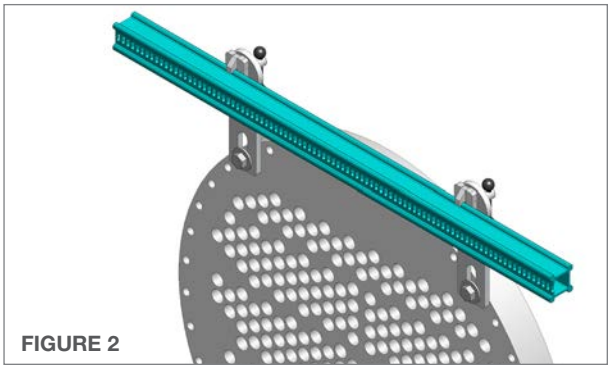


FIGURE 2

3. Insert the **Lower Rail (non-slotted)** into the lower mounting brackets. 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 clamps securing the rail to the mounting brackets, and ensure lower mounting brackets are securely clamped or bolted to the tube bundle flange. **(Figure 3)**

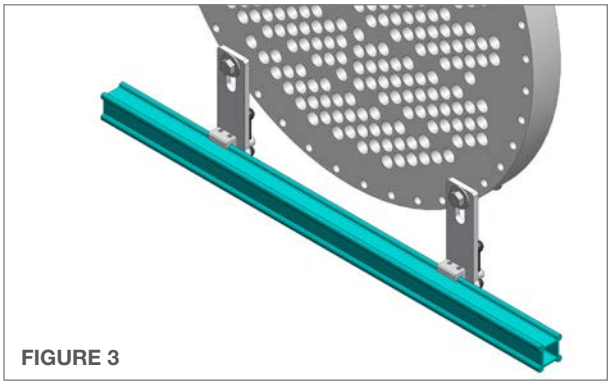


FIGURE 3

4. Loosen the **Quick Adjust Handle** and pull the gearbox away from the carriage plate. This will allow the **Horizontal Drive Carriage** to slide onto the rail without pneumatic power to rotate the drive. Center the carriage on the top rail and push the gearbox back toward the carriage plate. This will engage the gear into the rail slots. Verify the gear is engaging the slots correctly and retighten the adjustable handle. **(Figure 4)**

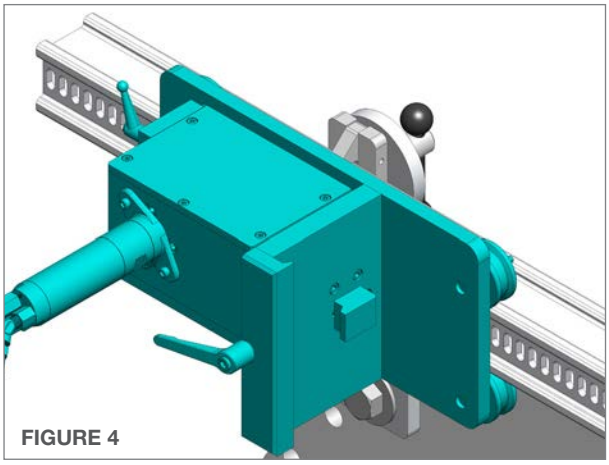


FIGURE 4

5. Slide the **Idler Carriage** onto the Lower Non-Slotted Rail. **(Figure 5)**

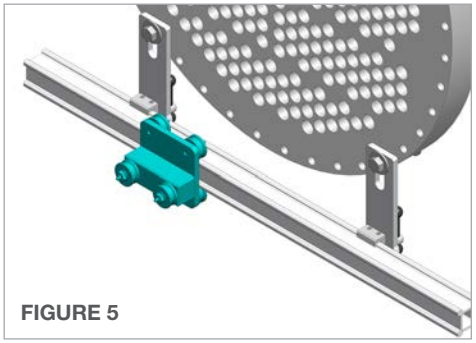


FIGURE 5

6. Loosen the **Large Adjustable Handle** for the Vertical Rail Clamp**.** Align the Idler Carriage with the vertical rail clamp on the horizontal carriage. Install the **Vertical Rail** with **(slots facing out)** down through the horizontal carriage clamp and between the rollers on the idler carriage. Adjust the position of the vertical rail as required and secure the clamp on the horizontal carriage by tightening the large adjustable handle. **(Figure 6)**

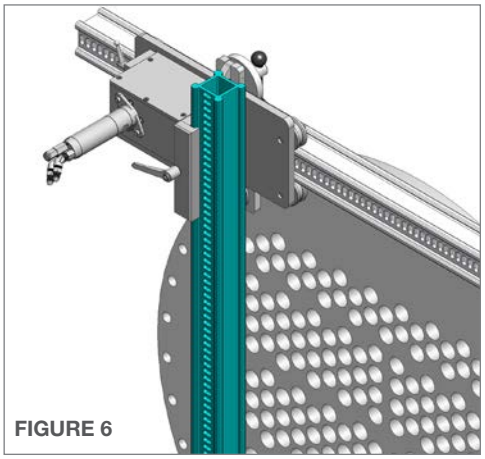


FIGURE 6

7. Loosen the **Quick Adjust Handle** and pull the gearbox away from the carriage plate. This will allow the **Vertical Drive Carriage** to slide onto the rail without pneumatic power to rotate the drive. Center the carriage on the vertical rail and push the gearbox back toward the carriage plate. This will engage the gear into the rail slots. Verify the gear is engaging the slots correctly and retighten the adjustable handle. **(Figure 7)**

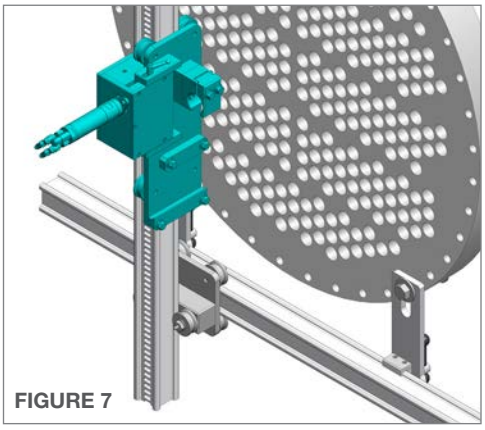


FIGURE 7

8. Install the four **Rail Stops** at both ends of the top, slotted, horizontal rail, and both ends of the vertical slotted rail. **(Figure 8)**

NOTE: Verify the mounting brackets and rail clamps are securely tightened and that the drive carriages are securely engaged and the adjustable handles are tightened.

Never loosen the vertical gearbox once the guide assembly and tractor are installed, as it may result in the carriage falling vertically down. This may cause damage and/or injury.

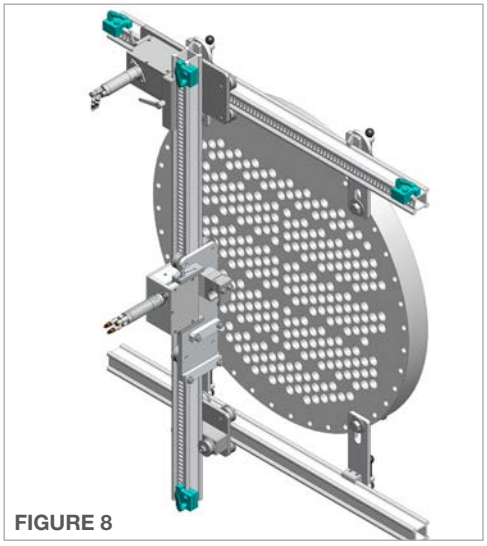
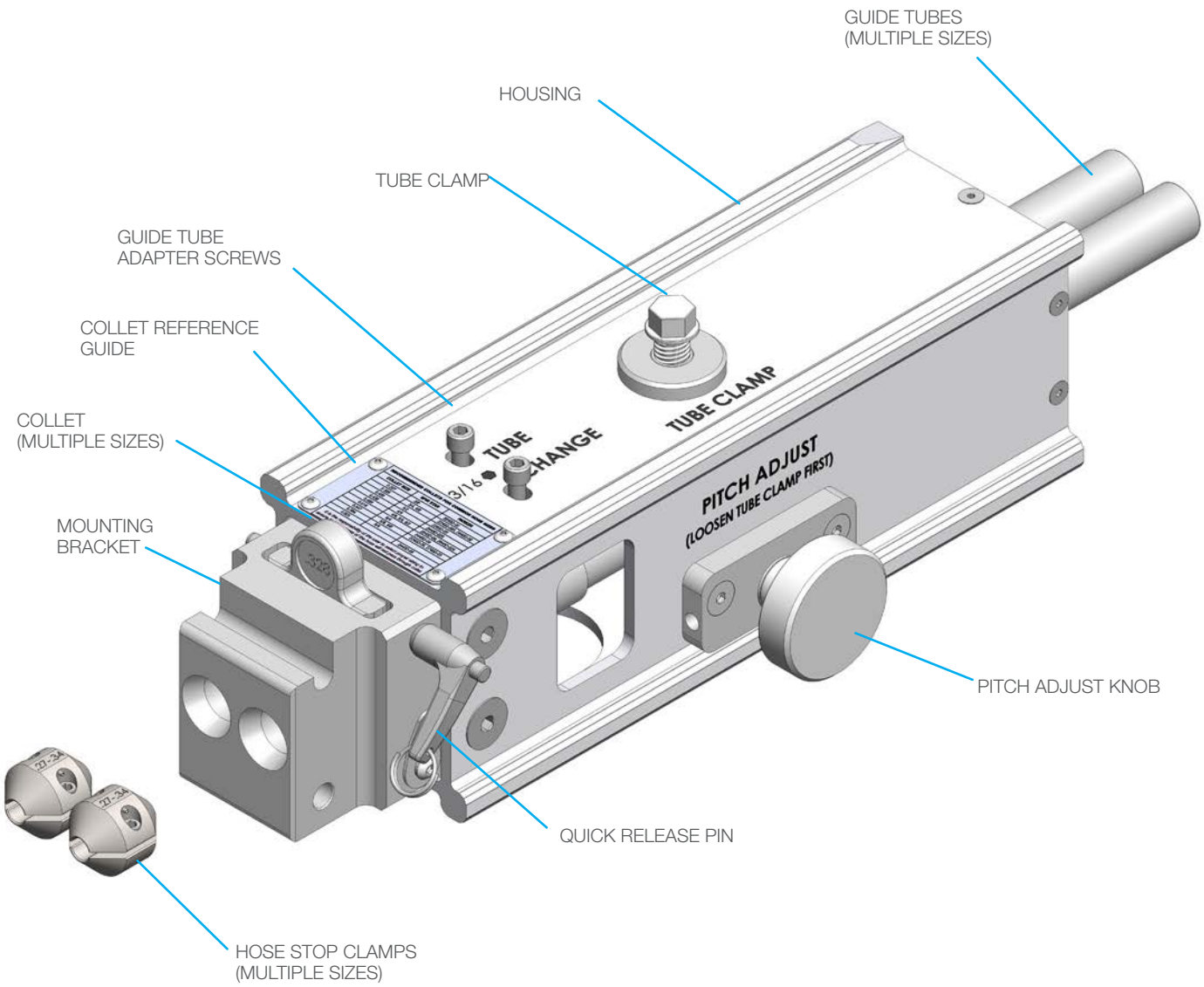


FIGURE 8

GUIDE ASSEMBLY - OVERVIEW

GUIDE ASSEMBLY



GUIDE ASSEMBLY

1. Select the appropriate Guide Tube size and length for the application. The length of the Guide Tubes for an exchanger bundle with no channel head is 12.5 in. (318 mm). The guide tube assembly has approximately 5 in. (127 mm) of adjustment. 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. Note: 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 Bolt and the two 3/16 in. Socket Head Cap Screws (SHCS) 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 two 3/16 in. SHCS.

⚠WARNING

Appropriate size Collet selection is critical to ensuring proper backout prevention of the tool.

***NOTE: BN9.5 guide tubes (Ø.625 in. / 6 mm O.D.) require an ABX 114 adapter. BN18 guide tubes require an ABX 124 to be installed into the Guide Assembly.**

StoneAge (SA) PART NUMBER GUIDE TUBE REFERENCE CHART

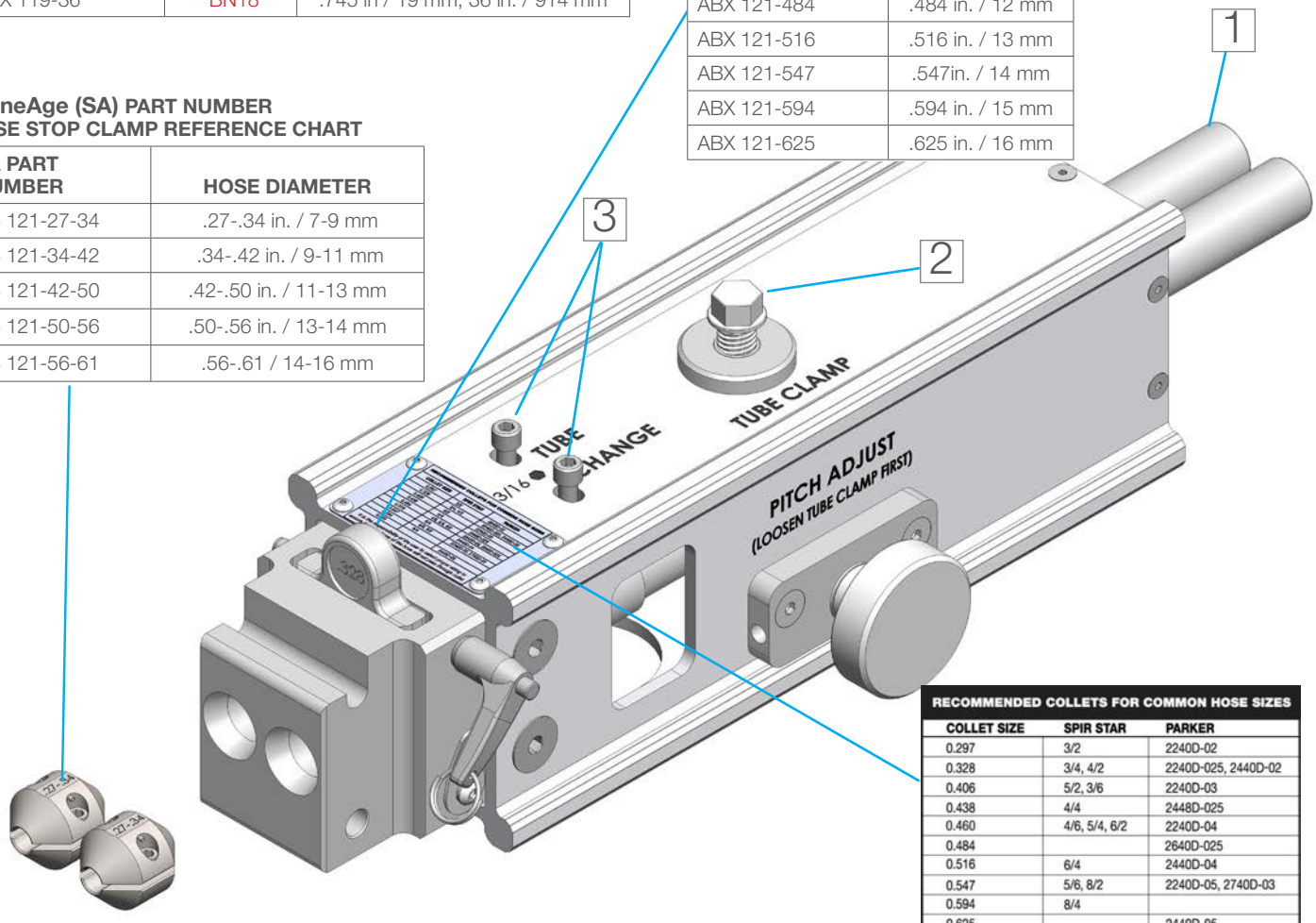
SA PART NUMBER	SA TOOL	INSIDE DIAMETER, LENGTH
ABX 115-12	*BN9.5	.459 in / 12 mm, 12.5 in. / 318 mm
ABX 115-36	*BN9.5	.459 in / 12 mm, 36 in. / 914 mm
ABX 116-12	BN13	.546 in / 14 mm, 12.5 in. / 318 mm
ABX 116-36	BN13	.546 in / 14 mm, 36 in. / 914 mm
ABX 117-12	BN15	.674 in / 17 mm, 12.5 in. / 318 mm
ABX 117-36	BN15	.674 in / 17 mm, 36 in. / 914 mm
ABX 119-12	*BN18	.745 in / 19 mm, 12.5 in. / 318 mm
ABX 119-36	*BN18	.745 in / 19 mm, 36 in. / 914 mm

StoneAge (SA) PART NUMBER COLLET REFERENCE CHART

SA PART NUMBER	COLLET SIZE
ABX 121-297	.297 in. / 8 mm
ABX 121-328	.328 in. / 8 mm
ABX 121-406	.406 in. / 10 mm
ABX 121-438	.438 in. / 11 mm
ABX 121-460	.460 in. / 12 mm
ABX 121-484	.484 in. / 12 mm
ABX 121-516	.516 in. / 13 mm
ABX 121-547	.547in. / 14 mm
ABX 121-594	.594 in. / 15 mm
ABX 121-625	.625 in. / 16 mm

StoneAge (SA) PART NUMBER HOSE STOP CLAMP REFERENCE CHART

SA PART NUMBER	HOSE DIAMETER
HS 121-27-34	.27-.34 in. / 7-9 mm
HS 121-34-42	.34-.42 in. / 9-11 mm
HS 121-42-50	.42-.50 in. / 11-13 mm
HS 121-50-56	.50-.56 in. / 13-14 mm
HS 121-56-61	.56-.61 / 14-16 mm



RECOMMENDED COLLETS FOR COMMON HOSE SIZES

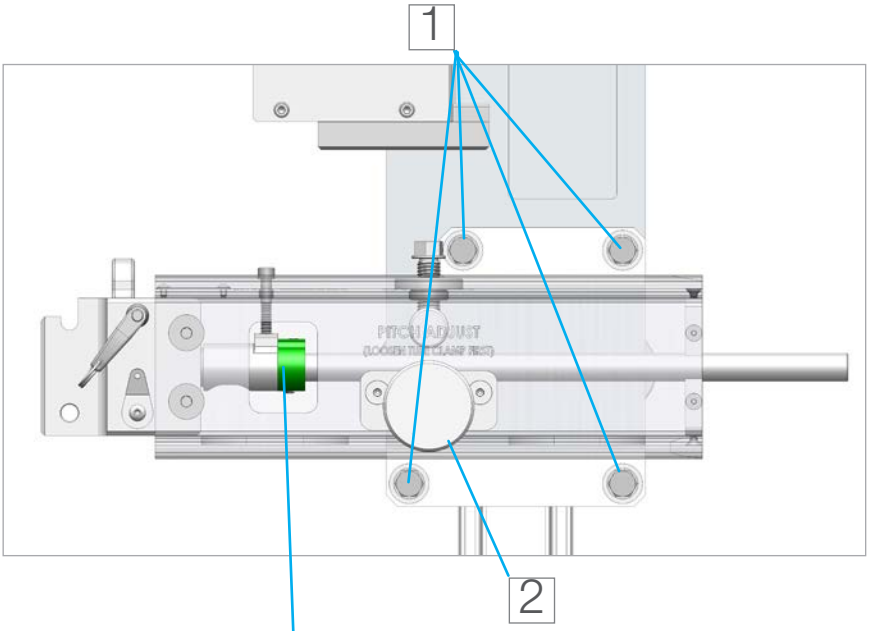
COLLET SIZE	SPIR STAR	PARKER
0.297	3/2	2240D-02
0.328	3/4, 4/2	2240D-025, 2440D-02
0.406	5/2, 3/6	2240D-03
0.438	4/4	2448D-025
0.460	4/6, 5/4, 6/2	2240D-04
0.484		2640D-025
0.516	6/4	2440D-04
0.547	5/6, 8/2	2240D-05, 2740D-03
0.594	8/4	
0.625		2440D-05

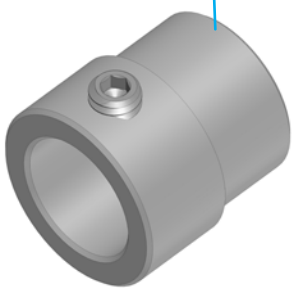
It is the responsibility of the user to select proper sizing to assure the end sleeve of the hose will not pass through collet.

ATTACH GUIDE ASSEMBLY TO LIGHTWEIGHT POSITIONER

1. Using a 9/16 in. wrench, loosen all four rail clamp bolts located on the vertical carriage. Install the Guide Assembly into the rail clamps and adjust position until the Guide Tubes are approximately 1/2 in. (13 mm) away from the tube sheet face. Tighten the four rail clamp bolts.
2. Turn the pitch adjustment knob until the guide tubes are at the same pitch as the tubes in the bundle. Adjust the Tube Clamp Bolt until the Guide Tubes are resting in the bottom of the “V” blocks. Make any fine adjustment to the Guide Tube pitch if required and tighten the Tube Clamp Bolt.

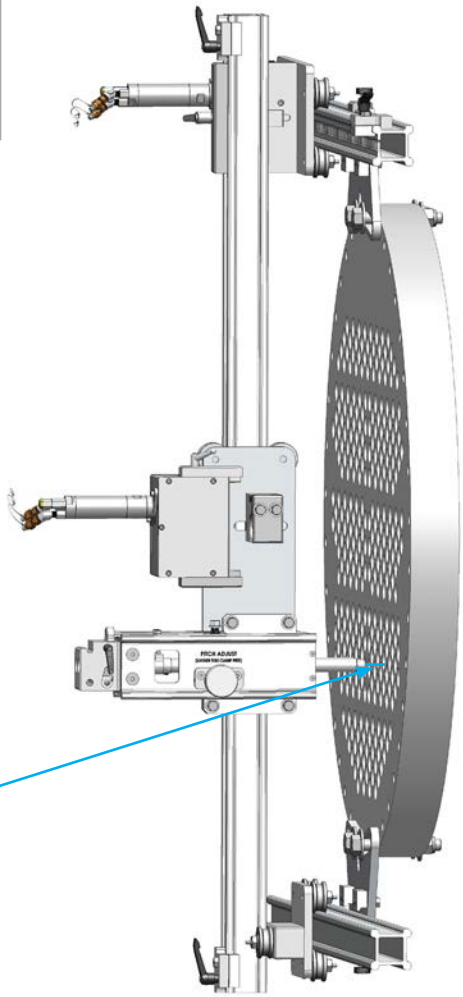
NOTE: Over-tightening the Tube Clamp may damage thin wall guide tubes.





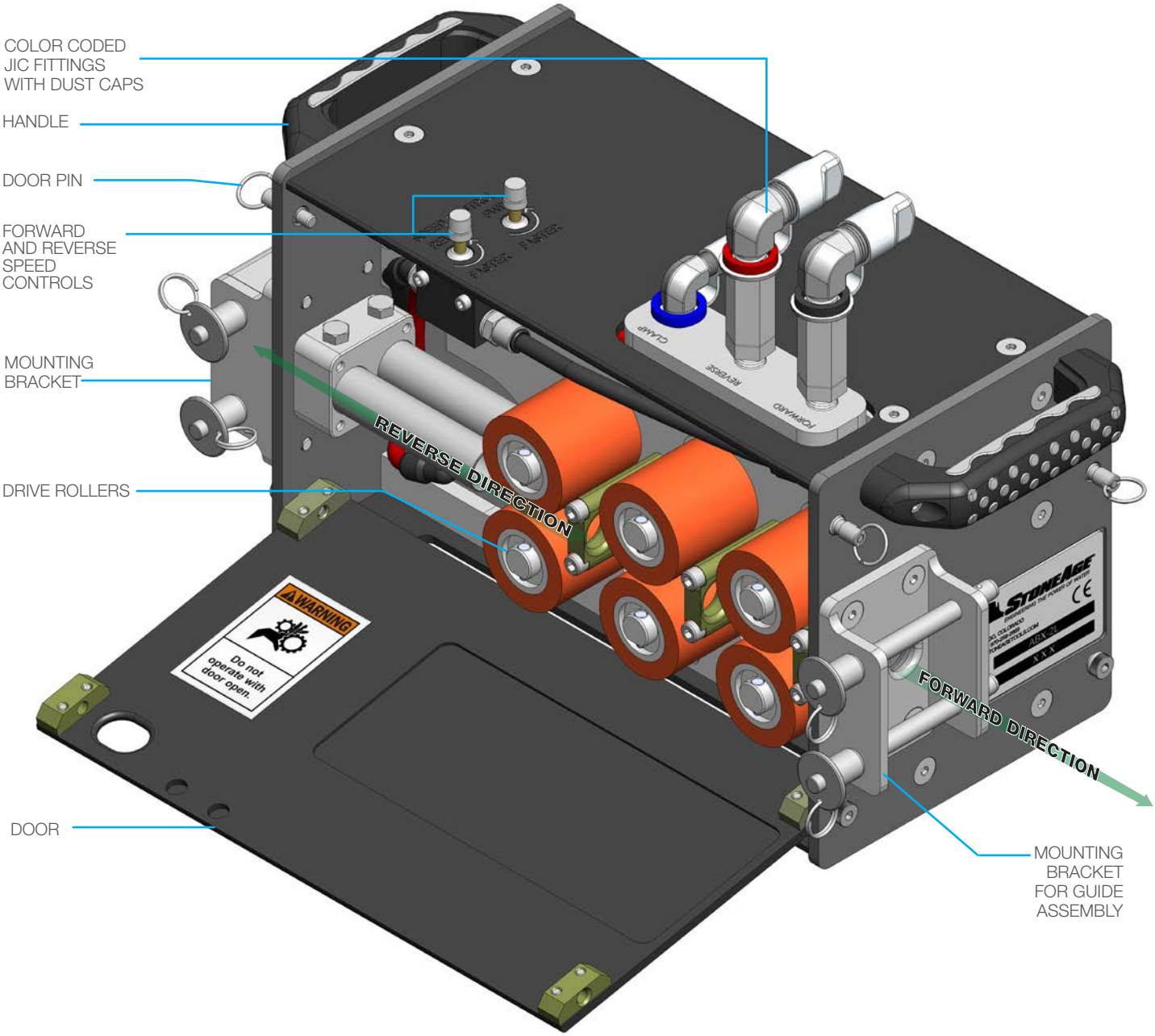
ABX 114 ADAPTER FOR BN9.5
(Ø.625 in. / 6 mm O.D.)
Guide Tubes

ABX 124 ADAPTER FOR BN18
(Ø.875 in. / 22 mm O.D.)
Guide Tubes

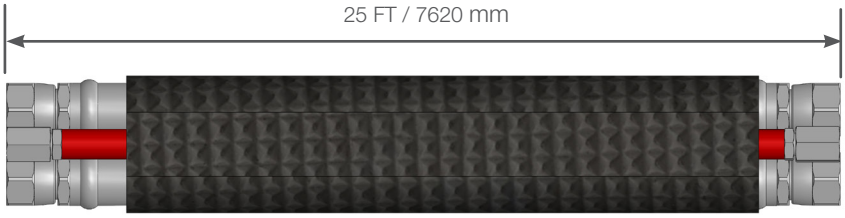


NOTE:
Adjust position until the Guide Tubes are approximately 1/2 in. (13 mm) away from the tube sheet face.

AUTOBOX® (ABX-2L) HOSE TRACTOR



PNEUMATIC SUPPLY LINES

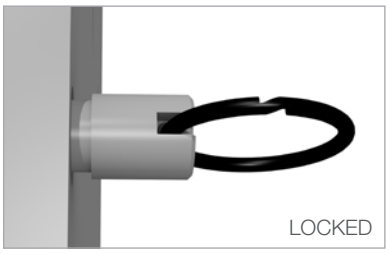


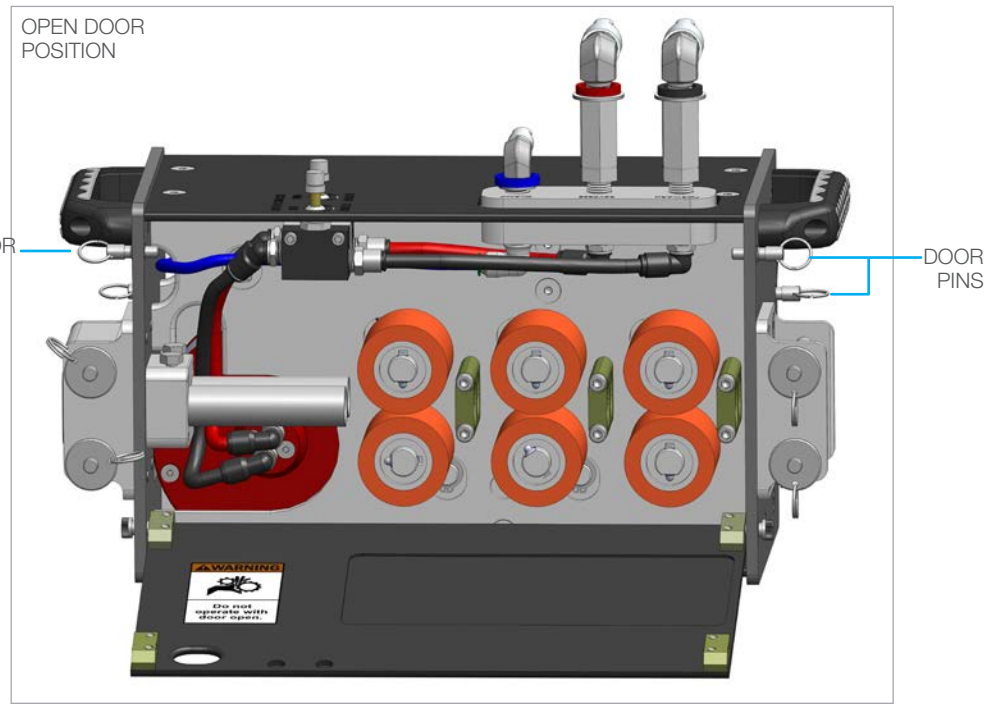
ABX-2L HOSE TRACTOR - DOORS & PIN

DOOR
Always run the ABX-2L 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, then release it so that it is no longer in the groove. Close the door by raising it into position. To lock the door, pull and twist the pull ring, then release it into the groove of the pin.

NOTE: Make sure to lock both doors on each side of the Hose Tractor before operating ABX-2L Hose Tractor.





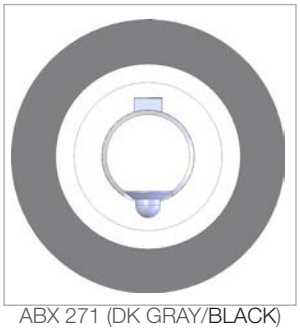
CLOSED DOOR POSITION

⚠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.

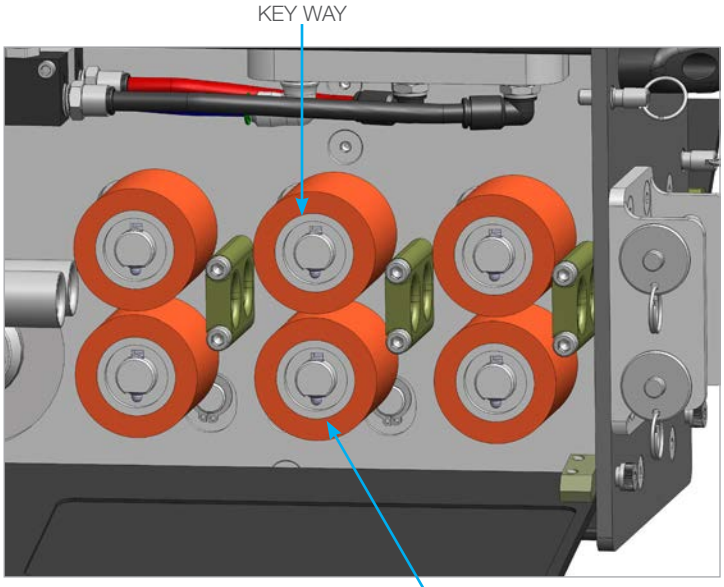
TO REPLACE THE DRIVE ROLLERS:

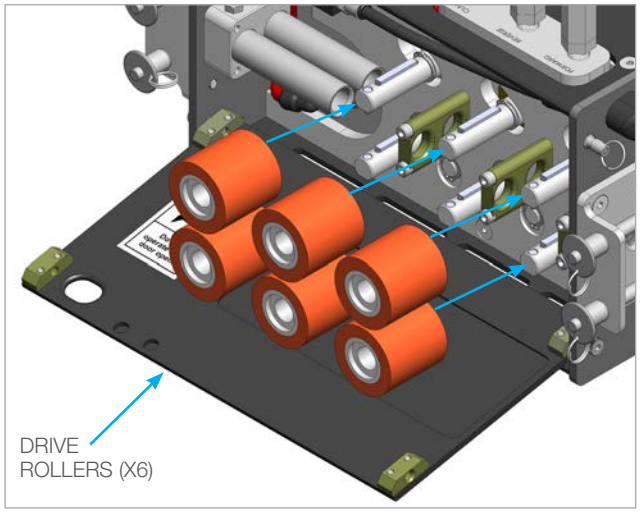
1. Select the correct roller size for the particular hose being used:
   - ABX 271 (**DARK GRAY**/**BLACK**) rollers should be used with 5 mm and 6 mm I.D. hoses.
     The O.D. range for the ABX 271 roller is .44-.50 in (11 mm - 13 mm)
   - ABX 272 (**ORANGE**) rollers should be used with 3 mm and 4 mm I.D. hoses.
     The O.D. range for the ABX 272 is .27-.41 in (7 mm - 10 mm)
2. Slowly run the Drive Rollers in order to orient the key ways of the Drive Rollers upward and the spring plungers downward.
   NOTE: Rollers should be removed with the keyway facing up to prevent losing keys.
3. Use a small common screwdriver or similar tool to depress the ball spring plunger, and pull the rollers straight out from the shafts.
4. Prior to reinstalling the Drive Rollers onto the shafts, apply a liberal coat of Anti-seize to the shaft OD and keys.
   We recommend Mariners Choice Never-Seez®.
5. Reinstall the rollers by sliding into place until the spring plungers snap out.
   NOTE: Rollers should be installed with the keyway facing up to prevent losing keys.
6. Once the correct rollers are installed, close and lock the doors. The Hose Tractor can now be installed onto the Guide Assembly.



ABX 271 (DK GRAY/BLACK)

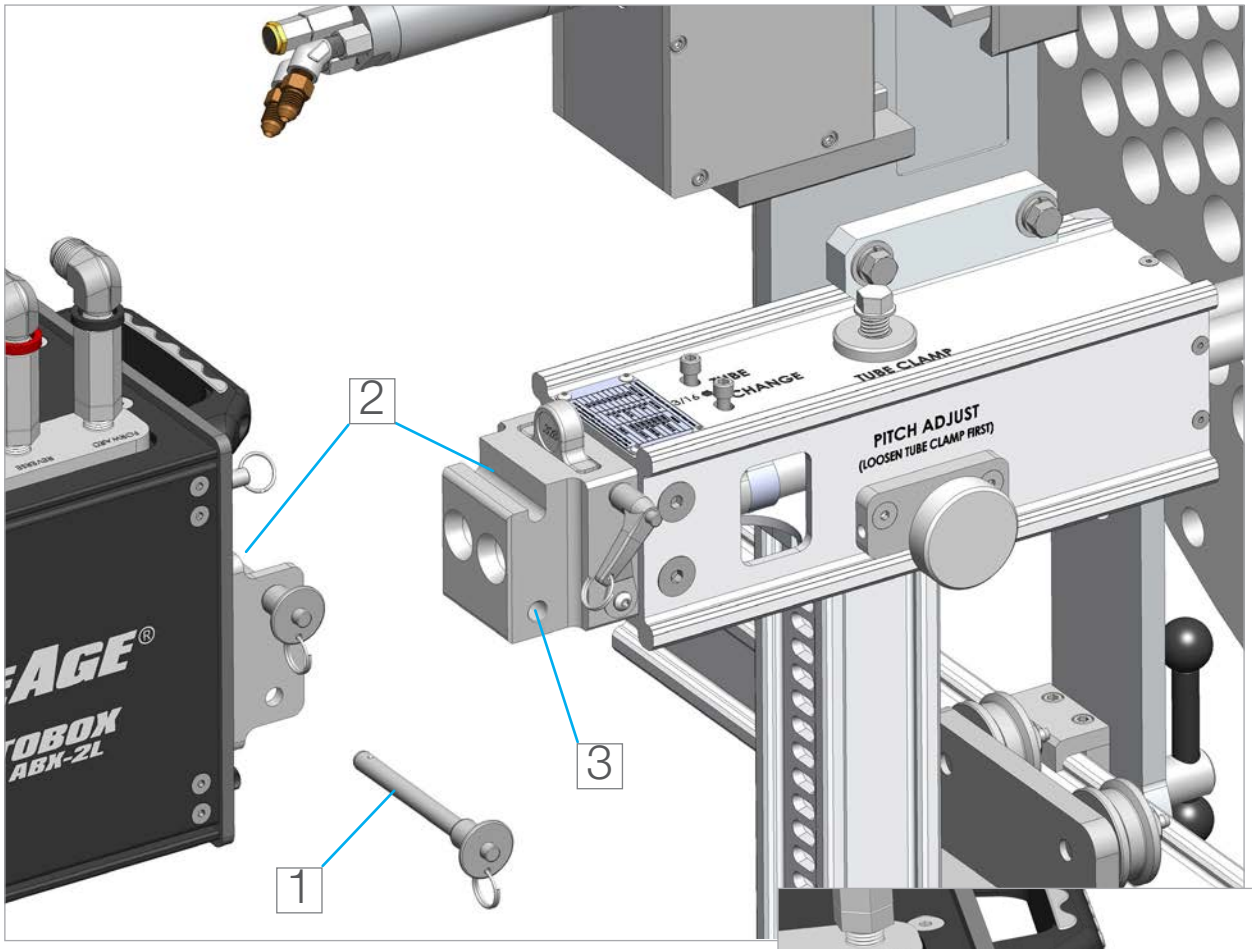
ABX 272 (ORANGE)





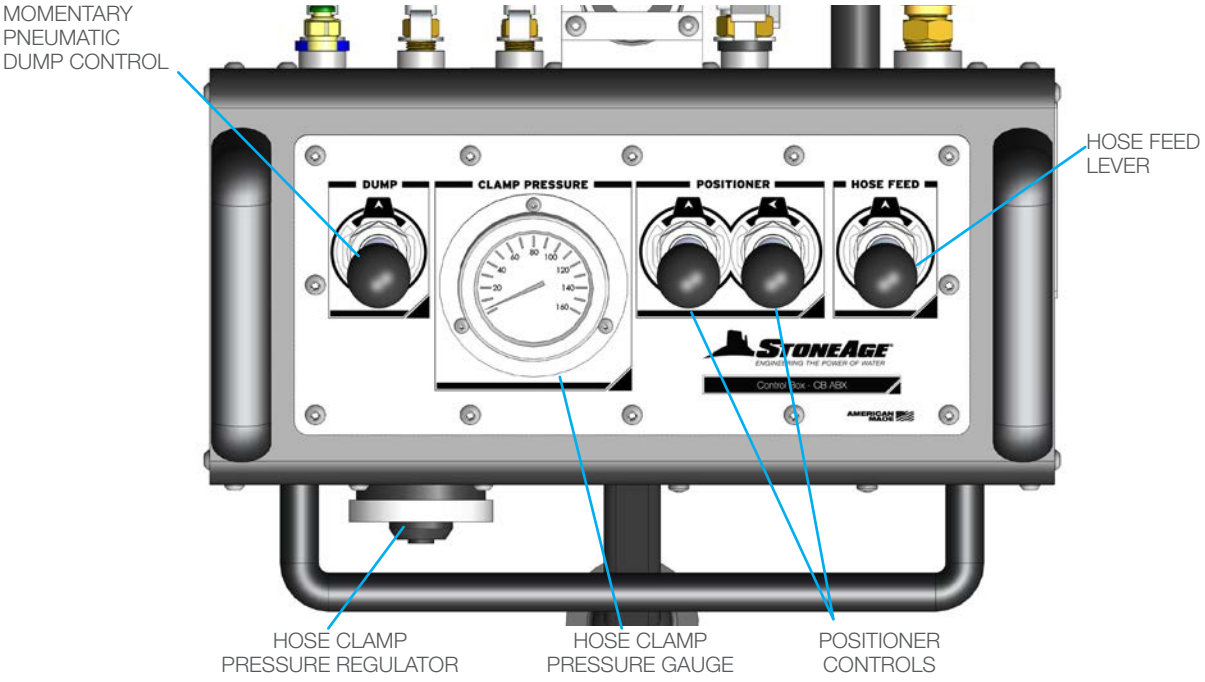
ATTACH ABX-2L HOSE TRACTOR TO GUIDE ASSEMBLY

1. Remove the lower quick release pin from the ABX-2L Hose Tractor.
2. Slide the mounting bracket over the block on the Guide Assembly and lay the pin onto the top slot on the Guide Assembly block.
3. Install the lower pin through the mounting bracket on the Hose Tractor and the block on the Guide Assembly.

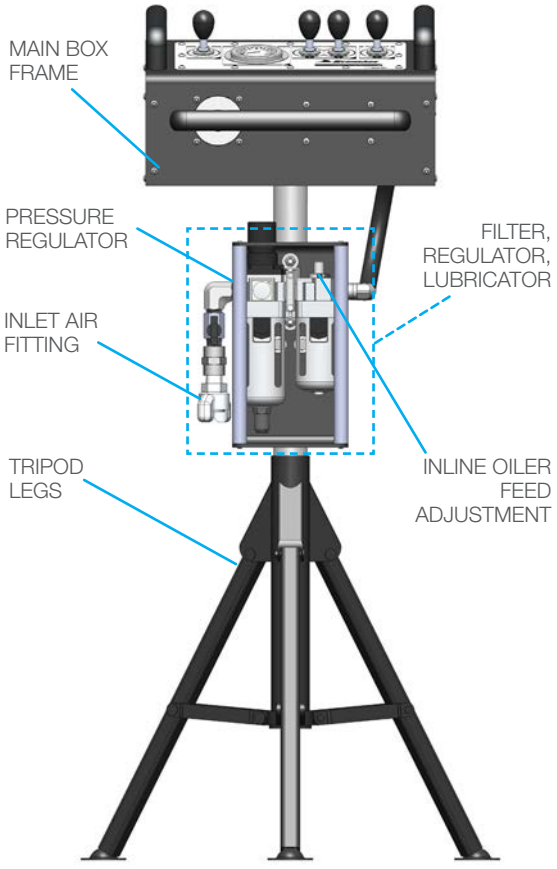


The tractor is now securely mounted to the Guide Assembly

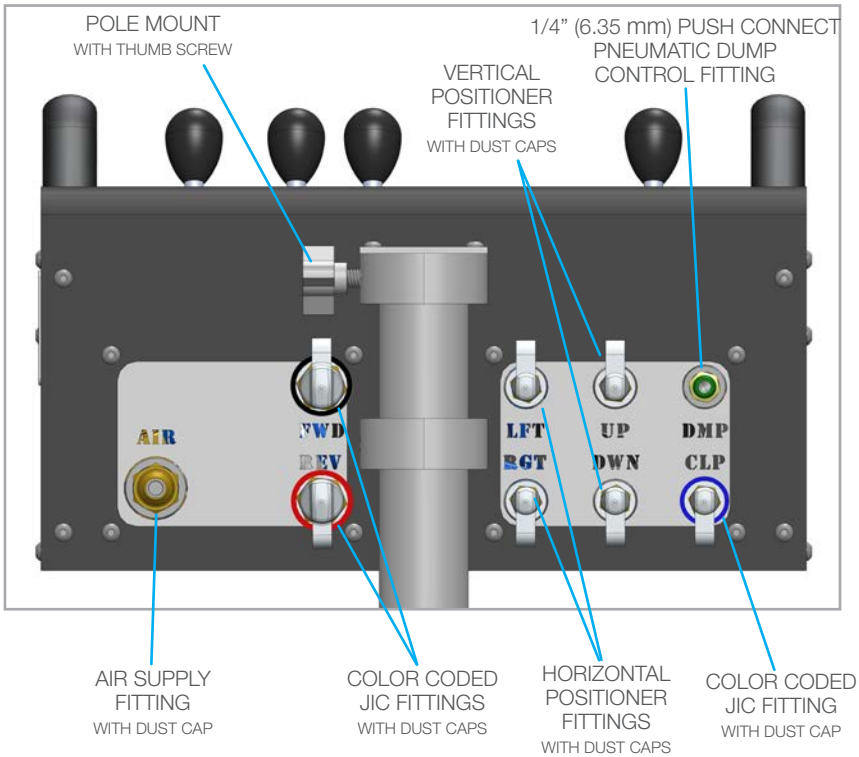
CONTROL BOX
TOP VIEW



CONTROL BOX
FRONT VIEW



CONTROL BOX
REAR VIEW

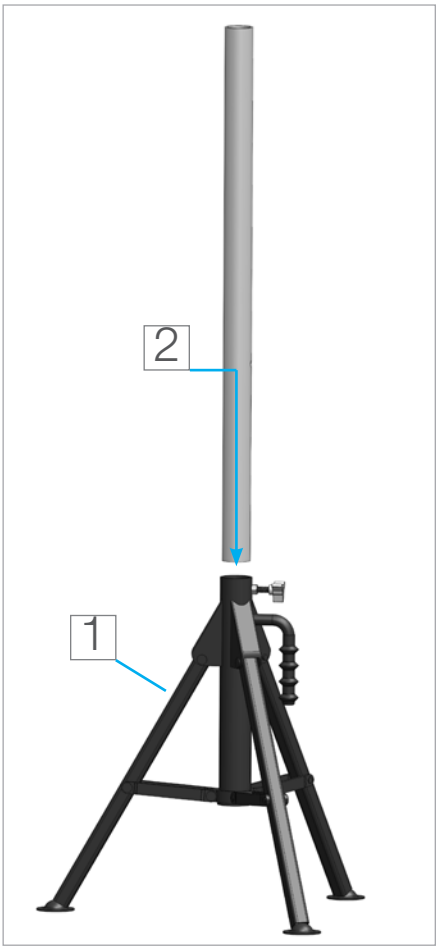


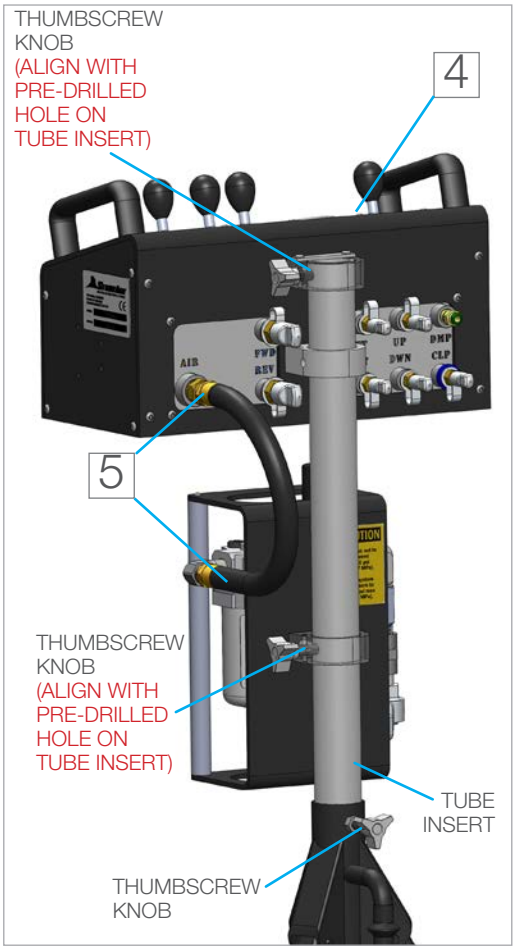
ASSEMBLE CONTROL BOX, FRL, AND TRIPOD BASE

1. Setup the tripod base in a location with good visibility to the bundle face, but at a safe distance away from waterblast zone.
2. Slide the vertical tube into the tripod base. Secure with the supplied thumbscrew knob. Note: The vertical tube has a hole through one wall that the thumbscrew must engage.
3. Slide the Filter, Regulator, Lubricator (FRL) assembly over the vertical tube down to the tripod base. Secure with the supplied thumbscrew knob.

   Note: The vertical tube has a hole through one wall that the thumbscrew must engage.

4. Slide the Control Box over the vertical tube. The Control Box has a stop that keeps it located at the top of the vertical tube. Secure with the supplied thumbscrew knob.
5. Install and tighten the short 1/2 in. (13 mm) I.D. hose between the FRL and the Control Box.



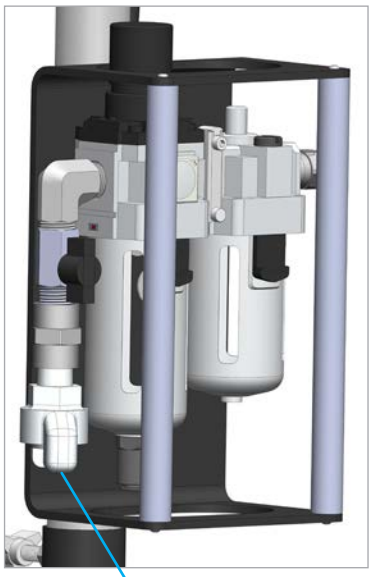


AIR SUPPLY AND LUBRICATOR SETTING

1. The Control Box 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. If another pneumatic connection is preferred, this fitting can be removed and any male 1/2 in (13 mm) NPT fitting may be used.
2. Using the regulator adjust the operating air pressure to 100 psi (0.7 MPa) for the application.

⚠WARNING

Maximum operating pressure is 100 psi (0.7 MPa). Never exceed 140 psi (0.97 MPa) supply pressure. Exceeding 140 psi (0.97 MPa) supply pressure may result in injury to the Operator and/or damage to the equipment.

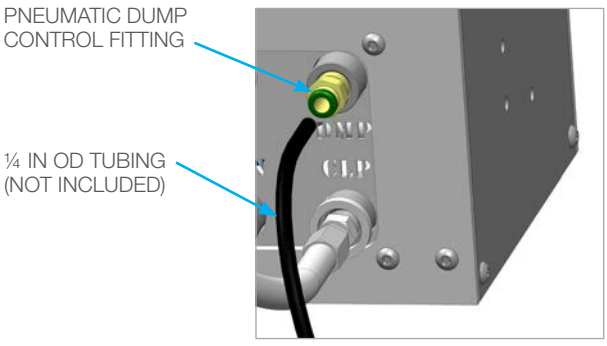


AIR SUPPLY FITTING

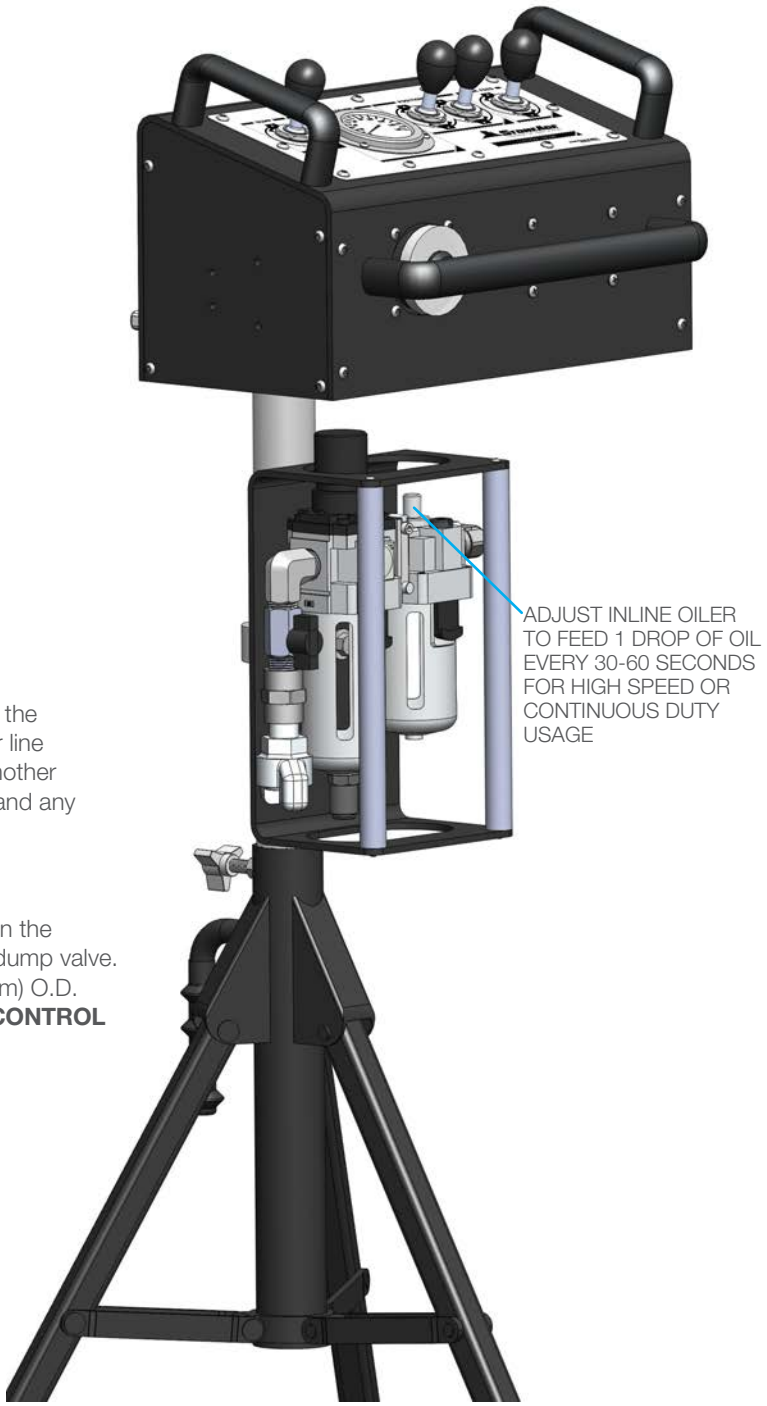
A universal **AIR SUPPLY FITTING** (Chicago style) is located on the back of the Control Box. Connect a compatible compressed air line (not included) according to the manufacturer's instructions. If another pneumatic connection is preferred, this fitting can be removed and any male ½ in NPT fitting may be used.

PNEUMATIC DUMP CONTROL FITTING AND LINE

A **MOMENTARY PNEUMATIC DUMP CONTROL** is located on the Contol Box 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. (6 mm) O.D. nylon tubing (not included) between the **PNEUMATIC DUMP CONTROL FITTING** and the pneumatic dump valve.



CONTROL BOX REAR VIEW

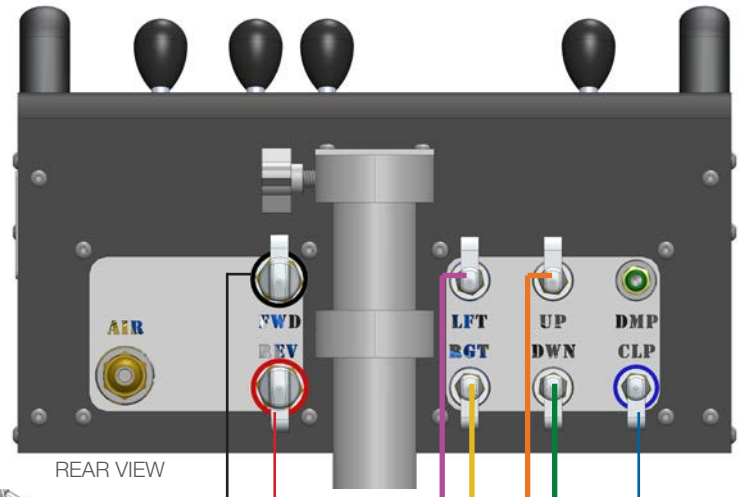


PNEUMATIC SUPPLY LINE CONNECTIONS

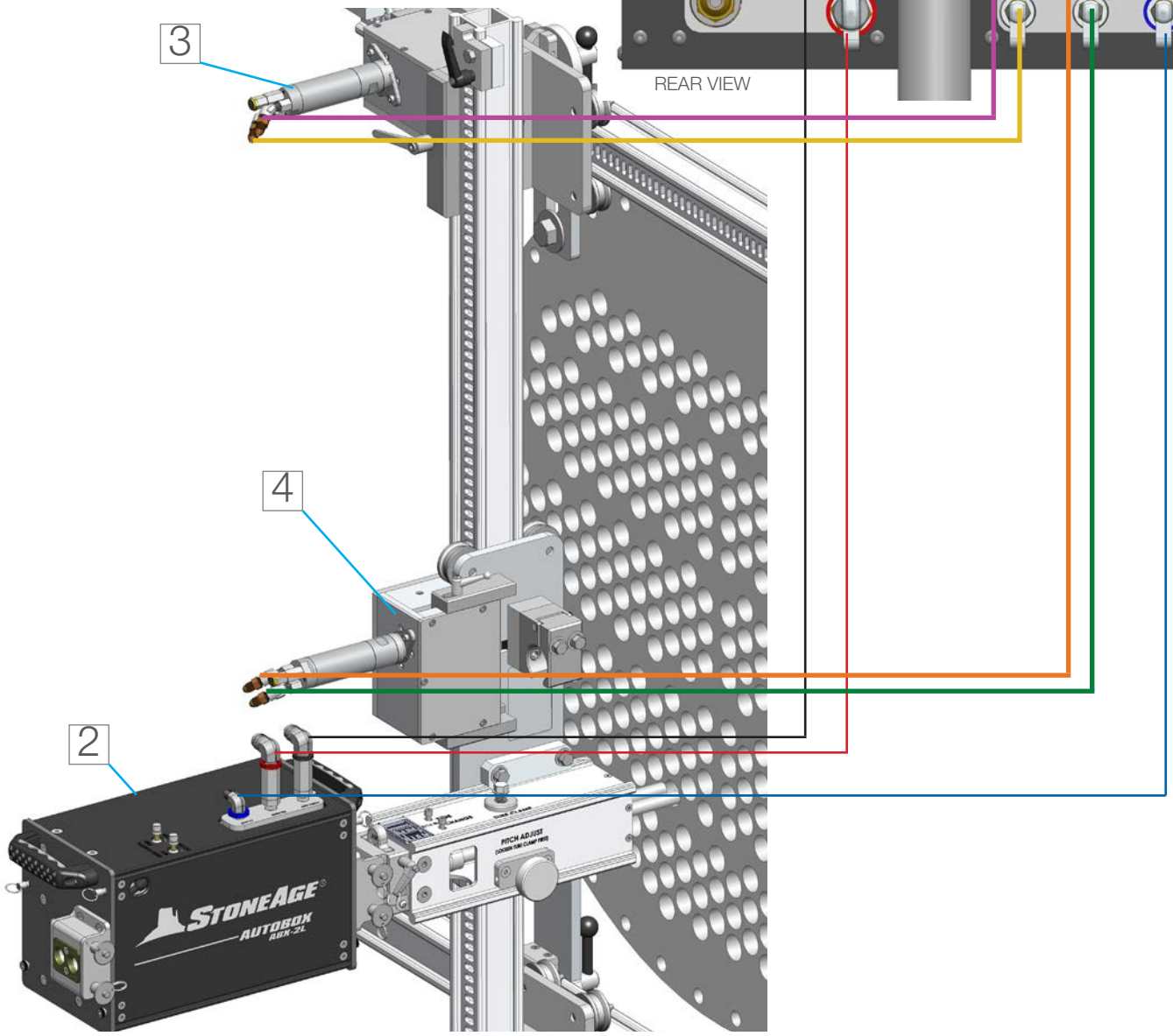
1. Remove the dust caps from the Joint Industry Council (JIC) fittings of the Control Box and the ABX-2L Hose Tractor.
2. Connect the ABX-2L Hose Tractor to the Control Box with two 1/2 in. (13 mm) JIC hoses and one 1/4 in. (6 mm) JIC hose. Verify the Control Box rotates the rollers in the appropriate direction and that the clamp functions correctly.
3. Connect the horizontal positioner drive air motor to the Control Box with two 1/4 in. (6 mm) JIC hoses. Verify the Control Box moves the horizontal carriage in the appropriate direction.
4. Connect the vertical positioner drive air motor to the Control Box with two 1/4 in. (6 mm) JIC hoses. Verify the Control Box moves the vertical carriage in the appropriate direction.
5. Test the Control Box before operating the ABX-2L Hose Tractor with high pressure water to verify the control valves move the hose in the intended direction, and that the dump valve is working properly.

CLAMP
REVERSE
FORWARD
LEFT
UP
RIGHT
DOWN

Note: The 4 Positioner control lines are not color coded. Colors are shown in manual for clarity.



REAR VIEW



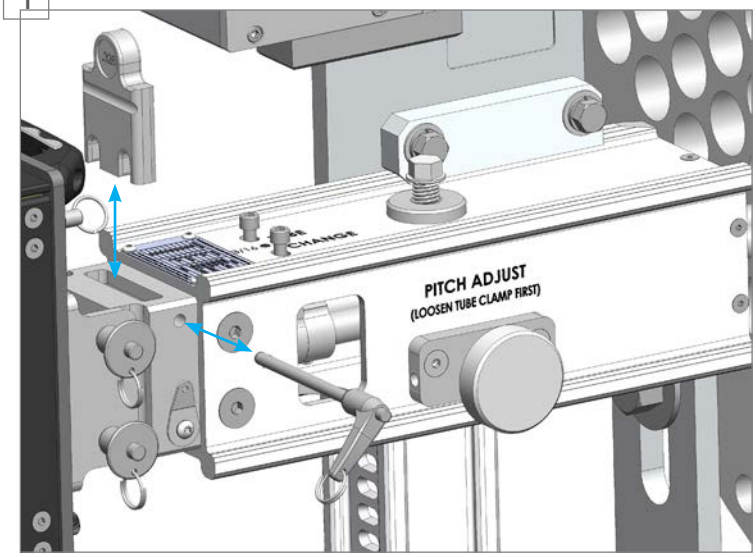
COLLET INSERTION, HOSE, AND HOSE STOP INSTALLATION

1. Remove Quick Release Pin and pull out existing Collet.
2. Insert Banshee tool on hose through the ABX-2L Hose Tractor, and hose guide assembly. Be sure that the Banshee tool and hose end pass the location of the Collet.
3. Select the appropriate Collet for the hoses to be used. (See "Recommended Collets For Common Hose Sizes" plaque on the ABX-100 Hose Guide.)
4. Install the Collet and quick release pin.
5. Pull on the hoses from the back of the ABX-2L Hose Tractor to ensure that the Collet does not allow the Banshee to back out of the Guide or Hose Tractor.
6. To install hose stops, push tool through until the tips are 1-2" (25-51 mm) past the end of the tube bundle. Loosely install the stop, then push toward the mounting bracket and tighten in place.

⚠WARNING

Appropriate size Collet seclection is critical to ensuring proper anti-withdrawl prevention of the tool.

1



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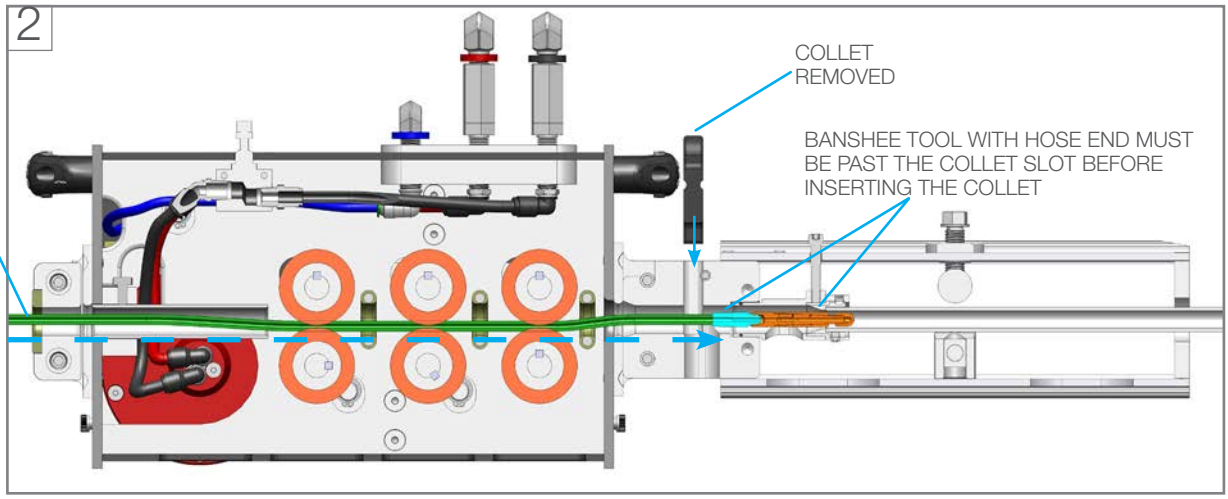

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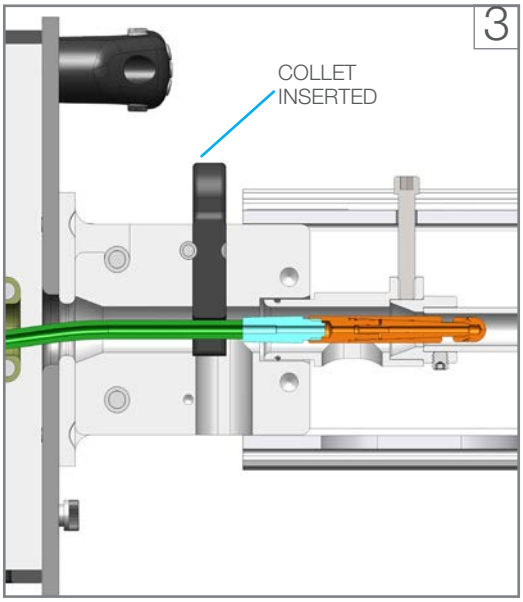
3



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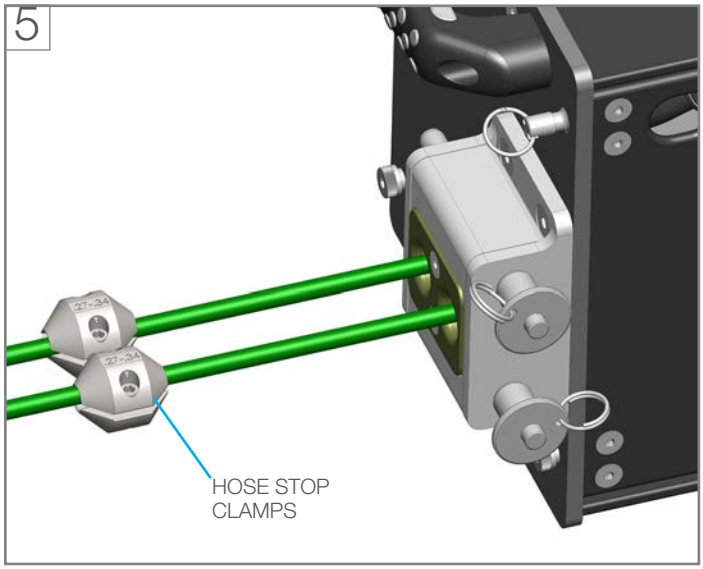


CONTROL BOX

- The **HOSE FEED LEVER** will move the hose in the forward (feeding) and reverse (retracting) directions. The **OFF** position is at the spring centered middle position and will stop the Drive Rollers from turning. The speed controls are located on the ABX-2L Hose Tractor. Speed is independantly adjustable for Forward/Reverse. Minimum speed is .2ft/sec (6 cm/sec). Maximum speed is 3.0ft/sec (91.44 cm/sec).
- To use the **MOMENTARY PNEUMATIC DUMP CONTROL**, hold it in the High Pressure On position to route the high-pressure water to the tool. Release the knob to divert the high-pressure water away from the tool.
- To de-energize the system, release the **HOSE FEED LEVER** and the **MOMENTARY PNEUMATIC DUMP CONTROL.** This will stop the Drive Rollers from moving and reroute the high-pressure water away from the ABX-2L Hose Tractor.

TEST RUN PROCEDURE

- Perform the **PRE-RUN SAFETY CHECK (SEE PAGE 6)**.
- Ensure Collet is installed and hose clamp pressure is set at 20-30psi (.14-.20 MPa)
- 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.
- Adjust the hose feed speed controls. Proper forward and reverse speeds will vary, depending on the type of material being removed and the tube size. Adjustment of the hose feed speed controls may be necessary during operation in order to optimize cleaning and overall productivity.
- Operate the high-pressure water at full pressure and use the **MOMENTARY PNEUMATIC DUMP CONTROL** to verify that the dump valve is working properly.

RUN PROCEDURE

- After completing the setup, the ABX-2L Hose Tractor system is ready for operation.
- Once all hose connections have been made, it is recommended to flush the hoses and verify the dump valve is working properly before installing the Banshee tools.
- After flushing the hoses, install the Banshee tools and insert both tools into the back of the ABX-2L Hose Tractor. It may be necessary to twist the hoses slightly as the tools and hose ends are manually pushed through the machine.
- Once the Banshees are inside the Guide Tubes, install the Collet (anti-withdrawl protection). The appropriate Collet must be verified, installed, secured, tested, and performance confirmed before operating at high pressure.
- Adjust the clamp pressure to 20-30 psi. (.14-.20 MPa). Align the Guide Tubes with an open set of tubes in the heat exchanger bundle.
- Feed forward and advance the hoses into the tube bundle at low pressure and wait for the tools to exit the far side of the heat exchanger.
- Set the forward hose stops in the desired position to ensure the entire tube is cleaned, but that the hose crimp does not fully exit the tube.
- Retract the hoses into the Guide Tubes.
- Close the dump and gradually increase the pump to the desired operating pressure.
- Feed forward and advance the hoses into the tube bundle. Dump and make any desired changes to forward and/or reverse operating speeds.
- If the Drive Rollers are slipping excessively, increase the clamp pressure. It is recommended to operate the clamp pressure as low as possible without excessive slippage. Optimal clamp pressure is achieved when the Drive Rollers slip ½ to 1 full rotation after hitting the hose stops (forward) or the Collet engages the hose crimp (reverse). It is recommended to use hose supplied with the secondary crimp so the (anti-withdrawl protection) Collet does not impact the pressure containing crimp.
- Operate the left/right and up/down positioner functions to begin high pressure cleaning at the preferred location on the tube bundle.
- Always align the Guide Tubes as closely as possible with the heat exchanger tubes before advancing the hoses.
- The ABX-2L System is now ready to operate.

HIGH-PRESSURE HOSE

The ABX-2L 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 .62 in. (15.75 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.
- **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 hose running running through the drive rollers.
- **The ABX-2L Hose Tractor MUST be supervised at all times.** This device is not intended to push the hose and waterjet tool. Once the waterjet tool has pulled the hose to its capacity, slack will form in the hose between the device and the back-out preventer.

NOTICE

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

- Open the door to install the high-pressure hose. The **HOSE CLAMP PRESSURE REGULATOR** on the Control Box MUST be turned to zero pressure to open the Drive Rollers for easy hose installation. Insert the hose, equipped with the waterjet tool, between the Drive Rollers. Increase the pressure on the **HOSE CLAMP PRESSURE REGULATOR** to extend the clamp rollers and clamp the hose. Close and lock the door before operating the ABX-2L Hose Tractor.

Test the Control Box before operating the ABX-2L Hose Tractor with high-pressure water to verify the control valves move the hose in the intended direction, and that the dump valve is working properly.

HOSE CLAMP

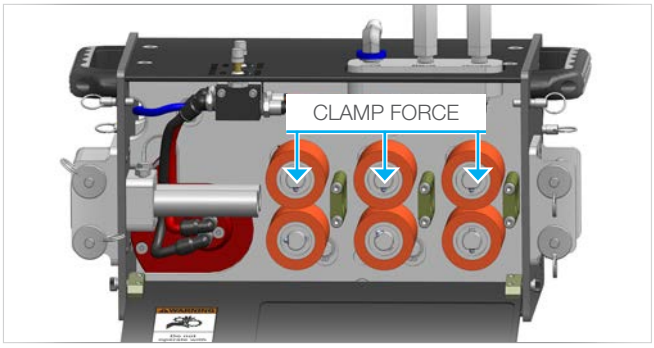
- The Drive Rollers are controlled by turning the **HOSE CLAMP PRESSURE REGULATOR**. Use the **HOSE CLAMP PRESSURE GAUGE** to record desired pressure for future use. Clamp force will not damage hoses. Proper clamp force will provide good control of the hose in forward and reverse directions, and keep the hose running through the drive rollers.

⚠ WARNING

- Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the ABX-2L Hose Tractor will release the hose and may create a dangerous runaway hose condition, which can result in severe injury and/or death.

⚠ WARNING

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



STORAGE, TRANSPORTATION, AND HANDLING

When moving the ABX-2L Hose Tractor, lift with care to prevent bodily injury.

The ABX-2L Hose Tractor is shipped in a custom wooden crate and should be stored upright in the same crate between jobs.

When storing the unit, use compressed air to blow out the air lines to remove debris and moisture. Use mild soapy water to clean the machine in order to remove corrosive materials.

Apply a small amount of air tool oil directly into the forward and reverse 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 three fittings to keep moisture and dirt out.

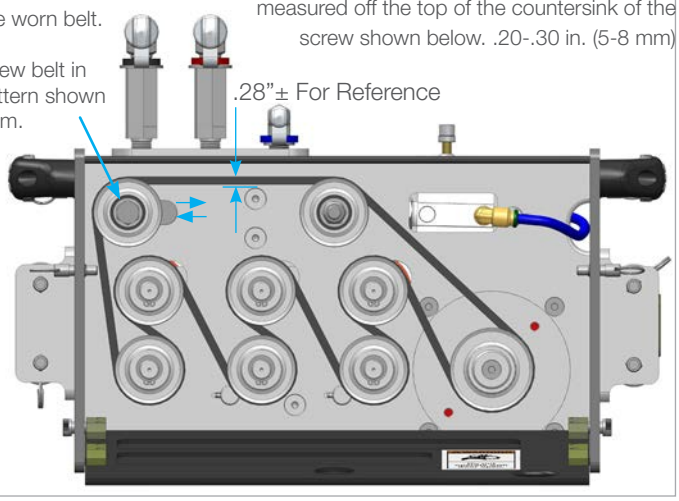
Maintenance Item	Frequency	Maintenance Required
Forward, reverse, and clamp fittings	**Before** each use	Inspect threads on fittings for wear or damage.
Forward and reverse fittings	**After** each use	Apply a small amount of air tool oil directly into the forward and reverse fittings. Then, briefly operate 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 three fittings to keep moisture and dirt out. **NOTICE** Do not add oil to the clamp fitting, as oil may accumulate in the air cylinders and prevent them from fully retracting.
Drive Rollers	**After** each use	The Drive Rollers are very durable and should last several hundred hours. However, it is recommended to inspect all Drive Rollers for wear and/or cracks at the completion of each job. Replacement is required when wear begins to affect the hose feed in forward or reverse, or when it affects the hose alignment. It is recommended to replace all six Drive Rollers at the same time to maintain optimal performance.
Belt	**After** each use	Check and adjust belt tension with the Rollers in the MAX open position. It may be necessary to install a hose or other material to hold the rollers open. NOTE: Do not use any materials with sharp edges, as they will damage the rollers. To inspect press down between the two idlers with 5 lbs of force on the belt. The belt should deflect .25 in. ± .05 in. (6 mm ±1mm). If the belt deflects more than .30 in. (8 mm) it should be tightened. (See Diagram below) **NOTICE** Do not use any materials with sharp edges to hold the Drive.
All components the hoses pass through	**After** each use	Most wear parts are made from 17-4 PH stainless steel 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.

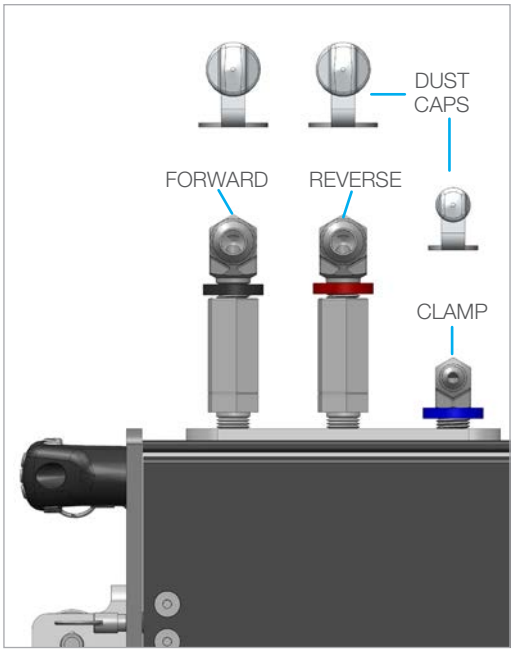
TO REPLACE THE BELT:
-Using a 9/16" Socket, loosen the hex head bolt and slide the idler sprocket to the right.

-Remove the worn belt.

-Install the new belt in the wrap pattern shown in the diagram.

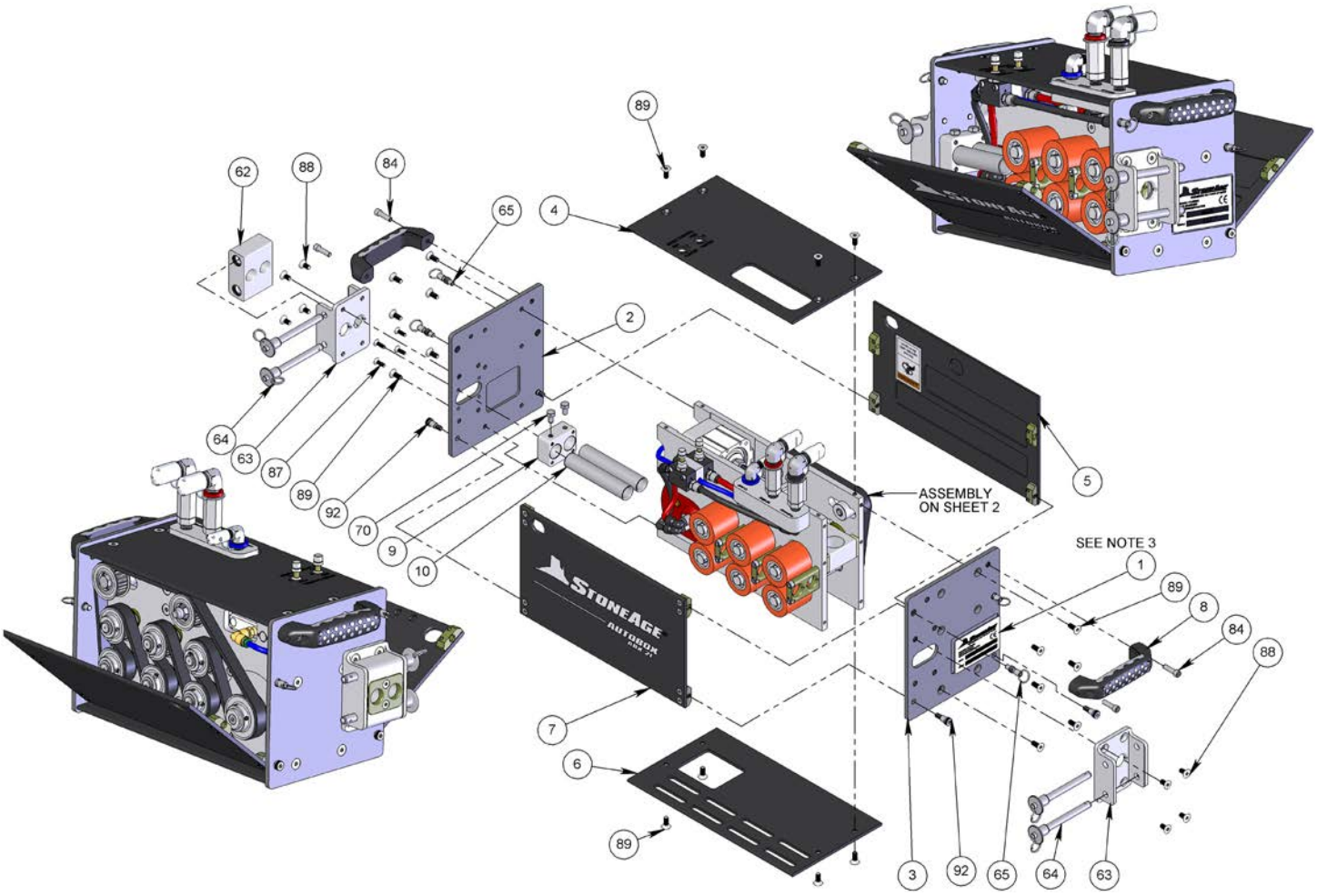
SETTING TENSION:
Adjust belt tension with the Drive Rollers in the MAX open position. It may be necessary to install a hose or other material to hold the rollers open. The level of acceptable deflection can be measured off the top of the countersink of the screw shown below. .20-.30 in. (5-8 mm)





Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the AUTOBOX® (ABX-2L-V2) Hose Tractor and Control Box.

AUTOBOX® (ABX-2L) HOSE TRACTOR



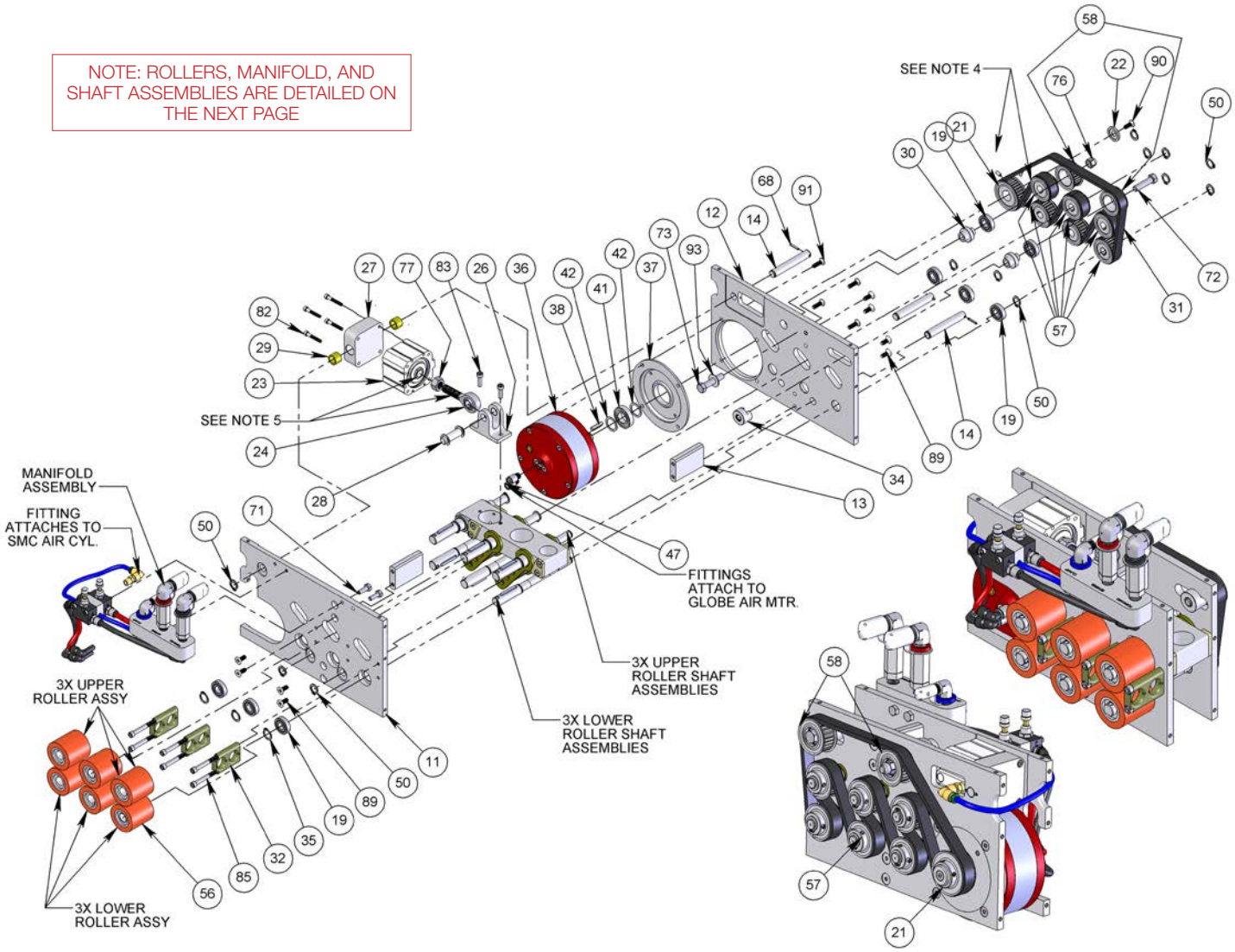
#	DESCRIPTION	QTY
1	ABX 203 CE Serial Plate	1
2	ABX 205 Side Plate Inlet	1
3	ABX 206 Side Plate Outlet	1
4	ABX 207 Plate, Top	1
5	ABX 208 Guard, Back Assy	1
6	ABX 210 Plate, Bottom	1
7	ABX 211 Door Assy	1
8	ABX 215 Pull Handle Rubber Grip Grey	2
9	ABX 217 Hose Guide Plate, Inner	1
10	ABX 218-001 Wear Ring	2
11	ABX 220 Plate, Outer	1
12	ABX 221 Plate, Inner	1
13	ABX 222 Plate, Stiffener	2
14	ABX 223 Shaft, Link	3
15	ABX 224 Link Bar	4
16	ABX 225 Spacer, Link	2
17	ABX 226 Shaft, Drive Roller	6
18	ABX 227 Spacer, Top Shaft	6

19	ABX 228 Bearing .500 ID x 1.125 OD Sealed Permalube	14
20	ABX 229 Ball Plunger	6
21	ABX 231 Drive Aluminum Sprocket 32T x .75	1
22	ABX 232 Cap, Air Motor Shaft	1
23	ABX 233 Cylinder	1
24	ABX 234 Rod End	1
25	ABX 235 Plate Bearing	1
26	ABX 236 Plate, Air Cylinder Clevis	1
27	ABX 237 Cylinder Pivot Plate	1
28	ABX 238 Healess Clevis Pin .50 OD x 1.25 SS	1
29	ABX 239 Sleeve Bearing .500 oD x .6875 OD	2
30	ABX 240 Shaft, Idler Nut	2
31	ABX 242 Drive Belt	1
32	ABX 243-001 Hose Guide Block	3
33	ABX 247 Flow Control Valve MASC200-08	2
34	ABX 248 Idler Nut	1

35	ABX 249 Retaining Ring, HD Ext SS	6
36	ABX 250 Air Motor, Globe	1
37	ABX 252 Plate, Air Motor Bearing	1
38	ABX 253 Step Key	1
39	ABX 255 Pad, Bearing Plate RH	2
40	ABX 256 Pad, Bearing Plate LH	2
41	ABX 257 Bearing 19mm x 37mm x 9mm	1
42	ABX 258 Shim Washer	2
43	ABX 259 FTG, P4M x PL5F 45° Elbow	2
44	ABX 260 FTG, P4M x PL8mmF 90° Elbow	2
45	ABX 261 FTG, PL8mmF to P4M Straight Adpt.	2
46	ABX 262 FTG, PL8mmM to PL8mmF 90° Elbow	2
47	ABX 263 FTG, PL8mmM to PL8mmF 90° Elbow	2
48	ABX 265 Manifold	1
49	ABX 266 Filter, .25 NPT	2
50	ABX 267 Retaining Ring, SL External SS	15

AUTOBOX® (ABX-2L) HOSE TRACTOR
CONTINUED...

NOTE: ROLLERS, MANIFOLD, AND SHAFT ASSEMBLIES ARE DETAILED ON THE NEXT PAGE



#	DESCRIPTION	QTY
51	ABX 268-BK-1 Black Tube 8mm Air Motor Fwd	1
52	ABX 268-BK-2 Black Tube 8mm Air Motor Fwd	1
53	ABX 268-R-1 Red Tube 6mm Air Motor Rev	1
54	ABX 268-R-1 Red Tube 6mm Air Motor Rev	1
55	ABX 270-B-1 Clamp Tube .025 OD	1
56	ABX 272 Drive Roller, 70A Small Hose	2
57	ABX 280 Drive Aluminum Sprocket 26T x .50	6
58	ABX 281 Idler Aluminum Sprocket 26T x .50	2
59	ABX 283 Plate, Spacer	1
60	ABX 285 FTG, Elbow 90° Elbow P4M x J4 SS	1
61	ABX 286 FTG, Elbow 90° Elbow P4M x J8 SS	2

62	ABX 290 Rear Mount Inside Assembly	1
63	ABX 291-001 Mounting Bracket	2
64	ABX 298 Quick Pin 17-4 SS .38 x 3.0	4
65	ABX 566 Spring Plunger, Pull Ring Locking	4
66	BR 167 90° Dust Cap	2
67	BR 168 90° Dust Cap	1
68	BRLM 191 Spring Pin, .125 x .75	3
69	CB 558 Ftg, Elbow P4PL4	1
70	GB 325-02 Bolt, Hex .25-20 x .50 SS	2
71	GB 325-03 Bolt, Hex .25-20 x .75 SS	2
72	GB 337-06 Bolt, Hex .37-16 x 1.50 SS	1
73	GB 337-07 Bolt, Hex .37-16 x 1.75 SS	1
74	GK 125-125-0750-SE-SS Key	6
75	GK 188-188-1250-SE-SS Key	6
76	GN 337-L Nylok Nut SS	1
77	GN 350-H-20 Hex Nut SS	1
78	GP 011-B Blue ID Band	1
79	GP 011-BK Black ID Band	1

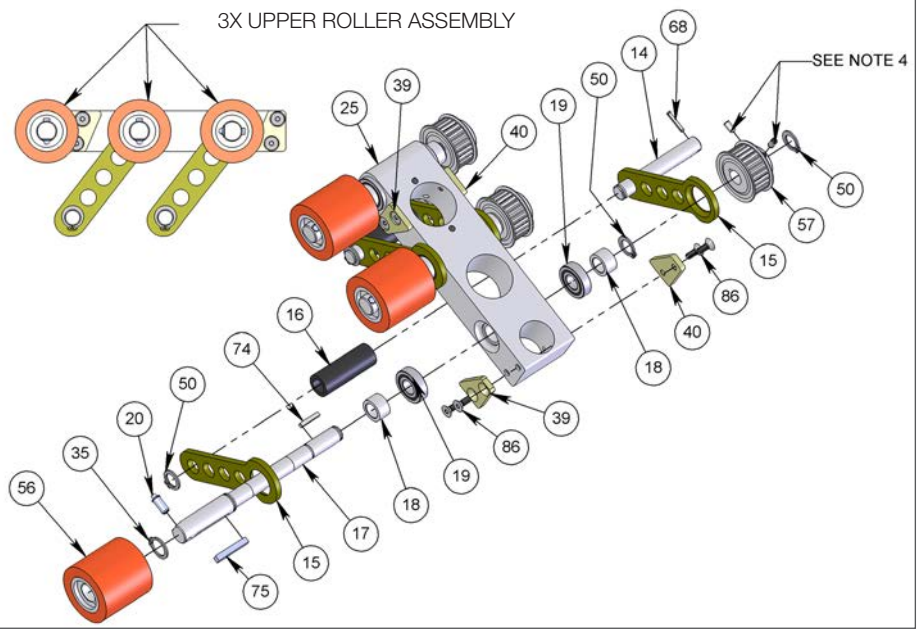
80	GP 011-R Red ID Band	1
81	GS 316-09 SHCS .16-32 X 2.25 SS	2
82	GS 319-05 SHCS .19-24 X 1.25 SS	4
83	GS 325-03 SHCS .25-20 X .75 SS (TB 050)	2
84	GS 325-035 SHCS .25-20 X 0.88 SS	4
85	GS 325-09 SHCS .25-20 X 2.25 SS	6
86	GSF 319-02 FHCS .19-24 X .50 Lg SS	8
87	GSF 319-025 FHCS .19-24 X .63 Lg SS	4
88	GSF 325-02 FHCS .19-24 X .50 Lg SS	8
89	GSF 325-025 FHCS .19-24 X .63 Lg SS	28
90	GSF 3M6-16-1.00 FHCS M6X1.00X16 SS	1
91	GSF 3M6-20-1.00 FHCS M6X1.00X20 SS	4
92	GSSH 0312-0375-SS Shoulder Screw	4
93	GW 337-F Flat Washer SS	1
94	HRS 563 Ftg., P2 x .25 OD Nylon Push 90°	1

AUTOBOX® (ABX-2L) HOSE TRACTOR
SUB ASSEMBLIES

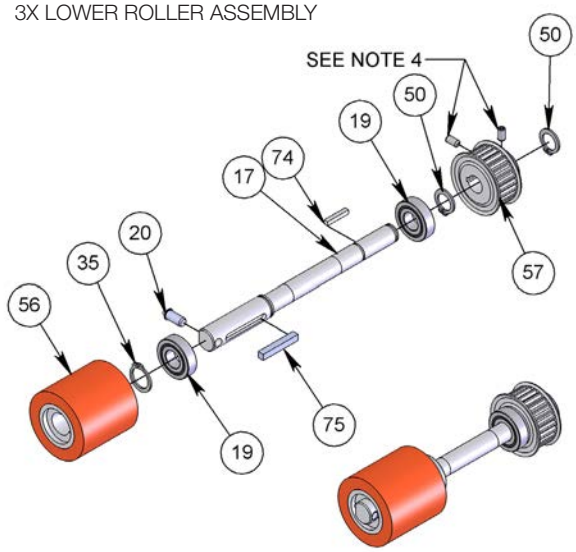
NOTE: PART NUMBERS, DESCRIPTIONS, AND QUANTIITES ARE LOCATED ON THE PREVIOUS TWO PAGES

ABX 271 (GRAY/BLACK) ROLLERS
ARE INCLUDED IN THE
ABX-2L EPP-001
EXTRA PARTS PACKAGE

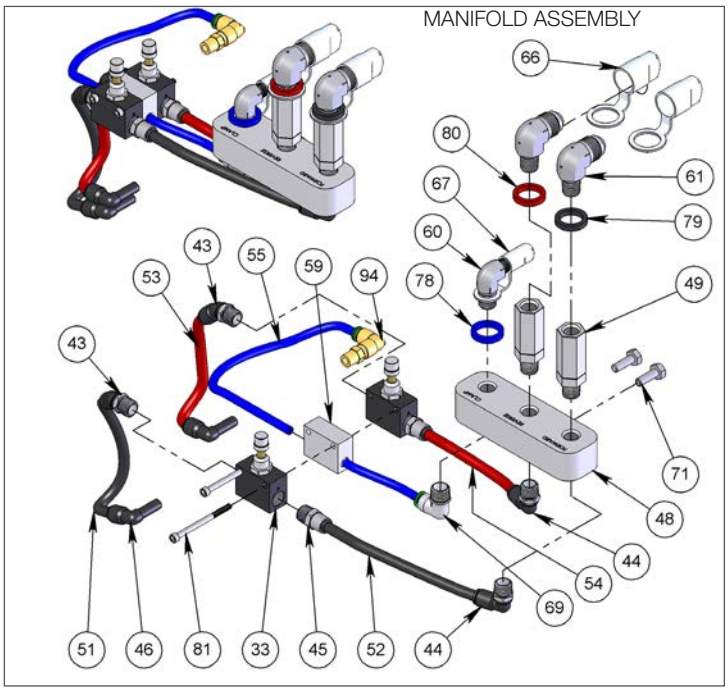
3X UPPER ROLLER ASSEMBLY



3X LOWER ROLLER ASSEMBLY



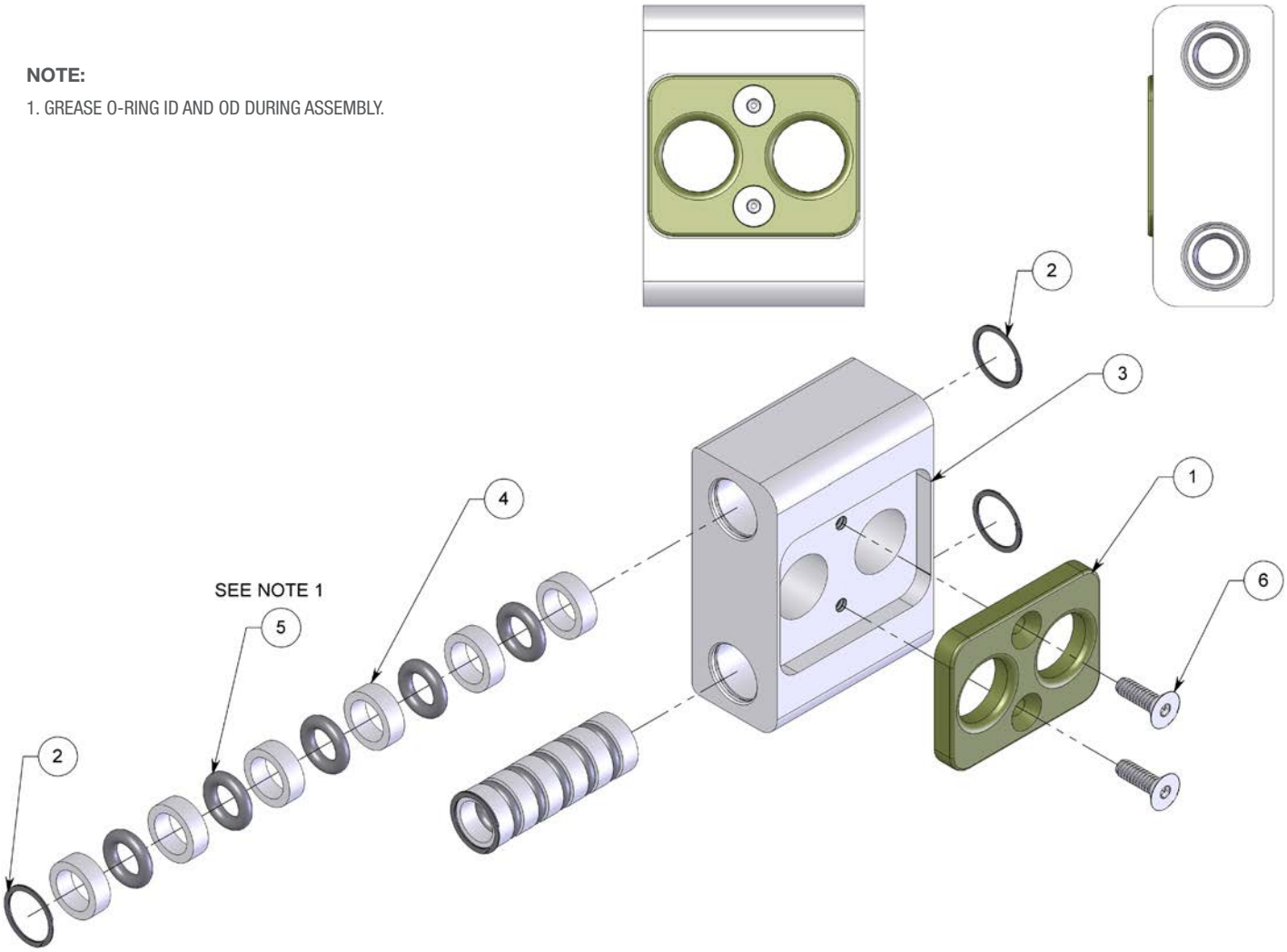
MANIFOLD ASSEMBLY



ABX 290 REAR MOUNT ASSEMBLY

NOTE:

1. GREASE O-RING ID AND OD DURING ASSEMBLY.



#	PART NUMBER	DESCRIPTION	QTY
1	ABX 216-001	HOSE GUIDE PLATE, OUTER	1
2	ABX 230	SPIRAL INTERNAL RETAINING RING, .625 BORE, SS	4
3	ABX 292-001	REAR MOUNTING BRACKET, INSIDE	1
4	ABX 293	SPACER, ORING	12
5	ABX 294	ORING, SHOCK ABSORBER	10
6	GSF 319-025	FHCS .19-24 X .63 Lg SS	2

AUTOBOX® (ABX-100-XX) GUIDE ASSEMBLY
ACCESSORY PARTS GUIDE

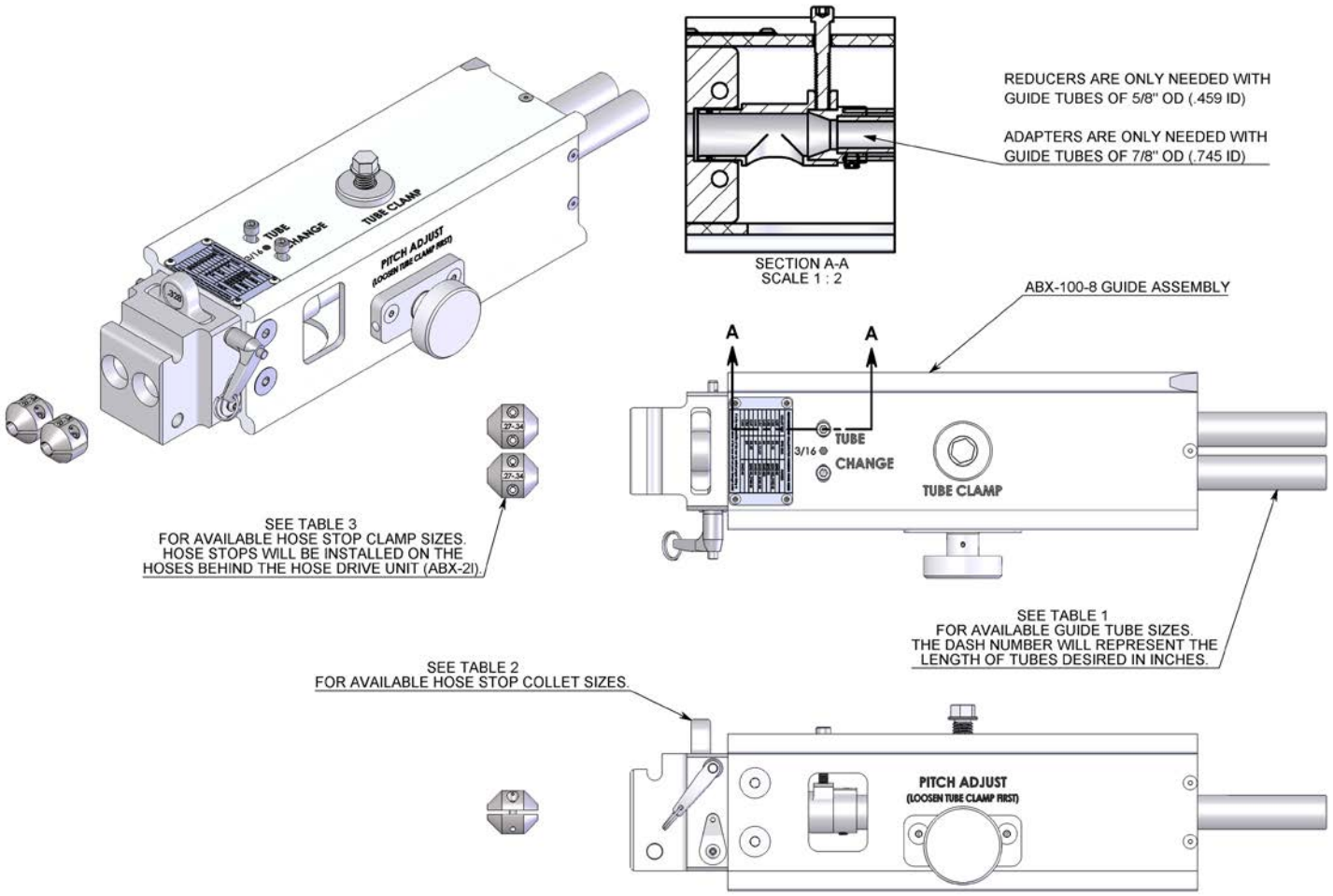


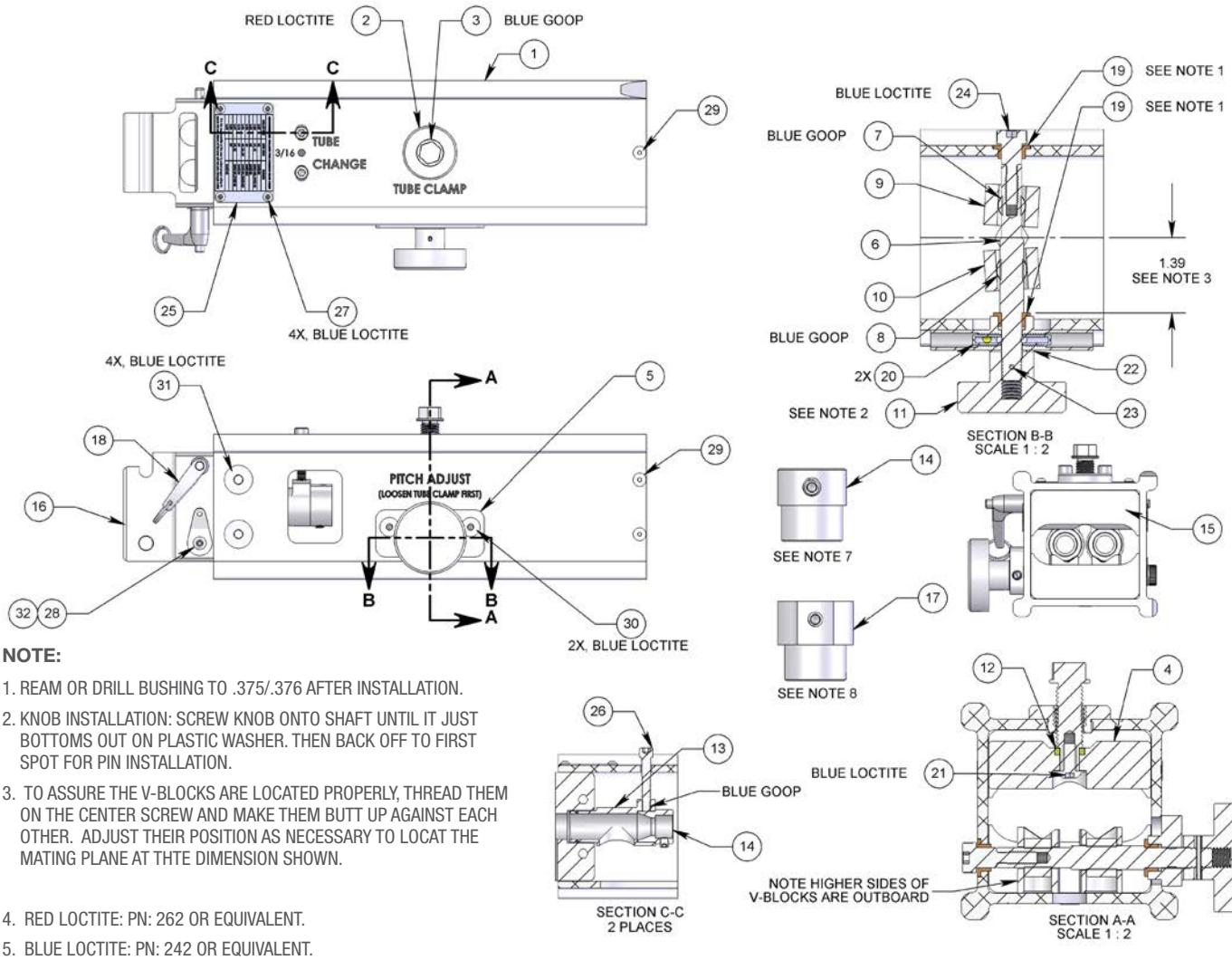
TABLE 1: GUIDE TUBES WITH REDUCERS/ ADAPTERS (XX=LENGTH IN INCHES)		
PART NUMBER	DESCRIPTION	QTY
ABX 114	REDUCER (REQUIRES ABX 115)	2
ABX-115-XX	GUIDE TUBE, .459 ID (REQUIRES ABX 114)	2
ABX-116-XX	GUIDE TUBE, .546 ID	2
ABX-117-XX	GUIDE TUBE, .674 ID	2
ABX-119-XX	GUIDE TUBE, .745 ID (REQUIRES ABX 124)	2
ABX-124	ADAPTER (REQUIRES ABX 124)	2

TABLE 2: HOSE STOP COLLETS		
PART NUMBER	DESCRIPTION	QTY
ABX 121-297	HOSE STOP COLLET .297 in. / 8 mm	1
ABX 121-328	HOSE STOP COLLET .328 in. / 8 mm	1
ABX 121-406	HOSE STOP COLLET .406 in. / 10 mm	1
ABX 121-438	HOSE STOP COLLET .438 in. / 11 mm	1
ABX 121-460	HOSE STOP COLLET .460 in. / 12 mm	1
ABX 121-484	HOSE STOP COLLET .484 in. / 12 mm	1
ABX 121-516	HOSE STOP COLLET .516 in. / 13 mm	1
ABX 121-547	HOSE STOP COLLET .547in. / 14 mm	1
ABX 121-594	HOSE STOP COLLET .594 in. / 15 mm	1
ABX 121-625	HOSE STOP COLLET .625 in. / 16 mm	1

TABLE 3: HOSE STOP CLAMPS		
PART NUMBER	DESCRIPTION	QTY
HS 121-27-34	HOSE STOP CLAMP ASSEMBLY, .27-34	2
HS 121-34-42	HOSE STOP CLAMP ASSEMBLY, .34-42	2
HS 121-42-50	HOSE STOP CLAMP ASSEMBLY, .34-42	2
HS 121-50-56	HOSE STOP CLAMP ASSEMBLY, .50-56	2
HS 121-56-61	HOSE STOP CLAMP ASSEMBLY, .56-61	2

TABLE 4: GUIDE ASSEMBLY		
PART NUMBER	DESCRIPTION	QTY
ABX-100-8	HOSE STOP CLAMP ASSEMBLY, .27-.34	1

AUTOBOX® (ABX-100-8) GUIDE ASSEMBLY
MAIN ASSEMBLY PARTS GUIDE



NOTE:

1. REAM OR DRILL BUSHING TO .375/.376 AFTER INSTALLATION.
2. KNOB INSTALLATION: SCREW KNOB ONTO SHAFT UNTIL IT JUST BOTTOMS OUT ON PLASTIC WASHER. THEN BACK OFF TO FIRST SPOT FOR PIN INSTALLATION.
3. TO ASSURE THE V-BLOCKS ARE LOCATED PROPERLY, THREAD THEM ON THE CENTER SCREW AND MAKE THEM BUTT UP AGAINST EACH OTHER. ADJUST THEIR POSITION AS NECESSARY TO LOCAT THE MATING PLANE AT THTE DIMENSION SHOWN.
4. RED LOCTITE: PN: 262 OR EQUIVALENT.
5. BLUE LOCTITE: PN: 242 OR EQUIVALENT.
6. BLUE GOOP IS A SWAGELOK BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
7. ADAPTER ONLY USED WITH 5/8" (15.89 mm) OD GUIDE TUBES.
8. ADAPTER ONLY USED WITH 7/8" (22.23 mm) OD GUIDE TUBES.

#	PART NUMBER	DESCRIPTION	QTY
1	ABX 101-001	HOUSING	1
2	ABX 102	INSERT THREAD CLAMP WITH HELICOIL	1
3	ABX 103	MACHINED BOLT .50-13 MALE	1
4	ABX 104	BAR CLAMP	1
5	ABX 105	BLOCK, DETENT	1
6	ABX 106	SCREW, CENTER	1
7	ABX 107	BARREL NUT, .38-24 RH	1
8	ABX 108	BARREL NUT, .44-24 LH	1
9	ABX 109	V-BLOCK, GUIDE TUBE .38	1
10	ABX 110	V-BLOCK, GUIDE TUBE .44	1
11	ABX 111	KNOB, MODIFIED	1
12	ABX 112	WASHER, THRUST	1
13	ABX 113-001	COUPLING	2
14	ABX 114	REDUCER, .459 ID GUIDE TUBE	2
15	ABX 118	CAP, HOSE GUIDE	2
16	ABX 120-001	MOUNTING BRACKET, INSIDE	1

17	ABX 124	ADAPTER, .745 ID GUIDE TUBE	1
18	ABX 130-001	QUICK-RELEASE PIN	1
19	ABX 131	FLANGED BUSHING	2
20	ABX 132	BALL PLUNGER	2
21	ABX 133	SCREW, BHCS, FLANGED	1
22	ABX 135	WASHER, PLASTIC	1
23	ABX 136	SPRING PIN	1
24	ABX 138	SCREW, SHOULDER	1
25	ABX 139	COLLET REFERENCE PLATE	1
26	GS 325-06	SHCS .25-20 X 1.50 SS (TB 044)	2
27	GSB 313-0075	BHCS 6-32 X 1.88 LG SS	4
28	GSB 319-015	BHCS .19-24 X .38 LG SS	1
29	GSF 316-015	FHCS .16-32 X .38 LG SS	6
30	GSF 325-025	FHCS .25-20 X .63 LG SS	2
31	GSF 337-03	FHCS .37-16 X .75 LG SS	4
32	GW 319-L	LOCK WASHER SS	1

1. Acceptance of Terms and Conditions. These Terms and Conditions shall operate as Seller's acceptance of Buyer's purchase order, and such acceptance is made expressly conditional on assent by Buyer to the Terms and Conditions. Such assent shall be deemed to have been given unless written notice of objection to any of such 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 its Buyer with prompt and efficient service. However, to negotiate individually the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, products furnished and services rendered by Seller are sold only on the Terms and Conditions stated herein. Notwithstanding any Terms or Conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to Seller's Terms and Conditions of sale 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. PRODUCTS SOLD BY SELLER ARE DESIGNED AND INTENDED TO BE USED AT HIGH PRESSURES AND SPEEDS, AND MAY BE DANGEROUS IF OPERATED IMPROPERLY OR WITHOUT THE USE OF APPROPRIATE SAFETY DEVICES AND GUARDS. BUYER IS CAUTIONED TO CAREFULLY READ AND UNDERSTAND THESE TERMS AND CONDITIONS, AS THEY HAVE IMPORTANT LEGAL CONSEQUENCES.

2. Payment/Prices. Unless other arrangements have been made in writing between Seller and Buyer, payment for product delivered shall be made upon receipt of invoice. The prices shown on the face hereof are those currently in effect. Prices invoiced shall be per price list 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 Seller's products or services and for the collection of which Seller is or may be responsible to any governmental authority unless acceptable exemption certificates are provided by Buyer in accordance with 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 equipment or services being purchased, whether now in effect or hereafter imposed by any governmental authority, foreign or domestic.

3. Warranty. Subject to the limitations and conditions hereinafter set forth, Seller warrants to the original Buyer that its products are free from defects in workmanship and material for a period of one (1) year from shipment date. Seller's obligation under this warranty shall be limited to repairing, replacing or issuing a credit for, at Seller's option, any products or services it finds to be defective in material or workmanship. In no event shall Seller be liable for any incidental, consequential or indirect damages of any kind. THIS WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY FOR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. No statement or recommendation made by Seller or its representative to Buyer or User shall constitute a warranty by Seller or a waiver or modification to any of the provisions hereof or create any liability for Seller. All warranty claims are subject to the exclusions and limitations set forth below:

a. The warranty shall not apply if the product or service (1) has been subject to misuse, negligence or accident; (2) has not been installed or operated in accordance with Seller's recommendations; (3) has been operated under more severe conditions than those specified for the particular product or service; (4) has been operated beyond the rated capacity of the product; or (5) has been repaired or altered outside Seller's facilities or in any way so as, in Seller's judgment, to affect its stability or reliability.

b. Products that Seller furnishes, but does not manufacture, carry only the warranty of the Manufacturer of such products. Where other Manufacturers' or Suppliers' products used in Seller's products or services prove defective, Seller's liability shall exist only to the extent that Seller is able to recover from such Manufacturers or Suppliers for such defects.

c. Any warranty granted by Seller to the Buyer shall be deemed void if any goods covered by such warranty are used for any purpose not recommended or permitted. In addition, the Buyer shall indemnify Seller and hold Seller harmless from and against any and all claims, damages, losses, costs, expenses and other liability of whatever nature that Seller suffers or incurs by reason of any such unintended use.

d. Notice of defective product or service must be given in writing to Seller by Buyer or User within fifteen (15) business days following receipt of goods. Buyer or User shall keep such products or services in an unaltered condition for examination by Seller's representative. No goods may be returned for credit or adjustment without prior written permission from Seller.

4. Product Liability. Buyer specifically acknowledges that the products being purchased may be operated at high speeds and/or pressures, and that as such they may be inherently dangerous if not used correctly. Buyer shall be solely responsible for the safe operation of the products at all times and for determining the safety devices and guards that may be required for the safe operation of the products. Buyer shall undertake to specify and order all safety devices and guards necessary for the safe operation of the equipment covered. All safety devices and guards offered in Seller's quotations are recommended for purchase. Seller may provide necessary safety devices and guards not offered in this quotation at an extra price in accordance with the specifications of Buyer. Buyer shall at all times use and require its contractors to use all necessary and appropriate safety devices, guards and proper safe operating procedures. Buyer shall ensure that proper Operator training is provided. Buyer shall not remove or modify any such devices, guards or warning signs and shall insist on safe operating practices on the part of its personnel. In no event shall Seller be responsible for any injuries to persons or property caused by defects in any equipment, including by way of illustration and not limitation, any pumps, compressors, fittings, connections, components, piping or hoses up to the point that same are connected to the product. Buyer agrees to indemnify and to save Seller harmless from any and all liability or obligation incurred by or against Seller, including costs and attorneys' fees, to or by any persons injured directly or indirectly in the operation of the equipment furnished under the following conditions:

a. if Buyer fails to purchase and use necessary and appropriate safety devices and guards as determined and/or recommended by Seller;

b. if Buyer fails to maintain in good working order such safety devices and guards as are purchased from Seller;

c. if Buyer adds, omits, repairs, modifies, replaces or substitutes any components on the equipment without permission from Seller;

d. if Buyer exceeds at any time the maximum safe loads, pressures or speeds recommended by Seller for the equipment furnished hereunder without the specific written consent of Seller; or

e. if Buyer otherwise fails to operate the product or equipment in accordance with Seller's printed instructions or otherwise negligently operates the equipment.

5. 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. All deliveries are based on F.O.B. Seller's factory, unless specifically agreed otherwise, and Buyer shall pay all shipping costs and insurance from that point. Seller, in its sole discretion, will determine and arrange the means and manner of transportation of the products. Responsibility of Seller shall cease and Buyer assumes all risk of loss or damages upon Seller's delivery to and receipt by a common carrier. Carriers shall be responsible for goods lost or damaged in transit and Buyer shall immediately notify the carrier in writing of such loss or damage. At Buyer's request Seller will offer its assistance. THE PROPOSED SHIPMENT DATE IS AN ESTIMATE. 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). Shortages or errors must be reported within fifteen (15) business days from receipt of shipment to secure adjustment. No merchandise may be returned without securing written approval from Seller. Seller will notify Buyer promptly of any material delay and will specify the revised delivery date as soon as practicable. Seller shall not be liable for any delay in delivery or performance, or for any failure to manufacture, deliver or perform due to (a) any cause beyond its reasonable control; (b) any act of God, act of Buyer, act of civil or military authority, governmental priority, strike or other labor disturbance, flood, epidemic, war, riot, delay in transportation or car shortage; or (c) inability on account of any cause beyond the reasonable control of Seller to obtain necessary materials, components, services or facilities. In the event of any such delay, the date of delivery or of performance shall be extended for a period equal to the time lost by reason of the delay.

6. Technical Advice. All technical advice, recommendations and services of Seller are intended for use by persons having adequate skill, at their own risk, and Seller assumes no responsibility, and Buyer hereby waives all claims against Seller, for results obtained or damages incurred from the use of Seller's advice, recommendations and services.

7. Modification. These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement and cannot be supplemented or amended without Seller's prior written approval. Seller's waiver of any breach, or failure to enforce any of the 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 thereof. If any provisions of these Terms and Conditions are held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

8. Disputes. Buyer and Seller shall attempt in good faith promptly to resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Buyer and Seller 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 parties. 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. A state or federal court located within the State of Colorado shall have sole and exclusive jurisdiction over any litigation concerning any such matters as well as any alleged defects of any products or equipment covered thereby or damages sustained as a result of such alleged defects. 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 arbitration.

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

NOTES

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