



DOMED BUNDLE POSITIONER (DBP-100) USER MANUAL

FOR ICM AND DELTA T
STYLE EVAPORATORS

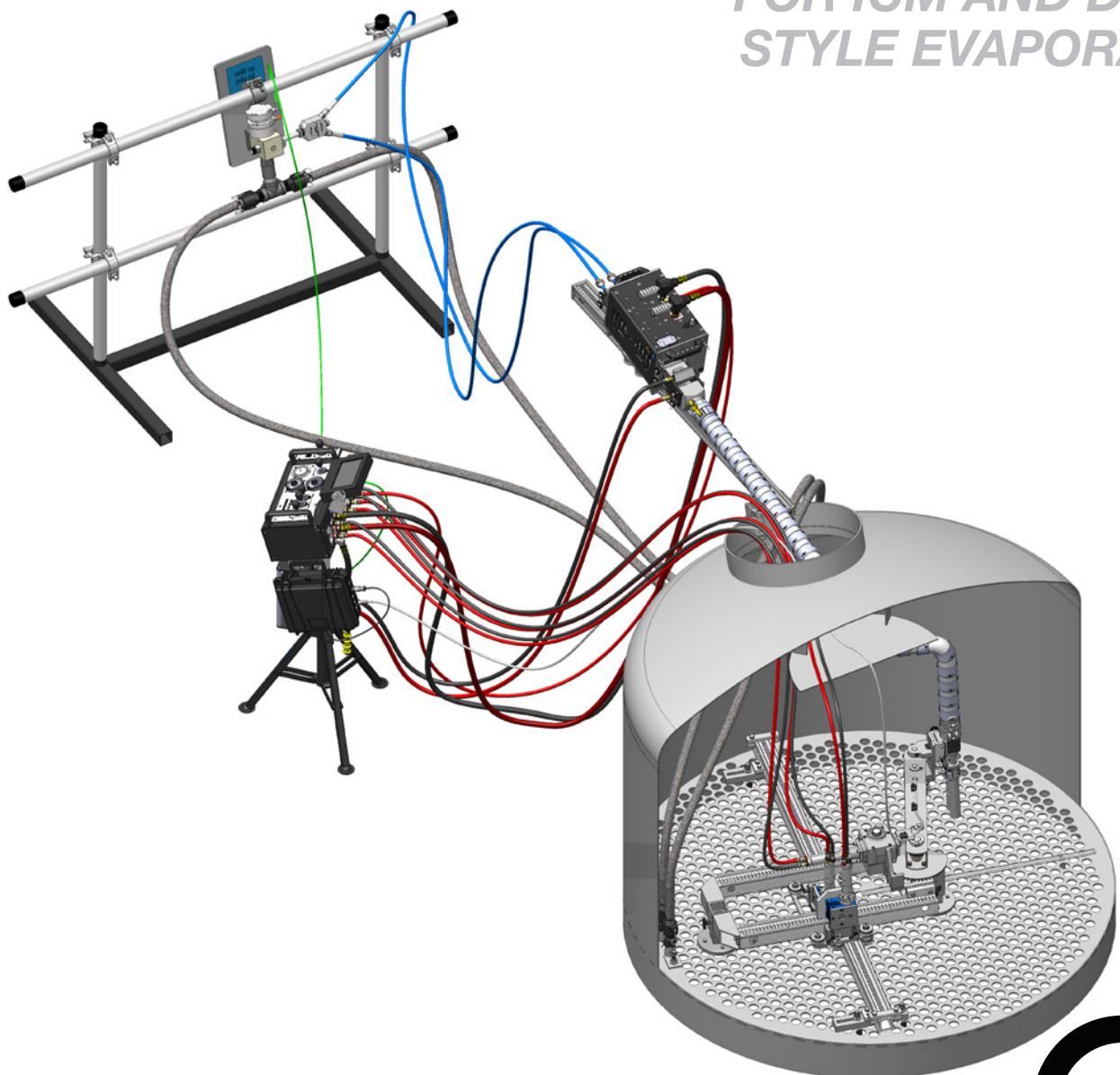


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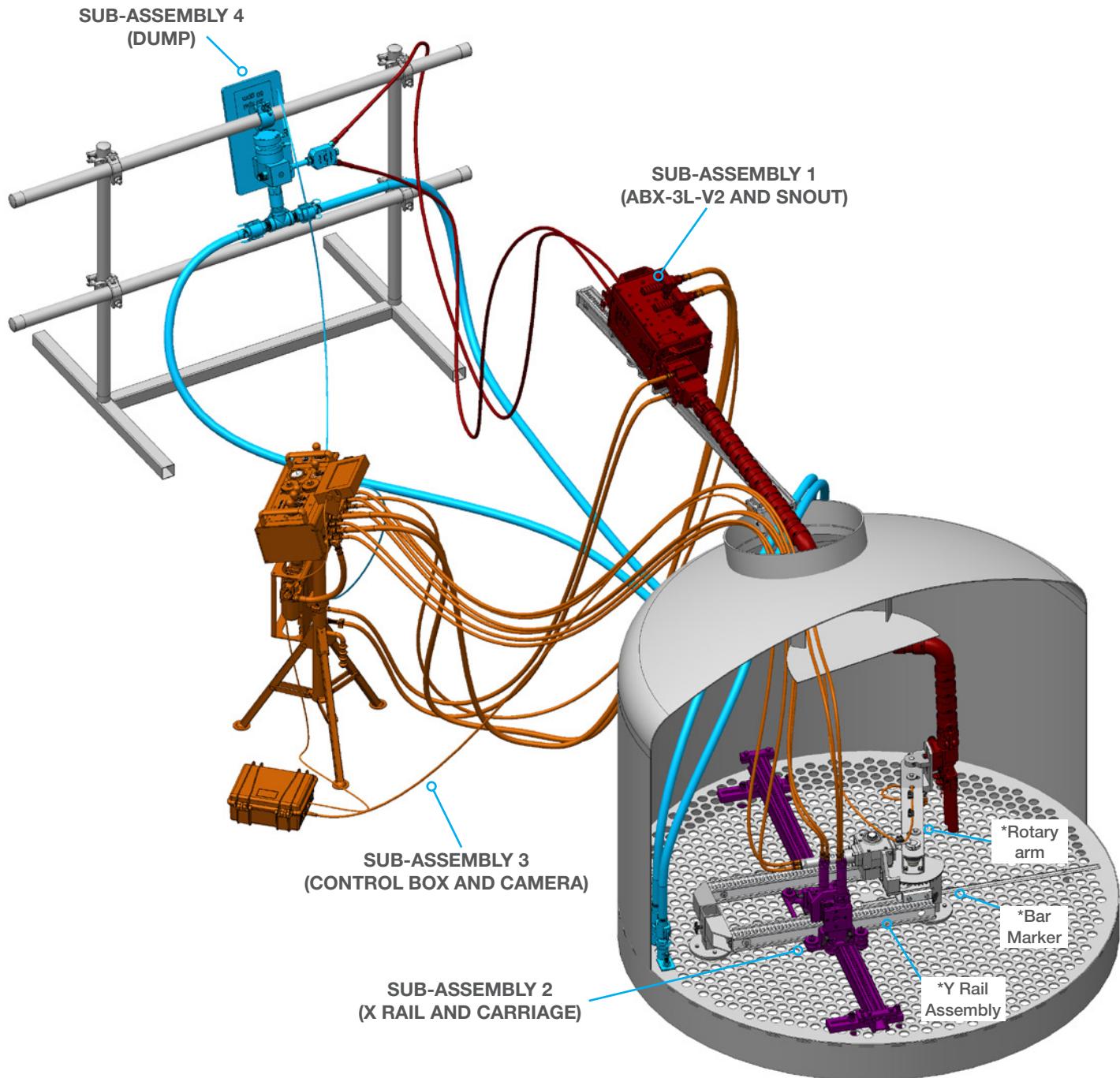
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SUB-ASSEMBLY COLOR CODE DIAGRAM

REVIEW THIS BEFORE STARTING ASSEMBLY:

THE FOUR COLOR CODED SUB-ASSEMBLIES NEED TO BE ASSEMBLED BEFORE CONNECTING EVERYTHING TO THE DOMED BUNDLE. THE COLORS ARE ASSOCIATED TO THEIR RESPECTIVE SECTIONS IN THIS MANUAL. THE HOSE CONNECTIONS WILL BE MADE IN A LATER SECTIONS OF THIS MANUAL



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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). Please see separate User Manuals for the ABX-3L-V2 Hose Tractor and AK-3L Air Knife.

For detailed up to date information on these components.
<https://www.stoneagetools.com/manuals>

SPECIFICATIONS		
DBP-100 POSITIONER	Imperial	Metric
Weight: without snout	102 lbs	42 kg
Dimensions for System Assembly	See the "DOMED BUNDLE POSITIONER SET-UP DIMENSIONS" section of this manual for detailed information.	
Usable Exchanger Diameter Range Options	69, 84, or 96 in.	1753, 2134, or 2438 mm
ABX-3L-V2 TRACTOR	Imperial	Metric
Weight	49 lbs	22 kg
Dimensions	8.3 x 8.2 x 16.9 in.	211 x 208 x 429 mm
Feed Rate: (dependent upon application and hose size)	0.3 - 3.0 ft/sec	8 - 914 mm/sec
Push/Pull Force	15 - 150 lbs (5 - 50 lbs per lance)	15 - 68 kg (2 - 23 kg per lance)
System Air Consumption	50 cfm at 100 psi	1416 lpm at 6,8 bar
Poly Hose Size	(1, 2, or 3) 8/4 hoses maximum	
CBX-DBP CONTROL BOX	Imperial	Metric
Weight: Control Box (Includes Control Box, FRL, and stand)	48 lbs	21.7 kg
Dimensions for Control Box Assembly	44 x 19 x 19 in (25 in. diameter foot print)	1114 x 492 x 492 mm (628 mm. diameter foot print)
Maximum Air Supply Pressure:	125 psi	8,6 bar
System Operating Pressure:	100 psi	6,8 bar
Recommended Operational Temperature Range:	-20 ° to 140 °F	-29 ° to 60 °C
Air Connection to Control Box	Chicago style twist-claw fitting	
Air Connection from Control Box to Tractor	(2) ½" JIC and (1) ¼" JIC	
Air Connections from Control Box to Air Knife, Linear Drive, and Rotary Arm Drive	(2 Each) ¼" JIC	

DESCRIPTION OF EQUIPMENT AND INTENDED USE

The Domed Bundle Positioner (DBP-100) is a motorized positioning system that is used in conjunction with an ABX-3L-V2 Hose Tractor, Rigid Snout and Control Box to position flex lance guide tubes over heat exchanger tubes in exchangers and evaporators.

The design seeks to allow full coverage of the tube sheet where a standard square frame positioner could not be mounted. In some applications there is limited access to install or mount a traditional square positioning frame.

The base package includes the Positioner, Snout and Snout Adapter, Control Box and Pneumatic Connection Umbilicals, Camera System, Rail Mount for the ABX-3L-V2 Hose Tractor, and a Bar Marker.

KEY FEATURES:

- Three pneumatic positioning motors with gearboxes mounted onto a frame and each can be independently used to position the guide tubes (X direction, Y direction and a Rotary Arm).
- A Control Box with discrete control of each functional direction is supplied as part of the system.
- The frame is primarily constructed of aluminum and is easily broken down into four smaller lighter pieces in order to be inserted through a man way, reassembled and mounted rigidly to the tube sheet.
- The machine should only need to be repositioned 180° once inside the exchanger in order to achieve full coverage of the tube sheet.
- Positioning allows for access to tubes located around the outer edge of the exchanger where a standard square frame would not allow.
- An extra set of included frame rails allows the machine to be adjusted for a wider range of exchanger diameters.
- A Guide Tube and Rigid Snout assembly attaches to the Rotary Arm with two quick disconnect pins.



EU DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
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Durango, CO 81303
USA

Authorized Representative:

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

Declare that:

Domed Bundle Positioner (DBP-100) and Control Box (CBX-DBP)
for high pressure water cleaning of system parts.

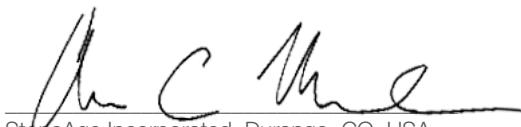
Is compliant with the following Directives and Standards:

Directive 2006/42/EC (Machinery Directive)

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

The Technical File for Domed Bundle Positioner (DBP-100) and Control Box (CBX-DBP) 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
Adam Markham, Director of Engineering and Technology

07/15/2019
Date



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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.

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 Domed Bundle Positioner (DBP-100) and accessories 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 top of the Autobox Hose Tractor (ABX-3L-V2).
- The Control Box should be located in a safe location where the Operator has good visibility of the operation. The Domed Bundle Positioner (DBP-100) 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 Domed Bundle Positioner (DBP-100) and accessories, lift with care to prevent bodily injury.

HIGH-PRESSURE HOSE

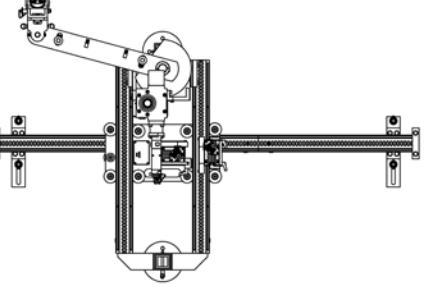
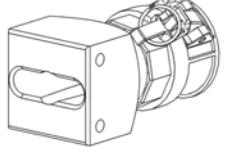
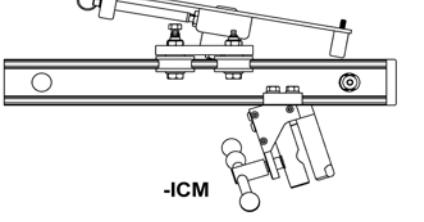
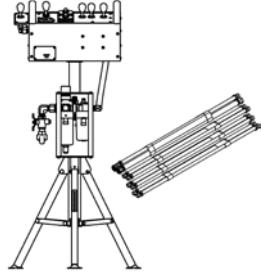
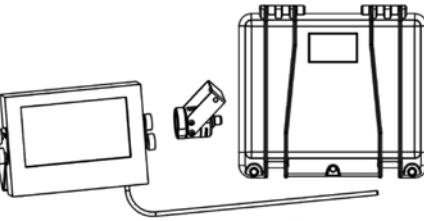
- The AUTOBOX® (ABX-3L-V2) Hose Tractor is designed to be used with Parker Pro-Lance® and/or Spir Star Blast-Pro® hose ends. Standard hose ends may not fit into Hose Tractor and/or Guide Tubes. **NOTE: MAXIMUM hose end diameter must NOT exceed .74 in. (19 mm)**
- Only high quality hoses intended for waterblast applications should be used as high-pressure hoses. Pressure rating of high-pressure hoses **MUST NEVER** be exceeded.
- 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.

PRE-RUN SAFETY CHECK

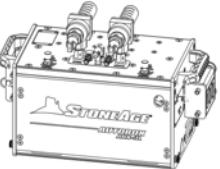
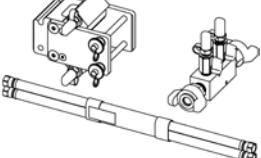
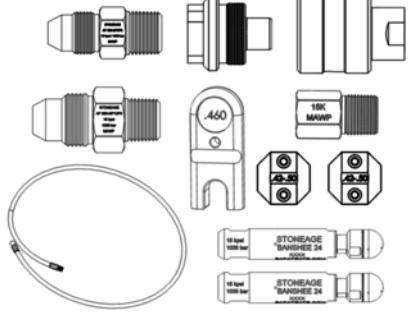
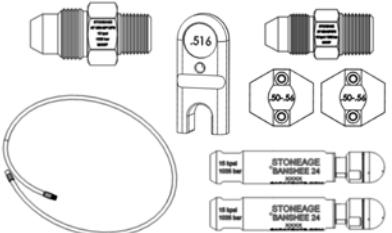
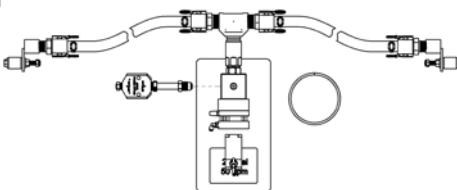
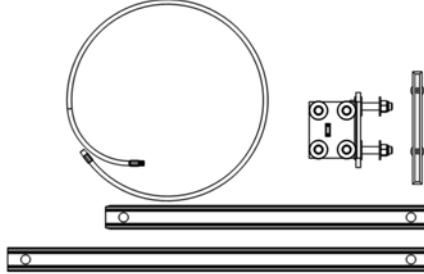
Refer to WJTA-IMCA's, Recommended Practices For The Use Of High-pressure Waterjetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

- 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. See the "Hose" section in this manual for more detail.
- Check all high-pressure threaded connections for tightness.
- ****Ensure that any anti-withdrawal devices (back-out preventers), whip checks (hose whips), and all other applicable safety devices are installed and set-up properly.****
- Ensure the doors of the Autobox Hose Tractor (ABX-3L-V2) are closed and securely latched.
- Test the Control Box before operating the Domed Bundle Positioner (DBP-100) 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 inside the dome and/or hydroblasting zone.

DBP-100-PKG CONTENTS

	QTY.	DESCRIPTION	PART ID
	1	DOMED BUNDLE POSITIONER ASSEMBLY	DBP-100
	1	SNOUT ASSEMBLY	DBP 350
	1	3L SNOUT ADAPTER	HCS 310
	1	BAR MARKER ASSEMBLY, 34"	DBP 215-34
	2	DOMED BUNDLE POSITIONER RAIL MOUNTS	DBP-300-ICM
	1	DOMED BUNDLE POSITIONER CONTROL BOX (CB 371-25, CB 370-25, AND DBP 371-25 HOSE BUNDLES INCLUDED IN CBX-DBP)	CBX-DBP
	1	DOMED BUNDLE POSITIONER CAMERA ASSEMBLY	CAM-DBP

**SEE "PART DIAGRAMS" SECTION AT THE BACK OF THIS MANUAL FOR MORE DETAILED PART BREAK DOWNS.

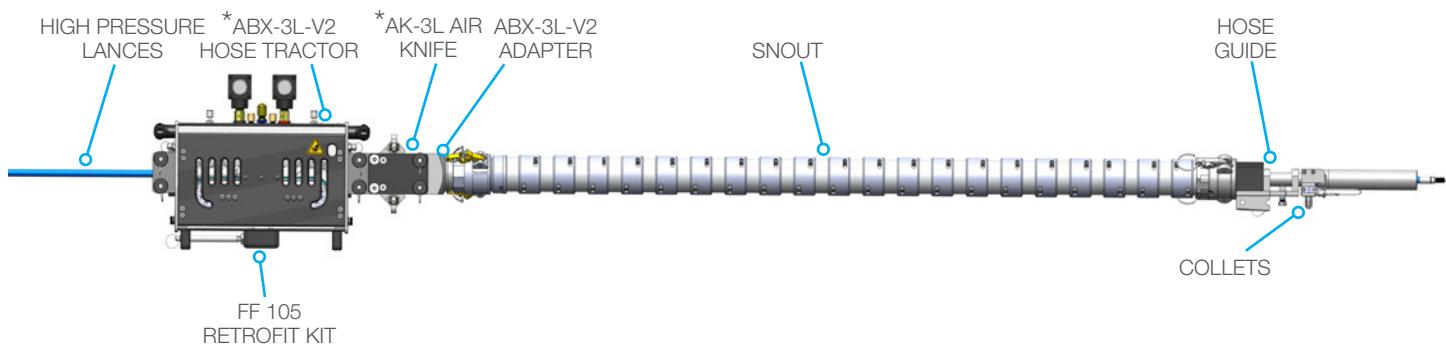
	DESCRIPTION	PART ID
	AUTOBOX, BELT TRACK DRIVE ASSY 3 LANCE	ABX-3L-V2
	AIR KNIFE ASSEMBLY FOR ABX-3L-V2	AK-3L
	<p>15K ICM HOSE HOOK UP KIT INCLUDES:</p> <p>AF 068-MP12P12 ADAPTER 3/4 MP MALE X 3/4 NPT MALE 15K AF 068-MP12P8 ADAPTER 3/4 MP MALE X 1/2 NPT MALE 15K AF 068-MP9P8 ADAPTER 9/16 MP MALE X 1/2 NPT MALE 15K GP 060-P8 SCREW TYPE COUPLING SET, 1/2 NPT GP 051-P4P8 BUSHING, 1/4 NPT FEMALE X 1/2 NPT MALE FF 121-484 HOSE STOP, COLLET STYLE, SINGLE, .484 ACHO H62050F1/4 HOSE, 6/2, 50FT, 1/4NPTM OP X1/4NPTM OP, 15k PSI BN24-P4 BANSHEE TUBE SPINNER, 15k PSI BN24 044-DBP15 HEAD, UNIVERSAL 15k PSI 11GPM HS 121-42-50 HOSE STOP, CLAMP STYLE, .42-.50", 10.7-12.7MM (4/6, 5/4, 6/2, 2640D-025, 2240D-04, 2740D-025)</p>	DBP 615-ICM-K
	<p>20K ICM HOSE HOOK UP KIT INCLUDES:</p> <p>AF 063-MP12 ADAPTER 1-12 TYPE M X MP12 AF 060-MP9 ADAPTER 9/16-18 TYPE M X 9/16 MP FF 121-516 HOSE STOP, COLLET STYLE, SINGLE, .516 ACHO H64050FTM6NZRM HOSE, 6/4, 50FT, 9/16TM X 3/8 RM BP, 21.7k PSI BN24-MP6L BANSHEE TUBE SPINNER, 20k PSI BN24 044-DBP20 HEAD, UNIVERSAL 20k PSI 11GPM HS 121-50-56 HOSE STOP, CLAMP STYLE, .50-.56", 12.7-14.2MM (4/6, 5/4, 6/2, 2640D-025, 2240D-04, 2740D-025)</p>	DBP 620-ICM-K
	<p>DUMP VALVE ASSEMBLY KIT INCLUDES:</p> <p>ABX 369-MP12 Y MANIFOLD ACDA 610200342-K DUMP VALVE 20K, 50GPM AF 070-MP9 GLAND AF 070-MP12 GLAND AF 071-MP12 COLLAR AF 076-MP9 PLUG DBP 360 DUMP LINE ASSY DBP 364 FTG, CAM LOCK FEMALE HB16 DBP 365 FTG, CAM LOCK MALE P20M HB16 DBP 366 FTG, CAM LOCK MALE P16M HB16 DBP 370 RAILING CLAMP, 1.5 PIPE FC 311.1 DUMP HOSE FOF DBP, 25FT FC 311.2 HOSE CLAMP GN 850-HJ HEX JAM NUT GSF 550-065 FHCS .50-13 X 1.62 BK SA 577-MP12LMP12L-6 NIPPLE</p>	DBP 613-K
	<p>15K AND 20K - CONVERT FROM ICM TO DELTA T KIT INCLUDES:</p> <p>DBP 330 DELTA T TROLLEY CLAMP ASSEMBLY DBP 215-12 BAR MARKER ASSEMBLY, 12IN DBP 102-34.5-001 2.5 BOX RAIL EXTRUSION, SLOTTED, 34.5IN BU 002-3.75-001 RAIL, 3.75FT, 2.5IN SLOTTED W/ROUND HOLES</p> <p>**ACHO H64070FTM6NZRM HOSE, 6/4, 70FT, 9/16TM X 3/8 RM BP, 21.7k PSI (DBP 620-DT-K ONLY)</p> <p>**ACHO H62070F1/4 HOSE, 6/2, 70FT, 1/4NPTM OP X1/4NPTM OP, 15k PSI (DBP 615-DT-K ONLY)</p>	(20K) DBP 620-DT-K (15K) DBP 615-DT-K

AUTOBOX ABX-3L-V2 AND SNOOT SUB-ASSEMBLY

THE AUTOBOX HOSE TRACTOR AND SNOOT SUB-ASSEMBLY

This sub-assembly will be set aside and installed later into the main assembly. It will not need to be disassembled to be set up in another location. The following steps will detail how to assemble the parts shown below.

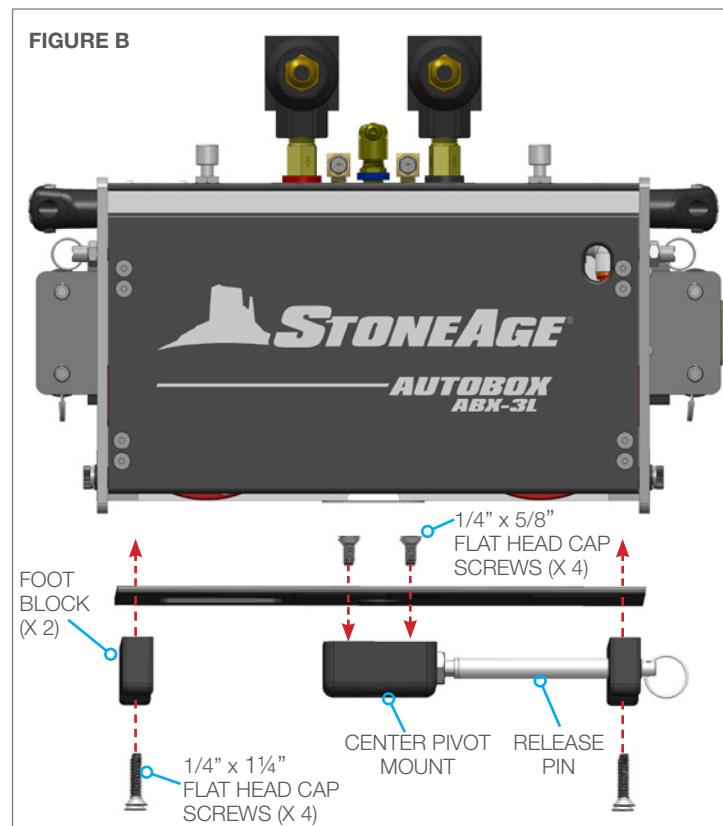
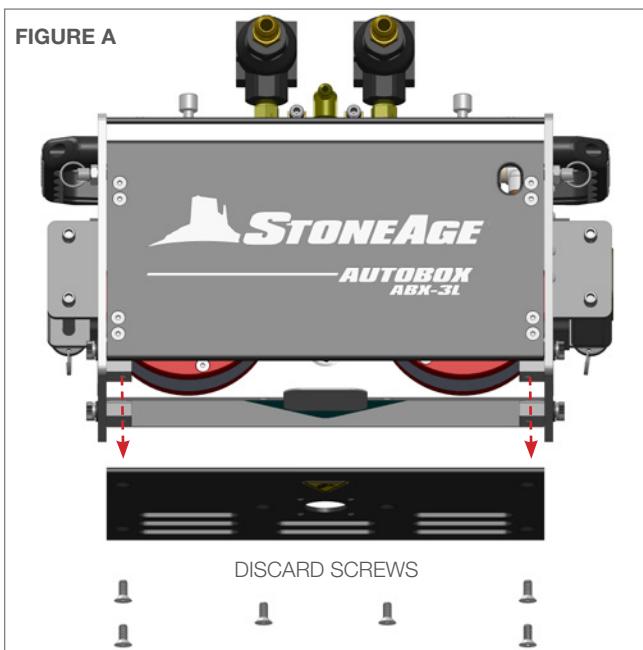
*Items are optional and are not included in base Domed Bundle Positioner Package.



AUTOBOX® FF 105 RETROFIT KITS INSTALLATION

THIS RETROFIT KIT IS PART WITHIN THE DBP-300-XX RAIL MOUNT ASSEMBLIES AND NEEDS TO BE INSTALLED ON THE ABX-3L-V2 FIRST. IT ALLOWS THE ABX-3L-V2 TO BE MOUNTED ON THE PIVOT ON THE RAIL MOUNT. IF IT HAS ALREADY BEEN INSTALLED, SKIP TO THE NEXT PAGE.

- A. Remove the bottom plate and discard all the flat head cap screws. (**Figure A**)
- B. Fasten the Center Pivot Mount to the Bottom Plate with four 1/4" x 5/8" flat head cap screws.
Orient the Release Pin as shown. (**Figure B**)
- C. Fasten the Foot Blocks and Bottom Plate to the ABX-3L-V2 with the 1/4" x 1 1/4" flat head cap screws provided in the kit. (**Figure B**)



AUTOBOX ABX-3L-V2 AND SNOUT SUB-ASSEMBLY

LOADING LANCES INTO THE AUTOBOX HOSE TRACTOR

NOTICE

It is very important to avoid any crossing or twisting of the lances throughout the Tractor, Air knife, Snout Adapter, Snout, and Guide Assemblies. Failure to do so will result in insufficient feeding of the lances and will require the system to be broken down and reassembled.

1. Load lances into positions 1 and 3 at the Rear of the Tractor, leaving the middle port empty. Push through the Tractor until enough has been fed to load the Air Knife and Snout Adapters. (**Figure 1**)

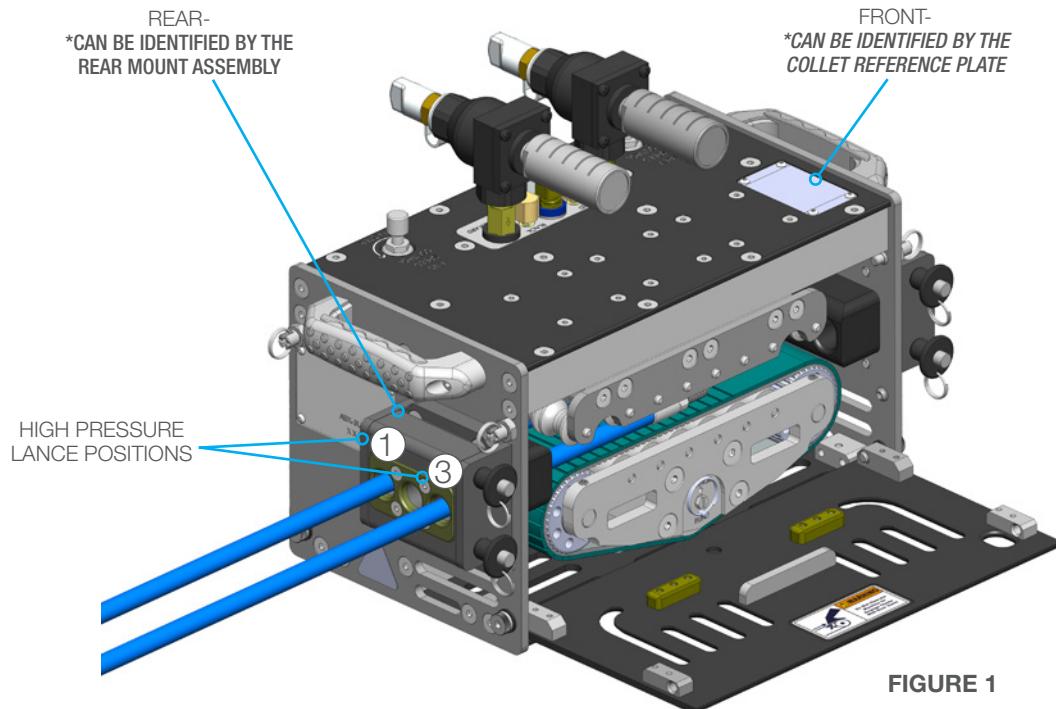


FIGURE 1

AIR KNIFE AND SNOUT ADAPTER INSTALLATION

2. If using the Air Knife accessory; Remove the Quick Release Pins on the Air Knife and insert the plastic end of the Snout Adapter, aligning the holes with the holes on the Air Knife. Insert the Quick Release Pins through both parts and lock into place. This sub-assembly can remain together. (**Figure 2**)
3. If NOT using the Air Knife accessory; insert the plastic end of the Snout Adapter into the Mounting Bracket on the ABX-3L-V2, align the holes and insert the Quick Release Pins through both parts and lock into place. (**Figure 2.1**)

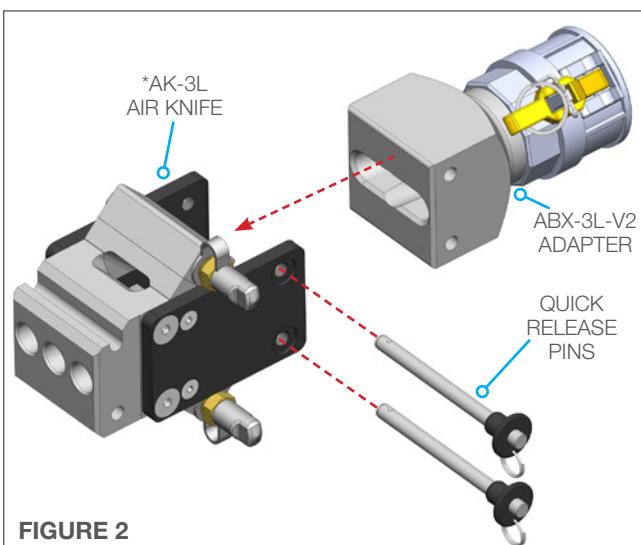


FIGURE 2

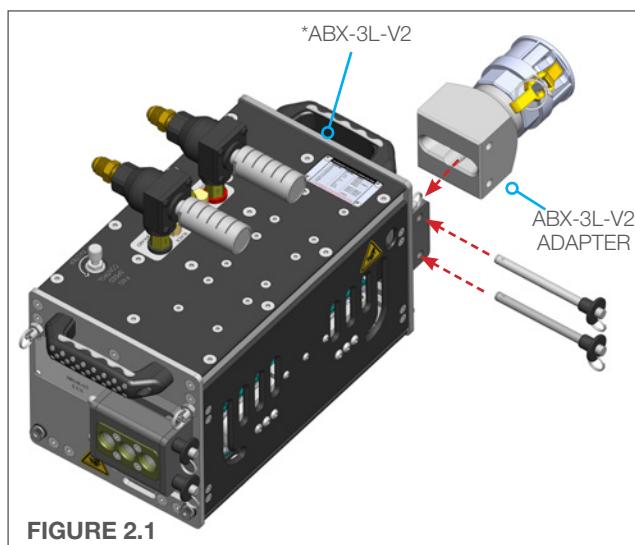


FIGURE 2.1

AUTOBOX ABX-3L-V2 AND SNOUT SUB-ASSEMBLY

4. Keeping both lances in positions 1 and 3, push them through the Air Knife and Snout Adapter, leaving about 24" extended out of the end of the Snout Adapter.
5. Insert the Air Knife into the Mounting Bracket on the ABX-3L-V2 Tractor.
6. Insert both Quick Release Pins through the Air Knife and Mounting Bracket until they lock in place.

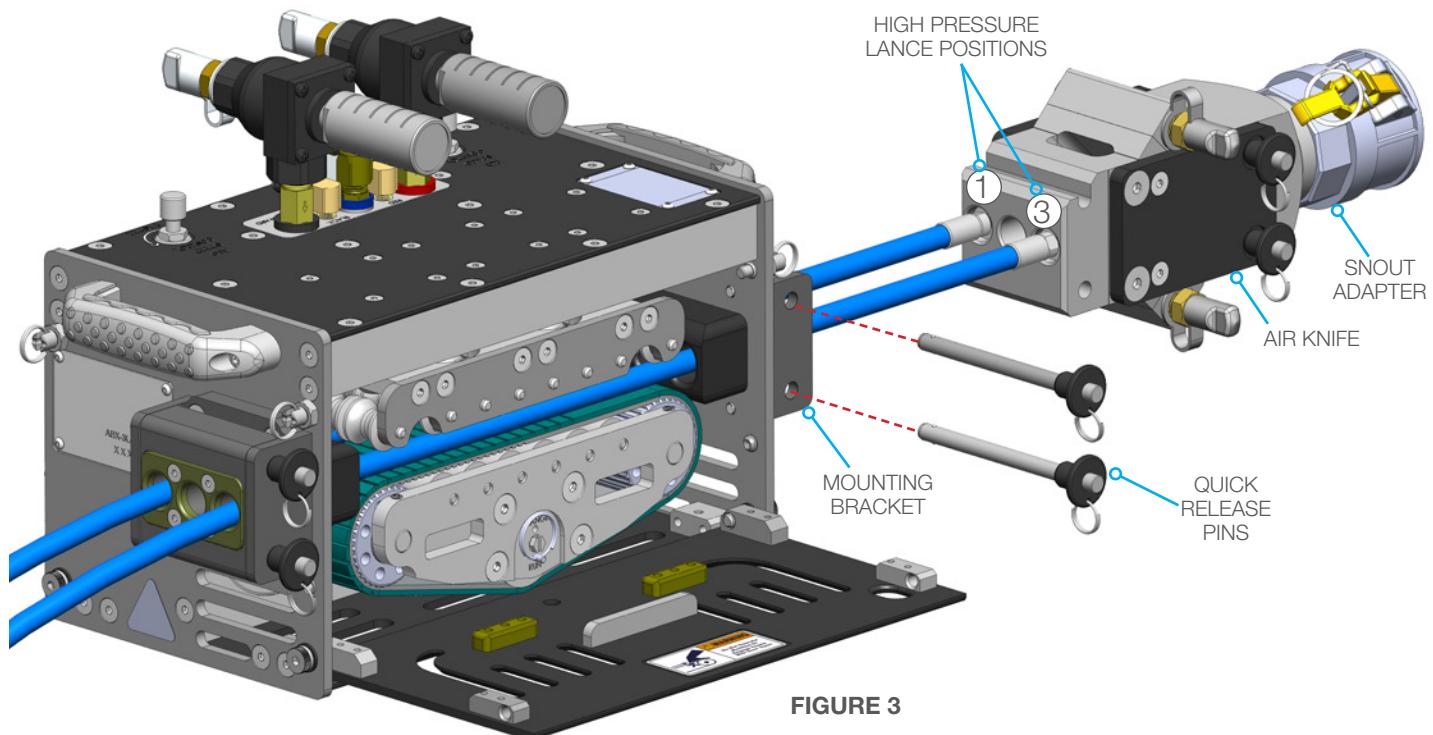


FIGURE 3

LOADING LANCES INTO THE SNOUT

Remember it is important to keep the lances from twisting inside the Snout. The following steps are designed to prevent this from happening.

7. Tape both hoses together at the end and approximately 12 inches (305mm) up. (**Figure 4**)
8. Using a permanent marker, mark one of the Male Hose Ends. Write the position number or color one to identify if the lances come out the Snout in the same position.

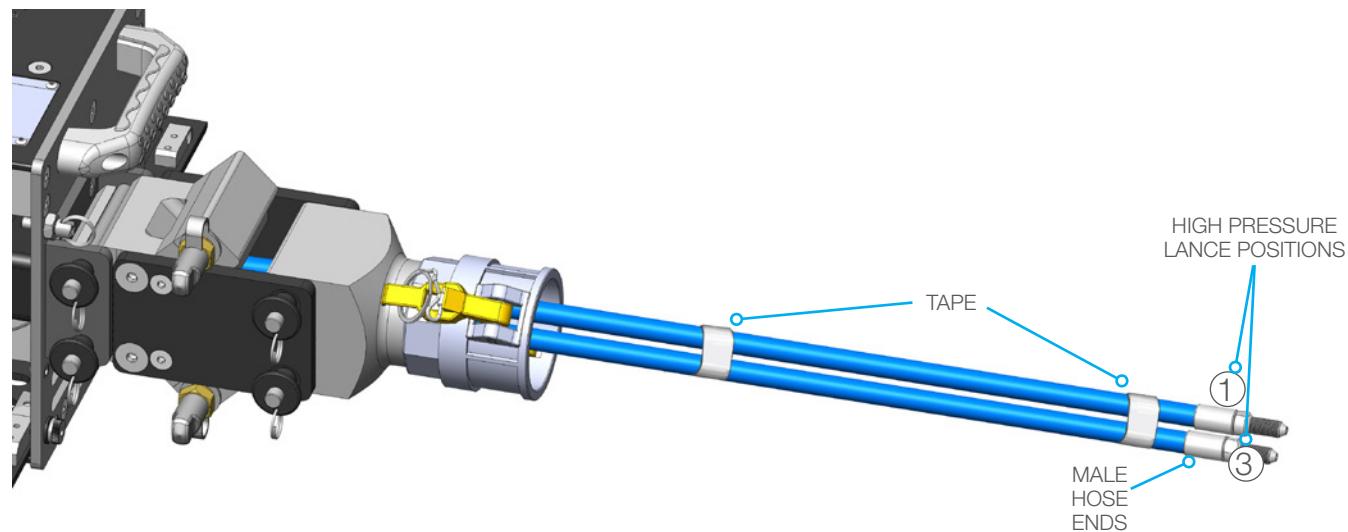


FIGURE 4

AUTOBOX ABX-3L-V2 AND SNOUT SUB-ASSEMBLY



TECH TIP: It is helpful to have two people at this point. One to feed the lances into the Snout and one to hold the Snout straight.

- Feed the lances all the way through the Snout and lock the Male Camlock end of the Snout into the Female End of the Adapter. If the marked lance comes out in a different position, pull the lances out of the Snout, untwist, and reload them. (**Figure 5**)

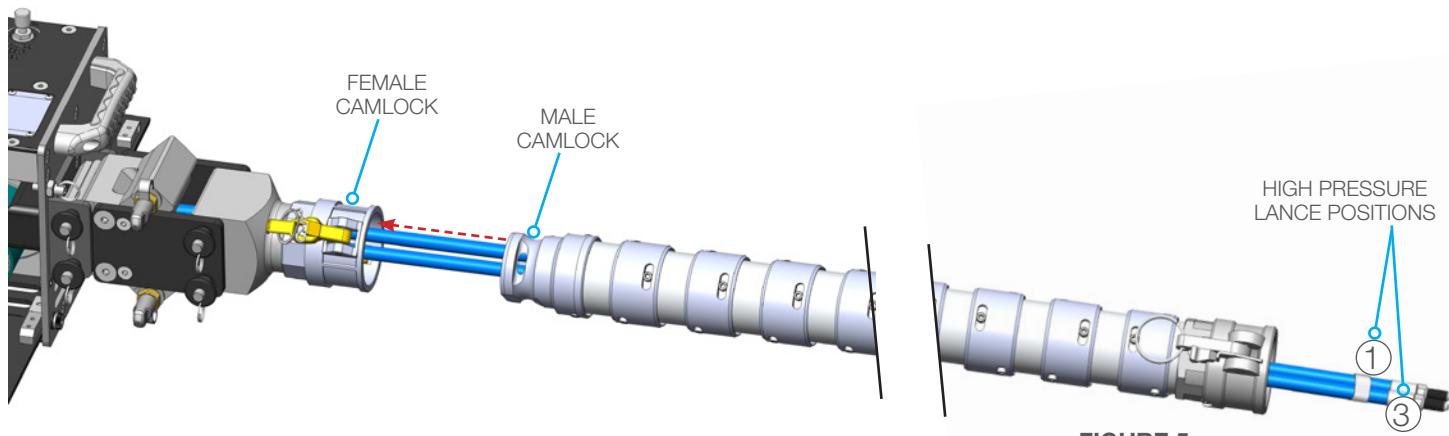


FIGURE 5

LOADING LANCES INTO THE HOSE GUIDE ASSEMBLY

- Take the temporary tape off of the lances.
- Remove the Collets from the Hose Guide by pulling out the Release Pins. (**Figure 6**)
- Push the lances through the Hose Guide, leaving enough slack to attach the Banshee tools. (**Figure 6**)
- When the hose ends are visible, insert the Collets and secure with the Release Pins. (**Figure 6**)

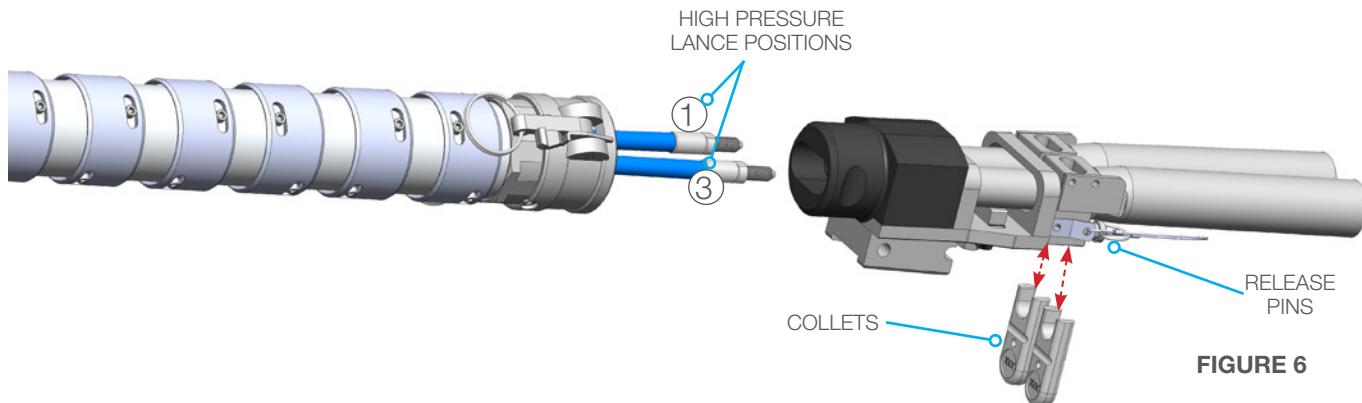


FIGURE 6

NOTICE

The Hose Guide should be oriented as shown in order for it to be properly installed on the Domed Bundle Positioner. The Collets will appear to be upside down in relation to the floor.

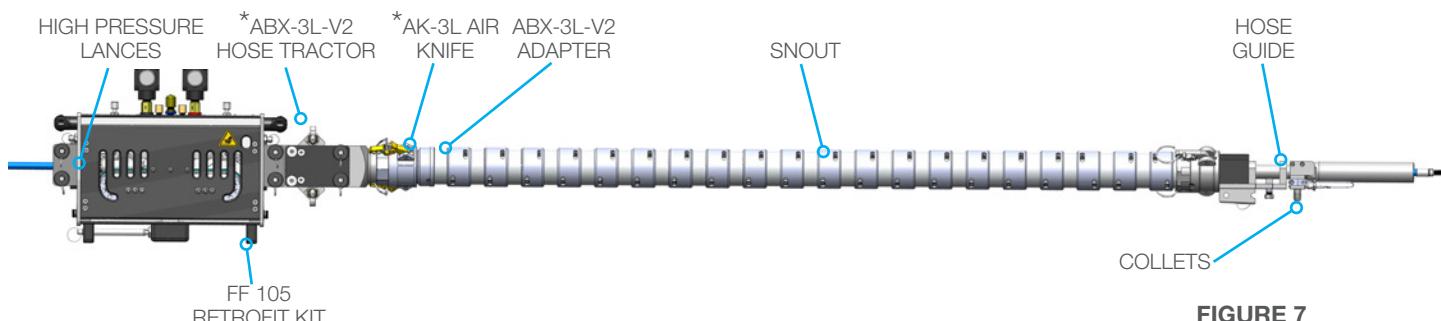


FIGURE 7

AUTOBOX ABX-3L-V2 AND SNOUT SUB-ASSEMBLY

INSTALL BANSHEE TOOLS

14. Flush lances with water or compressed air to remove any debris prior to installing Banshee tools.
15. Install Banshee tools onto the male ends of the lances using the appropriate wrenches. *See the included Banshee User Manual for a list of wrench sizes.

NOTICE

DO NOT USE A PIPE WRENCH OR PLIERS WITH TEETH

This can crush and crack the hardened steel body, leading to tool breakage during operation.

All BANSHEE tools require the use of a correctly sized open-end wrench to fit the flats provided on the inlet nut. The wrench flats should always be used when attaching the tool to the lance. See the Banshee User Manual for proper wrench sizing.

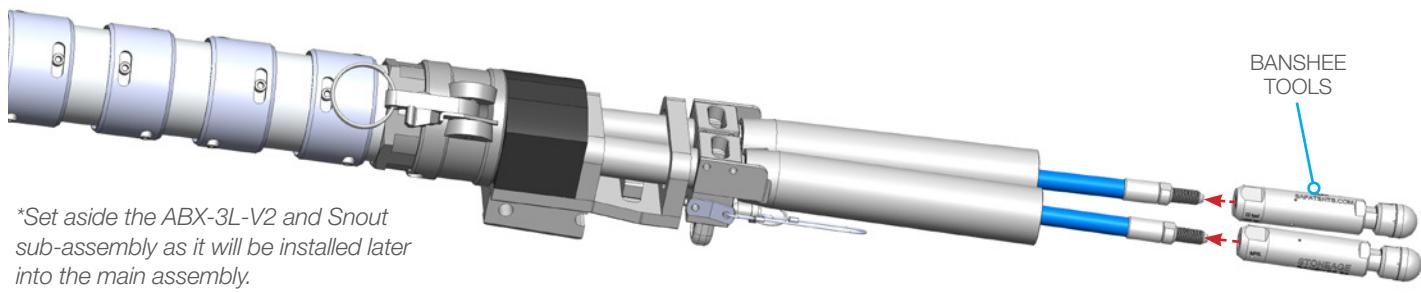


FIGURE 8

X RAIL AND CARRIAGE SUB-ASSEMBLY

THE X RAIL SUB-ASSEMBLY

This sub-assembly will be set aside and installed later into the main assembly. It will not need to be disassembled to be set up in another location. The lengths of the Long and Short Rails are determined by the diameter of the tube bundle face. See the “Tube Face Installation Dimensions” section of this manual for appropriate rail sizing. This chapter will detail how to assemble the X-Rail sub-assembly shown below.

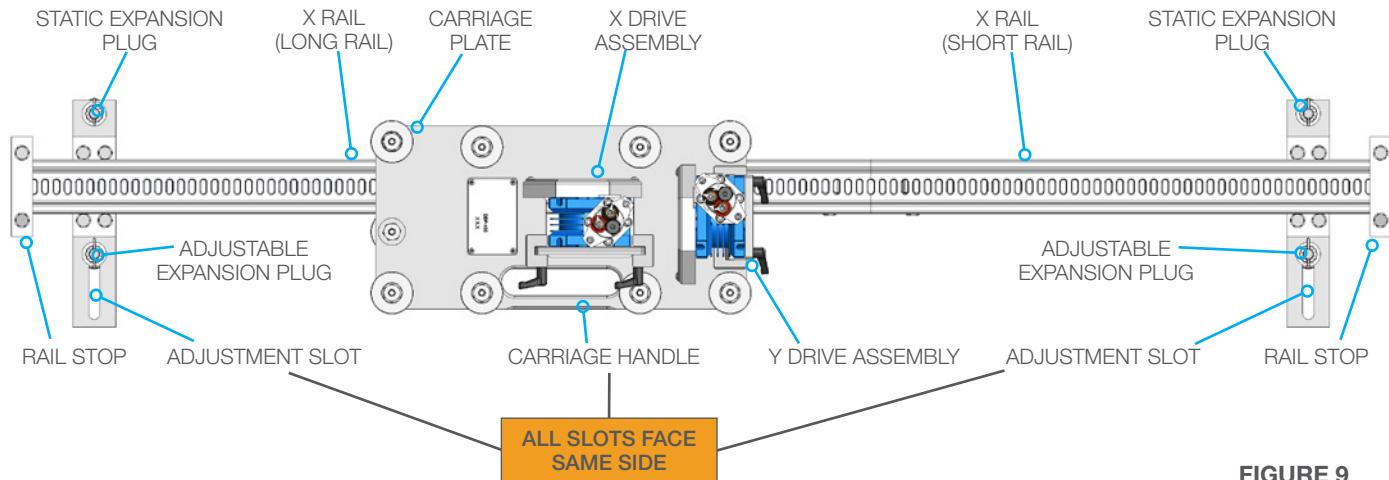


FIGURE 9

INSTALLING THE CARRIAGE ONTO X RAIL

NOTICE

It is very important to position the Carriage Handle on the same side of the rail as the Adjustment Slots.

1. Rotate the Adjustable Drive Handles counter-clockwise to disengage the X Drive Assembly on the Carriage. This allows the Carriage to freewheel onto the X Rail. (**Figures 10 & 10.1**)

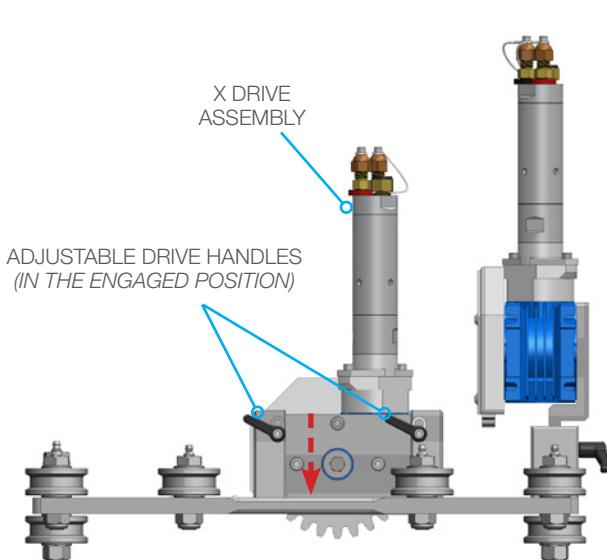


FIGURE 10

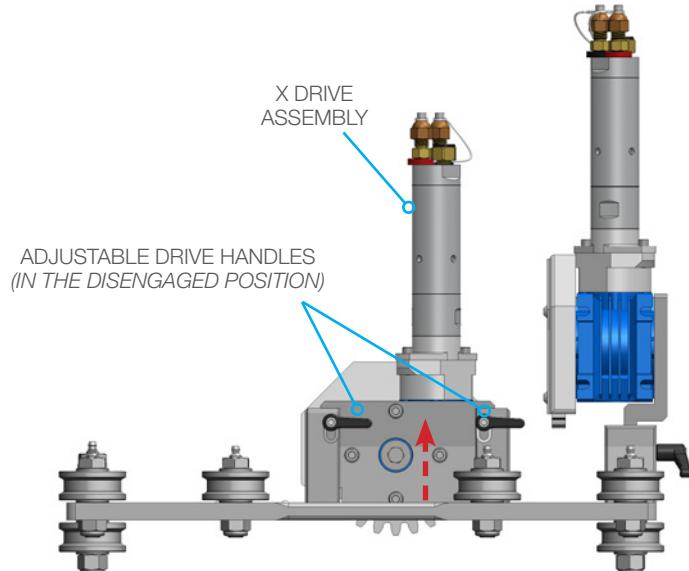


FIGURE 10.1

X RAIL AND CARRIAGE SUB-ASSEMBLY

2. Slide the Carriage onto the Rail, making sure that the Carriage Handle is aligned with the Adjustment Slot on the Rail Clamp. (**Figure 11**)
3. Once the Carriage is on the Rail, release the X Drive Assembly so the gear is engaged with the Slotted Rail.

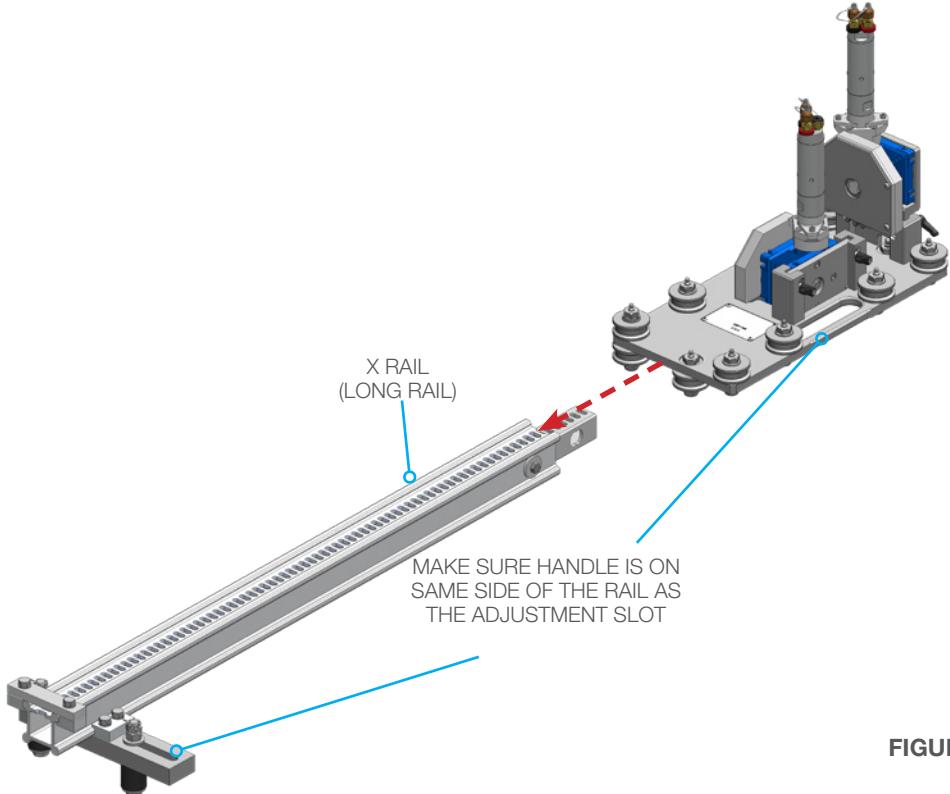


FIGURE 11

4. Using a 1/2" open end or ratchet style wrench, loosen the Wedge Bolt that runs through the Slotted Rail and Splice Tube. (**Figure 12**)
5. Slip the other Slotted Rail over the Splice Tube as shown below.
6. Insert the other Wedge Bolt through the Slotted Rail and Splice Tube and tighten both Wedge Bolts.

*Set aside the X Rail sub-assembly as it will be installed later into the main assembly.

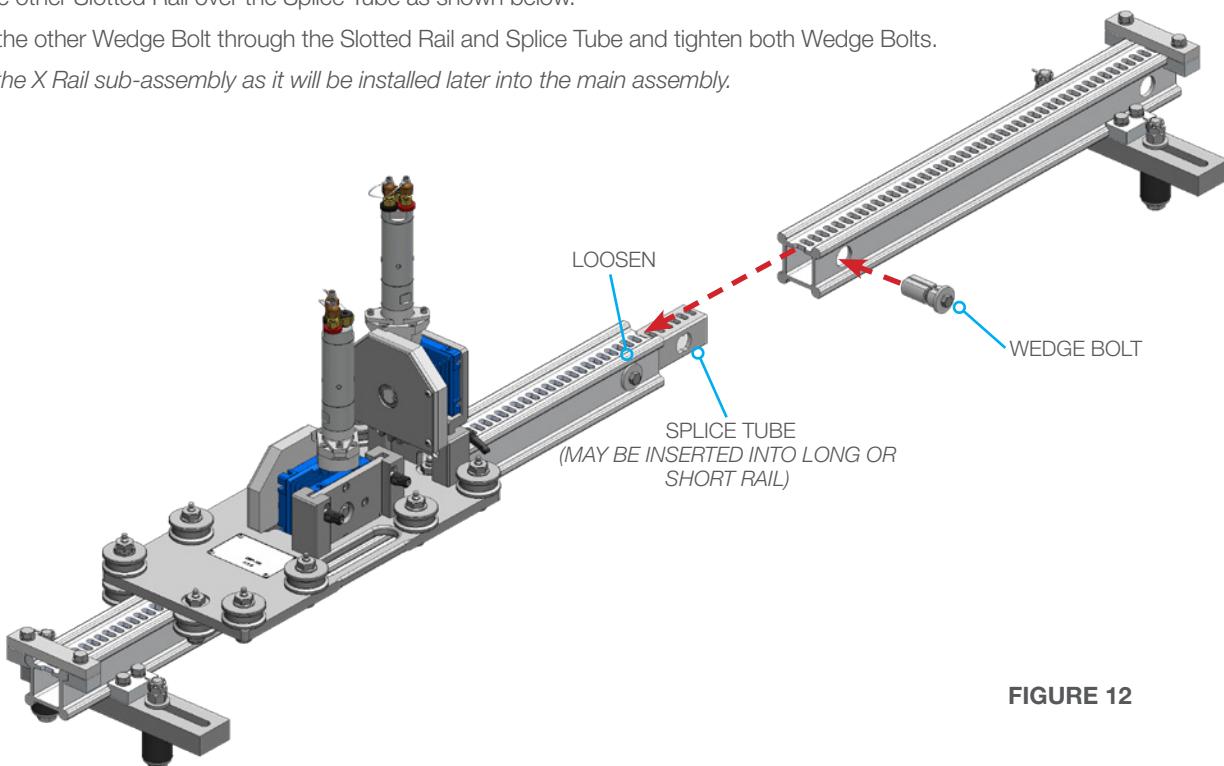


FIGURE 12

CONTROL BOX

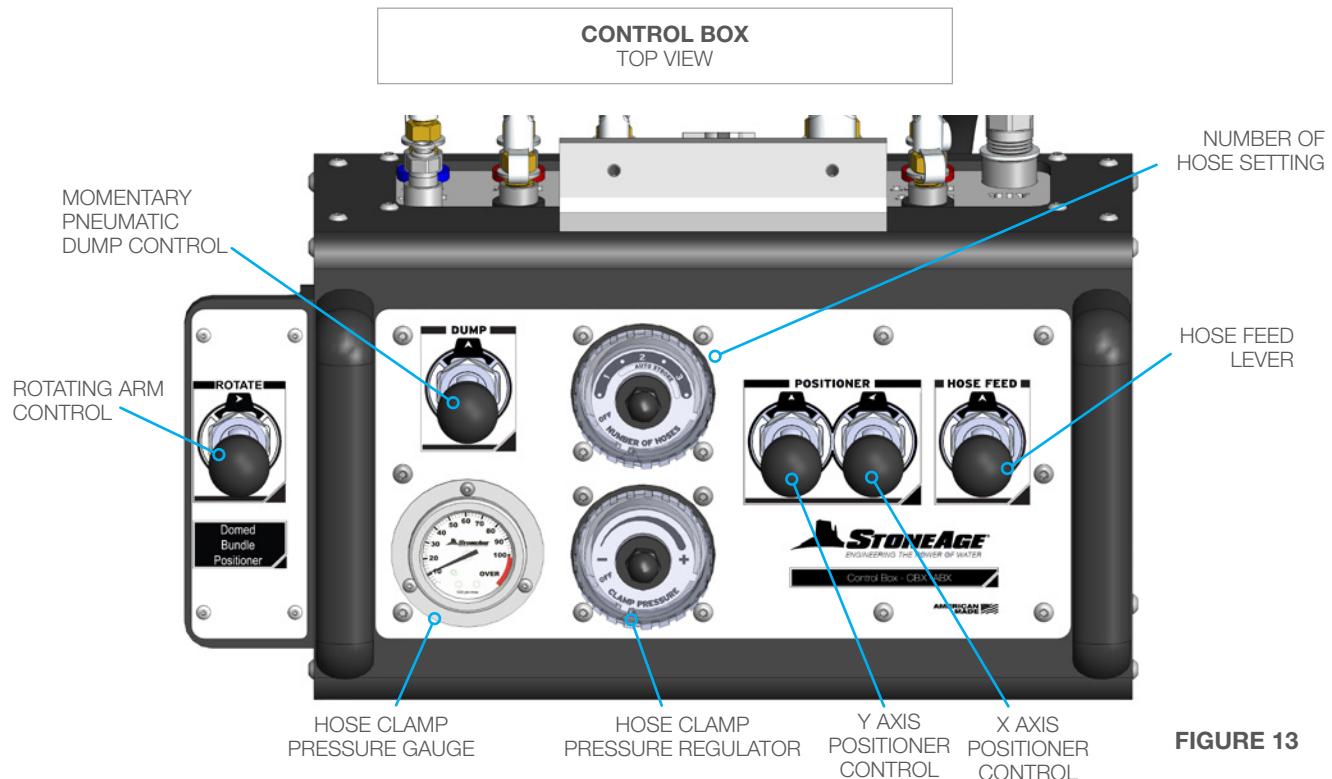


FIGURE 13

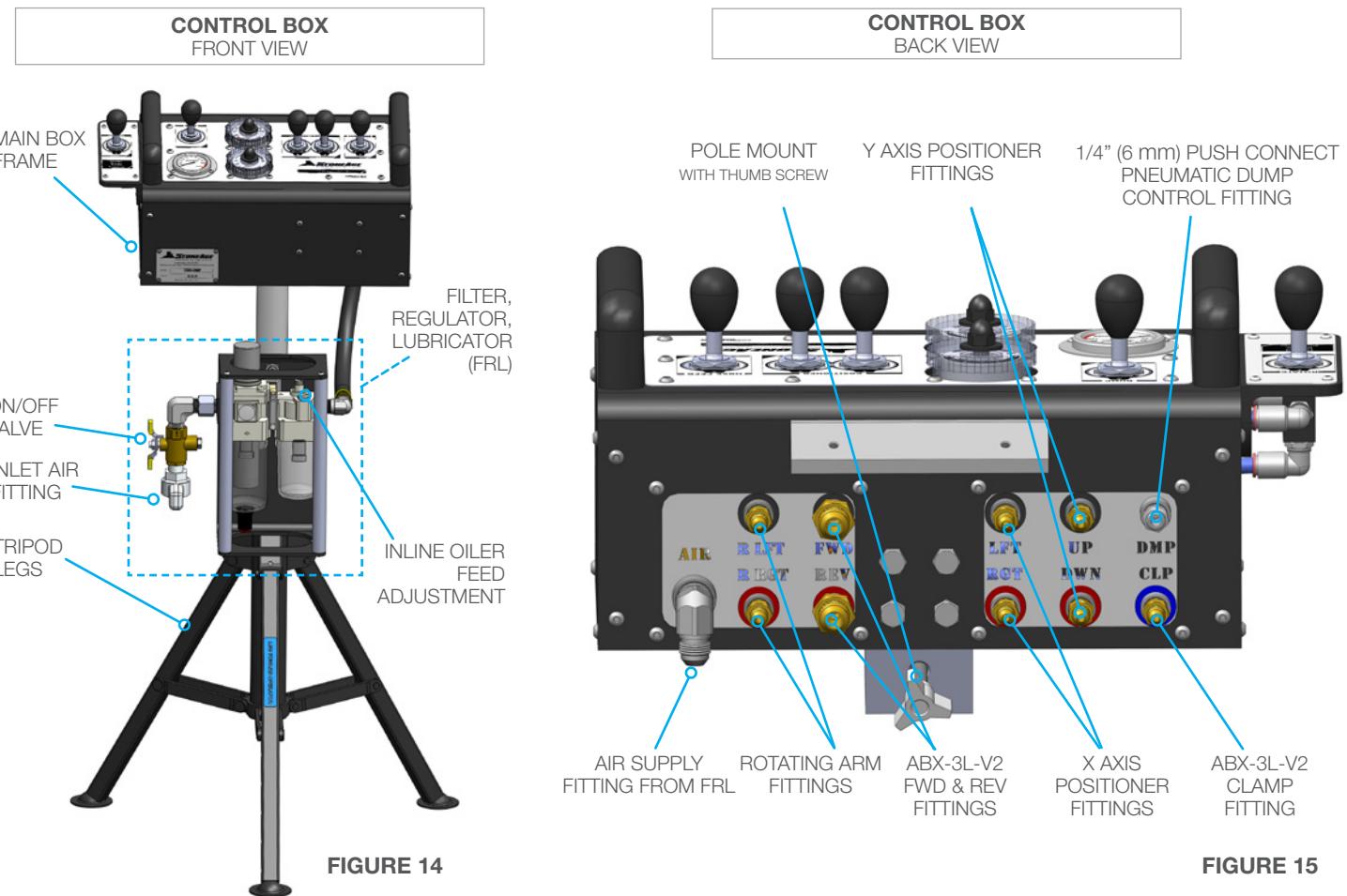


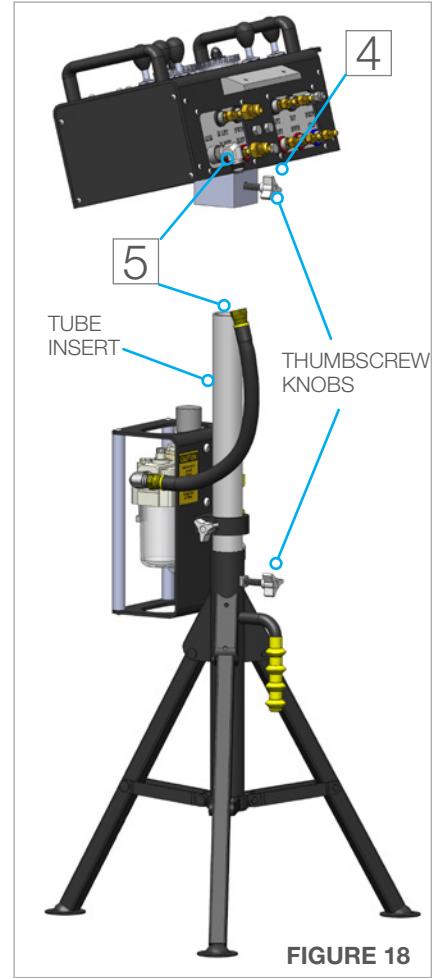
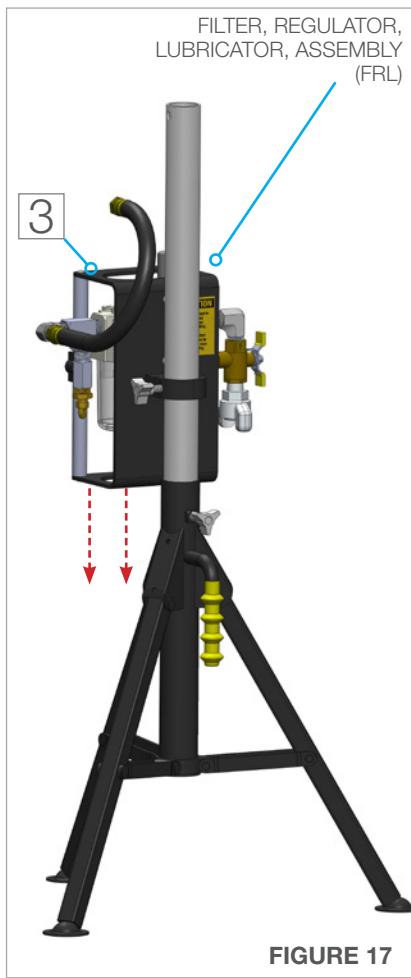
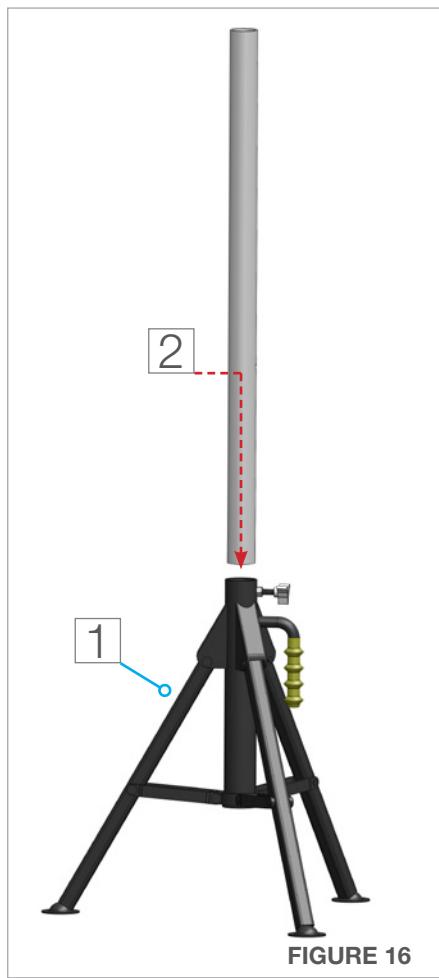
FIGURE 14

FIGURE 15

CONTROL BOX

ASSEMBLE CONTROL BOX, FRL, AND TRIPOD BASE SET-UP

1. Setup the tripod base at a safe distance away from high pressure nozzle waterblast zone.
2. Slide the vertical tube into the tripod base. Secure with the supplied thumbscrew knob.
3. Slide the Filter, Regulator, Lubricator (FRL) assembly over the vertical tube down to the tripod base. Secure with the supplied thumbscrew knob.
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.
2. Using the regulator to adjust the operating air pressure to 100 psi (0.7 MPa) for the application.

WARNING

Maximum operating air pressure is 100 psi (0.7 MPa). Never exceed 125 psi (0.86 MPa) supply pressure. Exceeding 125 psi (0.86 MPa) supply pressure may result in injury to the Operator and/or damage to the equipment.

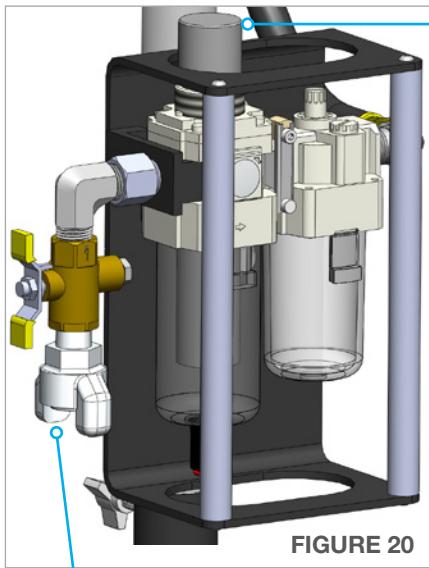


FIGURE 20

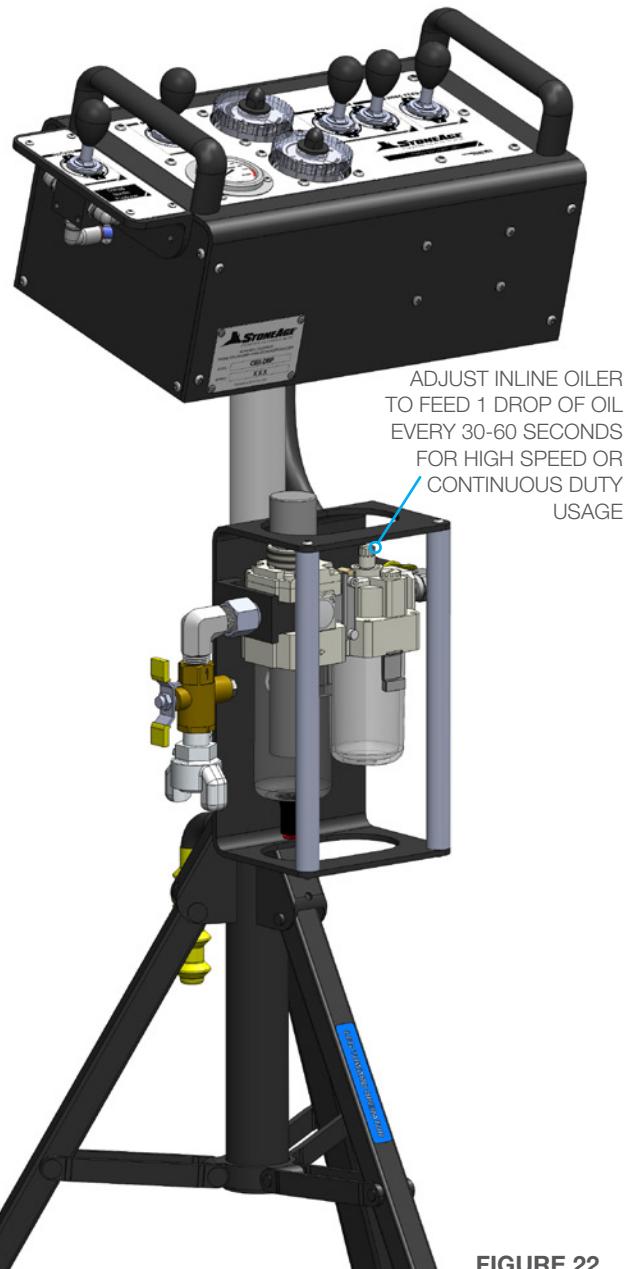
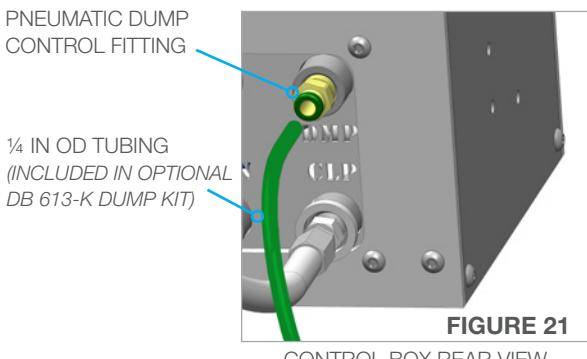


FIGURE 22

PNEUMATIC DUMP CONTROL FITTING AND LINE

A **MOMENTARY PNEUMATIC DUMP CONTROL** is located on the Control 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. O.D. tubing between the **PNEUMATIC DUMP CONTROL FITTING** and the pneumatic dump valve.



CONTROL BOX REAR VIEW

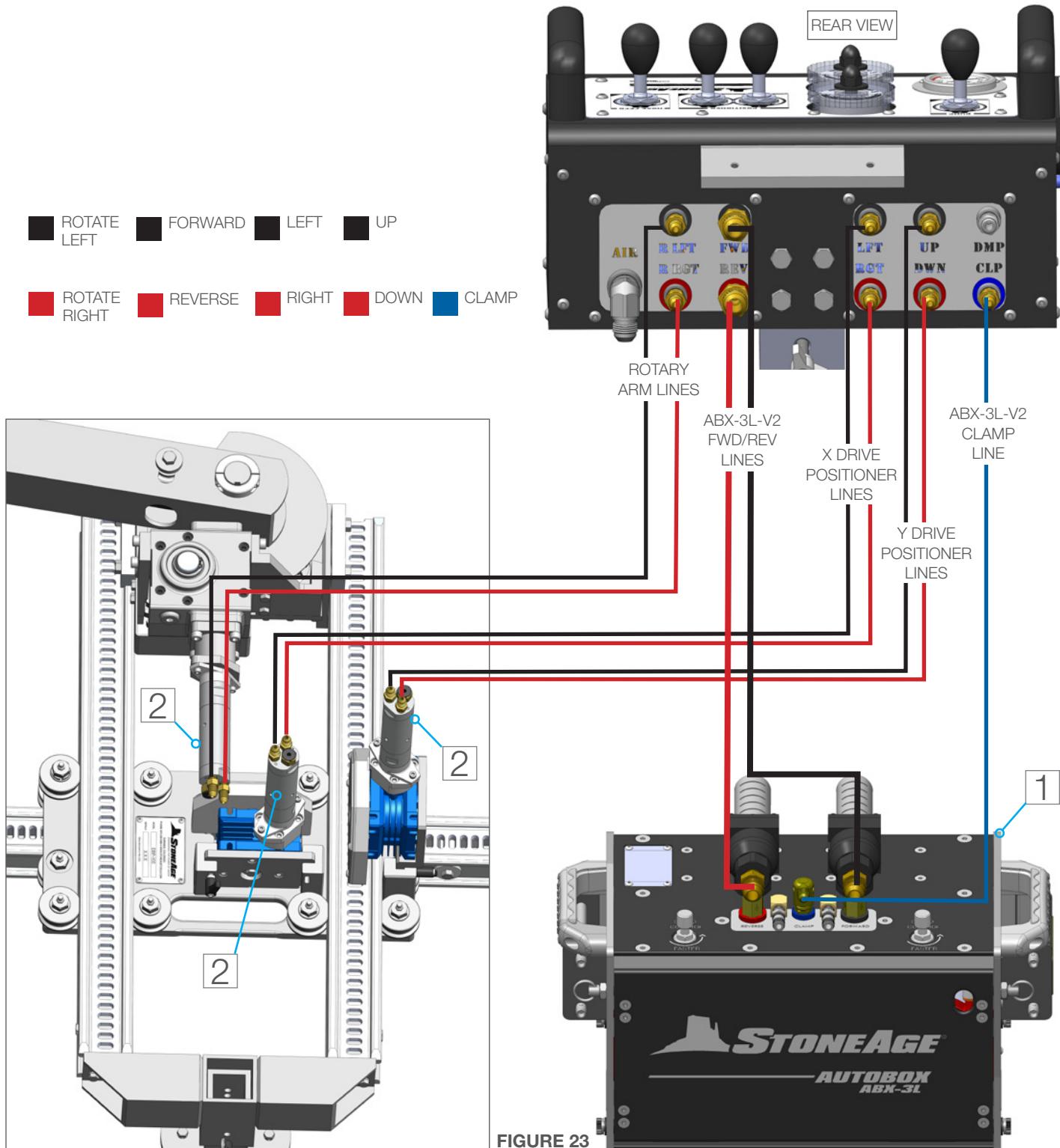
CONTROL BOX

PNEUMATIC SUPPLY LINE CONNECTION DIAGRAM

This Diagram is for reference to ensure all connections are correct.

At this stage in the assembly, connect all lines to the back of the Control Box ONLY.

1. The hose bundle for the AUTOBOX® (ABX-3L-V2) has two 1/2 in. lines and one 1/4 in. line. The 1/2 in. lines are Black for FWD and Red for REV. The 1/4 in. line is Red and connects to the Blue CLP fitting.
2. There are three paired 1/4 in. line hose bundles for Domed Bundle Positioner. Follow the Black and Red color coding to connect them to the Control Box only. These control the X Positioner, Y Positioner, and Rotary Arm.



PNEUMATIC SUPPLY LINES FOR OPTIONAL AIR KNIFE CONNECTION

Clean and dry air is required for the Air Knife accessory to perform properly. If clean and dry air is not available, StoneAge recommends installing an inline air filter before the Air Knife air supply lines. Please see the Air Knife Accessory User Manual for more detailed information.

1. Twist the Chicago Air Fitting on the AK 140 Manifold Assembly onto the Chicago Air Fitting on the Control Box. (**Figure 24**)
2. Using a small adjustable end wrench, fasten the two 3/8" air supply lines to the AK 140 Manifold Assembly. The color coding does not apply to the Air Knife accessory and the supply lines may be installed in any order. (**Figure 25**)
3. The manifold assembly has two quarter turn ball valves that control air supply to the upper and lower air knife components. Turn both Ball Valves to the ON position. Ball valves are in the ON position when they are parallel to the hoses. (**Figure 26**)

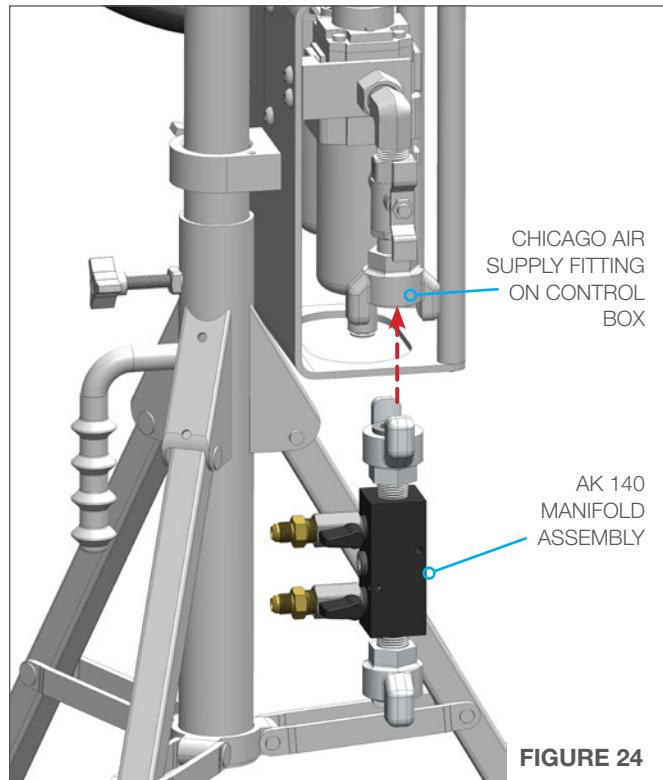


FIGURE 24

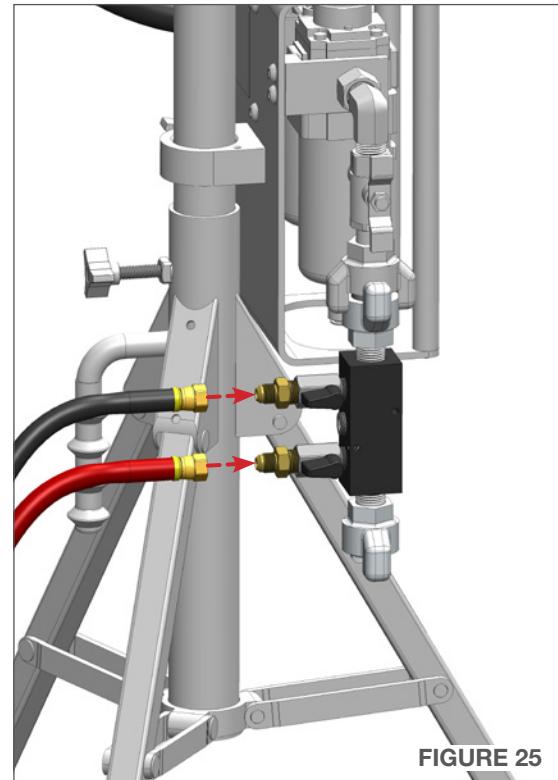


FIGURE 25

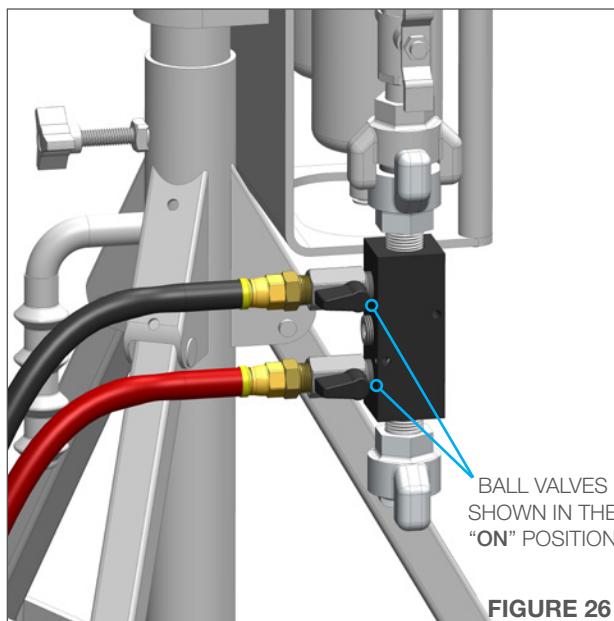


FIGURE 26

CONTROL BOX

CONNECT THE CAMERA SYSTEM

1. The Power Pack may be hung from the side of the Control Box or placed on the ground. (**Figure 27**)
2. The Monitor Assembly has bolts that slip into the holes on the Monitor Mount. (**Figure 27.1**)

FIGURE 27

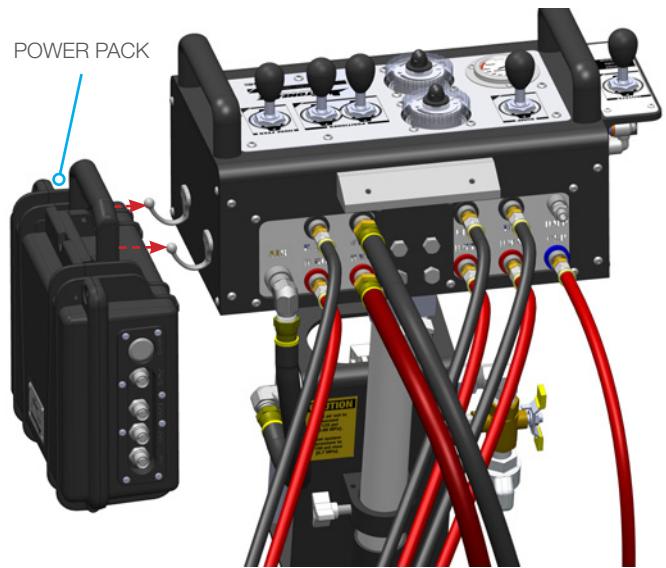
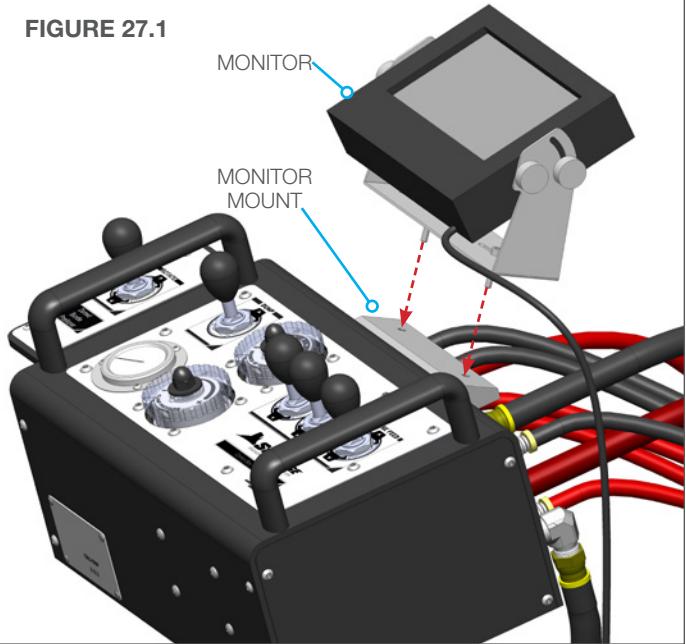


FIGURE 27.1



3. Connect the plug coming from the Monitor to the port labeled "**OUTPUT**" on the side of the Battery Box. (**Figure 27.2**)
4. Connect the plug coming from the Camera to either port labeled "**INPUT 1**" or "**INPUT 2**" on the side of the battery box. (**Figure 27.2**)
5. Plug the US or EU power cable connector into the opposite side of the Power Pack and the other end into the appropriate outlet. (**Figure 27.3**)
6. Press the ON/OFF button to power the unit on. (**Figure 27.2**)

FIGURE 27.2

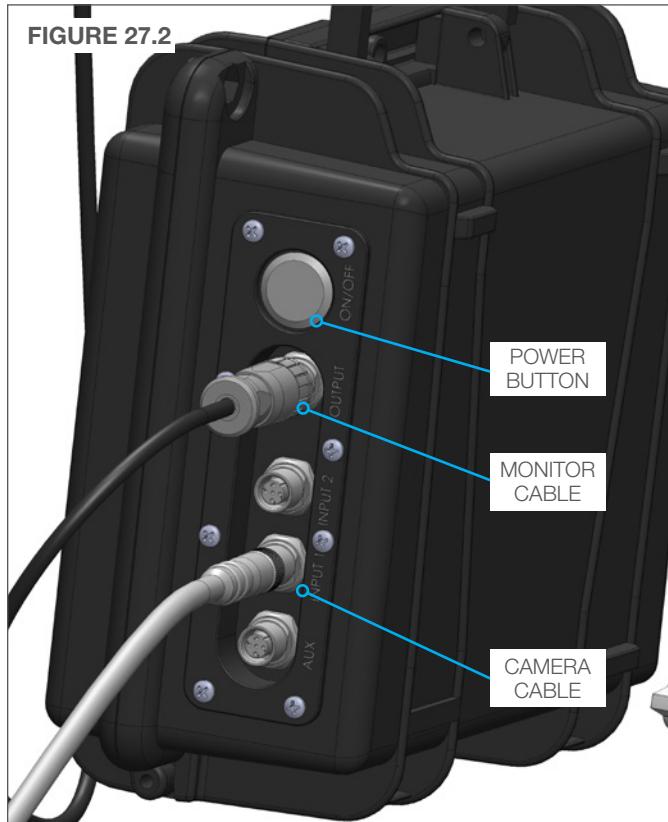
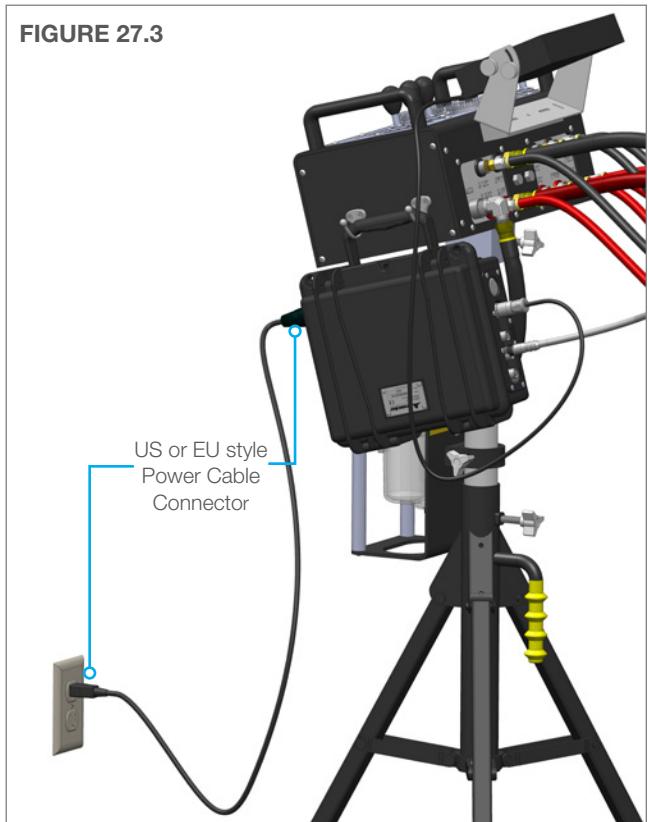
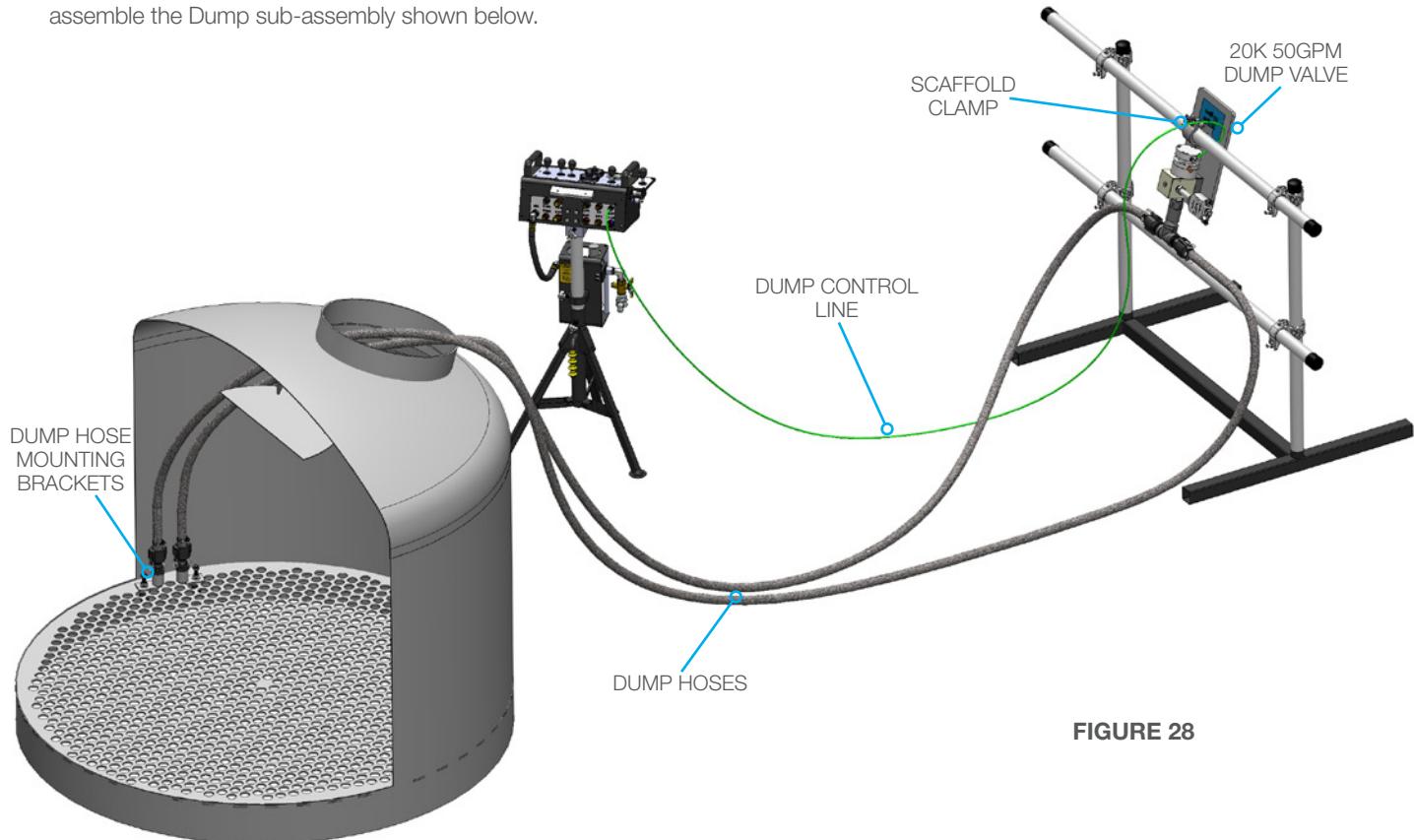


FIGURE 27.3

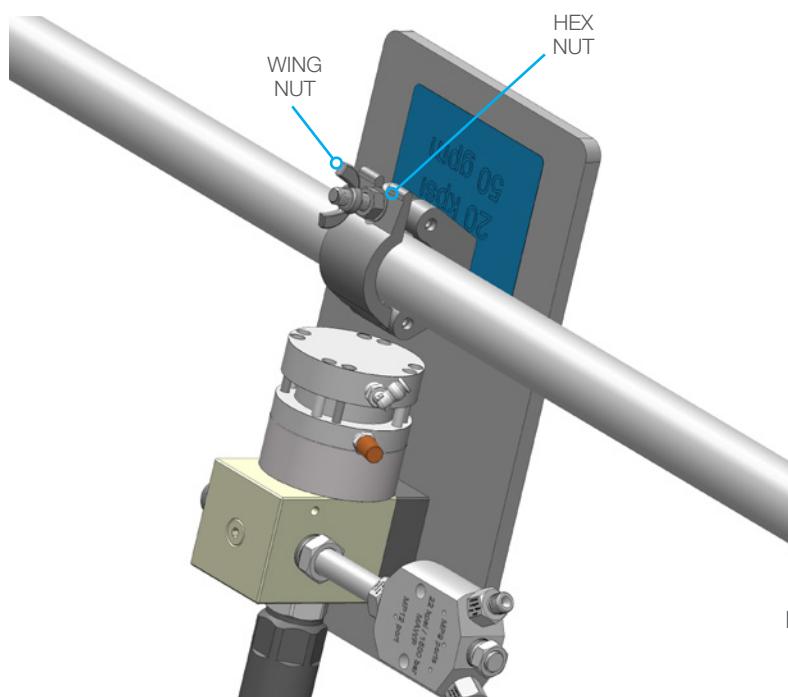


THE DUMP SUB-ASSEMBLY

This sub-assembly should be set up on the scaffold first then the hoses will be fed into the dome last. This chapter will detail how to assemble the Dump sub-assembly shown below.

**FIGURE 28****INSTALLING THE DUMP ONTO SCAFFOLD**

1. Install the Dump in the middle of a rail on the Scaffolding or on the best access point. Tighten the hex nut first with an open end wrench, then tighten the wing nut by hand. (**Figure 29**)

**FIGURE 29**

DUMP SUB-ASSEMBLY

2. Connect the Dump Control Line to the Press Lock Fitting on the Dump. (**Figure 30**)

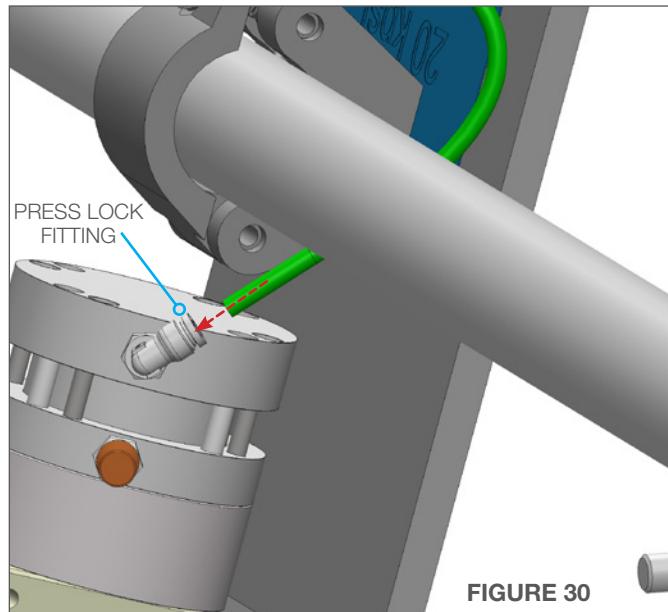


FIGURE 30

3. Connect the other end of the Dump Control Line to the Press Lock Fitting on the back of the Control Box. (**Figure 30.1**)

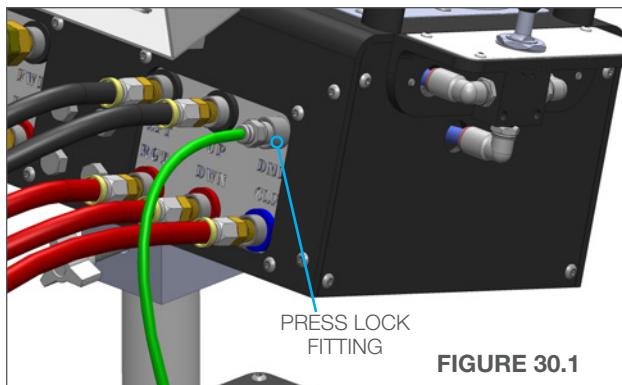


FIGURE 30.1

4. Connect the Female Camlocks on the Dump Hoses to the Male Camlocks on the Dump Valve. (**Figure 31**)

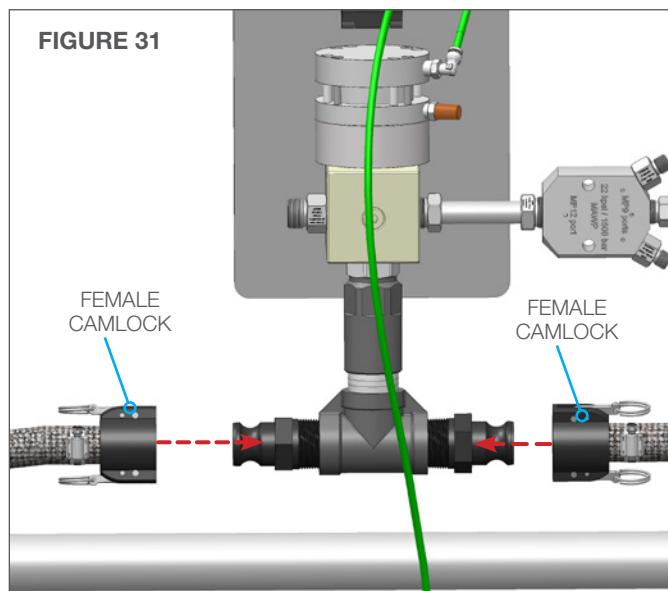


FIGURE 31

DOMED BUNDLE POSITIONER SET-UP DIMENSIONS FOR 69 INCH (1753mm) BUNDLE FACE

DOMED BUNDLE POSITIONER INSTALLATION DIMENSIONS

The next three pages have dimensional diagrams for 69in. (1753mm), 84in. (2134mm), and 96in. (2438mm) domed bundle set-ups. It will be necessary to refer to the applicable page throughout these installation instructions.

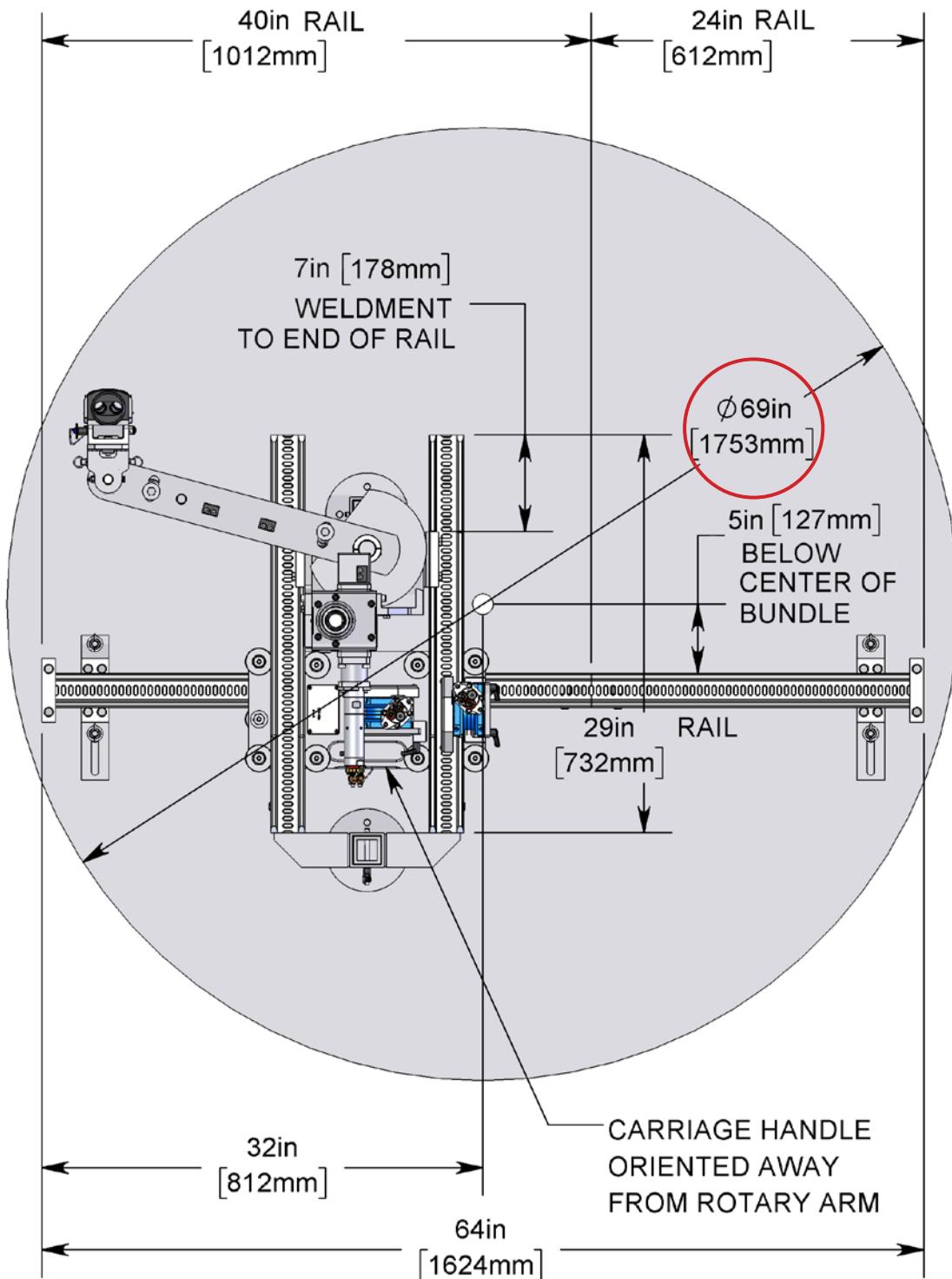


FIGURE 32

DOMED BUNDLE POSITIONER SET-UP DIMENSIONS FOR 84 INCH (2134mm) BUNDLE FACE

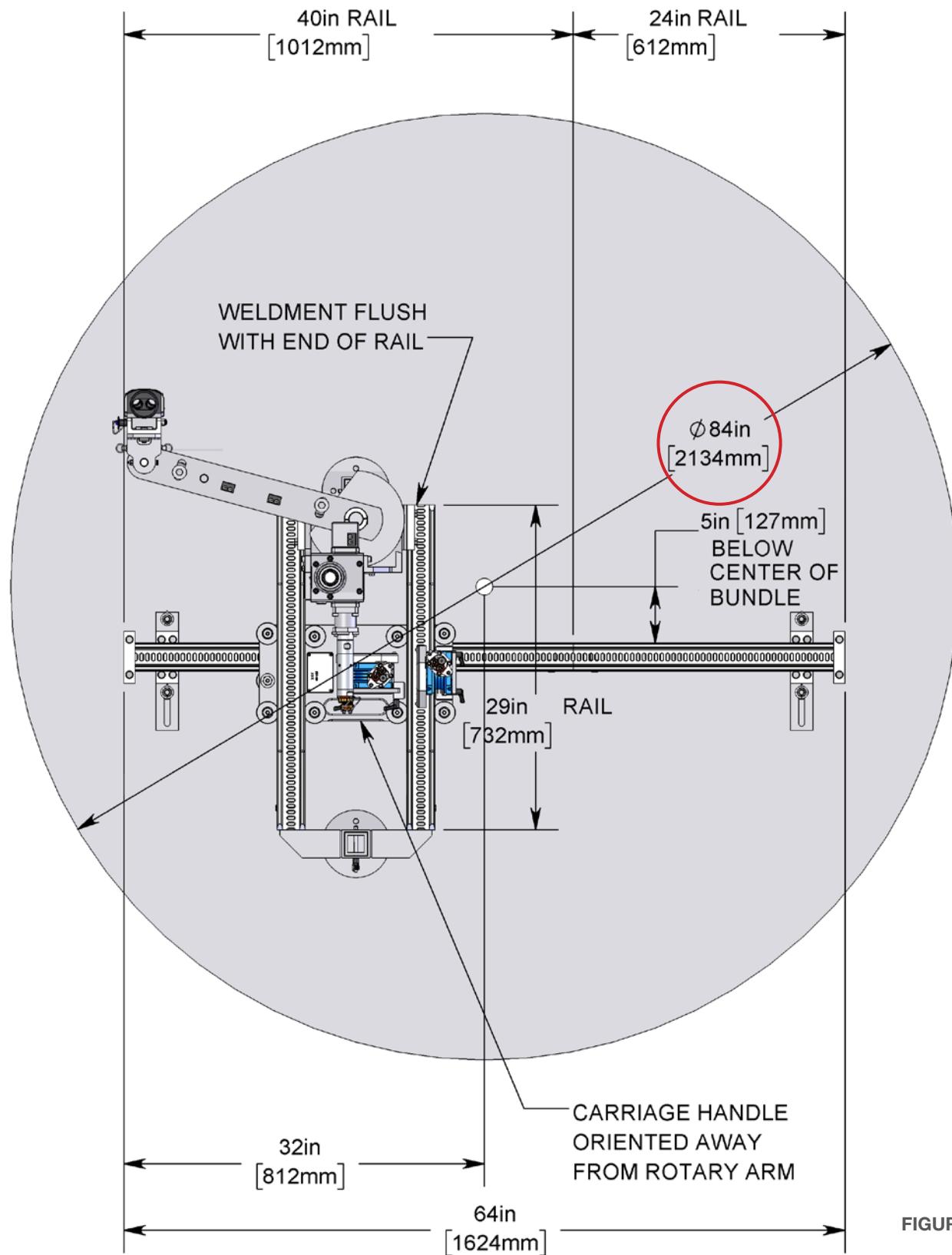
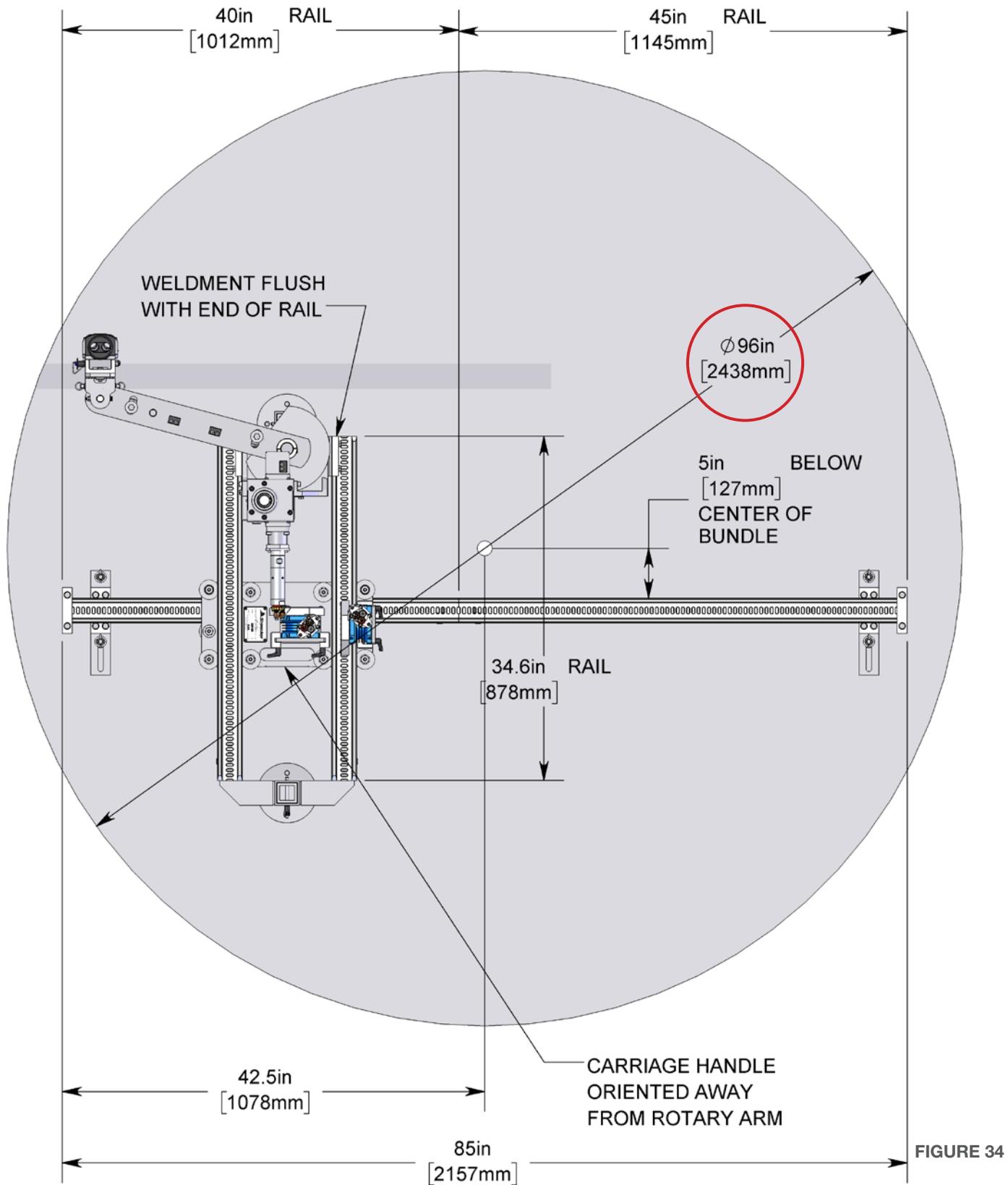


FIGURE 33

DOMED BUNDLE POSITIONER SET-UP DIMENSIONS FOR 96 INCH (2438mm) BUNDLE FACE



DOMED BUNDLE POSITIONER ATTACHMENT TO TUBE BUNDLE

DOMED BUNDLE POSITIONER STEP BY STEP SET-UP

TECH TIP: It is highly recommended to put the three necessary ratcheting box wrenches (1/2", 3/4", and 9/16") on a lanyard or leash for the installer to take inside the dome.

1. Loosen the four bolts on both Rail Clamp Assemblies with a 9/16" wrench, so that they are free to slide along the X Rail Sub-assembly but do not come off. (**Figure 35**)
2. Loosen the two Adjustable Expansion Plugs on the Rail Clamp Assemblies with a 3/4" wrench. (**Figure 35**)

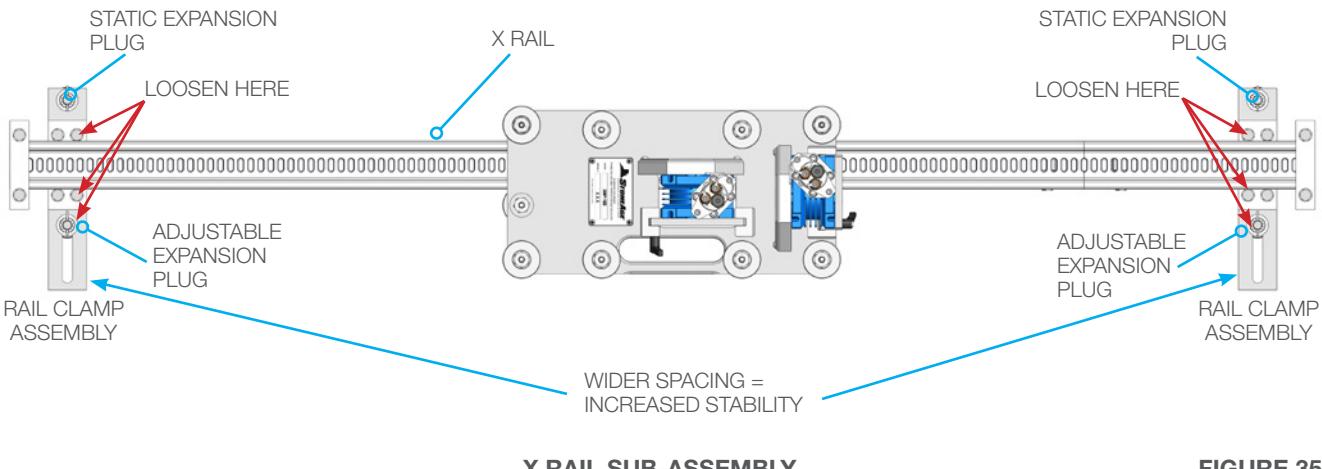


FIGURE 35

3. Hand the X Rail Sub-assembly through the man way to someone positioned inside the Domed Bundle. (**Figures 36 & 37**)
4. Do not lock the X Rail Sub-assembly into place as it will need to remain loose for the installation of the Y Rail Assembly.

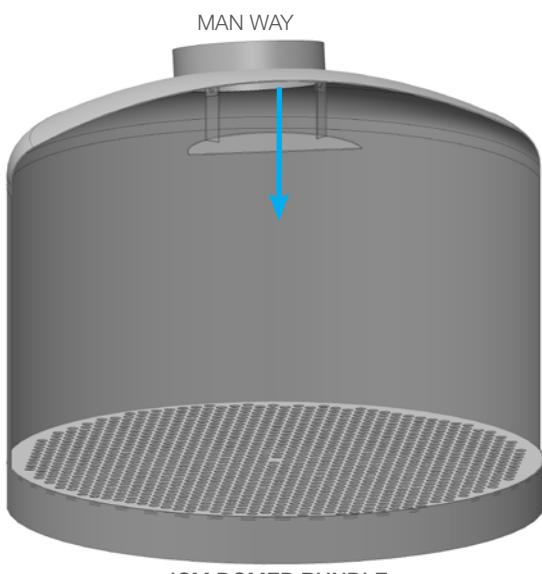


FIGURE 36



FIGURE 37

DOMED BUNDLE POSITIONER ATTACHMENT TO TUBE BUNDLE

5. Hand the Y Rail Assembly through the man way to the person positioned inside the Domed Bundle.
6. Rotate the Adjustable Drive Handles on the Y Drive Assembly counter-clockwise to disengage the drive gear. This will allow the Y Rail Assembly to slide under the Y Drive Assembly. (**Figures 39**)
7. To make enough room to install the Y Rail Assembly, set the X Rail Assembly on its side or at an angle. Remember to insert the Y Rail Assembly with the Skid Pad on the same side as the Carriage Handle. (**Figures 38**)
8. Once the Y Rail Assembly is inserted, release the Adjustable Drive Handles on the Y Drive Assembly so the gear is engaged. (**Figure 39**)

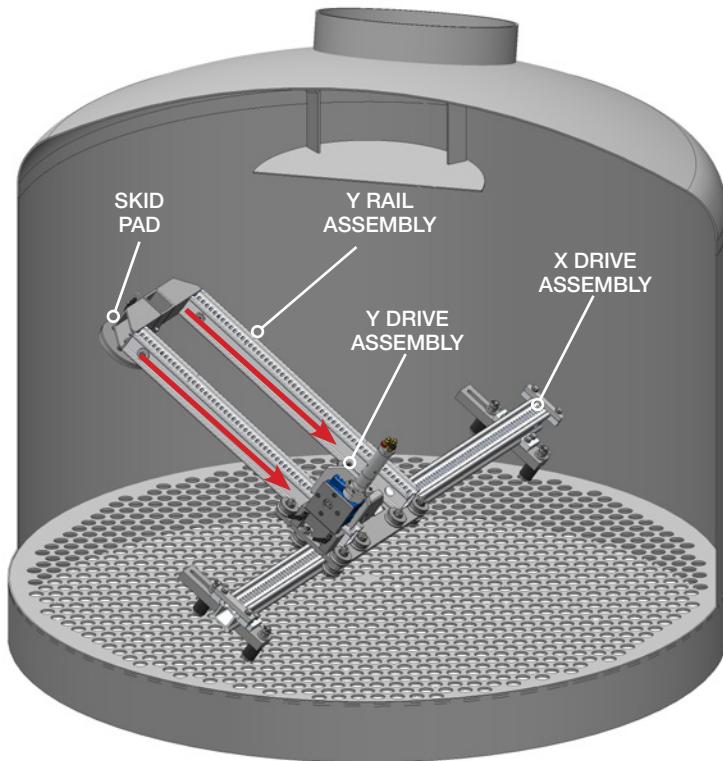


FIGURE 38

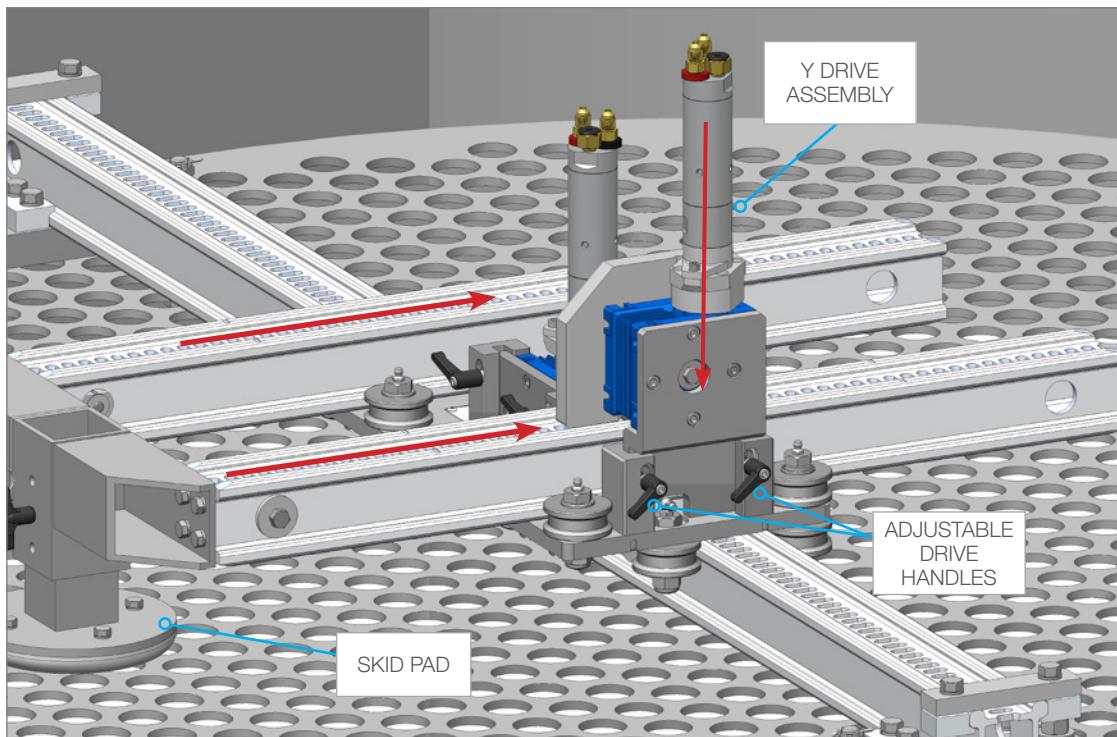


FIGURE 39

DOMED BUNDLE POSITIONER ATTACHMENT TO TUBE BUNDLE

NOTICE

The Static Expansion plugs on the X Rail Sub-assembly must be positioned two rows or 5 inches off center of the exchanger. The positioning of the X Rail Sub-assembly is critical to ensuring the Snout will not be pinched or strained. **Reference the “Domed Bundle Positioner Set-Up Dimensions” section in this manual for exact dimensions and alignment diagrams. (Figure 40)**

9. Insert and set the two Static Expansion Plugs into the appropriate tubes, being sure that the Rail Clamp Assemblies are as close to the ends of the X Rail as possible. (**Figure 40.1**)
10. Slide the Adjustable Expansion Plugs until they drop into a tube. Hold the Castle Nut and tighten the Hex Nut with 3/4" wrench. If the Castle Nut does not stay stationary, the Expansion Plug will not expand. (**Figure 40.2**)
11. Tighten the four Rail Clamp Bolts on each Rail Clamp Assembly with a 9/16" wrench. (**Figure 40.2**)

TECH TIP: The side of the tube face to be cleaned is always on the opposite side of the Carriage Handle.

Use something to mark the Center Tube or Blank. It will be helpful when flipping the positioner around to clean the opposite side of the tube face.

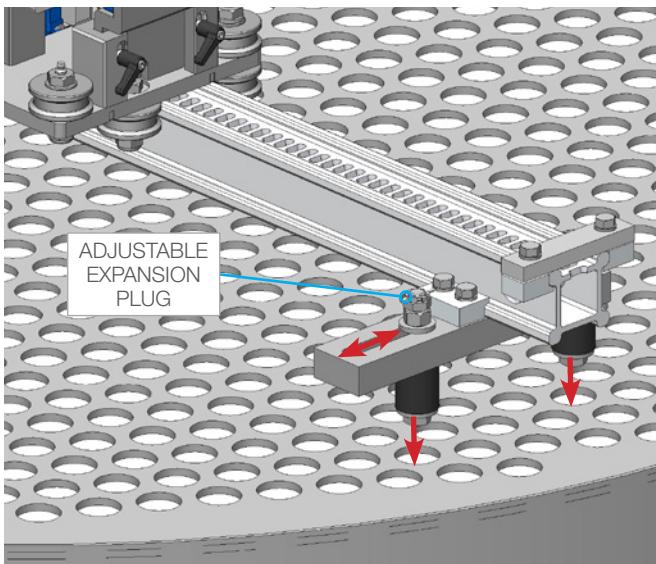
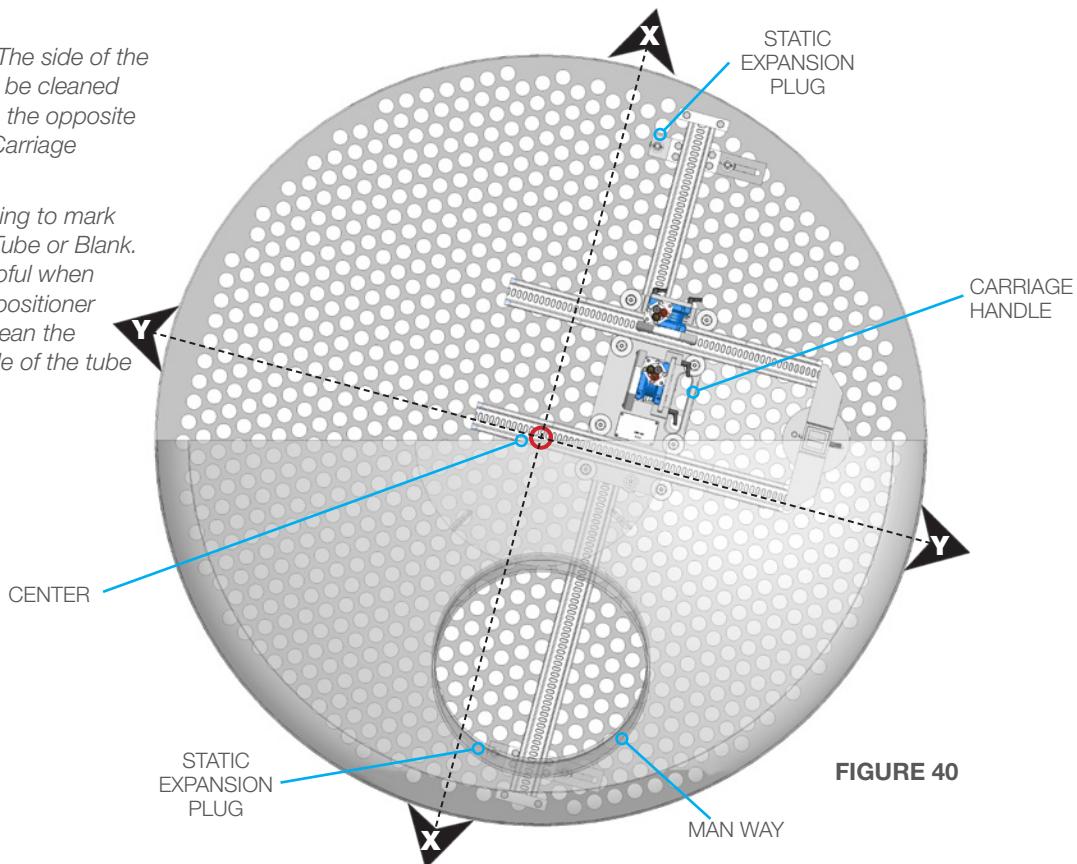


FIGURE 40.1

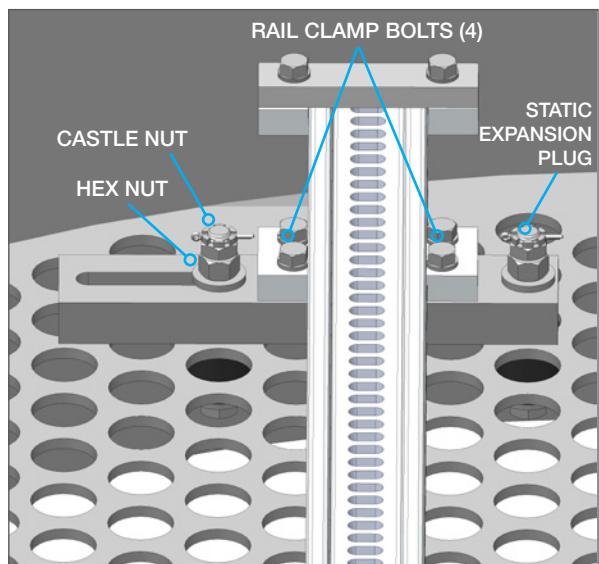
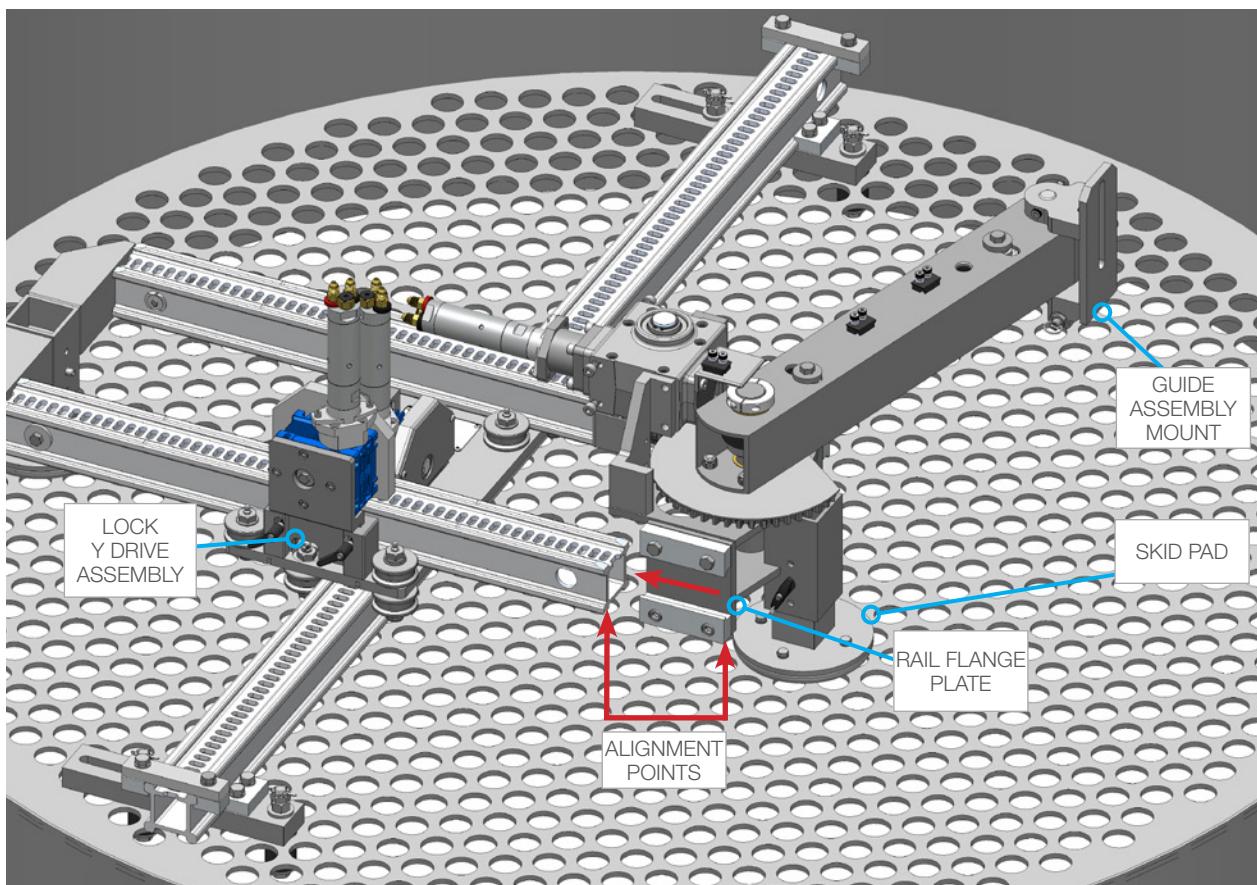
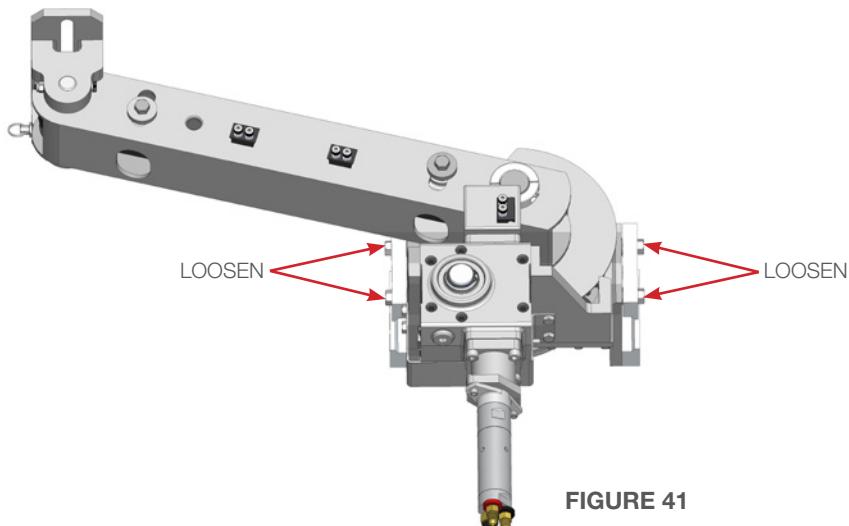


FIGURE 40.2

DOMED BUNDLE POSITIONER ATTACHMENT TO TUBE BUNDLE

12. Loosen the four Rail Clamp Bolts on the Rotary Arm Assembly with a 9/16" wrench and hand it through the man way to the person positioned inside the Domed Bundle. (**Figure 41**)
13. Align the end of the Rail Flange Plate with the end of the Y Rails for 84" and 96" diameter tube faces. **69" diameter tube faces will have a 7inch (178mm) offset from the end of the Y Rails. Reference the "Domed Bundle Positioner Set-Up Dimensions" section in this manual for verification.** (**Figure 42**)
14. When the Rotary Arm Assembly is in the correct position, tighten the bolts that were loosened on both Rail Flange Plates with a 9/16" wrench.



DOMED BUNDLE POSITIONER ATTACHMENT TO TUBE BUNDLE

15. Pull out the Quick Release Pins on both Skid Pads and let them drop down until they hit the tube face. Lock the Quick Release Pins when the Skid Pads are in place. (**Figure 43**)

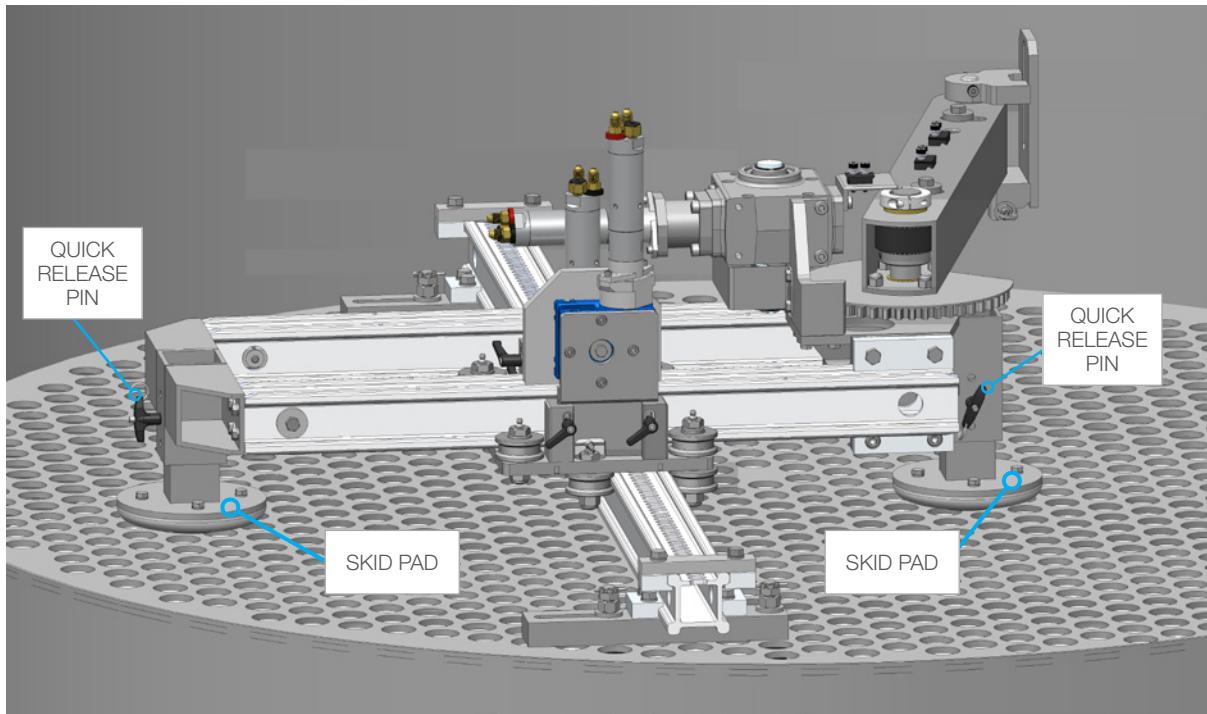


FIGURE 43

16. The Positioner will move in the X or Y Positions freely when their respective Adjustable Drive Handles are released. Be sure the Adjustable Drive Handles are locked in place before operation.

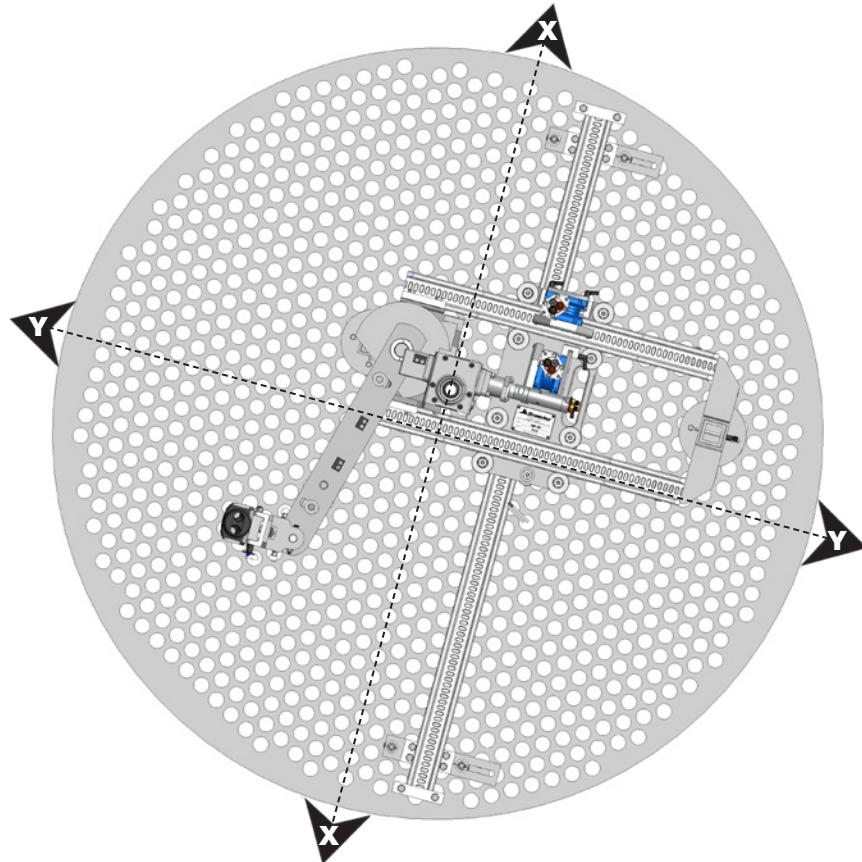


FIGURE 44

DOMED BUNDLE POSITIONER CONNECTIONS

PNEUMATIC SUPPLY LINE CONNECTION FROM CONTROL BOX TO POSITIONER

All the pneumatic supply lines should be connected to the back of the Control Box. If not please go back to the "Control Box/Pneumatic Supply Line Connection Diagram" section of this manual.

1. Connect the main air supply line to the Control Box and blow out all lines to clear debris before connecting the Domed Bundle Positioner.
2. There are three paired 1/4 in. line hose bundles for Domed Bundle Positioner. The back of the Control Box is labeled and color coded. Follow the Black and Red color coding and to ensure proper connection. (**Figure 45**)

 **TECH TIP:** Feed one pair of supply lines at a time through the man way to avoid confusion. If there is a diffuser plate in the dome, feed the hoses above it and it will keep them out of the way of the positioner.

	ROTARY ARM	X DRIVE POSITIONER	Y DRIVE POSITIONER
CONTROL BOX MARKINGS	ROTATE LEFT ROTATE RIGHT	LEFT RIGHT	UP DOWN

FIGURE 45

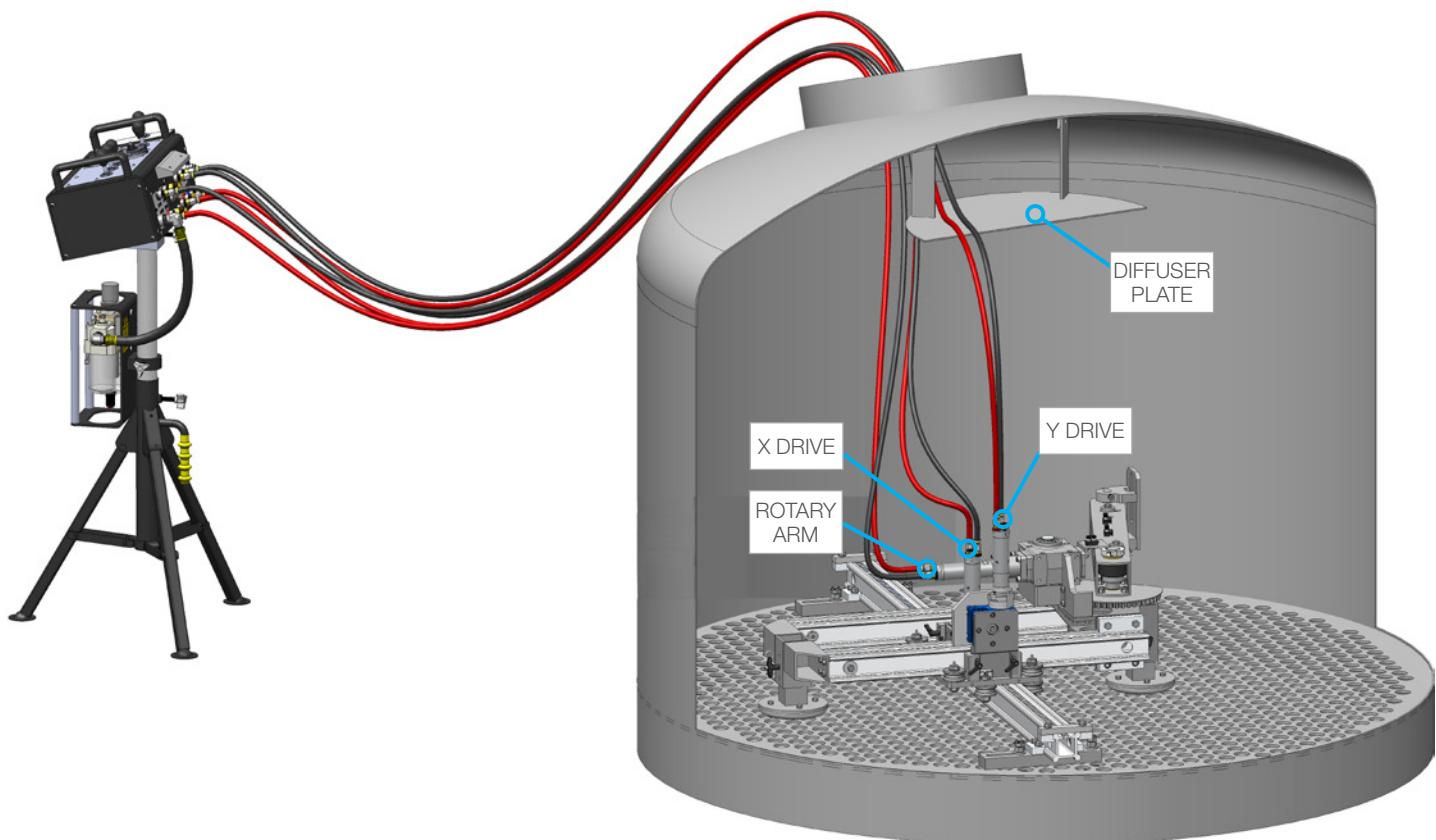


FIGURE 46

DOMED BUNDLE POSITIONER CONNECTIONS

CAMERA CONNECTION TO ROTARY ARM

The Camera should be connected to the side of the Battery Box. If not please go back to the “Sub-Assembly 3 - Connect The Camera System”, section of this manual.

1. Run the female end of the Camera Cable from the Battery Box into the Man Way and down to the Rotary Arm Assembly.
2. Thread the cable through the holes in the Rotary Arm and connect it to the back of the Camera.
3. Install the Camera onto the Rotary Arm by engaging the two Quick Release pins into the Camera Bracket. Be sure they are locked securely into place.
4. Clamp the cable to the Rotary Arm with the three Cable Clamps. This will help keep the cable out of the way of the Rotary Arm during operation.

 **TECH TIP:** If there is a diffuser plate in the dome, feed the cable above it and it will keep it out of the way of the positioner.

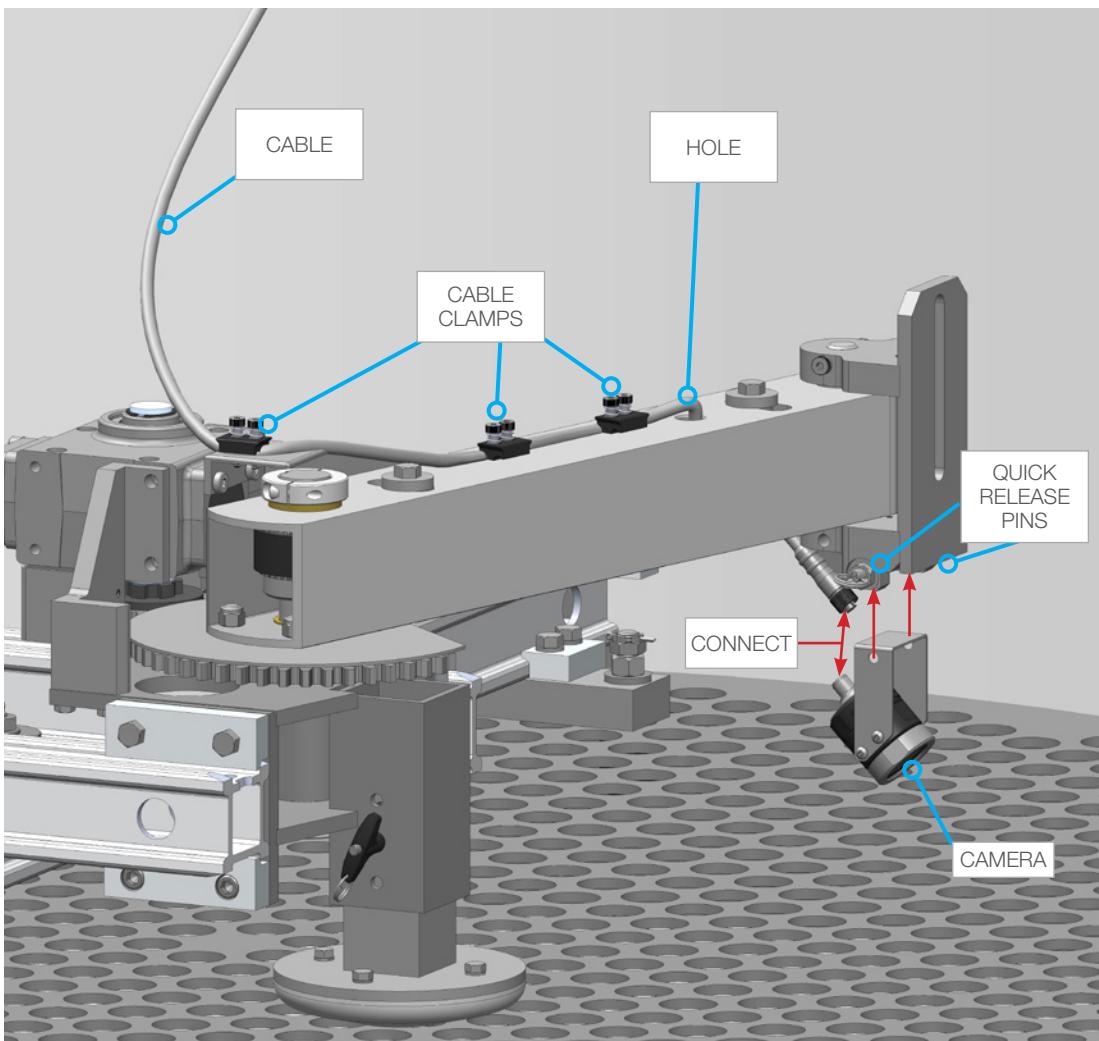


FIGURE 47

ICM AND DELTA T RAIL MOUNT INSTALLATIONS

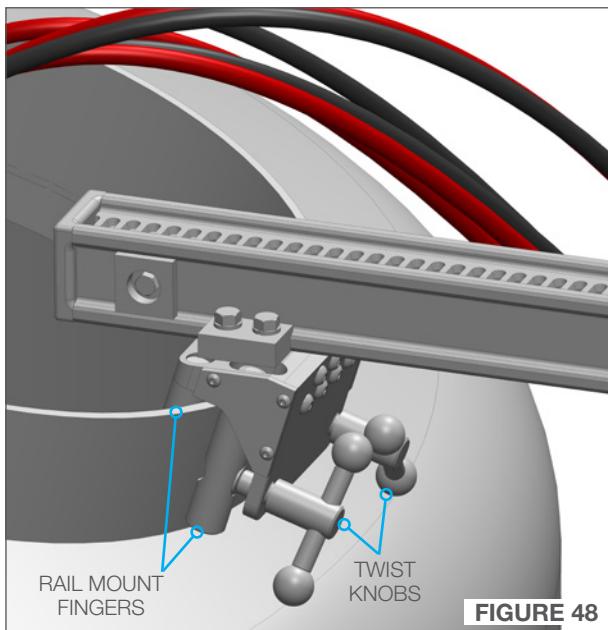
The ICM and Delta T Rail Mounts are similar except for the man way Trolley Clamp Assemblies. The ICM Rail Mount is designed to mount at an angle. The Delta T Mount is designed to be bolted directly to the flange.

CAUTION

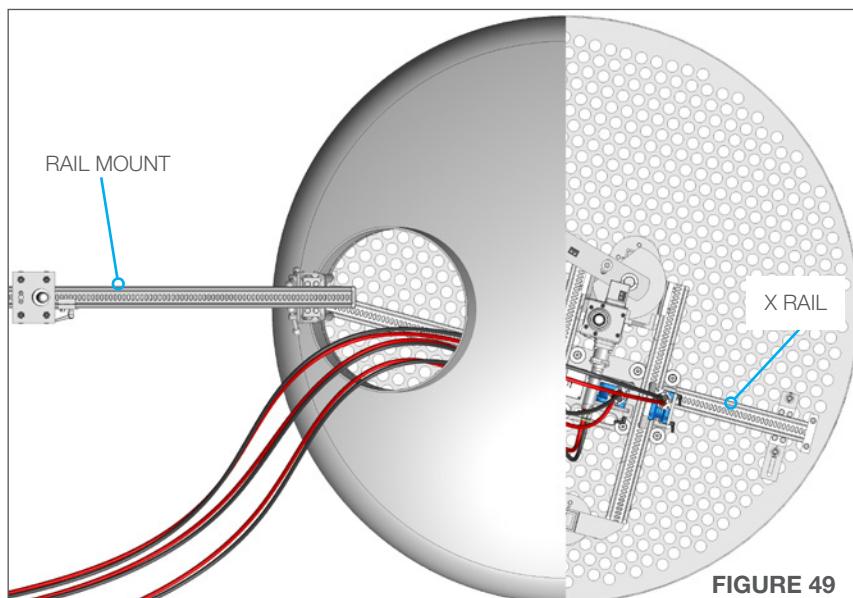
The Rail Mount Assembly is designed to support the ABX-3L-V2 Assembly and Snout only.
DO NOT lean on the Rail Mount as this could result in minor or moderate injury.

To Mount to the ICM man way:

1. Set the fingers of the Rail Mount Trolley Clamp Assembly on the edge of the man way flange and loosely tighten with the Twist Knobs. (**Figure 48**)



2. Adjust the position of the Rail Mount so that it is as in-line as possible with the X Rail on the Positioner. There may be obstructions on the man way. If so, try to keep it within 30° of the X Rail of the Positioner. (**Figure 49**) This will keep the Snout from being pinched.



RAIL MOUNT INSTALLATION

3. Make sure the Rail Mount is close to level to the floor. (**Figure 50**)
4. Tighten the Twist Knobs as tight as possible as this is critical to avoiding damage to components due the Rail Mount coming loose.
5. Set the Rail Stop about midway on the Rail.

TECH TIP: It is necessary to let the trolley have free movement during some sections of some bundles. It is also necessary to lock the tractor back some when working closer to the man-way to prevent excessive snout length fed into the man-way. This will depend on the diameter of the tube face.

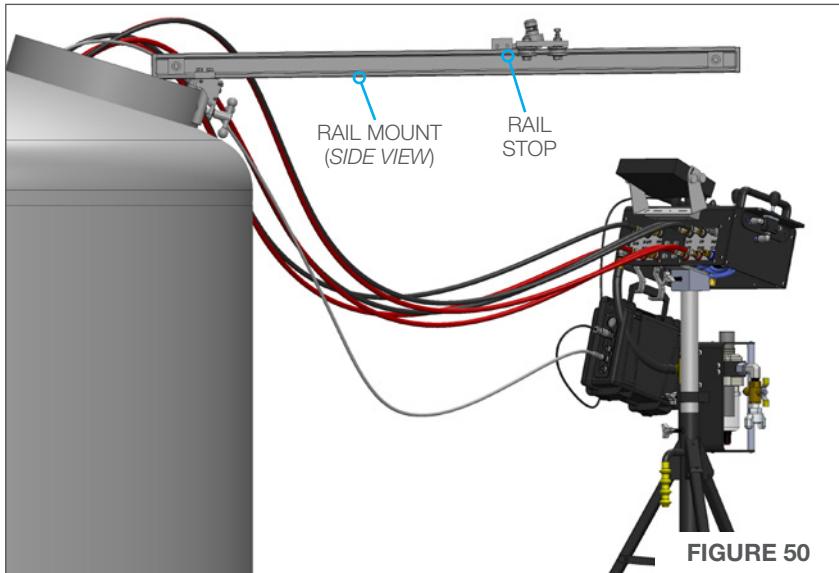


FIGURE 50

To Mount to the Delta T man way:

1. Fasten the Trolley in the six O'Clock position on the flange of the man way. Use two 3/4" x 4" Hex Bolts, four 3/4" flat washers and two 3/4" Lock Nuts. Install one set of washers on either side of the flange as shown in (**Figure 51**).
2. Loosening the Adjustable Handle on the Trolley will allow for adjustment of the Rail in and out of the dome. (**Figure 51.1**)

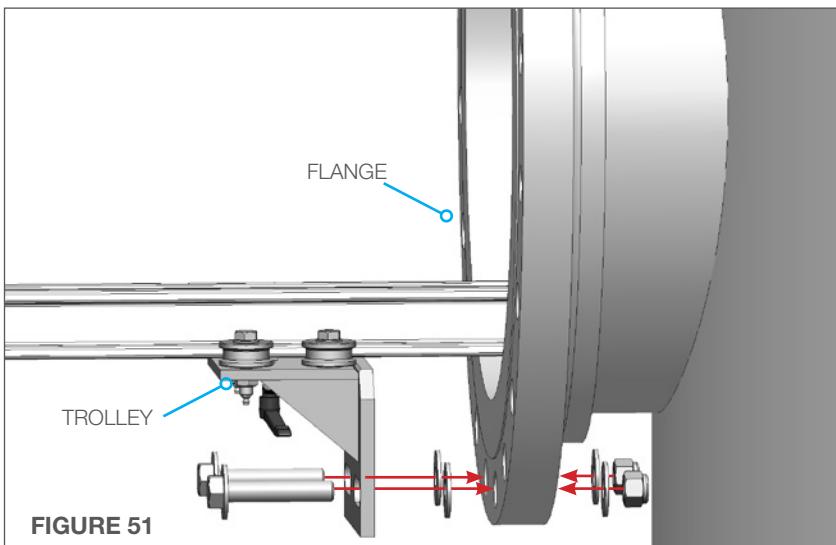


FIGURE 51

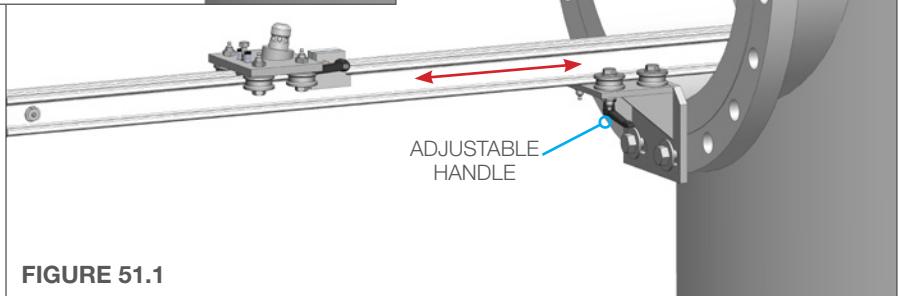
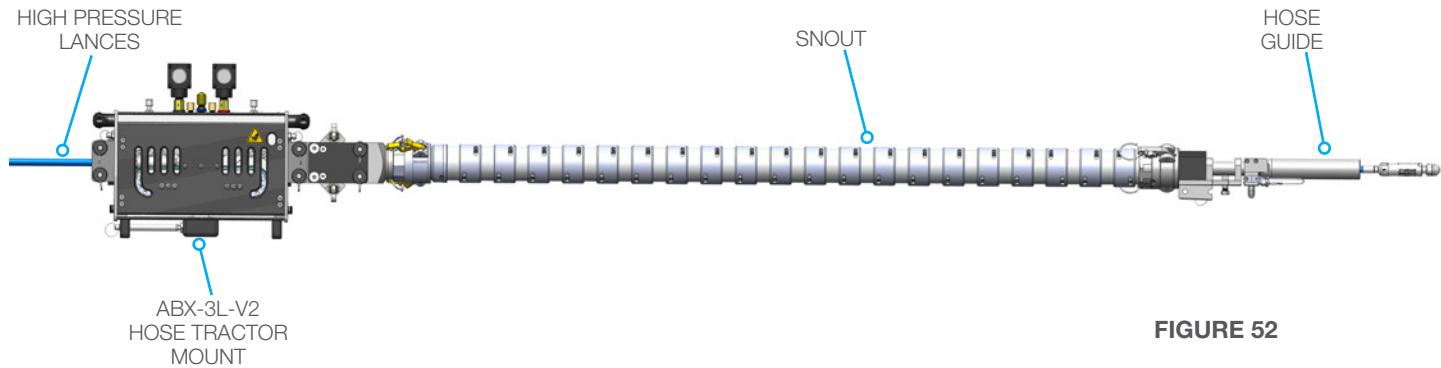


FIGURE 51.1

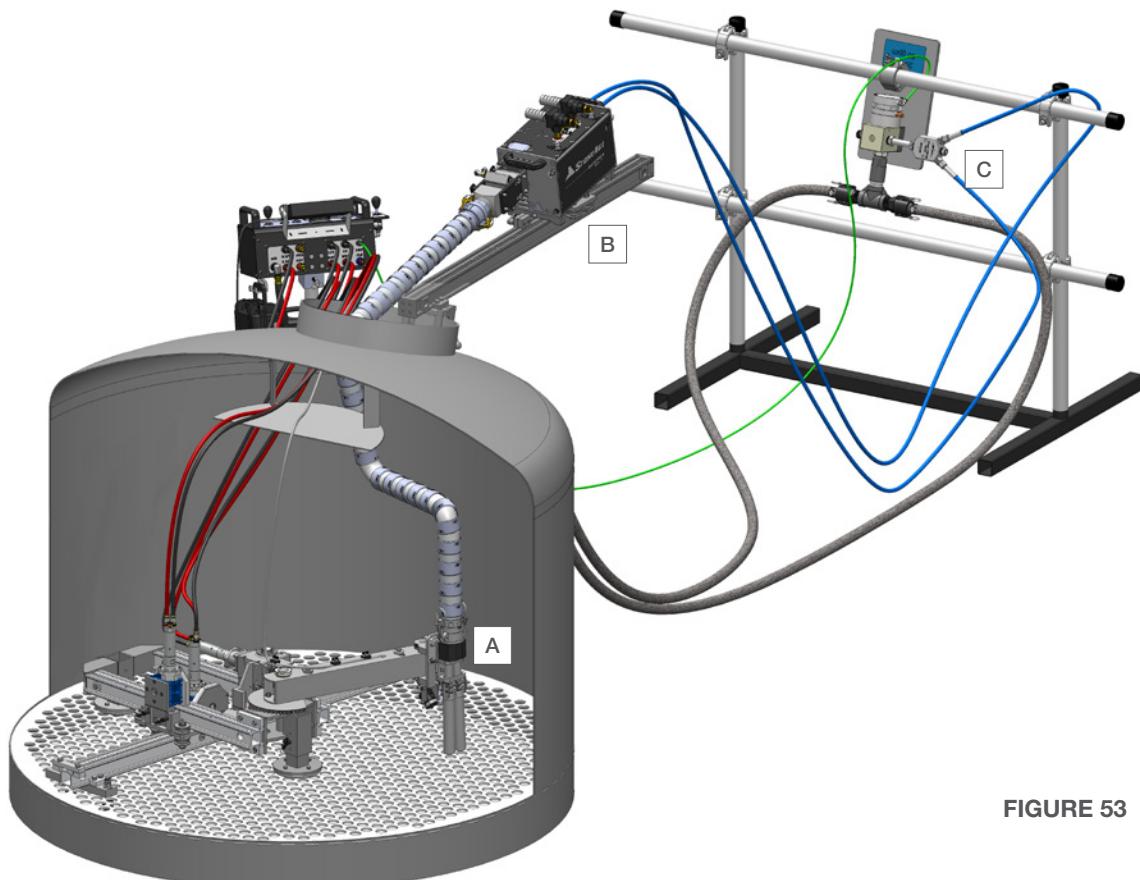
ABX-3L-V2, SNOUT, AND HOSE GUIDE INSTALLATION

TECH TIP: This is a minimum of a two person installation; one person inside the dome to make the Hose Guide connection and one to hand the Guide and Snout into the man way. This sub-assembly should remain as parallel to the floor when transporting to and into the Dome. This is to keep the lances from twisting.

**FIGURE 52**

This sub-assembly has three connection points; (**Figure 53**)

- The Hose Guide to the Domed Bundle Positioner
- The ABX-3L-V2 to the Trolley on the Rail Mount
- The two High Pressure Lances to the Dump Manifold on the scaffold.

**FIGURE 53**

RAIL MOUNT AND MANIFOLD INSTALLATION

1. Feed the Guide and Snout into the man way to the person positioned inside the Dome.
2. Pull the Quick Release Pin on the Guide Mount and connect the Guide to the on the Domed Bundle Positioner. (**Figure 54**)

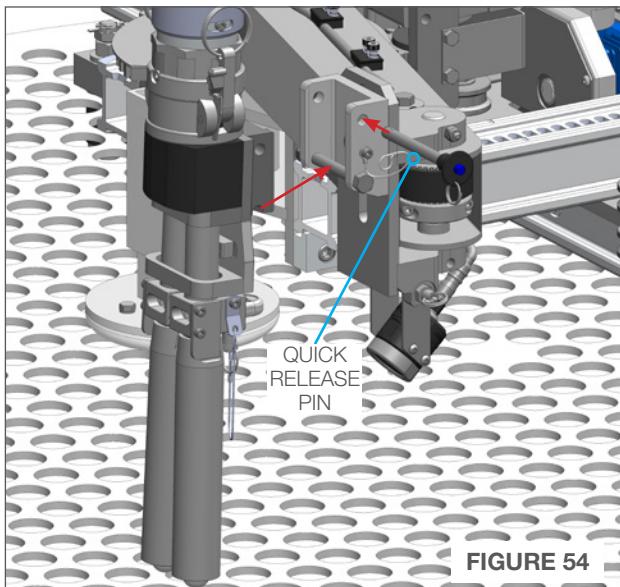


FIGURE 54

3. Pull out and hold the Release Pin under the ABX-3L-V2, set the mount onto the Trolley Pivot, and release the Release Pin, making sure it locks into place. (**Figure 55**)

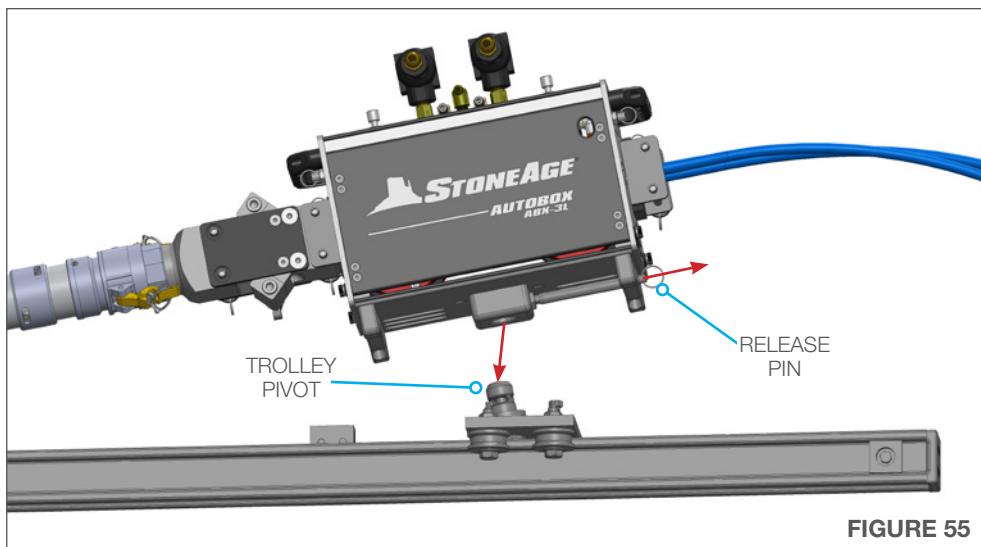


FIGURE 55

4. Install the 20k female swivel or the 15k Quick Disconnect ends of the High Pressure Hoses onto the Manifold. (**Figures 56 & 56.1**)

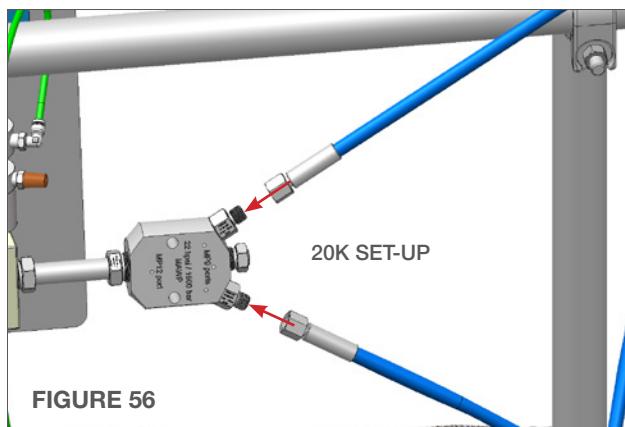


FIGURE 56

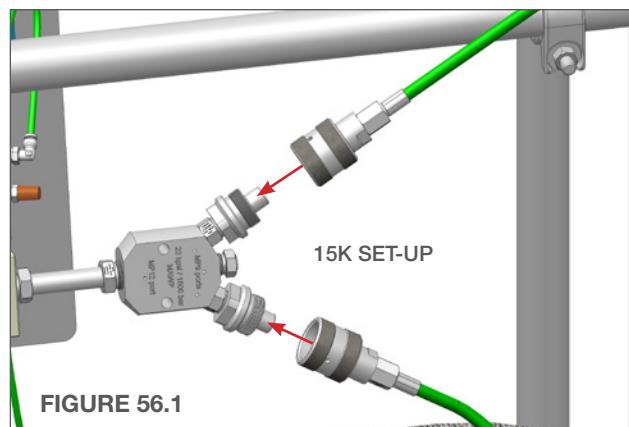


FIGURE 56.1

AUTOBOX ABX-3L-V2 AND AIR KNIFE CONNECTIONS FROM CONTROL BOX

PNEUMATIC SUPPLY LINE CONNECTION FROM CONTROL BOX

1. The hose bundle for the ABX-3L-V2 has two 1/2 in. lines and one 1/4 in. line. The 1/2 in. lines are Black for FWD and Red for REV. The 1/4 in. line is Red and connects to the Blue CLP fitting. (**Figure 57**)

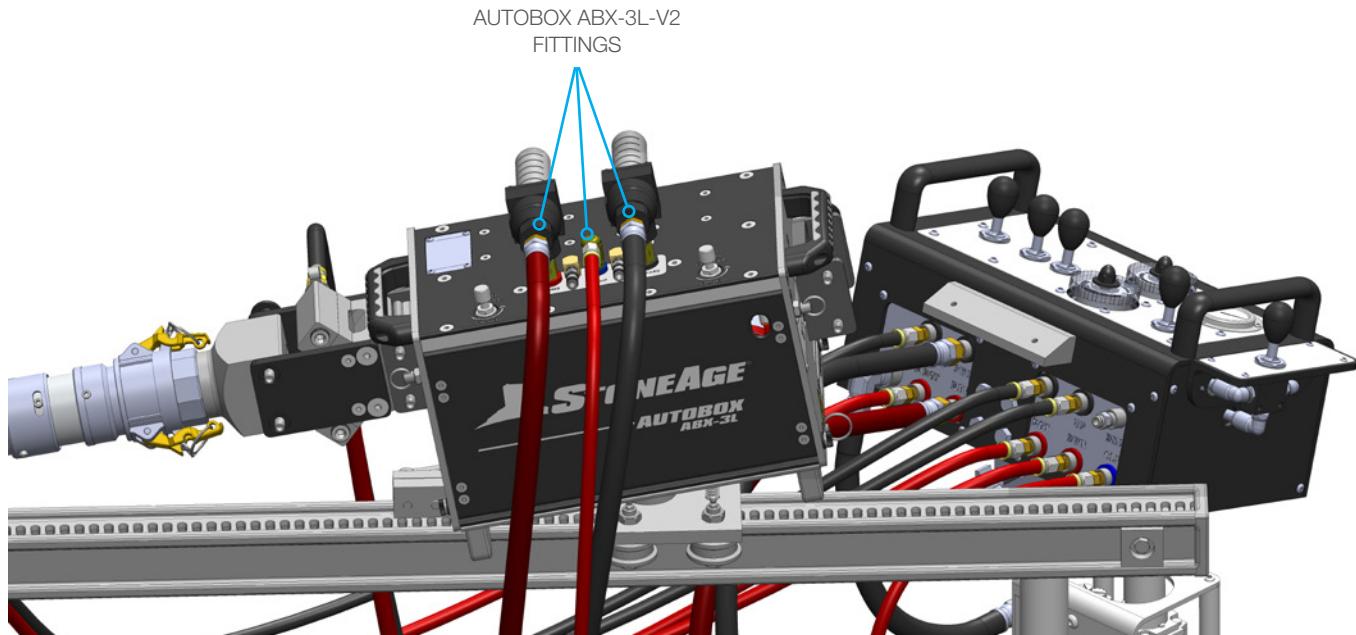


FIGURE 57

2. Using a small adjustable end wrench, fasten the other ends of the two 3/8" air supply lines to the Air Knife Assembly. The color coding does not apply to the Air Knife accessory and the supply lines may be installed in any order. (**Figure 58**)

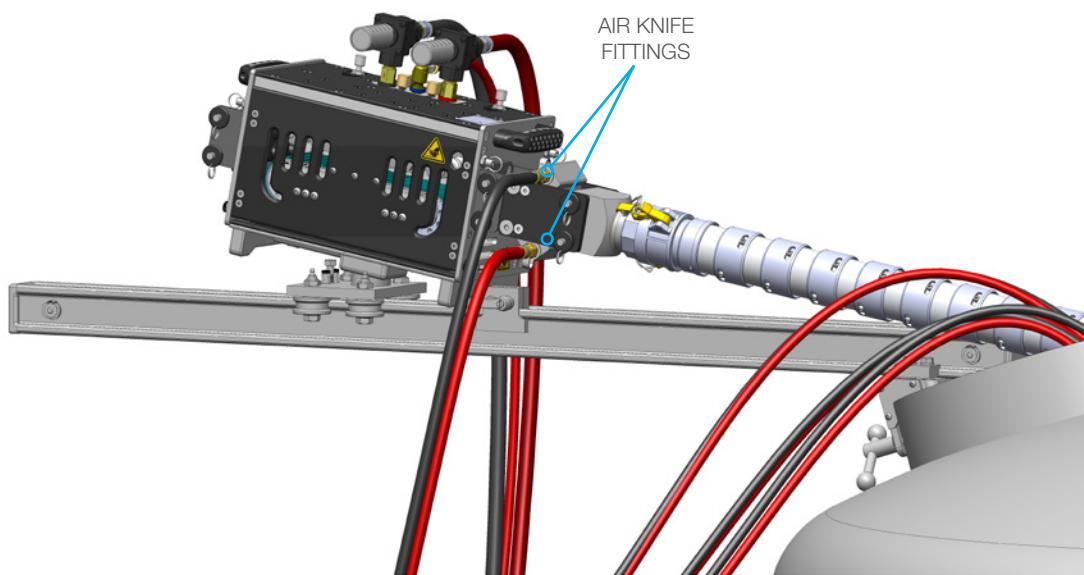


FIGURE 58

DUMP LINES TO TUBE FACE

DUMP LINE CONNECTIONS

1. Install the Dump Line Adapters on the far opposite side of the Rotating Arm or cleaning quadrant. (**Figure 59**)
2. Loosen the Hex Nut on the Expansion Plug with a 3/4" wrench. (**Figure 59.1**)
3. Slide the Adjustable Expansion Plugs until they drop into a tubes. Hold the Castle Nut and tighten the Hex Nut with 3/4" wrench. If the Castle Nut does not stay stationary, the Expansion Plug will not expand. (**Figure 59.2**)

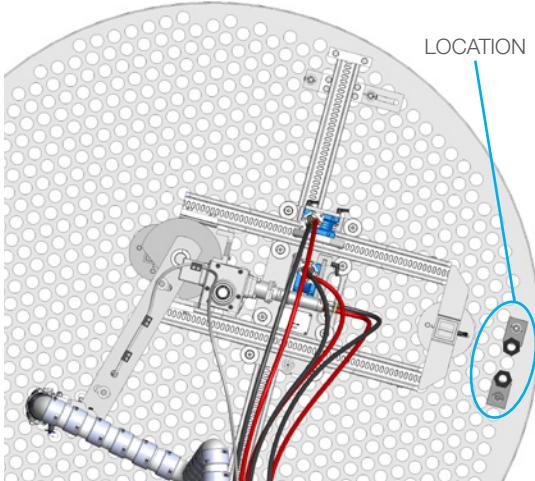


FIGURE 59

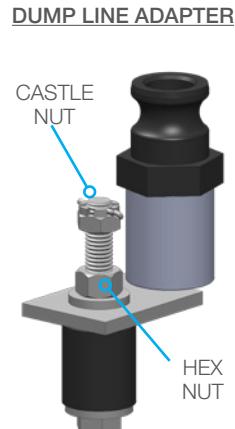


FIGURE 59.1

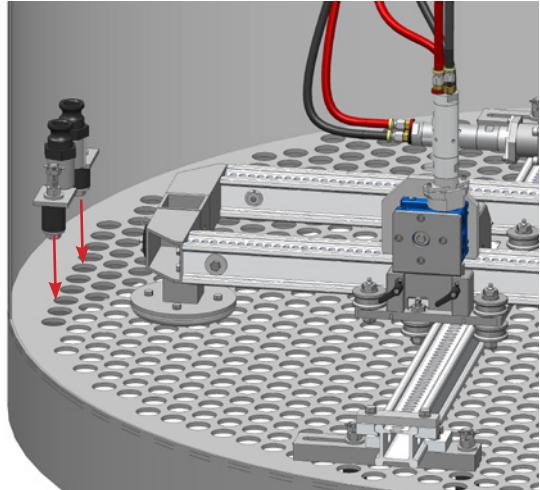


FIGURE 59.2

4. Feed the Dump Hoses into the Dome and connect the Female Camlock ends to the Male Camlock ends on the Dump Line Assemblies. (**Figure 60**)

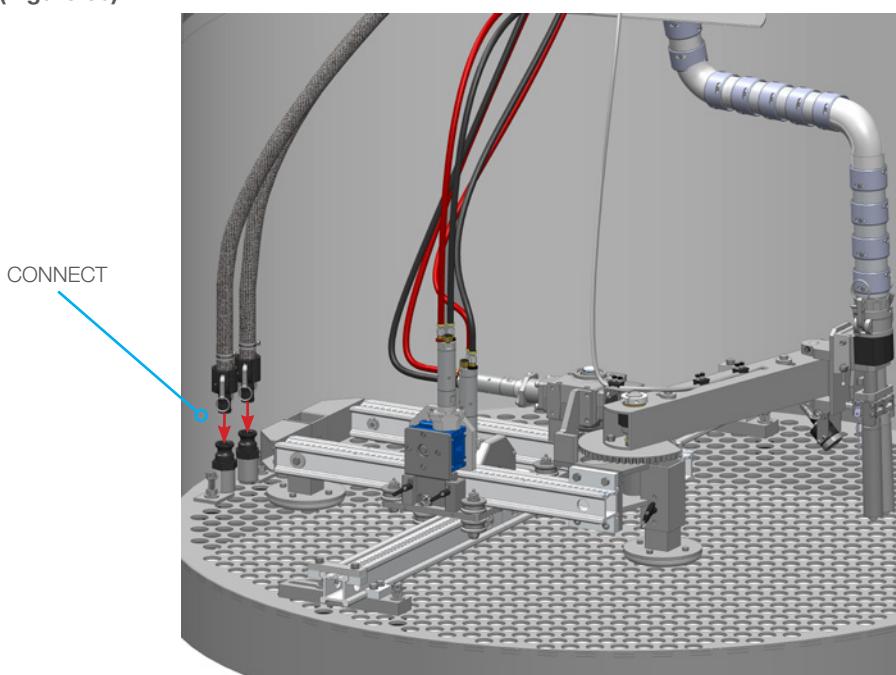


FIGURE 60

BAR MARKER INSTALLATION

The Bar Marker is a visual aid that is used to locate the tool position within the Dome when using the Camera.

1. Locate the center of the Tube Face. On some tube faces, the center will be a blank hex. (**Figure 61**)

In order to clean the rows the Bar Marker is covering, move the bar marker over two rows when switching cleaning quadrants. (**Figure 61.1**)

 **TECH TIP:** Use something to mark the Center

Tube or Blank. It will be helpful when flipping the positioner around to clean the opposite side of the tube face.

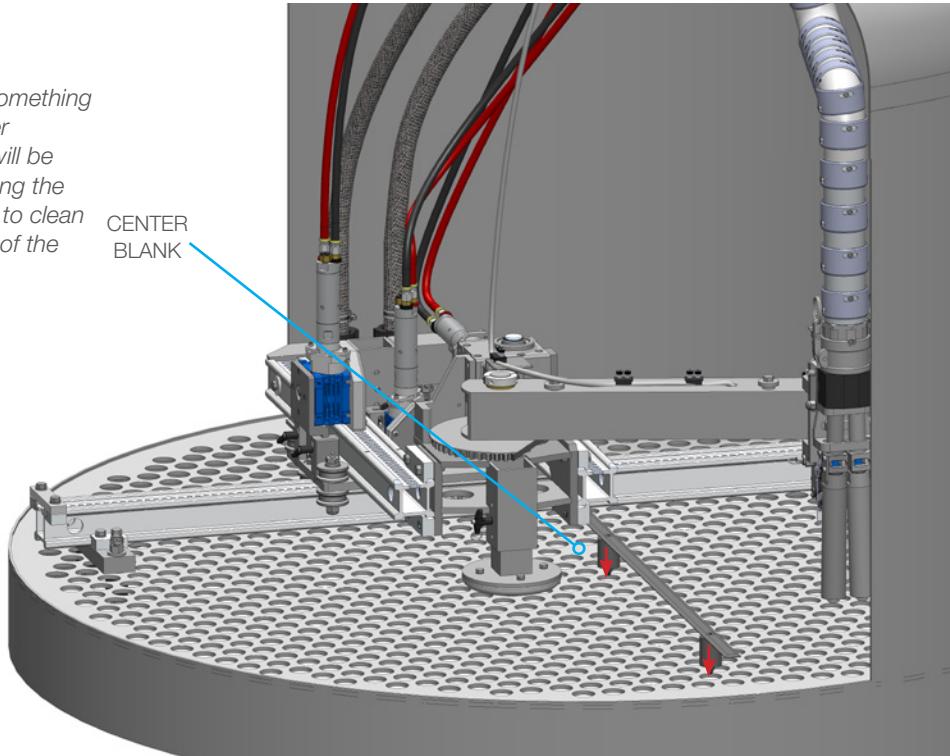


FIGURE 61

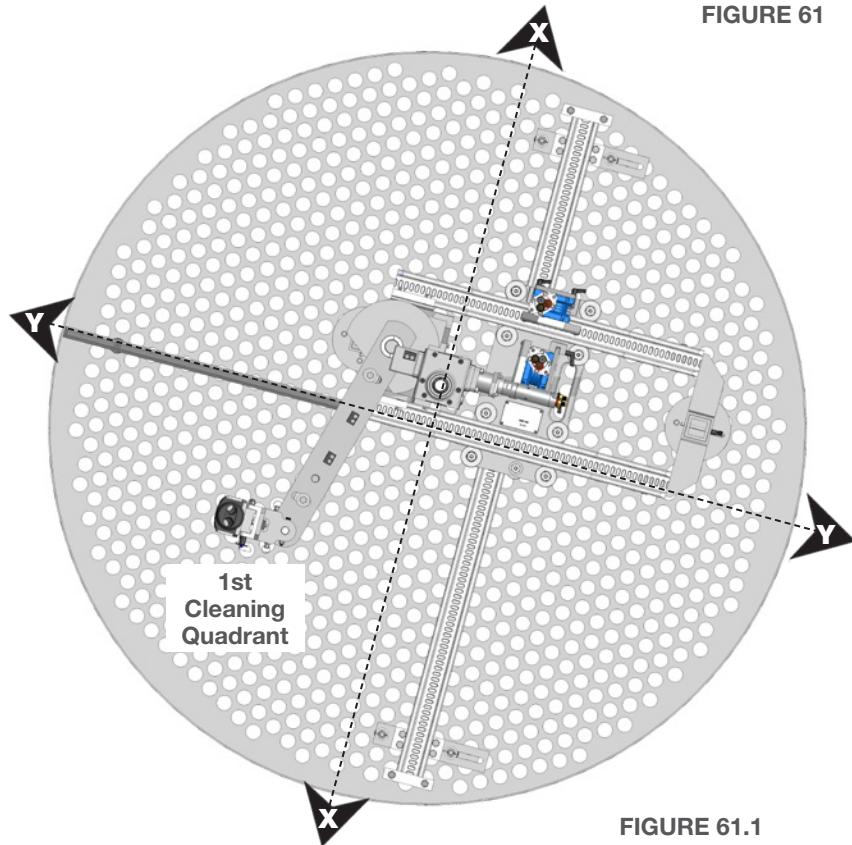


FIGURE 61.1

OPERATION

CONTROL BOX FUNCTIONS

- 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 Belt from turning. The speed controls are located on the ABX-3L-V2 Hose Tractor. Speed is independently adjustable for Forward/Reverse. Minimum speed is .3ft/sec (91 mm/sec). Maximum speed is 3.0ft/sec (914 mm/sec).
- To use the **MOMENTARY PNEUMATIC DUMP CONTROL**, hold it in the Forward/UP 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 Belt from moving and reroute the high-pressure water away from the ABX-3L-V2 Hose Tractor.
- The **Y AXIS POSITIONER LEVER**, will move the positioner carriage up and down the Y Rail. Let go of the lever to stop the movement and it will automatically return to the neutral position.
- The **X AXIS POSITIONER CONTROL**, will move to positioner carriage side to side along the X Rail. Let go of the lever to stop the movement and it will automatically return to the neutral position.
- The **ROTATING ARM CONTROL**, will move to rotating positioner arm in a windshield wiper motion. Let go of the lever to stop the movement and it will automatically return to the neutral position. When the limit in the Y direction has been reached the Rotating Arm Controls is used to move the Hose Guide in the direction of the quadrant being cleaned. Always move along the radius of the quadrant to be cleaned, never in any other direction.
- The **NUMBER OF HOSE DIAL** controls the ability to vary the feed motor pressure for 1, 2, or 3 hose operation and is unrelated to Hose Clamp Pressure. It was originally designed for use with the ABX-3L-V2 Hose Tractor on a Lightweight Positioner. However, for the Domed Bundle Positioner operation, it is recommended to start at 2 and move towards 3.
- The **HOSE CLAMP PRESSURE REGULATOR** controls the drive belt traction. It is recommended to set the hose clamp pressure to 20-40psi (.14-.28 MPa) to avoid 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). Clamp force will not damage hoses. Proper clamp force will provide good control of the hose in forward and reverse directions, and will keep the hose running through the Drive Belt. Proper clamp force will also increase the life of the Drive Belt and High Pressure Hoses.

**CLAMP PRESSURE MUST NOT EXCEED;
66 PSI**

- Use the **HOSE CLAMP PRESSURE GAUGE** to record desired pressure for future use and to monitor pressure during operation.

NOTICE

Test the Control Box before operating the AUTOBOX® (ABX-3L-V2) 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

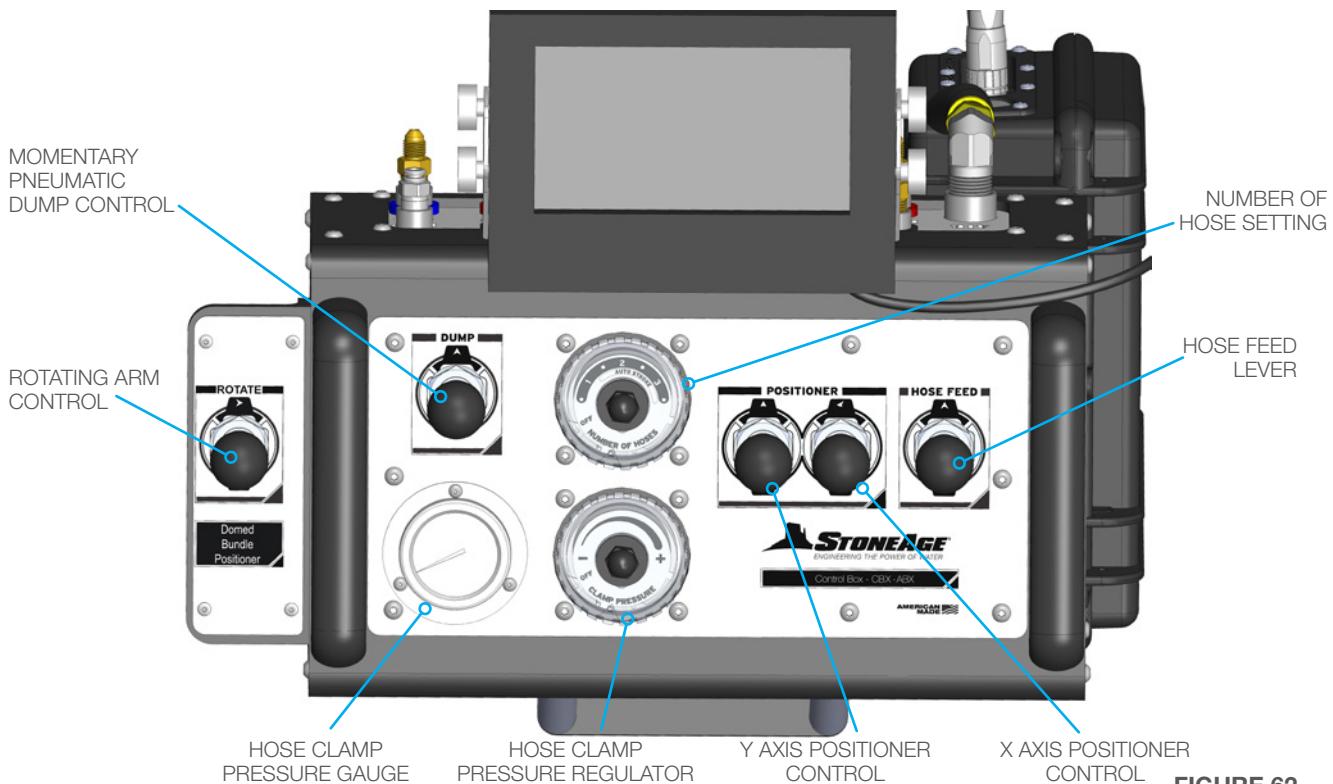


FIGURE 62

DANGER

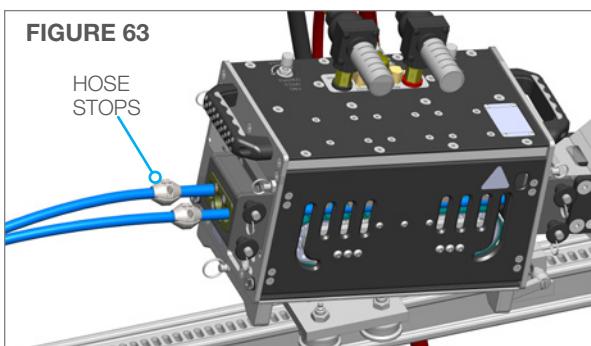
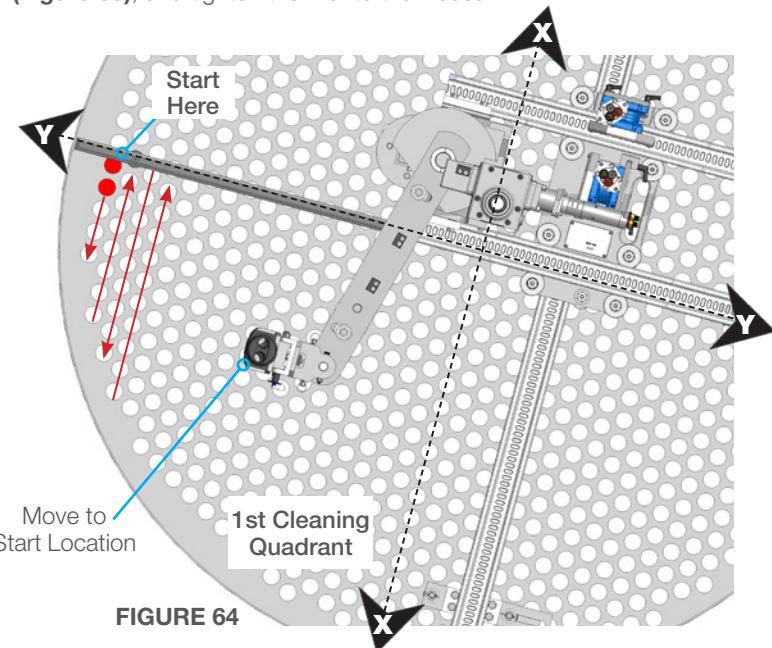
DO NOT RUN THE DOMED BUNDLE POSITIONER UNTIL ALL OPERATORS ARE OUTSIDE OF THE DOME AND THE SYSTEM IS READY TO RUN.

TEST RUN PROCEDURE

- Perform the **PRE-RUN SAFETY CHECK** (**FOLLOW "THE WARNING AND SAFETY INSTRUCTIONS" SECTION IN THIS MANUAL**).
- On the Battery Box for the Camera, Turn the Power ON. This will activate the Monitor Screen on the Control Box and allow sight into the Dome.
- Ensure appropriate Collets are installed securely in the Hose Guide and set initial hose clamp pressure to 20-40psi (.14-.28 MPa)
- Align the Banshee Tools or Guide Tubes as closely as possible to the exchanger tubes before advancing them into the tubes.
- Operate the high-pressure hose and waterjet tool at full pressure to test the clamp force. Optimal clamp force will provide good control of the hose in forward and reverse directions, and will vary by application.
- Adjust the hose feed speed controls on the ABX-3L-V2. 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

1. Loosely install the Hose Stops on the hoses.
2. Feed forward and advance the Banshee Tools into the tube bundle at low pressure and listen for high pitched whistle of the Banshee Tools exiting the tubes at the far side of the heat exchanger. There is no visibility to the end of the tubes, so listening for the high pitched whistle of the Banshee Tools exiting the tubes is critical to proper Hose Stop set up.
3. When the Banshee Tools have exited the tubes, stop the forward movement of the lances and dump the high pressure water.
4. Move the Hose Stops into the approximate position shown in **(Figure 63)**, and tighten them onto the Hoses.

**FIGURE 63****FIGURE 64**

5. Retract the Tools back into the Guide Tubes.
6. Using the X Axis, Y Axis, and/or Rotating Arm Controls, locate the first two tubes to be cleaned on the Camera Monitor. **(Figure 64)**
7. Close the dump and gradually increase the pump to the desired operating pressure.
8. Feed forward and advance the hoses into the tube bundle and follow the cleaning pattern as shown in **(Figure 64)** until the first quadrant is complete.
9. Make sure all tubes have been cleaned in the quadrant before switching to the next. A key indicator of a dirty tube could be scale or other materials on the outer rim. Cleaned tubes should appear shiny on the outer rim.
10. Before Switching to the second cleaning quadrant, move the Marker Bar over two tube rows into the cleaned quadrant. This will allow the previously covered rows to be cleaned.
11. Before rotating the positioner 180° to clean the other half of the tube face; dump the high pressure water to de-energize the system, turn off the pump, temporarily disconnect the Hose Guide from the Rotary Arm assembly and relocate the Dump hoses to the far opposite side of the tube face. ***It will be helpful to mark the center of the tube face.***

OPERATION

AUTOBOX HOSE TRACTOR (ABX-3L-V2) OPERATING TIPS

Please see separate User Manuals for the ABX-3L-V2 Hose Tractor for more detailed information.

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

- Dump the water when making any desired changes to forward and/or reverse operating speeds.
- If the Drive Belt is 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 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 the pressure containing crimp. Operating at high clamp pressures will reduce Belt life.

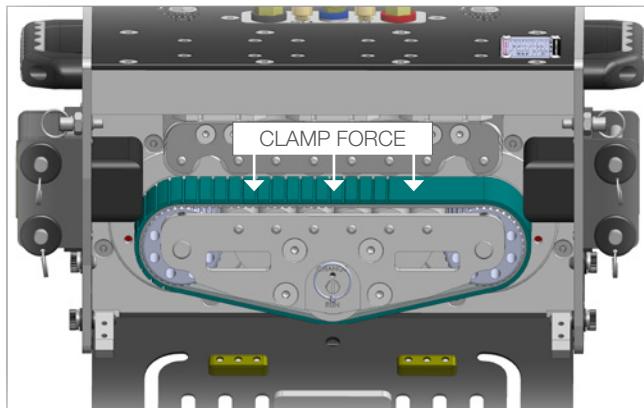
**CLAMP PRESSURE MUST NOT EXCEED;
66 PSI**

- When operating the ABX-3L-V2 Hose Tractor, an obstacle or restriction within a heat exchanger tube may be encountered. When this occurs, the ABX-3L-V2 Hose Tractor is designed to slow and stall the air drive motor, stopping the advancement of the hose, lance, and Banshee tool. The operator should stop forward feed and reverse the lance feed direction, backing the tool away from the obstruction. Repeat the back and forth operation, until the resistance or obstruction is cleared via the cleaning action of Banshee tool at the end of the hose. The ABX-3L-V2 Hose Tractor is not designed for continuous high speed slippage. If excessive slippage occurs, gradually increase the clamp force using the **HOSE CLAMP PRESSURE REGULATOR** on the Control Box.

⚠ WARNING

Do not fully release the hose clamp (decreasing pressure to zero) during operation, or the ABX-3L-V2 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.



Component	Maintenance Item	Frequency	Maintenance Required
ABX-3L-V2	Forward, reverse, and clamp fittings	Before each use	Inspect threads for wear or damage.
CB-DBP	Lubricant level of Filter, Regulator, Lubricator	Before each use	For average conditions, the use of high quality SAE #10 (S.U.V. 150-200 SEC @ 100°F) oil is recommended. Other lubricants, as specified by the maker of the equipment to be lubricated, may be used if not heavier than SAE #40 (S.U.V. 800 SEC @100°F).
ABX-3L-V2	(Inside)	After each use	When storing the unit, use compressed air to blow out any residual remove debris and moisture. Use mild, soapy, low pressure, water to clean the machine in order to remove corrosive materials. DO NOT SPRAY WATER INTO OR SUBMERGE, THE AIR MOTOR HOUSING OR BREATHER.
ABX-3L-V2	Drive Belt (See Belt Replacement instructions in the ABX-3L-V2 User Manual)	After each use	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.
			NOTICE Operation with a severely damaged belt will result in excessive damage to the Idler rollers and drive sprockets.
CB-DBP	FWD, REV, LFT, RGT, UP, DOWN, and ROTATE fittings	After each use	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.
			NOTICE Do not add oil to the Clamp (CLP) fitting, as oil may accumulate in the air cylinders and prevent them from fully retracting.
All	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.
DBP-100 and DBP-300-XX	Carriage rollers	Every 100 Hours of use	Lubricate Zerks on all Carriage Rollers using any multipurpose NLGI 2 grease.
DBP-100 and DBP-300-XX	Vertical and Horizontal Rails	As Needed	Inspect for wear that would allow Carriage Rollers to slip off. Replace Rail as needed.
CB-DBP	Lubricant level of Filter, Regulator, Lubricator	Cessation of oil dripping through the 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. Depressurize 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.
CB-DBP	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.

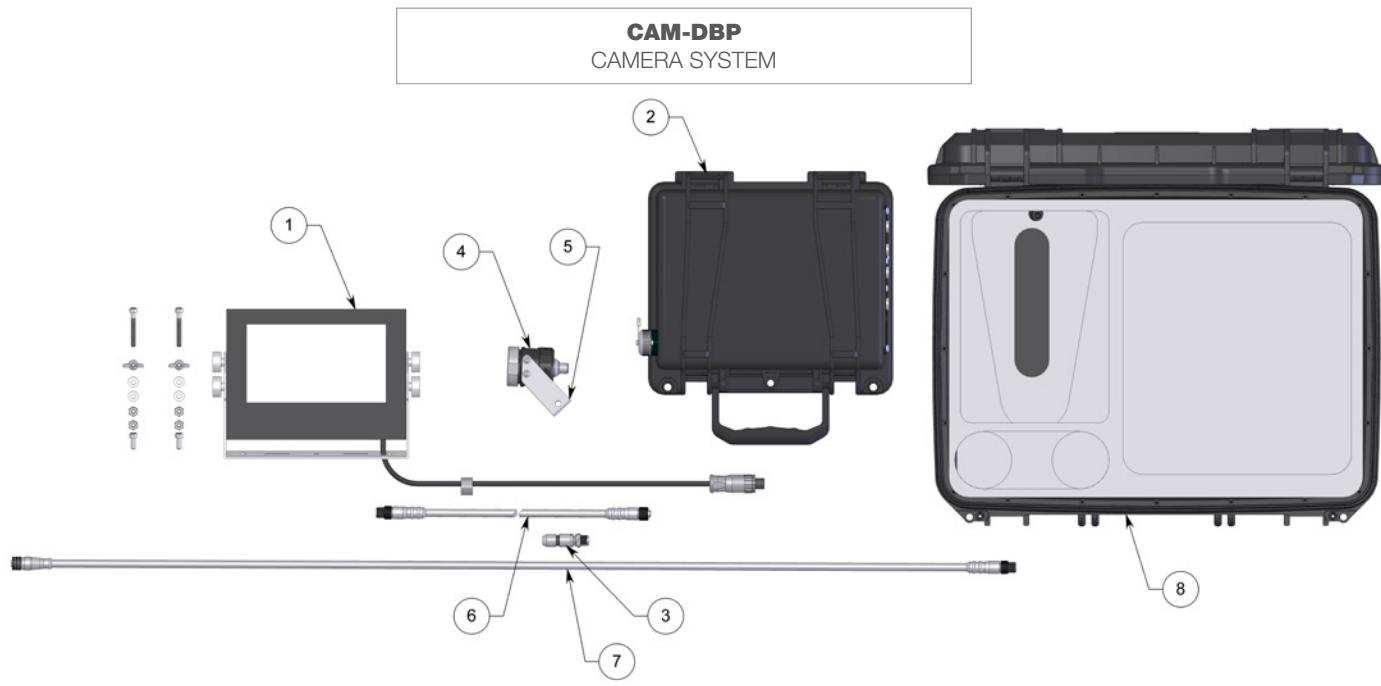
Please see separate User Manuals for the ABX-3L-V2 Hose Tractor and AK-3L Air Knife for more detailed information on these components. <https://www.stoneagetools.com/manuals> Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the Domed Bundle Positioner and all accessories.

PART DIAGRAMS

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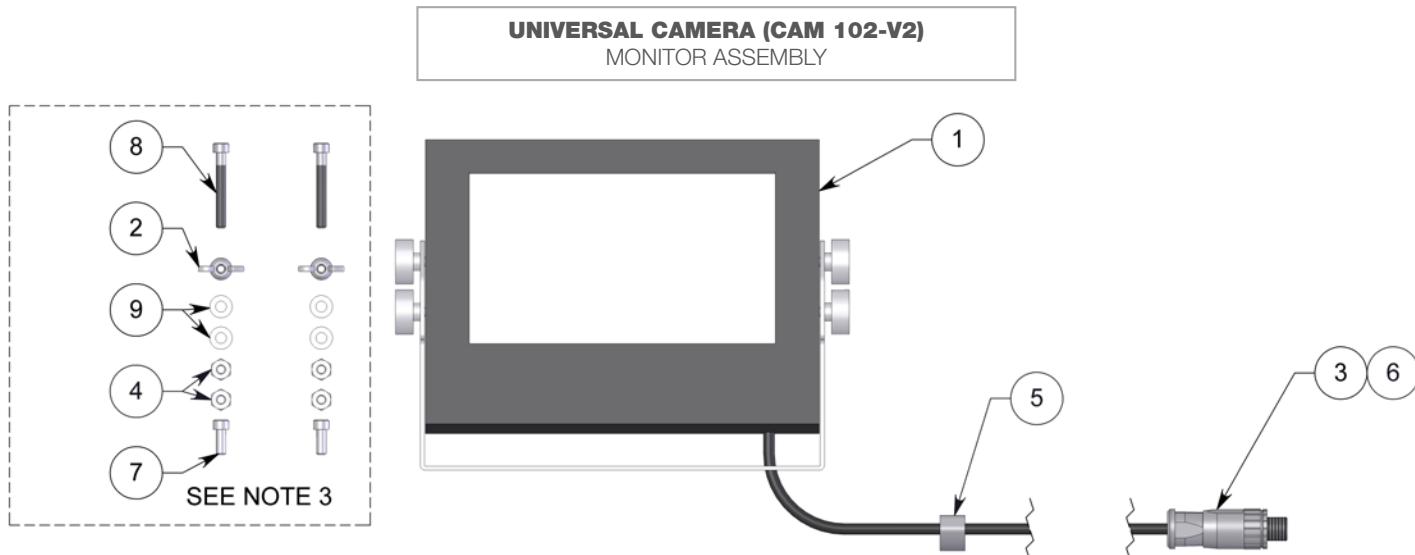
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Please see separate User Manuals for the ABX-3L-V2 Hose Tractor and AK-3L Air Knife for more detailed information on these components. <https://www.stoneagetools.com/manuals> Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the Domed Bundle Positioner and all accessories.



#	PART NUMBER	QTY
1	CAM 102-V2 MONITOR ASSEMBLY	1
2	CAM 200-AC-V2 POWER PACK ASSEMBLY	1
3	CAM 210 CIRCULAR CONNECTOR 4POS SCREW MALE	1
4	CAM 220 CAMERA HOUSING ASSEMBLY	1

5	CAM 223 DBP CAM BRACKET	1
6	CAM 245 CAMERA CABLE	1
7	CAM 246 CAMERA CABLE 4 PIN 1 METER	1
8	CAM 330 CAMERA ASSEMBLY CASE	1

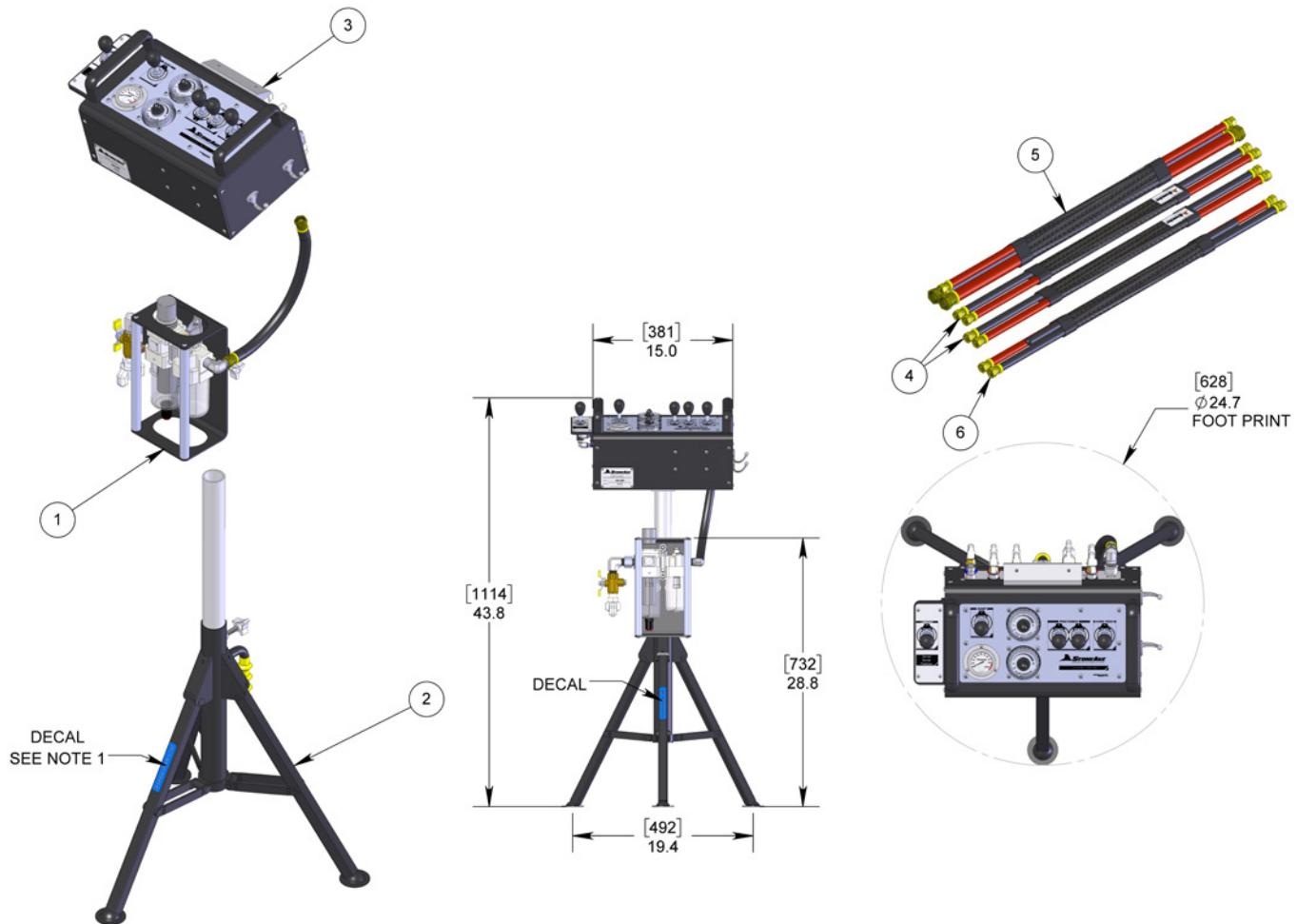


#	PART NUMBER	QTY
1	CAM 102.1 MONITOR	1
2	CAM 149 10-24 WING NUT	2
3	CAM 199 CONEC M12 SCREW TERMINAL MALE 8 POS	1
4	GN 319-H NUT, HEX 10-24 SS	4

5	CAM 283 VELCRO	1
6	GPHS 0125-OLE-A-BK-0500 HEAT SHRINK, .125 ID X .500 LG BLACK	4
7	GS 319-02 SHCS 10-24 X .50 SS	2
8	GS 319-06 SHCS 10-24 X 1.50 SS	2
9	GW 319-F WASHER, FLAT #10 SS	4

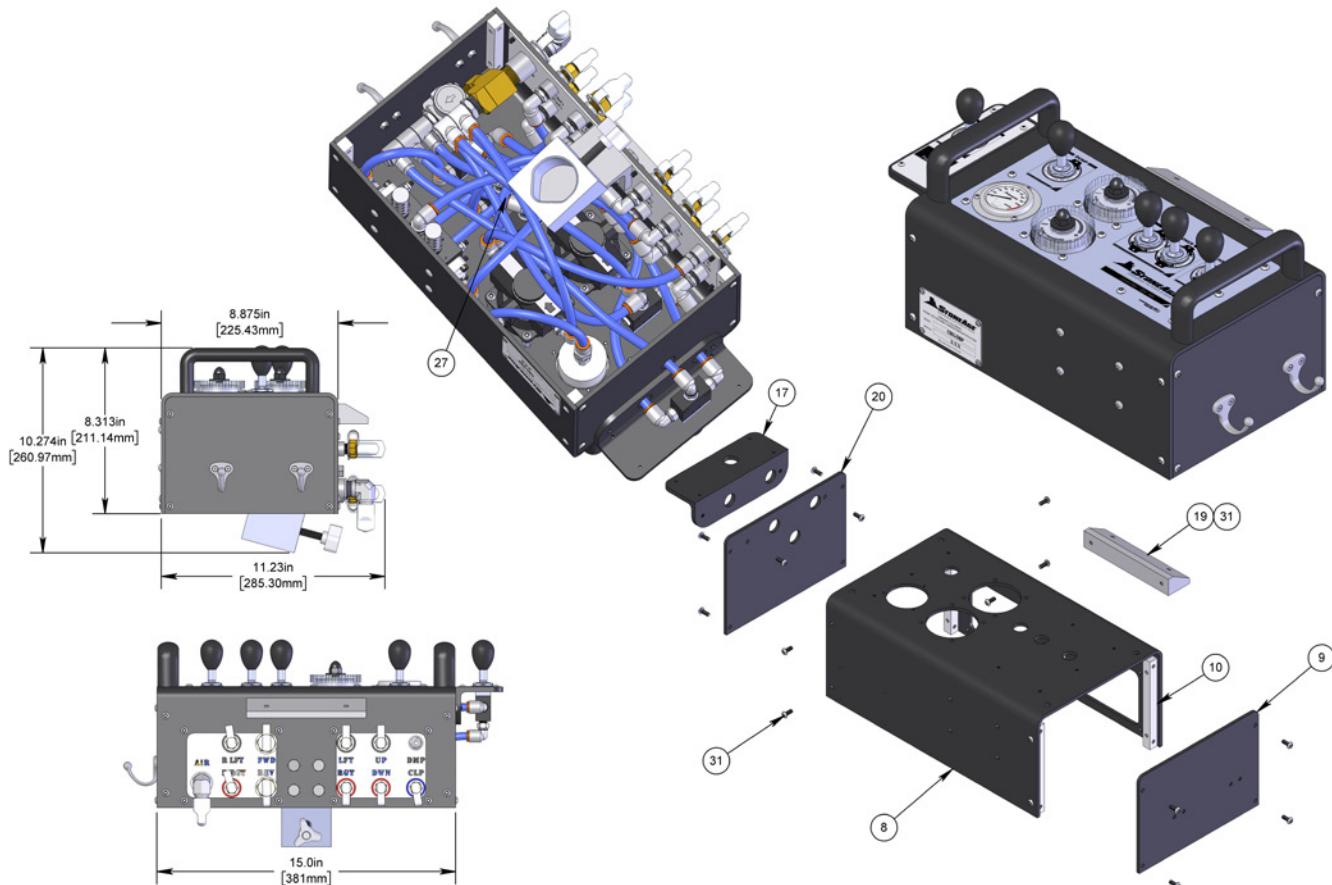
PART DIAGRAMS

CBX-DBP
CONTROL BOX ASSEMBLY



#	PART NUMBER	QTY.	HOSE QTY.
1	CB 310 FRL ASSY	1	-
2	CBX 301 CB STAND ASSEMBLY	1	-
3	CBX 400 CONTROL BOX ASSY	1	-
4	CB 371-25 LWP HOSE BUNDLE ASSY	-	2
5	CB 370-25 ABX HOSE BUNDLE ASSY	-	1
6	DBP 371-25 HOSE BUNDLE ASSEMBLY	-	1

**AUTOBOX® (CBX 400)
CONTROL BOX ASSEMBLY**
(CONTINUED ON NEXT PAGE)

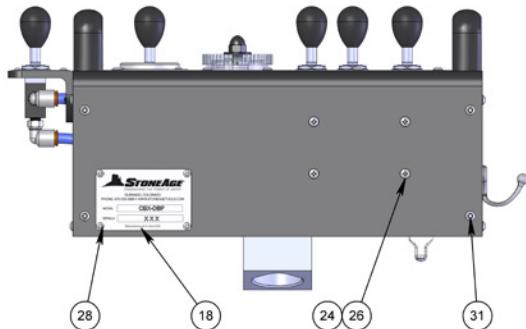


#	PART NUMBER	QTY.
8	CBX 321 FRAME	1
9	CBX 322-CAM SIDE PLATE	1
10	CBX 323 BRACE REAR	4
17	CBX 403 COVER	1
19	CBX 405 DISPLAY MOUNT	1
20	CBX 422 SIDE PLATE	1
27	GPTB 0375-PUR95A-BL	8FT
31	GTB 319-02-32 BHTS .19-32 X .50 TORX SS	44

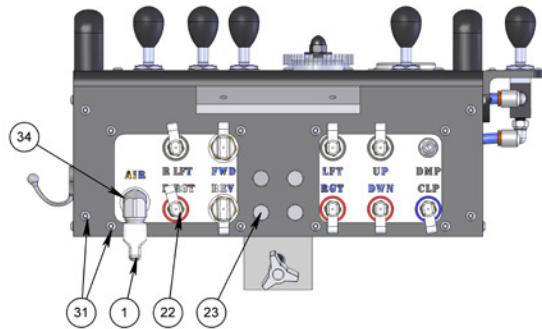
PART DIAGRAMS

**AUTOBOX® (CBX 400)
CONTROL BOX ASSEMBLY**
(CONTINUED)

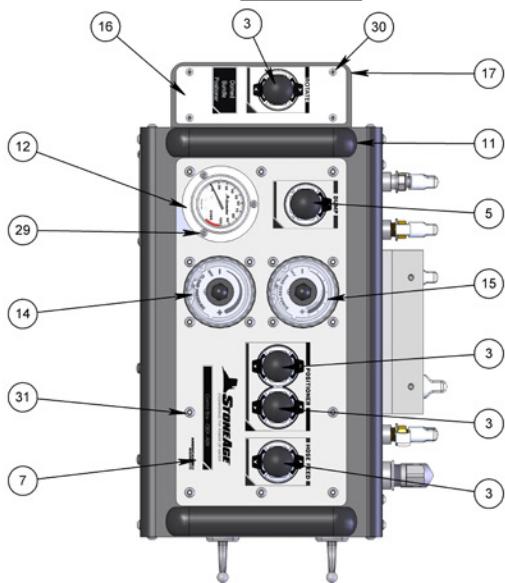
FRONT ASSEMBLY



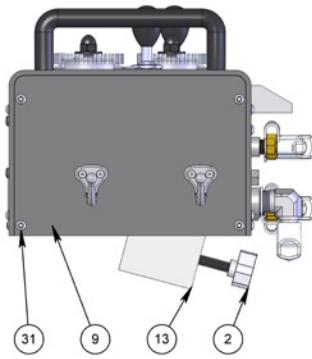
REAR ASSEMBLY



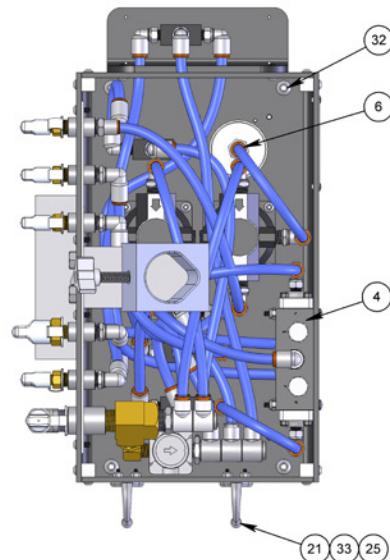
TOP ASSEMBLY



SIDE VIEW

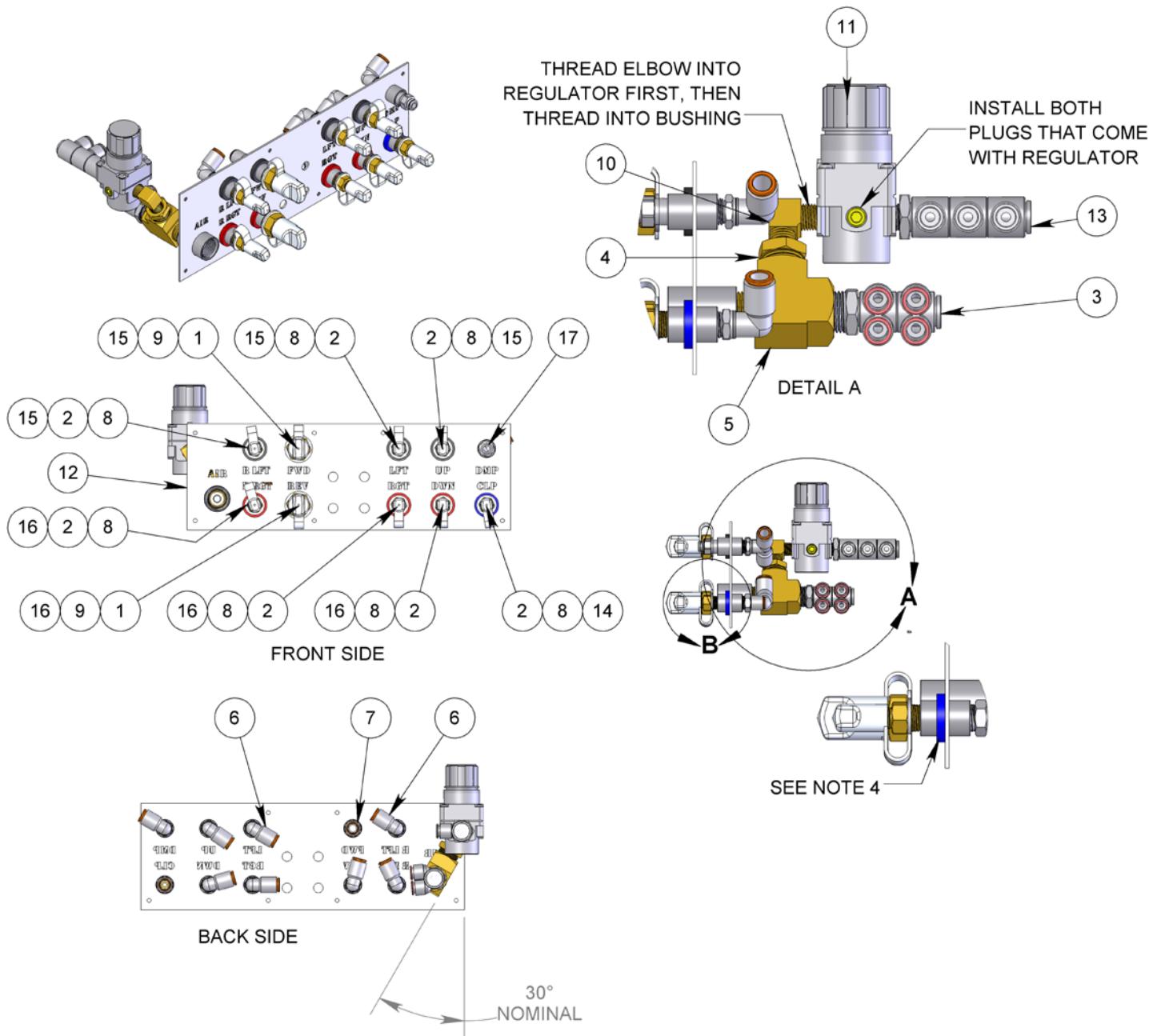


BOTTOM ASSEMBLY



#	PART NUMBER	QTY.
1	BR 167 90° DUST CAP J8 (FOR ABX-3L)	1
2	CB 314 3-LOBE KNOB	1
3	CB 333-HD PNEUM3WAYASSY	4
4	CB 334 RY3 AAA PILOTED SPOOL VALVE ASSY	1
5	CB 337-HD PNEUM3WAYASSY - DUMP	1
6	CB 349 FTG, ADAPTER P4F PL6	1
7	CBX 320 GRAPHIC OVERLAY	1
11	CBX 325 HANDLE TOP	2
12	CBX 326 GAUGE, CUSTOM	1
13	CBX 331 POLE MOUNT WELDMENT	1
14	CBX 335 CLAMP, REG ASSY	1
15	CBX 336 NUMBER, REG ASSY	1
16	CBX 401 GRAPHIC OVERLAY	1
17	CBX 403 COVER	1

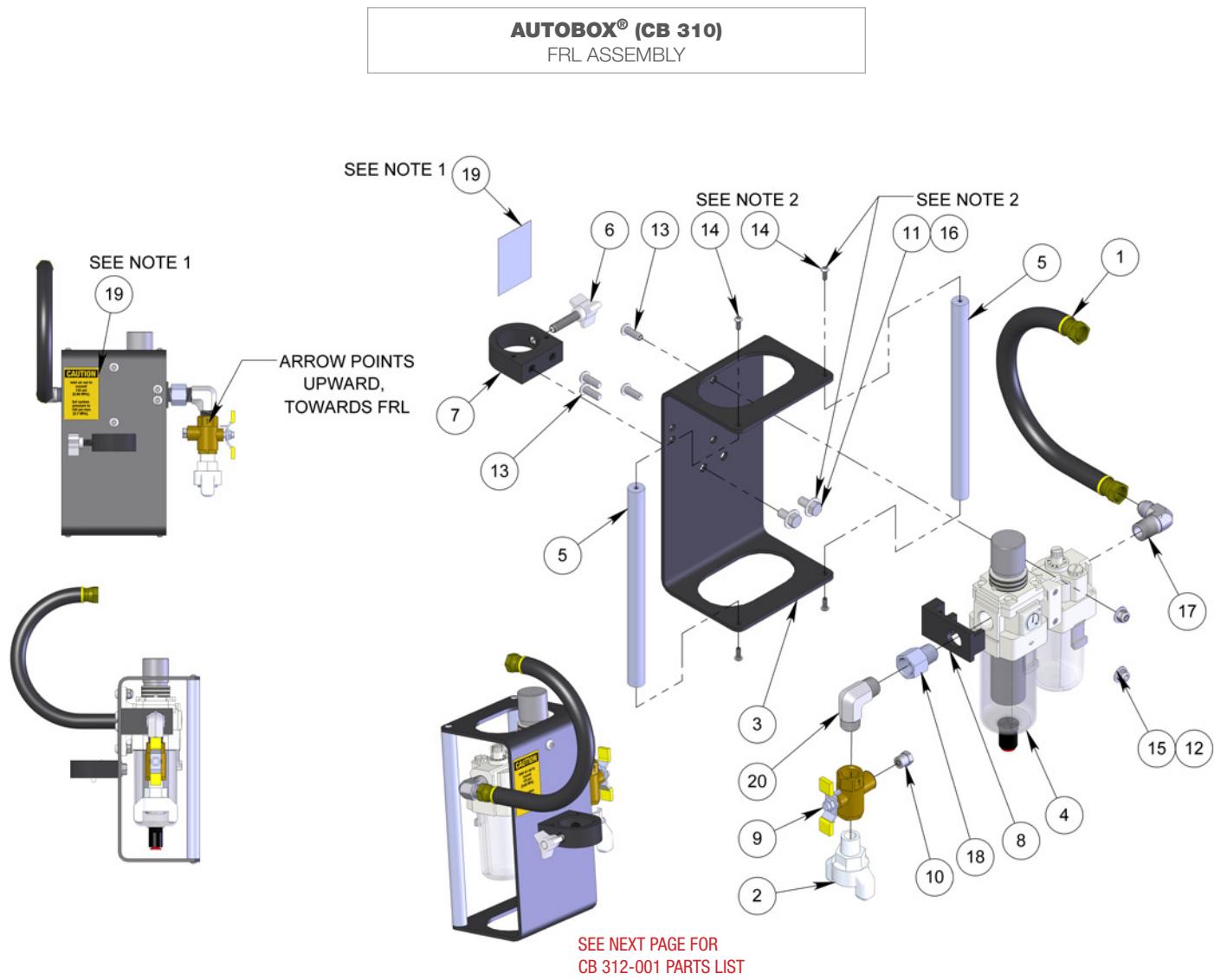
18	CBX 404 SERIAL PLATE	1
21	CBX 423 J-HOOK	2
22	CBX 427-001 COUPLER PLATE, REAR ASSEMBLY	1
23	GB 337-03 BOLT, HEX .37-16 X .75 SS	4
24	GN 319-L NYLOK NUT SS (HC 025.1)	4
25	GN 513-L NYLOK NUT	4
26	GPPH 319-08 PHPMS 10-24 X 2.00 SS	4
28	GR 125-SS-188-250 RIVET	4
29	GSB 313-02 BHCS 6-32 X .50 SS (CB 554)	3
30	GSB 313-0075 BHCS 6-32 X .19 SS	4
31	GTB 319-02-32 BHTS .19-32 X .50 TORX SS	44
32	GTB 331-025 BHTS .31-18 X .62 TORX SS	4
33	GTF 513-025 FHTS .138-32 X 0.63 TORX ZINC	4
34	HRS 573 FTG, ELBOW 90 P8M J8M	1

AUTOBOX® (CB 427-001)
COUPLER PLATE, REAR ASSEMBLY


#	PART NUMBER	QTY
1	BR 167 DUST CAP J8	2
2	BR 168 DUST CAP, J4	7
3	CB 330 FTG, MANIFOLD 90 P8M 4XPL6	1
4	CB 343 FTG, BUSHING P8M P4F	1
5	CB 346 FTG, TEE P8M P8F P8F	1
6	CB 351 FTG, ELBOW SWIVEL 90 P4M PL6	8
7	CB 354 FTG, ADAPTER P4M PL6	2
8	CB 356 FTG, ADAPTER P4M J4M BRASS	7

9	CB 357 FTG, ADAPTER P4M J8M BRASS	2
10	CB 365 FTG, ELBOW 90 P4M P4M	1
11	CB 704 PRESSURE REGULATOR, 60 PSI	1
12	CBX 427.1-001 COUPLER PLATE, REAR WELDMENT	1
13	CBX 440 FTG, MANIFOLD 90 P4M 3XPL6	1
14	GP 011-B BLUE ID BAND MED	1
15	GP 011-BK BLACK ID BAND MED	4
16	GP 011-R RED ID BAND MED	4
17	SM 309 FTG, ADAPTER P4M PL4	1

PART DIAGRAMS

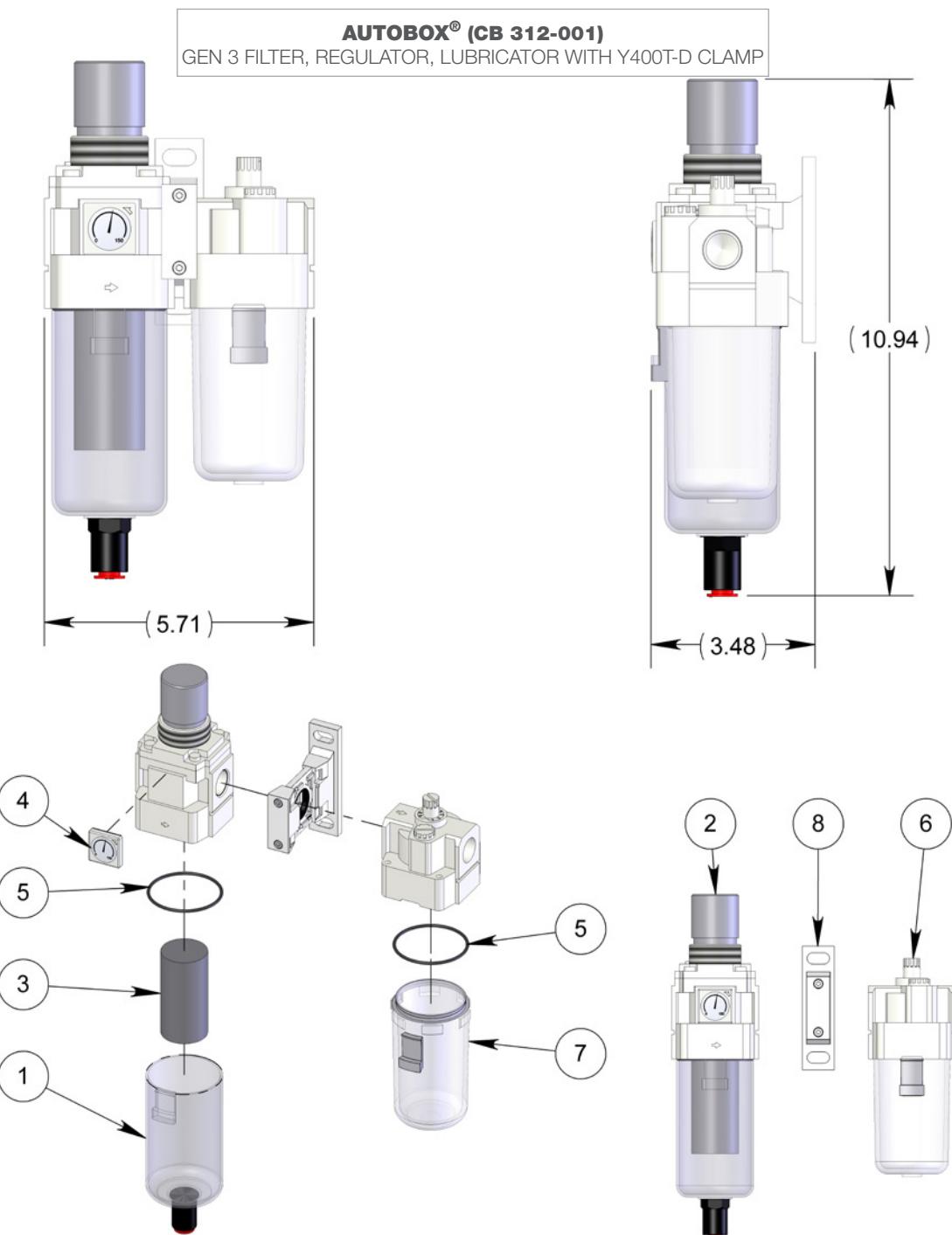


NOTES:

- CLEAN ALL DEBRIS & OILS BEFORE INSTALLING. INSTALL AT APPROXIMATE ORIENTATION AND LOCATION & AT ROOM TEMP.
- APPLY BLUE LOCTITE (PN: 242 OR EQUIVALENT) TO ALL STRAIGHT THREADED FASTENERS.
- APPLY THREAD SEALANT (LOCTITE 567 OR EQUIVALENT) TO ALL TAPERED THREADS.
- ADD BLUE GOOP WHICH IS A SWAGELOK BRAN ANTI-SEIZE TO ALL OTHER THREADED HARDWARE OR AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.

#	PART NUMBER	QTY.
1	CB 052-14 HOSE ASSY (FOR CB ABX)	1
2	CB 114 INLET FITTING	1
3	CB 311 FRL FRAME	1
4	CB 312-001 GEN3 FRL WITH Y400T-D CLAMP	1
5	CB 313 ROD	2
6	CB 314 3-LOBE KNOB	1
7	CB 328-001 POLE MOUNT	1
8	CB 395 FRL BRACKET	1
9	CB 792 VALVE, AUTODRAIN, P8	1
10	DB 026 MUFFLER, SINTERED BRONZE, P4	1

11	GB 337-03 BOLT, HEX .37-16 X .75 SS	2
12	GN 331-L NYLOK NUT SS	2
13	GSB 331-035 BHCS .31-18 X .88 LG SS	4
14	GTB 319-02-32 BHTS .19-32 X .50 LG TORX-SS	4
15	GW 331-F FLAT WASHER SS	2
16	GW 337-F FLAT WASHER SS	2
17	HRS 573 FITTING 90 DEG P8J8	1
18	ML 077-P8 BUSHING	1
19	PL 156-125 CAUTION INLET AIR, 125PSI MAX	1
20	SBT 292.1 FTG 90° ELBOW P8MP8M	1

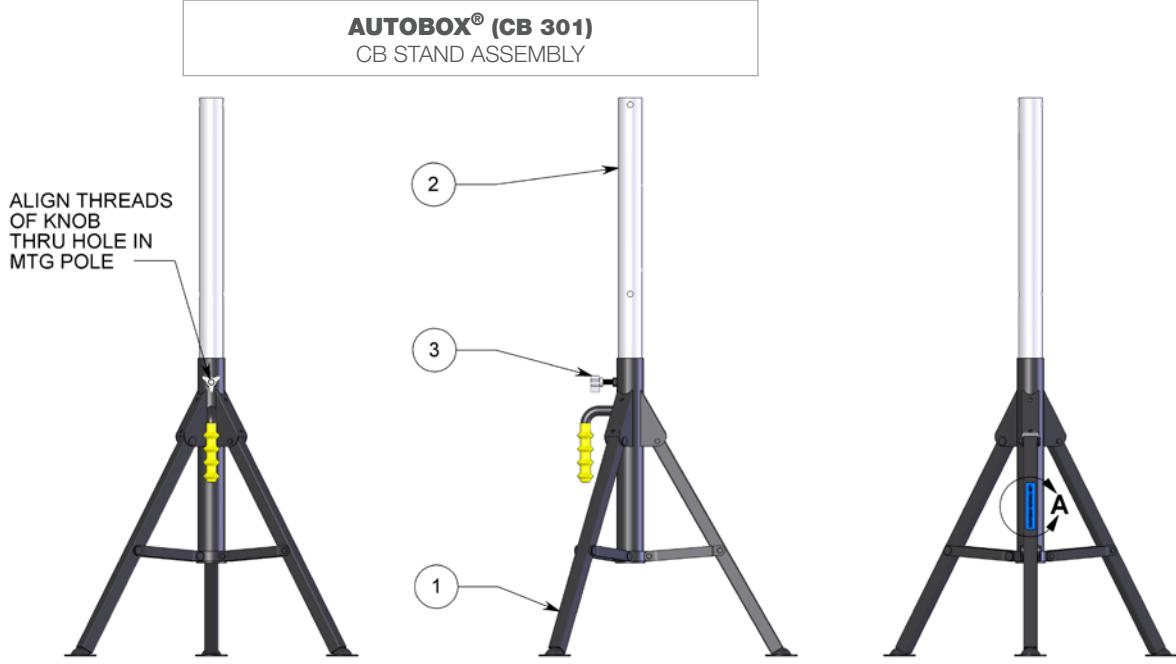


#	PART NUMBER	QTY.
1	CB 312.1.1 FILTER REGULATOR BOWL	1
2	CB 312.1.3 FILTER BODY	1
3	CB 312.1.6 REPLACEMENT SMC FILTER	1
4	CB 312.1.7 SMC GAUGE WITH LENS	1
5	CB 312.1.8 ORING FOR AW40-A REGULATOR	2
6	CB 312.2.1 LUBRICATOR BODY	1
7	CB 312.2.2 LUBRICATOR BOWL	1
8	CB 312.3-001MODIFIED Y400T-D BRACKET ASSEMBLY, FRL	1

PART DIAGRAMS



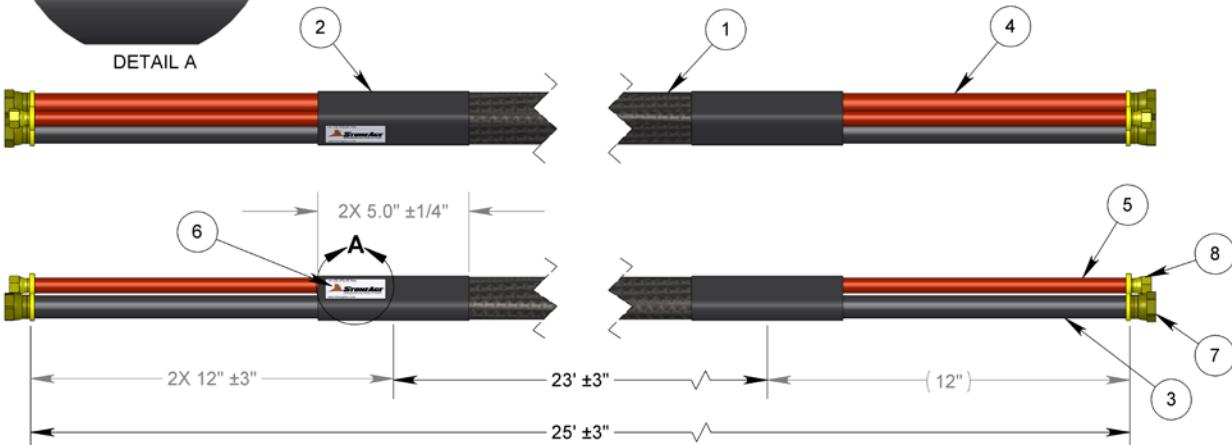
DETAIL A
SEE NOTE 1



#	PART NUMBER	QTY.
1	CB 3001.1 CUSTOM SUMNER STAND	1
2	CB 303 MTG POLE	1
3	CB 314 3-LOBE KNOB	1
4	PL 163 DECAL, LEG TOWARD OPERATOR	1



AUTOBOX® (CB 370-25)
CONTROL LINE ASSEMBLY

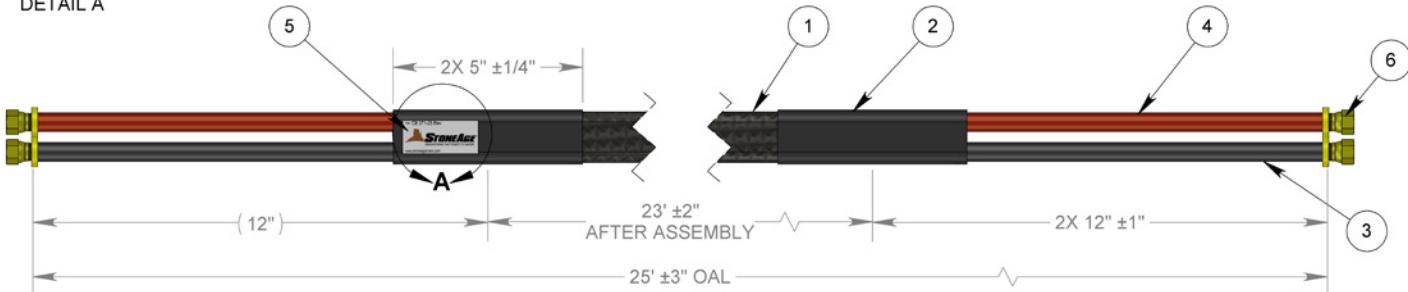


#	PART NUMBER	QTY.
1	GPSL 1750-NYL-G-BK 1.75 DIA BRAIDED EXPANDABLE HEAVY DUTY NYLON	1
2	GPHS 2000-OLE-A-BK 2.00 DIA HEAVY DUTY MOISTURE SEAL HEAT-SHRINK	2
3	GPHO 0500-RUB-BK 1/2" ID X 3/4" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, BLACK	1
4	GPHO 0500-RUB-RD 1/2" ID X 3/4" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, RED	1
5	GPHO 0250-RUB-RD 1/4" ID X 1/2" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, RED	1
6	CB 370.7-25 LABEL PROVIDED BY VENDOR	1
7	GP 053 1/2" PUSH-ON BRASS HOSE FITTING 1/2" JIC	4
8	SRT 122 1/4" PUSH-ON BRASS HOSE FITTING 1/4" JIC	2



AUTOBOT® (CB 371-25)
CONTROL LINE ASSEMBLY

DETAIL A

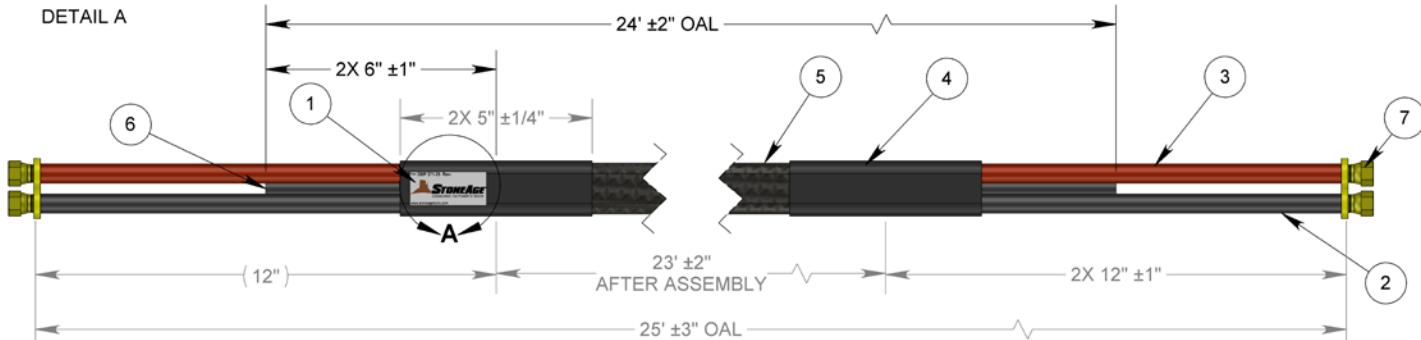


#	PART NUMBER	QTY.
1	GPSL 1000-NYL-G-BK 1.00 DIA BRAIDED EXPANDABLE HEAVY DUTY NYLON (TECHFLEX GORILLA SLEEVE NHN 1.00 BK)	1
2	GPHS 2000-OLE-A-BK 2.00 DIA HEAVY DUTY MOISTURE SEAL HEAT-SHRINK (REF MC 7270K85)	2
3	GPHO 0250-RUB-BK 1/4" ID X 1/2" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, BLACK (REF MC 5288K11-BLACK)	1
4	GPHO 0250-RUB-RD 1/4" ID X 1/2" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, RED (REF MC 5288K11-RED)	1
5	CB 371.7-25 LABEL PROVIDED BY VENDOR	1
6	SRT 122 1/4" PUSH-ON BRASS HOSE FITTING 1/4" JIC (DIXON 287-0407)	4



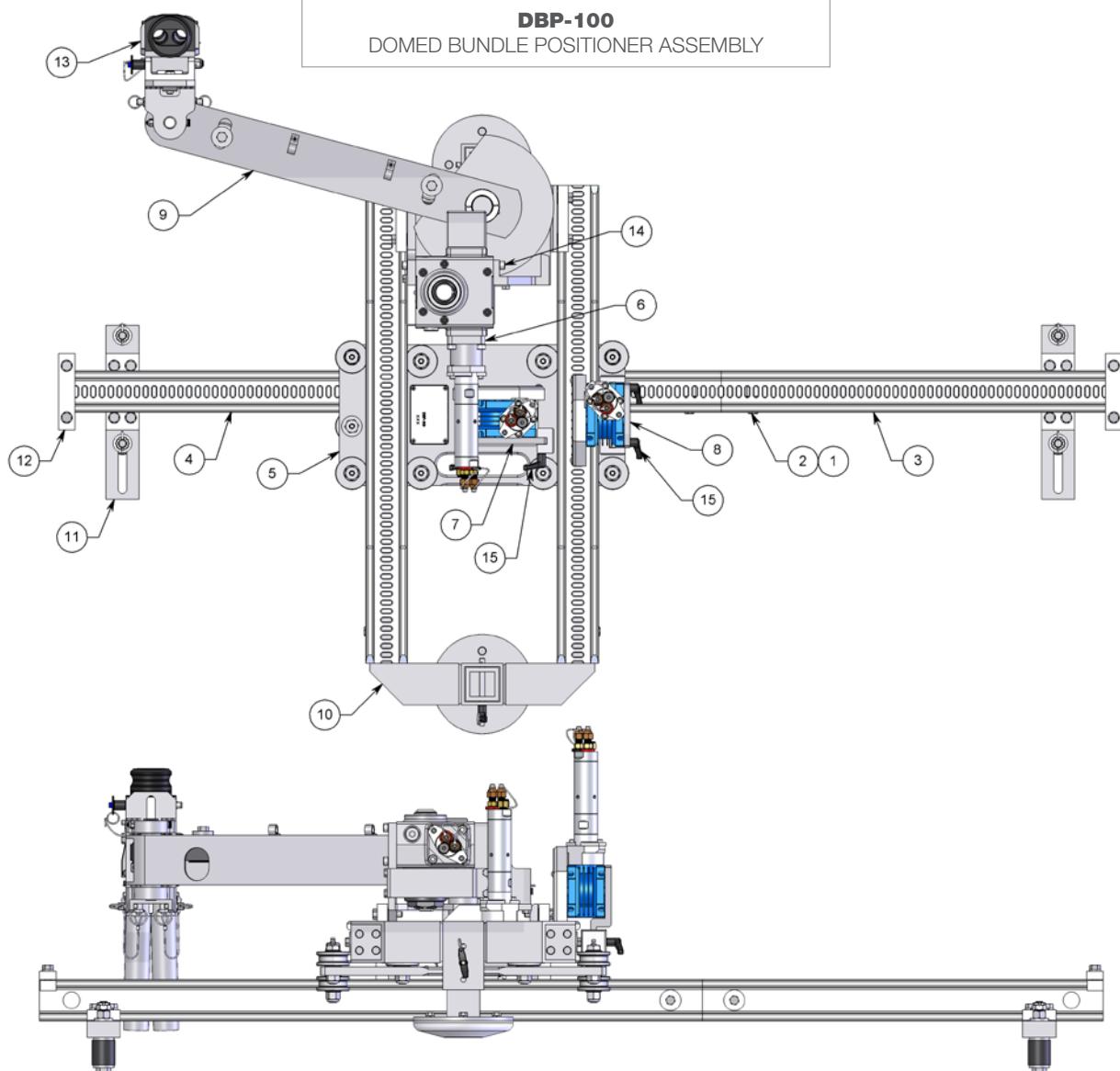
AUTOBOT® (DBP 371-25)
CONTROL LINE ASSEMBLY

DETAIL A



#	PART NUMBER	QTY.
1	DBP 371.7-25 LABEL PROVIDED BY VENDOR	1
2	GPHO 0250-RUB-BK 1/4" ID X 1/2" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, BLACK (REF MC 5288K11-BLACK)	1
3	GPHO 0250-RUB-RD 1/4" ID X 1/2" OD PUSH-ON AIR HOSE, BUNA-N/PVC, 250 PSI, RED (REF MC 5288K11-RED)	1
4	GPHS 2000-OLE-A-BK 2.00 DIA HEAVY DUTY MOISTURE SEAL HEAT-SHRINK (REF MC 7270K85)	2
5	GPSL 1000-NYL-G-BK 1.00 DIA BRAIDED EXPANDABLE HEAVY DUTY NYLON (TECHFLEX GORILLA SLEEVE NHN 1.00 BK)	1
6	GPTB 0500-PUR95A-BK 1/2 OD X 21/64 ID, URETHANE TUBING, OPAQUE BK, FREELIN-WADE 66 (REF MC 5648K33-BLACK)	1
7	SRT 122 1/4" PUSH-ON BRASS HOSE FITTING 1/4" JIC (DIXON 287-0407)	4

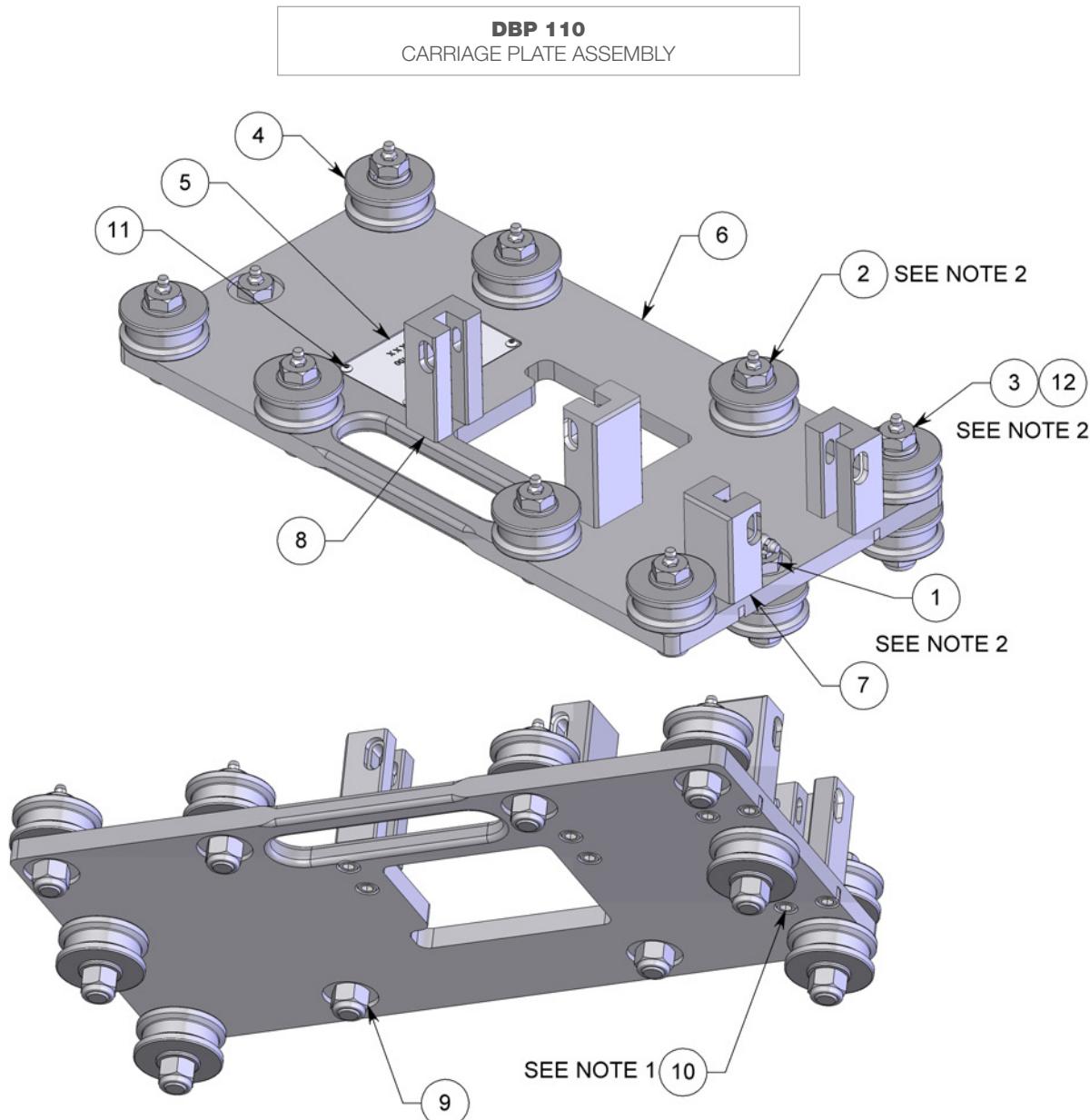
PART DIAGRAMS



#	PART NUMBER	QTY.
1	BR 006-2.5-001 2.5IN SPLICE TUBE	1
2	BR 008-2.5-001 WEDGE BOLT ASSEMBLY	2
3	BU 002-2-001 2.5 BOX RAIL EXTRUSION, SLOTTED	1
4	BU 002-3.33-001 2.5 BOX RAIL EXTRUSION, SLOTTED	1
5	DBP 110 CARRIAGE PLATE ASSY	1
6	DBP 120 CONE DRIVE PIVOT ASSY	1
7	DBP 130 MOTOVARIO ASSY HZ	1
8	DBP 140 MOTOVARIO ASSY VT	1
9	DBP 148 ROTARY ARM ASSY	1
10	DBP 178 Y RAIL ASSY	1
11	DBP 185 RAIL CLAMP ASSY HZ	2
12	DBP 192 STOP ASSY 2.5	2
13	DBP 250 GUIDE TUBE ASSEMBLY	1
14	GS 3M8-22-1.25 SHCS M8X1.25 X 22 SS	4
15	SRT 557 ADJUSTABLE HANDLE .25-20 X 1.19 SS	4

BR 008-2.5-001 WEDGE BOLT ASSEMBLY

#	PART NUMBER	QTY.
1	BR 009-001 GARTER SPRING	1
2	BR 012-2.5 POSITIONING WASHER	1
3	BRLM 028-001 WEDGE DISC	1
4	BRLM 029-001 WEDGE DISC, TAPPED	1
5	BRLM 030-001 WEDGE BOLT SPLIT HALF	1
6	GB 531-09 BOLT, HEX .31-18 X 2.25	1

**NOTES:**

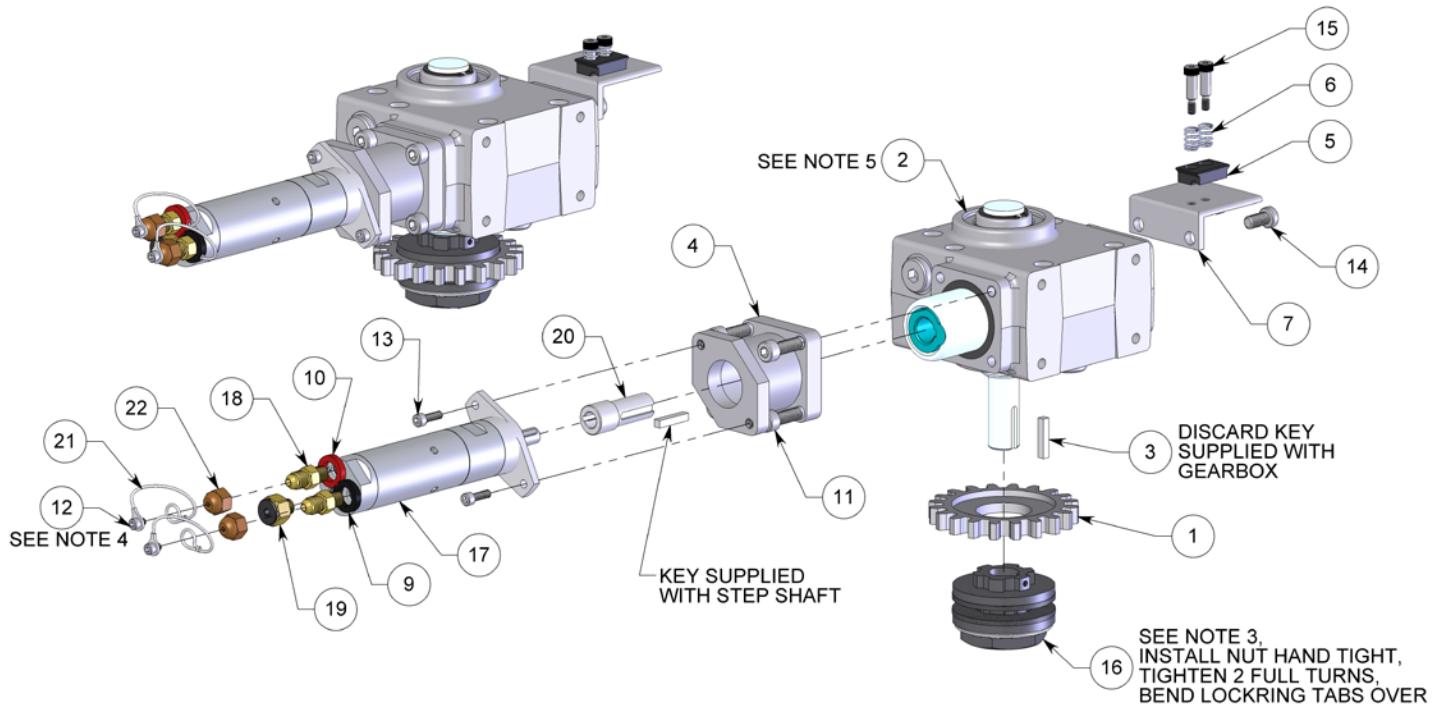
1. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
2. BLUE GOOP® IS A SWAGELOK® BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.

#	PART NUMBER	QTY.
1	BR 052-2.0-90 AXLE-ZERK	1
2	BR 052-2.0 AXLE-ZERK	7
3	BR 052-3.25 AXLE-ZERK	2
4	BR 055 ROLLER ASSY	12
5	DBP 109 SERIAL PLATE	1
6	DBP 111 CARRIAGE HZ	1
7	DBP 115 HANDLE MOUNT BLOCK	2
8	DBP 116 HANDLE MOUNT BLOCK HZ	2
9	GN 350-L NYLOK NUT SS	10
10	GS 331-03 SHCS .31-18 X .75 SS	8
11	GSB 313-0075 BHCS 6-32 X .19 SS	4
12	GW 350-L LOCK WASHER SS	2

PART DIAGRAMS

DBP 120

CONE DRIVE PIVOT ASSEMBLY



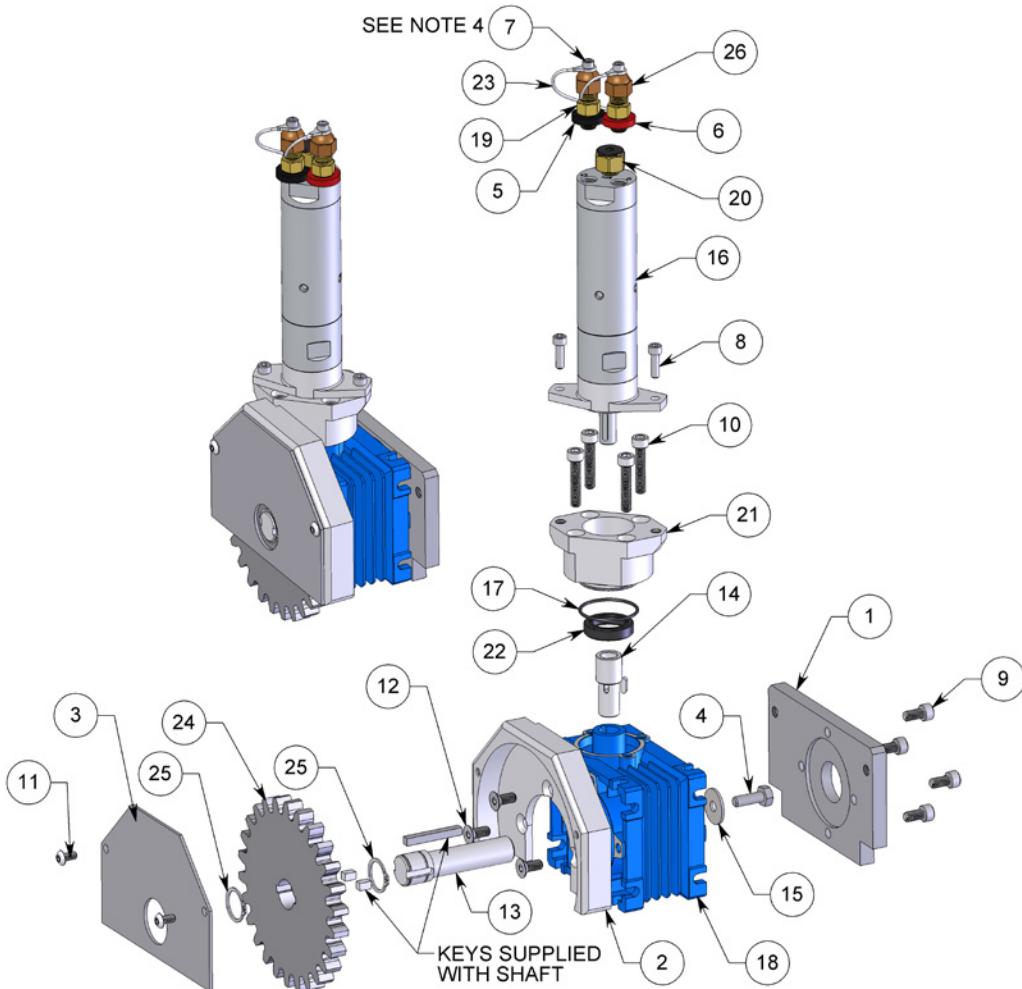
NOTES:

1. APPLY TEFLOON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.
2. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
3. APPLY SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS AND THREADS OF TORQUE LIMITER.
4. APPLY RED LOCTITE® (262 OR EQUIVALENT) WHERE NOTED.
5. REMOVE (4) M8 TORX SCREWS AND FLANGE, DISCARD.

#	PART NUMBER	QTY.
1	BUD 170-D-SS SPUR GEAR FOR BUD WITH TORQUE LIMITER	1
2	DBP 121.1 GEARBOX, CONE DRIVE	1
3	DBP 121.1.1 KEY, OVERRSIZE	1
4	DBP 122 CONE DRIVE ADAPTER	1
5	DBP 123 CABLE CLAMP BLOCK	1
6	DBP 124 STEEL COMPRESSION SPRING	2
7	DBP 168 GEARBOX PLATE	1
8	GK 188-188-1000-SE KEY (CST 022.1)	1
9	GP 013-BK BLACK ID BAND, SM	1
10	GP 013-R RED ID BAND, SM	1
11	GS 3M8-22-1.25 SHCS M8X1.25 X 22 SS	4

12	GS 316-01 SHCS .16-32 X .25 SS	2
13	GS 319-025 SHCS .19-24 X .62 SS	2
14	GSLH 3M8-16-1.25 SHCS, LOW HD M8X1.25 X 16 SS	2
15	GSSH 0250-0625-SS SHOULDER SCREW	2
16	LP 250-75 TORQUE LIMITER	1
17	LWP 520-001 AIR MOTOR	1
18	LWP 556 FTG, ADAPTER P2M J4M	2
19	LWP 557 FTG, EXHAUST PROTECTOR P2M	1
20	SKRL 148 STEP SHAFT, 56C	1
21	SRT 209.1 LANYARD ASSY VT (CUT TO LENGTH)	2
22	SRT 558 J4 CAP	2

DBP 130
MOTOVARIO HORIZONTAL ASSEMBLY

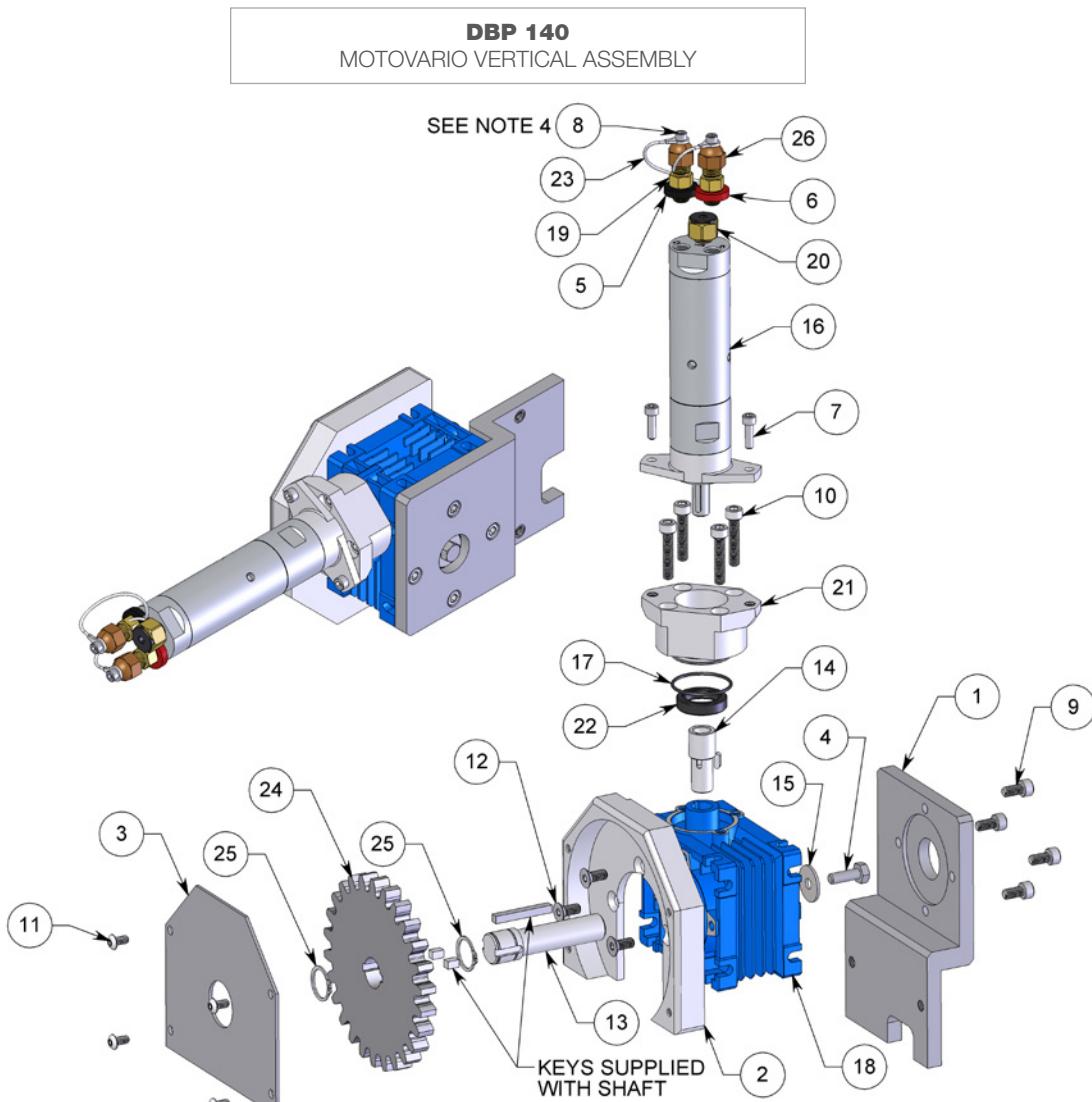
**NOTE:**

1. APPLY TEFLOON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.
2. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
3. APPLY SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS.
4. APPLY RED LOCTITE® (262 OR EQUIVALENT) WHERE NOTED.

#	PART NUMBER	QTY.
1	DBP 131 MOTOVARIO PLATE HZ	1
2	DBP 135 GEAR COVER HZ	1
3	DBP 136 GEAR COVER PLATE HZ	1
4	GB 325-03 BOLT, HEX .25-20 X .75 SS	1
5	GP 013-BK BLACK ID BAND, SM	1
6	GP 013-R RED ID BAND, SM	1
7	GS 316-01 SHCS .16-32 X .25 SS	2
8	GS 319-025 SHCS .19-24 X .62 SS	2
9	GS 3M6-12-1.0 SHCS M6X1.0 X 12 SS	4
10	GS 3M6-30-1.0 SHCS M6X1.0 X 30 SS	4
11	GSB 319-015 BHCS .19-24 X .38 SS	2
12	GSF 3M6-14-1.00 FHCS M6X1.00 X 14 SS	3
13	LWP 509 MOTOVARIO SHAFT	1

14	LWP 510-001 STEP SHAFT	1
15	LWP 516 WASHER, OVERSIZED	1
16	LWP 520-001 AIR MOTOR	1
17	LWP 538 O-RING	1
18	LWP 550 MOTOVARIO NMRV030301600_625IN	1
19	LWP 556 FTG, ADAPTER P2M J4M	2
20	LWP 557 FTG, EXHAUST PROTECTOR P2M	1
21	SKRL 179 MOTOR MOUNT HUB	1
22	SL 010 SEAL	1
23	SRT 209.1 LANYARD ASSY VT (CUT TO LENGTH)	2
24	SRT 520 SPUR GEAR SS (6 DP, 14.5 PA, 26 T)	1
25	SRT 537 RETAINING RING, SS EXTERNAL	2
26	SRT 558 J4 CAP	2

PART DIAGRAMS

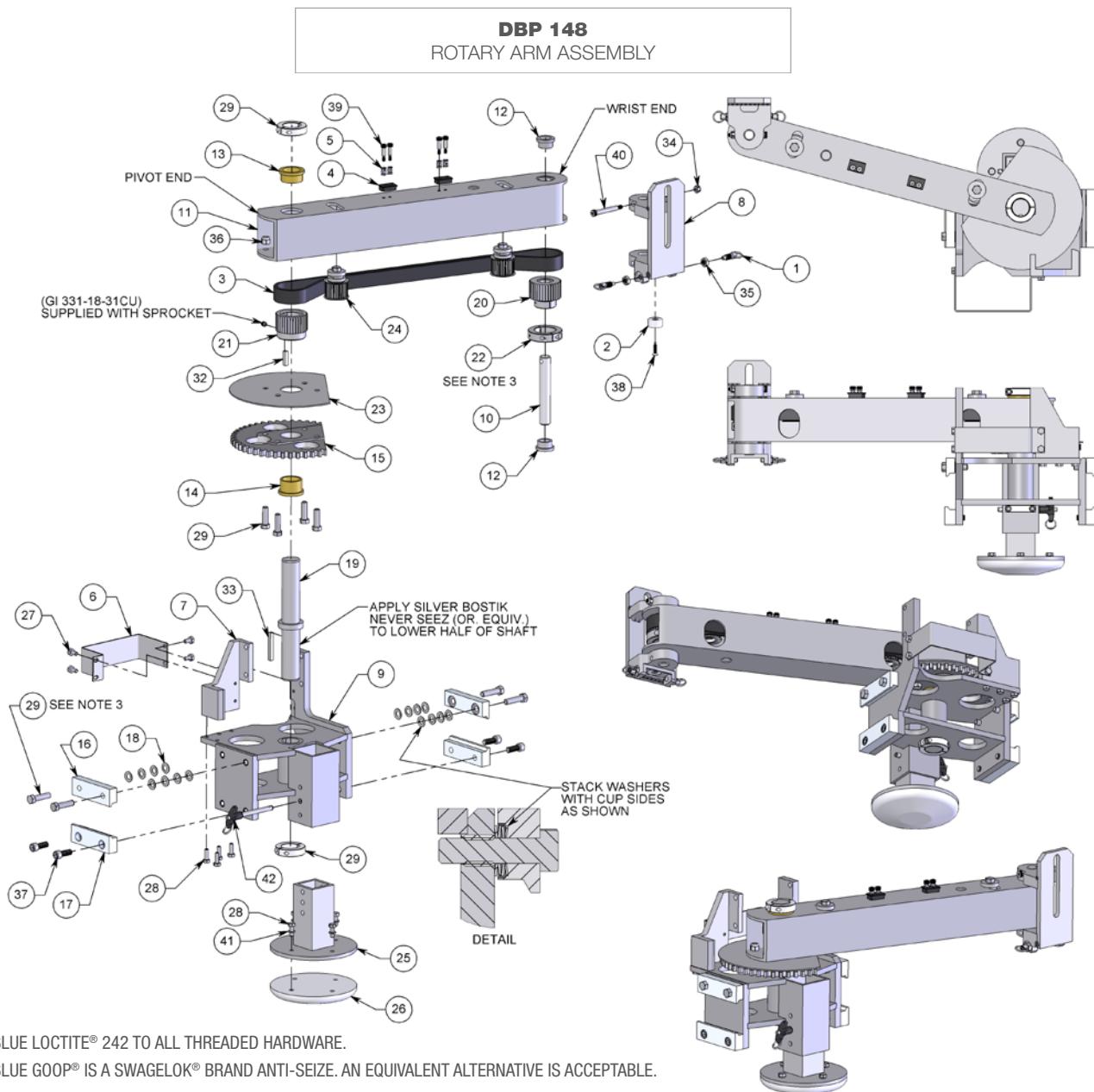


NOTES:

1. APPLY TEFILON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS.
2. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.
3. APPLY SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS.
4. APPLY RED LOCTITE® (262 OR EQUIVALENT) WHERE NOTED.

#	PART NUMBER	QTY.
1	DBP 141 MOTOVARIO PLATE VT	1
2	DBP 145 GEAR COVER VT	1
3	DBP 146 GEAR COVER PLATE VT	1
4	GB 325-03 BOLT, HEX .25-20 X .75 SS	1
5	GP 013-BK BLACK ID BAND, SM	1
6	GP 013-R RED ID BAND, SM	1
7	GS 319-025 SHCS .19-24 X .62 SS	2
8	GS 316-01 SHCS .16-32 X .25 SS	2
9	GS 3M6-12-1.0 SHCS M6X1.0 X 12 SS	4
10	GS 3M6-30-1.0 SHCS M6X1.0 X 30 SS	4
11	GSB 319-015 BHCS .19-24 X .38 SS	4
12	GSF 3M6-14-1.00 FHCS M6X1.00 X 14 SS	3
13	LWP 509 MOTOVARIO SHAFT	1

14	LWP 510-001 STEP SHAFT	1
15	LWP 516 WASHER, OVERSIZED	1
16	LWP 520-001 AIR MOTOR	1
17	LWP 538 O-RING	1
18	LWP 550 MOTOVARIO NMRV030301600_625IN	1
19	LWP 556 FTG, ADAPTER P2M J4M	2
20	LWP 557 FTG, EXHAUST PROTECTOR P2M	1
21	SKRL 179 MOTOR MOUNT HUB	1
22	SL 010 SEAL	1
23	SRT 209.1 LANYARD ASSY VT (CUT TO LENGTH)	2
24	SRT 520 SPUR GEAR SS (6 DP, 14.5 PA, 26 T)	1
25	SRT 537 RETAINING RING, SS EXTERNAL	2
26	SRT 558 J4 CAP	2

**NOTES:**

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

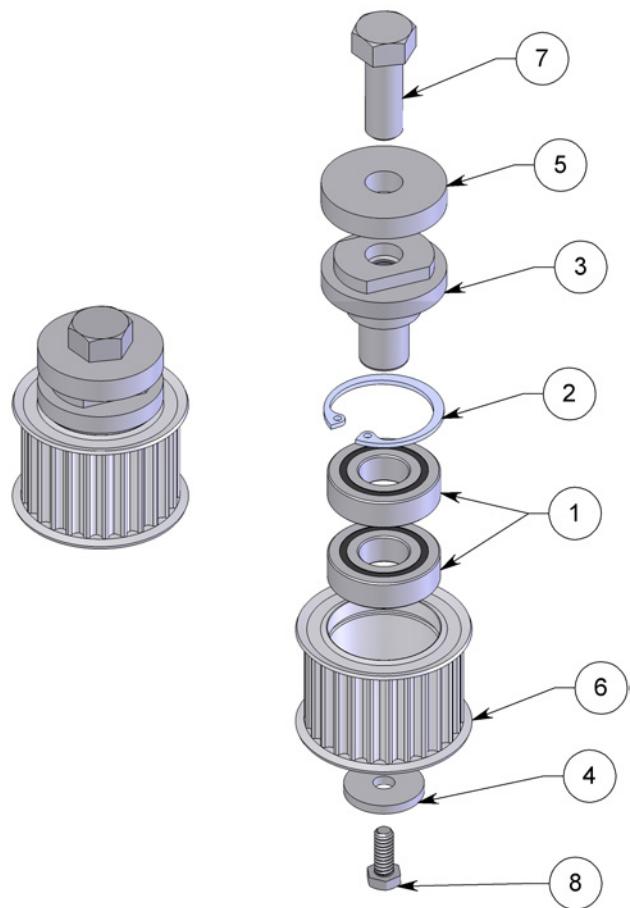
#	PART NUMBER	QTY.
1	ABX 566-001 SPRING PLUNGER ASSY	2
2	CAM 161 MAGNET	1
3	DBP 105 BELT	1
4	DBP 123 CABLE CLAMP BLOCK	2
5	DBP 124 STEEL COMPRESSION SPRING	4
6	DBP 125 GUARD, PIVOT GEAR	1
7	DBP 149 PIVOT BRACKET VT	1
8	DBP 150-001 GUIDE WELDMENT	1
9	DBP 151 PIVOT WELDMENT	1
10	DBP 152 WRIST PIN	1
11	DBP 153 ROTARY ARM	1
12	DBP 154 SLEEVE BEARING, FLANGED .75 ID	2
13	DBP 155 MODIFIED SLEEVE BEARING, FLANGED 1.25 ID	1

14	DBP 155.1 SLEEVE BEARING, FLANGED 1.25 ID	1
15	DBP 156 SPUR GEAR (6 DP, 14.5 PA, 48 T)	1
16	DBP 157 RAIL CLAMP, UPPER	2
17	DBP 158 RAIL CLAMP, LOWER	2
18	DBP 159 WASHER, BELLEVILLE SPRING	16
19	DBP 161 PIVOT PIN WITHOUT KEYS	1
20	DBP 162 WRIST SPROCKET	1
21	DBP 163 PIVOT SPROCKET	1
22	DBP 165 COLLAR ASSY, WRIST	1
23	DBP 166 GUARD LARGE 48T	1
24	DBP 170 BELT IDLER ASSY	2
25	DBP 190 SKID WELDMENT	1
26	DBP 191 SKID PAD	1
27	GB 325-02 BOLT, HEX .25-20 X .50 SS	4

28	GB 325-03 BOLT, HEX .25-20 X .75 SS	8
29	GB 337-05 BOLT, HEX .37-16 X 1.25 SS	4
29	GB 337-06 BOLT, HEX .37-16 X 1.50 SS	4
29	GC SP-20-SS COLLAR ASSY, TWO PIECE	2
32	GK 250-250-1000-SE KEY (SG 072)	1
33	GK 250-250-2000-SE KEY (SBT 155)	1
34	GN 325-L NYLOK NUT SS (TB 044.1)	1
35	GN 337-HJ HEX JAM NUT SS	2
36	GN 337-L NYLOK NUT SS	4
37	GS 337-04 SHCS .37-16 X 1.00 SS	4
38	GSF 319-03 FHCS .19-24 X .75 SS	1
39	GSSH 0250-0625-SS SHOULDER SCREW	4
40	GSSH 0312-2000-SS SHOULDER SCREW	1
41	GW 325-L LOCK WASHER SS	4
42	JKT 315 QUICK RELEASE PIN .312 X 2.50	1

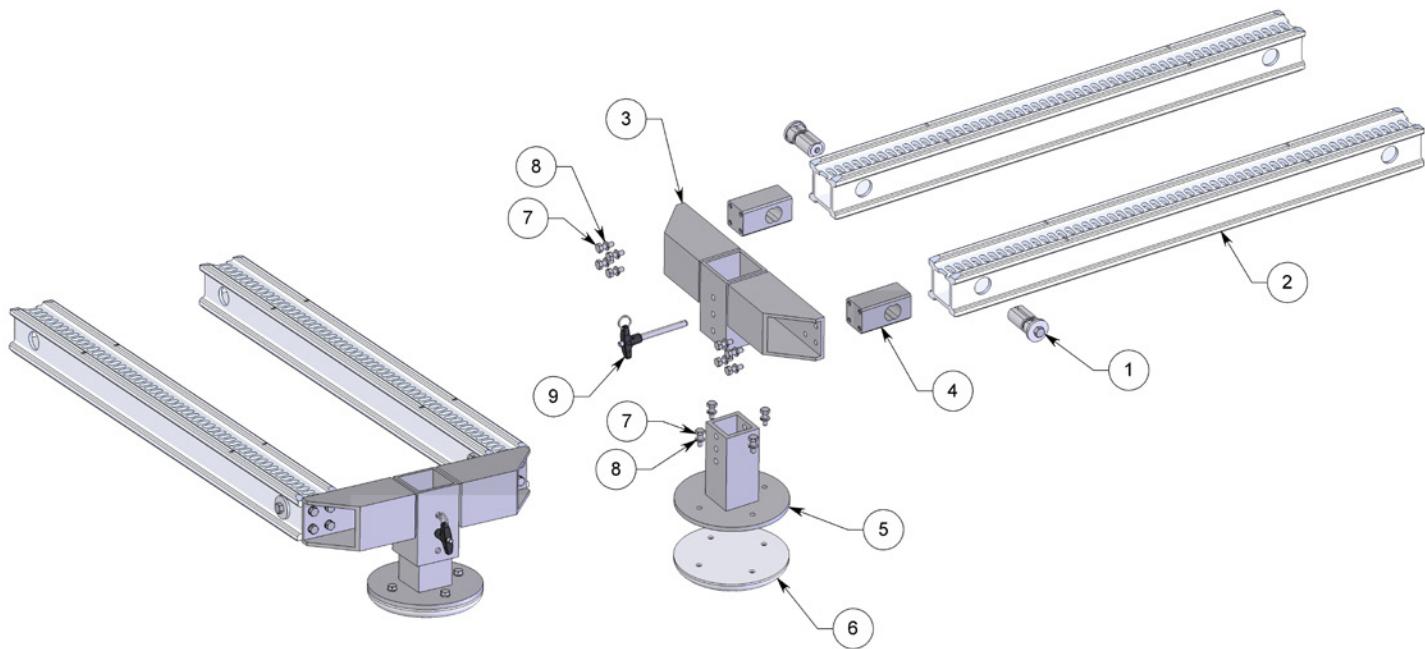
PART DIAGRAMS

DBP 170
BELT IDLER ASSEMBLY



#	PART NUMBER	QTY.
1	ABX 228 BEARING .500 ID X 1.125 OD SEALED PERMALUBE	2
2	ABX 574.2 1.25 ID RETAINING RING	1
3	DBP 171 IDLER STUD	1
4	DBP 172 IDLER BEARING WASHER	1
5	DBP 173 IDLER WASHER TOP	1
6	DBP 175 IDLER AL SPROCKET 26T	1
7	GB 337-04 BOLT, HEX .37-16 X 1.00 SS	1
8	GMS 319-02 HHMS 10-24 X .50 SS	1

DBP 178
Y RAIL ASSEMBLY

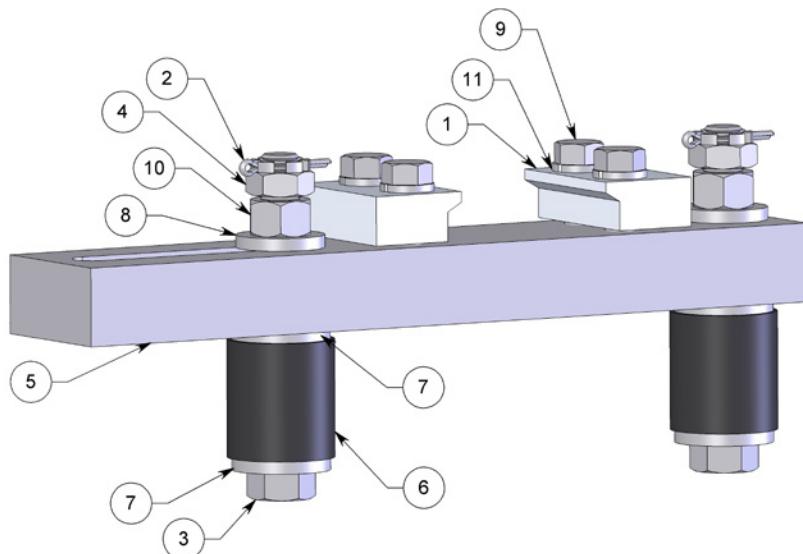
**NOTE:**

1. APPLY BLUE LOCTITE® 242 TO ALL THREADED HARDWARE.

#	PART NUMBER	QTY.
1	BR 008-2.5-001 WEDGE BOLT ASSEMBLY	2
2	DBP 102-29-001 2.5 BOX RAIL EXTRUSION, SLOTTED	2
3	DBP 180 RAIL WELDMENT	1
4	DBP 182 RAIL BLOCK	2
5	DBP 190 SKID WELDMENT	1
6	DBP 191 SKID PAD	1
7	GB 325-03 BOLT, HEX .25-20 X .75 SS	12
8	GW 325-L LOCK WASHER SS	12
9	JKT 315 QUICK RELEASE PIN .312 X 2.50	1

PART DIAGRAMS

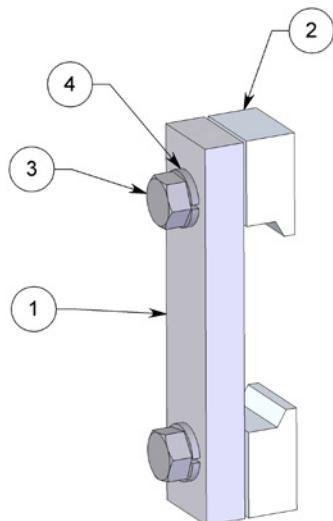
DBP 185
HORIZONTAL RAIL CLAMP ASSEMBLY



#	PART NUMBER	QTY.
1	BR 060-D RAIL CLAMP, DRILLED	2
2	DBP 181 COTTER PIN, SS	2
3	DBP 183 HEX BOLT, .50-13 X 4.0	2
4	DBP 184 LOCKNUT, HEX CASTLE	2
5	DBP 186 MOUNT BLOCK HZ	1

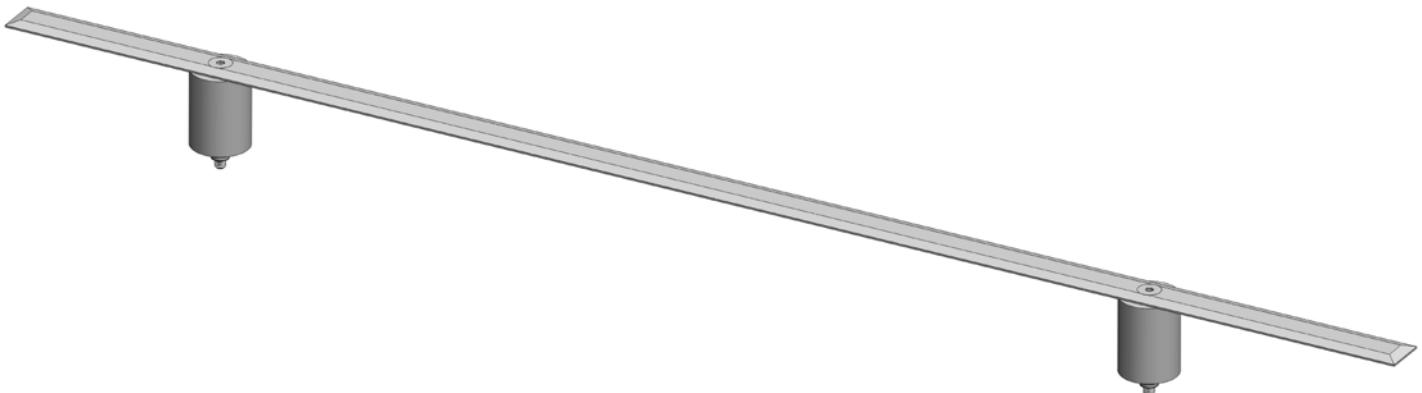
6	DBP 187 WEDGE, 1.36 DIA	2
7	DBP 188 WASHER, LARGE	4
8	DBP 189 WASHER, SMALL	2
9	GB 337-06 BOLT, HEX .37-16 X 1.50 SS	4
10	GN 550-H HEX NUT	2
11	GW 337-L LOCK WASHER SS	4

DBP 192
STOP ASSEMBLY 2.5



#	PART NUMBER	QTY.
1	DBP 193 STOP BLOCK 2.5	1
2	DBP 194 RAIL CLAMP	2
3	GB 337-05 BOLT, HEX .37-16 X 1.25 SS	2
4	GW 337-L LOCK WASHER SS	2

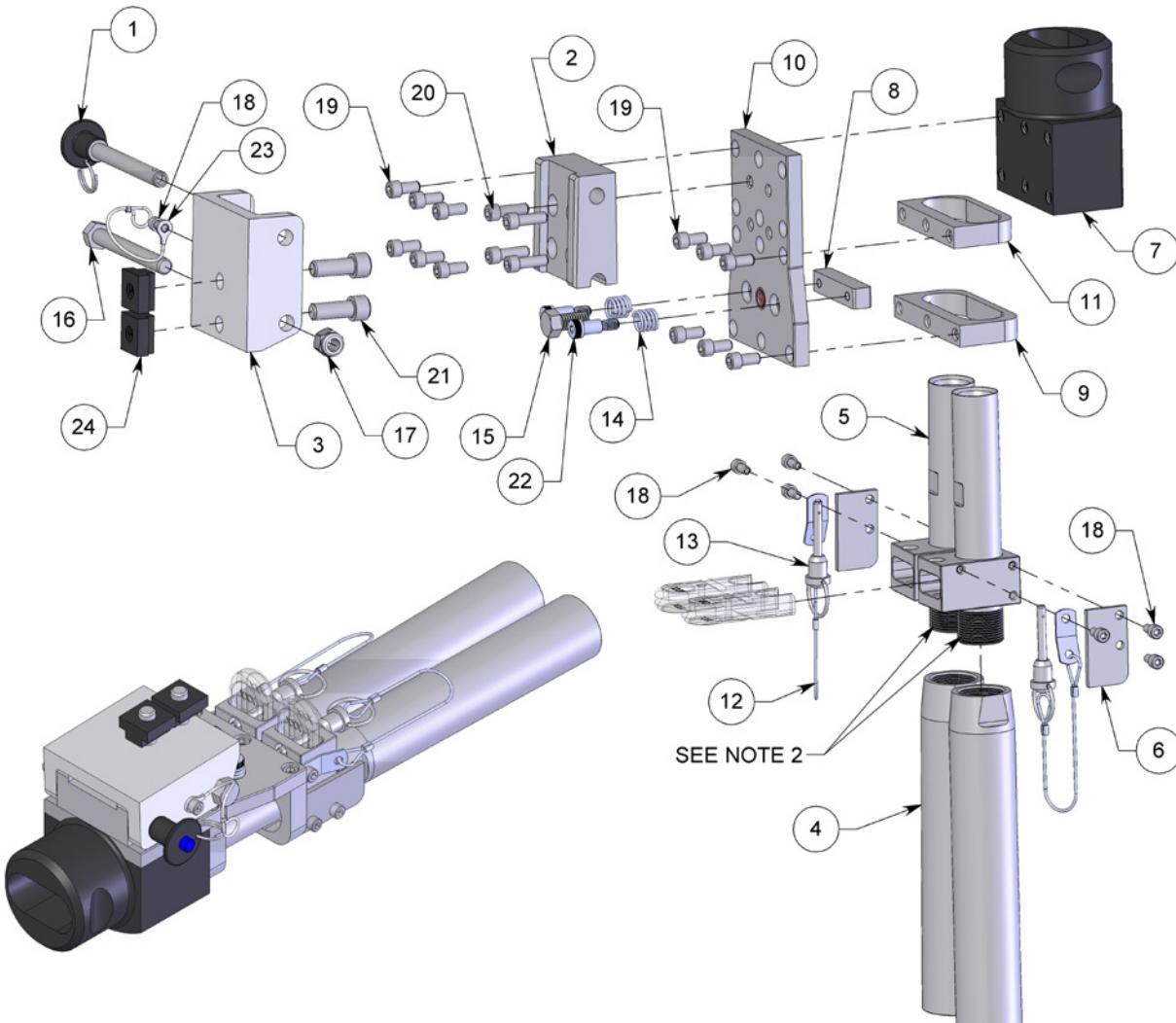
DBP 215-XX
BAR MARKER ASSEMBLY, 12" OR 34"



#	PART NUMBER	-34/QTY.	-12/QTY.
1	DBP 216-34 BAR MARKER	1	-
	DBP 216-12 BAR MARKER	-	1
2	DBP 217 BAR PLUG	2	2
3	GN 325-L NYLOK NUT SS (TB 044.1)	2	2
4	GSF 325-10 FHCS .25-20 X 2.50 SS	2	2
5	GW 325-F FLAT WASHER SS	2	2

PART DIAGRAMS

DBP 250
GUIDE TUBE ASSEMBLY



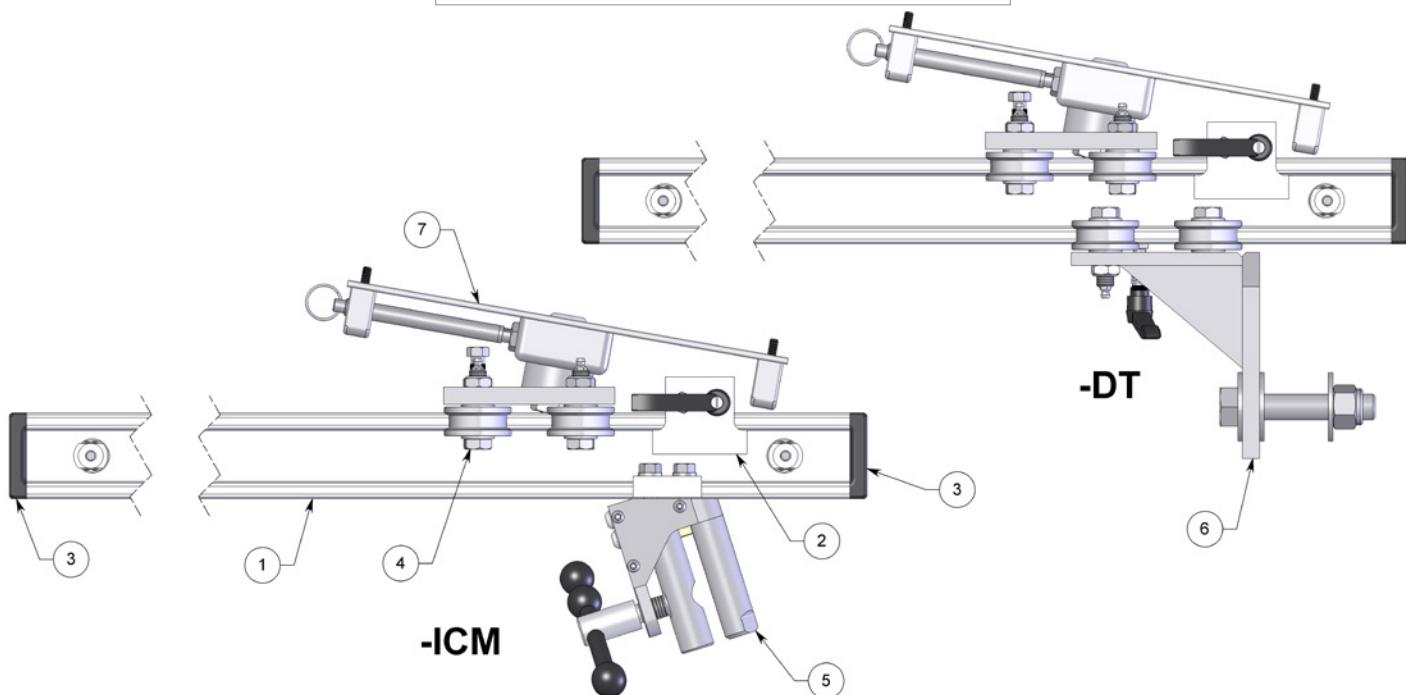
NOTES:

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

#	PART NUMBER	QTY.
1	ABX 298 QUICK PIN 17-4 SS .38 X 3.0	1
2	DBP 206 MOUNTING BRACKET	1
3	DBP 207 GUIDE PLATE	1
4	DBP 209 GUIDE TUBE OUTGOING 1.01 ID	2
5	DBP 211 GUIDE TUBE WELDMENT	2
6	DBP 214 TAB	2
7	DBP 251 SNOOT GUIDE ADAPTER	1
8	DBP 253 DOUBLE SLIDE	1
9	DBP 254 TUBE BLOCK	1
10	DBP 255 MOUNTING PLATE	1
11	DBP 260 TUBE BLOCK SUPPORT	1

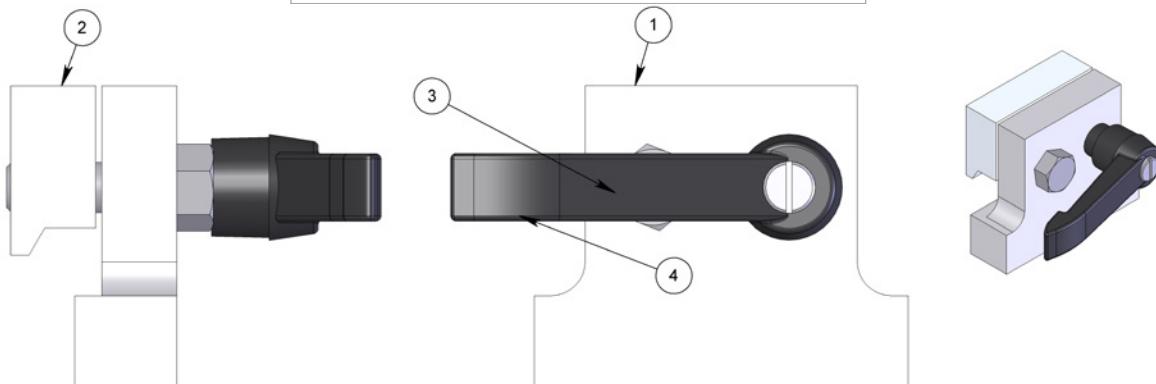
12	DBP 264 LANYARD WITH TAB	2
13	DBP 265 PIN, QUICK RELEASE	2
14	FF 164 SS COMPRESSION SPRING	2
15	GB 337-03 BOLT, HEX .37-16 X .75 SS	1
16	GB 337-14 BOLT, HEX .37-16 X 3.50 SS	1
17	GN 337-L NYLOK NUT SS	1
18	GS 319-015 SHCS .19-24 X .38 SS	7
19	GS 325-02 SHCS .25-20 X .50 SS	12
20	GS 325-03 SHCS .25-20 X .75 SS (TB 050)	4
21	GS 337-04 SHCS .37-16 X 1.00 SS	2
22	GSSH 0312-0500-SS SHOULDER SCREW	2
23	SRT 209.1 LANYARD ASSY VT (CUT TO LENGTH)	1
24	SRT 592 T-NUT FULL THD .38-16	2

DBP 300-XX
RAIL FLANGE MOUNT ASSEMBLY



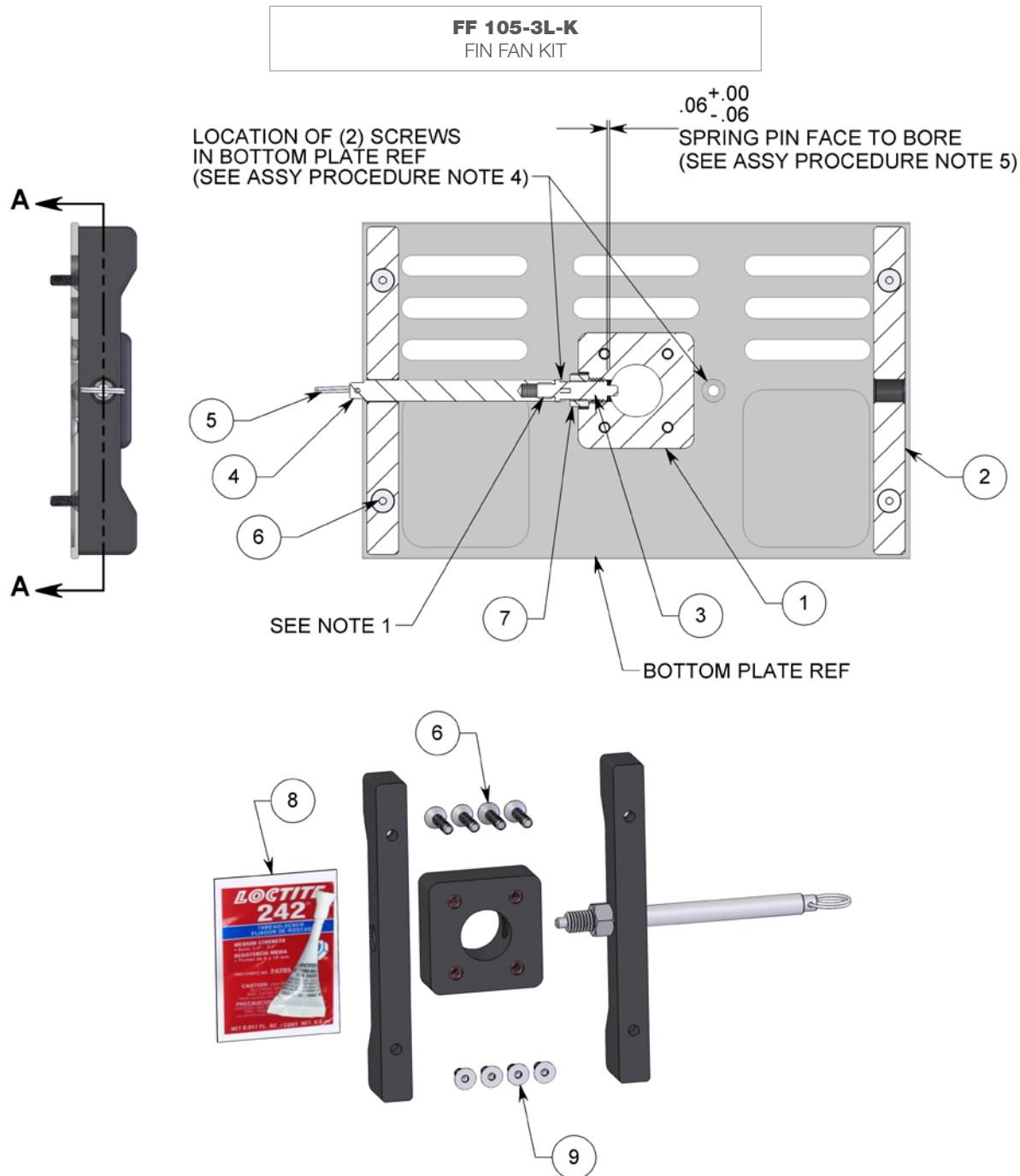
#	PART NUMBER	-ICM/QTY.	-DT/QTY.
1	BU 002-4.67-001 2.5 BOX RAIL EXTRUSION, SLOTTED	1	1
2	BU 152 RAIL STOP ASSY	1	1
3	DBP 305 RAIL PLUG ASSY	2	2
4	DBP 315 BOX RAIL ABX MOUNT ASSY	1	1
5	DBP 320 ICM TROLLEY CLAMP ASSY	1	-
6	DBP 330 DELTA T TROLLEY CLAMP ASSY	-	1
7	FF 105-3L-K FIN FAN KIT	1	1

BU 152
RAIL STOP ASSEMBLY



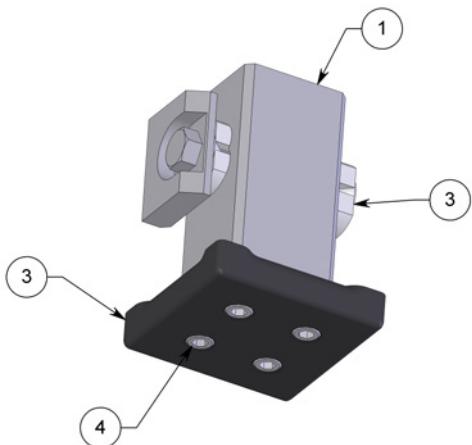
#	PART NUMBER	QTY.
1	BU 149 PLATE, RAIL STOP	1
2	BR 060 RAIL CLAMP	1
3	GB 537-05 BOLT, HEX .37-16 X 1.25	1
4	BU 151 HANDLE	1

PART DIAGRAMS



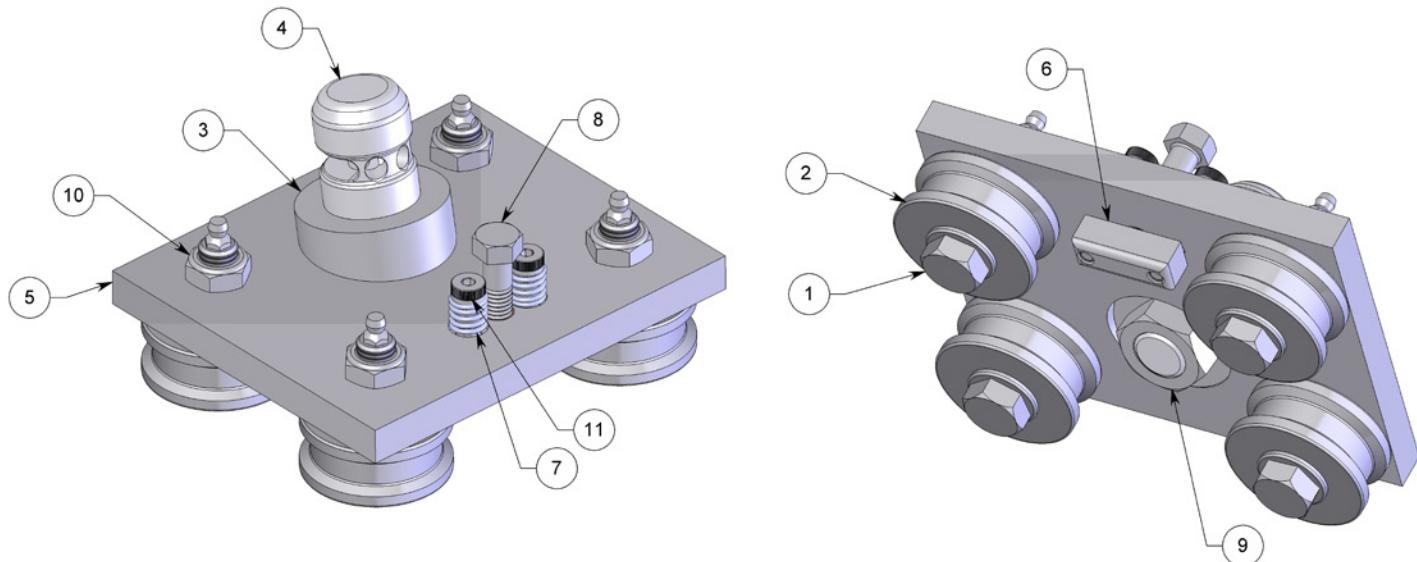
#	PART NUMBER	QTY.
1	FF 149 PIVOT BLOCK	1
2	FF 150-3L BLOCK FOOT	2
3	FF 151 SPRING PLUNGER	1
4	FF 152-3L EXTENSION STUD	1
5	FF 153 SPLIT RING	1
6	FF 154 FHCS .25-20 X 1.25 LG SS THREADLOCKING	4
7	GN 550-H HEX NUT	1
8	GP 180 LOCTITE 242 BLUE .5ML	1
9	GSF 325-025 FHCS .25-20 X .62 SS	4

DBP 305
RAIL PLUG ASSEMBLY



#	PART NUMBER	QTY.
1	DBP 182 RAIL BLOCK	1
2	DBP 305.1 RAIL PLUG	1
3	PROP 008-2.5-001 2.5" WEDGE BOLT ASSEMBLY	1
4	TB 050 SHCS .25-20 X .75 SS	4

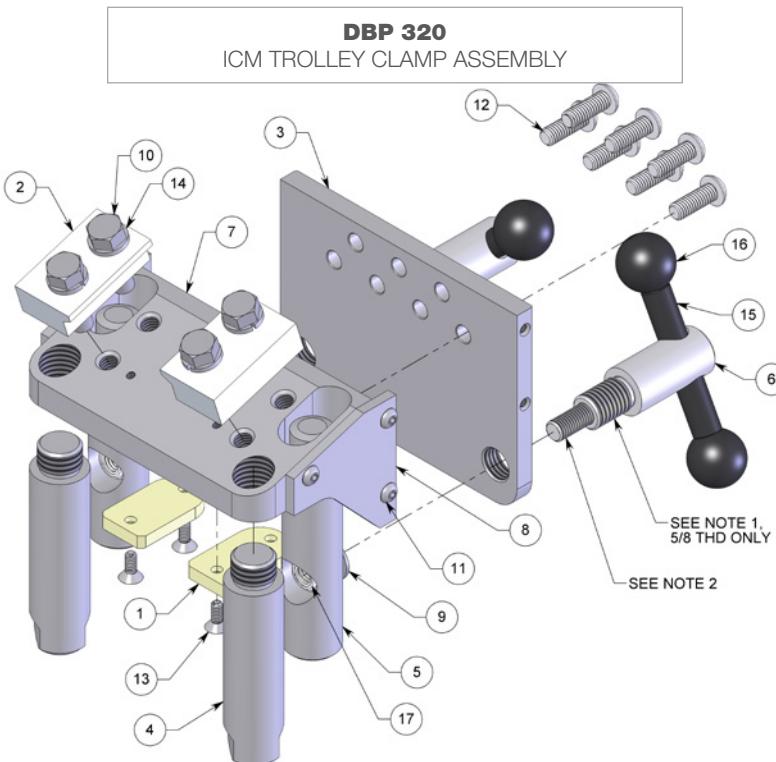
DBP 315
BOX RAIL ABX MOUNT ASSEMBLY



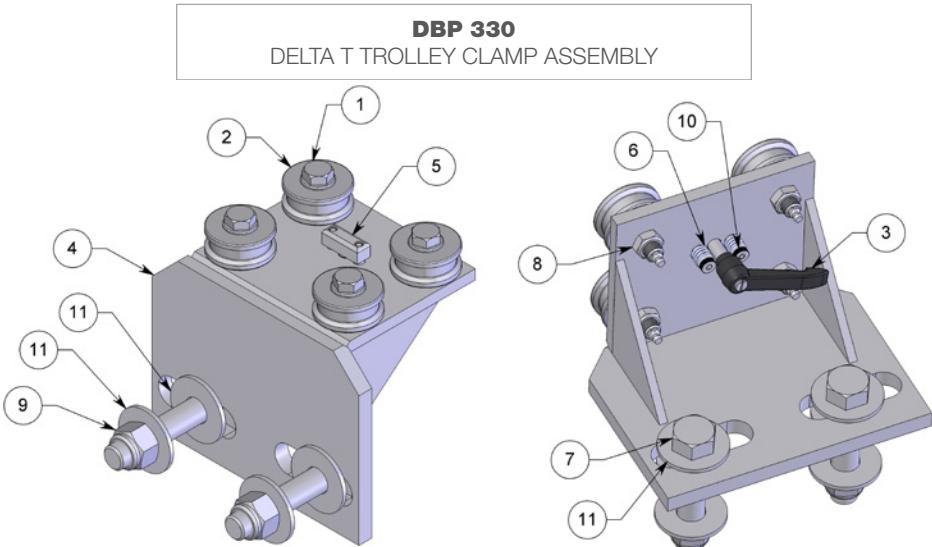
#	PART NUMBER	QTY.
1	BR 051-2.0-0 AXLE-ZERK	4
2	BR 055 ROLLER ASSY	4
3	DBP 301 BRONZE SLIDER	1
4	DBP 302 TRACTOR PIVOT STUD	1
5	DBP 303 BOX RAIL AUTOBOX MOUNT	1

6	FF 163 SLIDE STOP	1
7	FF 164 SS COMPRESSION SPRING	2
8	GB 337-06 BOLT, HEX .37-16 X 1.50 SS	1
9	GN 875-HJ-16 HEX JAM NUT	1
10	GN 350-LJ NYLOK NUT THIN SS	4
11	GSSH 0312-1000-SS SHOULDER SCREW	2

PART DIAGRAMS

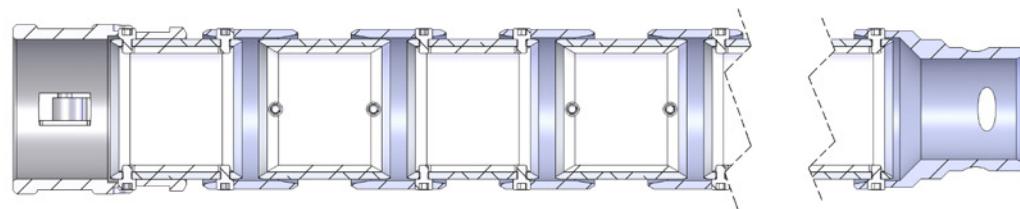


#	PART NUMBER	QTY.			
1	ABX 573 CLEVIS BEARING PAD	2	6	DBP 324 RAIL CLAMP SHAFT	2
2	BR 060-D RAIL CLAMP, DRILLED	2	7	DBP 325 TOP PLATE	1
3	DBP 321 PUSH PLATE	1	8	DBP 326 GUSSET	2
4	DBP 322 THREADED ROD	2	9	DBP 327 HIGH LOAD THRUST BEARING	2
5	DBP 323 THREADED ROD PLUNGER	2	10	GB 337-05 BOLT, HEX .37-16 X 1.25 SS	4
			11	GSB 319-02 BHCS 10-24 X .50 SS (TR130 235)	6
			12	GSB 331-03 BHCS .31-18 X .75 SS	7
			13	GSF 319-02 FHCS .19-24 X .50 SS (CB 555)	4
			14	GW 337-L LOCK WASHER SS	4
			15	LWP 531 RAIL CLAMP LEVER	2
			16	LWP 532 RAIL CLAMP KNOB	4
			17	SRT 333 NYLOCK NUT SS THIN (SEE GN 337-LJ)	2

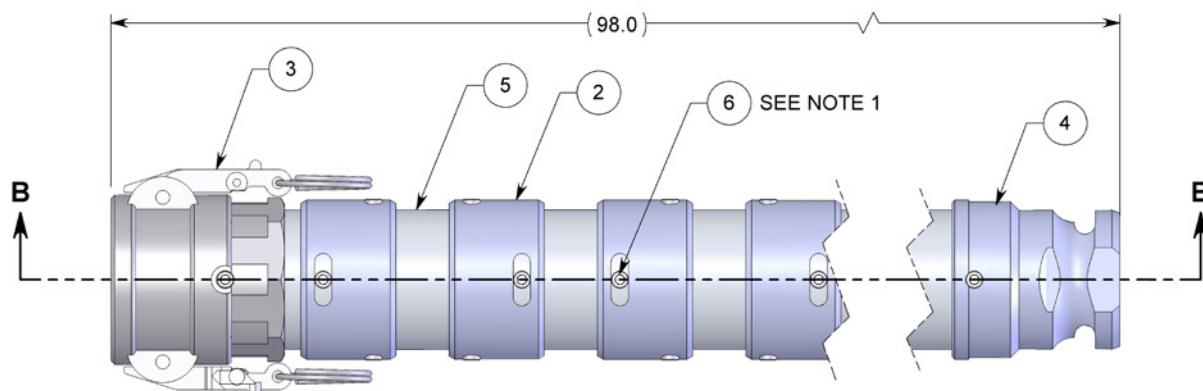


#	PART NUMBER	QTY.			
1	BR 051-2.0-0 AXLE-ZERK	4	6	FF 164 SS COMPRESSION SPRING	2
2	BR 055 ROLLER ASSY	4	7	GB 575-16 BOLT, HEX .75-10 X 4.00	2
3	BU 151 HANDLE	1	8	GN 350-LJ NYLOK NUT THIN SS	4
4	DBP 310 BOX RAIL FLANGE MOUNT WELDMENT	1	9	GN 575-L NYLOK NUT	2
5	FF 163 SLIDE STOP	1	10	GSSH 0312-1000-SS SHOULDER SCREW	2
			11	GW 575-F FLAT WASHER	6

DBP 350
RIGID SNOUT 2.0 ASSEMBLY

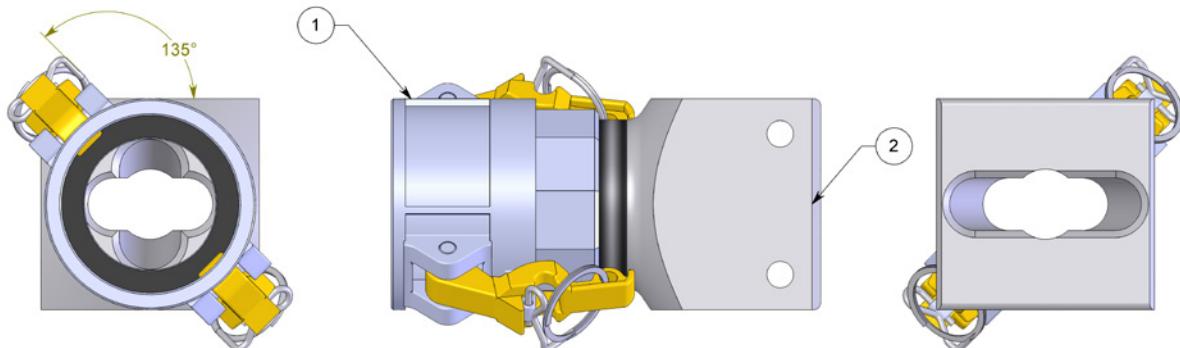


SECTION B-B



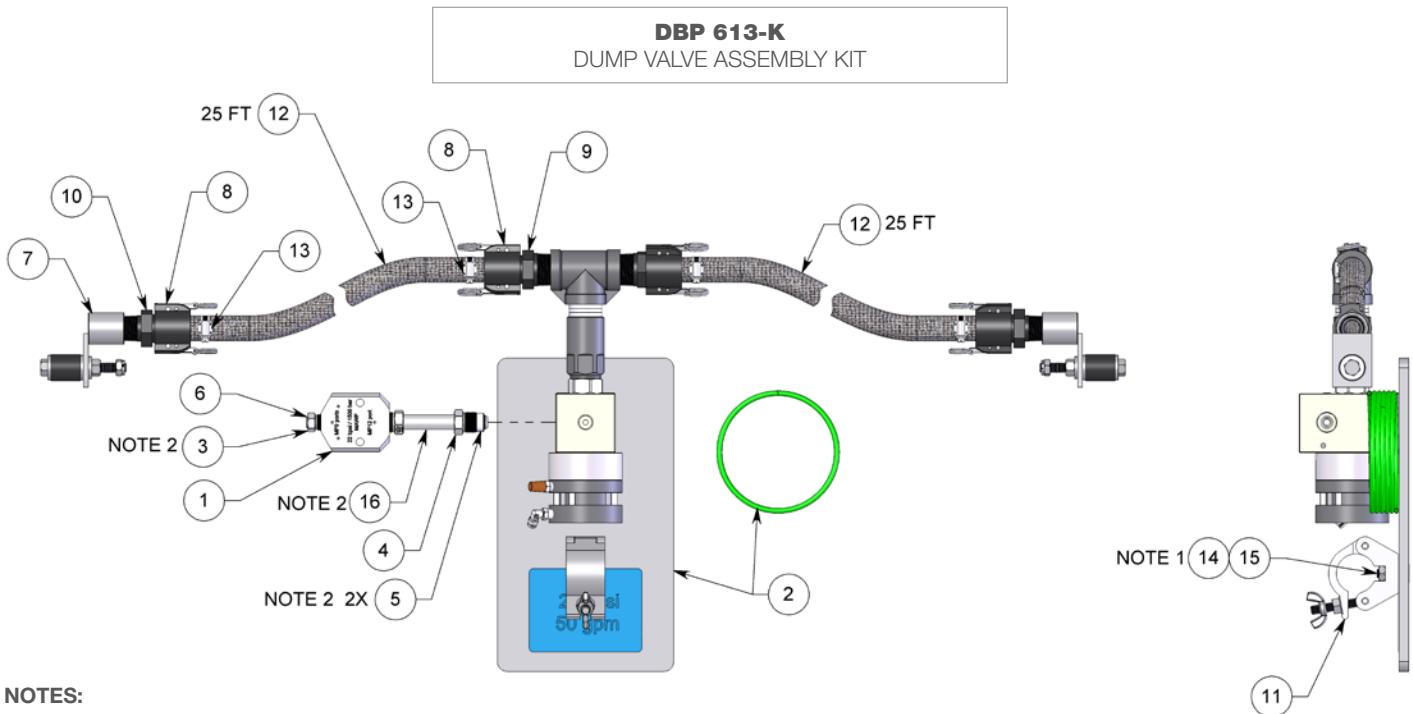
#	PART NUMBER	QTY.
1	DBP 350.1 POLY TUBE	35
2	DBP 350.2 OD RING	34
3	DBP 350.3 FEMALE CAMLOCK	1
4	DBP 350.4 MALE CAMLOCK	1
5	DBP 350.5 TUBE	35
6	GS 519-01-32 SHCS .19-32 X .25	140

HCS 310
3L SNOUT ADAPTER



#	PART NUMBER	QTY.
1	BJ 543 SNOUT 2 NPT FEMALE COUPLER	1
2	HCS 310.1 SNOUT GUIDE BLOCK	34

PART DIAGRAMS

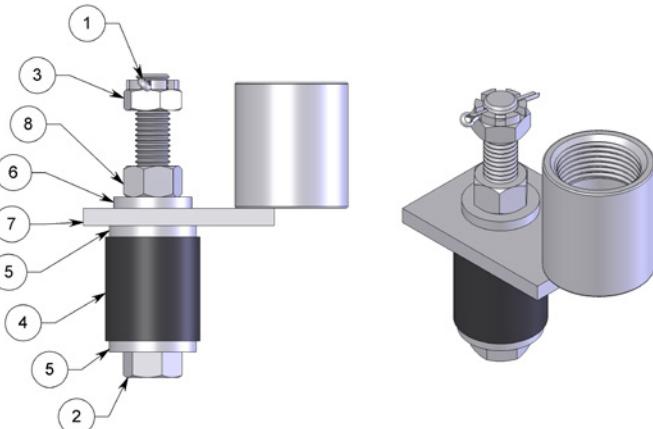


NOTES:

2. APPLY RED LOCTITE® 262 (OR EQUIVALENT) WHERE NOTED.
3. APPLY BLUE GOOP® IS A SWAGELOK® BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.

#	PART NUMBER	QTY.
1	ABX 369-MP12 Y MANIFOLD	1
2	ACDA 610200342-K DUMP VALVE 20K, 50GPM CONTAINS: ACDA 61020019-K DUMP VALVE 20K, WITH FITTINGS (QTY 1) GPTB 0250-PUR95A-GN 250 URETHANE TUBING GREEN (QTY 1)	1
3	AF 070-MP9 GLAND	1
4	AF 070-MP12 GLAND	2
5	AF 071-MP12 COLLAR	2
6	AF 076-MP9 PLUG	1
7	DBP 360 DUMP LINE ASSY	2
8	DBP 364 FTG, CAM LOCK FEMALE HB16	4
9	DBP 365 FTG, CAM LOCK MALE P20M HB16	2
10	DBP 366 FTG, CAM LOCK MALE P16M HB16	2
11	DBP 370 RAILING CLAMP, 1.5 PIPE	1
12	FC 311.1 DUMP HOSE FOF DBP, 25FT	2
13	FC 311.2 HOSE CLAMP	4
14	GN 850-HJ HEX JAM NUT	1
15	GSF 550-065 FHCS .50-13 X 1.62 BK	1
16	SA 577-MP12LMP12L-6 NIPPLE	1

DBP 360
DUMP LINE ASSEMBLY



#	PART NUMBER	QTY.
1	DBP 181 COTTER PIN, SS	1
2	DBP 183 HEX BOLT, .50-13 X 4.0	1
3	DBP 184 LOCKNUT, HEX CASTLE	1
4	DBP 187 WEDGE, 1.36 DIA	1

5	DBP 188 WASHER, LARGE	2
6	DBP 189 WASHER, SMALL	1
7	DBP 361 WELDMENT, DUMP LINE BRACKET	1
8	GN 550-H HEX NUT	1

PART DIAGRAMS

DBP 615-ICM-K

DBP ICM HP HOSE HOOK UP KIT, 15K

PART NUMBER	QTY.
AF 068-MP12P12 ADAPTER 3/4 MP MALE X 3/4 NPT MALE 15K	1
AF 068-MP12P8 ADAPTER 3/4 MP MALE X 1/2 NPT MALE 15K	1
AF 068-MP9P8 ADAPTER 9/16 MP MALE X 1/2 NPT MALE 15K	2
GP 060-P8 SCREW TYPE COUPLING SET, 1/2 NPT	2
GP 051-P4P8 BUSHING, 1/4 NPT FEMALE X 1/2 NPT MALE	2
FF 121-484 HOSE STOP, COLLET STYLE, SINGLE, .484	2
ACHO H62050F1/4 HOSE, 6/2, 50FT, 1/4NPTM OP X1/4NPTM OP, 15k PSI	2
BN24-P4 BANSHEE TUBE SPINNER, 15k PSI	2
BN24 044-DBP15 HEAD, UNIVERSAL 15k PSI 11GPM	2
HS 121-42-50 HOSE STOP, CLAMP STYLE, .42-.50", 10.7-12.7MM (4/6, 5/4, 6/2, 2640D-025, 2240D-04, 2740D-025)	2

DBP 615-DT-K

DBP HP HOSE HOOK UP KIT, 15K

PART NUMBER	QTY.
DBP 330 DELTA T TROLLEY CLAMP ASSEMBLY	1
DBP 215-12 BAR MARKER ASSEMBLY, 12"	1
DBP 102-34.5-001 2.5 BOX RAIL EXTRUSION, 34.5"	2
BU 002-3.75-001 RAIL, 3.75FT, 2.5IN SLOTTED WITH ROUND HOLES	1
ACHO H62070F1/4 HOSE, 6/2, 70FT, 1/4NPTM OP X1/4NPTM OP, 15k PSI	2

DBP 620-ICM-K

DBP ICM HP HOSE HOOK UP KIT, 20K

PART NUMBER	QTY.
AF 063-MP12 ADAPTER, 1-12 TYPE-M X MP12	1
AF 060-MP9 ADAPTER 9/16-18 TYPE-M X 9/16 MP(M)	2
FF 121-516 HOSE STOP, COLLET STYLE, SINGLE, .516	2
ACHO H64050FTM6NZLM HOSE, 6/4, 50FT, 9/16TM X 3/8LM BP, 21.7KPSI	2
BN24-MP6L BANSHEE TUBE SPINNER, 22k PSI	2
BN24 044-DBP20 HEAD, UNIVERSAL 22K PSI	2
HS 121-50-56 HOSE STOP, CLAMP STYLE, .50-.56", 12.7-14.2MM (5/6, 6/4, 8/2, 2740D-03, 2440D-04, 2240D-05)	2

DBP 620-DT-K

DBP DELTA T PRESSURE KIT, 15K

PART NUMBER	QTY.
DBP 330 DELTA T TROLLEY CLAMP ASSEMBLY	1
DBP 215-12 BAR MARKER ASSEMBLY, 12"	1
DBP 102-34.5-001 2.5 BOX RAIL EXTRUSION, 34.5"	2
BU 002-3.75-001 RAIL, 3.75FT, 2.5IN SLOTTED WITH ROUND HOLES	1
ACHO H64070FTM6NZLM HOSE, 6/4, 70FT, 9/16TM X 3/8LM BP, 21.7KPSI	2

NOTES

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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>

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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