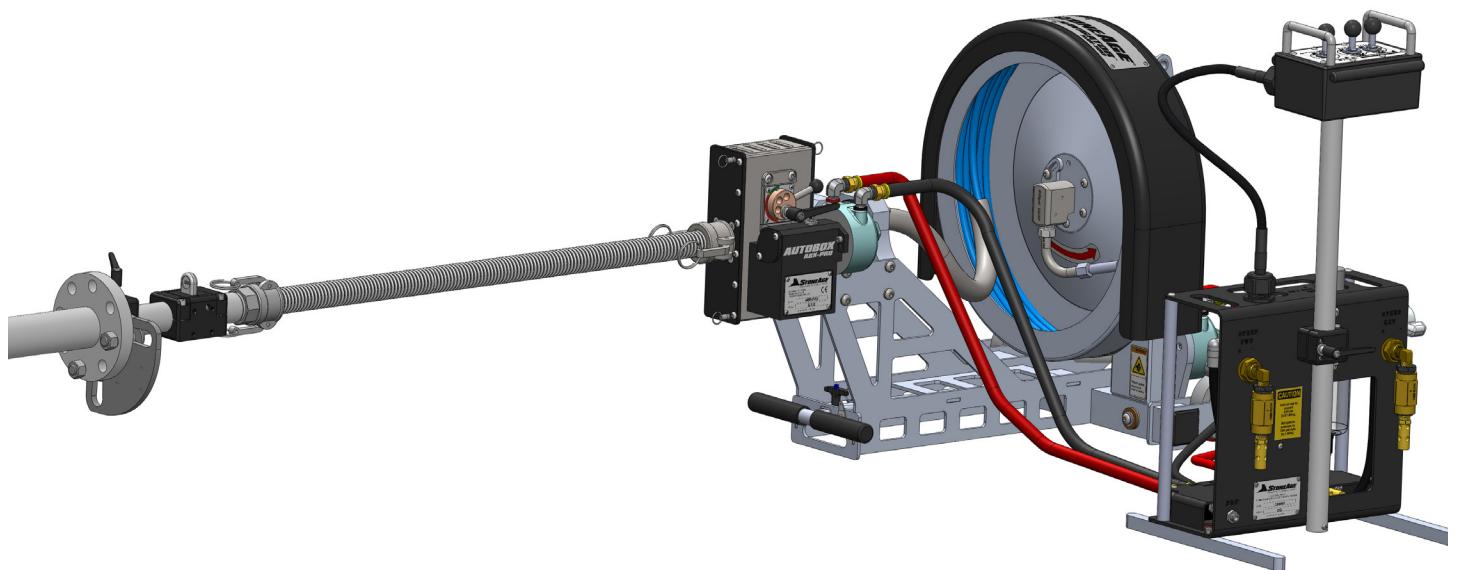




# NAVIGATOR (NAV-100) & CONTROL BOX (CB-NAV) USER MANUAL



PL 613 REV B  
(7/16)

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UK

This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s).

## SPECIFICATIONS

### GENERAL:

|                      |   |
|----------------------|---|
| Hose feed rate       | 2.7 in/s to 32 in/sec (69 mm/s to 813 mm/s) |
| Min pipe size        | 2 in (51 mm)                                |
| Max pipe size        | 4 in (102 mm)                               |
| Hose size            | ø.39 in - ø.50 in, 4 layer hose             |
| Air connection to CB | Chicago style twist-claw fitting            |
| CB-NAV to Navigator  |   |
| Air connections      | 1/2" JIC (x 2), 1/4" JIC (x 2)              |

### WEIGHTS:

|                     |                |
|---------------------|----------------|
| Navigator NAV-100   | 75 lbs (34 kg) |
| Not including hoses | 26 lbs (12 kg) |

### DIMENSIONS:

|                   |                       |                                 |
|-------------------|-----------------------|---------------------------------|
| Navigator NAV-100 | 35" x 21" x 24"       | (890 mm x 533 mm x 610 mm)      |
| Snout             | 72" x 2" dia.         | (1829 mm x 51 mm)               |
| ABX-PRO           | 12.5" x 6" x 9.5"     | (318 mm x 152 mm x 241 mm)      |
| CB-NAV            | 14" x 14" x 18" - 28" | (356mm x 356mm x 457mm - 711mm) |

## DESCRIPTION OF EQUIPMENT AND INTENDED USE

The Navigator NAV-100 is a hose feed device designed to quickly and safely clean a broad range of pipes with or without a flange. The Navigator NAV-100 mounts to pipes from 2 inches (51 mm) to 4 inches (102 mm) in diameter. The Navigator NAV-100 will clean past multiple bends and elbows using hose rotation and StoneAge's proven self-rotary tools. Standard safety practices should still be followed, but the Navigator NAV-100 allows the user to be stand away from the pipe entrance and be shielded from a tool.

### KEY FEATURES:

#### **Navigator NAV-100**

- Modular, lightweight design
- Quick install
- Optional Strap Mount Assembly accommodates a wide variety of pipes

#### **Control Box CB-NAV**

- Small, lightweight, ergonomic design that includes a portable floor stand and filter-regulator-lubricator assembly
- 10' (3048 mm) umbilical allows user to move with the controls
- Drive controls: forward/reverse hose feed, rotate drum
- Pneumatic dump control switch



**CE DECLARATION OF INCORPORATION  
OF PARTLY COMPLETED MACHINERY**

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

Declare that this "partly completed machinery" supplied with this declaration:

Equipment: NAVIGATOR ASSEMBLY

Model name: NAV-100 is in accordance with the following Directives: and

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

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

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

Signed \_\_\_\_\_ Date 04/11/2016

Andrew Birt

Independent Dealer Manager

StoneAge, Inc., Worcester, UK

The technical files for the Navigator Assembly (NAV-100) User Manuals are maintained at: StoneAge, Inc. 466 South Skylan Drive, Durango, CO 81303, USA

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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 of the Water Jetting Association (WJA) Code of Practice, or equivalent (see [www.waterjetting.org.uk](http://www.waterjetting.org.uk)).

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

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

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

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

### PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

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

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

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

### SAFETY LABEL DEFINITIONS

Replacement labels can be ordered through Stoneage®. See part diagrams for label locations and replace when necessary.

The NAVIGATOR NAV-100 has the potential to cause serious injury if fingers, hair, or clothing become caught between the drive rollers of the drum assembly.

KEEP HANDS CLEAR  
OF ROLLERS



The ABX-PRO Tractor has the potential to cause serious injury if fingers, hair, or clothing become caught between the hose rollers of the ABX-PRO Tractor.

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



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

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

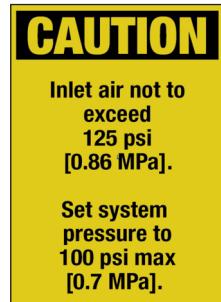
The risk assessment MUST consider potential material or substance hazards including:

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

### PPE may include:

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

Maximum operating air pressure is 100 psi (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



## 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](http://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 Navigator NAV-100 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 located on the Splash Guard of the Navigator NAV-100. The adjustment instruction is located in the "ProDrive Set-up" section of this manual.
- The Control Box should be located in a safe location where the Operator has good visibility of the pipe and hose. The Navigator NAV-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.

### PRE-RUN SAFETY CHECK

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

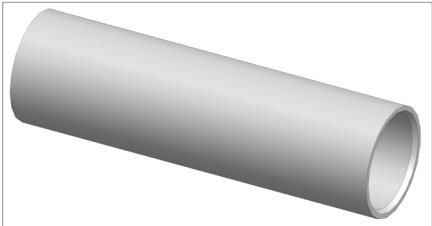
- Complete a job specific risk assessment and act on the resulting actions.
- Adhere to all site specific safety procedures.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Ensure the work place is free of unnecessary objects (e.g. loose parts, hoses, tools).
- Ensure all Operators are using the correct Personal Protective Equipment (PPE).
- Check that the air hoses are properly connected and tight.
- Check all hoses and accessories for damage prior to use. Do not use damaged items. Only high quality hoses intended for waterblast applications should be used as high-pressure hoses.
- Check all high-pressure threaded connections for tightness.
- **\*\*Ensure that an anti-withdrawal device (back-out preventer), and all other applicable safety devices are installed and set-up properly.\*\***
- Test the Control Box before operating the Navigator NAV-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 in the hydroblasting zone.

## SYSTEM ASSEMBLY - OVERVIEW

### NAVIGATOR PIPE ATTACHMENT AND BACKOUT PREVENTION ASSEMBLIES

SEE "RECOMMENDED COLLET SIZE" CHART ON PAGE 13

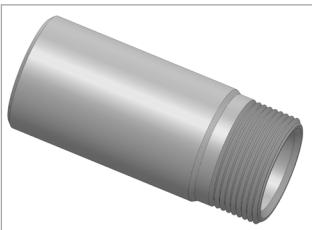
BOP 081-6  
SNOUT TUBE



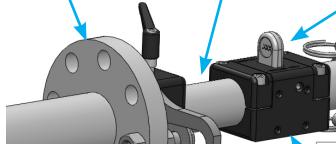
FF-121-XX  
COLLET



BOP 084  
THREADED SNOUT TUBE



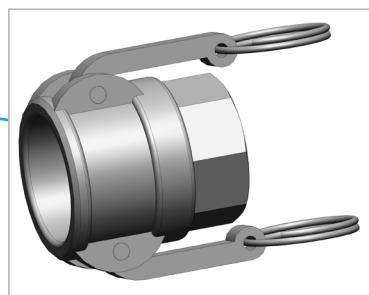
Pipe shown  
for graphic  
representation only.  
Not included in  
assembly.



BOP 085  
CAMLOCK



BOP 030 COLLET  
BLOCK ASSEMBLY

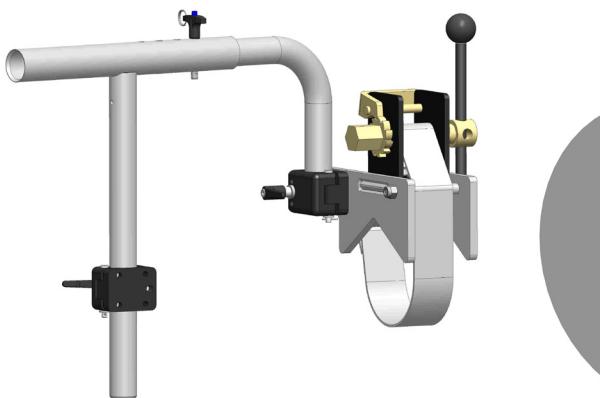


SNOUT  
BOP 090



BOP 010-2-4 QTR  
QUARTER PLATE FLANGE MOUNT

### NAVIGATOR OPTIONAL PIPE MOUNT ITEMS

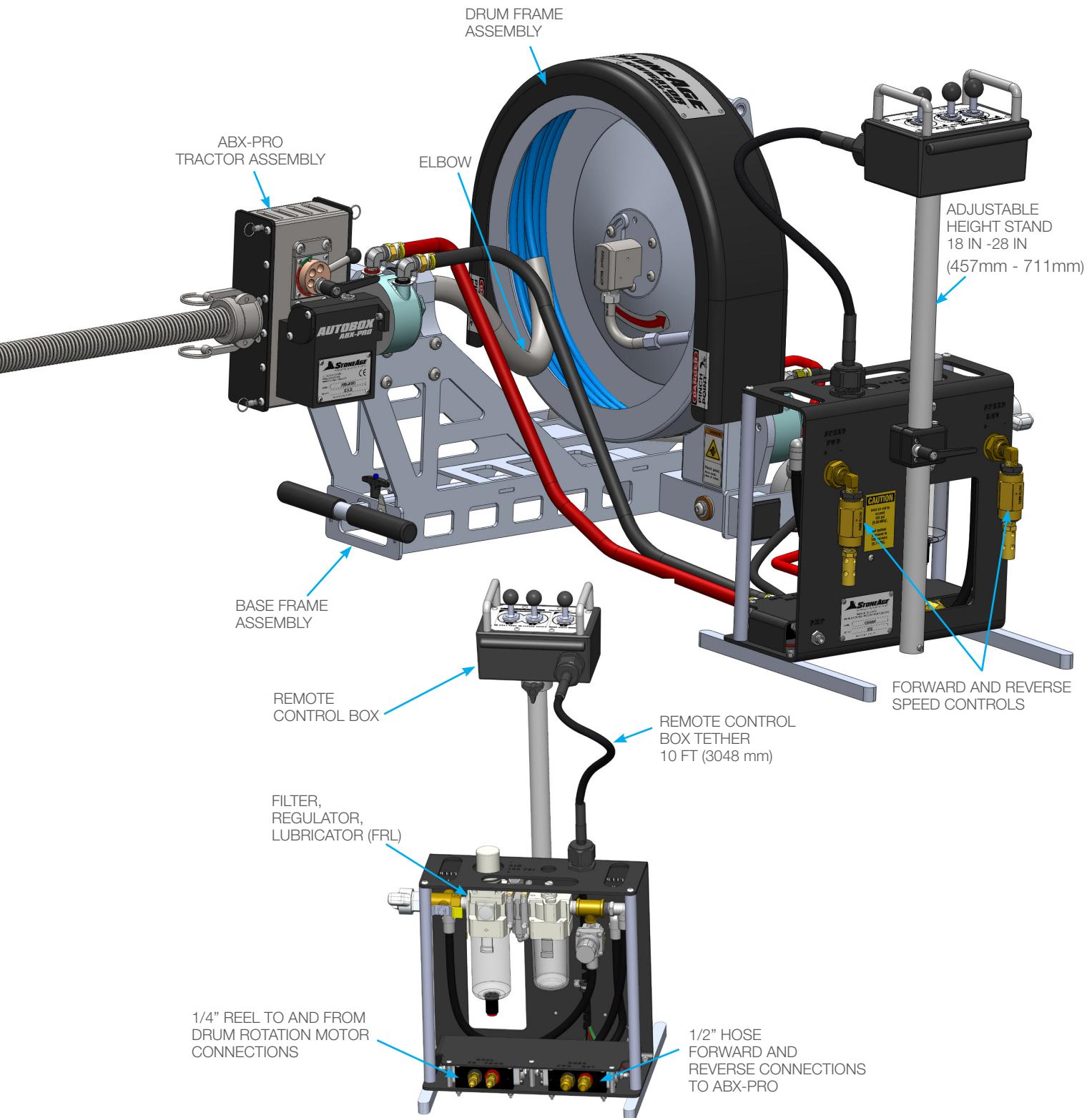


BOP 050 STRAP MOUNT PIPE  
ATTACHMENT ASSEMBLY



BOP 012 SPLASH PLATE

**NAVIGATOR WITH CONTROL BOX ASSEMBLY**  
(NAV-100 AND CB-NAV)



**CONTROL BOX ASSEMBLY**  
(CB-NAV)

## NAVIGATOR SET-UP

### HOSE DRUM ASSEMBLY TO BASE FRAME ASSEMBLY

1. Remove Quick Release Pin from Base Frame Assembly. Install the Hose Drum Assembly onto the Base Frame Assembly by placing the shoulder screw heads into the notches on the Joint Plates and inserting the Quick Release Pin through the holes in the Joint Plates. **(Figure 1)**

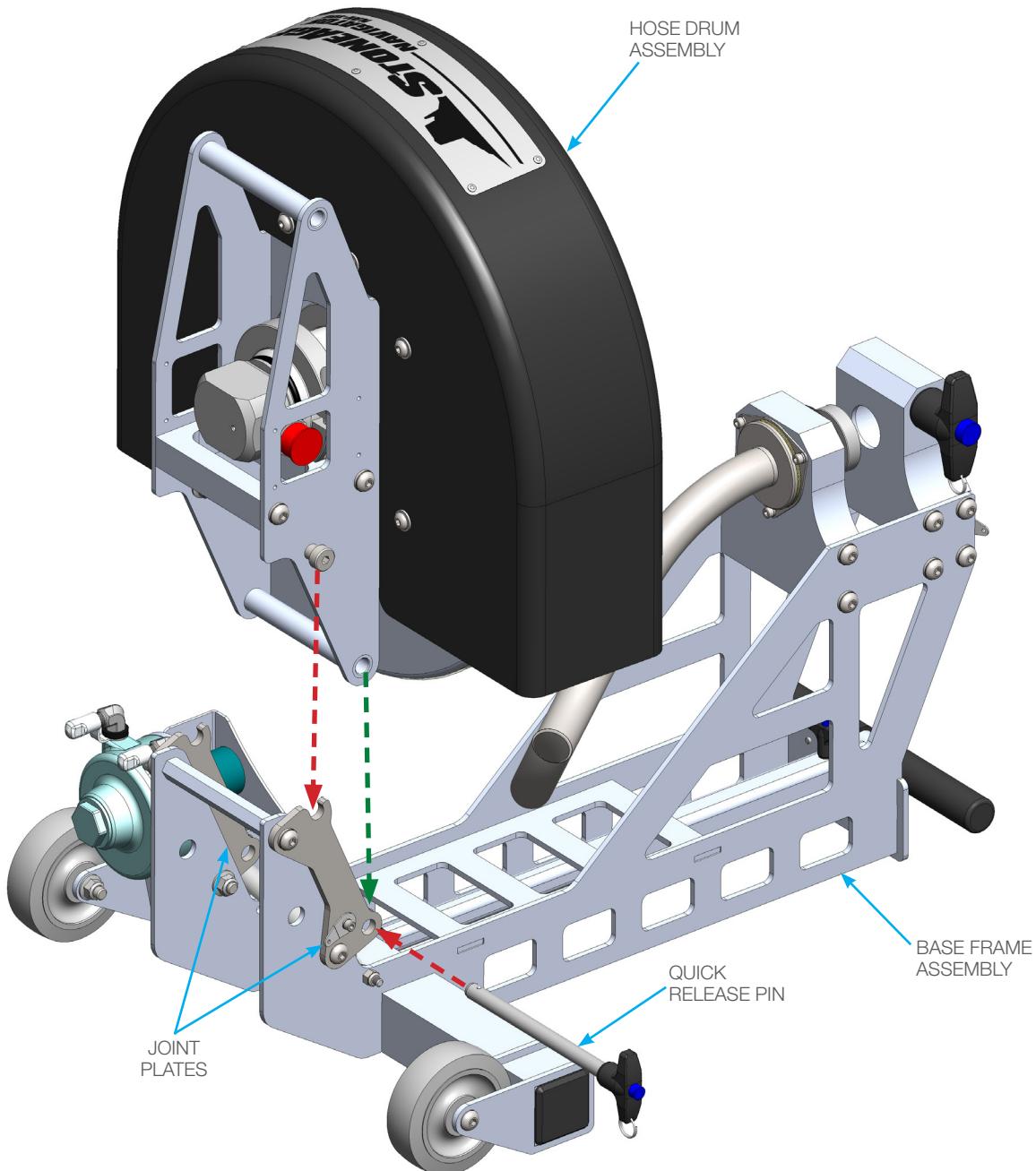
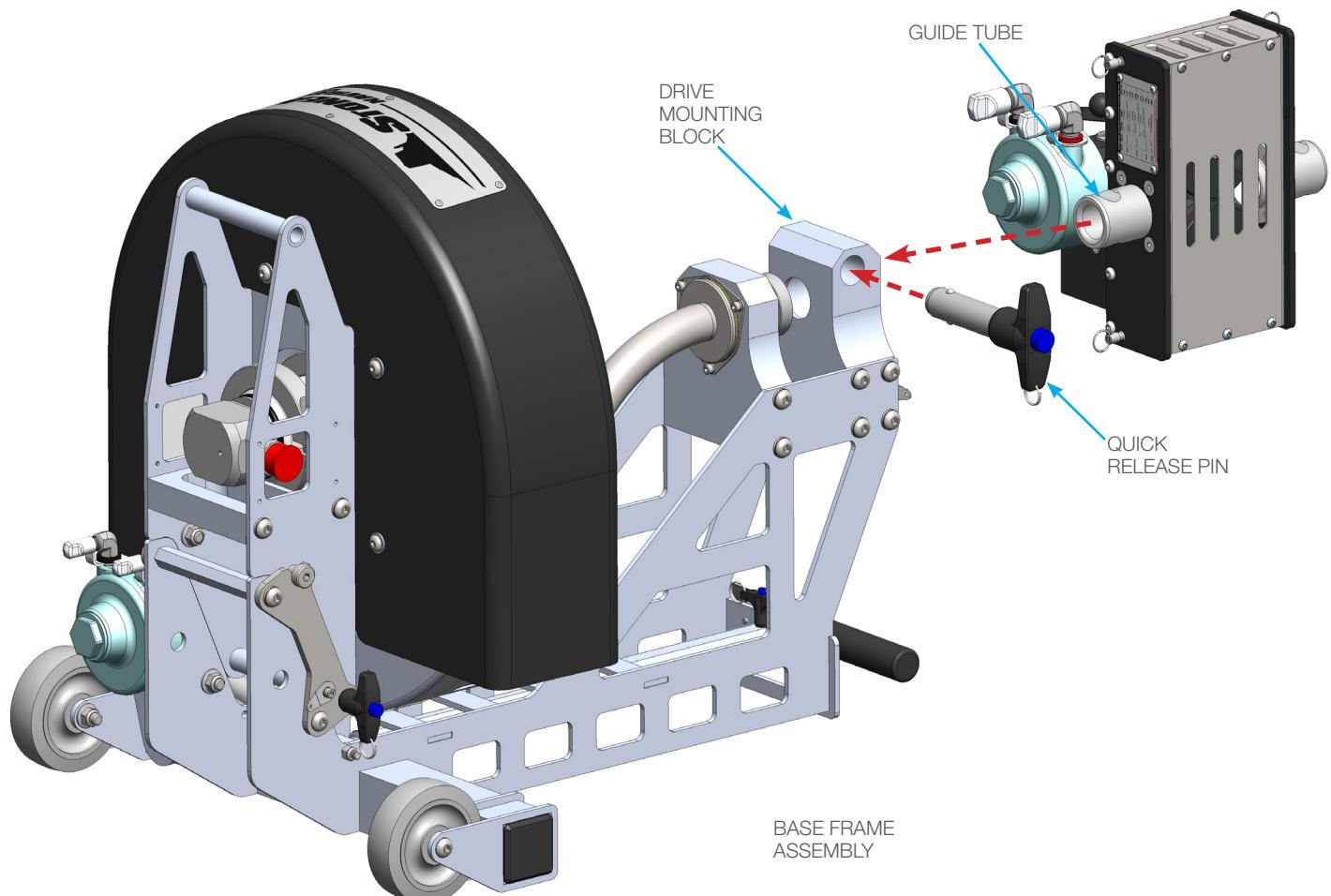


FIGURE 1

**ABX-PRO PRODRIVE TO BASE FRAME ASSEMBLY**

2. Remove Quick Release Pin from Base Frame Assembly, Install the ABX-PRO PRODRIVE onto the Base Frame Assembly by sliding the Guide Tube into the Drive Mounting Block and inserting the Quick Release Pin. (**Figure 2**)

**FIGURE 2**

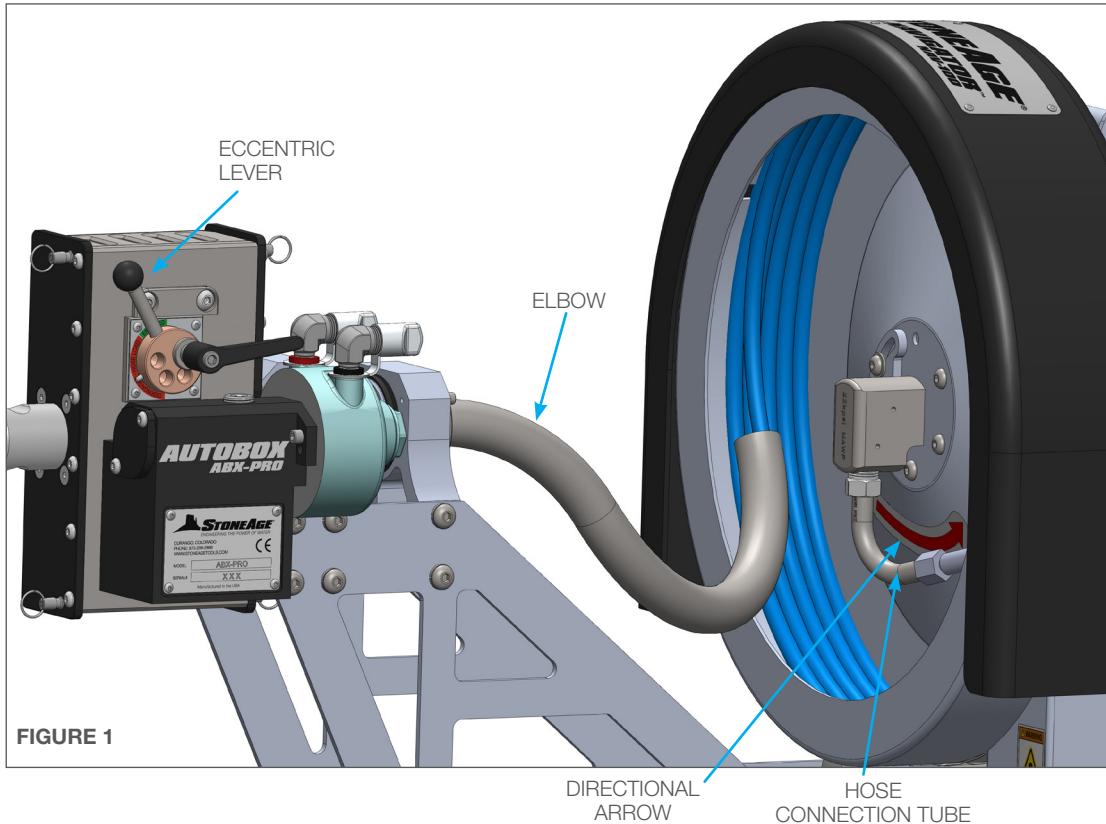
## NAVIGATOR SET-UP

### LOADING THE HIGH-PRESSURE HOSE

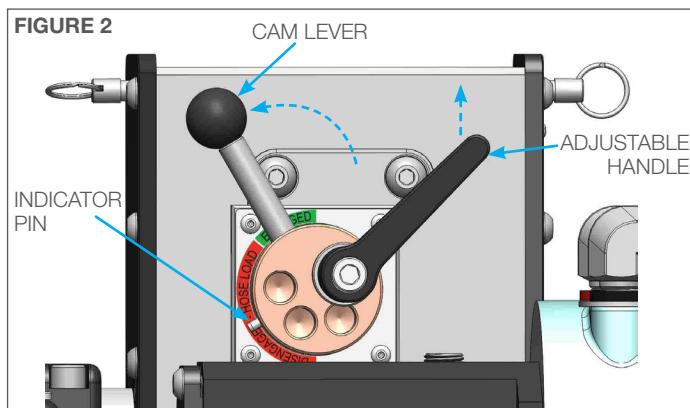
#### NOTICE

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 Rollers.

1. Connect the female hose end to the hose connection tube and wind the hose in the direction of the arrow inside the drum. (**Figure 1**)



2. Load the hose into the ABX-PRO tractor by releasing the Adjustable Handle and rotating the Cam Lever counterclockwise until the Indicator Pin is in the “**Disengaged**” position. This will open up the space between the rollers to allow for the hose to slip between them. (**Figure 2**)



3. With the Rollers open, slip the hose through the Drive Block, Rollers and Guide Tube. Be sure to pull enough extension to feed through the Snout. (**Figure 3**)

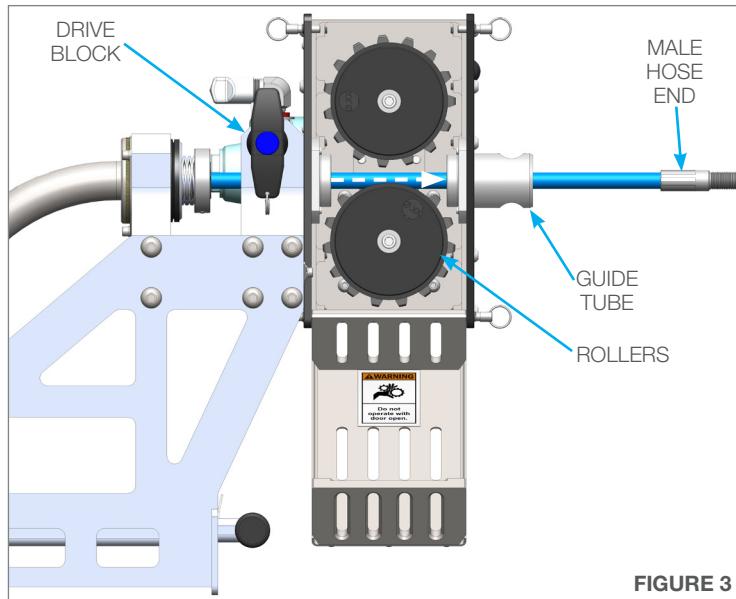


FIGURE 3

4. Rotate the Cam Lever clockwise to the **"Engaged"** position to tighten the Idler Roller down onto the hose. Push the Adjustable Handle down to tighten the bushing assembly. (**Figure 4**)
5. Push the back cover back into the closed position and secure the two Quick Release Pins on the top of the ABX-PRO AUTOBOX® PRODRIVE TRACTOR. (**Figure 5**)

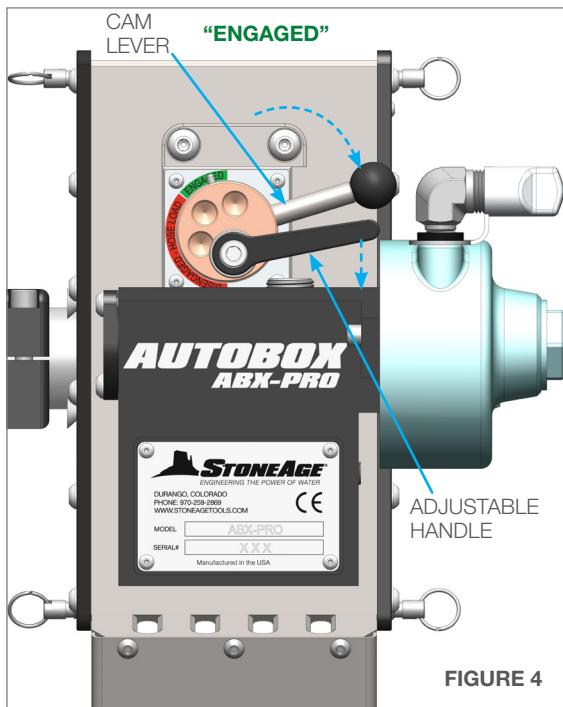


FIGURE 4

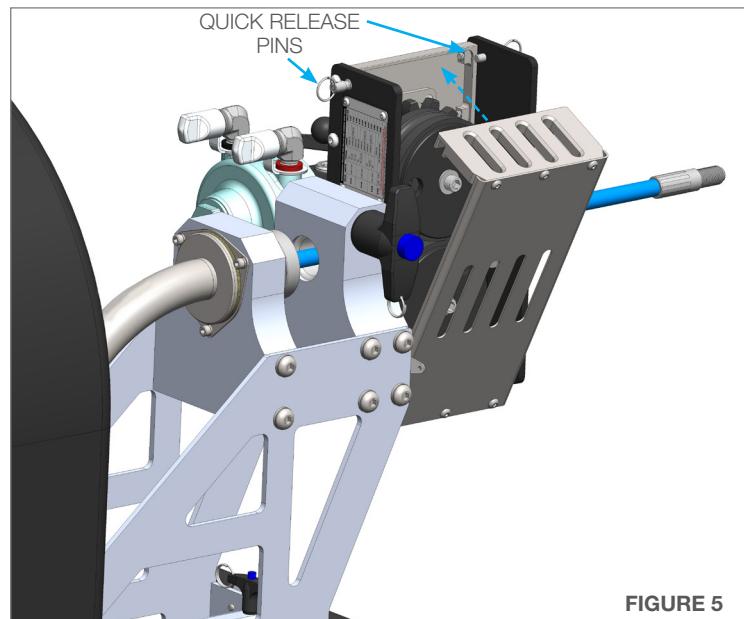
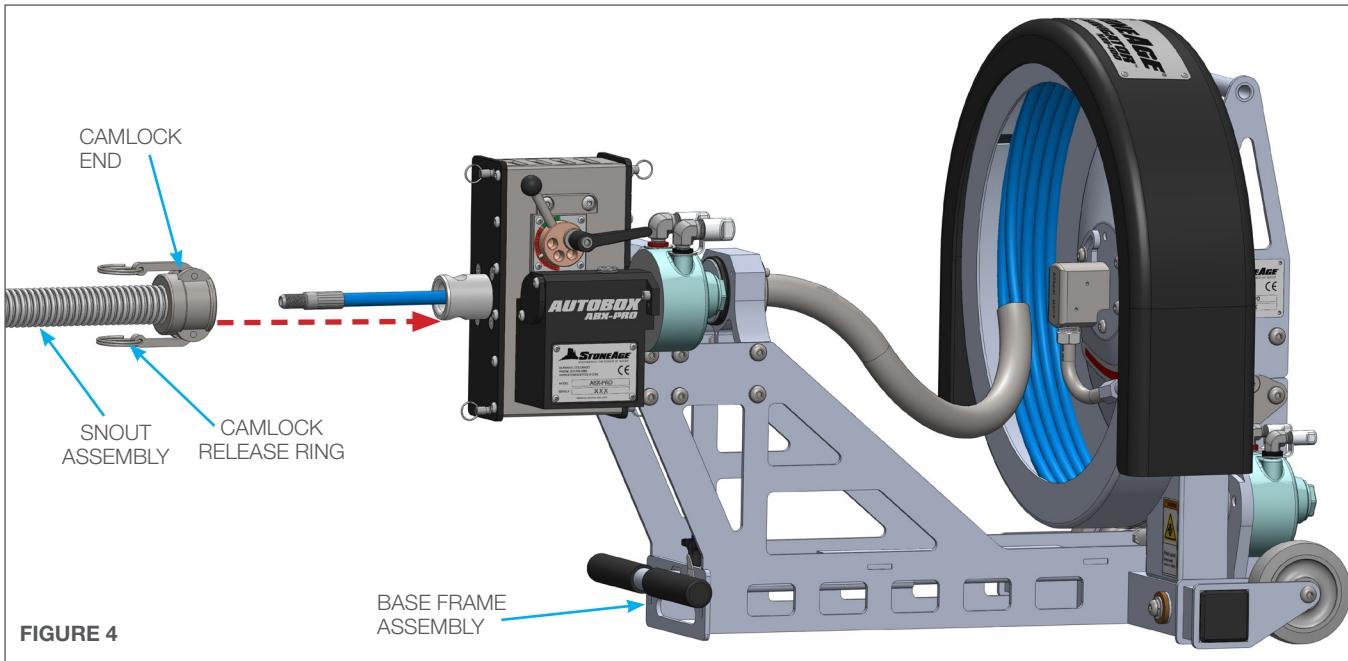


FIGURE 5

## NAVIGATOR SET-UP

### SNOUT ASSEMBLY TO ABX-PRO PRODRIVE

- Pull on the Camlock Release Rings and slide the Camlock onto the male end of the ABX-PRO PRODRIVE. Push the Camlock pins back to lock into place. (**Figure 4**) Pull on the Snout Assembly to make sure it is secured. Feed the rest of the hose through the Snout Assembly and leave enough length to feed through a pipe flange attachment.

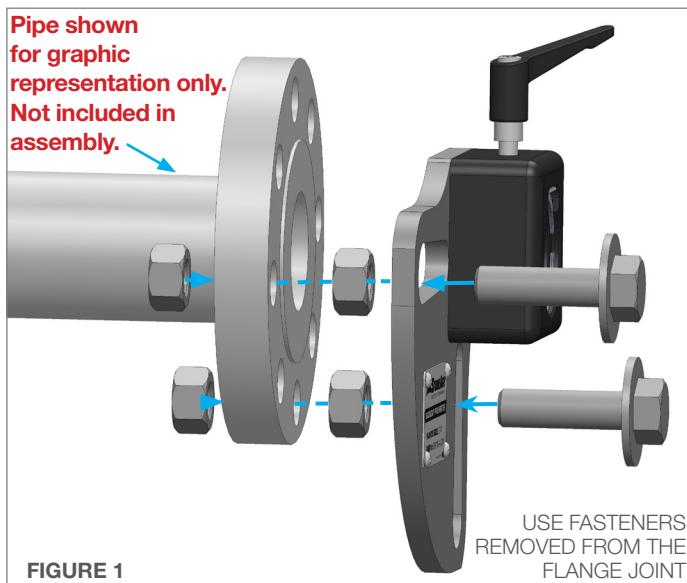


## QUARTER PLATE FLANGE MOUNT ASSEMBLY SET-UP - INCLUDED

### QUARTER PLATE FLANGE MOUNT (BOP 010-2-4 QTR) TO PIPE

- Attach the Quarter Plate Flange Mount to the pipe flange using the fasteners that were removed from the flange joint. The nuts shown between the pipe flange and the Quarter Plate Flange Mount are to allow for drainage. Other spacer options are acceptable. (**Figure 1**)
- Adjust the Quarter Plate Flange Mount by sliding it along the slots to center the inside diameter of the Hinge Clamp with the inside diameter of the pipe. Tighten all hardware to secure in place. (**Figure 2**)

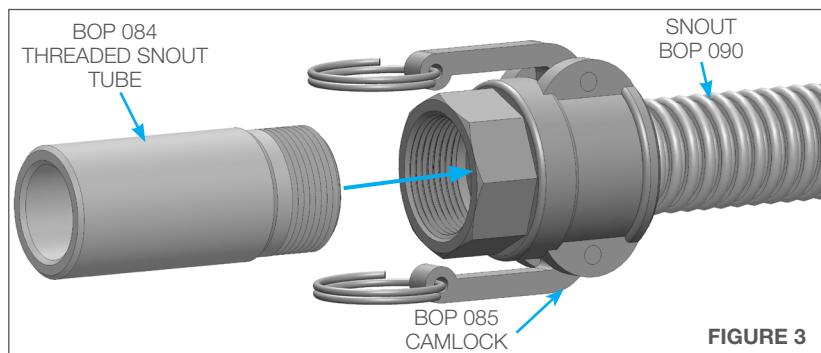
**NOTE: If the cleaning tool diameter is larger than the inside diameter of the snout tubes, the high pressure hose will need to be fed through the Quarter Plate Flange Mount before installing the tool on the male hose end. Skip to the next page if this is necessary.**



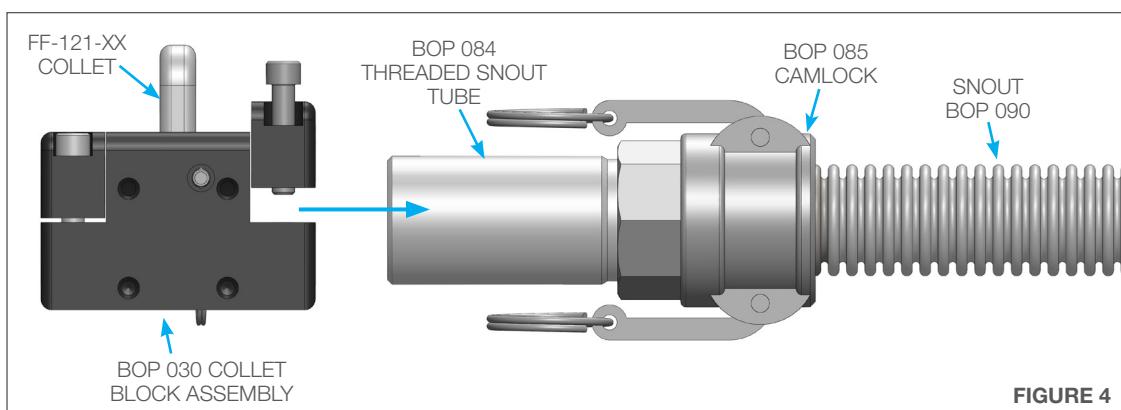
## QUARTER PLATE FLANGE MOUNT ASSEMBLY SET-UP - INCLUDED

### SNOUT CONNECTION AND BACKOUT PREVENTION ASSEMBLY

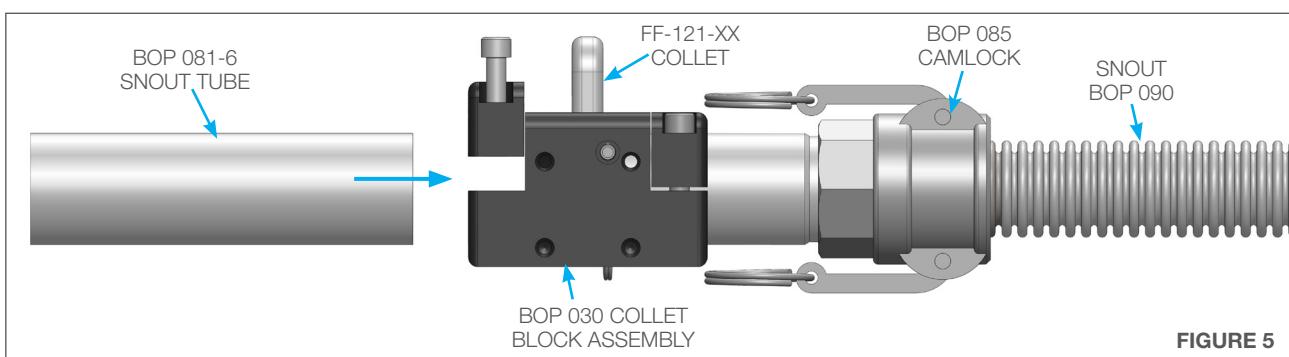
3. Thread the BOP 084 Threaded Snout Tube into the BOP 085 Camlock at the end of the BOP 090 Snout. (**Figure 3**)



4. Loosen the two screws on the collet cap block and slide the BOP 030 Collet Block Assembly onto the BOP 084 Threaded Snout Tube. Push the Collet Block until it stops on the Snout Tube, then tighten the two screws securely. (**Figure 4**)



5. Loosen the two screws on the collet cap block and slide the BOP 081-6 Snout Tube into the BOP 030 Collet Block Assembly. Push the Snout Tube until it stops in the Collet Block Assembly, then tighten the two screws securely. (**Figure 5**)



## QUARTER PLATE FLANGE MOUNT ASSEMBLY SET-UP - INCLUDED

### SNOUT CONNECTION AND BACKOUT PREVENTION COLLET

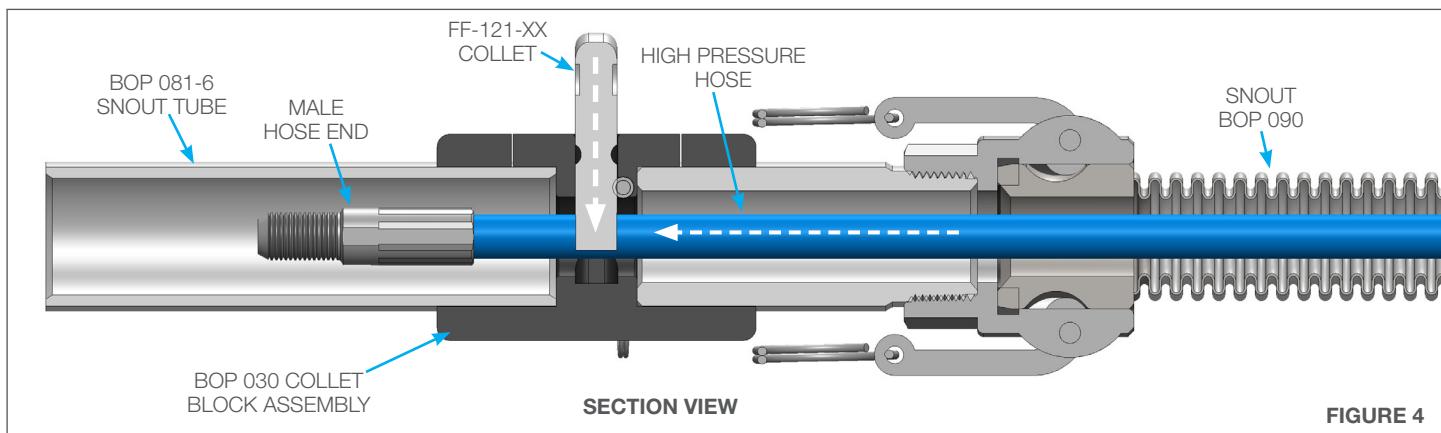
The NAVIGATOR NAV-100 comes with one customer specified FF 121-XX Collet installed in the BOP 030 Collet Block Assembly. It is necessary to change the Collet size when changing to a different diameter hose.

#### **WARNING**

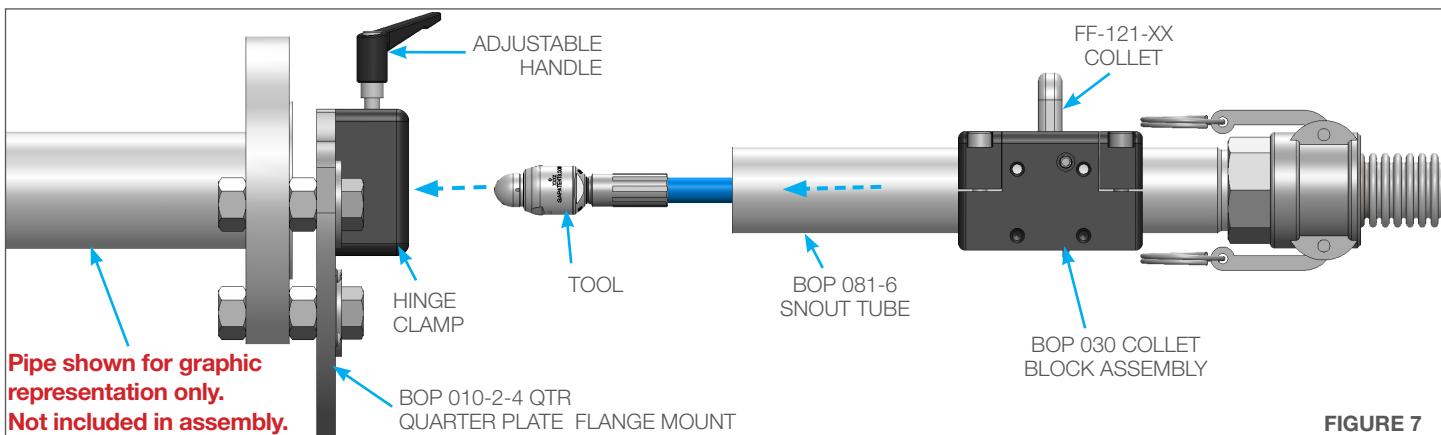
Prior to use, always test the backout preventer to ensure the tool does not pass backward through the Collet Block Assembly. Failure to do so can result in severe injury and/or death. It is the responsibility of the user to select proper collet sizing to assure the end of the hose will not pass through the Collet. Use the chart below in to select proper collet size.

| ROLLER INSIDE<br>ABX-PRO-100 | HOSE O.D.       | SPIR STAR | PARKER    | COLLET SIZE         | SA PART NUMBER |
|------------------------------|-----------------|-----------|-----------|---------------------|----------------|
| PRO 174-46<br>Ø 0.46 IN.     | 0.39 - 0.50 IN. | 4/4       | 2440D-025 | 0.438 in. / 11.0 mm | FF 121-438     |
|                              |                 | 5/4       |           | 0.460 in. / 11.7 mm | FF 121-460     |
|                              |                 |           | 2440D-03  | 0.484 in. / 12.3 mm | FF 121-484     |
|                              |                 | 6/4       | 2440D-04  | 0.516 in. / 13.0 mm | FF 121-516     |

6. Remove the Quick Release Pin and the Collet from the Collet Block Assembly. Push the Male Hose End past the Collet and reinsert the Collet and Quick Release Pin. Test the collet by pulling the hose in the reverse direction of installation to ensure the Male Hose End does not back out past the Collet. (**Figure 6**)



7. Attach desired tool onto the male hose end (Stoneage® Beetle® shown for reference). SEE THE APPLICABLE TOOL MANUAL FOR INSTALLATION INSTRUCTIONS. Loosen the adjustable handle on the Hinge Clamp. Feed the high pressure hose with tool and Snout Tube into the Quarter Plate Flange Mount. Tighten the adjustable handle to secure. (**Figure 7**)

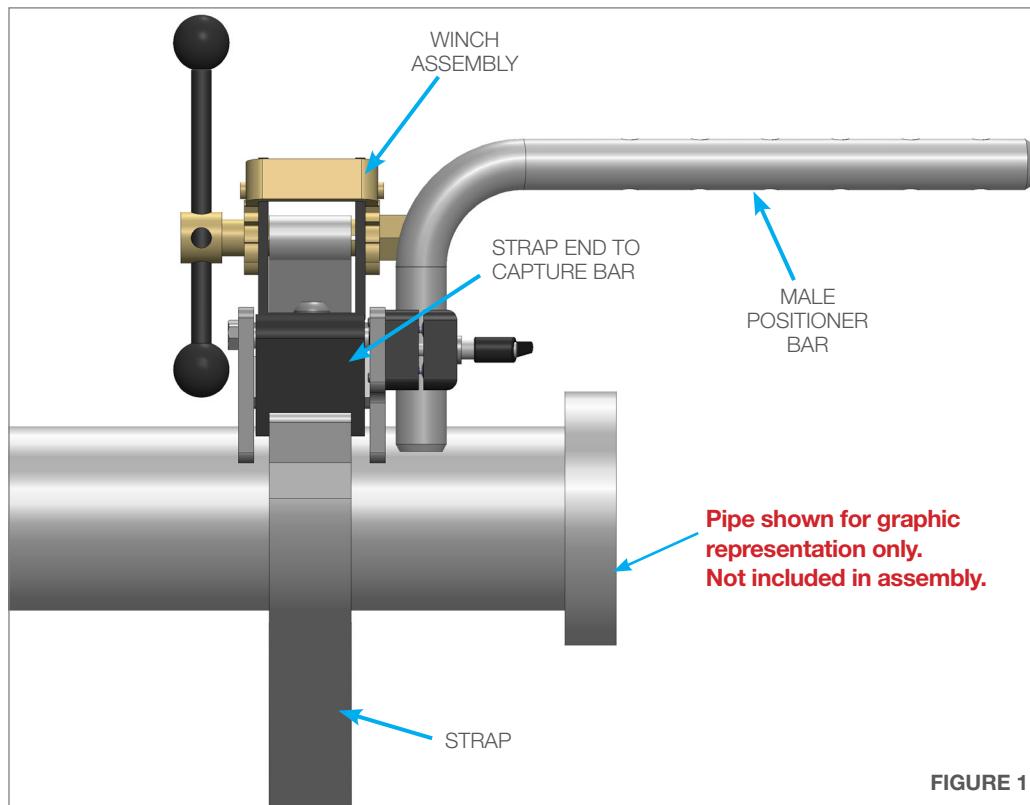


## STRAP MOUNT ASSEMBLY SET-UP- OPTIONAL

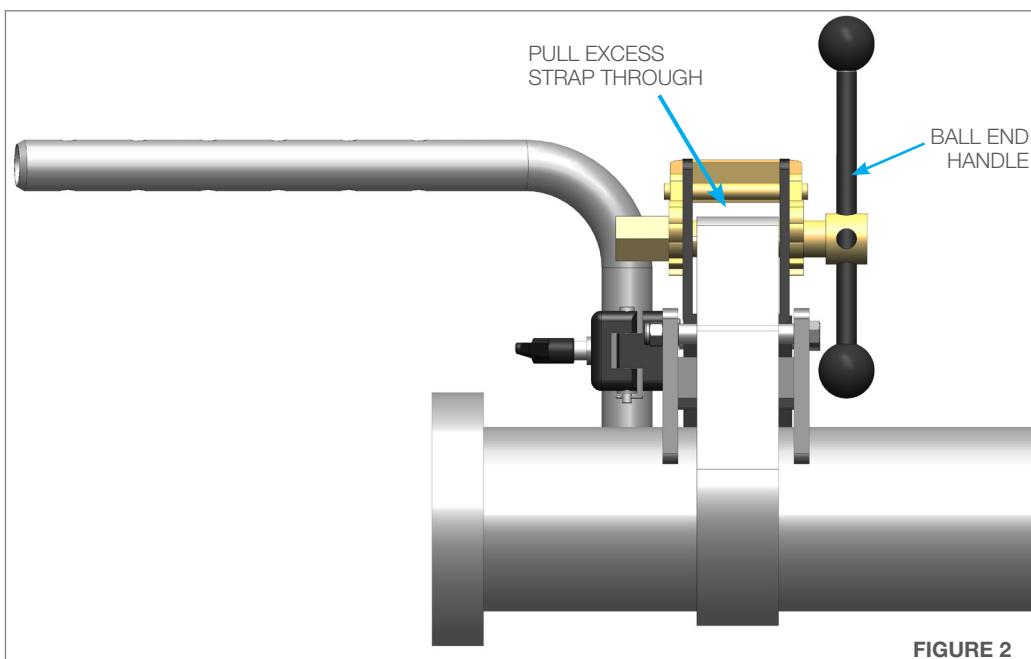
### STRAP MOUNT ASSEMBLY (BOP 050) - MALE POSITIONER SIDE

The Strap Mount Assembly (BOP 050) is designed for pipes that do not have flanges.

1. Attach the strap end to the strap capture bar and wrap the strap around the pipe towards the Winch Assembly. (**Figure 1**)



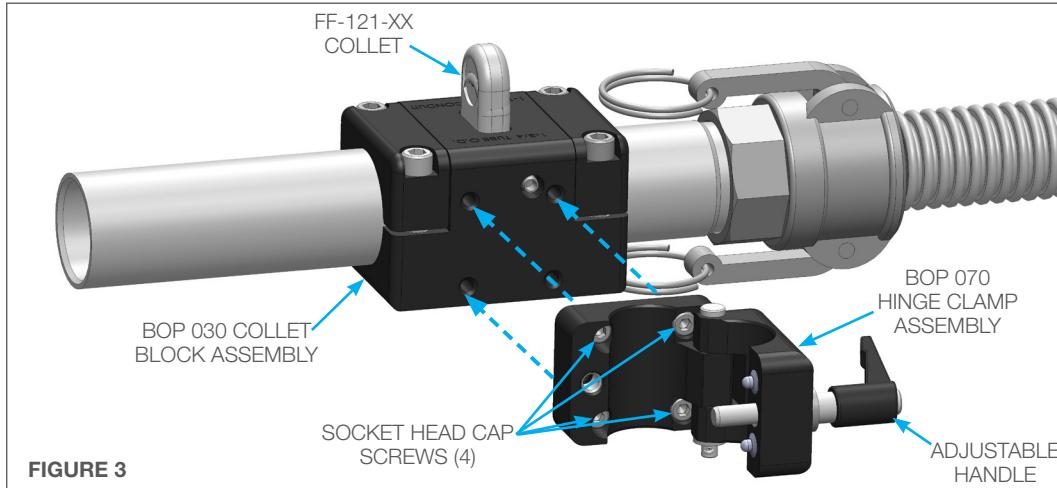
2. Pull excess strap through the Winch Assembly and tighten down with the Ball End Handle. (**Figure 2**)



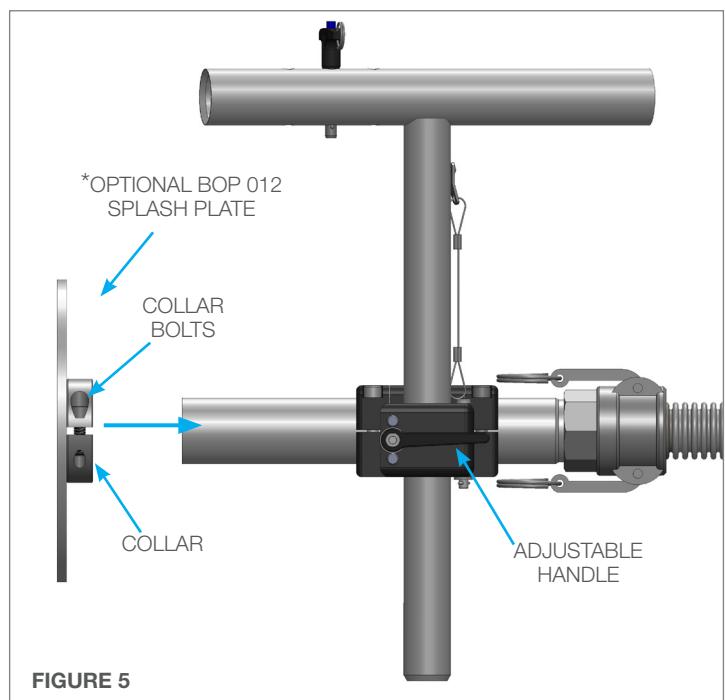
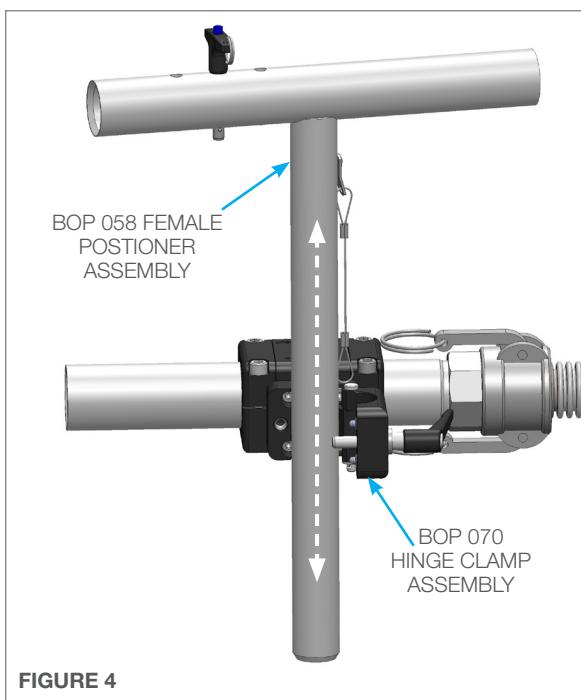
## STRAP MOUNT ASSEMBLY SET-UP- OPTIONAL

### STRAP MOUNT ASSEMBLY (BOP 050) - FEMALE POSITIONER SIDE

- Release the Adjustable Handle on the BOP 070 Hinge Clamp to access the 4 socket head cap screws. Locate the side of the BOP 030 Collet Block Assembly with 4 threaded holes. Orient the Hinge Clamp so that the hinge is on the right. Fasten the Hinge Clamp Assembly to the Collet Block Assembly using the 4 supplied socket head cap screws. (**Figure 3**)



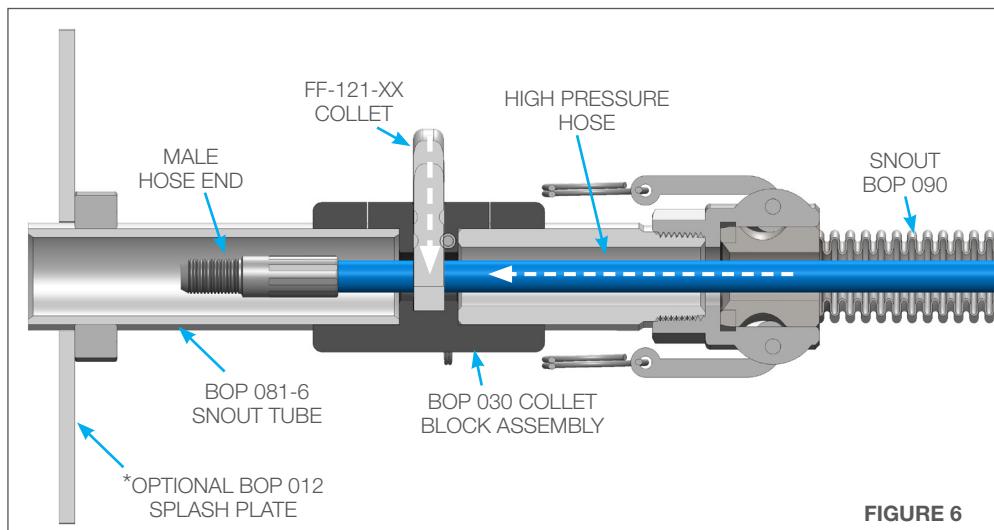
- Insert the BOP 058 Female Positioner Assembly into the Hinge Clamp Assembly. This can be done in the open or closed position and is designed to be adjustable based on the size of the pipe. (**Figure 4**)
- Close the Hinge Clamp Assembly and tighten the Adjustable Handle. To Install the BOP 012 OPTIONAL Splash Plate loosen the two bolts on the collar, slide it onto the BOP 081-6 Snout Tube and hand tighten the collar bolts when in position. (**Figure 5**)



## STRAP MOUNT ASSEMBLY SET-UP- OPTIONAL

### DRIVE SIDE TUBE MOUNT AND BACKOUT PREVENTION COLLET

6. Remove the Quick Release Pin and the Collet from the Collet Block Assembly. Push the Male Hose End past the Collet and reinsert the Collet and Quick Release Pin. Pull back on the hose to ensure the Male Hose End does not back out past the Collet. (**Figure 6**)



**FIGURE 6**

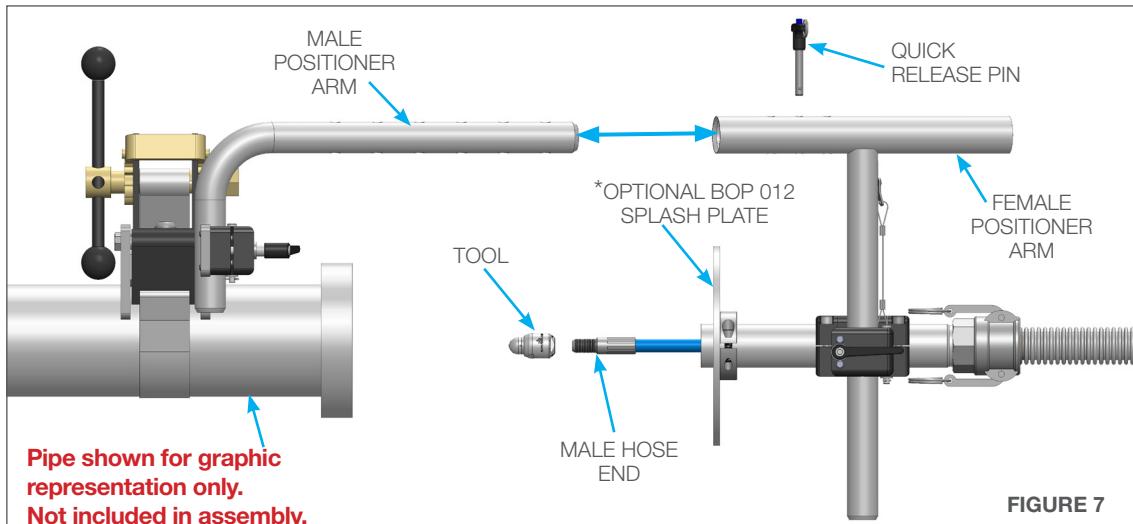
The NAVIGATOR NAV-100 comes with one customer specified FF 121-XX Collet installed in the BOP 030 Collet Block Assembly. It is necessary to change the Collet size when changing to a different diameter hose.

### **⚠ WARNING**

Prior to use, always test the backout preventer to ensure the tool does not pass backward through the Collet Block Assembly. Failure to do so can result in severe injury and/or death. It is the responsibility of the user to select proper collet sizing to assure the end of the hose will not pass through the Collet. Use the chart below in to select proper collet size.

| ROLLER INSIDE<br>ABX-PRO-100 | HOSE O.D.       | SPIR STAR | PARKER    | COLLET SIZE         | SA PART NUMBER |
|------------------------------|-----------------|-----------|-----------|---------------------|----------------|
| PRO 174-46<br>Ø 0.46 IN.     | 0.39 - 0.50 IN. | 4/4       | 2440D-025 | 0.438 in. / 11.0 mm | FF 121-438     |
|                              |                 | 5/4       |           | 0.460 in. / 11.7 mm | FF 121-460     |
|                              |                 |           | 2440D-03  | 0.484 in. / 12.3 mm | FF 121-484     |
|                              |                 | 6/4       | 2440D-04  | 0.516 in. / 13.0 mm | FF 121-516     |

5. Attach desired tool onto the male hose end (Stoneage® Beetle® shown for reference). SEE THE APPLICABLE TOOL MANUAL FOR INSTALLATION INSTRUCTIONS. Connect the Male and Female Positioner Arms. Select the appropriate positioning holes and insert the Quick Release Pin through both arms. (**Figure 7**)

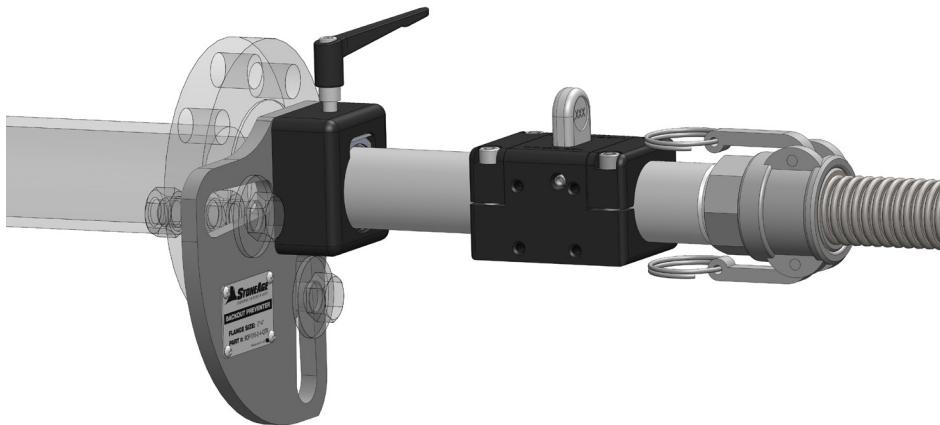


**FIGURE 7**

## TIGHT PIPE FLANGE JOINT ATTACHMENT OPTIONS

### NAV-100 NAVIGATOR ASSEMBLY WITH STRAIGHT MOUNTING OPTIONS

\*THE MOUNTING OPTION BELOW IS USED ON FLANGED PIPES\*  
(INCLUDED WITH NAVIGATOR PACKAGE)

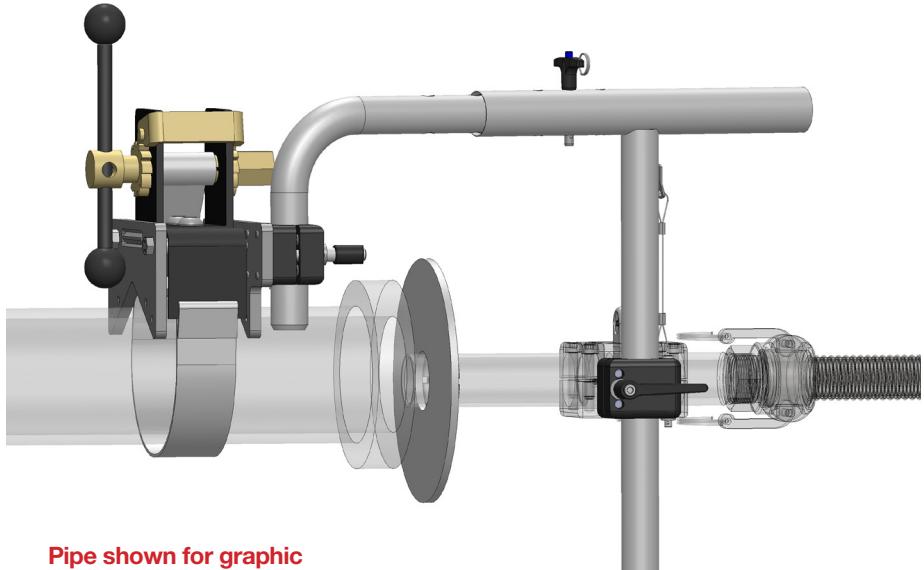


Pipe shown for graphic representation only. Not included in assembly.

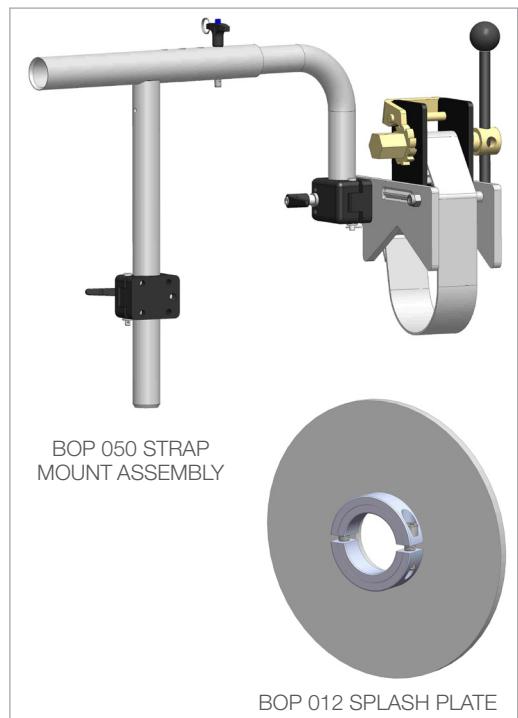


QUARTER PLATE BOP  
BOP 010-2-4 QTR

\*THE MOUNTING OPTION BELOW IS USED ON FLANGELESS PIPES \*  
(NOT INCLUDED WITH NAVIGATOR PACKAGE)



Pipe shown for graphic representation only. Not included in assembly.



BOP 050 STRAP  
MOUNT ASSEMBLY

BOP 012 SPLASH PLATE

## TIGHT PIPE FLANGE JOINT ATTACHMENT OPTIONS

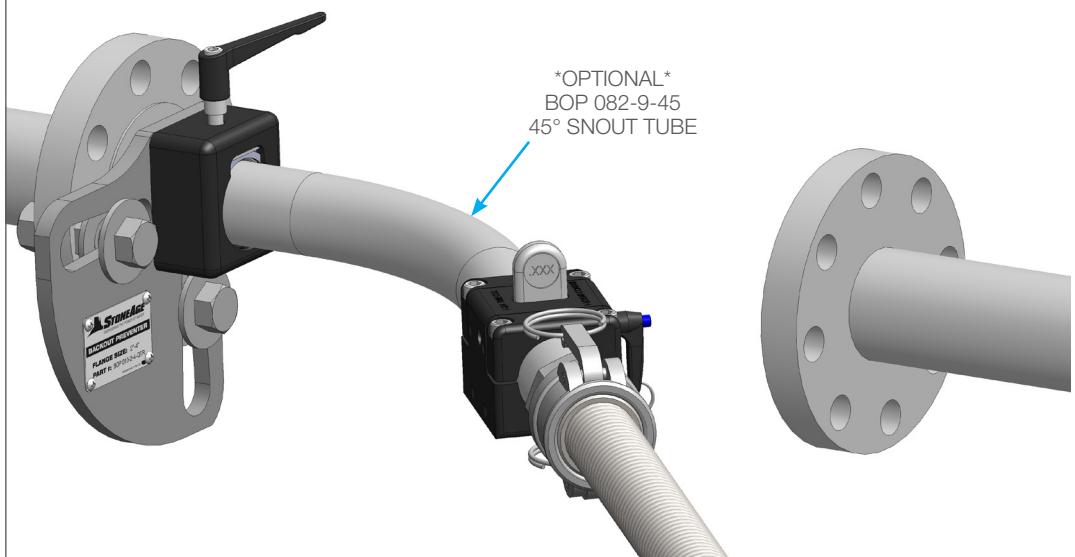
### NAV-100 NAVIGATOR ASSEMBLY WITH OFF AXIS MOUNTING OPTIONS FOR TIGHT PIPE JOINTS

THE MOUNTING OPTIONS BELOW ARE FOR USE WHEN THE PIPE JOINT WILL NOT SEPARATE ENOUGH TO ALLOW A STRAIGHT ENTRY CONNECTION.

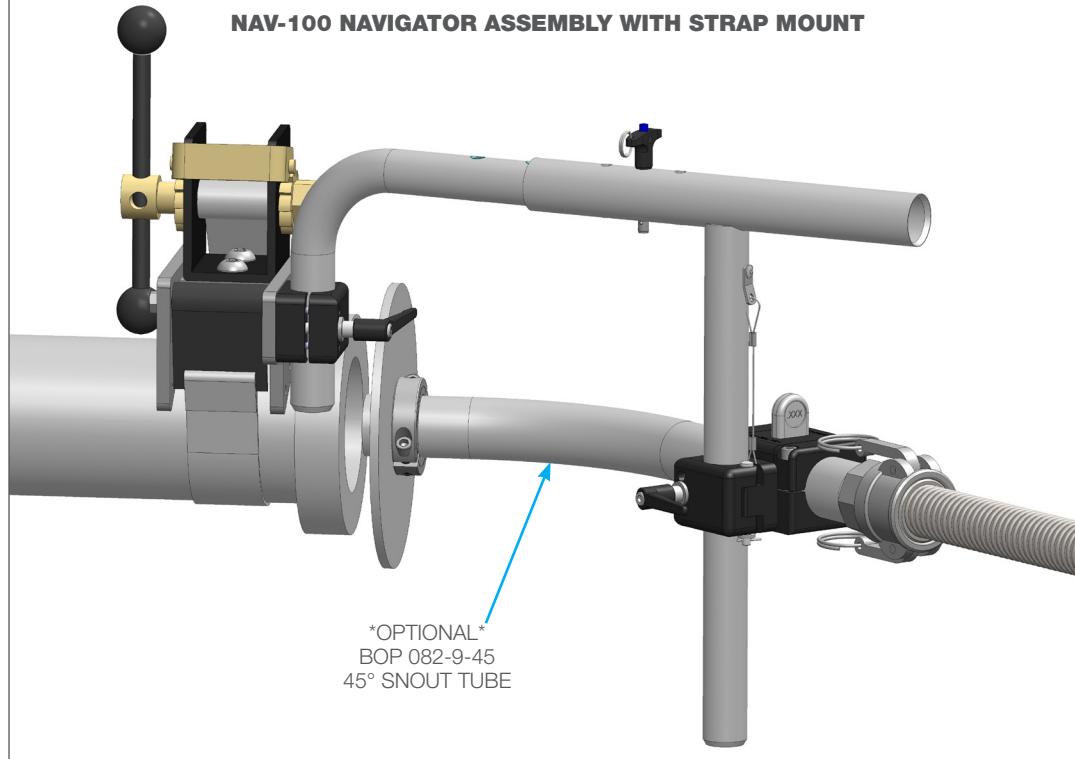
THE BOP 082-9-45 IS AVAILABLE THROUGH STONEAGE® FOR 45° BENDS. A STANDARD 1.75" ELECTRICAL CONDUIT CAN ALSO BE USED FOR CONNECTIONS OF VARYING ANGLES.

MAINTAIN A GREATER THAN 6" CENTERLINE RADIUS BEND TO AVOID CONSTRAINING THE MOVEMENT OF THE TOOL.

#### NAV-100 NAVIGATOR ASSEMBLY WITH QUARTER PLATE MOUNT



#### NAV-100 NAVIGATOR ASSEMBLY WITH STRAP MOUNT

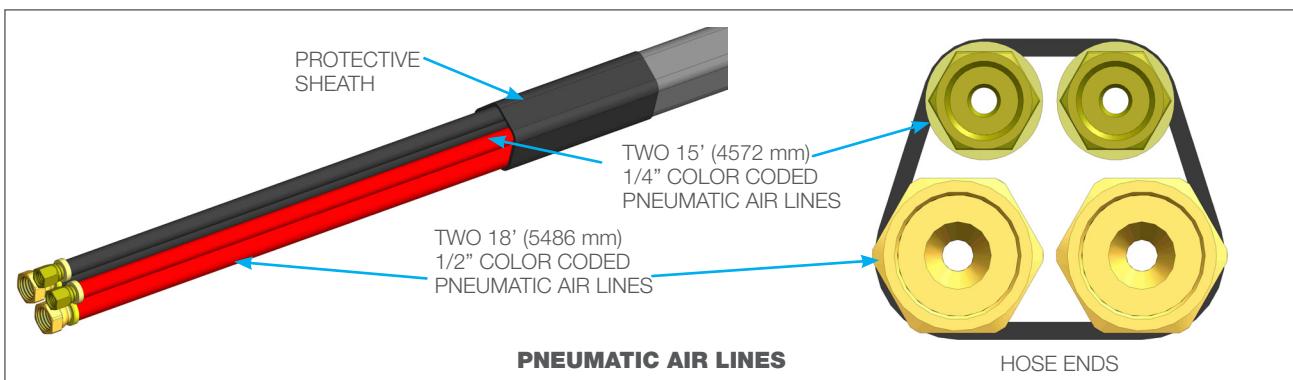
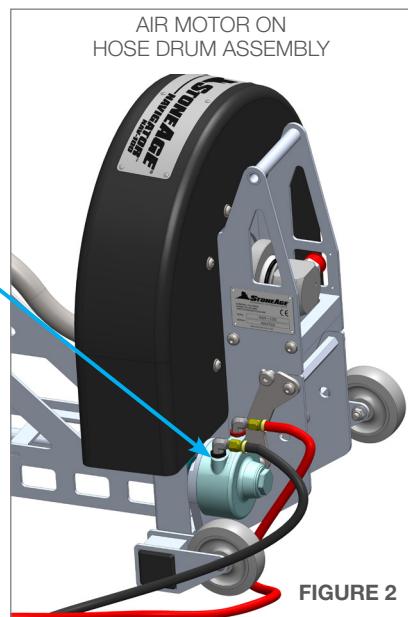
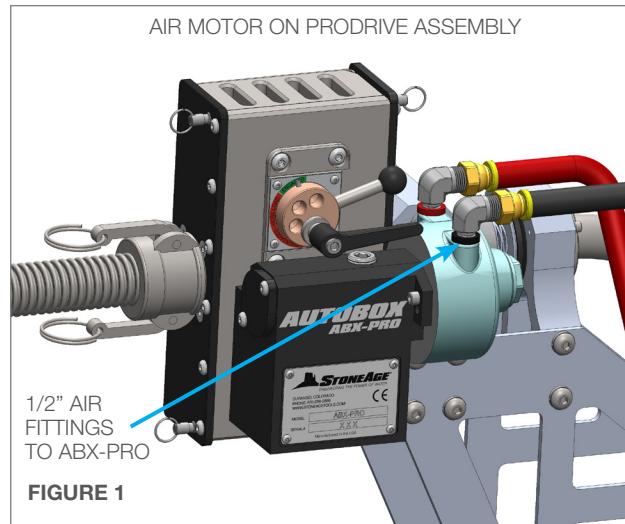
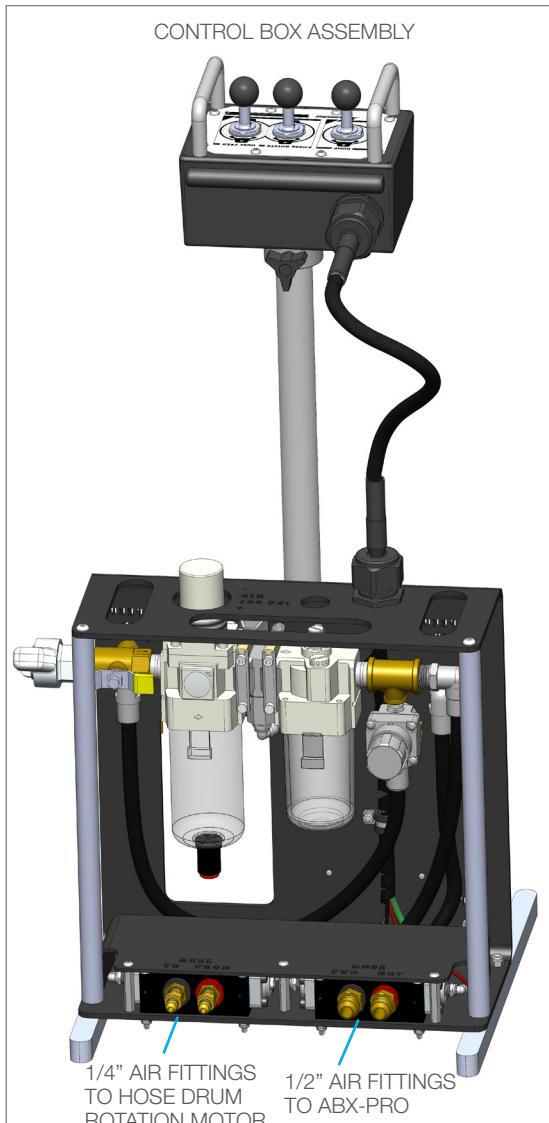


## CONTROL BOX SET-UP

### PNEUMATIC AIR LINE CONNECTIONS

1. Pull the Dust Caps off the Pneumatic Air Fittings on the control box and the air motors.
2. Connect the 1/2" Pneumatic Supply Lines from the Control Box to the ProDrive Assembly. (**Figure 1**)
3. Connect the 1/4" Pneumatic Supply Lines from the Control Box to the Hose Drum Assembly. (**Figure 2**)

Pay attention to the color coded tabs on the air fittings of the Air Motors and the Control Box. Connect the red hoses to the red banded air fittings and the black hoses to the black banded air fittings. (**Figures 1 & 2**)

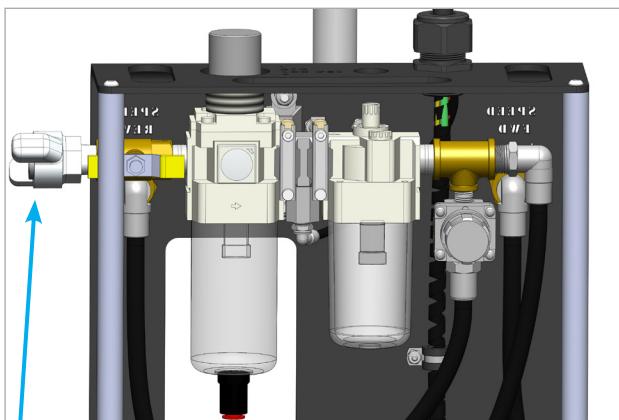


**AIR SUPPLY AND LUBRICATOR SETTING**

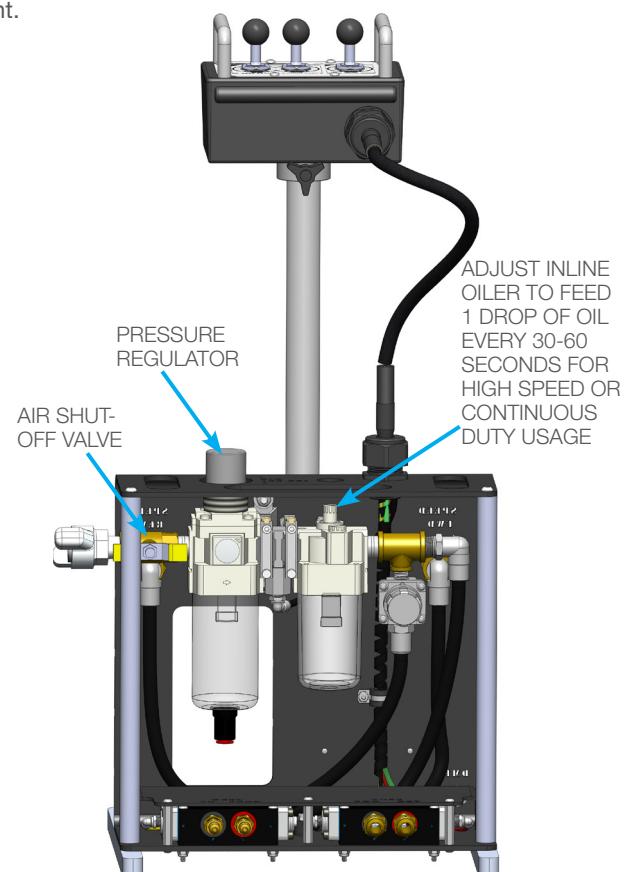
1. The CB-NAV Control Box is supplied with a twist claw style inlet coupling (Chicago style) located on the side of the FRL Assembly. Connect a compatible compressed air line (not included) according to the Manufacturer's instructions.
2. Using the pressure regulator on the FRL, adjust the operating pressure to 100 psi (0.7 MPa) for the application.
3. The CB-NAV Control Box is shipped with a minimum level of ISO Viscosity Grade 46 (SAE 20) air tool oil. The lubricator bowl will need to be filled between the Minimum and Maximum lines with an equivalent air tool oil.

**WARNING**

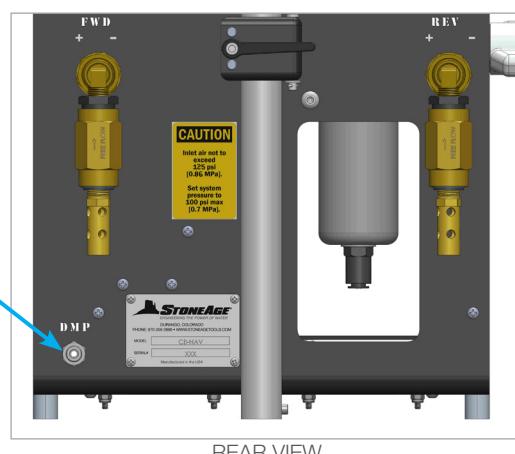
Maximum operating pressure is 100 psi (0.7 MPa). Never exceed 140 psi (0.97 MPa) supply pressure. Exceeding 140 psi supply pressure may result in injury to the Operator and/or damage to the equipment.

**AIR SUPPLY FITTING**

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

**PNEUMATIC DUMP CONTROL FITTING AND LINE**

A **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. (6.35 mm) O.D. flexible tubing (not included) between the DUMP CONTROL FITTING and the pneumatic dump valve. (NOT INCLUDED)



DUMP CONTROL FITTING  
INSTALL 1/4 IN. (6.35  
MM) O.D. TUBING (NOT  
INCLUDED) HERE

## OPERATION

### CONTROL PANEL OPERATION

The Control Box consists of a base unit with a tethered Remote Box to allow the operator to easily move around if desired. There are three levers on the Remote Box: **DUMP**, **HOSE ROTATE**, and **HOSE FEED**. All three levers are spring loaded to return to the center, OFF position.

The **DUMP** lever, when pushed forward, provides air to the  $\frac{1}{4}$ " push-connect fitting that is intended to supply air to a pneumatic dump valve to divert high-pressure water to the tool.

When the **HOSE FEED** lever is pushed forward, it drives the hose forward into the pipe. Drum rotation is automatically coupled with the switch when pushed forward. This rotation is essential to navigating around bends. It also keeps the hose expanded towards the outside of the drum so that it doesn't coil inward and potentially fall out of the drum. When the **HOSE FEED** lever is pulled backward, it retracts the hose from the pipe. Rotation of the drum is not coupled; the hose naturally expands in the drum when retracting.

The **HOSE ROTATE** lever activates the drum rotation only. Either direction of the switch always activates rotation in the same direction. Rotation is used in a couple scenarios:

- When driving forward into a pipe – and the hose is already around several bends – the tool will drive into an elbow and see an increase in rotational resistance. Drum rotation will strain as curvature builds up in the hose. Instead of trying to keep forcing the tool forward, using rotation only will slowly relax the built up hose curvature, which also slowly drives the tool forward through the bend.
- During hose retraction, it's ideal to reverse out of the pipe without rotation; this will reduce wear on the hose and rollers. Occasionally, the tool can get hung up at a bend, especially if it is far into a pipe. Temporarily activating rotation will get the tool moving again.

Forward and Reverse **HOSE FEED** speeds can be adjusted independently using the flow control valves on the base of the control box. Slow speeds are required to go forward through bends. Faster speeds are acceptable during retraction.

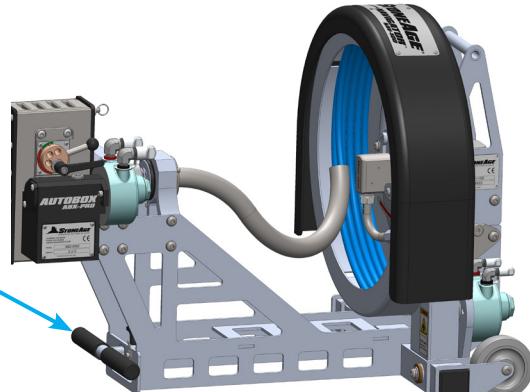
When using the Navigator and the hose is being driven forward in a pipe, the operator should watch the inside of the drum area, specifically where the hose is entering the compound elbow. The amount of force this section of hose can take is the machine's limiting factor. With a lot of elbows in a pipe, there's going to be a lot of torsional resistance and a lot of stress on the hose. Too much stress and the hose would buckle and tie itself into a knot. To help prevent this, a fixed-pressure regulator in the control box limits the air pressure available to the rotation motor.



### STORAGE, TRANSPORTATION, AND HANDLING

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

The Navigator (NAV-100) can be easily transported by lifting the handle on the base assembly and wheeling it to its next location.



## MAINTENANCE AND TROUBLESHOOTING

### MAINTENANCE

| Maintenance Item                      | Frequency              | Maintenance Required  |
|---------------------------------------|------------------------|---|
| Air Motors                            | <b>After</b> each use  | Apply a small amount of air tool oil directly into the forward and reverse fittings. Then, briefly operate the controls at slow speed for a short duration in each direction to coat the interior parts of the motor. |
| All Air Fittings                      | <b>After</b> each use  | Reinstall all dust caps to protect from dirt and moisture.  |
| All components the hoses pass through | <b>After</b> each use  | As wear occurs the rounded edges could become sharp and damage hoses. Any components showing excessive wear should be replaced.   |
| Roller grooves                        | <b>Before</b> each use | Replace roller if cuts or roughness is present. (See Pages 15-18 for Roller Replacement Instructions)   |
| Hose                                  | <b>After</b> each use  | Install cap on threads to protect threads and prevent contamination.  |
| Lubricator of control box             | <b>Before</b> each use | Add oil when fluid drops below minimum level marking.   |
| Snout and BOP Components              | <b>After</b> each use  | Wash out any material build up to prevent components from being clogged.  |
| Waterblast Tool                       | <b>After</b> each use  | Remove tool, lubricate and store in clean container.  |
| Webbing strap                         | <b>Before</b> each use | Replace strap when frayed, cut or torn  |

### TROUBLESHOOTING

| Problem                          | Solution  |
|----------------------------------|---|
| No air is delivered to tool      | <ul style="list-style-type: none"> <li>-Check that shut-off valve near regulator is open</li> <li>-Check that regulator is set to 100 psi</li> <li>-Open flow control valves by rotating the brass colored speed controls in the counterclockwise direction.</li> </ul> |
| Hose is being damaged by Rollers | <ul style="list-style-type: none"> <li>-Check that the proper Rollers are installed (see roller and collet reference plate)</li> <li>-Loosen eccentric lever to reduce clamp force on hose.</li> </ul>  |
| Hose slippage on Rollers         | <ul style="list-style-type: none"> <li>-Check that the proper Rollers are installed (see roller and collet reference plate)</li> <li>-Tighten eccentric lever to retain clamp force on hose.</li> <li>-Check Rollers for excessive wear in groove</li> </ul>            |

Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the Navigator (NAV-100), ProDrive (ABX-PRO), and Control Box (CB-NAV).

## ROLLER REMOVAL INSTRUCTIONS

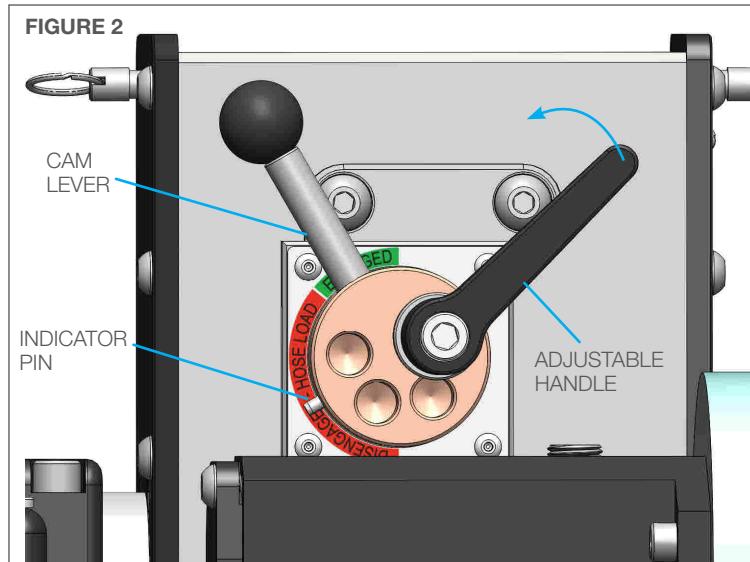
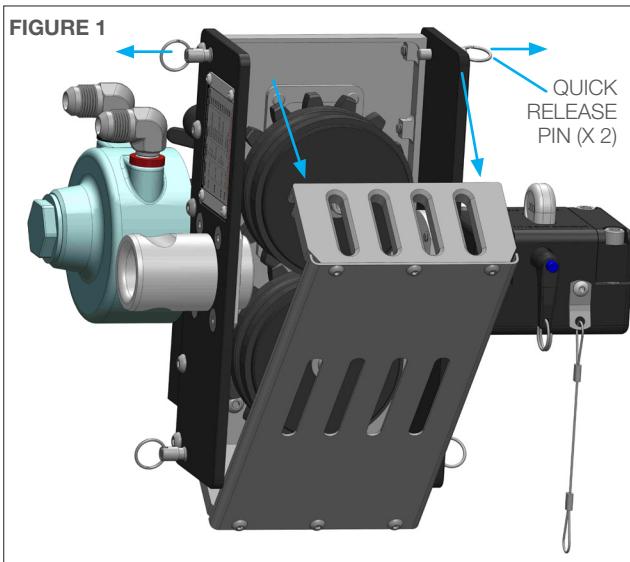
### ROLLER REMOVAL

**NOTE:** This process will be typical to every size Roller for the ABX-PRO Tractor Assembly. Installation of the appropriate Roller should be completed prior to installing the hose and tool into the AUTOBOX® ProDrive ABX-PRO-100 Assembly.

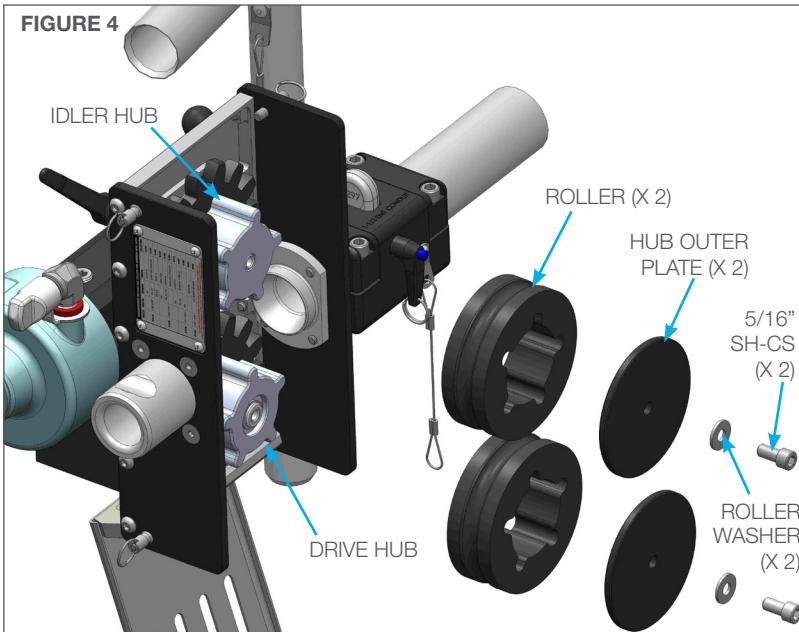
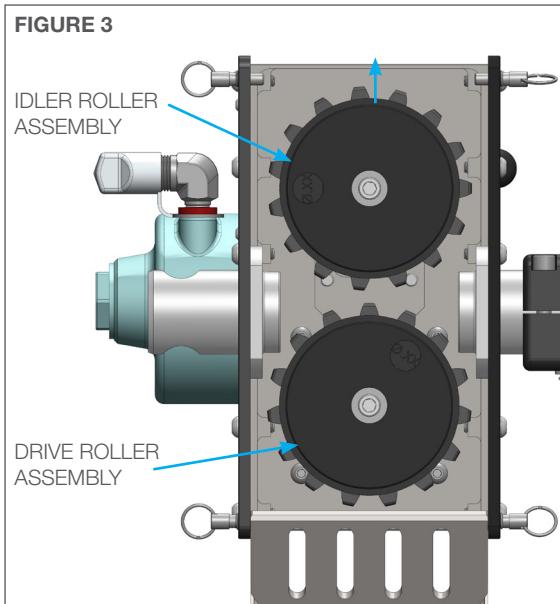
#### ⚠ WARNING

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

1. Open the back cover of the ABX-PRO Tractor by pulling the top two Quick Release Pins in the outward direction. (**Figure 1**)
2. Push the Adjustable Handle in the counterclockwise direction to loosen the CAM Lever and bushing. Push the Eccentric Lever in the counterclockwise direction, moving the indicator pin to “**Disengaged**”. (**Figure 2**)



3. Loosening the Cam Lever opens up the space between the Spline Roller Assemblies. (**Figure 3**)
4. Remove the two socket head cap screws, Roller Washers, Hub Outer Plates and Rollers. (**Figure 4**)



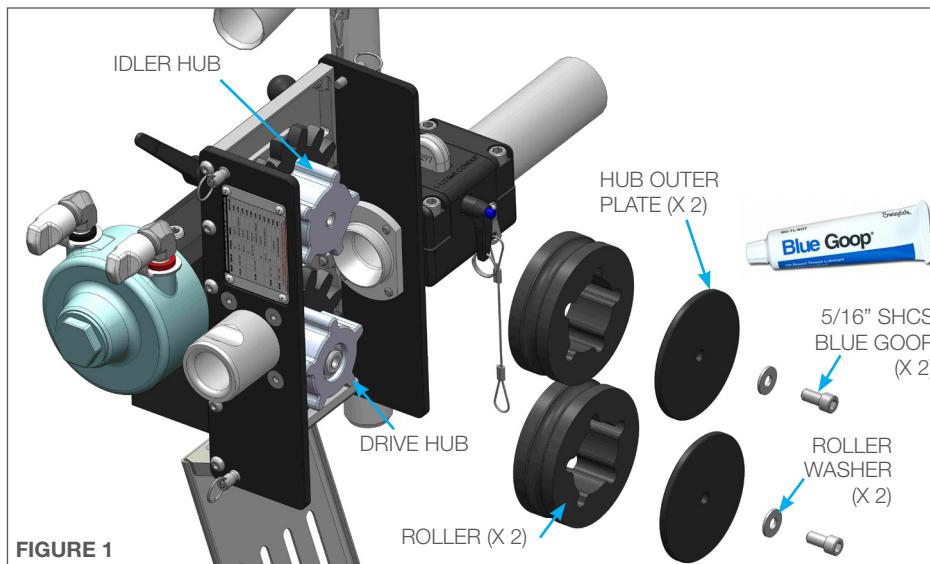
## ROLLER INSTALLATION

**NOTE: This process will be typical to every size Roller for the ABX-PRO Tractor Assembly. Installation of the appropriate Roller should be completed prior to installing the hose and tool into the AUTOBOX® ProDrive ABX-PRO-100 Assembly.**

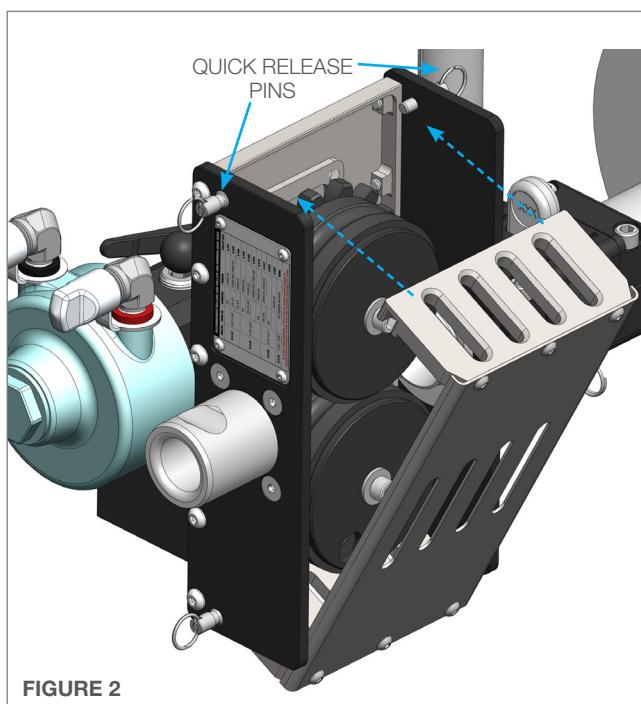
**⚠ WARNING**

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

1. Choose an alternate size or replacement roller by using the reference chart in the section below to select the proper sizing. Slide the desired Rollers onto the Hubs. Then fasten the Hub Outer Plates and Roller Washers onto the Spline Load Rollers with the two 5/16" socket head cap screws. (**Figure 1**)

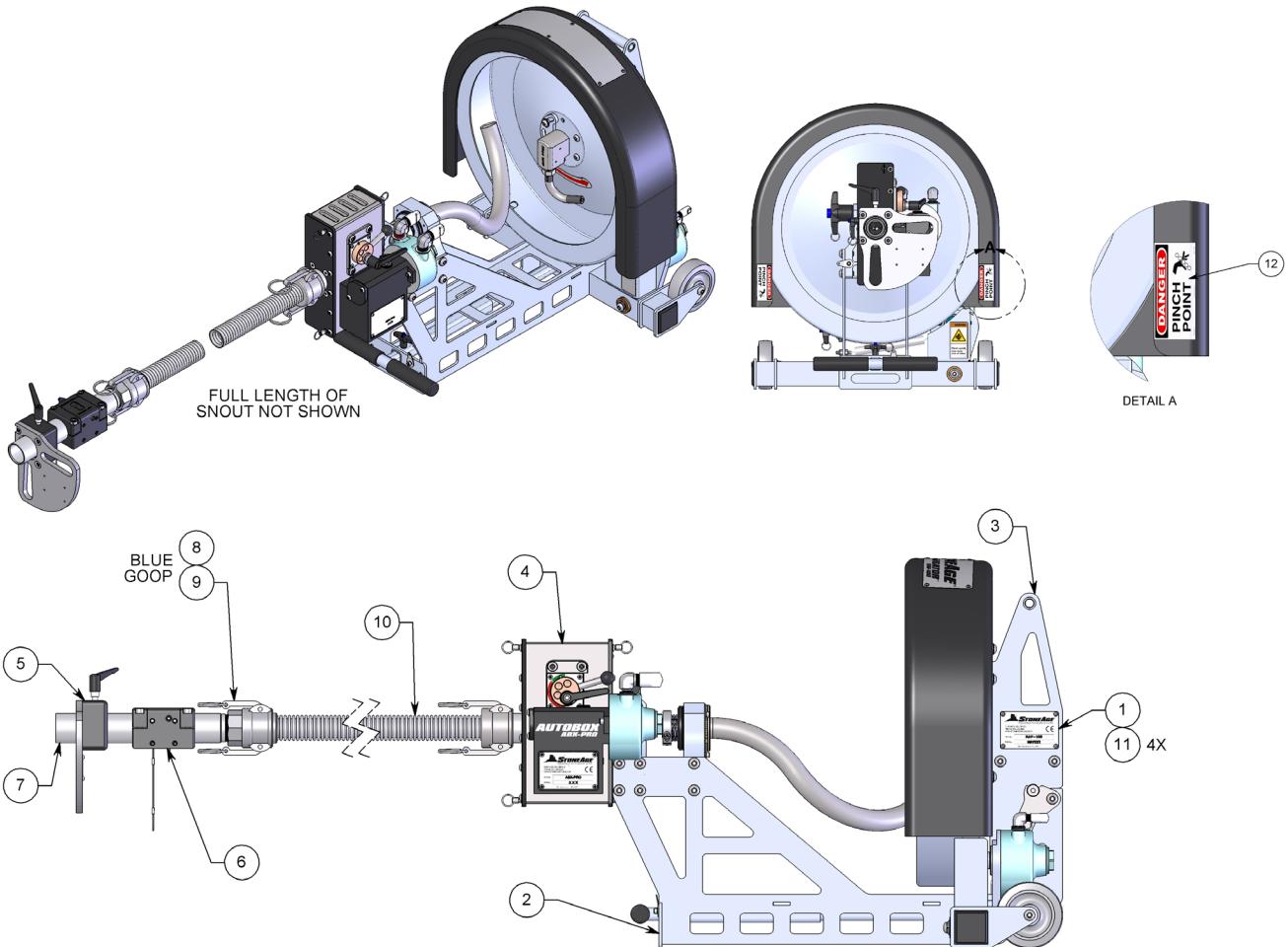


2. Push the back cover back into the closed position and secure the two Quick Release Pins on the top of the ABX-PRO AUTOBOX® PRODRIVE TRACTOR. (**Figure 2**)



## PARTS DIAGRAM

**NAVIGATOR (NAV-100)**  
FULL ASSEMBLY

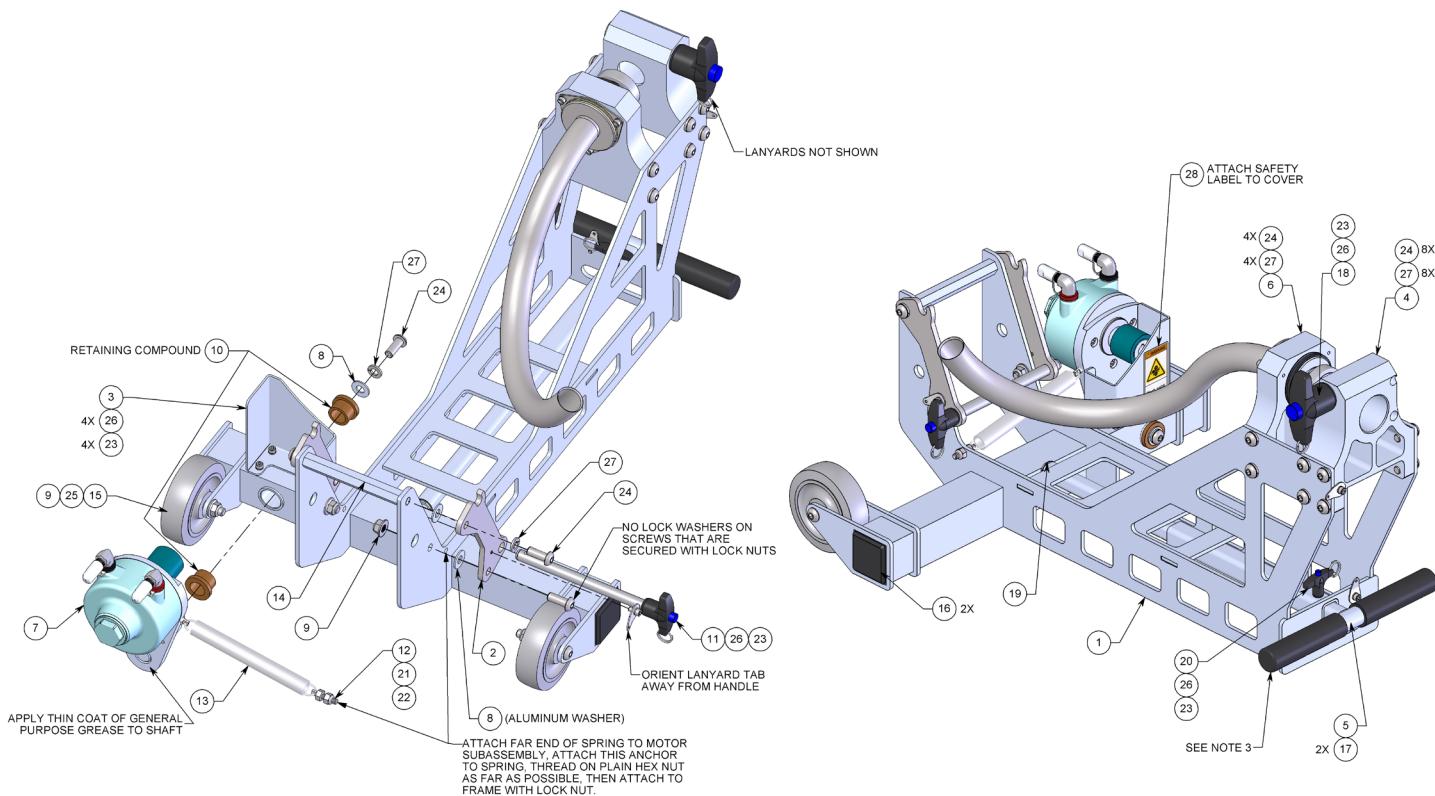


| # | PART NUMBER                               | QTY |
|---|---|-----|
| 1 | NAV 101 PLACARD, SERIAL PLATE, CE         | 1   |
| 2 | NAV 110 BASE FRAME ASSEMBLY               | 1   |
| 3 | NAV 130 DRUM FRAME ASSEMBLY               | 1   |
| 4 | ABX-PRO AUTOBOX PRODRIVE TRACTOR ASSEMBLY | 1   |
| 5 | BOP 010-2-4-QTR QUARTER PLATE BOP         | 1   |
| 6 | BOP 030 COLLET BLOCK ASSEMBLY             | 1   |

|    |   |   |
|----|---|---|
| 7  | BOP 081-6 SNOOT TUBE 1.75 X 6 SS              | 1 |
| 8  | BOP 084 SNOOT TUBE, 1.75 X 1.25 MNPT AL       | 1 |
| 9  | BOP 085 CAM LOCK 1.25F X 1.25 FNPT            | 1 |
| 10 | BOP 090 SNOOT, CORRUGATED, 1-1/4 CAMLOCKS, 6' | 1 |
| 11 | CB 747 BLIND RIVET, ALUM, 1/8" DIA X .25      | 4 |
| 12 | PL 160 WARNING PINCH POINT 1.5 X3.0 DECAL     | 2 |

**NAVIGATOR (BOP 090)**  
SNOOT ASSEMBLY



**NAVIGATOR (NAV 110)**  
 BASE FRAME ASSEMBLY


## NOTE:

1. APPLY THREAD ADHESIVE TO ALL THREADED COMPONENTS BLUE LOCTITE: PN: 242 OR EQUIVALENT.
2. APPLY GREEN RETAINING COMPOUND, LOCTITE PN: 290 OR EQUIVALENT TO COMPONENTS AS NOTED.
3. ASSURE INSIDE OF GRIP AND OUTER SURFACE OF ALUMINUM BAR ARE FREE OF GREASE, OILS, AND DIRT. COAT THE INSIDE OF THE GRIP AND OUTSIDE OF THE ALUMINUM BAR WITH ISOPROPYL ALCOHOL, THEN SLIDE GRIP FULLY ONTO ALUMINUM BAR TO INSTALL.

| #  | PART NUMBER  | QTY |
|----|--|-----|
| 1  | NAV 111 BASE FRAME, WELDMENT                         | 1   |
| 2  | NAV 112 JOINT PLATE                                  | 2   |
| 3  | NAV 113 COVER, DRIVE ROLLER                          | 1   |
| 4  | NAV 114 DRIVE MOUNTING BLOCK, CAM GROOVE             | 1   |
| 5  | NAV 115 HANDLE WELDMENT                              | 1   |
| 6  | NAV 150 COMPOUND ELBOW ASSEMBLY                      | 1   |
| 7  | NAV 160 ROTATION MOTOR ASSEMBLY                      | 1   |
| 8  | NAV 301 WASHER, FLAT, OVERSIZED OD, ALUMINUM         | 5   |
| 9  | NAV 302 NUT, LOCKING, FLANGED                        | 4   |
| 10 | NAV 303 BUSHING, FLANGED, 3/4" ID                    | 2   |
| 11 | NAV 304 PIN, QUICK-RELEASE, T-HANDLE, 1/2" DIA, 6" L | 1   |
| 12 | NAV 305 SPRING ANCHOR                                | 1   |
| 13 | NAV 306 SPRING, EXTENSION                            | 1   |
| 14 | NAV 307 STANDOFF, HEX, 5" L, 3/8-16 TAPPED ENDS      | 1   |

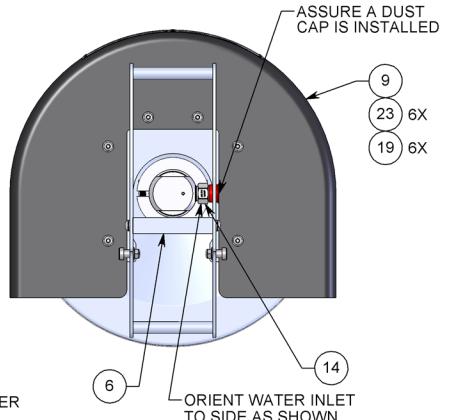
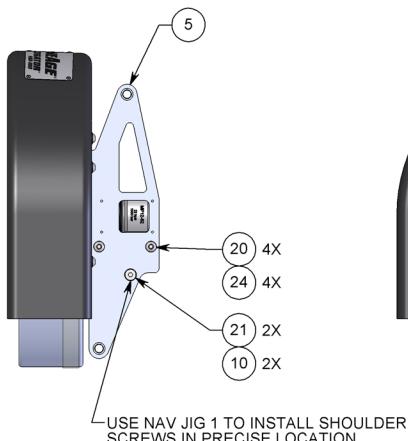
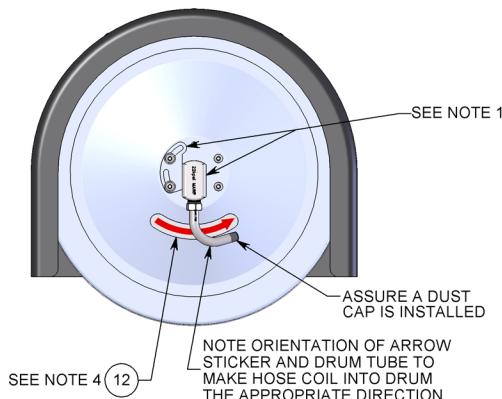
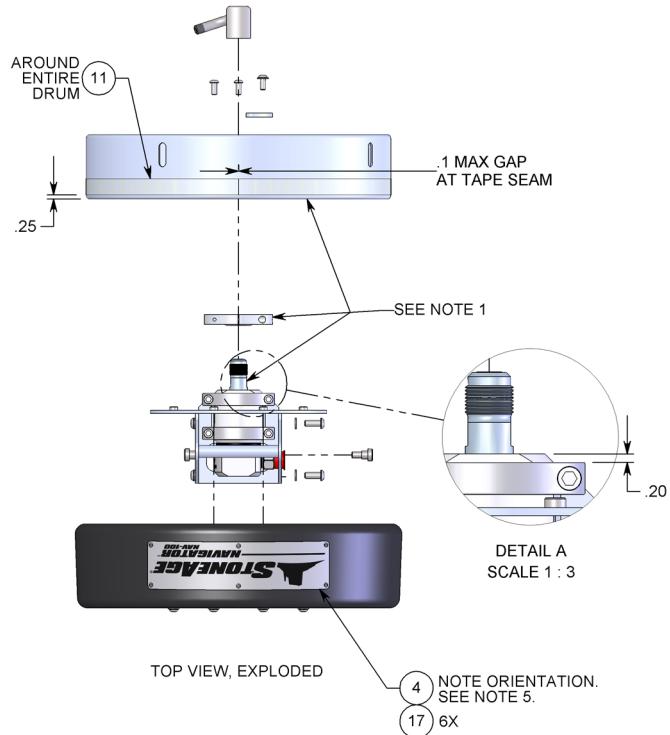
|    |   |    |
|----|---|----|
| 15 | NAV 308 WHEEL, 4" DIA x 1-1/4" WIDE, GREY               | 2  |
| 16 | NAV 309 FINISHING PLUG, SQUARE                          | 2  |
| 17 | NAV 311 GRIP, ROUND, HEX SURFACE                        | 2  |
| 18 | NAV 323 PIN, QUICK-RELEASE, T-HANDLE, 1" DIA, 2.5" L    | 1  |
| 19 | NAV 324 RETAINING RING                                  | 1  |
| 20 | NAV 325 PIN, QUICK-RELEASE, T-HANDLE, 0.25" DIA, 1.0" L | 1  |
| 21 | GN 325-H NUT, HEX, 1/4-20                               | 1  |
| 22 | GN 325-L NUT, LOCKING, 1/4-20                           | 1  |
| 23 | GS 319-015 SCREW, SHC, STAINLESS, #10-24 UNC X 0.375L   | 7  |
| 24 | GSB 337-04 SCREW, BHSC, 318-16 UNC X 1.000L             | 17 |
| 25 | GSB 337-10 SCREW, BHSC, 318-16 UNC X 2.500L             | 2  |
| 26 | GW 319-L WASHER, LOCK, #10, STAINLESS                   | 7  |
| 27 | GW 337-L WASHER, LOCK, 3/8", STAINLESS                  | 15 |
| 28 | PL 161 SAFETY LABEL, PINCH POINT, 1.5" X 3"             | 1  |

## PARTS DIAGRAM

**NAVIGATOR (NAV 130)**  
DRUM FRAME ASSEMBLY

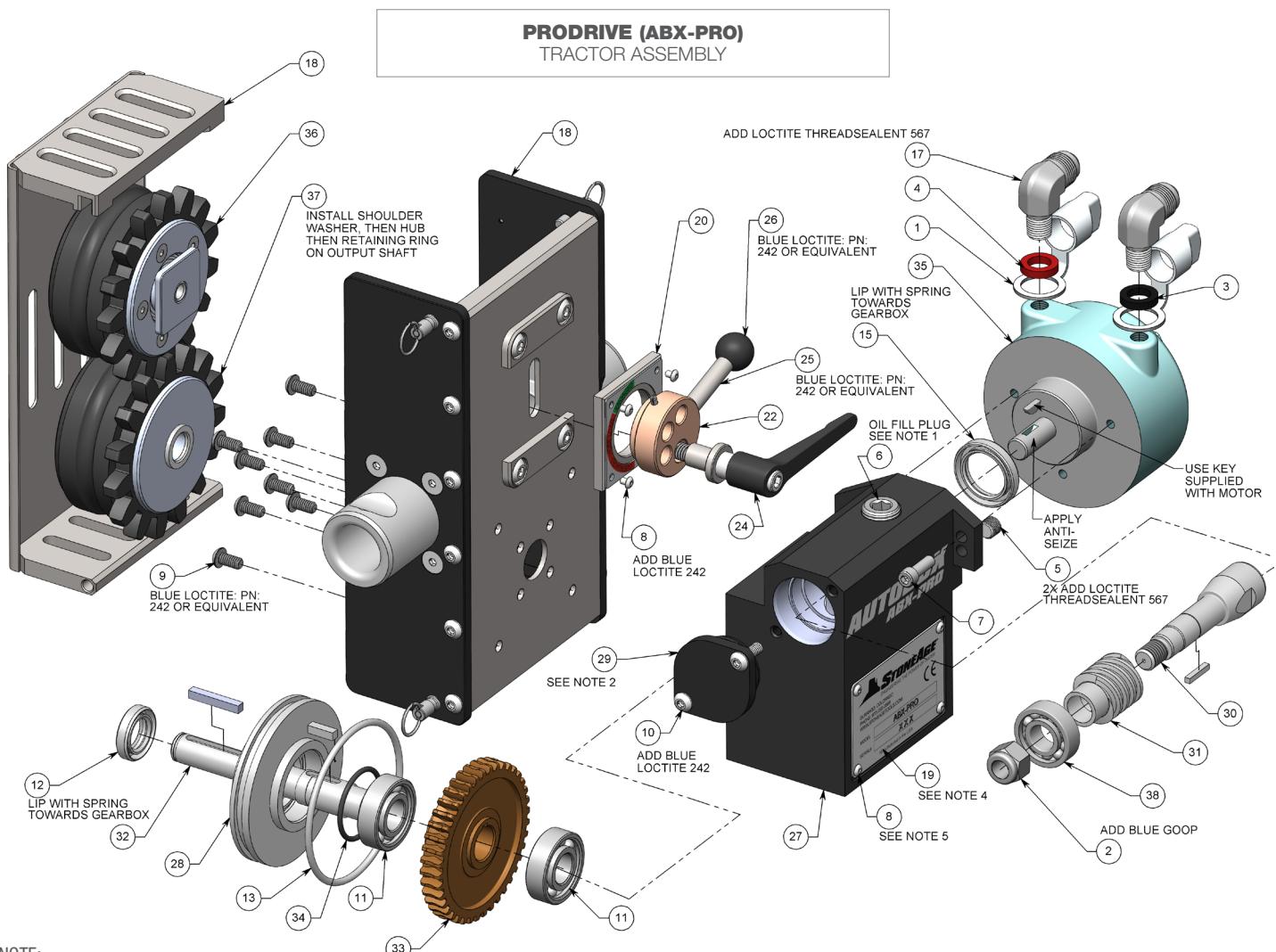
NOTE:

1. SWIVEL, FLANGE, DRUM, ELBOW & LOCKING PLATE INSTALLATION:
  - a) SECURE SWIVEL WITHIN CLAMPS AT LOCATION SHOWN IN TOP VIEW.
  - b) SLIDE ADAPTER FLANGE FULLY ONTO SWIVEL SHAFT (PROFILED SIDE TOWARD SWIVEL), ALIGN SCREW WITH FLAT ON SWIVEL SHAFT AS NOTED, THEN TIGHTEN BOTH SCREWS SECURELY (USE BLUE GOOP).
  - c) PLACE DRUM ON ADAPTER FLANGE (5 OF THE 6 HOLES WILL BE USED) AND ATTACH WITH ALL 5 SCREWS (USE BLUE LOCTITE).
  - d) SECURELY TIGHTEN ELBOW ONTO SWIVEL (USE BLUE GOOP).
  - e) PLACE FLAT SIDE OF LOCKING PLATE UP AGAINST ONE OF THE SIDES OF ELBOW. DETERMINE THE BEST SIDE AND ORIENTATION OF PLATE BY ASSURING 2 SCREWS CAN SECURE THE PLATE. REMOVE THOSE 2 SCREWS, PLACE PLATE FIRMLY AGAINST THE SIDE OF THE ELBOW, ADD FLAT WASHERS AND REINSTALL SCREWS. 2. 4x RED LOCTITE: PN: 262 OR EQUIVALENT
2. BLUE GOOP IS A SWAGELOK BRAND ANTI-SEIZE. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
3. APPLY BLUE LOCTITE: PN: 242 OR EQUIVALENT, TO ALL THREADED FASTENERS.
4. CLEAN AREA WHERE STICKER IS TO BE APPLIED WITH ISOPROPYL ALCOHOL. ATTACH STICKER APPROXIMATELY WHERE SHOWN.
5. ATTACH PLATE TO COVER WITH 2 CENTER RIVETS THROUGH EXISTING HOLES IN COVER. THEN BEND EACH END OF THE PLATE OVER THE COVER TO LOCATE WHERE THE OTHER 4 RIVETS WILL GO. MARK THE 4 LOCATIONS, DRILL <MOD-DIAM>.136 HOLES THROUGH FIBERGLASS COVER. SECURE THE CORNERS OF THE PLATE WITH THE 4 REMAINING RIVETS.



| #  | PART NUMBER                    | QTY |
|----|--------------------------------|-----|
| 1  | HCS 103 DRUM ADAPTER FLANGE    | 1   |
| 2  | HCS 105 KMP9 ELBOW             | 1   |
| 3  | HCS 120 ELBOW LOCKING PLATE    | 1   |
| 4  | NAV 102 BRANDING PLATE         | 1   |
| 5  | NAV 131 DRUM FRAME, WELDMENT   | 1   |
| 6  | NAV 132 SWIVEL MOUNT, WELDMENT | 1   |
| 7  | NAV 133 DRUM, 19" DIA          | 1   |
| 8  | NAV 134 HOSE CONNECTION TUBE   | 1   |
| 9  | NAV 135 DRUM COVER             | 1   |
| 10 | NAV 302 NUT, LOCKING, FLANGED  | 2   |
| 11 | NAV 312 TRACTION TAPE, 1" WIDE | 1   |
| 12 | NAV 322 STICKER, ARROW, LEFT   | 1   |

|    |   |    |
|----|---|----|
| 13 | SG-MP12K-62-90 SWIVEL                                       | 1  |
| 14 | AF 063-M12 ADAPTER, 1" TYPE-M TO MP12                       | 1  |
| 15 | AF 070-MP9 GLAND  | 1  |
| 16 | AF 071-MP9 COLLAR   | 1  |
| 17 | CB 747 BLIND RIVET, ALUM, 1/8" DIA X .25                    | 6  |
| 18 | GS 325-05 SCREW, SHC, STAINLESS, 114-20 UNC X 1.250L        | 2  |
| 19 | GSB 331-03 SCREW, BHSC, 516-18 UNC X 0.750L                 | 11 |
| 20 | GSB 337-04 SCREW, BHSC, 318-16 UNC X 1.000L                 | 4  |
| 21 | GSSH 0500-0375-SS SCREW, SHOULDER, 0.500 DIA x 0.375 LENGTH | 2  |
| 22 | GW 325-L-HC WASHER, LOCK, HIGH-COLLAR, 1/4", STAINLESS      | 1  |
| 23 | GW 331-F WASHER, FLAT, 5/16", STAINLESS                     | 8  |
| 24 | GW 337-L WASHER, LOCK, 3/8", STAINLESS                      | 4  |



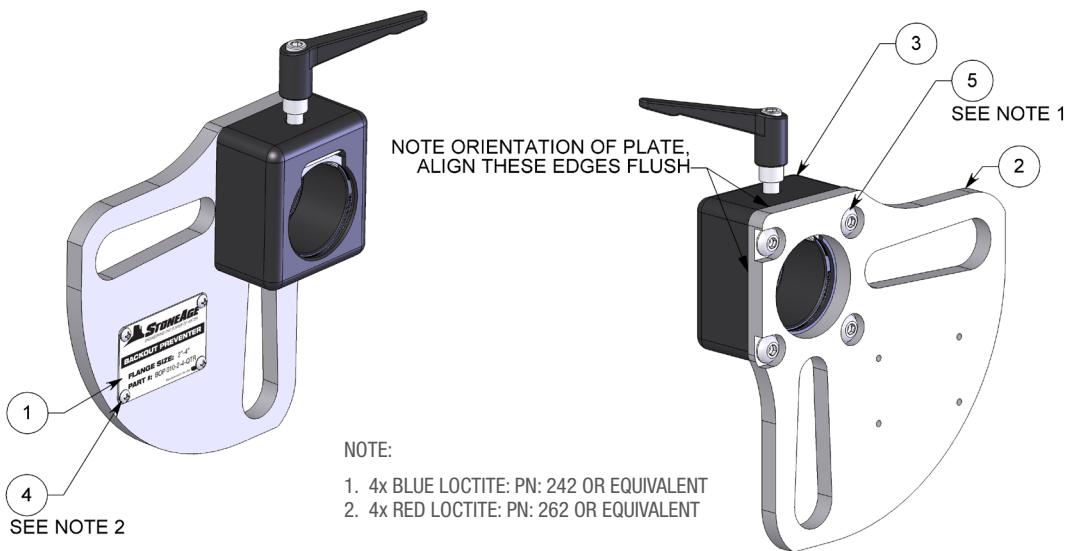
| #  | PART NUMBER                                | QTY. |
|----|--|------|
| 1  | BR 167 90° DUST CAP                        | 2    |
| 2  | GN 550-L NYLOK NUT                         | 1    |
| 3  | GP 013-BK BLACK ID BAND, SM                | 1    |
| 4  | GP 013-R RED ID BAND, SM                   | 1    |
| 5  | GP 025-P2SS HEX SOCKET PLUG                | 1    |
| 6  | GP 025-P8SS HEX SOCKET PLUG                | 1    |
| 7  | GS 325-03 SHCS .25-20 X .75 SS<br>(TB 050) | 2    |
| 8  | GSB 313-0075 BHCS 6-32 X .188<br>LG SS     | 8    |
| 9  | GSB 325-02 BHCS .25-20 X .50<br>LG SS      | 8    |
| 10 | GSB 325-03 BHCS .25-20 X .75<br>LG SS      | 2    |
| 11 | HLXD 002 BEARING, OUTPUT                   | 2    |

|    |   |   |
|----|---|---|
| 12 | HLXD 003 SEAL, OUTPUT                     | 1 |
| 13 | HLXD 006 O-RING, OUTPUT                   | 1 |
| 14 | HLXD 011 SPACER                           | 1 |
| 15 | HLXD 013 SEAL, INPUT                      | 1 |
| 16 | HLXD 017 CAP O-RING, INPUT                | 1 |
| 17 | HRS 552 FITTING, ELBOW<br>OUTLET P4J8 90° | 2 |
| 18 | PRO 101 HOUSING ASSEMBLY                  | 1 |
| 19 | PRO 109 CE SERIAL PLATE                   | 1 |
| 20 | PRO 112 CAM PLATE                         | 1 |
| 21 | PRO 113 CAM PLATE, DECAL                  | 1 |
| 22 | PRO 114 CAM BUSHING                       | 1 |
| 23 | PRO 115 ROLL PIN                          | 1 |
| 24 | PRO 116 ADJUSTABLE HANDLE<br>ASSEMBLY     | 1 |
| 25 | PRO 117 CAM LEVER SHAFT                   | 1 |

|    |                                  |   |
|----|----------------------------------|---|
| 26 | PRO 118 CAM LEVER KNOB           | 1 |
| 27 | PRO 130 GEARBOX HOUSING          | 1 |
| 28 | PRO 131 BULKHEAD, OUTPUT         | 1 |
| 29 | PRO 132 INPUT CAP                | 1 |
| 30 | PRO 133 INPUT SHAFT              | 1 |
| 31 | PRO 134 WORM 20-1                | 1 |
| 32 | PRO 136 OUTPUT SHAFT             | 1 |
| 33 | PRO 137 WORM GEAR 20-1           | 1 |
| 34 | PRO 138 O-RING                   | 1 |
| 35 | PRO 155 AIR MOTOR                | 1 |
| 36 | PRO 170 IDLER ROLLER<br>ASSEMBLY | 1 |
| 37 | PRO 181 DRIVE ROLLER<br>ASSEMBLY | 1 |
| 38 | RJ 009 BEARING                   | 1 |

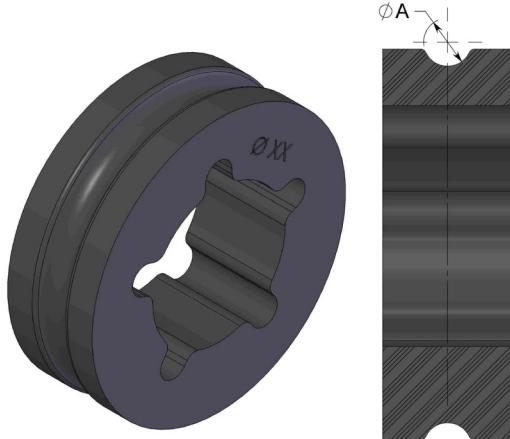
## PARTS DIAGRAM

**BOP-010-2-4 QTR**  
QUARTER PLATE BOP

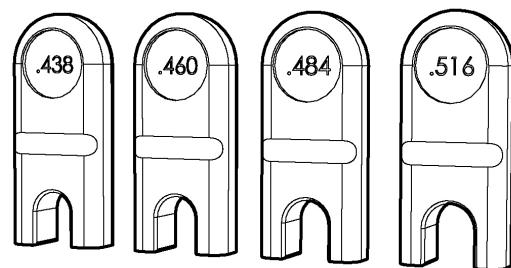


| # | PART NUMBER                                | QTY. |
|---|--|------|
| 1 | BOP 001-2-4-QTR DECAL PLATE                | 1    |
| 2 | BOP 002-2-4-QTR QUARTER FLANGE PLATE 2-4IN | 1    |
| 3 | BOP 007 TUBE CLAMP ASSY                    | 1    |
| 4 | BOP 013 SCREW 6-32X.25 SELF TAP            | 4    |
| 5 | GSB 331-03 BHCS .31-18 X .75 LG SS         | 4    |

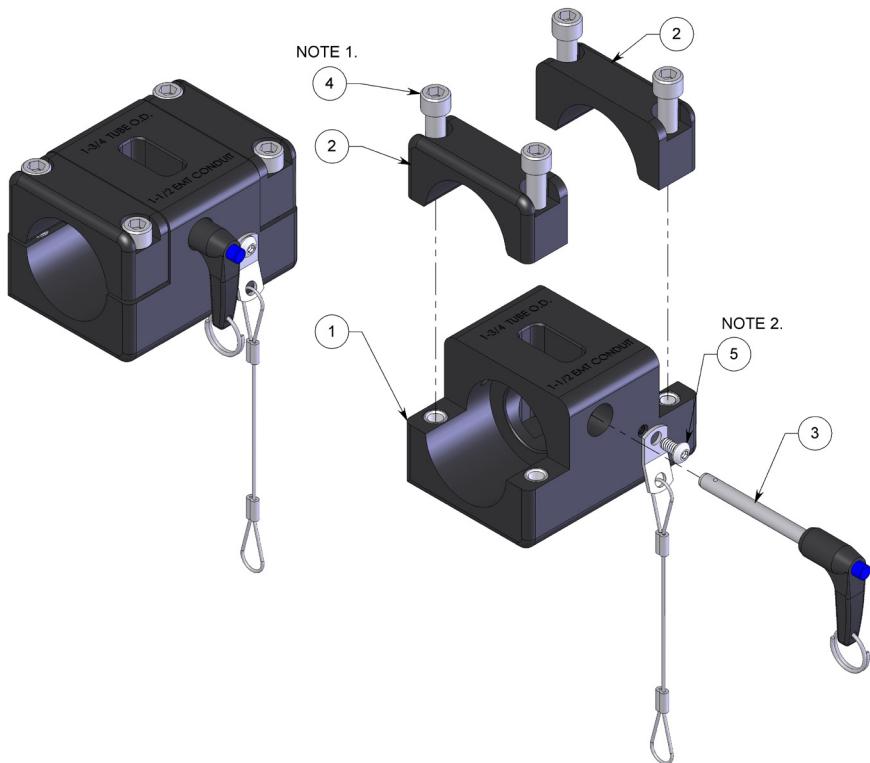
**PRO174-46**  
HOSE DRIVE ROLLERS



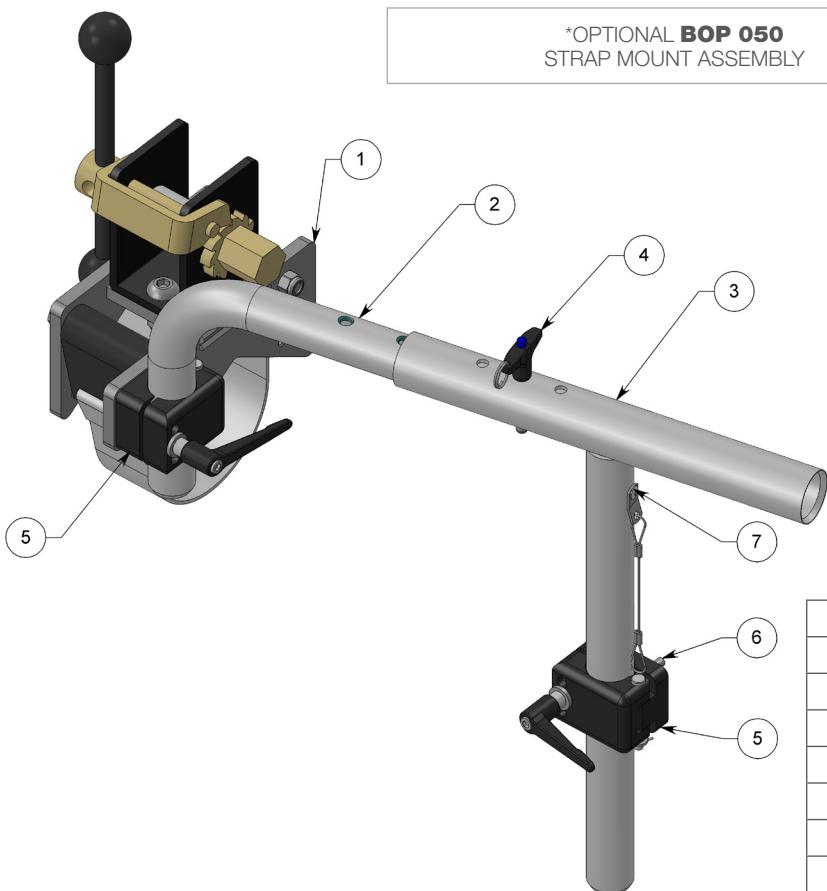
**FF 121-XX**  
COLLET STOPS



| ROLLER INSIDE<br>ABX-PRO-100 | HOSE O.D.       | SPIR STAR | PARKER    | COLLET SIZE         | SA PART NUMBER |
|------------------------------|-----------------|-----------|-----------|---------------------|----------------|
| PRO 174-46<br>Ø 0.46 IN.     | 0.39 - 0.50 IN. | 4/4       | 2440D-025 | 0.438 in. / 11.0 mm | FF 121-438     |
|                              |                 | 5/4       |           | 0.460 in. / 11.7 mm | FF 121-460     |
|                              |                 |           | 2440D-03  | 0.484 in. / 12.3 mm | FF 121-484     |
|                              |                 | 6/4       | 2440D-04  | 0.516 in. / 13.0 mm | FF 121-516     |

**BOP 030**  
COLLET BLOCK ASSEMBLY


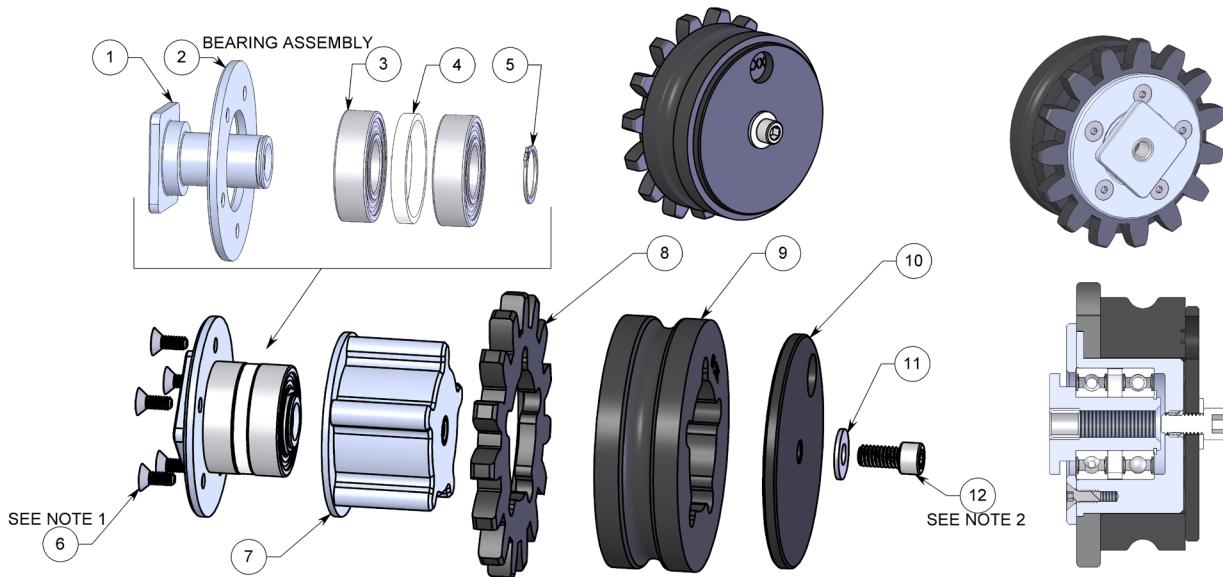
| # | PART NUMBER                         | QTY. |
|---|-------------------------------------|------|
| 1 | BOP 031 COLLET BLOCK BODY           | 1    |
| 2 | BOP 032 COLLET BLOCK CAP            | 2    |
| 3 | BOP 033 QUICK PIN                   | 1    |
| 4 | GS 331-06 SHCS .31-18 X 1.50 SS     | 4    |
| 5 | GSB 319-015 BHCS .19-24 X .38 LG SS | 1    |

\*OPTIONAL BOP 050  
STRAP MOUNT ASSEMBLY


| # | PART NUMBER                              | QTY. |
|---|--|------|
| 1 | BOP 051 RATCHET STRAP ASSEMBLY           | 1    |
| 2 | BOP 057 POSITIONER TUBE, MALE            | 1    |
| 3 | BOP 058 POSITIONER TUBE, FEMALE WELDMENT | 1    |
| 4 | BOP 059 QUICK PIN                        | 1    |
| 5 | BOP 070 HINGE CLAMP ASSEMBLY             | 2    |
| 6 | GS 325-025 SHCS .25-20 X .62 SS          | 8    |
| 7 | TB 015.1 RIVET                           | 1    |

## PARTS DIAGRAM

**PRODRIVE (PRO 170)**  
IDLER ROLLER ASSEMBLY



NOTE:

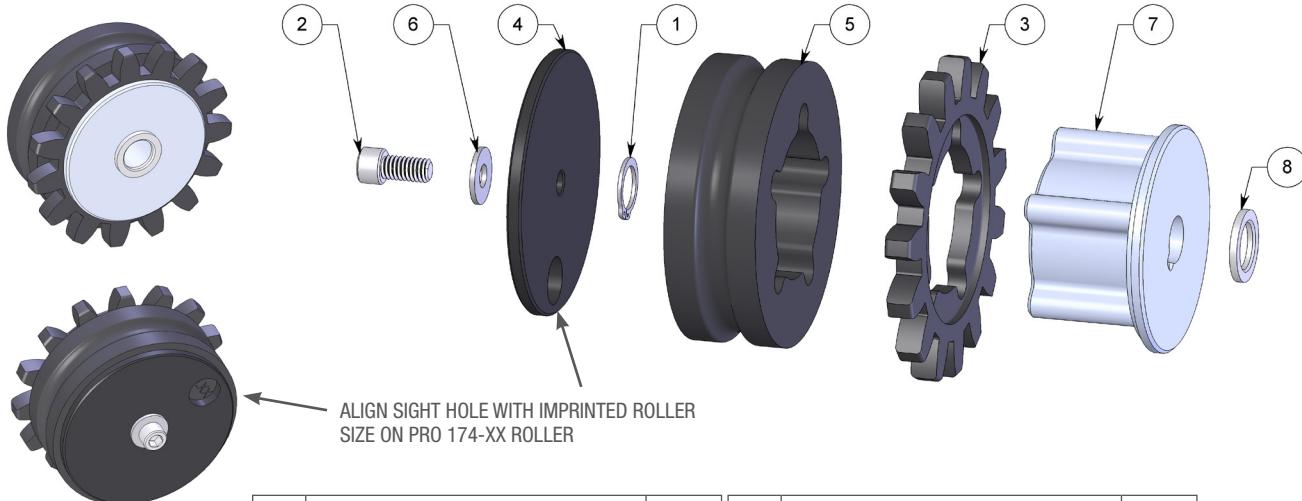
1. 5x BLUE LOCTITE: PN: 242 OR EQUIVALENT
2. APPLY BLUE GOOP (A SWAGELOK BRAND) ANTI-SEIZE.

| # | PART NUMBER                 | QTY. |
|---|-----------------------------|------|
| 1 | PRO 176 IDLER SHAFT         | 1    |
| 2 | PRO 177 IDLER BEARING PLATE | 1    |
| 3 | PRO 178 BEARING             | 2    |
| 4 | PRO 179 BEARING SPACER OD   | 1    |

|   |  |   |
|---|--|---|
| 5 | PRO 180 RETAINING RING                 | 1 |
| 6 | GSF 319-02-24 FHCS .19-.24 X .50 LG SS | 5 |
| 7 | PRO 171 IDLER HUB                      | 1 |
| 8 | PRO 172 ROLLER GEAR 15T                | 1 |

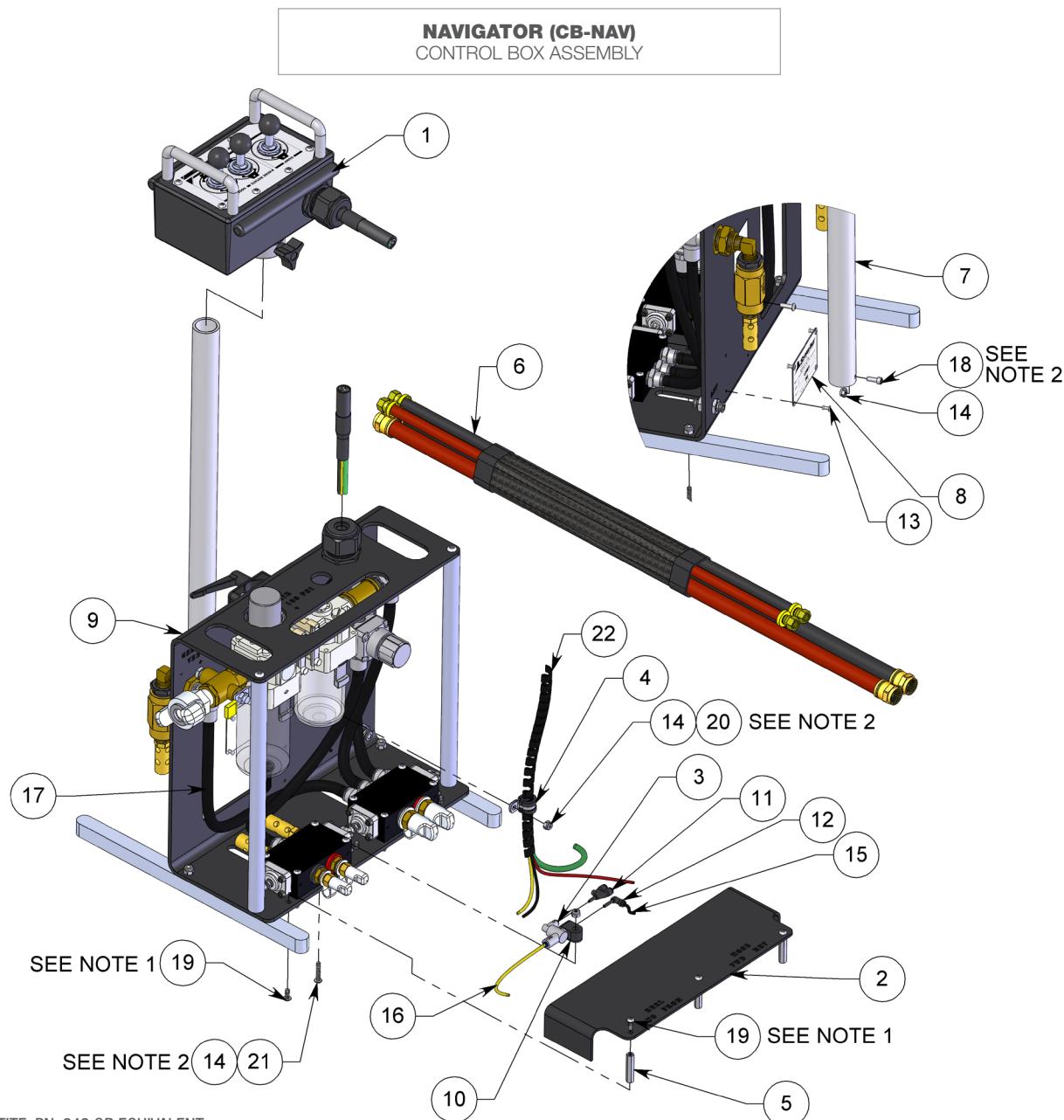
|    |                                 |   |
|----|---------------------------------|---|
| 9  | PRO 174-46 POLY ROLLER          | 1 |
| 10 | PRO 173 ROLLER PLATE            | 1 |
| 11 | PRO 175 HIGH-STRENGTH WASHER    | 1 |
| 12 | GS 331-025 SHCS .31-18 X .62 SS | 1 |

**PRO 181**  
DRIVE ROLLER ASSEMBLY



| # | PART NUMBER                       | QTY. |
|---|-----------------------------------|------|
| 1 | ABX 249 RETAINING RING, HD EXT SS | 1    |
| 2 | GS 531-025 SHCS .31-18 X .62 SS   | 1    |
| 3 | PRO 172 ROLLER GEAR               | 1    |
| 4 | PRO 173 ROLLER PLATE              | 1    |

|   |                               |   |
|---|-------------------------------|---|
| 5 | PRO 174-46 POLY ROLLER        | 1 |
| 6 | PRO 175 HIGH-STRENGTH WASHER  | 1 |
| 7 | PRO 182 DRIVE HUB             | 1 |
| 8 | PRO 183 SHAFT SHOULDER WASHER | 1 |



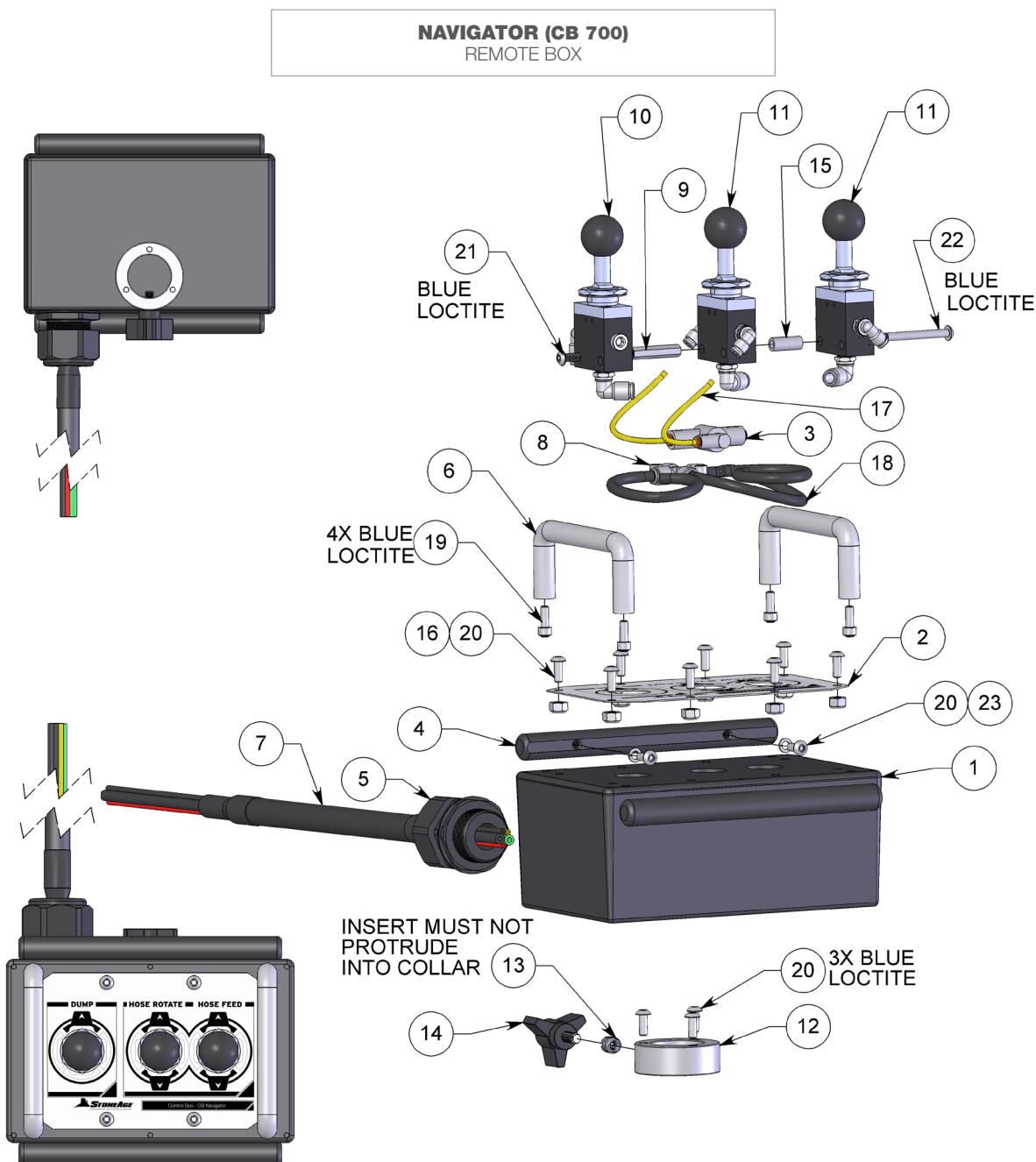
## NOTE:

1. BLUE LOCTITE: PN: 242 OR EQUIVALENT
2. APPLY BLUE GOOP (A SWAGELOK BRAND) ANTI-SEIZE.

| #  | PART NUMBER                        | QTY. |
|----|------------------------------------|------|
| 1  | CB 700 NAVIGATOR REMOTE BOX        | 1    |
| 2  | CB 705 FRL VALVE COVER             | 1    |
| 3  | CB 710 OR VALVE                    | 1    |
| 4  | CB 711 LOOP CLAMP                  | 1    |
| 5  | CB 712 HEX STANDOFF                | 3    |
| 6  | CB 715-18 NAV HOSE BUNDLE ASSEMBLY | 1    |
| 7  | CB 727 REMOTE BOX POLE, 1.250D     | 1    |
| 8  | CB 729 NAVIGATOR SERIAL PLATE      | 1    |
| 9  | CB 730 NAVIGATOR FRL BASE          | 1    |
| 10 | CB 731 HINGED PLASTIC CLAMP        | 1    |
| 11 | CB 732 FTG TUBE STEM WYE, PL2      | 1    |

|    |                                      |       |
|----|--------------------------------------|-------|
| 12 | CB 744 FTG TUBE STEM PL2 90 DEG      | 1     |
| 13 | CB 747 RIVET 1-8 X .25               | 4     |
| 14 | GN 319-L NYLOK NUT SS (HC 025.1)     | 3     |
| 15 | GPTB 0125-PUR95A-BK                  | 2 IN  |
| 16 | GPTB 0125-PUR95A-YL                  | 6 IN  |
| 17 | GPTB 0500-PUR95A-BK                  | 45 IN |
| 18 | GS 319-02 SHCS .19-24 X .50 SS       | 1     |
| 19 | GSB 319-02-32 BHCS .19-32 X .50 LG   | 6     |
| 20 | GSB 319-025 BHCS .19-24 X .625 LG SS | 1     |
| 21 | GSB 319-04 BHCS .19-24 X 1.00 LG SS  | 1     |
| 22 | SBT 511.1 SPIRAL WRAP,.375 ID        | 1     |

## PARTS DIAGRAM

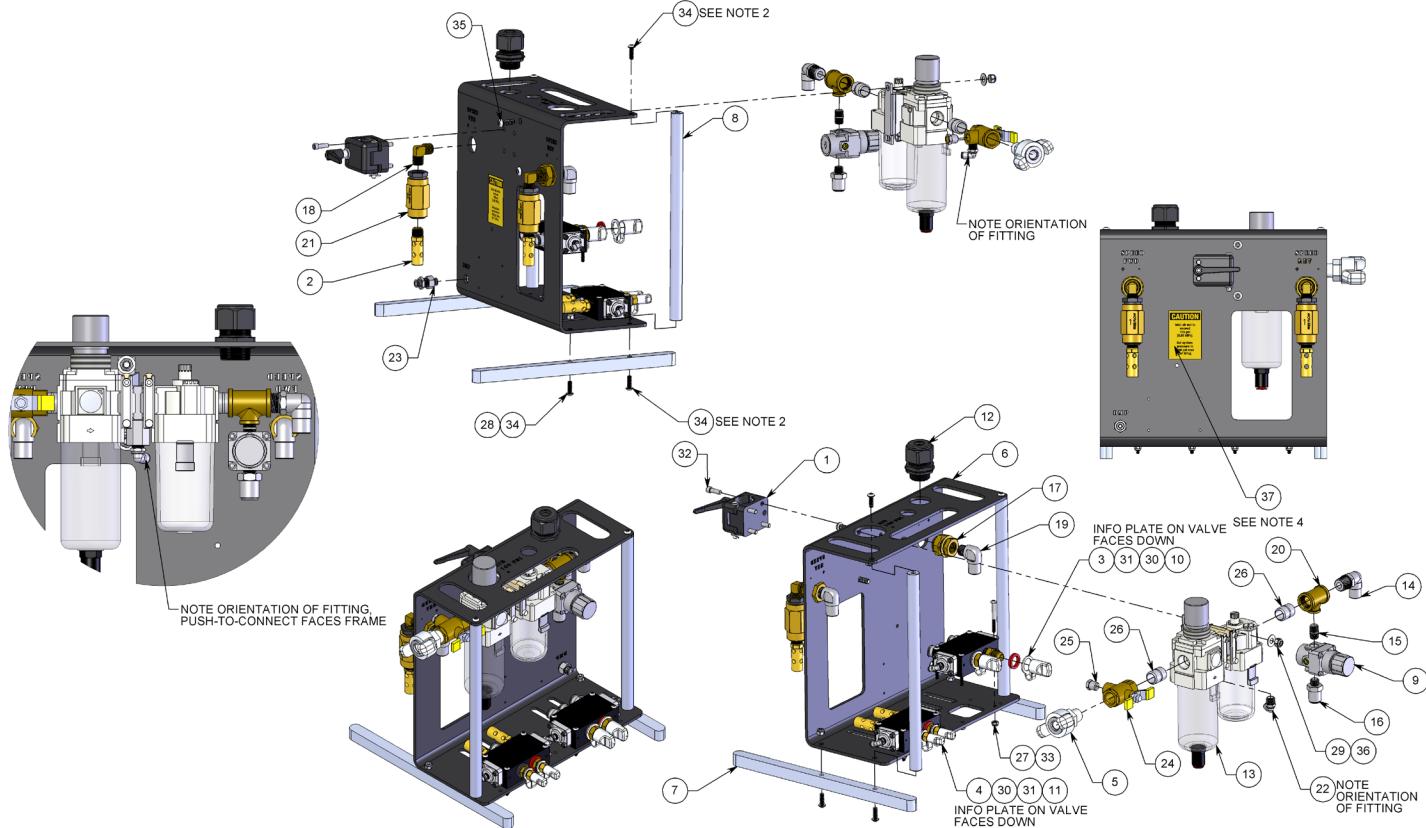


| #  | PART NUMBER                       | QTY. |
|----|-----------------------------------|------|
| 1  | CB 708 ENCLOSURE NAVIGATOR        | 1    |
| 2  | CB 709 GRAPHIC NAVIGATOR          | 1    |
| 3  | CB 710 OR VALVE                   | 1    |
| 4  | CB 713 CRIMP RUNG                 | 2    |
| 5  | CB 714 CORD GRIP, .51-.79         | 1    |
| 6  | CB 716 ANODIZED PULL HANDLE       | 2    |
| 7  | CB 717-10 NAV UMBILICAL           | 1    |
| 8  | CB 718 FITTING, CROSS, PL4        | 1    |
| 9  | CB 719 HEX STANOFF, 1.25 LG 10-32 | 1    |
| 10 | CB 721 PNEUM 3WAY ASSY, DUMP      | 1    |
| 11 | CB 722 PNEUM 3WAY ASSY, FWD-REV   | 2    |

|    |  |       |
|----|--|-------|
| 12 | CB 724 MODIFIED COLLAR                 | 1     |
| 13 | CB 725 THREAD LOCKING SLOTTED INSERT   | 1     |
| 14 | CB 726 THREE LOBE KNOB, .25-.20        | 1     |
| 15 | CB 728 SPACER, .192ID .313OD .75LG     | 1     |
| 16 | GN 519-L-32 NYLOK NUT                  | 8     |
| 17 | GPTB 0125-PUR95A-YL                    | 10 IN |
| 18 | GPTB 0250-PUR95A-BK                    | 23 IN |
| 19 | GS 319-02-32 SHCS .19-32 X .50 SS      | 4     |
| 20 | GSB 319-02-32 BHCS .19-32 X .50 LG     | 15    |
| 21 | GSB 319-04-32 BHCS .19-32 X 1.00 LG SS | 1     |
| 22 | GSB 319-10-32 BHCS .19-32 X 2.50 LG SS | 1     |
| 23 | GW 319-L LOCK WASHER SS                | 4     |

## **NAVIGATOR (CB 730)**

### FRL BASE ASSEMBLY



**NOTE:**

1. APPLY BLUE GOOP (A SWAGELOK BRAND) ANTI-SEIZE.
  2. ADD BLUE LOCTITE: PN: 242 OR EQUIVALENT TO ALL THREADED HARDWARE.
  3. ADD LOCTITE THREAD SEALANT 567 TO ALL NPT THREADS. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE
  4. CLEAN ALL DERRIS & OILS BEFORE INSTALLING. INSTALL AT APPROXIMATE OPERATING TEMPERATURE & AT ROOM TEMPERATURE

| #  | PART NUMBER  | QTY. |
|----|--|------|
| 1  | BOP 070 HINGE CLAMP ASSEMBLY   | 1    |
| 2  | BR 154 MUFFLER   | 2    |
| 3  | BR 167 DUST CAP  | 2    |
| 4  | BR 168 DUST CAP, J4  | 2    |
| 5  | CB 114 INLET FITTING   | 1    |
| 6  | CB 701 FRL FRAME   | 1    |
| 7  | CB 702 FRL BASE LEG  | 2    |
| 8  | CB 703 FRL ROD   | 2    |
| 9  | CB 704 PRESSURE REGULATOR, 60 PSI                                    | 1    |
| 10 | CB 706 VALVE ASSY DRIVE  | 1    |
| 11 | CB 707 VALVE ASSY DRUM   | 1    |
| 12 | CB 714 CORD GRIP, .51-.79  | 1    |
| 13 | CB 720 GEN3 FILTER-REGULATOR-LUBRICATOR WITH GEN2 CLAMP WITH AIR TAP | 1    |
| 14 | CB 733 FTG P8PL8 90DEG   | 1    |
| 15 | CB 734 FTG P4 NIPPLE   | 1    |
| 16 | CB 735 FTG P4PL8   | 1    |
| 17 | CB 736 FTG P6 BULKHEAD   | 2    |
| 18 | CB 737 FTG P6P6 90DEG  | 2    |

|    |  |   |
|----|--|---|
| 19 | CB 738 FTG P6PL8 90DEG                   | 2 |
| 20 | CB 739 FTG REDUCING TEE P8FP8FP4F        | 1 |
| 21 | CB 780-P6 IN-LINE FLOW CONTROL, P6       | 2 |
| 22 | CB 786 FITTING, 90DEG SWIVEL, P4MPL4     | 1 |
| 23 | CB 790 FITTING, BULKHEAD, PL4PL4         | 1 |
| 24 | CB 792 VALVE, AUTODRAIN, P8              | 1 |
| 25 | CB 793 BREATHER, SINTERED BRONZE, P4     | 1 |
| 26 | CB 794 PIPE NIPPLE, P8P8 X 1.13 SS       | 2 |
| 27 | GN 319-L NYLOK NUT SS (HC 025.1)         | 8 |
| 28 | GN 325-L NYLOK NUT SS (TB 044.1)         | 6 |
| 29 | GN 331-L NYLOK NUT SS                    | 2 |
| 30 | GP 011-BK BLACK ID BAND                  | 2 |
| 31 | GP 011-R RED ID BAND                     | 2 |
| 32 | GS 325-03 SHCS .25-20 X .75 SS           | 4 |
| 33 | GSB 319-08 BHCS .19-24 X 2.00 LG SS      | 8 |
| 34 | GSB 325-03 BHCS .25-20 X .75 LG SS       | 6 |
| 35 | GSB 331-035 BHCS .31-18 X .88 LG SS      | 2 |
| 36 | GW 331-F FLAT WASHER SS                  | 2 |
| 37 | PL 156-125 CAUTION INLET AIR, 125PSI MAX | 1 |

## TERMS AND CONDITIONS

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

Seller desires to provide its Buyer with prompt and efficient service. However, to negotiate individually the terms of each sales contract would substantially impair Seller's ability to provide such service. Accordingly, products furnished and services rendered by Seller are sold only on the Terms and Conditions stated herein. Notwithstanding any Terms or Conditions on Buyer's order, Seller's performance of any contract is expressly made conditional on Buyer's agreement to Seller's Terms and Conditions of sale unless otherwise specifically agreed to in writing by Seller. In the absence of such agreement, commencement of performance, shipment and/or delivery shall be for Buyer's convenience only and shall not be deemed or construed to be an acceptance of Buyer's Terms and Conditions. **PRODUCTS SOLD BY SELLER ARE DESIGNED AND INTENDED TO BE USED AT HIGH PRESSURES AND SPEEDS, AND MAY BE DANGEROUS IF OPERATED IMPROPERLY OR WITHOUT THE USE OF APPROPRIATE SAFETY DEVICES AND GUARDS. BUYER IS CAUTIONED TO CAREFULLY READ AND UNDERSTAND THESE TERMS AND CONDITIONS, AS THEY HAVE IMPORTANT LEGAL CONSEQUENCES.**

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

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

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

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

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

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

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

- a. if Buyer fails to purchase and use necessary and appropriate safety devices and guards as determined and/or recommended by Seller;
- b. if Buyer fails to maintain in good working order such safety devices and guards as are purchased from Seller;
- c. if Buyer adds, omits, repairs, modifies, replaces or substitutes any components on the equipment without permission from Seller;
- d. if Buyer exceeds at any time the maximum safe loads, pressures or speeds recommended by Seller for the equipment furnished hereunder without the specific written consent of Seller; or
- e. if Buyer otherwise fails to operate the product or equipment in accordance with Seller's printed instructions or otherwise negligently operates the equipment.

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

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

**7. Modification.** These Terms and Conditions are intended by Seller and Buyer to constitute a final, complete and exclusive expression of agreement and cannot be supplemented or amended without Seller's prior written approval. Seller's waiver of any breach, or failure to enforce any of the Terms and Conditions at any time, shall not in any way affect,

limit or waive Seller's right thereafter to enforce and compel strict compliance with every Term and Condition thereof. If any provisions of these Terms and Conditions are held to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of the other portions hereof.

**8. Disputes.** Buyer and Seller shall attempt in good faith promptly to resolve any dispute arising under these Terms and Conditions by negotiations between representatives who have authority to settle the controversy. If unsuccessful, Buyer and Seller shall further attempt in good faith to settle the dispute by nonbinding third-party mediation, with fees and expenses of such mediation apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the parties. All sales, agreements for sale, offers to sell, proposals, acknowledgments and contracts of sale, including, but not limited to, purchase orders accepted by Seller, shall be considered a contract under the laws of the State of Colorado and the rights and duties of all persons, and the construction and effect of all provisions hereof shall be governed by and construed according to the laws of such state. A state or federal court located within the State of Colorado shall have sole and exclusive jurisdiction over any litigation concerning any such matters as well as any alleged defects of any products or equipment covered thereby or damages sustained as a result of such alleged defects. If any litigation is commenced between Seller and Buyer, or their personal representatives, concerning any provision hereof, the party prevailing in the litigation shall be entitled, in addition to such other relief that is granted, to a reasonable sum as and for their attorneys' fees and costs in such litigation or arbitration.

#### STONEAGE TRADEMARK LIST

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

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

#### STONEAGE PATENT DATA

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

<http://www.sapatents.com>



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