

HOSE MANAGEMENT SYSTEMS (HMS-MP) MEDIUM PRESSURE AND (HMS 644-HP-XXX) HIGH PRESSURE CONVERSION KIT USER MANUAL

*FOR USE WITH THE
AUTOBOX® TRACTOR SYSTEMS*

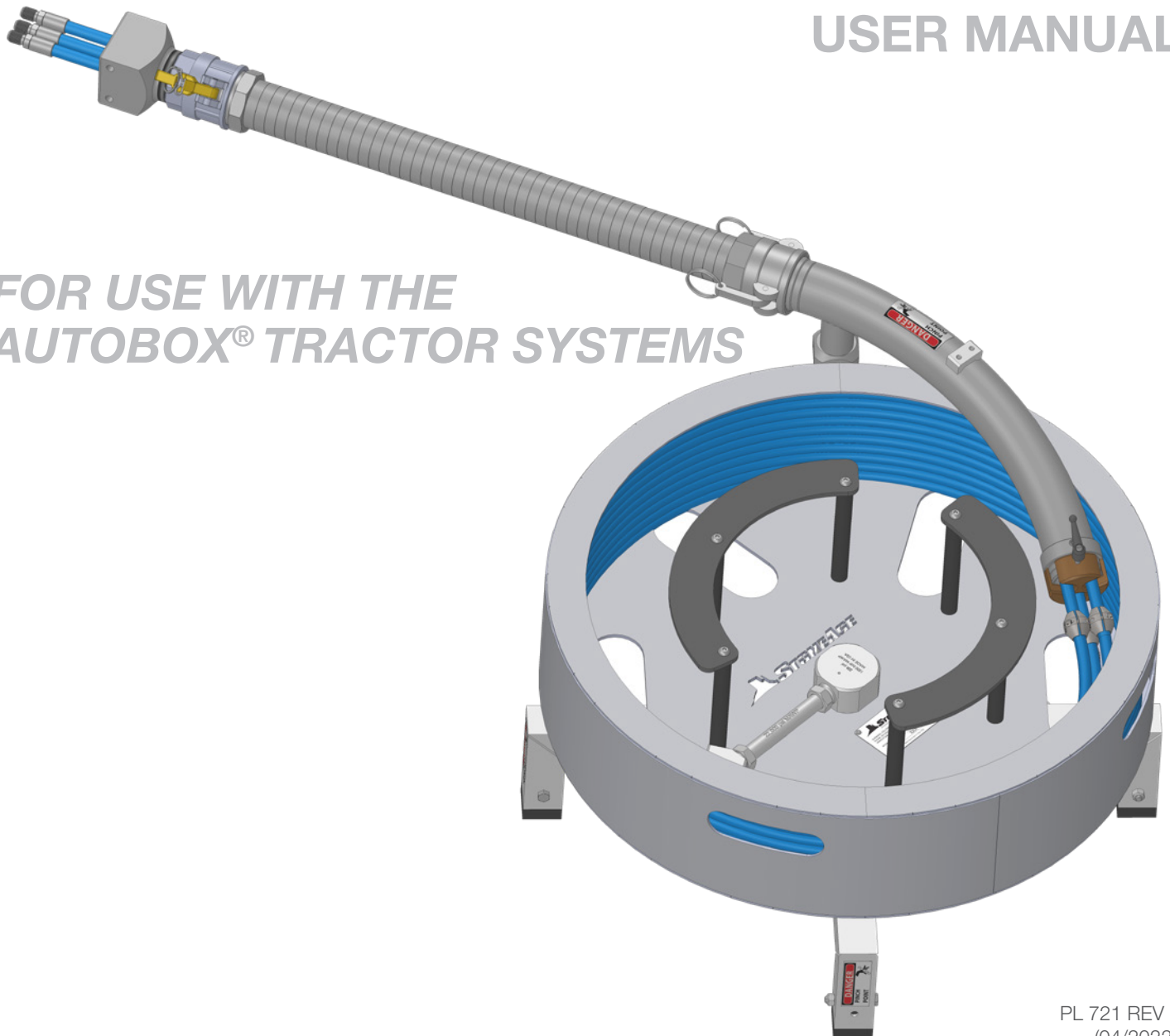


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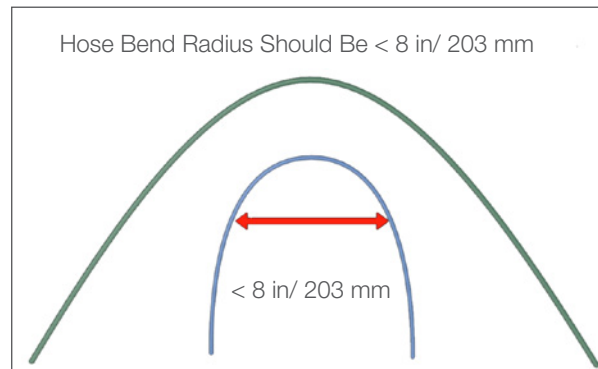
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This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s). Updated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

HMS-MP MEDIUM PRESSURE HOSE MANAGEMENT SPECIFICATIONS

Snout	Flex Lance Sizes	MAXIMUM HOSE STORAGE CAPACITIES			Swivel Pressure Range	Assembly Weight with Snout (Less Hoses)	Assembly Size with Snout (Less Hoses)	Manway Access	Maximum Bend Radius
		SINGLE Hose	DUAL Hose	TRIPLE Hose					
1.25	3/2 to 4/4 (3/2 to 8/4 single lance only)	One 6/4 @ 150ft (46m) or One 8/4 @ 100ft (31m)	Two 4/4 @ 150ft (46m) or Two 6/4 @ 100ft (31m) or Two 8/4 @ 75ft (23m)	Three 4/4 @ 100ft (31m) or Three 6/4 @ 65ft (20m) or Three 8/4 @ 50ft (15m)	2-22 kpsi 138-1500 bar	64 lbs 29kg	29.25" X 31" X 18" Tall (743mm x 787mm x 457mm Tall)	30" 762mm	8" 203mm
2.0	4/4 to 8/4	N/A							

NOTE: Use of stiffer hose is not recommended and will result in additional drag on the AUTOBOX® Tractors and slower feed speeds. The graph below depicts the proper hose bend radius.



DESCRIPTION OF EQUIPMENT AND INTENDED USE

The Medium Pressure Hose Management System (HMS-MP), is a modular, lightweight accessory for the AUTOBOX® PRODRIVE, ABX-2L, and 3L Tractors, which securely stores hoses typically used for heat exchanger tube cleaning.

The Hose Management System (HMS-MP) is a simple system to setup and operate, and greatly increases job site safety by eliminating the potential for high pressure hoses to snag on structure, valves, or other objects.

It also increases hose life by reducing wear and makes it easy to store and transport hoses between jobs.

KEY FEATURES

- Includes 84 in. (2 m) snout.
- 22k psi (1500 bar) max pressure.
- Can be used in triple, dual, or single lance applications.
- Increases hose life by reducing wear.
- Keeps job site clear of trip hazards.
- Quick Pin attachment to AUTOBOX® ABX-2L and ABX-3L
- Standard and Metric fittings



EC DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skyline Drive
Durango, CO 81303
USA

Authorized Representative:

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

Declare that:

**Hose Management System - Medium Pressure (HMS-MP)
for high pressure water cleaning of system parts.**

Are 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 Hose Management System (HMS-MP) is maintained at:

StoneAge Incorporated, 466 South Skyline 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
Scott Howell, New Product Introduction Manager

03/20/2022
Date



UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skyline Drive
Durango, CO 81303
USA

Authorized Representative:

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

Declare that:

**Hose Management System - Medium Pressure (HMS-MP)
for high pressure water cleaning of system parts.**

Are compliant with the following Statutory Requirements and Designated Standards:

S.I. 2008 No. 1597 (E) Safety of machinery – General principles for design – Risk assessment and risk reduction

The Technical File for Hose Management System (HMS-MP) is maintained at:

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StoneAge Incorporated, Durango, CO, USA
Scott Howell, New Product Introduction Manager

03/20/2022
Date

**UK
CA**

WARNING AND SAFETY INSTRUCTIONS

OPERATOR TRAINING

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

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

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

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

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.

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

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

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

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

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

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

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-IMCA's, Industry Best 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 or improperly assembled, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Users of the Hose Management System (HMS-MP) **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-IMCA's, Industry Best Practices for the use of High-pressure Waterjetting Equipment.
- The Control Box should be located in a safe location where the Operator has good visibility of the pipe and hose. The Hose Management System (HMS-MP) 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, Industry Best 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 on the equipment being used with the Hose Management System (HMS-MP) and set-up properly.****
- Test the Control Box before operating the Hose Management System (HMS-MP) 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.

HIGH-PRESSURE HOSE

The Hose Management System (HMS-MP) is designed to be used with Parker Pro-Lance® and/or Spir Star Blast-Pro® hose ends. Standard hose ends may not fit into the AUTOBOX® (ABX-3L) Hose Tractor and/or Guide Tubes.

- Only high quality hoses intended for waterblast applications should be used as high-pressure hoses. Pressure rating of high-pressure hoses **MUST NEVER** be exceeded.
- Verify that the high-pressure hose is properly installed in the back-out preventer. Operate the high-pressure hose and waterjet tool at full pressure to test the clamp force. Proper clamp force will provide good control of the hose in forward and reverse directions, and keep the hose running through the Drive Belt.

NOTICE

Do not use a shrouded hose or hose with a steel protective cover. This will cause severe damage to the Drive Rollers on the AUTOBOX® (ABX-3L) Hose Tractor.

- **HOSE LENGTHS** The ABX-3L has a variety of accessories that will require additional hose length to be considered in addition to the tube bundle length. This should be verified prior to ordering high pressure hose for each job. The chart below shows the actual length of each configuration and recommended additional length necessary to keep the assembly from lifting off the ground during operation. Provide the tube bundle length and use the chart to follow the calculation below to determine the total hose length.

$$(\text{Tube Bundle Length in inches / mm}) + (\text{Actual Length of Configuration in inches / mm}) + (\text{Recommended Additional Connection Length in / mm}) = \text{Total Hose Length in inches / mm}$$

ACCESSORY CONFIGURATIONS	ACTUAL LENGTH OF CONFIGURATION	RECOMMENDED ADDITIONAL CONNECTION LENGTH
ABX-3L, Hose Guide, and Lightweight Positioner	32.9 in / 836 mm	39 in / 991 mm
ABX-3L, Hose Guide, Lightweight Positioner, and HMS	145.0 in / 3683 mm	39 in / 991 mm
ABX-3L, Fin Fan Guide, Snout	138 in / 3505 mm	39 in / 991 mm
ABX-3L, Fin Fan Guide, Snout, and HMS	165 in / 4191 mm	39 in / 991 mm

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

$$\text{STANDARD: } (20\text{FT} \times 12 \text{ IN/FT}) + 32.9 \text{ IN} + 39 \text{ IN} = \mathbf{311.9 \text{ IN.}}$$

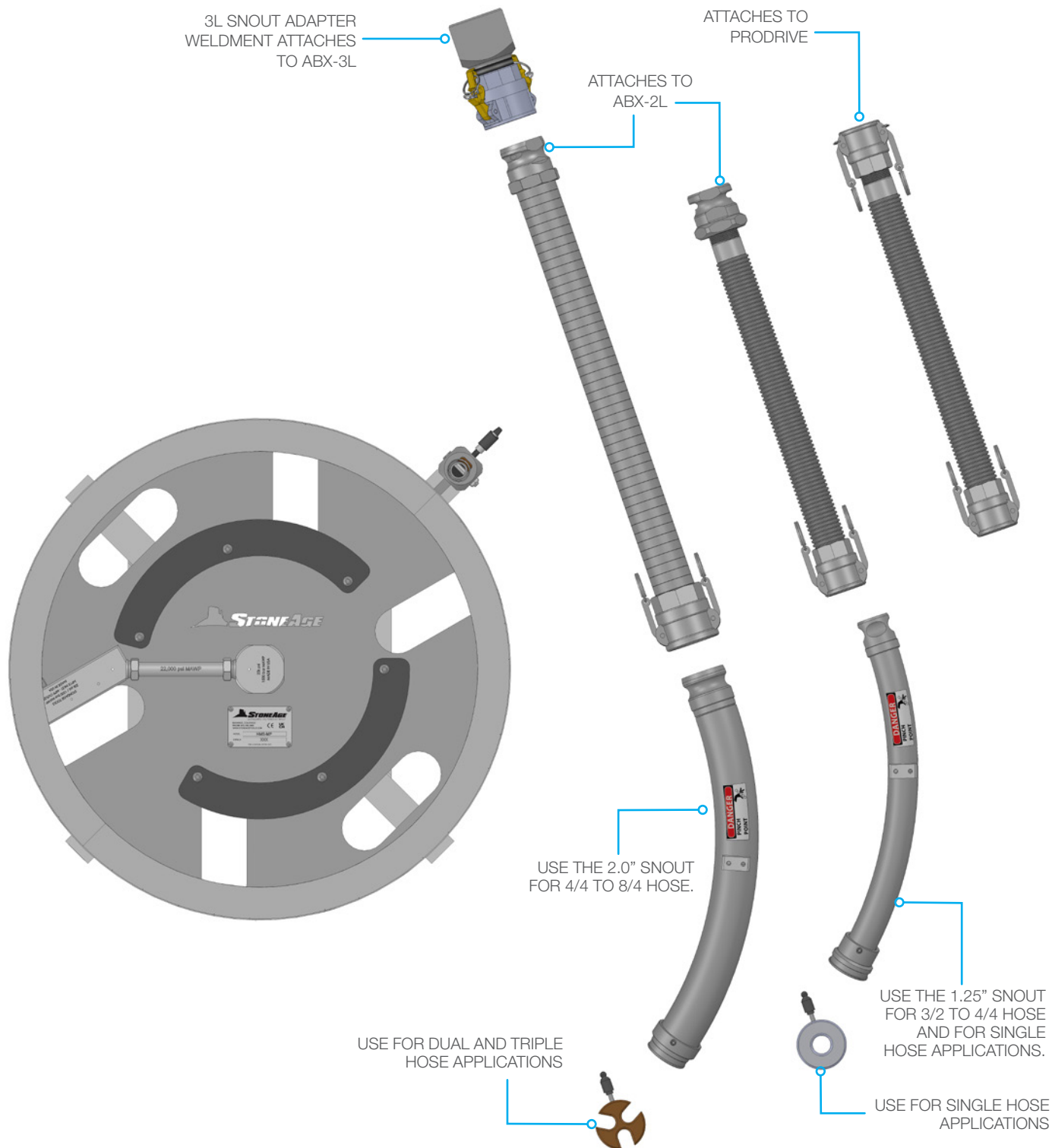
$$\text{METRIC: } 6096 \text{ MM} + 836 \text{ MM} + 991 \text{ MM} = \mathbf{7922 \text{ MM}}$$

SYSTEM ASSEMBLY - OVERVIEW

UP-HMS-MP

HOSE MANAGEMENT SYSTEM PARTS OVERVIEW

***SEE PART DIAGRAM SECTION AT THE BACK OF THIS MANUAL FOR DETAILED PART BREAK DOWNS AND PART NUMBERS**



UP-HMS-MP HOSE MANAGEMENT SYSTEM ASSEMBLY OVERVIEW

***SEE PART DIAGRAM SECTION AT THE BACK OF THIS MANUAL FOR DETAILED PART BREAK DOWNS AND PART NUMBERS**

TOP VIEW

TRIPLE
MANIFOLD

FITTINGS ARE BASED ON
THE STANDARD OR METRIC
ASSEMBLY
***IF RUNNING ONE OR TWO HOSES, USE
A GLAND AND A PLUG IN THE UNUSED
PORTS OF THE MANIFOLD**

HOSE DRUM
ASSEMBLY

HOSE STOP
ASSEMBLY

SNOUT
GUIDE

3L SNOUT
ADAPTER
WELDMENT

1.25" DIAMETER OR
2.0" DIAMETER
INTERLOCK SNOUT

NOTICE

USE THE 1.25" SNOUT FOR 3/2 TO 4/4 HOSE.
USE THE 2.0" SNOUT FOR 4/4 TO 8/4 HOSE.
***HOSES ARE NOT INCLUDED AND ARE SHOWN FOR CLARITY.**

SIDE VIEW

INLET ADAPTER
STANDARD OR METRIC

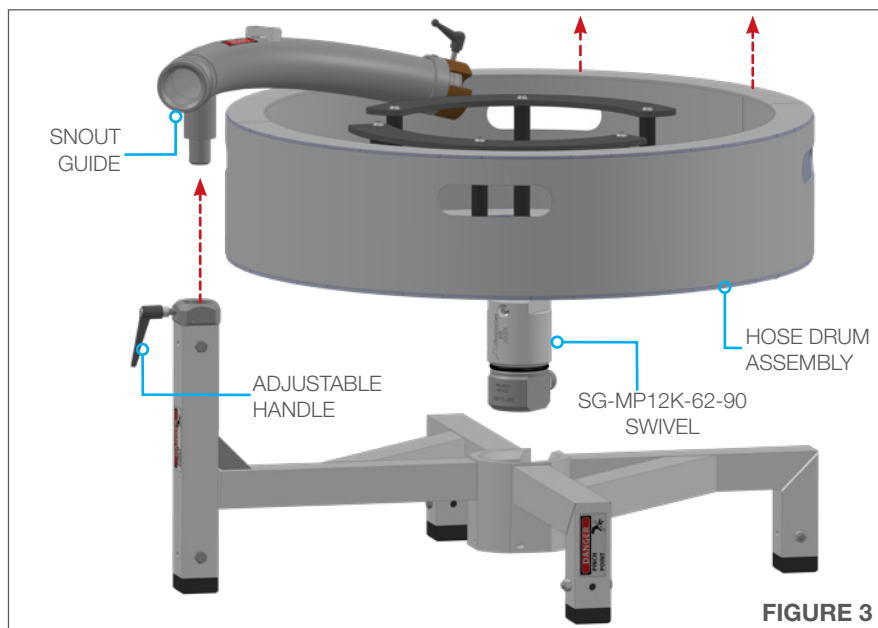
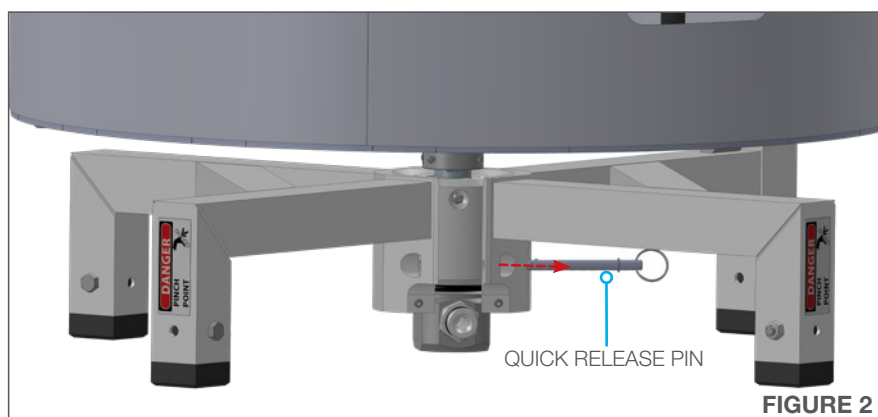
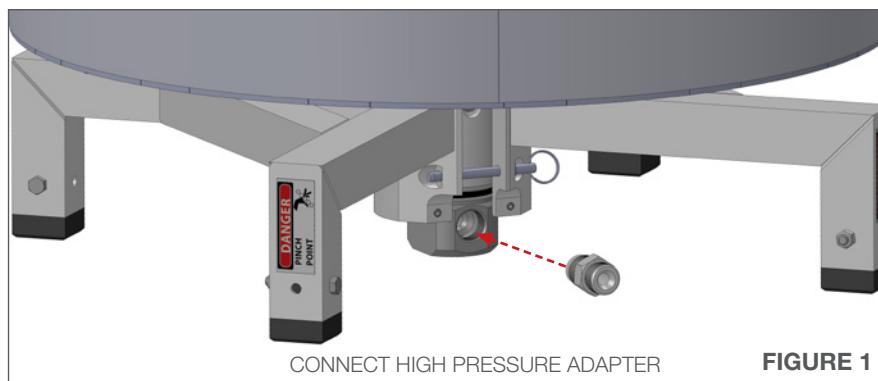
SG-MP12K-62-90
SWIVEL

DRUM, FRAME, AND HIGH PRESSURE ADAPTER ASSEMBLY

SWIVEL ADAPTER CONNECTION AT MAIN WATER INLET

The High Pressure Adapter at the Swivel can be replaced with others included in the HMS 005 Fitting Kit. See the “Part Diagram” section of this manual for a complete list of fittings. Be sure the Adapter is securely installed. If replacement is necessary, install the High Pressure Adapter with Swagelok Blue Goop®, or equivalent. **(Figure 1)**

When the swivel needs to be removed for maintenance, access is easy by releasing the Guide Snout with the Adjustable Handle, pulling the quick release pin out, and lifting the drum off the base. **(Figures 2 & 3)**



LOADING HOSES INTO THE DRUM

1. Lightly apply Blue Goop® Swagelok® Brand Anti-seize or an equivalent to all Adapter threads. Following the diagrams below, install the Adapters and/or Gland/Plugs into the HMS013-MP Manifold based on the numbers of lances being installed. Loosely thread the female hose ends onto the Adapters and wrap the hoses around the drum, in the direction of the red arrow approximately 3 times. This will allow the hoses to rotate freely and sit flat in the drum. Tighten the Female Hose Ends and continue to wrap the remainder of the hose in the Drum. (Figures 4 & 5)

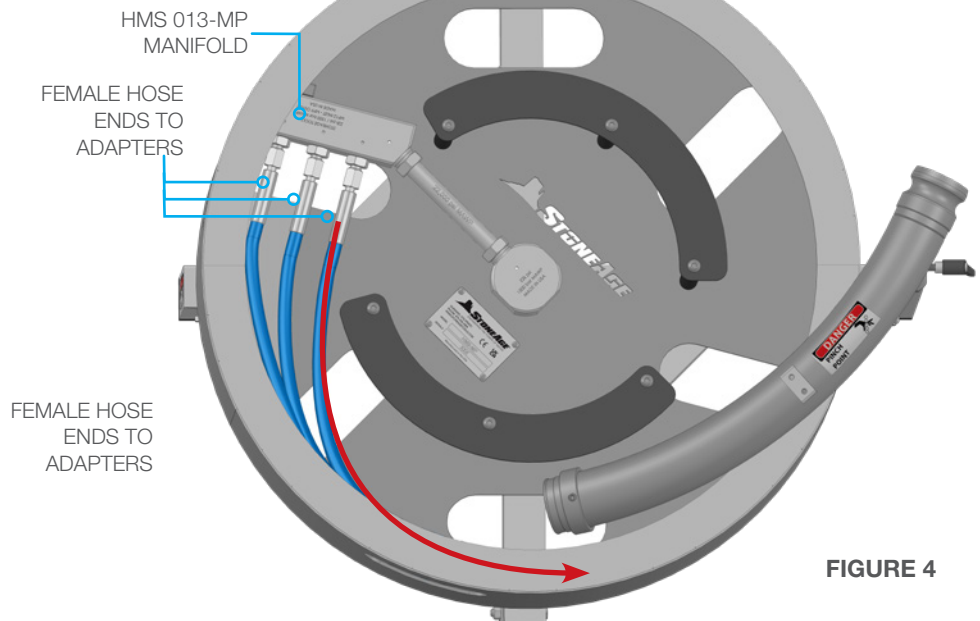
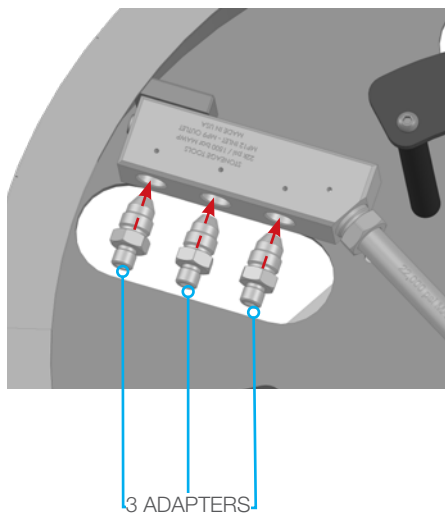


FIGURE 4

TWO HOSES- IF LOADING TWO HOSES, USE TWO ADAPTERS AND ONE PLUG

ONE HOSE- IF LOADING ONE HOSE, USE ONE ADAPTER AND TWO PLUGS

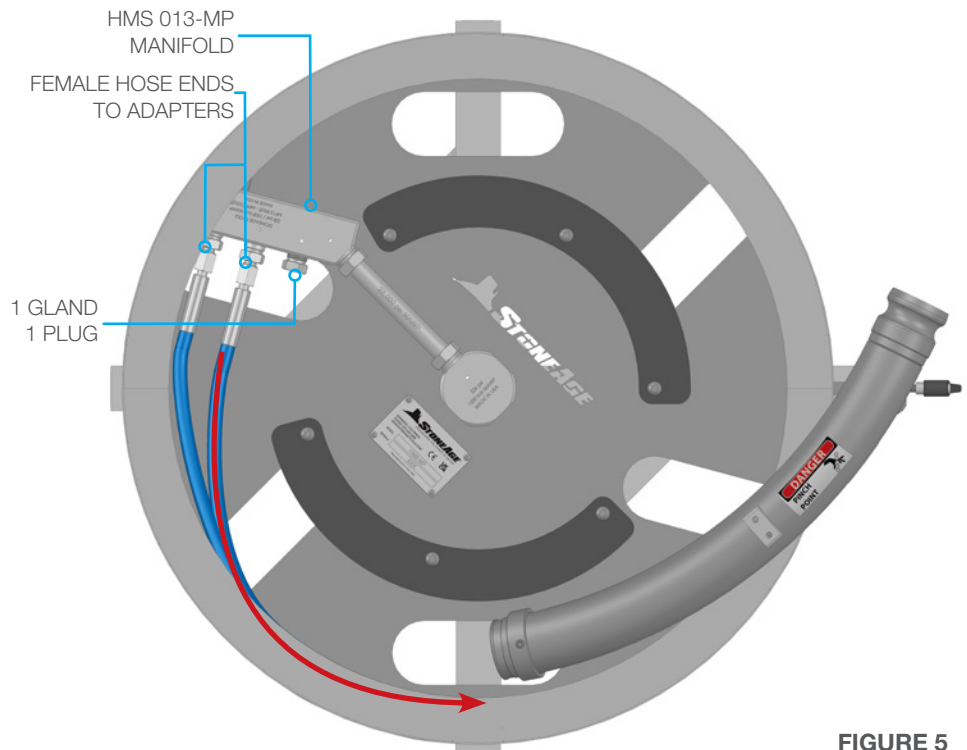
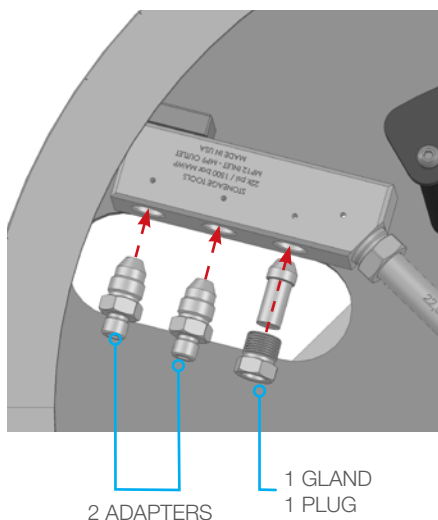
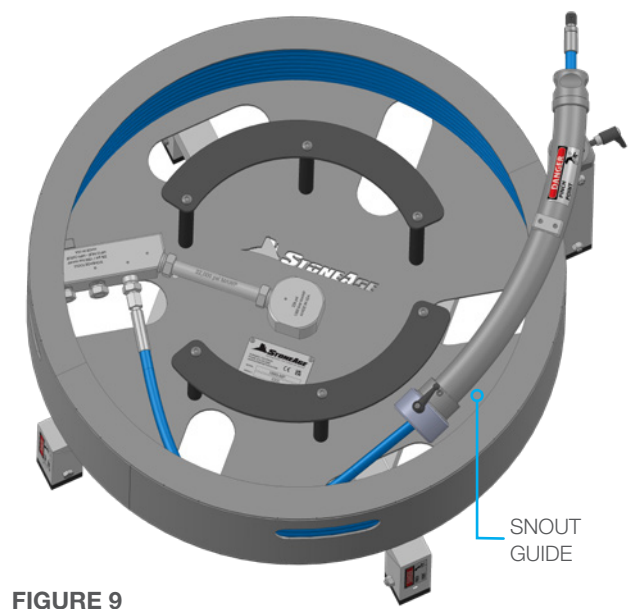
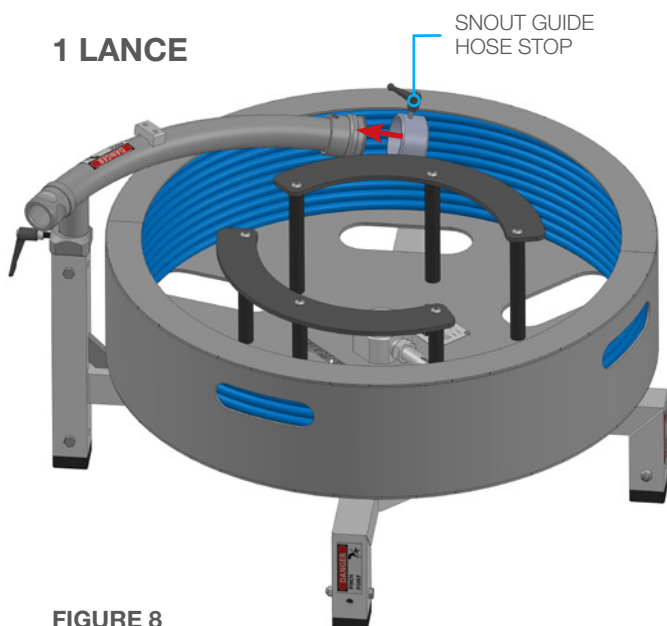
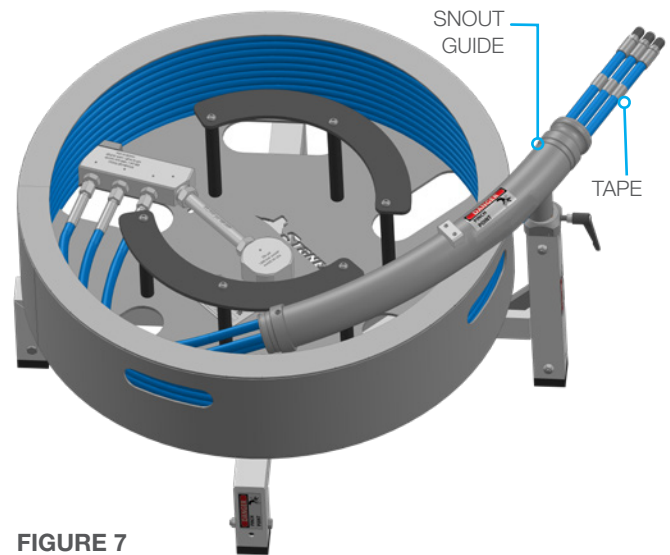
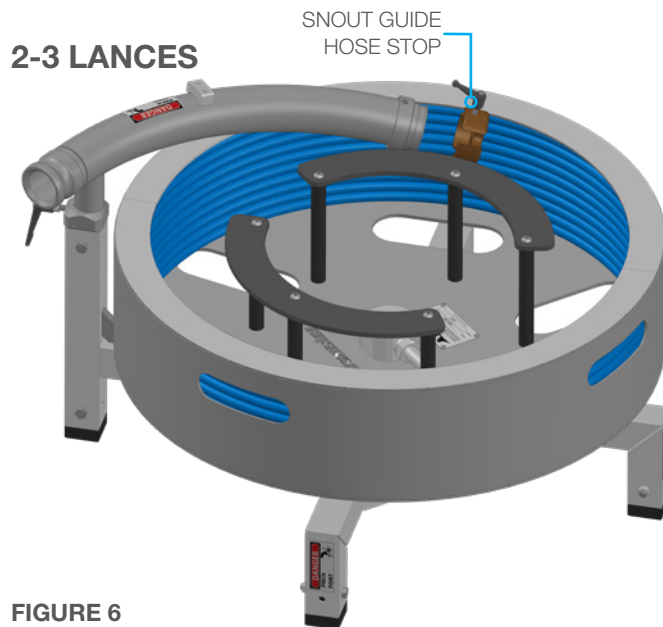


FIGURE 5

LOADING LANCE THROUGH SNOOT GUIDE

2. When using the 2" Snout Guide for 2-3 lances, remove the Snout Guide Hose Stop by releasing the Adjustable Handle and sliding the Stop off the Guide. **(Figure 6)**
3. When using the 1.25" Snout Guide for a single lance, install the Snout Guide Hose Stop by sliding it onto the end of the Snout Guide and tightening the adjustable Handle. **(Figure 8)**
4. If using more than one hose, wrap temporary tape just behind the male hose ends to keep them from twisting inside the Snout Guide, Snout, and HMS 310 3L Adapter. Push the hose ends through the Guide. **(Figure 7 or 9)**



LOADING HOSES INTO THE DRUM CONTINUED...

- Continue to push the hoses through the Snout, then connect the Female Camlock end of the Snout to the Snout Guide. (Figures 10 or 11)

2-3 LANCES

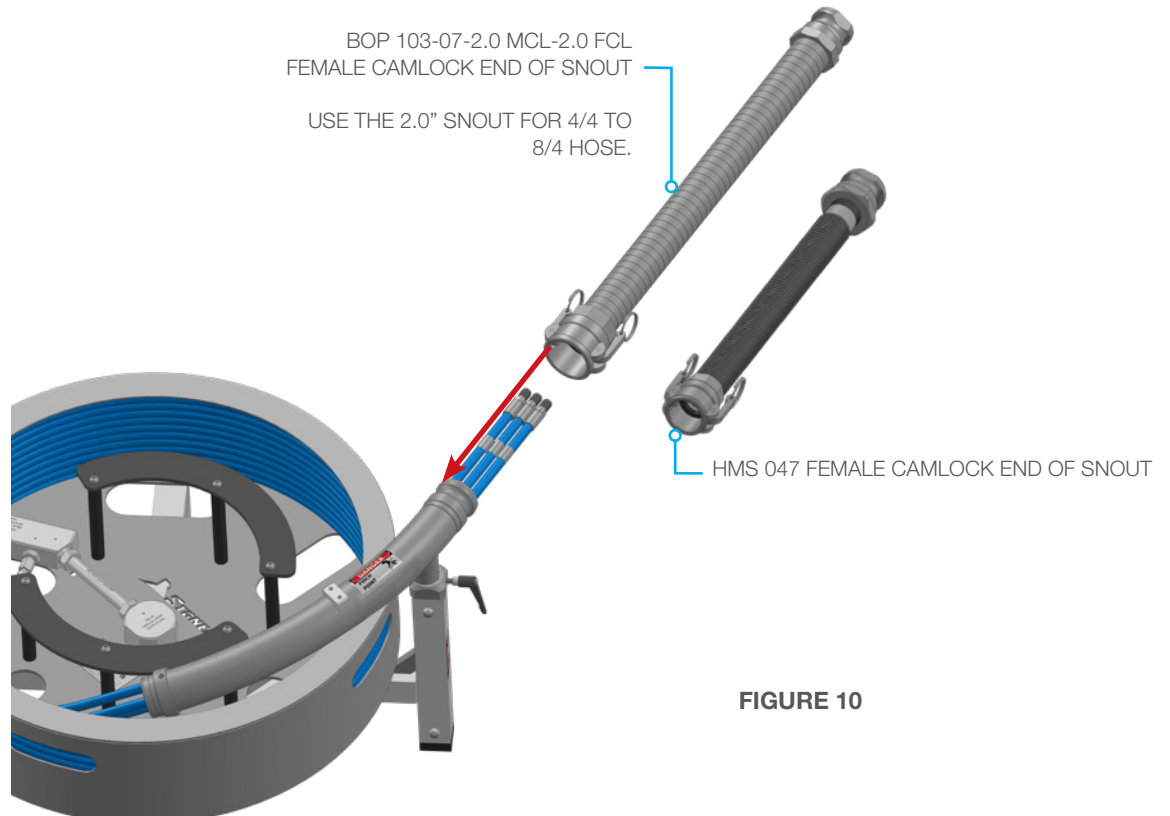


FIGURE 10

1-2 LANCES

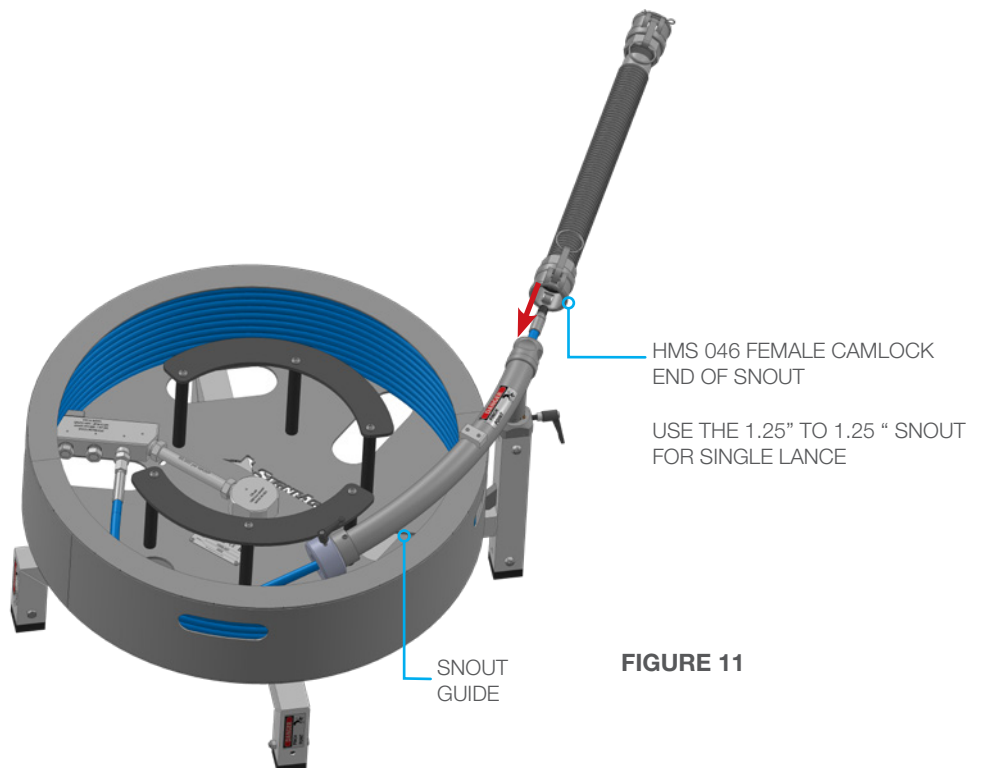
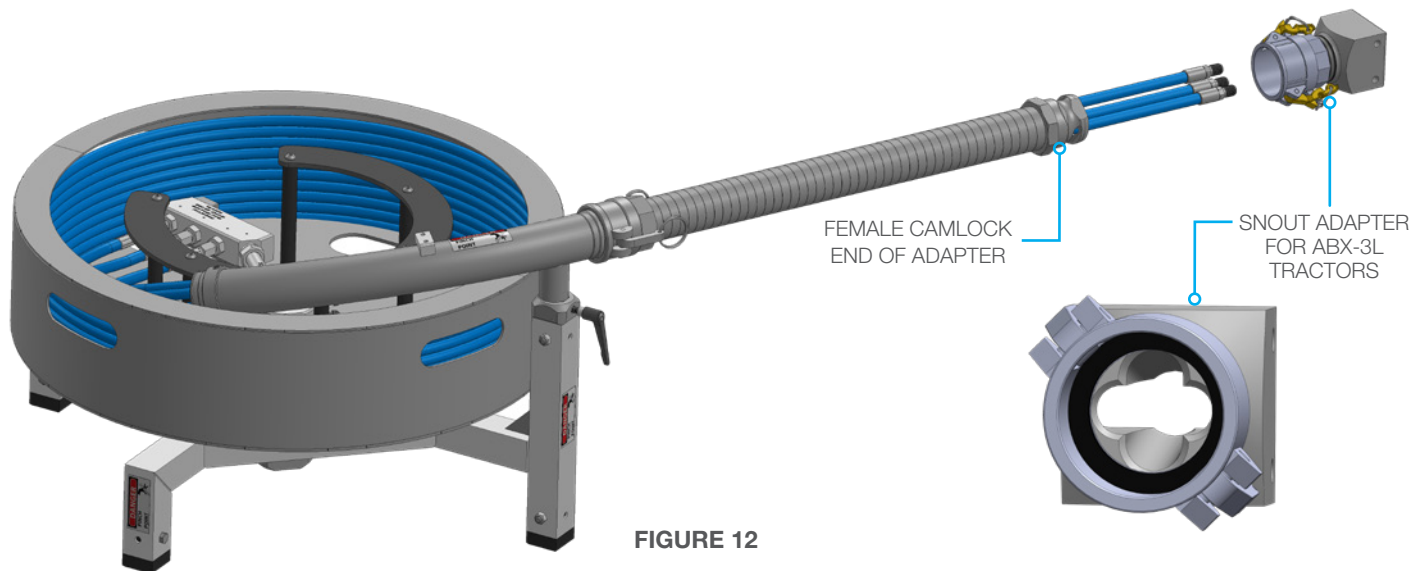


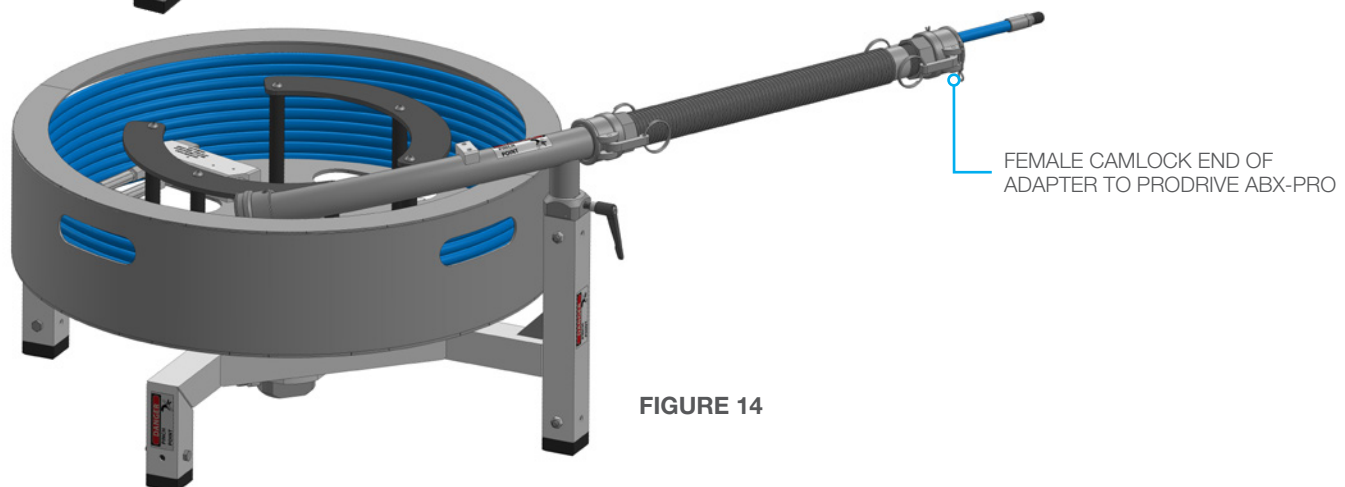
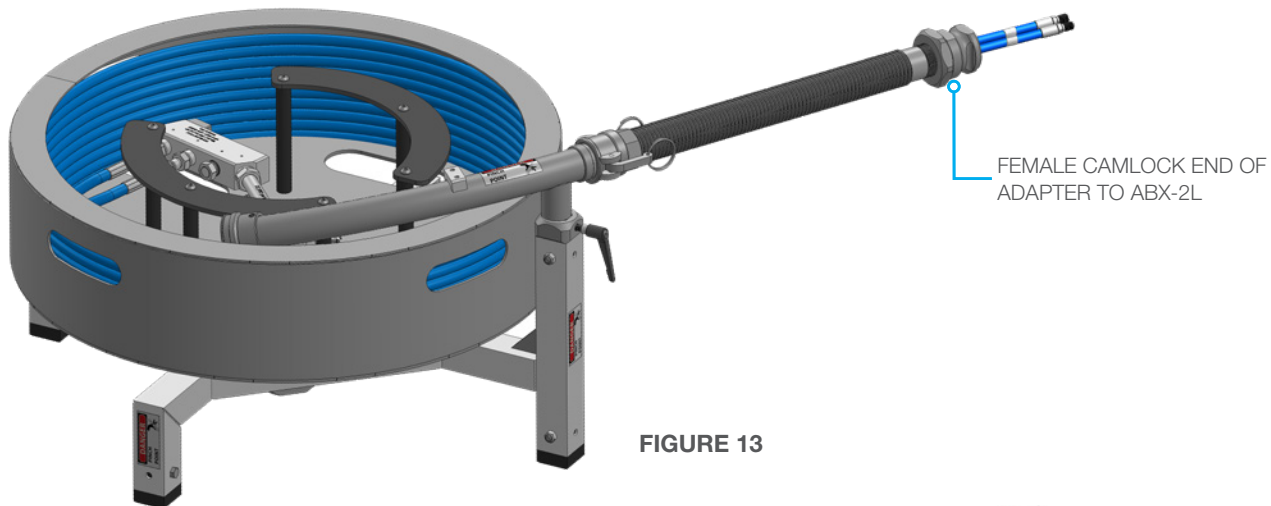
FIGURE 11

SNOUT AND SNOUT ADAPTER INSTALLATION

6. Feed the hoses through the HMS 310 3L Snout Adapter before attaching it to the Snout. This will make it easier to push the hoses through the slots in the Adapter. Connect the Female Camlock end of the Adapter to the Snout once all the hoses are passed through the Adapter. **(Figure 12)**



7. Feed the hoses through the Snouts. **(Figure 13 or 14)**



CONNECT SNOOT AND FEED HOSES THROUGH AUTOBOX® ABX-3L

Remove the tape from the hoses. Remove the two Quick Release Pins from the ABX 357 Mounting Bracket and slide the ABX 390 Rear Mount out. Insert the hoses into the AUTOBOX® ABX-3L. **(Figure 15)** The Hose Clamp Pressure Regulator on the Control Box **MUST** be turned to zero pressure to open the drive for easy hose installation. **(Figure 16)** (See the Operation section of the ABX-3L User Manual for more detail on hose loading).

⚠ WARNING

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

FIGURE 15

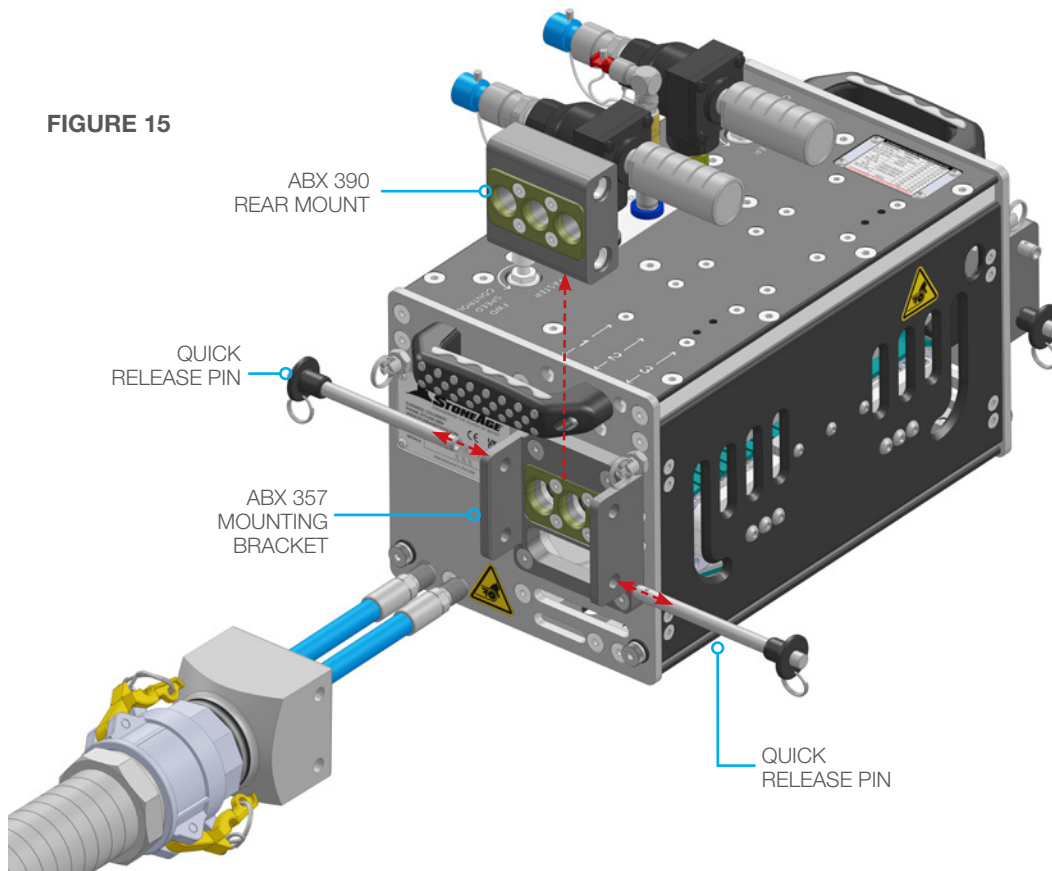


FIGURE 16

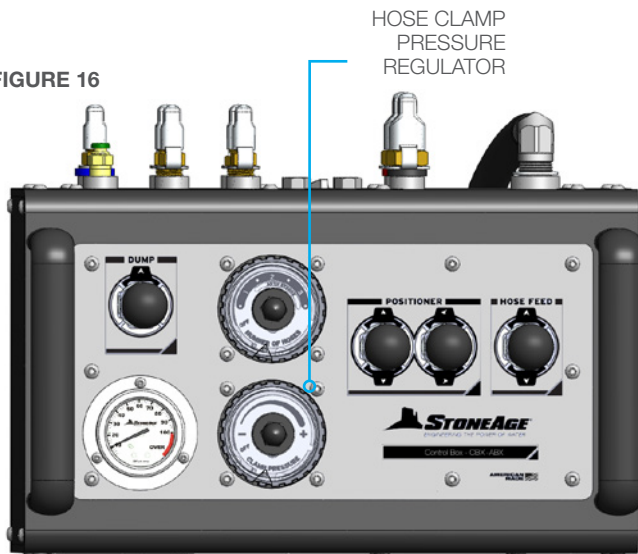
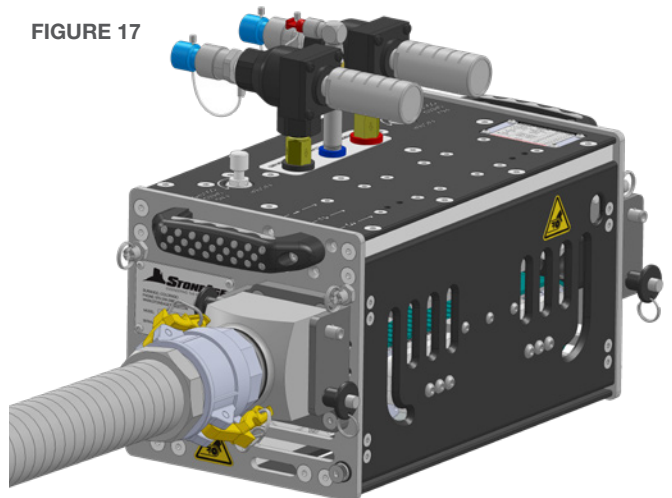


FIGURE 17



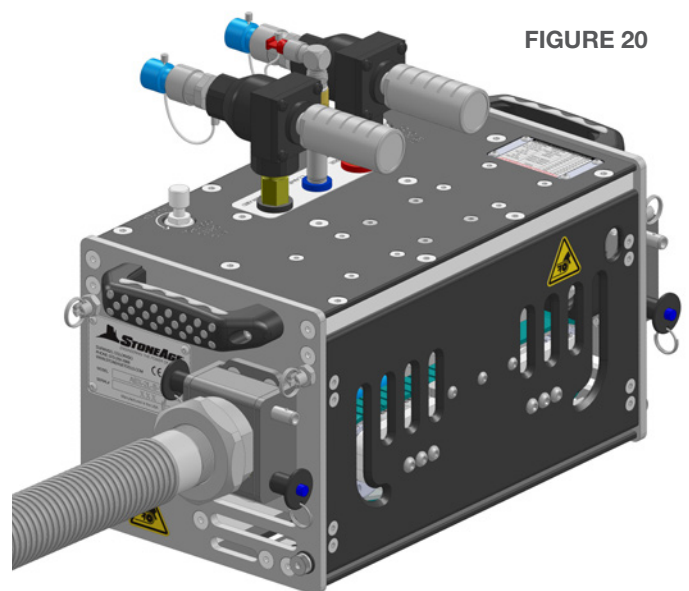
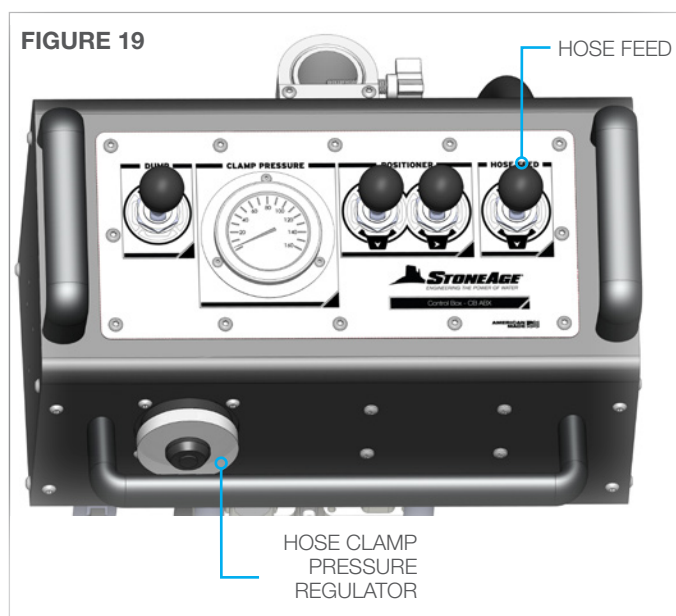
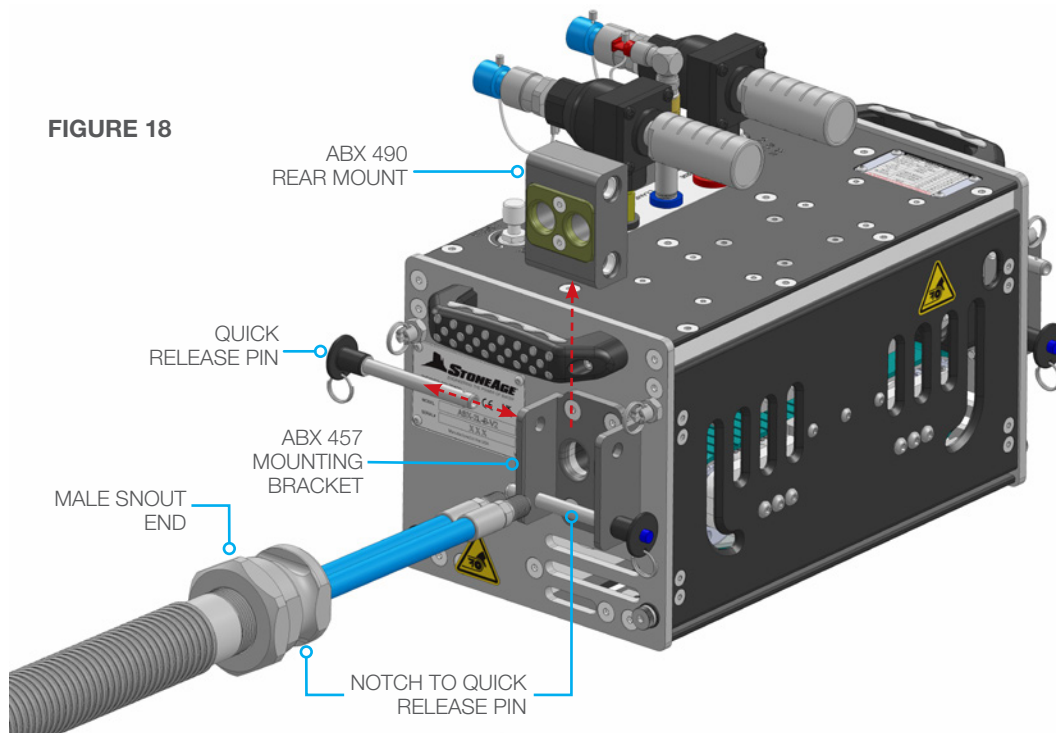
CONNECTION TO ABX-2L-B HOSE TRACTOR

CONNECT SNOOT AND FEED HOSES THROUGH AUTOBOX® ABX-3L

Remove the tape from the hoses. Remove the top Quick Release Pin from the ABX 457 Mounting Bracket and slide the ABX 490 Rear Mount out. Insert the hoses into the AUTOBOX® ABX-2L. **(Figure 18)** The Hose Clamp Pressure Regulator on the Control Box **MUST** be turned to zero pressure to open the drive for easy hose installation. **(Figure 19)** (See the Operation section of the ABX-2L User Manual for more detail on hose loading).

⚠ WARNING

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

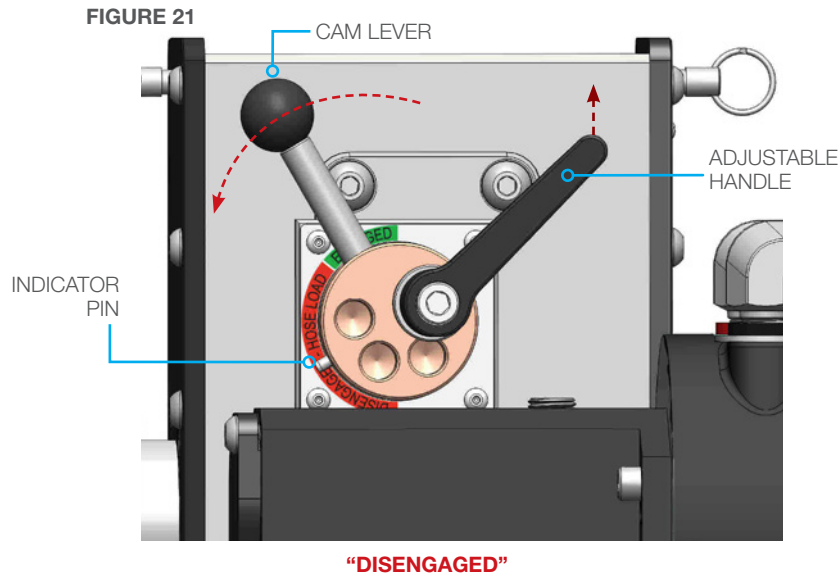


LOADING THE HIGH-PRESSURE HOSE INTO THE ABX-PRO TRACTOR AND GUIDE TUBE/COLLET BLOCK

NOTICE

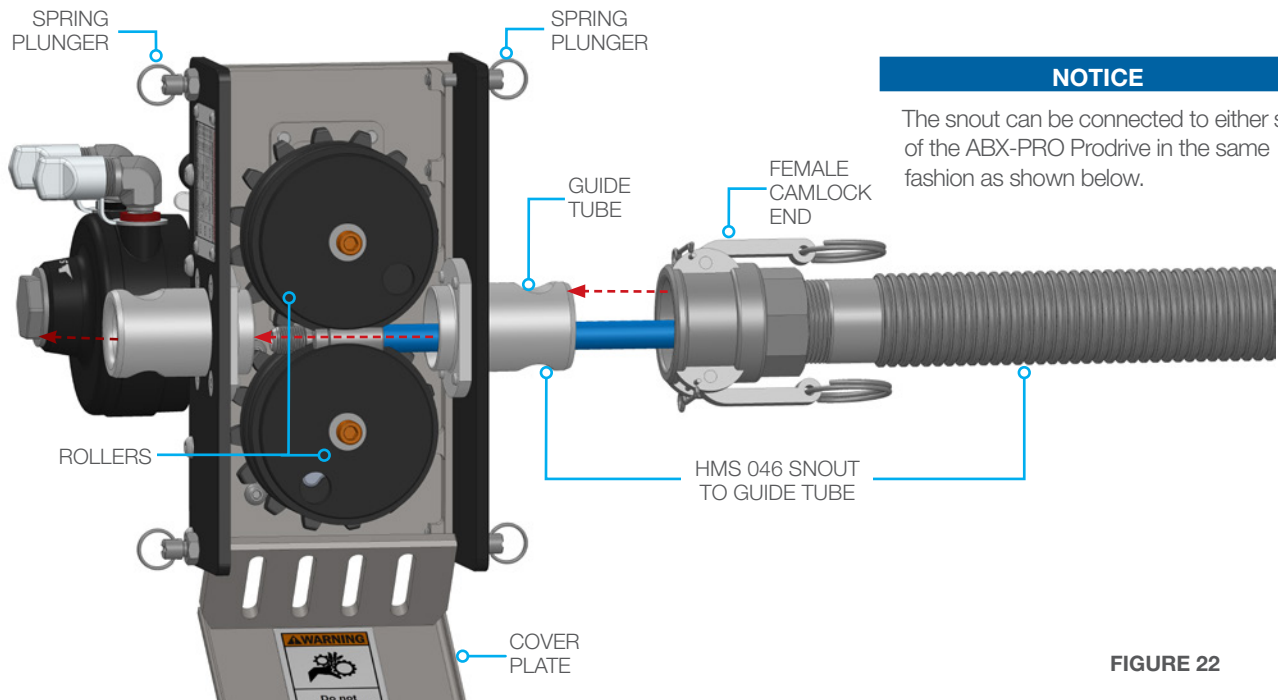
Only high quality hoses intended for waterblast applications should be used as high-pressure hoses. Pressure rating of high-pressure hoses **MUST NEVER** be exceeded. Do not use a shrouded hose or hose with a steel protective cover. This will cause severe damage to the Rollers.

1. To load a hose, release the Adjustable Handle and rotate the Cam Lever until the Indicator Pin is in the **"Disengaged"** position. This opens up the space between the rollers in the ABX-PRO Tractor. (**Figure 18**)



2. Pulling out the Spring Plungers will release the Cover Plate on the Tractor and allow access to the rollers. (**Figure 22**)
3. Push the lance through the ABX-PRO Prodrive and open the Camlock and connect the Female Camlock End to Guide Tube. (**Figure 22**)

Roller options can be found in the ABX-PRO-100 User Manual that is included with the ABX-PRO Tractor.



CONNECTION TO ABX-PRO PRODRIVE HOSE TRACTOR

4. Rotate the Cam Lever clockwise to the **“Engaged”** position to tighten the Idler Roller down onto the hose. There should be a slow slip on the hose. If the slip is too tight or loose, move the Eccentric Lever off until a slow slip is obtained. Once the slip level is achieved, push down on the Adjustable Handle to tighten the bushing assembly. **(Figure 23)**
5. Push the back cover back into the closed position and secure the two Spring Plungers on the top of the ABX-PRO Tractor. **(Figure 24)**

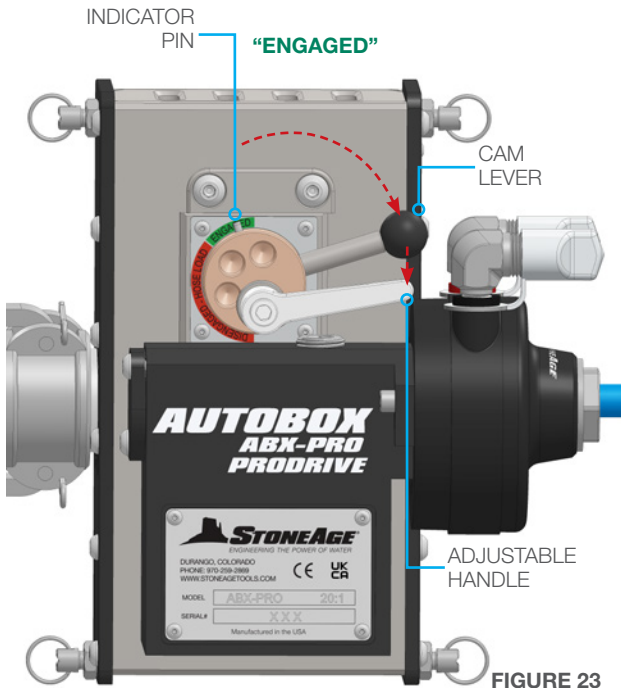


FIGURE 23

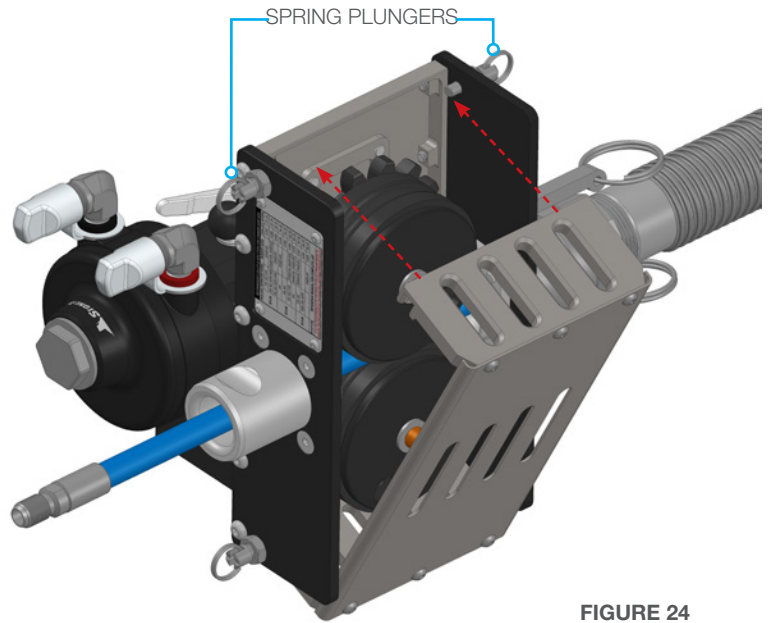


FIGURE 24

CONNECT SNOOT GUIDE HOSE STOPS AND HOSE STOP INSTALLATION

1. Lay each hose in the individual slots and slide the Snout Guide Hose Stop onto the Hose Stop Sleeve. Tighten the Adjustable Handle when the Guide is in place. **(Figure 25)**

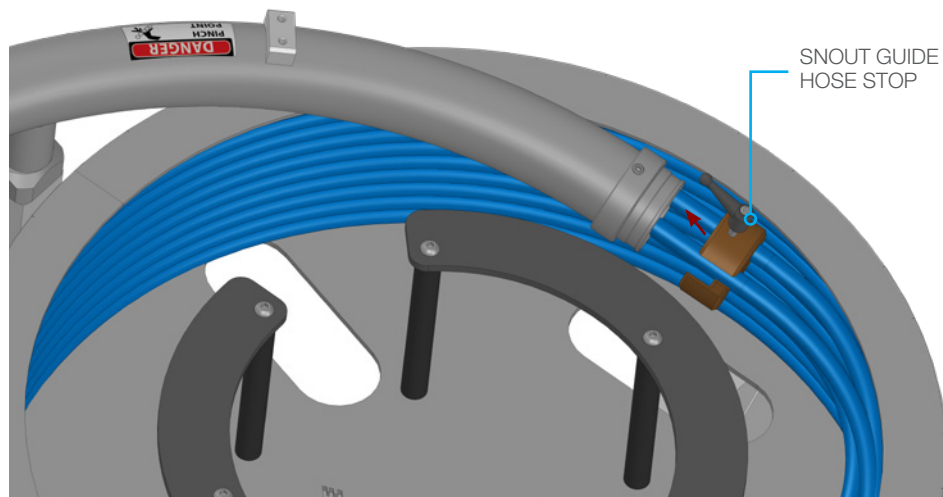
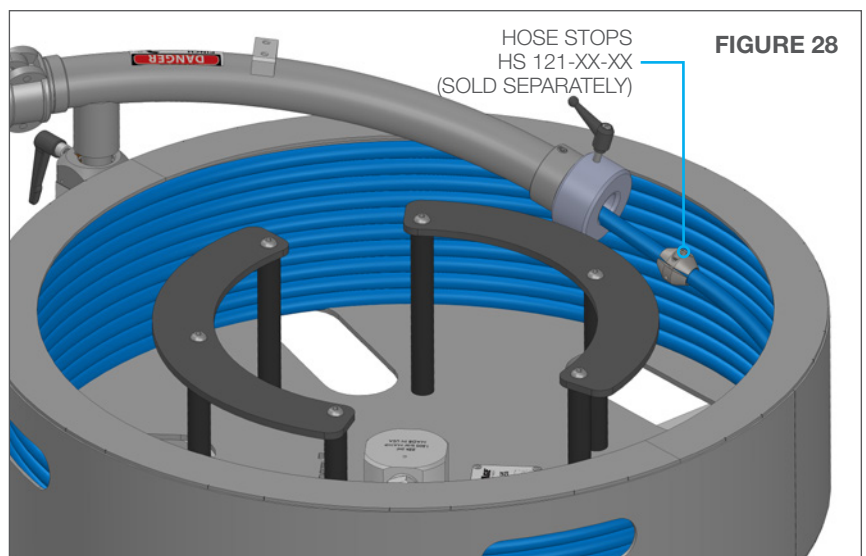
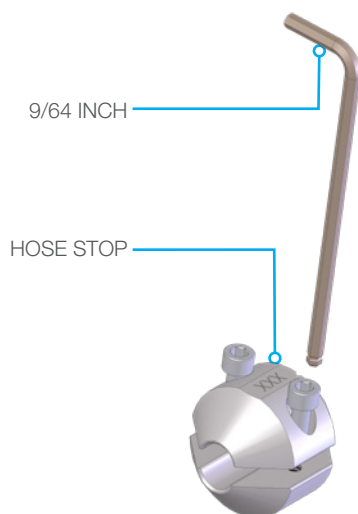
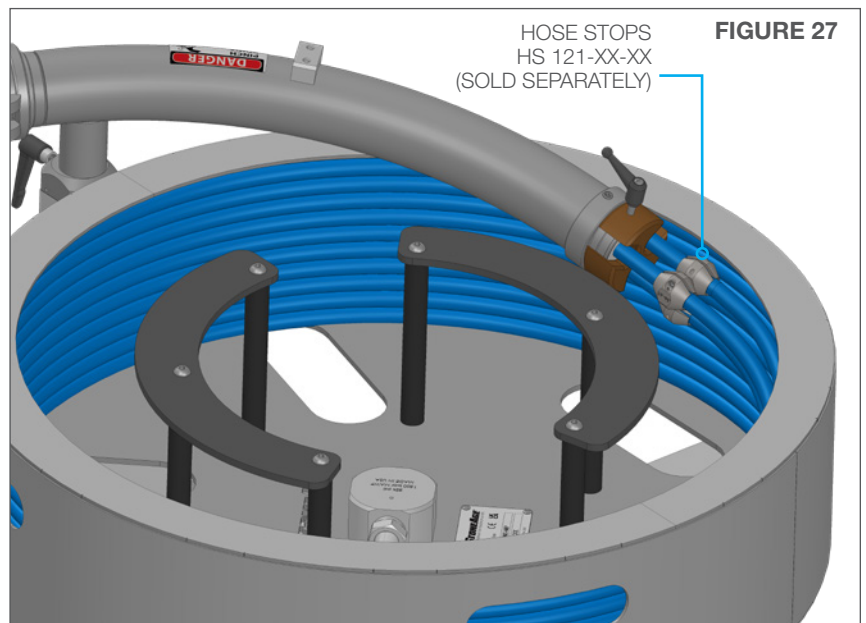
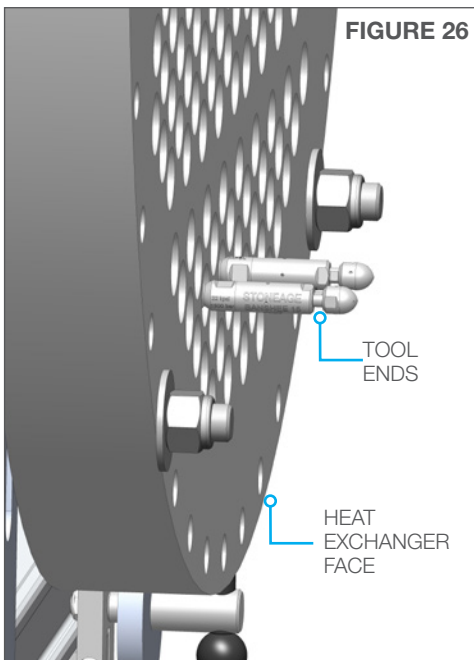


FIGURE 25

CONNECT HOSE STOPS TO HOSES

1. When the system is ready to run, drive the tools into the heat exchanger until they reach the far end of the heat exchanger. **(Figure 26)**
2. Install the appropriate Hose Stops (SOLD SEPARATELY) onto the hoses and locate against the Snout Guide Hose Stop. **(Figure 27 & 28)**



OPERATION

SNOUT

- Arrange the **SNOUT** to keep the curvature of the hose as gradual as possible to decrease wear on the hose and reduce drag on the AUTOBOX[®] Tractor motors.

WATER CONNECTION

- Connect your high pressure water hose to the inlet adapter on the swivel, located on the bottom of the Hose Management System (HMS-MP).
- Once set up, the operation of the Hose Management System (HMS-MP) is automatic. It is driven by the feed power of the AUTOBOX[®] Tractor to coil and uncoil hoses inside the drum.

AUTOBOX[®] TRACTORS

- See the individual AUTOBOX[®] Tractor User Manuals for full detailed operation and safety information.

MAINTENANCE

Maintenance Item	Maintenance Required
Swivel	Grease the swivel after every 100 hours of use
High Pressure Seals	Replace when high pressure seals begin to leak.

HMS 644-HP-XXX HIGH PRESSURE CUSTOM CONVERSION KIT OPTION

44KPSI HOSE MANAGEMENT SYSTEM IS OFFERED THROUGH STONEAGE SOLUTIONS AS THE HMS 644-HP-XXX CONVERSION KIT.

CONVERTING FROM MEDIUM PRESSURE TO HIGH PRESSURE

1. To remove the Hose Drum Assembly from the Frame, Remove the Snout from the Snout Guide.
2. Pull the Quick Release Pin out from under the drum and lift the assembly off the Frame. **(Figures 29 & 30)**

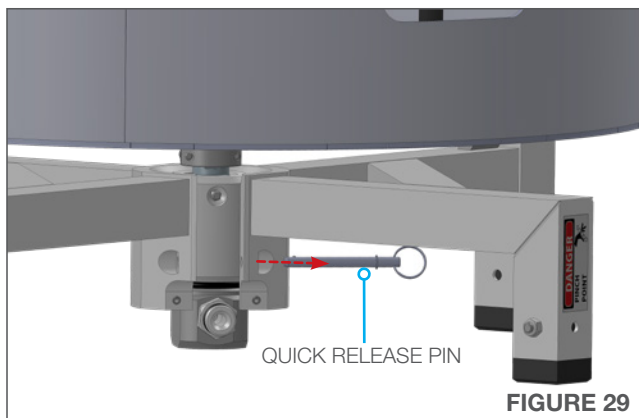


FIGURE 29

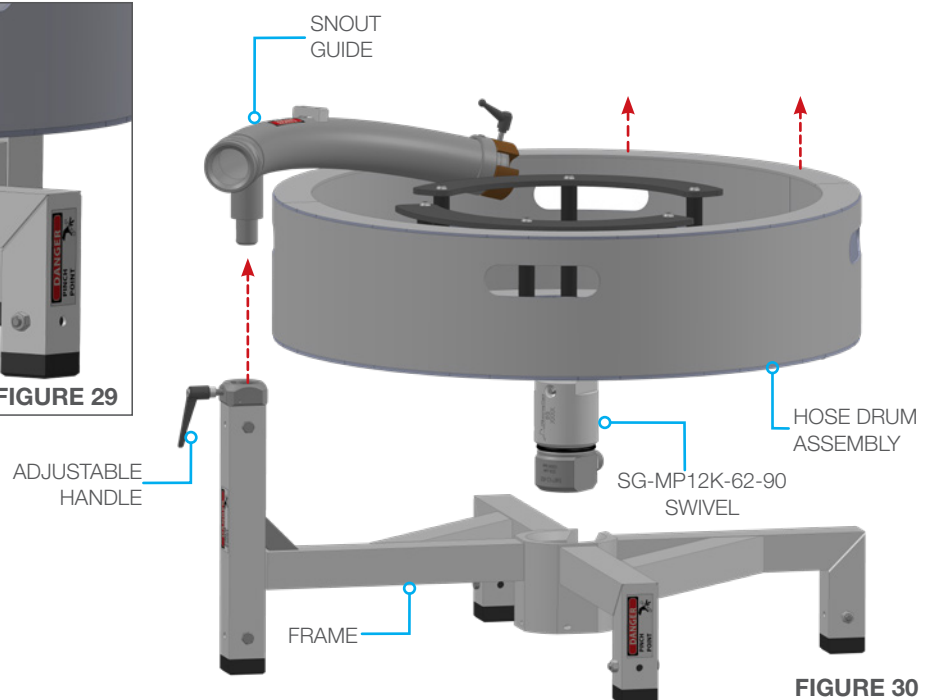


FIGURE 30

3. To remove the Medium Pressure Swivel, Coupling, and Manifold from the Hose Drum Assembly, unscrew all the fasteners from the bottom as shown in the diagram. Pull out the Medium Pressure Swivel, Coupling, and Manifold, and set aside. **(Figure 31)**
4. To install the High Pressure Conversion kit; **(Figures 31 & 32)**
 - Tighten Manifold onto the Nipple with Gland and Collar.
 - Loosely assemble the Gland and Collar onto the Drive Coupling.
 - Install the Assembly into the Drum and fasten from the bottom of the Drum.
 - Tighten the Gland to Drive Coupling.
 - Tighten the Swivel onto Drive Coupling per the torque spec below..
 - Align the notch on the Keyed Shaft Collar with the key on the Drive Coupling and secure.
5. **Return to Page 10 for hose loading instructions. Remember to install the appropriate High Pressure Fittings into the manifold. Additional parts and fittings can be found in the “Part Diagram” section of this manual.**

NOTICE

1. Apply swagelock® blue goop anti-seize or equivalent to all high pressure and UHP swivel fittings
2. Pressure test each assembly to ensure no leaks are present between the swivel inlet and manifold outlets.

PART	THREAD TYPE	TORQUE SPEC. (FT*LB)
UHP-H9-90 SWIVEL SHAFT	1.00"-12	90-100

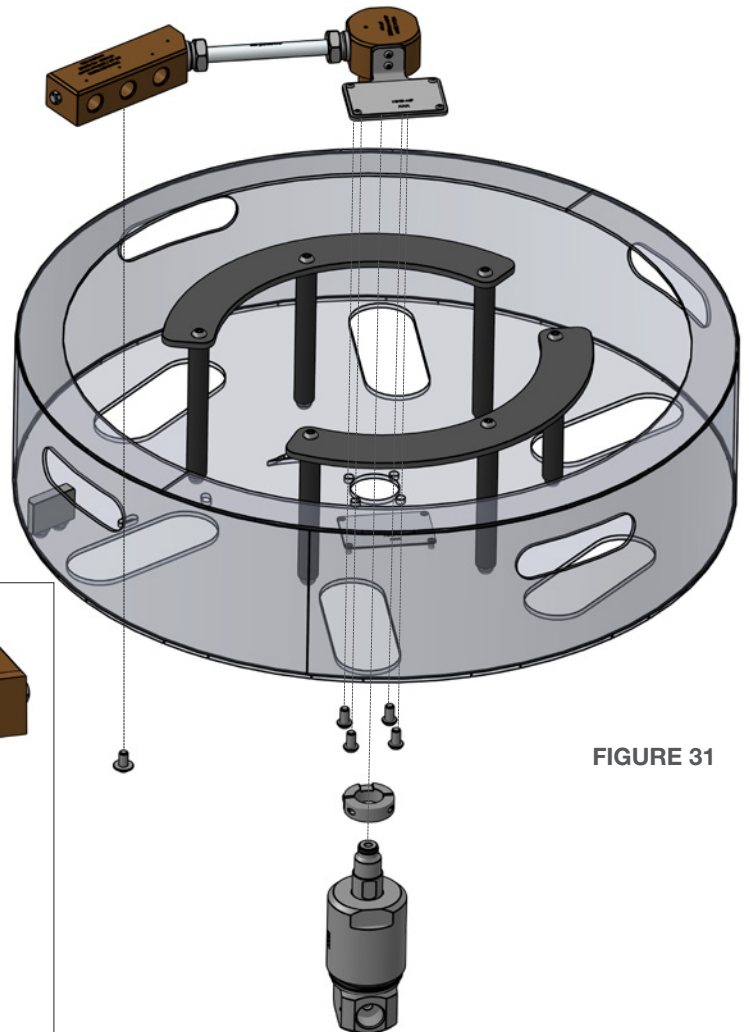
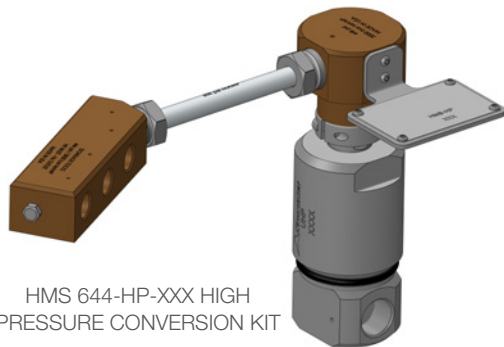


FIGURE 31

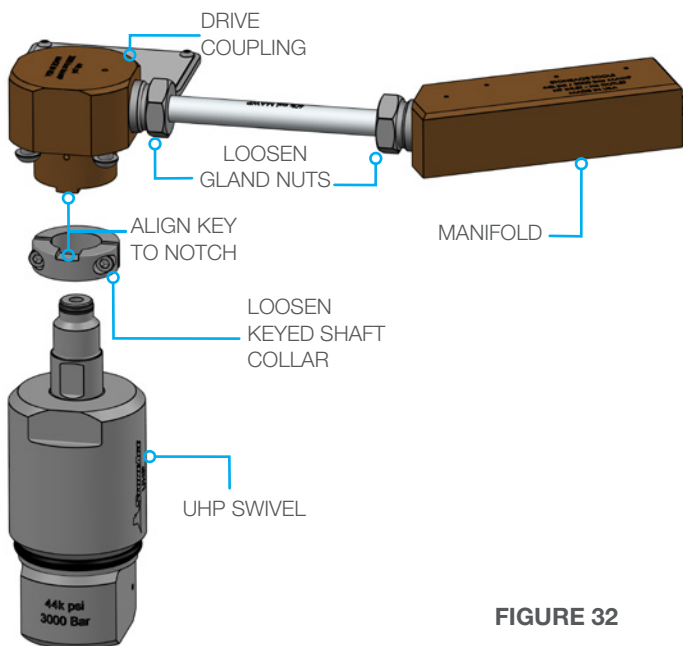
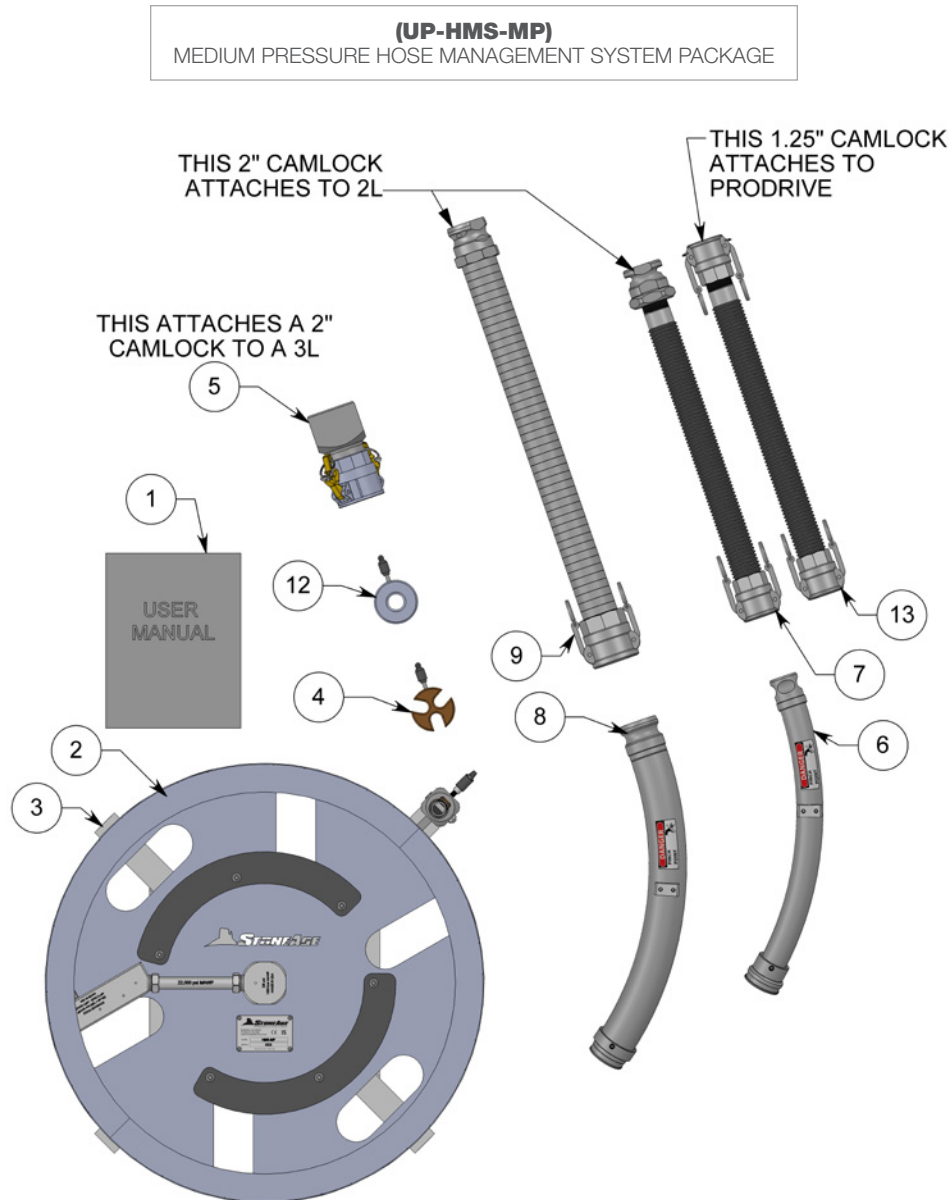


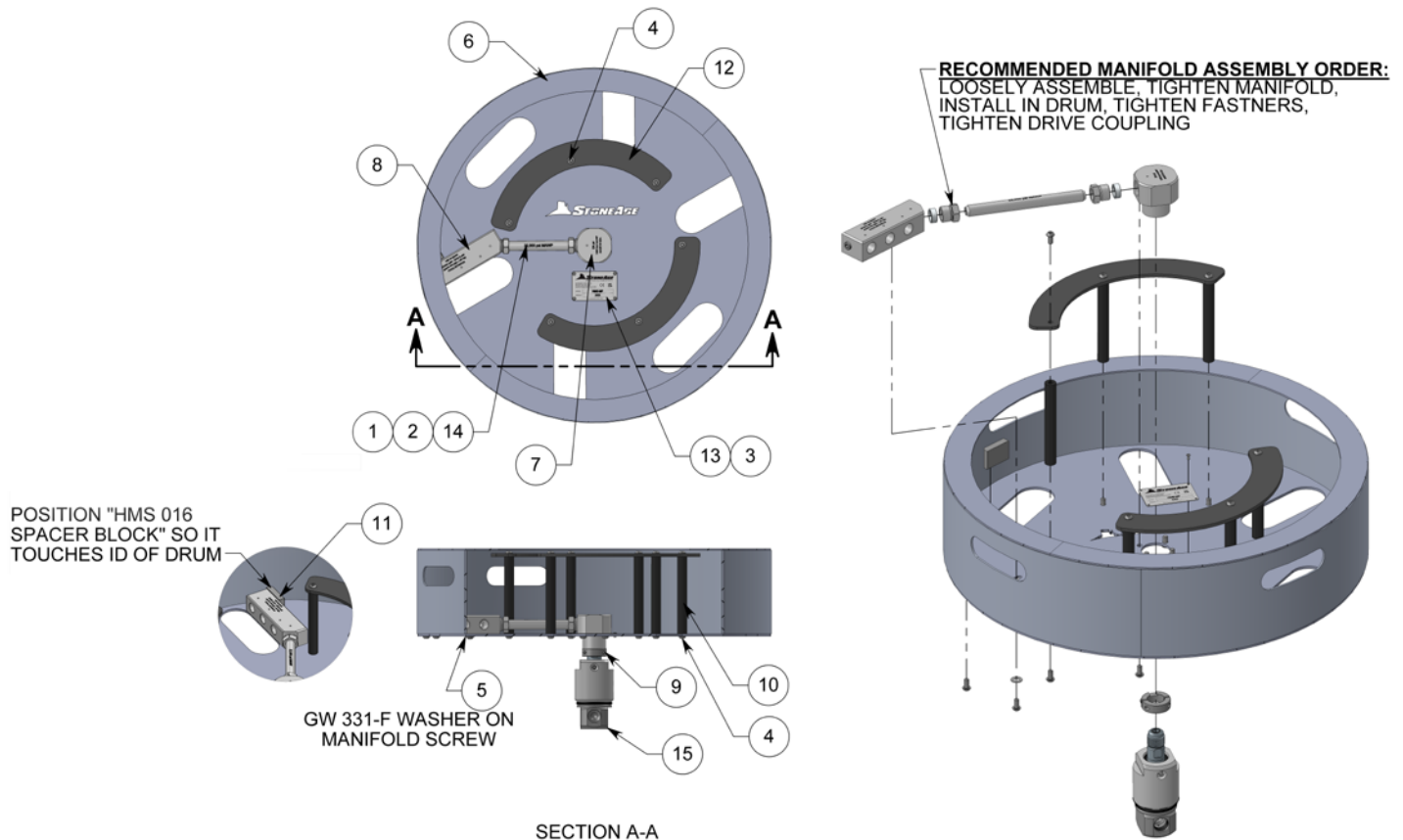
FIGURE 32

PART DIAGRAM



	#	PART NUMBER	DESCRIPTION	QTY	REQUIREMENT
FUNDAMENTAL COMPONENTS	1	PL 721	MANUAL, HOSE MANAGEMENT SYSTEM, MED. PRESSURE (HMS-MP)	1	YES
	2	HMS 001-MP	DRUM ASSEMBLY, MEDIUM PRESSURE	1	YES
	3	HMS 002	FRAME ASSEMBLY	1	YES
	4	HMS 045-3	HOSE STOP ASSEMBLY, TRIPLE	1	OPTION
	5	HMS 310	SNOUT 3L ADAPTER WELDMENT	1	OPTION
1.25" SNOUTS - FOR HOSES SMALLER THAN 4/4 (3mm & 4/2)	6	HMS 004-1.25	GUIDE SNOUT ASSEMBLY 1.25IN	1	OPTION
	7	HMS 047	SNOUT, 7FT, 1.25F CAMLOCK X 2.0M CAMLOCK	1	OPTION
2" SNOUTS - FOR HOSES 4/4 AND LARGER	8	HMS 004-2.0	GUIDE SNOUT ASSEMBLY 2.0	1	OPTION
	9	BOP 103-07-2.0MCL- 2.0FCL	2.0 INTERLOCK SNOUT, 7FT	1	OPTION
FITTING PACKAGES	10	HMS 005-3-STD	MEDIUM PRESSURE FITTINGS KIT, STANDARD FTGS, THREE LANCE	1	OPTION
	11	HMS 005-3-MET	MEDIUM PRESSURE FITTINGS KIT, METRIC FTGS, THREE LANCE	1	OPTION
SINGLE LANCE COMPONENTS (**INCLUDE HMS 004-1.25)	12	HMS 045-1	HOSE STOP ASSEMBLY, SINGLE	1	OPTION
	13	HMS 046	SNOUT, 7FT, 1.25F CAMLOCK X 1.25F CAMLOCK	1	OPTION
	14	HMS 005-1-STD	MEDIUM PRESSURE FITTINGS KIT, STANDARD FTGS, SINGLE LANCE	1	OPTION
	15	HMS 005-1-MET	MEDIUM PRESSURE FITTINGS KIT, METRIC FTGS, SINGLE LANCE	1	OPTION

HMS 001-MP
MEDIUM PRESSURE DRUM ASSEMBLY



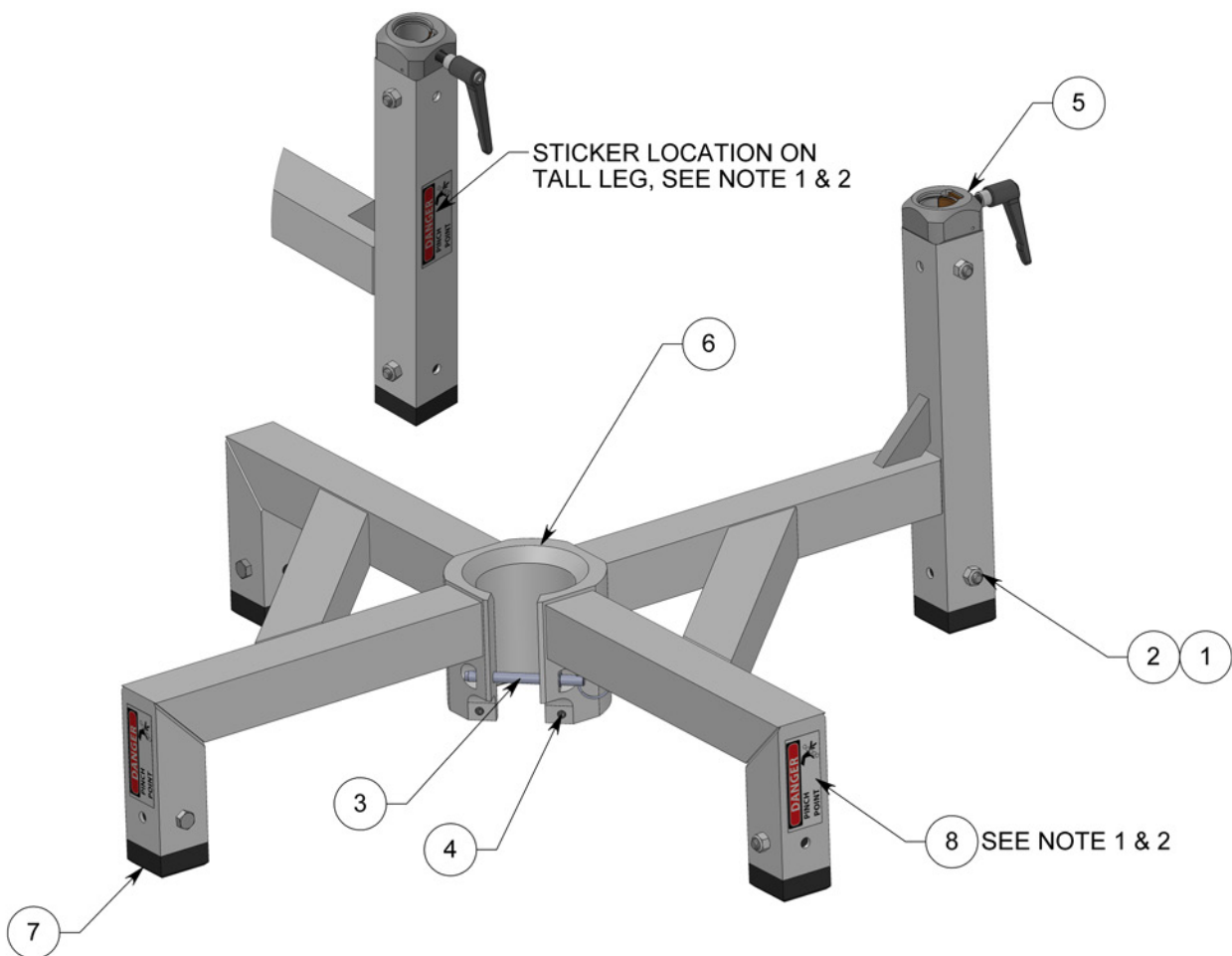
NOTE:

1. APPLY SILVER BOSTIK NEVER SEEZ ANTI-SEIZE OR EQUIVALENT TO ALL MEDIUM PRESSURE AND SG SWIVEL FITTINGS
2. APPLY BLUE LOCTITE 242 OR EQUIVALENT TO ALL FASTENERS
3. PRESSURE TEST EACH ASSEMBLY TO ENSURE NO LEAKS ARE PRESENT BETWEEN THE SWIVEL INLET AND MANIFOLD OUTLETS.

#	PART NUMBER	DESCRIPTION	QTY
1	AF 070-MP12	GLAND, 3/4 MP	2
2	AF 071-MP12	COLLAR, 3/4 MP	2
3	GR 125-SS-188-250	RIVET, BLIND, DOMED, SS, Ø.125, .188-.250 L	4
4	GSB 3M8-16-1.25	BHMS M8x1.25 x 16 SS	19
5	GW 331-F	WASHER, FLAT .31 SS	1
6	HMS 011	DRUM WELDMENT	1
7	HMS 012-MP	DRIVE COUPLING, MEDIUM PRESSURE	1
8	HMS 013-MP	TRIPLE DRUM MANIFOLD AND PLUG, MED. PRESSURE	1
9	HMS 014	KEYED SHAFT COLLAR METRIC	1
10	HMS 015	ROD, METRIC	6
11	HMS 016	SPACER BLOCK	1
12	HMS 017	SUPPORT RING	2
13	HMS 018-MP	SERIAL PLAQUE, HMS MEDIUM PRESSURE	1
14	SA 577-MP12LMP12L-8.0	3/4 MEDIUM PRESSURE TUBE NIPPLE, 8in OAL	1
15	SG-MP12K-62-90	SWIVEL	1

PART DIAGRAM

HMS 002 FRAME ASSEMBLY

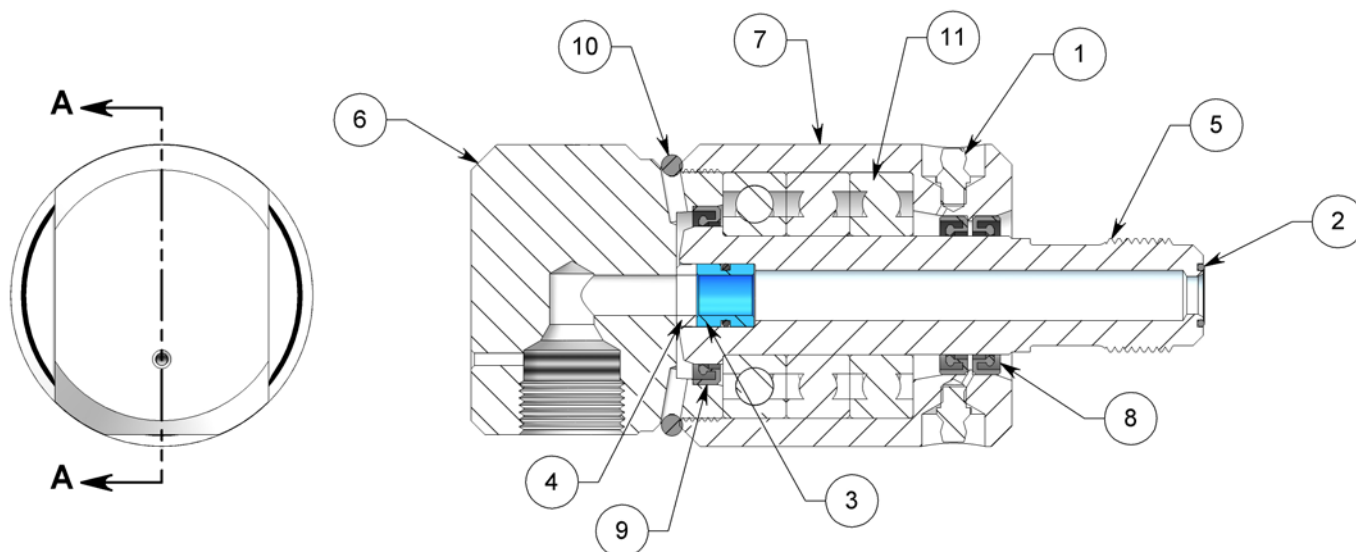


NOTE:

1. CLEAN ALUMINUM WITH ALCOHOL AND ALLOW TO DRY PRIOR TO APPLICATION OF STICKER.
2. ATTACH STICKER IN APPROXIMATE LOCATION SHOW.

#	PART NUMBER	DESCRIPTION	QTY
1	GB 5M8-55-1.25	BOLT, HEX M8X1.25 X 55	5
2	GN 3M8-1.25-L	NUT, NYLOK M8X1.25 SS	5
3	HMS 218	PIN, QUICK RELEASE .3120D X 2.50 LONG BALL DETENT	1
4	HMS 219	SPRING PIN, COILED .250D X 3.00	2
5	HMS 003	CLAMP ASSEMBLY	1
6	HMS 021	FRAME WELDMENT	1
7	HMS 022	LEG INSERT	4
8	PL 160	WARNING PINCH POINT 1.25x3.0 DECAL	4

SG-MP12K-62-90
SG SWIVEL

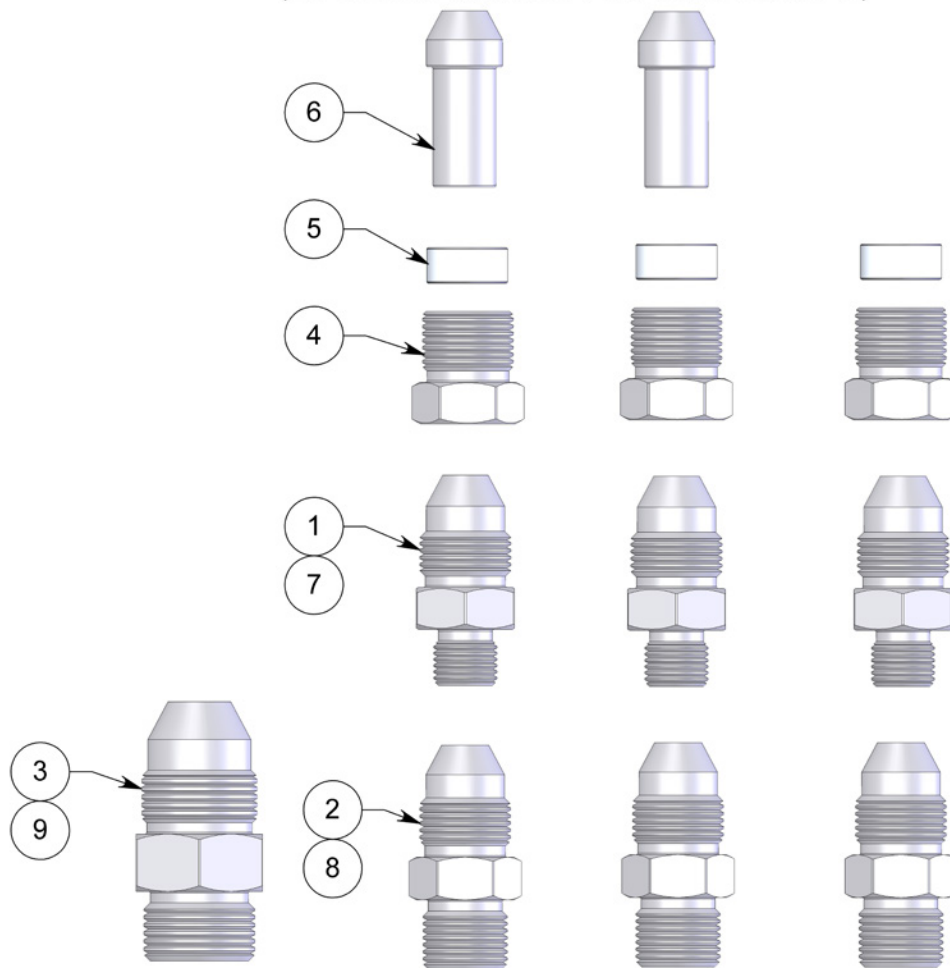


SECTION A-A

#	PART NUMBER	QTY.
1	FS 004-0 ZERK, STRAIGHT	2
2	FS 021-K O-RING	1
3	HC 012-TO HP SEAL, ORING	1
4	MJ 011-C SEAT, CARBIDE	1
5	SG 001-K-62 SHAFT	1
6	SG 002-MP12-62-90 NUT	1
7	SG 003 BODY	1
8	SG 006 SEAL, SMALL	2
9	SG 007 SEAL, LARGE	1
10	SG 008 O-RING	1
11	SG 009 BEARING (6206)	3

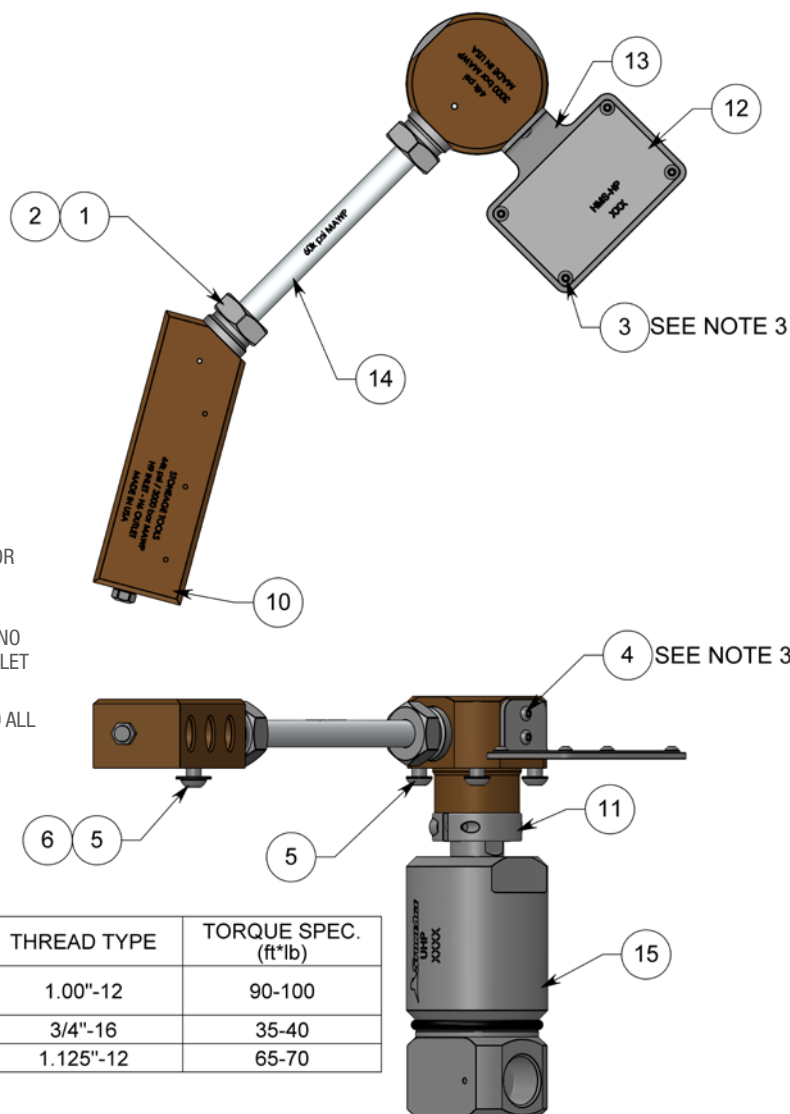
HMS 005-X-XXX FITTINGS KIT

HMS 005-3-STD SHOWN FOR REFERENCE
(STANDARD FITTINGS FOR THREE LANCES)



#	PART NUMBER	DESCRIPTION	KIT QUANTITIES			
			HMS 005-3-MET	HMS 005-3-STD	HMS 005-1-MET	HMS 005-1-STD
1	AF 060-MP9	ADAPTER, 9/16 MALE TYPE M TO 9/16 MALE MP, 22K	-	3	-	1
2	AF 061-MP9	ADAPTER, 3/4 MALE TYPE M TO 9/16 MALE MP	-	3	-	1
3	AF 063-MP12	ADAPTER, 1.00 MALE TYPE M TO 3/4 MALE MP, 22K	-	1	-	1
4	AF 070-MP9	GLAND, 9/16 MP	3	3	3	3
5	AF 071-MP9	COLLAR, 9/16 MP	3	3	1	1
6	AF 076-MP9	PLUG, 9/16 MP	2	2	2	2
7	GP 255-MP9BSPP4C	ADAPTER, MP9 MALE X BSPP4 MALE CONE	3	-	1	-
8	GP 255-MP9BSPP6C	ADAPTER, MP9 MALE X BSPP6 MALE CONE	-	-	1	-
9	GP 255-MP12M24C	ADAPTER, MP12 MALE X M24 MALE CONE	1	-	1	-

HMS 644-HP-XXX
HIGH PRESSURE CONVERSION KIT



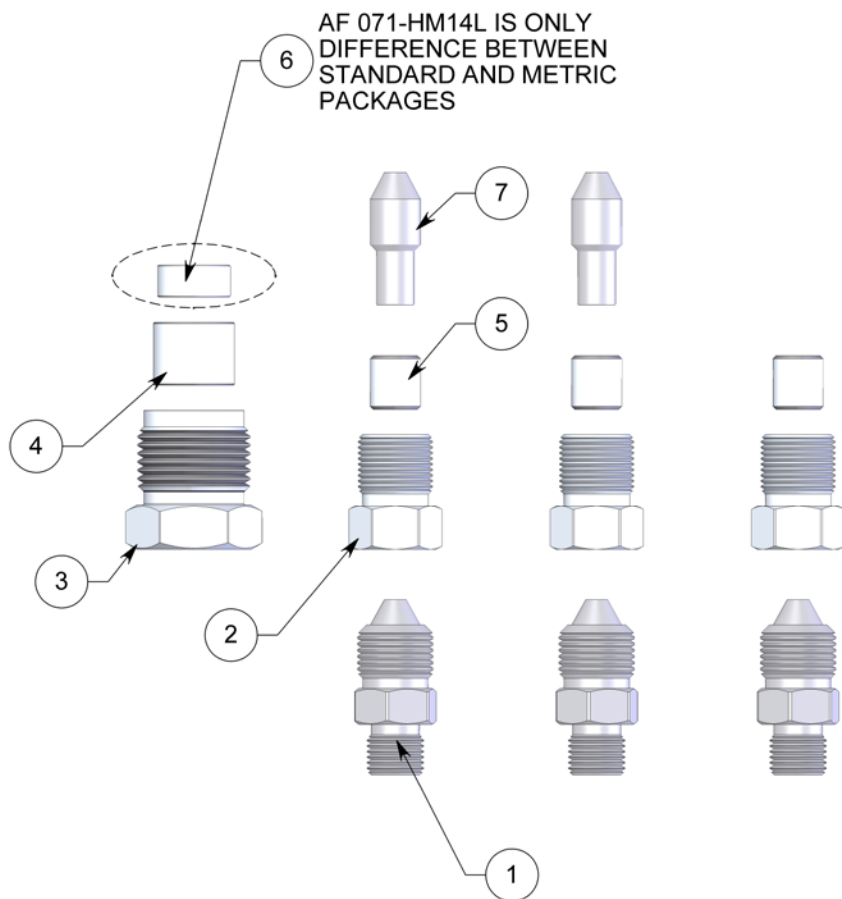
NOTE:

1. APPLY SWAGELOCK® BLUE GOOP ANTI-SEIZE OR EQUIVALENT TO ALL HIGH PRESSURE AND UHP SWIVEL FITTINGS
2. PRESSURE TEST EACH ASSEMBLY TO ENSURE NO LEAKS ARE PRESENT BETWEEN THE SWIVEL INLET AND MANIFOLD OUTLETS.
3. APPLY GREEN LOCTITE 680 OR EQUIVALENT TO ALL THREADS.

PART	THREAD TYPE	TORQUE SPEC. (ft*lb)
UHP-H9-90 SWIVEL SHAFT	1.00"-12	90-100
H6 FITTINGS	3/4"-16	35-40
H9 FITTINGS	1.125"-12	65-70

#	PART NUMBER / DESCRIPTION	HMS 644-HP-STD/QTY	HMS 644-HP-MET/QTY
1	AF 070-H9 GLAND, 9/16 HP	2	2
2	AF 071-H9 COLLAR, 9/16 HP	2	2
3	GSB 3M4-4-0.7 BHMS M4X0.7 X 4 SS	4	4
4	GSB 3M4-10-0.7 BHMS M4X0.7 X10 SS	2	2
5	GSB 3M8-16-1.25 BHMS M8X1.25 X 16 SS	5	5
6	GW 331-F WASHER, FLAT .31 SS	1	1
7	HMS 012-HP DRIVE COUPLING, HIGH PRESSURE	1	1
8	HMS 013-HP TRIPLE DRUM MANIFOLD AND PLUG, HIGH PRESSURE	1	1
9	HMS 014 KEYED SHAFT COLLAR METRIC	1	1
10	HMS 018-HP SERIAL PLAQUE, HMS HIGH PRESSURE	1	1
11	HMS 018.1-HP SERIAL PLAQUE MOUNT, HIGH PRESSURE	1	1
12	HMS 005-HP-MET HIGH PRESSURE FITTING PACKAGE, METRIC FITTINGS	-	1
13	HMS 005-HP-STD HIGH PRESSURE FITTING PACKAGE, STANDARD FITTINGS	1	-
14	HMS 569-H9LH9L-8.0 60KPSI NIPPLE 8IN OAL	1	1
15	UHP-H9-90 SWIVEL ASSEMBLY	1	1

HMS 005-HP-XXX HIGH PRESSURE FITTINGS KIT



#	PART NUMBER	HMS 005-HP-MET/QTY	HMS 005-HP-STD/QTY
1	AF 060-H6 ADAPTER .56 TYPE M TO H6	3	3
2	AF 070-H6 GLAND HP	3	3
3	AF 070-H9 GLAND HP	1	1
4	AF 071-H9 COLLAR	1	1
5	AF 071-H6 COLLAR	3	3
6	AF 071-HM14L COLLAR, LH	1	-
7	AF 076-H6 PLUG	2	2

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 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 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.stoneagetools.com/terms>

<http://www.stoneagetools.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.

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