



LIGHTWEIGHT STRIKER™ (SKRL-100) USER MANUAL

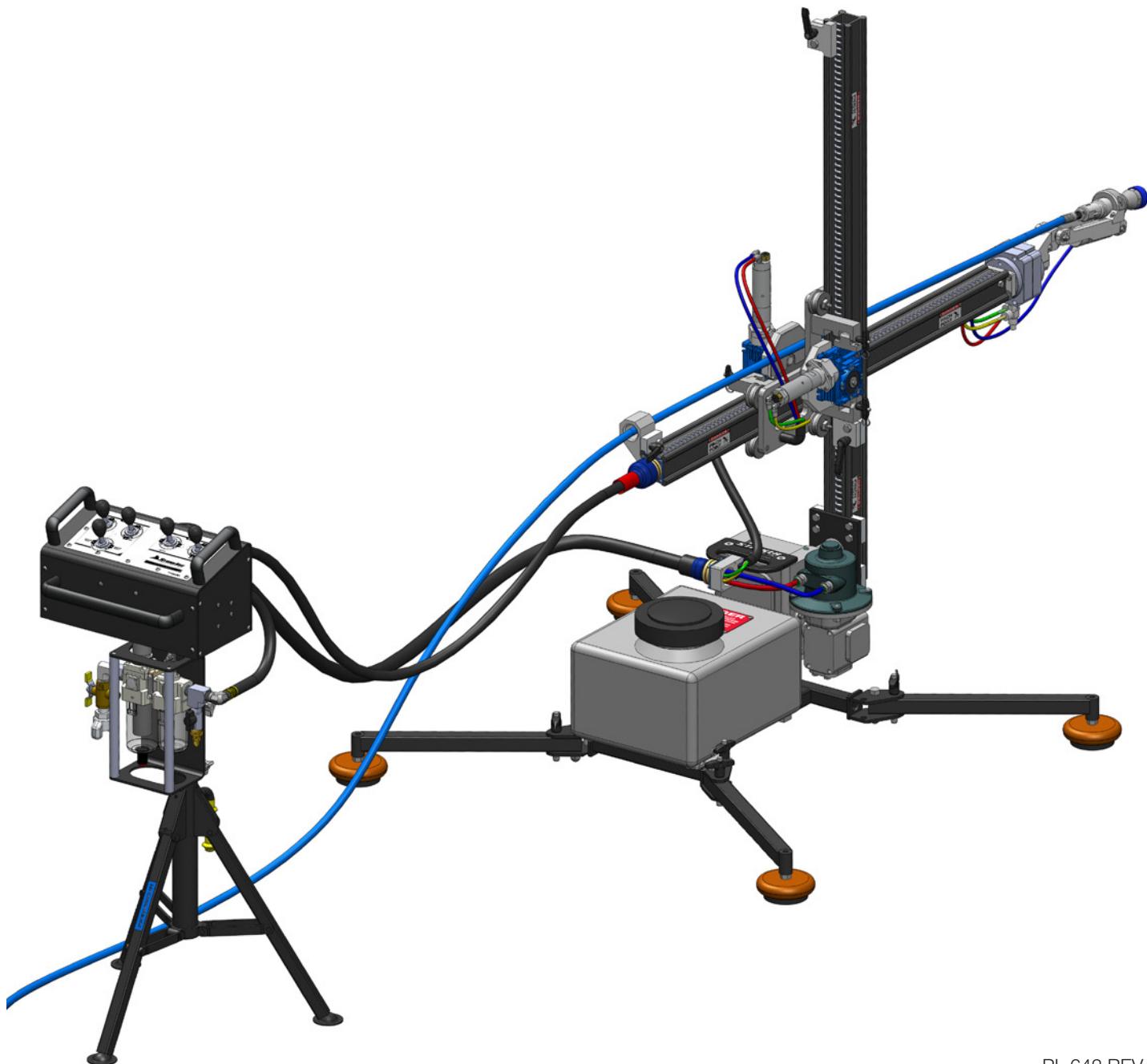


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This manual must be used in accordance with all applicable national laws. The manual shall be regarded as a part of the machine and shall be kept for reference until the final dismantling of the machine, as defined by applicable national law(s). Updated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

LIGHTWEIGHT STRIKER (SKRL-100) SPECIFICATIONS

	Imperial	Metric
Weight:	153 lbs	69 kg
Size, Outriggers Extended:	48in. Wide x 44in. Long x 57in. High	1220 mm Wide x 1118 mm Long x 1448 mm High
Cleaning Window:	47in. High x 68in. Wide x 40in. Deep	1194 mm High x 1727 mm Wide x 1016 mm Deep
Reaction Force:	Up to 55 lbs	25 kg
Control Box Weight: (Includes Control Box, FRL, and stand)	43 lbs	19.5 kg
Maximum Air Supply Pressure:	125 psi	8,6 bar
System Operating Pressure:	80 psi minimum, 100 psi maximum	5,5 bar minimum, 6,8 bar maximum
Maximum Air Consumption:	96 CFM	
Recommended Operational Temperature Range:	-4°F to 140°F	-20°C to 60°C

DESCRIPTION OF EQUIPMENT AND INTENDED USE

LIGHTWEIGHT STRIKER AND CONTROL BOX

The LIGHTWEIGHT STRIKER (SKRL-100) takes all the capability of the Striker system and packages it for maximum portability for previously inaccessible automated surface prep locations.

The powerful and responsive LIGHTWEIGHT STRIKER (SKRL-100) combines a rotary shotgun arm and positioning system for precise remote shotgunning in tough to reach locations.

The LIGHTWEIGHT STRIKER (SKRL-100) must not be put into service within the European Community ("EC") until the final machinery into which it is to be incorporated has been declared in conformity with the Machinery Directive and all other applicable EC Directives.

KEY FEATURES:

LIGHTWEIGHT STRIKER (SKRL-100)

- Modular system designed for portability and easily assembled in 3.5 minutes.
- Lightweight components for single operator setup and use
- Fully pneumatic controls
- Fits through 21" (534 mm) minimum opening diameter or width
- Affordable alternative to complicated robotic systems

STANDARD CONTROL BOX (CB-SKR)

- Small, lightweight, ergonomic design that includes a Portable stand and filter-regulator-lubricator assembly
- Body controls: In/Out, Up/Down, and Rotation
- Wrist controls: Rotation and Flex
- OPTIONAL Pneumatic Foot Pedal Dump Control for the non-wireless control box.



EU DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

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

Declare that:

Lightweight Striker (SKRL-100)
for high pressure water cleaning of system parts.

Is compliant with the following Directives and Standards:

Directive 2006/42/EC (Machinery Directive)

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

The Technical File for Lightweight Striker (SKRL-100)

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

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

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

02/11/2019
Date



UK DECLARATION OF CONFORMITY

Manufacturer:

StoneAge Incorporated
466 South Skylane Drive
Durango, CO 81303
USA

Authorized Representative:

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

Declare that:

Lightweight Striker (SKRL-100)
for high pressure water cleaning of system parts.

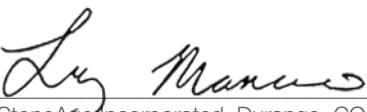
Are compliant with the following Statutory Requirements and Designated Standards:

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

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Liz Mancuso

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

02/11/2019

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 the Water Jetting Association (WJA) Code of Practice, or equivalent (see www.waterjetting.org.uk).

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

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

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

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

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

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

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

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

Operators MUST read, understand, and follow the Operational and Training Requirements (Section 7.0) of WJTA-IMCA's, Industry Best Practices for the Use of High Pressure Waterjetting Equipment, or equivalent.

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

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

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

PPE may include:

- **Eye protection:** Full face visor
- **Foot protection:** Kevlar® brand or steel toe capped, waterproof, non-slip safety boots
- **Hand protection:** Waterproof gloves
- **Ear protection:** Ear protection for a minimum of 85 dBA
- **Head protection:** Hard hat that accepts a full face visor and ear protection
- **Body protection:** Multi-layer waterproof clothing approved for water jetting
- **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 for the Use of High Pressure Waterjetting Equipment handbook, available online at www.wjta.org. Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system.
- The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate if damaged, until repaired.
- Make sure all threaded connections are tight and free of leaks.
- Users of the Lightweight Striker 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 placement of the tool. The Lightweight Striker and Control Box MUST be supervised at all times and should never be left unattended.
- Test the Control Box before operating the LIGHTWEIGHT STRIKER (SKRL-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.
- Always de-energize the system before opening the door to service or replace any parts. Failure to do so can result in severe injury and/or death.
- When moving the Lightweight Striker lift with care to prevent bodily injury.

SAFETY LABEL DEFINITIONS

The LIGHTWEIGHT STRIKER™ (SKRL-100) has the potential to cause serious injury to fingers or hands if they become caught between the rollers or rotating connections.

The LIGHTWEIGHT STRIKER™ (SKRL-100) has the potential to cause serious injury if fingers or hands become caught between the carriage and rails.

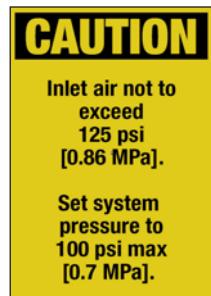


PRE-RUN SAFETY CHECK

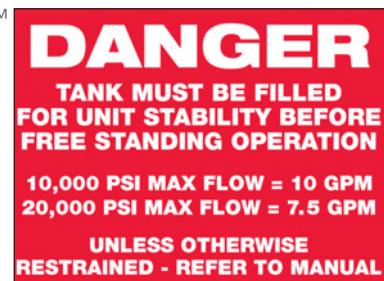
Refer to WJTA-IMCA's, Industry Best Practices for the Use of High Pressure Waterjetting Equipment and/or The Water Jetting Association's, WJA Code of Practice for additional safety information.

- 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 the ballast tank has been completely filled prior to operating the LIGHTWEIGHT STRIKER (SKRL-100)
- To safely move the Lightweight Striker, the ballast tank must be emptied to reduce the weight. The whole assembly is designed to come apart into 6 portable pieces that all weigh less than 50 lbs.
- Test the Control Box before operating the LIGHTWEIGHT STRIKER (SKRL-100) with high-pressure water to verify the control valves move the Wrist and Tool in the intended directions.
- 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.

The LIGHTWEIGHT STRIKER™ (SKRL-100) has a maximum operating air pressure of 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.

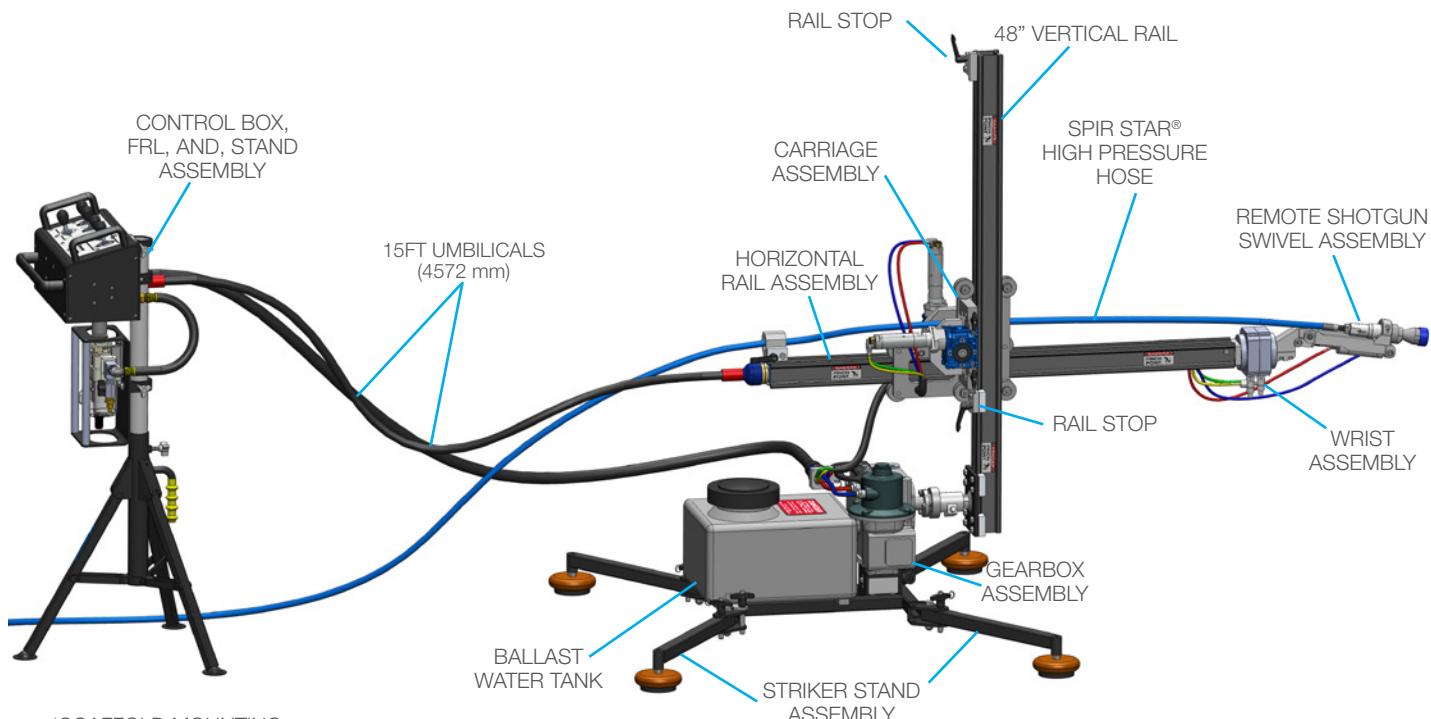


The LIGHTWEIGHT STRIKER™ (SKRL-100) is designed to be balanced in weight with a filled ballast tank. It must be filled unless otherwise anchored to the ground.



SYSTEM ASSEMBLY - OVERVIEW

LIGHTWEIGHT STRIKER™ SKRL-100 AND CB-SKR CONTROL BOX SYSTEM



*SCAFFOLD MOUNTING
OPTION
SEE SEPARATE PART DIAGRAM
PAGE FOR SKRL 501



*METAL GRATE MOUNTING
OPTION
SEE SEPARATE PART DIAGRAM
PAGE FOR SKRL 512



COLOR CODING

HIGH PRESSURE HOSE AND REMOTE SHOTGUN TOOLS
ARE COLOR CODED TO THEIR SPECIFIC PRESSURE
RATINGS FOR SAFETY

10K PACKAGE INCLUDES

SKRL 103

20' OAL SPIR STAR® 8/2 HIGH PRESSURE HOSE WITH ONE MALE 1/4 NPT END AND ONE 3/4 TYPE M FEMALE SWIVEL



20K PACKAGE INCLUDES

SKRL 203

20' OAL SPIR STAR® 8/4 HIGH PRESSURE HOSE WITH ONE MALE 9/16 MEDIUM PRESSURE END, AND ONE 3/4 TYPE M FEMALE SWIVEL



LIGHTWEIGHT STRIKER SET-UP - STAND ASSEMBLY

1. The Striker stand comes as shown in **(Figure 1)**

NOTICE

There are four 2 inch long Quick Release Pins for the legs and two 2.25 inch long Quick Release Pins that attach the Tank. Be sure not to install these incorrectly as they will not securely engage the lock mechanism.

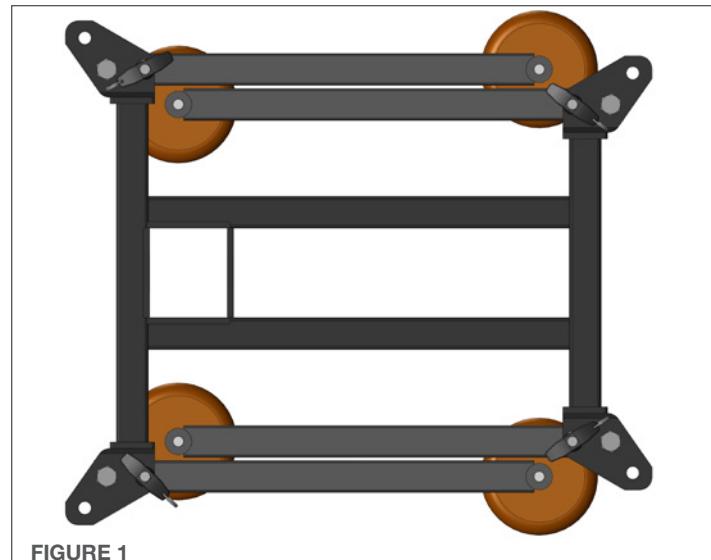


FIGURE 1

2. Remove the Quick Release Pins from the frame **(Figure 2)**, extend all the legs, and insert the Quick Release Pins back into the opposite holes in the frame. **(Figure 3)**

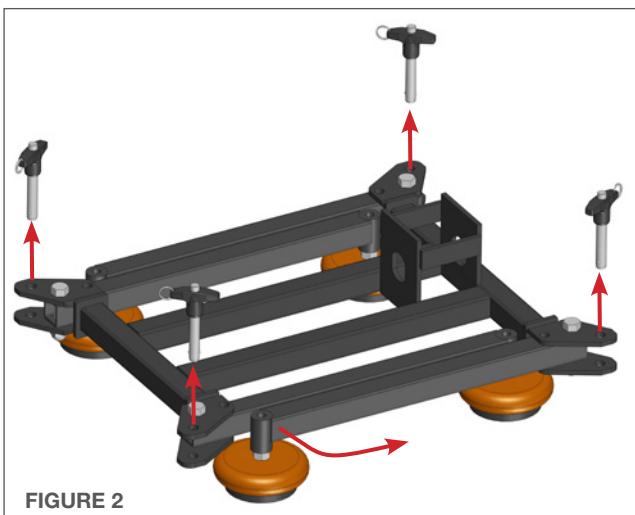


FIGURE 2

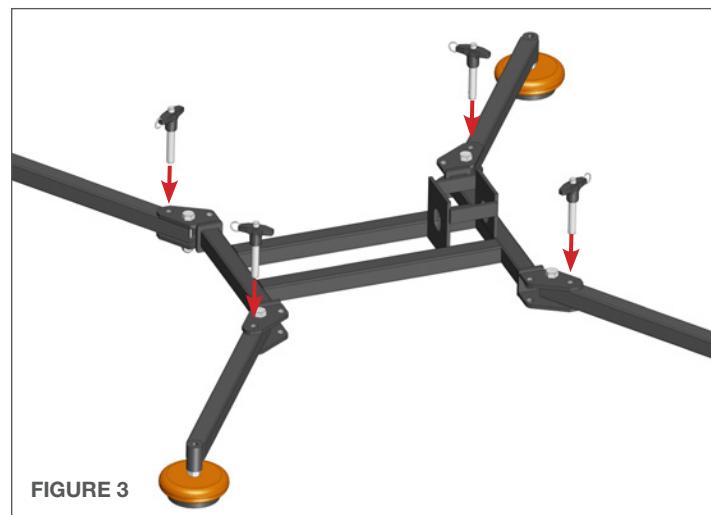


FIGURE 3

3. Test the Leg Assembly by lifting up and down to ensure it moves all pins are secured. **(Figure 4)**

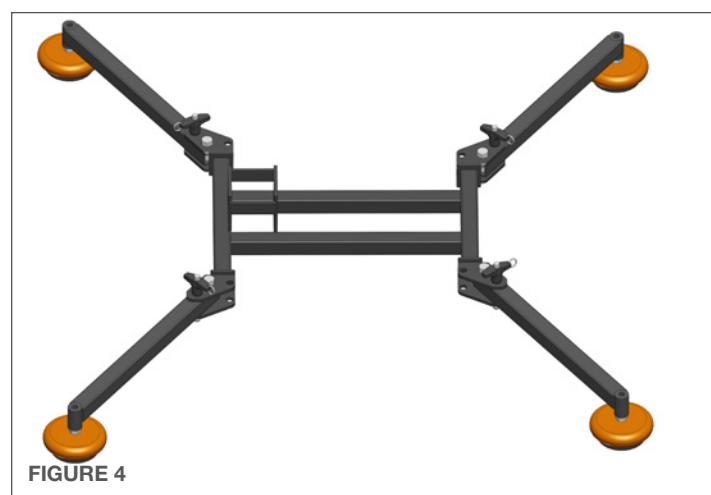
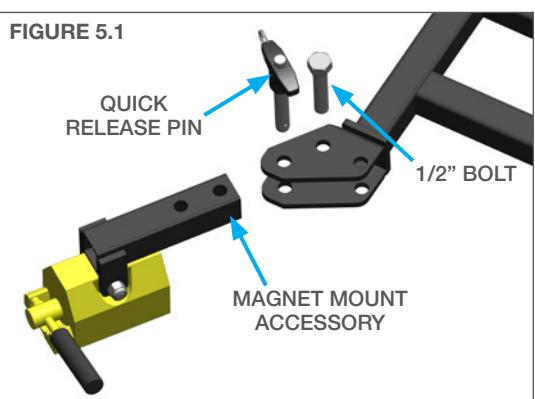
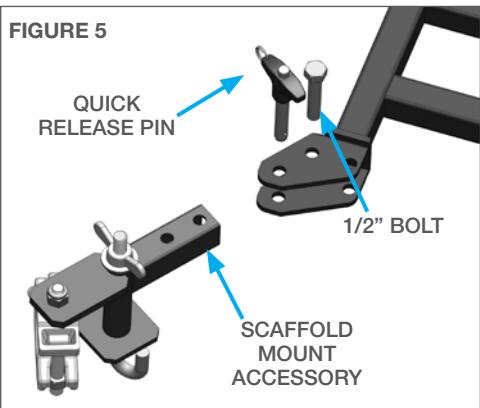


FIGURE 4

LIGHTWEIGHT STRIKER SET-UP - STAND ASSEMBLY AND GEARBOX

4. There are two additional mounting options for the Lightweight Striker. The scaffold mounting accessory is for mounting directly to scaffolding. The high powered magnet option is for placing the assembly on metal grating. They are both easily installed by removing the Quick Release Pins and the 1/2" bolts from the standard leg assemblies and inserting either the Scaffold Mount legs or the Magnet mounts, and reinstalling the Quick Release Pins and 1/2" bolts as shown in **(Figures 5 & 5.1)**.



NOTICE

There are four 2 inch long Quick Release Pins for the legs and two 2.25 inch long Quick Release Pins that attach the Tank. Be sure not to install these incorrectly as they will not securely engage the lock mechanism.

5. Place the Gearbox Assembly into the Mounting Weldment as shown in **(Figure 6)**. Orient the Spline Drive out from the frame.
6. Install Quick Release Wedge Bolt through Gearbox Assembly and the Mounting Weldment. Be sure to check that it has gone through the entire Mounting Weldment. Tighten the Quick Release Lever and push in to lock down and secure. **(Figures 7,8, & 9)**

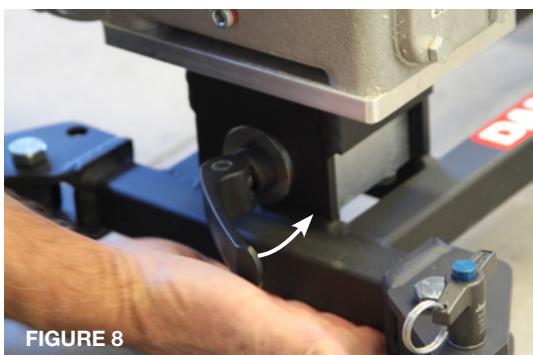
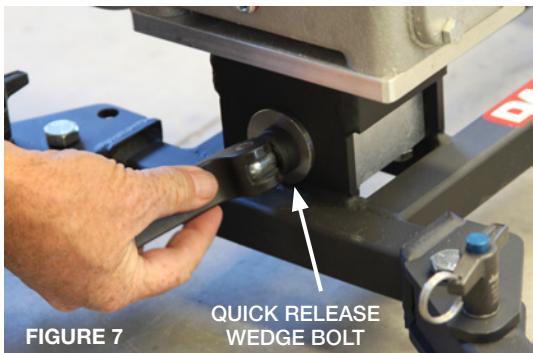
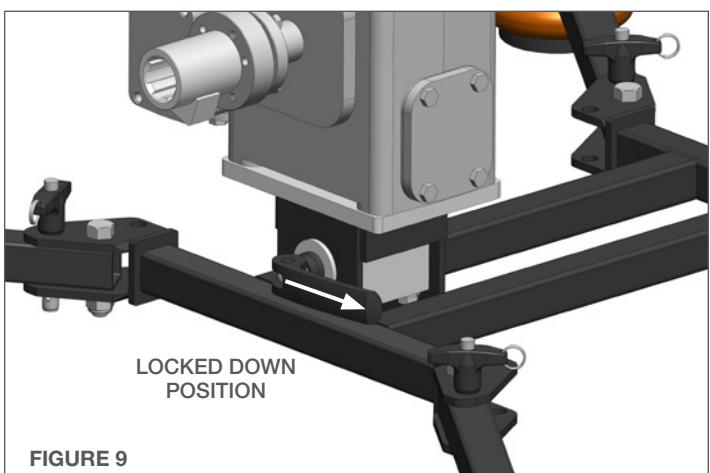
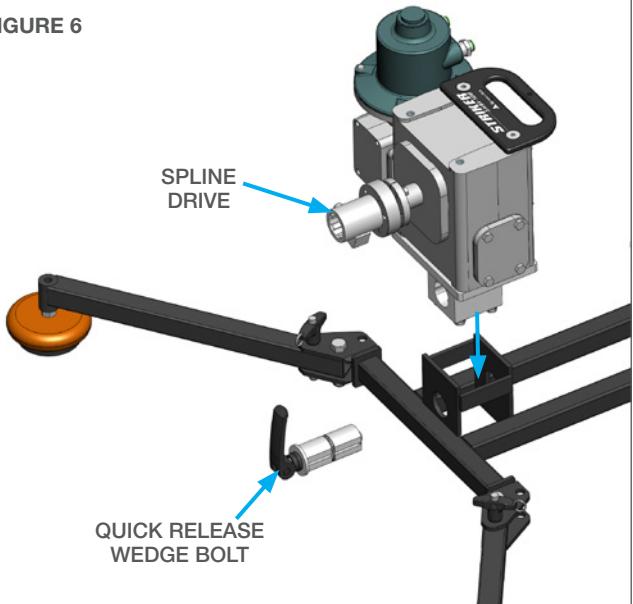
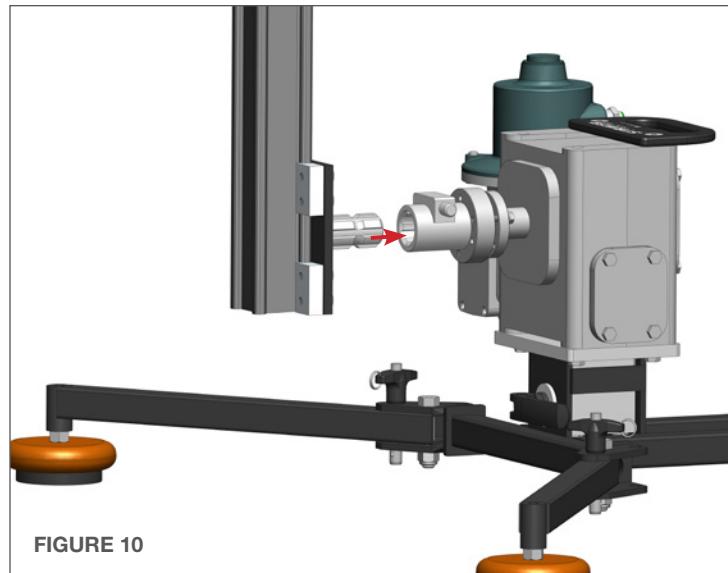


FIGURE 6

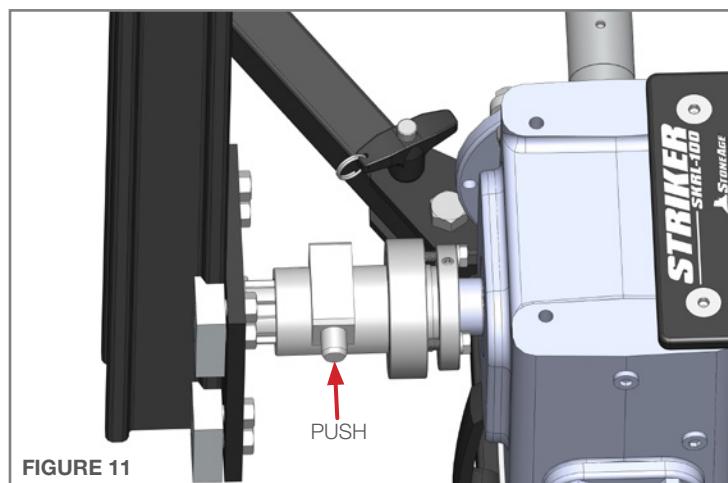


LIGHTWEIGHT STRIKER SET-UP - VERTICAL RAIL ASSEMBLY

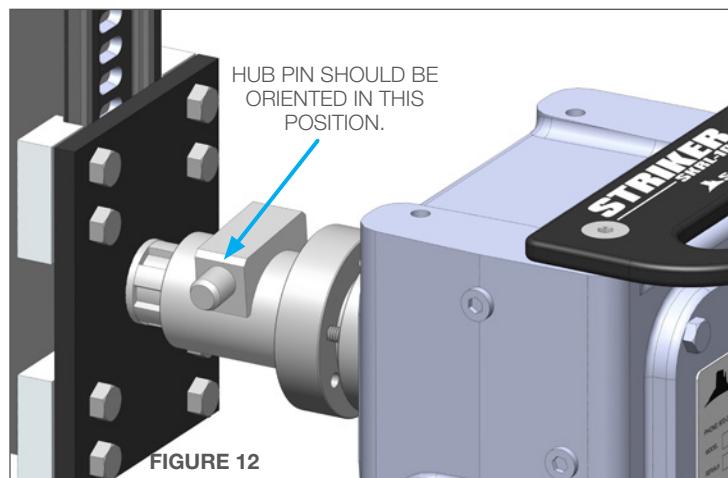
7. Install the Vertical Rail Assembly by aligning the splines on the Vertical Rail with the Splines inside the Spline Coupling. (**Figure 10**)



8. Depress the Hub Pin pin on the Spline Coupling. Make sure the spring pin is fully engaged when it is released. (**Figure 11**)

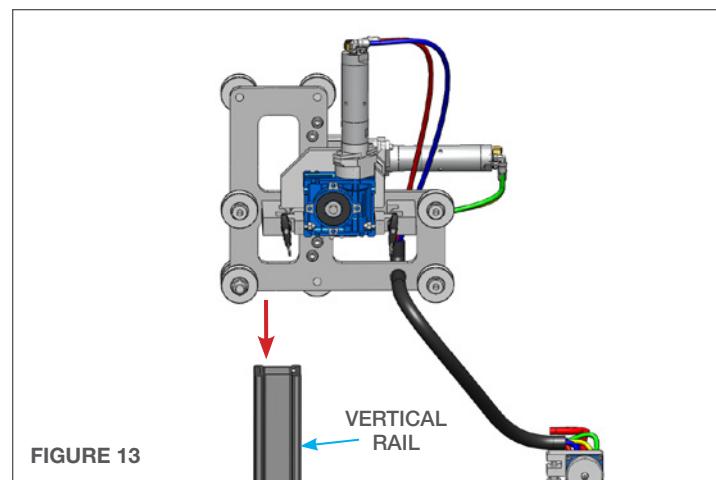
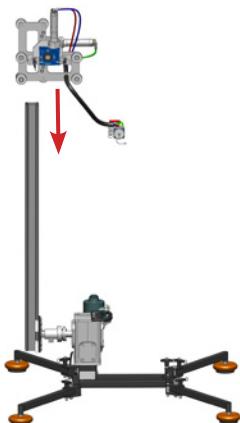


9. Proper placement of Hub Pin in relation to the Vertical Rail Assembly is shown below. (**Figure 12**)

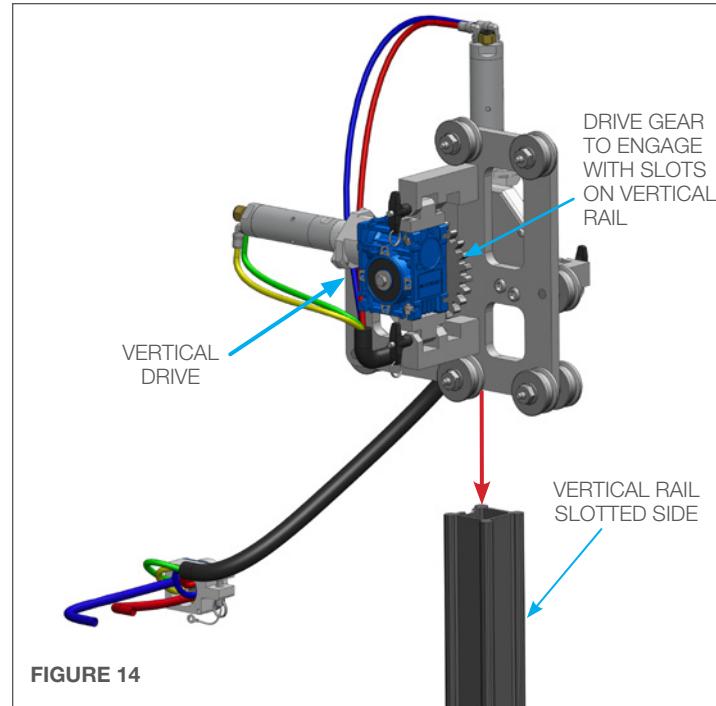


LIGHTWEIGHT STRIKER SET-UP - CARRIAGE ASSEMBLY

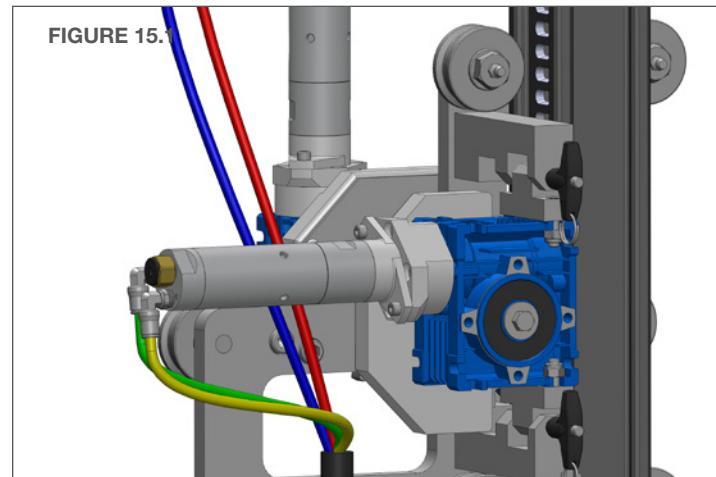
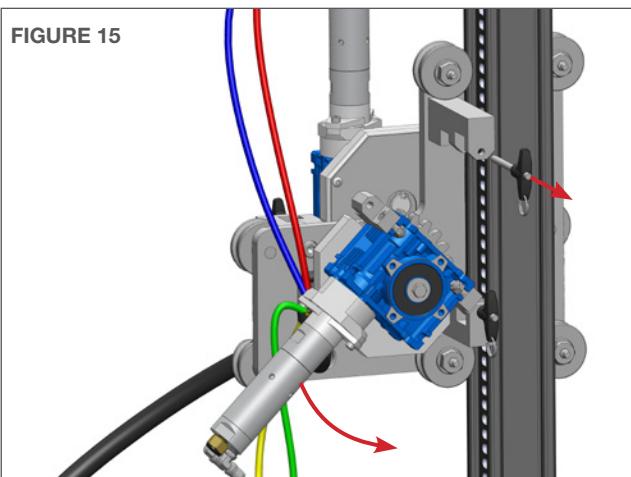
10. Orient the Carriage Assembly as shown in **(Figure 13)** with the umbilical end facing down.



11. Align the rollers with the Vertical Rail edges and slide the Carriage down to approximately chest level. **(Figure 14)**

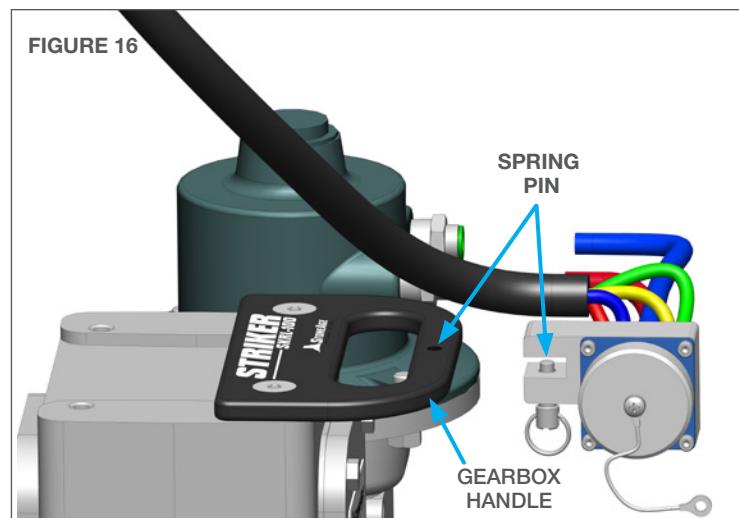


12. Lift up on the Vertical Drive and replace the upper Quick Release Pin. You should hear a click to indicate the drive gear on the Vertical Drive is engaged. **(Figure 15 & 15.1)**

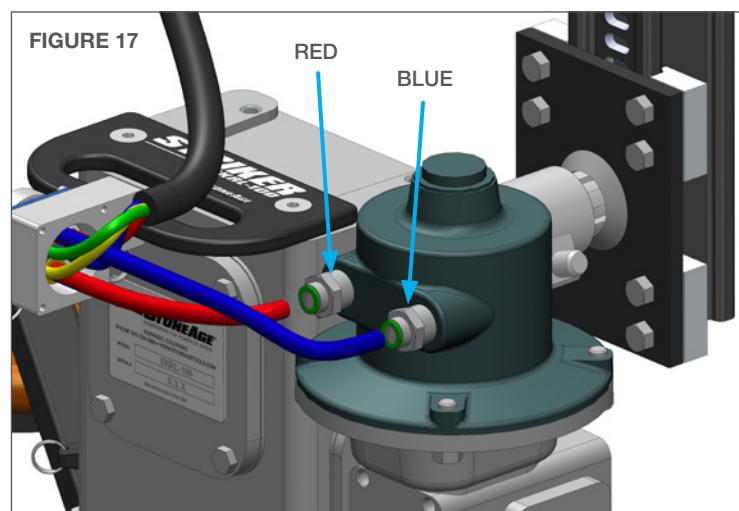


LIGHTWEIGHT STRIKER SET-UP - CONTROL UMBILICAL CONNECTION

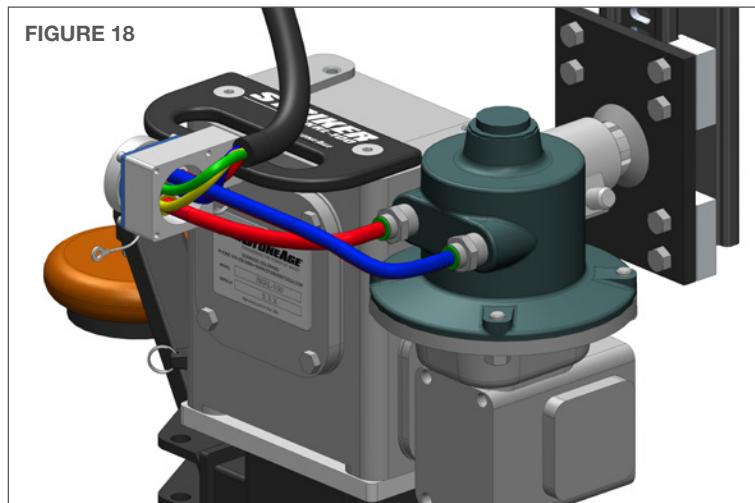
13. Install Socket Mount Plate onto the Gearbox handle. (**Figure 16**). Make sure Spring Pin is fully engaged.



14. Orient and Install Red and Blue tubing to air motor as shown in (**Figure 17**).

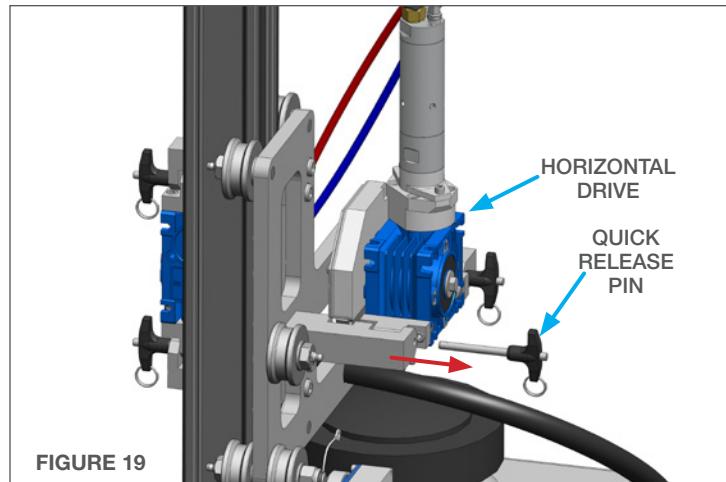


15. The correct orientations are shown in (**Figure 18**).

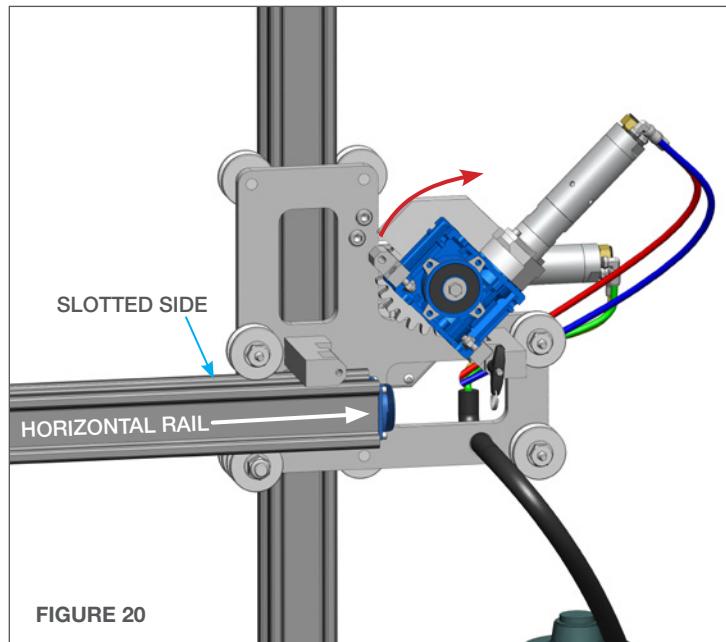


LIGHTWEIGHT STRIKER SET-UP - HORIZONTAL RAIL INSTALLATION

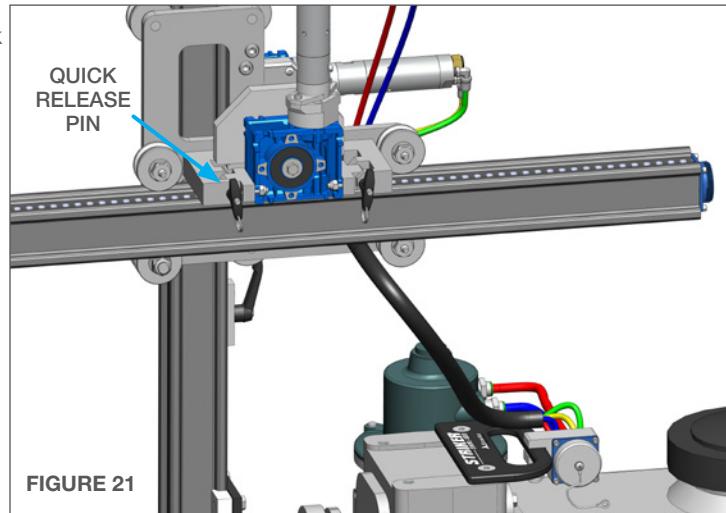
16. Pull the left Quick Release Pin out of the Horizontal Drive Assembly to allow the motor to tilt up. (**Figure 19 & 20**)



17. Slide the Horizontal Rail, socket end first, into the rollers on the Carriage Assembly. Then rock the Horizontal Drive back down onto the rail. (**Figure 20 & 21**)



18. Roll the Horizontal Drive back and forth until you hear a click to indicate he drive gear on the Horizontal Drive. Replace the Quick Release Pin. (**Figure 21**)



LIGHTWEIGHT STRIKER SET-UP - RAIL STOPS AND BALLAST TANK

19. Slide the Rear Stop onto the socket end of the Horizontal Rail and tighten the Quick Release Lever so that it faces away from the Carriage Assembly as shown in **(Figure 22)**

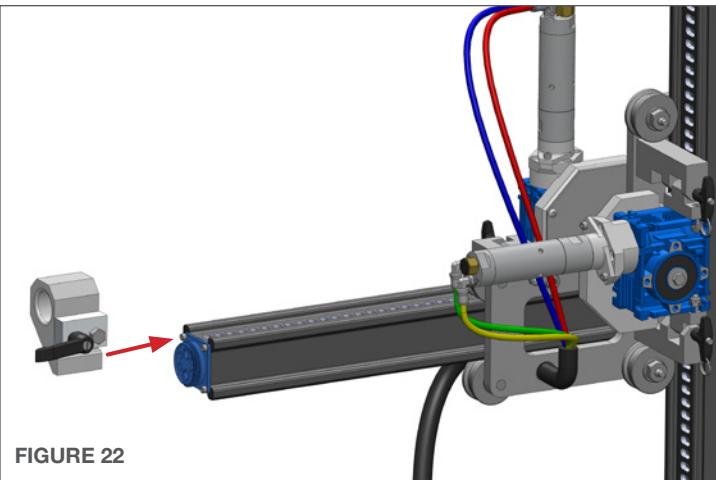


FIGURE 22

20. Slide the BU 152 Rail Stop onto the top of the Vertical Rail and tighten the Quick Release Lever so that it faces up and away from the Carriage Assembly as shown in **(Figure 23)**

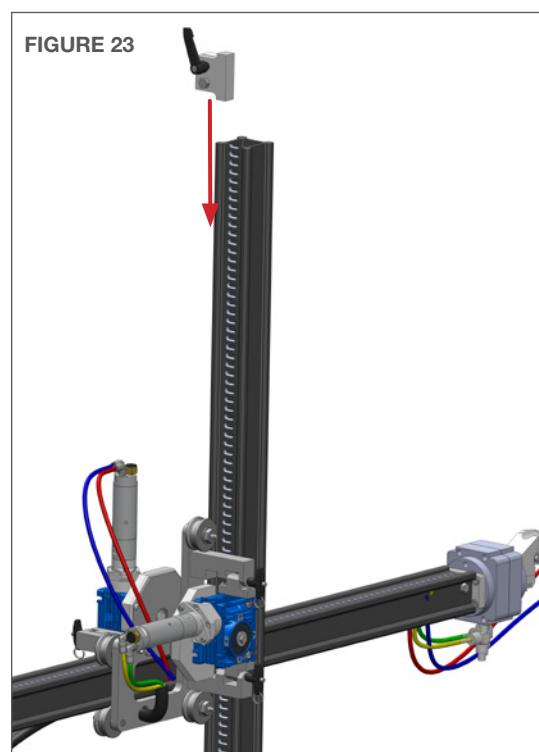


FIGURE 23

21. Place the Ballast Tank onto the Striker Stand as shown in **(Figure 24)**

NOTICE

There are four 2 inch long Quick Release Pins for the legs and two 2.25 inch long Quick Release Pins that attach the Tank. Be sure not to install these incorrectly as they will not securely engage the lock mechanism.

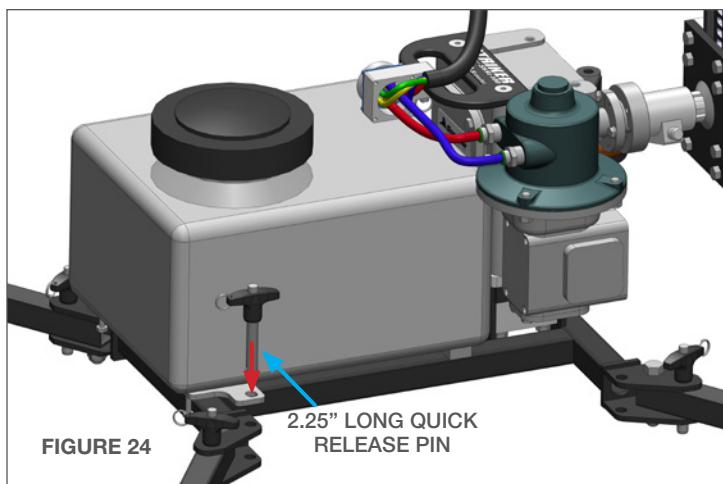


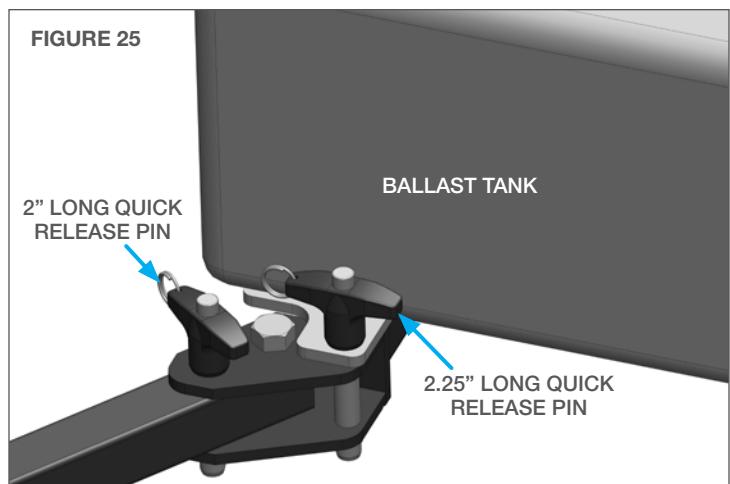
FIGURE 24

LIGHTWEIGHT STRIKER SET-UP - BALLAST TANK AND HIGH PRESSURE HOSE

22. Install the two Quick Release Pins on both sides of the Ballast Tank through the Striker Stand to secure the tank in place. (Figure 25)

NOTICE

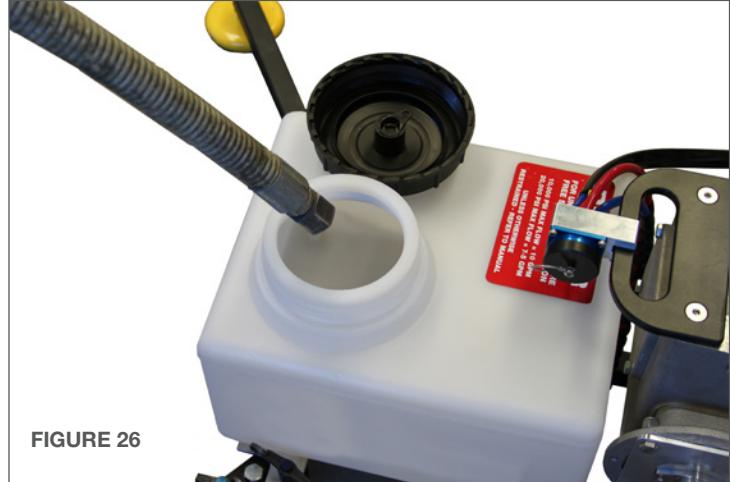
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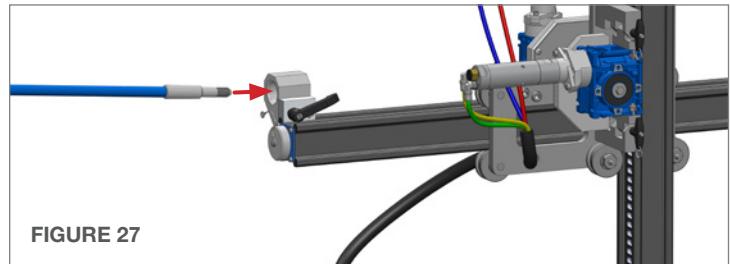
23. Remove the cap on top of the Ballast Tank and fill with water. (Figure 25)

WARNING

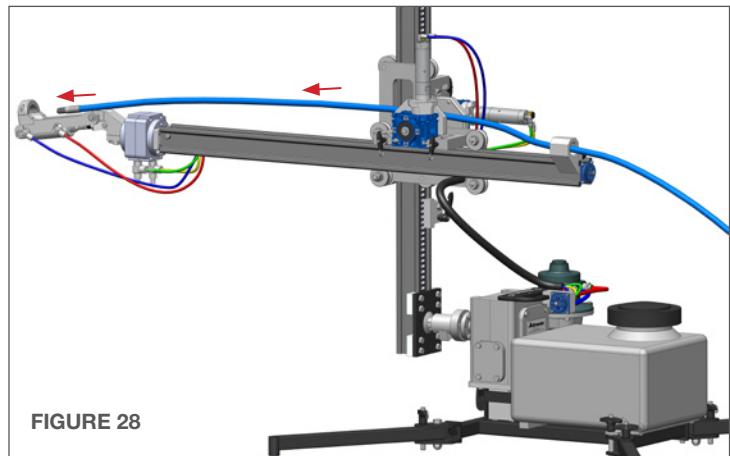
DO NOT OPERATE LIGHTWEIGHT STRIKER WITHOUT A FULL BALLAST TANK. Doing so **could** result in death or serious injury



24. Insert the male end of the High Pressure Hose through the Rear Rail Stop. (Figure 27)



25. Continue to feed the High Pressure Hose between the Horizontal Drive motor and the Carriage Assembly towards the Wrist. (Figure 28)

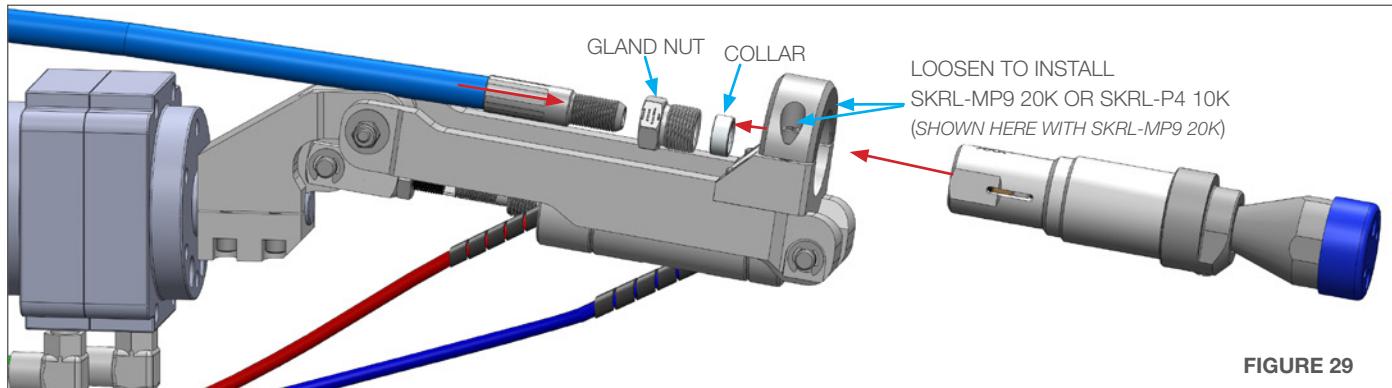


LIGHTWEIGHT STRIKER SET-UP - TOOL AND HIGH PRESSURE HOSE

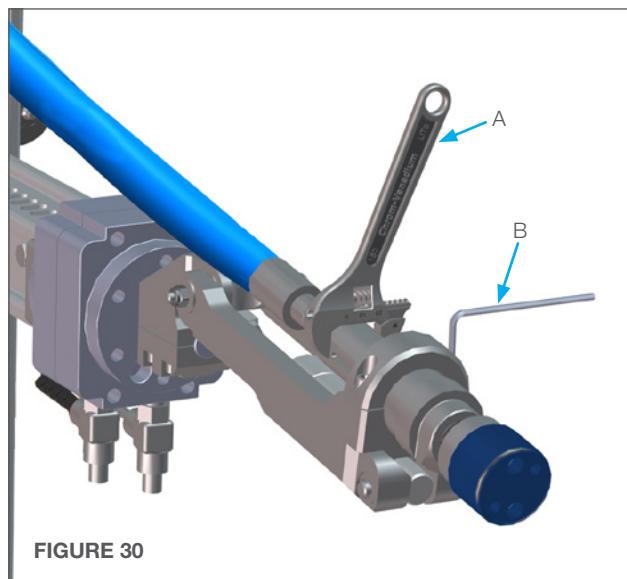
26. Fasten High Pressure Hose to waterblast tool by loosening the two 1/4" square head cap screws and sliding the tool into the holder until the shoulder hits the collar. (**Figure 29 & 30**) The hose end is a 9/16" medium pressure connection, with a modified gland nut and standard collar.

NOTICE

It is recommended to use BLUE GOOP, A SWAGELOK brand anti-seize, or an equivalent on threaded fittings to avoid galling.

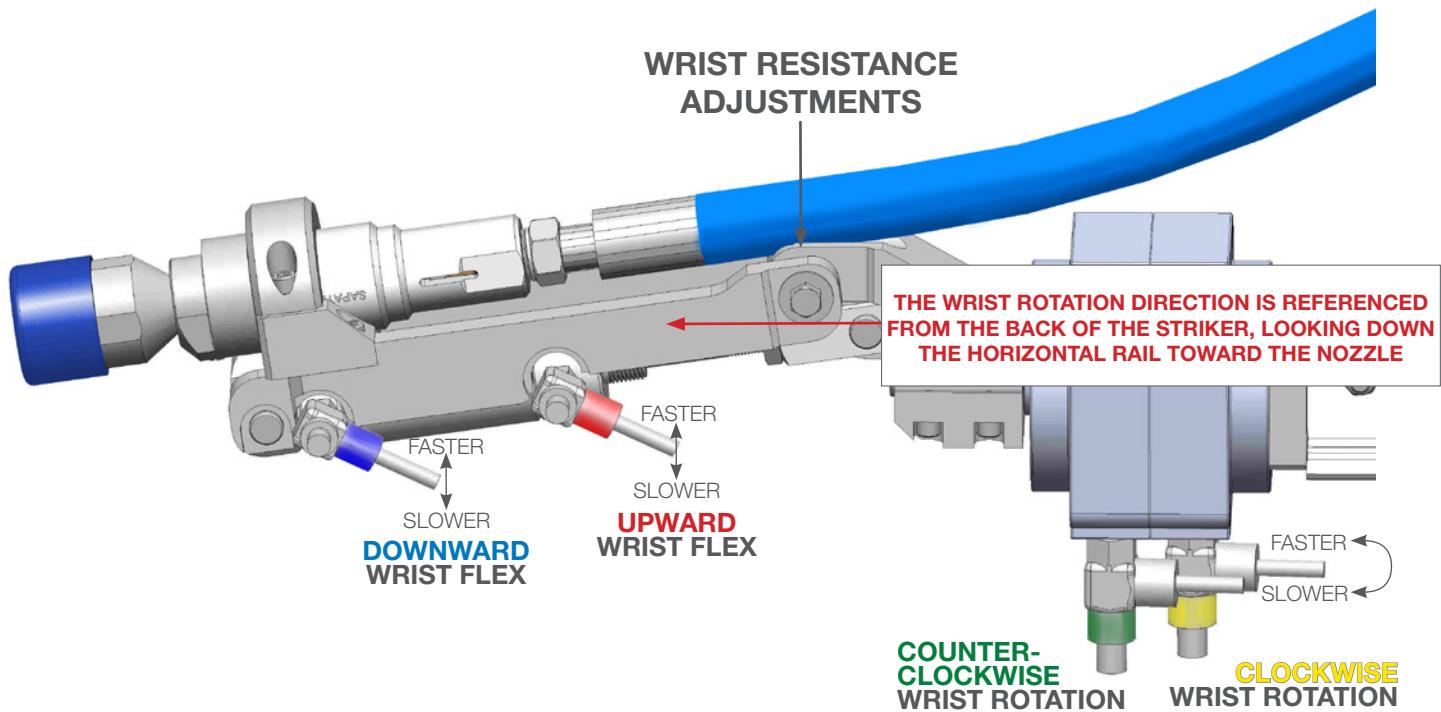


27. Tighten Wrist Clamp to Tool with Allen wrench. (**Figure 30**)

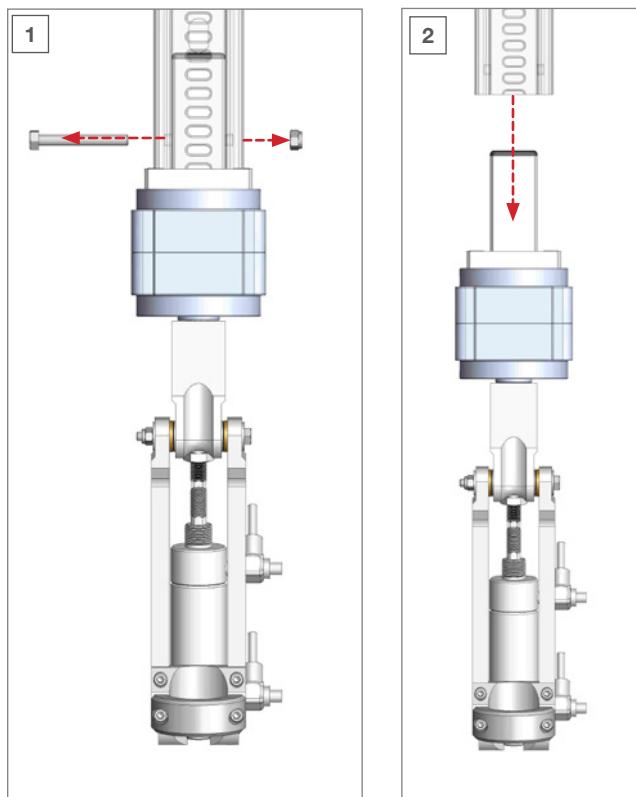


LIGHTWEIGHT STRIKER SET-UP - WRIST SPEED AND RESISTANCE ADJUSTMENTS

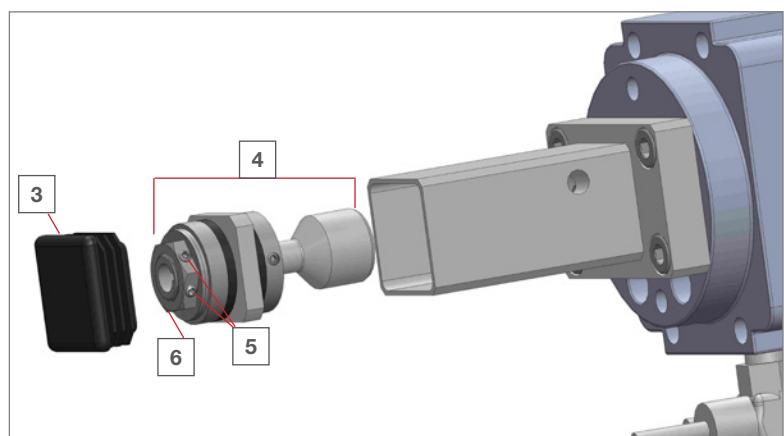
WRIST SPEED CONTROL ADJUSTMENTS



WRIST RESISTANCE ADJUSTMENTS

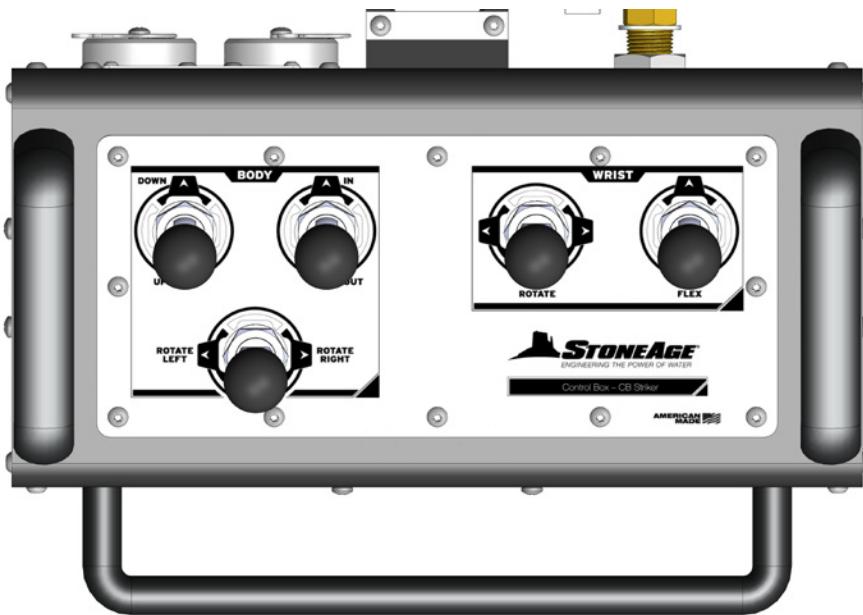


1. Remove Bolt and Lock Nut From the Rail and Wrist Assembly.
2. Pull the Wrist Assembly free of the Rail.
3. Remove the black plastic end cap from the end of the Wrist Assembly.
4. Remove the Friction Torque Limiter and Shaft
5. Loosen set screws.
6. Adjust nut to the left for less resistance and tighten to the right for increased resistance.

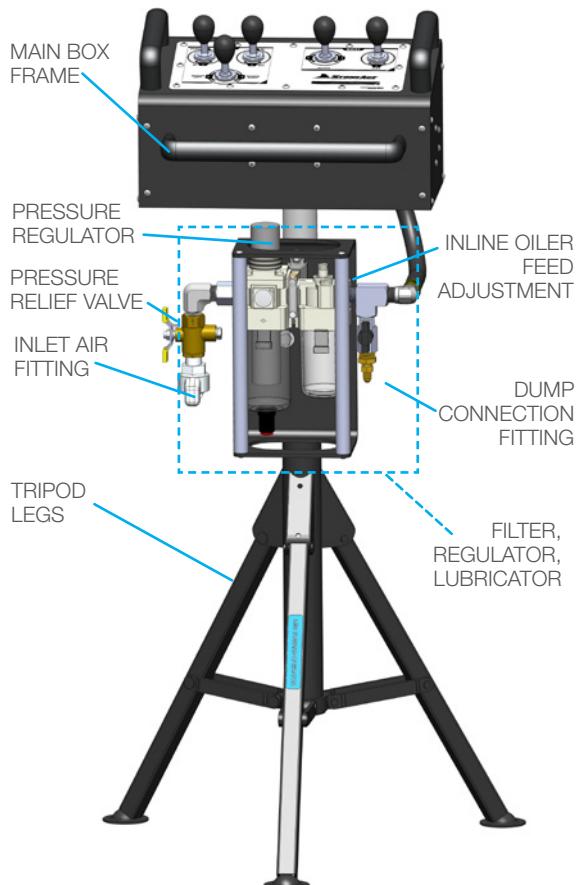


CONTROL BOX - OVERVIEW

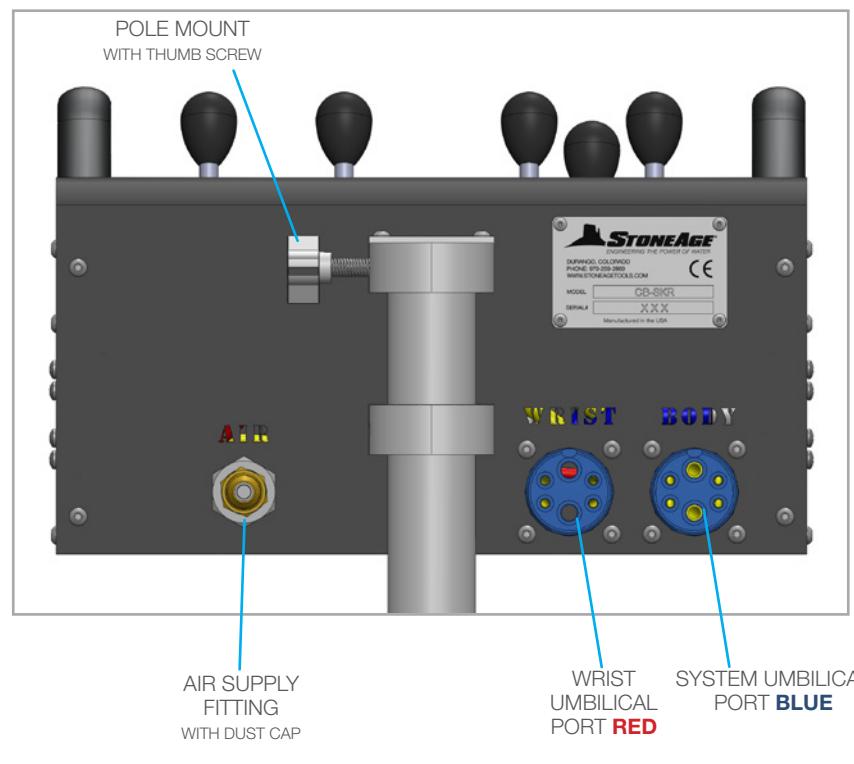
CONTROL BOX
TOP VIEW



CONTROL BOX
FRONT VIEW



CONTROL BOX
REAR VIEW



CONTROL BOX - ASSEMBLY

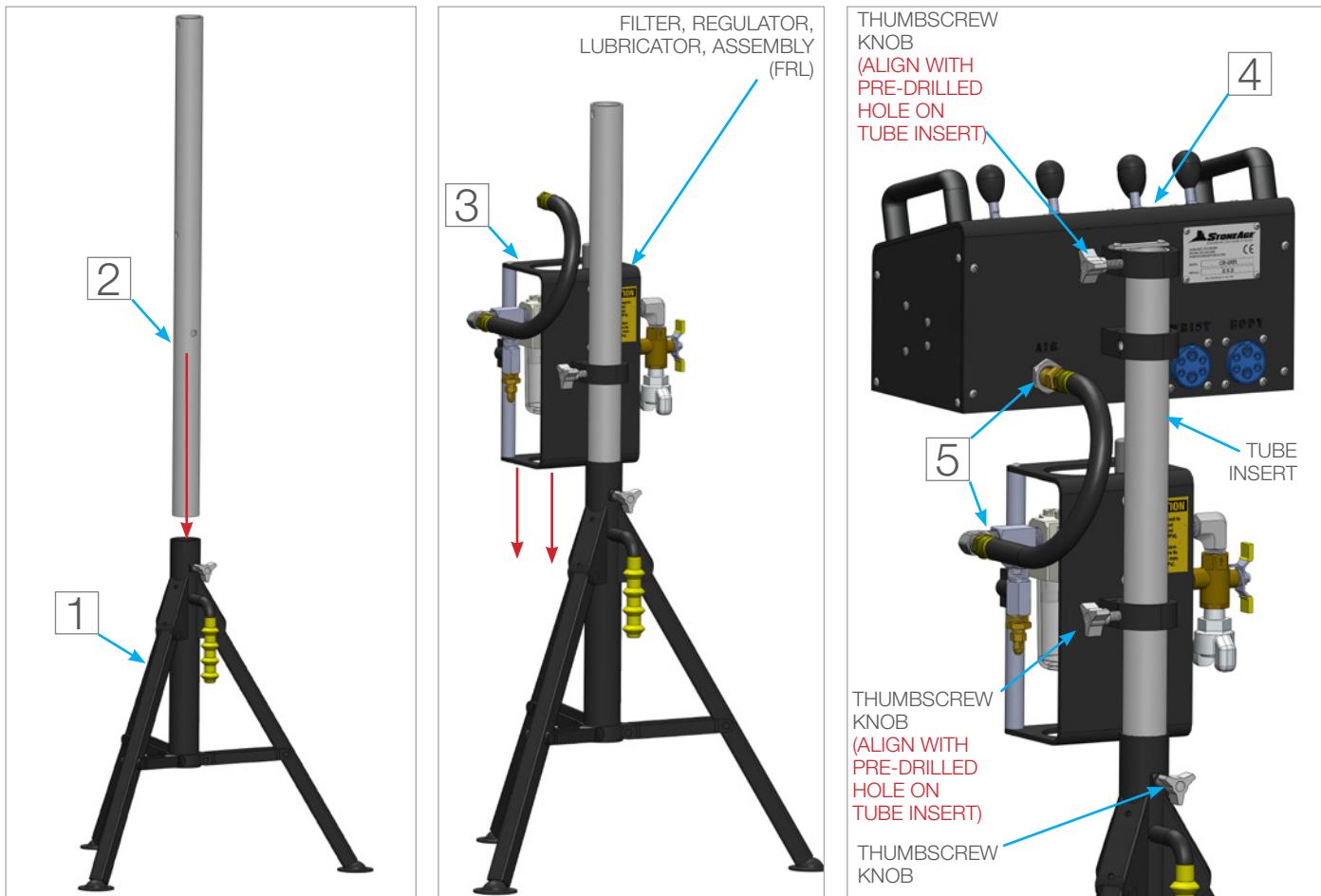
ASSEMBLE CONTROL BOX, FRL, AND TRIPOD BASE

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

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

NOTICE

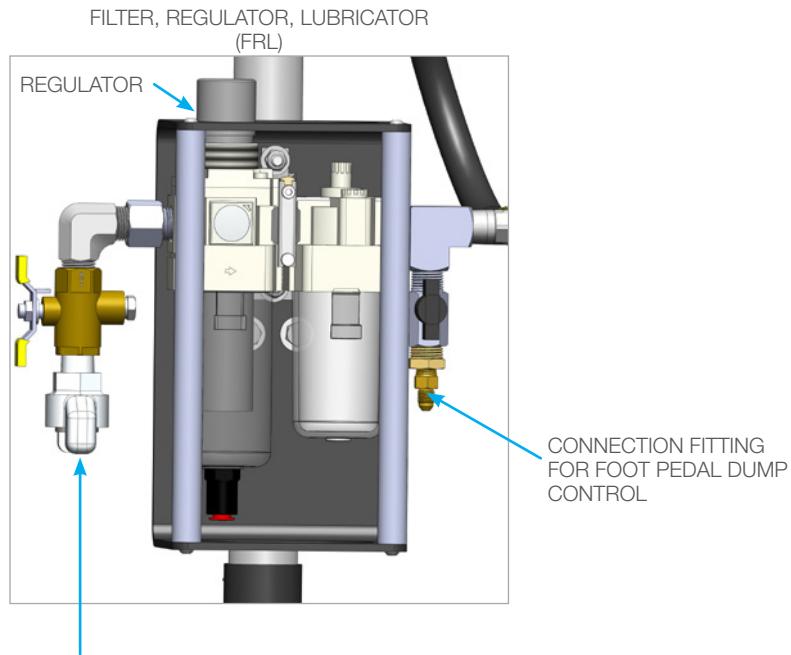
The vertical tube has a hole through one wall that the thumbscrew must engage.



CONTROL BOX AIR SUPPLY FITTING

AIR SUPPLY AND LUBRICATOR SETTING

- The Control Box is supplied with a twist claw style inlet coupling (Chicago style) located on the side of the FRL Assembly. Connect a compatible compressed air line (not included) according to the Manufacturer's instructions. If another pneumatic connection is preferred, this fitting can be removed and any male 1/2 in. NPT fitting may be used.
- Using the regulator adjust the operating pressure to 110 psi (0.76 MPa) for the application.

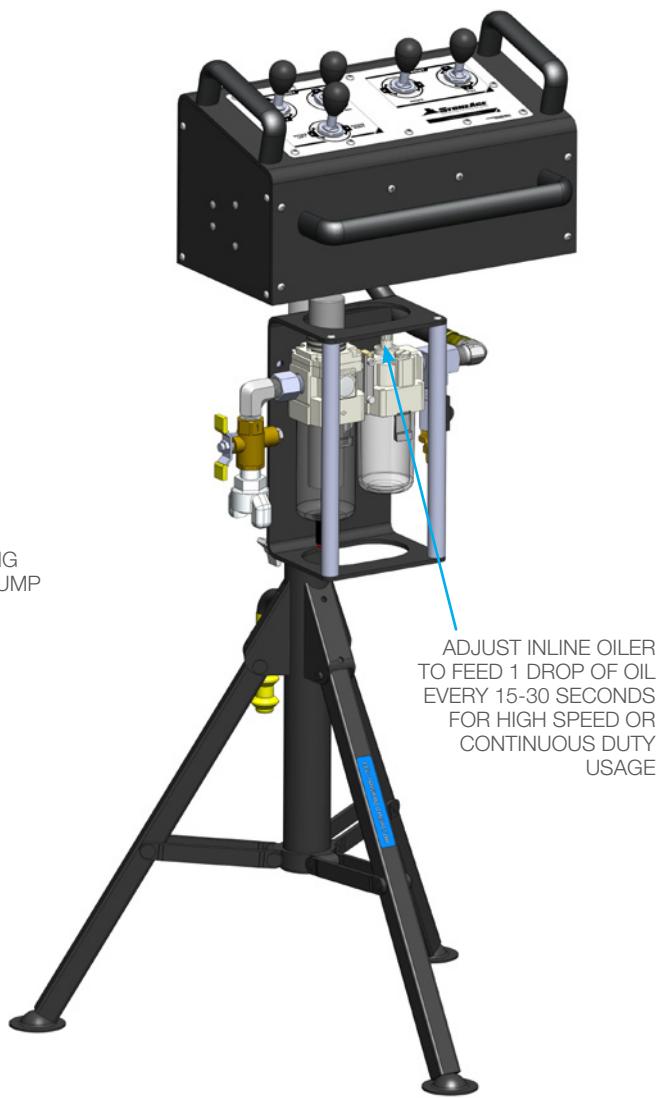


AIR SUPPLY FITTING

A universal **AIR SUPPLY FITTING** (Chicago style) is located on the side of the FRL. Connect a compatible compressed air line (not included) according to the manufacturer's instructions. If another pneumatic connection is preferred, this fitting can be removed and any male 1/2 in. NPT fitting may be used.

WARNING

Minimum operating pressure is 80 psi (0.55 MPa). Maximum operating air pressure is 100 psi (0.7 MPa). Exceeding 125 psi (0.86 MPa) supply pressure may result in injury to the Operator and/or damage to the equipment.



PNEUMATIC FOOT PEDAL DUMP CONTROL

NOT INCLUDED IN THE LIGHTWEIGHT STRIKER™ PACKAGE

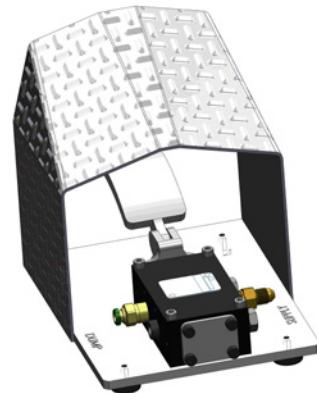
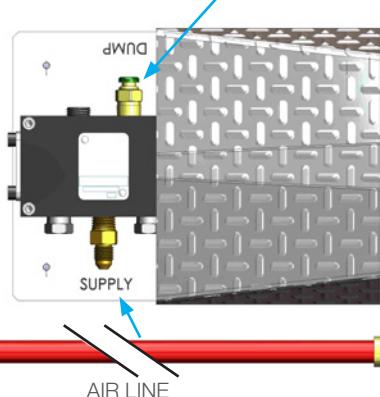
An optional Pneumatic Foot Pedal Dump Control with Air Line package is available for purchase through StoneAge Tools®.

To install the Pneumatic Foot Pedal Dump Control package, connect one end of the Air Line to the fitting on the Foot Pedal Dump marked "SUPPLY" and the other end to the Connection Fitting on the Control Box (See diagram above).

To connect to the Dump Valve, the Operator will need to install 1/4 in. O.D. Nylon tubing (Not Included in the FPA-SKR package) between the push fitting on the Foot Pedal Dump marked "DUMP" and the pneumatic dump valve.



INSTALL 1/4 IN. O.D. TUBING
(NOT INCLUDED IN THE FPA-SKR
PACKAGE)

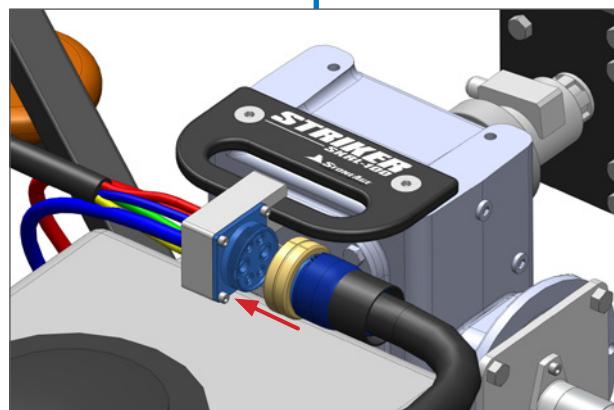
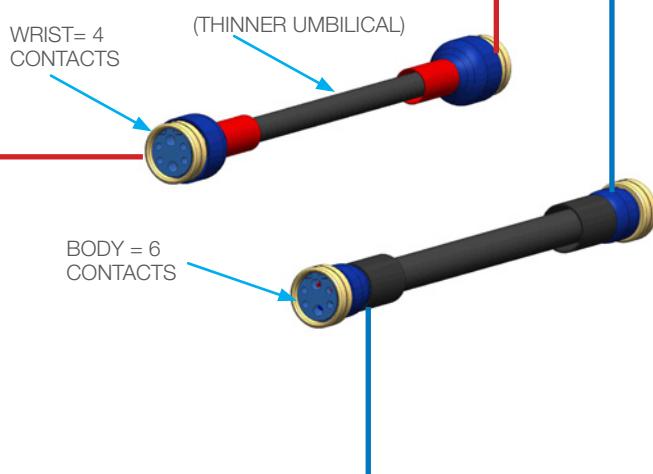
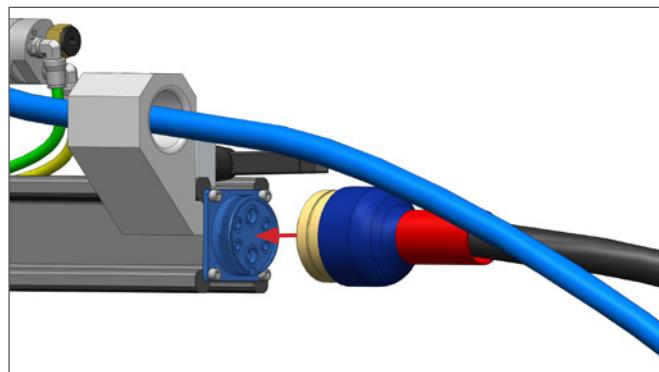
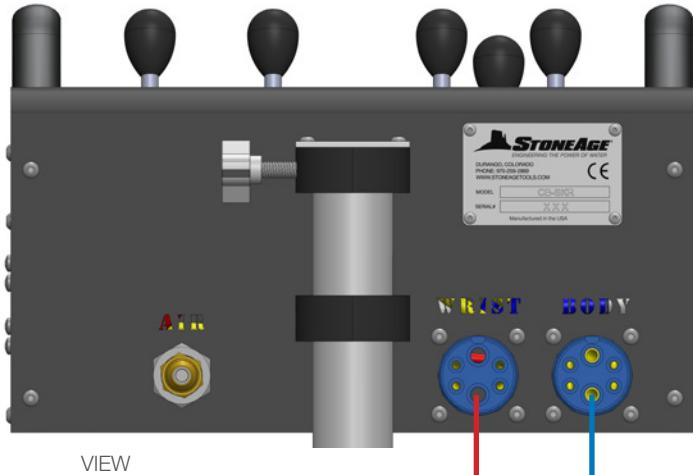


CONTROL BOX TO LIGHTWEIGHT STRIKER CONNECTION

PNEUMATIC SUPPLY LINE CONNECTIONS

1. Remove the dust caps from both sockets on the Control Box and the Lightweight Striker Assemblies.
2. Connect the Lightweight Striker to the Control Box by screwing the red umbilical onto the socket marked "Wrist" and the blue umbilical into the socket marked "Body". Verify the Control Box rotates, flexes, raises, and lowers, the wrist and rotates the assembly left and right correctly.
3. Familiarize yourself with the Control Box functions by hooking up to air, before operating the Lightweight Striker with high pressure water.

 BODY = 6 CONTACTS  WRIST= 4 CONTACTS



CONTROL BOX

- There are three levers that control the **BODY** of the LIGHTWEIGHT STRIKER™ (SKRL-100).
 - The **IN/OUT LEVER** will move the Horizontal Rail Assembly in the In (extending) and Out (retracting) directions.
 - The **UP/DOWN LEVER** will move the Carriage Assembly Up and Down the Vertical Rail Assembly.
 - The **ROTATE LEFT/RIGHT LEVER** will rotate the Vertical Rail Assembly from the Spline at the bottom in a windshield wiper motion.
- There are two levers that control the **WRIST** of the LIGHTWEIGHT STRIKER™ (SKRL-100).
 - The **ROTATE LEVER** rotates the SKRL-MP9 20K OR SKRL-P4 10K tool from the Wrist in a maximum 270° radius. **NOTE: The Horizontal Rail is slotted on top and bottom to allow the center of the Wrist rotation point to be pointed upward or downward.**
 - The **FLEX LEVER** flexes the SKRL-MP9 20K OR SKRL-P4 10K tool 90° from the Wrist.
- The **WRIST** speed controls are located on the wrist at the end of the Horizontal Rail Assembly. The wrist will operate differently while it is under high pressure water versus operating with air only. See the Wrist Speed and Resistance Adjustment page in this manual to adjust the wrist settings.
- The **OFF** position for all levers is at the spring centered middle position.
- To de-energize the system, remove foot from the **PNEUMATIC FOOT PEDAL DUMP CONTROL**. This will stop the Carriage Assembly and SKRL-MP9 20K OR SKRL-P4 10K tool from moving and reroute the high-pressure water away from the LIGHTWEIGHT STRIKER™ (SKRL-100).

WARNING

Crush Hazard. Keep hands, hair, and clothing, clear of Carriage Rollers, Wrist joints, Spline Hub, and out of all travel limit zones. Contact with moving parts can result in severe injury

DANGER

STAY BEHIND THE VERTICAL RAIL ASSEMBLY AND OUT OF THE SPRAY ZONE WHEN OPERATING THE TRACKED STRIKER. Failure to do so **will** result in death or serious injury.

TEST RUN PROCEDURE

- Perform the **PRE-RUN SAFETY CHECK (SEE PAGE 7)**.
- Test the Control Box before operating the LIGHTWEIGHT STRIKER™ (SKRL-100) with high-pressure water to verify the control valves move the Horizontal and Vertical Rail Assemblies in their intended directions, and the **PNEUMATIC FOOT PEDAL DUMP CONTROL** is working properly. Ensure that the High Pressure Water System cannot be energized while making adjustments.
- Operate the high-pressure water at full pressure and use the **PNEUMATIC FOOT PEDAL DUMP CONTROL** to verify that the dump valve is working properly. To activate dump, remove foot from the pedal.
- Operate the high-pressure system and waterjet tool at full pressure to test the Speed and Resistance settings on the Wrist. Properly setting up the Wrist will provide good control of the SKRL-MP9 20K OR SKRL-P4 10K tool in Rotation and Flex directions. Detailed adjustment instructions can be found on the Wrist Speed and Resistance Adjustment page in this manual.
- The LIGHTWEIGHT STRIKER™ (SKRL-100) has been engineered to stay in position with a maximum reaction force of 55 lbs when all outriggers are deployed. The LIGHTWEIGHT STRIKER™ (SKRL-100) may slide on smooth, oily, or slippery surfaces during operation. Anchoring the LIGHTWEIGHT STRIKER™ (SKRL-100) to the floor, heavy duty scaffolding, or similar components will aid in keeping the unit in position. The anchoring method MUST be capable of withstanding a minimum of 55 lbs of reaction force from the LIGHTWEIGHT STRIKER™ (SKRL-100). Operate the high-pressure hose and waterjet tool at full pressure to test the anchoring method.

RUN PROCEDURE

- After completing the setup, and taking all safety precautions the LIGHTWEIGHT STRIKER™ (SKRL-100) system is ready for operation.
- Ensure the LIGHTWEIGHT STRIKER™ (SKRL-100) is lined up with the job rail assembly and the rotate and flex functions on the Wrist, to begin high pressure cleaning at the preferred location.
- The LIGHTWEIGHT STRIKER™ (SKRL-100) MUST be supervised at all times.

HIGH-PRESSURE HOSE

- The LIGHTWEIGHT STRIKER™ (SKRL-100) is designed to be used with a 12ft (3658 mm) SPIR STAR® HP 8mm Hose and SPIR STAR® standard 9/16"-18 Medium Pressure 8-4 male end at the SKRL-MP9 20K OR SKRL-P4 10K and a SPIR STAR® 3/4"-16 Type M Swivel Female End at the coupler on the STRIKER assembly.
- 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 through the Carriage Assembly.
- Inspect high-pressure hoses for damage or wear before each use. Do not use damaged or worn high-pressure hose.

MAINTENANCE

MAINTENANCE		
Maintenance Item	Frequency	Maintenance Required
All Air Fittings	After each use	Reinstall all dust caps to protect from dirt and moisture.
Carriage rollers	Every 100 Hours of use	Lubricate Zerks on all Carriage Rollers using any multipurpose NLGI 2 grease.
Gearbox oil level	Every 100 Hours of use	The SKR 302 gearbox (and all electra gear -EG gearboxes) are factory filled with synthetic oil and should only be changed when performing maintenance that requires gearbox disassembly. It is recommended to check the oil level periodically. If the oil level is low or there is evidence of leaking, add proper lubrication through the fill port until it comes out the oil level plug port. Fill with ISO Viscosity Grade 460 polyglycol (PAG) lubricant; specifically Mobil Glygoyle 460 polyglycol (PAG) lubricant. Motovario gear boxes like the LWP 550 are factory filled with lubricant for the life of the gearbox and have no fill ports.
Lubricator of Control Box	Before each use	Add oil when fluid drops below minimum level marking. Use SAE#10 or ISO VG32 Tool Oil (StoneAge Part Number GP 041). Using oils that are not intended for air tool systems may cause malfunction and/or component damage.
Vertical and Horizontal Rails	As Needed	Inspect for wear that would allow Carriage Rollers to slip off. Replace Rail as needed.
Waterblast Tool	After each use	Remove tool, lubricate and store in clean container.

Contact StoneAge for Safety Data Sheets for material usage, a complete list of spare part numbers, and service instructions for the LIGHTWEIGHT STRIKER™ (SKRL-100) and Control Box.

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Loctite® and Threadlocker Blue 242® are registered trademarks of Henkel AG & Co. KGaA.

Blue Goop® is a registered trademark of Swagelok® Company

STORAGE, TRANSPORTATION, AND HANDLING

The LIGHTWEIGHT STRIKER™ (SKRL-100) is designed to be disassembled into six pieces, each piece weighing under 50 lbs. Pull the two quick release pins on the water tank, tilt it over, and empty it before moving. When breaking down the assembly for storage, be sure to lift each piece with care to prevent bodily injury.

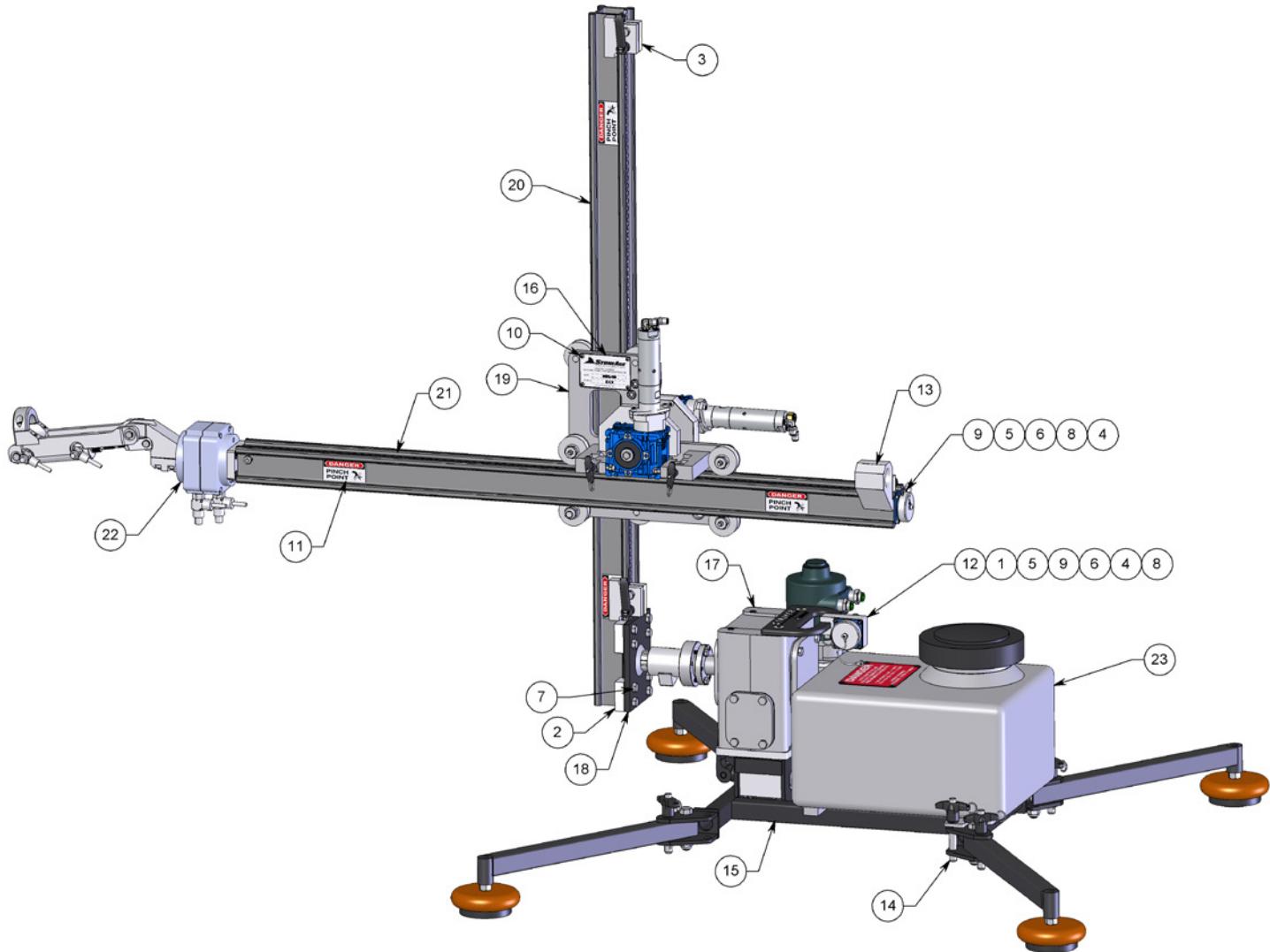
When storing the assembly , use compressed air to blow out the air lines to remove debris and moisture. Use mild soapy water to clean the machine in order to remove corrosive materials.

Apply a small amount of air tool oil directly into the forward and reverse fittings. Then, briefly operate the controls at slow speed for a short duration in each direction to coat the interior parts of the motor. Install the dust caps onto all three fittings to keep moisture and dirt out.

Install dust caps on both the Control Box and the LIGHTWEIGHT STRIKER™ (SKRL-100) blue, Twintec umbilical connections.

The LIGHTWEIGHT STRIKER™ (SKRL-100) is shipped in a custom wooden crate and may be stored upright in the same crate between jobs.

LIGHTWEIGHT STRIKER™ (SKRL-100)
LIGHTWEIGHT STRIKER ASSEMBLY



1. APPLY TEFLON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS
2. ADD BLUE LOCTITE 242 OR EQUIVALENT TO ALL THREADED HARDWARE.
3. ADD SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS AND TAPERED SPLINE HUB.

#	PART NUMBER	QTY.
1	ABX 566-001 SPRING PLUNGER ASSY	1
2	BR 060 RAIL CLAMP	4
3	BU 152 RAIL STOP ASSY	2
4	CB 430 LANYARD ASSY BOX	2
5	CB 452.2 FTG TWINTEC SOCKET	2
6	CB 459 SOCKET COVER	2
7	GB 337-04 BOLT, HEX .37-16 X 1.00 SS	8
8	GMS 319-015-32 PHMS .19-32X.38 LG PH-SS	2
9	GS 316-015 SHCS .16-32 X .38 SS	8
10	GSB 313-0075 BHCS 6-32 X .188 LG SS	4
11	PL 160 PINCH POINT 1.5X3.0 DECAL	8

12	SKR 188 QD HANGER	1
13	SKR 250 REAR STOP W HOSE GUIDE	1
14	SKR 335 QR PIN, T-HANDLE .50 X 2.25	2
15	SKRL 110 BASE ASSEMBLY	1
16	SKRL 139 SERIAL PLATE	1
17	SKRL 140 GEARBOX ASSY	1
18	SKRL 150 BASEPLATE WELDMENT	1
19	SKRL 160 CARRIAGE ASSY	1
20	SKRL 180-48 BOX RAIL, 2.5 SLOTTED, 48 IN VT	1
21	SKRL 182-46 BOX RAIL, 2.5 DUAL SLOTTED, 46IN HZ	1
22	SKRL 183 WRIST ASSEMBLY	1
23	SKRL 191 WATER TANK ASSY	1

PARTS DIAGRAM

**LIGHTWEIGHT STRIKER™ (SKRL 110)
BASE ASSEMBLY**

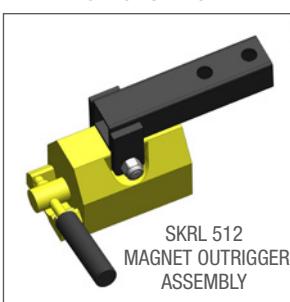


SCAFFOLD MOUNTING OPTION
SEE SEPARATE PART DIAGRAM
PAGE FOR SKRL 501



SKRL 501
DOWNRIGGER
ASSEMBLY

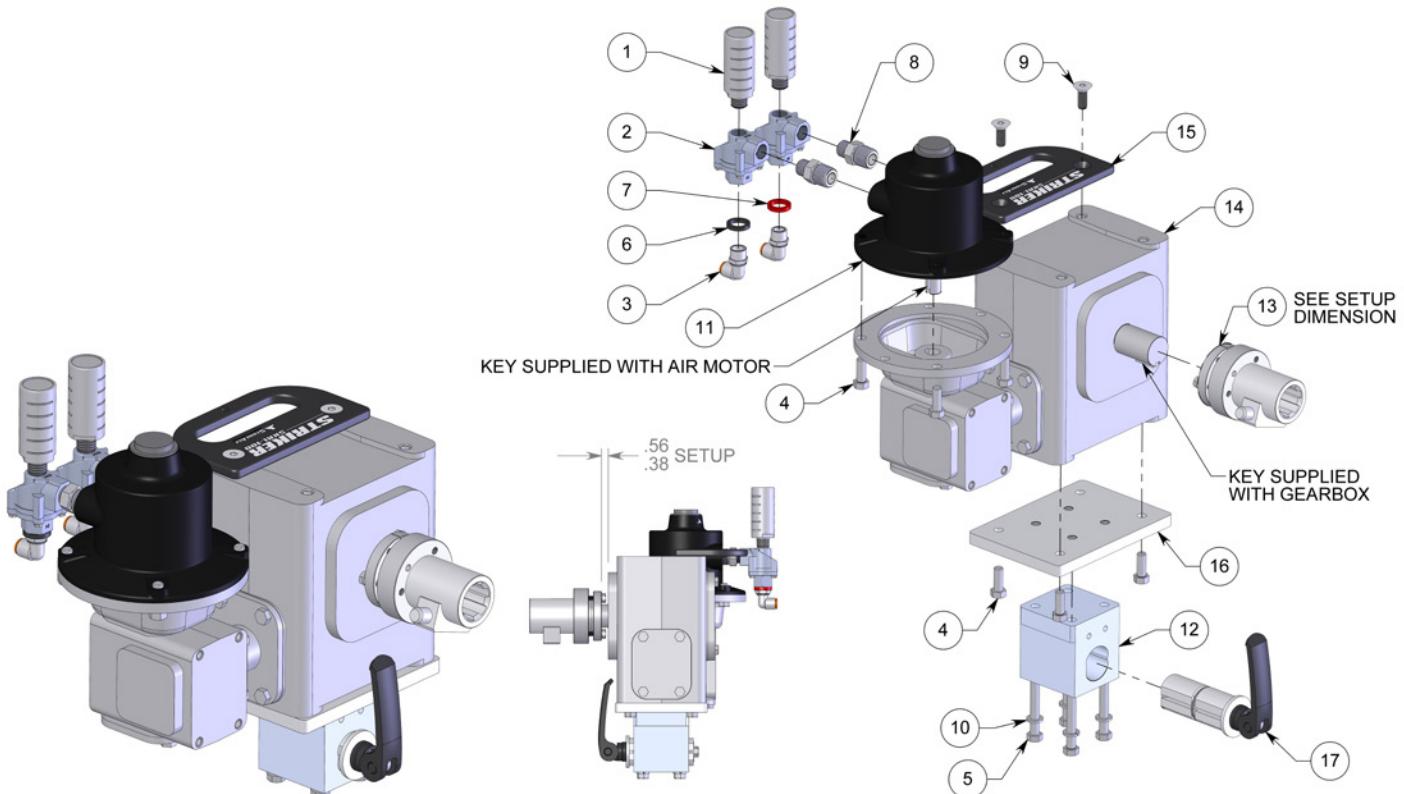
METAL GRATE MOUNTING OPTION
SEE SEPARATE PART DIAGRAM
PAGE FOR SKRL 512



SKRL 512
MAGNET OUTRIGGER
ASSEMBLY

#	PART NUMBER	QTY.
1	GB 350-10 BOLT, HEX .50-13 X 2.50 SS (HC 098)	4
2	GN 350-H HEX NUT SS	4
3	GN 350-L NYLOK NUT SS	4
4	SKR 330 FOOT, OUTRIGGER	4
5	SKR 331-001 STUD .5 X 2.5	4
6	SKRL 115 OUTRIGGER BASE WELDMENT	1
7	SKRL 120 OUTRIGGER WELDMENT	4
8	SKRL 130 QR PIN, T-HANDLE .50 X 2.00	4

LIGHTWEIGHT STRIKER™ (SKRL 140)
GEARBOX ASSEMBLY

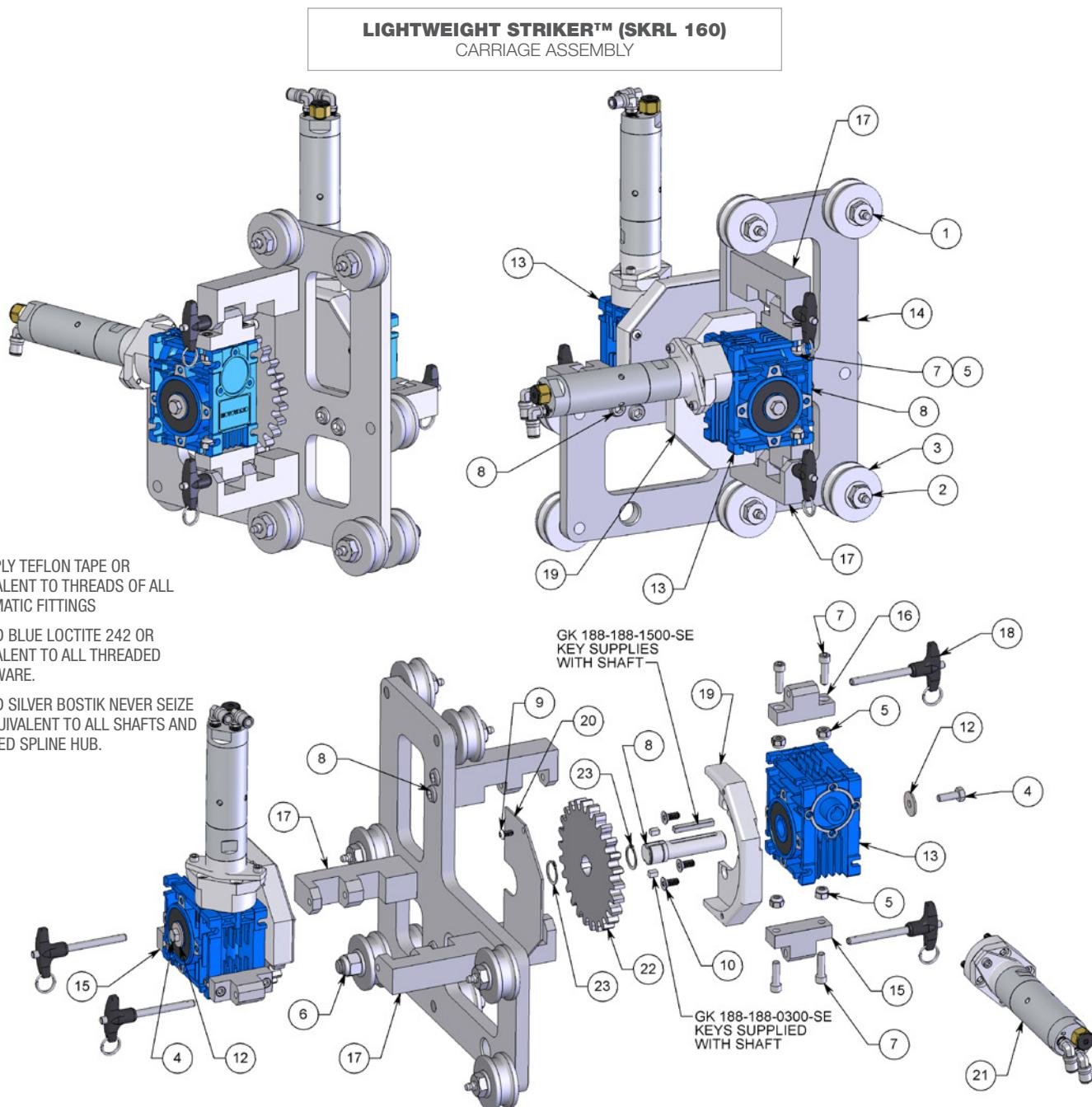


1. APPLY TEFLOON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS
2. ADD BLUE LOCTITE 242 OR EQUIVALENT TO ALL THREADED HARDWARE.
3. ADD SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS AND TAPERED SPLINE HUB.

#	PART NUMBER	QTY.
1	ABX 383 SILENCER, P6	2
2	CB 011-001 QUICK EXHAUST VALVE, P6	2
3	CB 352 FTG, ELBOW SWIVEL 90 P6M PL6	2
4	GB 337-04 BOLT, HEX .37-16 X 1.00 SS	8
5	GB 337-16 BOLT, HEX .37-16 X 4.00 SS	4
6	GP 011-BK BLACK ID BAND MED	1
7	GP 011-R RED ID BAND MED	1
8	GP 255-P8MP6M ADAPTER	2

9	GSF 337-04 FHCS .37-16 X 1.00 SS	2
10	GW 337-L LOCK WASHER SS	4
11	LM 016-4 AIR MOTOR	1
12	LP 095-001 CORNER POST	1
13	SKR 270 SPLINE HUB WELDMENT	1
14	SKRL 141-001 GEARBOX	1
15	SKRL 144 GBX HANDLE	1
16	SKRL 145 GBX MOUNT PLATE	1
17	SKRL 146 WEDGE BOLT	1

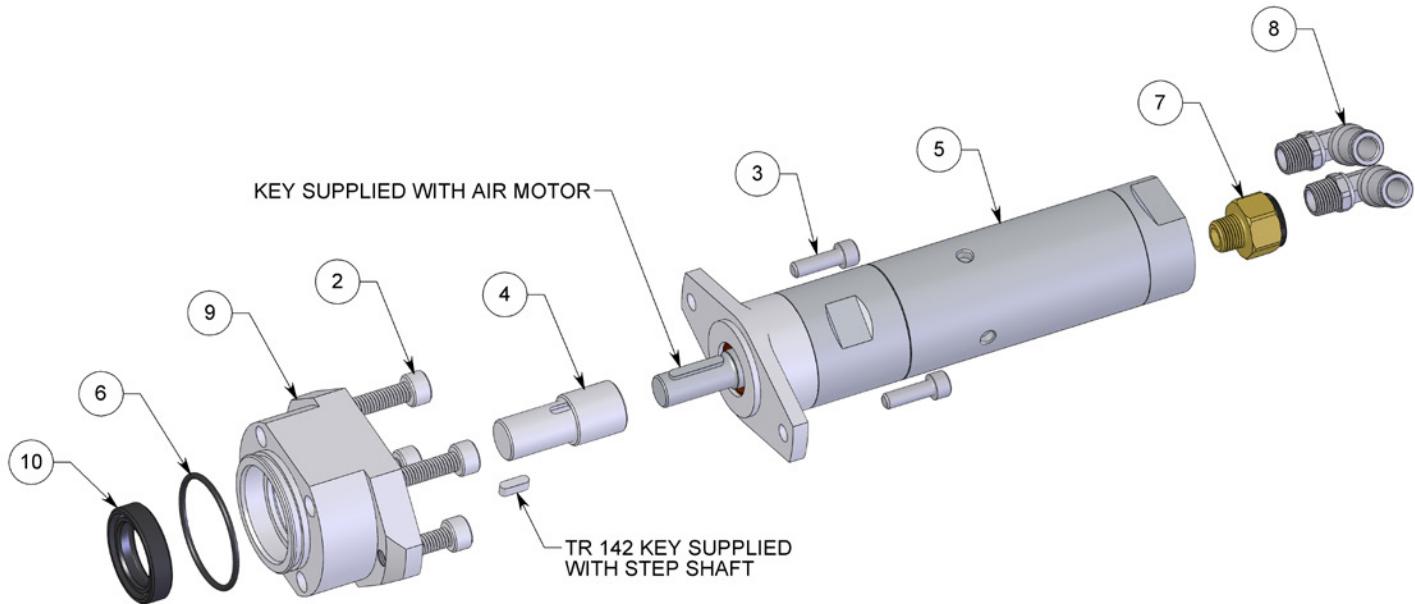
PARTS DIAGRAM



#	PART NUMBER	QTY.
1	BR 052-1.5 AXLE-ZERK	6
2	BR 052-3.25 AXLE-ZERK	1
3	BR 055 ROLLER ASSY	8
4	GB 325-03 BOLT, HEX .25-20 X .75 SS	2
5	GN 325-L NYLOK NUT SS (TB 044.1)	8
6	GN 350-L NYLOK NUT SS	1
7	GS 325-035 SHCS .25-20 X 0.88 SS	8
8	GS 337-04 SHCS .37-16 X 1.00 SS	8
9	GSB 319-015 BHCS .19-24 X .38 LG SS	4
10	GSF 3M6-14-1.00 FHCS M6X1.00X14 SS	6
11	LWP 509 MOTOVARIO SHAFT	2

12	LWP 516 WASHER, OVERSIZED	2
13	LWP 550 MOTOVARIO NMRV030301600_625IN	2
14	SKRL 161 CARRIAGE PLATE	1
15	SKRL 164 GBX PIVOT TEE, SLOTTED	2
16	SKRL 165 GBX PIVOT TEE	2
17	SKRL 166 GBX PIVOT MOUNT BLOCK	4
18	SKRL 170 PIVOT PIN 2.00	4
19	SKRL 175 GEAR COVER	2
20	SKRL 176 GEAR COVER PLATE	2
21	SKRL 177 AIR MOTOR ASSY	2
22	SRT 520 SPUR GEAR SS (6 DP, 14.5 PA, 26 T)	2
23	SRT 537 RETAINING RING, SS EXTERNAL	4

LIGHTWEIGHT STRIKER™ (SKRL 177)
AIR MOTOR ASSEMBLY



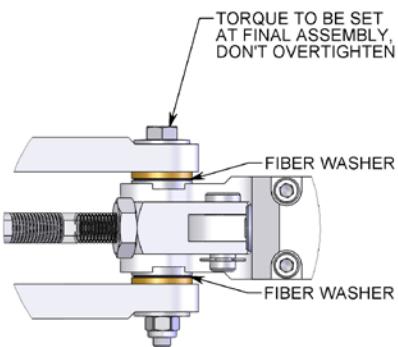
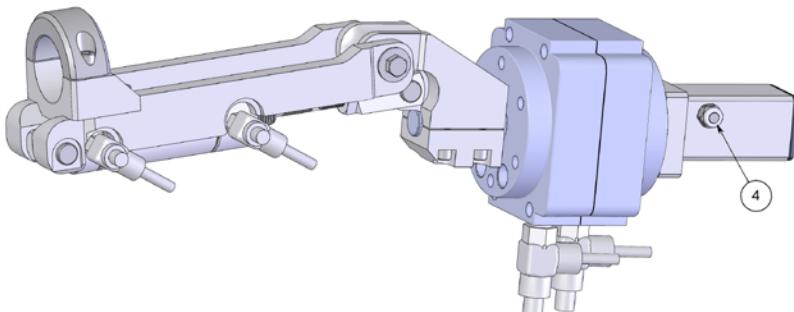
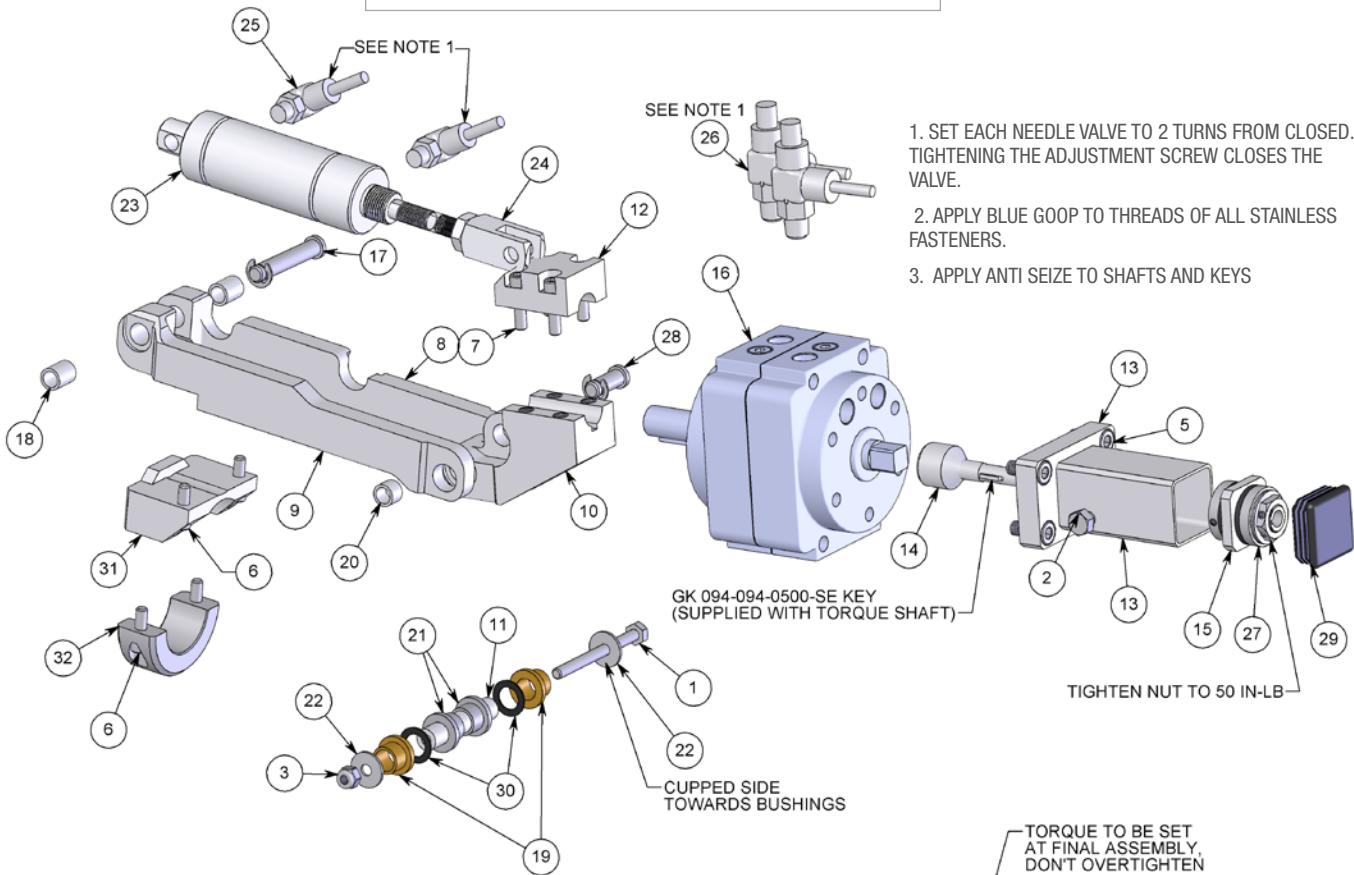
1. APPLY TEFILON TAPE OR EQUIVALENT TO THREADS OF ALL PNEUMATIC FITTINGS
2. ADD BLUE LOCTITE 242 OR EQUIVALENT TO ALL THREADED HARDWARE.
3. ADD SILVER BOSTIK NEVER SEIZE OR EQUIVALENT TO ALL SHAFTS AND TAPERED SPLINE HUB.

#	PART NUMBER	QTY.
1	GK 125-125-0375-RE KEY (TR 142)	1
2	GS 3M6-30-1.0 SHCS M6X1.0 X 30 SS	4
3	GS 319-025 SHCS .19-24 X .62 SS	2
4	LWP 510-001 STEP SHAFT	1
5	LWP 520-001 AIR MOTOR	1
6	LWP 538 O-RING	1
7	LWP 557 EXHAUST PROTECTOR, P2M	1
8	SKR 382 FTG, ELBOW SWIVEL 90 P2MPL4	2
9	SKRL 179 MOTOR MOUNT HUB	1
10	SL 010 SEAL	1

PARTS DIAGRAM

LIGHTWEIGHT STRIKER™ (SKRL 183)

WRIST ASSEMBLY

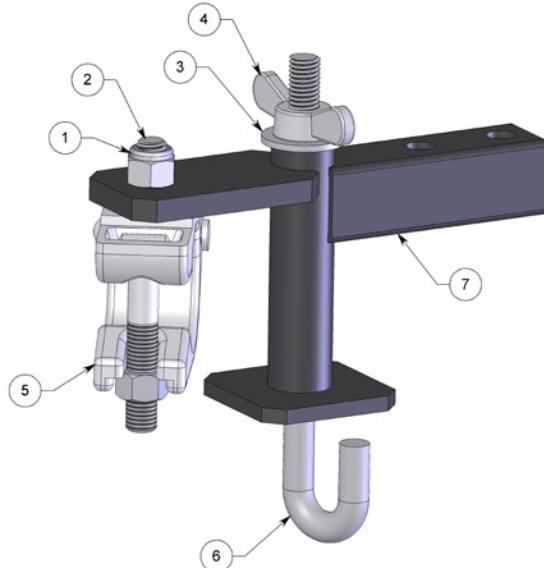


#	PART NUMBER	QTY.
1	GB 325-12 BOLT, HEX .25-20 X 3.00 SS (HC 024)	1
2	GB 331-09 BOLT, HEX .31-18 X 2.25 SS	1
3	GN 325-L NYLOK NUT SS (TB 044.1)	1
4	GN 331-L NYLOK NUT SS	1
5	GS 3M8-16-1.25 SHCS M8X1.25 X 16 SS	4
6	GS 325-03 SHCS .25-20 X .75 SS (TB 050)	4
7	GS 325-04 SHCS .25-20 X 1.00 SS (BC 053)	4
8	SKR 232 ULNA FORK	1
9	SKR 233 RADIUS FORK	1
10	SKR 237 PALM	1

11	SKR 238 WRIST BONE	1
12	SKR 240 SQUARE COLLAR HALF	1
13	SKR 241 END ROTARY MOUNT	1
14	SKR 242 TORQUE SHAFT W KEY	1
15	SKR 245 TORQUE PLATE	1
16	SKR 301 ROTARY AIR CYLINDER	1
17	SKR 340 PIN .375 X 2.25	1
18	SKR 341 BUSHING .375 X .625	2
19	SKR 342 BUSHING, FLANGE SOFT .5 X .5	2
20	SKR 343 BUSHING .375 X .375	1
21	SKR 344 BUSHING, FLANGE .5 X .5	2
22	SKR 345 WASHER, SPRING .265 X .812	2
23	SKR 350 AIR CYLINDER 1.5 DIA 1.5 STROKE	1

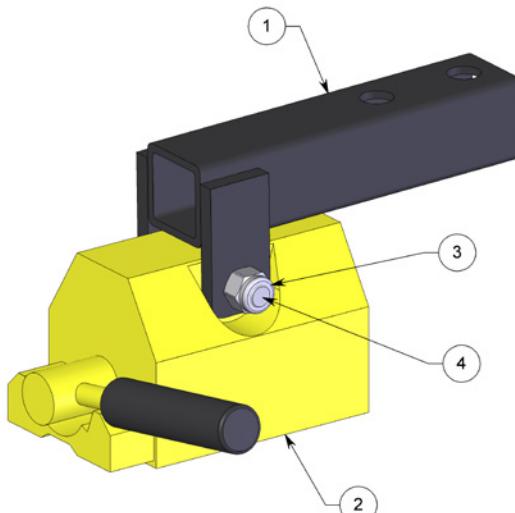
24	SKR 351 ROD END 1.5 CYL	1
25	SKR 355 FTG, BIMBA P2 PUSHLOCK NEEDLE VALVE	2
26	SKR 356 FTG, BIMBA P4 PUSHLOCK NEEDLE VALVE	2
27	SKR 360 FRICTION TORQUE LIMITER	1
28	SKR 365 CLEVIS .375 X .8125	1
29	SKR 366 RIBBED PLUG	1
30	SKR 370 FIBER WASHER	2
31	SKRL 181 TOOL HOLDER	1
32	SKRL 184 COLLAR UPPER HALF	1

LIGHTWEIGHT STRIKER™ (SKRL 501)
DOWNRIGGER ASSEMBLY



#	PART NUMBER	QTY.
1	GN 550-L NYLOK NUT	1
2	GSF 550-06 FHCS .50-13 X 1.50 LG Z	1
3	GW 550-F FLAT WASHER	1
4	SKR 509 WING NUT	1
5	SKR 510 SCAFFOLD CLAMP ASSY	1
6	SKR 511 J BOLT FRONT MODIFIED	1
7	SKRL 501.1 DOWNRIGGER WELDMENT	1

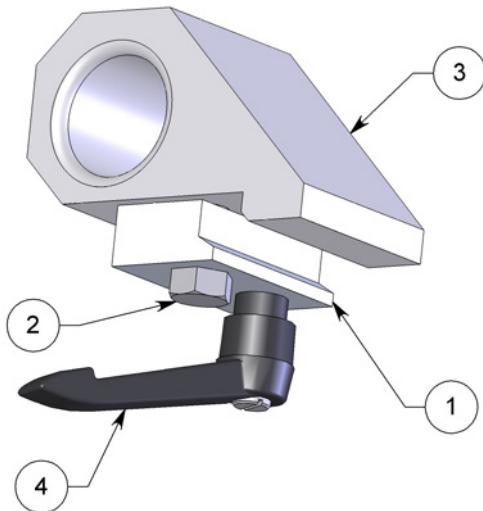
LIGHTWEIGHT STRIKER™ (SKRL 512)
MAGNET OUTRIGGER ASSEMBLY



#	PART NUMBER	QTY.
1	SKRL 511 MAGNET OUTRIGGER WELDMENT	1
2	SKRL 513 MAGNET 250	1
3	GN 537-L NYLOK NUT	1
4	GB 537-09 BOLT, HEX .37-16 X 2.25	1

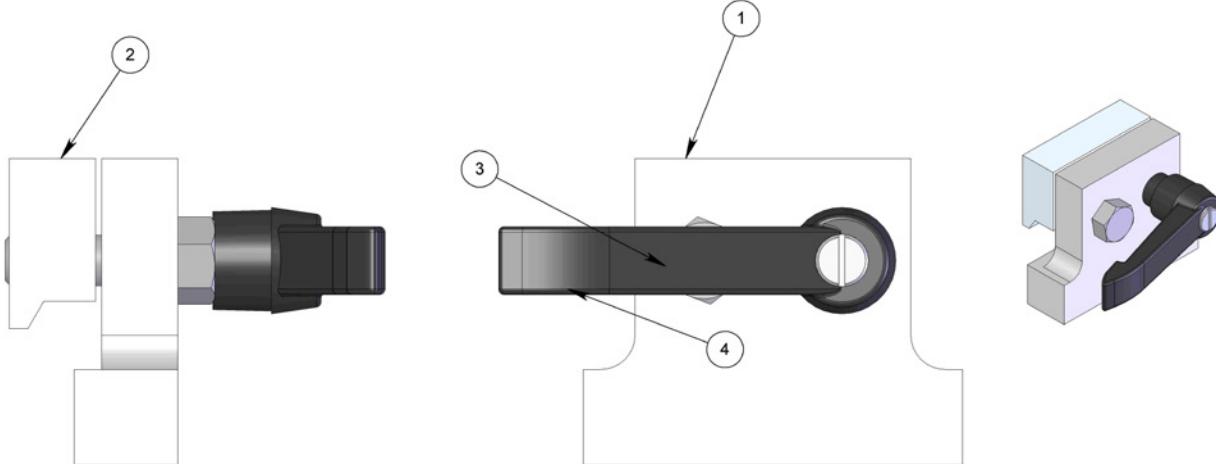
PARTS DIAGRAM

STRIKER® (SKR 250)
REAR STOP WITH HOSE GUIDE ASSEMBLY



#	PART NUMBER	QTY.
1	BR 060-D RAIL CLAMP, DRILLED	1
2	GB 537-06 BOLT, HEX .37-16 X 1.50	1
3	SKR 251-001 REAR STOP	1
4	SKR 253 HANDLE	1

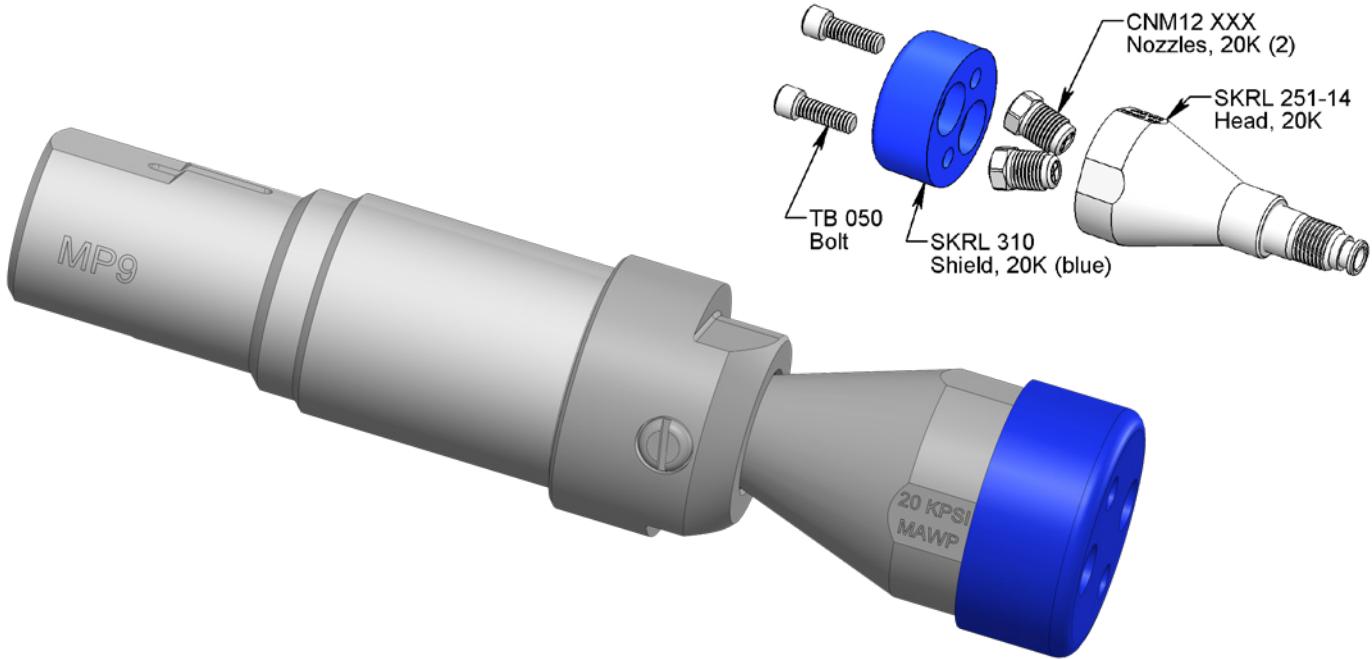
LIGHTWEIGHT STRIKER™ (BU 152)
RAIL STOP ASSEMBLY



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

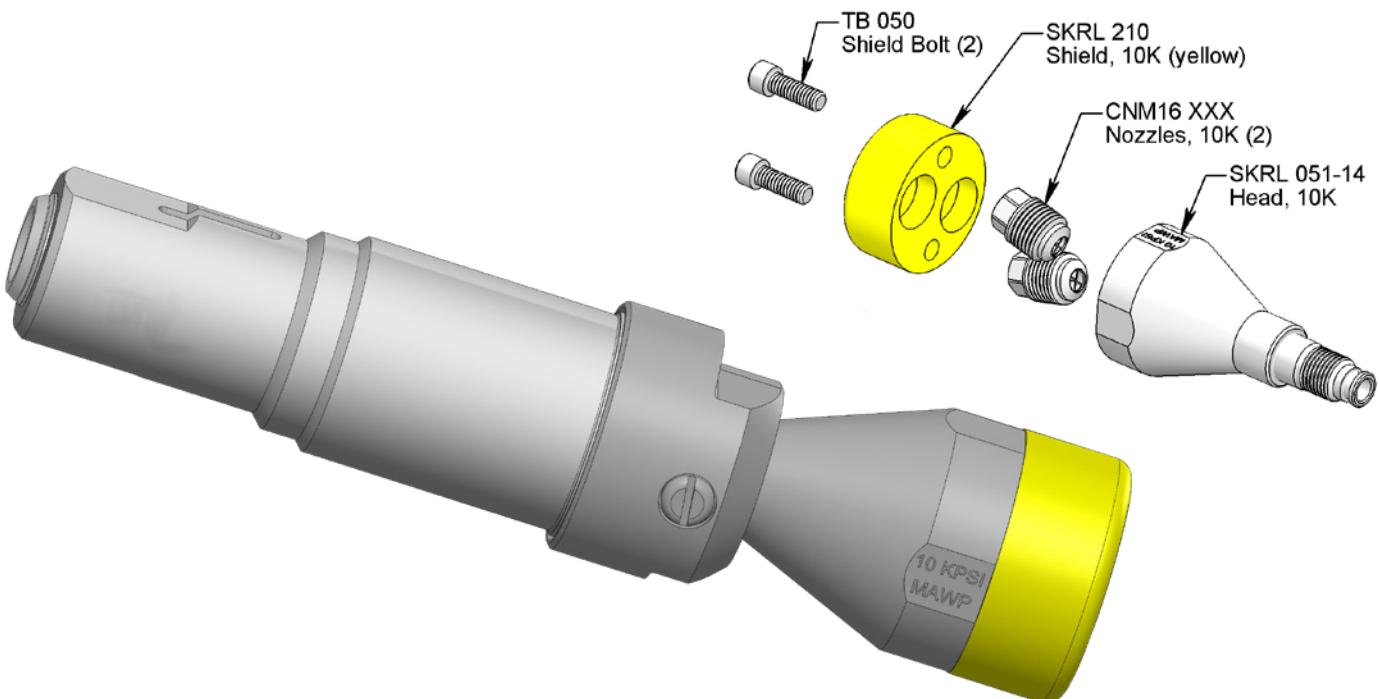
LIGHTWEIGHT STRIKER™ (SKRL-MP9)
20K REMOTE SHOTGUN SWIVEL ASSEMBLY

PLEASE SEE SKRL-MP9 20K MANUAL INSERT FOR DETAILED PARTS BREAK DOWNS AND SERVICE INFORMATION.

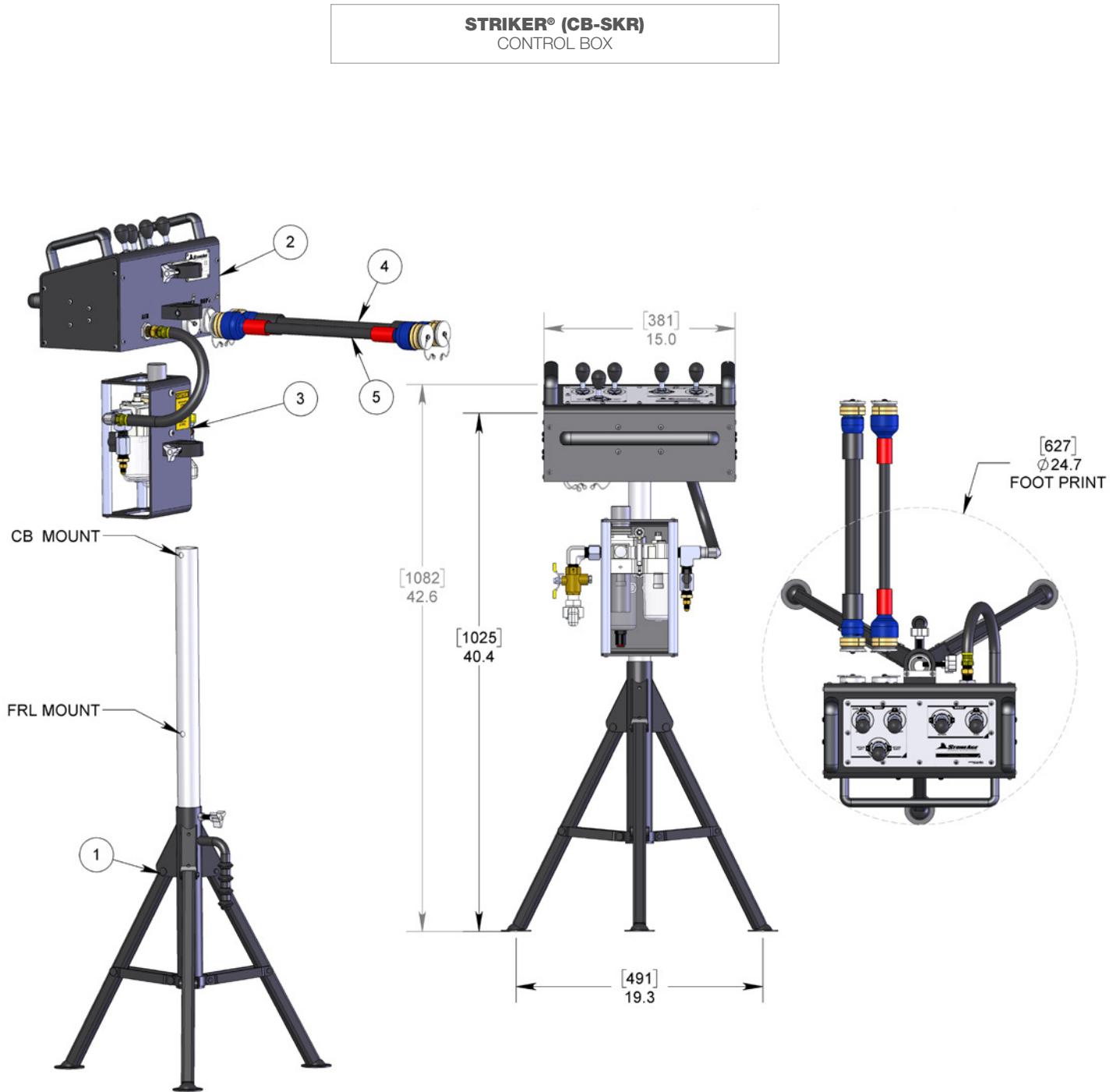


LIGHTWEIGHT STRIKER™ (SKRL-P4)
10K REMOTE SHOTGUN SWIVEL ASSEMBLY

PLEASE SEE SKRL-P4 10K MANUAL INSERT FOR DETAILED PARTS BREAK DOWNS AND SERVICE INFORMATION.



PARTS DIAGRAM



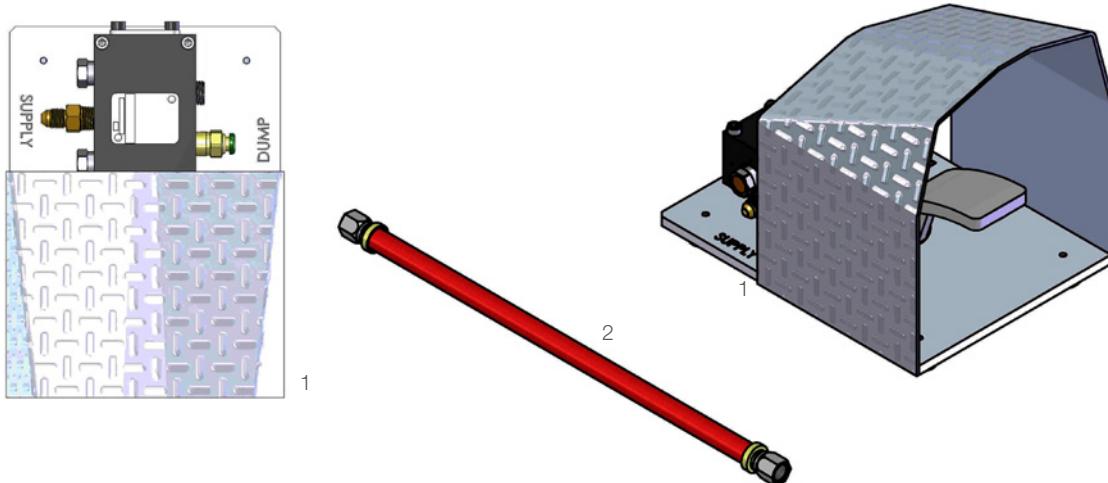
#	PART NUMBER	QTY.
1	CB 301 CB STAND ASSEMBLY	1
2	CB 400 CONTROL BOX ASSY	1
3	CB 403 FRL ASSY	1
4	CB 450 UMBILICAL 4PL4 2PL6	1
5	CB 451 UMBILICAL 4PL4	1

STRIKER® (CB 301)
CB STAND ASSEMBLY



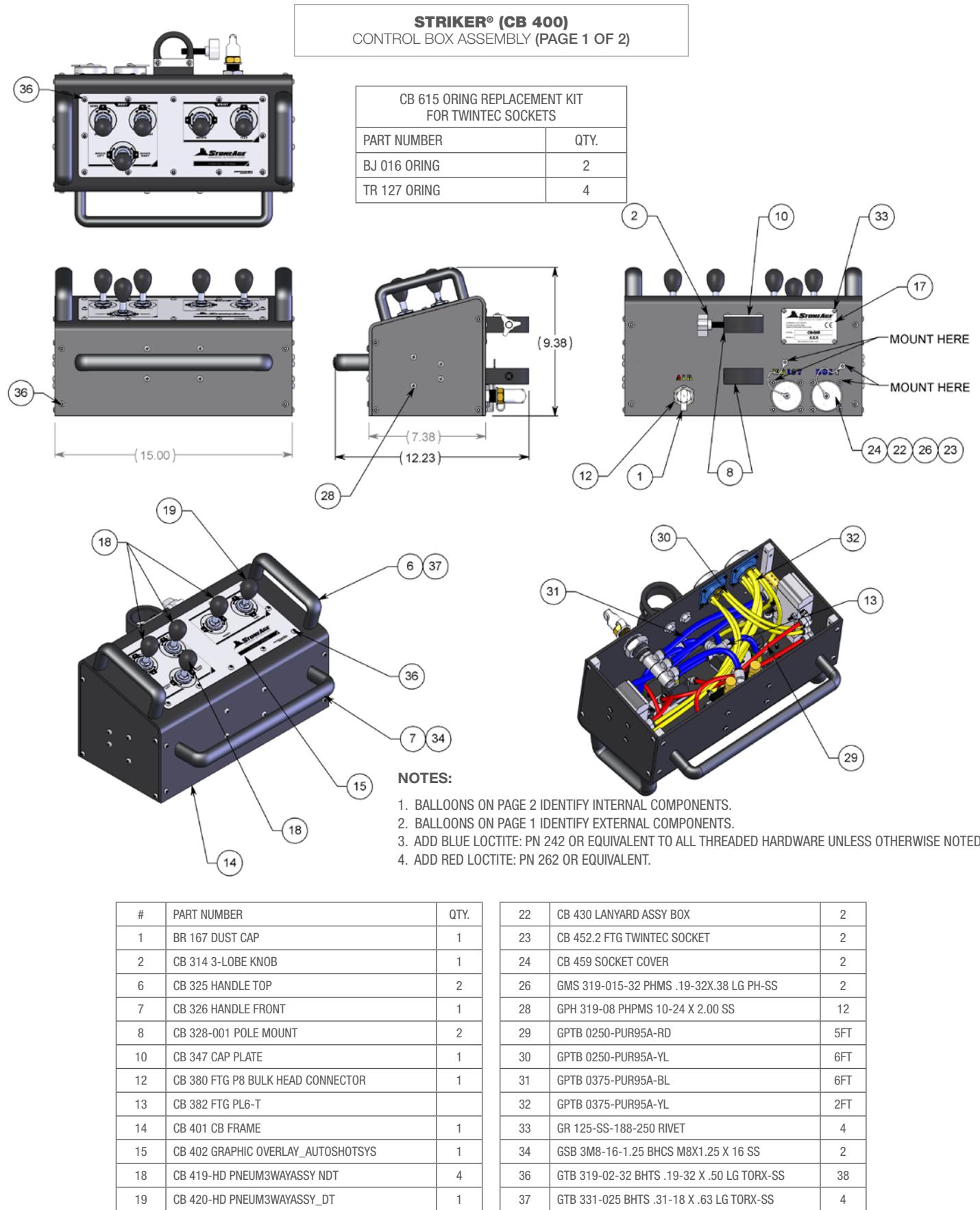
#	PART NUMBER	QTY.
1	CB 303 MTG POLE	1
2	CB 314 3-LOBE KNOB	1
3	CB 301.1 TRIPOD	1

STRIKER® (FPA-SKR)
FOOT PEDAL DUMP CONTROL
NOT INCLUDED IN PACKAGE

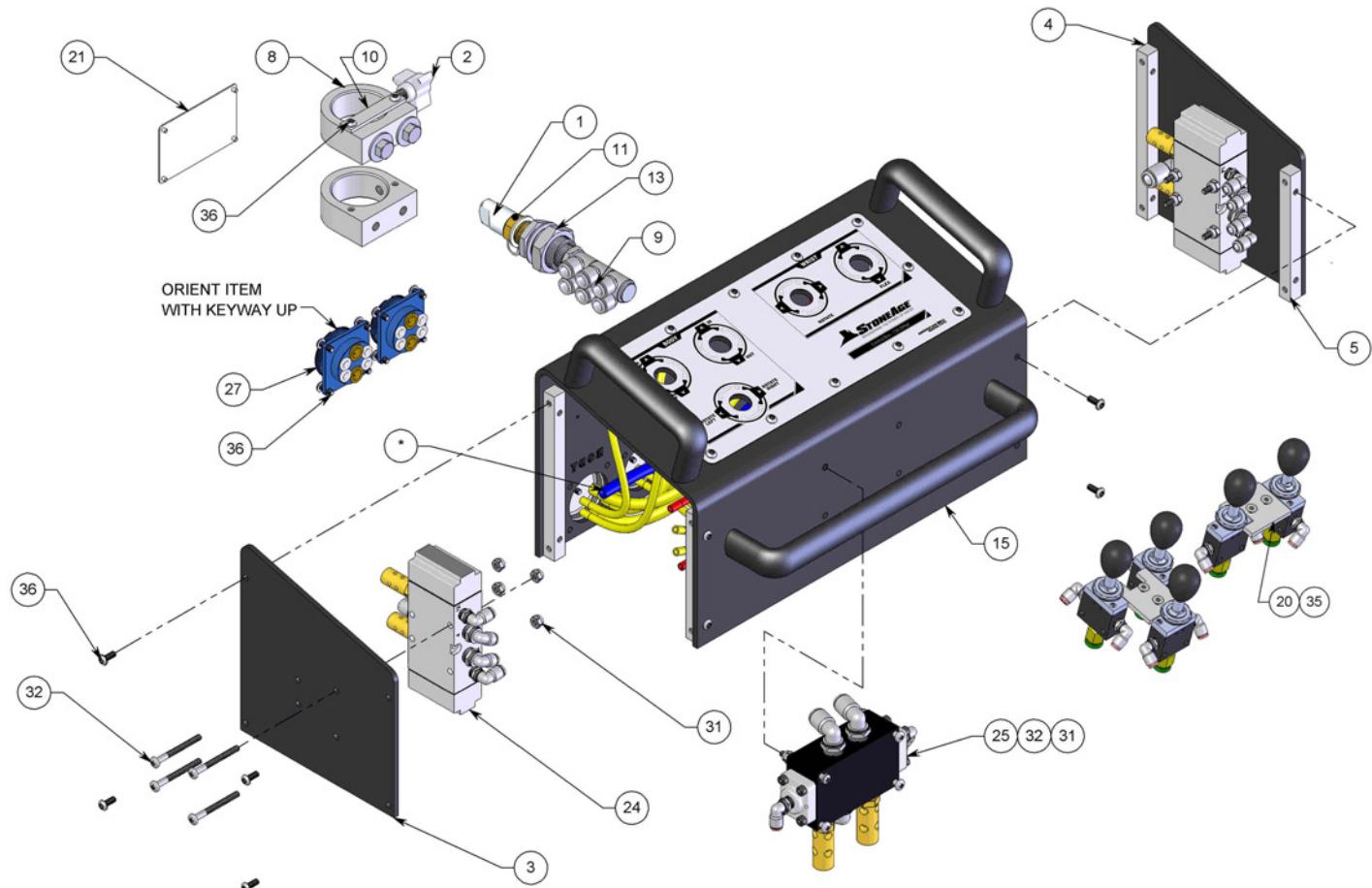


#	PART NUMBER	QTY.
1	FPA-100 FOOT PEDAL ASSEMBLY	1
2	FPA 102 HOSE ASSEMBLY	1

PARTS DIAGRAM



STRIKER® (CB 400)
CONTROL BOX ASSEMBLY (PAGE 2 OF 2)



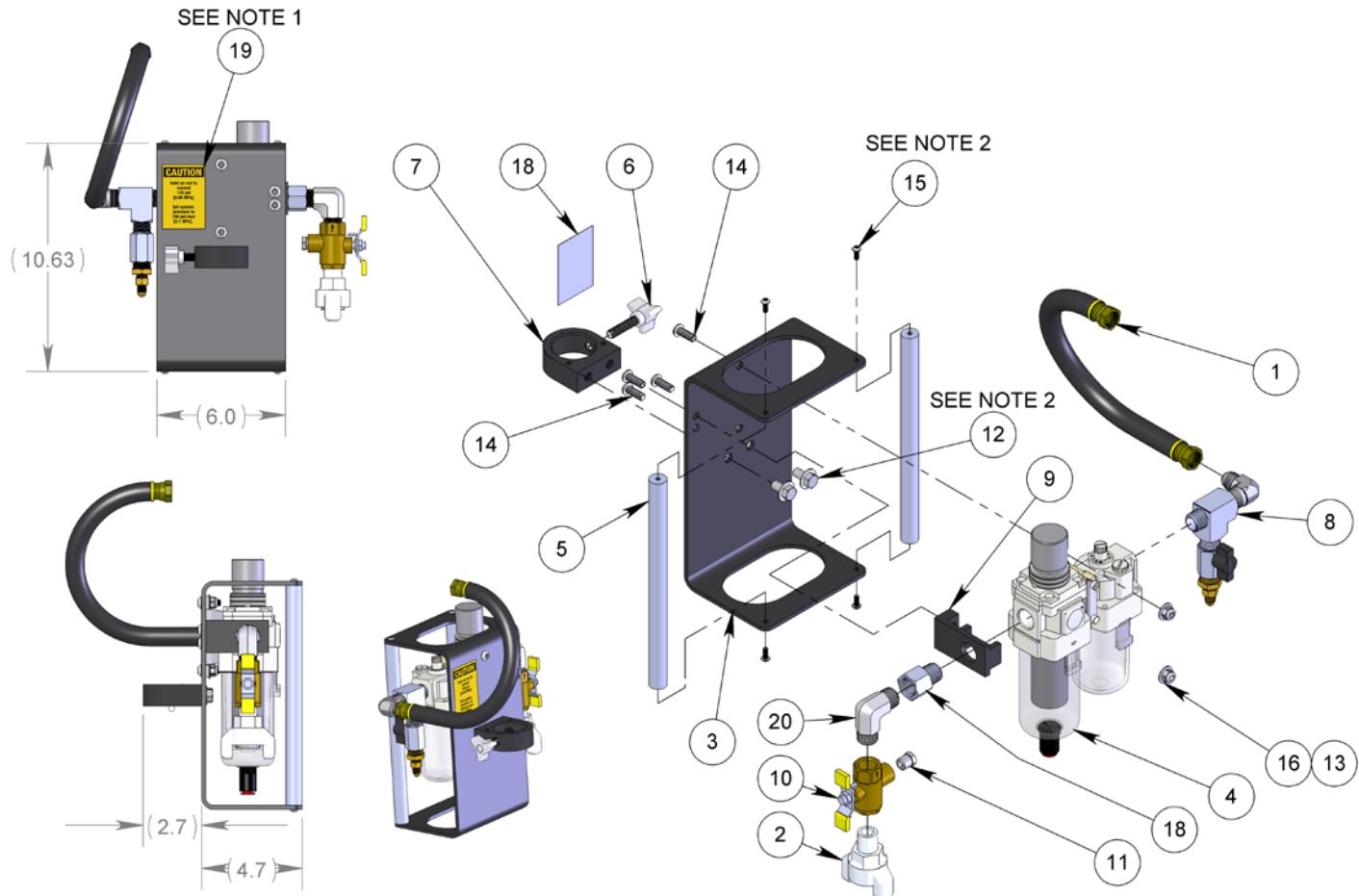
#	PART NUMBER	QTY.
1	BR 167 DUST CAP	1
2	CB 314 3-LOBE KNOB	1
3	CB 322 SIDE PLATE	2
4	CB 323 BRACE REAR	2
5	CB 324 BRACE FRONT	2
8	CB 328-001 POLE MOUNT	2
9	CB 331 P8PL6 6-WAY MANIFOLD	1
10	CB 347 CAP PLATE	1
11	CB 355 FTG P8J8 BRASS MALE TO MALE	1
12	CB 380 FTG P8 BULK HEAD CONNECTOR	1
14	CB 401 CB FRAME	1

16	CB 407 VALVEBRACE	2
17	CB 408 CE SERIAL PLATE	1
20	CB 421 FESTOPILOTEDASSY	2
21	CB 422 RY3 AAA PILOTED SPOOL VALVE ASSY	1
23	CB 452.2 FTG TWINTEC SOCKET	2
25	GB 337-03 BOLT, HEX .37-16 X .75 SS	4
27	GN 319-L NYLOK NUT SS (HC 025.1)	12
28	GPH 319-08 PHPMS 10-24 X 2.00 SS	12
35	GSF 319-02 FHCS .19-24 X .50 LG SS	4
36	GTB 319-02-32 BHTS .19-32 X .50 LG TORX-SS	38
38	GW 337-F FLAT WASHER	4

PARTS DIAGRAM

STRIKER® (CB 403)

SHAKER (CB-400)
(FILTER, REGULATOR, LUBRICATOR) FRL ASSEMBLY



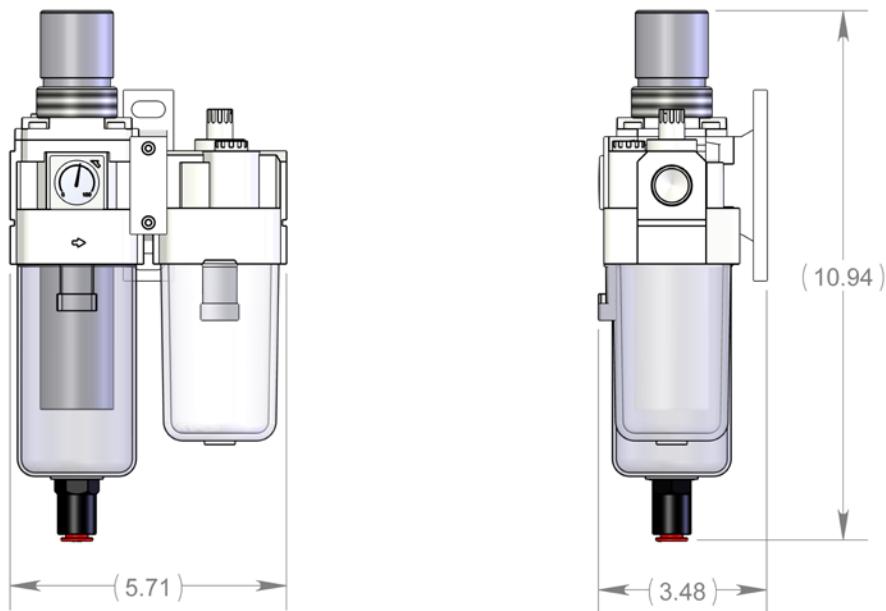
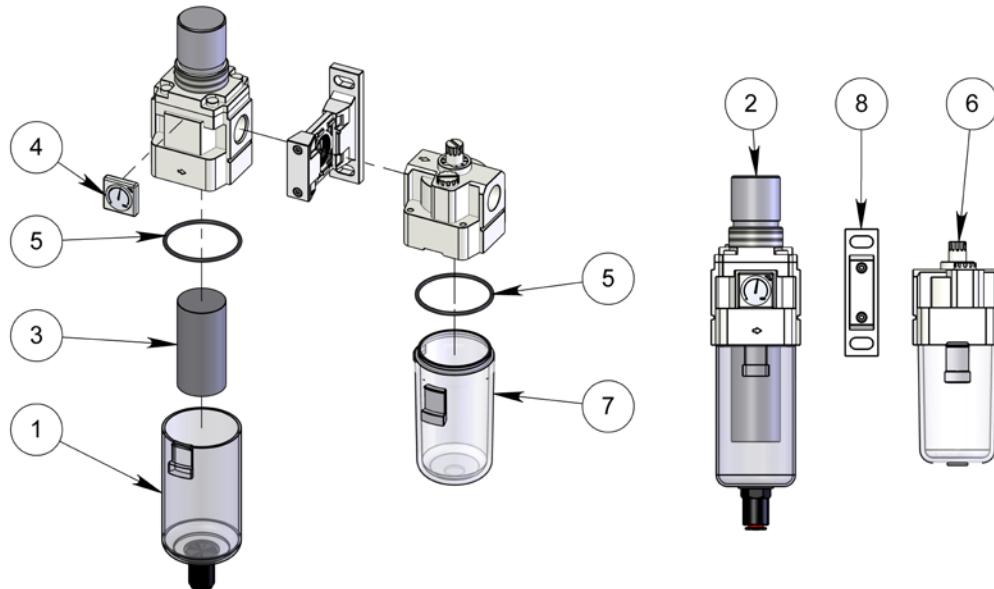
NOTES:

1. CLEAN ALL DEBRIS & OILS BEFORE INSTALLING. INSTALL AT APPROXIMATE ORIENTATION AND LOCATION & AT ROOM TEMP.
 2. ADD BLUE LOCTITE® 242 OR EQUIVALENT TO ALL NOTED HARDWARE.
 3. ADD LOCTITE THREAD SEALANT ® 567 TO ALL NPT THREADS. AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.
 4. ADD BLUE GOOP WHICH IS A SWAGELOK BRAND ANTI-SEIZE TO ALL OTHER THREADED HARDWARE OR AN EQUIVALENT ALTERNATIVE IS ACCEPTABLE.

#	PART NUMBER	QTY.
1	CB 052-14 HOSE ASSY (FOR CB PDT)	1
2	CB 114 INLET FITTING	1
3	CB 311 FRL FRAME	1
4	CB 312 GEN3 FILTER-REGULATOR-LUBRICATOR WITH GEN2 CLAMP	1
5	CB 313 ROD	2
6	CB 314 3-LOBE KNOB	1
7	CB 328-001 POLE MOUNT	1
8	CB 390 FRL DUMP SUPPLY ASSY	1
9	CB 395 FRL BRACKET	

10	CB 792 VALVE, AUTO DRAIN, P8	1
11	CB 793 BREATHER, SINTERED BRONZE, P4	1
12	GB 337-03 BOLT, HEX .37-16 X .75 SS	2
13	GN 331-L NYLOK NUT SS	2
14	GSB 331-035 BHCS .31-18 X .88 LG SS	4
15	GTB 319-02-32 BHTS .19-32 X .50 LG TORX-SS	4
16	GW 331-F FLAT WASHER SS	2
17	GW 337-F FLAT WASHER SS	2
18	ML 077-P8 BUSHING	1
19	PL 156-125 CAUTION INLET AIR, 125PSI MAX	1
20	SBT 292.1 FTG 90° ELBOW P8MP8M	1

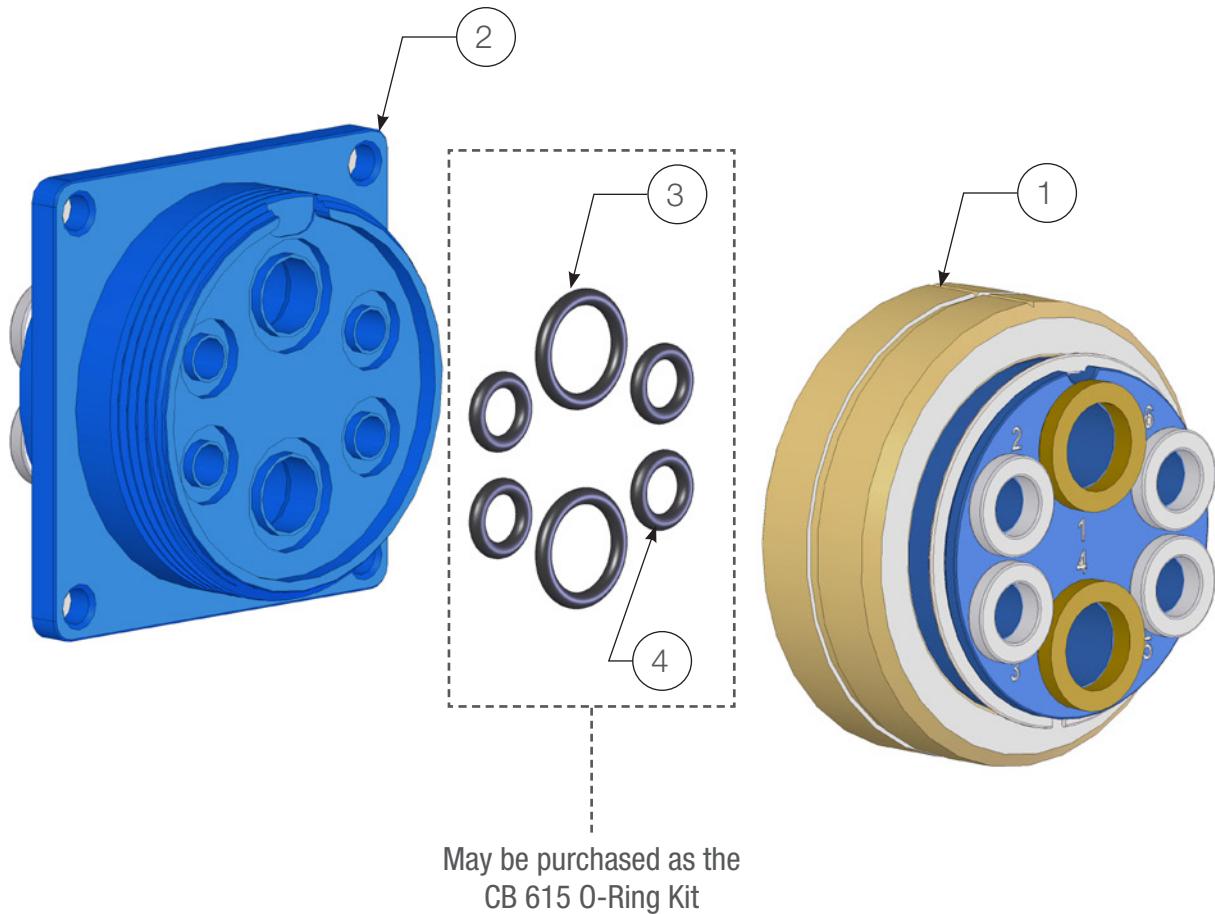
AUTOBOX® (CB 312-001)
GEN 3 FILTER, REGULATOR, LUBRICATOR WITH Y400T-D CLAMP



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

PART DIAGRAM

STRIKER® (CB 452)
TWINTEC PLUG AND SOCKET ASSEMBLY



#	PART NUMBER	QTY.
1	CB 452.1 TWINTEC PLUG	1
2	CB 452.2 TWINTEC SOCKET	1
3	BJ 016 O-RING	2
4	TR 127 O-RING	4

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TERMS AND CONDITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

STONEAGE TRADEMARK LIST

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

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

STONEAGE PATENT DATA

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

<http://www.sapatents.com>

STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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