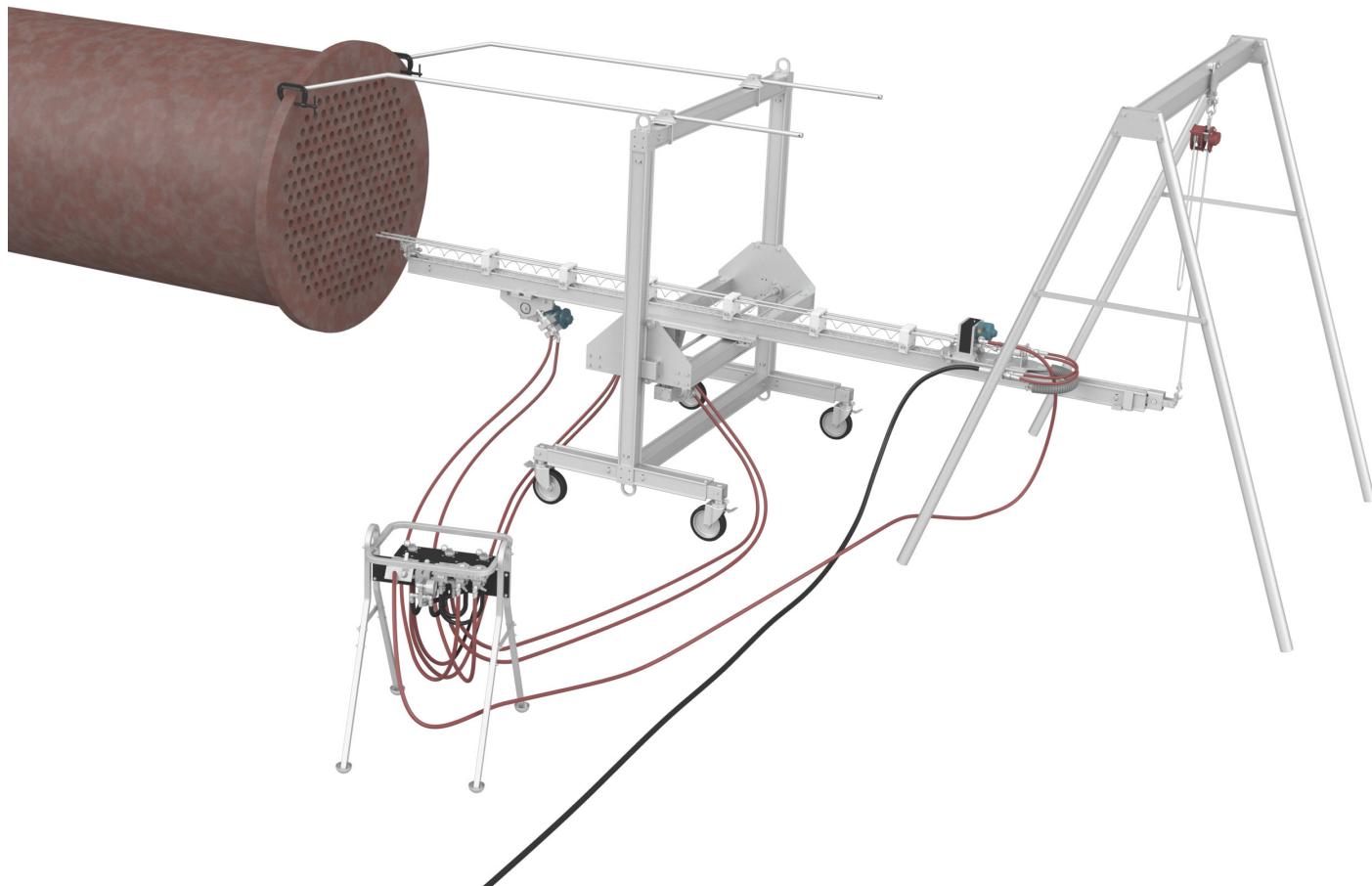




# RIGID LANCING MACHINE

## BRLM-500

### 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).

### TOOL SPECIFICATIONS

|                                  | BRLM-500 (15K)  | BRLM-500 (22K)  | BRLM-500 (40K)  |
|----------------------------------|---|---|---|
| <b>Pressure Range</b>            | 2–15k psi<br>140–1000 bar                                       | 15–22k psi<br>1000–1500 bar                                     | 22–40k psi<br>1500–2800 bar                                     |
| <b>Flow Range</b>                | Up to 50 gpm<br>Up to 189 l/min                                 | Up to 50 gpm<br>Up to 189 l/min                                 | Up to 20 gpm<br>Up to 76 l/min                                  |
| <b>Flow Coefficient</b>          | 2.3 Cv  | 2.0 Cv  | 0.3 Cv (UHS)<br>0.5 Cv (UH)                                     |
| <b>Inlet Connection</b>          | 1/2 NPT (P8)  | 3/4 MP (MP12)   | 9/16 HP (H9)  |
| <b>Lance Connection</b>          | 1/8, 1/4 NPT  | 3/8, 9/16 LH  | 3/8, 9/16 LH  |
| <b>Standard Rail Length</b>      | BRLM 500-15<br>15ft / 4.6m                                      | BRLM 500-15<br>15ft / 4.6m                                      | BRLM 500-15<br>5ft / 4.6m                                       |
| <b>Standard Extensions</b>       | BRLM 080-X<br>5, 10, 15, 20, or 25ft<br>1.5, 3, 4.6, 6, or 7.6m | BRLM 080-X<br>5, 10, 15, 20, or 25ft<br>1.5, 3, 4.6, 6, or 7.6m | BRLM 080-X<br>5, 10, 15, 20, or 25ft<br>1.5, 3, 4.6, 6, or 7.6m |
| <b>Stroke Length</b>             | Up to 60 ft<br>Up to 18m  | Up to 60 ft<br>Up to 18m  | Up to 60 ft<br>Up to 18m  |
| <b>Weight Complete</b>           | 1200–1500 lb<br>544–680 kg                                      | 1200–1500 lb<br>544–680 kg                                      | 1200–1500 lb<br>544–680 kg                                      |
| <b>Water Swivels</b>             | SG P12P12-62-0  | SL-MP9AV9-0   | UH-H9H6-0   |
| <b>Rotation Air Motor</b>        | Gast 4AM<br>20 to 40 cfm @ 80 psi                               | Gast 4AM<br>20 to 40 cfm @ 80 psi                               | Gast 4AM<br>20 to 40 cfm @ 80 psi                               |
| <b>Feed Air Motor</b>            | Gast 6AM<br>30 to 50 cfm @ 80 psi                               | Gast 6AM<br>30 to 50 cfm @ 80 psi                               | Gast 6AM<br>30 to 50 cfm @ 80 psi                               |
| <b>Maximum Water Temperature</b> | 160 °F 70 °C  | 160 °F 70 °C  | 160 °F 70 °C  |

### DESCRIPTION OF EQUIPMENT AND INTENDED USE

The Rigid Lancing Machine was designed for the effective cleaning of the inside of tubes within a heat exchanger bundle.

It is used with a rigid lance and nozzle head. Rigid Lances provide more forward-hitting power than flex lancing to clean difficult deposits. It is possible to operate 3 rotary lances simultaneously and remotely from the control box.

Air or hydraulic motors supply rotation and feed power. Since the lance is continuously rotated, a fewer number of larger, more powerful jets are used to completely clean the insides of the tubes. Larger jets will also penetrate tougher deposits more effectively than many smaller, non-rotating jets. Rotation of the tip also makes this tool effective for polishing tube walls. The powered feed allows all the jet power to be used in attacking the material ahead of the tip.

### KEY FEATURES:

#### RIGID LANCE MACHINE (BRLM-500)

- Adjustable feed rate for lance travel- Both directions of the lance can be regulated for speed to deliver appropriate cleaning.
- Adjustable lance stops- Forward stop to ensure complete tube coverage, optional retract stop to protect lances and operator
- Control Box - Control all movements of the complete package from up to 25 ft/8m away.
- Air or Hydraulic drive for power source flexibility.
- Expandable operating window - Allows for versatility for cleaning a variety of exchanger sizes.
- Steering control and tilt function - Positioner offers easy mobility and can be tilted to match the tube pitch angle of a bundle face.

## 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](http://www.waterjetting.org.uk)).

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

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

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

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

### IT IS THE 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 Protective Equipment for Personnel (Section 6) of WJTA-IMCA's Recommended Practices For The Use Of High-pressure Waterjetting Equipment for additional information.

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

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

### PPE may include:

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

## WARNING AND SAFETY INSTRUCTIONS

### ⚠ WARNING

Operations with this equipment can be potentially hazardous. Caution MUST be exercised prior to and during machine and water jet tool use. Please read and follow all of these instructions, in addition to the guidelines in the WJTA Recommended Practices handbook, available online at [www.wjta.org](http://www.wjta.org). Deviating from safety instructions and recommended practices can lead to severe injury and/or death.

- Do not exceed the maximum operating pressure specified for any component in a system. The immediate work area MUST be marked off to keep out untrained persons.
- Inspect the equipment for visible signs of deterioration, damage, and improper assembly. Do not operate until repaired. Make sure all threaded connections are tight and free of leaks.
- Users of the BRLM Rigid Lancing System MUST be trained and/or experienced in the use and application of high-pressure technology and cleaning, as well as all associated safety measures, according to the WJTA Recommended Practices for the use of High-pressure Water jetting Equipment.
- The Control Box should be located in a safe location where the operator has good visibility of the pipe and hose. The BRLM Lancing System and Control Box MUST be supervised at all times and should never be left unattended.
- Test the Control Box before operating the BRLM Rigid Lancing System with high-pressure water to verify the control valves move the hose in the intended direction, and that the dump valve is 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.

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.

### PRE-RUN SAFETY CHECK

Refer to WJTA-IMCA's, Recommended Practices For The Use Of High-pressure Water jetting 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.
- Ensure the waterblasting zone is properly barricaded and that warning signs are posted.
- Adhere to all site safety procedures.
- Ensure no personnel are in the hydroblasting zone.
- 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.
- Ensure that operators never connect, disconnect, or tighten hoses, adapters, or accessories with the high-pressure water pump unit running.
- Check all high-pressure threaded connections for tightness.

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

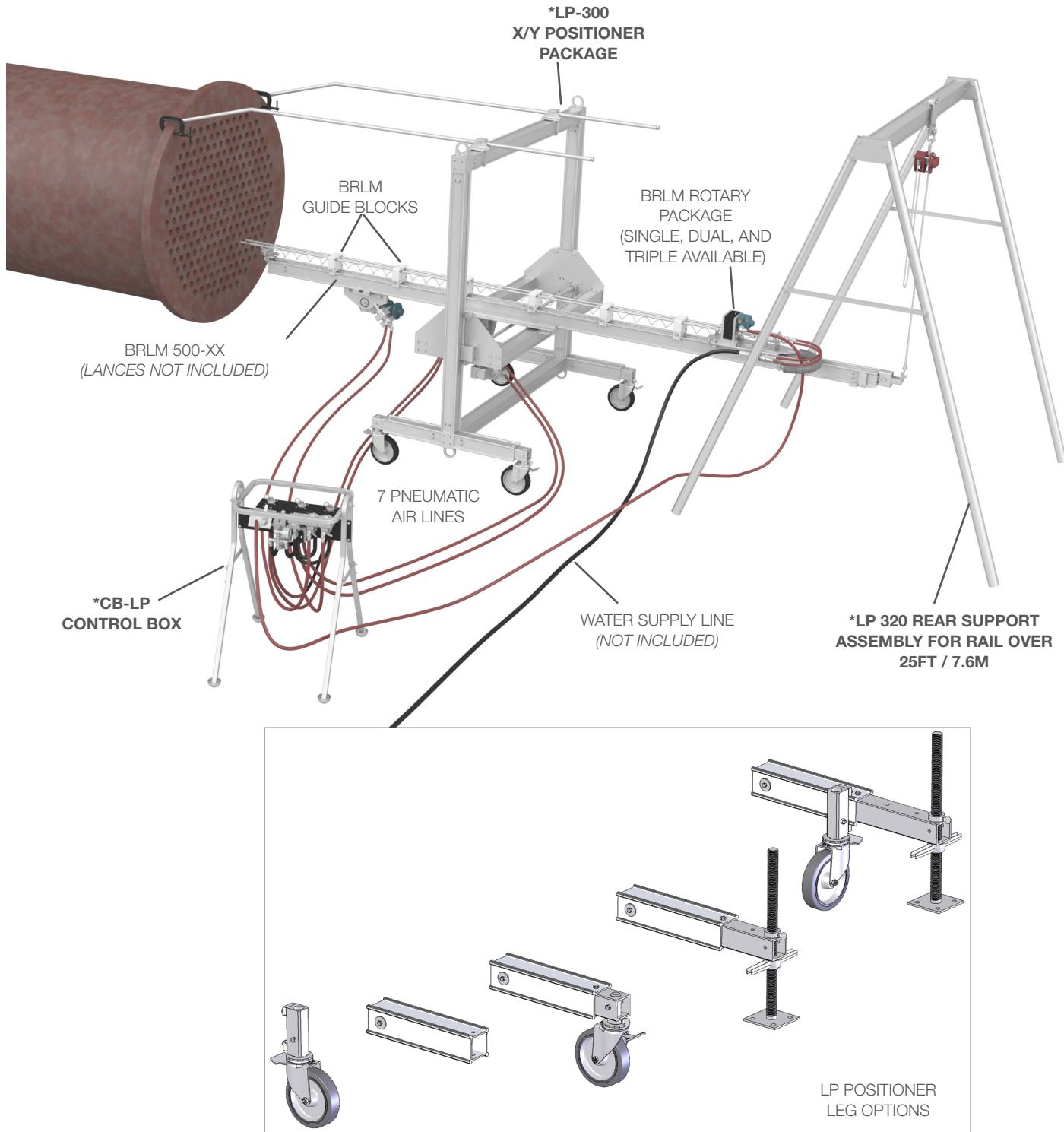
- Aerosols
- Biological and microbiological (viral or bacterial) agents
- Combustible materials
- Dusts
- Explosion
- Fibers
- Flammable substances
- Fluids
- Fumes
- Gases
- Mists
- Oxidizing Agents

## SYSTEM ASSEMBLY - OVERVIEW

### BRLM 500-XX

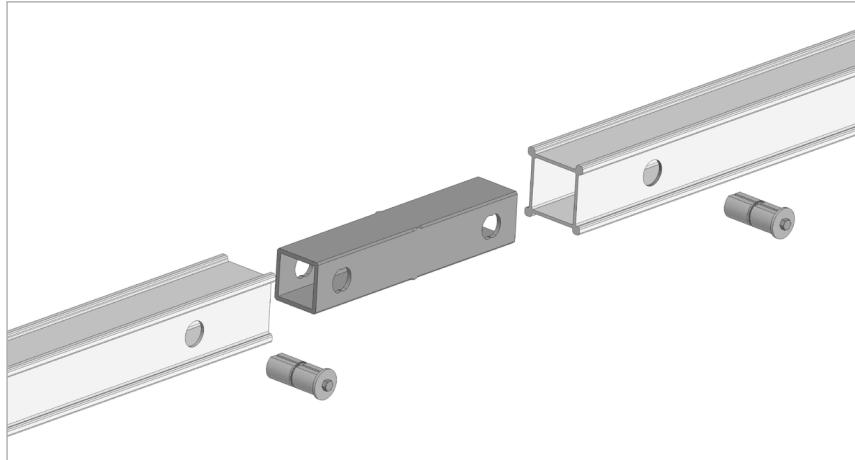
BOX RAIL LANCING MACHINE

\*THE LP-300 POSITIONER, LP 320 REAR SUPPORT, AND THE CB-LP CONTROL BOX ARE REQUIRED TO COMPLETE THE BOX RAIL LANCING MACHINE ASSEMBLY SHOWN BELOW. THERE ARE MORE DETAILED PART BREAKDOWNS IN THE BACK OF THIS MANUAL. FOR MORE DETAILED INFORMATION ON THE LANCE POSITIONER, SEE THE LP-300 MANUAL INSERT.



## ASSEMBLY, INSTALLATION, AND CONNECTION

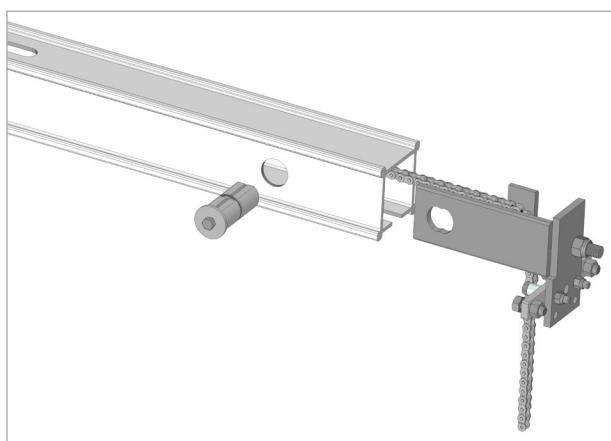
1. If an extension kit (BRLM 080) is used, insert the splice tube into the rear of the drive rail (the end without a slot) and slide the extension section over the splice tube. The extension rail has no slots and can be installed using either end. Use two wedge bolts oriented to pull and tighten these sections together. Splice the chain provided with the extension kit onto the chain from the drive section.



2. The drive gearbox shaft may be positioned 2'-8" or 3'-10" back from the front of the machine in order to allow clearance for existing channel heads or other obstructions. Feed a tape measure through the rear of the rail, through the slots you determine the drive motor should be positioned in, and through the end of the rail. Using wire, attach the chain to the tape measure and pull it back through the rail and slots.

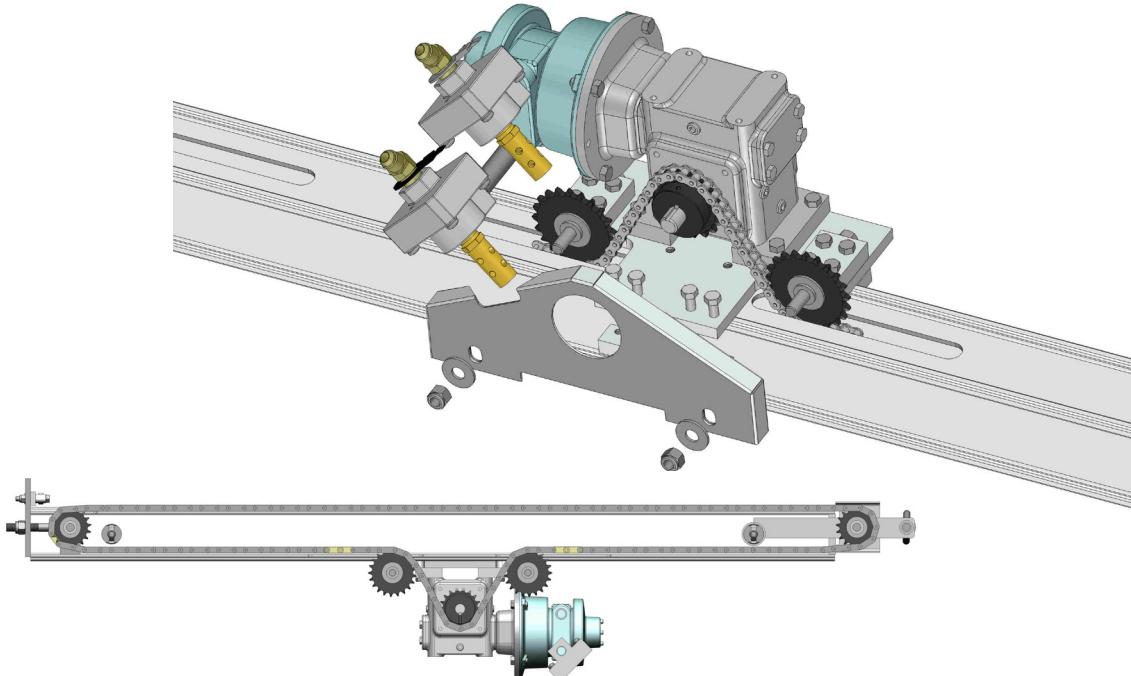


3. Feed the Chain over the front idler and slide the front idler into the rail. Note the sprocket is off center and should stick through the slot in the rail. Install the wedge bolt, making sure to orient the halves so that they expand in the direction to pull the idler assembly into the rail. Tighten the expansion bolt to secure the idler to the rail. REPEAT the entire procedure for rear idler assembly.

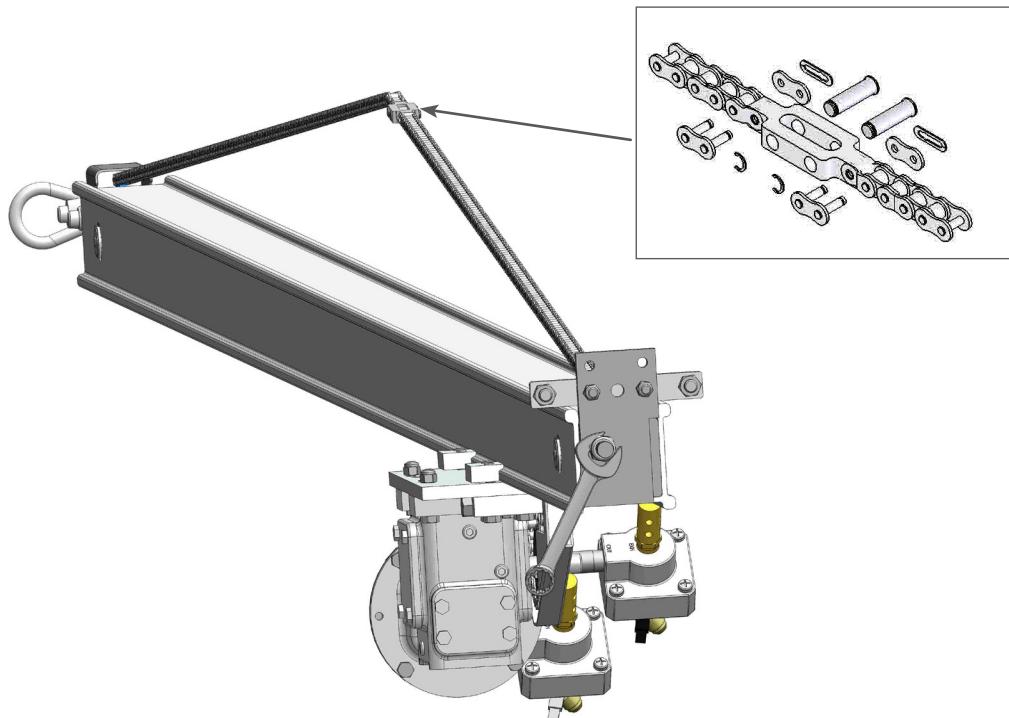


## ASSEMBLY, INSTALLATION, AND CONNECTION

- For installation of the drive assembly, remove the chain guard and only two of the rail clamps. Slightly loosen the other two clamps. Thread the chain, under the two outside sprockets and over the center sprocket. Center the drive over the slots and secure all the clamps to the rail. Replace the chain guard (Note washer locations) and flip the assembly over.

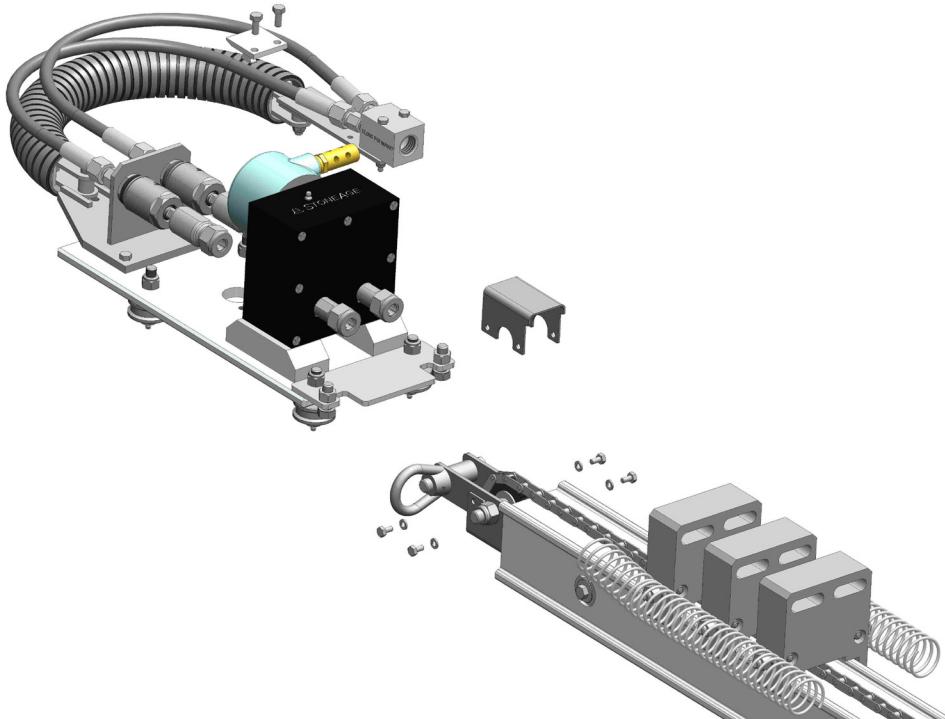


- Complete chain loop by attaching the chain to the chain hook link with (2) chain master links. Adjust the chain tension so there is about 1 inch of chain height for every 5 feet or rail length. This can be done by tightening the tension nut at the end of the rail.

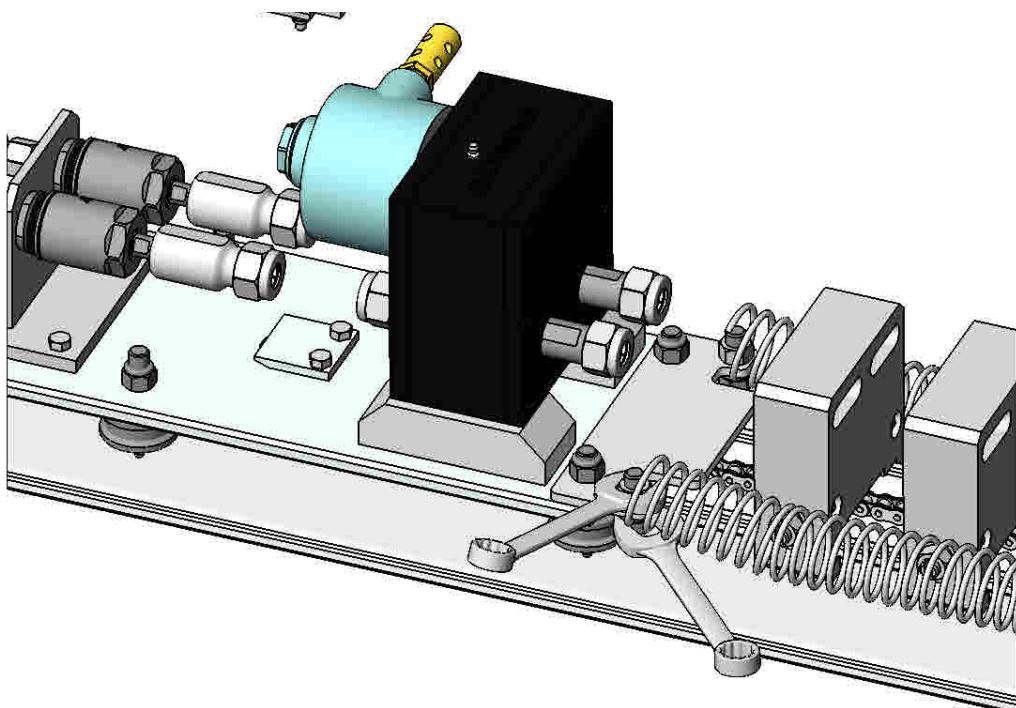


## ASSEMBLY, INSTALLATION, AND CONNECTION

6. Remove rear chain guard and slide the guide blocks onto the rail and move them all the way to the front. Next, remove the chain hook from the carriage and slide the carriage onto the rail. It may be necessary to loosen the rollers on one side to make it easier to install. Be sure to tighten all the rollers and replace the guard once finished.

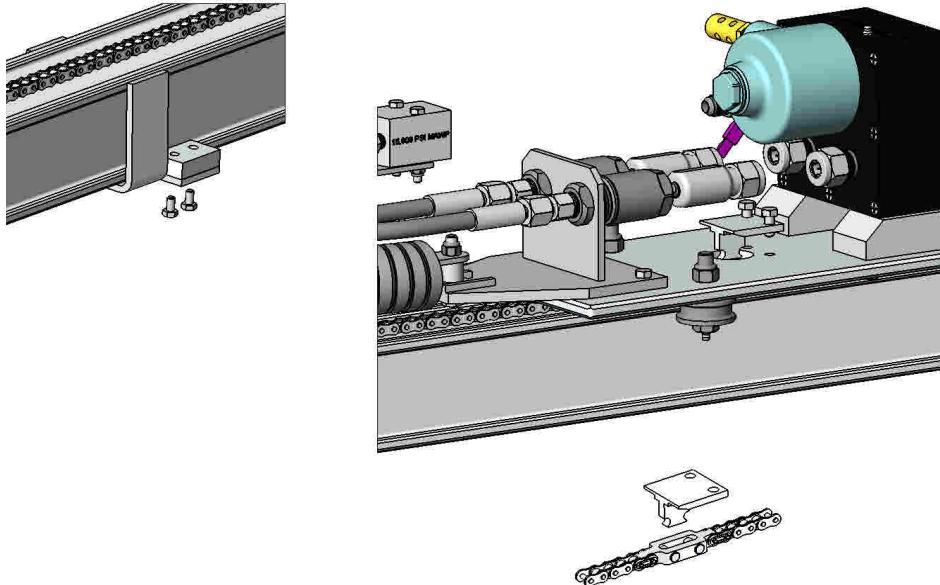


7. Attach the cable coils to the carriage and to the front idler assembly using the slotted anchor bolts. Be sure not to tighten the bolt over 20 ft-lbs of torque.

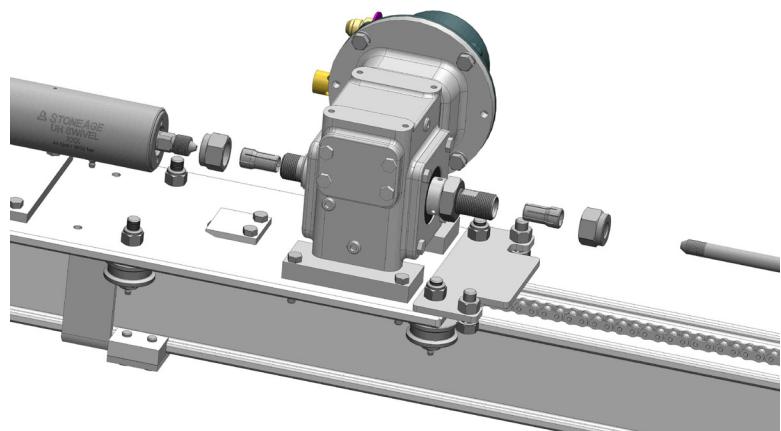
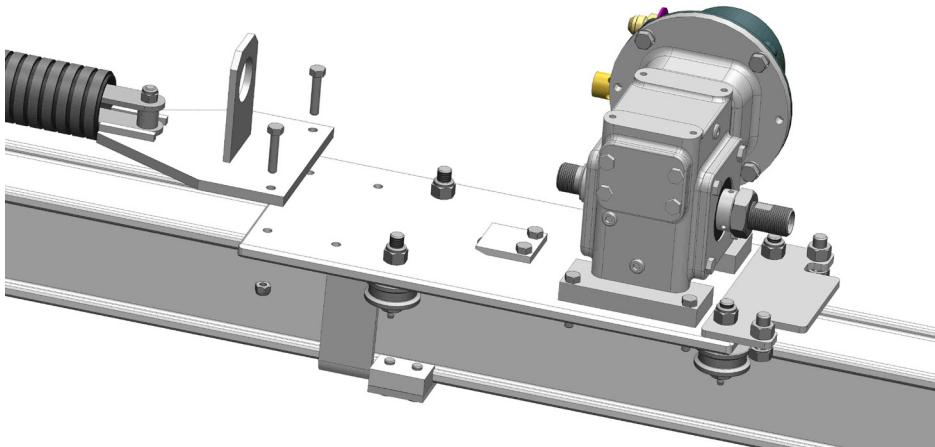


## ASSEMBLY, INSTALLATION, AND CONNECTION

8. Attach the rear stop to the rail. The exact position of the stop can be easily adjusted at a later time. Next, install the chain hook by slipping it through the carriage plate and in between the pins on the chain link. It often helps to move the carriage back and forth to lock it into place.

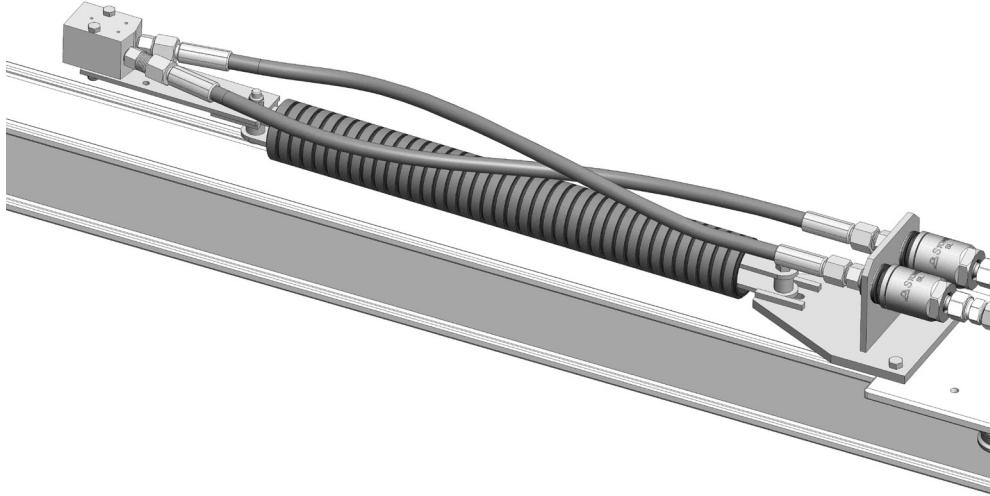


9. Attach the swivel bracket to the carriage plate. Then choose either the 9/16" or 3/8" collets and couplings set, to match the lance size. Insert the proper collets and the gland nuts. Slide the lance or lances through the gearbox and attach to the swivel with a coupling, making sure to properly prepare the threads on the end of the lance using anti-seize and Teflon tape with pipe threads. Slide the swivel back into the hole in the rear support and tighten the gland nuts to clamp the collets onto the lance.

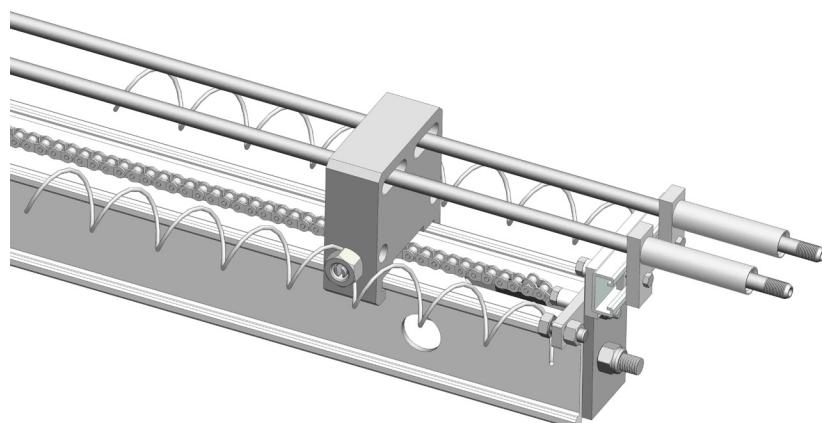
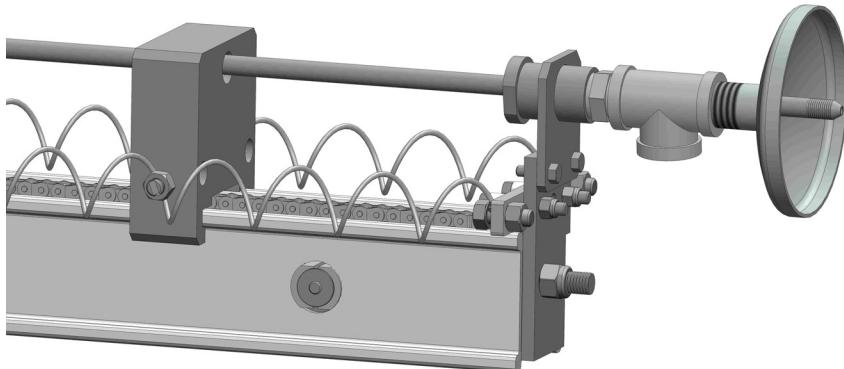


## ASSEMBLY, INSTALLATION, AND CONNECTION

10. Attach the tail chain to the carriage plate; if using a single rotary machine, straighten the tail chain and clamp the single hose in the clamp blocks. If using the dual rotary machine, attach the Y-Manifold to the tail chain; install the adapters into the swivel inlets and the manifold ports (use anti-seize). Straighten the tail chain and cross the hoses over each other from the swivels to the manifold ports as shown in the above illustration.



11. Attach the appropriate sized guide tube to the front of the rail. Advance or retract the carriage so the end of the lance where the tip will be located is about two inches inside the front splash guard (about the length of the nozzle tip). Install the rear stop up against the rear carriage wheels at this point to set the retract stop point. On a vertical setup, the rear stop will be way up in the air and not easily adjusted later.



## ASSEMBLY, INSTALLATION, AND CONNECTION

### Lances and Tips:

**Lances** - It is recommended that high strength alloy be used instead of standard pipe grades; 3/8 tubing can be threaded for 1/8 pipe, and 9/16 tubing can be threaded for 1/4 pipe. The material selected should have adequate wall thickness for the pressure being used. Lances with larger inside diameters will minimize pressure drop at higher flows, but will be limited in their operating pressure.

**Tips** - There are several different lance tip types; the most basic and cheapest is the steel tip with drilled orifices. Jet patterns can be selected to optimize unplugging or polishing. Since the lancing machine provides rotation, fewer and larger jets can be used. When rigid lancing on a securely supported lancing machine, there is no need to put in backward facing jets. While the drilled steel tip can be used up to 40,000 psi, orifice life at this pressure is less than 10 hours. At 20,000 psi, about 20 hours useful life can be expected, while at 10,000 psi (depending on water filtration) a drilled tip can last up to 40 hours. For the higher pressures, replaceable sapphire orifices can be used. Jet angles can be somewhat limited with the replaceable orifices; depending on the tip diameter, it may not be possible to put in radial porting.

Another type of tip includes a carbide cutting blade on the front. This type of tip is the only type that the operator is allowed to jam in to the material, as mechanical cutting is taking place along with waterjet cutting.

The third type of tip uses a single carbide nozzle insert, placed into the tip at a slight angle. This single, very focused jet will be pushed around by the slight side force and wobble its way through.

## OPERATION

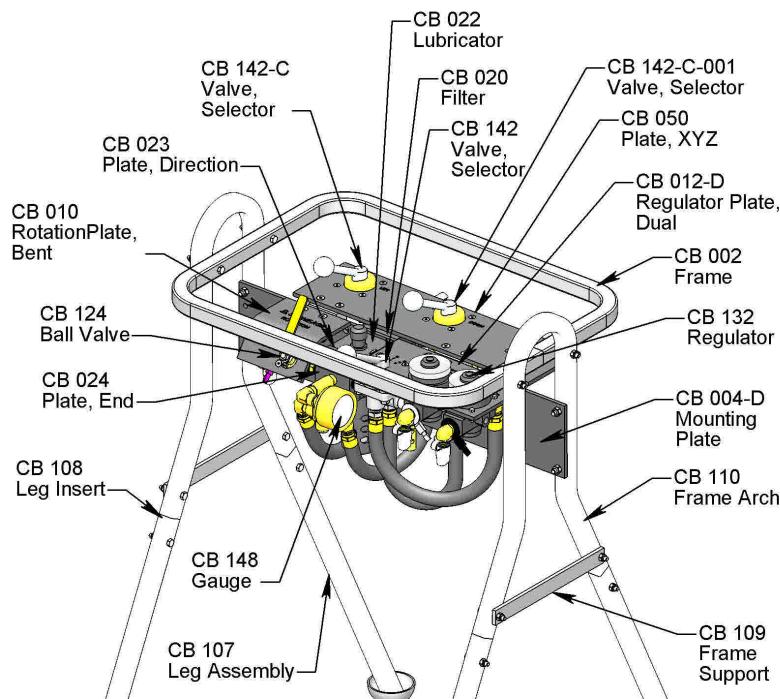
- Make sure the far end of the tube bundle is flagged off and no one is within this area. A deflector plate is recommended for debris and water, particularly in horizontal bundles.
- Turn the advance regulator on the control box down to zero, switch the selector valve to forward and slowly increase the regulator until the carriage begins to move, switch the selector valve back to off, leaving the regulator at this low setting. Think of the regulators as controlling push force as well as speed.
- Advance the carriage on the lancing machine until the tip is just inside the first tube if it is open or partially open; if it is a plugged tube, do not drive the tip into the material until the water pressure has started to come up; stop just short of the tip entering the tube.
- Start the rotation of the lances and close the dump valve; bring the pressure up slowly with the pump throttle or bypass valve. If it is a plugged tube, advance the tip into the material.
- Once operating pressure is reached, advance the lance into the tube. The forward regulator setting may need to be increased at this time to make the carriage move, as the jet thrust may be pushing back against the feed. Gradually increase the forward regulator, which is increasing the push force as well as the feed rate. Watch the lances to make sure they are not starting to flex; if they are, slightly decrease the regulator setting and leave it at this point. Also watch the machine and positioner for evidence of increasing load. If the machine hydraulics more than once or twice while cleaning every tube, the feed rate should be decreased to prevent this. Hydraulicking forces can be high enough to bend and destroy the lances; they can pick up a vertical machine, positioner and scaffold with two people standing on platforms (at least 500 pounds). Once an optimum feed rate is determined, the regulator has an adjustable stop that can be set and repeatedly returned to if desired.
- If the tubes are open and only being polished, there is an optimum feed rate to allow the jets to achieve complete coverage; multiply the number of jets by the orifice size of the jets and the rotation speed of the lance (600 rpm if the rotation speed is set on full). The result will be the feed rate in inches per minute to achieve complete jet coverage. Sometimes the material may require multiple jet strikes to be removed. The only way to determine this is to complete a cleaning pass at a certain speed, then check the tube for cleaning effectiveness and adjust the feed rate accordingly. If desired, set the adjustable stop in the regulator.
- The direction of the carriage should be reversed when the operator hears or observes the jets exiting at the far end of the tube bundle. The retract regulator can be slowed to allow an additional cleaning pass on the return stroke, or retracted at full speed if the forward cleaning pass is sufficient. Dump the pressure when the jets begin to exit the tube. Once a tube is cleaned and the nozzle tip retracted to clear the tube, use the positioner to move the machine to the next tube or tubes in that row. A practiced operator will be able to align the machine very quickly and likely in one move, but an inexperienced operator should take time initially to make sure the tip is aligned, otherwise the tip will run into the tube face and possibly bend and destroy a lance, particularly if the forward regulator is set at a high push/feed rate. Leaving the forward speed slower helps with tube alignment for an inexperienced operator.

## CONTROL BOX TO SYSTEM ASSEMBLY

### Control Box:

The control box consists of a ball valve that is used to turn on/off the rotation; it can also be partially opened/closed to regulate the rotation speed. There is a single air line connected from the exit of the ball valve to the rotation port on the air motor; the port selected should rotate the lance in a direction to tighten the nozzle tip onto the lance. Always blow out the air hoses before connecting to the motor ports.

The selector valve and two regulators are used to control the feed direction and speed as well as the push/pull force of the drive. Two hoses are connected from the regulators to the drive air motor; connect the hoses to match the description on the selector valve regarding direction. Reverse the hoses to the motor to achieve this if necessary. Continue in the same manner to connect two hoses to each of the LP positioning motors.

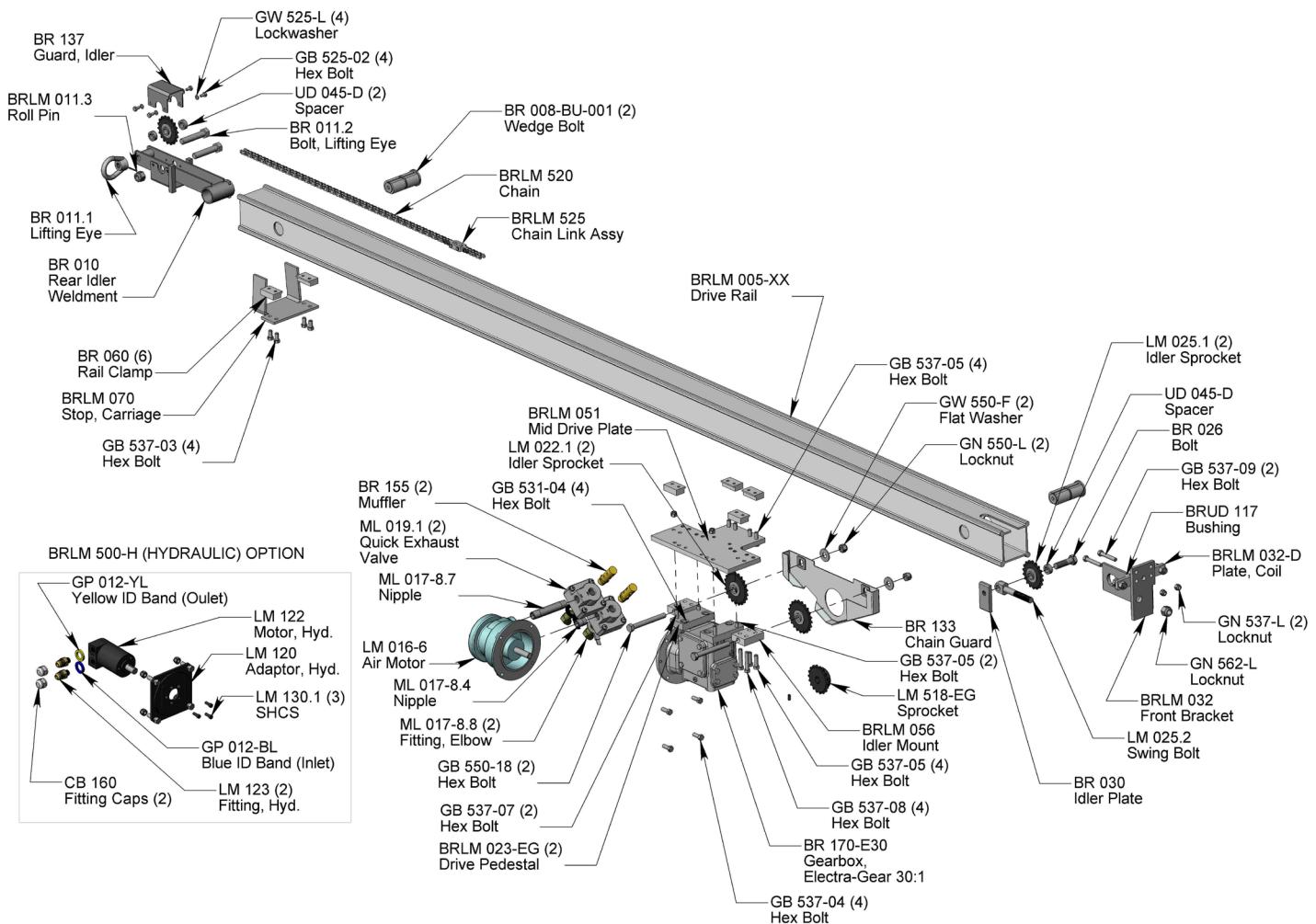


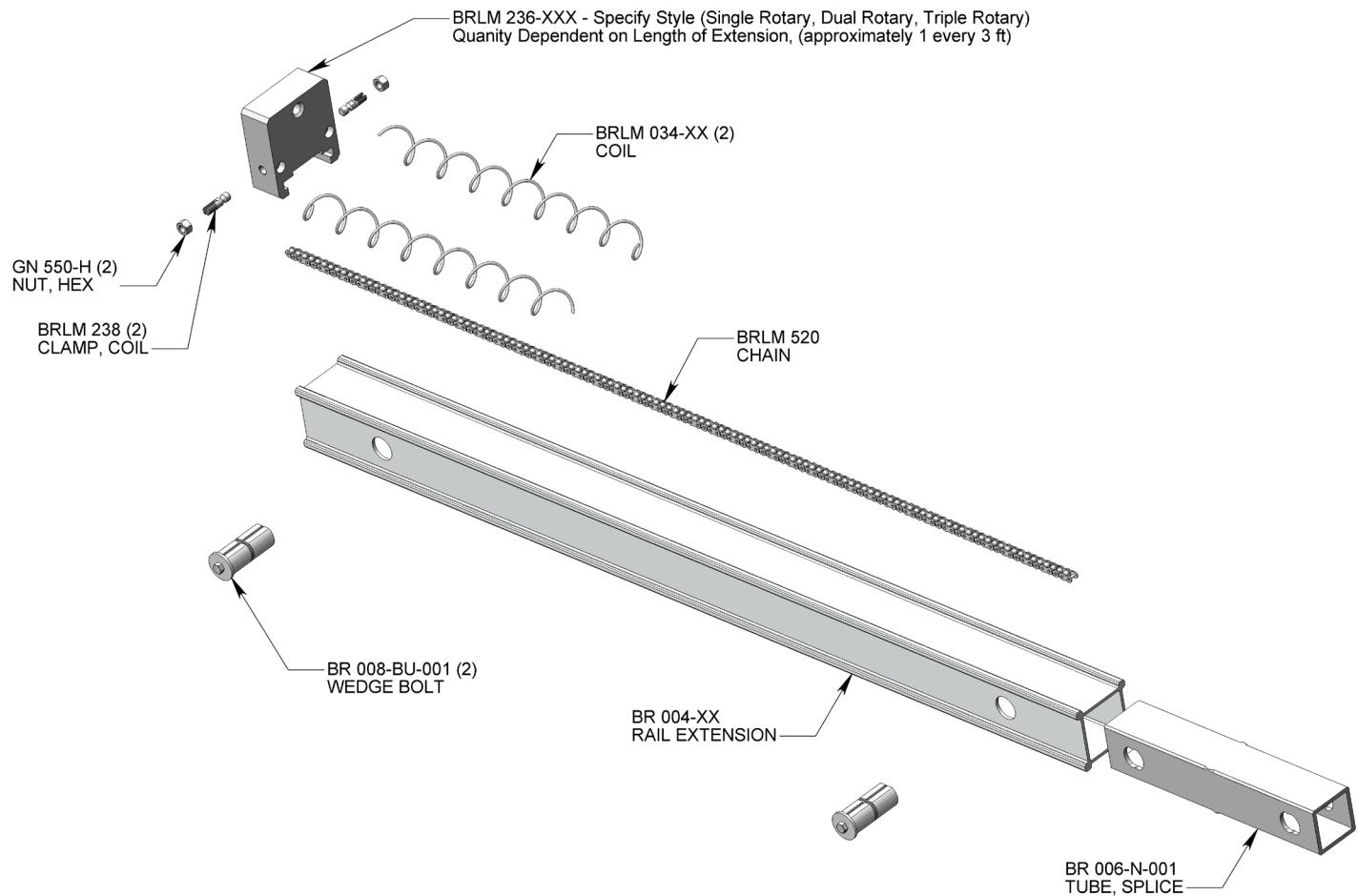
## MAINTENANCE

| Maintenance Item | Maintenance Required  |
|------------------|---|
| Air Supply       | A compressed air source of at least 70 cfm at 80 psi is required. Lower pressure will result in slower rotation and feed rates. Blow air through all hoses before connecting. Drain the filter bowl if it fills with water.   |
| Rail             | The lance rail should be kept clean. Do not apply any lubrication to the rail, as this tends to collect grit and increase wear.   |
| Chain            | Spray with a light oil occasionally to prevent corrosion  |
| Air Motor        | Air motors should be lubricated after use to prevent internal corrosion and seizing. To do this, remove air hose from motor fitting and squirt in some light oil.<br><br>Reconnect air line and run for a few seconds to distribute oil in motor. If the air motor seizes and does not run, remove air motor from gearbox, squirt some oil into ports, and try to rotate motor shaft with wrench until it breaks free. This does have the risk of damaging the vanes in the motor, but usually is successful. |

## PARTS DIAGRAM

**BRLM 500-XX**  
RIGID LANCING MACHINE

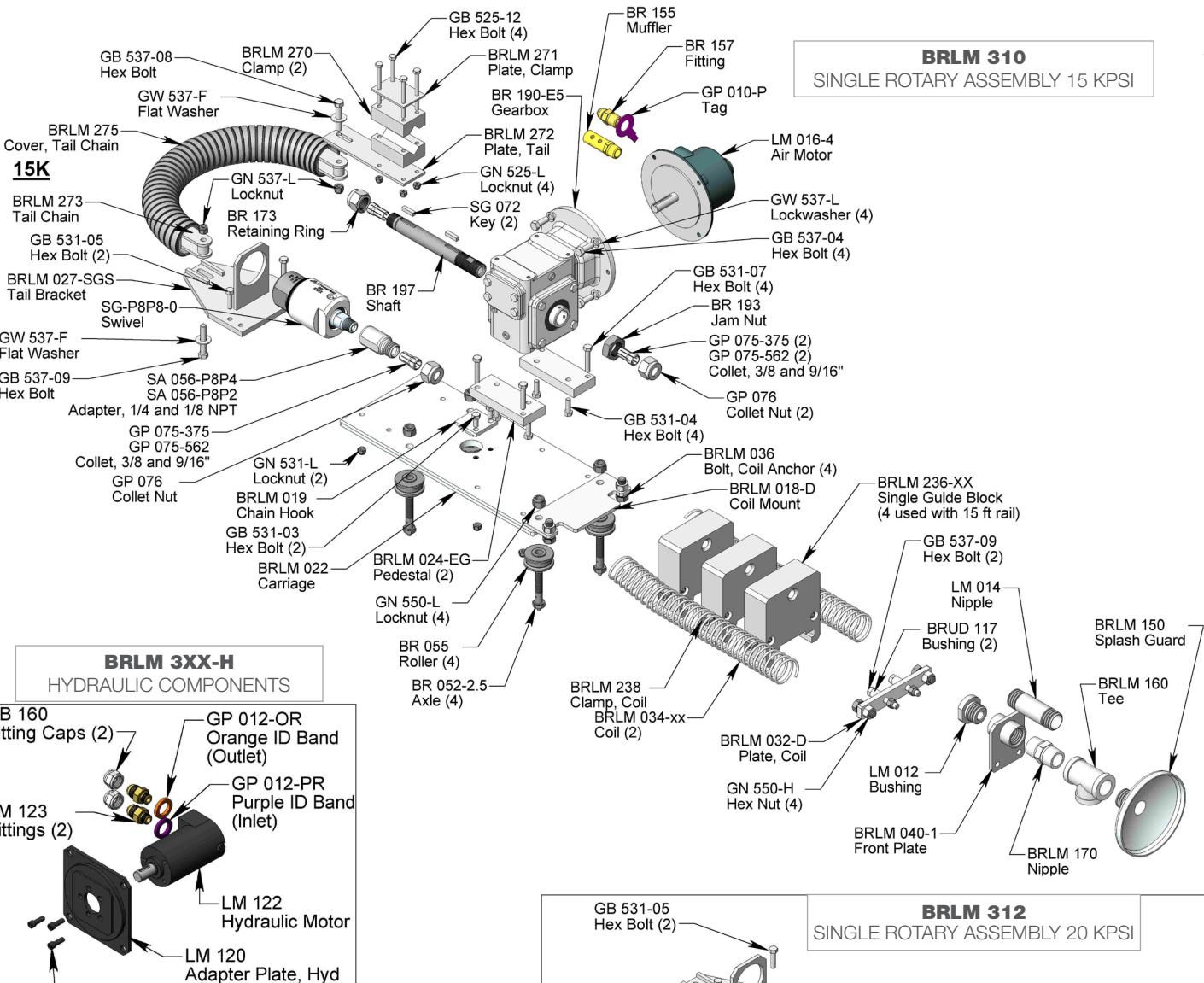


**BRLM 580-X**  
EXTENSION KIT

## PARTS DIAGRAM

### BRLM 3XX

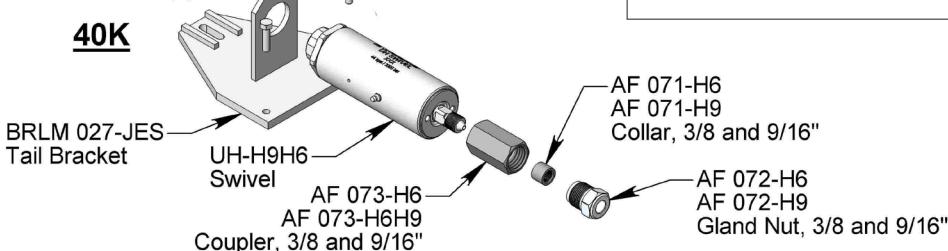
SINGLE ROTARY ASSEMBLY 15, 20, AND 40 KPSI



### BRLM 330

SINGLE ROTARY ASSEMBLY 40 KPSI

**40K**



### BRLM 310

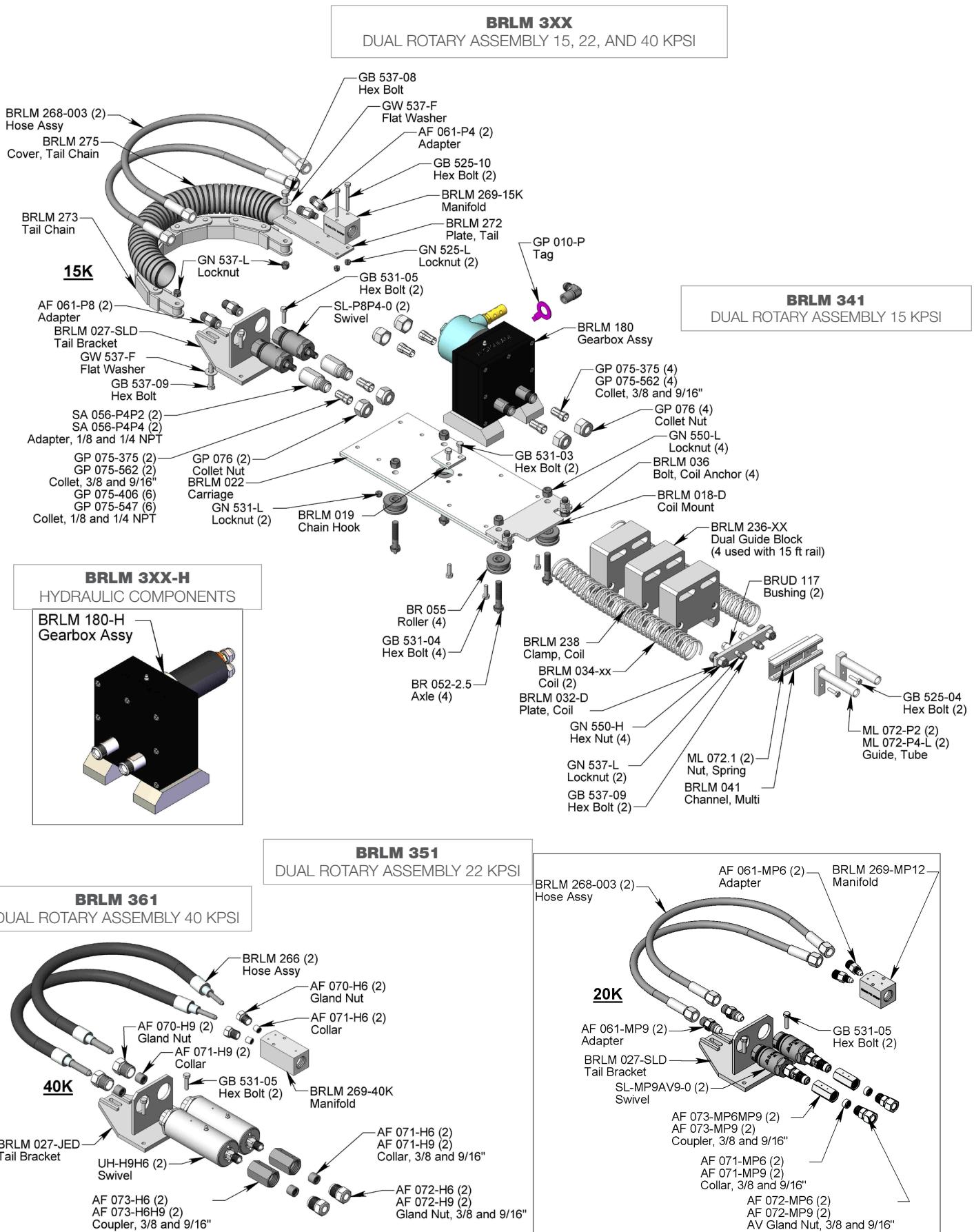
SINGLE ROTARY ASSEMBLY 15 KPSI

**20K**

### BRLM 312

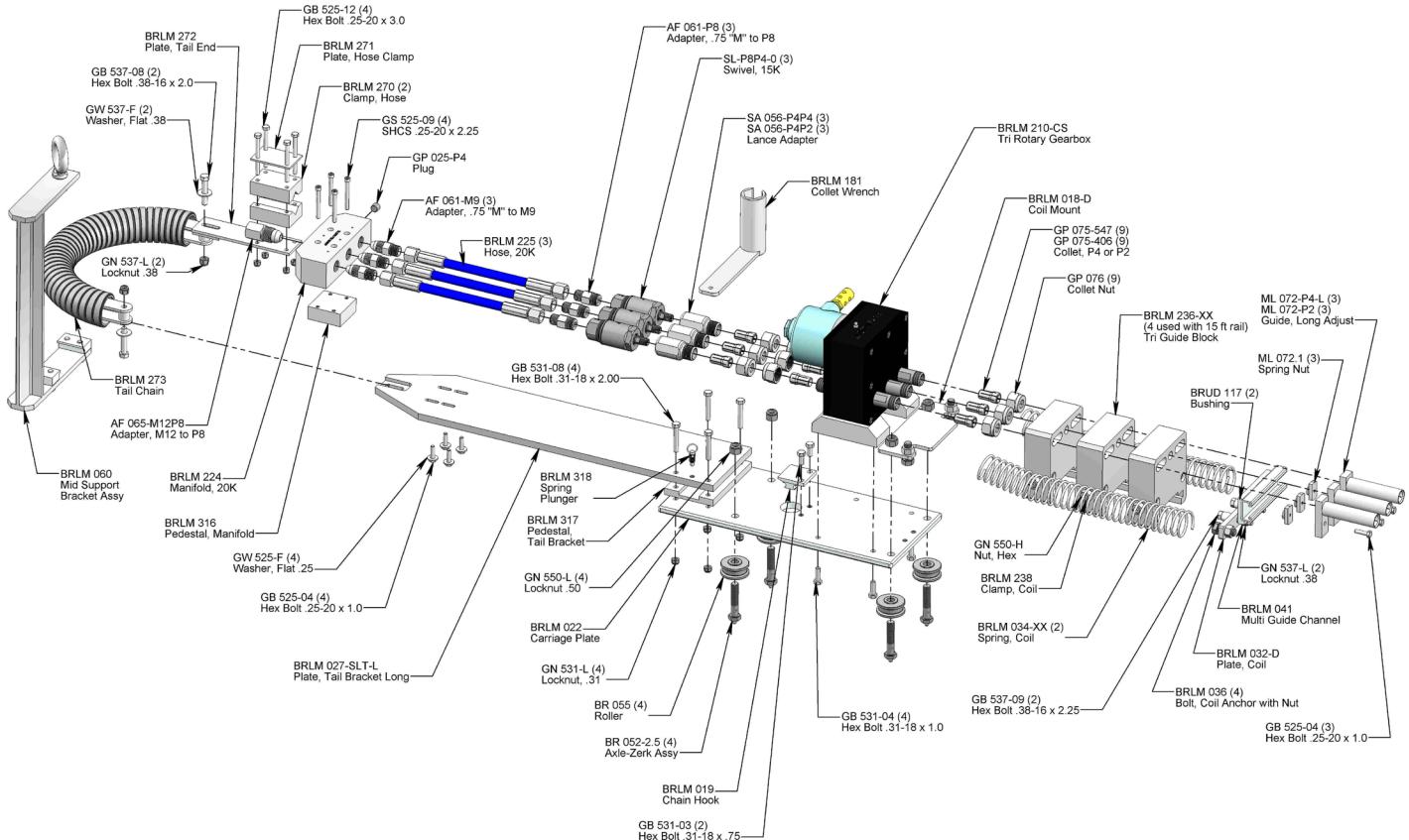
SINGLE ROTARY ASSEMBLY 20 KPSI



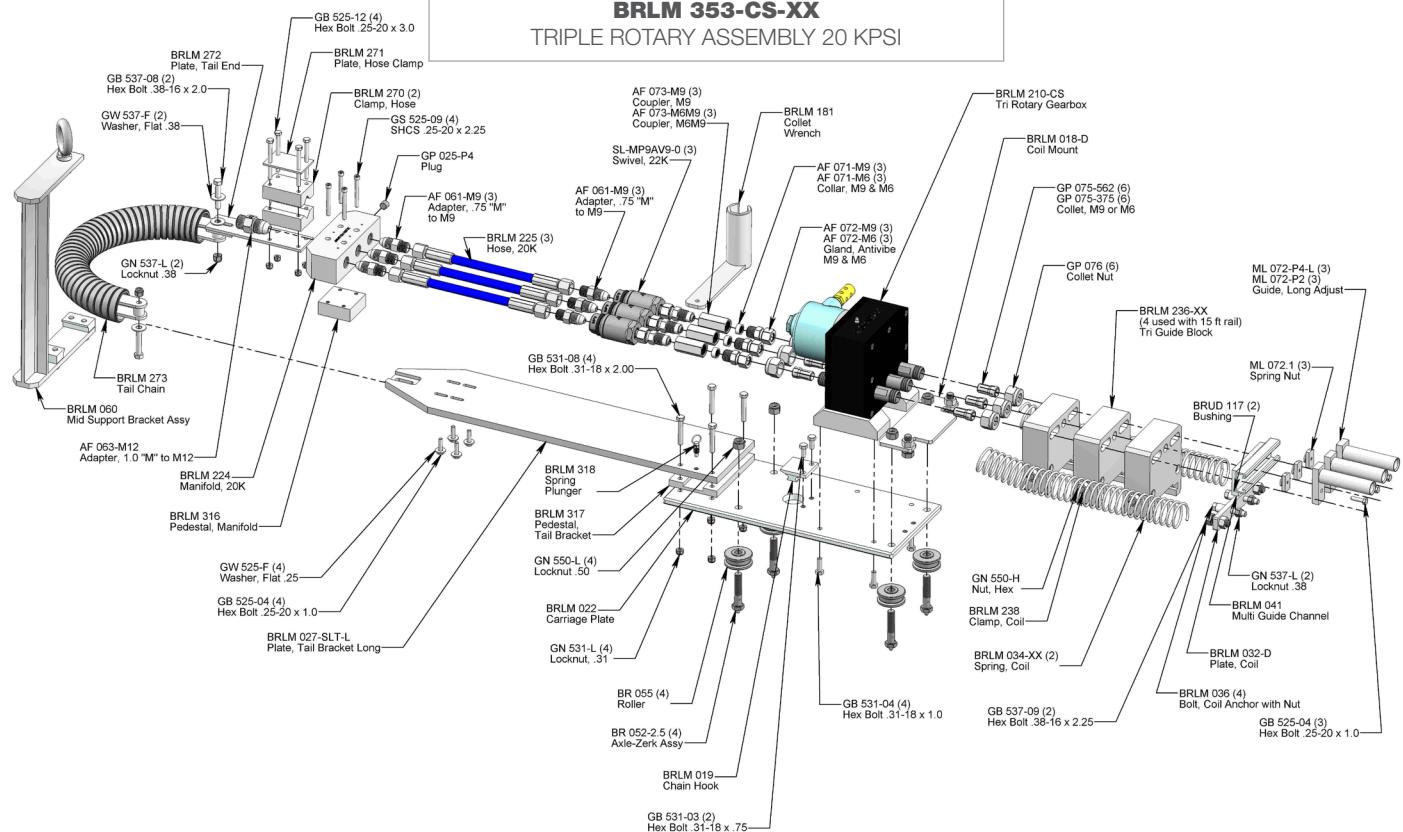


## PARTS DIAGRAM

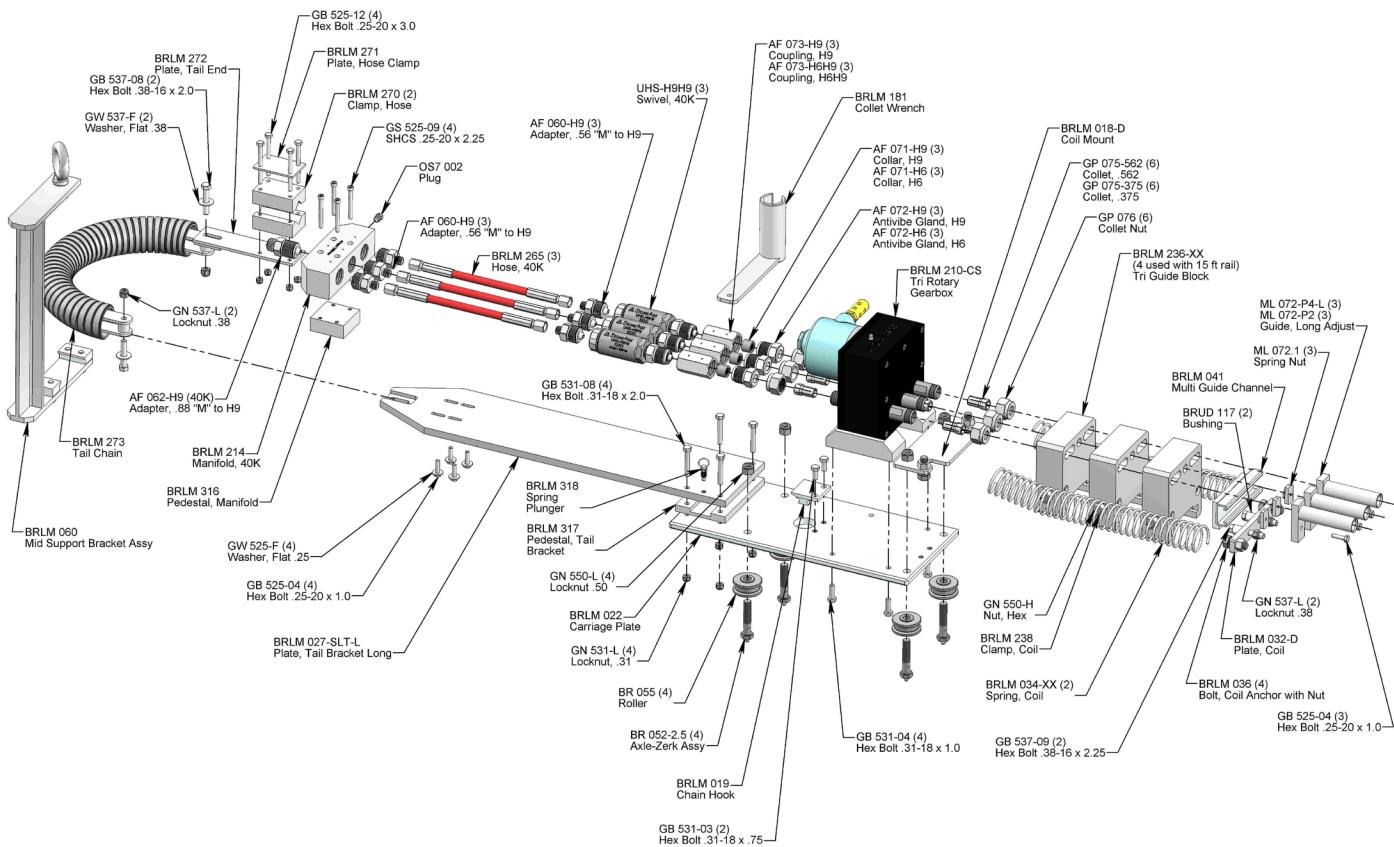
**BRLM 343-CS-XX**  
TRIPLE ROTARY ASSEMBLY 15 KPSI



**BRLM 353-CS-XX**  
TRIPLE ROTARY ASSEMBLY 20 KPSI

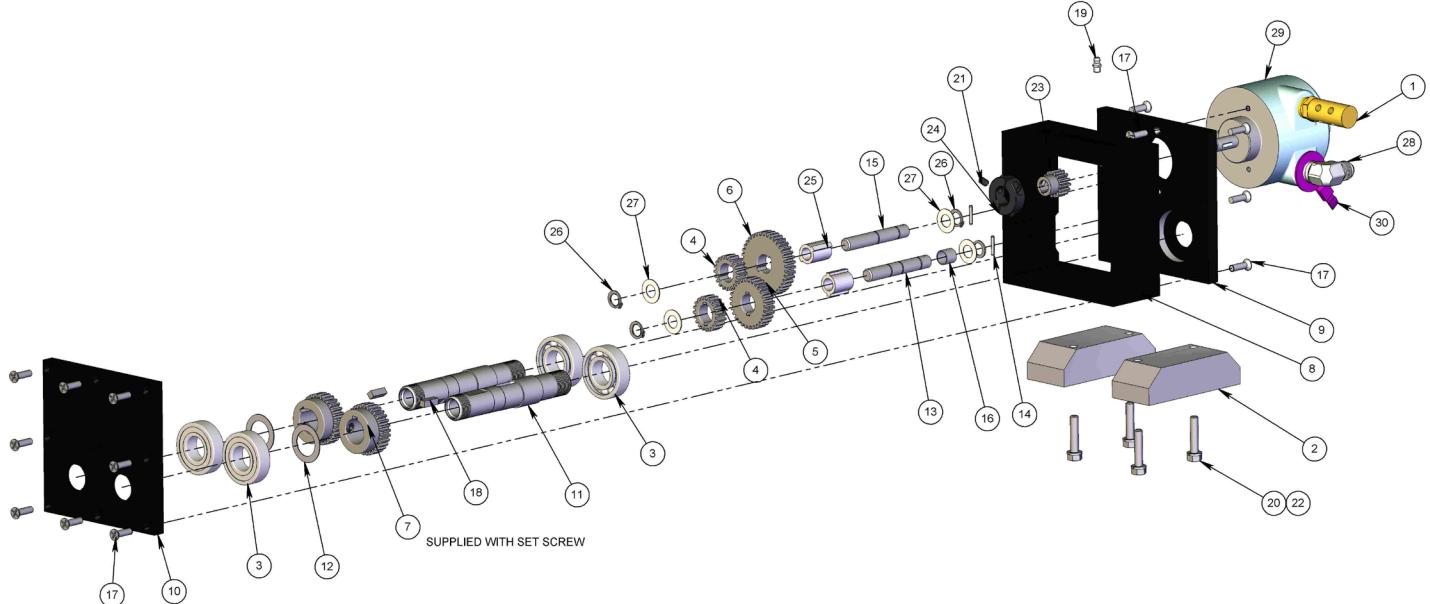


**BRLM 363-CS-XX**  
TRIPLE ROTARY ASSEMBLY 40 KPSI



## PARTS DIAGRAM

**BRLM 180**  
DUAL ROTARY GEARBOX

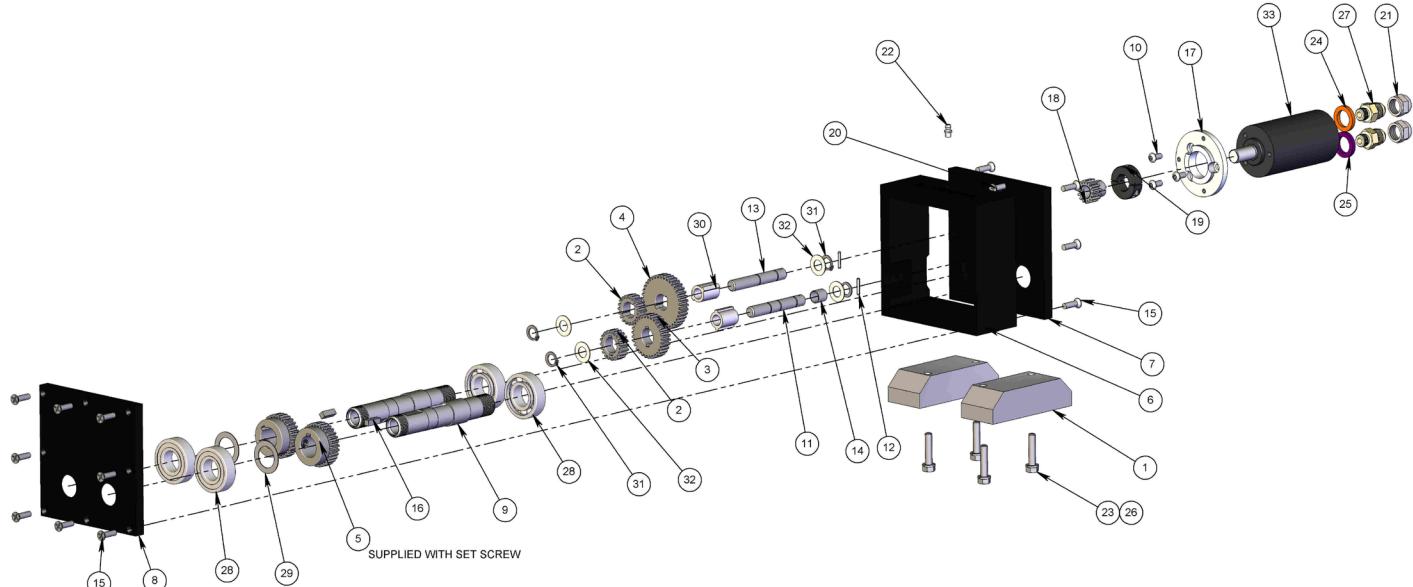


| #  | PART NUMBER                  | QTY. |
|----|------------------------------|------|
| 1  | BR 155 MUFFLER               | 1    |
| 2  | BRLM 024-SA BLOCK, MOUNT STD | 2    |
| 3  | BRLM 109 BEARING             | 4    |
| 4  | BRLM 172 BOSTONGEAR-GB20     | 2    |
| 5  | BRLM 174 BOSTONGEAR-GB30     | 1    |
| 6  | BRLM 176 BOSTONGEAR-GB38     | 1    |
| 7  | BRLM 178 BOSTONGEAR-NB30B-1  | 2    |
| 8  | BRLM 182 HOUSING, SPUR       | 1    |
| 9  | BRLM 183 PLATE, COVER REAR   | 1    |
| 10 | BRLM 184 PLATE, COVER FRONT  | 1    |

|    |                                    |    |
|----|------------------------------------|----|
| 11 | BRLM 186 SHAFT, SPUR GEAR          | 2  |
| 12 | BRLM 188 SHIM, SS                  | 2  |
| 13 | BRLM 190 SHAFT, FINAL              | 1  |
| 14 | BRLM 191 SPRING PIN, .125 X .75    | 2  |
| 15 | BRLM 192 SHAFT, INTERMEDIATE       | 1  |
| 16 | BRLM 193 SPACER,FINAL SHAFT        | 1  |
| 17 | BRLM 194 FHSCS .25-20 X .88 LONG   | 18 |
| 18 | BRLM 195 KEY, SQ .250 X .250 X .75 | 2  |
| 19 | FS 004-0 ZERK, STRAIGHT            | 1  |
| 20 | GB 531-06 BOLT, HEX .31-18 X 1.50  | 4  |
| 21 | GSS 525-28-37CU SET SCREW          | 1  |

|    |                                     |   |
|----|-------------------------------------|---|
| 22 | GW 531-L LOCK WASHER                | 4 |
| 23 | HRS 510 GEAR, 15T                   | 1 |
| 24 | HRS 510.2 COLLAR ASSY, PINION       | 1 |
| 25 | HRS 515 GEAR BUSHING                | 2 |
| 26 | HRS 518 RETAINING RING, SL EXTERNAL | 4 |
| 27 | HRS 529 THRUST WASHER               | 4 |
| 28 | HRS 573 FITTING 90 DEG P8J8         | 1 |
| 29 | SG 055 AIR MOTOR                    | 1 |
| 30 | GP 010-P PLASTIC ID WASHER P8       | 1 |

**BRLM 180H**  
DUAL ROTARY GEARBOX HYDRAULIC OPTION

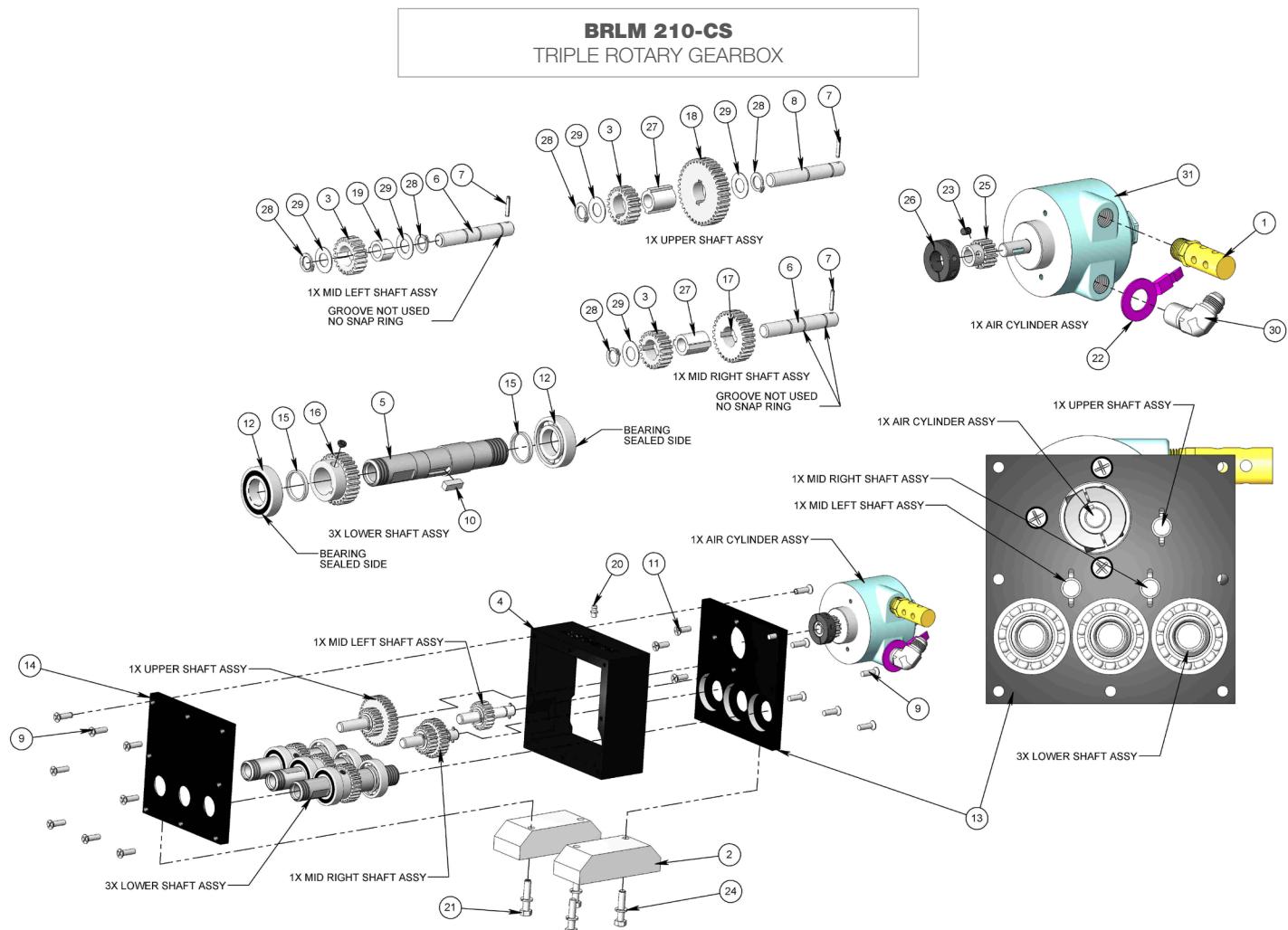


| #  | PART NUMBER                      | QTY. |
|----|----------------------------------|------|
| 1  | BRLM 024-SA BLOCK, MOUNT STD     | 2    |
| 2  | BRLM 172 BOSTONGEAR-GB20         | 2    |
| 3  | BRLM 174 BOSTONGEAR-GB30         | 1    |
| 4  | BRLM 176 BOSTONGEAR-GB38         | 1    |
| 5  | BRLM 178 BOSTONGEAR-NB30B-1      | 2    |
| 6  | BRLM 182 HOUSING, SPUR           | 1    |
| 7  | BRLM 183 PLATE, COVER REAR       | 1    |
| 8  | BRLM 184 PLATE, COVER FRONT      | 1    |
| 9  | BRLM 186 SHAFT, SPUR GEAR        | 2    |
| 10 | BRLM 189 SBHCS .25-28 X .50 LONG | 3    |

|    |                                    |    |
|----|------------------------------------|----|
| 11 | BRLM 190 SHAFT, FINAL              | 1  |
| 12 | BRLM 191 SPRING PIN, .125 X .75    | 2  |
| 13 | BRLM 192 SHAFT, INTERMEDIATE       | 1  |
| 14 | BRLM 193 SPACER,FINAL SHAFT        | 1  |
| 15 | BRLM 194 FHSCS .25-20 X .88 LONG   | 15 |
| 16 | BRLM 195 KEY, SQ .250 X .250 X .75 | 2  |
| 17 | BRLM 196 ADAPTER, HYD MOTOR        | 1  |
| 18 | BRLM 197 GEAR 15T HYD MOTOR        | 1  |
| 19 | BRLM 198 COLLAR ASSY, PINION       | 1  |
| 20 | BRLM 199 FHSCS .25-20 X .75 LONG   | 3  |
| 21 | CB 160 JIC-8 CAP                   | 2  |
| 22 | FS 004-0 ZERK, STRAIGHT            | 1  |

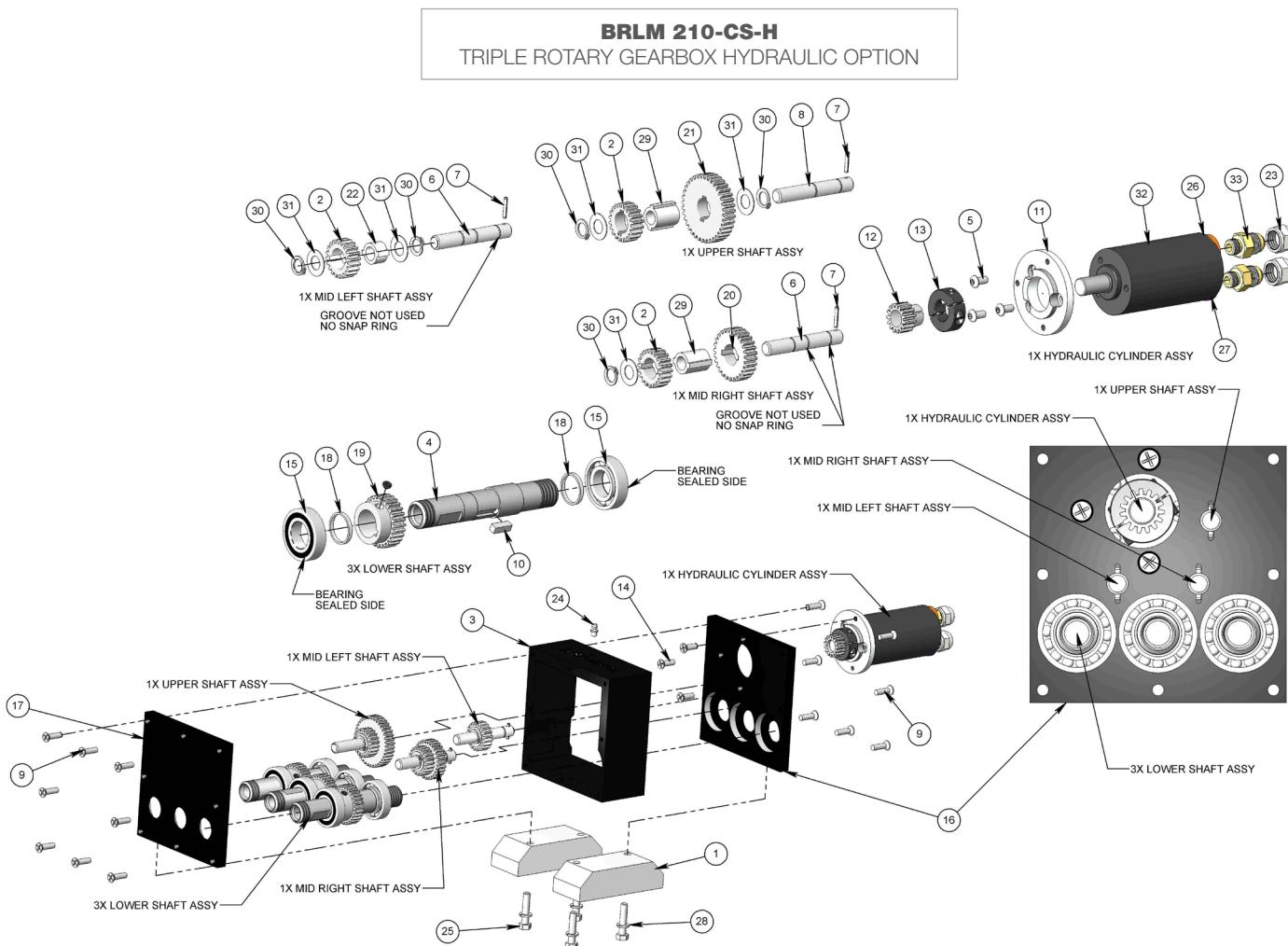
|    |                                     |   |
|----|-------------------------------------|---|
| 23 | GB 531-06 BOLT, HEX .31-18 X 1.50   | 4 |
| 24 | GP 012-0G ORANGE ID BAND            | 1 |
| 25 | GP 012-PR PURPLE ID BAND            | 1 |
| 26 | GW 531-L LOCK WASHER                | 4 |
| 27 | LM 123 FITTING HYD                  | 2 |
| 28 | BRLM 109 BEARING                    | 4 |
| 29 | BRLM 188 SHIM, SS                   | 2 |
| 30 | HRS 515 GEAR BUSHING                | 2 |
| 31 | HRS 518 RETAINING RING, SL EXTERNAL | 4 |
| 32 | HRS 529 THRUST WASHER               | 4 |
| 33 | LM 121 HYD MOTOR                    | 1 |

## PARTS DIAGRAM



| #  | PART NUMBER                        | QTY. |
|----|------------------------------------|------|
| 1  | BR 155 MUFFLER                     | 1    |
| 2  | BRLM 024-SA BLOCK, MOUNT STD       | 2    |
| 3  | BRLM 172 BOSTONGEAR-GB20           | 3    |
| 4  | BRLM 182 HOUSING, SPUR             | 1    |
| 5  | BRLM 186 SHAFT, SPUR GEAR          | 3    |
| 6  | BRLM 190 SHAFT, FINAL              | 2    |
| 7  | BRLM 191 SPRING PIN, .125 X .75    | 3    |
| 8  | BRLM 192 SHAFT, INTERMEDIATE       | 1    |
| 9  | BRLM 194 FHSCS .25-20 X .88 LONG   | 15   |
| 10 | BRLM 195 KEY, SQ .250 X .250 X .75 | 3    |
| 11 | BRLM 199 FHSCS .25-20 X .75 LONG   | 3    |
| 12 | BRLM 201 BEARING                   | 6    |
| 13 | BRLM 203 PLATE, COVER REAR         | 1    |
| 14 | BRLM 204 PLATE, COVER FRONT        | 1    |
| 15 | BRLM 207 SPACER, SPUR SHAFT        | 6    |

|    |                                     |   |
|----|-------------------------------------|---|
| 16 | BRLM 211 GEAR, MODIFIED             | 3 |
| 17 | BRLM 212 BOSTONGEAR-GB28            | 1 |
| 18 | BRLM 213 BOSTONGEAR-GB37            | 1 |
| 19 | BRLM 215 GEAR BUSHING MOD           | 1 |
| 20 | FS 004-0 ZERK, STRAIGHT             | 1 |
| 21 | GB 531-06 BOLT, HEX .31-18 X 1.50   | 4 |
| 22 | GP 010-X PLASTIC ID WASHER P8       | 1 |
| 23 | GSS 525-28-37CU SET SCREW           | 1 |
| 24 | GW 531-L LOCK WASHER                | 4 |
| 25 | HRS 510 GEAR, 15T                   | 1 |
| 26 | HRS 510.2 COLLAR ASSY, PINION       | 1 |
| 27 | HRS 515 GEAR BUSHING                | 2 |
| 28 | HRS 518 RETAINING RING, SL EXTERNAL | 5 |
| 29 | HRS 529 THRUST WASHER               | 5 |
| 30 | HRS 573 FITTING 90 DEG P8J8         | 1 |
| 31 | SG 055 AIR MOTOR                    | 1 |



| #  | PART NUMBER                        | QTY. |
|----|------------------------------------|------|
| 1  | BRLM 024-SA BLOCK, MOUNT STD       | 2    |
| 2  | BRLM 172 BOSTONGEAR-GB20           | 3    |
| 3  | BRLM 182 HOUSING, SPUR             | 1    |
| 4  | BRLM 186 SHAFT, SPUR GEAR          | 3    |
| 5  | BRLM 189 SBHCS .25-28 X .50 LONG   | 3    |
| 6  | BRLM 190 SHAFT, FINAL              | 2    |
| 7  | BRLM 191 SPRING PIN, .125 X .75    | 3    |
| 8  | BRLM 192 SHAFT, INTERMEDIATE       | 1    |
| 9  | BRLM 194 FHSCS .25-20 X .88 LONG   | 15   |
| 10 | BRLM 195 KEY, SQ .250 X .250 X .75 | 3    |
| 11 | BRLM 196 ADAPTER, HYD MOTOR        | 1    |
| 12 | BRLM 197 GEAR 15T HYD MOTOR        | 1    |
| 13 | BRLM 198 COLLAR ASSY, PINION       | 1    |
| 14 | BRLM 199 FHSCS .25-20 X .75 LONG   | 3    |
| 15 | BRLM 201 BEARING                   | 6    |
| 16 | BRLM 203 PLATE, COVER REAR         | 1    |

|    |                                     |   |
|----|-------------------------------------|---|
| 17 | BRLM 204 PLATE, COVER FRONT         | 1 |
| 18 | BRLM 207 SPACER, SPUR SHAFT         | 6 |
| 19 | BRLM 211 GEAR, MODIFIED             | 3 |
| 20 | BRLM 212 BOSTONGEAR-GB28            | 1 |
| 21 | BRLM 213 BOSTONGEAR-GB37            | 1 |
| 22 | BRLM 215 GEAR BUSHING MOD           | 1 |
| 23 | CB 160 JIC-8 CAP                    | 2 |
| 24 | FS 004-0 ZERK, STRAIGHT             | 1 |
| 25 | GB 531-06 BOLT, HEX .31-18 X 1.50   | 4 |
| 26 | GP 012-0G ORANGE ID BAND            | 1 |
| 27 | GP 012-PR PURPLE ID BAND            | 1 |
| 28 | GW 531-L LOCK WASHER                | 4 |
| 29 | HRS 515 GEAR BUSHING                | 2 |
| 30 | HRS 518 RETAINING RING, SL EXTERNAL | 5 |
| 31 | HRS 529 THRUST WASHER               | 5 |
| 32 | LM 121 HYD MOTOR                    | 1 |
| 33 | LM 123 FITTING HYD                  | 2 |

## PARTS DIAGRAM

**BRLM 236-XXX**  
GUIDE BLOCK KITS

Attach blocks every 8th coil.

5 FT EXTENSION  
(2 BLOCKS, 1 TAIL)



10 FT EXTENSION  
(3 BLOCKS, 1 TAIL)



15 FT EXTENSION  
(4 BLOCKS, 1 TAIL)



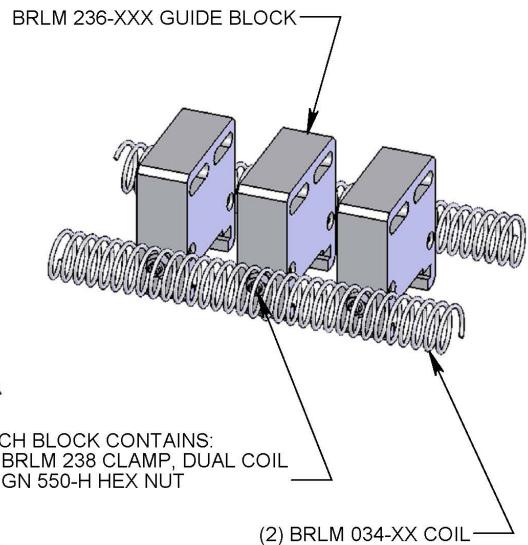
15 FT DRIVE  
(4 BLOCKS, 2 TAILS)



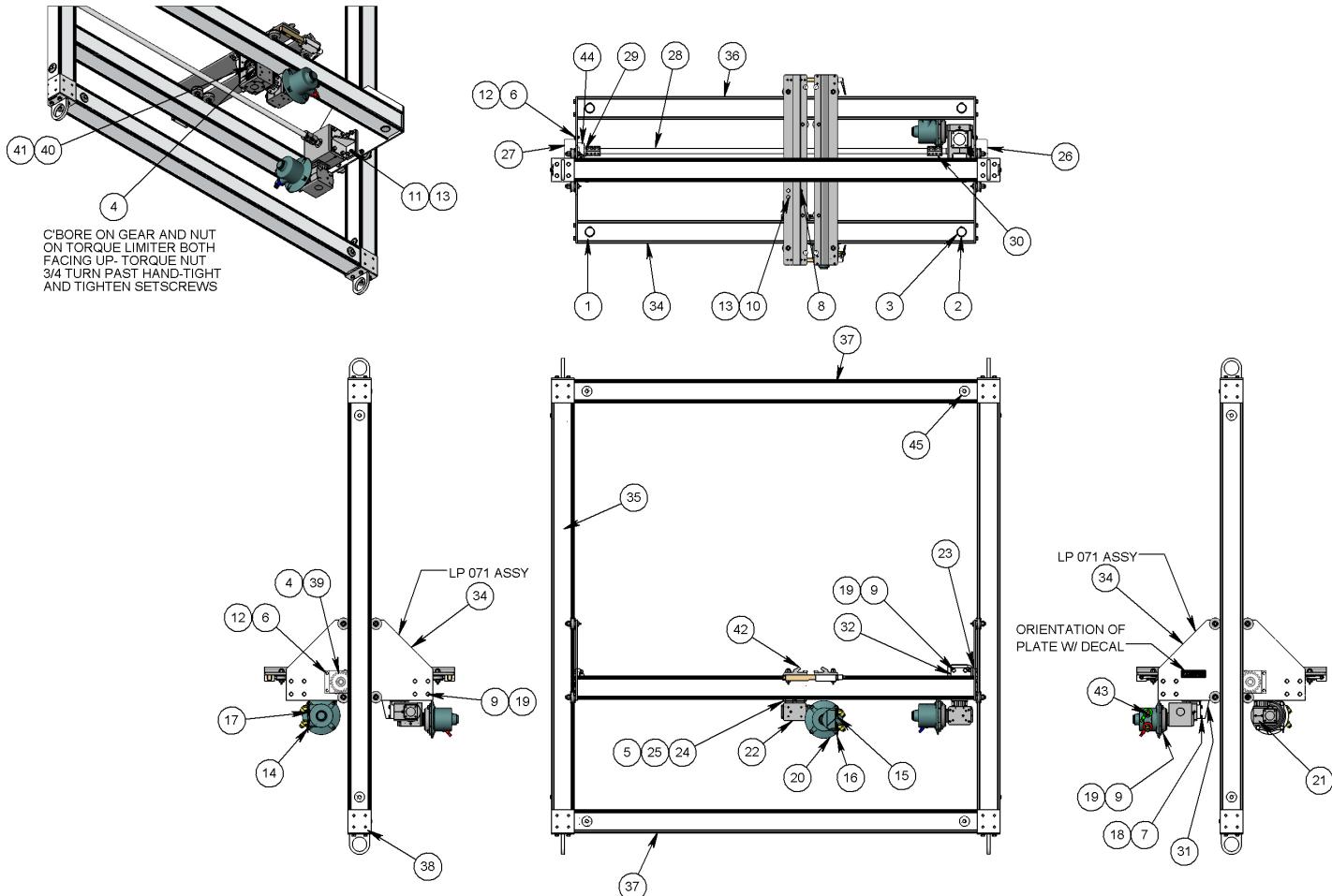
20 FT EXTENSION  
(6 BLOCKS, 1 TAIL)



25 FT DRIVE  
(7 BLOCKS, 2 TAILS)



**LANCE POSITIONER (LP-300)**  
LANCE POSITIONER ASSEMBLY



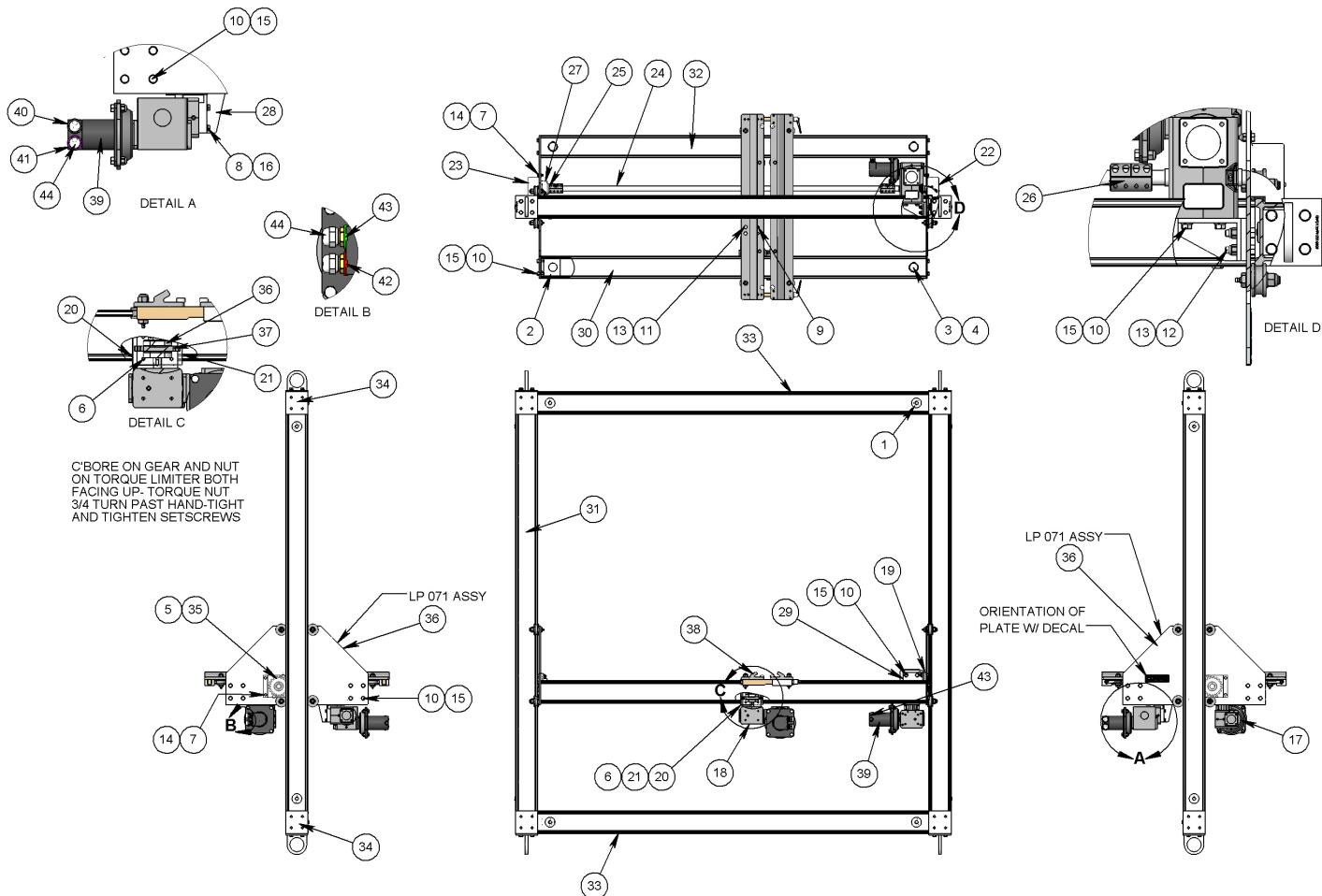
| #  | PART NUMBER                         | QTY. |
|----|-------------------------------------|------|
| 1  | BRUD 072 BEAM INSERT                | 4    |
| 2  | BRUD 073 BEAM PIN                   | 4    |
| 3  | BRUD 172 RETAINING RING, EXTERNAL   | 8    |
| 4  | CST 022.1 KEY .187 SQ X 1.00        | 7    |
| 5  | GB 525-02 BOLT, HEX .25-20 X .50    | 4    |
| 6  | GB 525-03 BOLT, HEX .25-20 X .75    | 4    |
| 7  | GB 525-05 BOLT, HEX .25-20 X 1.25   | 4    |
| 8  | GB 537-025 BOLT, HEX .37-16 X .62   | 2    |
| 9  | GB 537-04 BOLT, HEX .37-16 X 1.00   | 28   |
| 10 | GB 537-05 BOLT, HEX .37-16 X 1.25   | 4    |
| 11 | GB 537-06 BOLT, HEX .37-16 X 1.50   | 4    |
| 12 | GN 525-L NYLOK NUT                  | 4    |
| 13 | GN 537-L NYLOK NUT                  | 8    |
| 14 | GP 010-B BLUE PLASTIC ID WASHER P8  | 1    |
| 15 | GP 010-G GREEN PLASTIC ID WASHER P8 | 1    |

|    |                                      |    |
|----|--------------------------------------|----|
| 16 | GP 010-R RED PLASTIC ID WASHER P8    | 1  |
| 17 | GP 010-Y YELLOW PLASTIC ID WASHER P8 | 1  |
| 18 | GW 525-L LOCK WASHER                 | 8  |
| 19 | GW 537-L LOCK WASHER                 | 28 |
| 20 | LM 016-4 AIR MOTOR                   | 2  |
| 21 | LP 011-PC 2104 400-1 RALR            | 1  |
| 22 | LP 012-PC 1304 400-1 ULR             | 1  |
| 23 | LP 013 SPACER, VERTICAL GEARBOX      | 1  |
| 24 | LP 028 GUARD, GEAR HZ RH             | 1  |
| 25 | LP 029 GUARD, GEAR HZ LH             | 1  |
| 26 | LP 030 GUARD, GEAR RH                | 1  |
| 27 | LP 031 GUARD, GEAR LH                | 1  |
| 28 | LP 032-78 SHAFT, DRIVE               | 1  |
| 29 | LP 033 SHAFT, STUB                   | 1  |
| 30 | LP 034-001 COUPLING                  | 2  |
| 31 | LP 050-SS GEARBOX MOUNT HORIZONTAL   | 1  |

|    |   |   |
|----|---|---|
| 32 | LP 055-SS GEARBOX MOUNT VERTICAL              | 1 |
| 33 | LP 071 ASSY, 2 SIDE PLATES & ROLLERS          | 1 |
| 34 | LP 074-XX RAIL SLOTTED HORIZONTAL             | 1 |
| 35 | LP 076 RAIL SLOTTED VERTICAL                  | 2 |
| 36 | LP 077-XX CROSS BEAM                          | 1 |
| 37 | LP 078-XX CROSS TIE                           | 2 |
| 38 | LP 094-X CORNER ASSY                          | 4 |
| 39 | LP 170 GEAR WELDMENT                          | 2 |
| 40 | LP 225 TORQUE LIMITER                         | 1 |
| 41 | LP 270 GEAR, SPUR                             | 1 |
| 42 | LP 700 CARRIAGE CLAMP ASSY                    | 1 |
| 43 | ML 017-8.8 FITTING, ELBOW 45 P8J8             | 4 |
| 44 | LP 036 BEARING, FLANGE MOUNT (MFR VARIATIONS) | 1 |
| 45 | BR 008-BU-001 WEDGE BOLT                      | 8 |

## PARTS DIAGRAM

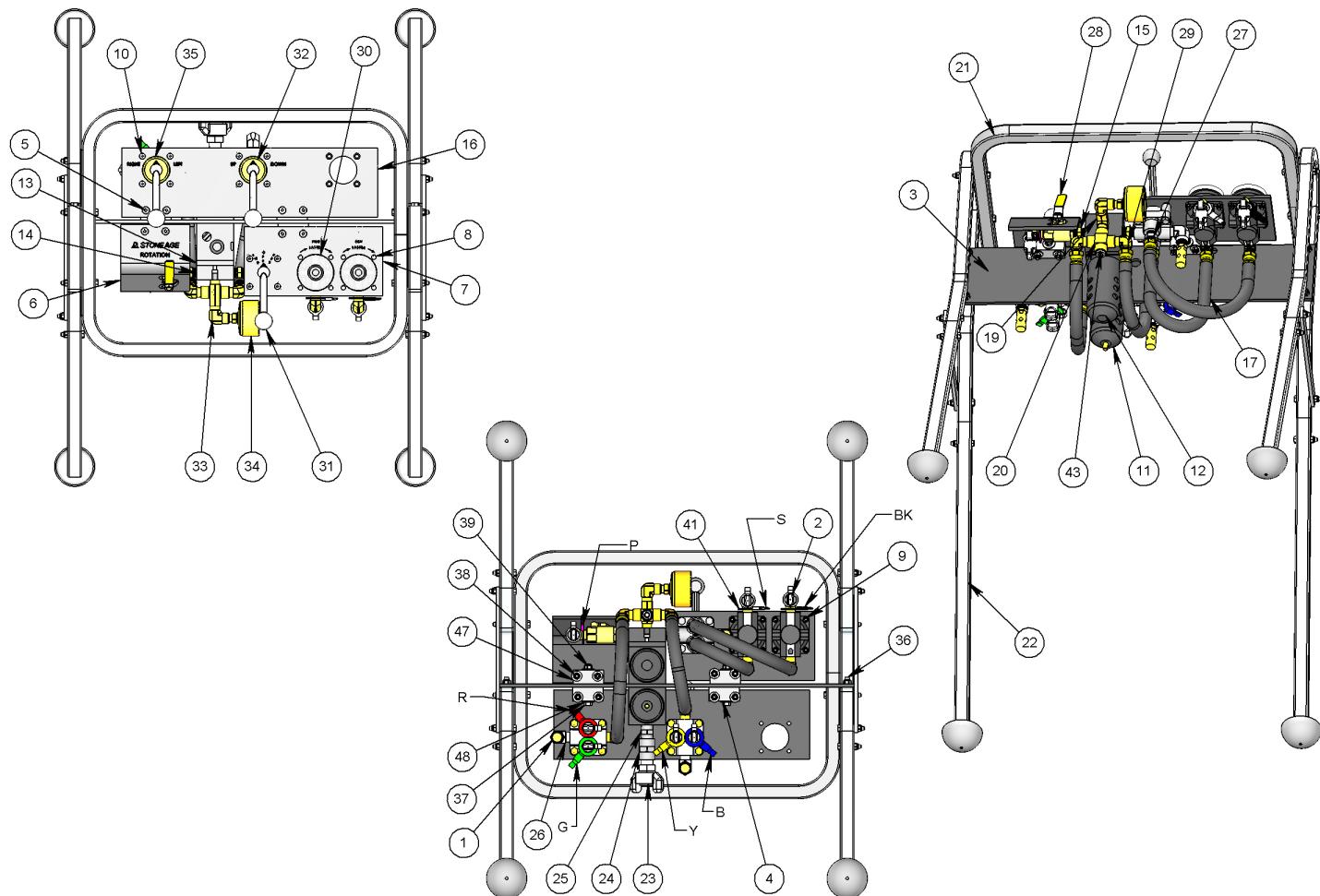
**LANCE POSITIONER (LP-300H-XX)**  
LANCE POSITIONER ASSEMBLY - HYDRAULIC



| #  | PART NUMBER                       | QTY |
|----|-----------------------------------|-----|
| 1  | BR 008-BU-001 WEDGE BOLT          | 8   |
| 2  | BRUD 072 BEAM INSERT              | 4   |
| 3  | BRUD 073 BEAM PIN                 | 4   |
| 4  | BRUD 172 RETAINING RING, EXTERNAL | 8   |
| 5  | CST 022.1 KEY .187 SQ X 1.00      | 7   |
| 6  | GB 525-02 BOLT, HEX .25-20 X .50  | 4   |
| 7  | GB 525-03 BOLT, HEX .25-20 X .75  | 4   |
| 8  | GB 525-05 BOLT, HEX .25-20 X 1.25 | 4   |
| 9  | GB 537-025 BOLT, HEX .37-16 X .62 | 2   |
| 10 | GB 537-04 BOLT, HEX .37-16 X 1.00 | 20  |
| 11 | GB 537-05 BOLT, HEX .37-16 X 1.25 | 4   |
| 12 | GB 537-06 BOLT, HEX .37-16 X 1.50 | 4   |
| 13 | GN 537-L NYLOK NUT                | 8   |
| 14 | GN 525-L NYLOK NUT                | 4   |
| 15 | GW 537-L LOCK WASHER              | 20  |
| 16 | GW 525-L LOCK WASHER              | 8   |

|    |   |   |
|----|---|---|
| 17 | LP 011-PC 2104 400-1 RALR                     | 1 |
| 18 | LP 012-PC 1304 400-1 ULR                      | 1 |
| 19 | LP 013 SPACER, VERTICAL GEARBOX               | 1 |
| 20 | LP 028 GUARD, GEAR HZ RH                      | 1 |
| 21 | LP 029 GUARD, GEAR HZ LH                      | 1 |
| 22 | LP 030 GUARD, GEAR RH                         | 1 |
| 23 | LP 031 GUARD, GEAR LH                         | 1 |
| 24 | LP 032-78 SHAFT, DRIVE                        | 1 |
| 25 | LP 033 SHAFT, STUB                            | 1 |
| 26 | LP 034-001 COUPLING                           | 2 |
| 27 | LP 036 BEARING, FLANGE MOUNT (MFR VARIATIONS) | 1 |
| 28 | LP 050-SS GEARBOX MOUNT HORIZONTAL            | 1 |
| 29 | LP 055-SS GEARBOX MOUNT VERTICAL              | 1 |
| 30 | LP 074-78 RAIL SLOTTED HORIZONTAL             | 1 |
| 31 | LP 076 RAIL SLOTTED VERTICAL                  | 2 |

|    |                                      |   |
|----|--------------------------------------|---|
| 32 | LP 077-78 CROSS BEAM                 | 1 |
| 33 | LP 078-XX CROSS TIE                  | 2 |
| 34 | LP 094-X CORNER ASSY                 | 4 |
| 35 | LP 170 GEAR WELDMENT                 | 2 |
| 36 | LP 225 TORQUE LIMITER                | 1 |
| 37 | LP 270 GEAR, SPUR                    | 1 |
| 38 | LP 700 CARRIAGE CLAMP ASSY           | 1 |
| 39 | LM 122 HYD MTR & LM 120 ADPT ASSY    | 2 |
| 40 | GP 012-BK BLACK ID BAND LG           | 1 |
| 41 | GP 012-PK PINK ID BAND LG            | 1 |
| 42 | GP 012-RD RED ID BAND LG             | 1 |
| 43 | GP 012-GN GREEN ID BAND LG           | 1 |
| 44 | CB 160 JIC-8 CAP                     | 4 |
| 45 | LP 071 ASSY, 2 SIDE PLATES & ROLLERS | 1 |

**LANCE POSITIONER (CB-LP)**  
 CONTROL BOX


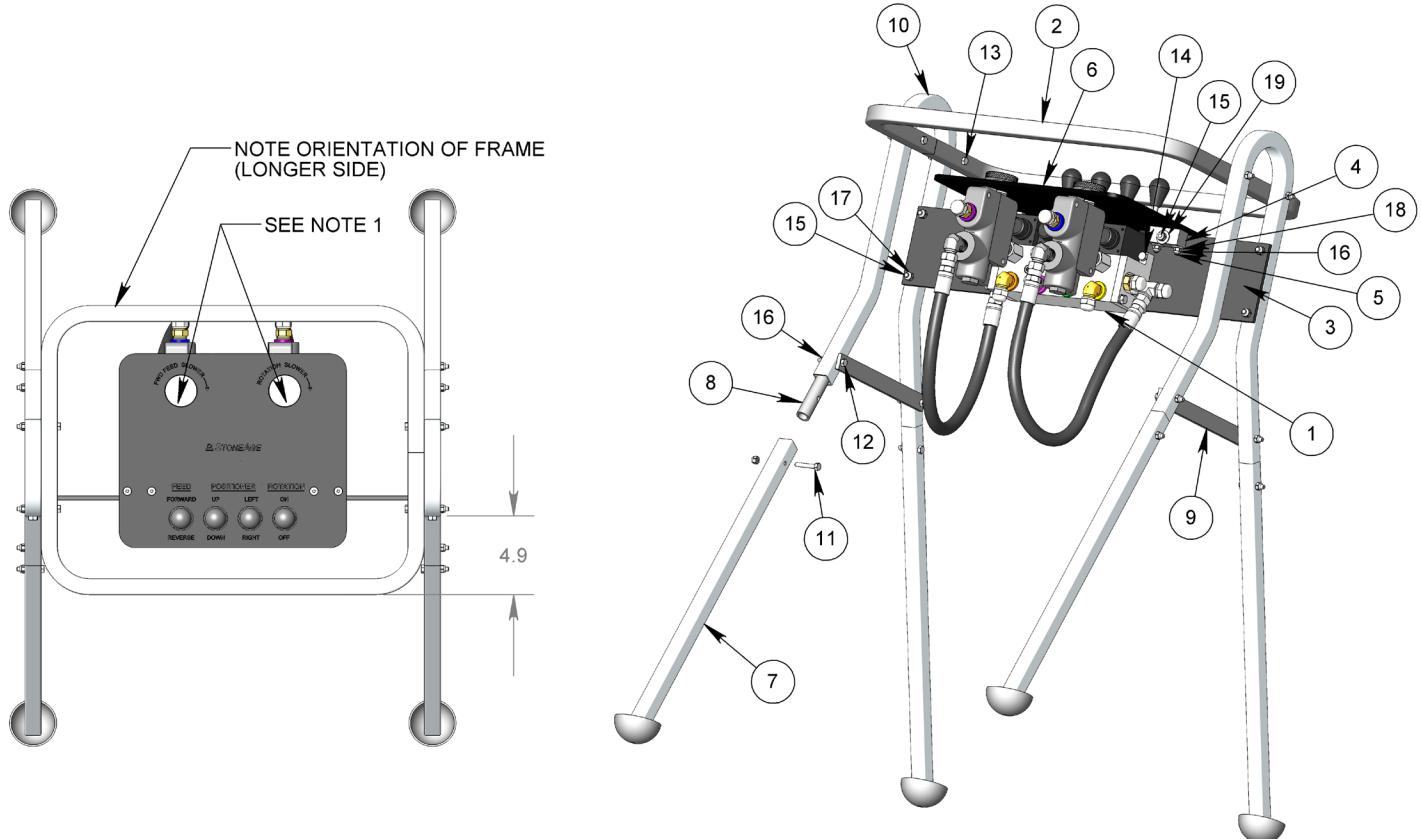
| #  | PART NUMBER                         | QTY. |
|----|-------------------------------------|------|
| 1  | BR 154 MUFFLER                      | 3    |
| 2  | BR 167 DUST CAP                     | 7    |
| 3  | CB 004-D MOUNTING PLATE             | 1    |
| 4  | CB 006 MOUNT BLOCK                  | 4    |
| 5  | CB 508 FSHCS .25-20 X 1.75 SS       | 8    |
| 6  | CB 010 ROTATION CONTROL PANEL       | 1    |
| 7  | CB 012-D PLATE DUAL REGULATOR       | 1    |
| 8  | CB 512.1 HHMS .19-24 X .75 SS       | 8    |
| 9  | CB 012.2 NUT, NYLOK (.190 X 24 UNC) | 8    |
| 10 | CB 555 FSHCS .19-24 X .50 SS        | 14   |
| 11 | CB 020 FILTER                       | 1    |
| 12 | CB 022 OILER                        | 1    |
| 13 | CB 023 PLATE, DIRECTION             | 1    |
| 14 | CB 024 PLATE END                    | 1    |
| 15 | CB 026 FITTING NIPPLE               | 2    |
| 16 | CB 050 PLATE, XYZ                   | 1    |

|    |                                 |   |
|----|---------------------------------|---|
| 17 | CB 052-14 HOSE ASSY             | 4 |
| 18 | CB 052-14 HOSE ASSY (REV)       | 1 |
| 19 | CB 054 FITTING TEE              | 1 |
| 20 | CB 058 FITTING, CROSS           | 1 |
| 21 | CB 100 FRAME SUB ASSY           | 1 |
| 22 | CB 107 LEG AS                   | 4 |
| 23 | CB 114 INLET FITTING            | 1 |
| 24 | CB 115 COUPLING                 | 1 |
| 25 | CB 116 NIPPLE                   | 1 |
| 26 | CB 120 ELBOW FITTING .375       | 3 |
| 27 | CB 122 FITTING, OUTLET P6J8     | 6 |
| 28 | CB 124 BALL VALVE ASSY          | 1 |
| 29 | CB 126 FITTING, ELBOW OUTLET    | 9 |
| 30 | CB 132 REGULATOR                | 2 |
| 31 | CB 142 VALVE, SELECTOR          | 1 |
| 32 | CB 142-C-001 VALVE, SELECTOR    | 1 |
| 33 | CB 147 FITTING, ELBOW .375-.250 | 1 |
| 34 | CB 148 GAUGE                    | 1 |

|    |  |    |
|----|--|----|
| 35 | CB 142-C VALVE, SELECTOR                     | 1  |
| 36 | GB 531-07 BOLT, HEX .31-18 X 1.75            | 4  |
| 37 | GB 531-11 BOLT, HEX .31-18 X 2.75            | 2  |
| 38 | GN 525-L NYLOK NUT                           | 10 |
| 39 | GN 531-L NYLOK NUT                           | 6  |
| 40 | GP 009-X PLASTIC ID WASHER P6 (1 EACH COLOR) | 5  |
| 41 | GP 009-S SILVER PLASTIC ID WASHER P6         | 1  |
| 42 | GP 009-BK BLACK PLASTIC ID WASHER P6         | 1  |
| 43 | GP 025-P6SS HEX SOCKET PLUG                  | 1  |
| 45 | GS 525-05 SHCS .25-20 X 1.25 BLK (CB 021)    | 2  |
| 46 | GS 525-025 SHCS .25-20 X .62 Z               | 4  |
| 47 | GW 525-F FLAT WASHER                         | 8  |
| 48 | GW 531-F FLAT WASHER                         | 4  |
| 49 | CB HOSE A                                    | 1  |
| 50 | CB HOSE B                                    | 1  |

## PARTS DIAGRAM

**LANCE POSITIONER (CB-LP-HV)**  
HYDRAULIC CONTROL BOX

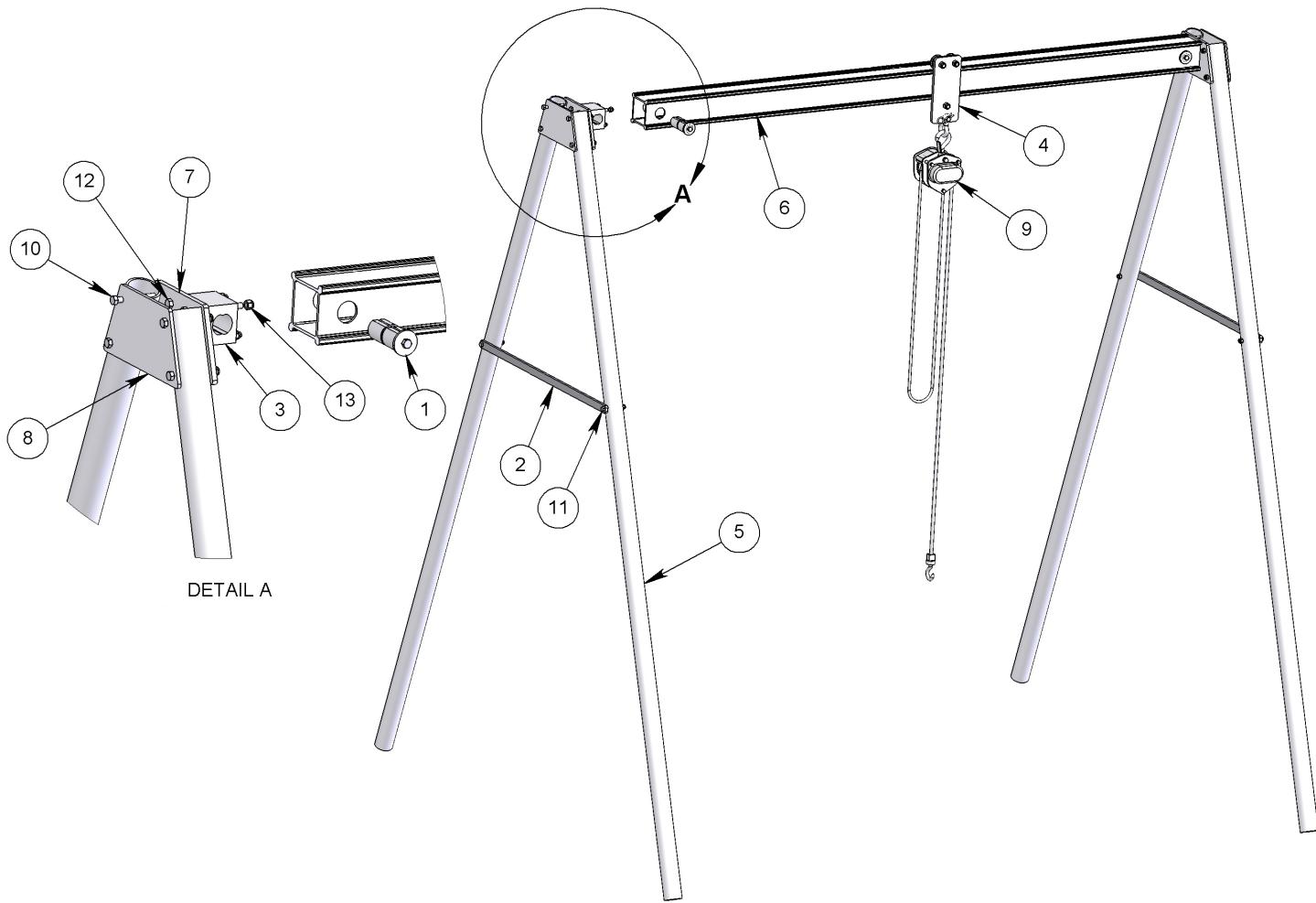


1. BEFORE INSTALLING CB 159 KNOBS ON THE CB-LP-HV.1 ASSY, BE SURE THAT BOTH (TRAVEL & ROTATION) VALVES ARE COMPLETELY IN THE CLOSED/CLOCKWISE NOTES: DIRECTION. THEN INSTALL KNOBS.

| # | PART NUMBER                   | QTY. |
|---|-------------------------------|------|
| 1 | CB-LP-HV.1 ASSY, HYD CONTROL  | 1    |
| 2 | CB 002 FRAME                  | 1    |
| 3 | CB 004-H MOUNTING PLATE       | 1    |
| 4 | CB 006 MOUNT BLOCK            | 2    |
| 5 | CB 508 FSHCS .25-20 X 1.75 SS | 4    |
| 6 | CB 012-HV HYD PLATE           | 1    |
| 7 | CB 107 LEG AS                 | 4    |
| 8 | CB 108 LEG INSERT             | 4    |
| 9 | CB 109 FRAME SUPPORT          | 2    |

|    |                                   |    |
|----|-----------------------------------|----|
| 10 | CB 110 FRAME ARCH                 | 2  |
| 11 | GB 525-06 BOLT, HEX .25-20 X 1.50 | 4  |
| 12 | GB 525-07 BOLT, HEX .25-20 X 1.75 | 4  |
| 13 | GB 525-10 BOLT, HEX .25-20 X 2.50 | 4  |
| 14 | GB 531-06 BOLT, HEX .31-18 X 1.50 | 2  |
| 15 | GB 531-07 BOLT, HEX .31-18 X 1.75 | 6  |
| 16 | GN 525-L NYLOK NUT                | 16 |
| 17 | GN 531-L NYLOK NUT                | 8  |
| 18 | GW 525-F FLAT WASHER              | 4  |
| 19 | GW 531-F FLAT WASHER              | 4  |

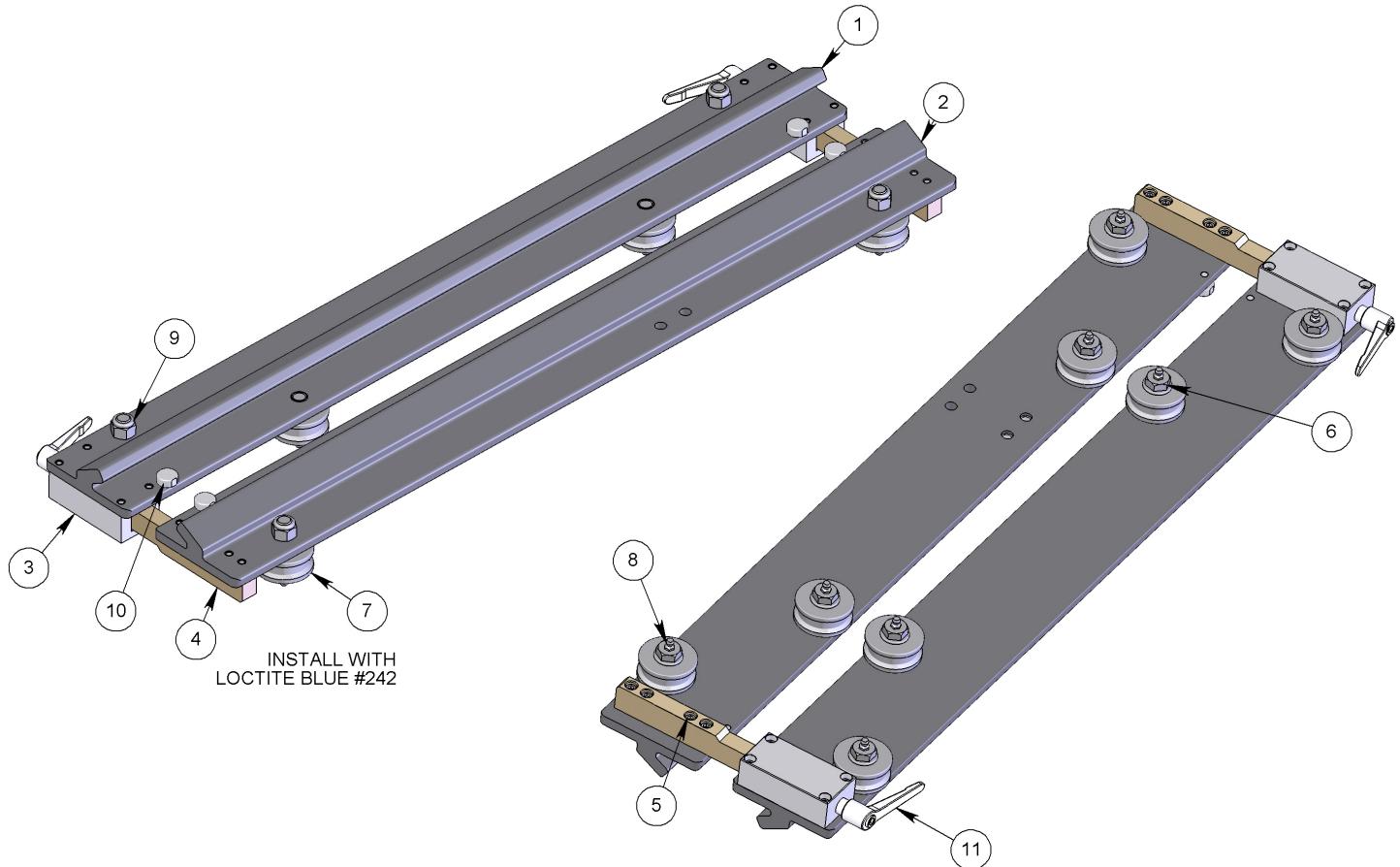
**LANCE POSITIONER (LP 320)**  
REAR SUPPORT ASSEMBLY



| #  | PART NUMBER                       | QTY. |
|----|-----------------------------------|------|
| 1  | BR 008-BU-001 WEDGE BOLT          | 2    |
| 2  | BJ 086.4-L LINK                   | 2    |
| 3  | LP 095-001 CORNER POST            | 2    |
| 4  | LP 310 TROLLEY ASSY               | 1    |
| 5  | LP 313 LEG, PIPE                  | 4    |
| 6  | LP 319 TOP BEAM                   | 1    |
| 7  | LP 314 PLATE, END FITTING         | 2    |
| 8  | LP 315 PLATE, END FITTING COVER   | 2    |
| 9  | UD 071-D CHAIN HOIST (EXT)        | 1    |
| 10 | GB 537-14 BOLT, HEX .37-16 X 3.50 | 8    |
| 11 | GB 537-13 BOLT, HEX .37-16 X 3.25 | 4    |
| 12 | GB 537-17 BOLT, HEX .37-16 X 4.25 | 8    |
| 13 | GN 537-L NYLOK NUT                | 20   |

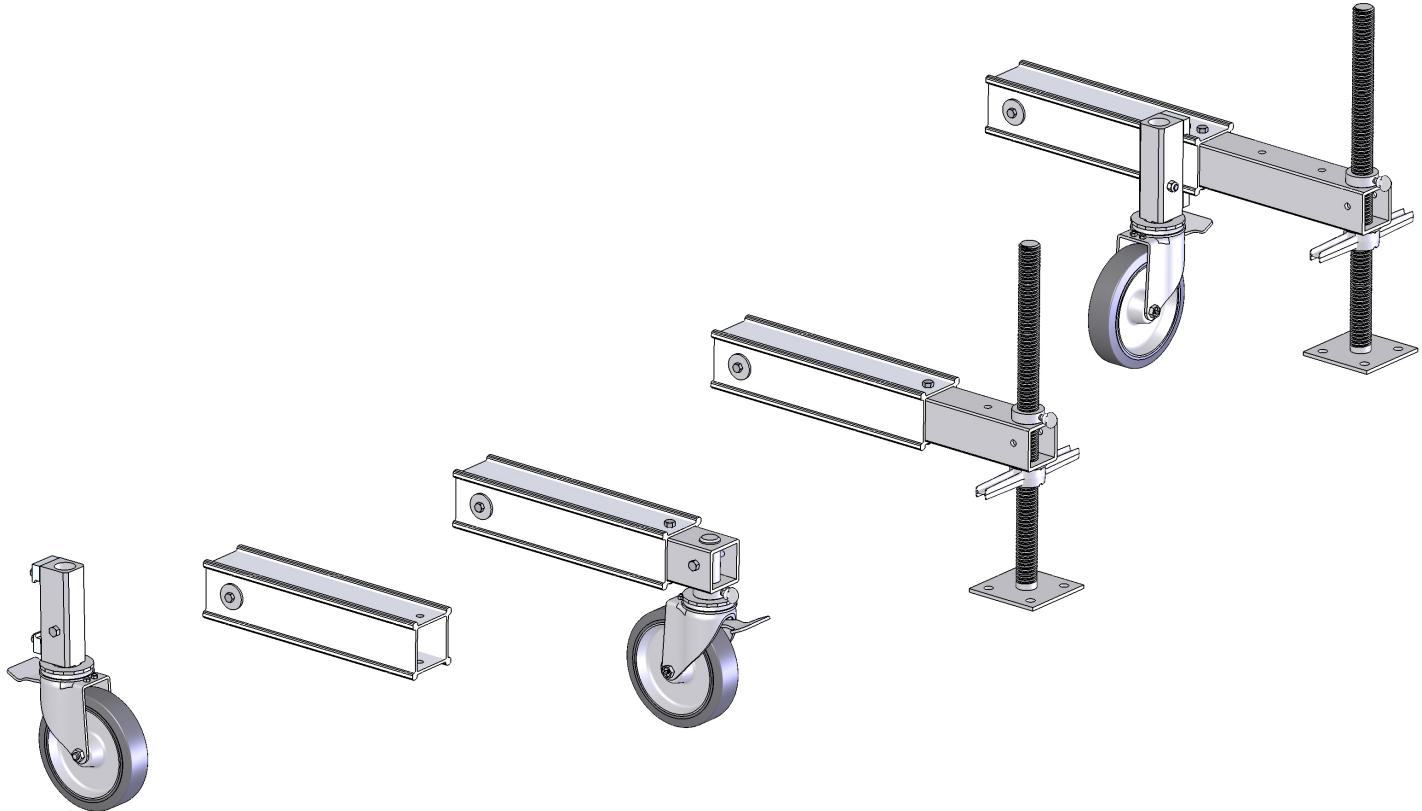
## PART DIAGRAMS

**LANCE POSITIONER (LP 700)**  
CARRIAGE CLAMP ASSEMBLY



| #  | PART NUMBER                              | QTY. |
|----|--|------|
| 1  | LP 701 FIXED RAIL ASSY                   | 1    |
| 2  | LP 705 CLAMPING RAIL ASSY                | 1    |
| 3  | LP 707 END CLAMP                         | 2    |
| 4  | LP 706 SLIDER                            | 2    |
| 5  | GS 325-04 SHCS .25-20 X 1.00 SS (BC 053) | 16   |
| 6  | LP 652-1.38 AXLE-ZERK                    | 4    |
| 7  | BR 055 ROLLER ASSY                       | 8    |
| 8  | BR 052-2.0 AXLE-ZERK                     | 4    |
| 9  | GN 550-L NYLOK NUT                       | 4    |
| 10 | LP 622 COMPRESSION SPACER                | 4    |
| 11 | LP 708 .375-16 SS HANDLE                 | 2    |

**LANCE POSITIONER (LP 330-XX)**  
LANCE POSITIONER LEG OPTIONS



| #  | PART NUMBER                       | -WC (WHEEL WITH CLAMP)/QTY. | -JE (JACK WITH EXTENSION)/QTY. | -WJE (WHEEL AND JACK WITH EXTENSION)/QTY. | -E (EXTENSION ONLY)/QTY. | -WE (WHEEL WITH EXTENSION)/QTY. |
|----|-----------------------------------|-----------------------------|--------------------------------|---|--------------------------|---------------------------------|
| 1  | BR 008-BU-001 WEDGE BOLT          | -                           | 1                              | 1   | 1                        | 1                               |
| 2  | GB 543-14 BOLT, HEX .43-14 X 3.50 | -                           | -                              | -   | -                        | 1                               |
| 3  | GB 543-16 BOLT, HEX .43-14 X 4.00 | -                           | 1                              | 1   | -                        | 1                               |
| 4  | GN 543-L NYLOK NUT                | -                           | 1                              | 1   | -                        | 2                               |
| 5  | LP 075 WHEEL INSERT               | -                           | 1                              | 1   | -                        | 1                               |
| 6  | LP 079-XX WHEEL RAIL              | -                           | 1                              | 1   | 1                        | 1                               |
| 7  | LP 086 COLLAR ASSY                | -                           | 1                              | 1   | -                        | 1                               |
| 8  | LP 089 WHEEL                      | 1                           | -                              | 1   | -                        | 1                               |
| 9  | LP 088 JACK ASSY                  | -                           | 1                              | 1   | -                        | -                               |
| 10 | LP 093 WHEEL MOUNT ASSY           | 1                           | -                              | 1   | -                        | -                               |
| 11 | LP 085 WASHER, CASTER             | -                           | 1                              | 1   | -                        | -                               |

## NOTES

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# TERMS AND CONDITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

## STONEAGE TRADEMARK LIST

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

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

## STONEAGE PATENT DATA

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

<http://www.sapatents.com>

## STONEAGE TERMS AND WARRANTY

View StoneAge's Terms and Warranty Conditions online.

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

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

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

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

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

**3. WARRANTY SERVICE PROVIDERS.** Service and repair of the Product is to be performed only by StoneAge authorized service representatives, including Dealers who are authorized repair centers, with StoneAge approved parts. Information about StoneAge authorized service representatives can be obtained through the StoneAge website at [www.stoneagetools.com/](http://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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