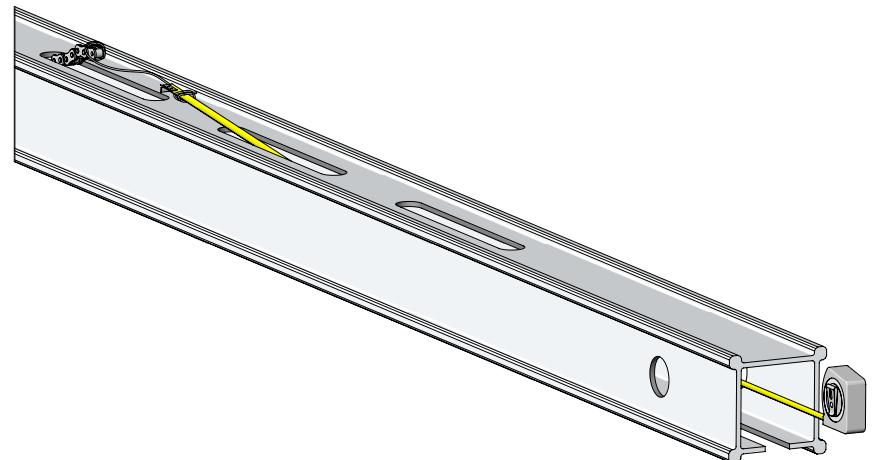
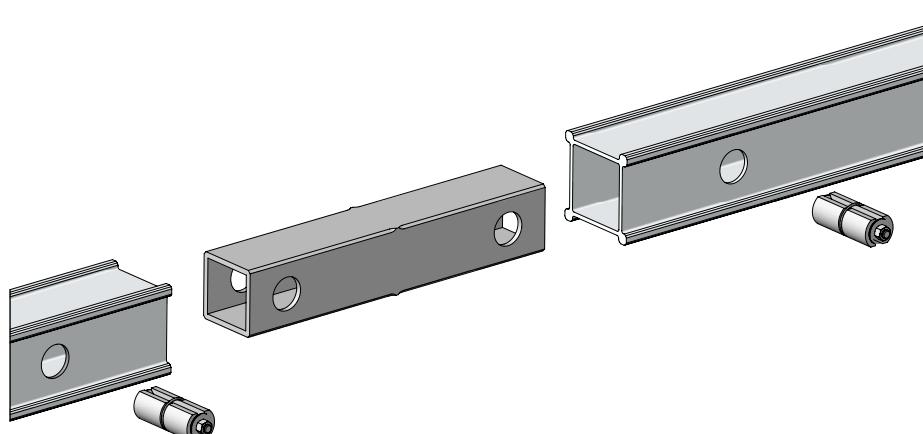


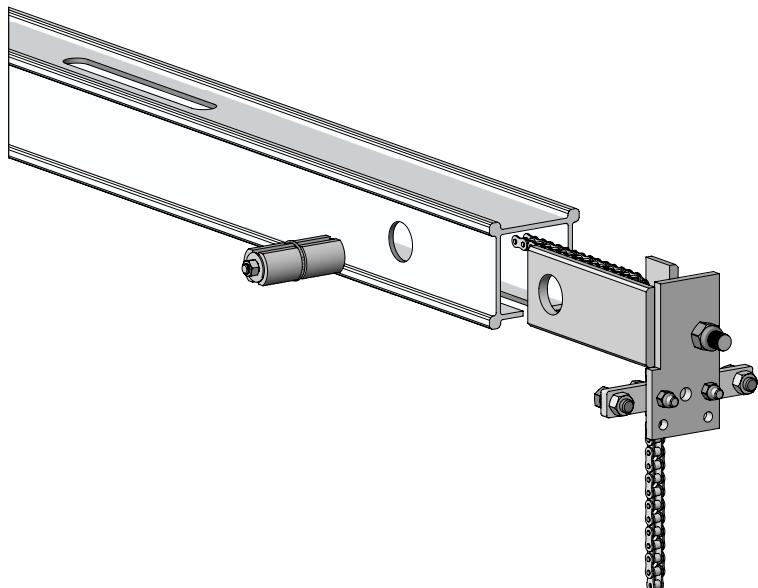
BRLM Lancing System

This Lancing System requires some assembly before use. An air powered system is shown but a hydraulic powered system follows the same assembly steps. Read through the entire process first to help you understand final assembly of the machine.

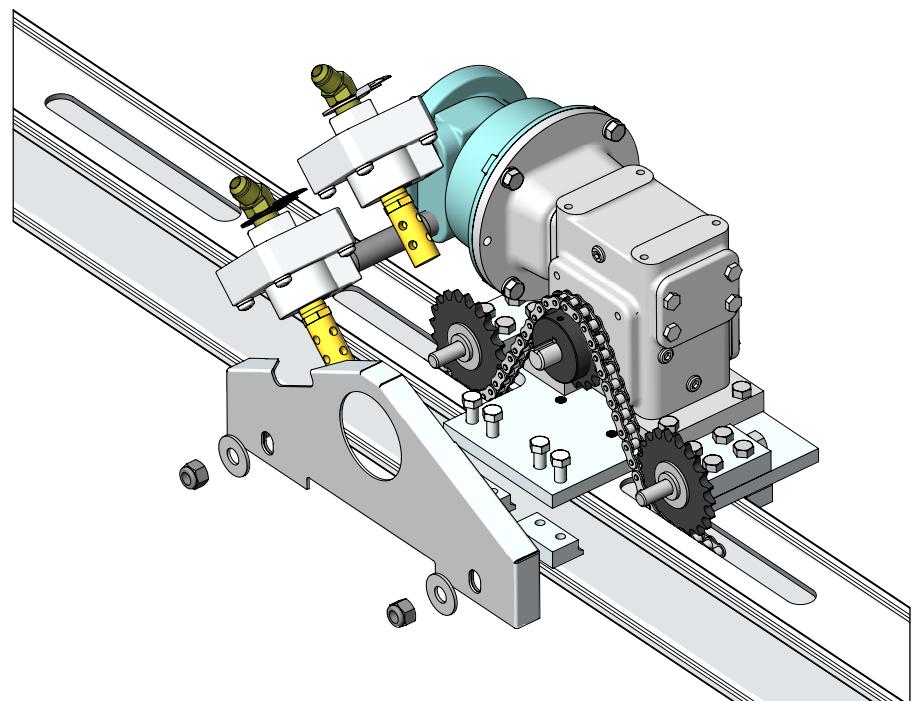
Assembly Instructions:



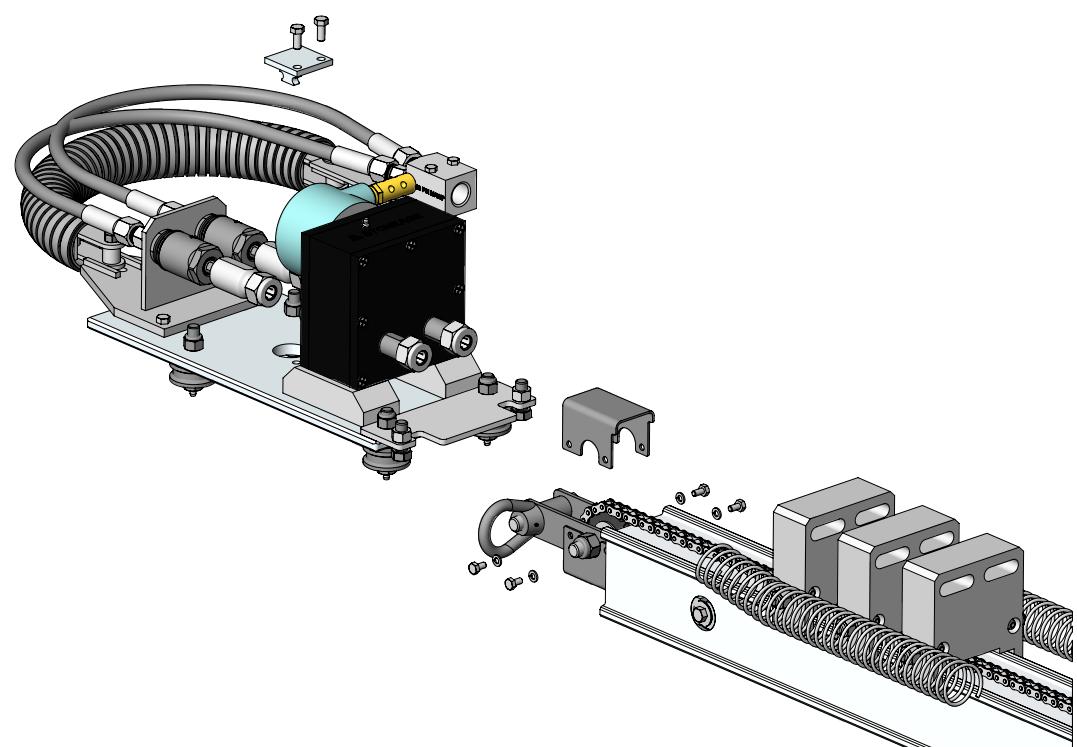
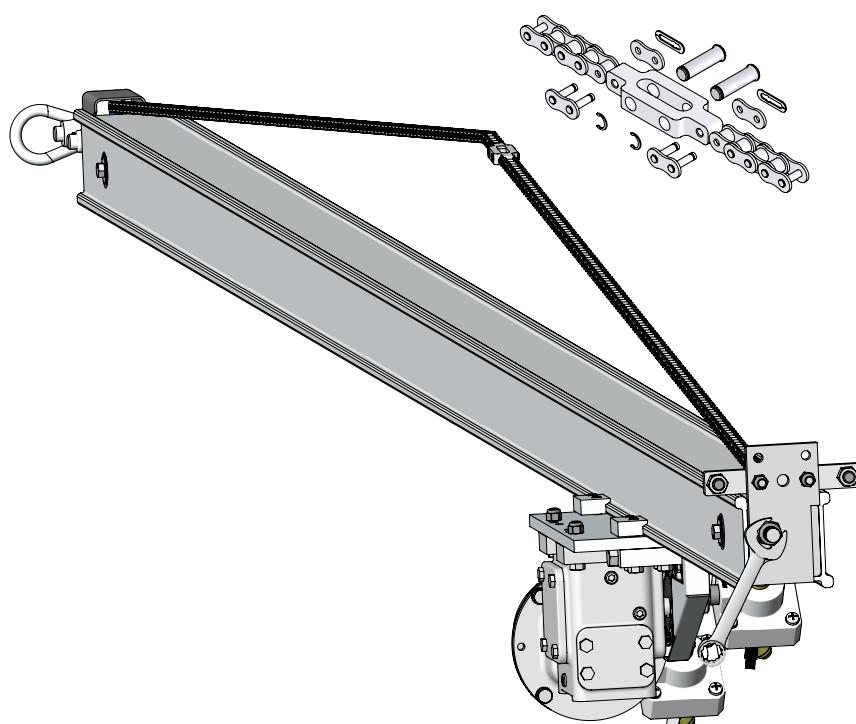
1) If an extension kit (BRLM 080) is used, insert the splice tube into the rear of the drive rail (the end without a slot) and slide the extension section over the splice tube. The extension rail has no slots and can be installed using either end. Use two wedge bolts oriented to pull and tighten these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

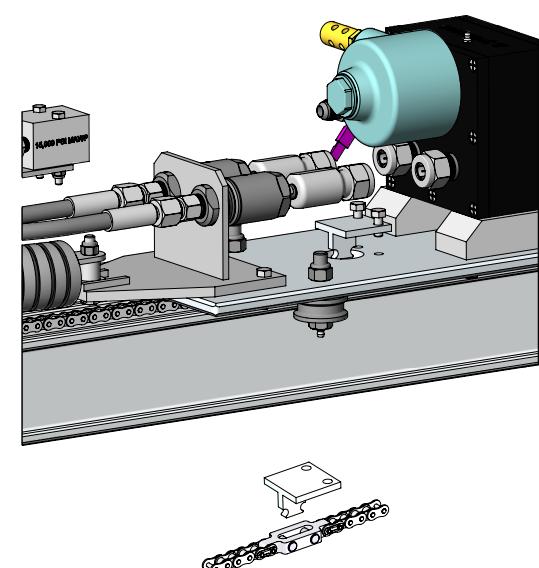
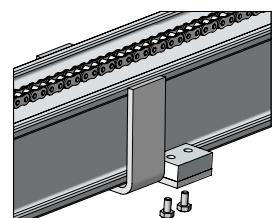
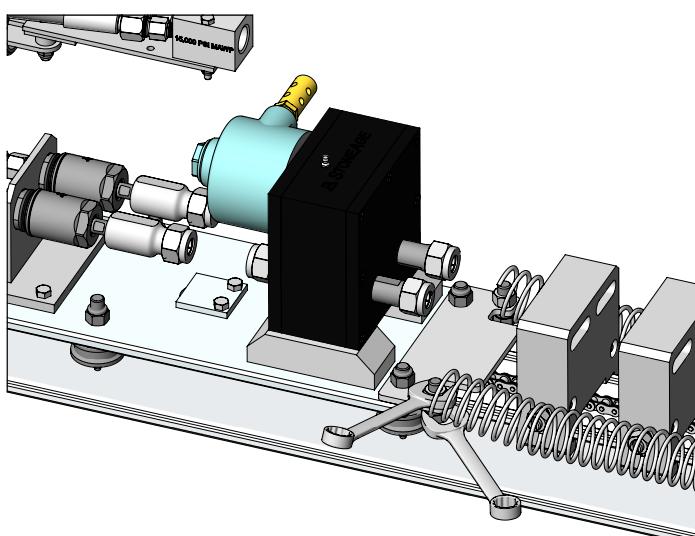


5) Complete chain loop by attaching the chain to the chain hook link with (2) chain master links. Adjust the chain tension so there is about 1 inch of chain height for every 5 feet or rail length. This can be done by tightening the tension nut at the end of the rail.

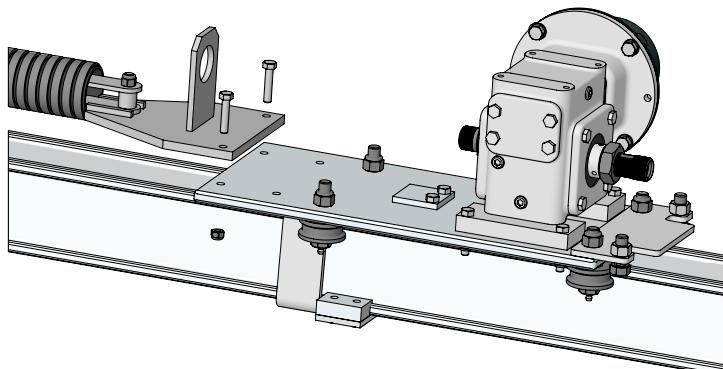
6) Remove rear chain guard and slide the guide blocks onto the rail and move them all the way to the front. Next, remove the chain hook from the carriage and slide the carriage onto the rail. It may be necessary to loosen the rollers on one side to make it easier to install. Be sure to tighten all the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

BRLM Lancing System

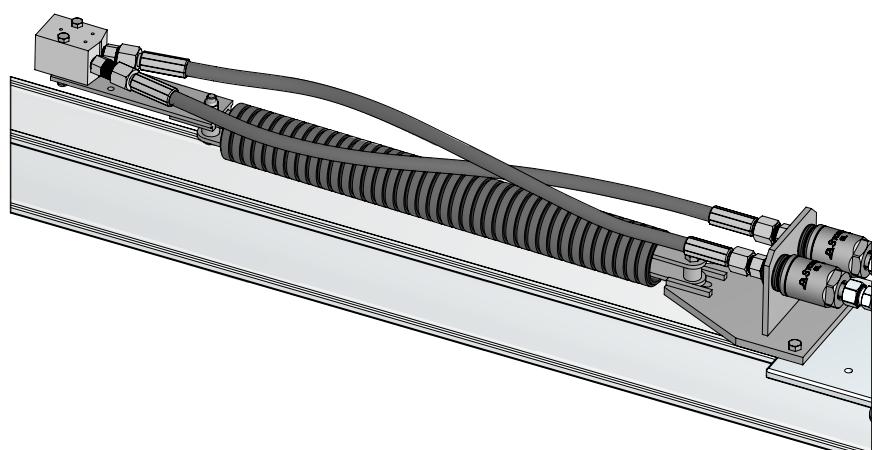
Assembly (continued):



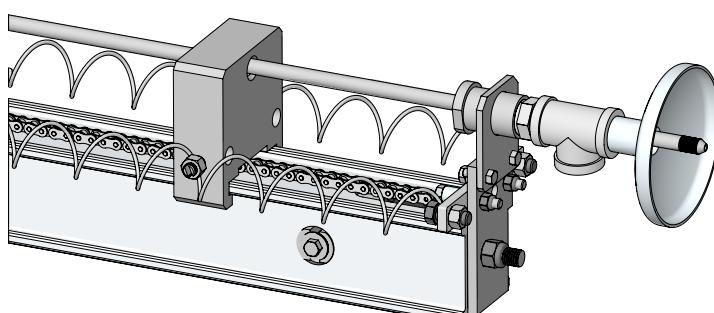
7) Attach the cable coils to the carriage and to the front idler assembly using the slotted anchor bolts. Be sure not to tighten the bolt over 20 ft-lbs of torque.



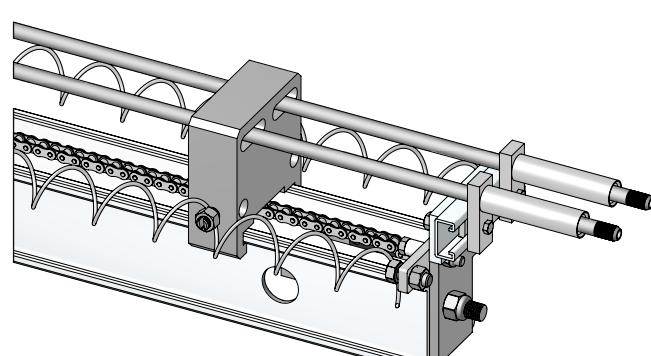
8) Attach the rear stop to the rail. The exact position of the stop can be easily adjusted at a later time. Next, install the chain hook by slipping it through the carriage plate and in between the pins on the chain link. It often helps to move the carriage back and forth to lock it into place.



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.



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 adaptors 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.

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.

BRLM Lancing System

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 hydraulicks 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.

Maintenance:

The BRLM Tube Lancing System is simple to operate but some care is necessary for safe and productive use. Please read and follow all of these recommendations.

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

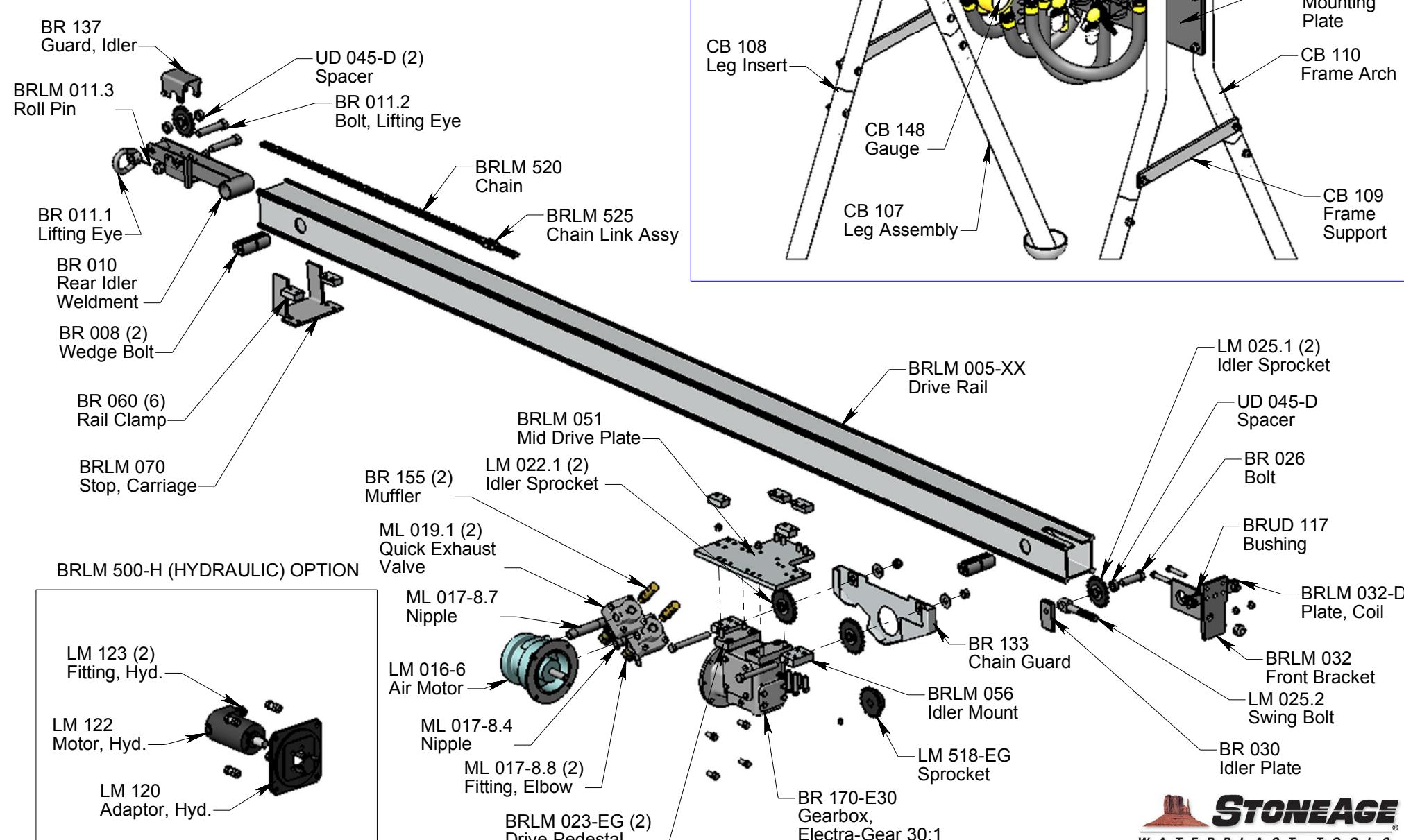
Air motors should be lubricated after use to prevent internal corrosion and seizing. To do this, remove air hose from motor fitting and squirt in some light oil. Reconnect air line and run for a few seconds to distribute oil in motor. If the air motor seizes and does not run, remove air motor from gearbox, 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.

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.

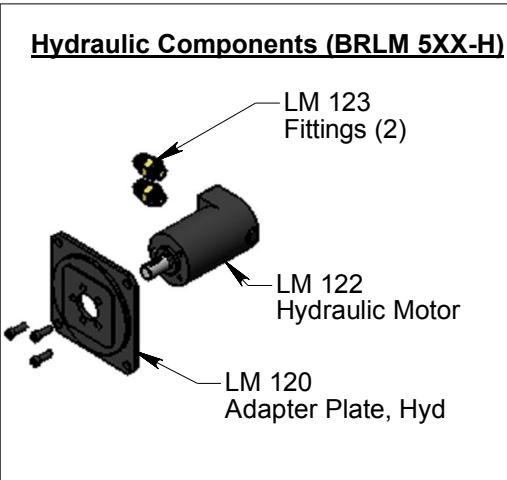
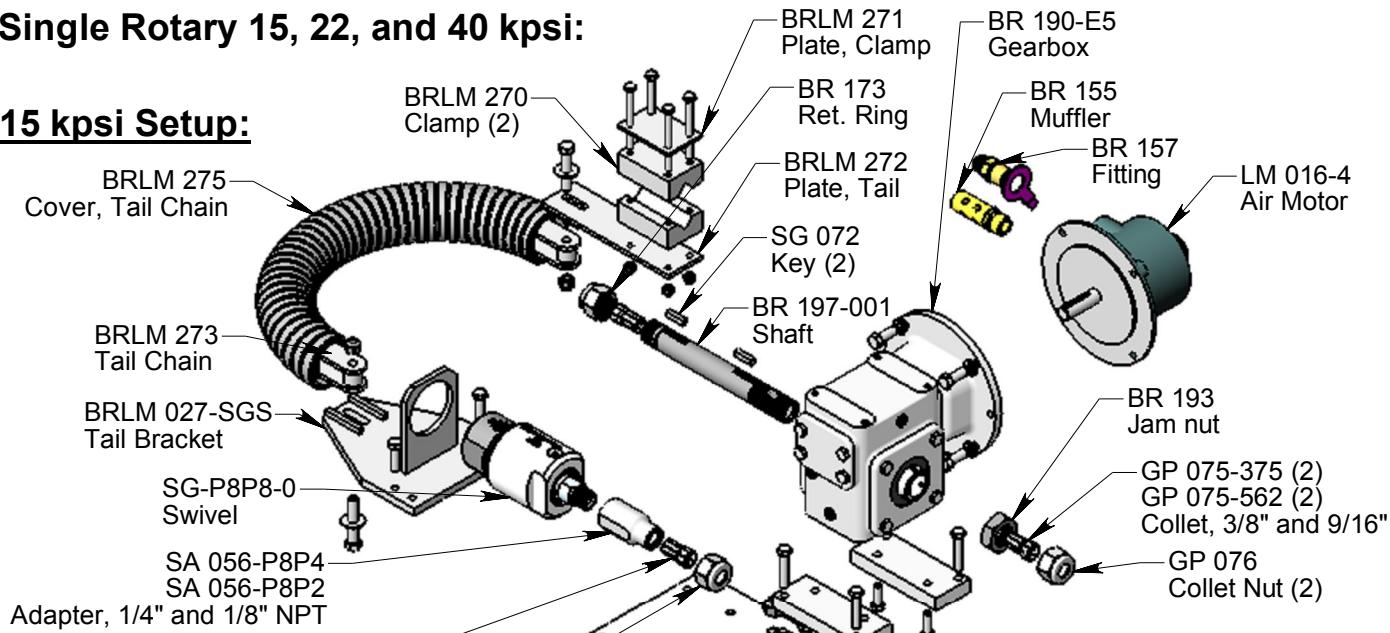
Exploded Assembly:



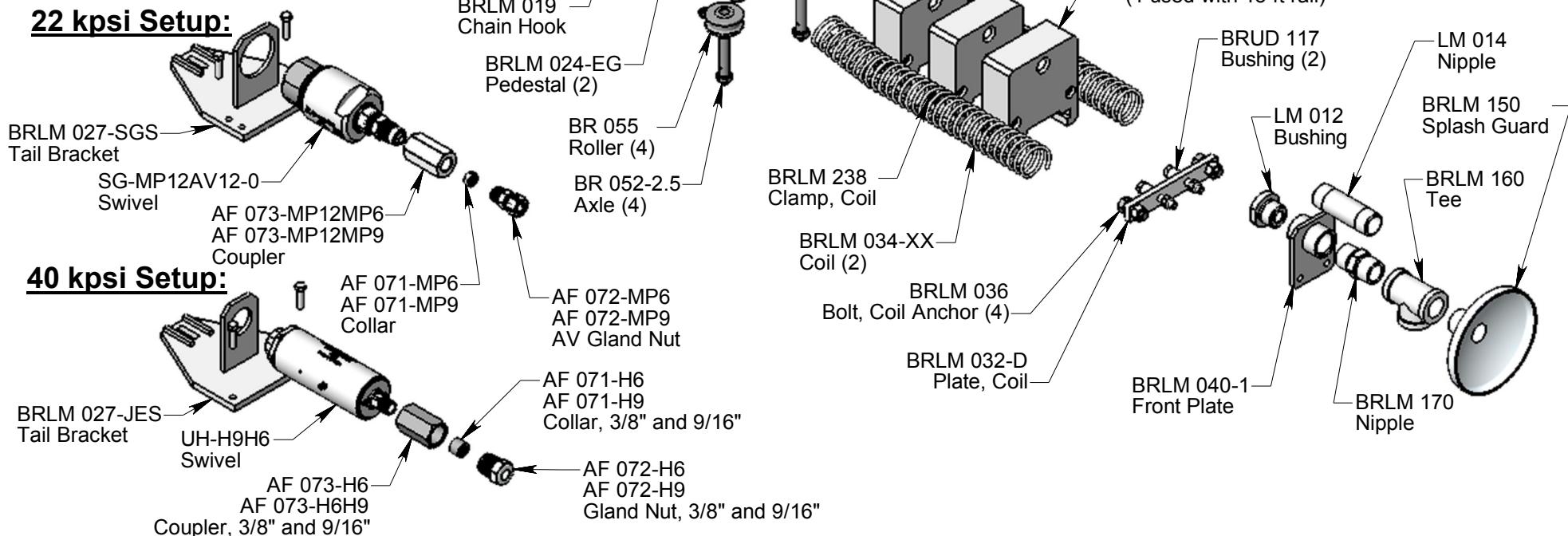
BRLM Lancing System

Single Rotary 15, 22, and 40 kpsi:

15 kpsi Setup:

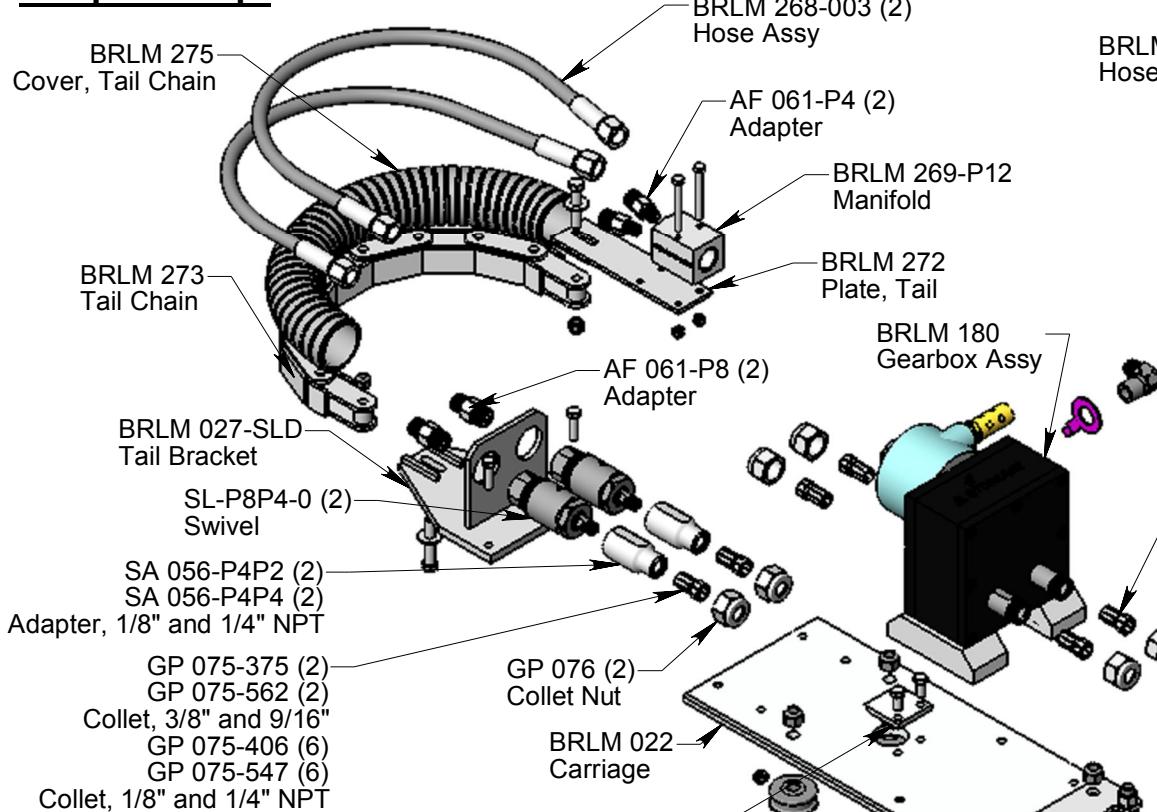


22 kpsi Setup:

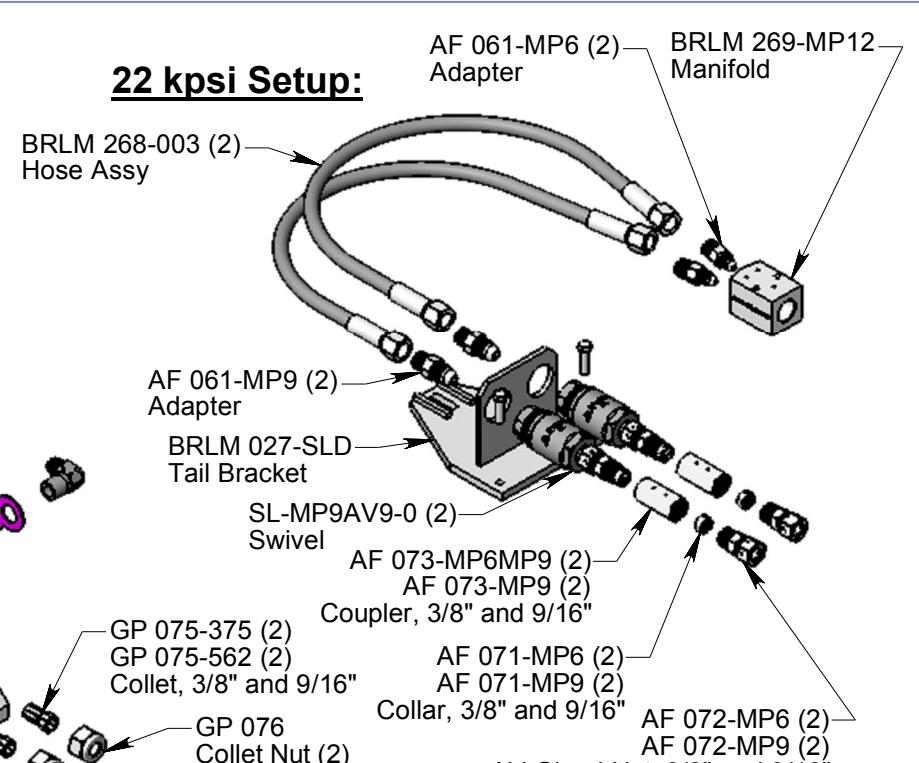


Dual Rotary 15, 22, and 40 kpsi:

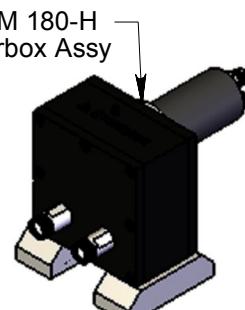
15 kpsi Setup:



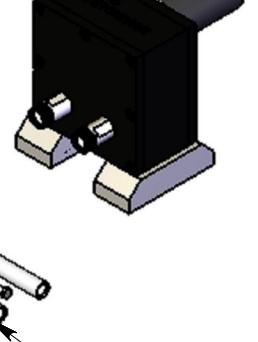
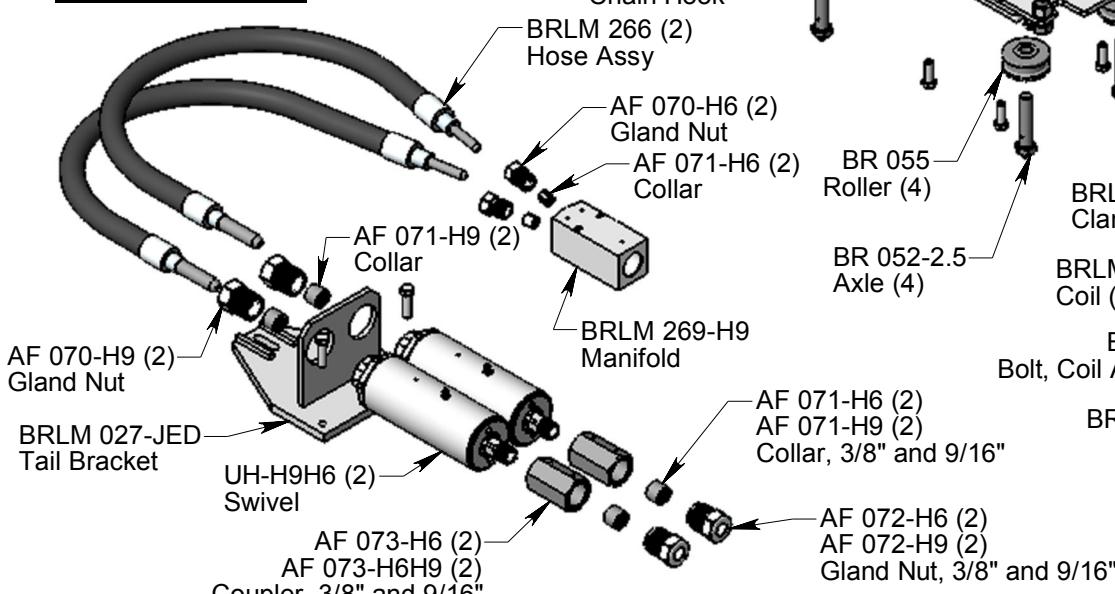
22 kpsi Setup:



BRLM 3xx-H (Hydraulic) Components

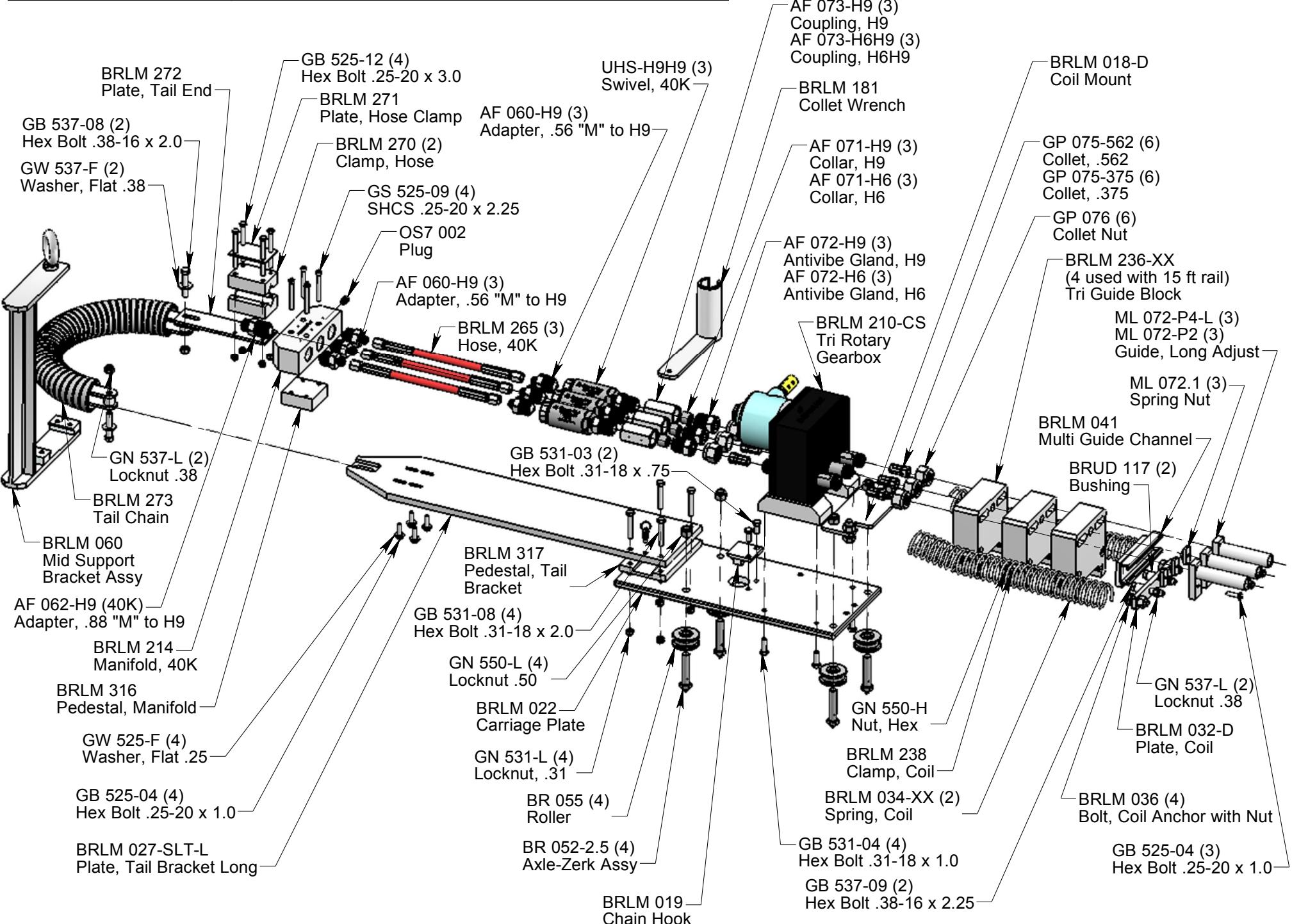


40 kpsi Setup:

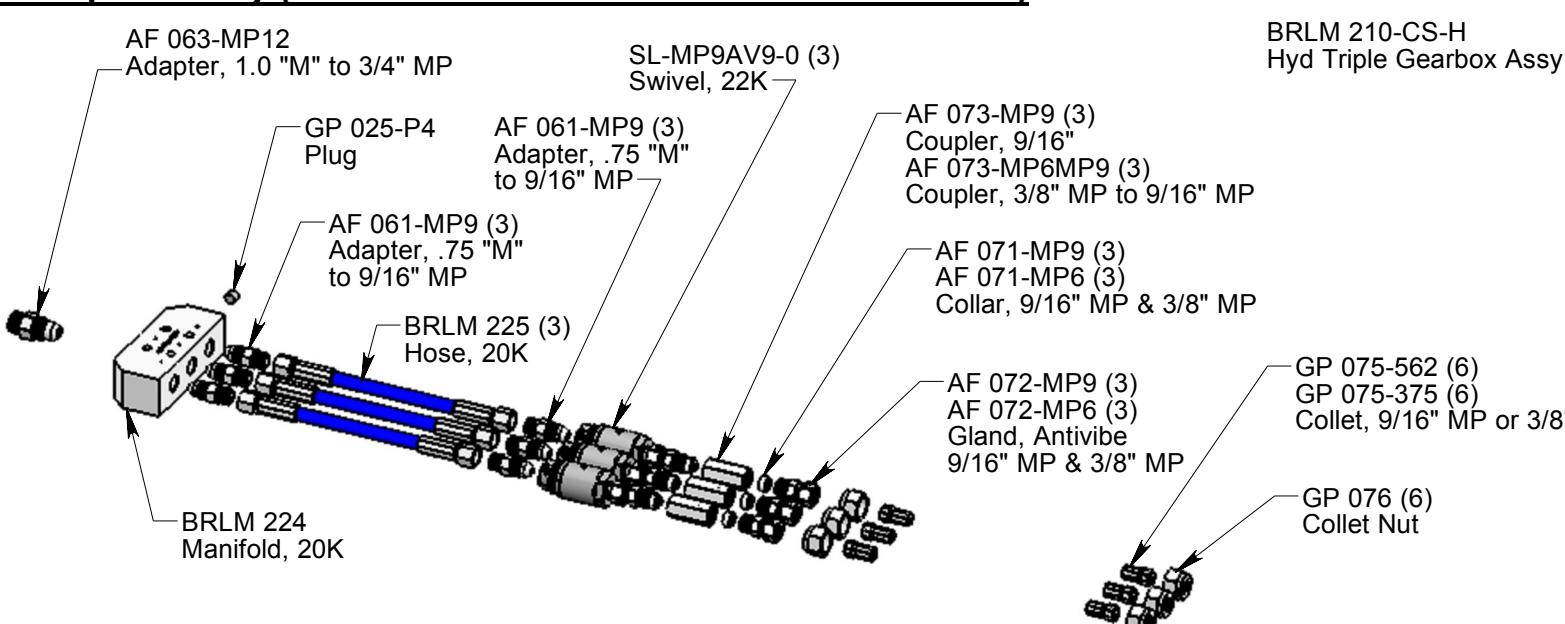


BRLM Lancing System

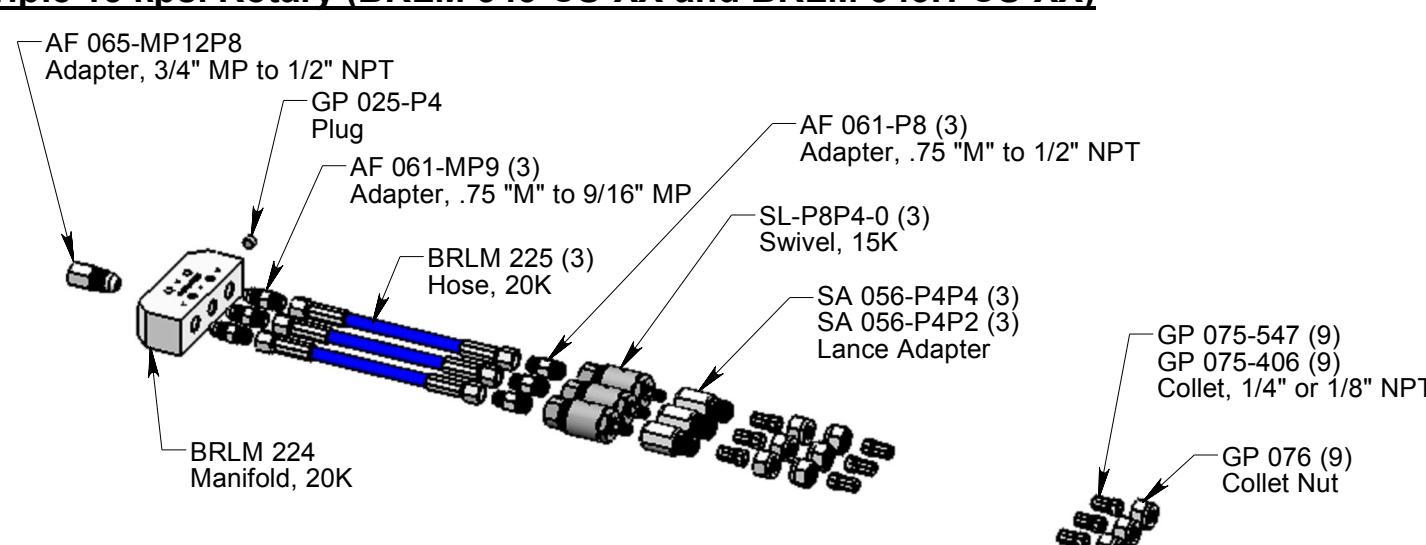
Triple 40 kpsi Rotary (BRLM 363-CS-XX and BRLM 363H-CS-XX)



Triple 22 kpsi Rotary (BRLM 353-CS-XX and BRLM 353H-CS-XX)

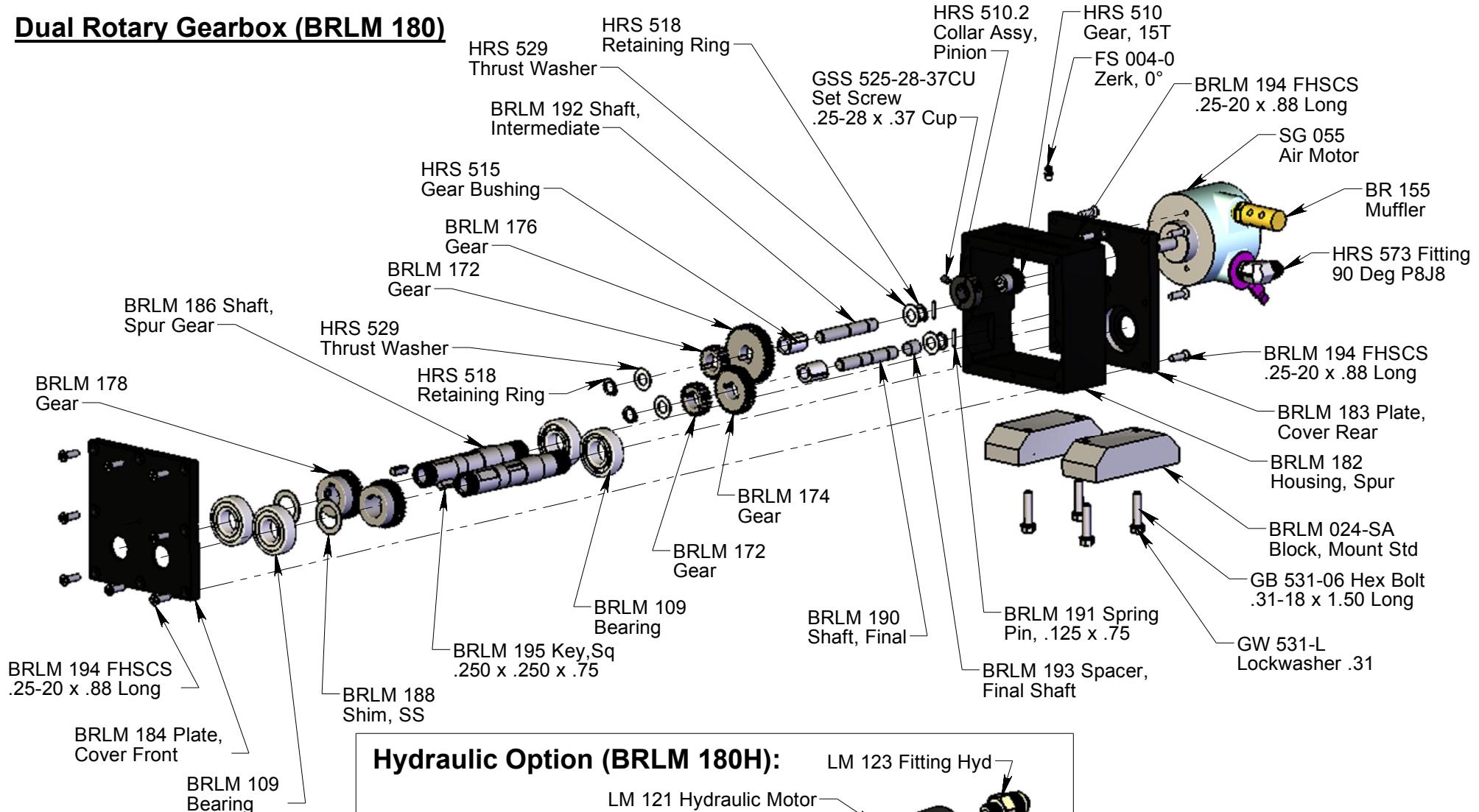


Triple 15 kpsi Rotary (BRLM 343-CS-XX and BRLM 343H-CS-XX)

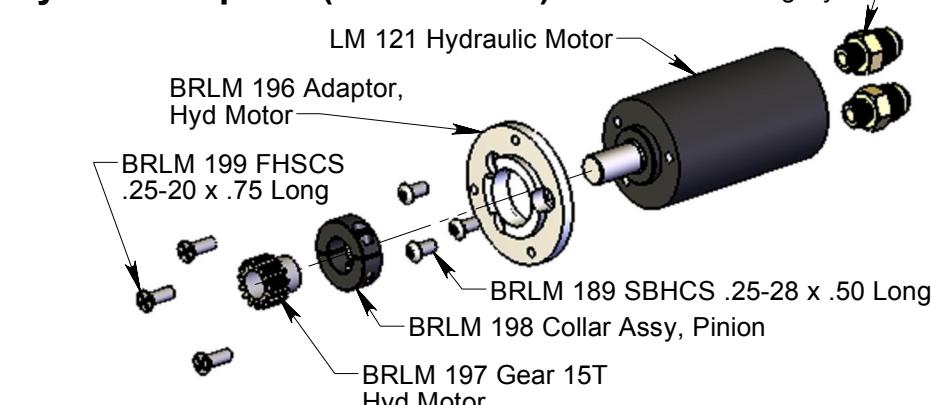


BRLM Lancing System

Dual Rotary Gearbox (BRLM 180)

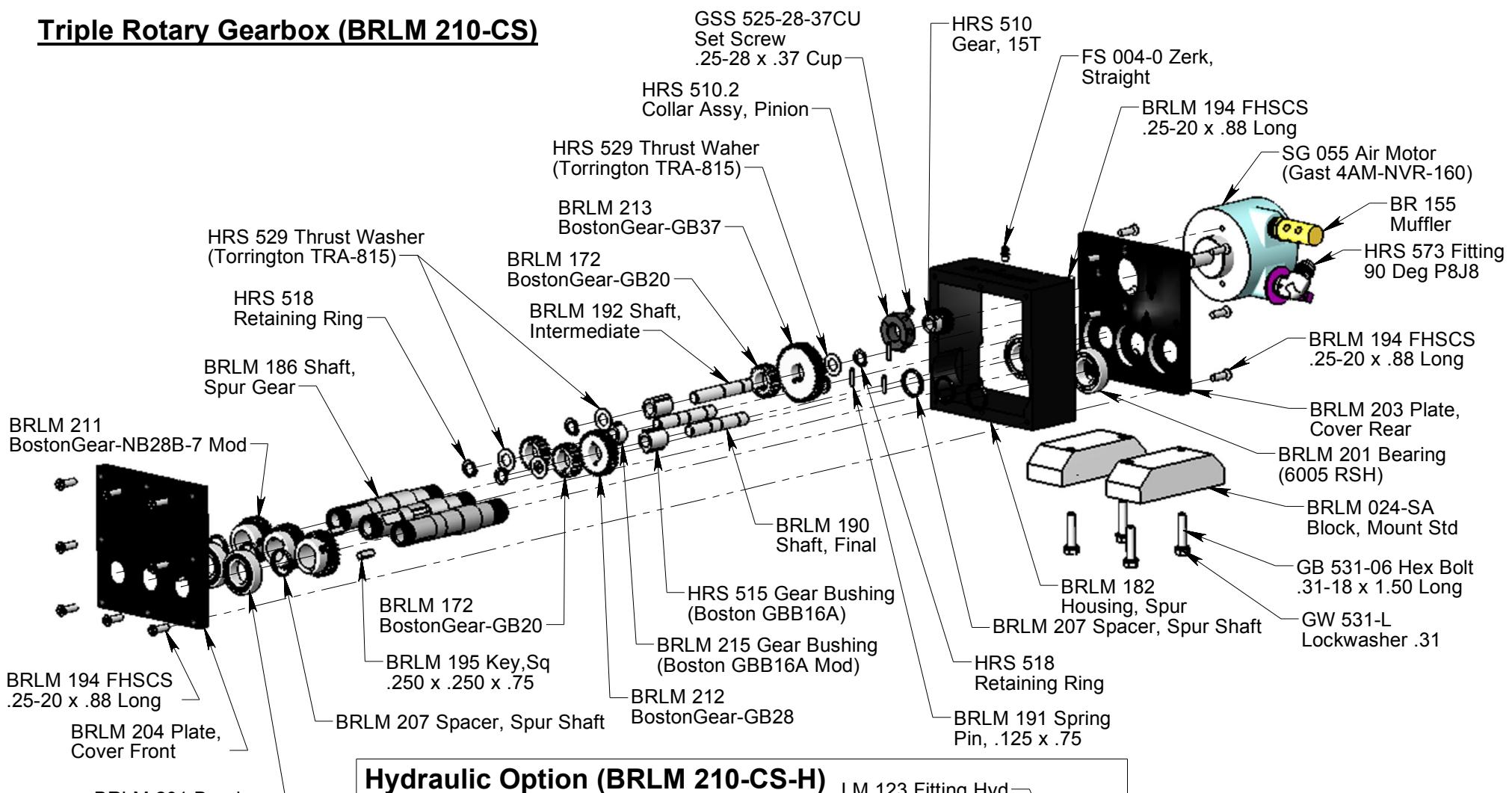


Hydraulic Option (BRLM 180H):

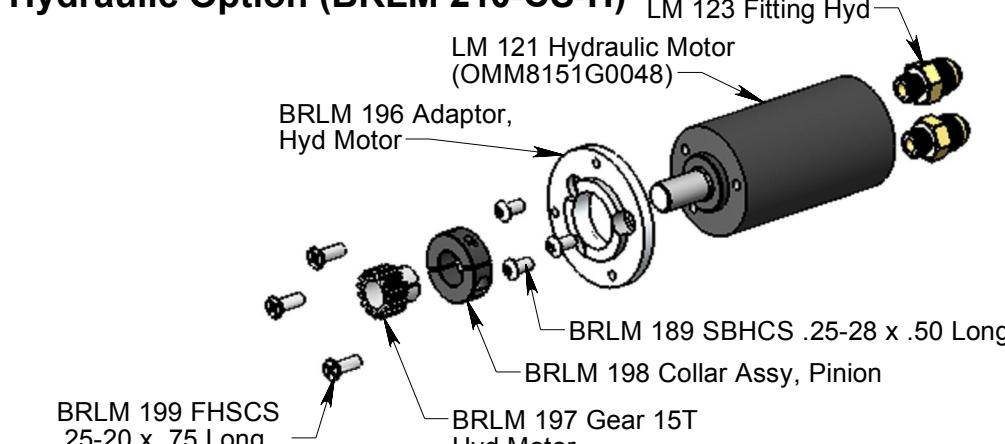


Note: This gearbox is factory filled with Texaco Marfak Multipurpose 2 Grease. It is normal for the gearbox to leak small amounts of oil that has separated from the lithium thickener. This slight loss of oil will not affect the lubricating properties of the grease or the performance of the gearbox. It is recommended to grease the gearbox every 10-12 hours. Any multipurpose NLGI 2 grease is acceptable.

Triple Rotary Gearbox (BRLM 210-CS)



Hydraulic Option (BRLM 210-CS-H)



Note: This gearbox is factory filled with Texaco Marfak Multipurpose 2 Grease. It is normal for the gearbox to leak small amounts of oil that has separated from the lithium thickener. This slight loss of oil will not affect the lubricating properties of the grease or the performance of the gearbox. It is recommended to grease the gearbox every 10-12 hours. Any multipurpose NLGI 2 grease is acceptable.