X-Ramp™ Hydraulic Lowering System

OEM INSTALLATION MANUAL

LIPPERT COMPONENTS®

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Introduction

The lift and lower suspension operation system of the X-Ramp™ Hydraulic Lowering System consists of a 12V DC hydraulic power unit, two hydraulic cylinders, two fluid velocity fuses in the cylinder retract ports — one on each side, and an accumulator. The function of the lift and lower system is to simplify the lifting (Extend or UP function) of the trailer's frame and body to an upper-most position, hydraulically locking the linkage into place so the linkage does not move during transport. The system also lowers (Retract or DOWN function) the trailer's frame and body to the ground at a controlled rate of speed for ease of loading and unloading.

Safety Requirements

⚠WARNING

The "WARNING" symbol above is a sign that an installation procedure has a safety risk involved and may cause death, serious personal injury or property damage if not performed safely and within the parameters set forth in this manual. Always wear eye protection when performing this installation procedure. Other safety equipment to consider would be hearing protection, gloves, and possibly a full face shield, depending on the nature of the installation procedure.

⚠WARNING

The trailer MUST be supported per manufacturer's recommendations before working underneath. Failure to do so may result in death, serious personal injury or property damage.

⚠CAUTION

Moving parts can pinch, crush or cut. Keep clear and use caution.

Resources Required

Common

- Personal protective equipment
- Jack stands
- Floor jack
- Gloss black spray paint
- Measuring tape
- Grease pencil/non-permanent marker
- Two ⅜" - 16 UNC Hex bolts x (length as needed)

Bolt-on

- Adjustable pliers
- Assorted wrenches
- Adjustable wrench
- Torque wrench
- Electric or cordless drill or screw gun
- Assorted drill bits

Weld-on

- Welder
- Oxyacetylene torch
- Fire extinguisher

Preparation

NOTE: Create a heat shield from steel plating that can be tucked between the area of the frame where welding will occur and any flammable materials of the trailer, such as hoses. Protect all exposed hoses during any welding or fabricating operations that may produce material that will singe, burn or otherwise weaken the hydraulic hoses. Weld sparks or other sources of concentrated heat can weaken sections of a hose, which can result in immediate or latent failures.

Installation

The X-Ramp sub-frame can either be welded to the trailer frame, or bolted to trailer frame if it comes equipped with axle hangers.

⚠WARNING

Make sure trailer is parked on solid, level ground. Clear all jack stand locations of debris and obstructions. Locations should also be free of depressions.

Fully Assembled Axle Sub-Frame

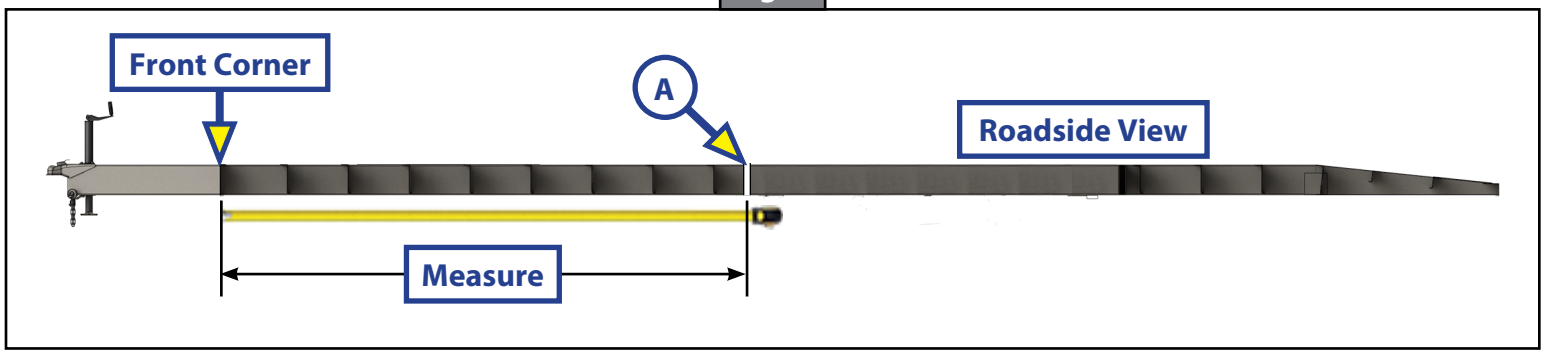
NOTE: Each OEM will have its own preferred method of positioning the trailer frame onto axle sub-frame, however LCI recommends the following:

Determine exact location where the axle sub-frame is to be fastened to the trailer frame. If necessary, contact the frame manufacturer for the correct location for product installation.

1. Using a measuring tape, measure from both front corners of the chassis, along the outside of both the roadside and curbside of the trailer deck frame (Fig. 1).
2. Using a grease pencil or non-permanent marker, make a mark on the deck frame where the front edge of the axle sub-frame will line up on the outside of the frame (Fig. 1A).
3. Lift front and rear of chassis/frame with floor jacks and stabilize with jack stands according to OEM recommendations.

NOTE: It is possible to lift the main frame using an overhead crane or lift truck.

Fig. 1

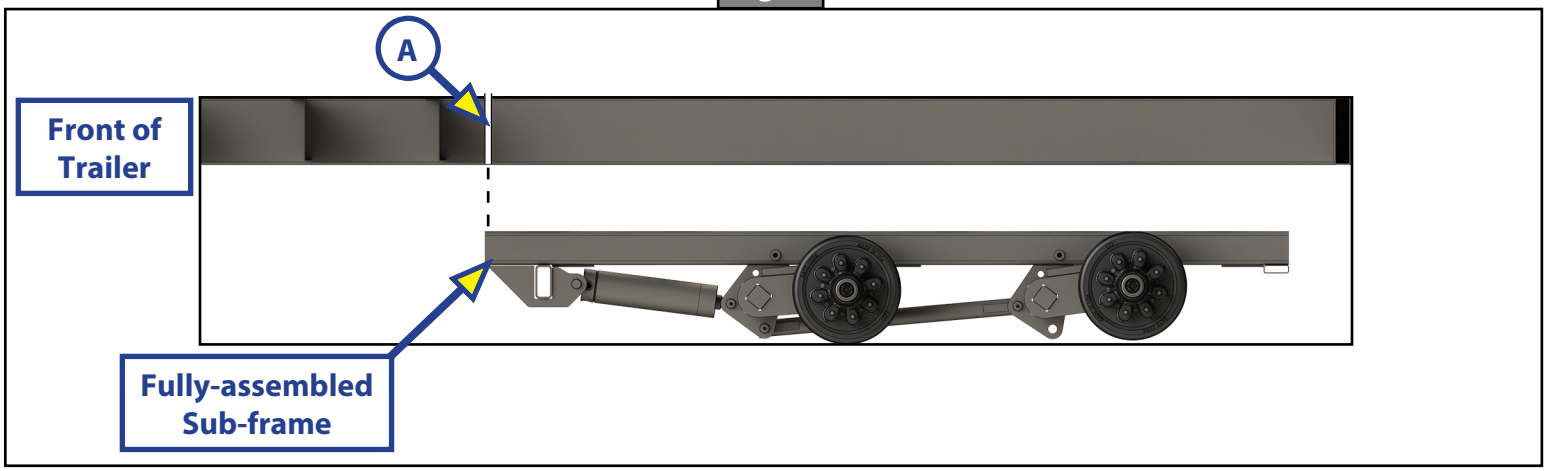


⚠WARNING

Do not go under the trailer unless it is properly supported. Unsupported trailers can fall and may result in death, serious personal injury or property damage.

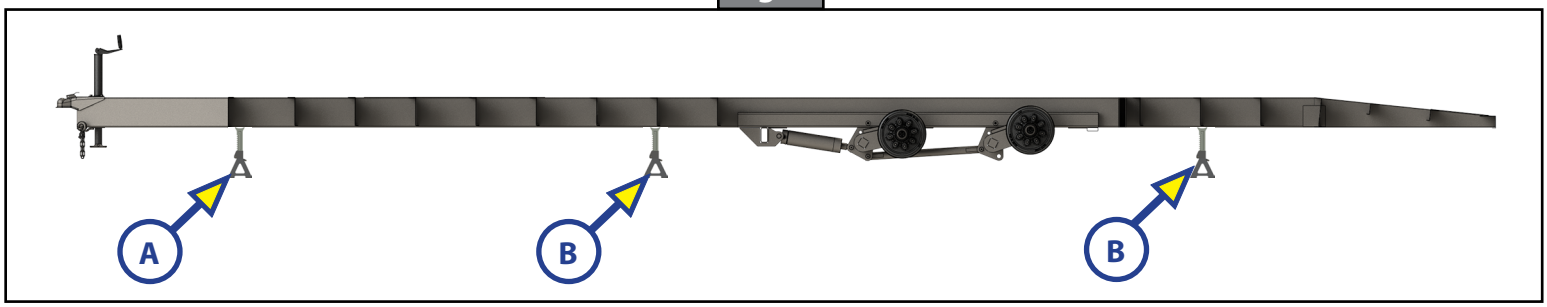
4. Position the axle sub-frame under the frame rails (Fig. 2), aligned to the marks (Fig. 2A) made in step 2.

Fig. 2



5. Position one jack stand under both the front roadside and curbside corners of the chassis (Fig. 3A) to support the frame.
6. Position additional jack stands at the center (Fig. 3B) and rear (Fig. 3C) of chassis to support the frame.
7. Lower the frame onto the axle sub-frame, and then onto the jack stands (Fig. 3).

Fig. 3



Welding Axle Sub-Frame

NOTE: Red lines with black borders indicate where welding is to occur. These lines are solid.

⚠WARNING

The trailer MUST be supported per manufacturer's recommendations before working underneath. Failure to do so may result in death, serious personal injury or property damage.

⚠CAUTION

Always wear eye protection when performing service or maintenance to the trailer. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

⚠CAUTION

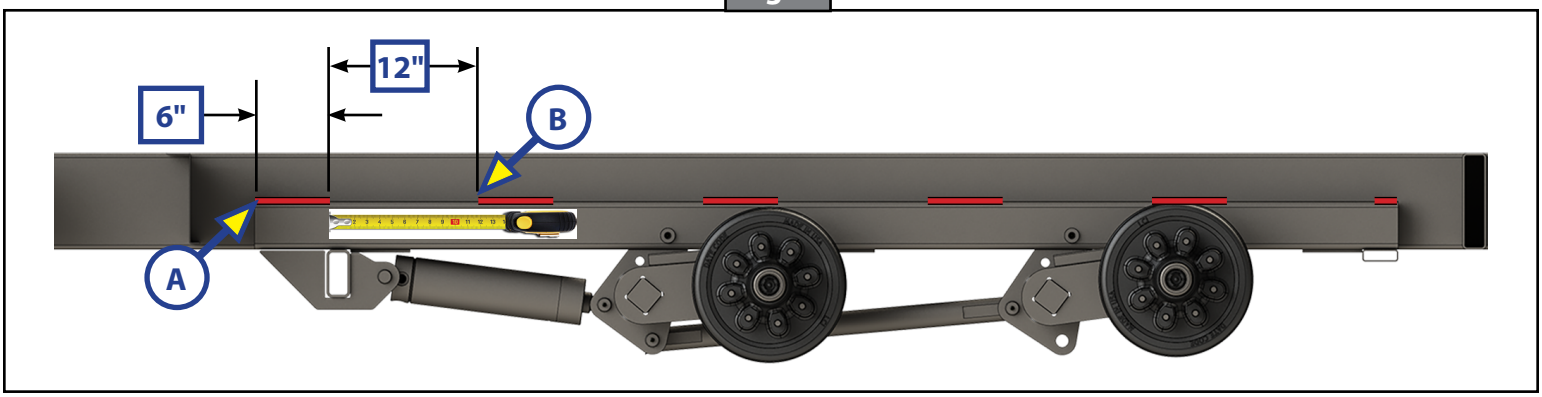
Protect all exposed hoses during any welding or fabricating operations that may produce material that will singe, burn or otherwise weaken the hydraulic hose. Weld sparks or other sources of concentrated heat can weaken sections of a hose, which can result in immediate or latent failures.

1. Starting on either the roadside or curbside, begin at the front of the sub-frame tube (Fig. 4A) and complete a 6" x 18" stitch weld, comprised of six welds total along the sub-frame.

NOTE: The 6" x 18" stitch weld is a 6" weld measured on 18" centers or 12" gap measured from end-to-end (Fig. 4B).

2. Complete a 6" x 18" stitch weld on the opposite side of the chassis alternating 6" welds with 12" gap in between welds.

Fig. 4



Bolting Axle Sub-Frame

⚠WARNING

The trailer MUST be supported per manufacturer's recommendations before working underneath. Failure to do so may result in death, serious personal injury or property damage.

⚠CAUTION

Always wear eye protection when performing service or maintenance to the trailer. Other safety equipment to consider would be hearing protection, gloves and possibly a full face shield, depending on the nature of the service.

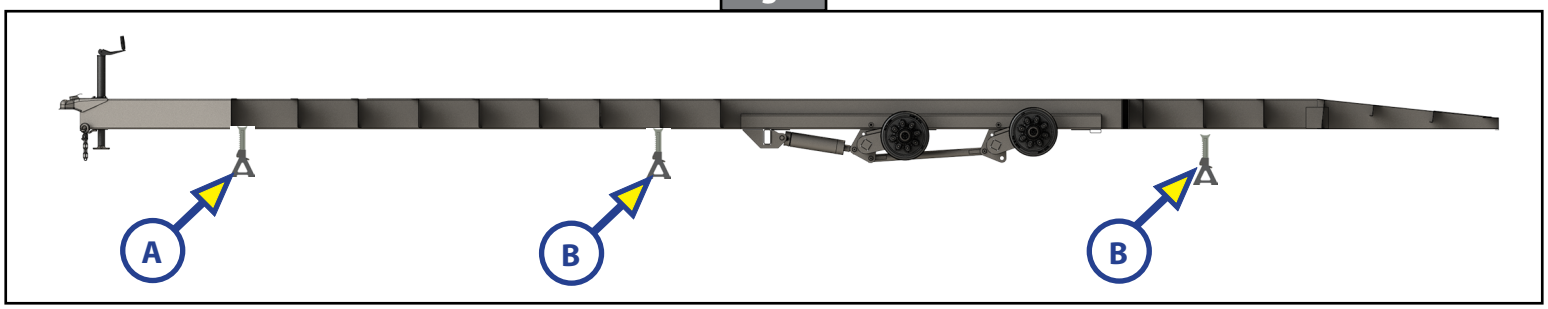
NOTE: Each OEM will have its own preferred method of positioning the trailer frame onto axle sub-frame. However, LCI recommends the following:

1. Lift front and rear of chassis/frame with floor jacks and stabilize with jack stands according to OEM recommendations.
2. Position one jack stand under both the front roadside and curbside corners of the chassis (Fig.5A) to support the frame.

NOTE: It is possible to lift the main frame using an overhead crane or lift truck.

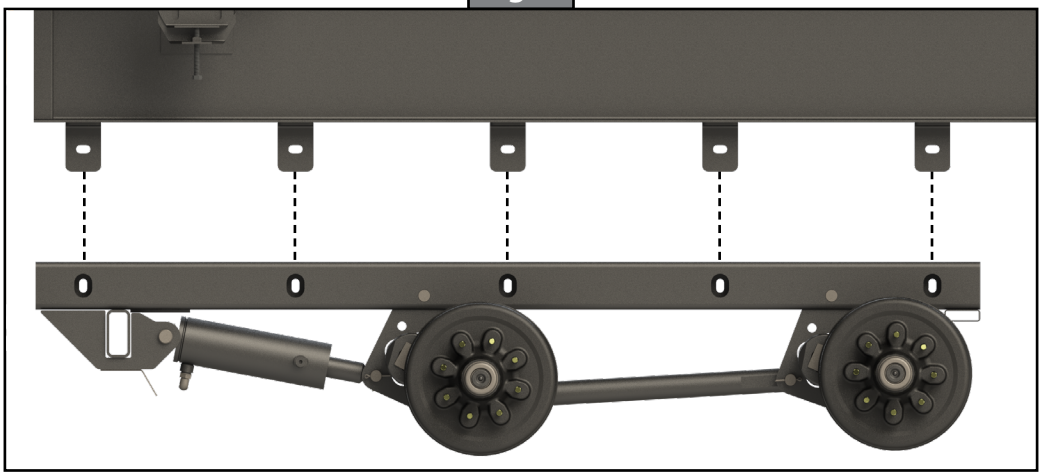
3. Position additional jack stands at the center (Fig. 5B) and rear (Fig. 5C) of chassis under both roadside and curbside to support the frame.

Fig. 5



4. Position the axle sub-frame under the frame rails and align the holes in the sub-frame with the holes in the ten axle hangers on the frame (Fig. 6).

Fig. 6



5. Lower the frame onto the axle sub-frame, and then onto the jack stands.
6. Bolt the sub-frame to the frame using the supplied bolts, washers and locking nuts then torque to 100-130 ft-lbs.

Installing the Hydraulic System

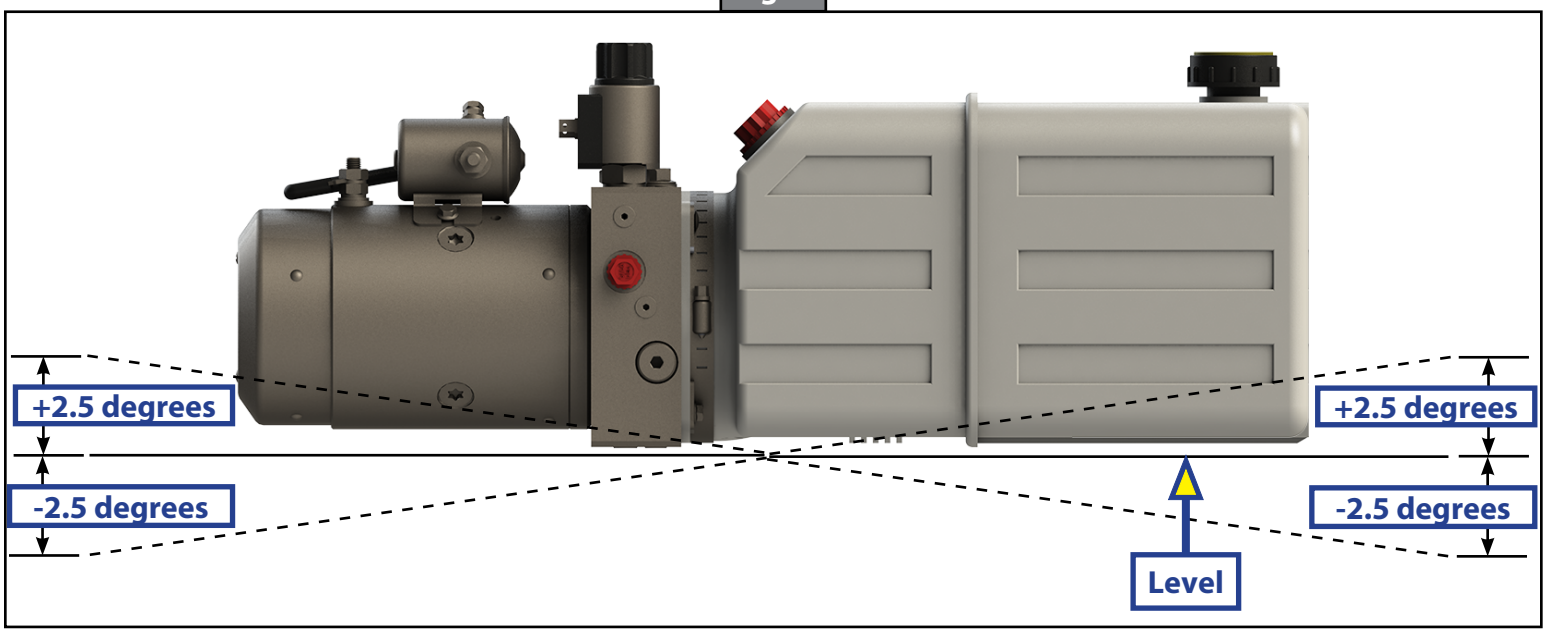
NOTE: Installation of the hydraulic power unit, fittings and hoses, should all take place in a clean and debris-free environment.

Installing the Hydraulic Power Unit

NOTE: Make sure the trailer is level before installing the hydraulic power unit.

NOTE: The hydraulic power unit **MUST** be mounted in a horizontal position on the trailer, within five degrees (total) of level (Fig. 7).

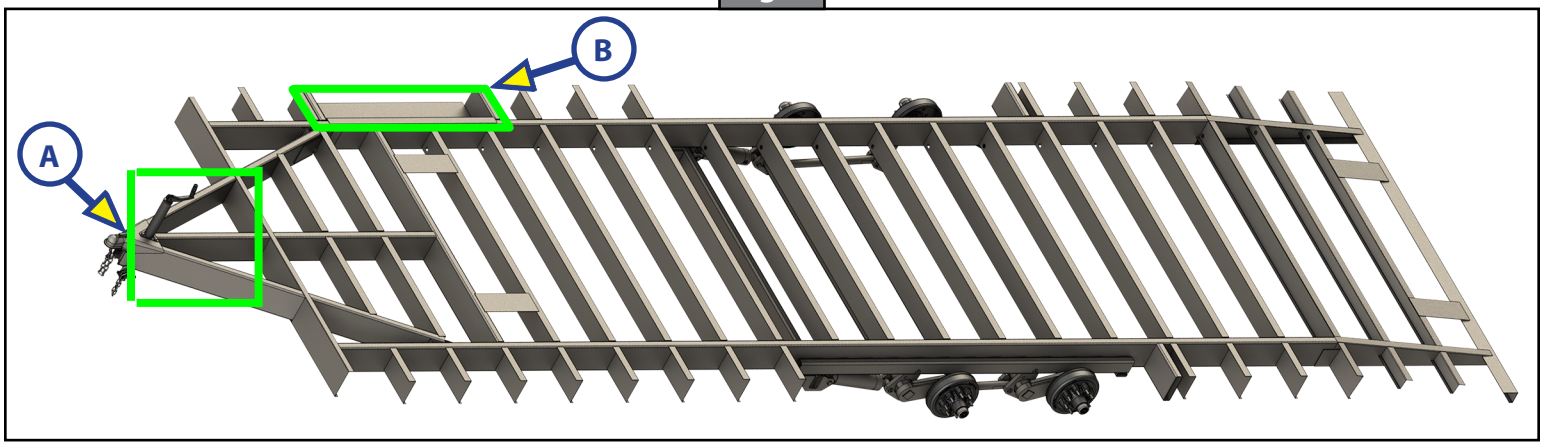
Fig. 7



Depending on the OEM application, the hydraulic power unit can be mounted in various locations on the trailer. The mounting location should provide protection from the weather. A utility box on the "A" frame of the trailer (Fig. 8A) or in a box mounted to the chassis (Fig. 8B), would both be possible locations.

1. Fasten the hydraulic power unit onto a stable and solid surface using two OEM supplied 3/8" - 16 UNC hex bolts x (length as needed).

Fig. 8



2. Install elbow hose fittings onto the power unit. The two ports are identified, one is port A (RETRACT) (Fig. 9) and the other port B (EXTEND) (Fig. 10).

Fig. 9

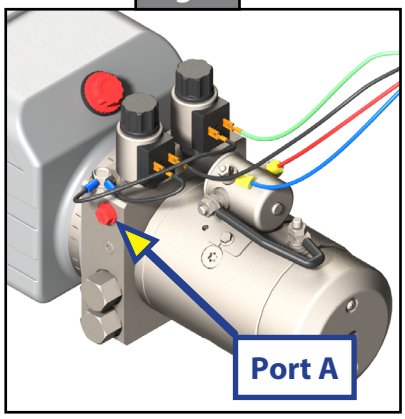
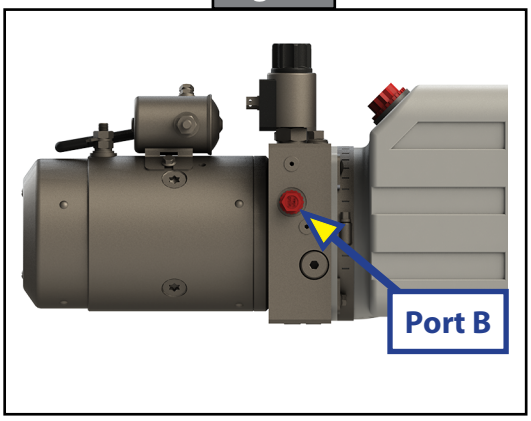


Fig. 10



Hydraulic Hoses

⚠WARNING

Hydraulic lines will be under pressure. Contact with fluid under pressure can cause bodily injury. Never place hands over or near a pressurized fitting to check for leaks. Be sure to wear eye protection.

The axle sub-frame arrives at the OEM with many of the hydraulic system hoses connected. This is completed at the Lippert Components manufacturing facility. The following items are shipped loose: the hydraulic power unit with an attached controller pendant, an accumulator, a hose to connect the accumulator to the hydraulic power unit, and the necessary fittings.

NOTE: Avoid routing hydraulic hoses close to any and all heat sources, if at all possible.

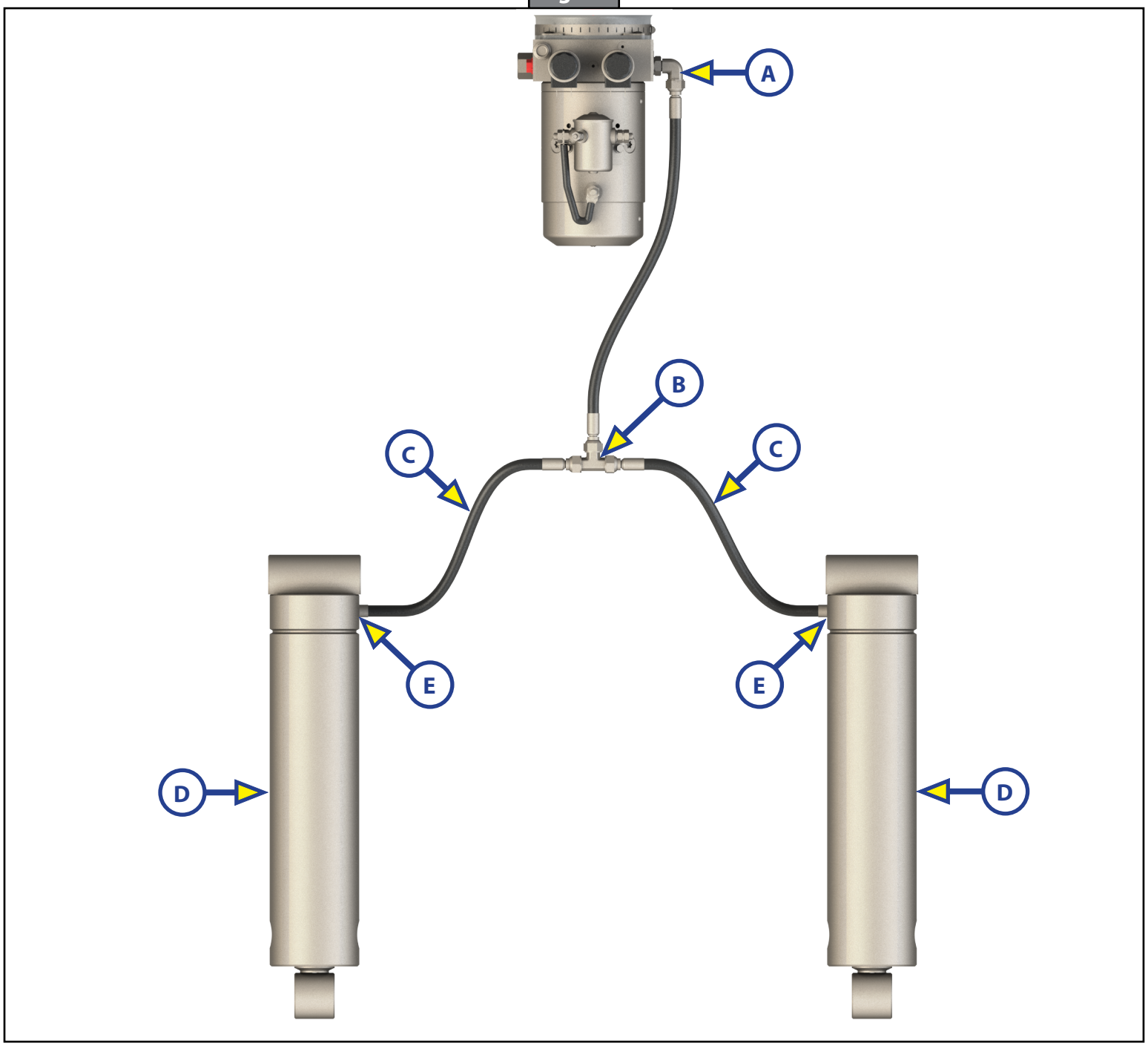
After the hydraulic power unit has been mounted to the frame, connect the remaining system components.

NOTE: Make sure to torque all fittings to 18-22 ft-lbs. Torque values are for wet installation of steel components.

Extend Hydraulic Hose Routing

1. Connect a black hose to Port B elbow fitting (Fig. 11A) on the hydraulic power unit and the other end to a tee fitting (Fig. 11B) that will connect to the cylinder extend ports on the two hydraulic cylinders (Fig. 11D).
2. Connect two black hoses (Fig. 11C) to the other ends of the tee fitting (Fig. 11B).
3. Add elbow fittings (Fig. 11E) to the extend ports on the underside of the hydraulic cylinders (Fig. 11D).
4. Connect the two hoses (Fig. 11C) to the elbow fittings (Fig. 11E) on the cylinder extend ports (Fig. 11D).

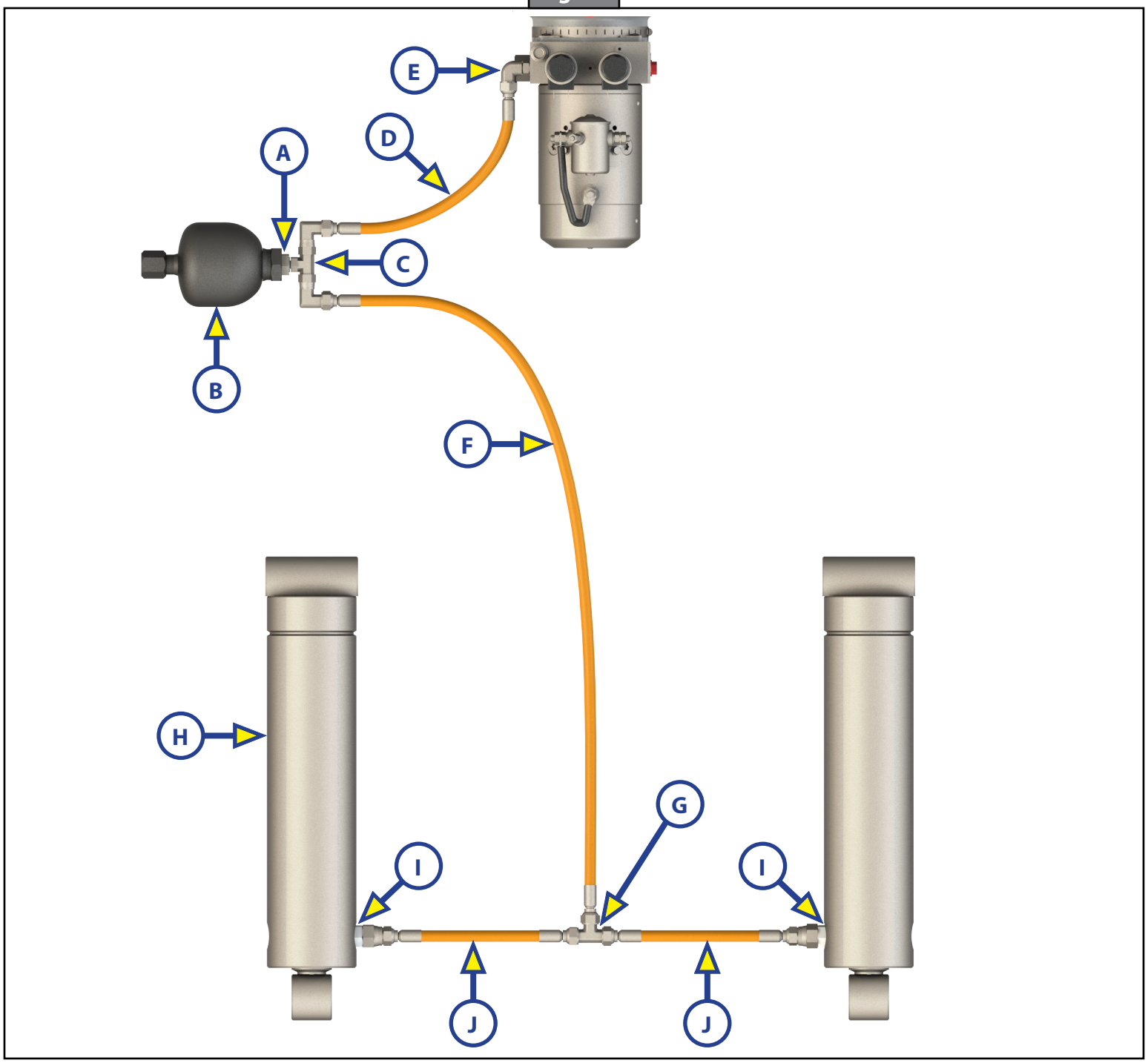
Fig. 11



Retract Hydraulic Hose Routing

1. Connect a reducer fitting (Fig. 12A) to the accumulator (Fig. 12B), then attach a tee fitting (Fig. 12C) to the reducer fitting.
2. Connect the orange hose that came with the accumulator (Fig. 12D) to the Port A elbow fitting (Fig. 12E) on the hydraulic power unit, then connect the other end to the one side of the accumulator tee fitting (Fig. 12C).
3. Connect an orange hose (Fig. 12F) to the other side of the accumulator tee fitting (Fig. 12C) to a tee fitting (Fig. 12G) that will connect to the cylinder retract ports on the two hydraulic cylinders (Fig. 12H).
4. Attach male straight fittings (Fig. 12I) to the retract ports on the hydraulic cylinders (Fig. 12H).
5. Connect orange hoses (Fig. 12J) to the other ports on the retract tee fitting (Fig. 12G) to each of the cylinder retract ports.

Fig. 12



Filling and Purging the Hydraulic System

NOTE: The fluid requirement is Dexron III ATF. For a list of alternative fluids, see Lippert Technical Information Sheet TI - 188: Hydraulic Operation Fluid Recommendation. To obtain this Technical Information sheet on-line, go to: https://www.lci1.com/support-low-entry-axle, click on the Technical Information Sheets tab and then select TI-188:Hydraulic Operation Fluid Recommendation from the listed documents..

1. Start with all hydraulic components in the fully retracted position, meaning the trailer is raised as if it were ready to travel.
2. Fill the reservoir until the fluid is about ¼" from the top of the reservoir, and no more than ½" from the top.
3. If there is no froth or foam in the reservoir, and the fluid is not within ½" of the top, fill the reservoir to within the level described in step 2.
4. With the fluid level full, and no foam in the reservoir, begin cycling the hydraulic system up and down.

NOTE: After completing one up and down cycle, and with the hydraulic cylinders fully retracted, note if there are any bubbles, froth or foam on top of the hydraulic fluid. This is an indication that air has been pushed back to the reservoir when the hydraulic components were retracted in the last cycle. Wait 15-20 minutes for the foam to dissipate before beginning the purge process again.

5. Check the reservoir for foam. If foam is present, see NOTE above and repeat steps 3 and 4. Repeat these steps until no foam is present in the reservoir. If no foam is present, the purge process is completed.

Operation

NOTE: Extending the cylinders will lower the trailer bed for loading and unloading. Retracting the cylinders maximum length will raise the trailer bed ready for travel.

⚠WARNING

Make sure the trailer is parked on solid, level ground. Clear area under trailer of debris and obstructions. Locations should also be free of depressions. When parking the trailer on extremely soft surfaces, utilize load distribution pads under rear of the trailer. People and pets should be clear of trailer while operating hydraulic system.

⚠CAUTION

Never travel with the trailer unless the bed is fully elevated. Hold the "UP" button 1-2 seconds after the trailer bed is fully raised.

Electronic Operation

NOTE: The trailer should always be hooked to the tow vehicle when loading and unloading.

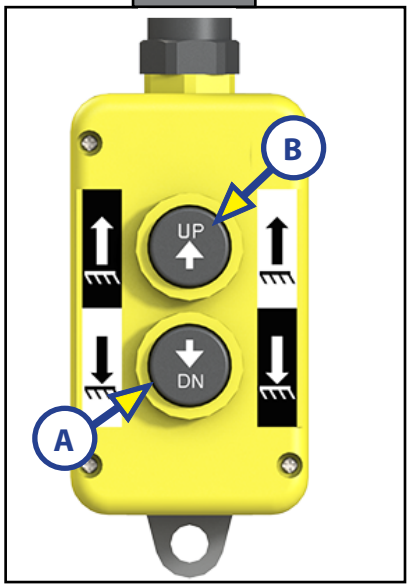
NOTE: Always maintain proper battery charge level.

1. Press the down (DN) button (Fig. 13A) on the pendant to raise the axles on the sub-frame, this will lower the trailer for loading and unloading.

NOTE: Always lower the trailer until the wheels of the sub-frame are completely off the ground.

2. Press the up (UP) button (Fig. 13B) on the pendant to lower the axles of the sub-frame chassis, which raises the trailer to the maximum height. Continue to hold the button 1-2 seconds after "full up" is achieved. Completing this action for 1-2 seconds after "full up" minimizes any linkage movement during transport and will extend linkage pin and cylinder life.

Fig. 13



Manual Override Procedure - Double Acting Hydraulic Power Unit

NOTE: Unhook the power unit motor from the power source prior to attempting the manual override procedure.

Retract

In the event of a dead battery, it is possible to operate the system manually.

1. Unthread the protective cap on top of the four-way cartridge valve, located on the hydraulic power unit (Fig. 14).
2. Turn the override knob counterclockwise until it stops.
3. Locate the manual override coupler on the front end of the power unit (Fig. 15).
4. Remove protective label (Fig.15A) from the power unit, to reveal the manual override coupler.
5. Using a drill with a ¼" hex bit, run the drill counterclockwise (Fig. 16) to retract/lower the trailer.
6. After retracting the trailer, make sure to turn the override knob clockwise (Fig. 14) until it stops.
7. Thread on the protective cap until it is finger tight.

Extend

NOTE: It is not recommended to manually extend/raise the trailer while it is loaded.

1. Unthread the protective cap on top of the two-way cartridge valve, located on the hydraulic power unit (Fig. 14).
2. Turn the override knob counterclockwise until it stops.
3. Locate the manual override coupler on the front end of the power unit (Fig. 15).
4. Remove protective label (Fig.15A) from the power unit, to reveal the manual override coupler.
5. Using a drill with a ¼" hex bit, run the drill counterclockwise (Fig. 16) to extend/raise the trailer.
6. After extending the trailer, make sure to turn the override knob clockwise until it stops.
7. Thread on the protective cap until it is finger tight.

Fig. 14

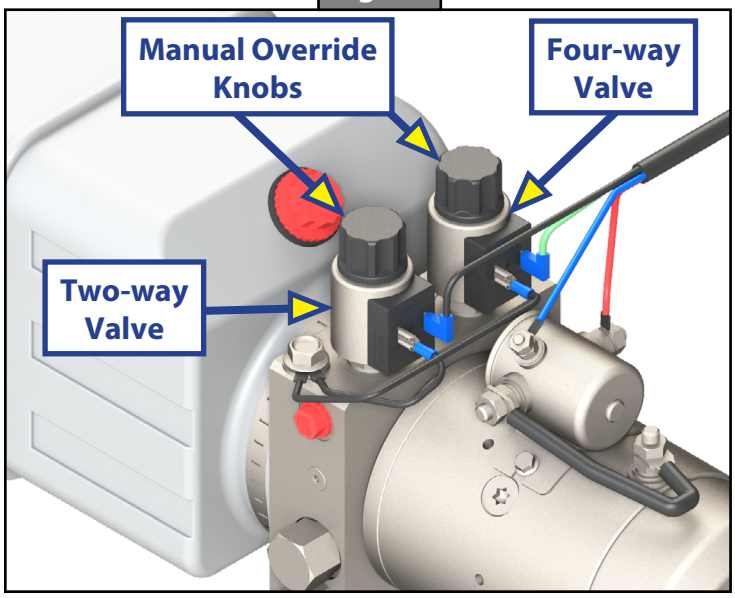


Fig. 15

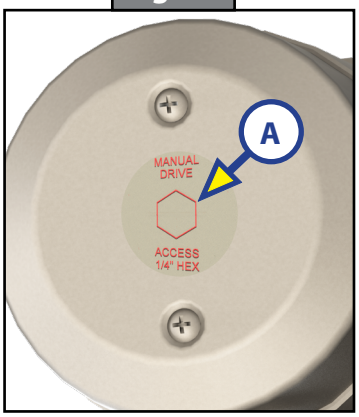
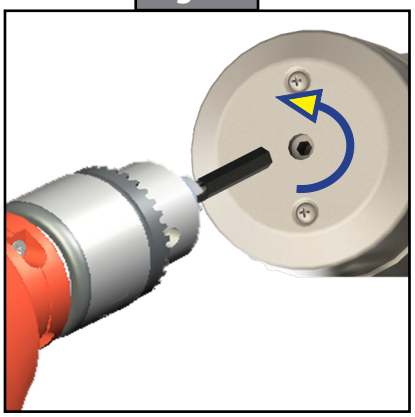


Fig. 16



Additional Information Sources

Additional information about this product can be obtained from lci1.com/support or by downloading the free myLCI app. The app is available on iTunes® for iPhone® and iPad® and also on Google Play™ for Android™ users.

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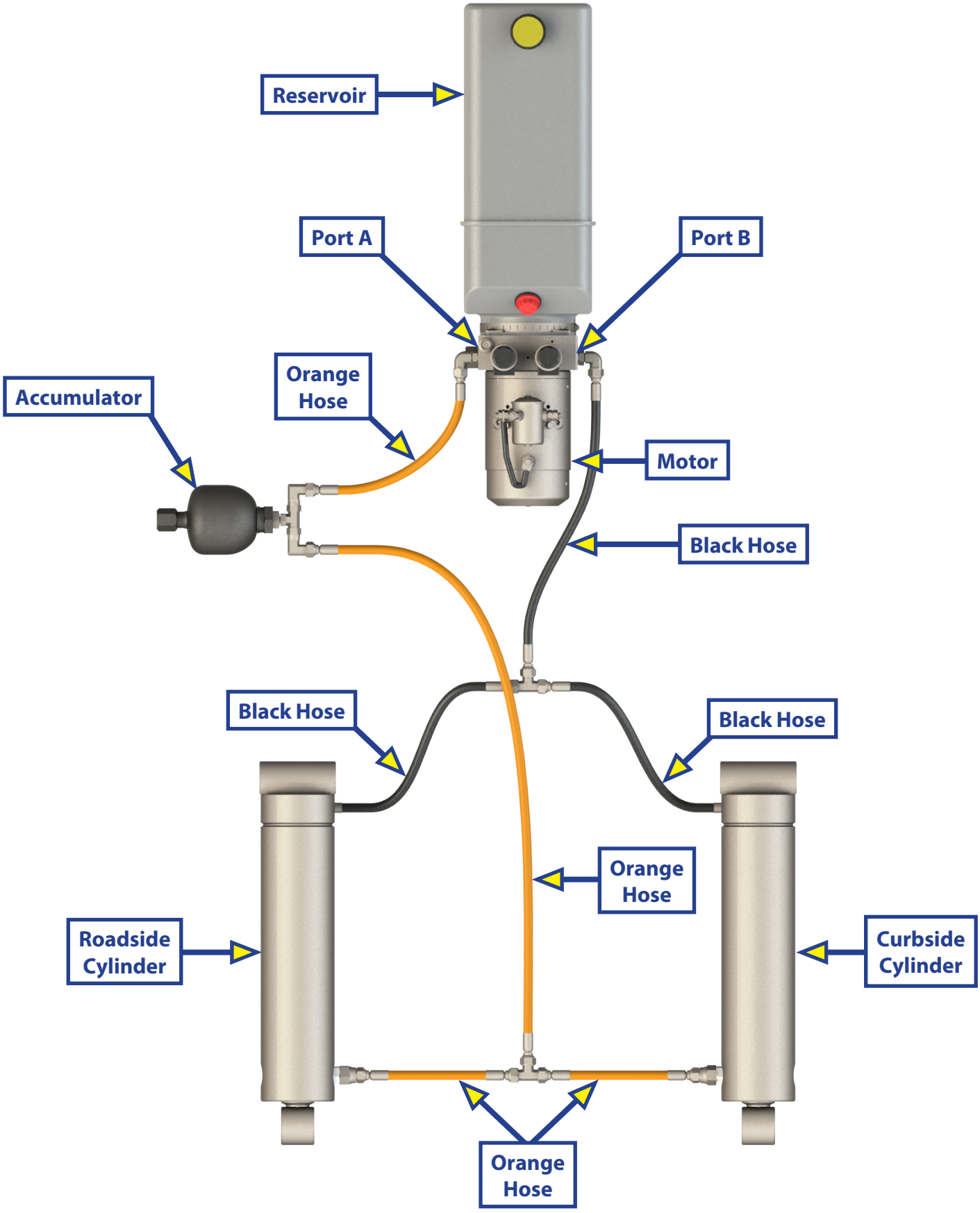
Hydraulic Plumbing Diagram



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