

## **HYDROSHOX Installation Instructions**

Thank you for your business! Since every installation is different we have provided these instructions as a guideline on how to install the **HYDROSHOX** on your vehicle. Since Mittler Bros does not know the end users application or how the product will be installed on the vehicle there may be additional fabrication necessary or additional parts needed beyond what has been supplied with this kit.



### **Kit Contents:**

- (4) **HYDROSHOX**
- (4) Coil Springs
- (1) Hydraulic Pump
- (1) Hydraulic Manifold Assembly
- (1) Remote Fluid Reservoir
- (2) Reservoir Mounting Brackets
- (30) ft of #4 High Pressure Braided Stainless Steel Hose
- (5) ft of #6 High Pressure Braided Stainless Steel Hose
- (10) ft of #8 Low Pressure Braided Stainless Steel Hose
- (4) #4 High Pressure Straight Hose Ends
- (4) #4 High Pressure 90 Degree Hose Ends
- (1) #6 High Pressure Straight Hose Ends
- (1) #6 High Pressure 90 Degree Hose End
- (2) #8 Low Pressure Straight Hose Ends
- (2) #8 Low Pressure 90 Degree Hose Ends
- (1) Switch Panel With Wire Harness
- (5) Quarts Of Hydraulic Oil

### Shock Installation:

1. Raise the vehicle and place it on jack stands.
2. Remove wheels and tires and existing shocks and coil springs.
3. Fully extend the shock and cylinder on the **HYDROSHOX** then determine mounting location based on desired ride height in the fully raised position. Keep in mind there will be some amount of shock compression once the weight of the vehicle is applied. This can vary based on spring selection, vehicle weight, etc. Make sure the fitting at the top of the shock (Figure 1) will be accessible to connect the hydraulic hose, and nothing will rub the shocks or hydraulic hoses when mounted. The 4" **HYDROSHOX** are 18.5" eye to eye fully extended. The 5" **HYDROSHOX** are 20.5" eye to eye extended.  
*Tip:* the **HYDROSHOX** raise or lower 4" or 5" (depending on kit purchased) but depending on how they are mounted on the vehicle may provide more suspension travel. For example, mounting the **HYDROSHOX** vertically connected to a solid rear axle will provide 4" or 5" of shock travel (depending on kit purchased), however mounting the **HYDROSHOX** close to the pivot point of the lower A-frame on an independent suspension will provide greater suspension travel due to the geometry of the independent suspension.
4. Fabricate shock mounts (if necessary) to fit the **HYDROSHOX** in the desired locations. Since the shock mounts are supporting the entire weight of the vehicle it's critical that they are robust. The spherical bearings on the **HYDROSHOX** have ½" holes. Make sure when mounted the spherical bearings can pivot freely.

### Hydraulic Pump and Reservoir Installation:

1. Determine mounting location for the hydraulic pump (Figure 2) and reservoir (Figure 3). The remote fluid reservoir **MUST** be mounted above the pump so fluid can gravity feed into the pump.  
*Tip:* the pump can be mounted under the vehicle if desired, and the remote fluid reservoir can be mounted anywhere above the pump such as in the trunk or truck bed.
2. Fabricate a bracket (if necessary) and mount the pump. The pump has mounting options on the bottom (Figure 4) with (2) 3/8-16 tapped holes spaced 3-1/4" apart and (2) 3/8-16 holes spaced 2-3/8" apart. The P & T ports (Figure 5) must face upward or horizontal but cannot be faced down. The port on the black tank of the hydraulic pump (Figure 6) must face upward. If necessary remove the 4 screws on the tank (Figure 6) and rotate the tank port upward and replace the 4 screws.
3. Fabricate a bracket (if necessary) and mount the reservoir. You must be able to get to the top of the reservoir in order to fill it with fluid once the installation of the system is complete.
4. Determine hydraulic hose length. The bottom of the reservoir will connect with the port on the black tank of the hydraulic pump (Figure 5). Cut the desired length of low pressure #8 (7/16" ID) stainless braided hose and assemble the desired AN fittings on the ends of the hose. The kit is supplied with both 90 degree and straight AN fittings. Follow the low pressure hose assembly instructions in Table A. Route hose away from sharp, hot or moving objects.

### Hydraulic Manifold Installation:

1. Determine mounting location for the hydraulic manifold (Figure 7).  
*Tip:* The wire harness from the pump is 4 ft long and will plug into the hydraulic manifold. Mounting the manifold close to the pump allows for easier plumbing and wiring.
2. Fabricate a bracket (if necessary) to mount the manifold. The manifold has (2) mounting holes spaced 4" apart to fit 5/16 socket head cap screws.

3. Determine hydraulic pressure hose length. Connect the “P” port of the manifold (Figure 8) with the “P” port of the hydraulic pump (Figure 5) using the high pressure #6 (.322” ID) stainless braided hose and supplied AN fittings. A 90 degree and straight fitting are supplied with the kit. Follow the high pressure hose assembly instructions in Table B. Route hose away from sharp, hot or moving objects.
4. Determine hydraulic return hose length. Connect the “T” port of the manifold (Figure 8) with the “T” port of the hydraulic pump (Figure 5) using #8 (7/16” ID) stainless braided hose and supplied AN fittings. Both 90 degree and straight fittings are supplied with the kit. Follow the low pressure hose assembly instructions in Table A. Route hose away from sharp, hot or moving objects.
5. Make sure the flow controls on the manifold (Figure 7) are screwed all the way out (counter clockwise) by loosening the lock nut with a ½” wrench and turning the screw with a 5/32 allen wrench.

#### **HYDROSHOX Hydraulic Line Installation:**

1. Determine hydraulic hose length from the hydraulic manifold to each of the **HYDROSHOX**. Connect using high pressure #4 (.197” ID) stainless braided hose and supplied AN fittings. Make sure the left front shock is connected to the LF port, right front to the RF port and so on. The kit includes 90 degree and straight fittings. Follow the high pressure line assembly instructions in Table B. Route hoses away from sharp, hot or moving objects.

#### **Switch Panel Installation:**

1. Determine location inside the vehicle to mount the switch panel (Figure 9).  
*Tip:* Switches can be removed from panel and mounted directly in the dash, console, etc. if desired.
2. Fabricate a bracket to mount the switch panel (if necessary).

#### **Wiring:**

1. Connect the red 12v+ wire at the switch panel to a fused (7.5 amp) 12v+ source.
2. Run the wire harness from the switch panel back to the manifold. Wire length is 16 ft which should be long enough to run under the vehicle if necessary. Keep wire clear of sharp, hot or moving objects.
3. Plug the connector at the manifold end of the wire harness into the manifold. Any excess wire should be coiled up and secured.
4. Plug the wire harness from the pump into the hydraulic manifold. Any excess wire should be coiled up and secured.
5. Connect the ground wire from the hydraulic unit (Figure 11) to a chassis ground.
6. Run a #4 wire (not included) from the positive battery terminal to the large post on the solenoid mounted on the hydraulic pump (Figure 10). Keep wire clear of sharp, hot or moving objects. This will supply the necessary power to run the pump when the solenoid is activated.

#### **System Startup:**

1. Fill the reservoir with 2-1/2 quarts of the supplied hydraulic oil initially. **DO NOT** fill the tank all the way up.
2. Put the wheels and tires back on the vehicle and lower the vehicle back down on the tires. When the vehicle is lowered the hydraulic cylinders should compress since there is no fluid in the system.
3. Turn the power switch on the switch panel to “On”.

4. Hold the front and rear switches in the “Lower” position for 10 seconds to allow any built up air pressure from collapsing the cylinders to escape.
5. Hold the front switch in the “Raise” position. You should hear the hydraulic pump running with the switch in the “Raise” position. Release the switch once the vehicle raises and stops at the top of the travel.
6. Check the fluid level in the hydraulic tank. Put additional hydraulic fluid in so that the tank is about ½ full (just over the internal baffle).
7. Hold the rear switch in the “Raise” position. You should hear the hydraulic pump running with the switch in the raise position. Release the switch once the vehicle raises and stops at the top of the travel.
8. Check the fluid level in the hydraulic tank. If you see fluid in the lower portion of the tank, do not add any. If no fluid is present add enough to bring the level into the lower portion of the tank.
9. Raise and lower the front and rear of the vehicle completely 5 or 6 times to bleed all the air out of the system. The pump does not run when the vehicle is being lowered. Periodically check the fluid level in the tank to make sure the tank does not run empty. If the tank runs empty it is possible to introduce additional air into the system which will need to be bled out.
10. Check for any oil leaks anywhere in the system. Any leaks must be addressed and repaired prior to using the system any further or driving the vehicle.
11. Once the bleeding process and leak check is complete, lower the vehicle all the way down, then add enough hydraulic oil into the tank so it is filled about 1/2 of the way full (just over the internal baffle). **DO NOT** fill the tank all the way up. Depending on the hydraulic hose lengths in your installation you may not need all 5 quarts of supplied hydraulic oil.

#### **System Tuning:**

If you find that the vehicle raises or lowers at different speeds in the front or rear when raising or lowering them both together this can be adjusted with the flow controls mounted on the manifold (Figure 7). Most vehicles are front heavy due to the weight of the engine, therefore when trying to raise the entire vehicle at once the rear will raise first before the front begins to raise. The opposite is true when lowering the vehicle. Since the front is heavier, the front will lower faster than the rear. The one way flow controls on the LF & RF hydraulic circuit control the flow of the fluid back to the tank from the front **HYDROSHOX** when the vehicle is lowered. Experiment by turning them clockwise 1 turn at a time with a 5/32” allen wrench until the vehicle will lower evenly. The one way flow controls on the LR & RR hydraulic circuits control the flow of the fluid out to the rear **HYDROSHOX** when the vehicle is raised. Experiment by turning them clockwise 1 turn at a time with a 5/32” allen wrench until the vehicle will raise evenly. Once you have the flow controls set tighten the lock nuts up with a ½” wrench.

Figure 1



Figure 2

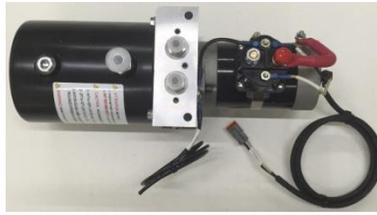


Figure 3



Figure 4

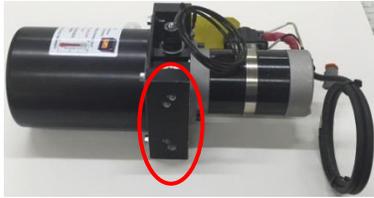


Figure 5

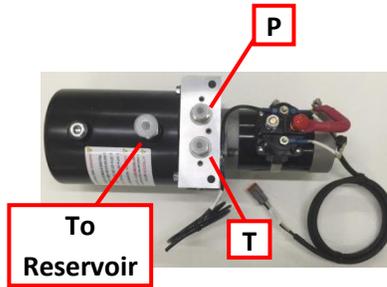


Figure 6

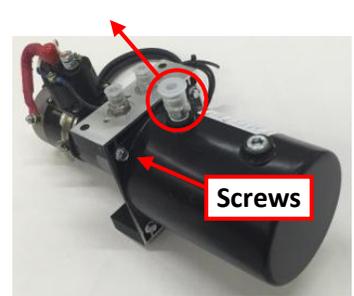


Figure 7

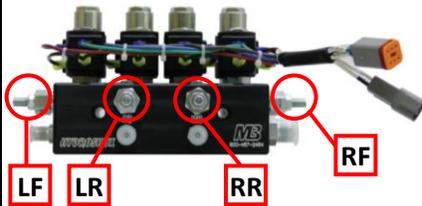


Figure 8

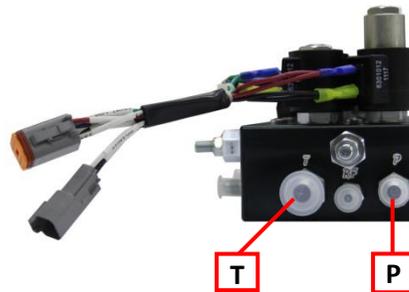


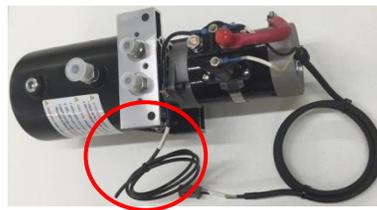
Figure 9



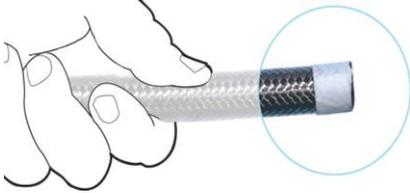
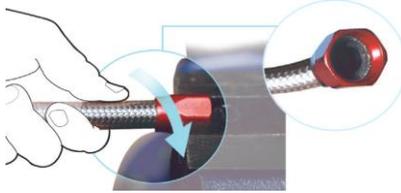
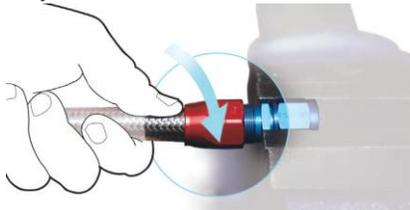
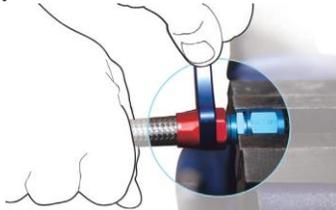
Figure 10



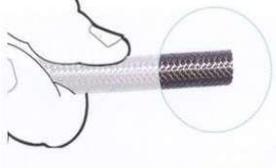
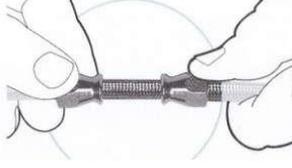
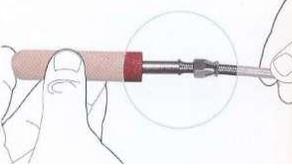
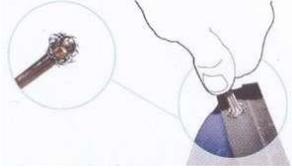
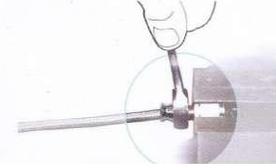
Figure 11



**Table A – Low Pressure Hose Assembly**

<p><b>Step 1</b></p>  <p>Bind masking tape tightly around the hose at the required length and cut through using a fine tooth saw blade or cut off wheel, leaving tape on both ends so that it retains the braid. Clean any debris from both the cut ends and inside the hose.</p>	<p><b>Step 2</b></p>  <p>On a clean flat surface disassemble the fitting. This consists of two parts, the socket (left) and main fitting body (right).</p>	<p><b>Step 3</b></p>  <p>Hold the socket in a smooth vice jaw and feed one end of the hose into the socket by turning clockwise and pushing until the hose finishes just behind the socket threads.</p>
<p><b>Step 4</b></p>  <p>Holding the main fitting body in the vice, lubricate the thread and push the hose and socket over the nipple end and start to thread the socket onto the fitting by hand.</p>	<p><b>Step 5</b></p>  <p>Finish tightening the socket onto the fitting using a good quality wrench until the socket is one full turn from the back of the fitting hex.</p>	

## Table B – High Pressure Hose Assembly

<p><b>Step 1</b></p>  <p>Using a fine tooth saw blade or cut off wheel, cut the PTFE lined hose to your required length. Clean any loose debris from both ends of the hose.</p>	<p><b>Step 2</b></p>  <p>The re-usable fittings are made up of three parts. The main body, the brass olive, which is what compresses on to the hose when the fitting is assembled, and lastly the socket. On a clean, flat surface, disassemble the two fittings which are to be used.</p>	<p><b>Step 3</b></p>  <p>Push the two sockets, back to back, over the stainless steel braid of the hose. You will notice that the braid on one end of the hose has flared out when cut, so work from the opposite end, this makes sliding the socket over the braid easier.</p>	<p><b>Step 4</b></p>  <p>Using an appropriate sized mandrel or small flat bladed screw driver, flare out both ends of the stainless steel braid from the PTFE inner liner.</p>
<p><b>Step 5</b></p>  <p>Push an olive onto each end of the PTFE inner tube by hand. The olive must sit over the PTFE tube but inside the flared out stainless steel braid. Finish off by pushing against a flat, solid surface making sure the PTFE inner tube is fully home in the brass olive.</p>	<p><b>Step 6</b></p>  <p>Hold the main body of the fitting in a 'soft jaw' vice and lubricate the male thread which accepts the socket. Push the hose over the nipple end and start to thread the socket over the lubricated male thread.</p>	<p><b>Step 7</b></p>  <p>Finish tightening the socket on to the main body using a good quality suitably sized spanner. Tighten up until the socket is a 'thumb nail' gap from the hex of the main body.</p> <p>Repeat steps 6 and 7 for the opposite end of the hose. Then you have finished. Important to note: under no circumstances should the socket be loosened from the main body in an attempt to adjust alignment.</p>	