

INSTALLATION INSTRUCTIONS

800-Series Hydraulic Release Bearing

A) Description

Tilton's 800 series hydraulic release bearing is a compact assembly that is adaptable for many different applications. The bearing is self-adjusting for clutch wear maintaining "near zero" clearance at all times. There is no extra return spring that pulls the piston back to the bottomed position. In this respect, the piston works like the piston in a disc brake caliper, returning only as far as forced. This is why with a Tilton hydraulic release bearing assembly the clutch pedal feel does not change with clutch wear allowing the driver to make more consistent shifts.

A. As Received

- 1) The ports are -3AN. Some assemblies are provided with a fitting converting one port to -4AN male. Select your lines accordingly.
- 2) If you need to take any measurements for clearance purposes fully compress the piston. It is now partially extended.

B. Installation

There are a few different ways that the assembly can be mounted depending on the particular part number and application. It is important to know that both ports are identical. It does not matter which port you use for the bleed port or the fill port. Position the assembly in the housing in a manner that allows the port with the bleed line to be within 15 degrees of the vertical position for air removal and allows a sensible hydraulic line routing.

- 1) In many applications the assembly and adapter bolt in place of the existing pilot tube or in place of the original hydraulic release bearing.
- 2) For custom applications where you will make your own adapter see **Figure 1** for the mounting configuration. The two holes in the base are sized for both 1/4" and 6 mm fasteners. You will want to locate (center) the assembly using the inner diameter of the base. If there is an existing pilot tube it must be removed or trimmed to below the top of the hydraulic release bearing base.

If you are installing this assembly into a known application where the bearing clearance and mounting configuration have already been determined proceed to section D.

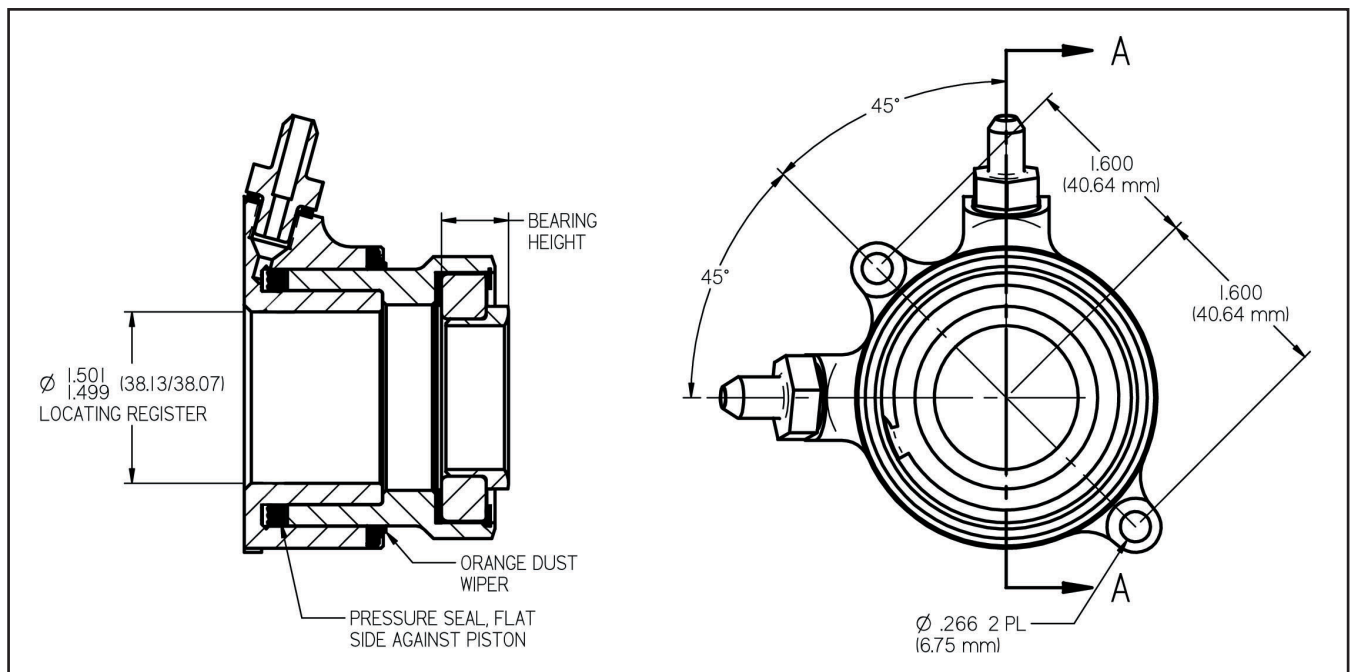


Figure 1

C. Measuring Bearing Clearance (for new applications with unknown clearance)

- 1) Install the flywheel and new clutch assembly as explained in their instructions. Worn friction discs will generate false readings.
- 2) Press with a *firm* and even force to make sure that the piston in the hydraulic release bearing is fully retracted.
- 3) Measure the distance "A" as shown in **Figure 2**. This is the distance from the engine/transmission housing interface to the top of the hydraulic release bearing with the piston fully retracted.
- 4) Measure the distance "B" shown in **Figure 3**. This is the distance from the engine/transmission housing interface to tips of the spring fingers on the clutch.
- 5) **C=A-B**. This is your bearing clearance. It should be in the range of **.170 to .230" for Tilton 5.5" and 7.25" clutches and .150" to .230" for The Tilton 4.5" clutch**. This will allow the full wear range of the clutch. If the clearance is outside of this range you will need to modify the position of the hydraulic release bearing assembly.

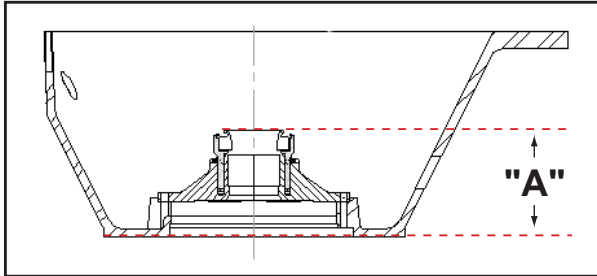


Figure 2: Distance from engine mounting surface to top of bearing

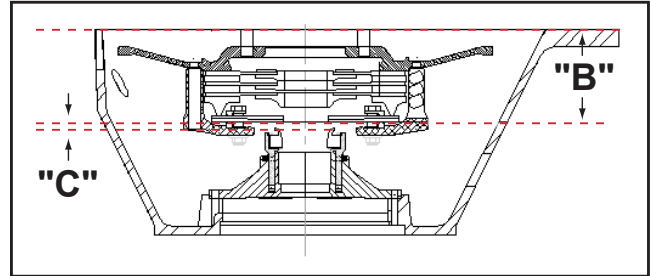


Figure 3: Distance from spring fingers to housing mounting

D. Hydraulic Lines

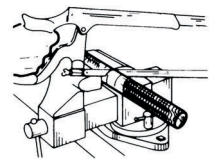
Some assemblies include hydraulic lines. **Diagram 1** provides complete instructions on how to properly cut the lines to the proper length and attach the fittings.

- 1) The ports are -3AN (3/8-24). Depending on the assembly part number the fittings could be -3AN male, -4AN (7/16-20) male, or -3AN banjo style. The male fittings are made to seal on the taper and not the threads. Do not use pipe tape or other sealants on any of the fittings.
- 2) The port coming out of the top must be connected to the bleed line. Route the bleed line outside of the housing for easy access.
- 3) The other port connects to the master cylinder.
- 4) Route both lines clear of heat sources such as the exhaust system. Also make sure that the lines will stay clear of the clutch and flywheel.

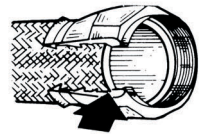
E. Master Cylinder Selection and Priming

- 1) A .750" (3/4") or .700" (7/10") bore master cylinder must be used with the Tilton 7.25" clutch. The .750" requires a shorter stroke while the .700" requires less force at the pedal and provides better modulation. A .625" (5/8") master cylinder bore size is recommended with a 5.5" or smaller Tilton clutch. Likewise, a smaller master cylinder requires less force on the pedal and provides better modulation but takes more stroke. **Table 1** lists the master cylinder size options.
- 2) Fill the master cylinder with a DOT 3 or Dot 4 compatible fluid. DOT 5 (silicone-based) fluids are not compatible with the seals. Special high temperature fluids are not required and usually shorten the seal life.
- 3) Have a port or bleed fitting open at the master cylinder and depress the pedal.
- 4) Close the master cylinder port and bleed screw and let the pedal return.
- 5) Repeat steps 3 and 4 until the emerging fluid is free of air.

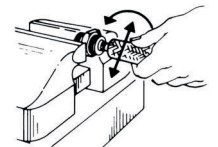
1. Cut the line to the required length. We recommend the use of a radiac wheel but it can be done satisfactorily with a 32 teeth-per-inch hacksaw blade. In either case, the line must be tightly wrapped with electrical masking tape and the cut be made through the tape. DO NOT cut SPEED-FLEX line with a chisel, snips, pliers or a shear as these may crush the Teflon liner.



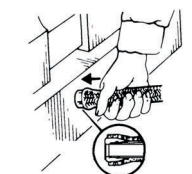
2. Deburr the Teflon and trim any loose ends of braid with sharp snips or diagonal cutting pliers.



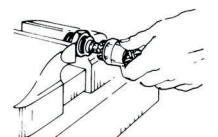
3. Install the socket on the hose with the threaded end of the socket toward the cut end of line. This will be a lot easier and you will end up with fewer holes in your hand if you clamp the socket in a vise. Push socket on well beyond end.



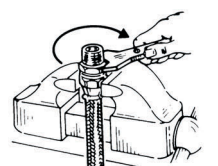
4. Place the hex portion of the nipple in the vise. Insert the end of the line onto the nipple and bottom of the hose against the chamfer seat of the nipple with a rotary motion of the line. This will size the I.D. of the Teflon tube.



5. Separate the braid from the O.D. of the Teflon tube. The best way is to use a braid spreader tool. In the absence of the tool, separate the braid with a small screwdriver or a scribe. Be careful not to scratch or nick the Teflon.



6. Install the sleeve between the braid and the Teflon tube. Make sure that none of the braid is trapped between the Teflon and the sleeve. Bottom the tube against the shoulder of the sleeve and make sure that the sleeve is inserted square.



7. With the nipple held in the vise, push the line and the sleeve onto the nipple until the sleeve bottoms. Remove the line and make sure that the Teflon tube is still bottomed against the shoulder of the sleeve and that the sleeve is square.

8. Push the line and the sleeve back onto the nipple and bottom against the chamfer. Start the socket onto the nipple threads and hand tighten.

9. Place the socket in the vise and complete the assembly by tightening the nipple onto the socket with a wrench until the gap between the face of the socket and the hex of the nipple is .023" - .046", using a feeler gauge.

10. Blow the assembly clean and pressure test before running driving the car.

Diagram 1

Tilton Master Cylinder Push Rod Stroke			
	5/8" Master Cylinder Bore	7/10" Master Cylinder Bore	3/4" Master Cylinder Bore
4.5" / 4.9" / 5.5" Clutch with 38mm bearing	.80" recommended	.65"	.57"
7.25" Clutch with 44mm bearing	Not recommended	.90"	.79" recommended

Table 1

F. Hydraulic Release Bearing Bleeding

- 1) Fill the master cylinder reservoir with DOT 3 or DOT 4 compatible fluid.
- 2) Open the bleed screw for the hydraulic release bearing.
- 3) Take the clutch pedal to full stroke.
- 4) Close the bleed screw after fluid stops flowing out.
- 5) Let the pedal return to its natural position and leave it there for at least 3 seconds.
- 6) Repeat steps 3 through 5 until the emerging fluid is free of air.
- 7) Do not stoke the pedal again until the pedal positive stop has been set.

G. Adjusting the Pedal Stop

A positive stop for the clutch pedal must be used to prevent over-stroking the hydraulic release bearing and the clutch. The method listed below provides a very simple and effective method for adjusting the positive stop position.

Calculated master cylinder strokes are also listed in **Table 1** for reference.

- 1) Lift the drive wheels off the ground and support the car on jackstands.
- 2) With the engine off, place the transmission in first gear and have someone attempt to rotate the drive wheels or driveshaft.
- 3) Depress the clutch pedal slowly until the clutch disengages and the drive wheels or driveshaft can be rotated. This is labeled as **Position A** in **Figure 4**.
- 4) Adjust the pedal stop to allow travel of the clutch pedal 3/8" (9 mm) past **Position A** in **Figure 4** to **Position B**. The distance shown in **Figure 4** is exaggerated for clarity. **Do not stroke the pedal any further than Position B throughout the procedure or you will damage the clutch.**

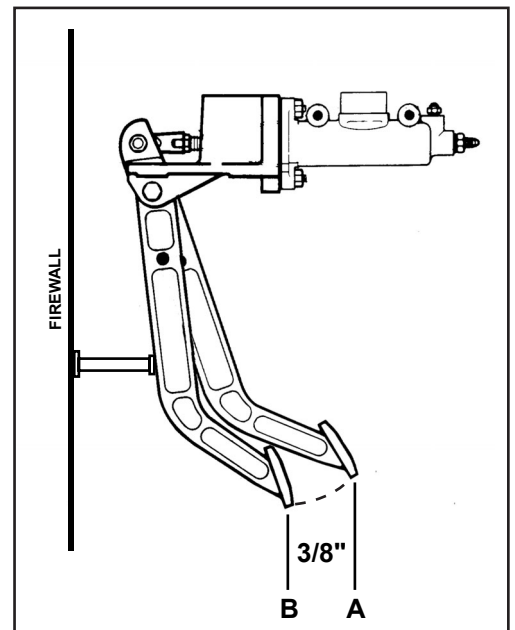


Figure 4

H. Periodic Maintenance

- 1) Spin the bearing race and check how it feels. If it has higher than normal resistance, feels dry, or feels rough replace the bearing. Some bearings are held in with a wave spring clip while others have a light press fit. It is best to have a regularly scheduled interval of bearing replacement. Always replace the bearing before a 12 or 24 hour race.
- 2) The piston can be removed and replaced without breaking the hydraulic seal or requiring bleeding. Periodically remove the piston and check for scores in the bore and on the piston. Wipe the piston and orange dust wiper before reinstalling. You may find that the piston is not dry. This could be the rubber grease used when installing the new seal. Do not mistake this for brake fluid. Scored pistons and bases must be replaced. They will not score unless there has been dirt contamination.
- 3) A seal kit (**62-905**) consists of the black hydraulic seal and the orange dust wiper. During replacement remove the orange wiper first. The hydraulic seal can then be removed by blocking off one port and applying air pressure to the other port pushing the seal out of the groove. *Wear safety glasses, use low pressure, and point the seal's exit path away from you.*
- 4) Use rubber grease when installing the new pressure seal to prevent seal damage. The flat side of the seal must contact the bottom of the piston. Then install the orange wiper.
- 5) Reinstall the piston.
- 6) Reinstall the bearing.

