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HUGHES PERFORMANCE® HP2215 VALVE BODY
Installation Instructions 9/24/16

For over 45 years our goal has been to provide racers and enthusiasts with reliably engineered, U.S. manufactured, torque converters and drive train components for your high performance application. *Before you start your build, please take a few moments to review the important Product Safety Information and installation steps set out within this instruction manual.* If you still have questions; Hughes Performance® technical team is here to help: (1-800-274-RACE).

Important Product Safety Information
Throughout these instructions important safety information is generally preceded by one of three signal words indicating the relative risk of injury. The signal words mean:

! WARNING a hazardous situation which, if not avoided, could result in death or serious injury. **You CAN be Killed or Seriously Injured if you do not follow instructions.**

! CAUTION a hazardous situation which, if not avoided, could result in minor or moderate injury. **You CAN be moderately INJURED and also may suffer property damage if you don't follow instructions.**

NOTICE careful attention is required to follow this installation instruction or operation but does generally not relate to personal injury. Damage to your product or other property may result if you do not follow instructions.

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! WARNING: Improper selection of Hughes Performance® products, failure to follow installation instructions and/or misuse increases the risk of injury or accident. For your safety and the safety of others:

- Assure the Hughes Performance® product selected is intended for your application with an additional safety margin above your expected horsepower, torque, and intended usage of product and vehicle.
- These instructions are not intended to address all risks related to modification of your vehicle or use. Remember: *you are the builder and chief safety engineer for your modified vehicle.* Consult and follow all OEM warnings and operating limitations.

(For Calif. Residents-Prop. 65):

! WARNING

This product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.
(for more information on Prop. 65 see www.P65WArnings.ca.gov/product)

To reduce risks: work with gloves, safety glasses, wash hands before eating, and dispose of any fluids properly.

SAFETY INFORMATION SPECIFIC TO THE HP2215 VALVE BODY

! WARNING: This valve body is intended for use in a competition application only never to be used on public streets or highways. This valve body is not intended for use in a street-driven application.

! CAUTION: We recommend that you secure the services of an experienced transmission builder in order to achieve proper installation of this product. These instructions and Safety messages are a general guide to assist the builder in the installation of this product. They are not intended to be a transmission rebuilding guide. The steps herein are designed for the experienced professional to follow in detail for proper installation and transmission function. Specialty tools are required to complete proper installation of this valve body.

! WARNING: Do not shift the transmission into neutral under load or with vehicle or drive shaft in motion. Do not turn off engine under load or with vehicle or drive shaft in motion. Doing so will cause an over speed condition of the direct drum within the transmission, increasing risk of direct drum failure, explosion, and injury.

! WARNING: Do not activate transbrake feature with vehicle or drive shaft in motion. Activation of transbrake feature with vehicle or drive shaft in motion will result in transmission damage and potential injury.

! CAUTION: Do not perform a 3-2 downshift under load or with vehicle or drive shaft in motion. Performing a 3-2 downshift under load or with vehicle or drive shaft in motion will excessively shock the intermediate sprag within the transmission, resulting in premature sprag wear or even failure. Progressive, accelerated damage will occur within the transmission in the result of an intermediate sprag failure.

! CAUTION: Recommended Burn Out Procedure: (1). Place transmission in second gear. (2). Begin burn out procedure and shift transmission into third gear while tires are still spinning. (3). Complete burn out procedure accordingly with transmission remaining in third gear. Failure to follow this burn out procedure is considered product misuse, and will result in excessive shock to the intermediate sprag within the transmission, resulting in premature sprag wear and increased risk of transmission failure.

NOTICE: Please verify all appropriate parts have been included with the transbrake kit before beginning installation. The following components will be included inside the box:

- Valve body
- Separator plate
- Upper and lower valve body gaskets
- Manual valve
- Solenoid and o-ring
- (16) direct drum springs
- Brake valve
- Brake valve spring
- Pressure regulator spring

NOTICE: Valve body requires manual shifting in all modes of operation, and features a reverse shift pattern (P-R-N-1-2-3).

Installation Sequence

! WARNING: Use protective eyewear and gloves. If dusty, use face mask, wet and wipe clean working surfaces. Transmission fluids and cleaning products are highly flammable! Avoid open flame, welding sparks, smoking, or other sources of ignition. Flexplate, torque converter, and transmission assembly involves heavy parts and pinch points. Use support jacks and review installation steps before attempting.

1. We recommend that a minimum of a 34-element intermediate sprag be used on the direct drum when using this valve body in your TH400 transmission. We offer several direct drums for severe duty use if you need one, including part number HP2234 (cast iron drum with 34-element sprag and races), part number HP2234B, (cast iron drum with 36-element sprag and races, and part number HP2234A (billet aluminum drum with 36-element intermediate sprag). We also recommend that a forged steel or billet steel forward clutch hub be installed in the transmission. We have this item available under part number HP2226.

2. Clean all dirt, grease, oil, and any other foreign substances or contaminants from the outside of the transmission and all associated surfaces. Be sure to dispose of all cleaning products and chemicals in a manner consistent with local regulations.

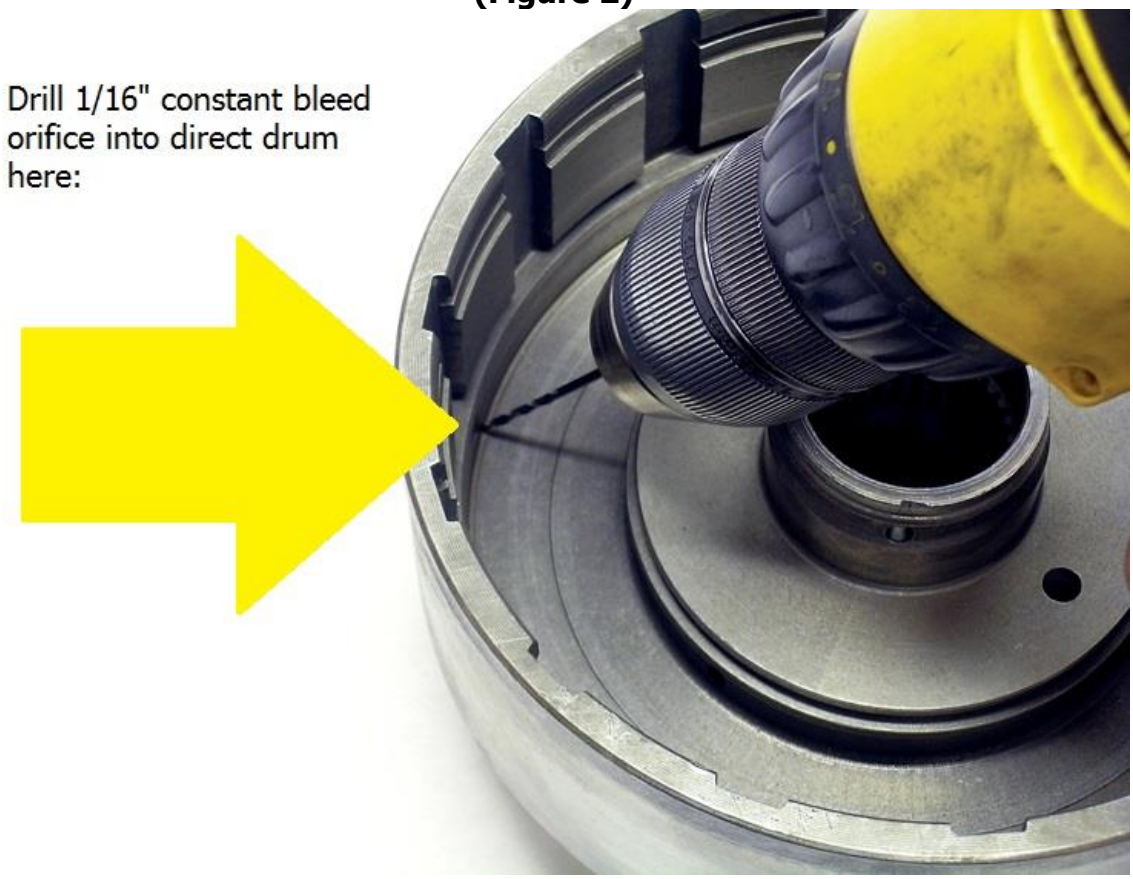
3. Properly secure transmission to a clean work bench or appropriate transmission service stand.

4. Begin transmission disassembly by removing front pump, input shaft and forward drum assembly, and direct drum assembly. ***NOTICE:*** Specialty tools are required in order to properly remove front pump from transmission assembly.

5. Remove and discard the intermediate band.

6. If re-using the original cast iron direct drum, disassemble direct drum completely by removing clutch pack, spring retainer, springs, apply piston, and seals. Using a 1/16-inch drill bit, and wearing safety glasses/gloves, drill a constant bleed orifice into the direct drum from the inside out behind the piston area. The drill may be held at a 45 degree angle for more drilling room (*see figure 2*). **! CAUTION:** Spring retainer and springs are under spring tension. Specialty tools are required for proper removal of spring retainer.

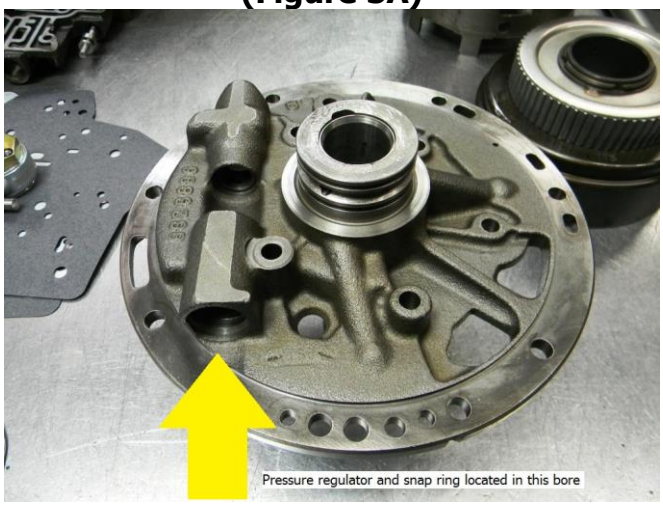
(Figure 2)



7. Once the bleed hole has been installed, remove the center lip seal from inside the drum and discard it. Re-install the direct apply piston. Install the direct return springs as supplied with the kit. Re-install the retainer and snap ring. Re-install the direct clutches and steels. We recommend .050-inch to .070-inch total clearance in the direct clutch pack. Remove the second sealing ring from the center support (*as viewed from the front of the transmission*) and discard it. Removal of the center lip seal from the piston and second sealing ring from the center support will properly dual feed the direct clutch. We recommend the use of Teflon sealing rings on the other three ring lands of the center support (as well as the pump stator). ***NOTICE:*** Use of cast iron sealing rings or any other sealing ring material other than Teflon will result in premature wear within the bore of the direct drum, and may lead to premature transmission failure.

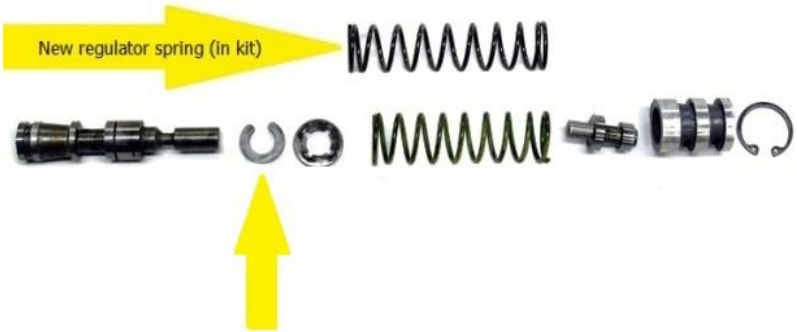
8. Locate the pressure regulator snap ring that retains the pressure regulator assembly in the front pump (*see figure 3A*).

(Figure 3A)



Apply pressure to the booster sleeve and remove the snap ring. Slowly remove the booster sleeve assembly. You may have to tap on the sleeve to free it from the bore. Remove the booster sleeve and valve, pressure regulator spring, spring retainer, spacers, and the pressure regulator valve. Replace the original pressure regulator spring with the spring supplied in the kit. Discard any horseshoe spacers. Slip the spring over the small end so it comes in contact with the retainer. Push the entire assembly up into the case. Push up on the booster sleeve and install snap ring (*see figure 3B*). Make sure the snap ring seats completely in the groove! **! CAUTION:** Pressure regulator components are under spring tension. Specialty tools are required for proper removal and installation.

(Figure 3B)

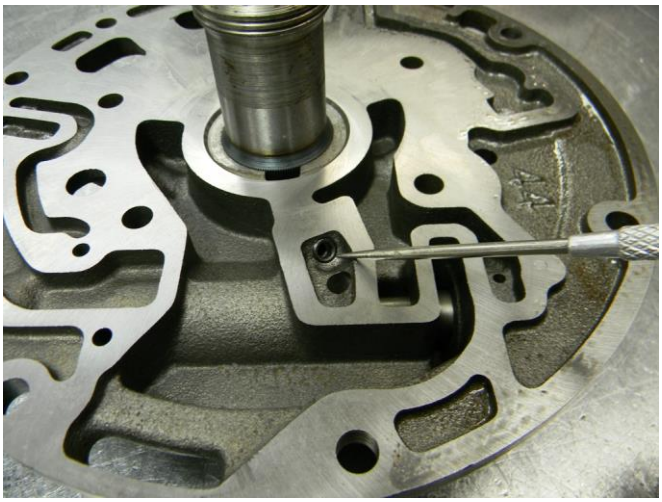


9. We strongly recommend the installation of a .110-inch to .125-inch torque converter feed restrictor into the pump stator body at this point in the build. You will need to source a short 5/16”-18 socket head set screw in order to make the restrictor. You can source this item from any common hardware store or most home improvement stores. Installation of this valve body kit into your transmission will increase operating line pressure into the range of 200 – 230 PSI in most applications. **! CAUTION:** Additional line pressure over and above OEM TH400 line pressure specifications will result in additional forward thrust force being generated by the torque converter. This thrust force places additional load on the flexplate and the crankshaft thrust bearing within the engine. This additional load can result in premature wear or even failure of the crankshaft thrust bearing. Installation of an appropriately sized torque converter feed restrictor helps address this risk. Once you have disassembled the front pump, locate the torque converter feed orifice in the pump stator body (*see figure 4A*).

(Figure 4A)

Tap/thread the feed orifice using a 5/16”-18 tap. The orifice is already the correct size as originally machined by GM to accept the 5/16”-18 tap. Begin cutting threads into the orifice, taking care to cut the threads no deeper into the orifice than 5/16-inch total. Once the threads are cut, use a small drop of red permanent thread locking compound and install a short 5/16”-18 socket head set screw into the orifice, making sure to tighten the set screw until it bottoms out against the threads. ***NOTICE:*** Insure that the set screw is *fully* below the flat surface of the pump stator body so that no interference is created between the set screw and front pump body upon reassembly of the front pump. Once the set screw is properly installed, drill the middle of the set screw out to an orifice diameter of .110-inch to .125-inch (*see figure 4B*).

(Figure 4B)



Be sure to thoroughly wash all components and blow out all orifices with compressed air to remove all debris created by the thread cutting and drilling processes. Dispose of all cleaning products and chemicals in a manner consistent with local regulations. Reassemble the front pump, being sure to maintain proper alignment between pump halves. ***NOTICE:*** Specialty tools are required to install the torque converter feed restrictor as well as to properly align pump halves for correct reassembly of front pump. Torque converter feed restrictor is not provided in the HP2215 valve body kit or components.

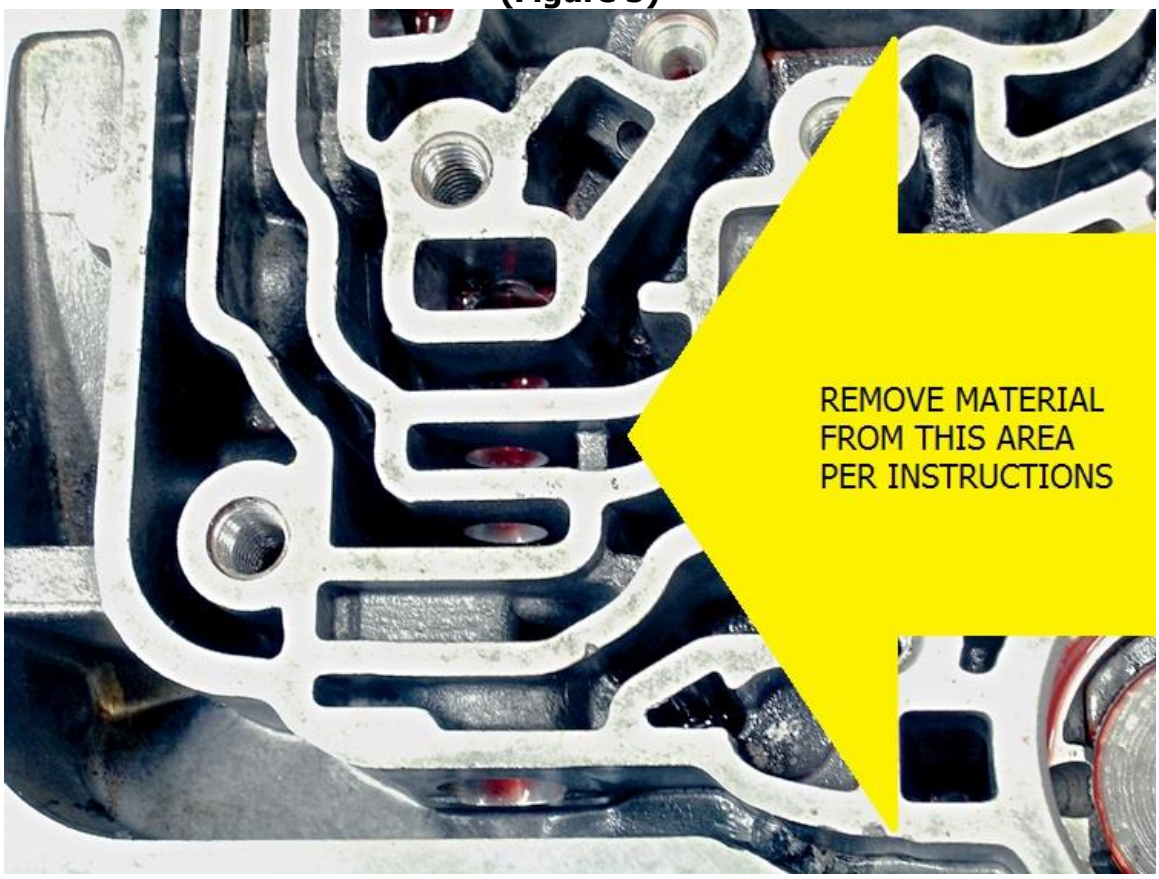
10. If you are converting a TH400 that was previously equipped with a full manual valve body then you must inspect the case at this point to see if a plug has been installed into the case where the front pump seats. Thoroughly inspect all fluid passages in the front of the transmission case for any plugs. Remove any plugs you find from those orifices. **! CAUTION:** Failure to remove any plugs in this area of the transmission case will result in transmission malfunction.

11. Reassemble the drums and front pump into the transmission case. Tighten all front pump bolts to 15 foot/pounds using an appropriate foot/pound torque wrench. ***NOTICE:*** Do not pinch or damage the sealing rings on the center support or the pump stator! Be sure to verify correct end-play (.010-inch to .025-inch).

12. Remove the original valve body, separator plate, and gaskets. Remove governor, governor supply tubes, and discard them. Remove and discard all check balls. Remove and discard intermediate band apply servo and spring. Re-install governor cover.

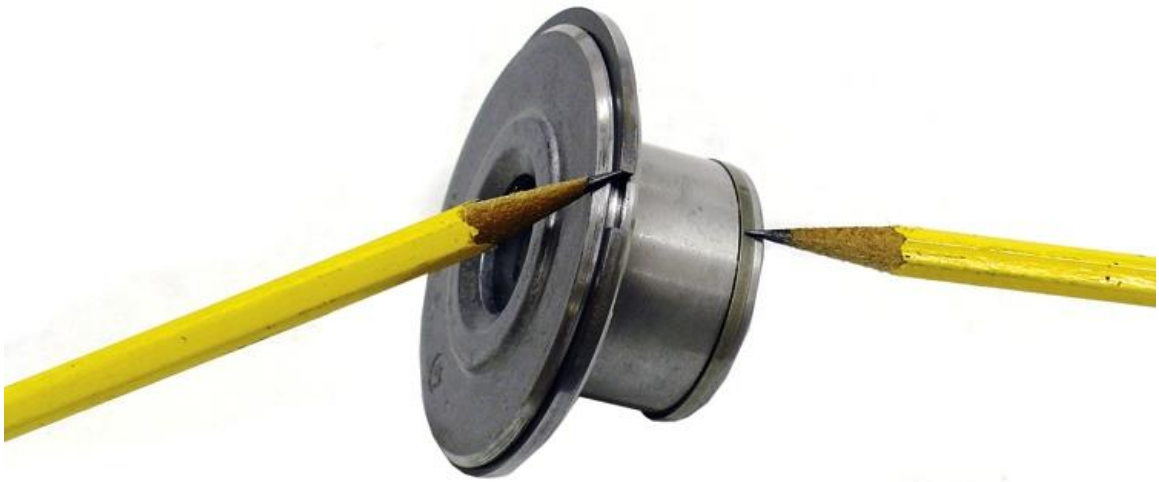
13. Using an 1/8-inch round rat-tail file, carefully open passage area adjacent to modulator bore (*see figure 5*). At least half of the casting wall should be removed. Care should be taken to not scratch or nick the bore area where the brake valve enters. This modification is necessary for proper transbrake release. Be sure to remove all metal filings and debris from transmission case after modifying this area of the case.

(Figure 5)



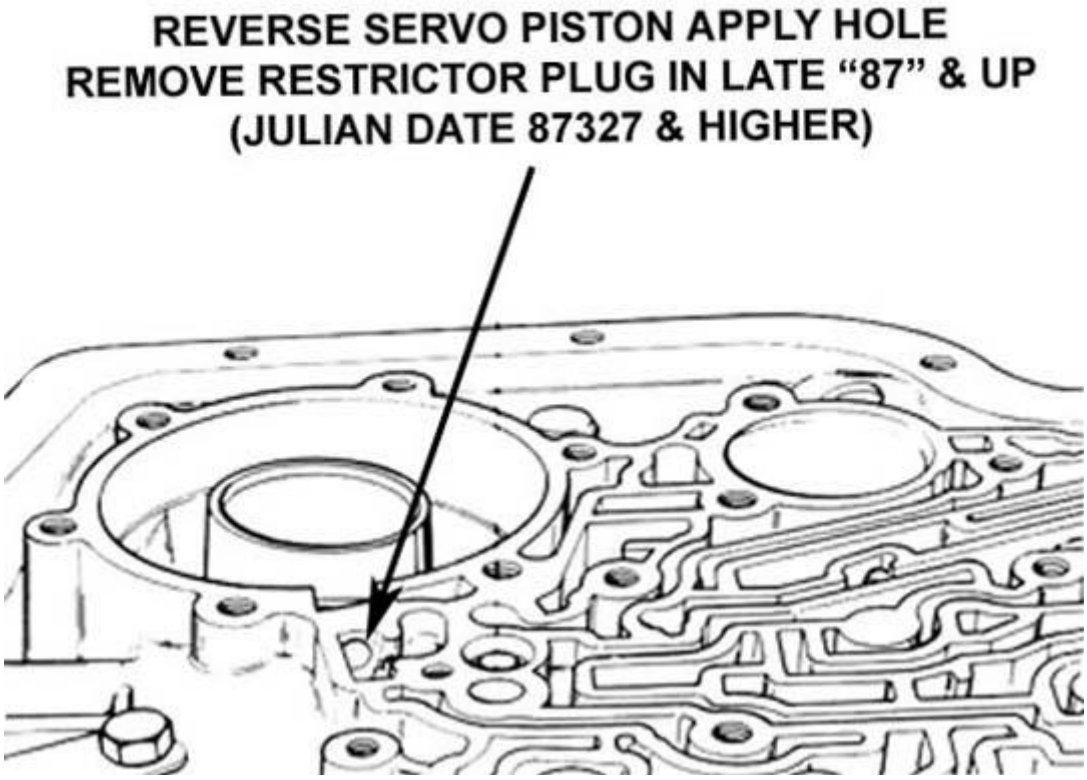
14. Remove the 6 bolts holding the servo cover to the case and remove reverse servo assembly. Remove and discard the sealing rings that are on the accumulator piston (*see figure 6*). **! CAUTION:** Reverse servo assembly is under spring tension.

(Figure 6)



15. For installations in late model cases that are equipped with a factory-installed restriction in the reverse servo piston apply hole, remove and discard the restrictor. The restrictor resembles a freeze plug installed in the apply hole (*see figure 7*).

(Figure 7)



16. Reassemble reverse servo assembly in opposite order of disassembly.

17. Remove vacuum modulator, modulator valve, and discard both items. Install brake valve spring onto brake valve. Install brake valve and spring assembly into modulator valve bore. Push on valve while it is in the case to make sure that there is no drag and that valve moves freely. Install solenoid and o-ring into modulator bore re-using the original modulator retainer clamp and bolt to secure it to the case.

18. Install upper valve body gasket, separator plate, lower valve body gasket, and valve body onto transmission. Be sure to properly engage the manual valve into the shift linkage when installing the valve body. Tighten all valve body bolts to 100 inch/pounds using an appropriate inch/pound torque wrench.

19. Install filter and pan.

! WARNING: Cooler fittings should never be plugged. If a cooler is not used, connect lines together with a loop of hard line or appropriate flexible hose that is compatible with automatic transmission fluid and that carries a minimum 500 PSI rating.

After assembly of transmission is completed, necessary wiring for the transbrake solenoid may be performed. Use a high quality momentary switch for transbrake activation. Connect a minimum 14 gauge wire from lead of switch to reliable 12V+ source. Connect other lead from switch to one of the solenoid wires. Connect other solenoid wire to a good source of chassis ground that is free of paint, rust, grease, dirt, etc. The transmission case is **not** a good source of ground! We do not recommend the use of a relay on the transbrake solenoid. A 20-amp in-line fuse may be installed for safety purposes. Be sure to use good quality wiring connections, preferably with solder for maximum durability and conductivity. **! WARNING:** Failure to use appropriate wiring methods, tools, and electrical components can result in improper product function, premature product failure, short circuits, and fire.

NOTICE: Valve body requires manual shifting in all modes of operation, and features a reverse shift pattern (P-R-N-1-2-3).

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Your Hughes Performance® product is covered by our Exclusive Limited Warranty (see separate term sheet or online at www.hughesperformance.com). *Failure to follow these instructions is considered misuse which at Hughes option may void your coverage under your Limited Warranty.* If you have any questions regarding your purchase, installation, or other Hughes Performance® products, please contact us at: 1-800-274-RACE, (fax: 602-340-8429), or online at www.hughesperformance.com

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