



®

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HUGHES PERFORMANCE® HP2211EBR 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 HP2211EBR 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.

! CAUTION: Recommended Burn Out Procedure if using this valve body in a drag racing application: (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 valve body kit before beginning installation. The following components will be included inside the box:

- (1) Valve body
- (1) Separator plate
- (2) Valve body gaskets
- (1) Manual valve
- (1) Vacuum modulator plug and o-ring
- (1) Pressure regulator spring
- (1) Rear servo spring
- (16) Direct drum springs

NOTICE: Valve body requires manual shifting in all modes of operation, and features a reverse shift pattern (P-R-N-1-2-3). Transmission will retain OE-style engine braking characteristics in 2nd and 3rd forward ranges due to active intermediate band within transmission.

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), or part number HP2234B (cast iron drum with 36-element sprag and races). We also recommend that a forged steel or billet steel forward clutch hub be installed in the transmission in applications exceeding 750 flywheel horsepower, or any application that

will be used in a severe duty or abusive environment. We have this item available under part number HP2226.

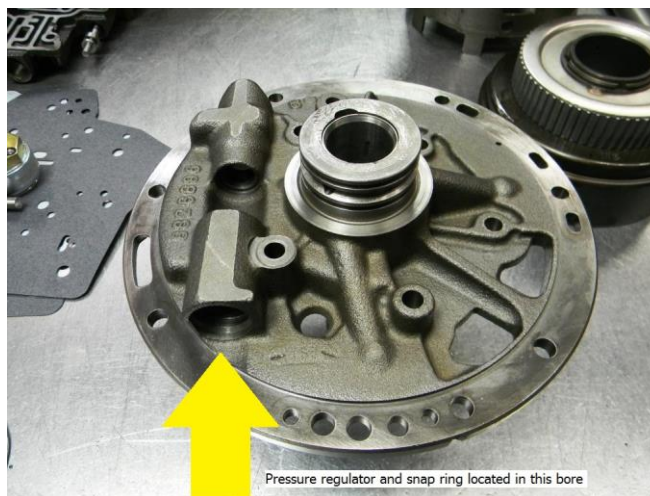
2. Clean all dirt, grease, oil, and any other foreign substances or contaminants from the outside of the transmission and all associated surfaces. Be sure to dispose of all cleaning products and chemicals in a manner consistent with local regulations.
3. Properly secure transmission to a clean work bench 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. Disassemble direct drum completely by removing clutch pack, spring retainer, springs, and apply piston. **! CAUTION:** Spring retainer and springs are under spring tension. Specialty tools are required for proper removal of spring retainer. Remove the center lip seal from inside the drum and discard it. Re-install the direct apply piston. **! CAUTION:** Specialty tools are required for proper piston installation to prevent damage to lip seal. 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 (*see figure 1*). Removal of the center lip seal from the piston and second sealing ring from the center support will properly dual feed the direct clutch pack. 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.

(Figure 1)



6. Locate the pressure regulator snap ring that retains the pressure regulator assembly in the front pump (*see figure 2A*).

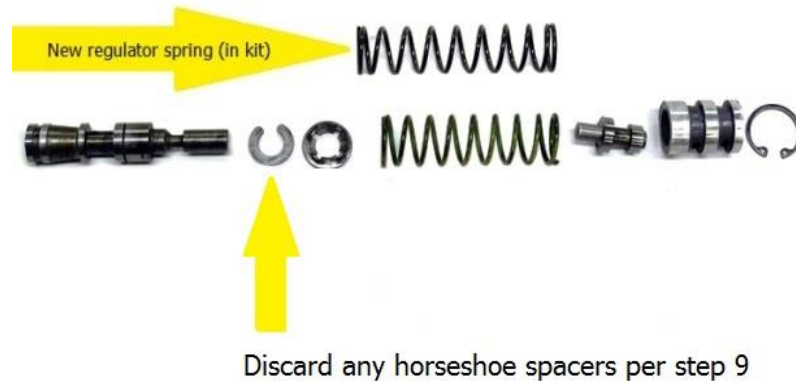
(Figure 2A)



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 2B*). 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 2B)



7. 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 3A*).

(Figure 3A)



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 3B).

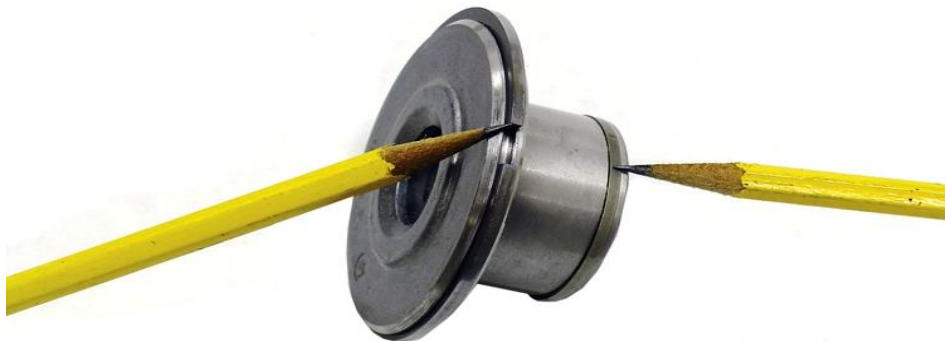
(Figure 3B)



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 HP2211EBR valve body kit or components.

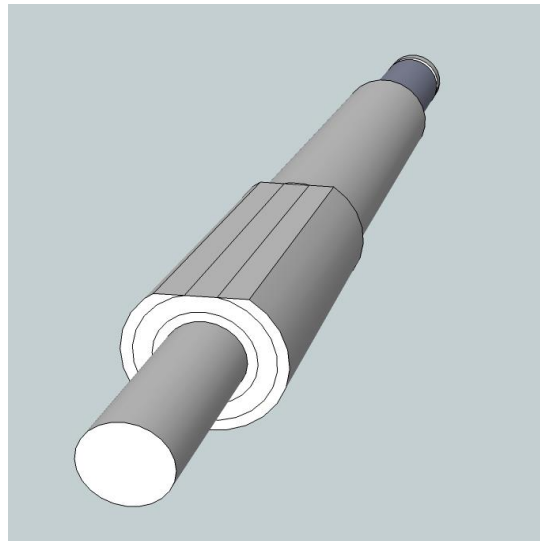
8. Reassemble the drums and front pump into the transmission case. Tighten all front pump bolts to 15 foot/pounds using an appropriate foot/pound torque wrench. **NOTICE:** Do not pinch or damage the sealing rings on the center support or the pump stator! Be sure to verify correct end-play (.010-inch to .025-inch).
9. Remove the original valve body, separator plate, and gaskets. Remove governor, governor supply tubes, and discard them. Remove all check balls. You may discard all but one check ball. One check ball will need to be re-used during reassembly and installation of new valve body to transmission. Re-install governor cover.
10. 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 4*). **! CAUTION:** Reverse servo assembly is under spring tension.

(Figure 4)



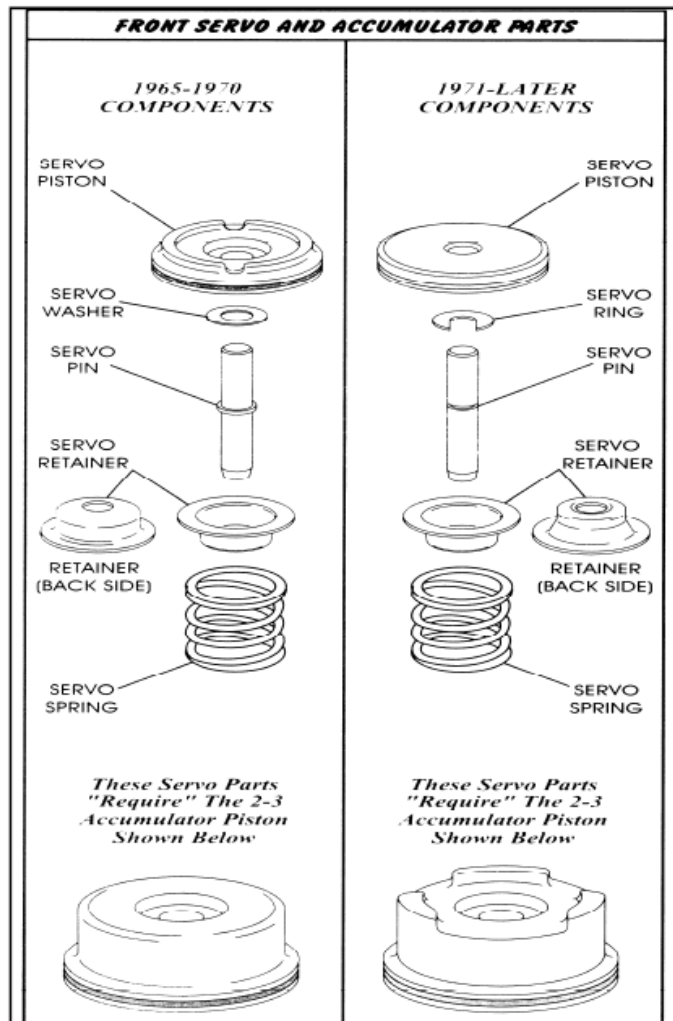
11. The reverse servo pin must be modified to allow fluid to bypass around the pin. Disassemble servo pin from servo. Using an appropriate grinding tool and safety glasses/gloves, grind a flat onto the servo pin (*see figure 5*). You only need to remove .030 - .050-inch of material from the servo pin when grinding to create the flat on the pin. Clean and de-burr the servo pin in order to insure smooth operation when re-installed into the transmission.

(Figure 5)



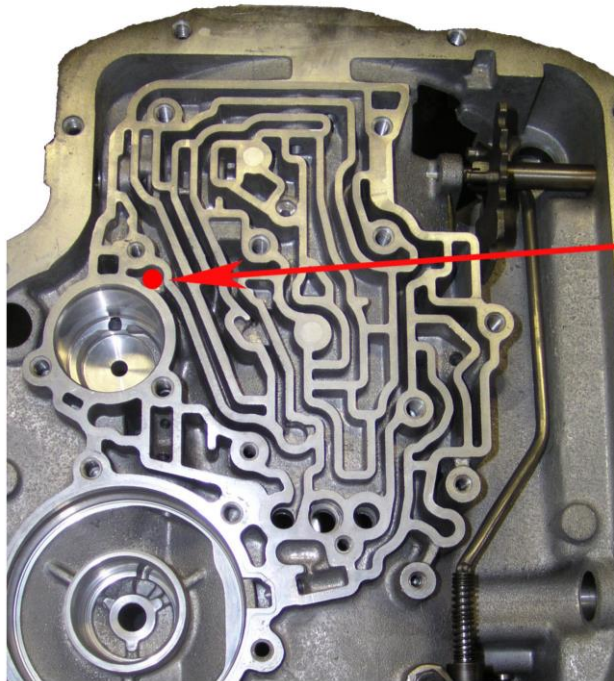
12. Using the modified servo pin and new spring supplied in the kit, reassemble reverse servo assembly in opposite order of disassembly.
13. Remove and discard vacuum modulator. Leave original modulator valve inside of transmission case. Install modulator plug and o-ring supplied in the kit into modulator bore. Re-use the original modulator retainer clamp and bolt to secure plug to the case.
14. Supplied in the new valve body is a 1971-later style accumulator for the intermediate servo. Remove intermediate servo from transmission case and inspect to verify that your transmission is equipped with the later-style intermediate servo components (*see figure 6*). If your transmission is equipped with 1965-1970 intermediate servo components, you must update your transmission with the 1971-later intermediate servo components before proceeding with further assembly. **! CAUTION:** Your transmission must be equipped with a 1971-later style intermediate servo in order for this valve body to function correctly on your transmission. Failure to use correct components will result in transmission malfunction, and could lead to transmission damage as well as personal injury.

(Figure 6)



15. Reassemble intermediate servo with correct 1971-later components.
16. Re-install (1) check ball into the transmission case (*see figure 7*). You may discard any remaining check balls.

(Figure 7)



**INSTALL (1) NEW
CHECKBALL
AT EACH
OF THESE
LOCATIONS**

17. 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.

18. 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.

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

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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WE APPRECIATE YOUR SUPPORT OF OUR PRODUCTS!**