4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

CHANGE: A new turbine input shaft speed sensor (ISS) has been added in some limited models beginning with the 2006 model year and expanded to additional platforms for 2007. (Refer to the chart in figure 1 for model usage)
The ISS assembly is a three wire hall-effect sensor that is mounted internally to the oil pump assembly. (See figure 2)
The ISS uses the rotor teeth located on the turbine input shaft to generate a digital voltage signal of varying frequency that corresponds to the rotational speed of the input shaft. (See figure 3)
This also required the addition of a new internal wire harness assembly. (See figure 4)

REASON: The ISS signal is an input to the control module (PCM or TCM) that will be used to better monitor and control line pressure, shift patterns, torque converter clutch slip speed and gear ratios. This component will allow the 4L60/65/70-E transmissions to enable use of computer instructions (algorithm) related to shift energy, and abuse torque management and provide much improved diagnostic capabilities.

Note: ***The new turbine input shaft speed sensor was gradually phased into production and certain design level criteria had to be followed. The following information is intended to provide a general outline of the stages involved to implement the use of the ISS.***

CHANGE: ***(1)*** Effective February 1st, 2005, the oil pump cover now uses a new design TCC valve with a single spring. (See figure 5)
REASON: Simplifies the assembly process, eliminates the possibility of springs becoming bound or bent and reduces material cost.

CHANGE: ***(2)*** Effective March 7th, 2005, the oil pump cover now uses a more compact boost valve and sleeve. (See figure 6) The snap ring groove location for the boost sleeve is now situated 2.57”(in.) from the bottom of the bore compared to 2.68”(in.) for the previous design. (Refer to figure 7) The bore length for the boost sleeve and snap ring has been reduced by 0.106”(in.).
REASON: Necessary in order to prepare for the new input speed sensor (ISS) assembly that will be packaged into the pump cover.

CHANGE: ***(3)*** After July 16th, 2005, the pump cover casting was modified in order to situate the ISS connector. This modification removed metal directly below the PR valve and boost sleeve bore and extended a cast wall inward. The internal TCC release passage was also modified at this time. The ISS mounting holes are not yet machined into the oil pump cover. (This is shown in figure 7 also)
REASON: Establishes a mounting point for the ISS connector, creates a mounting surface for the ISS assembly and will enable placement of the ISS assembly in a position to target rotor teeth on the turbine input shaft.

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

CHANGE: Oil pump cover changes also affected the stator shaft and stator shaft sleeve so as to relocate with oil passages within the oil pump cover.
At the same time, the turbine shaft oil seal ring grooves were moved inboard towards the rear of the unit approximately 0.190”(in.) to create an area to manufacture 15 rotor teeth.

REASON: To correlate with changes in the stator shaft and sleeve assembly.

CHANGE: ***(4)*** Late in 2005 and early in the 2006 model year, some pre ISS models may still not have the ISS mounting holes machined into the cover. This will be evident as a smooth un-machined surface without the ISS mounting holes. As ISS models were introduced, the machining took place and the input speed sensor (ISS) was added. (See figure 8)
For non ISS models, an ISS hole plug will be used in place of the ISS assembly. (See figure 9)

SERVICE INFORMATION:

Unit Identification - Refer to the chart shown in figure 1 for a list of transmissions and vehicle platforms known to use an ISS at the time of this printing.

Input Speed Sensor - The ISS assembly as shown in figure 2, is internal to the transmission. Operation of the ISS should be thoroughly evaluated with a scan tool to monitor RPM prior to transmission removal for any repairs. Due to the ISS circuitry design with its internal integrated circuit (IC) chip, it is not beneficial to measure the internal resistance and therefore no internal resistance values have been made available. Improper converter clutch operation or possible converter drain back concerns may be caused if the o-ring seal is damaged or omitted when servicing the ISS.
The steel locating brackets are necessary to keep the ISS wiring from coming in contact with the rotating reverse input clutch housing. These brackets push fit on to aluminum bosses that are cast into the oil pump cover.
At the time of this printing, the OEM part number for the ISS assembly is ***24237866***.

Turbine Input Shaft - The turbine input shaft as shown in figure 3 now has 15 rotor teeth added to trigger the ISS. The oil seal ring grooves have been relocated inboard towards the rear of the unit approximately 0.190”(in.) when compared to the previous design. Some pre ISS model turbine input shafts may have the rotor teeth machined in place and some may not. This was a manufacturing option. For this reason, great care must be taken when replacing the input clutch housing and turbine shaft assembly. A measurement from the front most oil seal ring groove to the base of the input shaft where it is pressed into the clutch housing must be taken and compared to the replacement component to ensure compatibility or transmission failure will be the result.

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

SERVICE INFORMATION:

Internal Wire Harness - The internal wiring harness as shown in figure 4 contains additional circuits for ISS equipped transmissions and can be easily identified by the black 20-way pass-thru connector. Non ISS transmissions use the previous design harness which has a light grey connector. The ISS circuit shares pin position E (Ckt 839) for ignition feed voltage. This is a pre existing circuit and is spliced internally to supply power to the ISS. The additional pin terminals are K (Ckt 1230) for ISS signal and also V (Ckt 1231) for low reference.
At the time of this printing, the OEM part number for the new internal wire harness for ISS equipped transmissions is ***24234121***.

TCC Valve - The new design TCC valve uses a single spring and is shown along with the previous design level valve with dual springs in figure 5. The new valve incorporates a spring pocket to prevent incorrect installation by only allowing the spring to be assembled into the pocket end of the valve. Components of the previous and current designs may not be intermixed. However, the current design TCC valve and spring can be used to back service the previous design level.

Boost Valve and Sleeve - The boost sleeve as shown in figure 6 and its corresponding valve have been made shorter in overall length. No components of the current and previous designs may be intermixed, nor interchanged together as an assembly in place of the other. There are two versions of the current design boost valve and sleeve assembly with different valve land dimensions for standard and high performance use. The pressure regulator valve, pressure regulator valve spring and pressure regulator isolator spring remain the same as the previous design.

Oil Pump Cover - An outline of the oil pump cover and stator shaft changes can be seen in figure 7. Great care must be taken if the oil pump cover and/or stator shaft are to be replaced. This is due to the many changes in the oil pump cover casting and corresponding stator shaft sleeve oil passages. These pieces must be compatible with the turbine input shaft being used or transmission failure will be the result.
The boost sleeve and pressure regulator valve can not be serviced from the sump area on units equipped with an ISS because of the location of the ISS connector as shown in figure 8. This operation will require removal of the transmission and oil pump assembly. Pre ISS or non ISS models equipped with an ISS hole plug as seen in figure 9 will still allow access to the boost valve sleeve and pressure regulator valve from the sump. If the o-ring is damaged or omitted from the ISS hole plug then improper converter clutch operation or converter drain back concerns may be evident. Failure to install the ISS hole plug if required will result in low or no converter charge and no movement.

Fault Codes - Refer to figure 10 for diagnostic trouble code (DTC) information.

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

Note: ***Transmission models and vehicle platforms that are indicated with an asterisk (*) are designated for export to Australia and will not be seen in the North American market.***

YEAR	BROADCAST CODE	TRANS	ENGINE	PLATFORM
2006	6 SJD	4L60-E	5.3 LITER	S-TRUCK (2WD)
2006	6 KLD	4L60-E	5.3 LITER	T-TRUCK (4WD)
2006	6 SKD	4L70-E	6.0 LITER	T-TRUCK (4WD)
2006	6 TKD	4L70-E	6.0 LITER	T-TRUCK (4WD)
2007	7 CLD	4L60-E	4.8/5.3 LTR	G-VAN (2WD)
2007	7 CLD	4L60-E	4.8/5.3 LTR	C-TRUCK (2WD)
2007	7 CFD	4L70-E	6.0 LITER	C-TRUCK (2WD)
2007	7 CVD	4L60-E	5.3 LITER	C-TRUCK (2WD)
2007	7 KFD	4L70-E	6.0 LITER	K-TRUCK (4WD)
2007	7 SBD	4L65-E	6.0 LITER	S-TRUCK (2WD)
2007	7 SFD	4L60-E	3.7 LITER	S-TRUCK (2WD)
2007	7 SJD	4L60-E	5.3 LITER	S-TRUCK (2WD)
2007	7 SLD	4L60-E	2.9 LITER	S-TRUCK (2WD)
2007	7 KLD	4L60-E	5.3 LITER	T-TRUCK (4WD)
2007	7 SKD	4L70-E	6.0 LITER	T-TRUCK (4WD)
2007	7 TFD	4L60-E	3.7 LITER	T-TRUCK (4WD)
2007	7 TKD	4L70-E	6.0 LITER	T-TRUCK (4WD)
2007	7 TLD	4L60-E	2.9 LITER	T-TRUCK (4WD)
2007	7 HBD *	4L65-E	3.6 LITER	CAR - HOLDEN *
2007	7 HSD *	4L60-E	3.6 LITER	CAR - HOLDEN *
2007	7 HTD *	4L60-E	5.7/6.0 LTR	CAR - HOLDEN *

Figure 1

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

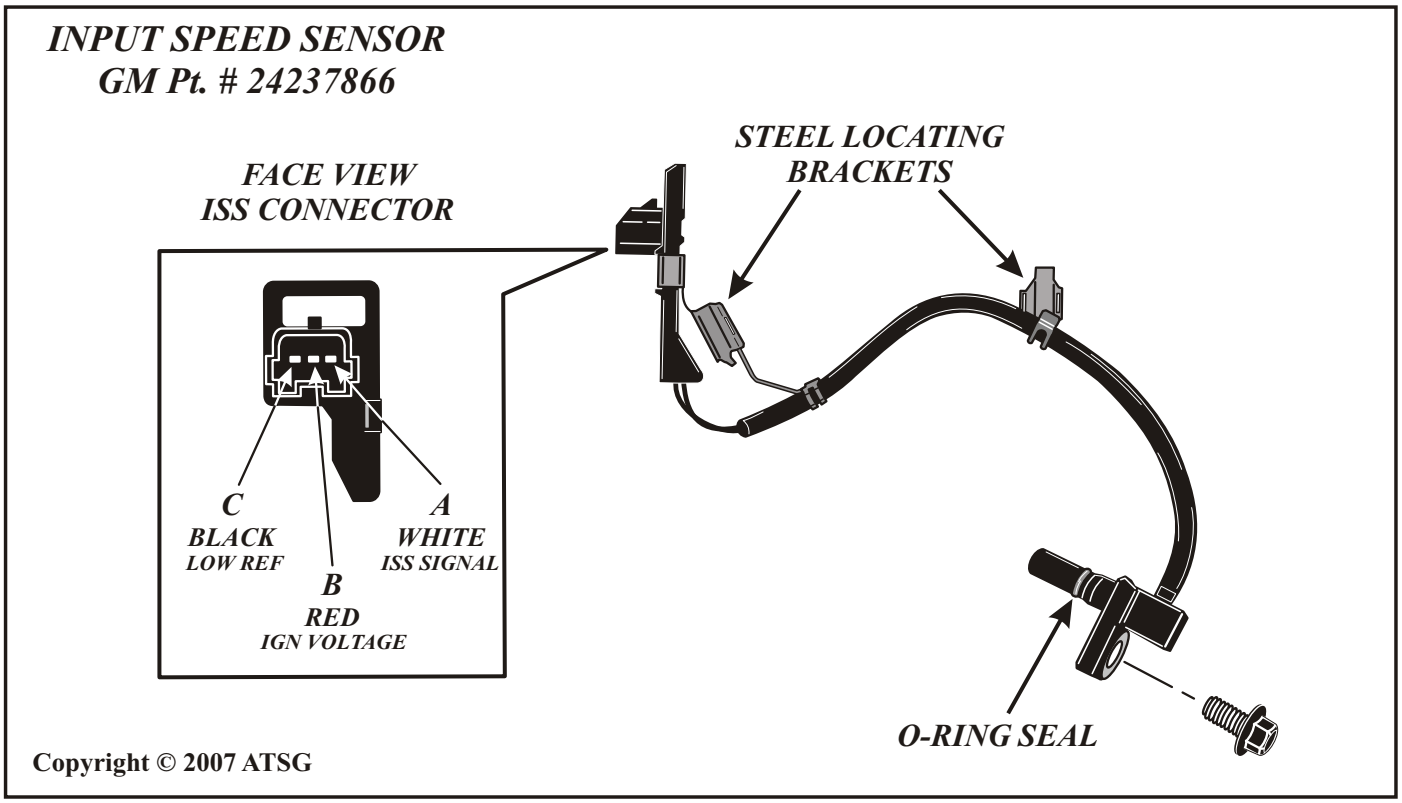

Figure 2

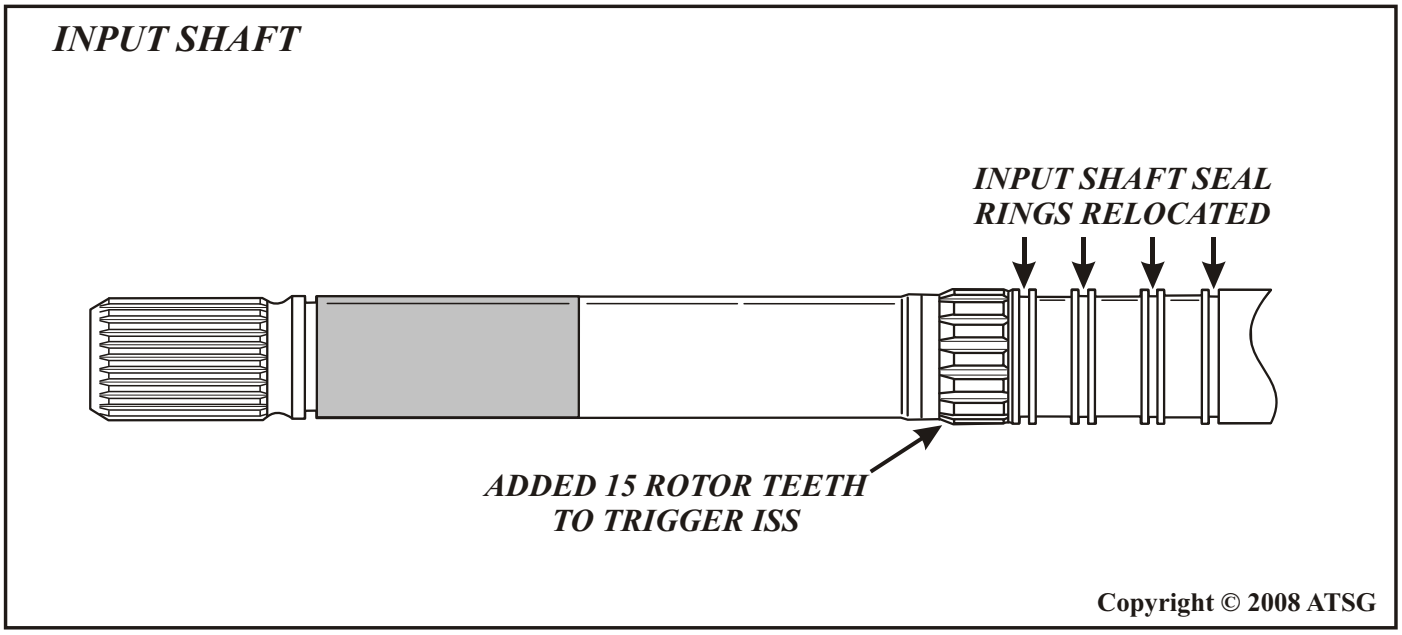

Figure 3

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

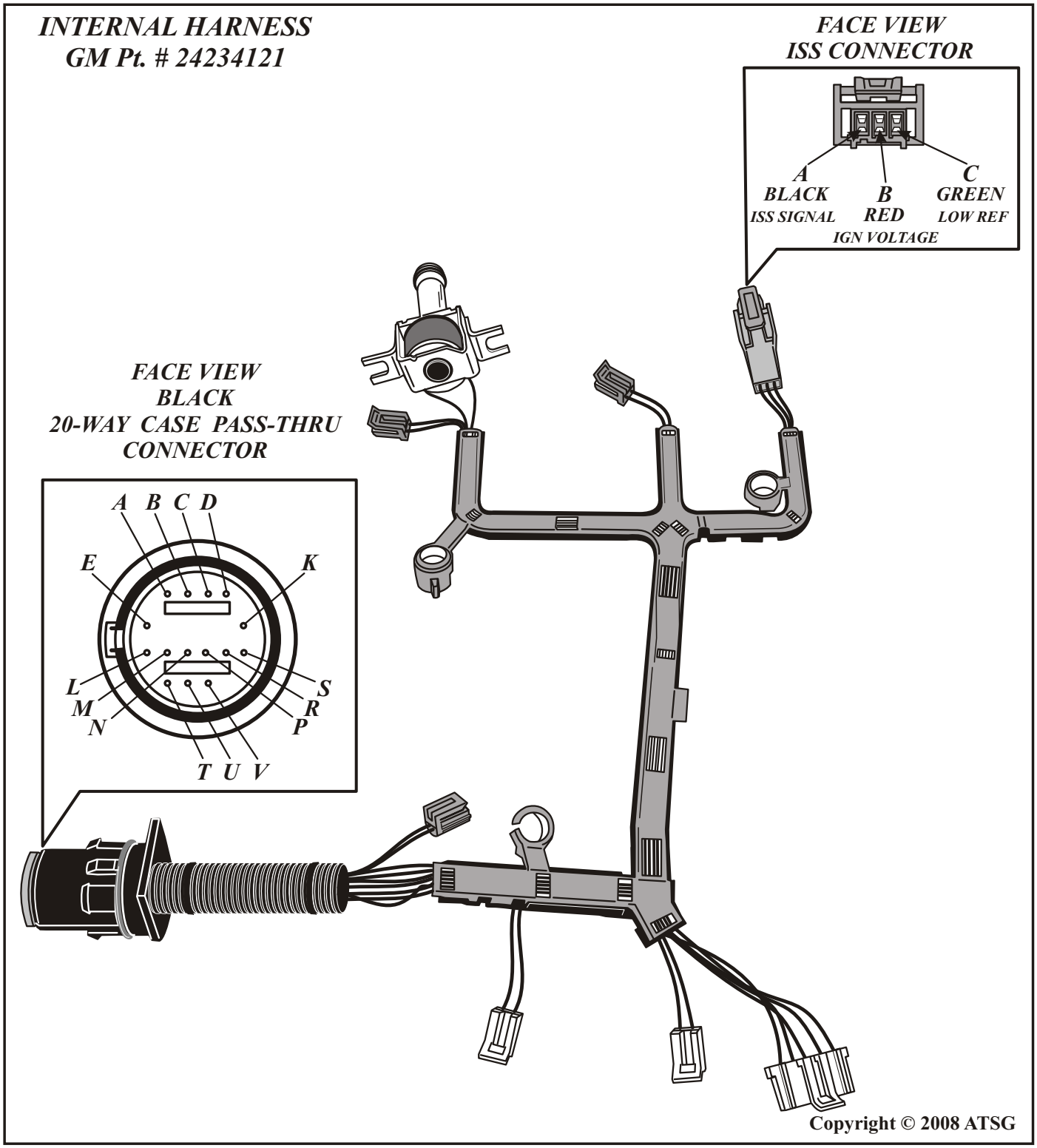

Figure 4

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

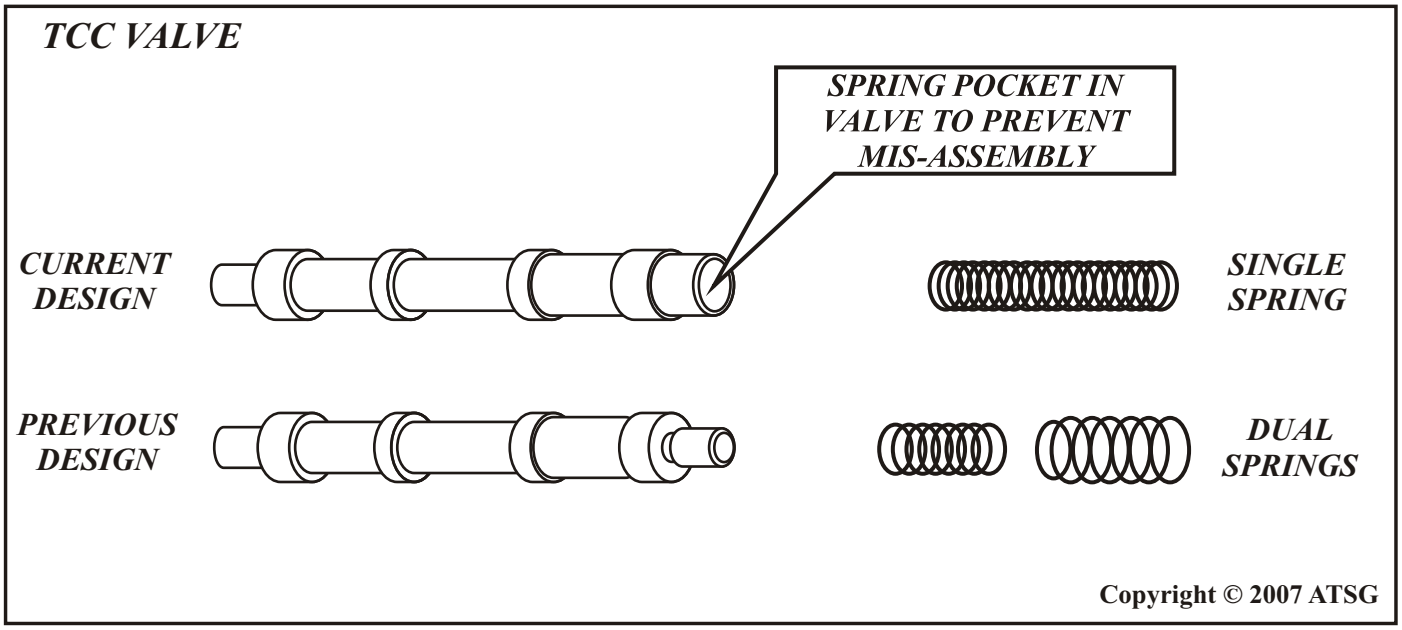

Figure 5

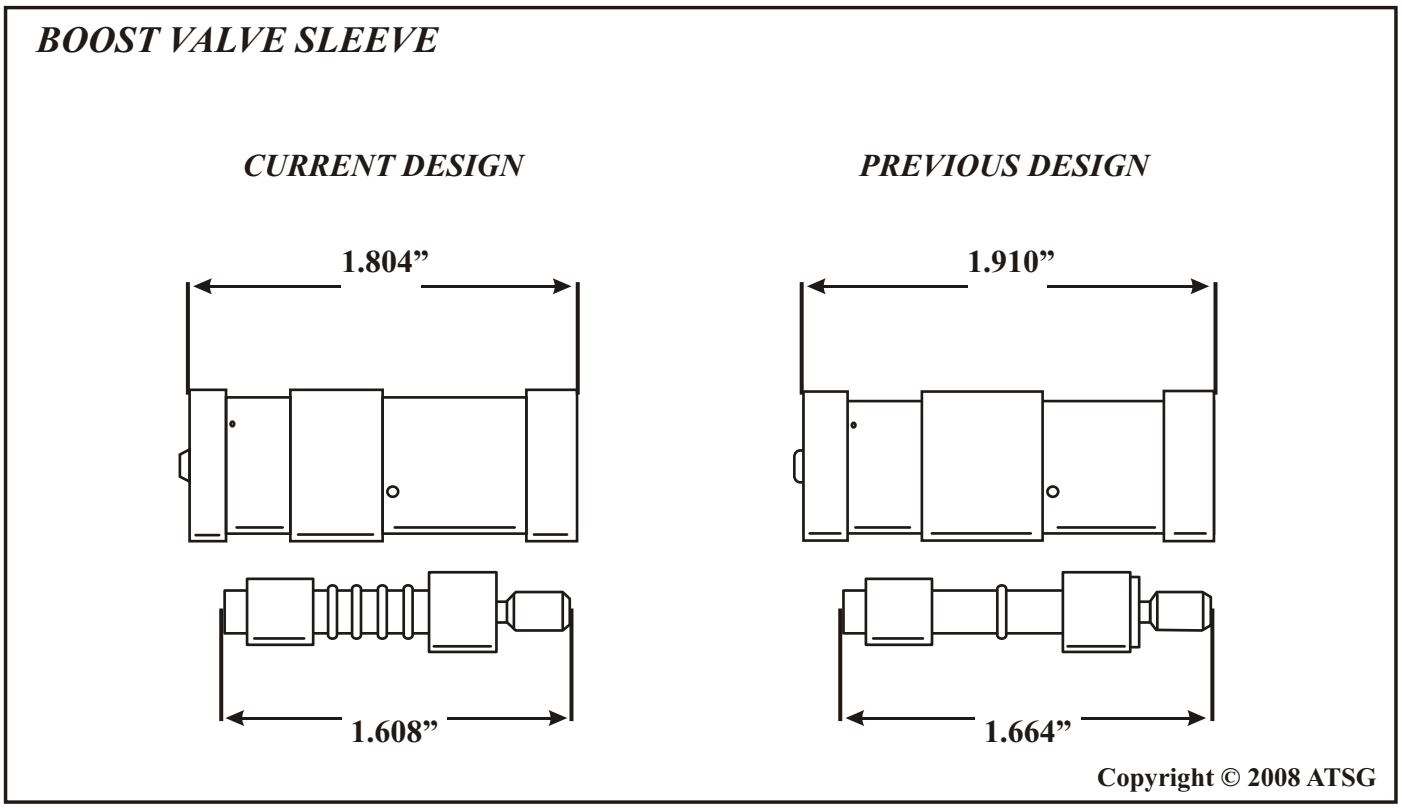

Figure 6

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

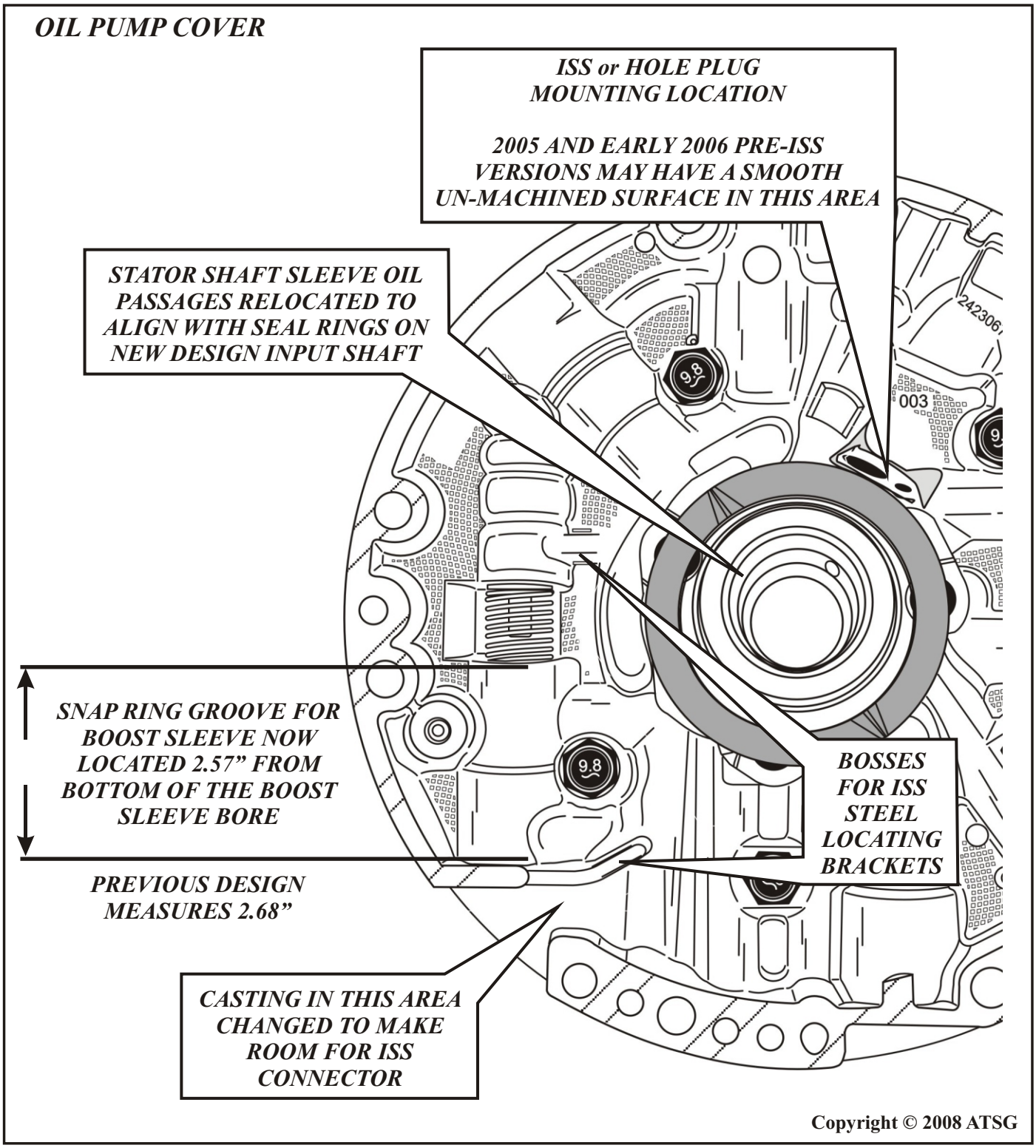

Figure 7

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

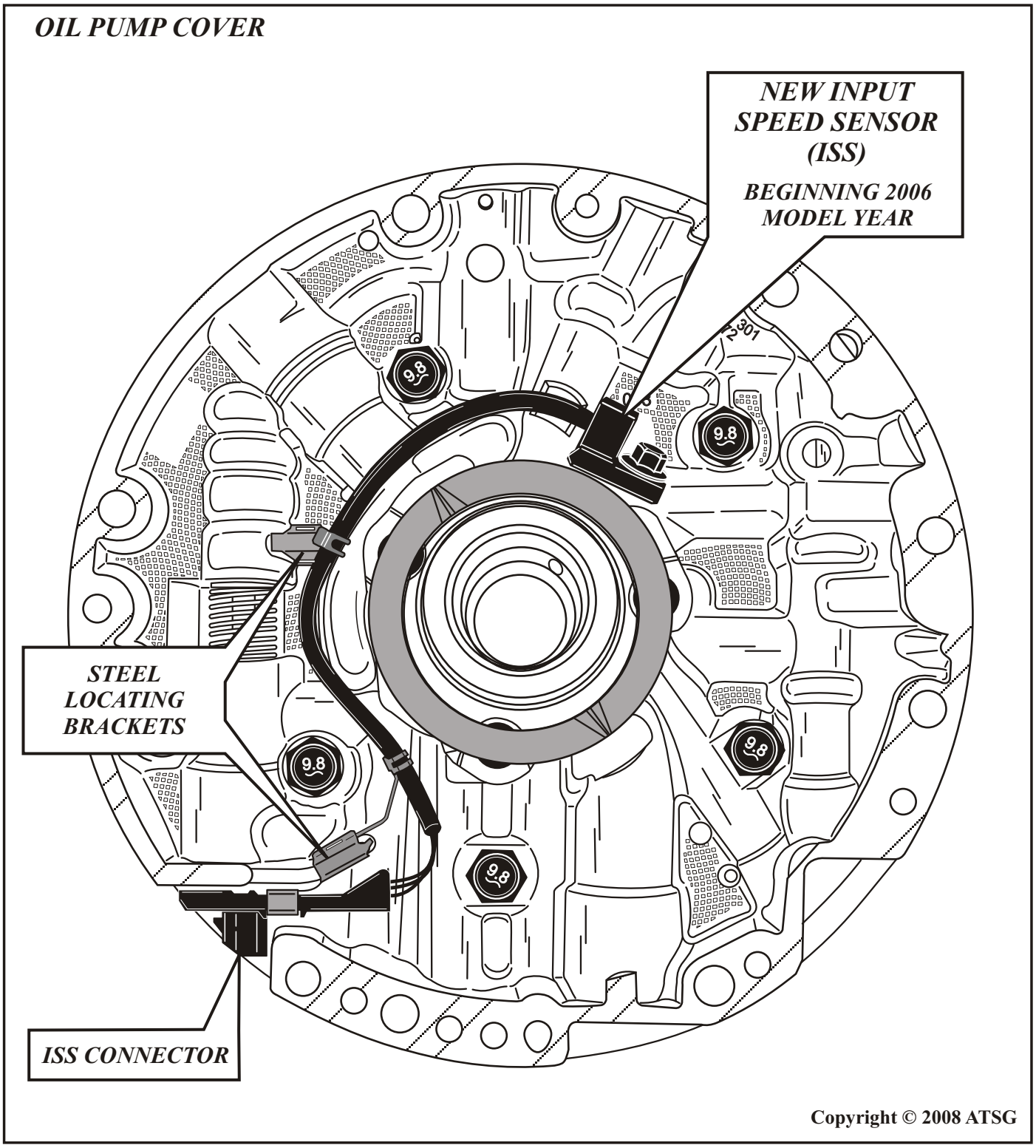

Figure 8

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

OIL PUMP COVER

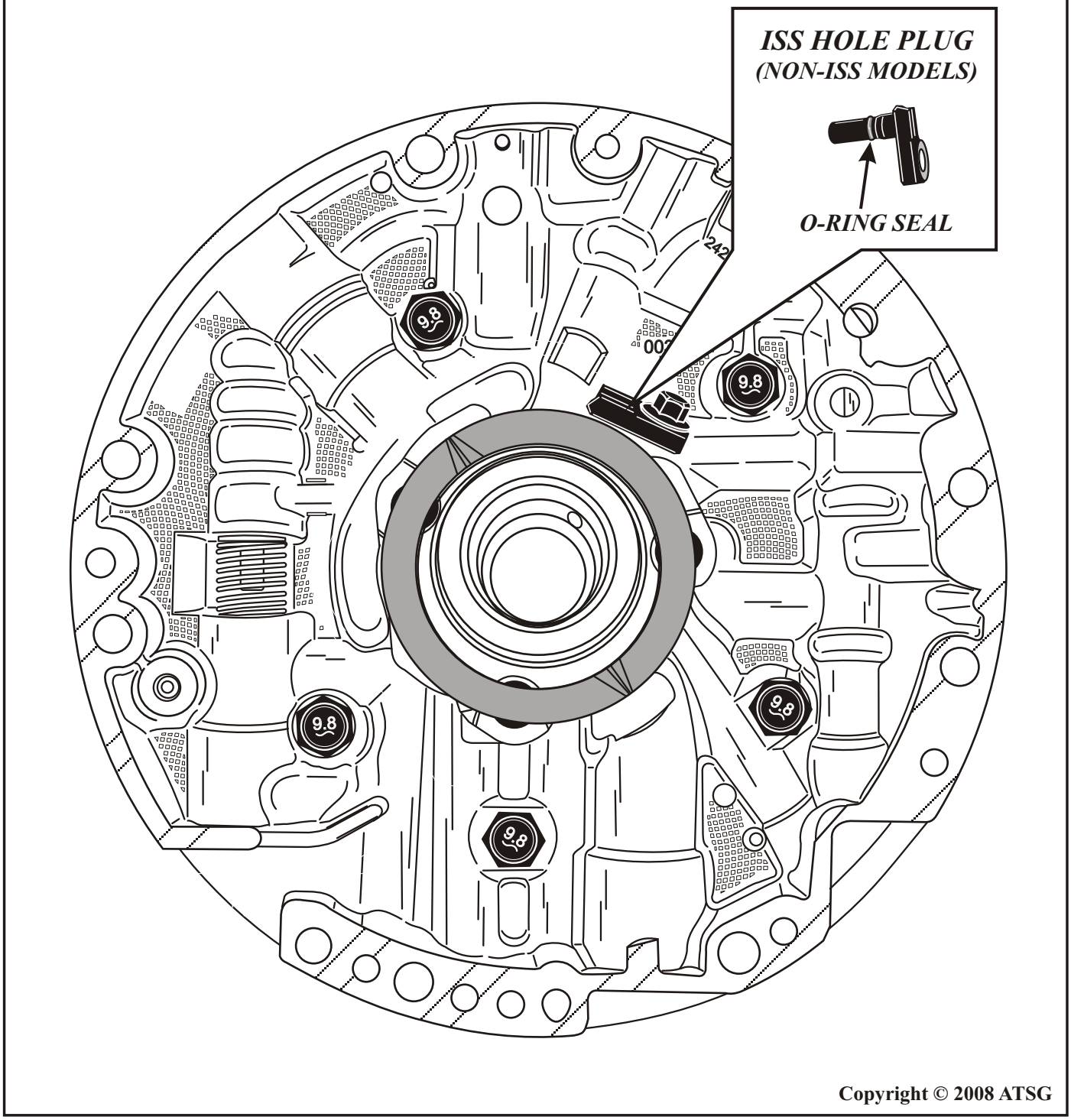

Figure 9

4L60/65/70-E

PRODUCTION CHANGES / INPUT SPEED SENSOR ADDED

Note: ***Fault codes P0716 and P0717 are assigned directly to the operation of the ISS. The fault code definitions, default action and code setting criteria are as indicated in the chart shown below. Units equipped with the ISS provide a more precise monitoring of gear ratio and converter clutch slip speed. As a result, we can now expect to see other fault codes such as the P0730 series for ratio errors as well as P0741 and P0742 for diagnosis of converter clutch operation.***

DTC	DEFINITION	CRITERIA
P0716	ISS Performance	An unrealistic change in ISS rpm is detected PCM/TCM compares transmission input and output speed to determine a system problem
P0717	ISS Ckt Low Volts	Low signal voltage from ISS is detected PCM/TCM saw input speed less than 100 rpm with the engine running

Both fault codes P0716 and P0717 are type B diagnostics which will illuminate the malfunction indicator light (MIL) upon completion of two consecutive trips with the failure present.

Once the fault code (DTC) is set, it will force a default action designed to protect the transmission.

Figure 10