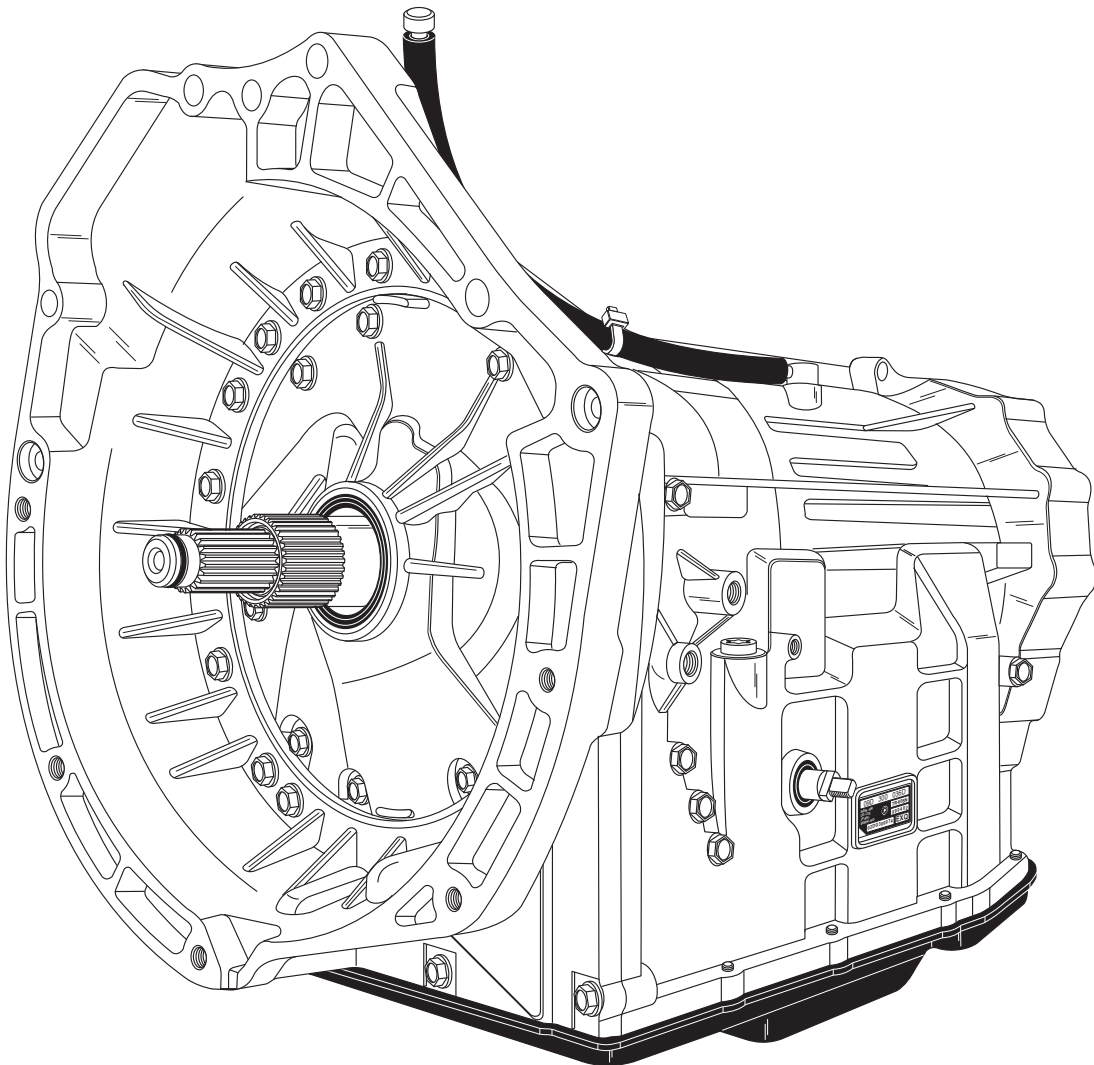


V.W. 09D/TR60SN

The Japanese company AISIN Co., LTD is the manufacturer and developer of the Rear Wheel Drive TR60SN transmission, which is a 6 speed, fully automatic and electronic controlled transmission. Volkswagen engineers were also involved, in conjunction with Aisin, in the development process for their vehicles and Volkswagen gave it the "09D" designation.

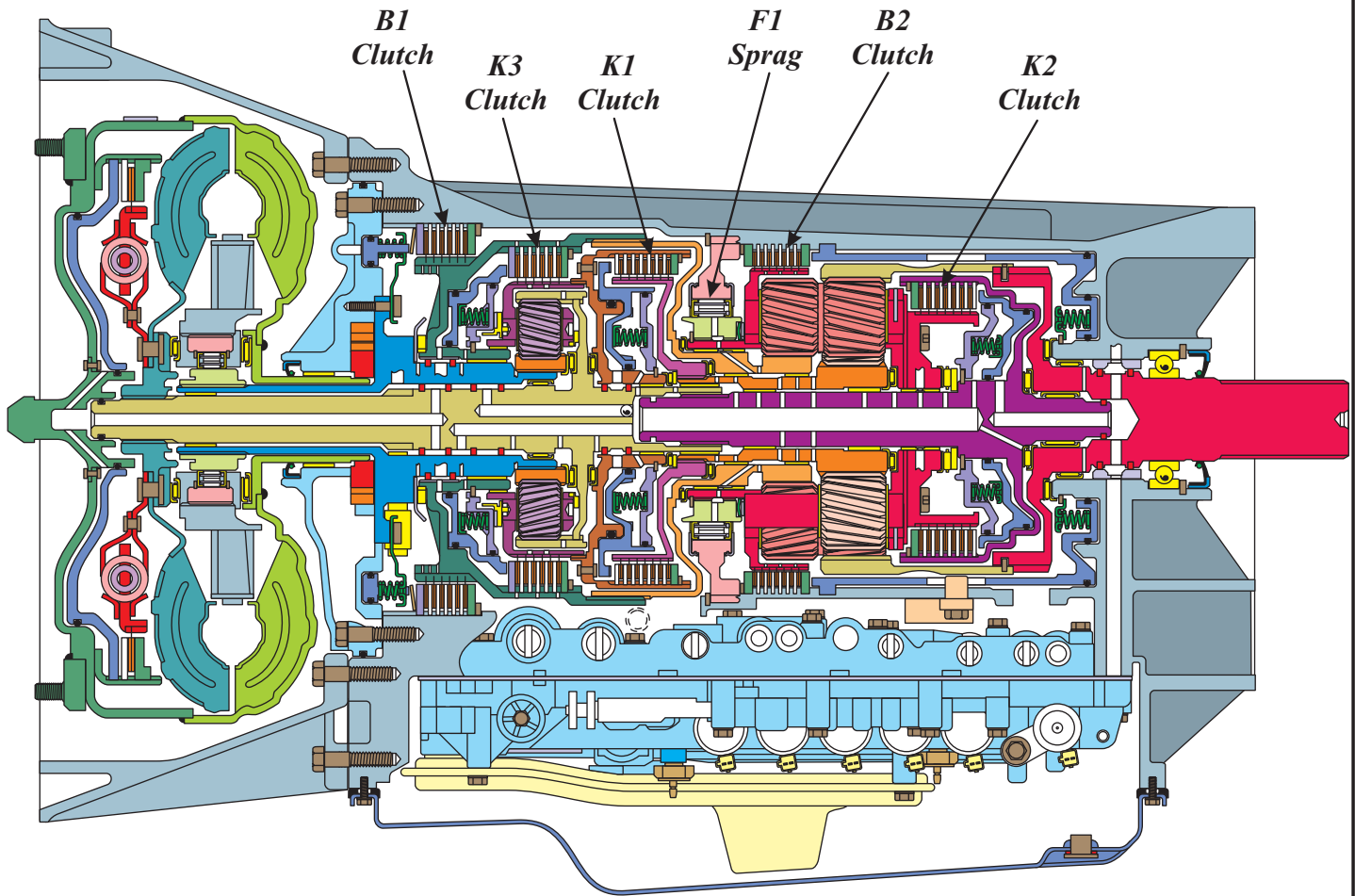
The TR60SN, 09D transmission is used in a wide variety of applications and engine sizes. As a result, the number of friction plates, and planetary gears (3 or 4 pinion), will vary depending on torque load requirements of the specific vehicle. The TR60SN transmission uses a gear ratio sensitive system, requiring the correct transmission interchange. The TR60-SN is currently used in the Porsche Cayenne, Volkswagen Touareg, and Audi Q7 vehicles, although there are a few Japanese applications for Toyota and Lexus.



COMMON VEHICLE APPLICATION CHART					
VEHICLE	YEAR	ENGINE	CODES	VW	AISIN
<i>AUDI, Q7</i>	<i>2007-Up</i>	<i>4.2L (V8) 257 kW</i>	<i>HPH,</i>	<i>09D</i>	<i>TR60SN</i>
<i>PORSCHE, CAYENNE</i>	<i>2003-Up</i>	<i>3.2L (V6) 162 kW</i>		<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>3.2L (V6) 162 kW</i>	<i>BAA, BMX, EXL, EXQ, HAM,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>3.2L (V6) 177 kW</i>	<i>BAA, BMX, EXP, GLK, HAM, HAP,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>3.6L (V6) 206 kW</i>	<i>BHK, HPG, HZW, JXU,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>4.2L (V8) 228 kW</i>	<i>FCS, GLH, HAU, HZV,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>4.2L (V8) 257 kW</i>	<i>AXQ, BAR, BHX, HPH, JXS, KMF,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>3.0L (V6 Diesel) 165 kW</i>	<i>KRK,</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>4.9L (V10 Diesel) 230 kW</i>	<i>GLD, GTK, HAQ, HZX</i>	<i>09D</i>	<i>TR60SN</i>
<i>TOUAREG</i>	<i>2003-Up</i>	<i>4.9L (V10 Diesel) 258 kW</i>	<i>JXV,</i>	<i>09D</i>	<i>TR60SN</i>
Copyright © 2011 ATSG					

VEHICLE APPLICATION CHART JAPANESE MARKET			
VEHICLE	YEAR	ENGINE	AISIN
<i>TOYOTA LAND CRUISER</i>	<i>2007-Up</i>	<i>4.6L -5.7L (V8)</i>	<i>TR60SN</i>
<i>TOYOTA HILUX SURF</i>	<i>2009-Up</i>	<i>4.6L (V8)</i>	<i>TR60SN</i>
<i>LEXUS GX460</i>	<i>2009-Up</i>	<i>4.6L (V8)</i>	<i>TR60SN</i>
<i>LEXUS IS</i>	<i>2007-Up</i>	<i>5.0L (V8)</i>	<i>TR60SN</i>
<i>LEXUS LX570</i>	<i>2009-Up</i>	<i>5.7L (V8)</i>	<i>TR60SN</i>

COMPONENT APPLICATION CHART



COMPONENT APPLICATION CHART

<i>Gear</i>	<i>K-1 Clutch</i>	<i>K-2 Clutch</i>	<i>K-3 Clutch</i>	<i>B-1 Clutch</i>	<i>B-2 Clutch</i>	<i>F-1 Sprag</i>	<i>Torque Conv. Clutch</i>	<i>Gear Ratio (Model Dependant)</i>	
<i>1st Gear</i>	<i>On</i>				<i>On*</i>	<i>Hold</i>		<i>4.148</i>	
<i>2nd Gear</i>	<i>On</i>			<i>On</i>				<i>2.370</i>	
<i>3rd Gear</i>	<i>On</i>		<i>On</i>				<i>On**</i>	<i>1.556</i>	
<i>4th Gear</i>	<i>On</i>	<i>On</i>					<i>On**</i>	<i>1.155</i>	
<i>5th Gear</i>		<i>On</i>	<i>On</i>				<i>On**</i>	<i>0.859</i>	
<i>6th Gear</i>		<i>On</i>		<i>On</i>			<i>On**</i>	<i>0.686</i>	
<i>Rev Gear</i>			<i>On</i>		<i>On</i>			<i>3.394</i>	

* The B-2 Clutch is applied in "Tiptronic Mode" 1st gear, only for engine braking.

** During normal driving operation, the Torque Converter Clutch may be applied in 3rd thru 6th gear.

Copyright © 2012 ATSG

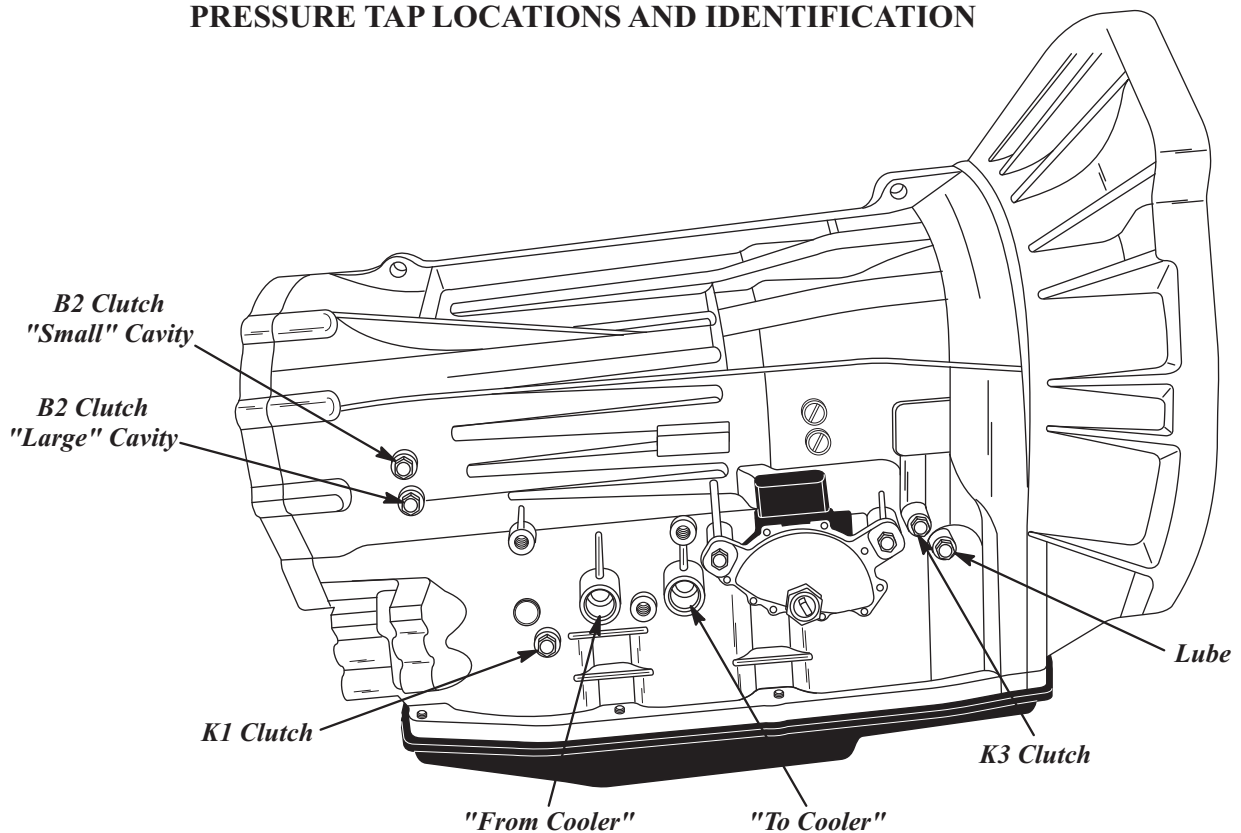
LINE PRESSURE SPECIFICATIONS

"Observed" Pressure Specifications

Selector Lever	Taps Required	Specifications in psi		
		K1	K3	B2
"D" Idle	K1 & B2	54-60		0.9
"D" Idle (Tiptronic)	K1 & B2	104-106		23-28
"D" Stall*	K1 & B2	146-160		0.9
"D" Stall (Tiptronic)*	K1 & B2	187-190		53-55
"R" Idle	K3 & B2		80-85	80-85
"R" Stall*	K3 & B2		270-275	270-275
* "D" & "R" Stall, at approx 2300 rpm, the PCM cuts fuel to engine.				
Other "Observed" Pressures				
Lube Pressure 4-8 psi, 8-10 psi in 6th gear				

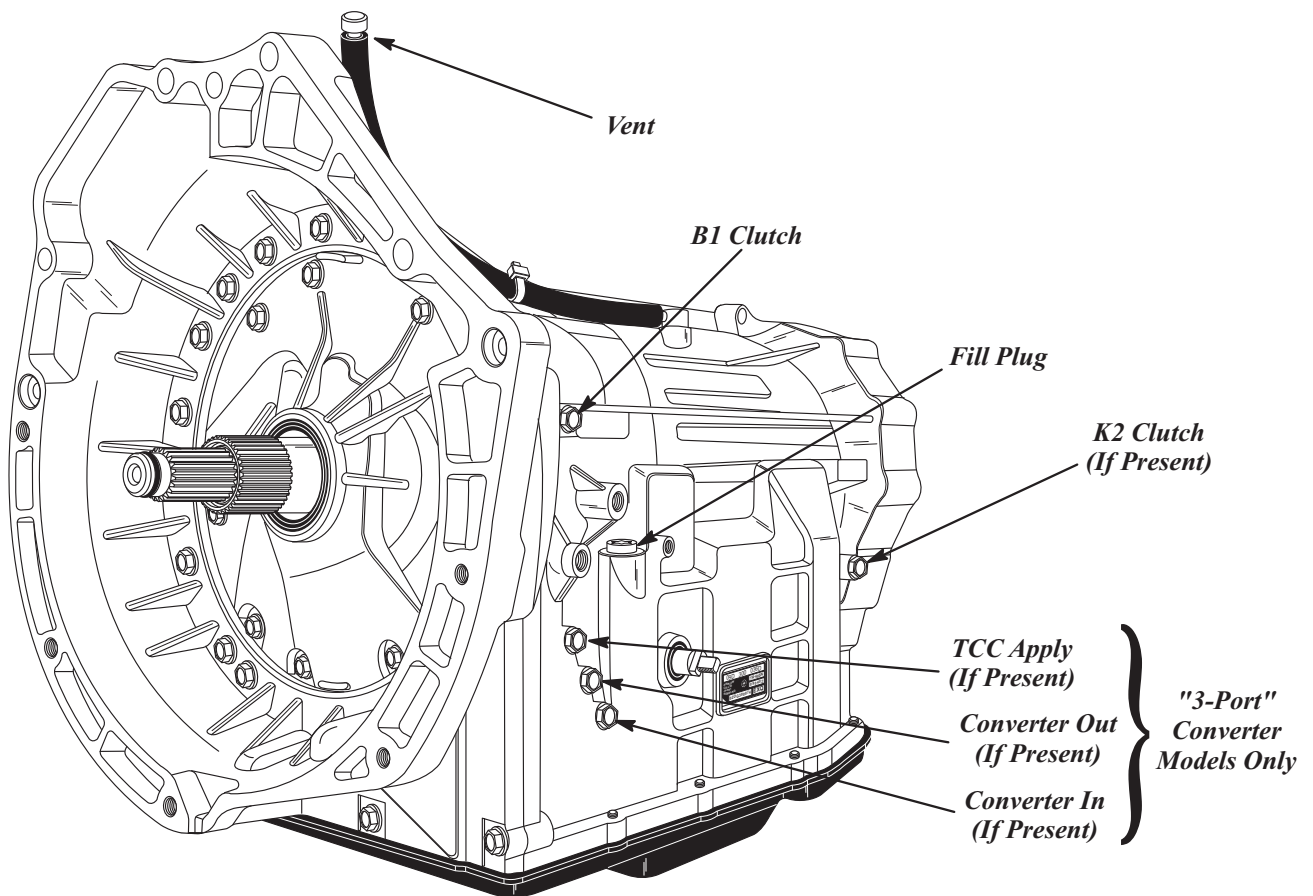
Note: Pressure specifications listed in the chart above may vary slightly depending on year, engine size, vehicle model, and the TCM calibrations.

PRESSURE TAP LOCATIONS AND IDENTIFICATION



Copyright © 2012 ATSG

PRESSURE TAP LOCATIONS AND IDENTIFICATION



Copyright © 2012 ATSG

ELECTRONIC COMPONENTS

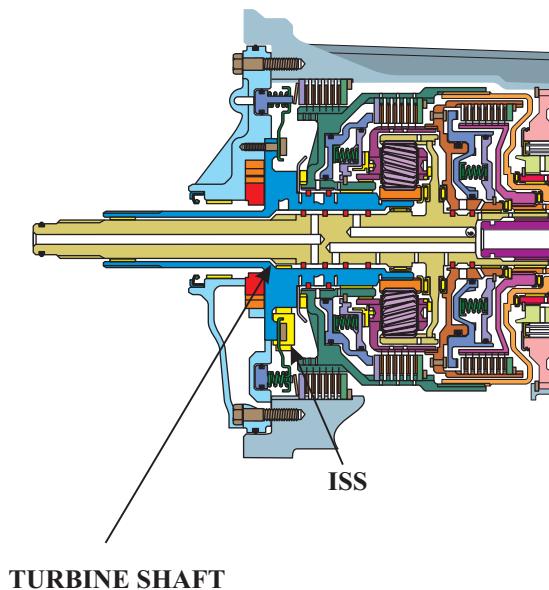
Input Speed Sensor (G182)

The Input Speed Sensor (G182) is located in the transmission oil pump stator, and retained with a bolt. The ISS has a Yellow connector that mounts on the back side of the oil pump body and is also retained with a bolt. The ISS signal is routed through the 8-way case connector.

The ISS is triggered by 12 rotor teeth on the turbine shaft to determine exact transaxle turbine speed. The TCM uses this information to control line pressure for garage shifts, control and monitor torque converter lock-up clutch, monitor gear ratios and diagnosis of shift components via the Dynamic Shift Program (DSP), which is VW's name for the shift adapt feature in the TCM.

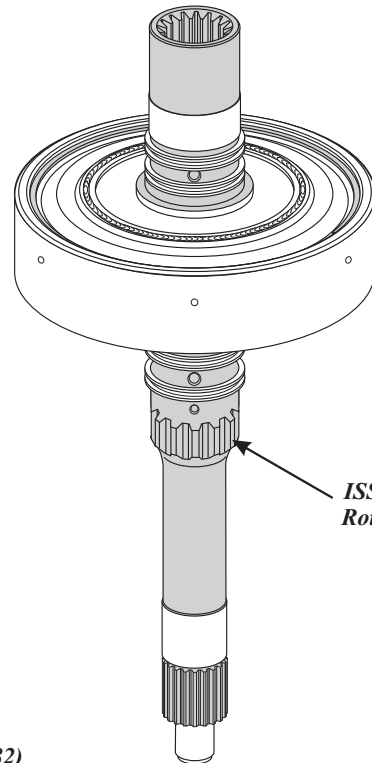
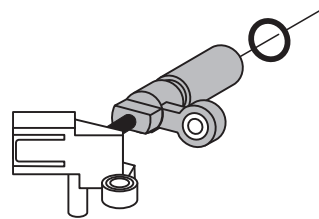
The ISS is based on the Hall Effect principle. The signal is a square-wave signal whose frequency is proportional to turbine shaft speed. Should the Input Speed Sensor fail, the engine RPM sensor is used as a back-up, but when engine RPM sensor is used there will be no shift adapt operations, no controlled pulse width modulation for TCC lock-up (apply and release only) and no pressure control on garage shifts (N-D, N-R) which will create harsh garage shift engagements.

INPUT SPEED SENSOR (G182)



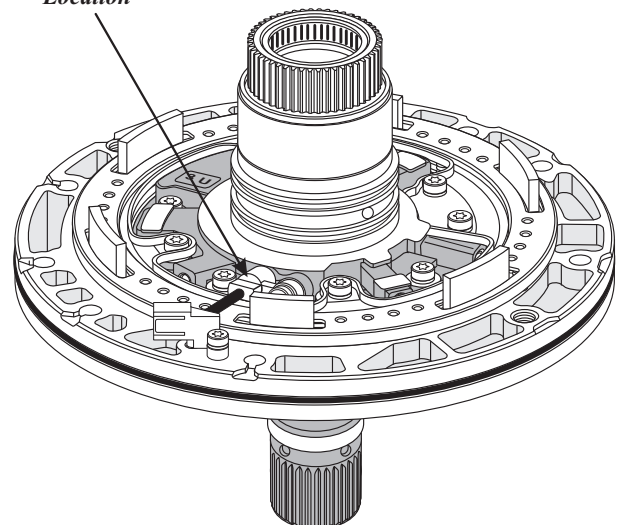
INPUT SPEED SENSOR (G182)

*5.0M Ohms Resistance
at room temperature*



*ISS (G182)
Rotor Teeth*

*ISS (G182)
Location*



Copyright © 2012 ATSG

ELECTRONIC COMPONENTS

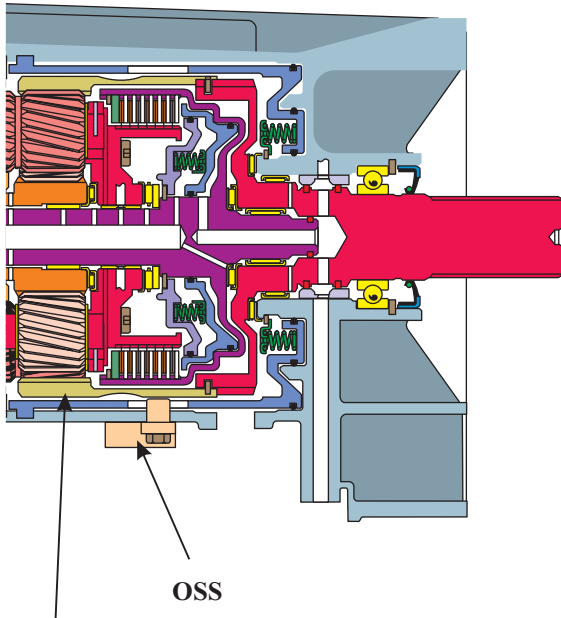
Output Speed Sensor (G195)

The Output Speed Sensor (G195) is located in the transmission case below the valve body, and retained with a bolt. The OSS has a White connector that mounts on one of the solenoid pin retaining brackets on the valve body. The OSS signal is fed through the 8-way case connector.

The OSS is triggered by 24 depressions on the rear planetary ring gear, to determine exact transmission output shaft speed. The TCM uses this information to determine shift points, control and monitor torque converter lock-up clutch, monitor gear ratios and diagnosis of shift components via the Dynamic Shift Program (DSP), which is VW's name for the shift adapt feature in the TCM.

The OSS is based on the Hall Effect principle. The signal is a square-wave signal whose frequency is proportional to output shaft speed. Should the Output Speed Sensor fail, the speed signal from the ABS Control Module is used as back-up, with limited shift adapt capability.

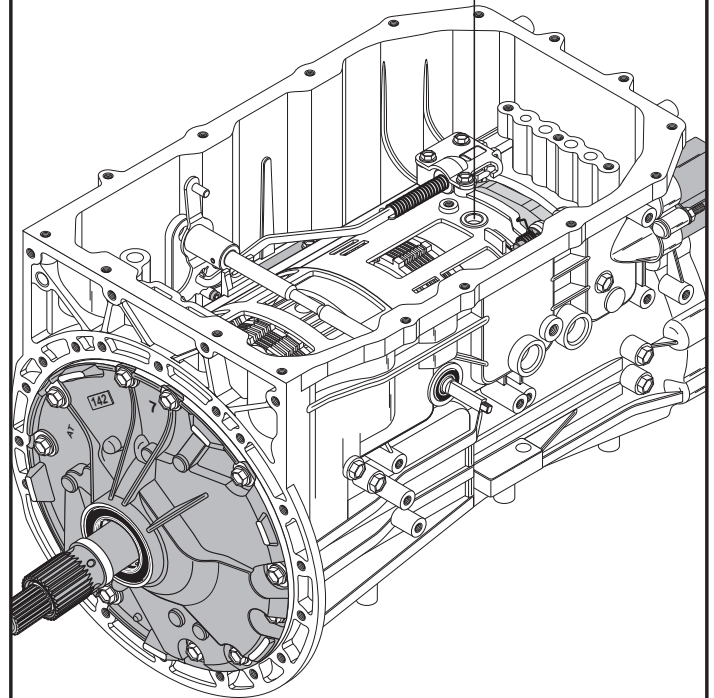
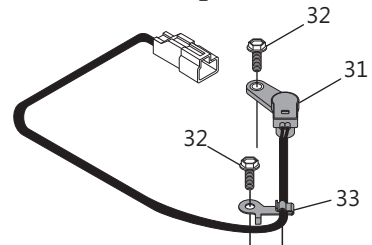
OUTPUT SPEED SENSOR (G195)



REAR PLANETARY
RING GEAR

OSS

**5.0M Ohms Resistance
at room temperature**



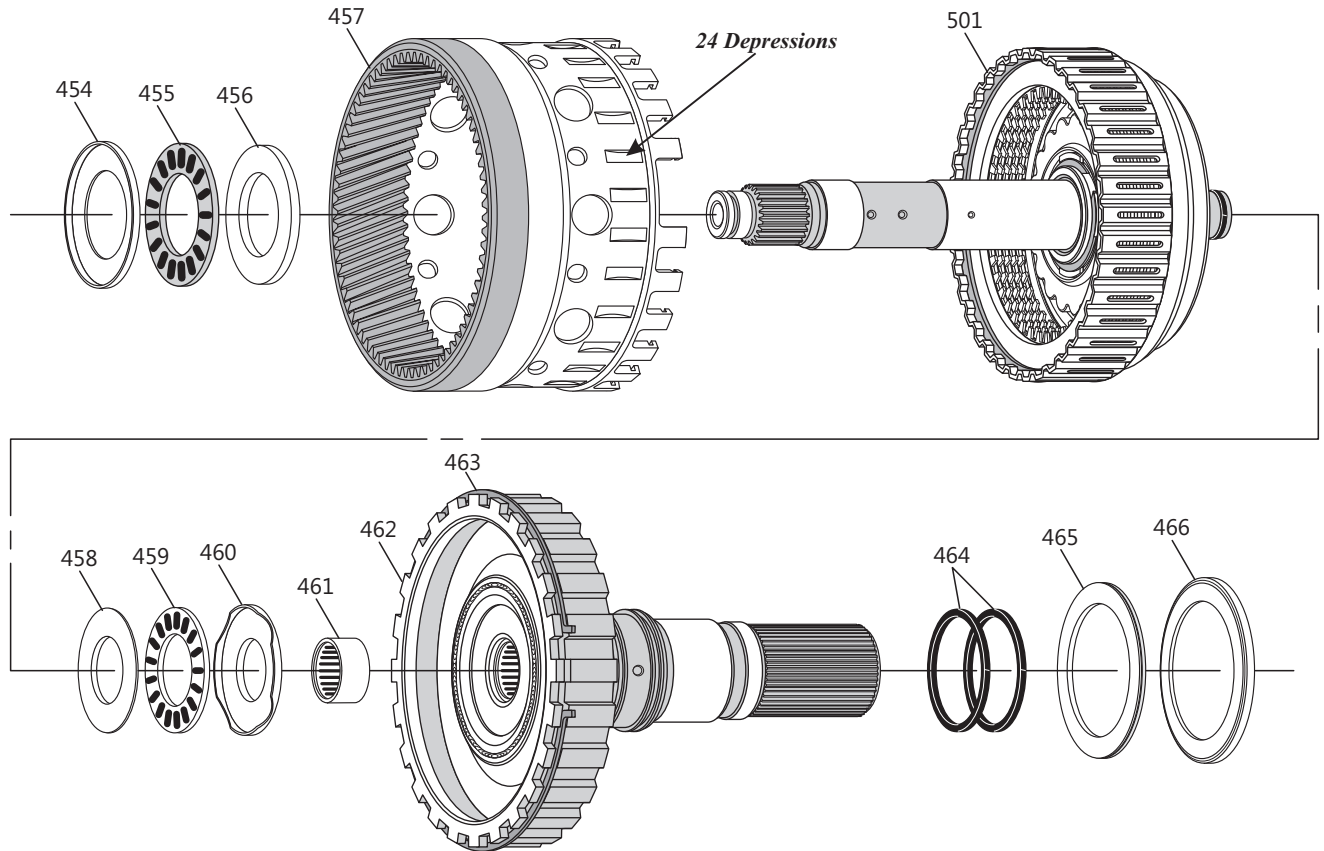
31 OUTPUT SPEED SENSOR AND CONNECTOR ASSEMBLY.

32 OSS AND RETAINER BOLTS, 11.5 MM (0.452") LONG (2 REQ.).

33 OUTPUT SPEED SENSOR HARNESS RETAINER.

Copyright © 2012 ATSG

OUTPUT SHAFT, REAR RING GEAR AND ASSOCIATED PARTS, EXPLODED VIEW



454 NUMBER 11 THRUST BEARING FRONT RACE.
 455 NUMBER 11 THRUST BEARING.
 456 NUMBER 11 THRUST BEARING REAR RACE.
 457 REAR PLANETARY RING GEAR.
 458 NUMBER 12 THRUST BEARING FRONT RACE.
 459 NUMBER 12 THRUST BEARING.

461 OUTPUT SHAFT CAGED NEEDLE BEARING.
 462 OUTPUT SHAFT, 4WD.
 463 REAR PLANETARY RING GEAR RETAINING SNAP RING.
 464 OUTPUT SHAFT SEAL RINGS (2 REQUIRED).
 465 NUMBER 13 THRUST BEARING.
 466 NUMBER 13 THRUST BEARING RACE.

SHIFT SOLENOID AND CLUTCH APPLICATION CHART

Gear Shift Position	Solenoid Shift Sequence								Clutch Application Chart					
	On/Off Solenoids		Pressure Control Solenoids						Clutch and Freewheel Components					
	N89 SV-2	N88 SV-1	N92 SV-5	N282 SV-9	N90 SV-3	N283 SV-10	N93 SV-6	N91 SV-4	K1	K2	K3	B1	B2	F1
Park			OFF	OFF	ON	ON	PWM							
Neutral			ON	ON	ON	ON	PWM							
Reverse			ON	ON	OFF	ON	PWM				ON		ON	
1st Gear	T	T	OFF	ON	ON	ON	PWM		ON					ON
2nd Gear			OFF	ON	ON	OFF	PWM	PWM	ON			ON		
3rd Gear	T/To	To	OFF	ON	OFF	ON	PWM	PWM	ON		ON			
4th Gear	T/To	To	OFF	OFF	ON	ON	PWM	PWM	ON	ON				
5th Gear	T/To	To	ON	OFF	OFF	ON	PWM	PWM		ON	ON			
6th Gear	ON	To	ON	OFF	ON	OFF	PWM	PWM		ON		ON		

T = On in Tiptronic Mode

To = Solenoid is toggled On to Off

SOLENOID OBSERVED AMPERAGE CHART

SOLENOID	RANGE				GEAR					
	Park	Reverse	Neut	Drive 1	Manual 1	2	3H 3M	4H 4M	5H 5M	6H 6M
SV5-N92 (K1)	.100A	.980A	.980A	.100A	.100A	.100A	.100A	.100A	.980A	.980A
SV9-N282 (K2)	.100A	.980A	.980A	.980A	.980A	.980A	.980A	.100A	.100A	.100A
SV3-N90 (K3)	.980A	.100A	.980A	.980A	.980A	.980A	.100A	.980A	.100A	.980A
SV10-N283 (B1)	.980A	.980A	.980A	.980A	.980A	.100A	.980A	.980A	.980A	.100A
SV6-N93 (LP)	.980A	.980A	.980A	.980A	.740A	.860A	.980A	.980A	.740A	.740A
SV4-N91 (TCC)	.200A	.200A	.200A	.200A	.200A	.200A	.200A .990A	.200A .990A	.200A .990A	.200A .990A
SV2-N89	0	0	0	0	1	0	0 -1*	0 -1*	0 -1*	1
SV1-N88	0	0	0	0	1	0	1*- 0	1*- 0	1*- 0	1*- 0

.100A= Very Low amperage
Solenoid OFF

SV1-N88

0 =OFF

1=ON

1*-0= ON to OFF
during shift transitions

SV2-N89

0 =OFF

1=ON

0-1*= OFF to ON
when TCC is ON

3H = 3rd Gear TCC OFF

3M = 3rd Gear TCC ON

(This applies to gears 3-6)

Solenoids SV3, 5, 9 and 10 are Normally Applied, which applies their assigned component when they are Off. They are Energized (On) to release their assigned component. These solenoids are also Modulated, to control their assigned component apply and release rates. Consult the charts above to compare the amperage to clutch application.

Solenoid SV6 (N93) is modulated based on engine load to control main line pressure. Amperage will decrease to increase main line pressure.

Note: N88 is pulsed ON to OFF during the transitions from 3rd thru 6th gears, although it is not necessary once the K2 Clutch is on, as there is pressure fed to the NO.2 Relay valve stroking the valve.

Transaxle Fluid Temp Sensor (G93)

The Transaxle Fluid Temp Sensor (G93) is located in the valve body and is mounted with a retaining plate.

The TFT is a negative temperature coefficient sensor, which means that as temperature rises the resistance decreases.

Starting at 150°C (270°F), the converter clutch is applied more frequently. If this does not result in cooling of the ATF, reduction of engine torque is initiated at 170°C (306°F).

Should the TFT fail, a substitute value is generated from the engine temperature and operating duration. There will be no controlled operation (ramping) of the converter clutch (ON or Off only) and no controlled shift adapt pressures, which usually results in harsh engagements.

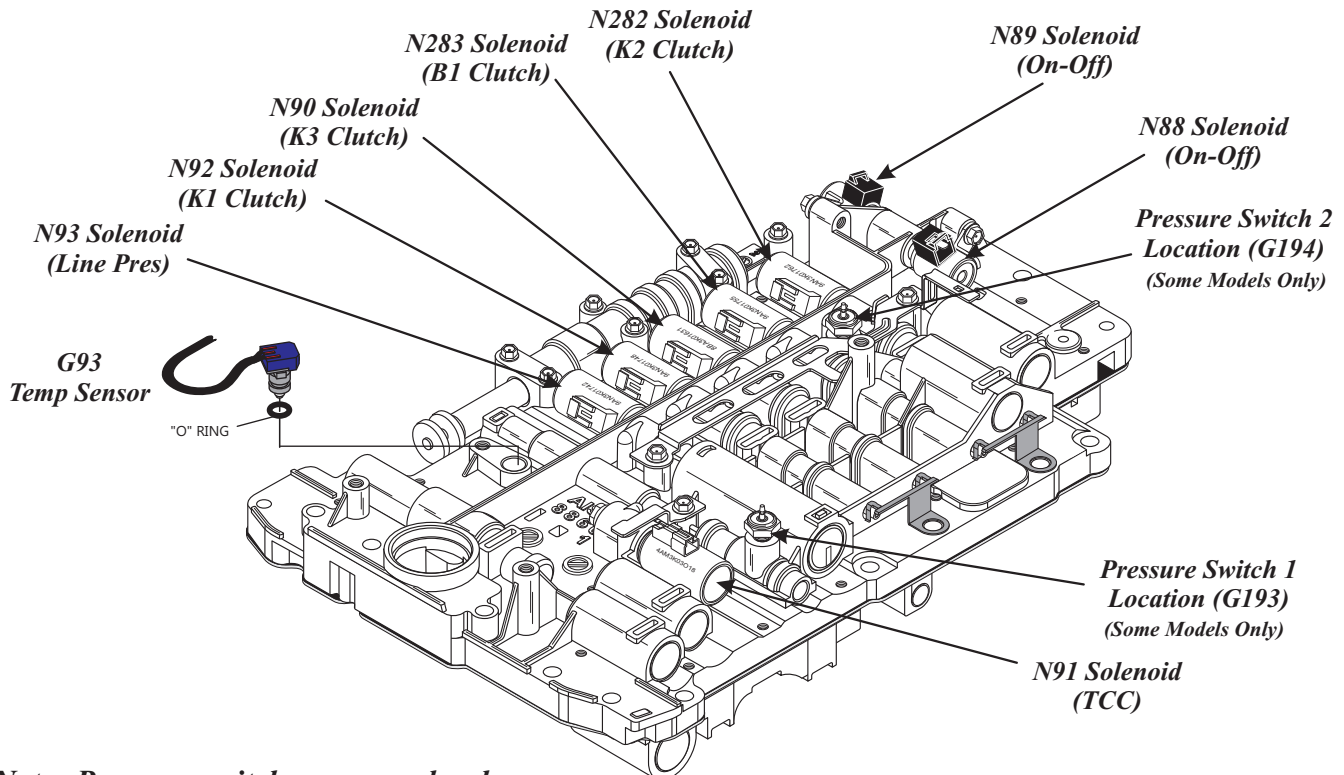
Pressure Switches 1 (G193) And 2 (G194)

Some "09D" transmissions are equipped with two pressure switches that screw into the valve body casting in the locations shown in Figure 10. Both switches are "normally open" switches that connect to ground when pressure exceeds approx. 44 psi and are used to verify valve movement in the valve body assembly.

Pressure Switch 1 (G193) is used to verify activation of the K-1 clutch.

Pressure Switch 2 (G194) is used to verify activation of the Small Cavity in the B-2 clutch. This switch will close in Tiptronic 1st and in Reverse.

SOLENOID IDENTIFICATION AND LOCATIONS



Note: Pressure switches are used only on some models equipped with the "09D" transmission.

Copyright © 2012 ATSG

SOLENOID OPERATION

On/Off Solenoids (N88), (N89)

These solenoids are the same and both operate in exactly the same manner, as shown in Figure 15, based on commands from the TCM. Both of the On/Off solenoids are "Normally Closed".

These two solenoids operate in conjunction with the Pulse Width Modulated (PWM) solenoids to provide a pressure increase while in TCC and ranges 4-6.

PWM Solenoid (N91)

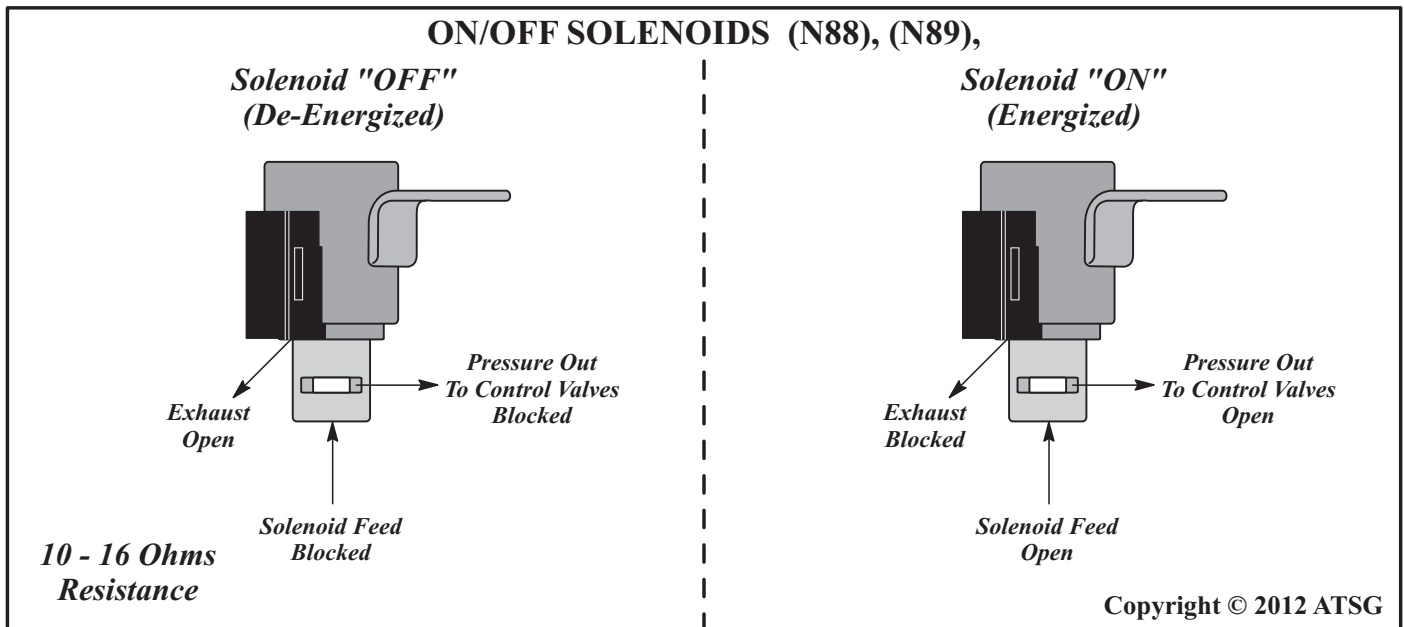
PWM Solenoid (N91) operates exactly the opposite of the other PWM solenoids, in that it is "Normally Vented".

Notice that the solenoid feed oil is fed through a .032" orifice, down the side of the solenoid and back through a passage to either TCC feed or to exhaust, depending on whether the solenoid is On or Off.

PWM Solenoids (N90), (N92), (N93), (N282), (N283)

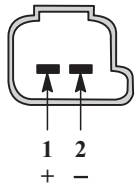
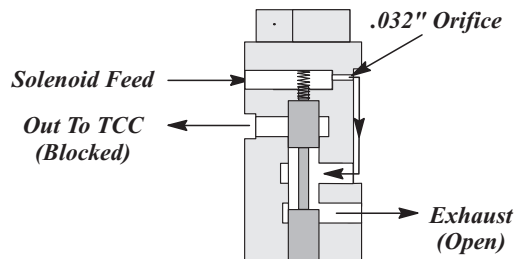
PWM Solenoids (N90), (N92), (N93), (N282), and (N283) operate exactly the opposite of the (N91) PWM solenoid, as they are "Normally Applied". Even though these solenoids look the same, there are different part numbers on each of them which would suggest that they may be different internally.

Notice that the solenoid feed oil is fed through a .032" orifice, down the side of the solenoid and back through a passage to solenoids assigned component or to exhaust, depending on whether the solenoid is On or Off.



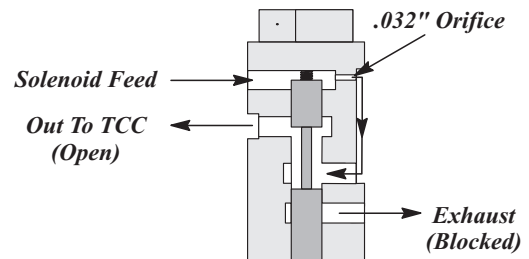
PWM SOLENOID (N91) "NORMALLY VENTED"

Solenoid "OFF"
(De-Energized)



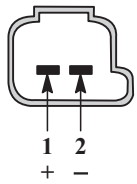
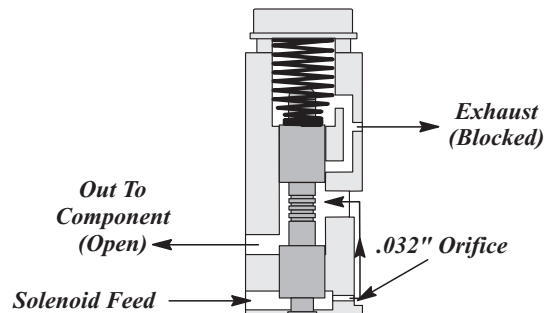
4.0 - 8.0 Ohms
Resistance

Solenoid "ON"
(Energized)



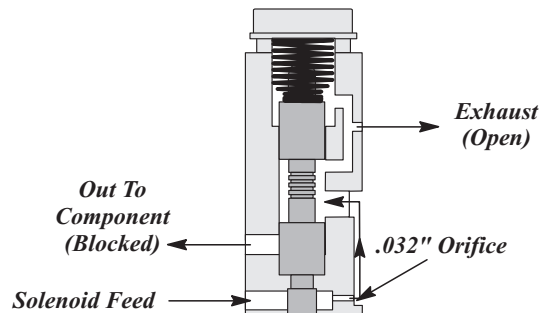
PWM SOLENOIDS (N90), (N92), (N93), (N282), (N283) "NORMALLY APPLIED"

Solenoid "OFF"
(De-Energized)



4.0 - 8.0 Ohms
Resistance

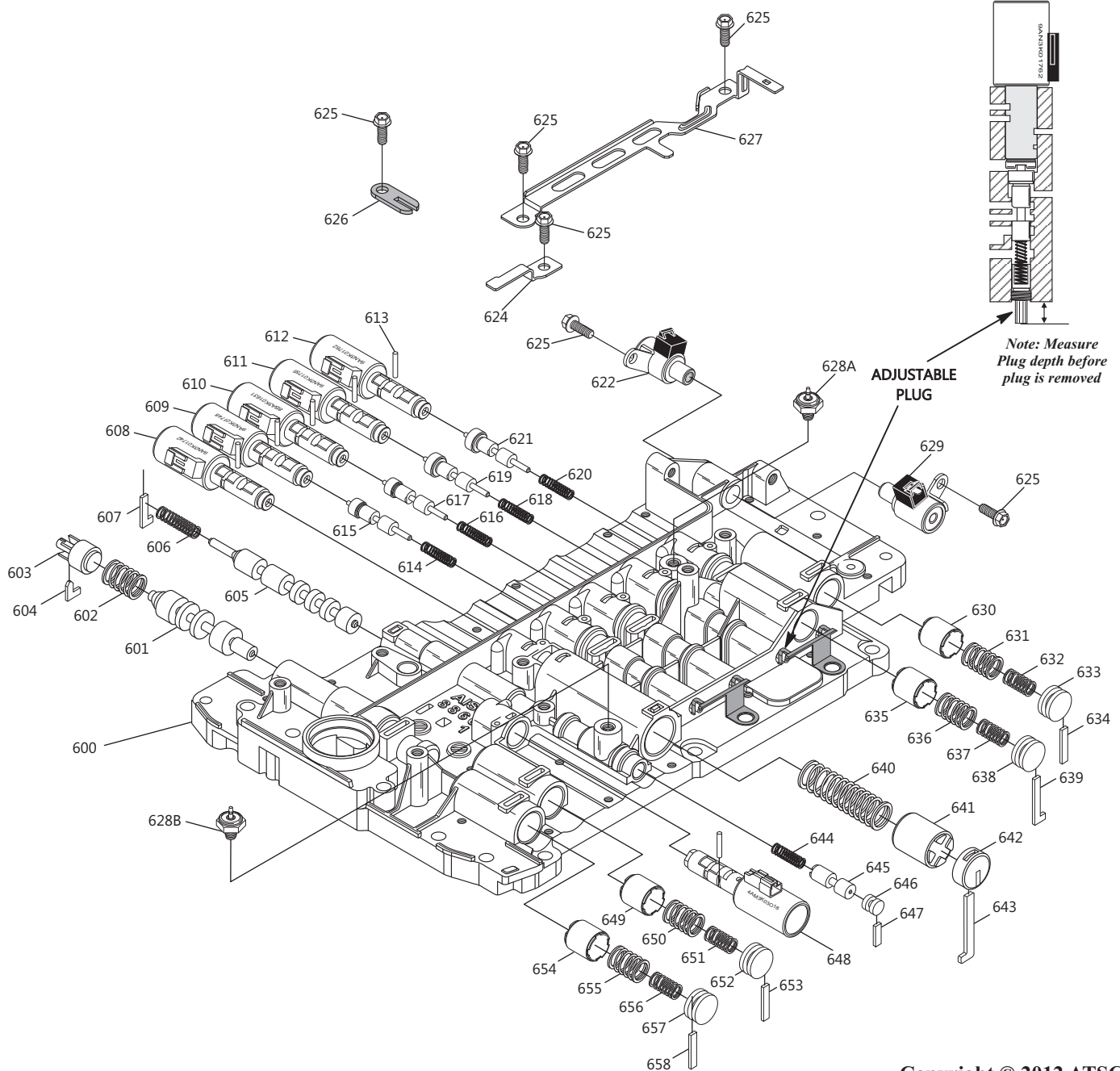
Solenoid "ON"
(Energized)



Even though these solenoids look the same, there are different part numbers on each of them, which would suggest that they may be different internally. "Tag them as they are removed".

Copyright © 2012 ATSG

EARLY CASTING 8860 1 "09D" LOWER VALVE BODY, EXPLODED VIEW



Copyright © 2012 ATSG



Technical Service Information

LOWER VALVE BODY LEGEND

600 LOWER VALVE BODY CASTING.
601 SECONDARY PRESSURE REGULATOR VALVE.
602 SECONDARY PRESSURE REGULATOR VALVE SPRING (RED).
603 SECONDARY PRESSURE REGULATOR VALVE ADJUSTMENT PLUG.
604 SECONDARY PRESSURE REGULATOR VALVE ADJUSTMENT RETAINER.
605 NUMBER 1 RELAY VALVE.
606 NUMBER 1 RELAY VALVE SPRING (NONE).
607 NUMBER 1 RELAY VALVE RETAINER.
608 N93 PWM LINE PRESSURE CONTROL SOLENOID.
609 N92 PWM K1 CLUTCH CONTROL SOLENOID.
610 N90 PWM K3 CLUTCH CONTROL SOLENOID.
611 N283 PWM B1 CLUTCH CONTROL SOLENOID.
612 N282 PWM K2 CLUTCH CONTROL SOLENOID.
613 PWM SOLENOID RETAINER PINS (6 REQUIRED).
614 K1 CLUTCH REGULATOR VALVE SPRING (RED).
615 K1 CLUTCH REGULATOR VALVE.
616 K3 CLUTCH REGULATOR VALVE SPRING (NONE).
617 K3 CLUTCH REGULATOR VALVE.
618 B1 CLUTCH REGULATOR VALVE SPRING (NONE).
619 B1 CLUTCH REGULATOR VALVE.
620 K2 CLUTCH REGULATOR VALVE SPRING (NONE).
621 K2 CLUTCH REGULATOR VALVE.
622 N89 ON/OFF SOLENOID.
624 N91 PWM TCC CONTROL SOLENOID PIN RETAINER.
625 RETAINING BOLTS, 12 MM (0.472") LONG (6 REQUIRED).
626 TRANSMISSION TEMP SENSOR RETAINING BRACKET.
627 N93, N90, N92, N283, N282 SOLENOID PIN RETAINER.
628A B2 PRESSURE SWITCH (NOT USED IN ALL MODELS).
628B K1 PRESSURE SWITCH (NOT USED IN ALL MODELS).
629 N88 ON/OFF SOLENOID.
630 K2 ACCUMULATOR PISTON.
631 K2 ACCUMULATOR PISTON OUTER SPRING (NONE).
632 K2 ACCUMULATOR PISTON INNER SPRING (GRAY).
633 K2 ACCUMULATOR PISTON BORE PLUG.
634 K2 ACCUMULATOR PISTON BORE PLUG RETAINER.
635 B1 ACCUMULATOR PISTON.
636 B1 ACCUMULATOR PISTON OUTER SPRING (NONE).
637 B1 ACCUMULATOR PISTON INNER SPRING (GRAY).
638 B1 ACCUMULATOR PISTON BORE PLUG.
639 B1 ACCUMULATOR PISTON BORE PLUG RETAINER.
640 FORWARD ENGAGEMENT ACCUMULATOR SPRING (NONE).
641 FORWARD ENGAGEMENT ACCUMULATOR PISTON.
642 FORWARD ENGAGEMENT ACCUMULATOR BORE PLUG.
643 FORWARD ENGAGEMENT ACCUMULATOR BORE PLUG RETAINER.
644 K1 SWITCH VALVE SPRING (PINK).
645 K1 SWITCH VALVE.
646 K1 SWITCH VALVE BORE PLUG.
647 K1 SWITCH VALVE BORE PLUG RETAINER.
648 N91 PWM TCC CONTROL SOLENOID.
649 N93/LINE PRESSURE SOLENOID ACCUMULATOR PISTON.
650 N93 ACCUMULATOR PISTON OUTER SPRING (NONE).
651 N93 ACCUMULATOR PISTON INNER SPRING (GRAY).
652 N93 ACCUMULATOR PISTON BORE PLUG.
653 N93 ACCUMULATOR PISTON BORE PLUG RETAINER.
654 K3 ACCUMULATOR PISTON.
655 K3 ACCUMULATOR PISTON OUTER SPRING (NONE).
656 K3 ACCUMULATOR PISTON INNER SPRING (GRAY).
657 K3 ACCUMULATOR PISTON BORE PLUG.
658 K3 ACCUMULATOR PISTON BORE PLUG RETAINER.
659 ROUND SCREENS (OPEN SIDE FACES SPACER PLATE) (2 REQ).
660 VALVE BODY SPACER PLATE.
661 OVAL SCREEN (OPEN SIDE FACES SPACER PLATE).
662 K3 EXHAUST CHECK VALVE, 9.96 MM (.392") DIAMETER.
663 K3 EXHAUST CHECK VALVE SPRING (WHITE).
664 REGULATED EXHAUST CHECK VALVE, 9.96 MM (.392") DIA.
665 REGULATED EXHAUST CHECK VALVE SPRING (WHITE).
666 B2 CLUTCH PLASTIC CHECK VALVE ASSEMBLY.
667 FORWARD/K2 PLASTIC CHECK VALVE ASSEMBLY.

SPECIAL NOTE: VALVE NAMES SHOWN WERE ASSIGNED BY ATSG BASED ON THEIR FUNCTION.

LOWER VALVE BODY SPRING SPECIFICATIONS

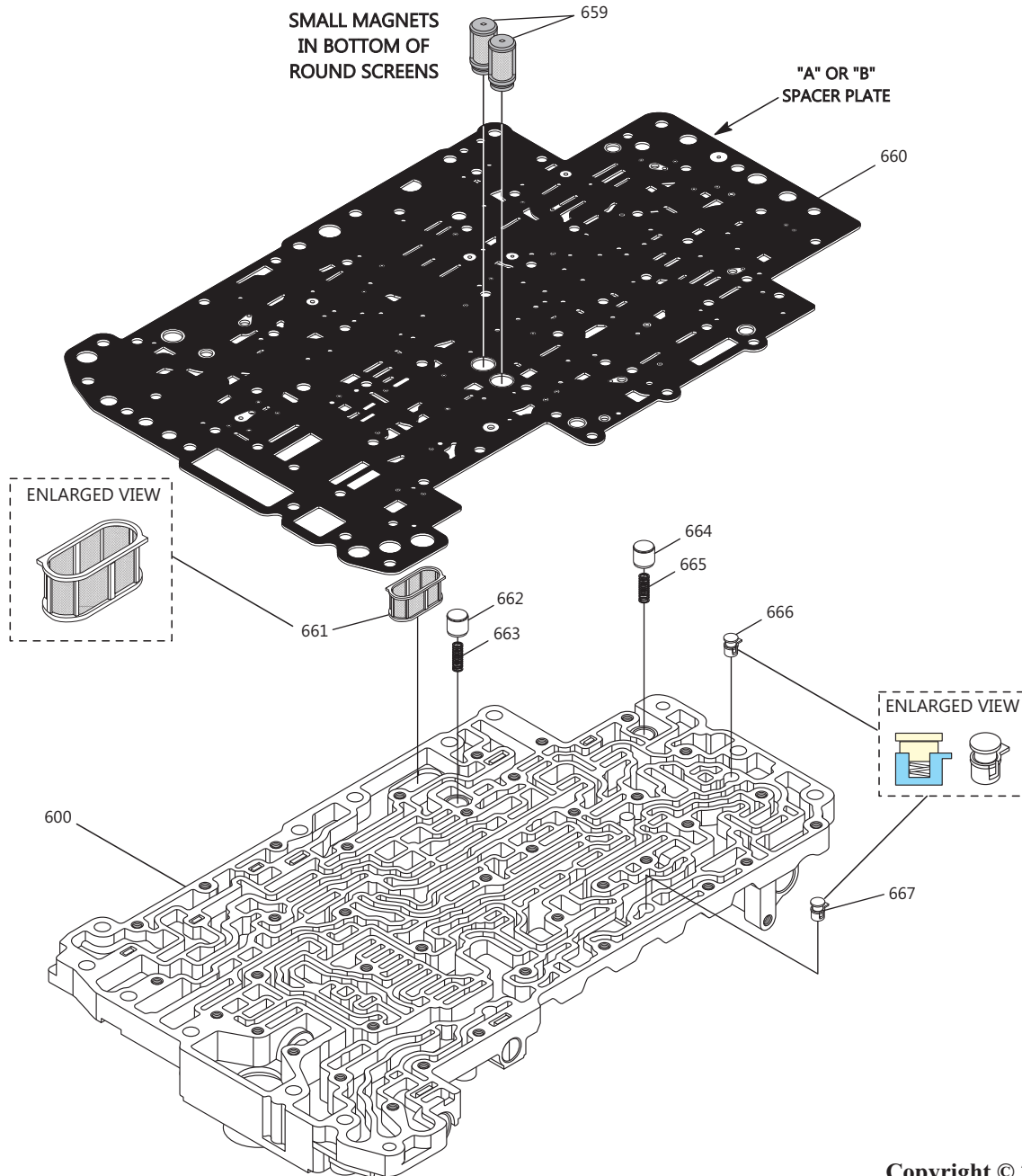
SPRING NUMBER 602 Free Length = 1.043" Spring Diameter = .623" Wire Diameter = .052" Approx Coils = 6 (RED)	SPRING NUMBER 620 Free Length = .860" Spring Diameter = .235" Wire Diameter = .032" Approx Coils = 13 (NONE)
SPRING NUMBER 606 Free Length = 1.560" Spring Diameter = .355" Wire Diameter = .025" Approx Coils = 13 (NONE)	SPRINGS 631, 636, 650, 655, Free Length = 1.085" Spring Diameter = .628" Wire Diameter = .082" Approx Coils = 6.5 (NONE)
SPRING NUMBER 614 Free Length = 1.018" Spring Diameter = .235" Wire Diameter = .025" Approx Coils = 14 (RED)	SPRINGS 632, 637, 651, 656, Free Length = 1.093" Spring Diameter = .430" Wire Diameter = .062" Approx Coils = 8.5 (GRAY)
SPRING NUMBER 616 Free Length = .860" Spring Diameter = .235" Wire Diameter = .032" Approx Coils = 13 (NONE)	SPRING NUMBER 640 Free Length = 2.456" Spring Diameter = .775" Wire Diameter = .075" Approx Coils = 10 (NONE)
SPRING NUMBER 618 Free Length = .860" Spring Diameter = .235" Wire Diameter = .032" Approx Coils = 13 (NONE)	SPRING NUMBER 644 Free Length = 1.090" Spring Diameter = .280" Wire Diameter = .025" Approx Coils = 11 (PINK)

LOWER VALVE BODY SPRING SPECIFICATIONS SMALL PARTS, WORM TRACK SIDE

SPRING NO. 663 Free Length = .600" Spring Diameter = .248" Wire Diameter = .023" Approx Coils = 11 (WHITE)	SPRING NO. 665 Free Length = .600" Spring Diameter = .248" Wire Diameter = .023" Approx Coils = 11 (WHITE)
--	--

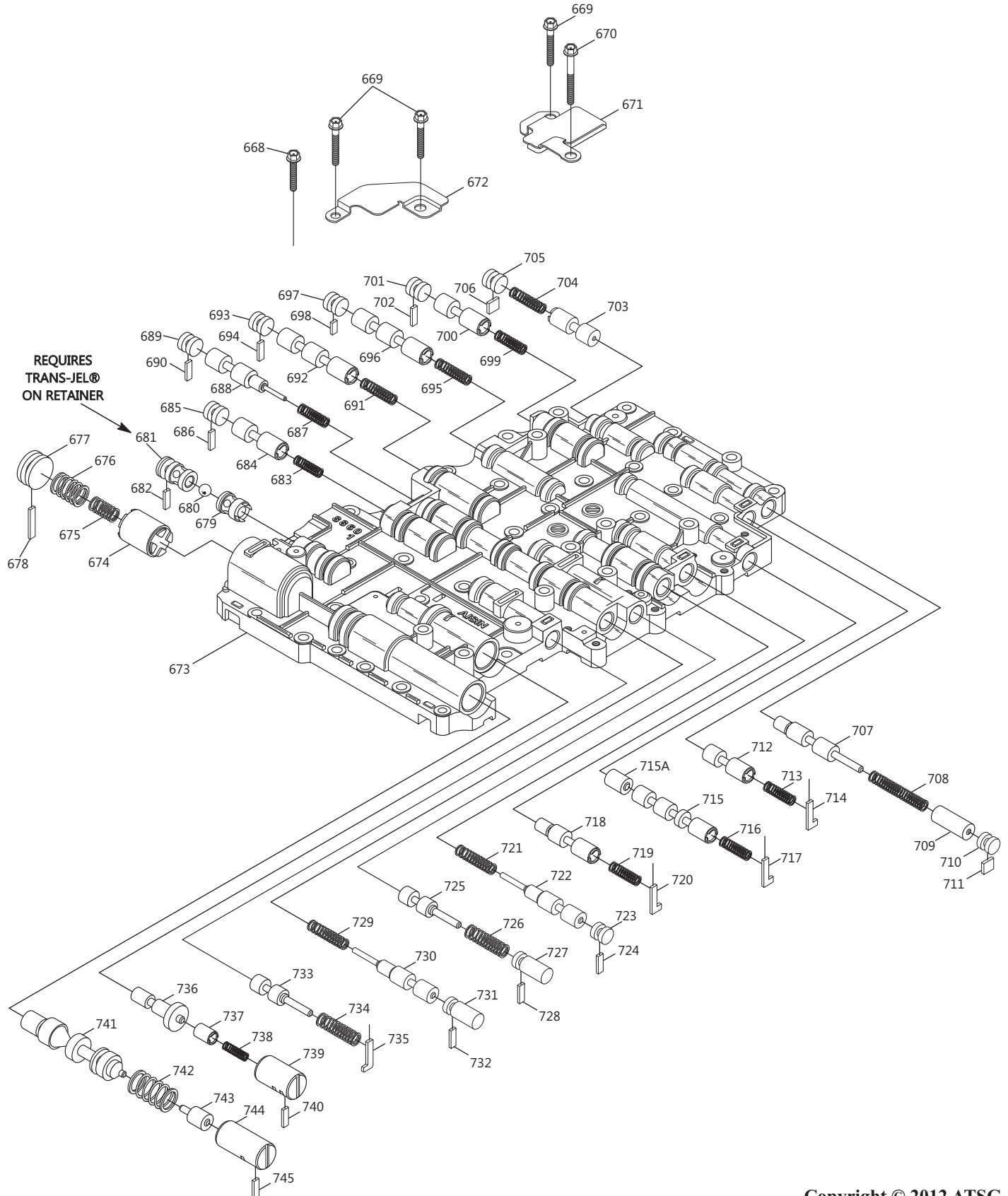
Copyright © 2012 ATSG

EARLY CASTING 8860 1 "09D" LOWER VALVE BODY SMALL PARTS, EXPLODED VIEW



Copyright © 2012 ATSG

EARLY CASTING 8860 1 "09D" UPPER VALVE BODY EXPLODED VIEW



Copyright © 2012 ATSG



Technical Service Information

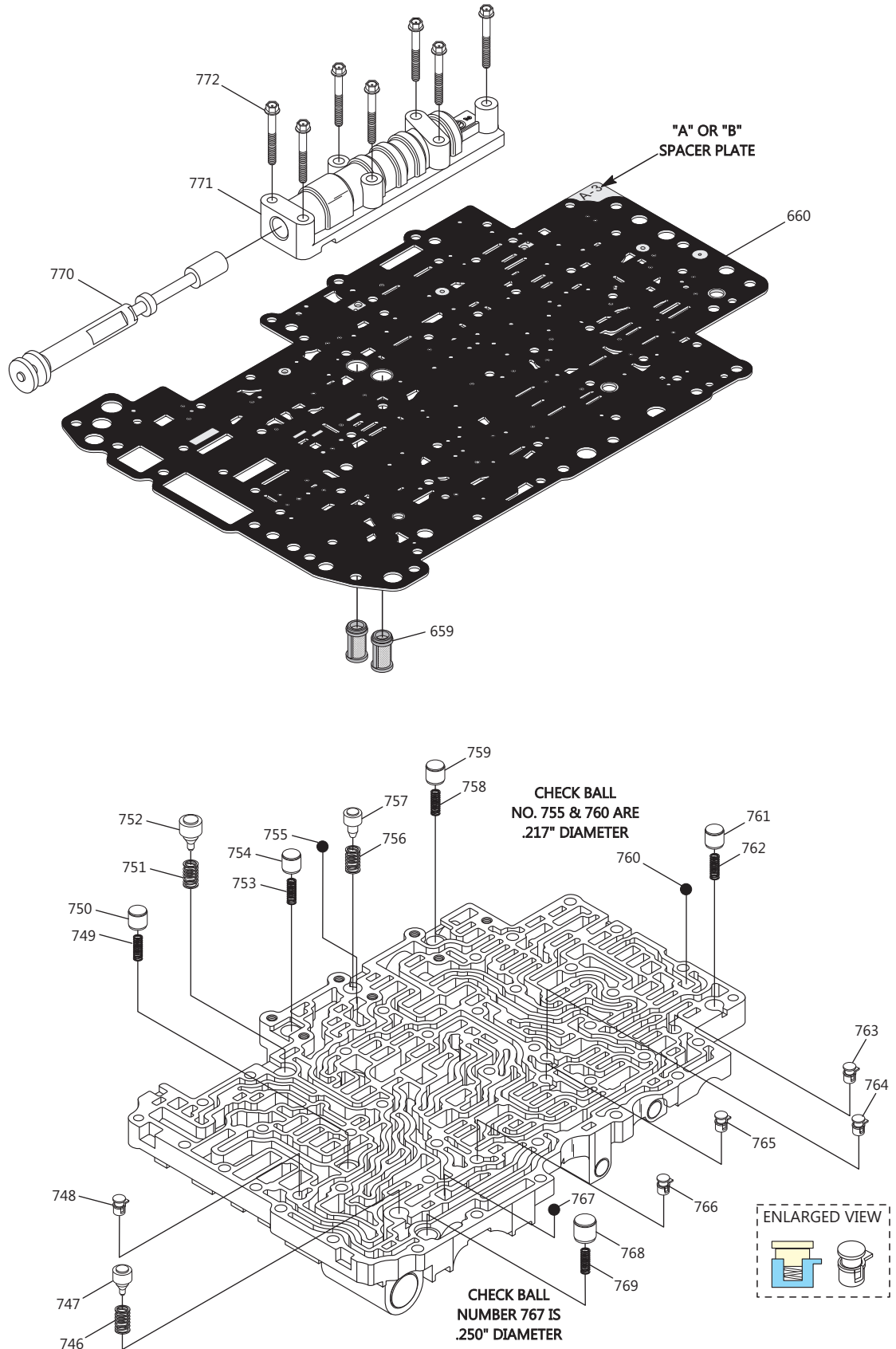
UPPER VALVE BODY LEGEND

659 ROUND SCREENS (2 REQUIRED).	720 B2 PORT CONTROL VALVE RETAINER.
660 VALVE BODY SPACER PLATE.	721 B1 RELAY VALVE SPRING (ORANGE).
668 UPPER VB TO LOWER VB BOLT, 22 MM (.866") (4 REQUIRED).	722 B1 RELAY VALVE.
669 UPPER VB TO LOWER VB BOLT, 28 MM (1.102") (25 REQUIRED).	723 B1 RELAY VALVE BORE PLUG.
670 UPPER VB TO LOWER VB BOLT, 40 MM (1.574") (10 REQUIRED).	724 B1 RELAY VALVE BORE PLUG RETAINER.
671 OIL BAFFLE NUMBER 2.	725 SOLENOID MODULATOR VALVE B VALVE.
672 OIL BAFFLE NUMBER 1.	726 SOLENOID MODULATOR VALVE B VALVE SPRING (LT BLUE).
673 UPPER VALVE BODY CASTING.	727 SOLENOID MODULATOR VALVE B VALVE BORE PLUG.
674 K1 ACCUMULATOR PISTON.	728 SOLENOID MODULATOR VALVE B VALVE BORE PLUG RETAINER.
675 K1 ACCUMULATOR PISTON INNER SPRING (LT BLUE).	729 K3 RELAY VALVE SPRING (ORANGE).
676 K1 ACCUMULATOR PISTON OUTER SPRING (NONE).	730 K3 RELAY VALVE.
677 K1 ACCUMULATOR PISTON BORE PLUG.	731 K3 RELAY VALVE BORE PLUG.
678 K1 ACCUMULATOR PISTON BORE PLUG RETAINER.	732 K3 RELAY VALVE BORE PLUG RETAINER.
679 K3/B1 THREE WAY INNER SHUTTLE BALL SEAT.	733 SOLENOID MODULATOR VALVE A VALVE.
680 SHUTTLE BALL (.250" DIAMETER STEEL).	734 SOLENOID MODULATOR VALVE A SPRING (LT BLUE).
681 K3/B1 THREE WAY OUTER SHUTTLE BALL SEAT.	735 SOLENOID MODULATOR VALVE A RETAINER.
682 K3/B1 THREE WAY OUTER SHUTTLE BALL SEAT RETAINER.	736 TCC APPLY CONTROL VALVE.
683 N283 SWITCH VALVE SPRING (PINK).	737 TCC APPLY CONTROL BOOST VALVE.
684 N283 SWITCH VALVE.	738 TCC APPLY CONTROL BOOST VALVE SPRING (TAN).
685 N283 SWITCH VALVE BORE PLUG.	739 TCC APPLY CONTROL BOOST VALVE SLEEVE.
686 N283 SWITCH VALVE BORE PLUG RETAINER.	740 TCC APPLY CONTROL BOOST VALVE SLEEVE RETAINER.
687 N90 SWITCH VALVE SPRING (ORANGE).	741 PRIMARY PRESSURE REGULATOR VALVE.
688 N90 SWITCH VALVE.	742 PRIMARY PRESSURE REGULATOR VALVE SPRING (PINK).
689 N90 SWITCH VALVE BORE PLUG.	743 LINE PRESSURE BOOST VALVE.
690 N90 SWITCH VALVE BORE PLUG RETAINER.	744 LINE PRESSURE BOOST VALVE SLEEVE.
691 K3 CONTROL VALVE SPRING (PINK).	745 LINE PRESSURE BOOST VALVE SLEEVE RETAINER.
692 K3 CONTROL VALVE.	746 LUBE CHECK VALVE SPRING (PINK).
693 K3 CONTROL VALVE BORE PLUG.	747 LUBE CHECK VALVE, 9.98 MM (.392") DIAMETER.
694 K3 CONTROL VALVE BORE PLUG RETAINER.	748 SECONDARY REG. VALVE PLASTIC CHECK VALVE ASSEMBLY.
695 B1 CONTROL VALVE SPRING (PINK).	749 TCC APPLY LIMIT CHECK VALVE SPRING (VIOLET).
696 B1 CONTROL VALVE.	750 TCC APPLY LIMIT CHECK VALVE, 9.98 MM (.392") DIAMETER.
697 B1 CONTROL VALVE BORE PLUG.	751 N93 SOLENOID LIMIT CHECK VALVE SPRING (LT. BLUE).
698 B1 CONTROL VALVE BORE PLUG RETAINER.	752 N93 SOLENOID LIMIT CHECK VALVE, 11.98 MM (.471") DIAMETER.
699 K2 CONTROL VALVE SPRING (PINK).	753 REVERSE LIMIT CHECK VALVE SPRING (WHITE).
700 K2 CONTROL VALVE.	754 REVERSE LIMIT CHECK VALVE, 9.98 MM (.392") DIAMETER.
701 K2 CONTROL VALVE BORE PLUG.	755 REVERSE ORIFICE PLASTIC CHECK BALL, 5.5 MM (.217") DIA.
702 K2 CONTROL VALVE BORE PLUG RETAINER.	756 LINE PRESSURE LIMIT CHECK VALVE SPRING (NONE).
703 B2 SWITCH VALVE (MANUAL "1") VALVE.	757 LINE PRESSURE LIMIT CHECK VALVE, 9.98 MM (.392") DIAMETER.
704 B2 SWITCH VALVE (MANUAL "1") SPRING (WHITE).	758 REGULATED EXHAUST CHECK VALVE SPRING (WHITE).
705 B2 SWITCH VALVE (MANUAL "1") BORE PLUG.	759 REGULATED EXHAUST CHECK VALVE, 9.98 MM (.392") DIAMETER.
706 B2 SWITCH VALVE (MANUAL "1") BORE PLUG RETAINER.	760 B2 "SMALL" CAVITY PLASTIC CHECK BALL, 5.5 MM (.217") DIA.
707 B2 REGULATOR VALVE.	761 LUBE RELIEF CHECK VALVE, 9.98 MM (.392") DIAMETER.
708 B2 REGULATOR VALVE SPRING (VIOLET).	762 LUBE RELIEF CHECK VALVE SPRING (RED).
709 B2 REGULATOR PLUNGER.	763 K2 CLUTCH PLASTIC CHECK VALVE ASSEMBLY.
710 B2 REGULATOR VALVE BORE PLUG.	764 B1 CLUTCH PLASTIC CHECK VALVE ASSEMBLY.
711 B2 REGULATOR VALVE BORE PLUG RETAINER.	765 K3 CLUTCH PLASTIC CHECK VALVE ASSEMBLY.
712 PRESSURE MODIFIER VALVE.	766 K1 CLUTCH PLASTIC CHECK VALVE ASSEMBLY.
713 PRESSURE MODIFIER SPRING (WHITE).	767 DRIVE RANGE ORIFICE PLASTIC CHECK BALL, 6.35 MM (.250") DIA.
714 PRESSURE MODIFIER RETAINER.	768 COOLER CHECK VALVE.
715A NUMBER 2 RELAY VALVE.	769 COOLER CHECK VALVE SPRING (TAN).
715 NUMBER 2 RELAY VALVE.	770 MANUAL VALVE.
716 NUMBER 2 RELAY VALVE SPRING (WHITE).	771 MANUAL VALVE BODY CASTING.
717 NUMBER 2 RELAY VALVE RETAINER.	772 MANUAL VALVE BODY RETAINING BOLT, 38 MM (1.496") (7 REQ).
718 B2 PORT CONTROL VALVE.	
719 B2 PORT CONTROL VALVE SPRING (WHITE).	

Copyright © 2012 ATSG

***SPECIAL NOTE: VALVE NAMES SHOWN WERE
ASSIGNED BY ATSG BASED ON THEIR FUNCTION.***

EARLY CASTING 8860 1 "09D" UPPER VALVE BODY SMALL PARTS, EXPLODED VIEW



Copyright © 2012 ATSG



Technical Service Information

UPPER VALVE BODY SPRING SPECIFICATIONS

SPRING NUMBER 675
Free Length = 1.070"
Spring Diameter = .425"
Wire Diameter = .062"
Approx Coils = 9 (LT BLUE)

SPRING NUMBER 676
Free Length = 1.090"
Spring Diameter = .625"
Wire Diameter = .080"
Approx Coils = 6 (NONE)

SPRING NUMBER 683, 691,
695, AND 699.
Free Length = 1.080"
Spring Diameter = .279"
Wire Diameter = .024"
Approx Coils = 10 (PINK)

SPRING NUMBER 687, 721, 729,
Free Length = 1.130"
Spring Diameter = .255"
Wire Diameter = .027"
Approx Coils = 13 (ORANGE)

SPRING NUMBER 704, 713,
716, AND 719.
Free Length = 1.130"
Spring Diameter = .297"
Wire Diameter = .030"
Approx Coils = 12 (WHITE)

SPRING NUMBER 708
Free Length = 1.280"
Spring Diameter = .275"
Wire Diameter = .027"
Approx Coils = 21 (VIOLET)

SPRING NUMBER 738
Free Length = .750"
Spring Diameter = .220"
Wire Diameter = .028"
Approx Coils = 12 (TAN)

SPRING NUMBER 726, 734,
Free Length = 1.425"
Spring Diameter = .386"
Wire Diameter = .055"
Approx Coils = 13 (LT BLUE)

SPRING NUMBER 742
Free Length = 1.235"
Spring Diameter = .545"
Wire Diameter = .048"
Approx Coils = 6 (PINK)

UPPER VALVE BODY SPRING SPECIFICATIONS SMALL PARTS, WORM TRACK SIDE

SPRING NO. 746
Free Length = .685"
Spring Diameter = .346"
Wire Diameter = .042"
Approx Coils = 6 (PINK)
SPRING NO. 749
Free Length = .610"
Spring Diameter = .249"
Wire Diameter = .029"
Approx Coils = 7 (VIOLET)

SPRING NO. 751
Free Length = .700"
Spring Diameter = .407"
Wire Diameter = .035"
Approx Coils = 6 (LT. BLUE)

SPRING NO. 753
Free Length = .600"
Spring Diameter = .248"
Wire Diameter = .023"
Approx Coils = 11 (WHITE)

SPRING NO. 756
Free Length = .430"
Spring Diameter = .373"
Wire Diameter = .050"
Approx Coils = 4 (NONE)
SPRING NO. 758
Free Length = .600"
Spring Diameter = .248"
Wire Diameter = .023"
Approx Coils = 11 (WHITE)
SPRING NO. 762
Free Length = .625"
Spring Diameter = .250"
Wire Diameter = .033"
Approx Coils = 8 (RED)
SPRING NO. 769
Free Length = .672"
Spring Diameter = .274"
Wire Diameter = .019"
Approx Coils = 10 (TAN)

Copyright © 2012 ATSG

CASE PASSAGE ID

