



Introduction

The 722.8 is Mercedes Front Wheel Drive Continuous Variable Transmission. It is widely used throughout the world except here in the United States at the time of printing.

This manual provides basic dis-assembly procedures of the transmission with detailed information on the valve body as well as a complete set of oil schematics and case passage identification.

Many thanks goes to Automatic Choice for providing this transmission to be used for this publication. And for ALTO Products in their assistance with providing an additional valve body.

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WAYNE COLONNA
TECHNICAL CONSULTANT

PETER LUBAN
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

GREG CATANZARO
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

DALE ENGLAND
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP
18635 SW 107TH AVENUE
CUTLER BAY, FLORIDA 33157
(305) 670-4161



**Mercedes
722.8 CVT**

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**AUTOMATIC TRANSMISSION SERVICE GROUP
18635 S.W. 107 AVENUE
CUTLER BAY, FLORIDA 33157
(305) 670-4161**

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Mercedes continuously variable automatic transmission is referred to as the 722.8 Autotronic.

No pressure taps are available for any diagnosing with this transmission. Externally, very little can be observed such as the “to cooler” and “cooler return” ports, Mercedes typical filler tube cap and a 4 pin Electrohydraulic connector for the internal CVT Control Unit and a drain plug in the bottom pan (figures 1-4).

To disassemble this unit, begin by removing the 6 pan bolts, the pan and filter (figure 5).

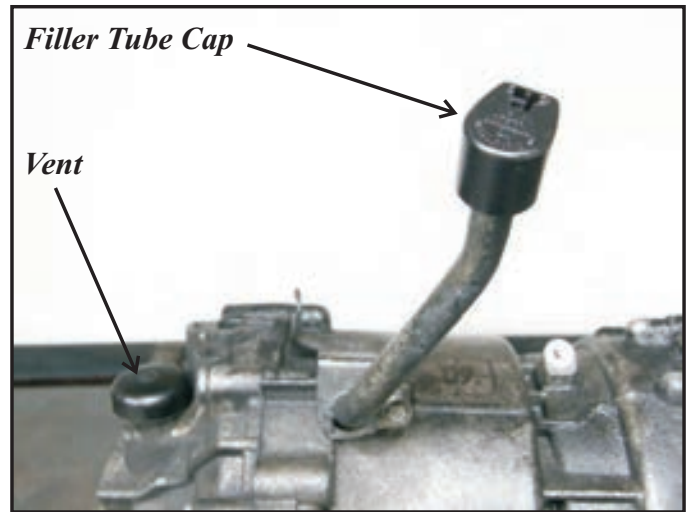


Figure 3

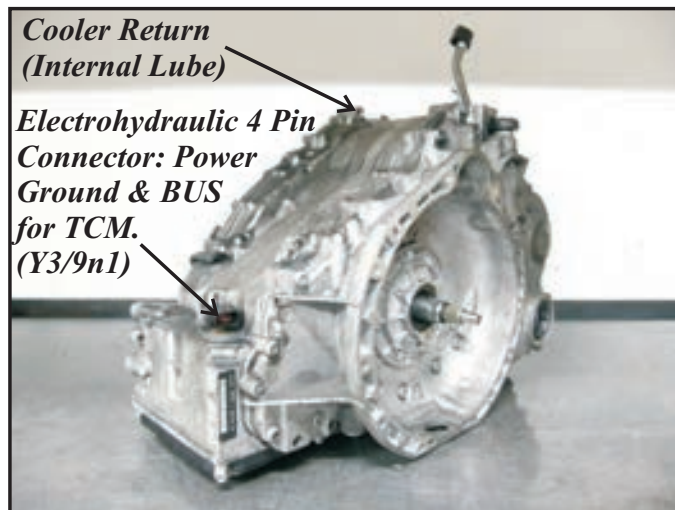


Figure 1

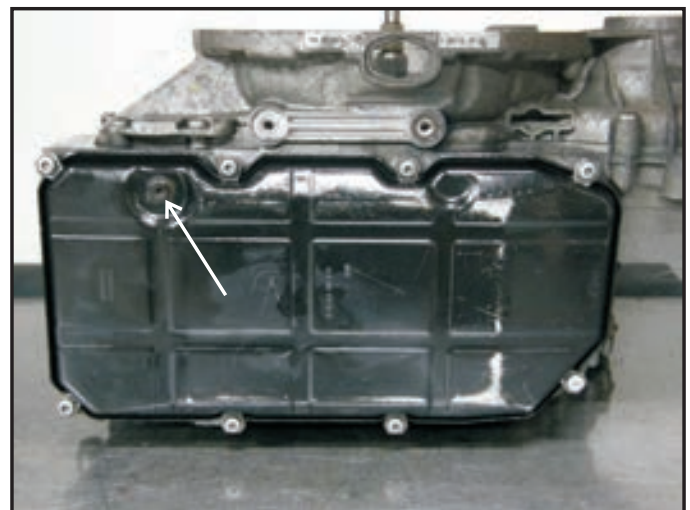


Figure 4

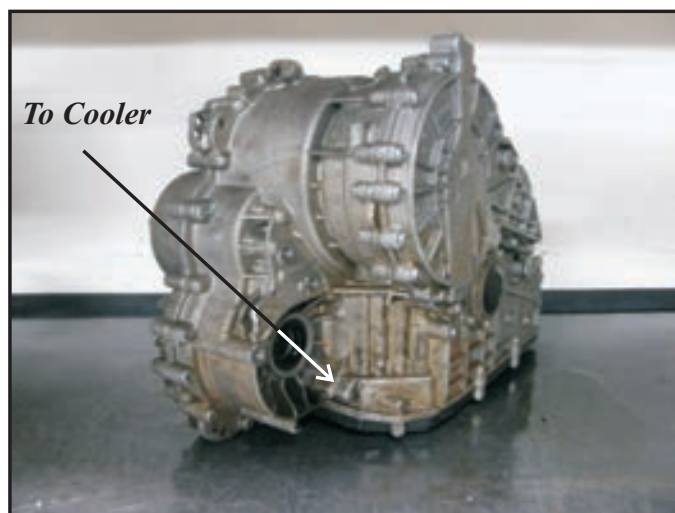


Figure 2



Figure 5

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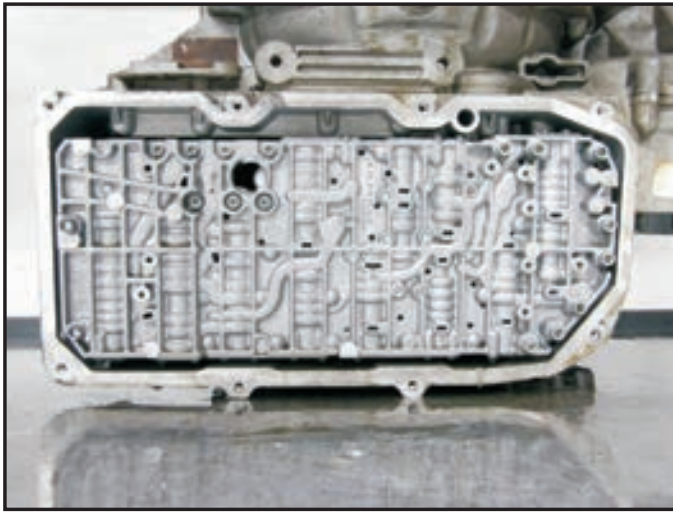


Figure 6

With the filter removed the valve body assembly's 17 retaining bolts can be removed (figure 6).

Carefully lift the valve body out of the transmission providing enough room to clear Electrohydraulic unit on the top side of the valve body without damage (figure 7) and then set it aside.

Place the case upright facing the converter housing side and remove the 12 outer perimeter bolts followed by the 5 retaining inside the converter housing (figure 8).

Rotate the case 180° and remove the 8 perimeter bolts from the main case going into the converter housing (figures 9 & 10).



Figure 7

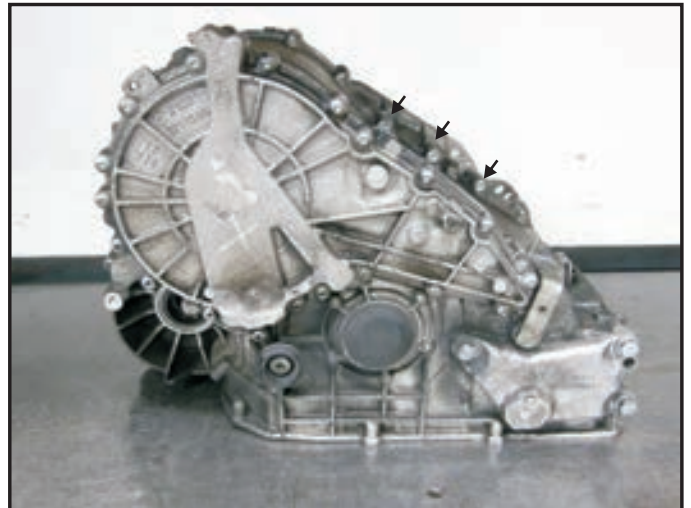


Figure 9

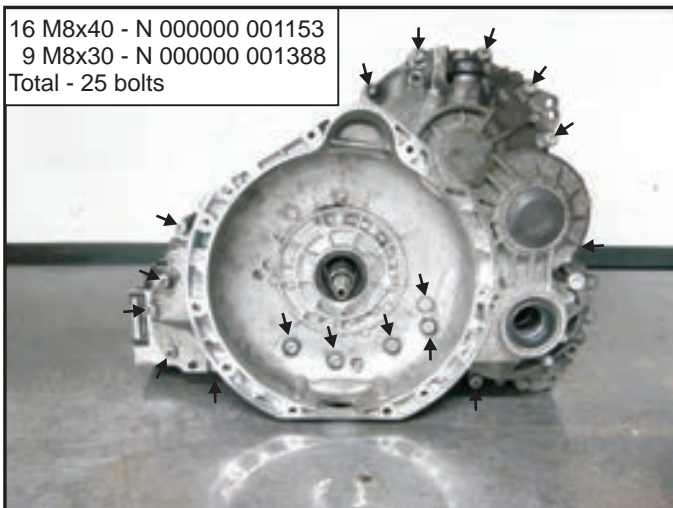


Figure 8

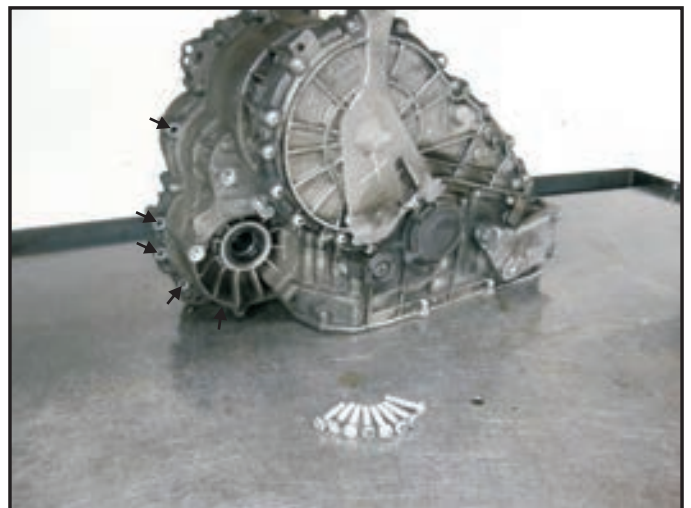


Figure 10

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With the converter housing retaining bolts removed, carefully separate the two case halves (figure 11) and set aside the converter housing.

Remove the 19 rear cover retaining bolts from the back side of the main case (figure 12).

Carefully lift the cover from the case. Be watchful as pieces for the park mechanism may lift out of place and drop away un-noticed (figures 13 & 14).

There is a snap ring on the back side of the clutch drum and planetary assembly which does not need to be removed at this time. To remove this assembly rotate the case 180° (figure 16).

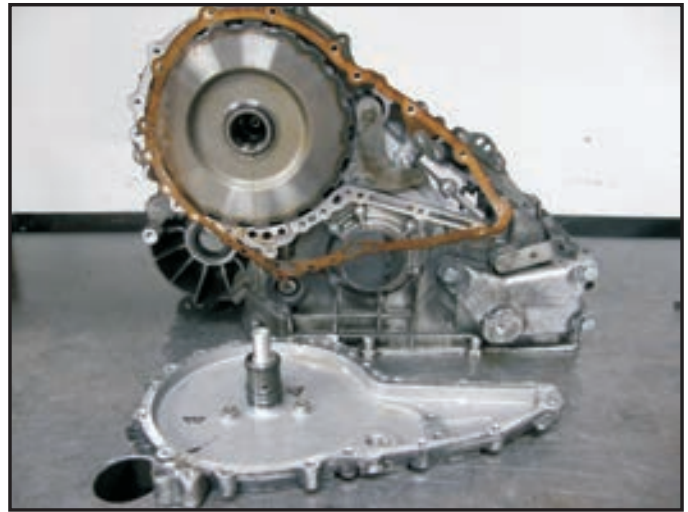


Figure 13

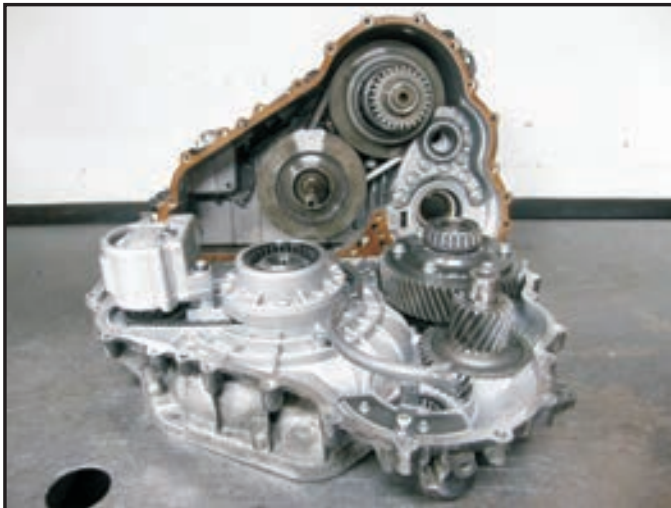


Figure 11



Figure 14

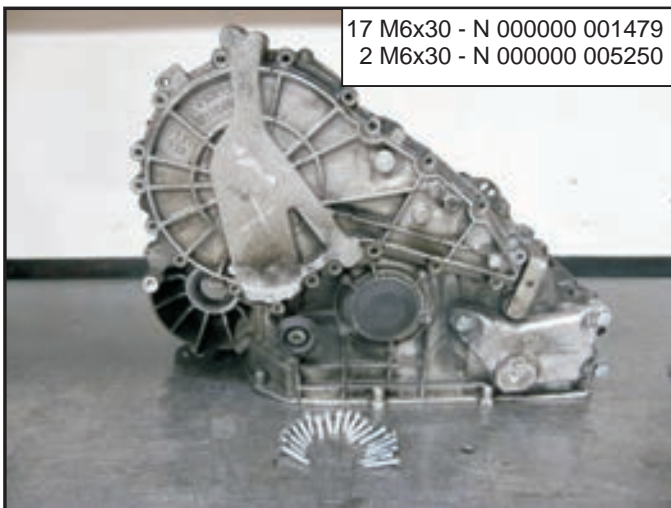


Figure 12



Figure 15

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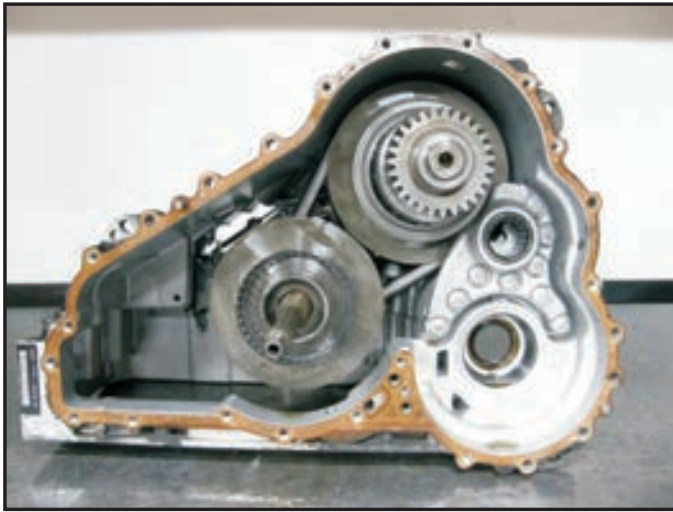


Figure 16

Locate the upper pulley otherwise referred to as a secondary, driven or output pulley. The gear located on the end of this assembly meshes with the differential components (figure 16). Remove the snap ring that retains this gear to the upper pulley assembly (figure 17).

Once the snap ring is removed, carefully use a brass drift and a hammer to drive the center shaft through the gear (figures 18 & 19).

This will also drive the clutch drum and planetary assembly out of the upper pulley assembly (figure 20). Once the drum and planetary assembly is removed set is aside and remove the reverse clutch assembly from the case (figure 21).



Figure 17

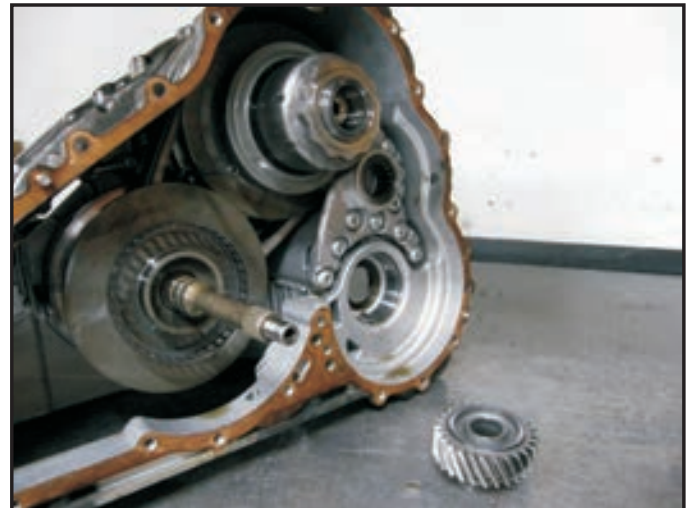


Figure 19



Figure 18

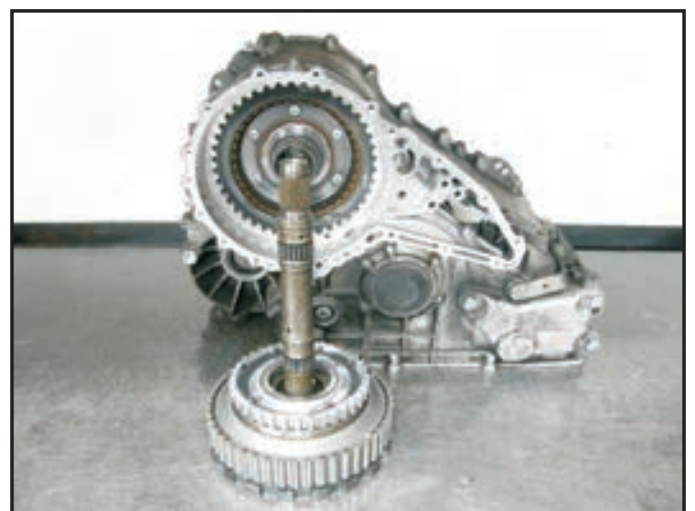


Figure 20

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Once the reverse clutch assembly has been lifted from the case, access is made for the removal of the 6 bolts which holds in place the reverse clutch molded piston, diaphragm return spring and retainer (figures 22 & 23).

Spin the case around and remove the transfer gear bearing support from the inside of the main case near the upper pulley assembly (figure 24).

Carefully remove the converter clutch apply and converter clutch release oil thimble filters from the case (figure 25).

Secure the Thrust Link Belt with two wire ties as seen in figure 26 and rotate the case 180°.

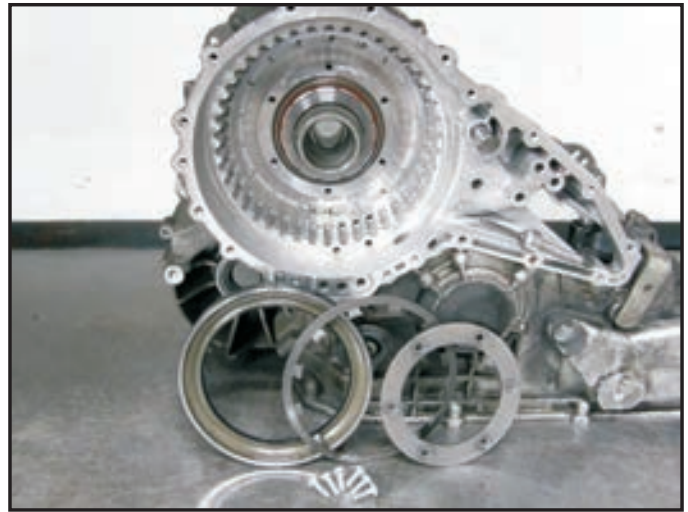


Figure 23

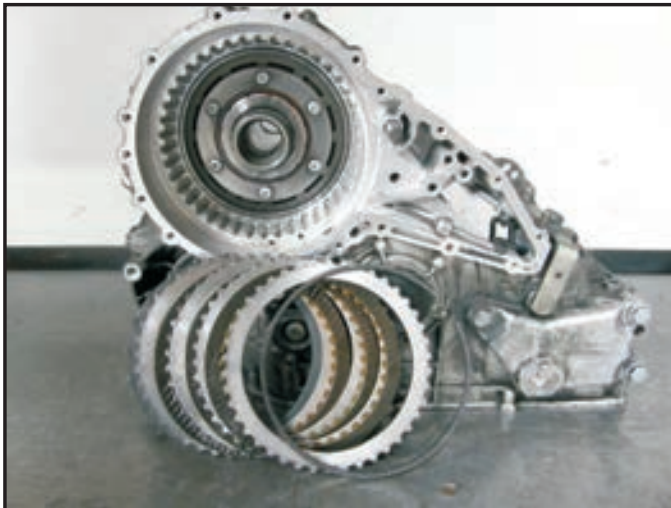


Figure 21

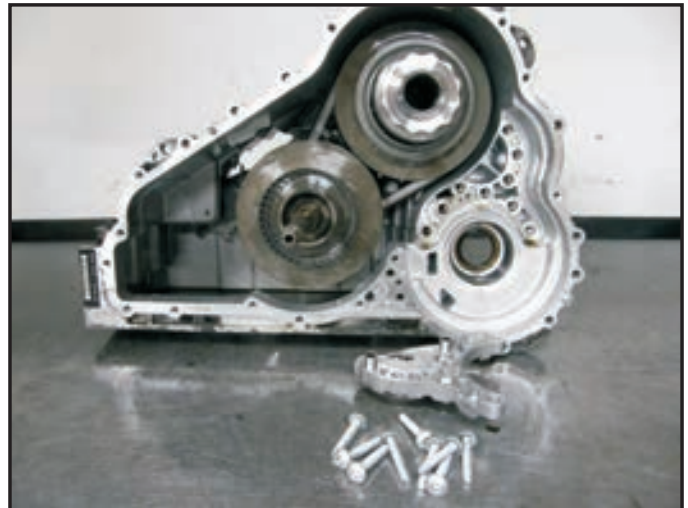


Figure 24



Figure 22



Figure 25

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Figure 26

Remove the cover (A 169 371 08 05) for the lower pulley shaft retaining nut (figure 27). The lower pulley is also referred to as the drive or primary pulley assembly.

Mercedes special tool part number 722 589 01 09 00 will be needed to remove the upper pulley retaining nut while a typical 12 point 46 mm (1 13/16") socket can be used to remove the lower pulley retaining nut (figure 28).

Secure the pulley extracting tools to the case as seen in figure 29. Once in place, screw in both the upper and lower pulley extracting tools simultaneously while carefully guiding the variator assembly (A 169 370 17 00) out of the case (figures 29 & 30).

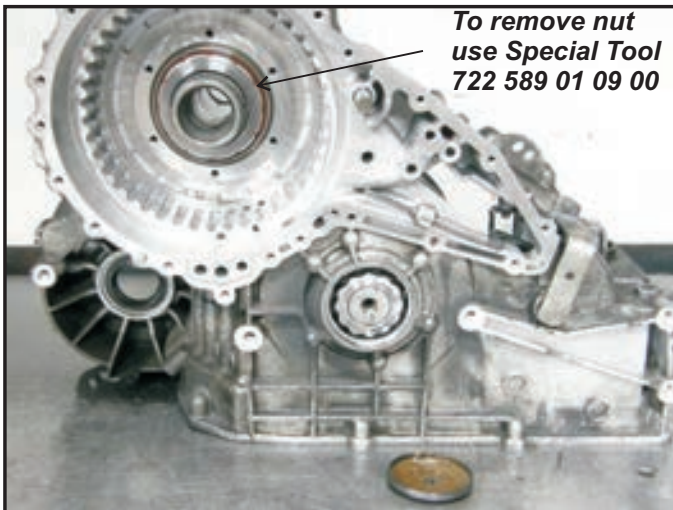


Figure 27

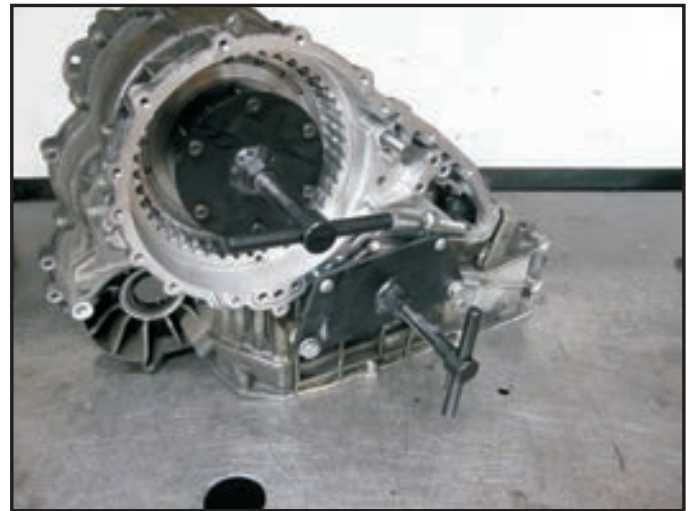


Figure 29



Figure 28



Figure 30

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Remove the pulley extracting tools from the case and separate the pulleys from the thrust link belt and set aside (figure 31).

Special note: To install the pulleys back into the case is done as an assembly with a tool that holds open the driven pulley. This will relieve tension on the belt enabling the pulleys to be mounted back into the case.

Remove the carrier assembly from the converter housing (figures 32 & 33), followed by the fill tube (figure 34) and the stator shaft/lower pulley bearing support assembly (figure 35).

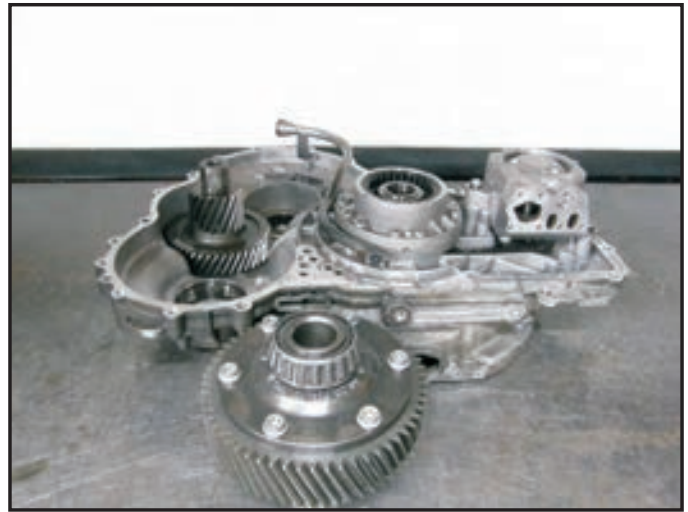


Figure 33



Figure 31

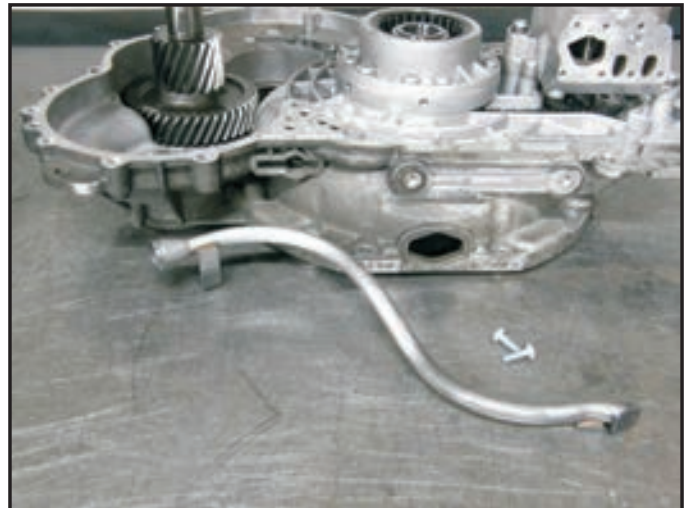


Figure 34

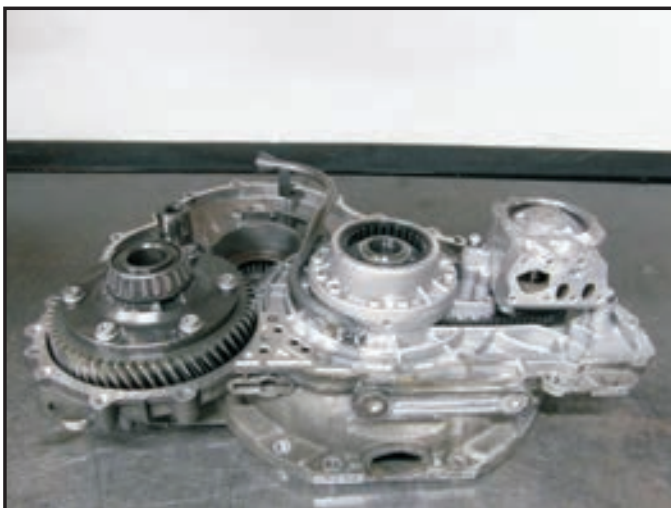


Figure 32



Figure 35

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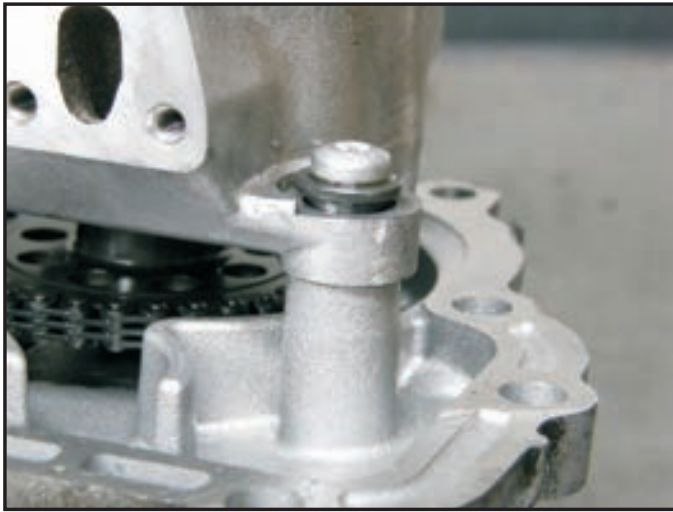


Figure 36

The dual-pipe vane-type pump is mounted to the converter housing with 2 # 30 torx type bolts. Each of these bolts have a spacer sleeve which prevents the bolts from securing the pump assembly firmly to the converter housing. The slight free movement of the pump assembly is sufficient enough to allow the proper alignment to the valve body securing a good seal for the suction and double feed ports (figures 36 to 39).

With the pump removed, the drive sprocket, chain (A 169 988 00 90) and driven sprocket gear to case washer (A 169 372 04 62) come in to view (figure 40) and can be removed from the case (figure 41).

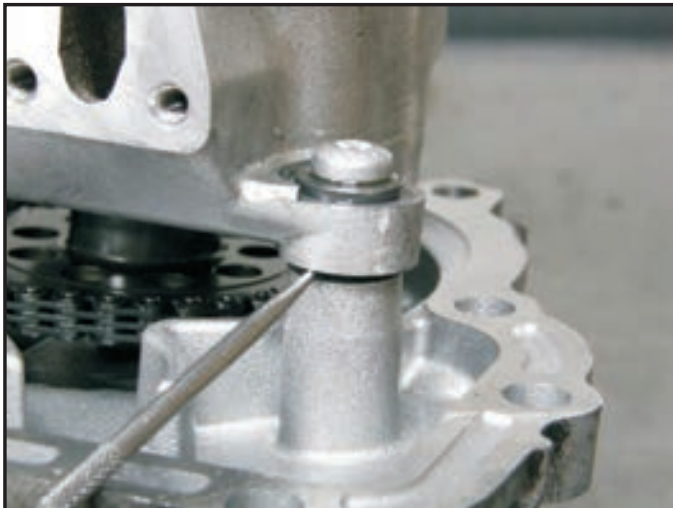


Figure 37



Figure 39



Figure 38



Figure 40

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With the drive sprocket removed from the case, the bushing for the drive sprocket can be inspected for wear (figure 42).

If the transfer gear needs to be removed, flip the converter housing over and remove the end cover (A 169 371 08 05) as seen in figure 43.

Locate and remove the retaining snap ring (figure 44).

Place the assembly into a press carefully supporting the housing so as to be able to press the transfer gear out of the bearing without damaging the housing (figures 45 and 46).



Figure 43

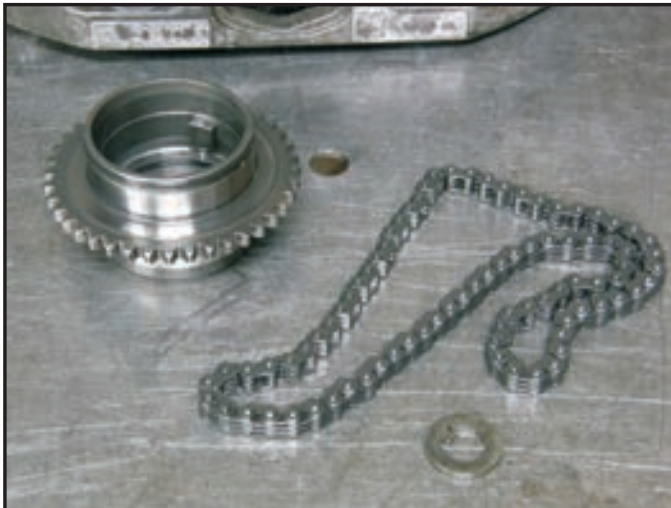


Figure 41



Figure 44



Figure 42



Figure 45

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Figure 46

Should the stator shaft that is pressed into the lower pulley bearing support (figure 47) become damaged in the sealing ring area (figure 48) or the splines on the stator shaft for the stator in the converter become stripped, the stator shaft can be removed and replaced.

Remove the retaining snap ring from the housing (figure 49).

Place the assembly into a press carefully supporting the housing so as to be able to press the stator shaft out of the housing without damaging cracking it (figure 50).

When pressing in a replacement shaft, ensure proper hole alignment from the shaft to the housing.



Figure 47

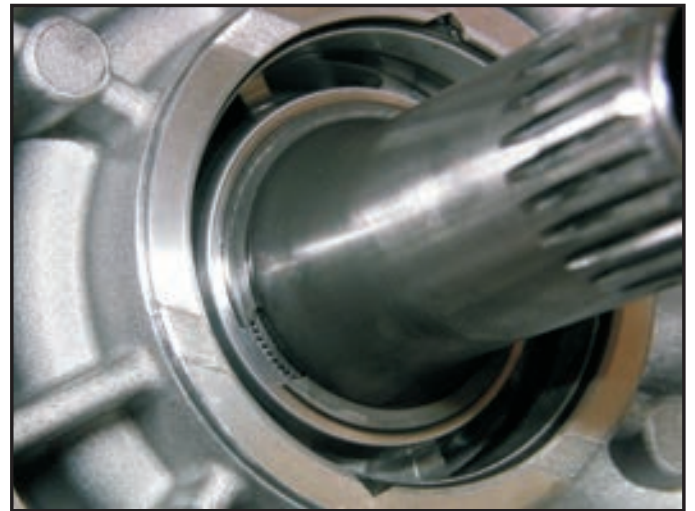


Figure 49



Figure 48



Figure 50

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The dual-pipe vane-type pump (figure 51) has an access slot that allows for a small screwdriver to get under the snap ring to be lifted out as seen in figure 52.

With the snap ring removed, a pair of needle nose pliers or equivalent can be used to remove the cover from the pump assembly (figure 53).

Tip: a slight tap on the driven gear will push the cover part way out of the housing for an easier removal of the cover.

Remove the space washer that goes between the cover and the first eccentric cylinder cover (figures 54 & 55).



Figure 53



Figure 51



Figure 54



Figure 52



Figure 55

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Figure 56

Remove the first eccentric cylinder cover from the housing exposing the rotor and vane assembly (figure 56).

Using needle nose pliers or equivalent, remove the two pin retainers noting their different lengths (figures 57 to 59).

With a magnet, carefully lift out 12 vane blades from the rotor as seen in figure 60.



Figure 57



Figure 59



Figure 58



Figure 60

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With the vane blades removed from the rotor, lift out the eccentric pressure wall from the housing (figures 61 & 62).

With the eccentric pressure wall removed from the housing, rotate the pump shaft until the opening for the retaining snap comes in to view (figure 63) and remove the snap ring (figure 64).

Rotate the shaft again until the key-way that secures the rotor to the shaft faces upwards (figure 65).



Figure 63



Figure 61



Figure 64



Figure 62



Figure 65

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Figure 66

With the key-way now facing upwards, carefully lift the rotor from the assembly (figure 66).

Using a suitable magnet, lift the key-way from the slot in the pump shaft (figure 67).

Next, lift the second eccentric cylinder cover from the housing (figure 68).

The bottom side of this cover contains two beaded seals (figures 69 & 70). One seal provides permanent pressure supply to the transmission while the other seal provides on-demand pressure. These seals are critical for proper operation of the transmission. Be sure to replace them if they are compromised in any way.



Figure 67



Figure 69



Figure 68



Figure 70

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With the pump housing now empty, there is one locating pin at the bottom that needs to be removed and set aside (figures 71 to 73).

The pump shaft and driven sprocket can now be removed from the pump housing (figure 74).

See page 26 for pump details and re-assembly procedure.

To disassemble the Forward Clutch Drum and planetary assembly (figure 75), begin by lifting out the planetary carrier (figure 76).

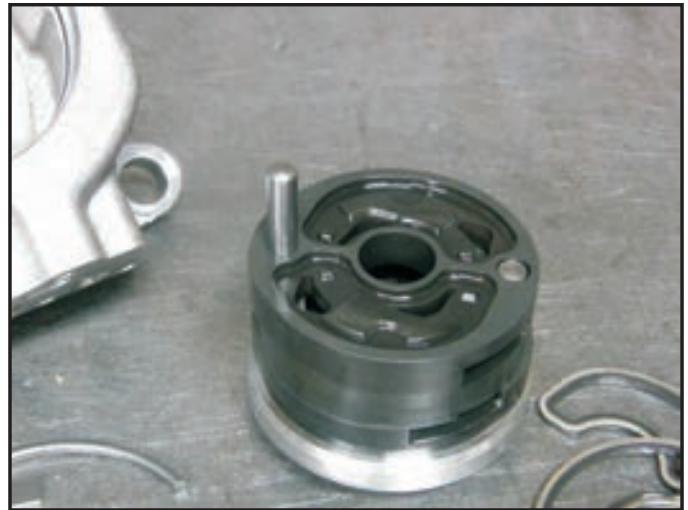


Figure 73



Figure 71



Figure 74



Figure 72



Figure 75

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Figure 76

Remove the internal ring gear retaining snap ring (figure 77).

Lift the internal ring gear from the drum assembly (figure 78) followed by the open face needle bearing (figure 79).

Located in the drum between the internal ring gear and forward clutch assembly are two snap rings (figure 80).

The internal ring gear sets down on top of the upper snap ring for proper positioning. The lower snap ring retains the forward clutch apply plate.



Figure 77



Figure 79



Figure 78

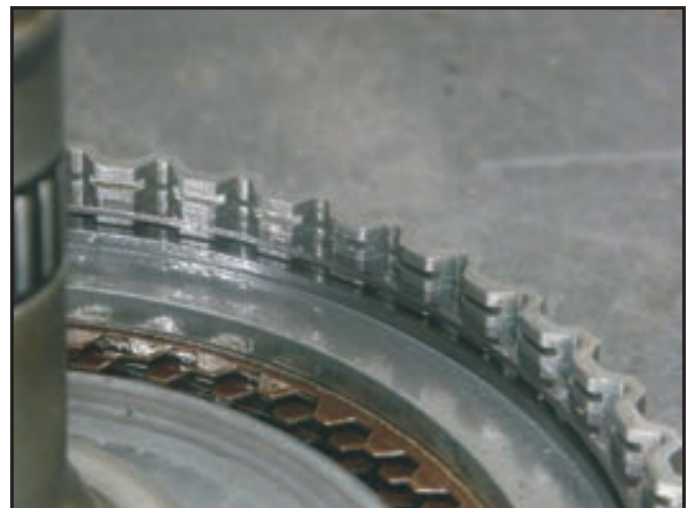


Figure 80

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Remove the internal ring gear positioning snap ring (figure 81).

Remove the forward clutch assembly's retaining snap ring (figure 82).

Lift the forward clutch assembly from the drum (figure 83).

Rotate the drum around and remove the snap ring that retains the turbine shaft to the drum (figure 84).

Position the assembly into a press as seen in figure 85 and carefully press the shaft from the drum (figure 86).

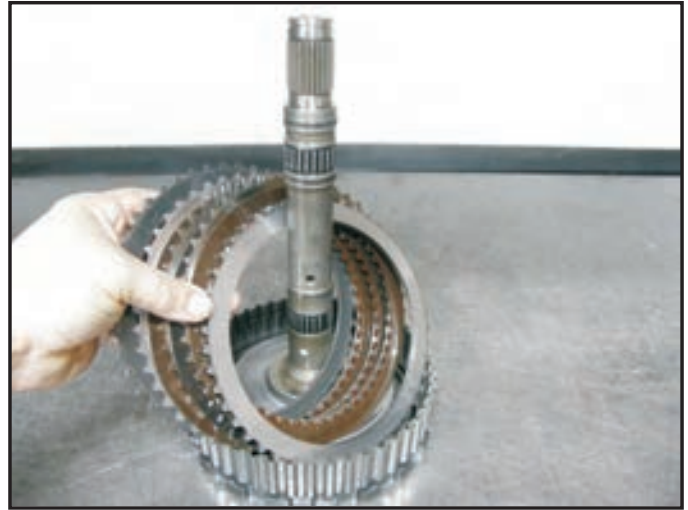


Figure 83



Figure 81



Figure 84



Figure 82



Figure 85

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Figure 86

When pressing the turbine shaft from the forward clutch drum, arrange the support bars in such a manner that it will catch the diaphragm return spring and counter balance piston and retainer as seen in figure 87.

Remove the forward clutch bonded piston from the drum (figure 88).

The upper and lower pulley assemblies are not serviceable with internal parts at the time of printing.

The lower (primary/drive) pulley is a contained unit and can only be replaced as a unit however, the upper (secondary/driven) pulley set can be disassembled.

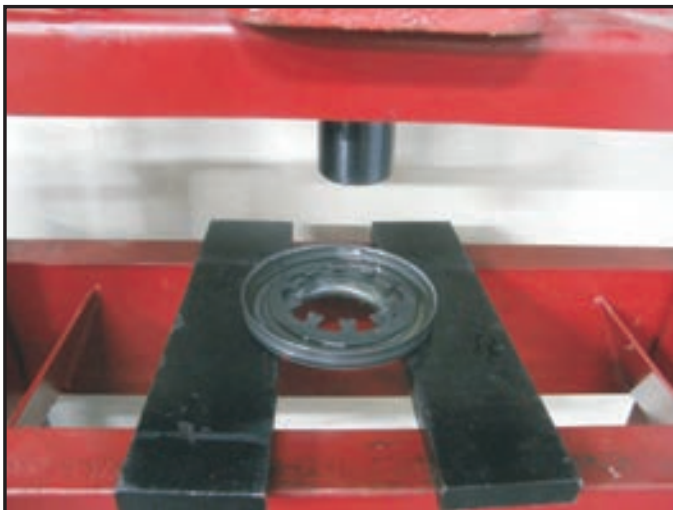


Figure 87



Figure 89



Figure 88



Figure 90

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Care must be taken when disassembling the upper pulley assembly as the 70mm (2 3/4") 12 point nut holds down high tension spring.

The high tension spring in the CVT used to produce this handout was broken damaging its associated parts as seen in figures 89 to 95.

There is a metal piston containing a solid Teflon ring with rubber O-ring underneath it and one molded piston that can be serviced individually inside this assembly should these parts become available (figure 95).



Figure 93



Figure 91



Figure 94



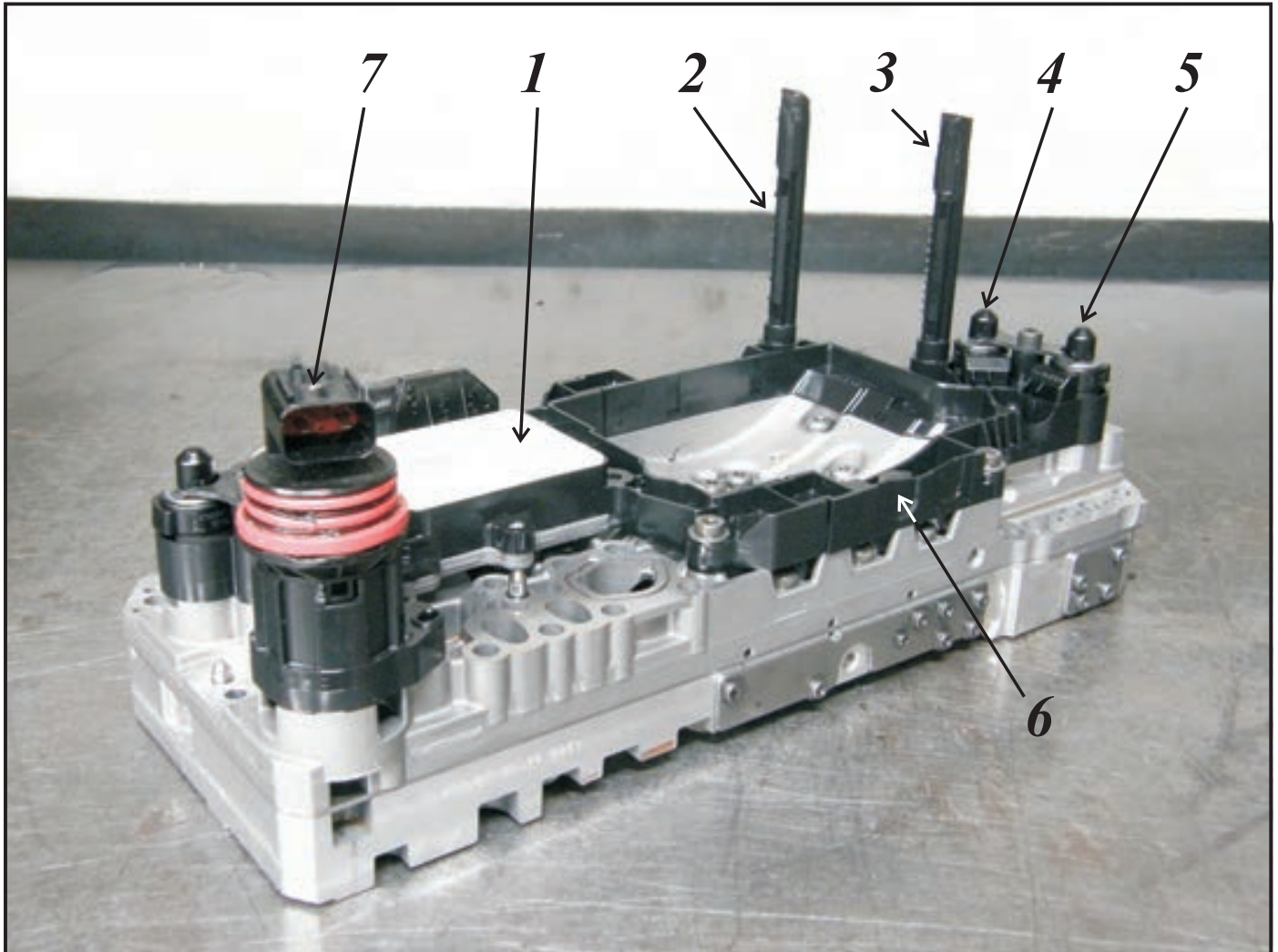
Figure 92



Figure 95

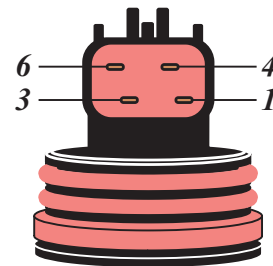
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The Electrohydraulic Unit



1. CVT Control Unit (Y3/9n1)
2. Output RPM Sensor (Y3/9b5)
3. Secondary PRM Sensor (Y3/9b4)
4. Clutch Control Solenoid (Y3/9y3)
5. Primary Control Solenoid [Ration Change] (Y3/9y1)
6. Primary RPM Sensor (Y3/9b3)
7. 4 pin electrohydraulic connector

The primary control solenoid provides the ratio changes of the CVT while the secondary control solenoid provides pulley contact pressure. The clutch control solenoid also referred to as the Reverse Control Solenoid controlling clutch apply pressure. This solenoid can prevent clutch engagement in either forward or reverse or both.

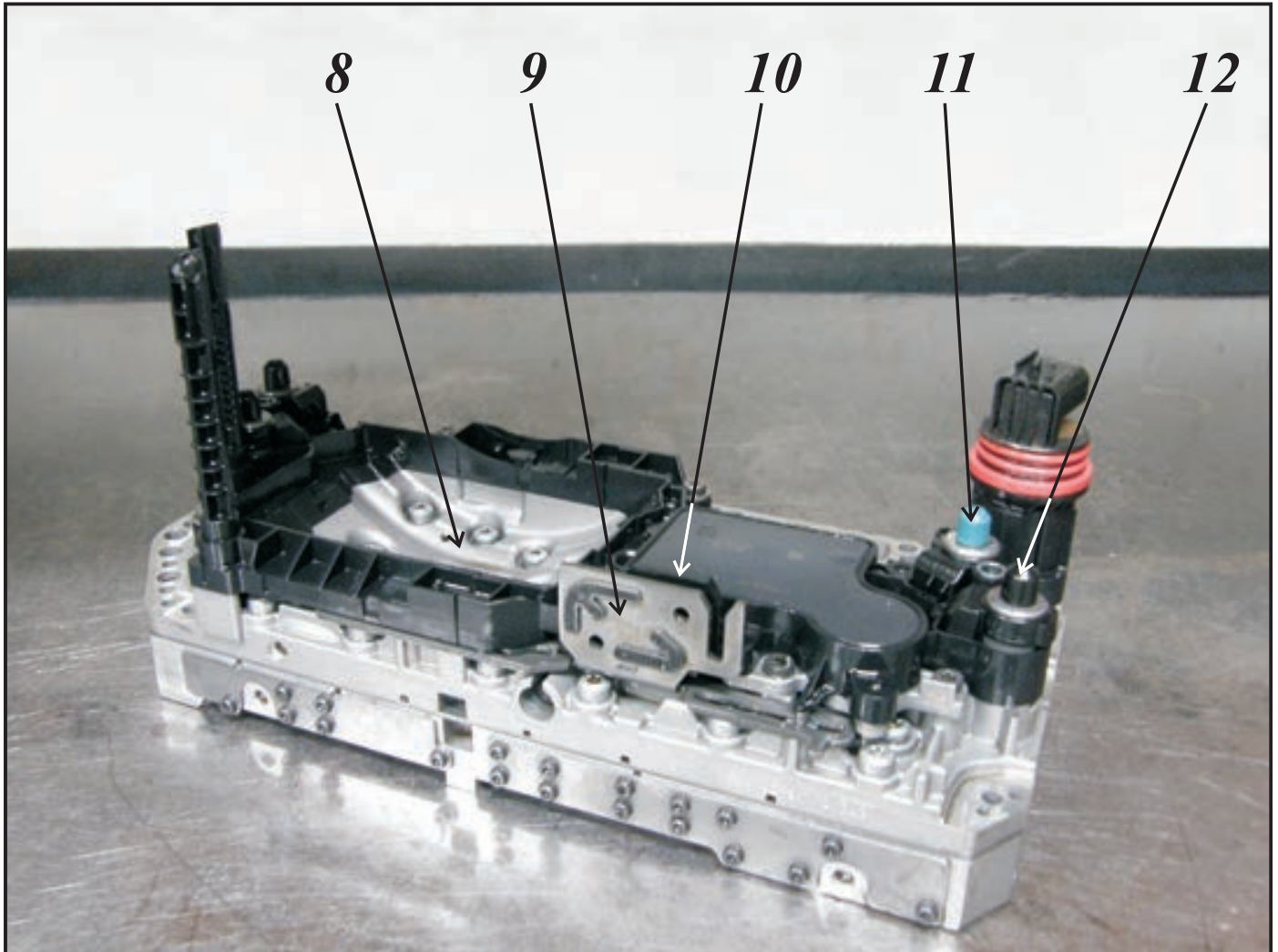


1. Pin 1 - Circuit 31
2. Pin 3 - CAN-C High
3. Pin 4 - Circuit 87
4. Pin 6 - CAN-C Low

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Figure 96

The Electrohydraulic Unit

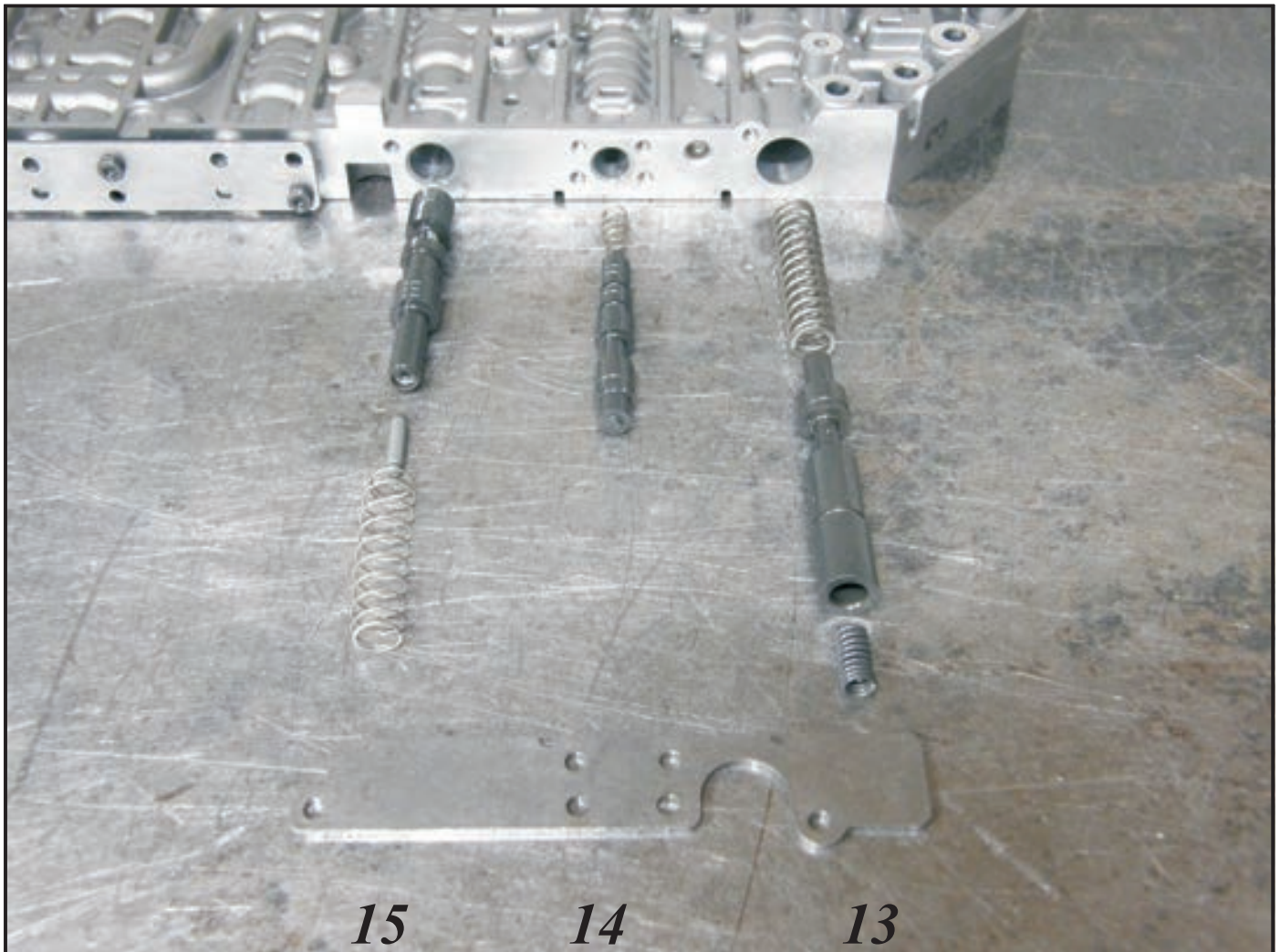


- 8. The Valve Body
- 9. The Selector Lever Valve Magnet Position Sensor Slide Plate
- 10. Selector Lever Range Sensor (Y3/9b1)
- 11. Torque Converter Clutch Control Solenoid (Y3/9y4)
- 12. Secondary Control Solenoid [*Contact Pressure*] (Y3/9y2)

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Figure 97

The Electrohydraulic Unit

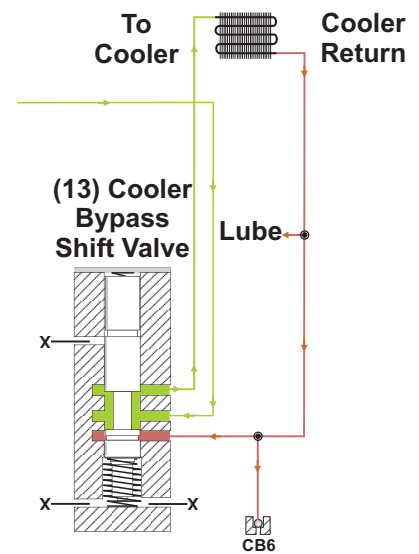


- 13. Cooler bypass shift valve
- 14. Clutch regulating valve
- 15. Primary pressure regulator valve

The valve numbering coincides with Mercedes Systems Description manual.

The cooler bypass shift valve is fitted with a thermal style spring which will expand at a predetermined temperature. At which time it will push the valve into a position causing a reverse flow to the radiator supplying lubrication fluid to the transmission from the cooler return circuit.

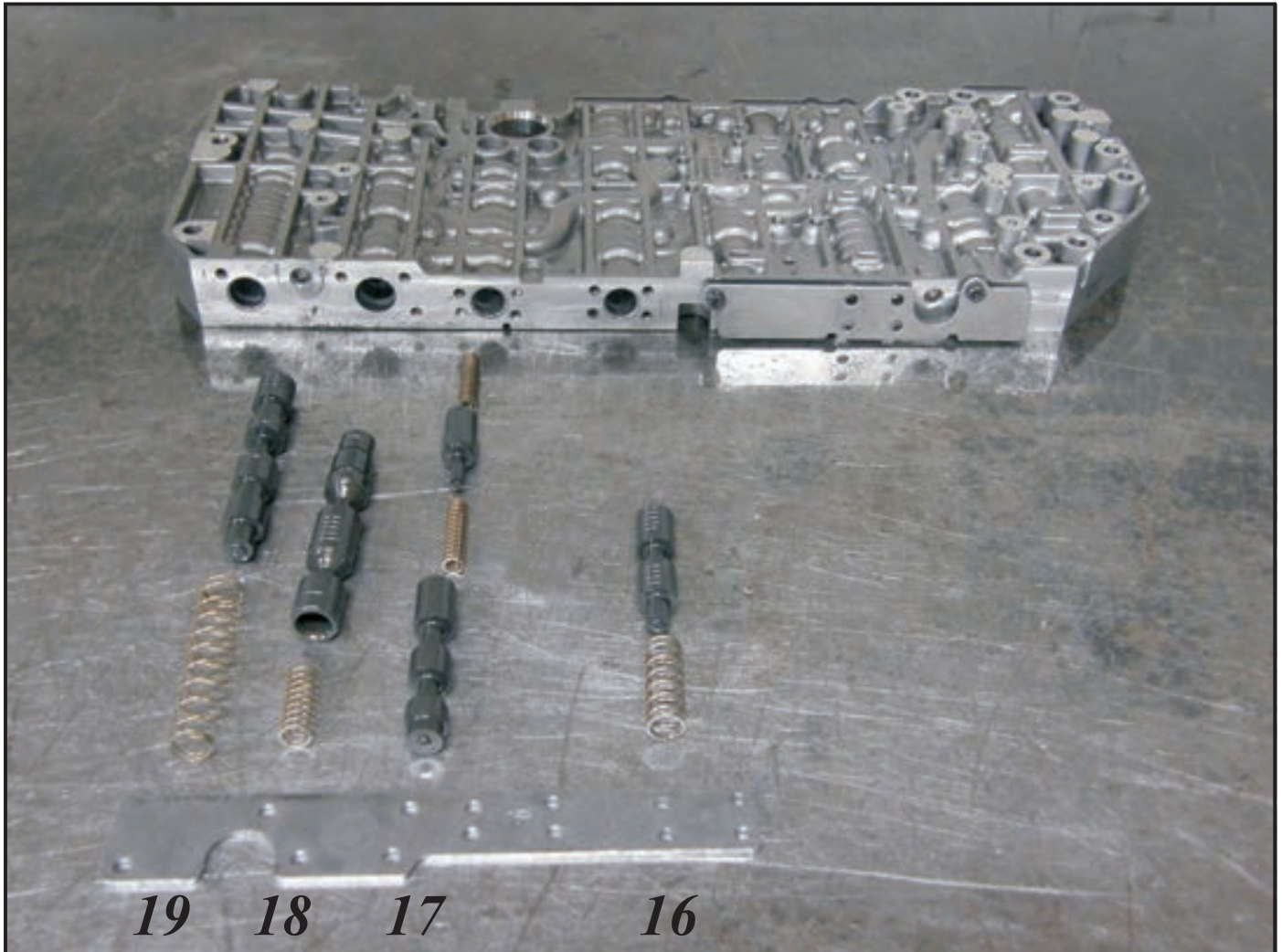
The radiator is also equipped with a thermal bypass valve.



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Figure 98

The Electrohydraulic Unit



- 16. Limp-home shift valve 2
- 17. Auxiliary pressure regulating valve
- 18. Secondary pressure regulating valve
- 19. Limp-home shift valve 1

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Figure 99

The Electrohydraulic Unit



- 20. Lubrication Regulating Valve
- 21. Valve supply regulating valve
- 22. Primary pressure limitation regulating valve
- 23. Torque converter lockup clutch regulating valve

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Figure 100

The Electrohydraulic Unit



- 24. Directional control ball
- 25. Selector lever valve
- 26. Primer check valve

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Figure 101

722.8 Dual-Type Vane-Type Pump Details

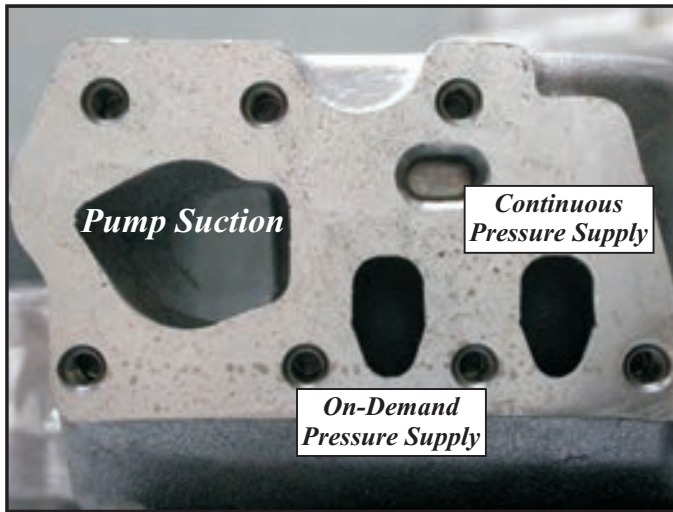


Figure 102

The 722.8 utilizes a dual pipe vane type pump that is gear chain driven. The rotor turns in a double eccentric cylinder resulting in two opposite pressure chambers. This results in the pump having two pressure controlled ports referred to as a part time and full time duct. The full time duct is constantly in operation to supply the transmission with oil. To allow large movements during shift processes, the part time duct is connected to the full time duct. This ensures that there is a sufficient amount of oil during these On-Demand shift processes. Once the part time on demand duct is no longer needed it then connects to the intake port. See figures 102 to 109 for the full time (Continuous Pressure Supply) and the part time (On-Demand Pressure Supply) intake and output porting identification.

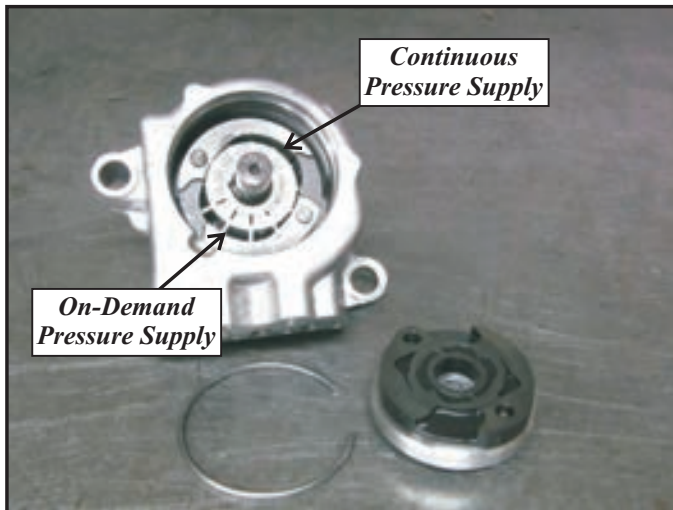


Figure 103

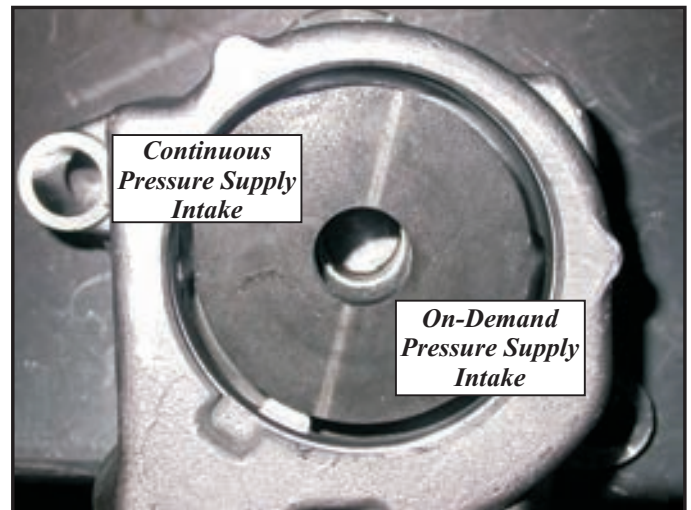


Figure 105

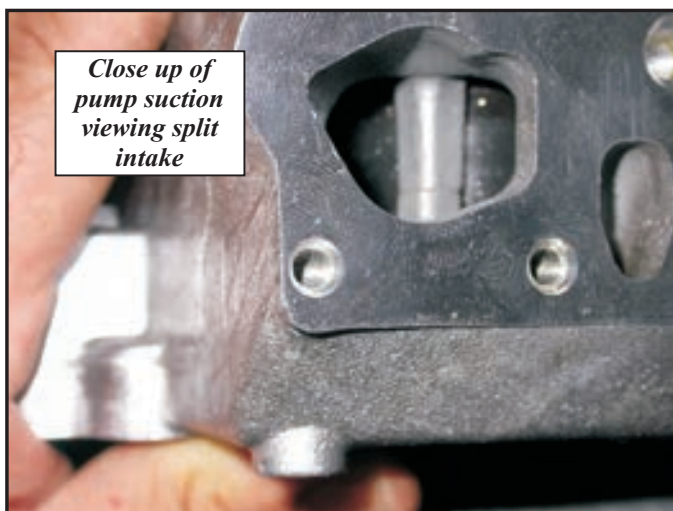


Figure 104

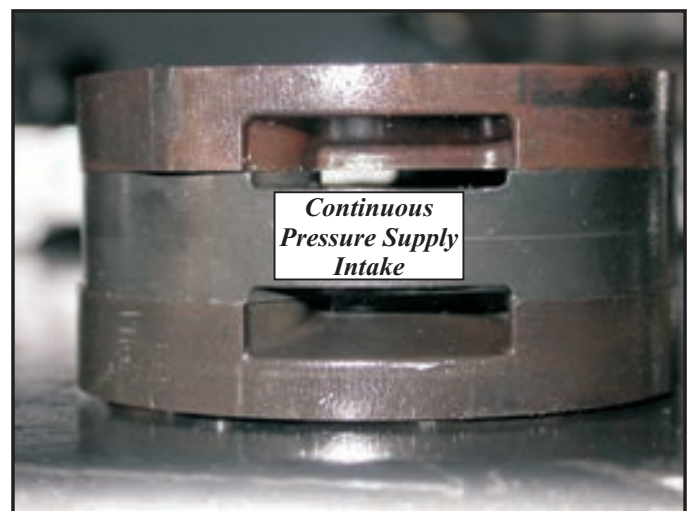


Figure 106

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722.8 Pump Assembly Procedure

The Dual-Type Vane-Type pump consists of a housing, a chain driven shaft, rotor and vanes, a rotor key way pin, a C clip, 3 alignment pins, a bottom plate, vane outer race, top plate, cover and snap ring (figure 110).

The assembly begins by ensuring there is a good bushing and seal in the pump housing for the driven gear shaft (figure 111).

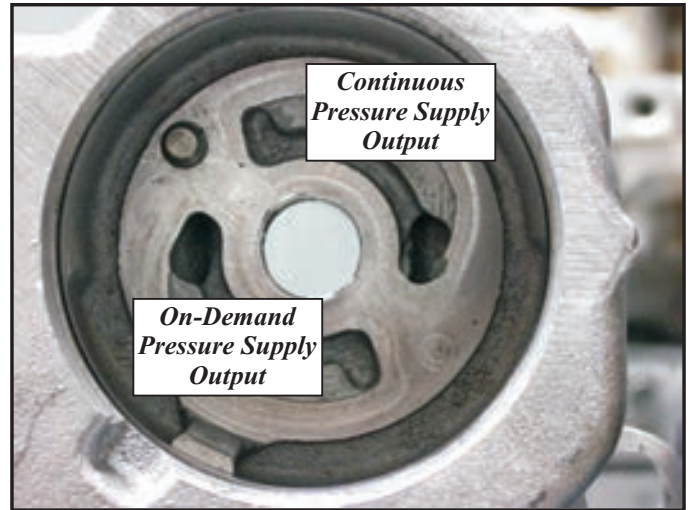


Figure 109



Figure 107



Figure 110

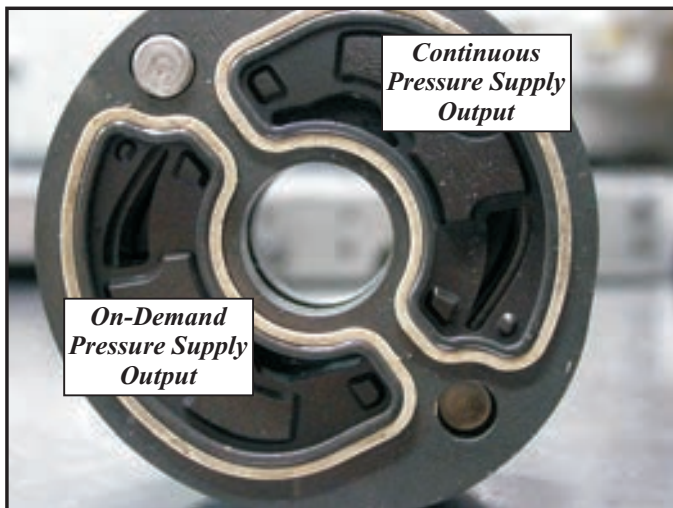


Figure 108



Figure 111

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722.8 Pump Assembly Procedure



Figure 112

Of the 3 alignment pins, 2 are approximately 27.43 mm in length while the 3rd is approximately 21.84 mm. Install a 27.43 mm into the pump housing pocket as seen in figures 113 and 114.

Install the chain driven shaft (figure 115).

Install two new molded beaded seals into the bottom pump plate as seen in figure 116. Place the bottom pump plate into the pump pocket with the seals facing down.

Once in place, install the 2nd 27.43 mm pin as seen in figures 116 and 117.



Figure 113



Figure 115



Figure 114



Figure 116

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722.8 Pump Assembly Procedure

The rotor and vane outer race has an identification dot next to an alignment pin hole as seen in figure 118. This identification dot faces down next to the alignment pin in the 11 o'clock position seen in figure 119.

Rotate the chain driven shaft so that the key way slot is facing upward and install the key way pin (figures 120 and 121).

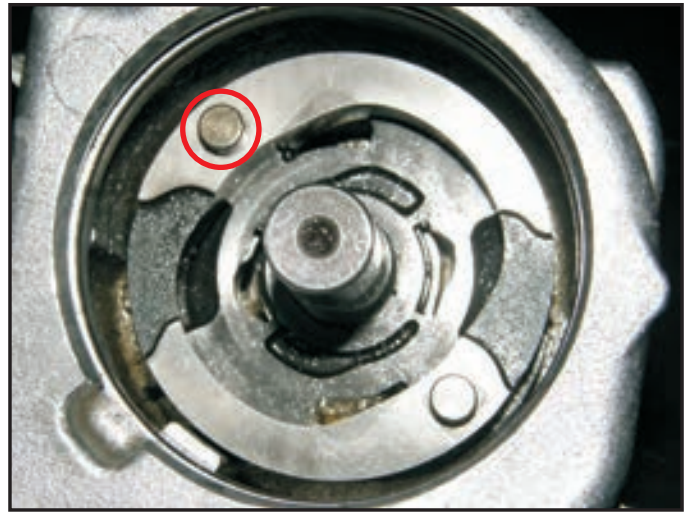


Figure 119



Figure 117



Figure 120

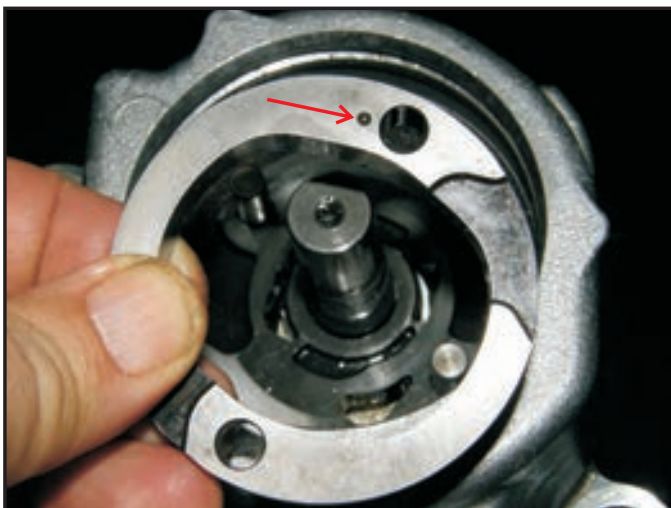


Figure 118



Figure 121

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722.8 Pump Assembly Procedure



Figure 122

Install the rotor and vanes (figure 122) followed by the retaining C clip (figure 123).

At this time the pump top plate can be installed being indexed to the two alignment pins (figures 124 and 125). Both pins should have near the exact same depth once the top plate is in place.

Install a new o'ring in the pump housing for the pump cover (figure 126).



Figure 123



Figure 125



Figure 124



Figure 126

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722.8 Pump Assembly Procedure

Inspect the chain driven shaft support bushing in the cover and replace if necessary (figure 127).

Fix cover to top plate sealing ring in cover with jell (figure 128).

Align the small squar rib caste into the cover with the snap ring access notch in the pump housing as seen in figure 129. This will align the cover's locating pins to the top plate in the pump.

Install the pump cover's retaining snap ring into the housing with one end of the snap ring near the access notch for easier removal (figure 130).



Figure 129

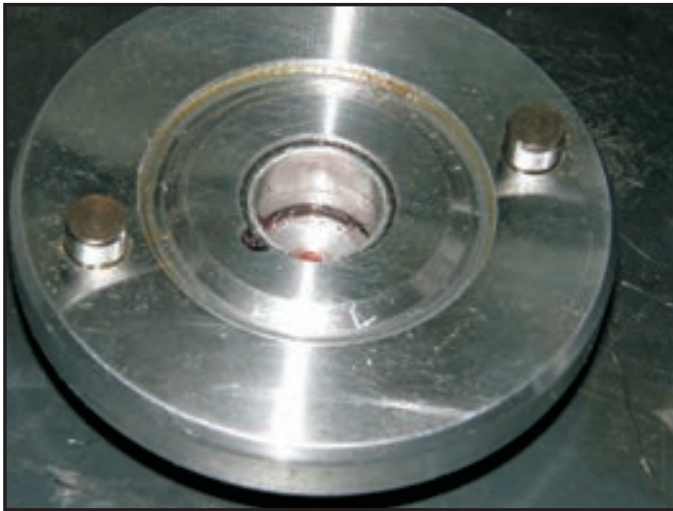


Figure 127

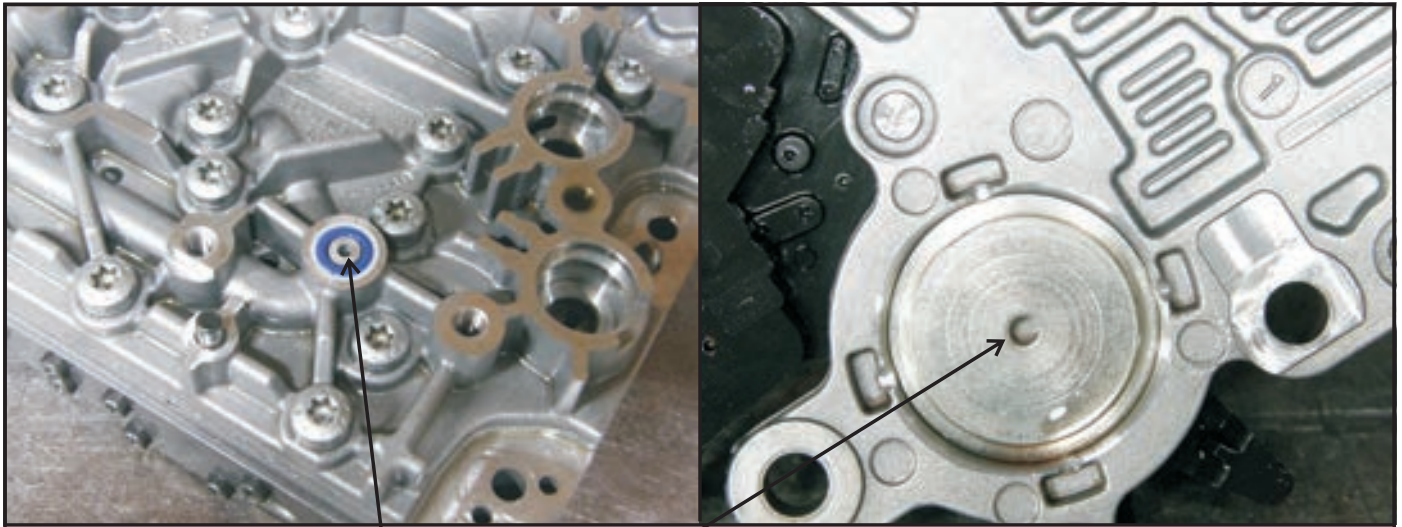


Figure 130

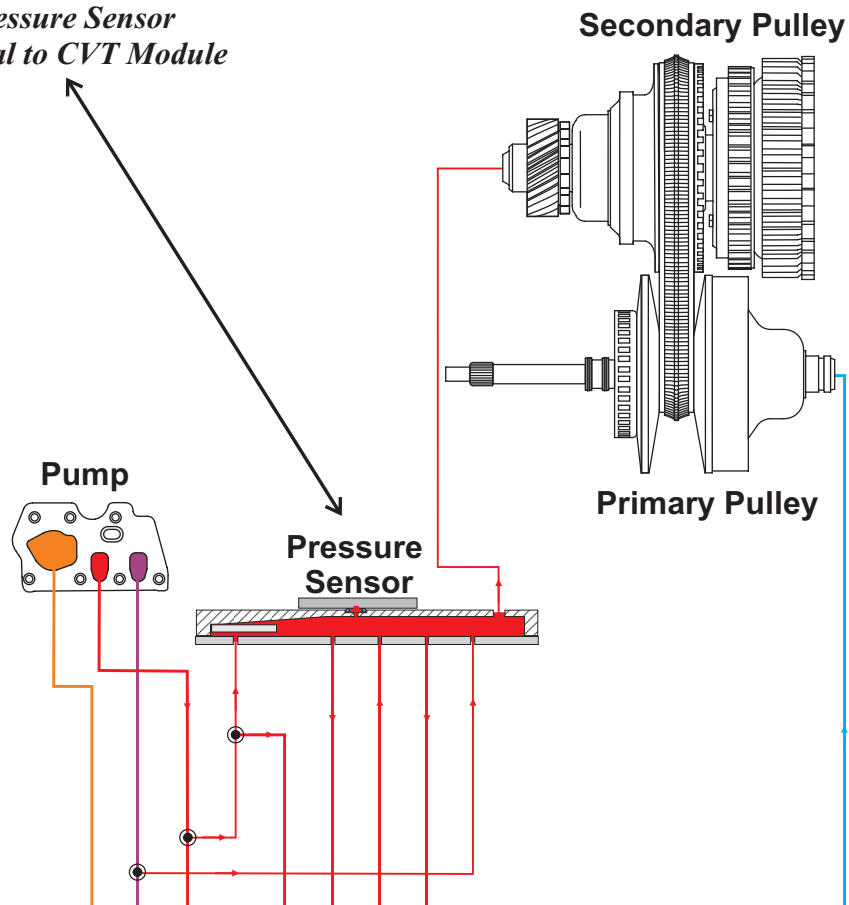


Figure 128

The Electrohydraulic Unit



*Secondary Pulley
Pressure Sensor
Integral to CVT Module*



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Figure 131

The Electrohydraulic Unit

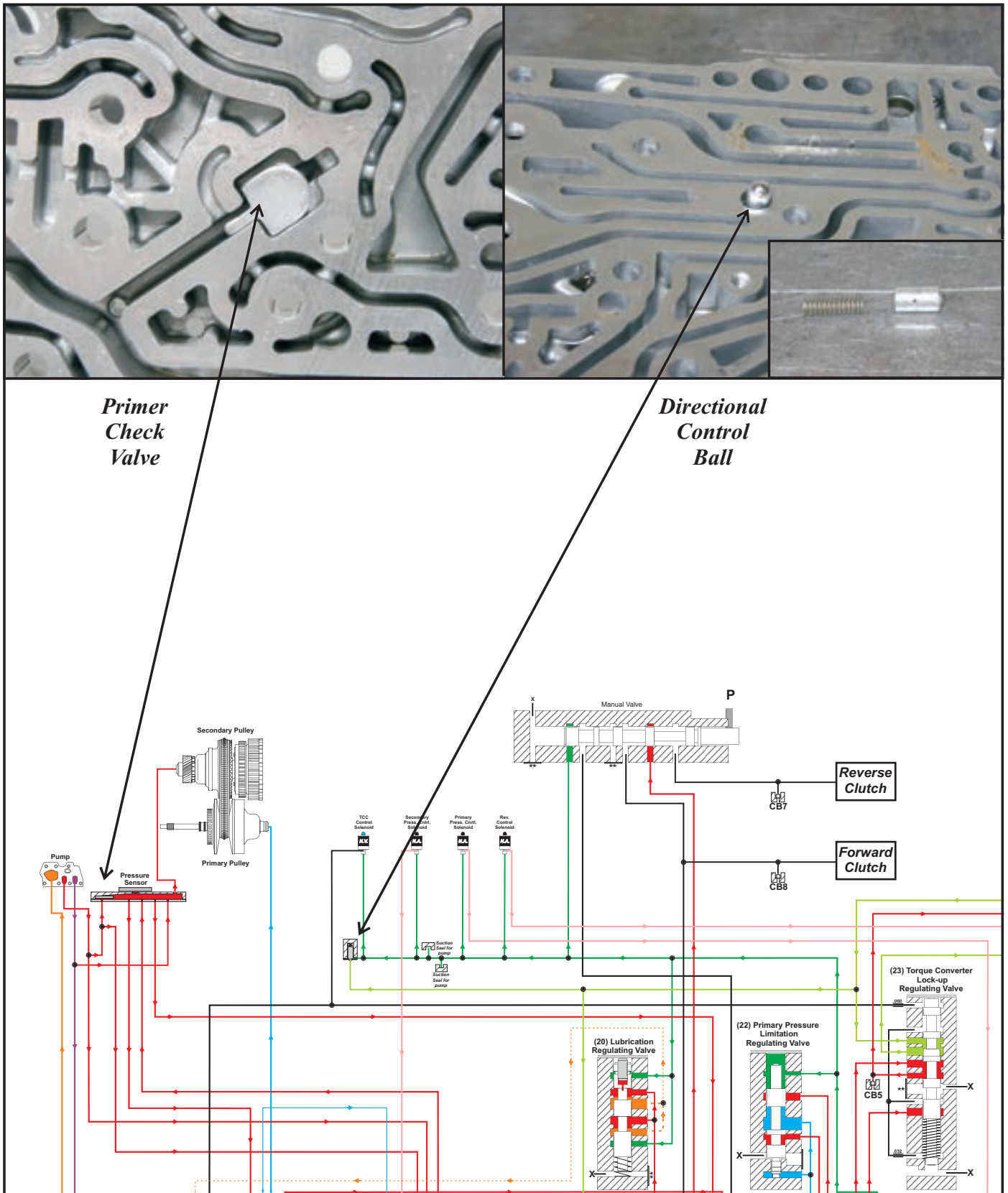


Figure 132

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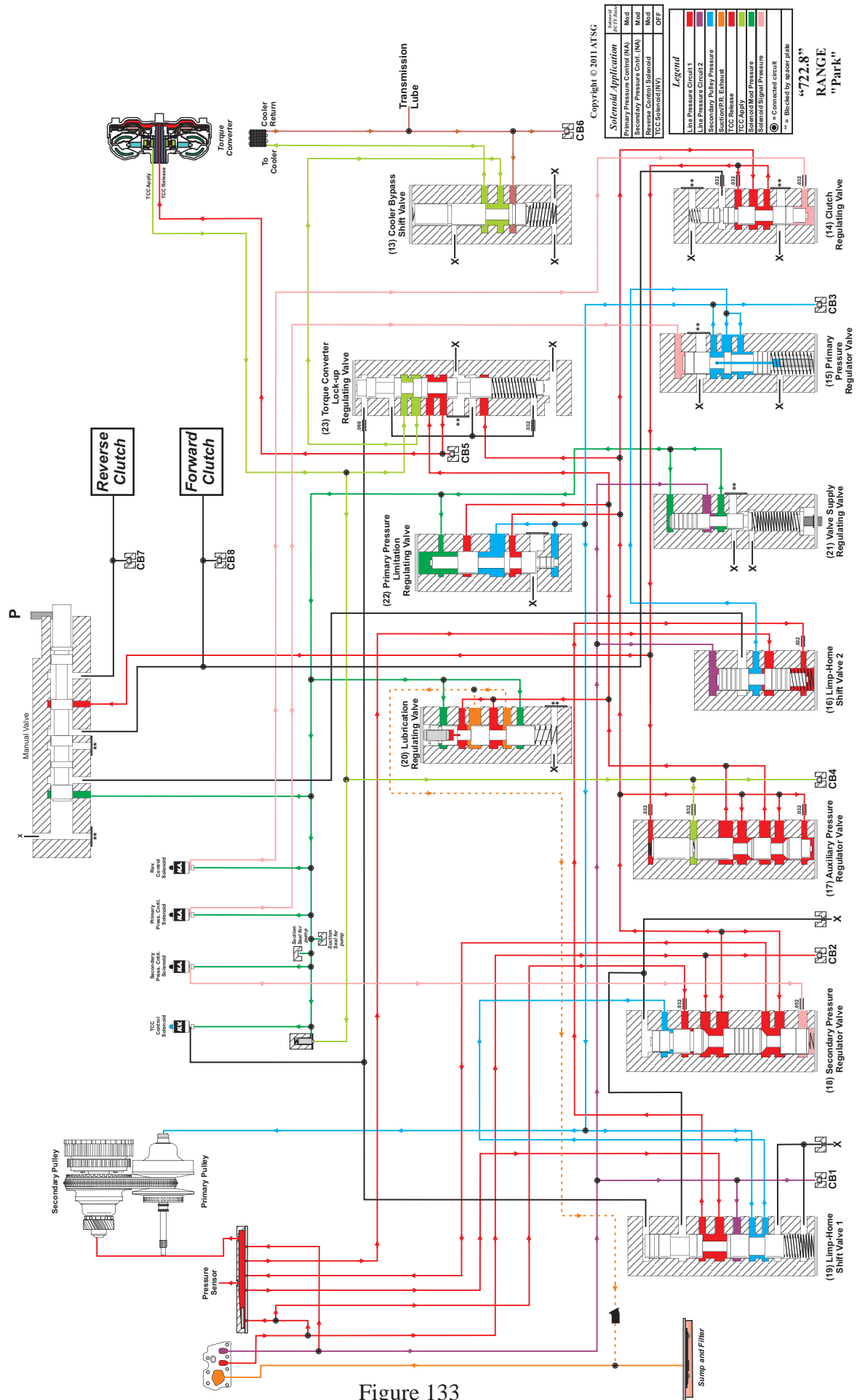


Figure 133

Automatic Transmission Service Group

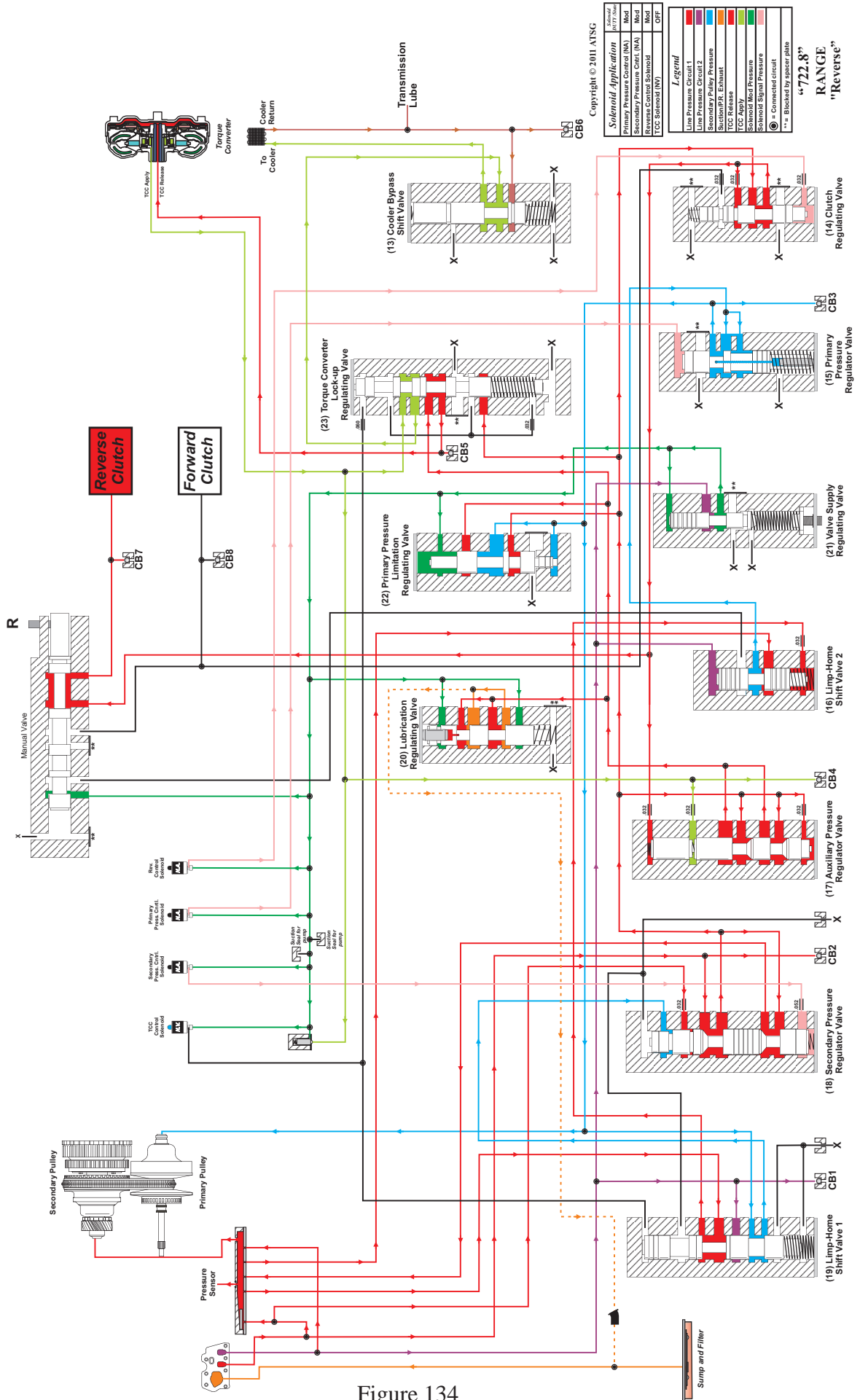


Figure 134

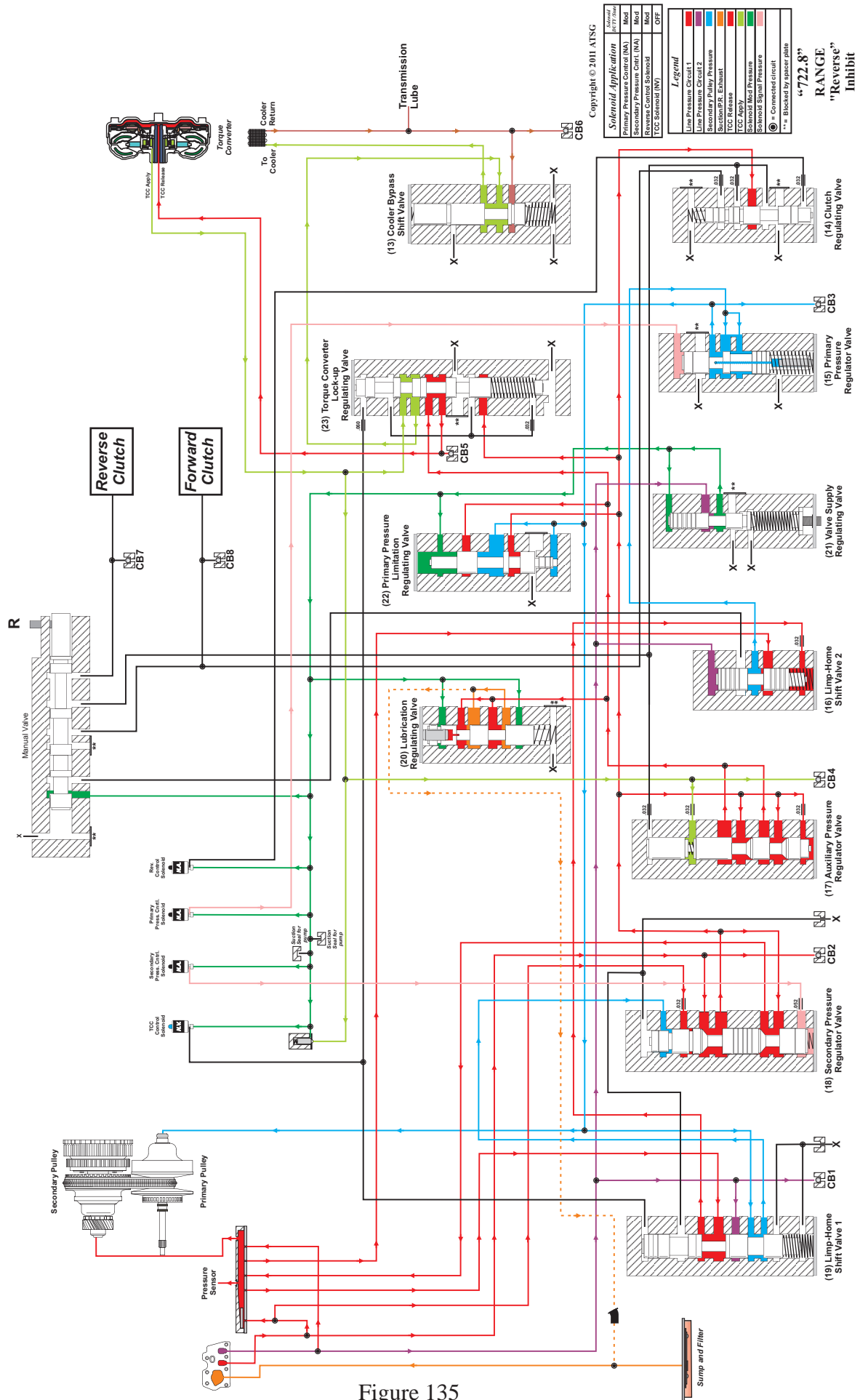


Figure 135

Automatic Transmission Service Group

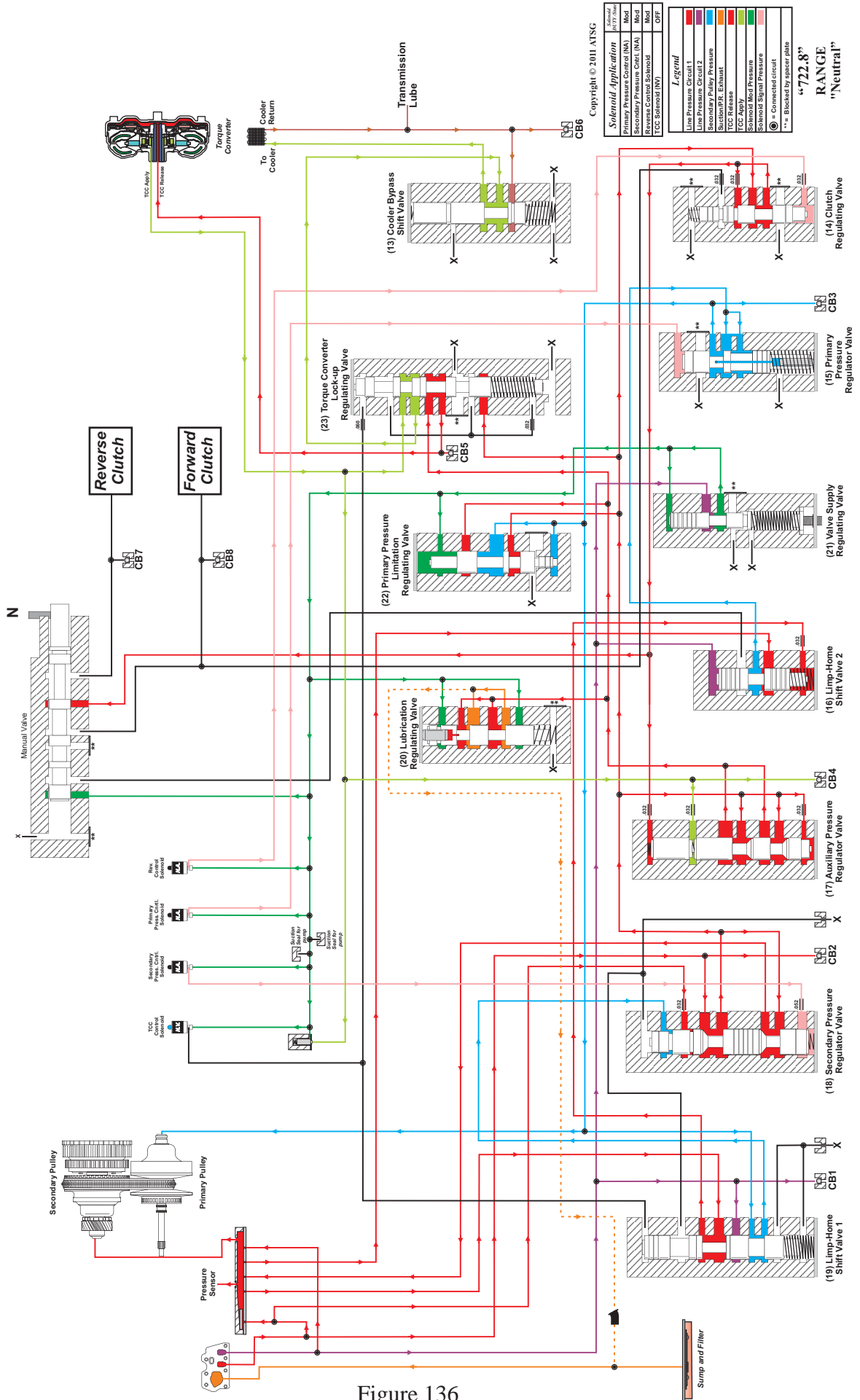
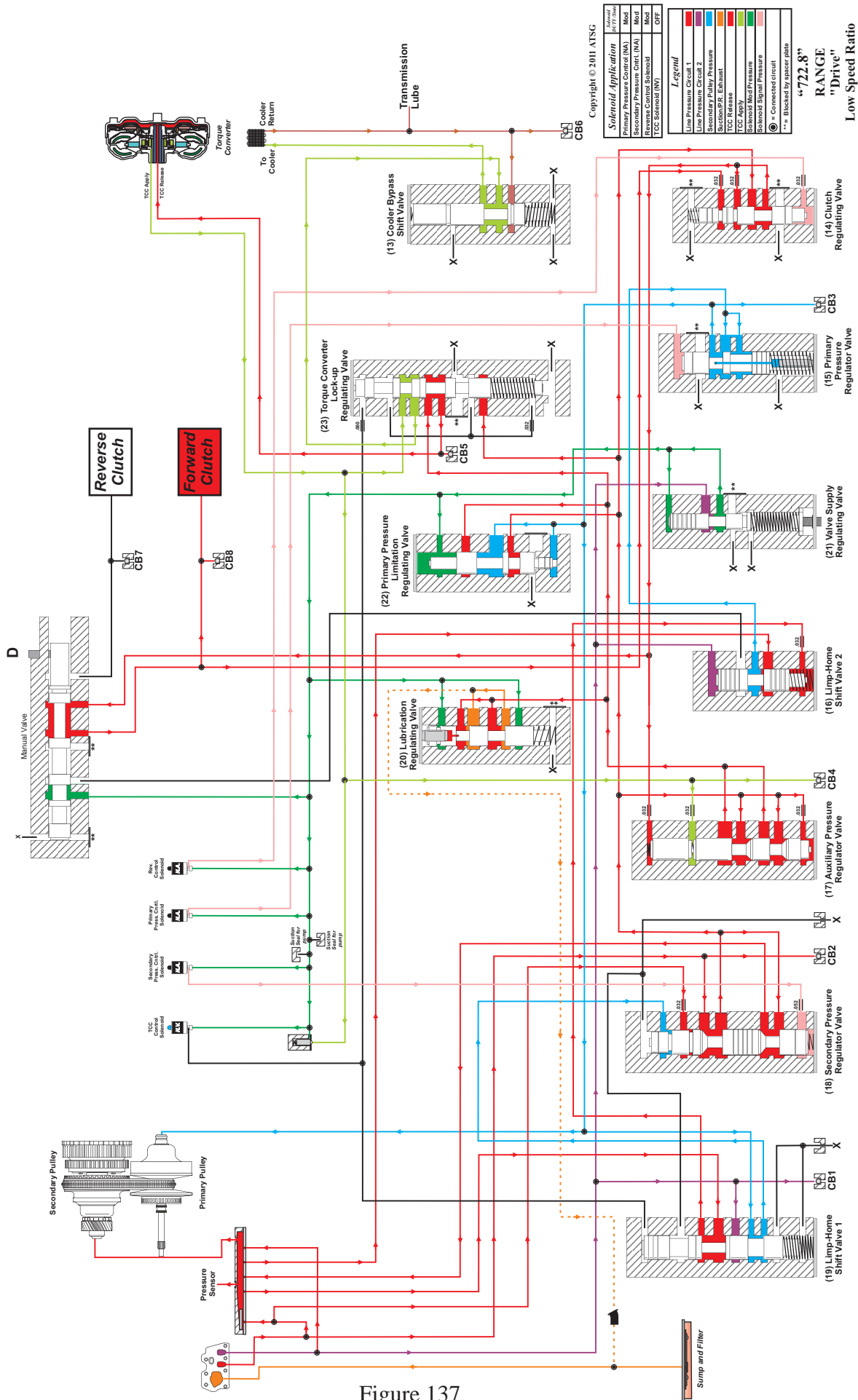


Figure 136

Technical Service Information



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Solenoid Application	Mod	Mod
Lock Pressure Control (NA)	Mod	Mod
Secondary Pressure Control (NA)	Mod	Mod
Reversal Control Solenoid	Mod	Mod
TCC Solenoid (NV)	Mod	OFF

Legend
Lock Pressure Circuit 1
Lock Pressure Circuit 2
Secondary Pulley Pressure
Section P/R Exhaust
TCC Release
TCC Apply
Solenoid Signal Pressure
Connected circuit
Blocked by spacer plate

Figure 137

Automatic Transmission Service Group

722.8⁹
 RANGE "Drive"
 Low Speed Ratio

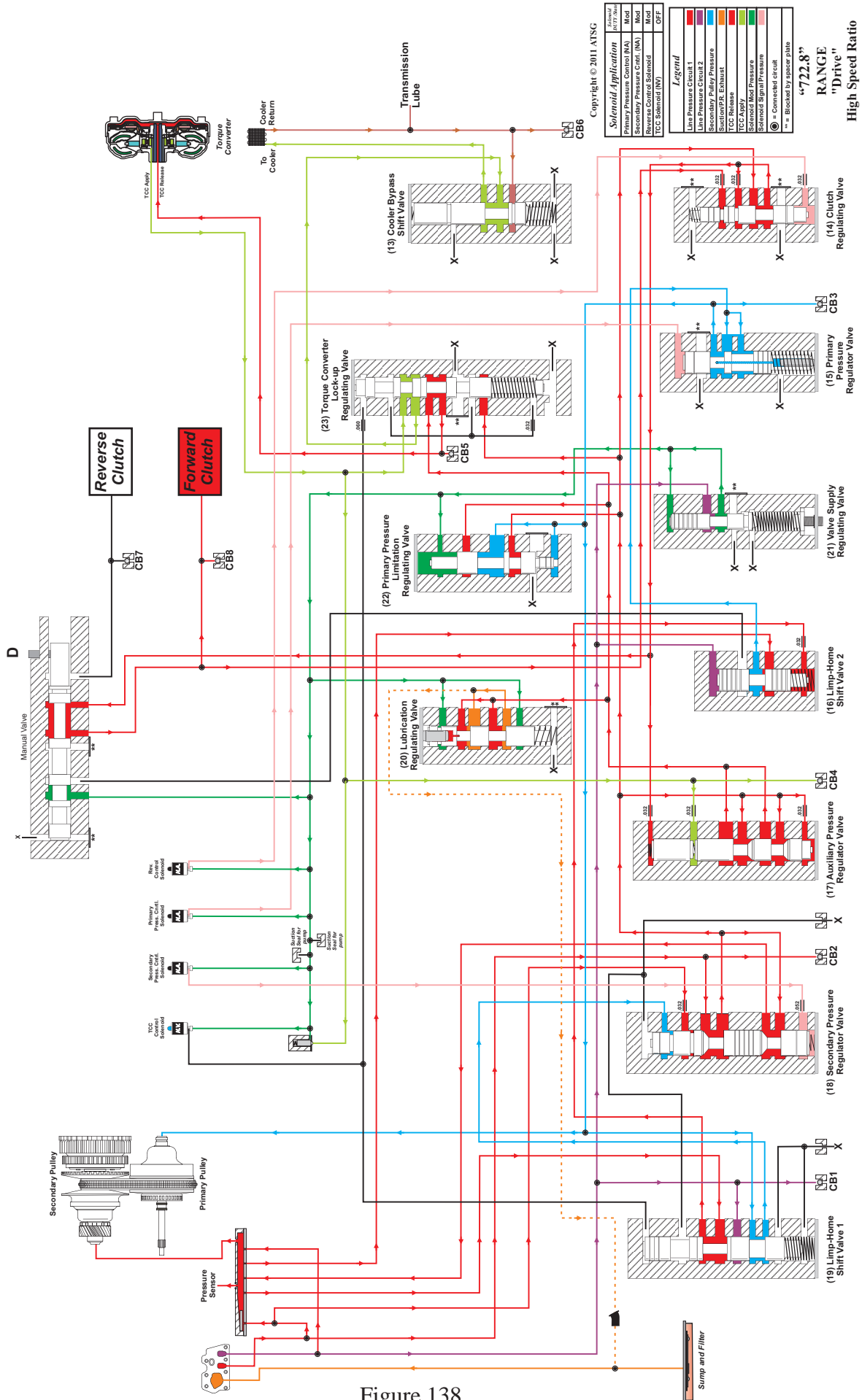
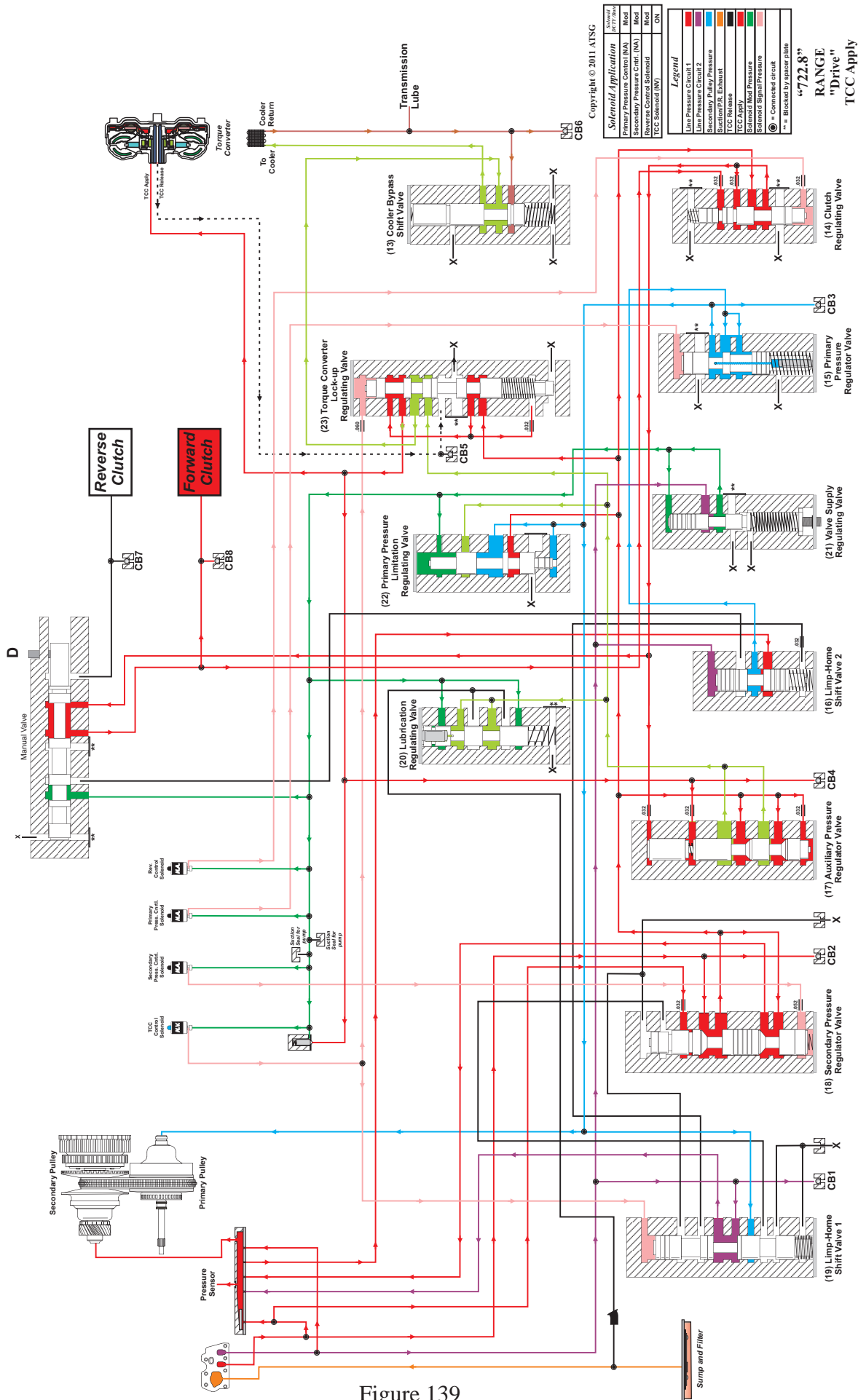


Figure 138



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Solenoid Application	Line Pressure Circuit 1	Line Pressure Circuit 2	Secondary Pulley Pressure	Suction/PRE Exhaust	TCC Apply	Solenoid Mod Pressure	Solenoid Signal Pressure
Primary Pressure Control (NA)	Red	Blue	Green	Yellow	Black	Purple	Orange
Secondary Pressure Ctrl. (NA)	Red	Blue	Green	Yellow	Black	Purple	Orange
Reverse Control Solenoid	Red	Blue	Green	Yellow	Black	Purple	Orange
TCC Solenoid (NV)	Red	Blue	Green	Yellow	Black	Purple	Orange

Legend

- Line Pressure Circuit 1
- Line Pressure Circuit 2
- Secondary Pulley Pressure
- Suction/PRE Exhaust
- TCC Apply
- Solenoid Mod Pressure
- Solenoid Signal Pressure
- ☒ = Connected circuit
- ☒ = Blocked by spacer plate

Mercedes 722.8
"Drive"
TCC Apply

Figure 139

Automatic Transmission Service Group

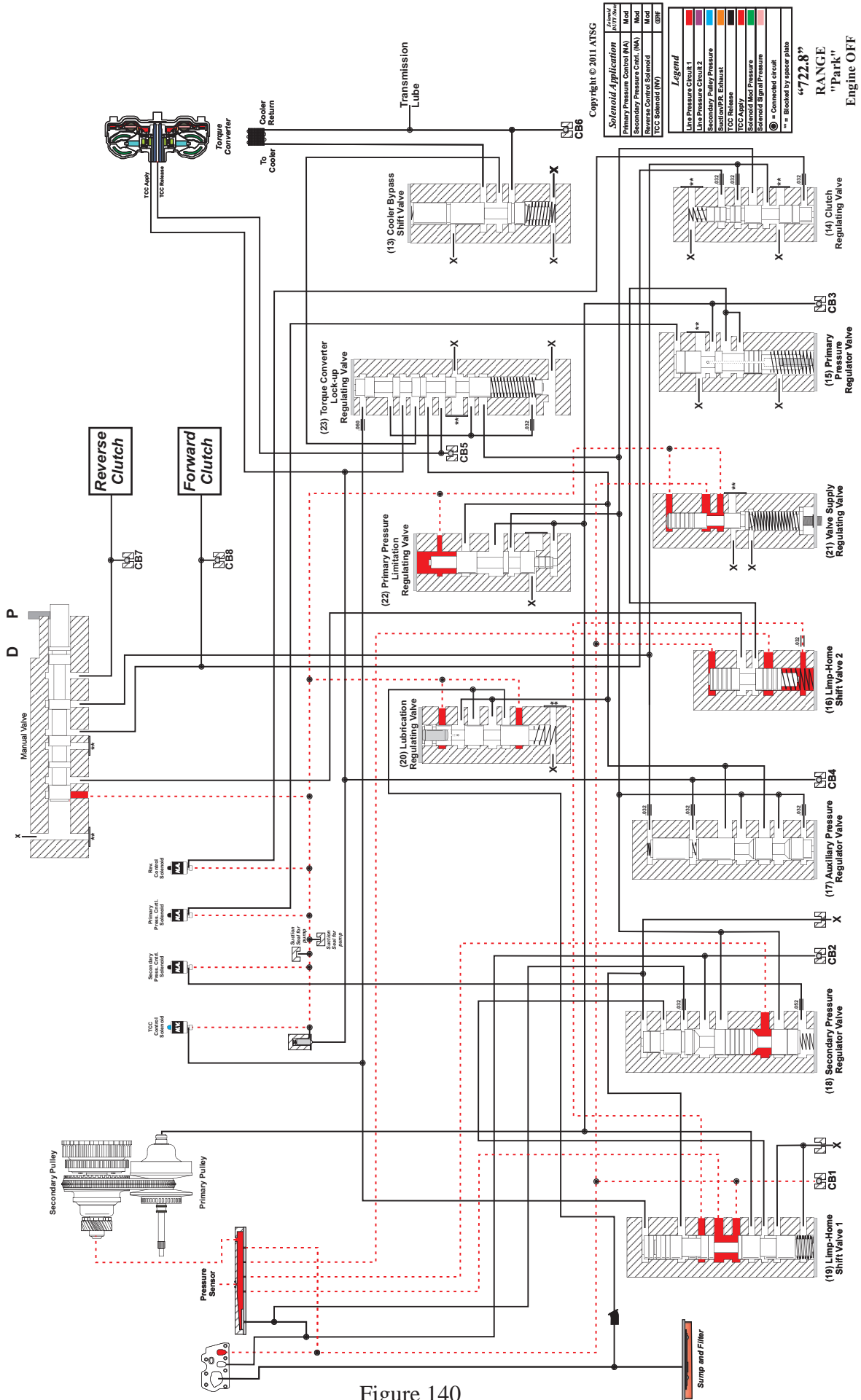


Figure 140

Case Passages Main Case

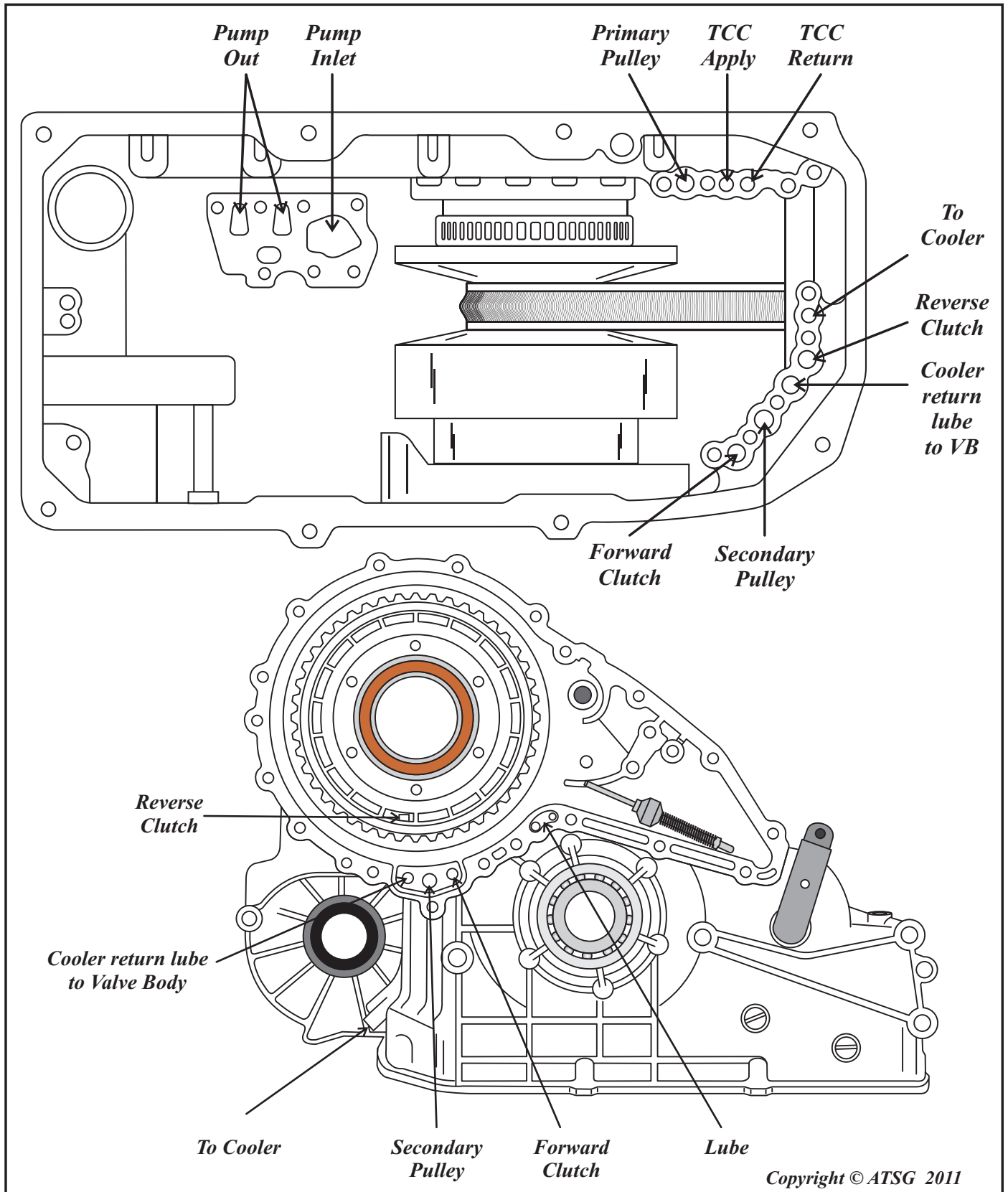
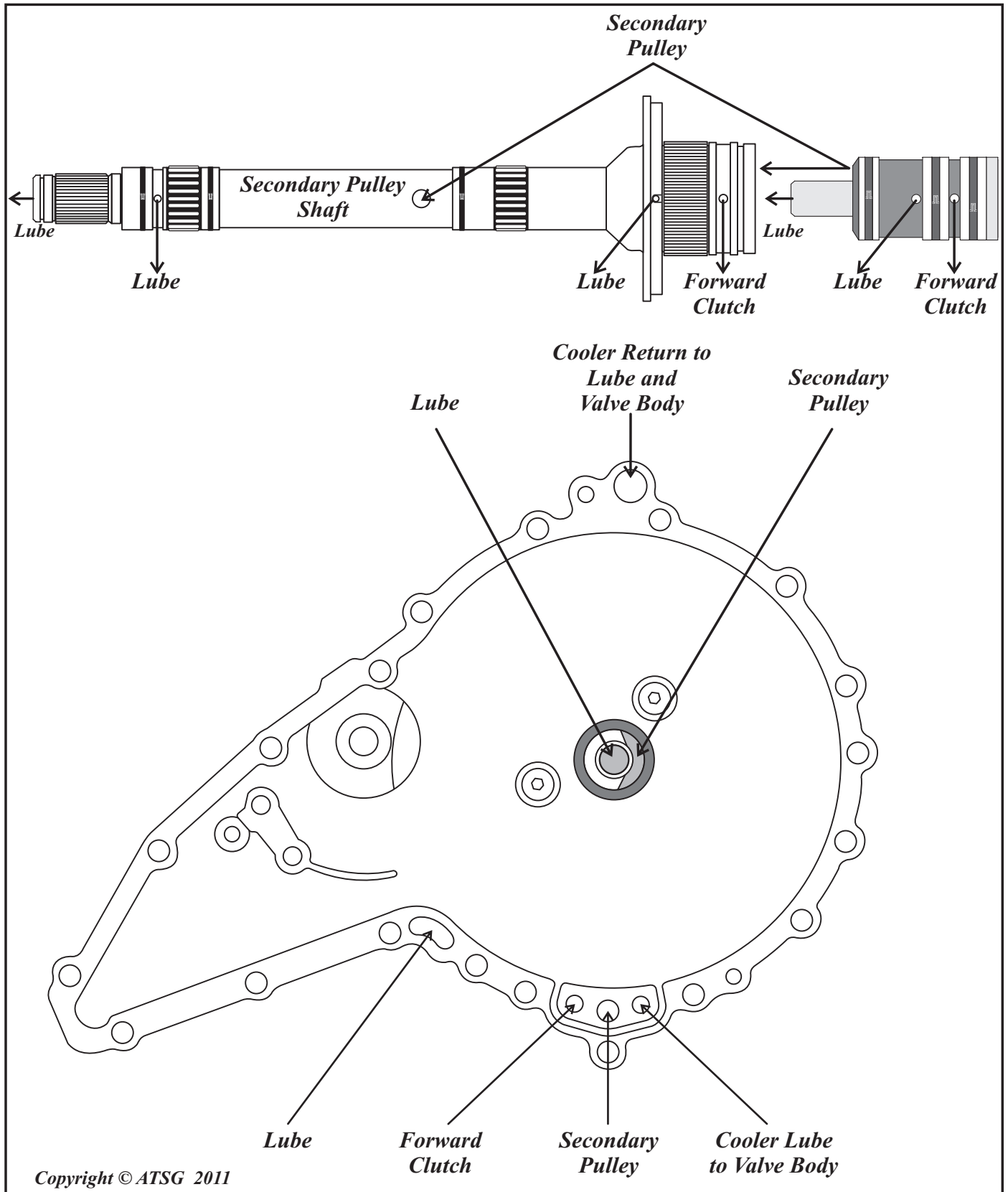


Figure 141

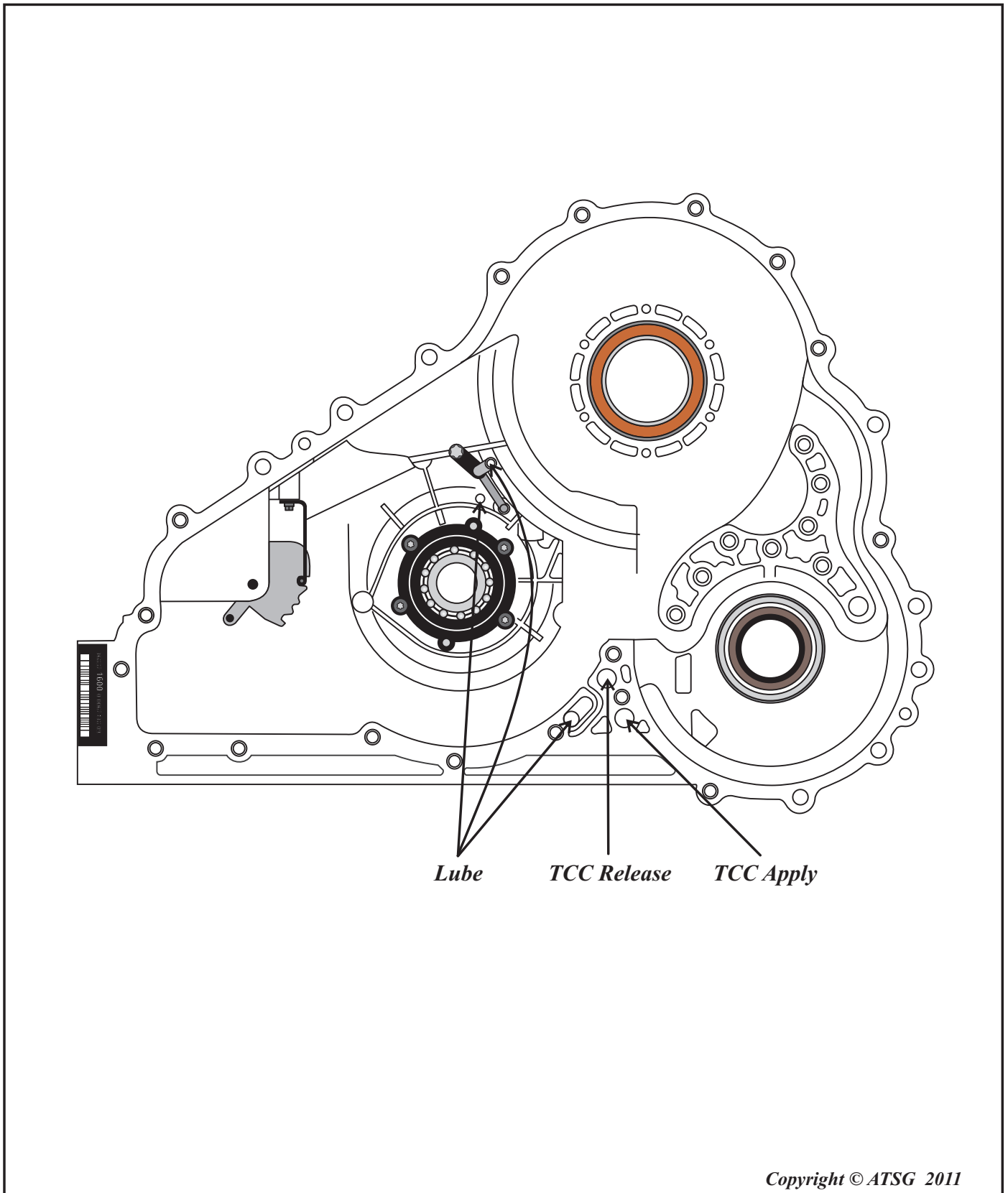
Rear Main Case Cover and Secondary Pulley Shaft Passages



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Figure 142

Case Passages Inside Main Case



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Figure 143

Case Passages Converter Housing

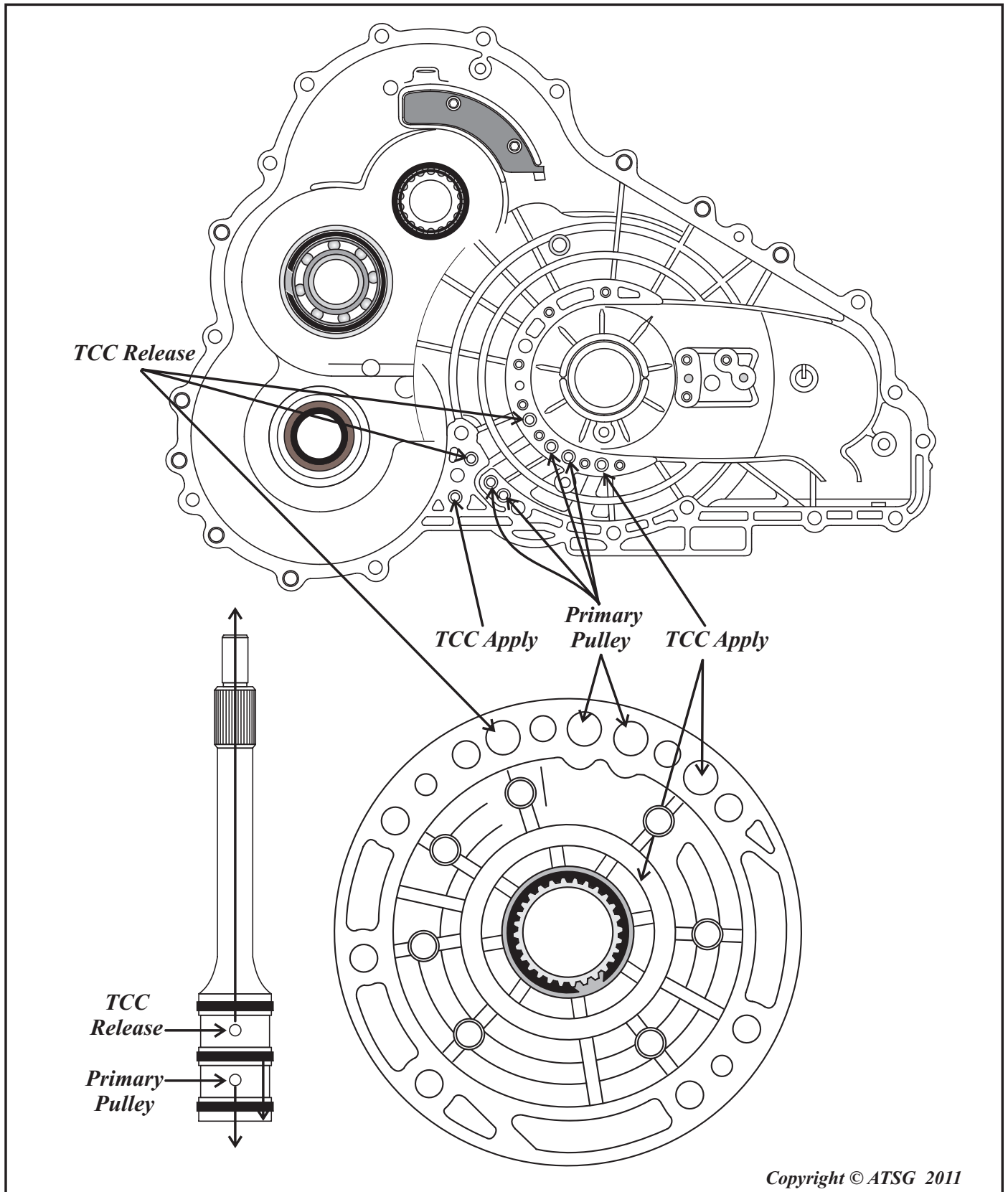


Figure 144

Special Tools

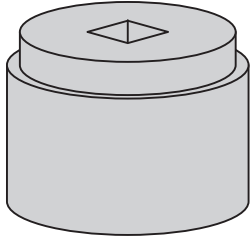
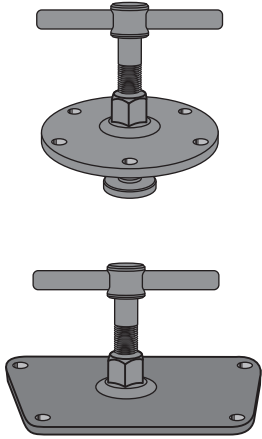

<p>Upper pulley retaining nut socket Mercedes special tool part number 722 589 01 09 00</p>	
<p>Upper and lower pulley removal set from AC - M169.TOOL01</p>	
<p>Fluid Level Dip Stick Mercedes special tool part number 168 589 0121 00</p> <p>Uses special MB 326.20 CVT 0282 Fluid made by Shell.</p> <p>Full fill specification (transmission, converter and remote cooler) - 6.5 liters</p> <p>Full fill specification (transmission, converter and attached cooler) - 6.25 liters</p> <p>Service fill specification pan drop only - 5.7 liters.</p>	 <p><i>Copyright © ATSG 2011</i></p>

Figure 145