



Technical Service Information

SUBARU LINEARTRONIC CVT PRELIMINARY INFORMATION

The Subaru Lineartronic CVT Transmission was introduced in various markets with the start of the 2009 model year. In the United States it was first utilized in the Subaru Legacy and Outback models equipped 2.0L or 2.5L engines after which it spread to the entire Subaru car line that are equipped with these engine applications.

The Lineartronic utilizes a forward and reverse clutch to move the vehicle in each of those directions as well as a transfer clutch to provide all wheel drive. A pulley system consisting of a primary pulley, a secondary pulley and a drive chain provide the various ratio changes while driving. A three element torque converter with a lockup clutch is used to provide fuel economy.

The Lineartronic is fully electronically controlled using a variety of solenoids, sensors and switches. Various driving modes are available to the driver such as Full Automatic, Manual and Temporary Manual Modes. The vehicle is also fitted with steering wheel mounted paddle shifters.

Even though this is a CVT, computer software has been programmed to provide the illusion of a stepped transmission shift feel.

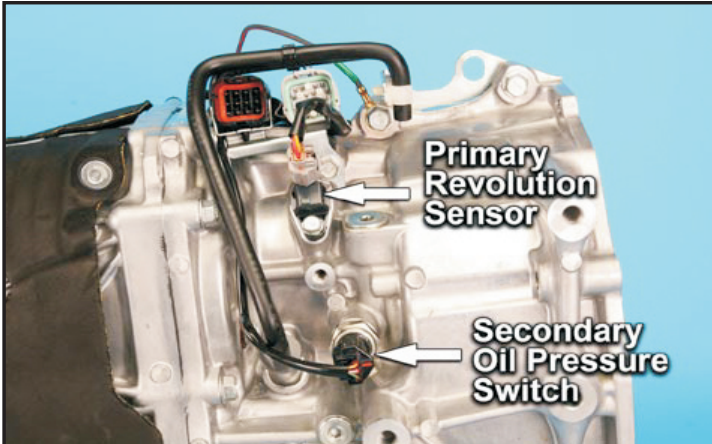
During the time the engine is being started, the rotational speed of the oil pump is not fast enough to provide sufficient oil pressure to engage the input clutch. While this condition exists the transmission provides no resistance to engine start.

After engine speed exceeds 400 rpm, the primary and secondary pulleys are charged and then the input clutch engages. This insures the pulleys cannot move until the tension pressure on the chain has been established. As the input clutch engages, engine power is delivered to the rotational components of the transmission.

As pressure increases, the tension chamber of the primary and secondary pulleys are charged and clamping force on the chain is established. This force insures that the attitude (alignment) of the chain is maintained throughout all gear ratios.

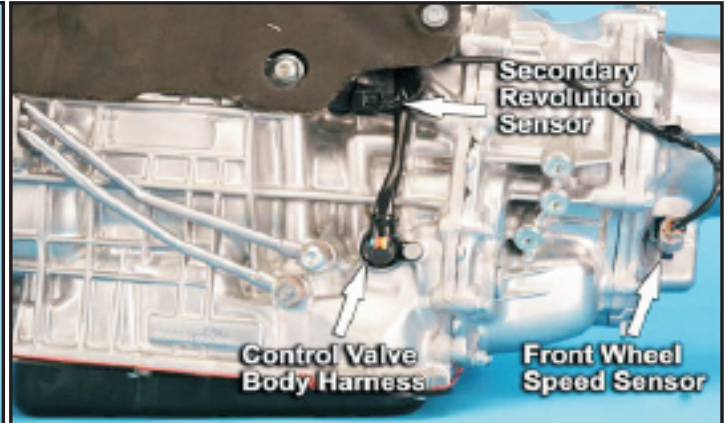
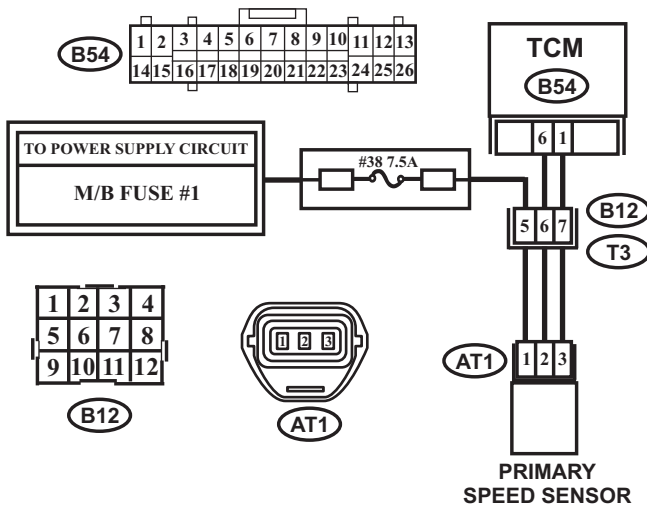
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ELECTRONIC CONTROL SYSTEM



The Primary Revolution Sensor detects the rotational speed of the primary pulley and is a 3 wire type Hall Effect Sensor.

The Secondary Oil Pressure Switch senses oil pressure in the secondary pulley hydraulic circuit.



The Secondary Revolution Sensor detects the rotational speed of the secondary pulley and is a 3 wire type Hall Effect Sensor.

The Front Wheel Speed Sensor Detects front wheel speed & looking at the transfer driven gear which actually makes this the Output Speed Sensor and is a 3 wire Hall Effect type sensor.

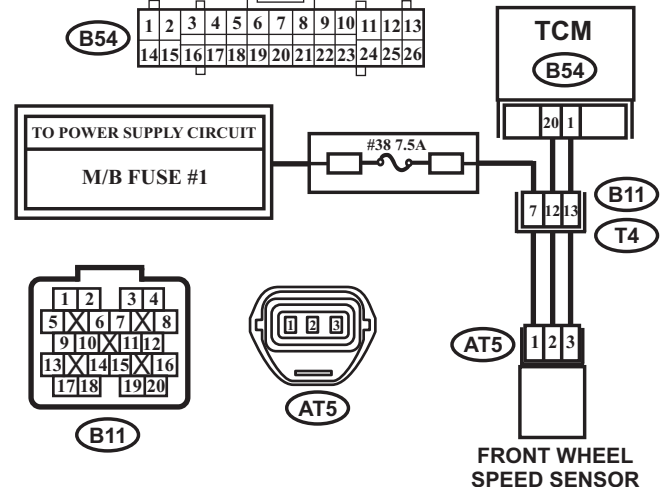
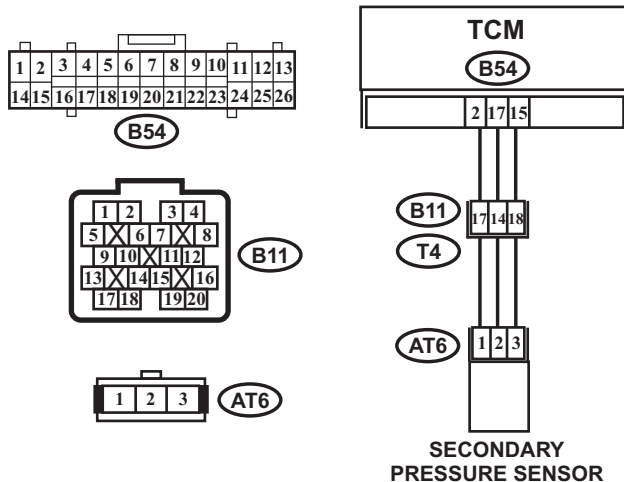
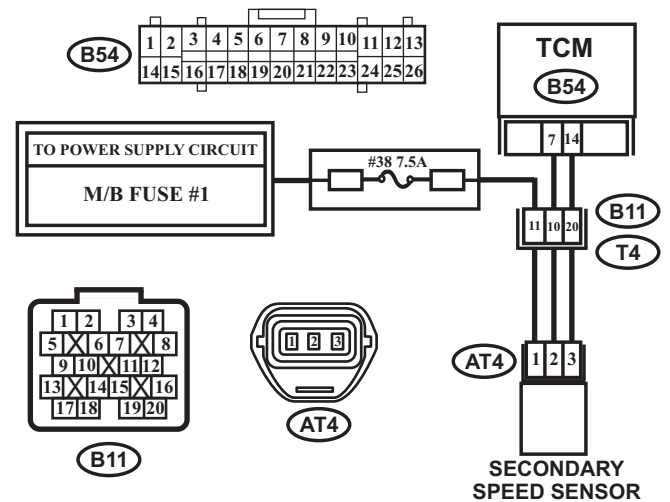


Figure 1

Figure 2

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ELECTRONIC CONTROL SYSTEM

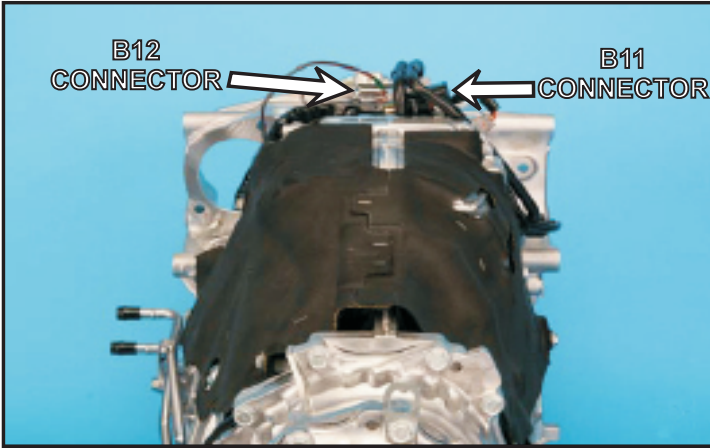
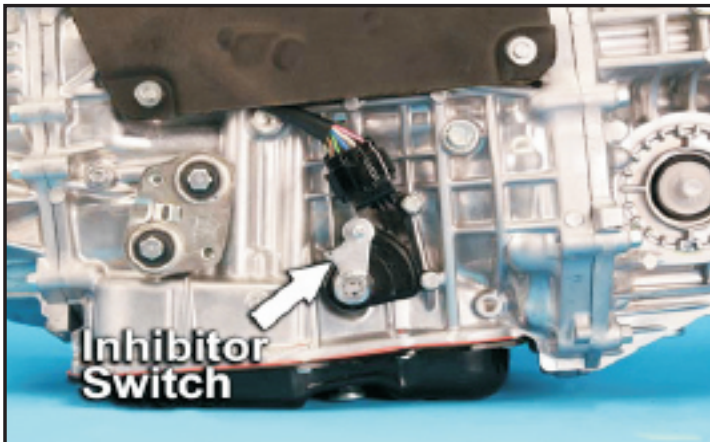


Figure 3



The Inhibitor Switch allows for engine startup in Park & Neutral only as well as gear selection position information to the TCM.

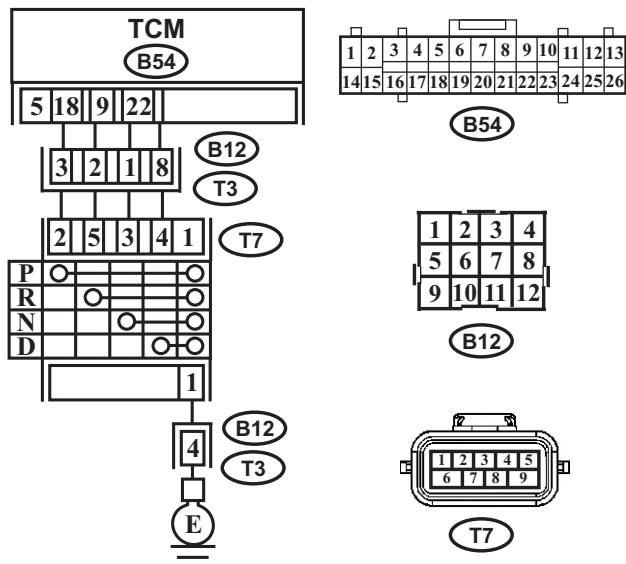


Figure 4

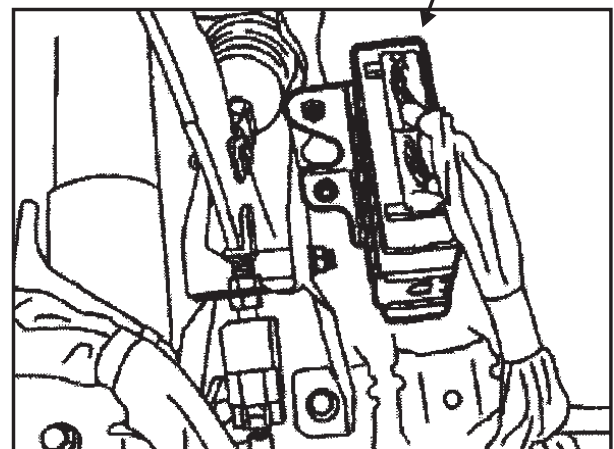
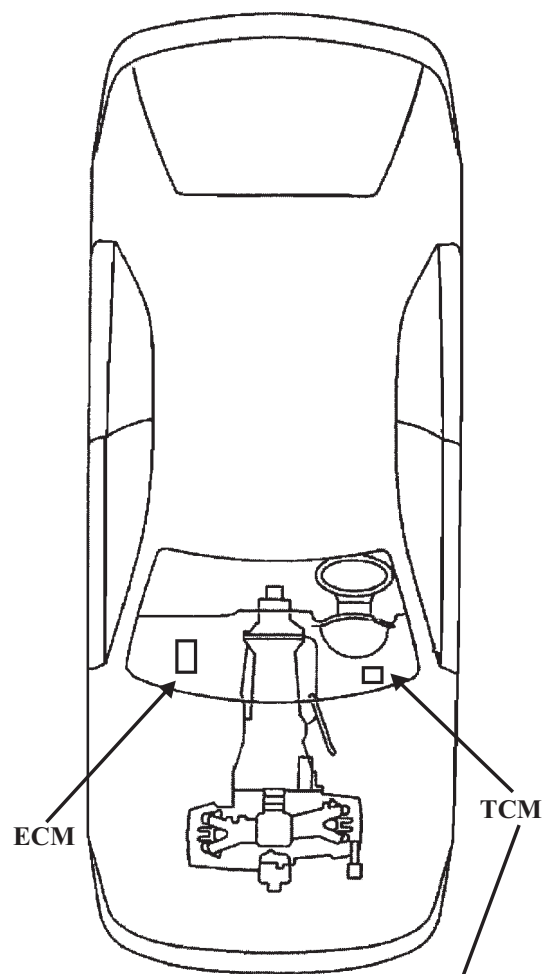


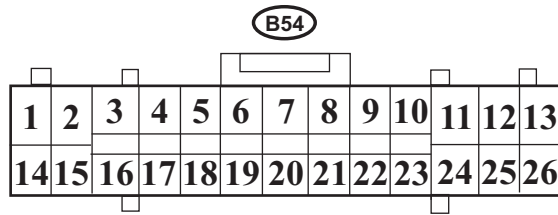
Figure 5



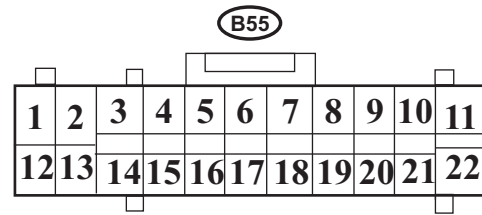
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ELECTRONIC CONTROL SYSTEM

TCM CONNECTOR/TERMINAL IDENTIFICATION



- 1 - TCM Ground
- 2 - Secondary Pressure Sensor Power Supply
- 3 - ATF Temperature Sensor Signal
- 4 - Not Used
- 5 - Inhibitor Switch "Park" Range
- 6 - Primary Speed Sensor Signal
- 7 - Secondary Speed Sensor Signal
- 8 - Not Used
- 9 - Inhibitor Switch "Neutral" Range
- 10 - Not Used
- 11 - Forward & Reverse Linear Solenoid
- 12 - Secondary Linear Solenoid
- 13 - All Wheel Drive Solenoid
- 14 - Secondary Speed Sensor Ground
- 15 - Secondary Pressure Sensor Ground
- 16 - ATF Temperature Sensor Ground
- 17 - Secondary Pressure Sensor Signal
- 18 - Inhibitor Switch "Reverse" Range
- 19 - Not Used
- 20 - Front Wheel Speed Sensor Signal
- 21 - Not Used
- 22 - Inhibitor Switch "Drive" Range
- 23 - Lock-Up Solenoid (On/Off)
- 24 - Primary UP Duty Solenoid
- 25 - Primary DOWN Duty Solenoid
- 26 - Lock-Up Duty Solenoid



- 1 - Backup Power Supply
- 2 - Main Power Supply
- 3 - Not Used
- 4 - Manual Mode Switch
- 5 - Manual Mode UP Switch
- 6 - Not Used
- 7 - Not Used
- 8 - Not Used
- 9 - Not Used
- 10 - Not Used
- 11 - Main Power Supply
- 12 - Not Used
- 13 - Stop Light Switch Input
- 14 - Not Used
- 15 - Not Used
- 16 - Manual Mode DOWN Switch
- 17 - CAN Communication Line (-)
- 18 - CAN Communication Line (+)
- 19 - Data Link Signal
- 20 - Self-Shut Relay
- 21 - Ignition Supply Voltage
- 22 - Main Power Supply

NOTE: Some wiring diagrams may show the B54 connector terminals preceded with an "A".

NOTE: Some wiring diagrams may show the B55 connector terminals preceded with an "B".

Figure 6

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ELECTRONIC CONTROL SYSTEM

LINEARTRONIC CVT WIRING SCHEMATIC

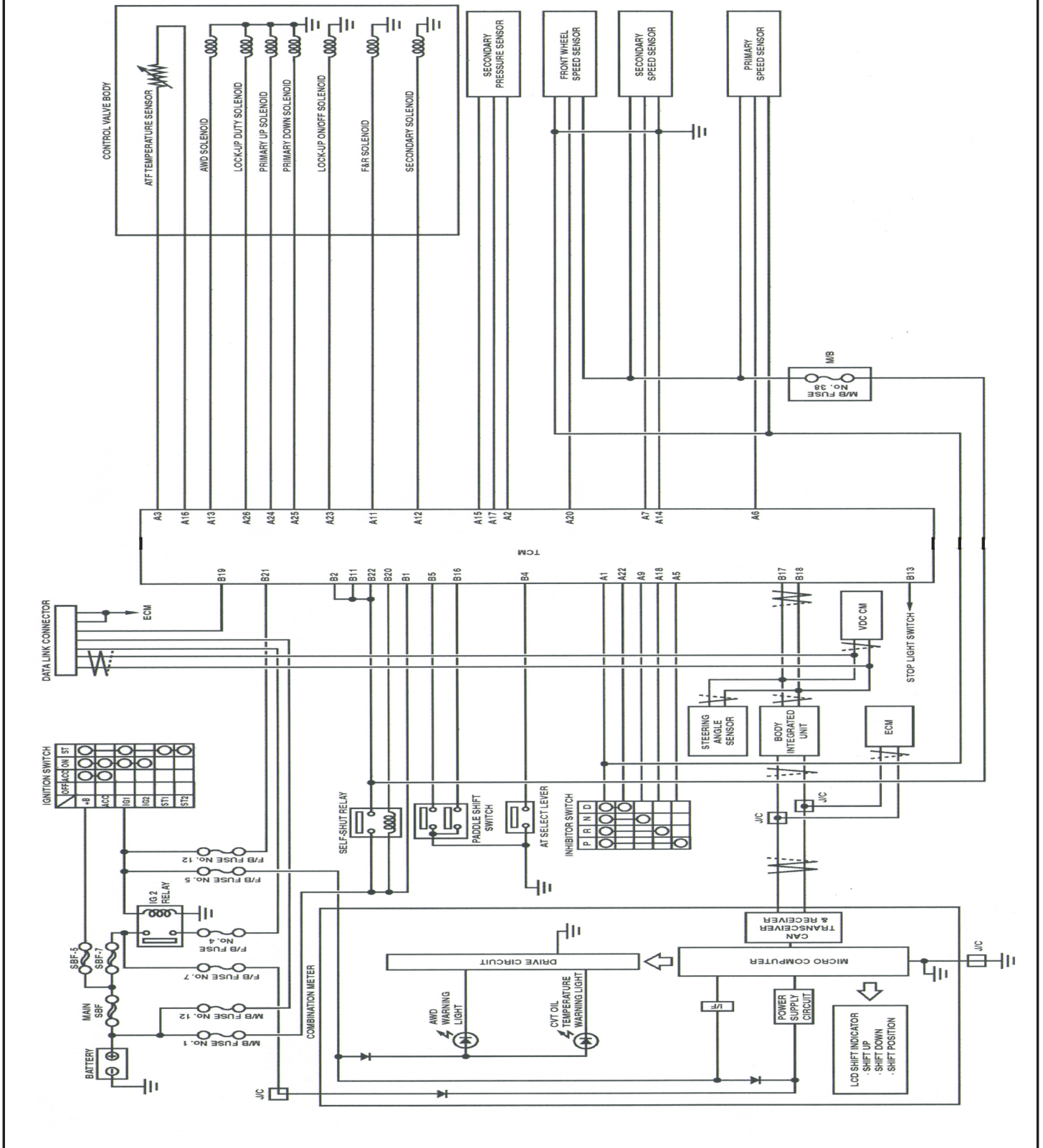
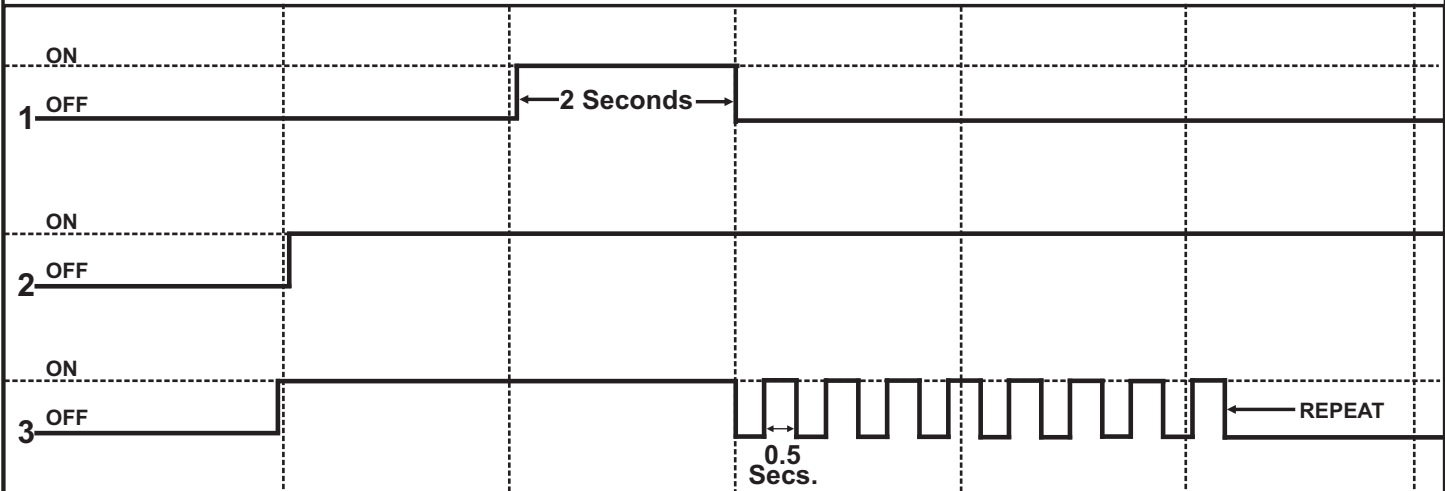
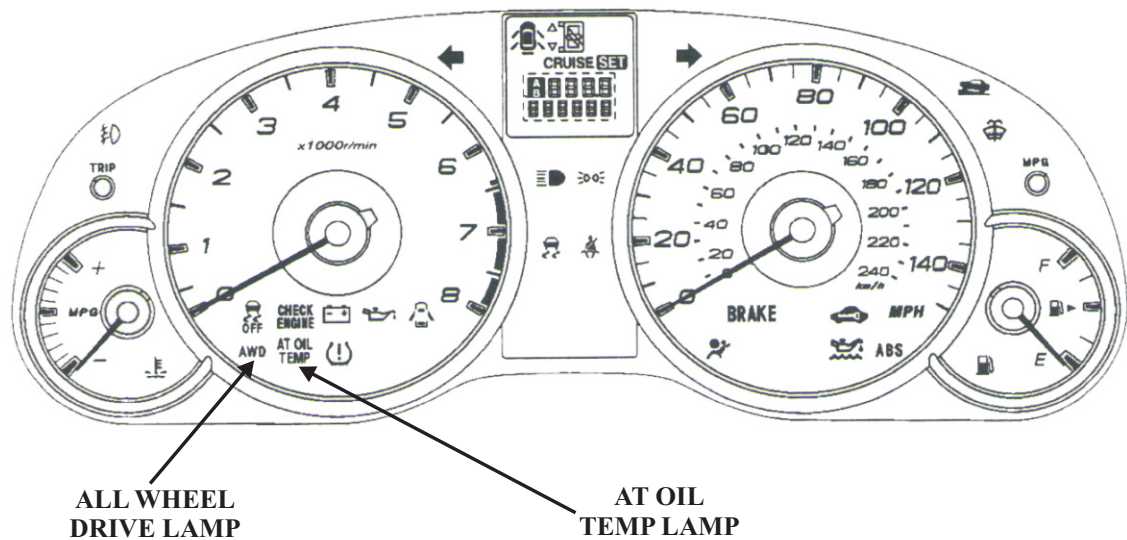


Figure 7

CODE RETRIEVAL PROCEDURE



1 - Normal flash pattern.
2 - ATF temperature too high.
3 - Transmission system malfunction detected.

During normal transmission operation the “AT Oil Temp Lamp” will illuminate when the ignition is turned on and then go out after 2 seconds, see graph above.
If transmission temperature gets too high the “AT Oil Temp Lamp” will turn on and remain on as long as the temperature condition exists, see graph above.
When a fault exists in the transmission control system, the “AT Oil Temp Lamp” will turn on for 2 seconds and then begin to flash continuously, see graph above.

Figure 8



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DIAGNOSTIC PROCEDURES

DTC	DEFINITION	DIAGNOSTIC PROBABILITY
P0705	Transmission Range Sensor Circuit No PRNDL Input	Inhibitor Switch malfunction or short circuit
P0708	AT Range Switch - No Input	Inhibitor Switch malfunction or open circuit
P0712	Transmission Fluid Temperature Sensor Circuit Low	ATF Temperature Sensor is faulty or input signal circuit is shorted
P0713	Transmission Fluid Temperature Sensor Circuit High	ATF Temperature Sensor is faulty or input signal circuit is open
P0719	Brake Switch Circuit Low	Brake Switch malfunction, open or shorted input signal circuit
P0720	Output Speed Sensor Circuit Fault	Front Wheel Speed Sensor is faulty or signal circuit is open or shorted
P0724	Brake Switch Circuit High	Brake Switch malfunction, input signal circuit is shorted
P0730	Gearshift Control Performance Abnormal	Primary Speed Sensor, Secondary Speed Sensor, Control Valve or Chain Malfunction
P0801	Reverse Inhibit Control Circuit Fault	Shift Lock Solenoid is faulty or output signal circuit is open or shorted
P0841	Secondary Oil Pressure Sensor Performance malfunction	Secondary Pressure Sensor faulty or Control Valve malfunction
P0842	Secondary Oil Pressure Sensor Circuit Low	Secondary Pressure Sensor is faulty or input signal circuit is open or shorted
P0843	Secondary Oil Pressure Sensor Circuit High	Secondary Pressure Sensor is faulty or input signal circuit is open or shorted
P0890	AT Self-Shut Relay Circuit Low	Self-Shut Relay Input Circuit open or shorted
P0951	Manual Switch Fault	Manual Mode Switch input signal circuit open or shorted
P0962	Secondary Solenoid Circuit Low	Secondary Solenoid is faulty or solenoid circuit is open or shorted
P0963	Secondary Solenoid Circuit High	Secondary Solenoid is faulty or solenoid circuit is open or shorted
P0965	Forward & Reverse Solenoid Function	Forward & Reverse Solenoid or Control Valve malfunction
P0966	Forward & Reverse Solenoid Circuit Low	Forward & Reverse Solenoid is faulty or solenoid circuit is Shorted
P0967	Forward & Reverse Solenoid Circuit High	Forward & Reverse Solenoid is faulty or solenoid circuit is open
P0970	Transfer Solenoid Circuit Low	AWD Solenoid is Faulty or solenoid circuit is shorted or open.
P0971	Transfer Solenoid Circuit High	AWD Solenoid is Faulty or solenoid circuit is shorted or open
P0973	Primary Solenoid System "A" Circuit Low	Primary "UP" Solenoid is faulty or solenoid circuit is shorted

Figure 9



Technical Service Information

DIAGNOSTIC PROCEDURES

DTC	DEFINITION	DIAGNOSTIC PROBABILITY
P0974	Primary Solenoid System “A” Circuit High	Primary “UP” Solenoid is faulty or solenoid circuit is open or shorted
P0976	Primary Solenoid System “B” Circuit Low	Primary “DOWN” Solenoid is faulty or solenoid circuit is open or shorted
P0977	Primary Solenoid System “B” Circuit High	Primary “DOWN” Solenoid is faulty or solenoid circuit is open or shorted
P1718	AT CAN Communication Circuit Fault	CAN communication circuit is open or shorted or ECM, ABS/VDCCM CAN communication error
P1724	AT EEPROM Error	AT EEPROM malfunction
P1725	AT Body System CAN Communication Error	Combination Meter, A/C, Body Integrated Unit CAN communication error
P2746	Primary Pulley Revolution Sensor Circuit fault	Primary Speed Sensor signal circuit is open or shorted
P2750	Secondary Pulley Revolution Sensor Circuit Fault	Secondary Speed Sensor input signal circuit open or shorted
P2762	Lock-Up Duty Cycle Solenoid Malfunction	Lock-Up Duty Cycle Solenoid, Lock-Up Clutch or Control Valve malfunction
P2763	Lock-Up Duty Cycle Solenoid Circuit High	Lock-Up Duty Cycle Solenoid circuit is shorted or open
P2764	Lock-Up Duty Cycle Solenoid Circuit Low	Lock-Up Duty Cycle Solenoid circuit is shorted or open
P2769	Lock-Up On/Off Solenoid Circuit Low	Lock-Up On/Off Solenoid circuit is shorted or open
P2770	Lock-Up On/Off Solenoid Circuit High	Lock-Up On/Off Solenoid circuit is shorted or open

Figure 10



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DIAGNOSTIC PROCEDURES

AT LEARNING

Whenever the TCM or transmission is repaired or replaced or the valve body has been replaced, the TCM will require an AT Learn procedure as follows:

Preparation For Learning:

- 1 - Bring transmission temperature to 40-65°C (104-149°F) as displayed by the scan tool.
- 2 - Place shift lever into the “P” position.
- 3 - Apply electronic parking brake.
- 4 - Raise vehicle on hoist just enough for tires to clear the ground.
- 5 - Make certain scan tool is still connected to the data link connector.
- 6 - Turn ignition switch ON.
- 7 - Turn off all electrical load devices such as A/C, headlamps, etc.

Perform AT Learn:

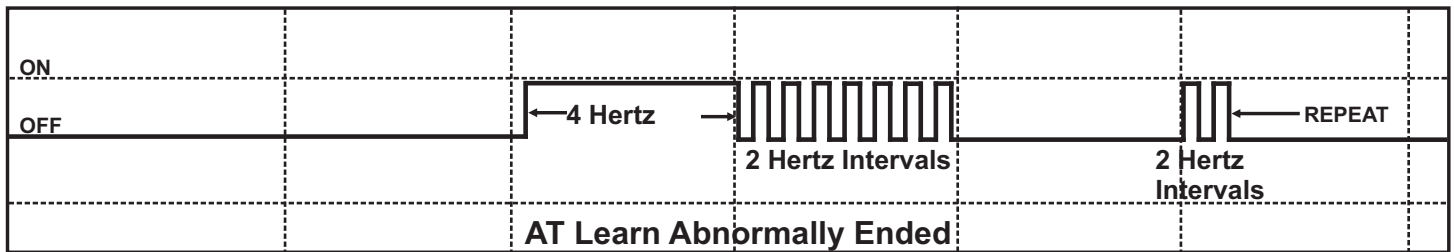
- 1 - Locate and select the “AT Learn Mode” in the scan tool.
- 2 - Follow the scan tool on screen instructions.

NOTE: During the AT Learn procedure the AT Oil Temp Lamp will begin flashing and continue until the AT Learn Procedure is successfully completed at which time the AT Oil Temp Lamp will turn Off.

- 3 - Wait until the scan tool displays the following message: “AT Learning Normally Ended”. This indicates that the AT Learn has successfully completed.

Important Note:

If the scan tool displays a message that says “AT Learning Ended Abnormally”, the AT Oil Temp Lamp will flash a 4 Hertz intervals and then turning on and off for 2 Hertz intervals as shown in the waveform below.



The AT Learn can end abnormally for the following reasons:

- 1 - A fault was detected during the AT Learn procedure.
- 2 - The accelerator pedal was depressed during the AT Learn procedure.
- 3 - An operation that was not directed was performed.
- 4 - ATF temperature went out of range.
- 5 - Battery voltage is low.
- 6 - The Malfunction Indicator Lamp illuminated.
- 7 - The electronic parking brake was not applied with enough effort.
- 8 - The brake pedal was not applied.
- 9 - A sudden engine rpm increase occurred.



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DIAGNOSTIC PROCEDURES ALL WHEEL DRIVE DIAGNOSTICS

When the AWD system is operating normally the AWD Lamp will illuminate when the ignition is turned on.

The AWD Lamp will go out after 2 seconds as seen in the graph below.

The AWD Lamp will illuminate when AWD ON/OFF switching function is in “FF Mode” (Front Wheel Drive) as seen in the graph below.

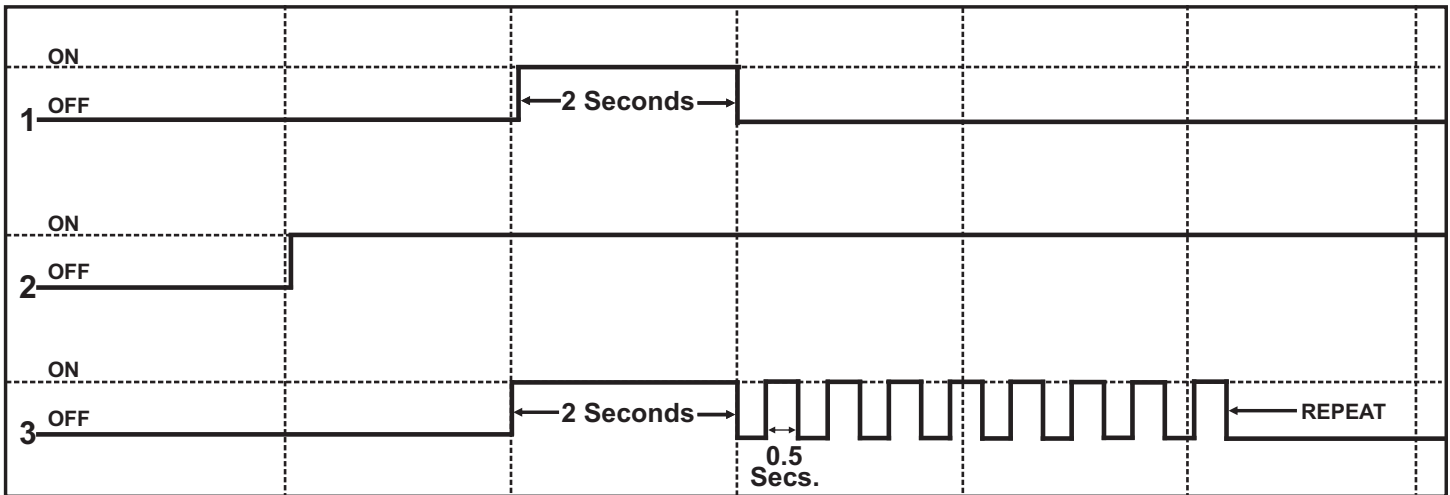
The AWD Lamp will flash when any of the following malfunctions are detected with the engine running:

1 - When a tire with a different diameter is installed or tire pressure in any of the 4 tires are excessively low.

2 - When “Rear Differential Inspection Mode” is judged as “NG (Not Good)” as seen in the graph below.

CAUTION: Be sure to use only the spare tire that came with the vehicle. DO NOT tow the vehicle with the front wheels off the ground and the rear wheels on the ground or vice versa.

When towing on all 4 wheels, limit towing to 30 km/h (20 mph) and for a distance limited to 50 km (31 miles).



1 - Normal flash pattern.

2 - When “FF MODE” is selected.

3 - All Wheel Drive system malfunction detected.



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DIAGNOSTIC PROCEDURES

REAR DIFFERENTIAL INSPECTION MODE PROCEDURE

A "Rear Differential Inspection Mode" must be performed whenever any of the following work has been performed:

- 1 - Transmission replacement.
- 2 - Replacement of the rear differential or its hypoid gear set.
- 3 - Replacement of the front differential or its hypoid gear set.

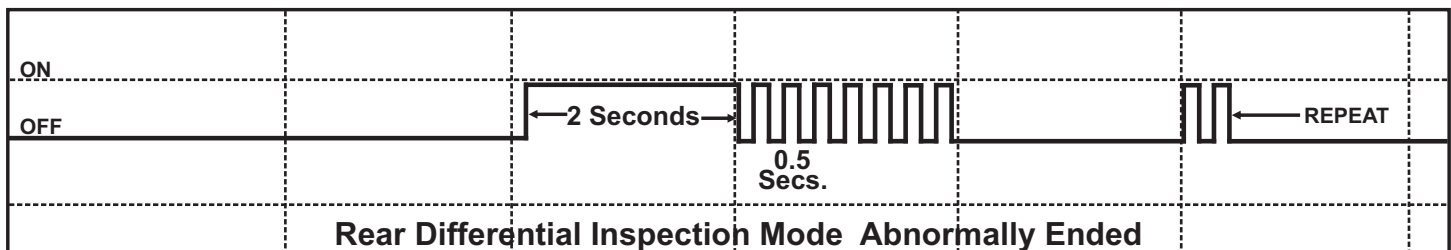
Rear Differential Inspection Mode Procedure:

- 1 - Place the shift selector lever in the "P" position.
- 2 - Apply electronic parking brake.
- 3 - Raise vehicle on the hoist until wheels clear the ground.
- 4 - Connect the scan tool to the Data Link Connector.
- 5 - Turn the ignition ON. (In the event the vehicle is equipped with a push button start, press the push button twice with out stepping on the foot brake).
- 6 - Select "AT Learning and Inspection Mode" from the scan tool display.
- 7 - Select "Rear Differential Inspection Mode" from the scan tool display.
- 8 - Follow the scan tool on screen instructions.
- 9 - After the message "Inspection Completed, Turn Ignition Switch OFF" is displayed, the Rear Differential Inspection Mode' is completed.

The results of the rear differential inspection mode will be displayed on the scan tool as follows:

- 1 - When ended normally - "Rear Differential Has Been Replaced Successfully".
- 2 - When ended abnormally - "Rear Differential Error Detected". Repair procedure problem.
- 3 - When interrupted - "Inspection Interrupted". Begin inspection mode over from the beginning.

When the rear differential inspection mode does not end normally, the AWD Lamp will start flashing at 0.5 second intervals as seen in the graph below.



When the rear differential inspection mode does not end normally or is interrupted, the following reasons are possibilities:

- 1 - The front or rear differentials have an incorrect ratio.
- 2 - The TCM has detected a failure.
- 3 - The VDC system (Vehicle Dynamics Control) has a failure.
- 4 - The foot brake pedal was accidentally applied.
- 5 - The inspection mode procedure was not completed in a timely manner.
- 6 - The vehicle does not support rear differential inspection mode.

CVT FLUID ADJUSTMENTS & SPECIFICATIONS

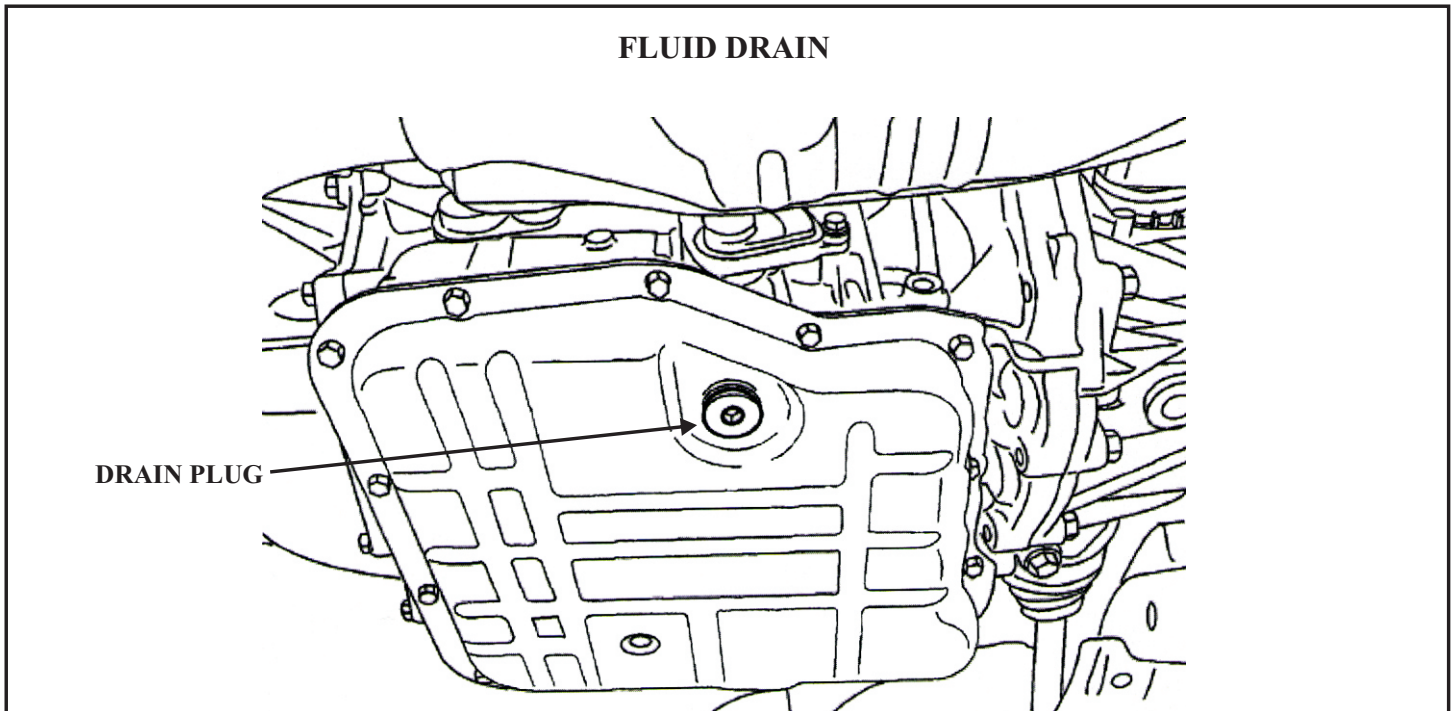


Figure 11

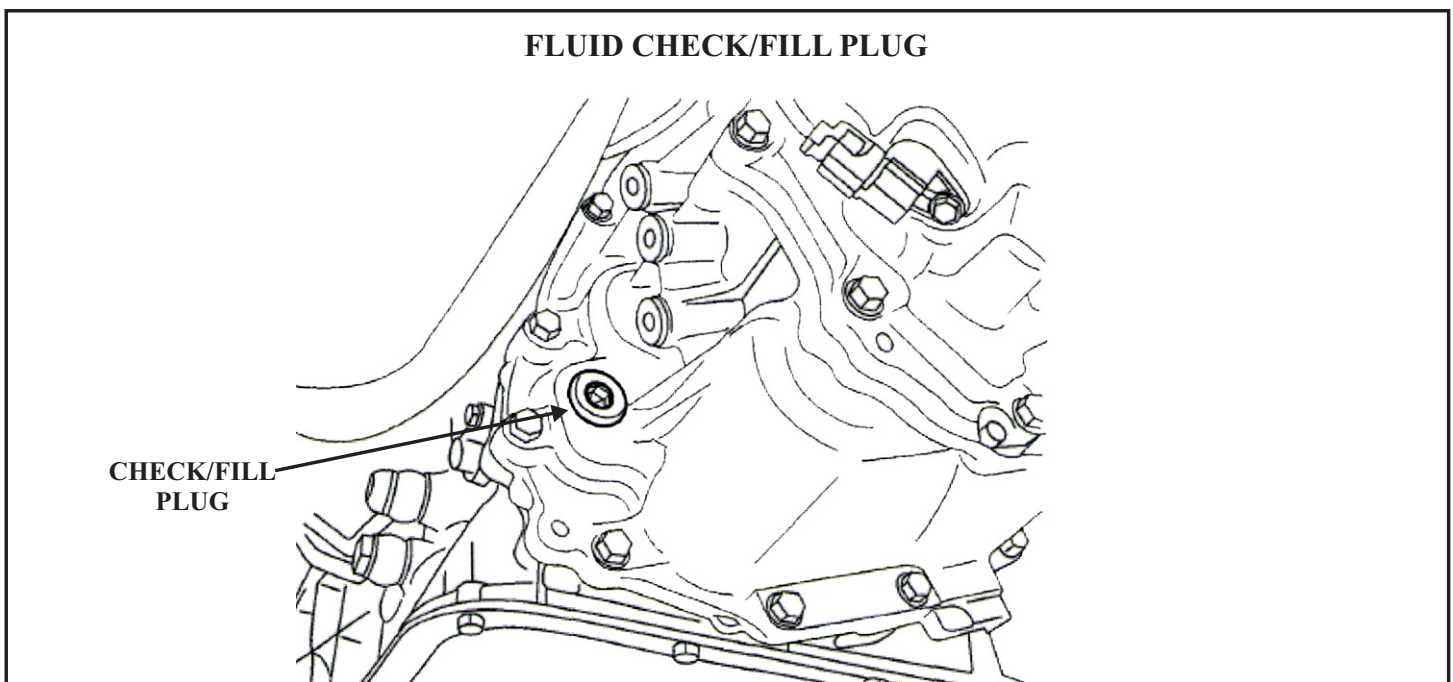


Figure 12

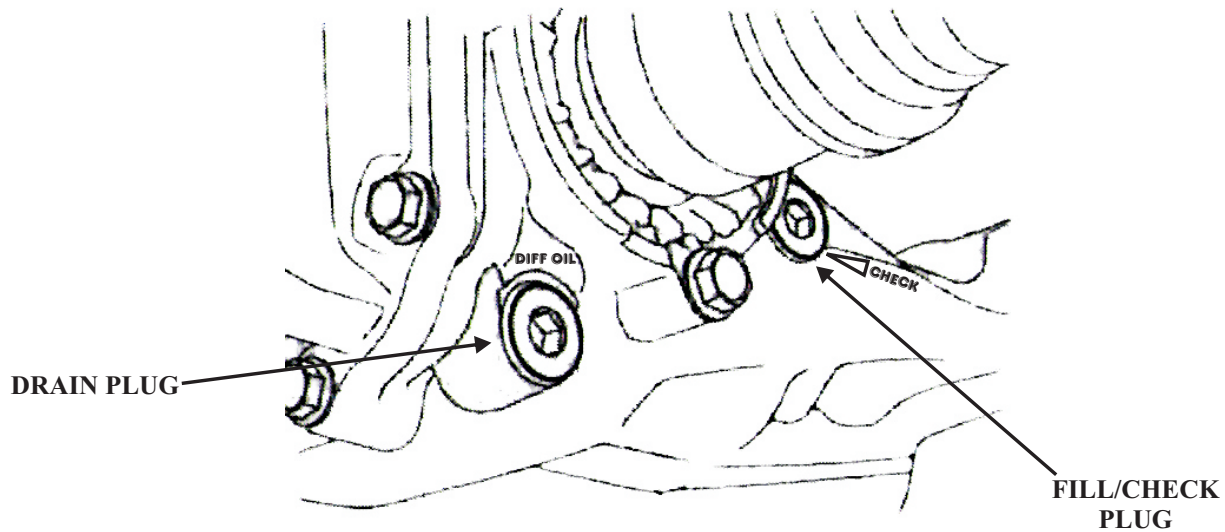
Remove the Check/Fill Plug and add enough fluid until the level is even with the plug opening. Once the transmission has operated and is at normal operating temperature, carefully remove the Check/Fill Plug and recheck fluid level. If the level is below the plug opening add more fluid until it is, if there is too much fluid, let it seek its own level and replace plug.

Recommended Fluid Type - Subaru Lineartronic CVT fluid.

Dry Capacity - 12.5 Liters (13.2 Qts.)

DIFFERENTIAL OIL ADJUSTMENTS & SPECIFICATIONS

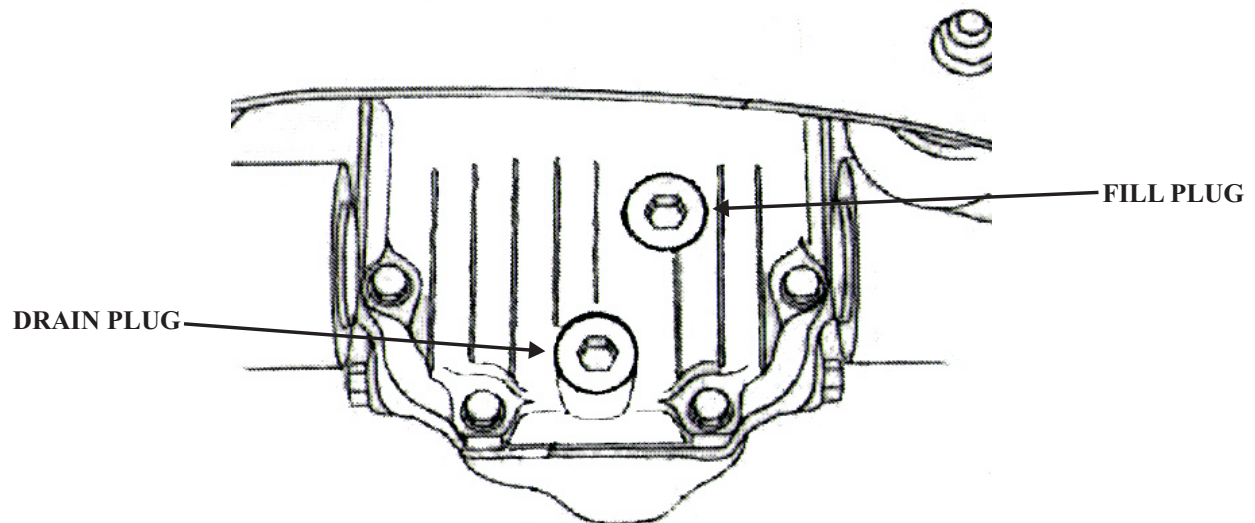
FRONT DIFFERENTIAL



FLUID TYPE - 75W90 GEAR OIL
CAPACITY - 1.4 LITERS (1.5 QTS.)

Figure 13

REAR DIFFERENTIAL



FLUID TYPE - 75W90 GEAR OIL
CAPACITY - 0.8 LITERS (0.8 QTS.)

Figure 14

LINE PRESSURE SPECIFICATIONS



Figure 15



Figure 16

LINE (Secondary) PRESSURE			
Condition	Range	Throttle	kgf/cm ² /PSI
Idle	P-N	CLSD	5.1 - 15.3/72 - 218
Stall	D-R	WOT	51.0 - 61.2/725 - 870

TRANSFER CLUTCH PRESSURE			
Range	On Duty Ratio %	Throttle	kgf/cm ² /PSI
Manual Mode (2nd)	95-100	WOT	10.2 - 12.2/145 - 174
	60	Adjust to 60% Duty Cycle	4.1 - 7.1/58 - 102
	0	CLSD	—
P-N	0	CLSD	0

COOLER LINE IDENTIFICATION

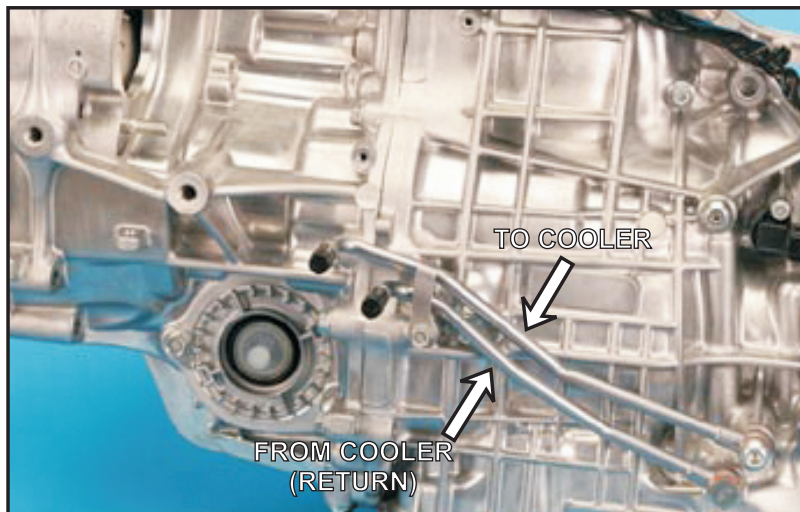
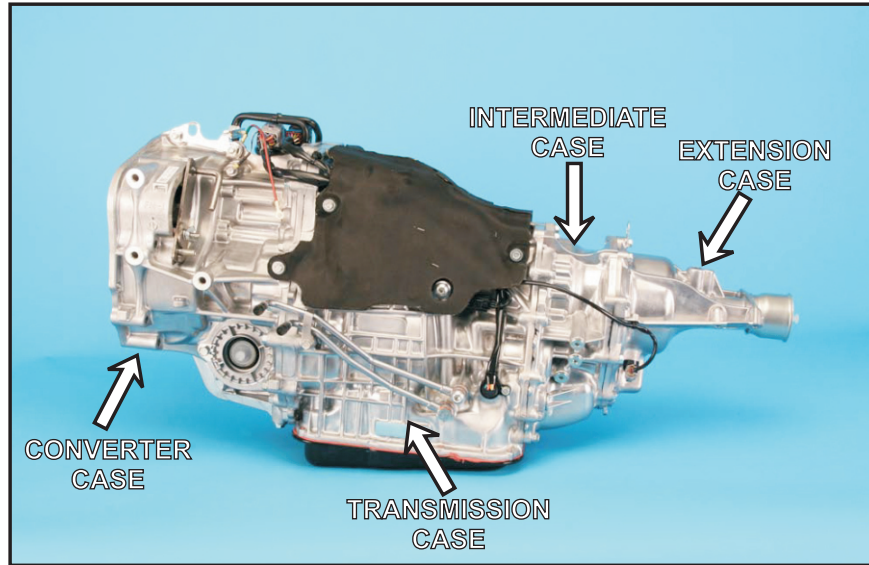


Figure 17

TRANSMISSION COMPONENT DESCRIPTION



The Lineartronic CVT Is categorized into 4 main case sections the Converter Case, the Transmission Case, the Intermediate Case and the Extension Case.

Figure 18



The bottom of the converter case is open allowing access to the converter to flex plate bolts.

Figure 19



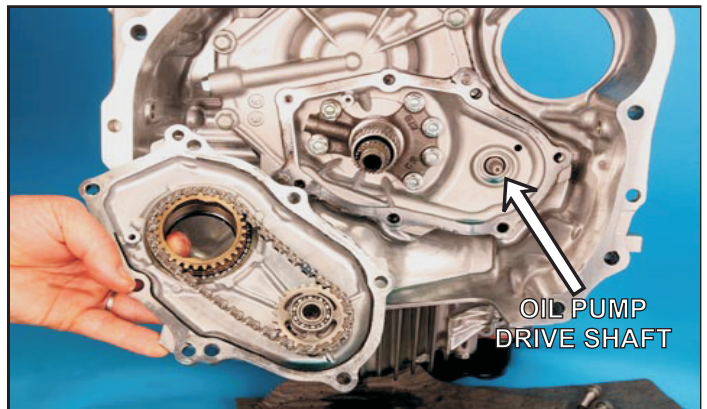
The lockup clutch can be applied at low speed which can occur at 31 kph.

Figure 20



The front cover houses the pump drive assembly.

Figure 21

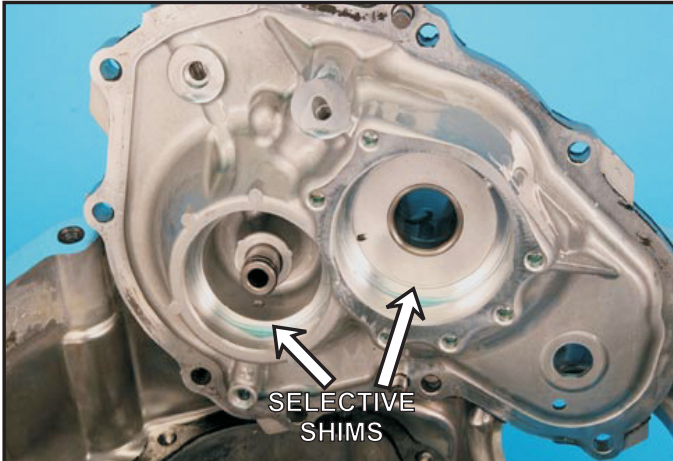


The chain drive turns the oil pump drive shaft.

Figure 22

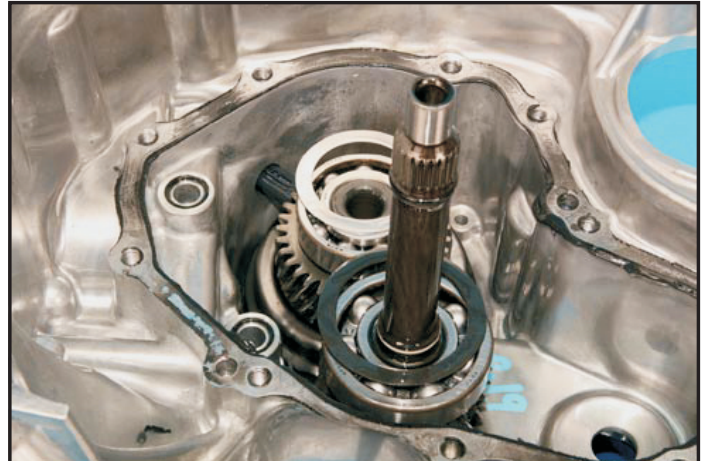
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TRANSMISSION COMPONENT DESCRIPTION



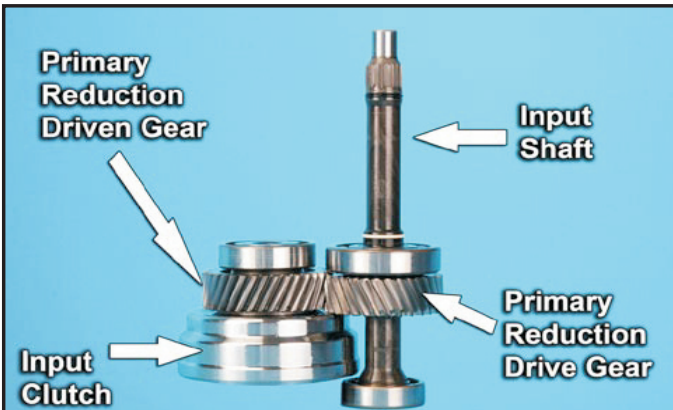
Remove the converter case cover from the converter case. There is also a selective shim located behind the drive & driven input reduction gears.

Figure 23



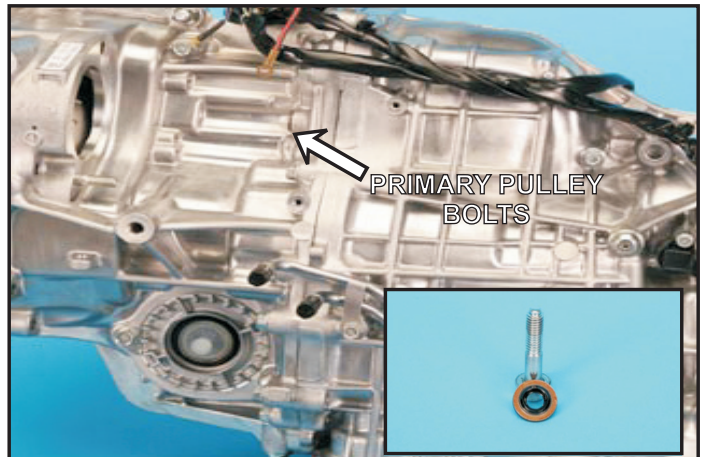
The front reduction drive & driven gears can now be removed.

Figure 24



When rotated by the torque converter, the primary reduction drive gear turns the primary reduction driven gear which is also the input clutch drum. The input clutch connects engine power to the gearbox.

Figure 25



There are 2 bolts that secure the primary pulley to the converter case, these must be removed before the converter case & the transmission case can be split.

Figure 26



Before the drive pinion retainer is removed, remove the 2 secondary pulley retaining bolts.

Figure 27



The converter case also houses the final drive carrier.

Figure 28

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TRANSMISSION COMPONENT DESCRIPTION

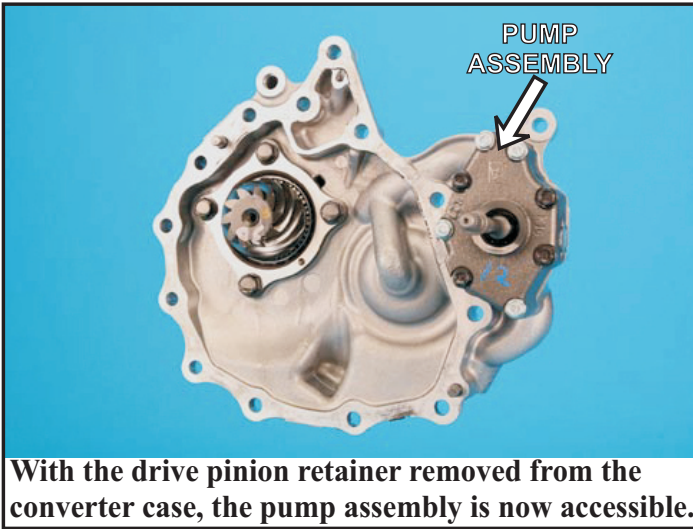


Figure 29

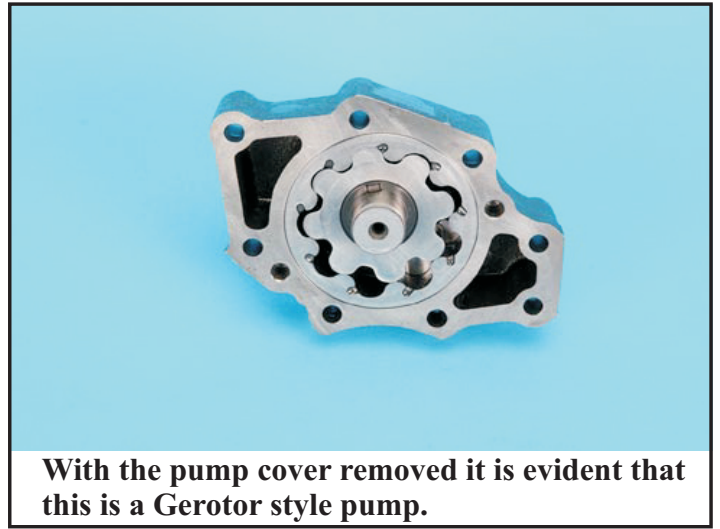


Figure 30

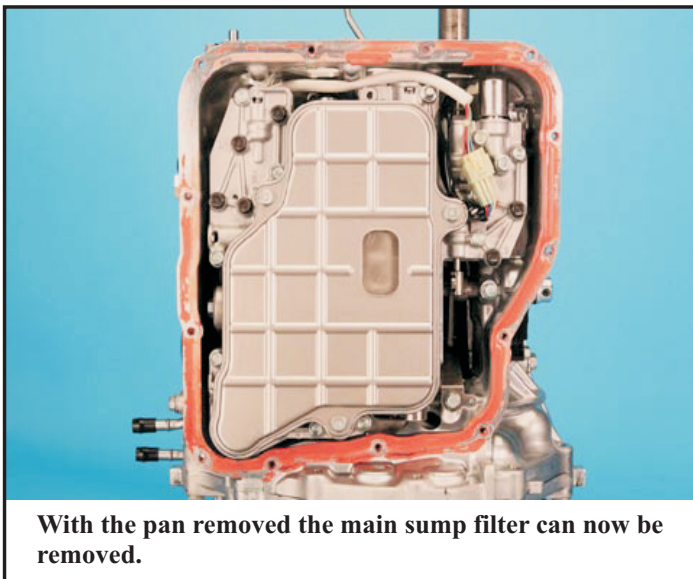


Figure 31

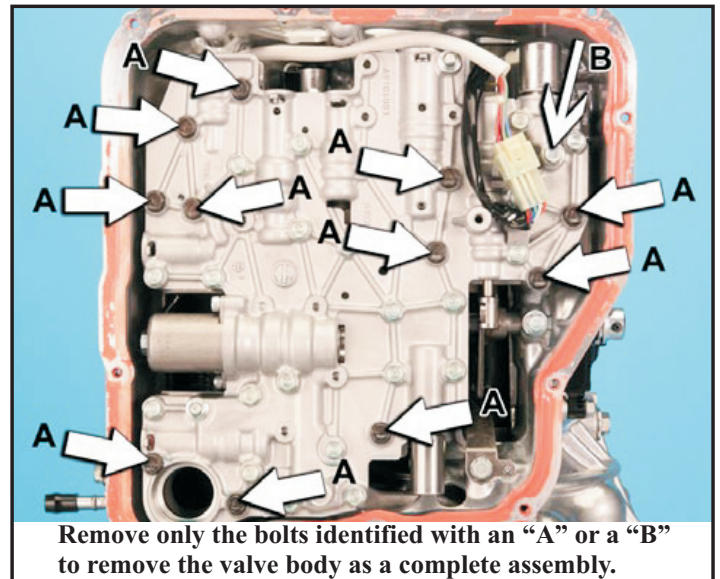


Figure 32

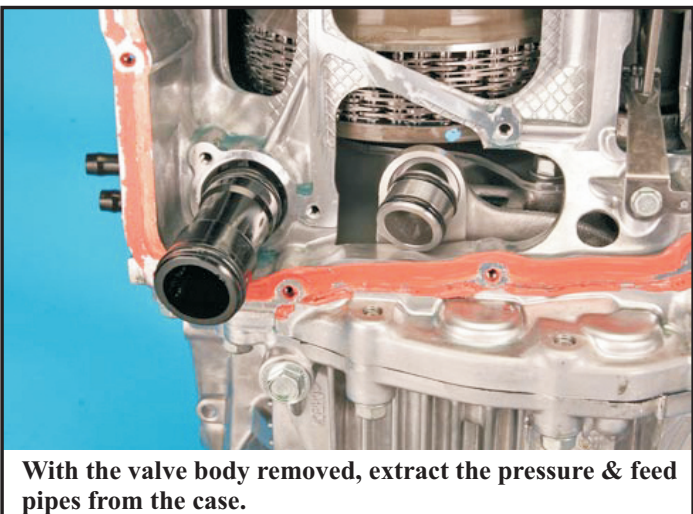


Figure 33

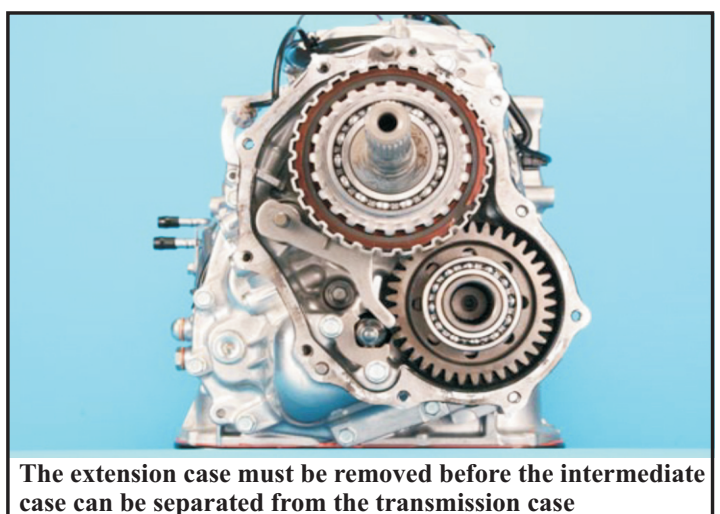
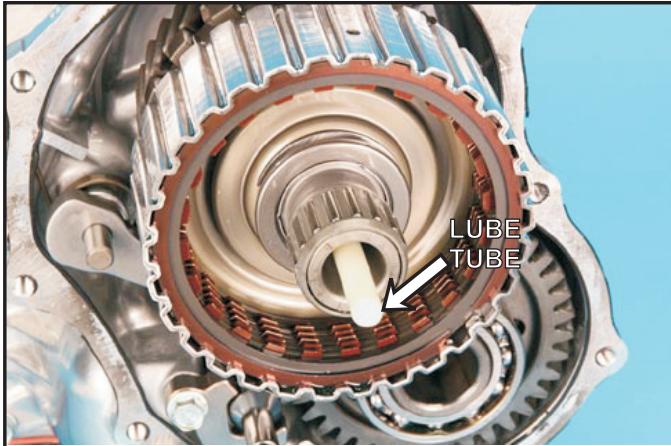


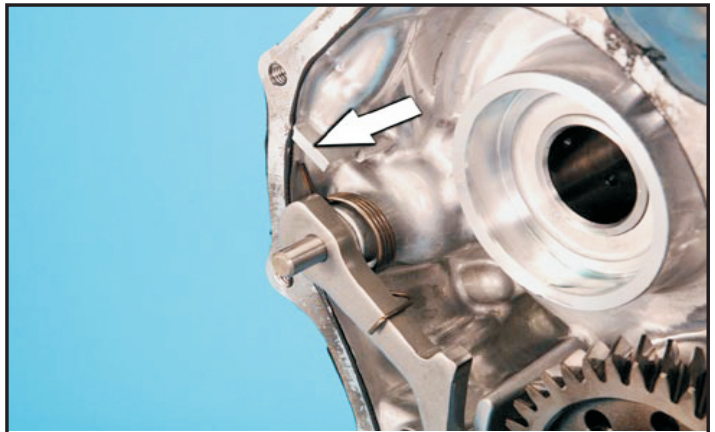
Figure 34

TRANSMISSION COMPONENT DESCRIPTION



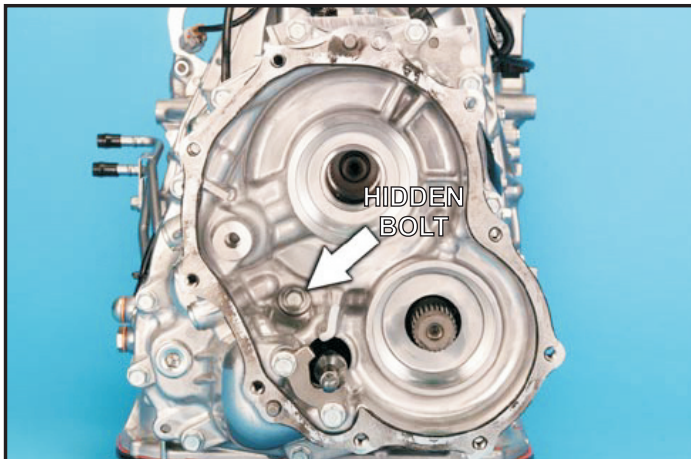
The transfer clutch drum & the transfer driven gear can now be removed, be careful with the plastic lube tube.

Figure 35



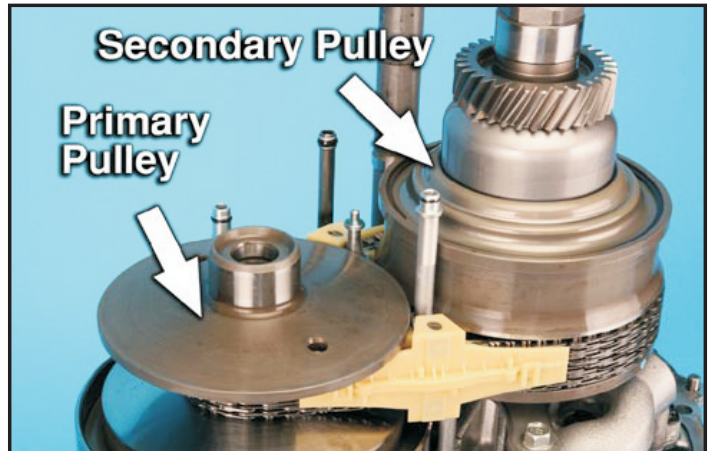
The proper assembly of the park pawl mechanism is shown here, notice the end of the return spring goes into a hole in the case.

Figure 36



Once all the components have been removed from the back of the intermediate case, the hidden bolt can now be removed. This is why the extension case must come off first.

Figure 37



Once the transmission case is removed the pulley and chain assemblies can be prepared for removal, use caution about feed tube locations.

Figure 38



In preparation for chain removal, some slack has to be provided by opening the secondary pulley sheave.

Figure 39



Before chain removal make certain the chain guide has cleared the lube pipe.

Figure 40

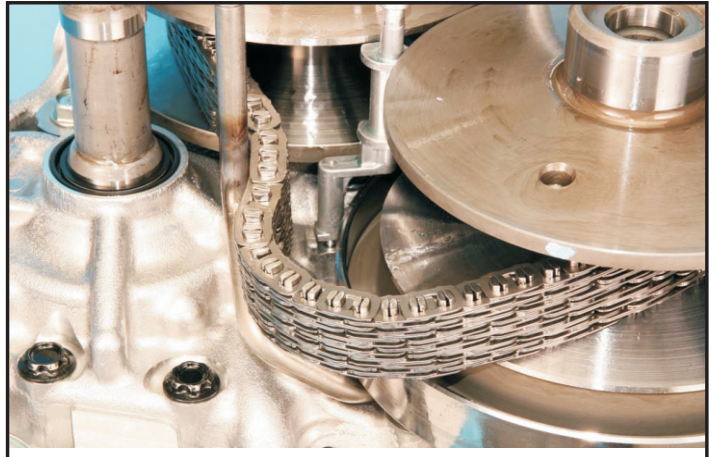
Technical Service Information

TRANSMISSION COMPONENT DESCRIPTION



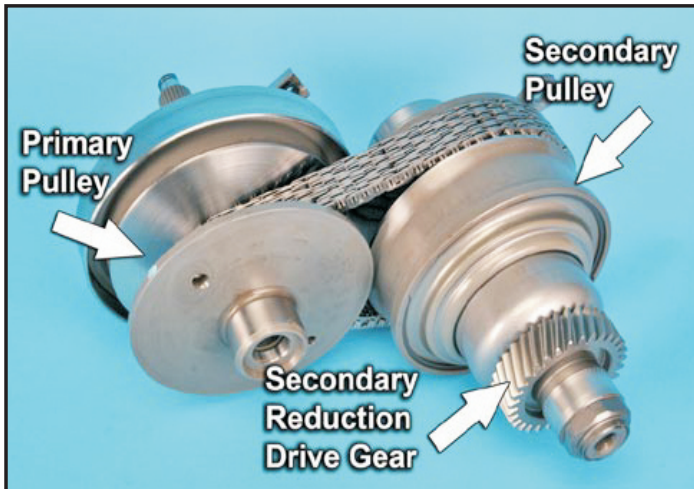
With 2 small screwdrivers unlock the tabs and then carefully pry the guide apart.

Figure 41



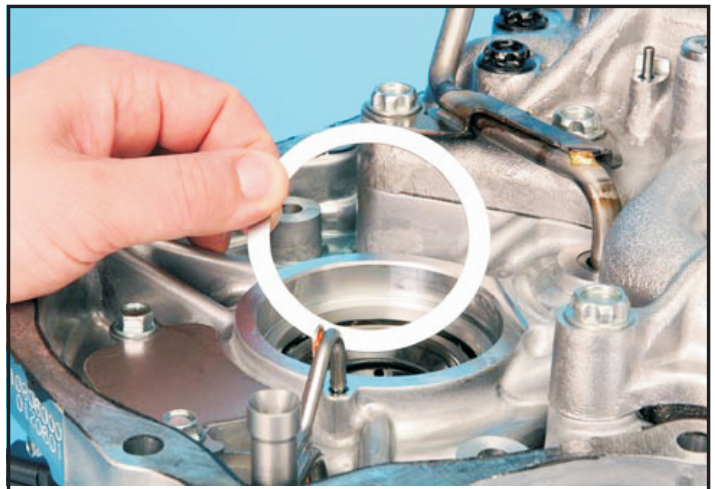
The chain can now be removed from the pulleys in preparation of removing both pulley assemblies.

Figure 42



The pulley and chain assembly is now removed in preparation of removal of the extension housing.

Figure 43



There is a selective shim under the primary pulley support bearing.

Figure 44



The transmission vents through a plate & chamber. The external rubber vent hose connects to this chamber through a metal pipe. The large tube acts as a guide for a lube pipe.

Figure 45



Nestled in a recess in the intermediate case is an additional filter. Also found in the intermediate case is the reverse clutch assembly.

Figure 46

Technical Service Information

TRANSMISSION COMPONENT DESCRIPTION

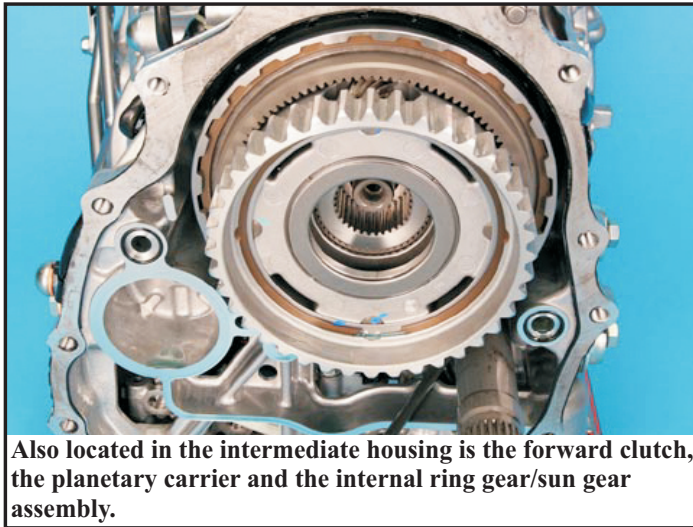


Figure 47

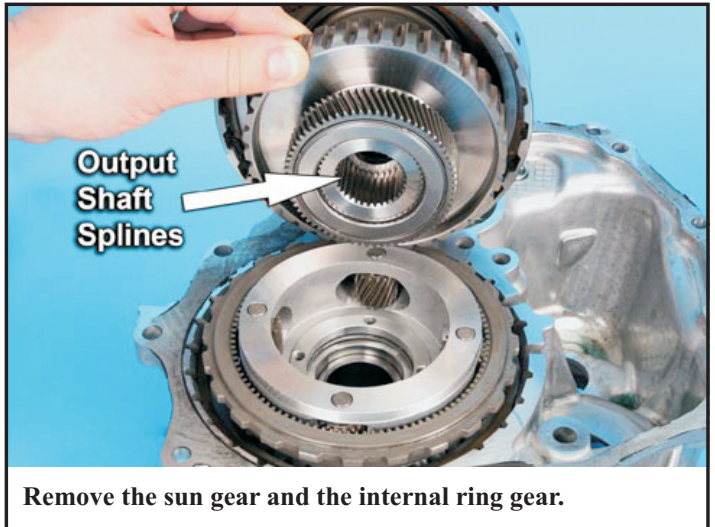


Figure 48

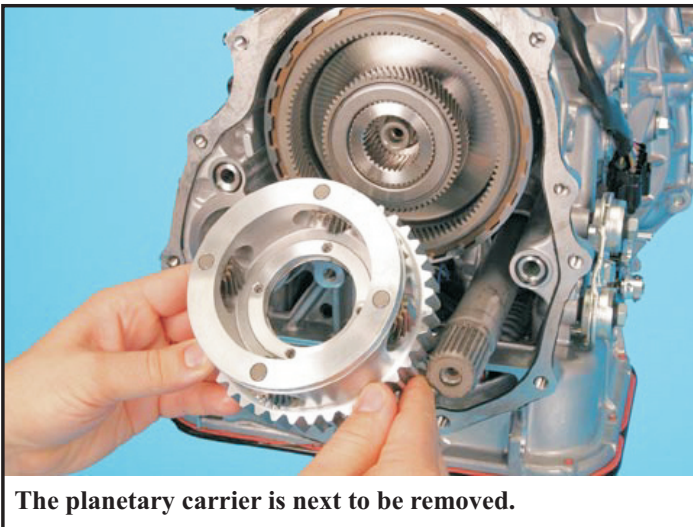


Figure 49

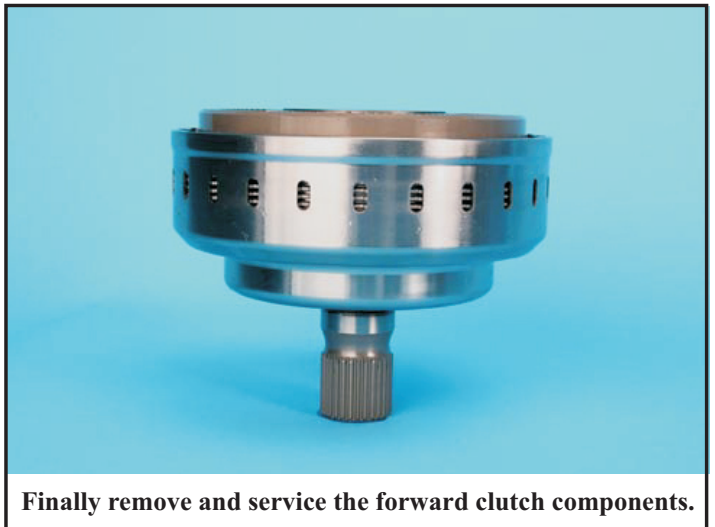


Figure 50

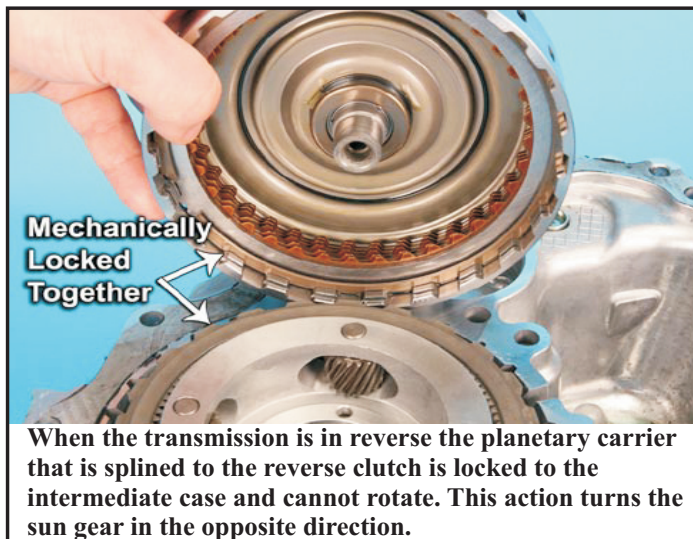


Figure 51

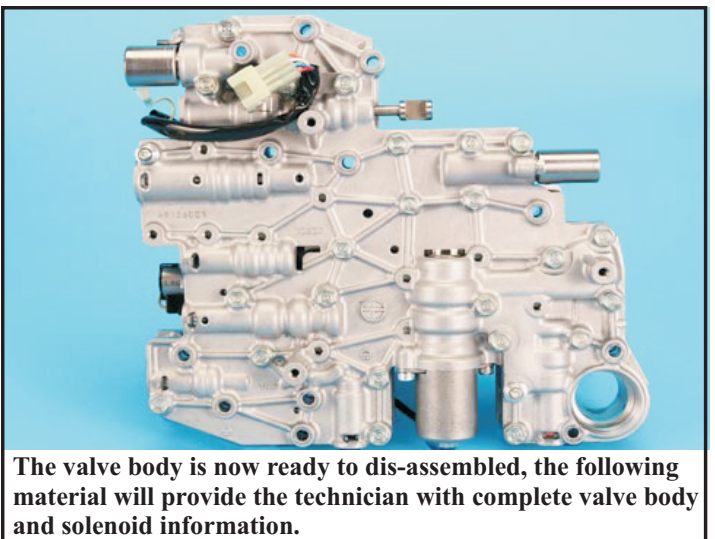


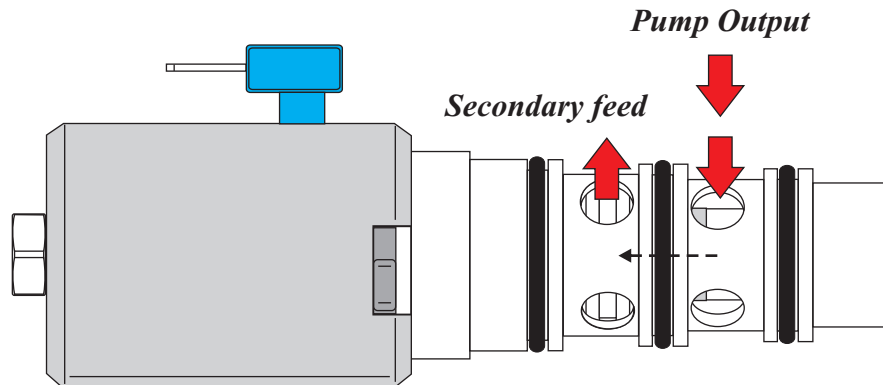
Figure 52

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

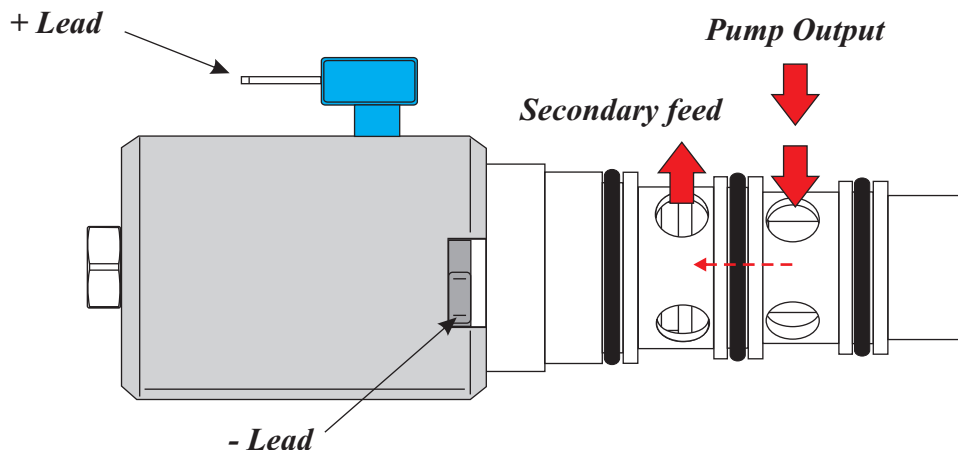
SECONDARY LINEAR CONTROL SOLENOID

Solenoid Off



Pump Output is fed to the front of the Secondary Linear Control Solenoid. The Regulating valve located inside of the snout of the solenoid is forced to the left opening the port leading to Secondary Pulley feed which is also the line pressure passage.

Solenoid On



Pump Output is fed to the front of the Secondary Linear Control Solenoid. The Regulating valve located inside of the snout of the solenoid is forced to the left opening the port leading to Secondary Pulley feed which is also the line pressure passage. When the solenoid is energized pressure is also fed through a screen leading to the Secondary passage.

*Solenoid Ohm value is between 7-7.5 Ohms as tested
Connect the + lead to the terminal in the blue connector and the - lead
to the mounting tab as illustrated above*

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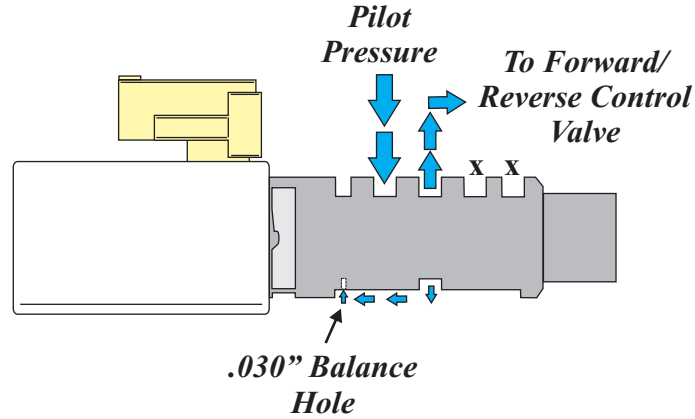
Figure 53

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

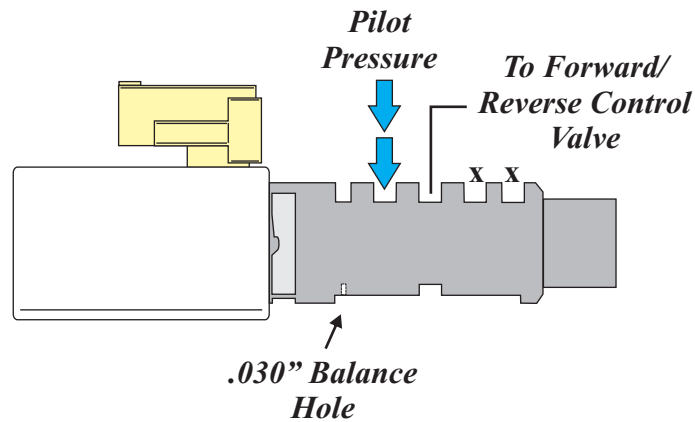
FORWARD AND REVERSE LINEAR CONTROL SOLENOID

Solenoid Off



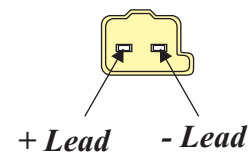
When the solenoid is Off, pilot pressure is connected to the Forward/Reverse Control valve.

Solenoid On



When the solenoid is On, pilot pressure is blocked leading to the Forward/Reverse Control valve.

Connector View



*Solenoid Ohm value is between 6-6.5 Ohms as tested.
Connect meter across the two terminals as illustrated above.*

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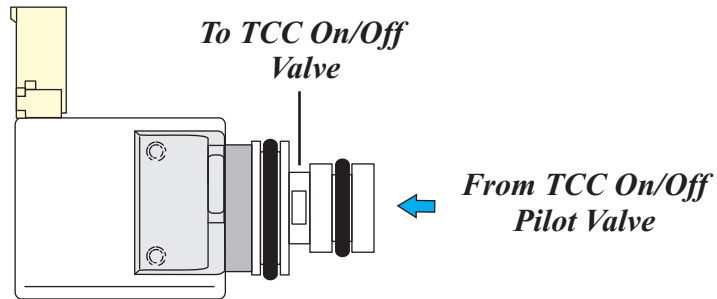
Figure 54

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

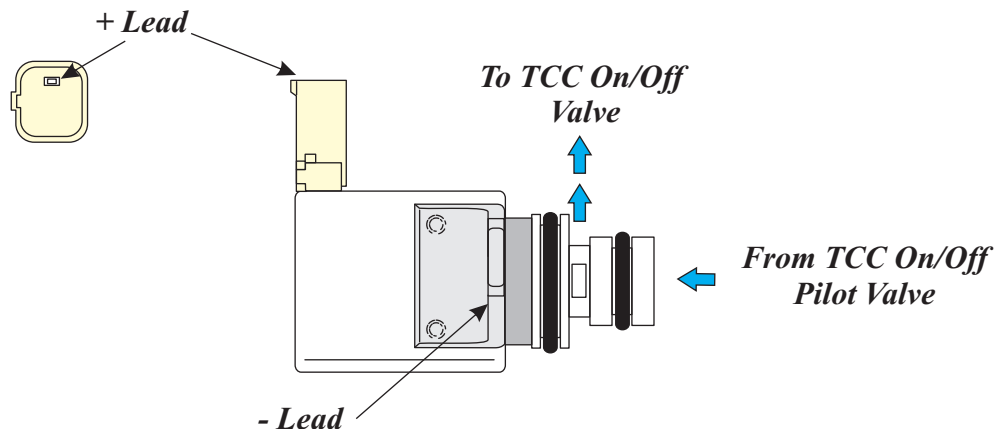
LOCK-UP ON/OFF SOLENOID

Solenoid Off



When the solenoid is Off, TCC On/Off pilot pressure is blocked to the TCC On/Off Valve

Solenoid On



When the solenoid is On, TCC On/Off pilot pressure is connected to the TCC On/Off Valve

Solenoid Ohm value is between 17-17.5 Ohms as tested.

Connect meter as shown in the illustration above.

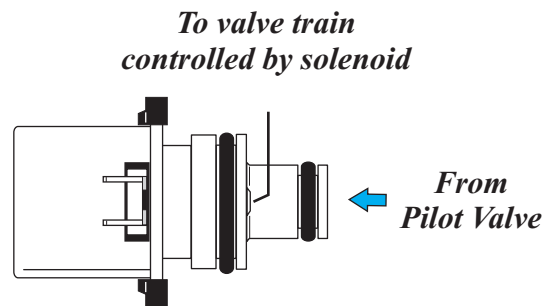
Note: this solenoid is better tested in the valve body casting using air pressure.

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

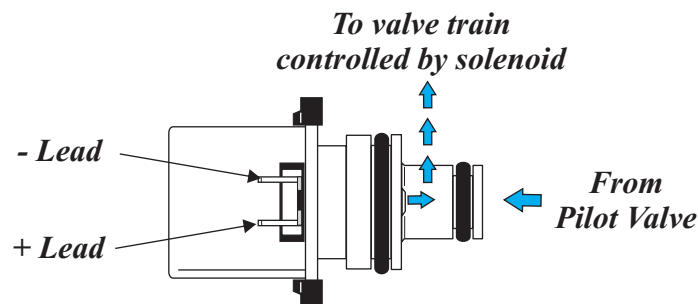
LOCK-UP DUTY, PRIMARY UP, PRIMARY DOWN AND ALL WHEEL DRIVE SOLENOID

Solenoid Off



*When the solenoid is Off, pilot pressure is blocked to the valve train controlled by the solenoid.
Note: the names of the valves correspond with the names of the solenoids.*

Solenoid On



*When the solenoid is On, pilot pressure is connected to the valve train controlled by the solenoid.
Note: the names of the valves correspond with the names of the solenoids.*

*Solenoid Ohm value is between 3.2-4.2 Ohms as tested.
Connect meter across the two terminals as illustrated above.
Note: It is not necessary to remove the plastic terminal cover to test ohm value.
Refer to the terminal and connector I.D for ohm tests.*

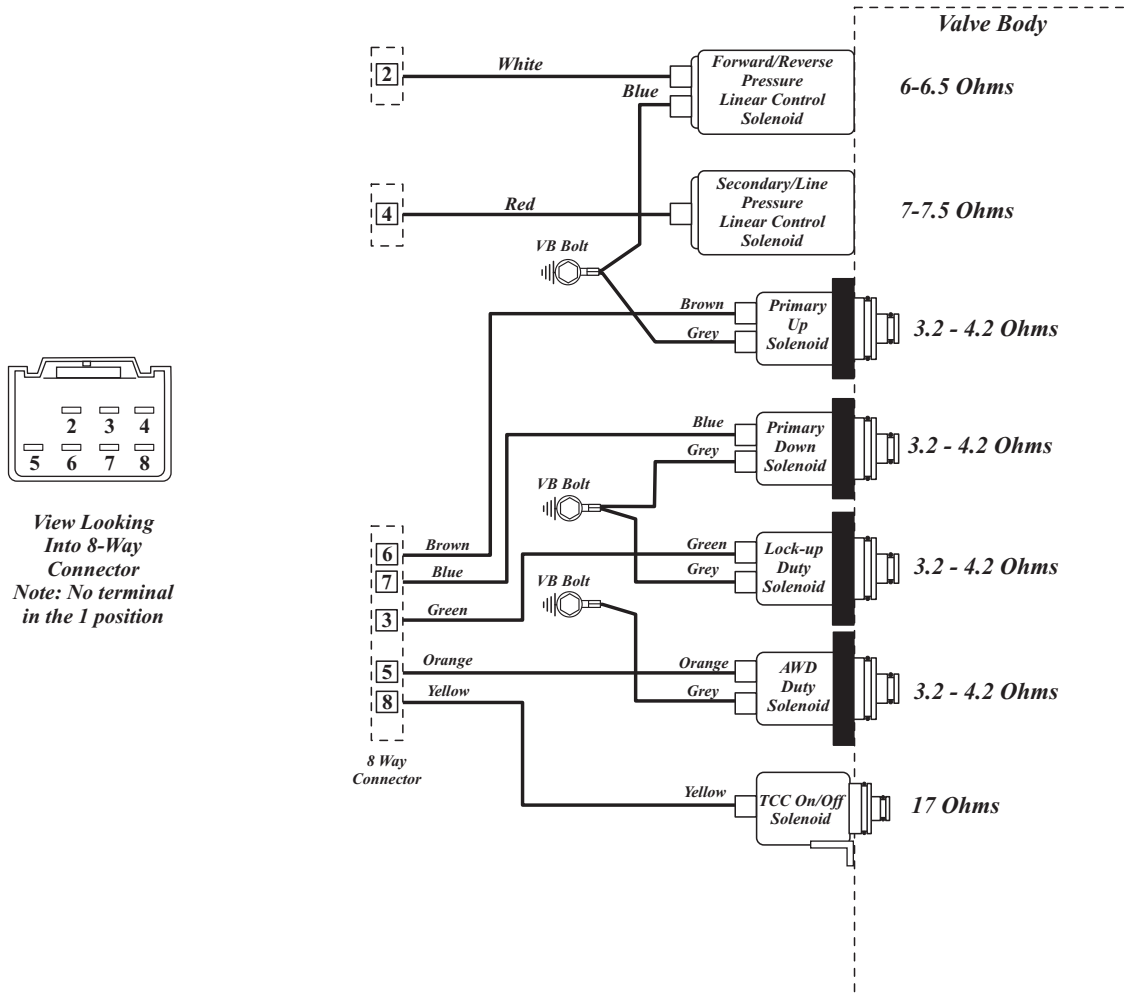
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Figure 56

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

INTERNAL HARNESS AND TERMINAL I.D.



Solenoid Ohm Test chart

TERMINAL	SOLENOID	OHM VALUE
2 & Ground	Forward/Reverse Linear control	6-6.5 Ohms
3 & Ground	Lock-up Duty	3.2 - 4.2 Ohms
4 & Ground	Secondary/Line Linear control	7-7.5 Ohms
5 & Ground	AWD Duty	3.2 - 4.2 Ohms
6 & Ground	Primary Up Duty	3.2 - 4.2 Ohms
7 & Ground	Primary Down Duty	3.2 - 4.2 Ohms
8 & Ground	TCC On/Off	17 Ohms

Ground Refers to the Valve Body casting with the solenoid bolted in place.

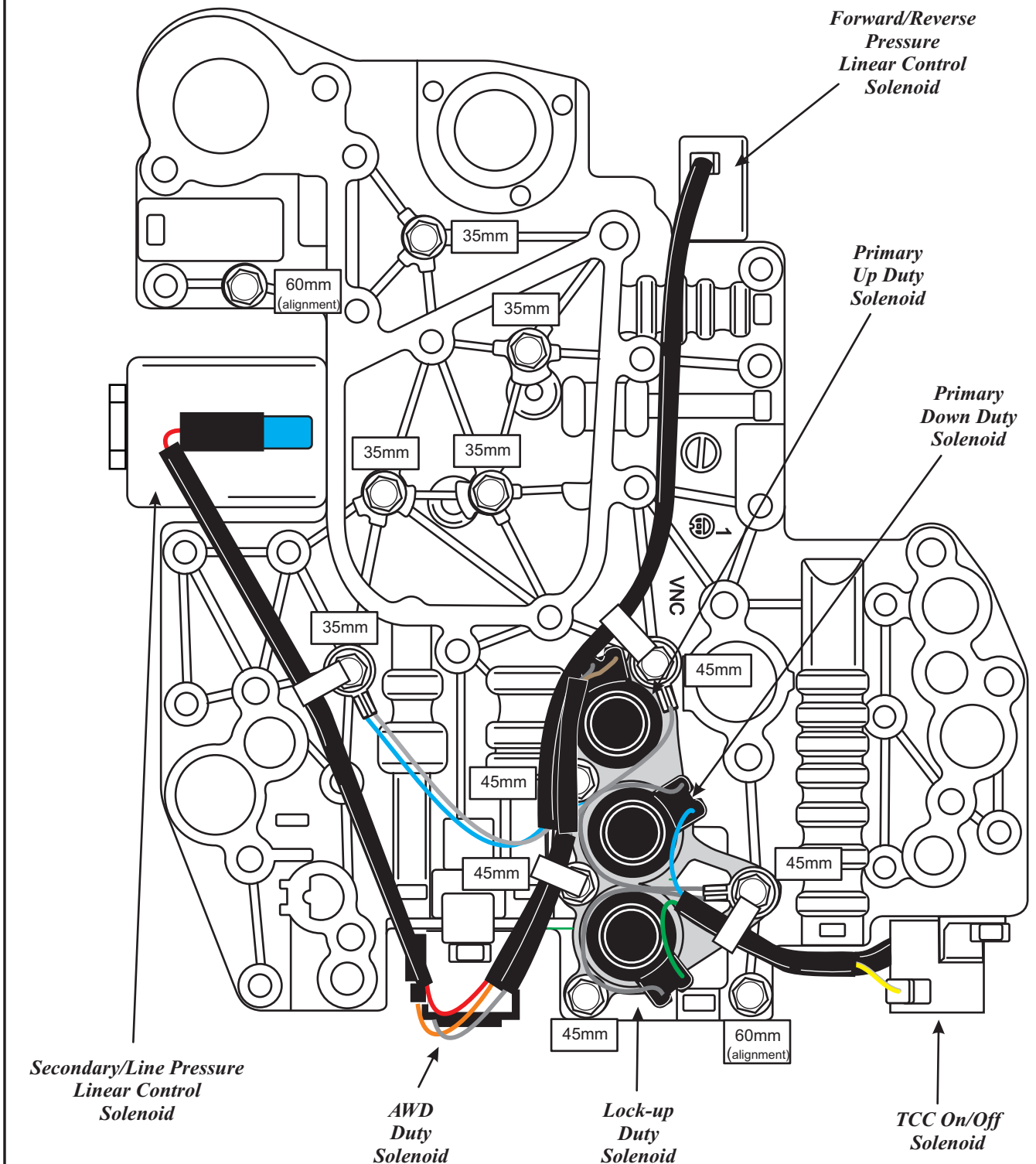
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Figure 58

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

SOLENOID LOCATION AND BOLT LENGTHS VALVE BODY UPPER SIDE



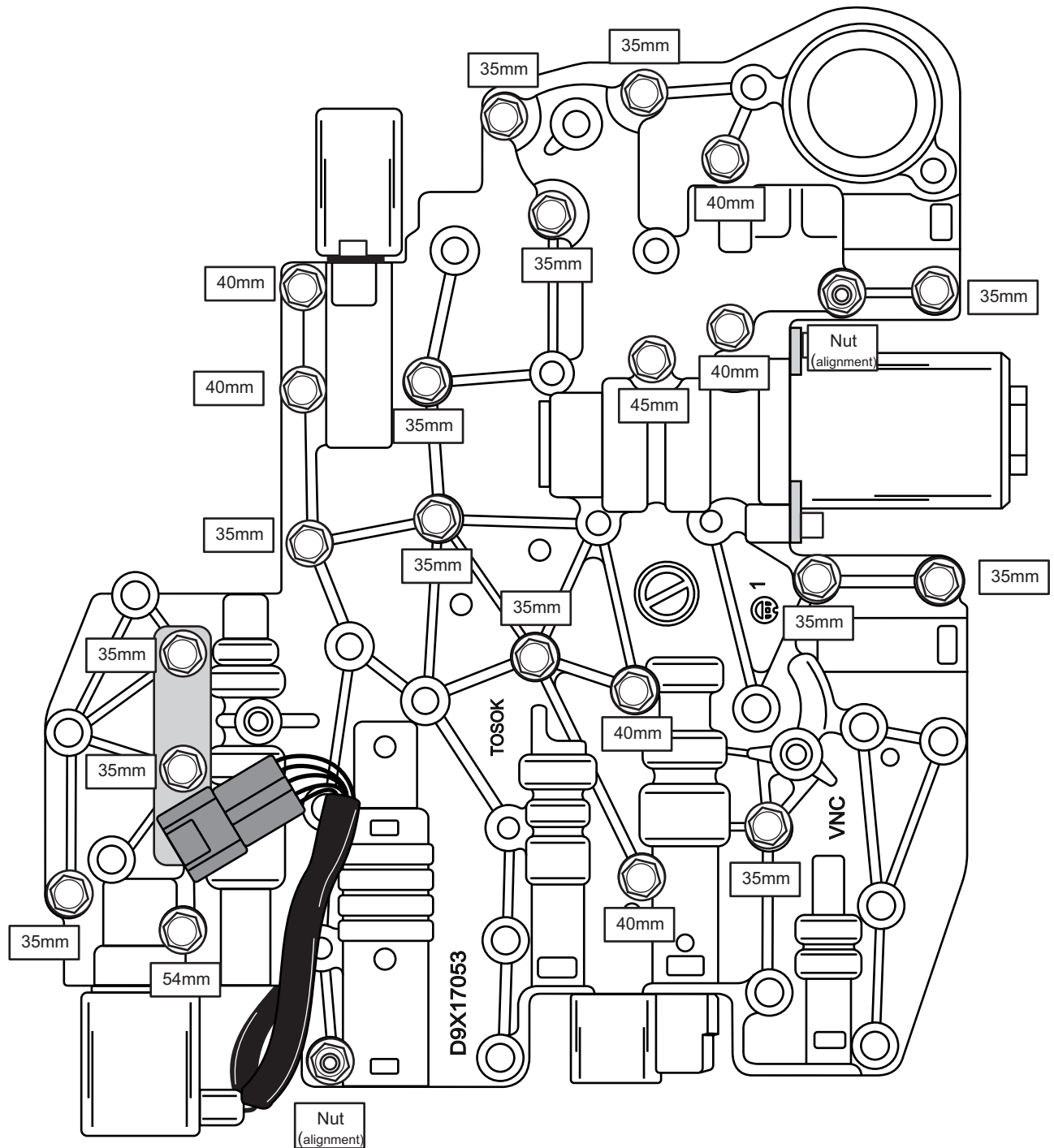
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Figure 59

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

BOLT LENGTHS VALVE BODY LOWER SIDE



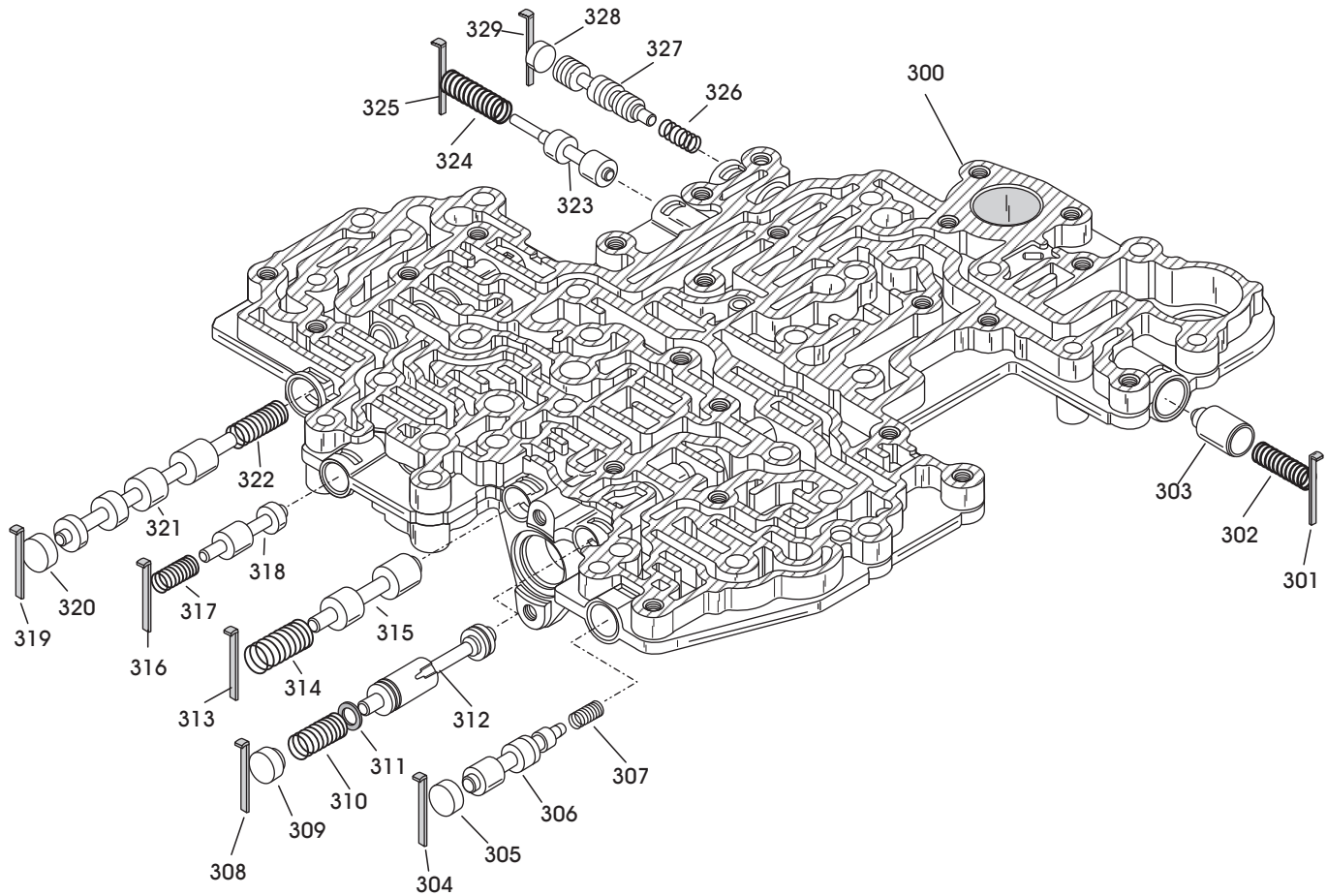
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Figure 60

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

UPPER VALVE BODY



UPPER VALVE BODY LEGEND

- | | |
|--|---|
| 300 UPPER VALVE BODY CASTING. | 316 RETAINER |
| 301 RETAINER | 317 LUBE/TORQUE CONVERTER PILOT VALVE SPRING |
| 302 FORWARD/REVERSE LIMIT VALVE SPRING | 318 LUBE/TORQUE CONVERTER PILOT VALVE |
| 303 FORWARD/REVERSE LIMIT VALVE | 319 RETAINER |
| 304 RETAINER | 320 BORE PLUG |
| 305 BORE PLUG | 321 TORQUE CONVERTER CLUTCH SWITCH VALVE |
| 306 TRANSFER CLUTCH (AWD) CONTROL VALVE | 322 TORQUE CONVERTER CLUTCH SWITCH VALVE SPRING |
| 307 TRANSFER CLUTCH (AWD) CONTROL VALVE SPRING | 323 TORQUE CONVERTER CLUTCH SOLENOID PILOT VALVE |
| 308 RETAINER | 324 TORQUE CONVERTER CLUTCH SOLENOID PILOT VALVE SPRING |
| 309 BORE PLUG (STEPPED) | 325 RETAINER |
| 310 PRIMARY DOWN CONTROL VALVE SPRING | 326 FORWARD/REVERSE CONTROL VALVE SPRING |
| 311 SHIM (.030") | 327 FORWARD/REVERSE CONTROL VALVE |
| 312 PRIMARY DOWN CONTROL VALVE | 328 BORE PLUG |
| 313 RETAINER | 329 RETAINER |
| 314 PRIMARY DOWN SWITCH VALVE SPRING | |
| 315 PRIMARY DOWN SWITCH VALVE | |

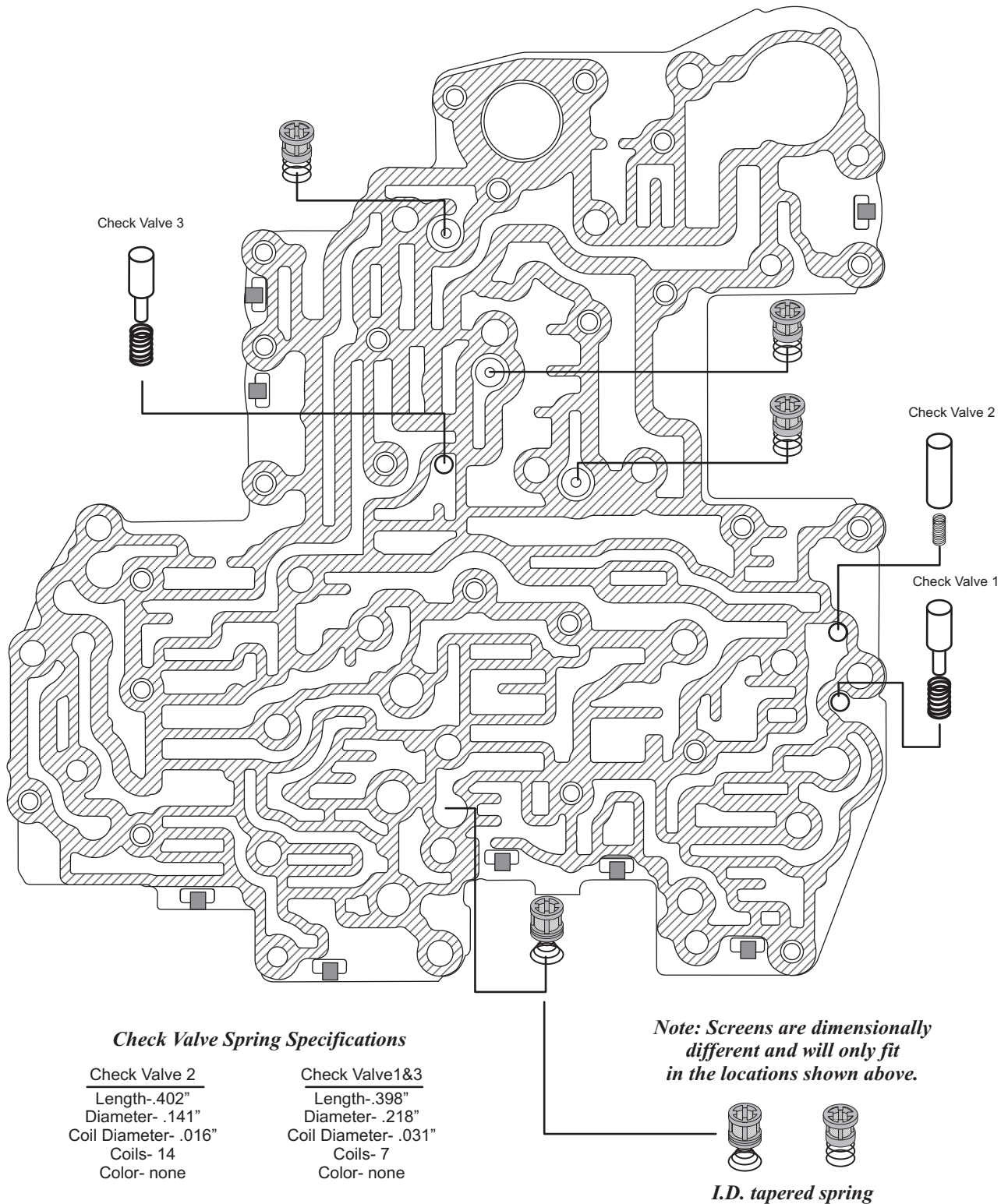
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Figure 61

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

UPPER VALVE BODY SMALL PARTS AND RETAINER LOCATIONS



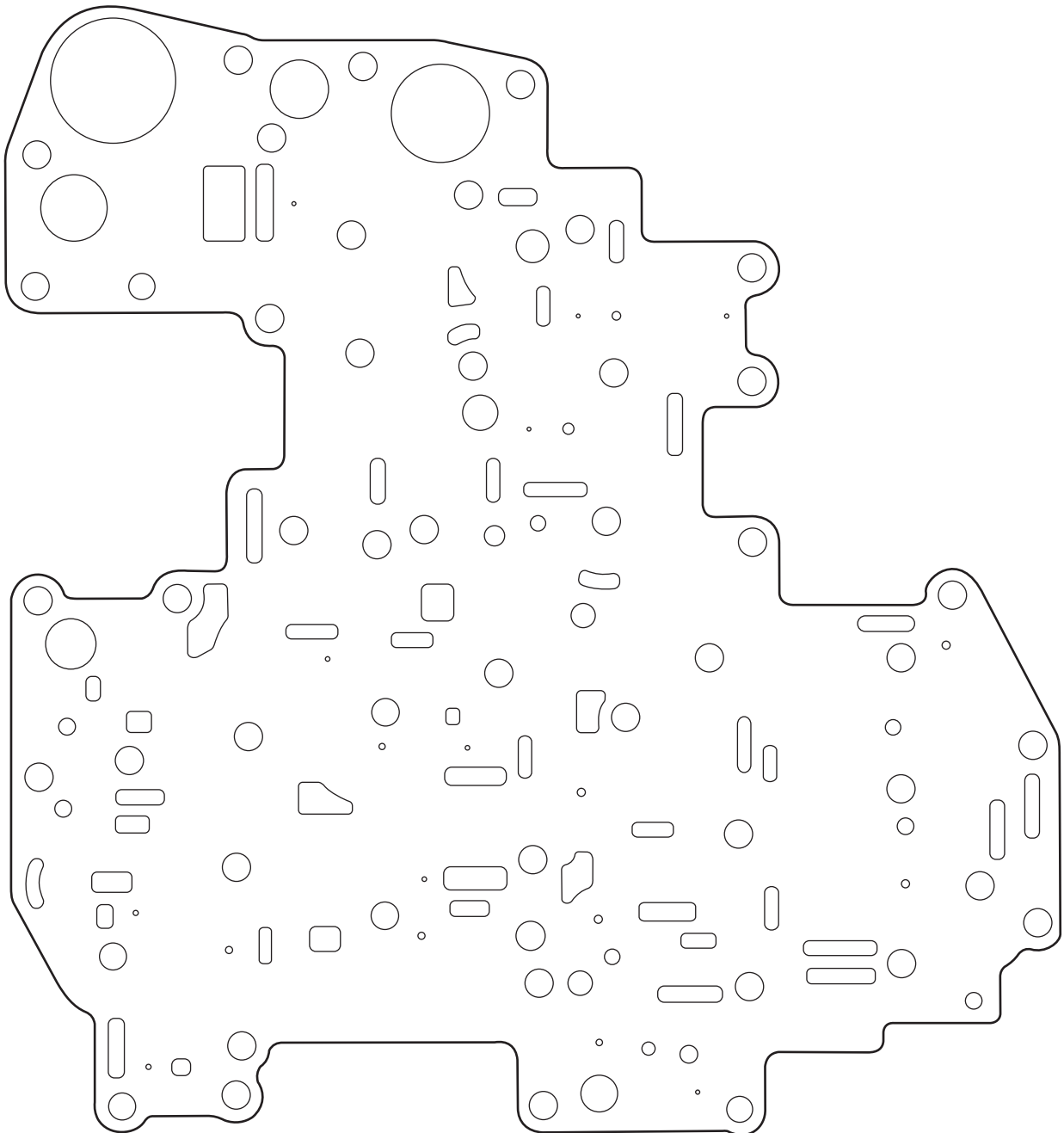
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Figure 62

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

SPACER PLATE



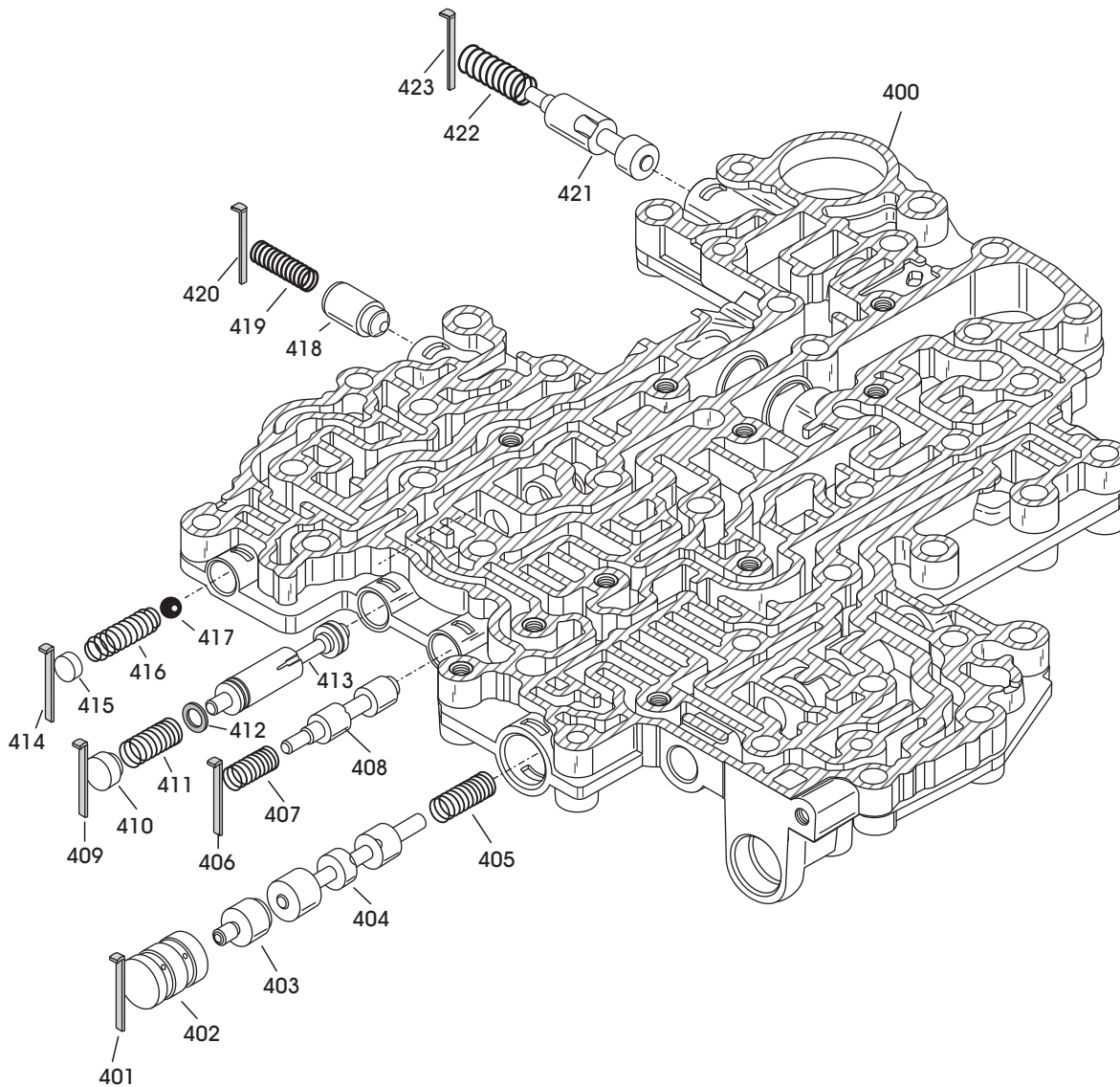
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Figure 63

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

LOWER VALVE BODY



LOWER VALVE BODY LEGEND

- | | |
|---|---|
| 400 LOWER VALVE BODY CASTING | 412 SHIM (.039") |
| 401 RETAINER | 413 PRIMARY UP CONTROL VALVE |
| 402 TORQUE CONVERTER CLUTCH REGULATOR VALVE SLEEVE | 414 RETAINER |
| 403 TORQUE CONVERTER CLUTCH REGULATOR VALVE PLUNGER | 415 BORE PLUG |
| 404 TORQUE CONVERTER CLUTCH REGULATOR VALVE | 416 LUBRICATION CHECK BALL SPRING |
| 405 TORQUE CONVERTER CLUTCH REGULATOR VALVE SPRING | 417 LUBRICATION CHECK BALL (.343") |
| 406 RETAINER | 418 PRIMARY DOWN CONTROL LIMIT VALVE |
| 407 MAIN PILOT VALVE SPRING | 419 PRIMARY DOWN CONTROL LIMIT VALVE SPRING |
| 408 MAIN PILOT VALVE | 420 RETAINER |
| 409 RETAINER | 421 SECONDARY PRESSURE LIMIT VALVE |
| 410 BORE PLUG (STEPPED) | 422 SECONDARY PRESSURE LIMIT VALVE SPRING |
| 411 PRIMARY UP CONTROL VALVE SPRING | 423 RETAINER |

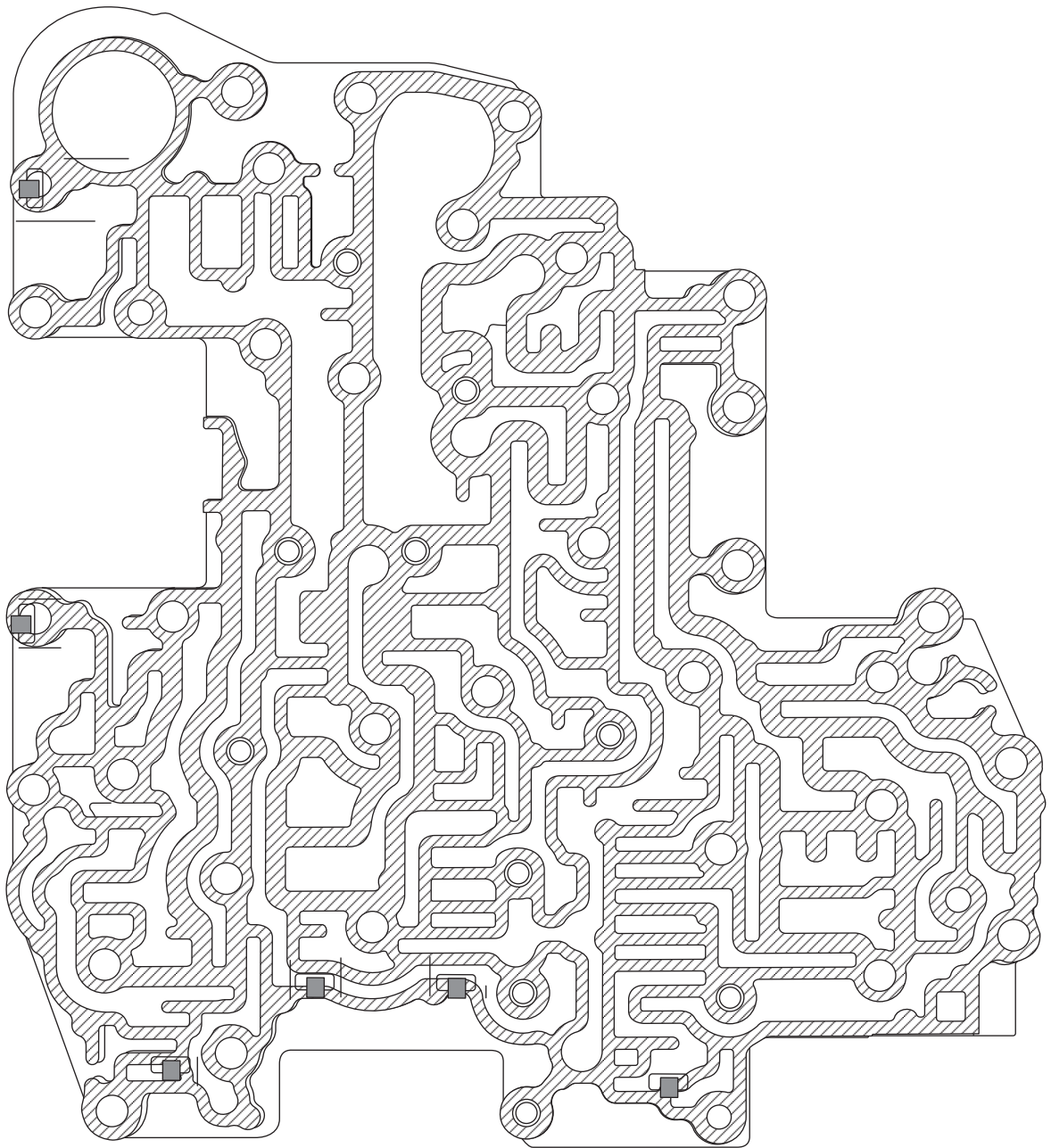
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Figure 64

Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

LOWER VALVE BODY RETAINER LOCATIONS



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Figure 65



Technical Service Information

VALVE BODY & SOLENOID DESCRIPTIONS

UPPER VALVE BODY SPRING SPECIFICATIONS

SPRING NUMBER 302
Free Length = 1.040"
Spring Diameter = .298"
Wire Diameter = .047"
Approx Coils = 13
Color = None

SPRING NUMBER 307
Free Length = .530"
Spring Diameter = .242"
Wire Diameter = .019"
Approx Coils = 10
Color = None

SPRING NUMBER 310
Free Length = 1.038"
Spring Diameter = .352"
Wire Diameter = .039"
Approx Coils = 10
Color = None

SPRING NUMBER 314
Free Length = .950"
Spring Diameter = .427"
Wire Diameter = .043"
Approx Coils = 9
Color = None

SPRING NUMBER 317
Free Length = 1.037"
Spring Diameter = .300"
Wire Diameter = .027"
Approx Coils = 12
Color = None

SPRING NUMBER 322
Free Length = 1.210"
Spring Diameter = .363"
Wire Diameter = .043"
Approx Coils = 12.5
Color = None

SPRING NUMBER 324
Free Length = 1.390"
Spring Diameter = .354"
Wire Diameter = .051"
Approx Coils = 13
Color = None

SPRING NUMBER 326
Free Length = .840"
Spring Diameter = .322"
Wire Diameter = .023"
Approx Coils = 7
Color = None

LOWER VALVE BODY SPRING SPECIFICATIONS

SPRING NUMBER 405
Free Length = 1.177"
Spring Diameter = .382"
Wire Diameter = .034"
Approx Coils = 12
Color = None

SPRING NUMBER 407
Free Length = 1.155"
Spring Diameter = .356"
Wire Diameter = .047"
Approx Coils = 12.5
Color = None

SPRING NUMBER 411
Free Length = 1.040"
Spring Diameter = .352"
Wire Diameter = .039"
Approx Coils = 10
Color = None

SPRING NUMBER 416
Free Length = 1.640"
Spring Diameter = .347"
Wire Diameter = .030"
Approx Coils = 14
Color = None

SPRING NUMBER 419
Free Length = .980"
Spring Diameter = .298"
Wire Diameter = .047"
Approx Coils = 12
Color = None

SPRING NUMBER 422
Free Length = 1.145"
Spring Diameter = .432"
Wire Diameter = .055"
Approx Coils = 10
Color = None

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Figure 66