The 80- 20 Rule

Bob Warnke
TCRA
4.16.16

The 80 – 20 Rule

- 80% of your converters will never have TC issues.
- 20% that have clutch apply or pressure related issues, will likely be valve body or pump control issues.
- 80% of initial apply issues, may be resolved by resetting adapts.
- 20% of your customers will likely claim 80% of the problems.
- 80% of this material is available on-line and 20% is new or verbal.
- 80 pages in print, 20% will may be reviewed today.

Diagnostics and Control of TC Clutch:

1st: Identify the type of converter .
2nd: Identify the condition of failure.

3rd: Options to isolate the problem.

Transmissions included here:

ZF 9 HP 48- Jeep Cherokee, Chrysler 200, Caravan ‘16
ZF 8 HP 45/90, Dodge truck, up to 2500.
GM 6T30/40/45/50
GM 6T70
GM 6L45/90
Ford 6R60/80 & ZF 6 HP

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Type of Converter

- TC clutch design;

  Two path (pass)- Clutch fixed to damper.

  Three path- Clutch fixed to the damper.

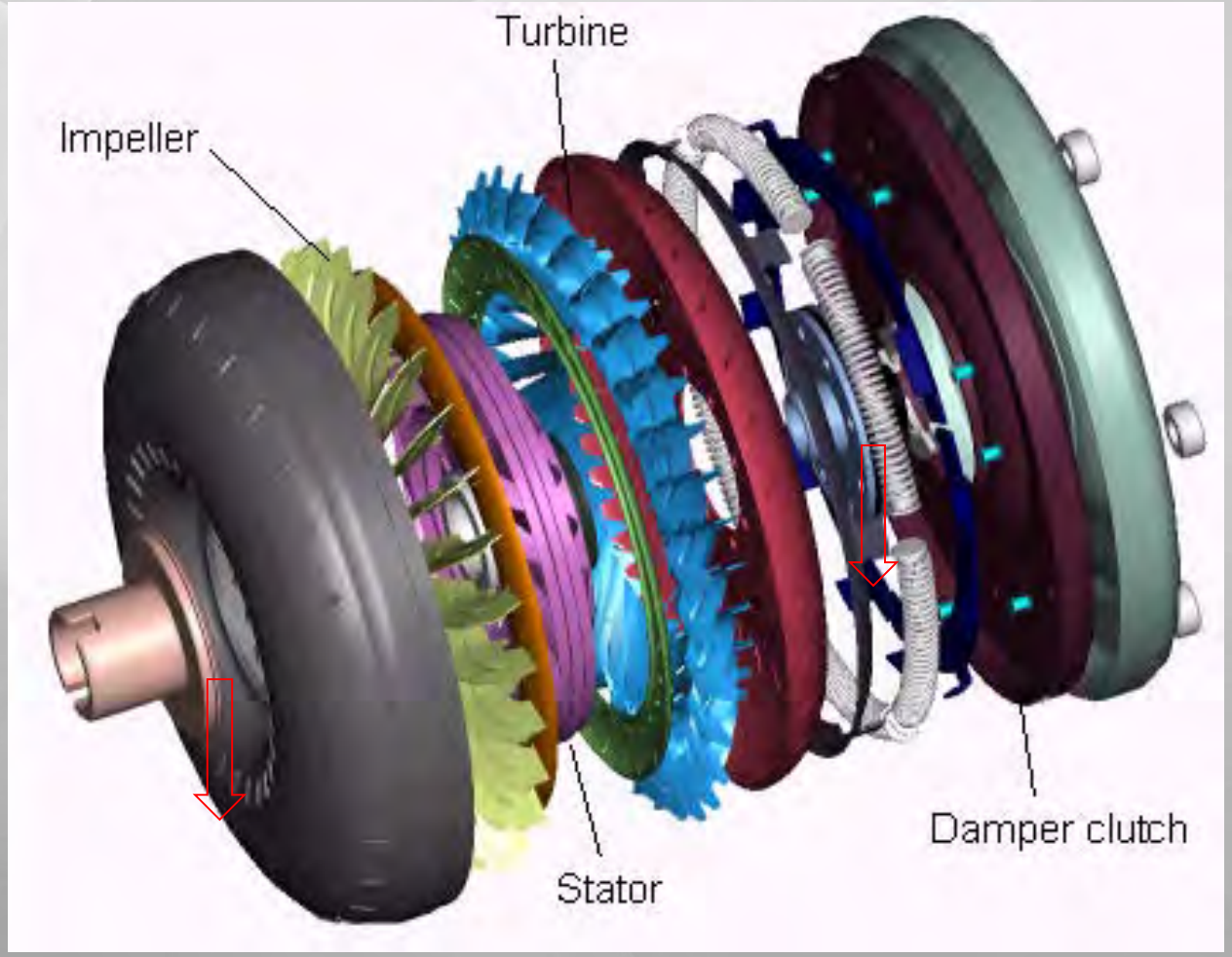
  (AX4S, CD4E, Honda)

  Three path- Clutch fixed to cover.

Two Path

Turbine fixed to Damper or turbine hub.

Examples:
Two Path, Turbine fixed:
4T65E
4L60/70E
4L80E
5L40E
48RE
45/545/68RFE
41TE
TF81SC
U140-U660 etc.
5R55W
4R100
5R110
Three path, Turbine fixed:
CD4E
AX4N
Honda



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ZF 6 HP- 26 – Two path.

Friction loaded

Ford 6F35-Two path

Floating piston

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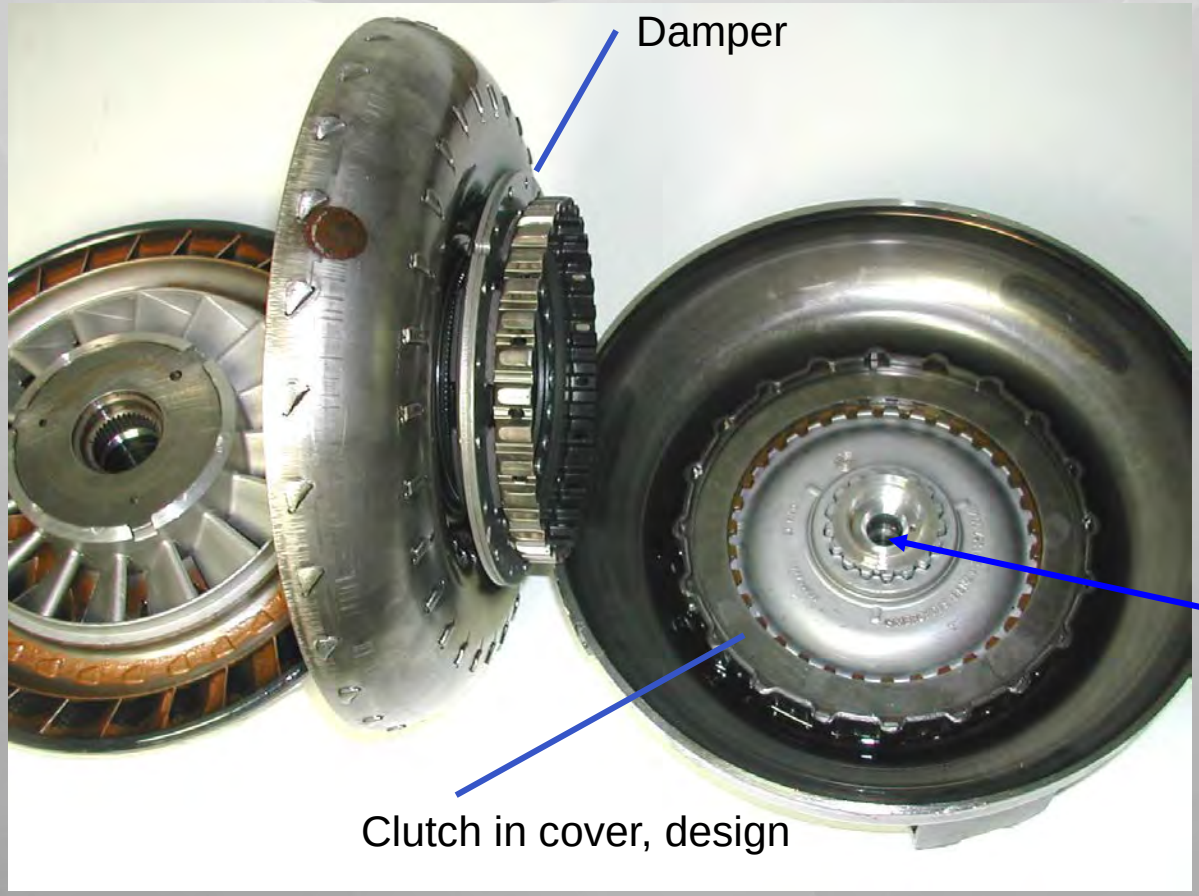
722.6 / 722.9

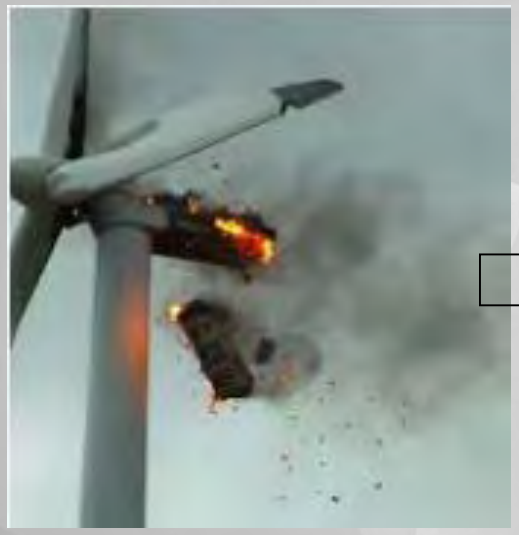
Three path, multi-plate clutch, piston extends from the cover.

Applications:
RE5RO5A
AS68RC
ZF 8 HP
6R140
Etc.



Design concern: Cannot have excess leakage into the piston area or centrifugal force will create piston travel. .

Failure Modes



Run-away Heat

Excess slip or poor pressure control = heat.

Poor flow, excess tolerance = inefficiency.& heat.

Over-load

Excess apply pressure = piston distortion & lining failure.

Overloading = cover distortion.

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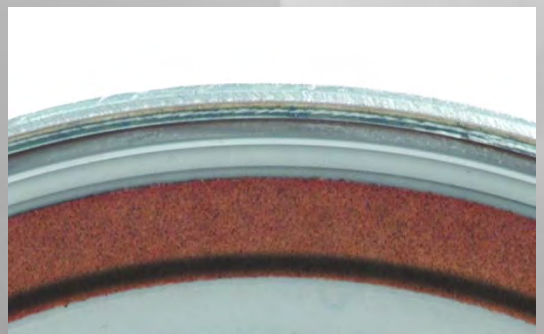
Examples of:
Excess converter charge and apply pressure:

Excess converter charge pressure = cover distortion, ballooning.

Poor material and high pressure = Turbine hub thrust and pulled blades.



Excess apply psi. distorts TC piston. Friction should apply from the outer edge inward.

Excess apply psi. = Bent TC piston

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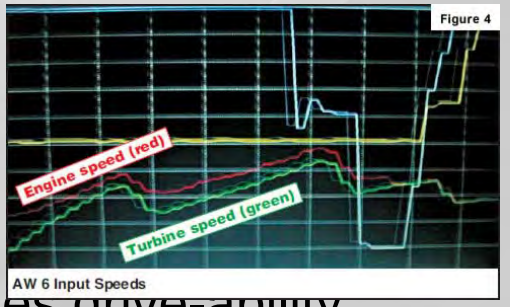
Failure Review

- 100% efficiency, is when the TC piston is locked to the cover.
- A differential in engine RPM to turbine shaft RPM causes heat.
- Smooth gear change requires either slipping/open TC clutch or progressive damper spring rate.
- Converters are remaining applied for tow-haul, mid-sized vehicle engine braking, start stop, neutral idle and may not open during shifts.
- Many CVT's with TCC converters, lock after 15 mph and remain applied.
- Under pressurization causes high stall, poor acceleration,overheat.
- Excess pressure causes TC piston and cover distortion.

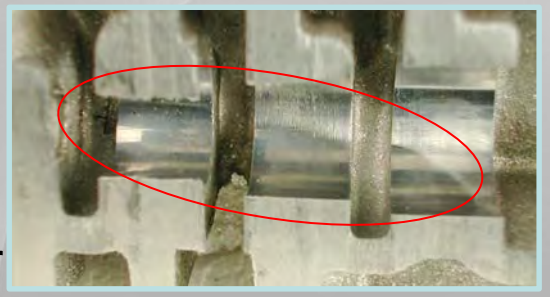
- More speeds and reduced converter slip improve economy.

- More shifting and control over converter clutch slip, leads to increased valve body and solenoid activity.



- Shift overlap, without TCC slippage, causes drive-ability problems.

- As the valve body & TEHCM wear, shifting and converter control is lost.



- The TCM or TEHCM can only adapt for point.

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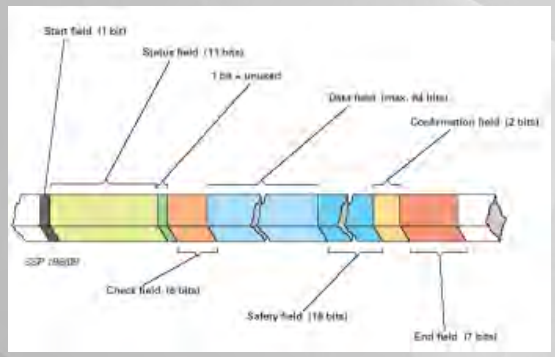
Isolating control issues:

- Programming vs. TCM vs. Solenoid vs. Hydraulics.

- Checking cooler flow and release pressure indicate two different issues.

What is the root of the problem?



Computer program and VIN match.

Audi- ZF 6, TCM, Contamination and terminal solder issues.

ZF 6- Pump circuit cross leaks.

6T30, solenoid contamination

Valve bore wear

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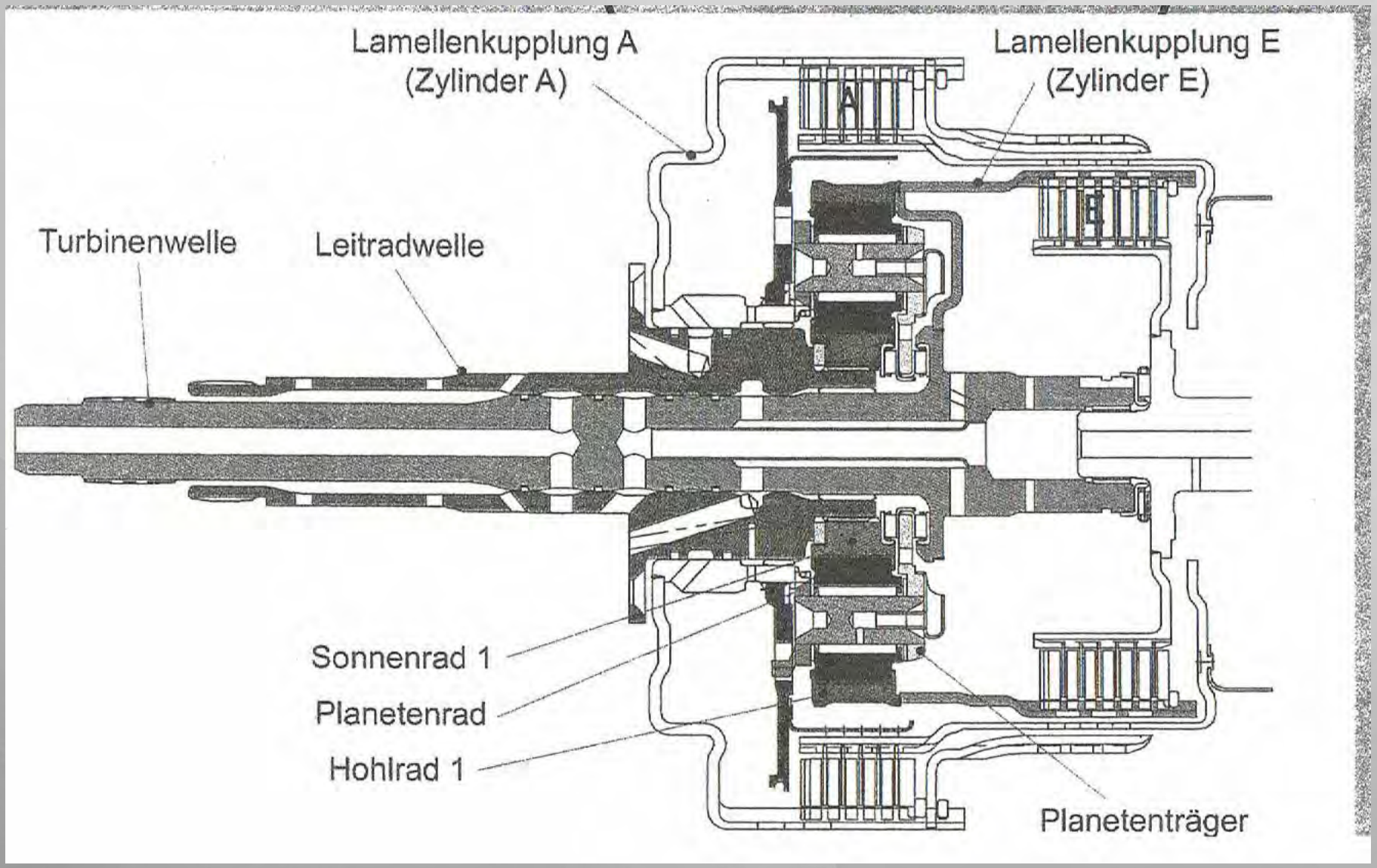
Lamellenkupplung A
(Zylinder A)
Lamellenkupplung E
(Zylinder E)
Turbinenwelle
Leitradwelle
Sonnenrad 1
Planetenrad
Hohlrad 1
Planetenträger

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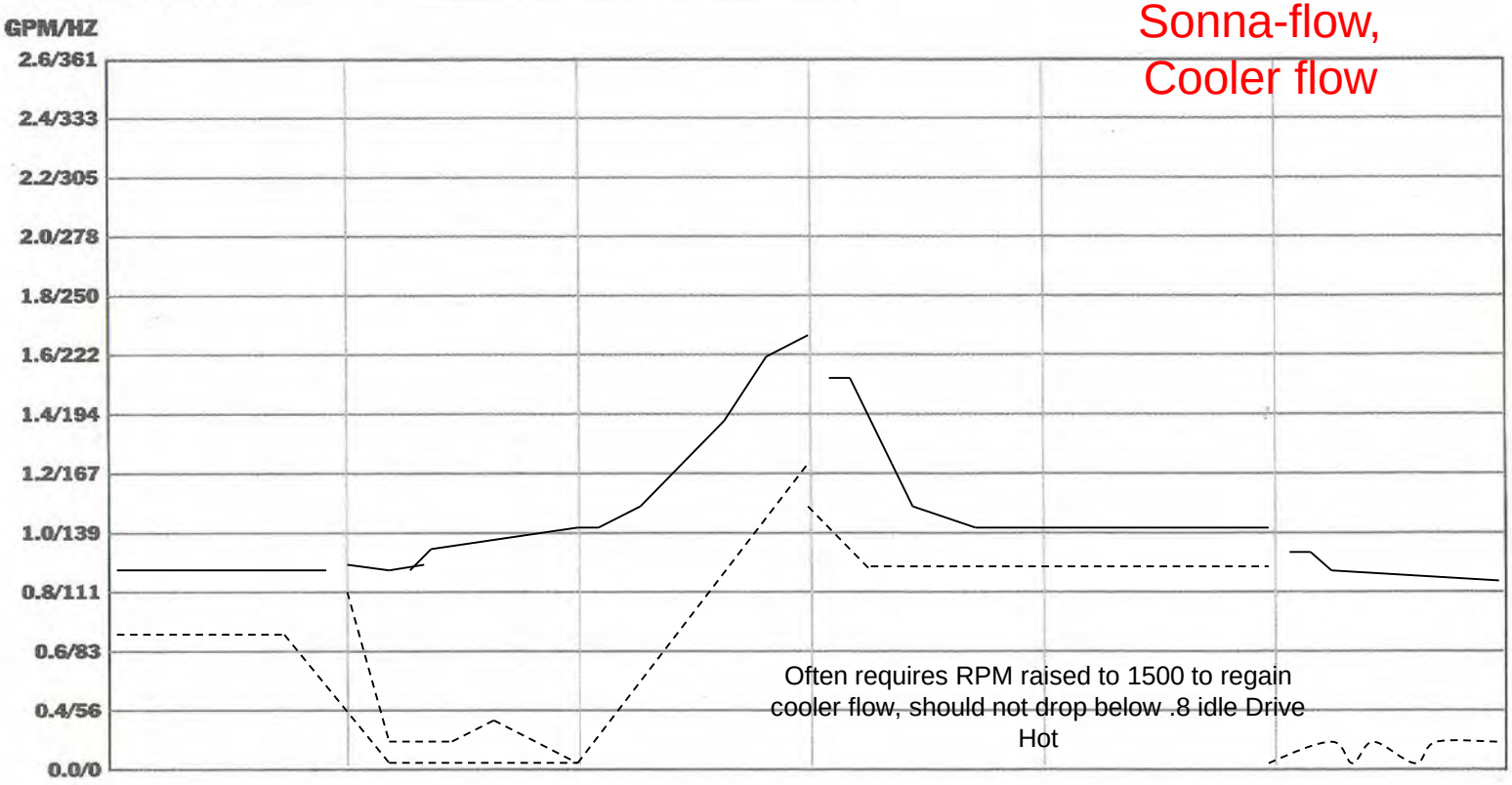
APPLICATION: **HONDA** 4 & 5 speeds, Odyssey Illustrated.

Sonna-flow,
Cooler flow



Event:

Condition:

Poor release oil flow ---------- Proper release oil flow ——————

Correction:

Notes: Prior to Sonnax line to lube pressure regulator valve –90892-04K, operating temperature high 240-360f.

After valve body upgrades –180f. Maximum Concerns, TCC lining failure, overheat code, TC 740 Code, TCC shudder

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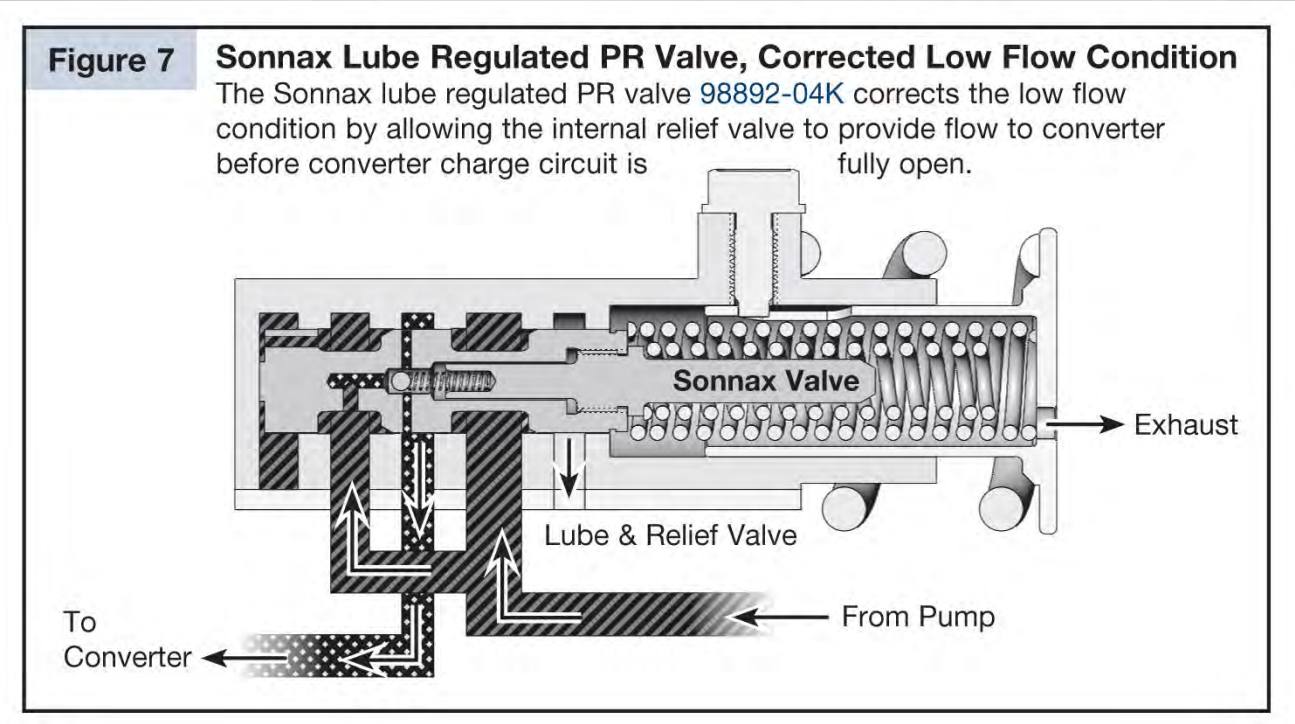
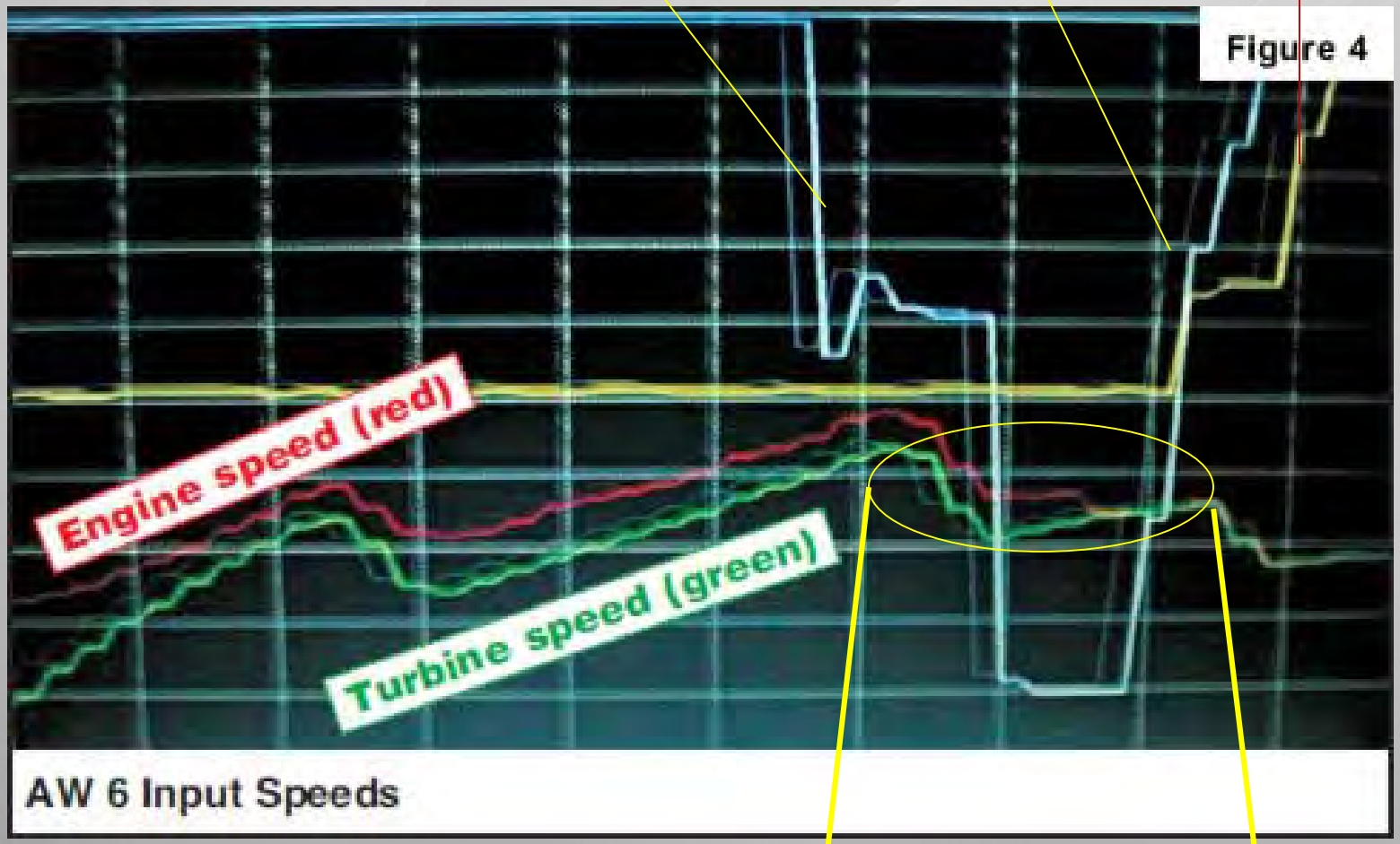
Honda; Line to lube pressure regulator valve. Honda utilizes a three path converter.



3 solenoids are actuated in this .8 seconds
Vent to Exhaust, Clutch apply, and TCC apply



During the shift ,TC slip is opened.

After shift ,TC is closed.

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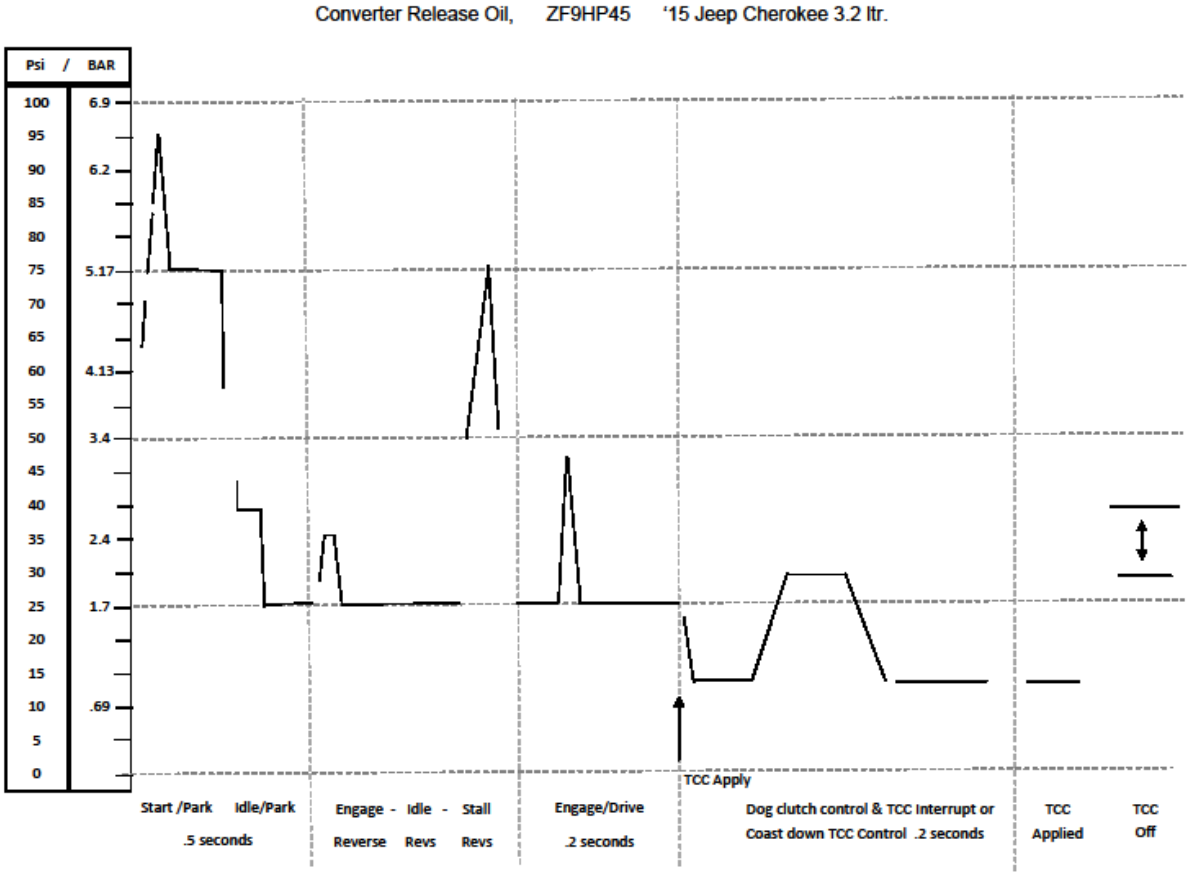
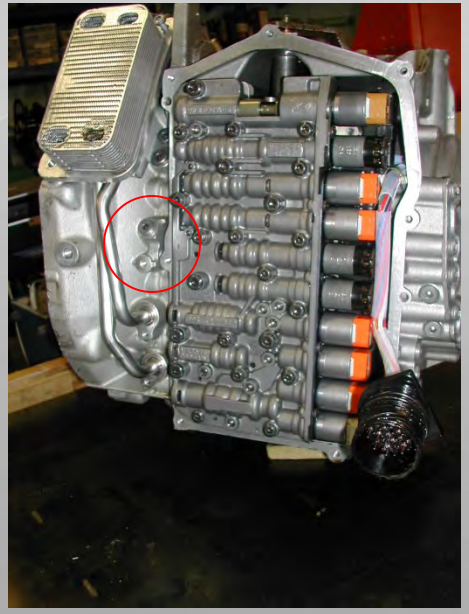
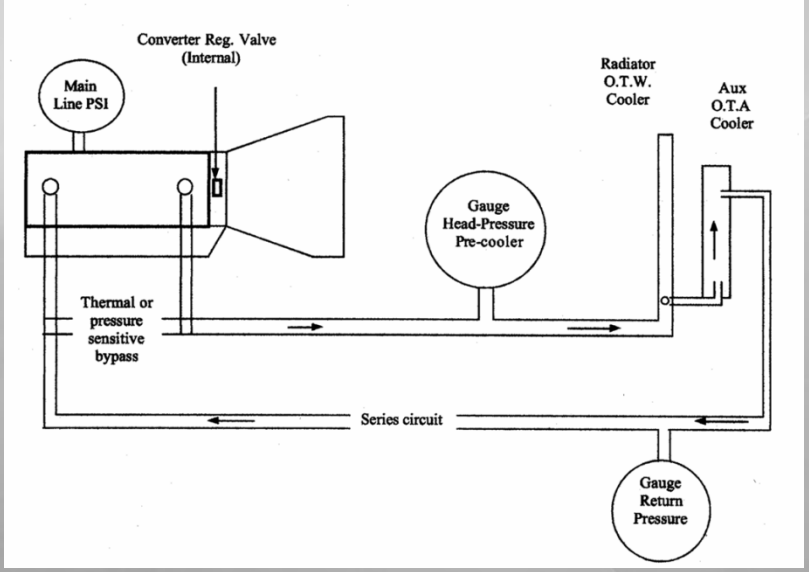
ZF 9 HP48- Converter Release Pressure Test Data





Converter flow is required to control heat.
The pump and valves control pressure and flow.
Testing flow indicates:
TC clutch release clearance
TC valve position and orifices.
Pump and filter capacity.
Condition of converter feed and exhaust.
Cooler restriction



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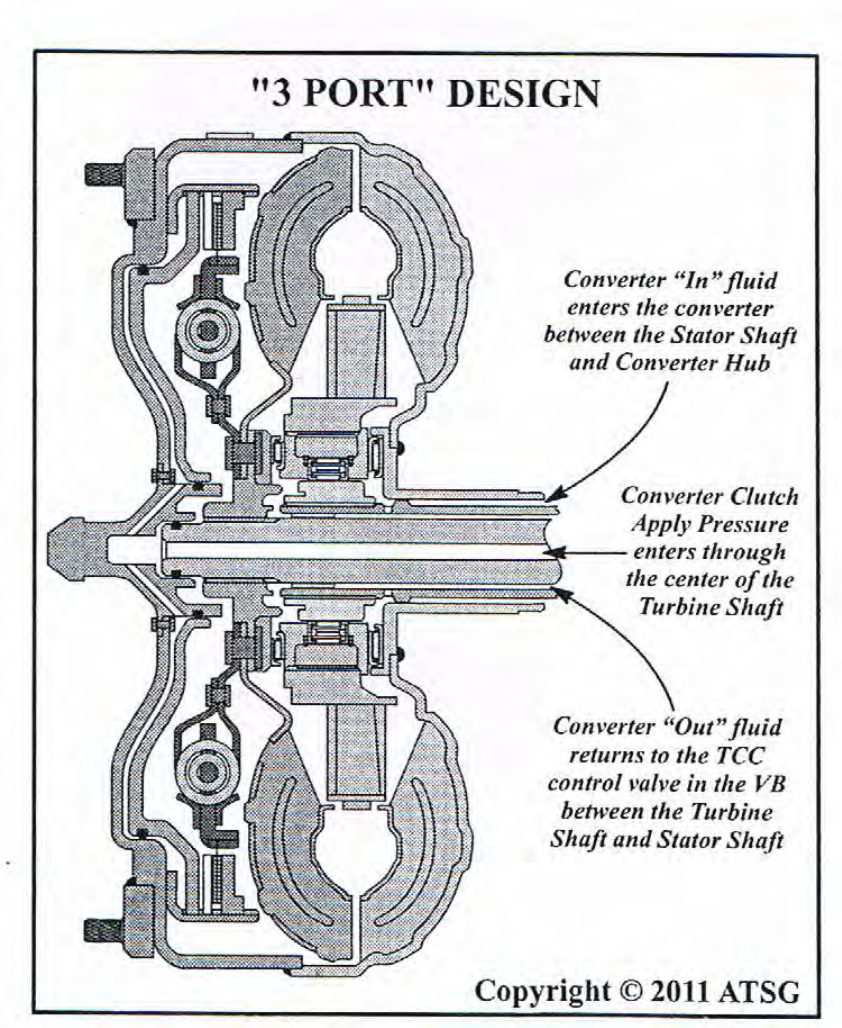
Three path oil flow
TR60SN, ZF 8HP, AS68RC, 722.6/9, RE5RO5A, 6R140.
Piston fixed in, moves away from the cover



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Need to become familiar with the controlling inputs and data obtainable from the transmission.

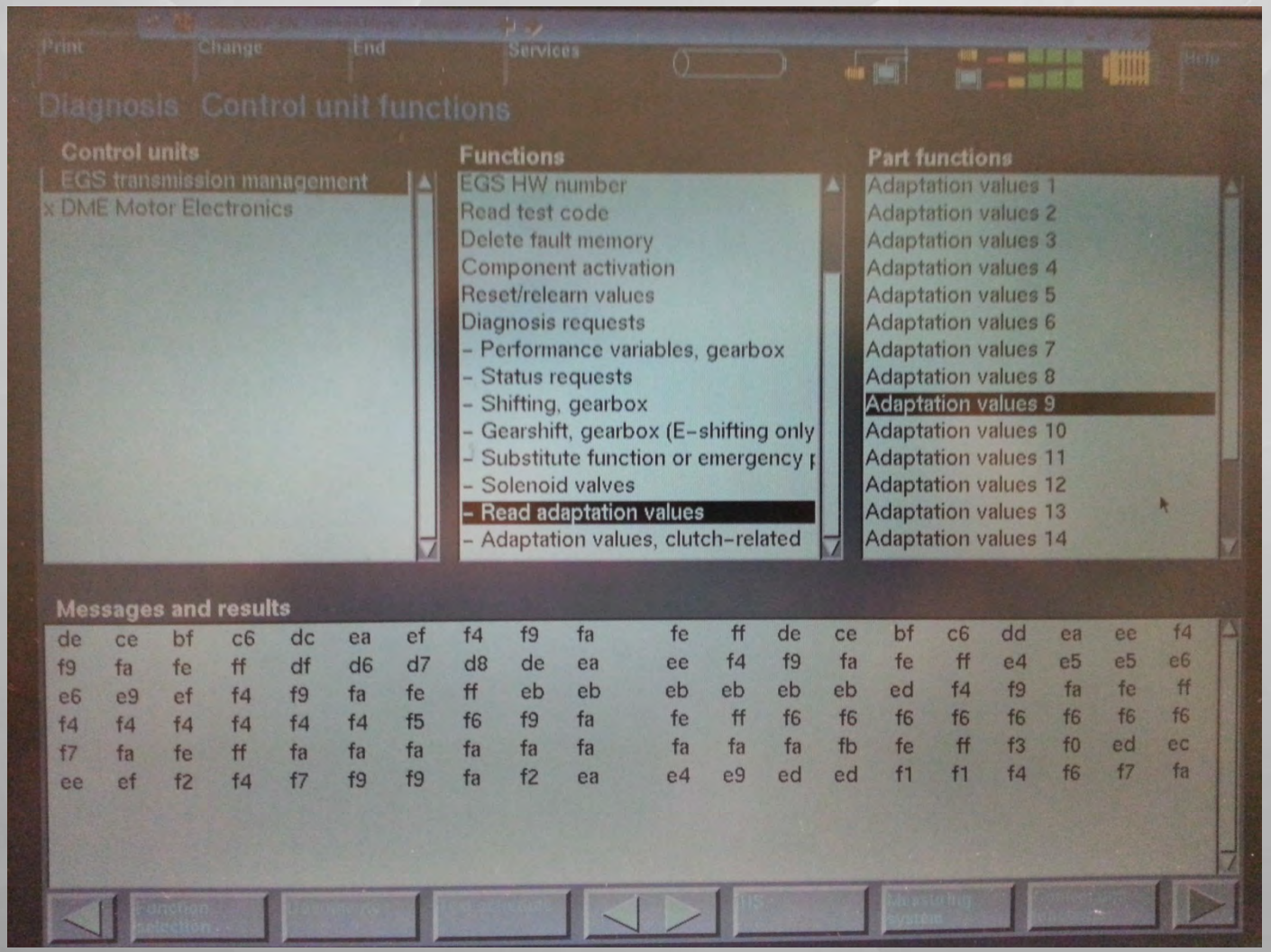
Scanner information from a road test may not be sufficient!

- Calculated torque is more important today.
- Speed sensor input and tire size/pressure.
- TC slip RPM.
- What is normal? When is TC supposed to be open /closed ?
- TC solenoid control. The need to scope known good.
- Converter pressure. “ “
- Cooler flow “ “
- Factory updates?
- After-market experience?
- Is this a two path or three path converter?

Programing Terminology

- Reprogram: This is required to match the VIN, when a Mechatronic or TCM has been replaced.
- Re-flash: OE manufacture has developed a software update to improve or overcome a drive-ability complaint in an existing program.
- Reset Adaption: This brings OE program back to base level and restarts the learning process over.
- Quick Learn: Fast learn process, much of which is static or first shift sequence.
- Adaption: A long learn process. Must obtain operating temperature before it will start adaption. Generally require 10 up/down shifts under all throttle angles to be as required and comfortable.

Example of ZF 6, TCM Adaption



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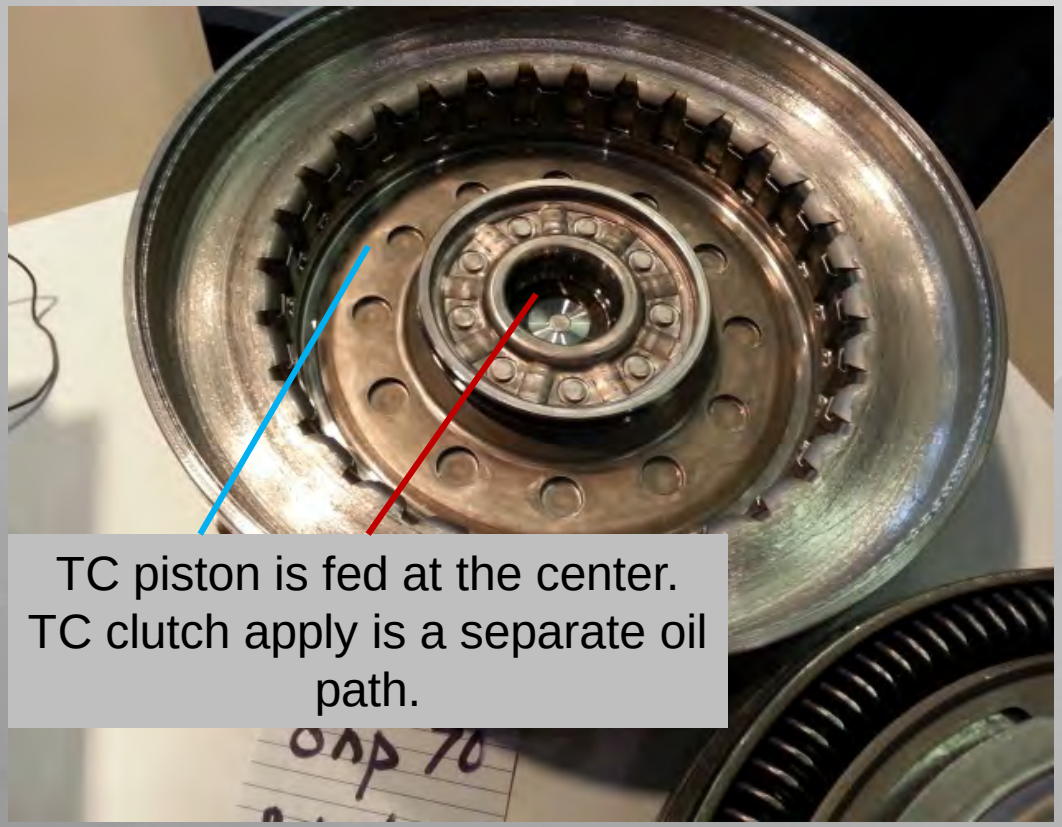
Unit Specifics

ZF 8 HP 70/80 Converter
Dodge 2500 truck and BMW 5/X series

This is a three path converter, clutch is within the cover



TC piston is fed at the center.
TC clutch apply is a separate oil path.

TC clutch damper

Multi-plate clutch

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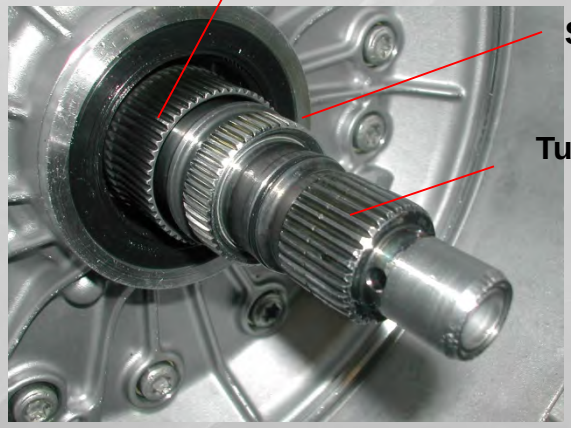
ZF 8 HP 45/70
Dodge, Jeep 2011 >
Three Path Converter



- ZF 8 HP could have the optional A clutch dis-engagement (neutral at stop). The units will have a nitrogen accumulator in the pan. This charges lube and pump pressure at idle in drive. This type of system will also affect converter load at idle, as the A clutch is brought back on. NVH will be a “point of concern” on this as well as other units using Neutral in Drive.

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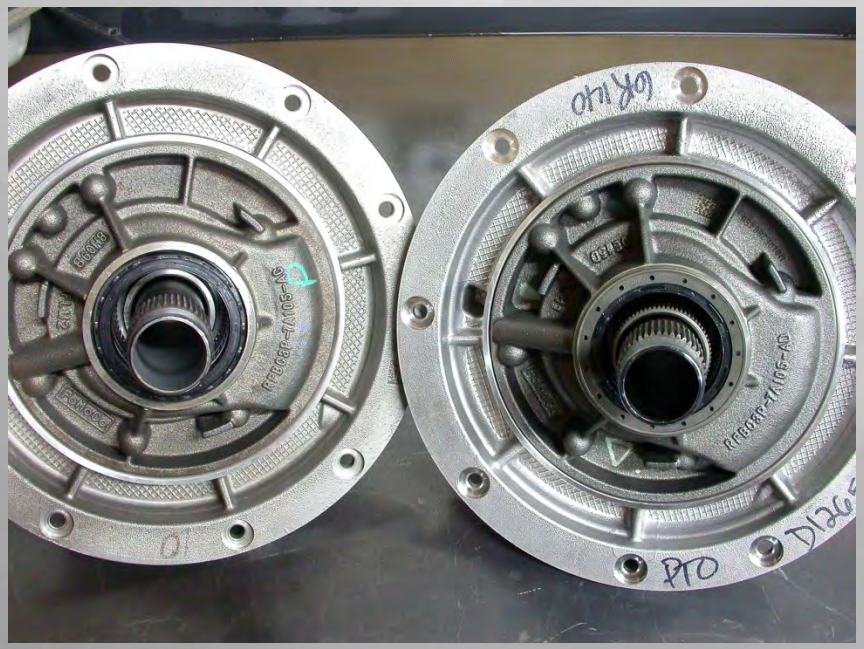
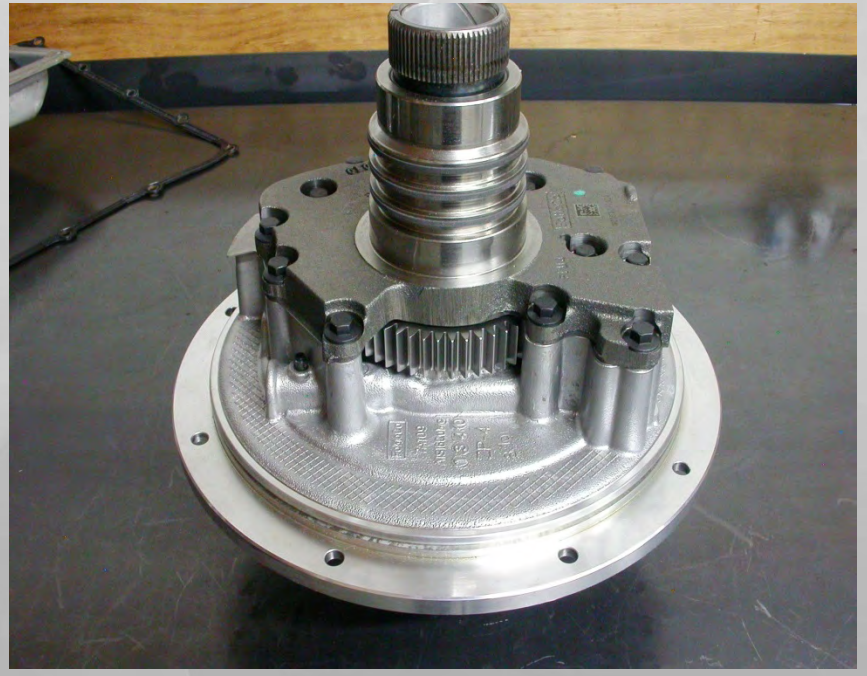
6R140 pumps





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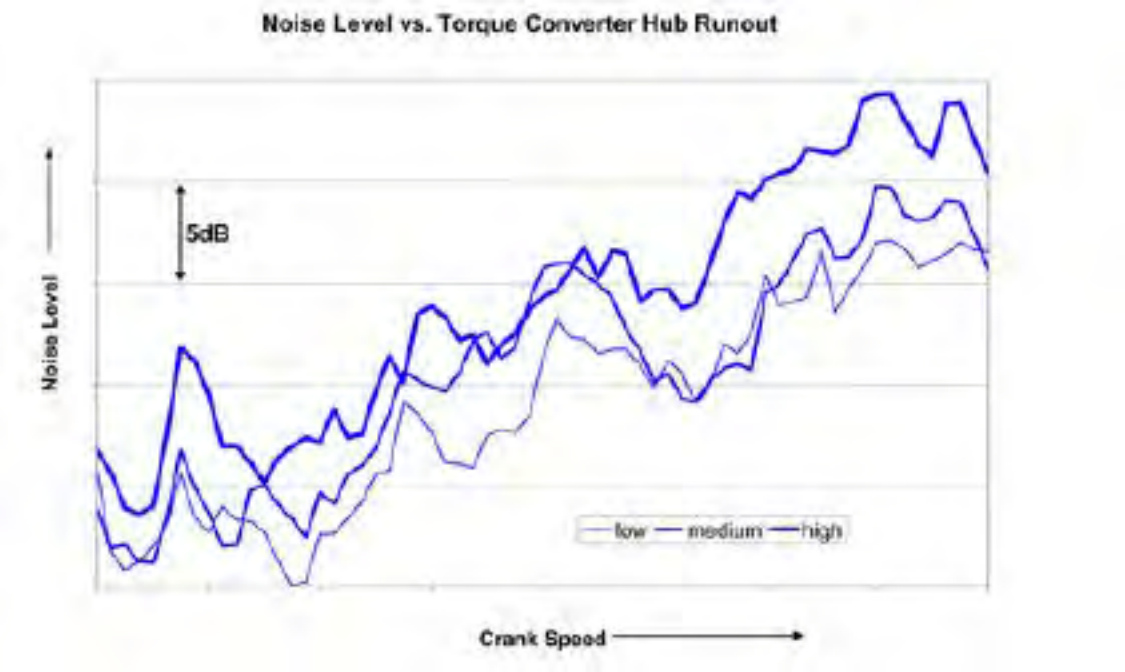
ZF 8 & 6R140 Impeller hub
(similarity and precautions)



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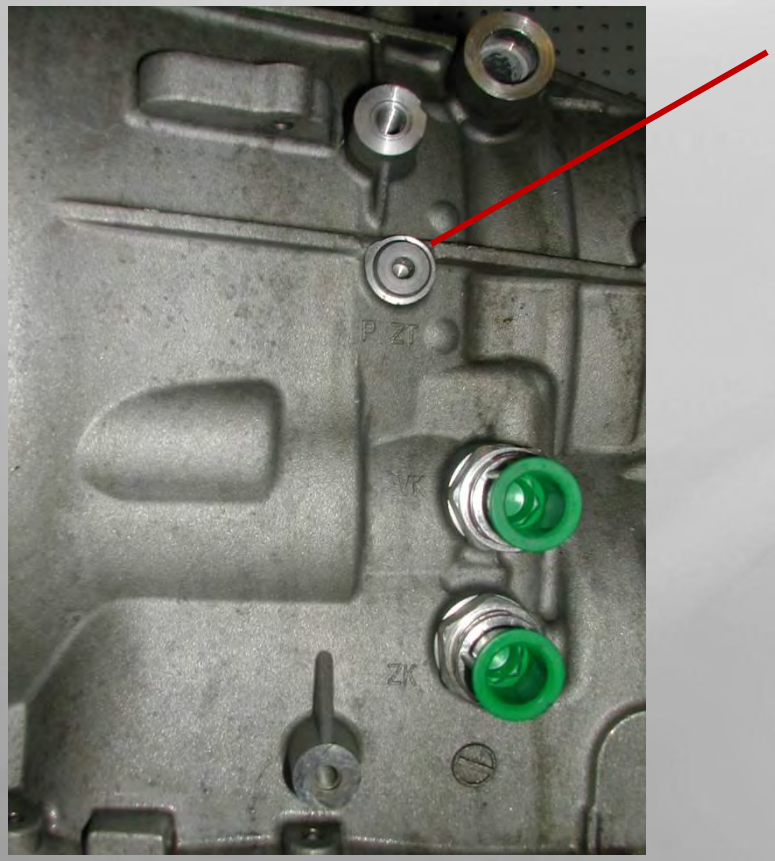
ZF 8HP Converter release pressure



P ZT tap is the only pressure port available. It monitors converter charge, in this three path converter.

Monitoring converter charge is an indication of pump, filter, pressure regulation, lockup valve, solenoid and the converter clutch piston seal condition.

OE notes minimum of 15 psi. or 1.0 bar, max of 87 psi. or 6.0 bar. That min/max will depend on SV/ TCC valve position.

Past experience: Any leaks within the converter, stator or valve body that allow residual oil to become trapped behind the TC piston will create a partial clutch apply, because of centrifugal force. That can result in harsh shifts or driveline vibration. (NVH)

VK top cooler line: To cooler
ZK bottom cooler line: Return from cooler

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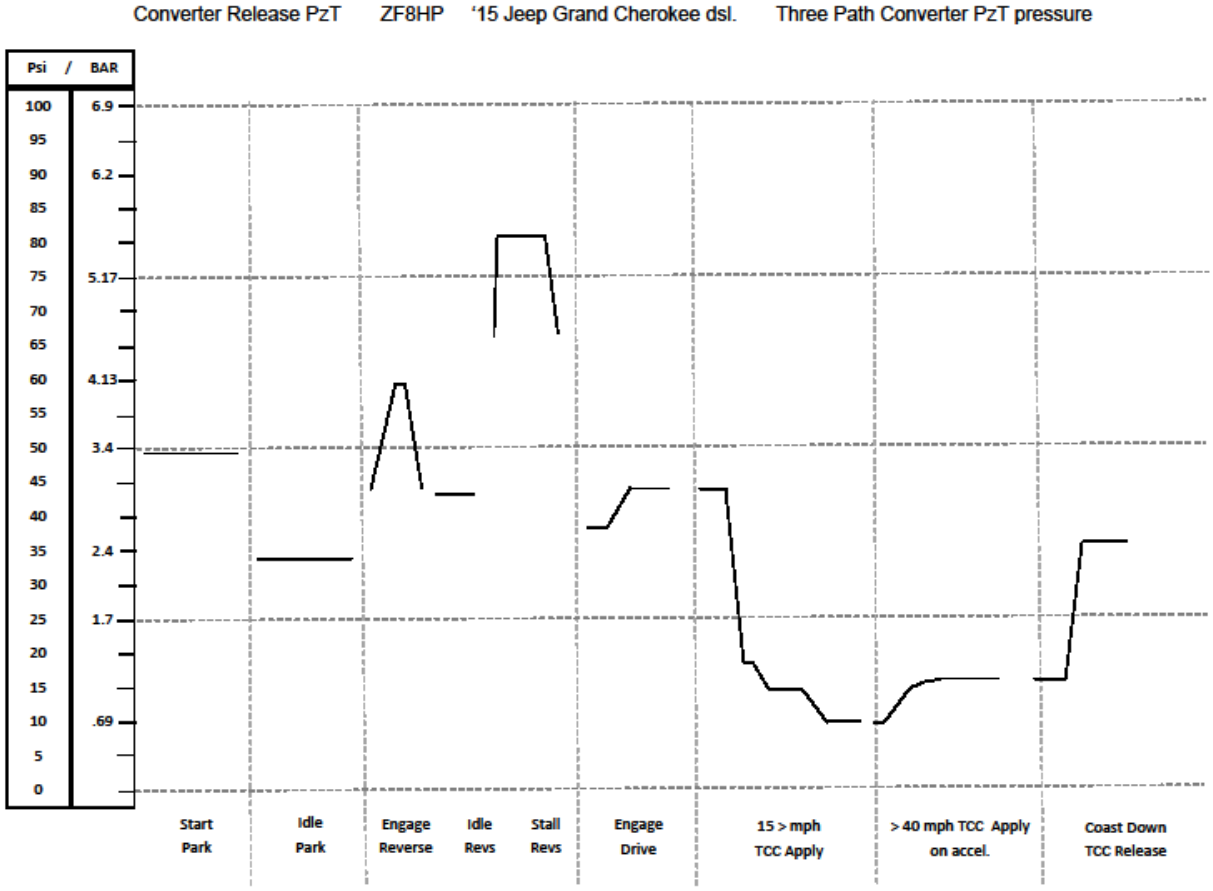
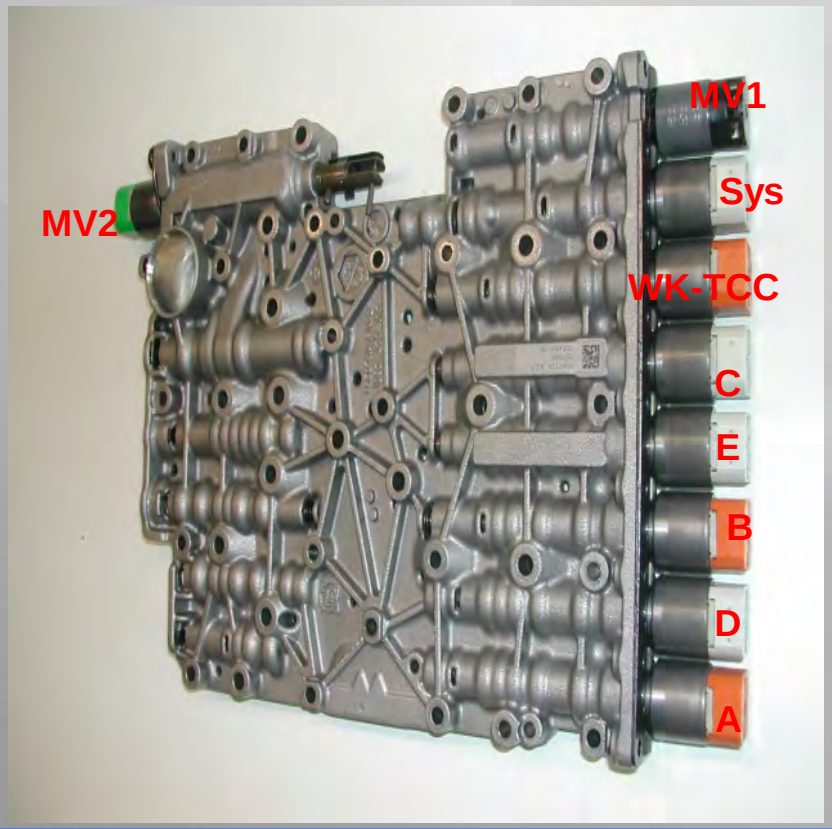
INSERT

ZF 8- Converter charge pressure. Pz T

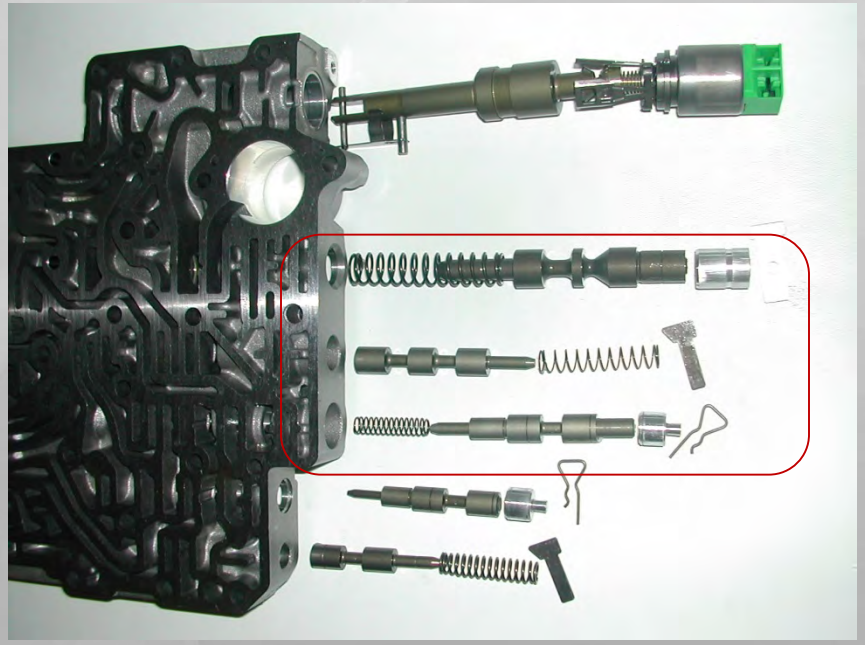


ZF 8 HP Mechatronic
TCC factors:

WK- Is the TCC solenoid



Red; Valves in the ZF8, that affect TC control and TC apply. This is a three path converter!



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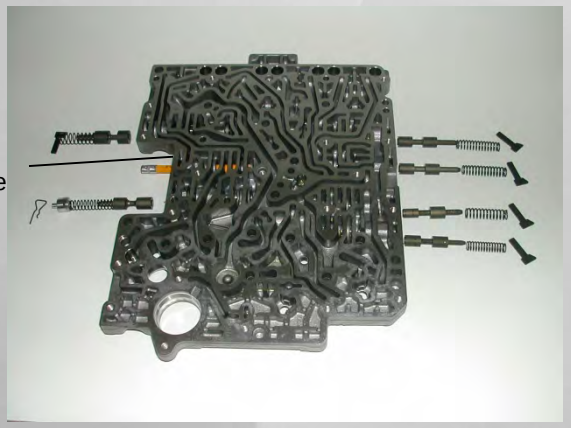
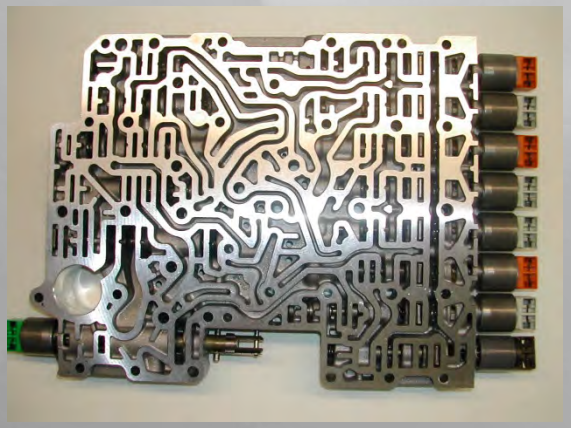
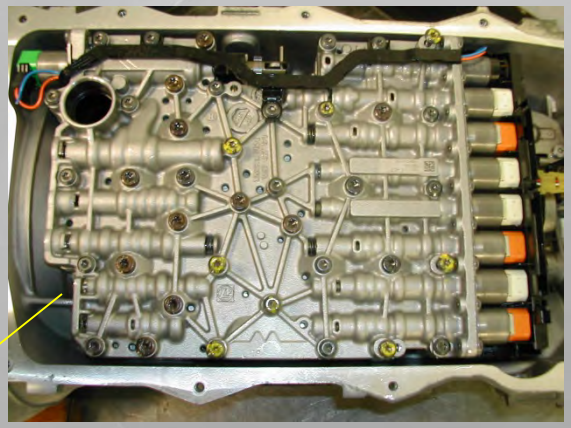
ZF 8 HP 45

Noted problems:
Solenoid failure, Clutch regulator and solenoid regulator bore wear.

No valve here in this application.







Yellow Painted heads, remove VB from case.

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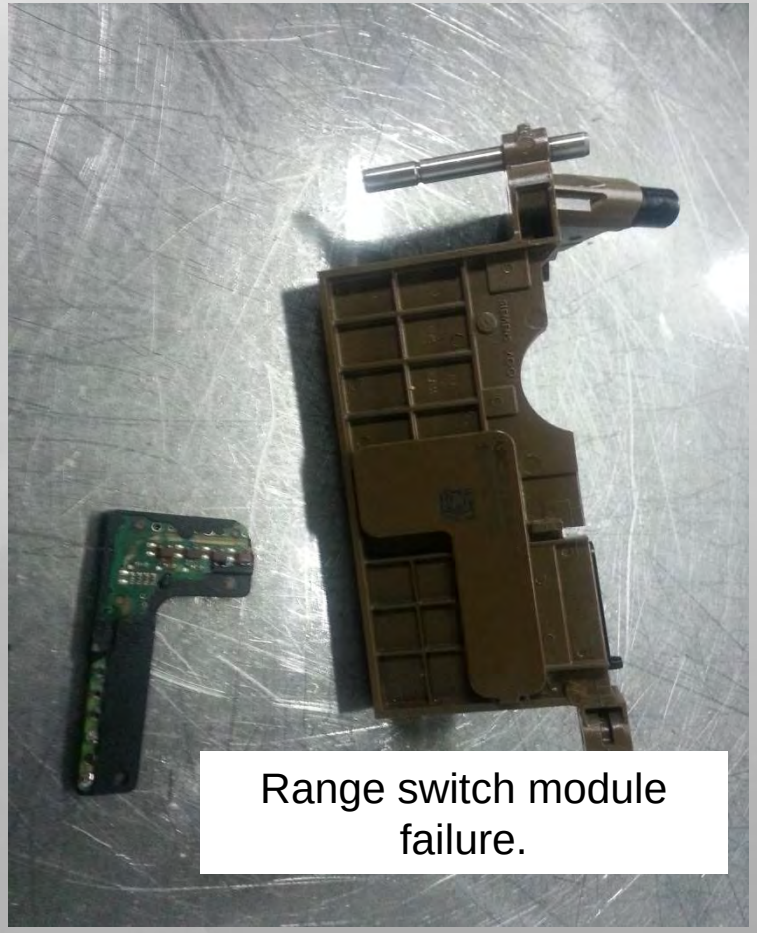
ZF 8 TCM Issues

Loose termination solder points.



Range switch module failure.

GM 6T30/40, and 6T70 Scanner,

Focus on these parameters:

- Tap Cell # :

  0 to 4, no adjustments or concerns

  5 to 10, adaption in process, reset and monitor rate of adjust.

  11 >, Concerns; possible codes in history files.
- Check Input signals.

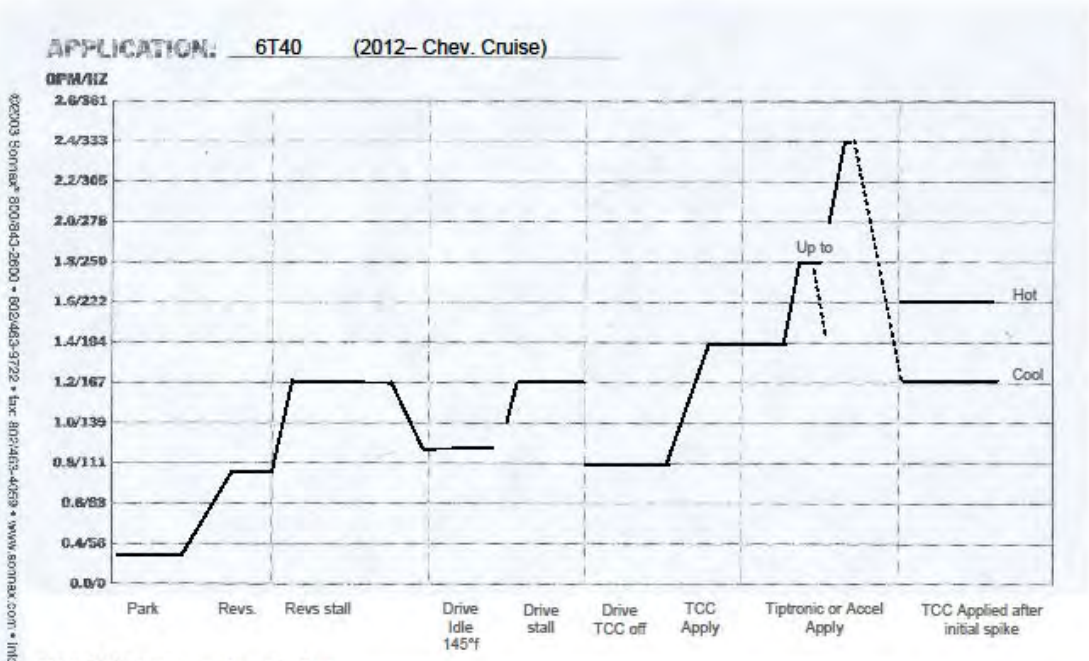
  3/5/Rev material collects on the input magnet first.
- Clutch shift time:

  Normal is .2 to .8 seconds.
- Monitor TCC slip rate:

  Normal is 18 to 30 RPM w/ light accel.

  Full apply/cruise will go to -0-.

6T40 Cooler flow



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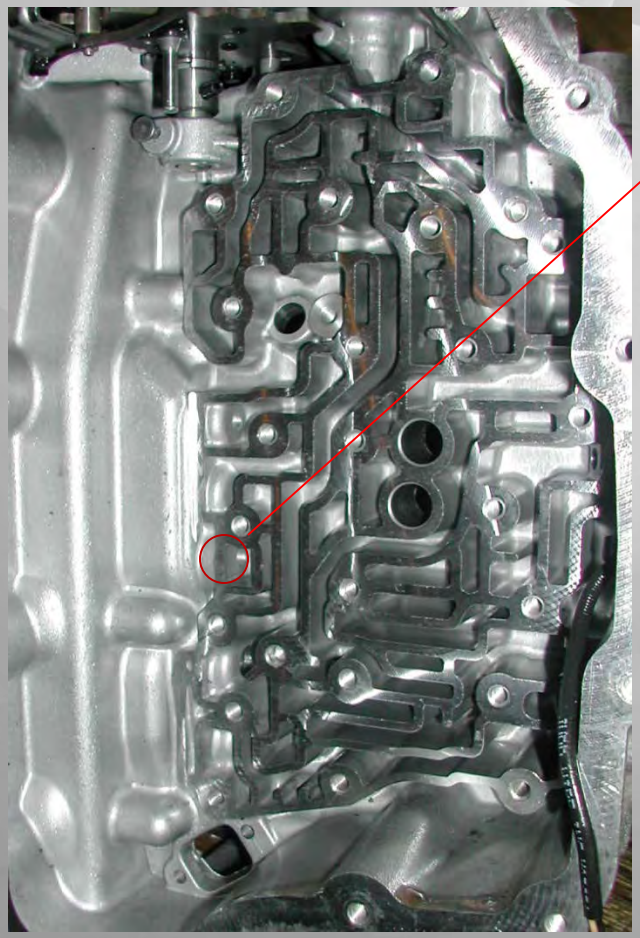
6T30/40

No Lockup, Code 741

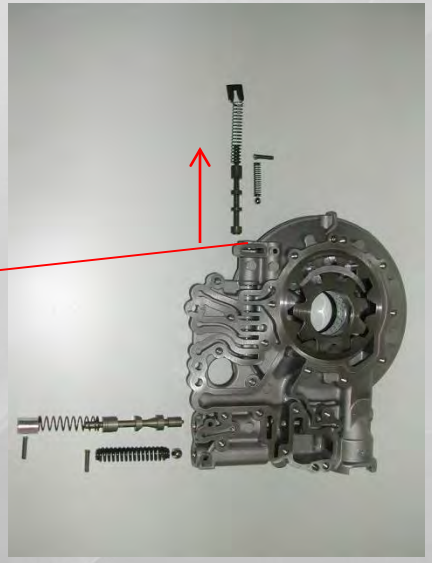
Before transmission removal: Check cooler flow !

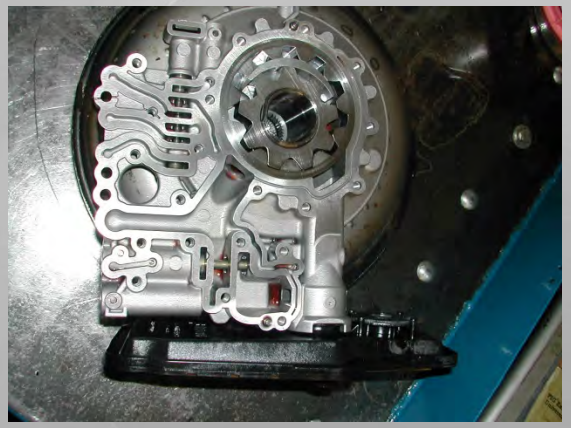
After cooler flow, remove TEHCM and air check TCC valve.



Low air pressure supplied here:

Should stroke TCC control, then valve should return.





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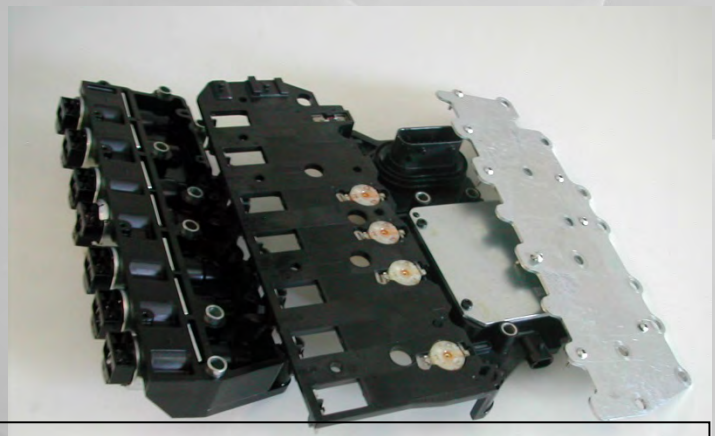
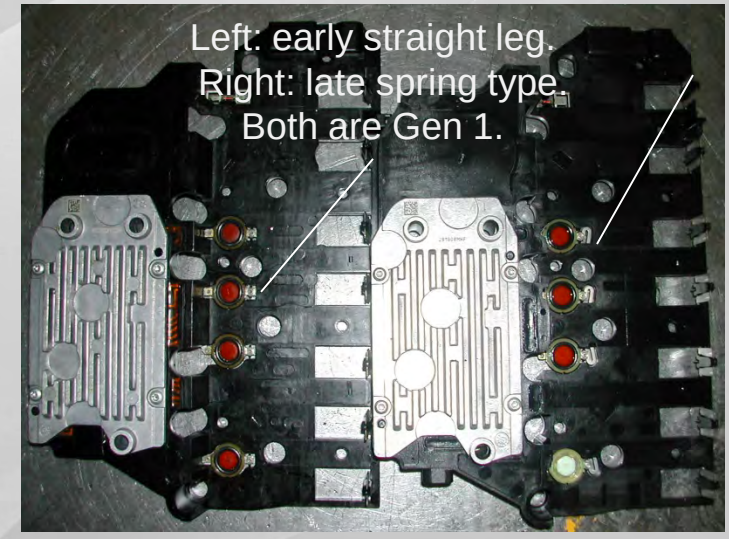
6T40 Pressure switch failure.

Gear ratio or implausible gear codes.



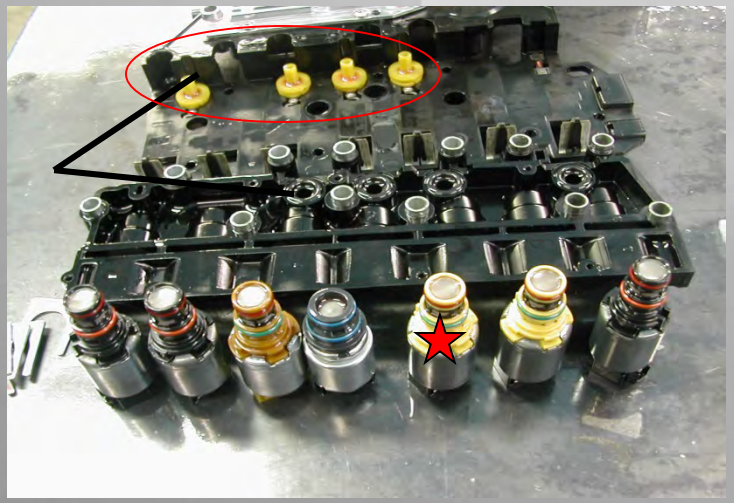
Gen 1, Early, without thimble type switch

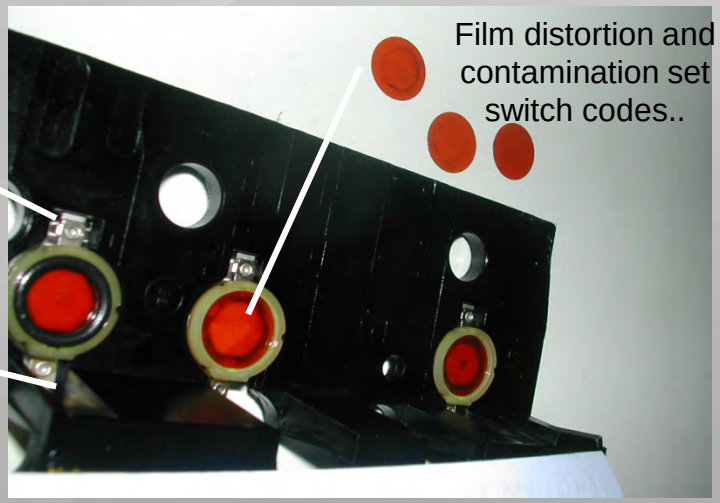


All switches are N.C. Normally closed.

Place ohm-meter lead outside each leg rivet.

Push on film with pencil eraser. Switch should open.





Gen I, Late thimble and o-rings.
Star is TCC solenoid

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6T40/50 Solenoid Components

Contamination is a problem when the 3 5 Rev waive plate breaks.

1. Solenoid retainers can be pulled out, once the gasket is removed.
2. Solenoids can be opened to clean, by bending back the crimp on the can.
3. Solenoids are coded. Each flow rate number on the canister, is programmed into the TCU. Exchanging requires adaption and/or re-flash.

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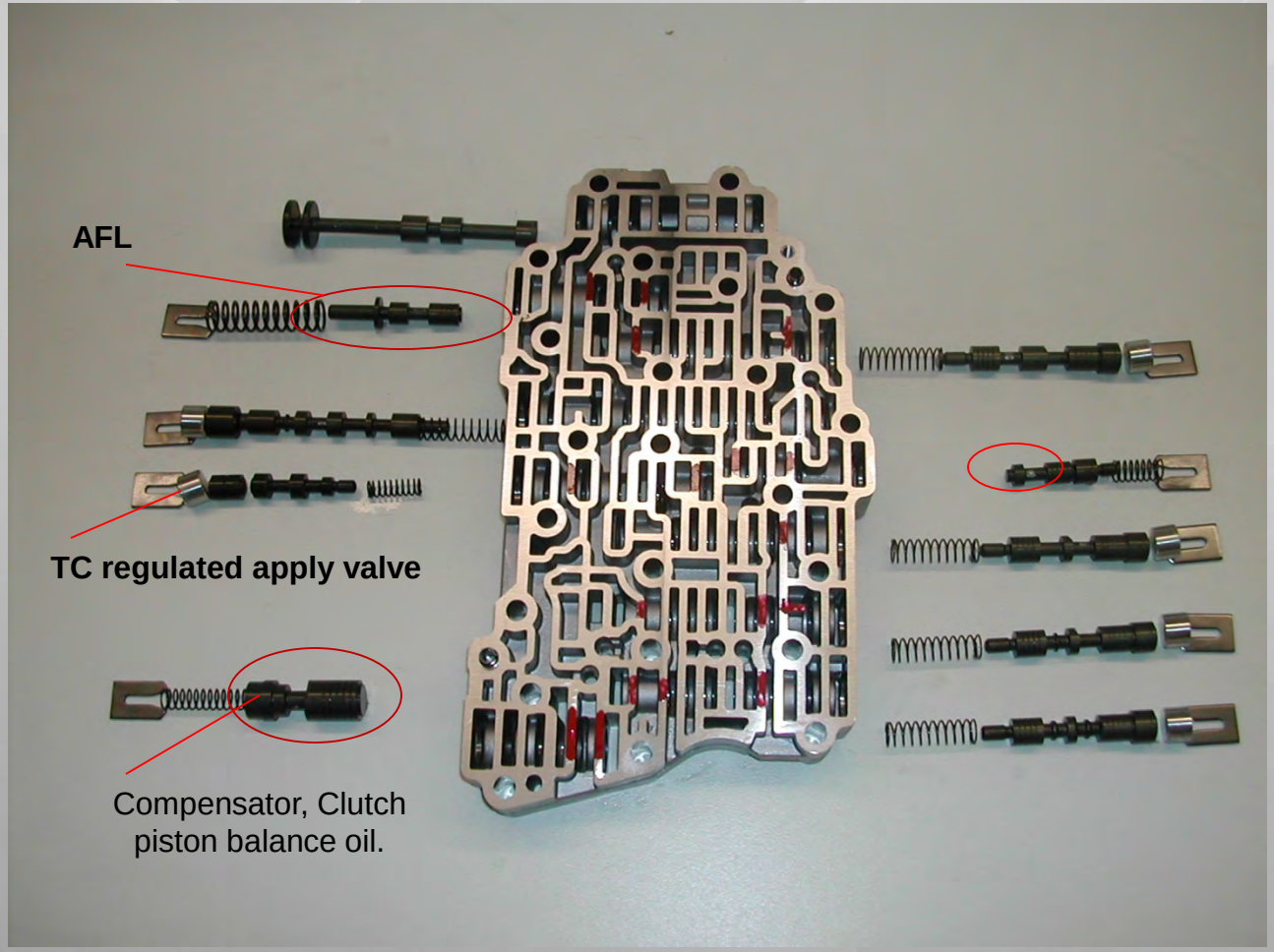
6T30/40- Vacuum test at the red lines on casting. Common valves with bore wear.



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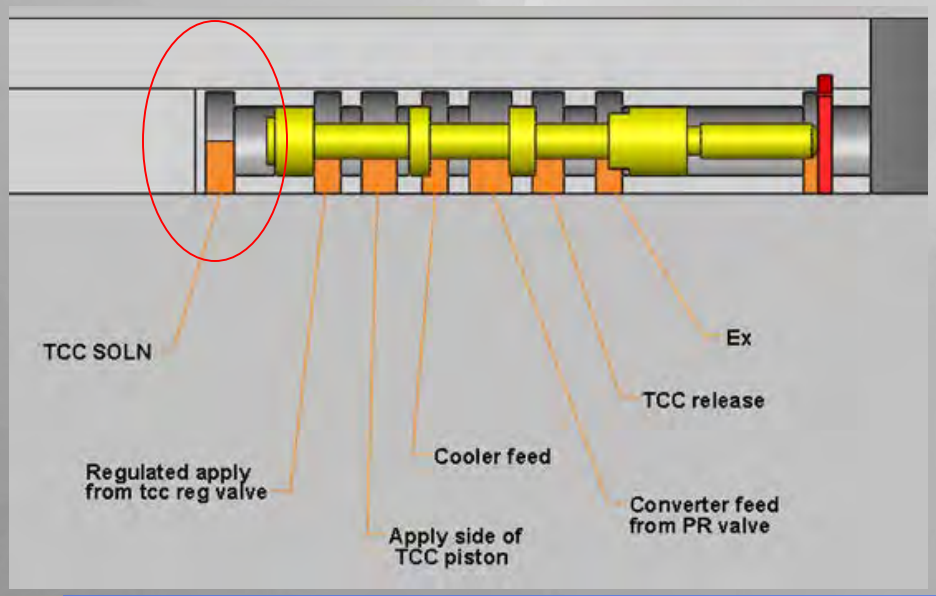
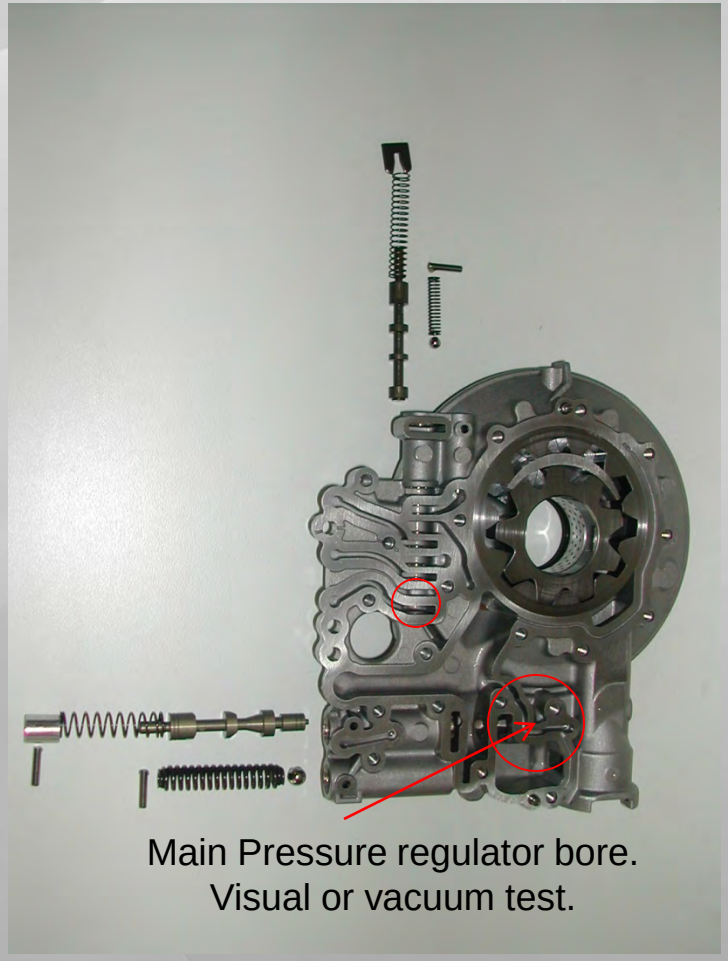
6T30/40 Pump and Valves.

Known to develop bore wear at these locations:

Example: TC control starts to move at 16 psi. At 22 psi it is at full stroke. If the bore is worn or the TCC solenoid feed is bad, the valve may stall part way which cuts off converter flow.





Main Pressure regulator bore.
Visual or vacuum test.

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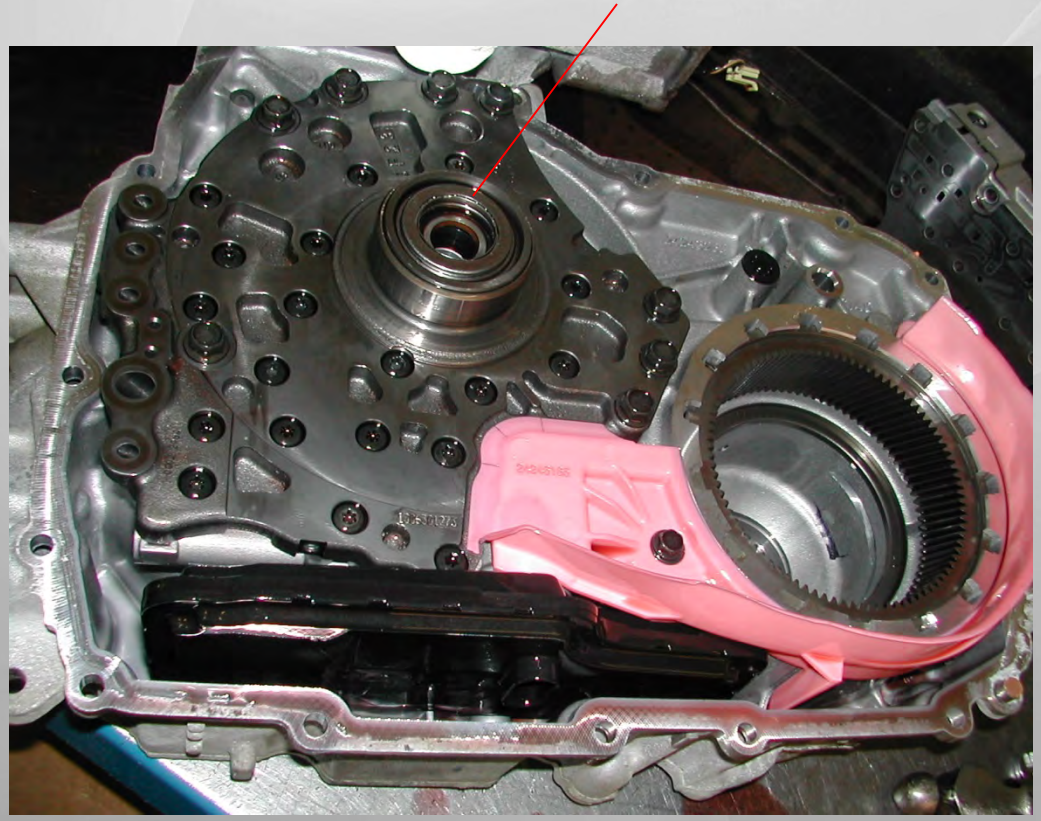
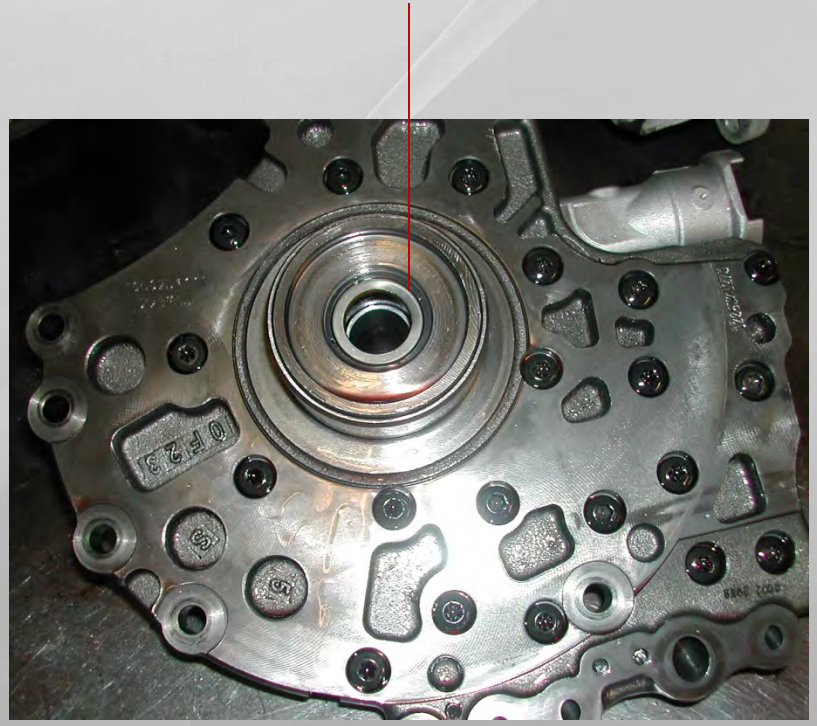
6T30/40 Turbine Shaft, TCC seal.

Caution, not to damage this seal when loading the turbine shaft and case half.



6T30/40 No TCC application and or Code 741: Post repair, metal clad seal damage

Converter turbine hub seal to turbine shaft.



Pump stator seal. Easily damaged as bell housing is lowered onto the lower assembly.

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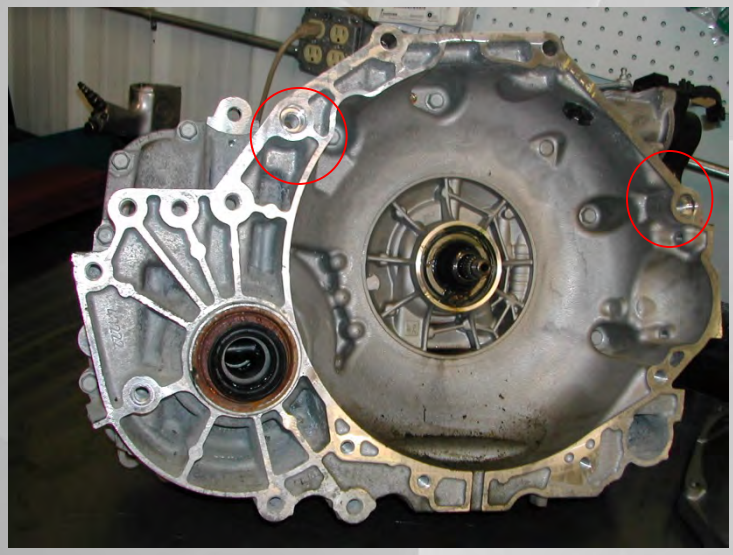
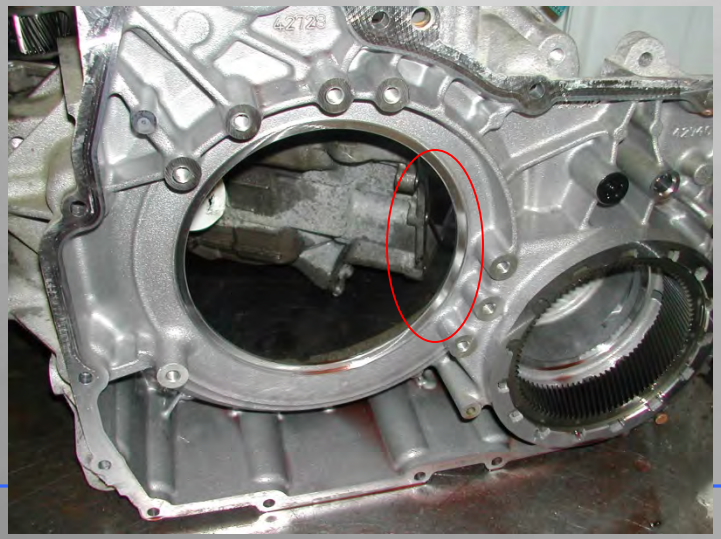
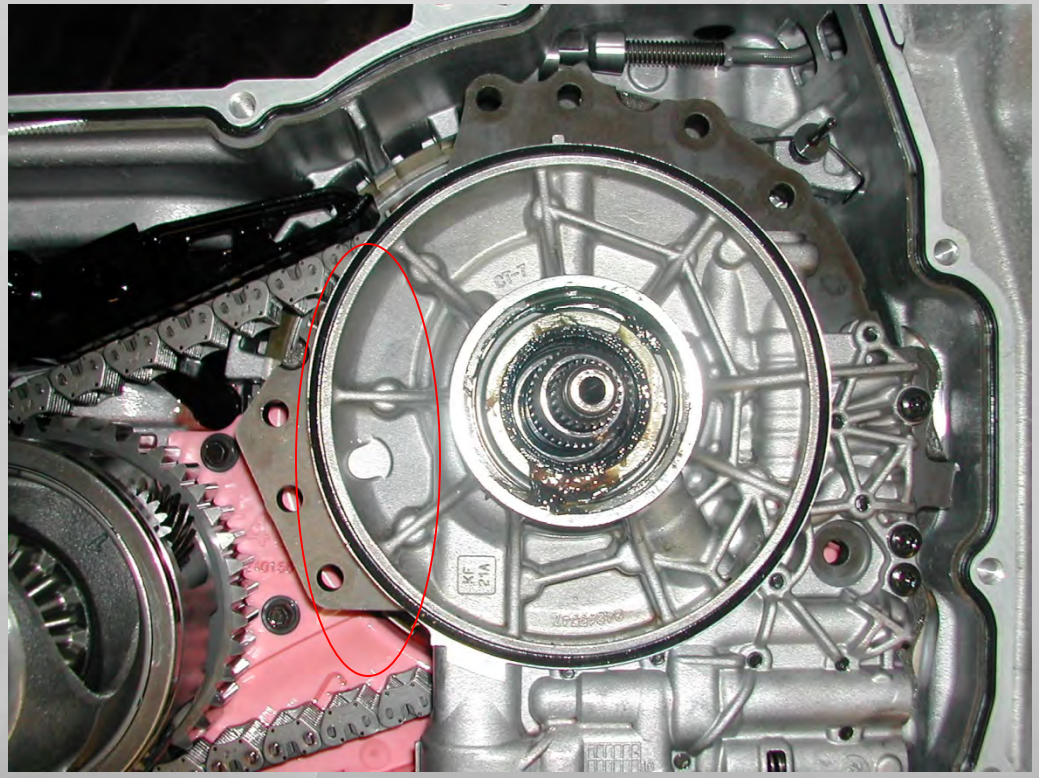
6T40

Pump bushing and Converter impeller hub alignment







Verify no wear present at these surfaces! These control alignment. Excess wear will create pump bushing and converter hub leaks.

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6T70 Pressure

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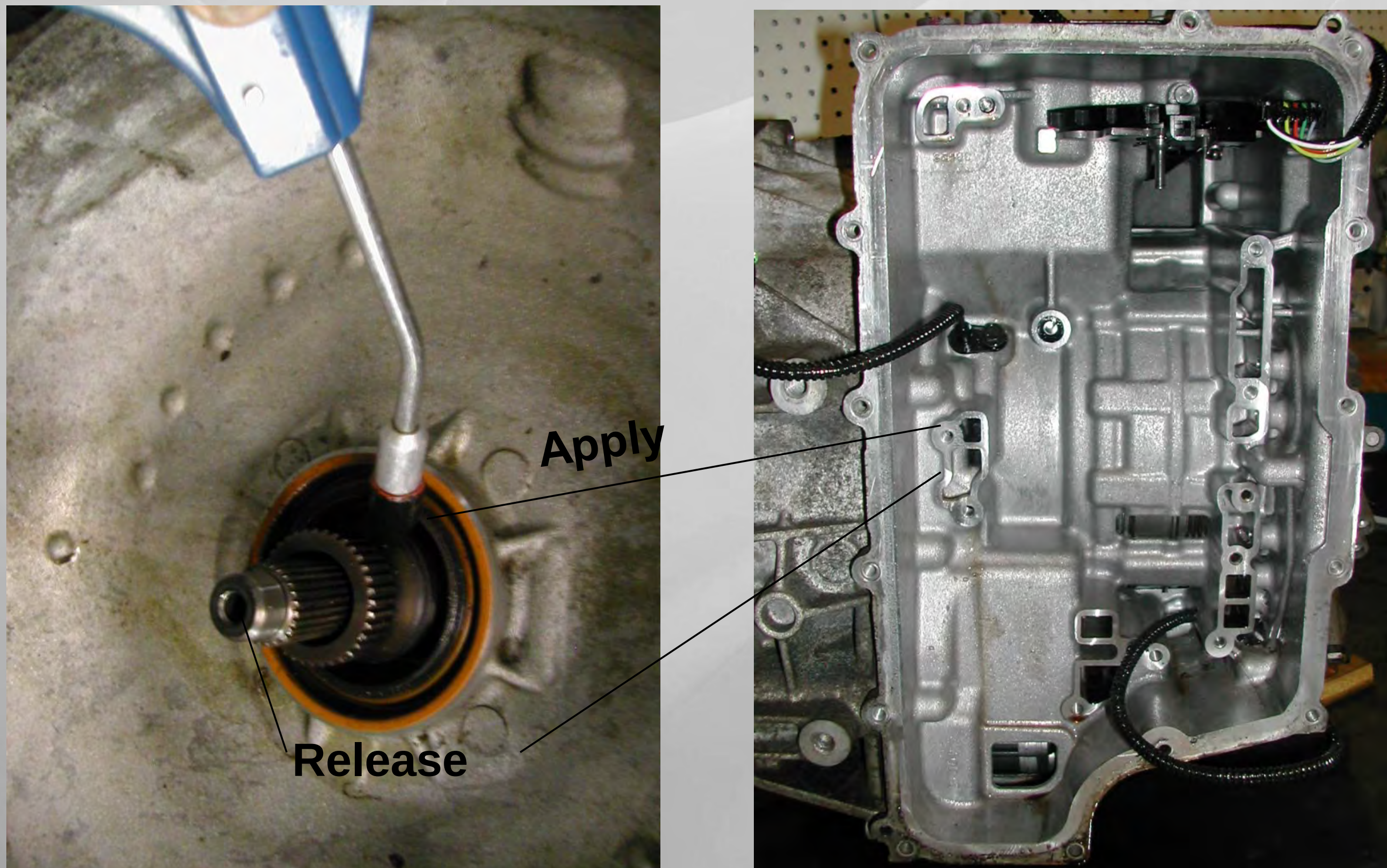
6T70: Line Pressure Specifications

Requested (kPa via Line solenoid:	Desired Line tap psi.:
0	50-130
200	100-130
400	160-190
600	220-250
1000	270-300

Known causes of low line pressure:

- Contamination of the relief ball in the pump.
- Pump outlet to case seal leaking.
- Mis-assembly of pump drive chain.

6T70 TCC circuit air test



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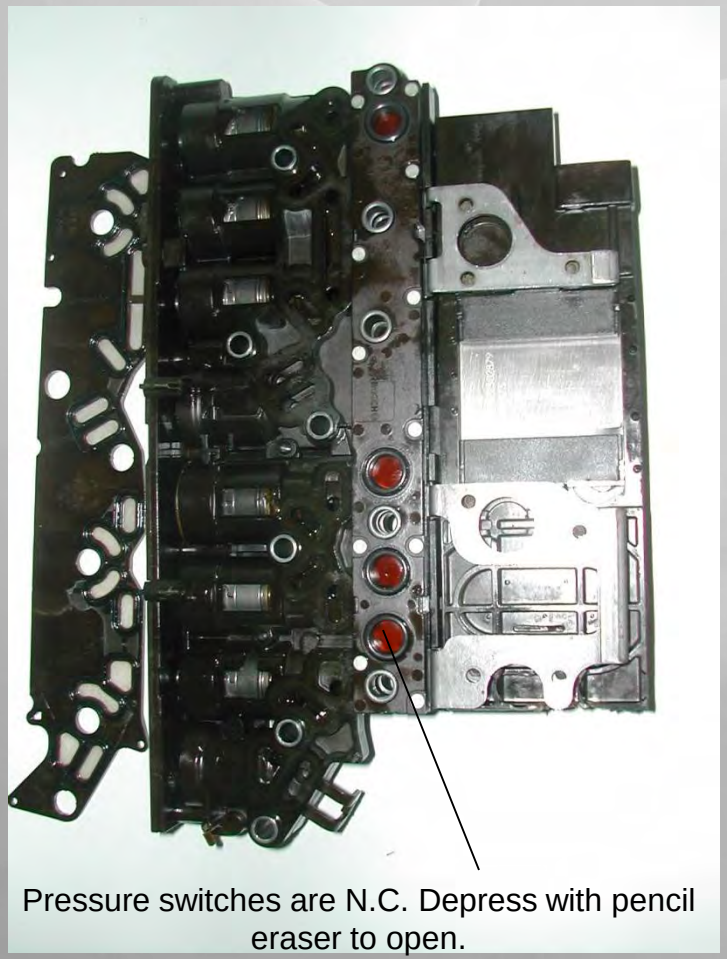
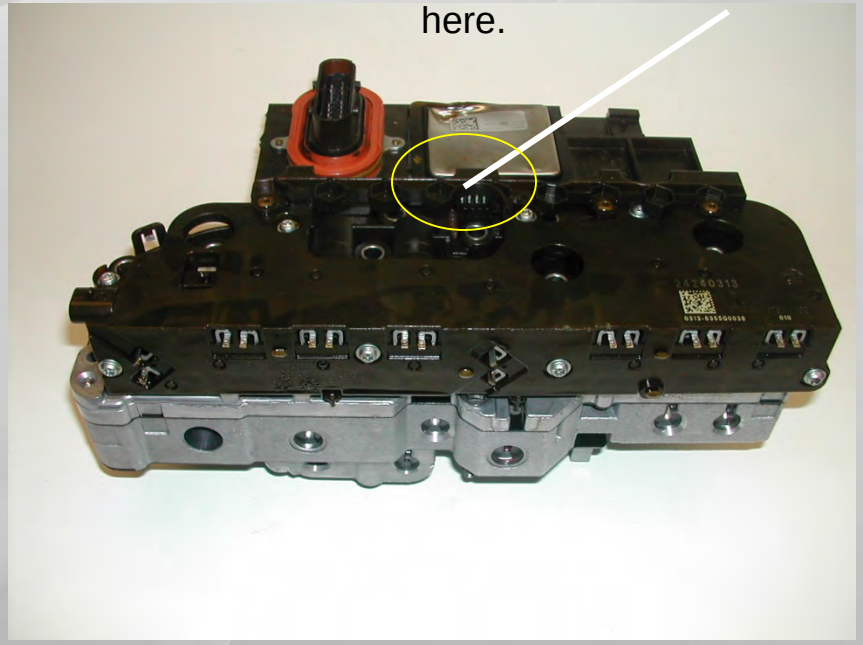
6T70 Pressure switch service & testing

Switch failure is common. Implausible gear or gear ratio codes.
Also TCC may not be functional depending on the sequence of failure.



Pressure switches are N.C. Depress with pencil eraser to open.

5 pin pressure switch terminal access here.



At rest each switch is 2.2 to 8.0 ohms. Depressing the film they should open to 0.0. As viewed here, ground pin is on the right. Moving toward left, each switch has it's own power leg.

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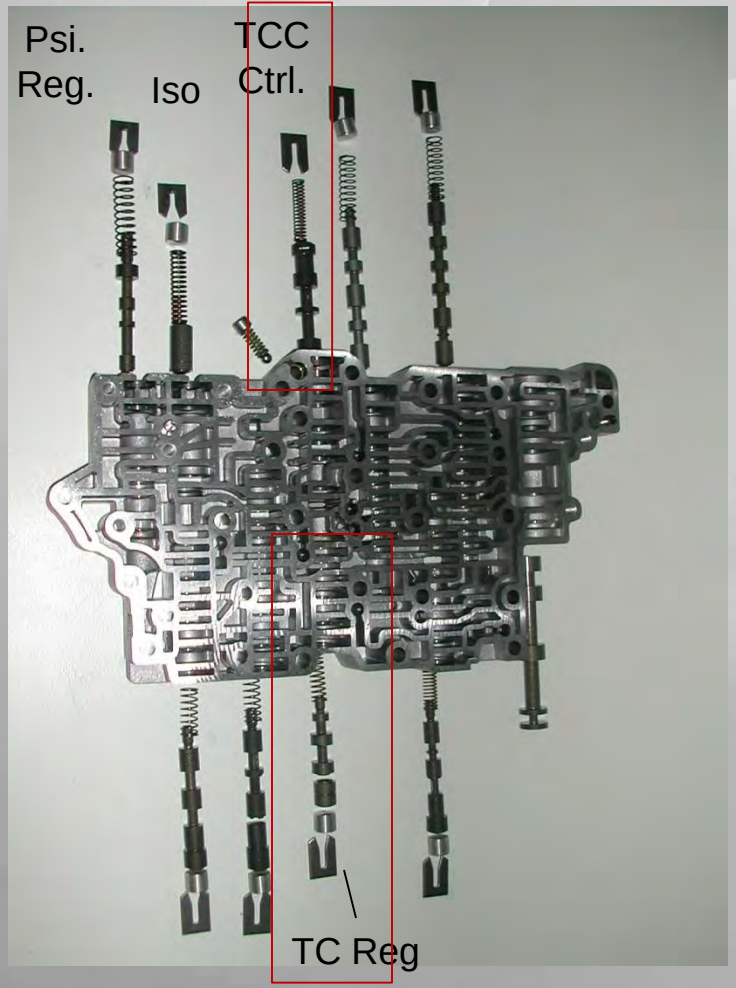
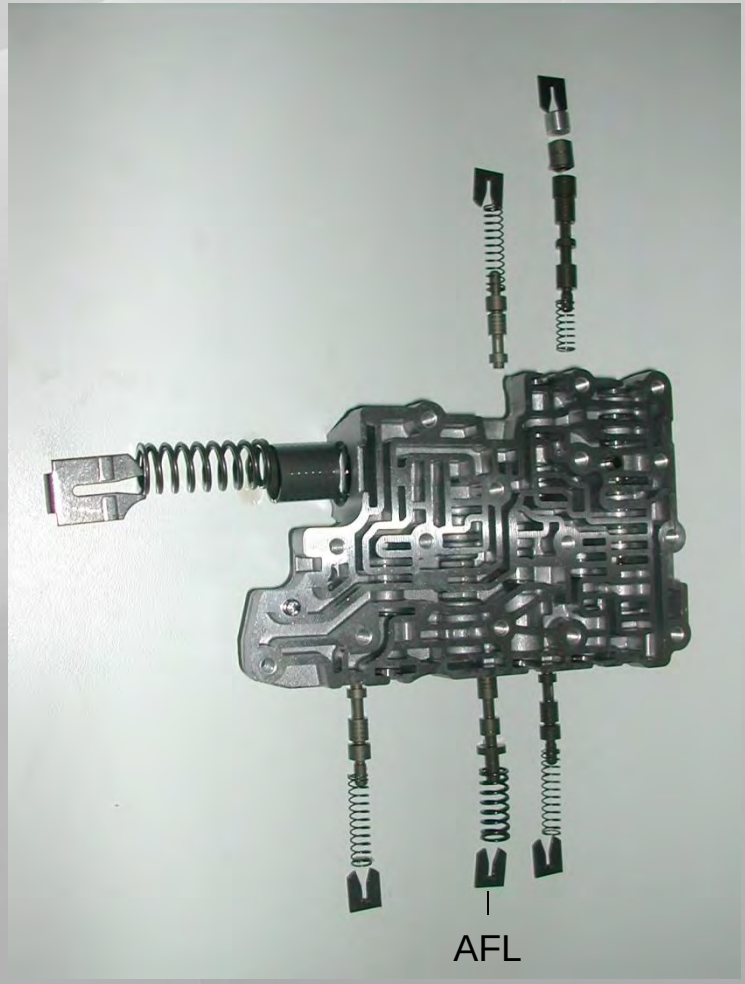
6T70, Gen 1

Inspect for bore wear and broken isolator spring.





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6T70, Gen 1

9 check balls at the pins.
3 actuator feed accumulator pistons within the circles. .

Look for gasket damage due to check ball contact here.

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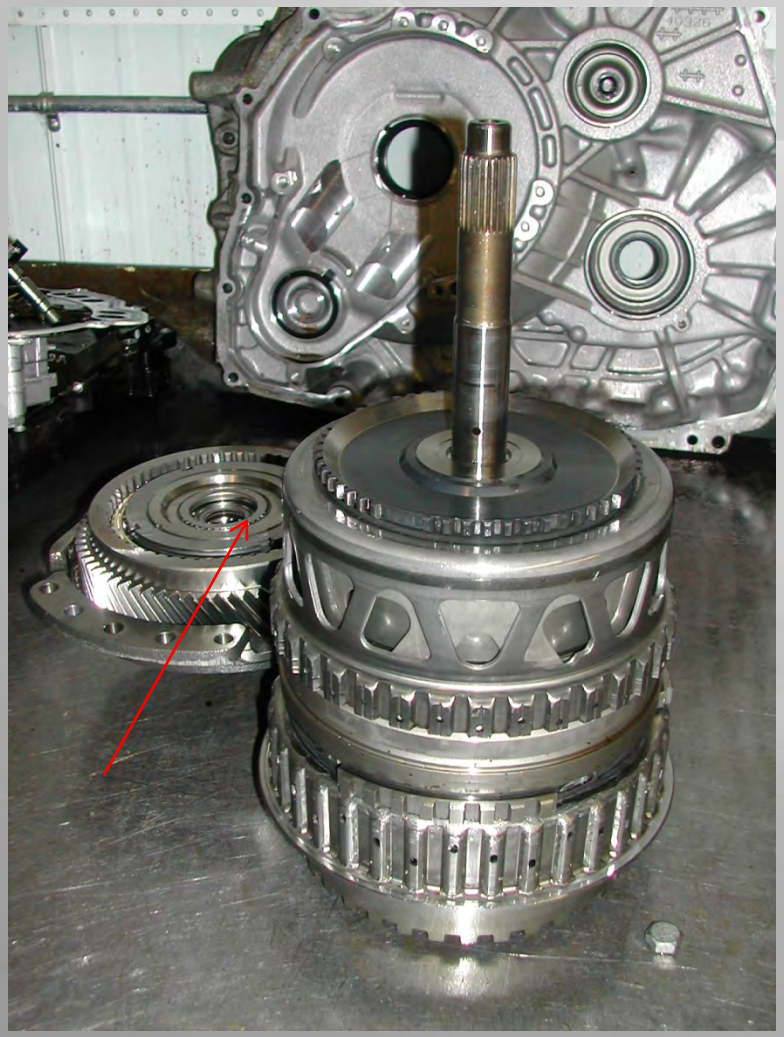
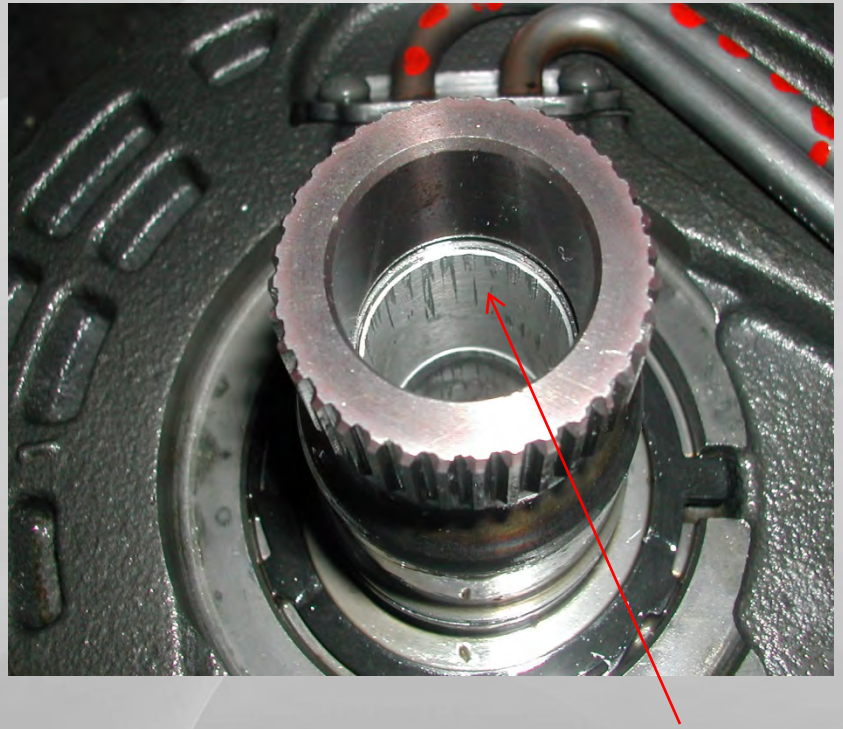
TCC oil control





TC Release oil is controlled by the bushing and driven sprocket seal.

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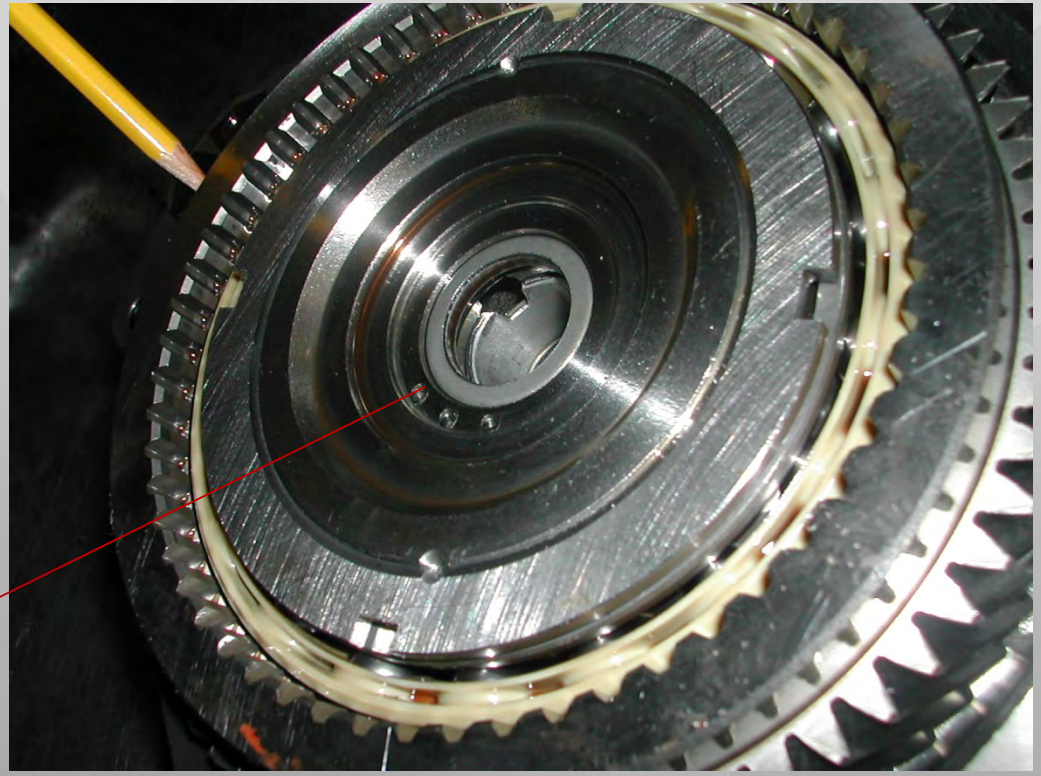
6T70 Drive sprocket support seal for TCC release oil.

Easily damaged, thin wall housing with Teflon insert. Causes code 741



The ball bearing for this gear is not serviced separately !

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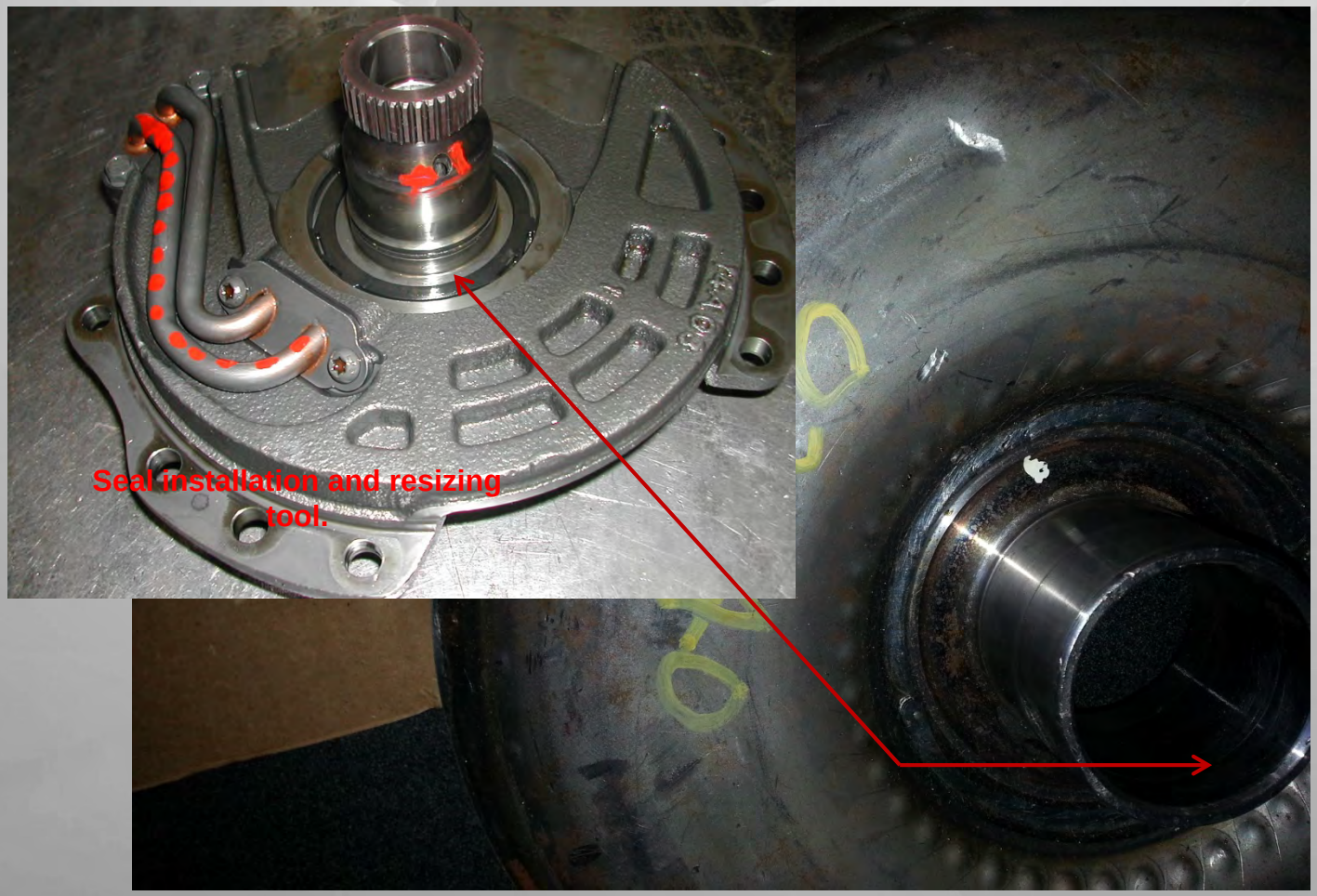
6T70- Turbine hub ID, has an internal bushing and seal contact area. This controls TC charge and apply pressure.



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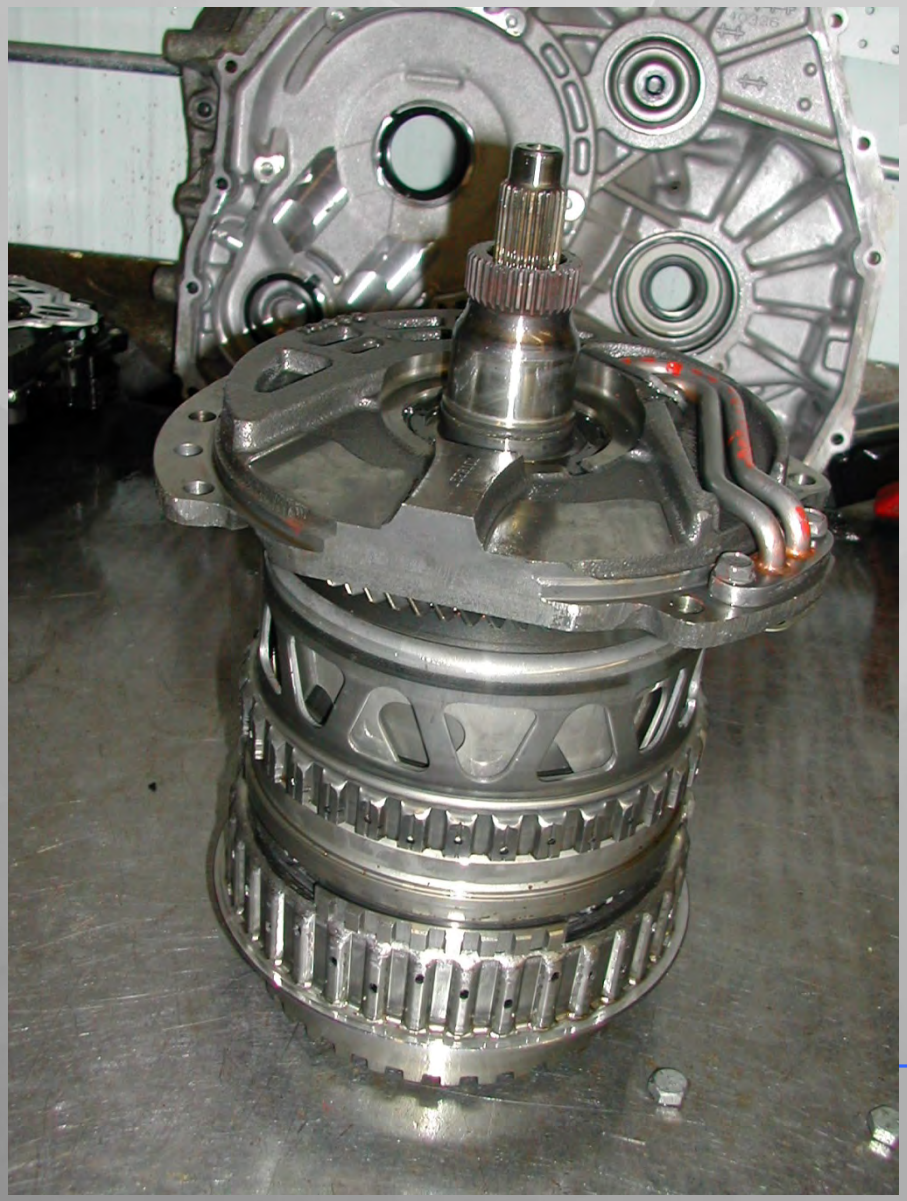
6T70-
Pump drive relationship to converter/apply charge oil.



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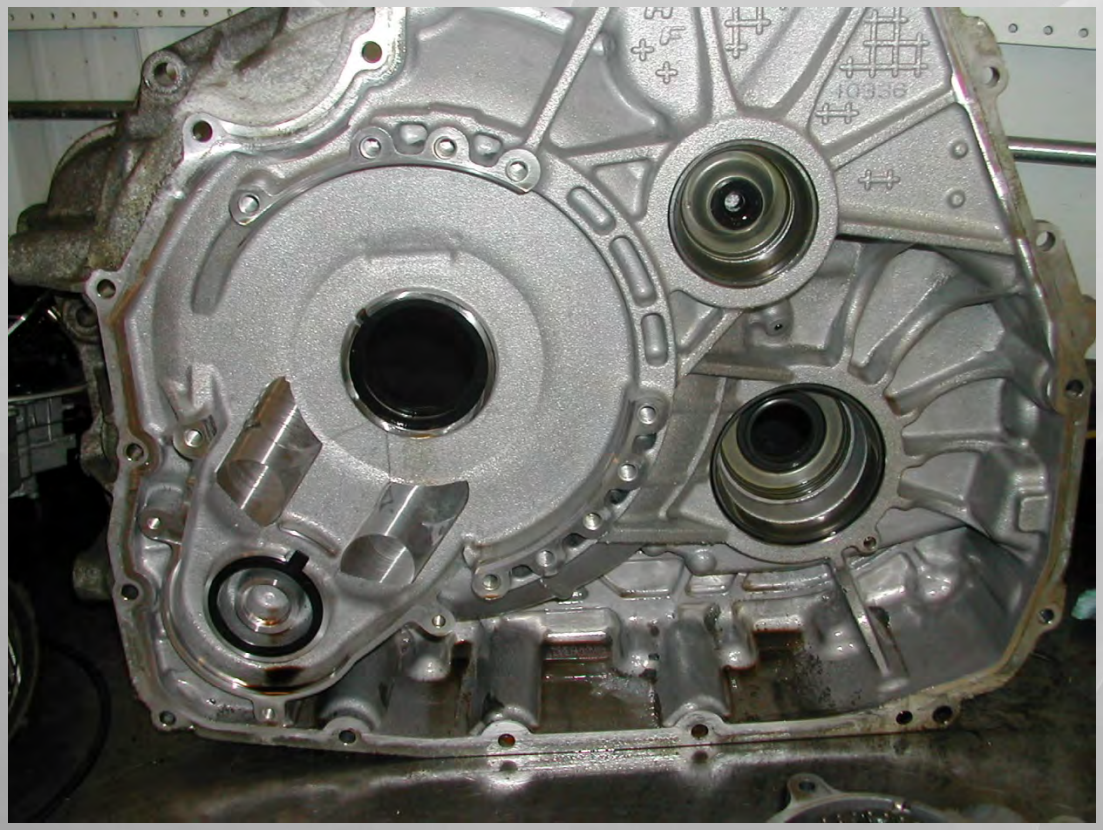
6T70- Front Differential Gear Support



The stator is the pilot for the converter hub bushing. The stator is centered in the case by the machined step in the bell housing. That step matches the gear support. It is critical the case is not worn. The support should not move over .002” .

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6T40/45/70 Converter

6T70 slightly different, but does have the metal clad lip seal pictured in previous slide, which is easily damaged.

Converter should be loaded horizontally.

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Converter Damper Issues

6T70/75 Damper- Top
Ford 6F50 Bottom left.
Note: The spring seat failure.

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GM 6L45/80/90

Shift Quality & Torque Converter Clutch concerns:

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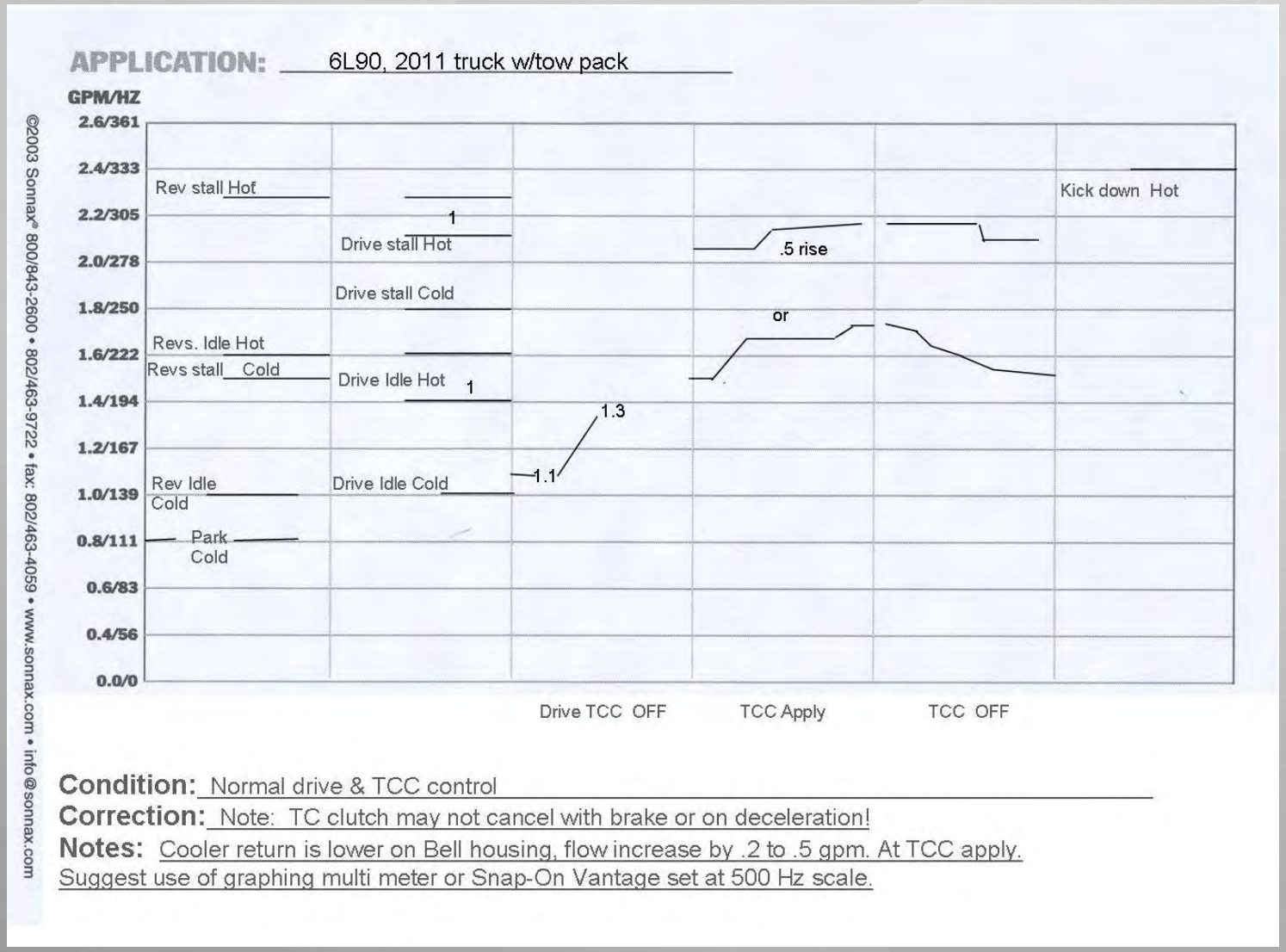
6L80/90, Cooler flow



Condition: Normal drive & TCC control

Correction: Note: TC clutch may not cancel with brake or on deceleration!

Notes: Cooler return is lower on Bell housing, flow increase by .2 to .5 gpm. At TCC apply.
Suggest use of graphing multi meter or Snap-On Vantage set at 500 Hz scale.

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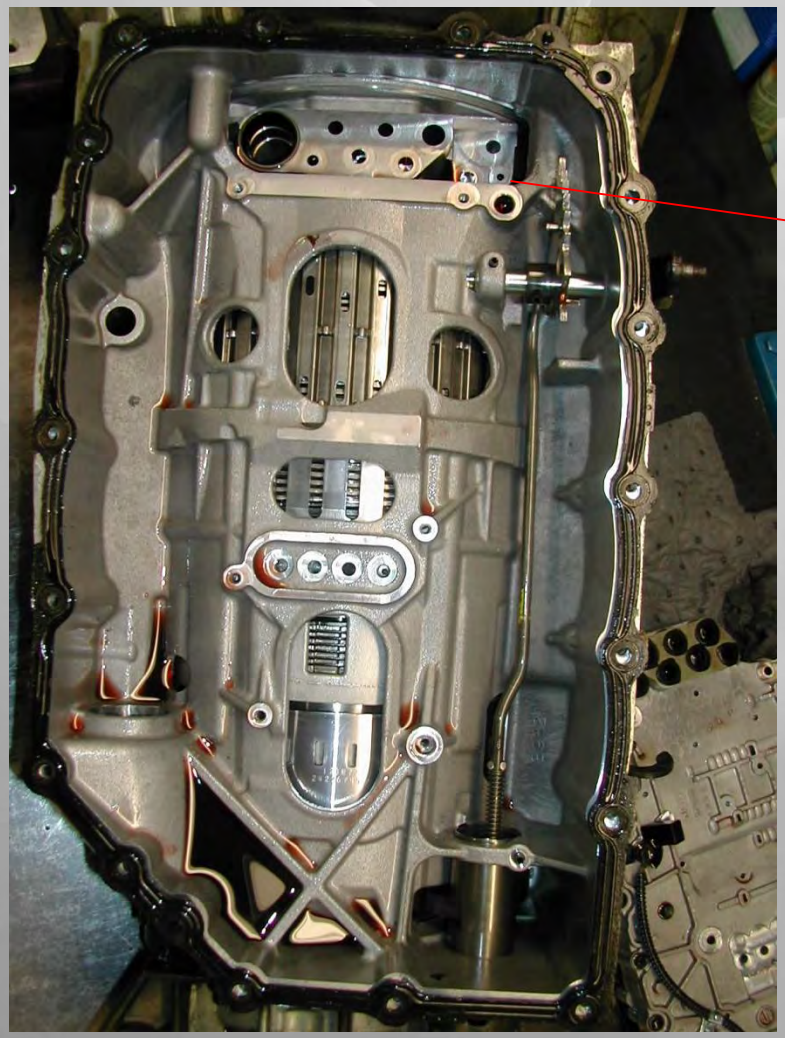
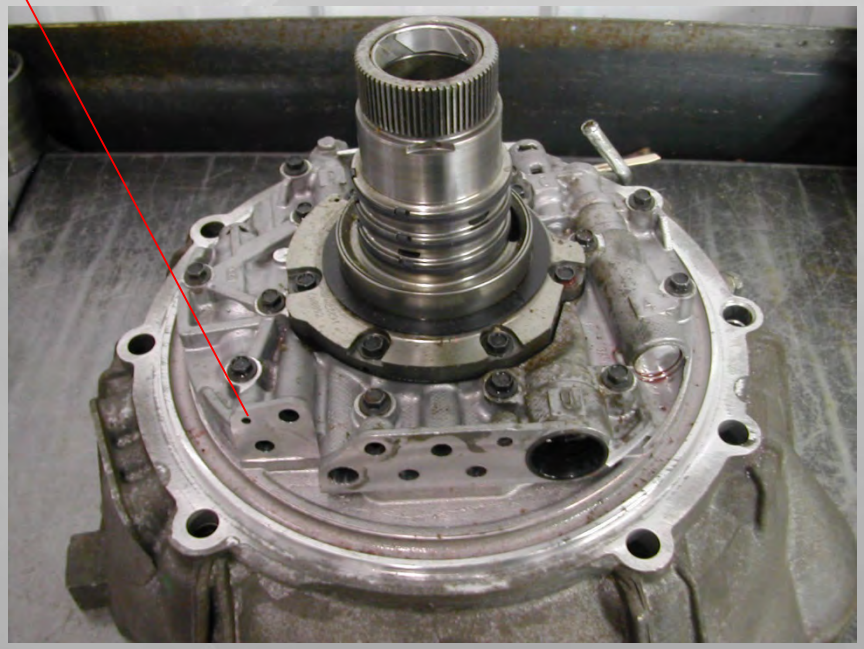
6L90- Pump converter clutch valve.
Complaint: 741 TC Code, No TC apply, engine stall.
Cause: Pump valve sticking.



The 6L45/6L90 TCC signal circuit can be air tested on the pump. This port dead-ends at the TC control valve. With low air supply, should hear TC control valve stroke and return. (the smallest diameter port here)



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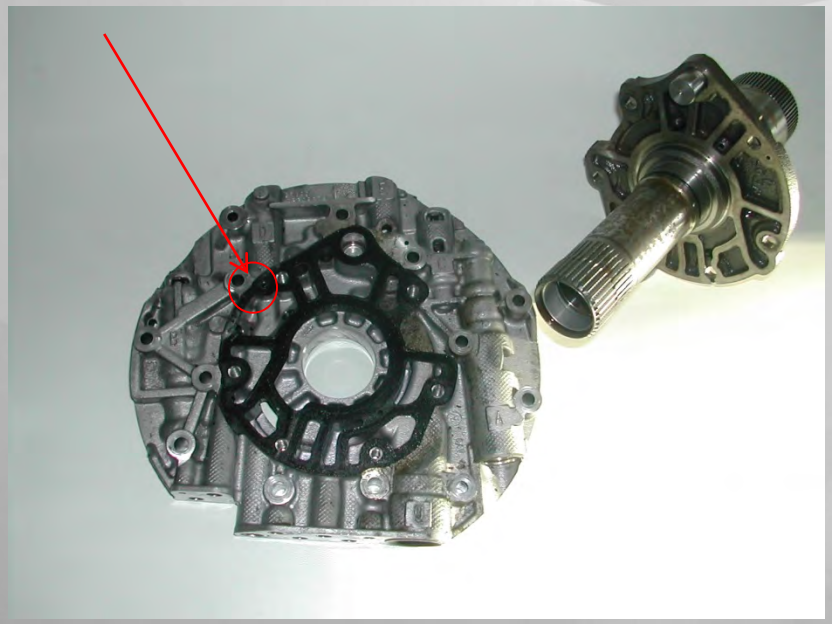
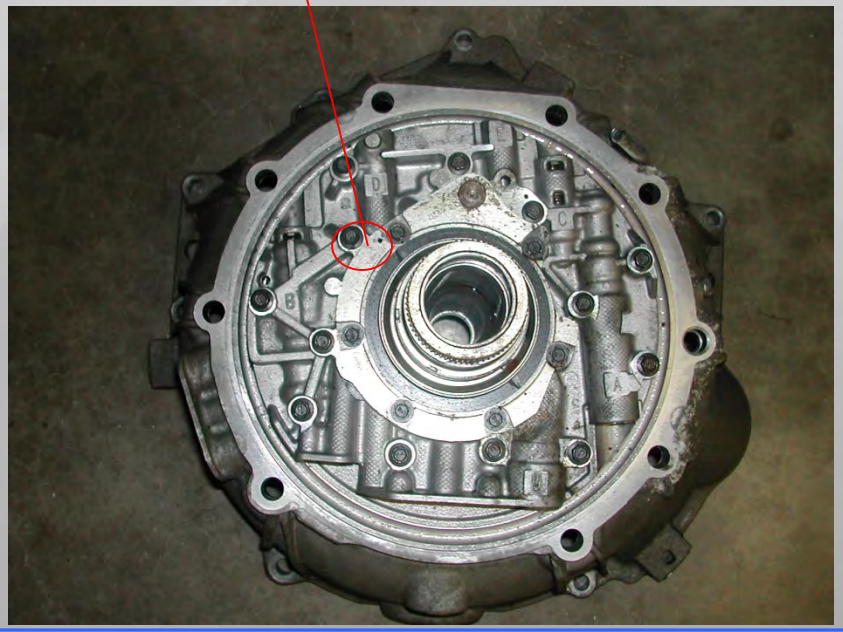
GM 6L50/80/90
Complaint: Overheat, TCC slip codes



Orifice plug missing from under this hole.
Known to fall out if stator is removed.



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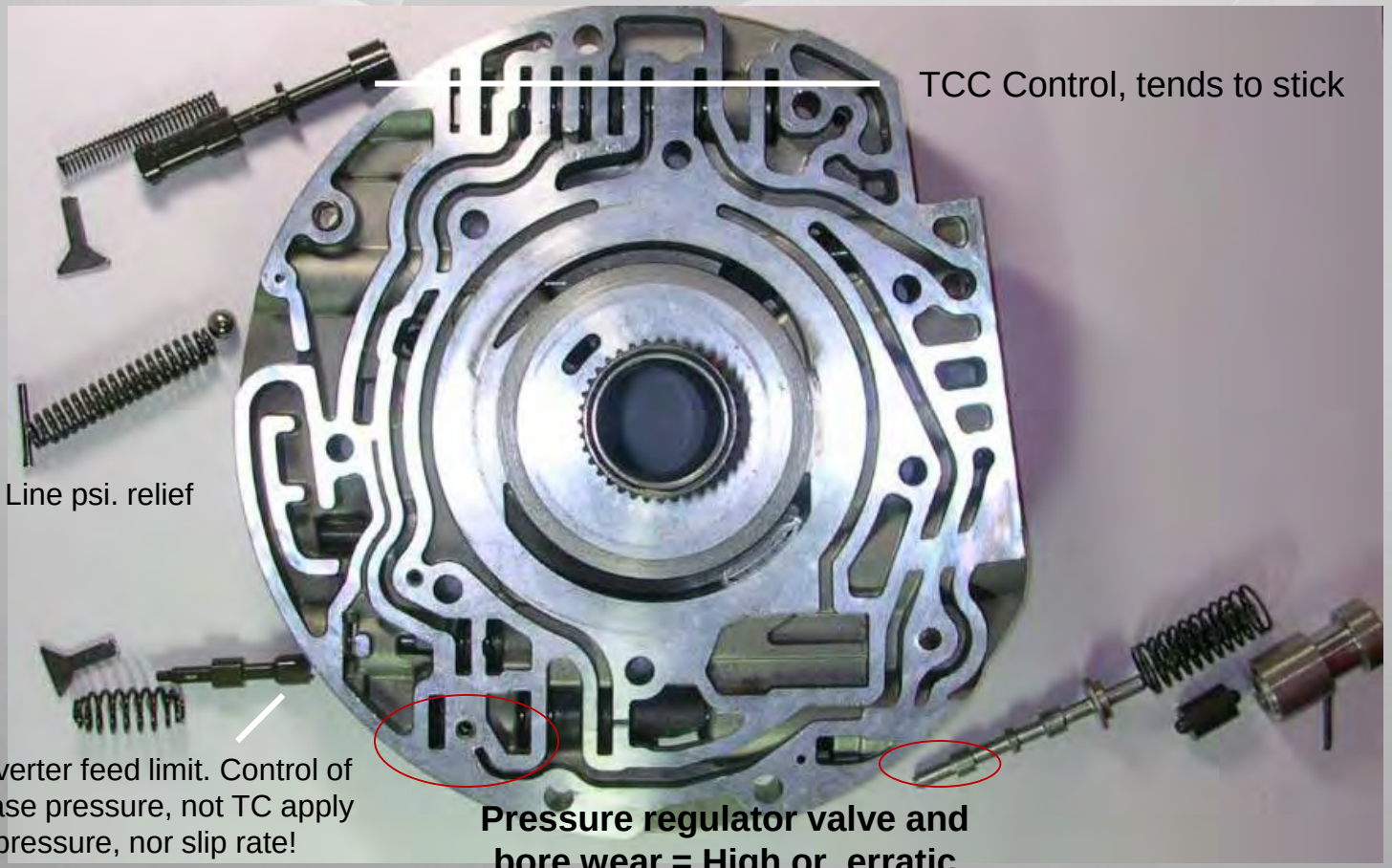
6L45/90 - Pump valves.

Known bore wear.



Pressure regulator valve and bore wear = High or erratic pressure and reduced converter charge.

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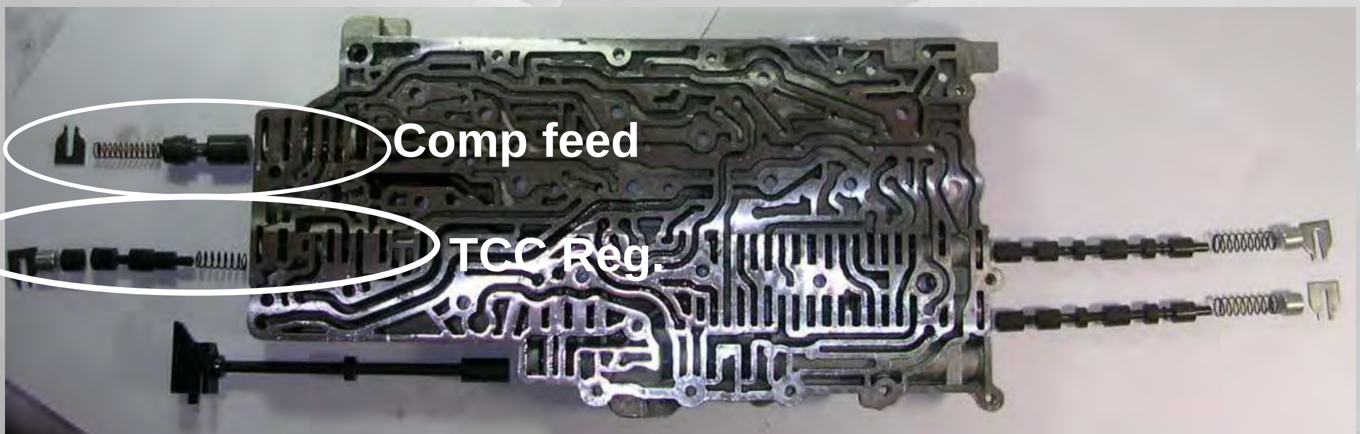
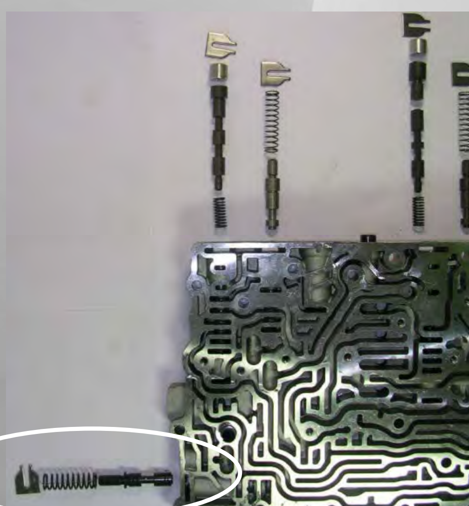
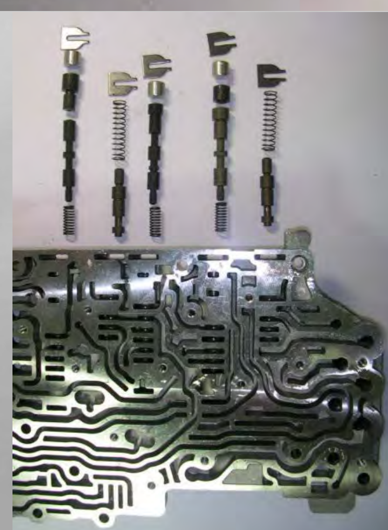
6L80/90 valve body

For TCC and drive-ability concerns, inspect the following bores:



AFL





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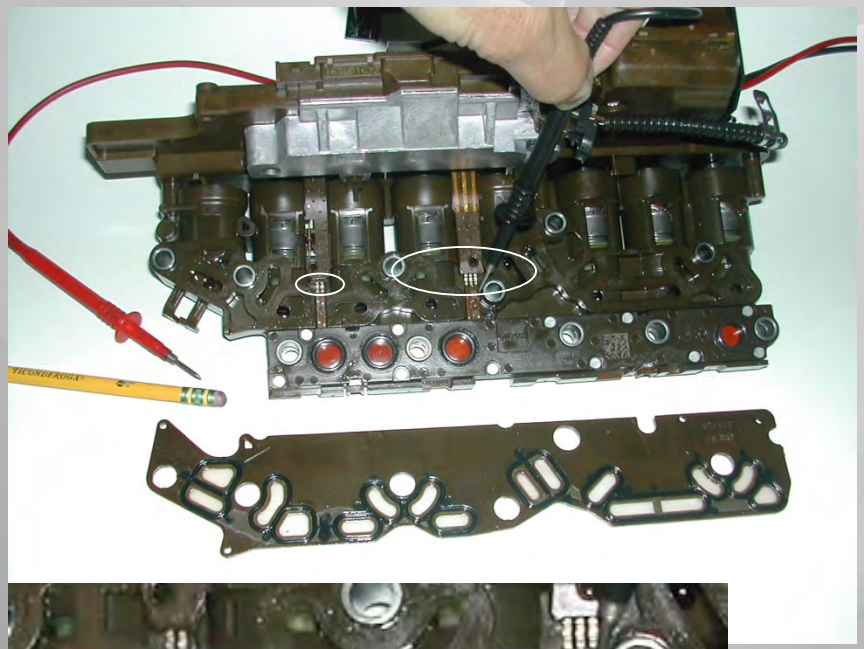
6L45/90 pressure switch tests

The circuits can be tested using a low impedance ohm-meter.



Ohm-meter probe tip, resting in pin-hole.

1: Remove the gasket plate.
The exposed switch circuits are circled.
The right has three blades, the left has two.

2: Place the ground side of the ohm-meter on right outer blade. The plastic cover has pin-holes, which can be used to hold the tip of the probe.

3: At rest each switch will have 3.5 to 8.5 ohms. When the red switch film is depressed with an eraser, resistance will go to -0-.

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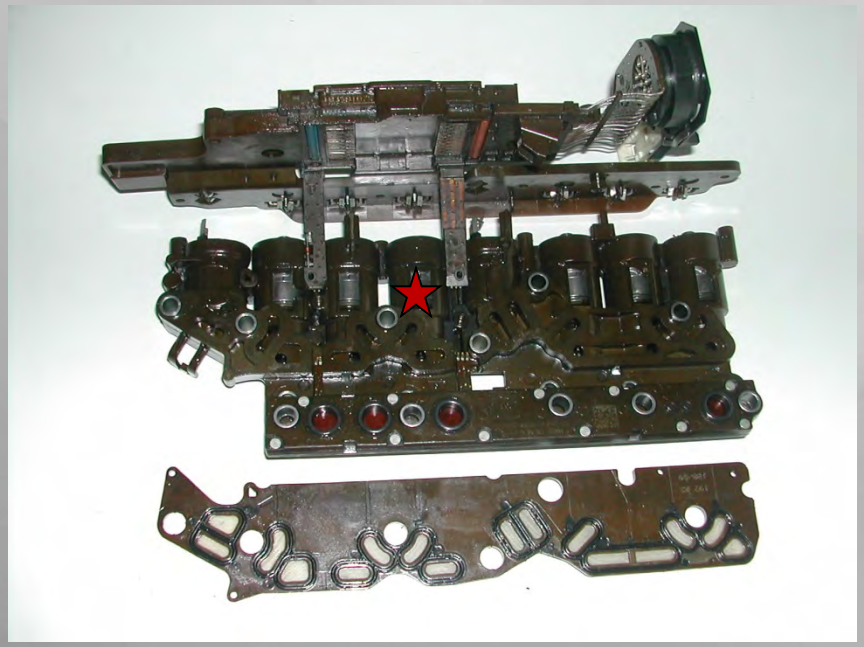
6L45/90 TECHM exploded view



★ TCC solenoid

Connector locking tab is removable. Reports of these breaking, so save your cores!

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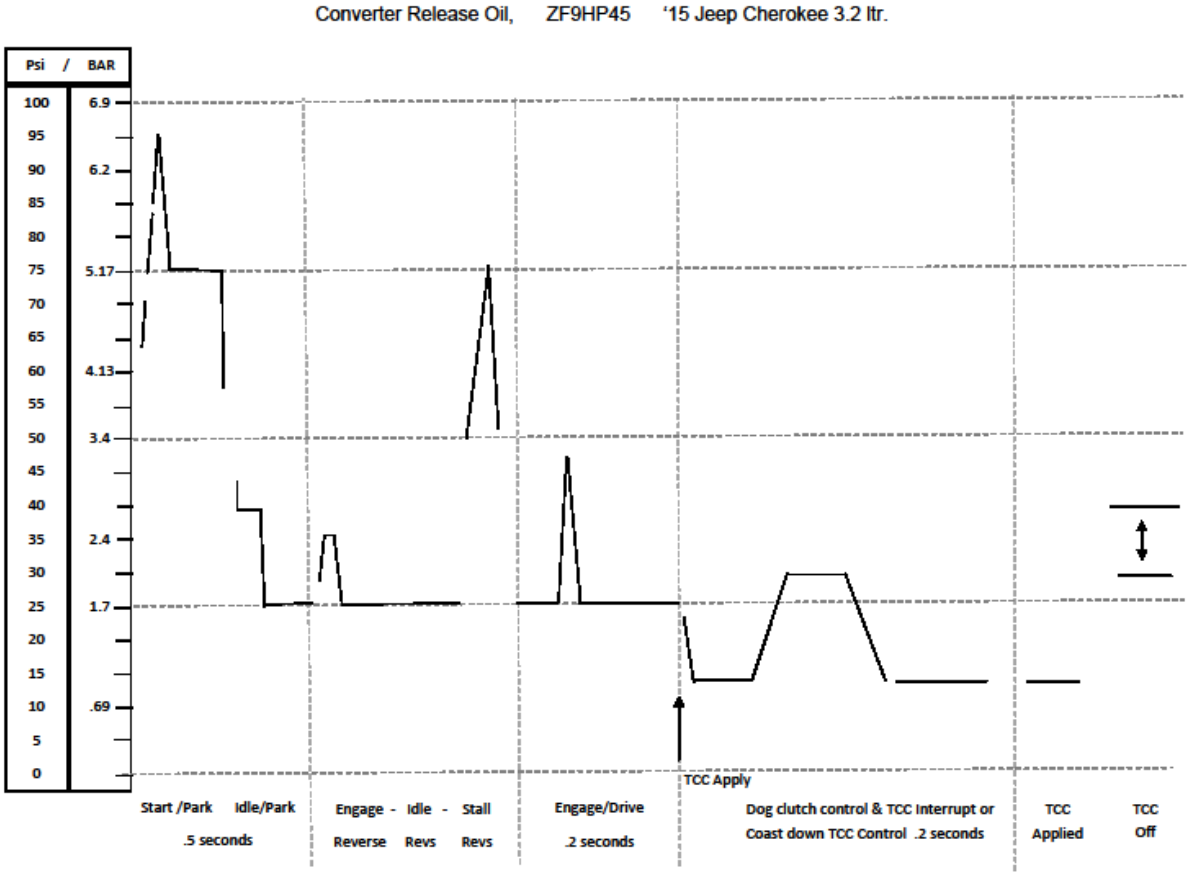
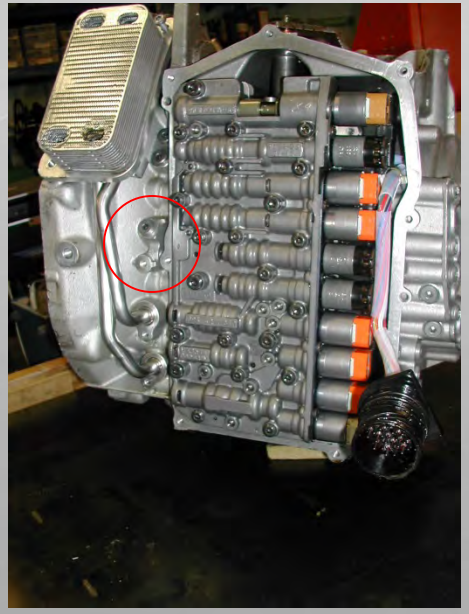
ZF 9 HP48- Converter Pressure Test Data





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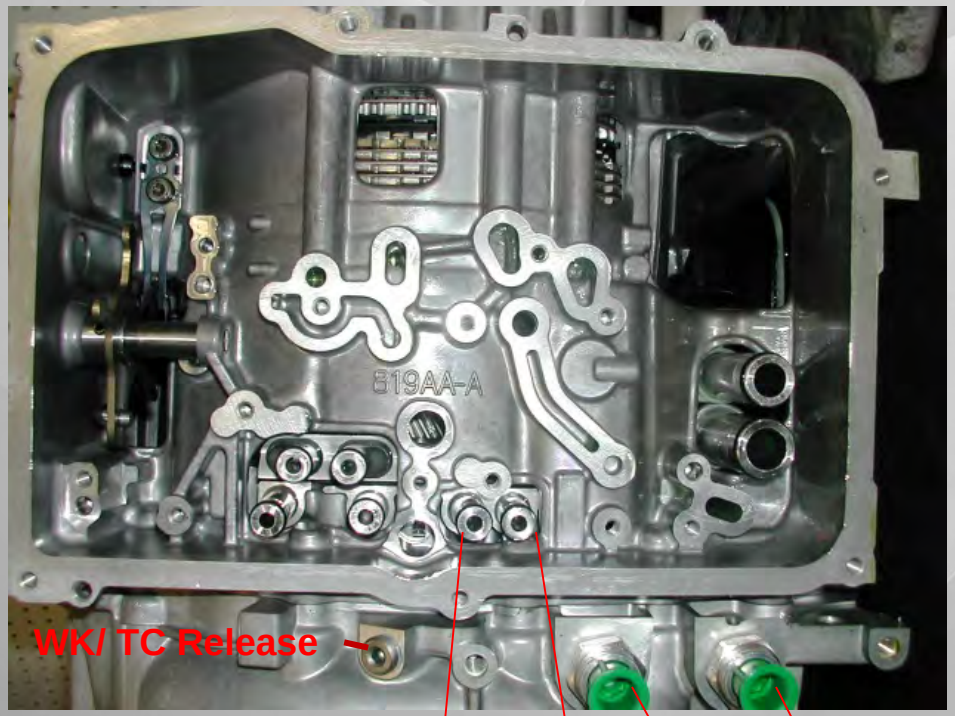
ZF9 HP 48

Valve body removal and converter circuit Id.



OTA, (oil to water) cooler, cut-away.
Rear ports are water access.
Front (below the cover) ATF flow.

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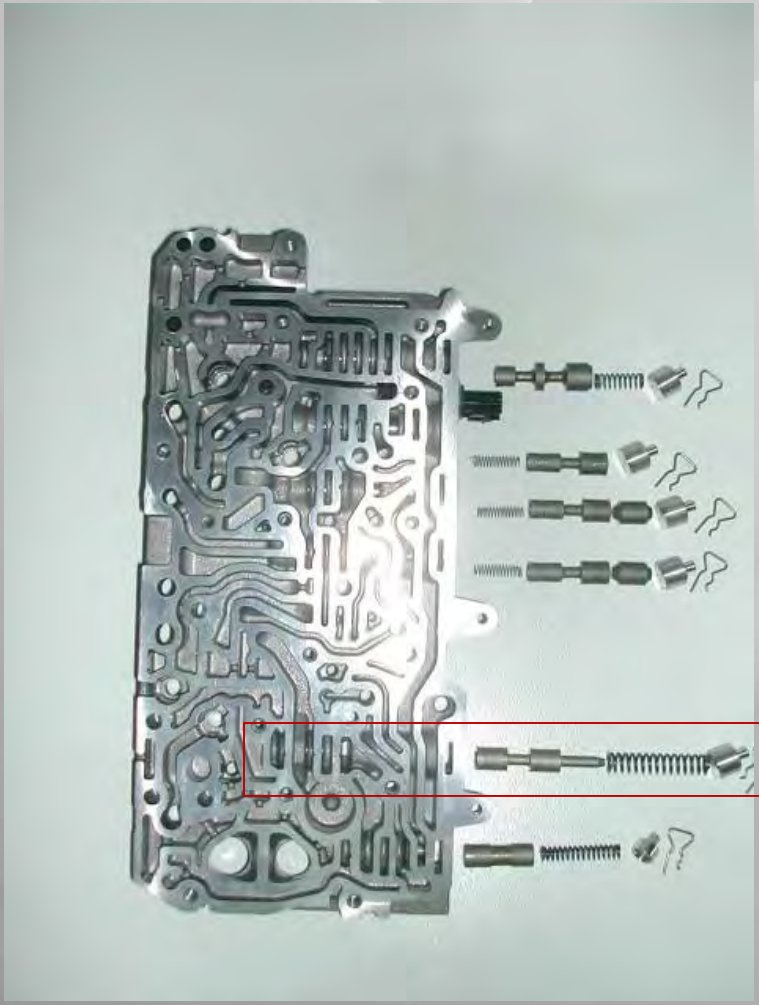
ZF 9 HP Valve body, manual park type

exploded view



Valve identification,
(Top down)
Limp home valve
Pressure transducer terminal
C clutch valve
D clutch valve
B clutch valve
Solenoid pressure regulator
Shift valve system pressure

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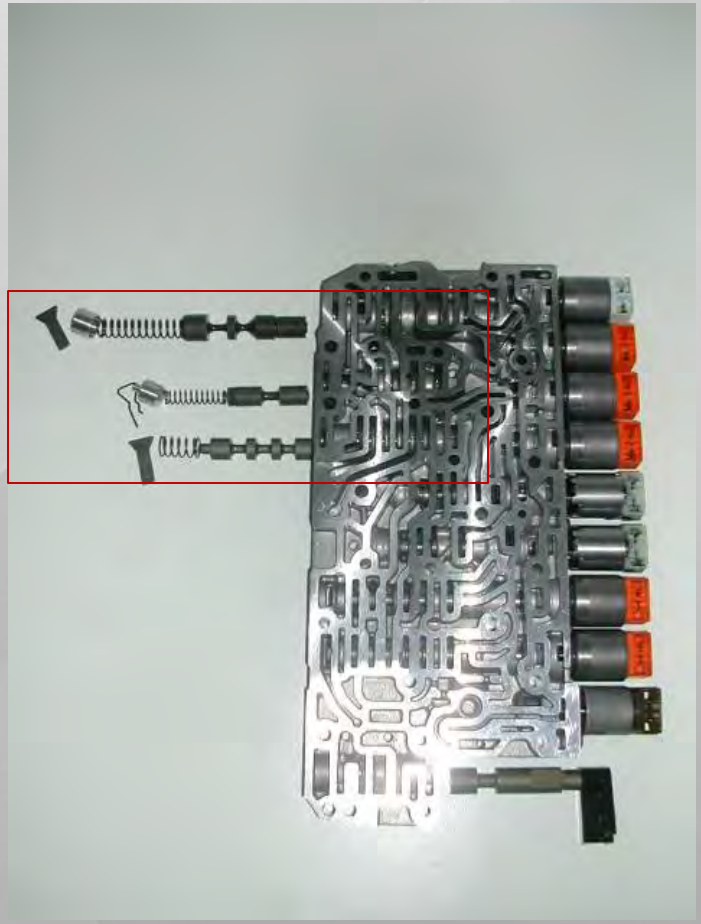
ZF 9 HP 48, Manual park type

Valve identification,
(Top down)

Main system Press. Regulator
Lubrication valve
Converter switch valve



ZF 9 HP 48, Manual park type

Solenoid Identification, (Top down):
Sys: Solenoid, System Pressure
TCC, Converter clutch control. ★
B solenoid- Rear driving clutch-on in 3,5,9, Rev
E solenoid- Front driving clutch-on in 4 to 9.
A solenoid- Dog clutch, Front- on 1 to 7.
F solenoid- Dog clutch, Rear- on all,except 5 to 9
D solenoid- Rr. Large brake.- on all except 2 to 6
C solenoid- Rr. small brake- on 2,6,8 & braking
LHM solenoid- limp home sold.

Valve identification, (Top down)
Lockup clutch regulator
E clutch valve
A clutch valve
F clutch valve

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Testing information:

- ZF 9 HP45 Notes:

The external design cooler has a thermal bypass valve in it. If that cooler is flushed or replaced converter temp and cooler out will have to exceed bypass temp opening (est .125 f) in order to charge the cooler and avoid an under fill.

Filter is internal!

Fluid capacity, 6.0 ltrs./12.7 qts. Part # 68157995AB Miller dipstick# 10323A

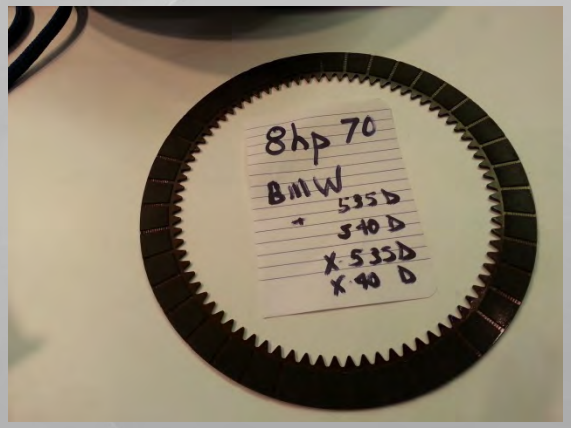
Fill plug is over the differential. Drain plug is under bell housing area.

Not all cases have the three bell housing to case pressure taps! Some only have the converter pressure.

ZF 9 HP 48, Common problems:

- Harsh shift concerns: Fix = Reflash
- Loss of Reverse,1st, 7,8,9 = Snap ring blown from C clutch case groove. Updated snap ring.
- Neutral after coast down; Fix = Reflash, if not resolved replace external TCM.
- Anytime the valve body or transmission has been serviced, Adaption must but be reset and Adaption memory cell's cleared.
- Do not confuse adaption reset with "valve body solenoid learn" . This matches the solenoids to the TCM. Do not relearn solenoids when the transmission, as an assembly has been replaced! Solenoid relearn will erase all factory settings!
- If the adaption memory cell counter is -0-, then that cell has not been updated.

ZF 8 HP 70/80 Converter
Destined for Dodge 2500 truck



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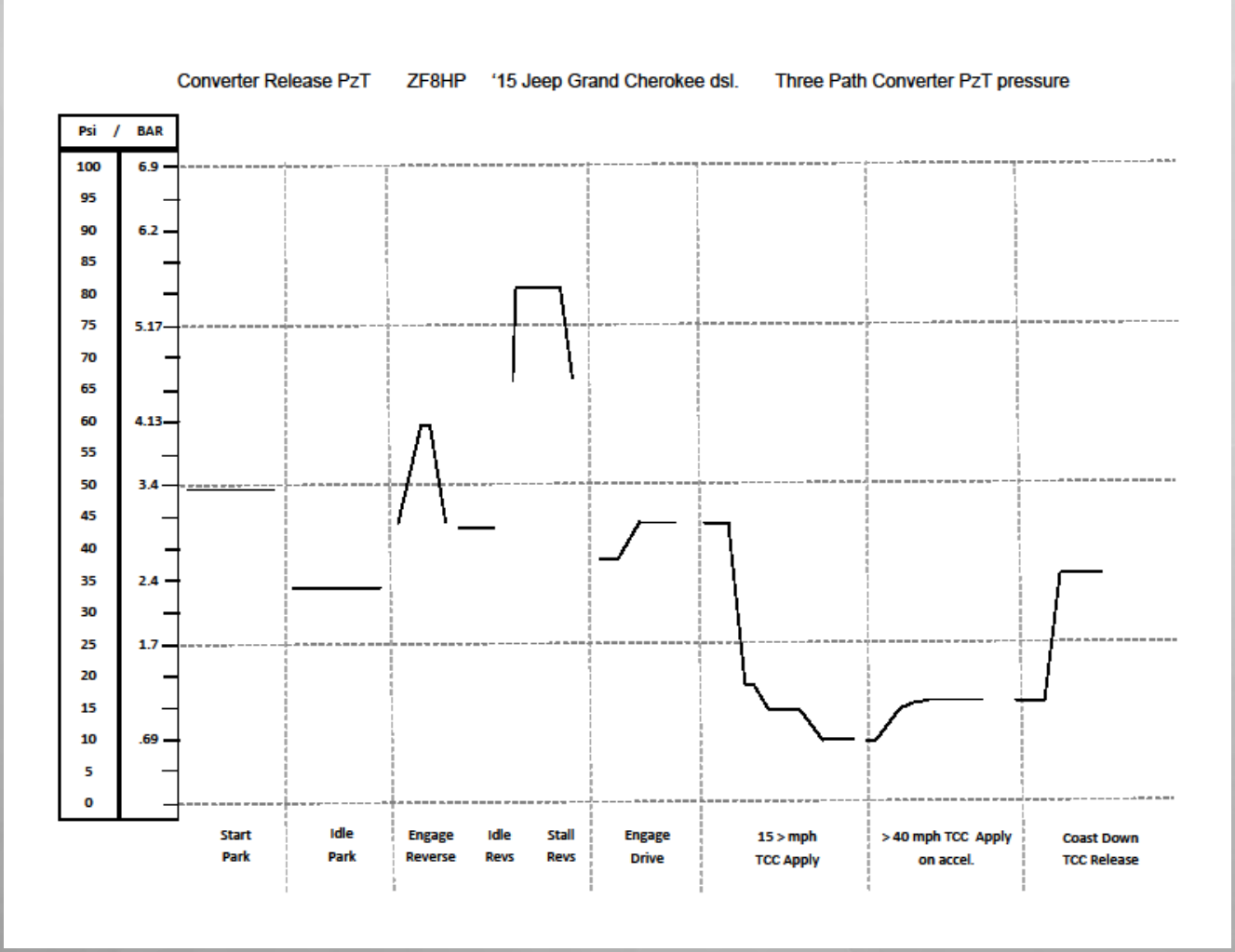
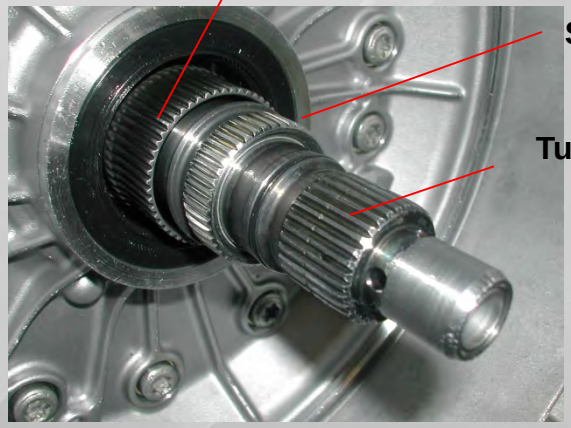
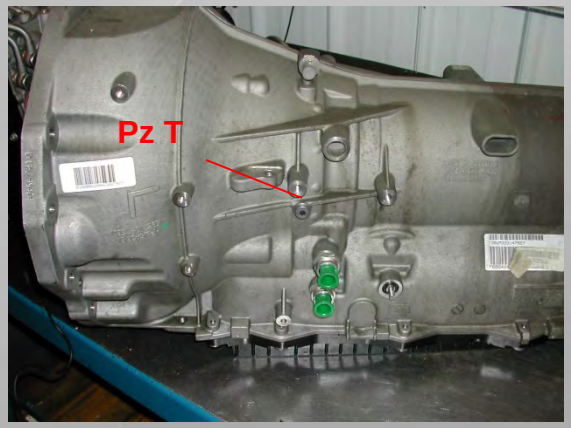
ZF 8- Converter charge pressure. Pz T



ZF 8 HP 45/70
Dodge, Jeep 2011 >
Three Path Converter



- ZF 8 HP could have the optional A clutch dis-engagement (neutral at stop). The units will have a nitrogen accumulator in the pan. This charges lube and pump pressure at idle in drive. This type of system will also affect converter load at idle, as the A clutch is brought back on. NVH will be a “point of concern” on this as well as other units using Neutral in Drive.



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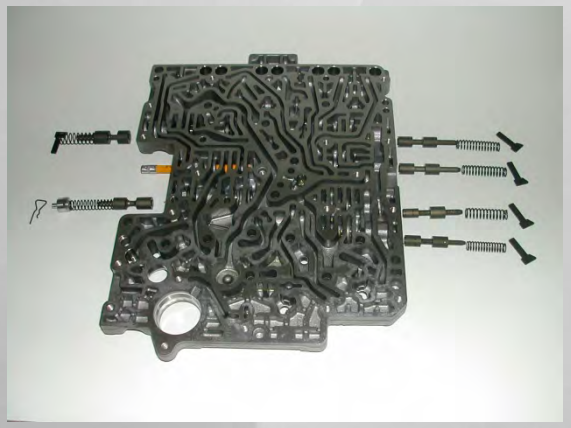
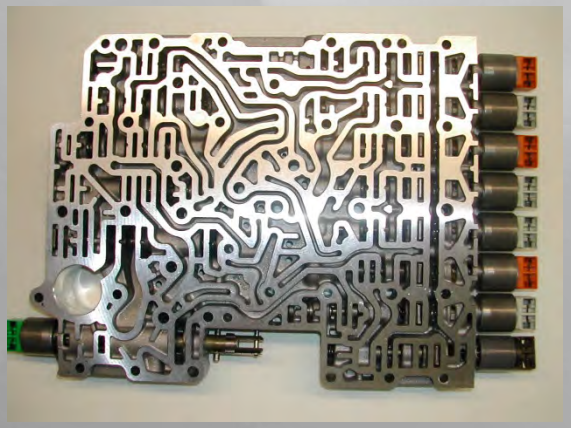
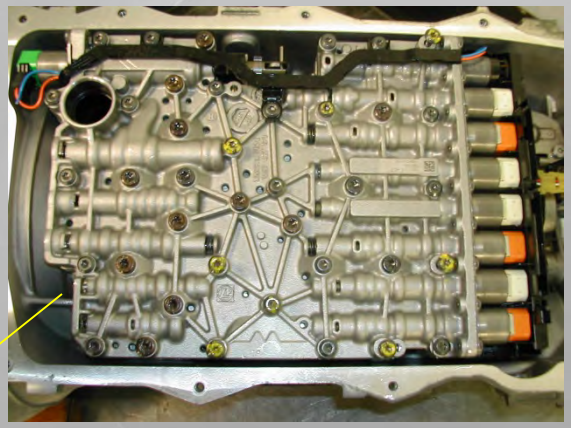
Transmission Type	Model	Engine Displacement	Converter Kit
ZF-8 HP 45 HIS	335i (F30)	3,0L R6	1090 298 002
ZF-8 HP 45	528i (F10)	3,0L R6	1090 298 031
ZF-8 HP 45	535i (F10)	3,0L R6	1090 298 002
ZF-8 HP 45 HIS	535i (F10)	3,0L R6	
ZF-8 HP 45	535i Gran Turismo (F07)	3,0L R6	1090 298 002
ZF-8 45 HIS	535i Gran Turismo (F07)	3,0L R6	
ZF-8 HP 45 X	535xi (F10)	3,0L R6	1090 298 002
ZF-8 HP 45 X	535xi Gran Turismo (F07)	3,0L R6	1090 298 002
ZF-8 HP 70	550i (F10)	4,4L V8	1090 298 026
ZF-8 HP 70	550i Gran Turismo (F07)	4,4L V8	1090 298 026
ZF-8 HP 70 X	550xi (F07)	4,4L V8	1090 298 026
ZF-8 HP 70 X	550xi Gran Turismo (F07)	4,4L V8	1090 298 026
ZF-8 HP 45 HIS	640i Cabriolet (F12)	3,0l R6	
ZF-8 HP 45	640i Cabriolet (F12)	3,0l R6	1090 298 002
ZF-8 HP 45 HIS	640i Cabriolet (F12)	3,0l R6	
ZF-8 HP 45	640i Coupe (F13)	3,0l R6	1090 298 002
ZF-8 HP 45 HIS	640i Coupe (F13)	3,0l R6	
ZF-8 HP 70	650i Cabriolet (F12)	4,4L V8	1087 298 026
ZF-8 HP 70 H	750i Active Hybrid (F04)	4,4L V8	

Transmission Type	Model	Engine Displacement	Converter Kit
ZF-8 HP 90	760i (F01)	6,0L V12	1090 298 007
ZF-8 HP 45 HIS	M 135i (F20)	3,0L R6	
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 002
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 002
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 002
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 002
ZF-8 HP 45 X	X3 (F25)	3,0L R6	1090 298 031
ZF-8 HP 45 X	X5 (E70)	3,0L R6	109 298 002
ZF-8 HP 70 X	X5 (E70)	4,4L V8	1090 298 026
ZF-8 HP 45 X	X6 (E71)	3,0L R6	1090 298 002
ZF-8 HP 70 X	X6 (E71)	4,4L V8	1087 298 026

ZF 8 HP 45







Yellow Painted heads, remove VB from case.

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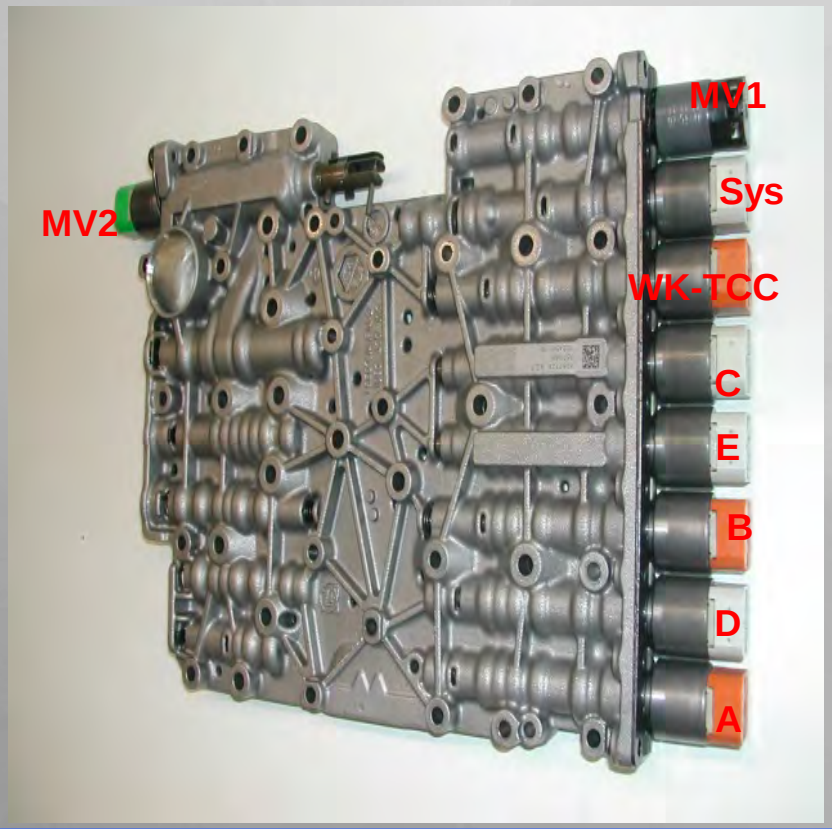
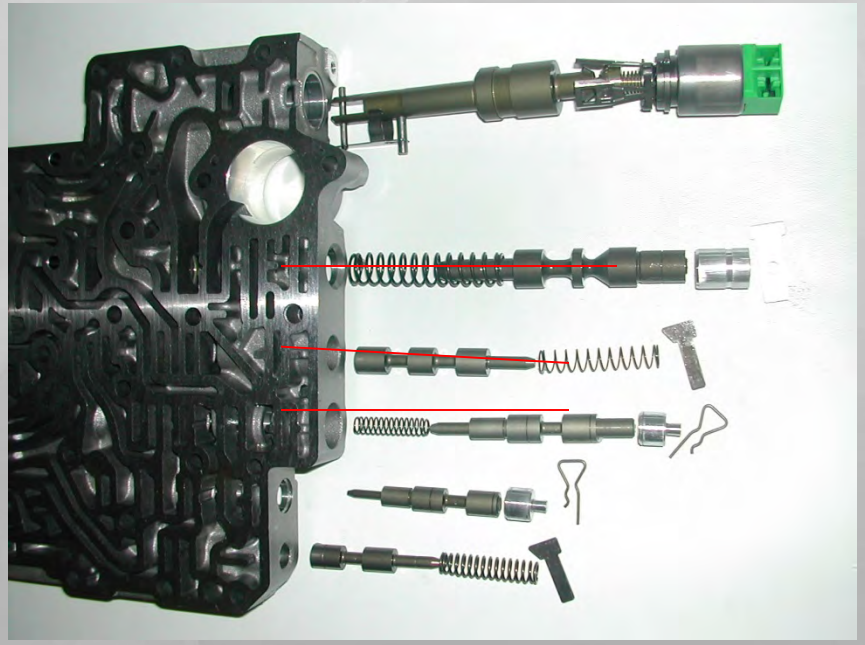
ZF 8 HP Mechatronic
TCC factors:

WK- Is the TCC solenoid



Red; Valves in the ZF8, that affect TC control and TC apply.



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ZF 6 HP 19/21 and Ford 6R60

Two Path Converter

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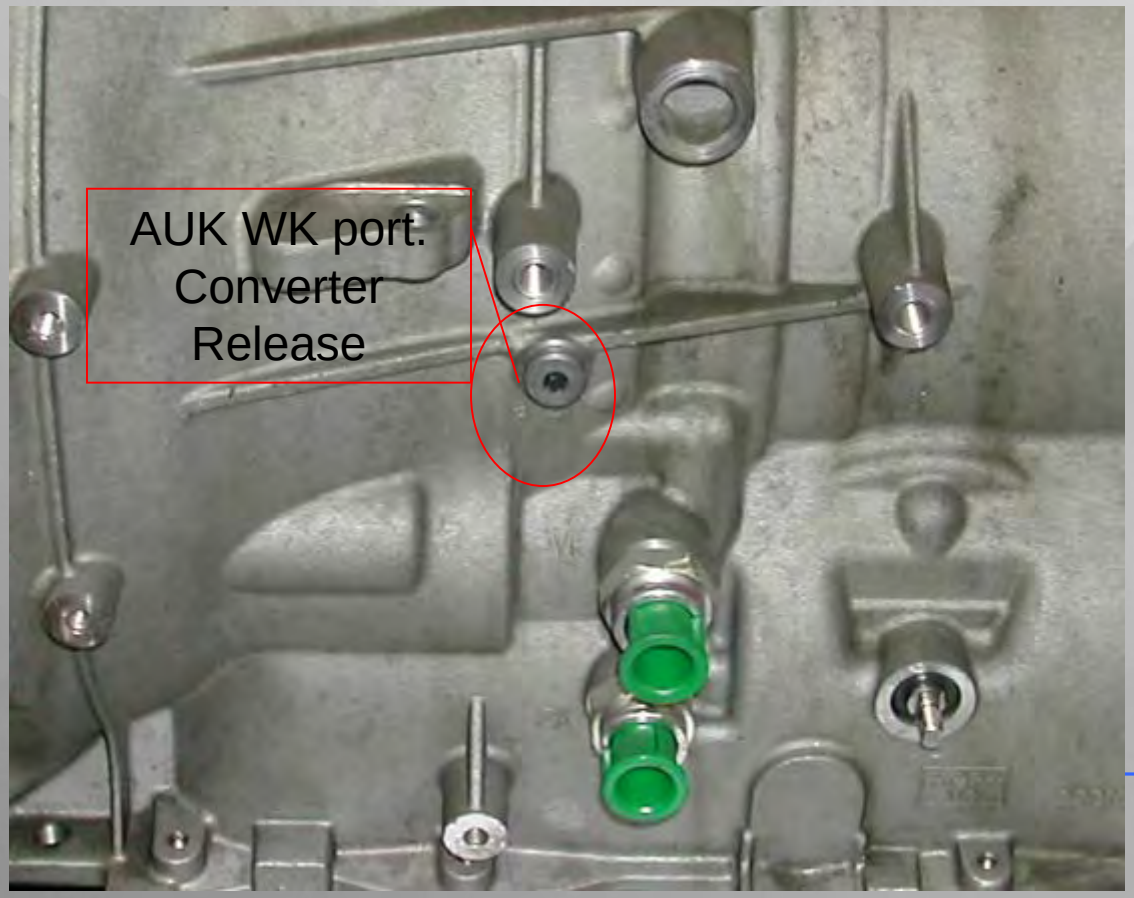
ZF 6 HP 19/21/26 -TC Release pressure test:

Complaints: Rough idle, drive-line vibration at low RPM/ low speed.
Harsh up or down shifts.
Complaint of bump down on acceleration from stop, or feels like second gear starts.

The pressure test at WK, isolates Hydraulic or Solenoid control from Converter clutch.



Normal WK psi:
P,R,N,D, idle: 76
P,R,N.D, stall: 90
Drive accel, through1- shift, 72-78 psi.
After 2-3 shift, WK drops to 1.0 to 1.5 psi. After 4th WK is -0-.
Most instances remains at -0- during up/downshifts. Forced kickdown, TC opens to 78 psi. for .5 seconds, then back to 1.5 psi.

TCC control may vary slightly, dependent on vehicle and programming.

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ZF 6 and or Ford 6R60/80
Complaint: Harsh shifts, TCC slip or cycling.
Cause: Incorrect solenoid calibration or defective TCC solenoid.

- Ford 6R80, 2010> Top Mechatronic
- Ford 6R60, 2006 > 2010, Middle.
- ZF6 HP M version, Lowest
- TC solenoid has a star on it.

The flow rate between Ford and ZF Bosch solenoids, are not the same.

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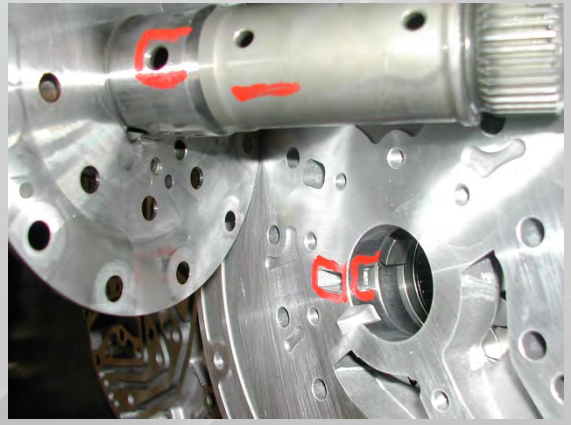
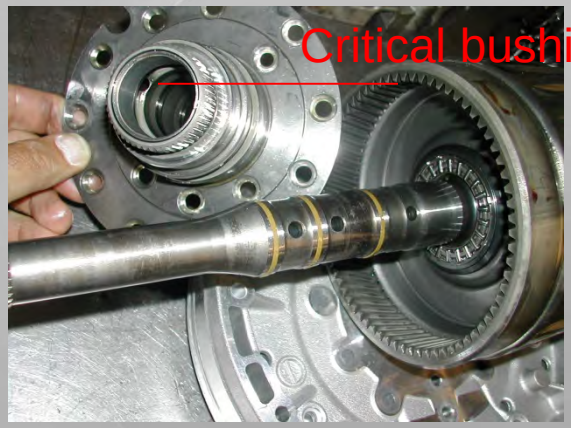
6HP19/21 Pump and Stator warpage and cross leaks will require inspection as service life is extended.
Circuits in red paint control TCC apply and release.





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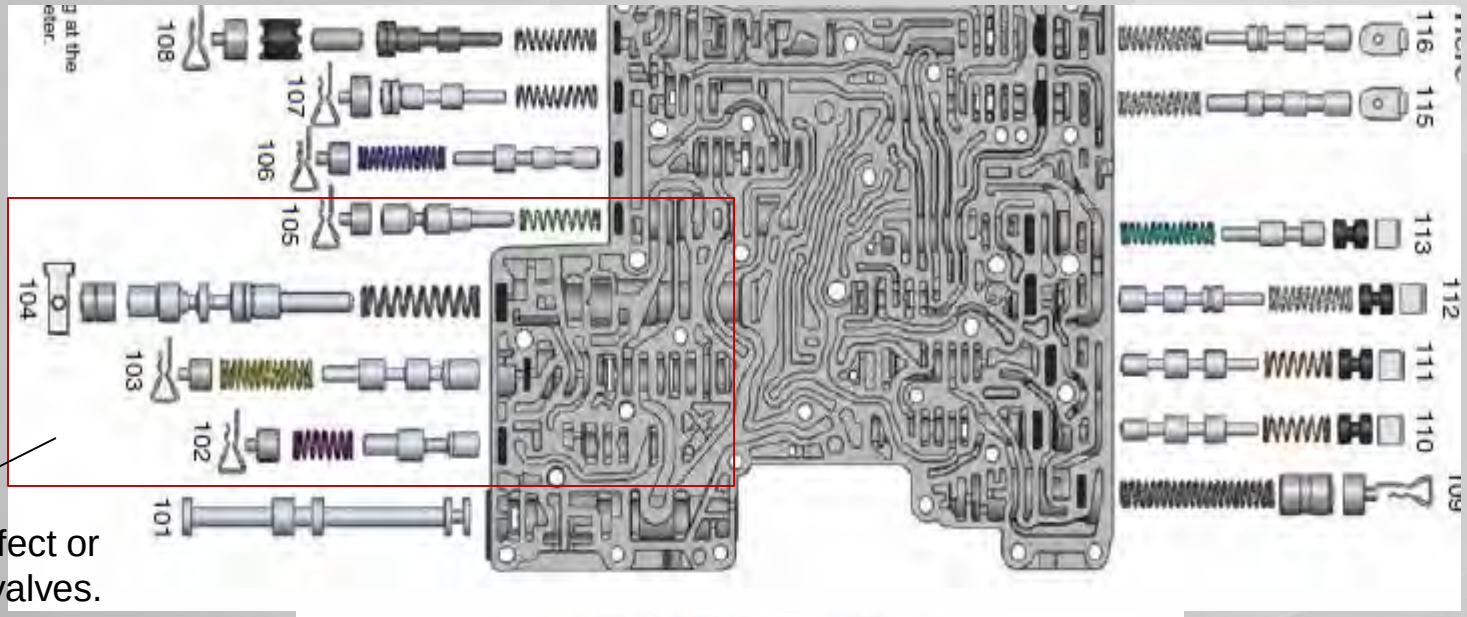
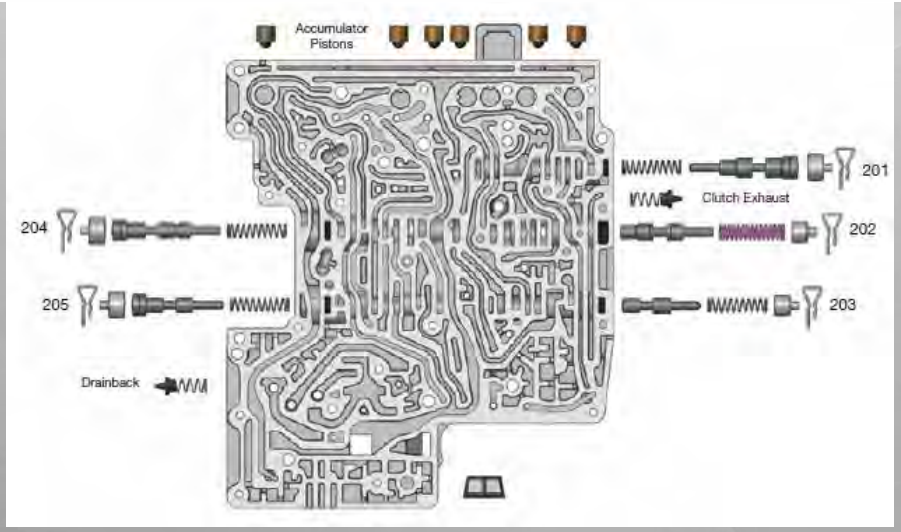
ZF 6, Gen 1 & Ford 6R60/80



TCC affect or control valves.



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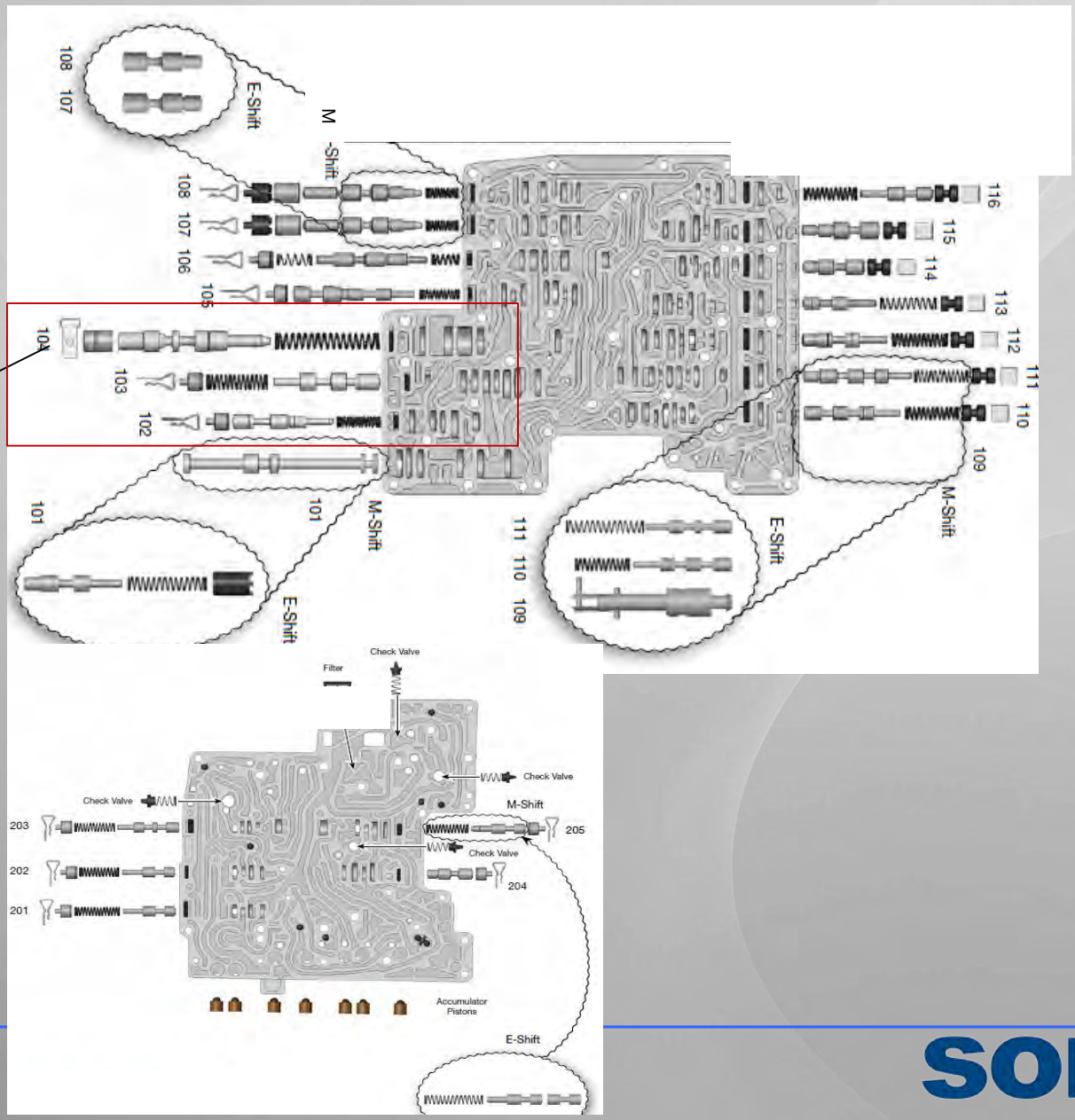
ZF 6, Gen II

TC control



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ZF6HP19/26/32*

*Also fits Ford 6R60

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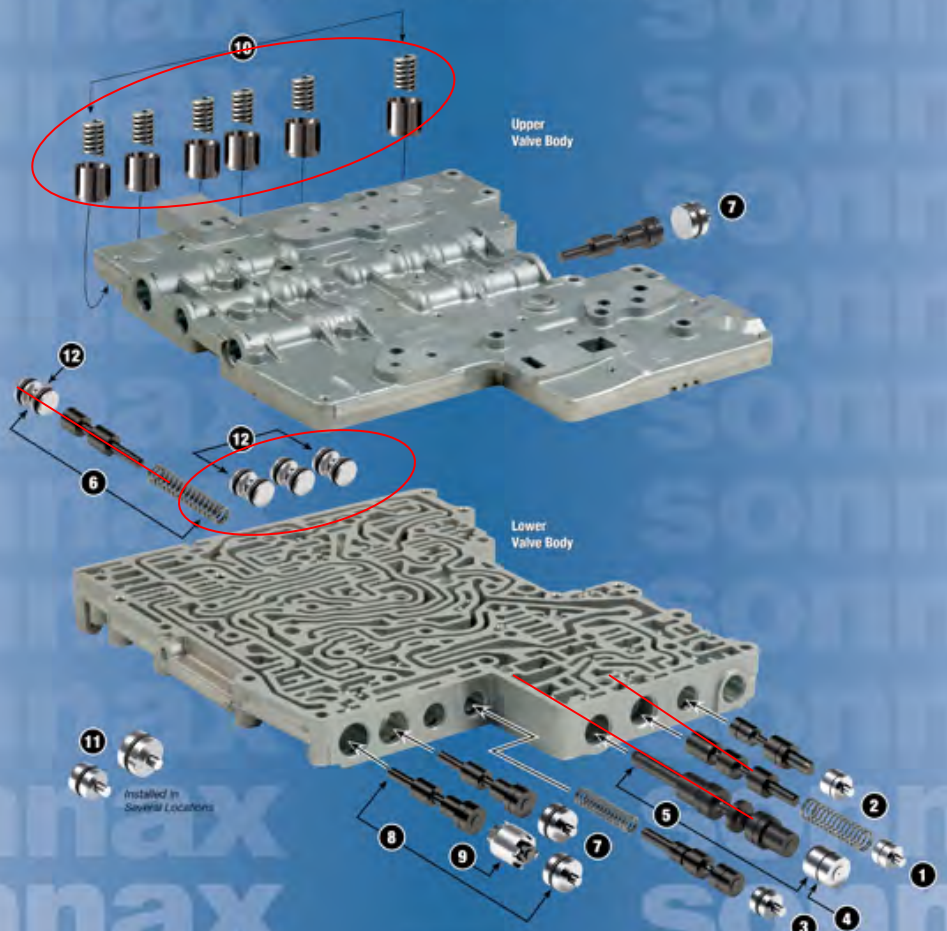

1 95740-05K
Oversized Converter Release Regulator Valve Kit
Helps cure:
- Excessive TCC slip, RPM & related codes
- Harsh lockup apply & release

Note: Requires tool kit **F-95740-TL5** & the **VB-FIX** reaming fixture.

2 95740-11K
Oversized Lubrication Control Valve Kit
Helps cure:
- Low converter pressure
- Lube failure

Note: Requires tool kit **F-95740-TL11** & the **VB-FIX** reaming fixture.

3 95740-13K
Oversized Bypass Clutch Control Valve Kit
Helps cure:
- Converter overheat
- Low TCC release pressure

Note: Requires tool kit **F-95740-TL13** & the **VB-FIX** reaming fixture.

4 95740-03
Pressure Regulator Sleeve
Helps cure:
- Harsh or erratic line pressure
- Broken parts

5 95740-01K
Oversized Pressure Regulator Valve Kit
Helps cure:
- Delayed or no reverse
- Poor shift quality

Note: Requires tool kit **F-95740-TL** & the **VB-FIX** reaming fixture.

6 95740-17K
Oversized Solenoid Pressure Regulator Valve Kit
Helps cure:
- Gear ratio or solenoid codes
- Wrong gear starts

Note: Requires tool kit **F-95740-TL17** & the **VB-FIX** reaming fixture.

7 95740-08K
Oversized Clutch D1 or E Control Valve Kit
Fits either of 2 Locations
Helps cure:
- Flare upshifts or downshift bind-ups
- Excessive clutch overlap & clutch distress

Note: Requires tool kit **F-95740-TL8** & the **VB-FIX** reaming fixture.

8 95740-09K
Oversized Clutch A Control Valve Kit
Helps cure:
- Flare upshifts or downshift bind-ups
- Excessive clutch overlap & clutch distress

Note: Requires tool kit **F-95740-TL8** & the **VB-FIX** reaming fixture.

9 95740-21K
Clutch A Control Boost Valve & Sleeve Kit
Helps cure:
- Delayed/Harsh forward engagement
- Flare/Neutral on 5-4 downshift

10 95740-15K
Valve Body Accumulator Piston & Spring Kit — 6 Sets
Helps cure:
- Firm up/downshift and/or engagement
- Erratic EDS solenoid control

11 95740-19K — 6 large & 6 small plugs
12 95740-25K — 4 plugs (Internal)
O-Ringed End Plug Kits
Helps cure:
- Soft/Inconsistent shift feel

For harsh shifts and TCC concerns, inspect the red valve, bores.

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