

Oil Pressure Checks

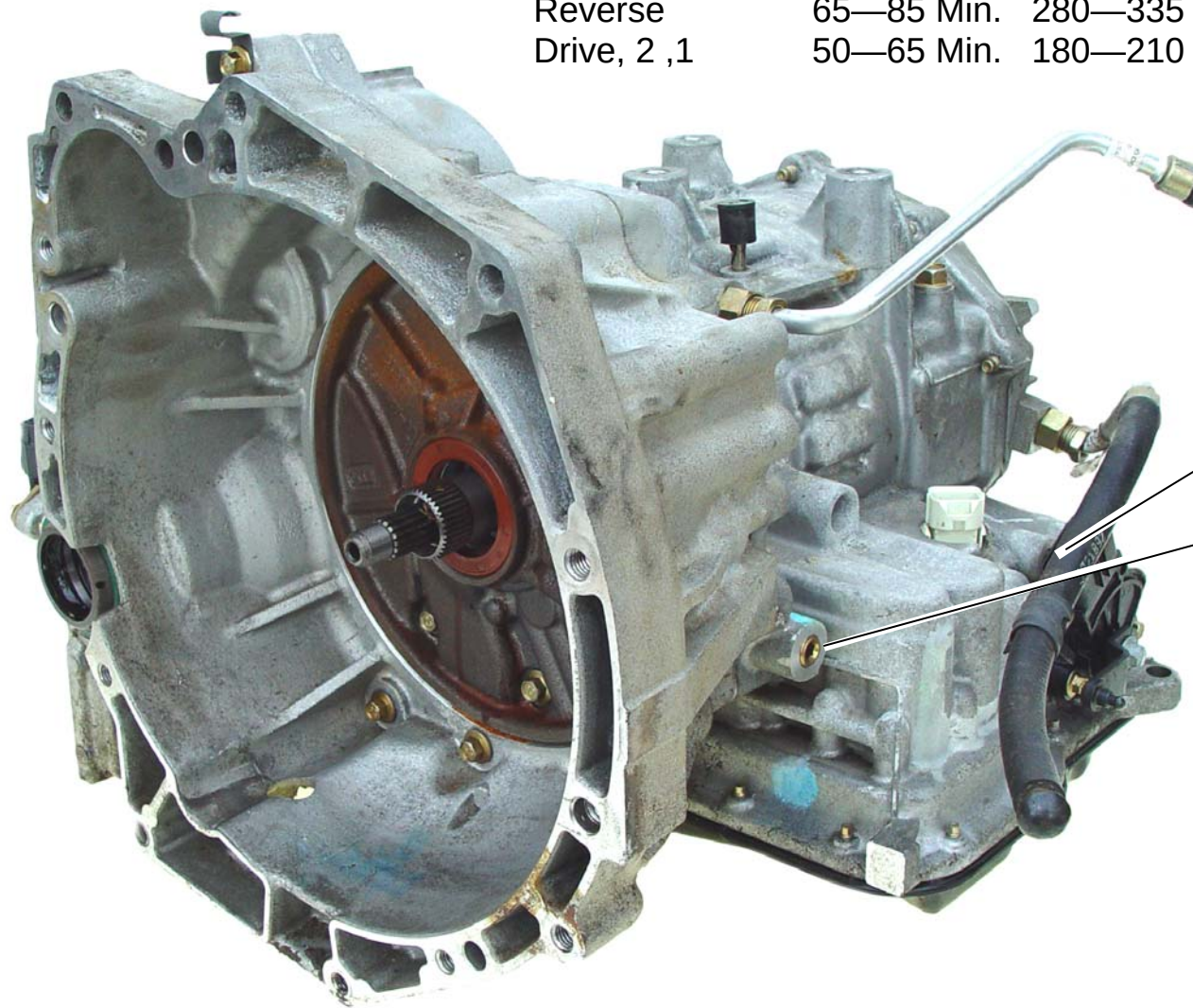
4F27E

Line Pressure Specifications

Park & Neutral	50—65 Min.	180—210 Max.
Reverse	65—85 Min.	280—335 Max
Drive, 2 ,1	50—65 Min.	180—210 Max.

Gear Ratios

Rev:	2.65 to 1
1st:	2.82 to 1
2nd:	1.50 to 1
3rd:	Direct
4th:	.73 to 1



Identification

3rd clutch oil
pressure tap

Line Pressure Tap

Identification

Identification Tag



Oil Pan

Use Loctite 5699 and no pan gasket.
Install 20 pan bolts to 62 in. lb.



Identification

Filter and Oil Fill

Use Mercon V Fluid
Dry fill is 6.6 liters



Transmission Fluid Temperature
Sensor (TFT) location.



Identification

Tag

4F27E common
characters

Type of
vehicle

Build
Level

Bar code

Type of
vehicle

Build
Level

Engi-
neering
level

Year and
Julian
Date

Serial
Number

Tag is on bottom of transmission pan

Complaints and Corrections

COMPLAINT: Has 2nd, 4th goes to neutral.

QUALIFICATION: This means servo piston is OK and band is OK.

Likely CAUSE: 3-4 solenoid. [Page 18]
Test by swapping Lockup and 3-4 solenoids.

COMPLAINT: No 2nd and no 4th.

CAUSES: Servo Piston is broken, Band is broken, or 2nd and 4th Solenoid is NG.

QUALIFICATION: Swap 2nd and 4th sol with Forward Sol.

Complaint no change: Piston or Band.

Complaint changes: Swap the solenoid back to forward and replace 2-4 solenoid.

COMPLAINT: No 3rd-No 3rd hot-Occasional no 3rd-2 to 3 or 3 to 2 cutloose.

QUALIFICATION: Place Selector in "D". Between 1/16 and 3/8 throttle, pressure must go up and down as tho the gauge is attached to the gas pedal. [See Pressure rise next page.]

Pressure Rise is OK: Burned direct clutch and rings on rear cover ring tower. Page 7.

Pressure not OK: Check electrical. Amps to EPC does not effect pressure replace EPC.

From: Stone Age Engineer

Current information can only reach you thru the senses of perception-Seeing-Hearing-Tasting-Smelling and Touching. Your brain mixes current information with the total of your experience and forms an opinion. [A guess with common sense]

Your opinion or guess is made 8 times more accurate by attaching a pressure gauge. With a scanner your opinion will get 4 times more accurate. Both: Is $8 \times 4 = 32$ times more accurate.

Because a scanner hooks up fast the tendency is to use it more and a gauge less.

1. A scanner will tell you what the trans should be doing. A gauge tells you what it IS doing.
2. A gauge will ALWAYS tell when you need a scanner, but a scanner will not always tell you when you need a gauge.

It's 50 years later and a gauge is still the champ.

Why is the gauge still the champ?

Because a gauge will tell you if pressure rise is working and scanner will only tell you if it is being commanded. Why is knowing that so Important?

Time, Time, Your time, Shops time and Shops Stress. Time spent working on a slip, shifting or lockup is totally wasted until you KNOW pressure rise is working. [Read 3 times-OUT LOUD]

Checking Pressure Rise: Next Page.

Checking Pressure Rise

Never work on a slip, shift or lockup complaint without Seeing if Pressure Rise is, or isn't OK.

Attach Pressure Gauge; Place selector in "D". Pressure must be above minimum listed for the trans. If below min, worn pump or very hot, bring RPM up a couple hundred rpm above idle with the throttle. If min in "D" and "R" is attained at 800 rpm, pump is usually OK even if worn.

At idle, or 800 rpm if needed, record the pressure in every selector position.

With that record as your reference there is 3 Questions to ask. 1. Does pressure change by selector range? 2. Does it change with more throttle. 3. does it go max with no Volts?

REVERSE: 30 to 50 lbs more than "D". When throttle is added, in Reverse, Pressure Must increase at least another 100 lbs.

[Exceptions all the way are 604—42LE]
FORWARD: Many trans's command more pressure in 2 or 1. At idle or prox 800 move selector to 2 and then 1. If pressure goes up either or both places, that is evidence that PR is OK. If it stays the same it is still OK. If it is less in 2 or 1, that would indicate a leak to a friction unit.

With Selector in "D": Apply Foot brake, add throttle. Pressure should at least double between idle and just under stall [1500-2500rpm]. [Exception is Torqueflite which goes up 50%]

With Selector in "D": While driving 50up mph Lift throttle which should bring pressure to min. Then turn the key off momentarily and back on again. While the key is off pressure should jump instantly to max., then back down to min when the key is turned back on.

Why Pressure rise is so important?

If it's not working, **low pressure**, it will burn clutches with just a few hard throttle shifts.

If it's not working, **high pressure**, it'll burnup gear train, for lack of lube, or destroy pump.

Ancient Wisdom from Stone Age Engineering

Factory specs are what you use until you find out what works the best. If you didn't have factory specs how'd you know where to start?

Fast Reference

Internal Parts Direct & Reverse Rings

End Cover

BENCH TECH

Hello Bench Technician:

Pay attention to the rings on tower.
These rings wear on the sides.
Side clearance in the groove should not
exceed .005 with feeler gauge.

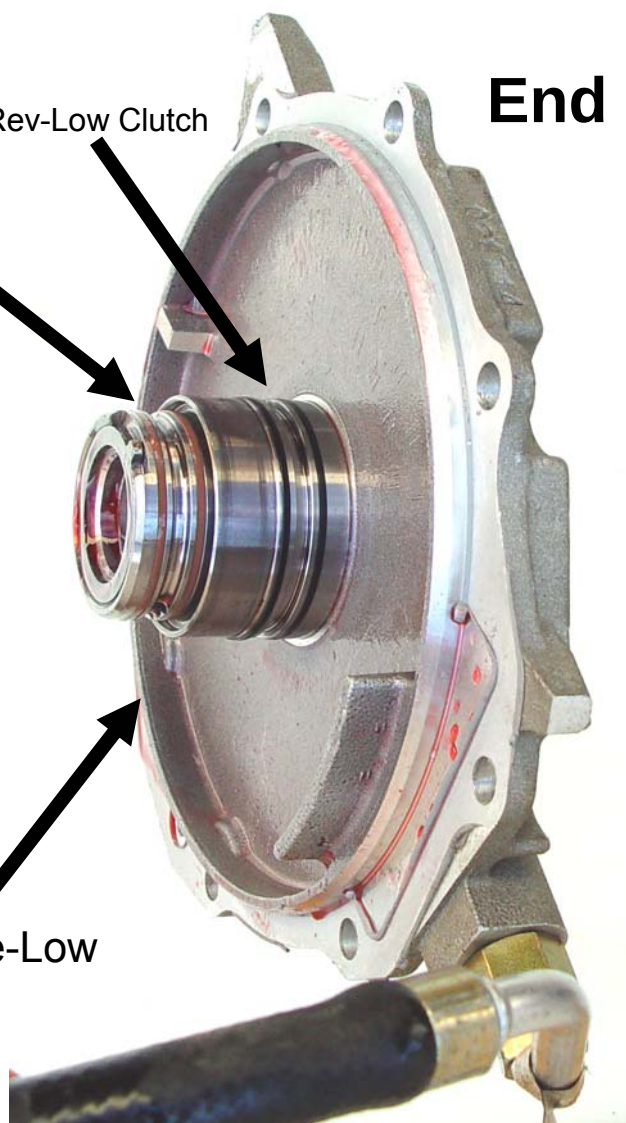
If the Direct Clutch or the Reverse Low
Clutches are burned suspect these rings.

"Thanks for Listening" Tech Team

Direct and Reverse-Low
Ring Tower

Direct Clutch

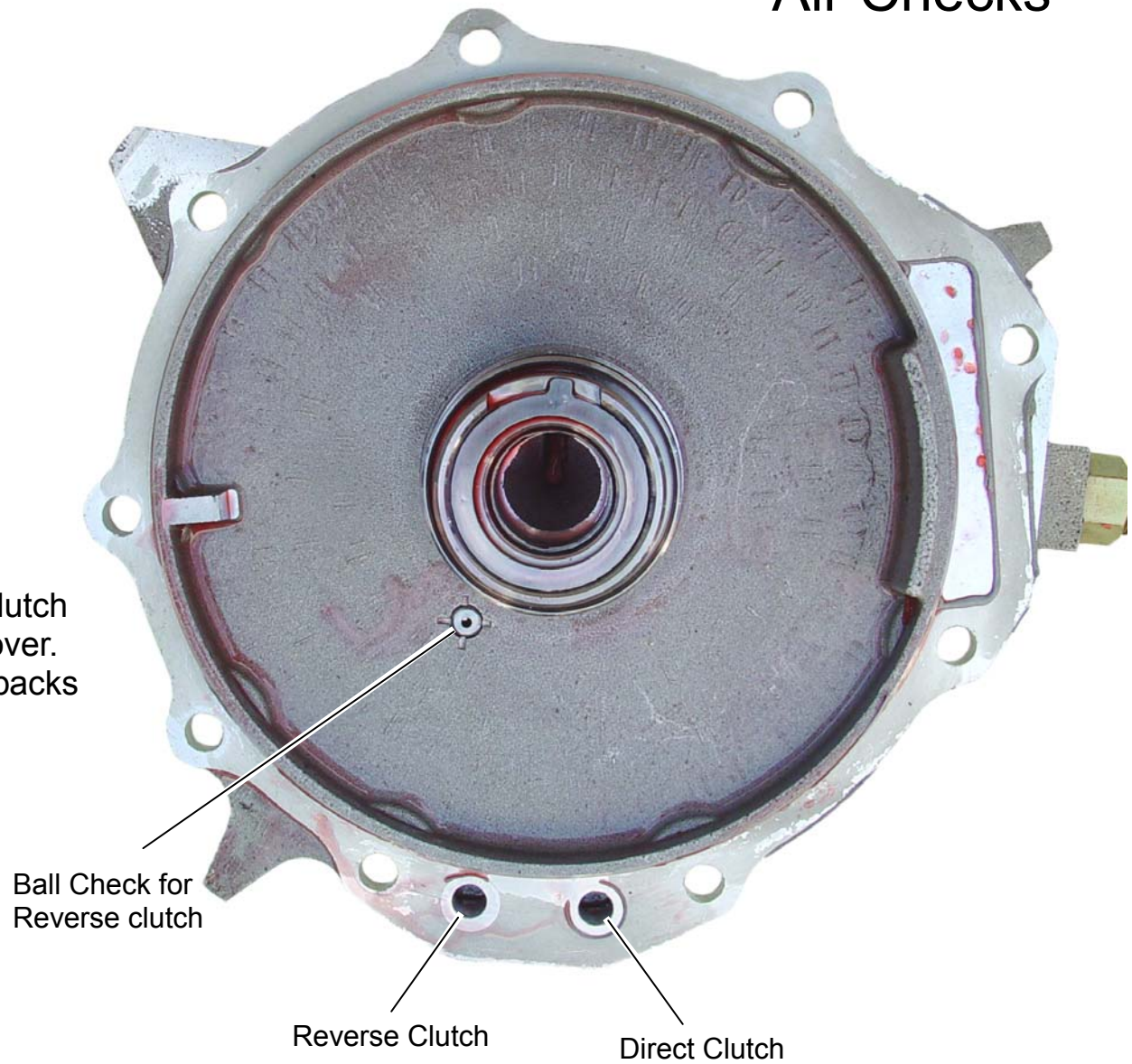
Rev-Low Clutch



Air Checks

Fast Reference

Place reverse and direct clutch drum assembly on End Cover. Then air check the clutch packs through the holes shown.



Fast Reference

Low One Way Clutch Rotation

When the low one way clutch is installed properly the carrier assembly will freewheel in the direction of the arrow.



Listen Here

Intermediate/OD Servo Piston

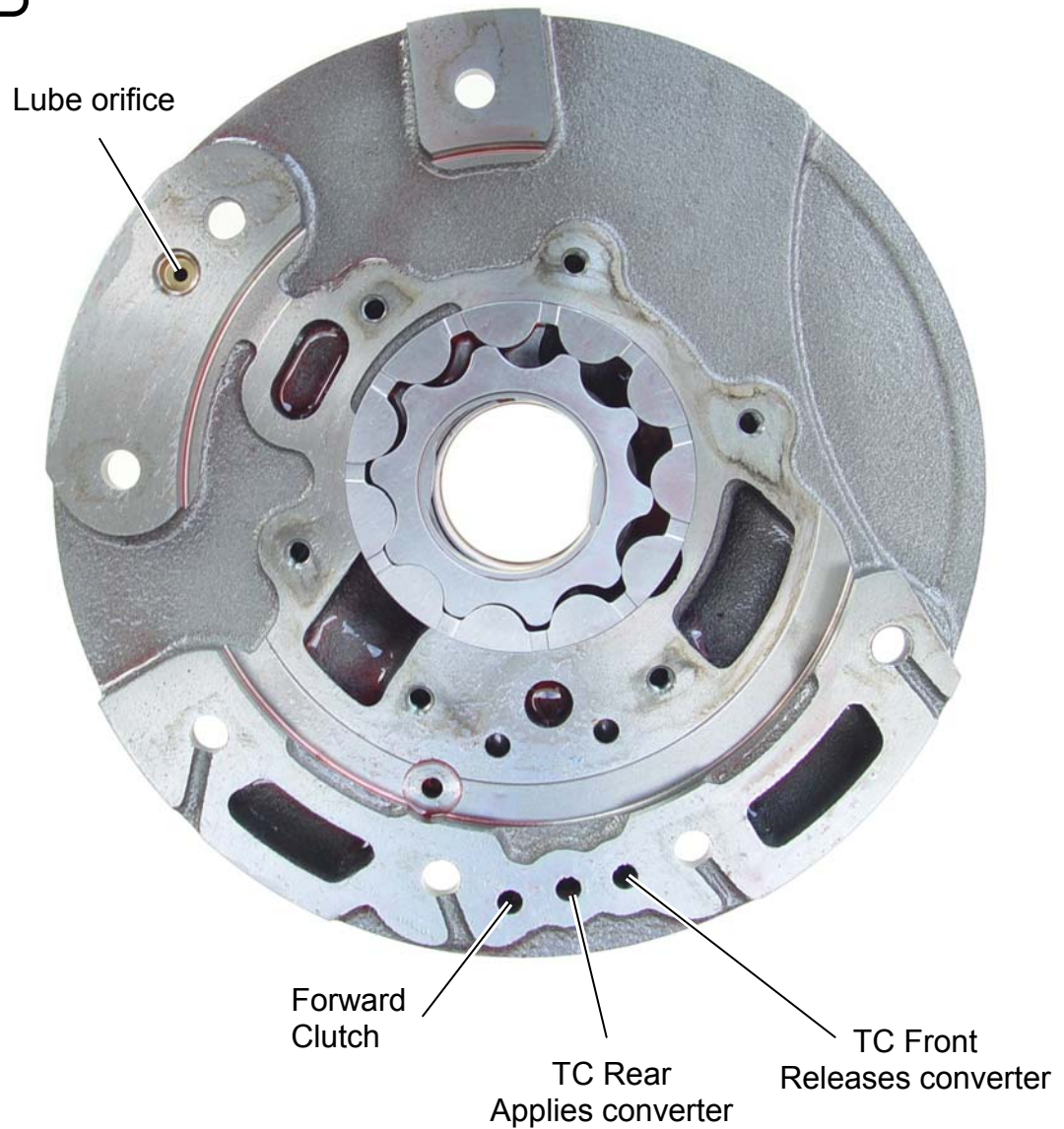
This piston breaks.
Give it new one.
XS4Z-7D0221AB
Ford



Fast Reference

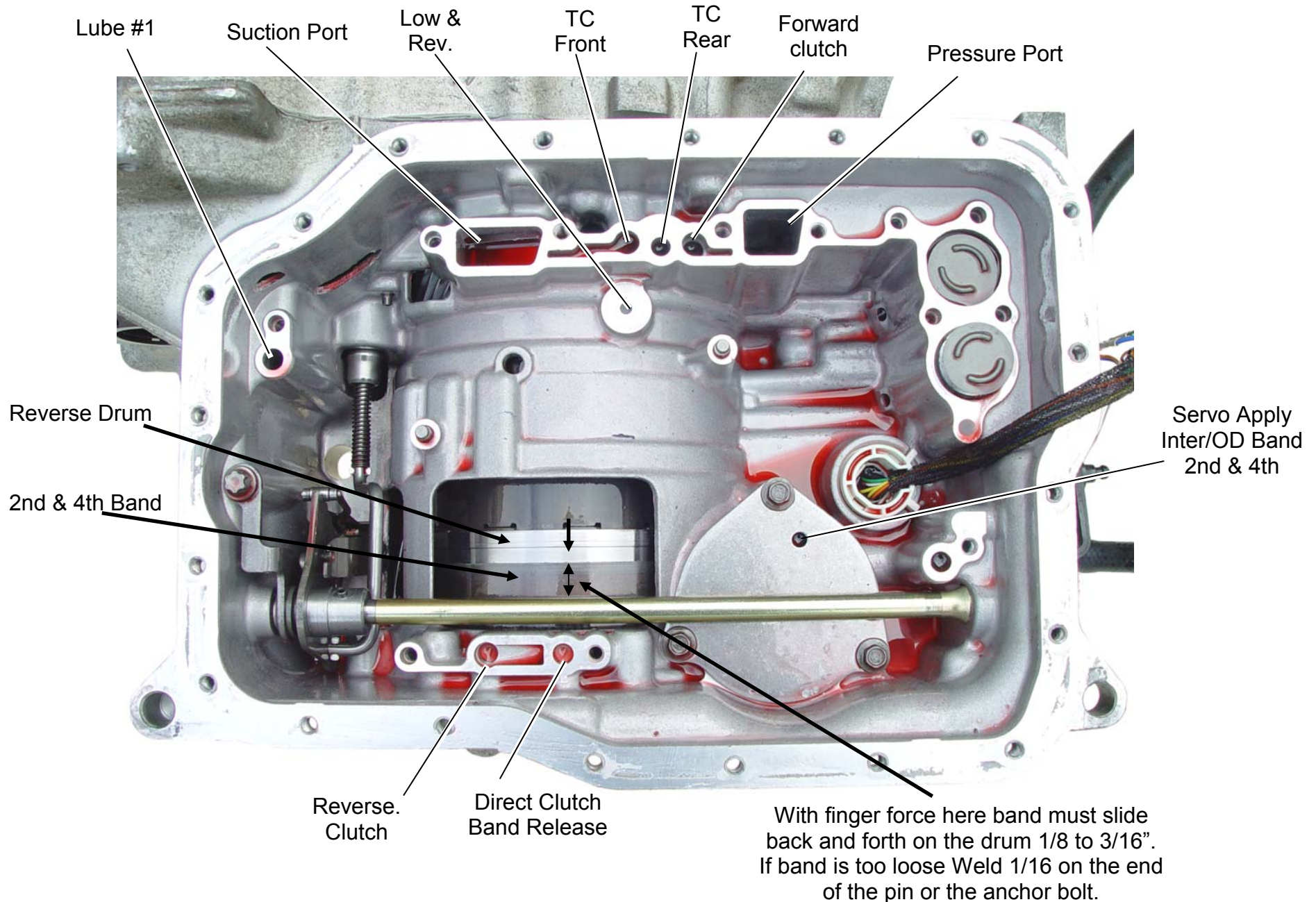
Air Checks

With Pump and Stator bolted together insert the Forward drum and then install the torque converter. Then air check the locations Shown. Take it easy, or converter will blow off the pump.



Fast Reference

Air Checks & Band Check

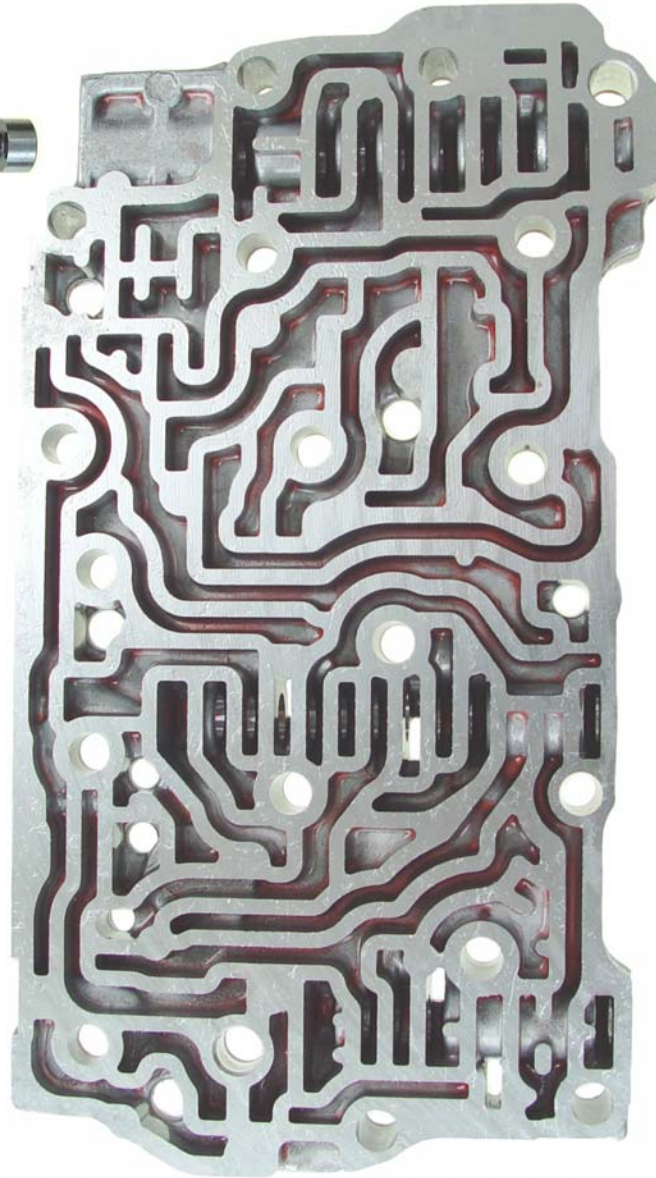


Valve Body

Channel Casting: Upper Body



Manual Valve



Low Reverse Valve

1.225x345x30x10



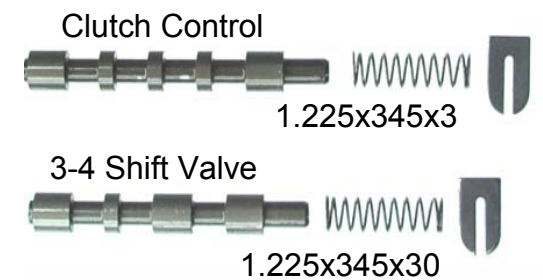
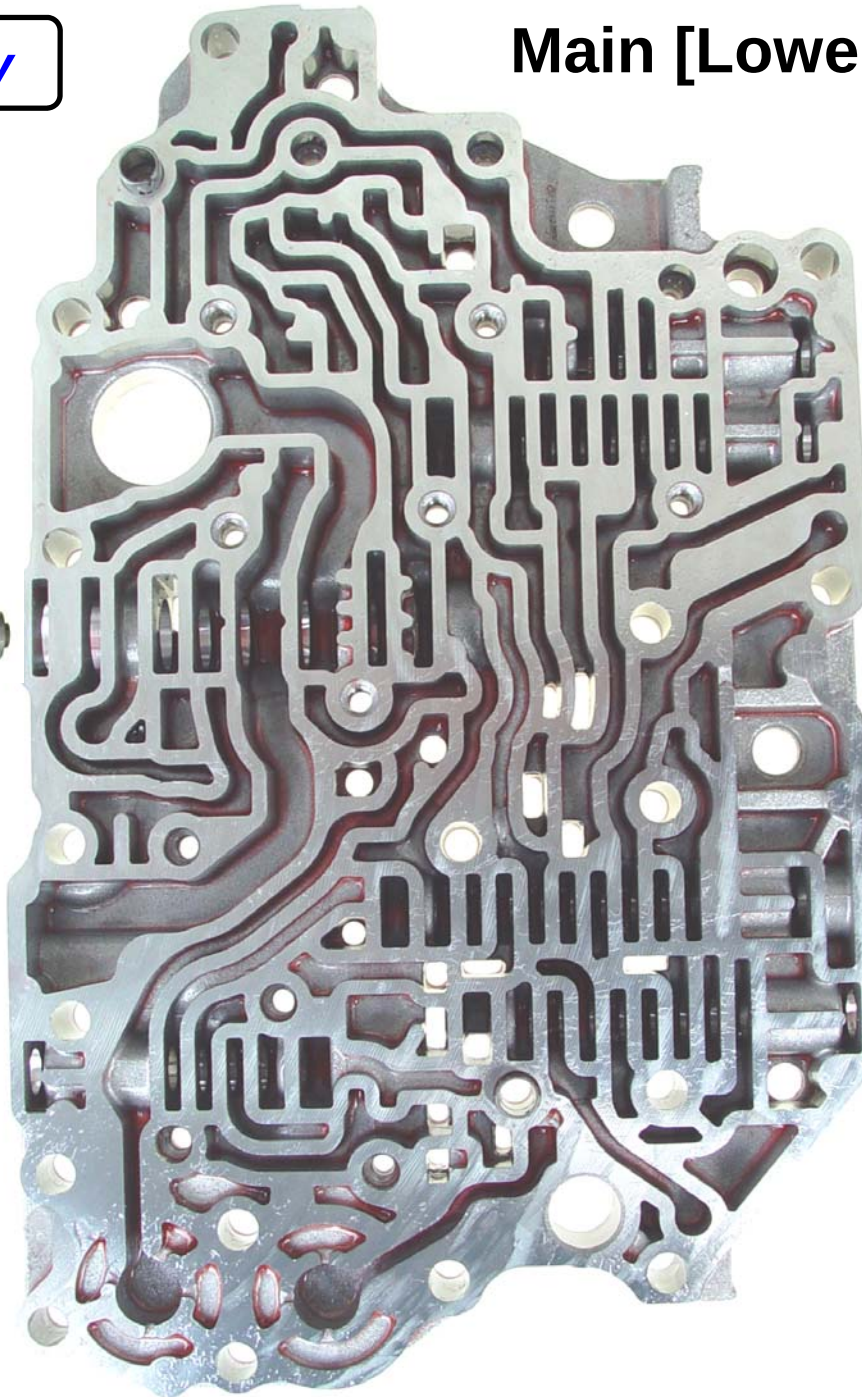
Solenoid Regulator

1.725x346x42x17

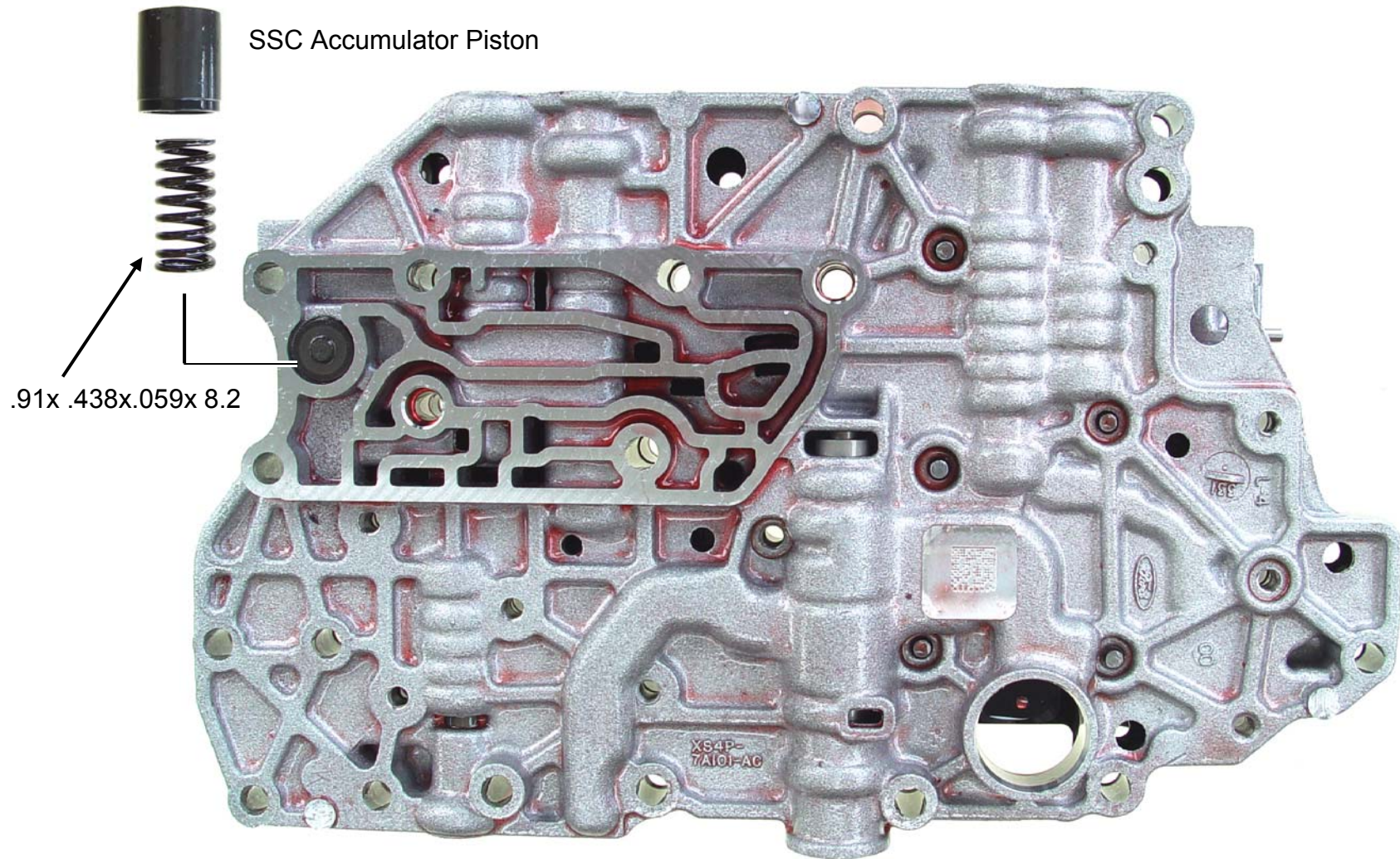


Valve Body

Main [Lower] Valve Body



Valve Body Section

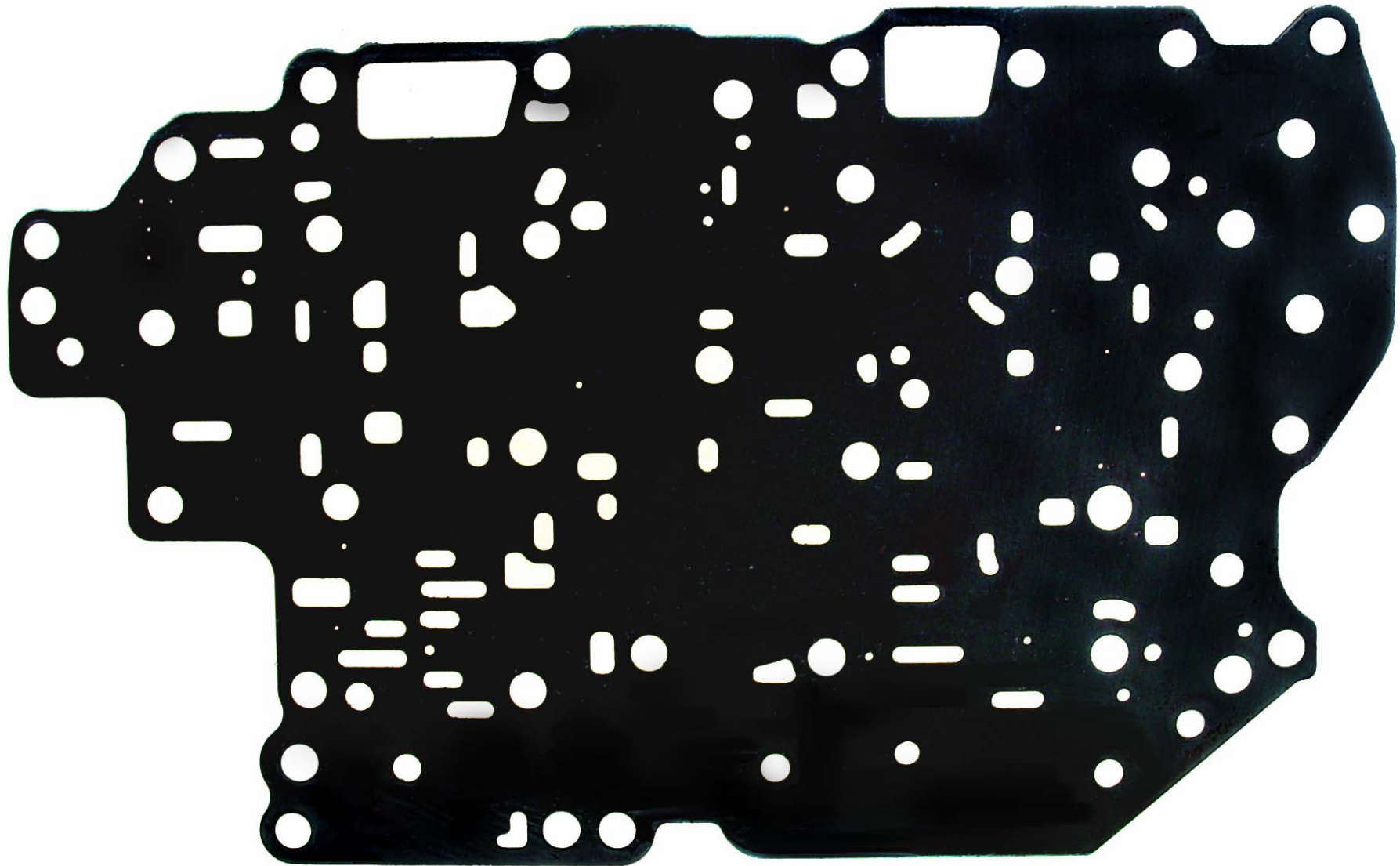


Valve Body Section

Valve Body

Separator Plate

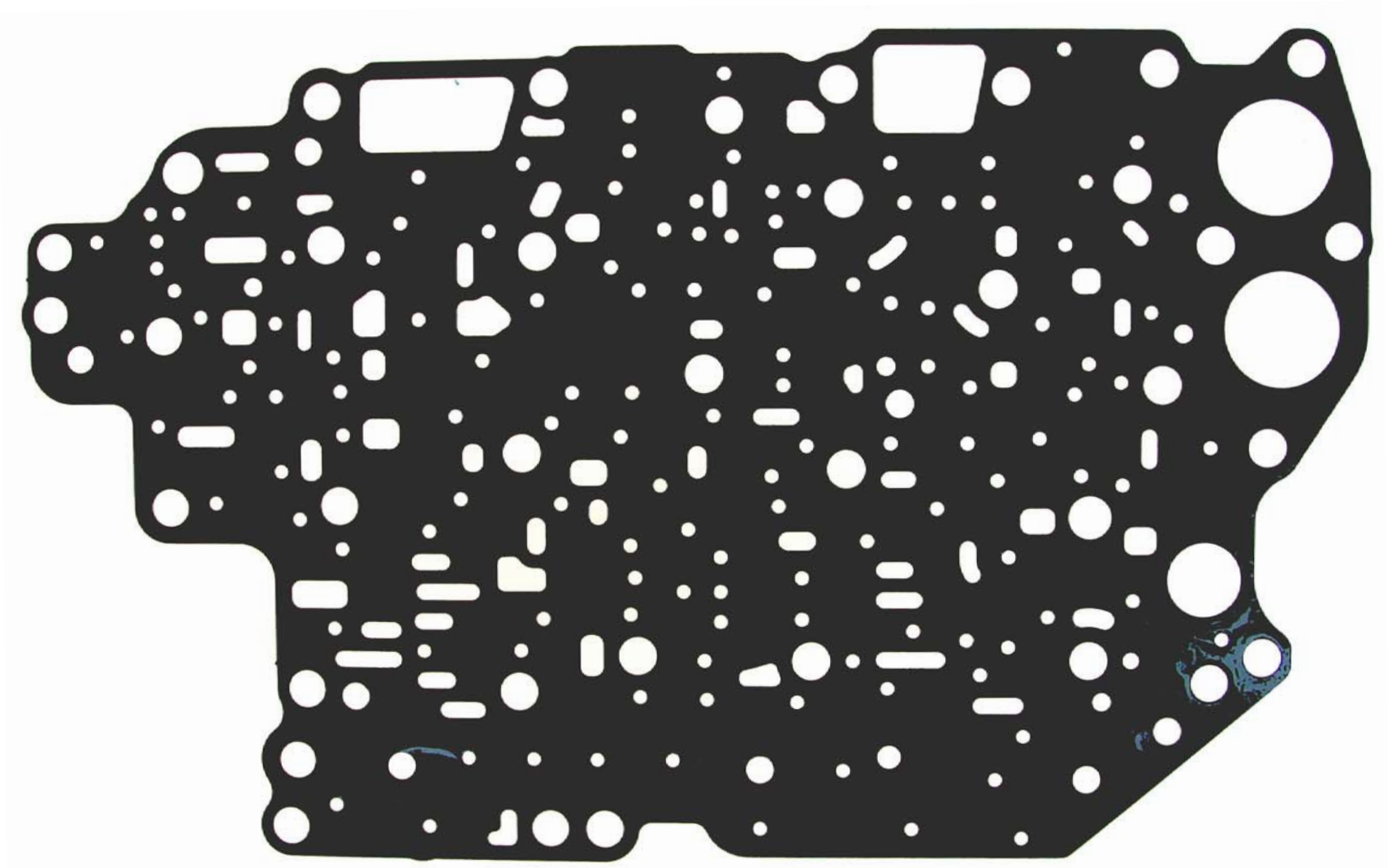
Lower valve body side has gasket bonded to separator plate.



Valve Body

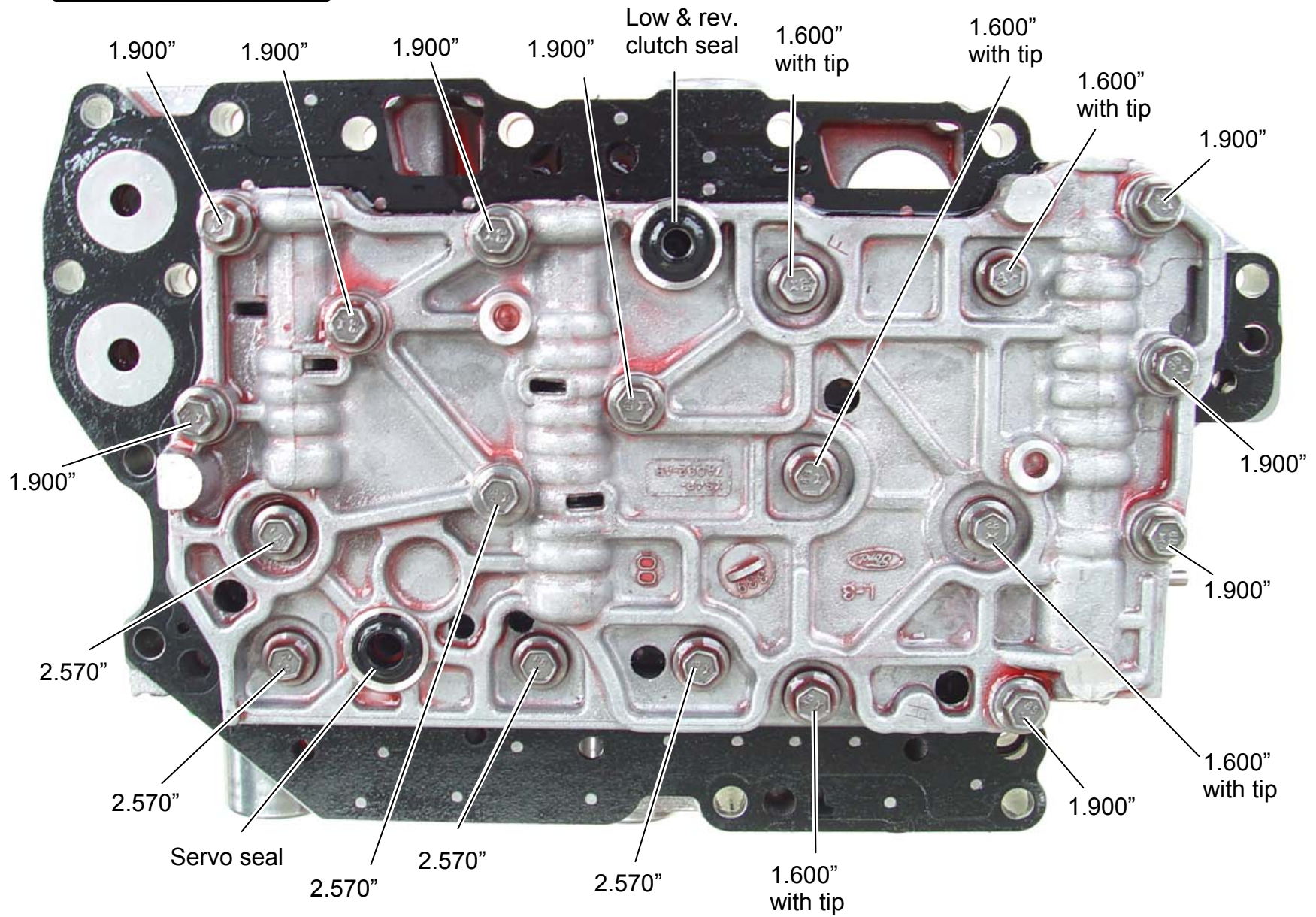
Valve Body Gaskets

Valve Body Gaskets are the same on both sides of the plate.



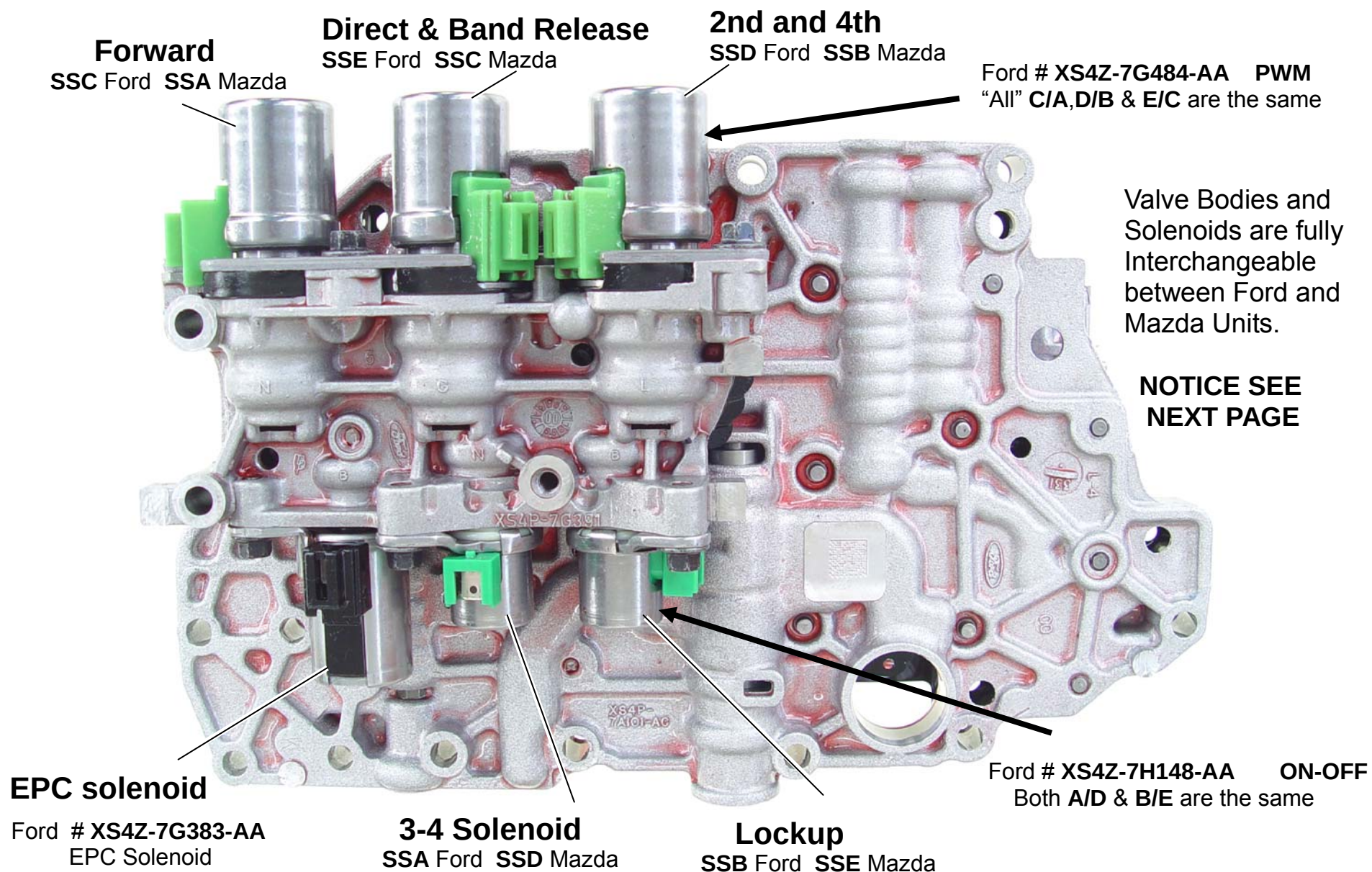
Valve Body

Channel Assembly



Valve Body

Ford 4F27E Mazda FN4AEL Solenoids



Valve Body Assembly Bolts

All bolts are 8mm
Torque to 80 in lbs.
Let'em set a bit, then
loosen and retighten.



1.600" with tip 5 pieces

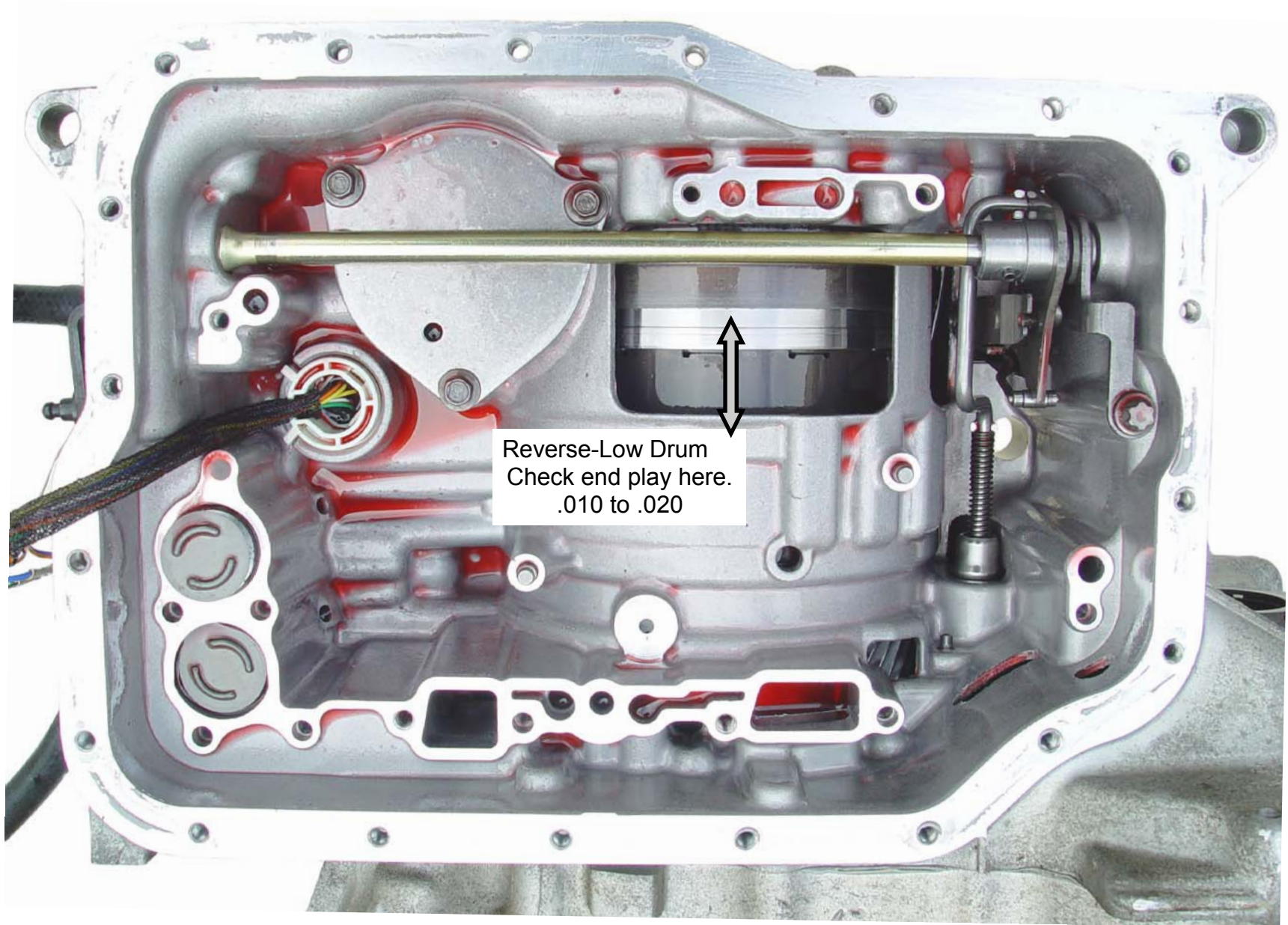


1.900" 9 pieces

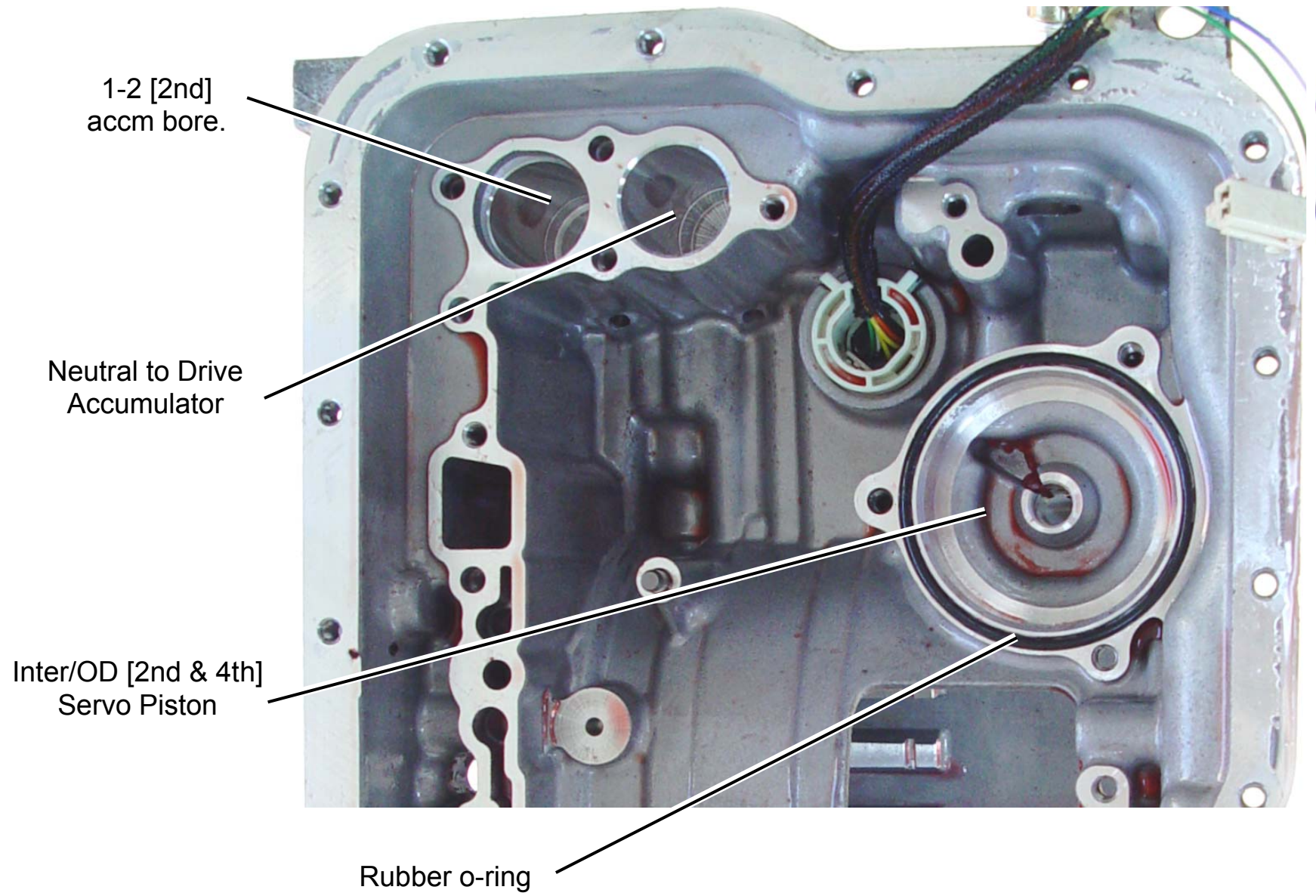


2.570" 5 pieces

Control Lever and Park



Case



Accumulators

2.658" x .832" x .138" x 12



2.664" x .519" x .088" x 19

1-2 Accumulator



2.937" x .829" x .090" x 12.5



2.157" x .612" x .095" x 16

N-D Accumulator



Int and OD Band Piston

Intermediate/OD Servo Piston

1.468x1.346x156x4.4



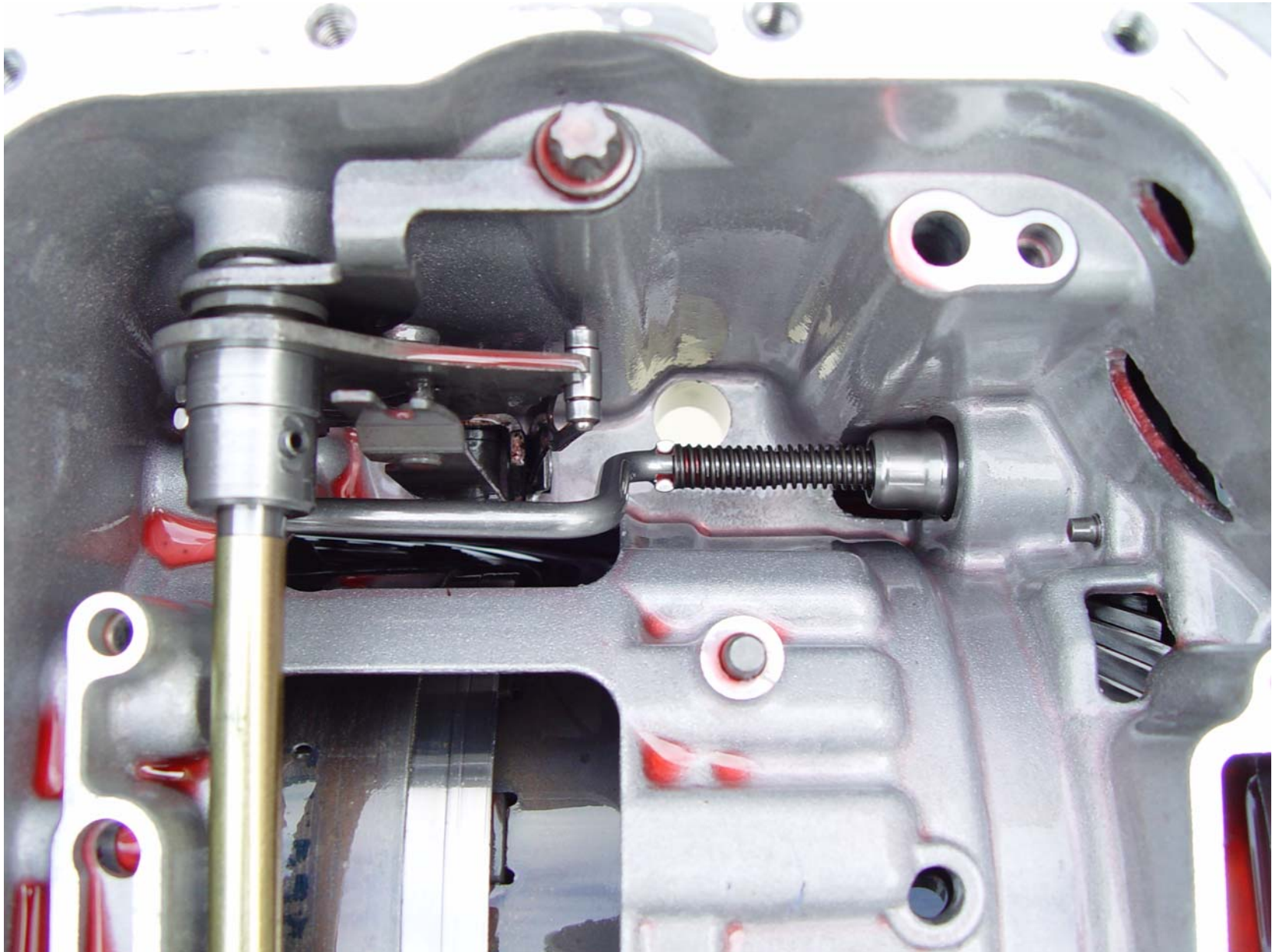
This piston breaks.
Give it new one.
XS4Z-7D0221AB
Ford



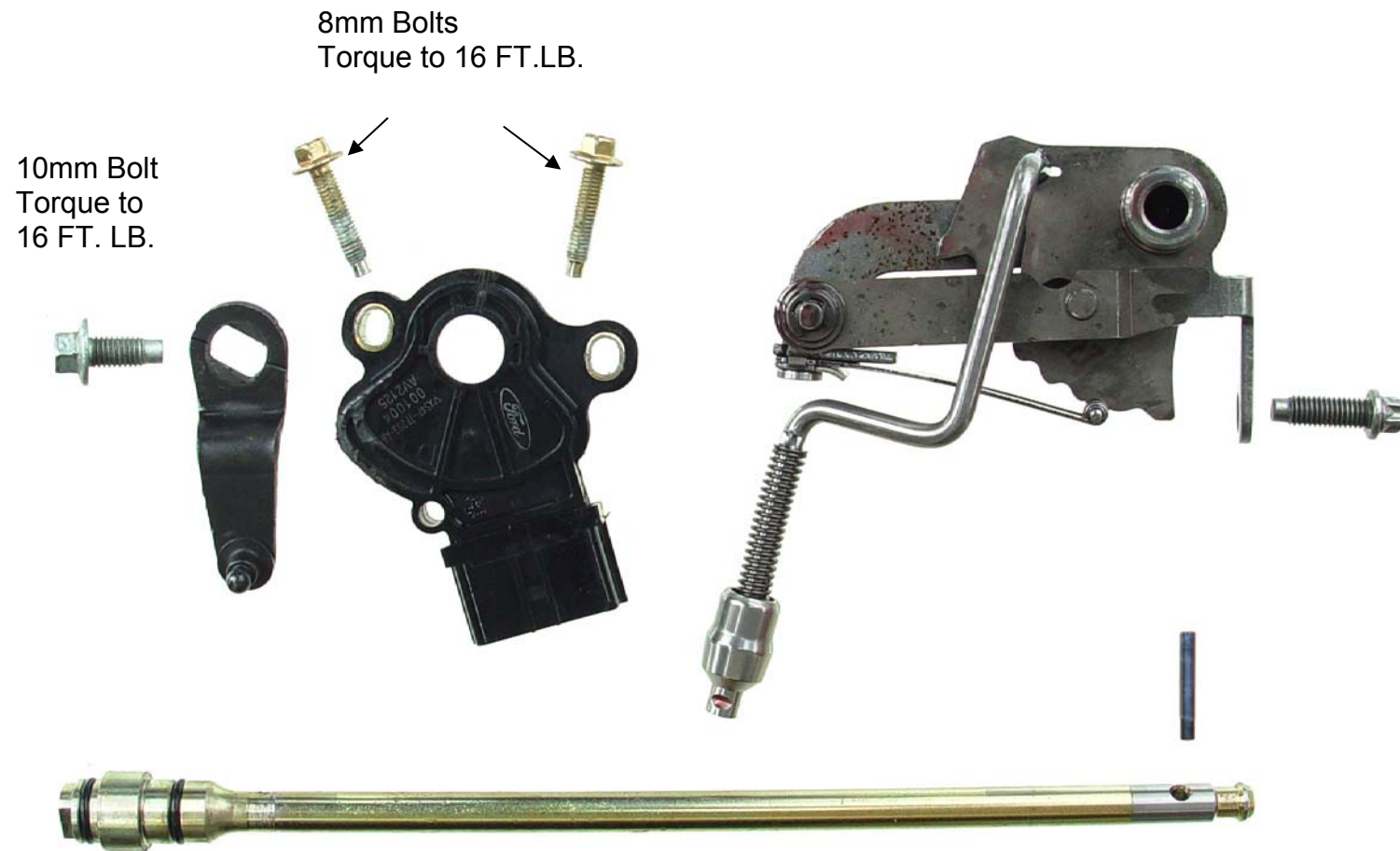
8mm bolts 3 pieces
Torque to 80 in lbs.



Control Lever and Parts

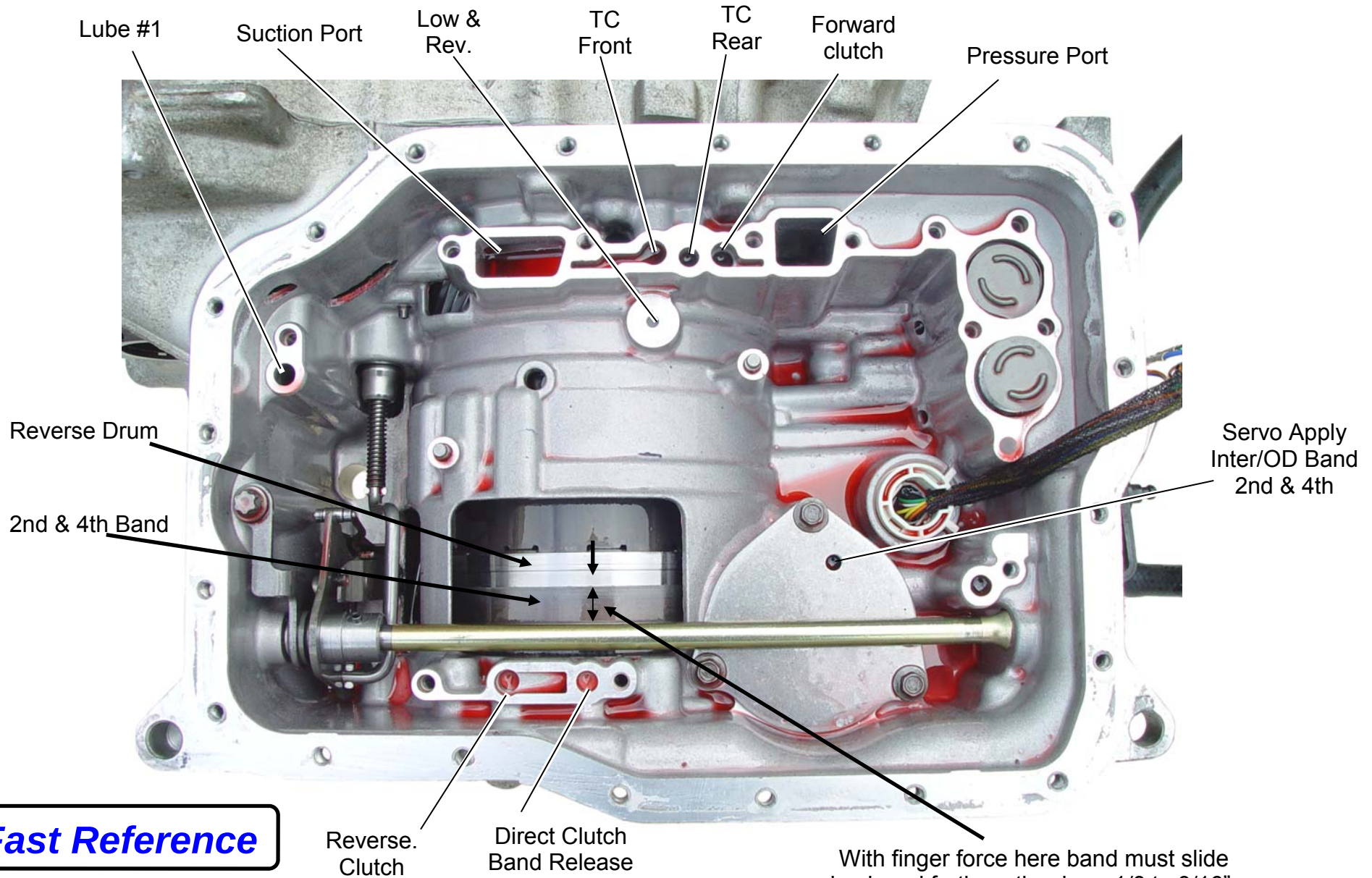


Control Lever and Parts



Valve Body

Air Checks & Band Check

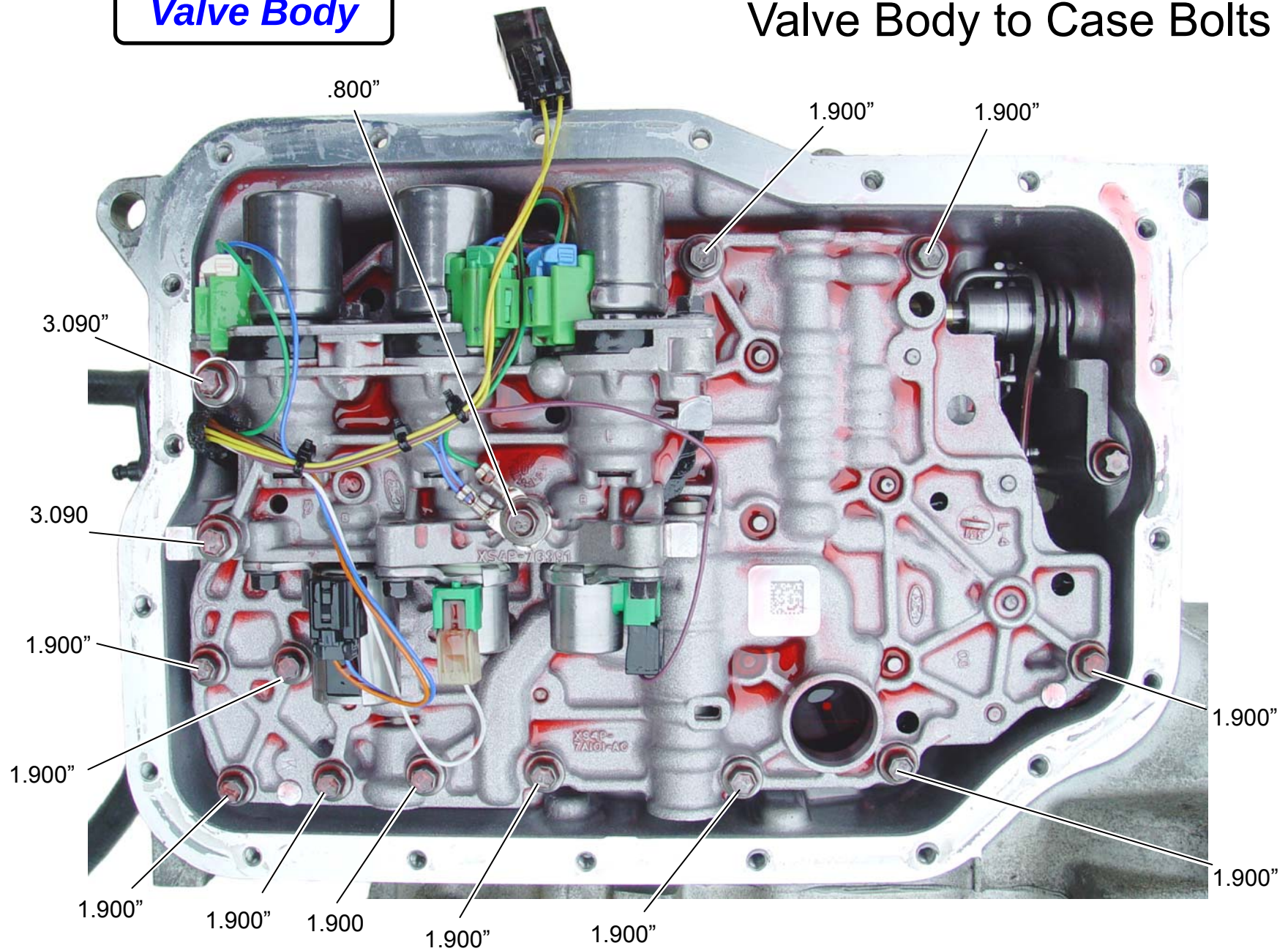


Fast Reference

With finger force here band must slide back and forth on the drum 1/8 to 3/16". If band is too loose Weld 1/16 on the end of the pin or the anchor bolt.

Valve Body

Valve Body to Case Bolts



Valve Body

The Technology IS the Ethic

If the sign on the building or any advertising says, "Transmissions" that is declaration to the Universe that you know how to fix them.

When a product or service is offered, the offer itself is a specific claim by the seller that he is accepting the MORAL and TECHNICAL responsibility for correct function, for a reasonable length of time, in exchange for money.

Regardless what you may call your repair, the job is in your shop to have the complaints and failures corrected. It doesn't matter how honest you are, as a person, if you do not fix the causes of the complaints and failures where is the ethic?

Each transmission develops 3 to 5 complaints and failures you see over and over again and again.

A service is ethical and deserving to the exact extent that your service corrects the causes of those complaints and failures; and does not include a whole bunch of parts that were not needed.

No more and no less, Gil

Valve Body to Case Bolts

Bolts shown actual size.
Bolts are 8mm.
Torque to 80 in lbs.

.800" 1 piece
Torque to 89 in lbs.



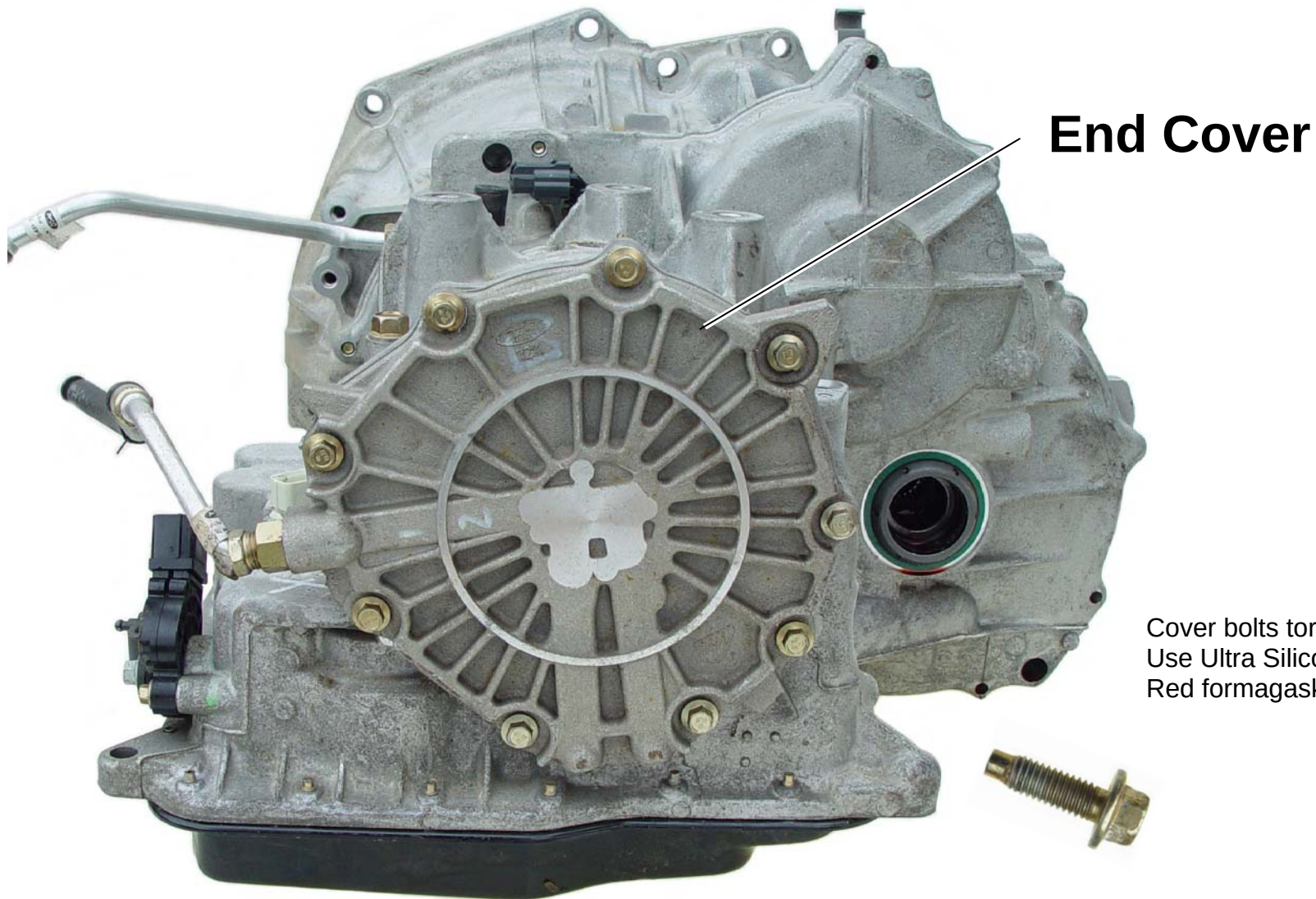
1.900" 11 pieces



3.090" 2 pieces



Internal Parts



Cover bolts torque to 16 FT.LB
Use Ultra Silicone Sealant or Loctite
Red formagasket under end cover.

Internal Parts

Internal Parts Direct & Reverse Rings

End Cover

BENCH TECH

Hello Bench Technician:

Pay attention to the rings on tower.
These rings wear on the sides.
Side clearance in the groove should not
exceed .005 with feeler gauge.

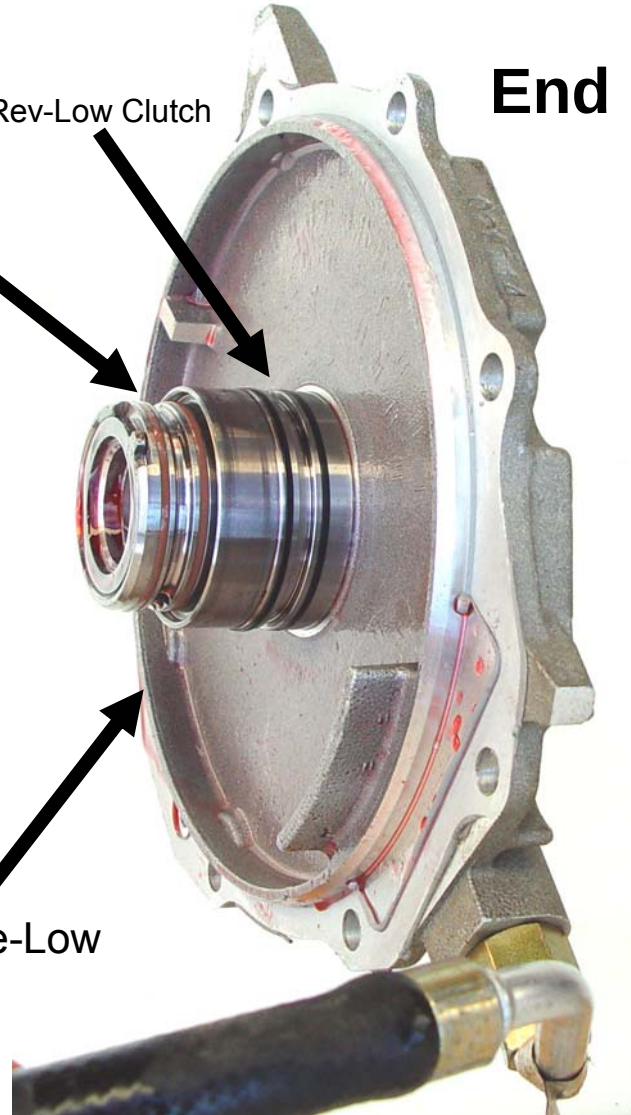
If the Direct Clutch or the Reverse Low
Clutches are burned suspect these rings.

"Thanks for Listening" Tech Team

Direct and Reverse-Low
Ring Tower

Direct Clutch

Rev-Low Clutch

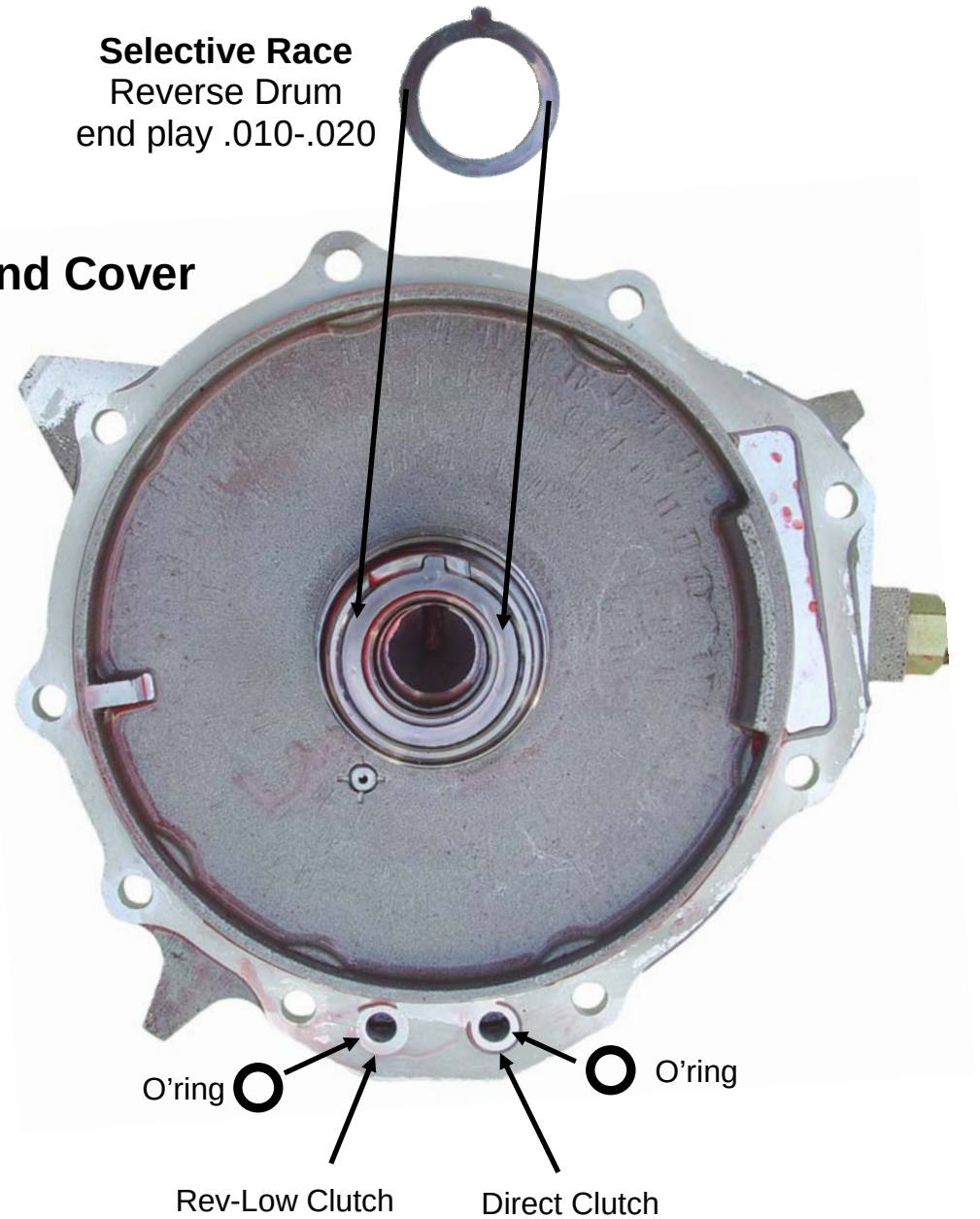


Internal Parts



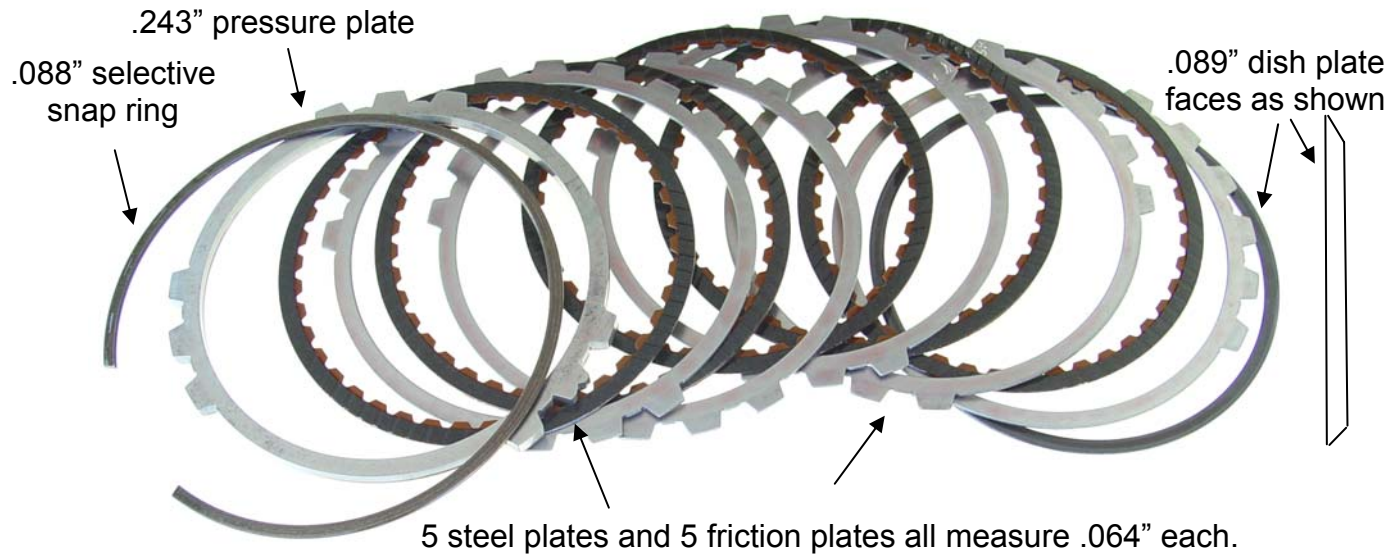
Selective Race
Reverse Drum
end play .010-.020

End Cover



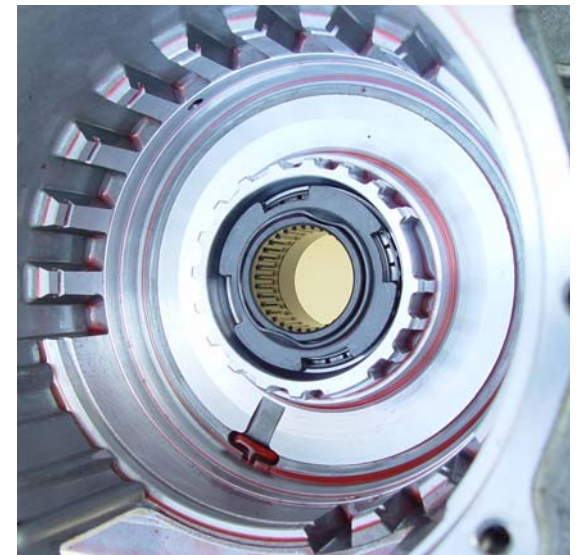
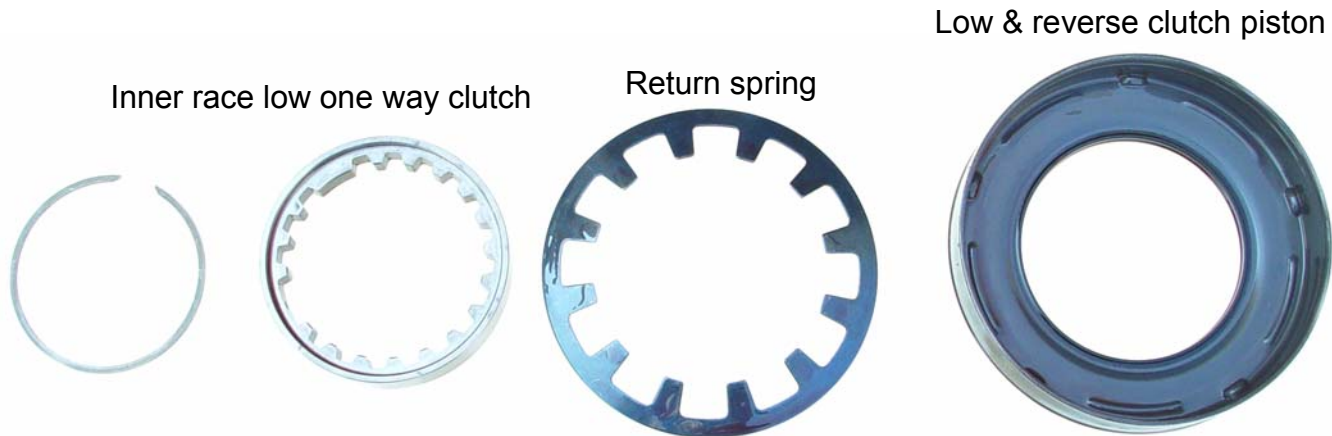
Internal Parts

Low & Reverse Clutch

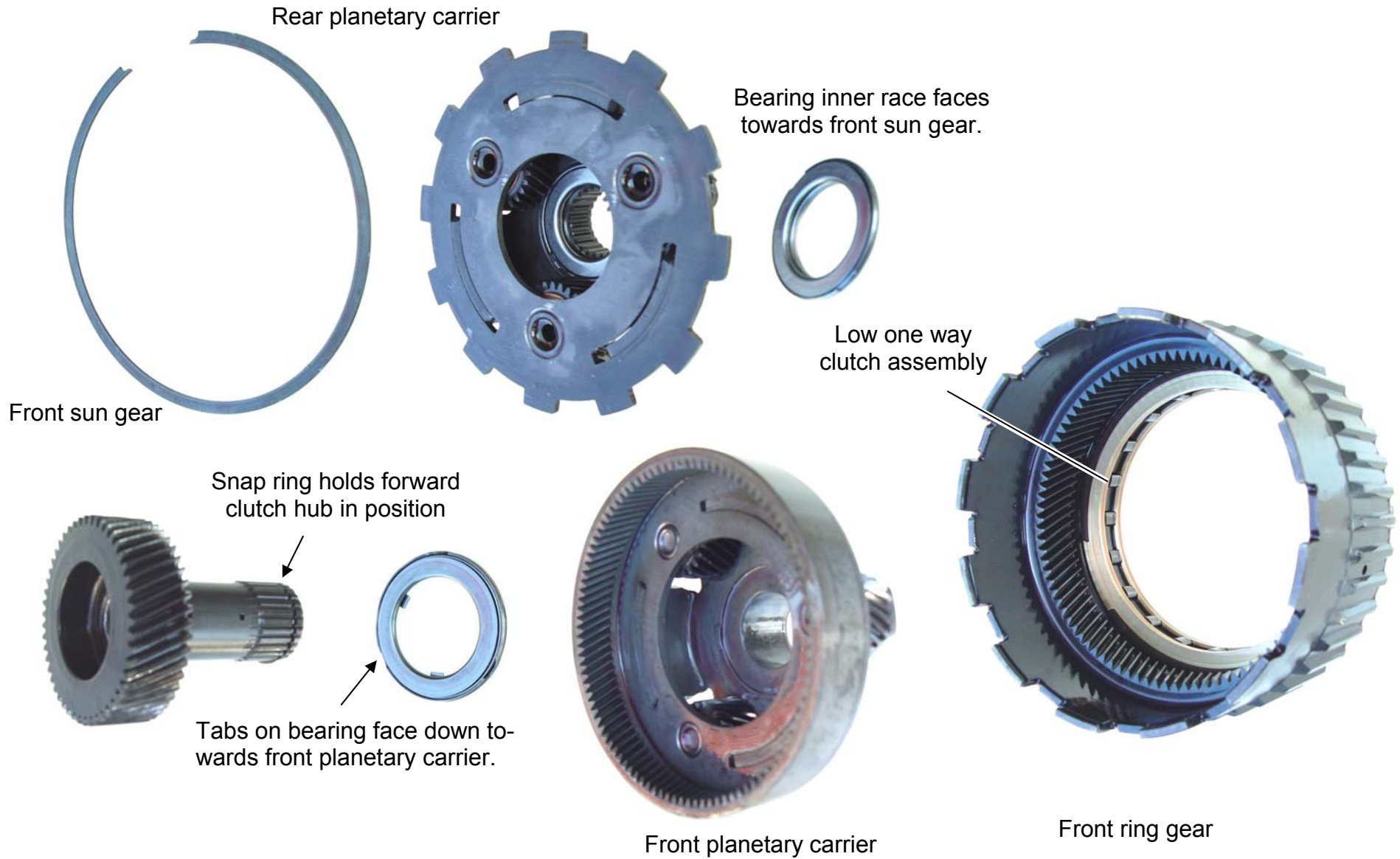


Clutch Packs

Low & reverse clutch clearance should be .085" - .100"

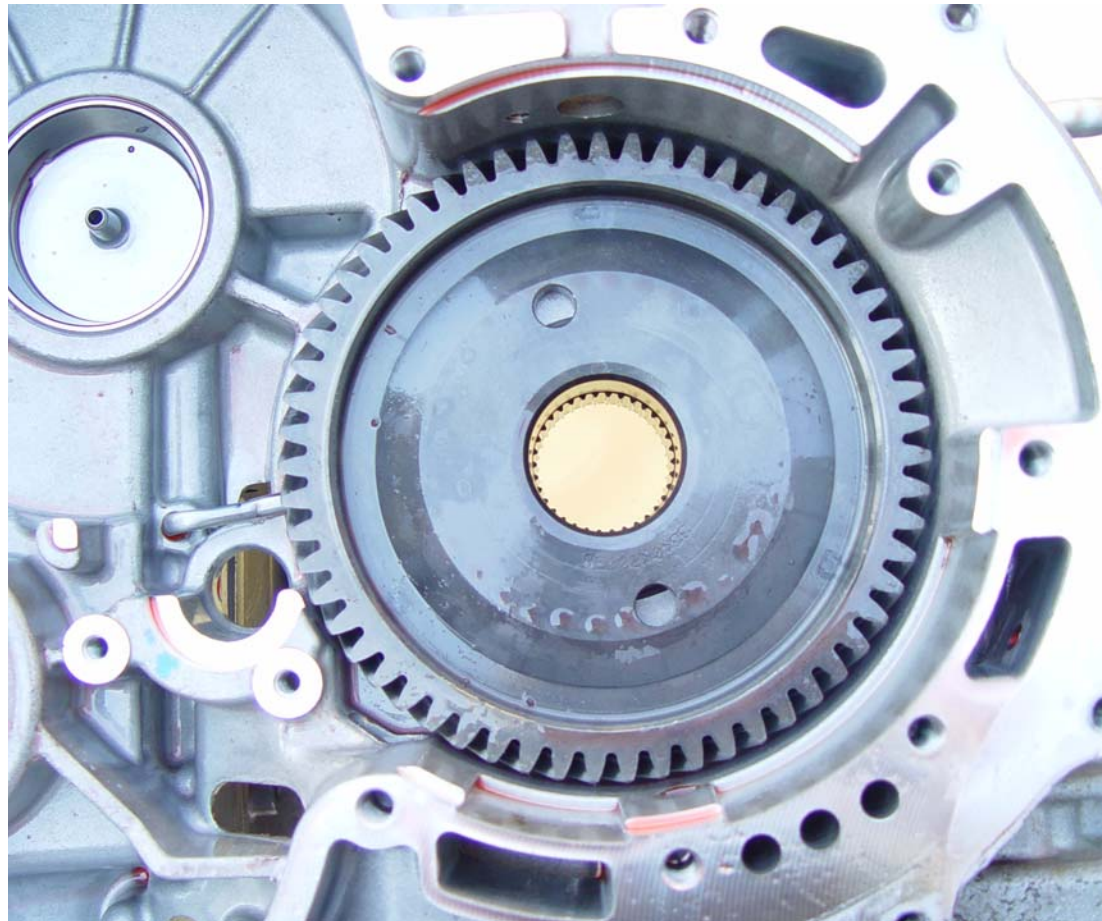
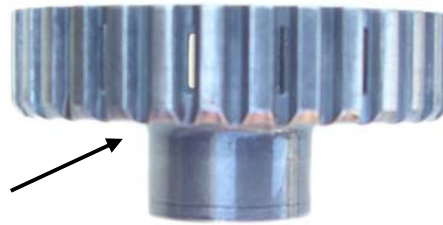


Internal Parts



Internal Parts

No bearing either side of the forward clutch hub. Snap ring on the front sun gear holds it in position.



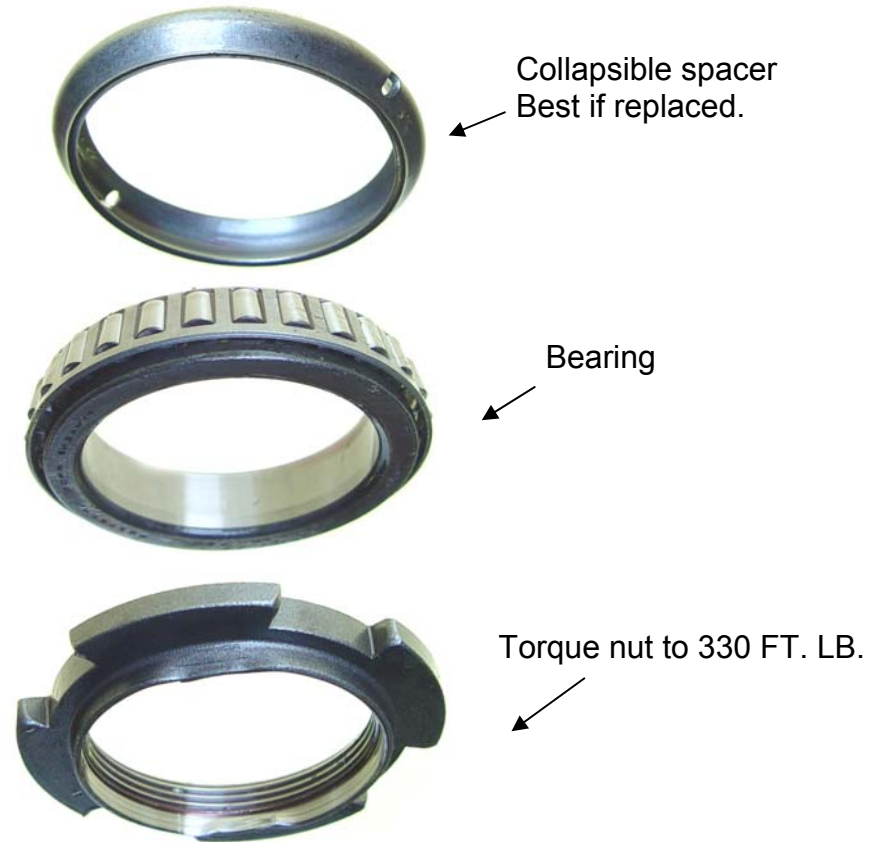
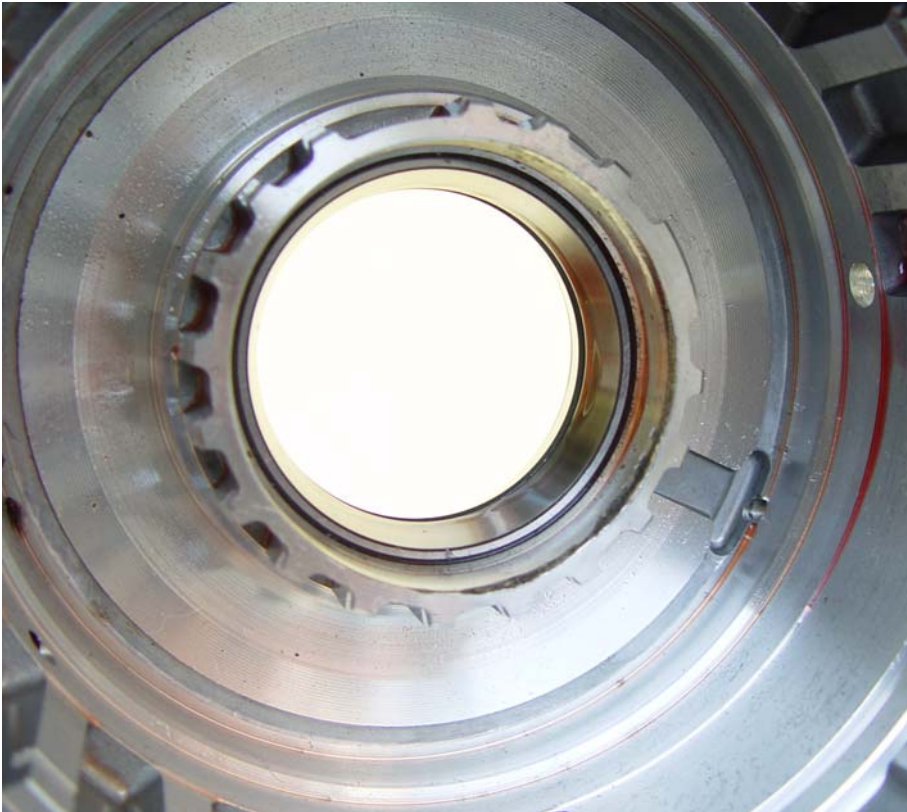
Internal Parts



Bearing races

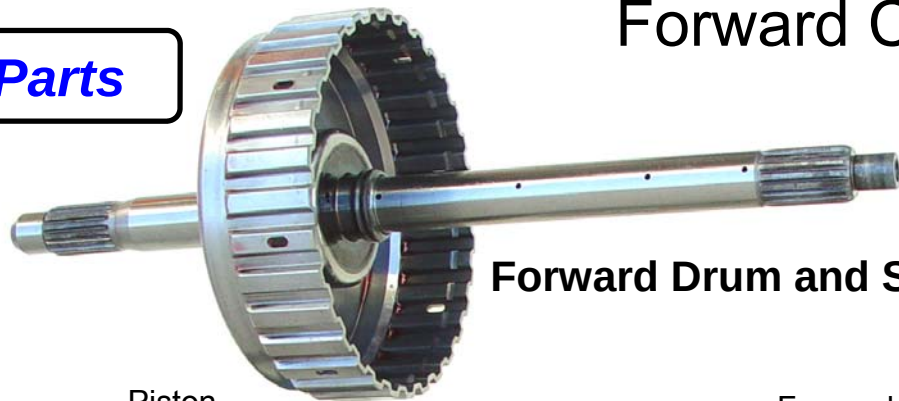


Internal Parts



Internal Parts

Forward Clutch Assembly



Forward clutch clearance
.035" - .050"

Forward Drum and Shaft

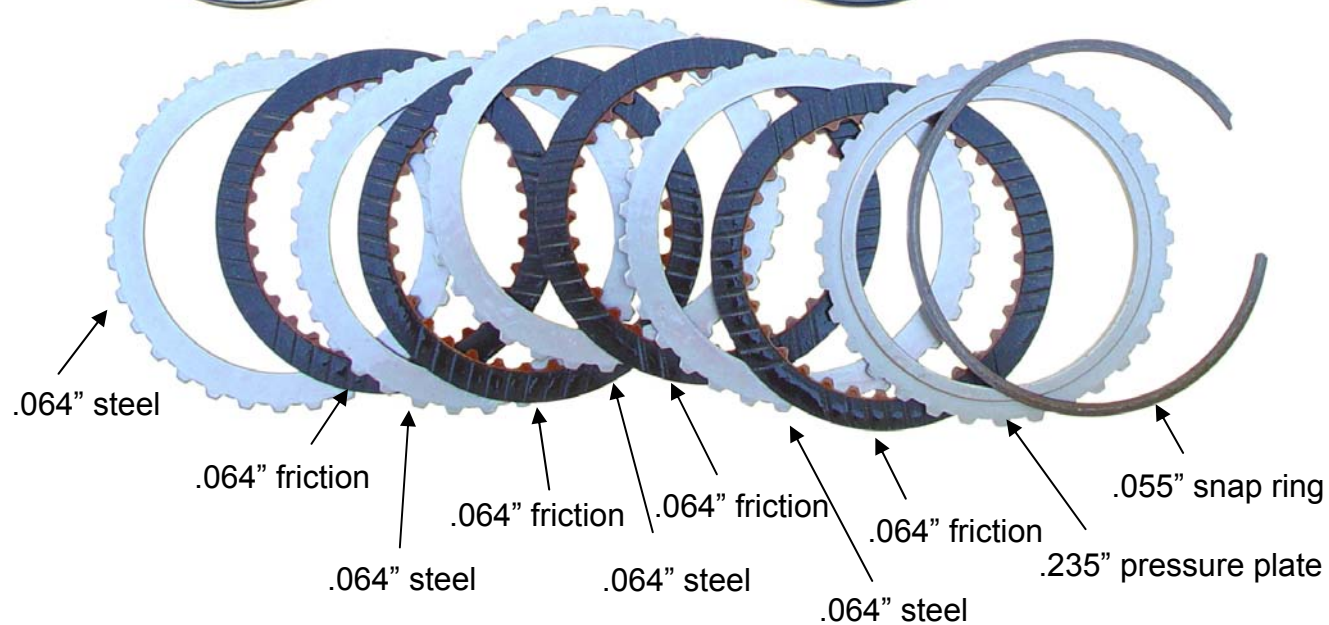
Piston



Return springs



Forward clutch balance piston



.064" steel

.064" friction

.064" steel

.064" friction

.064" steel

.064" friction

.064" steel

.064" friction

.235" pressure plate

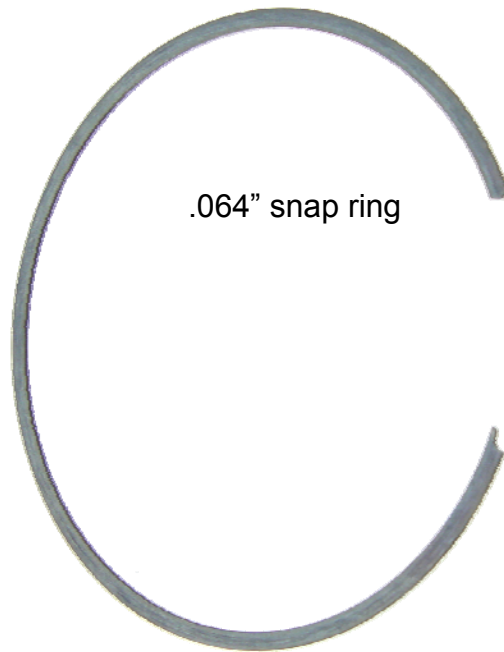
.055" snap ring

Internal Parts

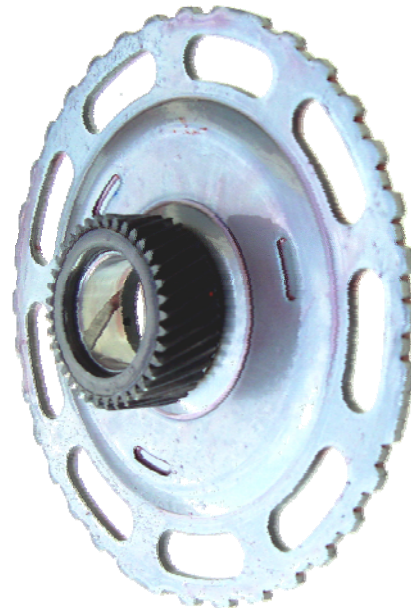
Internal Parts



Reverse/direct clutch
drum assembly

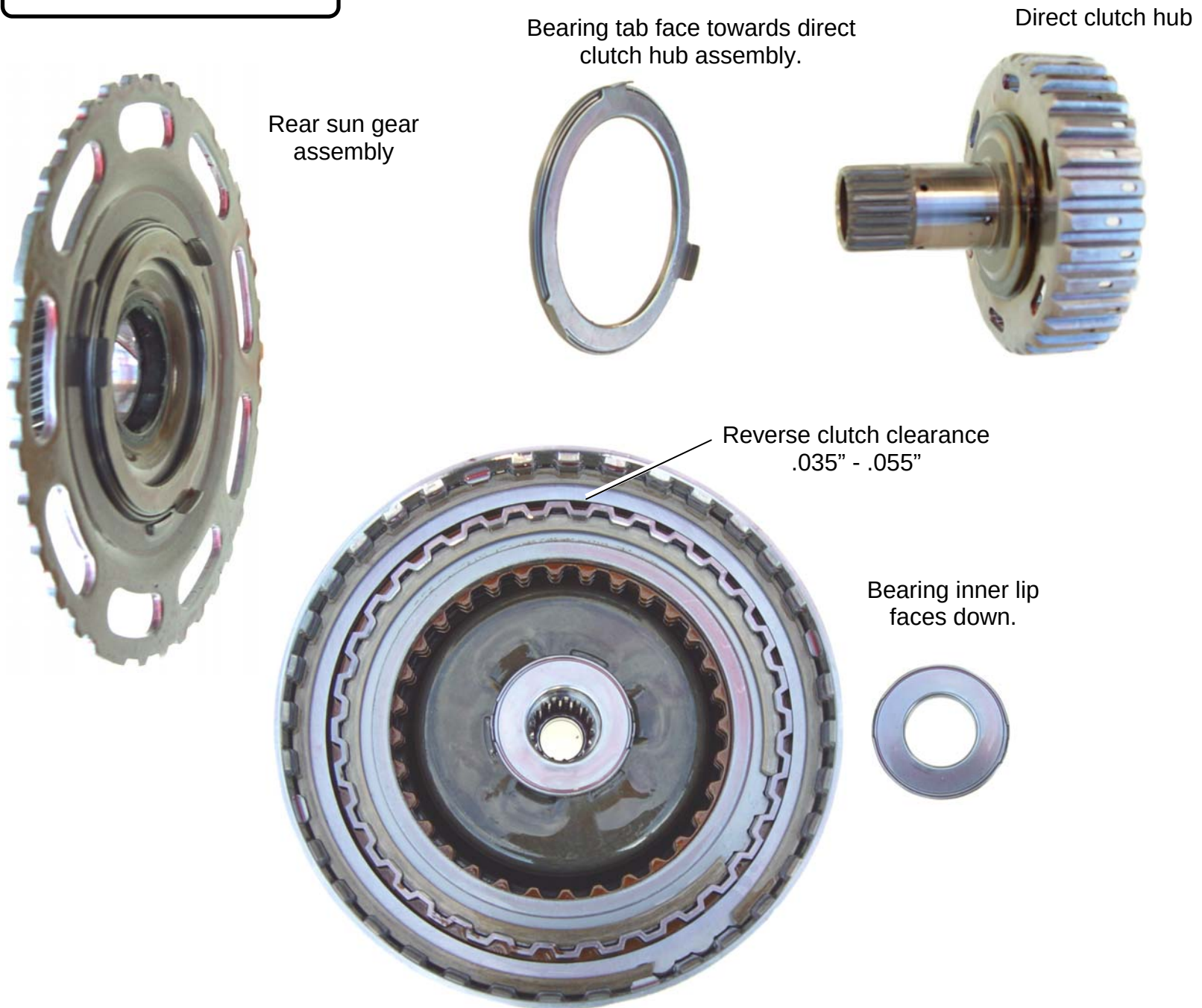


.064" snap ring



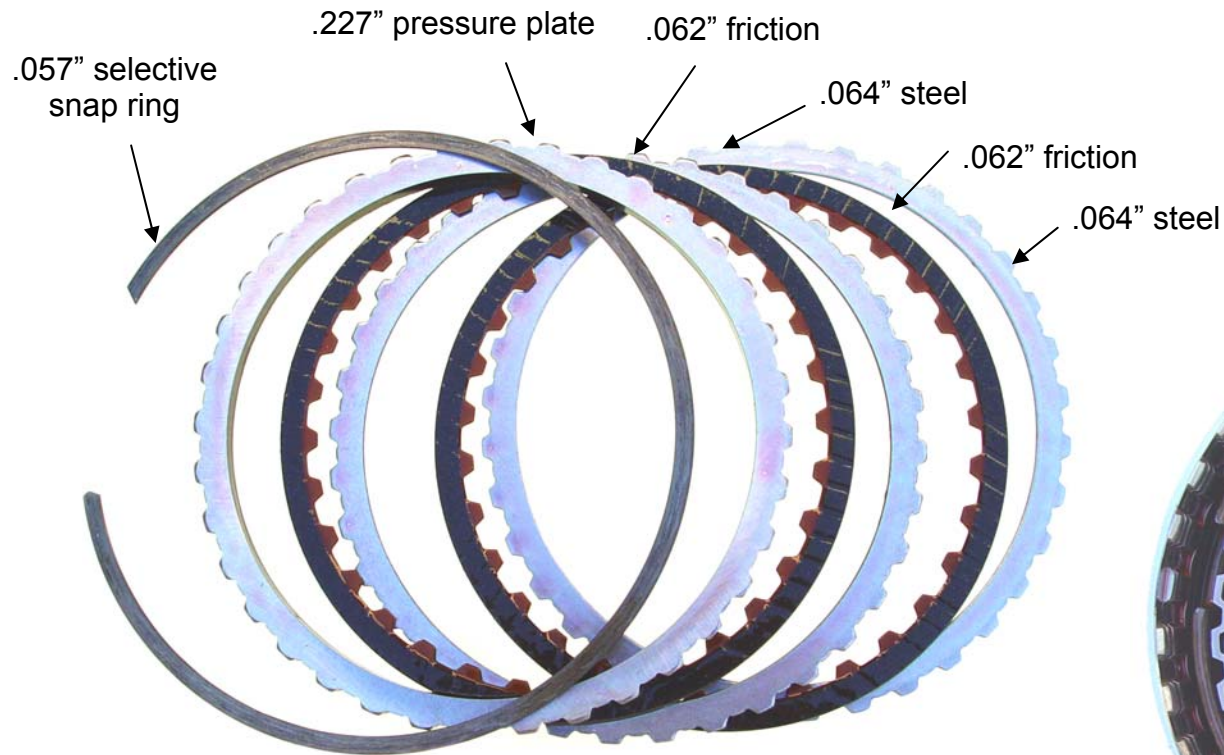
Rear sun gear assembly

Internal Parts



Internal Parts

Low/Reverse Clutch



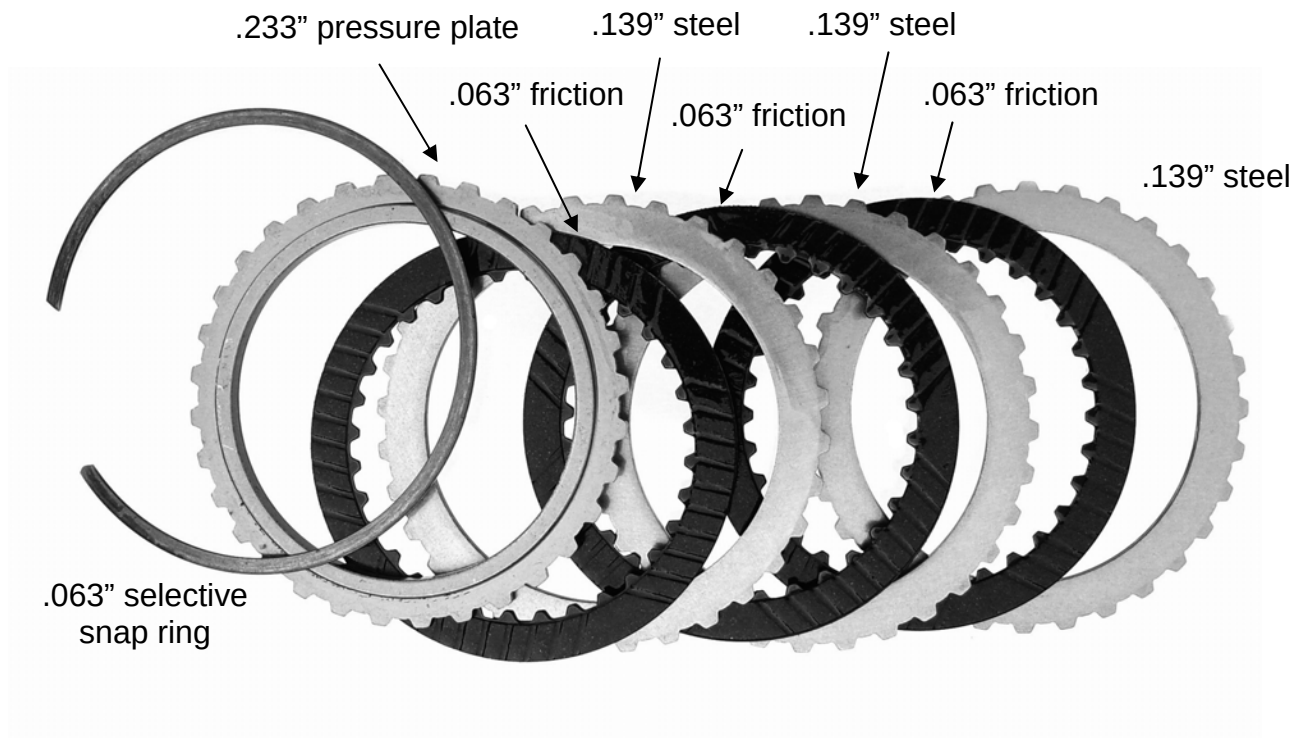
Reverse clutch clearance
.035" - .055"



Internal Parts

Direct Clutch

Direct clutch clearance
should be .055" - .070"



Internal Parts

Direct clutch balance piston

Return springs



Direct Clutch



Direct clutch piston



Direct clutch drum

Internal Parts

Reverse clutch piston return springs



Reverse Clutch



Reverse clutch piston

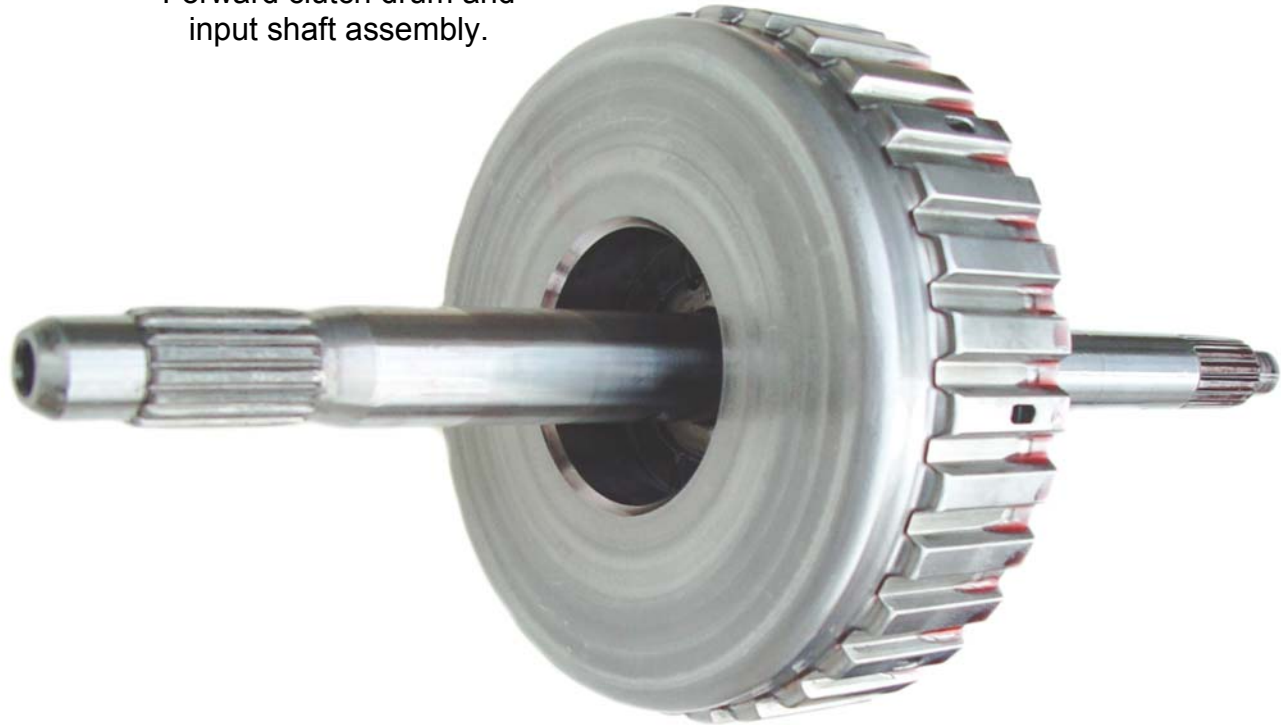


Reverse drum assembly

Internal Parts

Forward clutch drum and
input shaft assembly.

.077" black plastic washer



Pump

Pump Cover



Six 10 mm bolts
Torque to 10 ft lbs.



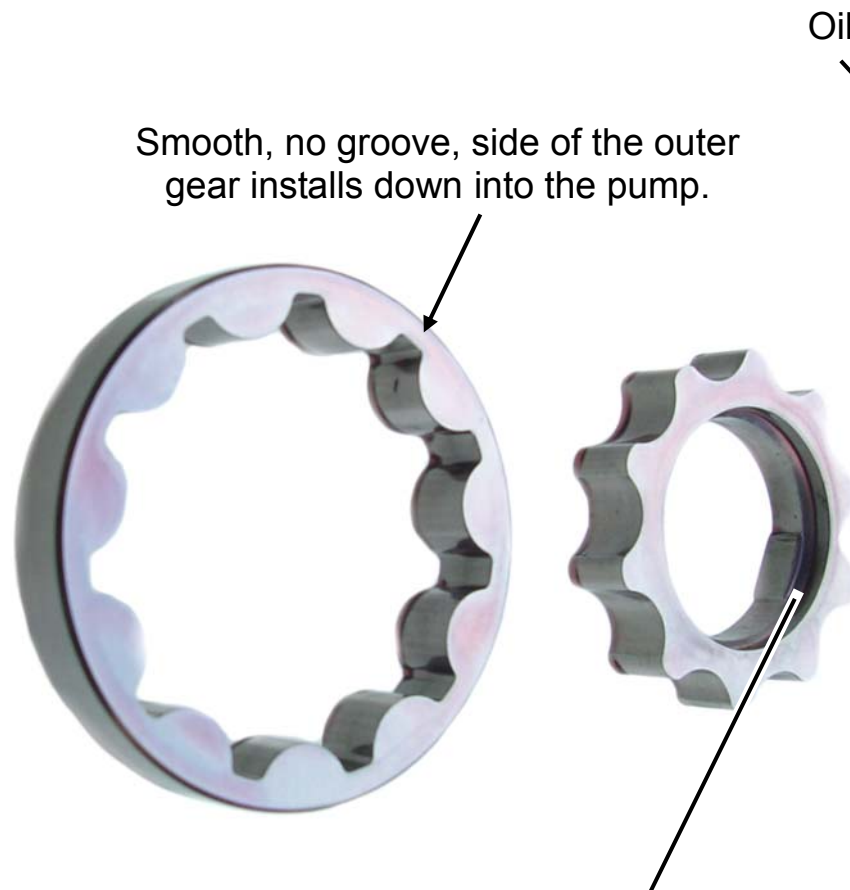
Pump Assembly

Pump



Pump

Pump Assembly



Smooth, no groove, side of the outer gear installs down into the pump.

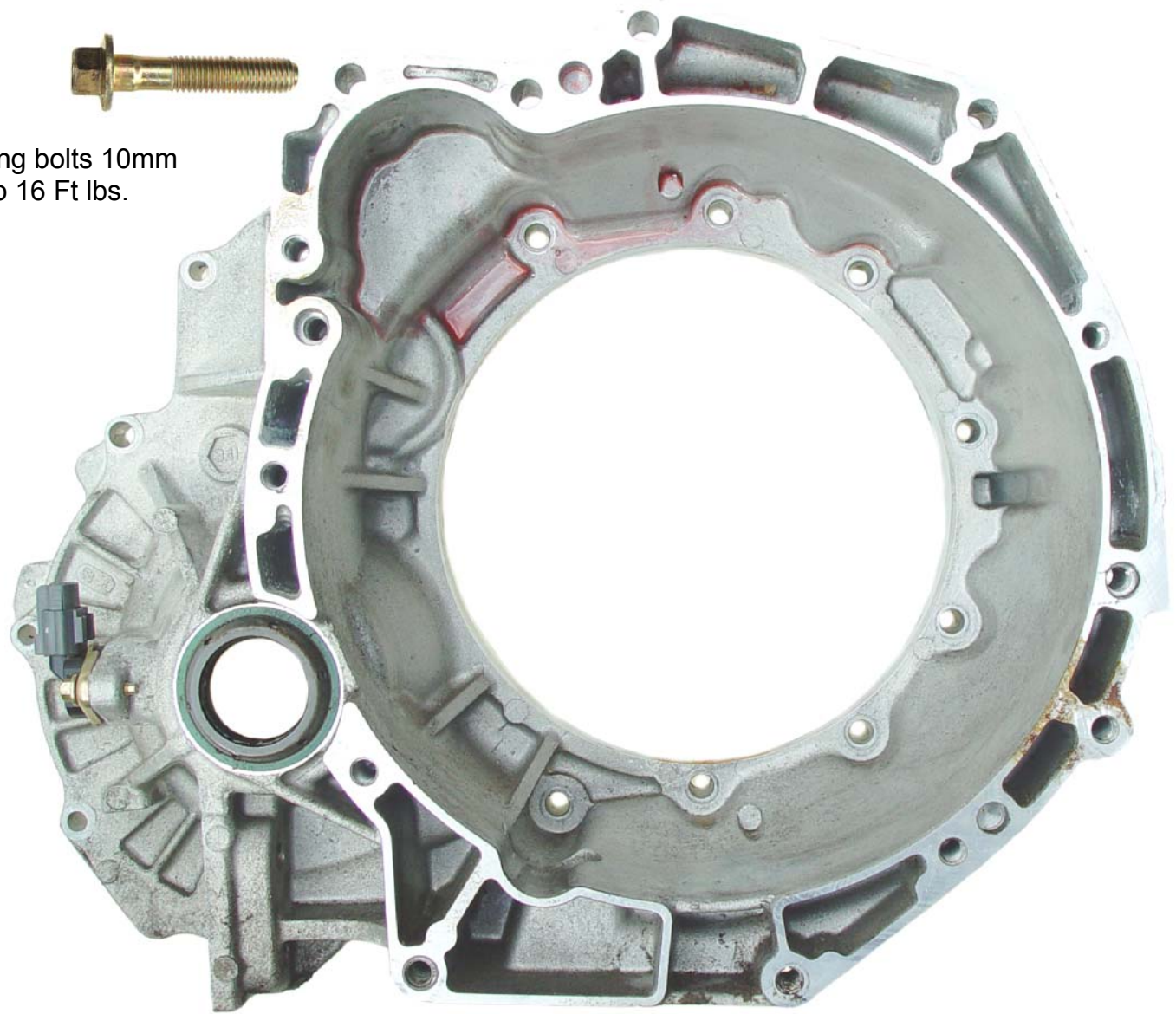
The inside with the deepest offset goes into pump first.

Oil grooves

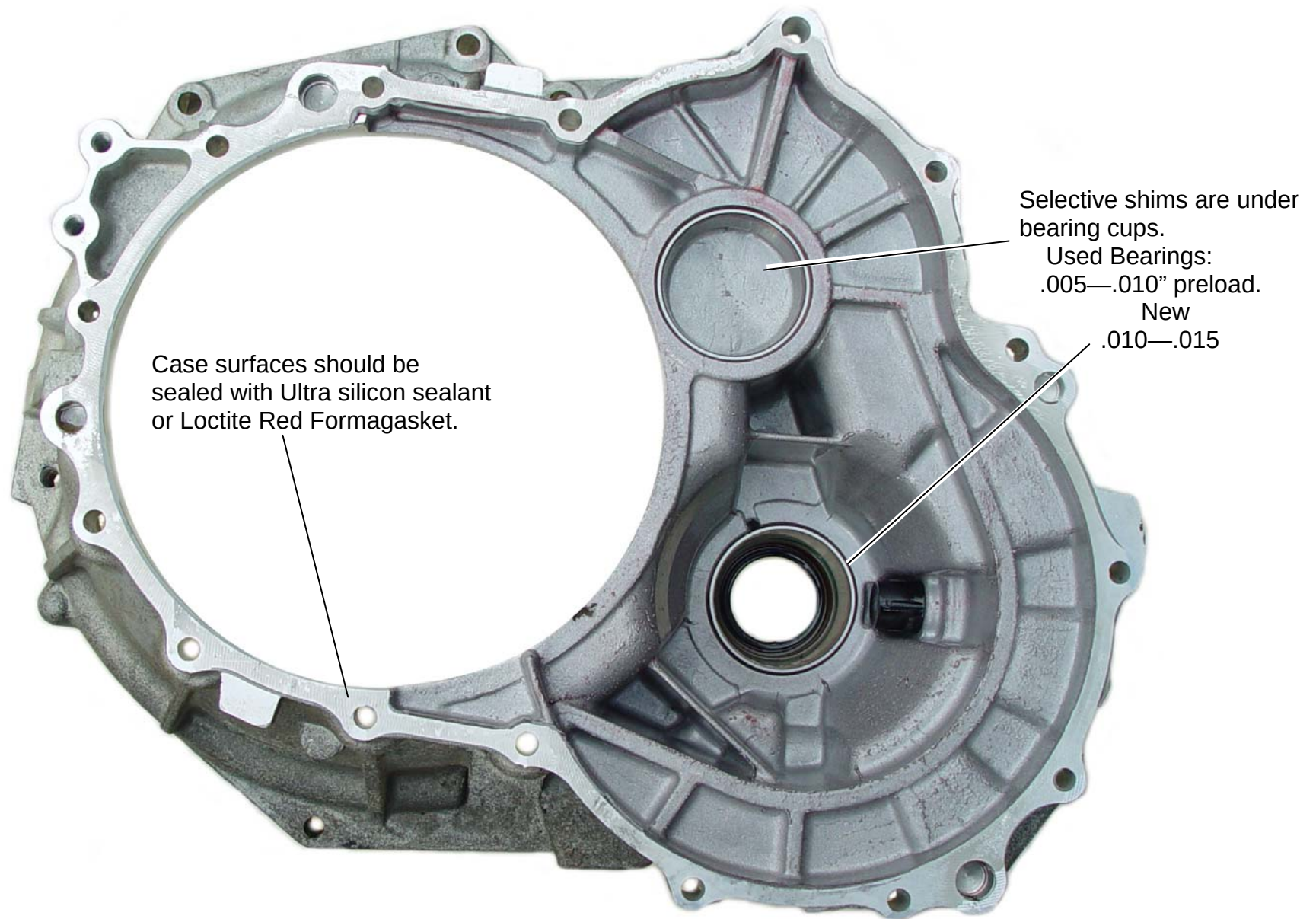


Bell housing and Differential Area Parts

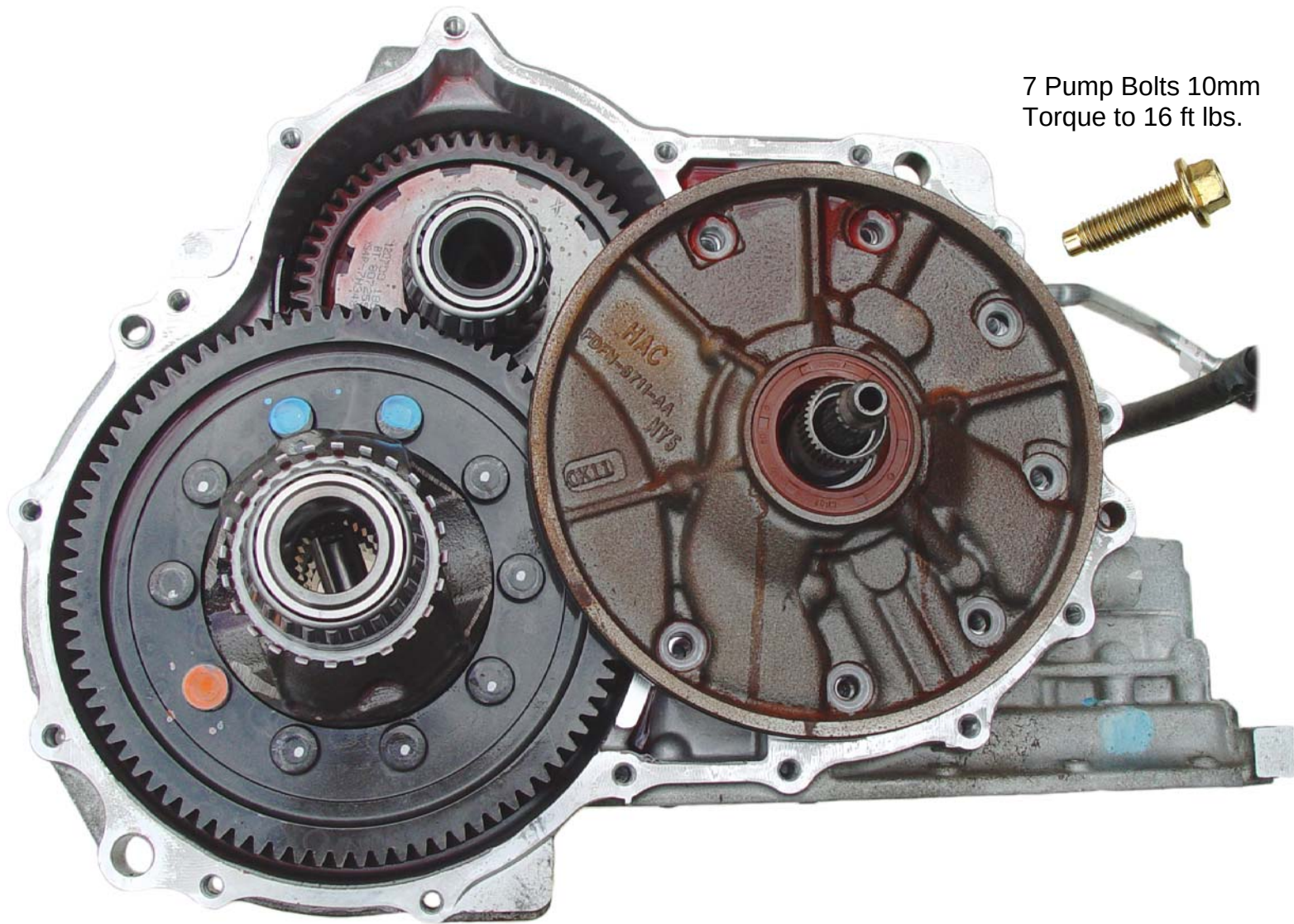
15 bell housing bolts 10mm
Torque to 16 Ft lbs.



Bell and Differential Housing

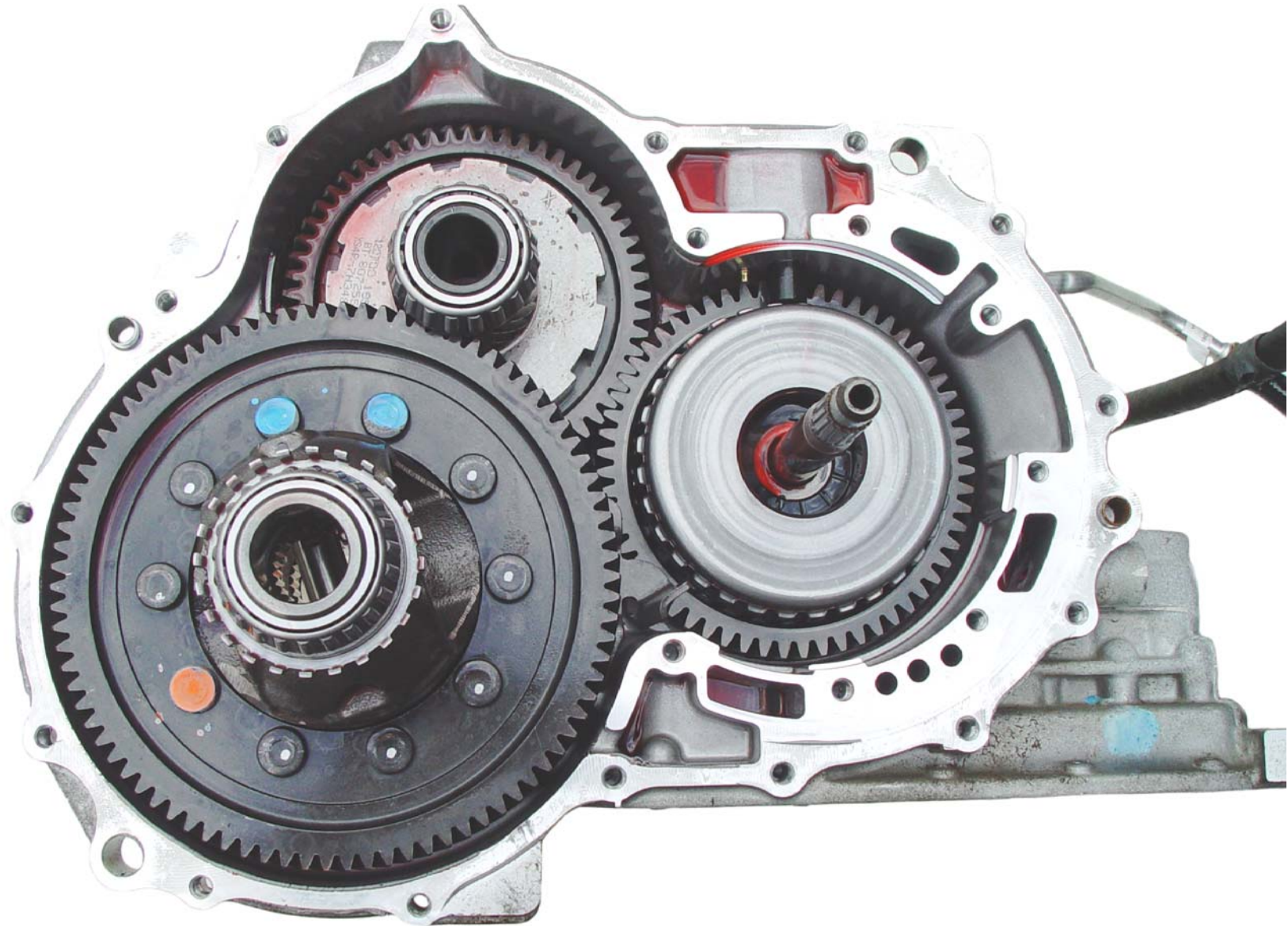


Pump and Differential Housing

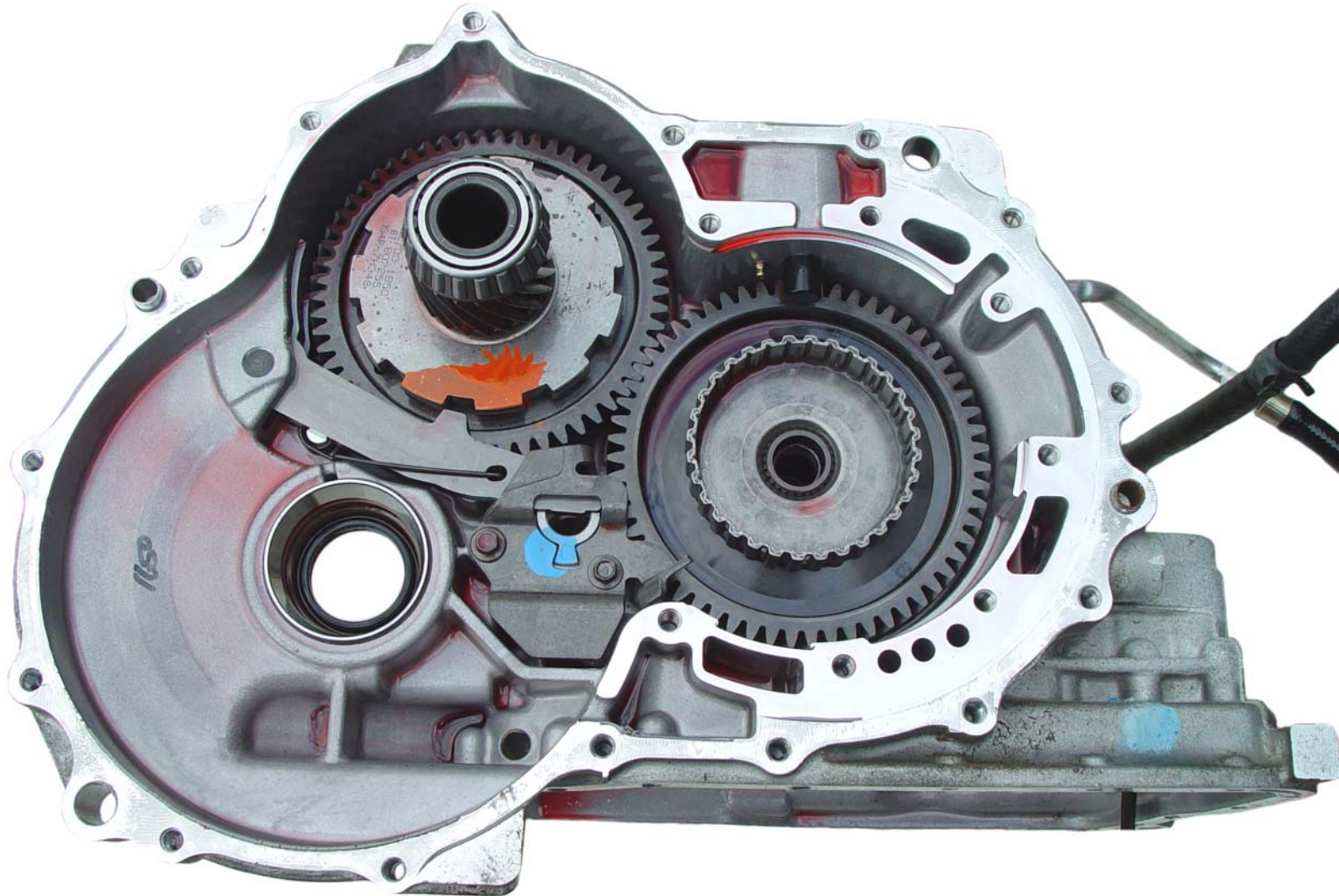


7 Pump Bolts 10mm
Torque to 16 ft lbs.

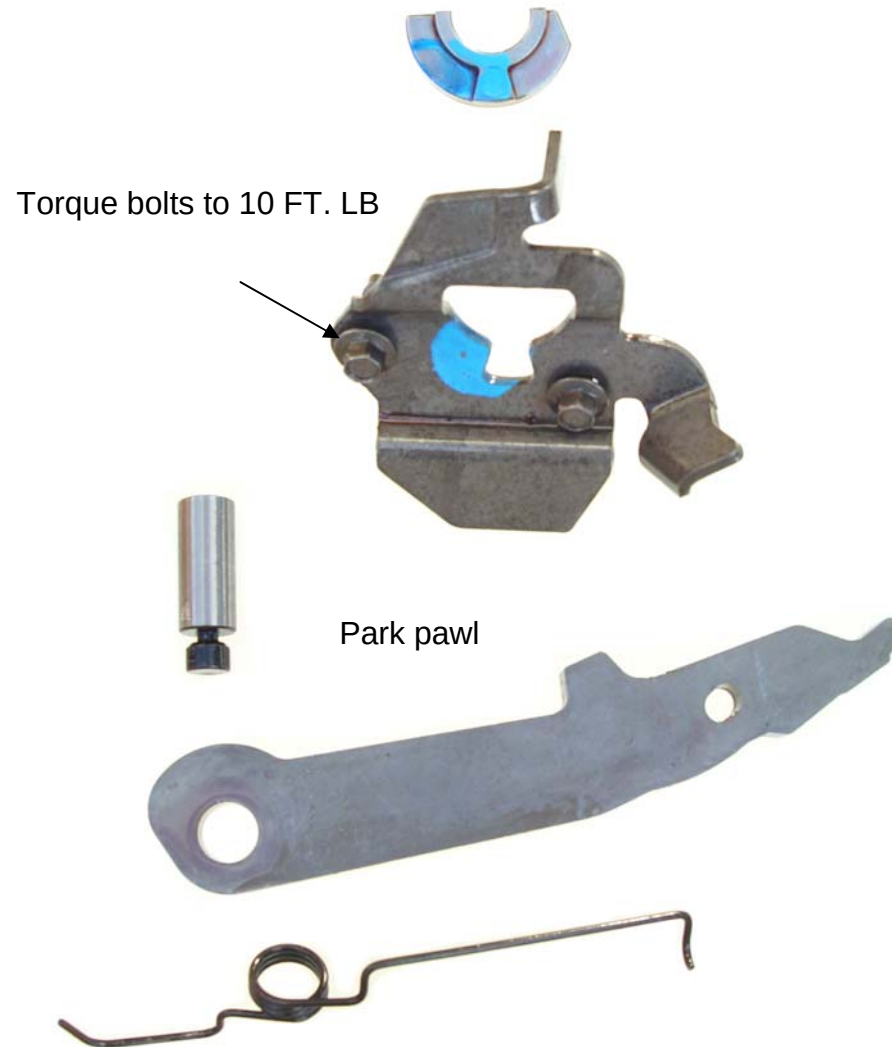
Differential Housing—Final Drive



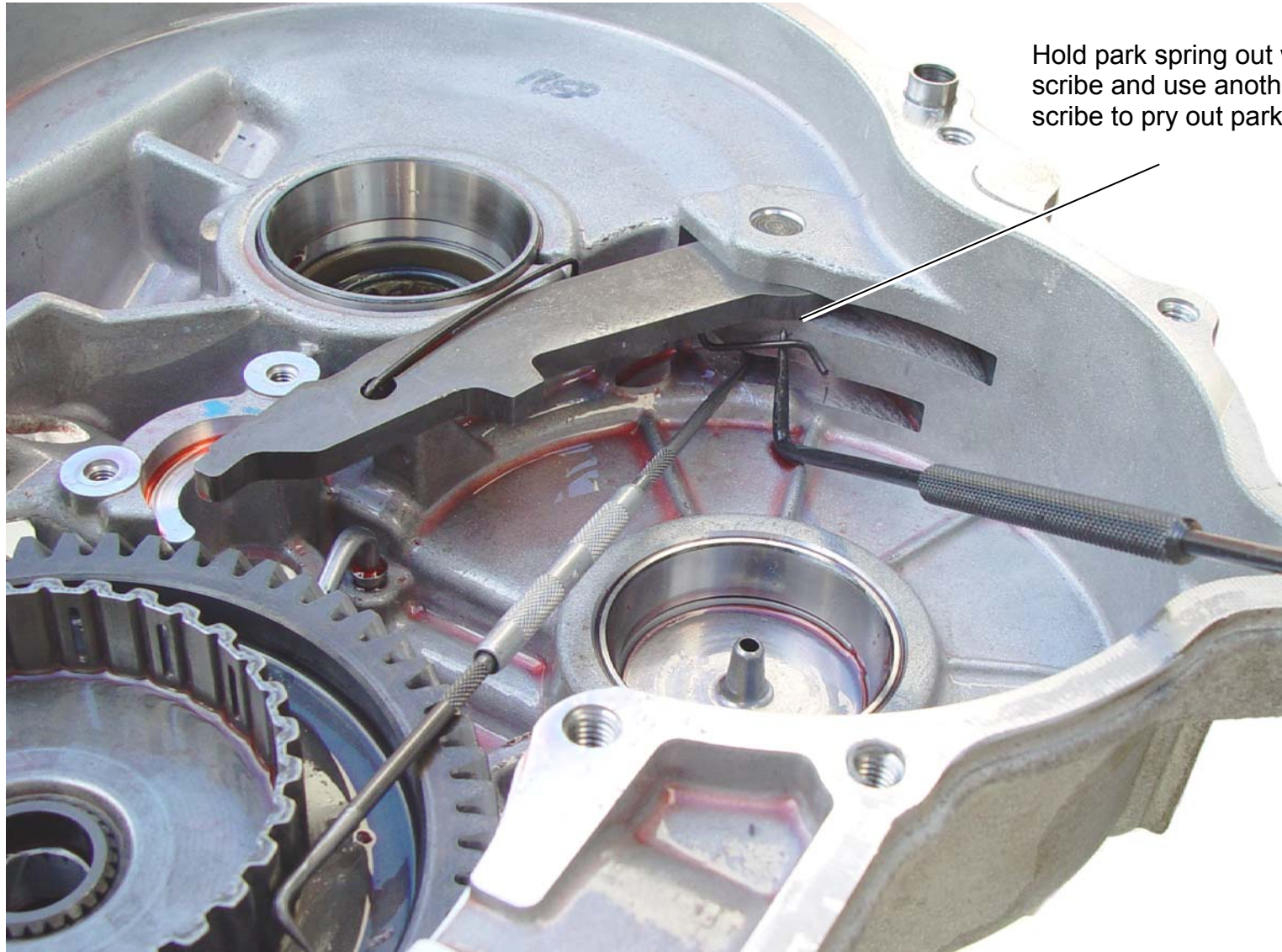
Park and Drive/Driven Gears



Park Pawl Parts



Removing Park Arm

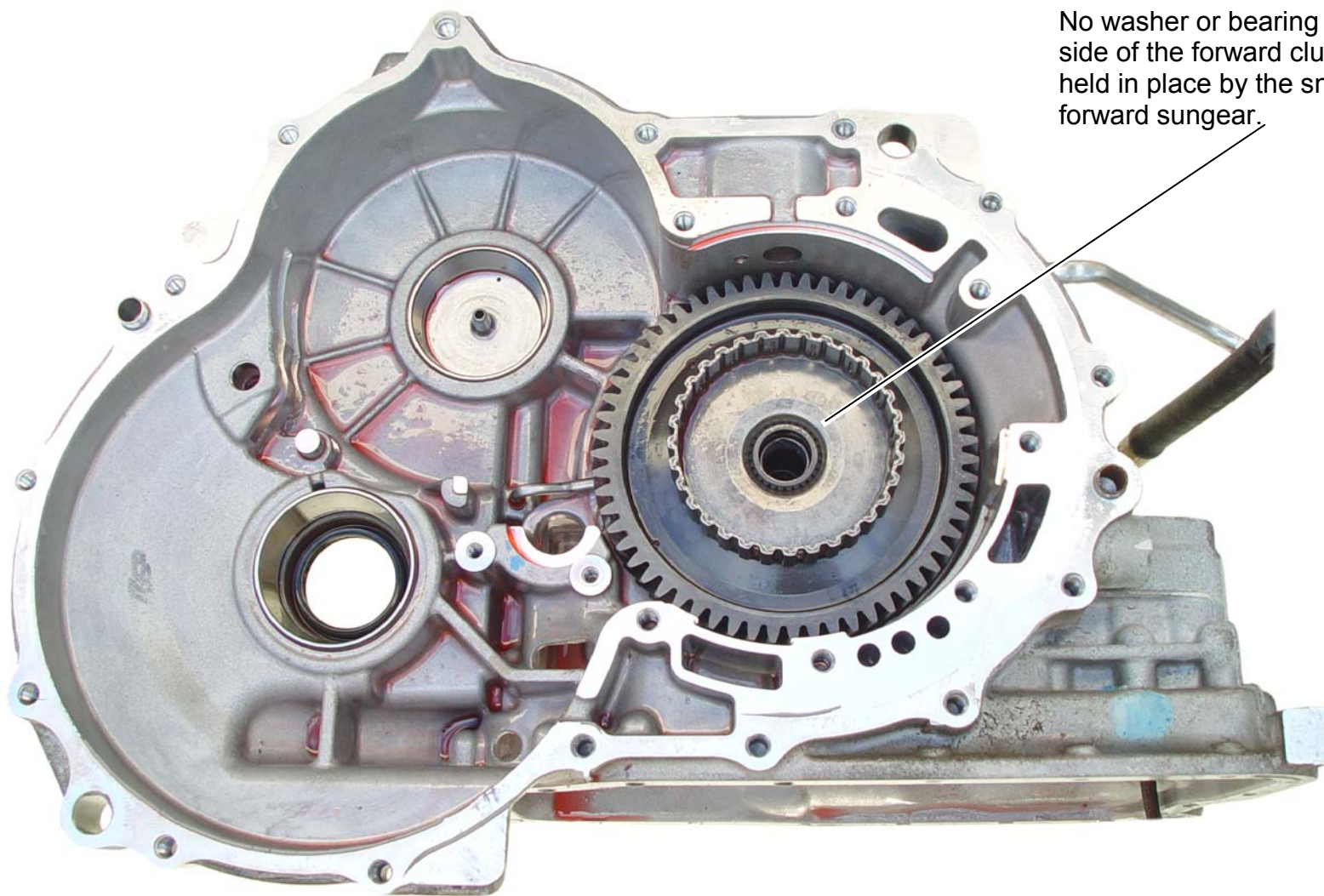


Final drive gear set.



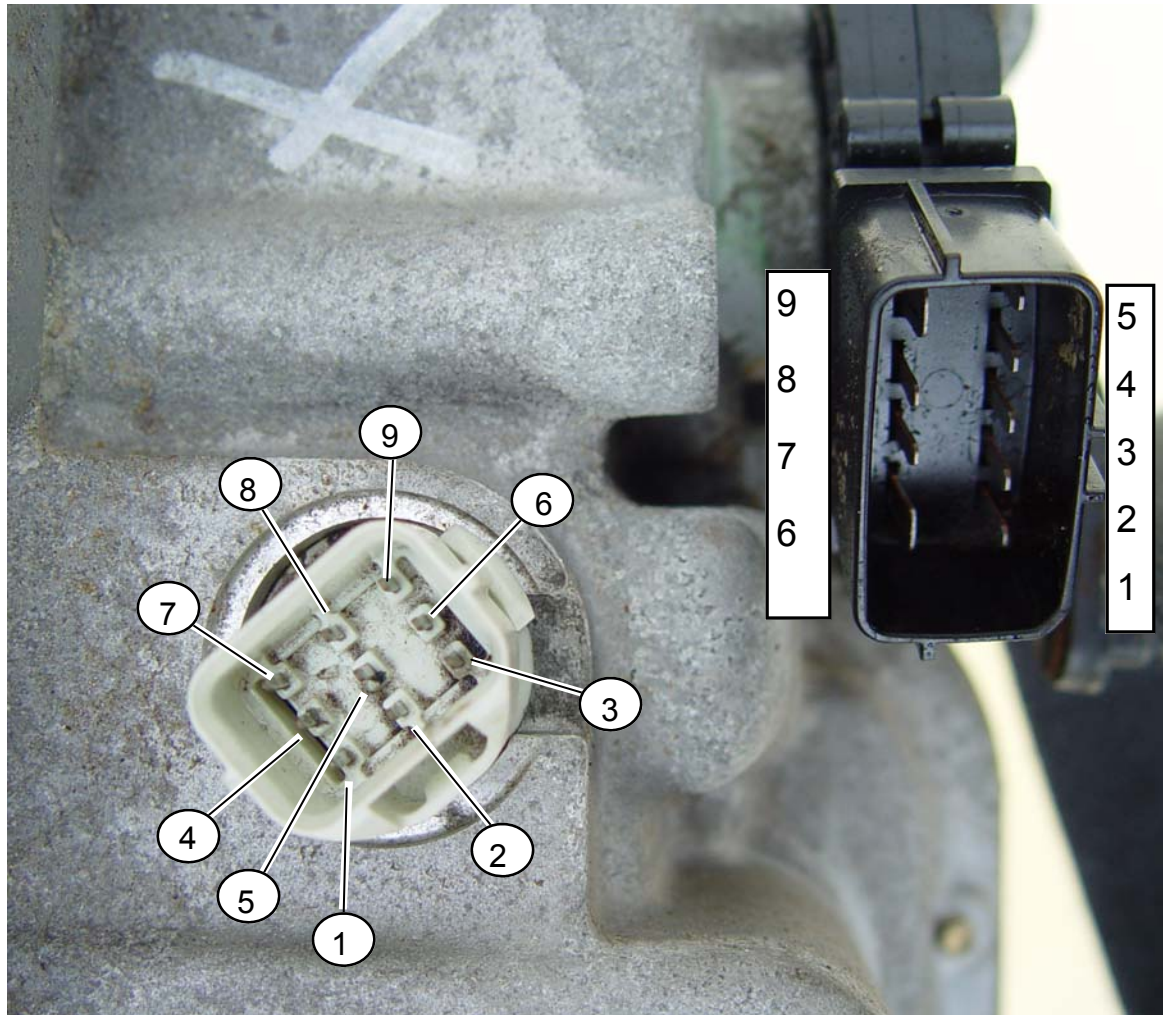
Final drive.





No washer or bearing goes on either side of the forward clutch hub. It is held in place by the snap ring on the forward sun gear.

Case Connector and Trans Range Sensor



Trans Range Sensor ID		
Position	Pin with Continuity	
Park	5&6	8&9
Reverse	1&4	
Neutral	1&8	
Drive	1&2	
2nd	1&7	
1st	1&3	

Case Connector ID	
Pin	Function
1	SSE
2	PCA
3	SSC
4	TFT return
5	TFT
6	SSA
7	PCA
8	SSB
9	SSD

NOTICE: Ford and Mazda units both function identically the solenoids are merely named differently...
Solenoids and Valve Bodies interchange freely between the 2 units.

Ford 4F27E Solenoid Firing Order & Friction Application Chart

Shifter Position	PCM Commanded Gear	Active Solenoids	Clutches/Band
Park/Neutral	Park/Neutral	SSA	
Reverse	Reverse	SSE	Rev. & Low Rev.
Drive	1st	SSD & SSE	Forward & Low One Way
	2nd	SSE	Forward & Int./OD Band
	3rd	None	Forward & Direct
	3rd w/TCC	SSB & SSC	Forward, Direct & TCC
	4th	SSA & SSC	Direct & Int./OD Band
	4th w/TCC	SSA, SSB & SSC	Direct, Int./OD Band & TCC
"1"	"1" Manual	SSA, SSB & SSE	Forward, Low One Way & Low Rev.

SSA and SSB are normally closed and are ON-off solenoids. They measure 10-26 Ω
SSC, SSD and SSE are normally open and are PWM solenoids. They measure 1-4 Ω
Trans Fluid Temperature Sensor 35K Ω at 70 degrees F.

Mazda FN4AEL Solenoid Firing Order & Friction Application Chart

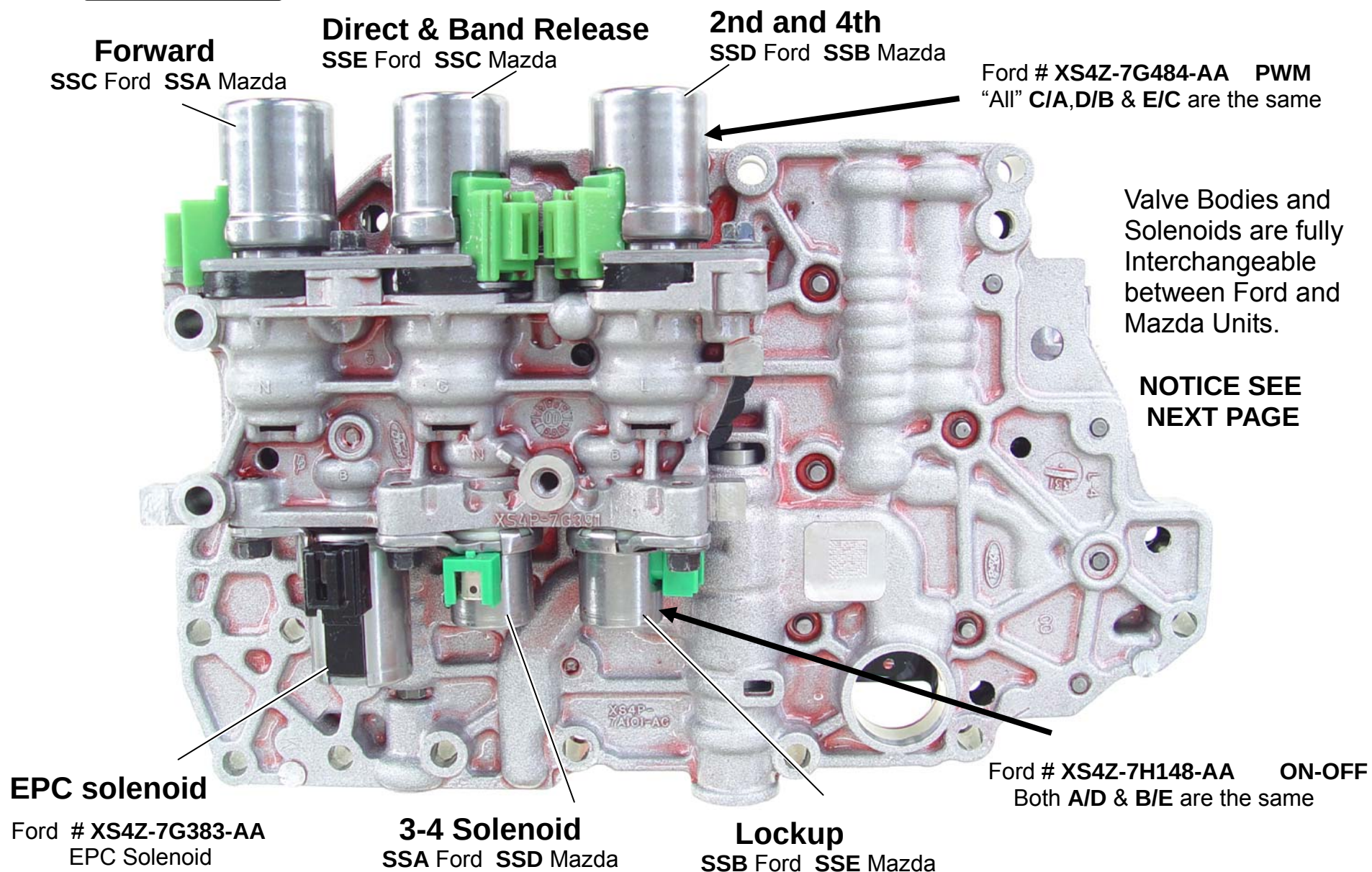
Shifter Position	PCM Commanded Gear	Active Solenoids	Clutches/Band
Park/Neutral	Park/Neutral	SSD	
Reverse	Reverse	SSC	Rev. & Low Rev.
Drive	1st	SSB & SSC	Forward & Low One Way
	2nd	SSC	Forward & Int./OD Band
	3rd	None	Forward & Direct
	3rd w/TCC	SSE & SSA	Forward, Direct & TCC
	4th	SSD & SSA	Direct & Int./OD Band
	4th w/TCC	SSD, SSE & SSA	Direct, Int./OD Band & TCC
"1"	"1" Manual	SSD, SSE & SSC	Forward, Low One Way & Low Rev.

SSD and SSE are normally closed and are ON-off solenoids. They measure 10-26 Ω
SSA, SSB and SSC are normally open and are PWM solenoids. They measure 1-4 Ω
Trans Fluid Temperature Sensor measures 35K Ω at 70 degrees F.

Valve Body

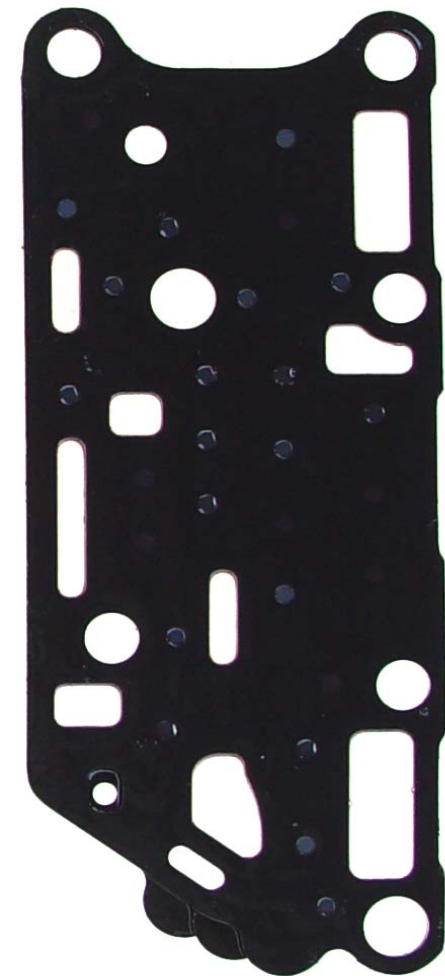
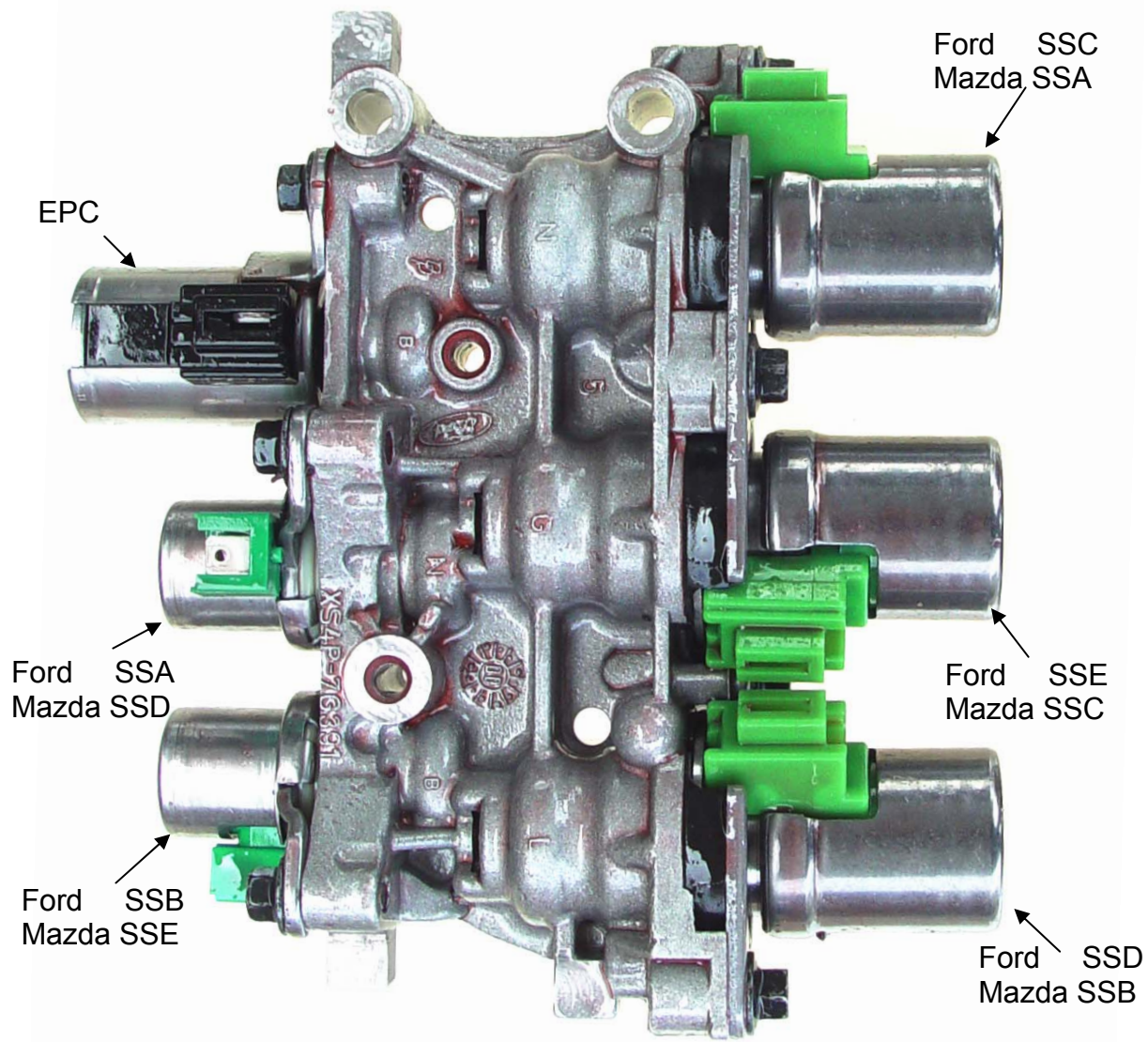
Solenoids

Ford 4F27E Mazda FN4AEL Solenoids



Solenoids

Solenoid Body



Solenoid body plate assembly
Has bonded gaskets

Solenoid Body

Torque solenoid body bolts to 80 in lbs.



Torque solenoid bracket bolts to 80 in lbs.



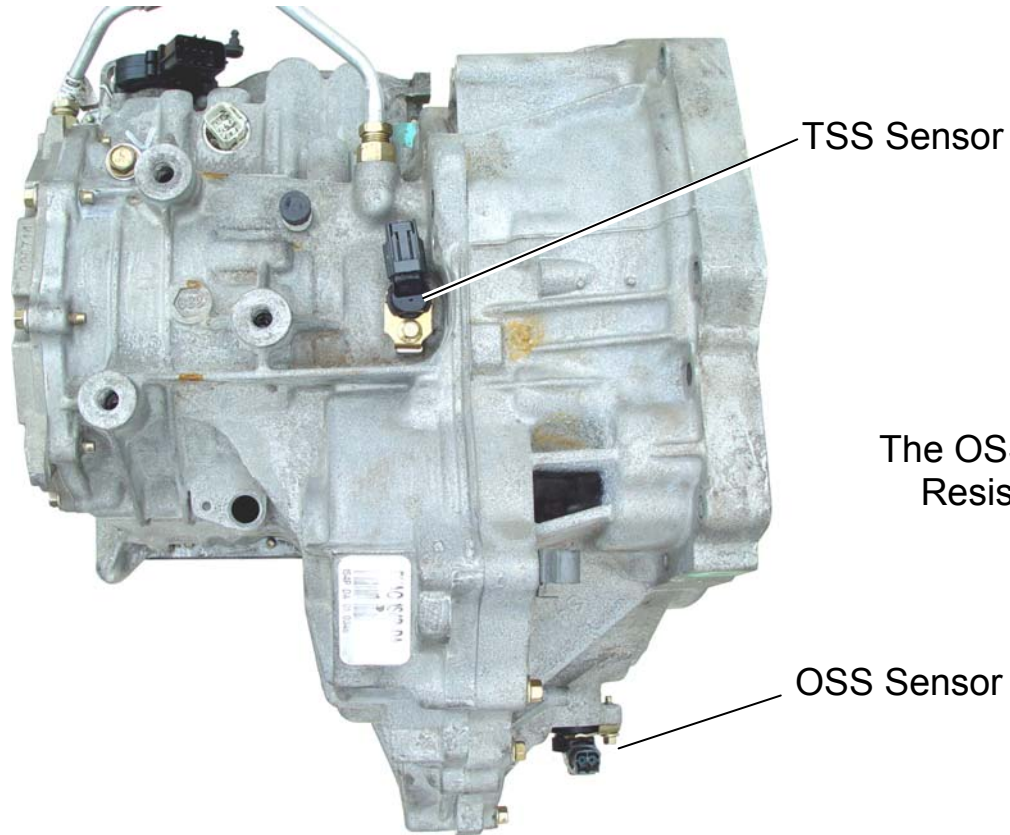
Don't injure grommet when removing solenoid.

Solenoids

Solenoid Body-Casting



TSS and OSS Sensors



Gear Ratios

Reverse 2.65 to 1

1st 2.82 to 1

2nd 1.50 to 1

3rd direct

4th .73 to 1

OSS Sensor 350 Ω

TSS Sensor 850 Ω

The OSS sensor is larger than the TSS sensor.
Resistance varies some with temperature.

Torque Converter



Abbreviations

A	Ampere(s)/Amp(s)
ABS	Antilock Brake System
A/C	Air Conditioning
AC	Alternating Current
ACC	Automatic Climate Control
ACL	Air Cleaner
ACR4	Air Conditioning Refrigerant, Recovery, Recycling, Recharging
A/D	Analog to Digital
ADL	Automatic Door Lock
A/F	Air/Fuel Ratio
AIR	Secondary Air Injection
ALC	Automatic Level Control
AM/FM	Amplitude Modulation/Frequency Modulation
Ant	Antenna
AP	Accelerator Pedal
API	American Protection Institute
APP	Accelerator Pedal Position
APT	Adjustable Part Throttle
ARS	Automatic Restraint System
A/T	Automatic Transmission/ Transaxle
ATC	Automatic Temperature Control
ATDC	After Top Dead Center
Auto	Automatic
avg	Average
AWD	All Wheel Drive
AWG	American Wire Gage
B+	Battery Positive Voltage
B	Battery Negative Voltage
BARO	Barometric Pressure sensor
batt	Battery
BBV	Brake Booster Vacuum
BCM	Body Control Module
BHP	Brake Horsepower
BLK	Black
BLU	Blue
BOO	Brake on / off switch
BP	Back Pressure
BPM	Brake Pressure Modulator
BPMV	Brake Pressure Modulator Valve
BPP	Brake Pedal Position
BRN	Brown
BTDC	Before Top Dead Center
BTSI	Brake Transmission Shift Interlock

Btu	British Thermal Units
C	Degrees Celsius
CAC	Charge Air Cooler
CAFÉ	Corporate Average Fuel Economy
Cal	Calibration
Cam	Camshaft
CARB	Calif Air Resources Board
cc	cubic centimeters
CCM	Central Control Module
CCOT	Cycling Clutch Orifice Tube
CCP	Climate Control Panel
CD	Compact Disc
CE	Commutator End
CEAB	Cold Engine Air Bleed
CEMF	Counter Electromotive Force
cfm	cubic feet per minute
cg	center of gravity
CID	Cubic Inch Displacement
CKP	Crankshaft Position sensor
CKT	Circuit
CL	Closed Loop
C/Ltr	Cigar Lighter
CMP	Camshaft Position sensor
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
Coax	Coaxial
COMM	Communication
Conn	Connector
CPA	Connector Position Assurance
CPP	Clutch Pedal Position
CPS	Central Power Supply
CPU	Central Processing Unit
CRT	Cathode Ray Tube
CRTC	Cathode Ray Tube Controller
CS	Charging System
CTP	Closed Throttle Position
cu ft	Cubic foot/feet
cu in	Cubic inch/inches
CV	Constant Velocity (Joint)
Cyl	Cylinder(s)
DAB	Delayed Accessory Bus
DB	Decibels on A-weighted Scale
DC	Direct Current

DCM	Door Control Module
DE	Drive End
DEC	Digital Electronic Controller
DERM	Diagnostic Energy Reserve Module
DI	Distributor Ignition
dia	diameter
DIC	Driver Information Center
Diff	Differential
DK	Dark
DLC	Data Link Connector
DMM	Digital Multimeter
DOHC	Dual Overhead Camshafts
DR	Driver
DRL	Daytime Running Lamps
DTC	Diagnostic Trouble Code
DTM	Diagnostic test mode
EBCM	Electronic Brake Control Module
EBTCM	Electronic Brake & Traction Control Module
EC	Electrical Center
ECC	Electronic Climate Control
ECI	Extended Compressor at Idle
ECL	Engine Coolant Level
ECM	Engine Control Module
ECS	Emission Control System
ECT	Engine Coolant Temperature
EEPROM	Electrically Erasable Programmable Read Only Memory
EEVIR	Evaporator Equalized Values in Receiver
EFE	Early Fuel Evaporation
EGR	Exhaust Gas Recirculation
EGRTVV	Exhaust Gas Recirculation Thermal Vacuum Valve
EI	Electronic Ignition
ELAP	Elapsed
ELC	Electronic Level Control
E/M	English/Metric
EMF	Electromotive Force
Eng	Engine
EOP	Engine Oil Pressure
EOT	Engine Oil Temperature
EPA	Environmental Protection Agency
EPR	Exhaust Pressure Regulator
EPROM	Erasable Programmable Read Only Memory
ESC	Electronic Suspension Control
ESD	Electrostatic Discharge
ETC	Electronic Throttle Control or Electronic Temperature Control

ETR Electronically Tuned Receiver
 EVAP Evaporative Emission
 EVO Electronic Variable Orifice
 Exh Exhaust
 F Degrees Fahrenheit
 FC Fan Control
 FDC Fuel Data Center
 FED Federal (all United States except Calif)
 FEDS Fuel Enable Data Stream
 FF Flexible Fuel
 FI Fuel Injection
 FMEM Failure management effects mode
 FMVSS Federal Motor Vehicle Safety Standards
 F/P Fuel Pump
 Ft foot/feet
 FT Fuel Trim
 F4WD Full Time Four Wheel Drive
 4WAL Four Wheel Antilock
 4WD Four Wheel Drive
 FW Flat Wire
 FWD Front Wheel Drive
 g gram(s) or Gravitational Acceleration
 GA Gage
 gal gallon(s)
 gas gasoline
 GCW Gross Combination Weight
 Gen Generator
 GL Gear Lubricant
 GM General Motors
 GM SPO General Motors Service Parts Operations
 gnd ground
 gpm gallons per minute
 GRN Green
 GRY Gray
 GVWR Gross Vehicle Weight Rating
 H Hydrogen
 H2O Water
 Harn Harness
 HC Hydrocarbons
 H/CMPR High Compression
 HD Heavy Duty
 HDC Heavy Duty Cooling
 hex hexagon
 Hg Mercury
 Hi Alt High Altitude
 HO2S Heated Oxygen Sensor
 hp horsepower
 HPL High Pressure Liquid
 HPS High Performance System

HPV High Pressure Vapor
 Htd Heated
 HTR Heater
 HUD Head-up Display
 HVAC Heater-Vent-Air Conditioning
 HVACM Heater-Vent-Air Conditioning Module
 HVM Heater Vent Module
 Hz Hertz
 IAC Idle Air Control
 IAT Intake Air Temperature
 IC Integrated Circuit or Ignition Control
 ICM Ignition Control Module
 ID Identification or Inside Diameter
 IDI Integrated Direct Ignition
 ign ignition
 ILC Idle Load Compensator
 in inch(es)
 INJ Injection
 inst instantaneous
 I/P Instrument Panel
 IPC Instrument Panel Cluster
 I/PEC Instrument Panel Electrical Center
 ISC Idle Speed Control
 ISO International Standards Organization
 ISS Input Speed Shaft
 KAM Keep Alive Memory
 KDD Keyboard Display Driver
 kg kilogram
 kHz kilohertz
 km kilometer
 km/h kilometers per hour
 km/l kilometers per liter
 kPA kilopascals
 KS Knock Sensor
 kV kilovolts
 L Liter
 L4 In-Line Four Cylinder Engine
 L6 In-Line Six Cylinder Engine
 lb pound
 lb ft pound feet (torque)
 lb in pound inch (torque)
 LCD Liquid Crystal Display
 LDCL Left Door Closed Locking
 LDCM Left Door Control Module
 LED Light Emitting Diode
 LF Left Front
 LH Left Hand
 Lm lumens
 LR Left Rear

lt left
 LT Light
 MAF Mass Air Flow
 Man Manual
 MAP Manifold Absolute Pressure
 MAT Manifold Absolute Temperature
 max maximum
 M/C Mixture Control
 MDP Manifold Differential Pressure
 MFI Multiport Fuel Injection
 mi mile(s)
 MIL Malfunction Indicator Lamp
 min minimum
 ml milliliter
 MLP Manual lever position sensor
 mm millimeter
 mpg miles per gallon
 mph miles per hour
 ms millisecond
 MST Manifold Surface Temperature
 M/T Manual Transmission/Transaxle
 MV Megavolt
 mV millivolt
 NAES North American Export Sales
 NC Normally Closed
 NEG Negative
 Neu Neutral
 NLGI National Lubricating Grease Institute
 N-m Newton-meter (torque)
 NO Normally Open
 NOx Nitrogen Oxides
 NPTC National Pipe Thread-Course
 NPTF National Pipe Thread-Fine
 NVRAM Non-volatile Random Access Memory
 O2 Oxygen
 O2S Oxygen Sensor
 OBD II On-board Diagnostics II
 OC Oxidation Converter (Catalytic)
 OD Outside Diameter
 ODO Odometer
 OE Original Equipment
 OEM Original Equipment Manufacturer
 OHC Overhead Camshaft
 OL Open Loop
 ORN Orange
 OSS Output Shaft Speed
 oz ounce(s)
 PAG Polyalkylene Glycol
 PASS Passenger

P/B	Power Brakes	RTD	Real Time Damping	TWC	Three-way Converter (Catalytic)
PC	Pressure Control	RTV	Room Temperature Vulcanizing	TWC+OC	Three-way + Oxidation Converter (Catalytic)
PCB	Printed Circuit Board	(Sealer)		TXV	Thermal Expansion Valve
PCM	Powertrain Control Module	RWAL	Rear Wheel Antilock	UART	Universal Asynchronous Receive & Transmit
PCS	Pressure Control Solenoid	RWD	Rear Wheel Drive	U/H	Under Hood
PCV	Positive Crankcase Ventilation	s	second(s)	U/HEC	Under Hood Electrical Center
PM	Permanent Magnet (Generator)	SAE	Society of Automotive Engineers	U-Joint	Universal Joint
P/N	Part Number	SC	Supercharger	UTD	Universal Theft Deterrent
PNK	Pink	SCB	Supercharger Bypass	UV	Ultraviolet
PNP	Park/Neutral Position	SCM	Seat Control Module	V	Volt(s) or Voltage
PRNDL	Park, Reverse, Neutral, Drive, Low	SDM	Sensing & Diagnostic Module	V6	V-type 6 Cylinder Engine
POA	Pilot Operated Absolute (Valve)	SEO	Special Equipment Option	V8	V-type 8 Cylinder Engine
POS	Positive	SFI	Sequential Multiport Fuel Injection	Vac	Vacuum
POT	Potentiometer (Variable Resistor)	SI	System International (modern version of metric system)	VAC	Vehicle Access Code
PPL	Purple	SIR	Supplemental Inflatable Restraint	VATS	Vehicle Anti-theft System
ppm	parts per million	SLA	Short/Long Arm	VCM	Vehicle Control Module
PROM	Programmable Read Only Memory	sol	solenoid	VDOT	Variable Displacement Orifice Tube
P/S	Power Steering	SO2	Sulfur Dioxide	VDV	Vacuum Delay Valve
PSD	Power Sliding Door	SP	Splice Pack	vel	velocity
PSP	Power Steering Pressure	SPO	Service Parts Operations	VES	Variable Effort Steering
psi	pounds per square inch	sq ft	square foot/feet	VF	Vacuum Fluorescent
psia	pounds per square inch absolute	sq in	square inch(es)	VIO	Violet
psig	pounds per square inch guage	SRC	Service Ride Control	VIN	Vehicle Identification Number
pt	pint	SRI	Service Reminder Indicator	VMV	Vacuum Modulator Valve
PWM	Pulse Width Modulated	ST	Scan Tool	VR	Voltage Regulator
qt	quart(s)	S4WD	Selectable Four Wheel Drive	V ref	Voltage reference
R-12	Refrigerant-12	sw	Switch	VSS	Vehicle Speed Sensor – also called OSS sensor
R-134a	Refrigerant-134a	syn	synchronizer	W/	with
RAM	Random Access Memory (impermanent memory device; memory contents lost when power removed)	Tach	Tachometer	W/B	Wheel Base
RAP	Retained Accessory Power	TB	Throttle body	WHL	Wheel
RAV	Remote Activation Verification	TBI	Throttle Body Fuel Injection	WHT	White
RCDLR	Remote Control Door Lock Receiver	TC	Turbocharger	W/o	without
RDCM	Right Door Control Module	TCC	Torque Converter Clutch	WOT	Wide Open Throttle
Ref	Reference	TCIL	Transmission control indicator lamp	W/P	Water Pump
Rev	Reverse	TCS	Transmission control switch	W/S	Windshield
RF	Right Front or Radio Frequency	TDC	Top Dead Center	WSS	Wheel Speed Sensor
RFA	Remote Function Actuation	TEMP	Temperature	WU-OC	Warm-up Oxidation Converter (Catalytic)
RFI	Radio Frequency Interference	Term	Terminal	WU-TWC	Warm-up Three-way Converter (Catalytic)
RH	Right Hand	TFP	Transmission Fluid Pressure	X-valve	Expansion Valve
Rly	relay	TFT	Transmission Fluid Temperature	yd	yard(s)
RM	Relay module	TOC	Transmission Oil Cooler	YEL	Yellow
ROM	Read Only Memory (permanent memory device)	TP	Throttle Position		
RPM	Revolutions Per Minute—Engine Speed	TPA	Terminal Positive Assurance		
RPO	Regular Production Option	TPM	Tire Pressure Monitoring		
RR	Right Rear	TR	Transmission Range / Sensor		
rt	right	TRANS	Transmission/Transaxle		
		TSS	Turbine shaft sensor		
		TVRS	Television & Radio Suppression		
		TVV	Thermal Vacuum Valve		

COMPLETE LIST OF SAE-DEFINED DIAGNOSTIC TROUBLE CODES (DTC):

Must use a scan tool connected to
OBD II connector to retrieve codes.

PO1XX Fuel & Air Metering

PO100 Mass or Volume Airflow Circuit Problem
PO101 Mass or Volume Airflow Circuit Range or Performance Problem
PO102 Mass or Volume Airflow Circuit Low Input
PO103 Mass or Volume Airflow Circuit High Input
PO105 Manifold Absolute Pressure or Barometric Pressure Circuit Problem
PO106 Manifold Absolute Pressure or Barometric Pressure Circuit Range
or Performance Problem
PO107 Manifold Absolute Pressure or Barometric Pressure Circuit Low Input
PO108 Manifold Absolute Pressure or Barometric Pressure Circuit High Input
PO110 Intake Air Temperature Circuit Problem
PO111 Intake Air Temperature Circuit Range or Performance
PO112 Intake Air Temperature Circuit Low Input
PO113 Intake Air Temperature Circuit High Input
PO115 Engine Coolant Temperature Circuit Problem
PO116 Engine Coolant Temperature Circuit Range or Performance Problem
PO117 Engine Coolant Temperature Circuit Low Input
PO118 Engine Coolant Temperature Circuit High Input
PO120 Throttle Position Circuit Problem
PO121 Throttle Position Circuit Range or Performance
PO122 Throttle Position Circuit Low Input
PO123 Throttle Position Circuit High Input
PO125 Excessive Time to Enter Closed Loop Fuel Control
PO130 02 Sensor Circuit Problem (Bank 1 *Sensor 1)
PO131 02 Sensor Circuit Low Voltage (Bank 1 *Sensor 1)
PO132 02 Sensor Circuit High Voltage (Bank 1 *Sensor 1)
PO133 02 Sensor Circuit Slow Response (Bank 1 *Sensor 1)
PO134 02 Sensor Circuit No Activity Detected (Bank 1 *Sensor 1)
PO135 02 Sensor Heater Circuit Problem (Bank 1 *Sensor 1)
PO136 02 Sensor Circuit Problem (Bank 1 *Sensor 2)
PO137 02 Sensor Circuit Low Voltage (Bank 1 *Sensor 2)
PO138 02 Sensor Circuit High Voltage (Bank 1 *Sensor 2)
PO139 02 Sensor Circuit Slow Response (Bank 1 *Sensor 2)
PO140 02 Sensor Circuit No Activity Detected Bank 1 *Sensor 2)
PO141 02 Sensor Heater Circuit Problem (Bank 1 *Sensor 2)
PO142 02 Sensor Circuit Problem (Bank 1 *Sensor 3)
PO143 02 Sensor Circuit Low Voltage (Bank 1 *Sensor 3)
PO144 02 Sensor Circuit High Voltage (Bank 1 *Sensor 3)
PO145 02 Sensor Circuit Slow Response (Bank 1 *Sensor 3)
PO146 02 Sensor Circuit No Activity Detected (Bank 1 *Sensor 3)
PO147 02 Sensor Heater Circuit Problem (Bank 1 *Sensor 3)
PO150 02 Sensor Circuit Problem (Bank 2 *Sensor 1)
PO151 02 Sensor Circuit Low Voltage (Bank 2 *Sensor 1)
PO152 02 Sensor Circuit High Voltage (Bank 2 *Sensor 1)

PO153 02 Sensor Circuit Slow Response (Bank 2 *Sensor 1)
PO154 02 Sensor Circuit No Activity Detected (Bank 2 *Sensor 1)
PO155 02 Sensor Heater Circuit Problem (Bank 2 *Sensor 1)
PO156 02 Sensor Circuit Problem (Bank 2 *Sensor 2)
PO157 02 Sensor Circuit Low Voltage (Bank 2 *Sensor 2)
PO158 02 Sensor Circuit High Voltage (Bank 2 *Sensor 2)
PO159 02 Sensor Circuit Slow Response (Bank 2 *Sensor 2)
PO160 02 Sensor Circuit No Activity Detected (Bank 2 *Sensor 2)
PO161 02 Sensor Heater Circuit Problem (Bank 2 *Sensor 2)
PO162 02 Sensor Circuit Problem (Bank 2 *Sensor 3)
PO163 02 Sensor Circuit Low Voltage (Bank 2 *Sensor 3)
PO164 02 Sensor Circuit High Voltage (Bank 2 *Sensor 3)
PO165 02 Sensor Circuit Slow Response (Bank 2 *Sensor 3)
PO166 02 Sensor Circuit No Activity Detected (Bank 2 *Sensor 3)
PO167 02 Sensor Heater Circuit Problem (Bank 2 *Sensor 3)
PO170 Fuel Trim Problem (Bank 1 *)
PO171 System Too Lean (Bank 1 *)
PO172 System Too Rich (Bank 1 *)
PO173 Fuel Trim Problem (Bank 2)
PO174 System Too Lean (Bank 2)
PO175 System Too Rich (Bank 2)
PO176 Fuel Composition Sensor Circuit Problem
PO177 Fuel Composition Sensor Circuit Range or Performance
PO178 Fuel Composition Sensor Circuit Low Input
PO179 Fuel Composition Sensor Circuit High Input
PO180 Fuel Temperature Sensor Circuit Problem
PO181 Fuel Temperature Sensor Circuit Range or Performance
PO182 Fuel Temperature Sensor Circuit Low Input
PO183 Fuel Temperature Sensor Circuit High Input

PO2XX Fuel & Air Metering

PO201 Injector Circuit Problem — Cylinder 1
PO202 Injector Circuit Problem — Cylinder 2
PO203 Injector Circuit Problem — Cylinder 3
PO204 Injector Circuit Problem — Cylinder 4
PO205 Injector Circuit Problem — Cylinder 5
PO206 Injector Circuit Problem — Cylinder 6
PO207 Injector Circuit Problem — Cylinder 7
PO208 Injector Circuit Problem — Cylinder 8
PO209 Injector Circuit Problem — Cylinder 9
PO210 Injector Circuit Problem — Cylinder 10
PO211 Injector Circuit Problem — Cylinder 11
PO212 Injector Circuit Problem — Cylinder 12

PO213 Cold Start Injector 1 Problem
PO214 Cold Start Injector 2 Problem

PO3XX Ignition System or Misfire

PO300 Random Misfire Detected
PO301 Cylinder 1 Misfire Detected
PO302 Cylinder 2 Misfire Detected
PO303 Cylinder 3 Misfire Detected
PO304 Cylinder 4 Misfire Detected
PO305 Cylinder 5 Misfire Detected
PO306 Cylinder 6 Misfire Detected
PO307 Cylinder 7 Misfire Detected
PO308 Cylinder 8 Misfire Detected
PO309 Cylinder 9 Misfire Detected
PO310 Cylinder 10 Misfire Detected
PO311 Cylinder 11 Misfire Detected
PO312 Cylinder 12 Misfire Detected
PO320 Ignition or Distributor Engine Speed Input Circuit Problem
PO321 Ignition or Distributor Engine Speed Input Circuit Range or Performance
PO322 Ignition or Distributor Engine Speed Input Circuit No Signal
PO325 Knock Sensor 1 Circuit Problem
PO326 Knock Sensor 1 Circuit Range or Performance
PO327 Knock Sensor 1 Circuit Low Input
PO328 Knock Sensor 1 Circuit High Input
PO330 Knock Sensor 2 Circuit Problem
PO331 Knock Sensor 2 Circuit Range or Performance
PO332 Knock Sensor 2 Circuit Low Input
PO333 Knock Sensor 2 Circuit High Input
PO335 Crankshaft Position Sensor Circuit Problem
PO336 Crankshaft Position Sensor Circuit Range or Performance
PO337 Crankshaft Position Sensor Circuit Low Input
PO338 Crankshaft Position Sensor Circuit High Input

PO4XX Auxiliary Emission Controls

PO400 Exhaust Gas Recirculation Flow Problem
PO401 Exhaust Gas Recirculation Flow Insufficient Detected
PO402 Exhaust Gas Recirculation Flow Excessive Detected
PO405 Air Conditioner Refrigerant Charge Loss
PO410 Secondary Air Injection System Problem
PO411 Secondary Air Injection System Insufficient Flow Detected
PO412 Secondary Air Injection System Switching Valve or Circuit Problem
PO413 Secondary Air Injection System Switching Valve or Circuit Open
PO414 Secondary Air Injection System Switching Valve or Circuit Shorted
PO420 Catalyst System Efficiency Below Threshold (Bank 1 *)
PO421 Warm-up Catalyst Efficiency Below Threshold (Bank 1 *)
PO422 Main Catalyst Efficiency Below Threshold (Bank 1 *)
PO423 Heated Catalyst Efficiency Below Threshold (Bank 1 *)
PO424 Heated Catalyst Temperature Below Threshold (Bank 1 *)
PO430 Catalyst System Efficiency Below Threshold (Bank 2)
PO431 Warm-up Catalyst Efficiency Below Threshold (Bank 2)

PO432 Main Catalyst Efficiency Below Threshold (Bank 2)
PO433 Heated Catalyst Efficiency Below Threshold (Bank 2)
PO434 Heated Catalyst Temperature Below Threshold (Bank 2)
PO440 Evaporative Emission Control System Problem
PO441 Evaporative Emission Control System Insufficient Purge Flow
PO442 Evaporative Emission Control System Leak Detected
PO443 Evaporative Emission Control System Purge Control Valve Circuit Problem
PO444 Evaporative Emission Control System Purge Control Valve Circuit Open
PO445 Evaporative Emission Control System Purge Control Valve Circuit Shorted
PO446 Evaporative Emission Control System Vent Control Problem
PO447 Evaporative Emission Control System Vent Control Open
PO448 Evaporative Emission Control System Vent Control Shorted
PO450 Evaporative Emission Control System Pressure Sensor Problem
PO451 Evaporative Emission Control System Pressure Sensor Range or Performance
PO452 Evaporative Emission Control System Pressure Sensor Low Input
PO453 Evaporative Emission Control System Pressure Sensor High Input

PO5XX Vehicle Speed Control & Idle Control System

PO500 Vehicle Speed Sensor Problem
PO501 Vehicle Speed Sensor Range or Performance
PO502 Vehicle Speed Sensor Low Input
PO505 Idle Control System Problem
PO506 Idle Control System RPM Lower Than Expected
PO507 Idle Control System RPM Higher Than Expected
PO510 Closed Throttle Position Switch Problem

PO6XX Computer & Output Circuits

PO600 Serial Communication Link Problem
PO605 Internal Control Module (Module Identification Defined by J1979)

PO7XX Transmission

Next Page:

PO7XX Transmission

PO703 Brake Switch Input Problem
PO705 Transmission Range Sensor Circuit Problem (PRNDL Input)
PO706 Transmission Range Sensor Circuit Range or Performance
PO707 Transmission Range Sensor Circuit Low Input
PO708 Transmission Range Sensor Circuit High Input
PO710 Transmission Fluid Temperature Sensor Circuit Problem
PO711 Transmission Fluid Temperature Sensor Circuit Range or Performance
PO712 Transmission Fluid Temperature Sensor Circuit Low Input
PO713 Transmission Fluid Temperature Sensor Circuit High Input
PO715 Input or Turbine Speed Sensor Circuit Problem
PO716 Input or Turbine Speed Sensor Circuit Range or Performance
PO717 Input or Turbine Speed Sensor Circuit No Signal
PO720 Output Speed Sensor Circuit Problem
PO721 Output Speed Sensor Circuit Range or Performance
PO722 Output Speed Sensor Circuit No Signal
PO725 Engine Speed Input Circuit Problem
PO726 Engine Speed Input Circuit Range or Performance
PO727 Engine Speed Input Circuit No Signal
PO706 Transmission Range Sensor Circuit Range or Performance
PO707 Transmission Range Sensor Circuit Low Input
PO708 Transmission Range Sensor Circuit High Input
PO710 Transmission Fluid Temperature Sensor Circuit Problem
PO711 Transmission Fluid Temperature Sensor Circuit Range or Performance
PO712 Transmission Fluid Temperature Sensor Circuit Low Input
PO713 Transmission Fluid Temperature Sensor Circuit High Input
PO715 Input or Turbine Speed Sensor Circuit Problem
PO716 Input or Turbine Speed Sensor Circuit Range or Performance
PO717 Input or Turbine Speed Sensor Circuit No Signal
PO720 Output Speed Sensor Circuit Problem
PO721 Output Speed Sensor Circuit Range or Performance
PO722 Output Speed Sensor Circuit No Signal
PO725 Engine Speed Input Circuit Problem
PO726 Engine Speed Input Circuit Range or Performance
PO727 Engine Speed Input Circuit No Signal

PO730 Incorrect Gear Ratio
PO731 Gear 1 Incorrect Ratio
PO732 Gear 2 Incorrect Ratio
PO733 Gear 3 Incorrect Ratio
PO734 Gear 4 Incorrect Ratio
PO735 Gear 5 Incorrect Ratio
PO736 Reverse Incorrect Ratio
PO740 Torque Converter Clutch System Problem
PO741 Torque Converter Clutch System Performance or Stuck Off
PO742 Torque Converter Clutch System Stuck On
PO743 Torque Converter Clutch System Electrical
PO745 Pressure Control Solenoid Problem
PO746 Pressure Control Solenoid Performance or Stuck Off
PO747 Pressure Control Solenoid Stuck On
PO748 Pressure Control Solenoid Electrical
PO750 Shift Solenoid A Problem
PO751 Shift Solenoid A Performance or Stuck Off
PO752 Shift Solenoid A Stuck On
PO753 Shift Solenoid A Electrical
PO755 Shift Solenoid B Problem
PO756 Shift Solenoid B Performance or Stuck Off
PO757 Shift Solenoid B Stuck On
PO758 Shift Solenoid B Electrical
PO760 Shift Solenoid C Problem
PO761 Shift Solenoid C Performance or Stuck Off
PO762 Shift Solenoid C Stuck On
PO763 Shift Solenoid C Electrical
PO765 Shift Solenoid D Problem
PO766 Shift Solenoid D Performance or Stuck Off
PO767 Shift Solenoid D Stuck On
PO768 Shift Solenoid D Electrical
PO770 Shift Solenoid E Problem
PO771 Shift Solenoid E Performance or Stuck Off
PO772 Shift Solenoid E Stuck On
PO773 Shift Solenoid E Electrical

Ford OBDII Code Listing

B1231	Longitudinal acceleration threshold exceeded	C1102	Acceleration switch circuit failure
B1318	Battery voltage low	C1145	Wheel speed RF input circuit failure
B1342	ECU internal failure	C1155	Wheel speed LF input circuit failure
B1342B	ECU is defective	C1165	Wheel speed RR input circuit failure
B1485	Stop lamp switch input circuit battery short	C1175	Wheel speed LR input circuit failure
B1676	Battery voltage out of range	C1230	Rear wheel speed sensor input circuit fault
B1869	Lamp air bag warning indicator circuit open	C1233	LF wheel speed signal comparison fault
B1870	Lamp air bag warning indicator circuit short to battery	C1234	RF wheel speed signal comparison fault
B1871	Passenger air bag disable module fault	C1235	Speed wheel RR input signal missing
B1877	Seatbelt driver pretensioner circuit open	C1236	Speed wheel RR input signal missing
B1878	Seatbelt driver pretensioner circuit short to battery	C1237	Rear wheel speed signal comparison fault
B1879	Seatbelt driver pretensioner circuit short to ground	C1414	Incorrect module design level
B1881	Seatbelt passenger pretensioner circuit open	P1000	OBDII drive cycle not complete
B1882	Seatbelt passenger pretensioner circuit short to battery	P1001	KOER not able to complete, KOER aborted
B1883	Seatbelt passenger pretensioner circuit short to ground	P1039	Vehicle speed signal missing or improper
B1884	PAD warning lamp inoperative	P1051	Brake switch signal missing or improper
B1885	Seatbelt driver pretensioner circuit resistance low on squib	P1100	Mass air flow sensor intermittent
B1886	Seatbelt passenger pretensioner circuit resistance low on squib	P1101	Mass air flow (MAF) sensor out of self test range
B1887	Air bag driver circuit short to ground	P1112	Intake air temperature sensor intermittent
B1888	Air bag passenger circuit short to ground	P1116	Engine coolant temperature (ECT) sensor out of self test range
B1889	Passenger air bag disable module, module sensor obstructed	P1117	Engine coolant temperature (ECT) sensor intermittent
B1890	PAD warning lamp circuit short to battery	P1118	Manifold air temperature sensor (MAT) (ACT)
B1891	Air bag tone warning indicator circuit short to battery	P1119	Manifold air temperature sensor (MAT) (ACT)
B1892	Air bag tone warning indicator circuit failure	P1120	Throttle position circuit out of range low
B1900	Driver side air bag fault	P1121	Throttle position sensor inconsistent with MAF sensor
B1901	Air bag crash sensor #1 feed/return circuit short to ground	P1124	Throttle position sensor out of self test range
B1916	Air bag driver circuit short to battery	P1125	Throttle position sensor intermittent
B1921	Air bag diagnostic monitor ground circuit open	P1127	Exhaust not warm enough downstream oxygen sensor not tested
B1925	Air bag passenger circuit short to battery	P1128	Upstream oxygen sensors swapped from bank to bank
B1927	Passenger side air bag fault	P1129	Downstream oxygen sensors swapped from bank to bank
B1932	Air bag driver circuit open	P1130	Lack of HO2S11 switch adaptive fuel at limit (bank 1 upstream)
B1933	Air bag passenger circuit open	P1131	Lack of HO2S11 switch sensor indicates lean (Bank 1 upstream)
B1934	Air bag driver inflator circuit resistance low on squib	P1132	Lack of HO2S11 switch sensor indicates rich (Bank 1 upstream)
B1935	Air bag passenger inflator circuit resistance low on squib	P1133	HO2S11 fuel control shifted lean (Bank 1upstream)
B1941	Air bag crash sensor #1 feed/return circuit open	P1134	HO2S11 fuel control shifted rich (Bank 1upstream)
B2141	NVM configuration failure	P1135	Ignition switch signal missing or improper
C1095	Hydraulic pump motor circuit failure	P1137	Lack of HO2S12 switch sensor indicates lean (Bank 1 downstream)
		P1138	Lack of HO2S12 switch sensor indicates rich (Bank 1 downstream)
		P1139	Water in fuel circuit malfunction
		P1140	Water in fuel condition fail

P1141	Fuel restriction indicator circuit malfunction	P1260	Theft detected – engine disabled
P1142	Fuel restriction switch condition fault	P1270	Engine RPM or vehicle speed limiter reach
P1150	Lack of HO2S12 switch adaptive fuel at limit (Bank 2 upstream)	P1280	Injection control pressure sensor out of range low
P1151	Lack of HO2S21 switch sensor indicates lean (Bank 2 upstream)	P1281	Injection control pressure sensor out of range high
P1152	Lack of HO2S21 switch sensor indicates rich (Bank 2 upstream)	P1282	Injection control pressure excessive
P1153	HO2S21 fuel control shifted lean (Bank 2 upstream)	P1283	KOEO injection control regulator fail
P1154	HO2S21 fuel control shifted rich (Bank 2 upstream)	P1284	KOER fail due to injection control pressure failures
P1157	Lack of HO2S21 switch sensor indicates lean (Bank 2 downstream)	P1285	Cylinder head over temperature sensed
P1158	Lack of HO2S21 switch sensor indicates rich (Bank 2 downstream)	P1288	Cylinder head temperature sensor out of self test range
P1184	KOER fail engine oil temperature out of self test range	P1289	Cylinder head temperature sensor high input
P1190	Throttle position sensor B control circuit malfunction	P1290	Cylinder head temperature sensor low input
P1191	Throttle position sensor B out of range	P1299	Cylinder head over temperature protection active
P1192	Throttle position sensor circuit low input	P1309	Misfire monitor failure
P1193	Throttle position sensor circuit high input	P1316	IDM codes detected retrieve IDM codes
P1194	Throttle position sensor B out of self test range	P1317	IDM codes not retrieved
P1195	Throttle position sensor B inconsistent	P1351	Ignition diagnostic monitor (IDM) circuit malfunction
P1209	Injection control pressure peak delta test fail	P1352	Ignition coil A primary malfunction
P1210	Injection control pressure fail maximum pressure test at no-start	P1353	Ignition coil B primary malfunction
P1211	KOER fail injection control pressure steady state	P1354	Ignition coil C primary malfunction
P1212	Injection control pressure fail minimum pressure test at crank	P1355	Ignition coil D primary malfunction
P1220	Throttle position sensor B out of range	P1356	PIP's occurred while IDM pulse width indicates engine not turning
P1224	Throttle position sensor B out of self test range	P1357	Ignition diagnostic monitor pulse width not detected
P1227	Waste gate failed closed (Over pressure)	P1358	IDM signal out of self test range
P1228	Waste gate failed open (Under pressure)	P1359	Spark output circuit malfunction
P1229	Intercooler pump driver fault	P1364	Ignition coil circuit malfunction
P1230	Fuel pump low speed malfunction (VLCM)	P1369	Engine temperature light monitor failure
P1231	Fuel pump secondary circuit low high speed (VLCM)	P1380	Variable cam timing solenoid A malfunction
P1232	Fuel pump secondary circuit high high speed (VLCM)	P1381	Variable cam timing over advanced (Bank A)
P1233	Fuel system disabled or offline	P1383	Variable cam timing over retarded (Bank A)
P1234	Fuel system failed or offline	P1385	Variable cam timing solenoid B malfunction
P1235	Fuel pump control out of range (VLCM)	P1386	Variable cam timing over advanced (Bank B)
P1236	Fuel pump control out of range (VLCM)	P1388	Variable cam timing over retarded (Bank B)
P1237	Fuel pump secondary circuit malfunction	P1389	Glow plug high side out of range low
P1238	Fuel pump secondary circuit malfunction	P1390	Octane adjust service pin out of self test range
P1244	Alternator load input failed high	P1391	Glow plug Bank #1 out of range high
P1245	Alternator load input failed low	P1392	Glow plug Bank #1 out of range low
P1247	Manifold air pressure fail turbocharger hose off	P1393	Glow plug Bank #2 out of range high
P1248	Manifold air pressure fail connection hose off	P1394	Glow plug Bank #2 out of range low
P1249	Waste-gate fail steady state test	P1395	Glow plug monitor fail bank #1 absolute test
P1250	Lack of power to FPRC solenoid	P1396	Glow plug monitor fail bank #2 absolute test

P1141	Fuel restriction indicator circuit malfunction	P1260	Theft detected – engine disabled
P1142	Fuel restriction switch condition fault	P1270	Engine RPM or vehicle speed limiter reach
P1150	Lack of HO2S12 switch adaptive fuel at limit (Bank 2 upstream)	P1280	Injection control pressure sensor out of range low
P1151	Lack of HO2S21 switch sensor indicates lean (Bank 2 upstream)	P1281	Injection control pressure sensor out of range high
P1152	Lack of HO2S21 switch sensor indicates rich (Bank 2 upstream)	P1282	Injection control pressure excessive
P1153	HO2S21 fuel control shifted lean (Bank 2 upstream)	P1283	KOEO injection control regulator fail
P1154	HO2S21 fuel control shifted rich (Bank 2 upstream)	P1284	KOER fail due to injection control pressure failures
P1157	Lack of HO2S21 switch sensor indicates lean (Bank 2 downstream)	P1285	Cylinder head over temperature sensed
P1158	Lack of HO2S21 switch sensor indicates rich (Bank 2 downstream)	P1288	Cylinder head temperature sensor out of self test range
P1184	KOER fail engine oil temperature out of self test range	P1289	Cylinder head temperature sensor high input
P1190	Throttle position sensor B control circuit malfunction	P1290	Cylinder head temperature sensor low input
P1191	Throttle position sensor B out of range	P1299	Cylinder head over temperature protection active
P1192	Throttle position sensor circuit low input	P1309	Misfire monitor failure
P1193	Throttle position sensor circuit high input	P1316	IDM codes detected retrieve IDM codes
P1194	Throttle position sensor B out of self test range	P1317	IDM codes not retrieved
P1195	Throttle position sensor B inconsistent	P1351	Ignition diagnostic monitor (IDM) circuit malfunction
P1209	Injection control pressure peak delta test fail	P1352	Ignition coil A primary malfunction
P1210	Injection control pressure fail maximum pressure test at no-start	P1353	Ignition coil B primary malfunction
P1211	KOER fail injection control pressure steady state	P1354	Ignition coil C primary malfunction
P1212	Injection control pressure fail minimum pressure test at crank	P1355	Ignition coil D primary malfunction
P1220	Throttle position sensor B out of range	P1356	PIP's occurred while IDM pulse width indicates engine not turning
P1224	Throttle position sensor B out of self test range	P1357	Ignition diagnostic monitor pulse width not detected
P1227	Waste gate failed closed (Over pressure)	P1358	IDM signal out of self test range
P1228	Waste gate failed open (Under pressure)	P1359	Spark output circuit malfunction
P1229	Intercooler pump driver fault	P1364	Ignition coil circuit malfunction
P1230	Fuel pump low speed malfunction (VLCM)	P1369	Engine temperature light monitor failure
P1231	Fuel pump secondary circuit low high speed (VLCM)	P1380	Variable cam timing solenoid A malfunction
P1232	Fuel pump secondary circuit high high speed (VLCM)	P1381	Variable cam timing over advanced (Bank A)
P1233	Fuel system disabled or offline	P1383	Variable cam timing over retarded (Bank A)
P1234	Fuel system failed or offline	P1385	Variable cam timing solenoid B malfunction
P1235	Fuel pump control out of range (VLCM)	P1386	Variable cam timing over advanced (Bank B)
P1236	Fuel pump control out of range (VLCM)	P1388	Variable cam timing over retarded (Bank B)
P1237	Fuel pump secondary circuit malfunction	P1389	Glow plug high side out of range low
P1238	Fuel pump secondary circuit malfunction	P1390	Octane adjust service pin out of self test range
P1244	Alternator load input failed high	P1391	Glow plug Bank #1 out of range high
P1245	Alternator load input failed low	P1392	Glow plug Bank #1 out of range low
P1247	Manifold air pressure fail turbocharger hose off	P1393	Glow plug Bank #2 out of range high
P1248	Manifold air pressure fail connection hose off	P1394	Glow plug Bank #2 out of range low
P1249	Waste-gate fail steady state test	P1395	Glow plug monitor fail bank #1 absolute test
P1250	Lack of power to FPRC solenoid	P1396	Glow plug monitor fail bank #2 absolute test

P1397	KOER glow plug test aborted	P1502	KOER fail due to auxiliary powertrain control module active
P1399	Glow plug high side out of range high	P1504	Idle air control circuit malfunction
P1400	DPFE sensor circuit low voltage detected	P1505	Idle air control system at adaptive clip
P1401	DPFE sensor circuit high voltage detected	P1506	Idle air control overspeed error
P1403	DPFE sensor hoses reversed	P1507	Idle air control underspeed error
P1405	DPFE sensor upstream hose off or plugged	P1512	Inlet manifold runner control malfunction (Bank #1 stuck closed)
P1406	DPFE sensor downstream hose off or plugged	P1513	Inlet manifold runner control malfunction (Bank #2 stuck closed)
P1407	Exhaust gas recirculation no flow detected	P1516	Inlet manifold runner control input error (Bank #1)
P1408	EGR flow out of self test range	P1517	Inlet manifold runner control input error (Bank #2)
P1409	EGR control circuit malfunction	P1518	Inlet manifold runner control malfunction (stuck open)
P1410	EGR barometric pressure sensor VREF voltage	P1519	Inlet manifold runner control malfunction (stuck closed)
P1411	Secondary air injection system incorrect downstream flow detected	P1520	Inlet manifold runner control circuit malfunction
P1413	Secondary air injection system monitor circuit low voltage	P1525	KOER or cont. mon. fail charge air bypass valve
P1414	Secondary air injection system monitor circuit high voltage	P1527	AWS solenoid circuit malfunction
P1442	Evaporative emission control system leak detected (small leak)	P1528	PONLY solenoid circuit malfunction
P1443	Evaporative emission control system purge control valve malfunction	P1529	SCAIR solenoid circuit malfunction
P1444	Purge flow sensor circuit low input	P1530	A/C clutch circuit malfunction
P1445	Purge flow sensor circuit high input	P1531	KOER fail pedal position sensor moved
P1450	Unable to bleed up fuel tank vacuum	P1536	PBA fail
P1451	Evaporative emission control system vent control valve circuit malfunction	P1537	Inlet manifold runner control malfunction (bank 2 stuck open)
P1452	Unable to bleed up vacuum in tank	P1538	Inlet manifold runner control malfunction (bank 1 stuck open)
P1455	Evaporative emission control system purge control leak detected (gross leak)	P1539	Power to A/C clutch circuit overcurrent (VLCM)
P1457	Unable to pull vacuum in tank	P1540	Air bypass valve circuit malfunction
P1460	Wide open throttle A/C cutout circuit malfunction	P1549	Intake manifold communication control circuit malfunction
P1461	A/C pressure sensor circuit high input	P1550	Power steering pressure switch out of self test range
P1462	A/C pressure sensor circuit low input	P1601	ECM/TCM serial communication error
P1463	A/C pressure sensor insufficient pressure change	P1602	Imm/TCM serial communication error
P1464	KOER A/C clutch fail – A/C demand out of self test range	P1605	Keep alive memory test fail
P1469	Low A/C cycling period	P1608	Internal control module malfunction
P1473	Fan secondary high with fan(s) off (VLCM)	P1610	Flash EPROM reprogramming error
P1474	Low fan control primary circuit malfunction	P1611	Flash EPROM reprogramming error
P1479	High fan control primary circuit malfunction	P1612	Flash EPROM reprogramming error
P1480	Fan secondary low with low fan on	P1613	Flash EPROM reprogramming error
P1481	Fan secondary low with high fan on	P1614	Flash EPROM reprogramming error
P1484	Open power ground to VLCM (VLCM)	P1615	Flash EPROM reprogramming error
P1500	VSS intermittent	P1616	Flash EPROM reprogramming error
P1501	KOER fail vehicle speed seen during KOER test	P1617	Flash EPROM reprogramming error
		P1618	Flash EPROM reprogramming error
		P1619	Flash EPROM reprogramming error
		P1620	Flash EPROM reprogramming error

P1621 Immobilizer code word / ID write failure
 P1622 Immobilizer ID unmatched
 P1623 Immobilizer code word / ID write failure
 P1625 B+ supply to VLCM fan circuit malfunction (VLCM)
 P1625 B+ supply to VLCM A/C circuit malfunction (VLCM)
 P1630 Alternator #1 circuit malfunction
 P1631 Alternator #2 circuit malfunction
 P1634 Data output link failure flag
 P1645 F/P resistor switch circuit malfunction
 P1650 Power steering pressure switch out of self test range
 P1651 Power steering pressure switch input malfunction
 P1662 KOEO fail injector driver unit relay test
 P1663 FDCC fail
 P1667 CI fail
 P1668 EEC/IDM communications fault
 P1670 EF fail
 P1680 Metering oil pump malfunction
 P1681 Metering oil pump malfunction
 P1682 Metering oil pump malfunction
 P1683 MOP thermosensor circuit malfunction
 P1684 MOP position sensor circuit malfunction
 P1685 MOP stepping motor circuit malfunction
 P1686 MOP stepping motor circuit malfunction
 P1687 MOP stepping motor circuit malfunction
 P1688 MOP stepping motor circuit malfunction
 P1689 MOP stepping motor circuit malfunction
 P1690 KOEO waste gate fail
 P1691 SPCNT solenoid circuit malfunction
 P1692 SEXEC solenoid circuit malfunction
 P1693 SINEC solenoid circuit malfunction
 P1694 SINLF solenoid circuit malfunction
 P1700 Transmission concern—trans fails to neutral
 P1701 Reverse engagement error
 P1702 Transmission concern
 P1703 Brake switch out of range
 P1704 Digital TRS failed to transition state
 P1705 MLPS fail out of range
 P1706 E4OD fail vehicle speed excessive in park
 P1708 Clutch switch circuit malfunction
 P1709 PNP switch out of range

P1710 Transmission concern
 P1711 KOER fail transmission oil temperature higher or lower than expected
 P1713 No change in TFT—low range—TCC problems & harsh shifts
 P1714 SS1 inductive signature malfunction
 P1715 SS2 inductive signature malfunction
 P1718 No change in TFT- high range-TCC problems and harsh shifts
 P1720 VSS (meter) circuit malfunction
 P1727 CCS inductive signature malfunction
 P1728 E4OD converter clutch control excessive slippage
 P1729 4x4 fail
 P1730 4x4 low error
 P1731 1-2 shift error
 P1732 2-3 shift error
 P1733 3-4 shift error
 P1735 1st gear switch circuit malfunction
 P1736 2nd gear switch circuit malfunction
 P1738 Shift time error
 P1740 TCC inductive signature malfunction
 P1741 TCC control error
 P1742 TCC mechanical failure solenoid struck on
 P1743 LOOP solenoid circuit malfunction
 P1744 Excessive slip across CC
 P1745 Transmission concern
 P1746 PCA solenoid circuit open
 P1747 ETV circuit shorted
 P1748 EPC fail
 P1749 EPC solenoid failed low
 P1751 SSB shift solenoid 1 fault
 P1754 CCS fail
 P1756 SSB shift solenoid 2 fault
 P1760 PCA solenoid intermittent short to ground
 P1761 Shift solenoid C performance
 P1762 Transmission concern
 P1765 Solenoid 5 circuit malfunction
 P1766 Shift solenoid D performance
 P1767 Transmission concern
 P1770 Clutch solenoid circuit malfunction
 P1775 Shift 1 circuit malfunction
 P1776 Shift 2 circuit malfunction
 P1779 OCIL fail
 P1780 TCS input incorrect for selected position

P1781 4x4 circuit out of range
P1783 Transmission oil temperature over temperature
P1784 Transmission 1st and Reverse mechanical fail
P1785 Transmission 1st and 2nd mechanical failure
P1887 Transmission 3rd or 4th gear electrical fault
P1788 VFS #2 open circuit
P1788b Transmission 2-3 timing or CCS circuit open
P1789 VFS #2 short circuit
P1789b Transmission 2-3 timing or CCS circuit shorted
P1790 TPS (mechanical) circuit malfunction
P1791 TPS (electrical) circuit malfunction
P1792 Atmospheric pressure circuit malfunction
P1793 Intake air volume circuit malfunction
P1794 Battery voltage circuit malfunction
P1795 Idle switch circuit malfunction
P1796 Kick down switch circuit malfunction
P1797 Neutral switch circuit malfunction
P1798 Water thermosensor circuit malfunction
P1799 Hold switch circuit malfunction
P1900 Transmission concern
U1020 Module communications network concern
U1021 SCP indicates lack of A/C clutch status input
U1039 SCP indicates VSS signal missing or incorrect
U1051 SCP indicates brake switch signal missing
U1073 SCP indicates lack of engine coolant fan status
U1131 SCP indicates lack of fuel pump status response
U1135 SCP indicates ignition switch signal missing
U1256 SCP indicates A communications error
U1451 Lack of response at PATS module engine off
U1850 Invalid or missing fuel system data