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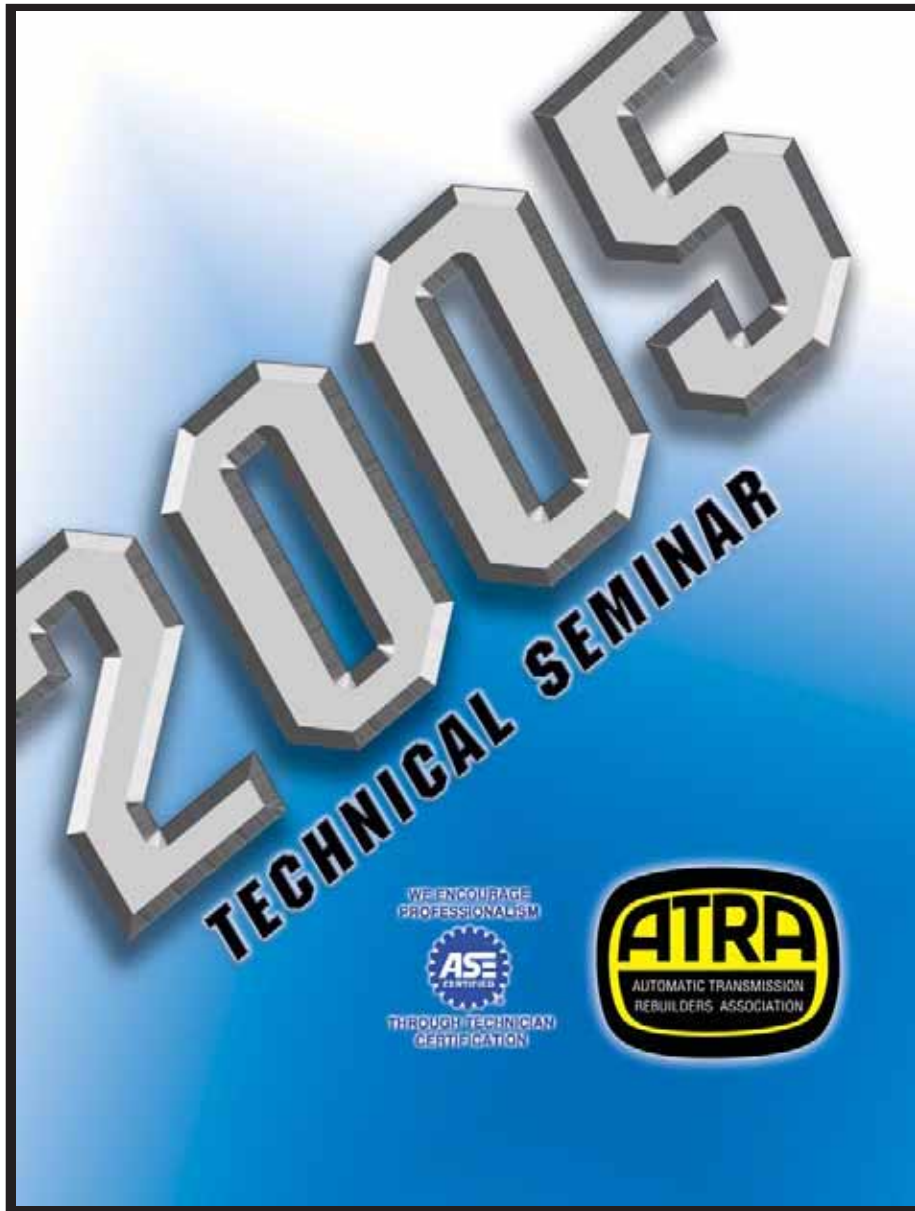


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The

Automatic Transmission Rebuilders Association

2400 Latigo Avenue
Oxnard, CA 93030

Phone: (805) 604-2000 Fax: (805) 604-2005
<http://www.atra.com>

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Dennis Madden
Chief Executive Officer

Welcome to the 2005 ATRA Technical Seminar!

This year marks another milestone in the evolution of the ATRA technical seminar. Because again the ATRA seminar manual has been developed and printed in full color!

Having worked on several seminar manuals myself I know what it takes to produce a seminar. Lance Wiggins and the ATRA Technical staff have really pulled out all the stops again; another sign of the new things coming out of the "New" ATRA.

This seminar, along with everything else at ATRA is a group effort, with a lot of effort in the background that nobody ever sees. I could not be more delighted with the staff here at ATRA.

ATRA is changing all the time: with the new items like the 3-year Golden Rule warranty, to give your customer that added peace of mind; point-of-sale items to make your shop look even more professional; Nation-wide advertising and referral services, getting more consumers into ATRA Members' shops. These are just a few of the changes you've seen in the past year, and it's only the beginning.

On behalf of the ATRA staff, and the ATRA Chapters that work so hard to bring you this seminar, welcome.

Sincerely,

Dennis Madden,
ATRA, CEO



Lance Wiggins
Technical Director

ATRA is proud to be celebrating another year serving the automatic transmission repair industry. A lot of changes have taken place over the last year and it's because of those changes that technical training has become an integral part of today's transmission repair industry. It's just not possible anymore to get by with a measure of common sense and a decent technical aptitude. To remain profitable, today's technicians need up-to-date training on an ongoing basis.

To that end, ATRA is pleased to present its 2005 Technical Seminar. Packed with countless hours of research and development, writing, editing, photography and layout, this year's seminar will stand out as one of the most demanding and useful technical training programs ever developed for this industry.

Once again, this year's technical manual has been produced in *full color*. With over 300 pages of up-to-the-minute technical information, the 2005 Technical Seminar Manual will remain a valuable resource long after the seminar is just a memory.

We're confident that you'll find this year's seminar presentation and technical manual both informative and profitable. In fact, we're so sure you'll be satisfied with what you learn in this program, we guarantee it!

So, on behalf of the entire ATRA staff, the international board of directors, and all of the ATRA members worldwide, we'd like to thank you for helping to make our over 50 years memorable.

A handwritten signature in cursive script that reads "Lance Wiggins".

Lance Wiggins
Technical Director

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It's difficult enough getting the seminar book researched, written, pictured, edited, and printed let alone getting it out to the seminar attendees. This is where the ATRA Staff comes in.

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Without the ATRA team, it would be very hard to accomplish the task at hand. Please enjoy the seminar.

Lance Wiggins
ATRA, Technical Director

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Of Freudenberg-NOK*

Highest Quality Components in TransTec Overhaul Kits

Gaskets:

Paper gaskets included in TransTec kits are manufactured by our Freudenberg-NOK Necedah plant (formerly known as Farnam). This QS-certified plant also supplies virtually all domestic OEMs with many of their paper gasket requirements used in automotive transmission and engine applications. Look for the TransTec name on these paper gaskets.

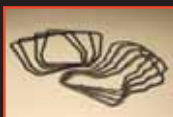


It's your assurance of quality.

For applications using bonded valve body plates, we supply bonded gaskets with metal cores. You get the same OE-quality gaskets in TransTec

overhaul kits that we supply to OEMs.

The manufacturing process used for our silicone beaded gaskets utilizes leading-edge technology to provide superior sealing.



Pan gaskets made of cork and rubber are high quality and manufactured by OE suppliers. Duraprene® fibrous material pan gaskets are also offered as an alternative for installer preference. Our molded rubber pan gaskets are formed around a plastic core for more stability; a proprietary process which Freudenberg-NOK developed for its current OEM customers. These gaskets feature torque-limiting inserts to help avoid over-torquing.



Bonded Pistons:

Bonded pistons are manufactured using a very precise molding process to create smooth, exacting rubber sealing surfaces bonded to metal pistons. Freudenberg was a pioneer in molding bonded pistons for European applications. NOK is the dominant supplier for Asian applications, and Freudenberg-NOK is an OE supplier of these domestically. The sealing surface of these pistons performs the same function as previous separate-seal designs, so bonded pistons should always be replaced during a rebuild.



Lip Seals:

The majority of lip seals contained in TransTec kits are manufactured by Freudenberg-NOK plants and exclusive to our kits. We have supplied lip seals via the IPC group to automotive manufacturers for over 40 years. TransTec kits for import applications contain original NOK lip seals, a claim no other kit maker can make.

Sealing Rings:

TransTec kits use Freudenberg-NOK manufactured PTFE (Teflon®) rings.

The QS-certified manufacturing plant is a pioneer in PTFE machined ring design. A machined ring involves a more exacting manufacturing process that results in components that seal better. With over 28 different compounds to choose from, complex formulas are used to ensure superior sealing in a broad range of sealing applications. In addition, TransTec is the aftermarket leader using state-of-the-art materials including VespeI®, PEEK™ and other synthetics. For applications requiring metal, we use only OEM-quality rings.



Metal Clad Seals:

Globally, Freudenberg-NOK manufactures more precision-molded radial shaft seals than all other manufacturers *combined*. TransTec alone has sold over 3 million NOK seals for *domestic* applications since they were first introduced in 1999. NOK brand oil seals are used exclusively in TransTec kits – no other transmission kits have them.



O-rings & D-rings:

The Freudenberg and NOK group companies manufacture O-rings and D-rings for automotive applications on a worldwide basis, an advantage we use to incorporate the OEM design, materials and resources of these seals into our kits.



It's What's Inside That Counts!

We're so confident in our world-class seals that we mold our initials into them. Look for these RMA (Rubber Manufacturers Association) codes on our seals.

IPC FNJ
NOK CFW

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Schaffer

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Rostra

Solve problems. Stop comebacks.

4T65-E

TCC Regulated Apply Valve
FIXES TCC SLIP, CODE 1870



*84754-34K

4T40-E

TCC Regulator
Apply Valve Sleeve
FIXES NO TCC APPLY,
SOFT OR SLIPPING APPLY



*33000-02

4L80-E

Actuator Feed Limit Valve Kit
FIXES WRONG GEAR STARTS,
SOLENOID CODES,
CLUTCH/BAND FAILURE



*34200-16K

SATURN TAAT

Pressure Regulator Valve Sleeve
and Separate OEM-Sized Valve
FIXES DELAYED OR
HARSH REVERSE ENGAGEMENT
AND HIGH LINE PRESSURE



*95200-05K
95200-06

4L80-E

Sure Cure® Kit
FIXES 2ND GEAR STARTS, NO 4TH,
CODES 68, 85, 86, 87



SC-4L80E

4L80-E

Self-Regulating Reverse Boost
Valve & Sleeve
PREVENTS BROKEN CASE,
SERVO OR CLUTCH PISTON



34200-10K

4L60-E

TCC Regulator Valve Kits
FIXES 1870 SLIP CODE, LOW
TCC APPLY PRESSURE



*77754-03K
*77754-04K

4L60-E

Actuator Feed Limit Valve Kit
FIXES WRONG GEAR STARTS,
SOLENOID CODES,
CLUTCH/BAND FAILURE



*77754-09K



DESIGNED TO SAVE

***Requires Tooling**

Note: Many of these parts fit other applications.

4L30E

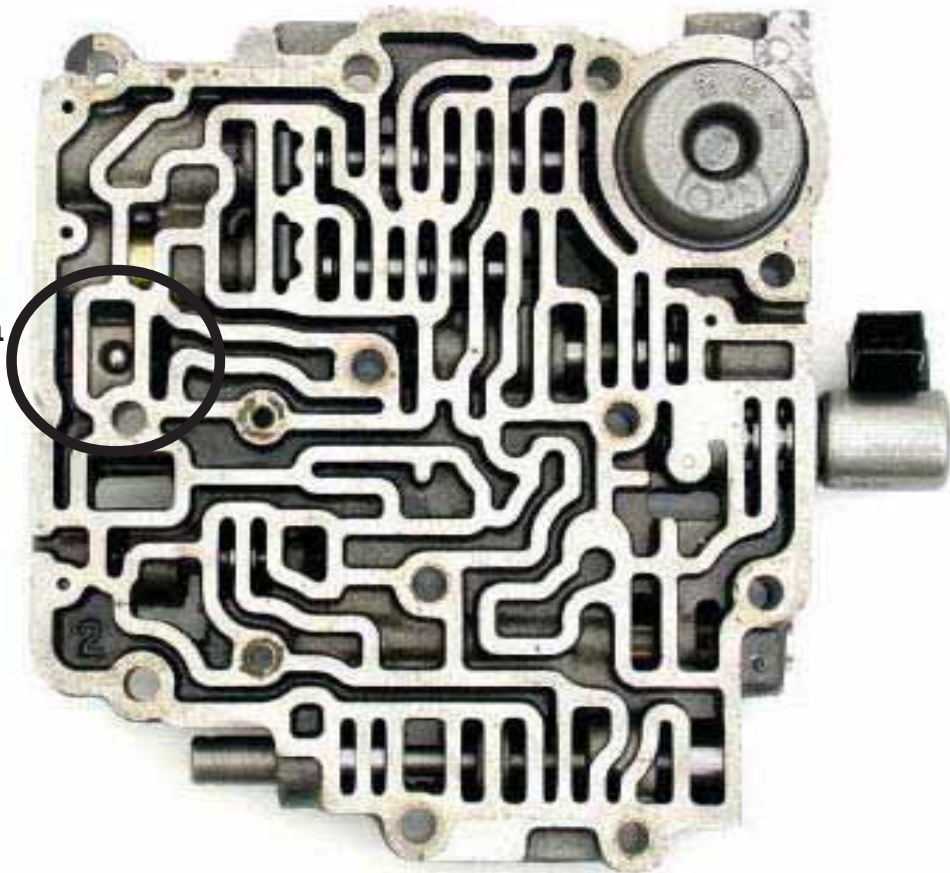


Checkball Location

3rd Clutch Checkball Missing

A bindup or slip condition in 4th gear may be caused by a missing or leaking 3rd Clutch Checkball. When this Checkball is missing, 1-2 Servo release pressure can leak in 4th gear causing the 1-2 band to apply.

**3rd clutch
checkball**



Checkball Location *(continued)*

D 3 2 Shuttle Ball Missing:

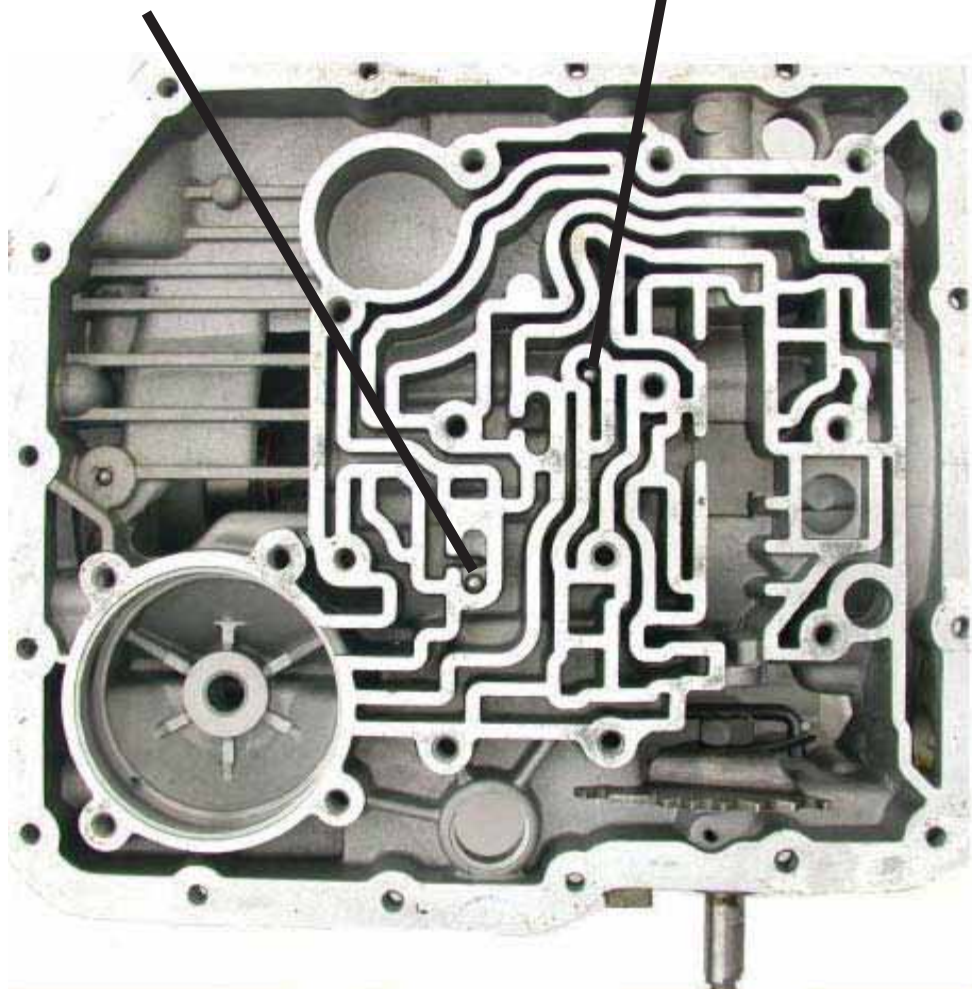
A missing D 3 2 Shuttle Ball will cause low mainline pressure in D4 and Manual Low and have normal pressure in D3 and Manual 2.

3rd Clutch Quick Dump Ball Missing:

A missing 3rd Clutch Quick Dump Ball will cause a 3-2 down shift clunk or bind on the 3-2 down shift.

D 3 2 Shuttle Ball

3rd Clutch Quick Dump Ball

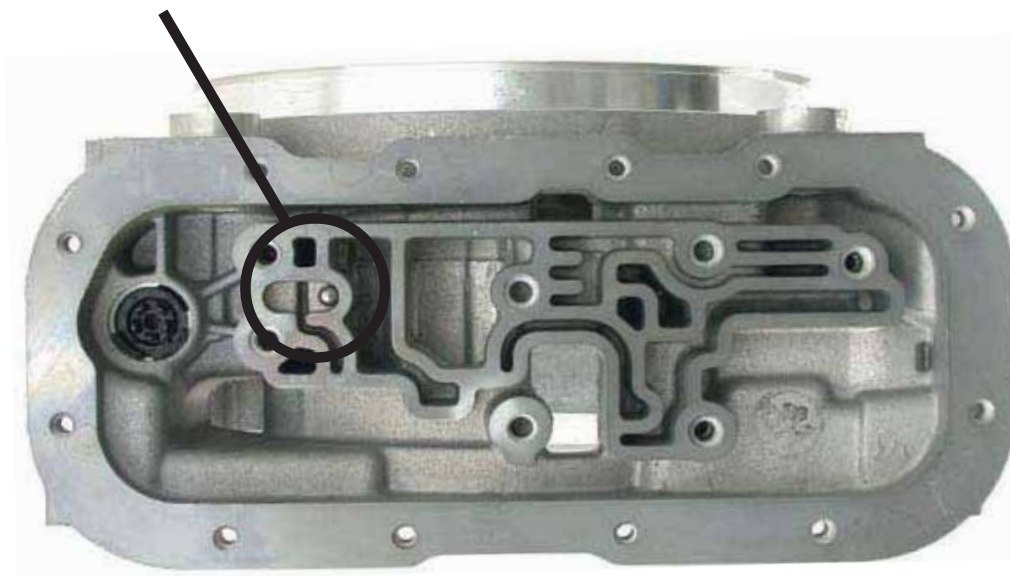
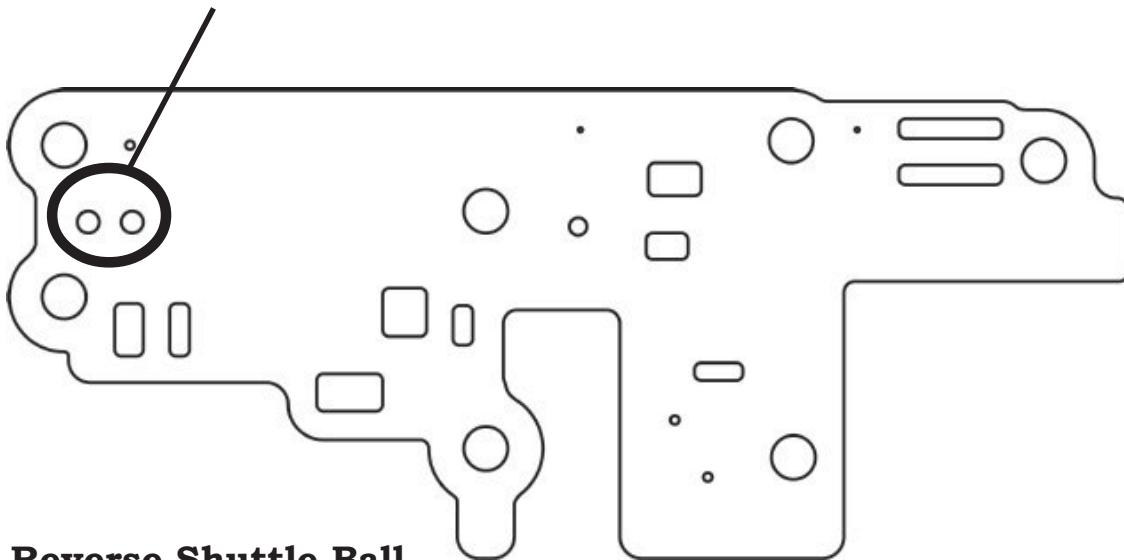


Checkball Location *(continued)*

Reverse Shuttle Ball Missing:

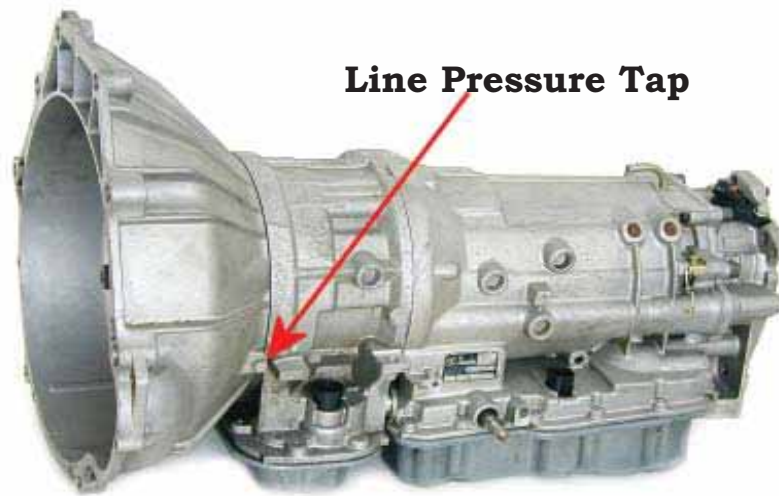
A missing Reverse Shuttle Ball will cause a no lockup condition in all forward ranges. In Reverse, a missing Reverse Shuttle Ball can cause the 2nd Clutch to partially apply, burning the 2nd Clutch and possibly causing a bind in Reverse.

2 Holes = Ball
1 Hole = No Ball



Pressure Taps

Pressures:		
	Idle	Stall
Drive	45-55	150-160
Reverse	65-75	210-225



The Servo Release Pressure should be equal to mainline pressure in 3rd and 4th gears and zero in all other gears including Park and Neutral.

Servo Release Pressure

Pilot Drill: 1/8"
Tap Drill: "Q" or 21/64"
Tap: 1/8" NPT



Line Pressure Taps

2nd Clutch Pressure:

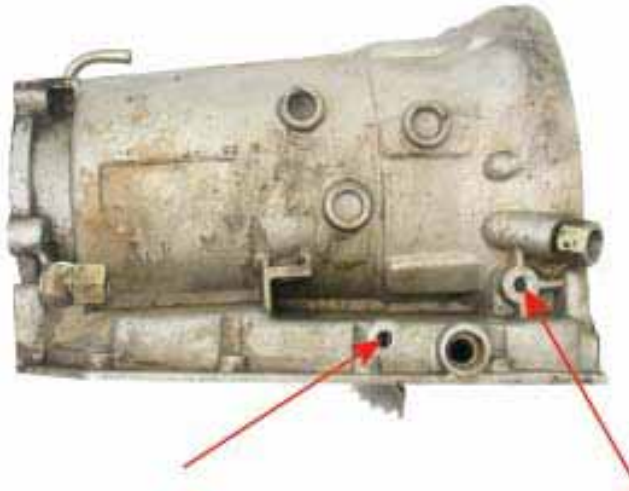
The 2nd Clutch pressure should be equal to mainline pressure in 2nd, 3rd and 4th gear and zero in all other gears including Park and Neutral.

4th Clutch Pressure:

The 4th Clutch pressure should be equal to mainline pressure in 4th gear and zero in all other gears including Park and Neutral.

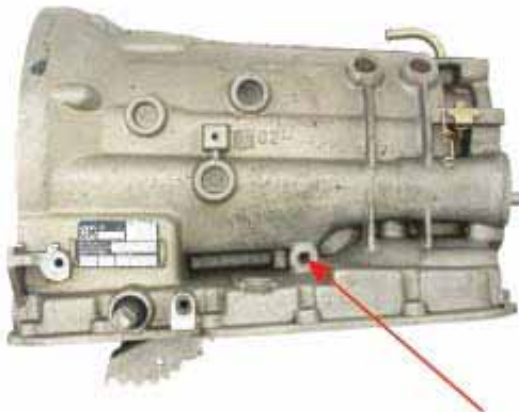
Servo Apply Pressure:

The Servo Apply pressure should be equal to mainline pressure in all forward ranges and zero in Park, Reverse and Neutral.



2nd Clutch Apply Pressure

4th Clutch Apply Pressure

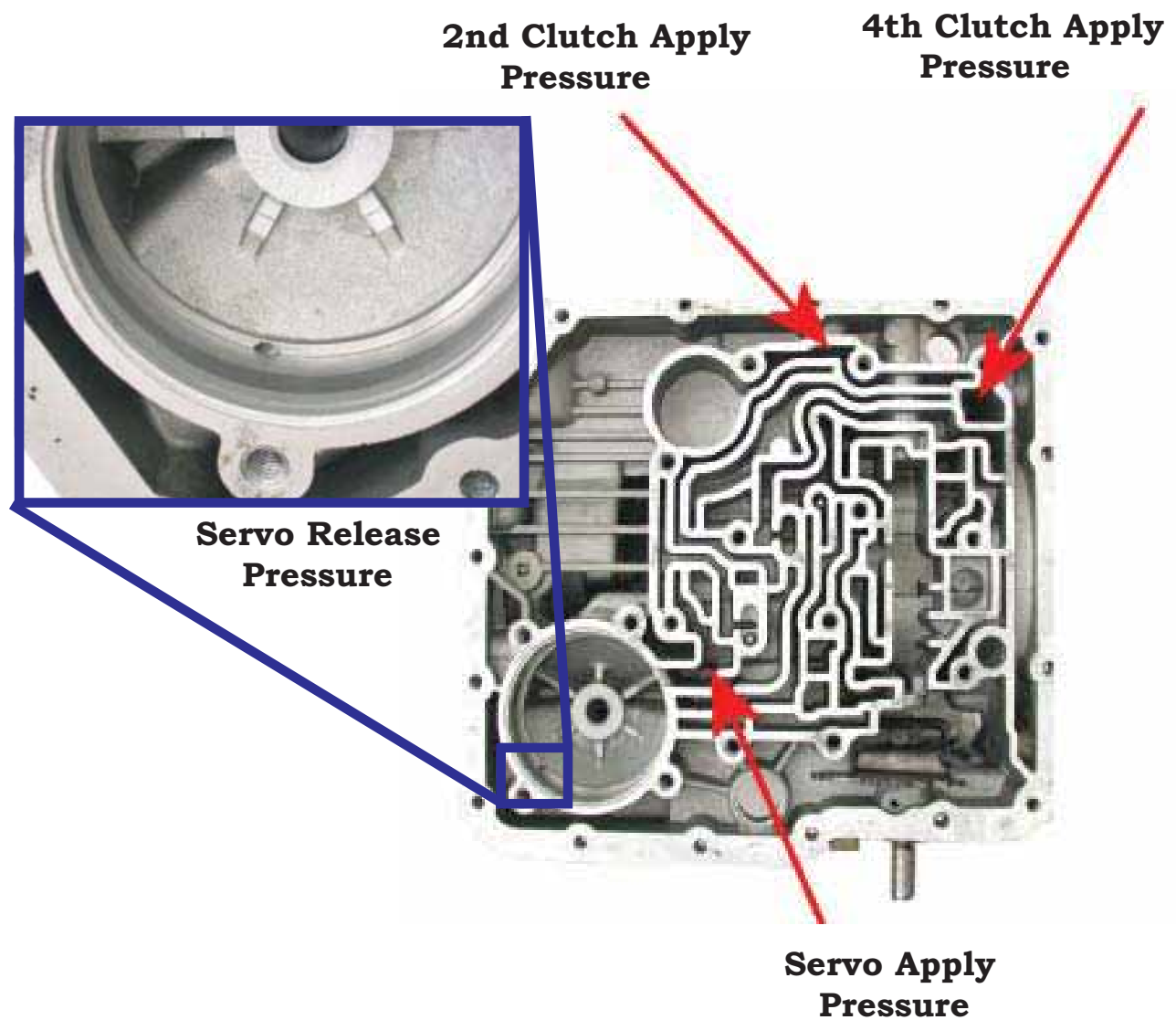


Servo Apply Pressure

Pilot Drill: 1/8"
Tap Drill: "Q" or 21/64"
Tap: 1/8" NPT

Pressure Tap Circuits

When you are drilling the pressure taps, take notice of the correct circuit locations prior to drilling.



Input Sprag Rotation

No Reverse, No Drive Engagement, Bind in 2nd Gear

If you install the Input Sprag incorrectly or if the sprag has failed; the symptoms that will follow are no reverse, no drive engagement and a bind in 2nd gear. Check the transmission in all ranges, if you have Manual Low, look for the Sprag as the root of the problem.

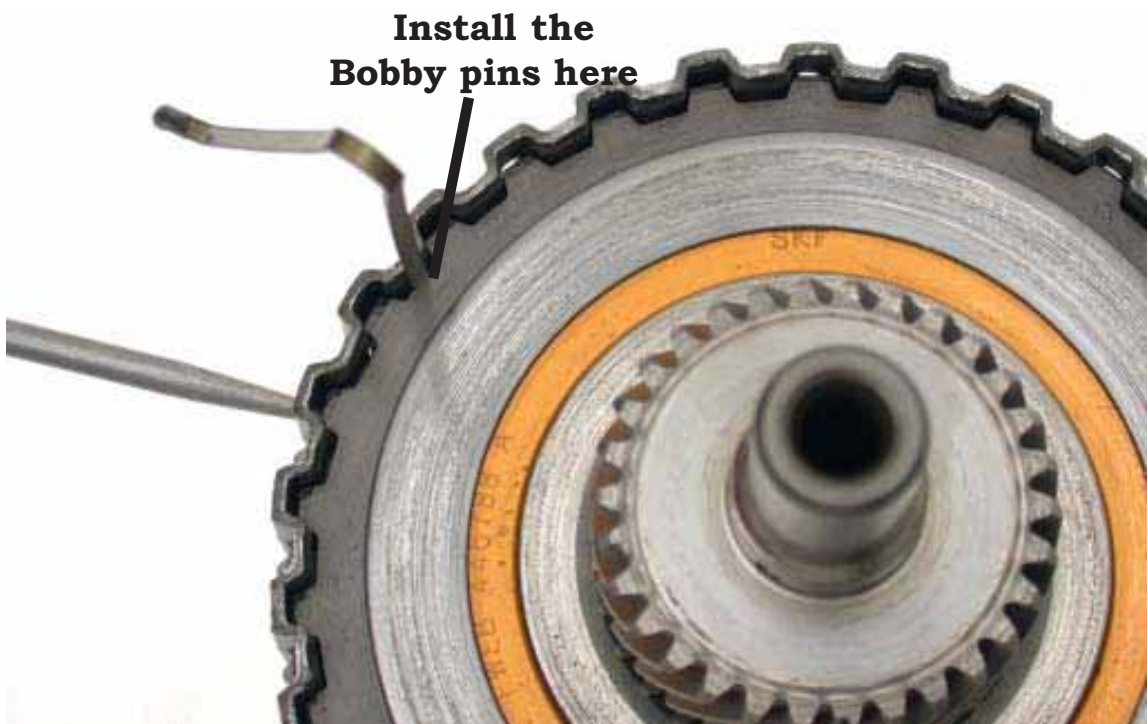
**Sun Gear Freewheels
Counter Clockwise**



3rd Clutch Drum Disassembly

Tools and Procedures

The correct tool for disassembling the 3rd Clutch Drum assembly is expensive and most technicians do not have this tool. Unfortunately the only other method is using a pick and putting your finger tips and thumbs in jeopardy. The following procedure is an easy inexpensive way around harming yourself.



3rd Clutch Drum Disassembly

Tools and Procedures (continued)

In order to remove the sprag assembly to gain access to the clutches you must first remove the internal snap ring holding the sprag race assembly to the drum. To do this, start with one end of the snap ring, push in on the snap ring with a scribe and slide a bobby pin between the drum and the snap ring, keeping that portion of the snap ring out of the groove. Work your way around the drum installing several bobby pins until the snap ring is completely out of the groove.

Install several Bobby pins around the 3rd Clutch Drum.



3rd Clutch Drum Disassembly

Tools and Procedures (continued)

Once you have all of the Bobby pins in place, simply use two screw drivers to pop the race out of the drum.



Pry the Sprag Race out with two screw drivers.

3rd Clutch Drum Assembly

Pressure Plate Installation

The 3rd Clutch Cushion Plate should be installed as shown for proper operation. If the 3rd Clutch Cushion Plate is installed incorrectly a harsh 3rd gear will occur. There is no factory specifications for clutch clearance.

Try to maintain 0.008"-0.010" per disc.



**3rd Clutch Cushion
Plate is beveled as
shown**

Binds in 2nd Gear

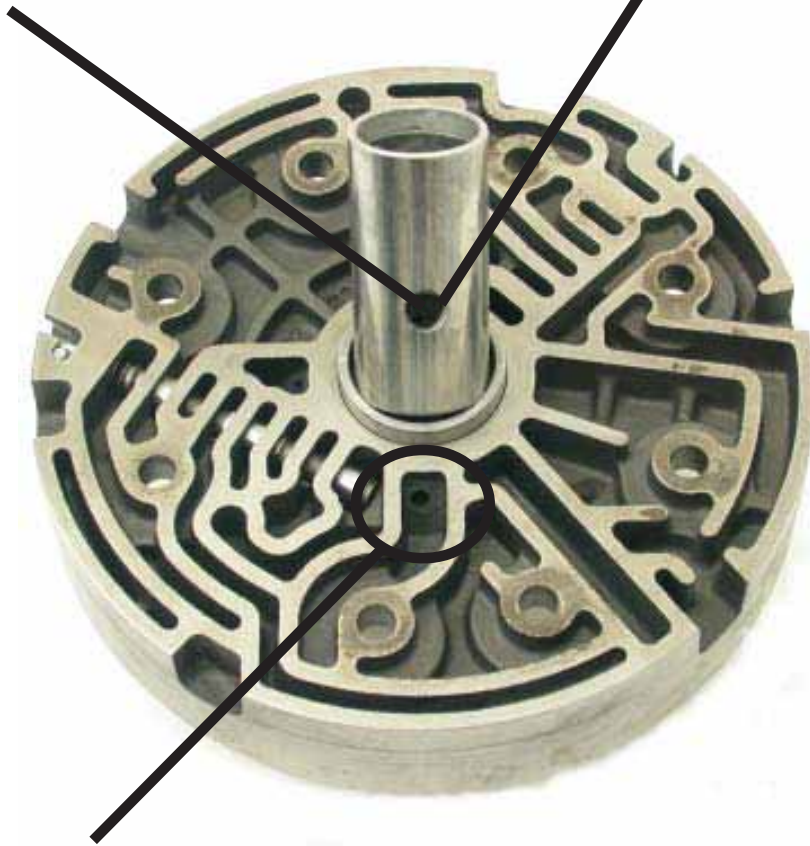
Bushing Installation

Installation of the 3rd Clutch Bushing is very important. If the feed hole is not aligned properly, 3rd clutch failure will occur. It will also cause a bind in 2nd due to the 3rd clutch staying on.

NOTE:
The offset hole MUST
face down

**This hole must line up
with the 3rd Clutch
Feed Circuit**

3rd Clutch Feed

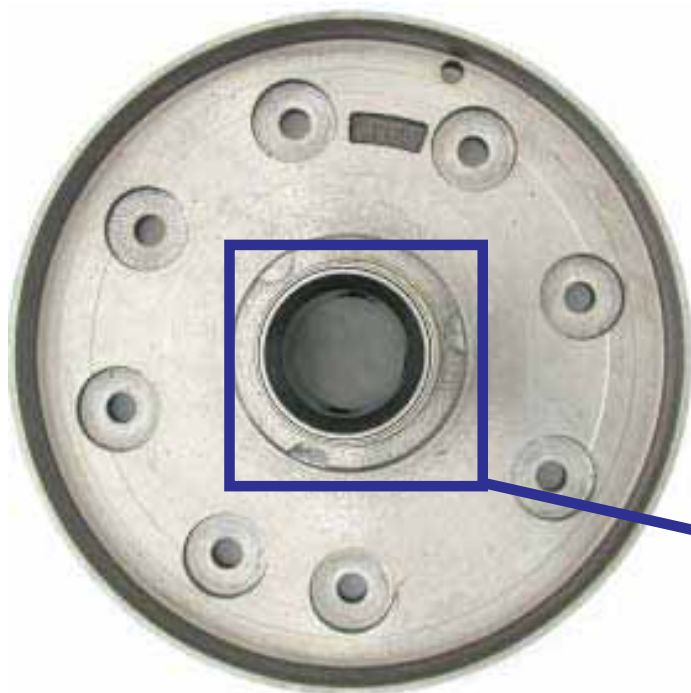


Center Support Washer

Isuzu Washers

Center Supports that use a “no-tab” style thrust washer tend to fail because the plastic washer is allowed to spin on the support. If you choose to machine the “no-tab” style Center Support you can use the 3 tab washers and they are more adjustable for endplay. These washers are also used for the Pump to adjust Over-drive housing endplay.

0.064”	Yellow	8-96013-761-0
0.070”	Red	8-96013-762-0
0.077”	Black	8-96013-763-0
0.084”	White	8-96013-764-0
0.094”	Green	8-96013-765-0
0.100”	Blue	8-96013-766-0



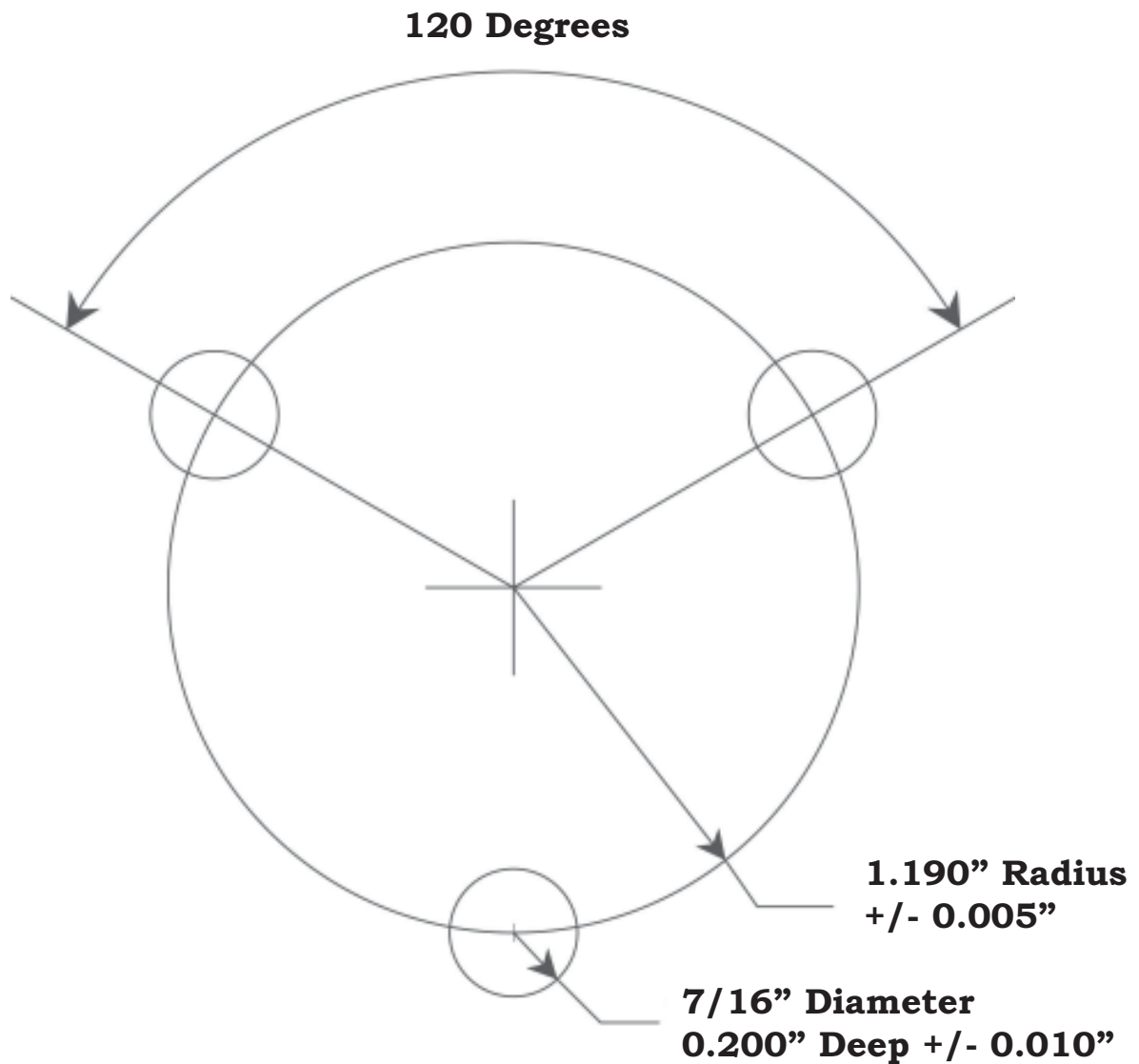
Main Case Endplay
0.014”-0.031”
O/D Case Enplay
0.004”-0.030”

Refer to the Blue
Print on the
following page

Center Support Washer

Isuzu Washers (continued)

Do not use a drill press to machine the Center Support. It should only be machined on a milling machine. Use this schematic as a reference to machine the Center support area for the three tab washer.



Computer Types

Type 1

1990-1993 Isuzu Rodeo and Trooper

Type 1b

1992-1995 BMW w/4L30E

Type 2

1994-1995 Isuzu Rodeo, Trooper, Amigo and Honda Passport

Type 3

1996-1999 Isuzu Rodeo, Trooper, Amigo, Vehicross, Honda Passport and Acura SLX

Type 4

2000-up Isuzu Rodeo, Trooper, Amigo, Vehicross, Honda Passport and Acura SLX

Type 5

1997-1998 Cadillac Catera

Type 6

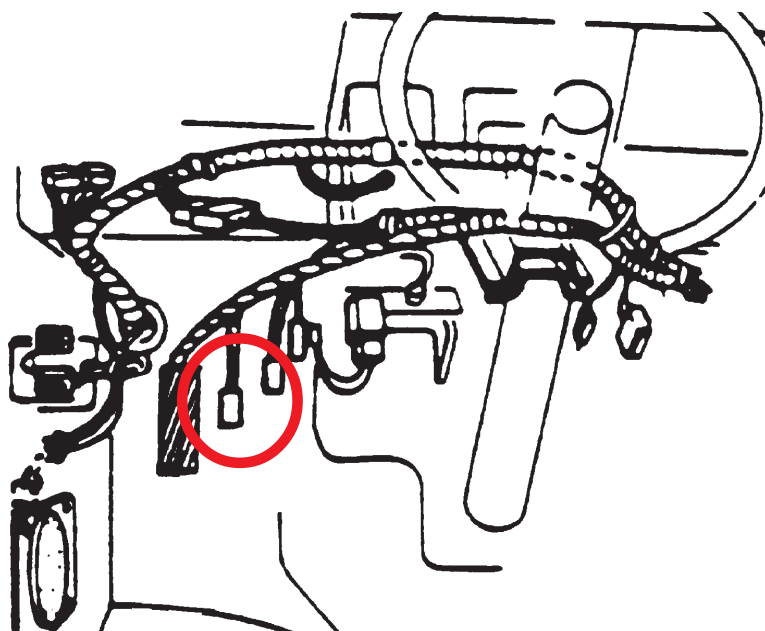
1996-2001 BMW w/4L30E

1999-2001 Cadillac Catera

Computer Type 1 & 2

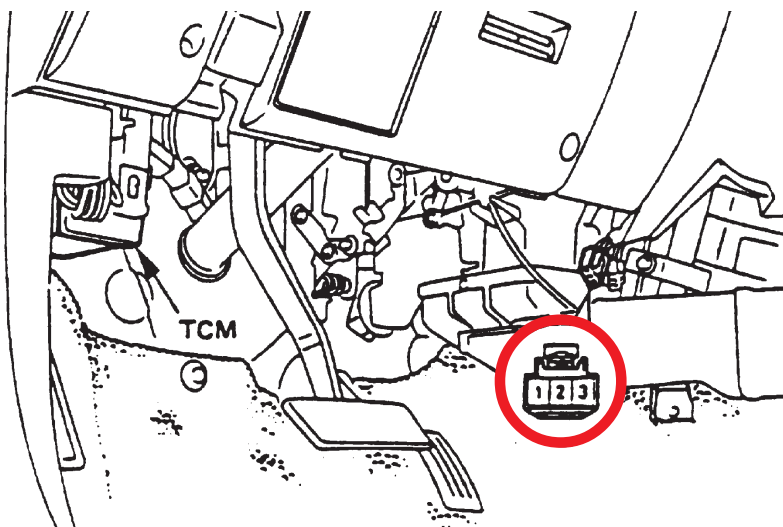
Manual Code Retrieval

1990-1991 Isuzu Troopers used a two-terminal diagnostic connector. To display codes, simply jump the two terminals together.



Ground the Yellow w/Black stripe wire on the 2 or 3 pin connector

1992-1995 Isuzu Troopers have a three-terminal diagnostic connector. To display codes, jump the two outer terminals together.



Type I

Codes

17	1-2/3-4 Solenoid shorted to ground
21	TPS Voltage too high
22	TPS Voltage too low
23	Engine coolant switch voltage high
25	1-2/3-4 Solenoid open or shorted to B+
26	2-3 Solenoid shorted to ground
28	2-3 Solenoid open or shorted to B+
29	TCC Solenoid shorted to ground
31	No engine RPM signal
32	Force Motor circuit amperage too low (Less than 0.095A)
33	Force Motor circuit amperage too high (Higher than 1.5A)
34	Band Apply Solenoid open or shorted to B+
35	Band Apply Solenoid open or shorted to ground
36	TCC Solenoid open or shorted to B+
39	No VSS
41	Gear ratio error
43	Solenoid ground supply circuit open, shorted to ground or shorted to B+
46	Down shift error
48	Low battery voltage (Below 9.0V)
49	High battery voltage (Above 16V)
55	EPROM failure
56	Transmission range switch input incorrect
65	Trans Temp sensor shorted to ground
66	Trans Temp sensor open or shorted to B+
77	Kickdown switch stuck closed (shorted to ground)
82	Transmission range switch input incorrect

Type 2

Codes

- 11 No VSS
- 13 No engine RPM signal
- 15 Trans Temp Sensor open or shorted to B+
- 16 Trans Temp Sensor shorted to ground
- 21 TPS Voltage too high
- 22 TPS Voltage too low
- 23 TPS connector disconnected
- 25 Low battery voltage (Below 9.0V)
- 26 High battery voltage (Above 16V)
- 31 1-2/3-4 Solenoid open or shorted to ground
- 32 2-3 Solenoid open or shorted to ground
- 33 TCC Solenoid open or shorted to B+
- 34 Band Apply Solenoid open or shorted to ground
- 35 Force Motor open or shorted
- 36 Solenoid B+ supply circuit open or shorted to ground
- 37 Torque management serial line fault
- 41 1-2/3-4 Solenoid shorted to B+
- 42 2-3 Solenoid shorted to B+
- 43 TCC Solenoid shorted to ground
- 44 Band Apply Solenoid shorted to B+
- 46 Solenoid B+ supply circuit shorted to B+
- 51 Engine Coolant Switch open, shorted to ground or shorted to B+
- 52 Kickdown Switch stuck closed (shorted to ground)
- 53 Transmission range switch input incorrect in P, N or R position
- 54 Transmission range switch input incorrect
- 55 Brake Switch open or shorted to ground
- 56 Brake Switch shorted to B+
- 61 Gear ratio error
- 62 Downshift protection
- 63 EPROM failure
- 64 TCC valve stuck on
- 65 TCC valve stuck off
- 82 Shift or Band Apply Solenoids faulty during driving

Type 3

Codes

P0218	Transmission fluid over temp
P0560	System voltage malfunction
P0705	Transmission range switch illegal position
P0706	Transmission range switch performance
P0711	TFT sensor performance
P0712	TFT sensor circuit low
P0713	TFT sensor circuit high
P0719	Brake switch stuck on
P0722	Output speed sensor
P0723	Output speed sensor intermittent
P0724	Brake switch stuck off
P0730	Gear ratio error
P0742	TCC stuck on
P0748	Force motor electrical fault
P0751	SSA (1-2/3-4 solenoid) stuck on or stuck off
P0753	SSA (1-2/3-4 solenoid) electrical fault
P0756	SSB (2-3 solenoid) stuck on or stuck off
P0758	SSB (2-3 solenoid) electrical fault
P1790	ROM check sum error
P1792	EEPROM check sum error
P1835	Kickdown switch stuck on
P1850	Band apply solenoid electrical fault
P1860	TCC solenoid electrical fault
P1870	Transmission component slipping

Type 4

Codes

P0218	Transmission fluid over temp
P0502	No VSS signal
P0562	System voltage low
P0563	System voltage high
P0601	PCM/ECM memory checksum
P0602	PCM/ECM programming error
P0604	PCM/ECM RAM error
P0606	Internal performance
P0705	Transmission range switch illegal position
P0706	Transmission range switch performance
P0711	TFT sensor performance
P0712	TFT sensor circuit low
P0713	TFT sensor circuit high
P0719	Brake switch stuck on
P0722	Output speed sensor
P0723	Output speed sensor intermittent
P0724	Brake switch stuck off
P0730	Gear ratio error
P0742	TCC stuck on
P0748	Force motor electrical fault
P0751	SSA (1-2/3-4 solenoid) stuck off
P0752	SSA (1-2/3-4 solenoid) stuck on
P0753	SSA (1-2/3-4 solenoid) electrical fault
P0756	SSB (2-3 solenoid) stuck off
P0757	SSB (2-3 solenoid) stuck on
P0758	SSB (2-3 solenoid) electrical fault

Type 4

Codes

P1120	TPS1 circuit
P1220	TPS2 circuit
P1221	TPS1-TPS2 correlation (circuit performance)
P1271	APS1-APS2 correlation (circuit performance)
P1272	APS2-APS3 correlation (circuit performance)
P1273	APS1-APS3 correlation (circuit performance)
P1275	APS1 circuit
P1280	APS2 circuit
P1285	APS3 circuit
P1790	ROM check sum error
P1792	EEPROM check sum error
P1835	Kickdown switch stuck on
P1850	Band apply solenoid electrical fault
P1860	TCC solenoid electrical fault
P1870	Transmission component slipping

Type 5 & 6 (Except BMW)

Codes

P0218	Transmission fluid over temp
P0560	System voltage malfunction
P0601	TCM internal error
P0703	Brake switch circuit
P0705	Transmission range switch illegal position
P0706	Transmission range switch performance
P0711	Transmission fluid over temp
P0712	TFT sensor circuit low
P0713	TFT sensor circuit high
P0722	Output speed sensor
P0725	Engine RPM signal
P0727	Engine RPM signal
P0730	Gear ratio error
P0742	TCC stuck on
P0743	TCC solenoid electrical fault
P0748	Force motor electrical fault
P0751	SSA (1-2/3-4 solenoid) stuck off
P0752	SSA (1-2/3-4 solenoid) stuck on
P0753	SSA (1-2/3-4 solenoid) electrical fault
P0756	SSB (2-3 solenoid) stuck off
P0757	SSB (2-3 solenoid) stuck on
P0758	SSB (2-3 solenoid) electrical fault
P1560	TCM voltage interrupted
P1600	Transmission power relay circuit (Solenoid B+ supply)

Type 5 & 6 (Except BMW)

Codes

P1605	TCM internal error
P1621	TCM internal error
P1625	Transmission power relay circuit (Main Case Solenoid B+ supply)
P1705	P/N output circuit from ECM to TCM (not the trans range sensor)
P1740	Torque management circuit
P1743	TPS signal invalid from ECM to TCM
P1760	Keep alive power circuit fault
P1740	Torque management circuit
P1792	Engine coolant circuit
P1800	Transmission power relay circuit (Main Case Solenoid B+ supply)
P1835	Kickdown switch stuck on (info from ECM on some models)
P1844	TCS torque reduction request circuit
P1845	Gear ratio output to ABS
P1850	Band apply solenoid electrical fault
P1870	Transmission component slipping
P1890	ECM to TCM data input circuit (TPS data incorrect on some models)
P1895	Engine torque delivered circuit (TCM to traction control module)
U2100	CAN bus circuit
U2104	CAN bus circuit
U2105	CAN bus circuit
U2108	CAN bus circuit

Aisin Warner Section

Nissan

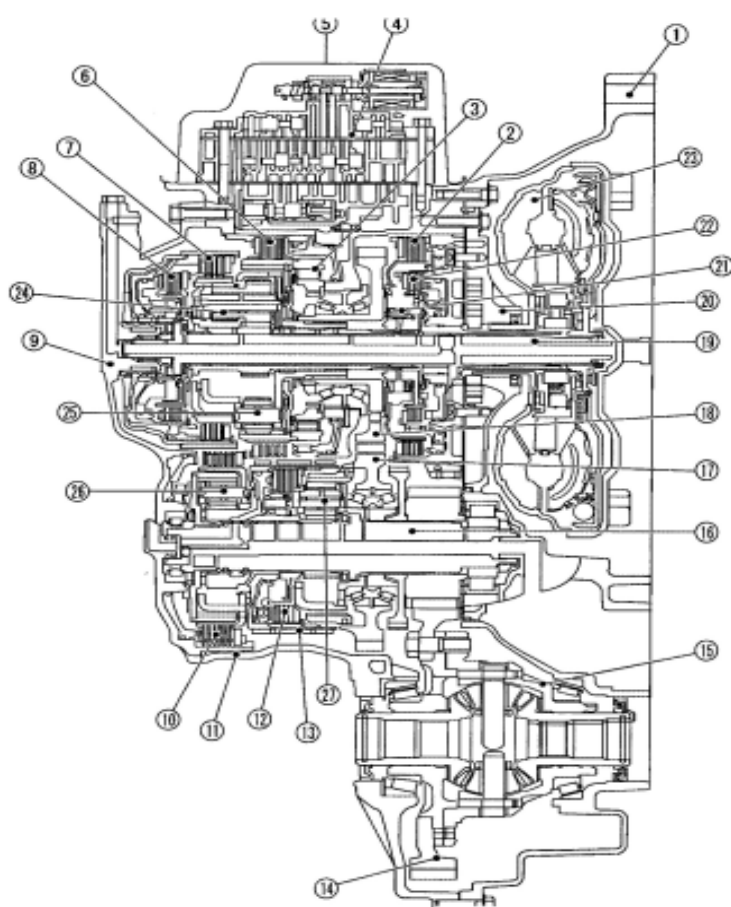
Applications and Internal Component ID

Aisin Warner:

RE5F22A:

2004 and newer Maxima V6

2005 and newer Altima



1	Converter Housing	10	B5 Brake	19	Input Shaft
2	2nd Brake	11	Transaxle Case	20	Oil Pump
3	One-Way Clutch No.2	12	U/D Clutch	21	One-Way Clutch No.1
4	Control Valve Assembly	13	U/D Brake	22	2nd Coast Brake
5	Side Cover	14	Final Gear	23	Torque Converter
6	1st and Reverse Brake	15	Differential Case	24	Main Rear Planetary Gear
7	Forward Clutch	16	Output Shaft	25	Main Front Planetary Gear
8	Direct Clutch	17	Counter Driven Gear	26	U/D Rear Planetary Gear
9	Transaxle Case Cover	18	Counter Drive Gear	27	U/D Front Planetary Gear

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Component Application Chart

Shift position		Clutch			Brake					One-way clutch		Remarks
		F/C 1	D/C 2	U/D.C 3	2nd C/ B 4	2nd/B 5	1st & R/B 6	U/D.B 7	B5/B 8	O.C1 9	O.C2 10	
P									●			PARK POSITION
R			●				●		●			REVERSE POSITION
N									●			NEUTRAL POSITION
	1st	●							●		●	
D	1 ⇄ 2	●			■	■			●	■	■	Automatic shift 1 ⇄ 2 ⇄ 3 ⇄ 4 ⇄ 5
	2nd	●			●	●			●	●		
	2 ⇄ 3	●			●	●		■	■	●		
	3rd	●			●	●		●		●		
	3 ⇄ 4	●		■	●	●		■		●		
	4th	●		●	●	●				●		
	4 ⇄ 5	●	■	●	■	●				■		
	5th	●	●	●		●						
M5	5th	●	●	●		●						Locks in 5th gear*
M4	4th	●		●	●	●				●		Locks in 4th gear*
M3	3rd	●			●	●		●		●		Locks in 3rd gear*
M2	2nd	●			●	●			●	●		Locks in 2nd gear*
M1	1st	●					●		●		●	Locks in 1st gear*

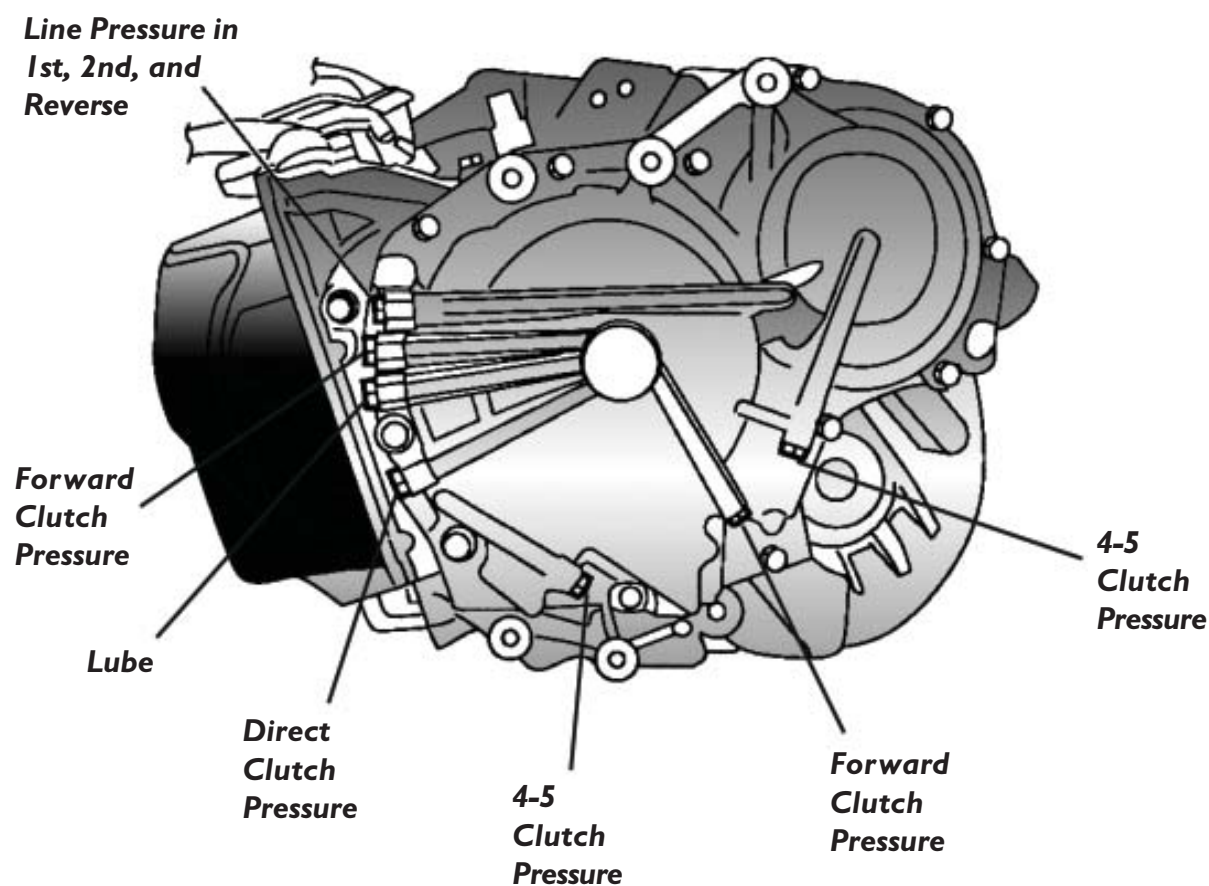
●: Operates

■: In transition between applied and released.

*: Except when automated up/down shift control and up/down shift permission control are activated.

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Pressure Tap Locations



Engine Speed:	D, M positions	Reverse
Idle	48-57 psi	73-88 psi
WOT Stall	186-202 psi	247-287 psi

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Manual Code Retrieval

Preliminary Test:

1. With the selector lever in Park, start the engine and warm it to operating temperature.
2. Turn the ignition switch to the Off position, then turn the switch in cycles On, Off, On, Off (ending in the Off position).
3. Wait 10 seconds.
4. Turn the ignition switch to the “On” position (do not start engine).
5. The “A/T Check” indicator should come on for about 2 seconds. If the “A/T Check” indicator does not come on, check the CAN bus circuits from the TCM to the instrument cluster, power and ground to A/T control module and the “A/T Check” indicator lamp and circuits.

*** The short blinks indicate codes that are not set and the long blinks indicate codes that are set. Example: If all of the blinks are short except for the 8th, 12th, and 23rd, it means you have codes 8, 12 and 23 set.**

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Manual Code Retrieval (continued)

Code retrieval procedure:

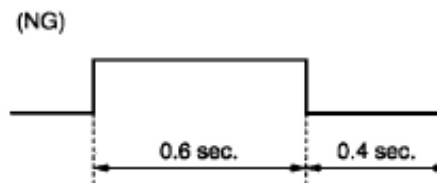
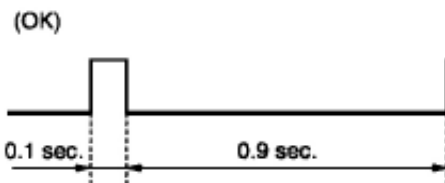
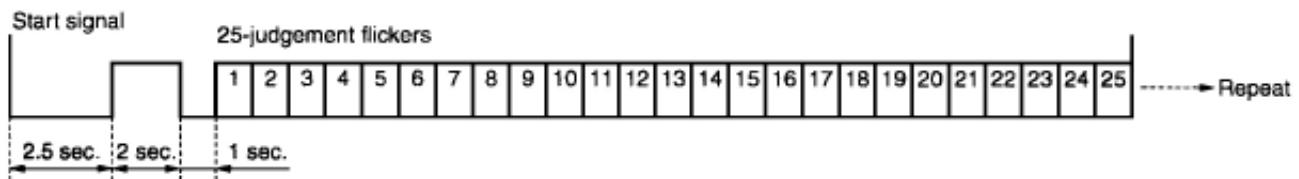
Note: Step 7 must be performed within 2 seconds of completing step 6

(turning ignition switch "On")

1. Set the Parking Brake
2. Turn the ignition switch to the "Off" position
3. Push the shift lock release button
4. Move the selector lever from the "P" to the "D" position.
5. Make sure the accelerator pedal is fully released (closed throttle)
6. Depress the brake pedal
7. Turn the ignition switch to the "On" position
8. Move the selector lever to the "N" position, then release the brake pedal.
9. Move the selector lever to the "D" position, then depress the brake pedal.
10. Release the brake pedal.
11. Depress the accelerator pedal fully, then release it

The A/T Check indicator should now flash, indicating any self-diagnosis codes that are set.

*** The short blinks indicate codes that are not set and the long blinks indicate codes that are set. Example: If all of the blinks are short except for the 8th, 12th, and 23rd, it means you have codes 8, 12 and 23 set.**



Codes are cleared by turning the ignition switch off after the code retrieval procedure has been performed.

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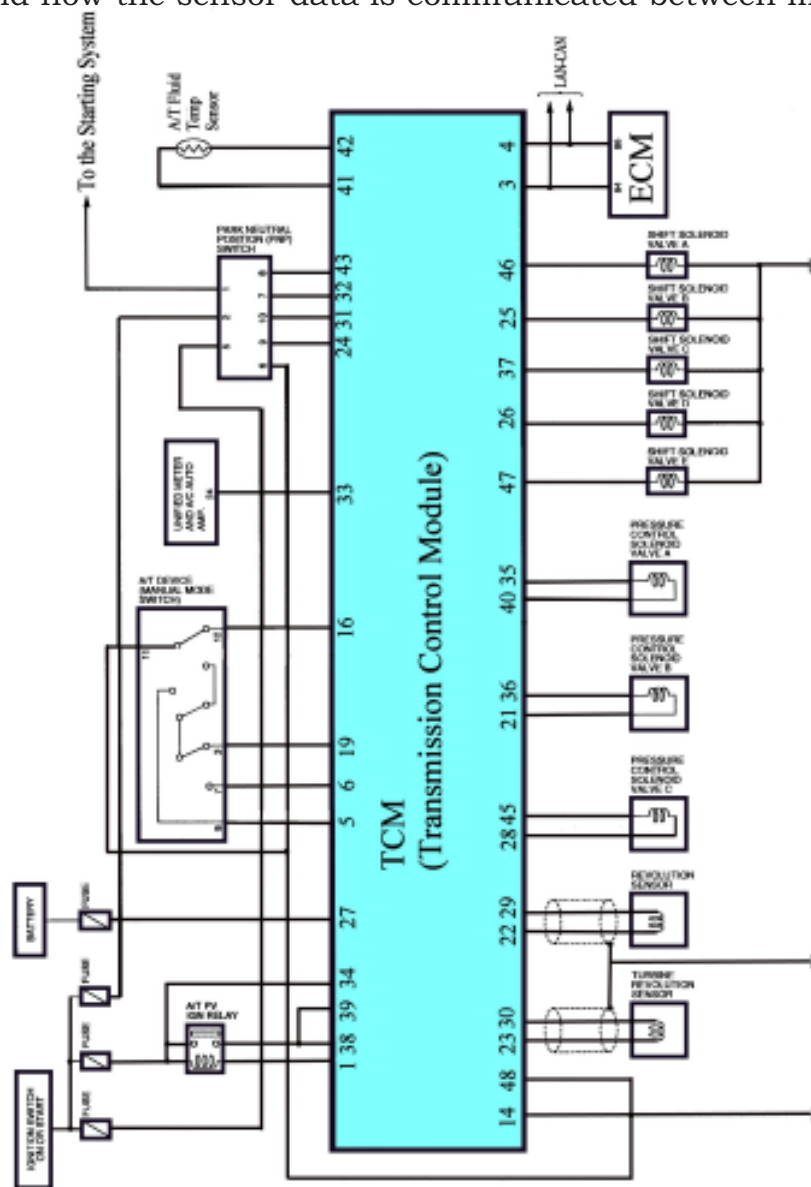
DTC Identification

OBDII DTC	Flash Code	Cause
P0500	15	Vehicle speed signal from instrument cluster
P0613		TCM internal malfunction
P0705	11	PNP switch signal fault
P0710	12	ATF temperature sensor circuit fault
P0711		ATF temperature sensor no signal change (not rational)
P0717	2	Turbine speed sensor signal loss or out of range
P0722	1	Vehicle speed sensor (revolution sensor) signal loss or out of range
P0726	14	Engine speed signal fault (from ECM)
P0731	17	1 st gear ratio error
P0732	18	2 nd gear ratio error
P0733	19	3 rd gear ratio error
P0734	20	4 th gear ratio error
P0735	21	5 th gear ratio error
P0744	24	TCC performance (TCC slip)
P0745	3	PC solenoid A (line pressure) electrical circuit fault
P0750	6	Shift solenoid A electrical circuit fault
P0755	7	Shift solenoid B electrical circuit fault
P0760	8	Shift solenoid C electrical circuit fault
P0762	22	Shift solenoid C stuck on (performance fault)
P0765	9	Shift solenoid D electrical fault
P0770	10	Shift solenoid E electrical fault
P0775	4	PC solenoid B electrical circuit fault
P0780	23	Shift performance fault (incorrect gear, long shift, slipping)
P0795	5	PC solenoid C electrical circuit fault
P0797	25	PC solenoid C stuck on (performance fault)
P0826		Manual mode switch signal fault
P0882		TCM power loss (power/ground fault, battery/charging fault, battery disconnected)
P1726	13	Electronic throttle control system fault
U1000	16	CAN communication line (CAN bus fault)

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Wiring Diagram

The transmission control module wiring diagram below shows some of the same components and circuits that you would find in previous year models. If you look closely, you will notice that some sensors you would find on earlier vehicles, such as the TPS, are not present. The overview of the CAN bus network covered in the next couple of pages will help you understand which modules these sensor signals go to, and how the sensor data is communicated between modules.



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CAN Communication

There are some quick tests you can perform on the Nissan CAN bus network without even using a scan tool or DMM. Using this type of test procedure can help you quickly determine if there is a problem and narrow down where the problem may be located.

For example, looking at the CAN data transfer charts on the following pages, you can determine which modules are transmitting specific data information, and which are receiving (“T” for the transmitting module, “R” for the receiving module).

Example 1:

Verifying the network between the ECM and the Unified Meter and A/C Amp. The “Engine Speed Signal” is transmitted over the CAN bus network by the ECM, and received by the Unified Meter and A/C Amp (instrument cluster module).

Test 1:

So if you start the engine and the tachometer is functioning, then you have verified that the network between the ECM and Unified Meter and A/C Amp is intact and functioning at this time.

Example 2:

Verifying the network between the TCM and the Unified Meter and A/C Amp. The “A/T Position Indicator Lamp” data is transmitted over the CAN bus network by the TCM, and received by the Unified Meter and A/C Amp (instrument cluster module).

Test 2:

If you move the Transmission Selector Lever and the Position Indicator Lamps are functioning properly, you have verified that the network between the TCM and Instrument Cluster is intact and functioning at this time.

Looking at the network wiring diagram, you can see that by performing the tests described above you can verify the integrity of the network from the Unified Meter and A/C Amp to the ECM.

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CAN Communication (continued)

TYPE 14/TYPE 15/TYPE 16									
T: Transmit R: Receive									
Signals	ECM	TCM	Display control unit	Display unit	BCM	Unified meter and A/C amp.	Driver seat control unit	ABS actuator and electric unit (control unit)	IPDM E/R
Engine speed signal	T	R	R			R		R	
Engine status signal	T				R				
Engine coolant temperature signal	T	R				R			
Key switch signal					T		R		
Ignition switch signal					T		R		R
ABS operation signal	R	R						T	
Fuel consumption monitor signal	T					R			
			R	R		T			
A/C switch signal	R				T				
A/C compressor request signal	T								R
Blower fan motor switch signal	R				T				
A/C control signal			T	T		R			
			R	R		T			
Cooling fan speed request signal	T								R
Cooling fan speed signal	R								T
Position light request signal					T	R			R
Low beam request signal					T				R
Low beam status signal	R								T
High beam request signal					T	R			R
High beam status signal	R								T
Front fog light request signal					T				R
Day time running light request signal					T	R			
Vehicle speed signal						R		T	
	R	R	R		R	T	R		
Sleep wake up signal					T	R	R		R
Door switch signal			R	R	T	R	R		R
Turn indicator signal					T	R			
Cornering lamp request signal					T				R
Key fob iD signal					T		R		
Key fob door unlock signal					T		R		
Oil pressure switch signal					R				T
					T	R			
Buzzer output signal					T	R			
Fuel level sensor signal	R					T			
ASCD SET indicator signal	T					R			
ASCD CRUISE indicator signal	T					R			
Malfunction indicator lamp signal	T					R			

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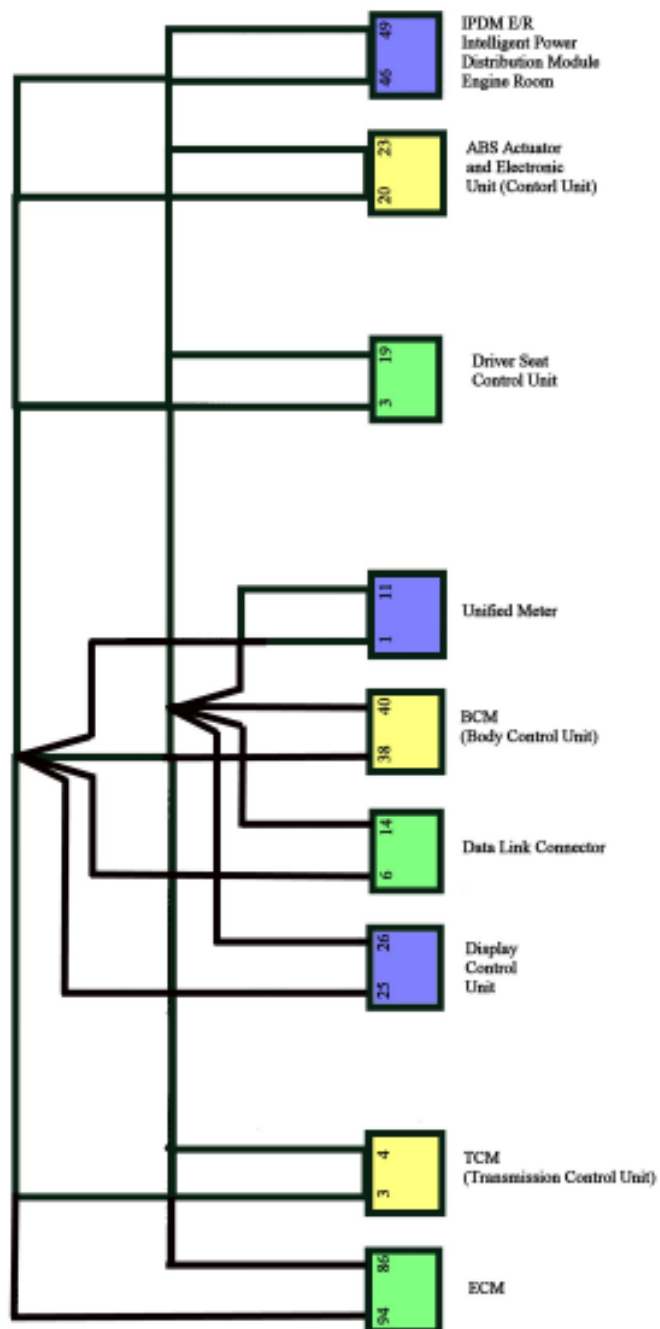
CAN Communication (continued)

Signals	ECM	TCM	Display control unit	Display unit	BCM	Unified meter and A/ C amp.	Driver seat control unit	ABS actuator and electric unit (control unit)	IPDM E/R
Front wiper request signal					T				R
Front wiper stop position signal					R				T
Rear window defogger switch signal					T				R
Rear window defogger control signal	R		R	R					T
Hood switch signal					R				T
Theft warning horn request signal					T				R
Horn chirp signal					T				R
ABS warning lamp signal						R		T	
Brake warning lamp signal						R		T	
System setting signal			T	T	R		R		
			R	R	T		T		
Distance to empty signal			R	R		T			
Seat belt buckle switch signal					R	T			
Parking brake switch signal					R	T			
A/T self-diagnosis signal	R	T							
Electric throttle control signal	T	R							
Engine and A/T integrated control signal	T	R							
	R	T							
Accelerator pedal position signal	T							R	
P range signal		T					R	R	
R range signal		T					R		
Stop lamp switch signal		R				T			
TCS operation signal	R	R						T	
Input shaft revolution signal	R	T							
Output shaft revolution signal	R	T							
ASCD operation signal	T	R							
ASCD OD cancel request	T	R							
SLIP indicator lamp signal						R		T	
A/T CHECK indicator lamp signal		T				R			
A/T position indicator lamp signal		T				R			
A/T shift schedule change demand signal		R						T	
Manual mode indicator signal		T				R			

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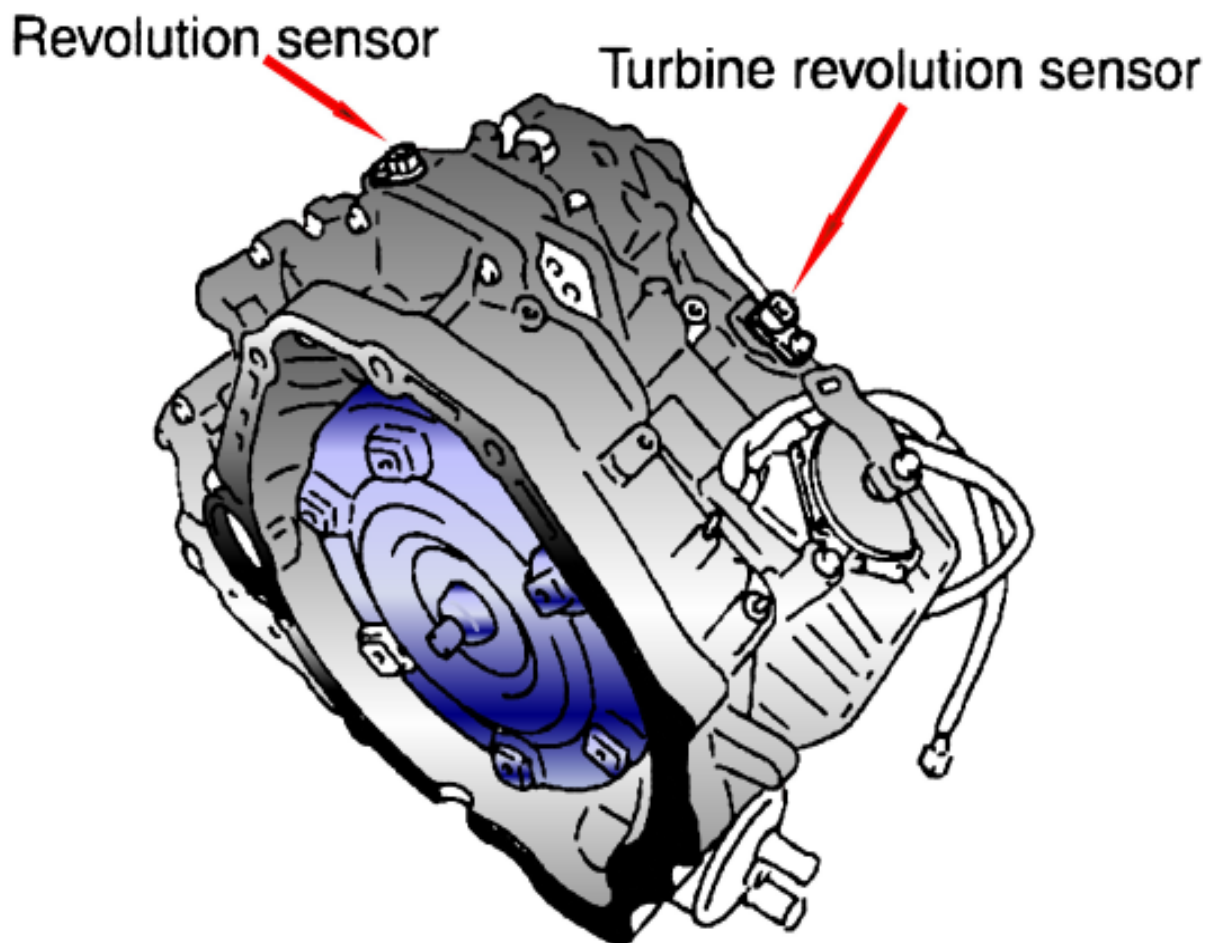
CAN Communication (continued)

CAN System (TYPE 16)



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Revolution and Turbine Speed Sensor ID and Testing



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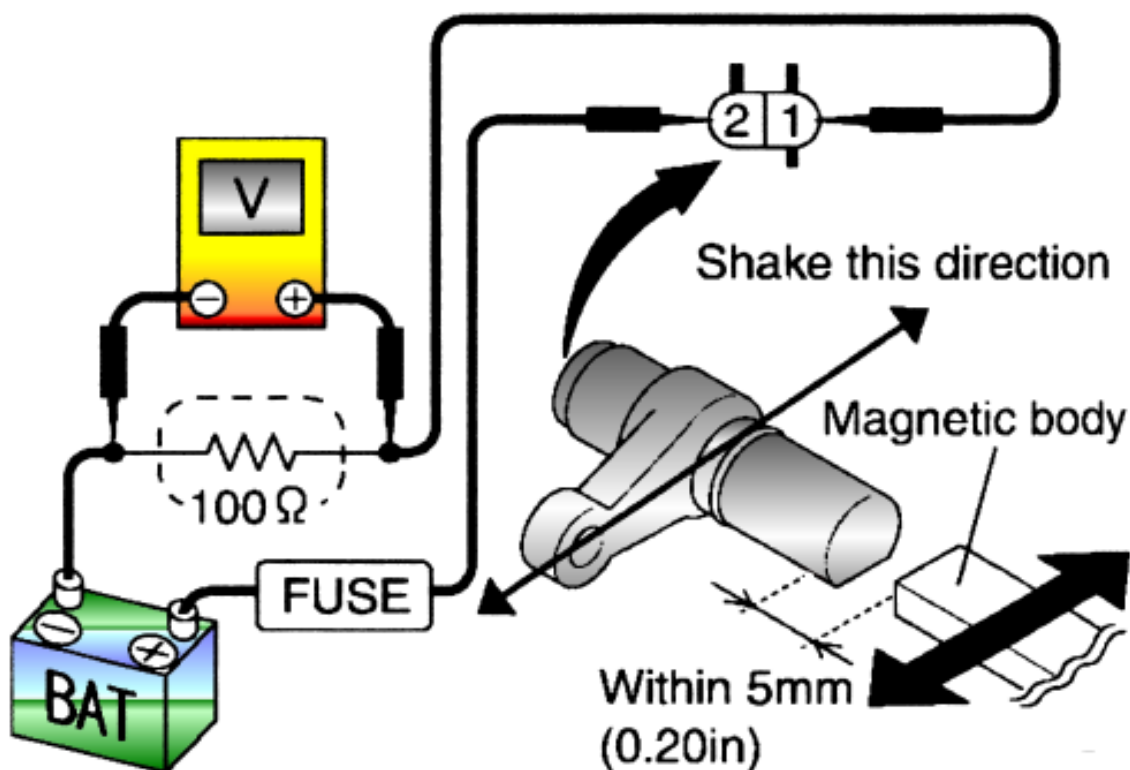
Revolution and Turbine Speed Sensor ID and Testing

When a piece of magnetic metal (iron) is waved back and forth as illustrated, measured voltage should toggle between a high reading of 1.2 – 1.6 volts, and a low reading of 0.4- 0.8 volts. These sensors are not pulse generators, they must have voltage to operate properly.

100 ohm Resistor

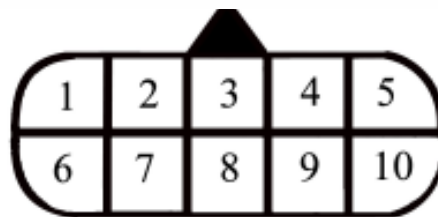
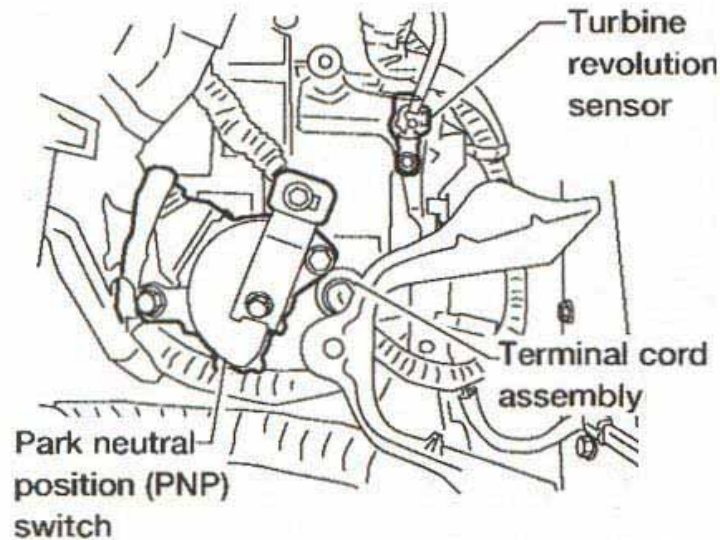
Radio Shack Part Number

271-1311



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Park/Neutral Position Switch Testing

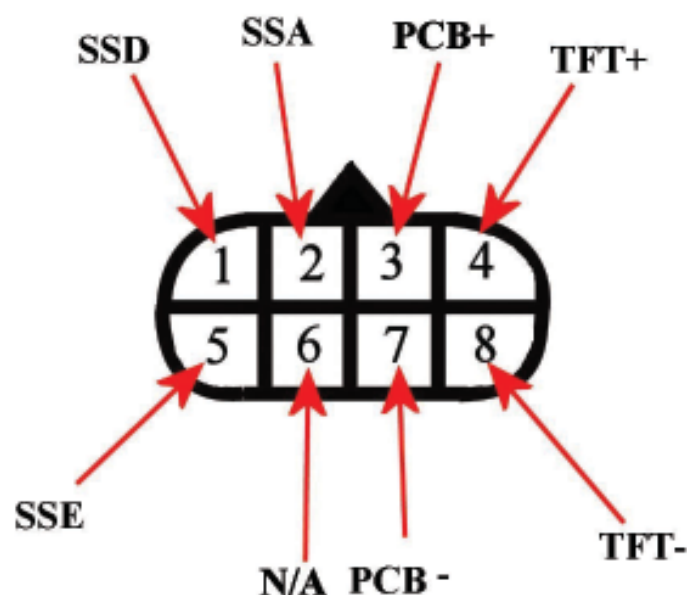


Circuit	Starter		Reverse		Position				
	+	-	+	-	-	A	B	C	PA
Terminal No.	5	1	2	4	6	9	10	7	8
Lever position									
P	○—○				○—○				○
R			○—○		○—○	○			
N	○—○				○		○		○
D					○		○—○		

○—○ : Continuity

Nissan

Solenoid and A/T Temperature Sensor Testing



Solenoid Resistances

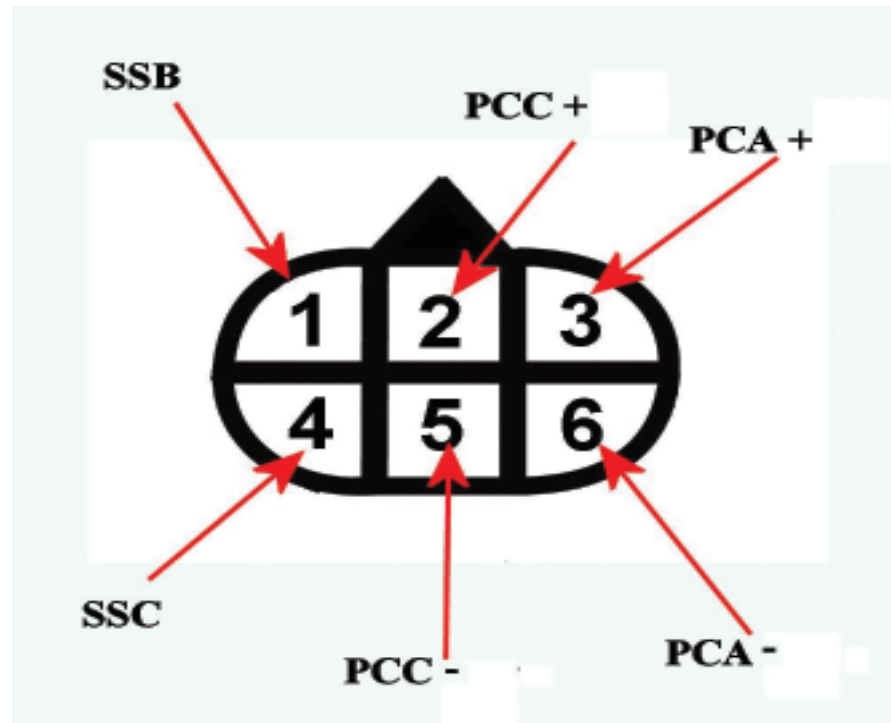
Solenoid	Resistance	Measure between:
SSA	11-16 ohms	2 and ground
SSD	11-16 ohms	1 and ground
SSE	11-16 ohms	5 and ground
PCB	5.0 – 5.6 ohms	3 and 7

A/T Fluid Temperature Sensor Readings

Temperature	Resistance (unplugged)	Voltage (plugged in)
0°C (32°F)	9.8 k	4.0 volts
20°C (68°F)	4.2 k	3.0 volts
80°C (176°F)	0.54 k	0.8 volts
100°C (212°F)	0.31 k	0.5 volts

Nissan

Solenoid and A/T Temperature Sensor Testing (continued)



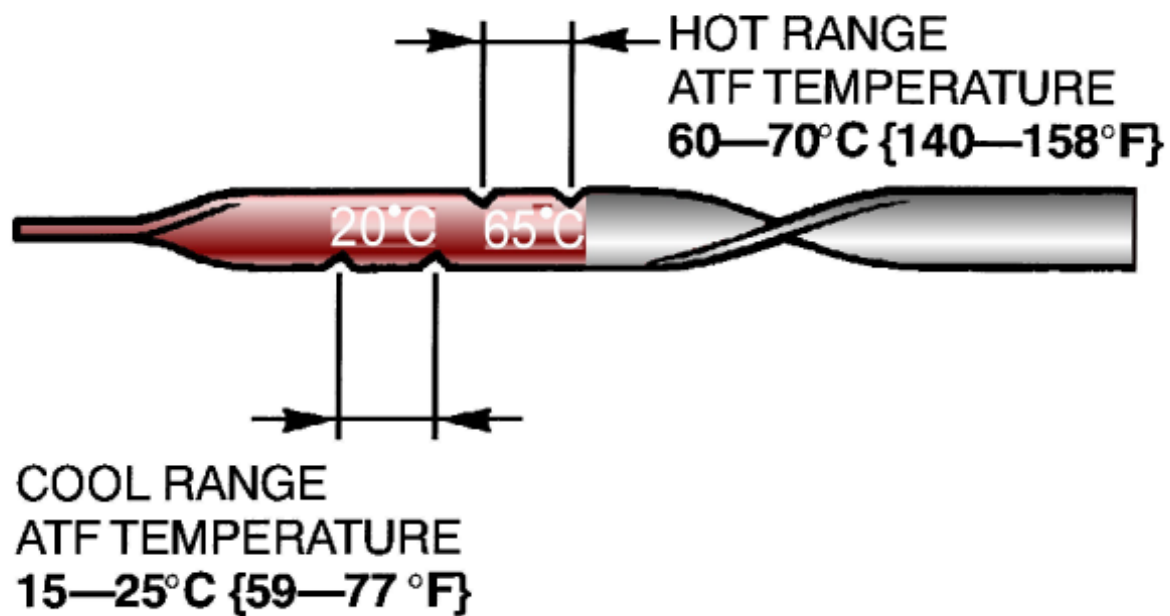
Solenoid Resistance

Solenoid	Resistance	Measure between:
SSB	11-16 ohms	1 and ground
SSC	11-16 ohms	4 and ground
PCA	5.0-5.6 ohms	3 and 6
PCC	5.0-5.6 ohms	2 and 5

Nissan

Fluid Fill/Check Procedure

Nissan: Nissan Matic-K (P/N 999MP-MTK00P)



AXIOM™

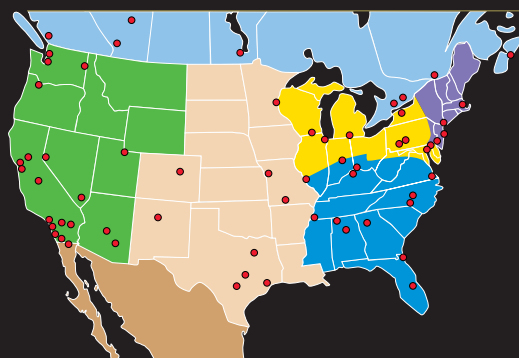
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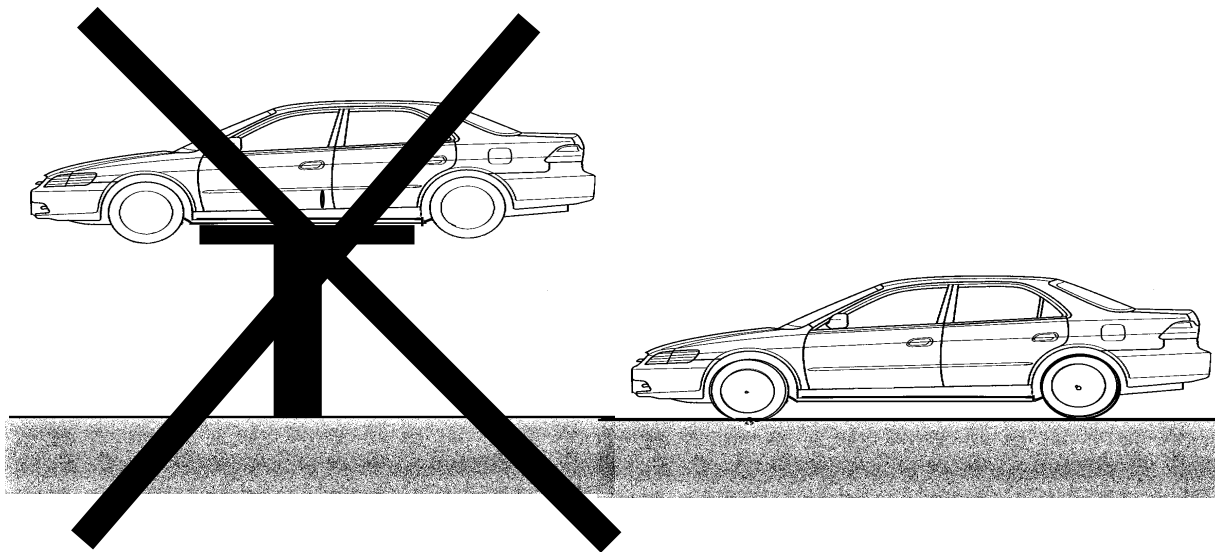
Honda Section

BAXA, MAXA and B7XA

ATRA Bulletin #634

No 2-3 Shift On the Rack After Rebuild

Many times after rebuild a no 2-3 shift is discovered. The computer strategy does not allow a successful 2-3 shift with the wheels off of the ground. It may be possible to shift the transmission manually to get the 2-3 shift. The transmission may shift erratic during the initial road test.



INCORRECT

CORRECT

Acura

1995-2004 Vehicle Applications

Transaxle Model	Vehicle Model
A6VA	1997 2.2CL
B6VA	1998 – 1999 2.3CL
B7ZA / M7ZA	1997 – 1999 3.0CL
BGFA / MGFA	2001 – 2003 3.2CL
M5DA	1996 – 3.5RL
M1WA	1995 – 1998 2.5 TL
M5HA	1996 – 1998 3.2TL
B7VA (4 speed)	1999 3.2TL
B7VA (5 speed)	2000 3.2TL
B7WA	2001 -3.2TL
MGHA	2001 -MDX
S4XA	1996 – 1999 Integra
SKWA	2000 – 2001 Integra
MRMA	2002 - RSX
MR9A	1991 – 2002 NSX

Honda

1995-2004 Applications

Transaxle Model	Vehicle Model
A4RA / B4RA / M4RA	1996 – 2000 Civic
BMXA	2001 – 2004 Civic
M4VA (CVT)	1996 – 2000 Civic HX
MLYA (CVT)	2001 Civic
SZCA (CVT)	Civic Hybrid
BAXA / MAXA	1998 – 2002 Accord 4
MCLA	2003 – Accord 4
B7XA	1998 – 2002 Accord V6
BAYA / MAYA	2003 – Accord V6
M6HA	1997 – 2001 Prelude
MPJA	1995 – 1997 Odyssey
MDWA	1998 Odyssey
B7TA / B7VA	1999 – 2001 Odyssey
BYBA	2002 Odyssey
MDMA / SDMA /	1997 – 2001 CRV
MCVA / MRVA	2002 – CRV
MHTA	2001 - Insight

Honda/Acura

General Information

The following pages are procedures that need to be performed during every repair. Diagnosing Honda/Acura transmissions can be difficult and time consuming especially when a problem was never found and/or was created during the overhaul. These procedures were developed and tested to help reduce comebacks.

Pressure testing

All Applications

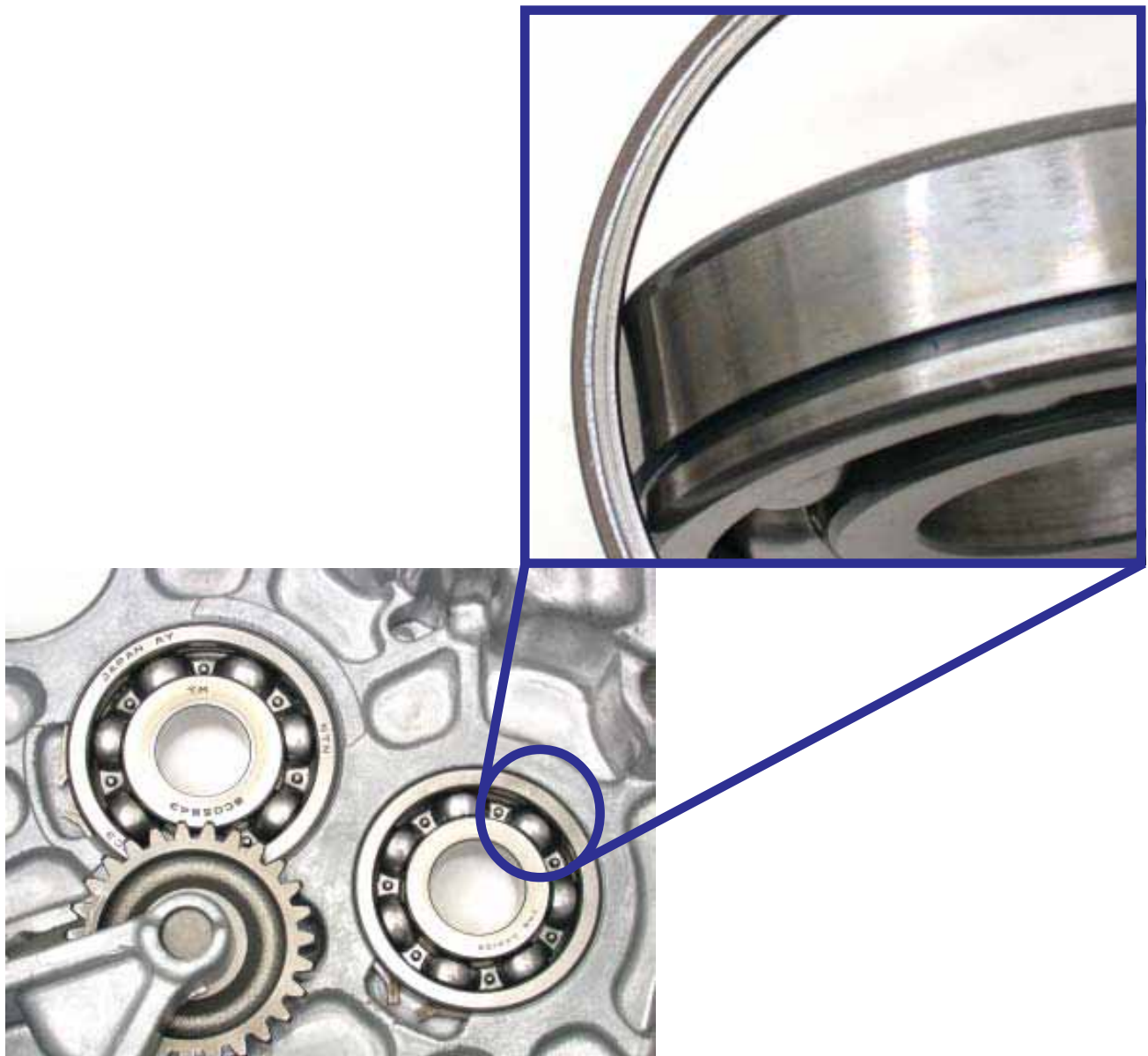
Standard mechanical gauges will work for checking line pressure, however if you use a mechanical gauge, the accumulation effect of the gauge and rubber hose can cause flares or mask harsh shifts when connected to a clutch pressure port. It is best to use transducer type electronic gauges for clutch pressures.



Shaft Bearing Snaprings

General Information

Always remove the bearings from the case and carefully inspect snaprings for wear. Excessive wear allows shaft movement which can cause noise problems and shaft tube retainer/end cover damage.



Clutch Packs

General Information (continued)

Check for wear on the bottom steel plate of each clutch pack

The cushion plate will often wear into the bottom steel plate. This will increase clutch pack clearance, and decrease the cushioning effect on clutch apply. If the groove is more than 0.005" deep, replace the steel plate.

Steel plate finish:

Improper Steel plate finish can cause shift quality problems. The factory finish on an unused steel plate is NOT a mirror finish. It looks more like a scratchy surface.

Shift Concerns:

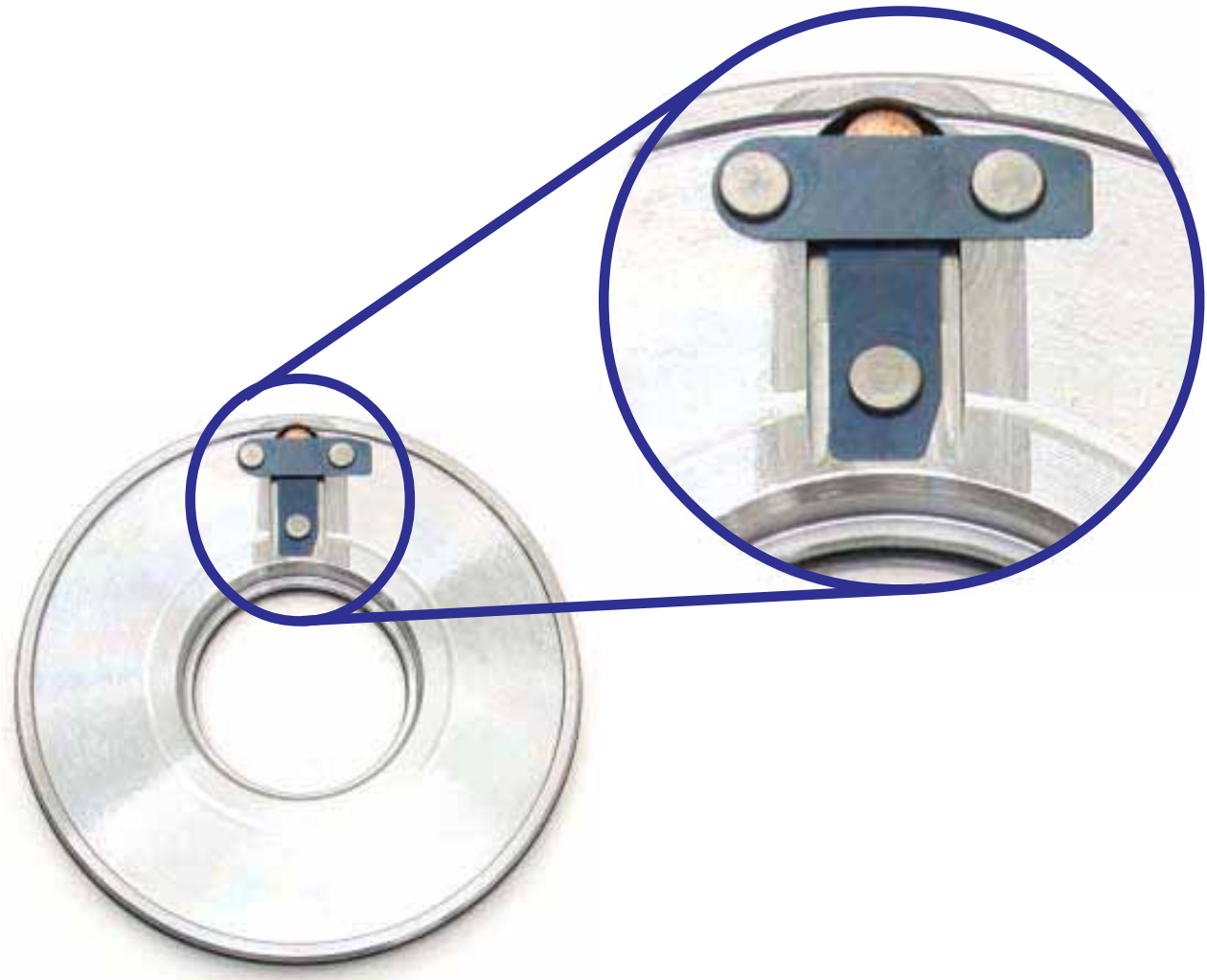
1. Slide Bump
2. Shudder
3. Groan
4. Grunt
5. Squawk



Piston Flapper Valves

Clean and Inspect

Carefully clean the piston flapper valve with solvent and compressed air. Closely inspect the flapper valve for contamination, such as clutch fibers or metal debris stuck behind the “flapper”.



All Drums

Drum cracks are a common failure on many units and are most common on Civic units. Inspect the Drums for cracks and Steel Plate lug wear.



Seals

Torque Converter and Axle Seals are Directional

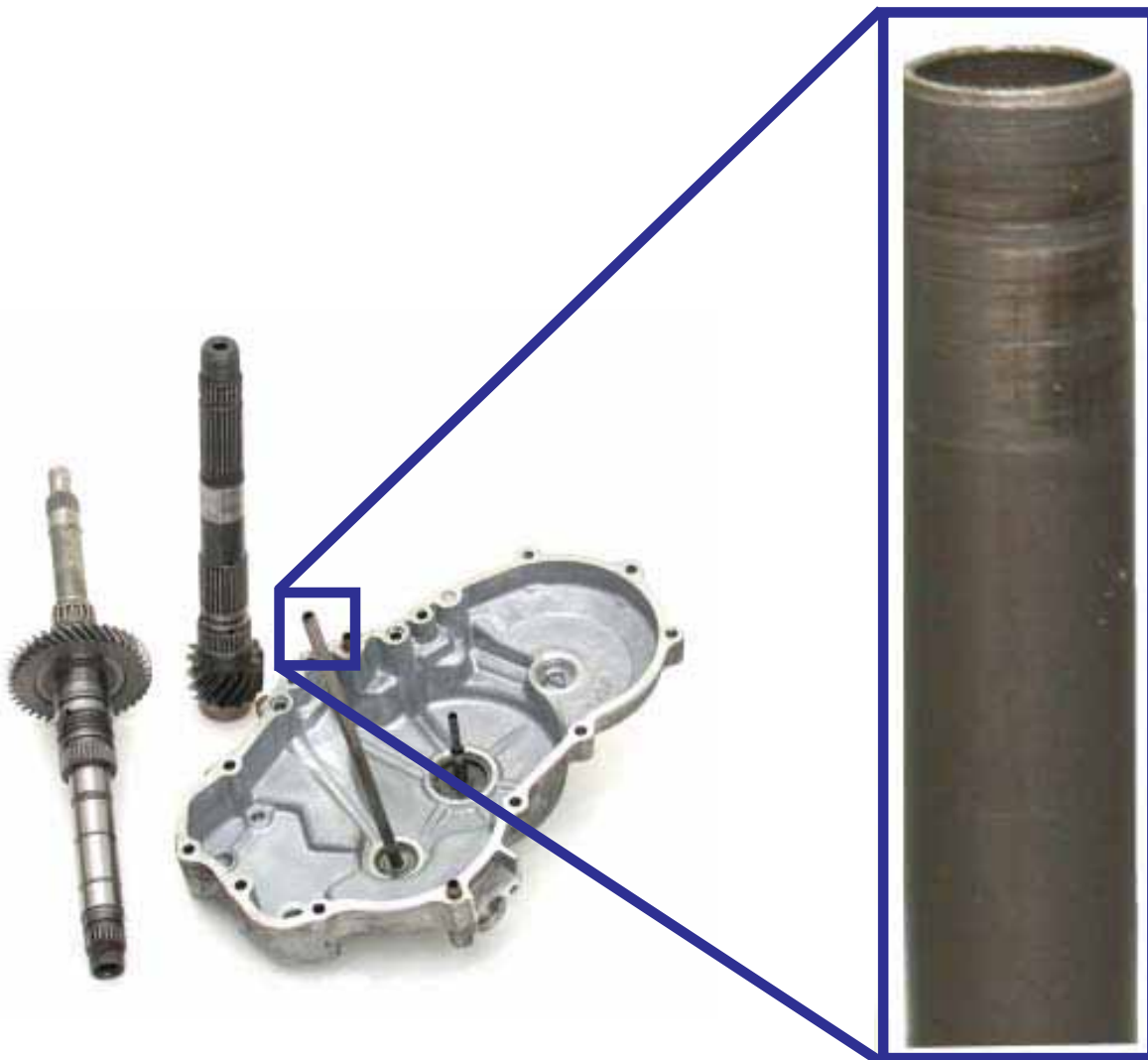
Most Honda seals have an arrow showing the correct rotation. On 4-cylinder applications the torque converter seal has an arrow pointing counter clockwise, on V6 applications the arrow points clockwise.



Shaft Bushings and Tubes

Closely Inspect the Tube Ends for any Signs of Wear or Scoring

A slight polishing or marking on the end of the tube where the shaft bushing rides is acceptable. If any scoring, grooves or wear is present, replace both the tube and the bushing.



Shaft Bushings and Tubes

Check the Tube to Bushing Clearance with “Scotch” Type Tape

1. With a pair of scissors, cut a narrow (1/16") strip of “Scotch” or similar type plastic tape (about 0.002" thick).
2. Lay the piece of tape lengthwise at the end of the tube, leaving some of the tape hanging off of the end of the tube.
3. Fold the loose end of the tape in slightly so it will lead itself into the shaft bushing.
4. Insert the tube into the shaft, taped end first.

The tube should not fit into the bushing with the piece of tape on it. If it will fit into the bushing (without excessive force), the bushing or tube are worn and need to be replaced.



Valve Body

Correct End Plug Installation

Be very careful during disassembly and reassembly of the valve body. If these plugs are installed incorrectly many different shift concerns will occur depending on what plug is installed incorrectly.

This end faces out (away from the valve)



This end faces in (towards valve/spring)



Manual Code Retrieval

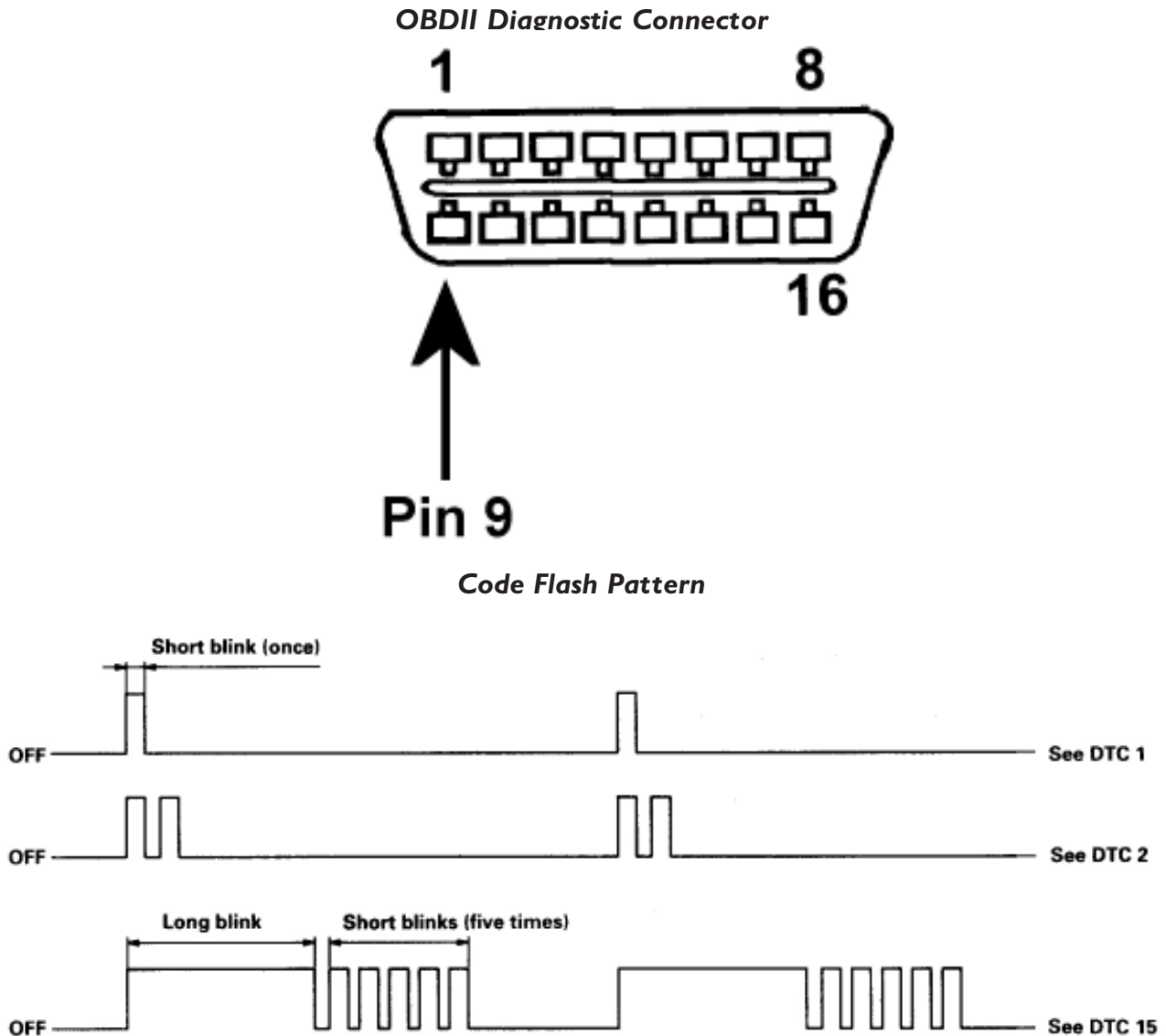
OBDII Diagnostics

Code Retrieval:

On later OBDII vehicles, the two pin service check connector was deleted. If the vehicle does not have a service check connector, ground pin 9 (brown wire) at the OBDII connector to flash transmission codes out of the D, D4, or D5 light.

Clear Codes:

Remove BACK-UP fuse (7.5Amp) from under dash or underhood fuse/relay box for 10 seconds, or use scan tool to clear codes.



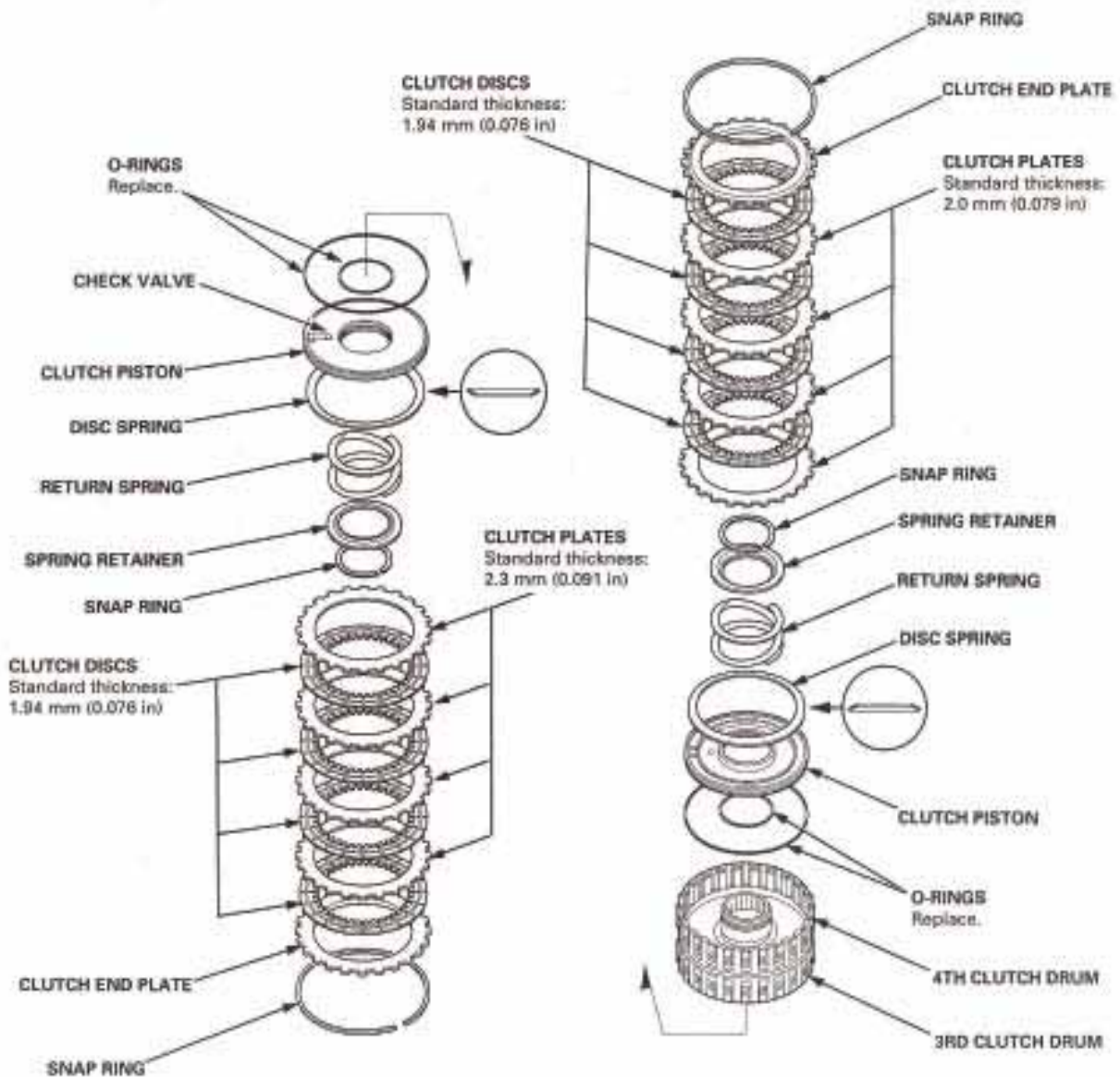
DTC Definitions

Flash	OBDII DTC	Indicator light	Definition
1	P1753	Yes	Lock-up Solenoid Valve A circuit fault
2	P1758	Yes	Lock-up Solenoid Valve B circuit fault
3	P1790	Yes	Throttle Position Sensor fault
4	P1791	Yes	VSS signal fault
5	P1705	Yes	A/T Gear Position Switch fault (short)
6	P1706	No	A/T Gear Position Switch fault (open)
7	P0753	Yes	Shift Control Solenoid A circuit fault
8	P0758	Yes	Shift Control Solenoid B circuit fault
9	P0720	Yes	Countershaft Speed Sensor (NC) signal fault
10	P1792	Yes	Engine Coolant Temperature Sensor signal fault
11	P0725	Yes	Engine Speed Signal fault
12	P1793	Yes	MAP sensor signal fault
13	P1794	Yes	Barometric Sensor signal fault
14	P1786	Yes	FAS signal fault (ECM to TCM)
15	P0715	Some models before 1998 will not flash indicator light	Mainshaft Speed Sensor (NM) signal fault Note: this code can be caused by a transaxle performance problem (slipping, incorrect gear, etc.)
16	P1768	Yes	Linear Solenoid circuit fault A/T Clutch Pressure Control Solenoid A circuit fault
18	P1787	No	FFS signal fault (ECM to TCM)
22	P0763	Yes	Shift Control Solenoid C circuit fault
23	P1773	Yes	A/T Clutch Pressure Control Solenoid B circuit fault
24	P1709	Yes	A/T Shift Switch circuit fault (manual upshift/downshift switch)
25	P1738	No	2nd Clutch Pressure Switch signal fault
26	P1739	No	3rd Clutch Pressure Switch signal fault
27	P1740	No	4th Clutch Pressure Switch signal fault
28	P0710	Yes	ATF Temperature Sensor signal fault
29	P1778	Yes	A/T Lock-up Pressure Control Solenoid circuit fault
30	P1870	Yes	Shift Control Linear Solenoid circuit fault
31	P1873	Yes	PH – PL Control Linear Solenoid circuit fault
32	P1879	Yes	Start Clutch Control Linear Solenoid circuit fault
33	P1882	Yes	Reverse Inhibitor Solenoid circuit fault
34	P1885	Yes	Drive Pulley Speed Sensor signal fault
35	P1886	Yes	Driven Pulley Speed Sensor signal fault
36	P1888	Yes	Secondary Gear Shaft Speed Sensor signal fault
37	P1655	Yes	TMA or TMB signal fault (Civic CVT) SEAF or SEFA signal fault (Prelude) Note: Prelude will not flash code 37 from indicator light
40	P0740	No	Lock-up control system fault
41	P0730	No	Shift control system fault
42	P1890	Yes	Shift control system fault
43	P1891	Yes	Start clutch control system fault
45	P0780	Yes	Mechanical problem in hydraulic system
46	P1750	Yes	Mechanical problem in hydraulic system
47	P1751	Yes	Mechanical problem in hydraulic system
63	P1710	No	1st Hold Switch signal fault

BAXA/MAXA/B7XA Family

Poor Shift Quality After Overhaul

Cushion Plate Direction



3rd and 4th Clutch Drums

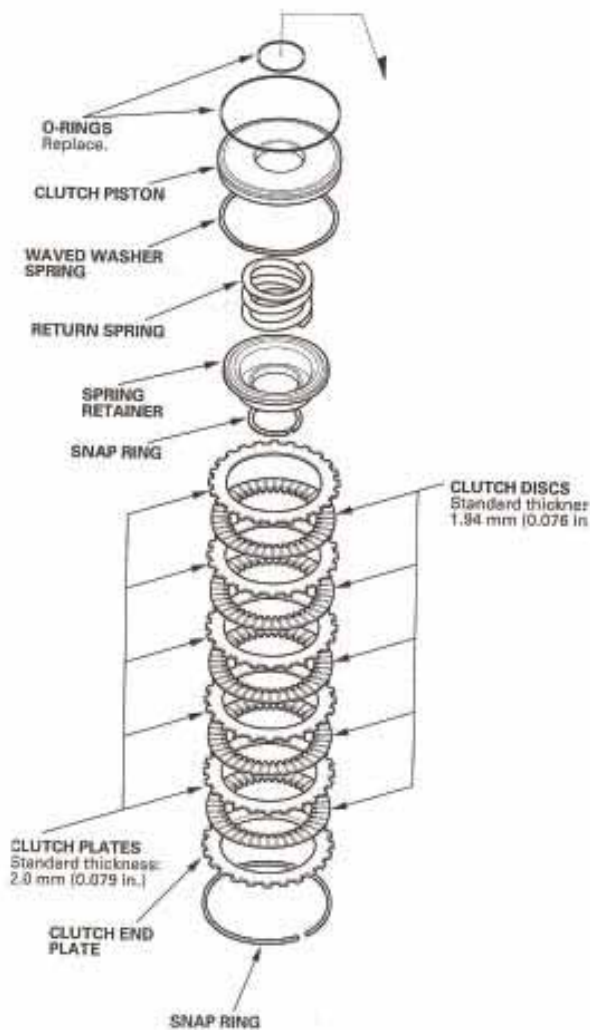
BAXA/MAXA/B7XA Family

Poor Shift Quality After Overhaul

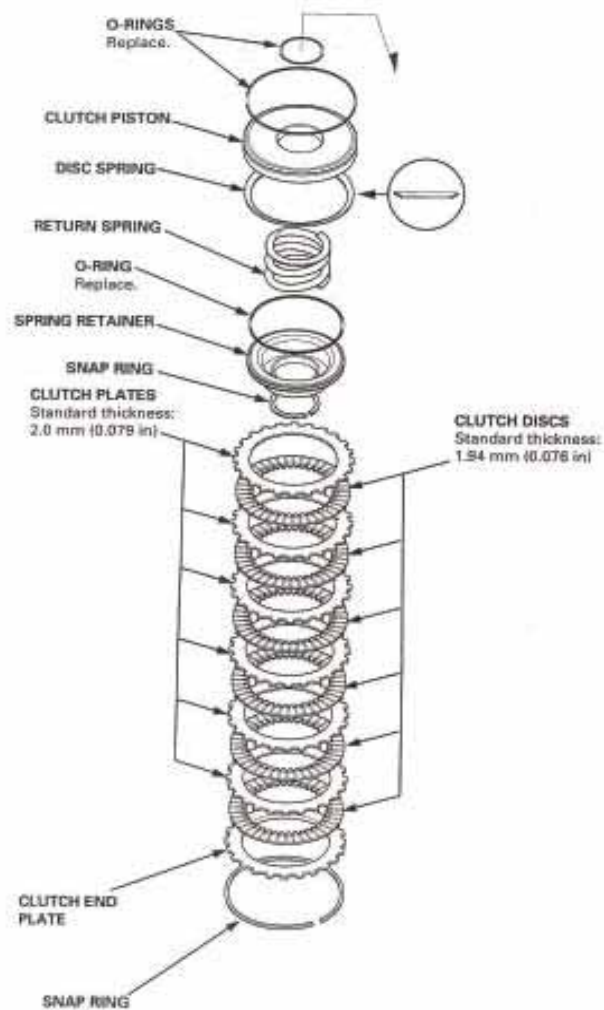
Cushion Plate Direction

Some units use a wave type cushion plate and others use a dish type cushion plate

Wave Plate Design



Dish Plate Design

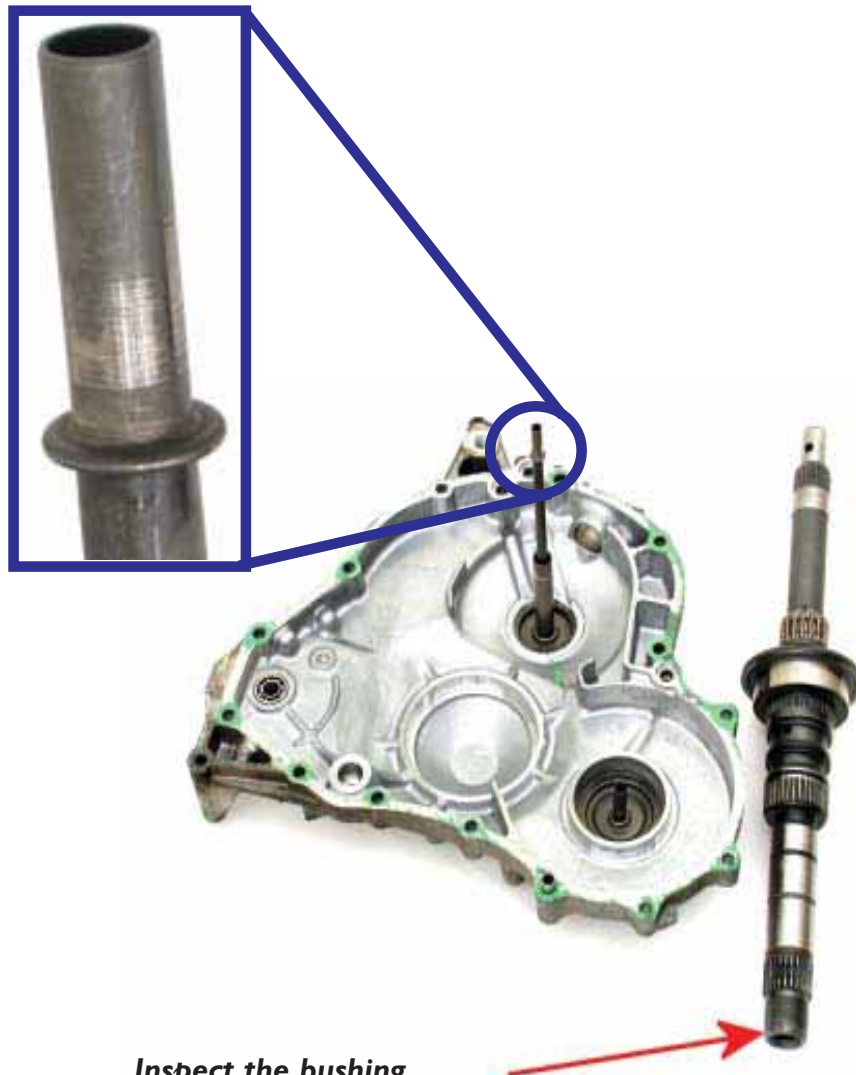


1st Clutch Drum

Bindup in Reverse

Worn Feed Tube and Bushing

A worn mainshaft bushing or pipe may cause crossleaks between the 3rd clutch and 4th clutch assemblies. Install a pressure gauge on the 3rd clutch pressure port. Stall test the transmission in Reverse, there should be NO pressure in the 3rd clutch pressure tap.



*Inspect the bushing
with tape as previously
discussed*

Gear Noise/Whine

Noise in 1st and 2nd Gear

MAXA, BAXA, B7XA, B7VA, B7TA 4 Cylinder and V6 Applications

Be careful when pulling the retainer assembly. If the puller bolts are installed too deep they can damage the thrust bearing surface below the ball bearing.



WARNING: Bolts should not be impacted into the retainer assembly. Impacting your puller bolts into the retainer will cause the lip of the retainer to rise at the arrow points shown. This will cause bearing damage.

Gear Noise/Whine

Noise in 1st and 2nd Gear (continued)

MAXA, BAXA, B7XA, B7VA, B7TA 4 Cylinder and V6 Applications

Make sure the transfer gear is installed correctly. The step on the gear needs to be installed towards the threaded end of the shaft.

The step must face the threaded end of the shaft



Gear Noise/Whine

Noise in 1st and 2nd Gear (continued)

4 cylinder models

Make sure the Reverse Idler Gear is installed correctly. The ridge on the gear must face up during installation as shown in the picture below.

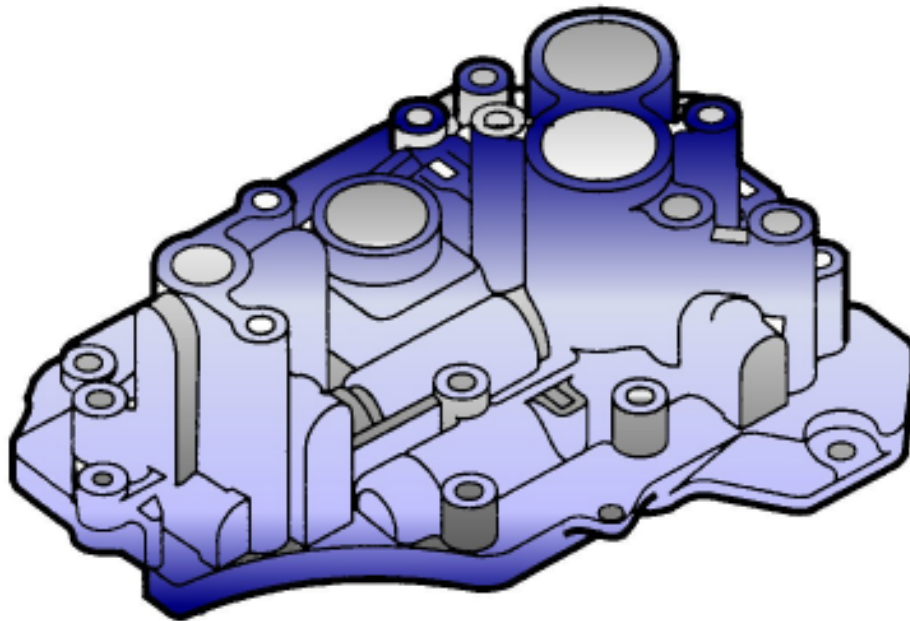


B7TA/B7XA

Popping / Snapping / Grinding in Reverse

Some B7TA and B7XA transaxles in 1998 – 2000 Honda Accords and 1999 – 2000 Honda Odysseys may make a snapping, popping, or grinding noise in reverse, especially under acceleration. This is caused by the Servo Bore depth being machined incorrectly by the factory.

The Factory has an updated design servo valve body: Honda part number 27400-P7X-A50



CPC Solenoid Feed Pipes

V6 Units

During the rebuild make sure you install all of the pipes in there proper locations. Often times during the rebuild the CPC Solenoid feed pipe is not installed correctly or not installed at all.

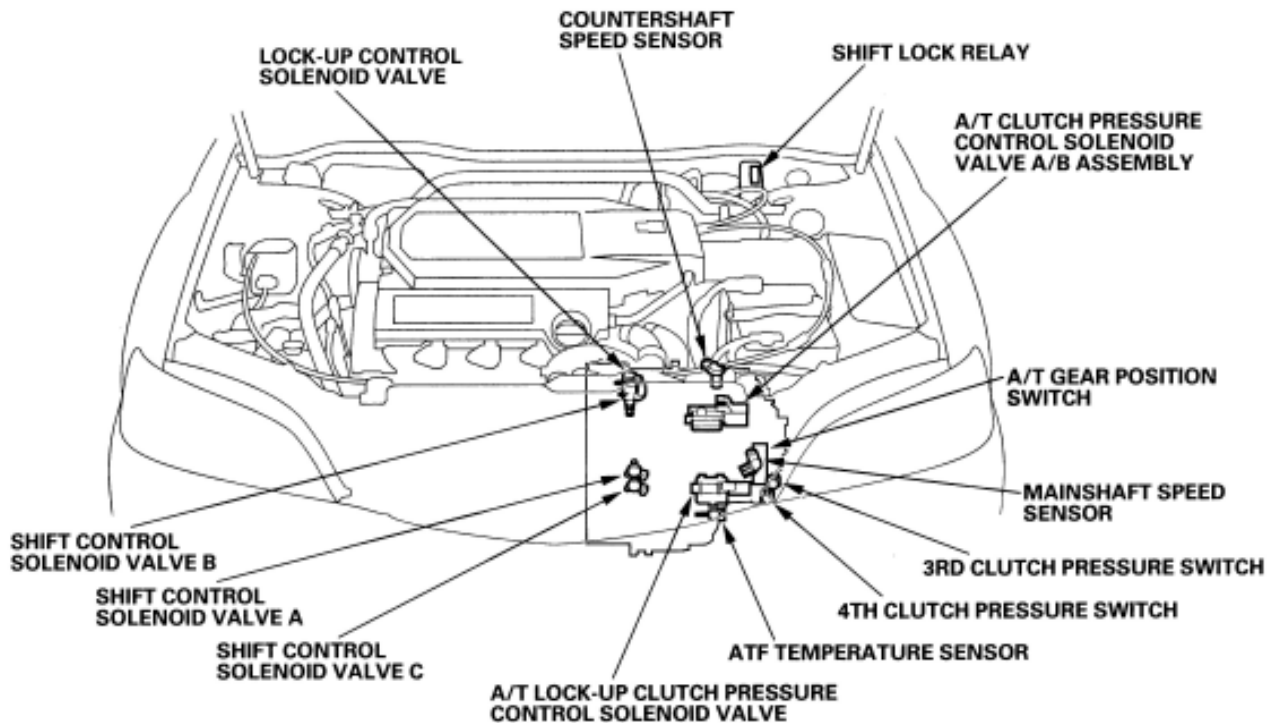
CPC Feed Pipes



External Components

5 Speed V6 Electrical Component ID

Use this chart to identify the components you are working on. Make sure the components are connected to the correct harness plugs.



Solenoid	V6 Wire Colors
Torque Converter Clutch Solenoid Valve	Yellow and Black
Shift Control Solenoid Valve A	Blue/Yellow and Black
Shift Control Solenoid Valve B	Green/White and Black
Shift Control Solenoid Valve C	Green and Black

MCLA

No Reverse Condition

2003 Accord 4 Cylinder

2003 Accord 4 cylinder can develop a no reverse condition if the transmission is shifted between forward and reverse several times, and wheel speeds exceeding 12 mph (such as when the vehicle is stuck in snow). This is due to a programming problem causing the PCM to get stuck in reverse inhibit mode.

Have a dealer reprogram the PCM according to Honda TSB 03-042

2003 Accord 4 cylinder 2 door	From VIN 1HGCM7...3A000001 Thru VIN 1HGCM7...3A023877
2003 Accord 4 cylinder 4 door	From VIN 1HGCM5...3A000001 Thru VIN 1HGCM5...3A080789
2003 Accord 4 cylinder 4 door	From VIN 3HGCM5...3G700001 Thru VIN 3HGCM5...3G705659
2003 Accord 4 cylinder 4 door	From VIN JHMCM5...3C000001 Thru VIN JHMCM5...3C077295

Updated vehicles will have a punch mark above the 9th character of the engine compartment VIN.

Note: The PCM inhibits reverse by turning off Shift Solenoid Valve E. A quick test is to check the Shift Solenoid Valve E circuit for voltage with a DMM.

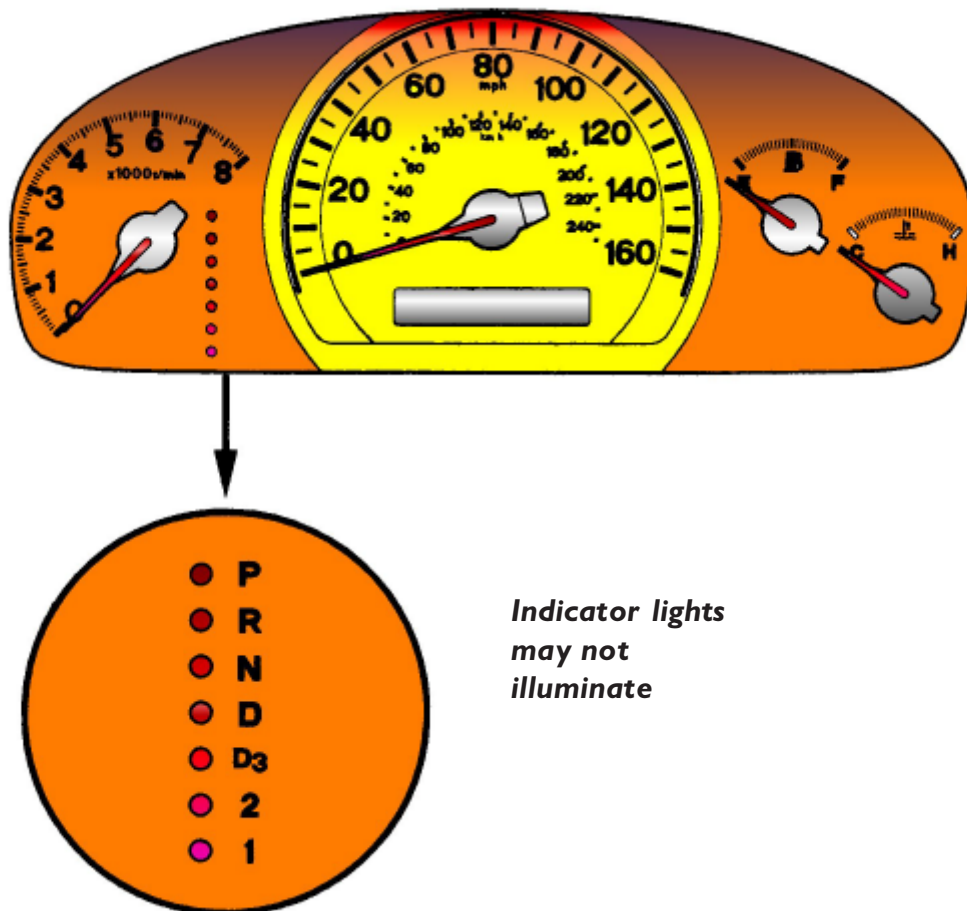
* No voltage = reverse inhibit command.

2003 Accord V6

DTC U1055, Shift Position Indicator Inoperative

2003 model year Accord V6's with DTC U1055, along with shift position indicator, cruise control, and A/C not working, may have a problem with PCM communication on the F-CAN network. There is a software update for this concern.

Have a dealer reprogram the PCM according to Honda TSB 03-072



BGFA, B7WA, B7VA 5 Speed

Replace the PCM when Installing an Overhauled or Replacement Transaxle

2000 – 2003 Acura 3.2TL and 2001 – 2003 3.2CL have an updated PCM available to improve transaxle performance and durability.

2000 – 2002 3.2TL	All
2003 3.2TL (except Type S)	From VIN 19UUA5...3A000001 Thru VIN 19UUA5...3A019556
2003 3.2TL Type S	From VIN 19UUA5...3A000001 Thru VIN 19UUA5...3A019061
2001 – 2002 3.2CL	All
2003 3.2CL	From VIN 19UYA42...3A000001 Thru VIN 19UYA42...3A005203

* To order the correct PCM, you need to know the vehicle's emission type. The dealer can scan the vehicle to retrieve the emission type.

PCM P/N	Year/Model	Emission Type*
37820-P8E-305RM	2000-01 3.2TL	KA
37820-P8E-305RM	2001 3.2CL	KA
37820-PGE-305RM	2001 3.2CL Type-S	KA, KL
37820-P8E-306RM	2000-01 3.2TL	KL
37820-P8E-306RM	2001 3.2CL	KL
37820-PJE-A62RM	2002-03 3.2TL	KA
37820-PJE-A62RM	2002-03 3.2CL	KA
37820-PGE-A58RM	2002-03 3.2TL Type-S	KA, KL
37820-PGE-A58RM	2002-03 3.2CL Type-S	KA, KL
37820-PJE-L62RM	2002-03 3.2TL	KL
37820-PJE-L62RM	2002-03 3.2CL	KL

KA = Federal

KL = California

BAYA/MAYA

2003 Accord V6 Update PCM Software

Update PCM Software when the Transaxle is Overhauled or Replaced

Updated PCM software has been developed to improve driveability and durability under certain driving conditions.

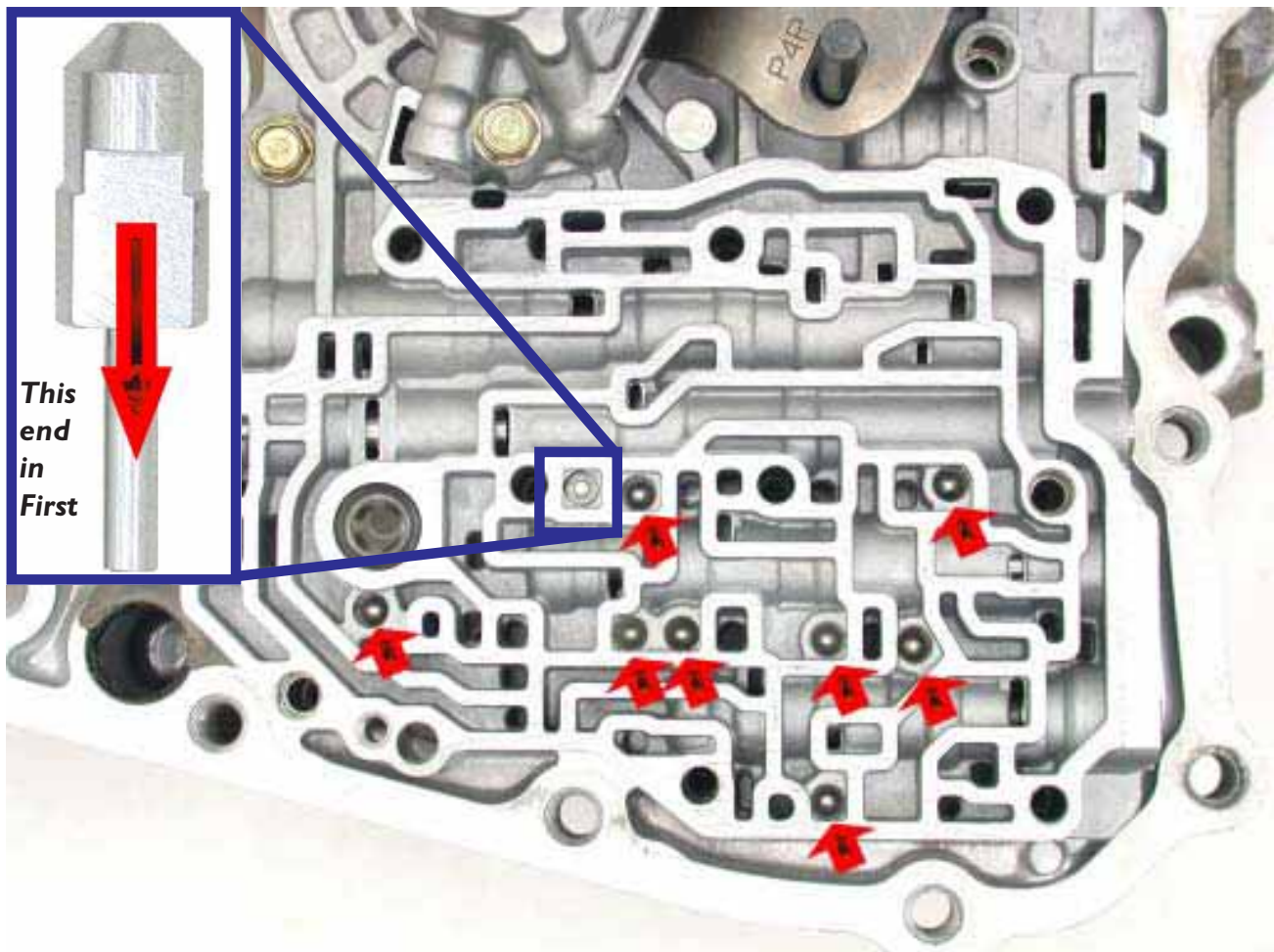
Have a dealer reprogram PCM according to Honda TSB 03-070

2003 Accord V6 4-door	From VIN 1HGCM6...3A000001 Thru VIN 1HGCM6...3A091630
2003 Accord V6 2-door	From VIN 1HGCM8...3A000001 Thru VIN 1HGCM8...3A035060

A4RA/B4RA/M4RA

1996-2000 Civic Valve Body Checkball and Relief Valve Locations

The 1st gear Accumulator Choke Valve installation is very important. If the valve is installed incorrectly, forward engagement problems may occur.



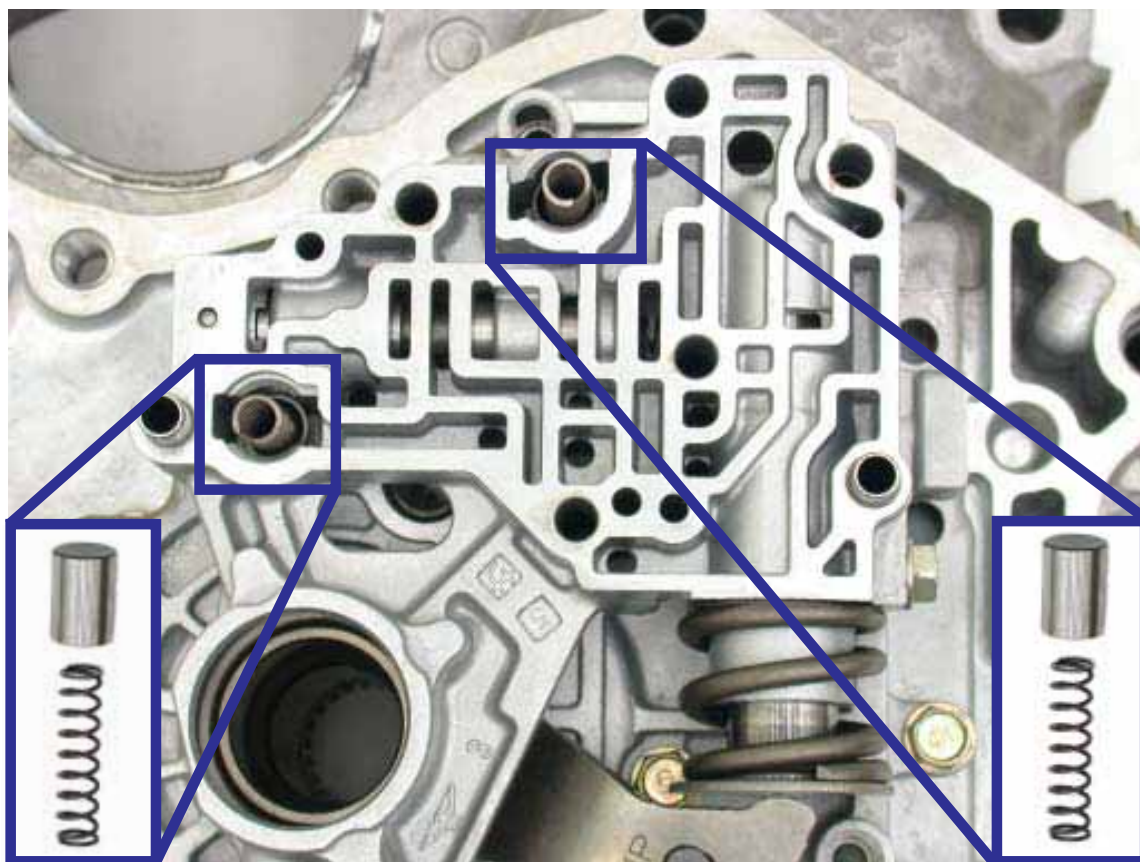
A4RA/B4RA/M4RA

1996-2000 Civic Valve Body Checkball and Relief Valve

Locations

Regulator Body

Incorrect installation of the Cooler Relief Valve and the torque converter relief valve can cause multiple problems. Always install the valve first and then the spring.



M4VA

Civic CVT External Components

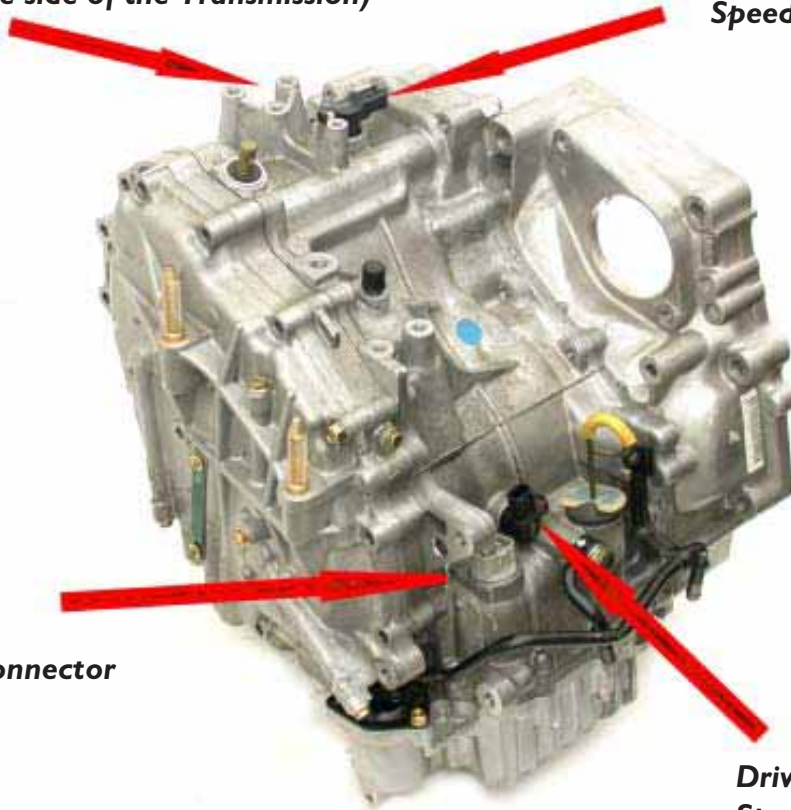
General Identification

Secondary Shaft Speed Sensor
(Located on the side of the Transmission)

**Driven Pulley
Speed Sensor**

Case Connector

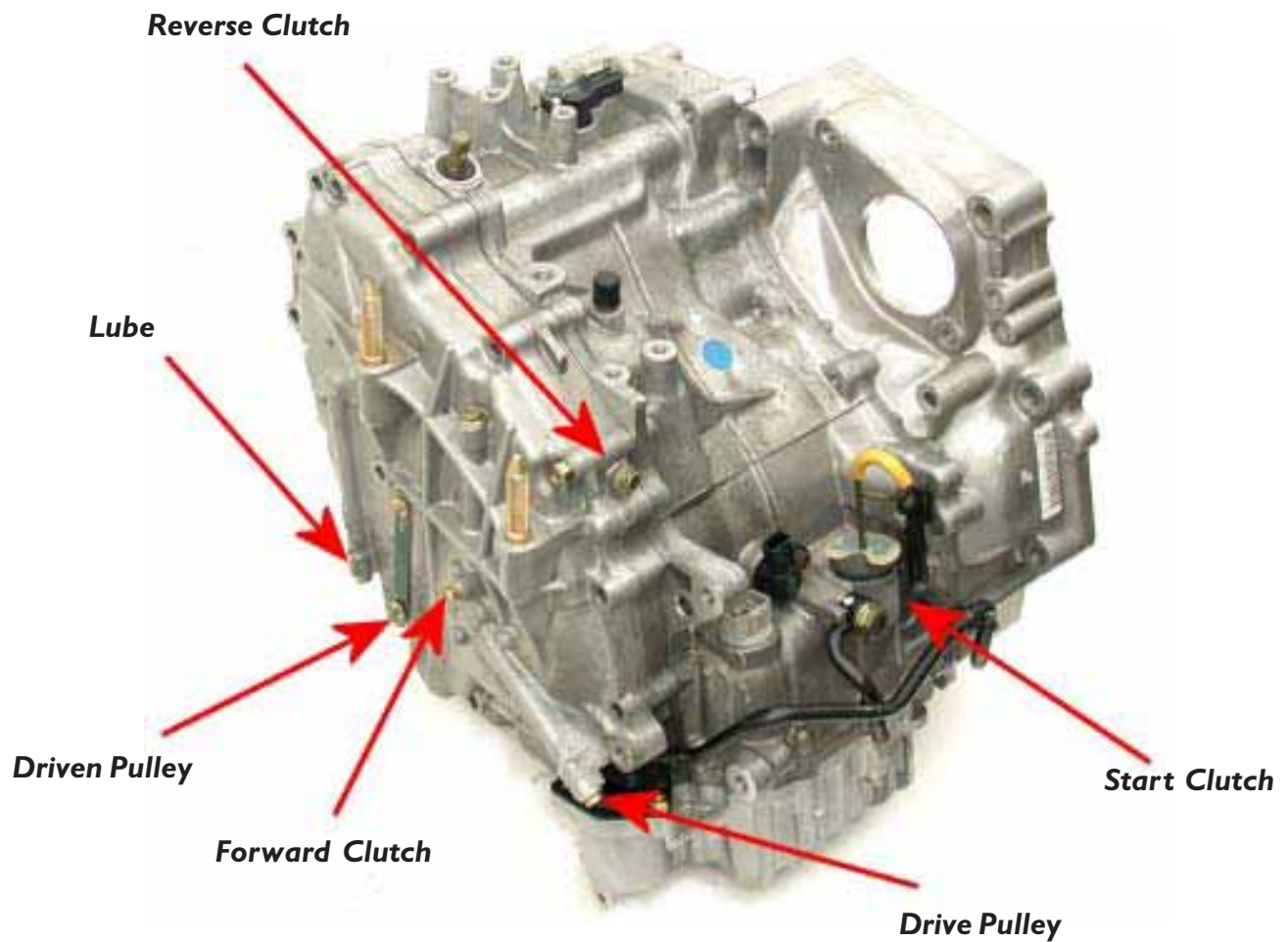
**Drive Pulley
Speed Sensor**



M4VA

Civic CVT Pressure Taps

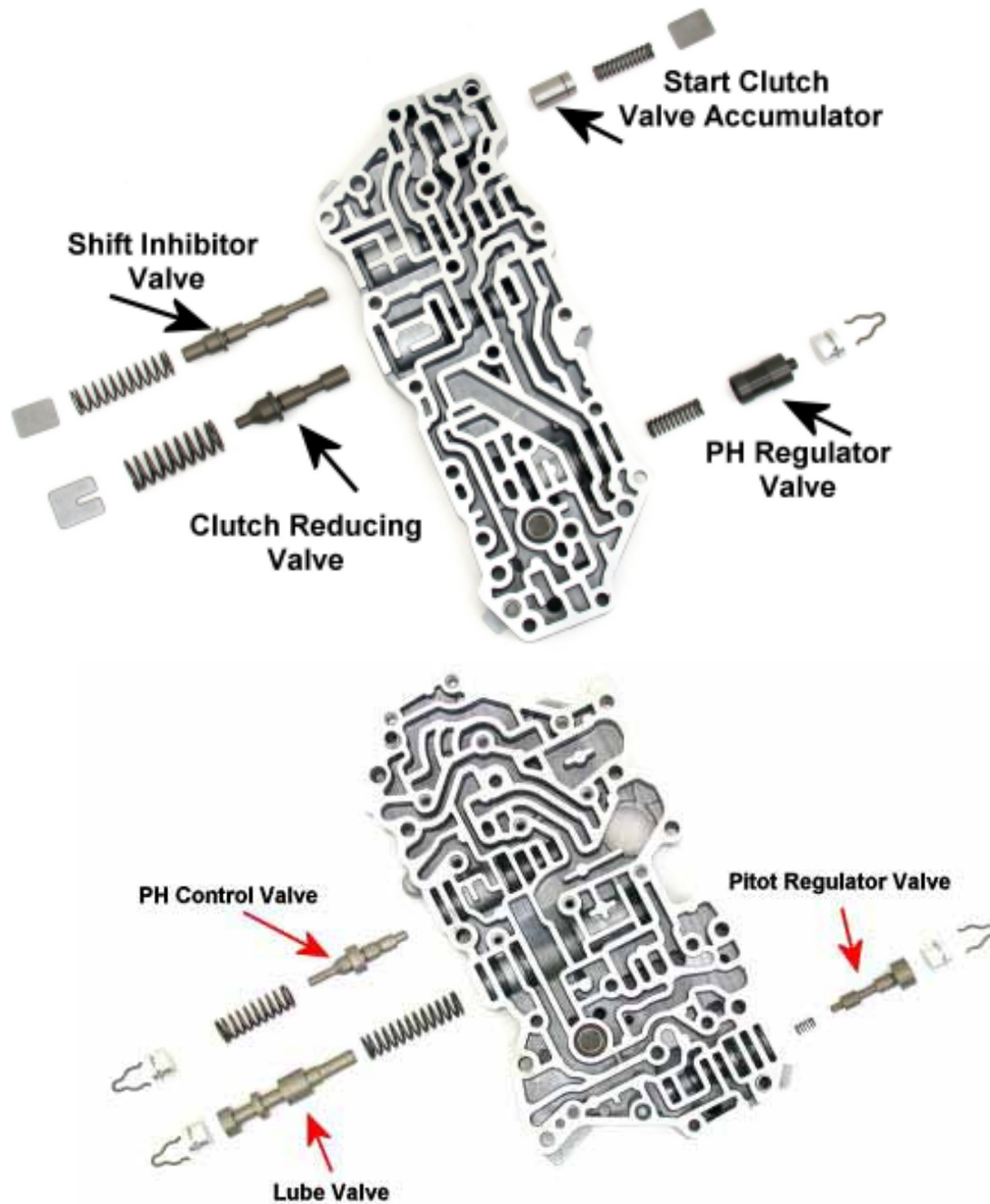
General Identification



M4VA

Valve Body Assembly

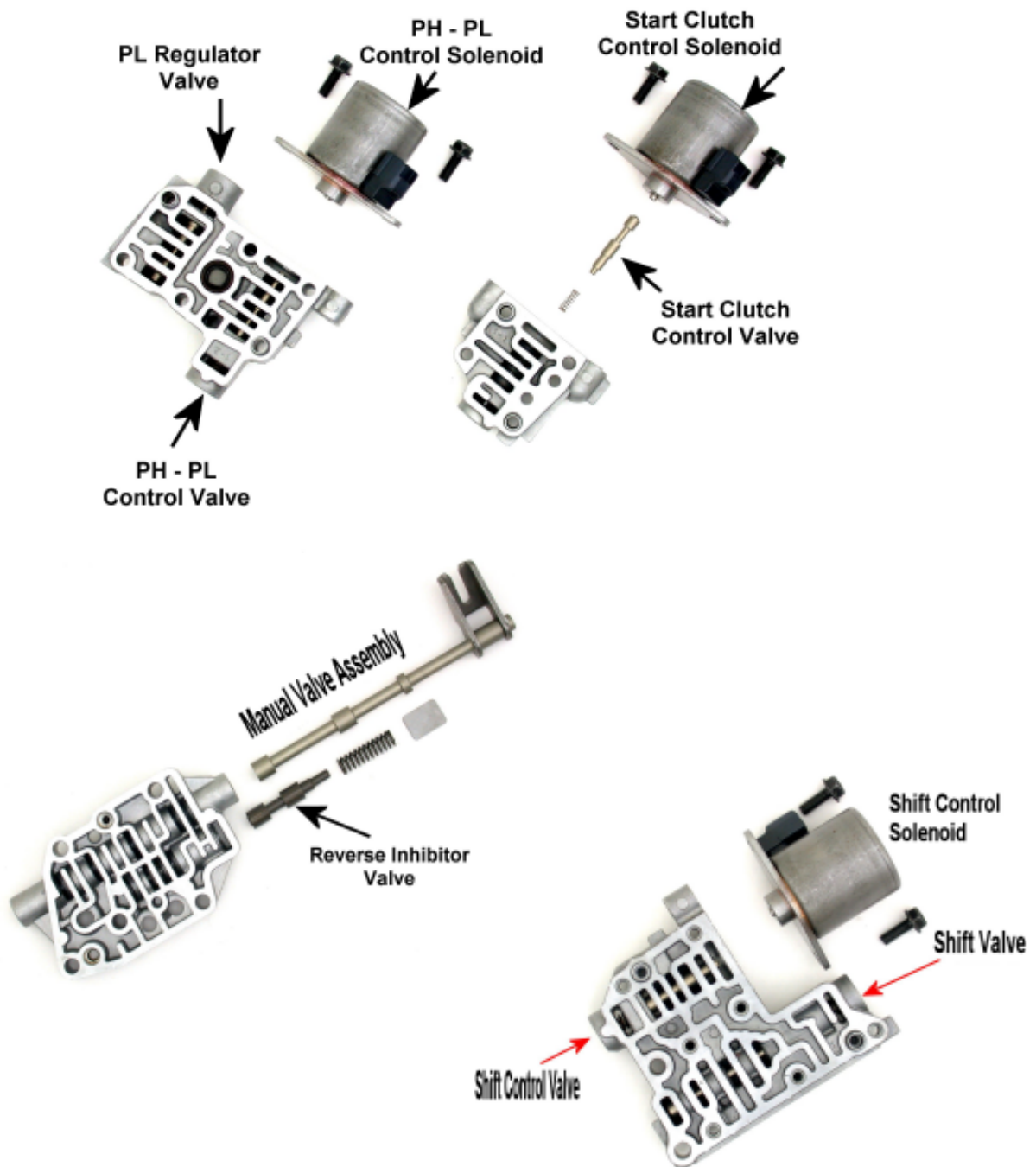
An exploded view of the Valve Body break down not available in any shop manuals at this time.



M4VA

Valve Body Assembly (continued)

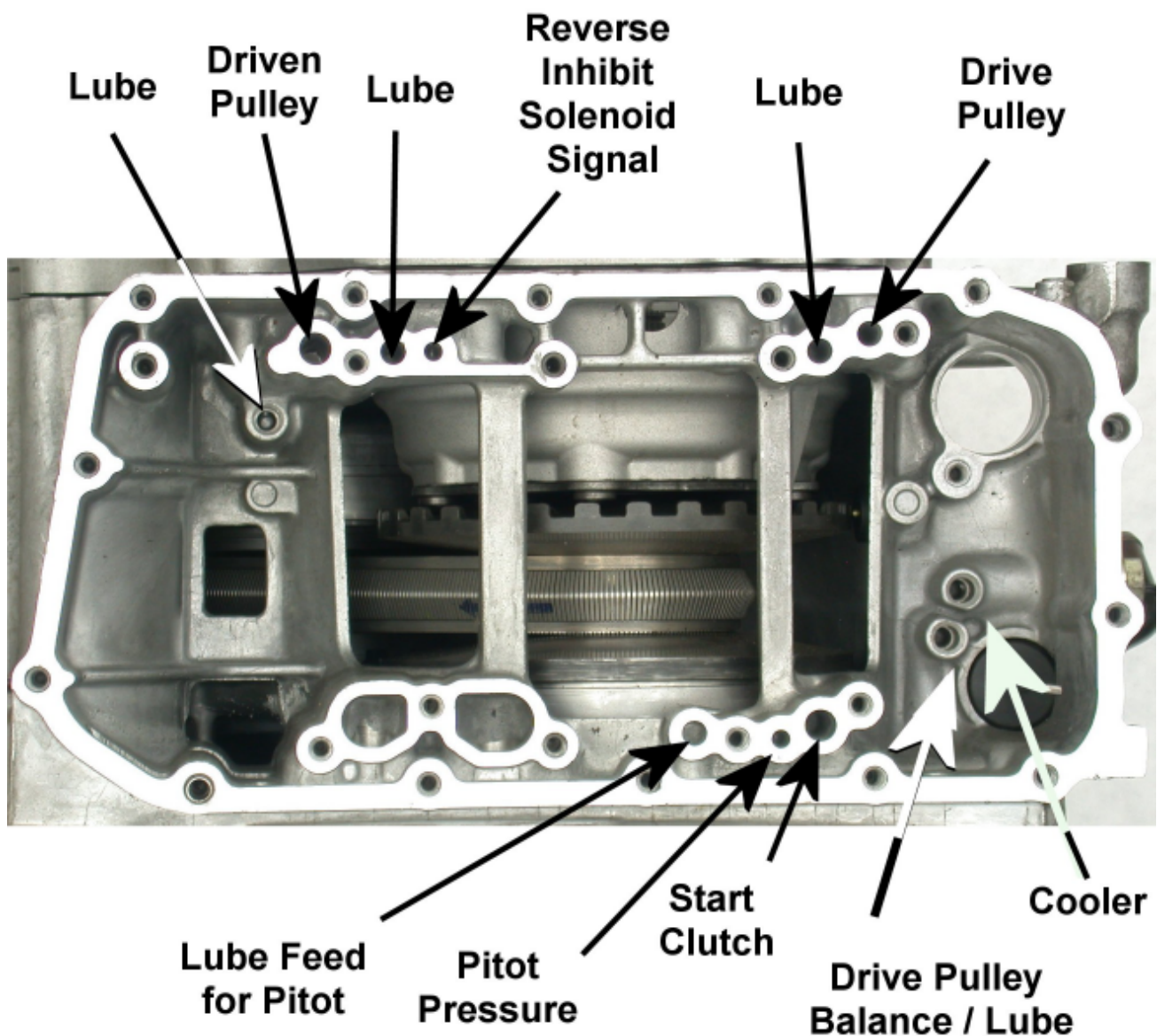
An exploded view of the Valve Body break down not available in any shop manuals at this time.



M4VA

Case Passage Air Test ID

It's always a good idea to air test the unit before disassembly and after rebuild. You can easily check the pulley assembly by pressurizing the driven pulley and turning the pulley with a screw driver. The pulley will squeeze down and close, then perform the same procedure with the Drive pulley.



M4VA

Pulleys and Belt

The belt and pulleys are only available as an assembly and are VERY EXPENSIVE!!

Air test the pulleys before disassembling the unit, check the sheave finish. Make sure there is no polishing, dishing, or scoring. All of these concerns will cause multiple problems.

The finish you're looking for is an even ground finish similar to a brand new roller bearing outer race.



*Inspect the pulley
Sheave for rough
surfaces*

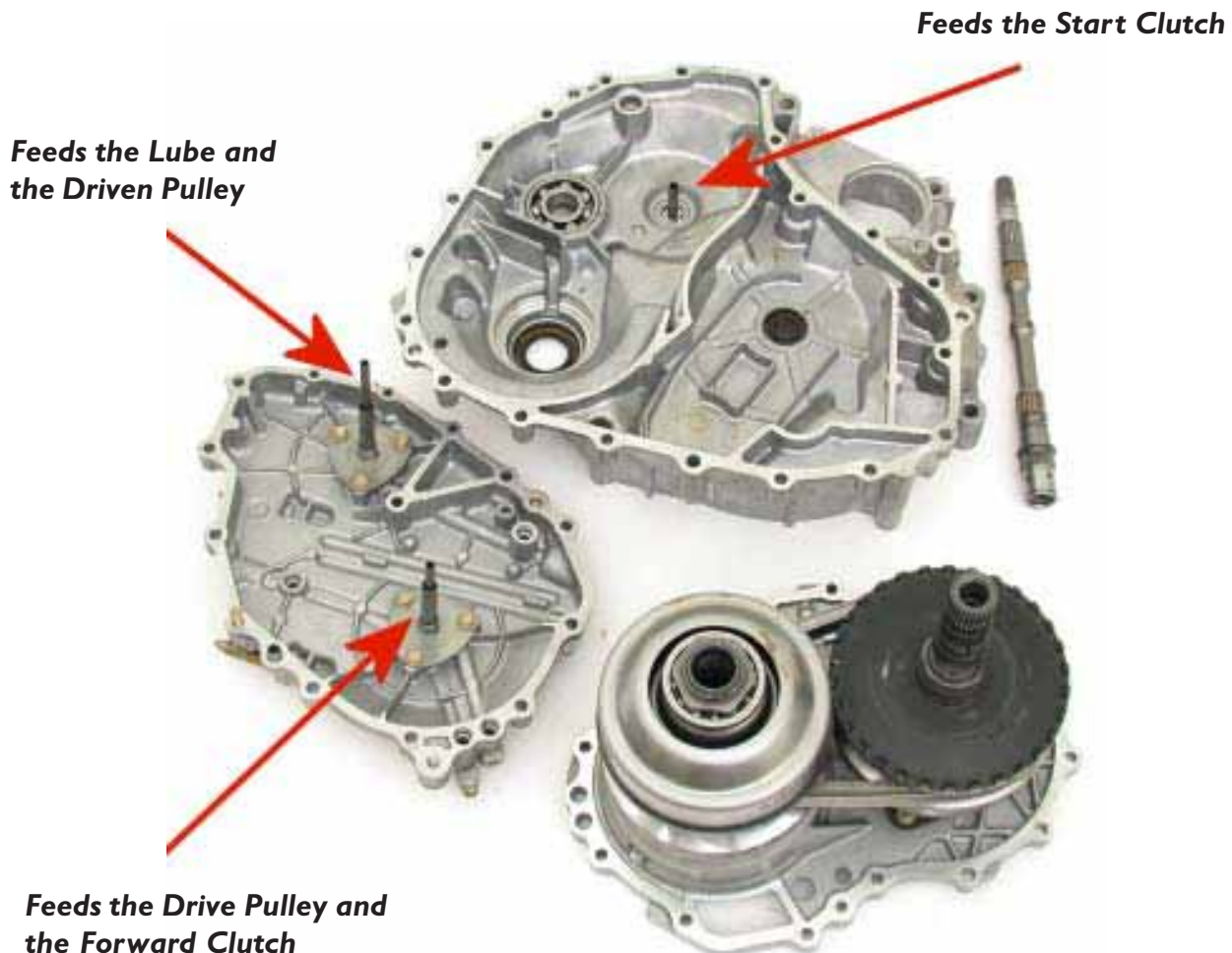


M4VA

General Overhaul Procedures

Shaft Tubes and Shaft Bushings

Inspect the shaft and bushings for wear with “scotch” type tape. Do not overlook basic Honda transxale overhaul procedures. Check all feed pipes and shaft bushings



M4VA

Start Clutch Drum Assembly

The Start Clutch components are only available as a complete assembly from Honda. The Start Clutch components have been upgraded by Honda.

Possible symptoms when the Start Clutch is failed:

- 1. Shudder on take-off**
- 2. Falls out of gear at a stop**
- 3. Falls out of gear during decel**
- 4. Neutral bang engagment**

Clearance Specifications are: **0.020"-0.028"**

NOTE: Always inspect the clutch plates for glazing or worn off nitride finish.



M4VA

Start Clutch Drum Assembly (continued)

After removing the spring and retainer, there is another snapping that must be removed before the piston will come out of drum.



M4VA

Start Clutch Control Problems

General Engagement Concerns:

1. Engine stalling in gear
2. Delayed engagements
3. Harsh engagements
4. No engagement until engine speed is increased

Critical inputs to the TCM/ECM for start clutch control:

1. Brake switch signal
2. Range switch signal
3. MAP sensor signal
4. TPS signal

Fix engine codes and engine performance problems first

Perform start clutch calibration procedure

Check the TCM/ECM for good grounds

M4VA

Start Clutch Control Problems (continued)

Surging in gear at a stop

1. Fix any engine codes or engine performance/drivability problems first.
2. Contaminated/sticking solenoids and valves
3. Bad TCM/PCM grounds
4. Updated TCM for 1996-1998 year models **P/N 28100-P2M-306**

Service kit: P/N 27010-P4V-305

Contains:

1. Pan gasket
2. Harness connector oring
3. Pickup filter oring
4. Start clutch control linear solenoid
5. Shift control linear solenoid
6. Drain bolt washer

Shudder/Chatter on Takeoff

Start clutch shudder caused by:

1. Deteriorated fluid
2. Wrong fluid type
3. Glazed or damaged start clutch

Low Pressure:

1. Forward Clutches
2. Slip/Shudder
3. Check the pump for damage

M4VA

Start Clutch Control Problems (continued)

Surging in gear at a stop, shudder, idle fluctuation
1999 – 2000 Civic HX

Symptoms:

1. Idle fluctuates between 500 and 1500 RPM (more pronounced when cold)
2. Shudder when accelerating from a stop, or when coming to a stop
3. Surging at highway speeds between 2000 and 3000 RPM
4. Excessive shock when the engine is cold, and you start to accelerate
5. A “coo” sound, lasting about 5 to 10 seconds, after coming to a stop

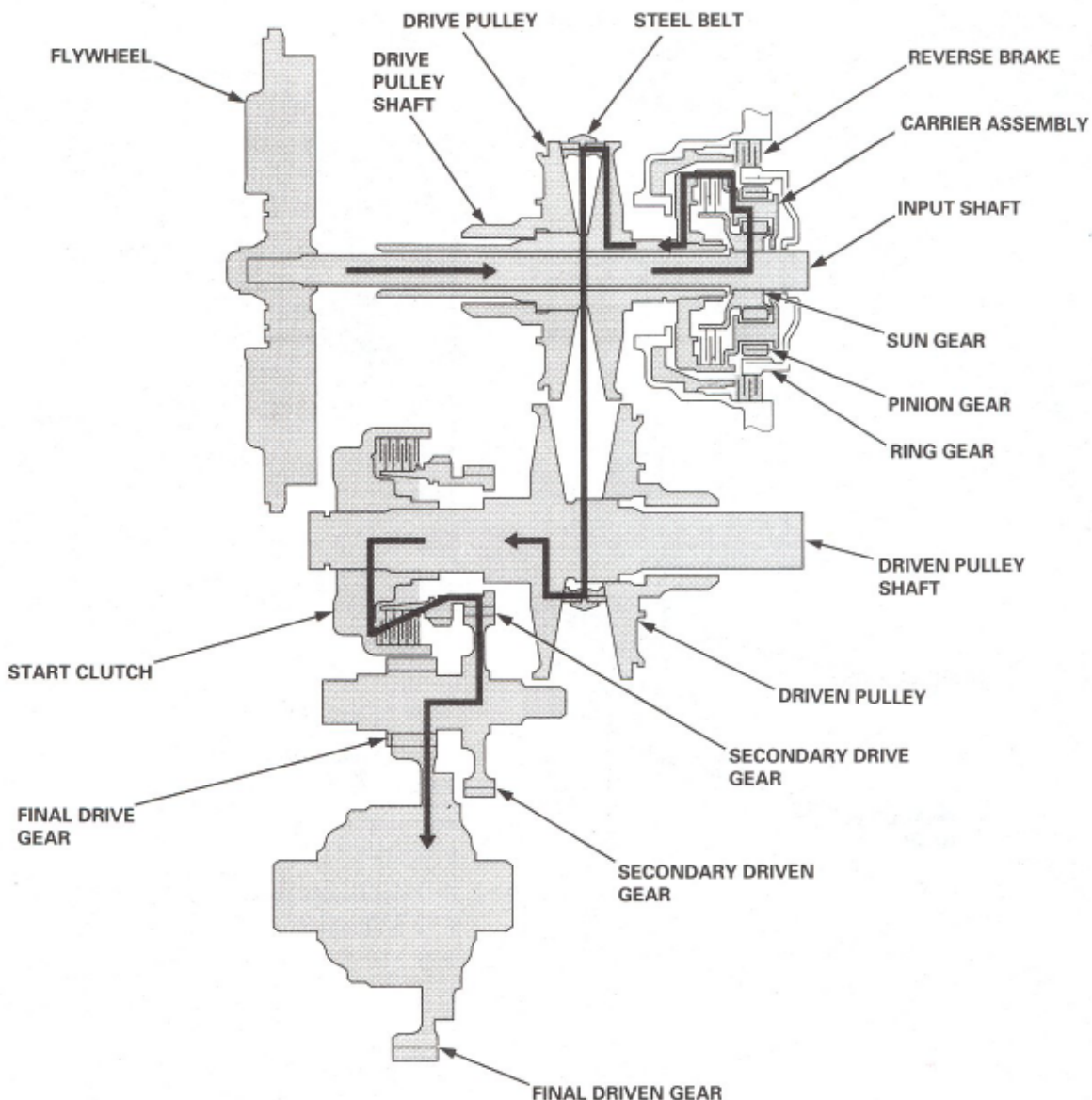
Replace the start clutch assembly, start clutch control valve, and the PCM

Start Clutch Kit (49 State – JF1)	P/N 06220-P2M-309
Start Clutch Kit (California – JL2)	P/N 06220-P2M-405

M4VA

Whining/Gear Noise in Reverse

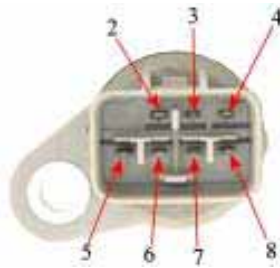
In Reverse everything is rotating simultaneously from the input shaft to the Start Clutch Assembly. When the vehicle is at a stop there is a distinct whine noise associated with the transmission. This is normal and no service should be performed.



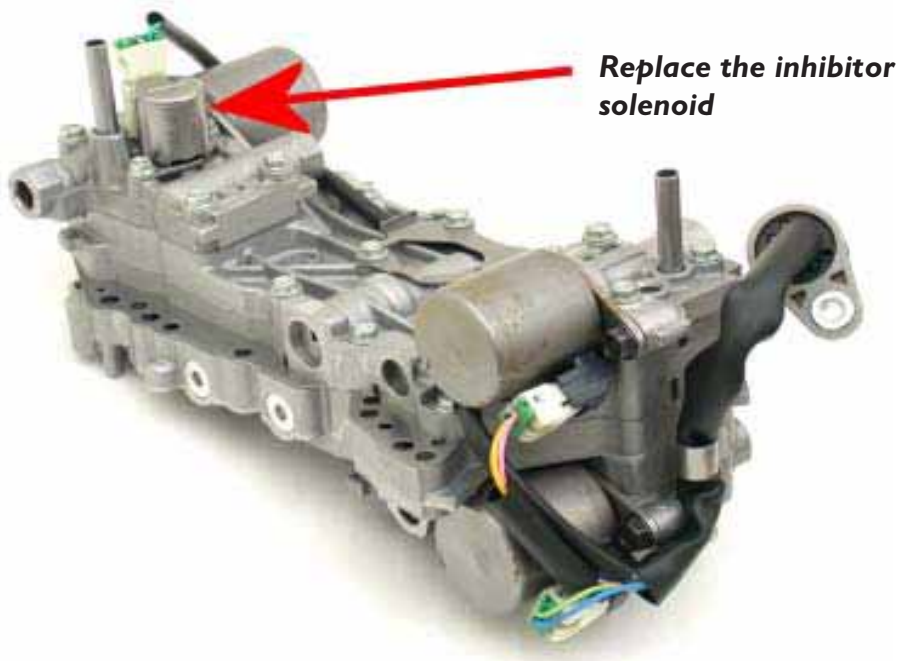
M4VA

No Reverse

Problems may be intermittent and may occur only when cold or hot. Back probe the harness connector and check for voltage to the inhibitor solenoid.



Solenoid:	Measure between:	Resistance spec:
Shift Control Linear Solenoid	Terminals 3 and 7	3.8 to 6.8 ohms
PH-PL Linear Solenoid	Terminals 2 and 6	3.8 to 6.8 ohms
Start Clutch Control Linear Solenoid	Terminals 4 and 8	3.8 to 6.8 ohms
Inhibitor Solenoid	Terminal 5 and valve body	11.7 to 21.0 ohms



M4VA

Start Clutch Relearn Procedure

Procedure for 1996 model only:

Caution: *Do not use this procedure for 1997 and newer vehicles.*

1. Engage the parking brake and block the front wheels securely.
2. Jump the Service Check connector (the Service Check connector is located under the dash on the passenger side of the vehicle).
3. Start the engine and warm it up to normal operating temperature (the radiator fan comes on twice.)
4. Fully depress the brake pedal and accelerator for 20 seconds with the gear selector in D position (full power stall).
5. Shift into N or P. To store the negative pressure in memory, let the engine idle in N or P for one minute under the following conditions:
 - * With the brake pedal depressed
 - * With the A/C switch off
 - * With the combination light switch (headlights/running lights) off
 - * With the heater fan switch off
 - * Turn OFF all other electrical accessories

Note: *Start step 5 within 60 seconds after the radiator fan goes off.*

6. Shift into "D" position and let the engine idle for two minutes to store the feedback signal under the same conditions as in step 5.
7. Connect a scan tool and verify the TCM has completed the start clutch calibration.

Note: *The TCM will not store the feedback signal when the CVT fluid temperature is below 104 degrees F (40 degrees C), even if the engine coolant reaches normal operating temperature.*

- * Repeat these procedures until the start clutch calibration is shown to be completed in scan data.
8. Disconnect the jumper from the Service Check connector.

M4VA

Start Clutch Relearn Procedure (continued)

Procedure for 1997 – 2003 vehicles:

The TCM ('97-'98) and PCM ('99 and newer) memorize the feedback signal when you drive the vehicle as follows:

1. After warming up the engine (the radiator fan comes on)
2. Shift into the "D" position
3. Turn off all electrical accessories
4. Drive the vehicle up to 37 MPH (60 km/h)
5. After your speed reaches 37 MPH (60 km/h), release the accelerator for 5 seconds

M4VA

Road Test Chart

These charts are useful to troubleshoot slipping concerns. New vehicle owners and technicians that are not familiar with CVT type transaxle operation can use this chart to verify normal operating conditions.

“D” Position			
Throttle Position Sensor Voltage	Engine RPM at 25 MPH (40 Km/h)	Engine RPM at 37 MPH (60 Km/h)	Engine RPM at 62 MPH (100 Km/h)
0.75 V	1250-1650 RPM	-----	-----
2.25 V	2500-3100 RPM	2650-3250 RPM	2700-3300 RPM
4.5 V	3950-4550 RPM	4650-5250 RPM	5200-5800 RPM

“S” Position			
Throttle Position Sensor Voltage	Engine RPM at 25 MPH (40 Km/h)	Engine RPM at 37 MPH (60 Km/h)	Engine RPM at 62 MPH (100 Km/h)
0.75 V	1800-2200 RPM	2200-2800 RPM	3550-4150 RPM
2.25 V	2950-3550 RPM	3250-3850 RPM	4050-4650 RPM
4.5 V	4100-4700 RPM	5100-5700 RPM	5900-6500 RPM

“L” Position			
Throttle Position Sensor Voltage	Engine RPM at 25 MPH (40 Km/h)	Engine RPM at 37 MPH (60 Km/h)	Engine RPM at 62 MPH (100 Km/h)
0.75 V	3100-3700 RPM	3650-4250 RPM	4450-5050 RPM
2.25 V	3500-4100 RPM	4050-4650 RPM	4800-5400 RPM
4.5 V	4100-4700 RPM	5100-5700 RPM	5900-6500 RPM

Jatco 5 Speed Section

Applications and Designations

Mazda: JA5A-EL

2002 and newer MPV
2003 and newer Mazda 6 (V6)

Volkswagen: 09A (AG5)

Late 2002 and newer Jetta 1.8T and 2.8
Late 2002 and newer GTI 1.8T and 2.8

Land Rover: Jatco 5 Speed Automatic Transaxle

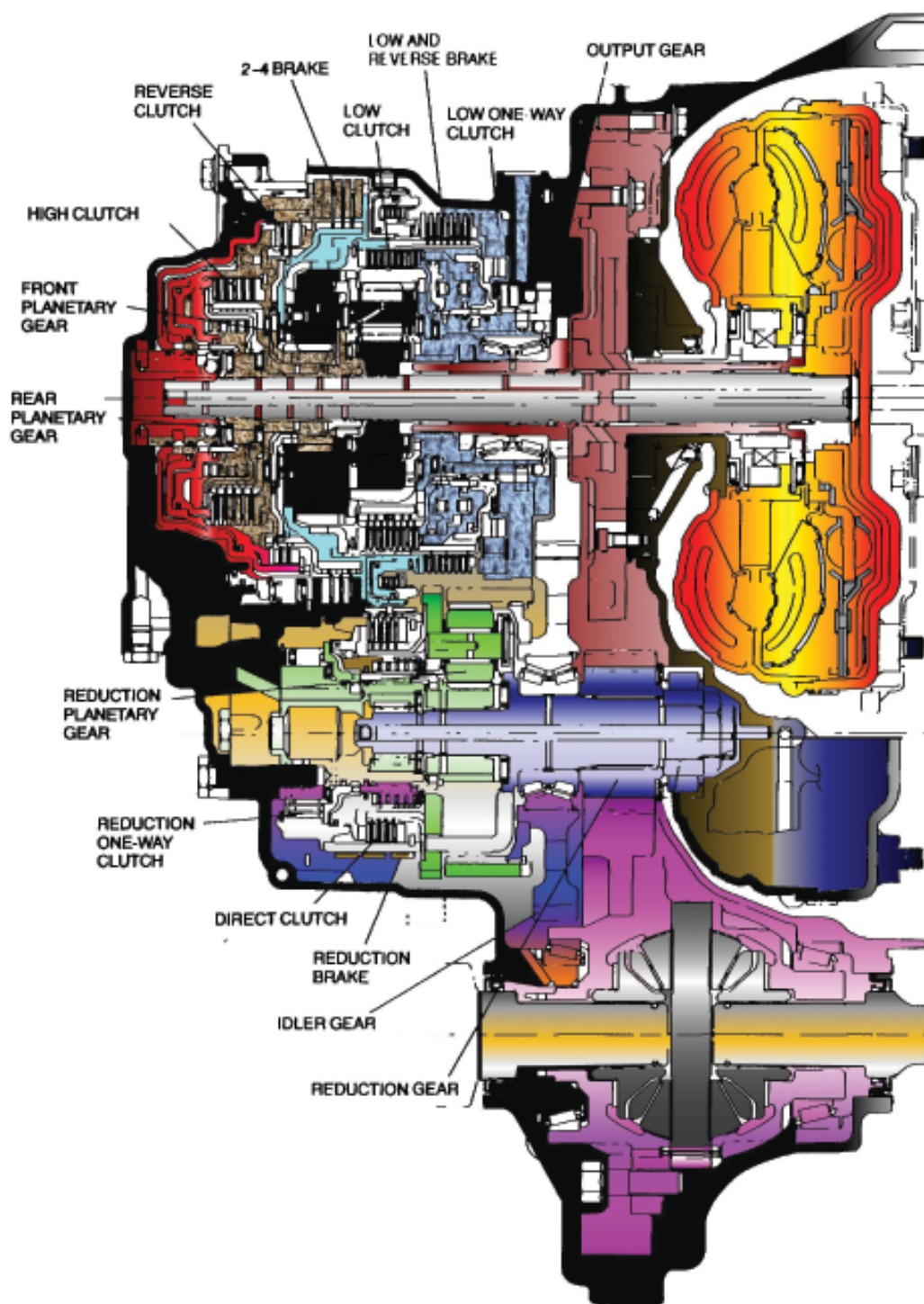
2002 and newer Freelander

Jaguar: JF506E

X Type

Mazda

Component Application Chart



Mazda

Component Application Chart (continued)

Position/Renge	Mode	Mode	Gear position	Engine braking effect	Low clutch	2-4 brake	High clutch	Reverses clutch	Low and reverse brake	Reduction brake	Direct clutch	Low one-way clutch	Reduction one-way clutch	Solenoids		
														Shift solenoid A	Shift solenoid B	Shift solenoid C
P	—		—	—						○				○	○	○
R	—		Reverse	Yes				○	○	○				○	○	○
			Reverse inhibition control	No				○		○				○	○	○
N	—		—	—						○				○	○	○
D	O/D OFF switch OFF	Normal/Slope	1GR	No	○							●	●	○	○	○
			2GR	No	○	○							●	○	○	
			3GR	No	○		○						●		○	
			4GR	No		○	○						●			○
			5GR	Yes		○	○				○			○		○
	O/D OFF switch ON	—	1GR	No	○							●	●	○	○	○
			2GR	No	○	○							●	○	○	
			3GR	No	○		○						●		○	
			4GR	Yes		○	○			○						○
			5GR*	Yes		○	○				○			○		○
3	—	—	2GR	No	○	○							●	○	○	
			3GR	Yes	○		○			○					○	
			4GR*	Yes		○	○			○						○
			5GR*	Yes		○	○				○			○		○
2			2GR	Yes	○	○				○				○	○	
			3GR*	Yes	○		○			○					○	
			4GR*	Yes		○	○			○						○
			5GR*	Yes		○	○				○			○		○

○: Operating

●: Transmits the torque only when driving

*: To prevent engine overspeed, inhibits downshift until the engine speed is reduced to the preset speed

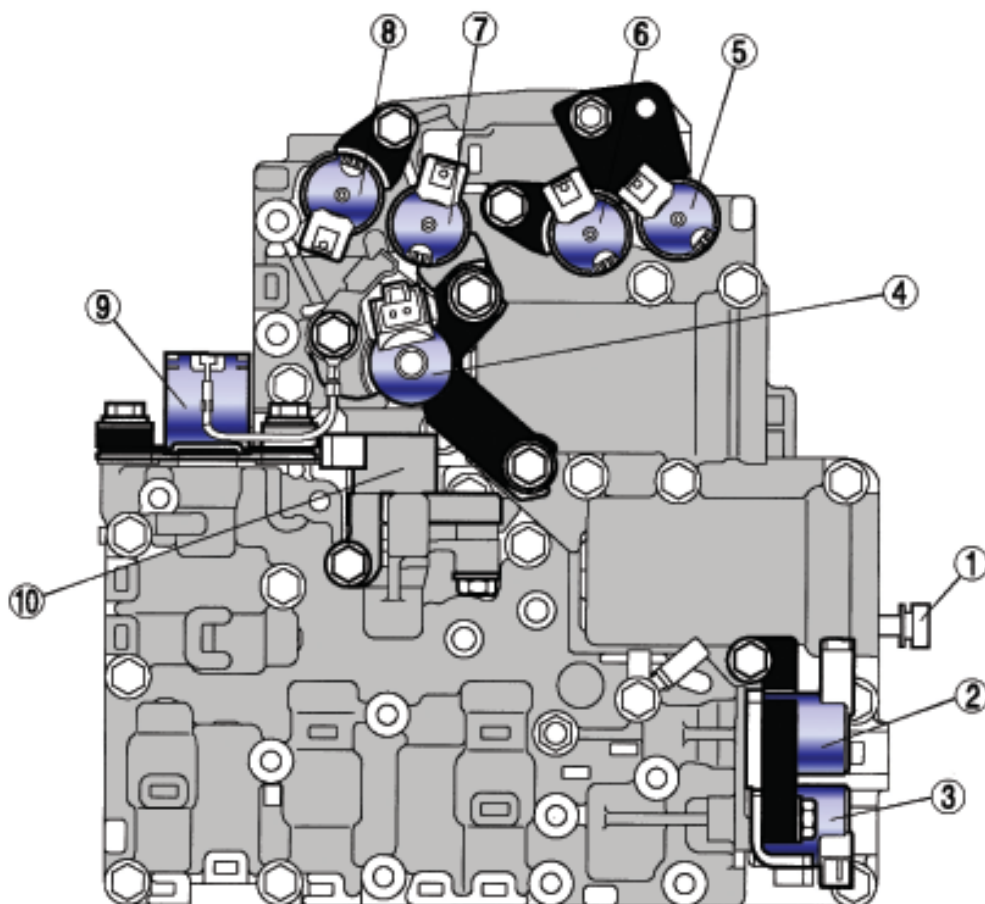
Mazda

DTC Identification

DTC	MIL	OD Light	Cause
P0705	On	Yes	Transaxle Range Switch Circuit Shorted
P0706	On	Yes	Transaxle Range Switch Circuit Open
P0711	On	No	Transaxle Fluid Temperature Sensor Malfunction (Stuck)
P0712	On	Yes	Transaxle Fluid Temperature Sensor Shorted
P0713	On	Yes	Transaxle Fluid Temperature Sensor Open
P0715	On	Yes	Input / Turbine Speed Sensor Circuit Fault
P0720	On	Yes	Vehicle Speed Sensor Circuit Fault
P0740	On	No	Torque Converter Clutch System Fault
P0743	On	Yes	Torque Converter Clutch Solenoid Circuit Fault
P0748	Off	Yes	Pressure Control Solenoid Circuit Fault
P0751	On	No	SSA Fault (Stuck Off)
P0752	On	No	SSA Fault (Stuck On)
P0753	On	Yes	SSA Circuit Fault (Open/Short)
P0756	On	No	SSB Fault (Stuck Off)
P0757	On	No	SSB Fault (Stuck On)
P0758	On	Yes	SSB Circuit Fault (Open/Short)
P0761	On	No	SSC Fault (Stuck Off)
P0762	On	No	SSC Fault (Stuck On)
P0763	On	Yes	SSC Circuit Fault (Open/Short)
P0768	Off	Yes	Reduction Timing Solenoid Circuit Fault (Open/Short)
P0773	On	Yes	Neutral Shift Solenoid Circuit Fault (Open/Short)
P0778	Off	Yes	2-4 Brake Solenoid Circuit Fault (Open/Short)
P0791	On	Yes	Intermediate Speed Sensor Circuit Fault (Open/Short)
P0798	Off	Yes	High Clutch Solenoid Valve Circuit Fault (Open/Short)
P1710	Off	No	Ground Return Circuit Fault
U0073	On	Yes	CAN Bus Off
U0100	On	Yes	TCM Cannot Receive Any Signals From PCM

Mazda

Solenoid Identification



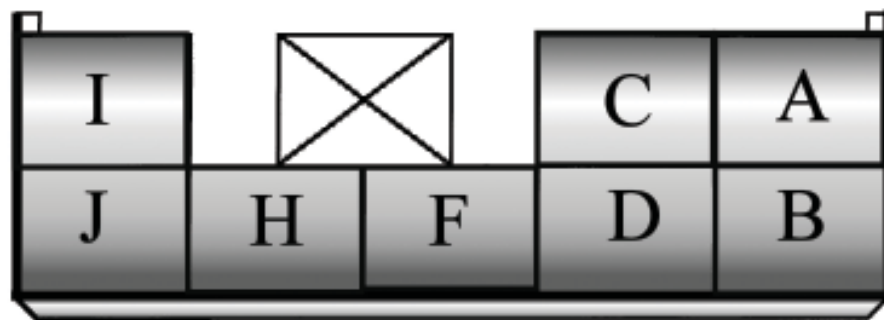
1	Manual Valve
2	2-4 Brake Solenoid Valve
3	Neutral Shift Solenoid Valve
4	TCC Solenoid Valve
5	Shift Solenoid C

6	Shift Solenoid B
7	Reduction Timing Solenoid Valve
8	Shift Solenoid A
9	Pressure Control Solenoid
10	High Clutch Solenoid Valve

Mazda

Solenoids, Sensors, and Case Connectors

Coupler Connector (8-PIN)



Part Side Connector (View From The Harness Side)

Solenoid	Measure between:	Resistance
SSA	K and A	14–18 ohms
Reduction Timing Solenoid	I and A	14–18 ohms
SSB	J and A	14–18 ohms
SSC	H and A	14–18 ohms
Pressure Control Solenoid	L and A	2.6–3.2 ohms
TCC Solenoid	C and A	12.0-13.2 ohms
High Clutch solenoid	F and A	2.6–3.2 ohms
2-4 Brake Solenoid	D and A	2.6–3.2 ohms
Neutral Shift Solenoid	F and A	14–18 ohms

Mazda

Solenoids, Sensors, and Case Connectors (continued)

Coupler Connector (10 PIN)



Part Side Connector (View From The Harness Side)

Sensor	Resistance	Measure Between:
Input Speed	513 – 627 ohms	A and B
Intermediate	513 – 627 ohms	C and D
Vehicle Speed	513 – 627 ohms	F and H

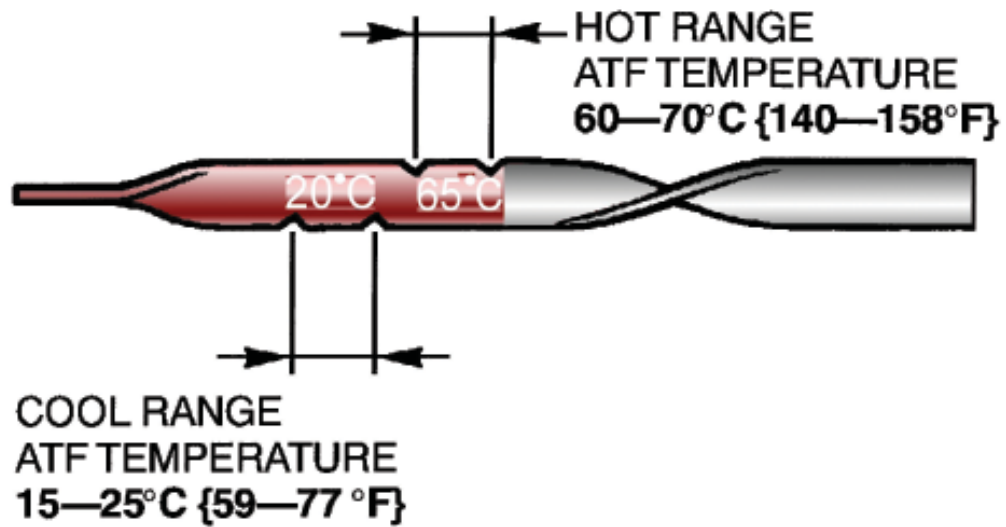
ATF Temperature Sensor:

Measure between pins I and J for specifications

Temperature °C (°F)	Resistance, K ohms
-40 (-40)	54.9
-20 (-4)	16.7
0 (32)	6.02
20 (68)	2.5
40 (104)	1.16
60 (140)	0.59
80 (176)	0.33
100 (212)	0.19
120 (248)	0.12
140 (284)	0.08

Mazda

Fluid Fill and Check



Fluid Type

Mazda: M-III or Dexron III

Mazda

Specifications

Total end play:	0.010" – 0.020" (End Cover section)
Output gear bearing preload:	5.6 – 11.5 inch pounds
Reduction gear bearing preload:	5.3 – 15.5 inch pounds
Differential bearing preload:	6.9 – 16.5 inch pounds

Torque Specifications:

End cover bolts:	14 – 16 foot pounds
Case half bolts:	20 – 22 foot pounds
Valve body bolts:	5.1 – 6.5 foot pounds
Pump to case bolts:	14 – 16 foot pounds
Pan bolts:	5.1 – 6.5 foot pounds

Mazda Clutch Specifications:

Reverse Clutch: 2 drive and 2 driven plates
Clearance: 0.020" – 0.031"
Friction plate minimum thickness: 0.067"

High Clutch: 5 drive and 5 driven plates
Clearance: 0.031" – 0.043"
Friction plate minimum thickness: 0.067"

Low Clutch: 7 drive and 7 driven plates
Clearance: 0.044" – 0.051"
Friction plate minimum thickness: 0.067"

Direct Clutch: 4 drive and 4 driven plates
Clearance: 0.071" – 0.087"
Friction plate minimum thickness: 0.067"

Low and Reverse Brake: 6 drive and 5 driven plates
Clearance: 0.031" – 0.043"
Friction plate minimum thickness: 0.067"

2-4 Brake: 3 drive and 4 driven plates
Clearance: 0.024" – 0.035"
Friction plate minimum thickness: 0.067"

Volkswagen

DTC Identification VAG DTC's

VAG DTC	Cause
00258	Solenoid 1 (N88) circuit fault (open/short)
00260	Solenoid 2 (N89) circuit fault (open/short)
00262	Solenoid 3 (N90) circuit fault (open/short)
00264	Solenoid 4 (N91) circuit fault (open/short)
00266	Solenoid 5 (N92) circuit fault (open/short)
00268	Solenoid 6 (N93) circuit fault (open/short)
00281	Vehicle Speed Sensor (G68) circuit fault
00293	Multi-function switch (F125) signal fault
00296	Kickdown switch signal fault
00300	Transmission fluid temperature sensor (G93) open/short to +
00347	Solenoid 8 (N281) circuit fault (open/short)
00348	Solenoid 9 (N282) circuit fault (open/short)
00349	Solenoid 10 (N283) circuit fault (open/short)
00350	Ground return wire fault (open/short)
00351	Intermediate speed sensor (G265) circuit fault (open/short)
00526	Brake light switch (F) signal fault
00529	Missing speed signal from TCM to ECM (check sensor inputs)
00532	Supply voltage low (power/ground, battery/charging system)
00652	Gear monitoring implausible signal or mechanical malfunction (gear ratio error)
00777	Throttle position sensor (G79) no signal.
001045	Tiptronic switch (F189) circuit fault (open/short)
001166	Engine torque signal fault (engine performance problem or module coding problem)
001192	Torque converter clutch malfunction (TCC slip)
001236	Selector lever lock solenoid (N110) circuit fault (open/short)
001312	Drive train data bus fault or no communication
001314	ECM no communication or incorrect equipment
001316	ABS module no communication
0018108	Brake pressure switch (F270) signal fault (open/short)
0017101	Transmission RPM sensor (G182) no signal. (can be caused by multi-function switch fault, wrong gear, or slipping/no engagement condition)
0065535	TCM (J217) internal failure

Volkswagen

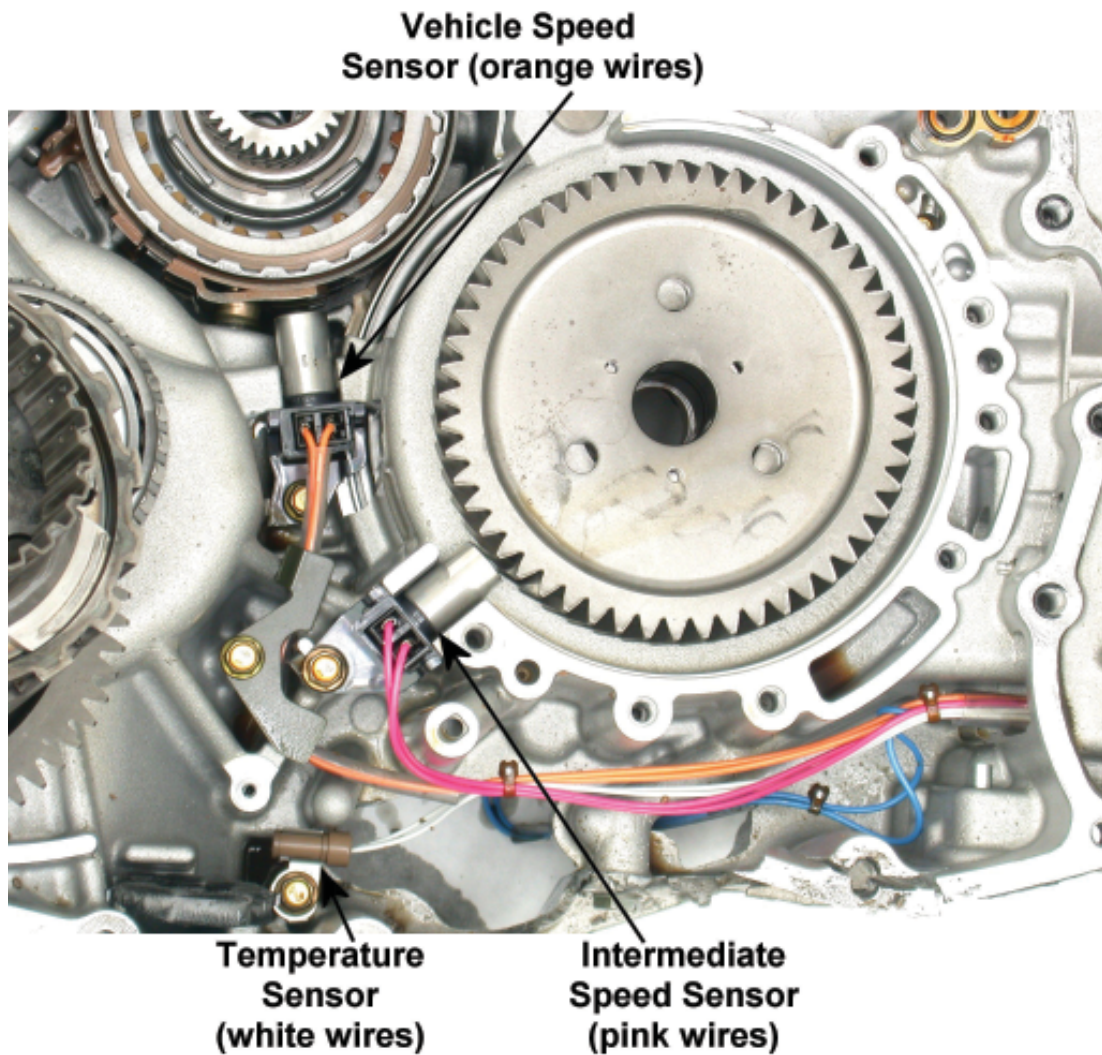
DTC Identification OBD-II SAE DTC's

DTC	Cause
P0614	ECM/TCM incompatible
P0700	TCM MIL request
P0705	Transmission range sensor circuit fault (multi-function switch)
P0710	Transmission fluid temperature sensor fault
P0715	Input/turbine speed sensor (G182) circuit fault
P0717	Input/turbine speed sensor (G182) circuit no signal
P0722	Output speed sensor (G68) no signal
P0725	Engine speed input circuit fault (signal from ECM)
P0730	Incorrect gear ratio
P0731	Gear ratio 1 incorrect
P0732	Gear ratio 2 incorrect
P0733	Gear ratio 3 incorrect
P0734	Gear ratio 4 incorrect
P0735	Gear ratio 5 incorrect
P0740	Torque converter clutch malfunction (TCC slip)
P0743	Torque converter clutch solenoid (N91) circuit failure (open/short)
P0746	Pressure control solenoid A (N93) stuck off
P0748	Solenoid 6 (N93) circuit fault (open/short)
P0753	Solenoid 1 (N88) circuit fault (open/short)
P0758	Solenoid 2 (N89) circuit fault (open/short)
P0763	Solenoid 3 (N90) circuit fault (open/short)
P0768	Solenoid 4 (N91) circuit fault (open/short)
P0773	Solenoid 5 (N92) circuit fault (open/short)
P0778	Solenoid 10 (N283) circuit fault (open/short)
P0785	Shift/Timing solenoid
P0791	Intermediate speed sensor (G265) circuit fault
P0811	Excessive clutch slippage
P0863	TCM communication circuit (CAN bus fault)
P0864	TCM communication circuit range/performance
P0865	TCM communication circuit low
P1626	Missing message from TCM (CAN bus fault)
P1780	Torque retraction malfunction (mechanical fault in transaxle)
P1823	Solenoid 8 (N281) circuit fault (open/short)
P1828	Solenoid 9 (N282) circuit fault (open/short)
P1850	Missing message from ECM (CAN bus fault)

Volkswagen

Electrical Component ID

Some publications show the sensors as being external, they are not. These sensors are located internally. The sensors are identical and can be interchanged.



Volkswagen

Electrical Component ID (continued)

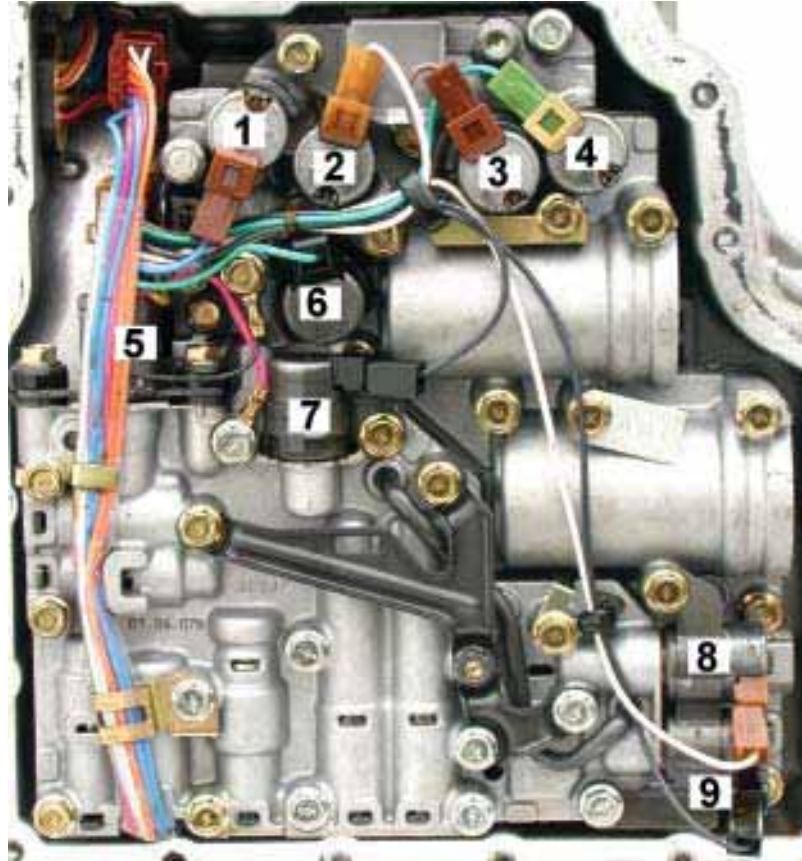
The Input speed sensor can be removed in the vehicle. Remove the End cover and locate the speed sensor for diagnosing.



**Input Speed Sensor
(blue wires)**

Volkswagen

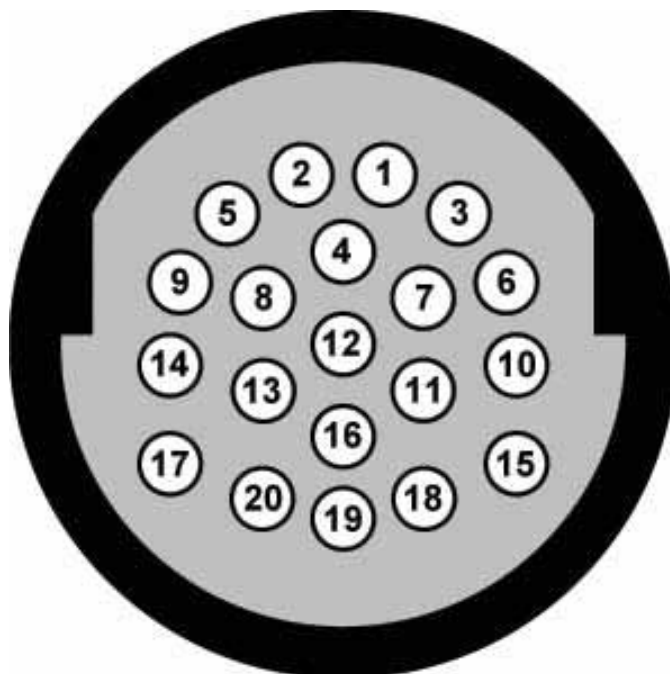
Electrical Component ID (continued)



Solenoid Identification	
1	N88 (Solenoid Valve 1)
2	N281 (Solenoid Valve 8)
3	N89 (Solenoid Valve 2)
4	N92 (Solenoid Valve 5)
5	N93 (Solenoid Valve 6)
6	N91 (Solenoid Valve 4)
7	N90 (Solenoid Valve 3)
8	N283 (Solenoid Valve 10)
9	N282 (Solenoid Valve 9)

Volkswagen

Solenoids, Sensors, and Case Connector



Solenoid / Sensor	Resistance	Measure Between:
Input Speed Sensor	400 – 600 ohms	1 and 2
Intermediate Speed	400 – 600 ohms	3 and 4
Vehicle Speed Sensor	400 – 600 ohms	5 and 6
N93	1.0 – 5.0 ohms	15 and 18
N92	9.0 – 24.0 ohms	11 and 18
N91	9.0 – 24.0 ohms	17 and 18
N282	9.0 – 24.0 ohms	13 and 18
N90	9.0 – 24.0 ohms	12 and 18
N281	9.0 – 24.0 ohms	14 and 18
N88	9.0 – 24.0 ohms	9 and 18
N89	9.0 – 24.0 ohms	10 and 18
N283	1.0 – 5.0 ohms	16 and 18
ATF Temp Sensor	(20°C) 68°F = 2.5k ohms (80°C) 176°F=300 ohms	7 and 8

Volkswagen/Land Rover

Fluid Check/Fill

Fluid check procedure:

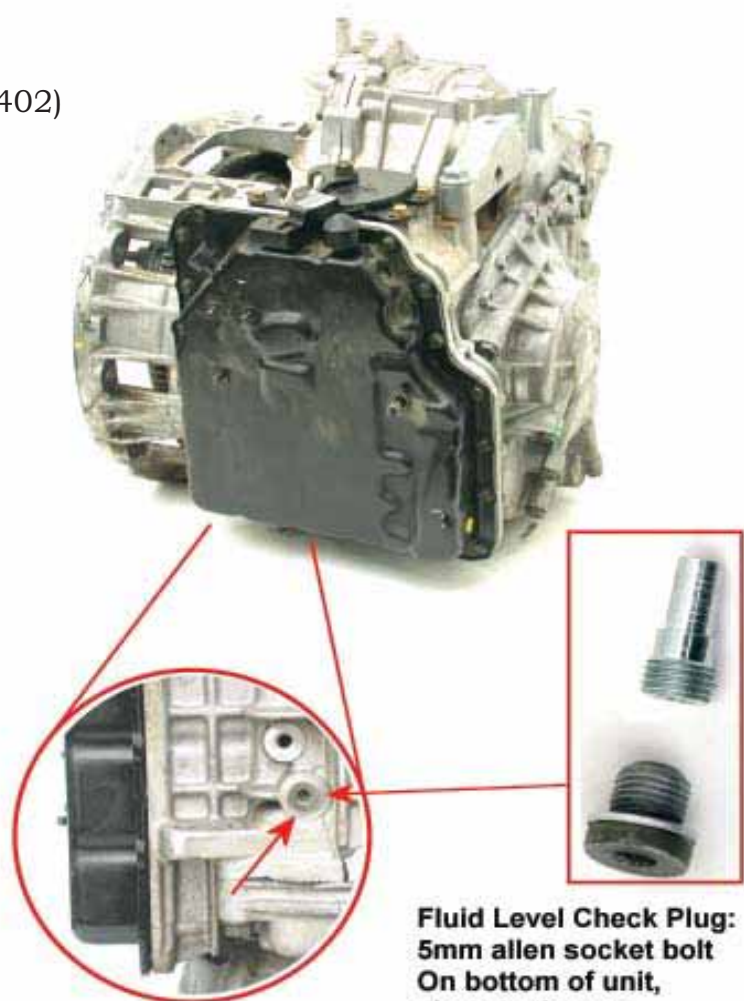
1. Start the engine.
2. Run until transmission fluid temperature is between 95° and 113° F.
3. Move the transmission selector through all ranges, then return to the Park position.
4. Remove the check plug (5mm allen, on bottom of unit).
5. Fluid should just dribble out of check plug hole.
6. If the fluid does not dribble out of check plug hole, carefully add fluid to transmission until it begins to run out.
7. Replace the check plug.

Fluid Type

Volkswagen: G 052 990 A2

Land Rover: LRN402 (Texaco N402)

Jaguar: WSS-M2C92-A1

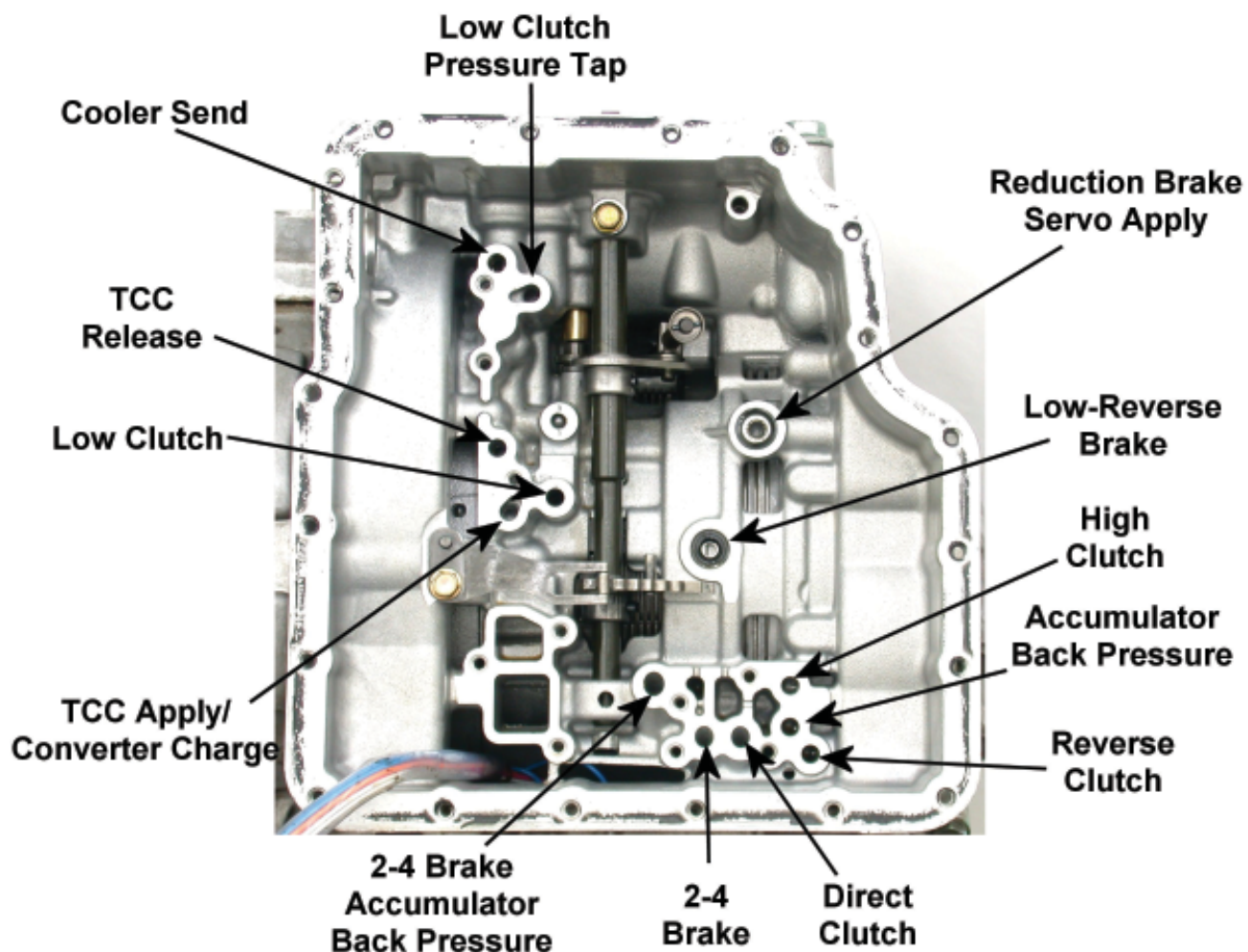


Fluid Level Check Plug:
5mm allen socket bolt
On bottom of unit,
close to the pan

Volkswagen

Case Passage Air Test Identification

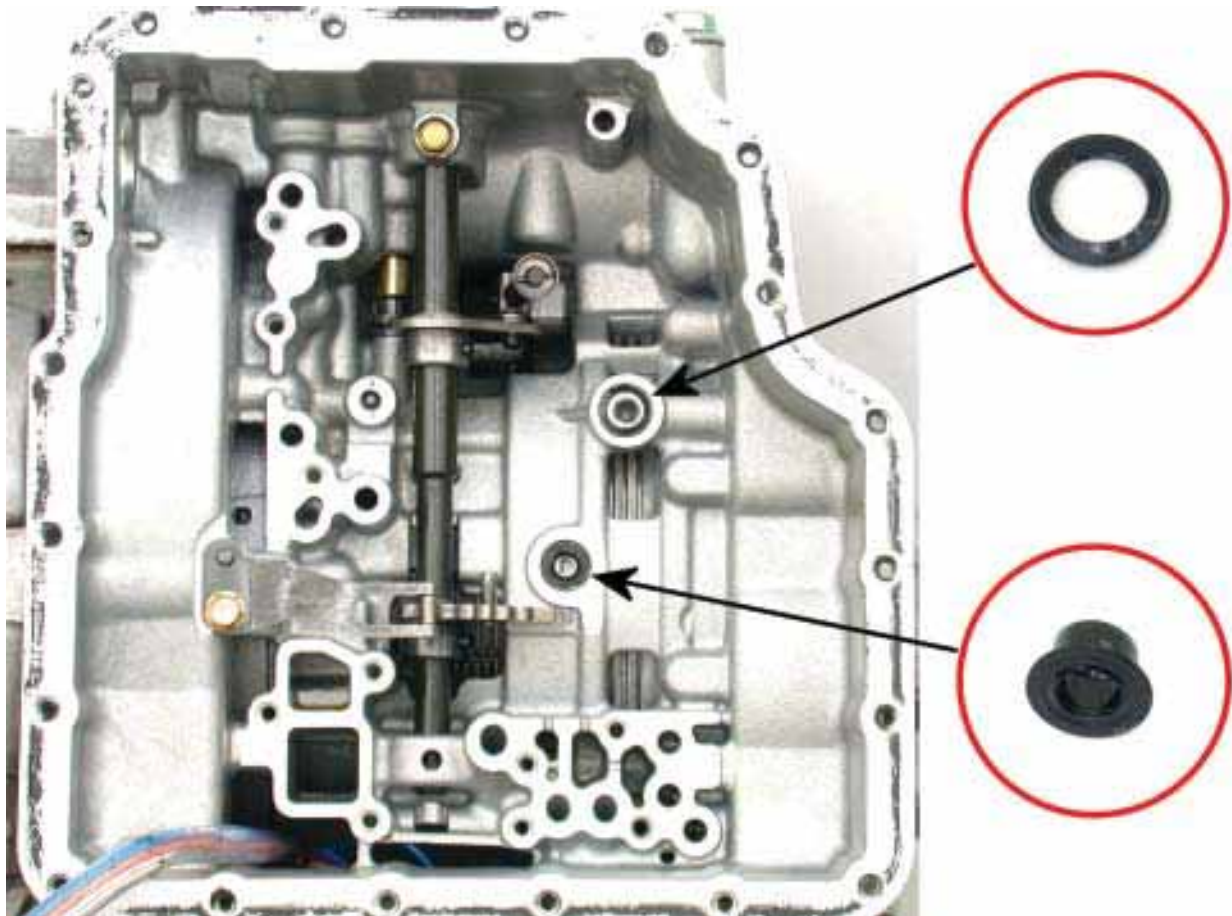
Always air check the clutches before disassembly and after reassembly before the Valve Body is installed



Volkswagen

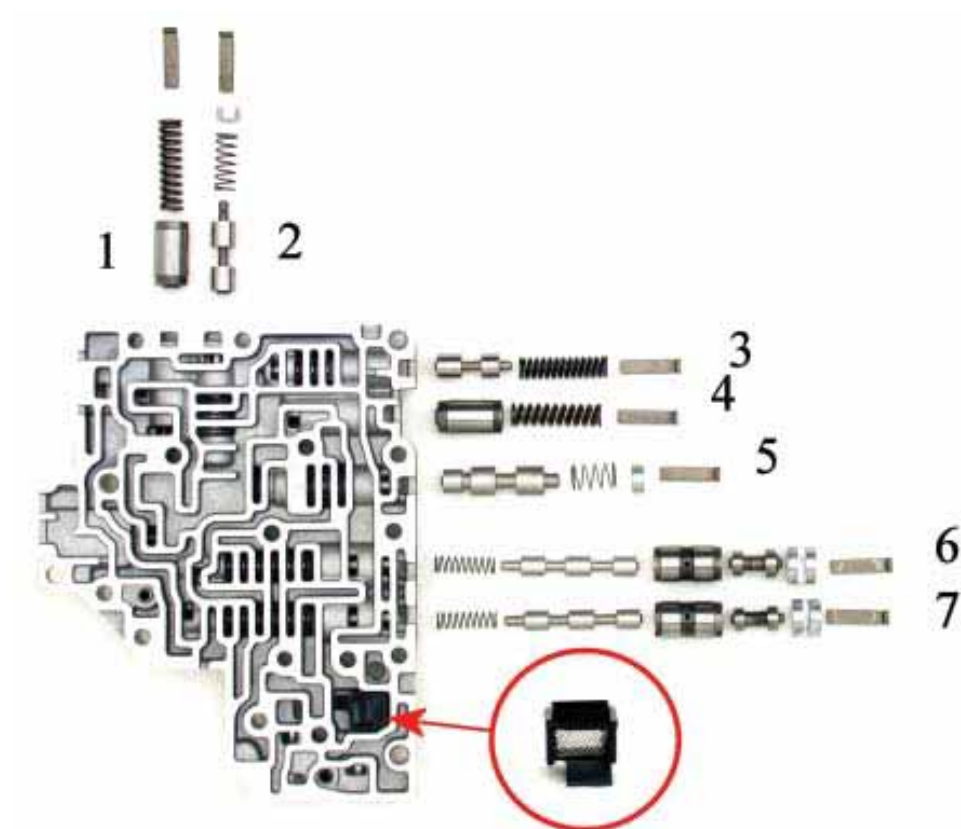
Valve Body to Case Seals

These seals are located behind the Valve Body. The Valve Body needs to be removed before the L/R piston assembly can be removed. If you attempt to remove the L/R piston without removing the Valve Body you will destroy the seal.



Volkswagen

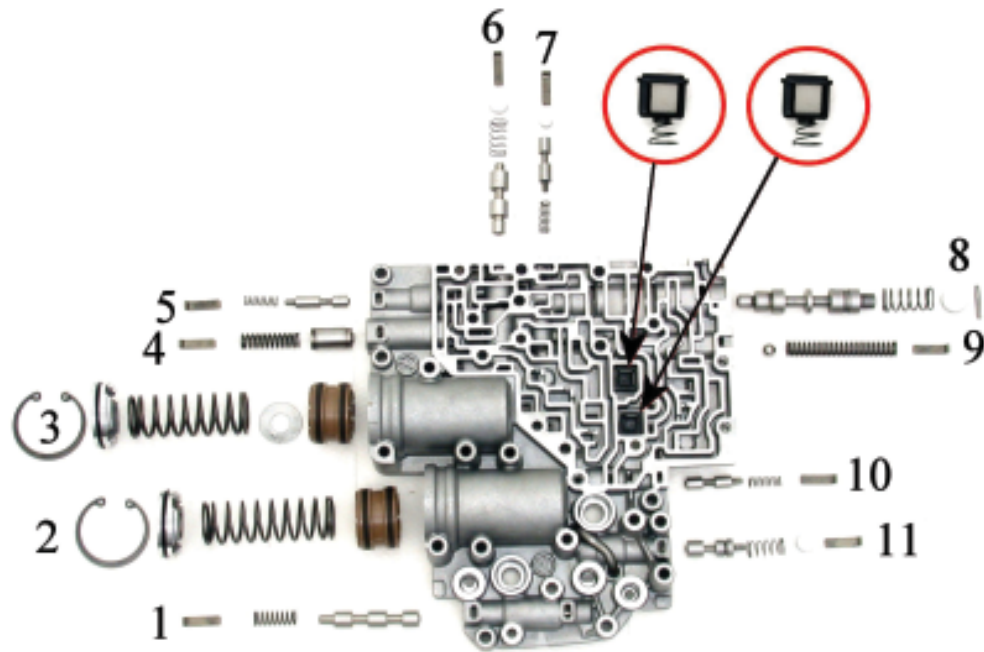
Valve Body Assembly



ID	Description
1	Modifier Accumulator
2	Pressure Modifier Valve
3	Torque Converter Regulator Valve
4	Throttle Accumulator Valve A
5	Accumulator Control Valve A
6	Unknown
7	Unknown

Volkswagen

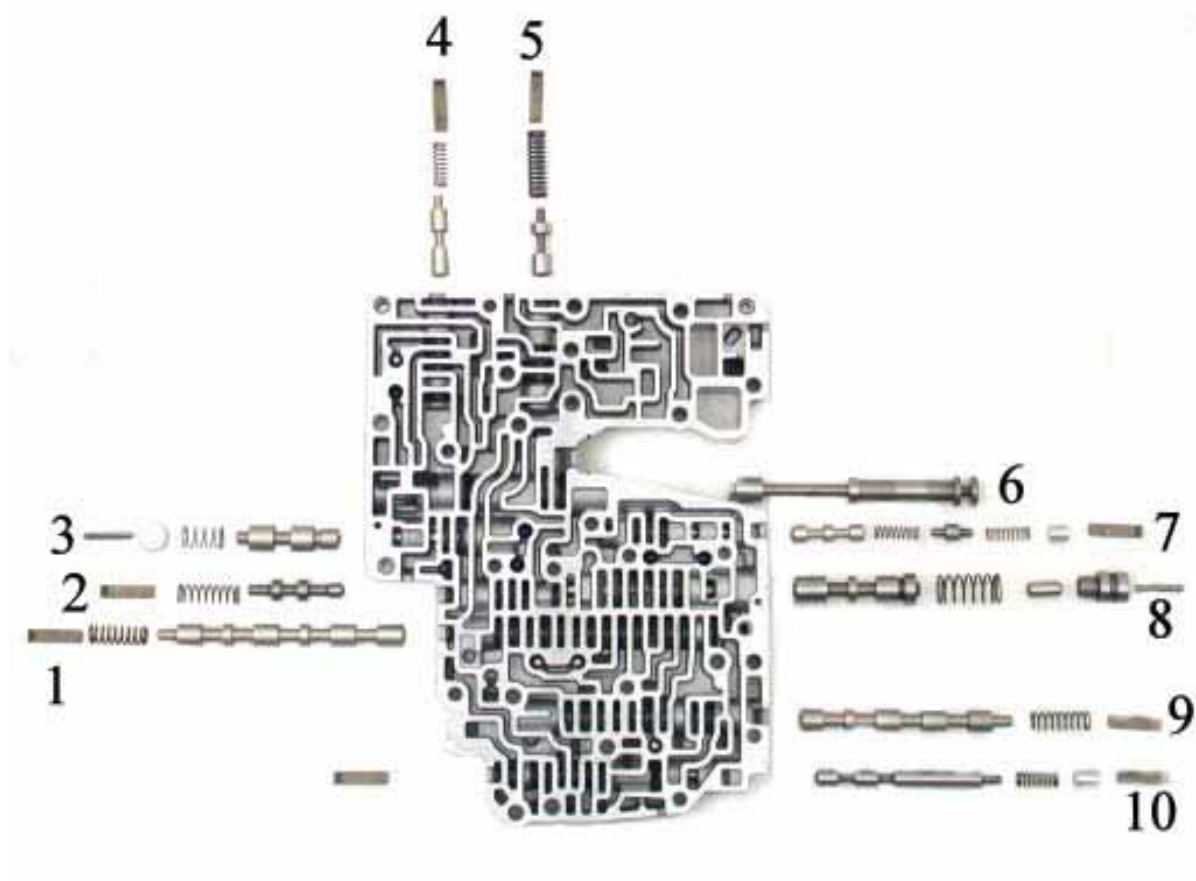
Valve Body Assembly (continued)



ID	Description
1	Shift Valve C
2	Low Clutch Accumulator
3	High Clutch Accumulator
4	Throttle Accumulator
5	Unknown
6	Accumulator Control Valve B
7	Unknown
8	Pressure Regulator Valve
9	Line Pressure Relief Valve
10	Reduction Timing Valve
11	Reduction Reducing Valve

Volkswagen

Valve Body Assembly (continued)

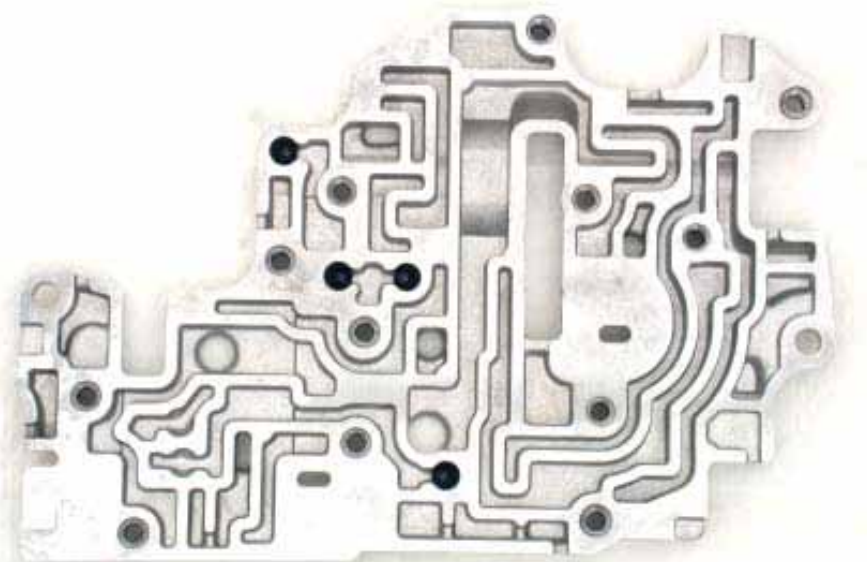
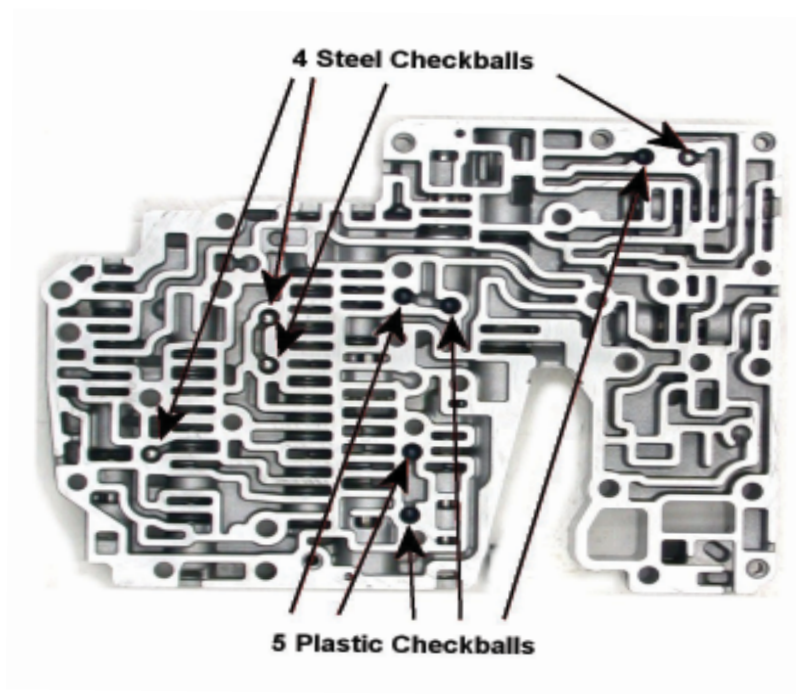


ID	Description
1	Shift Valve A
2	Reverse Inhibit Valve
3	Neutral Control Valve
4	Accumulator Switch Valve
5	Pilot Valve
6	Manual Valve
7	Neutral Shift Valve
8	TCC Control Valve
9	Shift Valve
10	Failsafe Valve

Volkswagen

Valve Body Assembly (continued)

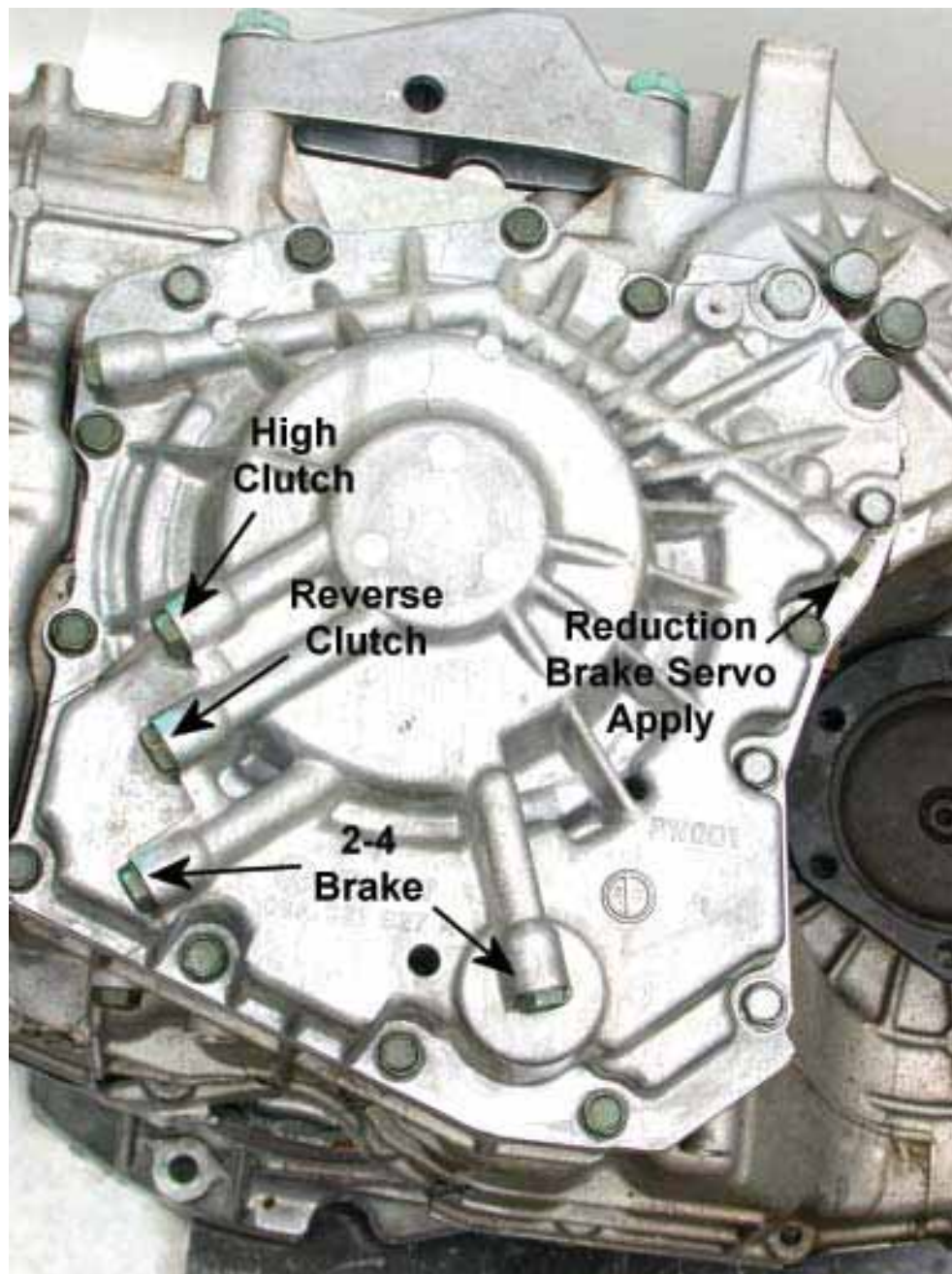
All check balls are .218" (5.5mm)



Volkswagen

Pressure Taps

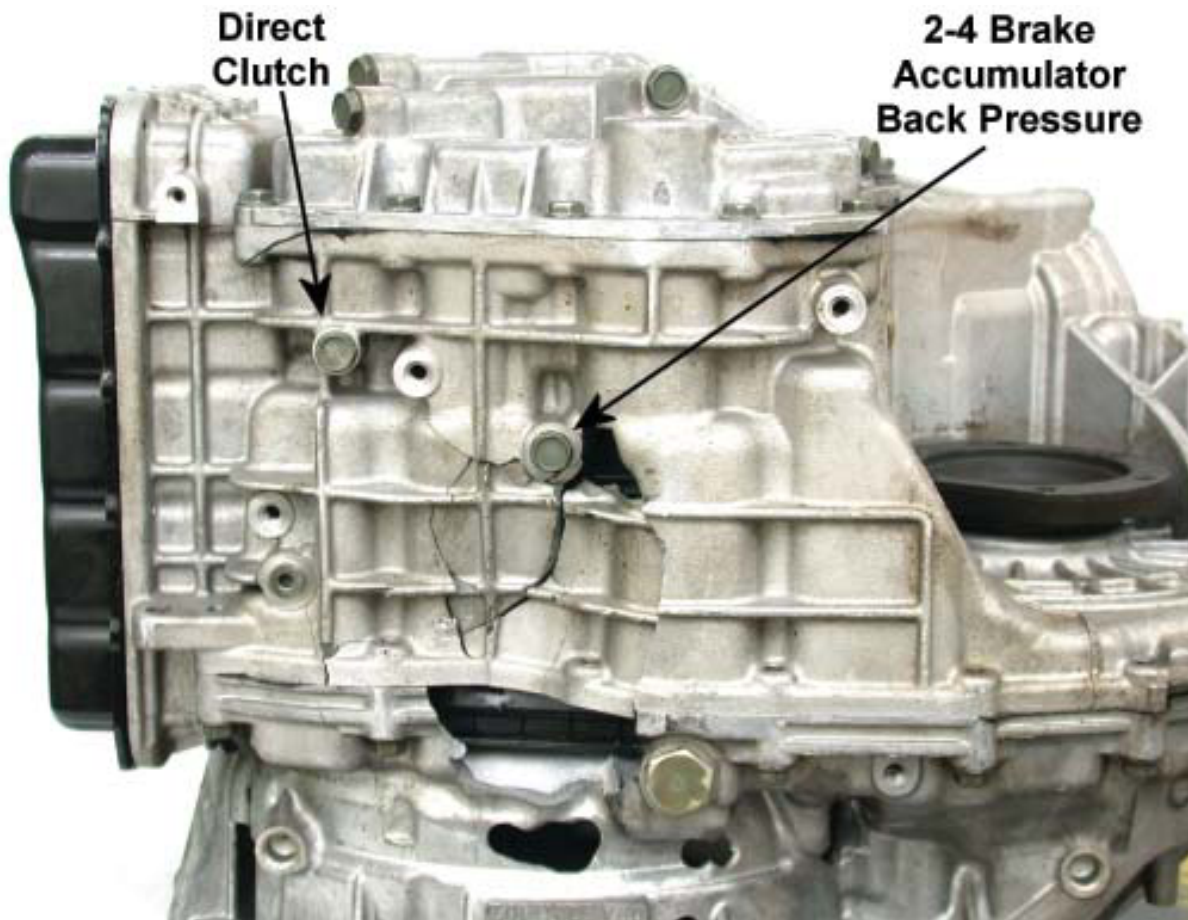
The End Cover pressure taps are M10x1.0 straight thread



Volkswagen

Pressure Taps (continued)

Pressure taps located at the bottom of the transmission case.

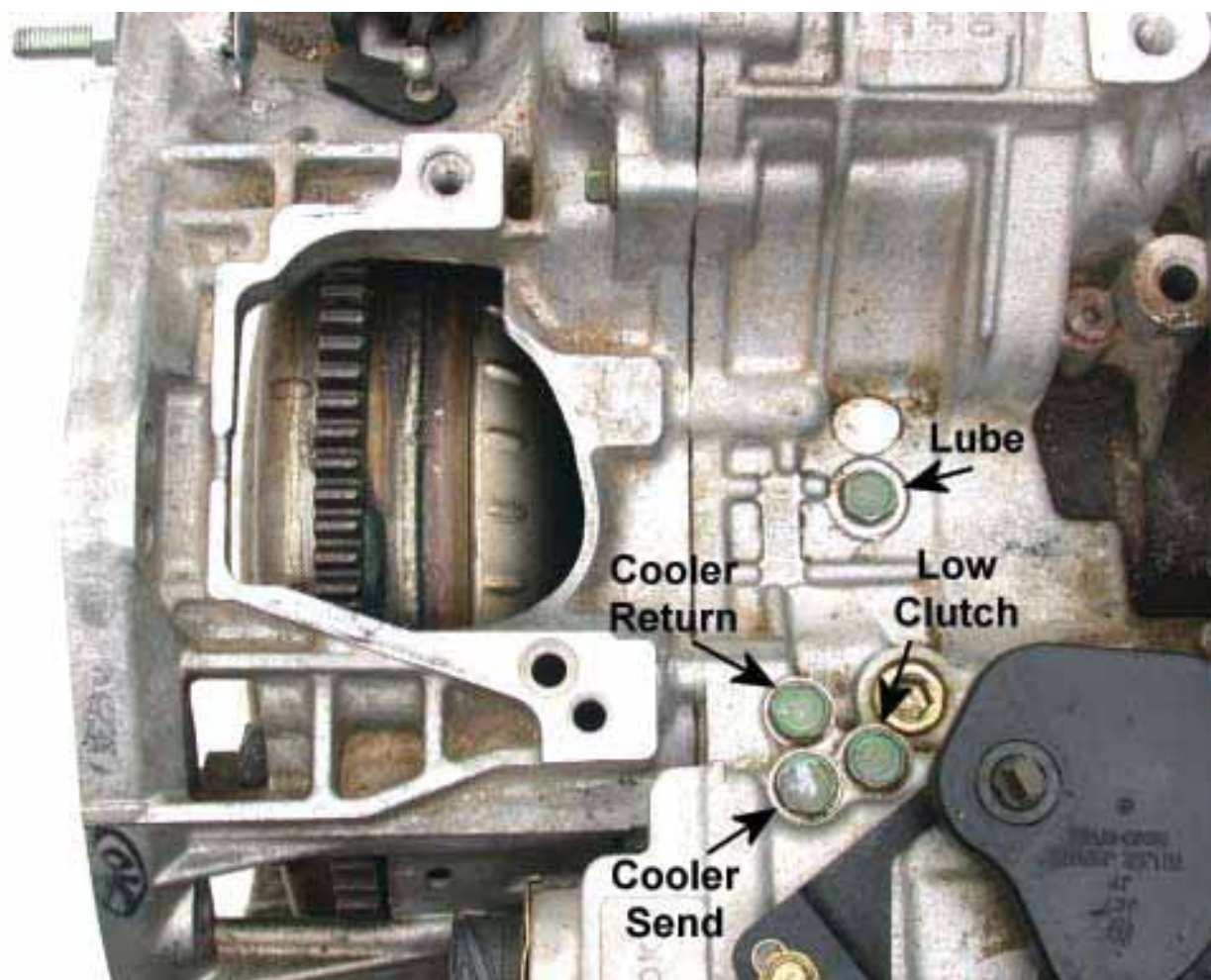


Broken cases are common due to the position of the transmission in the vehicle. The location of the transmission is low to the ground and surface street dips and other types of road hazards can cause the transmission to bottom out on the street surface.

Volkswagen

Pressure Taps (continued)

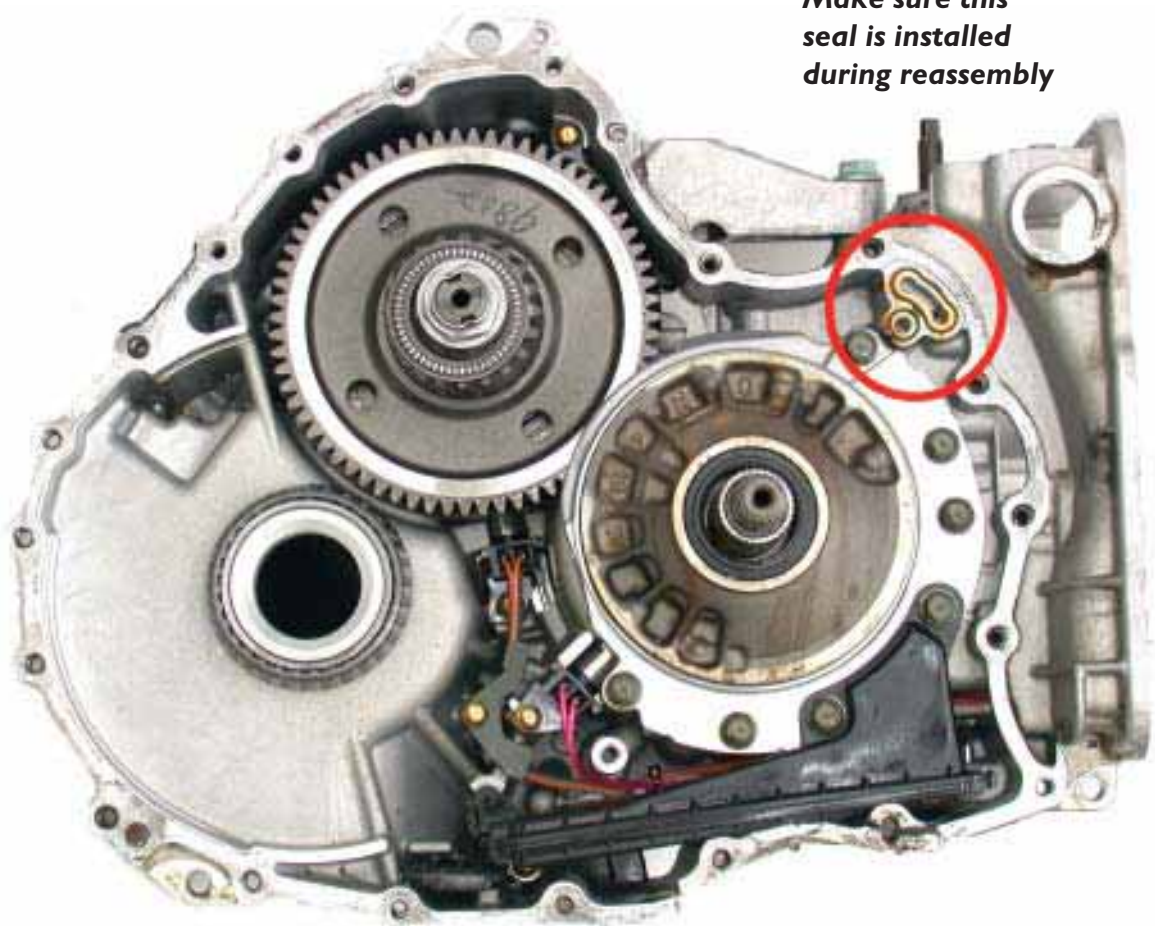
Pressure taps located at the top of case.



Volkswagen

Lube Failure

Make sure the Lube Seal is installed during your reassembly.

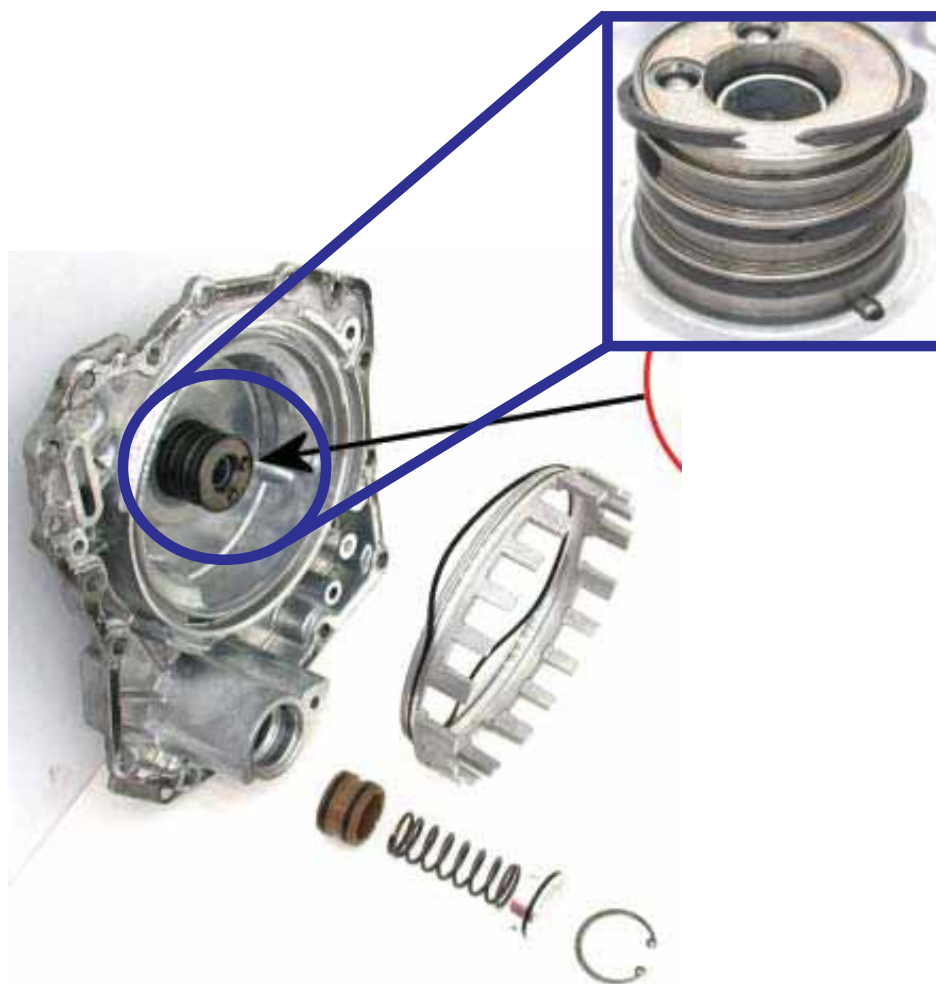


*Make sure this
seal is installed
during reassembly*

Volkswagen

Disassembly: End Cover Section

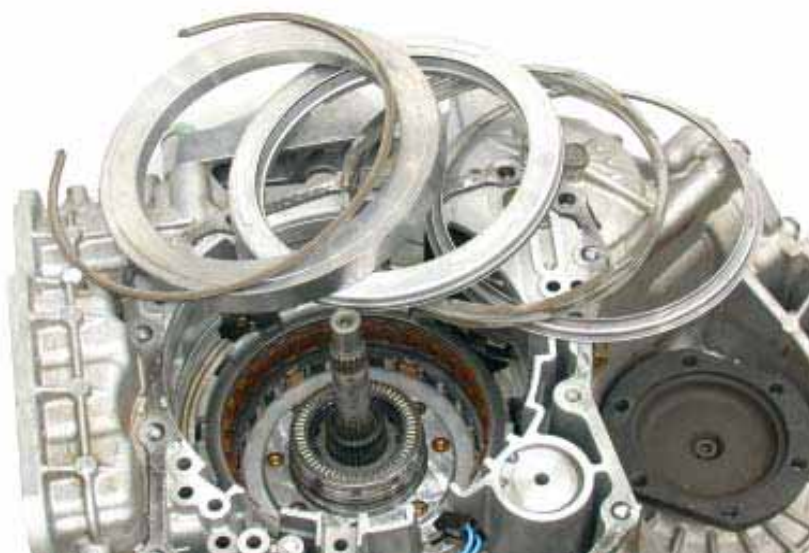
The V-Cut seals can be improperly installed. Be careful when installing the seals in the End-Cover section. Install seals with V-Cut as shown.



Volkswagen

Disassembly: End Cover Section (continued)

L/R piston housing, return spring, and spring seat.



***Correct return spring
seat installation***



Volkswagen

Reverse and High Clutch Drums

Piston cracks can be caused by crossleaks between the forward and reverse clutches. Inspect closely when there is a burnt/welded clutch failure. To check for crossleaks while in the vehicle, install a pressure gauge in the reverse clutch pressure tap. There should be 0 psi when in all of the forward ranges.

Check for cracks in this area



Volkswagen

Pump Specifications

The pump specifications are as follows:

Pump Clearances	Specifications
Outer Gear to Body	0.006"
Inner Lobe Tip Clearance	0.0008" - 0.0059"
Inner Gear Clearance	0.0008" - 0.0015"
Outer Gear Clearance	0.0008" - 0.0019"
Converter Hub Diameter	1.652" (41.97mm)
Converter Hub to Bushing Clearance	0.002" *
*Measured on a known good hub and bushing (There is no factory Specification)	

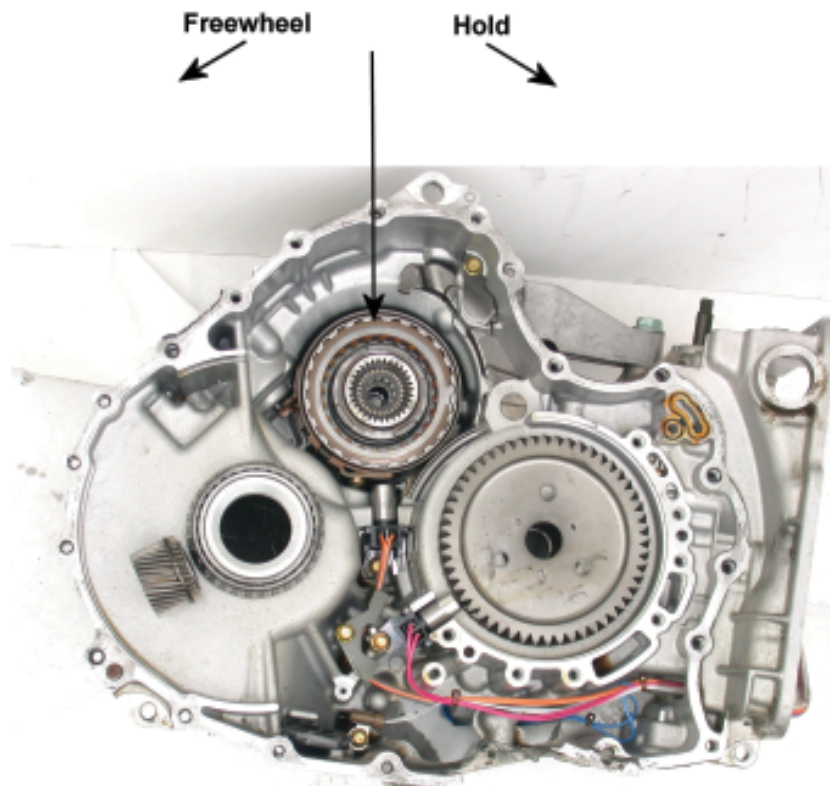


Bushing Installation:
Step is installed towards
the gear



Volkswagen

Sprag Rotation



Volkswagen

Sprag Rotation (continued)

