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Introduction

The RC4A-EL/JR405E by JATCO is a rear wheel drive 4 speed fully automatic electronically controlled transmission that is used in the 2003 to 2006 Mazda RX8 vehicles behind the 1.3 Rotary engine here in the United States. Outside of the U.S. it can be found in other applications such as Isuzu and General Motors.

The primary purpose of this presentation is provide information for a transmission that may rarely find its way into a shop. To have information is always a need and especially so with such a rare transmission. Additionally, the manufacturers do not provide any internal valve body information. In this hand out there is a complete valve body breakdown with names to valve assigned by ATSG. There is also available from ATSG a Technician Guide which contain complete color hydraulics for additional diagnostic assistance.

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RC4A-EL
JF405E

INDEX

Many thanks to Seth and the good folks at AACTION Transmissions in Miami Florida for the use of this transmission.

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RC4A-EL
PRELIMINARY INFORMATION

The RC4A-EL is JATCO's JR405E 4 speed computer controlled automatic transmission with On/Off converter clutch capabilities. Its US application has been limited to the Mazda RX8 from 2003 to 2006 but has current overseas coverage in Isuzu and Chevrolet vehicles.

As with many completely computer controlled transmissions, the gear shift mechanism provides a 4 Detent Position shifter with Tip Up/Tip Down manual shift control (Figure 1).

Shift Controls

The vehicle will only start in Park or Neutral Positions.

P (Park) - Places the internal park rod into a position which pushes a Park Pawl into a gear splined to the output shaft. Once indexed, it locks the output shaft preventing the rear wheels from rotating.

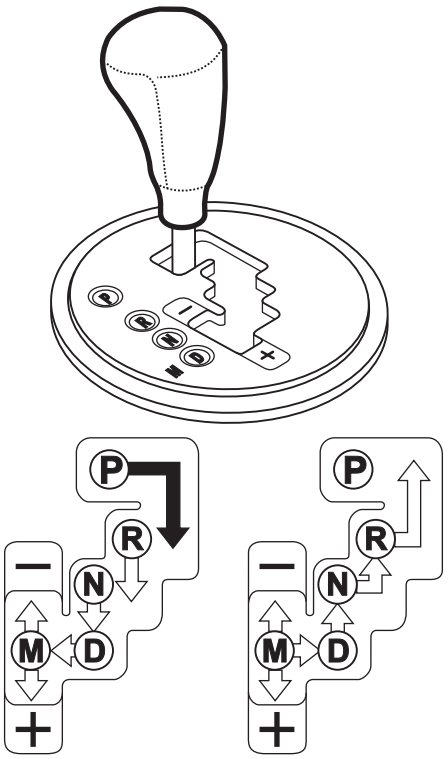
Warning - It is highly recommended that the Park Brake be used in conjunction with the selector lever in Park. Holding the vehicle in the Park position without the Park brake can be dangerous should the mechanical operation of the shift into Park fail.

R (Reverse) - This position provides reverse movement only. You must be at a complete stop before making this selection.

N (Neutral) - This position allows the wheels to be free to roll without power from the engine in both forward or reverse unless the Park Brake is applied.

D (Drive) - This position will allow the computer to control the sequence of all 4 forward gears automatically selecting the appropriate up-shifts and downshifts based upon the driving condition of the vehicle.

M (Manual) - This position will allow the operator to manual control each up-shift or downshift via the shift lever or through the paddles on the steering wheel (Figure 1 and 2).



Black Arrow - Indicates that the brake pedal must be depressed to shift (The ignition switch must be in the ACC or ON position).

White Arrow - Indicates the shift lever is free to move into any position.

Figure 1

Thumb Paddles

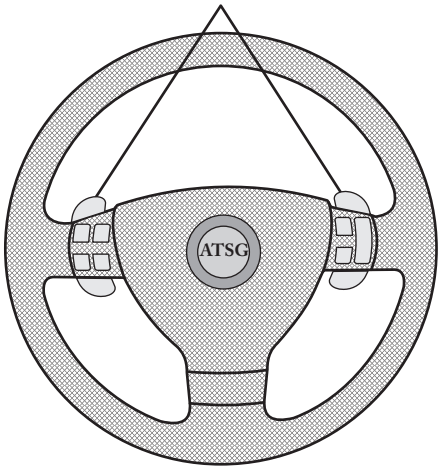


Figure 2

RC4A-EL
PRELIMINARY INFORMATION

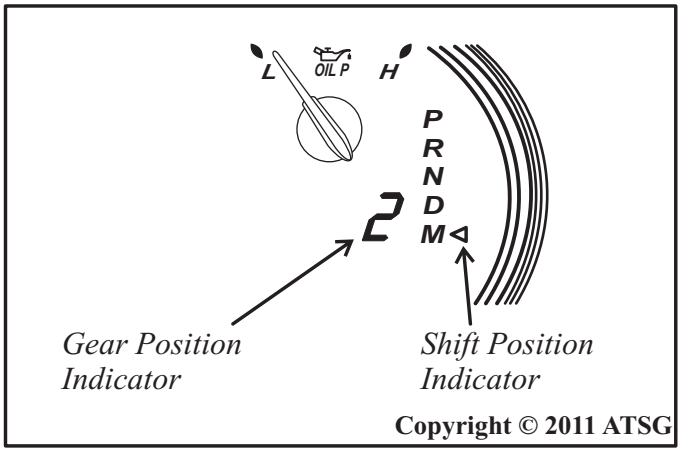


Figure 3

Once the selector lever has been placed into the Manual Mode Position, tapping the lever back towards the + sign will up-shift the transmission while tapping it forward towards the - sign will downshift the transmission. Similarly, the same procedure for manual up-shift and downshift control can be achieved while the selector lever is in the M gate tapping the up-shift and downshift paddles on the steering wheel.

Located in the Instrument Panel is a Shift Position Indicator light and a Gear Position Indicator light. This will inform the driver which mode has been selected with the selector lever as well as the current gear engaged (Figure 3).

When in the Manual Shift Mode, there are certain safety overrides written into the program to be aware of so as to know what is working correctly and what is actually malfunctioning.

Shifting Specifications

Up-Shift
If the vehicle speed is lower than the following speed specification for each gear, the gear cannot be shifted up to a higher gear.

M1 to M2 - A manual shift from 1st to 2nd can be achieved whether the vehicle is stopped or moving.
M2 to M3 - 20 km/h (12 mph)
M3 to M4 - 31 km/h (19 mph)

Downshift
If the vehicle speed is higher than the following speed specification for each gear, the gear cannot be shifted down to a lower gear.

M4 to M3 - 163 km/h (101 mph)
M3 to M2 - 110 km/h (68 mph)
M2 to M1 - 45 km/h (28 mph)

During deceleration, the gears will automatically downshift when speed is reduced to the following:

M4 to M3 - 31 km/h (19 mph)
M3 or M2 to M1 - 8 km/h (5 mph)

If the vehicle is driven at a low speed from a standing start while in M2, the gear may not shift down to M1 automatically. If the vehicle is kicked down at the following speeds or lower, the gears shift down automatically:

M4 to M3 - 149 km/h (93 mph)
M4 to M2 - 56 km/h (35 mph)
M3 to M2 - 56 km/h (35 mph)

Recommendations for shifting

Up-shifting
For normal acceleration and cruising, the following shift points are recommended:

M1 to M2 - 19 km/h (12 mph)
M2 to M3 - 34 km/h (21 mph)
M3 to M4 - 47 km/h (29 mph)

For Cruising
M1 to M2 - 18 km/h (11 mph)
M2 to M3 - 32 km/h (20 mph)
M3 to M4 - 45 km/h (28 mph)

Downshifting
When you must slow down in heavy traffic or on a steep upgrade, downshift before the engine starts to overwork. This gives better acceleration when you need more speed. On a steep downgrade, downshifting helps maintain safe speed and prolongs brake life.

RC4A-EL
PRELIMINARY INFORMATION

Passing
For extra power when passing another vehicle or climbing steep grades, depress the accelerator fully. The transmission will shift to a lower gear, depending on vehicle speed.

Climbing steep grades from a stop
To climb a steep grade from a stopped position:

1. Depress the brake pedal.
2. Shift to D or M1, depending on the load weight and grade steepness.
3. Release all brakes while gradually accelerating.

Descending steep grades
When descending a steep grade, shift to lower gears, depending on load weight and grade steepness. Descend slowly, using the brakes only occasionally to prevent them from overheating.

Shift features
The design of the electronic shift control has been engineered in such a way that the use of typical accumulators, a forward one-way clutch device and coast clutch drum assembly has been eliminated. The one reverse gear and four forward speeds are obtained by the use of 1 sprag, 3 driving clutch assemblies and 2 brake clutch assemblies (Figure 4).

For each clutch and brake assembly, a directional sensitive dished plate is utilized to absorb any possible shift shock as seen in figure 5 through 10.

A feed back control system (*pressure switches/speed sensors*) is utilized in part for shift adapt control in conjunction with centrifugal balance chambers supplied with lubrication pressure for enhanced clutch management during shift overlap.

The RC4A-EL transmission utilizes a 3 part lubrication system directly from the valve body. This fluid pressure is never routed through the cooler. Only converter apply pressure is routed through the cooler. In this way should the cooler become restricted, lubrication pressure is not compromised preventing planetary failure. The three part lubrication system provides lubrication to the extension housing area, the rear of the transmission through output and into the input shaft for planetary and bushing lube and the third circuit provides lubrication to the front of the transmission through the pump (see case passage identification in figures 11 and 12).

In addition to lubrication, the front lubrication pressure is supplied to the high clutch balancing chamber while the rear lubrication pressure is supplied to the low clutch balancing chamber.

Sealing rings, bushings and counter balance pistons are critical in sealing lube pressure. Should a loss of lubrication pressure occur in the balance chambers, the Neutral to Drive, 2-3 and 4-3 shifts may become noticeably abrupt. There are no taps to check lube pressure (figure 13), so a careful inspection of these lube circuits is suggested during rebuild.

Transmission Fluid Specification
8.7L/9.2 Quarts
ATF M-III or equivalent (e.g. Dexron® III)

Valve Body/ Solenoids/Pressure Switches
The valve body assembly which contains all the valves, solenoids and pressure switches provides a means by which the computer can control shift timing as well as shift feel.

There are a total of 6 solenoids, three pressure switches, 23 valve line-ups and 11 check balls making up the main valve body components (figures 14 to 24).

Solenoids and Pressure Switches
1. Line Pressure Control - *Normally Applied*
2. Converter Clutch Control - *Normally Vented*
3. Low Clutch (Solenoid A) -*Normally Applied*
4. 2-4 Brake (Solenoid B) - *Normally Applied*
5. High Clutch (Solenoid C) - *Normally Applied*
6. L/R Clutch (Solenoid F)-*Normally Applied*
7. 2-4 Brake Pressure Switch (PS-B)
8. High Clutch Pressure Switch (PS-C)
9. L/R Clutch Pressure Switch (PS-F)

RC4A-EL
PRELIMINARY INFORMATION

Solenoids

The Line Pressure Control Solenoid is an On/Off solenoid causing line pressure to be either high or low. The Shift Solenoids are then used to control both shift timing and shift feel.

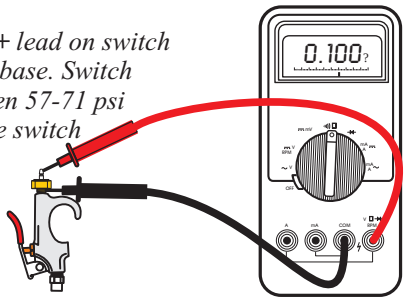
Although this transmission does not utilize typical accumulators to control shift shock, inside the valve body there can be found accumulators for the 2-4 Clutch (392) and High Clutch (345). However, since each of the shift solenoids control shift feel in addition to shift timing, they each have their own accumulators to absorb the pulsing of solenoid signal oil (See valves 322, 357, 378 and 383 figures 19-22).

All solenoids are supplied with a controlled feed pressure from the Solenoid Modulating Valve (381). This valve should always be inspected for bore wearing compromising the control of each solenoid. Wear here could cause both shift timing and feel issues along with gear ratio and solenoid performance codes.

Pressure Switches

For further control of clutch apply, three pressure switches are used to provide feedback information to the computer; the 2-4, High and Low/Reverse Clutch Pressure Switches. The 2-4 pressure switch provides information to the computer for finer control of the 1-2 and 3-4 shifts. The High Clutch Pressure Switch for the 2-3 and the Low/Reverse for a garage shift into Reverse. Each of these pressure switches have a 12 volt signal wire attached to them coming from the computer with approximately 12 volts. The switches are rated to close between 57-71 psi of pressure at which time they will ground the wire pulling the voltage down to below 1 volt.

PS Bench Test: Place + lead on switch terminal and - lead at base. Switch should read open. When 57-71 psi of air is supplied to the switch continuity should be observed.



Solenoid Function Chart

Solenoid	Type	Characteristics	Function	
Pressure Control Solenoid	ON/OFF	Normally High (Supplies solenoid pressure to PR valve)	Sets high or low line pressure depending on whether the solenoid is energized or de-energized	
SS A	Repeats ON and Off at 50 Hz (20 ms cycle); duty cycle type.	Normally High (Supplies solenoid pressure to amplifier valve)	Controls supply and drainage of solenoid pressure, according to change in ON time ratio (0-100%) for one cycle.	Controls amplifier valve. Regulates Low Clutch Pressure
SS B				Controls amplifier valve. Regulates 2-4 Brake Pressure
SS C				Controls amplifier valve. Regulates High Clutch Pressure
SS F				Controls amplifier valve. Regulates L/R Brake Pressure
TCC		Normally Low (Drains solenoid pressure supplied to amplifier valve)		Controls TCC Apply and Release

RC4A-EL
PRELIMINARY INFORMATION

Check Ball Function
The majority of the 11 check balls in the valve body controls off coming clutch pressure (figure 24). The basic function of each of the 11 check balls are as follows:

1. *Lubrication Ball*
2. *Lubrication Ball*
3. *Low Clutch Exhaust Ball (D-N, D-R, D-P)*
4. *TCC Blow Off Ball*
5. *High Clutch Exhaust Ball*
6. *Relay Shuttle Ball*
7. *Low Clutch Exhaust Ball (4-3)*
8. *Reverse Clutch Exhaust Ball*
9. *Reverse Clutch Exhaust Ball*
10. *Low/Reverse Brake Exhaust Ball*
11. *2-4 Brake Exhaust Ball*

Shift Control Summary
To provide a smooth transition from one gear to the next requires the proper operation of the following mechanical items:

1. *The Pressure Control Solenoid*
2. *The Pressure Regulator Valve*
3. *The Solenoid Modulating Valve*
4. *Shift Solenoids*
5. *Pressure Switches*
6. *Lubrication Pressure*
7. *Counter Balance Pistons*
8. *Clutch Assembly Cushion Plates*
9. *Accumulators*
10. *Check Balls*

Electrical Summary
The Mazda RX8 utilizes a Transmission Control Module (TCM) to operate the transmission. The TCM is located under the dash to the left side of the steering column.

Solenoid resistance checks can be made at the transmission case connector (figure 25) or from the TCM connector (figures 28 and 29).

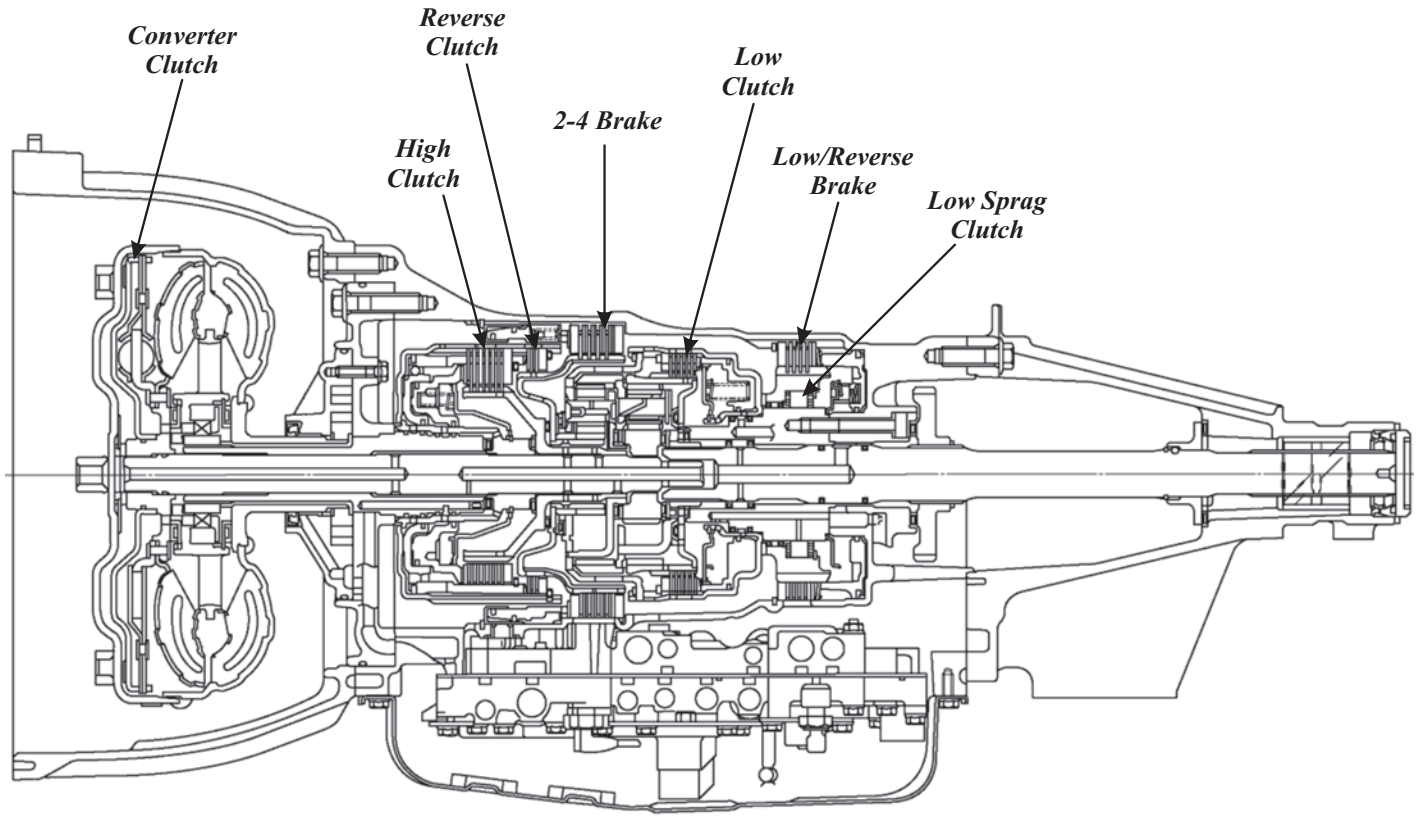
The Transmission Range sensor is adjusted in the Neutral Position by loosening the sensor from the case. The manual arm shaft lever has a square opening which aligns with a notch in the case. The range sensor is then rotated until continuity is seen with a meter between terminals C & D (figure 30). The sensor is then tightened to the case. A continuity check table for each gear shift range is provided in figure 30 to bench check the sensor following the neutral position adjustment procedure ensuring its proper operation.

The transmission fluid temperature sensor is a critical input to the TCM for refined control of the 3-4 shift and converter clutch apply. A resistance check chart is provided in figure 31 for inspection.

The Turbine Speed Sensor (TSS) and the Vehicle Speed Sensor (VSS) are identical Hall Affect sensors. They are each supplied with the same 12 voltage ignition source provided to the TCM and the Transmission Range Sensor (see figure 29). These Hall Affect provide a 0 to 5 volt pulse to the TCM. The TSS is excited by the 32 corrugated lugs on the High/Reverse Clutch drum while the VSS is excited by the 16 lugs on the parking gear (figure 31). This 5 volt pulse is best observed with a scope or digital graphing multi-meter. A typical DVOM would only average out the signal providing a 2.5 volt reading regardless of the speed of the vehicle. Since the TSS and VSS are excited by different lug counts combined with differences in rotational speed, the time base settings for each sensor can be adjusted to provide a similar appearance. The critical point of observation is that the sensor must provide a 0 to 5 volt pulse. As the rotational speed of the shaft increases so does the 0 to 5 volt pulse making the square signal narrower then wider as the speed decreases.

Should a malfunction of the transmission or related electrical components occur, a diagnostic trouble code will be produced placing the transmission into a failsafe condition. Refer to figures 32 and 33 for the listing of transmission related codes.

Mazda RX8 RC4A-EL Component Location Chart



COMPONENT APPLICATION AND SHIFT SOLENOID CHART

Gear	*Low Clutch*	*High Clutch*	*Reverse Clutch*	*2-4 Brake*	*L&R Brake*	*Low Sprag Clutch*	*PWM Sol "A"*	*PWM Sol "B"*	*PWM Sol "C"*	*PWM Sol "F"*	*TCC Sol*	*PS "B"*	*PS "C"*	*PS "F"*	*Gear Ratio*
Park								*X*	*X*	*X*					
Reverse			*On*		*On*			*X*	*X*					*X*	*2.272*
Neutral								*X*	*X*	*X*					
"D"-1st	*On*					*Hold*		*X*	*X*	*X*					*2.785*
"D"-2nd	*On*			*On*					*X*	*X*		*X*			*1.545*
"D"-3rd	*On*	*On*						*X*		*X*	*X**		*X*		*1.000*
"D"-4th		*On*		*On*			*X*			*X*	*X**	*X*	*X*		*0.694*
"M"-1st	*On*				*On**			*X*	*X*						*2.785*

X = Operating, Solenoids are On.
X = Torque Converter Clutch may be on depending on vehicle speed and throttle opening.*
M = When in Manual shift mode.

Figure 4

Low/Reverse Brake Assembly
Clutch Clearance Specification
0.028" - 0.043"(0.7 - 1.1 mm)

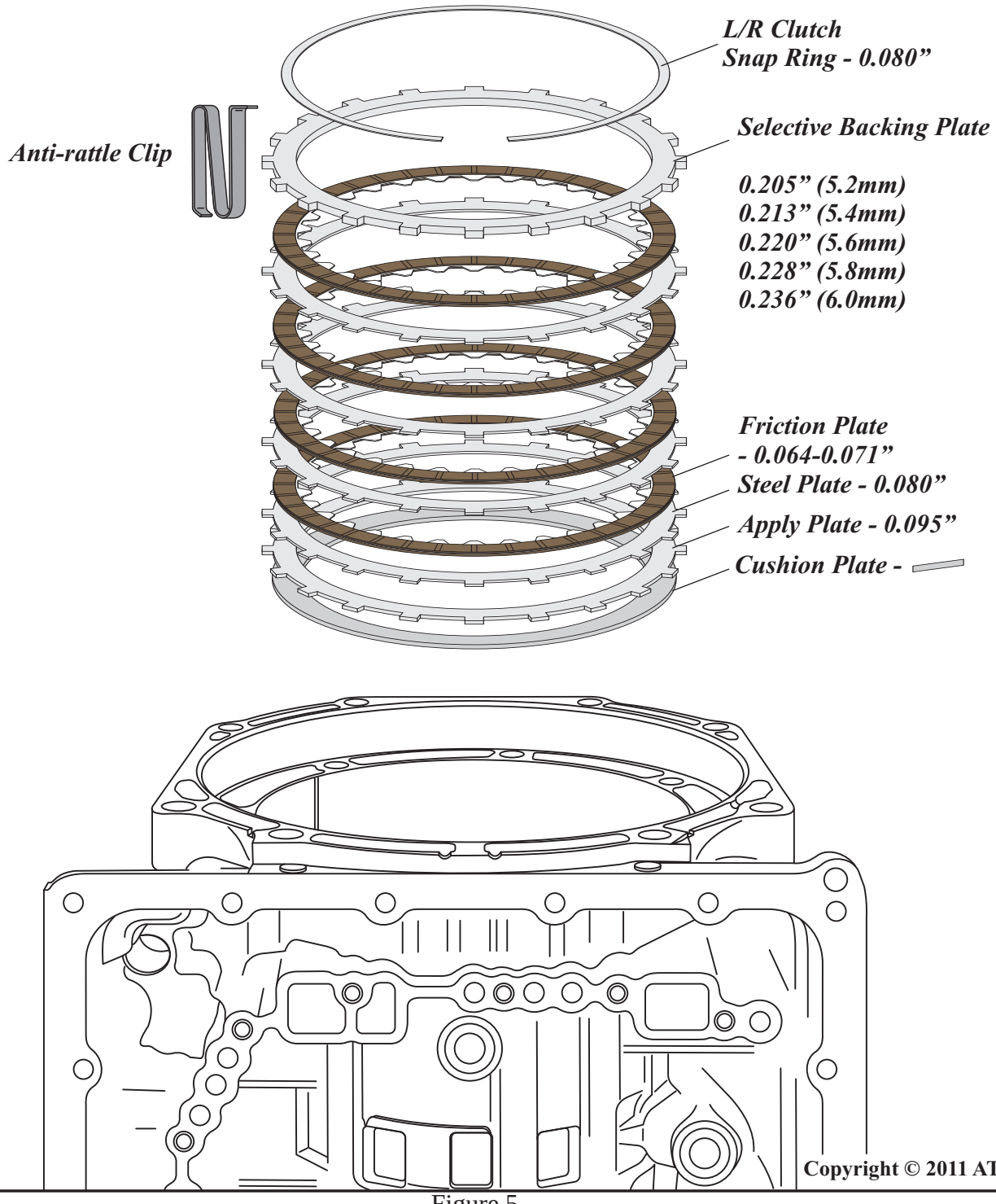
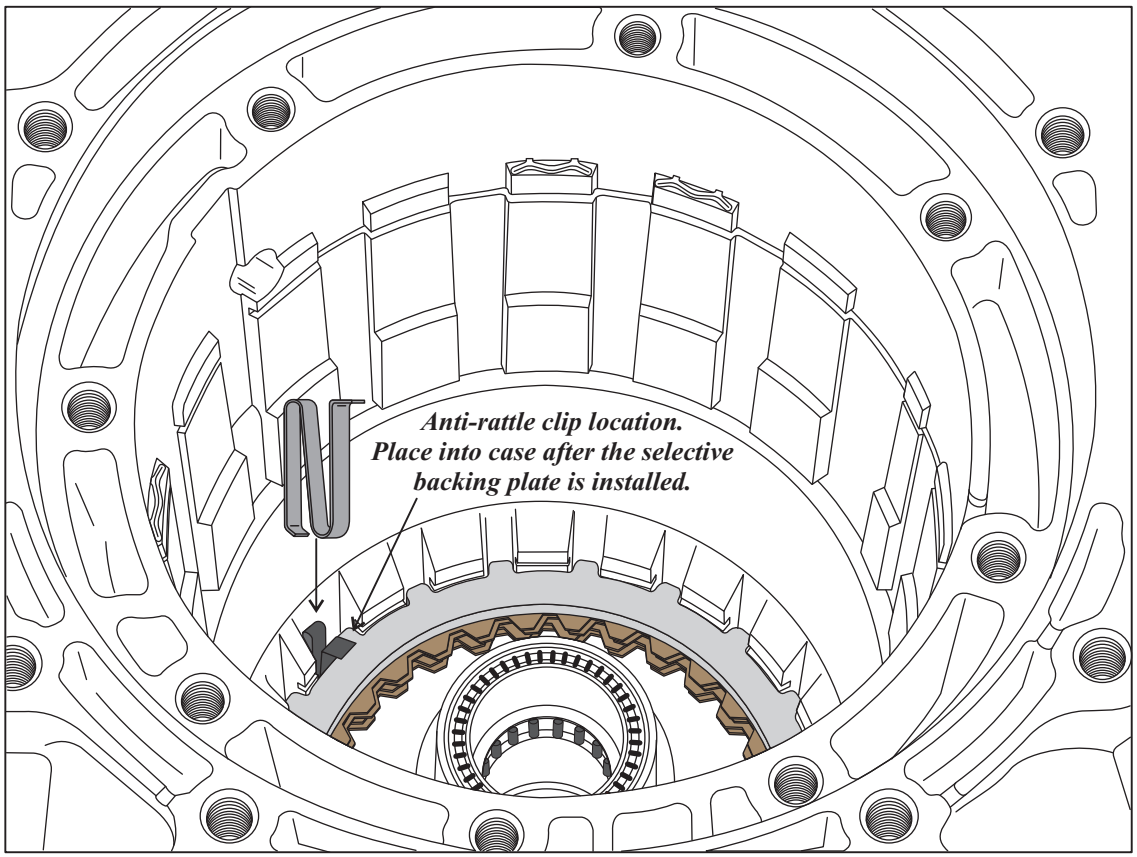


Figure 5



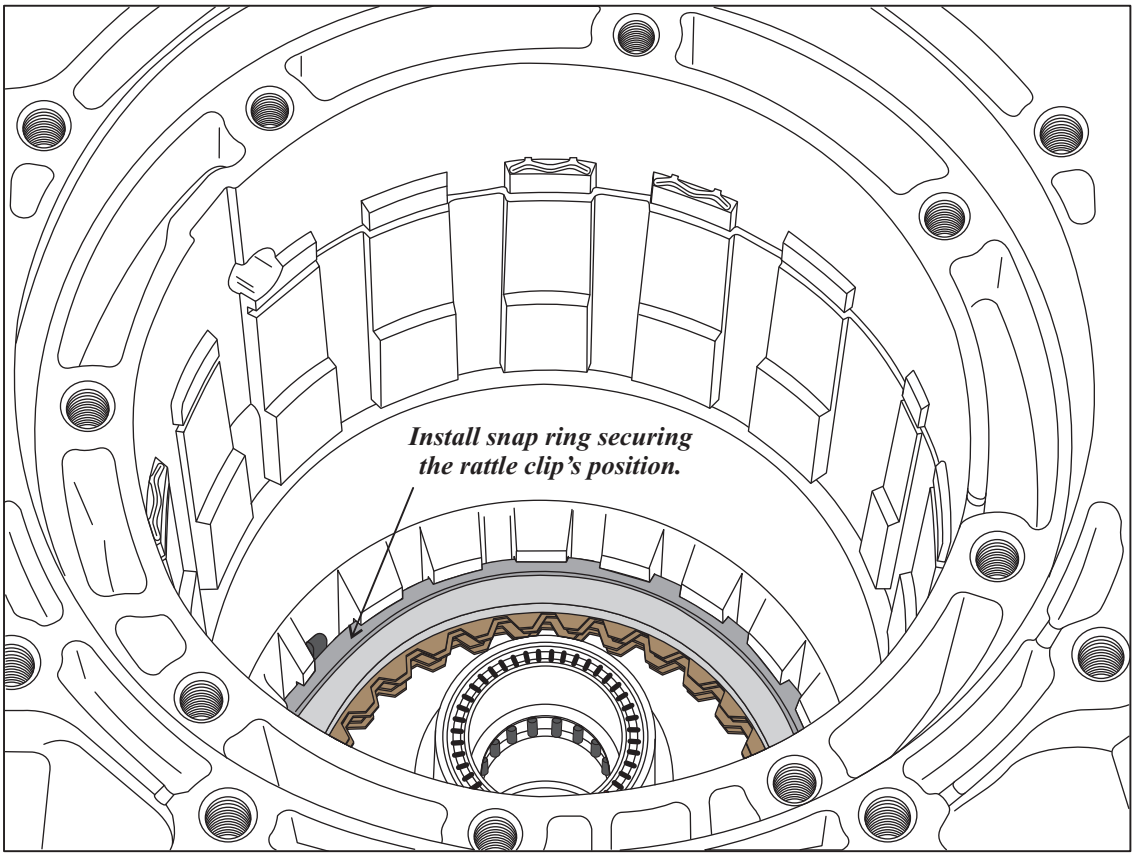
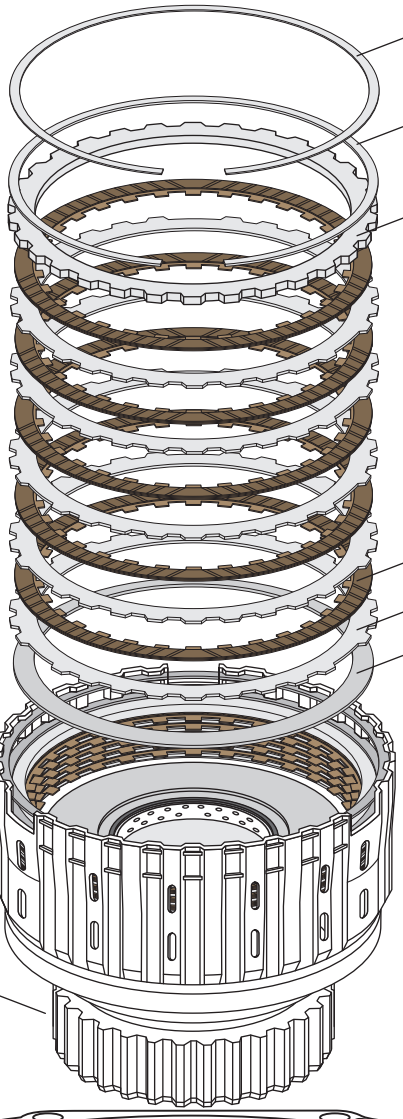


Figure 6

Low Clutch Drum Assembly



Front Carrier Snap Ring - 0.064”

Low Clutch Snap Ring - 0.080”

Clutch Clearance Specification
0.036” - 0.051”(0.9 - 1.3 mm)

Selective Backing Plate

0.150” (3.8mm)
0.157” (4.0mm)
0.165” (4.2mm)
0.173” (4.4mm)
0.181” (4.6mm)
0.189” (4.8mm)

Friction Plate - 0.064” - 0.071”

Steel Plate - 0.080”

Cushion Plate -

<u>Low Sprag</u> inside the Low Drum Assembly and will rotate clockwise and lock counter-clockwise when installed into the transmission

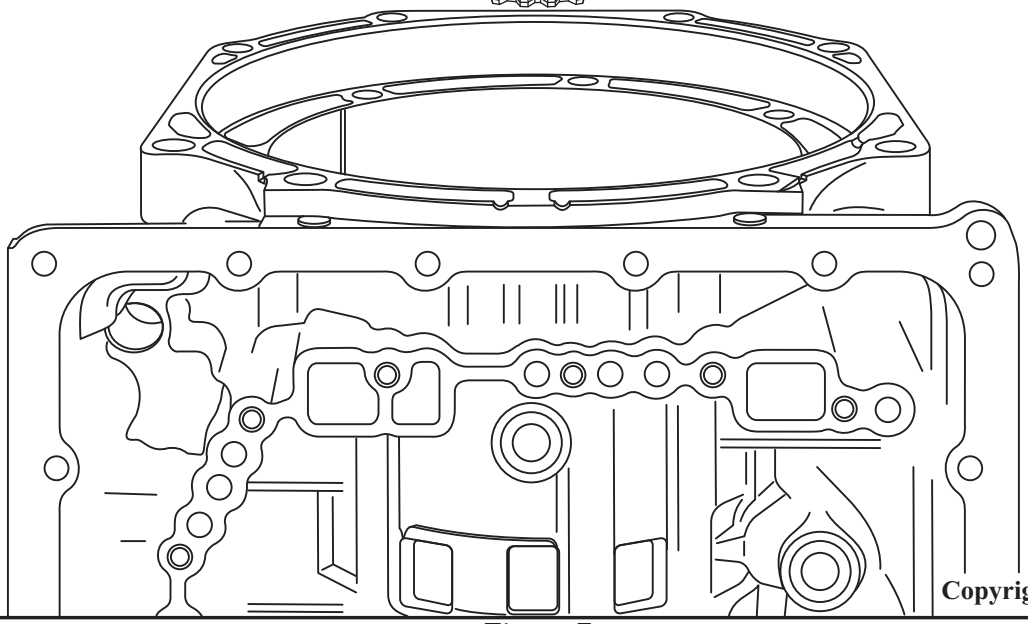


Figure 7

2-4 Brake Assembly
Clutch Clearance Specification
0.040" - 0.055"(1.0 - 1.4 mm)

There are 3 steel plate centering springs to be installed into the case

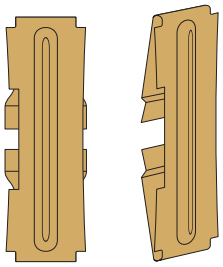
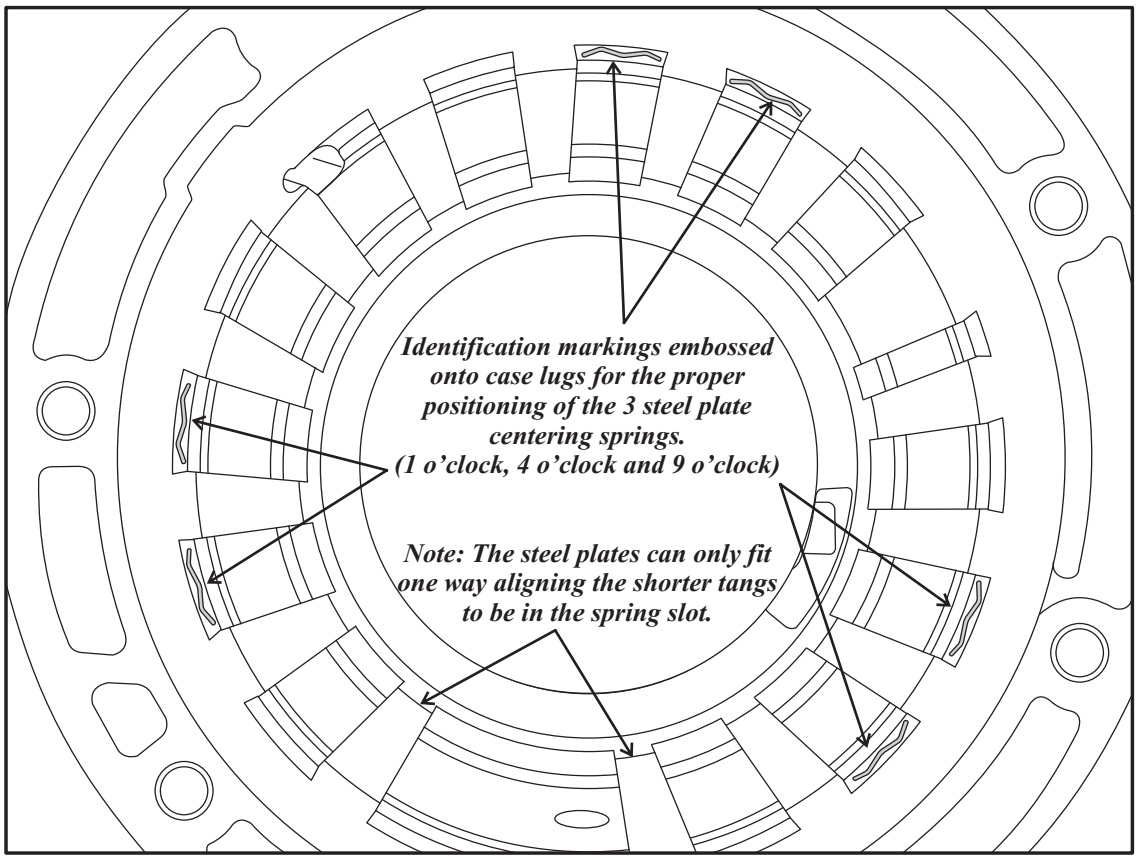


Figure 8



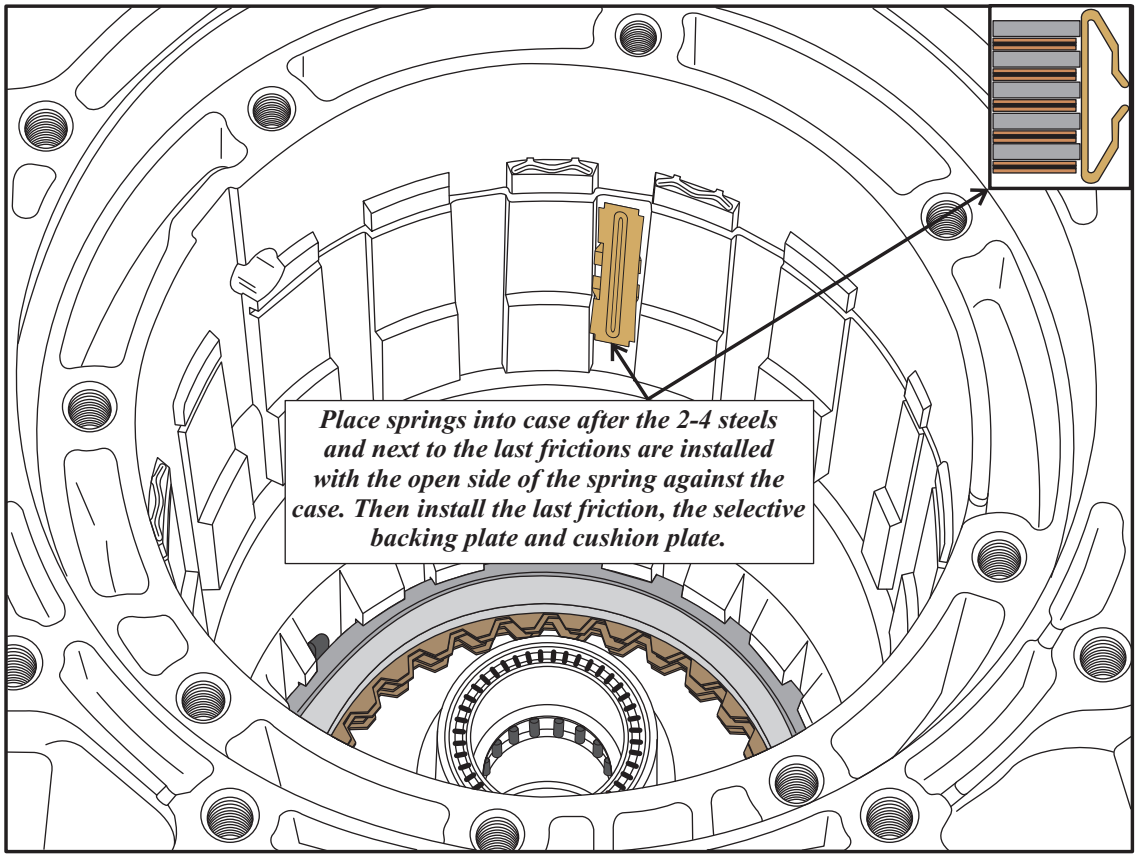
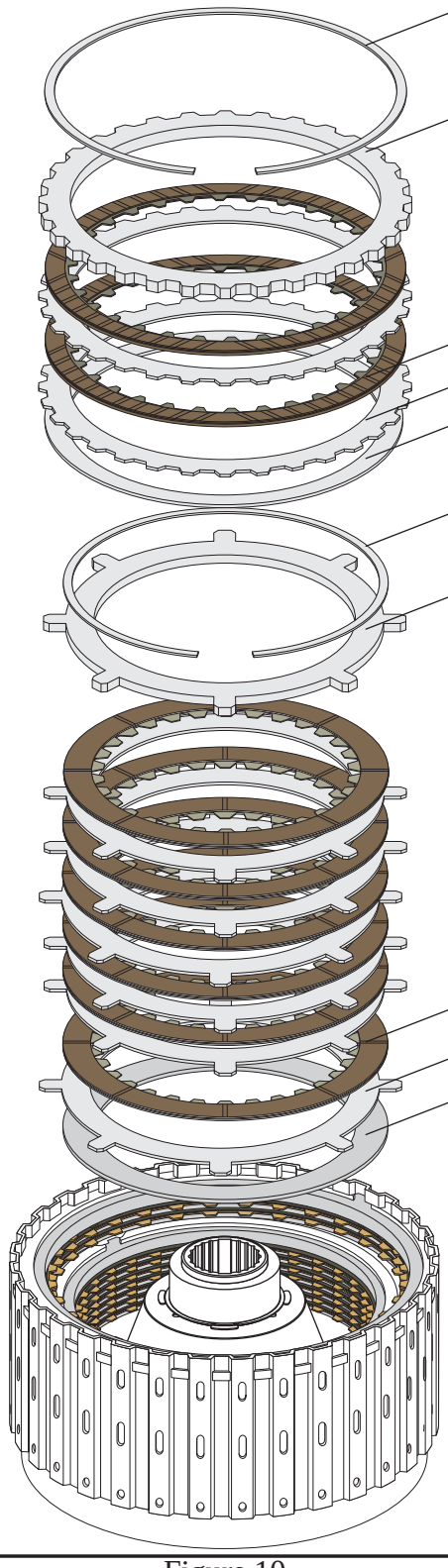


Figure 9

High And Reverse Clutch Drum Assembly
Clutch Clearance Specification
Reverse Clutch 0.024" - 0.036"(0.6 - 0.9 mm)
High Clutch 0.047" - 0.055" (1.2 - 1.4 mm)



Reverse Clutch
Snap Ring - 0.080"

Selective Backing Plate

0.191" (4.8 mm)
0.197" (5.0 mm)
0.205" (5.2 mm)
0.213" (5.4 mm)

Reverse Clutch Assembly

Friction Plate - 0.064" - 0.071"
Steel Plate - 0.064"
Cushion Plate -

High Clutch Snap Ring - 0.080"

Selective Backing Plate

0.181" (4.6 mm)
0.185" (4.7 mm)
0.191" (4.8 mm)
0.193" (4.9 mm)
0.197" (5.0 mm)
0.201" (5.1 mm)
0.205" (5.2 mm)
0.209" (5.3 mm)
0.213" (5.4 mm)

High Clutch Assembly

Friction Plate - 0.064" - 0.071"
Steel Plate - 0.080"
Cushion Plate -

Figure 10

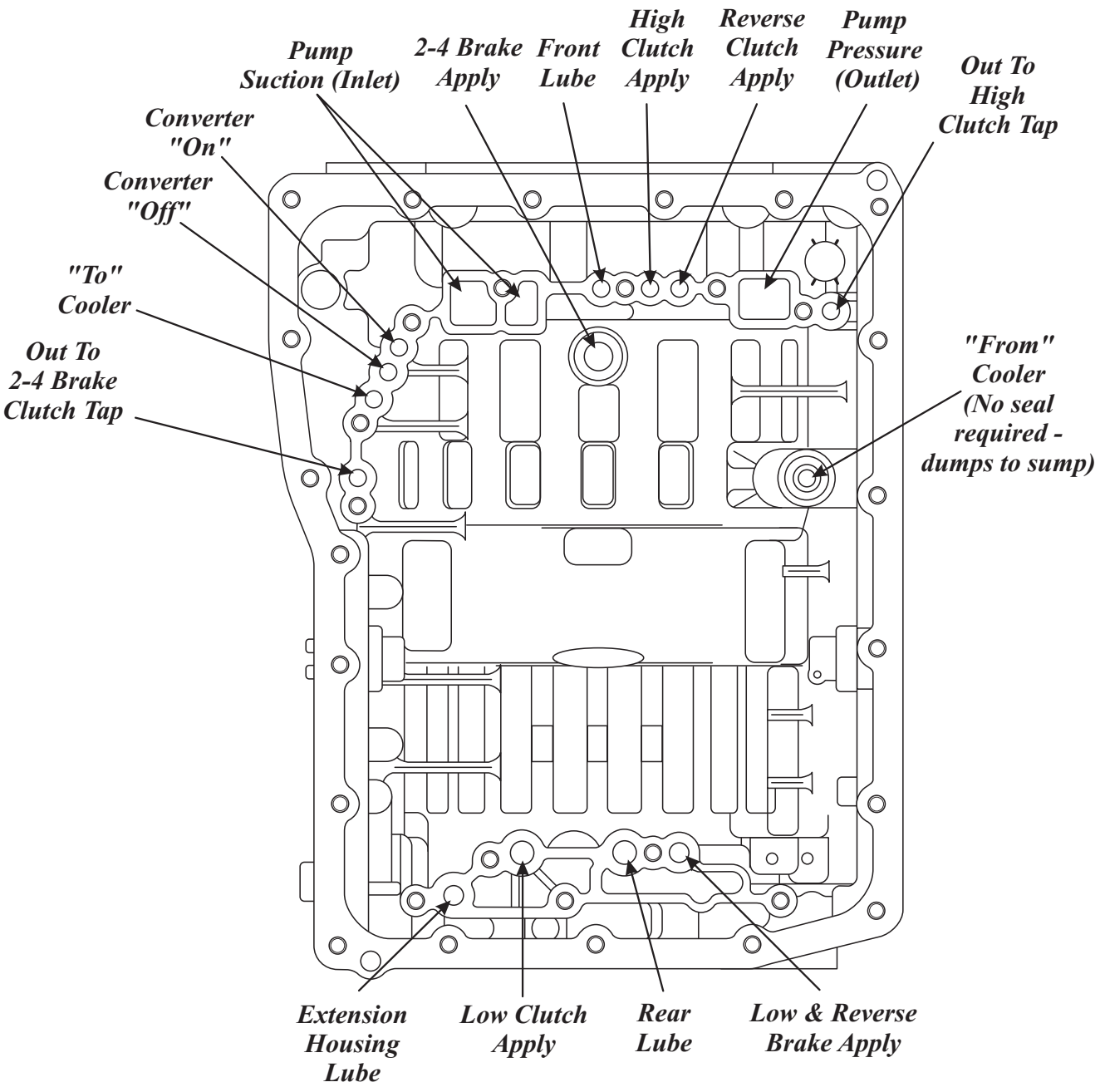


Figure 11

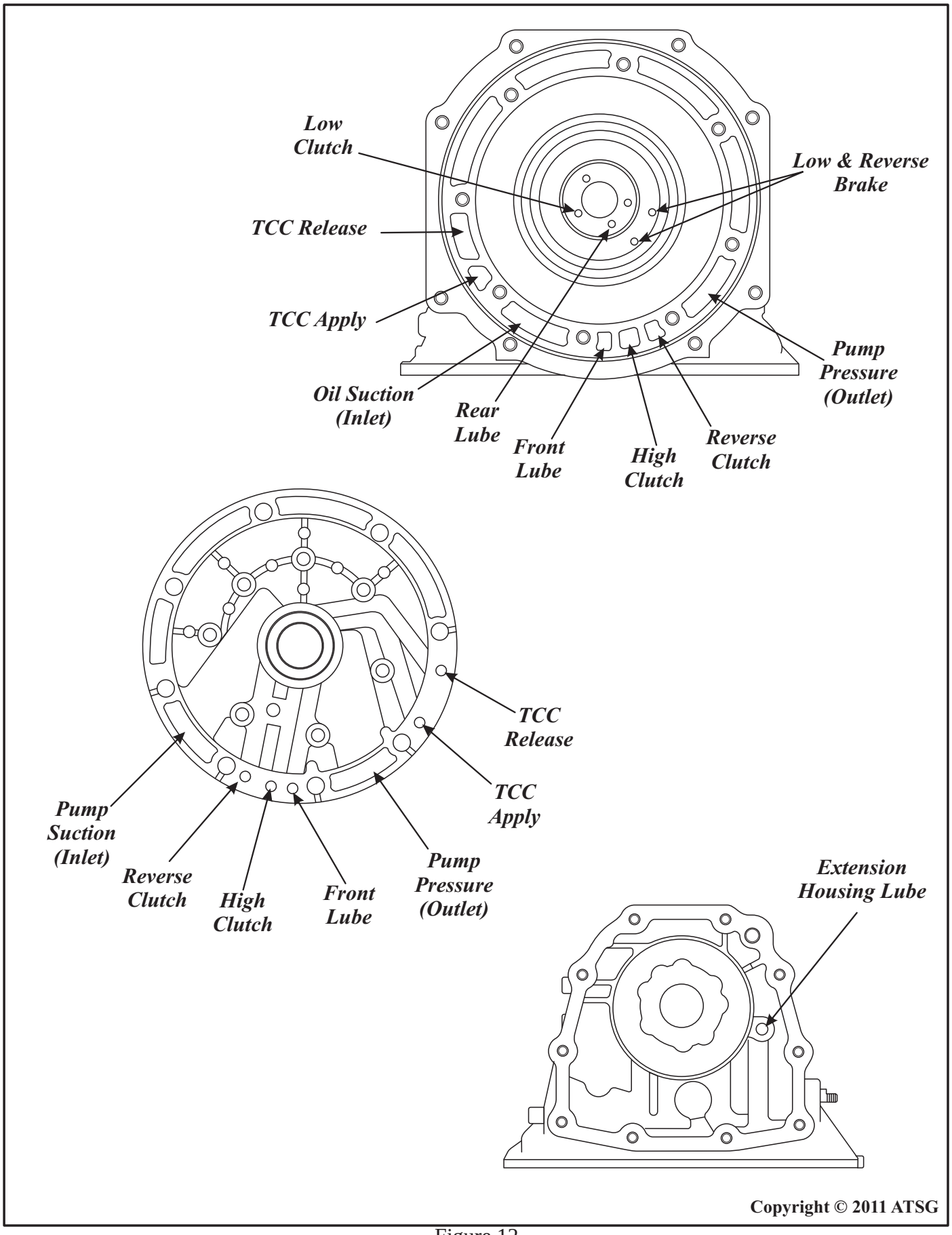
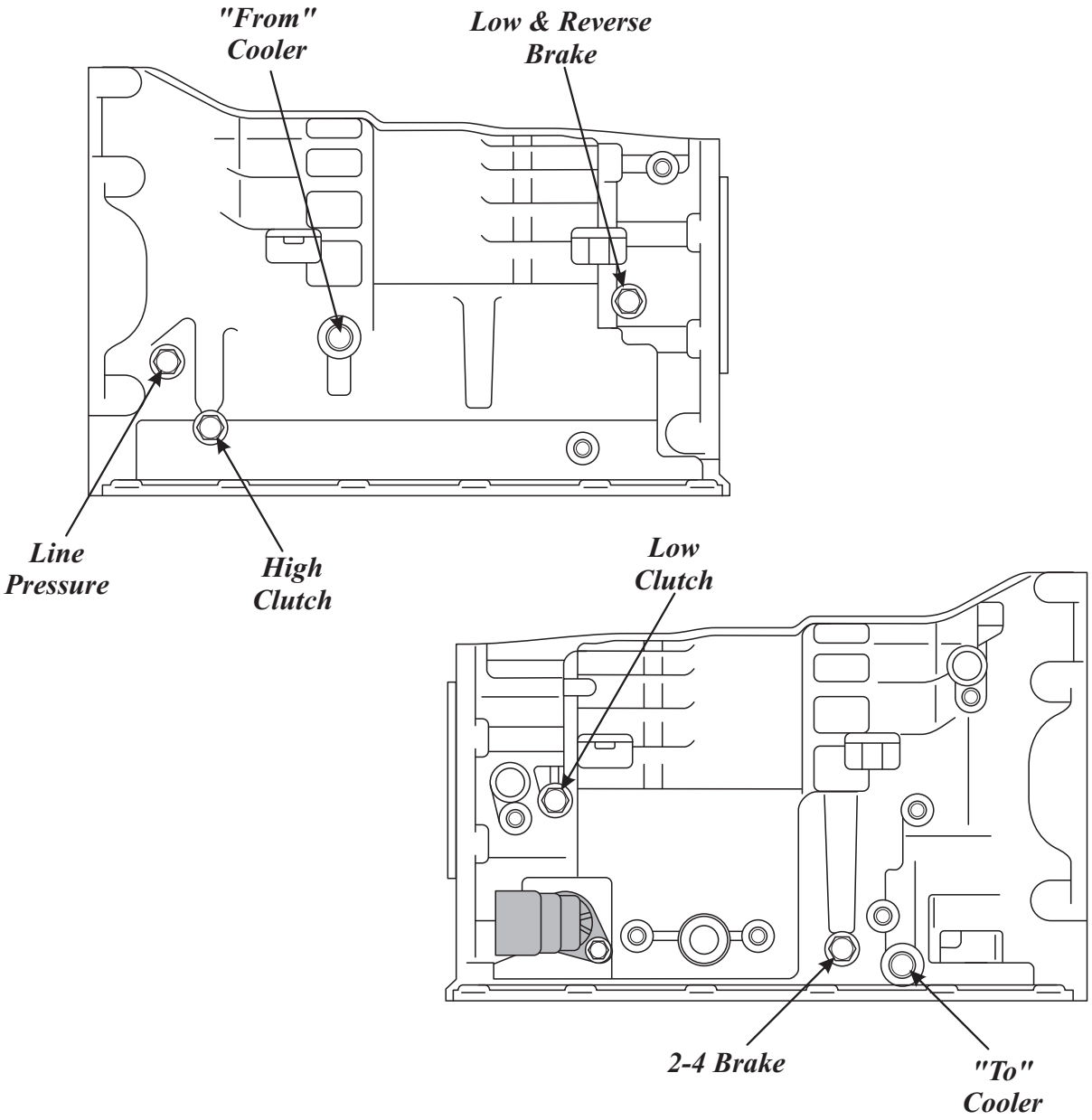


Figure 12



P	**Idle**	**55-84 psi**	**380-580kPa or 3.9-5.9 kgf/cm^2**
R	**Idle**	**55-84 psi**	**380-580kPa or 3.9-5.9 kgf/cm^2**
	Stall	**213-247 psi**	**1,470-1,700 or 15.0-17.3 kgf/cm^2**
D, M	**Idle**	**46-65 psi**	**320-450kPa or 3.3-4.6 kgf/cm^2**
	Stall	**164-193 psi**	**1,130-1,330 or 11.5-13.6 kgf/cm^2**

Note - Clutch pressure will be the same as line pressure when the clutch is fully engaged.

Figure 13

Solenoid And Switch Location And Identification

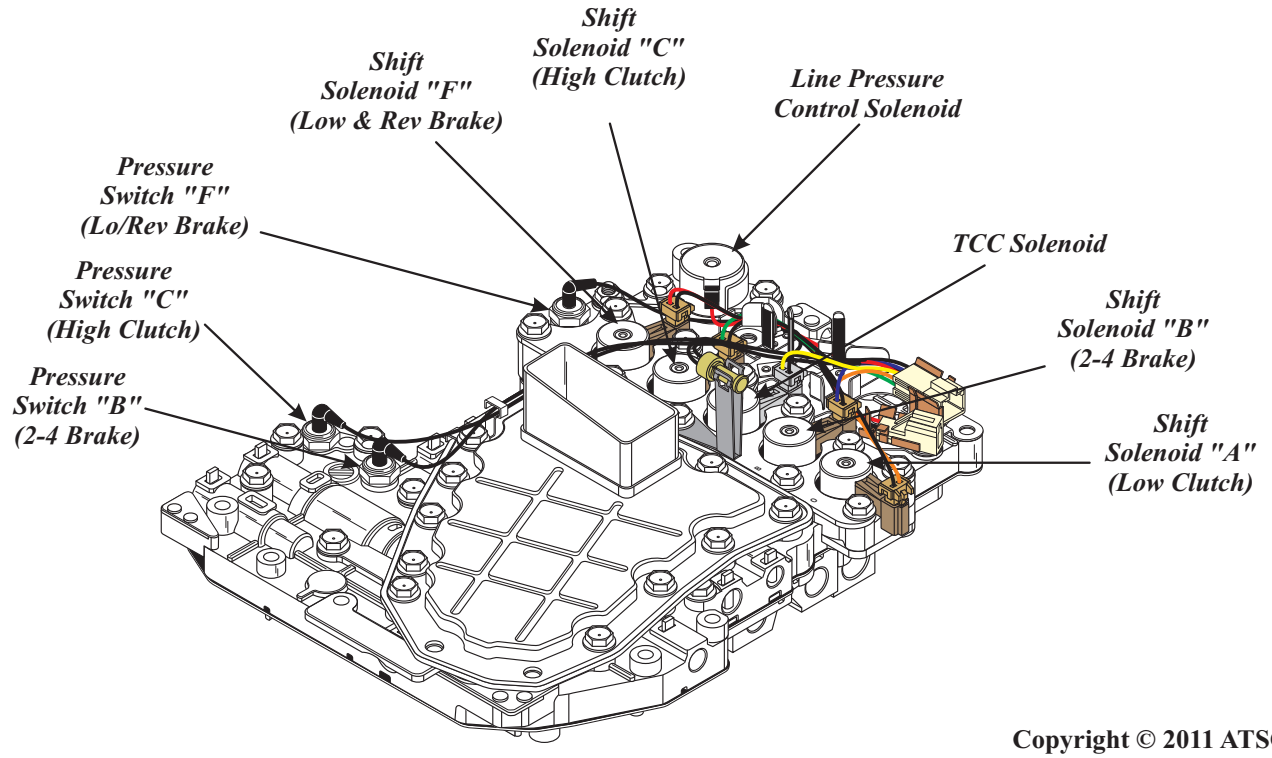
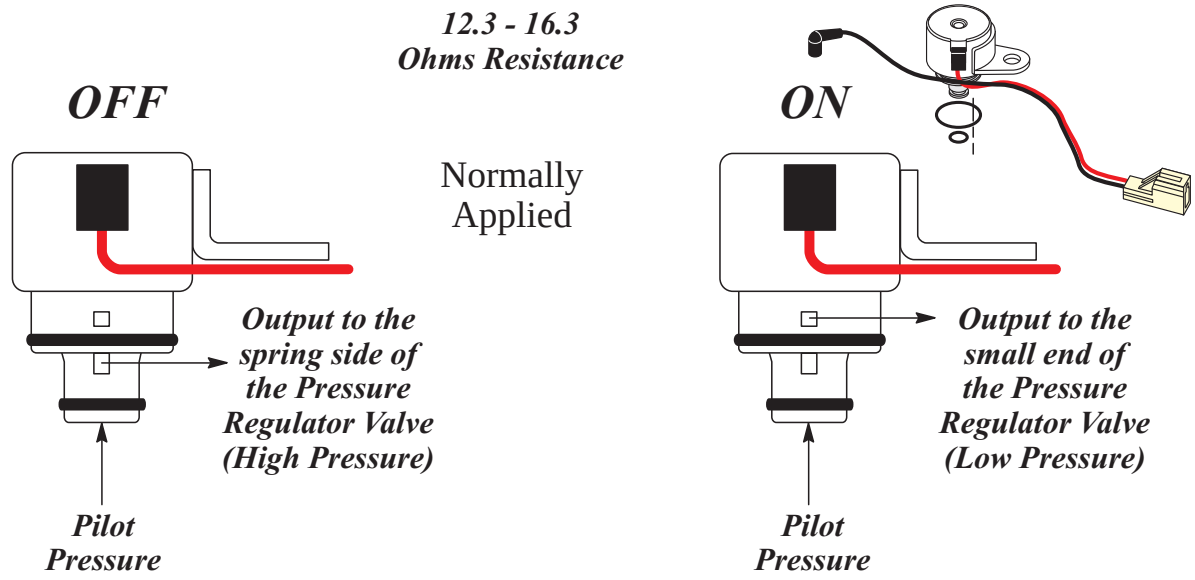


Figure 14

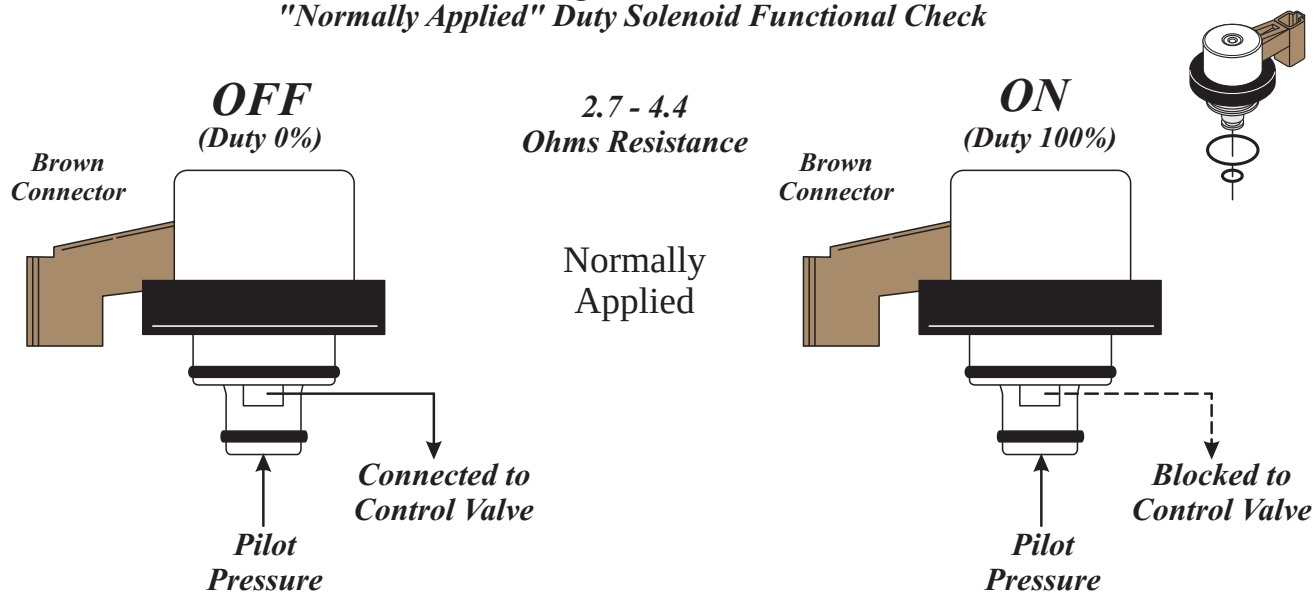
Line Pressure Control (ON/OFF) Solenoid Functional Check



Summary: The Pressure Control Solenoid is Normally Applied. When the Solenoid duty cycle is Low, pressure to the spring side of the Pressure Regulator Valve is high, resulting in Higher Line Pressure. When the Solenoid duty cycle is High, pressure to the spring side of the Pressure Regulator Valve is Low, resulting in Lower line pressure.

Figure 15

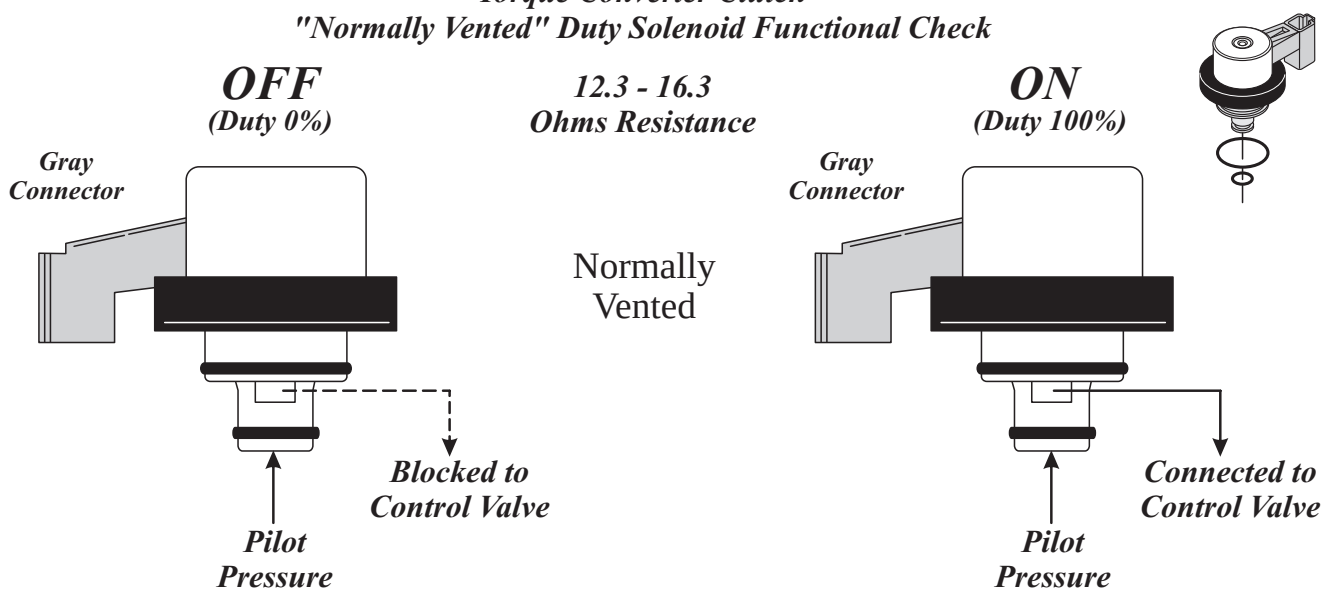
Low Clutch, 2-4 Brake, High Clutch and Low/Reverse Clutch "Normally Applied" Duty Solenoid Functional Check



Summary: The Low Clutch, 2-4 Brake, High Clutch and Low/Reverse Clutch Duty Solenoids are "Normally Applied". When the solenoid duty cycle is Low, pilot pressure to the control valve is high, opening the control valve for the appropriate clutch. When the solenoid duty cycle is High, pilot pressure to the control valve is blocked, allowing the spring to close the clutch control valves. These solenoids cycle at 50 Hz (20ms cycle).

Figure 16

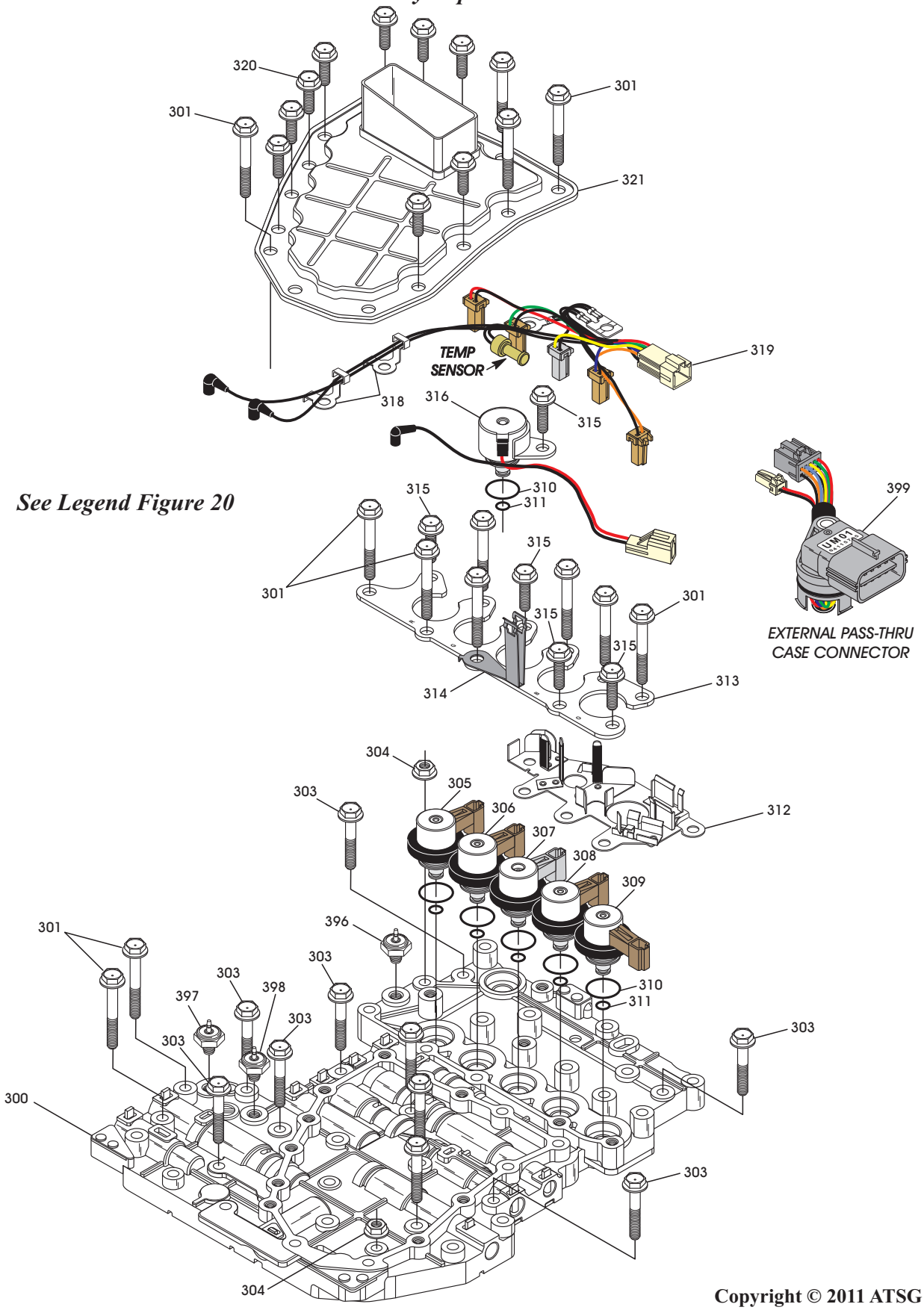
Torque Converter Clutch "Normally Vented" Duty Solenoid Functional Check



Summary: The Torque Converter Clutch Duty Solenoid is "Normally Vented". When the solenoid duty cycle is Low, pilot pressure to the TCC control valve is blocked, and converter clutch is Off. When the Solenoid duty cycle is High, pilot pressure to the TCC control valve is High, applying the Torque Converter Clutch. This solenoid cycles at 50 Hz (20ms cycle).

Figure 17

Lower Valve Body Exploded View



See Legend Figure 20

Figure 18

Lower Valve Body Exploded View

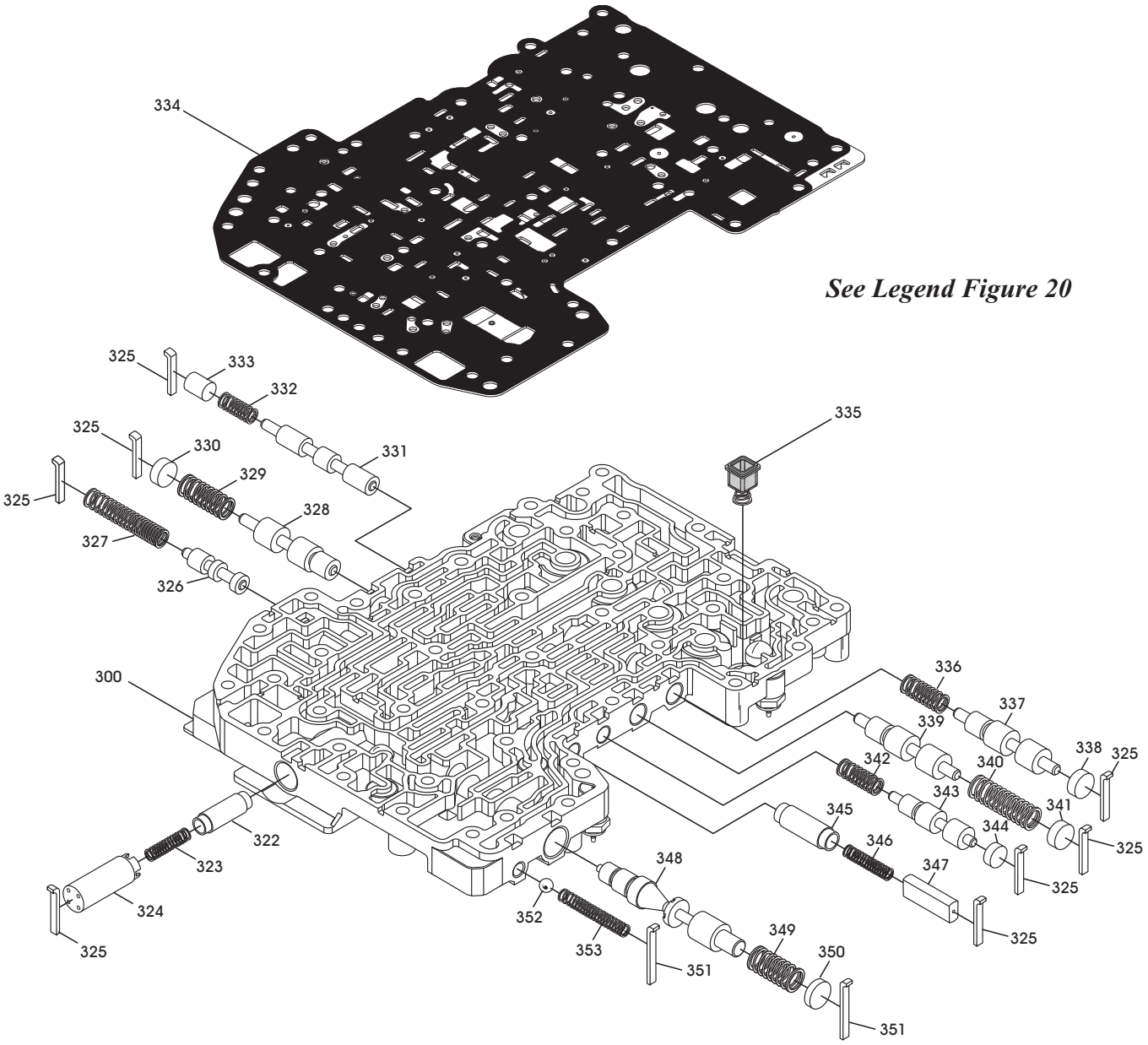


Figure 19

Legend For Figures 18, 19, and 22

300 LOWER VALVE BODY CASTING.
301 VB BOLT, 45 MM (1.771") (2 REQUIRED HERE).
303 VB BOLT, 35 MM (1.378") (13 REQUIRED).
304 VB NUT FOR 50 MM (1.968") BOLT FROM BOTTOM (2 REQUIRED).
305 SHIFT SOLENOID "F", PWM (LOW & REVERSE BRAKE)
306 SHIFT SOLENOID "C", PWM (HIGH CLUTCH).
307 TCC SOLENOID, PWM (CONVERTER CLUTCH)
308 SHIFT SOLENOID "B", PWM (2-4 BRAKE).
309 SHIFT SOLENOID "A", PWM (LOW CLUTCH).
310 SOLENOID *LARGE* "O" RING (6 REQUIRED).
311 SOLENOID *SMALL* "O" RING (6 REQUIRED).
312 INTERNAL WIRE HARNESS RETAINING BRACKET.
313 SHIFT SOLENOID RETAINING PLATE.
314 TFT SENSOR RETAINING BRACKET.
315 VB BOLT, 16 MM (.630") (5 REQUIRED).
316 LINE PRESSURE SOLENOID, ON/OFF, & HARNESS ASSEMBLY.
318 WIRE HARNESS RETAINING BRACKETS (2 REQUIRED).
319 INTERNAL WIRE HARNESS ASSEMBLY.
320 FILTER BOLT, 13.5 MM (.532") (9 REQUIRED).
321 OIL FILTER ASSEMBLY.
322 SHIFT SOLENOID B ACCUMULATOR VALVE.
323 SHIFT SOLENOID B ACCUMULATOR VALVE SPRING.
324 SHIFT SOLENOID B ACCUMULATOR VALVE SLEEVE.
325 "SHORT" VALVE RETAINER.
326 TCC REGULATING VALVE.
327 TCC REGULATING VALVE SPRING.
328 LOW CLUTCH TIMING VALVE.
329 LOW CLUTCH TIMING VALVE SPRING.
330 LOW CLUTCH TIMING VALVE BORE PLUG.
331 LOW/2-4 SEQUENCE VALVE
332 LOW/2-4 SEQUENCE VALVE SPRING.
333 LOW/2-4 SEQUENCE VALVE BORE PLUG.
334 VALVE BODY SPACER PLATE.
335 SPRING LOADED SCREEN ASSEMBLY.
336 LOW/REVERSE SWITCH VALVE SPRING.
337 LOW/REVERSE SWITCH VALVE.
338 LOW/REVERSE SWITCH VALVE BORE PLUG.
339 SEQUENCE REGULATING VALVE.
340 SEQUENCE REGULATING VALVE SPRING.
341 SEQUENCE REGULATING VALVE BORE PLUG.
342 HIGH/LOW-REVERS SEQUENCE VALVE SPRING.
343 HIGH/LOW-REVERS SEQUENCE VALVE.
344 HIGH/LOW-REVERS SEQUENCE VALVE BORE PLUG.
345 HIGH CLUTCH ACCUMULATOR VALVE.
346 HIGH CLUTCH ACCUMULATOR VALVE SPRING.
347 HIGH CLUTCH ACCUMULATOR SPACER.
348 MAIN PRESSURE REGULATOR VALVE.
349 MAIN PRESSURE REGULATOR VALVE SPRING.
350 MAIN PRESSURE REGULATOR VALVE BORE PLUG.
351 "LONG" VALVE RETAINER.
352 MAIN LINE PRESSURE "BLOW-OFF" BALL, 6.35 MM (.250").
353 MAIN LINE PRESSURE "BLOW-OFF" SPRING.
354 UPPER VALVE BODY CASTING.
355 MANUAL VALVE GUIDE PIN.
356 MANUAL VALVE.
357 SHIFT SOLENOID C ACCUMULATOR VALVE.
358 SHIFT SOLENOID C ACCUMULATOR VALVE SPRING.
359 SHIFT SOLENOID C ACCUMULATOR VALVE SLEEVE.
360 HIGH CLUTCH AMPLIFIER VALVE.
361 HIGH CLUTCH AMPLIFIER VALVE SPRING.
362 HIGH CLUTCH AMPLIFIER VALVE BORE PLUG.
363 2-4 CLUTCH AMPLIFIER VALVE.
364 2-4 CLUTCH AMPLIFIER VALVE SPRING.
365 2-4 CLUTCH AMPLIFIER BORE PLUG.
366 TCC CONTROL VALVE.
367 TCC CONTROL VALVE SPRING.
368 TCC BALANCE VALVE.
369 TCC BALANCE VALVE SLEEVE.
370 STEEL CHECK BALL, 6.35 MM (.250") DIAMETER).
371 CHECK BALL SPRING.
372 RELAY VALVE (ANODIZED GOLD).
373 RELAY VALVE SPRING.
374 RELAY VALVE BORE PLUG.
375 LOW CLUTCH AMPLIFIER VALVE.
376 LOW CLUTCH AMPLIFIER VALVE SPRING.
377 LOW CLUTCH AMPLIFIER VALVE BORE PLUG.
378 SHIFT SOLENOID A ACCUMULATOR VALVE.
379 SHIFT SOLENOID A ACCUMULATOR VALVE SPRING.
380 SHIFT SOLENOID A ACCUMULATOR VALVE SLEEVE.
381 SOLENOID MODULATING VALVE.
382 SOLENOID MODULATING VALVE SPRING.
383 SHIFT SOLENOID F ACCUMULATOR VALVE.
384 SHIFT SOLENOID F ACCUMULATOR VALVE SPRING.
385 SHIFT SOLENOID F ACCUMULATOR SPACER.
386 L/R CLUTCH AMPLIFIER VALVE.
387 L/R CLUTCH AMPLIFIER VALVE SPRING.
388 L/R CLUTCH AMPLIFIER BORE PLUG.
389 L/R AND 2-4 SEQUENCE VALVE SPRING.
390 L/R AND 2-4 SEQUENCE VALVE.
391 L/R AND 2-4 SEQUENCE VALVE BORE PLUG.
392 2-4 ACCUMULATOR VALVE.
393 2-4 ACCUMULATOR VALVE SPRING.
394 "STEEL" CHECK BALL, 5.5 MM (.218") DIAMETER (9 REQUIRED).
395 "TORLON" BALL IN "BATH-TUB", 5.5 MM (.218") DIAMETER.
396 PRESSURE SWITCH "F" (LOW & REVERSE BRAKE CLUTCH).
397 PRESSURE SWITCH "C" (HIGH CLUTCH).
398 PRESSURE SWITCH "B" (2-4 BRAKE CLUTCH).
399 EXTERNAL CASE CONNECTOR.

Figure 20

Lower Valve Body Spring Specifications

SPRING NUMBER 323
Free Length = 1.045"
Spring Diameter = .255"
Wire Diameter = .037"
Approx Coils = 15 (NONE)

SPRING NUMBER 327
Free Length = 1.920"
Spring Diameter = .366"
Wire Diameter = .062"
Approx Coils = 22 (NONE)

SPECIAL NOTE: Spring No. 327 has the first 13 coils spaced at .036". The remaining 9 are in coil bind and it looks as if it was manufactured that way. Spring came out with coil bound coils next to the valve.

SPRING NUMBER 329
Free Length = 1.030"
Spring Diameter = .430"
Wire Diameter = .019"
Approx Coils = 9 (NONE)

SPRING NUMBER 332
Free Length = .958"
Spring Diameter = .334"
Wire Diameter = .033"
Approx Coils = 9 (NONE)

SPRING NUMBER 336
Free Length = .765"
Spring Diameter = .307"
Wire Diameter = .019"
Approx Coils = 9 (NONE)

SPRING NUMBER 340
Free Length = .890"
Spring Diameter = .430"
Wire Diameter = .019"
Approx Coils = 15 (NONE)

SPRING NUMBER 342
Free Length = .850"
Spring Diameter = .270"
Wire Diameter = .022"
Approx Coils = 12 (NONE)

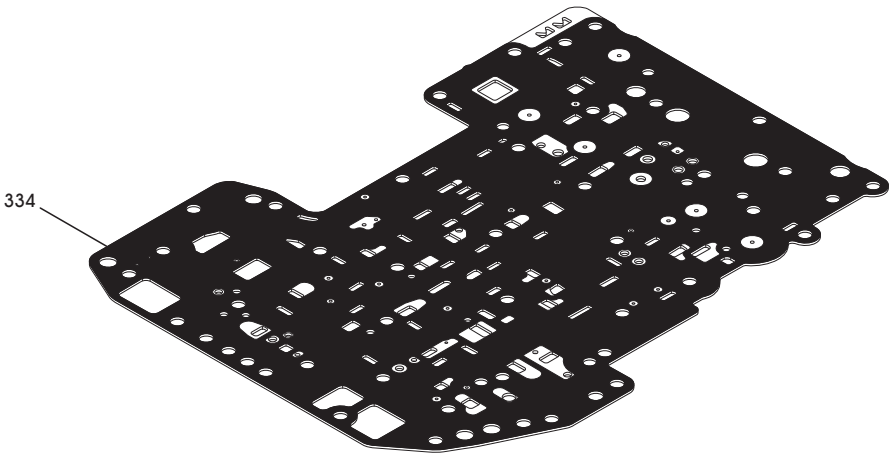
SPRING NUMBER 346
Free Length = 1.198"
Spring Diameter = .252"
Wire Diameter = .042"
Approx Coils = 17 (NONE)

SPRING NUMBER 349
Free Length = 1.200"
Spring Diameter = .550"
Wire Diameter = .055"
Approx Coils = 8 (NONE)

SPRING NUMBER 352
Free Length = 1.870"
Spring Diameter = .299"
Wire Diameter = .043"
Approx Coils = 19 (NONE)

Figure 21

Upper Valve Body Exploded View



See Legend Figure 20

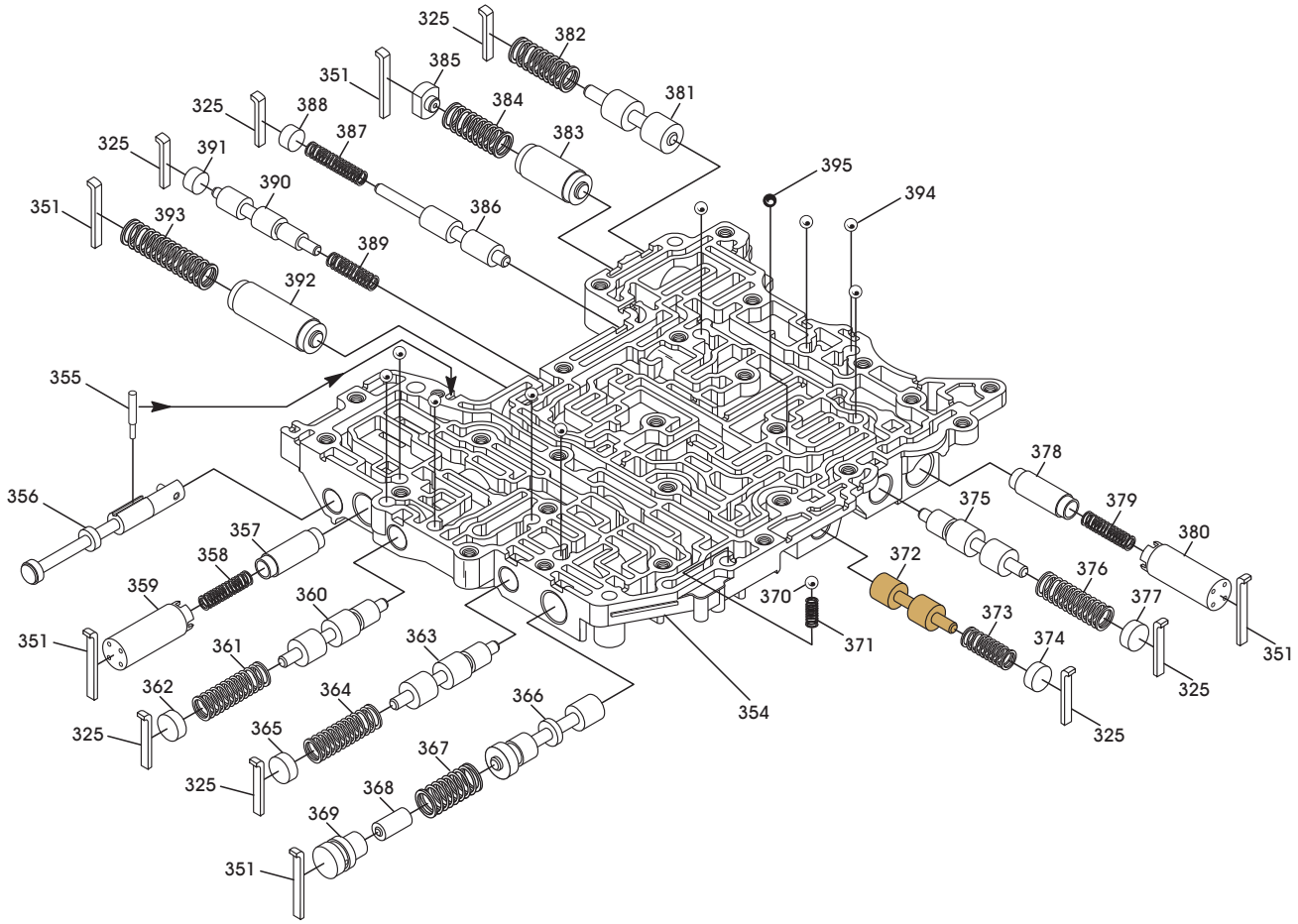


Figure 22

Upper Valve Body Spring Specifications

SPRING NUMBER 358
Free Length = 1.045"
Spring Diameter = .255"
Wire Diameter = .037"
Approx Coils = 15 (NONE)

SPRING NUMBER 361
Free Length = .890"
Spring Diameter = .430"
Wire Diameter = .019"
Approx Coils = 15 (NONE)

SPRING NUMBER 364
Free Length = .890"
Spring Diameter = .430"
Wire Diameter = .019"
Approx Coils = 15 (NONE)

SPRING NUMBER 367
Free Length = 1.045"
Spring Diameter = .548"
Wire Diameter = .042"
Approx Coils = 8 (NONE)

SPRING NUMBER 373
Free Length = .958"
Spring Diameter = .334"
Wire Diameter = .033"
Approx Coils = 9 (NONE)

SPRING NUMBER 376
Free Length = .890"
Spring Diameter = .430"
Wire Diameter = .019"
Approx Coils = 15 (NONE)

SPRING NUMBER 379
Free Length = 1.045"
Spring Diameter = .255"
Wire Diameter = .037"
Approx Coils = 15 (NONE)

SPRING NUMBER 382
Free Length = 1.250"
Spring Diameter = .425"
Wire Diameter = .051"
Approx Coils = 11 (NONE)

SPRING NUMBER 384
Free Length = 1.000"
Spring Diameter = .386"
Wire Diameter = .058"
Approx Coils = 10 (NONE)

SPRING NUMBER 387
Free Length = 1.230"
Spring Diameter = .272"
Wire Diameter = .038"
Approx Coils = 14 (NONE)

SPRING NUMBER 389
Free Length = .850"
Spring Diameter = .271"
Wire Diameter = .023"
Approx Coils = 12 (NONE)

SPRING NUMBER 393
Free Length = 1.722"
Spring Diameter = .431"
Wire Diameter = .079"
Approx Coils = 15 (NONE)

Figure 23

CHECK BALL LOCATIONS

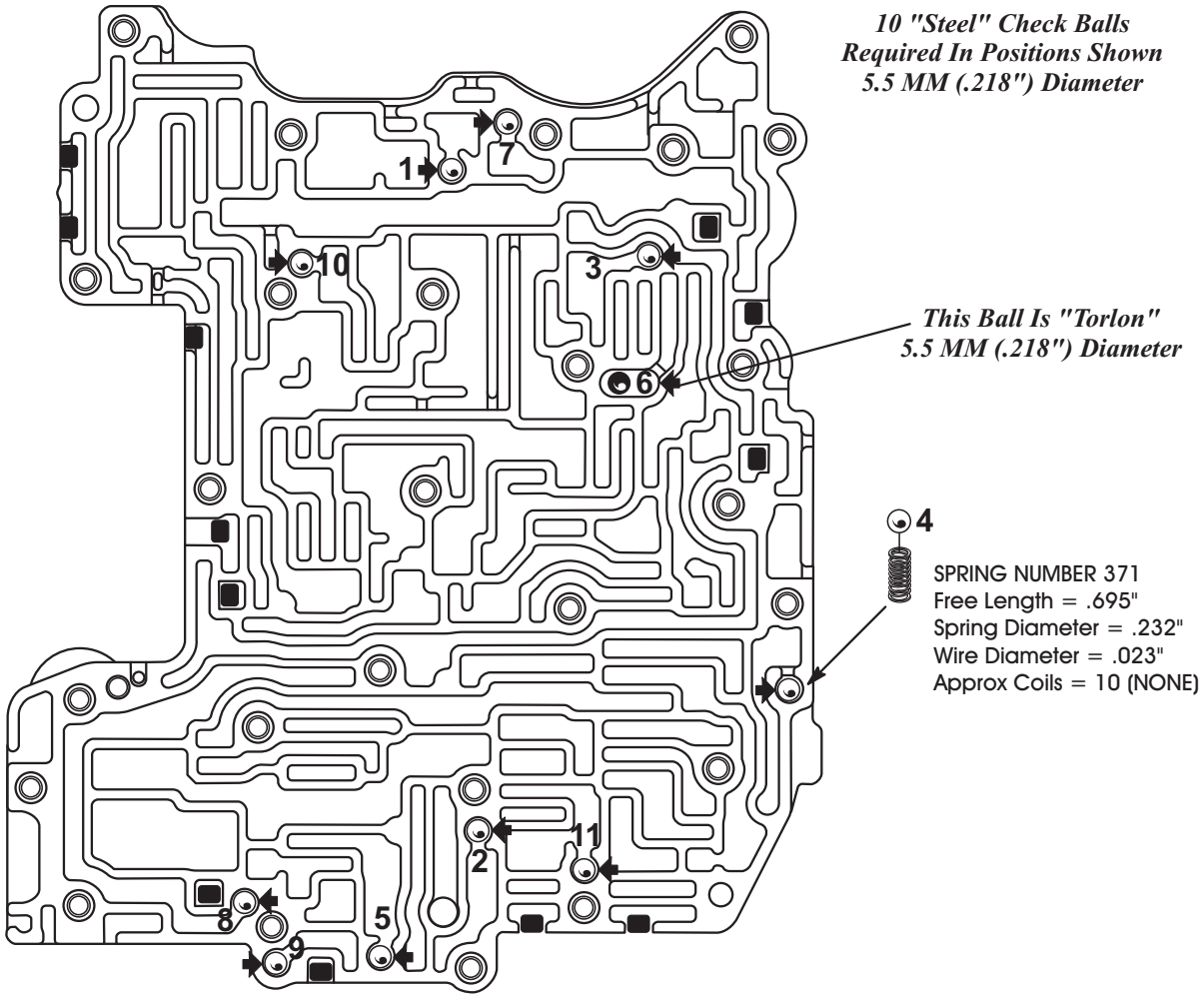
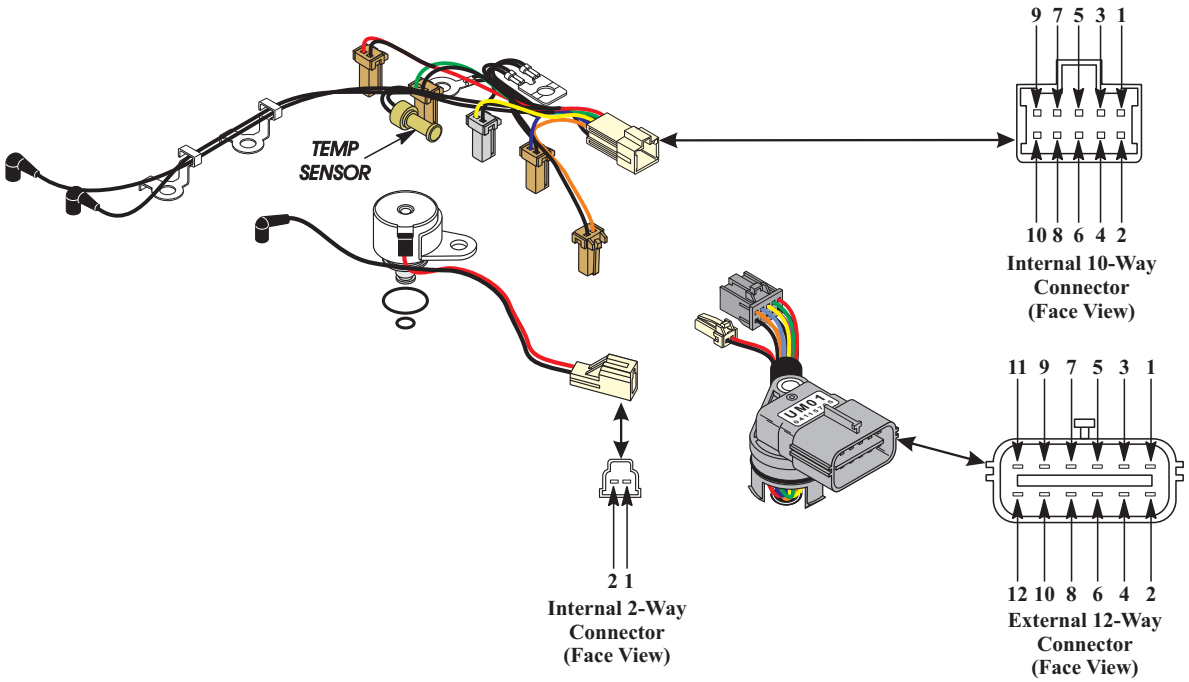


Figure 24

Mazda RX8 RC4A-EL Connector And Terminal Identification



EXTERNAL 12-WAY CONNECTOR TERMINAL ID AND FUNCTION

Term No.	*Circuit Function*	*Internal Wire Color*
1 (A)	*Pressure Switch "C", Detects oil pressure applied to High Clutch*	*Gray*
2 (B)	*Pressure Switch "B", Detects oil pressure applied to 2-4 Brake Clutch*	*Tan*
3 (C)	*Transmission Fluid Temperature (TFT) Sensor*	*Black*
4 (D)	*Transmission Fluid Temperature (TFT) Sensor*	*White*
5 (E)	*Shift Solenoid "A" Control (Low Clutch control)*	*Orange*
6 (F)	*Shift Solenoid "B" Control (2-4 Brake Clutch control)*	*Blue*
7 (G)	*Torque Converter Clutch (TCC) Solenoid Control*	*Yellow*
8 (H)	*Shift Solenoid "C" Control (High Clutch control)*	*Green*
9 (I)	*Shift Solenoid "F" Control (Low & Reverse Brake Clutch control)*	*Red*
10 (J)	*Ground Supply*	*Black*
11 (K)	*Voltage to Line Pressure Solenoid (Sets High or Low Line, depending on solenoid ON or OFF)*	*Red*
12 (L)	*Pressure Switch "F", Detects oil pressure to Low & Reverse Brake Clutch*	*White*

5 & 10	**Shift Solenoid A**	**2.7 - 4.4 ohms**
6 & 10	**Shift Solenoid B**	**2.7 - 4.4 ohms**
7 & 10	**TCC Solenoid**	**12.1 - 16.0 ohms**
8 & 10	**Shift Solenoid C**	**2.7 - 4.4 ohms**
9 & 10	**Shift Solenoid F**	**2.7 - 4.4 ohms**
11 & 10	**Pressure Control Solenoid**	**12.3 - 16.3 ohms**

Figure 25

Internal 10-Way Connector Terminal ID and Function		
Term No.	*Circuit Function*	*Internal Wire Color*
1	*Shift Solenoid "F" (Low & Reverse Brake Clutch control)*	*Red*
2	*Transmission Fluid Temperature (TFT) Sensor*	*White*
3	*Shift Solenoid "C" (High Clutch control)*	*Green*
4	*Transmission Fluid Temperature (TFT) Sensor*	*Black*
5	*Torque Converter Clutch (TCC) Solenoid Control*	*Yellow*
6	*Pressure Switch "C", Detects oil pressure applied to High Clutch*	*Gray*
7	*Shift Solenoid "B" (2-4 Brake Clutch control)*	*Blue*
8	*Pressure Switch "B", Detects oil pressure applied to 2-4 Brake Clutch*	*Tan*
9	*Shift Solenoid "A" (Low Clutch control)*	*Orange*
10	*Ground Supply*	*White*

Figure 26

INTERNAL 2-WAY CONNECTOR TERMINAL ID AND FUNCTION		
Term No.	*Circuit Function*	*Internal Wire Color*
1	*Voltage to Line Pressure Solenoid (Sets High or Low Line, depending on solenoid ON or OFF)*	*Red*
2	*Pressure Switch "F", Detects oil pressure to Low & Reverse Brake Clutch*	*White*

Figure 27

Mazda RX8 RC4A-EL Connector and Terminal Identification

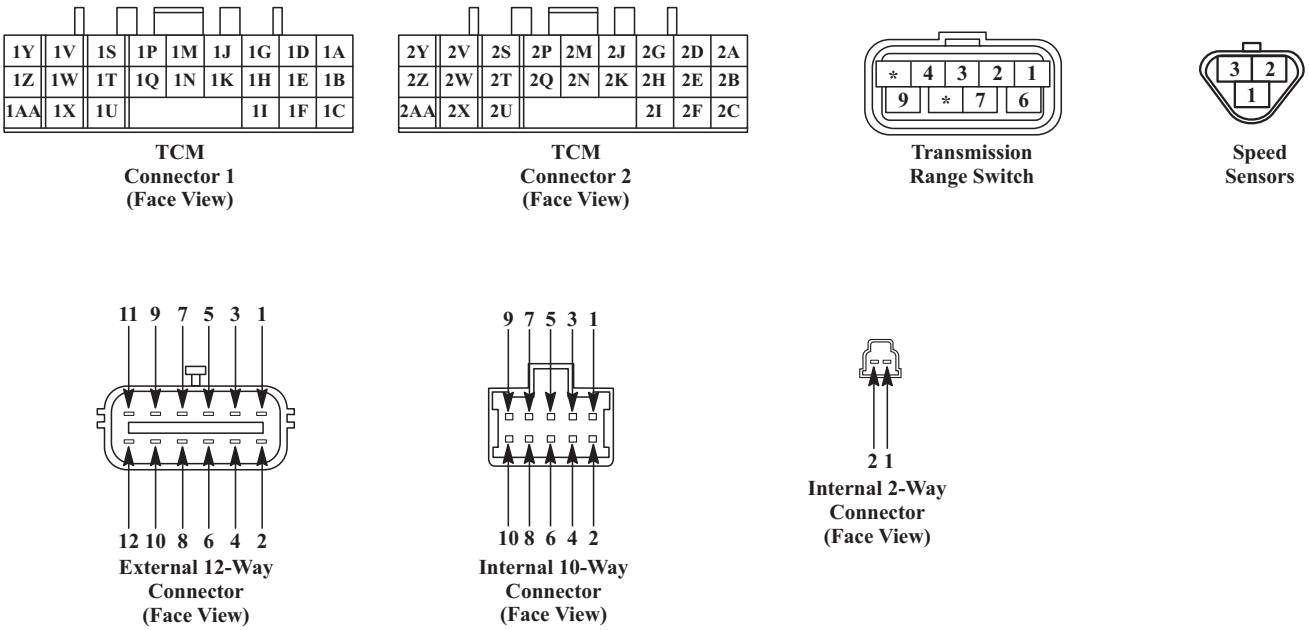


Figure 28

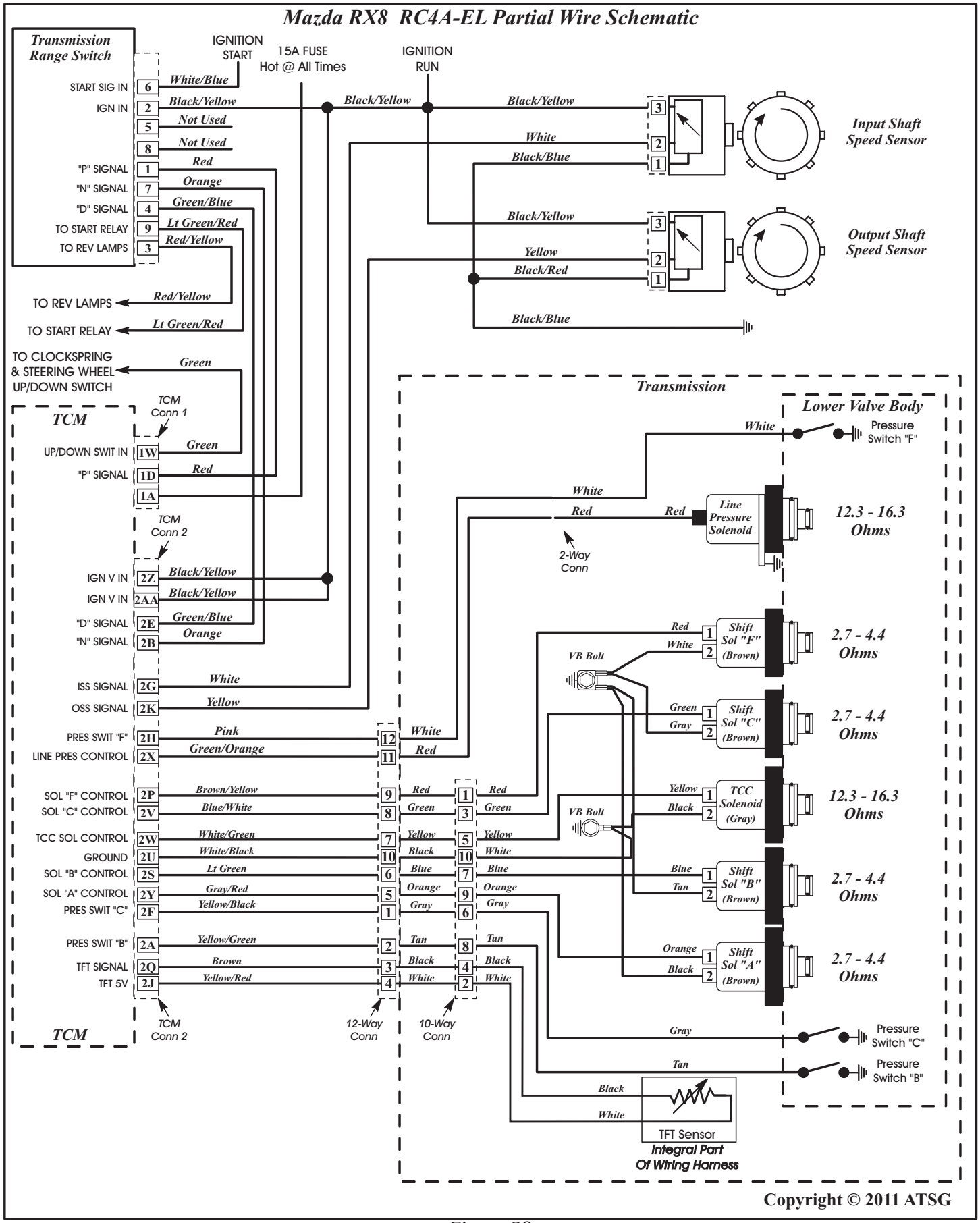
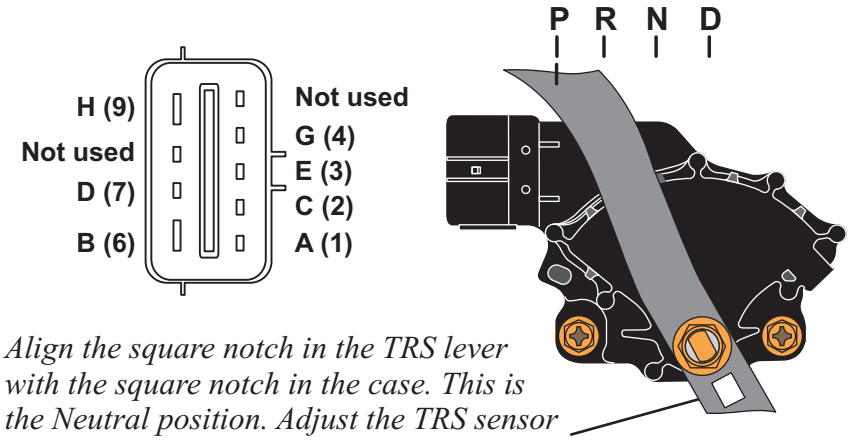

Mazda RX8 RC4A-EL Partial Wire Schematic
Transmission Range Switch
IGNITION START
15A FUSE Hot @ All Times
IGNITION RUN
START SIG IN 6 White/Blue
IGN IN 2 Black/Yellow
5 Not Used
8 Not Used
"P" SIGNAL 1 Red
"N" SIGNAL 7 Orange
"D" SIGNAL 4 Green/Blue
TO START RELAY 9 Lt Green/Red
TO REV LAMPS 3 Red/Yellow
Input Shaft Speed Sensor
Output Shaft Speed Sensor
TO REV LAMPS Red/Yellow
TO START RELAY Lt Green/Red
TO CLOCKSPRING & STEERING WHEEL UP/DOWN SWITCH Green
TCM
TCM Conn 1
UP/DOWN SWIT IN 1W Green
"P" SIGNAL 1D Red
1A
TCM Conn 2
IGN V IN 2Z Black/Yellow
IGN V IN 2AA Black/Yellow
"D" SIGNAL 2E Green/Blue
"N" SIGNAL 2B Orange
ISS SIGNAL 2G White
OSS SIGNAL 2K Yellow
PRES SWIT "F" 2H Pink
LINE PRES CONTROL 2X Green/Orange
SOL "F" CONTROL 2P Brown/Yellow
SOL "C" CONTROL 2V Blue/White
TCC SOL CONTROL 2W White/Green
GROUND 2U White/Black
SOL "B" CONTROL 2S Lt Green
SOL "A" CONTROL 2Y Gray/Red
PRES SWIT "C" 2F Yellow/Black
PRES SWIT "B" 2A Yellow/Green
TFT SIGNAL 2Q Brown
TFT 5V 2J Yellow/Red
TCM Conn 2
TCM
12-Way Conn
10-Way Conn
Transmission
Lower Valve Body
Pressure Switch "F"
Line Pressure Solenoid
12.3 - 16.3 Ohms
2-Way Conn
Shift Sol "F" (Brown)
2.7 - 4.4 Ohms
VB Bolt
Shift Sol "C" (Brown)
TCC Solenoid (Gray)
Shift Sol "B" (Brown)
Shift Sol "A" (Brown)
Pressure Switch "C"
Pressure Switch "B"
TFT Sensor
Integral Part Of Wiring Harness
Copyright © 2011 ATSG

Figure 29

Transmission Range Sensor (TRS)



Align the square notch in the TRS lever with the square notch in the case. This is the Neutral position. Adjust the TRS sensor to read Neutral: continuity between C & D then tighten switch to case.

Continuity Check Chart

Position/ Range	Terminal								
	A	B	C	D	E	F	G	H	I
P		○						○	
	○		○						
R			○		○				
N		○						○	
			○	○					
D			○				○		

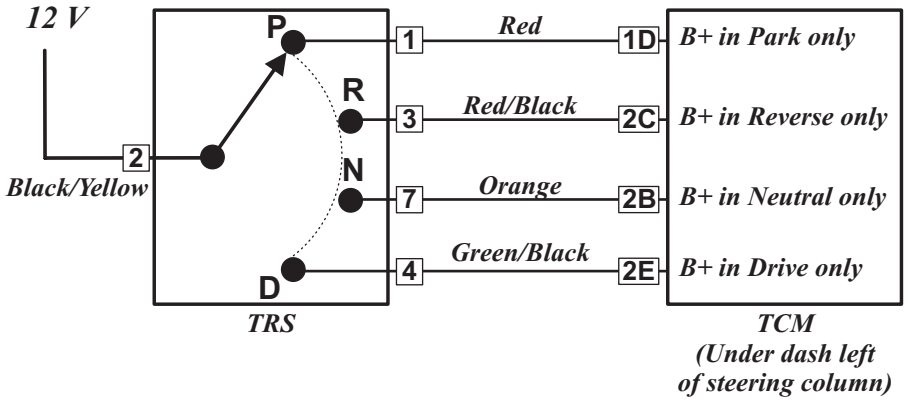
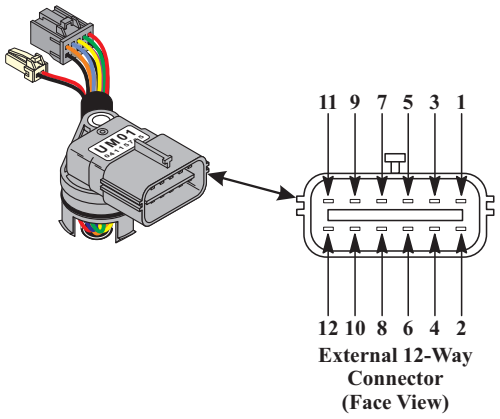


Figure 30

Transmission Fluid Temperature Sensor (TFT)

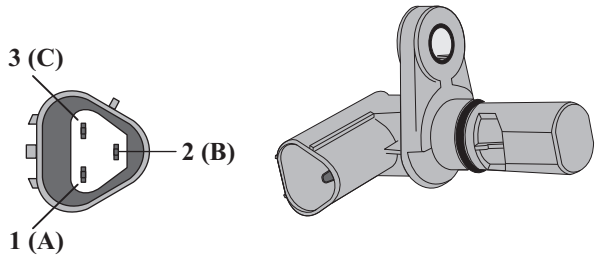


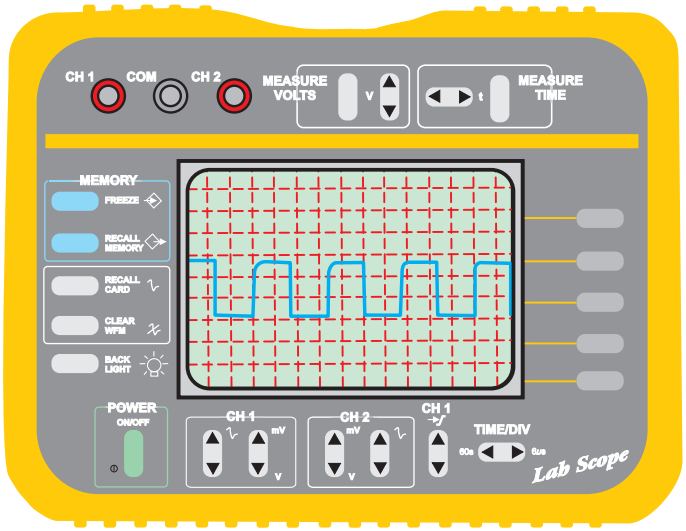
Terminals 3 & 4

ATF temperature F° (°C)	Resistance (kilohm)
-4 (-20)	15.87-17.54
32 (0)	5.727-6.320
68 (20)	2.375-2.625
104 (40)	1.102-1.218
140 (60)	0.561-0.620
176 (80)	0.308-0.341
212 (100)	0.181-0.200
248 (120)	0.112-0.123
266 (130)	0.089-0.099

Turbine Speed Sensor (TSS) and Vehicle Speed Sensor (VSS)

TSS

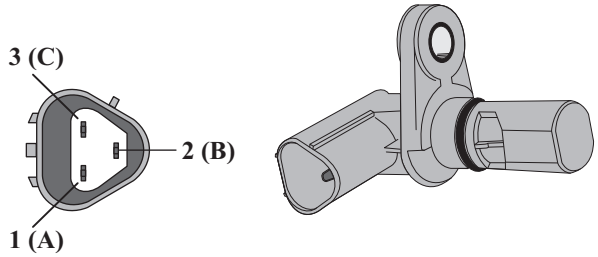


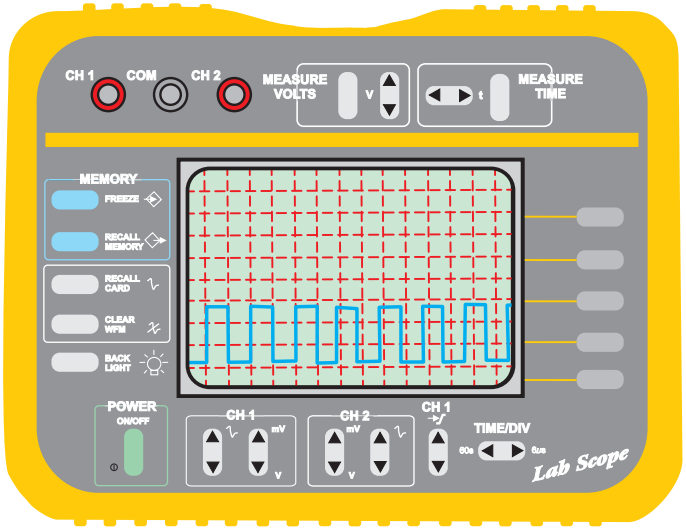


5V division set at 250 microseconds example shown in M range, 1st gear at 20 km/h (12 mph). The TSS reads a 32 lug corrugated High/Reverse clutch drum.
1 (A) = 12v supply, 2 (B) = Ground, 3 (C) = 5v pulse

Signal sent to terminal 2G in TCM

VSS





5V division set at 2.5 milliseconds example shown in M range, 1st gear at 20 km/h (12 mph). The VSS reads a 16 lug parking gear.
1 (A) = 12v supply, 2 (B) = Ground, 3 (C) = 5v pulse

Signal sent to terminal 2K in TCM

Figure 31

Transmission Related Diagnostic Trouble Codes

P0705	Switch Circuit Malfunction (Short to Power)
P0706	TR Switch Circuit Malfunction (Open Circuit/Short to Ground)
P0707	M Switch, Up Switch or Down Switch Circuit Malfunction (Open Circuit/Short to Ground)
P0711	TFT Sensor Malfunction (Stuck)
P0712	TFT Sensor Circuit Malfunction (Short to Ground)
P0713	TFT Sensor Circuit Malfunction (Open Circuit/Short to Power Supply)
P0715	TSS Circuit Malfunction
P0720	VSS Malfunction (Open Circuit/Short to Ground)
P0731	Incorrect 1st Gear Ratio
P0732	Incorrect 2nd Gear Ratio
P0733	Incorrect 3rd Gear Ratio
P0734	Incorrect 4th Gear Ratio
P0740	TCC System Malfunction (Mechanical/Hydraulic Fault)
P0743	TCC Solenoid Circuit Malfunction (Open/Short to Ground or Power)
P0748	PC Solenoid Circuit Malfunction (Open/Short to Ground or Power)
P0751	Shift Solenoid A Malfunction (Stuck Off)
P0753	Shift Solenoid A Circuit Malfunction (Open/Short to Ground or Power)
P0758	Shift Solenoid F Circuit Malfunction (Open/Short to Ground or Power)
P0761	Shift Solenoid C Malfunction (Stuck Off)
P0762	Shift Solenoid C Malfunction (Stuck On)
P0763	Shift Solenoid B Circuit Malfunction (Open/Short to Ground or Power)

Figure 32

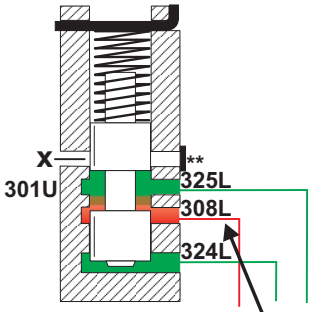
Transmission Related Diagnostic Trouble Codes

P0766	Shift Solenoid C Malfunction (Stuck Off)
P0767	Shift Solenoid C Malfunction (Stuck On)
P0768	Shift Solenoid C Circuit Malfunction (Open/Short to Ground or Power)
P0841	Oil Pressure Switch B Circuit Malfunction
P0846	Oil Pressure Switch C Circuit Malfunction
P0850	Neutral Switch Input Circuit Problem
P0871	Oil Pressure Switch F Circuit Malfunction
P0882	TCM B+ Low (Terminal 1A from 15 amp fuse)
P0960	GND Return Circuit Malfunction
P1759	2-4 Brake Amplifier (Failsafe) Valve Malfunction – may be a defective pressure switch B
P1764	L/R Brake Amplifier (Failsafe) Valve Malfunction – may be a defective pressure switch F

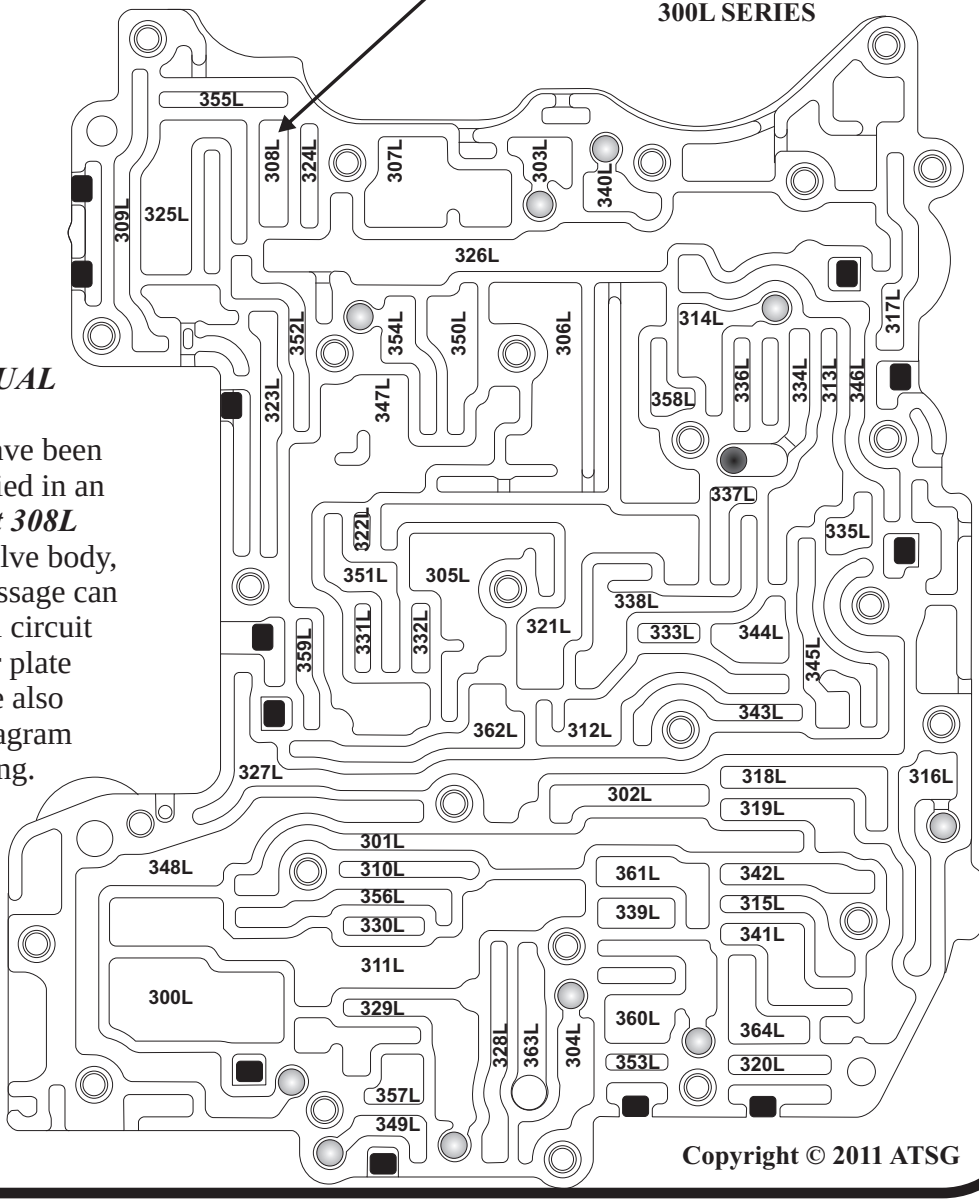
Figure 33

VALVE BODY MAPPING RC4A-EL

PARTIAL HYDRAULIC SCHEMATIC FOR PILOT VALVE



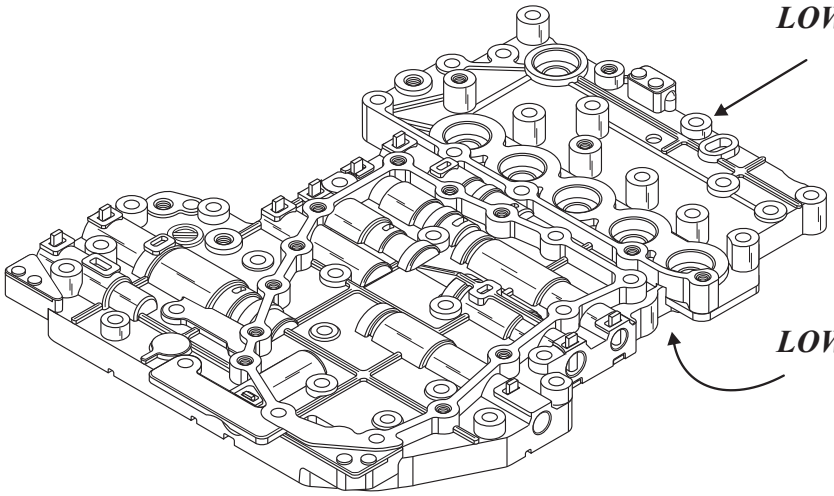
UPPER VALVE BODY LOWER SIDE (SAME ON ALL CASTINGS) 300L SERIES



HOW TO USE THIS MANUAL

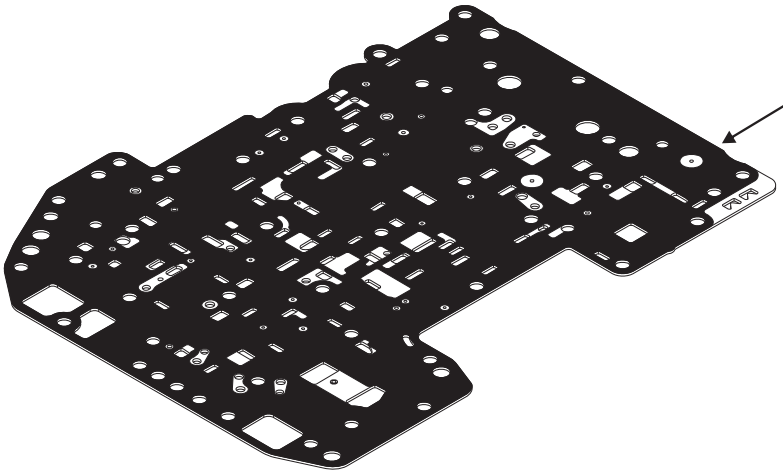
All castings and spacer plates have been numbered so they can be identified in an oil diagram. ***Example: Circuit 308L*** passage is located in the upper valve body, lower side (300L Series). This passage can now be located in the partial oil circuit diagram shown above. Spacer plate orifice sizes and locations are also identified in the oil circuit diagram labeled Valve Body Mapping.

RC4A-EL/JR405E VALVE BODY

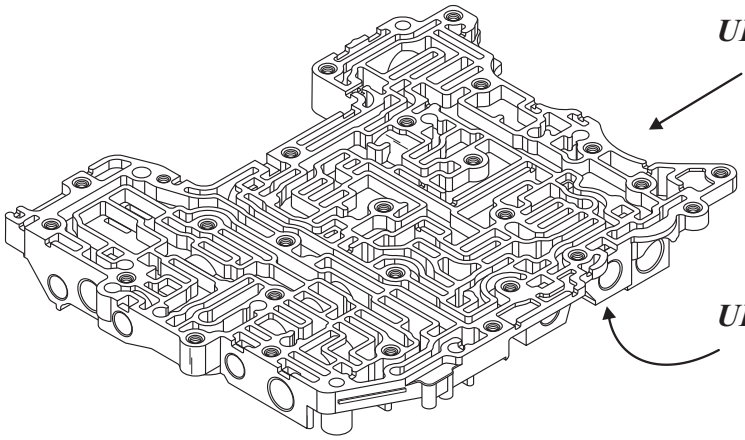


LOWER VALVE BODY
LOWER SIDE
100L Series

LOWER VALVE BODY
UPPER SIDE
100U Series



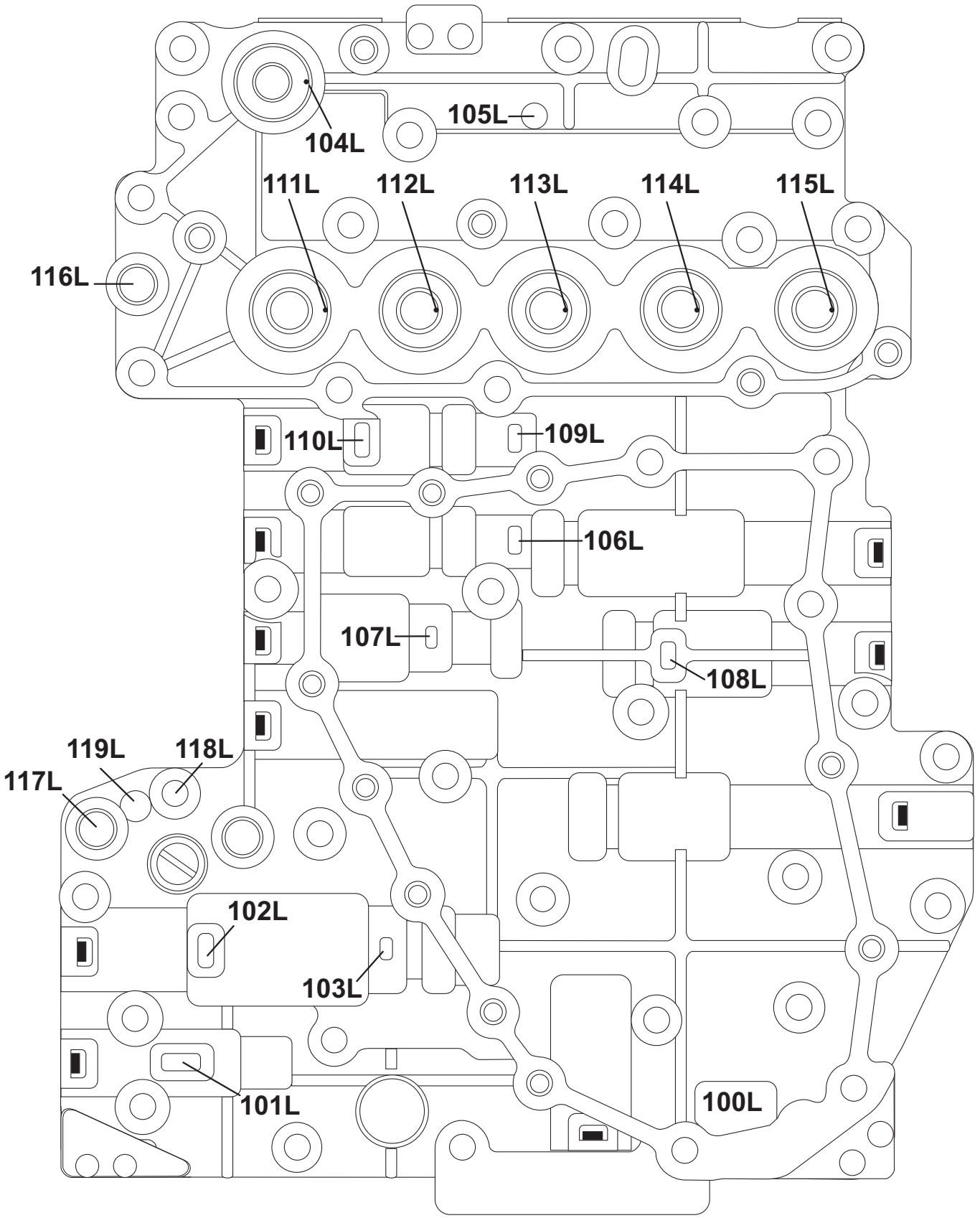
SPACER PLATE
2000 Series



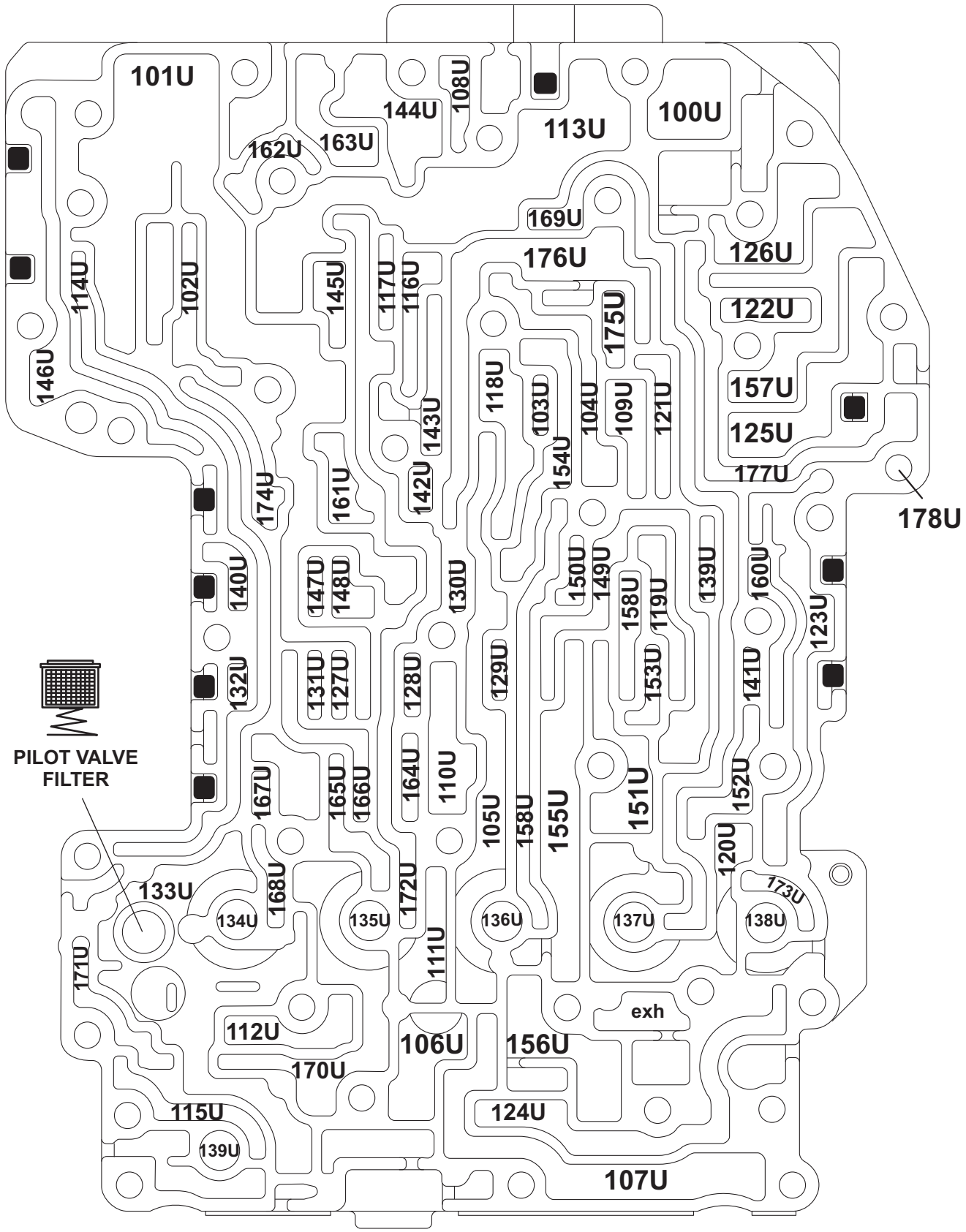
UPPER VALVE BODY
LOWER SIDE
300L Series

UPPER VALVE BODY
UPPER SIDE
300U Series

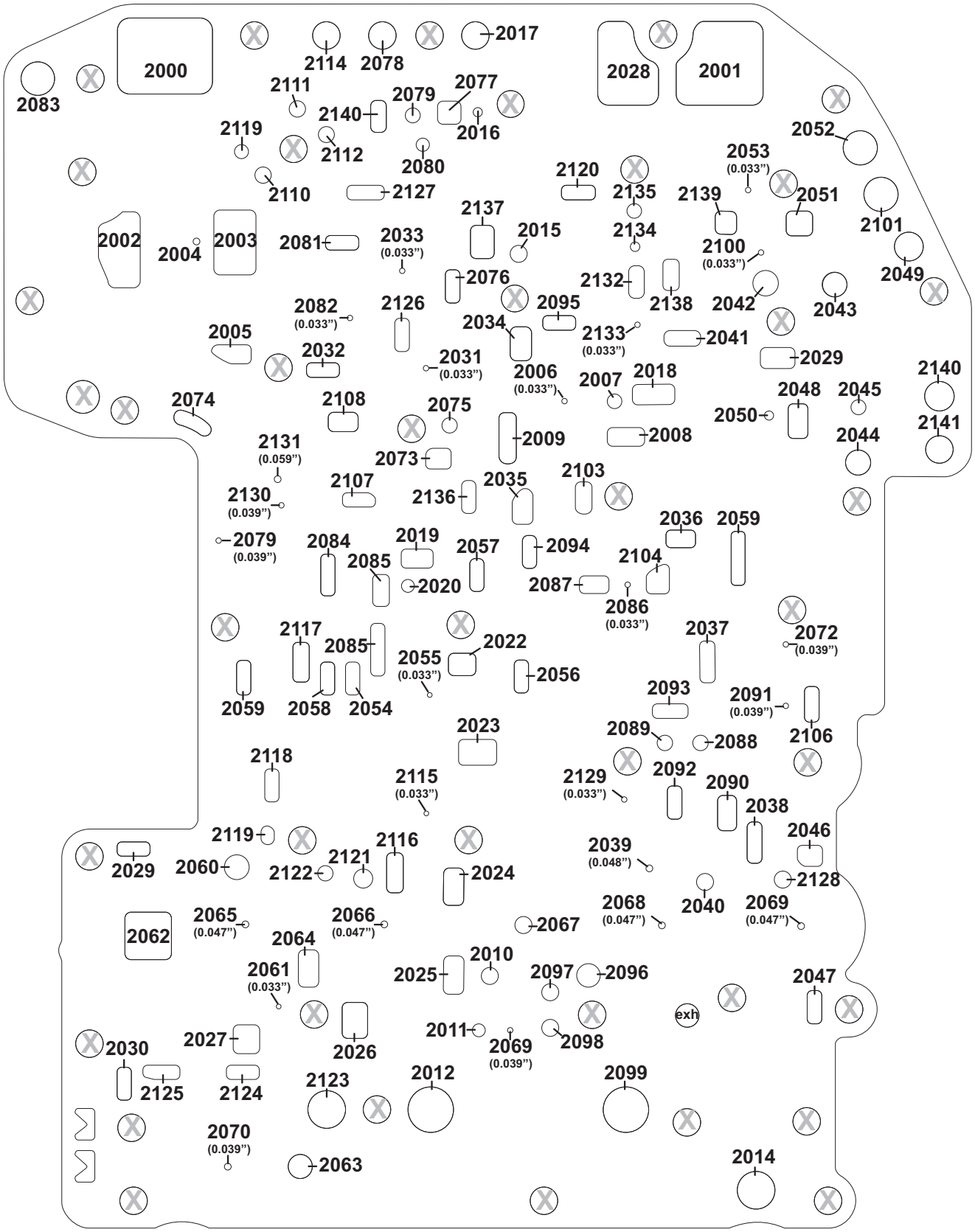
LOWER VALVE BODY LOWER SIDE
100L Series



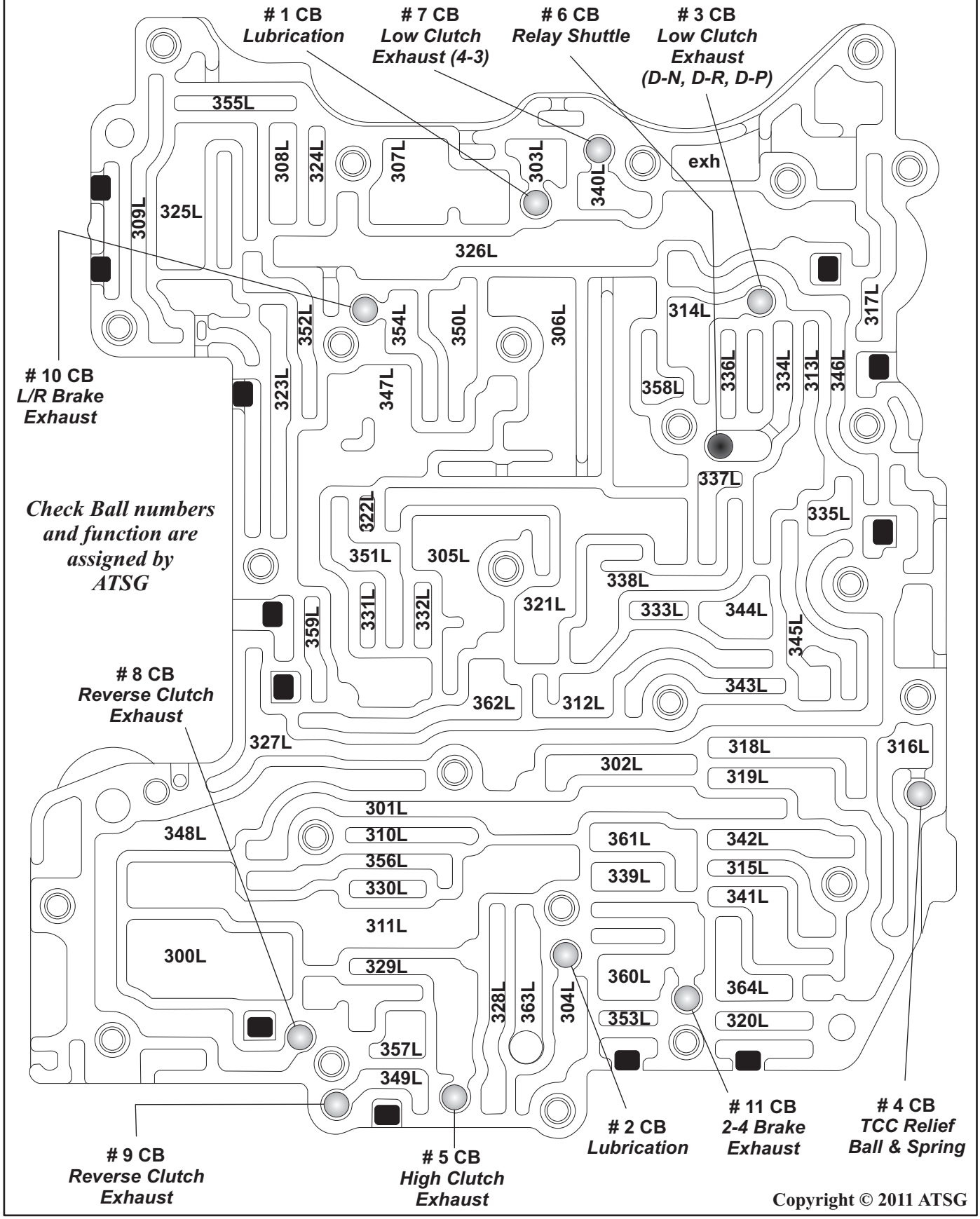
LOWER VALVE BODY UPPER SIDE
100U Series



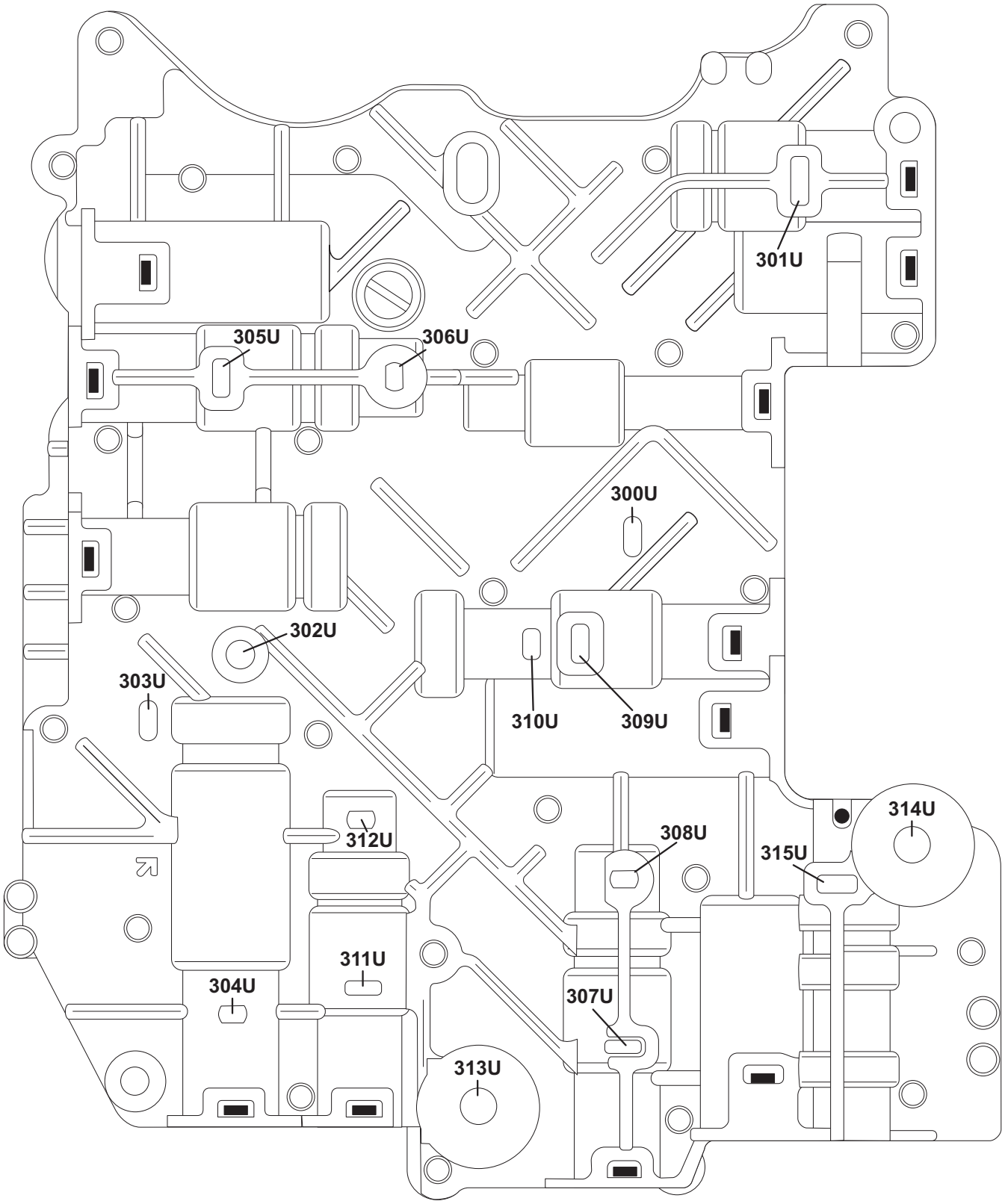
SPACER PLATE
2000 Series



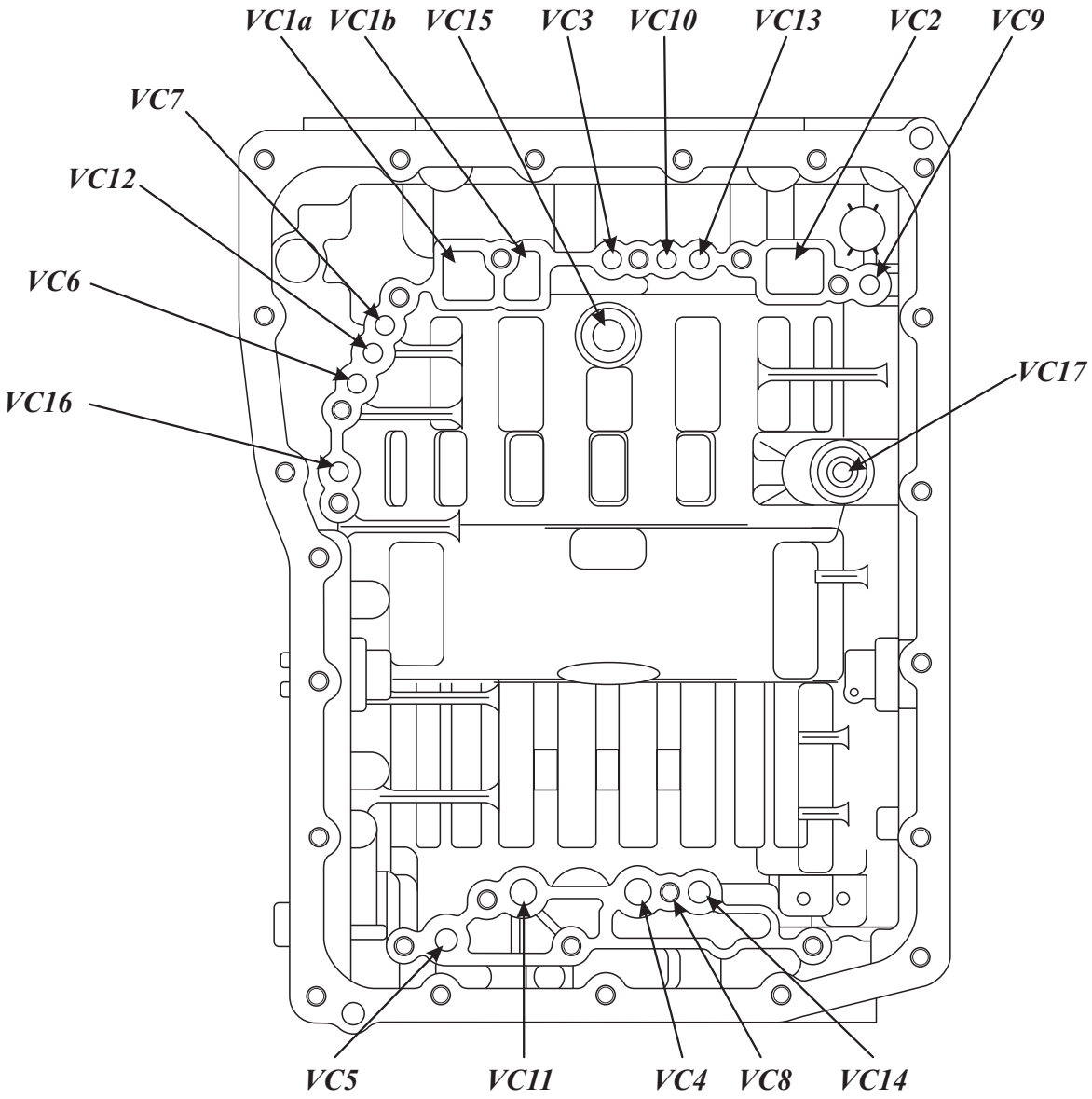
UPPER VALVE BODY LOWER SIDE
300L Series



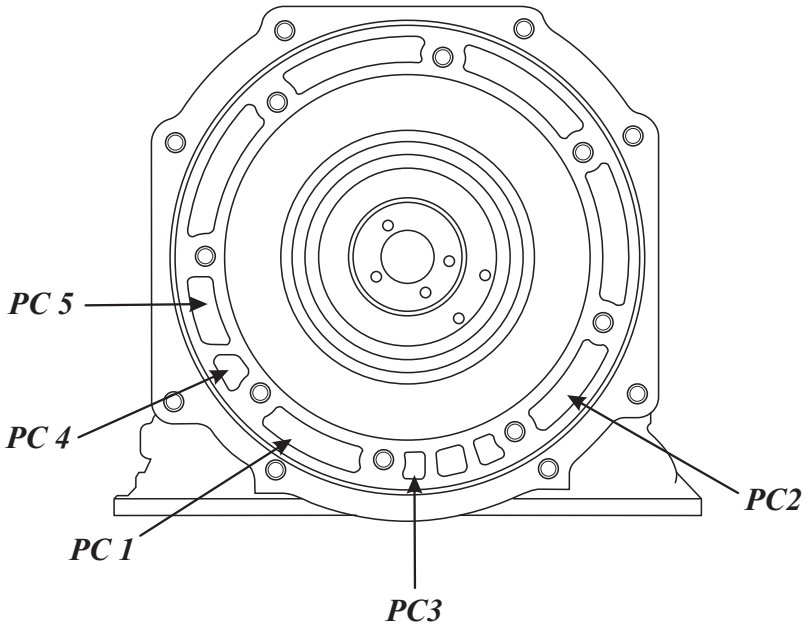
UPPER VALVE BODY UPPER SIDE
300U Series



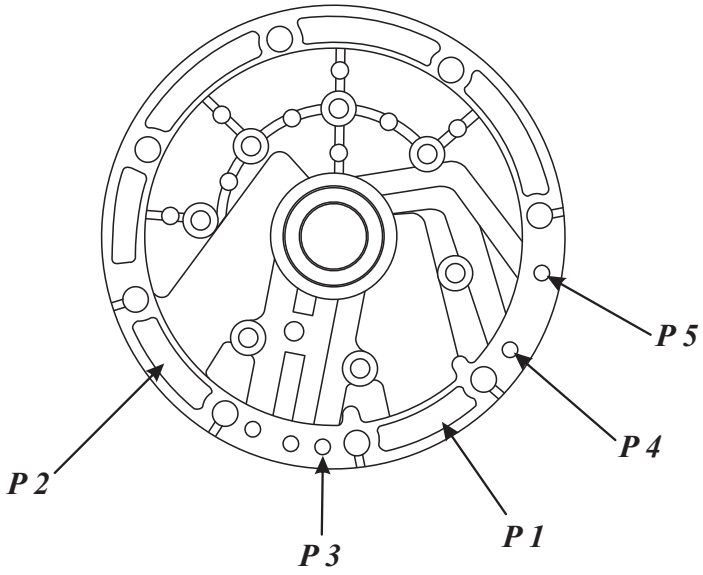
BOTTOM CASE TO VALVE BODY
Valve Body to Case (VC) Series

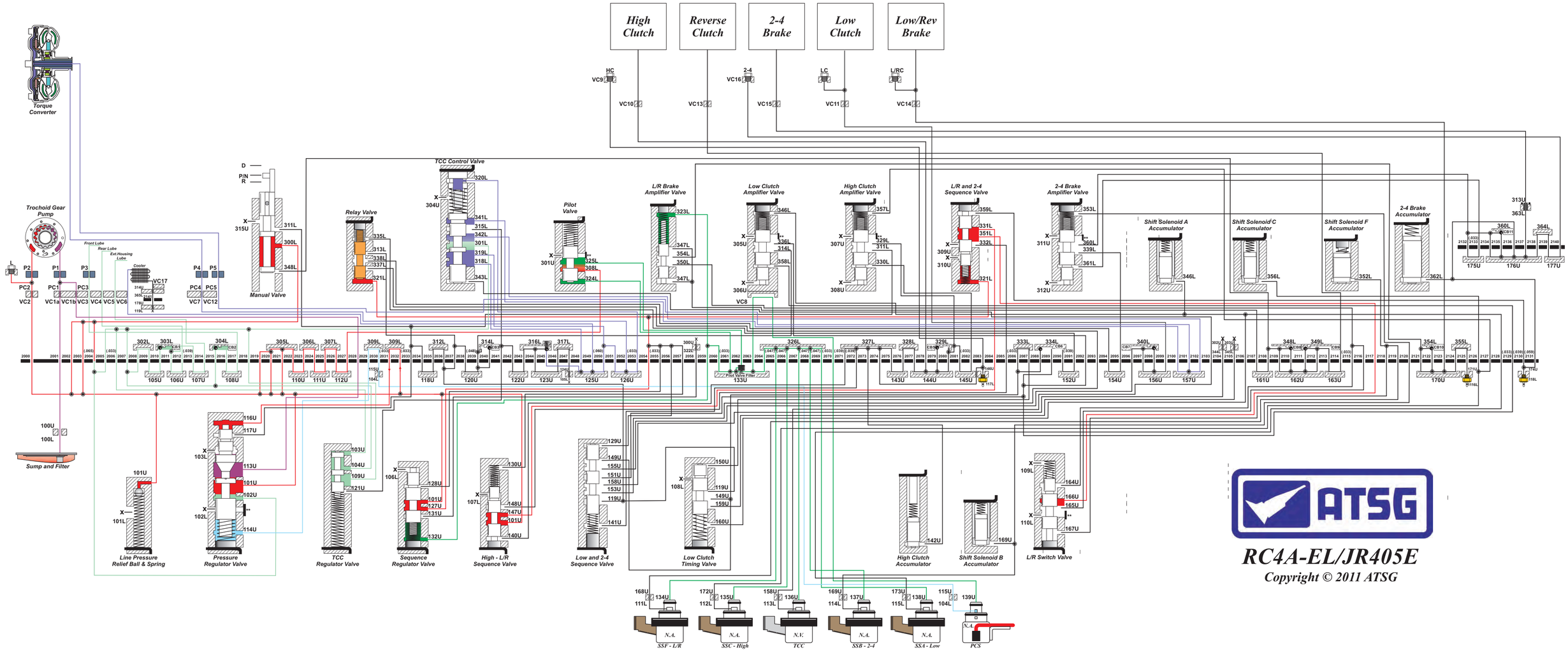


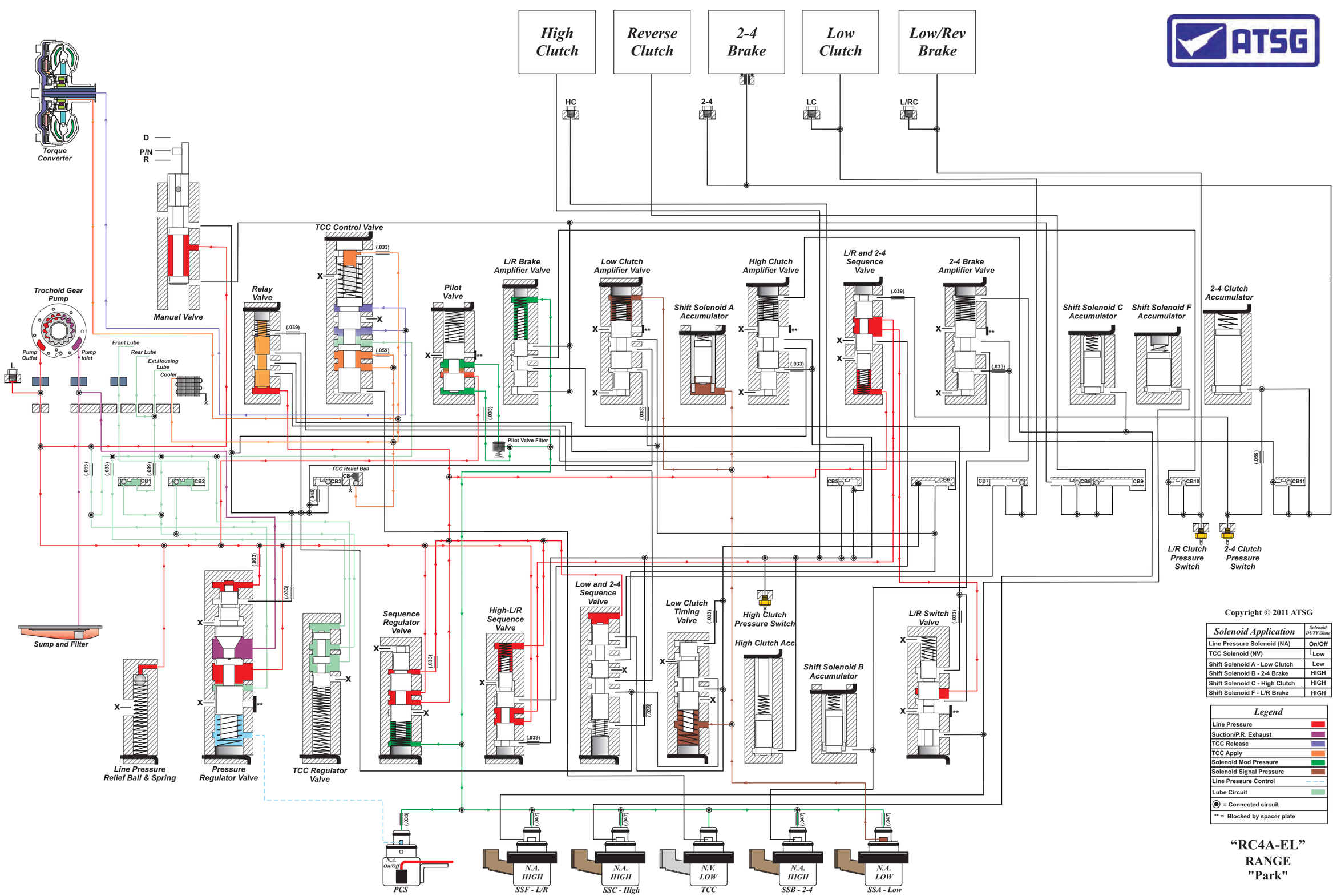
PUMP TO CASE
Pump to Case (PC) Series



PUMP
Pump (P) Series







Solenoid Application	Solenoid DUTY /State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	HIGH
Shift Solenoid C - High Clutch	HIGH
Shift Solenoid F - L/R Brake	HIGH

Legend
Line Pressure
Suction/P.R. Exhaust
TCC Release
TCC Apply
Solenoid Mod Pressure
Solenoid Signal Pressure
Line Pressure Control
Lube Circuit
= Connected circuit
** = Blocked by spacer plate

"RC4A-EL" RANGE "Park"

High Clutch	Reverse Clutch	2-4 Brake	Low Clutch	Low/Rev Brake
HC		2-4	LC	L/RC

Torque Converter

D
P/N
R

Manual Valve

Trochoid Gear Pump

Pump Outlet

Pump Inlet

L

Front Lube

Rear Lube

Ext.Housing Lube

Cooler

Relay Valve

TCC Control Valve

Pilot Valve

L/R Brake Amplifier Valve

Low Clutch Amplifier Valve

Shift Solenoid A Accumulator

High Clutch Amplifier Valve

L/R and 2-4 Sequence Valve

2-4 Brake Amplifier Valve

Shift Solenoid C Accumulator

Shift Solenoid F Accumulator

2-4 Clutch Accumulator

Pilot Valve Filter

Cooler Relief Ball

CB1 CB2 CB3 CB4 CB5 CB6 CB7 CB8 CB9 CB10 CB11

L/R Clutch Pressure Switch

2-4 Clutch Pressure Switch

Sump and Filter

Line Pressure Relief Ball & Spring

Pressure Regulator Valve

TCC Regulator Valve

Sequence Regulator Valve

High-L/R Sequence Valve

Low and 2-4 Sequence Valve

Low Clutch Timing Valve

High Clutch Pressure Switch

High Clutch Acc

Shift Solenoid B Accumulator

L/R Switch Valve

PCS (N.A. On/Off)

SSF - L/R (N.A. LOW)

SSC - High (N.A. HIGH)

TCC (N.V. LOW)

SSB - 2-4 (N.A. HIGH)

SSA - Low (N.A. LOW)

Solenoid Application	Solenoid DUTY /State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	HIGH
Shift Solenoid C - High Clutch	HIGH
Shift Solenoid F - L/R Brake	Low

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
◉ = Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL" RANGE "Reverse"

High Clutch	Reverse Clutch	2-4 Brake	Low Clutch	Low/Rev Brake
HC		2-4	LC	L/RC

Torque Converter

D
P/N
R

Manual Valve

Trochoid Gear Pump

Pump Outlet

Pump Inlet

L

Front Lube

Rear Lube

Ext.Housing Lube

Cooler

Relay Valve

TCC Control Valve

Pilot Valve

L/R Brake Amplifier Valve

Low Clutch Amplifier Valve

Shift Solenoid A Accumulator

High Clutch Amplifier Valve

L/R and 2-4 Sequence Valve

2-4 Brake Amplifier Valve

Shift Solenoid C Accumulator

Shift Solenoid F Accumulator

2-4 Clutch Accumulator

Pilot Valve Filter

Cooler Relief Ball

CB1 CB2 CB3 CB4 CB5 CB6 CB7 CB8 CB9 CB10 CB11

L/R Clutch Pressure Switch

2-4 Clutch Pressure Switch

Sump and Filter

Line Pressure Relief Ball & Spring

Pressure Regulator Valve

TCC Regulator Valve

Sequence Regulator Valve

High-L/R Sequence Valve

Low and 2-4 Sequence Valve

Low Clutch Timing Valve

High Clutch Pressure Switch

High Clutch Acc

Shift Solenoid B Accumulator

L/R Switch Valve

N.A. On/Off

PCS

N.A. HIGH SSF - L/R

N.A. HIGH SSC - High

N.V. LOW TCC

N.A. HIGH SSB - 2-4

N.A. LOW SSA - Low

Solenoid Application	Solenoid DUTY /State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	HIGH
Shift Solenoid C - High Clutch	HIGH
Shift Solenoid F - L/R Brake	HIGH

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
= Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL"
RANGE
"Drive"
1st GEAR

High Clutch | Reverse Clutch | 2-4 Brake | Low Clutch | Low/Rev Brake

HC | 2-4 | LC | L/RC

Torque Converter

D
P/N
R

Manual Valve

Trochoid Gear Pump

Pump Outlet | Pump Inlet

L

Front Lube | Rear Lube | Ext.Housing Lube | Cooler

Relay Valve

TCC Control Valve

Pilot Valve

L/R Brake Amplifier Valve

Low Clutch Amplifier Valve

Shift Solenoid A Accumulator

High Clutch Amplifier Valve

L/R and 2-4 Sequence Valve

2-4 Brake Amplifier Valve

Shift Solenoid C Accumulator

Shift Solenoid F Accumulator

2-4 Clutch Accumulator

Pilot Valve Filter

Cooler Relief Ball

CB1 | CB2 | CB3 | CB4 | CB5 | CB6 | CB7 | CB8 | CB9 | CB10 | CB11

L/R Clutch Pressure Switch

2-4 Clutch Pressure Switch

Sump and Filter

Line Pressure Relief Ball & Spring

Pressure Regulator Valve

TCC Regulator Valve

Sequence Regulator Valve

High-L/R Sequence Valve

Low and 2-4 Sequence Valve

Low Clutch Timing Valve

High Clutch Pressure Switch

High Clutch Acc

Shift Solenoid B Accumulator

L/R Switch Valve

PCS (N.A. On/Off)

SSF - L/R (N.A. HIGH)

SSC - High (N.A. HIGH)

TCC (N.V. LOW)

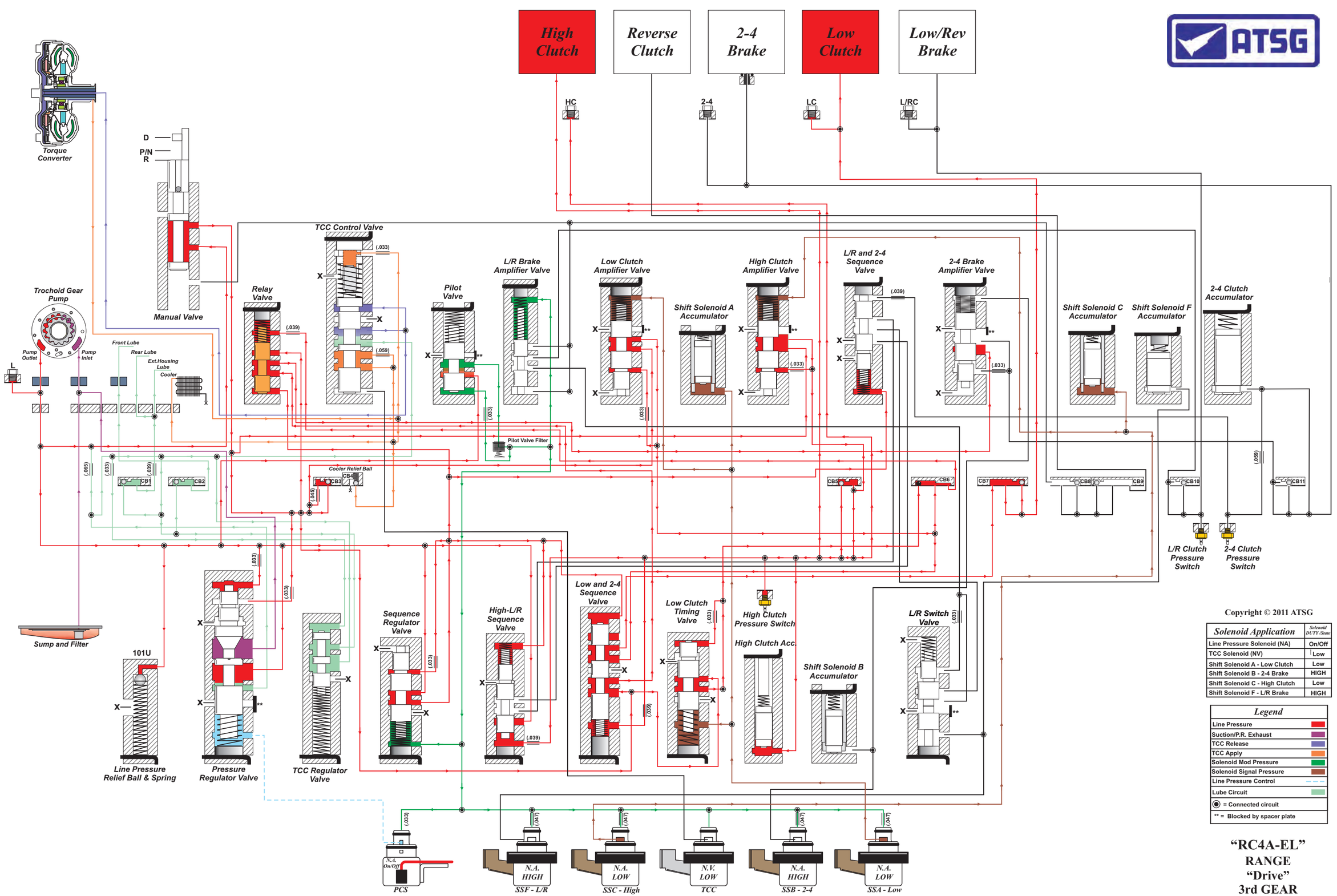
SSB - 2-4 (N.A. LOW)

SSA - Low (N.A. LOW)

Solenoid Application	Solenoid DUTY/State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	Low
Shift Solenoid C - High Clutch	HIGH
Shift Solenoid F - L/R Brake	HIGH

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
= Connected circuit	
** = Blocked by spacer plate	

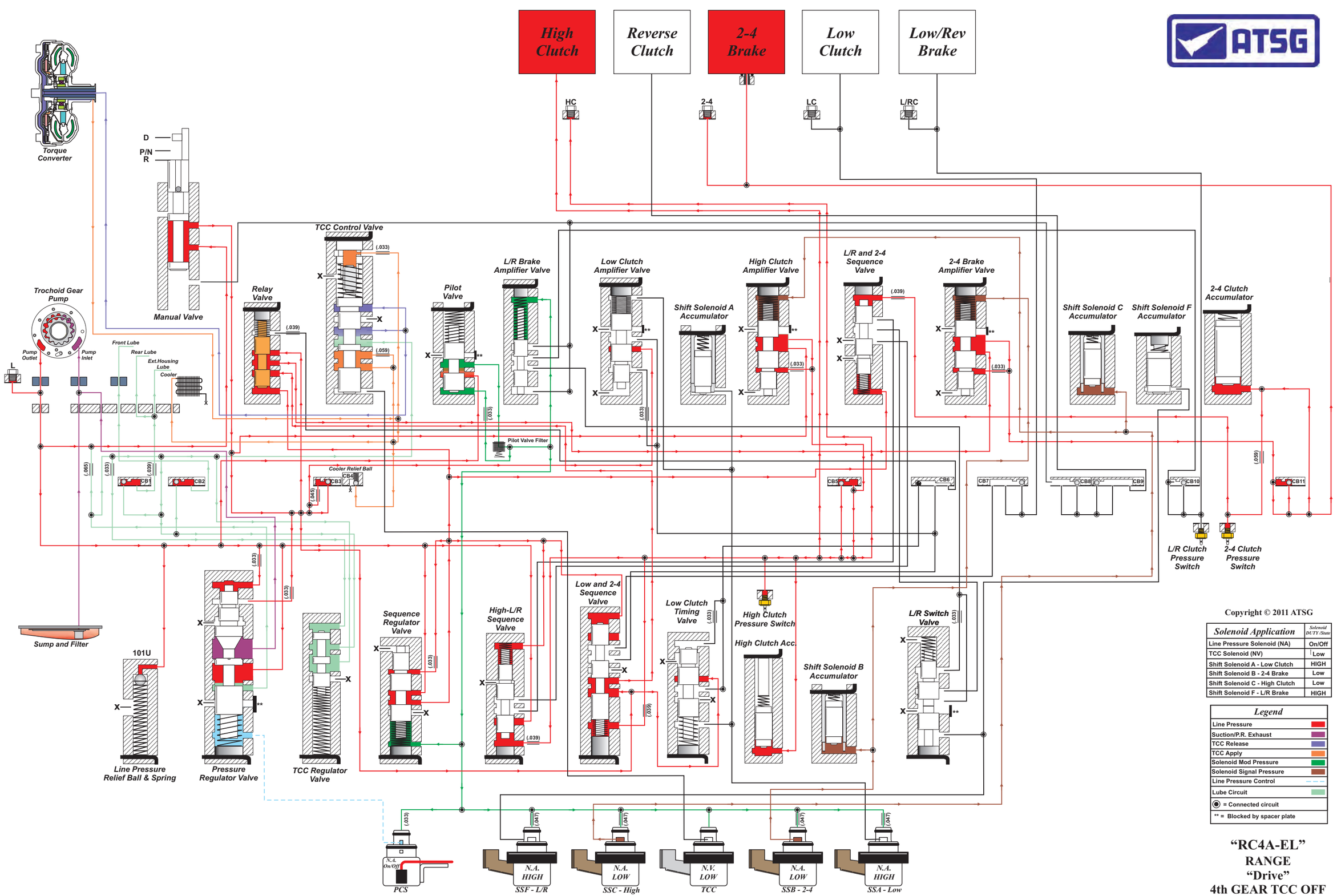
"RC4A-EL" RANGE "Drive" 2nd GEAR



Solenoid Application	Solenoid DUTY /State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	HIGH
Shift Solenoid C - High Clutch	Low
Shift Solenoid F - L/R Brake	HIGH

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
◉ = Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL" RANGE "Drive" 3rd GEAR



Solenoid Application	Solenoid DUTY State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	HIGH
Shift Solenoid B - 2-4 Brake	Low
Shift Solenoid C - High Clutch	Low
Shift Solenoid F - L/R Brake	HIGH

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
◉ = Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL"
RANGE
"Drive"
4th GEAR TCC OFF

High Clutch

Reverse Clutch

2-4 Brake

Low Clutch

Low/Rev Brake

HC

2-4

LC

L/RC

Torque Converter

D

P/N

R

Manual Valve

Trochoid Gear Pump

Pump Outlet

Pump Inlet

L

Front Lube

Rear Lube

Ext.Housing Lube

Cooler

Relay Valve

TCC Control Valve

Pilot Valve

L/R Brake Amplifier Valve

Low Clutch Amplifier Valve

Shift Solenoid A Accumulator

High Clutch Amplifier Valve

L/R and 2-4 Sequence Valve

2-4 Brake Amplifier Valve

Shift Solenoid C Accumulator

Shift Solenoid F Accumulator

2-4 Clutch Accumulator

Pilot Valve Filter

Cooler Relief Ball

CB1

CB2

CB3

CB4

CB5

CB6

CB7

CB8

CB9

CB10

CB11

L/R Clutch Pressure Switch

2-4 Clutch Pressure Switch

Sump and Filter

Line Pressure Relief Ball & Spring

Pressure Regulator Valve

TCC Regulator Valve

Sequence Regulator Valve

High-L/R Sequence Valve

Low and 2-4 Sequence Valve

Low Clutch Timing Valve

High Clutch Pressure Switch

High Clutch Acc.

Shift Solenoid B Accumulator

L/R Switch Valve

PCS

N.A. HIGH SSF - L/R

N.A. LOW SSC - High

N.V. LOW TCC

N.A. LOW SSB - 2-4

N.A. HIGH SSA - Low

Solenoid Application	Solenoid DUTY State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	HIGH
Shift Solenoid A - Low Clutch	HIGH
Shift Solenoid B - 2-4 Brake	Low
Shift Solenoid C - High Clutch	Low
Shift Solenoid F - L/R Brake	HIGH

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
◉ = Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL"
RANGE
"Drive"
4th GEAR TCC ON

High Clutch

Reverse Clutch

2-4 Brake

Low Clutch

Low/Rev Brake

HC

2-4

LC

L/RC

Torque Converter

D

P/N

R

Manual Valve

Trochoid Gear Pump

Pump Outlet

Pump Inlet

L

Front Lube

Rear Lube

Ext.Housing Lube

Cooler

Relay Valve

TCC Control Valve

Pilot Valve

L/R Brake Amplifier Valve

Low Clutch Amplifier Valve

Shift Solenoid A Accumulator

High Clutch Amplifier Valve

L/R and 2-4 Sequence Valve

2-4 Brake Amplifier Valve

Shift Solenoid C Accumulator

Shift Solenoid F Accumulator

2-4 Clutch Accumulator

Pilot Valve Filter

Cooler Relief Ball

CB1

CB2

CB3

CB4

CB5

CB6

CB7

CB8

CB9

CB10

CB11

L/R Clutch Pressure Switch

2-4 Clutch Pressure Switch

Sump and Filter

Line Pressure Relief Ball & Spring

Pressure Regulator Valve

TCC Regulator Valve

Sequence Regulator Valve

High-L/R Sequence Valve

Low and 2-4 Sequence Valve

Low Clutch Timing Valve

High Clutch Pressure Switch

High Clutch Acc

Shift Solenoid B Accumulator

L/R Switch Valve

PCS

N.A. On/Off

SSF - L/R

N.A. LOW

SSC - High

N.A. HIGH

TCC

N.V. LOW

SSB - 2-4

N.A. HIGH

SSA - Low

N.A. LOW

Solenoid Application	Solenoid DUTY /State
Line Pressure Solenoid (NA)	On/Off
TCC Solenoid (NV)	Low
Shift Solenoid A - Low Clutch	Low
Shift Solenoid B - 2-4 Brake	HIGH
Shift Solenoid C - High Clutch	HIGH
Shift Solenoid F - L/R Brake	LOW

Legend	
Line Pressure	
Suction/P.R. Exhaust	
TCC Release	
TCC Apply	
Solenoid Mod Pressure	
Solenoid Signal Pressure	
Line Pressure Control	
Lube Circuit	
= Connected circuit	
** = Blocked by spacer plate	

"RC4A-EL" RANGE "Drive" MANUAL 1st GEAR