



SUBARU 4AT PHASE II VERSION II CONTROL AND VALVE BODY CHANGES

CHANGE: Sometime at the beginning of the 2004 model year, (see Figure 1 for model I.D.), Subaru re-designed the 4AT Phase II Control system, while still using the same Clutch and Brake application, as shown in Figure 2. This required some component changes to accommodate this new design.

REASON: For improved function with fewer electronic components.

PARTS AFFECTED:

1. SOLENOID CONTROL-

The Solenoid firing order changed, as solenoid function has been redesigned. See Figure 3.

2. ALL SOLENOIDS-

- Line Pressure control Solenoid: Refer to Figure 4 for a description and operation .
- High Clutch, Low/Reverse and TCC Duty Solenoids: Refer to Figure 5 for a description and operation .
- 2-4 Brake and Low Clutch Duty Solenoids: Refer to Figure 6 for a description and operation .
- Transfer Clutch Duty Solenoid: Refer to Figure 7 for a description and operation .

3. INTERNAL WIRING HARNESS-

The Internal wiring harness changed with the newly designed Solenoids, refer to Figure 8.

4. VALVE BODY ASSEMBLY-

- Refer to Figure 9 for Sump Filter and harness location.
- Refer to Figures 10 and 11 for Lower Valve Body exploded view, legend and spring specs.
- Refer to Figures 12-14 for Upper Valve Body exploded view, legend and spring specs.
- Refer to Figure 15 for Upper Valve Body small parts and check ball function and locations.
- Refer to Figure 16 for Valve Body Bolt locations.

Note: *The Valve names are provided by ATSG and are based on valve function.*

5. CASE PASSAGES-

The Case passages changed to accommodate the Valve Body changes. See Figure 17.

INTERCHANGEABILITY:

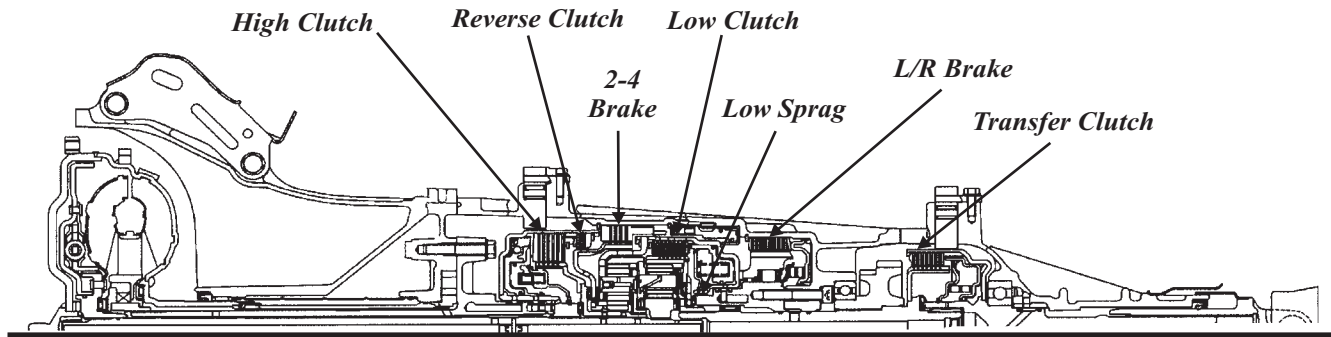
None of the parts listed above are interchangeable with previous design.

*Special Thanks to
Best Transmission
Springfield, MA*

4AT PHASE II VERSION II MODEL I.D.
<i>2004 and Later Subaru Forester Turbo 2005 and Later Subaru Forester Non-Turbo 2005 and Later Subaru Impreza Non-Turbo 2006 and Later Subaru Impreza Turbo 2005 and Later Subaru Legacy/Outback</i>

Figure 1

SUBARU 4AT PHASE II VERSION I AND VERSION II COMPONENT APPLICATION CHART



SELECTOR POSITION	REVERSE CLUTCH	2-4 BRAKE	HIGH CLUTCH	LOW CLUTCH	LOW/REVERSE BRAKE	LOW-ONE WAY CLUTCH	TRANSFER CLUTCH
P							
R	ON				ON		Mod.
N							
D	1			ON		ON	Mod.
	2	ON		ON			Mod.
	3		ON	ON			Mod.
	4	ON	ON				Mod.
Manual Mode	1*			ON	ON*	ON	Mod.
	1			ON		ON	Mod.
	2	ON		ON			Mod.
	3		ON	ON			Mod.
	4	ON	ON				Mod.

*= Low Reverse Clutch ON at Low speed determined by PCM

Mod. = Transfer Clutch Apply is Modulated which is determined by the PCM/ABS

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Figure 2

SUBARU 4AT PHASE II VERSION II SOLENOID APPLICATION CHART

SELECTOR POSITION		2-4 BRAKE DUTY %	HIGH CLUTCH DUTY %	LOW CLUTCH DUTY %	LOW/REVERSE BRAKE DUTY %	TCC DUTY %	TRANSFER CLUTCH DUTY %
P		H	H	H	H	L	Mod.
R		H	H	H	H to L	L	Mod.
N		H	H	H	H	L	Mod.
Ⓓ	1	H	H	L	H	L	Mod.
	2	L	H	L	H	L	Mod.
	3	L**	L	L	H	H	Mod.
	4	L	L	H	H	H	Mod.
<i>Manual Mode</i>	1*	H	H	H to L	L	L	Mod.
	1	H	H	L	H	L	Mod.
	2	L	H	L	H	L	Mod.
	3	L**	L	L	H	H	Mod.
	4	L	L	H	H	H	Mod.

*= Low Reverse Clutch ON at Low speed determined by PCM

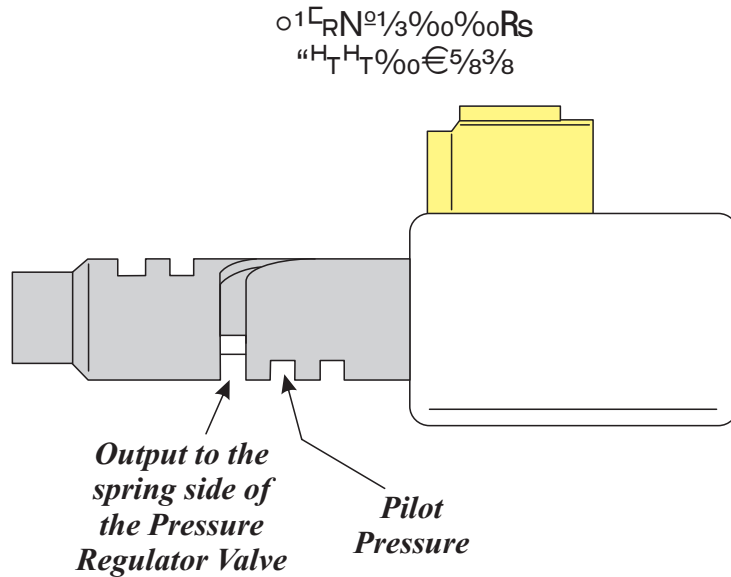
H to L=Ramps from High to Low during engagement

L** = The 2-4 duty solenoid may be at Low duty cycle in 3rd gear depending on PCM strategy.
2-4 Brake application is prevented by the 2-4 sequence valve.

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Figure 3

LINE PRESSURE CONTROL SOLENOID FUNCTIONAL CHECK

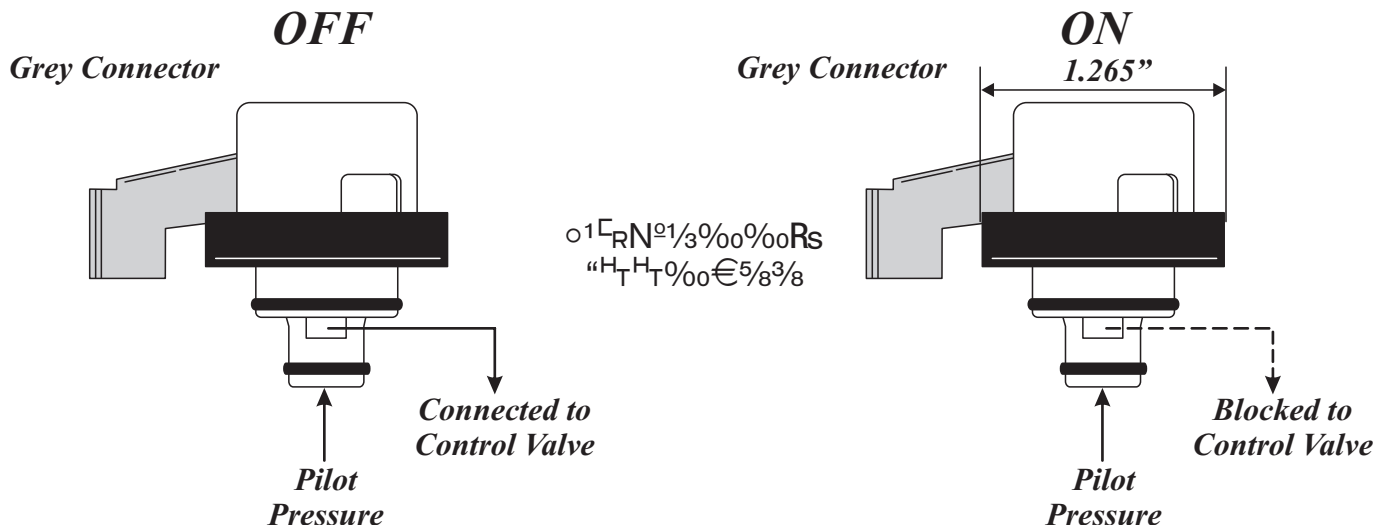


Summary: The Pressure Control Solenoid is Normally Applied. When the Solenoid duty cycle is Low, pressure to the spring side of the Pressure Regulator Valve is high, resulting in Higher Line Pressure. When the Solenoid duty cycle is High, pressure to the spring side of the Pressure Regulator Valve is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

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Figure 4

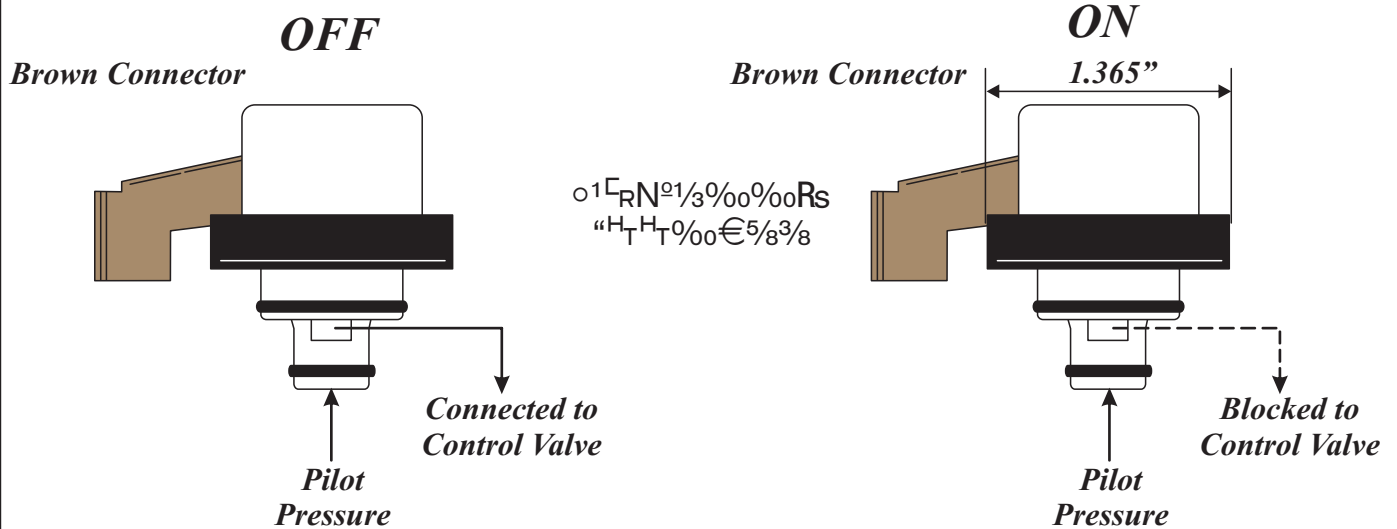
HIGH CLUTCH, LOW/REVERSE AND TCC DUTY SOLENOID FUNCTIONAL CHECK



Summary: The High, Low/Reverse and TCC Duty Solenoids are Normally Applied. When the Solenoid duty cycle is Low, Pilot pressure to the Control valve is high, opening the valves for the High Clutch and Low/Reverse. Note: The TCC Duty solenoid feeds the spring side of the TCC Control Valve preventing TCC apply. When the Solenoid duty cycle is High, Pilot pressure to the Control valve is blocked, allowing the spring to close the High and Low/Reverse Control valves. Note: The TCC Duty Solenoid at high duty cycle blocks the pressure to the spring side of the valve, allowing the TCC Control Valve to open applying the TCC.

Figure 5

2-4 BRAKE AND LOW CLUTCH DUTY SOLENOID FUNCTIONAL CHECK

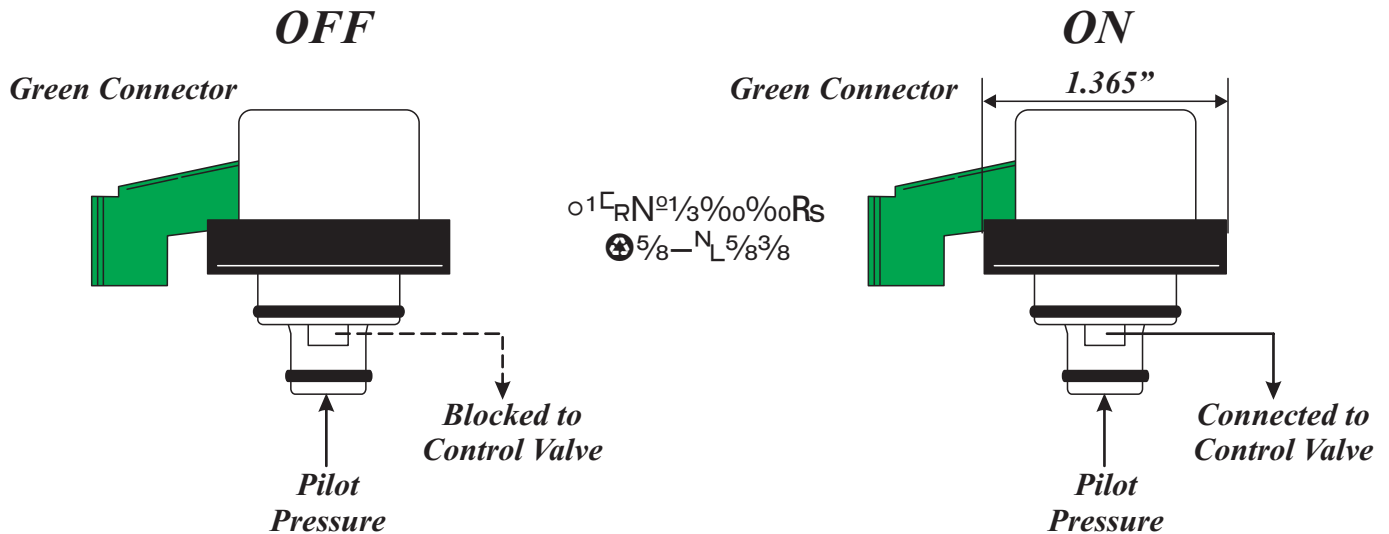


Summary: The 2-4 Brake and Low Clutch Duty Solenoids are Normally Applied. When the Solenoid duty cycle is Low, Pilot pressure to the Control valve is high, opening the valves for the 2-4 Brake and Low Clutch. When the Solenoid duty cycle is High, Pilot pressure to the Control valve is blocked, allowing the spring to close the 2-4 Brake and Low Clutch Control valves.

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Figure 6

TRANSFER CLUTCH DUTY SOLENOID FUNCTIONAL CHECK

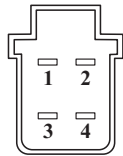
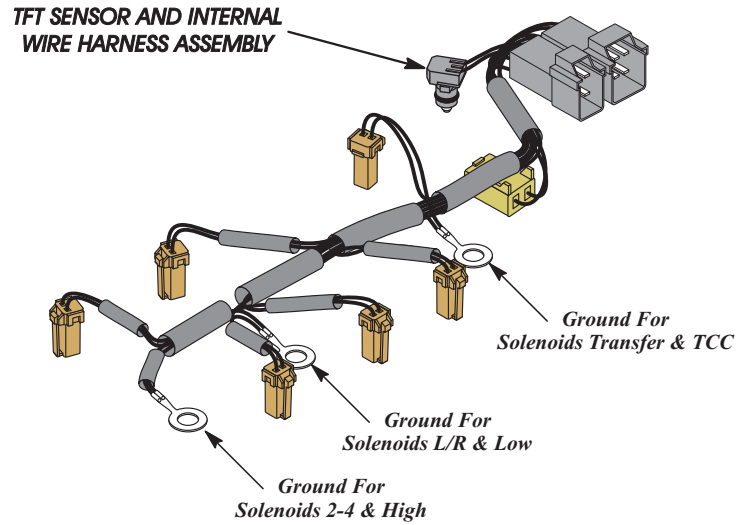


Summary: The Transfer Clutch Duty Solenoid is Normally Vented. When the Solenoid duty cycle is Low, Pilot pressure to the Control valve is blocked, closing the Transfer Clutch Control Valve. When the Solenoid duty cycle is High, Pilot pressure to the Control valve is High, opening the Transfer Clutch Control valve.

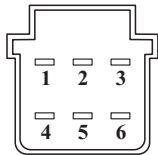
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Figure 7

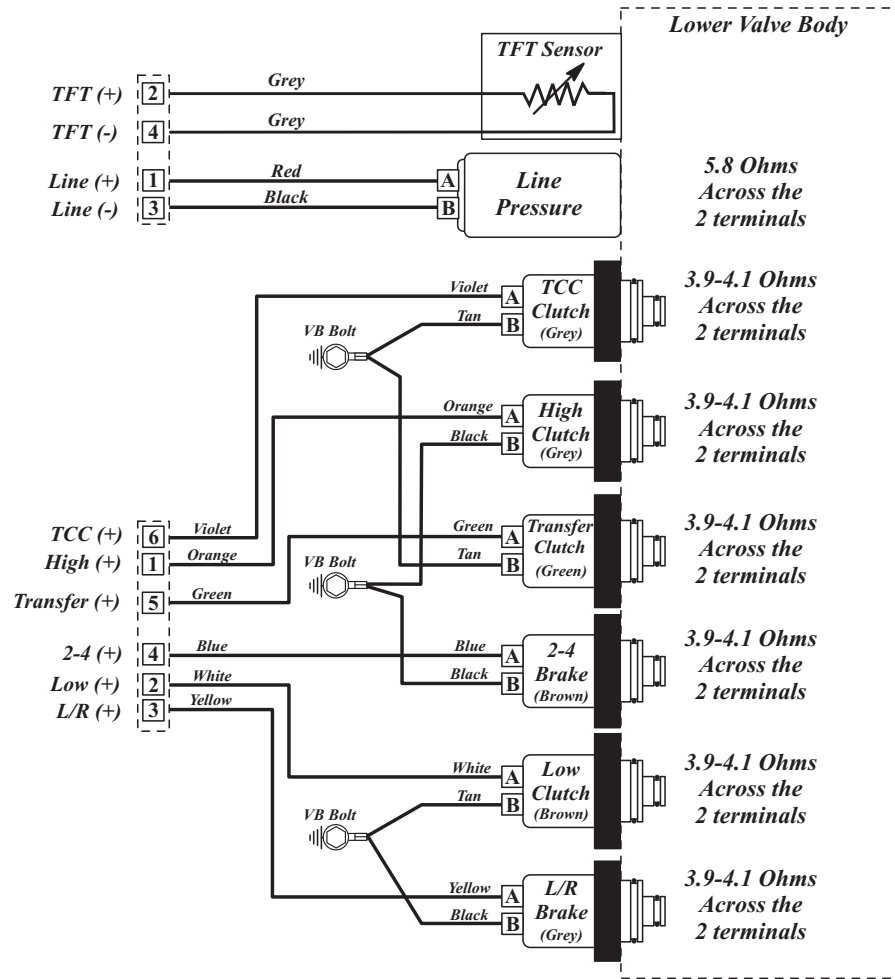
INTERNAL WIRING HARNESS



View Looking Into 4-Way Connector



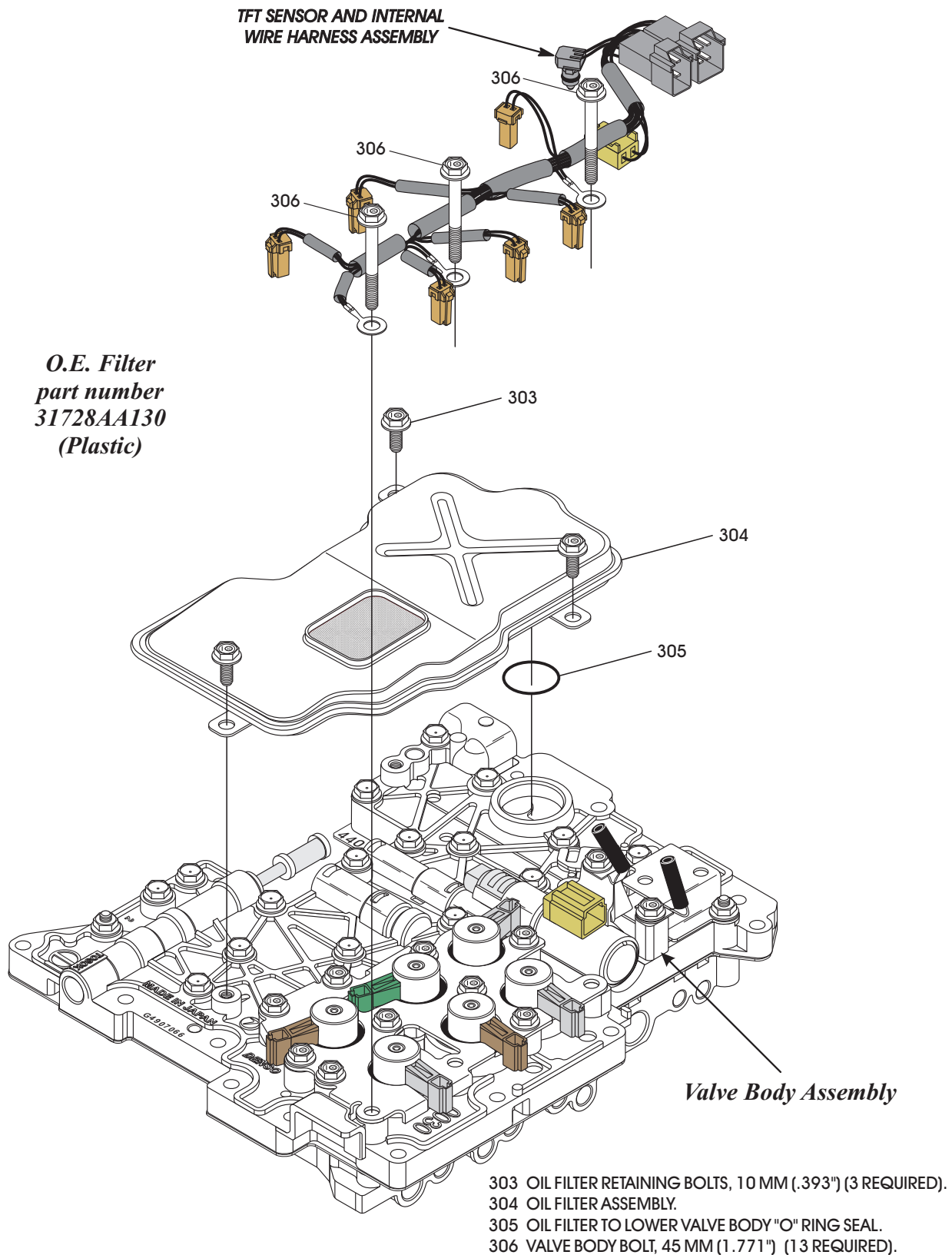
View Looking Into 6-Way Connector



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Figure 8

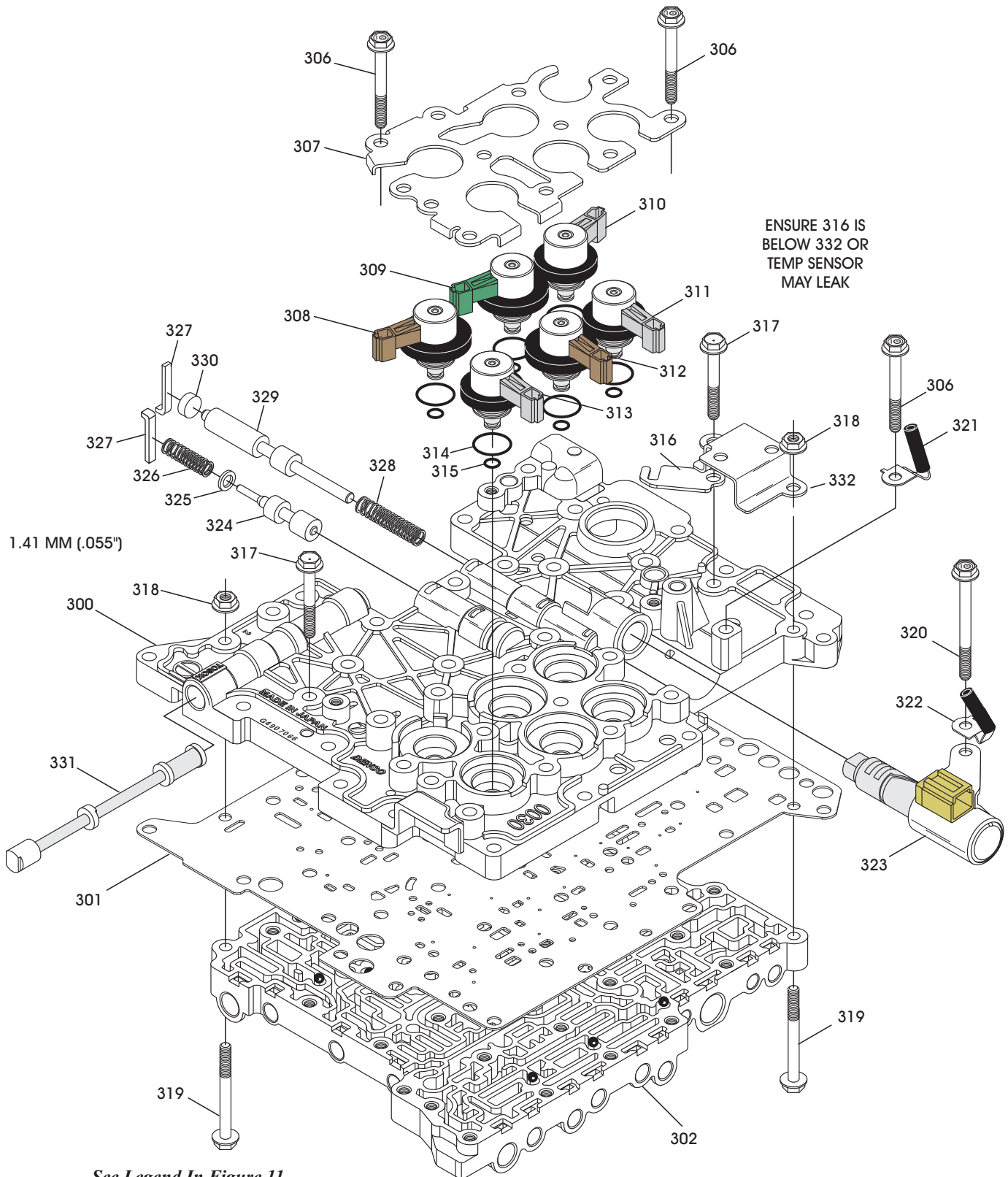
SUMP FILTER AND INTERNAL WIRING HARNESS LOCATION



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Figure 9

LOWER VALVE BODY EXPLODED VIEW



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Figure 10



Technical Service Information

FIGURE 10 LEGEND

- 300 LOWER VALVE BODY CASTING.
- 301 VALVE BODY SPACER PLATE.
- 302 UPPER VALVE BODY CASTING.
- 303 OIL FILTER RETAINING BOLTS, 10 MM (.393") (3 REQUIRED).
- 304 OIL FILTER ASSEMBLY.
- 305 OIL FILTER TO LOWER VALVE BODY "O" RING SEAL.
- 306 VALVE BODY BOLT, 45 MM (1.771") (13 REQUIRED).
- 307 SOLENOID RETAINING BRACKET.
- 308 LOW CLUTCH DUTY SOLENOID.
- 309 TRANSFER CLUTCH DUTY SOLENOID.
- 310 TORQUE CONVERTER CLUTCH DUTY SOLENOID.
- 311 HIGH CLUTCH DUTY SOLENOID.
- 312 2-4 BRAKE DUTY SOLENOID.
- 313 LOW REVERSE BRAKE DUTY SOLENOID.
- 314 SOLENOID LARGE "O" RING SEAL (6 REQUIRED).
- 315 SOLENOID SMALL "O" RING SEAL (6 REQUIRED).
- 316 TRANS TEMP SENSOR RETAINING BRACKET.
- 317 VALVE BODY BOLT, 40 MM (1.575") (16 REQUIRED).
- 318 NUT FOR 52 MM VALVE BODY BOLT.
- 319 VALVE BODY BOLT, 52 MM (2.047") (2 REQUIRED).
- 320 VALVE BODY BOLT, 60 MM (2.362") (1 REQUIRED).
- 321 INTERNAL WIRE HARNESS RETAINER.
- 322 INTERNAL WIRE HARNESS RETAINER.
- 323 LINE PRESSURE CONTROL SOLENOID.
- 324 PILOT VALVE.
- 325 SPRING SHIM, 1.41 MM (.055") THICK.
- 326 SPRING.
- 327 RETAINER.
- 328 SPRING.
- 329 REVERSE BOOST VALVE.
- 330 BORE PLUG.
- 331 MANUAL VALVE.
- 332 INTERNAL HARNESS CONNECTOR RETAINER BRACKET.

LOWER VALVE BODY SPRING SPECIFICATIONS

SPRING NUMBER 324

Free Length = 1.150"

Spring Diameter = .351"

Wire Diameter = .046"

Approx Coils = 13 (NONE)

SPRING NUMBER 329

Free Length = 1.900"

Spring Diameter = .359"

Wire Diameter = .043"

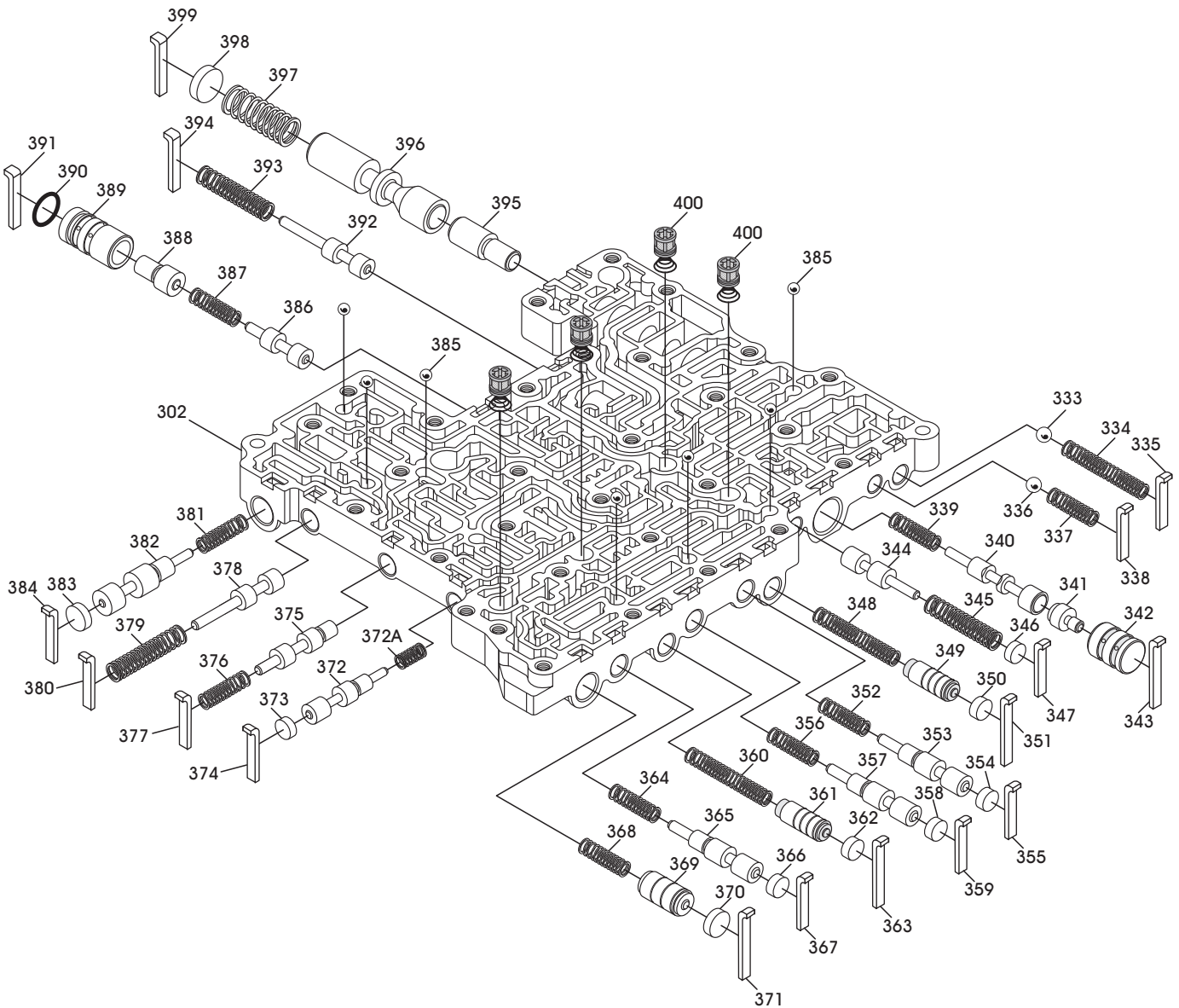
Approx Coils = 16 (NONE)

***Note: The Valve names are provided by ATSG
and are based on valve function.***

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Figure 11

UPPER VALVE BODY EXPLODED VIEW



See Legend In Figure 13

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Figure 12



Technical Service Information

FIGURE 12 LEGEND

- | | |
|--|---|
| 302 UPPER VALVE BODY CASTING. | 368 LOW CLUTCH DUTY SOLENOID ACCUMULATOR SPRING. |
| 333 LINE PRESSURE BLOW-OFF BALL, 8.72 MM (.343") DIAMETER. | 369 LOW CLUTCH DUTY SOLENOID ACCUMULATOR VALVE. |
| 334 LINE PRESSURE BLOW-OFF BALL SPRING. | 370 LOW CLUTCH DUTY SOLENOID ACCUMULATOR. |
| 335 BLOW-OFF BALL SPRING RETAINER. | 371 LOW CLUTCH DUTY SOLENOID ACCUMULATOR RETAINER. |
| 336 REAR LUBE CHECK BALL, 8.72 MM (.343") DIAMETER. | 372A TRANSFER CLUTCH CONTROL VALVE SPRING |
| 337 REAR LUBE SPRING. | 372 TRANSFER CLUTCH CONTROL VALVE. |
| 338 REAR LUBE SPRING RETAINER. | 373 TRANSFER CLUTCH CONTROL VALVE BORE PLUG. |
| 339 LOCK-UP CONTROL VALVE SPRING. | 374 TRANSFER CLUTCH CONTROL VALVE BORE PLUG RETAINER. |
| 340 LOCK-UP CONTROL VALVE. | 375 LOW/REVERSE BRAKE SEQUENCE VALVE. |
| 341 LOCK-UP CONTROL BOOST VALVE. | 376 LOW/REVERSE BRAKE SEQUENCE SPRING. |
| 342 LOCK-UP CONTROL BOOST VALVE SLEEVE. | 377 LOW/REVERSE BRAKE SEQUENCE SPRING RETAINER. |
| 343 LOCK-UP CONTROL BOOST VALVE SLEEVE RETAINER. | 378 LOW/2-4 RELAY VALVE. |
| 344 TCC REGULATOR VALVE 2. (APPLY) | 379 LOW/2-4 RELAY VALVE SPRING. |
| 345 TCC REGULATOR VALVE 2 SPRING. | 380 LOW/2-4 RELAY VALVE SPRING RETAINER. |
| 346 TCC REGULATOR VALVE 2 BORE PLUG. | 381 LOW/REVERSE BRAKE CONTROL VALVE SPRING. |
| 347 TCC REGULATOR VALVE 2 BORE PLUG RETAINER. | 382 LOW/REVERSE BRAKE CONTROL VALVE. |
| 348 HIGH CLUTCH DUTY SOLENOID ACCUMULATOR SPRING. | 383 LOW/REVERSE BRAKE CONTROL VALVE BORE PLUG. |
| 349 HIGH CLUTCH DUTY SOLENOID ACCUMULATOR VALVE. | 384 LOW/REVERSE BRAKE CONTROL VALVE BORE PLUG RETAINER. |
| 350 HIGH CLUTCH DUTY SOLENOID ACCUMULATOR BORE PLUG. | 385 STEEL CHECK BALLS, 5.53 MM (.217") DIAMETER (7 REQUIRED). |
| 351 HIGH CLUTCH DUTY SOLENOID ACCUMULATOR RETAINER. | 386 2-4 BRAKE SEQUENCE VALVE. |
| 352 HIGH CLUTCH CONTROL VALVE SPRING. | 387 2-4 BRAKE SEQUENCE VALVE SPRING. |
| 353 HIGH CLUTCH CONTROL VALVE. | 388 2-4 BRAKE SEQUENCE BOOST VALVE. |
| 354 HIGH CLUTCH CONTROL BORE PLUG. | 389 2-4 BRAKE SEQUENCE BOOST VALVE SLEEVE. |
| 355 HIGH CLUTCH CONTROL BORE PLUG RETAINER. | 390 2-4 BRAKE SEQUENCE BOOST VALVE SLEEVE "O" RING SEAL. |
| 356 2-4 BRAKE CONTROL VALVE SPRING. | 391 2-4 BRAKE SEQUENCE BOOST VALVE SLEEVE RETAINER. |
| 357 2-4 BRAKE CONTROL VALVE. | 392 TORQUE CONVERTER/LUBE REGULATOR VALVE 1. |
| 358 2-4 BRAKE CONTROL BORE PLUG. | 393 TORQUE CONVERTER/LUBE REGULATOR VALVE 1 SPRING. |
| 359 2-4 BRAKE CONTROL BORE PLUG RETAINER. | 394 TORQUE CONVERTER/LUBE REG. VALVE 1 SPRING RETAINER. |
| 360 2-4 BRAKE DUTY SOLENOID ACCUMULATOR SPRING. | 395 LINE PRESSURE REGULATOR INNER VALVE. |
| 361 2-4 BRAKE DUTY SOLENOID ACCUMULATOR VALVE. | 396 LINE PRESSURE REGULATOR VALVE. |
| 362 2-4 BRAKE DUTY SOLENOID ACCUMULATOR BORE PLUG. | 397 LINE PRESSURE REGULATOR VALVE SPRING. |
| 363 2-4 BRAKE DUTY SOLENOID ACCUMULATOR RETAINER. | 398 LINE PRESSURE REGULATOR VALVE BORE PLUG. |
| 364 LOW CLUTCH CONTROL VALVE SPRING. | 399 LINE PRESSURE REGULATOR VALVE BORE PLUG RETAINER. |
| 365 LOW CLUTCH CONTROL VALVE. | 400 PLASTIC SCREENS (4 REQUIRED). |
| 366 LOW CLUTCH CONTROL VALVE BORE PLUG. | |
| 367 LOW CLUTCH CONTROL VALVE RETAINER. | |

***Note: The Valve names are provided by ATSG
and are based on valve function.***

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Figure 13

UPPER VALVE BODY SPRING SPECIFICATIONS

SPRING NUMBER 334
Free Length = 2.700"
Spring Diameter = .375"
Wire Diameter = .062"
Approx Coils = 24 (NONE)

SPRING NUMBER 348,360
Free Length = 1.640"
Spring Diameter = .322"
Wire Diameter = .054"
Approx Coils = 23 (NONE)

SPRING NUMBER 368
Free Length = 1.140"
Spring Diameter = .390"
Wire Diameter = .062"
Approx Coils = 12 (NONE)

SPRING NUMBER 381
Free Length = 1.425"
Spring Diameter = .328"
Wire Diameter = .020"
Approx Coils = 12 (NONE)

SPRING NUMBER 337
Free Length = 1.500"
Spring Diameter = .353"
Wire Diameter = .038"
Approx Coils = 12 (NONE)

SPRING NUMBER 352
Free Length = 1.430"
Spring Diameter = .331"
Wire Diameter = .021"
Approx Coils = 11 (NONE)

SPRING NUMBER 372A
Free Length = .600"
Spring Diameter = .305"
Wire Diameter = .027"
Approx Coils = 12 (NONE)

SPRING NUMBER 387
Free Length = 1.027"
Spring Diameter = .352"
Wire Diameter = .030"
Approx Coils = 9 (NONE)

SPRING NUMBER 339
Free Length = 1.205"
Spring Diameter = .353"
Wire Diameter = .031"
Approx Coils = 10 (NONE)

SPRING NUMBER 356
Free Length = 1.255"
Spring Diameter = .331"
Wire Diameter = .021"
Approx Coils = 11 (NONE)

SPRING NUMBER 376
Free Length = 1.272"
Spring Diameter = .352"
Wire Diameter = .030"
Approx Coils = 10 (NONE)

SPRING NUMBER 393
Free Length = 1.673"
Spring Diameter = .355"
Wire Diameter = .054"
Approx Coils = 17 (NONE)

SPRING NUMBER 345
Free Length = 1.435"
Spring Diameter = .332"
Wire Diameter = .035"
Approx Coils = 14 (NONE)

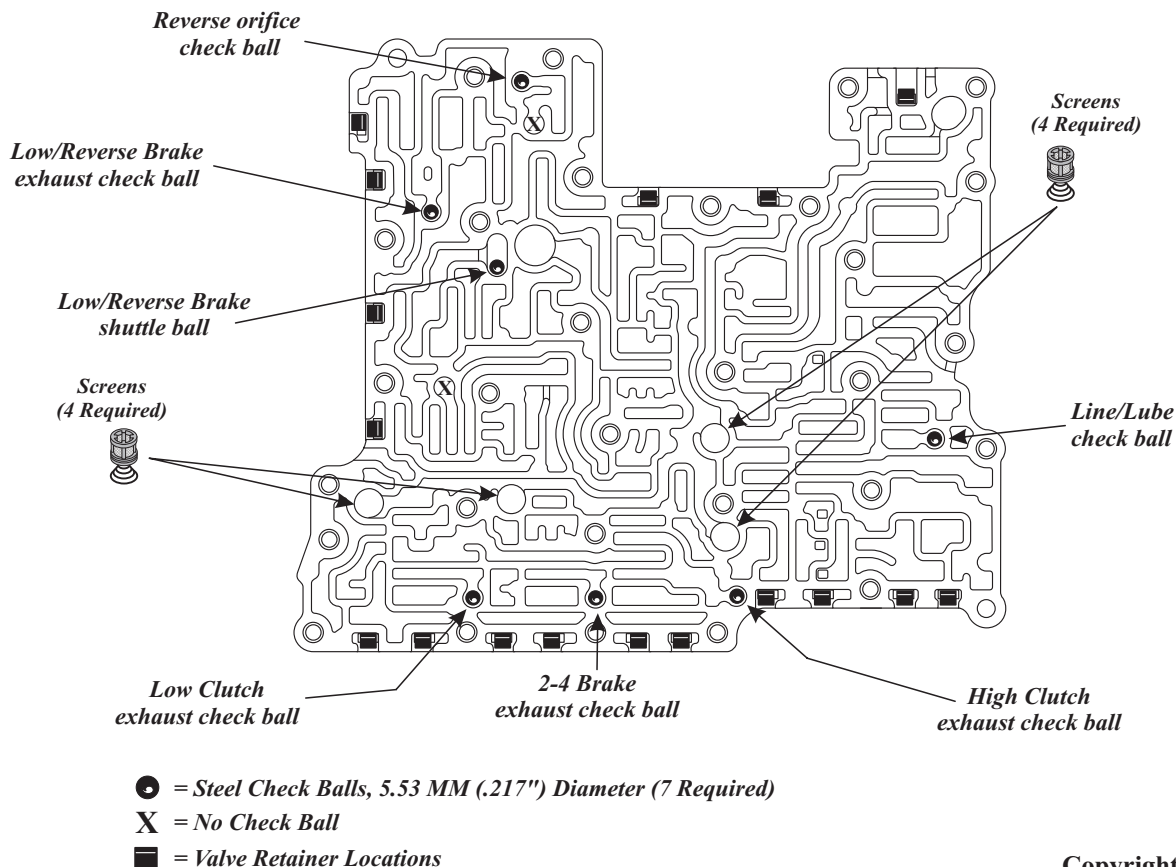
SPRING NUMBER 364
Free Length = 1.335"
Spring Diameter = .331"
Wire Diameter = .021"
Approx Coils = 11 (NONE)

SPRING NUMBER 379
Free Length = 1.448"
Spring Diameter = .359"
Wire Diameter = .046"
Approx Coils = 18 (NONE)

SPRING NUMBER 397
Free Length = 1.362"
Spring Diameter = .431"
Wire Diameter = .046"
Approx Coils = 10 (NONE)

Figure 14

UPPER VALVE BODY, SMALL PARTS LOCATIONS

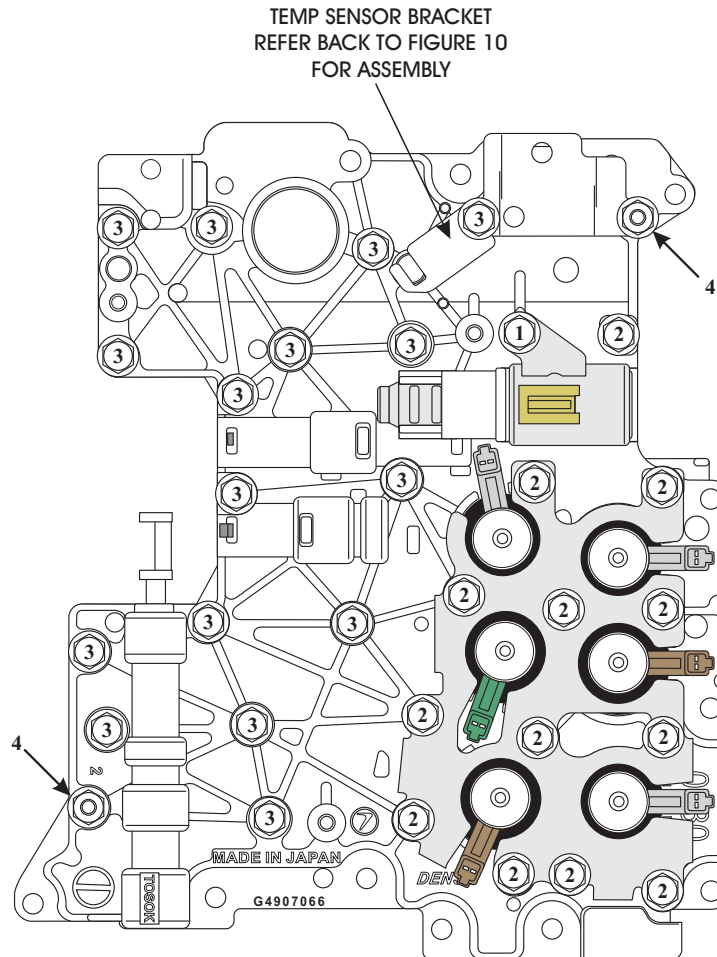


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Figure 15

VALVE BODY, bolt LOCATIONS

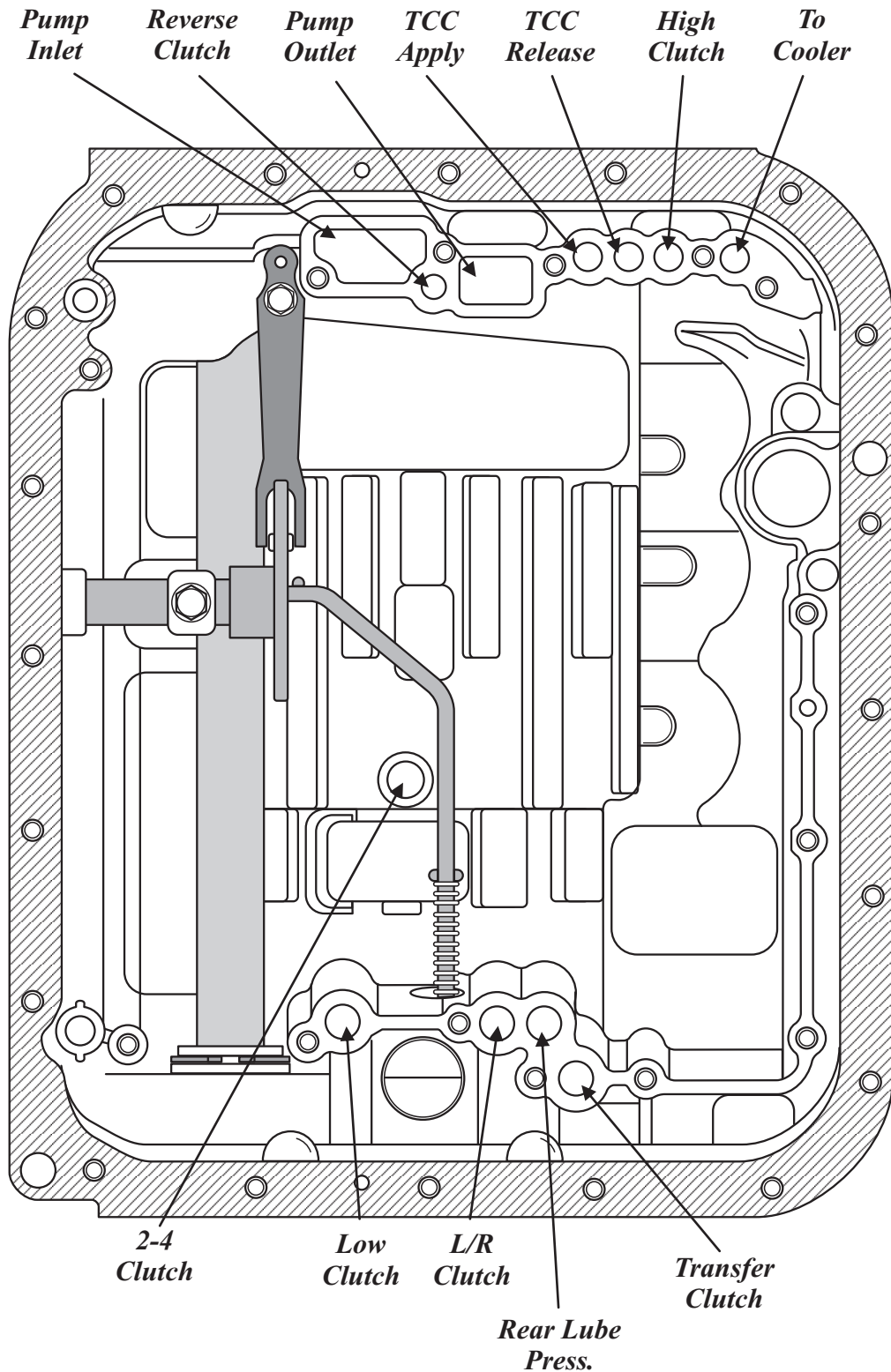
- 1 = 60 MM (2.362") (1 Required)
- 2 = 45 MM (1.771") (13 Required)
- 3 = 40 MM (1.575") (16 Required)
- 4 = 52 MM (2.047"), W/Nut (2 Required)



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Figure 16

CASE AIR CHECK/OIL PASSAGE IDENTIFICATION



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Figure 17