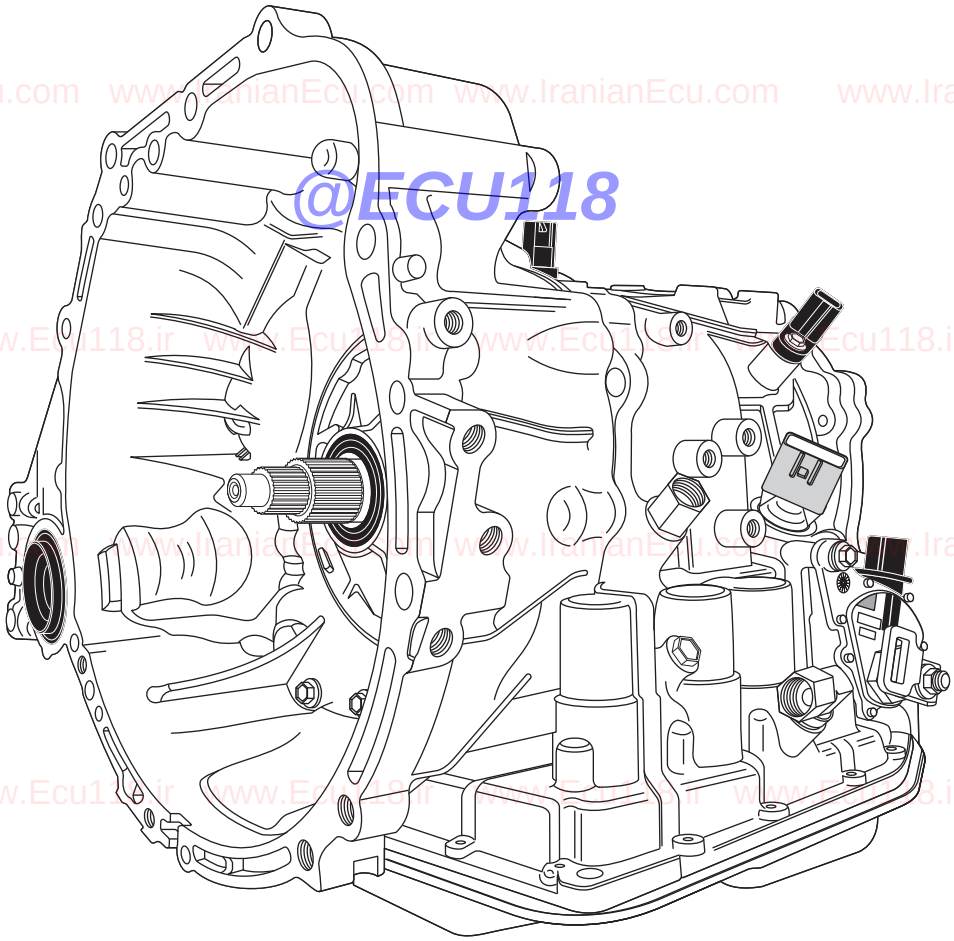
TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION

Starting at the beginning of production for the 2002 model year for Lexus and 2004 for Toyota, a spin-off of the U140/U240 Four speed transaxle, designated as the U150/U250 series was born. This transmission is classified as a 5 speed transmission, although it has 6 ratio's possible in the Drive position. The U150/250 is very similar to it's smaller brother, the U140, and actually uses some of the same parts.

This transaxles shift points, and shift feel are electronically controlled by a Powertrain Control Module. This is accomplished by the PCM monitoring engine load and adjusting solenoid duty cycle to match pressure rise and shift feel. The PCM also monitors the turbine and output speed sensors to calculate gear ratio and the Transmission Range Sensor for gear selection.

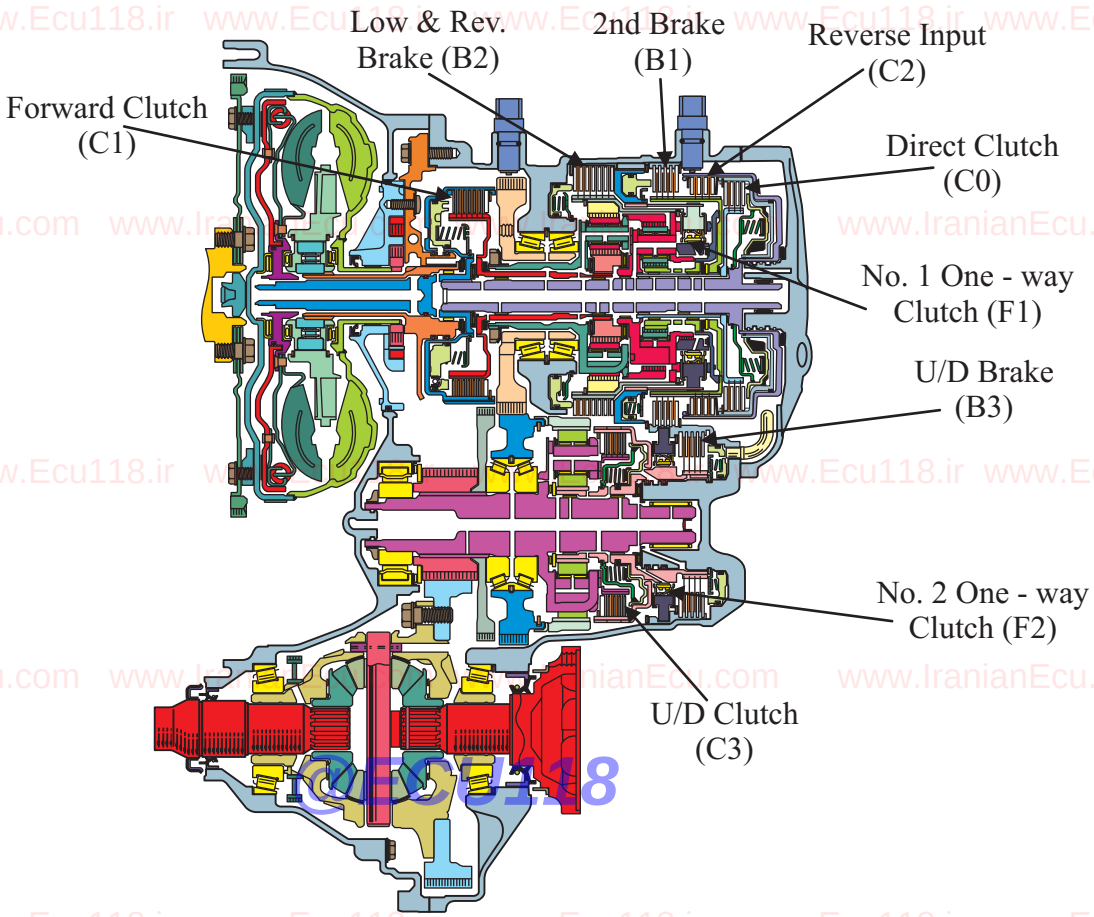
TOYOTA/LEXUS U150/U250 TRANSAXLE



TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION

Refer to Figure 1 for a component application chart.
Refer to Figure 2 for the Solenoid internal harness and connector I.D.
Refer to Figure 3 for the Solenoid ohm values.
Refer to Figure 4 for the Internal harness schematic.
Refer to Figure 5 for the Solenoid Identification and location.
Refer to Figure 6 for the Solenoid Firing Order.
Refer to Figure 7 for the SLT Solenoid function.
Refer to Figure 8 for the SL1 Solenoid function.
Refer to Figure 9 for the SL2 Solenoid function.
Refer to Figure 10 for the SL3 Solenoid function.
Refer to Figure 11 for the SR Solenoid function.
Refer to Figure 12 for the S4 Solenoid function.
Refer to Figure 13 for the DSL/TCC Solenoid function.
Refer to Figure 14-24 for the complete Valve Body assembly exploded views and valve descriptions.
Refer to Figure 25 for case passage I.D. and air Checks.

TOYOTA/LEXUS U150/U250
COMPONENT APPLICATION CHART



Gear Range	Fwd Clutch C1	Rev Input Clutch C2	Dir Clutch C0	U/D Clutch C3	2nd Brake B1	L/R Brake B2	U/D Brake B3	No. 1 One Way Clutch F1	No. 2 One Way Clutch F2
Park							ON		
Reverse		ON				ON	ON		
Neutral							ON		
D-1st. Gear	ON						ON	ON	ON
D-2nd. Gear	ON				ON		ON		ON
D-3rd. Gear Version 1	ON		ON	ON					
D-3rd. Gear Version 2	ON		ON				ON		ON
D-4th. Gear			ON		ON		ON		ON
D-5th. Gear			ON	ON	ON				

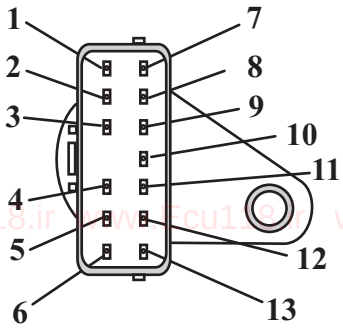
3rd Gear Version 1 is a higher ratio, as the Transfer assembly is turning 1:1
3rd Gear Version 2 is a lower ratio, as the Transfer assembly is in reduction
Note: These two versions are controlled by PCM scheduling and Line pressure. Version 2 is used at higher throttle/pressure.

Figure 1

TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION

SOLENOID INTERNAL HARNESS AND CONNECTOR I.D.

13 PIN CONNECTOR

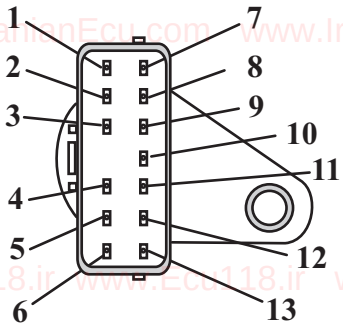


Terminal	Function	Internal wire Color
1	THO (temp +)	Orange
2	SLT +	Green
3	S4 +	Yellow
4	SL3+	Red
5	SL2+	Green
6	SL1+	White
7	E2 (temp -)	Orange
8	SLT -	Grey
9	SR+	Purple
10	DSL+	Light Blue
11	SL3-	Blue
12	SL2-	Brown
13	SL1-	Black

Figure 2

SOLENOID OHM VALUES

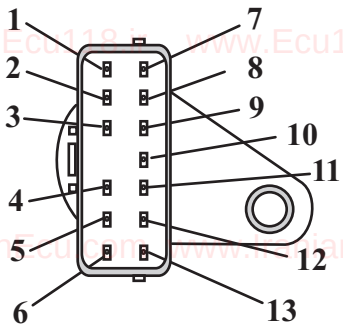
13 PIN CONNECTOR

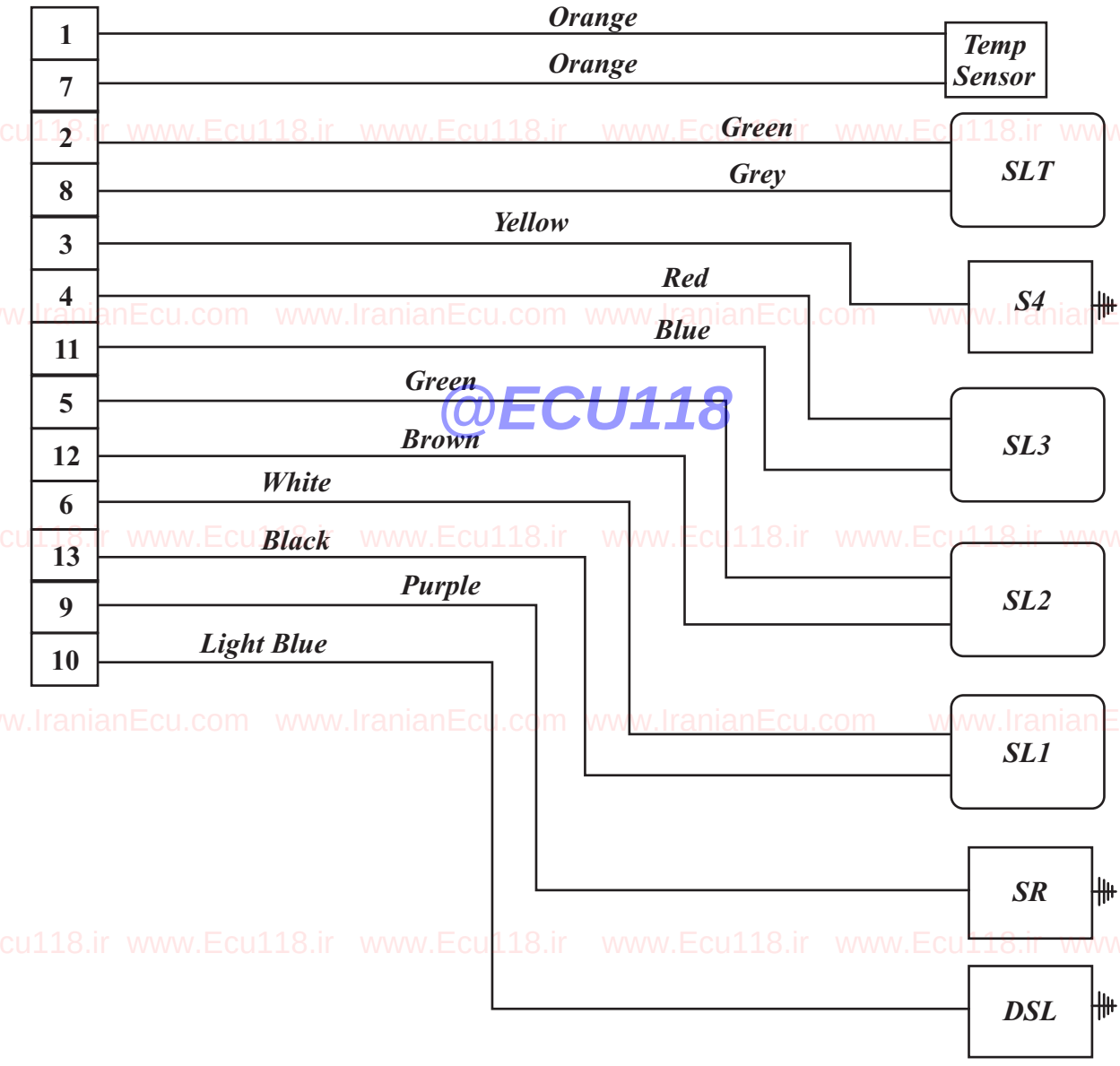


Test	Connect to terminals	Ohm Value
Temp Sensor	1 and 7	3.8k ohms @ 70°F
SLT	2 and 8	4.5 to 6.0
S4	3 and Gnd to the case	11 to 15
SL3	4 and 11	4.5 to 6.0
SL2	5 and 12	4.5 to 6.0
SL1	6 and 13	4.5 to 6.0
SR	9 and Gnd to the case	11 to 15
DSL	10 and Gnd to the case	11 to 15

Figure 3

13 PIN CONNECTOR INTERNAL HARNESS SCHEMATIC





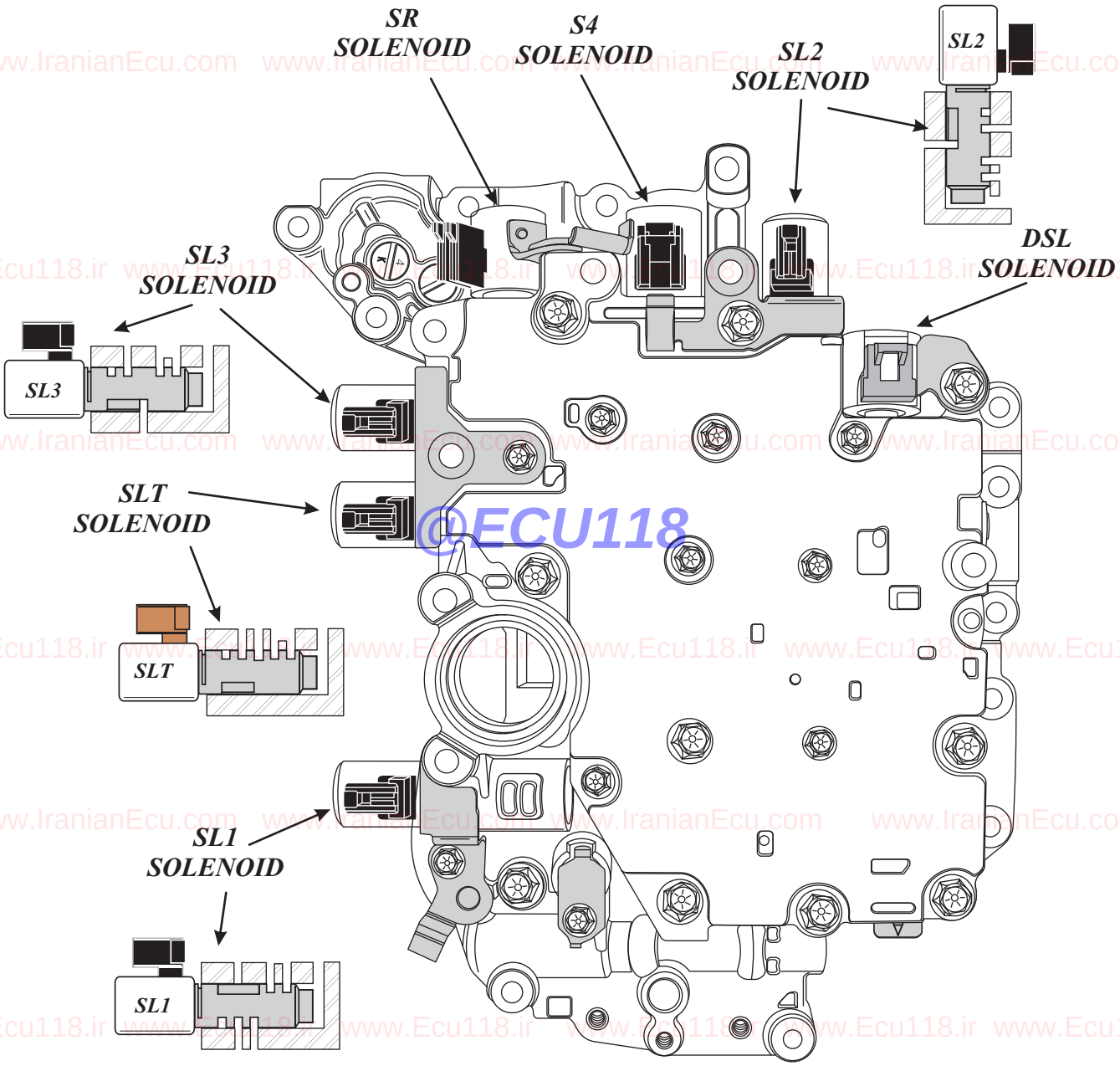
Note: The DSL ,SR and S4 Solenoid are grounded to the case

Figure 4

TOYOTA/LEXUS U150/U250

PRELIMINARY INFORMATION

U150 SERIES SOLENOID I.D.



Note: The Linear solenoids can be put into the wrong holes in the Valve Body. Refer to the illustration above with the cross-sectional views and verify that the solenoid is in the correct location.

Figure 5

TYPICAL SOLENOID FIRING ORDER

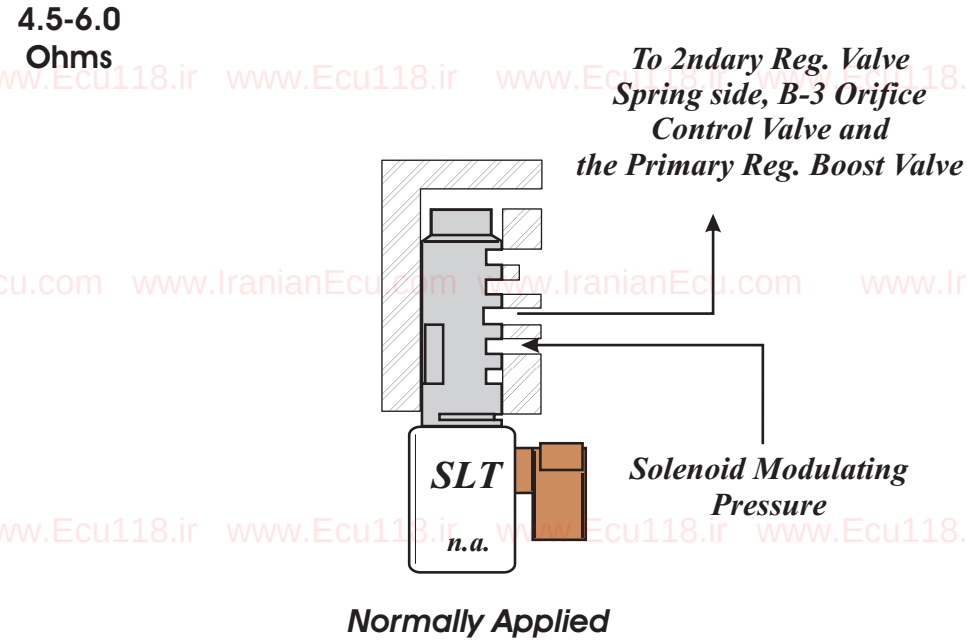
	SL1	SL2	SL3	S4	SR	DSL/TCC	SLT
1st	*ON*	*ON*	*Off*	*Off*	*Off*	*ON/M1***	*Modulates based on engine load*
2nd	*Off*	*ON*	*Off*	*Off*	*Off*		
3rd	*ON*	*Off*	*Off*	*Off*	*ON**	*ON***	
4th	*Off*	*Off*	*ON*	*Off*	*ON**	*ON***	
5th	*Off*	*Off*	*ON*	*ON*	*ON**	*ON***	

SR- must be ON for TCC apply, and must be OFF to provide the connection for the DSL to the B2 Control Valve for Reverse inhibit. The SR is also Off during the 2-3 upshift transition.

DSL - has 3 functions in Manual Low controls B2 brake to provide engine braking in Manual 1, in 3rd, 4th and 5th gear it controls TCC, and if turned on in Reverse will inhibit Reverse application.

Figure 6

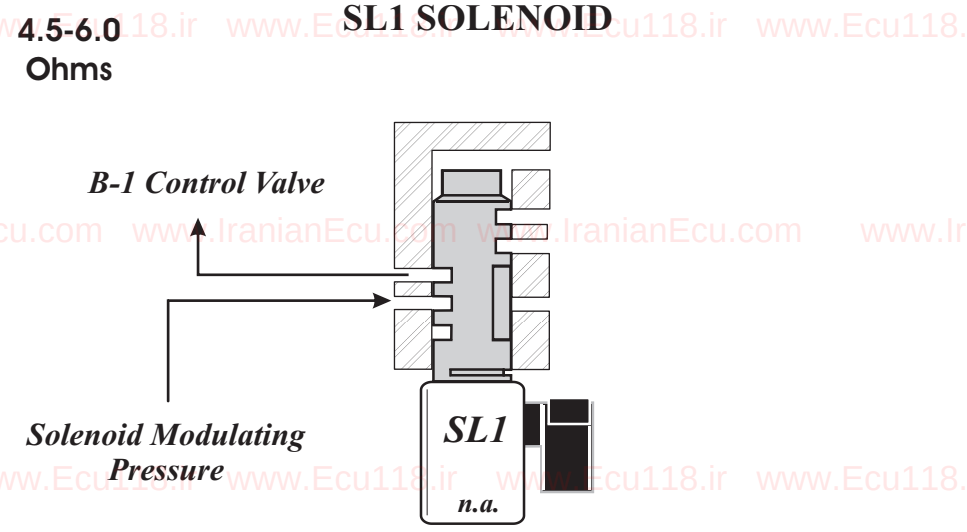
SLT LINE PRESSURE CONTROL SOLENOID



The SLT or Line Pressure Control Solenoid is a Normally Applied linear type Solenoid. When the Solenoid is OFF Solenoid Modulating Pressure will be connected to the port leading to the 2ndary Reg. Valve Spring side, B-3 Orifice Control Valve and the Primary Reg. Boost Valve causing Pressure to be high in those circuits, as well as Main Line Pressure. When the SLT Solenoid is ON pressure will be low leading to the valves listed above, as well as Line Pressure. This Solenoid is controlled by the PCM which calculates the duty cycle to match Line Pressure to engine load.

Figure 7

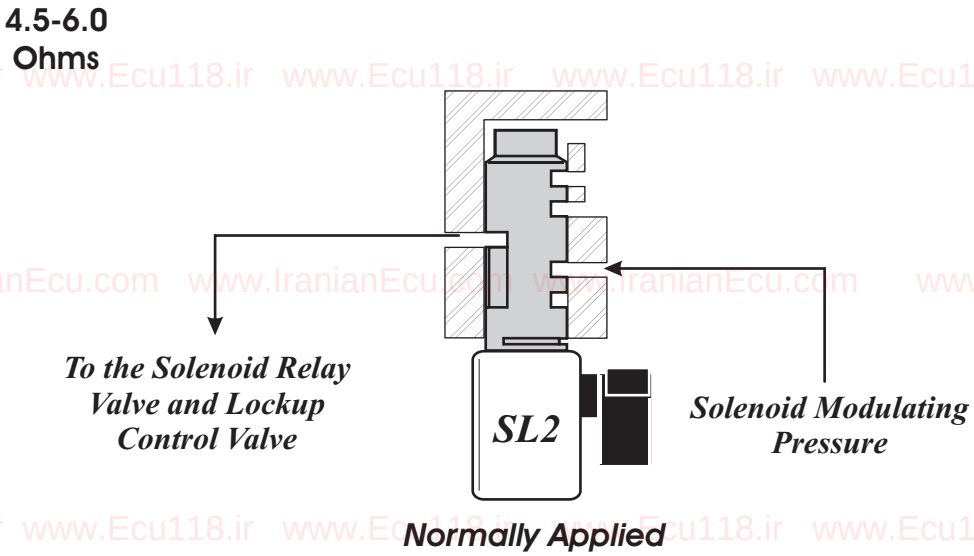
SL1 SOLENOID



The SL1 Solenoid is a Normally Applied linear type Solenoid. When the Solenoid is OFF Modulating Pressure will be connected to the port leading to the B-1 Control valve, which controls B-1 application. When the Solenoid is ON Modulating pressure will be blocked to the Valve.

Figure 8

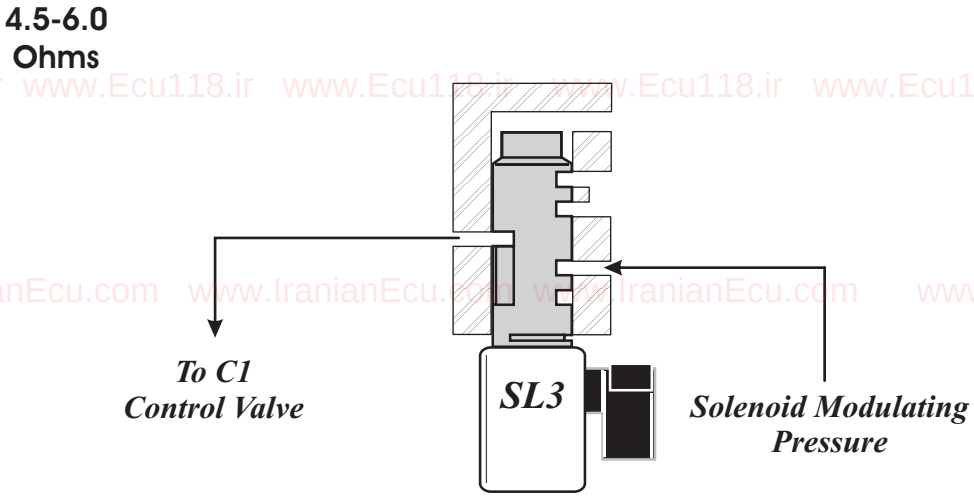
SL2 SOLENOID



The SL2 Solenoid is a Normally Applied linear type Solenoid. When the Solenoid is OFF Modulating Pressure will be connected to the port leading to the Solenoid Relay Valve, to control the 2-3 upshift, thru the C0 Control Valve, and the third land of the Lockup Control Valve. When the Solenoid is ON Modulating pressure will be blocked to the Valves listed above.

Figure 9

SL3 SOLENOID



The SL3 Solenoid is a Normally Applied linear type Solenoid. When the Solenoid is OFF Modulating Pressure will be connected to the port leading to the C1 Control Valve. When the Solenoid is ON Modulating pressure will be blocked to the Valves listed above.

Figure 10

SR SOLENOID

11-15
Ohms

Normally Closed

The SR Solenoid is a Normally Closed Solenoid. When OFF it blocks orificed Forward Clutch pressure from stroking the Solenoid Relay Valve. When ON it connects orificed Forward Clutch pressure to the First land of the Solenoid Relay Valve stroking the valve.

Figure 11

S4 SOLENOID

11-15
Ohms

Normally Closed

The S4 Solenoid is a Normally Closed Solenoid. When OFF it blocks orificed Forward Clutch pressure from the port leading to the Solenoid Relay Valve . When ON it connects orificed Forward Clutch pressure to the Solenoid Relay Valve, which in-turn leads to the 4-5 Shift Valve or Clutch Apply Control Valve, based on the position of the Solenoid Relay Valve..

Figure 12

DSL - TCC SOLENOID

11-15 Ohms

Normally Closed

The DSL/TCC Solenoid is a Normally Closed Solenoid. When OFF it blocks Solenoid modulating pressure from the Solenoid Relay Valve. When ON it connects Solenoid Modulating pressure to the B-2 Control Valve when the Solenoid Relay Valve is not stroked, for Reverse inhibit and for B2 application in Manual Low for engine braking. When On it connects Solenoid Modulating pressure to the Lock-up Relay Valve for TCC application

Figure 13

LOWER CHANNEL PLATE

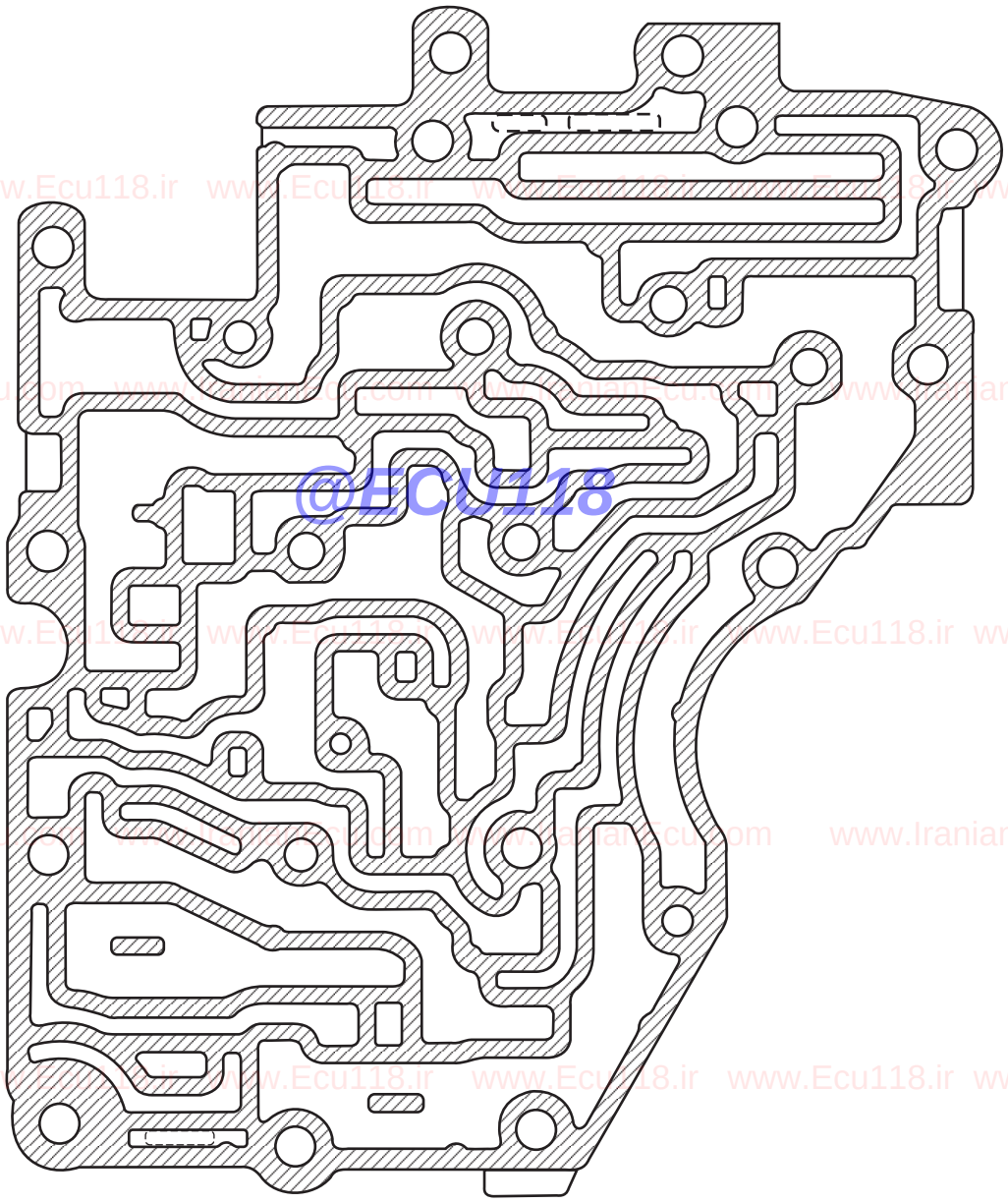


Figure 14

LOWER BONDED
SPACER PLATE

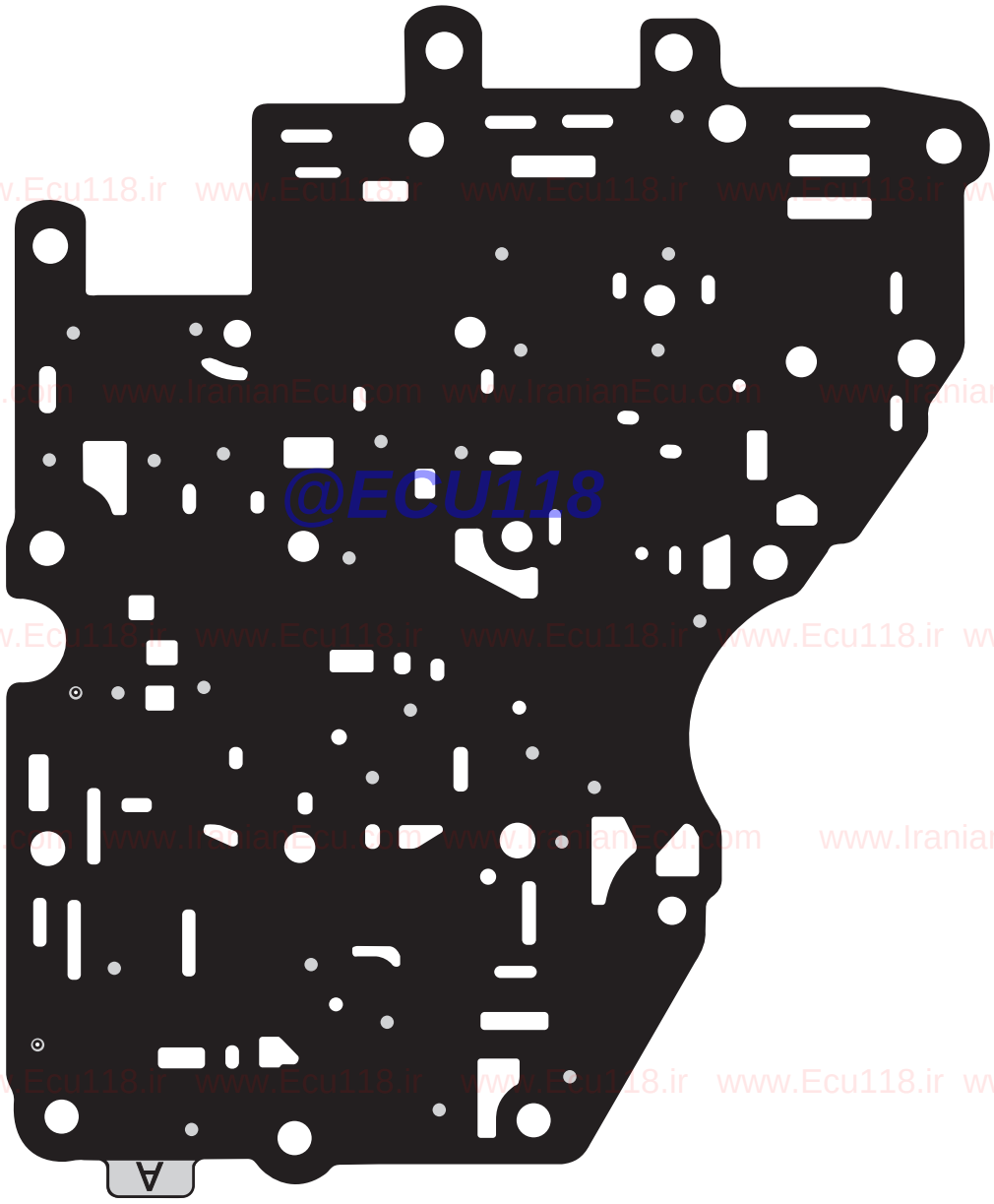


Figure 15

TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION

LOWER VALVE BODY LOWER SIDE
RELIEF BALL LOCATION

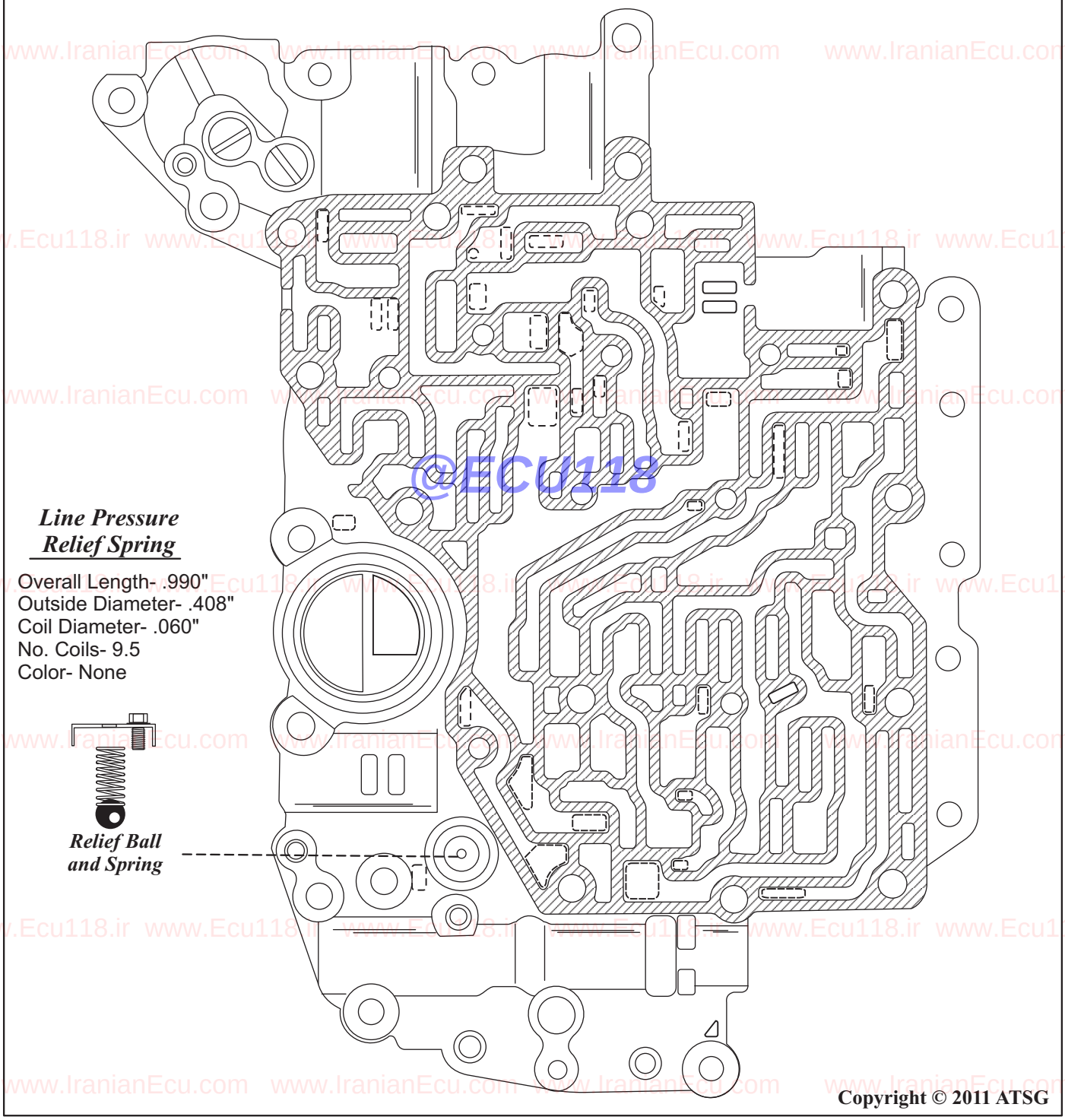


Figure 16

LOWER VALVE BODY UPPER SIDE RELIEF VALVE AND RETAINER LOCATIONS

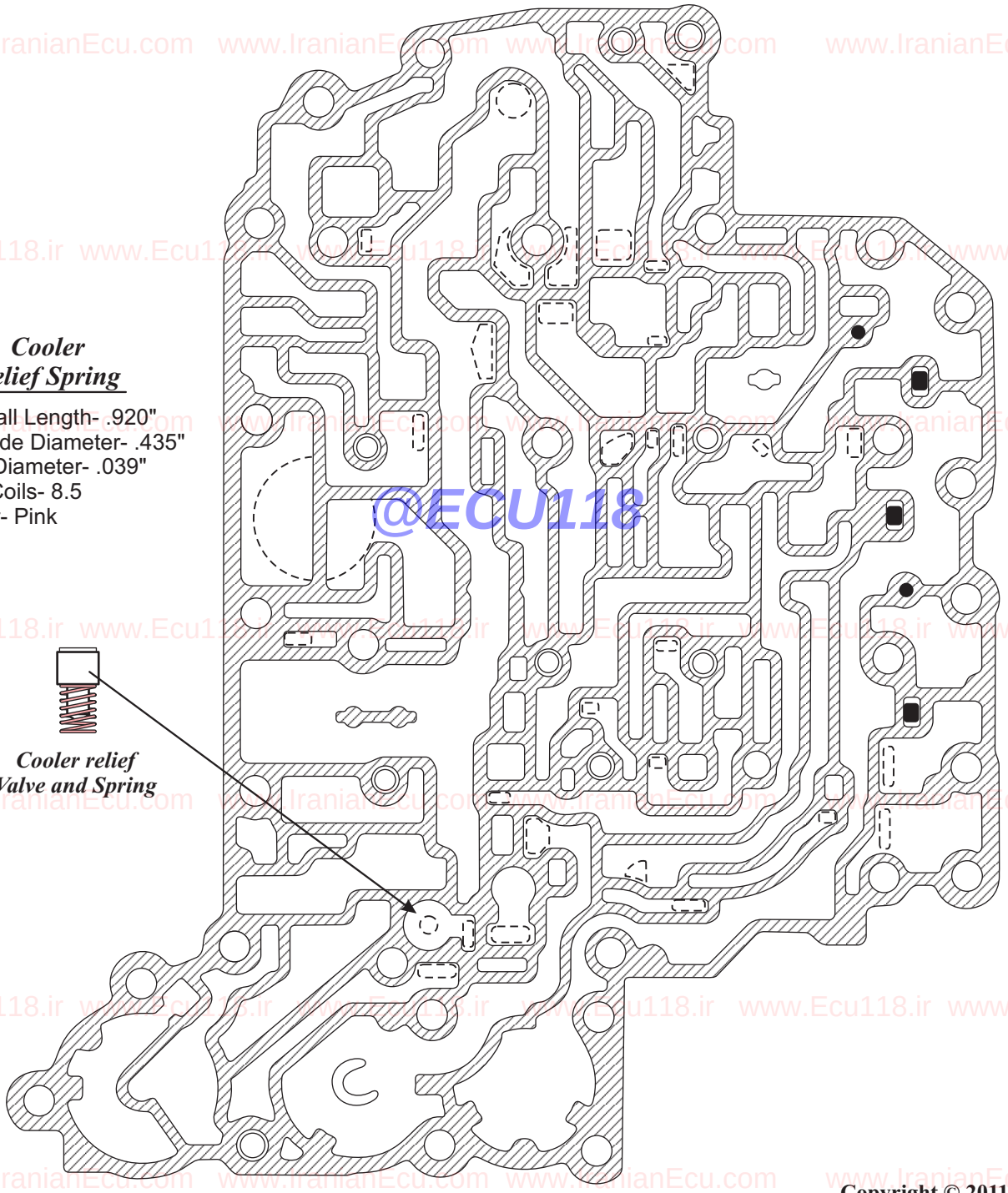
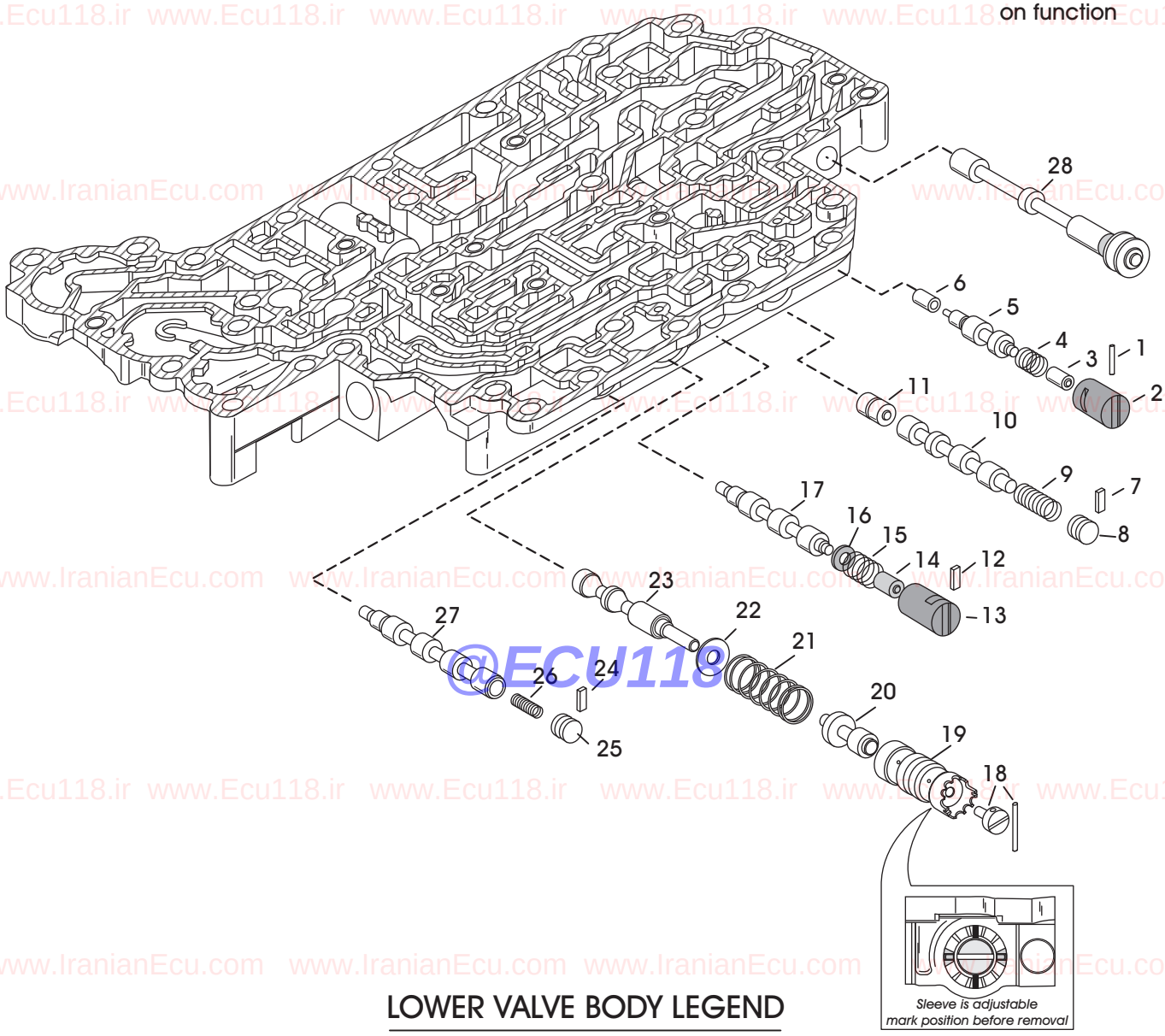


Figure 17

LOWER VALVE BODY
VALVE DESCRIPTIONS

Note: Some Valve names are ATSG's interpretation based on function



LOWER VALVE BODY LEGEND

1. B2 Switch Valve Retainer
2. B2 Switch Valve Boost Sleeve
3. B2 Switch Valve Boost Valve
4. B2 Switch Valve Spring
5. B2 Switch Valve
6. B2 Switch Valve Plug
7. 4-5 Shift Valve Retainer
8. 4-5 Shift Valve Bore Plug
9. 4-5 Shift Valve Spring
10. 4-5 Shift Valve
11. 4-5 Shift Valve Plug
12. B1 Switch Valve Retainer
13. B1 Switch Valve Boost Sleeve
14. B1 Switch Valve Boost Valve
15. B1 Switch Valve Spring
16. B1 Switch Valve Spring Shim .040"
17. B1 Switch Valve
18. Main Regulator Valve Plug and retainer
19. Main Regulator Valve Boost Sleeve
20. Main Regulator Valve Boost Valve
21. Main Regulator Valve Spring
22. Main Regulator Valve Washer
23. Main Regulator Valve
24. Clutch Apply Control Valve Retainer
25. Clutch Apply Control Valve Bore Plug
26. Clutch Apply Control Valve Spring
27. Clutch Apply Control Valve
28. Manual Valve

Figure 18

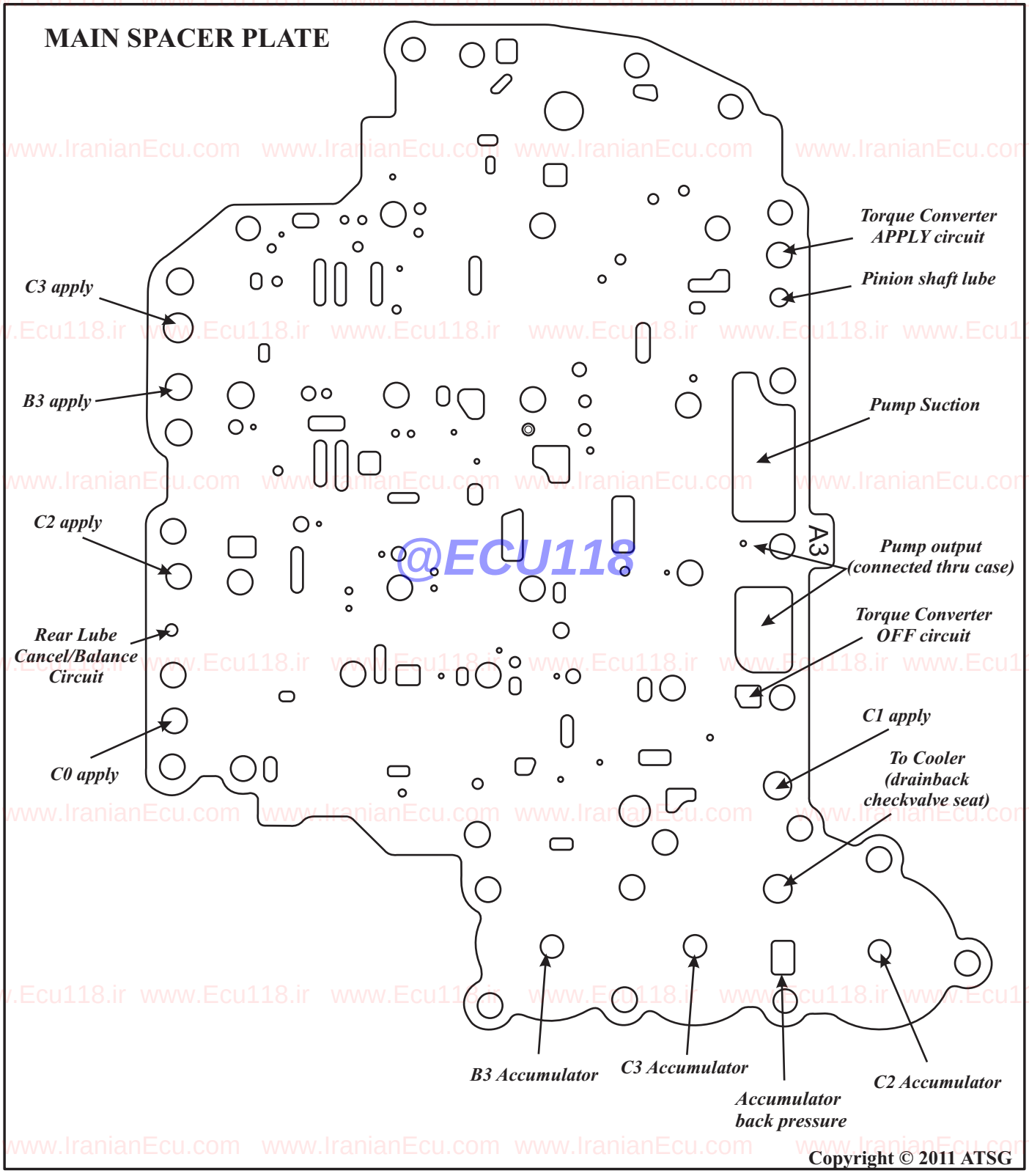
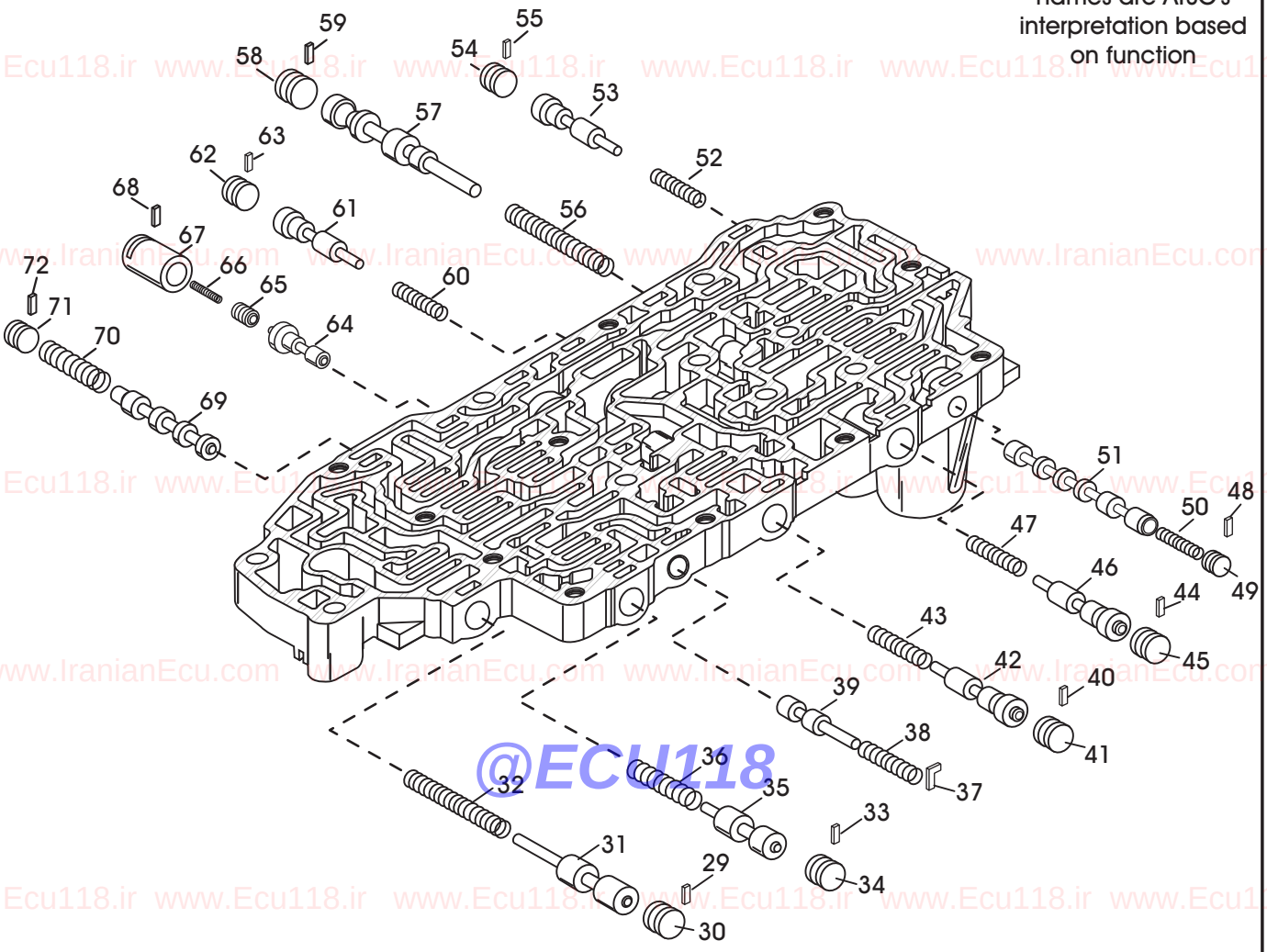


Figure 19

UPPER VALVE BODY VALVE DESCRIPTIONS

Note: Some Valve names are ATSG's interpretation based on function



UPPER VALVE BODY LEGEND

29. Solenoid Modulating Valve retainer
30. Solenoid Modulating Valve Bore Plug
31. Solenoid Modulating Valve
32. Solenoid Modulating Valve Spring
33. B2 Control Valve retainer
34. B2 Control Valve Bore Plug
35. B2 Control Valve
36. B2 Control Valve Spring
37. B3 Orifice Control Valve retainer
38. B3 Orifice Control Spring
39. B3 Orifice Control Valve
40. Accumulator Control Valve retainer
41. Accumulator Control Valve Bore plug
42. Accumulator Control Valve
43. Accumulator Control Valve Spring
44. C0 Control Valve retainer
45. C0 Control Valve Bore Plug
46. C0 Control Valve
47. C0 Control Valve Spring
48. Solenoid Relay Valve retainer
49. Solenoid Relay Valve Bore Plug
50. Solenoid Relay Valve Spring
51. Solenoid Relay Valve
52. C1 Control Valve Spring
53. C1 Control Valve
54. C1 Control Valve Bore Plug
55. C1 Control Valve retainer
56. Secondary Regulator Valve Spring
57. Secondary Regulator Valve
58. Secondary Regulator Valve Bore Plug
59. Secondary Regulator Valve retainer
60. B1 Control Valve Spring
61. B1 Control Valve
62. B1 Control Valve Bore Plug
63. B1 Control Valve retainer
64. Lock-up Control Valve
65. Lock-up Control Valve Plunger
66. Lock-up Control Valve Spring
67. Lock-up Control Valve Sleeve
68. Lock-up Control Valve retainer
69. Lock-up Relay Valve
70. Lock-up Relay Valve Spring
71. Lock-up Relay Valve Bore Plug
72. Lock-up Relay Valve retainer

Figure 20

LOWER VALVE BODY SPRING SPECS

4. B2 Switch Valve Spring

No. Coils-5.5
Overall Length-.958"
Outside Diameter- .412"
Coil Diameter- .029"
Color- Lt. Blue

9. 4-5 Shift Valve Spring

No. Coils-10.5
Overall Length-1.120"
Outside Diameter- .380"
Coil Diameter- .035"
Color- none

15. B-1 Switch Valve Spring

No. Coils-4.5
Overall Length-.645"
Outside Diameter- .505"
Coil Diameter- .037"
Color- Blue

21. Main Regulator Valve Spring

No. Coils-7.5
Overall Length-2.260"
Outside Diameter- .784"
Coil Diameter- .063"
Color- none

26. Clutch Apply Control Valve Spring

No. Coils-16.5
Overall Length-1.110"
Outside Diameter- .290"
Coil Diameter- .025"
Color- none

UPPER VALVE BODY SPRING SPECS

32. Solenoid Modulating Valve Spring

No. Coils-14
Overall Length-1.888"
Outside Diameter- .433"
Coil Diameter- .063"
Color- none

36. B2 Control Valve Spring

No. Coils-14.5
Overall Length-2.270"
Outside Diameter- .392"
Coil Diameter- .023"
Color- pink

38. B-3 Orifice Control Valve Spring

No. Coils-19
Overall Length-2.400"
Outside Diameter- .305"
Coil Diameter- .019"
Color- White

43. Accumulator Control Valve Spring

No. Coils-19
Overall Length-2.400"
Outside Diameter- .305"
Coil Diameter- .019"
Color- none

47. C0 Control Valve Spring

No. Coils-12.5
Overall Length-1.180"
Outside Diameter- .312"
Coil Diameter- .037"
Color- none

50. Solenoid Relay Valve Spring

No. Coils-10.5
Overall Length-1.000"
Outside Diameter- .264"
Coil Diameter- .027"
Color- White

52. C1 Control Valve Spring

No. Coils-12
Overall Length-1.190"
Outside Diameter- .313"
Coil Diameter- .029"
Color- none

56. Secondary Reg. Valve Spring

No. Coils-20
Overall Length-2.290"
Outside Diameter- .346"
Coil Diameter- .048"
Color- Blue

60. B-1 Control Valve Spring

No. Coils-12
Overall Length-1.180"
Outside Diameter- .313"
Coil Diameter- .029"
Color- none

66. Lock-up Control Valve Spring

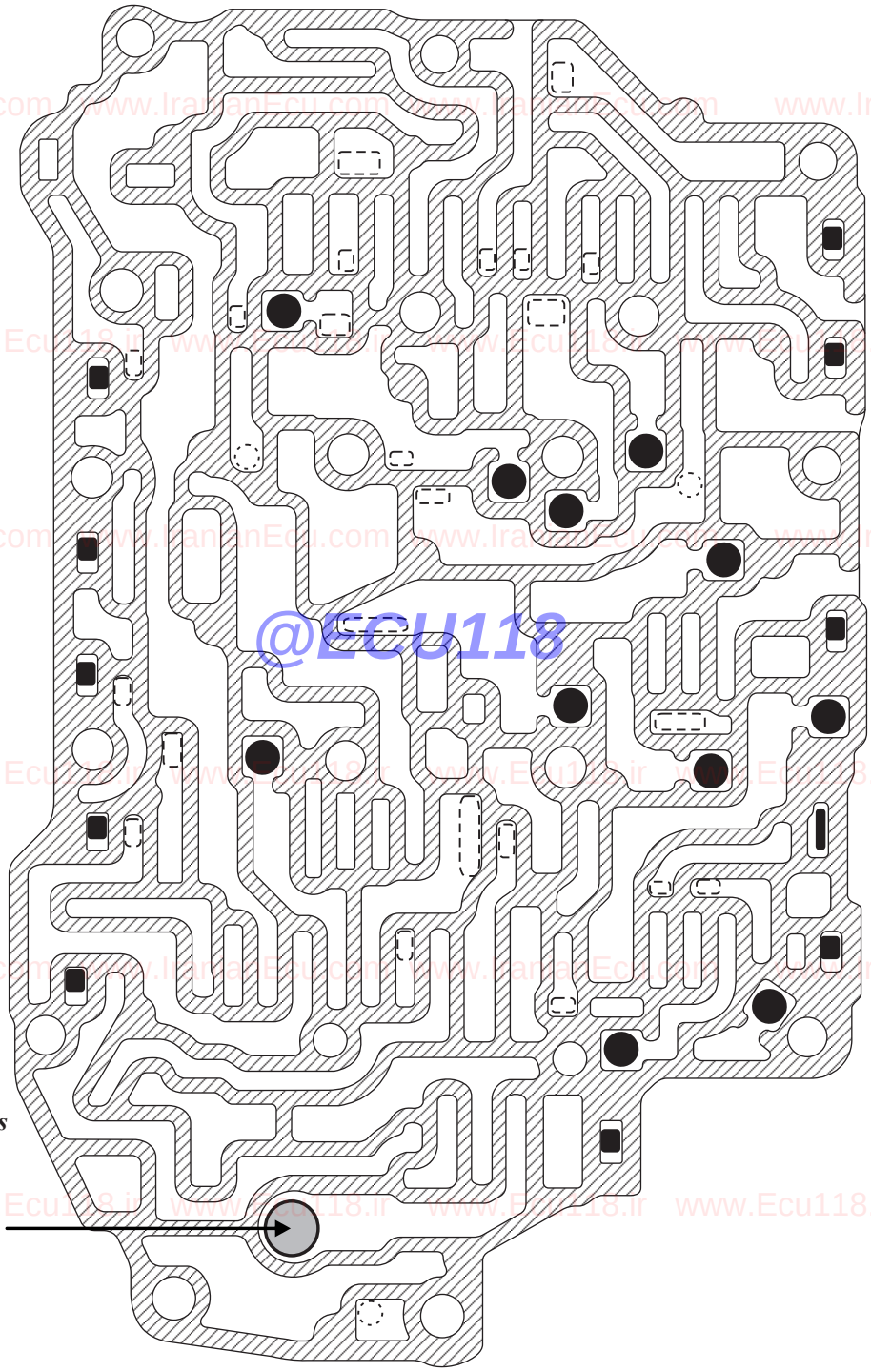
No. Coils-12
Overall Length-.835"
Outside Diameter- .218"
Coil Diameter- .023"
Color- White

70. Lock-up Relay Valve Spring

No. Coils-10
Overall Length-1.120"
Outside Diameter- .380"
Coil Diameter- .035"
Color- Blue

Figure 21

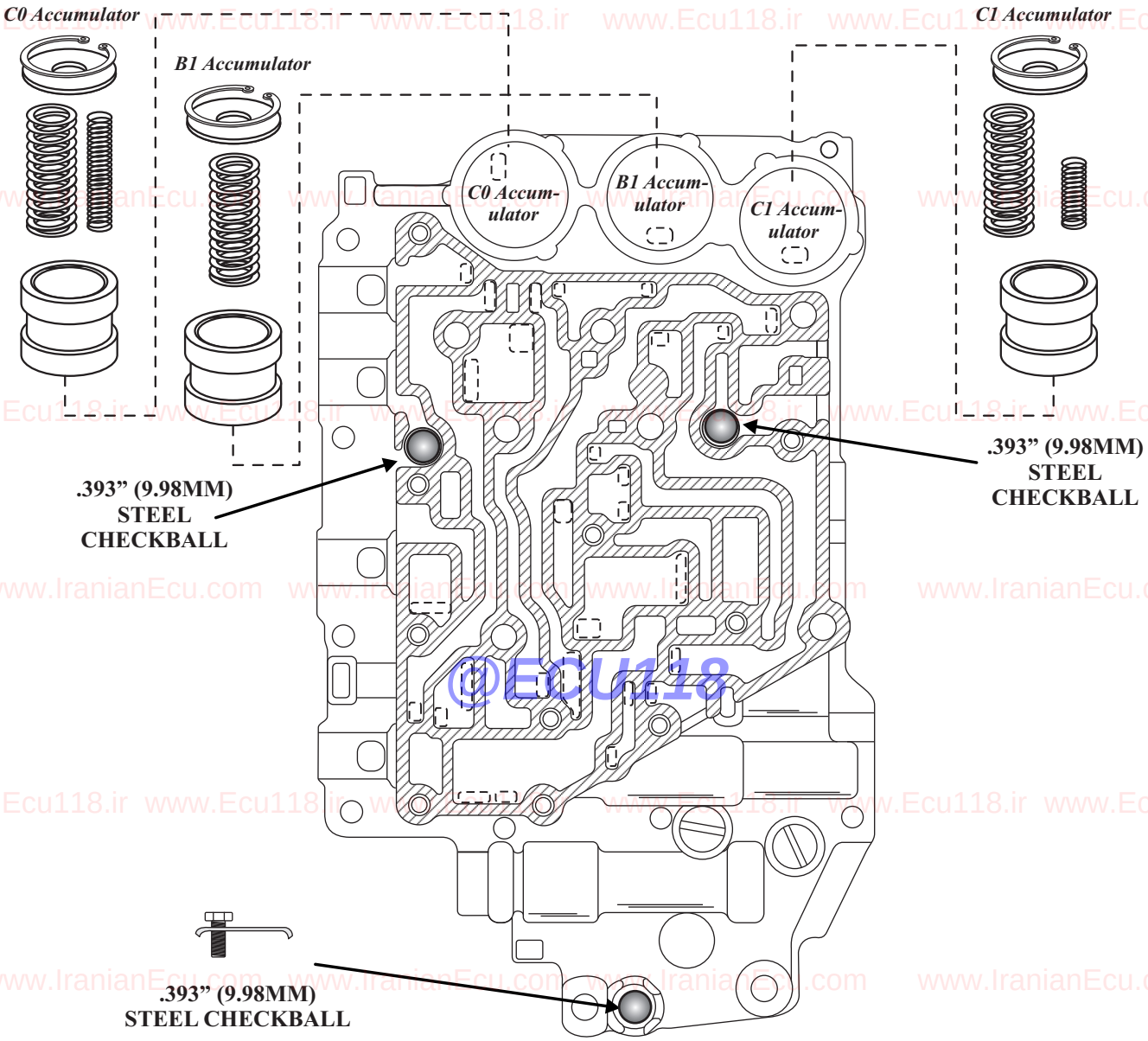
UPPER VALVE BODY LOWER SIDE
CHECK BALL AND RETAINER LOCATIONS



NOTE: All 11 Plastic Checkballs Are .218" (5.5MM)

Figure 22

UPPER VALVE BODY UPPER SIDE CHECK BALL AND ACCUMULATOR LOCATIONS



UPPER VALVE BODY ACCUMULATOR SPRING SPECS

C0 Accumulator Outer Spring	*C0 Accumulator Inner Spring*	*B1 Accumulator Spring*	*C1 Accumulator Outer Spring*	*C1 Accumulator Inner Spring*
No. Coils-10 Overall Length-2.000" Outside Diameter- .630" Coil Diameter- .085" Color- Light Green	No. Coils-15.5 Overall Length-2.175" Outside Diameter- .420" Coil Diameter- .051" Color- Light Green	No. Coils-10 Overall Length-1.966" Outside Diameter- .620" Coil Diameter- .083" Color- Green	No. Coils-11.5 Overall Length-2.160" Outside Diameter- .635" Coil Diameter- .077" Color- Red	No. Coils-11 Overall Length-1.185" Outside Diameter- .430" Coil Diameter- .055" Color- Red

Figure 23

TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION

UPPER VALVE BODY UPPER SIDE PLATE

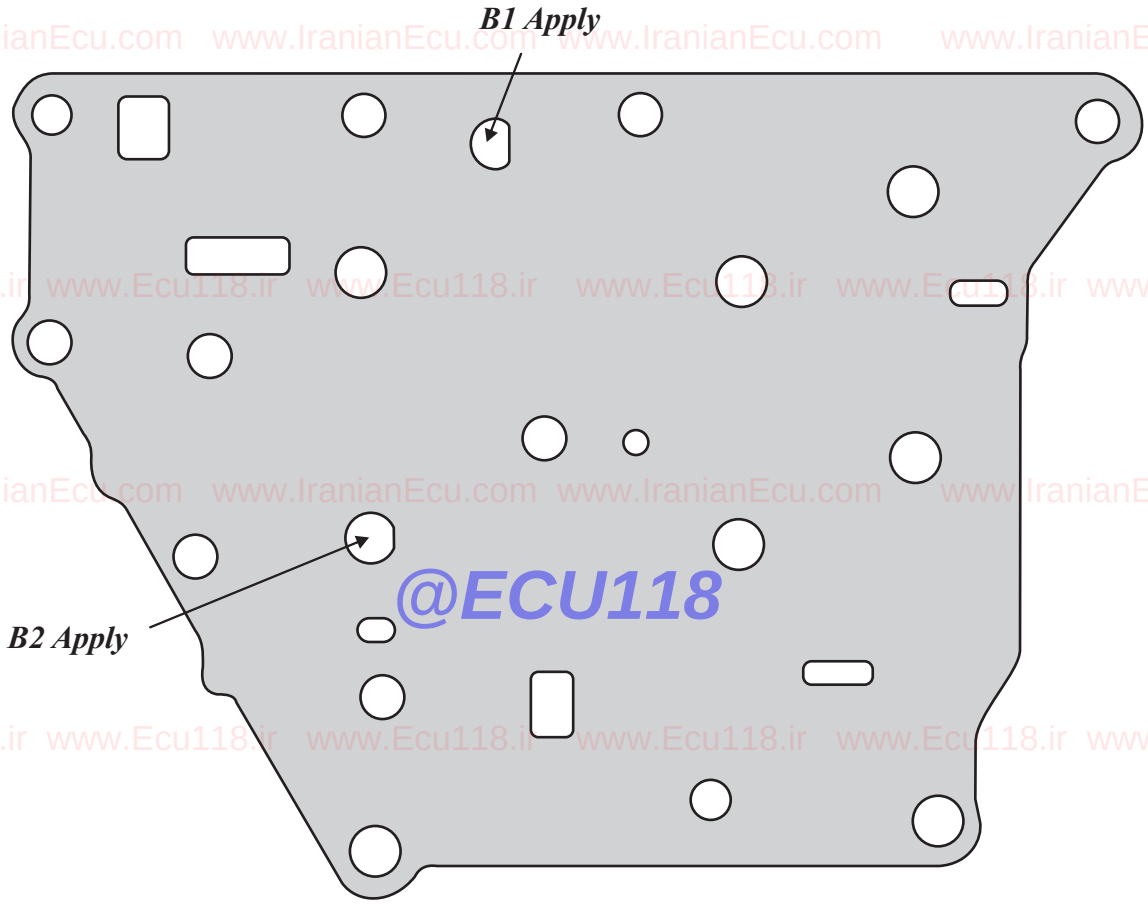
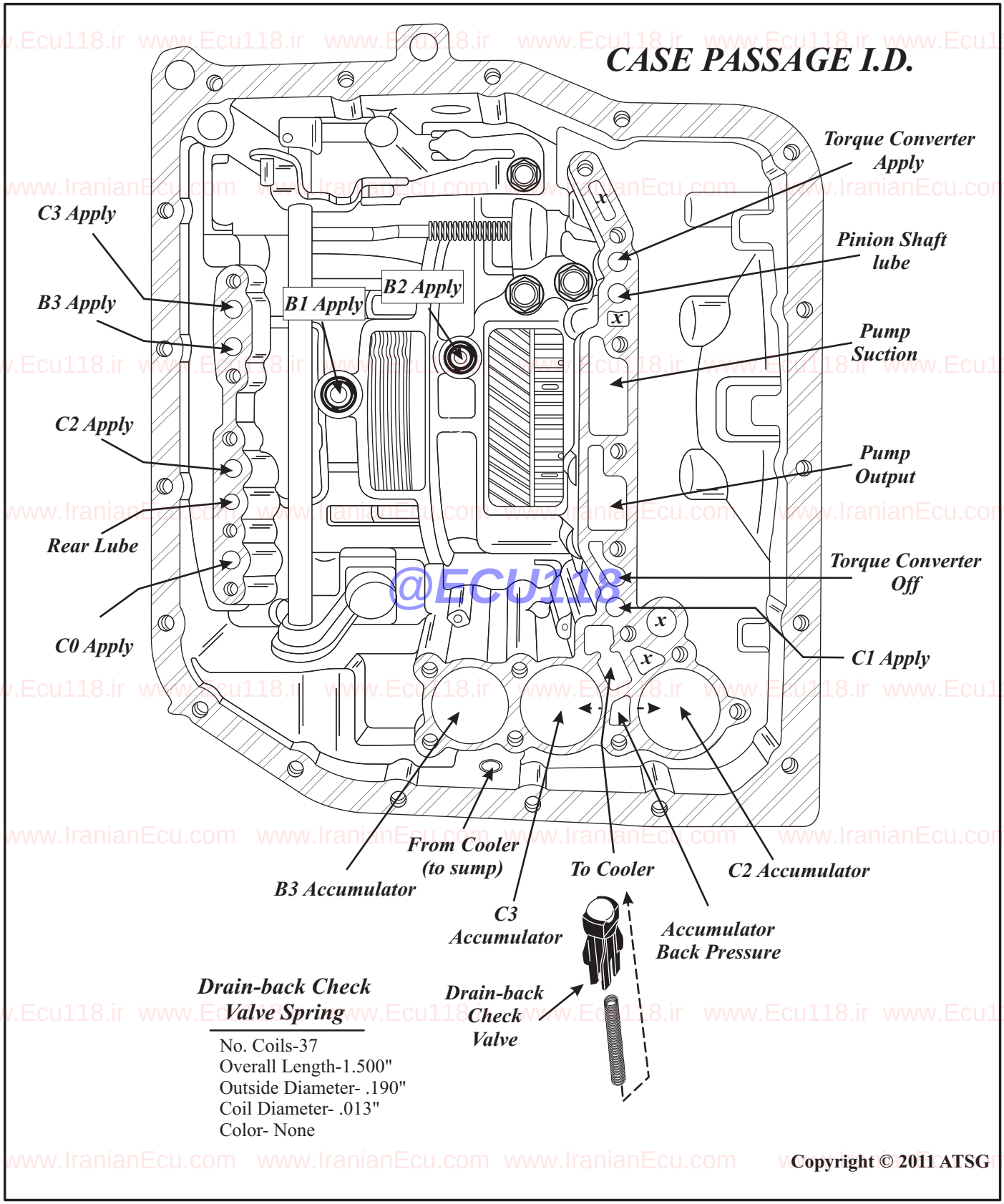


Figure 24

TOYOTA/LEXUS U150/U250
PRELIMINARY INFORMATION



Drain-back Check Valve Spring

No. Coils-37
Overall Length-1.500"
Outside Diameter- .190"
Coil Diameter- .013"
Color- None

Figure 25