



Technical Service Information

AW81-40LE PRELIMINARY INFORMATION

The AW80-40LE is a four speed electronically shifted transaxle that is used in the Chevy Aveo from 2004 to present. The AW80-40 uses six clutch packs and two one-way clutches. The AW80-40LE utilizes five solenoids, Shift Solenoid 1 and 2, Timing Solenoid, TCC Solenoid and a Pressure Control Solenoid.

The Timing Solenoid is normally closed and is used to time the 3-4 and 4-3 shift by controlling the apply and release of the forward (C1) clutch. It is also used to prevent a reverse engagement should reverse accidentally be selected while moving forward 5 mph or greater.

The TCM contains 6 shift strategies, Economic Mode, Power Mode, Up-Slope 1 Mode, Up-Slope 2 Mode, Down-Slope 1 Mode and Down-Slope 2 Mode.

Be careful when replacing electrical components as the components for the 1.2L engine differs from those for the 1.4L, 1.5L and 1.6L engines.

Refer to figure 1 for clutch and solenoid application.

Refer to figure 2 for clutch position and gear ratios.

Refer to Figure 3 for solenoid identification and resistance.

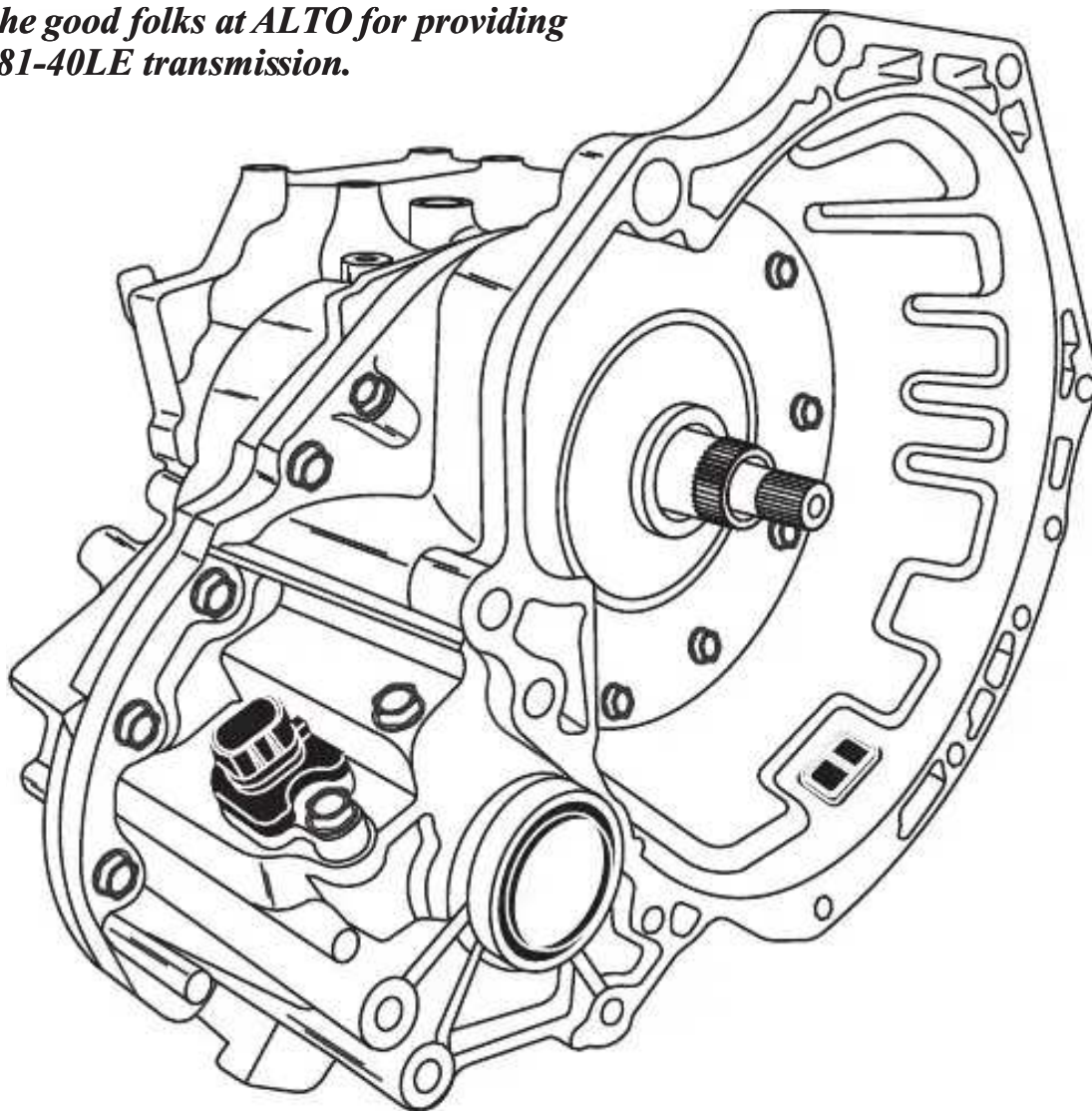
Refer to figure 4 and 5 for case passage identification.

Refer to figure 6 for valve body checkball location.

Refer to figure 7 for upper valve body identification.

Refer to figures 9 to 14 for Timing Solenoid operation & hydraulics

Many thanks to the good folks at ALTO for providing ATSG with a AW81-40LE transmission.





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Shift Application Chart												
Gear	Shifts	Solenoids			Clutch			Brake			One-Way Clutch	
		SS 1	SS 2	Timing	C1	C2	C3	B1	B2	B3	F1	F2
P	-	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R
Rev	Below 5 mph	ON	ON	OFF	OFF	OFF	ON	OFF	OFF	ON	O/R	INEF
	5 mph & Above	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R
N	-	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	O/R	O/R
D	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	O/R	HOLD
	2nd	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	HOLD	O/R
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	O/R	O/R
	3-4	OFF	ON	ON-OFF	ON-OFF	ON	OFF	OFF-ON	ON	OFF	O/R	O/R
	4th	OFF	ON	OFF	OFF	ON	OFF	ON	ON	OFF	O/R	O/R
2	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	O/R	HOLD
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	HOLD	O/R
	3rd	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	OFF	O/R	O/R
1	1st	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	O/R	INEF
	2nd	ON	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	HOLD	O/R

C1 - Forward Clutch
C2 - Direct Clutch
C3 - Reverse Clutch
B1 - O/D and 2nd Brake Clutch
B2 - 2nd Brake Clutch
B3 - 1st and Reverse Brake Clutch
F1 - 2nd Gear One-Way Freewheel Clutch (Sprag)
F2 - 1st Gear One-Way Freewheel Clutch (Sprag)

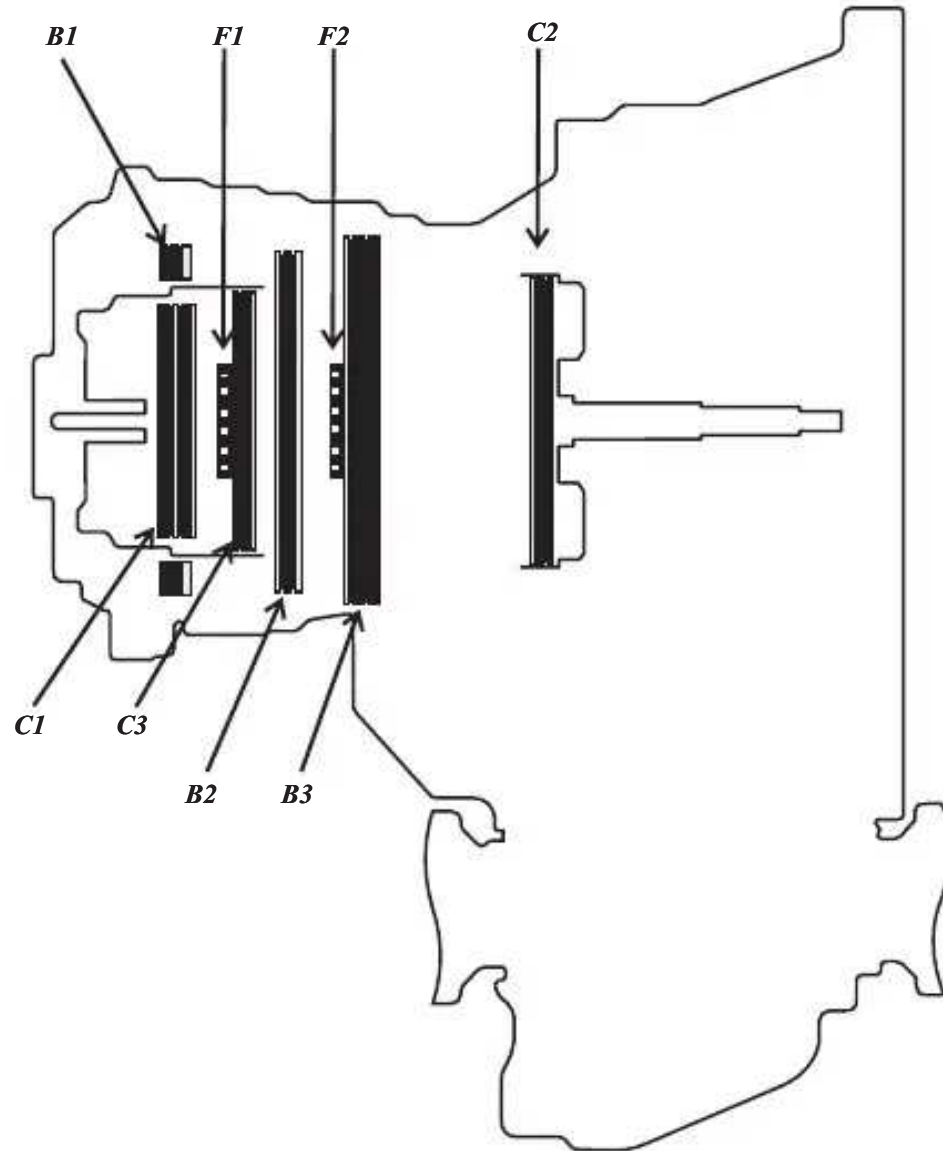
TCC and Line Pressure Control Solenoids not shown in chart above
O/R - Overrun (Freewheeling)
INEF - Holding but ineffective due to B3 clutch apply

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Figure 1

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CLUTCH POSITION



GEAR RATIOS	
GEAR	RATIO
FIRST	2.875
SECOND	1.568
THIRD	1.000
FOURTH	0.697
REVERSE	2.300
DIFFERENTIAL 1.2/1.4/1.5 SOHC	3.750
DIFFERENTIAL 1.4L DOHC	4.052

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Figure 2

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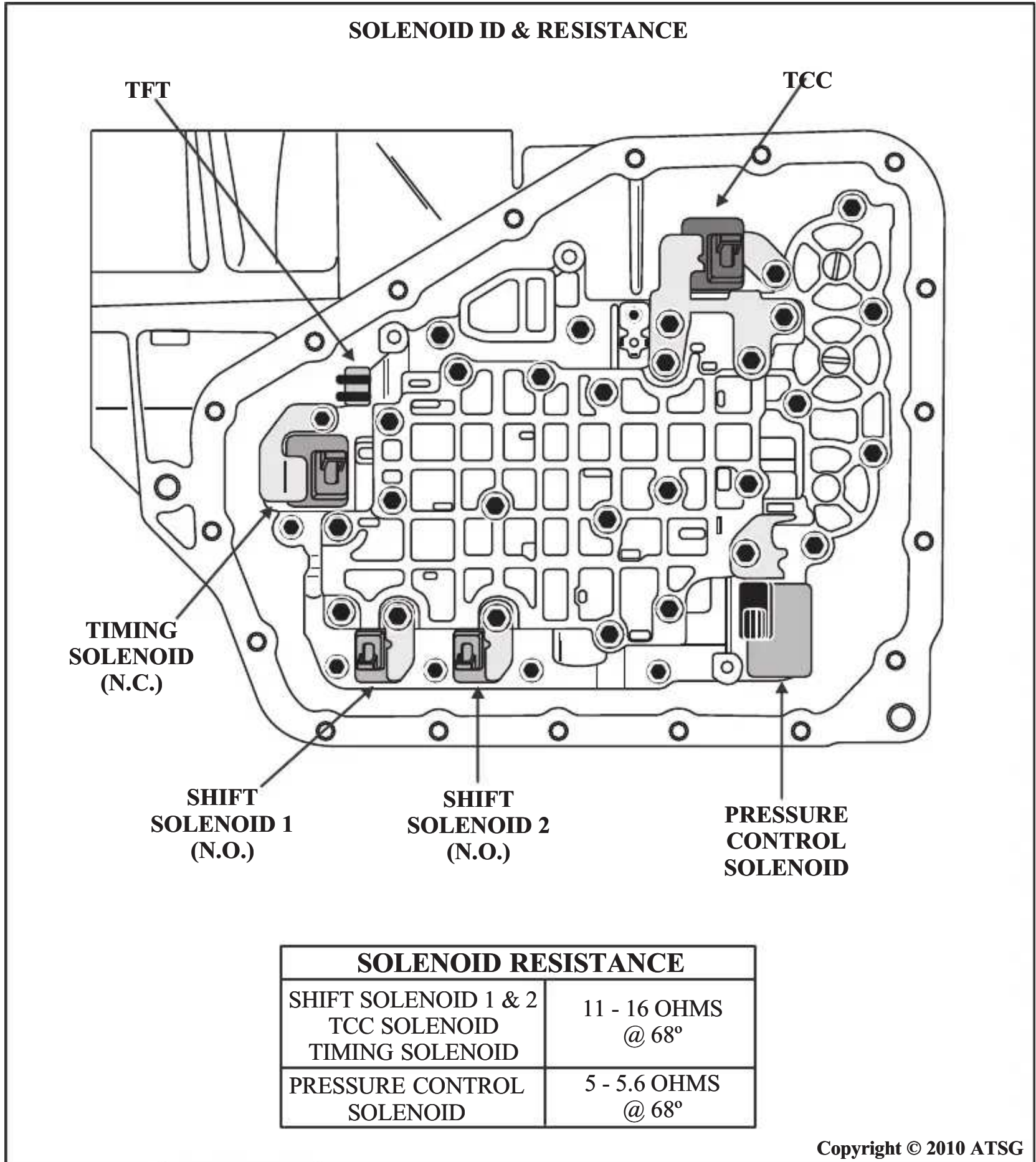
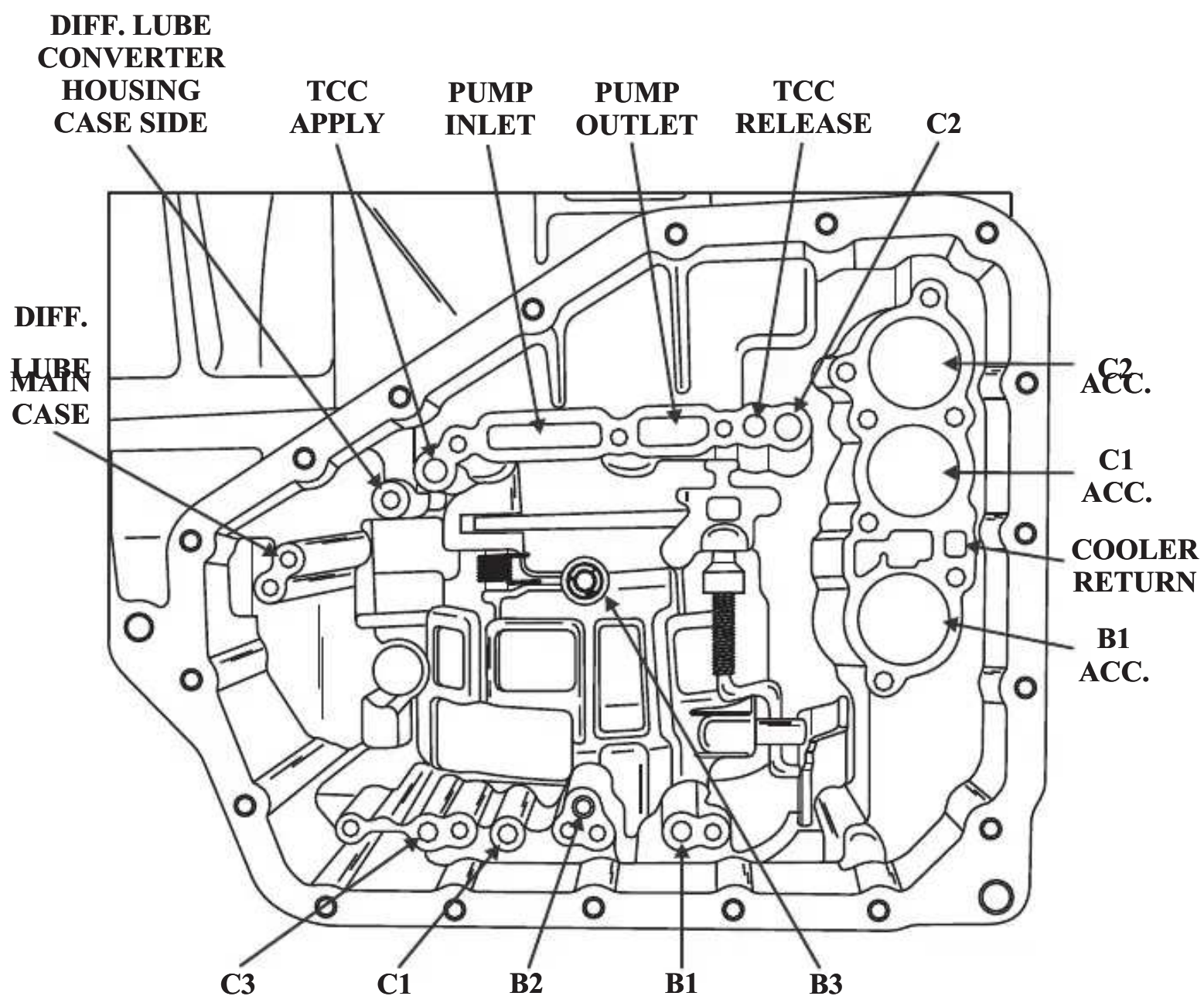


Figure 3

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CASE PASSAGE IDENTIFICATION



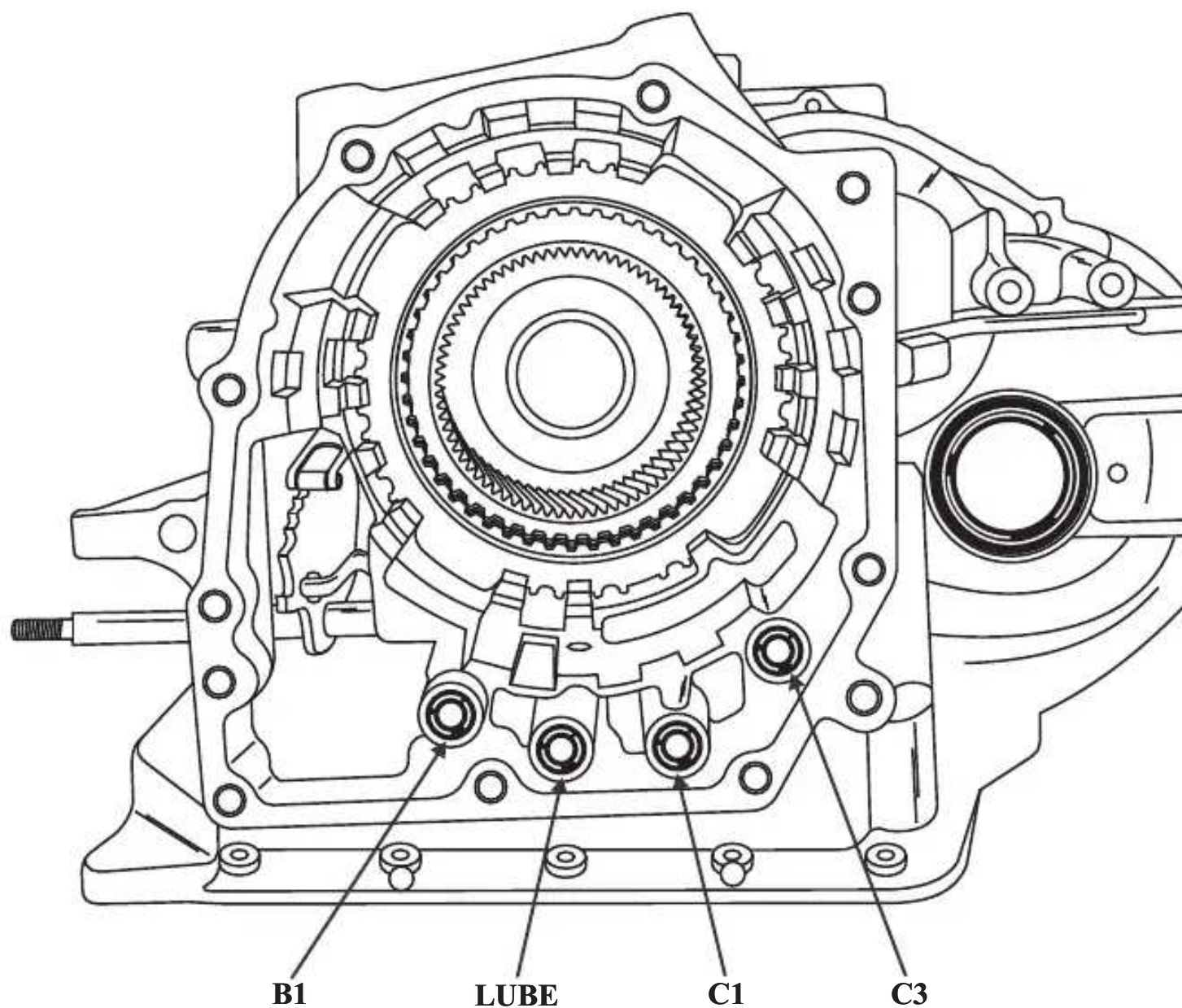
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Figure 4

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CASE PASSAGE IDENTIFICATION



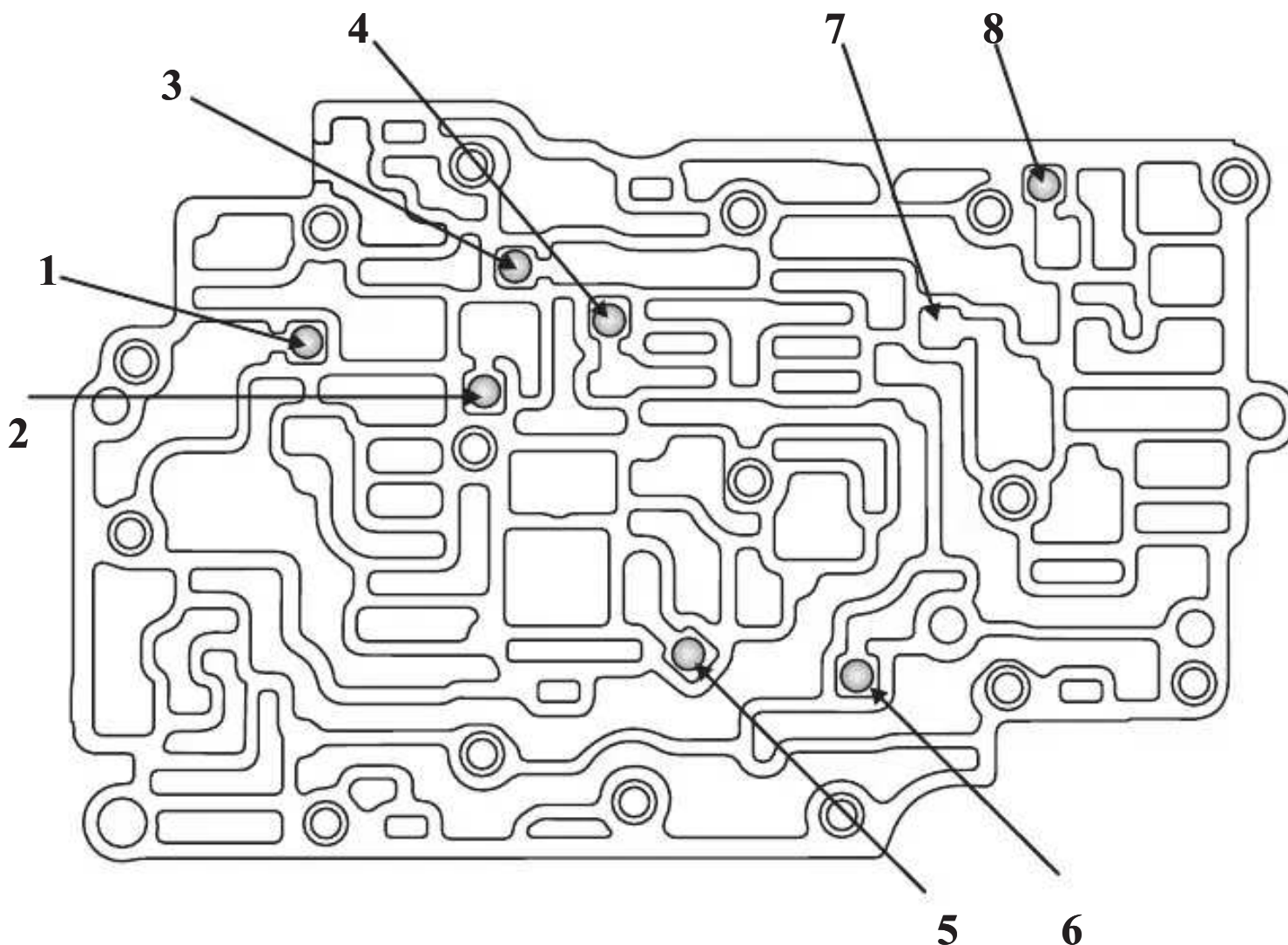
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Figure 5

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CHECKBALL LOCATIONS



- 1 - B1 Accumulator Orifice Control Ball
- 2 - Prevents Internal Transmission Lube while in Park
- 3 - B1 Clutch and Accumulator Orifice Control Ball
- 4 - B2 Clutch and Accumulator Orifice Control Ball
- 5 - B3 Clutch Orifice Control Ball
- 6 - C2 Clutch and Accumulator Orifice Control Ball
- 7 - Not used in all models (No hole in spacer plate)
- 8 - C3 Clutch and Accumulator Orifice Control Ball

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Figure 6

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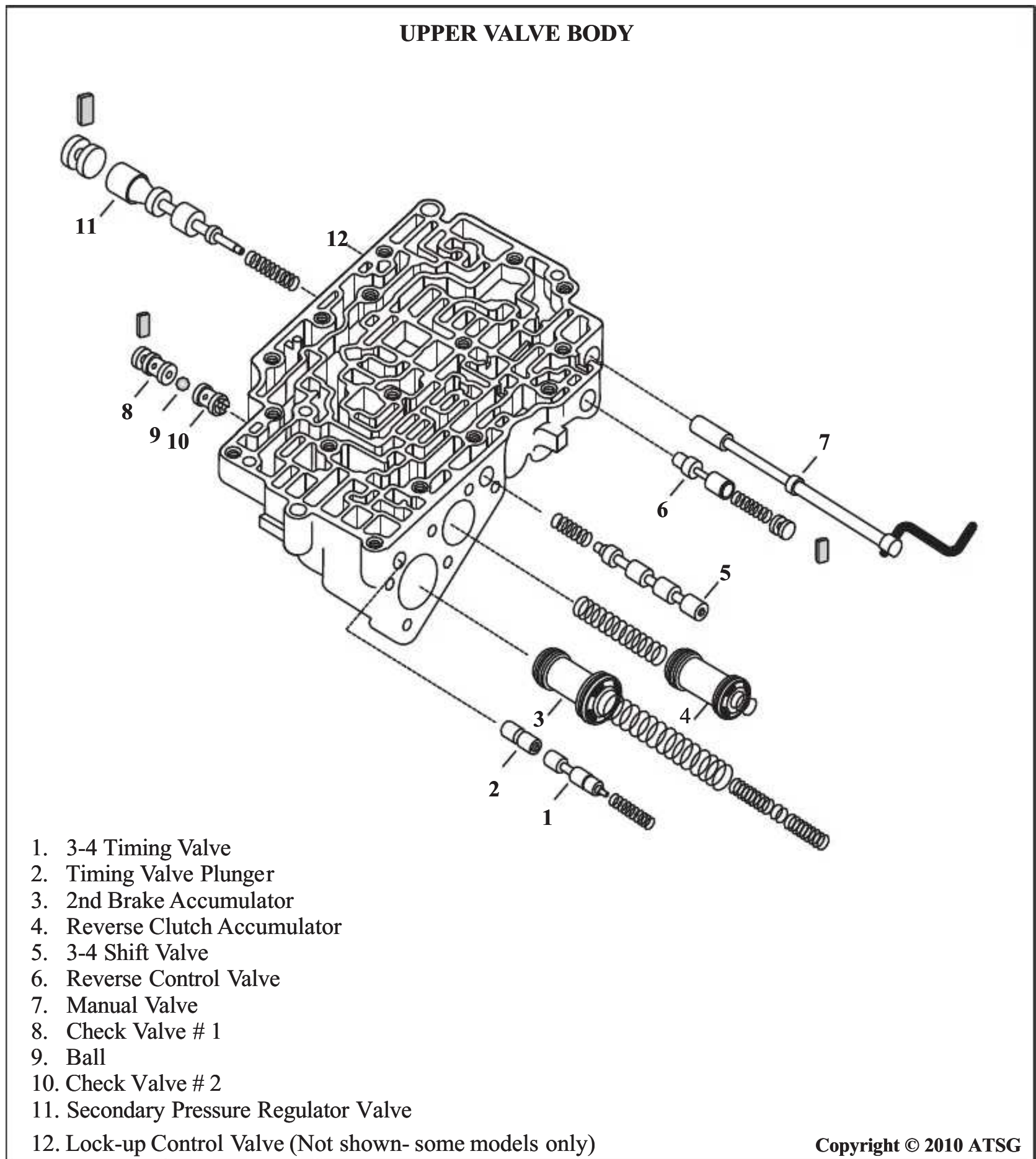
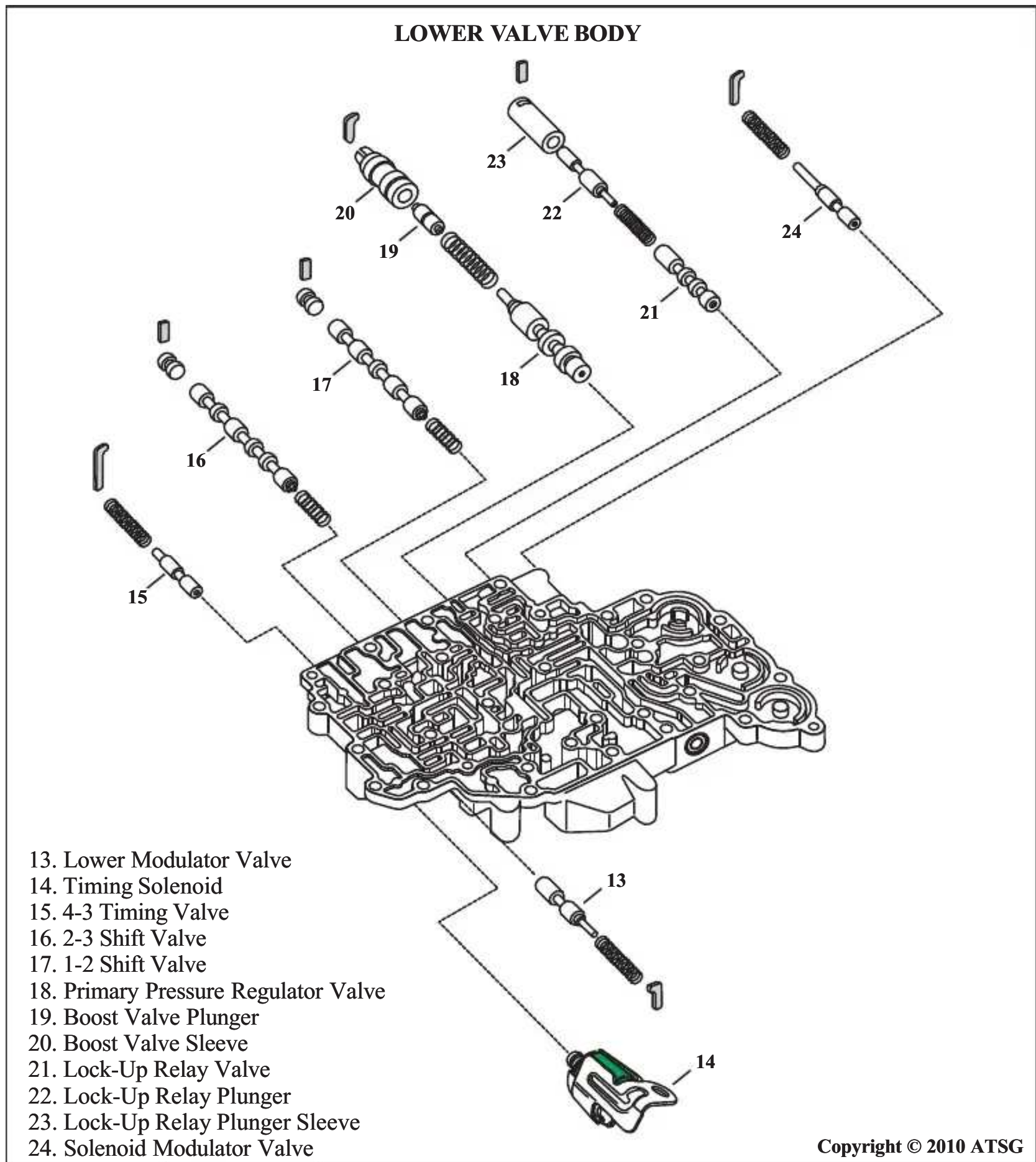


Figure 7

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Figure 8



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TIMING SOLENOID OPERATION

The Timing Solenoid is a normally closed solenoid and influences 3 valves in the valve body, a two piece 3-4 Timing Valve, the 4-3 Timing Valve and the Reverse Control Valve.

When a shift is made into 4th gear, the C1 (Forward Clutch) releases and the B1 (OD & 2nd Brake Clutch) applies. The Timing solenoid assists in the controlled release of the C1 clutch by the way it operates the 3-4 Timing Valve. The Solenoid remains off in all forward gears and is pulsed during the 3-4 and 4-3 shift. With the solenoid being a normally closed solenoid, when it is off these valves remain in the stroked position. When the solenoid is turned on, solenoid pressure is drained and the valves close by spring tension. Figures 9, 10 and 11 provide partial hydraulics which illustrates what occurs with the Timing Solenoid and related valves during the 3 to 4 shift. You will also notice that shift solenoids 1 and 2 are off in 3rd. The C1 clutch is fed pressure through the 3-4 shift valve. When a shift into 4th is made shift solenoid 2 turns on and strokes the 3-4 shift valve. This opens up a passage way for the C1 clutch to be exhausted past the 2-3 shift valve. At the same time the 3-4 shift valve supplies pressure into the B1 clutch circuit. When this circuit starts to pressurize, it splits the two piece timing valve past a 0.45" orifice in the spacer plate. The splitting of the valve plays a role in the apply of the B1 clutch as well as the rate in which the C1 clutch is released.

When a 4-3 shift occurs, the Timing Solenoid is pulsed at the same time shift solenoid 2 turns off. This forces the C1 apply pressure to be briefly forced through a 0.040" orifice by the 4-3 Timing Valve for a regulated and controlled apply (Refer to Figure 12).

This Timing Solenoid is also used to prevent a Reverse engagement should reverse be selected while the vehicle is moving forward 5 mph or greater as you can see in Figures 13 and 14.

Should this solenoid fail open, the vehicle will exhibit a no reverse, a delayed engagement into drive and a flare on the 4-3 downshift. If it fails closed a hard 3-4 and 4-3 downshift can be expected.

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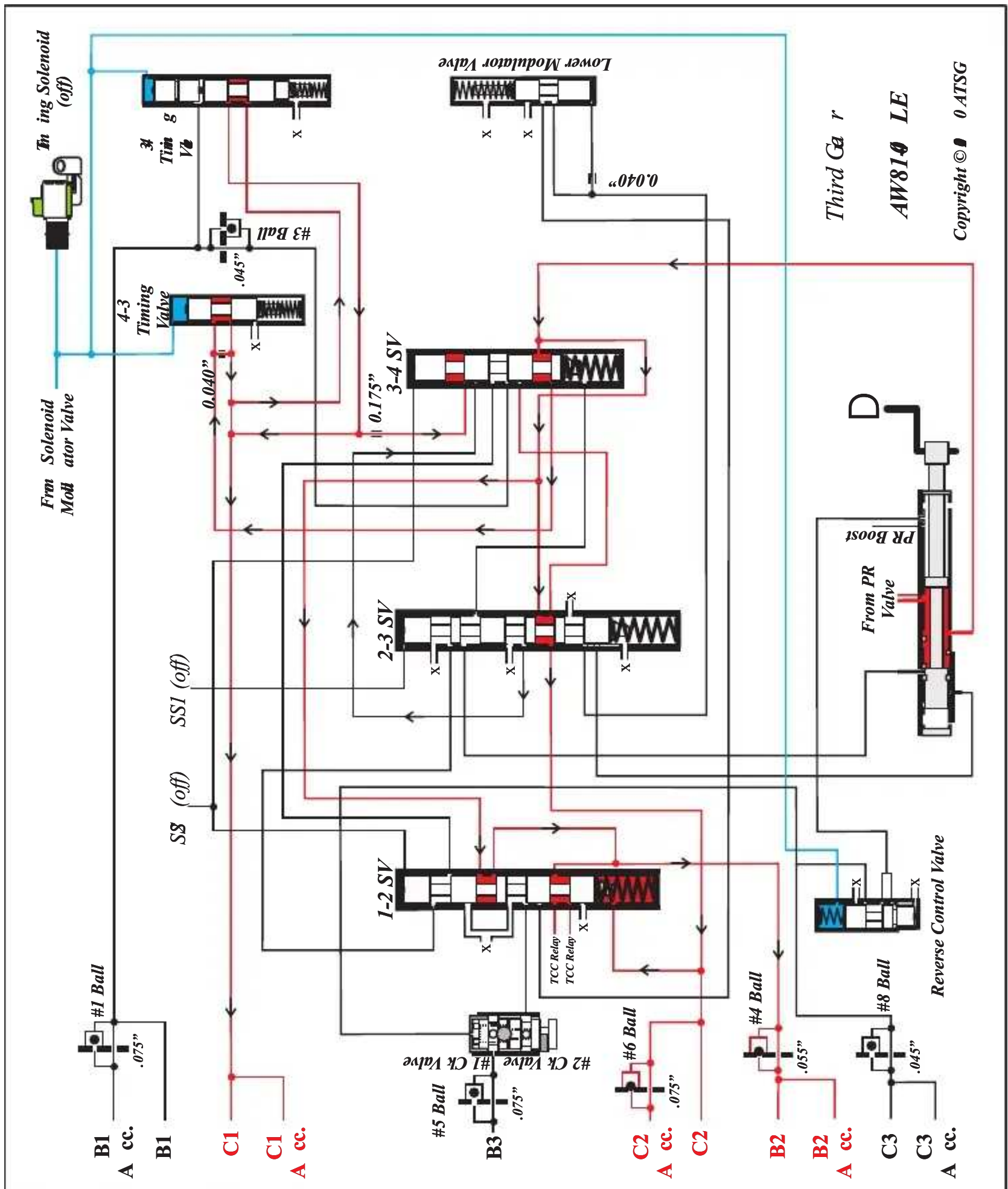


Figure 9



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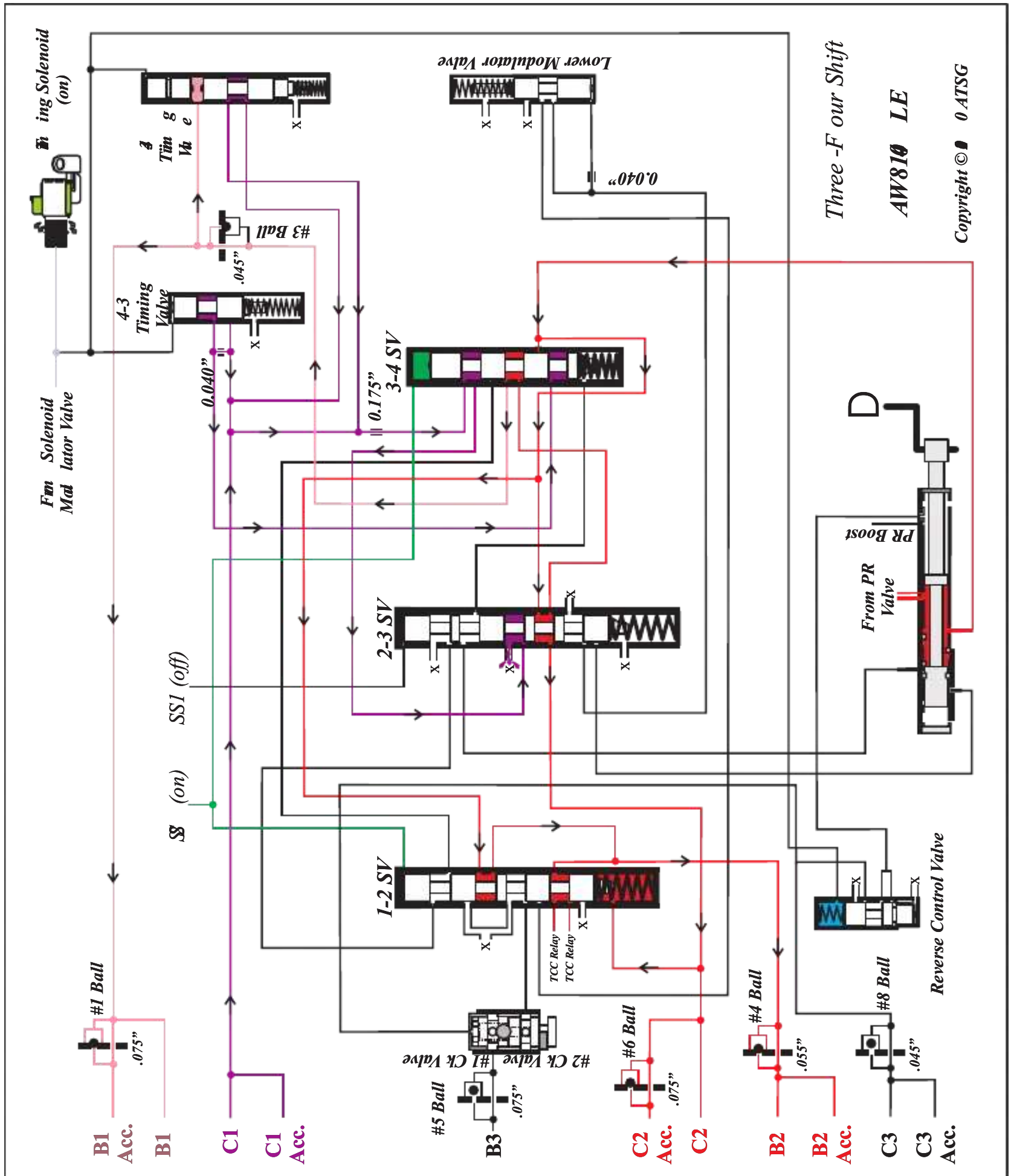


Figure 10

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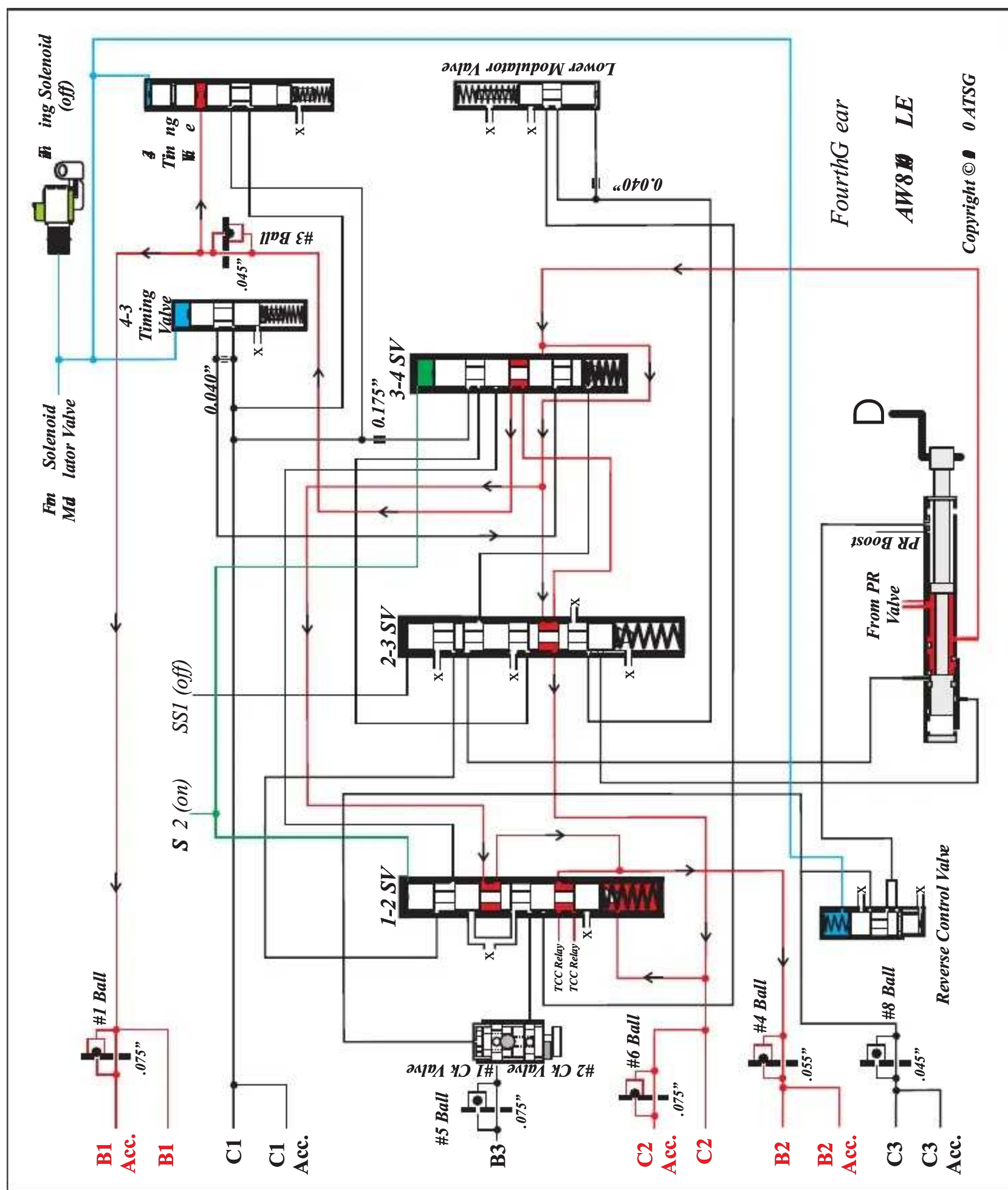


Figure 11



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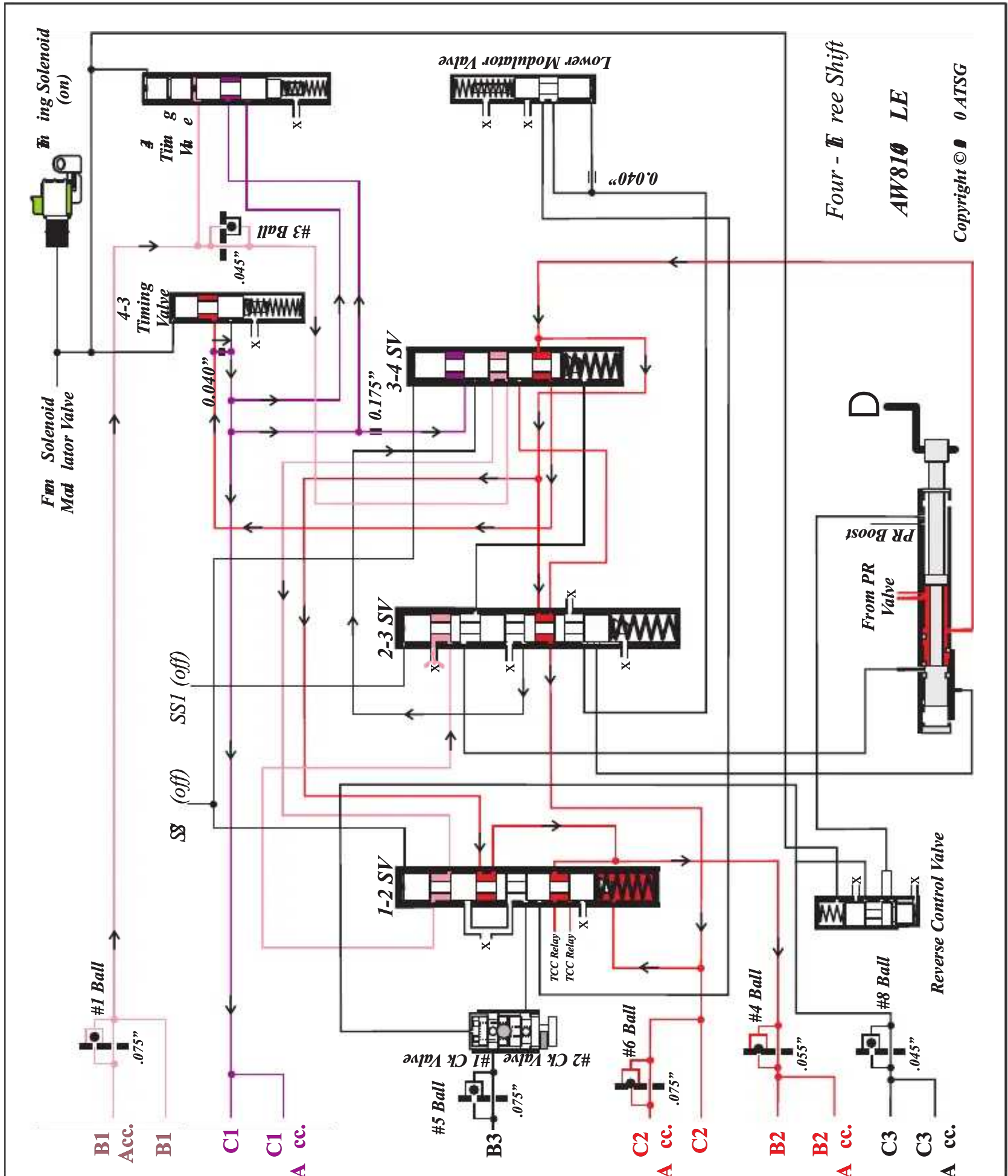


Figure 12



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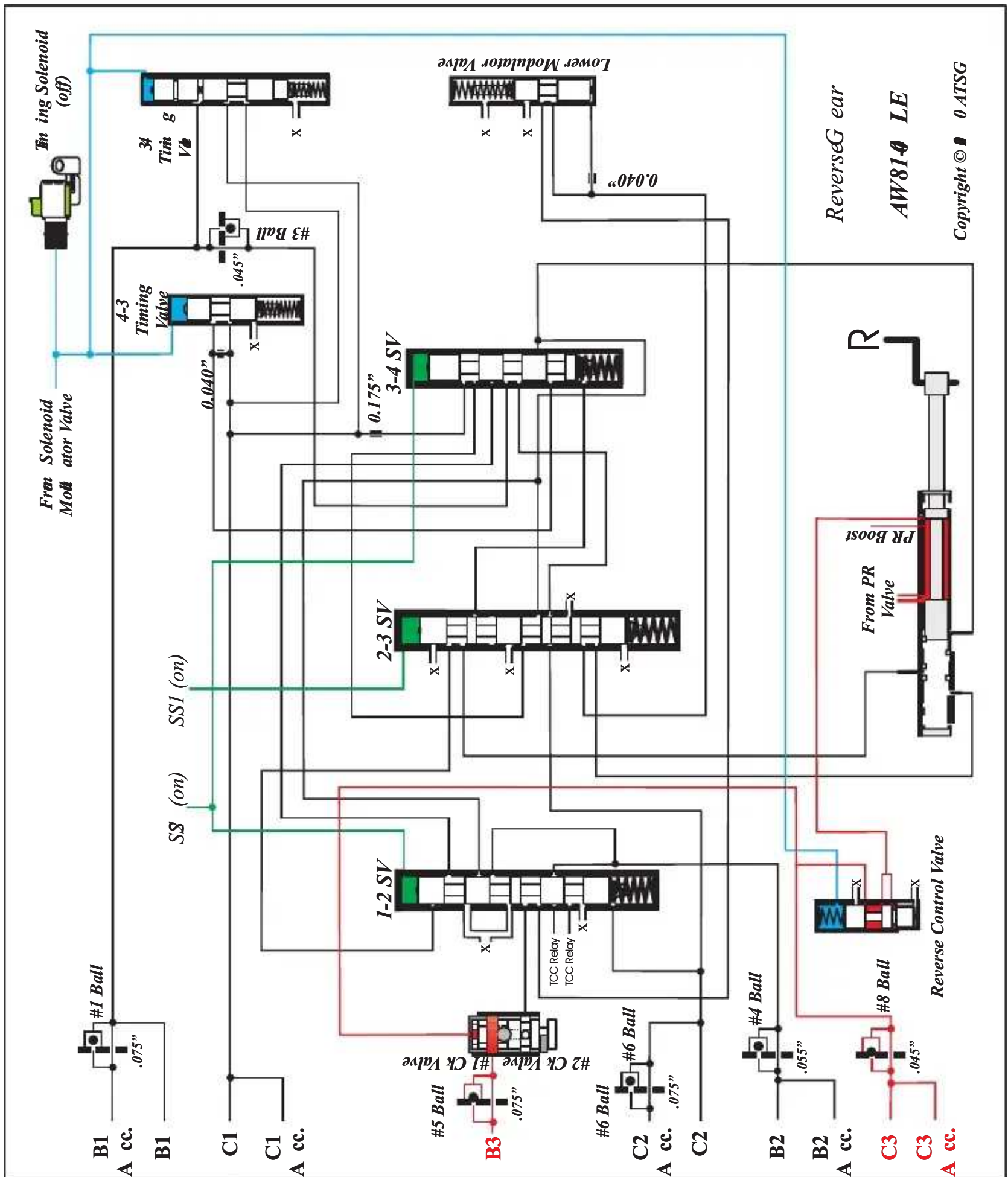


Figure 13



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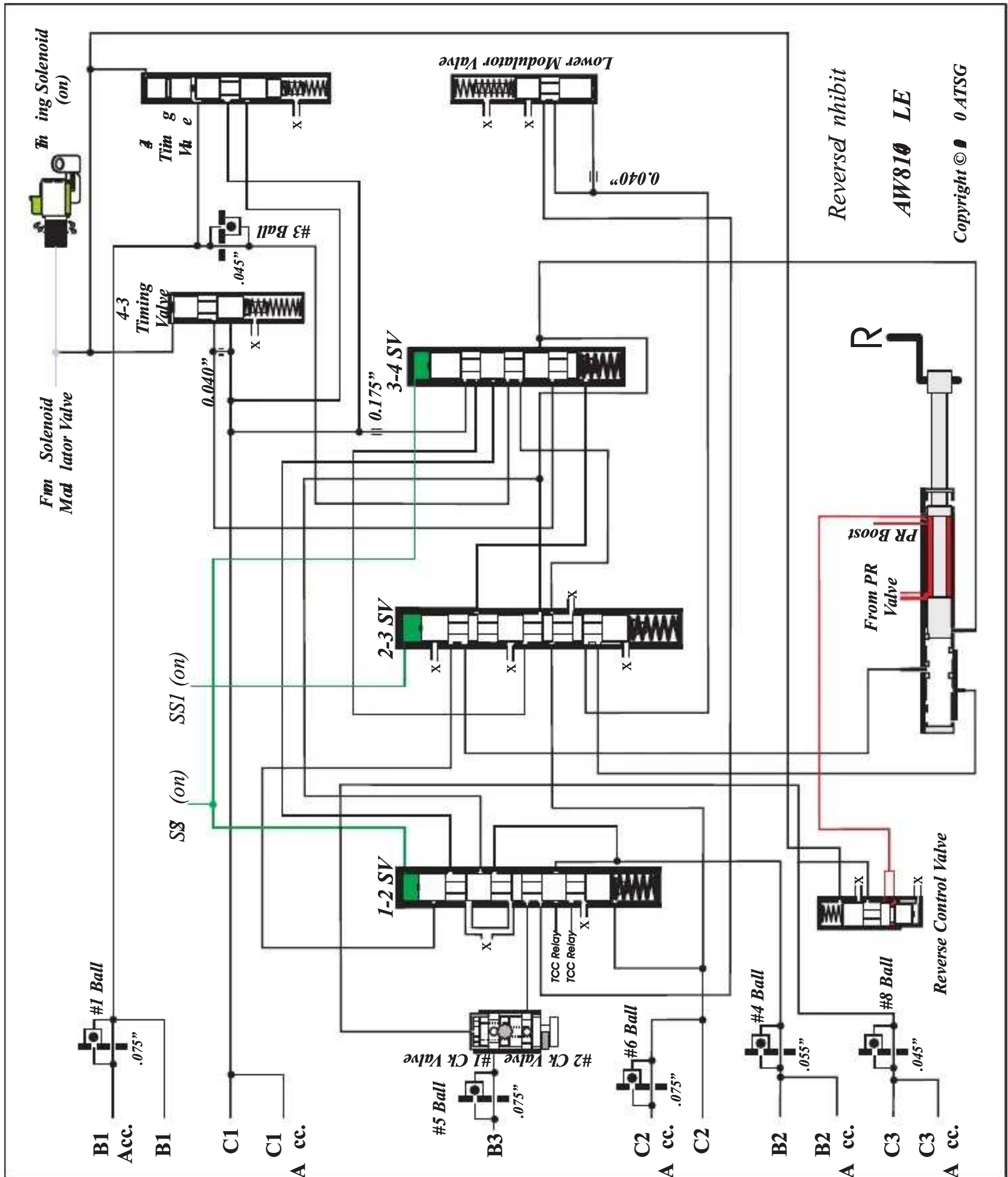


Figure 14