



722.9 NEW DESIGN VALVE BODY 7 G-TRONIC PLUS GENERATION SIX

Mercedes 7 speed transmission known as the 7 G-Tronic is commonly referred to as the 722.9 transmission. This 5th generation of Mercedes' transmission line up made it's first appearance in 2003. By 2010 a revised version of this transmission was developed making it the 6th generation of transmissions calling it the "7 G-Tronic **Plus**". There are currently 7 generations of transmission by Mercedes. They are as follows:

1. 1961: 4 Speed - K4A035
2. 1969: 3 Speed - W3A040
3. 1980: 4 Speed - W4A040
4. 1996: 5 Speed - W5A580 (NAG1)
5. 2003: 7 Speed - W7A700 (7G-Tronic)
6. 2010: 7 Speed - W7C700 (7G-Tronic Plus)
7. 2013: 9 Speed - W9A700

The most significant change made with the 6th generation was to the Torque Converter which incorporated a new feature known as "Centrifugal Pendulum Damper" (Figure 1). It is used to prevent Noise, Vibration and Harshness (NVH) as the TCC apply strategy has changed from high slip speeds when the TCC is applied to little to no slip (Figure 2). In other words, the converter clutch is fully applied sooner, rather than slipping the clutch on. These changes were made in part to accommodate dramatic increase in torque generated by the new V8 engine and the torque increase of the four and six cylinder diesel engines.

The torque converter lock-up clutch continues to utilize a three channel system, which has been improved in key areas. The path that the cooling oil takes to the clutch assembly has been redesigned to flow directly toward the coupling package. This provides for especially effective and efficient cooling. Another change was to increase the gap between the clutch disks increasing the overall clutch assembly clearance reducing drag torque significantly. The result is much improved performance, especially under cold-starting conditions when engaging a gear. Previous versions had a tendency to pull down engine rpms or even stall the engine under these conditions.

The 7 G-Tronic Plus transmission can be fitted with vehicles that features "Start - Stop" technology which is paired to an electric pump to sustain line pressure when the vehicle is stopped (engine off). If so equipped, the electrical motor is fastened to the bottom side of the converter/pump housing.

As a result of these changes, particularly with the new "Centrifugal Pendulum Damper," significant changes were made to the valve body which is the primary focus of this technical presentation. The K2 Shift Valve and the B2-2 Shift valve have been eliminated as seen in figure 3. This caused casting changes required to close off circuits once going to these valves. The shaded circuits identify these closed off passages in figure 3.

With having a different converter clutch apply strategy, both the Converter Inlet Regulating Valve and the Converter Clutch Shift Valve were dimensionally modified (Figures 4 and 5).



Technical Service Information

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The spacer plate received modest changes as well. Figure 6 is a typical spacer plate used in 7 G-Tronic transmissions identified by 2 or 3 notches. Holes within the plate are marked out to show changes made to the plate with the 7 G-Tronic PLUS plate. Holes 1 and 2 may or may not be present with 7 G-Tronic units as some models have the B1 and B3 orifice check valves while others do not. Hole 1 is for the B1 orifice check valve and hole 2 is for the B3 orifice check valve. If these holes are not in the plate, the valve body does not use these check valves. The 7 G-Tronic PLUS does not use these orifice check valves so these holes will not be present (Figure 7).

Hole 3 was eliminated due to a casting change to the B1/B3 Shift Valve. Hole 4 was eliminated due to the elimination of the B2-2 Shift Valve. Hole 5 took a slight move to sit over an added check valve for the K3 clutch feed circuit in the Lower Valve Body (Figure 8). Hole 6 was increased from .032" to .110" which is an exhaust circuit for the K2 Regulating Valve which is routed to where the K2 Shift Valve was once located.

Figure 7 is what a typical spacer plate will look like for the 7 G-Tronic PLUS transmission and is identified with a single notch.

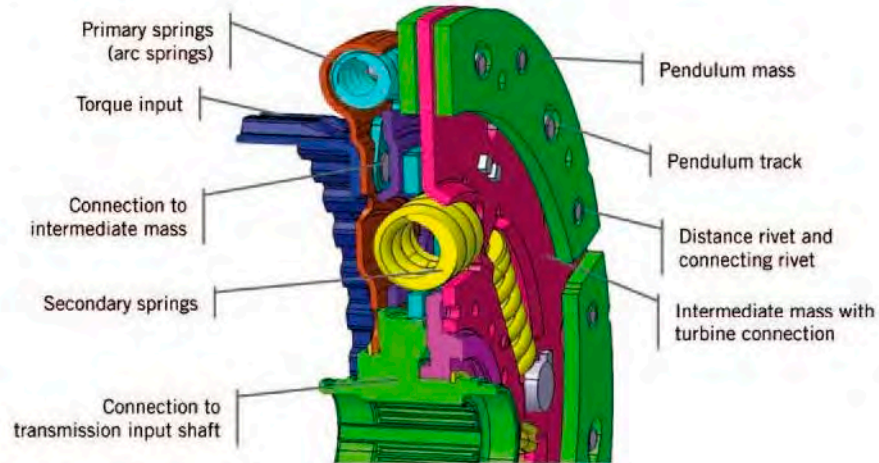
Each of the K1, K2 and K3 clutch feed circuits have an added one-way check valve to control engagement and pre-fill pressures as seen in Figure 8.

For comparison, a 7 G-Tronic hydraulic schematic is provided in figure 9 and a 7 G-Tronic PLUS hydraulic is provided in figure 10.

Many thanks to Transtec for the use of this transmission.

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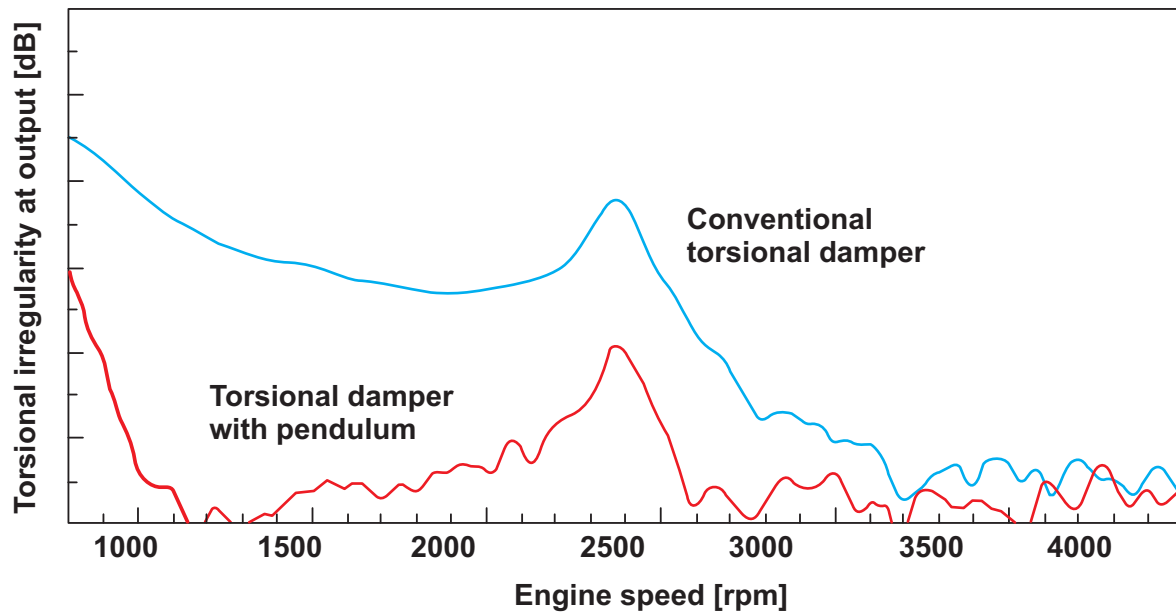
CENTRIFUGAL PENDULUM DAMPER TORQUE CONVERTER



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Figure 1

PENDULUM VS. NON PENDULUM CLUTCH APPLY



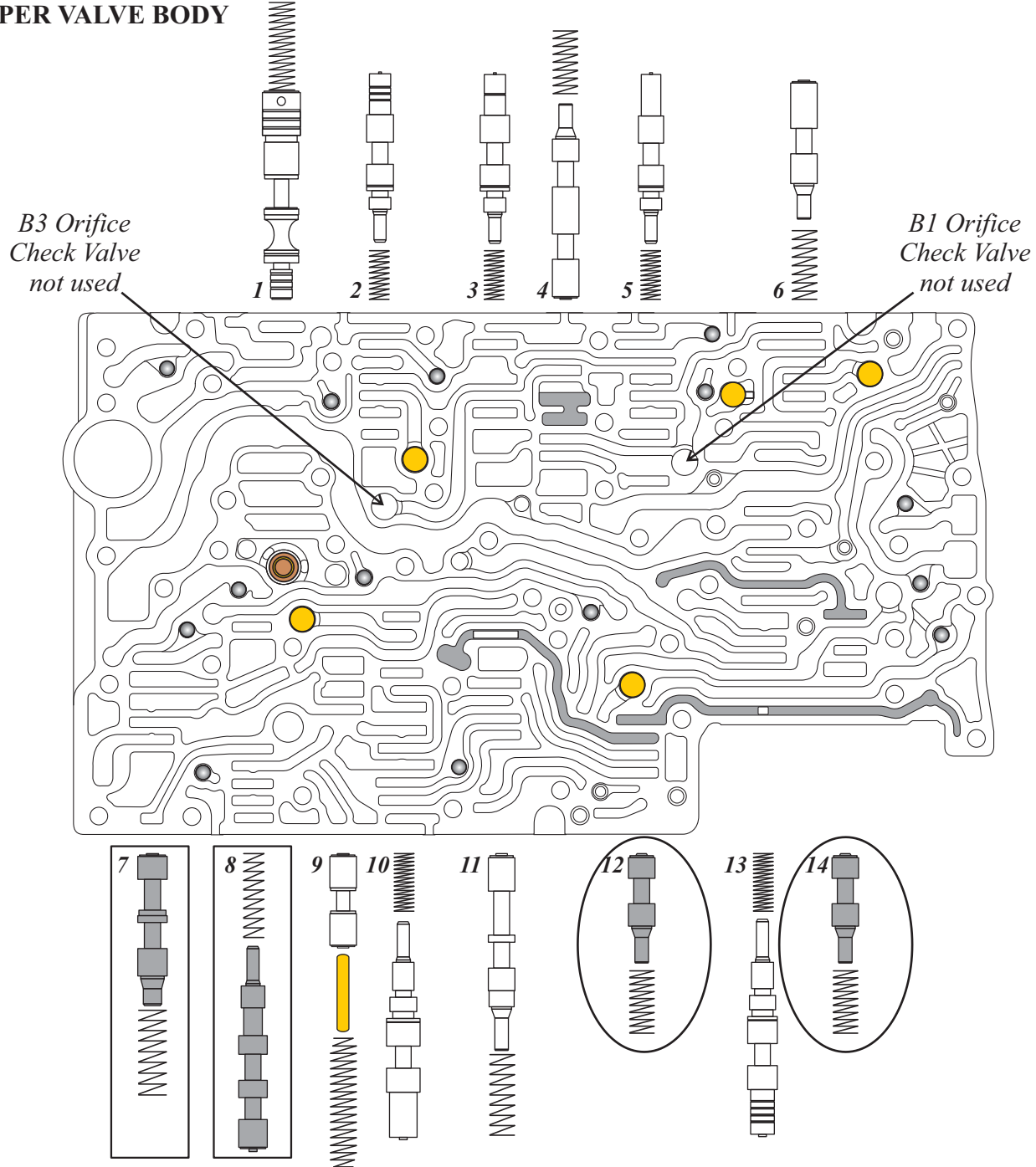
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Figure 2

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UPPER VALVE BODY



1. Working Pressure Regulator Valve
2. K1 Regulating Valve *Not used in some models/pi*
3. B1 Regulating Valve
4. B1/B3 Shift Valve
5. B3 Regulating Valve
6. K3 Shift Valve
7. Converter Inlet Regulating Valve → **Modified**
8. Converter Clutch Shift Valve → **Modified**

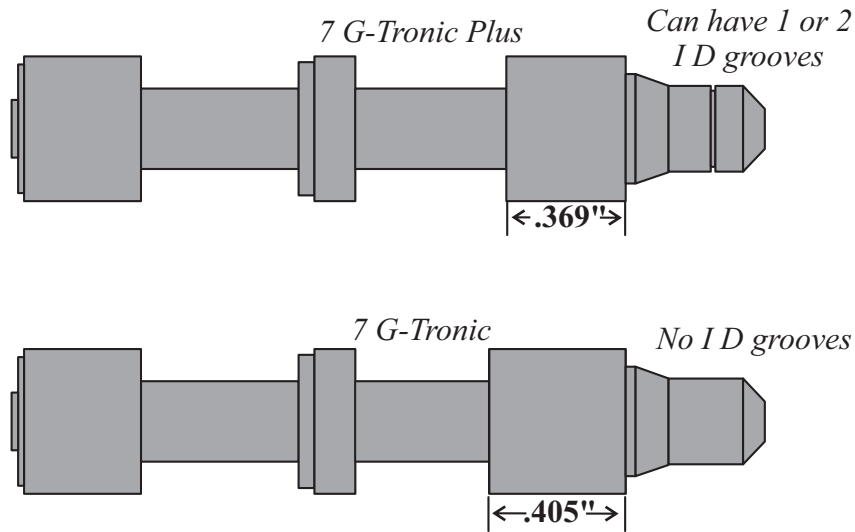
9. Lubrication Pressure Regulator Valve
(Pin not used in some models)
10. K2 Regulating Valve
11. Limp-home Mode Shift Valve
12. K2 Shift Valve → **Eliminated**
13. B2/BR Regulating Valve
14. B2 - 2 Shift Valve → **Eliminated**

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Figure 3

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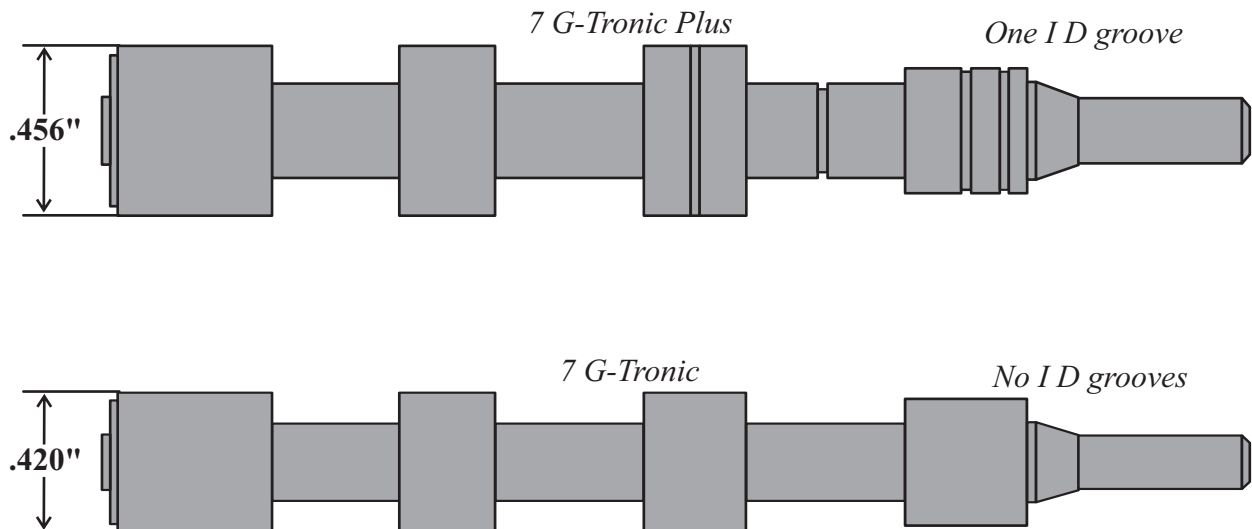
CONVERTER INLET REGULATOR VALVE



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Figure 4

CONVERTER CLUTCH SHIFT VALVE



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Figure 5

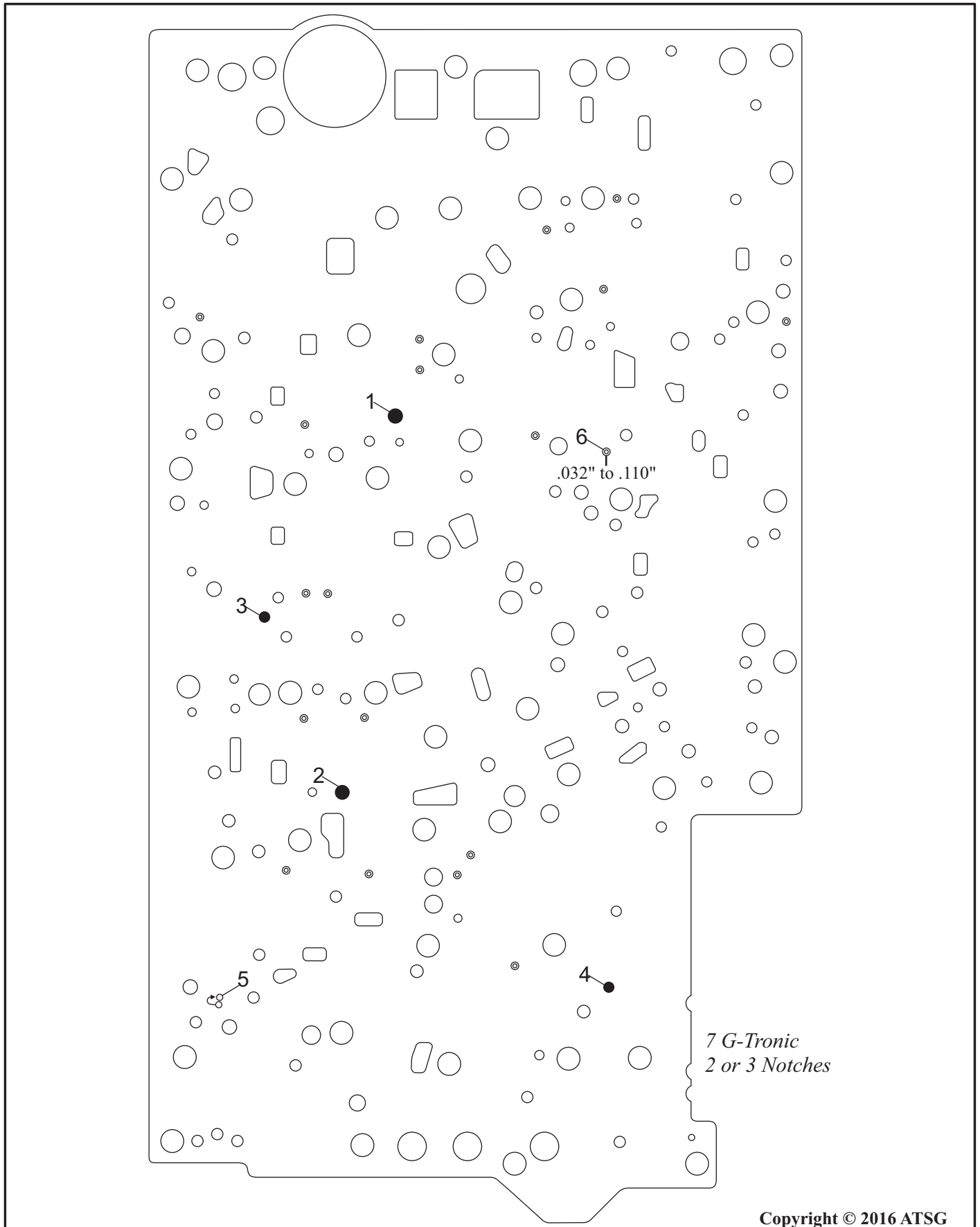


Figure 6

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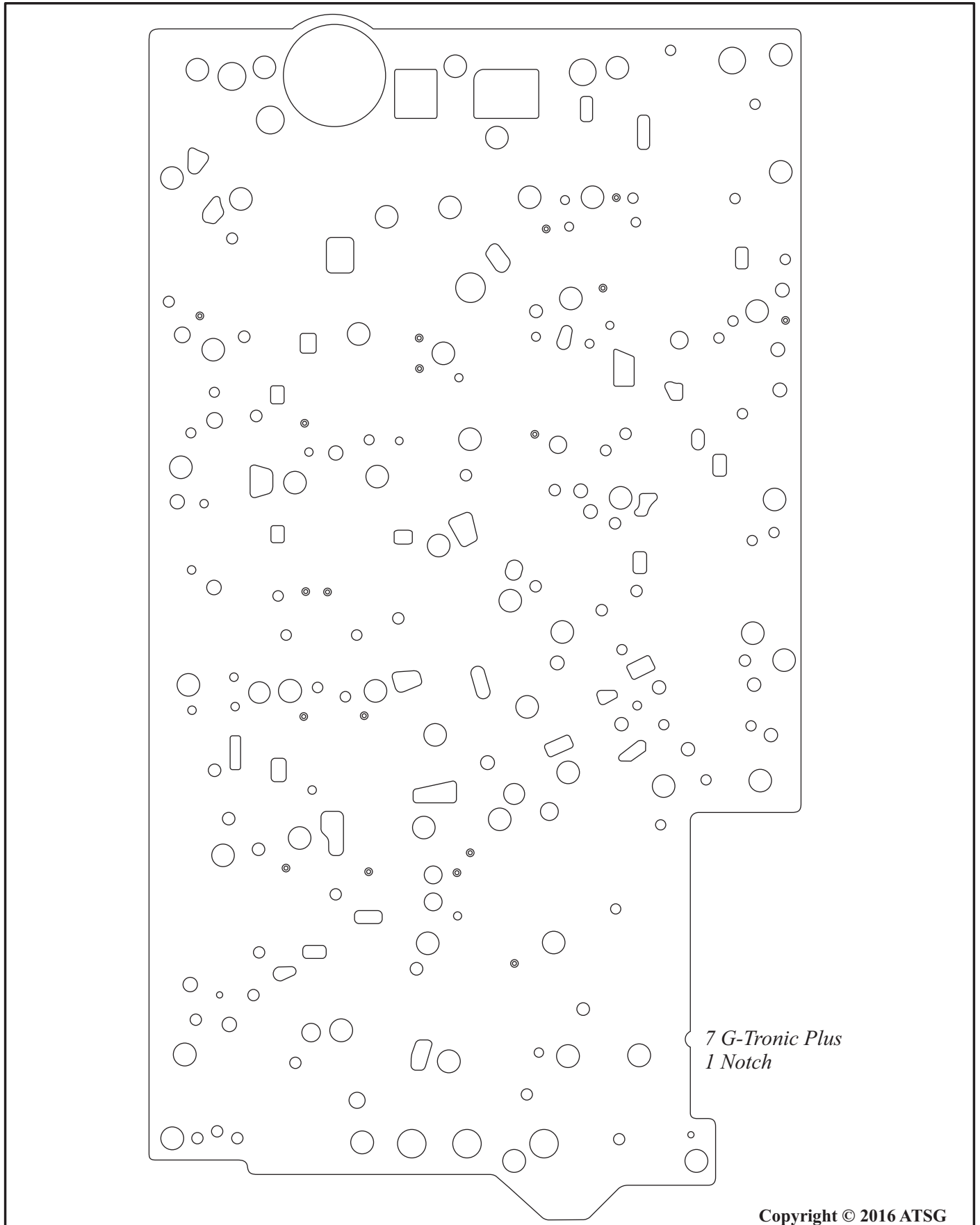
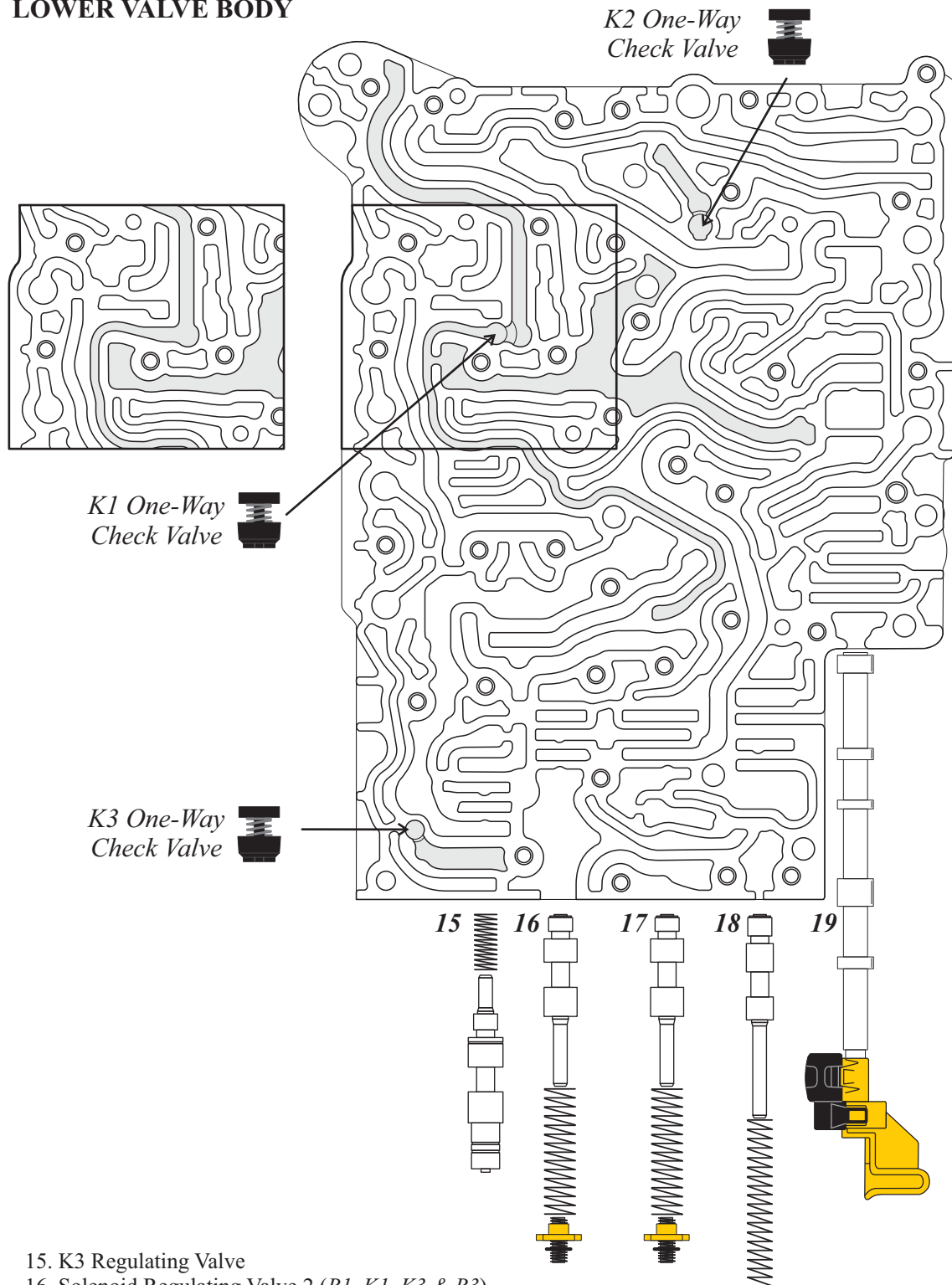


Figure 7

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LOWER VALVE BODY



- 15. K3 Regulating Valve
- 16. Solenoid Regulating Valve 2 (*B1, K1, K3 & B3*)
- 17. Solenoid Regulating Valve 1 (*TCC, PCS, K2 & B2/BR*)
- 18. B2 - 1 Shift Valve
- 19. Manual Valve

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Figure 8

7 G-Tronic Park

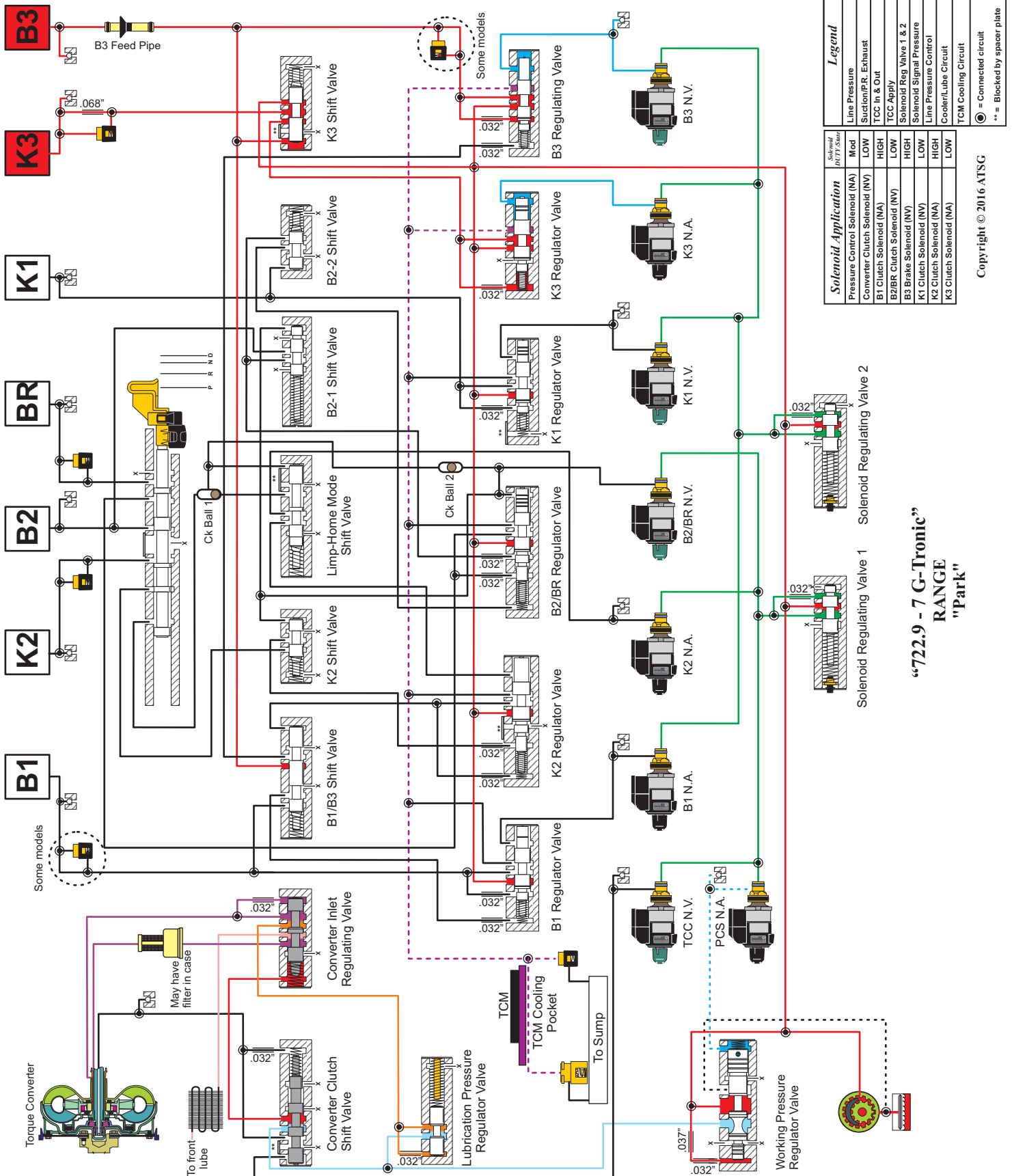


Figure 9

7 G-Tronic PLUS Park

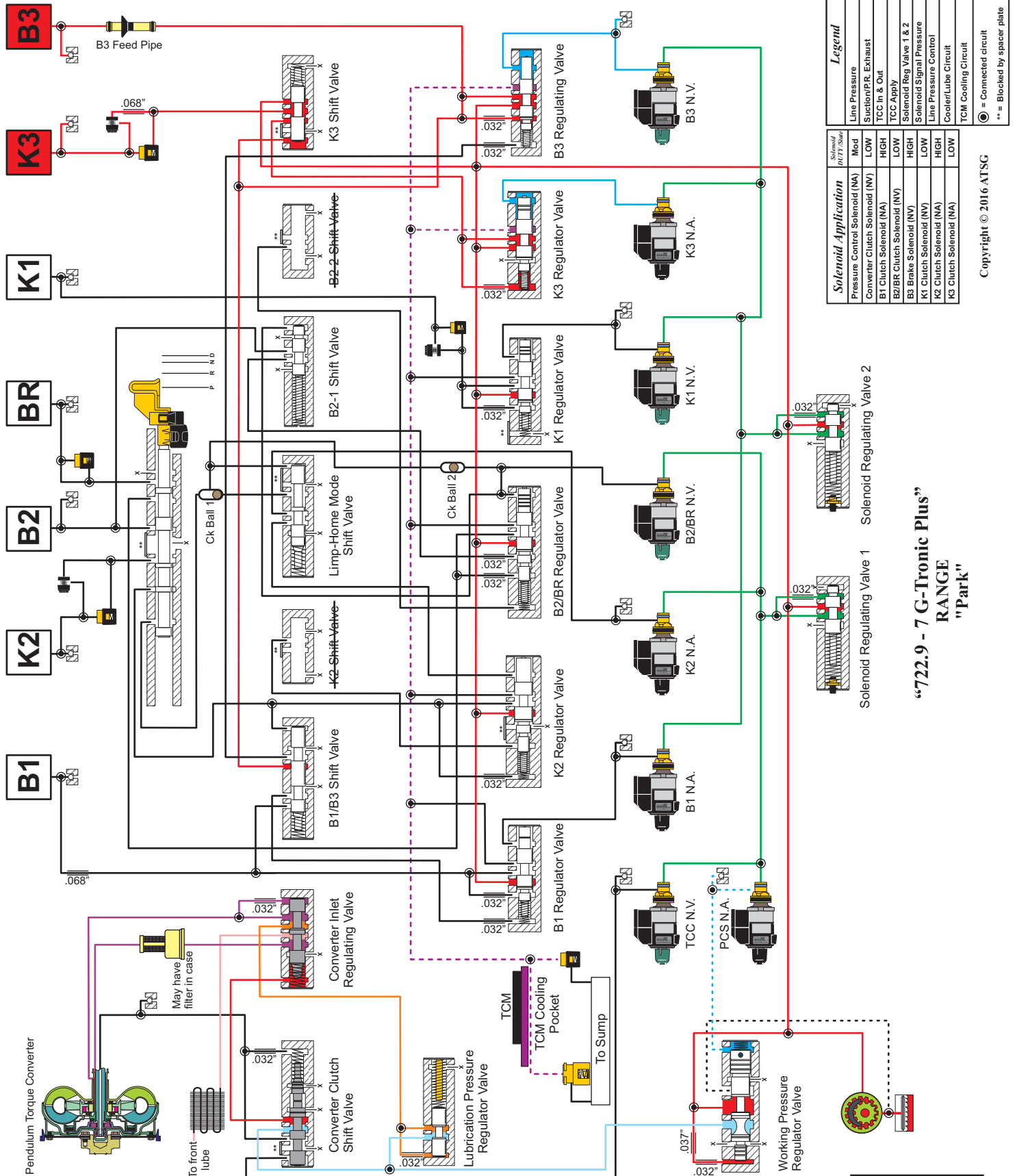


Figure 10