

INTRODUCING THE NEW GENERAL MOTORS 8L90



by Mike Souza
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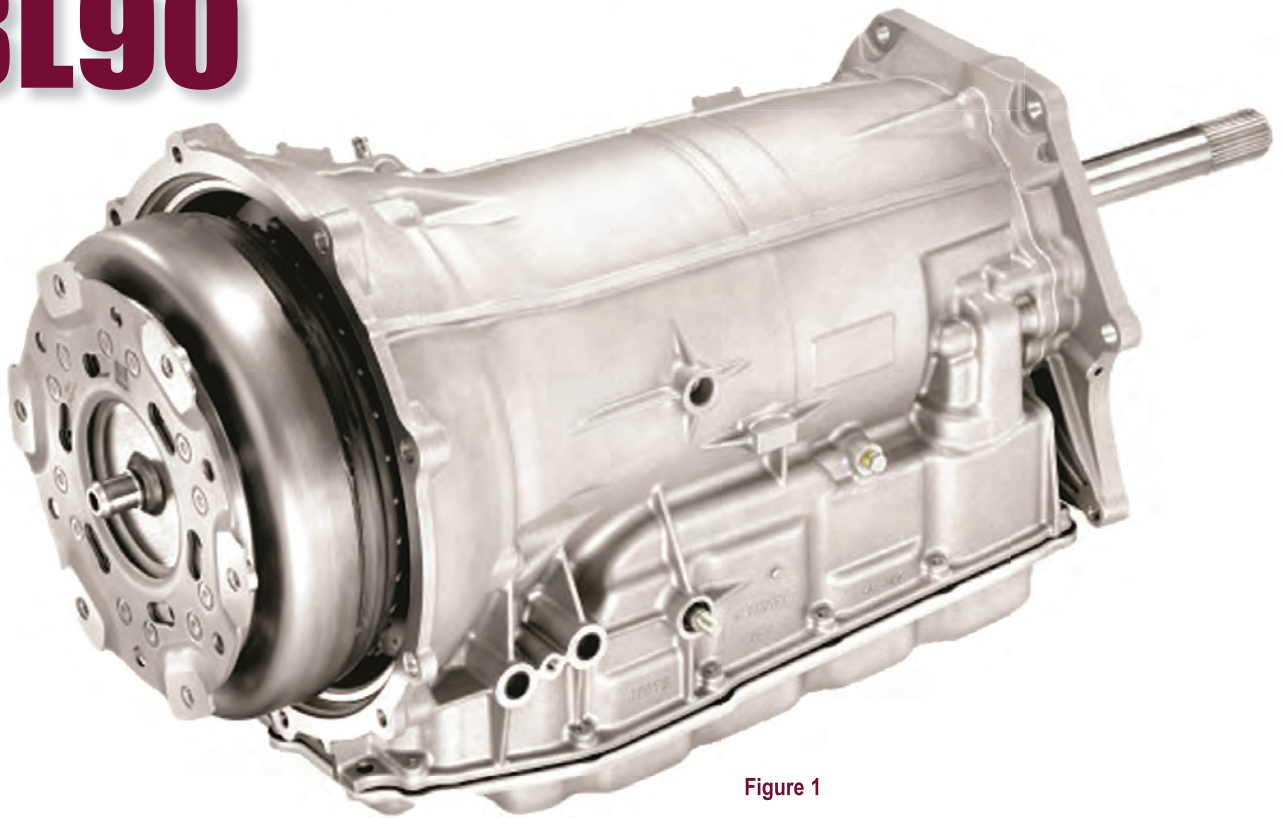


Figure 1

General Motors is introducing its new, 8L90 RPO code M5U in the 2015 Corvette Z06 (Stingray) equipped with a supercharged 6.2L LT4 V8 engine.

This new, 8-speed, automatic rear wheel drive transmission, with its “squashed” torque converter and one-piece, die-cast aluminum case with an integral bellhousing, was developed in house (figure 1). The 8L90 transmission is eight pounds lighter with the same overall size as its 6-speed predecessor, allowing it to fit in the same space.

Its new overall ratio changes will place the new Corvette Stingray into

the EPA-certified, 30-mile-per-gallon (MPG) highway fuel efficiency rating category. The earlier 2014 Stingray equipped with a 6L80 transmission has an EPA rating of 16 MPG in the city and 28 MPG on the highway, with a combined rating of 20 MPG. The 8L90 improves the Stingray’s efficiency up to 5% versus the 6L80, with a steeper first gear ratio to improve launch capability.

The transmission controller executes commands at 160 times per second, providing wide-open-throttle upshifts up to 0.08 seconds faster than the Porsche 911 equipped with a Direct Shift Transmission (DCT).

One of the main reasons the 8L90 is much lighter is the use of magnesium castings for the clutch pistons and valve body.



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Sixth gear is 1:1 direct while seventh and eighth are overdriven at 0.85:1 and 0.65:1 (figure 2). It has a five-clutch arrangement and a 738 pound-feet rated torque capacity capable of handling an estimated 635 pounds of torque.

Built in the GM Toledo, Ohio plant, the 8L90 will also become available in the Cadillac and other rear-wheel-drive models as an upgrade; for now the 6L80 transmission is the standard option. This transmission's beta hardware, although available in 2014, was delayed during the global economic recession for one year and replaced with the Aisin TL-80SN eight speed in the 2014 Cadillac.

The 8L90 is equipped with four, close-coupled planetary gearsets, two braking clutches, and three driving clutches. The driving clutches are located in front of the geartrain to minimize the oil feed distance (figure 3).

Name	8L90
RPO Codes	M5U
Production Location	Toledo, OH (USA)
Transmission Drive	Rear Wheel Drive
1st Gear Ratio	4.560
2nd Gear Ratio	2.971
3rd Gear Ratio	2.075
4th Gear Ratio	1.688
5th Gear Ratio	1.270
6th Gear Ratio	1.000
7th Gear Ratio	0.845
8th Gear Ratio	0.652
Reverse	3.818
Torque Converter Size – Diameter of Torque Converter Turbine	258 mm
Pressure Taps	Line Pressure
Transmission Fluid Type	DEXRON®HP
Transmission Type: 8	Eight Forward Gears
Transmission Type: L	Longitude Mount
Transmission Type: 90	Product Series
Position Quadrant	P, R, N, D, M
Case Material	Die Cast Aluminum
Transmission Net Weight (Approximate)	95 kg (210 lb)
Maximum Trailer Towing Capacity	Refer to applicable owner's manual

Figure 2

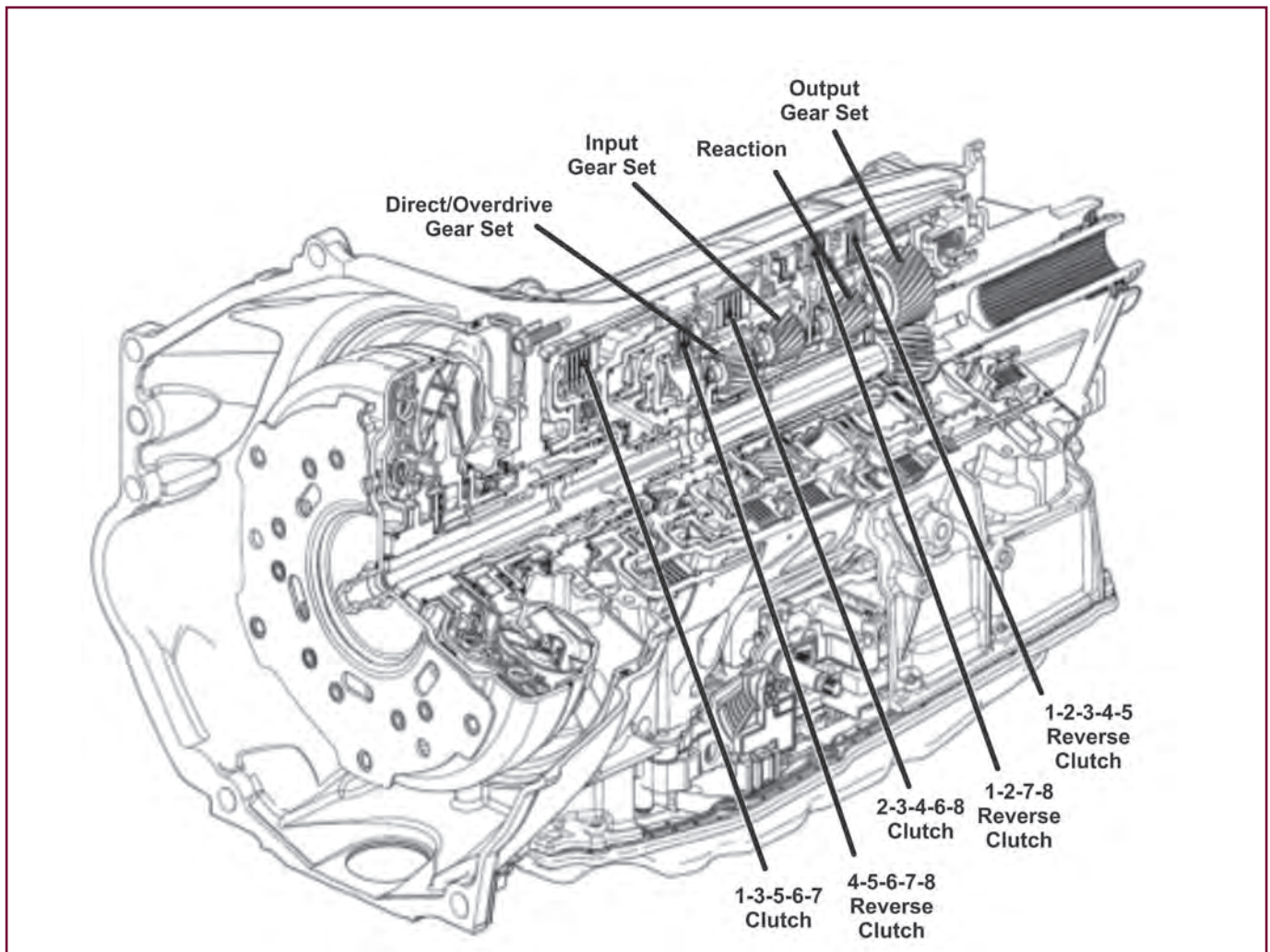


Figure 3

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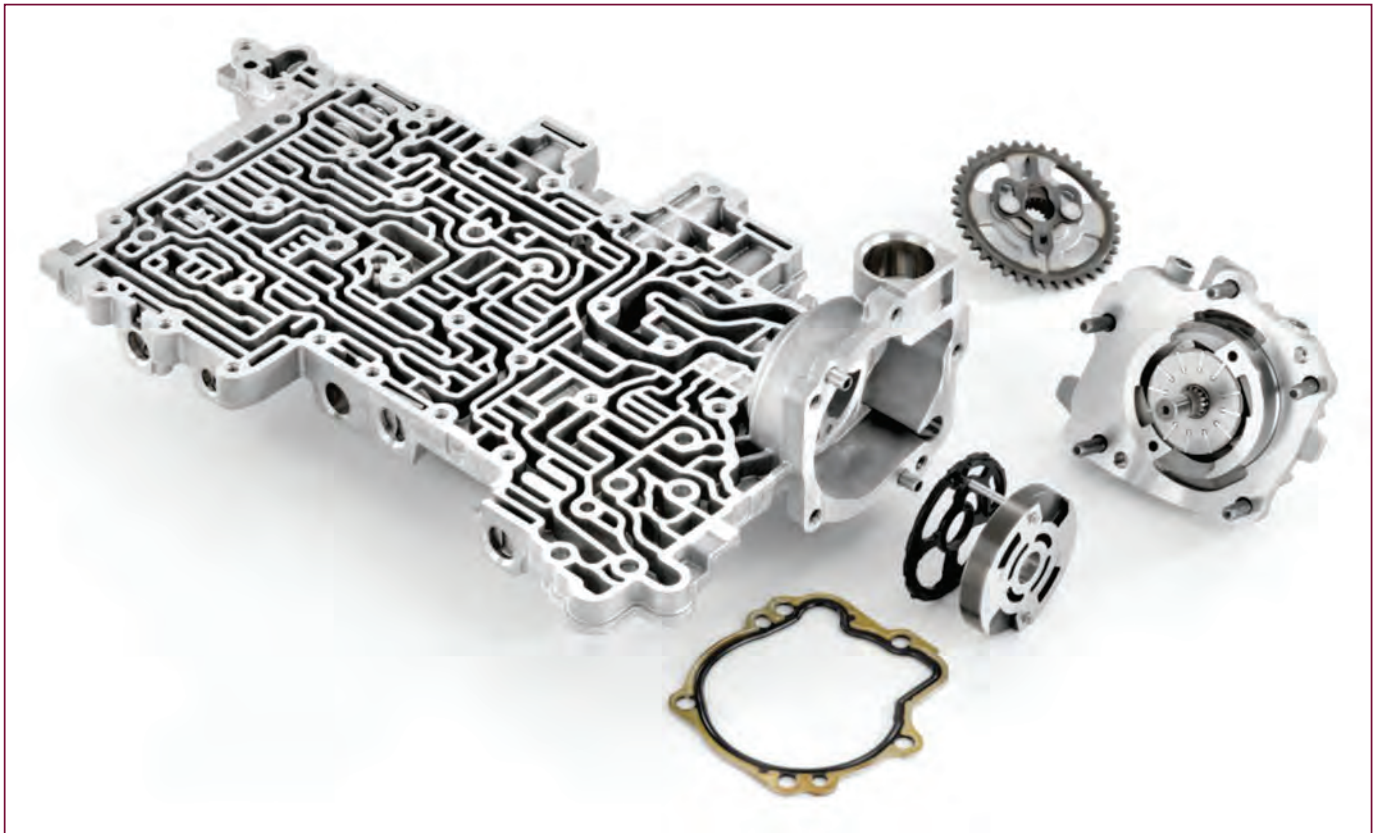


Figure 4

The 258-millimeter torque converter is based on the 6-speed transmission, modified to use an off-axis fluid pump. This moves the pump away from the center of the bellhousing, where it was on the 6L80 transmission. The 8L90's pump is located lower in the case, inside the valve body (figure 4).

The new, small, magnesium, binary, vane-type pump has two inlets

with one discharge per revolution, which serves as two pumps in one small space. It supplies a high flow rate when the demand is needed by recirculating the oil through half the pump at a time. This reduces pump pressure loss and improves efficiency.

One of the main reasons the 8L90 is much lighter is the use of magnesium castings for the clutch pistons and valve body.

The 2-3-4-6-8 and 4-5-6-7-8-R clutch drums have the same type blind spline as the 6L80 transmission (figures 5 and 6). In addition, the solenoid identification and strategy is similar to what Ford is doing with the 6R140W, also known as the Torqueshift 6.

A part unique number (PUN) is located on the valve body and solenoids and a transmission unique number (TUN) is located on the case (figure 7).

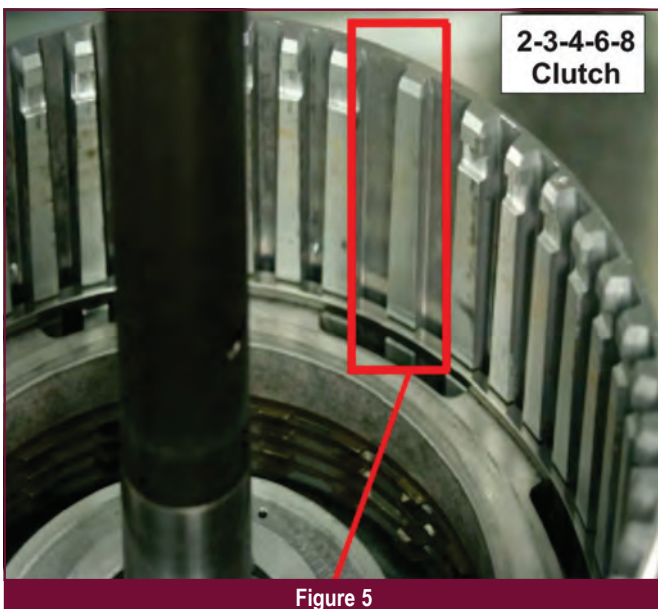


Figure 5

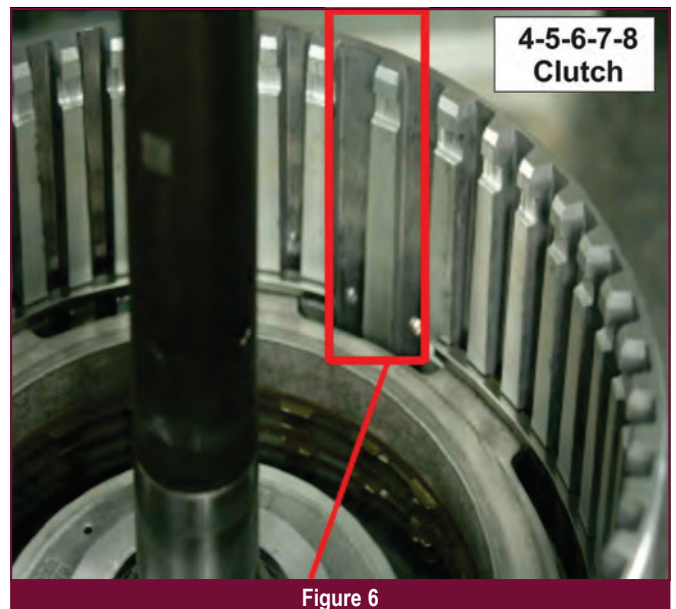


Figure 6



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The part numbers identify the solenoid unique performance characteristic data, which is stored in the transmission control module (TCM) as part of the TIS2 Web Service Programming System (SPS).

If you change the transmission, valve body, solenoids, or TCM during a repair, the unique performance characteristic data must be downloaded from the web server and reprogrammed into the TCM for the system to function at maximum efficiency.

You can reprogram the solenoid characterization using capable laptop software to access the TIS2Web Service Reprogramming System. You can also reprogram the solenoid characterization to refresh the unique performance characteristic data in the TCM. Here's how:

Document the new part unique number (PUN) or the transmission unique number (TUN) as required.

Log into the TIS2Web/SPS web site and enter the vehicle identification number (VIN).

Select transmission control module programming.

Select the applicable service procedure and provide the TUN or PUN required.

The system will read the VIN from the ECM using GM's Multiple Diagnostic Interface (MDI) and then retrieve the applicable data tree through the internet. The data tree accesses the original characterization data so it can be updated with the new component information.

The system acquires the characterization data for the new PUN/TUN and updates the genealogy tree. It then updates the TCM with the correct solenoid characterization data and updates the web with the new genealogy strategy.

That's about all for now. So stay tuned because you can be sure that you'll see future articles, bulletins, and seminar information on this new GM 8L90 transmission in the months ahead.



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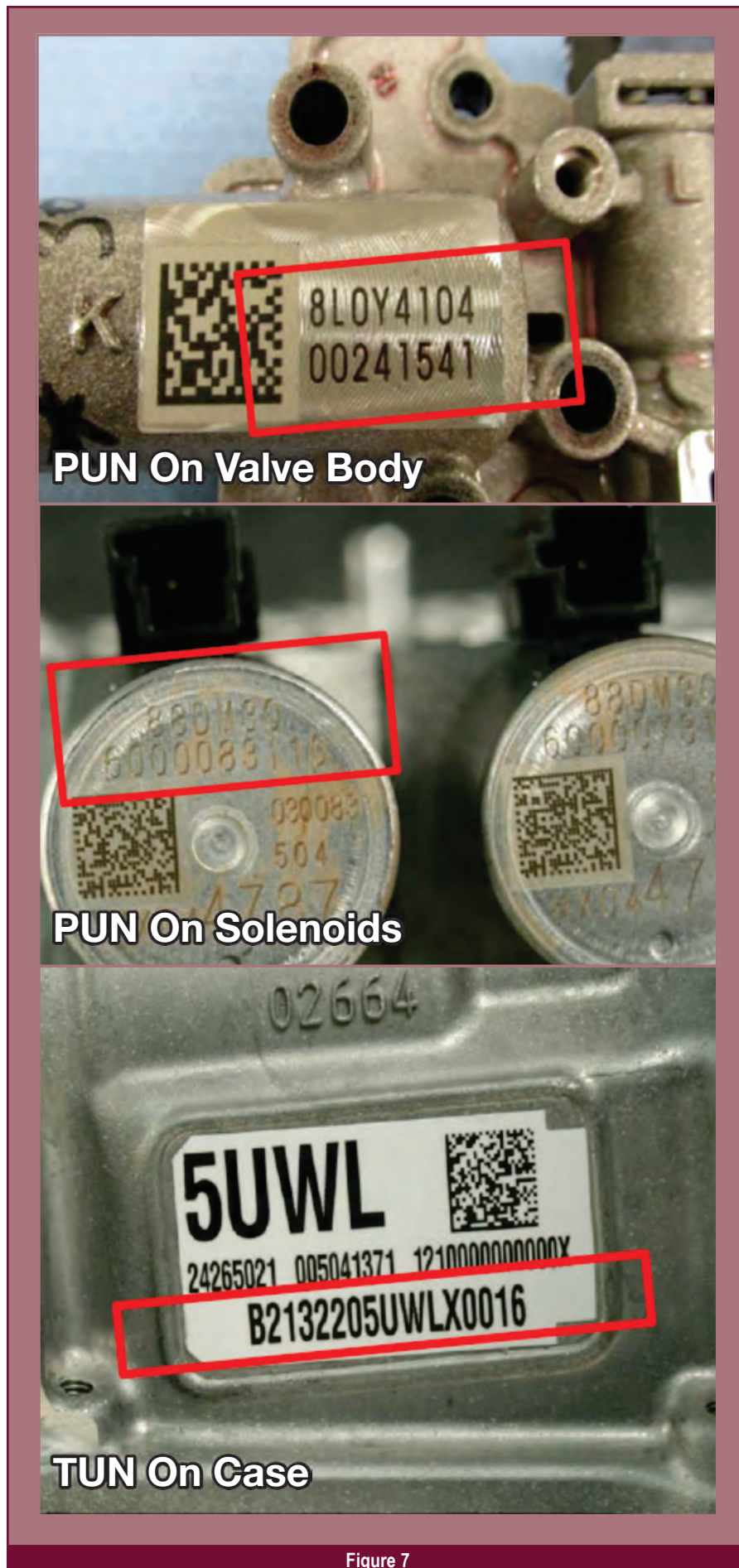


Figure 7

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