New Electronic Transmission Range Select Shift-by-Wire System

Selecting a gear on the Aisin AF50-8 8-speed automatic transmission (RPO MRC) in the new 2017 XT5 and LaCrosse takes only a flick of the wrist. These two models feature the first application of Electronic Precision Shift, which is a shift-by-wire system. Additional future models also will feature this system, which is controlled by various control modules both internal and external to the transmission.

The Electronic Transmission Range Select (ETRS) lever enables the transmission range to be selected by electronic control rather than by mechanical means. There is not a physical link, cable or linkage between the shifter and transmission.

**ETRS Shift Lever**

The automatic transmission shift pattern — Park, Reverse, Neutral, Drive, and Manual positions — is displayed on top of the shift lever. The lever contains sensors that indicate the desired transmission range. The selected gear position illuminates in red on the shift lever. The shift lever always starts in a center position, represented by a dot on the shift pattern. After shifting, it returns to the center position.

A non-contact type gear shift position sensor has been integrated in the Transmission Control Module (TCM). The sensor detects shift position, based on driver input using the shift lever, by using the Hall Effect, which outputs specified voltage according to the shift position. The magnet position in the sensor changes when moving the shift lever, enabling the Hall integrated circuit to convert magnetic field strength into an electrical signal according to the shift position.

The ETRS shift lever assembly includes:

- **Shift Interlock Button** – Located on the side of the shift lever, it has two sensors that are both inputs to the Chassis Control Module.
- **Park Button** – Located on top of the shift lever, it has two sensors that are both inputs to the Chassis Control Module.
- **Two Dimensional Shift Lever** – The shift lever position is determined by two internal sensors that each transmit an X and Y coordinate signal. All four signal circuits are inputs to the Chassis Control Module. The shift lever is designed so any single fault at the shifter can be isolated and error corrected by the Chassis Control Module.
- **Transmission Shift Lever Position Indicator** – The LED display on the face of the shift lever indicates the transmission’s actual gear position. It displays R (Reverse), N (Neutral), P (Park), D (Drive), and M (Manual).
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Gear Selection

**Park** – To shift into Park, press the Park button on top of the shift lever. To shift out of Park, with the ignition on and the brake pedal applied, press the Shift Interlock button on the side of the shift lever and move the lever to the desired gear.

**Reverse** – Press the Shift Interlock button on the side of the shift lever and move the lever forward and then left to shift into Reverse.

**Neutral** – Move and hold the lever forward to shift into Neutral. The transmission will automatically shift into Park after an extended period in Neutral. To exit the vehicle with the transmission in Neutral, such as when at a full-service car wash: press the brake pedal, open the driver’s door, and then shift to Neutral.

**Drive** – Move the lever rearward to shift into Drive.

**Manual** – While in Drive, move the lever rearward to activate manual mode. Use the steering wheel paddles to shift. Press rearward on the shift lever again to return to Drive.

The Chassis Control Module (CCM) monitors the position of the shift lever and communicates the information to the Transmission Range Control Module (TRCM), which then turns the gear selector shaft using a motor connected to the range selector shaft. The TRCM communicates on high-speed GMLAN and the Chassis Expansion Bus.

The Park/Neutral Position (PNP) switch is part of the TCM assembly. The TCM provides a ground to the ECM in Park and Neutral. The PNP switch provides a range signal (permission to crank) to the ECM to enable the engine to start.

All Electronic Transmission Range Selector and Transmission Range Control Module DTCs will set in the Chassis Control Module.

When a fault is detected in the Electronic Transmission Range Select system, the requested gear position or actual gear position cannot be determined, the vehicle will remain in the current commanded gear position until the vehicle speed is below 1 mph (3 kph).

In order to lower vehicle speed, the EBCM will engage braking. When vehicle speed is below 1 mph (3 kph), the electronic park brake and backup park lock (also known as Default to Park) will engage. The electronic park brake will not disengage until the condition is corrected and all related DTCs are in History.

**Critical Fault Mode**

When a fault is detected in the Electronic Transmission Range Select system and the requested gear position or actual gear position cannot be determined, the vehicle will remain in the current commanded gear position until the vehicle speed is below 1 mph (3 kph).

The TCM has a microprocessor with clock, RAM memory and a programmable ROM. Adaptive values are saved in the non-volatile memory (ROM). When the transmission is repaired or replaced, these values must be zeroed using a scan tool. When a TCM is replaced, the adaptive values do not transfer from the old TCM to the new TCM.

**Learn Procedures after Service**

The Gear Selector -N- Position Learn procedure is required when the TCM, ECM, Transmission Shift Lever, or transmission assembly has been repaired, replaced, removed, or serviced. Perform the procedure using the scan tool learn/reset function.

The Learned Values Reset procedure is required when the transmission assembly, torque converter, TCM, control valve body or Transmission Input Shaft Speed Sensor has been repaired, replaced, removed, or serviced.

(5) Thanks to Salvatore Canale
UPDATE: Blu-ray Discs Not Playing

Certain Universal Studios Blu-ray discs released after October 2015 may not start playing when the Play icon is pressed on some 2013-2016 SRX, XTS; 2014-2015 LaCrosse; and 2015-2016 Escalade, Silverado, Tahoe, Sierra and Yukon models equipped with the Rear Seat Entertainment system (RPO UWG, UWJ or U42). This condition does not affect accessory headrest-mounted DVD players.

When users select “Play” to begin playing an affected Blu-ray disc, the disc menu disappears and the menu background animation continues to loop.

The Blu-ray specification is large and allows for a lot of flexibility in the way users interact with the video content. Some studios have recently changed the way their menus are laid out to take advantage of the previously unused functionality, resulting in the Play menu error.

Software Update CD

A software update is available to correct this condition. Although this module is normally programmed via USB and calibrated via GM LAN, this particular portion of the module’s firmware requires that a CD be inserted into the module for an update.

The CD, part number V-IN2016-CD, began being shipped to dealerships in August 2016. Currently, shipping of the CDs continues, so not all dealerships have received a CD yet.

Check Software Version Number

To determine if the module needs to be updated, check the software version number. Turn on the Rear Seat Entertainment System, press the Menu button on the remote control and select Software Information, and then select Version and Other Micros. If F/E = 03/12/14 and B/E = 06/01/16, no update is necessary.

System Update

If an update is necessary, connect the vehicle to the Midtronics® PSC 550 Battery Maintainer or a similar programming support tool to ensure a proper battery charge.

If the vehicle is equipped with two screen displays both must be on. With a single overhead display, the screen source must be on Source #1. Select remote button “1” or “2” to switch between sources. With dual overhead displays, the 2nd-row screen will be Source #1 and the 3rd-row screen will be Source #2.

In vehicles with seatback displays, the left (driver) display is Source #1 and can be controlled by selecting remote button “1.” The right (passenger) display is Source #2 and can be controlled by selecting remote button “2.”

Select a tuner source (AM, FM, or XM) on both rear displays (if equipped) and the front screen. For the rear displays, press the Radio button on the remote control and select AM, FM, or XM using the left/right buttons on the remote.

control. Be sure to do this for both rear displays (if equipped). The front center stack screen must be changed a tuner source (AM, FM, or XM) using the infotainment controls.

Remove any media in the player, located in the instrument panel or in the glove box, and insert the update CD. A popup message will appear on the rear display(s). Select OK by highlighting the button with the remote control and pressing Enter. After a short time, the update CD will automatically eject. Remove the CD from the player.

Next, a message stating “Please insert Update disc will appear on the rear display(s). Re-insert the same update CD. Do not select Cancel.

Wait for the files to be copied. It should take about 20 minutes. The system will stay on the first update screen for about 5 minutes after the update CD has been reinserted. The system will then display “Updating back-end firmware” with a progress percentage. Once 100% has been reached, the CD will eject and can be removed. During the update process, one of the rear displays may stop displaying content.

TIP: Do not turn the power off or use the remote control after the update process has started. Do not touch the system until the update CD ejects automatically.

Once the CD is ejected, the update process will continue for a few more minutes. The progress display will reset to 0% and “Updating front-end firmware” will be displayed.

When the update process has finished, an “Update is complete” message will appear on the rear display(s). Select OK with the remote control and the system will restart automatically.

After the player restarts, check the software version in the Other Micros section. Verify that the updated software is F/E = 03/12/14 and B/E = 06/01/16.

Refer to Bulletin 16-NA-205 for additional information and for instructions on ordering a replacement CD if needed.

Thanks to Dave Gumpert
A number of conditions regarding engine performance and air conditioning operation on some 2016 Colorado and Canyon models may be due to the engine wiring harness rubbing on other components. These conditions may include the air conditioning blowing hot air, a fluctuating engine oil pressure gauge, an engine no start or misfire, and several illuminated warning lamps or Driver Information Center (DIC) messages.

Complete the diagnostic instructions in the appropriate Service Information for any symptoms or DTCs found. If the diagnosis does not lead to a resolution, check for chafing of the engine wiring harness in the following areas, perform any necessary wiring repairs and reroute the harness.

- **Air conditioning (A/C) compressor, A/C compressor suction and discharge line manifold, A/C line and A/C compressor clutch**
  - A wiring harness concern in these areas may cause:
    - The Check Engine light to illuminate and the engine to run rough or not start.
    - The 4WD warning lamp or StabiliTrak warning lamp to illuminate.
    - The oil pressure gauge to read erratically or read no oil pressure.
    - The A/C to not cool.
    - An open fuse in the Underhood Bussed Electrical Center (EBEC).

- **Serpentine belt near the fan clutch wiring harness support bracket**
  - The support bracket may be out position and allow the harness to run on the belt, which may cause:
    - An engine crank, no start condition or the engine to run rough or misfire.
    - The Check Engine light or other warning lamps to illuminate, such as the 4WD warning lamp or StabiliTrak warning lamp.
    - The A/C to not cool

- **Exhaust heat shield near the right rear of the engine** (refer to Bulletin #16-NA-081)
  - A wiring harness concern in this area may cause:
    - The Check Engine light or other warning lamps to illuminate.
    - A Reduced Power message on the DIC.
    - An open fuse in the EBEC.

- **Transmission bell housing bolt/stud**
  - A wiring harness concern in this area may cause:
    - The 4WD warning lamp or StabiliTrak warning lamp to illuminate.
    - The Check Engine light to illuminate.

- **Coolant pipe and clamp tabs between the engine and cowl**
  - The coolant pipe and clamp tabs may wear on the harness.

- **Brake fluid level switch**
  - A wiring harness concern in this area may cause:
    - The Check Engine light and service brake lamp to illuminate.
    - A Low Brake Fluid message on the DIC.

- **Transfer case encoder motor**
  - A wiring harness concern in this area may cause:
    - The Check Engine light or other warning lamps to illuminate.

Thanks to John Stempnik
The annual automotive industry Technician Satisfaction Survey will soon be taking place and technicians at all dealerships are encouraged to participate. Sponsored by GM and other automotive manufacturers, this year’s survey focuses on technician recruitment and retention in the dealership.

2016 Survey: September 19 – October 14

All GM Service Technicians, Technician Apprentices, and Maintenance Inspection Technicians (MIT) profiled in the Center of Learning will receive emails announcing the survey and a link to the survey. The survey will be available from Monday, September 19, to Friday, October 14.

The short survey shouldn’t take more than 15 minutes. The valuable feedback received from the survey results will be used to help GM support dealerships in their efforts to recruit and retain technicians.

Feedback from previous surveys has helped GM provide support for dealership technicians in a number of ways. Here are a few examples from recent surveys.

Improve communication between technicians and service consultants to explain the operation of infotainment systems – Several technical training courses have been updated that help in understanding the operation of infotainment systems. In addition, content in the monthly Emerging Issues Service Knowledge Seminars (TAC Talk in Canada) that is useful to service consultants is identified so they can relay that information to customers. New Model Features (NMF) training content also is now available to service consultants.

Improve service technician recognition – GM has completely revamped the Mark Of Excellence Service Technician Performance Recognition Program in the U.S. for 2016. Technicians now benefit from new weighted rankings. Each technician is ranked based on points earned and can win apparel, gift cards, a toolbox medallion, earnPOWER points, tool gift cards, and zone banquet and national travel awards. GM Canada supports technician recognition through the Technicians Guild Program, which focuses on technical education, professional development and customer service satisfaction.

Introduce new and innovative ways for technicians to learn (U.S. only) – Interactive video, a new training media, has been introduced that leverages the engaging production qualities of traditional video and adds user-involvement technology. The first application of interactive video is the High Voltage Depower Tool Usage course (18420.17W). Performance Support Objects also have been launched, which take the form of video or text, and contain key points derived from technical training courses that reinforce training content.

Create job roles for the skill level of Light Maintenance and include these job roles in the survey pool (U.S. only) – Maintenance Inspection Technician (MIT) and Technician Apprentice job roles have been created in the Learning Management System. These job roles are included in this year’s survey.

GM would like to thank all dealership technicians for your dedication and valuable feedback. Look for the survey link in your email soon.

Thanks to Diana Sancya, Chris Wallace, George Kalso and Bernie Pyra

Check Out the Service Information Technician Forum

A discussion with other technicians about diagnostic and repair information, GM service applications and other topics is a click away on the Service Information (SI) Technician Forum at www.service-gm-forum.com. A one-time registration is required.

The forum also can be accessed through GlobalConnect. Click the App Center link to view all apps, and then click the Technician Forum icon under Service.

Designated to promote communication among the GM technician community, the SI forum offers discussions on repair information covering all GM brands. Polls on a variety of GM service initiatives and common questions about service applications are a few of the other things that can be found on the forum. The forums are monitored by various subject matter experts who can assist with concerns and unanswered questions.

Forum Categories

The forum is organized in categories that range from specific diagnostic and repair information to general comments on daily life in the service department. The topics cover diagnostic and repair information for individual vehicle lines; general technical information covering training, infotainment systems, OnStar, collision repair and parts; tools; management topics; service applications and computer issues; and more.

Forum categories include:

Diagnostic and Repair Information – Covers repairs on Buick, Cadillac, Chevrolet, Chevy Truck, Chevrolet Volt, Medium Duty Trucks, GMC, Hummer, Oldsmobile, Pontiac, Saturn, and Saab models.

General Technical – Includes topics on all service manual sections, training and testing, digital technical pictures, OnStar, collision repair, and parts.

Tools – Features topics on scan tools, general tools, and the CH-51450 Oscilloscope Diagnostic Kit.

Service Manager – Discussions on management insight, customer satisfaction, and warranty issues.

Computers – Covers the Service Information, Data Bus Diagnostic Tool, Techline Information Systems, GDS 2, TechLink, PC software, PC operating systems, and PC hardware.

General Community – Open forum on non-technical discussions.


Thanks to Lisa Scott
Crankshaft Rear Oil Seal Leak

Some 2016-2017 Encore and Cruze models equipped with the 1.4L engine (RPO LE2) and 2016-2017 Malibu and Volt models equipped with the 1.5L engine (RPO LFV, L3A) may have a leak at the crankshaft rear oil seal. Abnormal crankcase pressures caused by a restriction in the induction system may lead to an oil leak at the crankshaft rear oil seal.

In order to determine the root cause of the engine oil leak, it’s necessary to test for excessively negative or positive crankcase pressures using the Evaporative Emissions System Tester (EEST).

The EEST connects at the engine oil dipstick port using the J-41413-300 hose adapter. The connection must be made with the engine off. The engine is then started and the pressure reading is recorded. Normal crankcase pressure readings for the 1.4L engine and the 1.5L engine are between -1 and -5 inches of water in Park at hot idle.

If crankcase pressure is in the proper range, follow the appropriate Service Information diagnostics for engine oil leaks.

If the crankcase pressure is excessively positive, above 0 inches of water, there is a positive crankcase pressure condition. Record cylinder leakage readings and check for improper camshaft cover operation.

If the crankcase pressure is excessively negative, below -16 inches of water, there is a negative crankcase pressure condition. Inspect for any air induction restrictions in the front air intake duct to air cleaner housing or in the air cleaner housing, such as water intrusion, a kinked PCV tube or any air induction system modifications.

In addition, inspect the air cleaner outlet duct for a blocked PCV fresh air port. If the port is not blocked, replace the camshaft cover assembly and repeat for proper crankcase pressure.

Thanks to Raymond Haglund

Service Know-How

10216.08V Emerging Issues – August 11, 2016

The latest service topics from Brand Quality and Engineering are reviewed, including information on the integrated trailer brake system on full-size trucks and how to remove the shift knob from a 2016-2017 Cruze with a manual transmission.

To view Emerging Issues seminars:

- Log in to www.centerlearning.com
  - Select Resources > Video on Demand > GM STC > Search Videos; or
  - Select Catalog to search for the course number, and then select View > Take or Continue Course