



Contact: Janis Little
Director, Product Communications
Tel: 714-372-6429
Email: JLittle@mmsa.com

Moe Durand
Manager, Product Communications
Tel: 714-372-6567
Email: M1Durand@mmsa.com

**2008 MITSUBISHI LANCER EVOLUTION DEBUTS TWO NEW TRANSMISSIONS:
6-SPEED TWIN-CLUTCH SPORTRONIC SHIFT TRANSMISSION (TC-SST) FOR EVOLUTION
MR AND 5-SPEED MANUAL FOR EVOLUTION GSR**

The 2008 Mitsubishi Lancer Evolution debuts the brand's first-ever automated manual transmission, the advanced 6-speed Twin-Clutch Sportronic Shift Transmission (TC-SST). An exclusive feature of the Evolution MR model for 2008, the TC-SST, is capable of executing lightning-quick upshifts with no drop-off in engine power. The TC-SST features both a console-mounted shifter and magnesium steering wheel paddle shifters and offers manual and fully automatic modes.

The 2008 Lancer Evolution GSR model will be exclusively equipped with a new higher-torque-capacity 5-speed manual transmission.

The TC-SST executes shifts more quickly than a driver could in a pure manual transmission. It is also much quicker than either a torque converter automatic transmission or a single-clutch automated manual transmission, such as those used in some luxury brand and exotic sports cars. In the 2008 Lancer Evolution MR, the new TC-SST provides the engaging driving experience and engine-control benefits of a manual transmission, but without the need to use a clutch pedal. In automatic "Normal" mode, the TC-SST provides quick, seamless shifts with better fuel efficiency than a conventional torque converter automatic.



The Twin-Clutch Sportronic Shift Transmission (TC-SST) is a dual-clutch automated manual transmission. Its structure is simpler than that of a conventional automatic transmission.

The TC-SST executes shifts with a consistency no driver can match, benefiting performance and fuel efficiency compared to conventional manual or automatic transmissions.

How TC-SST Works

The TC-SST, for all its capability, uses a less complex structure than a conventional torque converter automatic transmission. It is the advanced electronic and hydraulic controls that allow the precision operation required to make the transmission suitable for a road car. Essentially, the TC-SST is a manual transmission that can select two gears at a time: one gear is engaged by one of the two wet multi-plate clutches, and the other is pre-selected, awaiting to be engaged by the second wet multi-plate clutch.

The gear change is made – either manually or automatically depending on mode selected – when the clutches are “swapped,” which occurs simultaneously, with no perceptible lag time. The two clutches are electro-hydraulically operated. Upshifts and downshifts occur in just a fraction of a second, the longer interval necessary for the engine control module to “blip” the throttle to match engine and transmission speeds.

In principal, the TC-SST behaves like two three-speed manual transmissions operating on the same output shaft. The odd-number gears and even-number gears are on separate input shafts, and each shaft is connected to an individual clutch. The odd and even gear shafts are linked via a transfer gear, which results in a shorter overall transmission length. The transmission ECU, sensors and solenoids are all housed within the transmission valve body.

The TC-SST is equipped with a transmission oil cooler. As do many manual transmissions, the TC-SST uses automatic transmission fluid (ATF).

Shifting Options

The TC-SST offers three drive modes – Normal, Sport and S-Sport – and within each, the driver may choose Automatic or Manual shifting. Whether the driver shifts manually or selects an Automatic mode, the TC-SST functions in the same manner.

The console-mounted shifter has four positions, similar to a conventional automatic transmission: P, R, N and D. With “P” or “N” selected, the transmission control module (TCM) pre-selects 2nd and Reverse gears, with each clutch free as preparation for selection.

Selecting D, shift fork #1 is moved to the 1st gear side, meshes with first gear and gradually engages clutch #1 (for odd-number gears). Simultaneously, the TC-SST pre-selects 2nd gear by moving shift fork #2 to the 2nd gear side, where it rests meshed with 2nd gear. With the transmission in D and the vehicle at a stop, the clutch is intentionally slipped (in R, as well) to provide “creep” as in a conventional automatic or continuously variable transmission. Pressing the accelerator pedal fully engages the clutch, and the car moves.

At the upshift (manual or automatic), clutch #1 disengages while clutch #2 simultaneously engages; the shift, or “torque handover,” is accomplished through the clutch swap. Simultaneously, 3rd gear is pre-selected in the same manner, and so on.

The handoff from one clutch to the other means that there is always a clutch engaged, resulting in faster and smoother shifts with no torque loss, because there is no perceptible “on/off” as there is in a conventional manual transmission or a single-clutch automated manual.



The TC-SST can be shifted manually with either the console mounted shifter or the magnesium steering wheel shifter paddles (below).



Manual and Automatic

The choice of Automatic and Manual operation in the TC-SST makes this new transmission a versatile choice for both maximum performance and convenience. If the driver leaves the shifter in D, shifting is fully automatic, and the driver has control over shifting behavior through three selectable drive modes: Normal, Sport and S-Sport. The default mode is Normal. In Automatic operation, each drive mode controls shifting according to its own shift map and in response to various inputs from the engine, the steering, wheel speed sensors and S-AWC system.

The drive mode switch is located behind the shifter on the console. Pushing it forward (“+”) changes drive mode to Sport, and then pushing it up again changes it to S-Sport. The driver can switch between Normal and Sport modes at any time or vehicle speed. Switching from either Normal or Sport to S-Sport, however, can only be done at vehicle standstill or very low speeds (switch need to be held for 3 seconds for S-Sport). While in any drive mode, the driver can change to manual mode at any time by using the paddle shifters (details in next subsection).



The TC-SST console mounted shifter was engineered to mimic the feel of a crisp-shifting manual transmission shifter. The mode selector is seen to the lower right. (Right-hand drive model shown.)

For use around town and other daily driving situations, Normal mode uses relatively low-speed shift points to deliver unobtrusive shifting for maximum comfort together with optimum fuel economy. Sport mode uses higher shift points and quicker shifting to deliver instant throttle response for better performance feel. Sport mode is also useful for driving in mountainous areas or when engine braking is required.

The S-Sport mode can be selected for performance driving situations, such as track driving. Compared with Sport mode, S-Sport keeps the engine turning at higher revs while allowing lightning-fast shifting. Consequently, the driver will feel shift shock in S-Sport mode, which is recommended mainly for proper performance-driving venues.

Special Automatic Talents

The TC-SST of course has been designed to work with the Lancer Evolution MR's dynamic handling systems. In any of the three drive modes, the TCM continuously take input from engine operating parameters, including engine speed and torque, as well as information from the Super-All-Wheel Control system. The driver can expect, therefore, that the TC-SST will select the best gear for any given cornering situation.

As with a conventional automatic transmission, the TC-SST provides a kick-down function, quickly selecting a lower gear when the accelerator pedal is suddenly pressed to the floor. Shifting intelligence will hold lower gears while the vehicle is ascending an incline (for power) or descending (for engine braking). Here again, pulling one of the paddle shifters will instantly switch the transmission into manual mode to give the driver even more control.

Manual Operation

In any of the three drive modes – Normal, Sport and S-Sport – the driver can select Manual operation, and the drive mode chosen affects shifting speed. Normal mode provides the smoothest shifting and is ideal for urban driving. Sport mode will quicken the shifts and is ideal for country or mountain road driving. The S-Sport mode executes the quickest shifts possible, making it ideal for competitive track events. Since the driver and passengers will feel shift shock in S-Sport mode, it is not advisable for everyday driving.

The driver selects Manual operation in two ways: (1) with the console shifter, by pulling it back past D and then leftward into the Manual slot. Then, pulling the shifter rearward (“+”) selects an upshift and pushing it forward (“-”) selects a downshift.

(2) If the driver selects D with the console shift (Automatic mode), pulling on either of the magnesium steering wheel paddle shifters at any time afterward will switch the transmission to Manual mode. The right side steering wheel paddle is for upshifts (“+”) and left side for downshifts (“-”). In either case, when the TC-SST is in Manual mode, there are absolutely no automatic shift changes.

If the console shift is in D, then the transmission will revert to Automatic mode when the car comes to a very slow crawl or stops. If the console shift is in the Manual slot, the transmission will automatically shift to 1st gear at a stop or very slow speed (as it will in D), but it will remain in Manual mode when the driver accelerates again.

While the car is in motion, the driver can switch between Manual and Automatic modes at any speed. Pulling the upshift paddle (“+”) and holding it for one second will switch the TC-ST into Automatic mode. Pulling the downshift paddle (“-”), however, always results in a quick downshift. When driver turns off the ignition, the engine will run for about two seconds to disengage 2nd and Reverse gears from pre-selection.

TC-SST Shifter

The magnesium steering wheel paddle shifters used in the 2008 Lancer Evolution MR were first used on the 2007 Outlander SUV and are also seen on the Lancer GTS equipped with the continuously variable transmission. The console shifter in the Evolution MR, however, is new and unique to this model. Mitsubishi specially designed it to impart a different feel than shifters used on conventional automatic transmissions that offer some form of manual control.

The shift knob is the same type as used in the previous-generation Lancer Evolution MR. In the Manual slot, the shifter will feel more like a manual transmission shifter, and there is even a pull-ring used to engage Reverse gear. For safety, like a conventional automatic transmission, the TC-SSC features a shift-lock mechanism that locks the shifter in Park unless the brake pedal is depressed.

The shift lever assembly is networked with the engine control module (ECM), transmission control module (TCM) and various ECUs via the CAN bus. As a backup, it is also networked via the Local Integrated Network (LIN), which is a new European standard used here for the first time in a Mitsubishi model.

New Compact Manual Transmission for Evolution GSR

The 2008 Lancer Evolution GSR debuts a new 5-speed manual transmission (W5M6A) that provides a higher torque capacity than the 5-speed manual transmission used in the previous-generation Evolution models. The new transmission is also six millimeters shorter than the previous 5-speed and the same as the 6-speed used before.



New, compact 5-speed manual transmission is ideally paired to the torque characteristics of the new 4B11 T/C engine.

Enabling higher torque capacity requires greater gear face width, which would then result in to a longer transmission case. To make the room needed without lengthening the case, the W5M6A manual deletes a dedicated Reverse gear. Instead, Reverse is provided by meshing 1st and 3rd gears, with synchromesh used to a synchronize the idler gears that mesh them.

The 5-speed manual transmission uses triple synchros on 1st and 2nd gears and a double synchro on 3rd. The new transmission adds double synchros on 4th and 5th, compared to single synchros on the previous transmissions, to enhance durability when used on high-speed tracks, for example. A new ball-type synchro key is used, as well.

Like the previous manual transmission, the new W5M6A unit uses a 240-mm single-plate dry clutch. Ratios are identical to those in the previous 5-speed, but now with a lower final drive (4.687 vs. 4.529).

The rear exhaust manifold location for the new 4B11 engine has resulted in an altered gearshift control takeoff angle, which enables more linear routing of the shift cable and has also reduced cable friction.

To reduce transmission oil agitation during performance driving, the W5M6A transmission case features oil separator ribs and a large-capacity oil tank reservoir that stores oil during high engine speeds.

Lancer Evolution Warranty

Lancer Evolution is covered by a bumper-to-bumper, New Vehicle Limited Warranty of 36 months or 36,000 miles (whichever comes first). The restraints system and the highly technical powertrain are covered by a 5-year or 60,000 miles Powertrain Limited Warranty, an Anti-Corrosion Perforation Limited Warranty for 7-years or 100,000 miles and a generous 5-year, unlimited miles timeframe for roadside assistance. All warranties are transferable to subsequent owners; coverage time begins on the original in-service date (does not start over with resale.)

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