



Supermatic 10L90 Transmission Kit Installation Instructions

LT4 10L90 Transmission Kit - 19420480

LT1 10L90 Transmission Kit - 19432851

THIS TRANSMISSION SHOULD NOT BE USED AS A SERVICE REPLACEMENT TRANSMISSION FOR ANY PRODUCTION VEHICLE. THIS TRANSMISSION IS FOR A CHEVROLET PERFORMANCE "LT" STYLE CRATE ENGINE USING A CHEVROLET PERFORMANCE ENGINE CONTROL SYSTEM. IT WILL NOT FUNCTION WITH A "LS" STYLE ENGINE CONTROL SYSTEM, NOR ATTACH CORRECTLY TO ANY ENGINE EXCEPT AN "LT" STYLE. EACH CONTROLLER IS MATCHED TO THE TRANSMISSION AND NOT INTERCHANGEABLE WITH ANOTHER TRANSMISSION. EACH SOLENOID WITHIN THE TRANSMISSION IS CHARACTERISED AND THAT INFORMATION IS LOADED IN TO THE CONTROLLER.

Thank you for choosing Chevrolet Performance as your high performance source. Chevrolet Performance is committed to providing proven, innovative performance technology that is truly more than just power. Chevrolet Performance parts are engineered, developed and tested to exceed your expectations for fit and function. Please refer to our catalog for the Chevrolet Performance Parts Authorized Center nearest you or visit our website at www.chevroletperformance.com.

This publication provides general information on components and procedures that may be useful when installing or servicing a Supermatic Transmission. Please read this entire publication before starting work. Also, please verify that all of the components listed in the Package Contents section below were shipped in the kit.

The information below is divided into the following sections: package contents, component information, and Supermatic Transmission specifications, additional parts that you may need to purchase, torque specifications, and a service parts list.

It is not the intent of these specifications to replace the comprehensive and detailed service practices explained in the factory service manuals. For information about warranty coverage, please contact your local Chevy Performance parts dealer.

Observe all safety precautions and warnings in the service manuals when installing a Supermatic Transmission in any vehicle. Wear eye protection and appropriate protective clothing. Support the vehicle securely with jack stands when working under or around it. Use only the proper tools. Exercise extreme caution when working with flammable, corrosive, and hazardous liquids and materials. Some procedures require special equipment and skills. If you do not have the appropriate training, expertise, and tools to perform any part of this conversion safely, this work should be done by a professional.

The information contained in this publication is presented without any warranty. All the risk for its use is entirely assumed by the user. Specific component design, mechanical procedures, and the qualifications of individual readers are beyond the control of the publisher, and therefore the publisher disclaims all liability incurred in connection with the use of the information provided in this publication.

Legal and Emissions Information

This publication is intended to provide information about the Supermatic Transmission and related components. This manual also describes procedures and modifications that may be useful during the installation of a Supermatic Transmission. It is not intended to replace the comprehensive service manuals and parts catalogs which cover Chevrolet engines and components. Rather, it is designed to provide supplemental information in areas of interest to "do-it-yourself" enthusiasts and mechanics.

This publication pertains to transmissions and vehicles which are used off the public highways except where specifically noted otherwise. Federal law restricts the removal of any part of a federally required emission control system on motor vehicles. Further, many states have enacted laws which prohibit tampering with or modifying any required emission or noise control system. Vehicles which are not operated on public highways are generally exempt from most regulations, as are some special interest and pre-emission vehicles. The reader is strongly urged to check all applicable local and state laws.

Many of the parts described or listed in this manual are merchandised for off-highway application only, and are tagged with the "Special Parts Notice" reproduced here:

Special Parts Notice

This part has been specifically designed for Off-Highway application only. Since the installation of this part may either impair your vehicle's emission control performance or be uncertified under current Motor Vehicle Safety Standards, it should not be installed in a vehicle used on any street or highway. Additionally, any such application could adversely affect the warranty coverage of such an on-street or highway vehicle.

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System DO's and DON'Ts:

Do:

- Fill the transmission with the proper DEXRON® ULV (P/N 19352619 US, Canada 19352620) oil using the approved procedure in this I sheet.
- Install cooler lines to an appropriate transmission oil cooler.
- Use a Chevrolet Performance Parts Engine Control System to power the transmission control system.
- Use a Chevrolet Performance Installation kit to install the transmission to the engine (LT style only).
- Install the Vent Tube Assembly. It is critical to prevent water intrusion into the transmission.
- Connect the Transmission connector, Transmission Controller connector, Bulkhead connector (to LT engine control system) as instructed for proper transmission operation.
- A shifter with PRNDX indents must be used to access Sport mode. The transmission does not support additional "indents" or positions below "X". The "X" position is used to access the Sport calibration.

Don't:

- Remove transmission cooler line adapter. If it must be removed, do not "pry" out the plugs in the transmission. Do not re-use the seal.
- Dis-assemble the transmission or modify anything inside the transmission.
- Modify the wiring or attempt to operate the transmission without using a Chevrolet Performance Parts Engine Control System.
- Attempt to use with a carbureted engine or LS style Engine Control System.
- Do not use this transmission in place of a GM service transmission – the calibration in the transmission control module is not compatible with production systems.
- Do not mix transmissions and controllers. Each controller is "flashed" with the solenoid characteristics of the solenoids within a given transmission. Controllers and transmissions are "matched".

Supermatic 10L90 Transmission Description and Operation

THIS TRANSMISSION KIT IS DESIGNED FOR USE WITH CHEVROLET PERFORMANCE ENGINE CONTROL KITS. INSTALLING AND OPERATING THE TRANSMISSION WITHOUT USING A CHEVROLET PERFORMANCE ENGINE CONTROL KIT MAY RENDER THE TRANSMISSION INOPERABLE AS WELL AS IMPACT THE WARRANTY.

WHEN USED WITH A CHEVROLET PERFORMANCE ENGINE CONTROL KIT AND AN AFTERMARKET INSTRUMENT/GAGE DISPLAY, THE ECM WILL NOT SHOW GEARS 9 AND 10 IN SOME CASES, EVEN THOUGH THE TRANSMISSION IS UTILIZING ALL 10 FORWARD GEARS.

The 10 speed RWD is a fully automatic, 10 speed rear wheel drive, electronic-controlled transmission. The ten speed ratios are generated using four simple planetary gearsets, two brake clutches, and four rotating clutches. The resultant on-axis transmission architecture utilizes a squashed torque converter, an off-axis pump and four close coupled gearsets. The four rotating clutches have been located forward of the gearsets to minimize the length of the oil feeds which provides for enhanced shift response.

The transmission architecture features a case with integral bell housing for enhanced powertrain stiffness. A unique pump drive design allows for off-axis packaging very low in the transmission. The pump is a variable vane type which effectively allows for two pumps in the packaging size of one. This design and packaging strategy not only enables low parasitic losses and optimum priming capability but also provides for ideal oil routing to the controls system, with the pump located in the valve body itself. The transmission control module (TCM) is externally mounted, enabling packaging and powertrain integration flexibility. The controller makes use of three speed sensors which provide for enhanced shift response and accuracy.

The 4-element torque converter contains a pump, a turbine, a pressure plate splined to the turbine, and a stator assembly. The torque converter acts as a fluid coupling to smoothly transmit power from the engine to the transmission. It also hydraulically provides additional torque multiplication when required. The pressure plate, when applied, provides a mechanical direct drive coupling of the engine to the transmission.

The planetary gear sets provide the 10 forward gear ratios and reverse. Changing gear ratios is fully automatic and is accomplished through the use of a transmission control module (TCM). The TCM receives and monitors various electronic sensor inputs and uses this information to shift the transmission at the optimum time.

The hydraulic system primarily consists of an off-axis gear-driven variable vane-type pump next to the valve body, and 2 control valve body assemblies. The pump maintains the working pressures needed to stroke the clutch pistons that apply or release the friction components. These friction components, when applied or released, support the automatic shifting qualities of the transmission.

The friction components used in this transmission consist of 6 multiple disc clutches. The multiple disc clutches deliver 11 different gear ratios, 10 forward and one reverse, through the gear sets. The gear sets then transfer torque through the output shaft.



The transmission may be operated in any of the following gear ranges:

PARK (P)

This position locks the rear wheels and prevents the vehicle from rolling either forward or backward. PARK is the best position to use when starting the vehicle. Because the transmission utilizes a shift lock control system, it is necessary to fully depress the brake pedal before shifting out of PARK. For safety reasons, use the parking brake in addition to the PARK position.

REVERSE (R)

This position allows the vehicle to be operated in a rearward direction.

NEUTRAL (N)

This position allows the engine to be started and operated while driving the vehicle. If necessary, you may select this position in order to restart the engine with the vehicle moving. This position should also be used when towing the vehicle.

DRIVE (D)

Drive range should be used for all normal driving conditions for maximum efficiency and fuel economy. Drive range allows the transmission to operate in each of the 10 forward gear ratios. Downshifts to a lower gear, or higher gear ratio, are available for safe passing by depressing the accelerator or by manually selecting a lower gear in the manual mode range.

MANUAL (M) SPORT MODE (S)

This position allows the driver to utilize the Driver Shift Control (DSC) system, or manual mode. When the shift selector lever is moved to the M/S position, the driver may select upshifts or downshifts by using the optional paddle switches. See schematic below to set up paddle or tap up/tap down shifting.

To protect the engine or transmission from damage, the TCM will only allow you to shift into a gear appropriate for engine speed and vehicle speed.

The weight of the transmission is approximately 107.586 kg (237.19 lb.). The gear ratios of the transmission are as follows:

1 st	4.696
2 nd	2.985
3 rd	2.156
4 th	1.779
5 th	1.526
6 th	1.278
7 th	1.000
8 th	0.854
9 th	0.689
10 th	0.636

To protect the engine and/or transmission from damage, the TCM will only allow shifting into a gear appropriate for the engine speed and vehicle speed.

The torque rating of the 10L90 Supermatic Transmission is 650 lb.-ft. This transmission has been manufactured using a combination of production components and is not equivalent to a GM service transmission. It should not be substituted for a GM service transmission and will not operate correctly if installed in a production vehicle.

The Supermatic 10L90 transmission is based on production 10L90 from a 2017-2021 Chevy Camaro. Any service parts needed can be referenced to a 2017-2021 Camaro with 10L90 (RPO MI4). It includes the slip yoke rear housing from a 2018 Chevy Tahoe (RPO MF6). This transmission kit includes the transmission harness - designed to be used with Chevrolet Performance Engine Control kits, a transmission controller (flashed with the calibration), a vent hose, and a cooler line adapter. The calibration loaded into the Transmission Control Module (TCM) comes with 2 calibrations – Normal and Sport.

The transmission harness does not have provisions for power, ground, etc. and must be used in conjunction with a Chevrolet Performance engine wire harness. The transmission comes filled with oil. The level must be verified before operation. It should not be overfilled. The procedure to add/remove oil and verify the level is located at the end of this sheet.



The tap feature is not required for the transmission to operate but it is strongly recommended. No other forward gears are accessible without the use of paddles or a "tap".

The tap up/tap down feature works with the transmission gear selector in the "drive" position and the next position one click below. The transmission gear selector only has 5 positions, PRNDX - there are no additional indents past the X position. Tap is available if the vehicle speed is greater than 7 Mph/12 Kph. Tap will automatically exit after 10 seconds with no activity or if the vehicle speed drops below 7 Mph/12 Kph. If the gear selector is one "click" down from "drive", the transmission will go into the Sport mode calibration first. This calibration will still automatically shift through all the gears, it just uses the Sport calibration shift and pressure tables. The transmission does not have the capability of additional indents below "X". When it receives a tap request, either up or down, the transmission will remain in full tap mode. The tap shift must be utilized to shift the transmission. The gear selector must be moved into the "drive" position and then back to Sport in order for automatic shifting to return. It will remain in tap until the shifter is moved back to the "drive" position or the tap up is held for 3 seconds.

The transmission comes with a cooler line adapter installed to allow the user to use custom cooler lines. The adapter comes with #6 AN fittings. The adapter has been installed and no modifications are required for proper function. The transmission does not require an indicator/tube. The level is set by the fill operation. See below.

The transmission harness includes the following connections:

- 10L90 Transmission (required)
- Tap up/tap down function/paddle shift and floor shift connector (not required)
- Gauge driver connector (not required)
- Optional connector (not required)
- Blunt cut wires for Speedometer, Oil Pressure & Engine speed (Tach) outputs (not required)

The required connections for operation are the transmission, Chevrolet Performance engine wire harness, and the Transmission Controller. All other connections are not required to be used but can be used to increase functionality.

The transmission does not come with a gear selector. A gear selector with 2 forward selectors is needed. The first detect below D is used to enable the Sport Calibrations. Tap up/Tap down or paddle shifting is available in each calibration. The transmission does not have any additional indents below "X" - one indent below Drive.

Kit Contents:

Kit P/N 19420480

- 19420481 - Instruction Sheet
- 19420482 - Transmission Harness
- 24045004 - 10L90 Transmission
- 24285855 - Vent Tube Assembly
- 24284255 - Bracket
- 22942442 - Emblem
- 19432852 - LT1 Transmission Controller

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Transmission Installation:

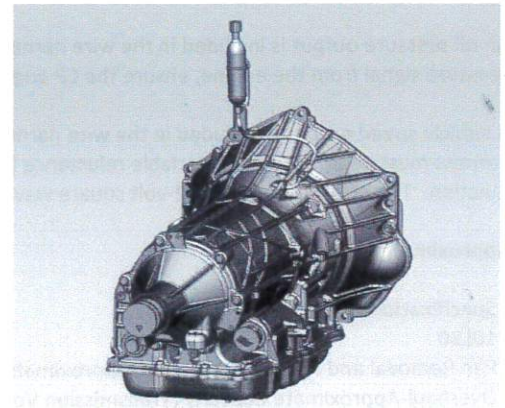
The installation of the transmission to the engine is covered in the Transmission Installation Kit from Chevrolet Performance. The installation instructions can be obtained at www.chevroletperformance.com.



Vent Tube Installation:

Install the vent tube as shown below.

Connect the short open end onto the vent tube on the transmission. The vent assembly should be mounted as high as possible. The enclosed bracket can be mounted to the top of the transmission to engine attachment bolt to facilitate the mounting of the vent.



The wire harness connects to the transmission and bulkhead connector of a Chevrolet Performance LT engine control harness. The transmission, Bulkhead connectors and transmission controller must be connected to ensure proper transmission operation. In order to use either the tap up/tap down or paddle function, they must be connected to the appropriate connector in the harness.

The Gage Driver connector can be used to operate late model digital gauges. The mating connector is provided with plugs to protect the connector when it is not used. The pin out of the connector is as follows:

Cavity	Description
A	Power – 12 volt ignition
B	Ground
C	CAN High
D	Can Low

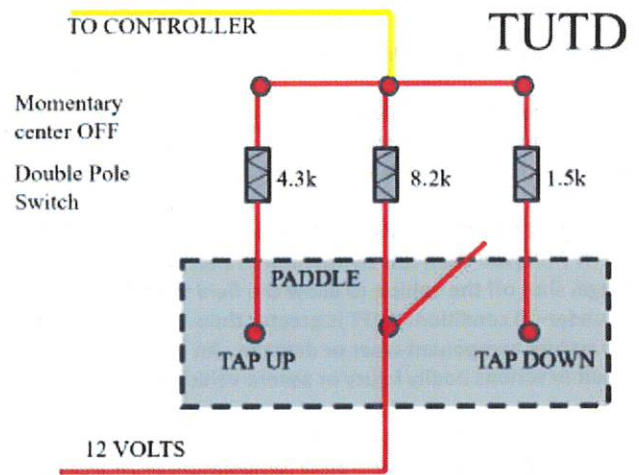
Optional Tap Up/Tap Down Feature

Tap up Tap Down is an optional feature that can be utilized. It is not required for operation in normal or sport mode.

The schematic for the tap feature is as follows:
(TUTD = tap up tap down)

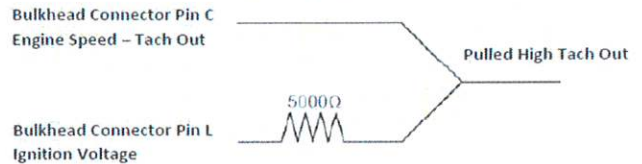
The Gear Shift Lever connector can be to operate the tap/up/tap down feature. Two pigtail harnesses are provided. Use the 4 wire pigtail harness for a typical GM console or floor shifter or the 2 wire pigtail for a typical column shifter. The column shifter should have only tap up/tap down and not a tow/haul feature. If neither option is desired, one of the pigtail connectors should be installed to protect the connector from contamination. The wires may be cut off. The pin out of the connector is as follows:

Cavity	Description
A	Power – 12 volt ignition
B	Tap Shift
C	Brake Light
D	Ground



The Option connector can be used to connect optional items that require CAN signals to operate. The mating connector is provided with plugs to protect the connector when it is not used. The pin out of the connector is as follows:

Cavity	Description
A	Power – 12 volt ignition
B	Ground
C	CAN High
D	Can Low



Tachometer, Speedometer, & Oil Pressure Signals

A tachometer signal is included in the wire harness. This is a 2 pulse/rev output which may correspond to a 4-cylinder setup in some tachometers or transmission controllers. Note the signal is a low voltage square wave, some tachometers or transmission controllers may need a pull-up resistor in order to read the signal, similar to a 5000 ohm, 1/4 watt resistor - this detail is left to the user. The following circuit has worked for numerous devices - the resistor value may need to be changed if your device does not read this output properly.



An oil pressure output is included in the wire harness and can be used for a pressure gauge if desired (see below for scaling). If using the optional oil pressure signal from the engine, ensure the CP engine wire harness is plugged into the oil pressure sensor.

A vehicle speed output is included in the wire harness for use with auto-scaling speedometers. The vehicle speed sensor connector in the CP wire harness must be attached to a variable reluctance (analog) type speed sensor (typical of most late model GM automatic transmissions) for this to function. The output signal is a 12-volt square wave.

Approximate Fluid Capacities

Specification Application	Metric	English
10L90		
Pan Removal and Filter Replacement-Approximate Capacity	7.7 liters	8.1 quarts
Overhaul-Approximate Capacity (Transmission Volume Only)	10.95 liters	11.6 quarts
Complete Trans System-Approximate Capacity (Including Cooler Volume)	12.52 liters	13.23 quarts

Transmission Fluid Fill Procedure

Caution: Use DEXRON® ULV (P/N 19352619 US, Canada 19352620) transmission fluid only. Failure to use the proper fluid may result in transmission internal damage.

Caution: Check the transmission fluid level immediately after adding fluid and before vehicle operation. Do not overfill the transmission. An overfilled transmission may result in foaming or fluid to be expelled out the vent tube when the vehicle is operated. Overfilling will result in possible damage to the transmission.

Transmission Fluid Fill Procedure

10L90 Check and Fill Procedure

This procedure checks both the transmission fluid level, as well as the condition of the fluid itself. Since this transmission is not equipped with a fill tube and dipstick, a tube in the bottom pan is used to set the fluid level.

Warning: The transmission fluid temperature (TFT) should be between 75-80°C (167-176°F). This is normal operating temperature of the fluid. If the TFT is lower than this temperature range, either idle or brake torque the vehicle to raise the fluid temperature. If the TFT is higher than this range, shut off the vehicle to allow the fluid to cool as required. Setting the fluid level with a TFT outside this range could result in either an over-fill or under-fill condition. If TFT is greater than 80°C = under-filled. If TFT is less than 75°C = over-filled. An under-filled transmission will cause premature component wear or damage. An over-filled transmission will cause fluid to overflow from the vent tube, possibly causing a fire that may result in serious bodily injury or severe vehicle damage, fluid foaming, or pump cavitation.

Note: This transmission is equipped with an internal thermal bypass valve, the transmission fluid level should be checked only after the TFT has reached or exceeded an operating temperature of 70°C (158°F). Once the TFT has reached or exceeded 70°C (158°F), then you can check the fluid level. For all 10 speed RWD transmission applications, use ONLY Dexron® ULV transmission fluid. Failure to use the proper fluid may result in damaging the transmission internally.

The quart containers of Dexron® ULV must be shaken to stir up the additives before pouring. Do NOT use Dexron® VI or Dexron® HP. When the oil level check plug is removed with the engine OFF, transmission fluid may drain from the hole.

1. Start and idle the engine.
2. Ensure the transmission fluid is normal operating temperature.
3. Depress the brake pedal and move the shift lever through each gear range. Pause for at least 3 seconds in each range. Move the shift lever back to PARK. Ensure the engine RPM is low (500-800 RPM).
4. Allow the engine to idle for at least 1 minute.

Caution: To obtain the required transmission temperature, set the vehicle parking brake, run converter stalls while also applying the foot brake and placing the transmission in drive gear range to heat the transmission oil. Run 10 seconds on, then 10 seconds off converter stall. Brake torque is not to exceed 1500 engine RPM's. Failure to maintain 10 second intervals or exceeding 1500 engine RPM's may result in transmission internal damage.
5. Raise the vehicle on a hoist or suitable method to achieve access to the transmission fill plug.. The vehicle must be level, with the engine running and the shift lever in the PARK range.
6. Remove the automatic transmission case plug (1) from the transmission. Allow any fluid to drain.



10L90 Case Plug

Danger: Transmission fluid is flammable and the area around the automatic transmission case plug is hot due to the proximity of the exhaust system components. Always wear protective gloves to avoid personal injury. When draining the transmission, protect all exhaust components including the catalytic converter and catalytic converter heat shield from making contact with transmission fluid. Failure to do this could cause smoke and/or a fire resulting in serious bodily injury or severe vehicle damage.

Caution: Thoroughly clean around the transmission case plug to prevent dirt or contaminants from entering the automatic transmission case during plug removal. Use compressed air to dislodge any caked dirt that may be stuck on and around the plug area. Use a mirror to confirm the area is free of dirt before removing the plug. Failure to clean around the plug may result in transmission contamination causing possible transmission internal damage.

Caution: THE ENGINE MUST BE RUNNING when the trans oil level check plug is removed or excessive fluid loss will occur, resulting in an under-filled condition. An under-filled transmission will cause premature component wear or damage.

Note: Continue to monitor the TFT. Do not allow the TFT to become overly cool or overly hot. If the fluid is flowing as a steady stream, wait until the fluid begins to drip. Re-install the case plug, torque to 22 NM (16 lb.-ft). If no fluid comes out, add fluid until fluid comes out in a steady stream and then drips out. Re-install the case plug, torque to 22 NM (16 lb.-ft).

