



SILVER SPORT *Transmissions*

NOVA – VENTURA - OMEGA - APOLLO 1968-1974



TKX 5-SPEED TRANSMISSION CONVERSION INSTALLATION MANUAL

FOLLOW FACTORY SERVICE MANUAL (FSM) RECOMMENDED SAFETY PRECAUTIONS. TRANSMISSION REMOVAL AND INSTALLATION IS A LABOR INTENSIVE JOB, WHICH CAN RESULT IN SERIOUS INJURY OR DEATH IF CAUTION IS NOT TAKEN. PLEASE BE CAREFUL PERFORMING THIS JOB, OR HAVE A PROFESSIONAL PERFORM THE JOB FOR YOU. REFER TO FACTORY SERVICE MANUAL FOR ADDITIONAL DETAILS OF THE PROCEDURES BELOW, AS REQUIRED.

FOR BOLT TORQUE SPECIFICATIONS, REFER TO YOUR FACTORY SERVICE MANUAL.

The material herein is the intellectual property of Silver Sport Transmissions ("SST") and is to be used by SST customers or their authorized installers for the sole purpose of installing SST-supplied transmissions and related parts. Under no circumstances shall the manual or any portion thereof be copied, duplicated, distributed or incorporated in any written or printed document without the express written approval of Silver Sport Transmissions.

Before you start:

Test drive the vehicle, if possible, before you begin. Pay attention to noise and vibration and record your observations. At the end of the installation, perform another test drive to compare.

In addition to this manual, you should have received instructions for checking your bellhousing runout. **The bellhousing runout must be checked (and corrected if necessary) for Tremec's warranty coverage.**

You should also verify the parts you received. Compare the received items to the detailed invoice provided in your shipment.

PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLATION

In addition to these instructions, you should receive the following instructions based on your order, **if applicable:**

1. All kits – MAA-00101 Inspection and Correction of Bellhousing to Crankshaft Runout
2. Hydraulic throw out bearing kit – MAG-00402 Hydraulic Kit Instructions for GM

Your invoice lists the individual hardware packs and where they are used.

NOTE: Transmission **must** be test shifted before installation. Due to jostling during shipping, some transmissions will not shift properly when removed from the box. Please make sure that the gear selector will move into each of the (6) possible positions while rotating the input shaft and checking for output shaft rotation. The rubber sleeve may need to be removed from the output shaft to allow it to turn easier (see photo on page 5). If the input shaft will not turn, slide the clutch disc over the input shaft and jerk the clutch disc left and right to break it free. If this does not correct the issue, call Silver Sport Transmissions' Technical Support at **888-609-0094** for assistance.

THIS CANNOT BE CORRECTED WITH THE TRANSMISSION INSTALLED IN THE CAR!
TEST SHIFT FIRST!

A. REMOVE EXISTING EQUIPMENT (IF FACTORY MANUAL CAR SKIP TO SECTION B)

1. Disconnect negative (-) battery cable.
2. If equipped with console, remove to permit disconnecting and removing floor shift components. If equipped with key/steering wheel lock, the linkage must be locked in position to permit key removal and turning steering wheel at all times. If column shift, remove linkage at steering column. Remove linkage from transmission.
3. Remove engine breather assembly, throttle linkage, ignition cap and components and any other items that would restrict lowering the back of the engine for transmission removal.
4. Remove the automatic dipstick tube bracket from its attachment at the engine. Some vehicles will permit removal of the dipstick tube from the transmission while others are removed with the transmission. Fluid may drain from the transmission at this point if the dipstick tube is removed.
5. Remove the transmission kickdown cable/linkage and brackets from the engine and vehicle. If a column shift, remove linkage between steering column and transmission and any associated brackets.
6. If equipped, remove vacuum modulator vacuum line from its connection at the engine and plug the engine vacuum source.
7. Remove fluid cooling lines at radiator and transmission. Fluid may drain. Plug the radiator connections.
8. Locate and disconnect the neutral safety switch wiring and backup light wiring, if equipped. Tag for future reuse during manual transmission installation.
9. Remove the automatic brake pedal. Depending on the vehicle and the under-dash access, pedal removal may require removal of the front seat, under-dash facia and or dropping the steering column. If the new pedal kit includes a new pedal support bracket, the original pedal bracket will also need to be removed. Retain all parts until the new pedals are installed.
10. Locate the factory clutch rod hole used for standard transmission vehicles. The hole generally has a factory rubber plug sealing it and is located behind the factory insulating/carpeting material.
11. Raise car securely on lift or jack stands (6-Ton recommended).
12. Loosen exhaust at manifold and remove as required for working clearance and to allow the engine to drop during transmission removal.
13. The emergency brake cable may need to be disconnected for working clearance.
14. Remove the driveshaft at the differential and transmission, if necessary, and remove driveshaft from vehicle.
15. Unbolt starter and set aside.
16. Remove speedometer cable.
17. Remove torque converter dust cover.
18. Remove the torque converter to flex plate fasteners. The engine will need to be rotated manually to access all the fasteners. (**NOTE:** The battery should have already been disconnected as directed in step number 1 to prevent accidental startup)
19. Secure rear of engine with hydraulic jack.
20. Remove bolts from transmission isolator at the crossmember and raise engine slightly to remove weight from crossmember.
21. Secure and support transmission (transmission jack recommended) and remove the crossmember.
22. Remove the bellhousing bolts holding transmission to the engine, lowering back of engine and transmission, as required, permitting access to all bolts.
23. Move transmission and torque converter rearward as a unit and disengage the transmission bellhousing from dowel pins. Continue moving rearward until the transmission unit can be lowered and removed from the car.
24. Remove the flex plate from the crankshaft.

B. REMOVE EXISTING EQUIPMENT (FACTORY MANUAL CAR)

1. Disconnect negative (-) battery cable.
2. Place transmission in neutral. Remove shifter knob and boot.
3. Remove console. Note location and orientation of all components and wiring.
4. Remove front seats and carpet.
5. Remove engine cooling fan and fan shroud.
6. Remove breather assembly & ignition cluster cover/distributor cap from engine.
7. Raise car securely on lift or jack stands.
8. Loosen exhaust at manifold pipe.
9. Unbolt starter and set aside.
10. Remove drive shaft at rear differential pinion yoke and remove from car.
11. Remove bell housing dust cover/inspection cover.
12. Remove linkage pin & clip at torque arm to clutch fork.
13. Remove shifter assembly.
14. Remove speedometer cable.
15. Remove exhaust pipes as required for working clearance and permit engine to drop.
16. Unbolt transmission isolator and remove crossmember.
17. The emergency brake cable may need to be disconnected for working clearance.
18. Disconnect backup switch wiring.
19. Secure rear of engine with hydraulic jack.
20. Secure transmission (jack recommended) and unbolt 4 speed transmission from bellhousing, then move rearward in vehicle and remove.
21. Remove manual transmission bellhousing, clutch pressure plate and clutch disk.
22. Remove manual transmission clutch fork and release bearing from bellhousing. Inspect release bearing, fork, and pivot ball stud for wear. Contact Silver Sport Transmissions for replacement or repair.
23. Inspect flywheel ring gear teeth (no cracks, chips, wear), and friction surface (no cracks). Silver Sport Transmissions strongly suggests removing flywheel and having it surfaced, then dynamically balanced at a reputable automotive machine shop **unless** the engine was externally balanced with the flywheel installed.
24. Remove the manual transmission pilot bushing.

C. INSTALL NEW EQUIPMENT (IF FACTORY MANUAL CAR SKIP TO SECTION D)

If your car is an automatic, a column shift 3-speed, or the vehicle was previously converted from such to a 4-speed, **a factory reproduction 4-speed tunnel hump must be installed in the vehicle before proceeding.** It is necessary for proper alignment and use of the Silver Sport Transmissions sheet metal cutting template and sheet metal that are provided in the kit. The 4-speed tunnel hump also provides additional tunnel clearance for your new transmission. Contact Silver Sport Transmissions to purchase a reproduction 4-speed tunnel hump if you do not have one.

NOTE: The amount of tunnel clearance that exists can vary from car to car. Once the factory 4-speed hump is installed in your car, Silver Sport Transmissions strongly recommends trial fitting your transmission before cutting your tunnel to install the TKX sheet metal. Some cars will only require minor dimpling, or a much smaller area to be cut. Silver Sport Transmissions' template and sheet metal is designed to be large enough to allow the TKX to fit in most if not all vehicles of this type, with plenty of clearance in the tunnel. Your car may not require as much clearance as our modification provides.

1. For all vehicles, install new pedals and pedal supports bracket and components. See supplied diagram with pedals if applicable.
2. If a Silver Sport hydraulic system is to be installed, refer to the appropriate portions on the installation manual for mounting of the hydraulic master cylinder.
3. If the original style mechanical linkage (clutch rod, Z bar, Z bar mounts, fork rod) is to be used, install the components per the Factory Service Manual for the particular vehicle. Note: On some vehicles, the frame side Z bar support is not bolted in but must be welded in.
4. To locate the shifter hole for vehicles whose kit did not include a shifter hole location on the template or in the sheet metal, the following procedure can be used to locate the shifter hole. Temporarily install the bellhousing to the engine and raise the engine to approximate final elevation. Measure from the bellhousing mounting face of the transmission to the center of the shift lever location, including offset from the centerline of the transmission. Transfer this dimension to the underside of the floor pan by measuring from the transmission mounting face of bellhousing down the underside of the floor pan and mark the shift lever location, including offset. Measure the square section of the shift tower and transfer this to the underside of the floor pan. Drill a pilot hole and center the 4-speed hump over the pilot hole. Once the 4-speed hump has been fitted, cut out the required area. It would be good to temporarily install the transmission to verify the accuracy of the work. **NOTE: Confirm nothing is in the way inside or under the vehicle during cutting.** Remove the bellhousing from the engine and lower the engine.
5. Complete the remaining installation per the instruction manuals provided with the transmission kit.

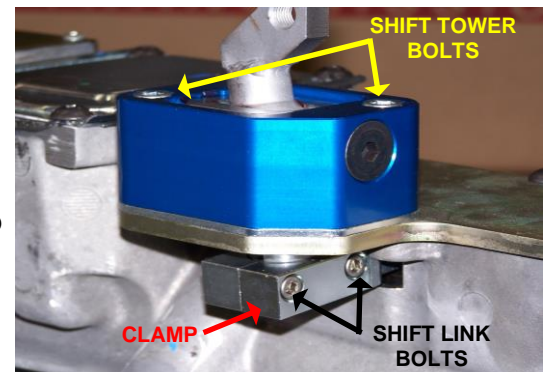
D. TEST FITMENT AND TUNNEL MODIFICATION



IMPORTANT: The TKX is a physically smaller transmission than the previous generation TKO and may not require any floor modification. Test fit the transmission before cutting the floor. If converting from an automatic to the TKX, you must have the 4 speed hump installed before test fitting the transmission. Test fit the transmission into the car and check fitment with the crossmember and isolator mount installed. A minimum of 1/4 inch clearance around the entire transmission is required. Some dimpling of the floor may be all that is required for fitment or smaller cuts than the following instructions show. The amount of tunnel clearance that exists can vary from car to car. Silver Sport Transmissions' template and sheet metal is designed to be large enough to allow the TKO/TKX to fit in most if not all vehicles of this type, with plenty of clearance in the tunnel. Your car may not require as much clearance as our modification provides.

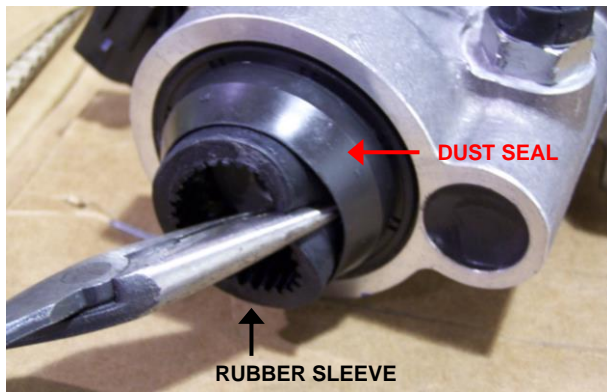
E. INSTALL NEW EQUIPMENT

1. Remove the (2) small socket-head bolts from the horizontal shift link underneath the shifter, then remove the clamp from the link (see photo on right). Take care not to lose or damage the nylon shifter cup that is retained by the clamp. Next, remove the two large socket head bolts from the top of the transmission shift tower and lift up on the tower to remove it. Note the orientation of the shift tower (for reference when reassembling).



2. Reinstall the rubber sleeve on the output shaft if it was removed during test shifting to help prevent fluid leakage during the installation. Fill transmission with 2 quarts, 20 ounces of transmission fluid, or until fluid runs out of the fill hole with the vehicle level. Reinstall the fill plug after adding fluid.

3. Install new pilot bearing assembly using a socket of similar diameter to the bearing and a hard rubber mallet. Make sure the bearing is installed facing the right direction (see photo below). Gently tap bearing fully into crankshaft until bearing face is flush with crankshaft face.
- NOTE:** The pilot bearing holes in some crankshafts are not sized consistently. The pilot bearing is designed to be a slight press fit in the bore. Your pilot bearing OD should be between one-half of a thousandth and two thousandths of an inch (0.0005" - 0.002") larger than the ID of the hole in your crankshaft. If outside of this range, a different pilot bearing is required, or your crankshaft or pilot bearing may be modified to fit. Contact your local parts store or machine shop for a suitable replacement or to modify your existing parts.



CHEVROLET PILOT BRG.

PONTIAC PILOT BRG.

(TRANSMISSION SIDE SHOWN)

4. Install bellhousing and inspect for proper alignment to crankshaft using dial indicator or test indicator (SST can provide these tools at extra cost). See "Inspection and Correction of Bellhousing to Crankshaft Runout" provided with your literature package. Make sure to record your runout data in a safe place, as it will be required in the event of a warranty issue. Mark offset dowel pin position if used to correct bellhousing runout, and carefully remove bellhousing.
5. To locate the shifter hole for automatic or column shift vehicles, use the following procedure:
- Temporarily install the bellhousing to the engine and raise the engine to approximate final elevation.
 - Measure from the bell housing mounting face of the transmission to the center of the shift lever location, including the offset from the centerline.
 - Transfer this dimension to the underside of the floor pan by measuring from the transmission mounting face of bellhousing down the underside of the floor pan and mark the shift lever location, including offset.
 - Measure the square section of the shift tower and transfer this to the underside of the floor pan.
 - Drill pilot holes and cut out the required area. It would be a good idea to temporarily install the transmission to verify the accuracy of the work.

NOTE: Confirm nothing is in the way inside or under the vehicle during cutting.

6. Use the provided 26T alignment tool with large pilot dia end to center the clutch disk when applying torque to the pressure plate bolts. Install the bolts with medium thread locking compound per clutch instructions and tighten in a star pattern, one turn at a time to prevent distorting the pressure plate fingers, until the cover is snug against the flywheel. Torque the bolts to 35 lb.-ft. in a star pattern.

NOTE: When installing the pressure plate and clutch disk onto the flywheel, NEVER use power or air tools. Using power or air tools will cause the flanges of the pressure plate to distort. This will in turn cause uneven pressure plate finger heights, which will lead to inconsistent or unsuccessful clutch releases. See MAA-05000 clutch installation instructions for more details.

7. Lower rear of engine (required for new transmission installation).

8. With the bellhousing still removed from the engine, install clutch fork and release bearing in the bellhousing if using mechanical clutch linkage. *The tips of the clutch fork and the spring fingers on the rear side of the clutch fork both fit inside the same groove on the release bearing.* If you purchased the SST hydraulic system with your transmission, the hydraulic release bearing will already be installed and you will not be using a clutch fork.



9. Install bellhousing to engine, while making sure that there are no hoses, cables, or wires caught between the bellhousing and engine block.

Torque the fasteners to the specification found in your Factory Service Manual.

IMPORTANT !!! Refer to MAA-00101 Inspection and Correction of Bellhousing to Crankshaft Runout

It is an absolute **requirement** that **runout** is **checked** and **corrected** **PRIOR** to installing the transmission. The runout specification for all of Silver Sport's kits is **0.005" (5 thousandths of an inch) MAXIMUM**. You **MUST** document the results **PRIOR** to installation of transmission and keep these measurements recorded in a safe place for your transmission warranty. Silver Sport's Customer Service will need this information if a warranty issue arises.

10. Install transmission, using caution when inserting the input shaft into the clutch disc and pilot bearing. Do not allow weight of transmission to rest on assembly until fully engaged (doing so can misalign disc or damage pilot bearing). Due to the tight clearance around the upper right transmission to bellhousing bolt, a socket head bolt can be substituted for the hex head bolt if you do not have a suitable hex head wrench. The rubber tailshaft sleeve may be temporarily removed and the slip yoke inserted and the output shaft rotated, as required, to facilitate engagement into clutch disk. **DO NOT UNDER ANY CIRCUMSTANCES use the transmission-to-bellhousing bolts to draw/pull the transmission up to the bellhousing!**

NOTE: MECHANICAL LINKAGE ONLY If the transmission stops approximately 1/2 - 3/4 inch away from seating fully against the bellhousing, install and **finger-tighten** bellhousing to transmission bolts (HWG-PACK A). Connect clutch linkage and depress pedal lightly while pushing transmission forward to facilitate alignment of clutch disk to input shaft and pilot bearing. **DO NOT** force the transmission into engagement – damage to the pilot bearing may result. Tighten bellhousing to engine bolts once the transmission is seated against the bellhousing.

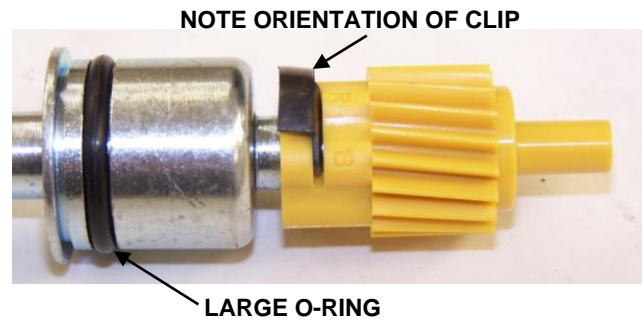
WARNING: THE FOLLOWING CAN CAUSE THE EARS OF THE TRANSMISSION CASE TO BREAK AND IS NOT COVERED UNDER WARRANTY (SEE PHOTO):

- a) DRAWING THE TRANSMISSION UP TO THE BELLHOUSING BY THE BOLTS.
- b) NOT TORQUING THE TRANSMISSION-TO-BELLHOUSING BOLTS TO 50 lb.-ft.
- c) NOT HAVING THE TRANSMISSION FULLY SEATED AGAINST THE BELLHOUSING WHEN TORQUING THE TRANSMISSION-TO-BELLHOUSING BOLTS.



11. Once the transmission is fully seated by hand against the bellhousing, fasten with 1/2" x 1-3/4" bolts and washers provided (HWG-PACK A) and torque to 50 lb.-ft.
12. Raise up the engine/transmission until transmission contacts the top of the tunnel.
13. Attach rubber isolator mount to transmission using M10-1.5 x 30 bolts and lock washers (HWG-PACK H).
14. Install new crossmember using your original hardware to attach to the frame. Lower transmission fully onto crossmember, and attach to mount with hardware pack HWG-PACK B. Confirm no interference to car body or noise will occur as the driveline moves under load. Confirm transmission is centered in floor tunnel.
15. The rubber tailshaft sleeve **MUST** be removed at this point (see step B-4 and photo on pg. 5). Install driveshaft by inserting the slip yoke into the rear of the transmission first. Then position the rear U-joint in the differential U-joint saddles. It may be helpful to be able to turn the rear wheels. Install rear straps and torque to factory specs. 17 lb.-ft. for 1310/1330 U-bolts; 24 lb.-ft. for 1350 U-bolts. (excessive torque can distort bearing cap leading to premature failure). Double check your assembly.
16. Reinstall bellhousing inspection cover and starter.
17. Connect clutch linkage - do not preload mechanical release bearing. Adjust linkage as required, following the method laid out in your Factory Service Manual. If using a SST hydraulic system (available separately), follow instructions provided.

18. Wrap tape around speedometer cable ends to prevent damage and keep them clean while routing new speedometer cable to transmission. Remove rubber plug from the speedometer cable port and install new speedometer cable with gear, clip and O-ring (HWA-PACK S) into transmission case. Install cable retainer bolt and tighten bolt to 4 lb.-ft. Connect cable to speedometer.



The TKO 500 and 600 have provision for electronic speedometer output also. The speed sensor is located on the passenger side of the transmission, directly opposite the mechanical speedometer output. The sensor is a standard two wire GM, sine wave, with 17 pulses per revolution of output shaft, which equates to roughly 33,000 to 60,000 pulses per mile depending on axle ratio and tire size. For reference, a 26" tire with a 3.73 gear will give 49,212 pulses per mile. Please refer to your speedometer's installation instructions or contact the speedometer manufacturer for information on connecting and calibrating your electronic speedometer.

19. The reverse light switch is located on the driver's side of the main case and is a black-bodied switch with (2) studs. The switch is a normally open, non-directional switch that will complete the lighting circuit when the transmission is in reverse. SST has provided a two-wire harness with your kit that will attach to the 5 speed reverse light switch. It can be spliced into your car's wiring harness in place of your original switch that was mounted to your 4 speed shift linkage. The wire pigtail at the very back of the tailhousing is a neutral safety switch. It is a normally open, non-directional switch that will complete the circuit when the transmission is in neutral. The plastic connector may be removed and the neutral safety switch may be spliced in to your starter circuit between the ignition switch and the starter solenoid if you so choose.

REVERSE LIGHT SWITCH



NEUTRAL SAFETY SWITCH



MECHANICAL SPEEDOMETER PORT



ELECTRONIC SPEED SENSOR



20. Tighten exhaust.

21. Reinstall shift tower, making sure it is oriented the same direction as it was originally. Make sure the nylon shifter cup is positioned in the horizontal link so that the splits in the cup are aligned parallel to the clamp.

22. Bolt on shifter handle with 3/8"-24 x 1" bolts and washers provided (HWA-PACK L). Use medium strength thread-lock compound. Torque to 25 lb.-ft. Confirm shifter motion through all gears.

23. Install shifter dust cover using (2) small screws provided and seal around the cover and the vertical seams with Permatex Ultra Grey Sealant or equivalent.

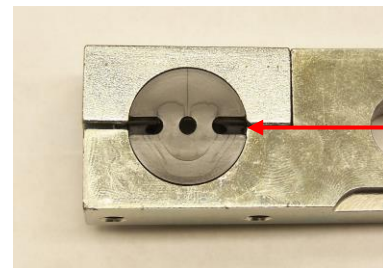
24. Install shifter boot and retainer ring, and/or console if so equipped.

25. Connect tachometer drive cable to distributor (if equipped).

26. Connect throttle linkage to carburetor.

27. Install distributor cap and breather.

28. Reconnect the negative (-) battery cable.



**NYLON
SHIFTER CUP
ORIENTATION**

FINAL INSTALLATION STEPS

1. If you did not fill the transmission with fluid before installation, remove the fill plug on the passenger's side of the transmission and fill with 2 quarts, 20 ounces of transmission fluid, or until fluid runs out of the fill hole with the vehicle level. Reinstall the fill plug after adding fluid.
2. Start engine and allow engine to idle for a few minutes.
3. Check for leaks while warming up.
4. Slowly rev engine in neutral and listen for any unusual sounds or vibration.
5. Shift through all forward gears with the clutch disengaged (clutch pedal depressed).
6. Do not shift into reverse above idle speed; reverse is not synchronized. Shifting into reverse may require shifting into a forward gear first to prevent grinding.
7. Test drive at low speeds and low RPM.
8. Gradually increase engine RPM and vehicle speed.
9. Compare this test drive to the pre-installation test drive.
10. Drive conservatively for the first 500-1000 miles for transmission break-in.
11. If you experience vibration at highway speeds, verify that there is no body contact with the new transmission. If there is no contact, it may be necessary to adjust your driveline angle. Much has been written about driveline angles and how to determine them, and there is a lot of great information available online from multiple websites. If you need further help with your driveline angle, call Silver Sport Transmissions' Customer Service at 888-609-0094.

SPECIFICATIONS AND MAINTENANCE

TREMEC HighPerformance ManualTransmission Fluid is endorsed by Tremec for use in all Tremec brand aftermarket performance transmissions. **GM Synchronesh (part #88900333; formerly part #12345349) or Pennzoil (part #3501), DEXRON/MERCON ATF (non-synthetic), and Mobil 1 ATF are the ONLY other fluids approved by Tremec.** **The use of ANY other fluid will void your warranty.** Silver Sport Transmissions recommends that the fluid be replaced after the first 500-1000 miles of normal driving, and then every 30,000 miles thereafter. It is acceptable to use the less-expensive DEXRON/MERCON fluid for the break-in period and then replace it with the Tremec HP MTF or GM Synchronesh.

FLUID CAPACITY: 2.7 QUARTS (U.S.)

DO NOT EXCEED MAXIMUM INPUT TORQUE:

- TKX: 600 lb.-ft. in 4th gear

GEAR RATIOS:

- TKX Wide Ratio
 - 1ST 3.27
 - 2ND 1.98
 - 3RD 1.34
 - 4TH 1.00
 - 5TH 0.72
- TKX Close Ratio
 - 1ST 2.87
 - 2ND 1.89
 - 3RD 1.28
 - 4TH 1.00
 - 5TH 0.68

(0.81 OPTIONAL)

CONTACT INFORMATION

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SILVER SPORT TRANSMISSIONS IS DEDICATED TO YOUR SATISFACTION AND ENJOYMENT OF THIS PRODUCT. PLEASE SEND US PICTURES OF YOUR CAR ALONG WITH A TESTIMONIAL OF HOW YOU RATE THIS PRODUCT. WE WILL BE POSTING MANY CUSTOMER FEEDBACK LETTERS AND PICTURES ON OUR WEBSITE AND BROCHURES.

ENJOY YOUR SILVER SPORT TRANSMISSION SYSTEM!