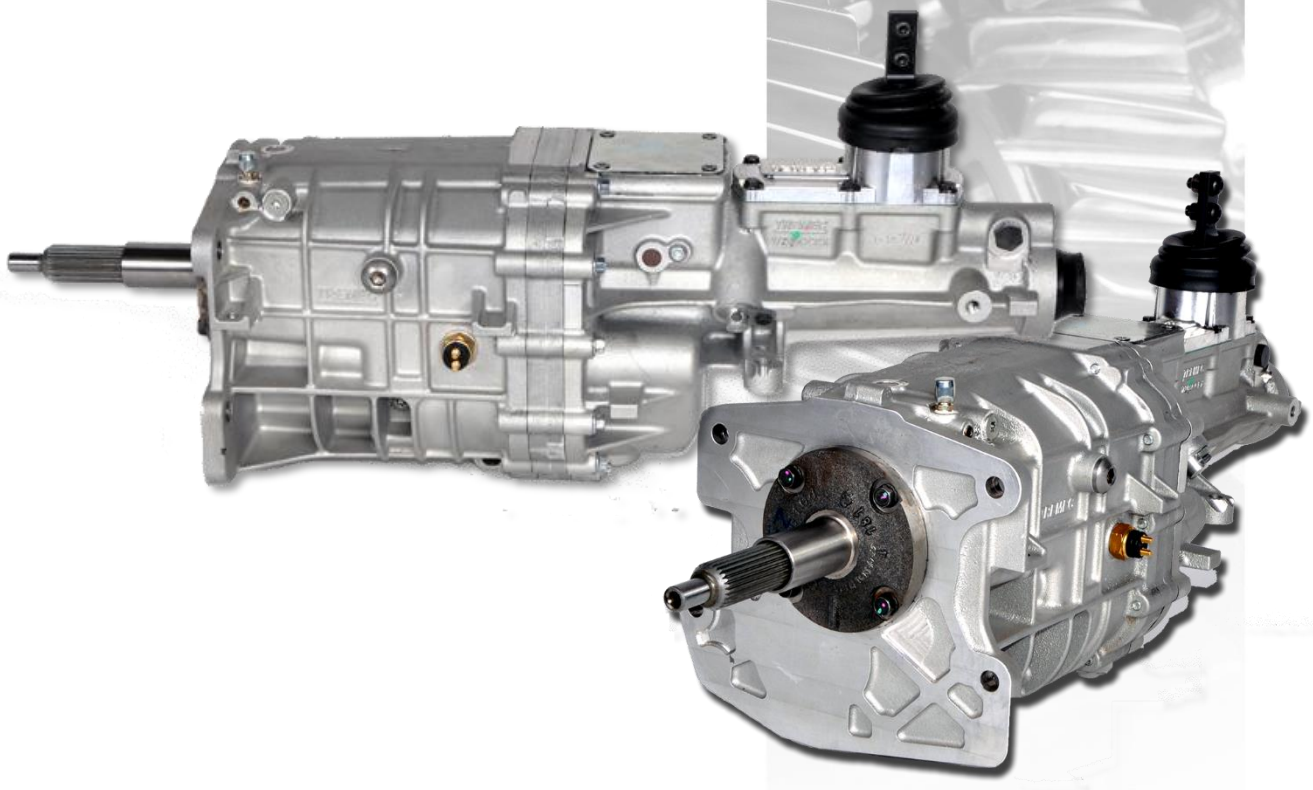
TREMEC®

TKX

5-Speed Rear-Wheel Drive Manual Transmission

Service Manual

SM_TKX_09.2020



46643 Ryan Court | Novi, MI 48377 U.S.A. | +1 (248) 859-6500 | www.tremec.com

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Section 1: General Information

Safety First

Carefully read this service manual before beginning any work on your TREMEC transmission.

Throughout this manual, you will see symbols that warn of potential physical danger or product damage if the accompanying instructions are not followed.

Symbols and Their Meaning

Note the following symbols and their meanings.

Warning.
This symbol indicates a potentially hazardous situation. If the instructions are not followed, the result could be death or serious injury.

Mandatory Action.
This symbol indicates that you must do an activity in order for the transmission to function properly. For example, you must use only one gasket underneath the shift tower. If it is eliminated, or more than one gasket is used, binding can occur. This would prevent proper shifting of the transmission and could damage the unit.

Prohibited.
This symbol indicates that you must **NOT** do something in order to avoid damaging the transmission. For example, you must not use sealant underneath the shift tower. Using sealant underneath the tower will prevent proper interlock functioning and could damage the unit.

Customer Service

Be sure you understand all procedures and instructions in this manual before you begin working on your TREMEC transmission. If you have any questions, contact TREMEC customer service at:

- Email: customer.service@tremec.com
- Toll Free: 1-800-401-9866

Notice

General Safety Precautions Use a hoist whenever lifting the transmission or shaft assemblies. Using a hoist can help prevent muscle strain or other possible injuries.

Always wear safety glasses when working on the transmission to help prevent possible eye injury due to small parts (such as snap rings) or metal chips that may fly up unexpectedly during a tear-down or rebuild.

To avoid injury, be careful when picking up gears or other sharp components. Consider wearing heavy cloth gloves or covering sharp objects with shop towels before picking them up.

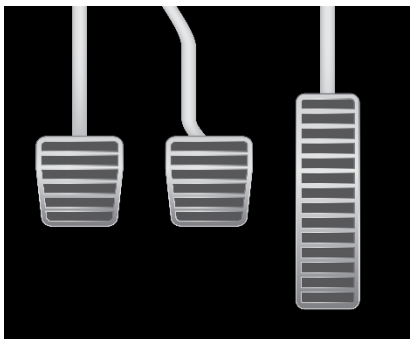
To avoid injury, let the transmission cool down prior to draining the fluid. It is recommended to drain the transmission fluid prior to disassembly of the unit.

Manual Transmission Operation

The love of the manual transmission isn't rational and doesn't need to be. Rowing your own gears enhances driving pleasure because it connects you to a car in a way that an automatic can't.

The key to driving a manual is the simultaneous engagement of the clutch and smooth application of the throttle. The following will provide basic guidelines for driving a vehicle with a manual transmission.

Understand the Different Pedals



A manual transmission requires the driver to shift the gears themselves. It will have three pedals: clutch, brake and accelerator to operate the vehicle.

The clutch pedal is located at the far left and is used when upshifting or downshifting. The clutch is disengaged when the pedal is pushed to the floor.

The middle pedal is the brake. The right pedal is the accelerator. You will use your left foot for the clutch and you right foot for the brake and accelerator.

When you push in the clutch, you are disengaging the drivetrain assembly. When you lift your foot off the clutch pedal, the friction of the assembly starts engaging, causing your vehicle to move.

Learn the Gears

The TREMEC 5-speed TKX manual transmission has five forward gears plus reverse. The gear patterns are clearly marked on the shifter or dashboard.

If the shift position is located in the center, the car will be in neutral - at which point you should be able to easily move the gear shifter back and forth. Neutral is not a gear; it is the absence of a gear.

For most cars, second gear is the workhorse. It will get you up and down steep hills, power you through curves, and gracefully motor you through downtown streets.

Reverse is somewhat different. It has a higher gear ratio than most gears – giving you fast acceleration. It is recommended to not go too far or too fast in this gear.

Fifth gear provides the TKX with a single overdrive. Overdrive is the operation of cruising at a sustained speed - such as highway driving - with reduced engine revolutions per minute (RPMs). Lower RPMs lead to better fuel consumption, lower noise and lower wear on the engine.

When to Shift

Generally, you should up shift gears when the tachometer is around "3" or 3,000 RPMs; down shift when the tachometer is around "1" or 1,000 RPMs. With experience, you will be able to figure out when to best shift by the way your engine sounds and "feels."

Make sure you do not exceed the tachometer redline; this may cause damage to the engine.

Section 1: General Information

Basic Steps to Drive a Manual Transmission

The golden rule of the manual transmission is that shifting begins with the clutch but ends with the gas. The following are basic steps to drive a stick shift.

Getting Started

The shift pattern shows you the location of each gear and the order to move through as you accelerate and decelerate. First gear is the lowest gear and is used for starting from rest.

- Put the shifter into the neutral position. Place your right foot firmly on the brake pedal and fully depress the clutch with your left foot.
- Turn the ignition key or press the starter button. (If you're not holding the clutch pedal fully down, a neutral-safety switch might not allow the starter to be activated.)
- With the clutch depressed and the car now running, move the shift lever into the first-gear position in the shift gate. Check the area immediately in front of the car for vehicles, objects, and pedestrians, then release the parking brake.
- Very smoothly and slowly, lift your left foot until you feel the car just begin to move. At the point the car starts to inch forward, stop any movement of your left (clutch) foot. Simultaneously slide your right foot off the brake and onto the throttle pedal (to the right), bringing engine speed up a bit.
- Feel the car edge forward. As it does, release a little pressure from the clutch. At this point, you will be hardly moving.
- Finally, lift fully off the clutch pedal and slowly step into the throttle pedal. The car should be picking up speed. If it shudders to a stop and the engine shuts off, you've stalled. Put the shift lever back in neutral and start over again with more focus on a smooth application of throttle and more gradual clutch-pedal release. This coordination is essential to flawless shifting – regardless if up-shifting or down-shifting your vehicle.

Know When to Change Gears

Gear Change	Approx. Speed	Tachometer RPM
Upshifting		
1st – 2nd	15 mph	2,000 – 3,000
2nd – 3rd	25 mph	2,500 – 3,500
3rd – 4th	40 mph	2,500 – 3,500
4th – 5th	50 mph	2,500 – 3,500
Downshifting		
5th – 4th	40 mph	2,000
4th – 3rd	30 mph	2,000
3rd – 2nd	20 mph	2,000
2nd – 1st	10 mph	1,500

- When it is time to shift into second gear, lift your foot off the throttle while simultaneously stepping down fully on the clutch pedal. As the car coasts, move the shift lever from the first-gear position to the second-gear position. Release the clutch pedal slowly while gently stepping back into the throttle pedal.
- Higher road speeds are attained by moving up sequentially through the gears. Each time a higher gear is required, lift off the gas, step down on the clutch, and move the lever to the next higher gear. If your car's acceleration seems "bogged down," you needed to be in the previous gear a bit longer. You'll get the feel for which gear you should be in at a given speed; the engine's sound and the amount of acceleration the car is delivering will guide you.

Stopping

- To slow down or stop, apply the brake pedal smoothly. To stop fully, you must push the clutch all the way in as the car gets below about 5 mph, or the engine will stall. At a stop, it's a good idea to slide the shift lever into neutral and keep the foot brake applied.

Parking

- For parking, you'll need to be able to access reverse. Don't try reversing and parking until you've mastered creeping ahead in first gear from rest, as you'll need to perform the same slow-creep operation while backing up.
- To park the car safely, put the shifter into first or reverse and apply the parking brake.

Important Notice

To locate and correct transmission issues, a systematic procedure should be followed.

Road test whenever possible. Technicians usually get second or third-hand reports of trouble experienced with the transmission. These reports do not always accurately describe the actual conditions.

Symptoms may indicate trouble in the transmission, while actually the problem may be with the axle, driveshaft, universal joints, engine, or clutch. This is especially true of noise complaints. Before removing the transmission to diagnose an issue, road test to check the possibility of trouble in other closely associated components.

Road testing is most effective when the technician drives the vehicle. However, riding with the driver can be very informative.

Check Functioning Prior to Disassembly

If a remote shift control is used, a careful check of the remote and connecting linkages (and their adjustment) must be made. The remote unit must be in good working order if the transmission is expected to shift properly.

Inspect Thoroughly During Disassembly

As the transmission is disassembled, inspect each part to ensure that it is not worn, damaged or no longer meets factory specifications. After the transmission is completely disassembled, check the lubricant for foreign particles. This is a source of trouble often overlooked during the disassembly.

Repair or Replace Worn Parts

All parts and components should be carefully examined. All parts that are damaged, worn or no longer meet specification should be replaced.

Parts that are worn to the extent that they do not have a long service life remaining should be replaced. Replacing these parts now will avoid another teardown in the near future.

Making the recommended changes or modifications will bring the transmission up to date and increase the service life of the unit.

Before You Start

Read this section before starting the detailed disassembly procedures. Follow procedures closely.

Rebuild Facilities

A suitable holding fixture or overhaul stand with a hole for the input shaft is desirable.

For easier working conditions, table height should be 28 - 30 inches.

Cleanliness

Transmissions should be steam cleaned prior to disassembly. Seal all openings before steam cleaning to prevent entry of dirt and water which can damage serviceable parts.

Dirt is abrasive and will cause premature wear of bearings and other parts. TREMEC suggests that technicians have a wash tank available to clean parts just prior to reassembly.

Section 1: General Information

Bearings
When a transmission is removed at relatively low mileage, bearings should be removed with pullers designed for this purpose. Wrap the bearings to keep out dirt. Clean, inspect, and lubricate all bearings just prior to reassembly. If accumulated mileage is over 150,000 miles, we suggest that all bearings be replaced. If bearings are worn or damaged, always replace them regardless of mileage.

Do not hammer on end yokes and flanges to remove or install them. It is not only destructive to the yoke or the flange itself, but can also cause serious internal transmission damage.

Hammering destroys or mutilates the pilot diameters and warps or bends the flange. Hammering on end yokes will close-in the bearing bores or misalign yoke lugs. This will result in early failures of journal needle bearings.

Serious damage can be done internally to bearings, thrust faces and washers by hammering on external parts. In most designs, when the yoke/flange locknuts are tightened and secure, the internal bearings and gears are in proper location. When the yoke/flange is driven on the shaft, however, two conditions can exist.

(1) If the bearing fit is tight on the shaft, usually the bearings will brinell as they must absorb the pounding force.
(2) If the bearing fit is loose, the shaft will keep moving inward until it is stopped by the internal parts such as the pilot bearing thrust washers.

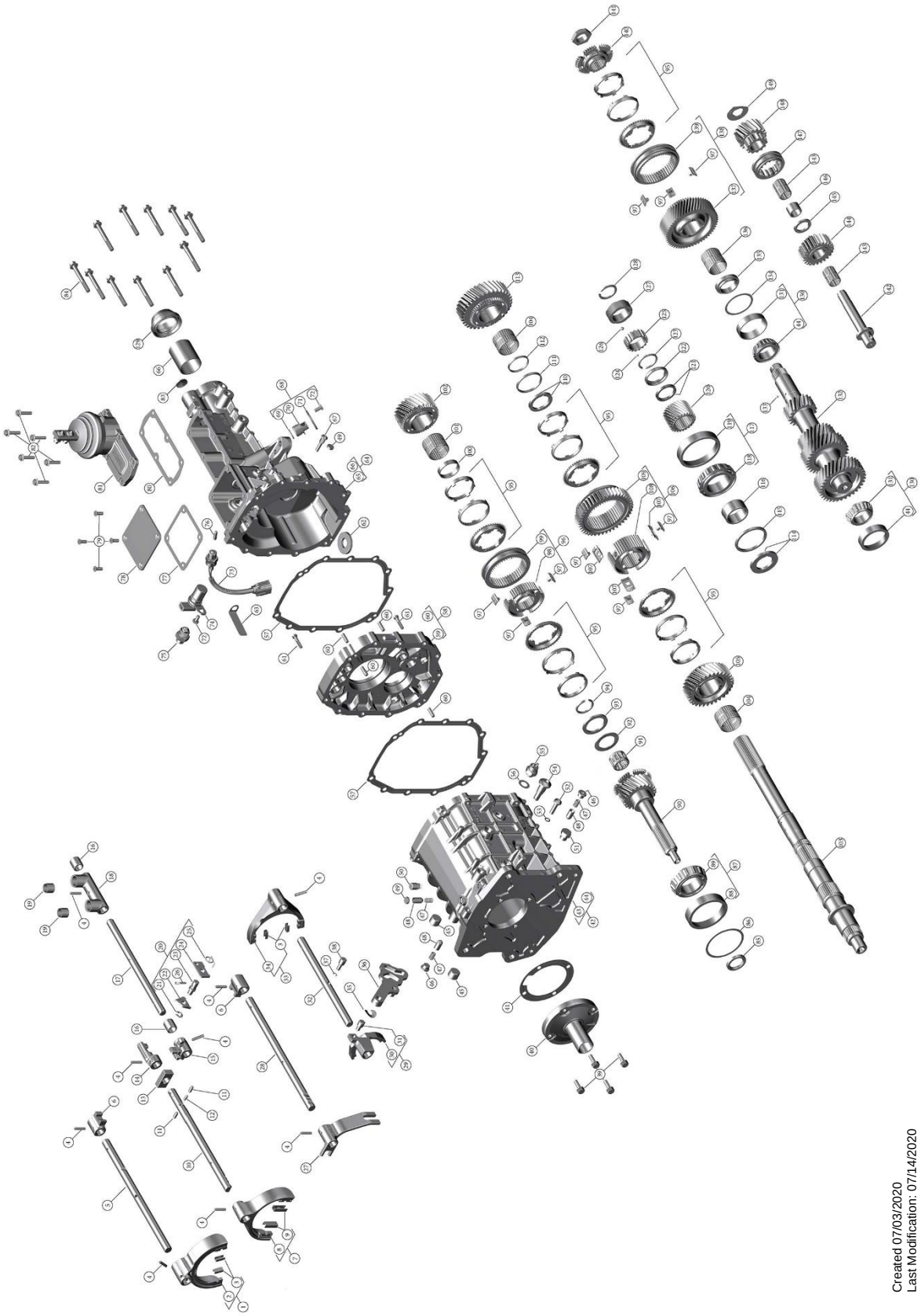
These conditions must be prevented.

Tools
In addition to a regular mechanics toolset, you will need the following specialty tools:

1. Hydraulic press. Available at local tool supply company
2. Snap-ring plier set. There are a few different snap ring sizes and styles that hold everything together so having a full set is a must
3. Bearing splitter (puller). Available at local tool supply company
4. Punch set. The shift arm, shift fork, and other pieces are held on with roll pins that need a good punch set to hammer them out.
5. T-40 Torx Bit
6. Gear puller with extended arms
7. Transmission jack
8. Five-foot (or larger) table to lay everything out and keep it organized
9. Rubber mallet
10. Feeler gauges

This guide assumes that the operator has the knowledge and capability to put the car on jack stands, remove the rear cradle, the differential, and subsequently remove the transmission.

TKX 5-Speed Manual Transmission Disassembled View



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Section 2: Specifications

Legend for TKX 5-Speed Manual Transmission Disassembled View

ITEM	QTY.	PART NAME	PART NUMBER
1	1	SHIFT FORK 1ST-2ND ASSY	TCEC17270
2	1	SHIFT FORK 1ST-2ND	TCHR17251
3	4	FORK INSERT	TCNS4240
4	9	PIN SLOTTED SPRING	1000-043-016
5	1	SHIFT RAIL 1ST-2ND	TCBR17252
6	2	GATE 1ST-2ND & 5TH-REV	TCTP17247
7	1	SHIFT FORK 3RD-4TH ASSY	TCEC17271
8	1	SHIFT FORK 3RD-4TH	TCHR17250
9	2	FORK INSERT	1386-235-001
10	1	SHIFT RAIL 3RD-4TH	TCBR17815
11	2	PLUNGER TRANS. SHIFTER INTERLOCK	2604895
12	1	INTERLOCK PIN	2604832
13	1	INTERLOCK PLATE	TCPT17263
14	1	GATE 3RD-4TH	TCTP17584
15	1	SELECTOR ARM	TCTP17246
16	2	LINEAR BEARING	TUBA7952
17	1	SELECTOR RAIL	TCBR17579
18	1	SELECTOR SEAT	TCTP4257
19	2	BUSHING, SHIFT LEVER SOCKET	2606246
20	1	INHIBITOR ASSY	TCEC17259
21	1	E-CLIP	7238695
22	1	REVERSE INHIBITOR	7238515
23	1	INHIBITOR RAIL	TCBR17260
24	1	INHIBITOR PLATE	TCPT17261
25	1	REVERSE INHIBITOR SPRING	7238635
26	1	SET SCREW-INTERNAL HEX W/DOG PT	6501092
27	1	LEVER - TRANS. REV GEAR SHIFT RELAY	TCLE17248
28	1	SHIFT RAIL 5TH-REV	TCBR17249
29	1	REVERSE FORK ASSY	2606216
30	1	REVERSE FORK	2606215
31	1	REVERSE FORK PIN	2606297
32	1	SHIFT RAIL 5TH	TCBR17444
33	1	SHIFT FORK 5TH ASSY	TCEC17811
34	1	SHIFT FORK 5TH	TCHR17810
35	1	CLIP, WAVE "E"	2603965
36	1	LEVER - TRANS. REVERSE-O.D.	2605948
37	1	CIRCLIP	TCMS17460
38	1	BLOCKER PIN	TCPE17461
39	4	BOLT, FRONT BEARING RETAINER	2603968
41	1	GASKET - CASE-RETAINER	TCSJ17420
44	2	BEARING CUP	BEA0483F
45	2	SOCKET HEAD PIPE PLUG	1300-052-007
46	2	WAFER HEAD MACHINE SCREW	TCTA1304
47	3	SPRING DETENT	TCRE17486
48	3	BALL POPPET	TCPE8862
49	2	COVER SEAL	SEA0232F
50	1	VENT ASSEMBLY	TCMS13804
51	1	CAP-HEX FLANGE BOLT	TUTN7205
52	1	SOCKET HEAD SCREW	BOL3534F
53	1	O-RING	TCSJ16927
54	1	PIN, PIVOT-REVERSE	2604720
55	1	REVERSE SWITCH	2606249
56	1	GASKET BACK UP LAMP SWITCH	2605032
57	2	SEALING GASKET	TCSJ17415
58	1	INTERMEDIATE PLATE ASSY	TCEP17266
59	1	INTERMEDIATE PLATE	TCPA17266
60	4	DOWEL PIN	141199
61	2	SOCKET HEAD CAP SCREW	TCTN17465
62	1	MAGNET.	2602631
63	1	IDENTIFICATION TAG	2604737
66	1	BUSHING EXTENSION	1386-127-003
67	1	RETAINER PIN	1386-183-003
68	1	PLUG KIT	30-360-1X
69	1	O-RING	30-463-10
70	1	SPEEDOMETER PLUG	30-39-1
71	1	RETAINER	30-360-1
72	2	SCREW	30-443-1

ITEM	QTY.	PART NAME	PART NAME
73	1	NEUTRAL SWITCH	1300-140-004
75	1	INTERLOCK PIN	TUTN11627
76	1	PLUNGER	TCPE17594
77	1	GASKET - SELECTOR COVER	TCSJ17417
78	1	COVER PLATE	TCPT17564
79	4	SOCKET CSK SCREW	BOL0944F
80	1	GASKET - SHIFTER	TCSJ17418
81	1	SHIFTER TURRET ASSY	TCEC17468
82	6	CONTROL TOWER BOLT	TCTN0620
83	1	PLUG REAR EXTENSION	12F000015
84	11	BOLT HEX. FLANGE HEAD	TCTN17406
85	1	SEAL ASSY TRANS. INPUT SHAFT OIL	2603865
86	A/R	SHIMS-INPUT SHAFT FRONT BRG	TCMS17595
		TCMS17596, TCMS17597, TCMS17598, TCMS17599, TCMS17600,	
		TCMS17601, TCMS17602, TCMS17603, TCMS17604, TCMS18069	
87	1	ASSY, BEARING-INPUT SHAFT TO CASE	2606064
88	1	BEARING CUP-INPUT SHAFT TO CASE	2606065
89	1	BEARING,CONE	2605686
91	1	NEEDLE ROLLER BEARING	TCBA11182
92	1	NEEDLE ROLLER THRUST	TCBA11183
93	1	THRUST WHASER	TCRA11214
94	1	SNAP RING	1386-139-001
95	5	DOUBLE CONE SYSTEM 67.5 mm HYBRID	TUES13926
96	1	SYNCH ASSY 3RD-4TH	TCES10944
97	9	STRUT (1ST-2ND, 3RD-4TH & 5TH)	TUNS5793
98	1	HUB SYNCHRO 3RD-4TH	TUMZ6059
99	1	SLEEVE SYNC. 3RD- 4TH	TCCL11338
100	1	SPACER BEARING 3RD	TCSP17856
101	1	NEEDLE BEARING	BEA0398F
102	1	3RD SPEED GEAR ASSY	TCEE17808
104	2	NEEDLE BEARING	BEA0491F
105	1	2ND SPEED GEAR ASSY	TCEE17783
106	1	SYNCH. ASSY 1ST-2ND	TCES17458
107	3	SYNCHRO INSERT 1ST-2ND	TCNS10957
108	1	HUB SYNCHRO 1ST-2ND	TCMZ17456
109	1	1ST-2ND AND REV GEAR SLIDING	TCCL17466
110	2	SPLIT WASHER 1ST	TCRA17809
111	1	ENCLOSURE RING - SPLIT WASHER 1ST	TCRA17812
112	1	SPACER BEARING 1ST	TCSP17855
114	2	SPLIT WASHER - TAPER BEARING	TCRA17851
115	1	ENCLOSURE RING - TAPER BEARING SPLIT	TCRA17852
116	1	BUSHING - TAPER BEARING	TCSP17853
117	1	ASSY, BEARING-MAIN SHAFT TO CASE	2605700
118	1	BEARING,CONE	2605706
119	1	BEARING CUP- MAIN SHAFT TO CASE	2605701
121	2	SPLIT WASHER 5TH	SPA0128F
122	1	ENCLOSURE RING - SPLIT WASHER 5TH	TCRA17857
123	1	SNAP RING	TCMS0660
128	1	RING - RETAINING	2604502
129	1	OIL SEAL	TCSJ1277
130	2	TAPERED ROLLER BEARING ASSY	BEA0480F
131	2	BEARING, CONE	BEA0481F
133	1	CARBON STEEL BALL	TCER1252
134	A/R	SHIMS-COUNTER SHAFT FRONT BRG	MST1940F
		MST1941F, MST1942F, MST1943F, MST1944F, MST1945F, MST1946F	
		MST1947F, MST1948F	
135	1	THRUST WASHER	TCRA17448
136	1	5TH GEAR NEEDLE BEARING	TCBA17459.
139	1	SLEEVE 5TH	TCCL17446
140	1	CLUTCH 5TH	TCCN17443
141	1	NUT	TDTU1685
142	1	REVERSE SHAFT	TCBR17257
143	2	REV. NEEDLE ROLLER BEARING	TCBA17269
144	1	REVERSE GEAR	TCEN17256
145	1	WASHER TRANS REV. GEAR THRUST	2605795
146	1	SPACER BEARING REV.	TCSP17410
147	1	SLEEVE-TRANS. REVERSE.	2605800
149	1	WASHER-TRANS REV. IDLER GEAR THRUST	2603695

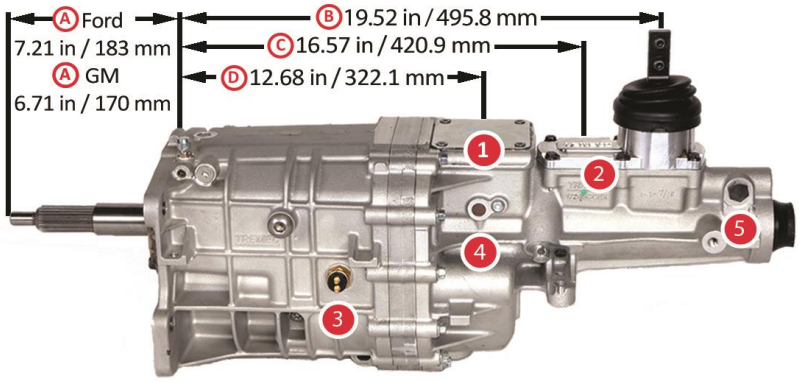
VARIABLE PARTS			Transmsission Assembly						
			TCET18086 FORD	TCET18083 GM	TCET18084 FORD	TCET17722 GM	TCET17765 FORD	TCET17805 GM	TCET18085 FORD
ITEM	QTY.	PART NAME	PART NUMBER						
40	1	BEARING RETAINER INPUT SHAFT	2606243	TCRB0131	2606243	TCRB0131	2606243	TCRB0131	2606243
42	1	CASE TRANSMISSION ASSY	TCEP17746	TCEP17264	TCEP17746	TCEP17264	TCEP17746	TCEP17264	TCEP17746
43	1	CASE TRANSMISSION	TCCA17746	TCCA17264	TCCA17746	TCCA17264	TCCA17746	TCCA17264	TCCA17746
64	1	EXTENSION HOUSING ASSY	TCEP17750	TCEP17265	TCEP17750	TCEP17265	TCEP17750	TCEP17265	TCEP17750
65	1	EXTENSION HOUSING	TCEX17750	TCEX17265	TCEX17750	TCEX17265	TCEX17750	TCEX17265	TCEX17750
74	1	SPEED SENSOR	4400-640-019	TNSW1137	4400-640-019	TNSW1137	4400-640-019	TNSW1137	4400-640-019
90	1	INPUT SHAFT	TCFM18027	TCFM17956	TCFM17409	TCFM17802	TCFM17409	TCFM17802	TCFM18025
103	1	MAIN SHAFT	TCFP18019	TCFP17849	TCFP18019	TCFP17849	TCFP18019	TCFP17849	TCFP18019
113	1	1ST SPEED GEAR ASSY	TCEE18030	TCEE18030	TCEE17774	TCEE17774	TCEE17774	TCEE17774	TCEE18030
120	1	GEAR 5TH SPEED DRIVEN	TCEN17801	TCEN17801	TCEN18018	TCEN18018	TCEN17801	TCEN17801	TCEN17801
124	1	CARBON STEEL BALL	10J000008	TCER1252	10J000008	TCER1252	10J000008	TCER1252	10J000008
125	1	ROTOR, SPEEDOMETER	TCEV1276	TCEV5065	TCEV1276	TCEV5065	TCEV1276	TCEV5065	TCEV1276
126	1	CARBON STEEL BALL	10J000008	10J000008	10J000008	10J000008	10J000008	10J000008	10J000008
127	1	GEAR - SPEEDOMETER DRIVE	TCEV4259	2601215	TCEV4259	2601215	TCEV4259	2601215	TCEV4259
132	1	COUNTER SHAFT	TCCF17952	TCCF17952	TCCF17768	TCCF17768	TCCF17768	TCCF17768	TCCF17952
137	1	5TH SPEED GEAR ASSY	TCEE17806	TCEE17806	TCEE17724	TCEE17724	TCEE17806	TCEE17806	TCEE17806
138	1	SYNCH. ASSY 5TH	TCES17807	TCES17807	TCES17726	TCES17726	TCES17807	TCES17807	TCES17807
148	1	REVERSE IDLE GEAR	TCEN18029	TCEN18029	TCEN17255	TCEN17255	TCEN17255	TCEN17255	TCEN18029

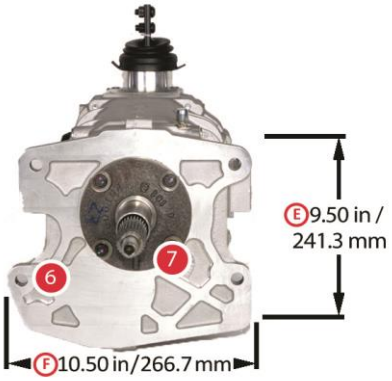
Section 2: Specifications

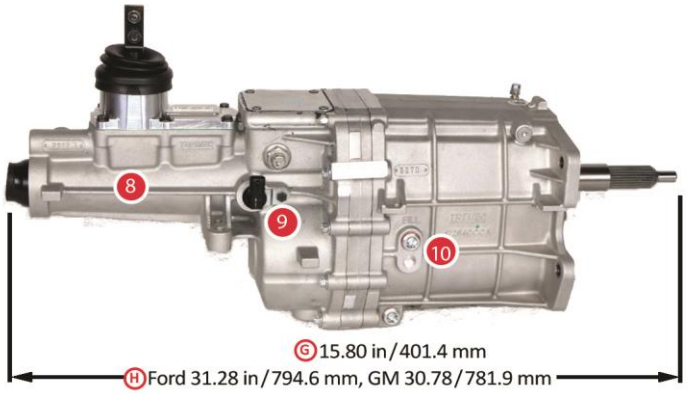
Features and Dimensions

1. Forward shift provision. Requires use of separate ‘forward’ conversion shifter assembly. Not included.
2. Standard reversible rear shifter. Custom offset shifters to achieve factory shift hand positions - available through TREMEC dealers.
3. Reverse light switch.
4. Mechanical speedometer output.
5. Neutral safety switch.
6. Ford or GM-style 4-speed bolt pattern.
7. Common mechanical clutch release bearing retainer. Can be converted to hydraulic clutch release using aftermarket systems - available through TREMEC dealers.
8. Torque-arm mount.
9. Electronic speedometer output.
10. Fluid drain and spill ports.
11. Slip yoke output.
12. Transmission mount location.

A. Input shaft length from front face of transmission.
B. Standard shifter location from front face of transmission.
C. Optional shifter location from front face of transmission.
D. Optional shifter location from front face of trans. Requires use of separate ‘forward’ conversion shifter assembly. Not included.
E. Height at transmission face.
F. Width at transmission face.
G. Trans mount pad from front face of transmission.
H. Overall length.
I. Trans mount pad to main shaft centerline.







Section 2: Specifications

Quick Specs

Forward Gears	5
Shifter Positions	3
Torque Capacity	Up to 600 lb-ft / 814 N-m
Max Rated RPM	6200
Overdrive	Single
Output Splines	31
Release Type	Mechanical
Speedo Output	Mechanical and Electronic
Dry Weight	99 lbs / 50 kg
Fluid Capacity	2.7 quart / 2.6 liter

Available Models

Part Number	Style	Torque Rating	Input Spline	Gear Ratios					
				1st	2nd	3rd	4th	5th	R
TCET18086	Ford	600 lb-ft	10	3.27	1.98	1.34	1.00	0.72	3.00
TCET18084	Ford	600 lb-ft	26	2.87	1.89	1.28	1.00	0.81	2.56
TCET17765	Ford	600 lb-ft	26	2.87	1.89	1.28	1.00	0.68	2.56
TCET18085	Ford	600 lb-ft	26	3.27	1.98	1.34	1.00	0.72	3.00
TCET18083	GM	600 lb-ft	26	3.27	1.98	1.34	1.00	0.72	3.00
TCET17722	GM	600 lb-ft	26	2.87	1.89	1.28	1.00	0.81	2.56
TCET17805	GM	600 lb-ft	26	2.87	1.89	1.28	1.00	0.68	2.56

Lubrication Specifications

For all TKX 5-speed models, TREMEC recommends TREMEC High Performance Manual Transmission Fluid (HP-MTF™), GM Synchromesh™ or Mobil 1 Synthetic ATF. Fluid capacity is 2.7 quart / 2.6 liter.

California Proposition 65 Warning

This product can expose you to chemicals, including 2-Ethoxyethanol, Methyl 1 Isobutyl Ketone, and Ethyl Acrylate which are known to the State of California to cause cancer, birth defects or other reproductive harm.
For more information, visit the California Office of Environmental Health Hazard Assessment website at: California proposition 65 (https://www.p65warnings.ca.gov/)

Fastener Tightening Specifications

Bolt Torque (Dry Thread)				
No.*	**Bolt**	**Description**	**Torque**	
A	5/16-18	Bearing Retainer	12-16 lb-ft	16-18 N-m
B	M8 X 1.25	Extension Housing	24-30 lb-ft	32-40 N-m
C	1/2-14 NPTF Pipe Thread	Fill & Drain Plugs	15-25 lb-ft	20-33 N-m
D	9/16-18	Oil Cooler Bolt	11-18 lb-ft	14-25 N-m
E	9/16-18	Reverse Lights	12-16 lb-ft	16-18 N-m
F	M6 X 1.0	Shifter	6-11 lb-ft	8-14 N-m
G	1/8-27 PTF	Breather Cap	11-16 lb-ft	14-18 N-m
H	M16 X 1.5	5th and Reverse Selector Arm	25-40 lb-ft	33-54 N-m
I	1/4-20-UNC	Electronic Speedometer	4-6 lb-ft	5-8 N-m
J	1/4-20-UNC	Mechanical Speedometer	4-6 lb-ft	5-8 N-m
K	M20 X 1.5	Shift Lug Detent	25-35 lb-ft	33-47 N-m
L	M10 X 1.5	Reverse Inhibitor	15-25 lb-ft	20-33 N-m
M	M16 X 1.5	Neutral Sensing Switch	12-16 lb-ft	16-18 N-m
N	M6 X 1.0	Inspection Cover Bolts	5-6 lb-ft	6-8 N-m
O	1/2-20-UNF	Shift Rail Detents	15-25 lb-ft	20-33 N-m
P	M8 X 1.25	Reverse Idler	16-20 lb-ft	22-27 N-m

** See Disassembled Parts Illustration/Legend*

Shimming Specifications

Description	Shim to Attain
Input Shaft / Mainshaft Shim	Endplay of 0.001 to 0.005 inch (0.0254 to 0.127 mm)
Countershaft Shim	Preload of 0.001 to 0.005 inch (0.0254 to 0.127 mm)

Section 2: Specifications

TREMEC Limited Warranty

WHAT IS COVERED:

TREMEC components and equipment (the “Product”) are covered under a Limited Warranty for 12 months from date of invoice purchase with unlimited mileage allowed during those 12 months. TREMEC will repair or replace, at its sole option, any TREMEC Product that upon inspection is found to have defective materials or workmanship. TREMEC may use new or refurbished parts for replacement. TREMEC Warranty is valid to the original End User and may be transferred to subsequent owners.

WHAT IS NOT COVERED:

TREMEC Warranty does not cover any components or equipment that are not produced or sold by TREMEC. Examples include but are not limited to clutch, flywheel, non-TREMEC shifter, and driveshaft. This warranty also does not cover the costs of any work or repairs that might be caused by use or installation of any parts from any manufacturer besides TREMEC.

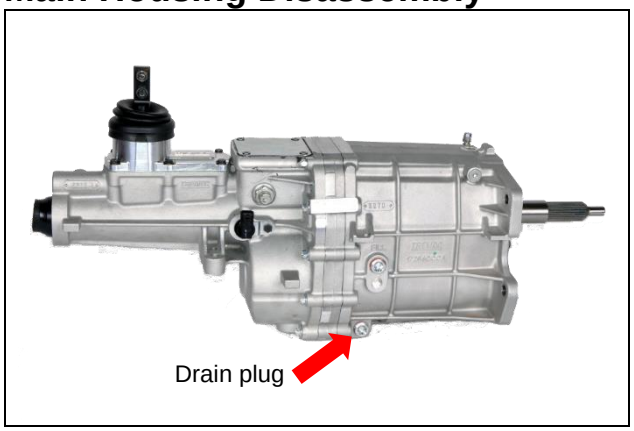
TREMEC Warranty does not cover the costs of damage or conditions caused by fire or accident; by abuse, negligence, or misuse (including but not limited to: overloading or racing the vehicle); by improper installation, modifications not authorized by TREMEC, insufficient maintenance; or damage caused by road salt or other corrosive materials.

TREMEC Warranty does not cover Product installed on a vehicle used for racing or competition, nor does it cover repairs of any damage or conditions caused by racing or competition. TREMEC Warranty does not cover the costs of repairing or replacing any Product or part due to damage caused by poor or improper maintenance, or the use of oils, lubricants or fluids of a type other than those recommended by TREMEC for your specific model of Transmission.

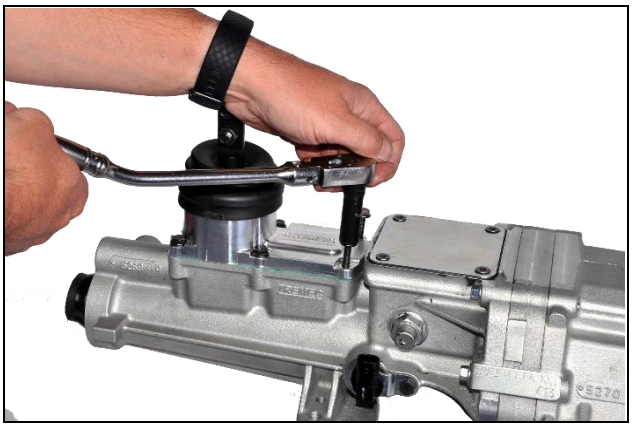
TREMEC Warranty does not cover the costs of repairing damage caused by environmental factors or Acts of God. “Environmental factors” include, but are not limited to, chemicals, salt, and road hazards. “Acts of God” include, but are not limited to, floods, lightning, tornadoes, sandstorms and earthquakes.

To the extent allowed under applicable law, TREMEC Warranty does NOT cover any incidental or consequential damages connected with the failure of the TREMEC Product under warranty. Such damages include but are not limited to lost time; inconvenience; loss of the use of your vehicle; cost of rental vehicles; fuel; telephone; travel or lodging; loss of personal or commercial property; or the loss of revenue.

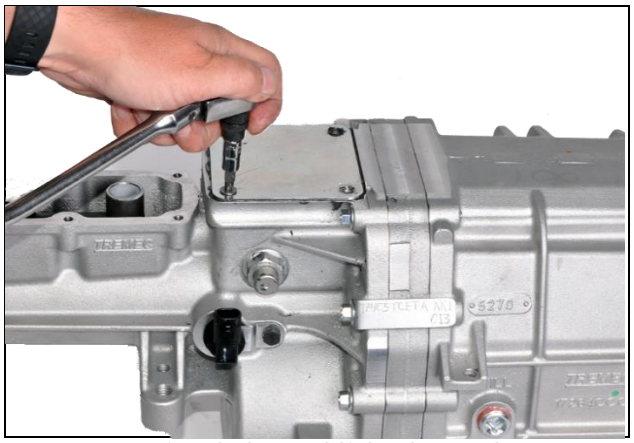
Main Housing Disassembly



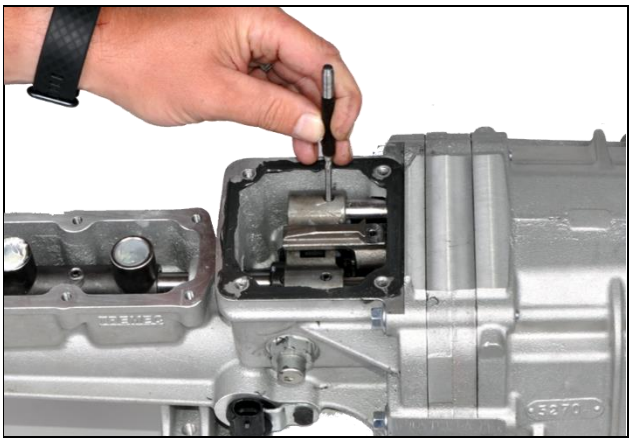
3.1: Start tear down by setting transmission on a sturdy bench
3.2: Drain transmission fluid



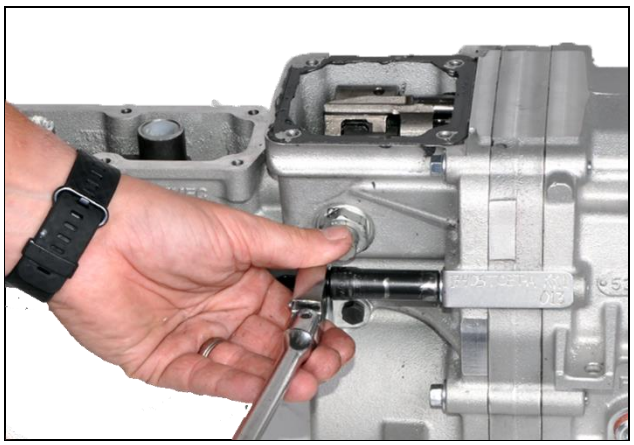
3.3: Remove six shift housing mounting bolts
3.4: Remove shift housing gasket



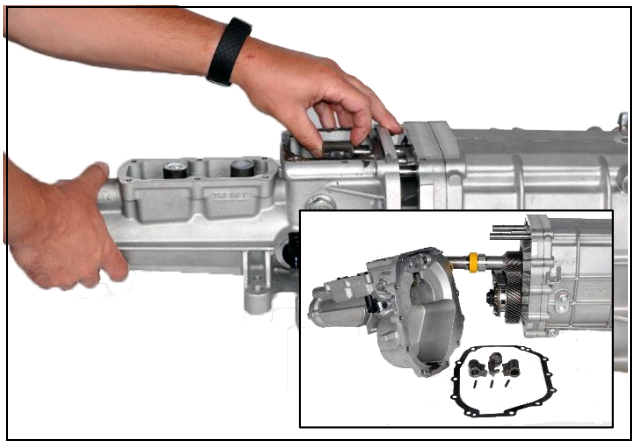
3.5: Remove four bolts to shift lug inspection cover
3.6: Remove shift lug inspection cover



3.7: Use a pin punch to remove three roll pins holding the shift lugs

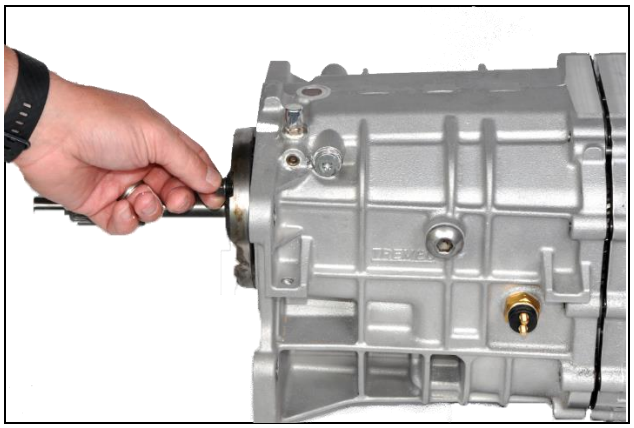


3.8: Remove 11 extension housing-to-transmission case retaining bolts

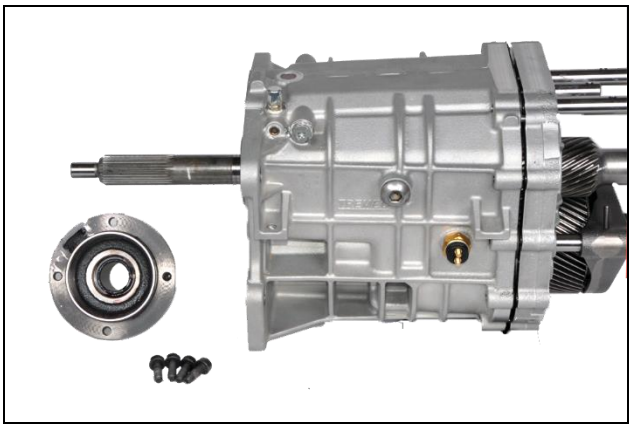


3.9: Remove extension housing
3.10: Remove shift lugs
3.11: Remove extension housing gasket

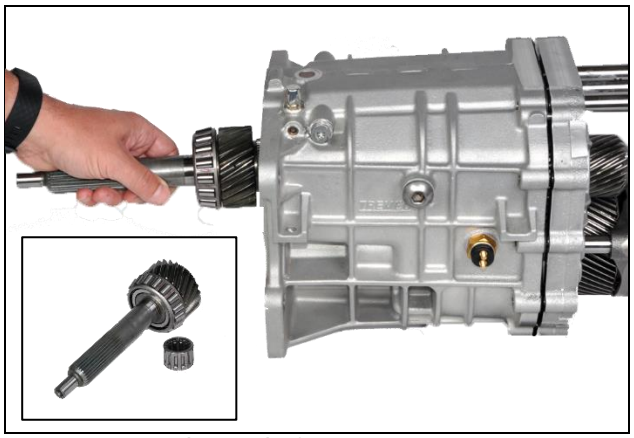
Section 3: Main Housing Disassembly



3.12: Remove four front bearing retainer bolts



3.13: Remove front bearing retainer



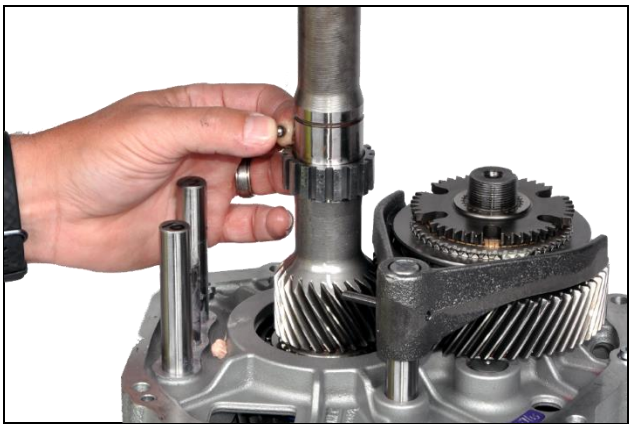
3.14: Remove input shaft
3.15: Remove input shaft pocket bearing

3.16: Position transmission in vertical position to access rear
3.17: Remove 5th gear locking nut (unstake nut from shaft)

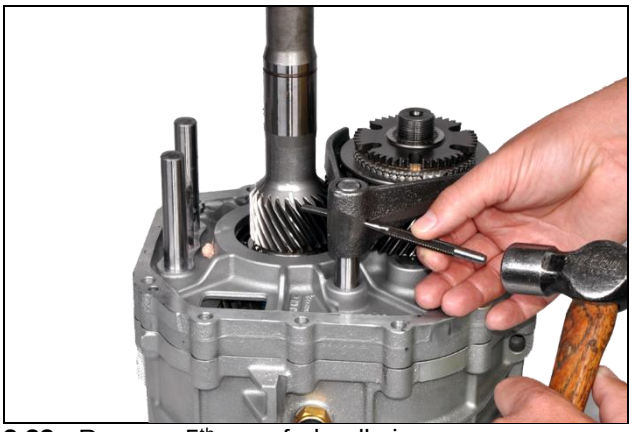
3.18: Remove speedometer gear snap ring

3.19: Remove mechanical speedometer gear
3.20: Remove steel locking ball

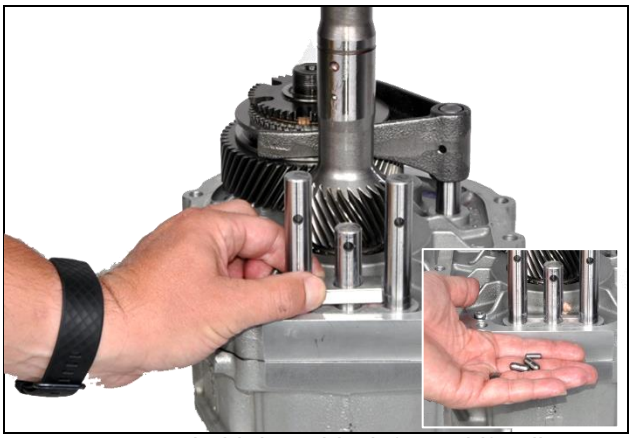
Section 3: Main Housing Disassembly



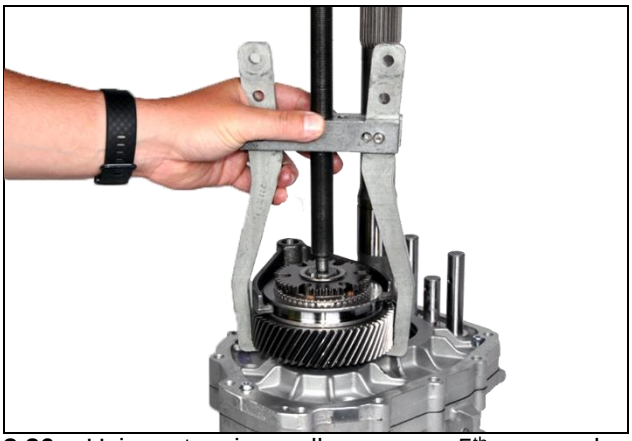
3.21: Remove electronic speedometer gear
3.22: Remove steel locking balls



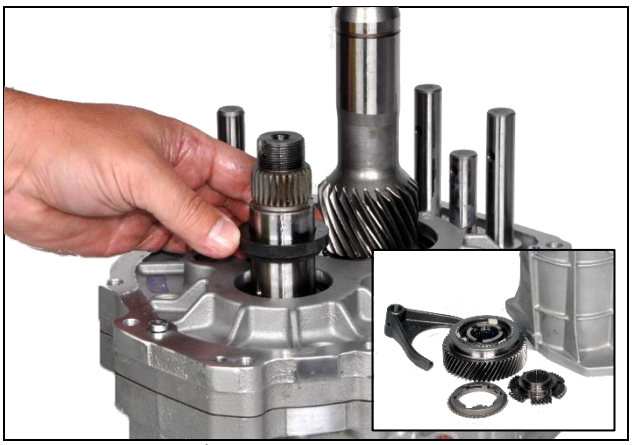
3.23: Remove 5th gear fork roll pin



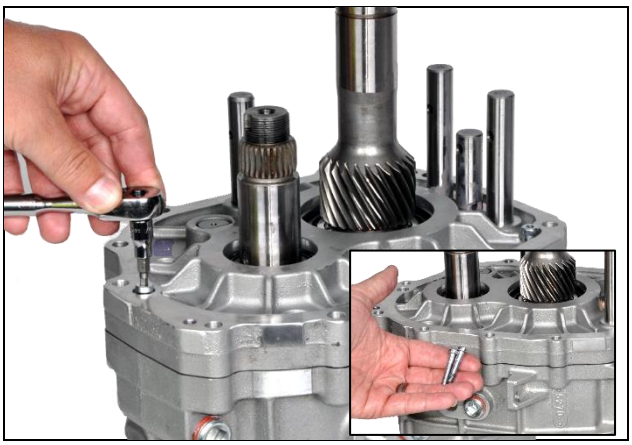
3.24: Remove hold down block from shift rails
3.25: Remove three shift rail locking pins from shift rails



3.26: Using a two-jaw puller, remove 5th gear and synchronizer assembly

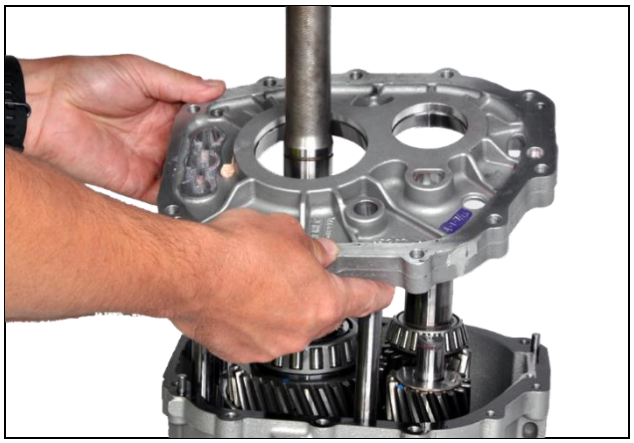


3.27: Remove 5th gear thrust washer
3.28: Remove steel locking ball under thrust washer

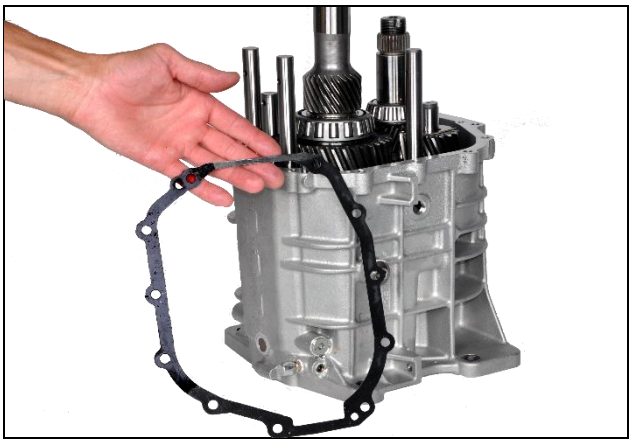


3.29: Remove two mid-plate retaining screws

Section 3: Main Housing Disassembly

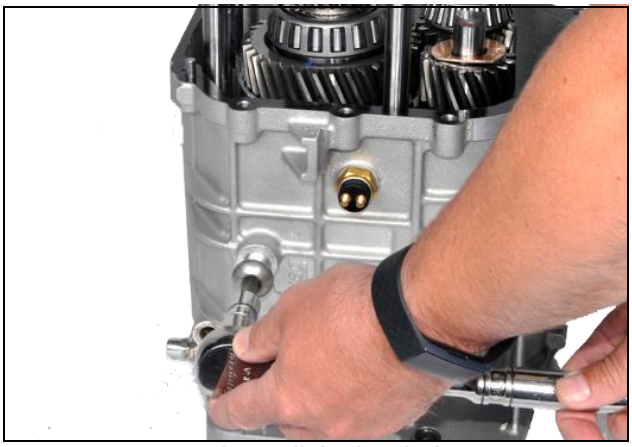


3.30: Remove mid-plate from main case



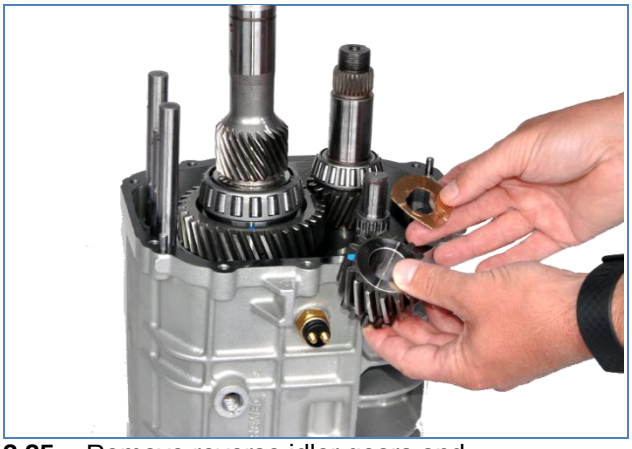
3.31: Remove extension housing gasket

3.32: Remove snap ring from 5th reverse selector link inside main case



3.33: Remove selector link pivot bolt

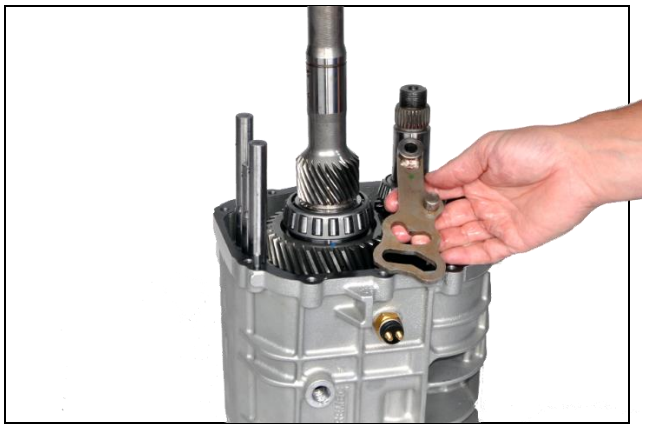
3.34: Rotate 5th reverse shift rail counter clockwise and remove from case



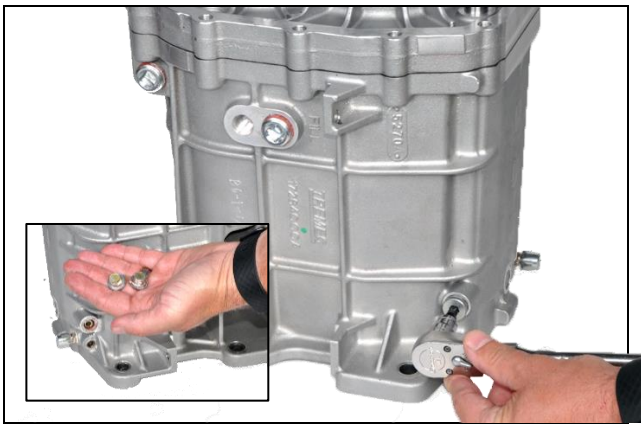
3.35: Remove reverse idler gears and synchronizer from case

3.36: Remove idler gear bearings from rail

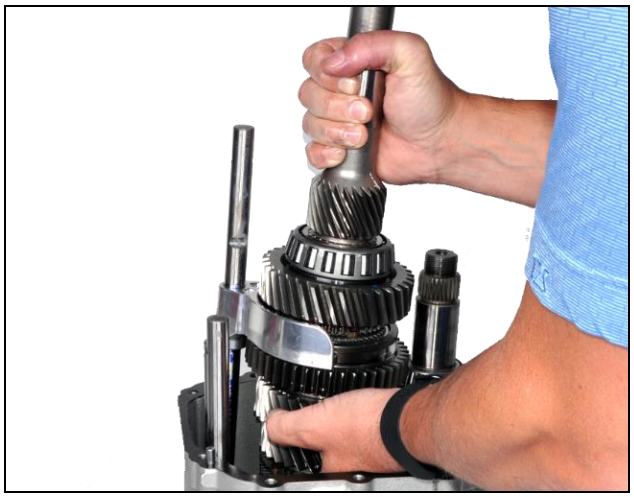
Section 3: Main Housing Disassembly



3.37: Remove shift selector link from case

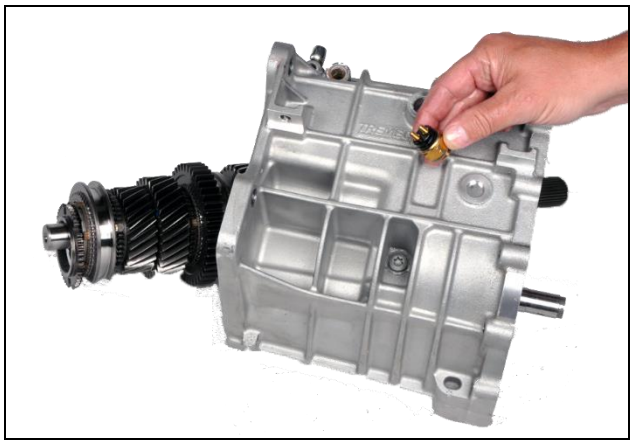


3.38: Remove two shift rail detent plugs
3.39: Remove all four detent springs and poppets



3.40: Remove main shaft assembly with 1-2 and 3-4 shift fork and rail assembly
3.41: Remove 5th and reverse shift rail and fork

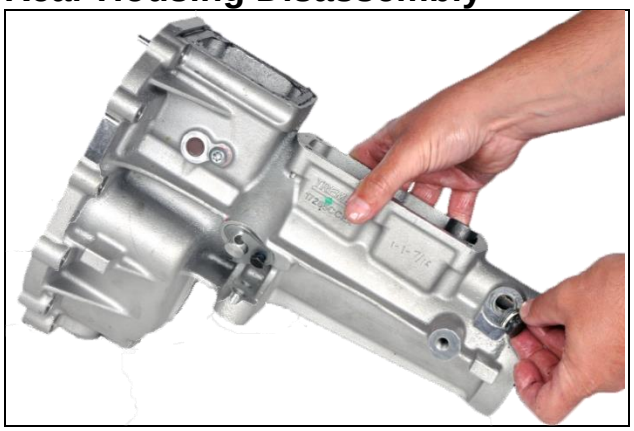
3.42: Remove cluster shaft from case



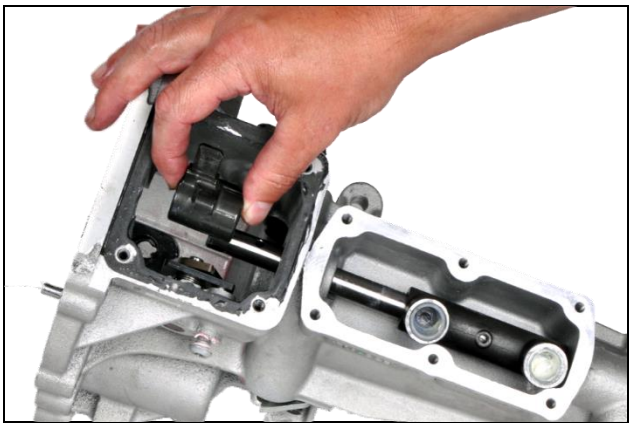
3.43: Remove back-up light switch

Section 4: Rear Housing Disassembly

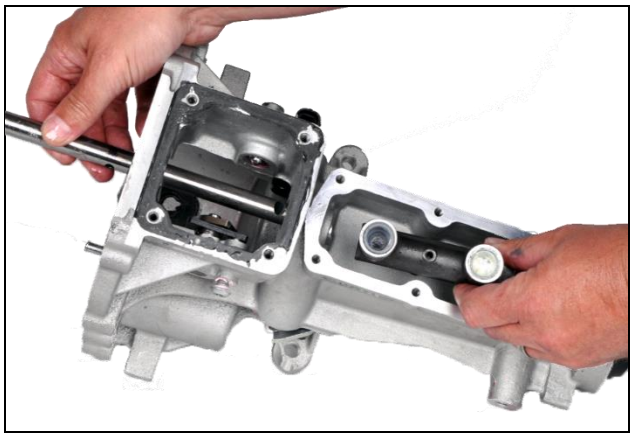
Rear Housing Disassembly



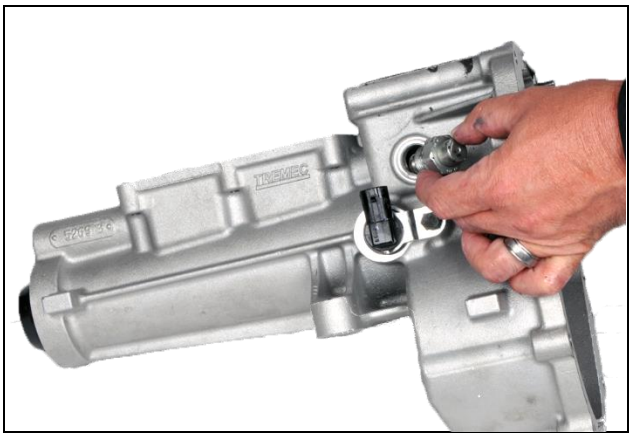
4.1: Remove pipe plug



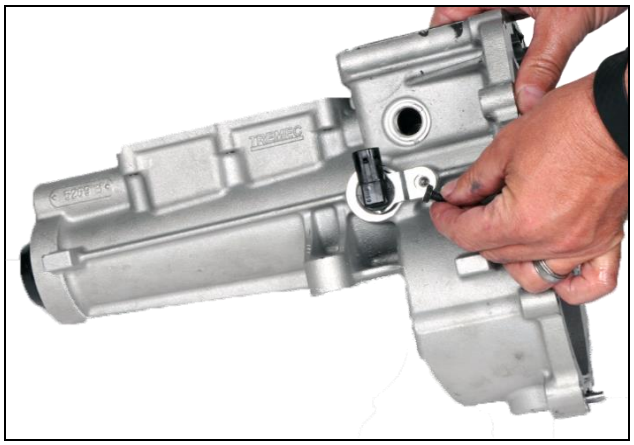
4.2: Remove roll pin from selector finger
4.3: Remove selector finger from shift rail



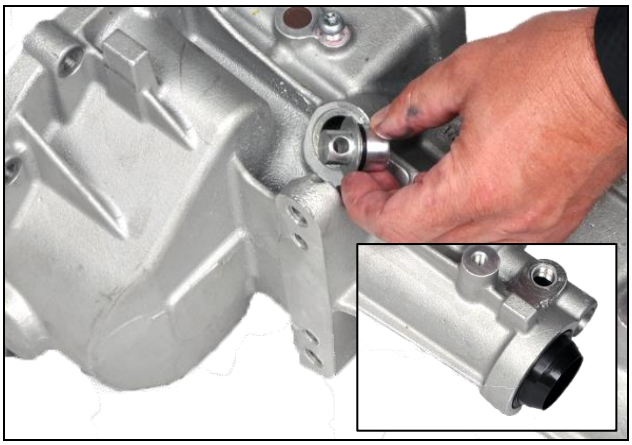
4.4: Remove roll pin from shift lever socket
4.5: Remove selector rail and shift socket



4.6: Remove shift rail detent

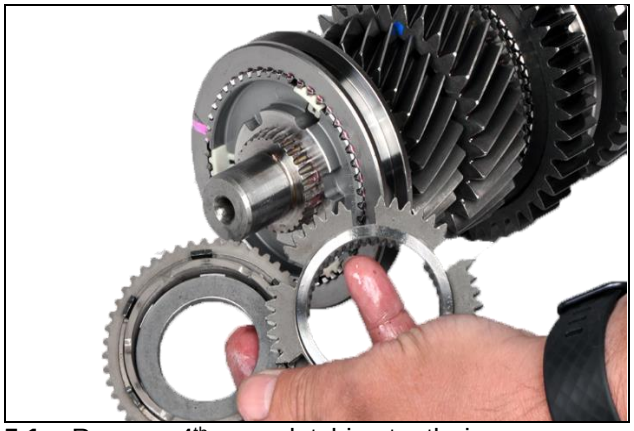


4.7: Remove bolt from Vehicle Speed Sensor (VSS)
4.8: Remove Vehicle Speed Sensor (VSS)



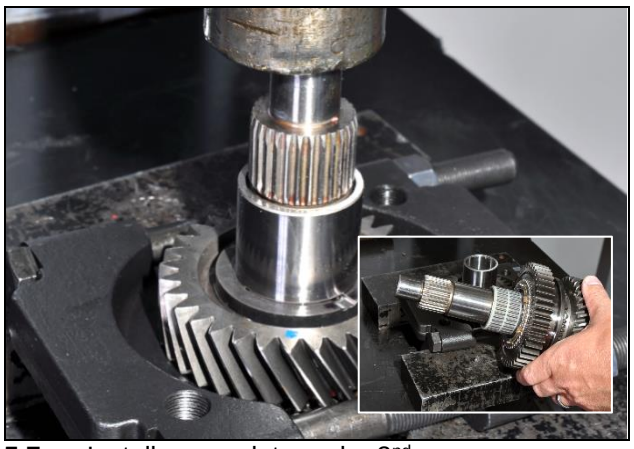
4.9: Remove bolt from mechanical speedo plug
4.10: Remove mechanical speedo plug and bracket
4.11: Remove rear seal using seal puller

Main Shaft Disassembly

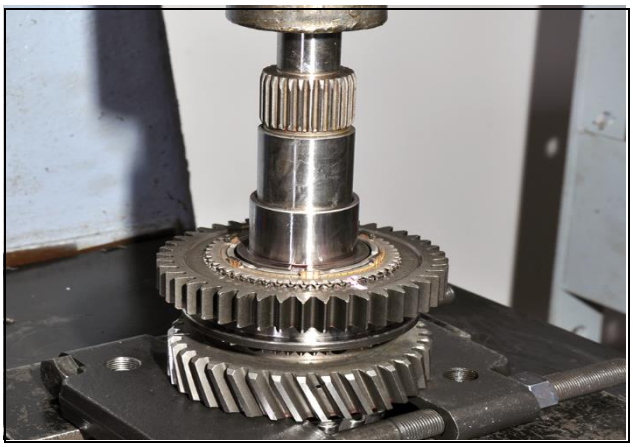


5.1: Remove 4th gear clutching teeth ring
5.2: Remove 4th gear thrust washers and bearing
5.3: Remove 4th gear inner and outer blocking ring

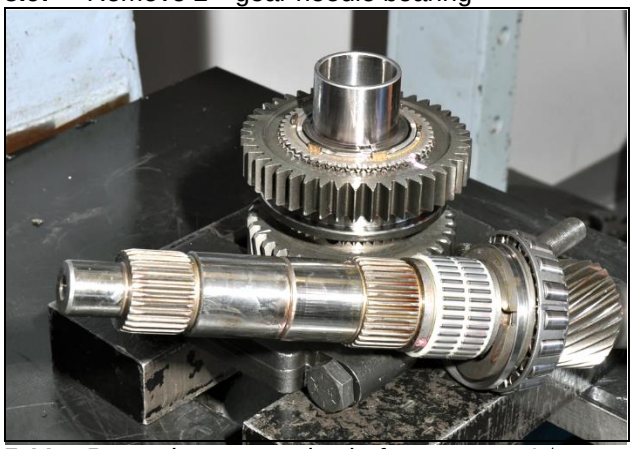
5.4: Install press plate under 3rd gear
5.5: Press down to remove 3rd gear needle bearing, thrust washer, blocking ring assembly



5.7: Install press plate under 2nd gear
5.8: Press down on shaft to remove 3rd gear thrust washer, 3rd gear bearing journal and 2nd gear
5.9: Remove 2nd gear needle bearing



5.10: Install press plate under 1st gear (be careful not to damage synchronizer teeth)



5.11: Press down on main shaft to remove 1st gear, 1-2 synchronizer, 1st gear bearing, 1-2 blocking rings, 2nd gear bearing journal, and thrust washer

5.12: Remove main shaft locking ring pieces
5.13: Remove steel locking ball
5.14: Remove output shaft bearing

Main Shaft Assembly

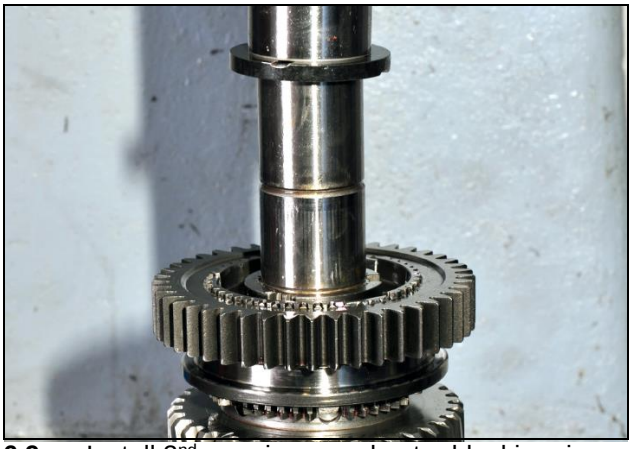
6.1: Install output shaft bearing
6.2: Install steel locking ball onto shaft
6.3: Install locking ring (three pieces)

6.4: Install 1st gear bearing

6.5: Install 1st gear

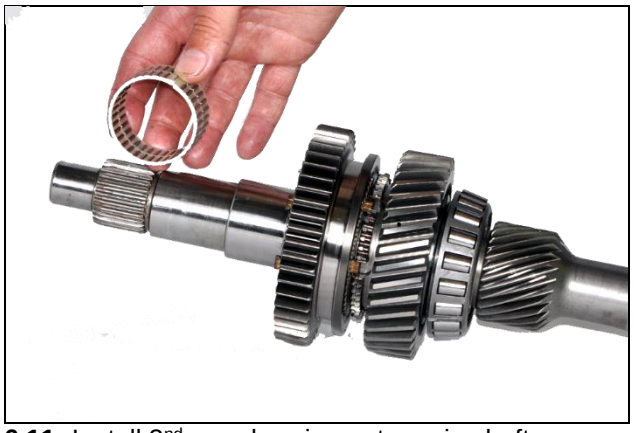
6.6: Install inner and outer 1st gear blocking ring

6.7: Install 1-2 synchronizer (1-2 shift fork grove will faced towards rear)
6.8: Press 1-2 synchronizer onto shaft (must align blocking rings to correctly fit in synchronizer tabs)

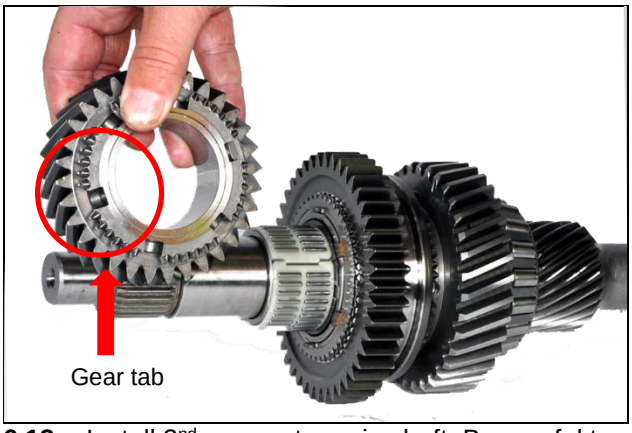


6.9: Install 2nd gear inner and outer blocking rings onto 1-2 synchronizer
6.10: Press 2nd gear thrust washer and bearing journal onto shaft

Section 6: Main Shaft Assembly

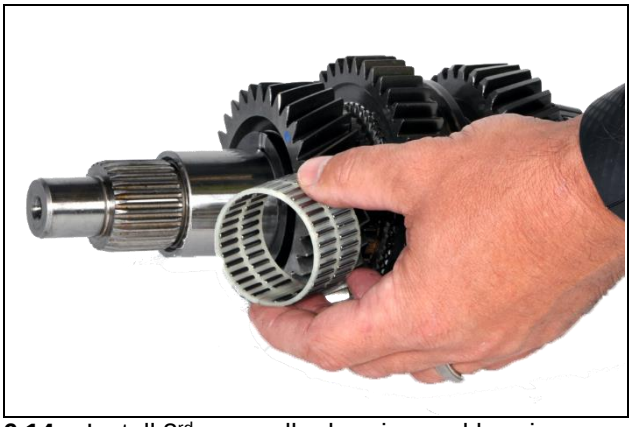


6.11: Install 2nd gear bearing onto main shaft

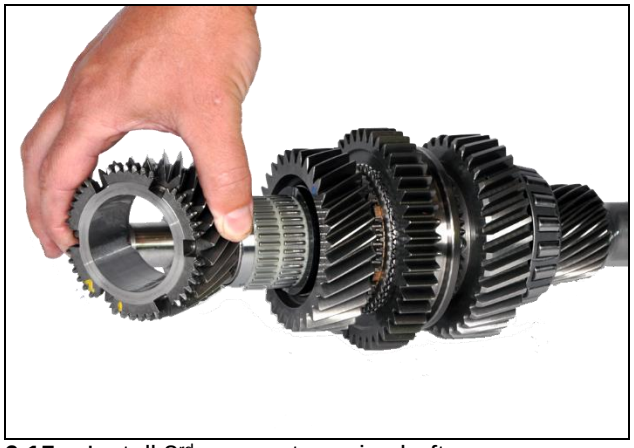


6.12: Install 2nd gear onto main shaft. Be careful to line up blockers into gear tabs

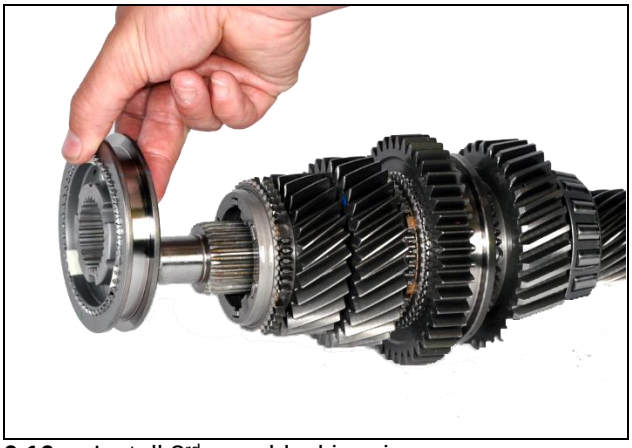
6.13: Press 3rd gear thrust washer and bearing journal onto main shaft



6.14: Install 3rd gear roller bearing and bearing thrust sleeve onto main shaft



6.15: Install 3rd gear onto main shaft

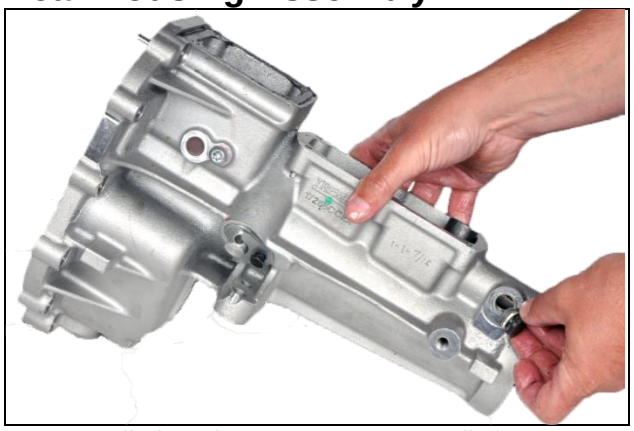


6.16: Install 3rd gear blocking ring

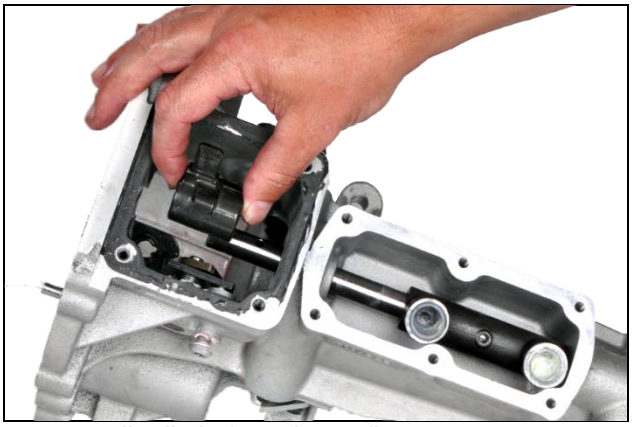
6.17: Press 3-4 synchronizer onto main shaft. Be careful to align blockers into tabs on synchronizer

Section 7: Main Housing Assembly

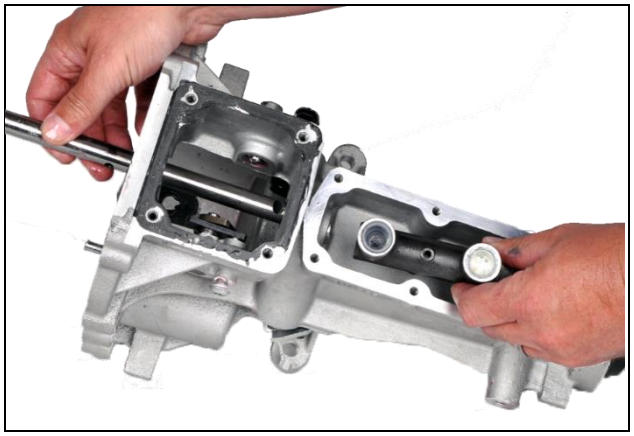
Rear Housing Assembly



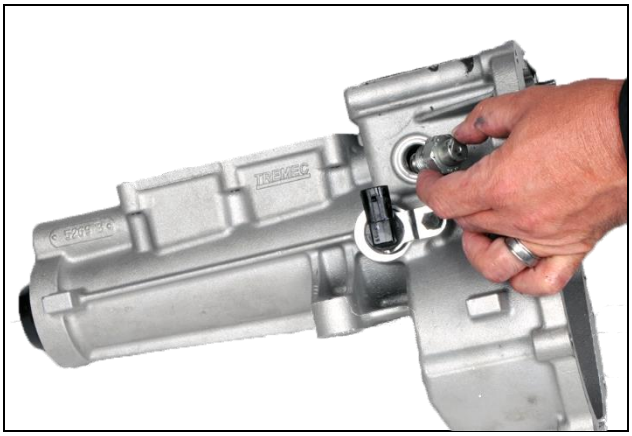
7.1: Install pipe plug. Torque to 15-25 lb-ft.



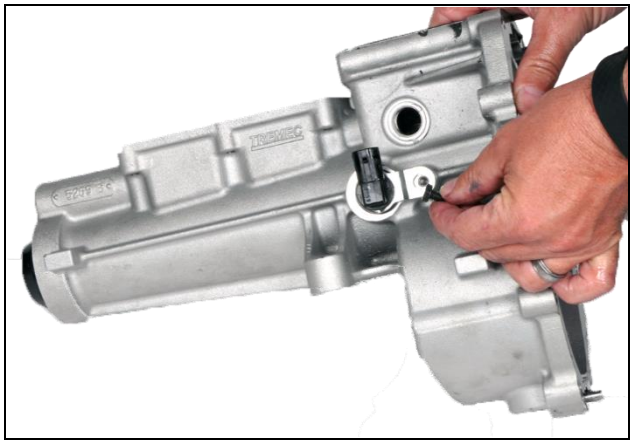
7.2: Install roll pin for selector finger
7.3: Install selector finger for shift rail



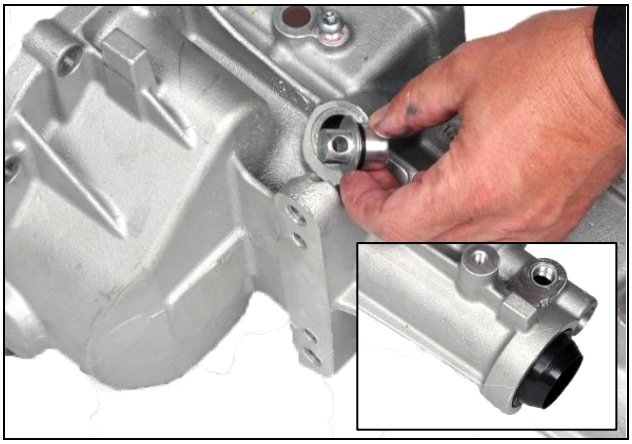
7.4: Install roll pin for shift lever socket
7.5: Install selector rail and shift socket



7.6: Install shift rail detent. Torque to 25-35 lb-ft

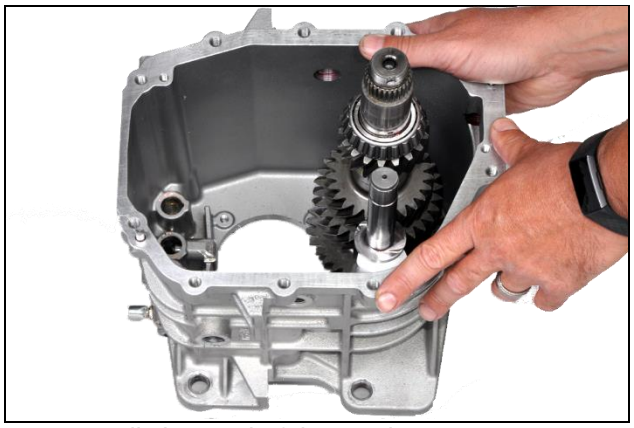


7.7: Install bolt for Vehicle Speed Sensor (VSS)
7.8: Install Vehicle Speed Sensor (VSS). Torque to 4-6 lb-ft

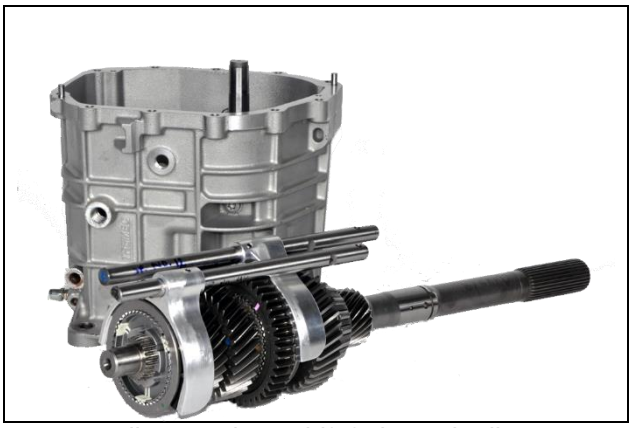


7.9: Install bolt for mechanical speedo plug
7.10: Install mechanical speedo plug and bracket
7.11: Install rear seal

Main Housing Assembly

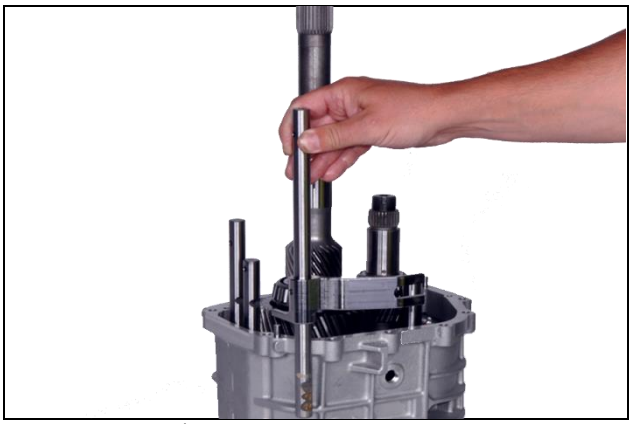


8.1: Install cluster shaft into main case

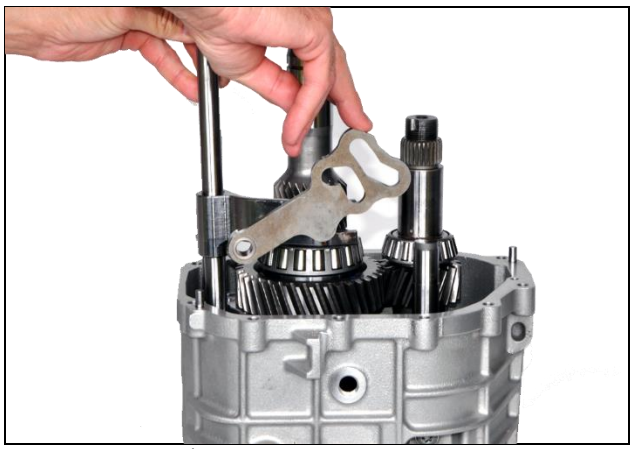


8.2: Install 1-2 and 3-4 shift forks and rails onto main shaft

8.3: Install main shaft and fork assembly into main case. Use a 2 ½" (round) x 1" (thick) spacer on the table to hold main shaft.



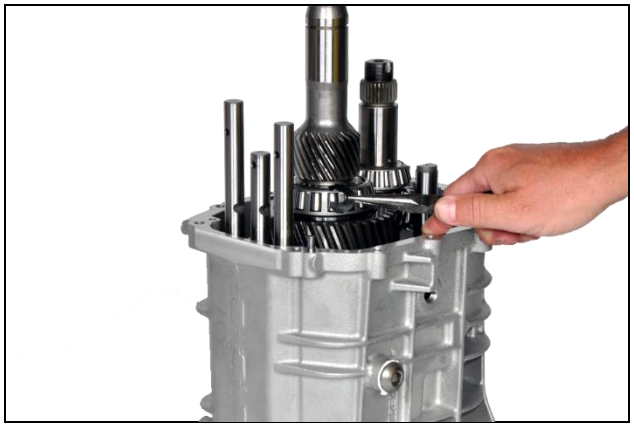
8.4: Install 5th and reverse gear fork and rail into main case



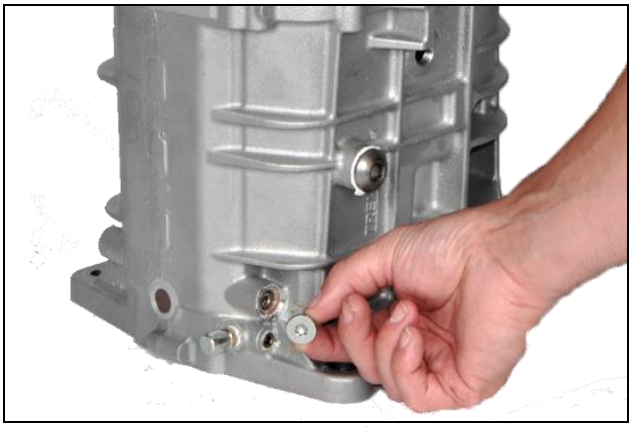
8.5: Install 5th and reverse gear selection arm into case

8.6: Install pivot pin into selector on side of main case. Torque to 25-40 lb-ft

Section 8: Main Housing Assembly

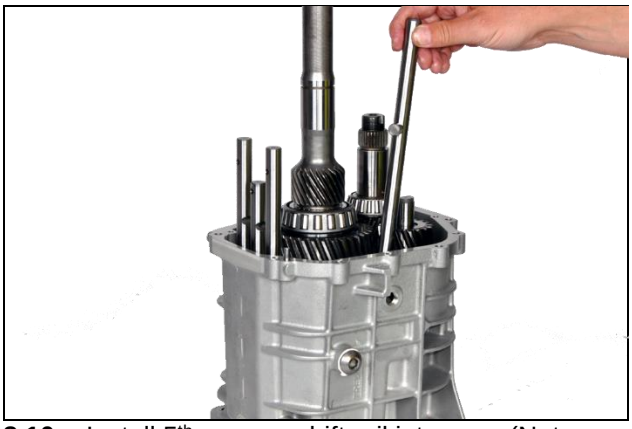


8.7: Install pivot pin snap ring

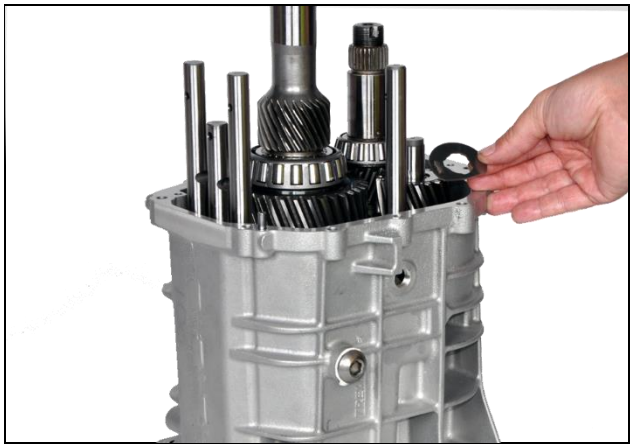


8.8: Install detent plunger spring and nut on either side of main case. Torque to 15-25 lb-ft

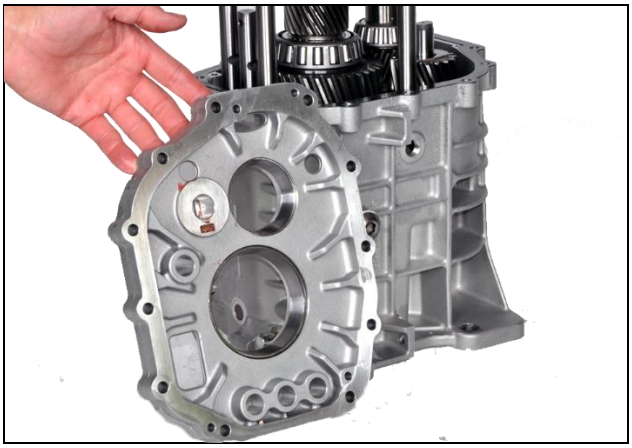
8.9: Install reverse idler synchronizer and fork into case



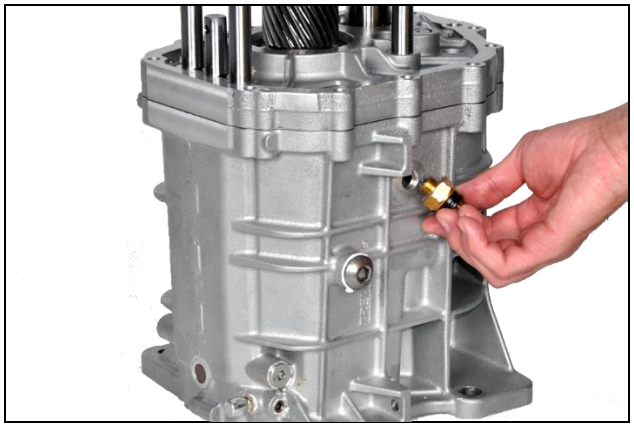
8.10: Install 5th reverse shift rail into case (Note: Rail detent roller fits in selector arm)



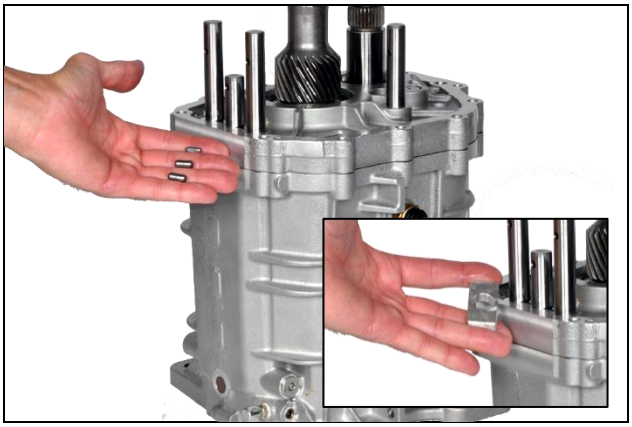
8.11: Install reverse gear thrust washer on top of idler gear (Note: Place tab in the 12 o'clock position)



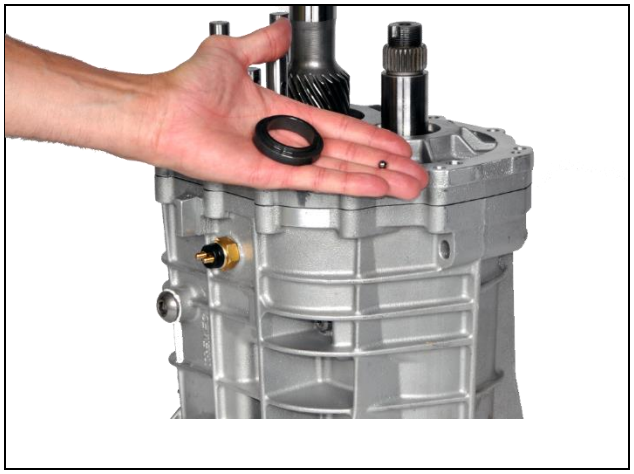
8.12: Install rear housing gasket and intermediate plate. (Note: Be careful to line up idler gear thrust washer.



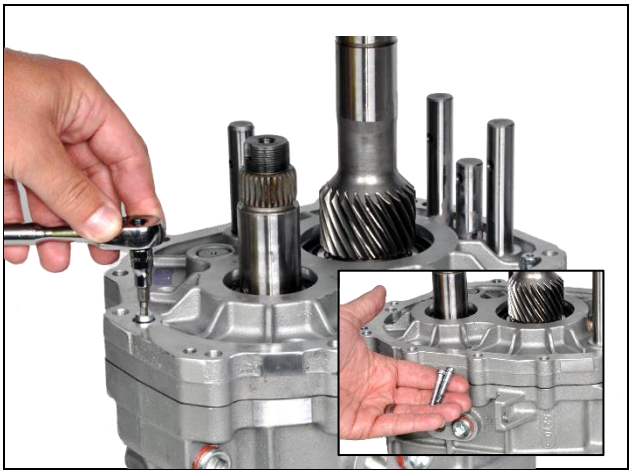
8.13: Install reverse light switch in case. Torque to 12-16 lb-ft



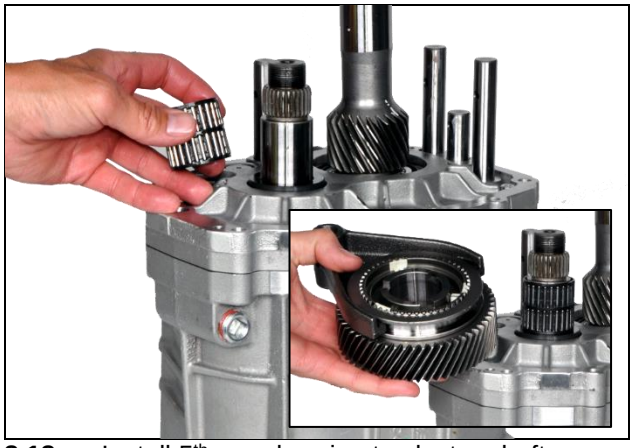
8.14: Install shift rail interlock pins (three pieces)
8.15: Install interlock pins hold down block



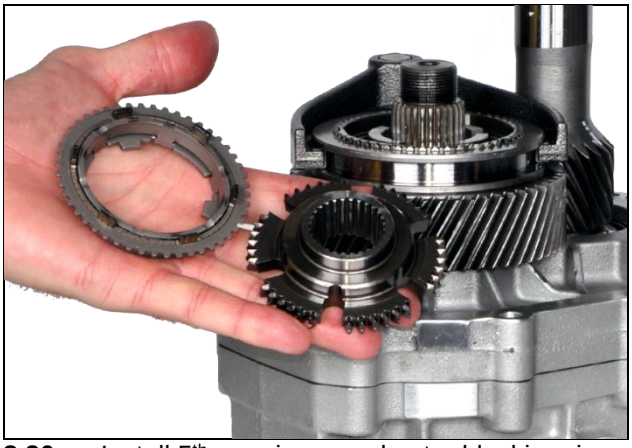
8.16: Install 5th gear bearing and thrust washer to cluster shaft



8.17: Install bolt into intermediate plate (two pieces) Torque to 15-25 lb-ft



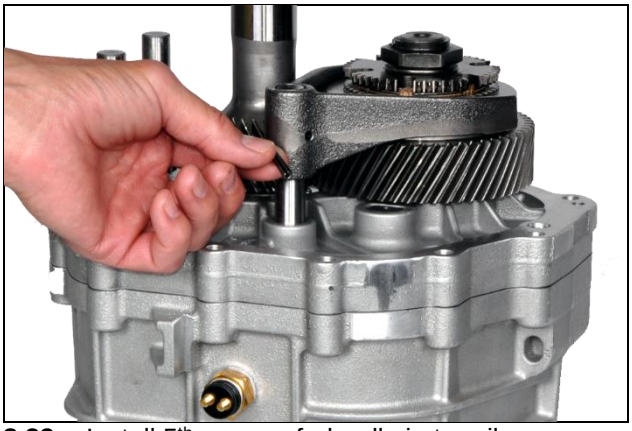
8.18: Install 5th gear bearing to cluster shaft
8.19: Install 5th gear synchronizer and fork to cluster shaft. Slide 5th gear fork onto 5th reverse rail upon install



8.20: Install 5th gear inner and outer blocking rings

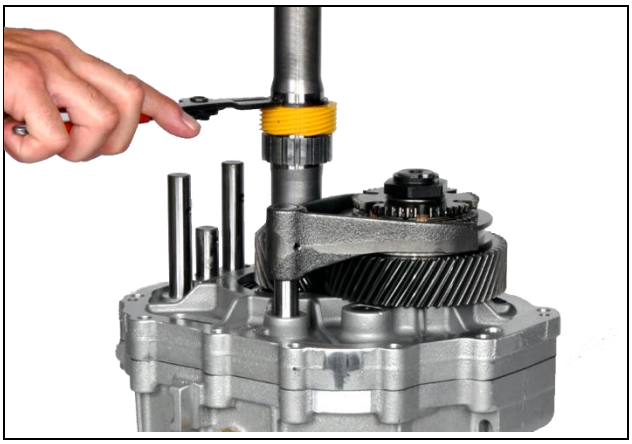
Section 8: Main Housing Assembly

8.21: Install counter shaft locking nut

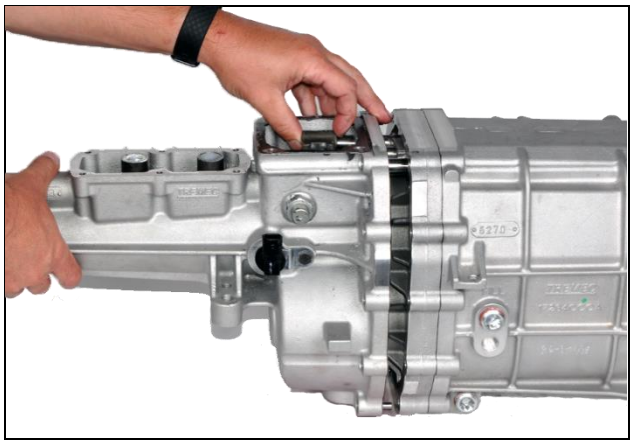


8.22: Install 5th reverse fork roll pin to rail

8.23: Install mechanical speedometer gear with detent ball to main shaft (Note: Ford=12 tooth; GM=17 tooth)



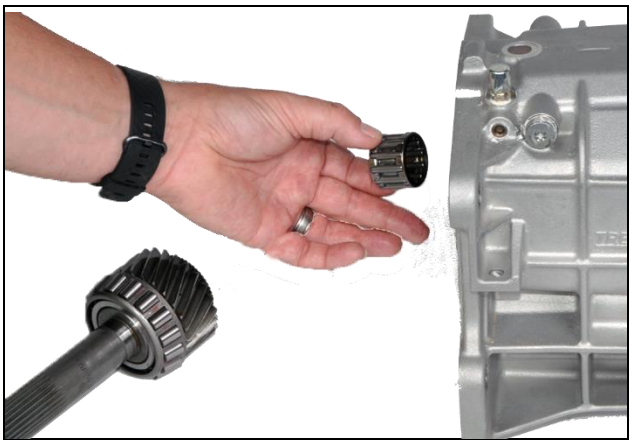
8.24: Install speedometer gear snap ring



8.25: Lay transmission flat on bench

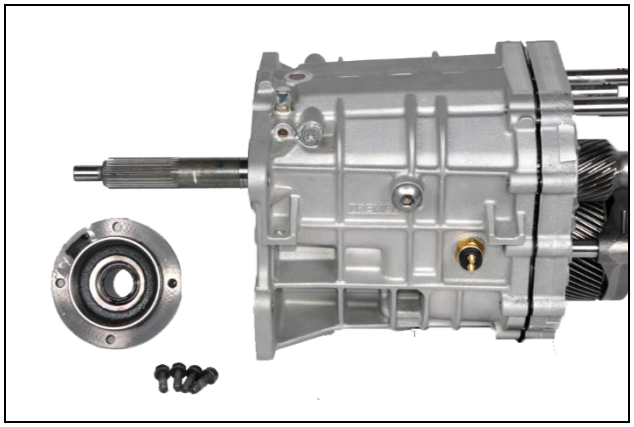
8.26: Install rear housing and shift lugs together on transmission

8.27: Install rear housing bolts. Torque to 24-30 lb-ft.

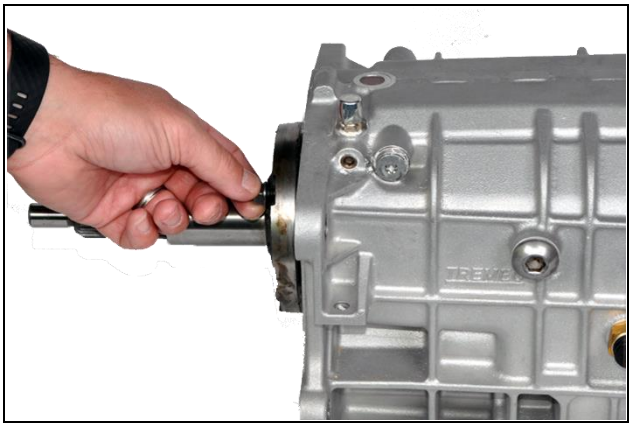


8.28: Install input shaft and pocket bearing

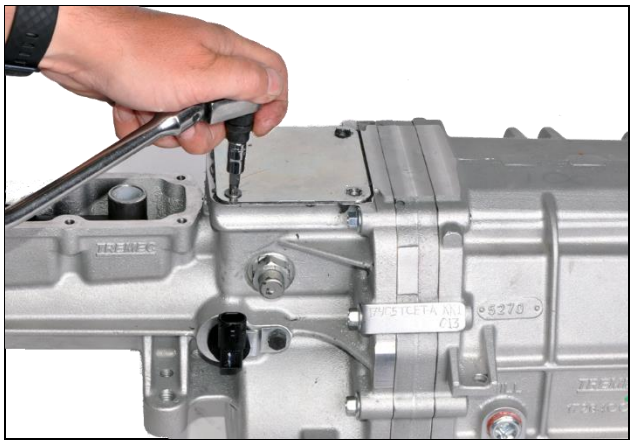
Section 8: Main Housing Assembly



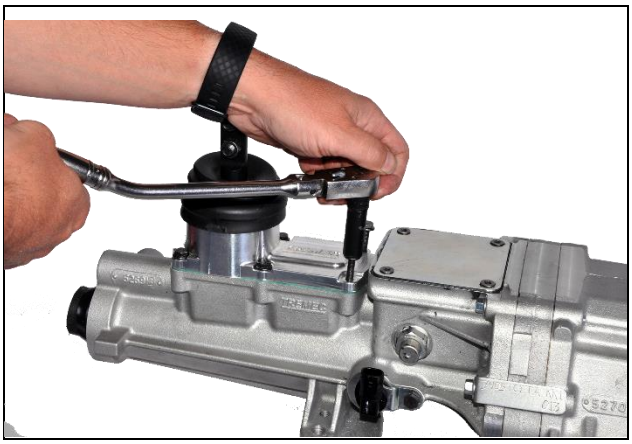
8.29: Install bearing retainer, input race and shims, apply Black RTV



8.30: Install four bolts. Torque to 12-16 lb-ft.



8.31: Apply Black RTV and Install top inspection cover. Torque screws to 5-6 lb-ft



8.32: Install shifter gasket and shifter. Torque bolts to 6-11 lb-ft.

Torque Transfer Solutions®

46643 Ryan Court
Novi, Michigan 48337 U.S.A.
Tel: +1 (248) 859-6500 | Fax: +1 (248) 859-6400
Customer Service: (800) 401-9866 | customer.service@tremec.com
www.tremec.com