

OVERHAUL

TRANSFER CASE

Disassembly (Transfer Case)

1. Drain and remove transfer case from vehicle. Remove 4WD indicator switch and breather vent. Remove rear output shaft yoke by removing retaining nut, steel washer and rubber seal from output shaft. On "STX" models, remove front output shaft yoke by removing lock nut, steel washer and rubber seal from output shaft.
2. On electronic shift transfer case, fabricate tool by forming small hook at tip of paper clip or safety pin. Remove locking sleeve from connector by hooking with tool and pulling from bottom. See **Fig. 10** . Remove Brown wire (center), Green (No. 4) and Blue (No. 5) by pulling from back of connector.
3. Remove speed sensor retaining bracket screw, bracket and sensor. See **Fig. 1** . Remove 3 electric motor mount bolts and motor. Note position of triangular shaft in case and triangular slot in electric motor. See **Fig. 12** .

CAUTION: Motor is serviced as an assembly only. DO NOT remove motor rear cover.

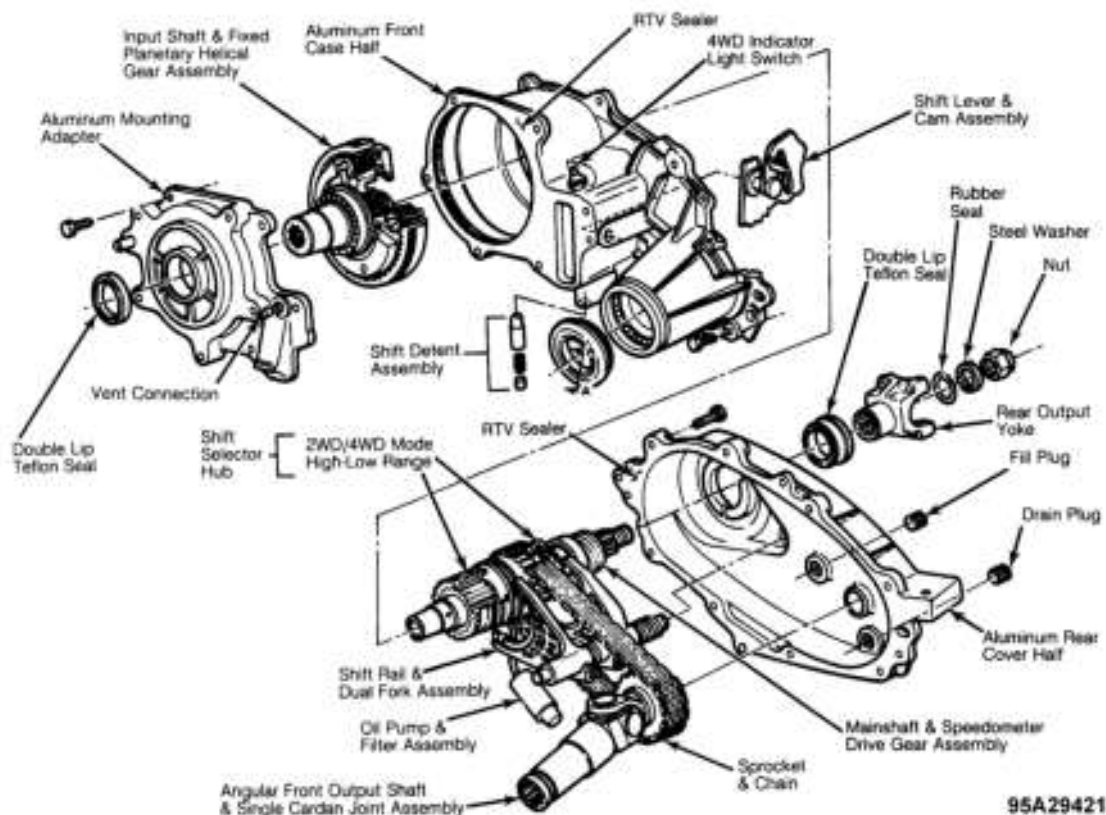


Fig. 11: View of Borg-Warner Manual Shift 1350 Transfer Case
Courtesy of FORD MOTOR CO.

4. On manual and electronic shift transfer cases, remove 9 bolts retaining front case to rear cover. Insert a 1/2" drive breaker bar between pry bosses to separate front case and rear cover. Remove RTV gasket

sealer from mating surfaces.

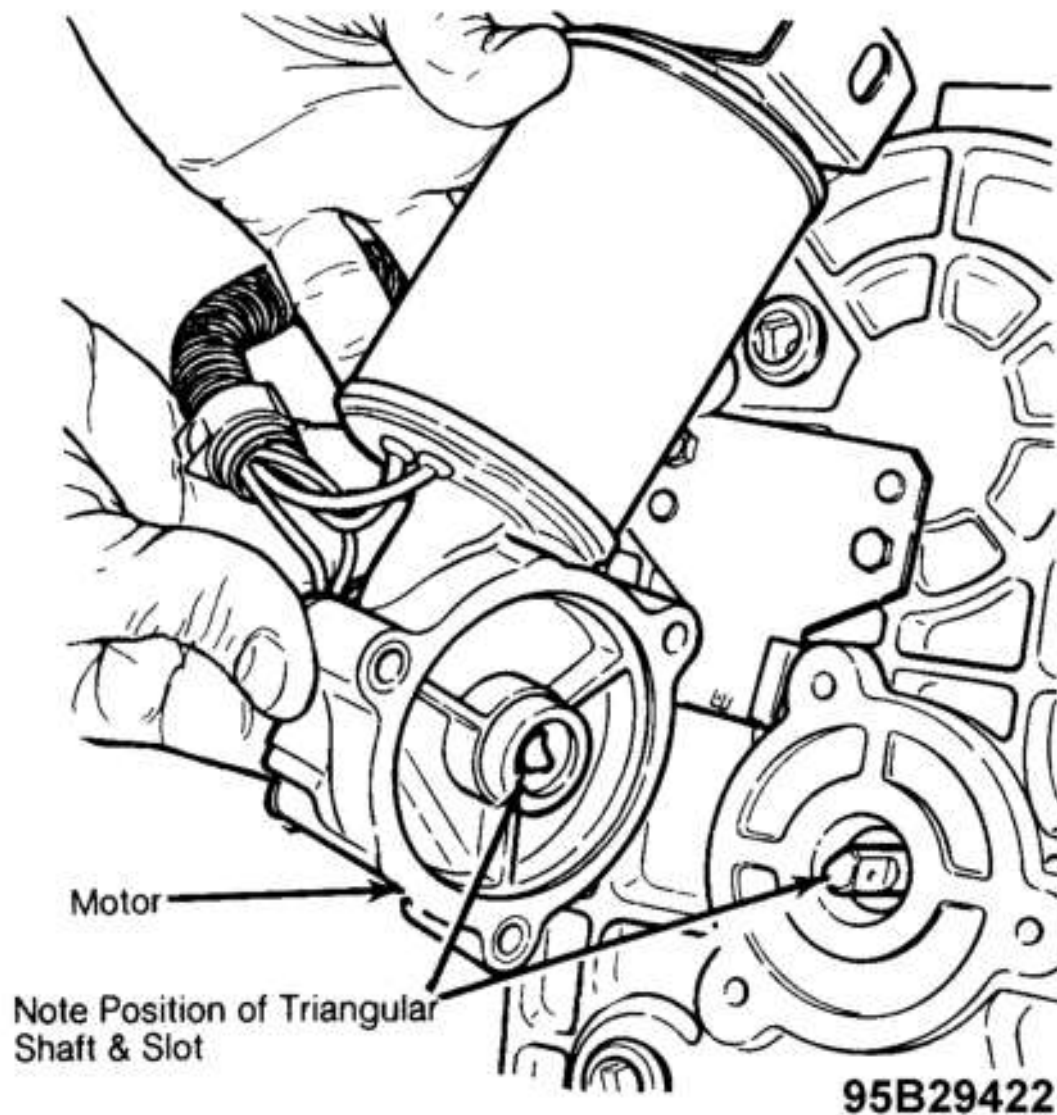
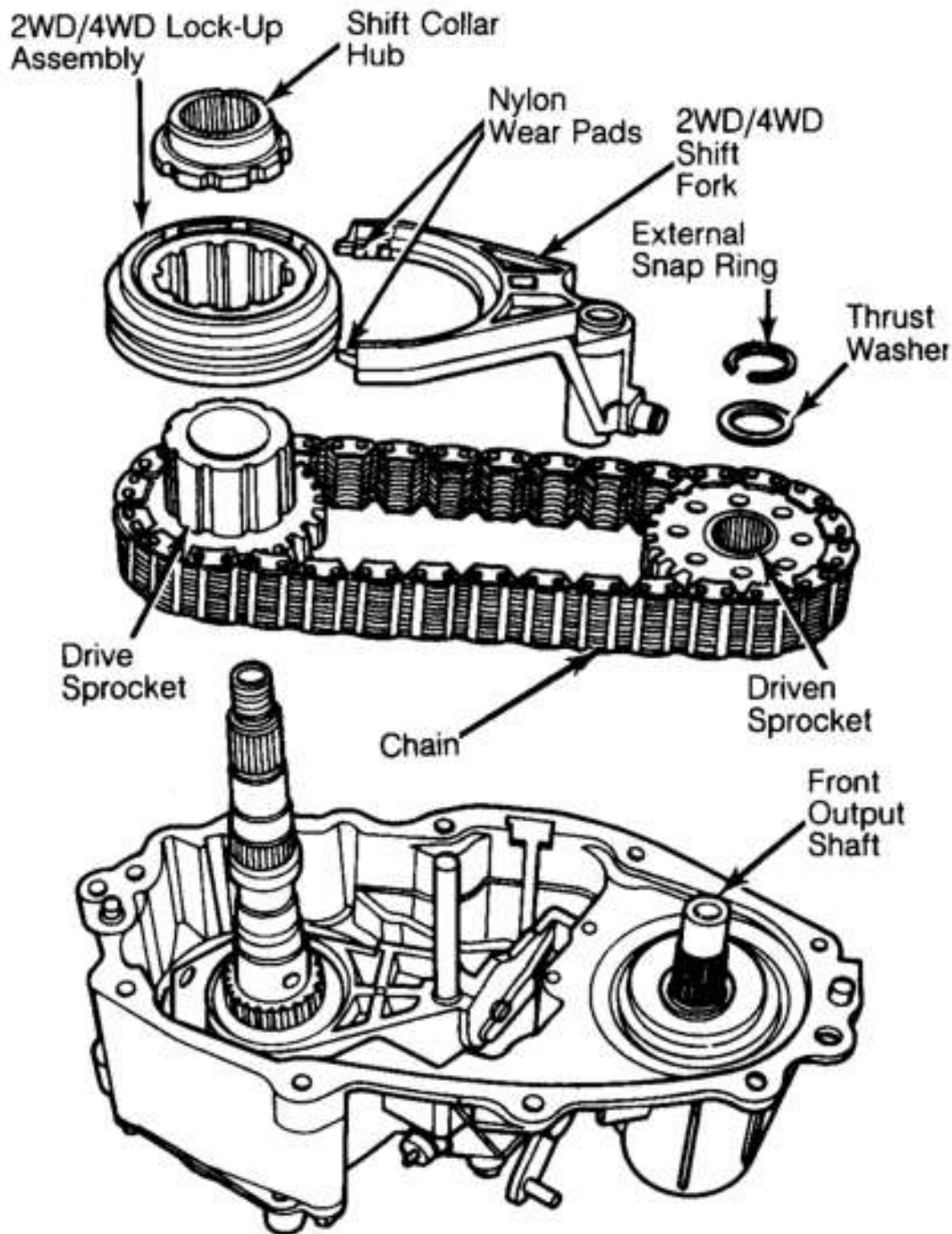


Fig. 12: View of Electric Shift Motor & Shift Cam Alignment
Courtesy of FORD MOTOR CO.

5. If replacing speedometer drive gear or ball bearing assembly, drive output shaft oil seal from inside of rear cover with a brass drift and hammer. Remove speedometer drive gear assembly. Note that round end of speedometer gear clip faces inside of rear cover.
6. Remove output shaft ball bearing internal snap ring. Remove ball bearing with Driver (T80T-4000-W) and Output Shaft Bearing Replacer (T83T-7027-B) from outside of case.
7. If necessary, remove front output shaft caged needle bearing from rear cover using Puller (D80L-100-S) and slide hammer. On electronic shift models, remove 3 nuts retaining clutch coil to rear cover. Remove coil assembly, "O" rings and Brown wire from cover. Remove clutch housing assembly from output shaft.
8. On manual and electronic shift models, remove 2WD/4WD shift fork spring from boss on 2WD/4WD

shift fork. On manual shift models only, remove shift collar hub from output shaft.

9. On manual and electronic shift models, remove 2WD/4WD lock-up assembly and 2WD/4WD shift fork as an assembly. Remove 2WD/4WD lock-up assembly from 2WD/4WD shift fork. See **Fig. 13**. If necessary, remove external clip and roller bushing assembly from 2WD/4WD shift fork. Pull out shift rail.



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Fig. 13: Removing Shift Collar Hub & Drive Chain

Courtesy of FORD MOTOR CO.

10. If disassembly of 2WD/4WD lock-up assembly is necessary, remove internal snap ring and pull lock-up hub and spring from lock-up collar. See **Fig. 11** . Remove external snap ring and thrust washer that retains driven sprocket to front output shaft.
11. On electronic shift models, remove helical cam assembly from front case. If necessary, remove helical cam, torsion spring and sleeve from shaft.
12. On manual and electronic shift models, remove chain, driven sprocket, and drive sprocket as an assembly. Remove collector magnet from front case. If disassembling oil pump, remove bolts from pump body.

NOTE: **Note position and markings of oil pump front cover, body, pins, rear cover, and pump retainer.**

13. Slip high-low range shift fork out of inside track of shift cam. If necessary, remove external clip and roller bushing assembly from high-low range shift fork. Remove high-low shift hub from planetary gear set in front case. See **Fig. 14** .

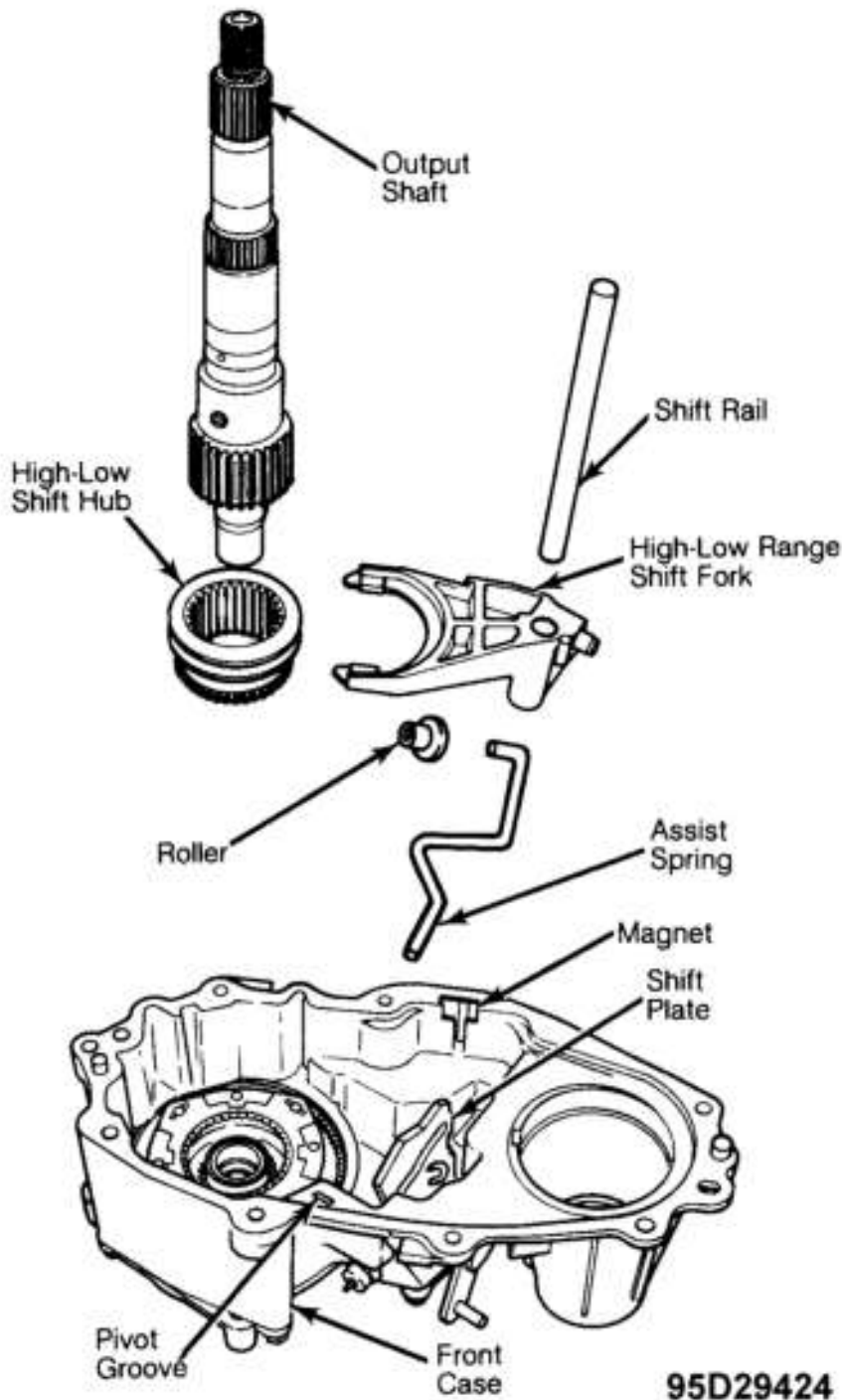


Fig. 14: High-Low Range Shift Assembly & Output Shaft (Manual Shift Model Shown; Electronic Shift Model Similar)
 Courtesy of FORD MOTOR CO.

14. On manual shift models, remove anchor end of assist spring from locking post in front case half. Remove spring and roller out of shift cam.
15. On manual and electronic shift models, turn case over. Remove 6 mounting adapter retaining bolts from front case. Remove mounting adapter, input shaft and planetary gear set as an assembly.

16. Expand tangs of large snap ring in mounting adapter, and pry under planetary gear set with screwdrivers. Separate input shaft and planetary gear set from mounting adapter. See **Fig. 15** .
17. If required, remove oil seal from mounting adapter with slide hammer. Remove internal snap ring from planetary carrier. Separate planetary gear set from input shaft assembly.
18. Remove external snap ring from input shaft. Press ball bearing from input shaft. Remove thrust washer, thrust plate and sun gear off input shaft. See **Fig. 15** .

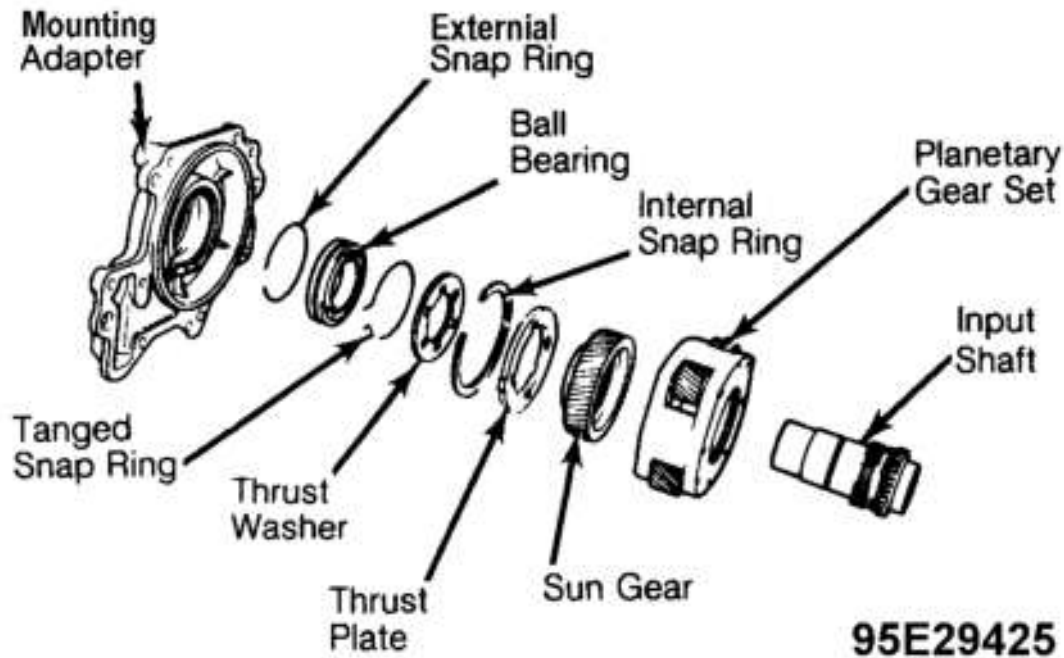
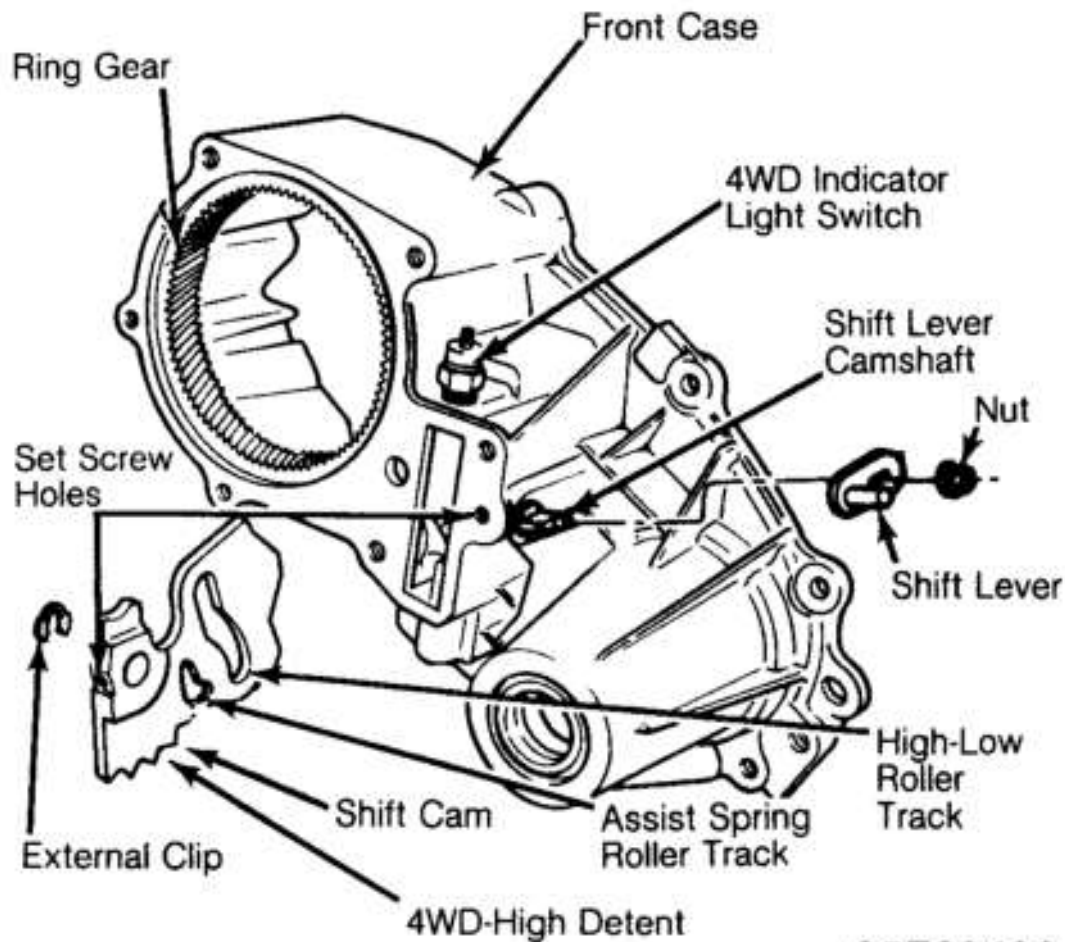


Fig. 15: Exploded View of Planetary Gear Set
 Courtesy of FORD MOTOR CO.

19. If necessary, press ring gear from front case. Note relationship of serrations to chamfered pilot diameter during removal.
20. On manual shift models, move shift lever by hand until shift cam is in "4WH" detent position. Scribe a line on outside of front case using side of shift lever and a grease pencil. See **Fig. 16** . Remove 2 Torx head set screws from front case and shift cam.
21. Turn front case over and remove external clip. Pry shift lever out of front case and shift cam. **DO NOT** pound on external clip during removal. Turn front case over and remove external clip. Pry shift lever assembly out of front case and shift cam. Remove "O" ring from second groove in shift lever shaft. Remove detent plunger and compression spring from inside of front case.



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Fig. 16: Shift Lever & Cam Assembly For Manual Shift Models
 Courtesy of FORD MOTOR CO.

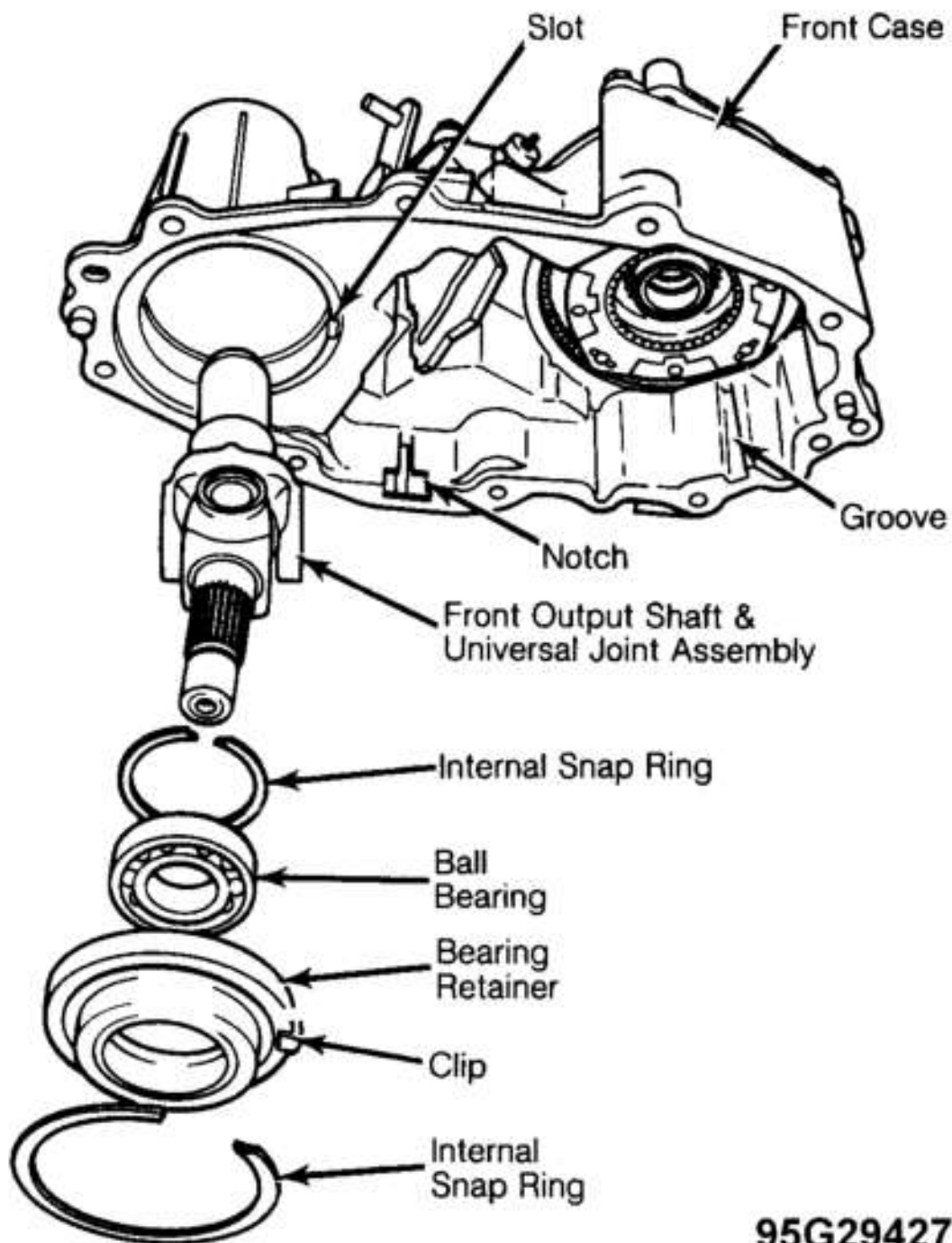
22. On manual and electronic shift models, remove internal snap ring and ball bearing retainer from front case. It may be necessary to tap on face of front output shaft and "U" joint assembly with a plastic hammer. Remove internal snap ring and drive ball bearing out of bearing retainer. See **Fig. 17** .

NOTE: The clip on bearing retainer is required to prevent bearing retainer from rotating. **DO NOT** discard clip.

Disassembly ("U" Joints)

1. Remove front output shaft and "U" joint assembly from front case. If necessary, remove oil seal with slide hammer. If necessary, remove internal snap ring and drive ball bearing out of front case bore.
2. Place front output shaft and "U" joint assembly in a soft-jawed vise. Remove internal snap rings that retain bearings in shaft.
3. Position "U" Joint Remover/Installer (T74P-4635-C) over shaft and press bearing out. If bearing cannot be pressed completely out, remove it with a pair of vise grips or channel lock pliers. Reposition tool on spider to remove opposite bearing. Repeat procedure until all bearings are

removed.



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Fig. 17: Removing/Installing Front Output Shaft Assembly
Courtesy of FORD MOTOR CO.

Reassembly ("U" Joints)

1. Lubricate all parts with Dexron II ATF during reassembly. Support front output shaft in soft-jawed

wise. If removed, start new bearing into end of shaft. Position spider into bearing and press bearing below snap ring groove using "U" joint installer. Remove tool and install new internal snap ring in groove.

2. Start new bearing into opposite end of shaft. Using "U" joint installer, press bearing until opposite bearing contacts snap ring. Remove tool and install new internal snap ring in groove. Reposition front output shaft assembly and install other 2 bearings in same manner.
3. Check "U" joint for binding. If "U" joint shows any sign of binding, tap both shafts sharply to relieve bind.

Reassembly (Transfer Case)

1. If removed, drive ball bearing into front output case bore using Driver (T80T-4000-W) and Output Shaft Bearing Replacer (T83T-7025-B). Ensure bearing is not cocked in bore. Install retaining snap ring for ball bearing. If removed, install front output oil seal in front case bore.
2. If removed, install ring gear in front case. Align serrations on outside diameter of ring gear to serrations previously cut in front case bore. Start piloted chamfered end of ring gear first and press in until it is fully seated. Ensure ring gear is not cocked in bore.
3. If removed, install ball bearing in bearing retainer bore. Drive bearing into retainer using driver and output shaft bearing replacer. Make sure ball bearing is not cocked in bore. Install ball bearing-to-retainer snap ring. Install front output shaft and "U" joint assembly through front case oil seal.
4. Position ball bearing and retainer assembly over front output shaft and install in front case bore. Clip on bearing retainer must align with slot in front case. Tap bearing retainer into place. Install internal snap ring. See **Fig. 17**.
5. On manual shift models, install compression spring and detent plunger into bore from inside of front case. If disassembled, install shift lever cam shaft to shift lever and tighten nut. After coating new "O" ring with grease, install "O" ring in second groove of shift lever shaft. Use a rubber band to fill the first groove so as not to cut "O" ring. Discard rubber band.
6. With shift cam, shift lever and snap ring installed in front case, position shift lever in "4WH" detent position (line scribed during disassembly). Place assist spring roller on 90 degree bend tang of assist spring. Insert roller into assist spring roller slot of shift cam. See **Fig. 18**.
7. Position middle section of assist spring into groove of front case pivot boss. Push in and lock the upper end of assist spring behind front case spring anchor tab. See **Fig. 18**.
8. Install 2 Torx head screws in front case and in shift cam. Tighten screws. Ensure set screw in front case is in first groove of shift lever shaft and not bottomed out against shaft itself. Shift lever should be able to move freely to all detent positions.
9. On manual and electronic shift models, slide sun gear, thrust plate and thrust washer over input shaft. Press ball bearing over input shaft. Install external snap ring to input shaft. Install planetary gear set on sun gear and install input shaft assembly. Install internal snap ring on planetary carrier.

NOTE: Sun gear recessed face and ball bearing snap ring groove should face toward rear of transfer case. Stepped face of thrust washer should face toward ball bearing.

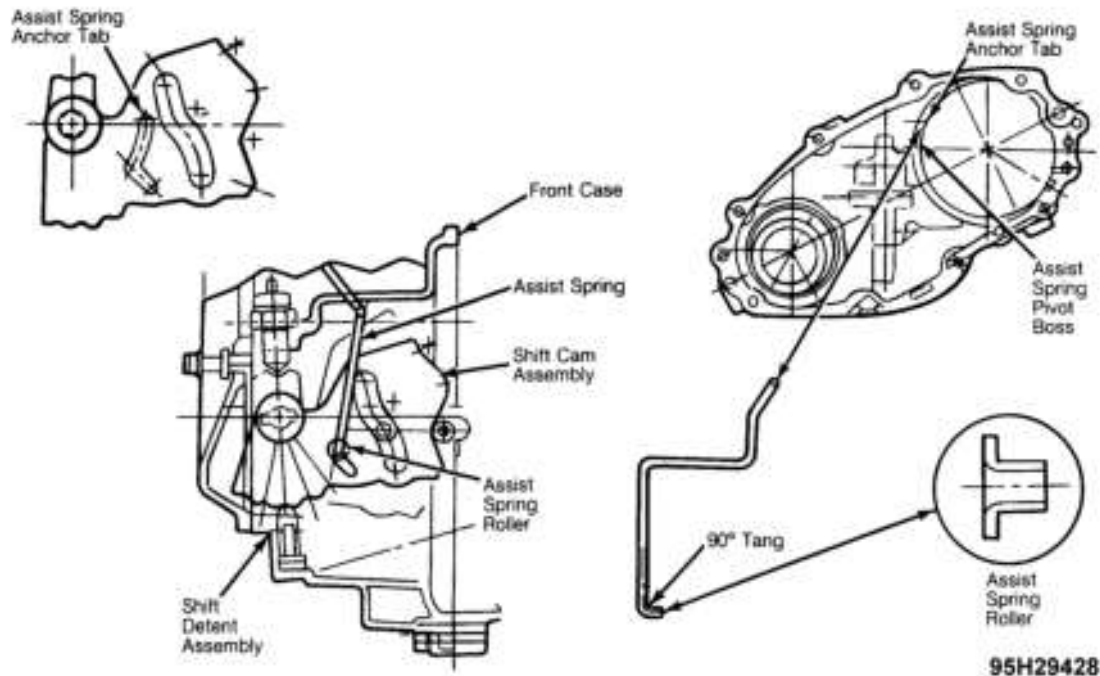


Fig. 18: Installing Assist Spring On Manual Shift Models
 Courtesy of FORD MOTOR CO.

10. Drive oil seal into bore of mounting adapter. Place tanged snap ring in mounting adapter groove. Position input shaft and planetary gear set in mounting adapter and push inward until planetary assembly and input shaft assembly are seated in adapter. Snap ring should snap into place.
11. Hold mounting adapter by hand and tap face of input shaft against wood block to ensure snap ring is engaged. Apply RTV sealer to mating surface of front case and mounting adapter. Position adapter on case. Install retaining bolts and tighten.
12. On manual shift models only, position roller on 90 degree bend tang of assist spring. Larger diameter end of spring must be installed first. Install roller into assist spring roller track of shift cam while at same time locating center of spring in pivot groove in front case. See **Fig. 14** and **Fig. 16** . Push anchor end of assist spring behind locking post adjacent to ring gear face.
13. On manual and electronic shift models, position high-low shift hub into planetary gear set. Ensure nylon wear pads are installed on shift fork. Dot on pad is installed in shift hole.
14. Slip high-low shift fork bushing into high-low roller track of shift cam and groove of high-low shift hub. See **Fig. 14** and **Fig. 16** . Install shift rail through high-low fork and make sure shift rail is seated in bore in front case.

NOTE: **Ensure Nylon wear pads are installed on shift fork and dot on pad is installed in fork hole.**

15. On manual and electronic shift models, place oil pump cover with word "TOP" facing front of front case. Install 2 pump pins (flats facing upward) with spring between pins and place assembly in oil pump bore in output shaft. Place the oil pump body and pick-up tube assembly over shaft. Be sure the pins are riding against inside of pump body.
16. Place oil pump body and pick-up tube over shaft. Ensure pins are riding against inside of pump body. Install oil pump rear cover with words "TOP REAR" facing rear of front case. Word "TOP" on front cover and rear cover should be on same side.

17. Install pump retainer so tabs face the front of transfer case. Install 4 bolts and rotate output shaft while tightening bolts to prevent pump from binding.

CAUTION: Output shaft must turn freely within oil pump. If binding occurs, loosen 4 bolts and retighten.

18. Install output shaft and oil pump assembly in input shaft. Ensure external splines of output shaft engage internal splines of high-low shift hub. Make sure oil pump retainer and oil filter leg are in groove and notch of front case. Install collector magnet in notch in front case.
19. Install chain, drive sprocket and driven sprocket as an assembly over shafts. Install thrust washer on front output shaft and external snap ring over thrust washer to retain driven sprocket.
20. If disassembled, assemble 2WD/4WD lock-up assembly. Install spring in lock-up collar. On electronic shift models, small end of spring in lock-up collar. On manual and electronic shift models, place lock-up hub over spring and engage lock-up hub in notches in lock-up collar. Install internal snap ring. See **Fig. 19** and **Fig. 21** through **Fig. 24** .

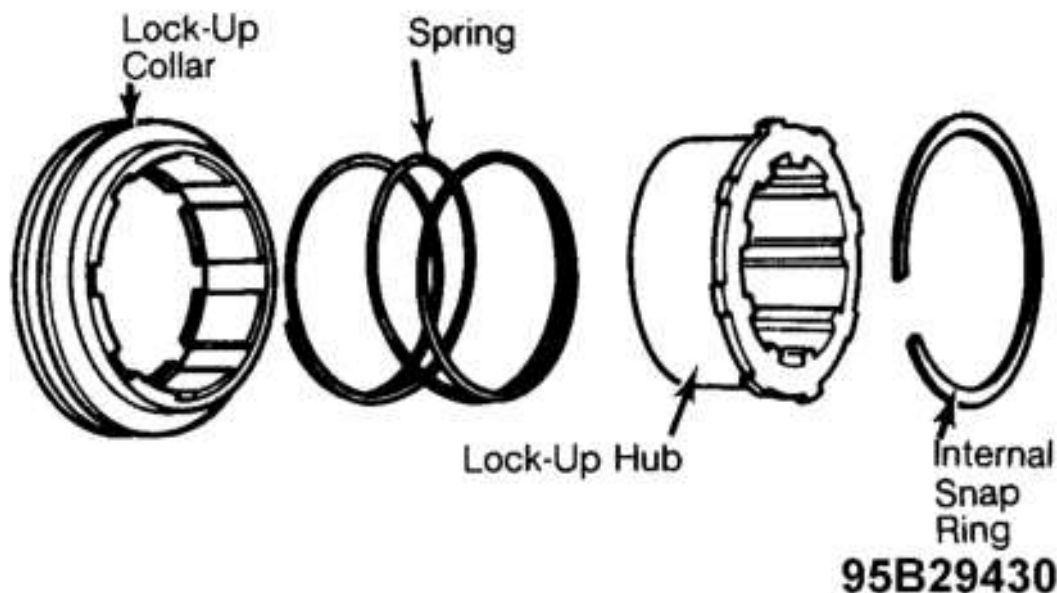


Fig. 19: Exploded View 2WD/4WD Lock-Up Assembly
Courtesy of FORD MOTOR CO.

21. Install 2WD/4WD shift fork to 2WD/4WD lock-up assembly. If removed, ensure Nylon wear pads are installed on fork and dot on pad is installed in hole in fork. Install 2WD/4WD lock-up collar and hub assembly over output shaft and onto shift rail. See **Fig. 13** .
22. If removed, install shaft, bushing and external clip on 2WD/4WD lock-up fork. Install shift collar hub on output shaft. If removed, drive caged needle bearing into rear cover bore. If removed, install ball bearing in rear cover bore. Install ball bearing internal snap ring.
23. On electronic shift models, assemble spring spacer on camshaft. Slide spring spacer then spring onto camshaft. Position first spring tang to left side of drive tang. Wind second spring tang back to right side of drive tang. Slide spring and spacer in as far as possible. Install helical cam onto camshaft with

cam tang in between spring tangs. See **Fig. 20** .

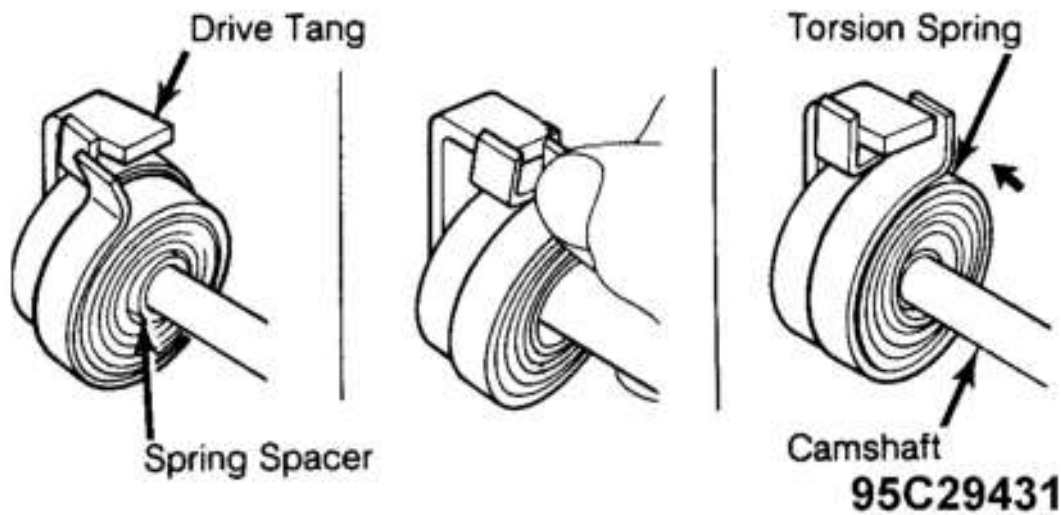


Fig. 20: Attaching Spring Tangs to Camshaft Tangs
Courtesy of FORD MOTOR CO.

24. Install tang end of camshaft assembly over alignment pin in front case. Camshaft assembly tangs should point toward top of case and rest on high-low shift fork assembly.
25. Lift 2WD/4WD shift fork slightly while holding shift rail down. Rotate helical cam track into high-low and 2WD/4WD fork roller bushings by turning camshaft assembly.

NOTE: The triangular shaft will be in 2 wheel high position at final assembly.

26. If disassembled, assemble shift collar hub to clutch housing. Install snap ring. Install clutch housing assembly on output shaft.
27. Install new "O" rings on clutch coil assembly studs and grommet. Install clutch coil assembly from inside rear cover until wire and studs extend through cover. Ensure Brown wire exits case and is not pinched.

Final Reassembly (Manual Shift Models)

1. Install speedometer drive gear assembly into rear cover bore with round end of speedometer gear clip facing toward inside of rear cover. Drive oil seal into rear cover bore.
2. Transfer case shift lever assembly should be shifted into "4H" detent position to assure positioning of shift rail to rear cover.
3. Coat mating surface of front case with a bead of RTV sealer. Install 2WD/4WD shift fork spring on shift rail and shift fork with spring mounted in vertical position.
4. Position rear cover on front case so that spring boss engages 2WD/4WD shift fork spring and shift rod. Install bolts and tighten.

CAUTION: If rear cover assembly does not seat properly, move rear cover up and down slightly to permit end of shift rail to enter shift rail hole

in rear cover boss.

5. Install rear yoke on output shaft. Install rubber seal, washer, and nut. Tighten nut to specifications. For "STX" models, install front yoke on output shaft, rubber seal, steel washer and lock nut.
6. Install 4WD indicator switch and breather plug. Install drain plug. Fill transfer case with Dexron II ATF. Install fill plug.

Final Reassembly (Electronic Shift Models)

1. Coat mating surface of front case with a bead of RTV sealer. Install 2WD/4WD shift fork spring on shift rail and shift fork with spring mounted in vertical position.
2. Position rear cover on front case so that output shaft aligns with rear cover output shaft bore. Camshaft assembly must align with rear cover motor bore.
3. If cover will not seat, tap output shaft with rubber mallet in direction away from triangular shaft while pushing down on rear cover. Another method is to insert screwdriver through sensor bore in rear cover so blade engages slot in middle of 2WD/4WD shift fork. Move fork toward triangular shaft to engage shift rail in rear cover bore.
4. Install and tighten transfer case cover bolts. Using pliers with wood or copper jaws, rotate triangular shaft it aligns with triangular slot in motor. Install electric motor and tighten retaining screws.
5. If shaft will not stay in 4WD high position, rotate shaft to 2WD position. Install motor and rotate counterclockwise until motor is aligned with mounting holes.
6. Install speed sensor and retaining bracket. Reconnect Brown, Green and Blue wires into connector. Install locking sleeve into connector.
7. If removed, install wire harness bracket on rear cover. Install speedometer drive gear in rear cover bore. Install oil seal in rear cover bore.
8. Install rear companion flange on output shaft. Install rubber seal, washer, and nut. Tighten nut.
9. Install breather plug and drain plug. Fill transfer case with Dexron II ATF. Install fill plug.