



1981
DATSUN
210

SERVICE MANUAL



DATSUN 210

Model B310 Series

FOREWORD

This service manual has been prepared primarily for the purpose of assisting service personnel in providing effective service and maintenance of the 1981 DATSUN 210.

This manual includes procedures for maintenance, adjustments, removal and installation, disassembly and assembly of components, and trouble-shooting.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your DATSUN model differs from the specifications contained in this manual, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

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Printed in Japan

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HOW TO USE THIS MANUAL

- ▶ This Service Manual is designed as a guide for servicing cars.
- ▶ This manual is divided into 19 sections. The first half of the manual presents sections which concern the engine, and the second half presents sections which deal with the chassis and body.
- ▶ A **QUICK REFERENCE INDEX** is provided on the first page. Refer to this index along with the index of the particular section you wish to consult.
- ▶ The first page of each section lists the contents and gives the page numbers for the respective topics.
- ▶ **SERVICE DATA AND SPECIFICATIONS** are contained in each section.
- ▶ **TROUBLE DIAGNOSES AND CORRECTIONS** are also included in each section. This feature of the manual lists the likely causes of trouble and recommends the appropriate corrective actions to be taken.
- ▶ A list of **SPECIAL SERVICE TOOLS** is included in each section. The special service tools are designed to assist you in performing repair safely, accurately and quickly. For information concerning how to obtain special service tools, write to the following address:

Kent-Moore Corporation
29784 Little Mack
Roseville, Michigan 48066

Kent-Moore of Canada, Ltd.
2395 Cawthra
Mississauga, Ontario
Canada L5A 3P2

- ▶ The measurements given in this manual are primarily expressed with the SI unit (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.
- ▶ The back cover of the manual provides maintenance data for quick reference.
- ▶ In the text, the following abbreviations are used:

S.D.S.: Service Data and Specifications
T: Tightening Torque

L.H., R.H.: Left Hand, Right Hand
M/T, A/T: Manual Transmission, Automatic Transmission

- ▶ The captions **CAUTION** and **WARNING** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the car.



IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the car.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the car's safety will be jeopardized by the service method selected.

MANUAL TRANSMISSION

SECTION MT

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REMOVAL AND INSTALLATION

REMOVAL

To dismount transmission from the car, proceed as follows:

1. Disconnect battery ground cable.
2. Remove console box and detach rubber boots if so equipped.
3. Place transmission control lever in neutral position.
- 4.
- F4W56A
- (1) Remove E-ring and control lever.



TM013A

- FS5W60A, F4W60L
- (2) Remove control lever.



TM7B1

5. Jack up the car and support its weight on safety stands. Use a hydraulic hoist or open pit, if available. Make sure that safety is insured.
 6. Disconnect front exhaust tube and remove bolt securing exhaust mounting bracket.
 7. Disconnect wires from reverse (back-up) lamp, Neutral, Top and O.D. gear (if so equipped) switches.
 8. Disconnect speedometer cable.
 9. Remove propeller shaft.
- Refer to Propeller Shaft (Section PD) for removal.

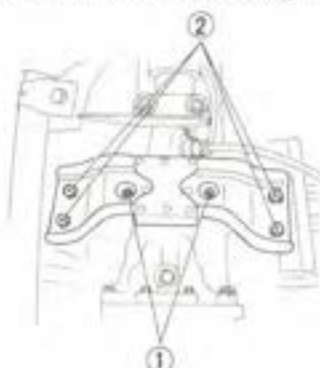
Note: Plug up the opening in the rear extension to prevent oil from flowing out.

10. Remove clutch operating cylinder.
11. Support engine by placing a jack under oil pan with a wooden block used between oil pan and jack.

CAUTION:

Do not place the jack under the oil pan drain plug.

12. Support transmission with a transmission jack.
13. Loosen rear engine mount securing bolts (1) temporarily and remove crossmember mounting bolts (2).



SMT163

14. Remove starter motor.
15. Remove bolts securing transmission to engine and gusset.

Then, support the engine and transmission with jacks, and slide transmission rearward away from engine and remove from the car.

CAUTION:

Take care in dismounting transmission not to strike any adjacent parts and main drive gear.

INSTALLATION

Install the transmission in the reverse order of removal, paying attention to the following points:

1. Before installing, clean mating surfaces of engine rear plate and transmission case.
2. Before installing, lightly apply grease to spline parts of clutch disc and main drive gear. And also apply grease to moving surfaces of control lever and striking rod.
3. Remove filler plug and fill transmission with recommended gear oil to the level of the plug hole.

Oil capacity:

FS5W60A, F4W56A

1.2 liters

(2-1/2 US pt, 2-1/8 Imp pt)

F4W60L

1.3 liters

(2-3/4 US pt, 2-1/4 Imp pt)

4. Apply sealant to threads of filler plug, and install filler plug to transmission case.

T : Filler plug

25 - 39 N·m

(2.5 - 4.0 kg·m,

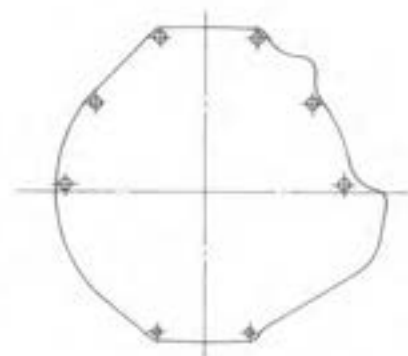
18 - 29 ft·lb)

5. Tighten bolts securing transmission to engine.

T : 16 - 22 N·m

(1.6 - 2.2 kg·m,

12 - 16 ft·lb)



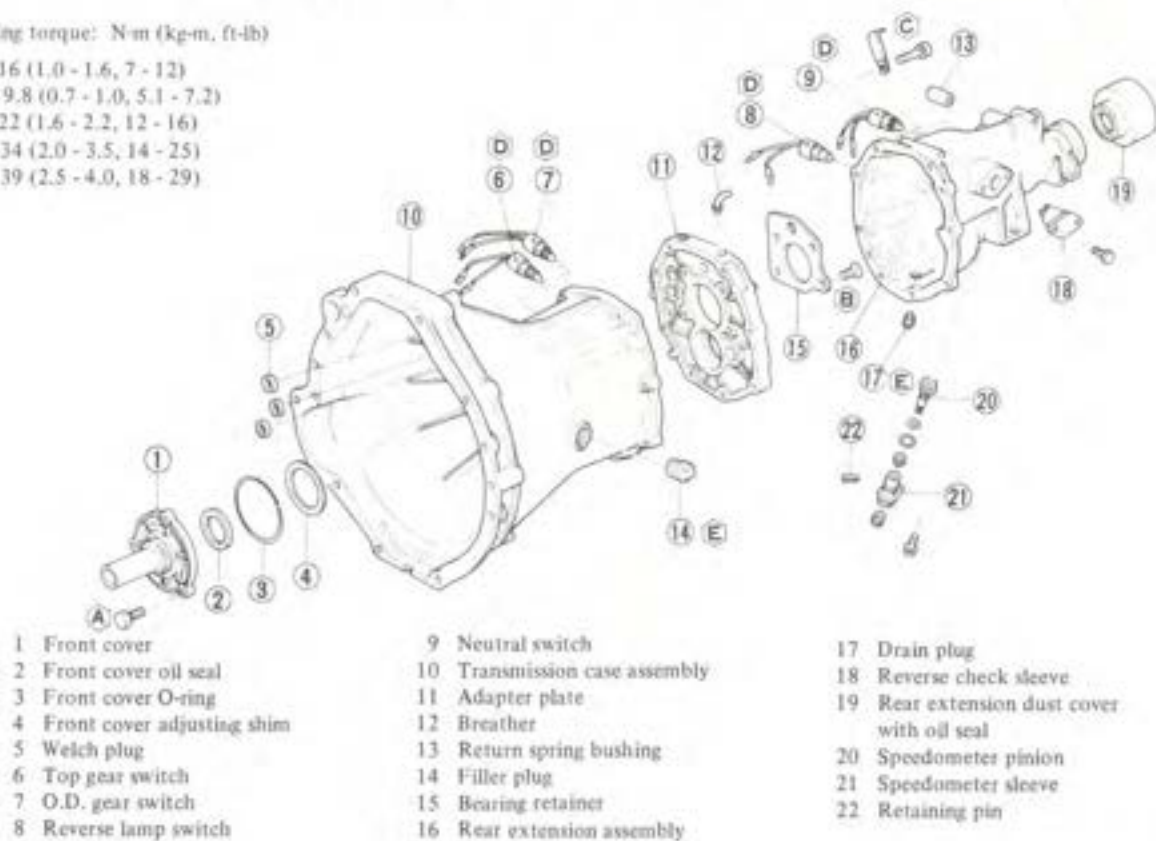
SMT164

6. Lubricate oil seal lip and bushing on rear extension with gear oil for initial lubrication.

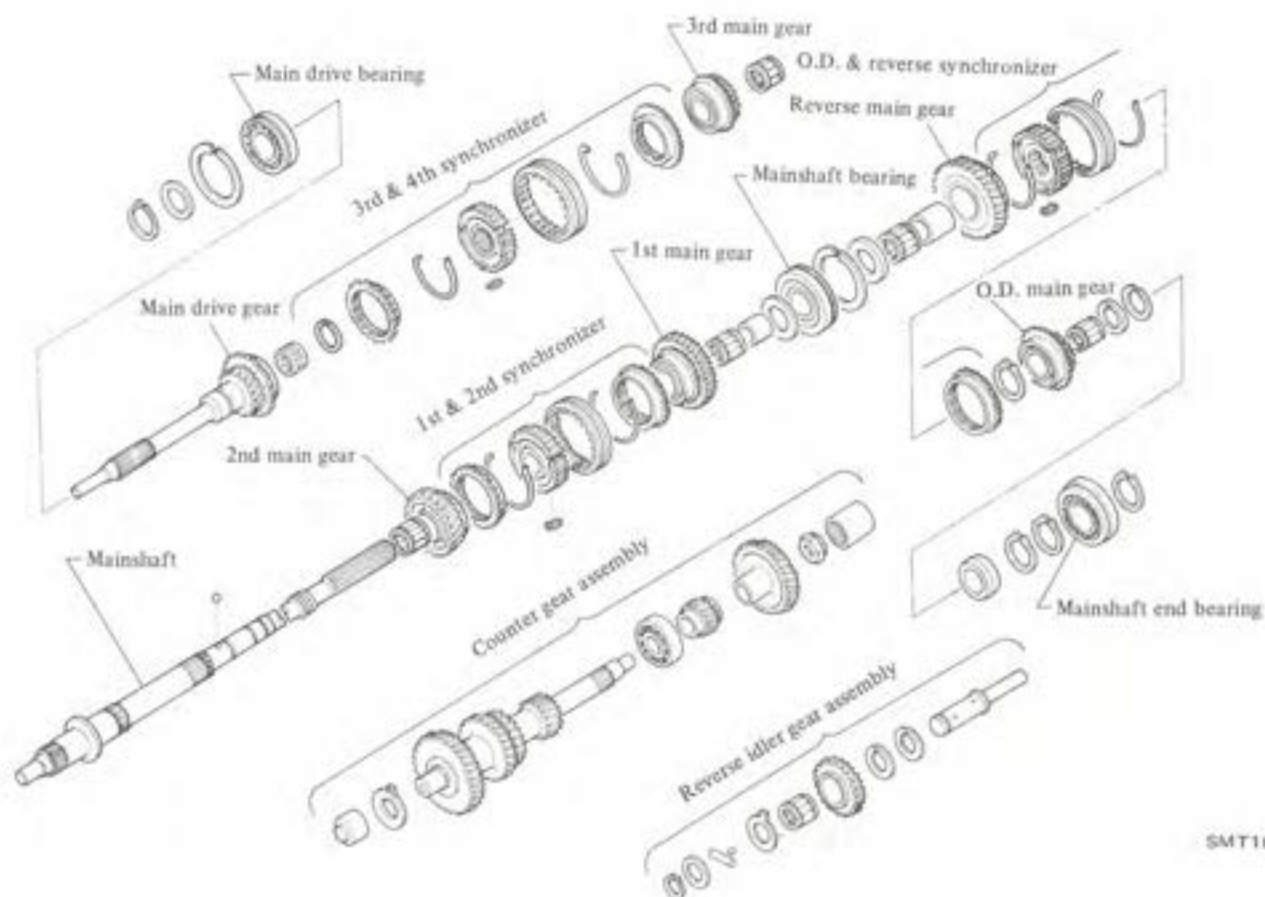
5-SPEED TRANSMISSION (Model : FS5W60A)

Tightening torque: N·m (kg-m, ft-lb)

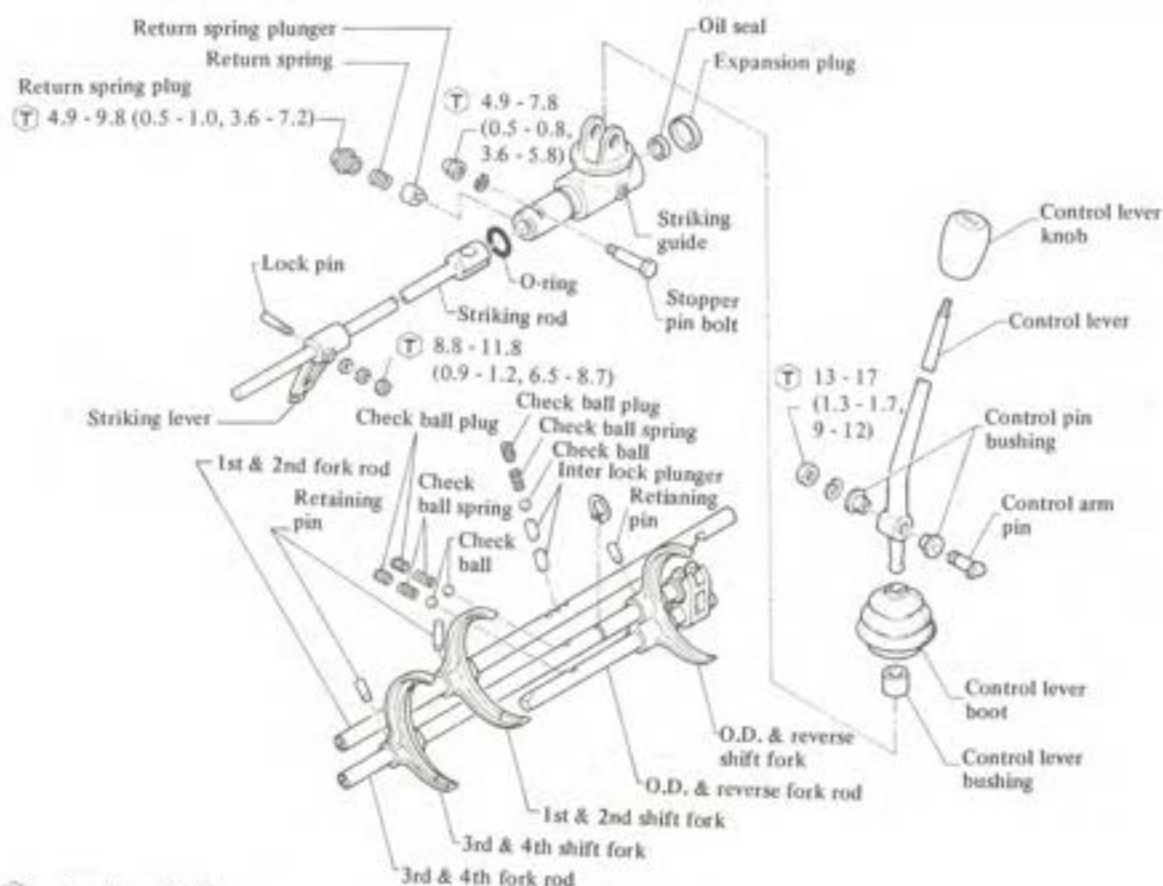
- A 10 - 16 (1.0 - 1.6, 7 - 12)
 B 6.9 - 9.8 (0.7 - 1.0, 5.1 - 7.2)
 C 16 - 22 (1.6 - 2.2, 12 - 16)
 D 20 - 34 (2.0 - 3.5, 14 - 25)
 E 25 - 39 (2.5 - 4.0, 18 - 29)



SMT165



SMT166



SMT167

DISASSEMBLY

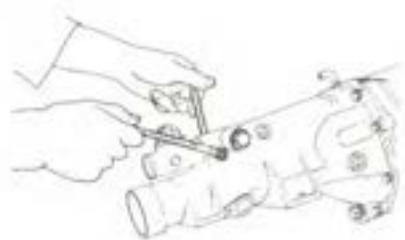
TRANSMISSION CASE DISASSEMBLY

1. Prior to disassembling transmission, thoroughly wipe off dirt and grease from it.
2. Drain oil thoroughly.
3. Remove dust cover from transmission case.

Remove release bearing and withdrawal lever.

4. Remove reverse lamp, neutral, Top and O.D. gear switches (if so equipped).
5. Remove speedometer pinion assembly.

6. Remove nut and stopper pin bolt from rear end of rear extension.



TM783

7. Remove return spring plug, return spring, and plunger from rear extension.



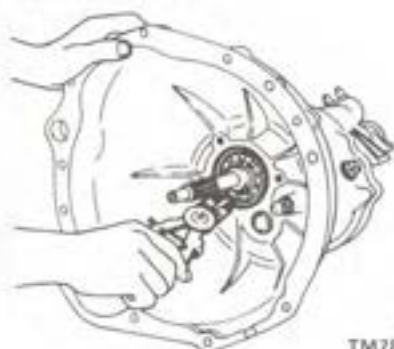
TM784

8. Remove reverse check sleeves assembly.
9. Remove front cover. Detach O-ring and front cover adjusting shim.



TM785

10. Remove main drive bearing snap ring with snap ring pliers.



TM786

11. Remove rear extension securing bolts and turn striking rod clockwise.

Drive out rear extension backward using a standard puller.



STM170

12. Separate transmission case from adapter plate by evenly tapping around it with a soft hammer.

CAUTION:

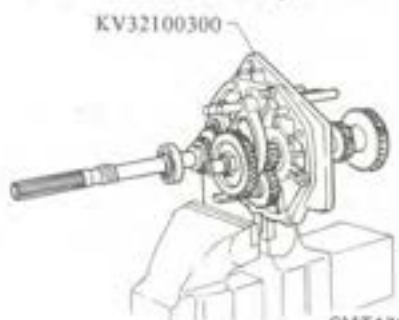
Do not pry transmission case or rear extension from adapter plate with screwdriver.



SMT171

13. Set up Adapter Setting Plate KV32100300 on adapter plate.

Place the above assembly in a vise.



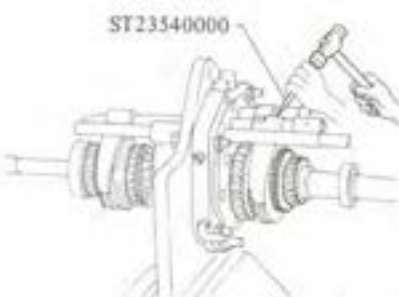
SMT172

14. Detach counter gear thrust washer.

DISASSEMBLY OF GEAR ASSEMBLY

Shift forks and fork rods

1. Drive out retaining pins from each fork rod with Fork Rod Pin Punch ST23540000.



SMT173

2. Remove three (3) check ball plugs.



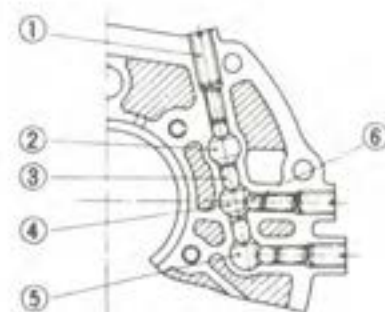
SMT174

3. Drive out fork rods from adapter plate by lightly tapping on the front end.

Detach shift forks.

Note:

- a. Be careful not to lose three (3) check balls and two (2) interlock plungers.
- b. Each gear and shaft can be detached from adapter plate without removing each fork rod.



- 1 Check ball plug
- 2 Fork rod (1st & 2nd)
- 3 Interlock plunger
- 4 Fork rod (3rd & 4th)
- 5 Fork rod (O.D. & Reverse)
- 6 Check ball

TM793

Gear assembly

Note: It is necessary to measure end play, before disassembling mainshaft and after reassembling mainshaft. Refer to Inspection for Gears and Shafts.

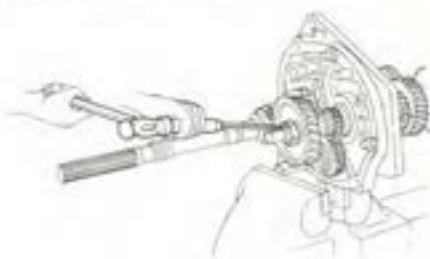
1. Remove snap ring of mainshaft end bearing. Draw out bearing using Bearing Puller KV32101330. Remove

other snap ring of mainshaft end bearing.



SMT176

2. With 1st and reverse gears doubly engaged, release staking on counter gear nut then loosen it.



SMT177

3. Remove following parts from mainshaft and counter shaft in rear extension side:

- (1) Counter gear nut.
- (2) Mainshaft holder snap ring, C-ring holder, C-ring and thrust washer.



SMT178

(3) Remove O.D. main gear with needle bearing and O.D. counter gear at the same time.

(4) Remove baulk ring, coupling sleeve, O.D. and reverse synchronizer hub snap ring, O.D. and reverse synchronizer hub, and reverse main gear together with needle bearing and bushing, and reverse counter gear simultaneously.



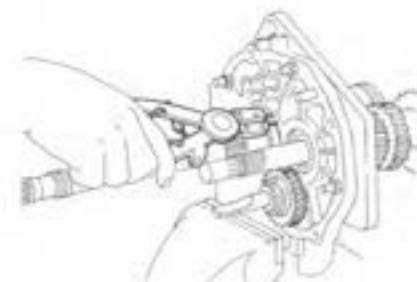
SMT179

- (5) Thrust washer.
4. Remove four (4) bearing retainer attaching screws with an impact driver and remove bearing retainer.



SMT183

5. Remove snap ring from mainshaft rear bearing using snap ring pliers.

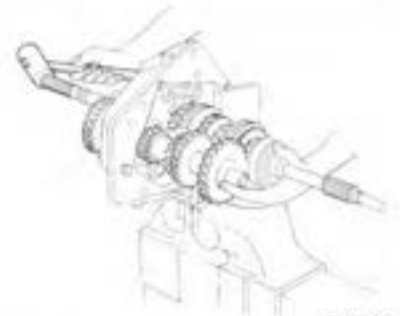


SMT184

6. Drive out mainshaft gear assembly together with counter gear assembly by lightly tapping the rear end with a soft hammer while holding the front of mainshaft gear assembly and counter gear assembly by hand.

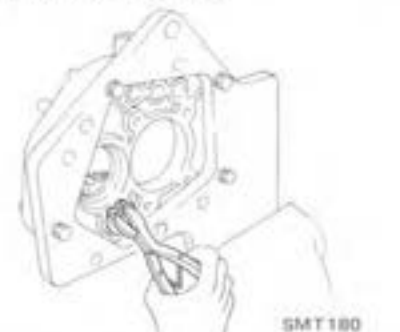
Remove counter gear, main drive gear and mainshaft assembly in that order.

CAUTION:
Be careful not to drop gears.



SMT185

7. Remove snap ring and spacer from reverse idler shaft.



SMT180

8. Tap reverse idler shaft.



SMT181

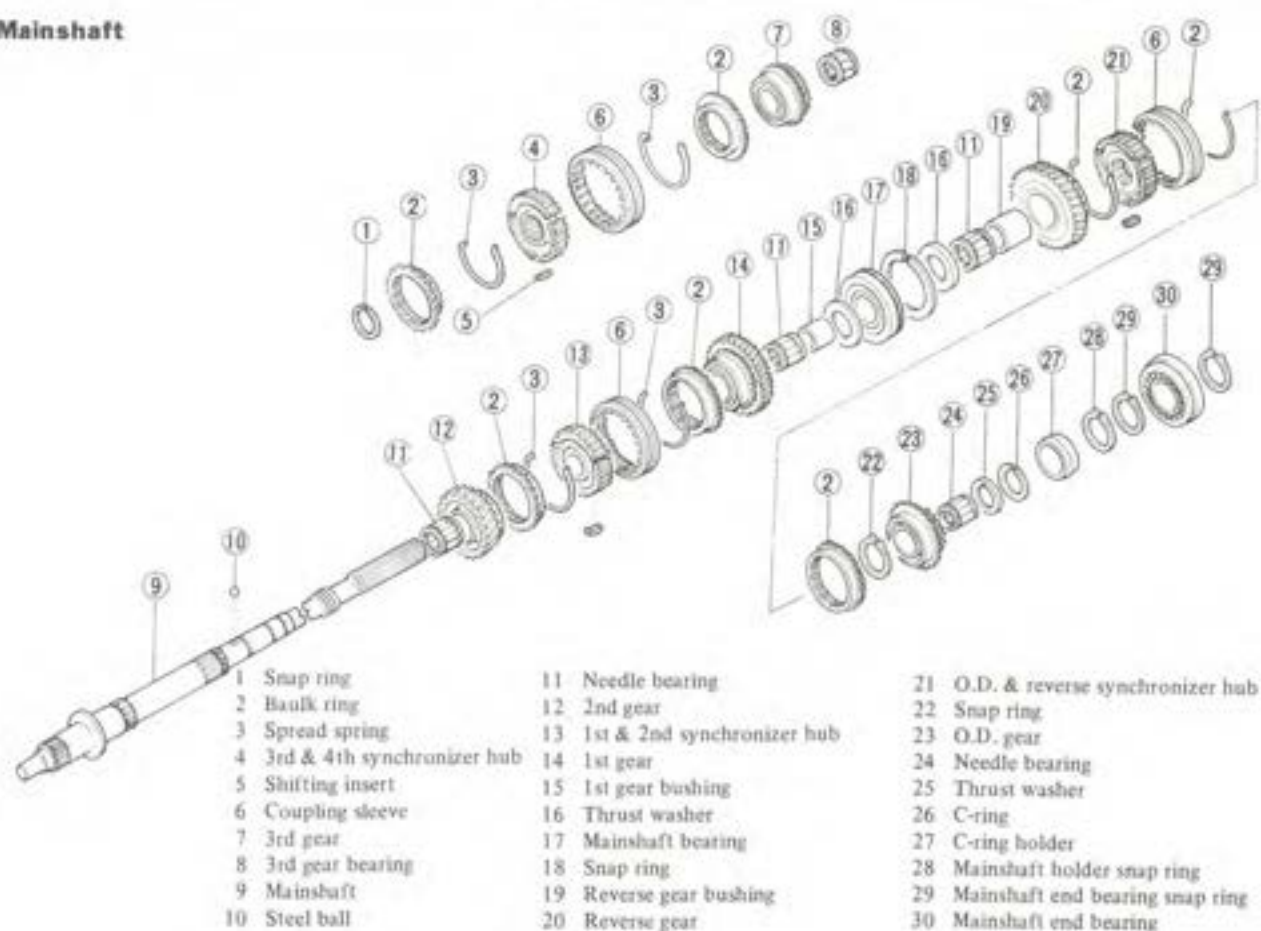
9. Draw out retaining pin from reverse idler shaft with Fork Rod Pin Punch ST23540000 and remove idler shaft.



SMT182

10. Remove thrust washers, spacer and reverse idler gear with needle bearing.

Mainshaft



SMT186

Disassemble mainshaft gear assembly as follows:

1. Remove snap ring from mainshaft front end.

Remove 3rd & 4th synchronizer assembly, baulk rings, 3rd gear and mainshaft needle bearing toward front side.



2. Press out mainshaft bearing using Bearing Puller ST30031000.

CAUTION:

When pressing out bearing, hold main shaft by hand so as not to drop it.



3. Remove thrust washer and 1st gear together with needle bearing and bushing, baulk rings, coupling sleeve, 1st and 2nd synchronizer hub and 2nd gear with needle bearing.

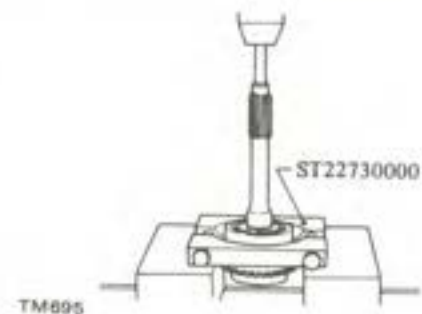
Main drive gear

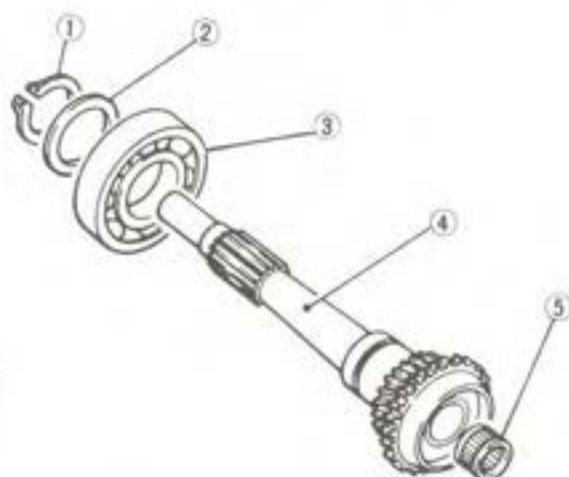
1. Remove snap ring and spacer with snap ring pliers.

2. Press out main drive bearing with Bearing Puller ST22730000 and a suitable press.

CAUTION:

When pressing out bearing, hold gear by hand so as not to drop it.

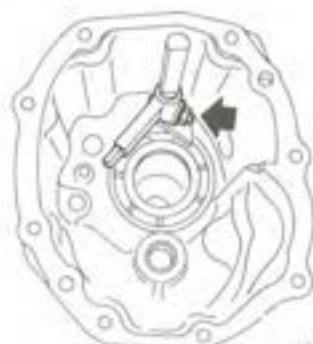




- 1 Snap ring
- 2 Spacer
- 3 Main drive bearing
- 4 Main drive gear
- 5 Pilot bearing

TM696

1. Remove lock pin nut and lock pin from striking lever. Remove striking lever.



SMT181

2. Remove oil seal with dust cover from rear end of rear extension, and remove striking rod and striking guide.

Note: Do not remove rear extension bushing from rear extension.

INSPECTION

Wash all parts in a suitable cleaning solvent and check for wear, damage or other faulty conditions.

CAUTION:

- a. Be careful not to damage any parts with scraper.
- b. Do not clean, wash or soak oil seals in solvent.

TRANSMISSION CASE AND REAR EXTENSION

1. Check for cracks which might cause oil leak or other faulty conditions.
2. Check mating surface of case to engine or adapter plate for small nicks, projection or sealant.
Remove all nicks, projection or sealant with a fine stone.
3. If rear extension bushing is worn or cracked, replace it as an assembly of bushing and rear extension.

BEARINGS

1. Thoroughly clean bearing and dry with compressed air.

CAUTION:

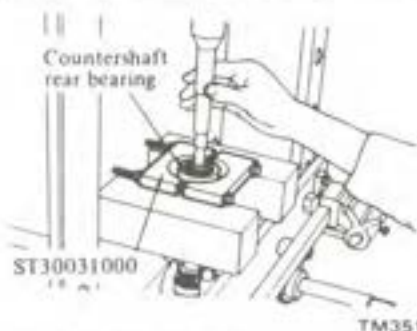
Do not allow the bearings to spin. Because it will damage the race and balls. Turn them slowly by hand.

Counter gear

Press out countershaft rear bearing using Bearing Puller ST30031000.

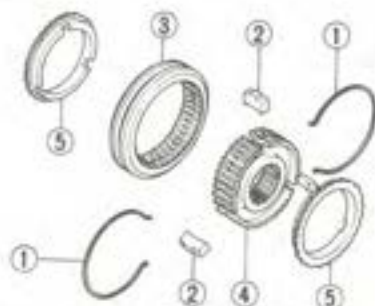
CAUTION:

When pressing out bearing, hold shaft by hand so as not to drop it.



Synchronizer

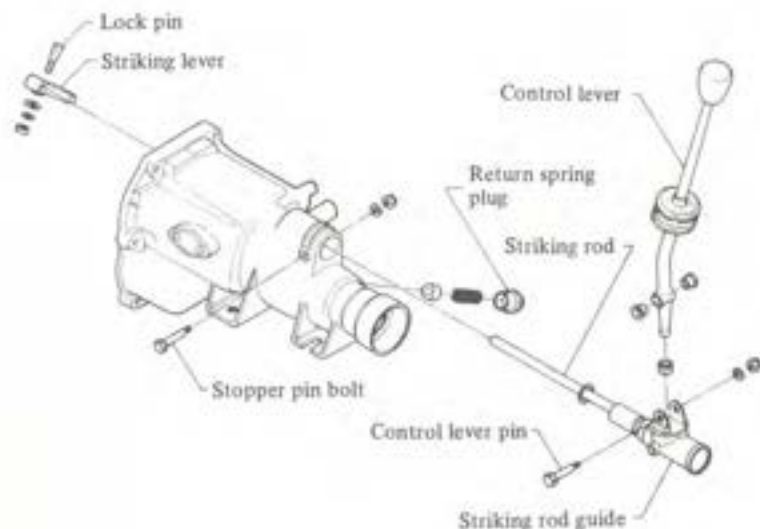
1. Remove spread spring ① and take out shifting insert ②.
2. Separate coupling sleeve ③ from synchro hub ④.



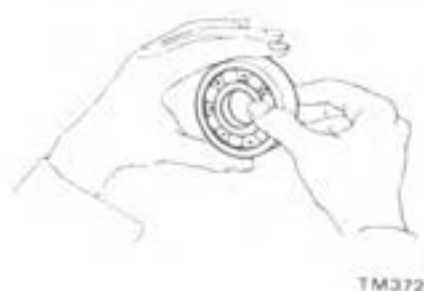
- 1 Spread spring
- 2 Shifting insert
- 3 Coupling sleeve
- 4 Synchro hub
- 5 Baulk ring

SMT187

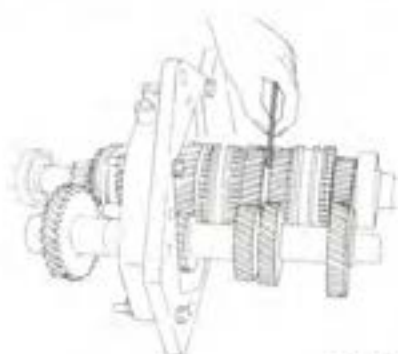
REAR EXTENSION DISASSEMBLY



SMT188



TM372



SMT190

2. When race and ball surfaces are worn or rough, or when balls are out-of-round or rough, replace bearing.
3. Replace needle bearing if worn or damaged.

GEARS AND SHAFTS

1. Check all gears for excessive wear, chips or cracks; replace as required.
2. Check shaft for bending, crack, wear, or worn spline; if necessary, replace.
3. It is necessary to measure end play, before disassembling mainshaft and after reassembling mainshaft. Measure end play to insure that it is within specified limit. If end play is not within specified limit, disassemble and check parts for condition. Replace any part which is worn or damaged.

Standard end play:

- 1st main gear
0.15 - 0.25 mm
(0.0059 - 0.0098 in)
- 2nd main gear
0.30 - 0.40 mm
(0.0118 - 0.0157 in)
- 3rd main gear
0.15 - 0.35 mm
(0.0059 - 0.0138 in)
- O.D. (5th) main gear
0.30 - 0.40 mm
(0.0118 - 0.0157 in)
- Reverse main gear
0.30 - 0.55 mm
(0.0118 - 0.0217 in)
- Counter gear
0.10 - 0.20 mm
(0.0039 - 0.0079 in)
- Reverse idler gear
0 - 0.20 mm
(0 - 0.0079 in)

4. Check for stripped or damaged speedometer pinion gear. If necessary, replace.

BAULK RING

1. Replace any baulk ring which is deformed or cracked.
2. Position baulk ring in place on gear cone, and measure the baulk ring-to-gear clearance with baulk ring pushed toward gear.

If the clearance is smaller than the specified value, replace baulk ring.

Standard baulk ring-to-cone clearance:

1.10 - 1.40 mm
(0.0433 - 0.0551 in)

If it is less than 0.5 mm (0.020 in), a worn baulk ring may be the cause and a new ring should be fitted.



TM806

SHIFTING INSERT

Replace, if worn excessively, worn unevenly, deformed, or damaged.

OIL SEAL

1. Discard O-ring or oil seal which is once removed. Replace oil seal if sealing lip is deformed or cracked. Also discard oil seal if spring is out of position.

2. Check the oil seal lip contacting with shaft; if necessary replace oil seal and shaft as a set.

REAR ENGINE MOUNTING INSULATOR

Replace rear engine mounting insulator, if weakened, deteriorated, or cracked.

ASSEMBLY

To assemble, reverse the order of disassembly. Observe the following instructions.

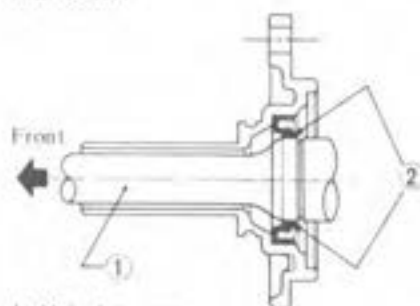
FRONT COVER ASSEMBLY

1. Make sure that seal mating surface is clean.

Using a press and Oil Seal Drift ST23800000, drive new seal into place on front cover.

Note: When pressing oil seal into place, apply coat of gear oil to surface adjoining oil seal.

2. Lubricate seal lip and main drive shaft with gear oil when installing front cover.



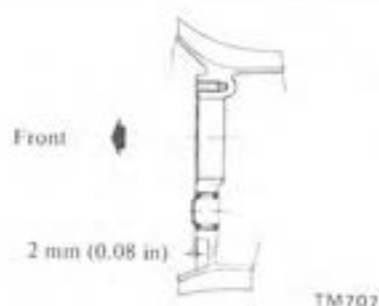
TM098A

TRANSMISSION CASE ASSEMBLY

1. Press countershaft needle bearing into transmission case from outside.

Note:

- a. Needle bearing should not be re-used after removal.
- b. When installing needle bearing, be sure to project it 2 mm (0.08 in) from transmission case front surface.
- c. Make sure that needle bearing turns smoothly.
- d. After installing needle bearing, apply multi-purpose grease to the bearing surface.



Countershaft Needle Bearing

2. Install withdrawal lever ball pin on case and tighten screw.

Ⓣ : Ball pin
 20 - 29 N·m
 (2.0 - 3.0 kg·m,
 14 - 22 ft·lb)

REAR EXTENSION ASSEMBLY

1. Apply grease to O-ring and plunger grooves in striking rod guide.
- Insert striking rod with striking rod guide through rear extension.

2. Install striking lever on front end of striking rod. Install lock pin and nut, and tighten it.

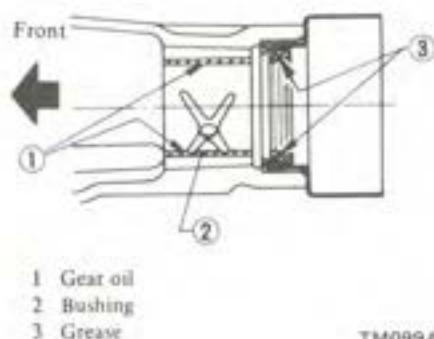
Ⓣ : Striking lever lock nut
 9 - 12 N·m
 (0.9 - 1.2 kg·m,
 6.5 - 8.7 ft·lb)

3. When installing expansion plug, apply sealant to it.
4. Make sure that seal mating surface is clean.

Using a press and Oil Seal Drift ST35300000, drive new seal into place on rear extension.

Note: When pressing oil seal into place, apply coat of gear oil to surface adjoining oil seal.

5. Coat oil seal lip and bushing with gear oil for initial lubrication. Pack cavity between seal lips with recommended multi-purpose grease when installing.



ASSEMBLY OF GEAR ASSEMBLY

Clean all parts in solvent and dry with compressed air.

Synchronizers

1. Place synchro hub into coupling sleeve.
2. Fit shifting inserts in three grooves in synchronizer hub.
3. Install spread spring to inserts so that insert is securely attached to inner side of coupling sleeve.

Install the other spread spring on the opposite side of synchro hub.

Note:

- a. Be careful not to hook front and rear ends of the spread spring to the same insert.
- b. Be sure that hub and sleeve operates smoothly and correctly by hand.



Mainshaft

1. Assemble 2nd gear needle bearing, 2nd gear, baulk ring, 1st & 2nd speed synchronizer assembly, 1st gear baulk ring, 1st gear bushing, needle bearing, 1st gear, and thrust washer on mainshaft.
2. Press mainshaft bearing onto mainshaft using Mainshaft Bearing Drift ST22350000.



3. Position 3rd gear needle bearing, 3rd gear, baulk ring, and 3rd & 4th synchronizer assembly on the front side of mainshaft.
4. Fit a new suitable snap ring in place so that there exists a minimum clearance between end face of hub and ring.

Note: Make sure snap ring fits in groove.

Available snap rings

No.	Thickness mm (in)
1	1.55 - 1.60 (0.0610 - 0.0630)
2	1.60 - 1.65 (0.0630 - 0.0650)
3	1.65 - 1.70 (0.0650 - 0.0669)



Main drive gear

1. Press main drive gear bearing onto shaft of main drive gear using Transmission Drift ST23800000.

Make sure that snap ring groove on shaft clears bearing.



2. Place main drive bearing spacer on main drive bearing and secure main drive bearing with a new thicker snap ring that will eliminate end play.

Note: Make sure snap ring fits in groove.

**Available snap rings**

No.	Thickness mm (in)
1	1.34 - 1.40 (0.0528 - 0.0551)
2	1.40 - 1.46 (0.0551 - 0.0575)
3	1.46 - 1.52 (0.0575 - 0.0598)
4	1.52 - 1.58 (0.0598 - 0.0622)
5	1.58 - 1.64 (0.0622 - 0.0646)
6	1.64 - 1.70 (0.0646 - 0.0669)
7	1.70 - 1.76 (0.0669 - 0.0693)

Counter gear

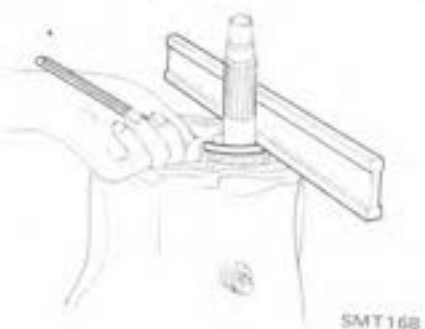
1. Install a counter gear thrust washer and counter gear into transmission case, and select counter gear thrust washer of proper thickness using straight edge.

Select washer from those shown in the following table so that end play of counter gear is specified value.

Standard end play:
0.10 - 0.20 mm
(0.0039 - 0.0079 in)

No.	Thickness mm (in)
1	2.20 - 2.25 (0.0866 - 0.0886)
2	2.25 - 2.30 (0.0886 - 0.0906)
3	2.30 - 2.35 (0.0906 - 0.0925)
4	2.35 - 2.40 (0.0925 - 0.0945)
5	2.40 - 2.45 (0.0945 - 0.0965)
6	2.45 - 2.50 (0.0965 - 0.0984)
7	2.50 - 2.55 (0.0984 - 0.1004)
8	2.55 - 2.60 (0.1004 - 0.1024)

Note: Be sure to measure at two or more positions on the end surface of counter gear.



2. Remove counter gear from the transmission case.

Reverse idler gear

1. Position thrust washers, needle bearing, reverse idler gear and thrust washer.

2. Insert new retaining pin to reverse idler shaft.

Assembly to adapter plate

1. Install reverse idler shaft by tapping with drift.
2. Install thrust washer, reverse idler gear, steel ball and two thrust washers.
3. Position thrust washer and fit a new snap ring in place so that reverse idler gear end play is within specified limit.

Reverse idler gear end play:
0 - 0.20 mm (0 - 0.0079 in)

Available snap rings

No.	Thickness mm (in)
1.	1.1 (0.043)
2.	1.2 (0.047)

4. Install baulk ring on main drive gear, and combine with mainshaft to complete the mainshaft assembly.

Note: Be sure to install pilot bearing in place when combining with mainshaft.

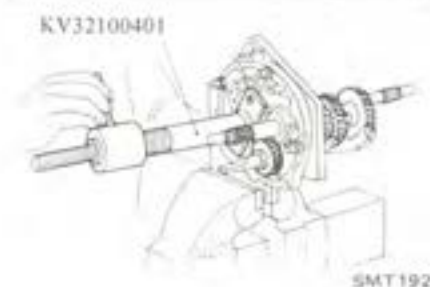
5. Combine mainshaft assembly with counter gear assembly, and place them into adapter plate simultaneously.

6. Install counter gear assembly together with mainshaft assembly by applying light blows with a soft-faced hammer. Then pull mainshaft assembly into adapter plate using Mainshaft Puller KV32100401. When installing mainshaft assembly, carefully hold gears by hand.

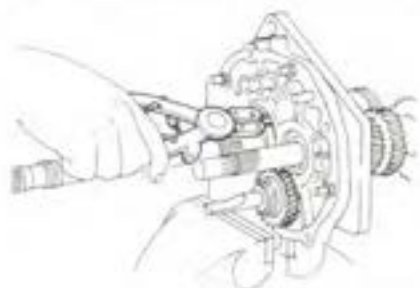
Make sure that snap ring groove on mainshaft rear bearing clears adapter plate.

CAUTION:

- Take care not to drop gears on floor.
- Take care not to damage bearings.



7. Fit snap ring to groove in mainshaft rear bearing with snap ring pliers.



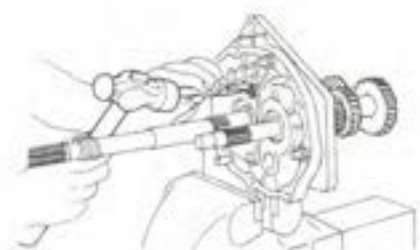
SMT258

Note: Make sure snap ring fits in groove.

8. Install bearing retainer on adapter plate.

Torque screws and stake each screw at two points with a punch.

ⓘ: Mainshaft bearing retainer screw
6.9 - 9.8 N·m
(0.7 - 1.0 kg·m,
5.1 - 7.2 ft·lb)



SMT193

Note: Make sure snap ring fits in groove.

9. Position thrust washer, reverse gear bushing, needle bearing and reverse main gear on end of mainshaft.

10. Install reverse counter gear on end of countershaft.

11. Install O.D. & reverse synchronizer assembly and fit a new suitable snap ring in place so that reverse main gear end play is within specified limit.

Reverse main gear end play:
0.30 - 0.55 mm
(0.0118 - 0.0217 in)

Note: Make sure snap ring fits in groove.

Available snap rings

No.	Thickness mm (in)
1.	1.32 (0.0520)
2.	1.38 (0.0543)
3.	1.46 (0.0575)
4.	1.54 (0.0606)
5.	1.62 (0.0638)

12. Position baulk ring, O.D. gear needle bearing, O.D. main gear and steel ball, on end of mainshaft.

13. Install O.D. counter gear on end of countershaft.

14. Position C-ring, C-ring holder and thrust washer in place and select thrust washer so that O.D. gear end play is within specified limit.

O.D. (5th) gear end play:
0.30 - 0.40 mm
(0.0118 - 0.0157 in)

Note: Make sure snap ring fits in groove.

Available thrust washers

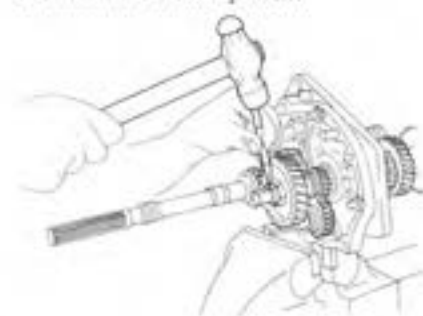
No.	Thickness mm (in)
1.	7.87 (0.3098)
2.	7.94 (0.3126)
3.	8.01 (0.3154)
4.	8.08 (0.3181)
5.	8.15 (0.3209)
6.	8.22 (0.3236)

15. With 1st and reverse gears doubly engaged, tighten countershaft nut to converted torque "C" using Wrench KV3210500.

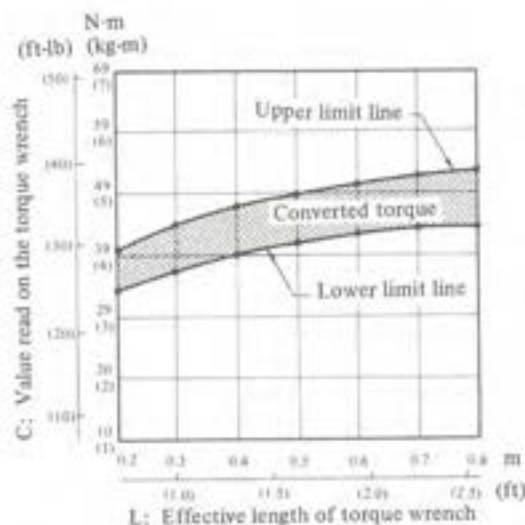


SMT194

Stake countershaft nut to groove of countershaft with a punch.



SMT195



SMT196

Explanation of converted torque

Mainshaft nut should be tightened to 49 to 59 N·m (5 to 6 kg-m, 36 to 43 ft-lb) torque with the aid of Wrench KV32101500. When doing so, the amount of torque to be read on wrench needle should be modified according to the following formula:

$$C \text{ N·m} = 49 \times \left(\frac{L}{L+0.1} \right) \text{ to}$$

$$59 \times \left(\frac{L}{L+0.1} \right),$$

or

$$C \text{ (kg-m)} = 5 \times \left(\frac{L}{L+0.1} \right) \text{ to}$$

$$6 \times \left(\frac{L}{L+0.1} \right)$$

or

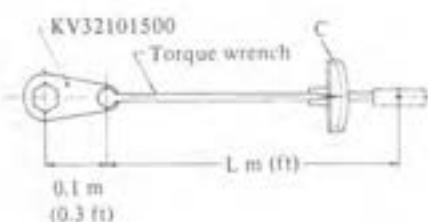
$$C \text{ (ft-lb)} = 36 \times \left(\frac{L}{L+0.33} \right) \text{ to}$$

$$43 \times \left(\frac{L}{L+0.33} \right)$$

Where,

C: Value read on the torque wrench
N·m (kg-m, ft-lb)

L: Effective length of torque wrench
m (ft)



TM587

Example,

when a 0.4 m-long torque wrench is used, the "C" in figure will be 39 to 47 N·m (4.0 to 4.8 kg-m, 29 to 35 ft-lb).

16. Measure gear end play.

Make sure that they are held within the specified values.

For details, refer to Gears and Shafts for inspection.

17. Fit 1.15 mm (0.0453 in) thick snap ring to the front side of mainshaft end bearing.

18. Install mainshaft end bearing using Bearing Drift ST22350000. Fit thick snap ring to the rear side of bearing to eliminate end play.

Available snap rings

No.	Thickness mm (in)
1.	1.15 (0.0453)
2.	1.2 (0.047)



Shift forks and fork rods

1. Insert O.D. & reverse fork rod into its shift fork and adapter plate.
2. With O.D. & reverse fork rod set at Neutral, insert interlock plunger into adapter plate.
3. Insert 3rd & 4th fork rod into O.D. & reverse fork and fit a new snap ring to 3rd & 4th fork rod.
4. Insert 3rd & 4th fork rod into adapter plate and its shift fork.
5. With 3rd & 4th fork rod set at Neutral, insert interlock plunger into adapter plate.

6. Insert 1st & 2nd fork rod into adapter plate and its shift fork.

7. Secure shift forks and fork rods with new retaining pins.

Note:

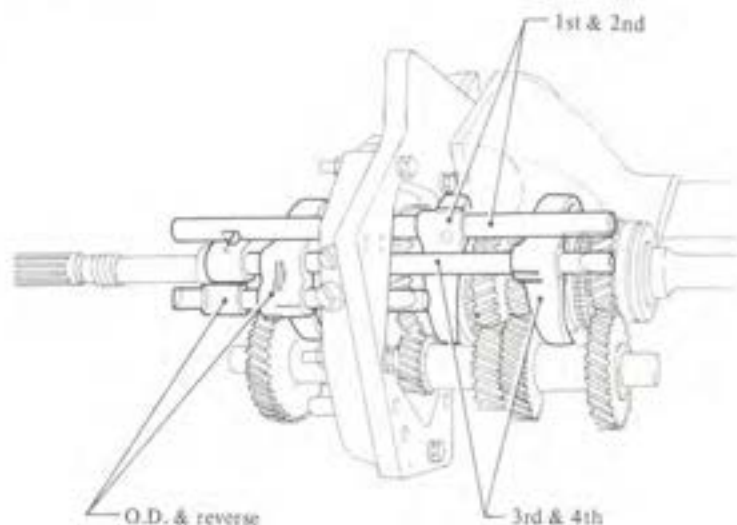
- a. Be sure to install interlock plunger when installing any adjacent fork rods to adapter plate. Properly align the groove in assembled fork rod with interlock plunger.
- b. Be sure to align 3rd & 4th shift fork with the groove in their coupling sleeve before installing.
- c. Also properly align 1st & 2nd and O.D. & reverse shift forks with their coupling sleeves before installing.

8. Install check balls and check ball springs. Applying locking sealer to check ball plug and install in place.

Align center notch in each fork rod with check ball.

Note:

- a. Check ball plug as 1st & 2nd fork rod is longer than those for 3rd & 4th fork rod and O.D. & reverse fork rod.
 - b. To insure that interlock plunger is installed properly, slide 1st & 2nd fork rod and operate the other fork rods. Make sure that gears except 1st and 2nd gear do not mesh.
9. Apply gear oil to all sliding surfaces and check to see that shift rods operate correctly and gears engage smoothly.



SMT 199

TRANSMISSION ASSEMBLY

Transmission case assembly

1. Remove adapter plate with gear assembly from Adapter Setting Plate KV32100300.

2. Clean mating surfaces of adapter plate and transmission case.

Apply sealant to mating surfaces of adapter plate and transmission case.

3. Install counter gear thrust washer selected previously.

Note:

- Apply grease to sliding surface of thrust washer.
- When installing thrust washer, note the front and rear directions.



Front (Oil groove side)



Rear (Thrust side)

TM727

4. Place wooden plate of more than 20 mm (0.79 in) thick under transmission case to make it level.

Slide transmission case onto adapter plate by lightly tapping with a soft hammer until case bears against adapter plate, and be sure to line up dowel pin.

Carefully install main drive bearing and counter gear front needle bearing.

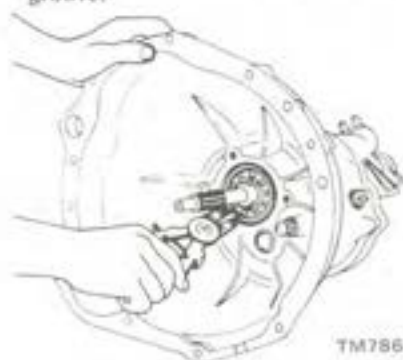
Make certain that mainshaft rotates freely.



SMT200

5. Fit main drive bearing snap ring to groove in main drive bearing with snap ring pliers.

Note: Make sure snap ring fits in groove.



TM786

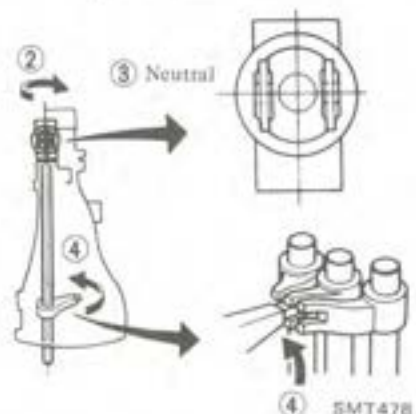
Rear extension assembly

1. Clean mating surfaces of adapter plate and rear extension.

Apply sealant to mating surfaces of adapter plate and rear extension.

2. Install rear extension as follows:

- (1) Set gears at Neutral.
- (2) Turn striking guide counter-clockwise.
- (3) Set striking guide at Neutral.
- (4) Align end of striking lever with cutout portion of fork rod.



SMT478

Note:

a. Use care when installing rear extension assembly. Do not allow shift arm to come out of the striking lever.

b. Install shift arm onto O.D. & reverse fork rod, and then fit striking lever pin into other fork rods.

3. Install through-bolts with washers.

Ⓙ: Rear extension installation bolt

16 - 22 N·m

(1.6 - 2.2 kg·m,

12 - 16 ft·lb)

4. Apply grease to plunger; install it in rear extension.

5. Install return spring.

Apply locking sealer to return spring plug and install it in place.

Ⓙ: Return spring plug

4.9 - 9.8 N·m

(0.5 - 1.0 kg·m,

3.6 - 7.2 ft·lb)

Front cover assembly

1. Select front cover adjusting shim as follows:

(1) Using vernier caliper depth gauge measure depth "A" from front end of transmission case to main drive bearing outer race with front cover adjusting shim in place.

(2) Select a shim of thickness "A"

No.	"A" mm (in)	Adjusting shim mm (in)
1	6.05 - 6.09 (0.2382 - 0.2398)	0.50 (0.0197)
2	6.10 - 6.14 (0.2402 - 0.2417)	0.55 (0.0217)
3	6.15 - 6.19 (0.2421 - 0.2437)	0.60 (0.0236)
4	6.20 - 6.24 (0.2441 - 0.2457)	0.65 (0.0256)
5	6.25 - 6.29 (0.2461 - 0.2476)	0.70 (0.0276)
6	6.30 - 6.34 (0.2480 - 0.2496)	0.75 (0.0295)
7	6.35 - 6.39 (0.2500 - 0.2516)	0.80 (0.0315)



TM816

3. Install front cover to transmission case with the adjusting shim and O-ring in place.

- ⓘ : Front cover installation bolt
 10 - 16 N·m
 (1.0 - 1.6 kg-m,
 7 - 12 ft-lb)

Outer parts assembly

1. Install speedometer pinion assembly and install securing bolt and tighten.

- ⓘ : Speedometer sleeve locking plate bolt
 2.9 - 4.9 N·m
 (0.3 - 0.5 kg-m,
 2.2 - 3.6 ft-lb)

2. Fit a new O-ring to groove in reverse check sleeve, install it in place and tighten reverse check sleeve bolts.
 3. Install reverse lamp switch and tighten. At the same time, install neutral, top and O.D. gear switches if so equipped.

Be sure to apply locking sealer before installation.

- ⓘ : Reverse lamp, neutral, top and O.D. gear switches
 20 - 34 N·m
 (2.0 - 3.5 kg-m,
 14 - 25 ft-lb)

4. Apply a light coat of multi-purpose grease to withdrawal lever, release bearing and bearing sleeve; install them on transmission case.

After connecting them with holder spring, install dust cover to transmission case.

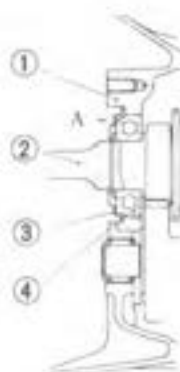
5. Install control lever temporarily, and move shift control lever through all gears to make sure that gears operate smoothly.
 6. Install drain plug coated with sealant in place.

- ⓘ : Drain plug
 25 - 39 N·m
 (2.5 - 4.0 kg-m,
 18 - 29 ft-lb)

7. Make sure that main drive shaft rotates smoothly in Neutral.

- Main drive gear rotating torque:
 Less than 0.18 N·m
 (1.8 kg-cm, 1.6 in-lb)

- 1 Transmission case
 2 Main drive gear
 3 Adjusting shim
 4 Bearing



TM817

2. Clean mating surfaces of front cover and transmission case.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

GENERAL SPECIFICATIONS

Engine model			A15	A14	A15	A12A
Transmission model			FS5W60A		F4W60L	F4W56A
No. of speeds			5		4	4
Synchronesh type			Warner			
Shift pattern						
Gear ratio	1st		3.513	3.513	3.513	3.757
	2nd		2.170	2.170	2.170	2.169
	3rd		1.378	1.320	1.378	1.404
	4th		1.000	1.000	1.000	1.000
	O.D. (5th)		0.821	0.821	—	—
	Rev.		3.764	3.764	3.764	3.640
Final gear ratio			3.700	3.545	3.700	3.889
Number of teeth	Mainshaft	Drive	20	20	20	19
		1st	34	34	34	32
		2nd	28	28	28	27
		3rd	24	23	24	23
		5th	18	18	—	—
		Rev.	34	34	34	31
	Counter-shaft	Drive	31	31	31	29
		1st	15	15	15	13
		2nd	20	20	20	19
		3rd	27	27	27	25
		5th	33	33	—	—
		Rev.	14	14	14	13
	Rev. idler shaft		22		22	17
Speed-ometer gear ratio	Tire	6.00-12-4PR	—		—	17/5
		155-13/6.15-13-4PR	16/5			
		155SR13	16/5			
		175/70SR13	16/5			
Oil capacity			liter (US pt, Imp pt)		1.2 (2-1/2, 2-1/8)	1.3 (2-3/4, 2-1/4)
					1.2 (2-1/2, 2-1/8)	

INSPECTION AND ADJUSTMENT

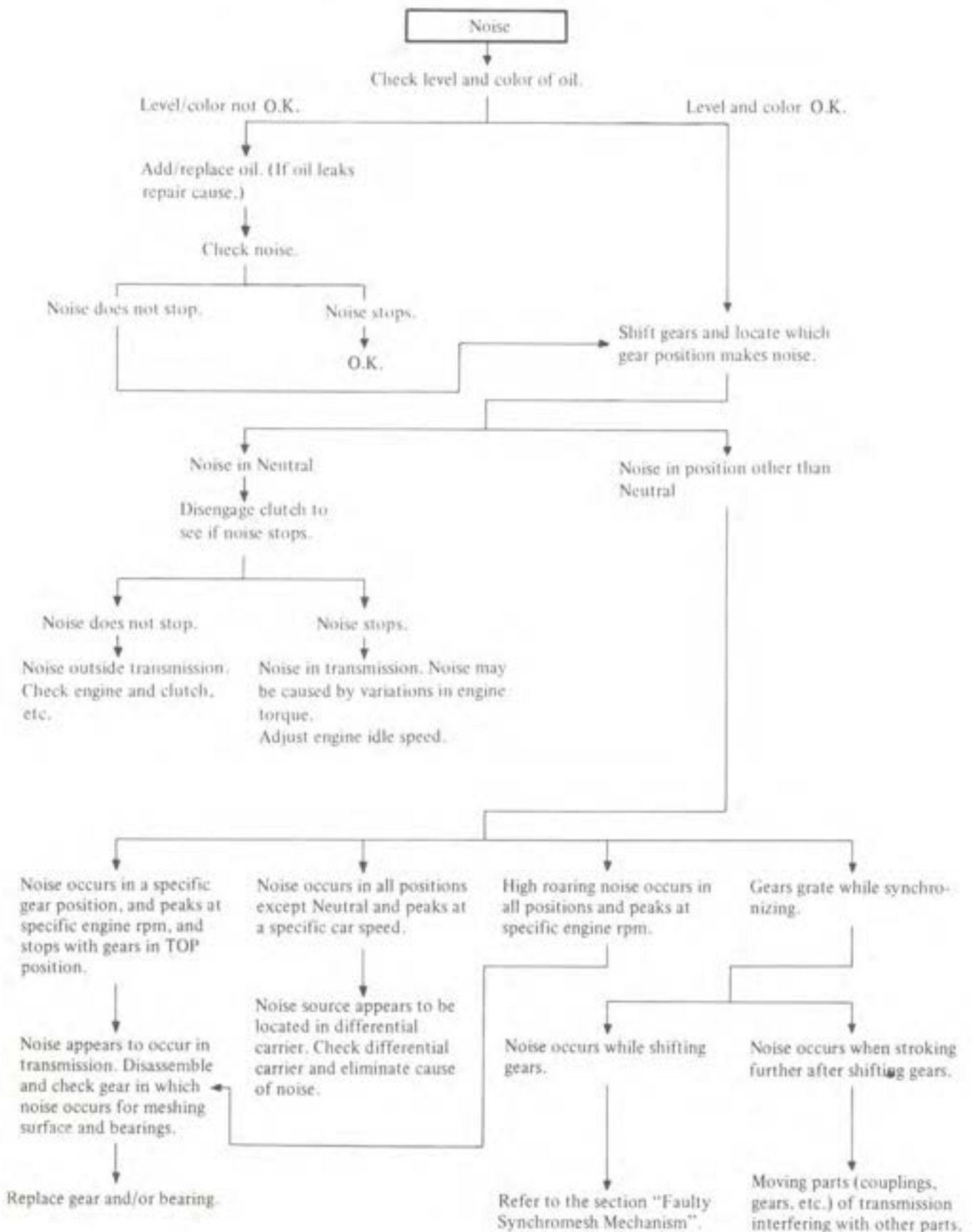
Transmission model		F55W60A	F4W60L	F4W56A
Item				
Gear end play mm (in)	1st main gear	0.15 - 0.25 (0.0059 - 0.0098)	0.15 - 0.25 (0.0059 - 0.0098)	0.15 - 0.25 (0.0059 - 0.0098)
	2nd main gear	0.30 - 0.40 (0.0118 - 0.0157)	0.30 - 0.40 (0.0118 - 0.0157)	0.15 - 0.25 (0.0059 - 0.0098)
	3rd main gear	0.15 - 0.35 (0.0059 - 0.0138)	0.15 - 0.35 (0.0059 - 0.0138)	0.10 - 0.30 (0.0039 - 0.0118)
	O.D. (5th) main gear	0.30 - 0.40 (0.0118 - 0.0157)	—	—
	Reverse main gear	0.30 - 0.55 (0.0118 - 0.0217)	—	—
	Counter gear	0.10 - 0.20 (0.0039 - 0.0079)	0.10 - 0.20 (0.0039 - 0.0079)	0 - 0.20 (0 - 0.0079)
	Reverse idler gear	0 - 0.20 (0 - 0.0079)	0.10 - 0.27 (0.0038 - 0.0106)	—
Clearance between baulk ring and gear mm (in)		1.10 - 1.40 (0.0433 - 0.0551)	1.10 - 1.40 (0.0433 - 0.0551)	1.05 - 1.40 (0.0413 - 0.0551)
Main drive gear rotating torque N·m (kg·cm, in·lb)		Less than 0.18 (1.8, 1.6)	Less than 0.18 (1.8, 1.6)	Less than 0.18 (1.8, 1.6)

TIGHTENING TORQUE

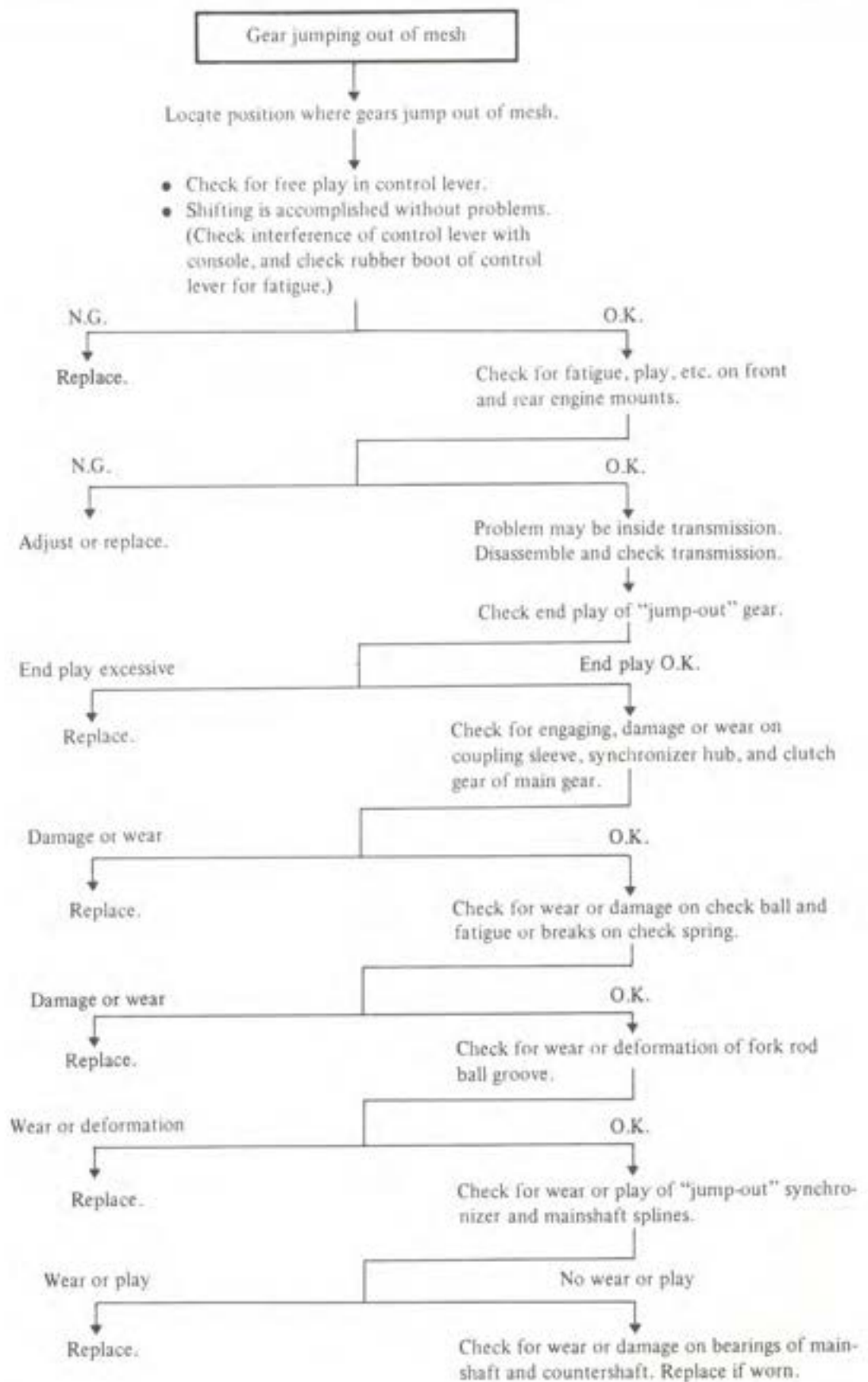
Unit	N·m	kg·m	ft·lb
Transmission installation			
Transmission to engine installation bolt	16 - 22	1.6 - 2.2	12 - 16
Transmission to engine rear plate installation bolt	16 - 22	1.6 - 2.2	12 - 16
Transmission to gusset installation bolt	45 - 60	4.6 - 6.1	33 - 44
Starter motor to transmission installation bolt	29 - 39	3.0 - 4.0	22 - 29
Rear mounting insulator to transmission installation bolt	8.8 - 11.8	0.9 - 1.2	6.5 - 8.7
Crossmember mounting bolt	31 - 42	3.2 - 4.3	23 - 31
Rear engine mount installation bolt	8.8 - 11.8	0.9 - 1.2	6.5 - 8.7
Clutch operating cylinder installation bolt	30 - 40	3.1 - 4.1	22 - 30
Propeller shaft to differential carrier	24 - 32	2.4 - 3.3	17 - 24
Control lever pin installation nut (F55W60A, F4W60L)	13 - 17	1.3 - 1.7	9 - 12
Exhaust mounting bracket to exhaust front tube	31 - 42	3.2 - 4.3	23 - 31
Gear assembly			
Ball pin	20 - 29	2.0 - 3.0	14 - 22
Striking lever lock nut (F55W60A, F4W60L)	8.8 - 11.8	0.9 - 1.2	6.5 - 8.7
Striking lever set screw (F4W56A)	5.9 - 9.8	0.6 - 1.0	4.3 - 7.2
Mainshaft bearing retainer screw (F55W60A, F4W60L)	6.9 - 9.8	0.7 - 1.0	5.1 - 7.2
Counter shaft lock nut (F55W60A)	49 - 5.9	5.0 - 6.0	36 - 43
Rear extension installation bolt	16 - 22	1.6 - 2.2	12 - 16
Stopper pin bolt (F55W60A, F4W60L)	4.9 - 7.8	0.5 - 0.8	3.6 - 5.8
Front cover installation bolt	10 - 16	1.0 - 1.6	7 - 12
Speedometer sleeve locking plate bolt	2.9 - 4.9	0.3 - 0.5	2.2 - 3.6
Top gear switch	20 - 34	2.0 - 3.5	14 - 25

Unit	N·m	kg·m	ft·lb
O.D. gear switch (F55W60A)	24 - 34	2.0 - 3.5	14 - 25
Neutral switch (F55W60A)	20 - 34	2.0 - 3.5	14 - 25
Reverse lamp switch	20 - 34	2.0 - 3.5	14 - 25
Return spring plug	4.9 - 9.8	0.5 - 1.0	3.6 - 7.2
Gear oil filler plug	25 - 39	2.5 - 4.0	18 - 29
Gear oil drain plug	25 - 39	2.5 - 4.0	18 - 29

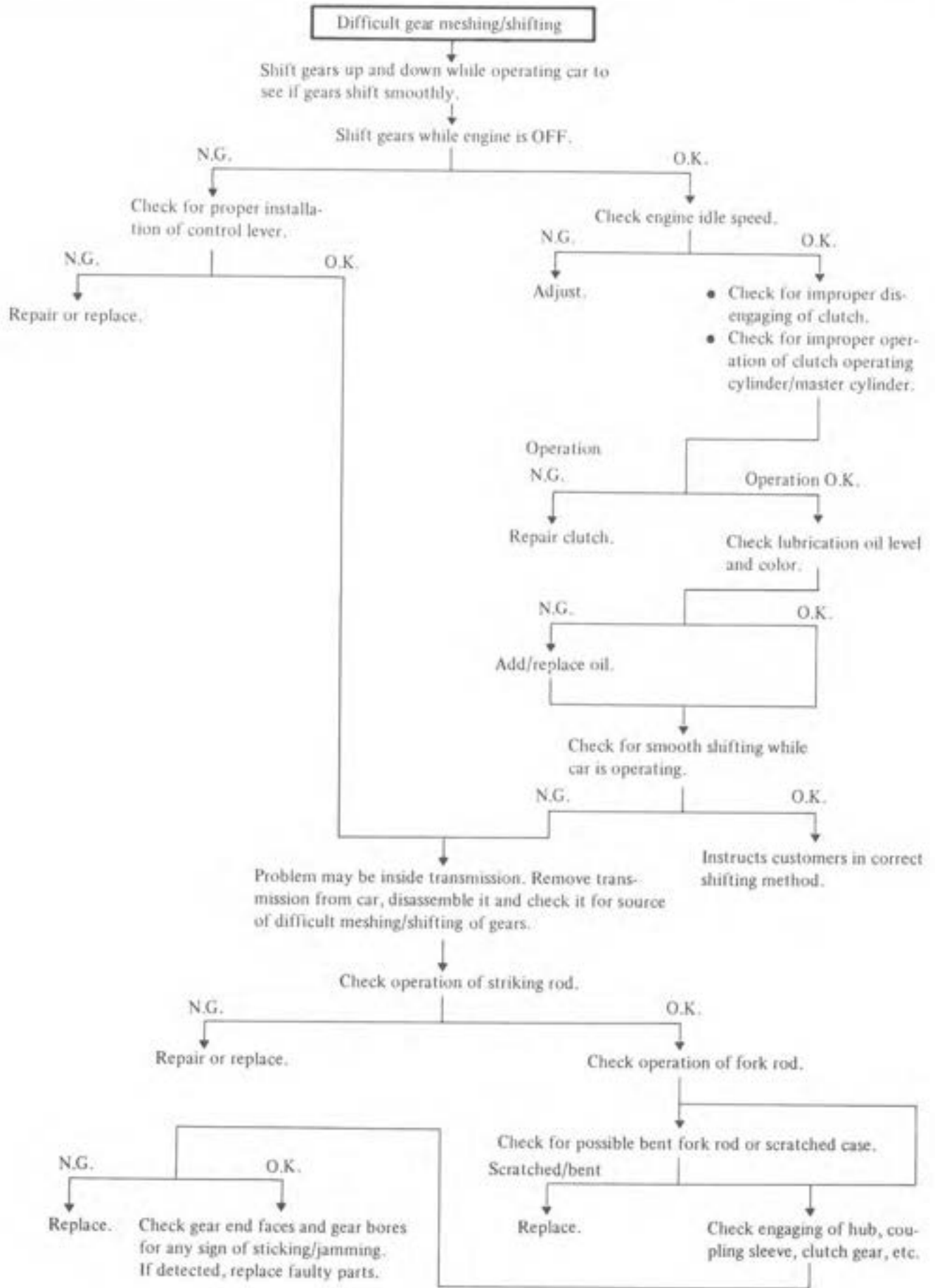
TROUBLE DIAGNOSES AND CORRECTIONS

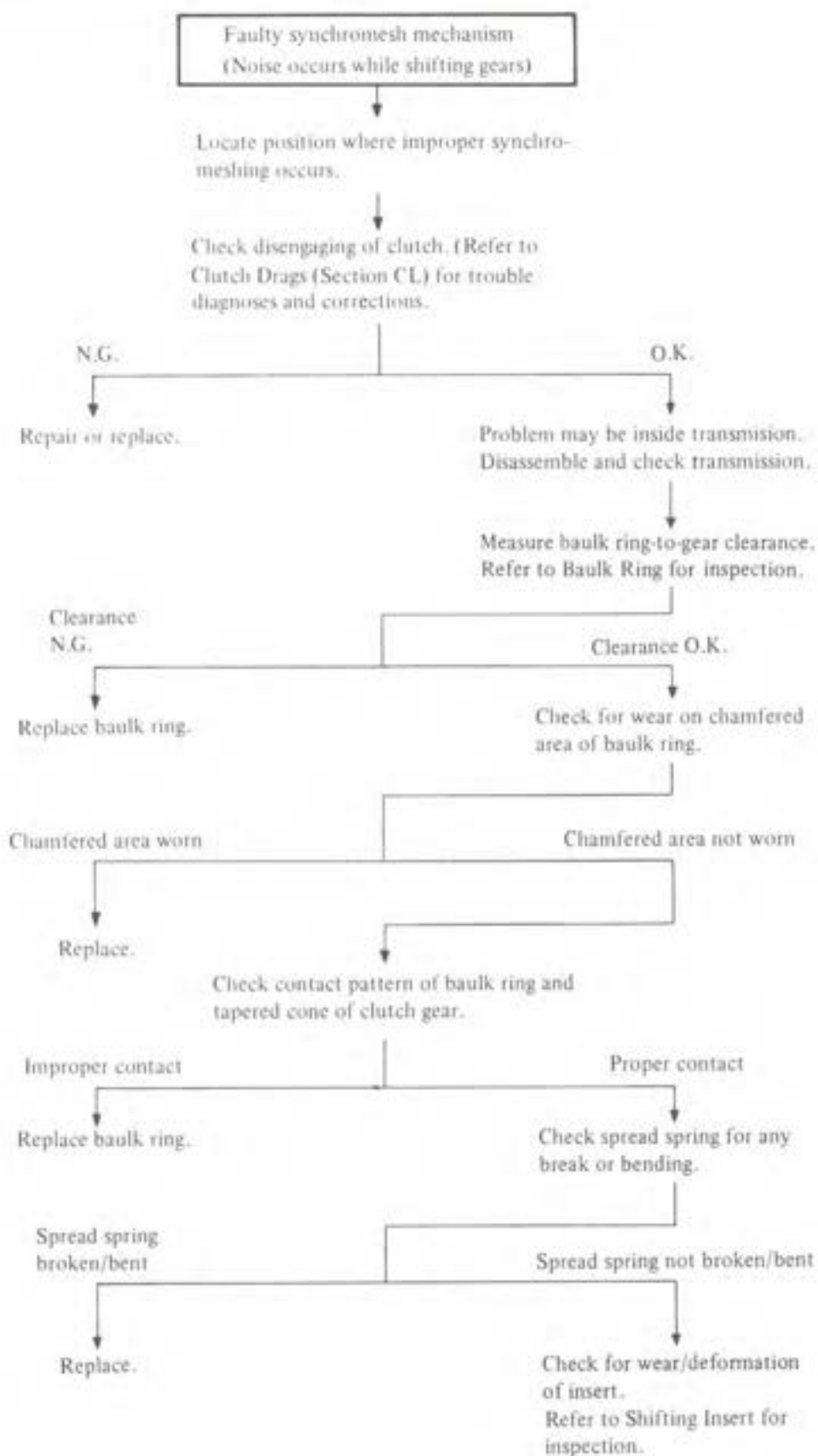


Manual Transmission



Manual Transmission





SPECIAL SERVICE TOOLS

Tool number (Kent-Moore No.)	Tool name		Unit application		
			FS5W60A	F4W60L	F4W56A
KV32100300 (J25693)	Adapter setting plate		X	X	X
ST23540000 (J25689)	Fork rod pin punch		X	X	X
ST22730000 (J25681)	Bearing puller		X	X	X
ST30031000 (J25733-1)	Bearing puller		X	X	—
ST33061000 (J25797-2)	Oil seal drift		—	—	X
ST35300000 (—)	Oil seal drift		X	X	X
ST23800000 (J25691)	Transmission drift		X	X	—
ST22350000 (J25678)	Mainshaft bearing drift		X	X	X
KV32100200 (—)	Countershaft bearing press stand		—	X	X
ST23050000 (J25684)	Counter gear height gauge		—	—	X

Manual Transmission

Tool number (Kent-Moore No.)	Tool name		Unit application		
			FS5W60A	F4W60L	F4W56A
KV32100100 (J26070)	Counter gear height gauge		—	X	—
ST23620000 (J25690-01)	Interlock ball guide		—	—	X
KV32100400 (J26071)	Mainshaft puller		—	X	—
KV32100401 (J26071-8)	Mainshaft puller		X	X	—
KV32101330 (See J26349)	Bearing puller		X	—	—
KV32101500 (J28804)	Wrench		X	—	—