WORKSHOP MANUAL

TF SERIES

MANUAL TRANSMISSION (MSG MODELS)

SECTION 7B



NOTICE

Before using this Workshop Manual to assist you in performing vehicle service and maintenance operations, it is recommended that you carefully read and thoroughly understand the information contained in Section - OA under the headings "GENERAL REPAIR INSTRUCTIONS" and "HOW TO USE THIS MANUAL".

All material contained in this Manual is based on the latest product information available at the time of publication.

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SECTION 7B MANUAL TRANSMISSION (MSG MODELS)

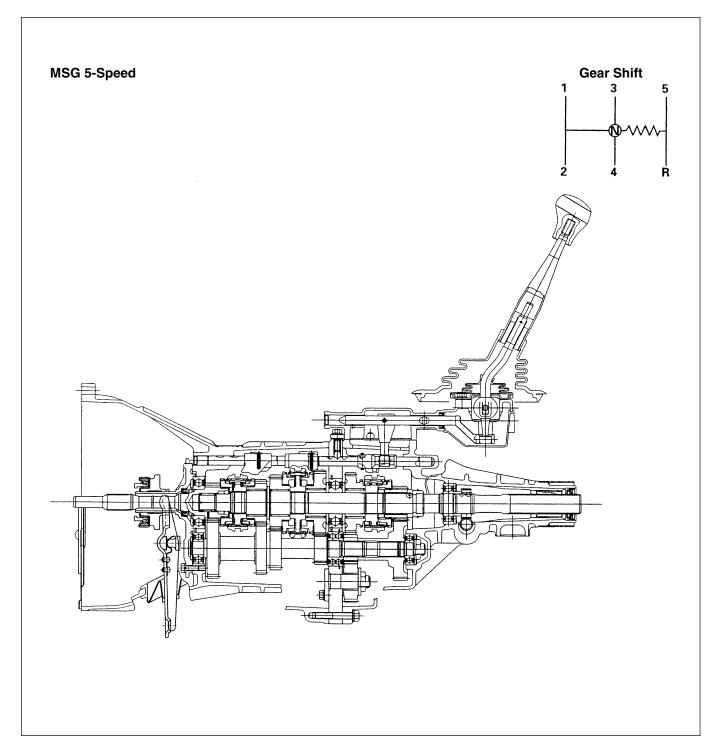
TABLE OF CONTENTS

	P.	AGE
4×2 Model Transmission	7B -	2
Main Data and Specifications	7B -	2
General Description	7B -	3
Torque Specification	7B -	4
Repair Kit	7B -	6
Removal and Installation	7B -	7
Disassembly	7B -	15
Inspection and Repair	7B -	25
Reassembly	7B -	29
4×4 Model Transmission	7B -	42
Main Data and Specifications	7B -	42
General Description	7B -	43
Torque Specification	7B -	47
Recommended Liquid Gasket	7B -	49
Removal and Installation	7B -	50
Disassembly	7B -	58
Inspection and Repair	7B -	74
Reassembly	7B -	80
Troubleshooting	7B -	103
Special Service Teel	7D	100

4×2 MODEL TRANSMISSION MAIN DATA AND SPECIFICATIONS

Transmission type		Fully synchronized 5-forward gears with a constant mesh type reverse gear.	
Transmission Con	trol	Direct control with the gear shift lever on the floor.	
Gear ratio		5E	5K
		3.758	4.122
		2.171	2.493
		1.413	1.504
		1.000	1.000
		0.855	0.855
		3.720	3.720
Oil capacity	lit. (US gal.)	1.55(0.41)
Weight; approx.,	kg(lbs)	33.3(73.8)

GENERAL DESCRIPTION



The MSG type transmission is fully synchronized 5-speed unit with blocking ring type synchronizers and a constant mesh type reverse gear.

The unit consists principally of a case with an integral clutch housing, intermediate plate, rear cover and gears.

The top of the rear cover is a quadrant box containing the transmission control mechanism.

The case and rear cover are cast aluminum alloy to reduce weight.

TORQUE SPECIFICATION

STANDDARD BOLTS

The torque values given in the following table should be applied where a particular torque is not specified.

N.m (kaf.m/lb.ft)

						N·m (kgf·m/lb·ft)
	Strength	4.8/4T	7T	8	.8	9.8/9T
	Class			Refined	Non-Refined	
	Bolt Identifi- cation	$\left\langle \begin{array}{c} \end{array} \right\rangle$		8	8	
	Bolt Diameterx Pitch (mm)	No mark	-			
Standard Hex.	M6 × 1.0	6 (0.6 / 52 lb.in)	7 (0.7 / 61 lb.in)	8 (0.8 /	69 lb.in)	-
Head Bolt	M8 × 1.25	13 (1.3 / 113 lb.in)	17 (1.7 / 12)	20 (2.	0 / 14)	24 (2.4 / 17)
rieau Boit	M10 × 1.25	27 (2.8 / 20)	37 (3.8 / 27)	42 (4.	3 / 31)	50 (5.1 / 37)
	M12 × 1.25	61 (6.3 / 45)	76 (7.8 / 56)	87 (8.	9 / 64)	95 (9.7 / 70)
	M14 ×1.5	96 (9.8 / 71)	116 (11.8 / 85)	133 (13	3.6 / 98)	142 (14.5 / 105)
	M16 × 1.5	130 (13.3 / 96)	170 (17.3 / 125)	193 (19	.7 / 143)	200 (20.4 / 148)
	M18 × 1.5	188 (19.2 / 139)	244 (24.9 / 180)	278 (28	.3 / 205)	287 (29.3 / 212)
	M20 × 1.5	258 (26.3 / 190)	337 (34.4 / 249)	385 (39	.3 / 284)	396 (40.4 / 292)
	M22 × 1.5	332 (33.9 / 245)	453 (46.3 / 335)	517 (52	.7 / 381)	530 (54.1 / 391)
	M24 × 2.0	449 (45.8 / 331)	570 (58.2 / 421)	,	.3 / 480)	692 (70.6 / 511)
	*M10 × 1.5	26 (2.7 / 20)	36 (3.7 / 27)	41 (4.	2 / 30)	48 (4.9 / 35)
	*M12 × 1.75	57 (5.8 / 42)	71 (7.2 / 52)	80 (8.	2 / 59)	89 (9.1 / 66)
	*M14 × 2.0	89 (9.1 / 66)	110 (11.2 / 81)	125 (12	2.7 / 92)	133 (13.6 / 98)
	*M16 × 2.0	124 (12.7 / 92)	162 (16.5 / 119)	185 (18	.9 / 137)	191 (19.5 / 141)
Flange Bolt	M6 × 1.0	7 (0.7 / 61 lb.in)	8 (0.8 / 69 lb.in)	9 (0.9 /	78 lb.in)	-
	M8 × 1.25	15 (1.5 / 11)	19 (1.9 / 14)	22 (2.	2 / 16)	26 (2.7 / 20)
	M10 × 1.25	31 (3.2 / 23)	41 (4.2 / 30)	47 (4.	8 / 35)	56 (5.7 / 41)
	M12 × 1.25	69 (7.0 / 51)	85 (8.7 / 63)	97 (9.	9 / 72)	106 (10.8 / 78)
	M14 × 1.5	104 (10.6 / 77)	126 (12.8 / 93)	144 (14	.6 / 106)	154 (15.7 / 114)
	M16 × 1.5	145 (14.8 / 127)	188 (19.2 / 139)	214 (21	.8 / 158)	221 (22.5 / 163)
	M18 × 1.5	-	-		-	-
	M20 × 1.5	-	-		=	-
	M22 × 1.5	-	-		=	-
	M24 × 2.0	-	-		-	-
	*M10 × 1.5	30 (3.1 / 22)	40 (4.1 / 30)	46 (4.	,	54 (5.5 / 40)
	*M12 × 1.75	64 (6.5 / 47)	78 (8.0 / 58)	89 (9.		99 (10.1 / 73)
	*M14 × 2.0	97 (9.9 / 72)	119 (12.1 / 88)	135 (13.		144 (14.7 / 107)
	*M16 × 2.0	137 (14.0 / 101)	178 (18.2 / 132)	203 (20	.7 / 132)	210 (21.5 / 155)

The asterisk * indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.

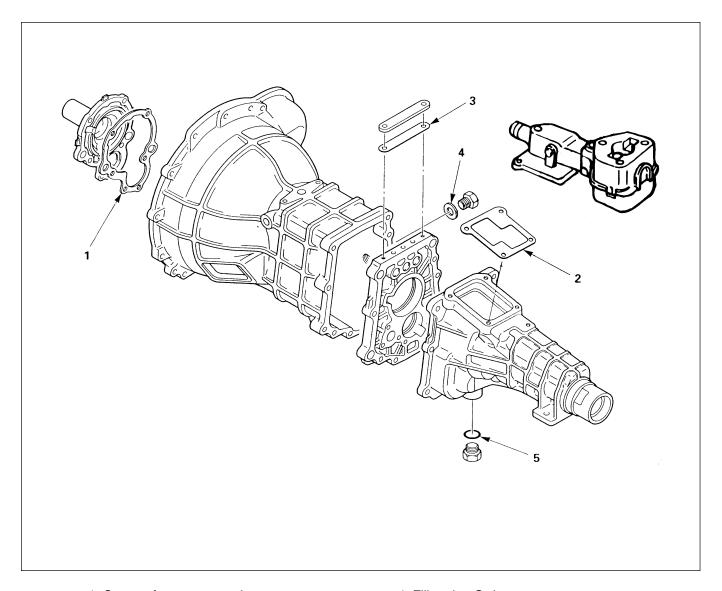
₹ FLARE NUTS

Pipe diameter mm (in)	Torque N·m (kgf·m/lb·ft)	Pipe diameter mm (in)	Torque N·m (kgf·m/lb·ft)
4.76 (0.187)	16 (1.6 / 12)	10.00 (0.394)	54 (5.5 / 40)
6.35 (0.250)	26 (2.7 / 20)	12.00 (0.472)	88 (9.0 / 65)
8.00 (0.315)	44 (4.5 / 33)	15.00 (0.591)	106 (10.8 / 78)

SPECIAL PARTS FIXING NUTS AND BOLTS

N·m (kgf·m/lb·ft) La Caracia de la 18.6±3.9 O Co Como Fre (1.9±0.4/13.7±2.9) 107.8±9.8 '79.6±7.2) 18.6±3.9 (1.9±0.4/13.7±2.9) 39.2±9.8 $(4\pm1/28.9\pm7.2)$ 24.5±2.9 (2.5±0.3/18.1±2.2) 24.5±2.9 (2.5±0.3/18.1±2.2) 39.2±9.8 37.2±7.8 $(4\pm1/28.9\pm7.2)$ (3.8±0.8/27.5±5.8)

REPAIR KIT



- 1. Case to front cover gasket
- 2. Control box gasket3. Plate gasket

- 4. Filler plug O-ring5. Drain plug O-ring

|+→||++| REMOVAL AND INSTALLATION

Read this Section carefully before performing any removal and installation procedure. This Section gives you important points as well as the order of operation. Be sure that you understand everything in this Section before you begin.

Important Operations - Removal Battery Cable

Disconnect the negative (-) cable from the battery terminal.

Engine Hood

Apply setting marks to the engine hood and the engine hood hinges before removing the engine hood.

Gear Shift Lever

- 1. Place the gear shift lever in the neutral position.
- 2. Remove the gear shift lever knob.
- 3. Remove the front console assembly.
- 4. Remove the gear shift lever grommet and dust cover.
- 5. Remove the gear shift lever cover bolts.
- 6. Remove the gear shift lever.

Note:

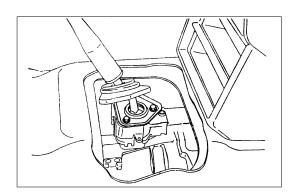
Cover the shift lever hole to prevent the entry of foreign material into the transmission.

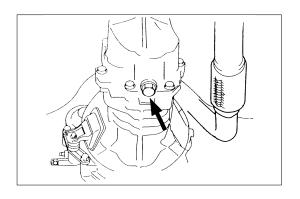
Lifting the Vehicle

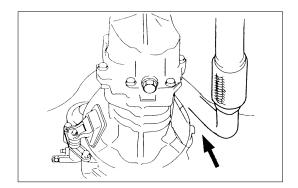
- 1. Jack up the vehicle.
- 2. Place chassis stands at the front and the rear of the vehicle.

Transmission Oil Draining

- 1. Remove the transmission oil drain plug.
- 2. Replace the drain plug after draining the oil.

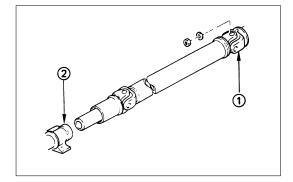






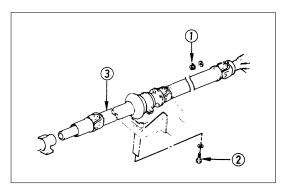
Exhaust Pipe

- 1. Remove the exhaust pipe bracket from the transmission case.
- 2. Remove the exhaust pipe.



Rear Propeller Shaft (Single Shaft Type)

- 1. Remove the propeller shaft flange yoke at the drive pinion side ①.
- 2. Remove the propeller shaft from the transmission main shaft spline ②.



Rear Propeller Shaft (Dual Shaft Type)

- Apply setting marks to the 2nd propeller shaft flange yoke.
 This will prevent mispositioning during the installation procedure.
- 2. Remove the 2nd propeller shaft flange yoke bolts at the drive pinion side ①.
- 3. Remove the center bearing retainer bolts 2.
- 4. Remove the 1st propeller shaft with the center bearing and the 2nd propeller shaft.

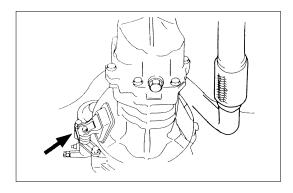
Pull the 1st propeller shaft toward the rear of the vehicle until the spline yoke is free of the transmission main shaft.



Disconnect the back up light switch connector and the speedometer sensor connector.

Slave Cylinder

Remove the slave cylinder from the transmission case.

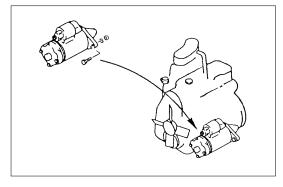


Engine Lifting Hanger

- 1. Attach the engine lifting hanger to the front portion of the engine.
- 2. Attach the lifting wire to both ends of the engine lifting hanger.

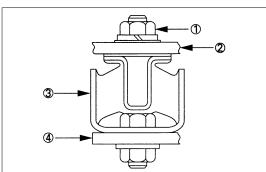
Starter Motor

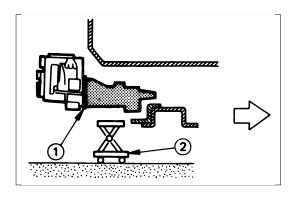
Remove the starter motor motor from the engine rear plate.



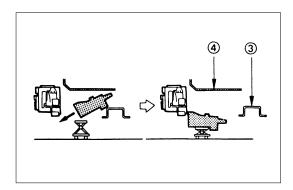
Transmission

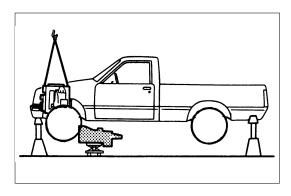
- 1. Support the transmission with a transmission jack.
- 2. Remove the engine rear mounting bracket bolts and nuts ① from the transmission ②.
- 3. Remove the bracket from No.3 crossmember.
- 4. Loosen the nuts for the rear mounting rubber.
- 5. Remove the rear mounting rubber ③ from the transmission ④.
- 6. Remove the gear control box from the transmission.
- Remove the transmission from the engine.
 The removal of the transmission will require the cooperative efforts of two mechanics.
 - 1) Remove the transmission nuts and bolts ① from the engine rear plate.
 - 2) Place a transmission jack ② beneath the transmission . Do not raise the transmission jack.





7B-10 MSG MODEL (2WD)





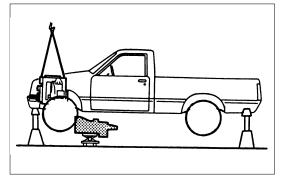
- 3) Manually move the transmission as far as possible toward the rear of the vehicle (into the space between the No.3 crossmember ③ and the floor panel ④.
- 4) Lower the clutch housing end of the transmission toward the transmission jack.
 - The rear of the transmission is supported by the No.3 crossmember at this time.
- Firmly grasp the transmission rear cover (1st mechanic).
 Raise the transmission jack toward the transmission (2nd mechanic).
 - Carefully lower the transmission onto the transmission jack. The transmission must be centered on the transmission jack.
- 8. Carefully pull the transmission jack with the transmission from beneath the vehicle.



Important Operations - Installation

Follow the removal procedure in the reverse order to perform the installation procedure.

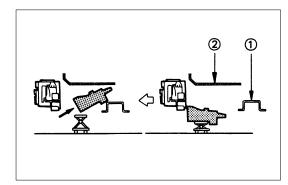
Pay careful attention to the important points during the installation procedure.





Transmission

- 1. Apply a thin coat of molybdenum disulfide grease to the top gear shaft spline.
- 2. Place the transmission on a transmission jack.
- 3. Carefully move the transmission jack and transmission into position behind the engine.



- 4. Slowly operate the transmission jack to raise the transmission until the rear of the transmission is at the same level as the No.3 crossmember ①.
- Manually support the transmission rear cover.
 Move the transmission into position between the No.3 crossmember and the floor panel ②.
- Slowly raise the transmission jack until the front of the transmission is aligned with the rear of the engine.
 The slope of the engine and the transmission must be the same.
- 7. Install the gear control box the transmission.
- 8. Align the top gear shaft spline with the clutch drive plate spline.



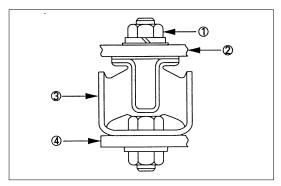
9. Install the transmission to the engine.

Tighten the transmission nuts and bolts to the specified torque.

Transmission Nut and Bolt Torque

N·m (kgf·m/lb·ft)

M10 : $40 \pm 10 \ (4.1 \pm 1.0/30 \pm 7.2)$ M12 : $78 \pm 16 \ (8.0 \pm 1.6/58 \pm 12)$





- 10.Install the rear mounting rubber ③ to the transmission ②. Install the rear mounting rubber ③ to the No.3 crossmember 4.
- 11. Tighten the rear mounting rubber nuts ① to the specified forque.

 $41 \pm 4.9 \ (4.2 \pm 0.5 \ / \ 30 \pm 3.6)$

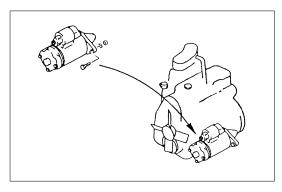
Rear Mounting Rubber Nut Torque

N·m (kgf·m/lb·ft)

Mounting Bolt Torgue

N·m (kgf·m/lb·ft)

 $41 \pm 4.9 \ (4.2 \pm 0.5 \ / \ 30 \pm 3.6)$





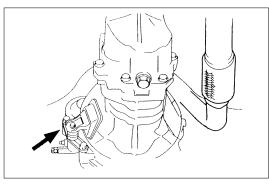
Starter Motor

- 1. Install the starter motor to the engine rear plate.
- 2. Tighten the starter motor bolts to the specified torque.

Starter Motor Torque

N·m (kgf·m/lb·ft)

 $78 \pm 16 \ (8.0 \pm 1.6 \ / \ 58 \pm 12)$





Slave Cylinder

Install the slave cylinder to the transmission case.

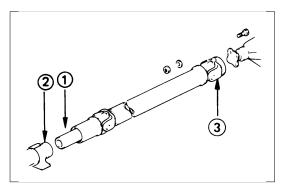
Slave Cylinder Bolt Torque

N·m (kgf·m/lb·ft)

 $78 \pm 16 \ (8.0 \pm 1.6 \ / \ 58 \pm 12)$

Harness Connector

Connect the back up light switch connector and speedometer sensor connector.



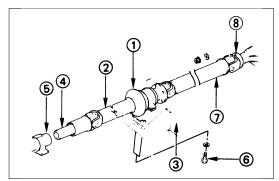


Rear Propeller Shaft (Single Shaft Type)

- 1. Insert the splined yoke ① with the propeller shaft into the transmission main shaft spline ②.
- 2. Install the propeller shaft flange yoke ③ to the drive pinion side.
- 3. Tighten the propeller shaft flange yoke bolt to the specified torque.

Propeller Shaft Flange Yoke Bolt Torque N·m (kgf·m/lb·ft)

M8 : 35.3 ± 2.94 (3.6 ± 0.3 / 26 ± 2.2) M10 : 62.7 ± 3.9 (6.4 ± 0.4 / 46.3 ± 2.9)





Rear Propeller Shaft (Dual Shaft Type)

- 1. Place the center bearing and retainer ① together with the 1st propeller shaft ② and 2nd propeller shaft ⑦ on the No.4 crossmember ③.
- 2. Insert the splined yoke ④ into the transmission main shaft spline ⑤.
- 3. Tighten the center bearing retainer bolts **(®)** to the specified torque.

Center Bearing Retainer Bolt Torque N·m (kgf·m/lb·ft) $60.8 \pm 11.8 (6.2 \pm 1.2 / 44.8 \pm 8.7)$



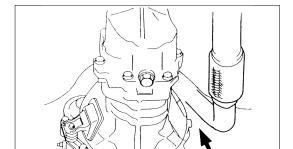
4. Connect the 2nd propeller shaft ⑦ and drive pinion side ⑧. Be sure to align the setting marks applied at disassembly.

5. Tighten the coupling bolts to the specified torque.

Propeller Shaft Flange Yoke Bolt

Torque N·m (kgf·m/lb·ft)

M8 : 35.3 ± 2.94 (3.6 ± 0.3 / 26 ± 2.2) M10 : 62.7 ± 3.9 (6.4 ± 0.4 / 46.3 ± 2.9)



Exhaust Pipe

- 1. Install the exhaust pipe to the exhaust manifold and the 2nd exhaust pipe.
- 2. Install the exhaust pipe bracket to the transmission case.



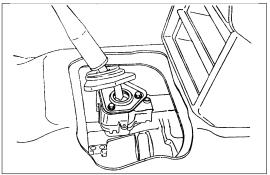
Gear Shift Lever

1. Replenish the transmission case with the specified engine oil.

Transmission Case Oil

lit(US gal.)

1.55(0.41)





- 2. Install the gear shift lever to the gear control box.
- 3. Tighten the gear shift lever cover bolts to the specified torque.

Shift Lever Cover Bolt Torque

N·m(kgf·m/lb·ft)

 $19.6 \pm 1.96 \ (2.0 \pm 0.2 \ / \ 14.5 \pm 4.5)$

- 4. Install the dust cover and the grommet.
- 5. Install the front console assembly.
- 6. Install the gear shift lever knob.

Lowering the Vehicle

- 1. Place a jack beneath the vehicle.
- 2. Raise the jack to remove the chassis stands.
- 3. Lower the vehicle to the ground.

Engine Hood

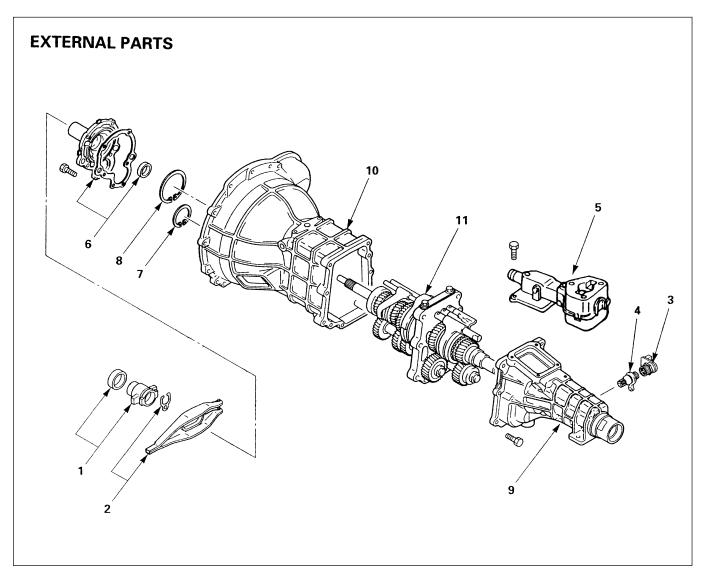
Align the setting marks(applied at removal)on the engine hood and the engine hood hinges to install the engine hood.

Battery Cable

Connect the negative (-) cable to the battery terminal.

DISASSEMBLY

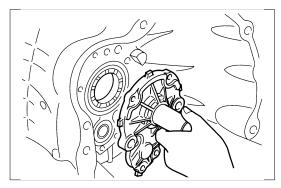
MAJOR COMPONENTS



Disassembly Steps

- 1. Clutch shift block and release bearing
- 2. Clutch shift fork
- 3. Speedometer sensor
- 4. Speedometer driven gear assembly5. Gear control box assembly
- ▲ 6. Front cover with oil seal

- ▲ 7. Counter gear snap ring
- ▲ 8. Bearing snap ring
 - 9. Rear cover with oil seal
 - 10. Transmission case
 - 11. Intermediate plate with gear assembly

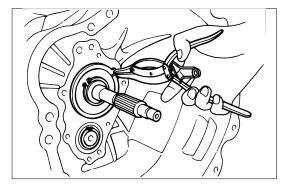




7 Important Operations

6. Front Cover with Oil Seal

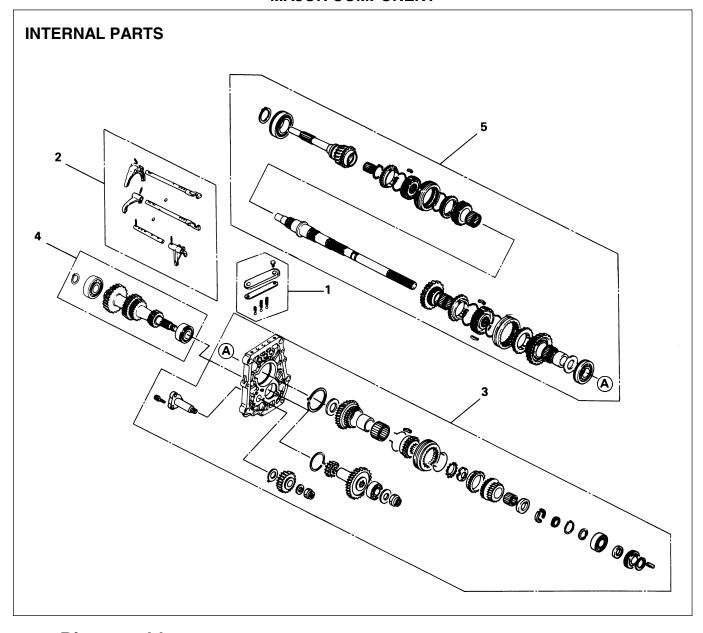
Remove the front cover with oil seal from the transmission case.



- 7. Counter Gear Snap Ring
- 8. Bearing Snap Ring

Use pair of snap ring pliers to remove the snap ring.

MAJOR COMPONENT



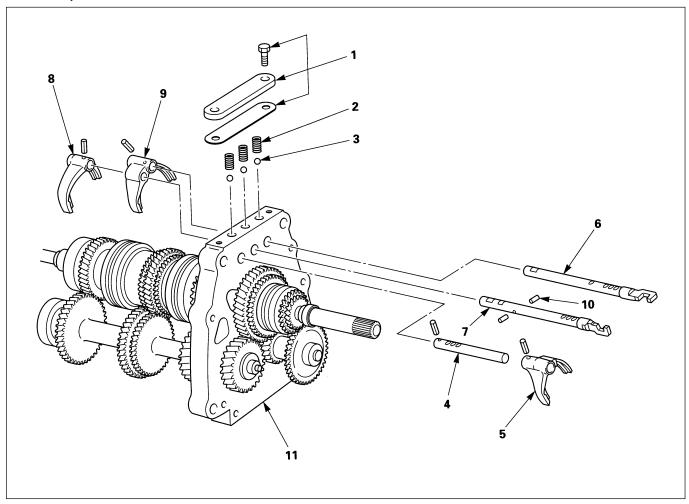
Disassembly steps

- 1. Detent assembly
- 2. Shift fork assembly & interlock pin
- 3. Rev. and 5th gear assembly

- 4. Counter gear shaft assembly
- 5. Top & main gear shaft assembly

MINOR COMPONENTS

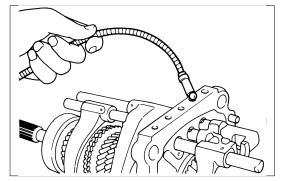
DETENT, SHIFT ARM ASSEMBLY AND INTERLOCK PIN



Disassembly Steps

- 1. Detent spring plate and gasket
- 2. Detent spring
- ▲ 3. Detent ball
 - 4. Rev. 5th shaft rod
 - 5. Rev. 5th shaft arm
 - 6. 1st 2nd shift rod

- ▲ 7. 3rd 4th shift rod
- ▲ 8. 3rd 4th shift arm
- ▲ 9. 1st 2nd shift arm
 - 10. Interlock pin
 - 11. Intermediate plate and gear assembly



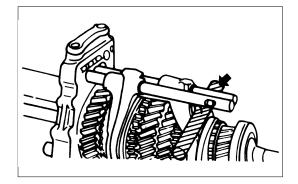
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Important Operations

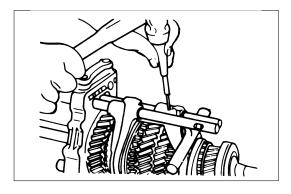
3. Detent Ball

Use a magnetic hand to remove the detent balls from the intermediate plate.

Take care not to lose the detent balls



- 7. 3rd 4th Shift Rod
- 8. 3rd 4th Shift Arm
- 9. 1st 2nd Shift Arm
- Hold a round bar against the shift arm end.
 This will prevent damage to other components.



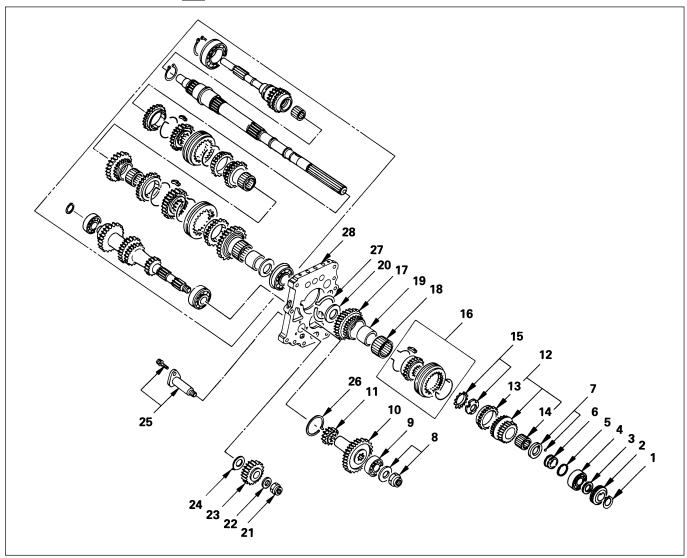
2) Use a spring pin remover to remove the shift arm spring pin from the shift arm and the shift rod.

Spring Pin Remover: 9-8529-2201-0

Discard the used spring pin.

Move the 3rd - 4th shift rod forward.
 Take care not to lose the interlock pins.

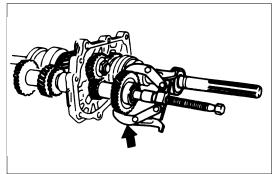
REVERSE GEAR AND 5TH GEAR



Disassembly Steps

- 1. Bearing snap ring
- 2. Speedometer drive gear and lock ball
- 3. Bearing spacer
- 4. Mainshaft end ball bearing
- 5. Thrust ring snap ring
- 6. Thrust washer thrust ring
- 7. Thrust washer and lock ball
- 8. Counter reverse gear nut and washer
- ▲ 9. Counter end ball bearing
- ▲10. Counter 5th gear
 - 11. Counter reverse gear
 - 12. 5th gear
 - 13. 5th block ring
 - 14. Needle bearing

- ▲15. Mainshaft lock nut and washer
- ▲16. Rev. 5th synchronizer assembly
 - 17. Reverse gear
 - 18. Needle bearing
 - 19. Needle bearing collar
 - 20. Thrust washer
- 21. Counter reverse gear lock nut
- 22. Thrust washer
- 23. Reverse idler gear
- 24. Thrust washer
- 25. Reverse idler shaft
- ▲26. Bearing snap ring
- ▲27. Bearing snap ring
- ▲28. Intermediate plate



$\overline{\mathbb{V}}$

Important Operations

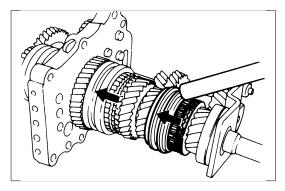
Û

9. Counter End Ball Bearing

10.Counter 5th Gear

Use the gear remover to remove the counter 5th gear with the ball bearing.

Gear Remover: 5-8840-0013-0 (J-22888)

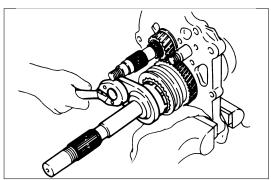




迎│ 15. Mainshaft Lock Nut and Washer

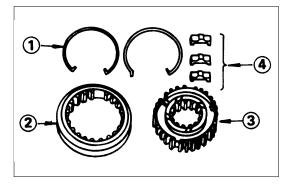
- 1) Engage the 3rd 4th synchronizer with the 3rd gear.
- 2) Engage the 1st 2nd synchronizer with the 1st gear.
- 3) Attach the holding fixture to the mainshaft and the countergear.

Holding Fixture : 5-8840-2001-0 (J-29768)





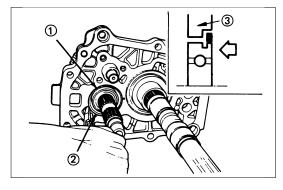
4) Use the lock nut wrench to remove the lock nut. Lock Nut Wrench: 5-8840-0350-0 (J-36629)





16.Rev. - 5th Synchronizer Assembly

- 1) Remove the synchronizer assembly as a set.
- 2) Disassemble the synchronizer assembly.
 - ① Springs
 - ② Sleeve
 - 3 Clutch Hub
 - 4 Inserts

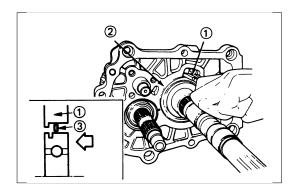


26. Bearing Snap Ring

- 1) Insert the snap ring pliers ① into the counter gear bearing snap ring hole ②.
 - The snap ring hole is in the intermediate plate 3.
- 2) Use the snap ring pliers to force open the counter gear bearing snap ring.

Tap on the front of the intermediate plate.

The ball bearing snap ring will come free.

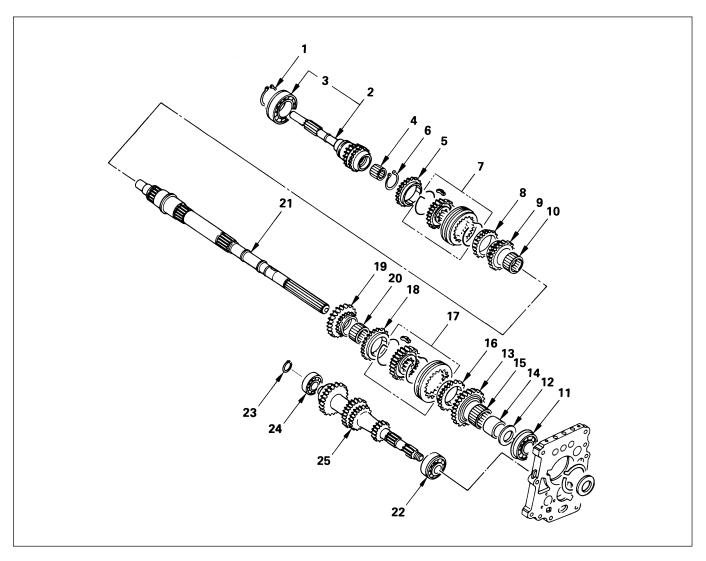


27.Bearing Snap Ring

28.Intermediate Plate

- 1) Insert the snap ring pliers into the mainshaft bearing snap ring hole.
 - The snap ring hole is in the intermediate plate ①.
- 2) Use the snap ring pliers ② to force open the mainshaft bearing snap ring ③.
 - Hold the snap ring open with the pliers.
- 3) Push the intermediate plate toward the rear of the transmission to remove it.
 - The ball bearing snap ring will come free.

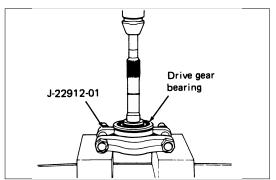
TOP GEAR SHAFT, MAINSHAFT GEAR AND COUNTER GEAR

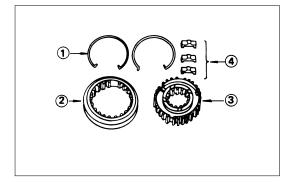


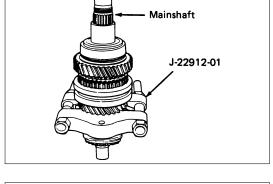
Disassembly Steps

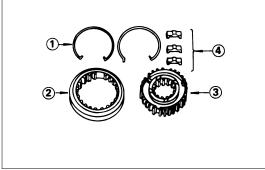
- ▲ 1. Top shaft snap ring
- ▲ 2. Top gear shaft
- ▲ 3. Ball bearing
 - 4. Needle bearing
 - 5. 4th block ring
 - 6. Mainshaft snap ring
- ▲ 7. 3rd 4th synchronizer assembly
 - 8. 3rd block ring
 - 9. 3rd gear
 - 10. Needle bearing
- ▲11. Mainshaft ball bearing
 - 12. 1st gear thrust washer
 - 13. 1st gear

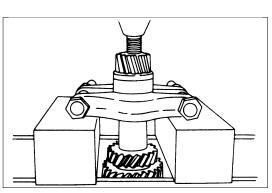
- 14. Needle bearing collar
- 15. Needle bearing
- 16. 1st block ring
- ▲17. 1st 2nd synchronizer assembly
 - 18. 2nd block ring
 - 19. 2nd gear
 - 20. Needle bearing
 - 21. Mainshaft
- ▲22. Rear ball bearing
 - 23. Bearing snap ring
- ▲24. Front ball bearing
 - 25. Counter gear











Important Operations



- 1. Top Gear Shaft Snap Ring
- 2. Top Gear Shaft
- 3. Ball Bearing
 - 1) Use a pair of snap ring pliers to remove the snap ring.
 - 2) Use a bench press and the bearing remover to remove the ball bearing.

Bearing Remover: 5-8840-0015-0 (J-22912-01)

7. 3rd - 4th Synchronizer Assembly

- 1) Remove the synchronizer assembly as a set.
- 2) Disassembly the synchronizer assembly.
 - ① Springs
 - 2 Sleeve
 - 3 Clutch Hub
 - 4 Inserts

11. Mainshaft Ball Bearing

Use a bench press and the bearing remover to remove the ball bearing.

Bearing Remover: 5-8840-0015-0 (J-22912-01)

17.1st - 2nd Synchronizer Assembly

- 1) Remove the synchronizer assembly as a set.
- 2) Disassembly the synchronizer assembly.
 - ① Springs
 - 2 Sleeve
 - 3 Clutch Hub
 - 4 Inserts



22.Rear Ball Bearing

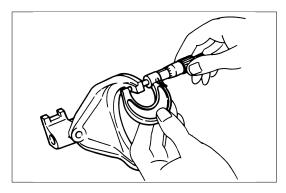
24. Front Ball Bearing

Use a bench press and the bearing remover to remove the ball bearing.

Bearing Removar: 5-8840-0015-0 (J-22912-01)

INSPECTION AND REPAIR

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

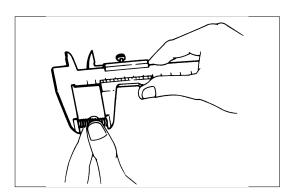




SHIFT ARM THICKNESS

Use a micrometer to measure the shift arm thickness. If the measured value is less than the specified limit, the shift arm must be replaced.

Shift Arm Thic	kness	mm(in)
	Standard	Limit
1st-2nd	9.6-9.8 (0.378-0.386)	9.0 (0.354)
3rd-4th	6.95-7.2 (0.273-0.283)	6.5 (0.256)
Rev5th	6.8-6.9 (0.268-0.272)	6.3 (0.248)

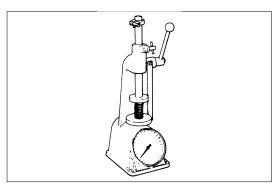




DETENT SPRING FREE LENGTH

Use a venier caliper to measure the detent spring free length. If the measured value is less than the specified limit, the detent spring must be replaced.

Detent Spring Free Length	mm(in)
Standard	Limit
25.6 (1.01)	23.6 (0.93)
20.0 (1.01)	20.0 (0.00)

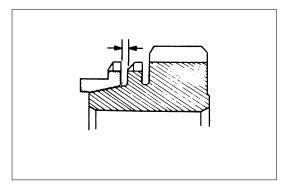




DETENT SPRING TENSION

Use a spring tester to measure the valve spring tension. If the measured value is less than the specified limit, the valve spring must be replaced.

Valve Spring Tensi	on	N(kg/lb)
Compressed Height mm(in)	Standard	Limit
22.1 (0.870)	61.8-65.7	55.9
22.1 (0.870)	(6.3-6.7/13.9-14.8)	(5.7/12.6)



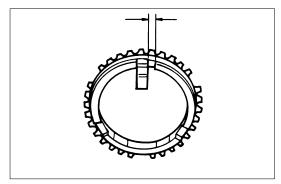


BLOCK RING AND DOG TEETH CLEARANCE

Use a thickness gauge to measure the clearance between the block ring and the dog teeth.

If the measured value exceeds the specified limit, the block ring must be replaced.

Block Ring and Dog Teeth Clearance		mm(in)
	Standard	Limit
1st,2nd	2.0 (0.078)	1.3 (0.051)
3rd, 4th, 5th	1.5 (0.059)	0.8 (0.032)





BLOCK RING AND INSERT CLEARANCE

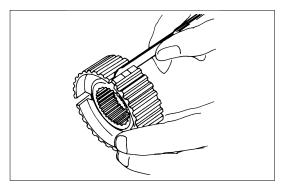
Use a thickness gauge to measure the clearance between the block ring and the insert.

If the measured value exceeds the specified limit, the block ring and the insert must be replaced.

Block Ring	and Insert	Clearance
------------	------------	-----------

mm(in)

	Standard	Limit
1st,2nd	3.46-3.74 (0.136-0.147)	4.0 (0.157)
3rd, 4th, 5th	3.51-3.79 (0.138-0.149)	4.0 (0.157)





CLUTCH HUB AND INSERT CLEARANCE

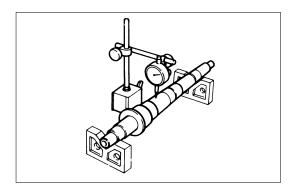
Use a thickness gauge to measure the clearance between the clutch hub and the insert.

If the measured value exceeds the specified limit, the clutch hub and the insert must be replaced.

Clutch Hub and Inse	rt Clearance
---------------------	--------------

mm(in)

Standard	Limit
0.01 - 0.19 (0.0004 - 0.0075)	0.3 (0.012)



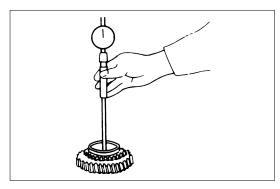


MAINSHAFT RUN - OUT

- 1. Install the mainshaft to a grinding machine.
- 2. Use a dial indicator to measure the mainshaft central portion run-out.

If the measured mainshaft run-out exceeds the specified limit, the mainshaft must be replaced.

Mainshaft Run - Out	mm(in)
Limit	
Less than 0.03 (0.0012)	





GEAR INSIDE DIAMETER

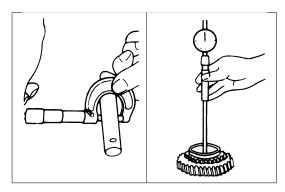
Use an inside dial indicator to measure the gear inside diameter.

If the measured value is less than the specified limit, the gear must be replaced.

Gear Inside Diameter

mm(in)

	,	
	Standard	Limit
1st	45.00-45.01	45.10 (1.7756)
Rev.	(1.7717-1.7720)	
2nd	41.00-41.01	41 10 (1 6191)
3rd	(1.6142-1.6146)	41.10 (1.6181)
5th	34.03-34.04	24.10 (1.2425)
	(1.3398-1.3402)	34.10 (1.3425)



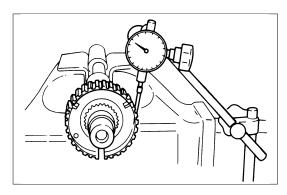


REVERSE IDLER GEAR AND IDLER GEAR SHAFT CLEARANCE

- 1. Use a micrometer to measure the idler gear shaft diameter.
- 2. Use an inside dial indicator to measure the idler gear inside diameter.
- Calculate the idler gear and idler gear shaft clearance.
 Idler gear inside diameter idler gear shaft diameter = idler gear and idler gear shaft clearance.

If the measured value exceeds the specified limit, the idler gear and/or the idler gear shaft must be replaced.

le	Idler Gear and Idler Gear Shaft Clearance mm	
	Standard	Limit
	0.041 - 0.074 (0.0016 - 0.0029)	0.150 (0.0059)





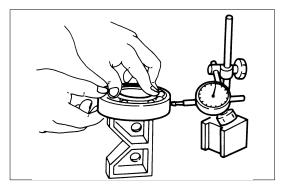
CLUTCH HUB SPLINE PLAY

- 1. Set a dial indicator to the clutch hub to be measured.
- 2. Move the clutch hub as far as possible to both the right and the left.

Note the dial indicator reading.

It the measured value exceeds the specified limit, the clutch hub must be replaced.

Clutch Hub Spline Play	mm(in)
Standard	Limit
0.019 (0 - 0.075)	0.20 (0.0079)





BALL BEARING PLAY

Use a dial indicator to measure the ball bearing play.

Ball Bearing Play	mm(in)
Limit	
0.2 (0.0079)	

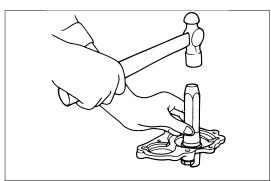


FRONT COVER OIL SEAL

Oil Seal Replacement

Oil Seal Removal

Use a screwdriver to pry the oil seal from the front cover.





Oil Seal Installation



1. Use the oil seal installer to install the oil seal to the front cover.

Oil Seal Installer: 5-8522-0042-0 (J-26540)

2. Apply engine oil to the oil seal lip.

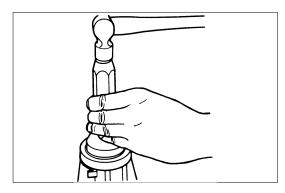


REAR COVER OIL SEAL

Oil Seal Replacement

Oil Seal Removal

Use a screwdriver to pry the oil seal from the rear cover.





Oil Seal Installation

1. Use the oil seal installer to install the oil seal to the rear cover.

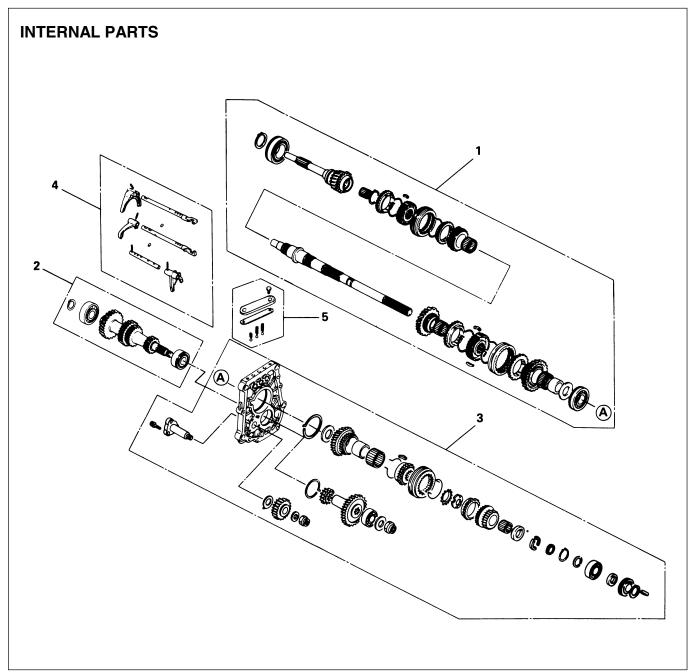
Oil Seal Installer: 9-8522-1273-0 (J-29769)

2. Apply engine oil to the oil seal lip.

+++

REASSEMBLY

MAJOR COMPONENT



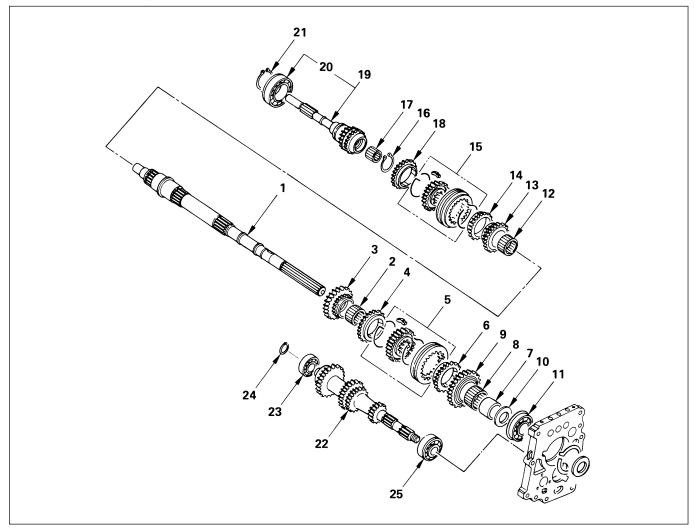
Reassembly steps

- 1. Top & main gear shaft assembly
- 2. Counter gear shaft assembly
- 3. Rev. and 5th gear assembly

- 4. Shift fork assembly & interlock pin
- 5. Detent assembly

MINOR COMPONENTS

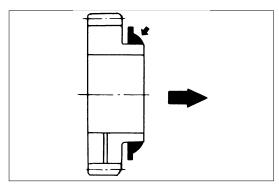
TOP GEAR SHAFT, MAINSHAFT GEAR AND COUNTER GEAR



Reassembly Steps

- 1. Mainshaft
- ▲ 2. Needle bearing
- ▲ 3. 2nd gear
 - 4. 2nd block ring
- ▲ 5. 1st-2nd synchronizer assembly
 - 6. 1st block ring
- ▲ 7. Needle bearing collar
- ▲ 8. Needle bearing
- ▲ 9. 1st gear
- ▲10. 1st gear thrust washer
- ▲11. Mainshaft ball bearing
- ▲12. Needle bearing
- ▲13. 3rd gear

- 14. 3rd block ring
- ▲15. 3rd-4th synchronizer assembly
- ▲16. Mainshaft snap ring
 - 17. Needle bearing
 - 18. 4th block ring
- ▲19. Top gear shaft
- ▲20. Ball bearing
 - 21. Top gear shaft snap ring
 - 22. Counter gear
 - 23. Front ball bearing
 - 24. Bearing snap ring
- ▲25. Rear ball bearing





Important Operations

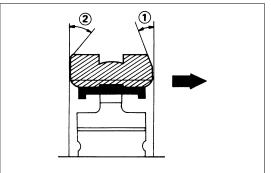


2. Needle Bearing



- 3. 2nd Gear
- 1) Apply the engine oil to the 2nd needle bearing and the 2nd gear.
- 2) Install the needle bearing and the 2nd gear to the mainshaft.

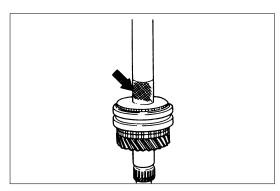
The dog teeth of the 2nd gear must be facing the rear side of the transmission.





5. 1st-2nd Synchronizer Assembly

- 1) Apply the engine oil to the clutch hub spline.
- Install the synchronizer assembly to the mainshaft.
 The outside sleeve heavy chamfering must be facing the rear of the transmission.
 - ① Chamfer Angle = 30°
 - ② Chamfer Angle = 45°

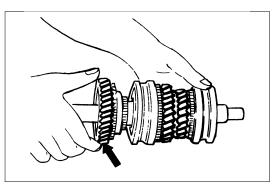




7. Needle Bearing Collar

Use a bench press and the collar installer to install the needle bearing collar.

Collar Installer: 5-8840-0178-0 (J-33851)



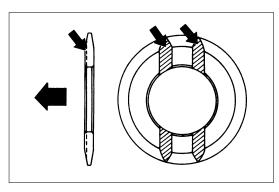


8. Needle Bearing





- 1) Apply the engine oil to the 1st needle bearing and the 1st
- Install the needle bearing and the gear to the mainshaft.
 The dog teeth of the 1st gear must be facing the front side of the transmission.

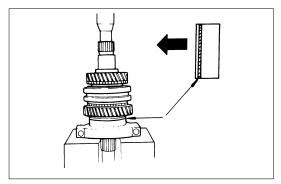




10.1st Gear Thrust Washer

Install the thrust washer to the mainshaft.

The thrust washer oil groove must be facing the 1st gear side.



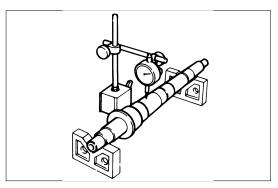


11.Mainshaft Ball Bearing

- 1) Apply the engine oil to the ball bearing inside circumference.
- 2) Use a bench press and the bearing installer to install the bearing.

The bearing snap ring groove must be facing the front of the transmission.

Bearing Installer: 5-8840-0015-0 (J-22912-01)

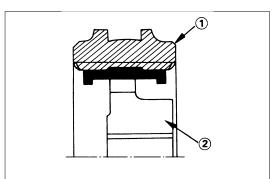




12. Needle Bearing

13.3rd Gear

- 1) Apply the engine oil to the 3rd needle bearing and the 3rd gear.
- Install the needle bearing and the gear to the mainshaft.
 The dog teeth of the 3rd gear must, be facing the front side of the transmission.

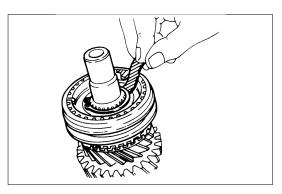




15.3rd-4th Synchronizer Assembly

- 1) Apply the recommended lubricating oil to the clutch hub spline.
- 2) Install the synchronizer assembly to the mainshaft.

 The sleeve light chamfering ① and the clutch hub heavy boss ② must be facing the rear of the transmission.





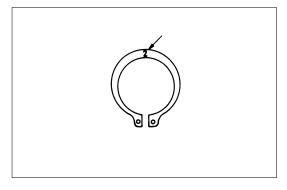
16.Mainshaft Snap Ring

1) Select the snap ring which will provide the minimum clearance between the mainshaft and the snap ring.

There are four snap ring sizes available.

The snap rings are numbered to indicate their thickness.

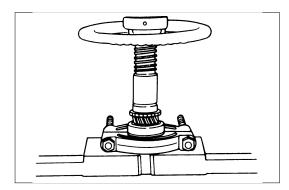
p Ring Clearance	mm(in)
Standard	
0 - 0.05 (0.002)	





Snap Ring Availability	mm(in)
Thickness	Identification Number
1.50 (0.059)	1
1.55 (0.061)	2
1.60 (0.063)	3
1.65 (0.065)	4

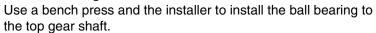
2) Use a pair of snap ring pliers to install the snap ring to the mainshaft.





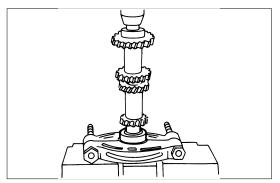
19.Top Gear Shaft

20.Ball Bearing



The snap ring groove must be facing the front of the transmission.

Bearing Installer: 5-8840-0015-0 (J-22912-01)



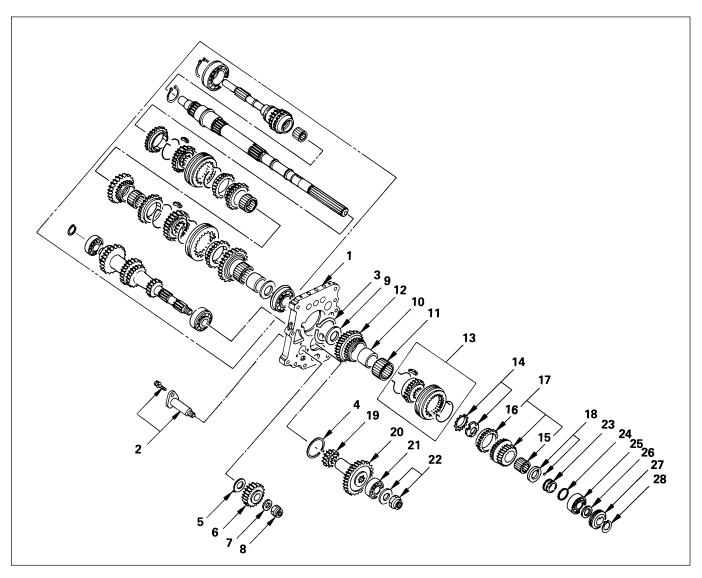


25.Rear Ball Bearing

Use a bench press and the bearing installer to install the bearing to the counter gear.

Bearing Installer: 5-8840-0015-0 (J-22912-01)

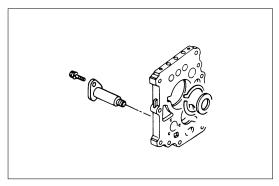
REVERSE GEAR AND 5TH GEAR



Reassembly Steps

- ▲ 1. Intermediate plate
- ▲ 2. Reverse idler shaft
 - 3. Bearing snap ring
 - 4. Bearing snap ring
 - 5. Thrust washer
- ▲ 6. Reverse idler gear
 - 7. Thrust washer
- ▲ 8. Counter reverse gear lock nut
- ▲ 9. Thrust washer
 - 10. Needle bearing collar
 - 11. Needle bearing
 - 12. Reverse gear
- ▲13. Rev.-5th synchronizer assembly
- ▲14. Mainshaft lock nut and washer

- 15. Needle bearing
- 16. 5th block ring
- 17. 5th gear
- ▲18. Thrust washer and lock ball
 - 19. Counter reverse gear
 - 20. Counter 5th gear
 - 21. Counter end ball bearing
- ▲22. Counter reverse gear nut and washer
- ▲23. Thrust washer thrust ring
- ▲24. Thrust ring snap ring
 - 25. Mainshaft end ball bearing
 - 26. Bearing spacer
 - 27. Speedometer drive gear and lock ball
 - 28. Bearing snap ring



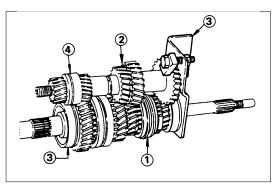


Important Operations



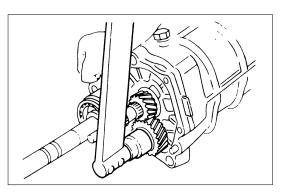
- 1. Intermediate Plate
- 2. Reverse Idler Shaft
- 1) Install the reverse idler shaft to the intermediate plate.
- 2) Tighten the reverse idler shaft bolt to the specified torque. Idler Shaft Bolt Torque $N \cdot m(kgf \cdot m/lb \cdot ft)$

 $18.6 \pm 3.9 \ (1.9 \pm 0.4 \ / \ 13.7 \pm 2.9)$





- 3) Set the mainshaft with gear assembly ① and the counter gear assembly 2 to the holding fixture 3.
 - Holding Fixture: 5-8840-2001-0 (J-29768)
- 4) Place the holding fixture (with the mainshaft and the counter shaft) in a vise.
- 5) Mesh the 3rd-4th synchronizer to the 3rd gear. Mesh the 1st-2nd synchronizer to the 1st gear.
- 6) Install the intermediate plate to the mainshaft and the counter gear ball bearings.





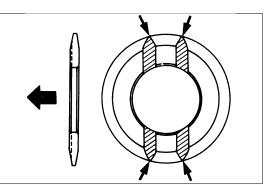
6. Reverse Idler Gear



8. Counter Reverse Gear Lock Nut

- 1) Apply the engine oil to the idler shaft and the reverse gear inside circumference.
- 2) Install the reverse gear to the idler shaft.
- 3) Install a new counter reverse gear lock nut. Never reinstall the old lock nut.
- 4) Tighten the reverse gear lock nut to the specified torque. Lock Nut Torque N·m (kgf·m/lb·ft)

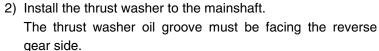
 $107.8 \pm 9.8 (11 \pm 1.0 / 79.6 \pm 7.2)$

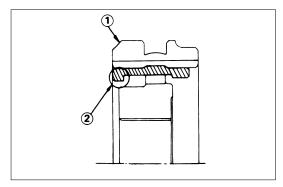




9. Thrust Washer

1) Apply the engine oil to both sides of the thrust washer.



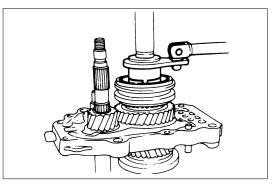




13.Rev.-5th Synchronizer Assembly

- 1) Apply the engine oil to the clutch hub spline.
- 2) Install the synchronizer assembly to the mainshaft.

 The sleeve heavy chamfer ① and the insert short side ② must be facing to the rear side of the transmission.





14. Mainshaft Lock Nut and Washer

- Install a new lock nut and washer to the mainshaft.
 Never reinstall the used lock nut and washer.
- 2) Use the lock nut wrench to tighten the lock nut to the specified torque.

Lock Nut Wrench: 5-8840-0353-0 (J-36629)

Lock Nut Torque N·m(kgf·m/lb·ft)

 $107.8 \pm 9.8 \ (11 \pm 1.0 \ / \ 79.6 \pm 7.2)$

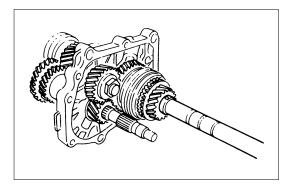


22. Counter Reverse Gear Nut and Washer

Tighten the counter gear lock nut to the specified torque.

Reverse Gear Nut Torque N·m(kgf·m/lb·ft)

 $107.8 \pm 9.8 (11 \pm 1.0 / 79.6 \pm 7.2)$

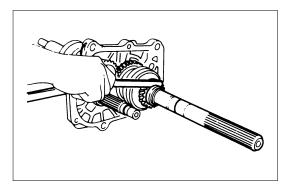


18. Thrust Washer and Lock Ball

23. Thrust Washer Thrust Ring

24. Thrust Ring Snap ring

- 1) Install the thrust washer with lock ball together with the thrust ring to the mainshaft.
- 2) Use a pair of snap ring pliers to install the snap ring.





3) Use a thickness gauge to measure the clearance between the 5th gear and the thrust washer.

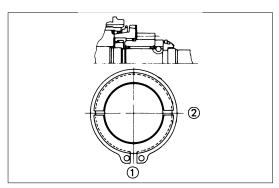
5th Gear and Thrust Washer Clearance

mm(in)

Standard

0.1 - 0.3 (0.004 - 0.012)

If required, replace the existing thrust washer with a new thrust washer to bring the clearance to specification.



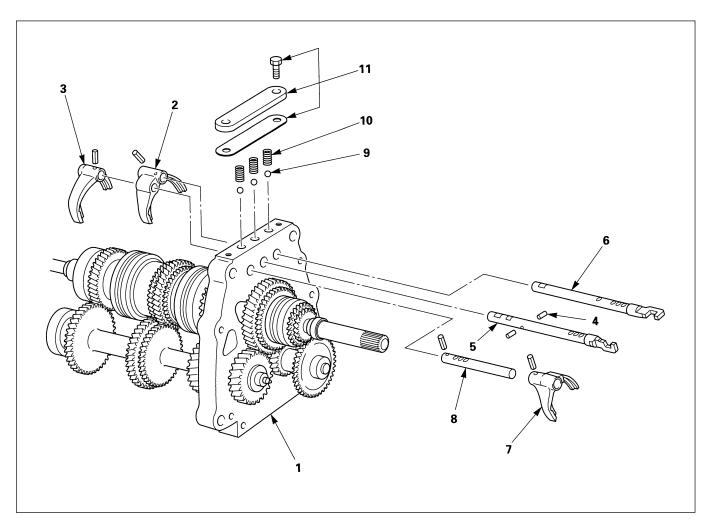


There are six thrust washer sizes available.

Thrust Washer Availa	mm(in)	
7.8 (0.307)	7.9 (0.311)	8.0 (0.315)
8.1 (0.319)	8.2 (0.323)	8.3 (0.327)

⁴⁾ Position the thrust ring snap ring gap ① and the thrust ring gap ② so that they are separated at a 90° angle.

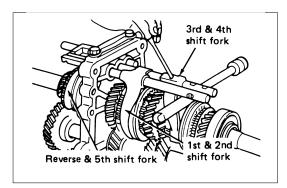
DETENT AND SHIFT ARM ASSEMBLY

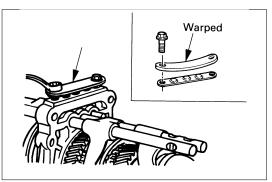


Reassembly Steps

- 1. Intermediate plate and gear assembly
- ▲ 2. 1st-2nd shift arm
- ▲ 3. 3rd-4th shift arm
 - 4. Interlock pin
 - 5. 3rd-4th shift rod
 - 6. 1st-2nd shift rod

- ▲ 7. Rev.-5th shift arm
 - 8. Rev.-5th shift rod
 - 9. Detent ball
 - 10. Detent spring
- ▲11. Detent spring plate and gasket







Important Operations

- 2. 1st-2nd Shift Arm
- 3. 3rd-4th Shift Arm
- 7. Rev.-5th Shift Arm
- 1) Hold a round bar against the shift rod end lower face to protect it against damage.
- 2) Use a spring pin installer to install the spring pin to the shift arm and the shift rod.

Never reinstall the used spring pins.



11. Detent spring Plate and Gasket.

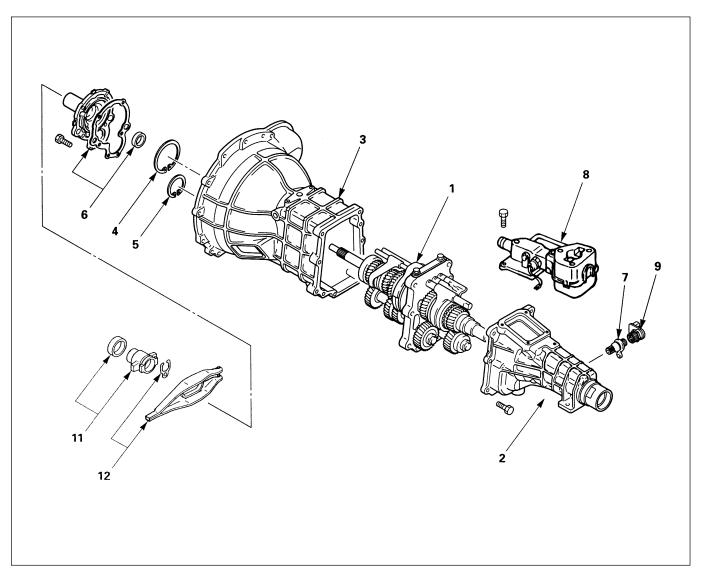
- 1) Install the new detent plete and new gasket onto the transmission case into the correct direction.
- 2) Tighten the detent spring plate bolts to the specified torque.

 Detent Spring Plate Bolt Torque

 N·m(kgf·m/lb·ft)

 $18.6 \pm 3.9 \ (1.9 \pm 0.4 \ / \ 13.7 \pm 2.9)$

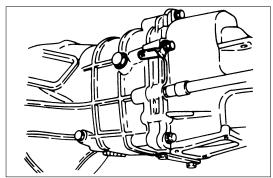
☆ MAJOR COMPONENTS



Reassembly steps

- 1. Intermediate plate with gear assembly
- ▲ 2. Rear cover with oil seal
- ▲ 3. Transmission case
- ▲ 4. Bearing snap ring
 - 5. Counter gear snap ring

- ▲ 6. Front cover with oil seal
 - 7. Speedometer driven gear
 - 8. Gear control box assembly
 - 9. Speedpmeter sensor
 - 10. Clutch shift fork
 - 11. Clutch shift block and release bearing



$\overline{\mathbb{V}}$

Important Operations



2. Rear Cover with Oil Seal

- 1) Align the pins at the lower side of the rear cover with the holes in the lower side of the intermediate plate.
- 2) Apply recommended liquid gasket or its equivalent to the rear cover fitting surfaces.
- 3) Install the rear cover to the intermediate plate.
- 4) Tighten the rear cover bolts to the specified torque.

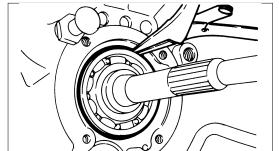
Rear Cover Bolt Torque

 $N \cdot m(kgf \cdot m/lb \cdot ft)$

 $37.2 \pm 7.8 \ (3.8 \pm 0.8 \ / \ 27.5 \pm 5.8)$



Take care not to twist or puncture the oil seal during the installation procedure.





3. Transmission Case

4. Bearing Snap Ring

- 1) Apply the engine oil to the transmission case top gear shaft ball bearing fitting faces.
- 2) Apply recommended liquid gasket or its equivalent to the transmission case fitting surfaces.
- 3) Install the transmission case to the intermediate plate.
- 4) Pull the top gear shaft from the transmission case until the ball bearing snap ring grove protrudes from the transmission case front cover fitting faces.
- 5) Use a pair of snap ring pliers to install the snap ring to the ball bearing.



6. Front Cover with Oil Seal

- 1) Clean and apply recommended liquid gasket or its equivalent to the through bolt threads.
- 2) Install the new gasket and tighten the new cover bolt to the specified torgue.

Front Cover Bolt Torgue

N·m(kgf·m/lb.ft)

 $24.5 \pm 2.9 \ (2.5 \pm 0.3 \ / \ 18.1 \pm 2.2)$



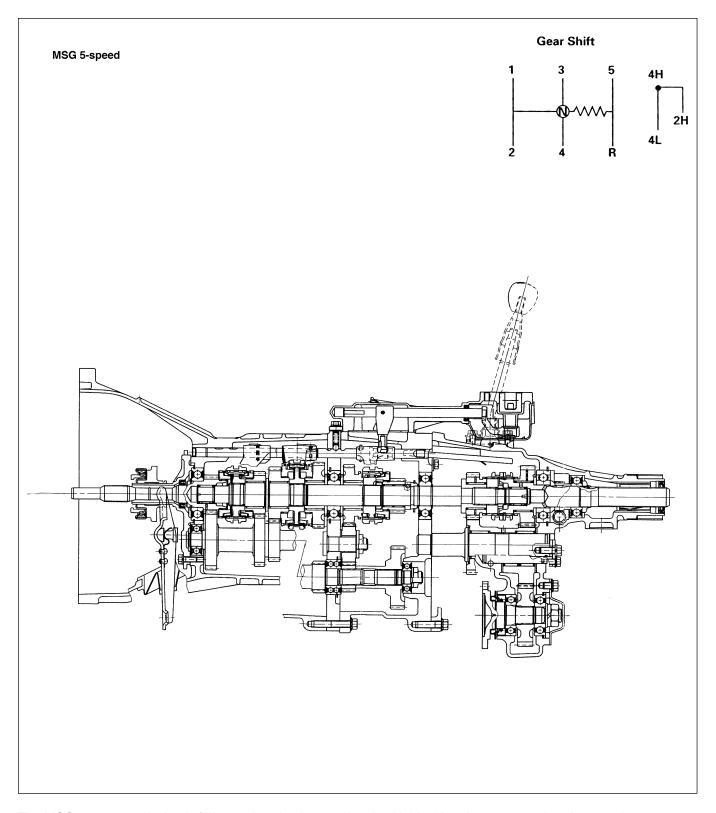
4×4 MODEL TRANSMISSION

MAIN DATA AND SPECIFICATIONS

Transmission type		Fully synchronized 5-forward gears with		
		a constant mesh type reverse gear.		
Transmission control		Direct control with the gear shift lever on the floor.		
Gear ratio	Gear ratio		5E	5k
	1st		3.785	4.122
	2nd		2.171	2.493
	3rd		1.413	1.504
	4th		1.000	1.000
	5th		0.855	0.855
	Rev.		3.720	3.720
Transfer case gear		Constant mesh type gear		
Transfer gear control		Direct control with the gear shift lever on the floor.		
*Gear ratio		Low 1.870		
		High	1.000	
Oil capacity	lit.(US gal.)	4.4 (1.16)		
Weight : approx.	kg(lbs)	70.1 (154.5)		

^{*}Transfer gear rations are only for effective on during four (4)wheels drive operations.

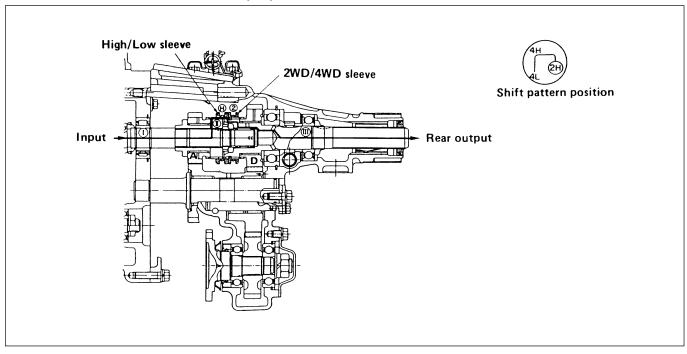
GENERAL DESCRIPTION



The MSG type transmission is fully synchronized 5-speek unit with blocking ring type synchronizers and a constant mesh type reverse gear, and the transfer mechanism is built into the rear part of the transmission assembly. The transfer mechanism is also constant mesh gear type shifting between the 2 and 4 wheel drive mode. Shifting the transfer gears between 'Low' and 'High' is possible during 4 wheel drive operation.

TRANSFER OPERATION

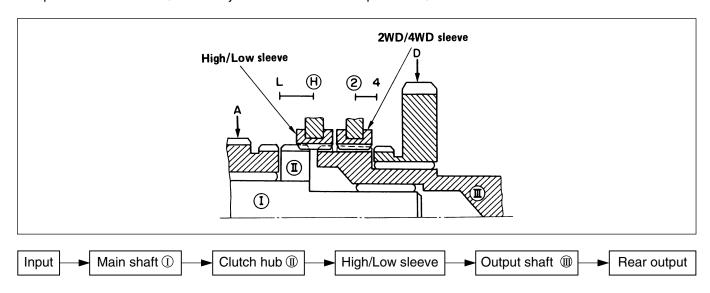
NORMAL REAR WHEEL DRIVE (2H)



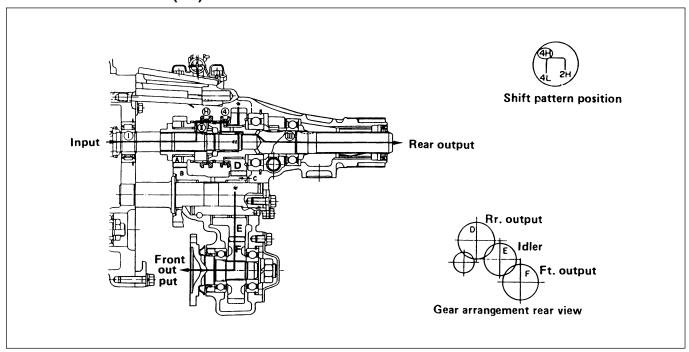
The High/Low sleeve and the 2WD/4WD sleeve operate as illustrated below, when the control lever of the transfer is set to 2H.

Input gear (A) and Output gear (D) become free.

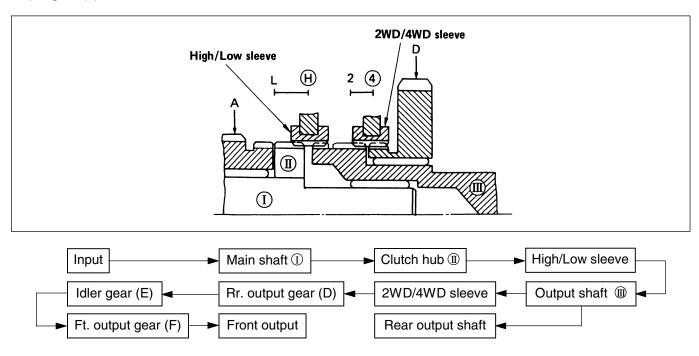
The power of main shaft ① is directly transferred to rear output shaft ⑩.



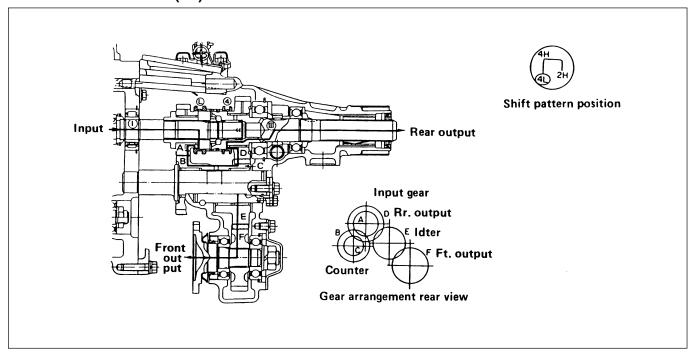
FOUR-WHEEL DRIVE (4H)



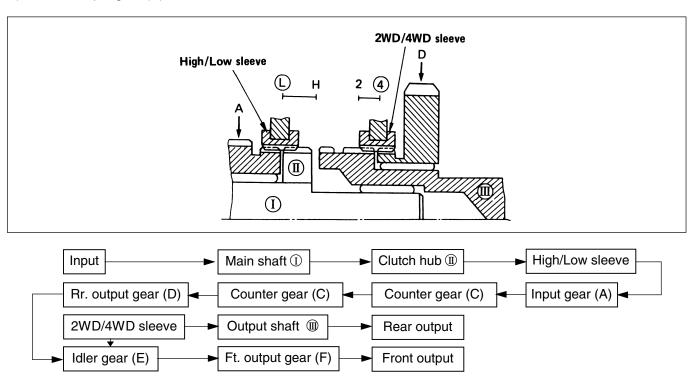
The 2WD/4WD sleeve operate as illustrated below, when the control lever of the transfer is set to 4H. Output gear (D) is engaged and the power of main shaft 1 is transferred to rear output shaft 1 via Idler gear (E) and Front output gear (F).



FOUR-WHEEL DRIVE (4L)



The High/Low sleeve and the 2WD/4WD sleeve operate as illustrated below, when the control lever of the transfer is set to 4L. Input gear (A) is engaged and the speed is reduced by a ingle gear. The power is transferred to the front output via Counter gears (B & C), Rr. Output gear (D), Idler gear (E) and Ft output gear (F). On the other hand, the power reduced by a single gear is transferred to the rear output shaft via Counter gears (B & C) and Rr. Output gear (D).



TORQUE SPECIFICATION

STANDDARD BOLTS

The torque values given in the following table should be applied where a particular torque is not specified.

N.m (kaf.m/lh.ft)

						N·m (kgf·m/lb·ft)
	Strength		7T	8	.8	9.8/9T
	Class			Refined	Non-Refined	
	Bolt Identifi- cation			8		
	Bolt Diameterx Pitch (mm)	No mark	-			
Standard Hex.	M6 × 1.0	6 (0.6 / 52 lb.in)	7 (0.7 / 61 lb.in)	8 (0.8 /	69 lb.in)	-
Head Bolt	M8 × 1.25	13 (1.3 / 113 lb.in)	17 (1.7 / 12)	20 (2.	0 / 14)	24 (2.4 / 17)
rieau Boit	M10 × 1.25	27 (2.8 / 20)	37 (3.8 / 27)	42 (4.	3 / 31)	50 (5.1 / 37)
	M12 × 1.25	61 (6.3 / 45)	76 (7.8 / 56)	87 (8.	9 / 64)	95 (9.7 / 70)
	M14 ×1.5	96 (9.8 / 71)	116 (11.8 / 85)	133 (13	3.6 / 98)	142 (14.5 / 105)
	M16 × 1.5	130 (13.3 / 96)	170 (17.3 / 125)	193 (19	.7 / 143)	200 (20.4 / 148)
	M18 × 1.5	188 (19.2 / 139)	244 (24.9 / 180)	278 (28	.3 / 205)	287 (29.3 / 212)
	M20 × 1.5	258 (26.3 / 190)	337 (34.4 / 249)	385 (39.3 / 284)		396 (40.4 / 292)
	M22 × 1.5	332 (33.9 / 245)	453 (46.3 / 335)	517 (52	.7 / 381)	530 (54.1 / 391)
	$M24 \times 2.0$	449 (45.8 / 331)	570 (58.2 / 421)	651 (66	.3 / 480)	692 (70.6 / 511)
	*M10 × 1.5	26 (2.7 / 20)	36 (3.7 / 27)	41 (4.	2 / 30)	48 (4.9 / 35)
	*M12 × 1.75	57 (5.8 / 42)	71 (7.2 / 52)	80 (8.	2 / 59)	89 (9.1 / 66)
	*M14 × 2.0	89 (9.1 / 66)	110 (11.2 / 81)	125 (12	2.7 / 92)	133 (13.6 / 98)
	*M16 × 2.0	124 (12.7 / 92)	162 (16.5 / 119)	185 (18	.9 / 137)	191 (19.5 / 141)
Flange Bolt	M6 × 1.0	7 (0.7 / 61 lb.in)	8 (0.8 / 69 lb.in)	9 (0.9 /	78 lb.in)	-
	M8 × 1.25	15 (1.5 / 11)	19 (1.9 / 14)	22 (2.	2 / 16)	26 (2.7 / 20)
	M10 × 1.25	31 (3.2 / 23)	41 (4.2 / 30)	47 (4.	8 / 35)	56 (5.7 / 41)
	M12 × 1.25	69 (7.0 / 51)	85 (8.7 / 63)	97 (9.	9 / 72)	106 (10.8 / 78)
	M14 × 1.5	104 (10.6 / 77)	126 (12.8 / 93)	144 (14	.6 / 106)	154 (15.7 / 114)
	M16 × 1.5	145 (14.8 / 127)	188 (19.2 / 139)	214 (21	.8 / 158)	221 (22.5 / 163)
	M18 × 1.5	-	-		-	-
	M20 × 1.5	-	-		-	-
	M22 × 1.5	-	-		-	-
	M24 × 2.0	-	-		-	-
	*M10 × 1.5	30 (3.1 / 22)	40 (4.1 / 30)	46 (4.	7 / 34)	54 (5.5 / 40)
	*M12 × 1.75	64 (6.5 / 47)	78 (8.0 / 58)	·	1 / 66)	99 (10.1 / 73)
	*M14 × 2.0	97 (9.9 / 72)	119 (12.1 / 88)		8 / 99.7)	144 (14.7 / 107)
	*M16 × 2.0	137 (14.0 / 101)	178 (18.2 / 132)	203 (20	.7 / 132)	210 (21.5 / 155)

The asterisk * indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.



₹ FLARE NUTS

Pipe diameter mm (in)	Torque N·m (kgf·m / lb·ft)	Pipe diameter mm (in)	Torque N·m (kgf·m / lb·ft)
4.76 (0.187)	16 (1.6 / 12)	10.00 (0.394)	54 (5.5 / 40)
6.35 (0.250)	26 (2.7 / 20)	12.00 (0.472)	88 (9.0 / 65)
8.00 (0.315)	44 (4.5 / 33)	15.00 (0.591)	106 (10.8 / 78)

SPECIAL PARTS FIXING NUTS AND BOLTS

 $N \cdot m(kgf \cdot m/lb \cdot ft)$ 49.0±9.8 (5±1/36.2±7.2) 147±9.8 (15±1/108.5±7.2) 127.4±9.8 (13±1/94.0±7.2) 127.4±9.8 (13±1/94.0±7.2) 107.8±9.8 (11±1/79.6±7.2) 24.5±2.9 (2.5±0.3/18.1±2.2) 24.5±2.9 (2.5±0.3/18.1±2.2) 39.2±9.8 (4±1/28.9±7.2) Apply adhesive (Permatex No.2 or equirelant) 37.2±7.8 (3.8±0.8/27.5±5.8) 39.2±9.8 (4±1/28.9±7.2)

☑ RECOMMENDED LIQUID GASKET

Туре	Brand Name	Manufacturer	Remarks	
	ThreeBond 1207B Three Bond		For Engine and	
RTV* Silicon Base	ThreeBond 1207C Three Bond		Transmission Repairs	
	ThreeBond 1215	Three Bond	For Axle Case Repairs	
Water Base	ThreeBond 1141E	Three Bond	For Engine Repairs	
Solvent	ThreeBond 1104	Three Bond	For Engine Repairs	
	BelcoBond 4	Isuzu		
	BelcoBond 401	Isuzu		
	BelcoBond 402	Isuzu		
Anerobic	LOCTITE 515	Loctite	A II	
	LOCTITE 518	Loctite	All	

^{*}RTV : Room Temperature Vulcanizer

Note:

- 1. It is very important that the liquid gaskets listed above or their exact equivalent be used on the vehicle.
- 2. Be careful to use the specified amount of liquid gasket.
- Follow the manufacturer's instructions at all times.
- 3. Be absolutely sure to remove all lubricants and moisture from the connecting surfaces before applying the liquid gasket.
 - The connecting surfaces must be perfectly dry.
- 4. LOTITE 515 and LOCTITE518 harden upon contact with a metal surface.
 - Do not apply LOTITE 515 or LOTITE 518 between two metal surfaces having a clearance of greater than 0.25 mm (0.01 in). Poor adhesion will result.

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REMOVAL AND INSTALLATION

Read this Section carefully before performing any removal and installation procedure. This Section gives you important points as well as the order of operation. Be sure that you understand everything in this Section before you begin.



Important Operations - Removal Battery Cable

Disconnect the negative (-) cable from the battery terminal.

Engine Hood

Apply setting marks to the engine hood and the engine hood hinges before removing the engine hood.

Gear Shift Lever and Transfer Change Lever

- 1. Place the gear shift lever in the neutral position.
- 2. Place the transfer change lever in the "H" position.
- 3. Remove the gear shift lever knob and transfer change lever knob.
- 4. Remove the center console assembly and front console assembly.
- 5. Remove the grommet and dust cover.
- 6. Remove the gear shift lever cover bolt.
- 7. Remove the gear shift lever.
- 8. Remove the transfer change lever retainer bolts.
- 9. Remove the transfer change lever and O-ring.

Note:

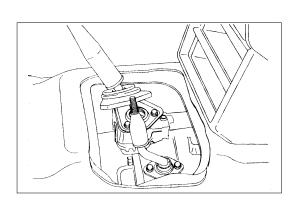
Cover the shift lever and change lever holes to prevent the entry of foreign material into the transmission.

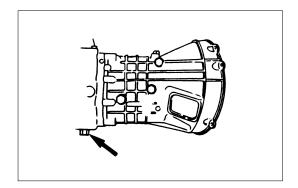
Lifting the Vehicle

- 1. Jack up the vehicle.
- 2. Place chassis stands at the front and the rear of the vehicle.

Transfer Case Protector

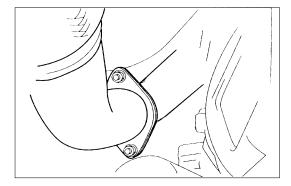
Remove the transfer case protector from the transmission mounting member and the side member.





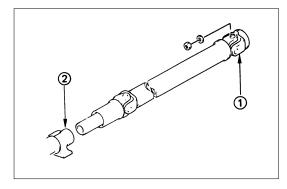
Transmission and Transfer Case Oil Draining

- 1. Remove the transmission oil drain plug.
- 2. Replace the drain plug after draining the oil.



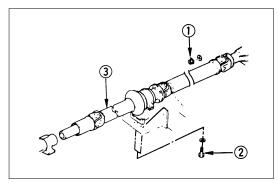
Exhaust Pipe

1. Remove the front exhaust pipe.



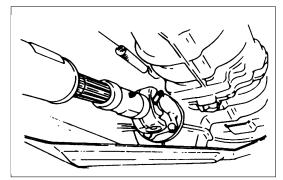
Rear Propeller Shaft (Single Shaft Type)

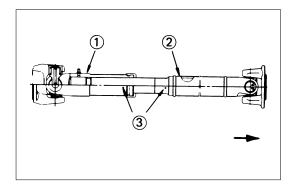
- 1. Remove the propeller shaft flange yoke at the drive pinion side ①.
- 2. Remove the propeller shaft from the transmission main shaft spline ②.



Rear Propeller shaft (Dual Shaft Type)

- Apply setting marks to the 2nd propeller shaft flange yoke.
 This will prevent mispositioning during the installation procedure.
- 2. Remove the 2nd propeller shaft flange yoke bolts at the drive pinion side ①.
- 3. Remove the center bearing retainer bolts ②.
- 4. Remove the 1st propeller shaft ③ with the center bearing and the 2nd propeller shaft.
 - Pull the 1st propeller shaft toward the rear of the vehicle until the spline yoke is free of the transmission main shaft.





Front Propeller Shaft

Remove the splined yoke flange bolt at the transfer case side. Do not allow the splined yoke to fall sway from the front Propeller shaft.



Important

Apply setting marks to the splined yoke and the propeller shaft before removing the front propeller shaft.

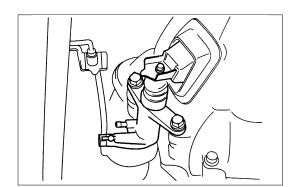
If the splined yoke should fall away from the front propeller shaft, align the setting marks 3 on the splined yoke 1 and the propeller shaft 2 to reassemble the two parts.



Disconnect the 4WD swich connectors, back up light switch connector and the speedometer sensor connector.

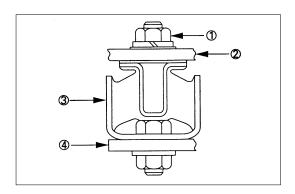
Slave Cylinder

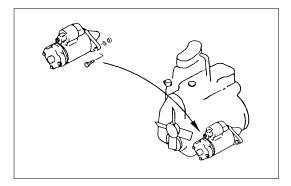
Remove the slave cylinder from the transmission case.

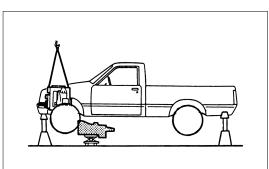


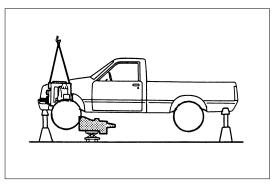
Engine Lifting Hanger

- 1. Attach the engine lifting hanger to the front portion of the engine.
- 2. Attach the lifting wire to both ends of the engine lifting hanger.









Engine Rear Mounting and Crossmember

- 1. Support the transmission with a transmission jack.
- 2. Remove No.2 crossmember.
- 3. Remove the engine rear mounting nuts from No.3 crossmember ③.
- 4. Remove the engine rear mounting bolts from the transmission ①.
- 5. Remove No.3 crossmember and bolts ③ from the side frame.
- 6. Remove the engine rear mounting 2.

Starter Motor

Remove the starter motor from the engine real plate.

Transmission with Transfer

- 1. Remove the transmission nuts and bolts from the engine rear plate.
- 2. Carefully pull the transmission with the transmission jack toward the rear of the vehicle.
- 3. Operate the transmission jack to slowly lower the transmission.

Important Operations - Installation

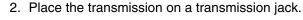
Follow the removal procedure in the reverse order to perform the installation procedure.

Pay careful attention to the important points during the installation procedure.

Transmission with Transfer



1. Apply a thin coat of molybdenum disulfide grease to the top gear shaft spline.



3. Carefully move the transmission jack and transmission into position behind the cab.

4. Slowly raise the transsmission jack until the front of the transmission is aligned with the rear of the engine.

The slope of the engine and the transmission must be the same.

- 5. Align the top gear shaft spline with the clutch driven plate internal spline.
- 6. Install the transmission to the engine.

Tighten the transmission nuts and bolt to the specified torque.

Transmission Nut and Bolt Torque

N·m (kgf·m/lb·ft)

M10: $40 \pm 10 (4.1 \pm 1.0 / 30 \pm 7.2)$ M12: $78 \pm 16 \ (8.0 \pm 1.6 / 58 \pm 12)$

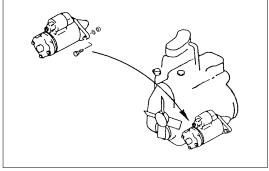


Install the starter motor to the engine rear plate.

Starter Motor Bolt Torque

N·m (kgf·m/lb·ft)

 $78 \pm 16 \ (8.0 \pm 1.6 \ / \ 58 \pm 12)$



Engine Rear Crossmember and Mounting 2 Member

1. Install the engine rear crossmember ② to the transmission

Rear Mounting Bolt Torque

N·m(kgf·m/lb·ft)

 $83.3 \pm 4.9 \ (8.5 \pm 0.5 / 61.5 \pm 3.6)$

2. Install the cross member ③ to the mounting rubber ②.

Mounting Rubber Nut Torque

N·m(kgf·m/lb·ft)

 $41 \pm 4.9 \ (4.2 \pm 0.5 \ / \ 30 \pm 3.6)$

3. Install the cross member to the sideframe.

Mounting Member Bolt Torque

N·m(kgf·m/lb·ft)

 $36.8 \pm 9.8 \ (3.8 \pm 1.0 \ / \ 27.1 \pm 7.2)$



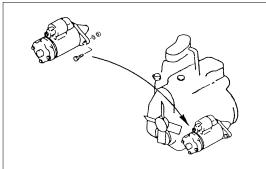


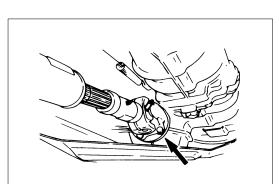
Install the slave cylinder to the transmission case.

Slave Cylinder Bolt Torque

 $N \cdot m(kgf \cdot m/lb \cdot ft)$

 $78 \pm 16 \ (8.0 \pm 1.6 \ / \ 58 \pm 12)$





Harness Connector

Connect the 4WD switch connector, back up light switch connector and speedometor sensor connector.



Front Propeller Shaft



- 1. Connect the propeller shaft flange yoke to the matching flange.
- 2. Tighten the propeller shaft flange yoke bolt to the specified torque.

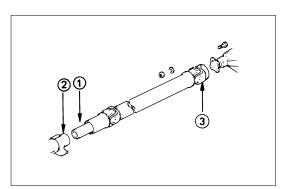
Propeller Shaft Flange Yoke Bolt Torque $N \cdot m(kgf \cdot m/lb \cdot ft)$

 $62.7 \pm 3.92 (6.4 \pm 0.4 / 46.3 \pm 2.90)$

Note:

If the splined yoke and the front propeller shaft have accidentally separated, align their setting marks and recouple them.

Refer to "FRONT PROPELER SHAFT REMOVAL".



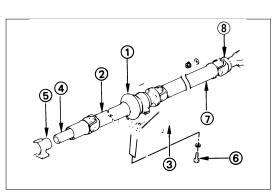


Rear Propeller Shaft (Single Shaft Type)

- 1. Insert the splined yoke ① with the propeller shaft into the transmission main shaft spline 2.
- 2. Install the propeller shaft flange yoke 3 to the drive pinion
- 3. Tighten the propeller shaft flange yoke bolt to the specified torque.

Propeller Shaft Flange Yoke Bolt Torque $N \cdot m(kgf \cdot m/lb \cdot ft)$

> M8: 35.3 ± 2.94 ($3.6 \pm 0.3 / 26.0 \pm 2.2$) M10: 62.7 ± 3.9 $(6.4 \pm 0.4 / 46.3 \pm 2.9)$





Rear Propeller Shaft (Dual Shaft Type)



- 1. Place the center bearing 1 together with the 1st peopeller shaft ② and 2nd propeller shaft ⑦ on the No.4 crossmember 3.
- 2. Insert the splined yoke 4 into the transmission main shaft spline 5.
- 3. Tighten the center bearing retainer bolts 6 to the specified torque.

Center Bearing Retainer Bolt Torque N·m(kgf·m/lb·ft)

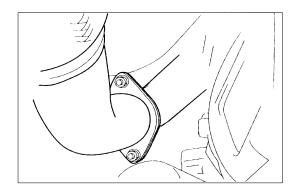
 $60.8 \pm 11.8 (6.2 \pm 1.2 / 44.8 \pm 8.7)$

- 4. Connect the 2nd propeller shaft 7 and drive pinion side 8. Be sure to align the setting marks applied at disassembly.
- 5. Tighten the coupling bolts to the specified torque.

Propeller Shaft Flange Yoke Bolt

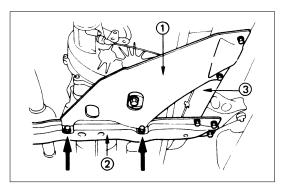
Torque N·m(kgf·m/lb·ft)

> M10: 35.3 ± 2.94 ($3.6 \pm 0.3 / 26.0 \pm 2.2$) M12: 62.7 ± 3.9 ($6.4 \pm 0.4 / 46.3 \pm 2.9$)



Exhaust Pipe

1. Install the 2nd exhaust pipe.

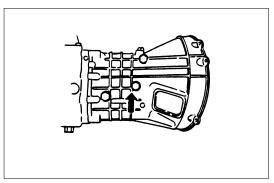


2

☐ Transfer Case Protector

- 1. Install the transfer case protector ① to the mounting member ② and the sidemembers ③.
- 2. Tighten the transfer case protector bolts to the specified torque.

Transfer Case Protector Bolt Torque $N \cdot m(kgf \cdot m/lb \cdot ft)$ 36.3 ± 9.8 (3.7 ± 1.0 / 26.8 ± 7.2)

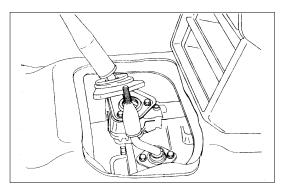




Gear Shift Lever and Transfer Change Lever

1. Replenish the transmission case and the transfer case with the specified engine oil.

Transmission and Transfer Case Oil lit (US gal.)
4.4 (1.16)





2. Install the gear shift lever to the gear control box.

Shift Lever Cover Torque N·m(kgf·m/lb·ft)

 $19.6 \pm 1.96 (2.0 \pm 0.2 / 14.5 \pm 1.5)$

3. Install the dust cover.

4. Insert the transfer change lever to the transfer case.

Change Lever Retainer Bolt Torque N·m(kgf·m/lb·ft)

 $19.6 \pm 1.96 \ (2.0 \pm 0.2 \ / \ 14.5 \pm 1.5)$

- 5. Install the grommet
- 6. Install the front console assembly and center console assembly.
- 7. Install the gear shift lever and the transfer change lever knobs.

Lowering the Vehicle

- 1. Place a jack beneath the vehicle.
- 2. Raise the jack to remove the chassis stands.
- 3. Lower the vehicle to the ground.

Engine Hood

Align the setting marks (applied at removal) on the engine hood and the engine hood hinges to install the engine hood.

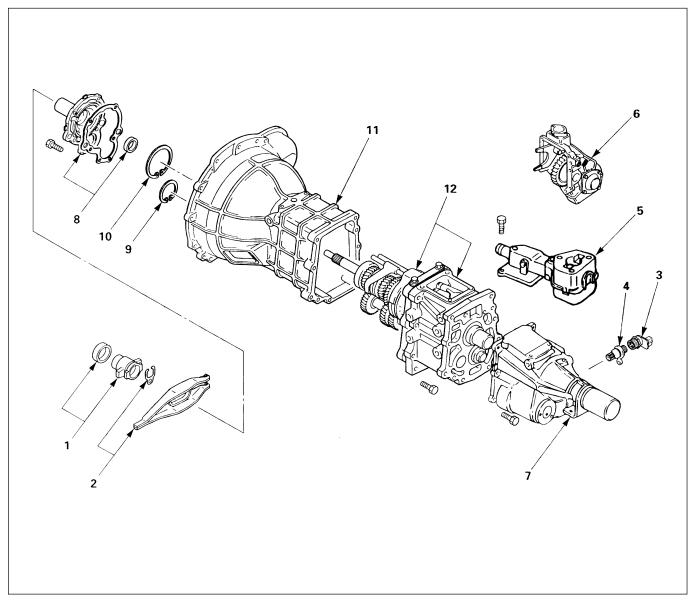
Battery Cable

Connect the negative (-) cable to the battery terminal.

-‡→ D

DISASSEMBLY

MAJOR COMPONENTS

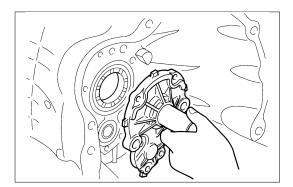


- 1. Clutch shift block and release bearing
- 2. Clutch shift fork
- 3. Speedometer sensor
- 4. Speedometer driven gear assembly
- 5. Gear control box assembly
- 6. Transfer side case assembly

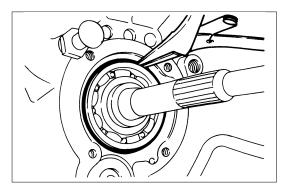
- 7. Transfer case assembly and gasket
- ▲ 8. Front cover with oil seal
 - 9. Counter gear snap ring
- ▲10. Bearing snap ring
- ▲11. Transmission case
 - 12. Adaptor case, intermediate plate and gear assembly

$\overline{\mathbb{V}}$

Important Operations

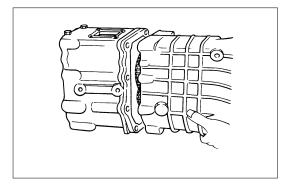


8. Front Cover with Oil Seal



10.Bearing Snap Ring

Remove snap ring from the outer circumference of the top gear shaft ball bearing.

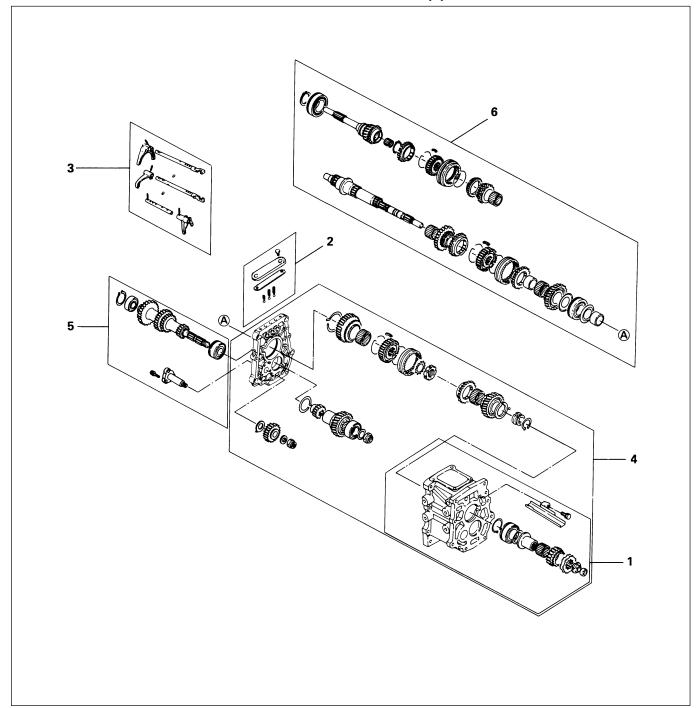


11.Transmission Case

Remove the transmission case from the intermediate plate with the adaptor assembly.

DISASSEMBLY OF INTERNAL PARTS (TRANSMISSION)

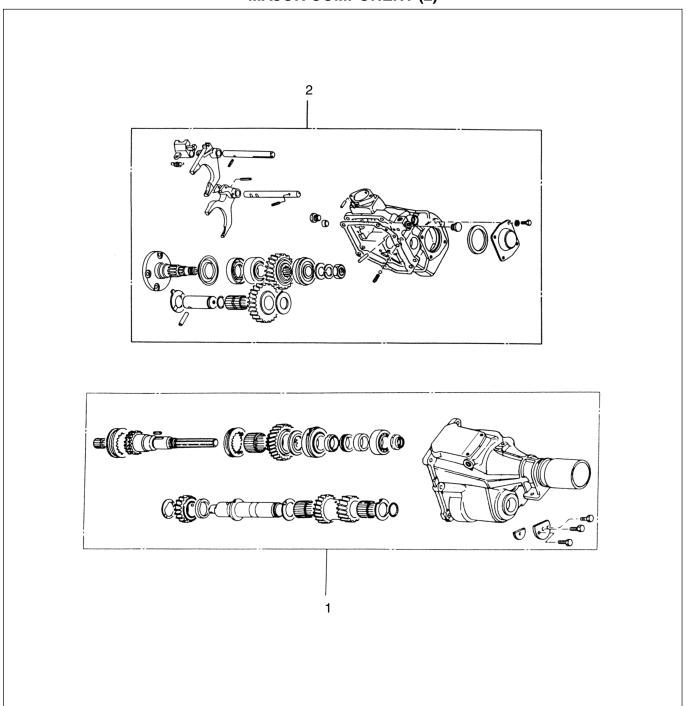
MAJOR COMPONENT (1)



- 1. Adapter case and input transfer gear
- 2. Detent assembly
- 3. Shift fork assembly & interlock pin
- 4. Rev. and 5th gear assembly
- 5. Cluster gear shaft assembly
- 6. Top & main gear shaft assembly

DISASSEMBLY OF INTERNAL PARTS (TRANSFER)

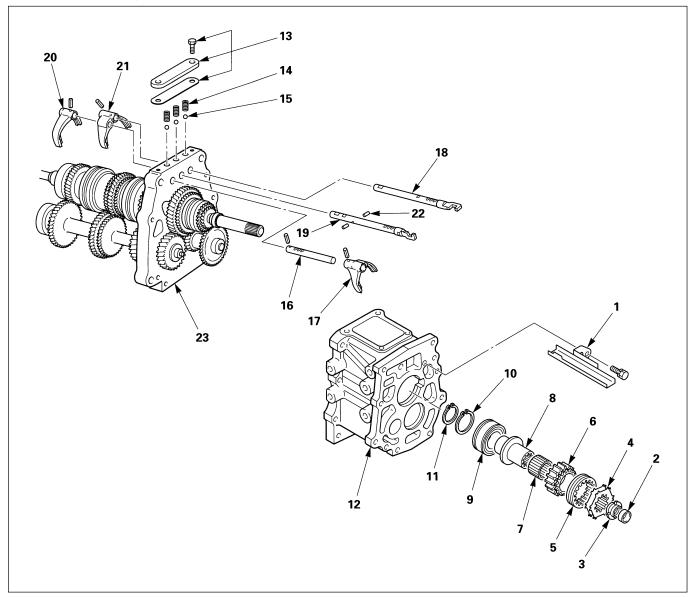
MAJOR COMPONENT (2)



- 1. Transfer case assembly
- 2. Transfer side case assembly

I MINOR COMPONENT

ADAPTOR CASE, INTERMEDIATE PLATE WITH GEAR ASSEMBLY

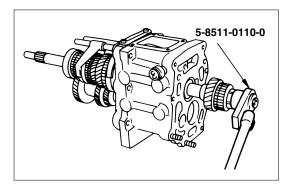


- 1. Oil guide
- 2. Spacer
- ▲ 3. Thrust input hub nut
 - 4. Thrust input hub
 - 5. High-Low shift sleeve
 - 6. Thrust input gear
 - 7. Needle bearing
 - 8. Thrust input gear collar
 - 9. Ball bearing
 - 10. Snap ring
 - 11. Snap ring
 - 12. Adaptor case

- 13. Detent spring plate and gasket.
- 14. Detent spring
- ▲15. Detent ball
 - 16. Rev.-5th shift rod
 - 17. Rev.-5th shift arm
 - 18. 1st-2nd shift rod
- ▲19. 3rd-4th shift rod
- ▲20. 3rd-4th shift arm
- ▲21. 1st-2nd shift arm
 - 22. Interlock pin
 - 23. Intermediate plate with gear assembly



Important Operations

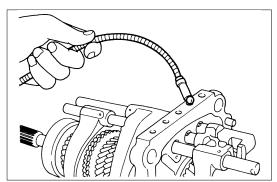




3. Thrust Input Hub Nut

- (1) Engage Top/3rd side synchronizer with the third gear and Low/2nd side synchronizer with the low gear.
- (2) This operation is necessary to prevent turning of the shaft when removing main shaft rear.

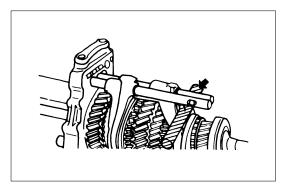
Wrench: 5-8511-0110-0 (J-29041)



15.Detent Ball

Use a magnetic hand to remove the detent balls from the intermediate plate.

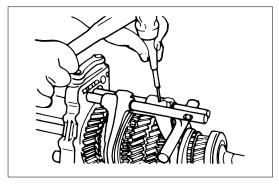
Take care not to lose the detent balls.





19.3rd-4th Shift Rod 20.3rd-4th Shift Arm 21.1st-2nd Shift Arm

Hold a round bar against the shift arm end.
 This will prevent damage to other components.



2) Use a spring pin remover to remove the shift arm spring pin from the shift arm and the shift rod.

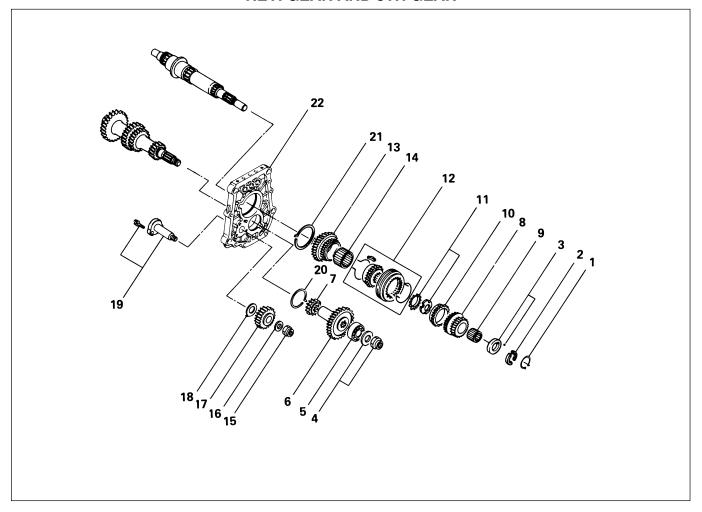
Spring Pin Remover: 9-8529-2201-0

Discard the used spring pin.

Move the 3rd-4th shift rod forward.
 Take care not to lose the interlock pins.

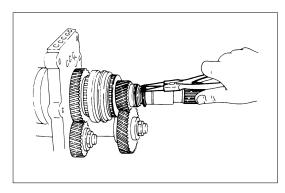
I MINOR COMPONENT

REV. GEAR AND 5TH GEAR



- ▲ 1. Snap ring
- ▲ 2. Thrust ring
 - 3. Thrust washer and lock ball
 - 4. Self lock nut and washer
- ▲ 5. Ball bearing
- ▲ 6. Cluster 5th gear
 - 7. Cluster Rev. gear
 - 8. 5th gear
 - 9. Needle bearing
 - 10. 5th blocking ring
- ▲11. Nut and lock washer
 - 12. Rev./5th synchronizer assembly

- 13. Rev. gear
- ▲14. Needle bearing
 - 15. Lock nut
 - 16. Thrust washer
 - 17. Rev. idler gear
 - 18. Thrust washer
 - 19. Rev. idler shaft
- ▲20. Snap ring
- ▲21. Snap ring
- ▲22. Intermediate plate

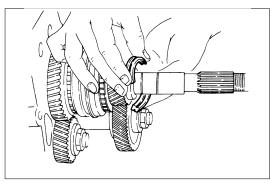


$\overline{\mathbf{V}}$

Important Operation

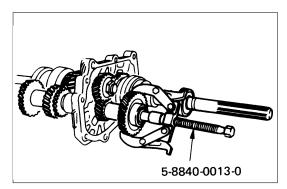
1. Snap Ring

Use a pair of snap ring pliers to remove snap rings.



2. Thrust Ring

Remove the thrust ring.

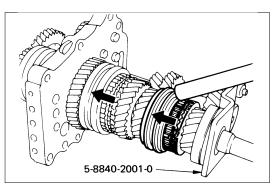




5. Ball Bearing

6. Cluster 5th Gear

Remover: 5-8840-0013-0

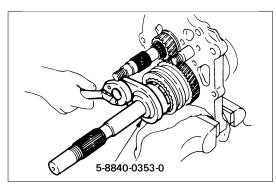




11.Nut and Lock Washer

(1) Engage Top/3rd synchronizer with the third gear and Low/2nd side synchronizer with the low gear, then attach tool to the main shaft and the cluster gear.

Holding fixture : 5-8840-2001-0 (J-29768)

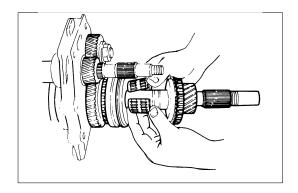




(2) This operation is necessary to prevent turning of the shaft when removing main shaft rear and cluster shaft reverse gear lock nut.

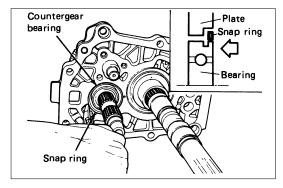
Wrench: 5-8840-0353-0 (J-36629)

7B-66 MSG MODEL (4WD)



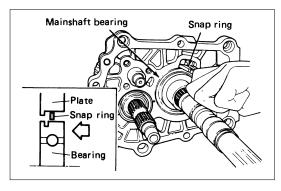
14. Needle Bearing

Remove the needle bearing (2 piece type).



20. Snap Ring; Cluster Gear Shaft

Insert the nose of snap ring pliers into the cluster gear side bearing snap ring hole in the intermediate plate and disengage the snap ring from the groove by tapping on the front face of the plate while expanding the cluster gear side bearing snap ring.



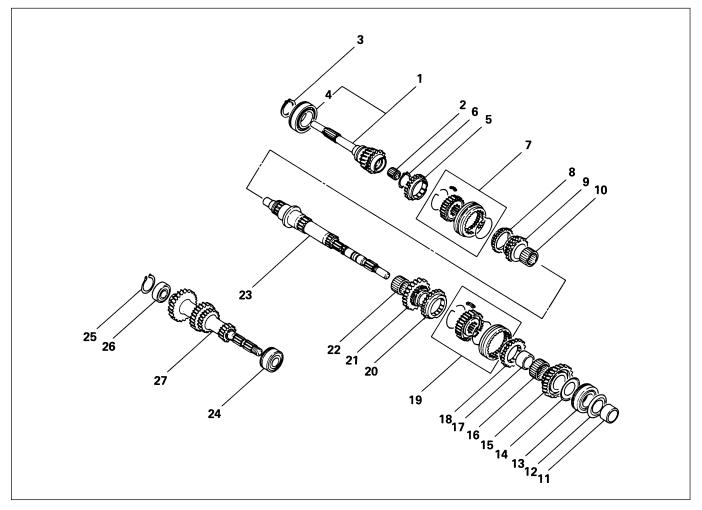
21. Snap Ring; Main Gear shaft

22.Intermediate Plate

Remove the intermediate plate rearward by expanding the mainshaft ball bearing snap ring with the snap ring pliers.

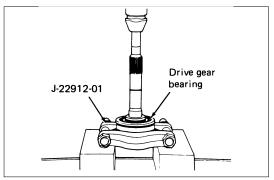
MINOR COMPONENT

TOP/MAIN GEAR SHAFT AND CLUSTER GEAR SHAFT



- 1. Top gear assembly
- 2. Needle bearing
- 3. Snap ring
- ▲ 4. Ball bearing
 - 5. 4th blocking ring
 - 6. Snap ring
- ▲ 7. 3rd/4th synchronizer assembly
 - 8. 3rd blocking ring
 - 9. 3rd gear
 - 10. Needle bearing
 - 11. Collar
 - 12. Trust Washer
- ▲13. Ball bearing
 - 14. Thrust washer

- 15. Low gear
- 16. Needle bearing
- 17. Collar
- 18. Low blocking ring
- ▲19. Low/2nd synchronizer assembly
 - 20. 2nd blocking ring
 - 21. 2nd gear
 - 22. Needle bearing
 - 23. Mainshaft
- ▲24. Ball bearing
 - 25. Ball bearing
 - 26. Snap ring
 - 27. Cluster gear shaft





7 Important Operation

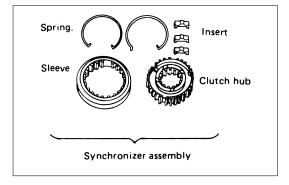
(i)

4. Ball Bearing; Top Gear Shaft

Install the tool under top gear shaft bearing and remove using a bench press.

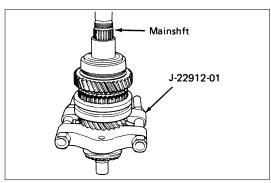
Bearing remover : 5-8840-0015-0

(J-22912-01)



7.3nd/4th Synchronizer Assembly 19.Low/2nd Synchronizer Assembly

Remove synchronizer assembly together with clutch hub, then disassemble these parts into sleeve, insert, spring and clutch hub.



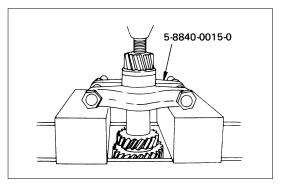


13.Ball Bearing; Main Shaft

Install the tool under 2nd gear and remove using a bench press.

Bearing remover : 5-8840-0015-0

(J-22912-01)





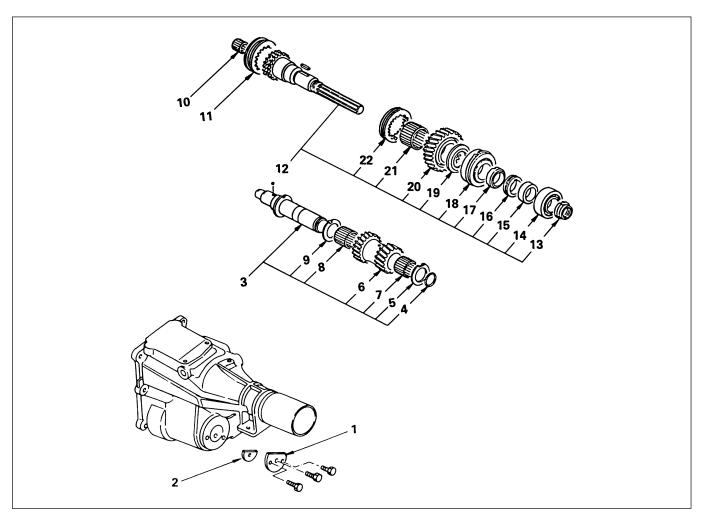
24.Ball Bearing

Install the tool under cluster gear rear bearing and remove using a bench press.

Bearing remove : 5-8840-0015-0

(J-22912-01)

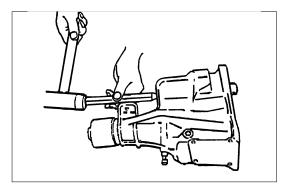
TRANSFER CASE ASSEMBLY



- 1. Lock plate
- 2. Distance plate
- ▲ 3. Transfer counter shaft assembly
- ▲ 4. O-ring
 - 5. Thrust washer
 - 6. Counter gear
 - 7. Needle bearing
 - 8. Needle bearing

 - 9. Thrust washer
 - 10. Needle bearing
 - 11. High/Low sleeve

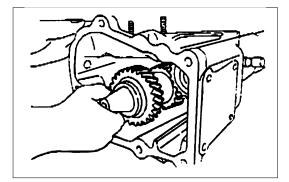
- ▲12. Output shaft assemby
- ▲13. Nut
- ▲14. Ball bearing
 - 15. Spacer
 - 16. Speedometer drive gear
 - 17. Distance piece
- ▲18. Ball bearing
 - 19. Thrust washer
 - 20. Output gear
 - 21. Needle bearing
 - 22. 4×2/4×4 sleeve



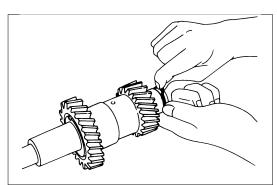
$\overline{\mathbf{v}}$

Important Operations

- 3. Transfer Counter Shaft Assembly
- 1) Lightly tap the rear end of the counter shaft.

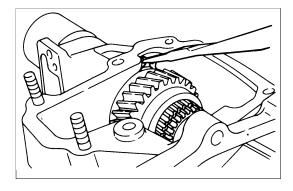


2) Remove the transfer counter shaft assembly from the case.



4. O-Ring

Remove the O-ring from the counter shaft, before removing the thrust washer and counter gear.



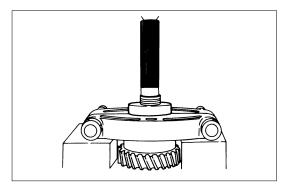
12.Output Shaft Assembly

- 1) Use a pair of snap ring pliers to expand the snap ring of the ball bearing.
- 2) Pull the output shaft assembly to the adaptor case side.
- 3) Remove the output shaft assembly from the transfer case.

13.Nut

- 1) Clamp the output shaft assembly in a vice or equiverent securely.
 - Take care not to damage the shaft.
- Loosen the nut.

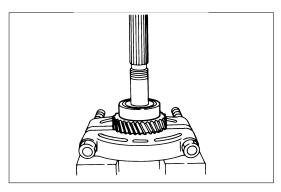
Nut hex; 41 mm (1-5/8 in)





14.Ball Bearing

Use the bearing remover and a bench press to remove the bearing. 5-8840-0015-0 (J-22912-01)

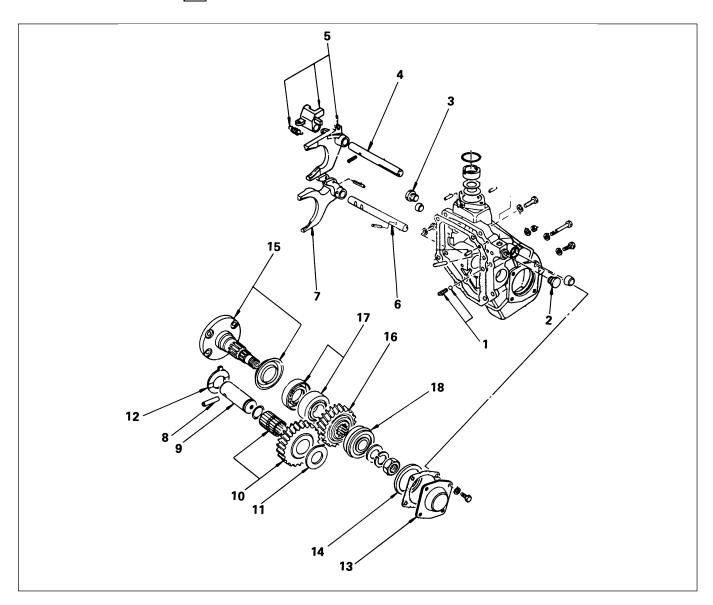




18.Ball Bearing

Use the bearing remover and a bench press to remove the bearing. 5-8840-0015-0 (J-22912-0)

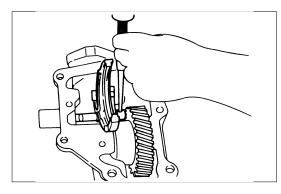
TRANSFER SIDE CASE ASSEMBLY



Disassembly Steps

- 1. Detent spring and detent ball
- 2. Screw plug
- 3. Screw plug
- ▲ 4. 4×2/4×4 shift rod
 - 5. 4×2/4×4 shift arm and shift block
- ▲ 6. High/Low shift rod
 - 7. High/Low shift arm
 - 8. Dowel pin
- ▲ 9. Idler gear shaft

- 10. Idler gear and needle roller bearing
- 11. Thrust washer
- 12. Thrust washer
- 13. Front output shaft cove
- 14. Distance piece
- ▲15. Output shaft
 - 16. Output gear
- ▲17. Output shaft front bearing
- ▲18. Output shaft rear bearing

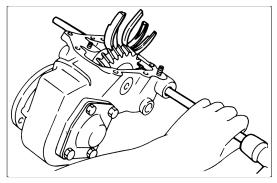




Important Operations

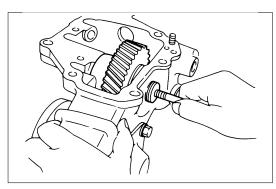


- 4. 4×2/4×4 Shift Rod
- 6. High/Low Shift Rods
- 1) Remove the spring pin from the shift arm. Spring Pin Remover: 9-8529-2201-0





2) Drive the shift rod toward the output flange.

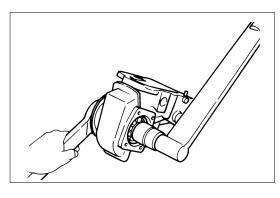


9. Idler Gear Shaft

Attach a bolt to the idler shaft threads and remove the shaft from the side case.

Bolt Size	Threads Pitch
8 mm	1.25

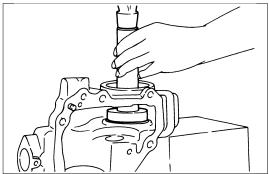
Take care not to damage and miss the thrust washers, bearing, and idler gear.





15.Output Shaft

- 1) Attach the wrench to the output flange of the shaft.
- 2) Loosen the output shaft nut.
- 3) Remove the washers and the shaft. Wrench: 5-8840-0133-0 (J-8614-01)





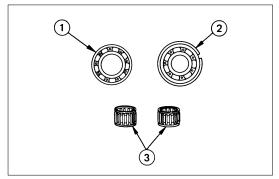
17.Output Shaft Front Bearing 18. Output Shaft Rear Bearing

Use the bearing remover to remove the front and the rear bearing.

Bearing Remover: 5-8523-0010-0 (J-29040) : 5-8840-0007-0 (J-8092) Grip

INSPECTION AND REPAIR

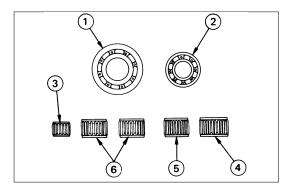
Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.





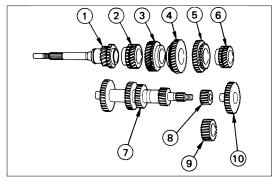
▼ Visual Check

Inspect the following parts for wear, damage or other abnormal conditions.



Transfer Side Case

- 1. Front output shaft front bearing
- 2. Front output shaft rear bearing
- 3. Idler gear bearing

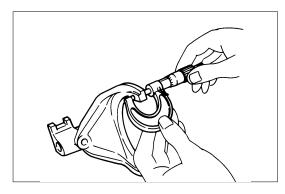


Transmission and Transfer Case

- 1. Rear output shaft front bearing
- 2. Rear output shaft pilot bearing
- 3. Rear output shaft pilot bearing
- 4. Rear output gear bearing
- 5. Transfer input gear bearing
- 6. Transfer counter gear bearing

Transmission

- 1. Clutch gear shaft
- 2. 3rd gear
- 3.2nf gear
- 4.1st gear
- 5. Reverse gear
- 6. Counter gear
- 7. Counter reverse gear
- 8. Reverse idle
- 9.5th gear
- 10.5th counter gear

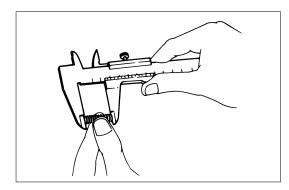




SHIFT ARM THICKNESS

Use a micrometer to measure the shift arm thickness. If the measured value is less than the specified limit, the shift arm must be replaced.

Shift Arm Thickness		mm(in)	
		Standard	Limit
	1st-2nd	9.65-9.85 (0.380-0.388)	9.0 (0.354)
	3rd-4th	6.95-7.2 (0.273-0.283)	6.5 (0.256)
	Rev5th	6.8-6.9 (0.268-0.272)	6.3 (0.248)
	Transfer	6.7-6.8 (0.264-0.268)	6.0 (0.236)

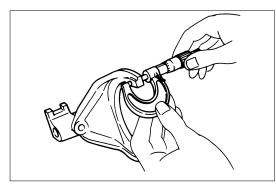




DETENT SPRING FREE LENGTH

Use a vernier caliper to measure the detent spring free length. If the measured value is less than the specified limit, the detent spring must be replaced.

Detent spring Free Length		mm(in)
	Standard	limit
Transmission	25.6 (1.01)	23.6 (0.93)
Transfer	43.0 (1.69)	41.0 (1.61)



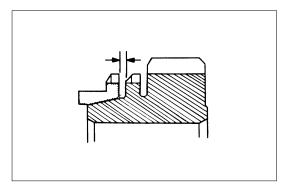


DETENT SPRING TENSION

Use a spring tester to measure the valve spring tension. If the measured value is less than the specified limit, the valve spring must be replaced.

Valve Spring Tension		N (kg/lb)
	Compressed	

	Compressed Height mm(in)	Standard	
	rieight mini(iii)		
Transmission	22.1 (0.970)	61.7-65.7	
Transmission	22.1 (0.870)	(6.3-6.7/13.7-14.8)	
Transfor	Fransfer 36.1 (1.421)	19.84-24.25	
Tansiei		(9-11)	



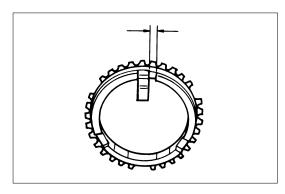


BLOCK RING AND DOG TEETH CLEARANCE

Use a thickness gauge to measure the clearance between the block ring and the dog teeth.

If the measured value exceeds the specified limit, the block ring must be replaced.

Block Ring and Dog Teeth Clearance		mm(in)
Standard		Limit
1st, 2nd	2.0 (0.078)	1.3 (0.051)
3rd, 4th, 5th	1.5 (0.059)	0.8 (0.031)



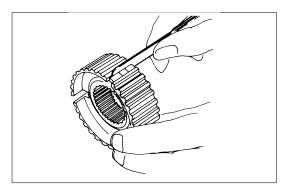


BLOCK RING AND INSERT CLEARANCE

Use a thickness gauge to measure the clearance between the block ring and the inset.

If the measured value exceeds the specified limit, the block ring and/or the insert must be replaced.

Block Ring and Insert Clearance		mm(in)
	Standard	Limit
1st, 2nd	3.46-3.74 (0.136-0.147)	4.0 (0.157)
3rd, 4th, 5th	3.51-3.79 (0.138-0.149)	4.0 (0.137)



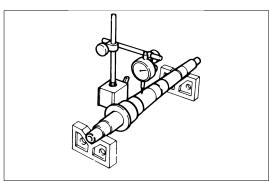


CLUTCH HUB AND INSERT CLEARANCE

Use a thickness gauge to measure the clearance between the clutch hub and the insert

If the measured value exceeds the specified limit, the clutch hub and/or the insert must be replaced.

Clutch Hub and Insert Clearance	e mm(in)
Standard	Limit
0.01-0.19 (0.0004-0.0075)	0.3 (0.012)



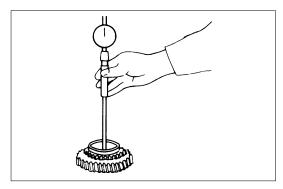


MAINSHAFT RUN-OUT

Use a dial indicator to measure the mainshaft central portion run-out.

If the measured mainshaft run-out exceeds the specified limit, the mainshaft must be replaced.

Mainshaft Run-Out	mm(in)
Limit	
Less than 0.03 (0.0012)	





GEAR INSIDE DIAMETER

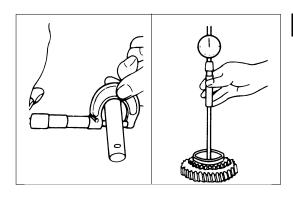
Use an inside dial indicator to measure the gear inside diameter.

If the measured value is less than the specified limit, the gear must be replaced.

Gear inside Diameter

mm(in)

	Standard	Limit
1st	45.00-45.01	45 10 (1 7756)
Rev.	(1.7717-1.7720)	45.10 (1.7756)
2nd	41.00-41.01	41 10 (1 6191)
3rd	(1.6142-1.6146)	41.10 (1.6181)
5th	34.03-34.02	34.10 (1.3425)
	(1.3398-1.3402)	34.10 (1.3423)
Transfer	33.00-33.025	33.10 (1.3031)
idler	(1.2992-1.3002)	33.10 (1.3031)



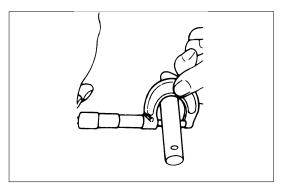


REVERSE IDLER GEAR AND IDLER GEAR SHAFT CLEARANCE

- 1. Use a micrometer to measure the idler gear shaft diameter.
- 2. Use an inside dial indicator to measure the idler gear inside diameter.
- Calculate the idler gear and idler gear shaft clearance.
 Idler gear inside diameter idler gear shaft diameter = idler gear and idler gear shaft clearance.

If the measured value exceeds the specified limit, the idler gear and/or the idler gear shaft must be replaced.

Idler Gear and Idler Gear Shaft Clear	rance mm(in)
Standard	Limit
0.041-0.074 (0.0016-0.0029)	0.150 (0.0059)

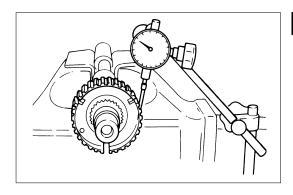




TRANSFER IDLER GEAR SHAFT OUTSIDE DIAMETER

Use a micrometer to measure the idler gear shaft diameter.

	mm(in)
Standard	
24.99-25.0 (0.9839-0.9843)	





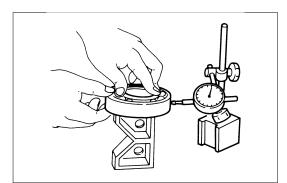
CLUTCH HUB SPLINE PLAY

- 1. Set a dial indicator to the clutch hub to be measured.
- 2. Move the clutch hub as far as possible to both the right and the left.

Note the dial indicator reading.

It the measured value exceeds the specified limit, the clutch hub must be replaced.

Clutch Hub Spline Play	mm(in	
Standard	Limit	
0-0.19 (0-0.0075)	0.20 (0.0079)	





BALL BEARING PLAY

Use a dial indicator to measure the ball bearing play.

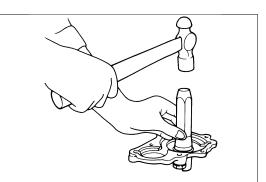
Ball Bearing Play	mm(in)
L	imit
0.2 (0	0.0079)



FRONT COVER OIL SEAL

Oil Seal Replacement Oil Seal Removal

Use a screwdriver to pry the oil seal from the front cover.





Oil Seal Installation



1. Use the oil seal installer to install the oil seal to the front



Oil Seal Installer: 5-8522-0042-0 (J-26540)

2. Apply engine oil to the oil seal lip.

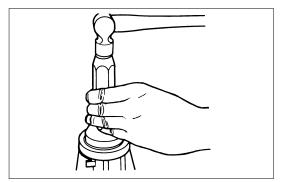


TRANSFER CASE OIL SEAL

Oil Seal Replacement

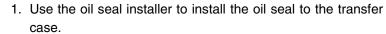
Oil Seal Removal

Use a screwdriver to pry the oil seal from the transfer case.





Oil Seal Installation



Oil Sesl Installer: 9-8522-1273-0 (J-29769)

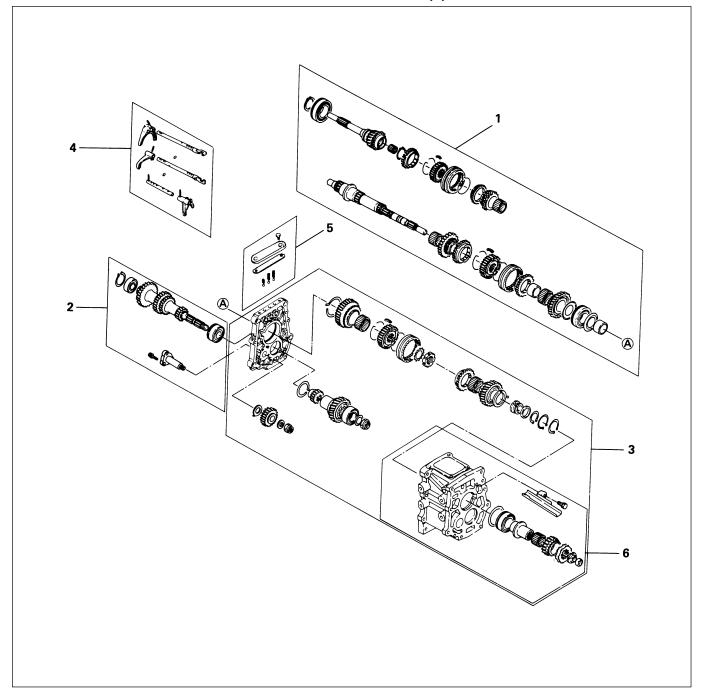
2. Apply engine oil to the oil seal lip.

→‡←

REASSEMBLY

REASSEMBLY OF INTERNAL PARTS (TRANSMISSION)

MAJOR COMPONENT (1)

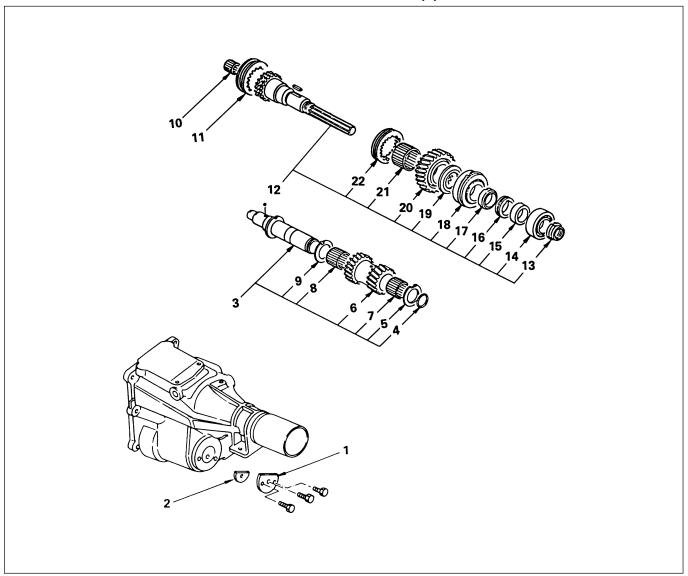


- 1. Top & main gear shaft assembly
- 2. Cluster gear shaft assembly
- 3. Rev. and 5th gear assembly

- 4. Shift fork assembly & interlock pin
- 5. Detent assembly
- 6. Adapter case and input transfer gear

REASSEMBLY OF INTERNAL PARTS (TRANSFER)

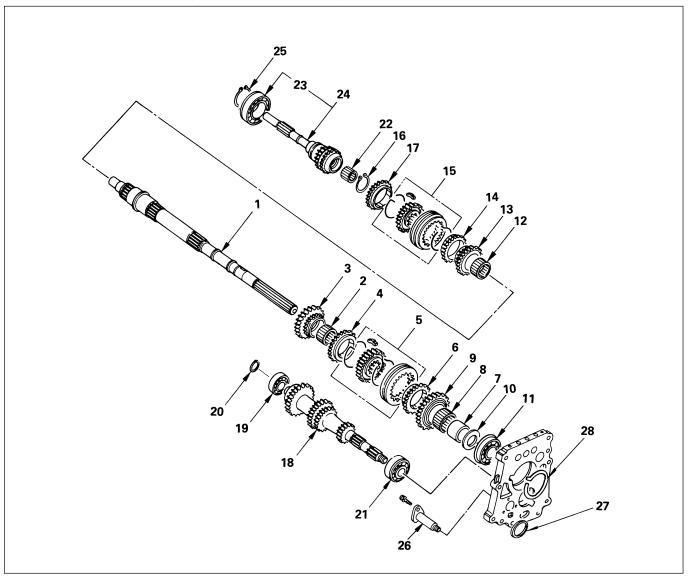
MAJOR COMPONENT (2)



- 1. Transfer case assembly
- 2. Transfer side case assembly

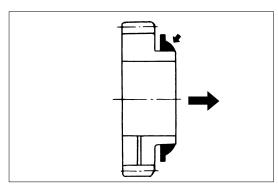
MINOR COMPONENTS

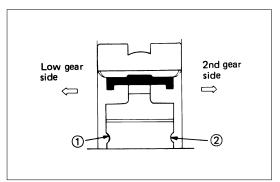
INTERMEDIATE PLATE, TOP GEAR SHAFT, MAINSHAFT GEAR WITH COUNTER GEAR



- 1. Mainshaft
- ▲ 2. Needle bearing
- ▲ 3. 2nd gear
 - 4. 2nd block ring
- ▲ 5. 1st-2nd synchronizer assembly
 - 6. 1st block ring
- ▲ 7. Needle bearing collar
- ▲ 8. Needle bearing
- ▲ 9. 1st gear
- ▲10. 1st gear thrust washer
- ▲11. Mainshafr ball bearing
- ▲12. Needle bearing
- ▲13. 3rd gear
 - 14. 3rd block ring
- ▲15. 3rd-4th synchronizer assembly

- ▲16. Mainshaft snap ring
 - 17. 4th block ring
 - 18. Counter gear
 - 19. Front ball bearing
 - 20. Bearing snap ring
- ▲21 Rear ball bearing
 - 22. Needle bearing
- ▲23. Ball bearing
- ▲24. Top gear shaft
 - 25. Top gear shaft snap ring
- ▲26. Reverse idler shaft
 - 27. Bearing snap ring
 - 28. Bearing snap ring







Important Operations



2. Needle Bearing



- 3. 2nd Gear
- 1) Apply the engine oil to the 2nd needle bearing and the 2nd gear.
- 2) Install the needle bearing and the 2nd gear to the mainshaft. The dog teeth of the 2nd gear must be facing the rear side of the transmission.



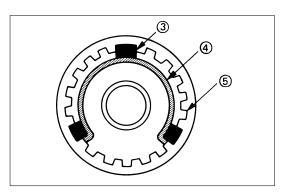
5. 1st-2nd synchronizer assembly

(1) The side of the clutch hub with the ② oil groove should be turned to the 2nd gear side.







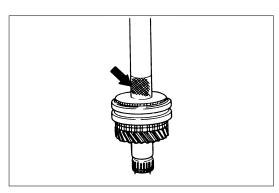




(2) Check that the inserts are fitted properly into the insert grooves in the blocker ring and that the insert spring is fitted to the insert keys as shown in this figure.

Then check that the clutch hub and sleeve slide smoothly.

- (3) Install the synchronizer assembly on the shaft, so that face of sleeve with light chamfer on the outer edge is turned to the front of transmission.
 - ③; Insert key
 - 4; Insert spring
 - ⑤; Clutch hub

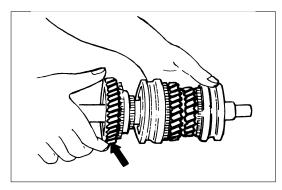




7. Needle Bearing Collar

Use a bench press and the collar installer to install the needle bearing collar.

Collar Installer: 5-8840-0178-0 (J-33851)

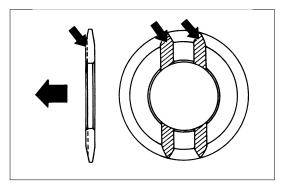




8. Needle Bearing

9.1st Gear

- 1) Apply the engine oil to the 1st needle bearing and the 1st gear.
- Install the needle bearing and the gear to the mainshaft.
 The dog teeth of the 1st gear must be facing the front side of the transmission.

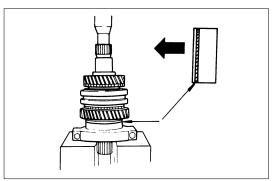




10.1st Gear Thrust Washer

Install the thrust washer to the mainshaft.

The thrust washer oil groove must be facing the front of the transmission.



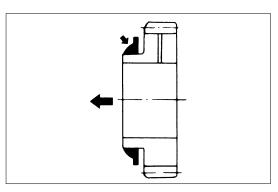


11. Mainshaft Ball Bearing

- 1) Apply the engine oil to the ball bearing inside circumference.
- 2) Use a bench press and the bearing installer to install the bearing.

The bearing snap ring groove must be facing the front of the transmission.

Bearing Installer: 5-8840-0015-0 (J-22912-01)



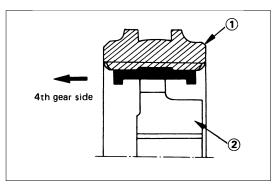


12. Needle Bearing

13.3rd Gear

- 1) Apply the engine oil to the 3rd needle bearing and the 3rd
- 2) Install the needle bearing and the gear to the mainshaft.

The dog teeth of the 3rd gear must be facing the front side of the transmission.

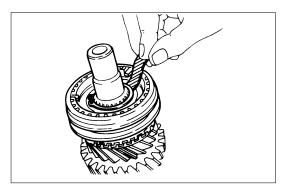




15.3rd-4th Synchronizer Assembly

- 1) Apply the recommended lubricating oil to the clutch hub spoine.
- 2) Install the synchronizer assembly to the mainshaft.

 The sleeve light chamfering ① and the clutch hub heavy boss ② must be facing the rear of the transmission.





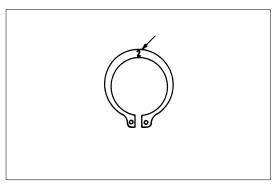
16.Mainshaft Snap Ring

1) Select the snap ring which will provide the minimun clearance between the mainshaft and the snap ring.

There are four snap ring sizes available.

The snap rings are numbered to indicate their thickness.

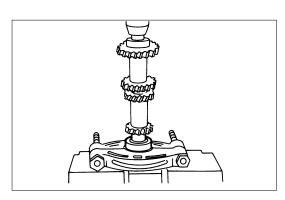
Mainshaft and Snap Ring Clearance	mm(in)
Standard	
0-0.05 (0.002)	





Snap Ring Availability	mm(i	
Thickness	Identification Number	
1.50 (0.059)	1	
1.55 (0.061)	2	
1.60 (0.063)	3	
1.65 (0.065)	4	

2) Use a pair of snap ring pliers to install the snap ring to the mainshaft.



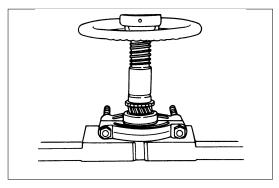


21.Rear Ball Bearing



Use a bench press and the bearing installer to install the bearing to the counter gear.

Bearing Installer: 5-8840-0015-0 (J-22912-01)

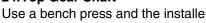




23.Ball Bearing



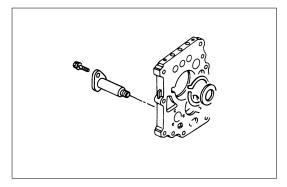
24.Top Gear Shaft



Use a bench press and the installer to install the ball bearing to the top gear shaft.

The snap ring groove must be facing the front of the transmission.

Bearing Installer: 5-8840-0015-0 (J-22912-01)





26. Reverse Idler Shaft

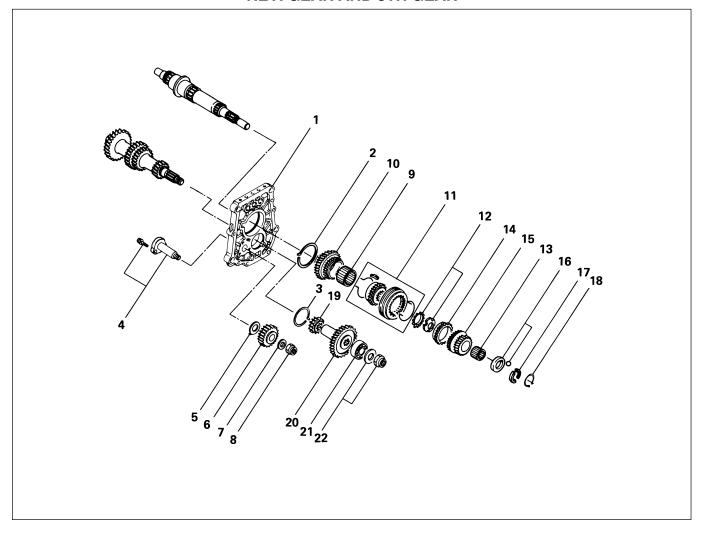
- 1) Install the reverse idler shaft to the intermediate plate.
- 2) Tighten the reverse idler shaft bolt to the specified torque.

Idler Shaft Bolt Torque N·m(kgf·m/lb·ft)

 $18.6 \pm 3.9 \ (1.9 \pm 0.4 \ / \ 13.7 \pm 2.9)$

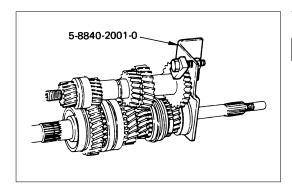
☆ MINOR COMPONENT

REV. GEAR AND 5TH GEAR



- ▲ 1. Intermediate plate
 - 2. Snap ring
 - 3. Snap ring
 - 4. Rev. idler shaft
- ▲ 5. Thrust washer
 - 6. Rev. idler gear
- ▲ 7. Thrust washer
- ▲ 8. Self lock nut
 - 9. Needle bearing
- ▲10. Rev. gear
- ▲11. Rev./5th synchronizer assembly

- ▲12. Lock washer and nut
 - 13. Needle bearing
 - 14. 5th blocking ring
- ▲15. 5th gear
- ▲16. Thrust washer and ball
 - 17. Thrust ring
- ▲18. Snap ring
 - 19. Cluster Rev. gear
 - 20. Cluster 5th gear
- ▲21. Ball bearing
- ▲22. Washer and lock nut



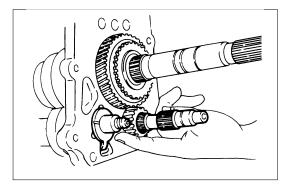


1. Intermediate Plate

Mesh the cluster gear with the mainshaft assembly and attach tool to the mainshaft and the counter gear.

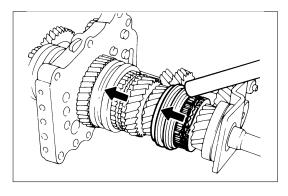
Place tool with the mainshaft and counter gear assembled in a vise, then install the intermediate plate.

Holding fixture : 5-8840-2001-0 (J-29768)

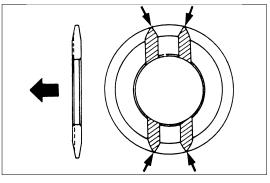


5. Thrust Washer

Check that the flange of the thrust washer is fitted to the stopper on the inermidiate plate.



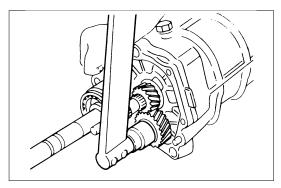
Engage the Top/3rd and Low/2nd synchronizers with the 3rd and Low gears, then attach and tighten the lock nuts to the specified torque as follows.





7. Thrust Washer

- 1) Apply the engine oil to both sides of the thrust washer.
- Install the thrust washer to the mainshaft.
 The thrust washer oil groove must be facing the rearward of the transmission.



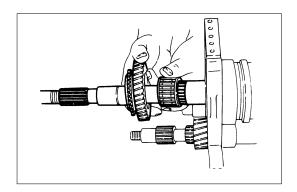


8. Self Lock Nut

Torque N·m(kgf·m/lb·ft)

 $107.8 \pm 9.8 \; (11 \pm 1 \: / \: 79.6 \pm 7.2)$

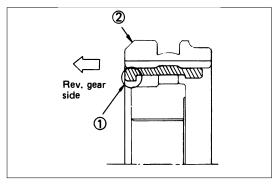
Discard the used nut and install new one at reassembly.



10.Reverse Gear

Install the needle bearing and the reverse gear.

Check that there is no dust and waste and apply the engine oil on the sliding surface.



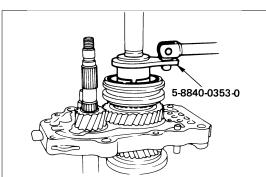


11.Rev./5th Synchronizer Assembly

When reassembling the synchronizer assembly, the side of the clutch hub with higher boss must face the heavy chamfer of the sleeve.

The shorter shoulder side of the insert should be on the same side.

- 1; Shorter shoulder side
- 2; Heavy chamfering





0

12.Lock Washer and Nut

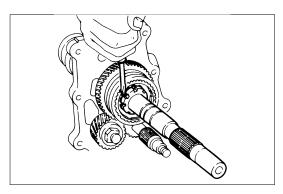
Lock the nut with lock washer after tightening it to the specified torque.

Wrench: 5-8840-0353-0

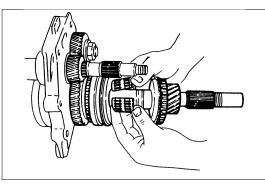
(J-36629) Torque

N·m(kgf·m/lb·ft)

 $127.4 \pm 9.8 (13 \pm 1 / 94.0 \pm 7.2)$

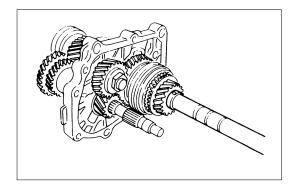


Be absolutely certain to bend the lock washer pawl in two places.



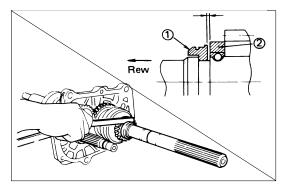
15.5th Gear

Install the block ring, the split needle bearing and the 5th gear. Check that there is no dust and waste and apply the engine oil on the sliding surface.



16.Thrust Washer and Ball

Install the lock ball and thrust washer on the mainshaft using a snap ring.





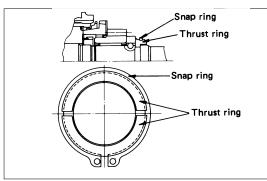
Clearance between thrust ring 1) and thrust washer 2).

Standard mm(in.)
0.10-0.30 (0.004-0.012)

Thicknesses of thrust washers available.

mm (in.)

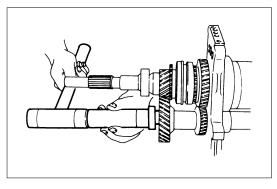
7.8, 7.9, 8.0, 8.1, 8.2, 8.3 (0.307, 0.311, 0.315, 0.319, 0.323, 0.327)





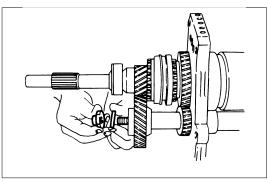
18.Snap Ring

The opening of the snap ring should be positioned at right angle to opening of the thrust ring.





Install the bearing using suitable tool.

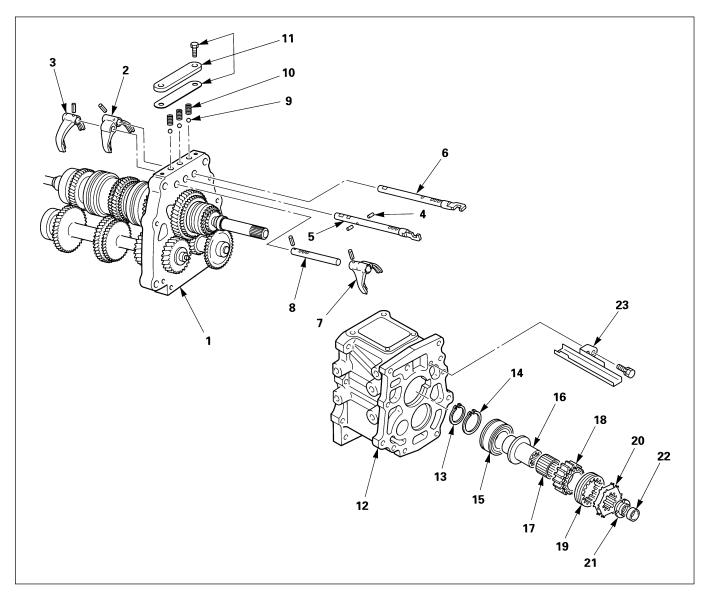




22 Washer and Lock Nut

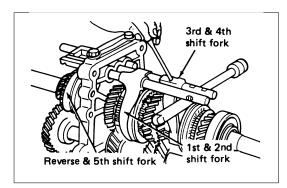
Torque $N \cdot m(kgf \cdot m/lb \cdot ft)$ $107.8 \pm 9.8 (11 \pm 1 / 79.6 \pm 7.2)$

ADAPTOR CASE, INTERMEDIATE PLATE WITH GEAR ASSEMBLY



- 1. Intermediate plate with gear assembly
- ▲ 2. 1st-2nd shift arm
- ▲ 3. 3rd-4th shift arm
 - 4. Interlock pin
 - 5. 3rd-4th shift rod
 - 6. 1st-2nd shift rod
- ▲ 7. Rev.-5th shift arm
 - 8. Rev.-5th Shift rod
 - 9. Detent ball
 - 10. Detent spring
- ▲11. Detent spring plate and gasket

- 12. Adaptor case
- 13. Snap ring
- 14. Snap ring
- 15. Ball bearing
- 16. Thrust input gear coller
- 17. Needle bearing
- 18. Thrust input gear
- 19. High-Low shift sleeve
- ▲20. Thrust input hub
- ▲21. Thrust input hub nut
 - 22. Spacer
 - 23. Oil guide

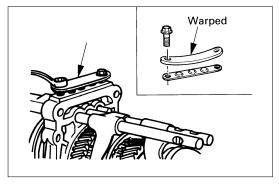




7 Important Operations

- 2. 1st-2nd Shift Arm
- 3. 3rd-4th Shift Arm
- 7. Rev.-5th Shift Arm
- 1) Hold a round bar against the shift rod end lower face to protect it against damage.
- 2) Use a spring pin installer to install the spring pin to the shift arm and the shift rod.

Never reinstall the used spring pins.





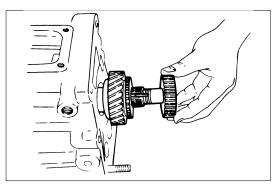
11 Detent Spring Plate and Gasket

- 1) Install the new detent plete and new gasket onto the transmission case into the correct direction.
- 2) Tighten the detent spring plate bolts to the specified torque.

 Detent Spring Plate Bolt Torque

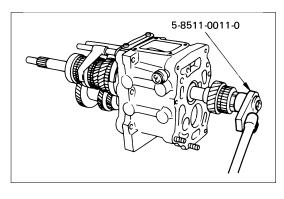
 N·m(kgf·m/lb·ft)

 $18.6 \pm 3.9 \; (1.9 \pm 0.4 \; / \; 13.7 \pm 2.9)$





20.Thrust Input Hub





21.Thrust Input Hub Nut



1) Install the input hub nut to the main shaft.

2) Use the wrench to tighten to the specified torque.

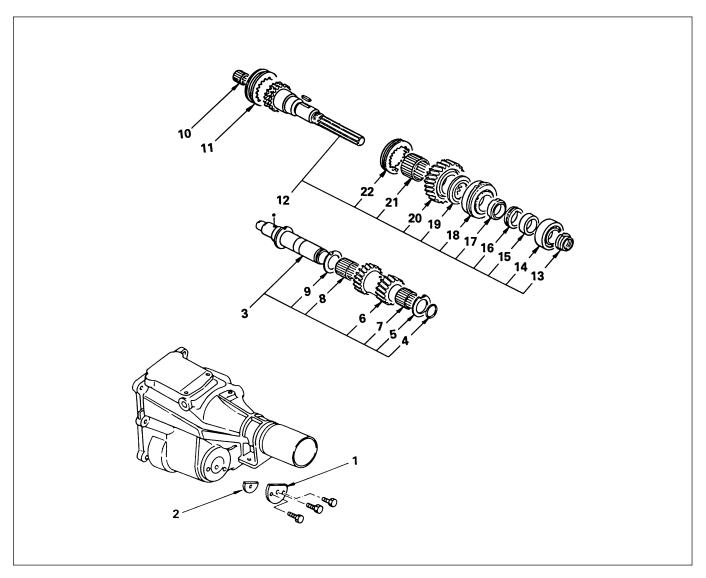
Thrust Input Hub Nut Torque

N·m(kgf·m/lb·ft)

 $127.4 \pm 9.8 \ (13 \pm 1 \ / \ 94.0 \pm 7.2)$

Wrench: 5-8511-0110-0 (J-29041)

TRANSFER CASE ASSEMBLY

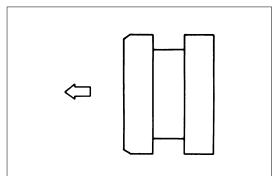


- ▲ 1. 4×2/4×4 sleeve
 - 2. Needle bearing
 - 3. Output gear
- ▲ 4. Thrust washer
- ▲ 5. Ball bearing
 - 6. Distance piece
 - 7. Speedometer drive gear
 - 8. Spacer
- ▲ 9. Ball bearing
- ▲10. Nut
- ▲11. Output shaft assembly

- 12. Thrust washer
- 13. Needle bearing
- 14. Counter gear
- 15. Needle bearing
- ▲16. Thrust washer
- **▲**17. O-ring
- ▲18. Counter shaft assembly
- ▲19. High/Low sleeve
- 20. Needle bearing
- ▲21. Distance plate
- ▲22. Lock plate



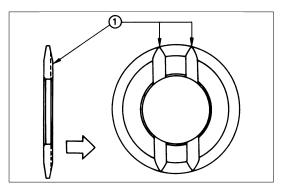
Important Operations





1. 4×2/4×4 sleeve

Install the $4\times2/4\times4$ sleeve the output shaft. The chamfered side of the sleeve facing the output shaft gear.

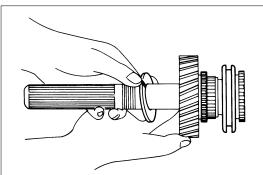


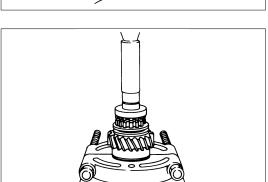


4. Thrust Washer

Install the thrust washer to the output shaft.

The oil grooved side of the washer facing the output shaft gear.

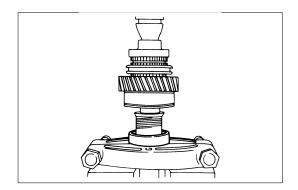






5. Ball Bearing

Use a bench press to install the ball bearing to the output shaft. The snap ring grooved side of the bearing turned to the speedometer drive gear.



9. Ball bearing

Use a bench press to install the ball bearing to the output shaft. The shield side of the bearing must be facing to the nut.



10.Nut

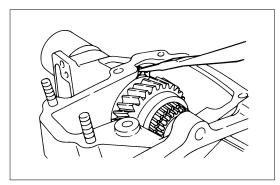
- 1) Install the nut to the output shaft.
- 2) Tighten the nut to the specified torque.

Nut Hex.: 41 mm (1-5/8 in)

Output Shaft Nut Torque

N·m(kgf·m/lb·ft)

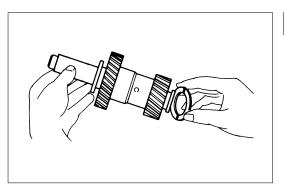
 $127.4 \pm 9.8 (13 \pm 1 / 94.0 \pm 7.2)$





11.Output Shaft Assembly

- 1) Install the bearing snap ring to the transfer case snap ring groove.
- 2) Place the output shaft assembly to the transfer case bore.
- 3) Use a pair of snap ring pliers to expand the snap ring.
- 4) Move the output shaft assembly to fit the snap ring to the bearing.

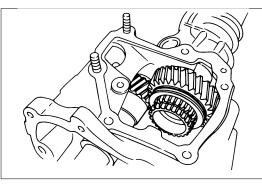




16.Thrust Washer

Install the thrust washer to the counter shaft.

The thrust washer oil grooved side must be facing the counter gear.

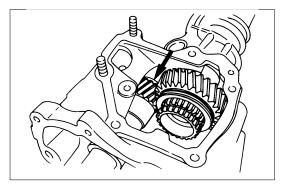




17.O-Ring

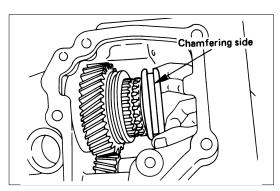
18. Counter Shaft Assembly

- 1) Apply new engine oil to the O-ring.
- 2) Position the counter shaft slot for the thrust washer tang at twelve o'clock.
- 3) Make sure the both of washer tangs positions at twelve o'clock.
- 4) Install the output shaft assembly to the transfer case bore.





Check to make sure the thrust washer tangs align with the mating slots properly.





19.High/Low Sleeve

Install the High/Low sleeve to the output shaft.

The chamfered side of the sleeve must be facing the adaptor case.

21.Distance plate

22.Lock Plate

Semi-tighten the lock plate bolts.

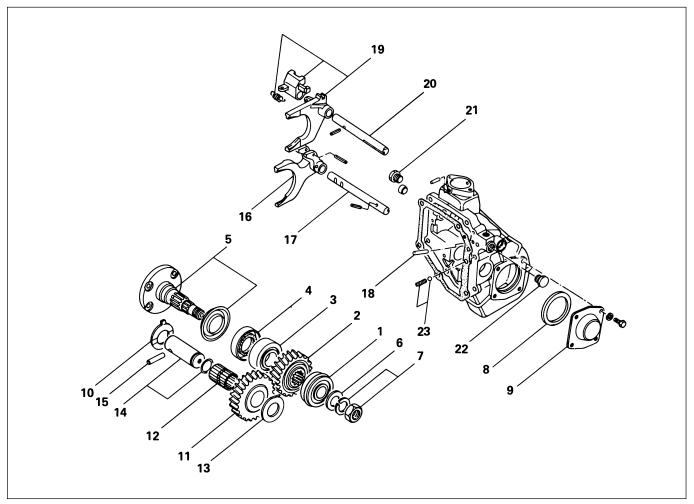
Before tighten the lock plate bolts, must be done the counter gear clearance adjustment.

Note:

Refer to transfer case assembly installation procedures on major components in this section.

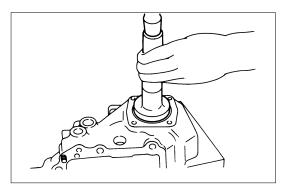
☆ MINOR COMPONENT

TRANSFER SIDE CASE ASSEMBLY



- ▲ 1. Ball bearing
- ▲ 2. Front output shaft gear
- ▲ 3. Ball bearing
- ▲ 4. Oil seal
- ▲ 5. Front output shaft
 - 6. Thrust washer
 - 7. Nut and lock washer
 - 8. Distance piece
- ▲ 9. Front output shaft cover
- ▲10. Thrust washer
 - 11. Idler gear
 - 12. Needle bearing

- ▲13. Thrust washer
- ▲14. Idler gear shaft
- ▲15. Dowel pin
- ▲16. High/Low shift arm
- ▲17. High/Low shift rod
 - 18. Interlock pin
- ▲19. 4×2/4×4 Shift arm and shift block
- **▲**20. 4×2/4×4 Shift rod
- ▲21. Screw plug
- ▲22. Screw plug
 - 23. Detent spring and ball



$\overline{\mathbb{V}}$

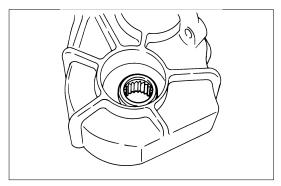
0

Important Operations

1. Ball Bearing

Use the bearing installer to install the bearing to the side case.

Bearing Installer : 5-8523-0010-0 (J-29040) Grip : 5-8840-0007-0 (J-8092)

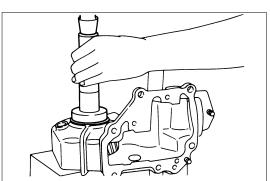




2. Front Output Shaft Gear

Install the output shaft gear to the case.

The gear that the smooth side must be facing the output flange.



3. Ball Bearing

Use the bearing installer to install the bearing to the case.

Bearing Installer : 5-8523-0010-0 (J-29040) Grip : 5-8840-0007-0 (J-8092)



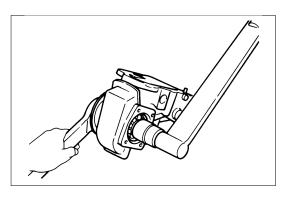


(iii)

4. Oil Seal

Use the oil seal installer to install the oil seal to the case.

Bearing Installer : 5-8523-0010-0 (J-29040) Grip : 5-8840-0007-0 (J-8092)





5. Front Output Shaft

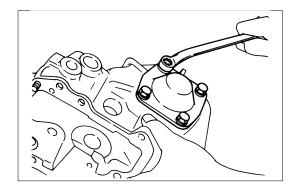
- 1) Install the output shaft to the bearings.
- 2) Use the wrench to tighten the nut to the specified torque.

Wrench: 5-8840-0133-0 (J-8614-01)

Output shaft Nut Torque N·m(kgf·m/lb·ft)



 $147.1 \pm 9.8 \; (15 \pm 1 \; / \; 108.5 \pm 7.2)$



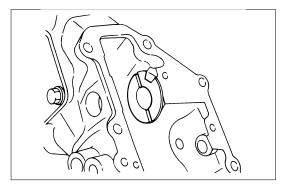
9. Front Output Shaft cover

Tighten the cover bolt to the specified torque.

Cover Bolt Torque

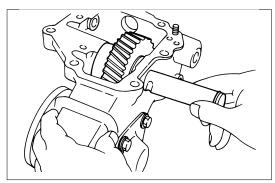
N·m(kgf·m/lb·ft)

 $24.5 \pm 2.9 \ (2.8 \pm 0.3 \ / \ 20.3 \pm 2.2)$



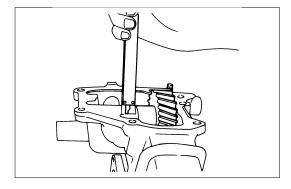
10.,13. Thrust Washer

- 1) Apply a grease to the thrust washers.
- Attach the thrust washer tang to the case slot.
 The oil grooved side must be facing the idler gear.



14.Idler Gear Shaft

- 1) Apply engine oil to the O-ring.
- 2) Attach the O-ring to the idler gear shaft.
- 3) Align the dowel pin slot of the shaft end with the case hole.
- 4) Install the gear shaft to the case bore.



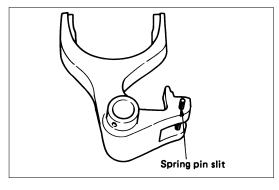
15.Dowel Pin

- 1) Install the dowel pin fully to the case dowel bore.
- 2) Check the dowel pin end projection using the depth gauge.

Dowel Pin Projection

mm (in)

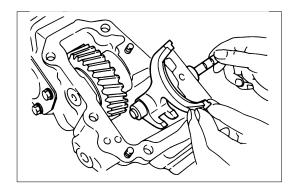
Standard 9 - 11 (0.35-0.43)



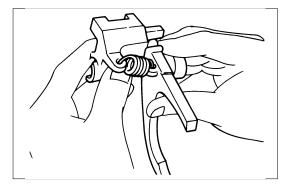
16.High/Low Shift Arm

17.High/Low Shift Rod

1) Set the spring pin to the High/Low shift arm, securely as shown in the illustration.

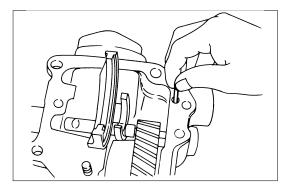


- 2) Install the High/Low shift rod to the case bore.
- 3) Set the shift arm to the shift rod.
- 4) Install the spring pin into the shift arm through the shift rod. Do not install a used spring pin.



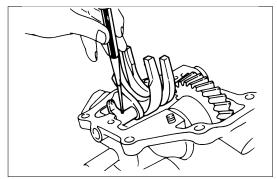
19.4×2/4×4 Shift Arm and Shift Block

Place the 4×2 shift arm and the shift block to connect them with the release spring.

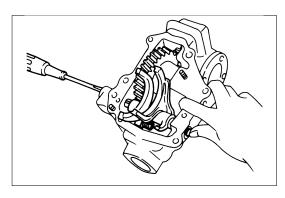


20.4×2/4×4 Shift Rod

1) Insert the interlock pin, the shift rod detent ball and the detent spring in the case.



2) Insert and secure the shift arm, the shift block and the shift rod in position with the spring pin.





21., 22. Screw Plug

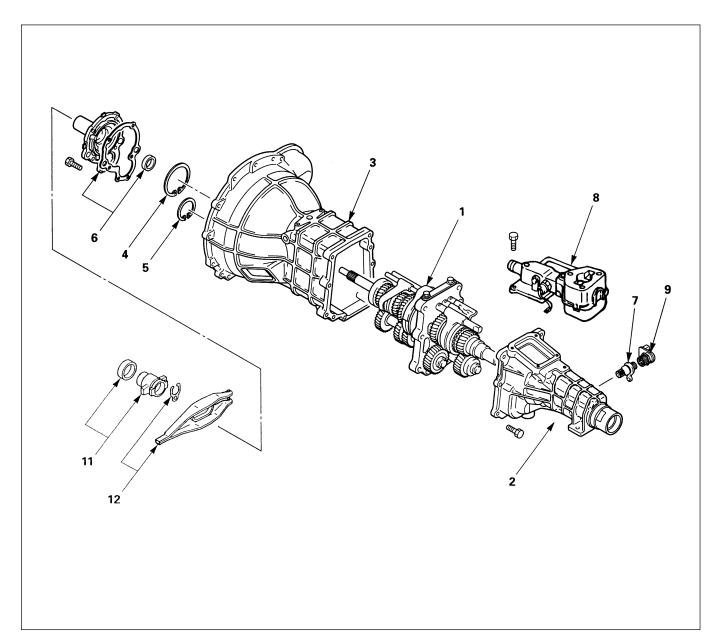
- 1) Install the screw plug to the case.
- 2) Tighten the screw plug to the specified torque.

Screw Plug Torque

N·m(kgf·m/lb·ft)

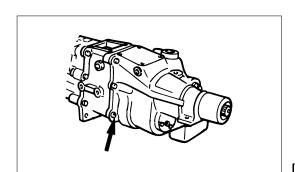
 $49.0 \pm 9.8 \ (5.0 \pm 1.0 \ / \ 36.2 \pm 7.2)$

★ MAJOR COMPONENTS



- ▲ 1. Adaptor case intermediate plate with gear assembly
- ▲ 2. Transfer case assembly and gasket
- ▲ 3. Transmission case
- 4. Bearing snap ring
 - 5. Counter gear snap ring
- ▲ 6. Front cover with oil seal

- 7. Transfer side case assembly
- 8. Speedometer driven gear
- 9. Gear contorl box assembly
- 10. Speedimeter senor
- 11. Clutch shift fork
- 12. Cluch shift block and release bearing





1. Adaptor Case Intermediate Plate with Gear Assembly Apply recommended liquid gasket or its equivalent to the

adaptor case fitting surfaces.

2. Transfer Case Assembly and Gasket

1) Install the new gasket and the transfer case assembly to the adaptor case with gear assembly.

Take care not to damage the bearing and the adaptor case bore.

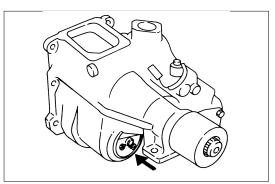


2) Tighten the transfer case bolts to the specified torque.

Transfer Case Assembly Bolt

N·m(kgf·m/lb·ft) Torque

 $37.2 \pm 7.8 \; (3.8 \pm 0.8 \, / \, 27.5 \pm 5.8)$



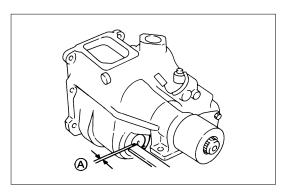


Transfer Counter Gear Thrust Clearance Adjustment

- 3) Loosen the lock plate bolts that semi-tightened on transfer case assembling procedures in minor component.
- 4) Push the counter shaft end toward the adaptor case until it to stop.



5) Use the depth gauge or the vernier caliper to measure the counter shaft end depth (A).



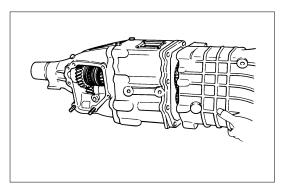
6) Select the distance plate from the measured values from the table as next page.

Refference: Counter Shaft Thrust Clearance

mm(in)

0.1 - 0.35 (0.004 - 0.014)

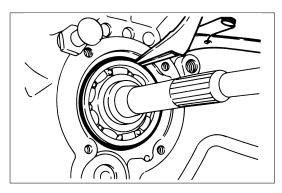
		mm(in)
Thickness of Distance plate	Measured value (A)	Marking color
2.6 (0.142)	3.7-3.95	Red
3.6 (0.142)	(0.146-0.156)	
2.9 (0.150)	3.9-4.15	Orango
3.8 (0.150)	(0.154-0.163)	Orange
4.0 (0.157)	4.1-4.35	Yellow
	(0.161-0.171)	reliow
4.2 (0.165)	4.3-4.55	Green
	(0.169-0.179)	Gleen
4.3 (0.169)	4.4-4.65	Blue
	(0.173-0.183)	Diue





3. Transmission Case

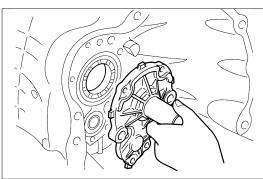
- 1) Apply the engine oil to the transmission case top gear shaft ball bearing fitting faces.
- 2) Apply recommended liquid gasket or its equivalent to the transmission case fitting surfaces.
- 3) Install the transmission case to the intermediate plate.



4. Bearing Snap Ring

Pull the top gear shaft from the transmission case until the ball bearing snap ring groove protrudes from the transmission case front cover fitting face.

Use a pair of snap ring pliers to install the snap ring to the ball bearing.



6. Front Cover with Oil Seal

1) Apply a recommended liquid gasket or equiverent to the bolt threads.



2) Install the new gasket and the front cover.

Tighten the new cover bolts to the specified torque.

Front Cover Bolt Torque N·m (kgf·m/lb·ft) $24.5 \pm 2.9 (2.5 \pm 0.3 / 18.1 \pm 2.2)$

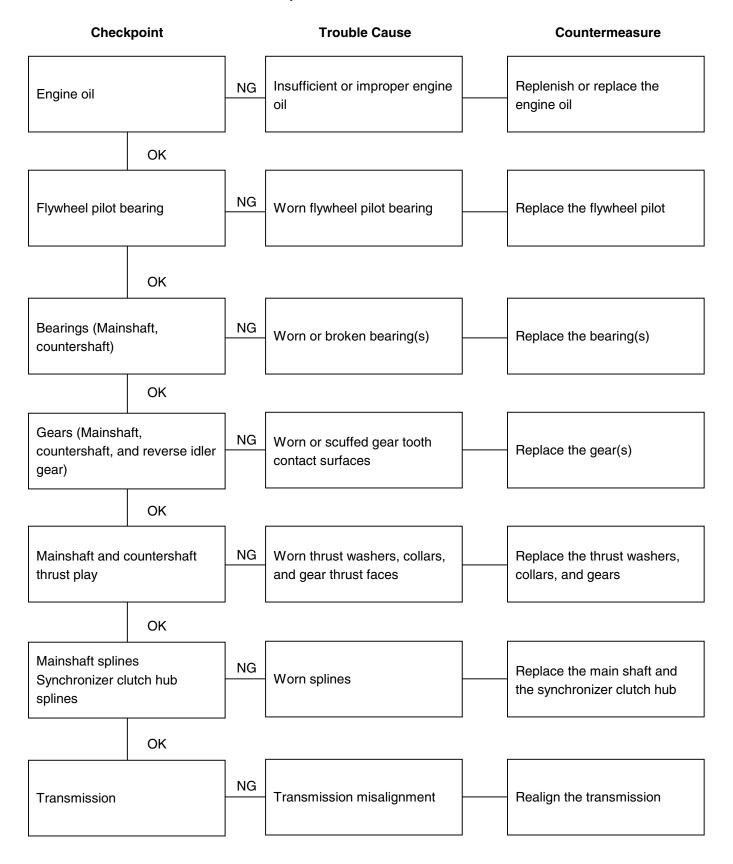
TROUBLESHOOTING

Refer to this Section to quickly troubleshooting and repair engine problems. Each diagnostic chart has three headings arranged from left to right.

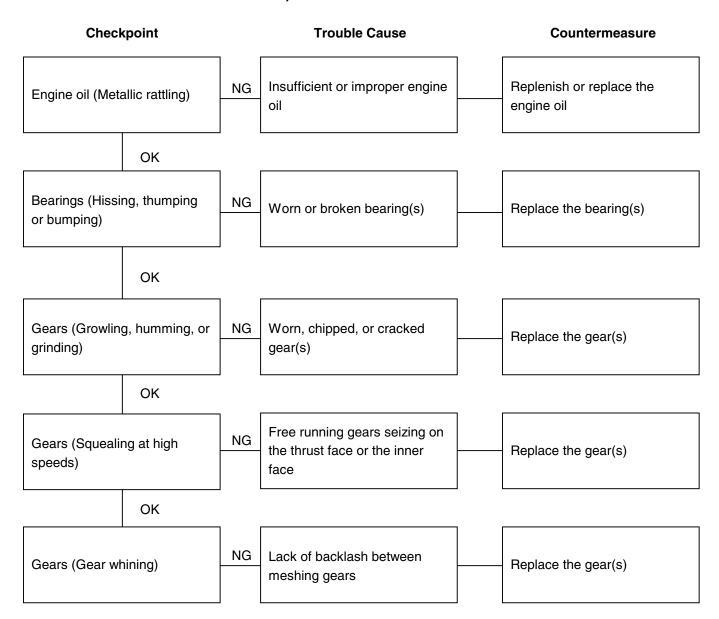
- (1) Checkpoint (2) Trouble Cause (3) Countermeasure This Section is divided into four sub-sections:
 - 1. Abnormal Noise
 - 1) Noise in Neutral
 - 2) Noisy Operation
 - 2. Head Shifting
 - 3. Walking or Jumping Out of Gear
 - 4. Oil Leakage

1. ABNORMAL NOISE

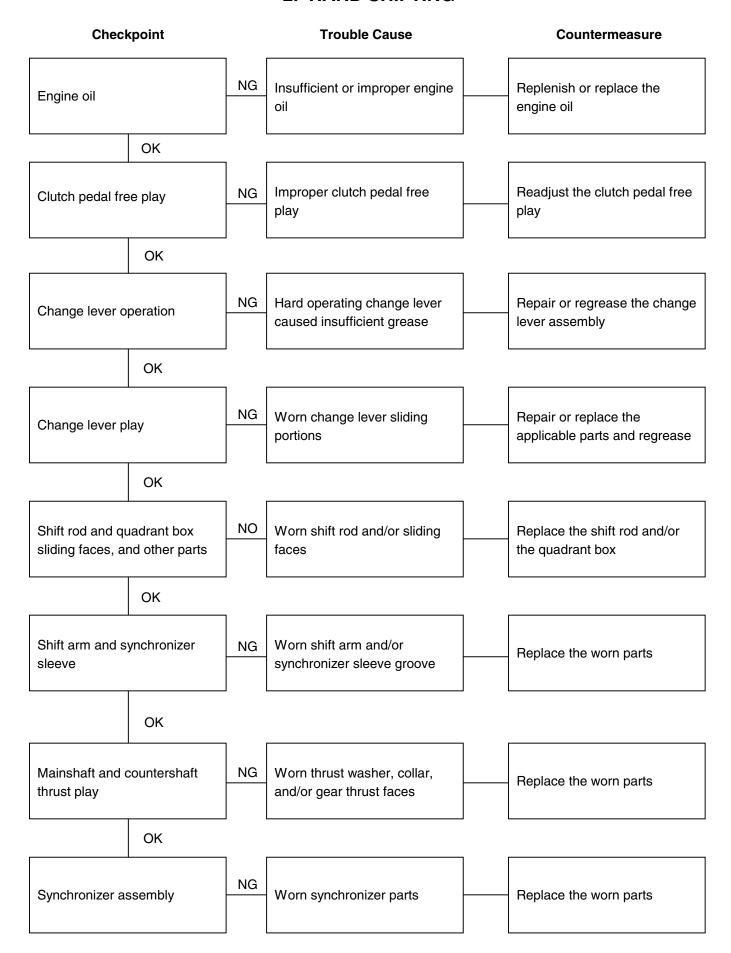
1) NOISE IN NEUTRAL



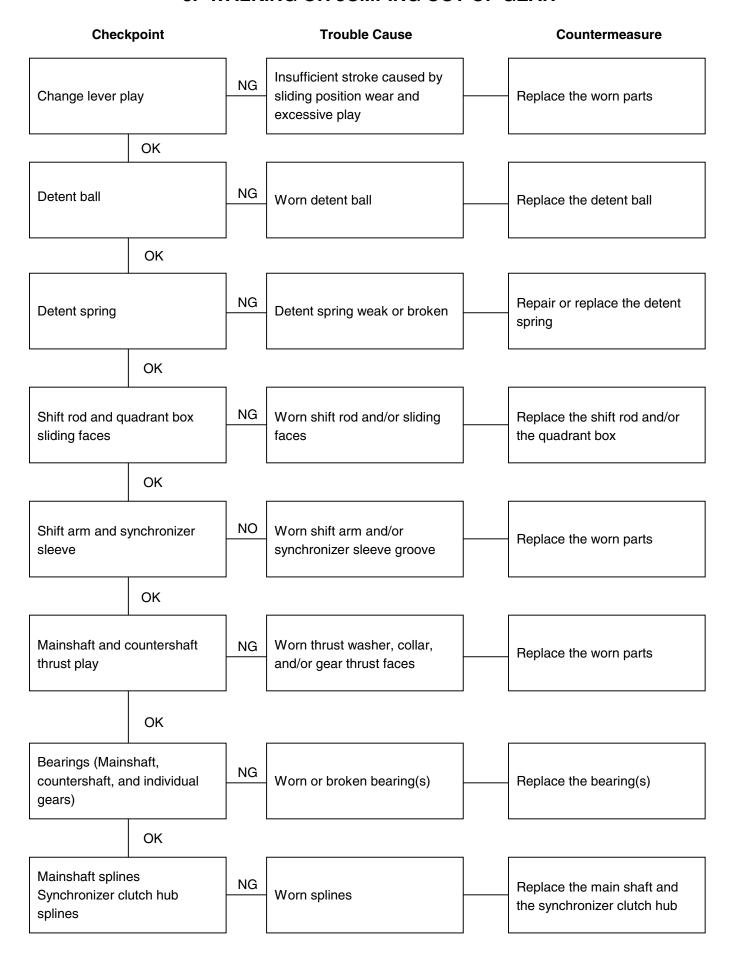
2) NOISY OPERATION



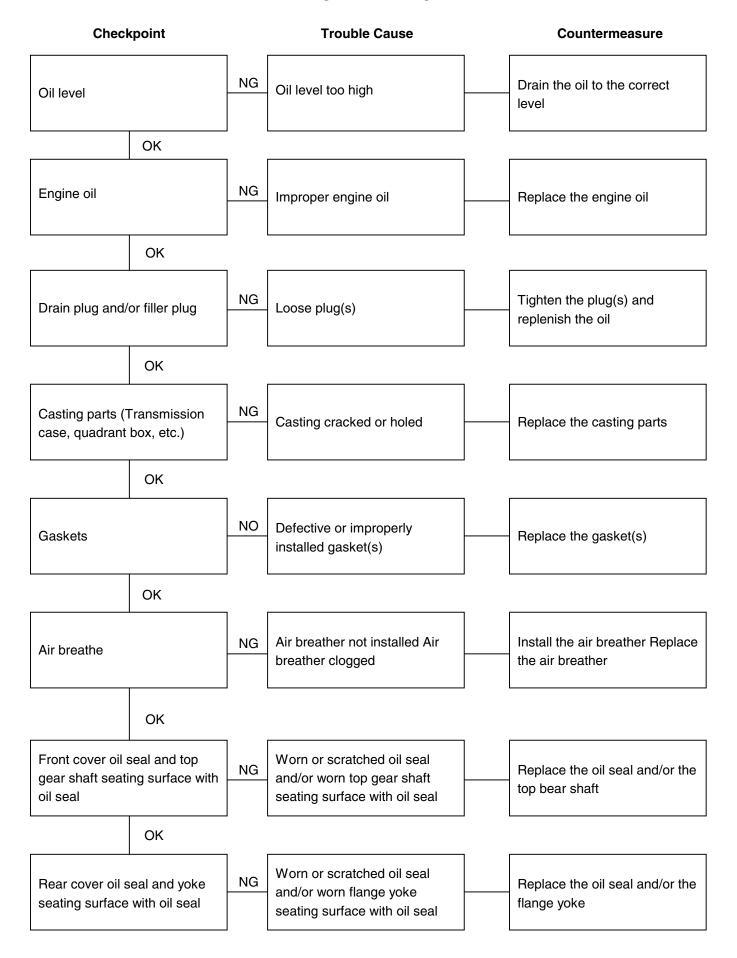
2. HARD SHIFTING



3. WALKING OR JUMPING OUT OF GEAR



4. OIL LEAKAGE



SPECIAL SERVICE TOOL

(2WD) (MSG)

ITEM NO.	ILLUSTRATION	PART NO.	PART NAME
MTL-42		9-8529-2201-0	Spring pin remover
MTL-1		5-8840-0013-0 (J-22888)	Gear remover
MTL-9		5-8840-2001-0 (J-29768)	Holding fixture
MTL-35		5-8840-0353-0 (J-36629)	Mainshaft nut wrench
MTL-3		5-8840-0015-0 (J-22912-01)	Bearing remover/installer
MTL-13		5-8840-0026-0 (J-26540)	Front cover oil seal installer
MTL-14		5-8522-0050-0 (J-29769)	Rear cover oil seal installer
MTL-21		5-8840-0178-0 (J-33851)	Mainshaft collar installer

7B-110 MSG MODEL (4WD)

(4WD) (MSG)

ITEM NO.	ILLUSTRATION	PART NO.	PART NAME
MTL-36		5-8511-0011-0 (J-29041)	Thrust input hub nut wrench
MTL-42		9-8529-2201-0	Spring pin remover
MTL-1		5-8840-0013-0 (J-22888)	Gear remover
MTL-9		5-8840-2001-0 (J-29768)	Holding fixture
MTL-35		5-8840-0353-0 (J-36629)	Mainshaft nut wrench
MTL-3		5-8840-0015-0 (J-22912-01)	Bearing remover/installer
MTL-32		5-8840-0133-0 (J-8614-01)	Output flange holder
MTL-11		5-8523-0010-0 (J-29040)	Output shaft Ft/Rr bearing remover
OTL-1		5-8840-0007-0 (J-8092)	Driver handle

MSG MODEL(2WD) 7B-111

ITEM NO.	ILLUSTRATION	PART NO.	PART NAME
MTL-13		5-8840-0026-0 (J-26540)	Front cover oil seal installer
MTL-14		5-8522-0050-0 (J-29769)	Rear cover oil seal installer
MTL-21		5-8840-0178-0 (J-33851)	Mainshaft collar installer

TFMSG-WE-981

You are requested to order this manual using the manual number that is shown above.

This manual is applicable for vehicles in all countries except the USA, Canada, Europe and Thailand.

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