DAIHATSU

TERIOS

J100

TO INDEX

MANUAL TRANSMISSION

MT

JMT00001–00000

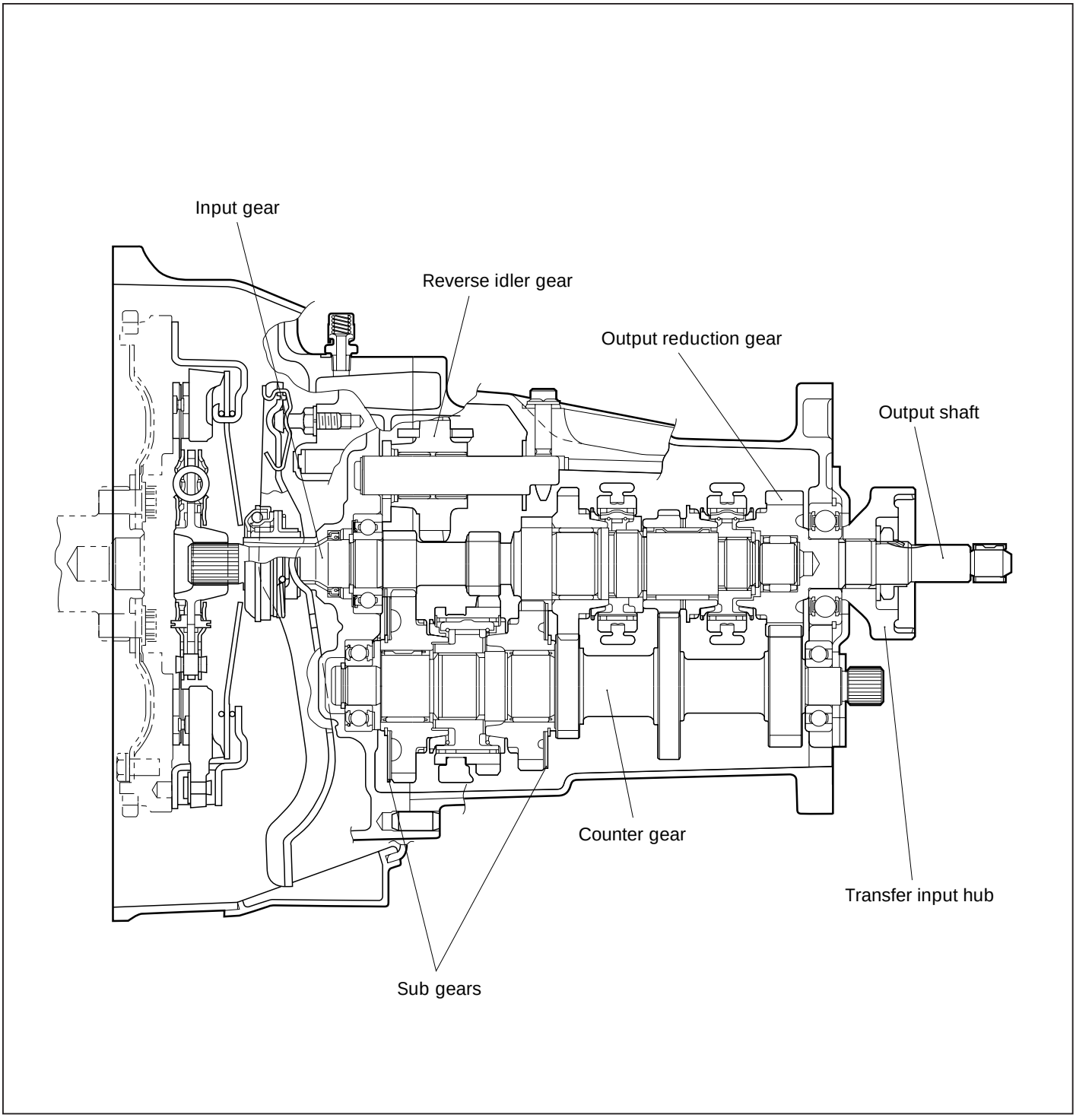
NO. 9710-JE

OUTLINE

1. The manual transmission employs five gears on all vehicles.
2. The gear train arrangement uses the output reduction type. This design has made possible the following features given below.
   (1) The number of pair of gears which are idling during the engine idling has been reduced to only two pairs (first gear and second gear). Consequently, the number of components emitting rattling noise has been decreased and the mechanism loss has been reduced.
   (2) For reduced mechanism loss, the counter gear is not rotating while the transmission is in neutral.
   (3) The shift feeling has been further improved by reducing the inertial weight at the time of synchronizing gears.

JMT00002-00000

SECTIONAL VIEW OF MANUAL TRANSMISSION



JMT00003-00001

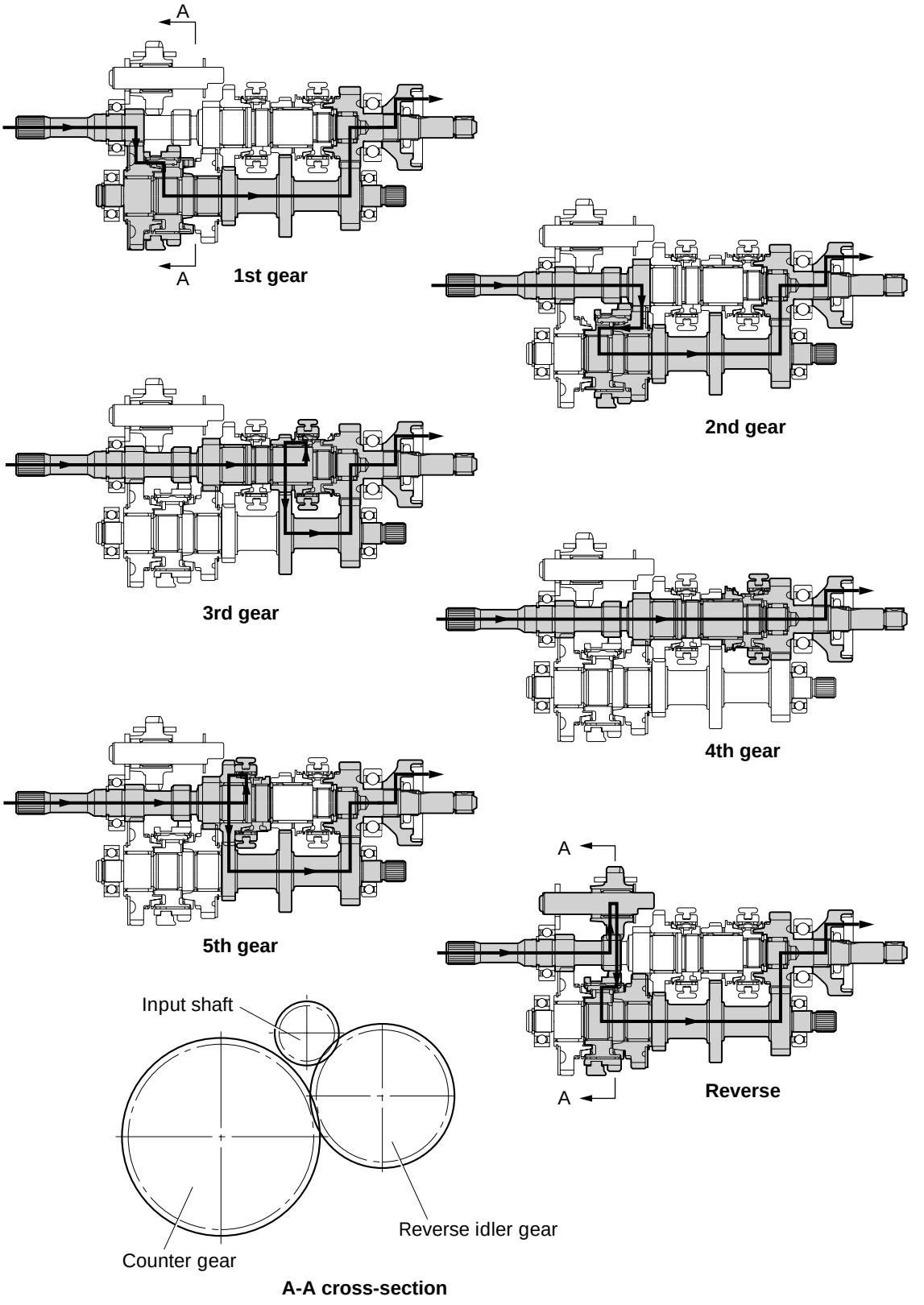
SPECIFICATIONS

Item		Specifications
Engine type		HC-EJ
Type	Forward gears	Constant-mesh type
	Reverse gear	Selective sliding type
Gear ratio	1st gear	4.059
	2nd gear	2.045
	3rd gear	1.376
	4th gear	1.000
	5th gear	0.838
	Reverse gear	4.128
Oil used	Type	SAE 75W-85 API GL-3 or GL-4
	Capacity liter	2.21 (including transfer)

JMT00004-00000

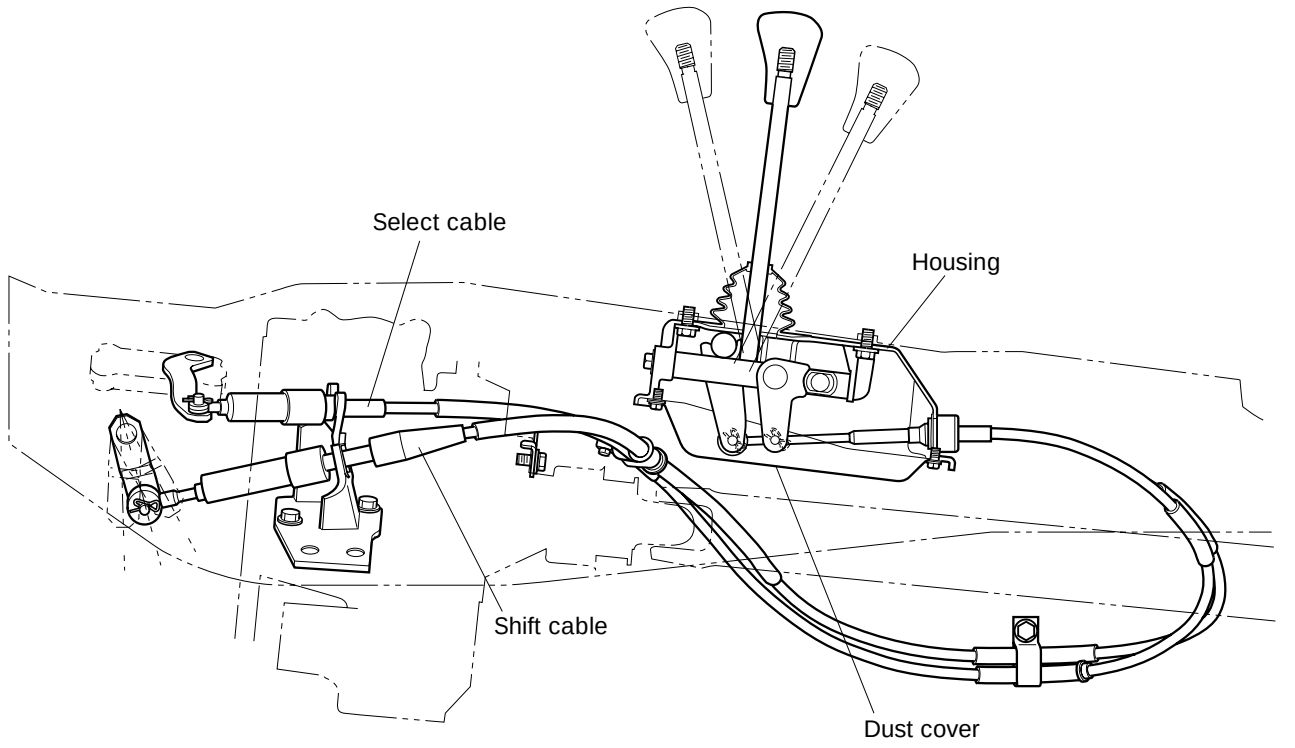
POWER FLOW ROUTE

The gear train has been so designed that the fourth gear makes direct connection, while the fifth gear makes overdrive. Furthermore, as for the gear arrangement, the first gear, reverse gear, second gear, fifth gear and output reduction are located in this sequence, counting from the front.



SHIFT CONTROL MECHANISM

1. The shift control mechanism employs the remote control method in which two push-pull cables are used, in the same way as with S100. Also, for improved shift feeling, an aluminum housing has been adopted.

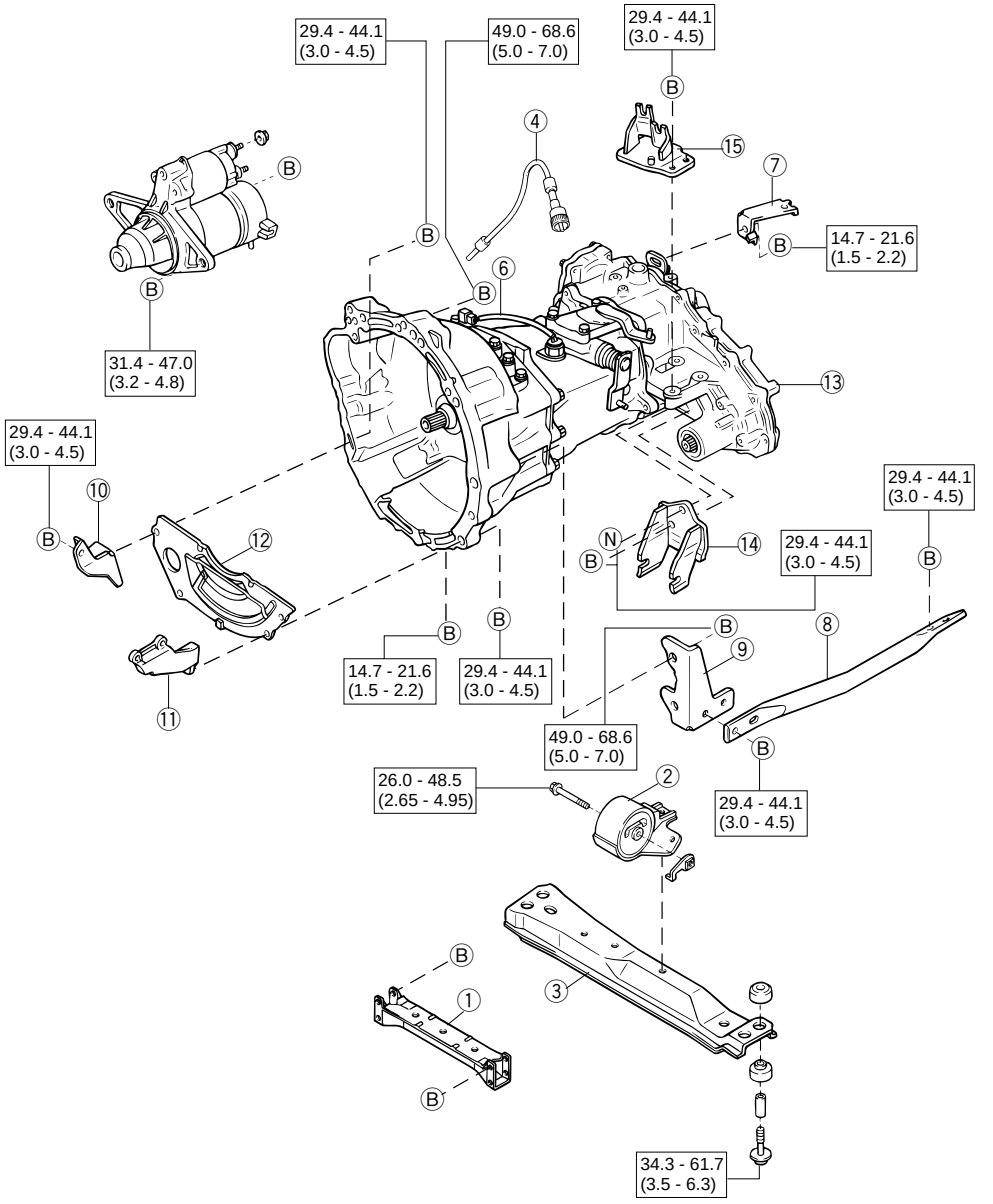


JMT00006-00003

INSTALLATION/REMOVAL OF MANUAL TRANSMISSION

COMPONENTS

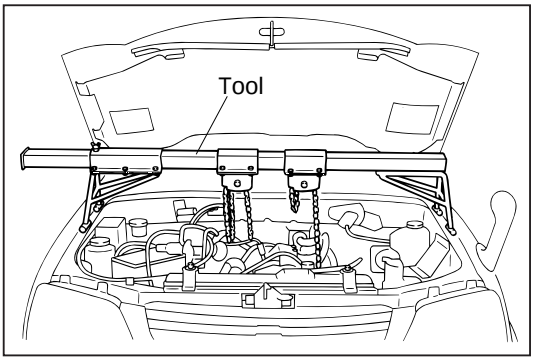
: Tightening torque
Unit : N·m (kgf-m)



① Frame front lower crossmember subassembly
② Engine mounting rear insulator
③ Engine rear support member subassembly
④ Speedometer driver cable assembly
⑤ Starter assembly
⑥ Backup lamp switch harness
⑦ Control cable bracket
⑧ Power train stiffener
⑨ Stiffener plate bracket
⑩ Stiffener right plate
⑪ Stiffener left plate
⑫ Clutch cover undercover
⑬ Transmission assembly with transfer
⑭ Engine mounting rear bracket
⑮ Transmission control cable bracket

1. OPERATION PRIOR TO REMOVAL

(1) Disconnect the negative (–) terminal of the battery.
(2) Suspend the engine by means of an engine support bridge.
NOTE:
• Attach the hook to the engine hanger.

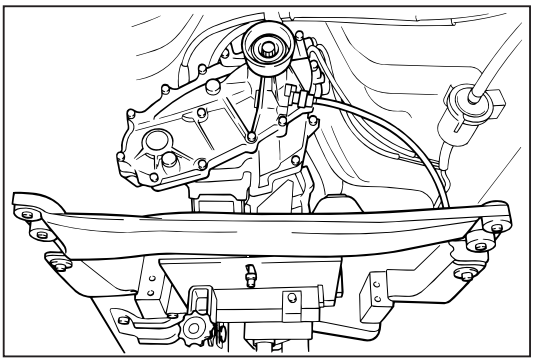


JMT00008-00005

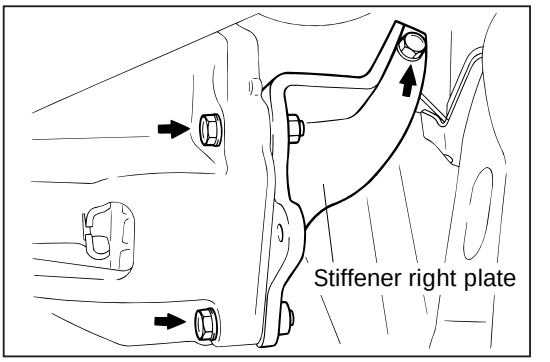
(3) Raise the vehicle with a lift.
(4) Drain the transmission oil.
(5) Remove the propeller shaft assembly and propeller front shaft assembly.
(6) Remove the front exhaust pipe assembly.
(7) Remove the clutch cable.
(8) Remove the shift cable assembly and select cable assembly.

2. MAIN POINTS OF REMOVAL

(1) Remove the front lower frame crossmember subassembly. With the transmission assembly supported by a transmission jack, etc., remove the attaching bolts of the engine mounting rear insulator and engine rear support member subassembly. Proceed to remove the engine rear support member subassembly.

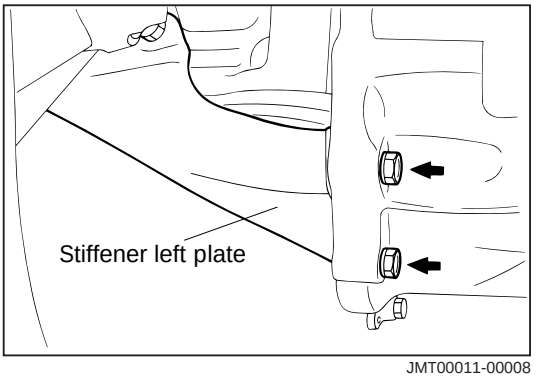

JMT00009-00006

(2) Remove the stiffener right plate by removing the three attaching bolts.



JMT00010-00007

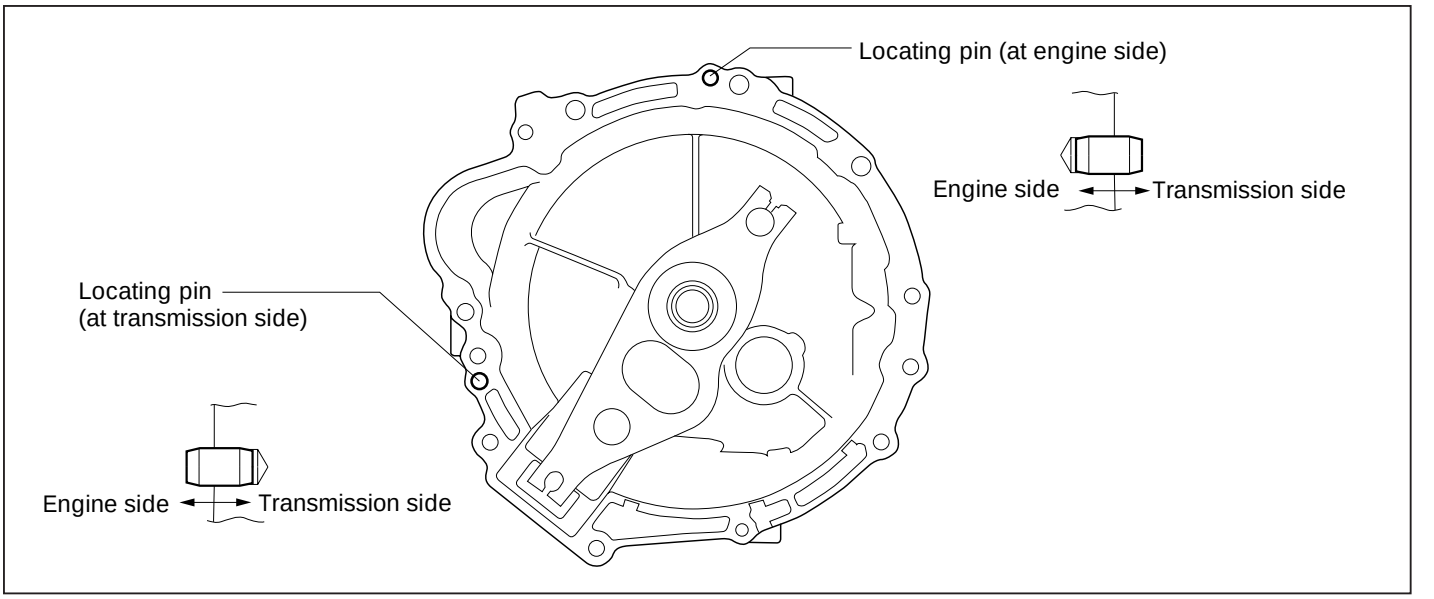
(3) Separate the stiffener left plate from the transmission by removing the two attaching bolts.
(4) Remove the transmission assembly with transfer from the vehicle by removing the five attaching bolts.



JMT00011-00008

3. OPERATION AFTER REMOVAL

(1) Ensure that the locating pin is positioned securely at both the transmission and engine sides.
NOTE:
- Make sure to replace the locating pin that has exhibited severely scored.

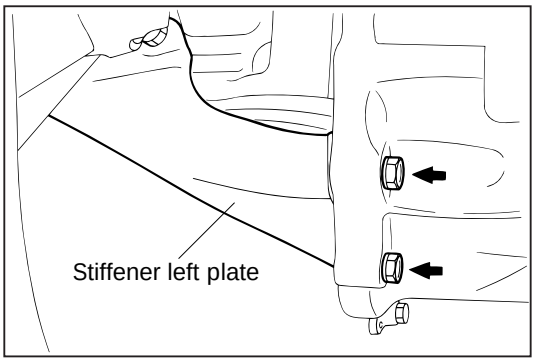


JMT00012-00009

4. MAIN POINTS OF INSTALLATION

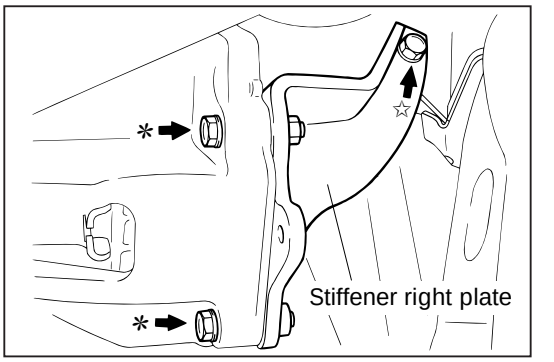
(1) With the transmission assembly with transfer supported by a transmission jack, etc., bring the surface of the transmission in close contact with the surface of the engine. Tighten the attaching bolts to the specified torque.
Tightening Torque: 49.0 - 68.6 N·m (5.0 - 7.0 kgf-m)

(2) Tighten the attaching bolts of the stiffener left plate.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



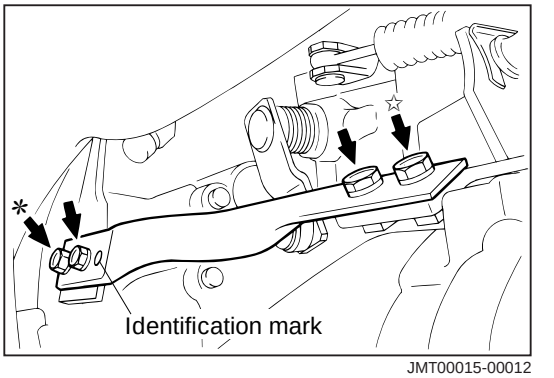
JMT00013-00010

(3) Tighten the attaching bolts of the stiffener right plate.
NOTE:
- Temporarily tighten the ⁎-marked bolts until the stiffener plate is brought in close contact with the transmission. Securely tighten the ☆-marked bolts.
Then, proceed to tighten the ⁎-marked bolts to the specified torque.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



JMT00014-00011

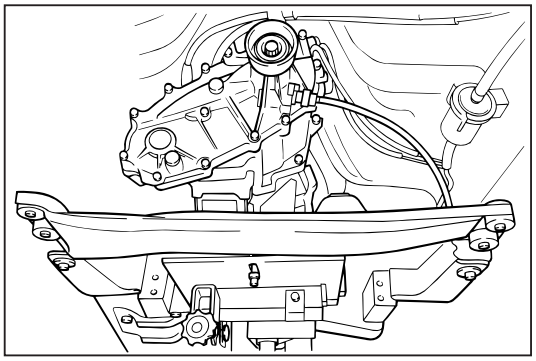
(4) Install the power train stiffener in the direction as indicated in the right figure.
NOTE:
- Temporarily tighten the ⁎-marked bolts. Securely tighten the ☆-marked bolts. Then, proceed to tighten the remaining two bolts securely.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



JMT00015-00012

(5) Tighten the attaching bolts of the engine mounting rear insulator and engine rear support member subassembly. Proceed to install the attaching bolts of the engine rear support member subassembly to the body.
(6) Remove the transmission jack, etc. Install the front lower frame crossmember subassembly.

NOTE:
• For the tightening torque, refer to MT–6.



JMT00016-00013

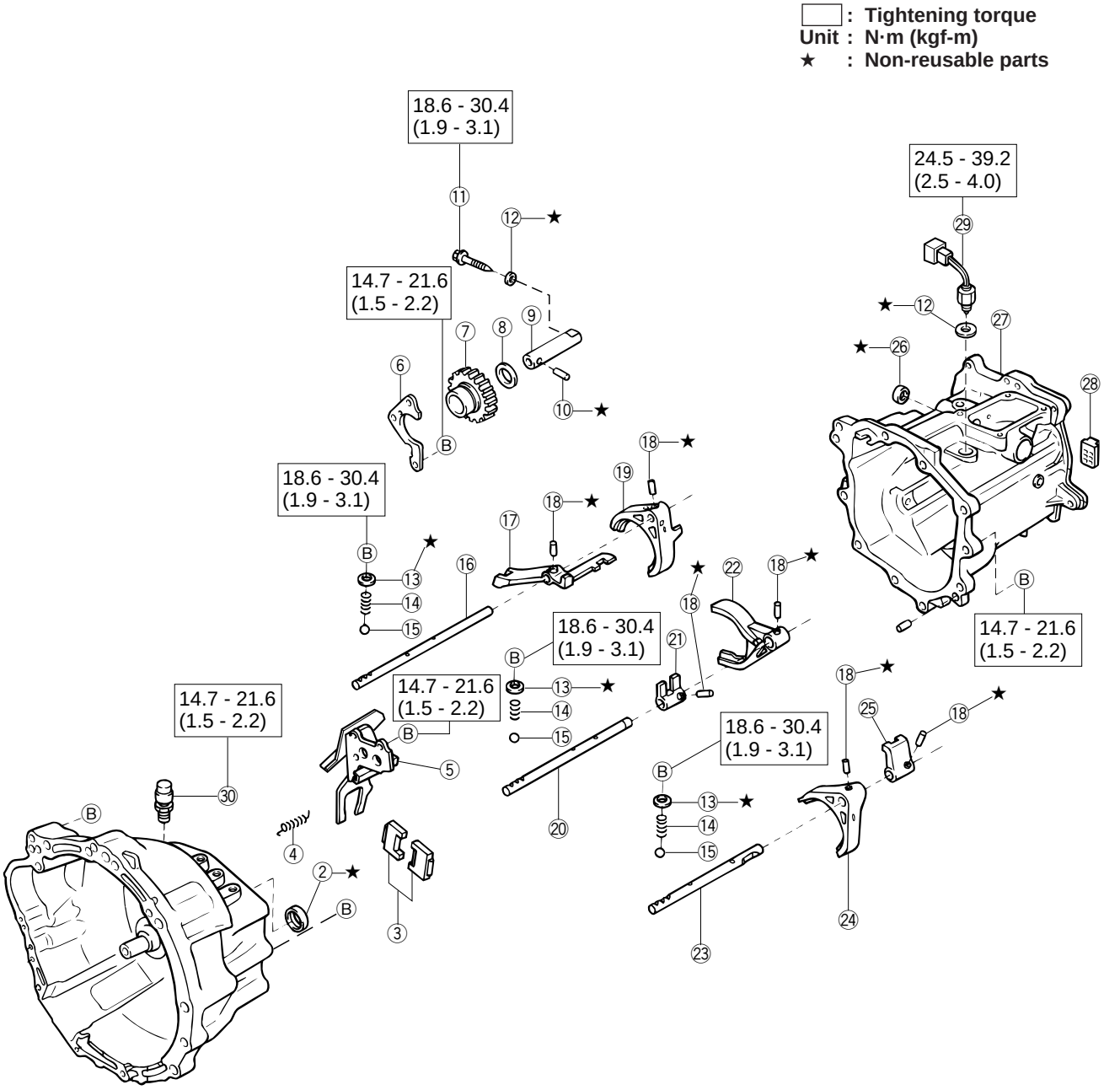
5. OPERATION AFTER INSTALLATION

(1) Install the shift cable assembly and select cable assembly.
(2) Assemble the clutch release cable assembly to the clutch release fork. Adjust the clutch free travel.
(3) Install the front exhaust pipe assembly.
(4) Install the propeller shaft assembly and propeller front shaft assembly.
(5) Pour the transmission oil.
(6) Lower the vehicle.
(7) Remove the engine support bridge.
(8) Connect the negative (–) terminal of the battery.

JMT00017-00000

DISASSEMBLY/ASSEMBLY OF MANUAL TRANSMISSION

COMPONENTS (PART 1)



① Clutch housing
★② Type S oil seal
③ Shift interlock plate
④ Tension spring
⑤ Reverse shift arm
⑥ Input shaft bearing lock plate
⑦ Reverse idler gear
⑧ Reverse idler gear thrust washer
⑨ Reverse idler gear shaft
★⑩ Slotted spring pin
⑪ Hexagon bolt
★⑫ Gasket
★⑬ Gasket
⑭ Compression spring
⑮ Ball
⑯ 5th & reverse shift fork shaft
⑰ 5th & reverse shift head
★⑱ Slotted spring pin
⑲ 5th shift fork
⑳ 3rd & 4th shift fork shaft
㉑ 3rd & 4th shift head
㉒ 3rd & 4th shift fork
㉓ 1st & 2nd shift fork shaft
㉔ 1st & 2nd shift fork
㉕ 1st & 2nd shift head
★㉖ Tight plug
㉗ Transmission case
㉘ Transmission magnet
㉙ Backup lamp switch assembly
㉚ Breather plug

NOTICE PRIOR TO OPERATION

This section summarizes the main points of each section of the configuration drawings posted on those pages previous to MT–10, MT–12, MT–20 and MT–28. The description is so arranged that the removal and assembly may readily be understandable when the configuration drawings are referred to the contents posted at the lower section of the page.
For more details, refer to the relevant pages.

JMT00019-00000

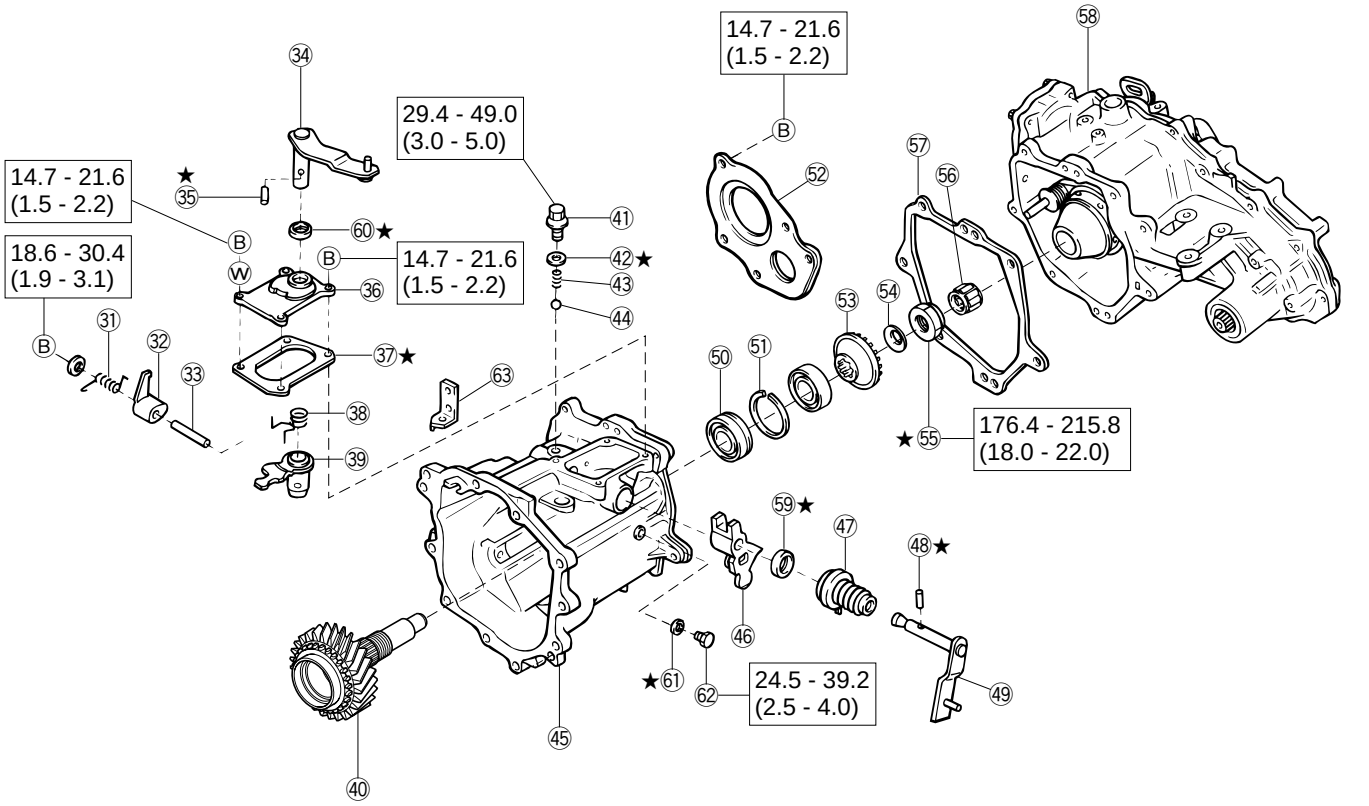
COMPONENTS (PART 1)

① Clutch housing	The clutch housing is connected to the transmission case by means of eight bolts of M8 (ℓ = 40 mm) and two bolts of M8 (ℓ = 60 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
★② Type S oil seal	Be sure to apply gear oil to the lip section when assembling. Press this oil seal by means of a 35 mm dia. rod.
③ Shift interlock plate	Overall length = 23.25 - 23.55 mm Length at inside = 17.7 - 17.9 mm The same plate is used in common at two points.
④ Tension spring	The tension spring is provided between Items ⑤ and ⑥.
⑤ Reverse shift arm	Ensure that the operating pin moves lightly and freely between the neutral position and the 5th gear position. The reverse shift arm is installed with three bolts of M8 (ℓ = 20 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
⑥ Input shaft bearing lock plate	The input shaft bearing lock plate is installed with three bolts of M8 (ℓ = 20 mm).
⑦ Reverse idler gear	Bush bore diameter d = 20.03 - 20.06 mm Care must be exercised as to the correct assembling direction.
⑧ Reverse idler gear thrust washer	Nylon-made washer
⑨ Reverse idler gear shaft	D = 20 mm This shaft is secured by means of the hexagon bolt ⑪.
★⑩ Slotted spring pin	Ensure that the section protruding from the shaft is 2.5 mm or less.
⑪ Hexagon bolt	Black bolt, hexagon socket Be sure to pull out this bolt when disassembling the transmission. Tightening torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)
★⑫ Gasket	
★⑬ Gasket	
⑭ Compression spring	The same spring is used in common at three points. L = 40 mm This compression spring is secured by means of a bolt of M10 (ℓ = 19 mm). Tightening torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)
⑮ Ball	The same ball is used in common at four points, including the reverse restrict ball. D = 7.9375 mm
⑯ 5th & reverse shift fork shaft	This fork shaft is the longest one among the three shafts. L = 265 mm, D = 13.0 mm
⑰ 5th & reverse shift head	Width contacting with inner lever: 12.1 - 12.2 mm Width contacting with reverse shift arm pin: 15.0 - 15.043 mm
★⑱ Slotted spring pin	The same pin is used in common at six points. D = 5 mm, L = 23 mm
⑲ 5th shift fork	Thickness of rib section contacting with hub sleeve: 6.7 - 6.9 mm
⑳ 3rd & 4th shift fork shaft	This shaft has the middle length among three shafts. L = 259 mm, D = 13.0 mm
㉑ 3rd & 4th shift head	Groove width at section contacting with shift inner lever: 12.1 - 12.2 mm
㉒ 3rd & 4th shift fork	Thickness of rib section contacting with hub sleeve: 6.7 - 6.9 mm
㉓ 1st & 2nd shift fork shaft	This fork shaft is the shortest one among the three shafts. L = 224 mm, D = 13.0 mm
㉔ 1st & 2nd shift fork	Thickness of section contacting with hub sleeve: 9.7 - 9.9 mm (Only the 1st & 2nd shift fork is wider than other shift forks.)
㉕ 1st & 2nd shift head	Groove width at section contacting with shift inner lever: 12.1 - 12.2 mm
★㉖ Tight plug	This plug is not required to remove, unless exceptional situation, such as oil leakage, occurs.
㉗ Transmission case	The clutch housing is connected to the transmission case with 10 bolts. Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m) The transfer assembly is connected to the transmission case with 6 bolts. Tightening torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)
㉘ Transmission magnet	This magnet is not secured with a bolt.
㉙ Backup lamp switch assembly	Tightening torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)
㉚ Breather plug	Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

JMT00020-00000

COMPONENTS (PART 2)

□ : Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts



- ㉛ Torsion spring
- ㉜ Reverse restrict cam
- ㉝ Reverse restrict shaft
- ㉞ Select lever subassembly
- ★㉟ Grooved pin
- ㊱ Control shaft cover
- ㊲ Transmission case cover gasket
- ㊳ Torsion spring
- ㊴ Select inner lever
- ㊵ Output shaft
- ㊶ Reverse restrict pin holder
- ★㊷ Gasket
- ㊸ Compression spring
- ㊹ Ball
- ㊺ Transmission case
- ㊻ Shift inner lever
- ㊼ Control shaft boot
- ★㊽ Grooved pin
- ㊾ Shift lever shaft subassembly
- ㊿ Radial ball bearing
- (51) Hole snap ring
- (52) Rear bearing retainer
- (53) Transfer input hub
- (54) Conical spring washer
- (55) Lock nut
- (56) Needle roller bearing
- (57) Extension housing gasket
- (58) Transfer assembly
- (59) Type T oil seal
- (60) Type K oil seal
- (61) Gasket
- (62) W/head straight screw plug
- (63) Clamp

COMPONENTS (PART 2)

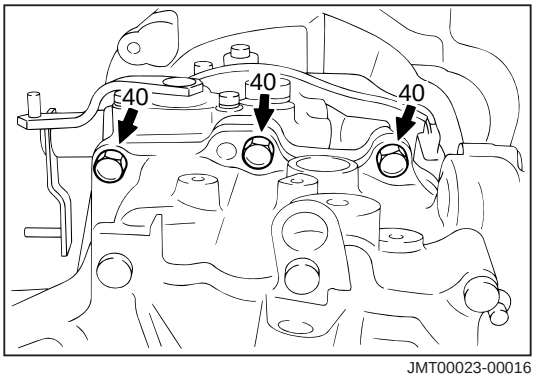
㉛ Torsion spring	Pay special attention to the assembling direction in the same way as with Item ㉜.
㉜ Reverse restrict cam	Pay special attention to the assembling direction during disassembly and assembly, for the reverse restrict cam has the correct assembling direction to be observed.
㉝ Reverse restrict shaft	D = 8 mm, L = 7.15 mm
㉞ Select lever subassembly	Pay special attention to the assembling direction of the lever when Items ㊳ and ㊴ are assembled.
★㉟ Grooved pin	D = 6 mm, L = 22 mm Drive this pin into position from the side where no groove is provided.
㊱ Control shaft cover	The transmission case cover is installed with a total of four bolts; two bolts of M8 and two reamer bolts (olive green) of M8 with Item ㊲ interposed.
★㊲ Transmission case cover gasket	(Non-asbestos)
㊳ Torsion spring	Pay special attention to the up-and-down direction of the spring during assembly.
㊴ Select inner lever	Width of section contacting with shift head: 14.88 - 14.98 mm
㊵ Output shaft	This shaft corresponds to the 4th gear.
㊶ Reverse restrict pin holder	Tightening torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)
★㊷ Gasket	
㊸ Compression spring	Free length: 24.00 mm Length as installed: 17.00 mm
㊹ Ball	The same ball is used in common at four points, including the shift fork ball.
㊺ Transmission case	Description is made in the “Components (part 1).” Apply Three Bond® 1216 or 1217 to the mating sections with the clutch housing and extension housing.
㊻ Shift inner lever	Width of section contacting with shift head: 11.88 - 11.98 mm Width of section contacting with select inner lever: 15.1 - 15.2 mm
㊼ Control shaft boot	Install this boot in such a way that the air bleeding section faces downward.
★㊽ Grooved pin	D = 6 mm, L = 24 mm
㊾ Shift lever shaft subassembly	Pay special attention to the assembling direction of the lever during assembly.
㊿ Radial ball bearing	
(51) Hole snap ring	This ring can be reused.
(52) Rear bearing retainer	This retainer is installed with five bolts of M8 (ℓ = 20 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
(53) Transfer input hub	
(54) Conical spring washer	Pay special attention to the correct installing direction during the assembly.
★(55) Lock nut	Width across flats of lock nut: 32 mm Tightening torque: 176.4 - 215.8 N·m (18.0 - 22.0 kgf-m) Be sure to stake the lock nut after tightening.
(56) Needle roller bearing	
★(57) Extension housing gasket	
(58) Transfer assembly	The transmission case is connected to the transfer assembly by means of five bolts of M10 (ℓ = 40 mm) and two bolts of M10 (ℓ = 210 mm).
★(59) Type T oil seal	The protruding dimension should be observed strictly at the time of installation to be 5 ± 0.3 mm.
★(60) Type K oil seal	The seal inclination at the time of prese-fitting should be 1° or less. Apply MP grease to the lip section.
★(61) Gasket	
(62) W/head straight screw plug	Tightening torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)
(63) Clamp	

JMT00022-00000

REMOVAL OF TRANSFER ASSEMBLY

NOTE:
- For disassembly of the transfer assembly, refer to Section TR.

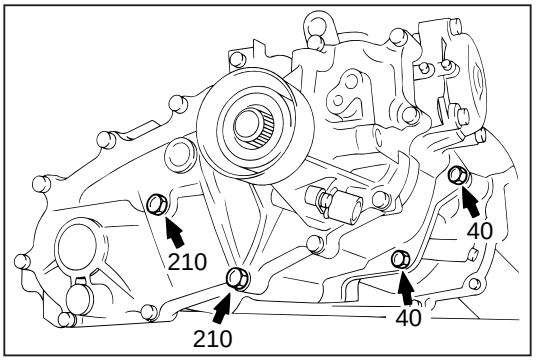
1. Remove the seven bolts indicated in the right figure.
   NOTE:
   - The numeral in the right figure denotes the nominal length of each bolt. (Unit: mm)



JMT00023-00016

2. Top the rib section of the transfer case. Then, pull out it toward you.
3. Remove the extension housing gasket.
   NOTE:
   - Never reuse the removed gasket.

4. Remove the needle roller bearing at the forward end of the transmission output shaft.



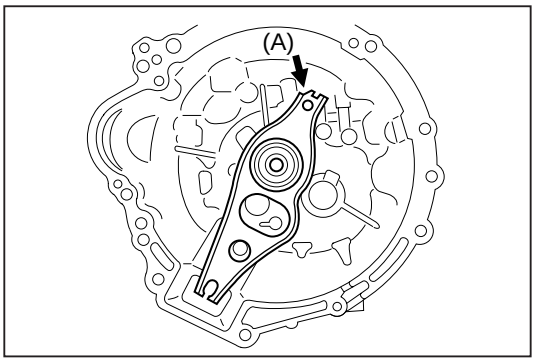
JMT00024-00017

DISASSEMBLY

DISASSEMBLY OF SHIFT AND SELECT LEVER RELATED PARTS

NOTE:
- After the sifting feeling and continuity for the reverse backup lamp switch have been checked.

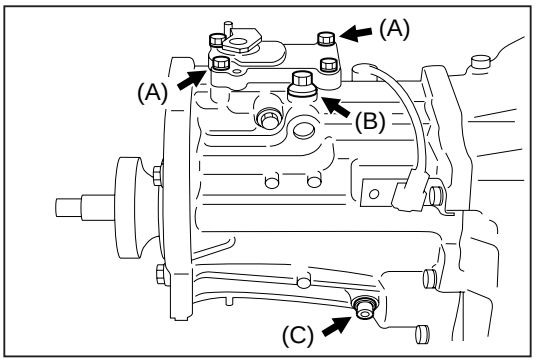
1. Remove the clutch-related parts.
   (Detach the engagement of the spring (A).)



JMT00025-00018

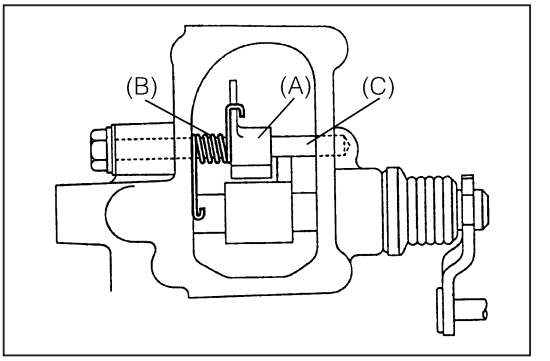
2. Remove the control shaft cover with gasket {(A) bolts are used for the reamer bolt}.
3. Remove the compression spring and ball of the reverse restrict pin holder (B) with the gasket.
   NOTE:
   - Disassemble the control shaft cover, as required.
   - Prior to the disassembly, drive out the grooved pin of the shift lever shaft.

4. Remove the hexagon bolt (C) of the reverse idler gear shaft with the gasket.
   NOTE:
   - This hexagon bolt is for securing the reverse idle shaft. Hence, be sure to remove this bolt before the transmission is disassembled.



JMT00026-00019

5. Pull out the shift lever subassembly and shift inner lever by driving out the grooved pin.
6. Remove the reverse restrict cam (A), torsion spring (B) and reverse restrict shaft (C) by removing the hexagon bolt with the gasket.
   NOTE:
   • The reverse restrict cam (A) has the correct assembling direction to be observed during assembly. Therefore, when disassembling the reverse restrict cam, make sure to remember the assembling direction in order that the part may be assembled correctly.



JMT00027-00020

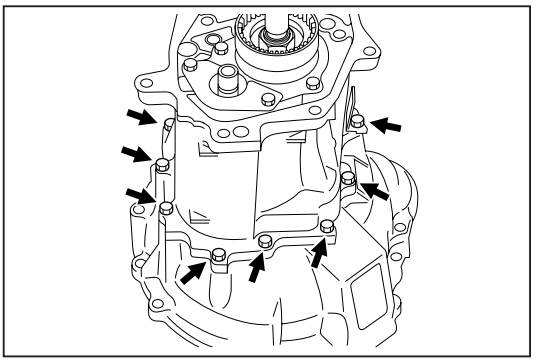
7. Remove the backup lamp switch assembly with the gasket.
   NOTE:
   • Do not reuse the gasket removed above.

DISASSEMBLY OF TRANSMISSION CASE

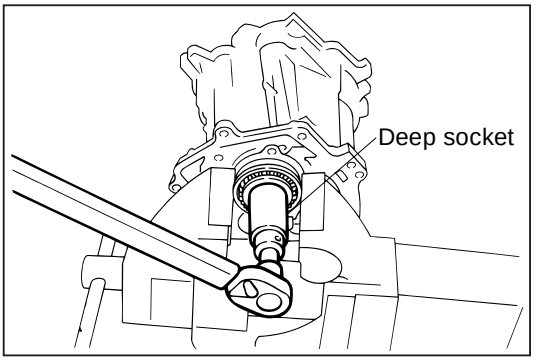
NOTE:
• Disassemble the transmission case after checking to see if any variation in rotation exists between the input and output shafts.

JMT00028-00000

1. Remove the 10 bolts of the transmission case, (including the two bolts to be removed from the side of the clutch housing).
   NOTE:
   • Of those bolts that are installed from the clutch housing side, one bolt is a hexagon socket head bolt due to a reason in the production line. However, here it is permissible to install the same hexagonal bolt as other bolts.

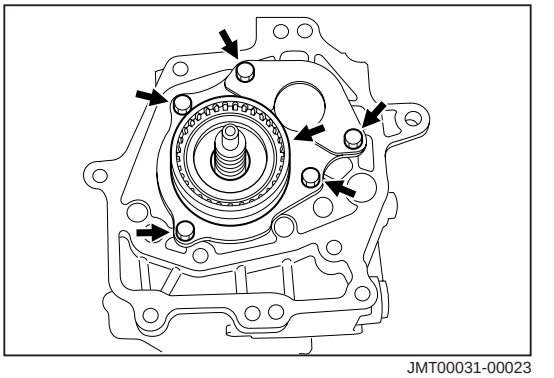

JMT00029-00021

2. Tap the rib section of the transmission case. Then, pull it out toward you.
3. Remove the lock nut by means of a deep socket.
   NOTE:
   • Do not reuse the removed lock nut.
   [Reference]
   • Deep socket dimensions (Tool commercially available)
   Width across flats: 32 mm × Overall length: 100 mm
4. Remove the conical spring washer.



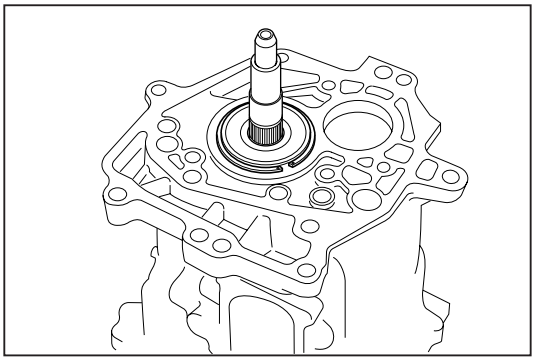
JMT00030-00022

5. Remove the transfer input hub.
6. Remove the rear bearing retainer and transmission magnet by removing the five bolts.



JMT00031-00023

7. Remove the hole snap ring with a snap ring expander.
8. Remove the output shaft from the transmission case.



JMT00032-00024

REMOVAL OF SHIFT FORK

NOTE:

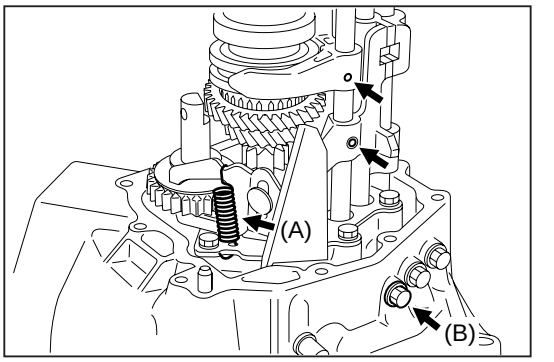
- Check the movement of reverse shift arm and contact width between the shift fork and the rib sleeve.
- Make sure that the shift fork is removed only after the gear concerned is placed in neutral.

JMT00033-00000

1. Detach the tension spring (A).
2. Remove the compression spring and ball by removing the hexagon bolt with the gasket (B).
3. Remove the 5th & reverse shift fork shaft by removing the slotted spring pin of the shift fork and shift head.

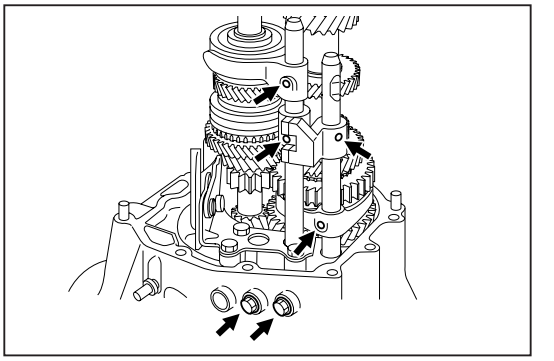
   NOTE:

   - When the slotted spring pin is driven out, a measure to sustain the reaction force for pulling out should be taken at the opposite side.



JMT00034-00025

4. Remove the 1st & 2nd shift fork shaft and the 3rd & 4th shift fork shaft progressively, following the procedure described in the steps 2 through 3 above.

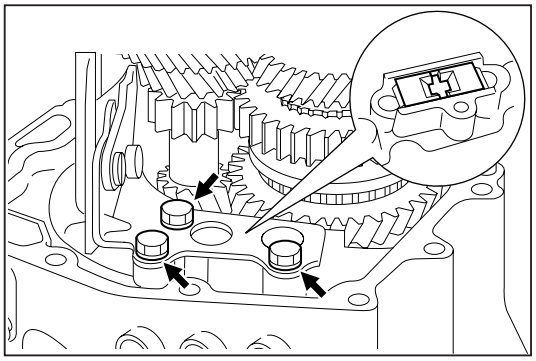


JMT00035-00026

REMOVAL OF INPUT SHAFT AND COUNTER GEAR

NOTE:
- Confirm that each gear can be engaged properly.

1. Pull out the output shaft assembly with the needle roller bearing, synchronizer ring and wave spring.
2. Remove the reverse shift arm by removing the three bolts.
3. Pull out reverse idler gear shaft, thrust washer and reverse gear.
4. Remove the input shaft bearing lock plate by removing the three bolts.
5. While holding both the input shaft and counter gear assembly by your hands, pull out them in such a way that they face toward the upper side.

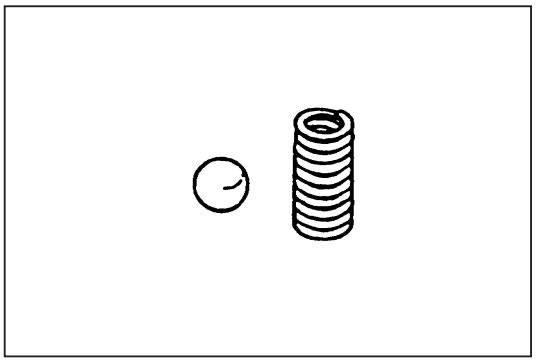


JMT00036-00027

INSPECTION

1. Measure the free length of the compression spring for shift fork shafts and reverse restrict pin.

	For shift fork shafts	For reverse restrict pin
Free length	40 mm	24 mm
Load as installed: N (kgf)	47.33 N (4.83 kgf)	23.83 N (2.43 kgf)
Height as installed	30 mm	17 mm



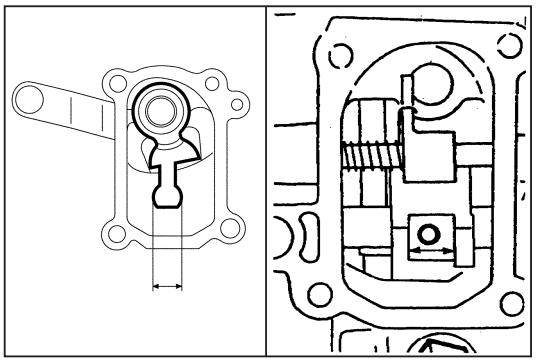
JMT00037-00028

2. Visually inspect the balls for deformation or scratches.

3. Measure the contact width section between the select inner lever shaft and shift heads.

Unit: mm

	Select inner lever	Shift inner lever heads
Specified Value	$15^{-0.02}_{-0.12}$	$15^{+0.2}_{+0.1}$



JMT00038-00029

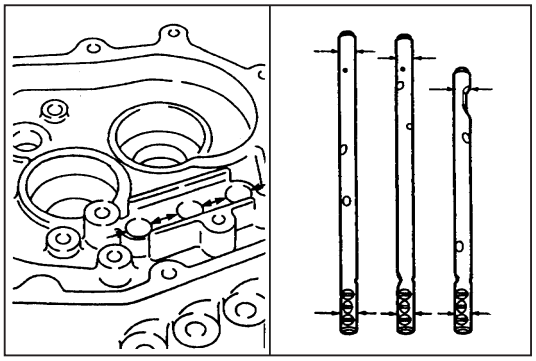
SHIFT FORKS AND HEADS

INSPECTION

1. Measure the outer diameter of the shift fork shafts and inner diameter of the case sides.

Unit: mm

	Case sides	Shift sides
Specified Value	$13.0^{+0.043}_{+0}$	$13.0^{-0.050}_{-0.077}$

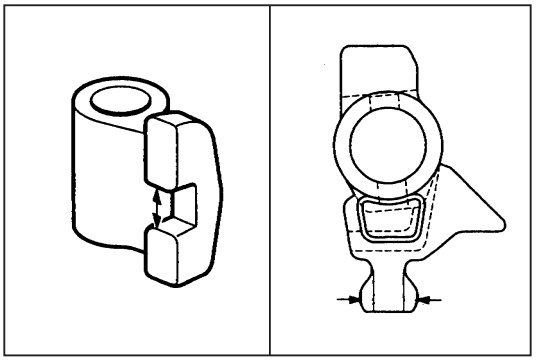


JMT00039-00030

2. Measure the contact width section between the shift heads and the shift inner lever.

Unit: mm

	Shift heads	Shift inner lever
Specified Value	$12.1^{+0.1}_{+0}$	$12^{-0.02}_{-0.12}$



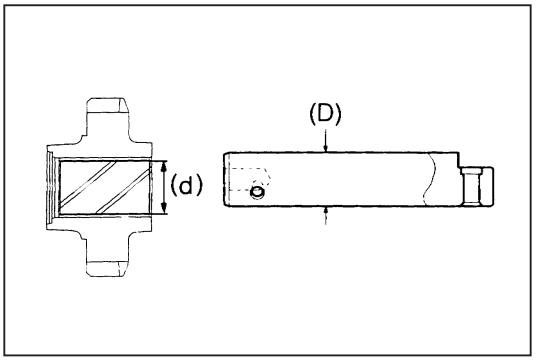
JMT00040-00031

REVERSE IDLER GEAR

1. Visually inspect the chamfered section of the reverse idle gear for damage.
2. Measure the bore diameter of the reverse idle gear bush.
3. Measure the outer diameter of the reverse idle gear shaft. Also, check its surface for scores, etc.

Unit: mm

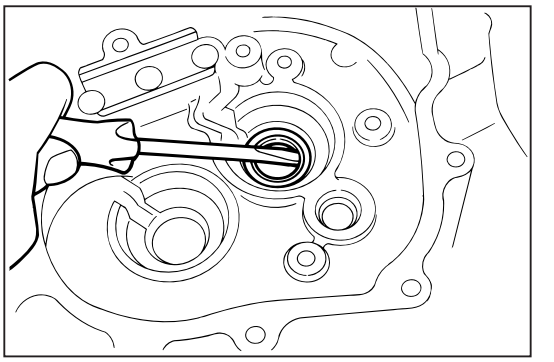
	(d)	(D)
Specified Value	$20^{+0.061}_{+0.032}$	$20.0^{+0}_{-0.013}$



JMT00041-00032

REPLACEMENT OF TYPE S OIL SEAL

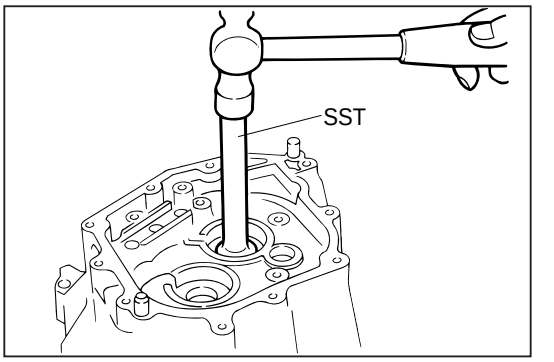
1. Remove the Type S oil seal with a common screwdriver.
   NOTE:
   - Do not reuse the removed Type S oil seal.



JMT00042-00033

2. Install a new Type S oil seal in the clutch housing, using the SST given below.
   SST: 09606-87201-000

   NOTE:
   - Prior to assembly, apply gear oil to the whole periphery of the lip section.

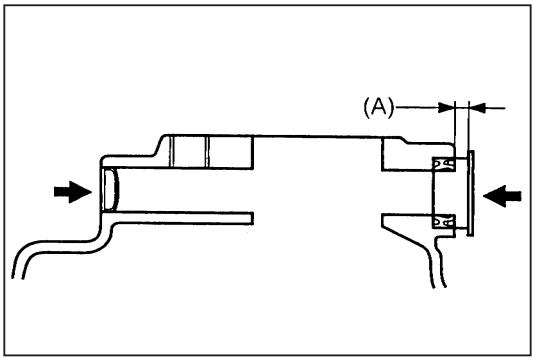


JMT00043-00034

SHIFT LEVER & SHIFT RELATED PARTS REPLACEMENT

REMOVAL

1. Remove the select lever boot.
2. Remove the tight plug (if necessary).
3. Remove the Type T oil seal.
   NOTE:
   - Do not reuse the removed tight plug and oil seal.



JMT00044-00035

INSTALLATION

1. Install the new tight plug as shown in the right figure.
2. Install the new Type T oil seal as shown in the right figure.
3. Ensure that the protrusion section (A) of the Type T oil seal conforms to the specified value.
   Specified Value: 5 ± 0.3 mm

   CAUTION:
   - If the protrusion section (A) exceeds the specification above (i.e. above 5.3 mm), it would cause oil leakage.

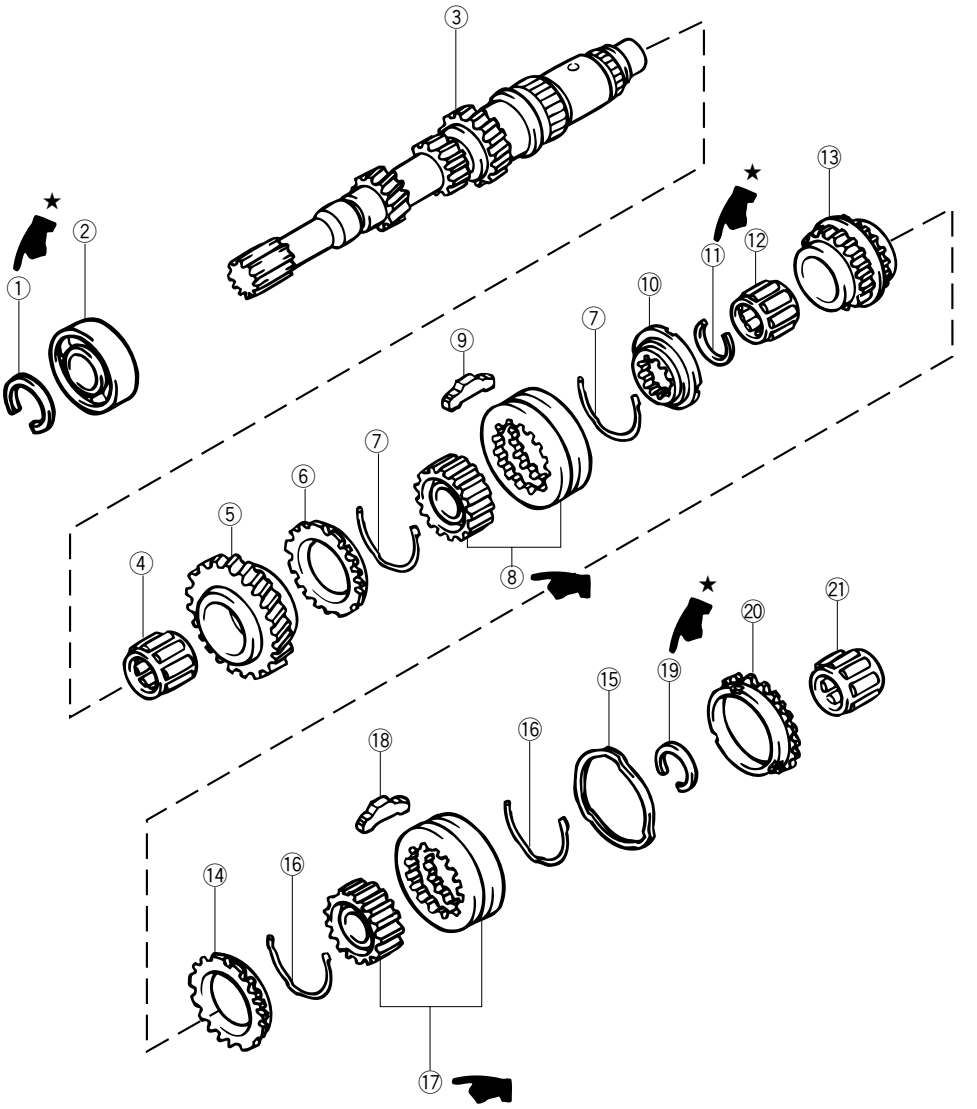
4. Check that continuity exists at the backup lamp switch assembly.

JMT00045-00000

INPUT SHAFT

COMPONENTS

★ : Non-reusable parts
☛ : Selection parts



★① Shaft snap ring
② Radial ball bearing (front)
③ Input shaft
④ Split type needle roller bearing
⑤ 5th gear
⑥ Synchronizer ring No. 1
⑦ Synchromesh shifting key spring
⑧ Synchronizer No. 3 hub assembly
⑨ Synchromesh shifting key
⑩ Transmission hub sleeve stopper
★⑪ Shaft snap ring
⑫ Needle roller bearing
⑬ 3rd gear
⑭ Synchronizer ring No. 1
⑮ Wave spring
⑯ Synchromesh shifting key spring
⑰ Synchronizer No. 2 hub assembly
⑱ Synchromesh shifting key
★⑲ Shaft snap ring
⑳ Synchronizer ring No. 1
㉑ Needle roller bearing

COMPONENTS

★① Shaft snap ring	This is shared in common with the snap ring of Item ⑲. Thickness selection type snap ring
② Radial ball bearing	
③ Input shaft	Needle roller bearing rotating section: D = 31.971 - 31.991 mm, two points Needle roller bearing rear end section: D = 19.966 - 19.984 mm
④ Split type needle roller bearing	The opening width of mating ends of the bearing should not exceed the shaft diameter + 5 mm during installation and removal. The opening end should not exceed 37 mm. ∗-1
⑤ 5th gear	Bore diameter: 37.00 - 37.025 mm Width: 27.82 - 27.88 mm Thrust end play: 0.1 - 0.4 mm
⑥ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Clearance between the gear and the synchronizer ring: 0.95 - 1.35 mm
⑦ Synchromesh shifting key spring	Items ⑦ and ⑯ are used in common. Make sure that no mating end of the spring comes in the same direction in assembly.
⑧ Synchronizer No. 3 hub assembly	Thickness at boss section: 12.37 - 12.43 mm The sleeve is shared in common with Item ⑰ However, be very careful not to mix the sleeve with others, for the hub and sleeve are assembled as a set. Assemble the hub in such a way that the oil-groove side of the hub comes at the front, namely the 5th gear side. The sleeve has no correct assembling direction to be observed. However, be sure to align the missing teeth provided at three points when the hub and sleeve are assembled.
⑨ Synchromesh shifting key	Items ⑨ and ⑱ are used in common. Therefore, a total of six pieces are used in common. Thickness: 4.6 - 4.8 mm
⑩ Transmission hub sleeve stopper	Thickness: 7.19 - 7.25 mm Assemble this retainer in such a way that the flat surface comes at the front; the oil-groove side comes at the rear.
★⑪ Shaft snap ring	This is shared in common with Item ① of the counter gear. Thickness selection type
⑫ Needle roller bearing	This is shared in common with Item ⑦ of the counter gear.
⑬ 3rd gear	Bore diameter: 37.00 - 37.025 mm Width: 37.95 - 37.98 mm Number of gear teeth: 33 Outer diameter: 63.7 Thrust end play: 0.1 - 0.52 mm
⑭ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Clearance between the gear and the synchronizer ring: 0.95 - 1.35 mm ∗-2
⑮ Wave spring	This wave spring is provided between items ⑰ and ⑳
⑯ Synchromesh shifting key spring	Items ⑦ and ⑯ are used in common. Make sure that no mating end of the spring comes in the same direction in assembly.
⑰ Synchronizer No. 2 hub assembly	Thickness at boss section: 18.52 - 18.58 mm Assemble the hub in such a way that the oil-groove side of the hub comes at the front, namely the 3rd gear side. Be sure to align the missing teeth provided at three points when the hub and sleeve are assembled. The sleeve has no correct assembling direction to be observed. Width of shift fork groove: 7.05 - 7.12 mm
⑱ Synchromesh shifting key	Items ⑨ and ⑱ are used in common. Therefore, a total of six pieces are used in common. Thickness: 4.6 - 4.8 mm
★⑲ Shaft snap ring	This is shared in common with the snap ring of Item ①. Thickness selection type
⑳ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Refer to Items ⑥ and ⑭.
㉑ Needle roller bearing	This needle roller bearing is located between the input shaft and the output shaft.

∗-1 When the snap ring ⑪ is removed, those parts ④ to ⑩ can be removed collectively.
∗-2 When the snap ring ⑲ is removed, those parts ⑫ to ⑱ can be removed collectively.

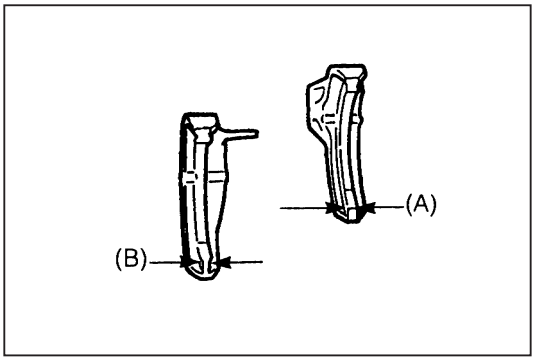
JMT00047-00000

INSPECTION PRIOR TO OPERATION

1. Measure the contact section of the shift forks for 3rd gear (A), 5th gear (B) and with the hub sleeves.

Unit: mm

	3rd gear (A) and 5th gear (B)	
	Fork	Hub sleeve
Specified Value	$7^{-0.1}_{-0.3}$	$7^{+0.12}_{+0.05}$
Allowable Limit	6.6	7.2

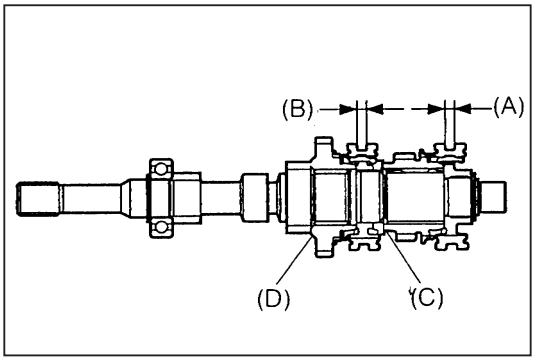


JMT00048-00037

2. Measure and record the thrust clearance for 3rd gear (C) and 5th gear (D), using a feeler gauge.

Unit: mm

	(C)	(D)
Specified Value	0.10 - 0.52	0.10 - 0.40

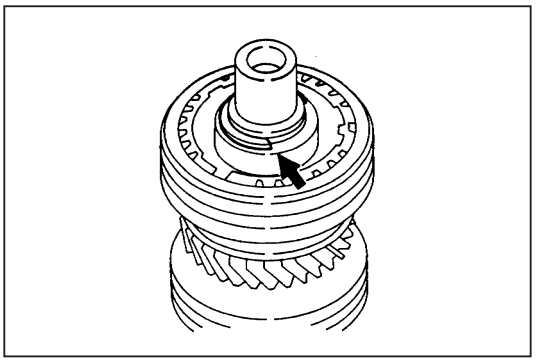


JMT00049-00038

NOTE:
- Ensure that the thrust clearance is measured at several points.
- If the measured thrust clearance fails to conform to the specification above, proceed to disassemble the input shaft assembly.

DISASSEMBLY

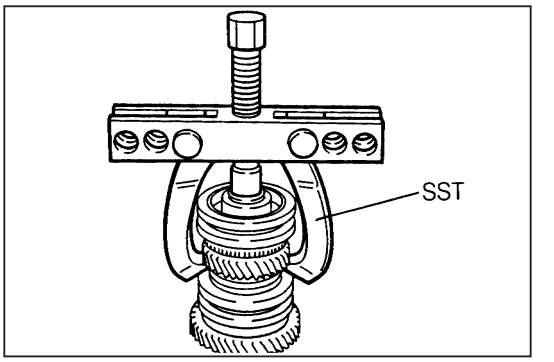
1. Using soft jaws, clamp the input shaft assembly in a vice so as to avoid the damage in the spline section.
2. Remove the selection type shaft snap ring at the rear side.
3. For reference at the time of installation, measure and record the removed shaft snap ring.


JMT00050-00039

4. Remove the following parts, using the following SST.
   SST: 09950-20017-000

NOTE:
- The following parts can be removed by driving out the input shaft by means of a press, with the 3rd gear section sustained by the SST (09334-87301-000)

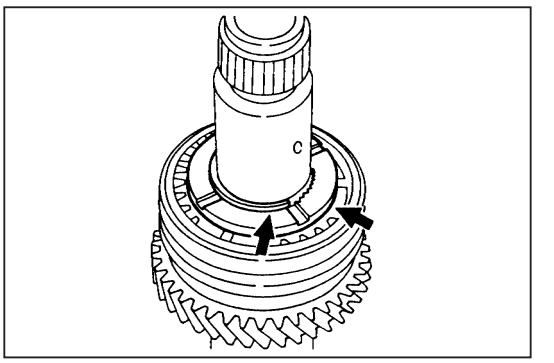
(1) Synchronizer No. 2 hub assembly
(2) Synchronizer ring No. 1
(3) 3rd gear



JMT00051-00040

5. Remove the needle roller bearing.

6. Remove the selection type shaft snap ring.
7. For reference at the time of installation, measure and record the removed shaft snap ring.
8. Remove the transmission hub sleeve stopper.

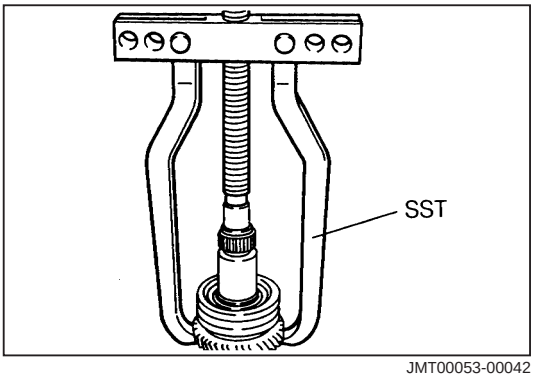


JMT00052-00041

9. Remove the following parts, using the following SST.
   SST: 09950-20017-000

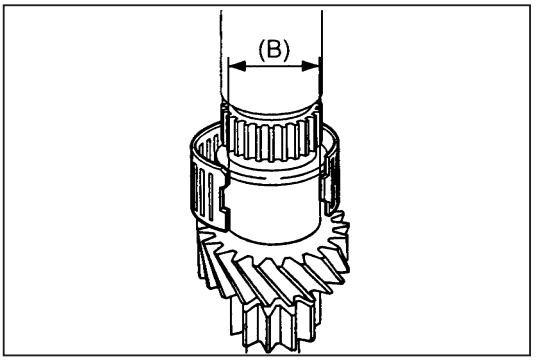
   NOTE:
   - The following parts can be removed by driving out the input shaft by means of a press, with the 5th gear section sustained by the SST (09334-87301-000).

   (1) Synchronizer No. 3 hub assembly
   (2) Synchronizer ring No. 1
   (3) 5th gear



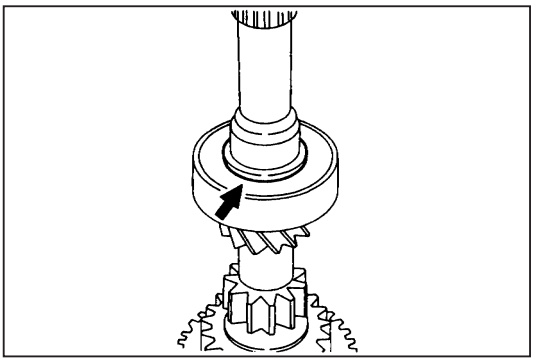
JMT00053-00042

10. Remove the split type needle roller bearing.
    CAUTION:
    - When the split type needle roller bearing is removed, make sure that the gap (B) at the opening of the needle roller bearing will not exceed the outer diameter of the input shaft by more than 5 mm.



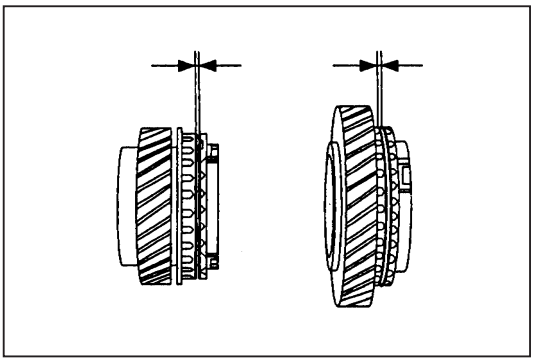
JMT00054-00043

11. Remove the selection type shaft snap ring.
12. Measure and record the thickness of the removed snap ring for the reference of installation.
13. Remove the radial ball bearing at the front side, using the following SST.
    SST: 09950-20017-000


JMT00055-00044

INSPECTION

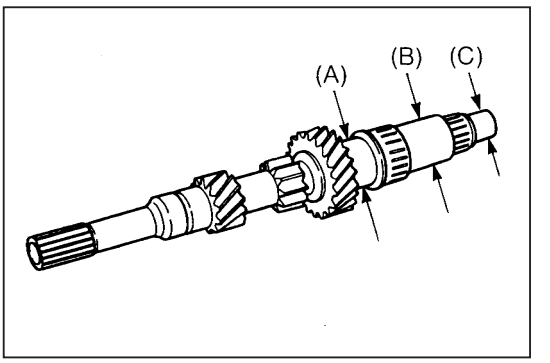
1. Check the clearance between the gear tapered section and the synchronizer rings.
   Specified Value: 0.95 - 1.35 mm


JMT00056-00045

2. Measure the outer diameter of the input shaft at the sections (A), (B) and (C) as shown in the right figure.
3. Visually inspect the sections (A), (B) and (C) for scratch or discoloration.

Unit: mm

	Specified Value
(A) and (B)	$32\ ^{-0.009}_{-0.029}$
(C)	$20\ ^{-0.016}_{-0.034}$

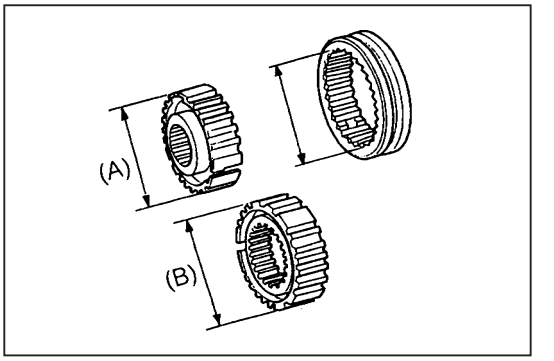


JMT00057-00046

4. Measure the dimensions between the outer diameter of the synchronizer No. 2 for 3rd (A) and synchronizer No. 3 for 5th (B) and bore diameter of both hub sleeves.

Unit: mm

Classification	(A) and (B)	Hub sleeve	Identification
No. 2	57.78 - 57.84	57.871 - 57.97	Yellow
No. 1	57.68 - 57.74	57.771 - 57.87	None
No. 3	57.58 - 57.64	57.67 - 57.77	White



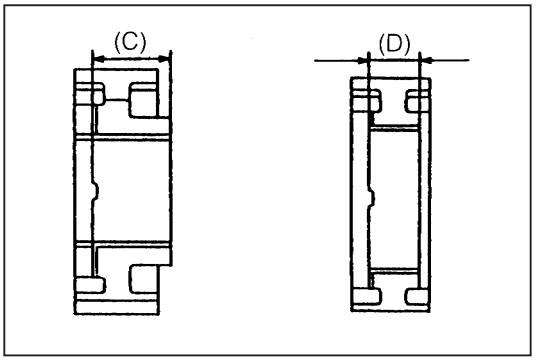
JMT00058-00047

CAUTION:
- If any part which has exceeded the value specified in the table above should be used, it would cause abnormal noise. Therefore, be certain to replace those parts as a set.

5. Measure the thickness of the synchronizer hub No. 2 (C) and No. 3 (D).

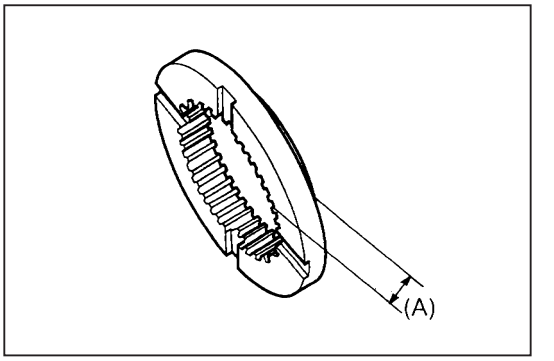
Unit: mm

	(C)	(D)
Specified Value	18.55 ± 0.03	12.4 ± 0.03



JMT00059-00048

6. Measure the height of the transmission hub sleeve stopper.
(A) section:
Specified Value: $7.2\ ^{+0.05\ mm}_{-0.01\ mm}$



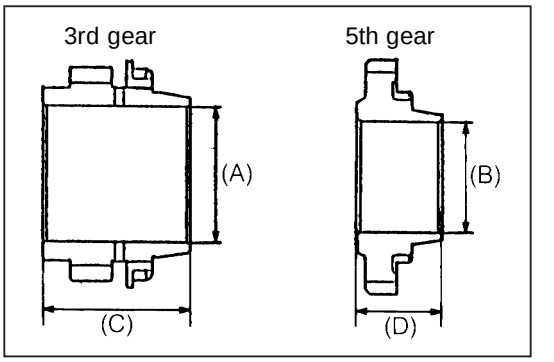
JMT00060-00049

7. Measure the thickness and inner diameter of the 3rd and 5th gears.

Unit: mm

	3rd gear (A)	5th gear (B)
Specified Value	$37.0\ ^{+0.025}_{+0}$	

	3rd gear (C)	5th gear (D)
Specified Value	37.95 ± 0.03	27.85 ± 0.03

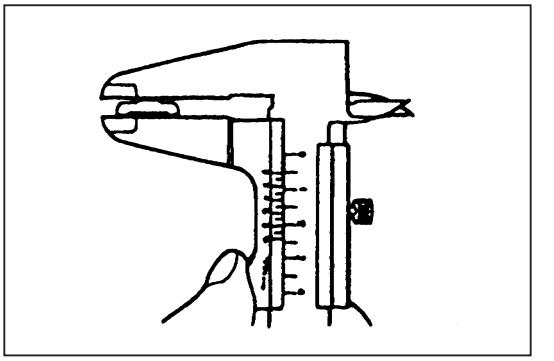


JMT00061-00050

8. Measure the height of the synchromesh shifting key.
Specified Value: $5\ ^{-0.2\ mm}_{-0.4\ mm}$

NOTE:
- All of the six shifting keys assembled in the input shaft are common parts.

9. Visually inspect the synchromesh shifting key spring for wear or damage.


JMT00062-00051

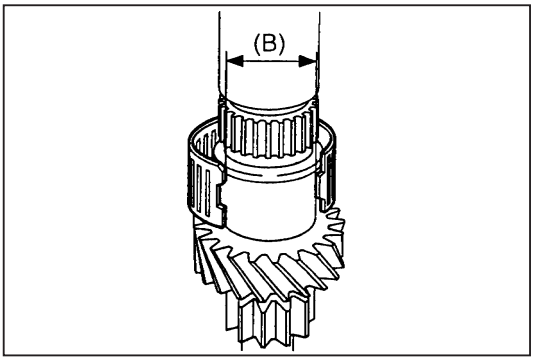
ASSEMBLY

NOTE:

- Be sure to apply gear oil to the relevant parts at every process.
- Never reuse those parts bearing an asterisked mark posted at the pages MT–20 and 21.

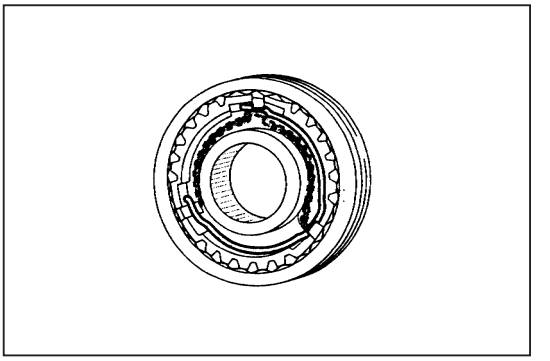
JMT00063-00000

1. Install the split type needle roller bearing and apply gear oil to it.
   CAUTION:
   - When the split type needle roller bearing is installed, make sure that the gap (B) at the opening of the needle roller bearing does not exceed the outer diameter of the input shaft by more than 5 mm.



JMT00064-00052

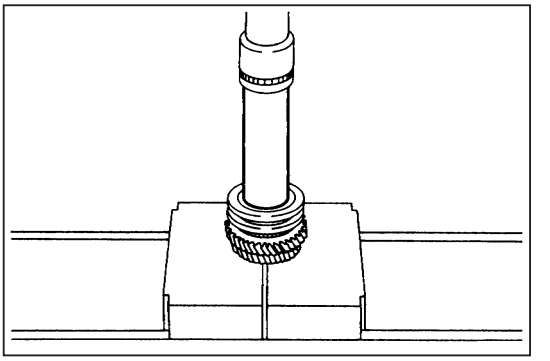
2. Install the 5th gear and synchronizer ring to the input shaft.
3. Assemble the synchromesh shifting key and key spring to the hub as shown in the illustration.
   NOTE:
   - Make sure that no opening end of the shifting key spring comes in the same direction in assembly.
   - Be sure to align the missing teeth provided at three points when the hub and sleeve are assembled.
   - The same hub sleeve is used for both the 3rd gear and 4th gear. However, the hub differs in shape between the 3rd gear and the 4th gear.



JMT00065-00053

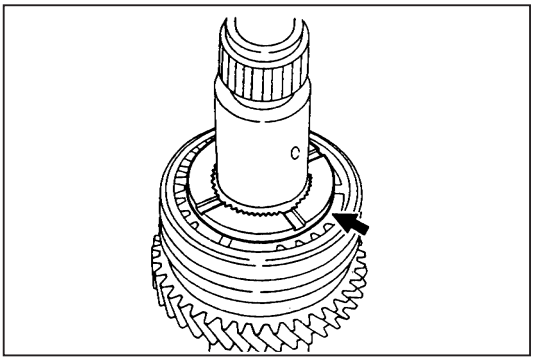
4. Ensure that the grooved section in the protrusion position of the synchronizer No. 3 hub faces toward the front (i.e. the 5th gear) side and press them, using the following SST.
   SST: 09310-87302-000

   NOTE:
   - Make sure that the synchronizer ring is aligned with the shifting key grooves (three points), while the synchronizer No. 3 hub is being pressed.



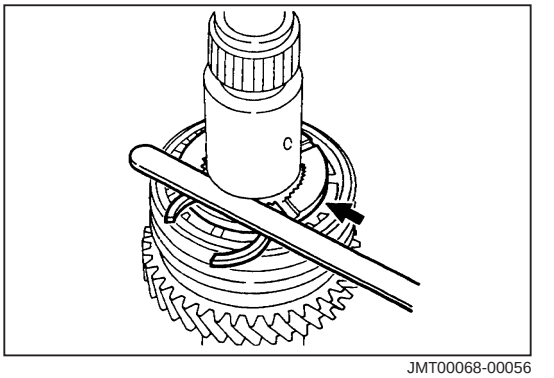
JMT00066-00054

5. Install the transmission hub sleeve stopper.
   NOTE:
   - Ensure that the oil groove section of the 5th shifting key retainer faces toward the 3rd gear side.



JMT00067-00055

6. Selection procedure for new shaft snap ring
   (1) Using the table below, select a new shaft snap ring having the same thickness as that measured at the time of the removal, or the thinnest shaft snap ring.
   Then, install the thus-selected snap ring on the shaft snap ring installation groove of the input shaft.
   (2) Measure the end play, using a feeler gauge as shown in the right figure.
   (3) Select a snap ring shaft whose end play is zero or almost zero and that can be set readily, using the table below.



JMT00068-00056

   (4) Again, ensure that the end play between the 5th shifting key retainer and the shaft snap ring conforms to the specified value.
   End Play:
   Specified Value: 0
   Allowable Limit: Less than 0.16 mm

Unit: mm

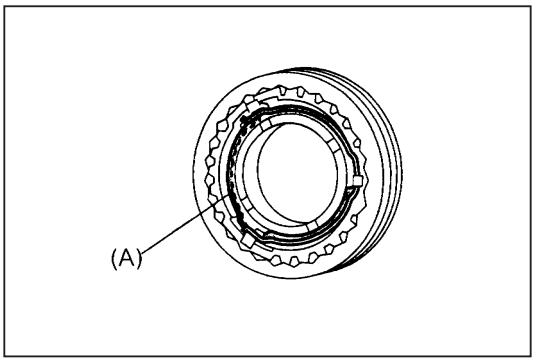
Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20263	2.06	None	90045-20267	1.90	Brown
90045-20264	2.02	Brown	90045-20268	1.86	Blue
90045-20265	1.98	Blue	90045-20269	1.82	None
90045-20266	1.94	None	90045-20270	2.10	Brown

NOTE:
- The shaft snap rings in the table above are the common parts as those used when the hub of the counter gear is set.

JMT00069-00000

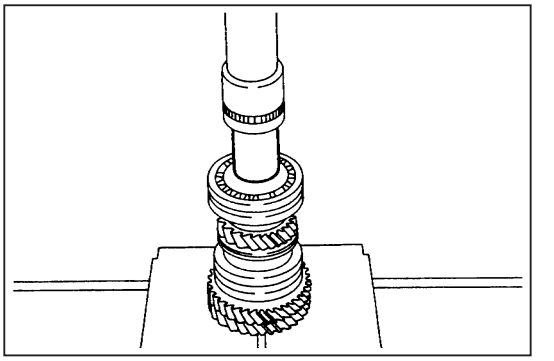
7. Install the needle roller bearing and apply gear oil.
8. Install the 3rd gear and synchronizer ring.
9. Assemble the synchromesh shifting key spring and shifting key to the synchronizer No. 2 hub assembly.
   NOTE:
   - For the handling of the hub sleeve, refer to the step 3 at page MT–25.

10. Ensure that the oil grooved section (A) of the synchronizer No. 2 hub assembly faces toward the 3rd gear side.



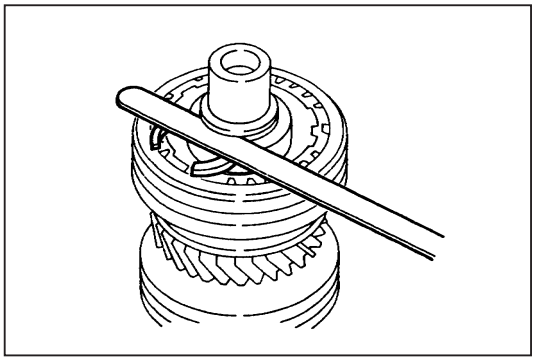
JMT00070-00057

NOTE:
- Make sure that the wave spring is interposed between the synchronizer hub No. 2 and the synchronizer ring in advance of the synchronizer hub No. 2 pressing, using the following SST.
  SST: 09310-87302-000



JMT00071-00058

11. Selection procedure for new shaft snap ring
    (1) For the selection procedure of the shaft snap ring, refer to the step 6 at page MT–26.



JMT00072-00059

    (2) Again, ensure that the end play between the hub and the shaft snap ring conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

Unit: mm

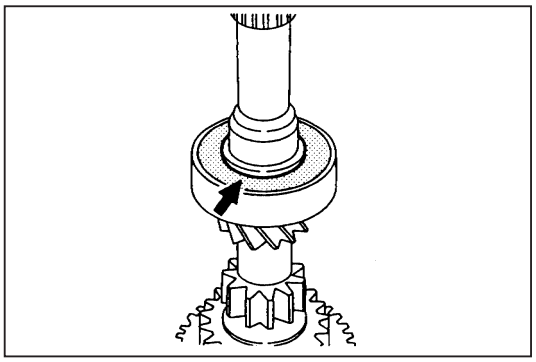
Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20271	2.06	None	90045-20275	1.90	Brown
90045-20272	2.02	Brown	90045-20276	1.86	Blue
90045-20273	1.98	Blue	90045-20277	1.82	None
90045-20274	1.94	None	90045-20278	1.78	Brown

NOTE:
- The shaft snap rings in the table above are the common parts as those used at the front bearing section of the input shaft.

JMT00073-00000

12. Press the radial ball bearing.
    NOTE:
    - Be very careful not to drop and disassemble the synchronizer ring and hub sleeve, while the radial ball bearing is being pressed.
    - The assembling operation of the radial ball bearing may be conducted first.

13. In the same manner of the step 11 above, install the selection type shaft snap ring.

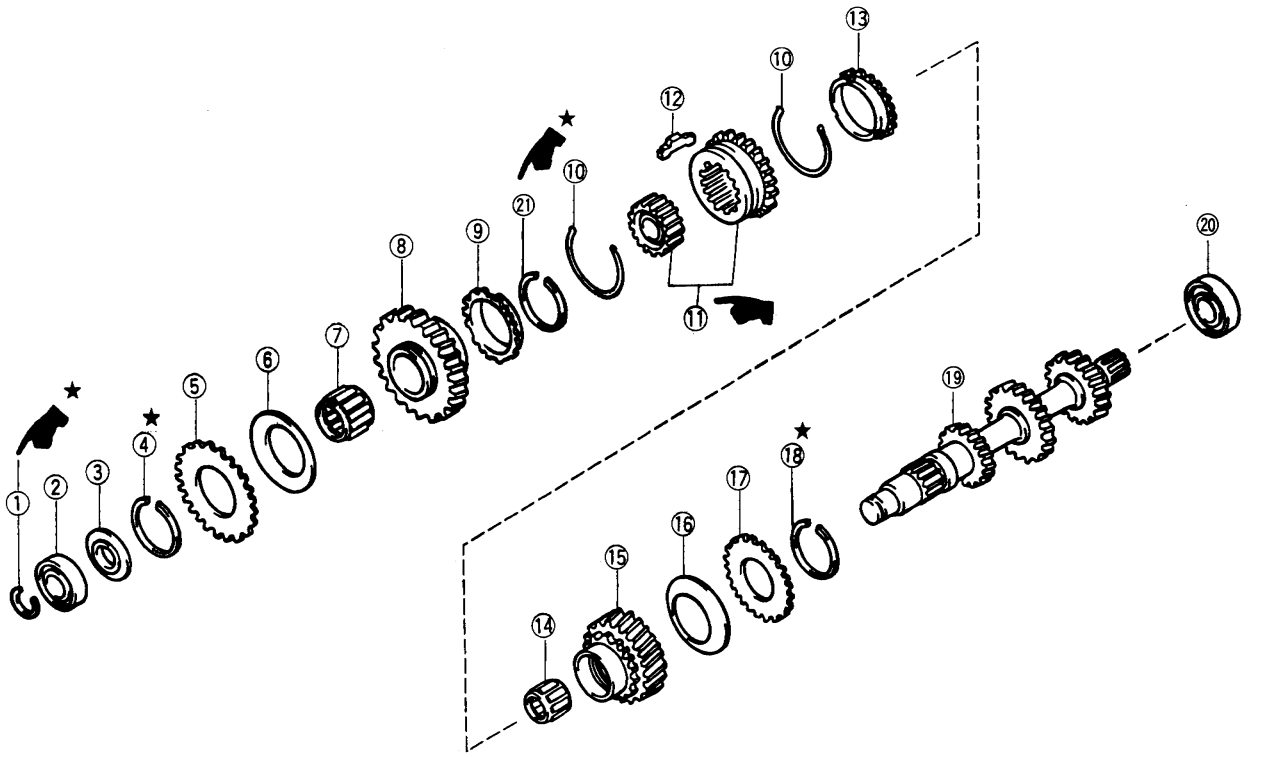


JMT00074-00060

COUNTER GEAR

COMPONENTS

★ : Non-reusable parts
☛ : Selection parts



★① Shaft snap ring
② Radial ball bearing
③ 1st gear thrust washer
★④ Shaft snap ring
⑤ 1st sub-gear
⑥ Conical spring washer
⑦ Needle roller bearing
⑧ 1st gear
⑨ Synchronizer ring No. 2
⑩ Synchromesh shifting key spring
⑪ Synchronizer No. 1 hub assembly
⑫ Synchromesh shifting key
⑬ Synchronizer ring No. 3
⑭ Split type needle roller bearing
⑮ 2nd gear
⑯ Conical spring washer
⑰ 2nd sub-gear
★⑱ Shaft snap ring
⑲ Counter gear
⑳ Radial ball bearing
★㉑ Shaft snap ring

COMPONENTS

★① Shaft snap ring	Thickness selection type
② Radial ball bearing	Assemble the bearing so that the side having a seal comes at the front.
③ 1st gear thrust washer	Thickness = 3.97 - 4.03 mm Assemble the washer in such a way that the protruding side comes at the front; the oil-groove side comes at the 1st gear side. Thrust end play of 1st gear = 0.1 - 0.52 mm
★④ Shaft snap ring	
⑤ 1st sub-gear	⁎-1 Items ④ and ⑱ are used in common. Items ④ to ⑧ are normally handled as assembled parts.
⑥ Conical spring washer	Items ⑥ and ⑯ are used in common.
⑦ Needle roller bearing	This bearing is shared in common with Item ⑫ of the input shaft.
⑧ 1st gear	Inner diameter: 37.00 - 37.025 mm Effective thickness: 27.31 - 27.37 mm Clearance with synchronizer ring: 0.95 - 1.35 mm Limit: 0.9 mm
⑨ Synchronizer ring No. 2	Not interchangeable with Item ⑬. To distinguish this from Item ⑬, missing teeth are provided at three points.
⑩ Synchromesh shifting key spring	Make sure that no mating end comes in the same direction in assembly.
⑪ Synchronizer No. 1 hub assembly	The hub and sleeve (reverse gear) are assembled as a set. Effective hub width: 26.97 - 27.03 mm Assemble the hub assembly so that the side having a larger boss protruding dimension comes at the front. As for the sleeve (reverse gear), make sure that the shift fork groove comes at the front side. Shift fork groove width: 10.05 - 10.12 mm ⁎-2
⑫ Synchromesh shifting key	Thickness = 5.0 - 5.2 mm, composed of 3 pieces.
⑬ Synchronizer ring No. 3	Not interchangeable with Item ⑨.
⑭ Split type needle roller bearing	This is shared in common with Item ④ of the input shaft. The opening width of mating ends should not exceed 37 mm during installation and removal.
⑮ 2nd gear	Inner diameter: 37.00 - 37.025 mm Effective thickness: 36.27 - 36.33 mm Clearance with synchronizer ring: 0.95 - 1.35 mm Limit: 0.9 mm Thrust clearance: 0.1 - 0.4 mm
⑯ Conical spring washer	Items ⑥ and ⑯ are used in common. Assemble each part to the 2nd gear in such a way that the portion having a wider spring diameter comes at the sub-gear side.
⑰ 2nd sub-gear	Items ⑮ to ⑰ are serviced as assembled parts together with the ring ⑱.
★⑱ Shaft snap ring	Items ④ and ⑱ are used in common.
⑲ Counter gear	Outer diameter of roller bearing rotating section: 31.971 - 31.991 mm
⑳ Radial ball bearing	
★㉑ Shaft snap ring	This is used in common with Item ⑪ of the input shaft. Thickness selection type.

⁎-1 When the snap ring ① is removed, those parts up to ⑧ can be removed collectively.
⁎-2 When the snap ring ㉒ is removed, those parts ⑩ to ⑱ can be removed collectively.

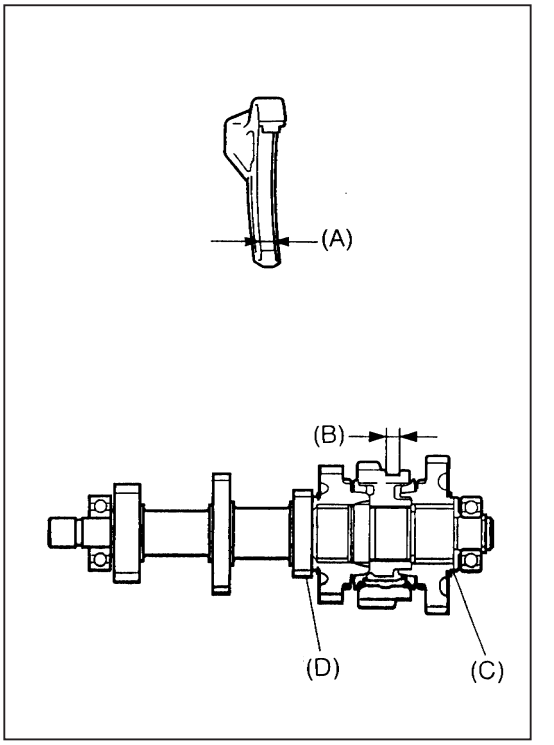
JMT00076-00000

INSPECTION PRIOR TO OPERATION

1. Measure the contact width section of the synchronizer No. 1 hub assembly (B) with the 1st & 2nd shift fork (A).

Unit: mm

	(A)	(B)
Specified Value	$10^{-0.1}_{-0.3}$	$10^{+0.12}_{+0.05}$
Allowable Limit	9.6	10.2



JMT00077-00062

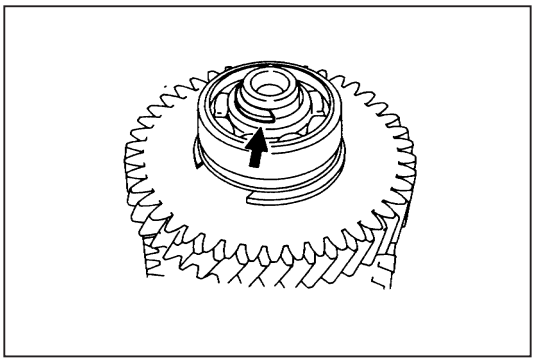
2. Measure and record the thrust clearance for 1st gear (C) and 2nd gear (D) as shown in the right figure.
   NOTE:
   - Prior to disassembling, make sure to measure the thrust clearance at several points.
   - If the measured thrust clearance exceeds the specified value in the table below, proceed to disassemble the counter gear.

Unit: mm

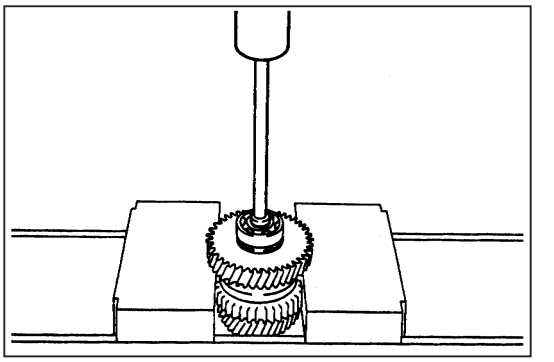
	1st gear (C)	2nd gear (D)
Specified Value	0.10 - 0.52	0.10 - 0.40

DISASSEMBLY

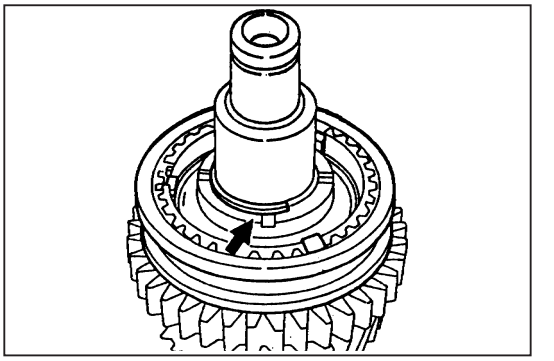
1. Using soft jaws, clamp the spline section of the counter gear assembly in a vice so as to avoid damage.
2. Remove the selection type shaft snap ring.
3. For reference at the time of installation, measure and record the removed selection type shaft snap ring.


JMT00078-00063

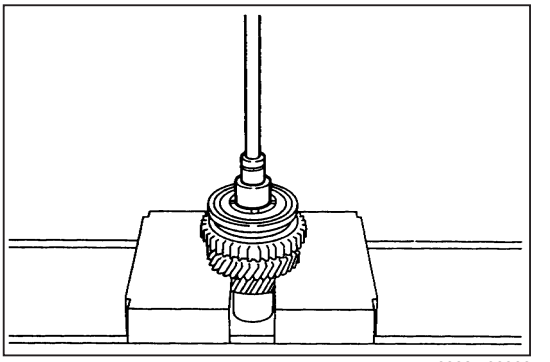
4. Remove the following parts by pressing the counter gear by means of a suitable rod.
   (1) Radial ball bearing
   (2) 1st gear thrust washer
   (3) 1st gear
   (4) Synchronizer ring No. 2
   (5) Needle roller bearing
   NOTE:
   - The parts described above can be removed by pressing the counter gear, while the 1st gear is supported by means of the following SST.
     SST: 09334-87301-000


JMT00079-00064

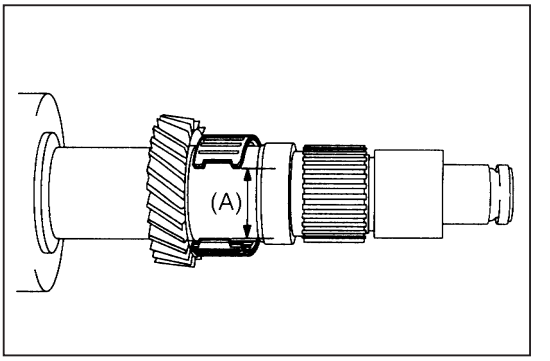
5. Remove the selection type shaft snap ring.
6. For reference at the time of installation, measure and record the removed selection type shaft snap ring.


JMT00080-00065

7. Remove the following parts.
   (1) Synchronizer No. 1 hub assembly
   (2) Synchronizer ring No. 3
   (3) 2nd gear with sub-gear
   NOTE:
   - The parts described above can be removed by pressing the counter gear, while the 2nd gear (sub-gear surface) is supported by means of the following SST.
     SST: 09334-87301-000

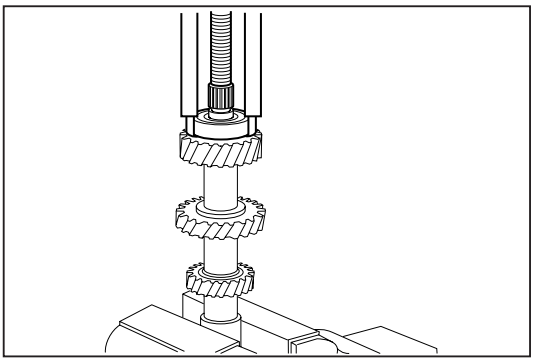

JMT00081-00066

8. Remove the split type needle roller bearing.
   CAUTION:
   - When the split type needle roller bearing is removed, make sure that the gap (A) at the opening of the needle roller bearing does not exceed the outer diameter of the counter gear by more than 5 mm. Failure to observe this caution would cause abnormal noise from the transmission.



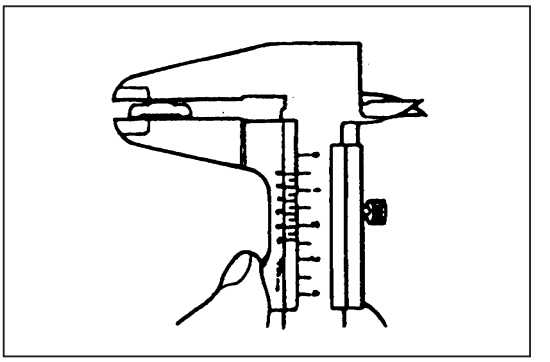
JMT00082-00067

9. Remove the radial ball bearing at the rear side of the counter gear, using the SST given below.
   SST: 09306-87602-000


JMT00083-00068

INSPECTION

1. Measure the height of the synchromesh shifting spring keys.
   Specified Value: 5.1 ± 0.1 mm

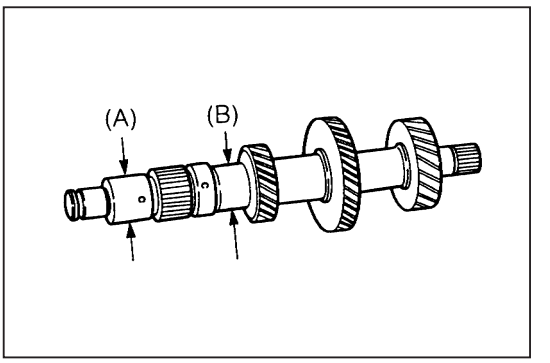

JMT00084-00069

2. Visually inspect the spring for synchromesh shifting key spring for damage or distortion.

3. Measure the outer diameter of the counter gear at the sections (A) and (B).

Unit: mm

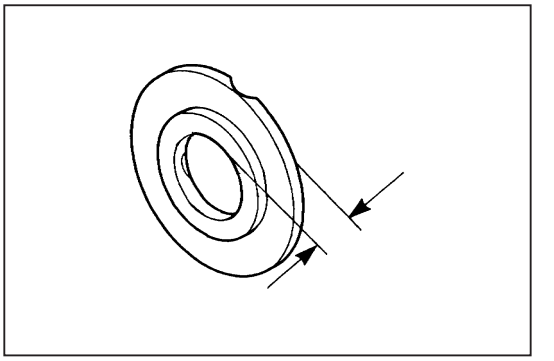
	(A)	(B)
Specified Value	32 $^{-0.009}_{-0.029}$	



JMT00085-00070

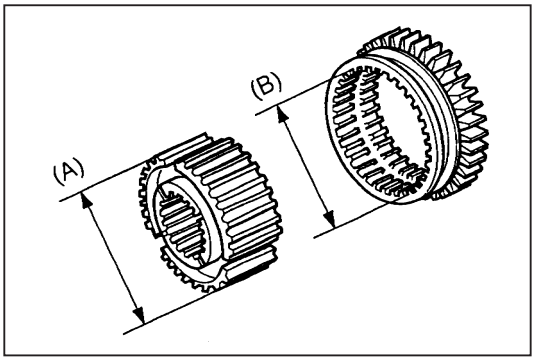
4. Visually inspect the sections (A) and (B) for discoloration and scratches.

5. Measure the thickness of the 1st gear thrust washer.
   Specified Value: 4 ± 0.03 mm



JMT00086-00071

6. Measure the dimensions between the outer diameter of the synchronizer No. 1 hub (A) and the bore diameter of synchronizer hub sleeve (B).
   [Reference information]
   The parts (A) and (B) are available only as a set. An identification mark is applied to the end surface of the synchronizer hub.



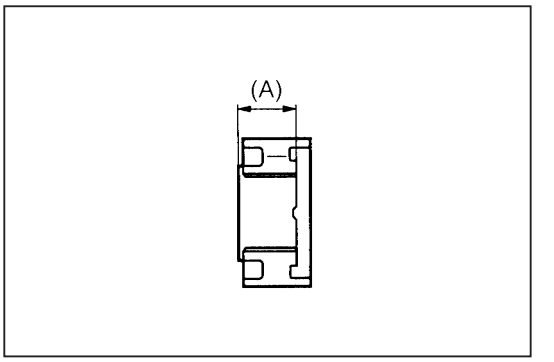
JMT00087-00072

Unit: mm

Classification	(A)	(B)	Identification
No. 2	69.78 - 69.84	69.871 - 69.97	Yellow
No. 1	69.68 - 69.74	69.771 - 69.87	None
No. 3	69.58 - 69.64	69.67 - 69.77	White

CAUTION:
- When replacing those parts (A) and (B), be sure to replace them as a set.

7. Measure the thickness (A) of the synchronizer No. 1 hub.
   Specified Value: 27 ± 0.03 mm

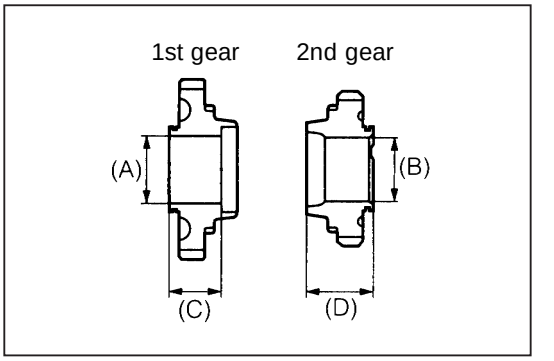


JMT00088-00073

8. Measure the inner diameter of 1st and 2nd gear.

Unit: mm

	1st gear (A)	2nd gear (B)
Specified Value	$37.0\ ^{+0.025}_{+0}$	



JMT00089-00074

9. Measure the thickness of 1st and 2nd gear.

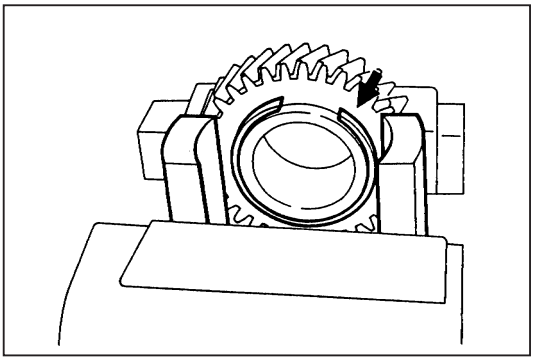
Unit: mm

	1st gear (C)	2nd gear (D)
Specified Value	27.34 ± 0.03	36.30 ± 0.03

REPLACEMENT OF CONICAL SPRING WASHER

1. Clamp the 1st gear together with the following SST in a vice as shown in the right figure.
   SST: 09350-32014-000

2. Remove the conical spring washer and sub-gear by removing the shaft snap ring.

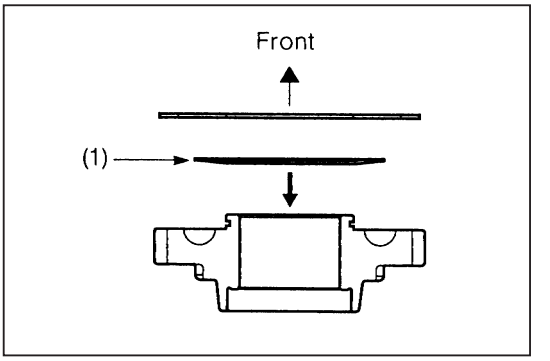


JMT00090-00075

INSPECTION

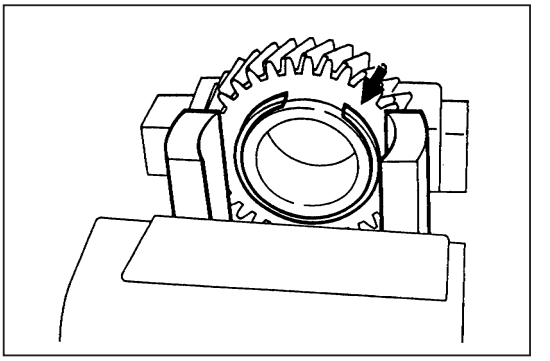
1. Measure the height of the conical spring washer.
   Specified Value: 2.01 mm
   Allowable Limit: 1.04 mm

2. Place a new conical spring washer (1) and sub-gear on the 1st gear.
3. Ensure that the expanded side of the conical spring washer faces toward the sub-gear side as shown in the right figure.



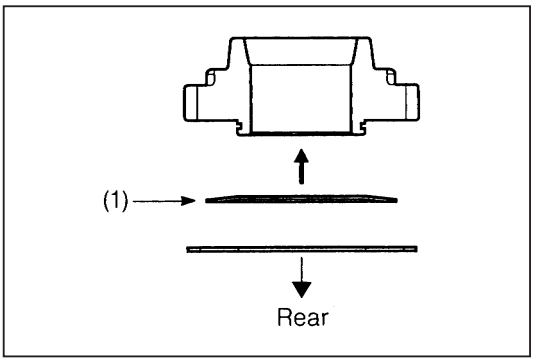
JMT00091-00076

4. Install a new shaft snap ring by pressing the conical spring washer, using the following SST.
   SST: 09350-32014-000



JMT00092-00077

5. In the same manner of the operation stated above, replace the conical spring washer for the 2nd sub-gear.
6. Ensure that the expanded side of the conical spring washer (1) for 2nd sub-gear faces toward the sub-gear side as shown in the right figure.

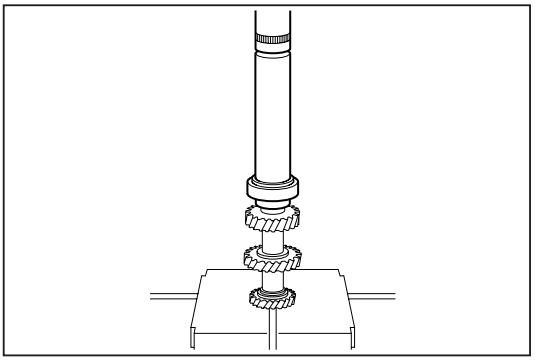


JMT00093-00078

ASSEMBLY

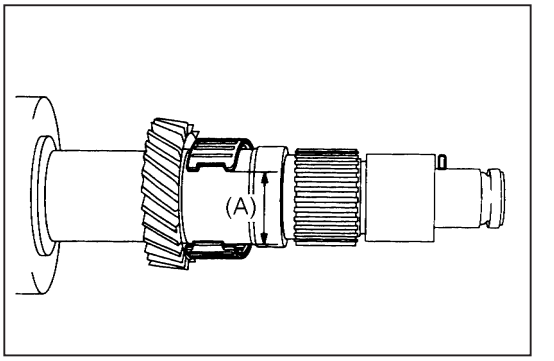
- When assembling the counter gear, apply gear oil at each step and assemble each part.
- As for those parts which bear the "★" marks at pages MT–28 and MT–29, never reuse them.

1. Install the radial ball bearing at the rear side of the counter gear, using a press in combination with the following SST given below.
   SST: 09310-87301-000



JMT00094-00079

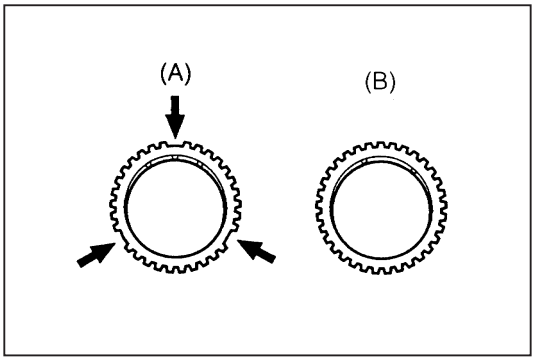
2. Install the split type needle roller bearing.
   CAUTION:
   - When the split type needle roller bearing is installed, make sure that the gap (A) at the opening of the needle roller bearing will not exceed the outer diameter of the counter gear by more than 5 mm.



JMT00095-00080

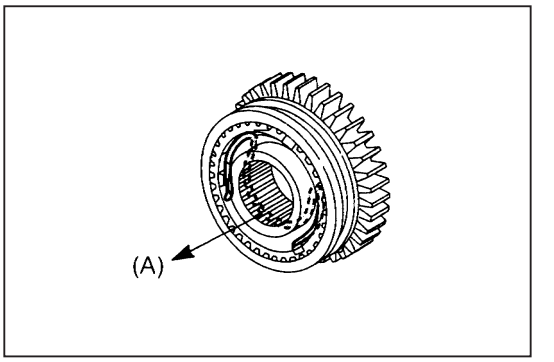
3. Apply gear oil to the outer periphery of the split type needle roller bearing and install the 2nd gear to the counter gear.

4. Place the synchronizer ring No. 3 into the synchronizer No. 1 hub.
   NOTE:
   - The external appearance of the synchronizer ring No. 3 {for 2nd gear (B)} differs from that of the synchronizer ring No. 2 {for 1st gear (A)}, as evident from the right illustration.



JMT00096-00081

5. Install the synchronizer ring No. 3 to the synchronizer No. 1.
6. Assemble the synchromesh shifting key and synchromesh shifting key spring to the synchronizer No. 1 hub assembly.
   NOTE:
   - During assembling, make sure that the mating ends of the shifting key springs come at different positions.
   - When installing the hub and hub sleeve, be sure to align three teeth-missing sections.

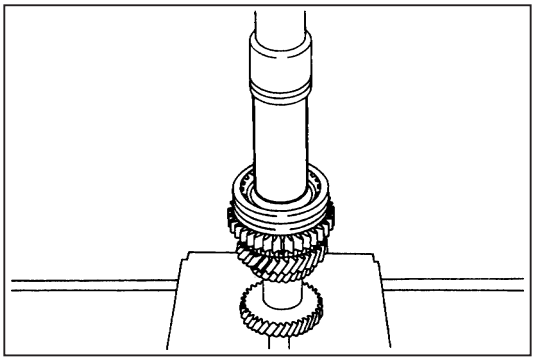


JMT00097-00082

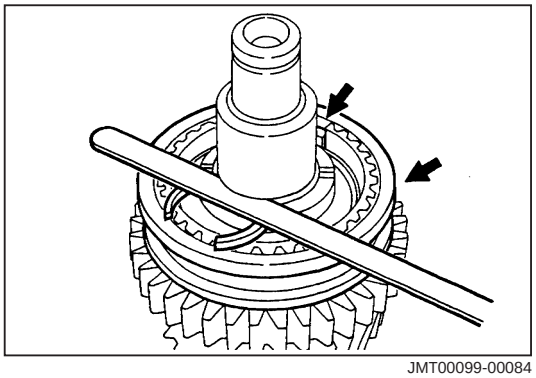
7. Prior to pressing the synchronizer No. 1 hub assembly, make sure that the protrusion section (A) of the hub faces toward the front side. (The hub sleeve has a shift fork groove.)

8. Apply gear oil to the tapered section of the 2nd gear.
9. Apply gear oil to the spline section.
10. Align the spline section. Press the synchronizer No. 2 hub assembly by using the following SST.
    SST: 09310-87302-000

    NOTE:
    - While the synchronizer No. 2 hub assembly is being pressed into the counter gear, make sure that the shifting key assembled to the hub is aligned with the shift key groove of the synchronizer ring.


JMT00098-00083

11. Selection sequence of new shaft snap ring.
    (1) Using the table below, select a new shaft snap ring having the same thickness as that measured at the time of removal, or the thinnest shaft snap ring.
    Then, install the thus-selected shaft snap ring on the shaft snap ring installation groove of the counter gear.
    (2) Measure the end play, using a feeler gauge as shown in the right figure.
    (3) Select a shaft snap ring whose end play is zero or almost zero and that can be set readily, using the table below. Then, proceed to install it.



JMT00099-00084

    (4) Again, ensure that the end play conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

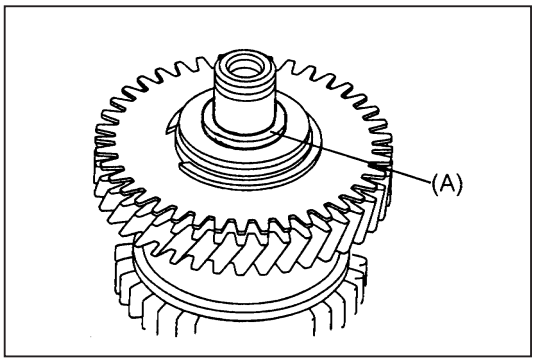
Unit: mm

Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20263	2.06	None	90045-20267	1.90	Brown
90045-20264	2.02	Brown	90045-20268	1.86	Blue
90045-20265	1.98	Blue	90045-20269	1.82	None
90045-20266	1.94	None	90045-20270	2.10	Brown

NOTE:
- The shaft snap rings in the table above are the same as those used when the hub of the input shaft is set.

JMT00100-00000

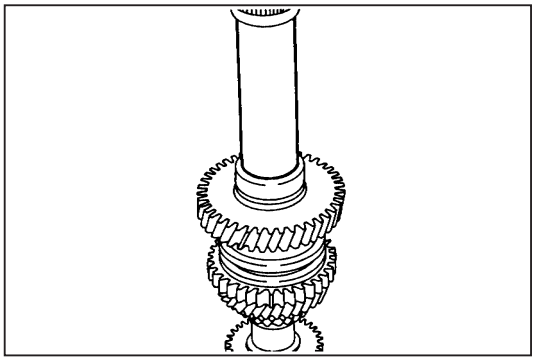
12. Install the needle roller bearing. Apply gear oil to the outer periphery of the needle roller bearing.
13. Place the synchronizer ring No. 2 (the ring having missing teeth).
14. Install the 1st gear with the sub-gear assembled.
15. Install the 1st gear thrust washer.
    NOTE:
    - Ensure that the protrusion section (A) of the 1st gear thrust washer faces toward the front side.



JMT00101-00085

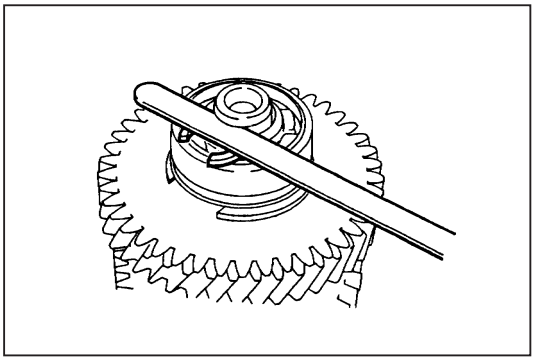
16. Press the radial ball bearing, using the following SST.
    SST: 09310-87301-000

    NOTE:
    - Make sure that the radial ball bearing having a seal faces toward the front.



JMT00102-00086

17. Selection sequence of new shaft snap ring
    (1) For the selection procedure of the shaft snap ring, refer to the step 11 at page MT–35.



JMT00103-00087

    (2) Ensure that the end play conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

Unit: mm

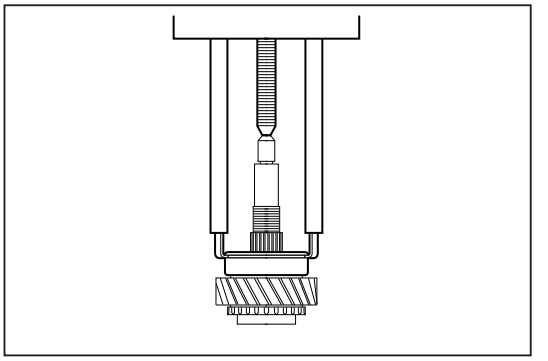
Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20279	2.06	None	90045-20283	1.90	Brown
90045-20280	2.02	Brown	90045-20284	1.86	Blue
90045-20281	1.98	Blue	90045-20285	1.82	None
90045-20282	1.94	None	90045-20286	1.78	Brown

JMT00104-00000

OUTPUT SHAFT

DISASSEMBLY

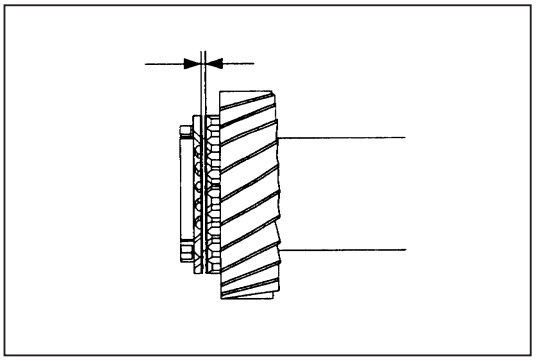
1. Remove the radial ball bearing (for rear), using the following SST.
   SST: 09306-87602-000


JMT00105-00088

INSPECTION

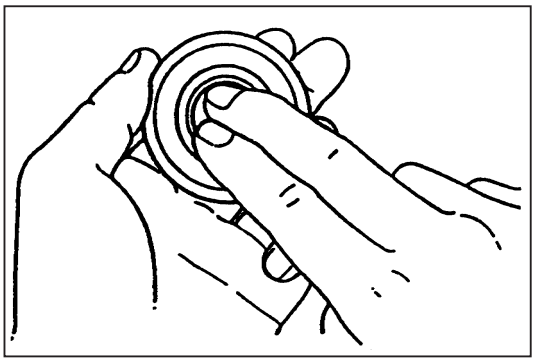
1. Check the clearance between the synchronizer ring and gear tapered section.

Specified Value	0.95 - 1.35 mm


JMT00106-00089

2. Visually inspect the gear and spline section of the output shaft for wear and damage.

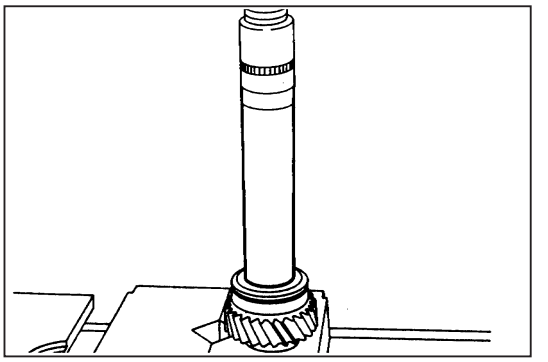
3. When you rotate the rear and center of the radial ball bearing inner race with your fingers, as shown in the right figure, they should be rotated smoothly without any bindings.


JMT00107-00090

ASSEMBLY

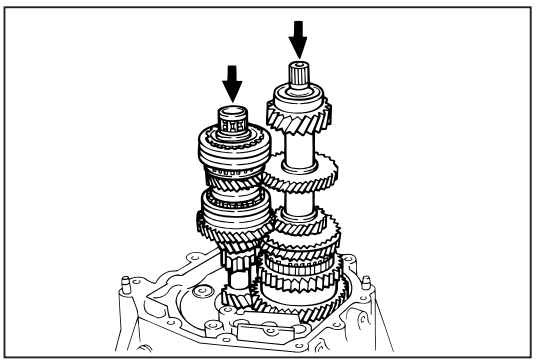
1. Press the inner race of the radial ball bearing.
   - Ensure that the retaining section of the radial ball bearing faces toward the rear side.

   NOTE:
   - The radial ball bearing can be pressed by using either the SST (09310-87302-000) or a pipe with which the inner race can be pressed.


JMT00108-00091

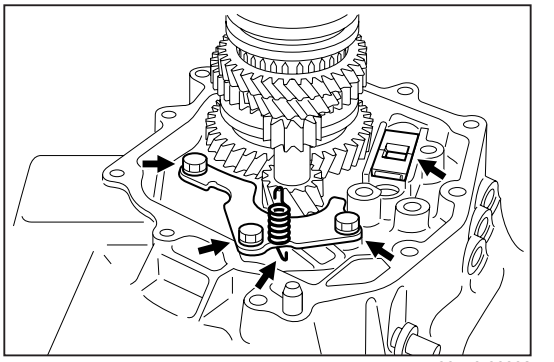
INSTALLATION

1. While holding both the input shaft and counter gear assemblies by your hands, install them to the clutch housing.
   NOTE:
   - Be careful not to damage the Type S oil seal during the installation of the shafts.

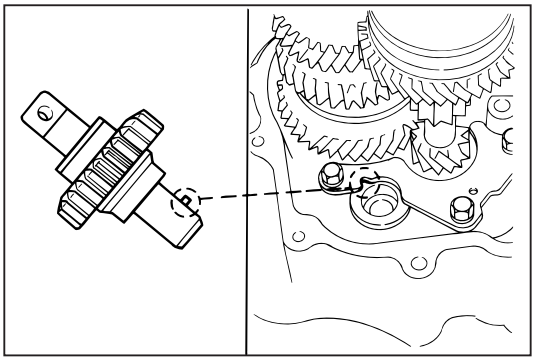

JMT00109-00092

2. Attach the tension spring to the input shaft bearing lock plate.
3. Tighten the input shaft bearing lock plate with the three bolts.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

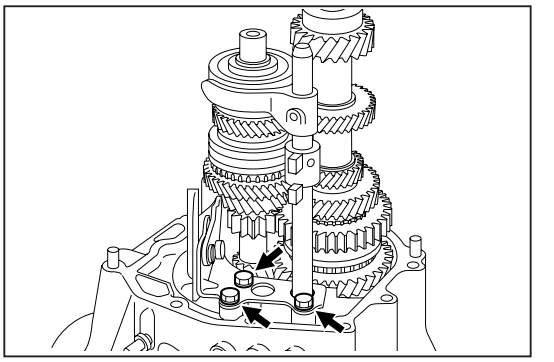
4. Place the two pieces of the shift lock plates on the clutch housing side.


JMT00110-00093

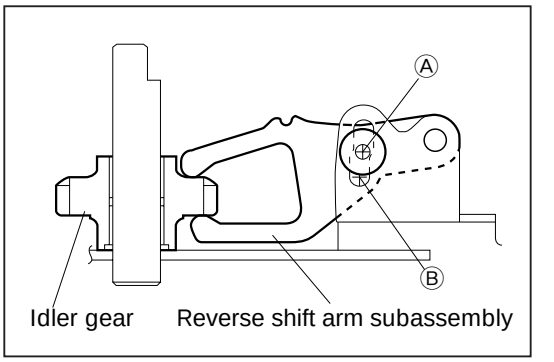
5. Assemble the reverse idler gear, shaft and thrust washer to the clutch housing.
   NOTE:
   - When installing, install the knock pin for use in preventing rotation of the idler gear shaft to the groove section at the clutch housing side.
   - Make sure that the gear chamfer and thrust washer (nylon) face upward (i.e. rear side).


JMT00111-00094

6. Tighten the reverse shift arm with the three bolts.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

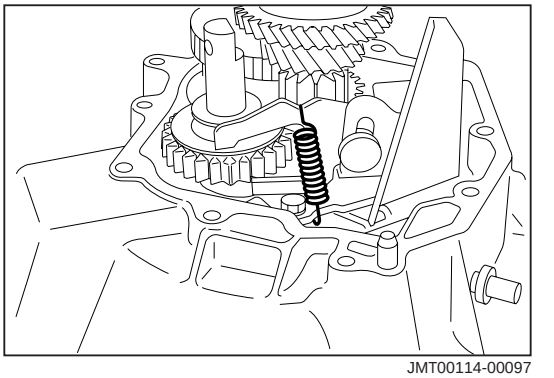

JMT00112-00095

7. Check of reverse shift arm for movement
   With the idler gear pushed against the lower edge surface, check that the pin moves freely (drops by its own weight) between the position Ⓐ (neutral position) to the position Ⓑ (5th gear position).



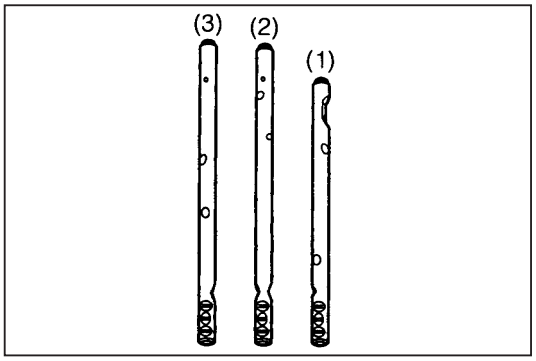
JMT00113-00096

8. Assemble the tension spring.
   NOTE:
   - Attach the spring to the recessed section of the arm subassembly.


JMT00114-00097

CONFIRMATION OF LENGTH/SHAPE OF SHIFT FORK AND SHIFT FORK SHAFT

9. The following three shift fork shafts differ in the overall length, as shown in the right figure.
   NOTE:
   - Be very careful not to make any wrong installation of these shift fork shafts.

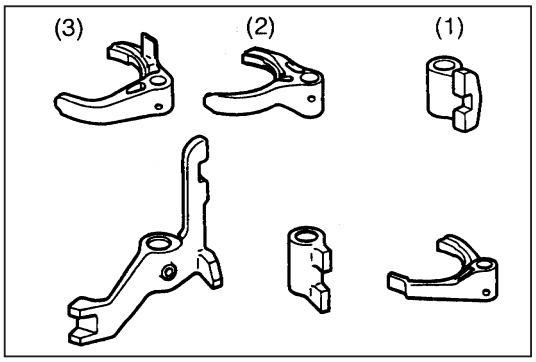


JMT00115-00098

Unit: mm

	Shift fork shafts	Overall Length
(1)	1st & 2nd	224.00
(2)	3rd & 4th	259.00
(3)	5th & Reverse	265.00

10. The shift forks and shift heads differ in the external view, as shown in the right figure. Hence, be very careful not to make any wrong installation of these shift forks and shift heads.
    (1) 1st & 2nd
    (2) 3rd & 4th
    (3) 5th & Reverse
    NOTE:
    - It is advisable to install the shift fork shaft and fork temporarily and confirm that the combination and direction are right. Then, proceed to the operation.

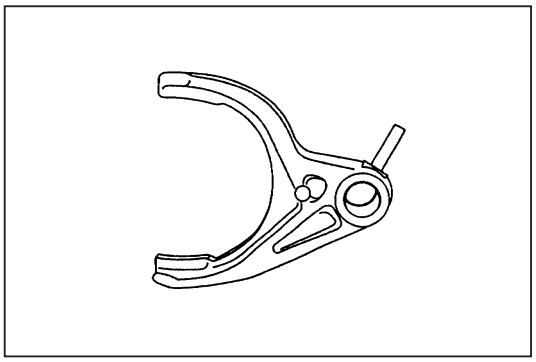


JMT00116-00099

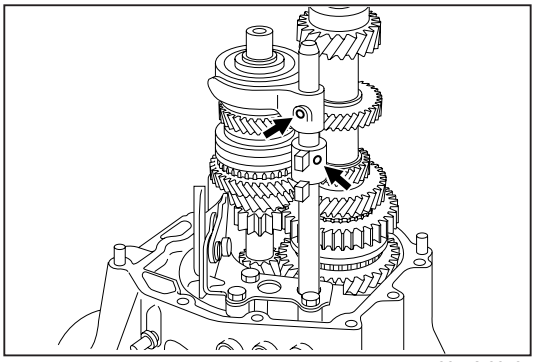
INSTALLATION TO SHIFT FORK AND SHIFT FORK SHAFT

- Apply gear oil to the required points. Perform the operations, following the procedure given below.

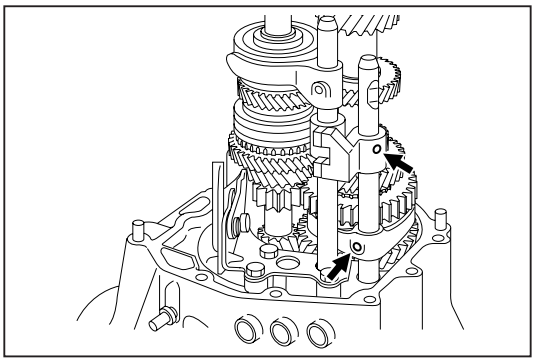
11. Temporarily drive a new slotted spring pin into all of the shift forks and heads so that the slotted spring pin may be driven easily during installation.


JMT00117-00100

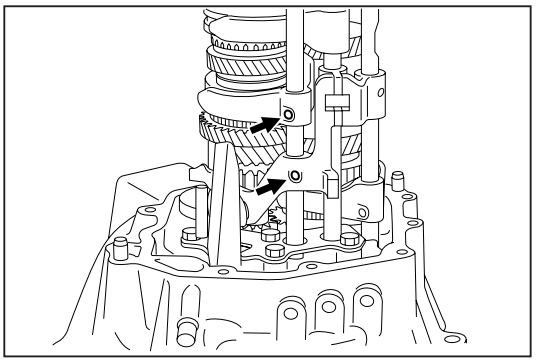
12. Install the 3rd & 4th shift fork into the hub sleeve and insert the 3rd & 4th shift fork shaft.
    NOTE:
    - Make sure that the gear is in the neutral position.
    - In order to drive a new slotted spring pin smoothly, it is advisable to prepare a guide pin whose outer diameter is 4.0 mm and whose length is 50.00 mm.
    - Perform the operations, while confirming the assembling direction of the shift fork and shift head and the positional relationship with the gears.
    - As for the shapes and lengths of the shift fork shaft, shift fork and shift head, refer to the steps 9 and 10 at page MT–39.
    - When driving a new slotted spring pin into position, a measure to sustain the reaction force against the driving force should be taken at the opposite side of the shift fork shaft.


JMT00118-00101

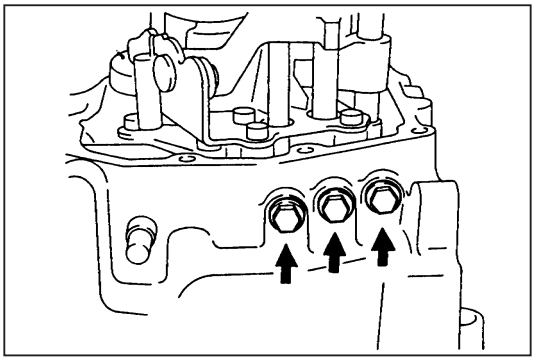
13. Insert a guide pin or the like into the back side groove of the shift fork, as the guide of installation for the slotted spring pin.
14. Install a new slotted spring pin.
15. In the same manner as described in the steps 12 and 13, insert the 3rd & 4th shift head.
16. Install the 1st & 2nd shift fork into the hub sleeve and insert the 1st & 2nd shift fork shaft.
17. As for the installation of 1st & 2nd shift fork and shift head, refer to the steps 12 and 13 described above.


JMT00119-00102

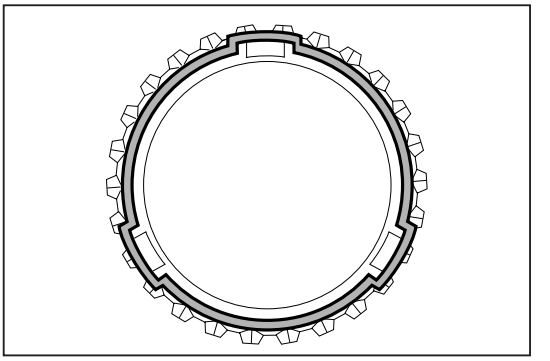
18. Insert the 5th & reverse shift head into the shift fork shaft.
19. As for the installation of the 5th & reverse shift fork and shift head, refer to the steps 12 and 13 described above.


JMT00120-00103

20. Install the three balls and compression springs and tighten the three bolts with a new gasket interposed.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)

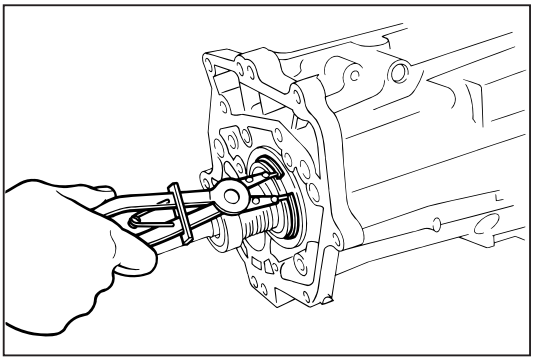

JMT00121-00104

21. Place the output shaft with the needle roller bearing, synchronizer ring and wave spring.
    NOTE:
    - Make sure to assemble the wave spring according to the convex shape of the synchronizer ring. (See the right figure.)



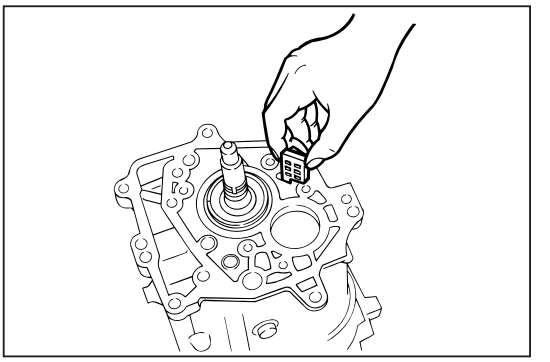
JMT00122-00105

22. Assemble the output shaft in the transmission case. Install the hole snap ring by means of a snap ring expander.



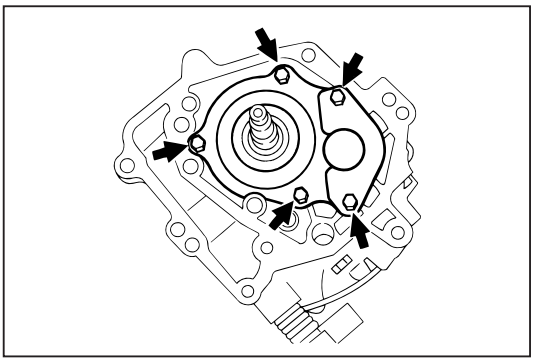
JMT00123-00106

23. Assemble the transmission magnet.



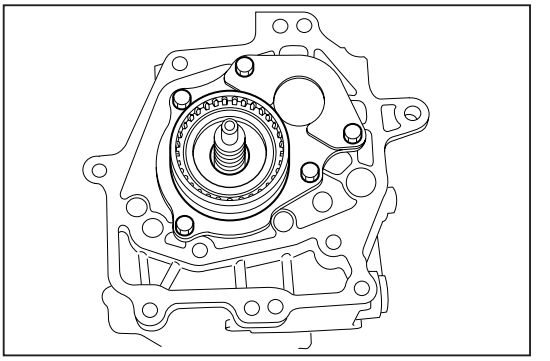
JMT00124-00107

24. Install the rear bearing retainer. Tighten the retainer with the five bolts.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)



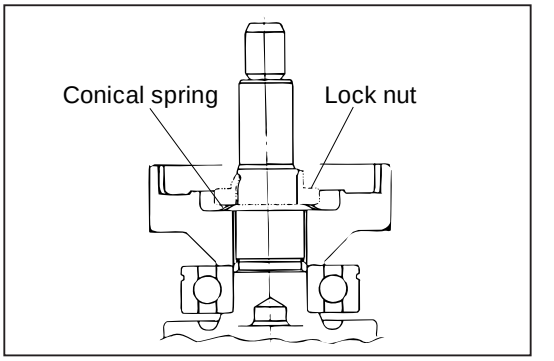
JMT00125-00108

25. Assemble the transfer input hub.



JMT00126-00109

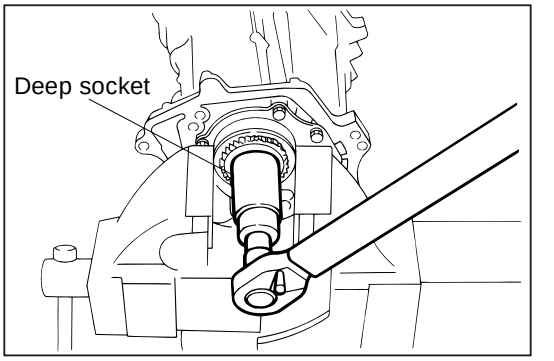
26. With the smaller diameter end placed at the nut side, assemble the conical spring.
    NOTE:
    - Make sure that the conical spring is assembled in the correct direction.



JMT00127-00110

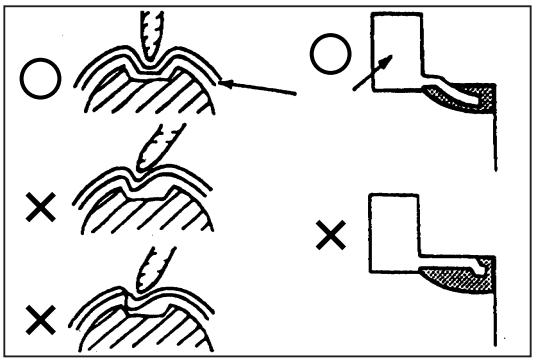
27. Insert a deep socket into the output shaft.
    [Reference]
    - Deep socket dimensions (Tool commercially available)
      Width across flats: 32 mm × Overall length: 100 mm

28. Using soft jaws, clamp the periphery of the transfer input hub in a vice so as to avoid damaging the hub.
    Tighten a new lock nut with a torque wrench.
    Tightening Torque: 176.4 - 215.8 N·m
    (18.0 - 22.0 kgf-m)

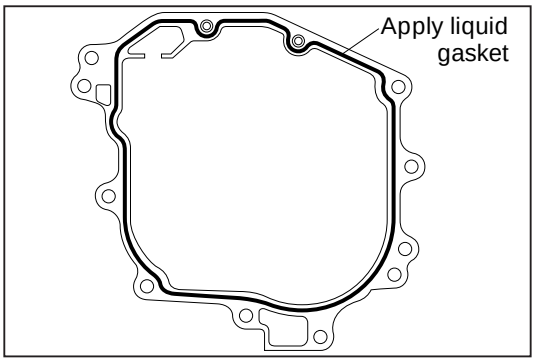


JMT00128-00111

29. Stake the new lock nut.
    NOTE:
    - When staking the new lock nut, point a suitable staking tool toward the output shaft axis center to lock securely, as shown in the right upper figure.
    - Poor staking, such as shown in the right middle and lower figures, may cause loosening of the lock nut.


JMT00129-00112

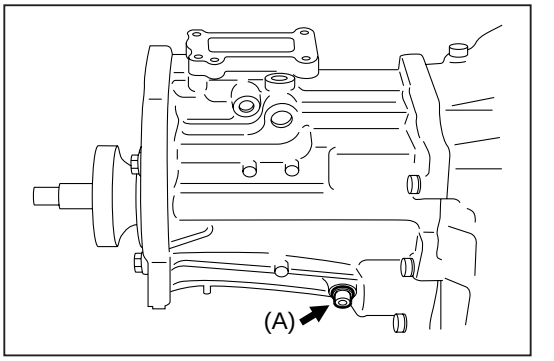
30. Clean the contact surface between the clutch housing and the transmission case side, using solvent or the like.
31. Apply the following bond to the transmission case surface as shown in the right figure.
    Specified Bond: Three bond® 1216 or 1217
    [Reference information]
    Nozzle Inner Diameter: 0.9 mm



JMT00130-00113

32. Quickly install the transmission case.
33. Tighten the ten bolts between the transmission case side and the clutch housing side.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

34. With a new gasket interposed, tighten the hexagon bolt (A) for reverse idler gear shaft.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)



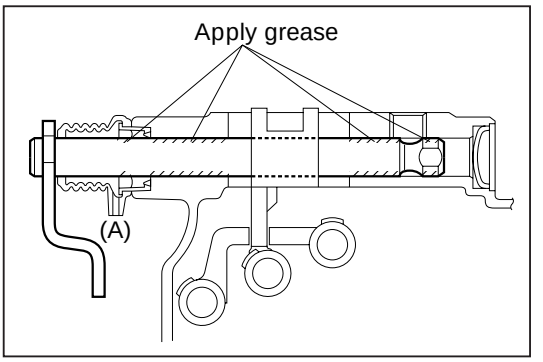
JMT00131-00114

35. Install the clutch related parts.

JMT00132-00000

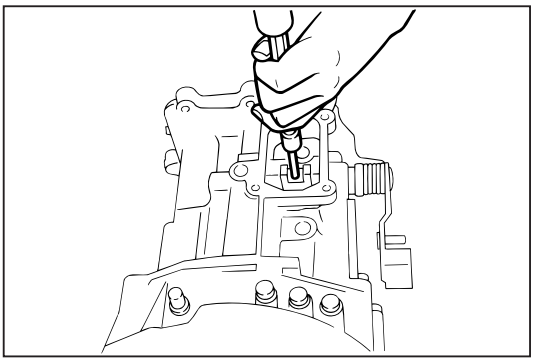
36. Install the shift lever boot and shift lever shaft correctly as shown in the right illustration.
CAUTION:
- Ensure that the air bleeding section (A) of the boot faces toward the lower side.

NOTE:
- Apply MP grease to those points specified in the right figure.



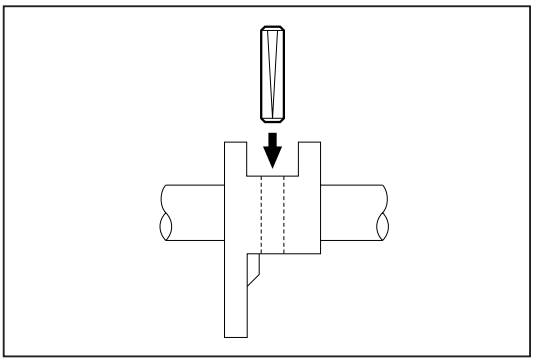
JMT00133-00115

37. Assemble the shift inner lever in the shift lever shaft sub-assembly. Drive a new grooved pin into position with a knock pin punch so that the shift inner lever may be secured.



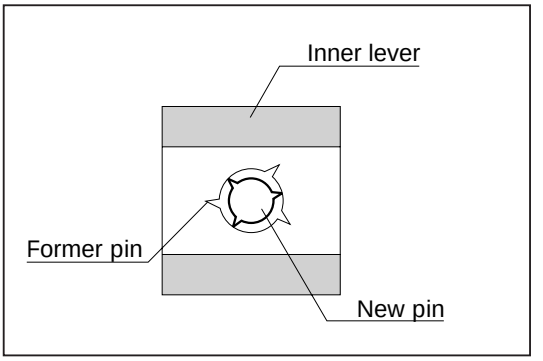
JMT00134-00116

NOTE:
- When driving a new grooved pin into position, the pin should be inserted from the smaller end of the taper.



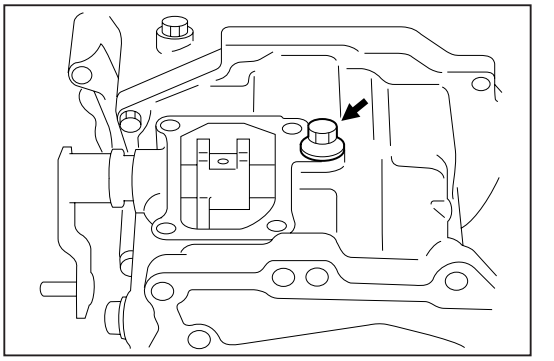
JMT00135-00117

NOTE:
- When driving the pin into position, be sure that the assembling is made in such a way that the installation angle is displaced from the trace of the former pin.



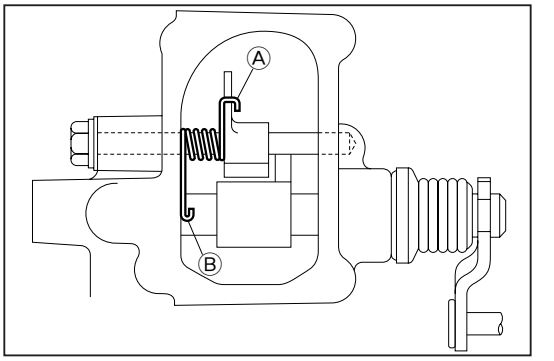
JMT00136-00118

38. Install the ball and compression spring and tighten the reverse restrict pin holder (B) with a new gasket interposed.
    Tightening Torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)



JMT00137-00119

39. Assemble the torsion spring, reverse restrict cam and reverse restrict shaft in the transmission case in this sequence.
    NOTE:
    - Make sure to attach the torsion spring securely at the two points of the cam (the section Ⓐ and the shift lever shaft (the section Ⓑ).

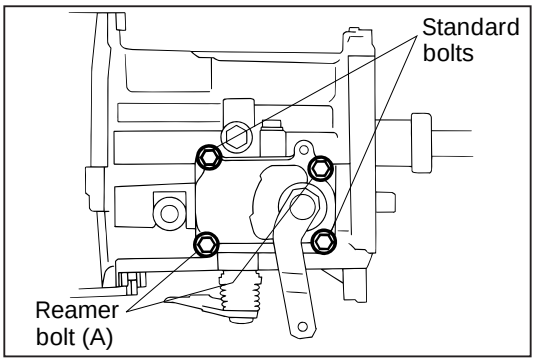


JMT00138-00120

40. Install and tighten the washer based head hexagon bolt with a new gasket used.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)

41. With a new gasket interposed, tighten the select lever shaft subassembly with the four bolts.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

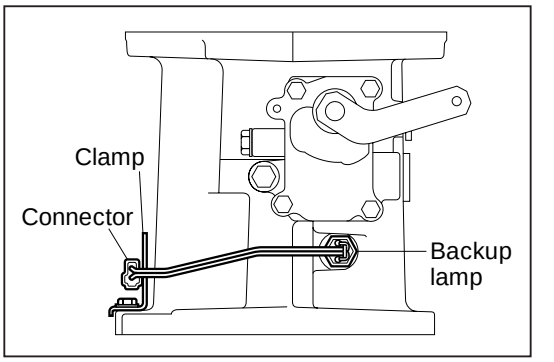
    NOTE:
    - Ensure that the reamer bolts (A) are placed as shown in the right figure.



JMT00139-00121

42. Install and tighten the backup lamp switch assembly with a new gasket used.
    Tightening Torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)

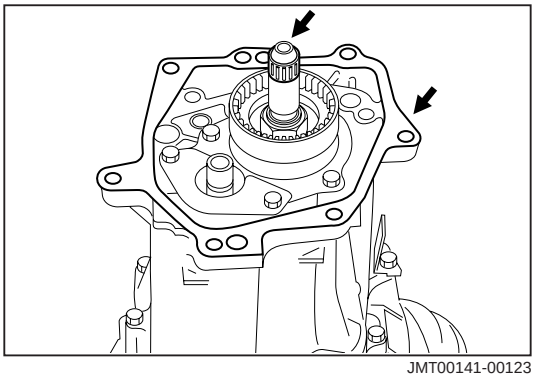
    NOTE:
    - Install the connector, using the drilled hole of the clamp.



JMT00140-00122

INSTALLATION OF TRANSFER ASSEMBLY

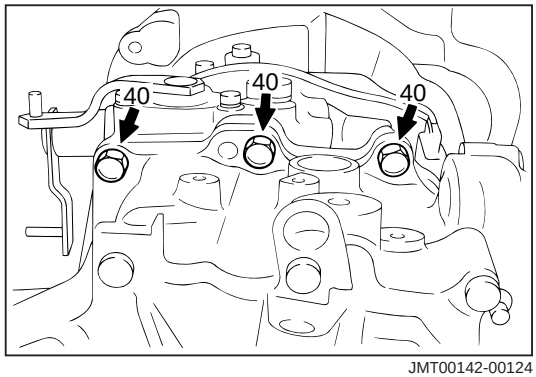
1. Install a new extension housing gasket to the rear edge surface of the transmission case.
2. Install the needle roller bearing to the forward end of the transmission output shaft.



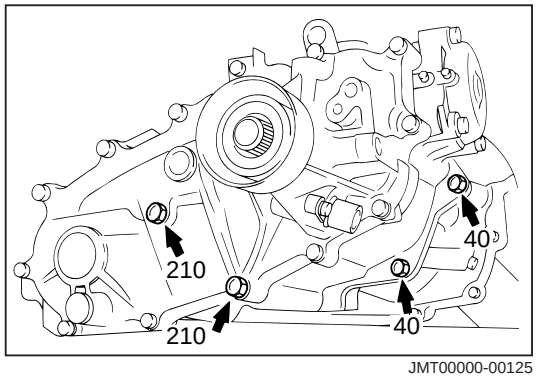
JMT00141-00123

3. Install and tighten the transfer assembly with the seven bolts.
   Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)

   NOTE:
   - The numeral in the right figure denotes the nominal length of each bolt. (Unit: mm)



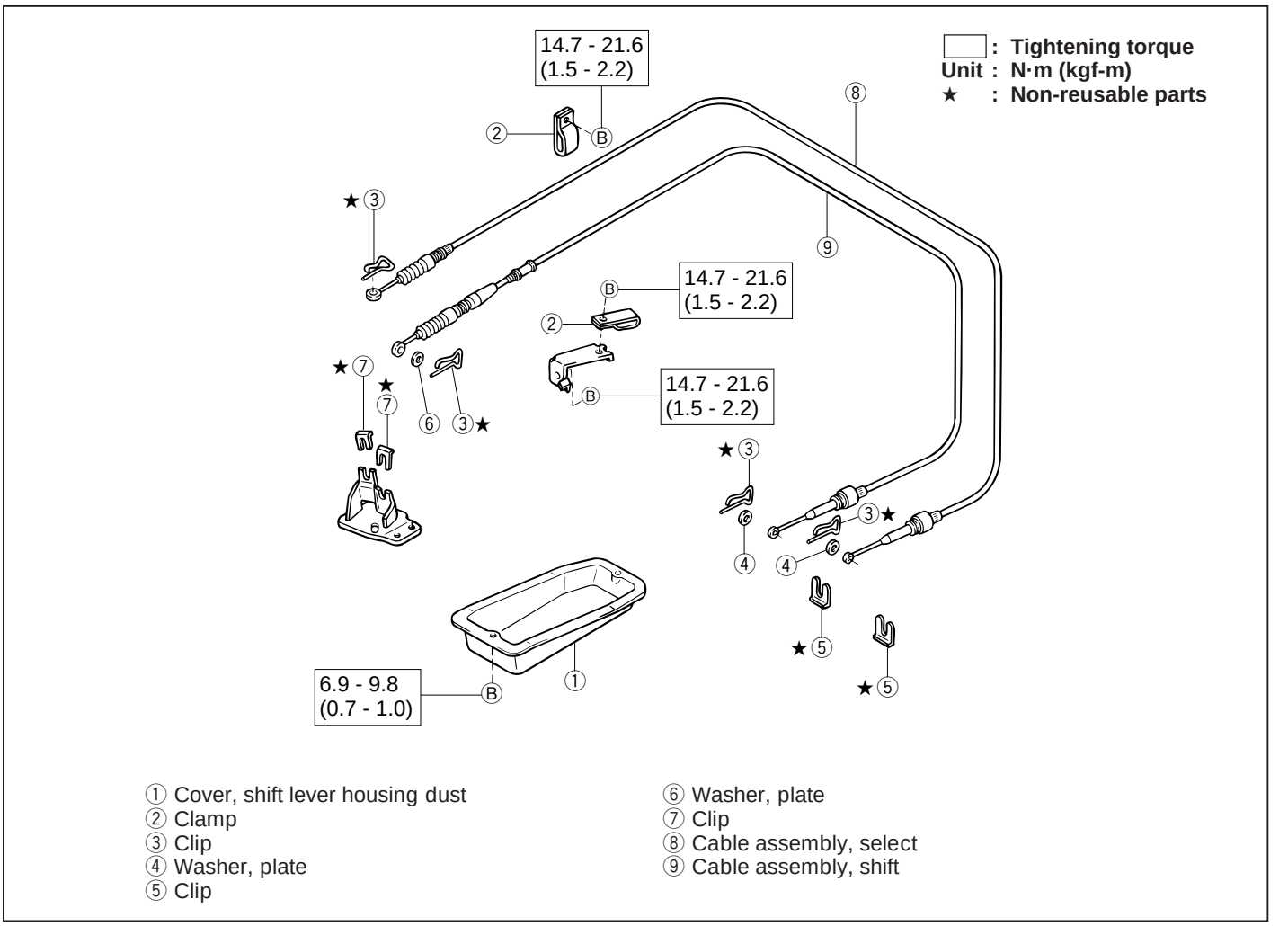
JMT00142-00124



JMT00000-00125

INSTALLATION/REMOVAL OF SHIFT CABLE & SELECT CABLE

COMPONENTS



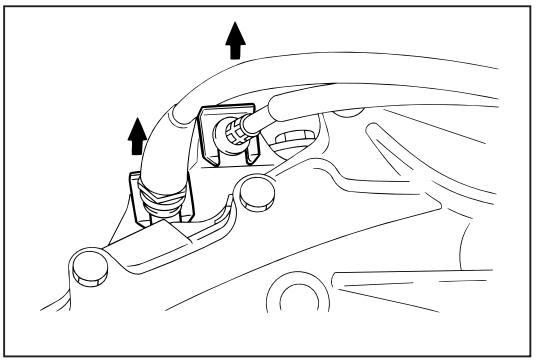
JMT00143-00126

1. MAIN POINTS OF REMOVAL

(1) Detach each clip with pliers or the like.

NOTE:

- Care must be exercised to ensure that the pliers, etc. will not touch with the cable section during the removal.

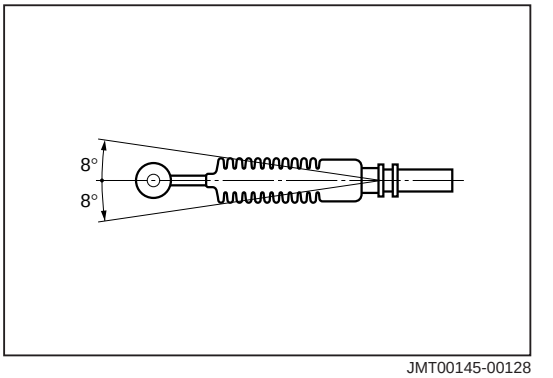


JMT00144-00127

(2) Remove the select cable assembly and shift cable assembly.

NOTE:

- Do not allow the ends of the shift and select cables to be bent beyond 8 degrees.

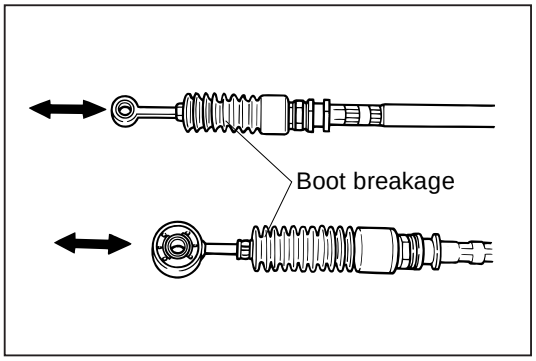


JMT00145-00128

2. CHECK

(1) Check that the inner cables of the shift cable and select cable slide smoothly.

(2) Check for boot breakage, other damage or distortion.



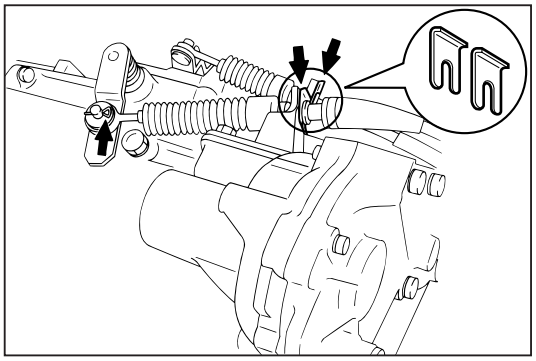
JMT00146-00129

3. MAIN POINTS OF INSTALLATION

(1) Insert the clips ⑤ and ⑦ until their upper edges become flush with the upper edges of the bracket or the retaining surface of the floor shift assembly.

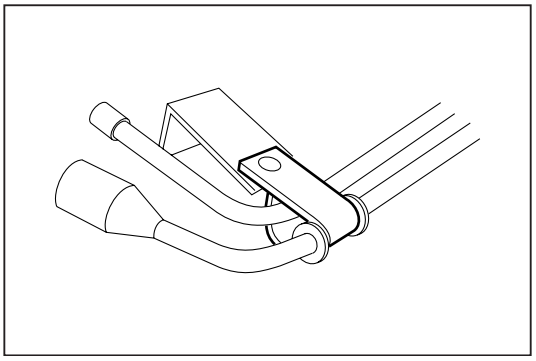
NOTE:

- Install the clips after the eye end has been installed first.
- Make sure that the clips are inserted in the correction direction as indicated in the figure. Never insert them reversely.
- Never allow a hammer, etc. to tap the cable during the clip installation. (If the cable should be tapped inadvertently, be certain to replace the cable with a new one.)



JMT00147-00130

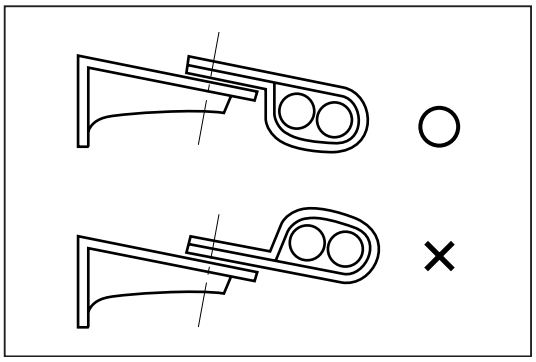
(2) When the shift cable is retained to the clamp ②, retain it to the H-shaped protector section of the shift cable.



JMT00159-00136

NOTE:

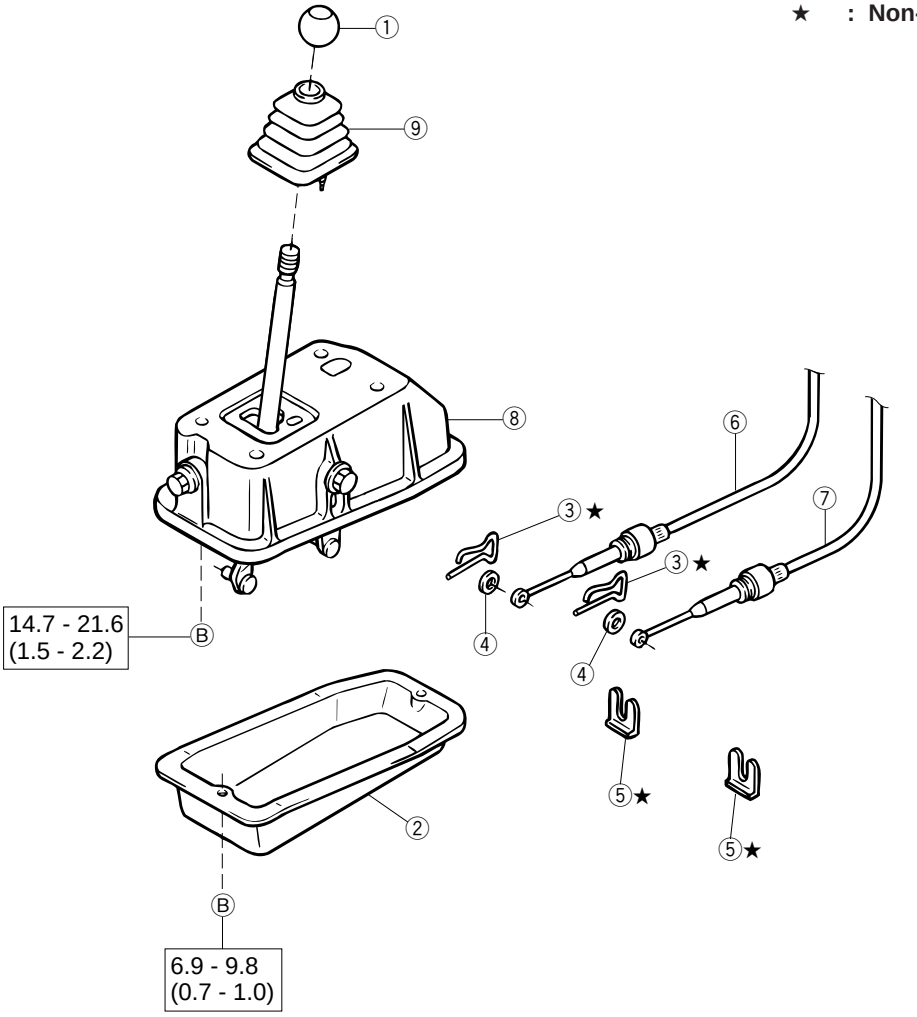
- Care should be taken as to the correct direction of the clamp ②. (For the correct direction, see the right figure.)



JMT00160-00137

INSTALLATION/REMOVAL OF TRANSMISSION FLOOR SHIFT ASSEMBLY

COMPONENTS



① Knob, shift lever
② Cover, shift lever housing dust
③ Clip
④ Washer, plate
⑤ Clip
⑥ Cable assembly shift
⑦ Cable assembly select
⑧ Floor shift assembly, transmission
⑨ Boot, shift & select lever

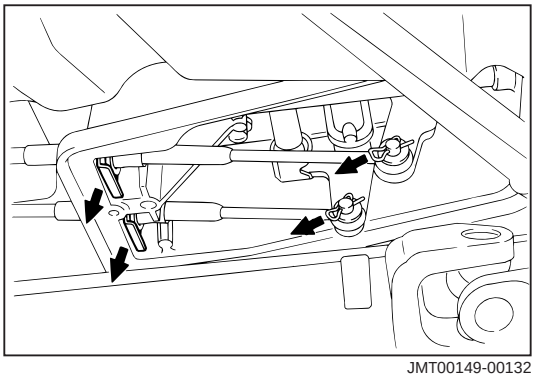
JMT00148-00131

1. MAIN POINTS OF REMOVAL

(1) Detach the clips ③ and ⑤, two each, with pliers or the like.

NOTE:

- Care must be exercised to ensure that the pliers, etc. will not touch with the cable section during the removal.

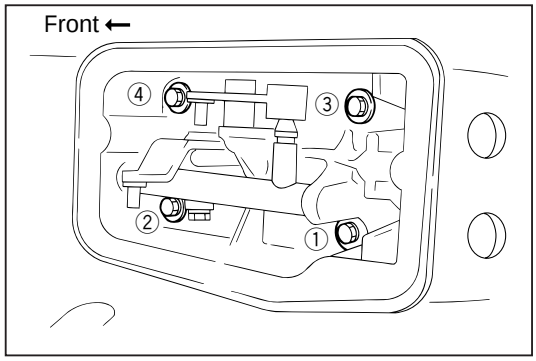


JMT00149-00132

2. MAIN POINTS OF INSTALLATION

(1) Tighten the floor shift assembly with the attaching bolts.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

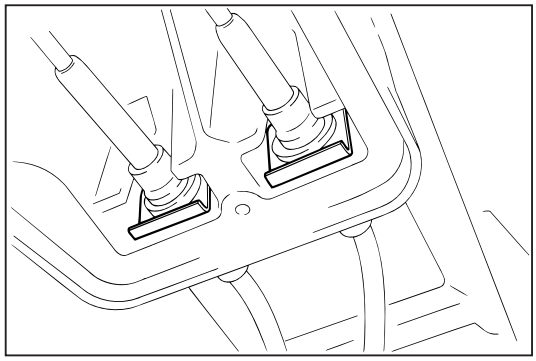
NOTE:
- Be certain to tighten the attaching bolts in the sequence specified in the right figure.



JMT00150-00133

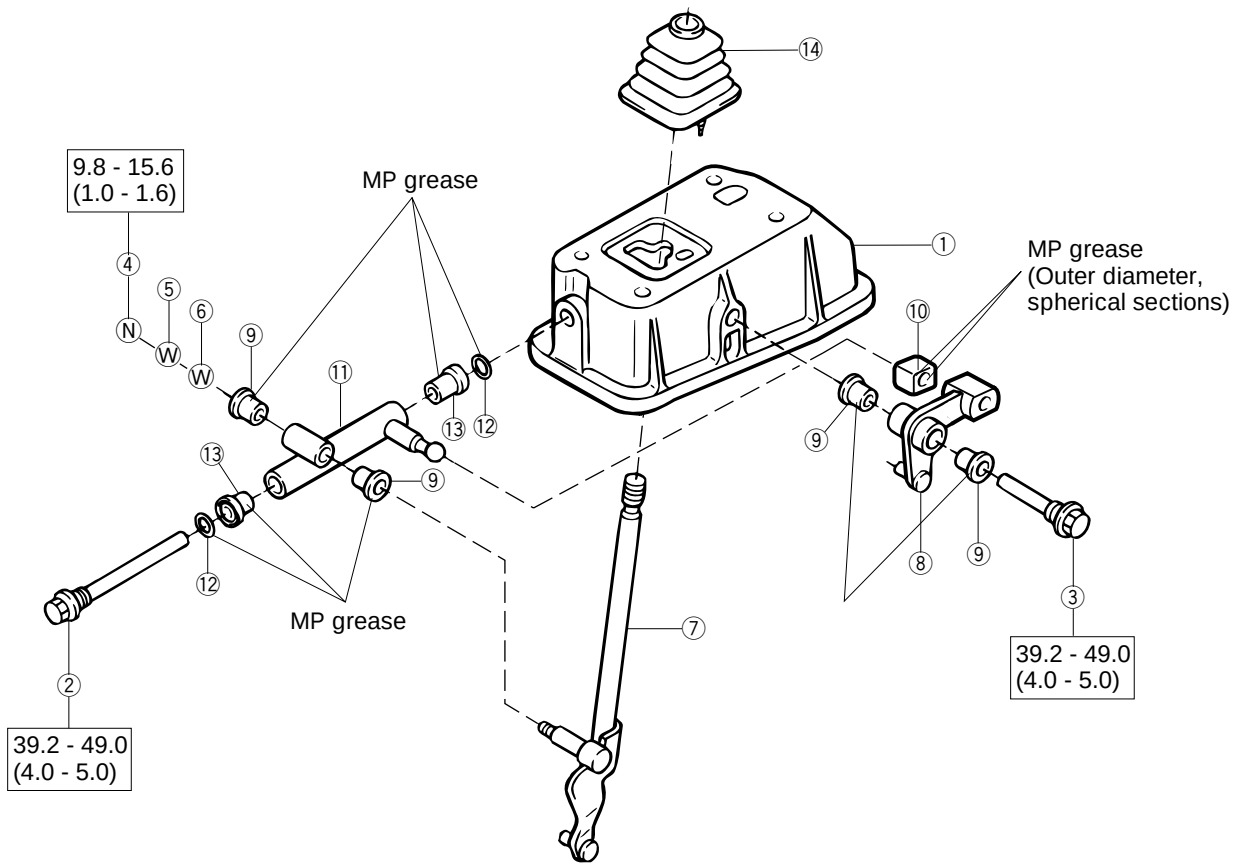
(2) Install the shift cable assembly and select cable assembly in the floor shift assembly. Secure them by means of the clips.

NOTE:
- Make sure that the clips are inserted in the correction direction as indicated in the figure. Never insert them reversely.
- Never allow a hammer, etc. to tap the cable during the clip installation.
- Insert the clips until they become flush with the lower edges of the cable retaining surface.
- Install the clips after the eye end has been installed first.


JMT00151-00134

DISASSEMBLY/ASSEMBLY OF TRANSMISSION FLOOR SHIFT ASSEMBLY

COMPONENTS



① Support, control link
② Bolt, washer based head hexagon
③ Bolt, washer based head hexagon
④ Nut
⑤ Washer, spring
⑥ Washer, plate
⑦ Lever subassembly, shift
⑧ Lever subassembly, control select
⑨ Bush
⑩ Guide, control select lever
⑪ Holder subassembly, shift lever
⑫ Ring, O
⑬ Bush
⑭ Boot, shift lever

JMT00152-00135

1. OPERATION PRIOR TO DISASSEMBLY

(1) Remove the transmission floor shift assembly.

2. MAIN POINTS OF ASSEMBLY

(1) Uniformly apply MP grease to the outer diameter and spherical section of the control select lever guide ⑩, the sliding sections of the bushes ⑨ and ⑬, and the O-ring ⑫.

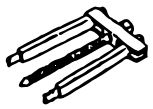
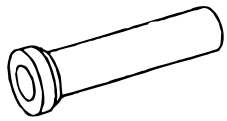
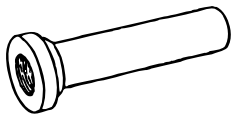
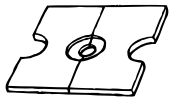
3. OPERATION AFTER ASSEMBLY

(1) Install the transmission floor shift assembly.

JMT00153-00000

APPENDIX

SSTs (Special Service Tools)

Shape	Part No.	Part name
	09306-87602-000	Counter gear front bearing puller
	09310-87301-000	Counter shaft front bearing replaer
	09310-87302-000	Counter shaft rear bearing replacer
	09334-87301-000	Transmission rear bearing anvil
	09350-32014-000	TOYOTA Automatic transmission tool set
	09606-87201-000	Front hub bearing remover & replacer
	09950-20017-000	Universal puller

JMT00154-00000

SERVICE SPECIFICATIONS

Unit: mm

			Specified Value	Allowable Limit
Free length of compression spring for reverse restrict pin	Free length		24.00	—
	Load as installed: N (kgf)		28.83 (2.43)	—
	Height as installed:		17.00	—
Free length of compression spring for shift fork shaft	Free length		40.00	—
	Load as installed: N (kgf)		47.33 (4.83)	—
	Height as installed:		30.00	—
Diameter	Outer	Reverse idler gear shaft	$20.0^{+0}_{-0.013}$	—
	Inner	Reverse idler shaft	$20.0^{+0.061}_{+0.032}$	—
Dimensions	Outer	Select inner lever	$15^{-0.02}_{-0.12}$	—
	Inner	Shift inner lever	$15.0^{+0.2}_{+0.1}$	—
	Outer	Shift fork shafts	$13.0^{-0.050}_{-0.077}$	—
	Inner	Case sides	$13.0^{+0.043}_{+0}$	—
	Outer	Shift inner lever	$12^{-0.02}_{-0.12}$	—
	Inner	Shift heads	$12.1^{+0.1}_{+0}$	—
	Outer	Reverse restrict shaft	$8^{-0.065}_{-0.090}$	—
	Inner	Reverse restrict cam	$8^{+0.16}_{+0.07}$	—
Clearance between scynchronizer ring and gear			0.9 - 1.4	0.5

JMT00155-00000

AT THE INPUT SHAFT SIDE

Unit: mm

				Specified Value	Allowable Limit
Contact width section between shift forks and synchronizer No. 2 & No. 3 hub sleeves		Shift forks	3rd & 5th	$7\ ^{-0.1}_{-0.3}$	6.6
		Hub sleeves	3rd & 5th	$7\ ^{+0.12}_{+0.05}$	7.2
Thrust clearance			3rd	0.10 - 0.52	—
			5th	0.10 - 0.40	—
Clearance between synchronizer rings and gears				0.95 - 1.35	0.90
Outer diameter of input shaft			(A) and (B)	$32\ ^{-0.009}_{-0.029}$	—
			(C)	$20\ ^{-0.016}_{-0.034}$	—
Dimensions	Outer diameter of hubs	Classification	Identification	—	—
		No. 2	Yellow	57.78 - 57.84	—
		No. 1	None	57.68 - 57.74	—
		No. 3	White	57.58 - 57.64	—
	Inner diameter of hub sleeves	No. 2	Yellow	57.871 - 57.97	—
		No. 1	None	57.771 - 57.87	—
		No. 3	White	57.67 - 57.77	—
Thickness of synchronizer hubs			No. 2	18.55 ± 0.03	—
			No. 3	12.40 ± 0.03	—
Thickness of transmission hub sleeve stopper				$7.2\ ^{+0.05}_{-0.01}$	—
Dimensions		Inner diameter	3rd and 5th gears	$37.0\ ^{+0.025}_{+0}$	
		Thickness	3rd gear	37.95 ± 0.03	—
			5th gear	27.85 ± 0.03	—
Height of synchromesh shifting key				$5\ ^{-0.2}_{-0.4}$	—
End play between the snap ring shaft and input shaft				0	Less than 0.16

JMT00156-00000

AT THE COUNTER SHAFT SIDE

Unit: mm

				Specified Value	Allowable Limit
Contact width section between the synchronizer No. 1 hub sleeve and 1st/2nd shift fork			Hub sleeve	10 $^{+0.12}_{+0.05}$	10.2
			Shift fork	10 $^{-0.1}_{-0.3}$	9.6
Thrust clearance between gear and counter shaft			1st	0.10 - 0.52	—
			2nd	0.10 - 0.40	—
Height of shifting key				5.1 ± 0.1	—
Outer diameter of countershaft (A) and (B)				32 $^{-0.009}_{-0.029}$	—
Thickness of 1st gear thrust washer				4 ± 0.03	—
Dimensions	Outer diameter of synchronizer No. 1 hub	Classification	Identification	—	—
		No. 2	Yellow	69.78 - 69.84	—
		No. 1	None	69.68 - 69.74	—
		No. 3	White	69.58 - 69.64	—
	Inner diameter of synchronizer No. 1 hub sleeve	No. 2	Yellow	69.871 - 69.97	—
		No. 1	None	69.771 - 69.87	—
		No. 3	White	69.67 - 69.77	—
Dimensions		Inner	1st and 2nd gear	37.0 $^{+0.025}_{+0}$	—
		Thickness	1st	27.34 ± 0.03	—
			2nd	36.30 ± 0.03	—
Height of conical spring washer				2.01	1.04
End play between the snap ring shaft and countershaft					Less than 0.16

JMT00157-00000

TIGHTENING TORQUE

Tightening components	N·m	kgf-m
Engine × Clutch housing	49.0 - 68.6	5.0 - 7.0
Stiffener right × Engine, Clutch housing	29.4 - 44.1	3.0 - 4.5
Stiffener left × Engine, Clutch housing	29.4 - 44.1	3.0 - 4.5
Clutch housing undercover × Clutch housing	14.7 - 21.6	1.5 - 2.2
Stiffener plate bracket × Powertrain stiffener	29.4 - 44.1	3.0 - 4.5
Powertrain stiffener × Transfer case	29.4 - 44.1	3.0 - 4.5
Lock nut × Output shaft	176.4 - 215.8	18.0 - 22.0
Reverse restrict pin holder × Transmission case	29.4 - 49.0	3.0 - 5.0
Transmission case cover × Transmission case	14.7 - 21.6	1.5 - 2.2
Bolt for reverse restrict shaft × Transmission case	18.6 - 30.4	1.9 - 3.1
Clutch housing × Transmission case	14.7 - 21.6	1.5 - 2.2
Input shaft bearing lock plate × Clutch housing	14.7 - 21.6	1.5 - 2.2
Reverse shift arm × Clutch housing	14.7 - 21.6	1.5 - 2.2
Bolt for shift fork shaft × Clutch housing	18.6 - 30.4	1.9 - 3.1
Rear bearing retainer × Transmission case	14.7 - 21.6	1.5 - 2.2
Washer based head hexagon × Transmission case	18.6 - 30.4	1.9 - 3.1
Backup lamp switch assembly × Transmission case	24.5 - 39.2	2.5 - 4.0
Breather plug × Clutch housing	14.7 - 21.6	1.5 - 2.2
W/head straight screw plug × Transmission case	24.5 - 39.2	2.5 - 4.0
Transfer assembly × Transmission case	29.4 - 44.1	3.0 - 4.5
Transmission control cable bracket × Transfer case	29.4 - 44.1	3.0 - 4.5
Control cable bracket × Transfer case	14.7 - 21.6	1.5 - 2.2
Control cable bracket × Clamp	14.7 - 21.6	1.5 - 2.2
Shift lever housing dust cover × Control link support	6.9 - 9.8	0.7 - 1.0
Control link support × Floor	14.7 - 21.6	1.5 - 2.2
Floor shift washer based head hexagon bolt	39.2 - 49.0	4.0 - 5.0
Floor shift nut	9.8 - 15.6	1.0 - 1.6

JMT00158-00000

TO INDEX

TO NEXT SECTION