

TRANSMISSION SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

CONTROL SYSTEMS**CS****MANUAL TRANSMISSION AND
DIFFERENTIAL****5MT****MANUAL TRANSMISSION AND
DIFFERENTIAL****6MT****MANUAL TRANSMISSION AND
DIFFERENTIAL (DIAGNOSTICS)****6MT(diag)****CLUTCH SYSTEM****CL****G1130BE5**

CONTROL SYSTEMS

CS

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General Description

CONTROL SYSTEMS

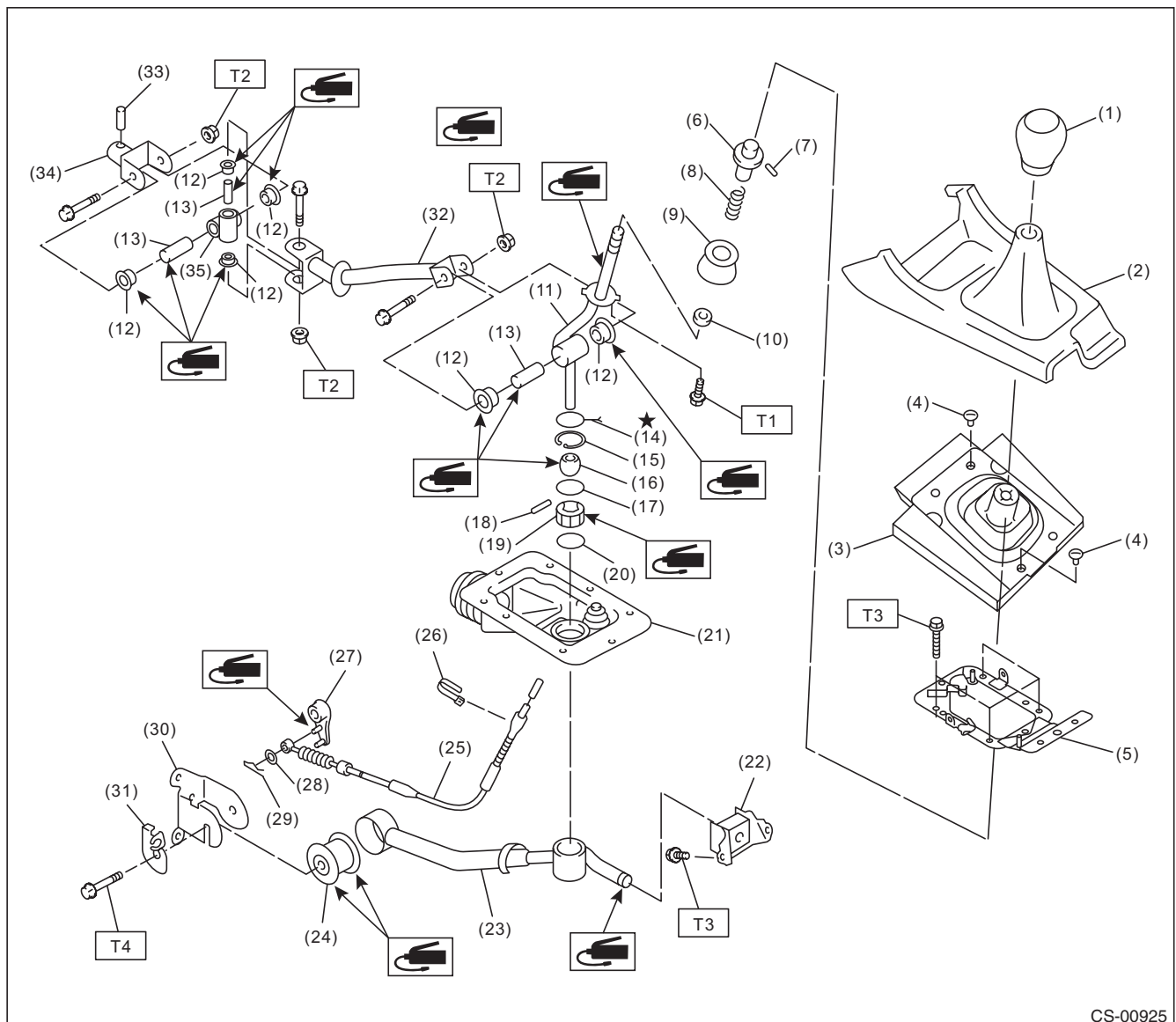
1. General Description

A: SPECIFICATION

Item		Specifications
Swing torque of rod against lever	N (kgf, lbf)	3.7 (0.38, 0.83) or less

B: COMPONENT

1. 6MT GEAR SHIFT LEVER



CS-00925

- | | | |
|-----------------------------|--------------------------|------------------|
| (1) Gear shift knob | (15) Snap ring | (29) Snap pin |
| (2) Console box front | (16) Bushing | (30) Bracket |
| (3) Boot and insulator ASSY | (17) O-ring | (31) Cable plate |
| (4) Clamp | (18) Spring pin | (32) Rod |
| (5) Plate COMPL | (19) Bushing | (33) Spring pin |
| (6) Slider | (20) O-ring | (34) Joint |
| (7) Spring pin | (21) Boot | (35) Boss |
| (8) Spring | (22) Cushion rubber | |
| (9) Holder | (23) Stay | |
| (10) Seat cushion | (24) Bushing | |
| (11) Lever | (25) Reverse check cable | |
| (12) Bushing | (26) Band clip | |
| (13) Spacer | (27) Reverse check lever | |
| (14) Lock wire | (28) Washer | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 1.3 (0.1, 1.0)

T2: 12 (1.2, 8.9)

T3: 18 (1.8, 13.3)

T4: 32 (3.3, 23.6)

CONTROL SYSTEMS

This exploded view diagram illustrates the assembly of a mechanical component, likely a pump or motor housing. The diagram includes the following parts and specifications:

- Part (1):** A small cap or plug.
- Part (2):** A larger housing or cover.
- Part (3):** Four screws used to secure the housing.
- Part (4):** A central component, possibly a pump head or impeller.
- Part (5):** A mounting bracket or base plate.
- Part (6):** A long shaft or rod.
- Part (7):** Multiple small pins or washers.
- Part (8):** A small circular component.
- Part (9):** A small circular component.
- Part (10):** A small circular component.
- Part (11):** A small circular component.
- Part (12):** A small circular component.
- Part (13):** A small circular component.
- Part (14):** A small circular component.
- Part (15):** A small circular component.
- Part (16):** A small pin or screw.
- Part (17):** A small pin or screw.
- Part (18):** A small pin or screw.
- Part (19):** Multiple small pins or washers.
- Part (20):** A small circular component.
- Part (21):** A small circular component.
- Part (22):** A small circular component.
- Part (23):** A small circular component.
- Part (24):** A small circular component.
- Part (25):** A small circular component.
- Part (26):** Multiple small pins or washers.

Torque Specifications:

- T1:** Indicated for parts (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), and (26).
- T2:** Indicated for parts (21), (22), (23), and (26).

Assembly Notes:

- Parts (16), (17), (18), (19), (20), (21), (22), (23), (24), (25), and (26) are marked with a star symbol, indicating they are critical components.
- Parts (7), (8), (9), (10), (11), (12), (13), (14), (15), (20), (21), (22), (23), (24), (25), and (26) are marked with a hand icon, indicating they are to be installed by hand.

- Tightening torque: N·m (kgf·m, ft·lb)**
T1: 12 (1.2, 8.9)
T2: 18 (1.8, 13.3)

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Before disconnecting electrical connectors, be sure to disconnect the negative terminal from battery.

MT Gear Shift Lever

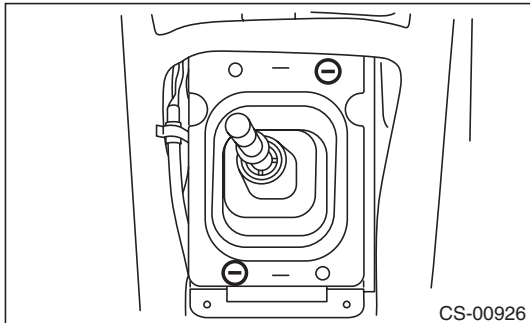
CONTROL SYSTEMS

2. MT Gear Shift Lever

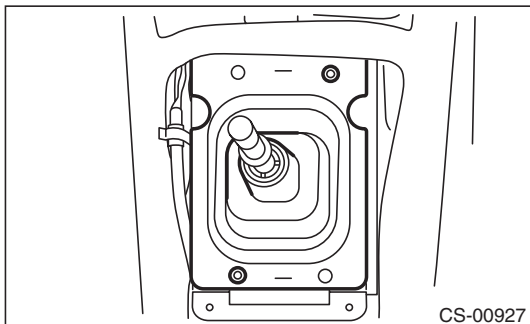
A: REMOVAL

1. STI MODEL

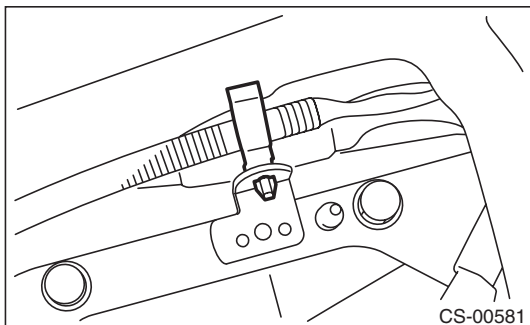
- 1) Disconnect the ground cable from battery.
- 2) Remove the gear shift knob.
- 3) Remove the console box. <Ref. to EI-51, REMOVAL, Console Box.>
- 4) Remove the console side cover and console front panel. <Ref. to EI-52, CONSOLE FRONT PANEL, REMOVAL, Center Console.>
- 5) Remove the clamp.



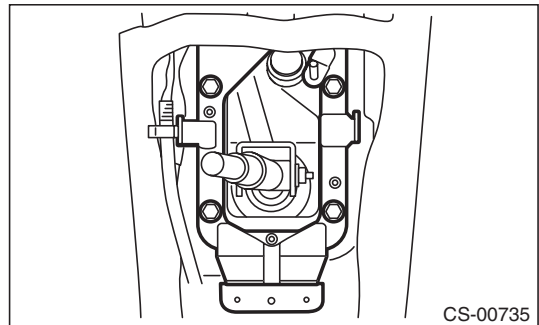
- 6) Remove the boot and insulator assembly.



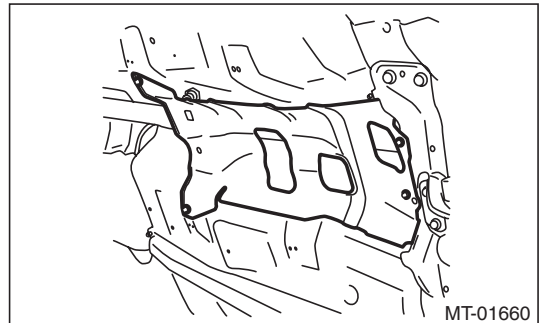
- 7) Remove the harness clamp from the plate COMPL.



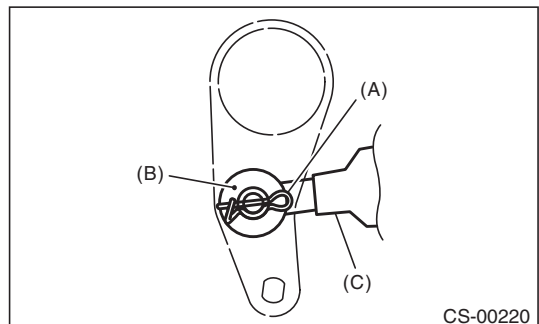
- 8) Remove the plate COMPL from the body.



- 9) Lift up the vehicle.
- 10) Remove the under cover.
- 11) Remove the center exhaust pipe. <Ref. to EX(STI)-8, REMOVAL, Center Exhaust Pipe.>
- 12) Remove the heat shield cover.



- 13) Remove the crossmember. <Ref. to 6MT-30, REMOVAL, Transmission Mounting System.>
- 14) Remove the snap pin and washer, and remove the reverse check cable from the reverse check lever.



- (A) Snap pin
- (B) Washer
- (C) Reverse check cable

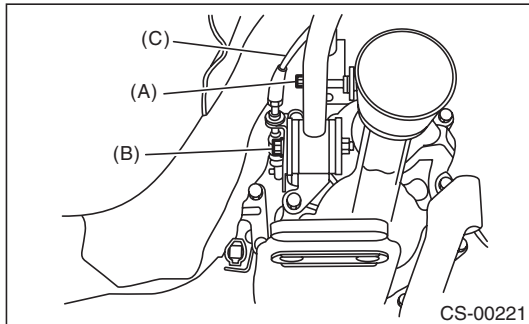
- 15) Move the transmission to the right side, and remove the joint COMPL, stay bolts and reverse check cable.

MT Gear Shift Lever

CONTROL SYSTEMS

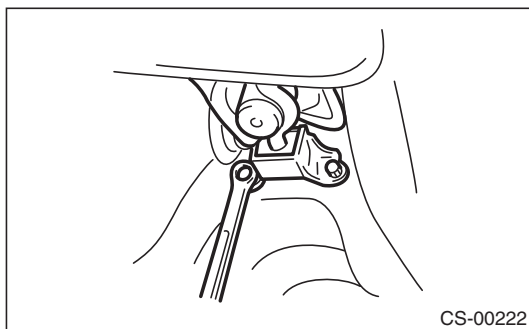
NOTE:

If the transmission is not moved aside, the joint COMPL and stay bolts may contact the body and cause damage.



- (A) Joint COMPL bolt
- (B) Stay bolt
- (C) Reverse check cable

16) Remove the cushion rubber from the body.

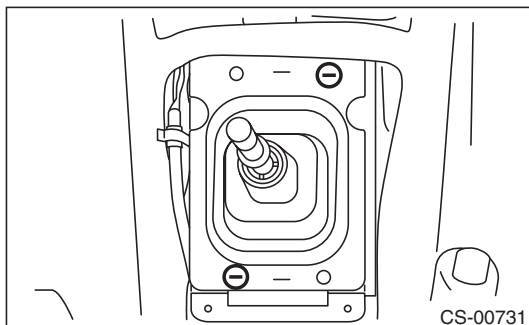


17) Lower the vehicle.

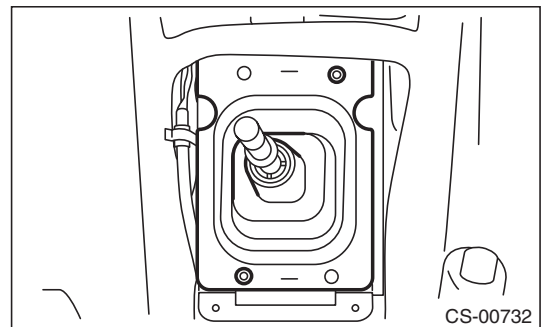
18) Remove the gear shift lever.

2. EXCEPT FOR STI MODEL

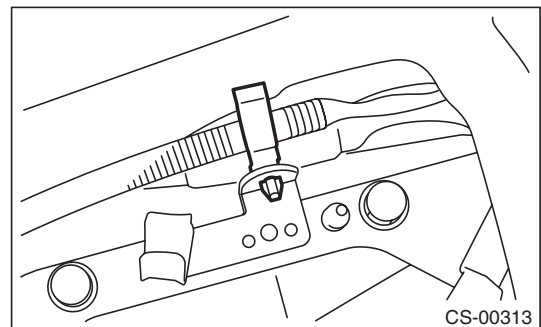
- 1) Disconnect the ground cable from battery.
- 2) Remove the gear shift knob.
- 3) Remove the console box. <Ref. to EI-51, REMOVAL, Console Box.>
- 4) Remove the console side cover and console front panel. <Ref. to EI-52, CONSOLE FRONT PANEL, REMOVAL, Center Console.>
- 5) Remove the clamp.



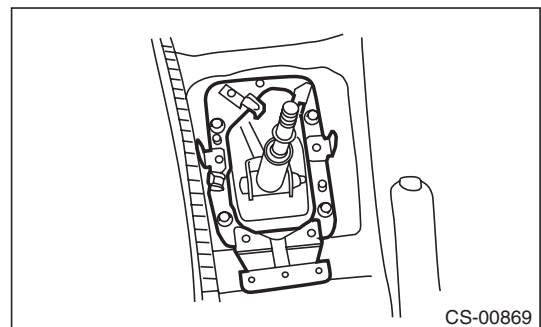
6) Remove the boot and insulator assembly.



7) Remove the harness clamp from the plate COMPL.



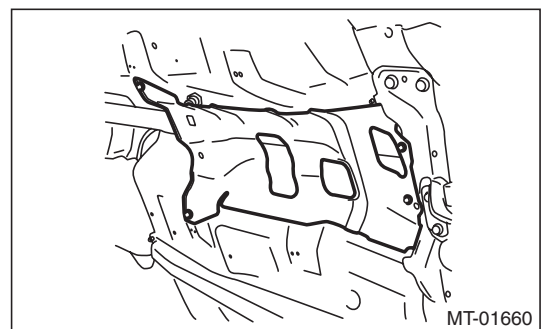
8) Remove the plate COMPL from the vehicle body.



9) Lift up the vehicle.

10) Remove the center exhaust pipe (rear). <Ref. to EX(w/o STI)-2, General Description.>

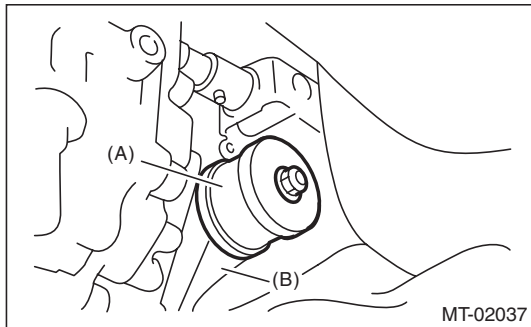
11) Remove the heat shield cover.



MT Gear Shift Lever

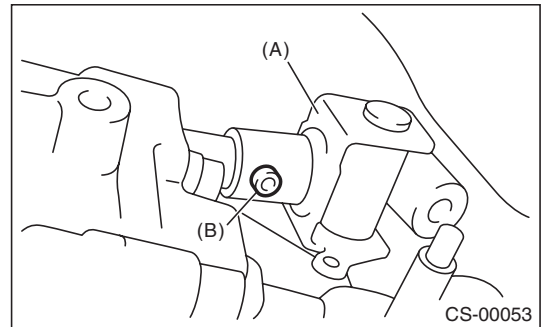
CONTROL SYSTEMS

12) Remove the stay from transmission bracket.



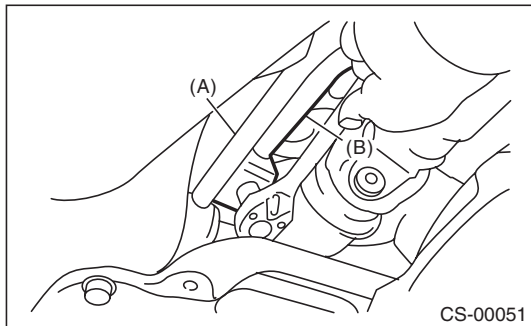
- (A) Stay
- (B) Transmission bracket

15) Extract the spring pin and remove the joint.



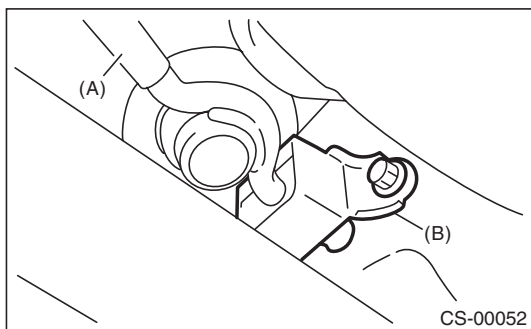
- (A) Joint
- (B) Spring pin

13) Remove the rod from joint.



- (A) Stay
- (B) Rod

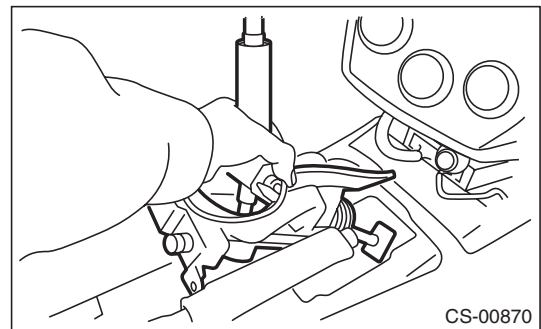
14) Remove the cushion rubber from the vehicle body.



- (A) Stay
- (B) Cushion rubber

16) Lower the vehicle.

17) Remove the gear shift lever.



B: INSTALLATION

1. STI MODEL

1) Insert the gear shift lever from the room side.

NOTE:

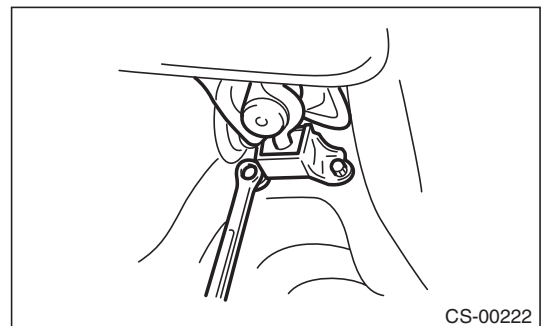
After inserting the rod and stay, temporarily put them onto transmission mount.

2) Lift up the vehicle.

3) Mount the cushion rubber on the body.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



4) Move the transmission to the right side of the vehicle, and install the joint COMPL and stay.

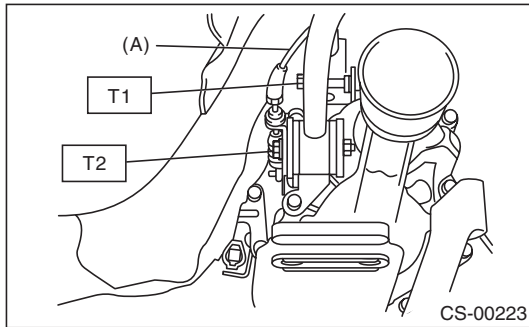
MT Gear Shift Lever

CONTROL SYSTEMS

Tightening torque:

T1: 12 N·m (1.2 kgf-m, 8.9 ft-lb)

T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



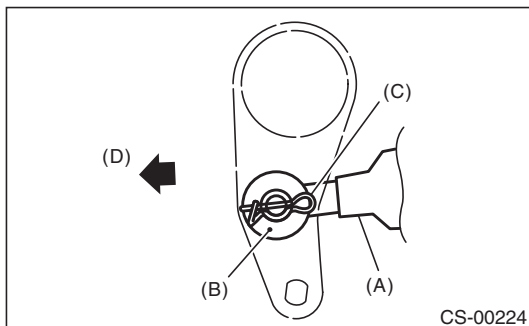
(A) Reverse check cable

5) Install the crossmember. <Ref. to 6MT-30, INSTALLATION, Transmission Mounting System.>

6) Install the reverse check cable end, washer and snap pin to the reverse check lever.

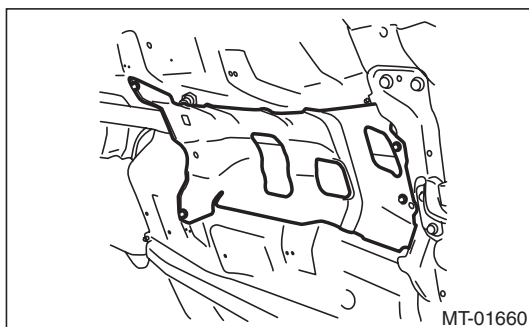
NOTE:

- Pay attention to the installing direction of the snap ring.
- Before installing, adjust the reverse check cable. <Ref. to CS-25, ADJUSTMENT, Reverse Check Cable.>



- (A) Reverse check cable
- (B) Washer
- (C) Snap pin
- (D) Front side

7) Install the heat shield cover.



8) Install the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>

9) Install the under cover.

10) Install the plate COMPL.

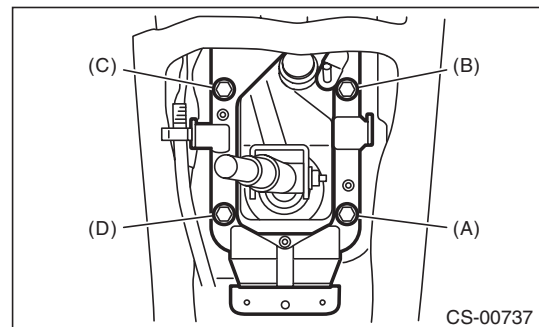
NOTE:

Be careful not to twist the inner boot when installing.

Tightening torque:

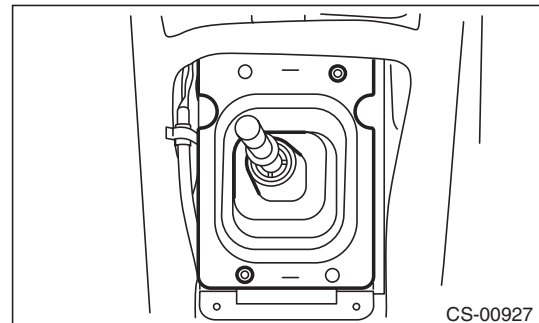
18 N·m (1.8 kgf-m, 13.3 ft-lb)

- (1) Set the plate COMPL to the vehicle.
- (2) Temporarily tighten the bolt (A).
- (3) Tighten the bolt (B).
- (4) Tighten the bolt (A).
- (5) Tighten the bolts (C) and (D).



11) Install the harness clamp to the plate COMPL.

12) Install the boot and insulator assembly, and secure with a clamp.



13) Install the console side cover and console front panel. <Ref. to EI-54, INSTALLATION, Center Console.>

14) Install the console box. <Ref. to EI-51, INSTALLATION, Console Box.>

15) Install the gear shift knob.

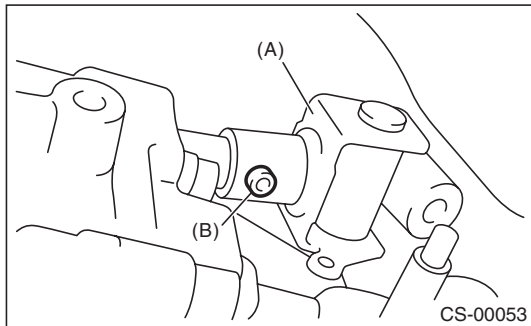
16) Make sure the gears can be shifted accurately into each gear.

MT Gear Shift Lever

CONTROL SYSTEMS

2. EXCEPT FOR STI MODEL

1) Install the joint to the transmission and secure with a spring pin.

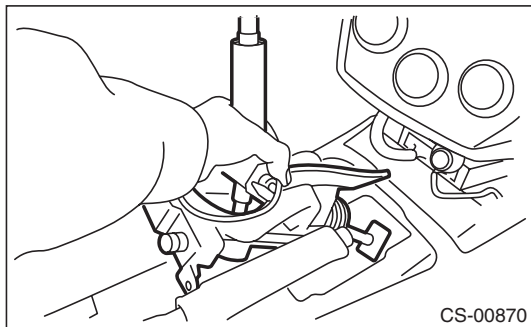


- (A) Joint
(B) Spring pin

2) Insert the gear shift lever from the room side.

NOTE:

Insert the rod and the stay, and then temporarily set them onto the transmission mount.

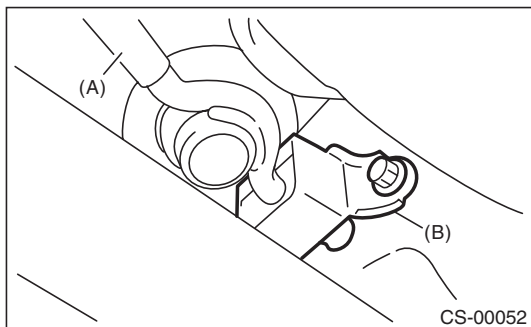


3) Lift up the vehicle.

4) Mount the cushion rubber on the vehicle body.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

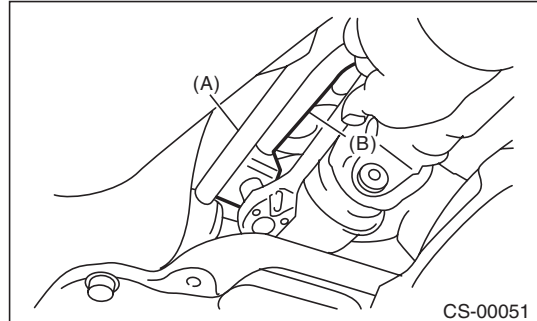


- (A) Stay
(B) Cushion rubber

5) Using new self-locking nuts, connect the rod to the joint.

Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)

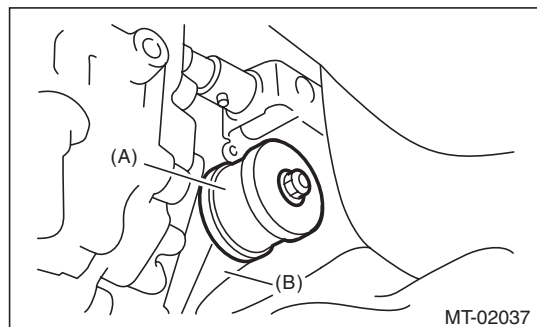


- (A) Stay
(B) Rod

6) Using new self-locking nuts, connect the stay to the transmission bracket.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



- (A) Stay
(B) Transmission bracket

7) Install the heat shield cover. <Ref. to EI-74, INSTALLATION, Heat Shield Cover.>

8) Install the center exhaust pipe (rear). <Ref. to EX(w/o STI)-2, General Description.>

9) Install the plate COMPL to the body.

Tightening torque:

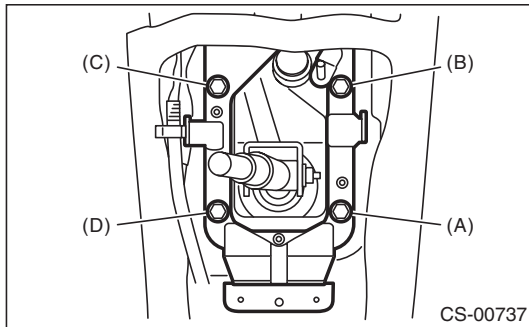
18 N·m (1.8 kgf-m, 13.3 ft-lb)

- (1) Set the plate COMPL to the vehicle.
- (2) Temporarily tighten the bolt (A).
- (3) Tighten the bolt (B).
- (4) Tighten the bolt (A).

MT Gear Shift Lever

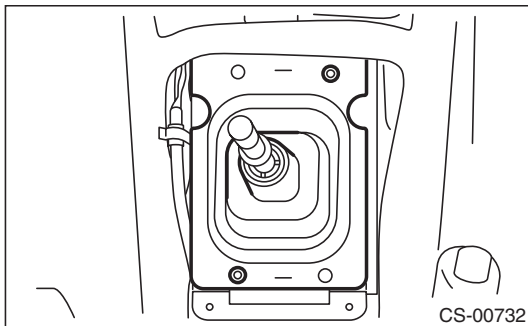
CONTROL SYSTEMS

(5) Tighten the bolts (C) and (D).



10) Install the harness clamp to the plate.

11) Install the boot and insulator assembly, and secure with a clamp.



12) Install the console side cover and console front panel. <Ref. to EI-54, INSTALLATION, Center Console.>

13) Install the console box. <Ref. to EI-51, INSTALLATION, Console Box.>

14) Install the gear shift knob.

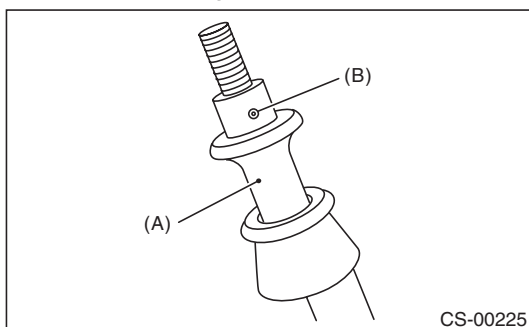
15) Make sure the gears can be shifted accurately into each gear.

16) Connect the battery ground terminal.

C: DISASSEMBLY

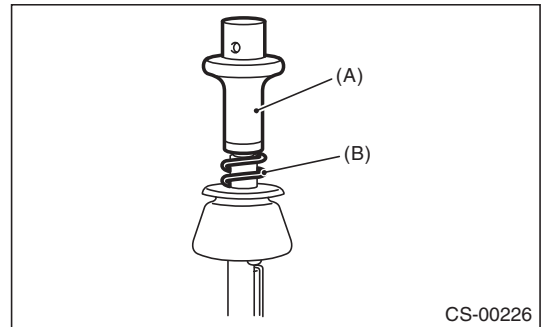
1. STI MODEL

1) Remove the spring pin from the slider.



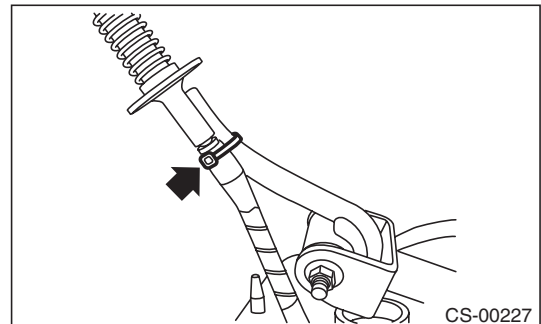
- (A) Slider
- (B) Spring pin

2) Remove the slider and spring.

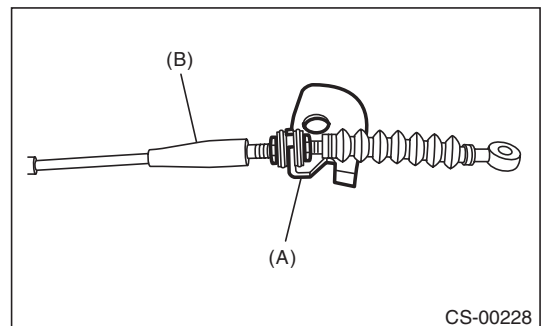


- (A) Slider
- (B) Spring

3) Cut off the band clip.

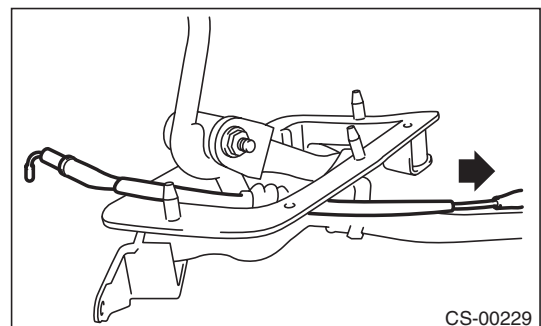


4) Remove the reverse check cable from the cable plate.



- (A) Cable plate
- (B) Reverse check cable

5) Remove the reverse check cable from the gear shift assembly.



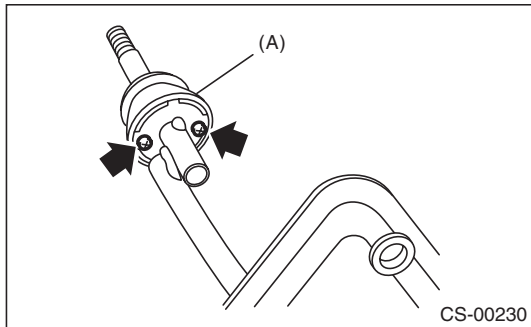
CS-11

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MT Gear Shift Lever

CONTROL SYSTEMS

6) Remove the holder and spring.

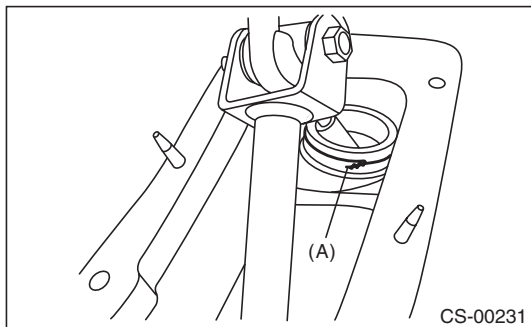


(A) Holder

7) Disassemble the lock wire.

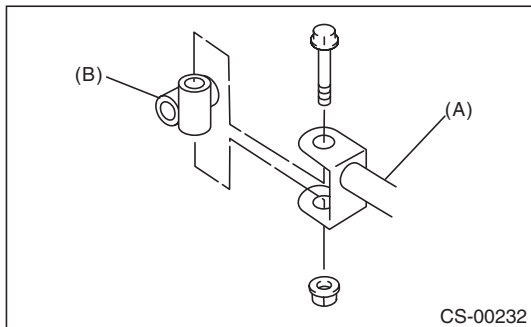
NOTE:

Do not reuse the lock wire.



(A) Lock wire

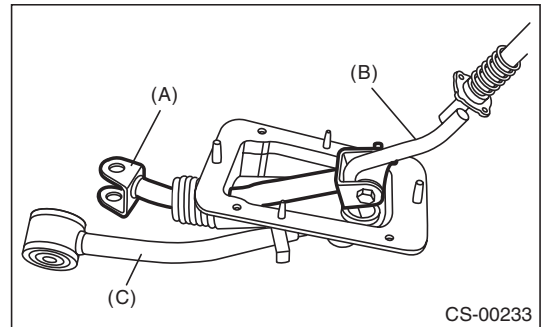
8) Remove the boss from the rod.



(A) Rod

(B) Boss

9) Remove the rod from lever.



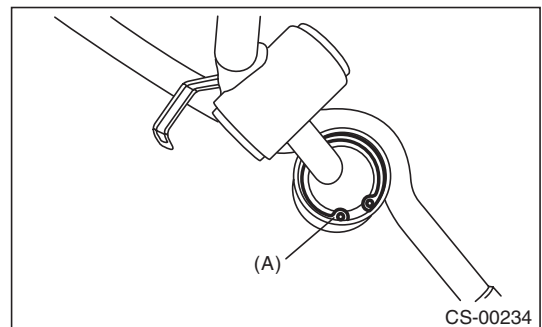
(A) Rod

(B) Lever

(C) Stay

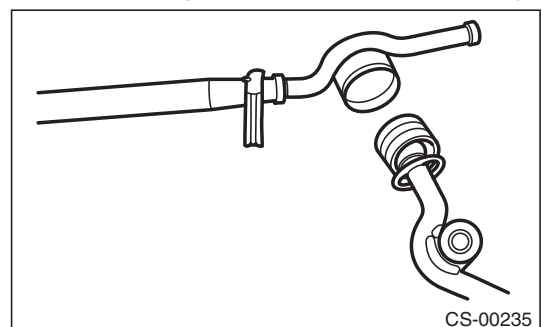
10) Separate the rod and inner boot.

11) Remove the snap ring from the stay.



(A) Snap ring

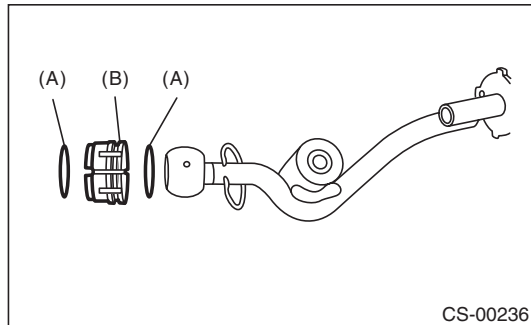
12) Separate the gear shift lever and the stay.



MT Gear Shift Lever

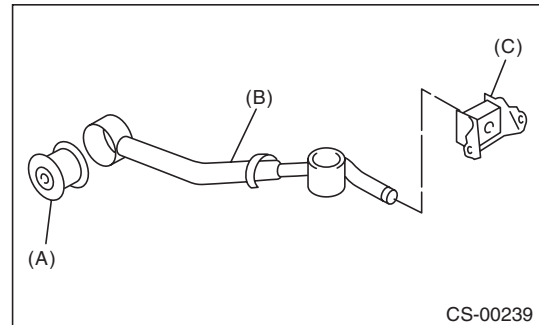
CONTROL SYSTEMS

13) Remove the O-ring and bushing from the gear shift lever.



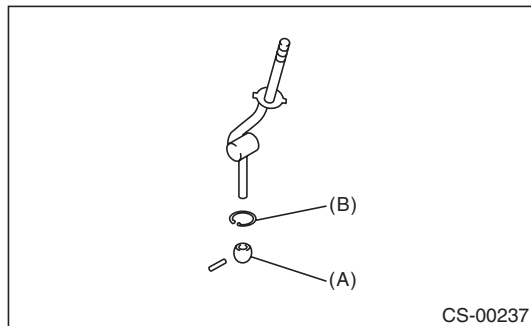
- (A) O-ring
- (B) Bushing

16) Remove the bushing and cushion rubber from the stay.



- (A) Bushing
- (B) Stay
- (C) Cushion rubber

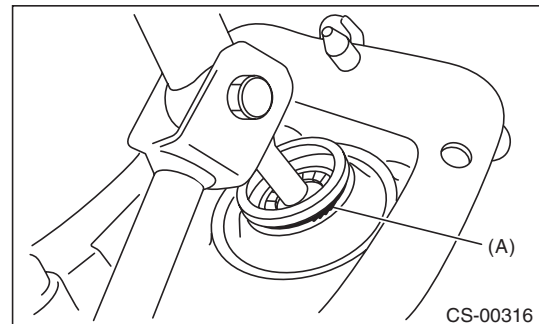
14) Remove the spring pin, and then remove the bushing and snap ring.



- (A) Bushing
- (B) Snap ring

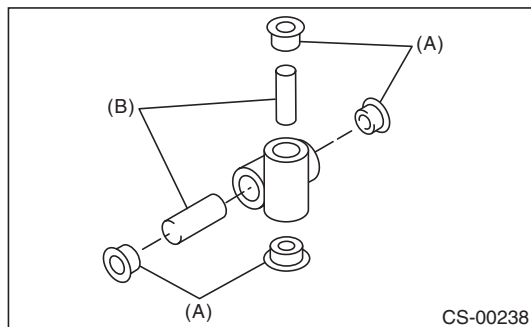
2. EXCEPT FOR STI MODEL

1) Remove the lock wires.



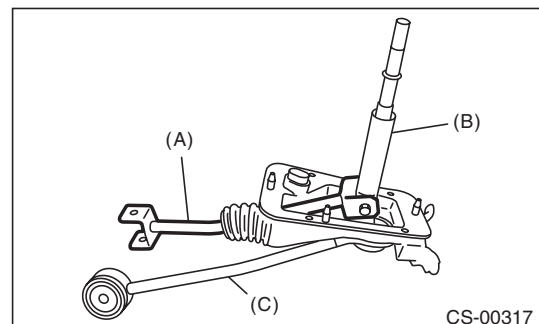
- (A) Lock wire

15) Remove the bushing and spacer from the boss.



- (A) Bushing
- (B) Spacer

2) Remove the rod from lever.



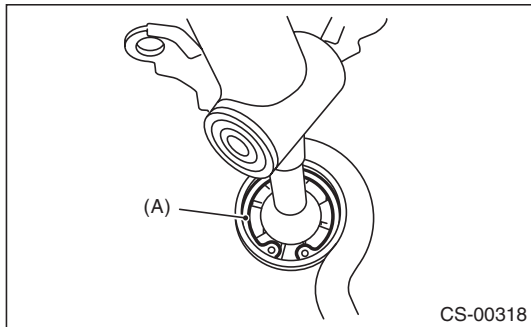
- (A) Rod
- (B) Lever
- (C) Stay

3) Separate the rod and inner boot.

MT Gear Shift Lever

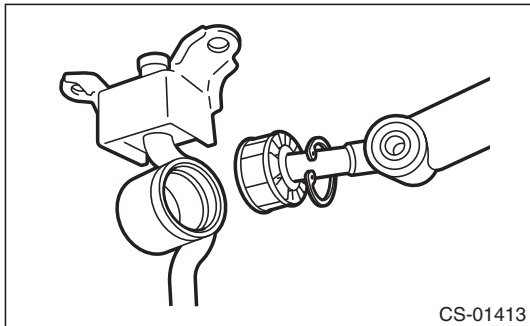
CONTROL SYSTEMS

4) Remove the snap ring from the stay.

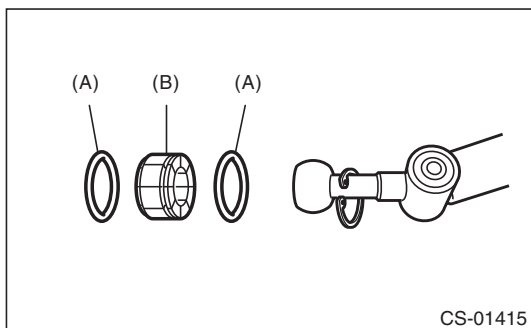


(A) Snap ring

5) Separate the gear shift lever and the stay.

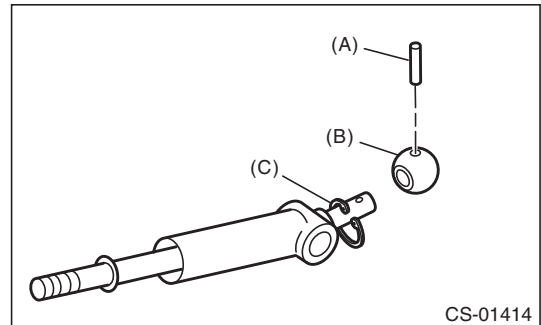


6) Remove the O-ring and bushing from the gear shift lever.



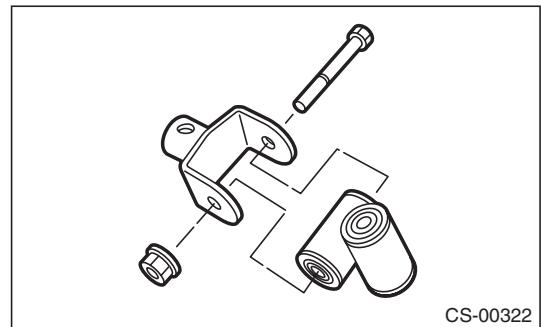
(A) O-ring
(B) Bushing

7) Remove the spring pin, and then remove the bushing and snap ring.

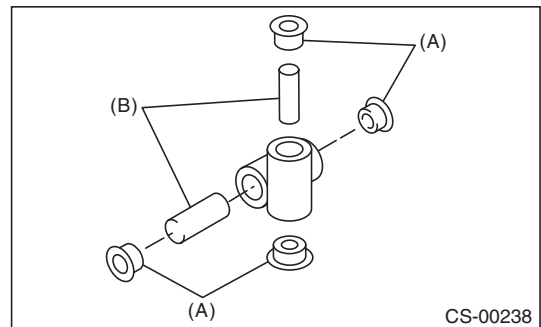


(A) Spring pin
(B) Bushing
(C) Snap ring

8) Remove the boss from the joint.



9) Remove the bushing and spacer from the boss.

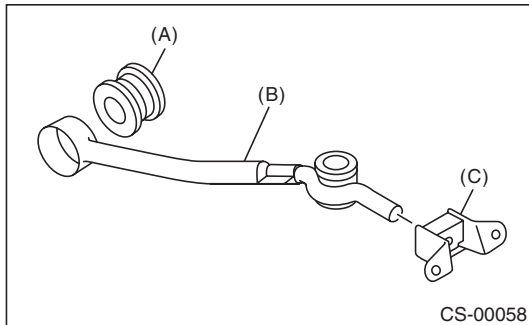


(A) Bushing
(B) Spacer

MT Gear Shift Lever

CONTROL SYSTEMS

10) Remove the bushing and cushion rubber from the stay.



- (A) Bushing
- (B) Stay
- (C) Cushion rubber

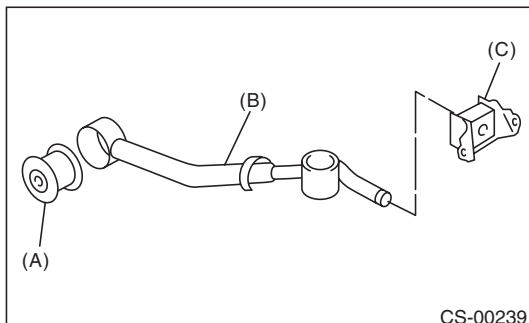
D: ASSEMBLY

NOTE:

- Clean all the parts before assembly.
- Apply NIGTIGHT LYW No. 2 grease or equivalent to each part. <Ref. to CS-3, 6MT GEAR SHIFT LEVER, COMPONENT, General Description.>

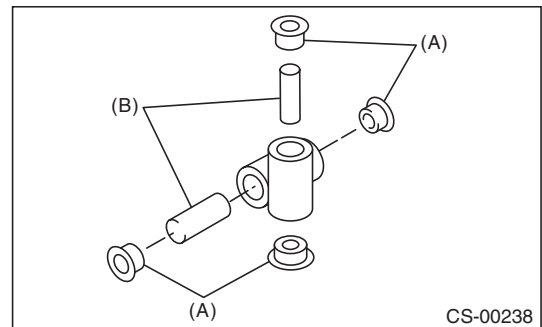
1. STI MODEL

1) Mount the bushing and cushion rubber to the stay.



- (A) Bushing
- (B) Stay
- (C) Cushion rubber

2) Install the bushing and spacer to boss.

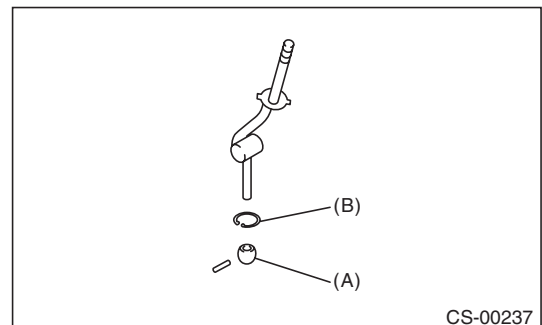


- (A) Bushing
- (B) Spacer

3) Install the snap ring to gear shift lever and install the bushing.

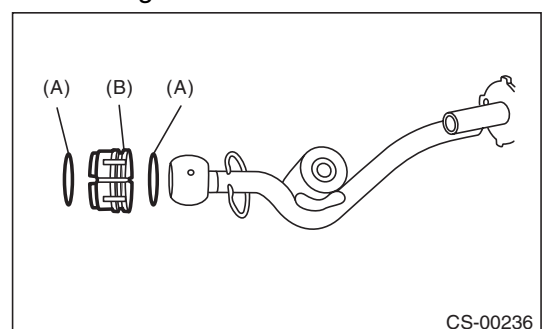
NOTE:

Apply grease to the bushing.



- (A) Bushing
- (B) Snap ring

4) Apply grease to the bushing and O-ring, and then install to gear shift lever.

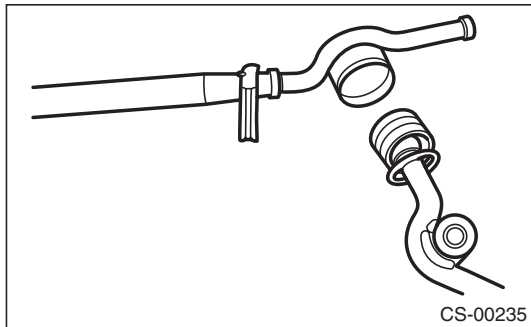


- (A) O-ring
- (B) Bushing

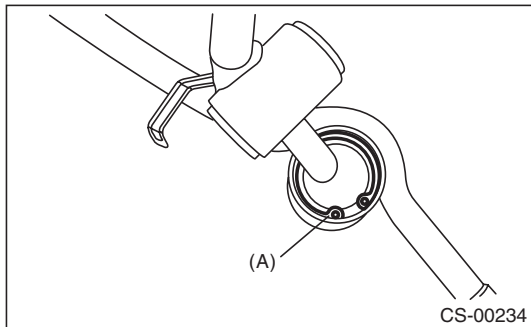
MT Gear Shift Lever

CONTROL SYSTEMS

5) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



6) Install the snap ring.



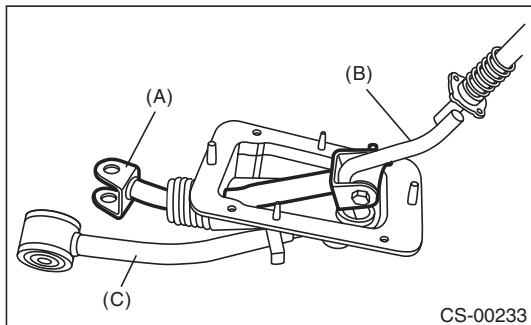
(A) Snap ring

7) Insert the gear shift lever and rod into boot hole.

8) Install the rod.

Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)

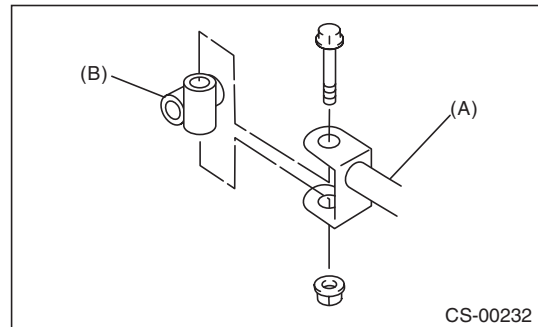


(A) Rod
(B) Lever
(C) Stay

9) Install the boss to the rod.

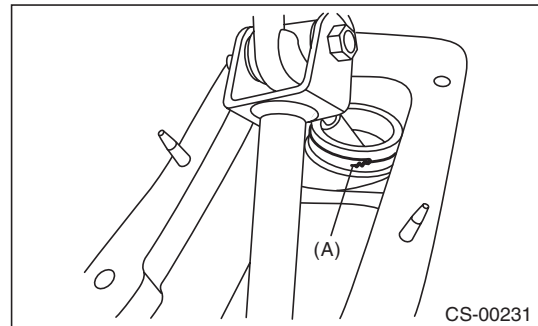
Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)



(A) Rod
(B) Boss

10) Install a new lock wire.



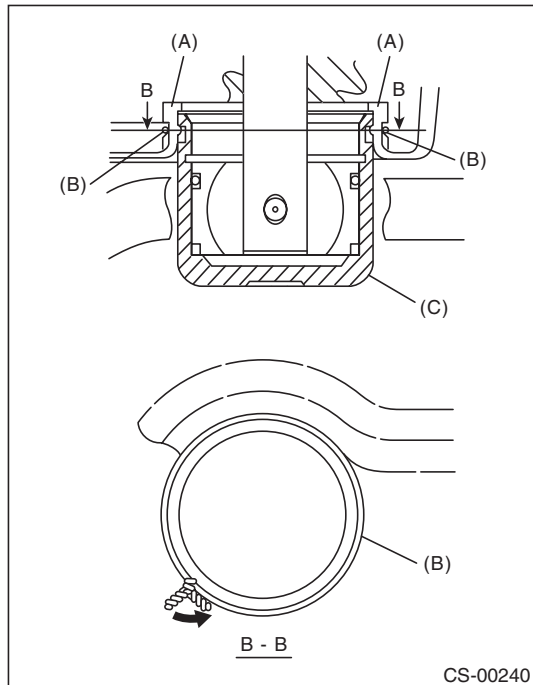
(A) Lock wire

MT Gear Shift Lever

CONTROL SYSTEMS

NOTE:

- Install the lock wire to the stay groove.
- Bend the extra wire to the same direction of lock wire winding.

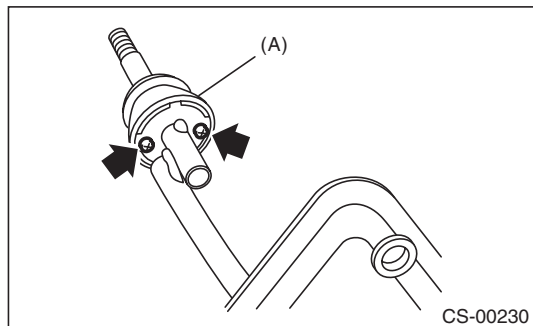


- (A) Inner boot
(B) Lock wire
(C) Stay

11) Install the holder.

Tightening torque:

1.3 N·m (0.1 kgf-m, 1.0 ft-lb)



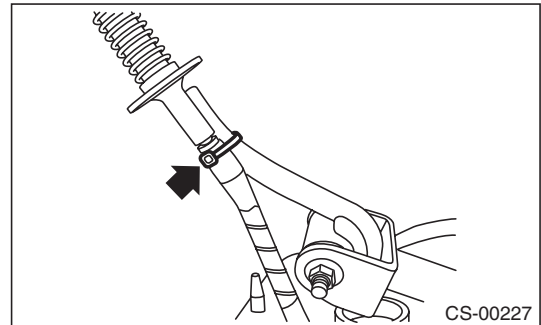
- (A) Holder

12) Insert the reverse check cable into the boot hole.

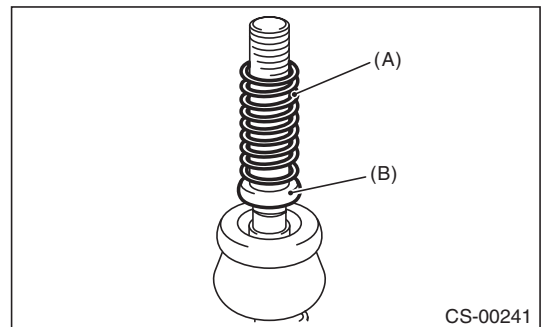
13) Insert the reverse check cable into the gear shift assembly, and fix in place with a band clip.

NOTE:

- Cut the excess band clip.
- Make sure that the reverse check cable is inserted into the gearshift lever with no gaps.



14) Install the seat cushion and spring.

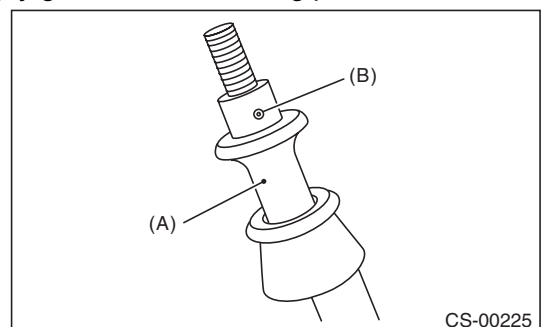


- (A) Spring
(B) Seat cushion

15) Use the spring pin to secure the end of the slider and reverse check cable.

NOTE:

Apply grease to the moving part of slider.



- (A) Slider
(B) Spring pin

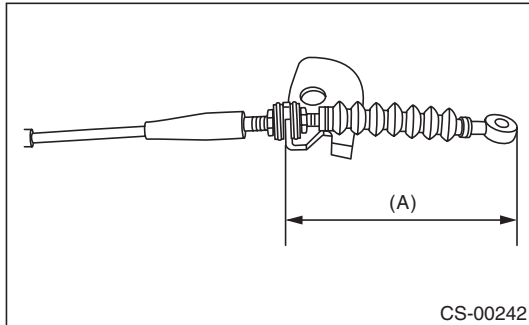
MT Gear Shift Lever

CONTROL SYSTEMS

16) With the cable pulled (the slider is lowered), adjust the distance between the edge of cable plate and the reverse check cable to 84 mm (3.31 in), and tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

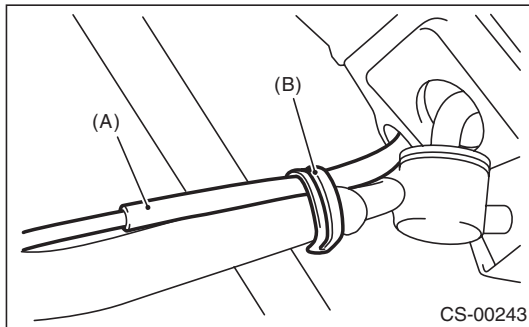


(A) 84 mm (3.31 in)

17) Secure the reverse check cable to the stay clip.

NOTE:

Install the reverse check cable on top of the stay.



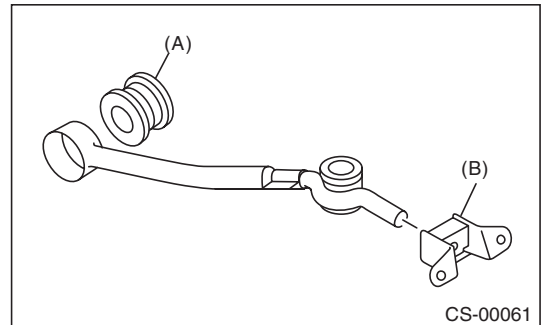
(A) Reverse check cable
(B) Clip

2. EXCEPT FOR STI MODEL

NOTE:

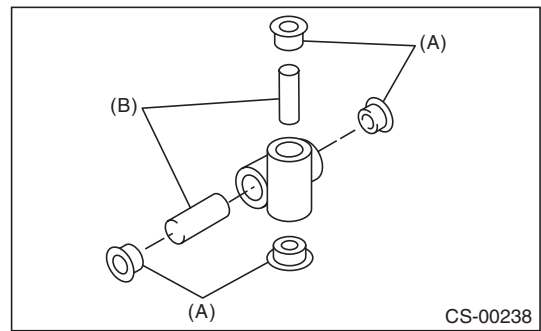
- Clean all the parts before assembly.
- Apply NIGTIGHT LYW No. 2 grease or equivalent to each part. <Ref. to CS-4, 5MT GEAR SHIFT LEVER, COMPONENT, General Description.>

1) Mount the bushing and cushion rubber to the stay.



(A) Bushing
(B) Cushion rubber

2) Install the bushing and spacer to boss.

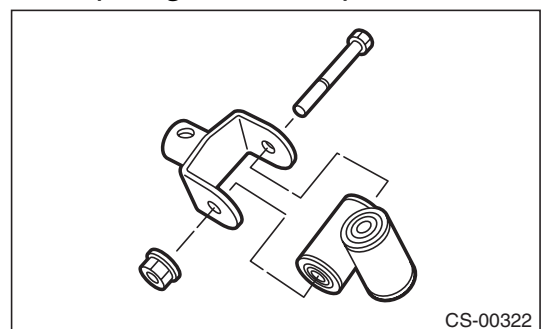


(A) Bushing
(B) Spacer

3) Using new self-locking nuts, install the boss to the joint.

Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)



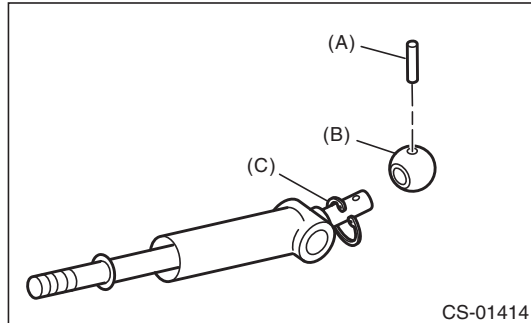
MT Gear Shift Lever

CONTROL SYSTEMS

4) Install the snap ring to gear shift lever and install the bushing.

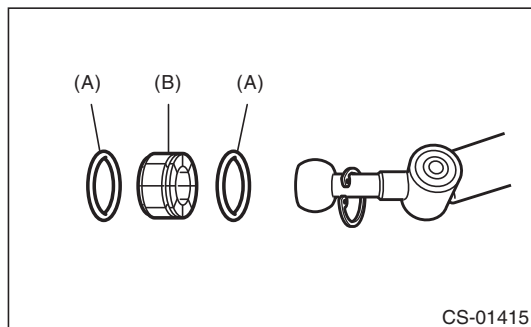
NOTE:

Apply grease to the bushing.



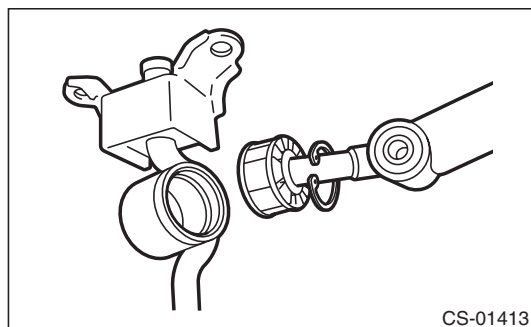
- (A) Spring pin
- (B) Bushing
- (C) Snap ring

5) Apply grease to the bushing and O-ring, and then install to gear shift lever.

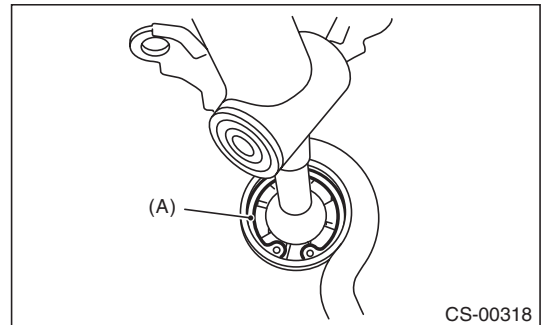


- (A) O-ring
- (B) Bushing

6) Apply sufficient grease into boss, and then install the gear shift lever to the stay.



7) Install the snap ring.



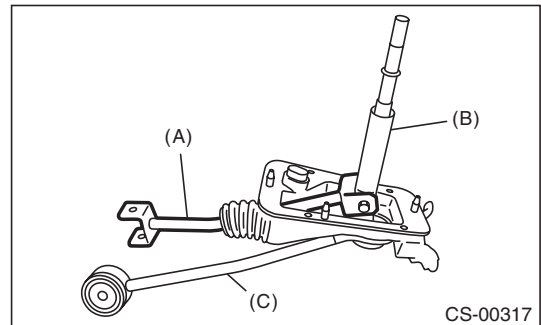
- (A) Snap ring

8) Insert the gear shift lever and rod into boot hole.

9) Install the rod.

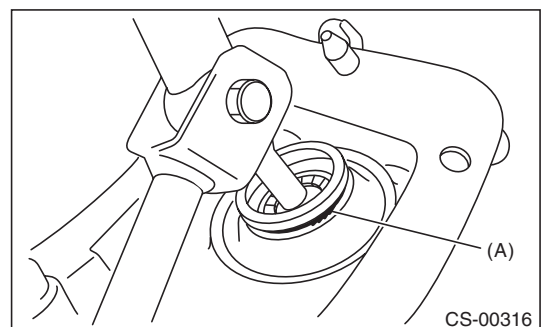
Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)



- (A) Rod
- (B) Lever
- (C) Stay

10) Install a new lock wire.



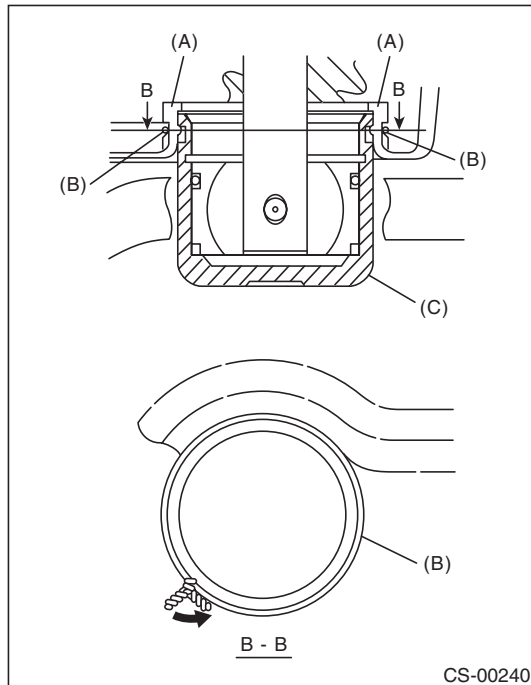
- (A) Lock wire

MT Gear Shift Lever

CONTROL SYSTEMS

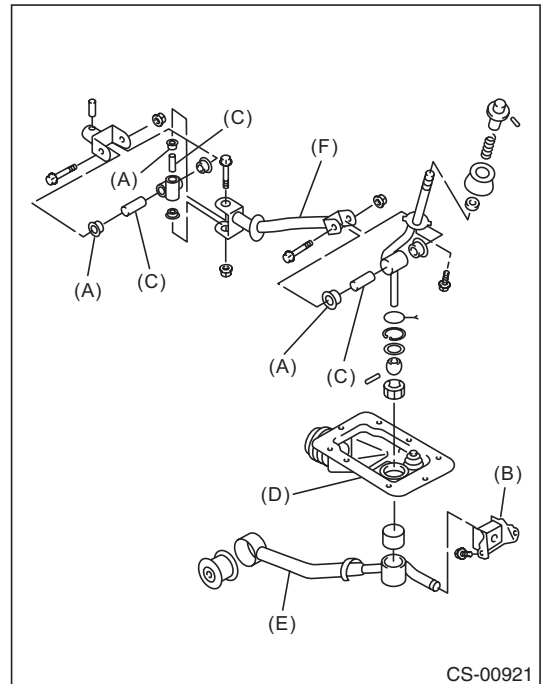
NOTE:

- Install the lock wire to the stay groove.
- Bend the extra wire to the same direction of lock wire winding.



- (A) Inner boot
- (B) Lock wire
- (C) Stay

• STI model



- (A) Bushing
- (B) Cushion rubber
- (C) Spacer
- (D) Boot
- (E) Stay
- (F) Rod

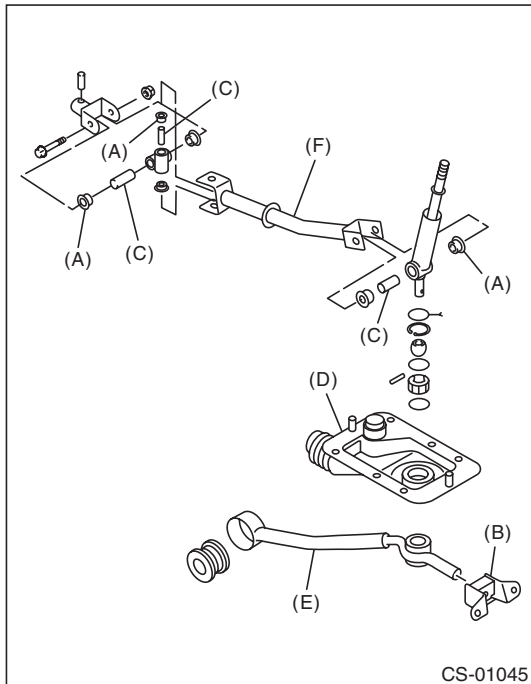
E: INSPECTION

1) Check the parts (bushing, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. If necessary, correct or replace faulty parts. Compare the removed parts with new parts to judge if there are damages or not.

MT Gear Shift Lever

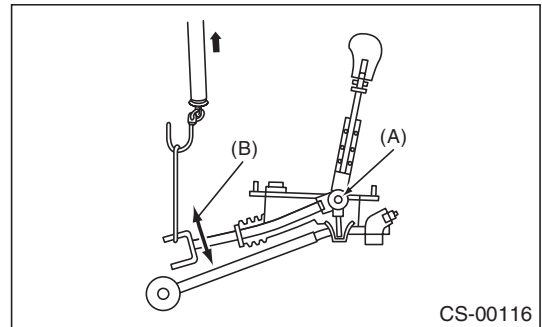
CONTROL SYSTEMS

- Except for STI model



- (A) Bushing
- (B) Cushion rubber
- (C) Spacer
- (D) Boot
- (E) Stay
- (F) Rod

- Except for STI model



- (A) Pivot
- (B) Swing torque

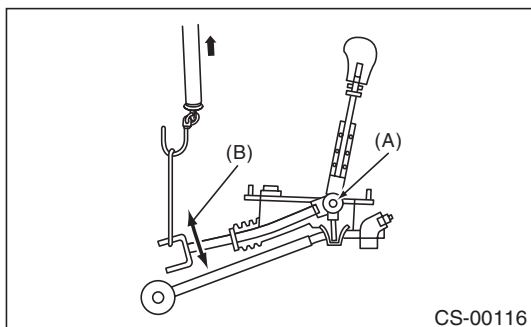
2) Check the swing torque of rod linked with the gear shift lever.

If the torque exceeds the specifications, replace the bushing or retighten nuts.

Swing torque:

3.7 N (0.38 kgf, 0.83 lbf) or less

- STI model



- (A) Pivot
- (B) Swing torque

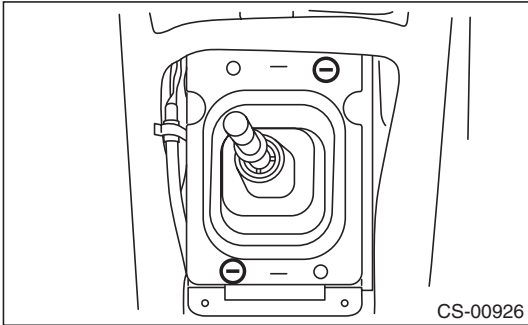
Reverse Check Cable

CONTROL SYSTEMS

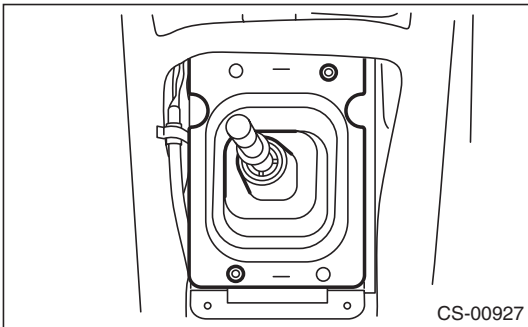
3. Reverse Check Cable

A: REMOVAL

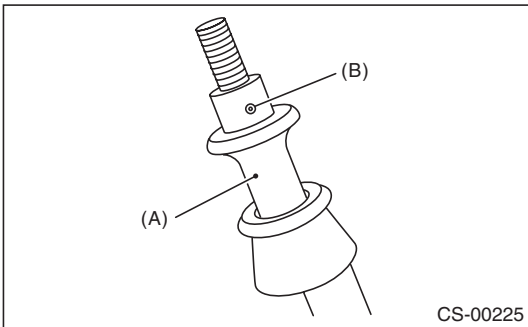
- 1) Remove the gear shift knob.
- 2) Remove the console box. <Ref. to EI-51, REMOVAL, Console Box.>
- 3) Remove the console side cover and console front panel.
- 4) Remove the clamp.



- 5) Remove the boot and insulator assembly.

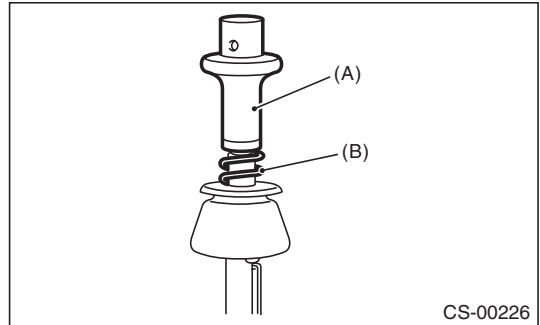


- 6) Remove the spring pin from the slider.



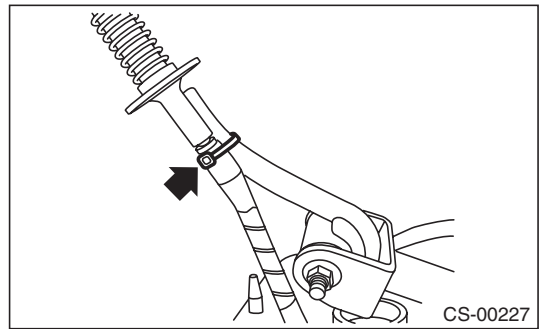
- (A) Slider
(B) Spring pin

- 7) Remove the slider and spring.

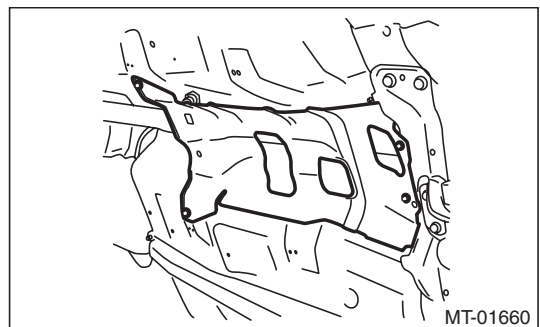


- (A) Slider
(B) Spring

- 8) Cut the band clip, and separate the reverse check cable from the gear shift lever.



- 9) Lift up the vehicle.
- 10) Remove the under cover.
- 11) Remove the center exhaust pipe. <Ref. to EX(STI)-13, REMOVAL, Rear Exhaust Pipe.>
- 12) Remove the heat shield cover.

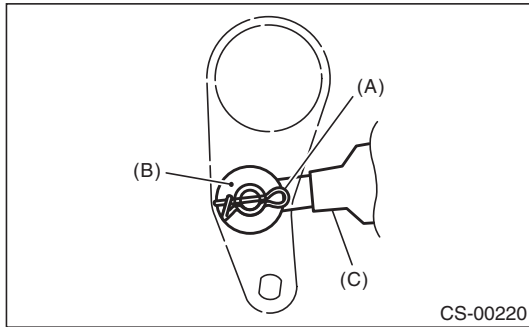


- 13) Remove the crossmember. <Ref. to 6MT-30, REMOVAL, Transmission Mounting System.>

Reverse Check Cable

CONTROL SYSTEMS

14) Remove the snap pin and washer, and separate the reverse check cable from the reverse check lever.

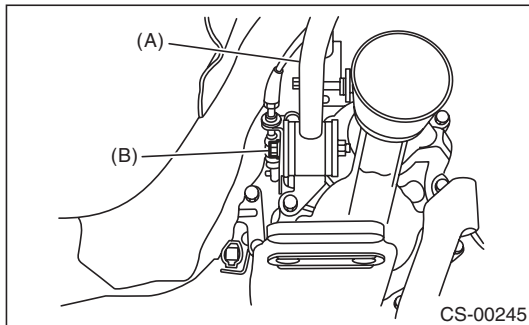


- (A) Snap pin
- (B) Washer
- (C) Reverse check cable

15) Move the transmission to the right side, and remove the stay bolts and the reverse check cable.

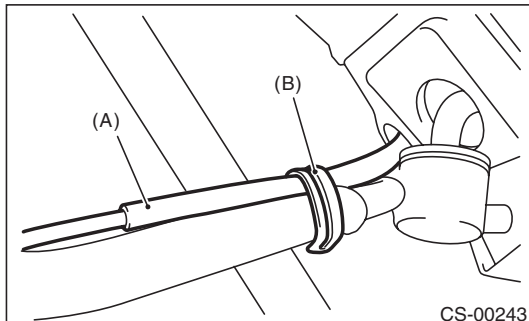
NOTE:

If the transmission is not moved aside, the stay bolts may contact the body and cause damage.



- (A) Stay
- (B) Stay bolt

16) Lift up the stay clip, and separate the stay from the reverse check cable.



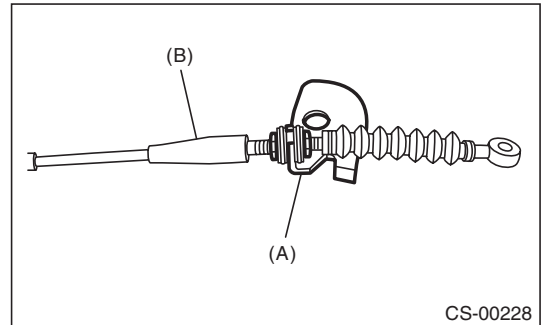
- (A) Reverse check cable
- (B) Clip

17) Pull out the reverse check cable from underside of the vehicle to remove it.

NOTE:

Be careful not to damage the inner boot.

18) Loosen the lock nut, and remove the reverse check cable from the cable plate.



- (A) Cable plate
- (B) Reverse check cable

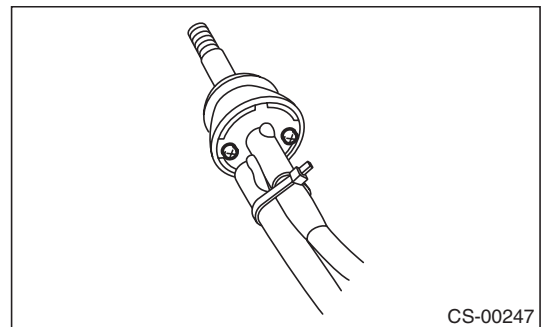
B: INSTALLATION

1) Insert the reverse check cable into the inner boot hole from underside of the vehicle.

2) Insert the reverse check cable into the gear shift lever assembly, and secure it with the band clip.

NOTE:

- Cut the excess band clip.
- Make sure that the reverse check cable is inserted into the gearshift lever with no gaps.



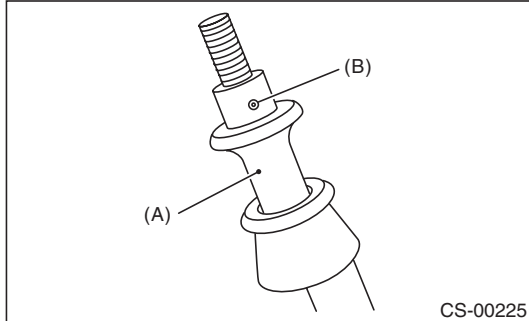
Reverse Check Cable

CONTROL SYSTEMS

3) Use the spring pin to secure the end of the slider and reverse check cable.

NOTE:

Apply grease to the moving part of slider.

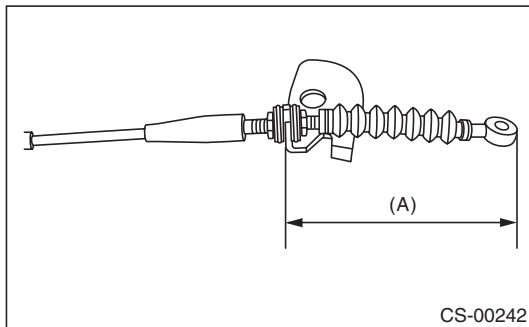


- (A) Slider
- (B) Spring pin

4) With the cable pulled (the slider is lowered), adjust the distance between the edge of cable plate and the reverse check cable to 84 mm (3.31 in), and tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)

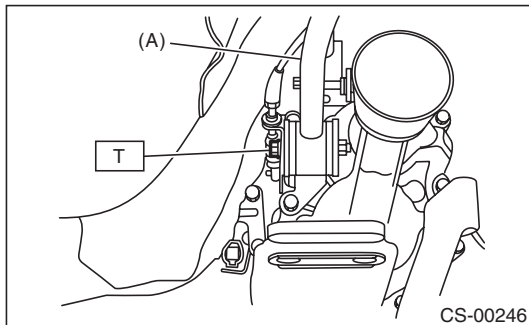


- (A) 84 mm (3.31 in)

5) Move the transmission to the right side, and install the stay.

Tightening torque:

T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)

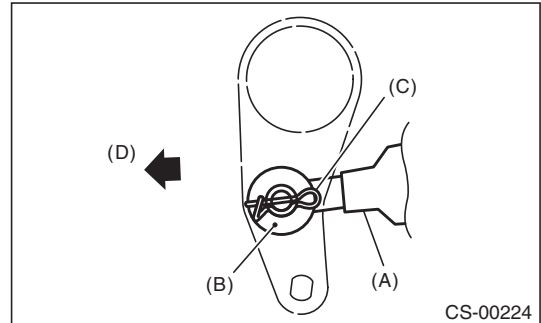


- (A) Stay

6) Install the reverse check cable, washer and snap pin to the reverse check lever.

NOTE:

Make sure to point the snap pin in an appropriate direction.

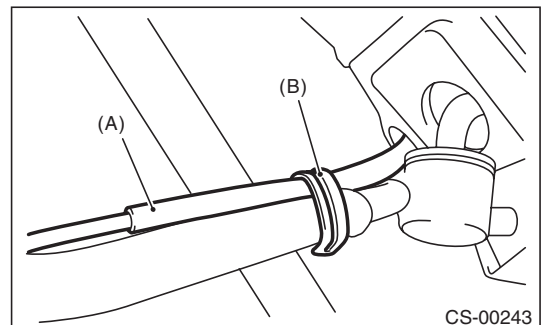


- (A) Reverse check cable
- (B) Washer
- (C) Snap pin
- (D) Front side

7) Secure the reverse check cable to the stay clip.

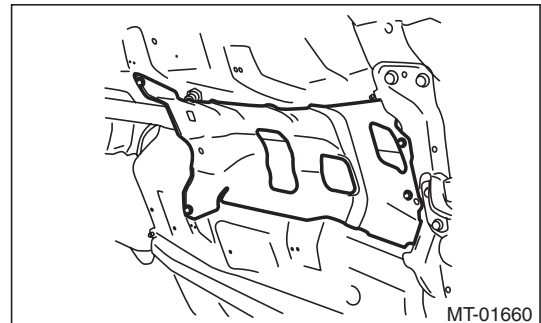
NOTE:

Install the reverse check cable on top of the stay.



- (A) Reverse check cable
- (B) Clip

8) Install the heat shield cover.

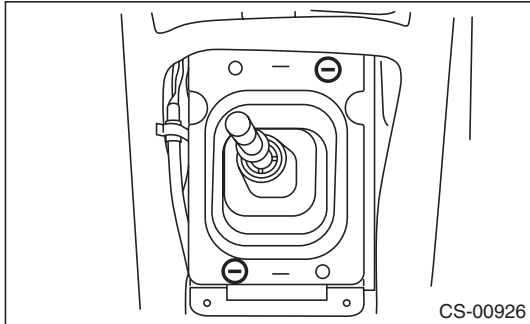


9) Install the center exhaust pipe. <Ref. to EX(STI)-13, INSTALLATION, Rear Exhaust Pipe.>

Reverse Check Cable

CONTROL SYSTEMS

10) Install the boot and insulator assembly, and secure with a clamp.



11) Install the console side cover and console front panel. <Ref. to EI-54, INSTALLATION, Center Console.>

12) Install the console box. <Ref. to EI-51, INSTALLATION, Console Box.>

13) Install the gear shift knob.

C: INSPECTION

1) Make sure the slider moves smoothly. If it does not move, adjust the reverse check cable, or check the slider for damage. <Ref. to CS-25, ADJUSTMENT, Reverse Check Cable.>

2) Check if the gear shifts into reverse when pulling up the slider. If the gear cannot shift into reverse, adjust the reverse check cable. <Ref. to CS-25, ADJUSTMENT, Reverse Check Cable.>

3) Check that the gear does not shift into reverse when the slider is not pulled up. If the gear shifts into reverse, adjust or replace the reverse check cable. <Ref. to CS-25, ADJUSTMENT, Reverse Check Cable.>

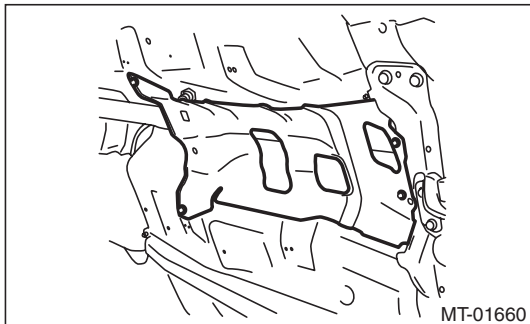
D: ADJUSTMENT

1) Lift up the vehicle.

2) Remove the transmission under cover.

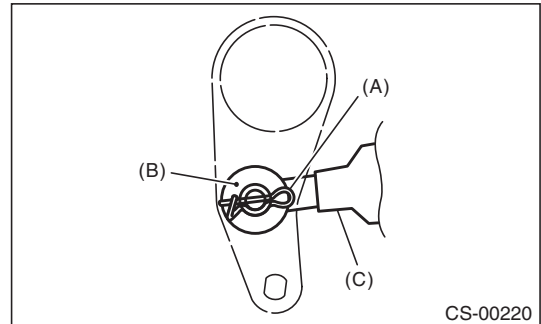
3) Remove the center exhaust pipe. <Ref. to EX(STI)-8, REMOVAL, Center Exhaust Pipe.>

4) Remove the heat shield cover.



5) Remove the crossmember. <Ref. to 6MT-30, REMOVAL, Transmission Mounting System.>

6) Remove the snap pin and washer, and separate the reverse check cable from the reverse check lever.



(A) Snap pin

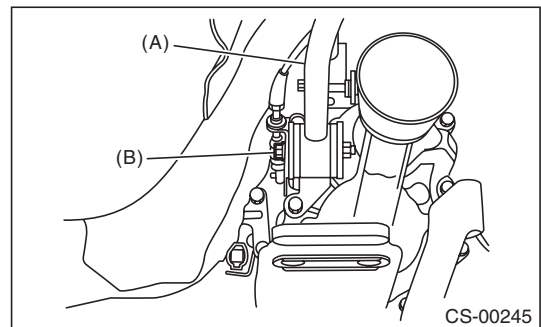
(B) Washer

(C) Reverse check cable

7) Move the transmission to the right side, and remove the stay bolts and the reverse check cable.

NOTE:

If the transmission is not moved aside, the stay bolts may contact the body and cause damage.



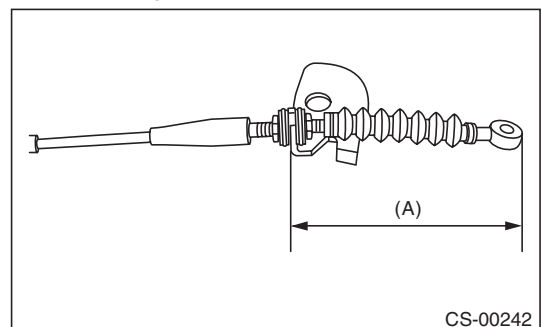
(A) Stay

(B) Stay bolt

8) With the cable pulled (the slider is lowered), adjust the distance between the edge of cable plate and the reverse check cable to 84 mm (3.31 in), and tighten the lock nut.

Tightening torque:

6 N·m (0.6 kgf-m, 4.4 ft-lb)



(A) 84 mm (3.31 in)

CS-25

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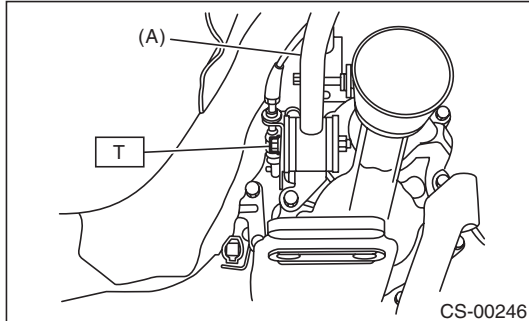
Reverse Check Cable

CONTROL SYSTEMS

9) Move the transmission to the right side, and install the stay.

Tightening torque:

T: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



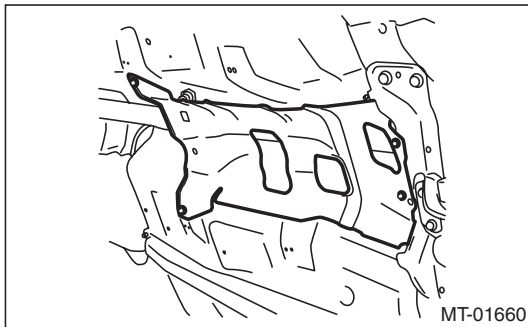
(A) Stay

10) Install the crossmember. <Ref. to 6MT-30, INSTALLATION, Transmission Mounting System.>

11) Install the heat shield cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

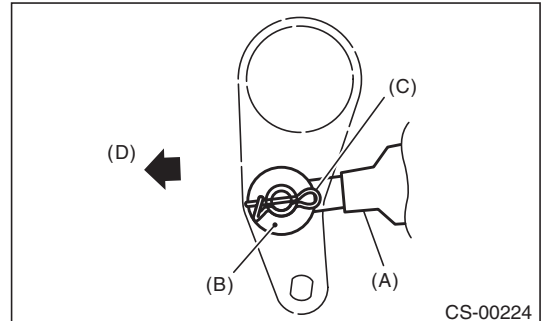


12) Install the center exhaust pipe. <Ref. to EX(STI)-9, INSTALLATION, Center Exhaust Pipe.>

13) Install the reverse check cable, washer and snap pin to the reverse check lever.

NOTE:

Make sure to point the snap pin in an appropriate direction.



(A) Reverse check cable

(B) Washer

(C) Snap pin

(D) Front side

14) Install the transmission under cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

General Diagnostic Table

CONTROL SYSTEMS

4. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
MT gear shift lever (6MT)	Cannot shift into reverse.	Adjust the reverse check cable.
	Can shift into reverse when the slider is not pulled up.	Adjust or replace the reverse check cable.
	Slider cannot be pulled up or sticks in the pulled-up position.	• Check the reverse check system of the transmission. • Adjust or replace the reverse check cable.

General Diagnostic Table

CONTROL SYSTEMS

CS-28

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MANUAL TRANSMISSION AND DIFFERENTIAL

5MT

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model		Turbo model	
Type		5-forward speeds and 1-reverse (all stage with synchromesh)	
Transmission gear ratio	1st	3.166	
	2nd	1.882	
	3rd	1.296	
	4th	0.972	
	5th	0.738	
	Reverse	3.333	
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	3.900
Rear reduction gear	Transfer	Type of gear	Helical
		Gear ratio	1.000
	Final	Type of gear	Hypoid
		Gear ratio	3.900
Front differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2)
Center differential	Type and number of gear		Straight bevel gear (bevel pinion: 2, bevel gear: 2 and viscous coupling)
Transmission gear oil		GL-5	
Transmission gear oil capacity		3.5 ℓ (3.7 US qt, 3.1 Imp qt)	

2. TRANSMISSION GEAR OIL

Recommended oil:

GL-5 (75W-90) or equivalent

5MT-2

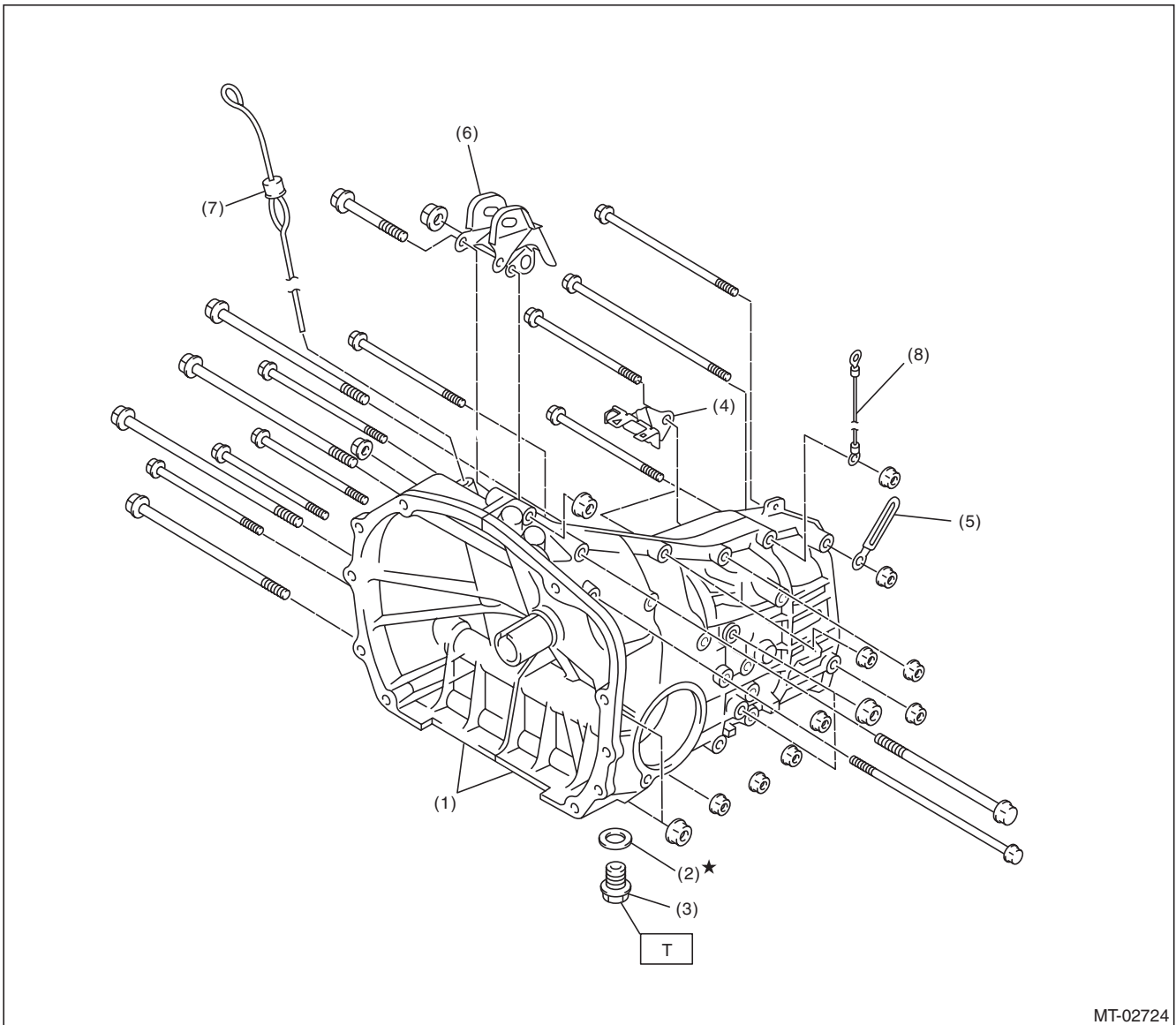
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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

B: COMPONENT

1. TRANSMISSION CASE



MT-02724

- | | |
|----------------------------|------------------------------------|
| (1) Transmission case ASSY | (5) Harness clip |
| (2) Gasket | (6) Pitching stopper bracket |
| (3) Drain plug | (7) Oil level gauge |
| (4) Harness bracket | (8) Transmission radio ground cord |

Tightening torque: N·m (kgf-m, ft-lb)

T: 44 (4.5, 32.5) (Aluminum gasket, silver)

70 (7.1, 51.6) (Copper gasket, brown)

70 (7.1, 51.6) (Metal gasket, black)

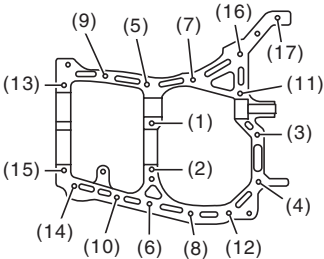
5MT-3

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

Transmission case tightening torque

 MT-00003	Bolt No.	Bolt size mm	Tightening torque: N·m (kgf-m, ft-lb)
	(5) — (15)	8	25 (2.5, 18.4)
	(1) — (4) (16), (17)	10	39 (4.0, 28.8)

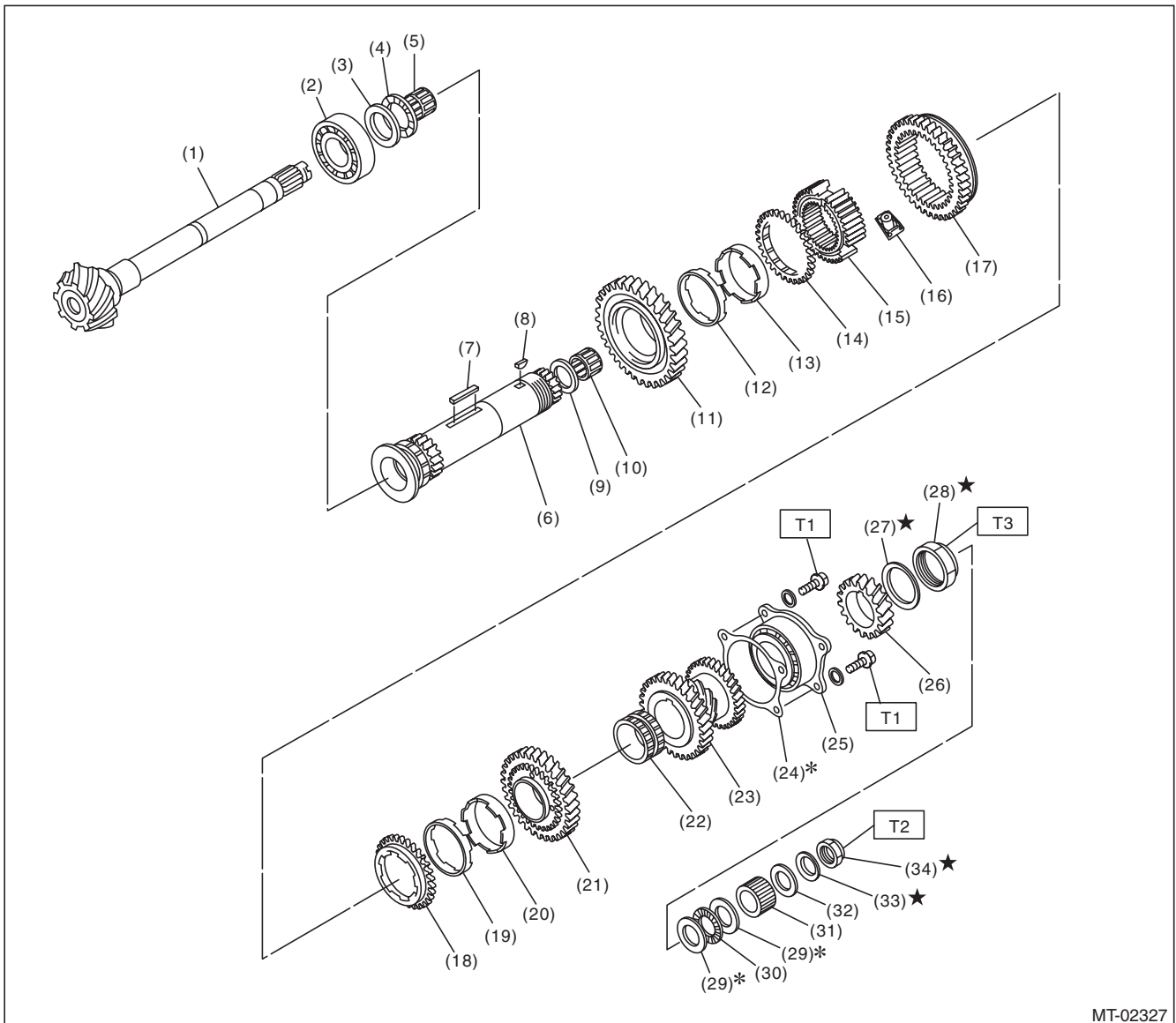
5MT-4

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DRIVE PINION ASSEMBLY



MT-02327

(1) Drive pinion shaft	(14) Outer baulk ring	(27) Lock washer
(2) Roller bearing	(15) 1st-2nd synchronizer hub	(28) Lock nut
(3) Washer	(16) Ball detent	(29) Adjusting washer
(4) Thrust bearing	(17) Reverse driven gear	(30) Thrust bearing
(5) Needle bearing	(18) Outer baulk ring	(31) Differential bevel gear sleeve
(6) Driven shaft	(19) Synchro cone	(32) Washer
(7) Key	(20) Inner baulk ring	(33) Lock washer
(8) Woodruff key	(21) 2nd driven gear	(34) Lock nut
(9) Drive pinion collar	(22) 2nd driven gear bushing	
(10) Needle bearing	(23) 3rd-4th driven gear	
(11) 1st driven gear	(24) Driven pinion shim	
(12) Inner baulk ring	(25) Roller bearing	
(13) Synchro cone	(26) 5th driven gear	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 30 (3.1, 22.1)

T2: 120 (12.2, 88.5)

T3: 260 (26.5, 191.8)

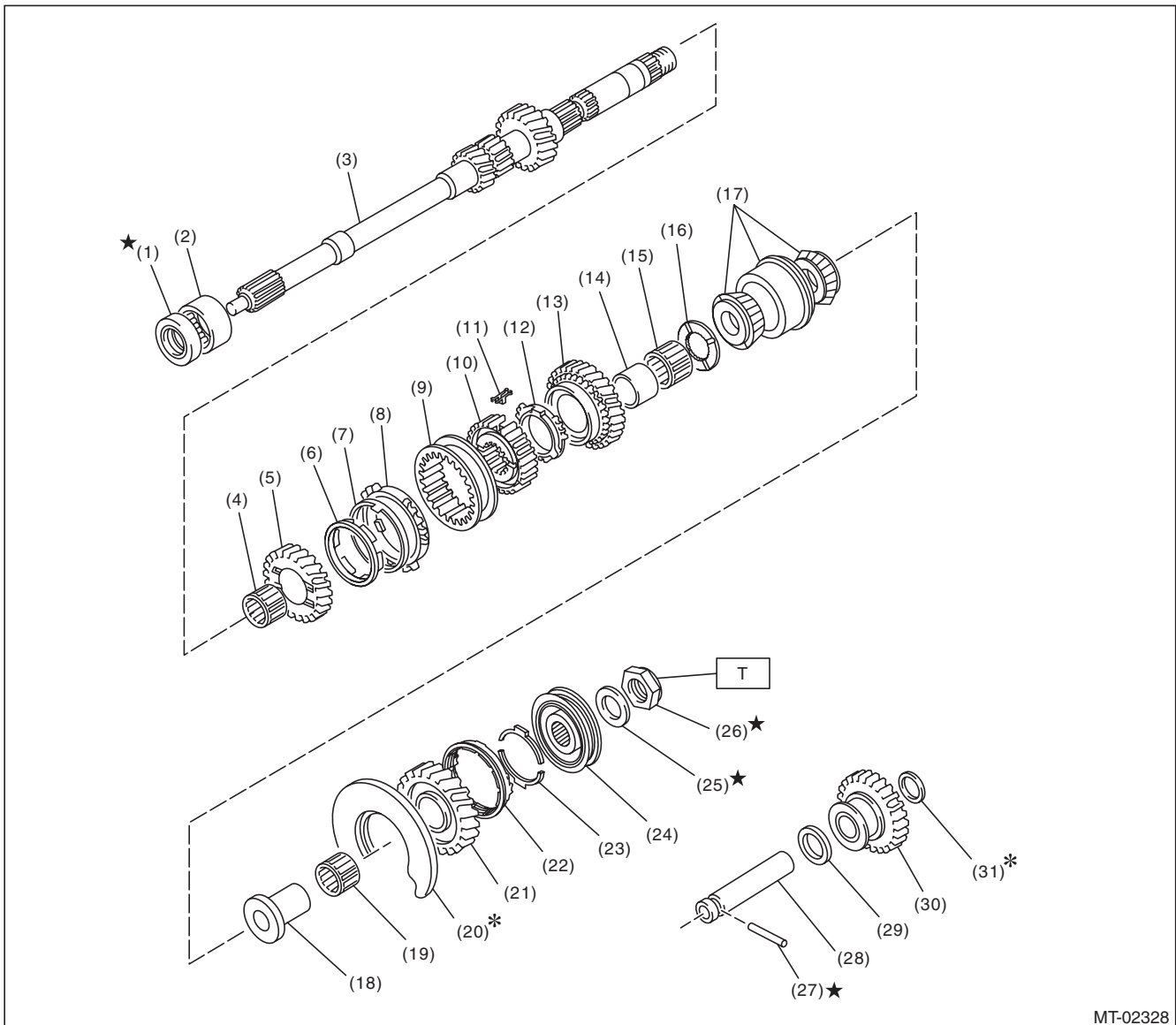
5MT-5

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

3. MAIN SHAFT FOR SINGLE-RANGE



MT-02328

- | | | |
|----------------------------------|------------------------------|-------------------------------|
| (1) Oil seal | (13) 4th drive gear | (25) Lock washer |
| (2) Needle bearing | (14) 4th needle bearing race | (26) Lock nut |
| (3) Transmission main shaft | (15) Needle bearing | (27) Straight pin |
| (4) Needle bearing | (16) 4th gear thrust washer | (28) Reverse idler gear shaft |
| (5) 3rd drive gear | (17) Ball bearing | (29) Washer |
| (6) Inner baulk ring | (18) 5th needle bearing race | (30) Reverse idler gear |
| (7) 3rd synchro cone | (19) Needle bearing | (31) Washer |
| (8) Outer baulk ring | (20)* Main shaft rear plate | |
| (9) 3rd-4th coupling sleeve | (21) 5th drive gear | |
| (10) 3rd-4th synchronizer hub | (22) 5th baulk ring | |
| (11) 3rd-4th shifting insert key | (23) Baulk lever | |
| (12) 4th baulk ring | (24) 5th hub & sleeve No. 2 | |

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)

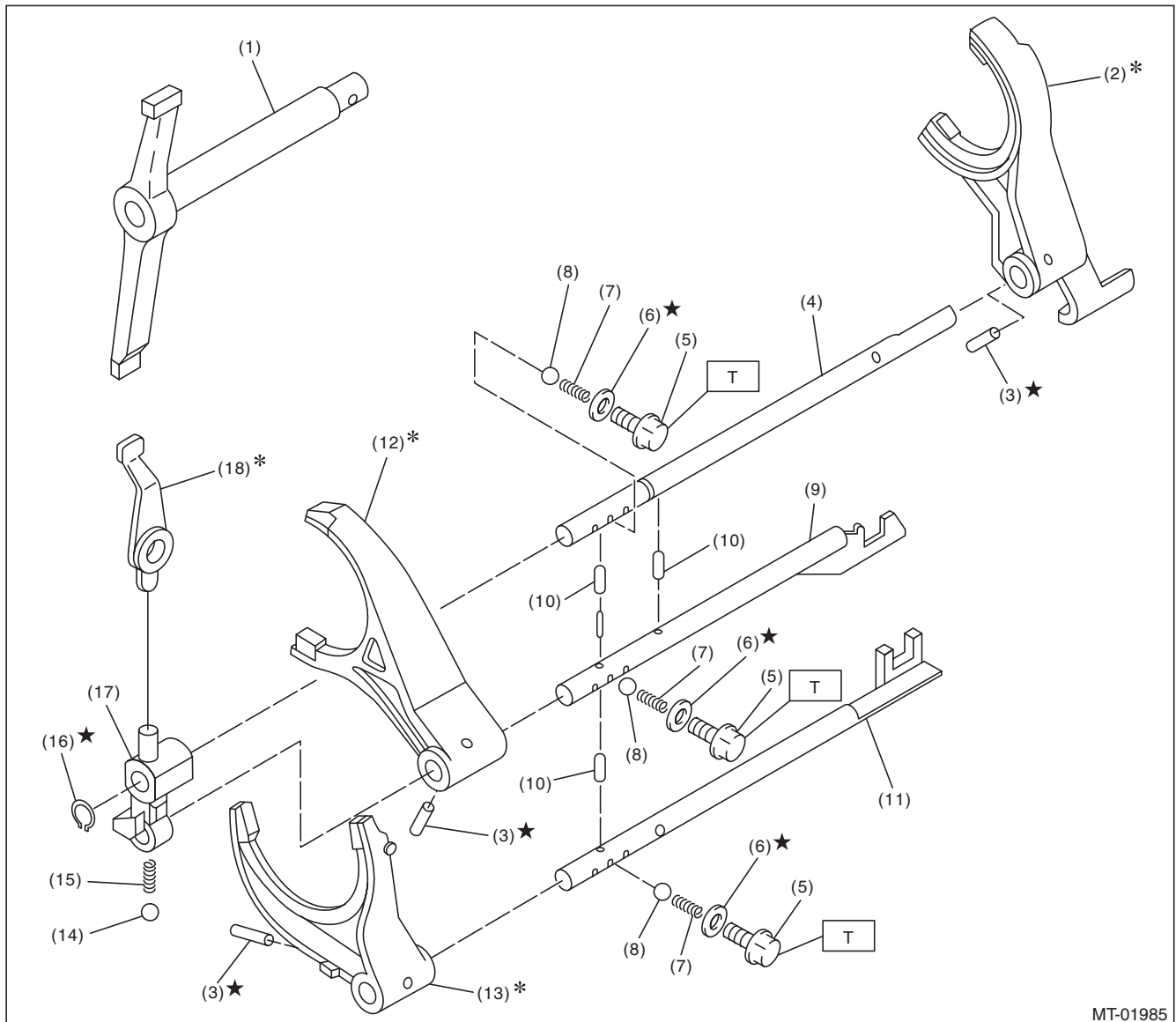
5MT-6

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

4. SHIFTER FORK AND SHIFTER ROD



MT-01985

- | | | |
|--------------------------|---------------------------|----------------------------|
| (1) Shifter arm | (8) Ball | (15) Spring |
| (2) 5th shifter fork | (9) 3rd-4th fork rod | (16) Snap ring (outer) |
| (3) Straight pin | (10) Interlock plunger | (17) Reverse fork rod arm |
| (4) Reverse fork rod | (11) 1st-2nd fork rod | (18) Reverse shifter lever |
| (5) Checking ball plug | (12) 3rd-4th shifter fork | |
| (6) Gasket | (13) 1st-2nd shifter fork | |
| (7) Checking ball spring | (14) Ball | |

Tightening torque: N·m (kgf-m, ft-lb)
T: 20 (2.0, 14.8)

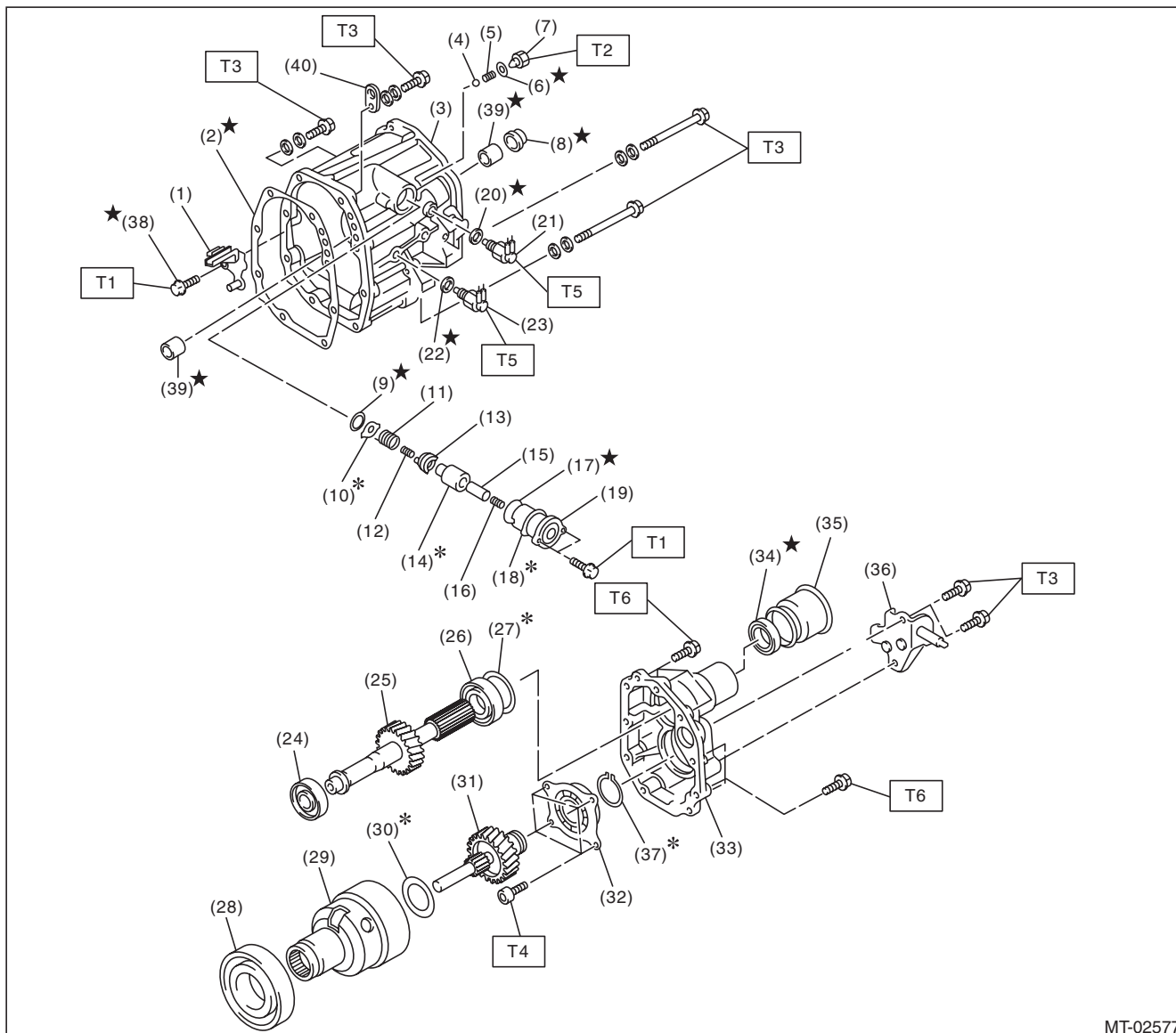
5MT-7

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

5. TRANSFER CASE AND EXTENSION



MT-02577

5MT-8

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General Description

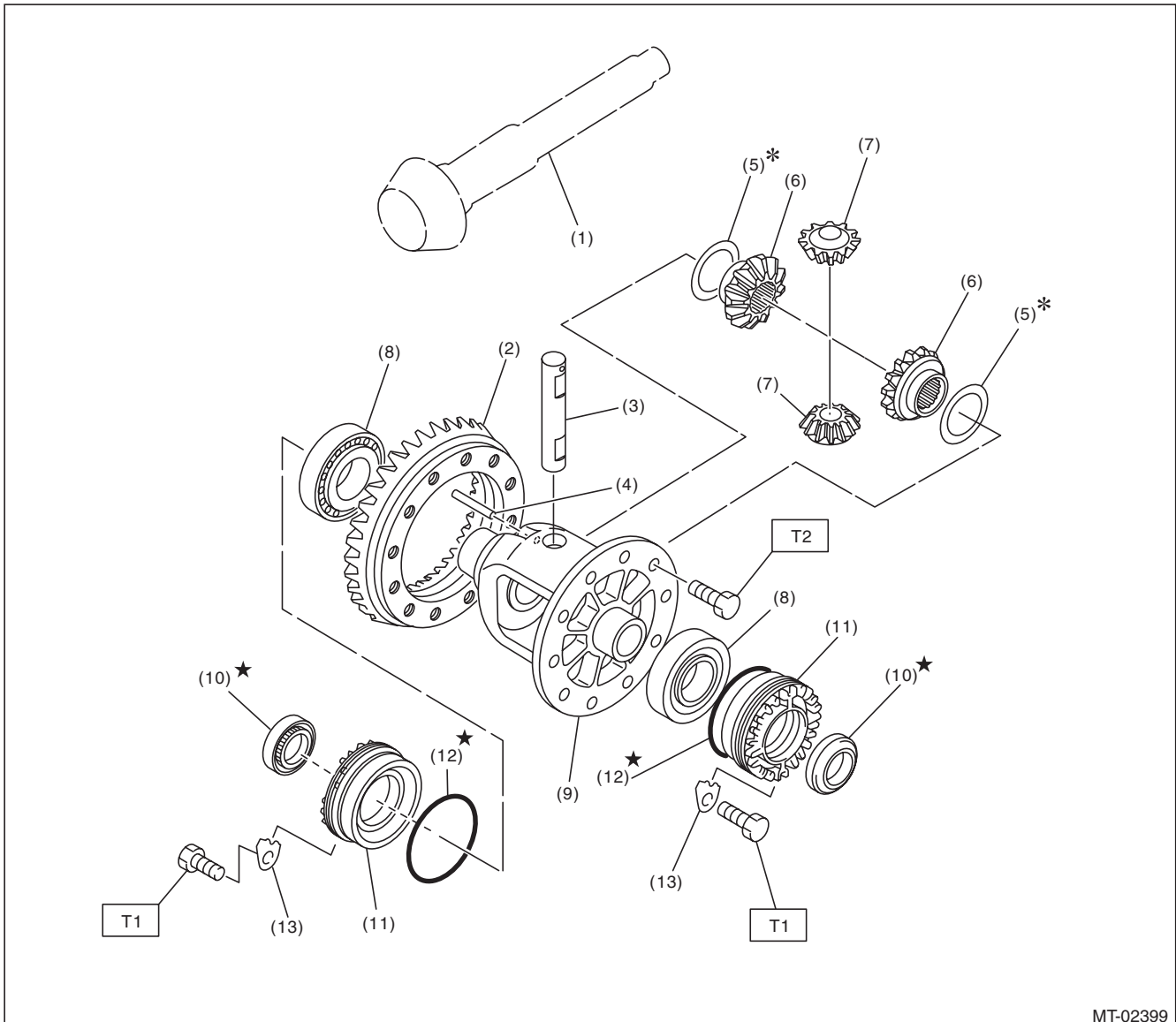
MANUAL TRANSMISSION AND DIFFERENTIAL

(1) Oil guide	(17) O-ring	(33) Extension case
(2) Gasket	(18) Adjusting select shim	(34) Oil seal
(3) Transfer case	(19) Reverse check sleeve	(35) Dust cover
(4) Ball	(20) Gasket	(36) Shift bracket
(5) Reverse accent spring	(21) Neutral position switch	(37) Snap ring
(6) Gasket	(22) Gasket	(38) Precoat bolt
(7) Plug	(23) Back-up light switch	(39) Roller bearing
(8) Oil seal	(24) Roller bearing	(40) Transmission hanger
(9) Snap ring (inner)	(25) Transfer driven gear	
(10) Reverse check plate	(26) Roller bearing	Tightening torque:N-m (kgf-m, ft-lb)
(11) Reverse check spring	(27) Thrust washer	T1: 6.4 (0.7, 4.7)
(12) Reverse return spring	(28) Ball bearing	T2: 9.75 (1.0, 7.2)
(13) Reverse check cam	(29) Center differential	T3: 24.5 (2.5, 18.1)
(14) Reverse accent shaft	(30) Thrust washer	T4: 26 (2.7, 19.2)
(15) Return spring cap	(31) Transfer drive gear	T5: 32.3 (3.3, 23.8)
(16) Return spring	(32) Ball bearing	T6: 40 (4.1, 29.5)

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

6. FRONT DIFFERENTIAL



- (1) Drive pinion shaft
- (2) Hypoid driven gear
- (3) Pinion shaft
- (4) Straight pin
- (5) Washer
- (6) Differential bevel gear

- (7) Differential bevel pinion
- (8) Roller bearing
- (9) Differential case
- (10) Oil seal
- (11) Differential side retainer
- (12) O-ring

- (13) Retainer lock plate

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)

T2: 62 (6.3, 45.7)

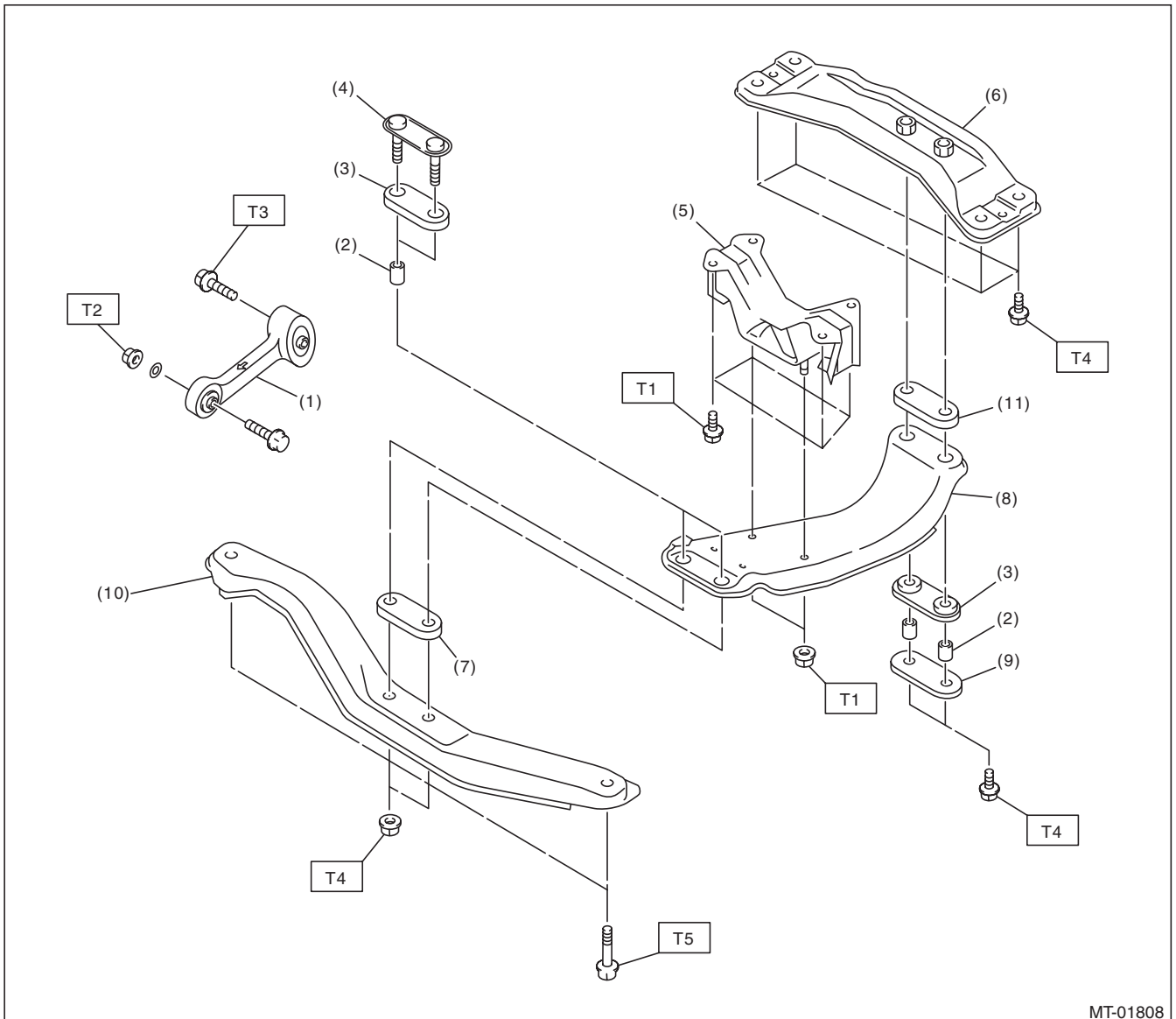
5MT-10

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

7. TRANSMISSION MOUNTING



MT-01808

- | | |
|---------------------------------|--------------------------|
| (1) Pitching stopper | (7) Upper cushion rubber |
| (2) Spacer | (8) Center crossmember |
| (3) Lower cushion rubber | (9) Rear plate |
| (4) Front plate | (10) Front crossmember |
| (5) Transmission cushion rubber | (11) Rear cushion rubber |
| (6) Rear crossmember | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 35 (3.6, 25.8)

T2: 50 (5.1, 36.9)

T3: 58 (5.9, 42.8)

T4: 70 (7.1, 51.6)

T5: 140 (14.3, 103.3)

5MT-11

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

C: CAUTION

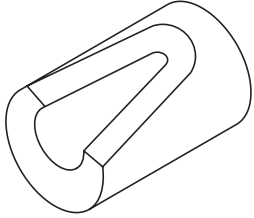
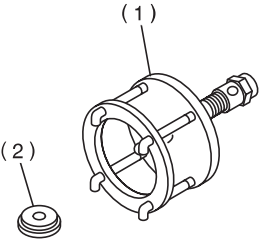
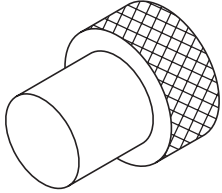
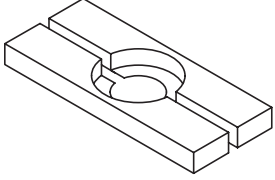
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old liquid gasket.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

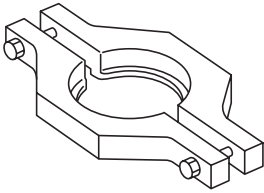
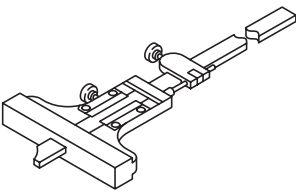
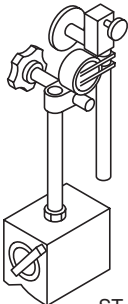
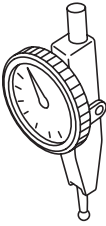
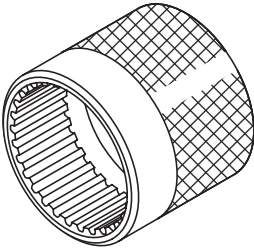
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399411700	399411700	ACCENT BALL INSTALLER	Used for installing reverse shifter rail arm.
 ST-899524100	899524100	PULLER SET	Used for removing and installing the front differential roller bearing. 1. Puller 2. Adapter
 ST-399780104	399780104	WEIGHT	Used for measuring preload on the front differential roller bearing.
 ST-498077000	498077000	REMOVER	- Used for removing the roller bearing of the drive pinion shaft. - Used for removing the roller bearing of the transfer driven gear.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

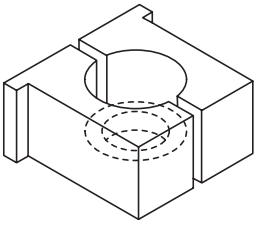
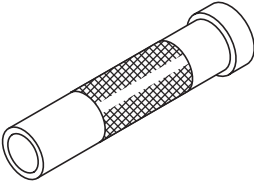
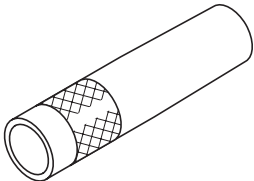
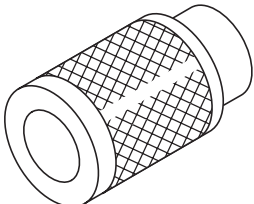
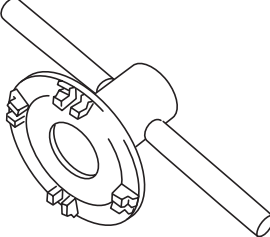
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.
 ST-498147001	498147001	DEPTH GAUGE	Used for adjusting the extension end play and main shaft end play.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring the backlash between bevel pinion gear and hypoid gear. • Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring the backlash between bevel pinion gear and hypoid gear. • Used together with MAGNET BASE (498247001).
 ST-498427100	498427100	STOPPER	• Used for removing and installing the drive pinion shaft assembly lock nut. • Used for backlash measurement of the hypoid gear and preload adjustment of the roller bearing.

5MT-14

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

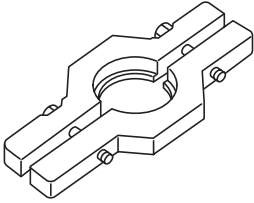
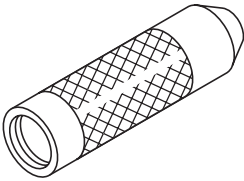
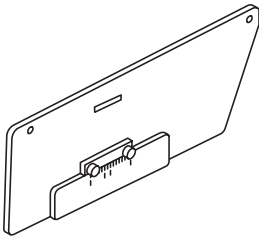
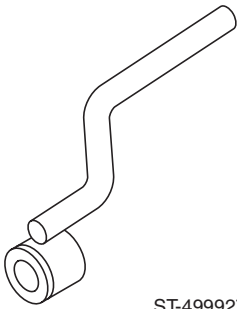
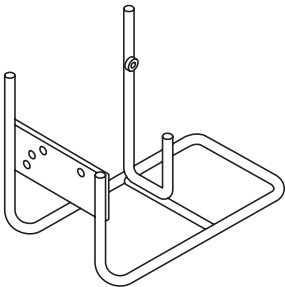
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing the main shaft lock nut.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	- Used for installing the front differential roller bearing inner race. - Used for installing drive pinion shaft washer.
 ST-499277200	499277200	INSTALLER	- Used for installing the 2nd driven gear bushing, 3rd-4th driven gear, roller bearing and 5th driven gear. - Used for installing drive pinion shaft washer.
 ST-499757002	499757002	INSTALLER	- Used for attaching the snap ring (outer 25). - Used for installing the roller bearing of transfer driven gear (transfer case side). - Used for removing the roller bearing and driven gear of the drive pinion shaft.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	- Used for removing and installing the differential side retainer. - Used for backlash measurement of the front differential hypoid gear and preload adjustment of the roller bearing. - WRENCH ASSY (499787000) can also be used.

5MT-15

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

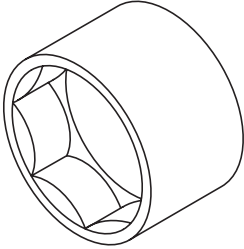
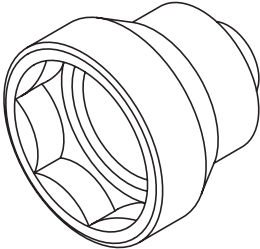
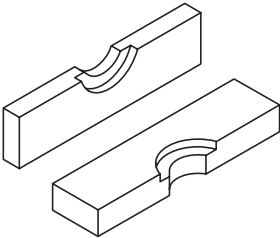
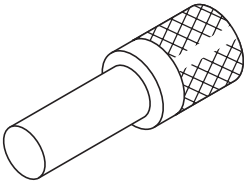
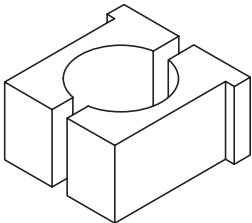
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499857000	499857000	5TH DRIVEN GEAR REMOVER	Used for removing the 5th driven gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	- Used for installing the 4th drive gear needle bearing race, main shaft ball bearing and 5th drive gear thrust washer. - Used together with REMOVER (899714110).
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting the drive pinion shaft shim.
 ST-499927100	499927100	HANDLE	Used for backlash measurement of the front differential hypoid gear and preload adjustment of the roller bearing.
 ST-499937100	499937100	TRANSMISSION STAND	Used for disassembling and assembling the transmission.

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

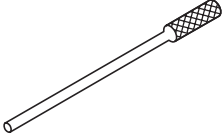
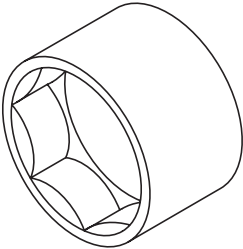
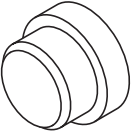
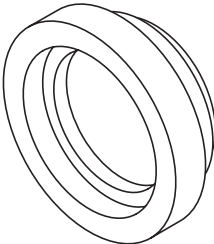
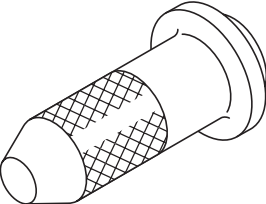
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the driven pinion lock nut and main shaft lock nut.
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven gear assembly lock nut.
 ST-899714110	899714110	REMOVER	Used for installing the transmission main shaft, drive pinion shaft and rear drive shaft.
 ST-899864100	899864100	REMOVER	• Used for removing transmission main shaft parts. • Used for installing the roller bearing of the transfer case. • Used for installing the roller bearing of transfer driven gear (extension case side). • Used for installing the roller bearing of transfer driven gear (transfer case side).
 ST-899884100	899884100	HOLDER	• Used for removing and installing the drive pinion shaft lock nut. • Used for removing and installing the driven shaft lock nut. • Used for measuring the starting torque of the drive pinion shaft.

5MT-17

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

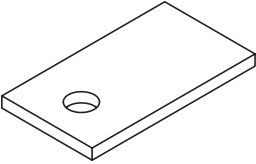
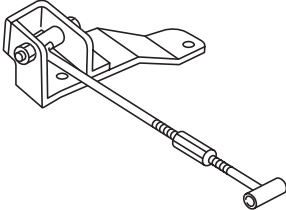
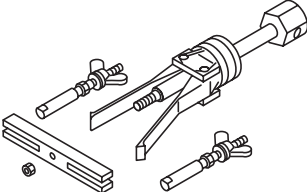
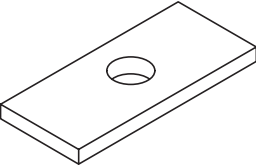
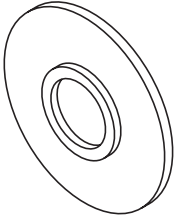
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	• Used for removing and installing the drive pinion shaft lock nut. • Used for measuring the starting torque of the drive pinion shaft.
 ST-398497701	398497701	ADAPTER	Used for installing the front differential roller bearing.
 ST-499587000	499587000	INSTALLER	Used for installing the driven shaft parts.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.

5MT-18

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

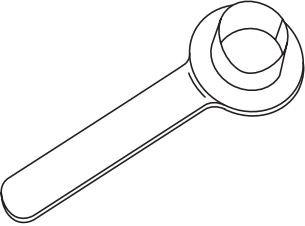
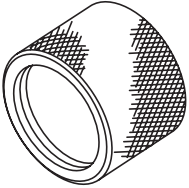
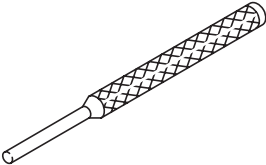
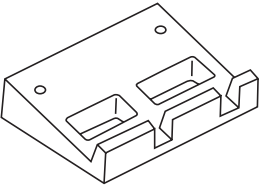
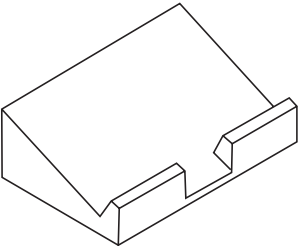
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498255400	498255400	PLATE	Used for adjusting the extension end play.
 ST41099AC000	41099AC000	ENGINE SUPPORT ASSY	Used for supporting engine.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension oil seal. • Used for removing the bearing outer race and oil seal of front differential side retainer.
 ST-398643600	398643600	GAUGE	Used for adjusting the extension end play.
 ST-398177700	398177700	INSTALLER	• Used for installing the roller bearing of transfer driven gear (extension case side). • Used for installing the ball bearing of the transfer drive gear.

5MT-19

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting the oil seal from damage when inserting the front drive shaft.
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST-398791700	398791700	STRAIGHT PIN REMOVER 2	Used for installing and removing the straight pin.
 ST-498267200	498267200	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.
 ST-498267300	498267300	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.

5MT-20

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
TORX® bit T70	Used for installing and removing the drain plug.

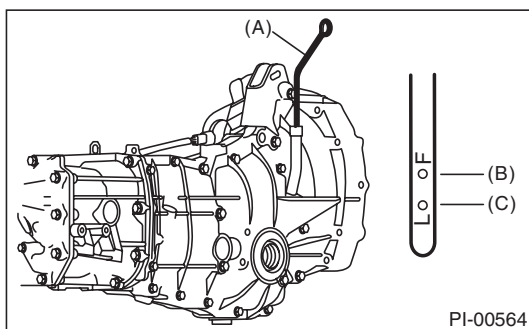
Transmission Gear Oil

MANUAL TRANSMISSION AND DIFFERENTIAL

2. Transmission Gear Oil

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Turn the ignition switch to OFF, and wait until the engine cools.
- 3) Remove the oil level gauge and wipe it clean.
- 4) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted in the proper direction.
- 5) Pull out the oil level gauge again, and check the oil level. If it is below the lower level, add oil through the oil level gauge hole to bring the level up to the upper level.



- (A) Oil level gauge
(B) Upper level
(C) Lower level

B: REPLACEMENT

- 1) Pull out the oil level gauge.
- 2) Lift up the vehicle.
- 3) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

CAUTION:

- Immediately after the vehicle has been running or after idling for a long time, the transmission gear oil will be hot. Be careful not to receive burns.
 - Be careful not to spill the transmission gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If gear oil is spilled, wipe it off completely.
- 4) Tighten the drain plug using TORX® bit T70.

NOTE:

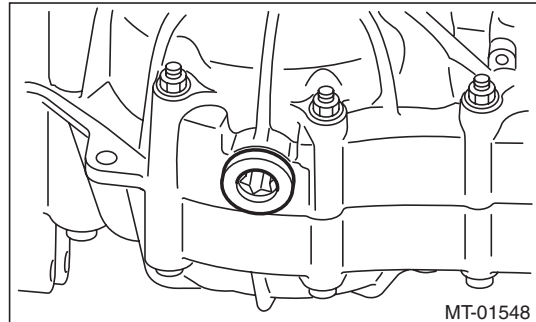
- Tighten the drain plug after draining the transmission gear oil.
- Use a new gasket.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket silver)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket brown)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Metal gasket black)



- 5) Lower the vehicle.
- 6) Pour gear oil through the oil level gauge hole.

Recommended gear oil:

GL-5 (75W-90) or equivalent

Gear oil capacity:

3.5 ℓ (3.7 US qt, 3.1 Imp qt)

- 7) Measure the transmission gear oil amount, and check that it is within the specification.

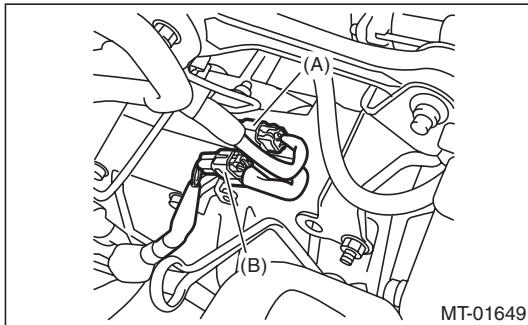
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3. Manual Transmission Assembly

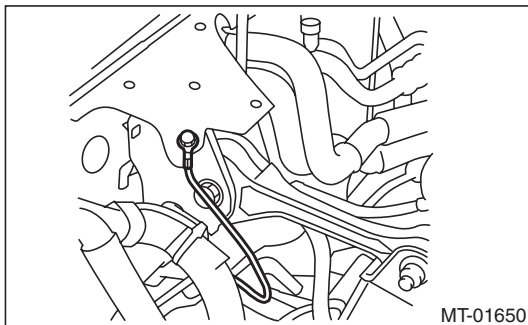
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Open the front hood.
- 3) Disconnect the ground cable from battery.
- 4) Drain transmission gear oil completely. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>
- 5) Remove the intercooler. <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 6) Disconnect the following connector.

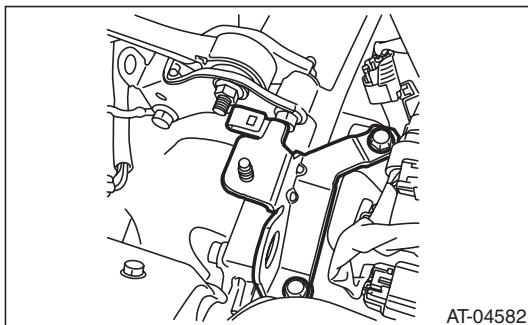


- (A) Neutral position switch and back-up light switch connector
(B) Rear oxygen sensor connector

- 7) Disconnect the transmission radio ground terminal.

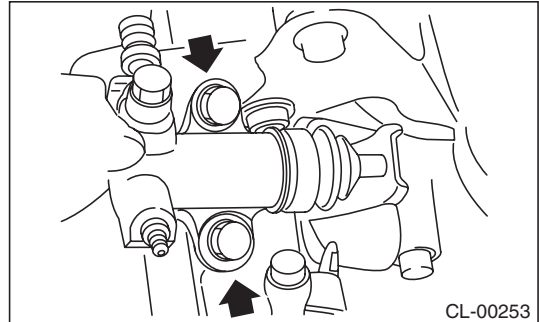


- 8) Remove the engine hanger.

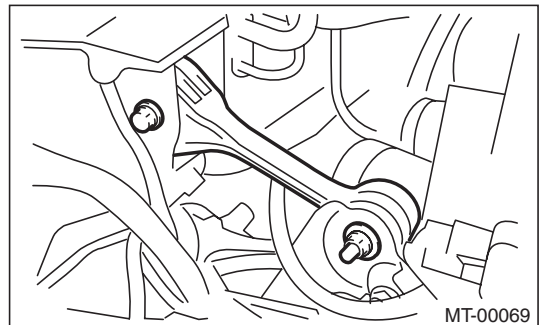


- 9) Remove the starter. <Ref. to SC(w/o STI)-2, General Description.>

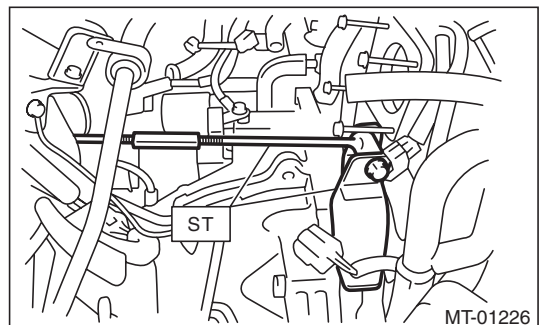
- 10) Remove the operating cylinder from the transmission, and suspend on a wire.



- 11) Remove the pitching stopper.



- 12) Set the ST.
ST 41099AC000 ENGINE SUPPORT ASSY



- 13) Lift up the vehicle.
- 14) Remove the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>
- 15) Remove the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>

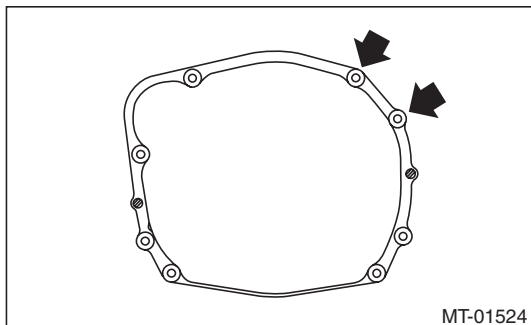
CAUTION:

When removing the exhaust pipes, make sure that each exhaust pipe does not drop off.

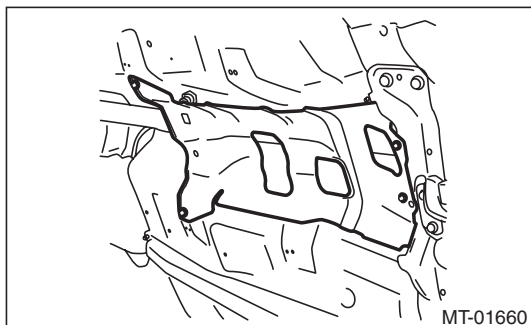
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

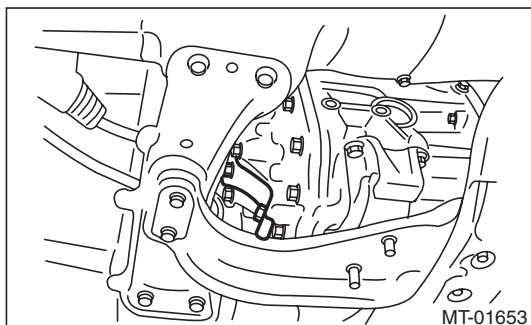
16) Remove the bolts which hold upper side of transmission to engine.



17) Remove the heat shield cover.



18) Remove the hangar bracket from the transmission.

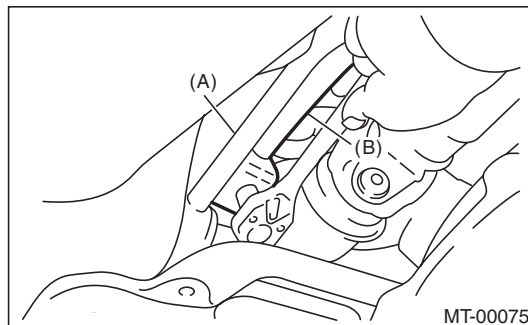


19) Remove the propeller shaft. <Ref. to DS-11, REMOVAL, Propeller Shaft.>

20) Remove the gear shift rod and the stay from the transmission.

(1) Disconnect the stay from the transmission.

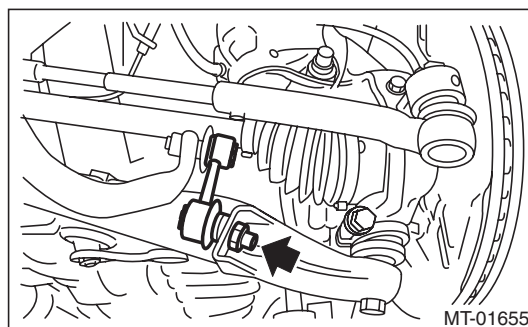
(2) Disconnect the gear shift rod from the transmission.



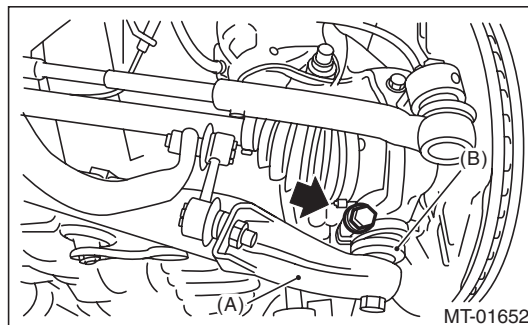
(A) Stay

(B) Gear shift rod

21) Disconnect the stabilizer link from the front arm.



22) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.



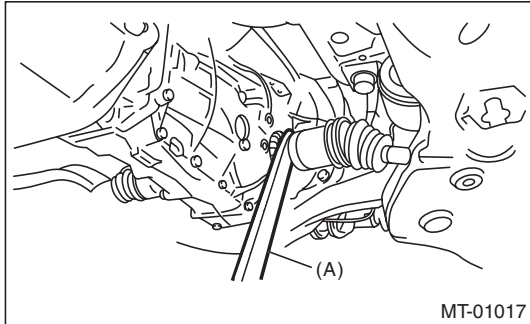
(A) Front arm

(B) Ball joint

Manual Transmission Assembly

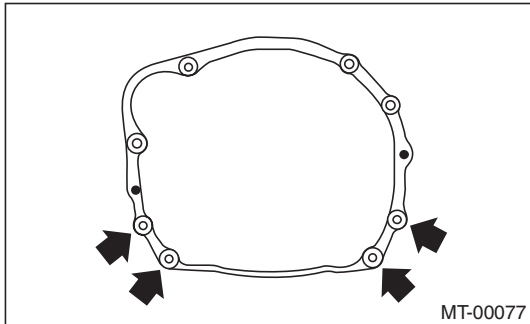
MANUAL TRANSMISSION AND DIFFERENTIAL

23) Using a crowbar, remove the left and right front drive shaft from the transmission.



(A) Crowbar

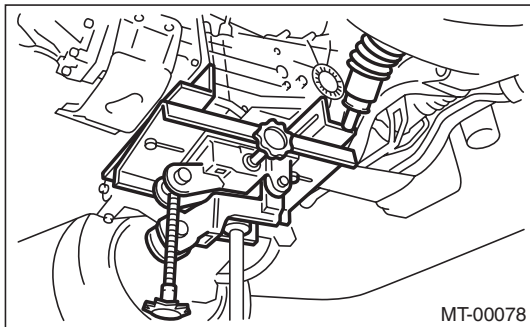
24) Remove the bolts and nuts which hold lower side of transmission to engine.



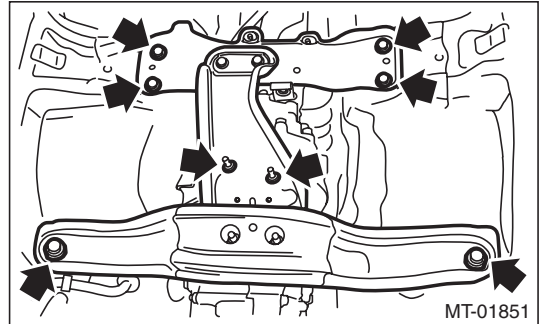
25) Place the transmission jack under the transmission.

CAUTION:

Always support the transmission case with a transmission jack.



26) Remove the front crossmember and rear crossmember from the vehicle.



27) While lowering the transmission jack, tighten the turnbuckle of the ST, and incline the engine unit rearward.

28) Remove the transmission.

NOTE:

Move the transmission jack towards the rear until the main shaft is withdrawn from the clutch disc.

29) Separate the transmission assembly from the transmission cushion rubber.

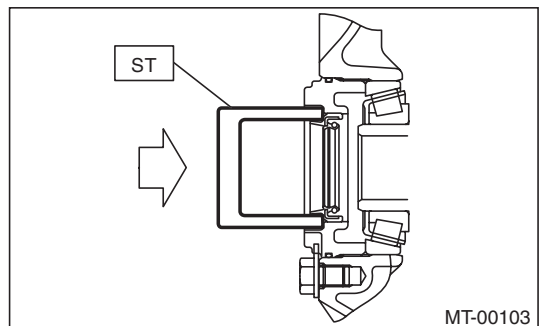
B: INSTALLATION

1) Replace the differential side retainer oil seal. <Ref. to 5MT-32, REPLACEMENT, Differential Side Retainer Oil Seal.>

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:

Be sure to replace the differential side retainer oil seal after removing the front drive shaft.



2) Tap the transmission hanger in the rear side of transmission with a rubber hammer to bend it until it is in close contact with the transmission case.

CAUTION:

Do not apply excessive load or impact to the transmission case.

3) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).

Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Install the transmission cushion rubber to the center crossmember, and tighten the nut (B).

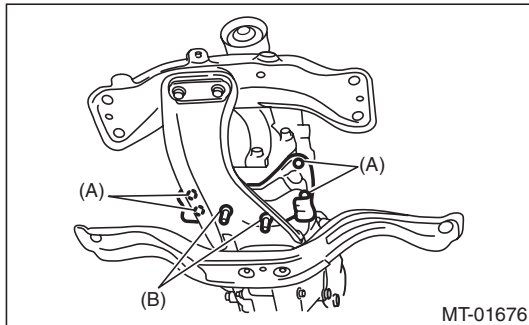
Tightening torque:

Bolt (A)

35 N·m (3.6 kgf-m, 25.8 ft-lb)

Nut (B)

35 N·m (3.6 kgf-m, 25.8 ft-lb)



5) Install the transmission onto the engine.

- (1) Lift up the transmission gradually using a transmission jack.
- (2) Engage at the spline section.

NOTE:

Be careful not to hit the main shaft against the clutch cover.

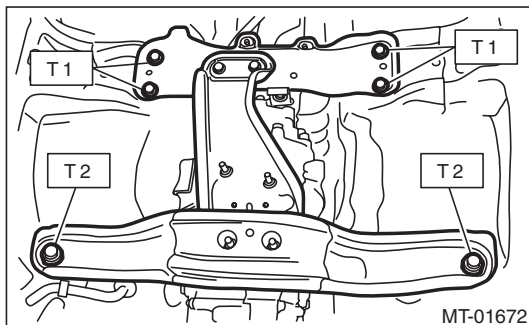
6) While raising the transmission jack, loosen the turnbuckle of the ST, and set the engine unit to the original position.

7) Install the front crossmember and rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)

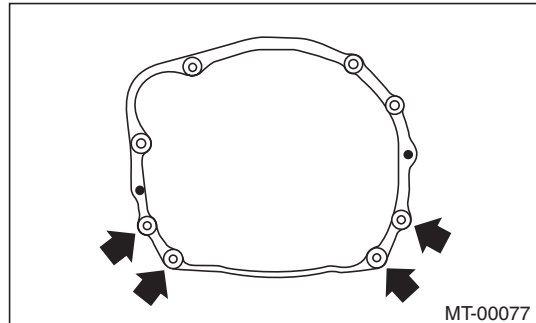


8) Take out the transmission jack.

9) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

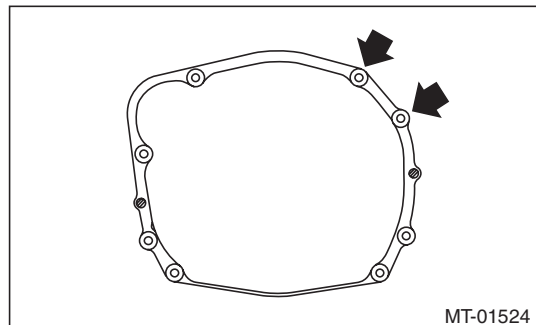


10) Connect the transmission to the engine.

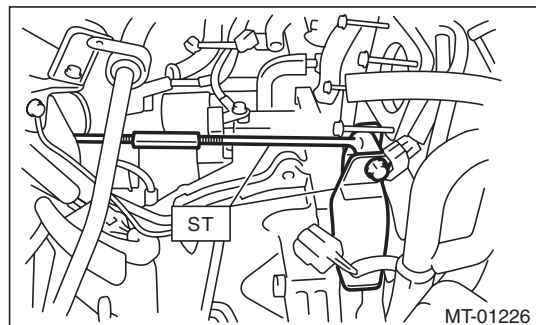
- (1) Install the starter. <Ref. to SC(w/o STI)-2, General Description.>
- (2) Tighten the bolts which hold the upper side of the transmission to the engine.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



11) Remove the ST.



Manual Transmission Assembly

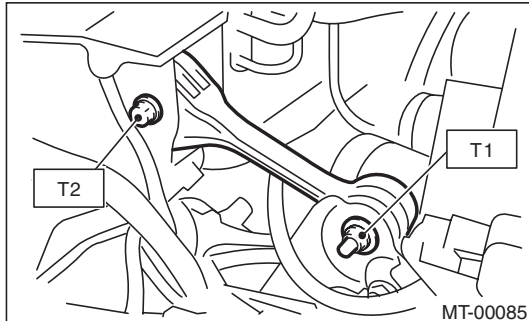
MANUAL TRANSMISSION AND DIFFERENTIAL

12) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

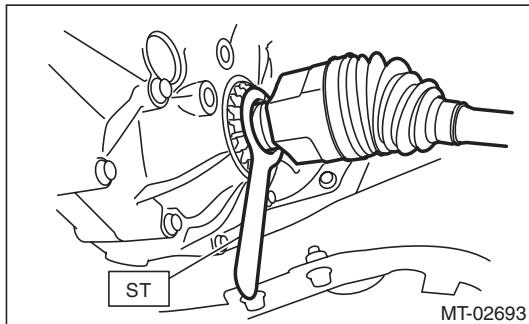
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



13) Lift up the vehicle.

14) Install the front drive shaft into the transmission.

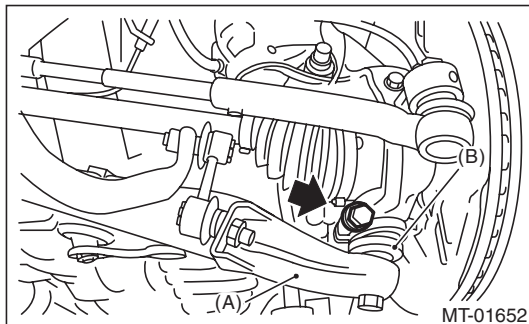
ST 28399SA010 OIL SEAL PROTECTOR



15) Insert the front arm ball joint into the housing lower part, and tighten the mounting bolt.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

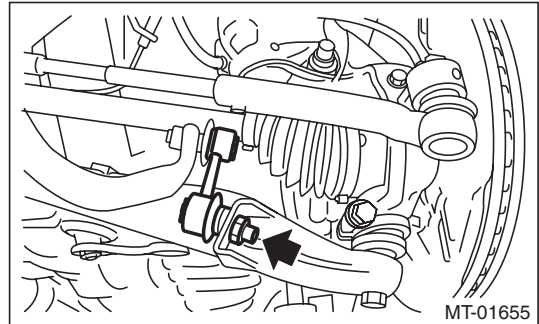


- (A) Front arm
- (B) Ball joint

16) Attach the stabilizer link to the front arm.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)

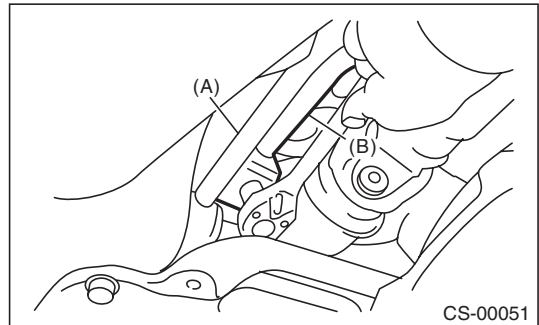


17) Attach the gear shift rod and stay.

(1) Attach the gear shift rod to the transmission.

Tightening torque:

12 N·m (1.2 kgf-m, 8.9 ft-lb)



- (A) Stay
- (B) Gear shift rod

(2) Install the stay to the transmission bracket.

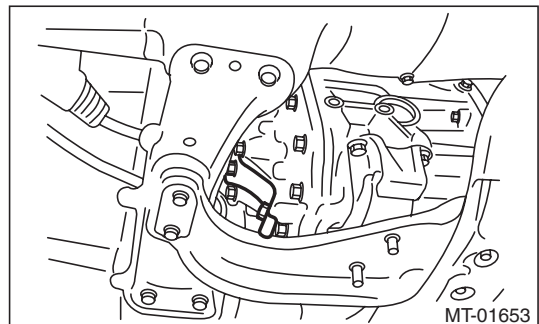
Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

18) Install the propeller shaft. <Ref. to DS-12, INSTALLATION, Propeller Shaft.>

19) Install the heat shield cover. <Ref. to EI-74, INSTALLATION, Heat Shield Cover.>

20) Install the hanger bracket to the transmission.



21) Install the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>

22) Install the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>

5MT-27

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Manual Transmission Assembly

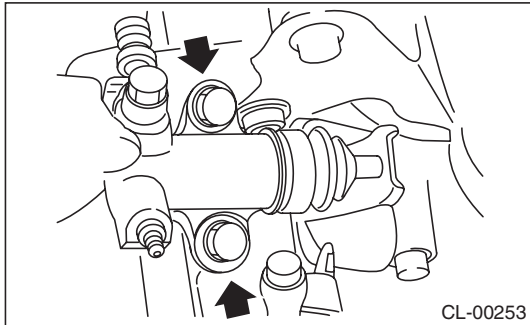
MANUAL TRANSMISSION AND DIFFERENTIAL

23) Install the under cover. <Ref. to EI-28, INSTALLATION, Front Under Cover.>

24) Install the operating cylinder.

Tightening torque:

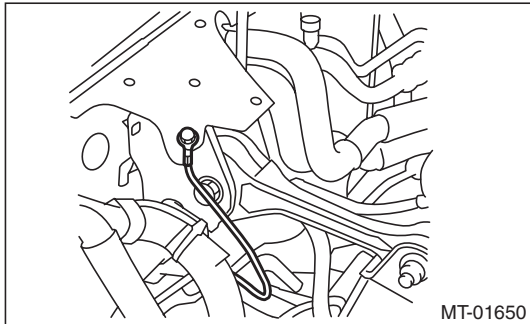
37 N·m (3.8 kgf-m, 27.3 ft-lb)



25) Install the transmission radio ground terminal.

Tightening torque:

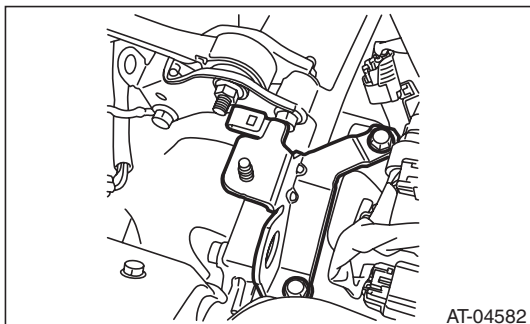
13 N·m (1.3 kgf-m, 9.6 ft-lb)



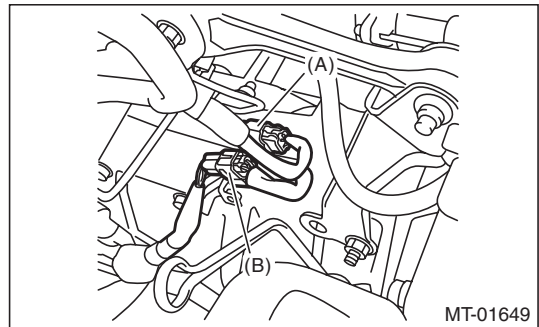
26) Install the engine hanger.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)



27) Connect the following connectors.



(A) Neutral position switch and back-up light switch connector

(B) Rear oxygen sensor connector

28) Install the intercooler. <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>

29) Connect the battery ground terminal.

30) Remove the lift arm from vehicle.

Transmission Mounting System

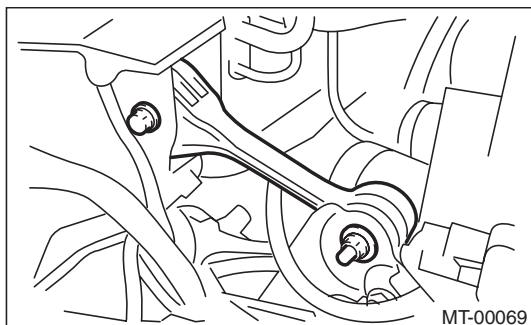
MANUAL TRANSMISSION AND DIFFERENTIAL

4. Transmission Mounting System

A: REMOVAL

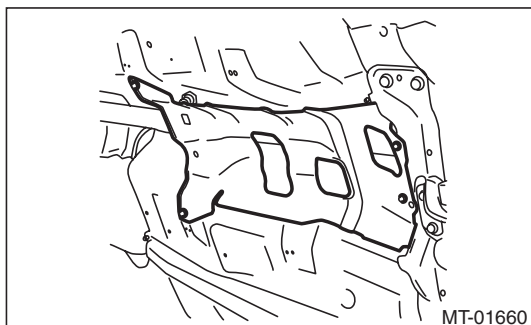
1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 3) Remove the pitching stopper.



2. CROSSMEMBER AND CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>
- 4) Remove the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>
- 5) Remove the heat shield cover.

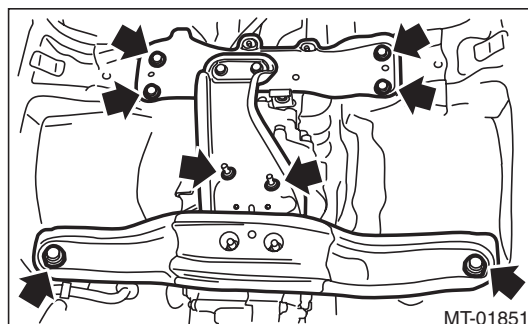


- 6) Set the transmission jack under the transmission case.

CAUTION:

Always support the transmission case with a transmission jack.

- 7) Remove the front crossmember and the rear crossmember.



- 8) Remove the transmission cushion rubber.

B: INSTALLATION

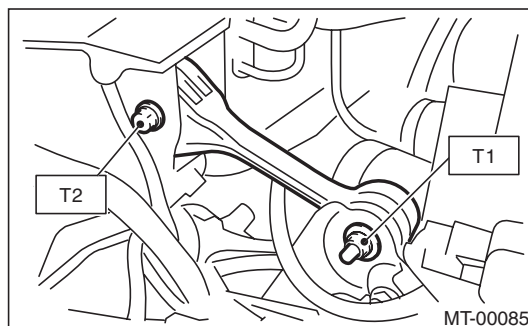
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



- 2) Install the intercooler. <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>
- 3) Connect the battery ground terminal.

2. CROSSMEMBER AND CUSHION RUBBER

- 1) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).

Transmission Mounting System

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Install the transmission cushion rubber to the center crossmember, and tighten the nut (B).

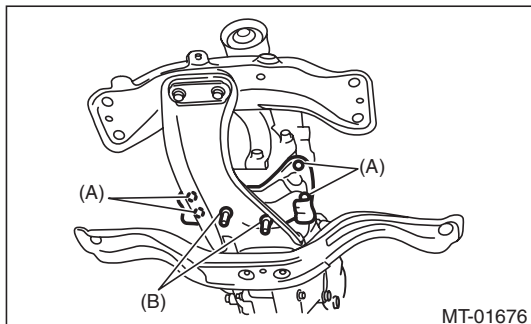
Tightening torque:

Bolt (A)

35 N·m (3.6 kgf-m, 25.8 ft-lb)

Nut (B)

35 N·m (3.6 kgf-m, 25.8 ft-lb)

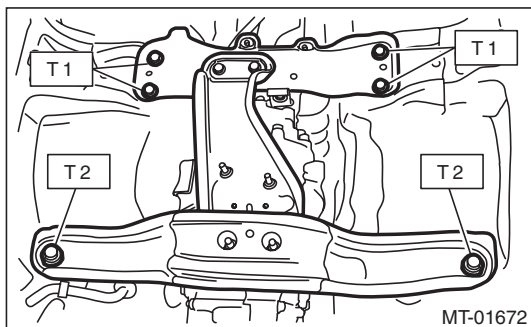


3) Install the front crossmember and rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103.3 ft-lb)



- 4) Remove the transmission jack.
- 5) Install the heat shield cover. <Ref. to EI-74, INSTALLATION, Heat Shield Cover.>
- 6) Install the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>
- 7) Install the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>
- 8) Lower the vehicle.
- 9) Connect the battery ground terminal.

C: INSPECTION

Check the following; repair or replace the faulty parts.

1. PITCHING STOPPER

Check the pitching stopper for bends or damage.
Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check the crossmember for bending or damage.
Check that the cushion rubber does not have hardening, cracks or other damages.

Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

5. Oil Seal

A: INSPECTION

Check for leakage of transmission gear oil from the oil seal. If there is oil leakage, replace the oil seal with the new part and check the propeller shaft.

B: REPLACEMENT

- 1) Clean the transmission exterior.
- 2) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.
- 3) Tighten the drain plug using TORX® bit T70.

NOTE:

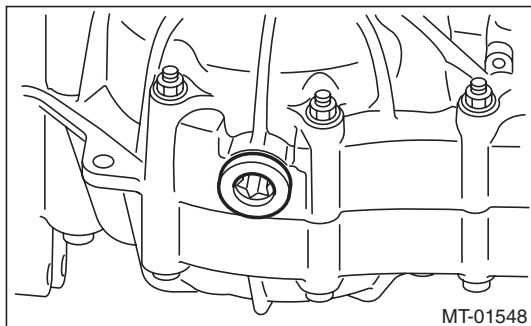
Use a new gasket.

Tightening torque:

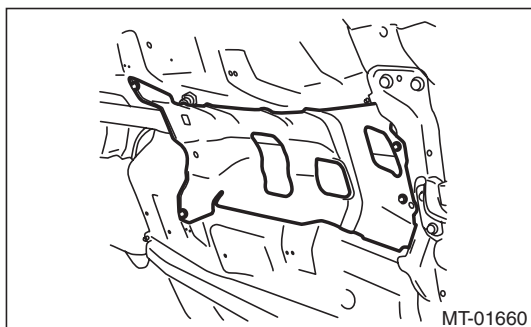
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket silver)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket brown)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Metal gasket black)



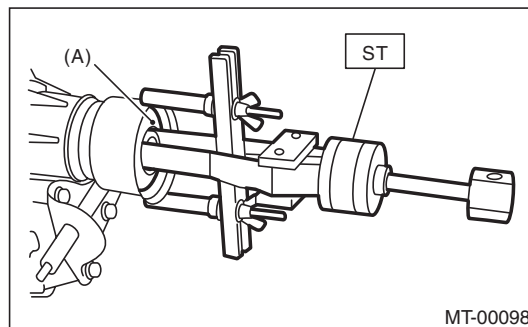
- 4) Remove the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>
- 5) Remove the heat shield cover.



- 6) Remove the propeller shaft. <Ref. to DS-11, REMOVAL, Propeller Shaft.>

- 7) Using the ST, remove the oil seal.

ST 398527700 PULLER ASSY



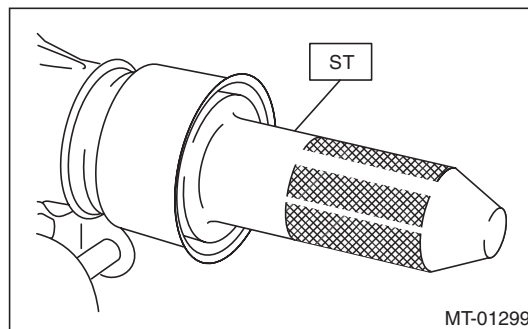
(A) Oil seal

- 8) Using the ST, install the oil seal.

NOTE:

- When grease is not applied to the oil seal lips, apply the transmission gear oil to the oil seal lips.
- Use a new oil seal.

ST 498057300 INSTALLER



- 9) Install the propeller shaft. <Ref. to DS-12, INSTALLATION, Propeller Shaft.>
- 10) Install the heat shield cover. <Ref. to EI-74, INSTALLATION, Heat Shield Cover.>
- 11) Install the rear exhaust pipe and muffler. <Ref. to EX(w/o STI)-2, General Description.>
- 12) Pour in transmission gear oil and check the oil level. <Ref. to 5MT-22, Transmission Gear Oil.>

Differential Side Retainer Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

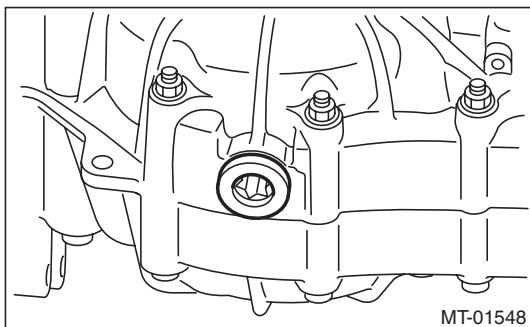
6. Differential Side Retainer Oil Seal

A: INSPECTION

Check for leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal with the new part and check the drive shaft.

B: REPLACEMENT

- 1) Lift up the vehicle.
- 2) Remove the transmission gear oil drain plug using TORX® bit T70, and drain the transmission gear oil completely.



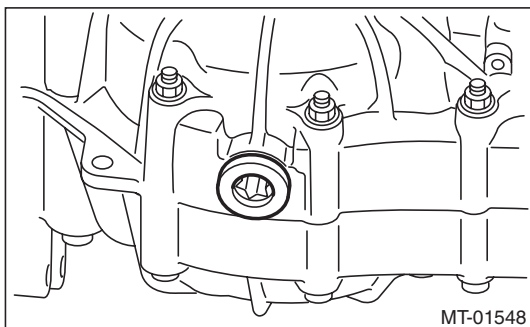
- 3) Replace the gasket with a new part and tighten the drain plug using the TORX® bit T70.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket silver)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket brown)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Metal gasket black)



- 4) Remove the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>
- 5) Separate the front drive shaft from the transmission. <Ref. to DS-27, REMOVAL, Front Drive Shaft.>

- 6) Remove the differential side retainer oil seal.

NOTE:

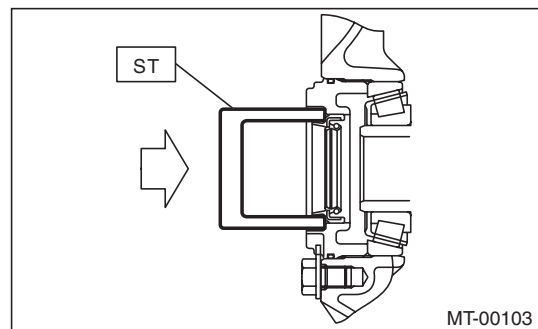
- Be sure to replace the differential side retainer oil seal whenever the front drive shaft is removed from the transmission.
- Use the ST 398527700 PULLER ASSY to remove the oil seal. If removing the oil seal with a flat tip screwdriver, be careful not to scratch the differential side retainer.

- 7) Using the ST, install the differential side retainer oil seal by lightly tapping with a plastic hammer.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

CAUTION:

Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.



- 8) Install the front drive shaft. <Ref. to DS-27, INSTALLATION, Front Drive Shaft.>

ST 28399SA010 OIL SEAL PROTECTOR

- 9) Install the center exhaust pipe. <Ref. to EX(w/o STI)-2, General Description.>

- 10) Lower the vehicle.

- 11) Add the transmission gear oil through the oil level gauge hole. <Ref. to 5MT-22, REPLACEMENT, Transmission Gear Oil.>

Switches and Harness

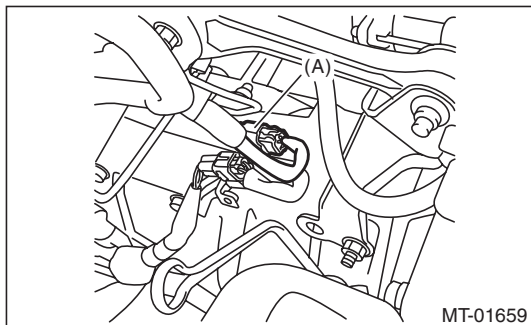
MANUAL TRANSMISSION AND DIFFERENTIAL

7. Switches and Harness

A: REMOVAL

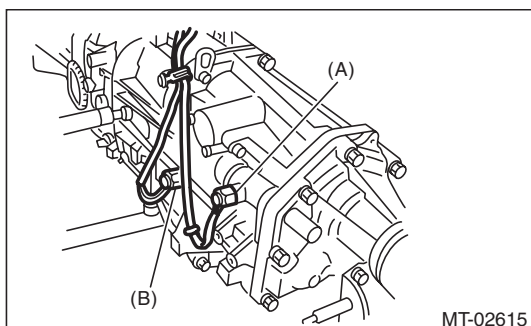
1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 3) Disconnect the connector back-up light switch & neutral position switch.



(A) Neutral position switch and back-up light switch connector

- 4) Lift up the vehicle.
- 5) Remove the back-up light switch & neutral position switch with the harness.



(A) Neutral position switch
(B) Back-up light switch

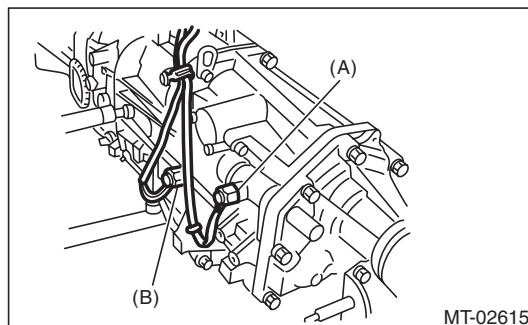
B: INSTALLATION

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

- 1) Install the back-up light switch & neutral position switch with the harness.

Tightening torque:

32.3 N·m (3.3 kgf-m, 23.8 ft-lb)



(A) Neutral position switch
(B) Back-up light switch

- 2) Connect the connectors of back-up light switch & neutral position switch.
- 3) Install the intercooler. <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>
- 4) Connect the battery ground terminal.

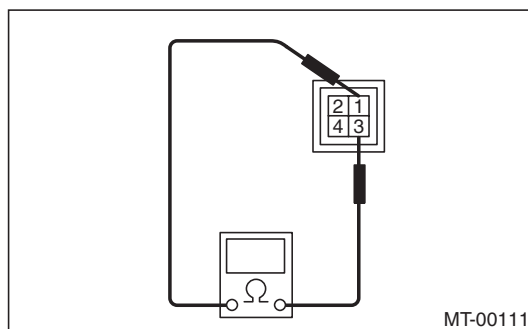
C: INSPECTION

1. BACK-UP LIGHT SWITCH

Check the back-up light switch. <Ref. to LI-8, INSPECTION, Back-up Light System.>

2. NEUTRAL POSITION SWITCH

- 1) Turn the ignition switch to OFF.
- 2) Disconnect the connector of neutral position switch.
- 3) Measure the resistance between neutral position switch terminals.



Gear shift position	Terminal No.	Specified resistance
Neutral position	1 and 3	Less than 1 Ω
Other positions		1 M Ω or more

- 4) Replace faulty parts.

Preparation for Overhaul

MANUAL TRANSMISSION AND DIFFERENTIAL

8. Preparation for Overhaul

A: PROCEDURE

- 1) Clean oil, grease, dirt and dust from the transmission.
- 2) Using the TORX® bit T70, remove the transmission gear oil drain plug, and drain the transmission gear oil completely.
- 3) Using the TORX® bit T70, tighten the transmission gear oil drain plug.

NOTE:

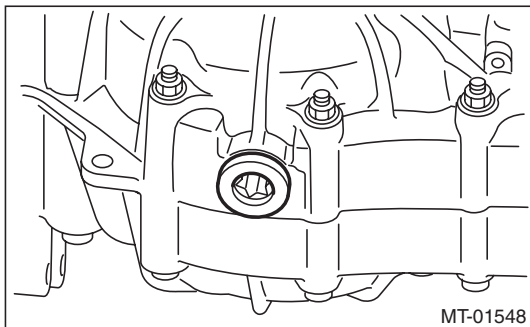
Use a new gasket.

Tightening torque:

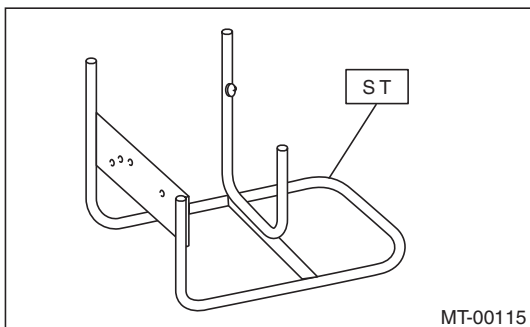
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket silver)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket brown)

70 N·m (7.1 kgf-m, 51.6 ft-lb) (Metal gasket black)



- 4) Attach the transmission to the ST.
ST 499937100 TRANSMISSION STAND



- 5) Apply oil to rotating parts before assembly.
- 6) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
- 7) Gaskets, lock washers and lock nuts must be replaced with new ones.
- 8) Apply liquid gasket to the specified areas to prevent leakage.

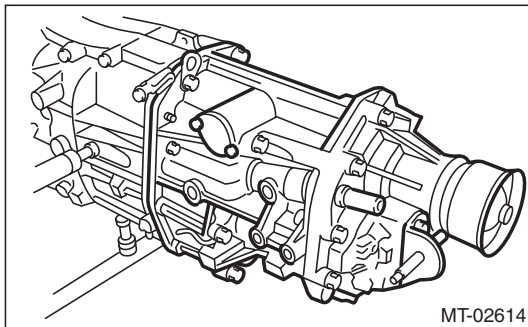
Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

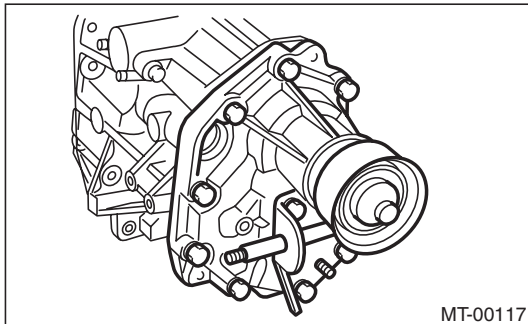
9. Transfer Case and Extension Case Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly.

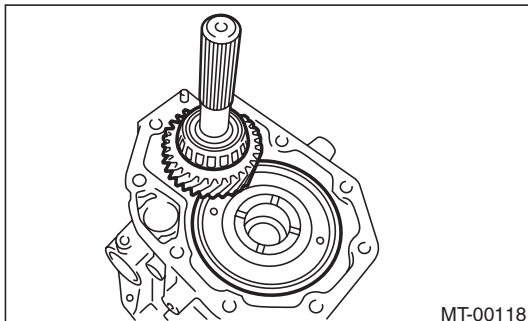


- 4) Remove the shifter arm.
- 5) Remove the extension case assembly.

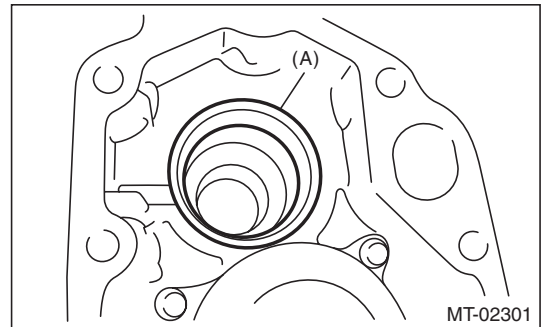


B: INSTALLATION

- 1) Install the center differential and transfer driven gear into the transfer case.

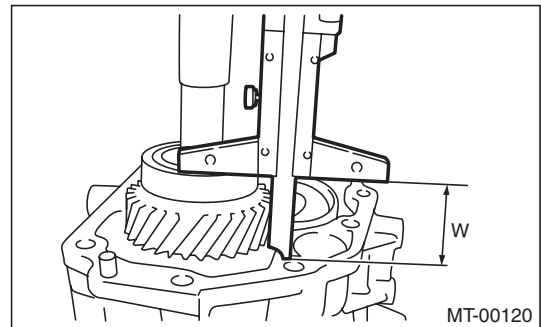


- 2) Remove the bearing outer race and thrust washer from the extension case.



(A) Bearing outer race

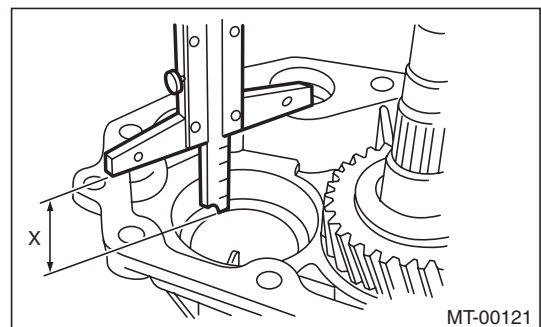
- 3) While pressing the bearing outer race horizontally, rotate the driven shaft for ten turns.
- 4) Measure the height "W" between transfer case and taper roller bearing on the transfer driven gear.



- 5) Measure depth "X" of bearing insertion part of the extension case.

NOTE:

Measure with bearing outer race and thrust washer removed.



- 6) Calculate the thrust washer thickness "t" using the following calculation.

$$t = X - W + (0.15 - 0.20 \text{ mm } (0.006 - 0.008 \text{ in}))$$

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

7) Select the washer with the nearest value in the following table.

Preload of the taper roller bearing (amount of standard protrusion):

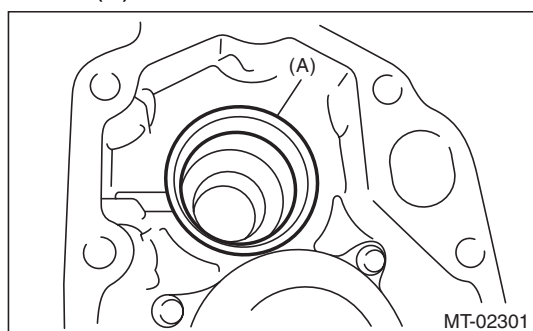
0.15 — 0.20 mm (0.006 — 0.008 in)

NOTE:

Be sure that it is always within the preload.

Thrust washer (61 × 50 × t)	
Part No.	Thickness mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0571)

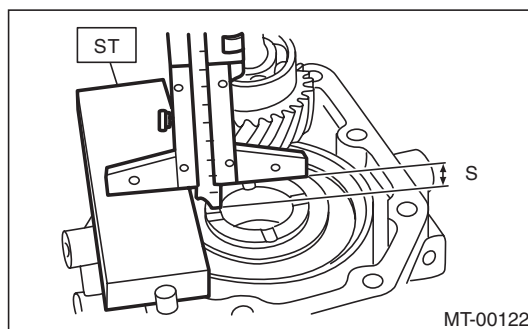
8) Install the selected thrust washer and bearing outer race (A) into the extension case.



(A) Bearing outer race

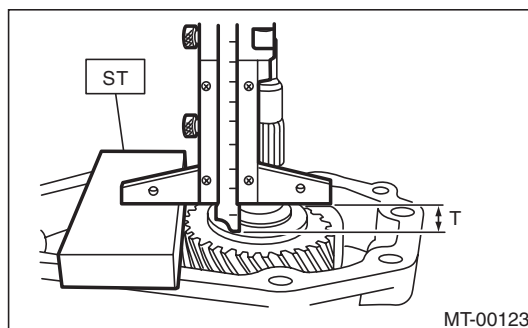
9) Measure the depth "S" between transfer case and center differential.

ST 398643600 GAUGE



10) Measure the height "T" between the extension case and transfer drive gear.

ST 398643600 GAUGE



NOTE:

Thickness of ST: 15 mm (0.59 in)

11) Calculate the thrust washer thickness "U" using the following calculation.

$U = S + T - 30 \text{ mm (1.18 in)}$ [Thickness of ST]

12) Select a suitable washer in the following table.

Standard clearance:

0.15 — 0.35 mm (0.0059 — 0.0138 in)

Thrust washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)
803036080	1.8 (0.071)
803036081	1.9 (0.075)

13) Fit the thrust washer onto the center differential.

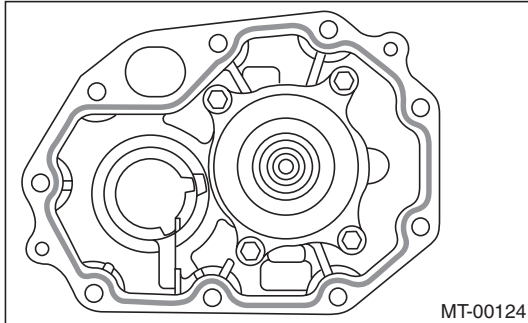
Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

14) Apply a proper amount of liquid gasket to the transfer case mating surface.

Liquid gasket:

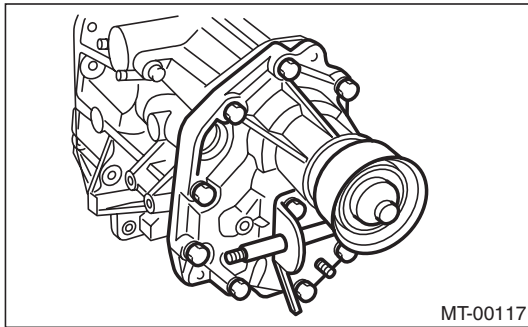
THREE BOND 1215 (Part No. 004403007) or equivalent



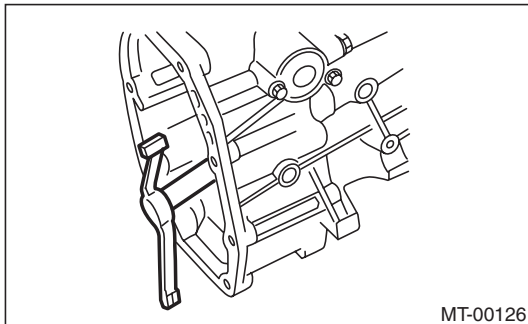
15) Attach the extension assembly to the transfer case.

Tightening torque:

40 N·m (4.1 kgf-m, 29.5 ft-lb)



16) Attach the shifter arm to transfer case.

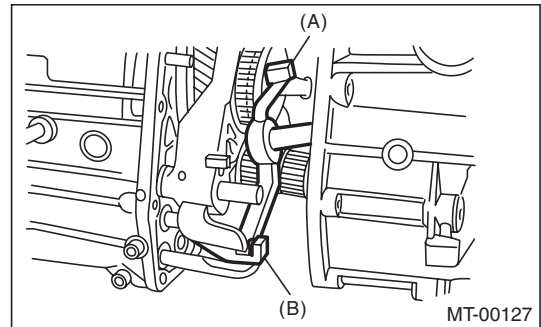


17) Attach the gasket.

NOTE:

Use a new gasket.

18) Hang the shifter arm on 3rd-4th fork rod.



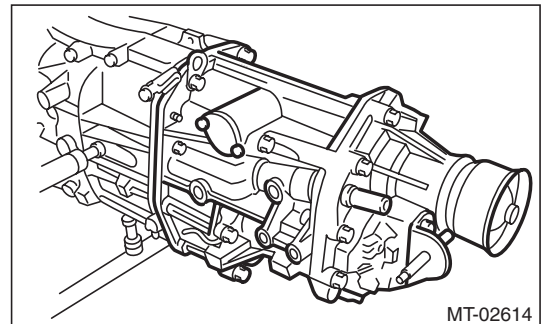
(A) Shifter arm

(B) 3rd-4th fork rod

19) Install the extension case assembly along with the transfer case to the transmission case.

Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

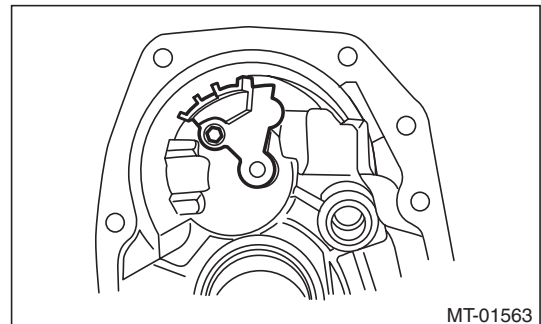


C: DISASSEMBLY

1. TRANSFER CASE

1) Remove the reverse check sleeve assembly.
<Ref. to 5MT-46, REMOVAL, Reverse Check Sleeve.>

2) Remove the oil guide.



3) Remove the oil seal.

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

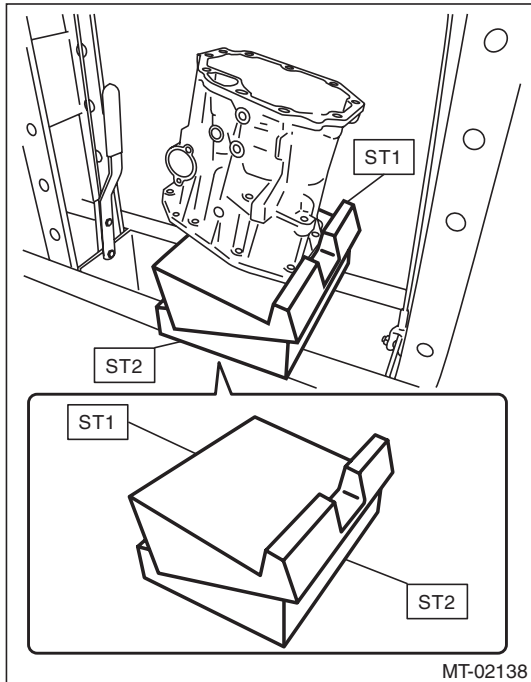
4) Set ST1, ST2 and transfer case to a press.

NOTE:

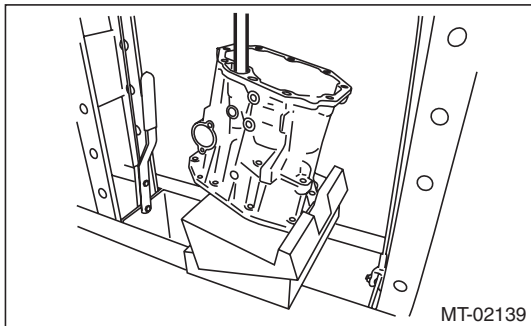
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.

ST1 498267300 CYLINDER HEAD TABLE

ST2 498267200 CYLINDER HEAD TABLE

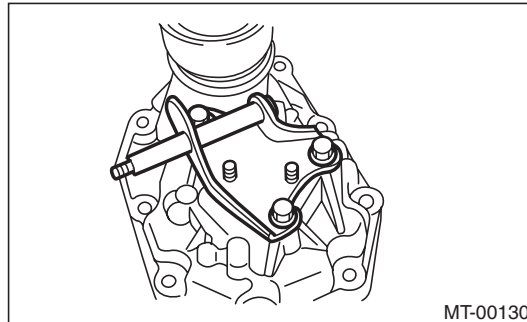


5) Using the round bar with diameter of 22 mm (0.87 in) or 23 mm (0.91 in), remove the roller bearing.



2. EXTENSION CASE

- 1) Remove the transfer drive gear assembly. <Ref. to 5MT-41, REMOVAL, Transfer Drive Gear.>
- 2) Remove the shift bracket.



- 3) Remove the oil seal from the extension case. <Ref. to 5MT-31, Oil Seal.>

D: ASSEMBLY

1. EXTENSION CASE

- 1) Using the ST, install the oil seal to the extension case. <Ref. to 5MT-31, Oil Seal.>

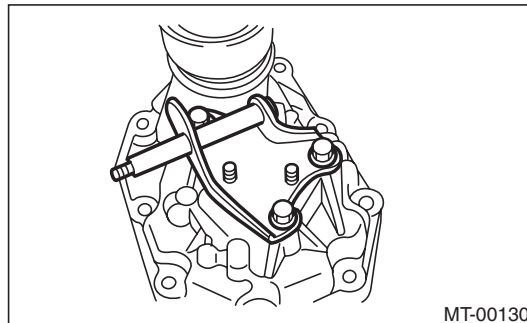
NOTE:

Use a new oil seal.

- 2) Install the shift bracket to extension case.

Tightening torque:

24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



- 3) Install the transfer drive gear to the extension case. <Ref. to 5MT-41, INSTALLATION, Transfer Drive Gear.>

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

2. TRANSFER CASE

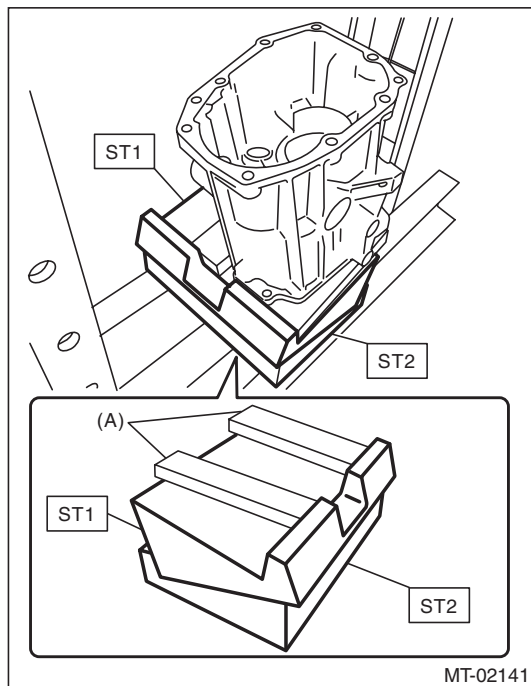
1) Set the ST1, ST2, iron plate and the transfer case to the press.

NOTE:

- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.
- Insert the iron plate which is thicker than the exposed length of the transfer case knock pin between the ST and transfer case.
- Set the iron plate so that the transfer case knock pin does not ride on the iron plate.

ST1 498267300 CYLINDER HEAD TABLE

ST2 498267200 CYLINDER HEAD TABLE



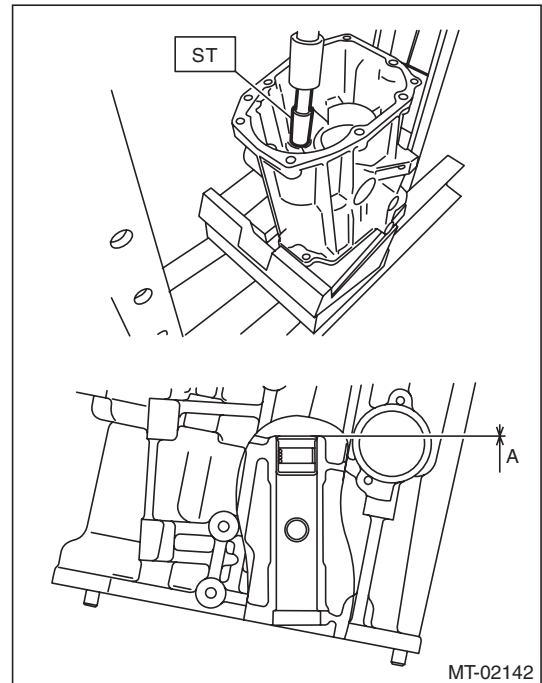
(A) Iron plate

2) Press-fit the roller bearing using the ST.

Press-fit depth of needle bearing:

A: 0 ± 0.2 mm (0 ± 0.01 in) from the end of transfer case

ST 899864100 REMOVER



3) Remove the iron plate, and turn over the transfer case.

NOTE:

Set the transfer case so that the hole for shifter arm is positioned vertically.

Transfer Case and Extension Case Assembly

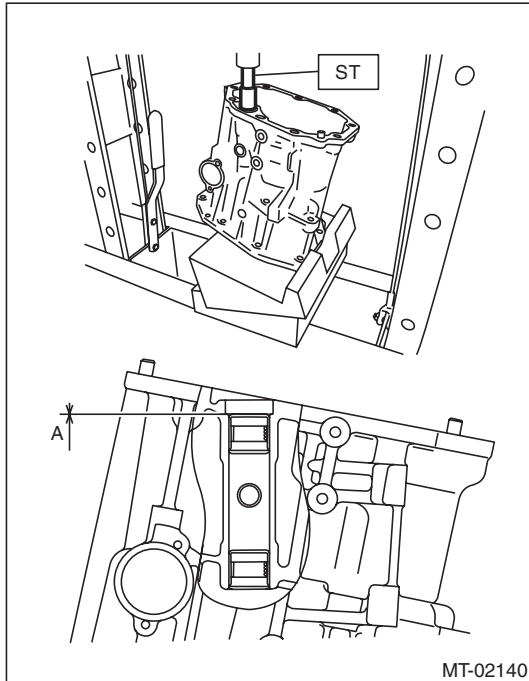
MANUAL TRANSMISSION AND DIFFERENTIAL

4) Press-fit the roller bearing using the ST.

Press-fit depth of needle bearing:

A: 0 ± 0.2 mm (0 ± 0.01 in) from the end of transfer case

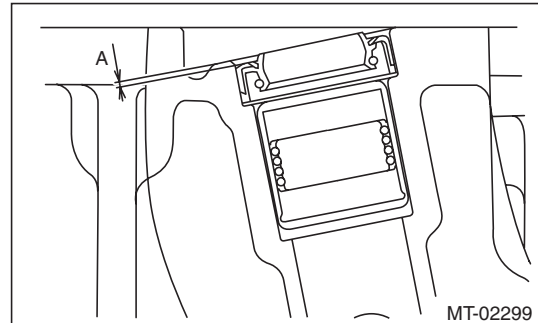
ST 899864100 REMOVER



8) Install the oil seal.

Press-fit depth of oil seal:

A: 1 ± 0.2 mm (0.04 ± 0.01 in) from the end of transfer case



5) Install the shifter arm to the transfer case, and make sure that the shift arm moves smoothly.

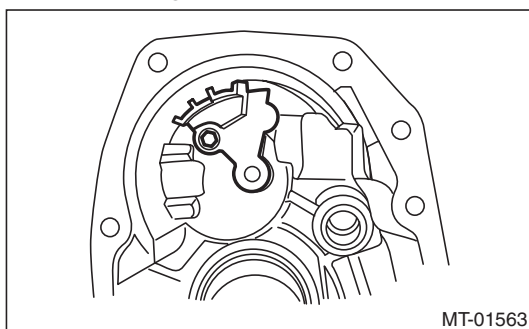
6) Install the oil guide to the transfer case.

NOTE:

Use a new installing bolt.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



7) Install the reverse check sleeve assembly to the transfer case. <Ref. to 5MT-46, INSTALLATION, Reverse Check Sleeve.>

5MT-40

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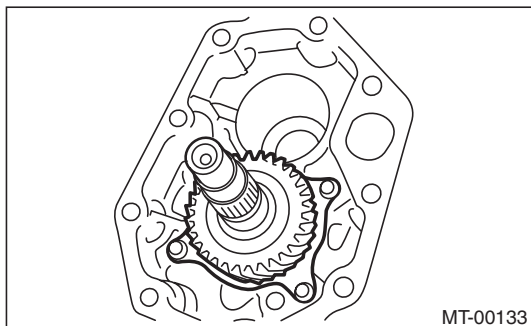
Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

10. Transfer Drive Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear.
- 6) Remove the transfer drive gear.

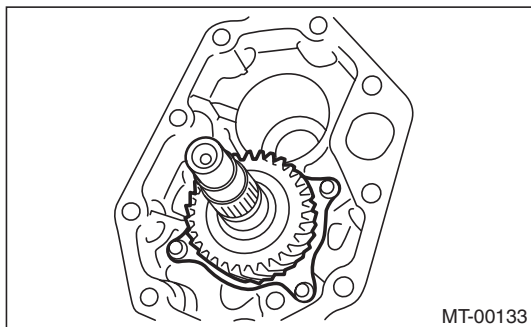


B: INSTALLATION

- 1) Install the transfer drive gear.

Tightening torque:

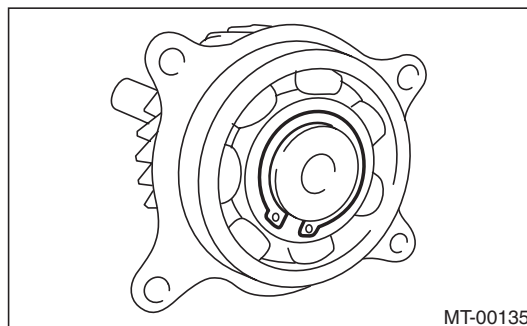
26 N·m (2.7 kgf-m, 19.2 ft-lb)



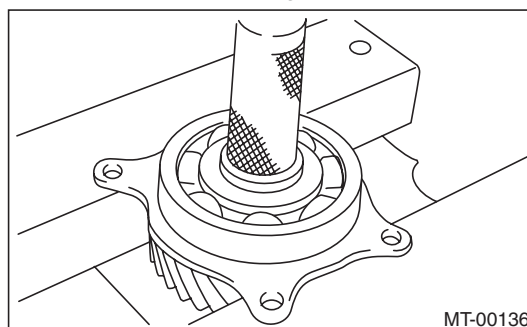
- 2) Install the transfer driven gear.
- 3) Install the extension case assembly.
- 4) Install the transfer case and the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-33, INSTALLATION, Switches and Harness.>
- 6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the snap ring.



- 2) Remove the ball bearing.



D: ASSEMBLY

- 1) Set the ST against the inner race of the bearing, and install the drive shaft.

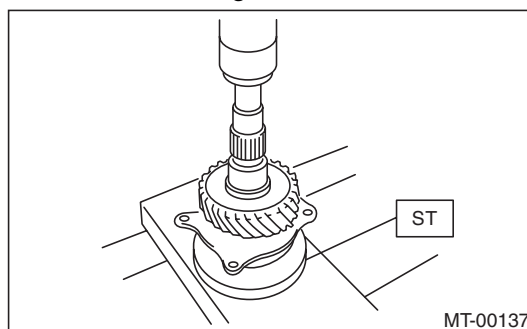
ST 398177700 INSTALLER

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Use a new ball bearing.



- 2) Install the snap ring on the transfer drive shaft.
- 3) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 5MT-42, INSPECTION, Transfer Drive Gear.>

Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

1) Bearing

Replace the bearings in the following cases.

- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

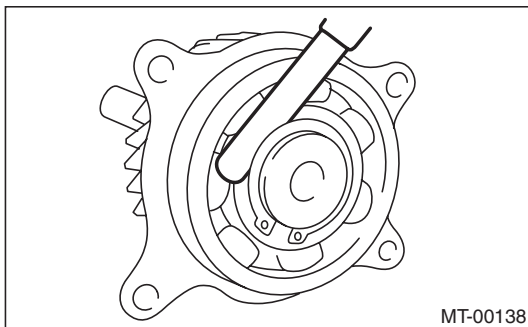
2) Drive gear

If the drive gear tooth surface and shaft are excessively broken or damaged, replace the drive gear.

3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

Clearance:

0.01 — 0.15 mm (0.0004 — 0.0059 in)



If the measurement is not within specification, select a suitable snap ring and replace it.

Snap ring (outer-30)	
Part No.	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

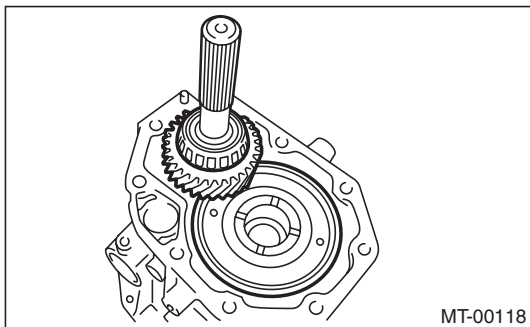
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

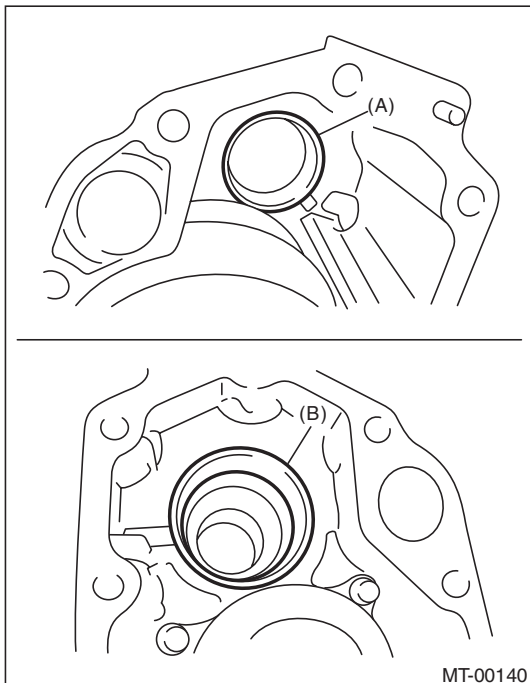
11. Transfer Driven Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear.



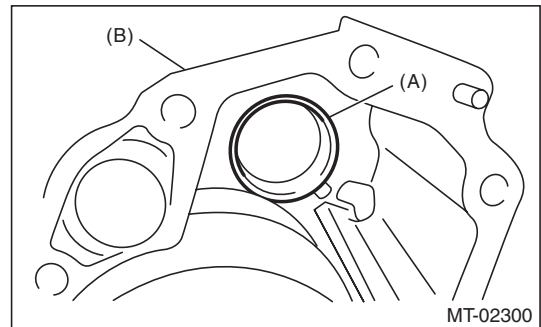
- 6) Remove bearing outer races from the extension case and transfer case.



- (A) Bearing outer race (transfer case side)
(B) Bearing outer race (extension case side)

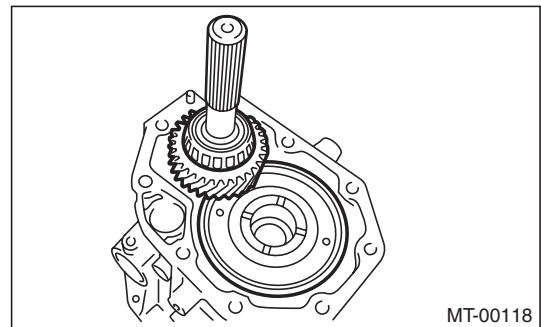
B: INSTALLATION

- 1) Install the bearing outer race to transfer case.



- (A) Bearing outer race
(B) Transfer case

- 2) Install the transfer driven gear.



- 3) Select a thrust washer. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the transfer case and the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-33, INSTALLATION, Switches and Harness.>
- 6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

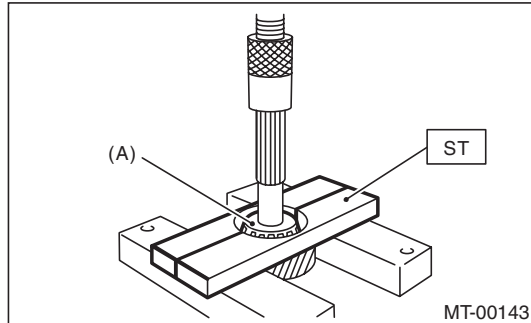
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1) Using the ST, remove the roller bearing (extension case side).

ST 498077000 REMOVER

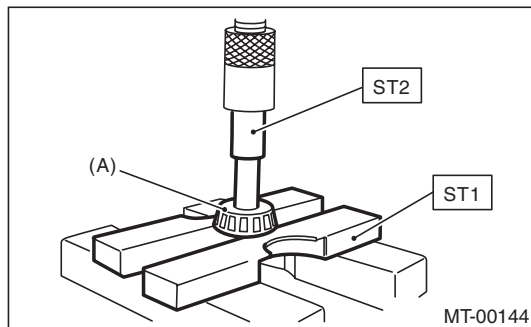


(A) Roller bearing

2) Using ST1 and ST2, remove the roller bearing (transfer case side).

ST1 498077000 REMOVER

ST2 899864100 REMOVER



(A) Roller bearing

D: ASSEMBLY

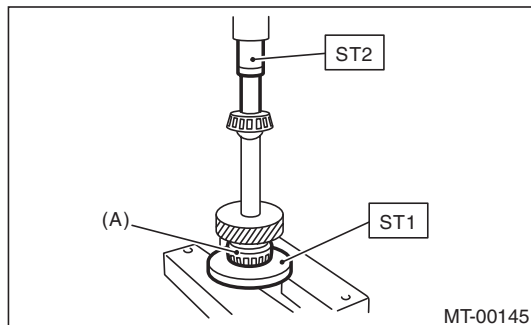
1) Using the ST, install the roller bearing (extension case side).

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



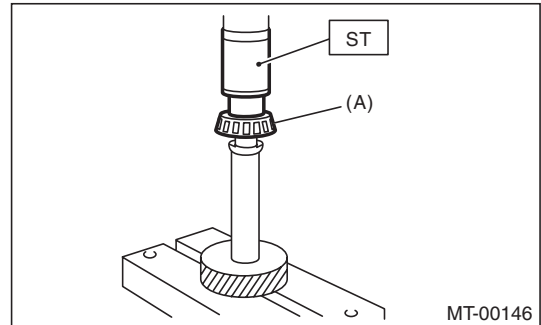
(A) Roller bearing

2) Using ST, install the roller bearing (transfer case side).

ST 499757002 INSTALLER

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

E: INSPECTION

1) Bearing

Replace the bearings in the following cases.

- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

2) Driven gear

If the tooth face of driven gear and the shaft are excessively broken or damaged, replace the driven gear.

Center Differential

MANUAL TRANSMISSION AND DIFFERENTIAL

12.Center Differential

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Remove the transfer driven gear. <Ref. to 5MT-43, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential.

B: INSTALLATION

- 1) Attach the center differential to transfer case.
- 2) Install the transfer driven gear. <Ref. to 5MT-43, INSTALLATION, Transfer Driven Gear.>
- 3) Install the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-33, INSTALLATION, Switches and Harness.>
- 6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

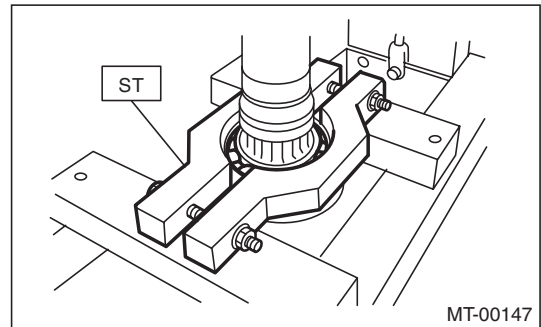
C: DISASSEMBLY

Remove the ball bearing using ST.

NOTE:

- Center differential is a non-disassembled part which should not be disassembled.

- Do not reuse the ball bearing.
- ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

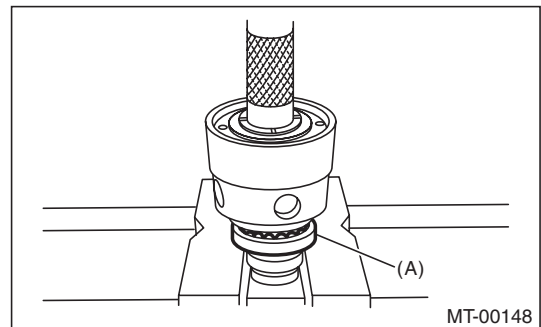


D: ASSEMBLY

Install the ball bearing to the center differential assembly.

CAUTION:

- Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Use a new ball bearing.



(A) Ball bearing

E: INSPECTION

1) Bearing

Replace the bearings in the following cases.

- In case of broken or rusty bearings
- In case of worn or damaged bearings
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- When bearing has other defects.

2) Center differential

If there is wear or damage, replace the center differential case assembly.

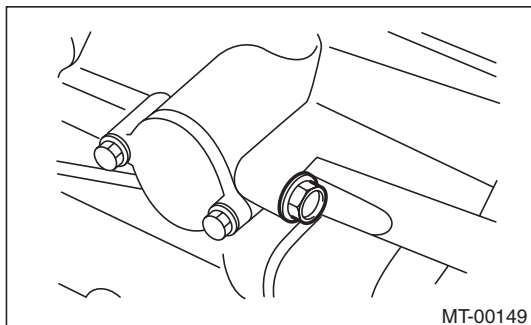
Reverse Check Sleeve

MANUAL TRANSMISSION AND DIFFERENTIAL

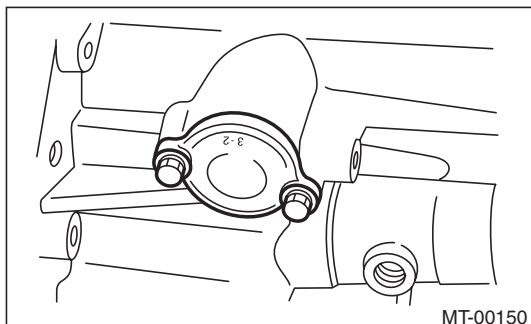
13.Reverse Check Sleeve

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the shifter arm.
- 4) Remove the plug, gasket, reverse accent spring, and reverse check ball.



- 5) Remove the reverse check sleeve.

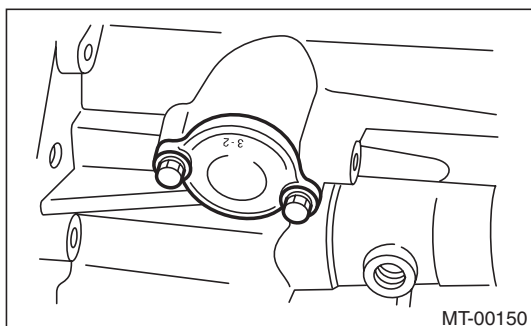


B: INSTALLATION

- 1) Install the reverse check sleeve.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



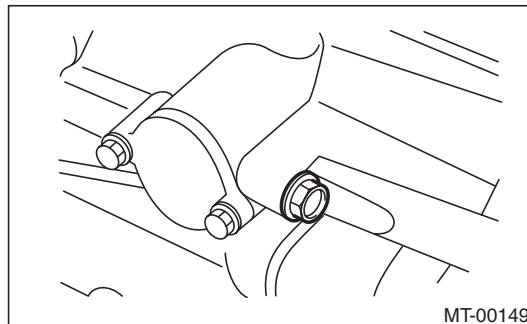
- 2) Install the reverse check ball, reverse accent spring, gasket, and plug to the transfer case.

NOTE:

Use a new gasket.

Tightening torque:

9.75 N·m (1.0 kgf-m, 7.2 ft-lb)



- 3) Attach the shifter arm to the transfer case assembly.

- 4) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>

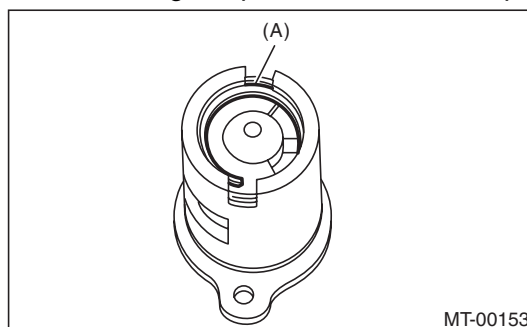
- 5) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Cover the reverse check sleeve with cloth, and remove the snap ring by using screwdriver.

NOTE:

If the snap ring is deformed or the spring repulsive force is not enough, replace with a new snap ring.

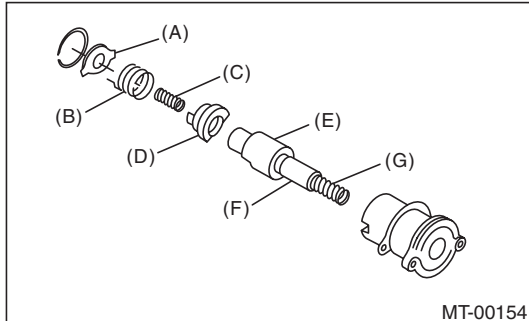


(A) Snap ring

Reverse Check Sleeve

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Remove the reverse check plate, reverse check spring, reverse check cam, return spring (5th-Reverse), reverse accent shaft, return spring cap, and return spring (1st-2nd).



- (A) Reverse check plate
- (B) Reverse check spring
- (C) Return spring (5th-Reverse)
- (D) Reverse check cam
- (E) Reverse accent shaft
- (F) Return spring cap
- (G) Return spring (1st-2nd)

3) Remove the O-ring.

NOTE:

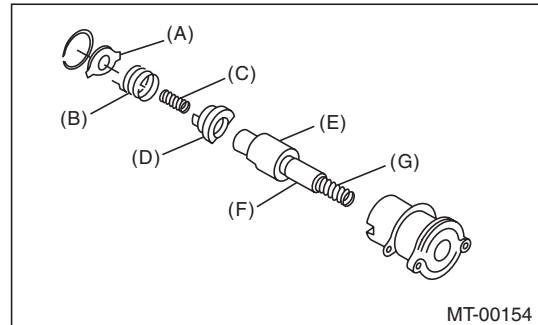
- Do not reuse the O-ring.
- Be careful not to damage the adjusting shim between reverse check sleeve assembly and case.

D: ASSEMBLY

1) Install the return spring (1st-2nd), return spring cap, reverse accent shaft, reverse check cam, return spring (5th-Reverse) and reverse check spring to the reverse check sleeve.

NOTE:

Be sure to insert the curved part of reverse check spring into the check cam groove.



- (A) Reverse check plate
- (B) Reverse check spring
- (C) Return spring (5th-Reverse)
- (D) Reverse check cam
- (E) Reverse accent shaft
- (F) Return spring cap
- (G) Return spring (1st-2nd)

2) Hook the curved part of reverse check spring onto the reverse check plate.

3) Rotate the cam so that the protrusion on the reverse check cam is located at the plate opening.

4) While fixing the cam to that position, attach the reverse check plate to the reverse check sleeve, and secure with snap ring.

5) Insert the O-ring into the sleeve groove.

NOTE:

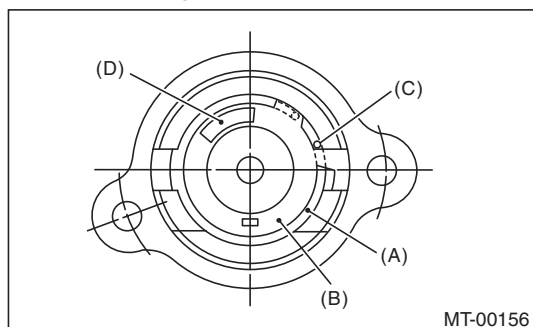
Use new O-rings.

Reverse Check Sleeve

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

- Make sure the cutout of the reverse accent shaft is aligned with the opening in the reverse check sleeve.
 - Turn the cam by hand to check for smooth rotation.
 - Move the cam and shaft all the way toward the plate, and make sure it releases.
- If the cam does not return properly, replace the reverse check spring. If the shaft does not return, check for scratches on the inner surface of sleeve. If the sleeve is in good order, replace the spring.



- (A) Snap ring
- (B) Reverse check plate
- (C) Reverse check spring
- (D) Reverse check cam

- Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-48, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

- 1) Shift the gear into 3rd gear position.
- 2) Because of the return spring, until the arm contacts the stopper the shifter arm will feel lighter moving towards 1st/2nd gear and heavier towards the reverse gear.
- 3) Make adjustment so that the heavy stroke (reverse side) is a little heavier than the lighter stroke (1st/2nd side).
- 4) To adjust, remove the bolts holding the reverse check sleeve assembly to the case, and move the sleeve assembly outward, then place an adjustment shim between the sleeve assembly and the case to adjust the clearance.

CAUTION:

Be careful not to damage the O-ring when placing shims.

NOTE:

- When the shim is removed, the neutral position will move closer to reverse; when the shim is added, the neutral position will move closer to 1st gear.
- If it is not possible to adjust the clearance with only shims, replace the reverse accent shaft and re-adjust.

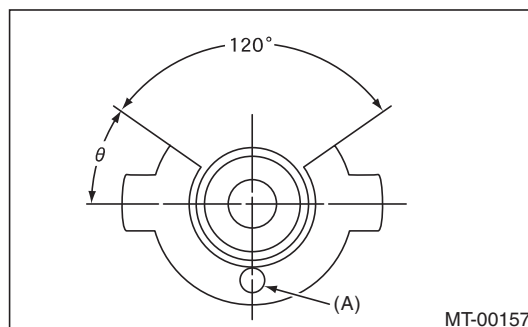
Adjusting shim	
Part No.	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA130	S	Neutral position is closer to 1st gear.
32188AA140	T	Standard
32188AA150	U	Neutral position is closer to reverse gear.

2. REVERSE CHECK PLATE ADJUSTMENT

- 1) Shift the shifter arm to "5th" and then to reverse to see if the reverse check mechanism operates properly.
- 2) Also check to see if the arm returns to neutral when released from the reverse position. If the arm does not return properly, replace the reverse check plate.

Reverse check plate			
Part No.	(A): No.	Angle θ	Remarks
32189AA001	0	28°	Arm stops closer to 5th gear.
32189AA011	1	31°	Arm stops closer to 5th gear.
32189AA021	2	34°	Arm stops in the center.
32189AA031	3	37°	Arm stops closer to reverse gear.
32189AA041	4	40°	Arm stops closer to reverse gear.



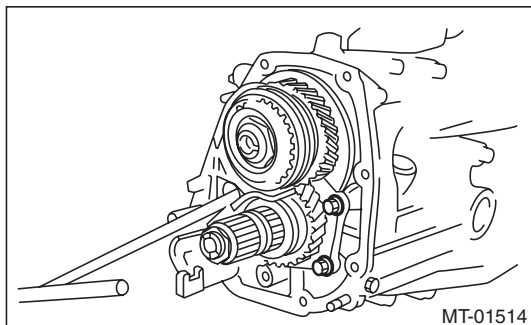
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

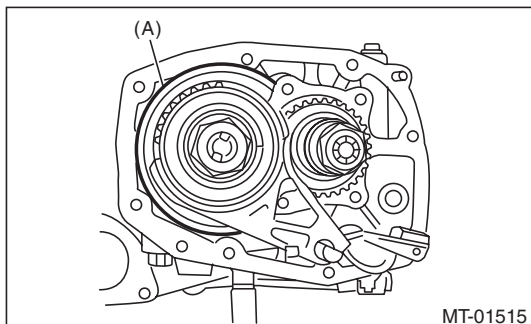
14. Transmission Case

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-15, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the bearing mounting bolt.

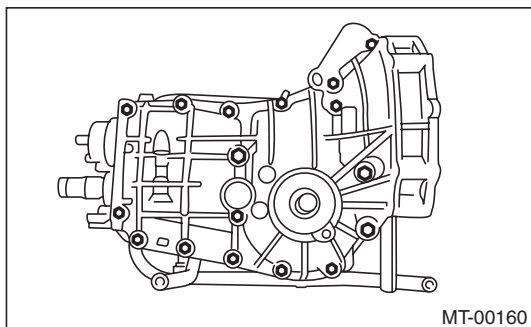


- 5) Remove the main shaft rear plate.



(A) Main shaft rear plate

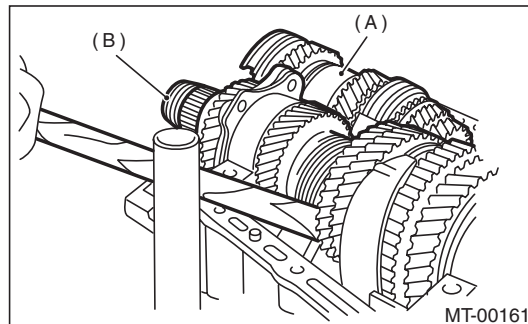
- 6) Remove the coupling bolts and nuts, and separate the transmission case into the right and left case.



- 7) Remove the drive pinion shaft assembly from the left side of the transmission case.

NOTE:

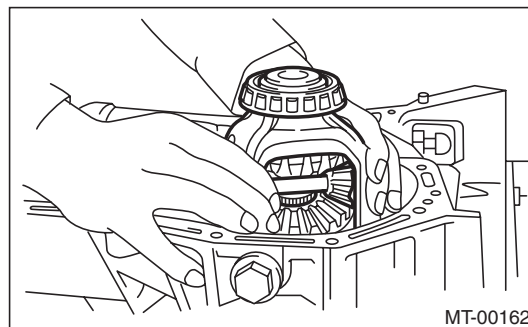
Use a hammer handle, etc. to remove if too tight.



(A) Main shaft ASSY for single-range

(B) Drive pinion shaft ASSY

- 8) Remove the main shaft assembly for single-range.
- 9) Remove the front differential assembly.



- 10) Remove the differential side retainers and bearing outer races on the left and right side. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>

NOTE:

Do not confuse the right and left roller bearing outer races.

- 11) Remove the reverse idler gear. <Ref. to 5MT-75, REMOVAL, Reverse Idler Gear.>
- 12) Remove the shifter fork and rod. <Ref. to 5MT-77, REMOVAL, Shifter Fork and Rod.>

B: INSTALLATION

- 1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with cleaning solvent.
- 2) Install the shifter fork and rod. <Ref. to 5MT-77, INSTALLATION, Shifter Fork and Rod.>
- 3) Select the drive pinion shim. <Ref. to 5MT-58, INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install the differential side retainer, from which the bearing outer race and O-ring have already been removed, to the transmission case LH side.
- 5) Install the front differential assembly.

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Install the main shaft assembly for single-range. Align the transmission case knock pin into the knock pin hole of the needle bearing.

7) Install the selected drive pinion shims and drive pinion shaft assembly.

NOTE:

Align the roller bearing knock pin hole to the transmission case knock pin.

8) Tighten the left and right side of the transmission case with the 17 mounting bolts.

NOTE:

- Insert bolts (11) and (16) from the LH side of the transmission case.
- Match the cases together so that the drive pinion shims are not caught between the cases.

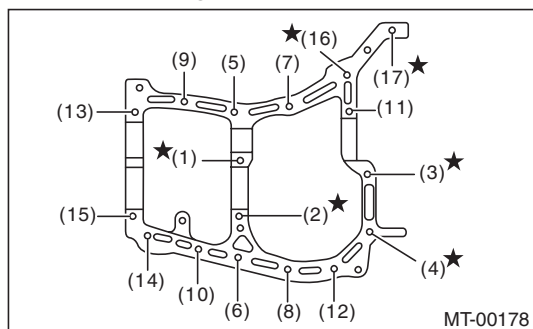
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.4 ft-lb)

★ **10 mm bolt**

39 N·m (4.0 kgf-m, 28.8 ft-lb)

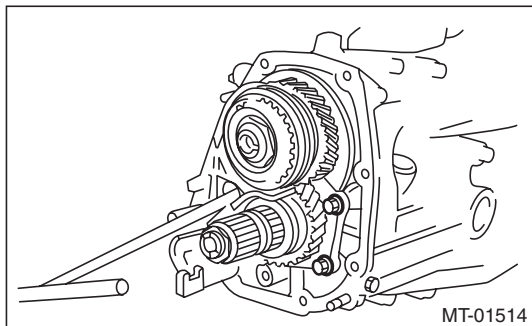


9) Install the bearing outer race to the RH side of the transmission case.

10) Tighten the bearing mounting bolts.

Tightening torque:

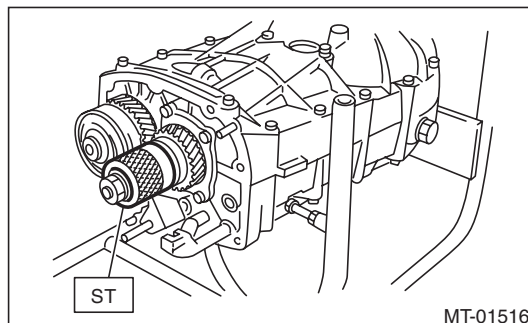
30 N·m (3.1 kgf-m, 22.1 ft-lb)



11) Adjust the backlash of the hypoid gear and the preload of the roller bearing.

(1) Attach the ST on drive pinion assembly.

ST 498427100 STOPPER



(2) Place the transmission with the LH side of case facing downward, and put ST1 on the bearing outer race.

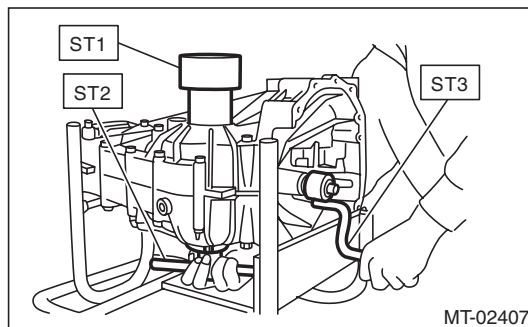
(3) Screw the retainer assembly from the bottom into left case using ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th, and turn the shaft several times. Screw in the retainer while rotating the ST3 until a slight resistance is felt on ST2.

This is the contact point of the hypoid gear and the drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT

ST2 18630AA010 WRENCH COMPL RETAINER

ST3 499927100 HANDLE



(4) Remove the WEIGHT, and screw in the side retainer without the O-ring into the RH side of the transmission case, and stop at the point where a slight resistance is felt.

5MT-50

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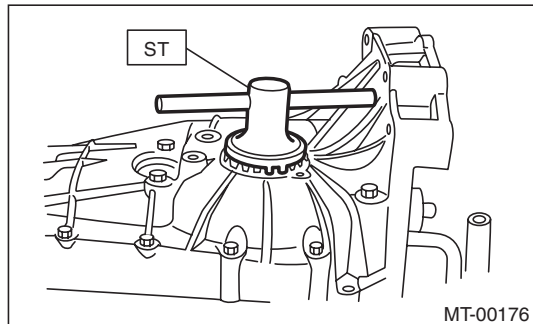
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

In this condition, the backlash between hypoid gear and drive pinion shaft is zero.

ST 18630AA010 WRENCH COMPL RETAINER



(5) Loosen the side retainer on the LH side of the transmission case by 3 notches, and turn the side retainer on the RH side of the transmission case by the same notches in order to apply backlash.

(6) Screw in the side retainer of the RH side of the transmission case additionally by 1 notch in order to apply preload on taper roller bearing.

(7) Tighten temporarily both the upper and lower lock plates, and put marks on both the side retainer and lock plate for later readjustment.

NOTE:

If it is hard to install the lock plates, reverse the sides and install them.

(8) Turn the transmission main shaft several times while tapping around the retainer lightly with plastic hammer.

(12) Inspect and adjust backlash and tooth contact of the hypoid gear. <Ref. to 5MT-72, INSPECTION, Front Differential Assembly.>

(13) Separate the transmission case into left and right parts. <Ref. to 5MT-49, REMOVAL, Transmission Case.>

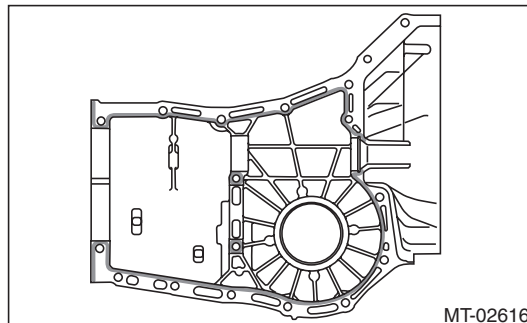
(14) Select a main shaft rear plate. <Ref. to 5MT-57, ADJUSTMENT, Main Shaft Assembly for Single-Range.>

(15) Check each shifter fork. <Ref. to 5MT-78, INSPECTION, Shifter Fork and Rod.>

16) Apply liquid gasket, then join the right side and left side of the case together.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



17) With brackets and clips as shown in the figure, tighten the seventeen bolts.

NOTE:

- Insert bolts (11) and (16) from the LH side of the transmission case.
- Match the cases together so that the drive pinion shims are not caught between the cases.

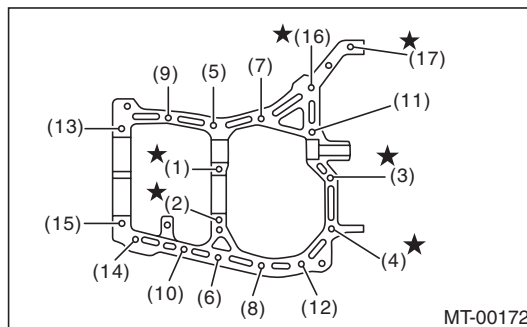
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.4 ft-lb)

★ **10 mm bolt**

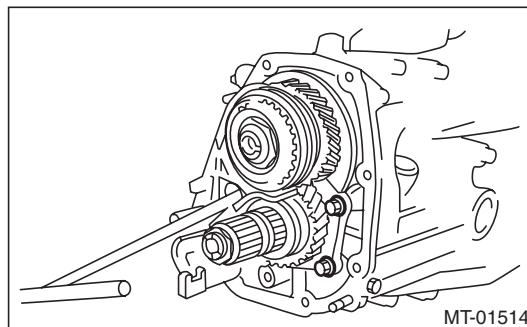
40 N·m (4.1 kgf-m, 29.5 ft-lb)



18) Tighten the bearing mounting bolts.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

19) Remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into the groove and tighten the retainer into the position where it was not loosened.

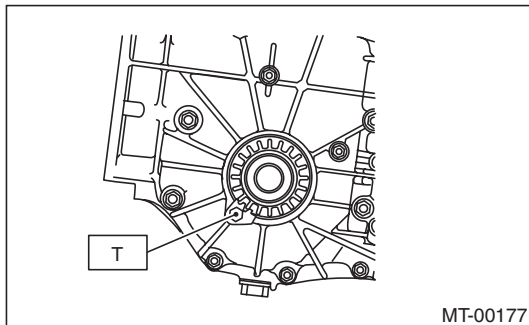
NOTE:

- When loosening the retainer, record the number of the turns made.
- Perform this for both left and right side retainers.
- Use new O-rings.

20) Install the lock plate.

Tightening torque:

T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



21) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>

22) Install the clutch release lever and bearing. <Ref. to CL-15, INSTALLATION, Release Bearing and Lever.>

23) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check the transmission case for cracks, damage, or oil leaks.

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

15. Main Shaft Assembly for Single-Range

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-49, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-58, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly for single-range.

B: INSTALLATION

- 1) Install the needle bearing and oil seal to the front of the transmission single-range main shaft assembly.

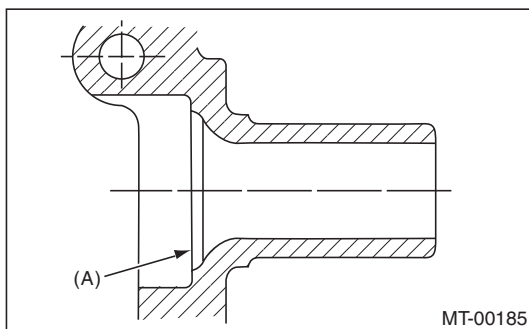
NOTE:

- Wrap the clutch splined section with vinyl tape to prevent damage to the oil seal.
- Apply NICHIMOLY N-130 or the equivalent to the sealing lip of the oil seal.
- Use a new oil seal.

- 2) Align the transmission case knock pin into the knock pin hole of the needle bearing outer race.

NOTE:

Align the end face of the seal with surface (A) when installing the oil seal.



- 3) Install the drive pinion shaft assembly. <Ref. to 5MT-58, INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install the transmission case. <Ref. to 5MT-49, INSTALLATION, Transmission Case.>
- 5) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

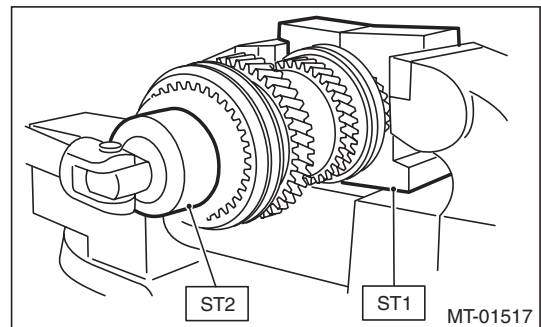
C: DISASSEMBLY

- 1) Put vinyl tape around main shaft spline to protect the oil seal from damage. Then pull out the oil seal and needle bearing by hand.
- 2) Remove the lock nut and lock washer from transmission main shaft assembly for single-range.

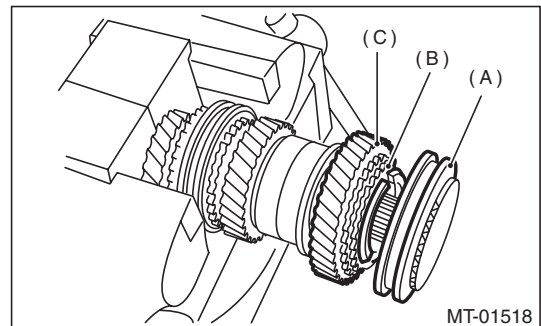
NOTE:

Flatten the lock nut tab before removing the lock nut.

- | | | |
|-----|-----------|---------------------|
| ST1 | 498937000 | TRANSMISSION HOLDER |
| ST2 | 499987003 | SOCKET WRENCH (35) |



- 3) Remove the 5th hub & sleeve No. 2, baulk lever, baulk ring, 5th drive gear and needle bearing.



- (A) 5th hub & sleeve No. 2
(B) Baulk ring
(C) 5th drive gear

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

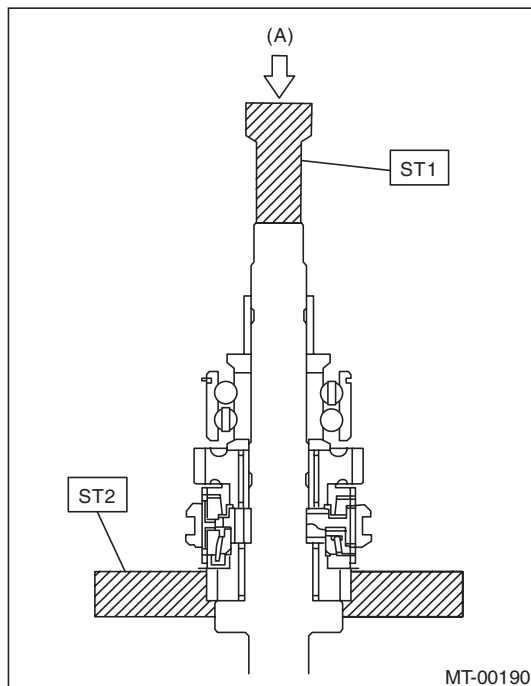
4) Using ST1 and ST2, remove the rest of the parts.

NOTE:

- When replacing the sleeve & hub, replace them as a set.
- Do not disassemble the sleeve & hub; the aligning position is pre-matched.
- If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



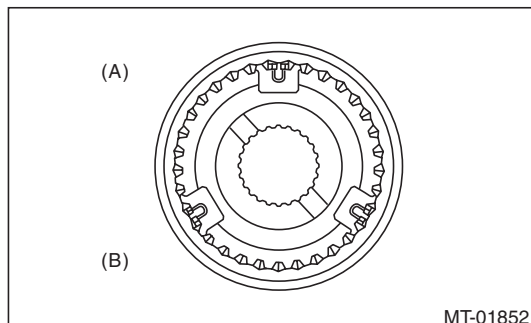
(A) Press

D: ASSEMBLY

1) When the sleeve & hub assemblies have been disassembled, reassemble by aligning the alignment marks.

NOTE:

Position the open ends of the spring 120° apart.



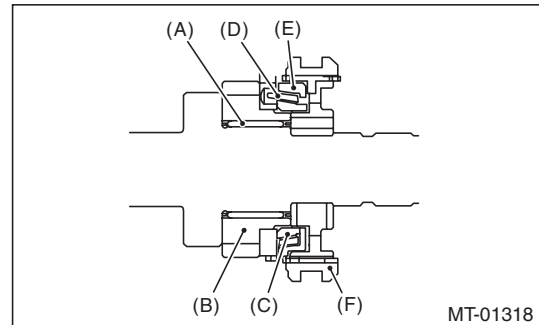
(A) 3rd-4th sleeve & hub ASSY

(B) 3rd gear side

2) Install the 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, sleeve & hub assembly for the 3rd needle bearing, on the transmission main shaft.

NOTE:

Align the groove in baulk ring with the shifting insert.



(A) 3rd needle bearing

(B) 3rd drive gear

(C) Inner baulk ring

(D) Synchro cone

(E) Outer baulk ring

(F) Sleeve & hub ASSY

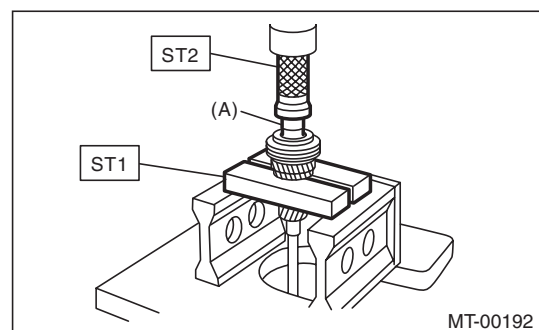
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



(A) 4th needle bearing race

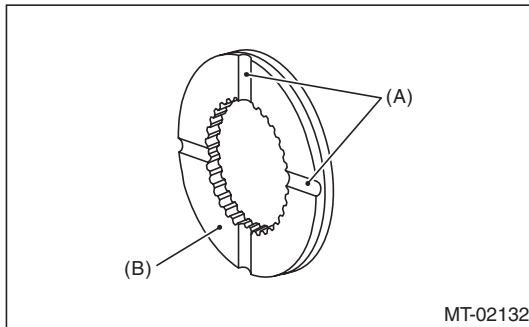
Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Install the baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to the transmission main shaft.

NOTE:

- Align the baulk ring and hub & sleeve assembly with the key groove.
- Make sure the thrust washer is facing the correct direction.



(A) Groove

(B) Face this surface to the 4th gear side.

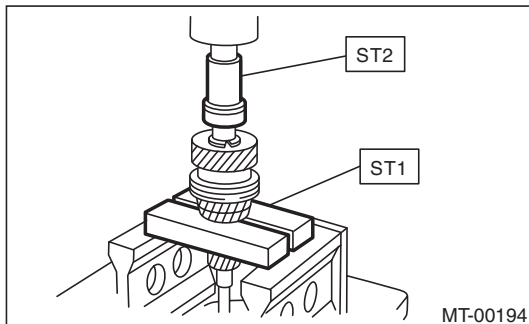
5) Press-fit the double taper roller bearing into the rear section of transmission main shaft using ST1, ST2 and a press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



6) Install the 5th needle bearing race into the rear section of transmission main shaft using ST1 and ST2.

CAUTION:

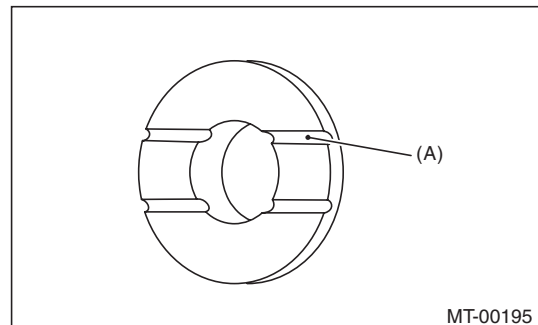
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Make sure the thrust washer is facing the correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

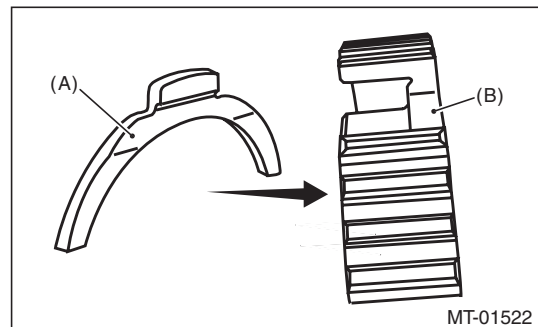


(A) Face this surface to the 5th gear side.

7) Install rest of the parts to the rear section of the transmission main shaft.

CAUTION:

• Install the baulk lever so that the concave side faces toward the 5th hub.



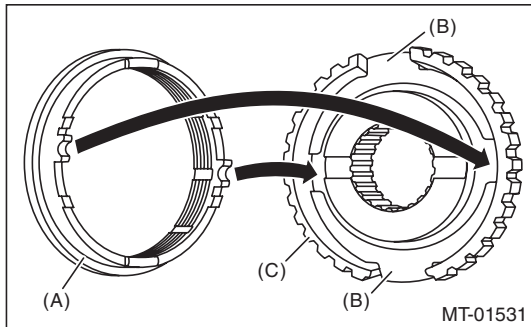
(A) Baulk lever

(B) 5th hub

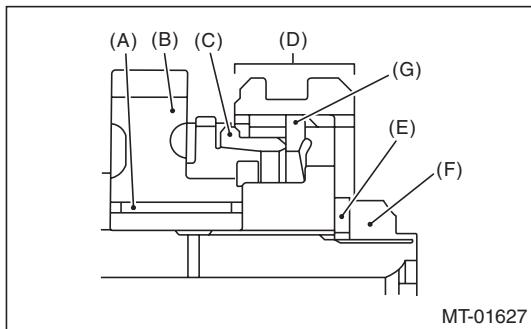
Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

- Align the protruded section of baulk ring between the baulk levers.



- (A) Baulk ring
- (B) Baulk lever
- (C) 5th hub



- (A) Needle bearing
- (B) 5th drive gear
- (C) Baulk ring
- (D) 5th hub & sleeve No. 2
- (E) Lock washer
- (F) Lock nut
- (G) Baulk lever

8) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:

Use new lock nuts and lock washers.

ST1 499987003 SOCKET WRENCH (35)

ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)

9) Crimp lock nuts in two locations after tightening.

E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- When the bearing balls, outer races and inner races are broken or rusty.
- When the bearing is worn.
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- When bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

3) Gear

Replace gears in the following cases.

- Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
- Correct or replace if the cone that contacts the baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.

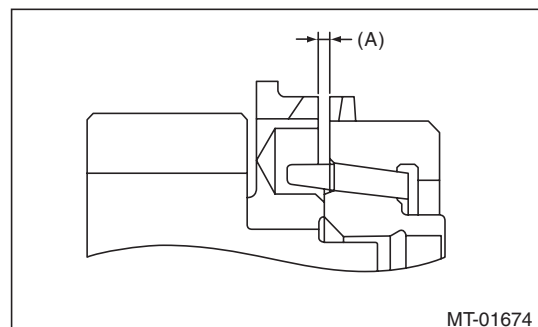
4) Baulk ring

Replace the baulk ring in the following cases.

- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.
- When the contact surface of the synchronizer ring insert section is cracked or abnormally worn.
- If the gap between the end faces of the ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):

0.5 mm (0.020 in) or more



- Apply gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.

5) Shifting insert key

Replace the insert key if deformed, excessively worn or defective in any way.

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Oil seal

Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.

7) Coupling sleeve and synchronizer hub

- Check the slipping condition of the coupling sleeve.
- Check the splines on the coupling sleeve and synchronizer hub for wear.

8) O-ring

Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.

9) Gearshift mechanism

Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT

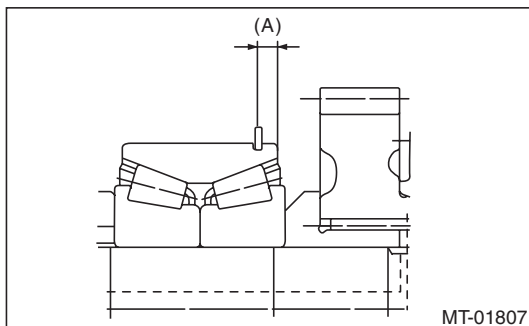
Selection of main shaft rear plate:

Measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

NOTE:

Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and moving flange of bearing.

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

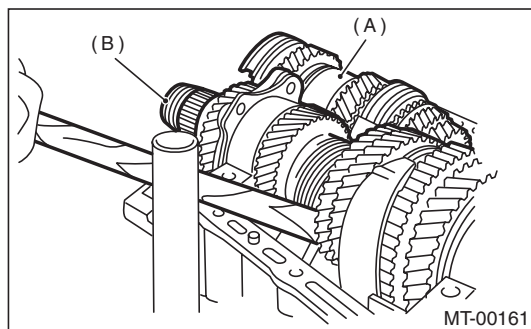
16. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-49, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly.

NOTE:

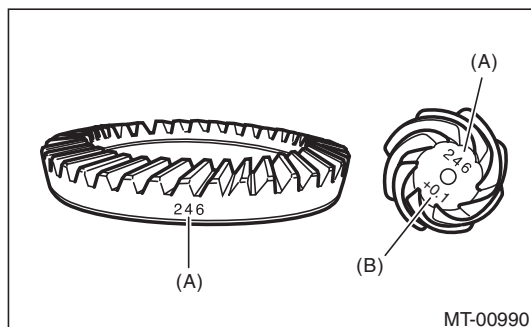
Use a hammer handle, etc. to remove if too tight.



- (A) Main shaft ASSY for single-range
(B) Drive pinion shaft ASSY

B: INSTALLATION

- 1) Remove the front differential assembly.
- 2) Hypoid gear set match mark/No.: The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers. The figure (B) below shows a number for shim adjustment. If no number is shown, the value is zero.

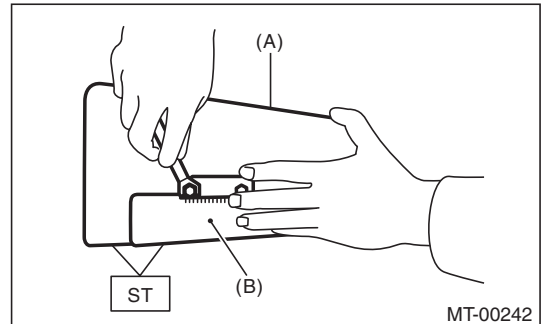


- (A) Set number
(B) Number for shim adjustment

- 3) Place the drive pinion shaft assembly on transmission main case RH without shim and tighten the bearing mounting bolts.
- 4) Check and adjust the ST.

- (1) Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
- (2) Tighten the two bolts.

ST 499917500 DRIVE PINION GAUGE ASSY



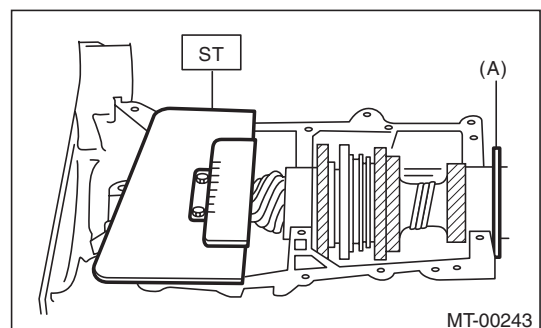
- (A) Plate
(B) Scale

- 5) Position the ST by inserting the knock pin of ST into the knock hole of transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

- 6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

ST 499917500 DRIVE PINION GAUGE ASSY



- (A) Adjust the clearance to zero without shim.

- 7) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by -.)

ST 499917500 DRIVE PINION GAUGE ASSY

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Select one to three shims in the following table for the value determined as described above, and take the shim(s) which thickness is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

9) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

10) Fit the transmission case knock pin to the knock pin hole of the roller bearing and install the drive pinion shaft assembly.

11) Install the main shaft assembly for single-range. <Ref. to 5MT-53, INSTALLATION, Main Shaft Assembly for Single-Range.>

12) Check each shifter fork. <Ref. to 5MT-78, INSPECTION, Shifter Fork and Rod.>

13) Install the transmission case. <Ref. to 5MT-49, INSTALLATION, Transmission Case.>

14) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

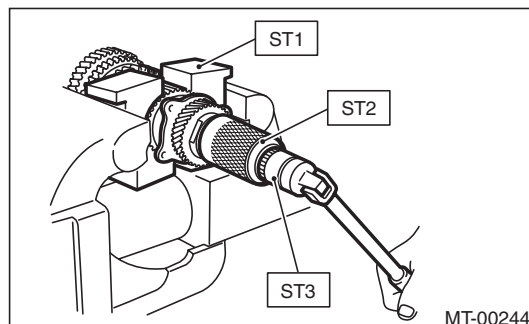
Attach a cloth to the end of driven shaft (on the frictional side of the thrust needle bearing) to prevent damage during disassembly or reassembly.

1) Flatten the tab of the lock nut. Remove the lock nut with ST1, ST2 and ST3.

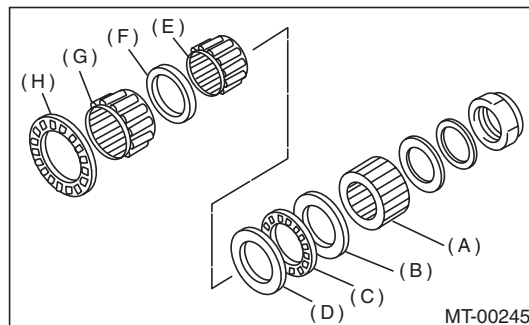
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)



2) Draw out the drive pinion shaft from driven shaft. Remove the differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing and drive pinion collar.



- (A) Differential bevel gear sleeve
- (B) Adjusting washer No. 1 (25 × 37.5 × t)
- (C) Thrust bearing (25 × 37.5 × 3)
- (D) Adjusting washer No. 2 (25 × 37.5 × t)
- (E) Needle bearing (25 × 30 × 20)
- (F) Drive pinion collar
- (G) Needle bearing (30 × 37 × 23)
- (H) Thrust bearing (33 × 50 × 3)

3) Remove the roller bearing and washer using ST and a press.

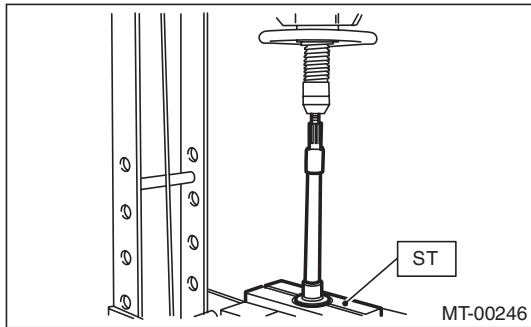
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Do not reuse the roller bearing.

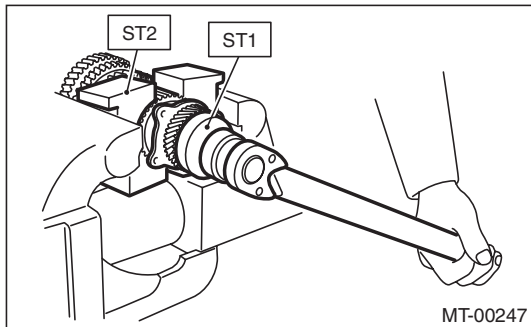
ST 498077000 REMOVER



4) Flatten the tab of the lock nut. Remove the lock nut using ST1 and ST2.

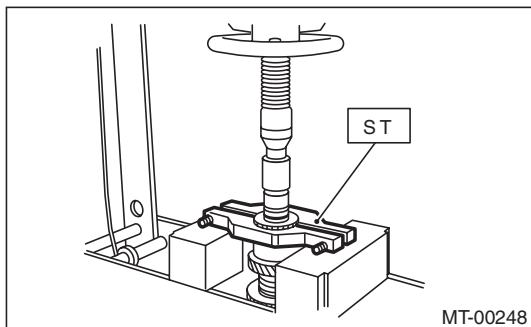
ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



5) Remove the 5th driven gear using ST.

ST 499857000 5TH DRIVEN GEAR REMOVER

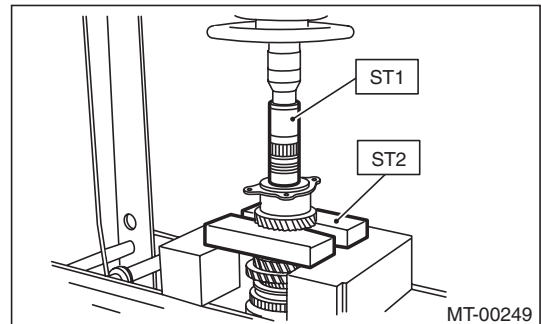


6) Remove the woodruff key.

7) Remove the roller bearing and 3rd-4th driven gear using ST1 and ST2.

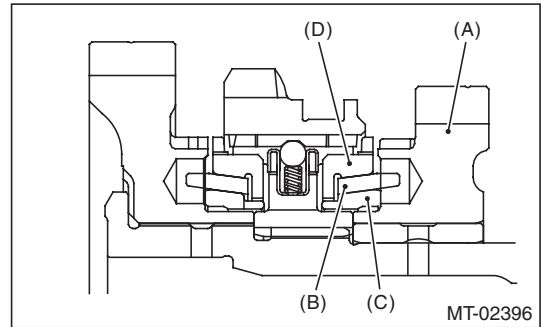
ST1 499757002 INSTALLER

ST2 899714110 REMOVER



8) Remove the key.

9) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



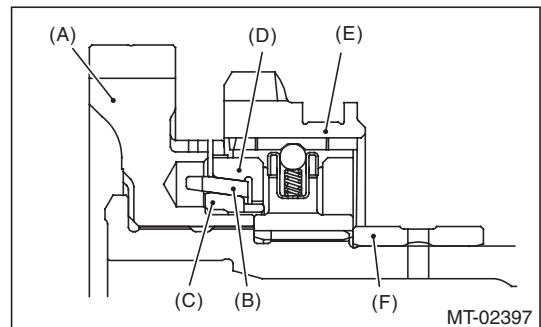
(A) 2nd driven gear

(B) Synchro cone

(C) Inner baulk ring

(D) Outer baulk ring

10) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd gear bushing and gear & hub assembly using ST1 and ST2.



(A) 1st driven gear

(B) Synchro cone

(C) Inner baulk ring

(D) Outer baulk ring

(E) Gear & hub ASSY

(F) 2nd gear bushing

5MT-60

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Drive Pinion Shaft Assembly

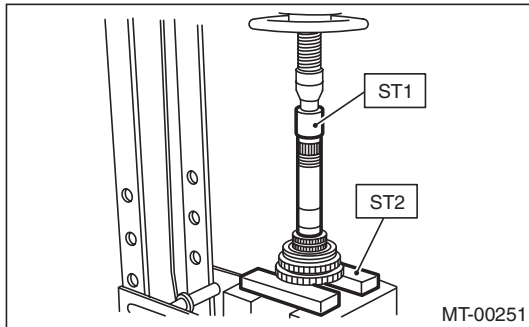
MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

If necessary, use a new gear and hub assembly as a set, when replacing the gear or hub. Because these must engage at the specified point, avoid disassembly as much as possible. If it must be disassembled, mark the engaging point on the spline beforehand.

ST1 499757002 INSTALLER

ST2 899714110 REMOVER

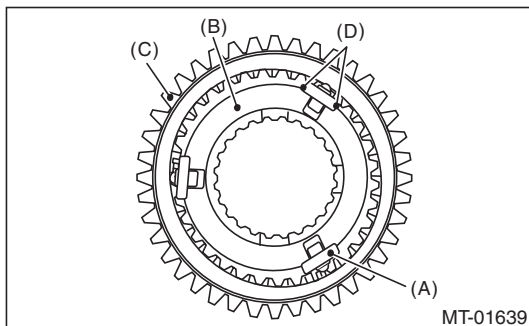


D: ASSEMBLY

1) Install the sleeve and the gear and hub assembly by matching the alignment marks.

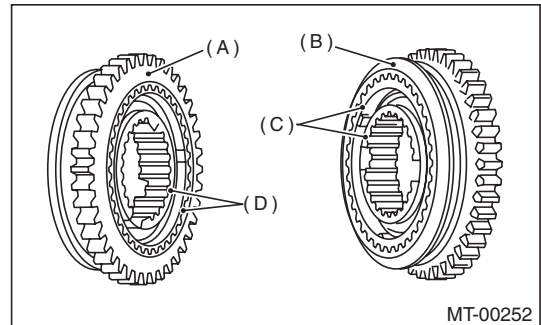
NOTE:

- Make sure that there is no large clearance at both sides of ball detent after assembly.



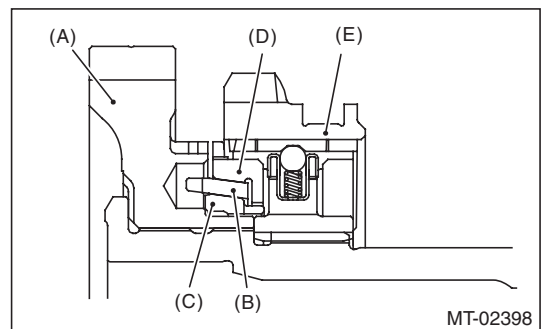
- (A) Ball detent
- (B) 1st-2nd synchronizer hub
- (C) Reverse driven gear
- (D) There is no large clearance at this part.

- Use the new gear & hub assembly, if replacing the gear or hub.



- (A) 1st gear side
- (B) 2nd gear side
- (C) Flush surface
- (D) Stepped surface

2) Install the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, and gear & hub assembly onto driven shaft.



- (A) 1st driven gear
- (B) Synchro cone
- (C) Inner baulk ring
- (D) Outer baulk ring
- (E) Gear & hub ASSY

NOTE:

- Take care to install the gear and hub assembly in proper direction.
- Align the baulk ring and gear & hub assembly with the key groove.

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the 2nd driven gear bushing onto driven shaft using ST1, ST2 and a press.

CAUTION:

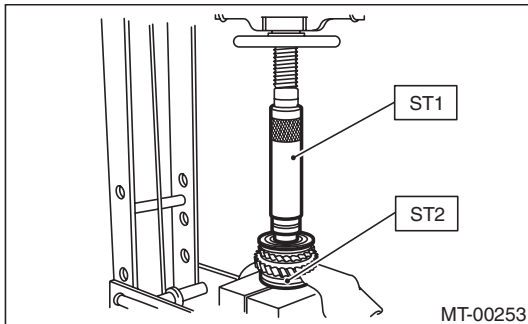
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

- Attach a cloth to the end of the driven shaft to prevent damage.
- When press fitting, align the oil holes of the shaft and bushing

ST1 499277200 INSTALLER

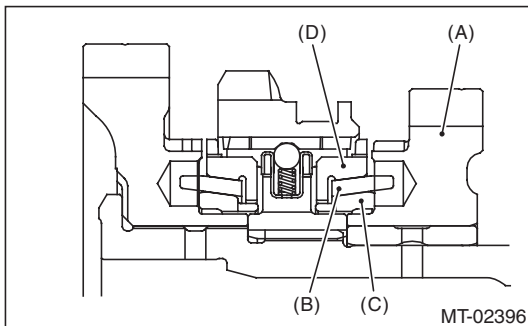
ST2 499587000 INSTALLER



4) Install the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring, and insert them onto driven shaft.

NOTE:

Align the groove in baulk ring with the insert.



- (A) 2nd driven gear
- (B) Synchro cone
- (C) Inner baulk ring
- (D) Outer baulk ring

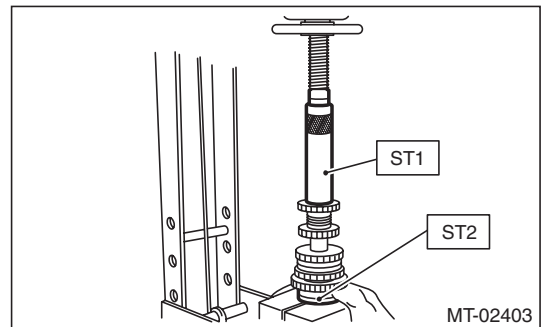
5) After installing key onto the driven shaft, install the 3rd-4th driven gear using ST1, ST2 and a press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277200 INSTALLER

ST2 499587000 INSTALLER



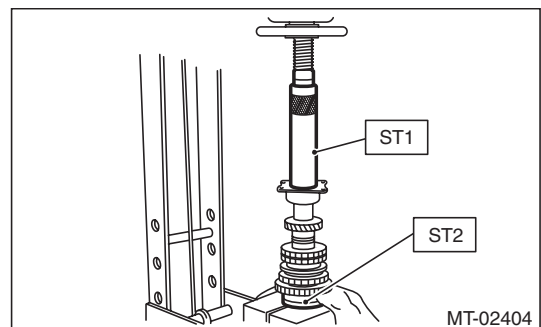
6) Install a set of roller bearings onto the driven shaft using ST1, ST2 and a press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277200 INSTALLER

ST2 499587000 INSTALLER



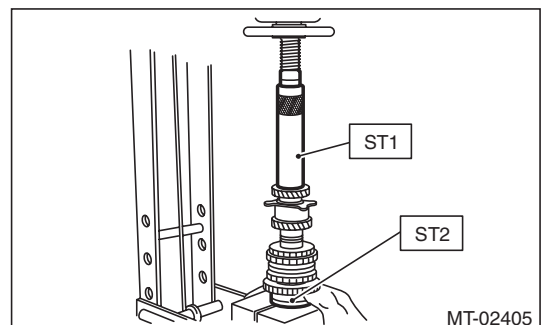
7) Position the woodruff key in groove of the rear of driven shaft. Install the 5th driven gear to the driven shaft using ST1, ST2 and a press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277200 INSTALLER

ST2 499587000 INSTALLER



5MT-62

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Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Install the lock washer. Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:

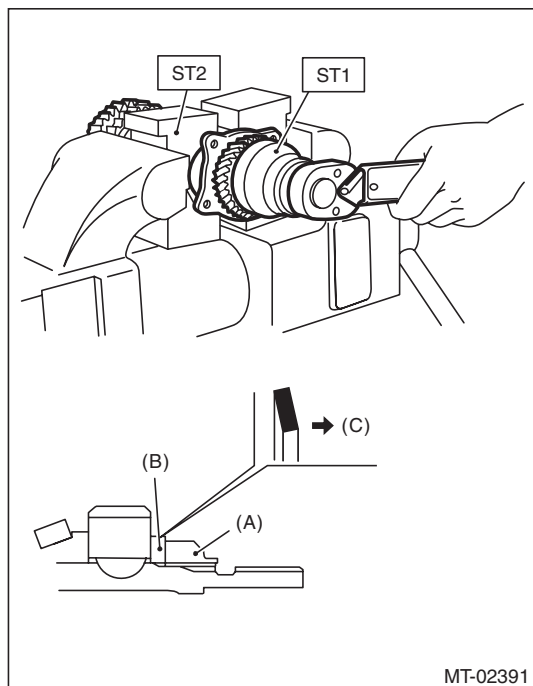
- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER

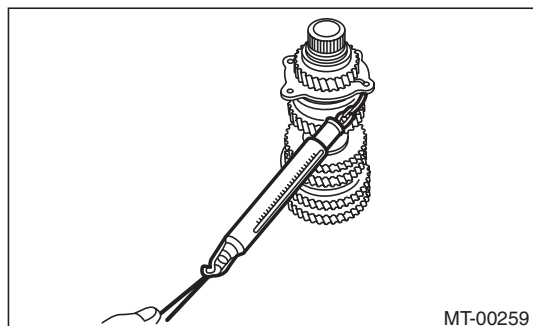
Tightening torque:

260 N·m (26.5 kgf-m, 191.8 ft-lb)



- (A) Lock nut
(B) Lock washer
(C) Nut side

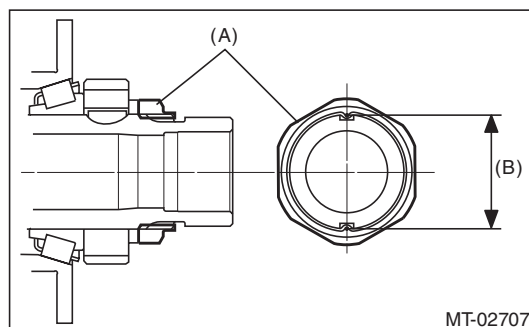
9) Using a spring scale, check that starting torque of the roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.34 lbf).



10) Crimp the lock nut at two locations so that the dimension (B) becomes 41.1 mm (1.62 in) or less.

CAUTION:

When crimping the lock nut, be careful not to crack it.

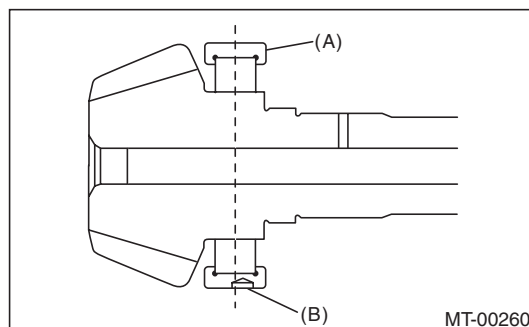


- (A) Lock nut
(B) Outer dimension after crimping

11) Install the roller bearing onto the drive pinion shaft.

NOTE:

When installing the roller bearing, direct the knock pin hole of outer race toward rear.



- (A) Roller bearing
(B) Knock pin hole

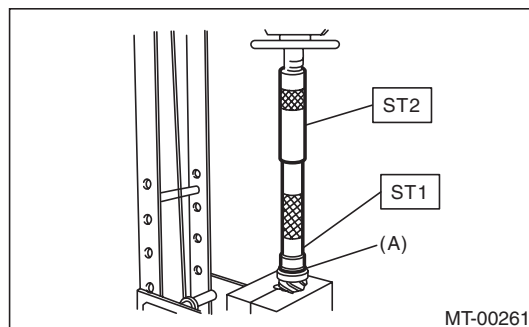
12) Install the washer using ST1, ST2 and a press.

CAUTION:

Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277100 BUSHING 1-2 INSTALLER

ST2 499277200 INSTALLER



- (A) Washer

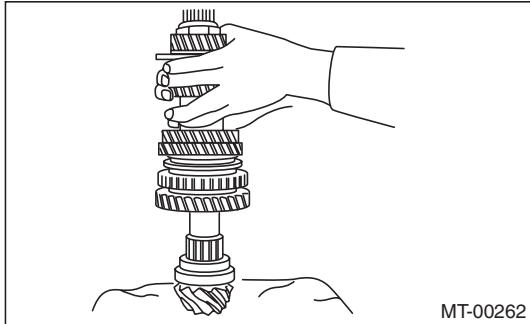
5MT-63

Brought to you by Ebay Seller "SubaruManuals"

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

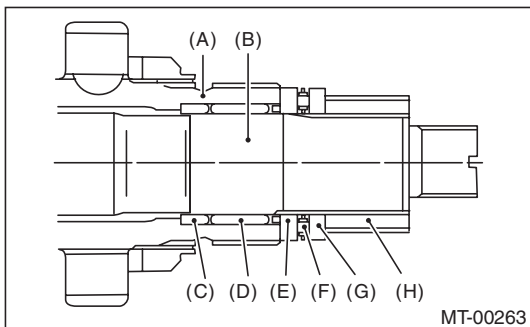
13) Install the thrust bearing and needle bearing.
Install the driven shaft assembly.



14) Install the drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in this order.

NOTE:

Be careful to install the spacer in the proper direction.



- (A) Driven shaft
- (B) Drive shaft
- (C) Drive pinion collar
- (D) Needle bearing (25 × 30 × 20)
- (E) Adjusting washer No. 2 (25 × 36 × t)
- (F) Thrust bearing (25 × 37.5 × 3)
- (G) Adjusting washer No. 1 (25 × 36 × t)
- (H) Differential bevel gear sleeve

15) Adjust the thrust bearing preload. <Ref. to 5MT-65, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

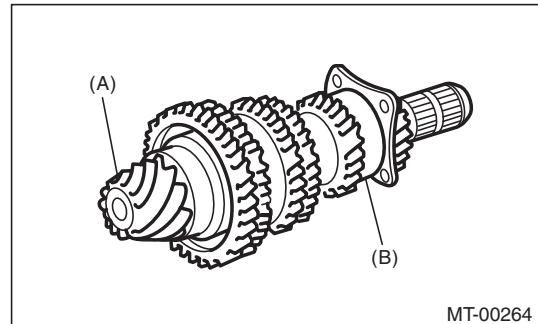
E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- When the bearing balls, outer races and inner races are broken or rusty.
- When the bearing is worn.
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion shaft assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike other bearings.



- (A) Drive pinion shaft
- (B) Ball bearing

- When bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

3) Gear

Replace gears in the following cases.

- Replace the gear with new part if its tooth surfaces are broken, damaged or excessively worn.
- Correct or replace if the cone that contacts the baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

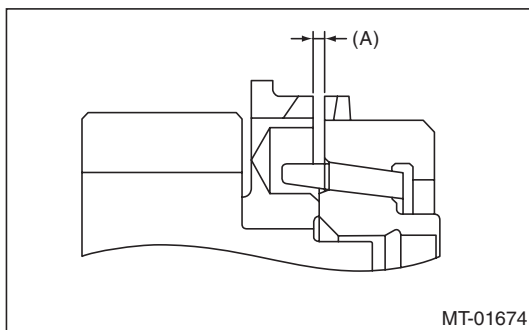
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following cases.

- When the inner surface and end face are damaged.
- When the baulk ring inner surface is abnormally or partially worn down.
- When the contact surface of the baulk ring insert section is cracked or abnormally worn.
- If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):

0.5 mm (0.020 in) or more



- Apply gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.

5) Coupling sleeve and synchronizer hub

- Check the slipping condition of the coupling sleeve.
- Check the splines on the coupling sleeve and synchronizer hub for wear.

6) Shifting insert key

Replace the shifting insert key if deformed, excessively worn or defective in any way.

7) Ball detent

Replace the ball detent if deformed, excessively worn or defective in any way.

8) Oil seal

Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.

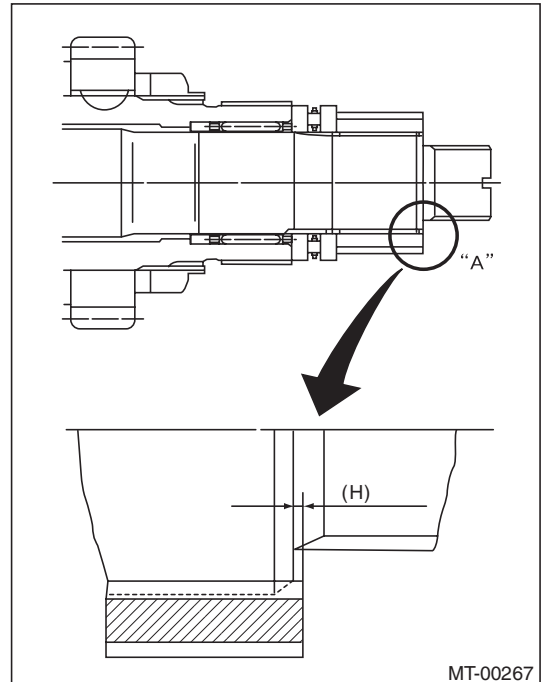
9) O-ring

Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

1) Select a suitable adjusting washer No. 1 so that dimension (H) will be zero in a visual check. Position the washer ($18.3 \times 30 \times t$) and lock washer ($18 \times 30 \times 2$) and attach the lock nut.



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Using the ST1, ST2 and ST3, tighten the new lock nut to the specified torque.

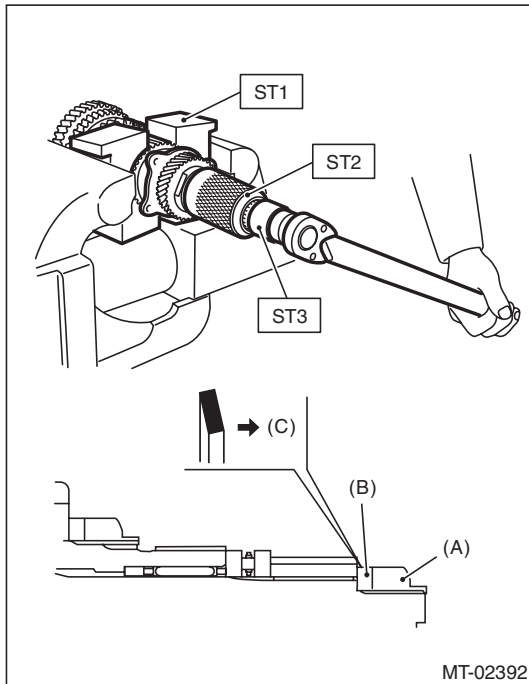
NOTE:

- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)

ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)



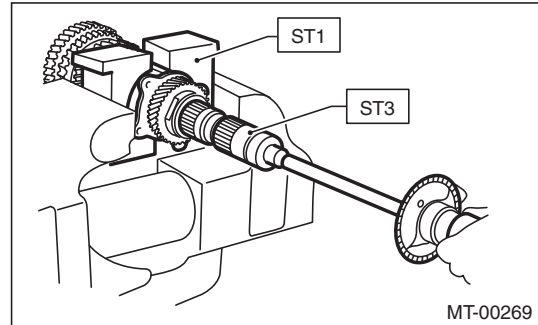
- (A) Lock nut
(B) Lock washer
(C) Nut side

3) After removing the ST2, measure the starting torque using torque driver.

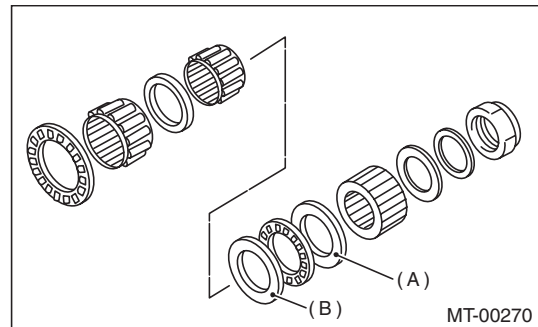
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:

0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.22 — 0.59 ft-lb)



4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and re-check starting torque.



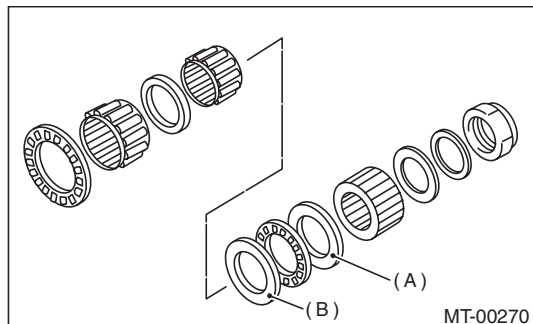
- (A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

5) If the specified starting torque cannot be obtained by the selection of adjusting washer No. 1, select adjusting washer No. 2 from the list below. Repeat steps 1) through 4) to adjust starting torque.



(A) Adjusting washer No. 1

(B) Adjusting washer No. 2

Starting torque	Dimension H	Adjusting washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

6) Recheck that the starting torque is within the specified range, then crimp the lock nut at four positions.

CAUTION:

When crimping the lock nut, be careful not to crack it.

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

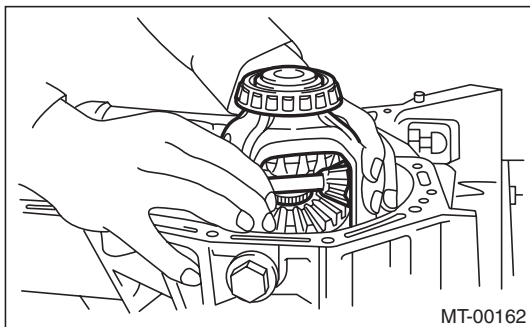
17. Front Differential Assembly

A: REMOVAL

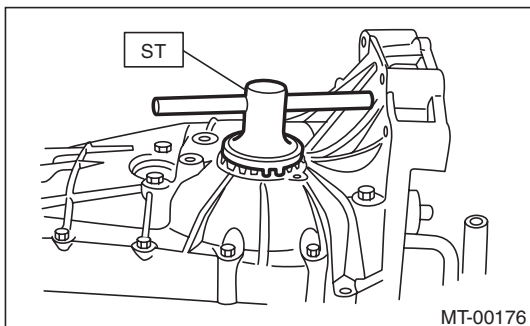
- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-49, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-58, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly for single-range. <Ref. to 5MT-53, REMOVAL, Main Shaft Assembly for Single-Range.>
- 6) Remove the front differential assembly.

NOTE:

- Do not confuse the right and left roller bearing outer races.
- Be careful not to damage the oil seal of retainer.



- 7) Remove the differential side retainers using ST. ST 18630AA010 WRENCH COMPL RETAINER



- 8) Remove the bearing outer race from the transmission case.

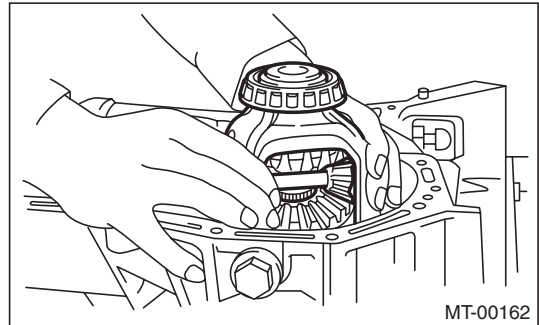
ST 398527700 PULLER ASSY

B: INSTALLATION

- 1) Install the differential side retainers using ST. ST 18630AA010 WRENCH COMPL RETAINER
- 2) Install the bearing outer race to the transmission case.
- 3) Install the front differential assembly.

NOTE:

Be careful not to bend the seal lips of oil seal.



- 4) Install the main shaft assembly for single-range. <Ref. to 5MT-53, INSTALLATION, Main Shaft Assembly for Single-Range.>
- 5) Install the drive pinion shaft assembly. <Ref. to 5MT-58, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 5MT-49, INSTALLATION, Transmission Case.>
- 7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

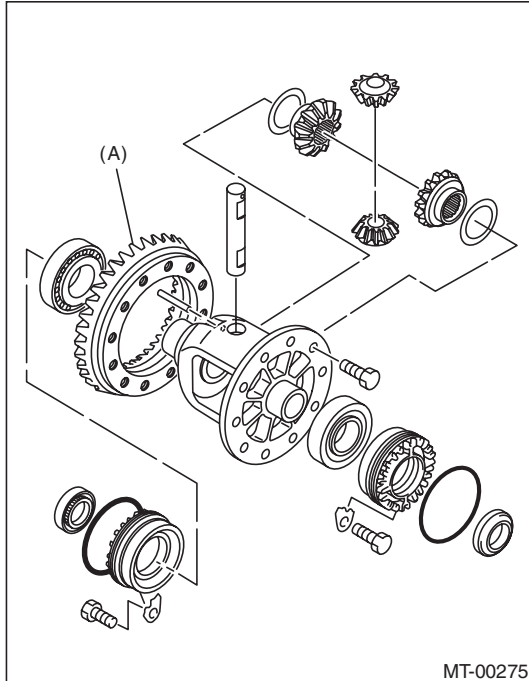
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

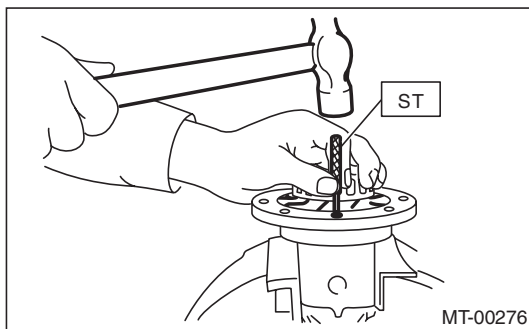
1) Remove the twelve bolts and remove hypoid driven gear.



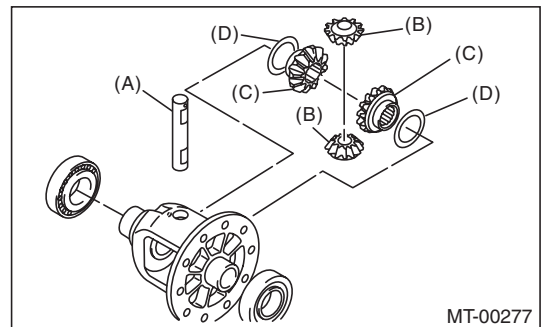
(A) Hypoid driven gear

2) Drive out the straight pin from differential assembly toward hypoid driven gear side.

ST 899904100 STRAIGHT PIN REMOVER



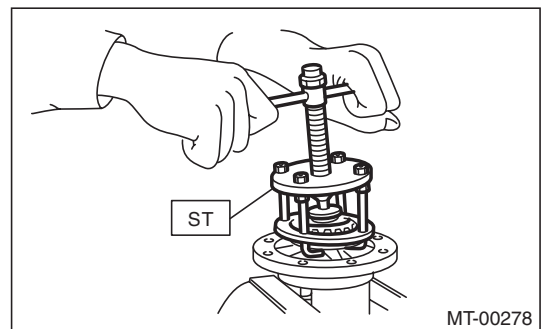
3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and washer.



- (A) Pinion shaft
- (B) Differential bevel pinion
- (C) Differential bevel gear
- (D) Washer

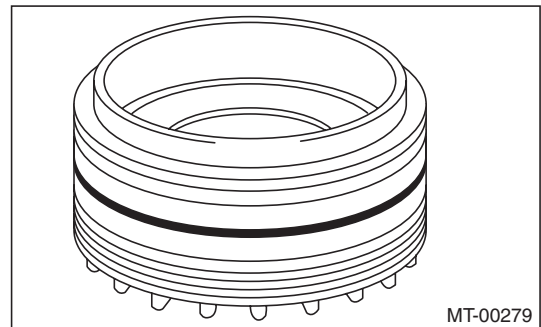
4) Using the ST, remove the roller bearing.

ST 899524100 PULLER SET



2. SIDE RETAINER

1) Remove the O-ring.



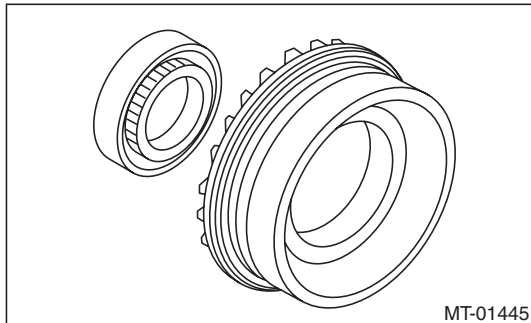
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Remove the oil seal.

NOTE:

- Remove using the flat tip screwdriver.
- Do not reuse the oil seal. Replace the oil seal with a new part.



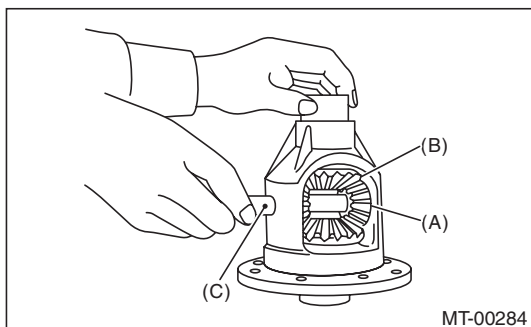
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the differential bevel gear and differential bevel pinion together with washer, and insert the pinion shaft.

NOTE:

Face the chamfered side of washer toward gear.



- (A) Differential bevel pinion
- (B) Differential bevel gear
- (C) Pinion shaft

2) Measure the backlash between differential bevel gear and differential pinion. If backlash is out of specifications, install a suitable washer to adjust.
<Ref. to 5MT-72, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

NOTE:

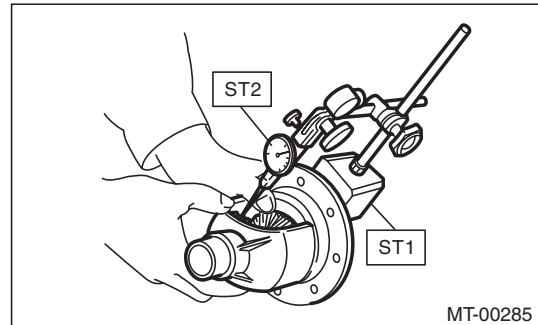
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

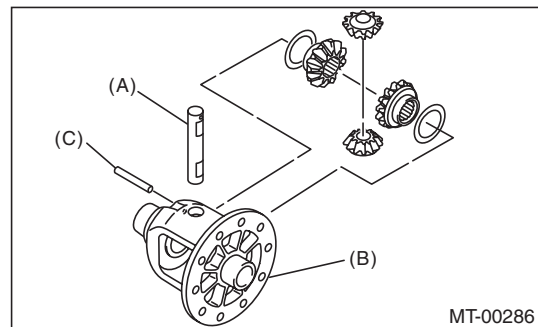


3) Align the pinion shaft and differential case with each hole, and drive the straight pin into the holes from the hypoid driven gear using the ST.

NOTE:

Lock the straight pin after installing.

ST 899904100 STRAIGHT PIN REMOVER



- (A) Pinion shaft
- (B) Differential case
- (C) Straight pin

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Install the roller bearing to differential case.

CAUTION:

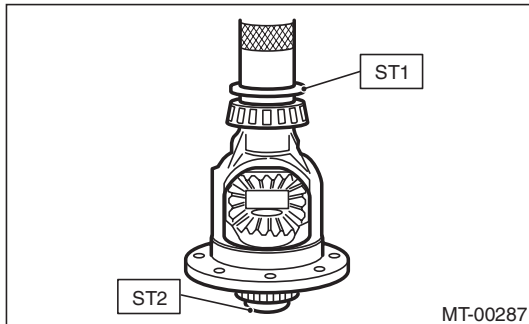
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Be careful because the roller bearing outer races are used as a set.

ST1 499277100 BUSHING 1-2 INSTALLER

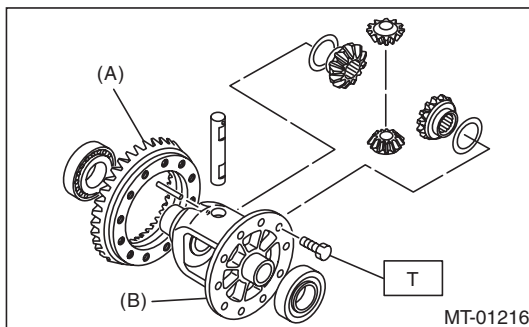
ST2 398497701 ADAPTER



5) Install the hypoid driven gear to the differential case using twelve bolts.

Tightening torque:

T: 62 N·m (6.3 kgf-m, 45.7 ft-lb)



(A) Hypoid driven gear

(B) Differential case

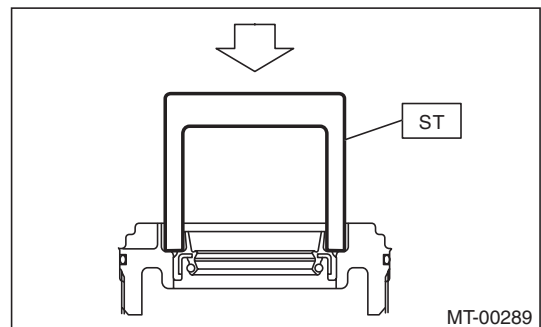
2. SIDE RETAINER

1) Install the oil seal.

NOTE:

- Use a new oil seal.
- Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Using the ST, install the oil seal by lightly tapping with a plastic hammer.

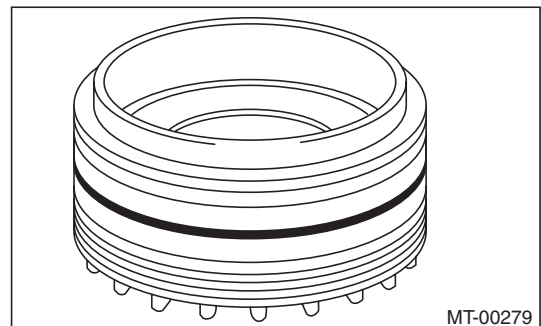
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) Install the O-ring.

NOTE:

- Use new O-rings.
- Apply gear oil to O-ring.
- Do not stretch or damage the O-ring.



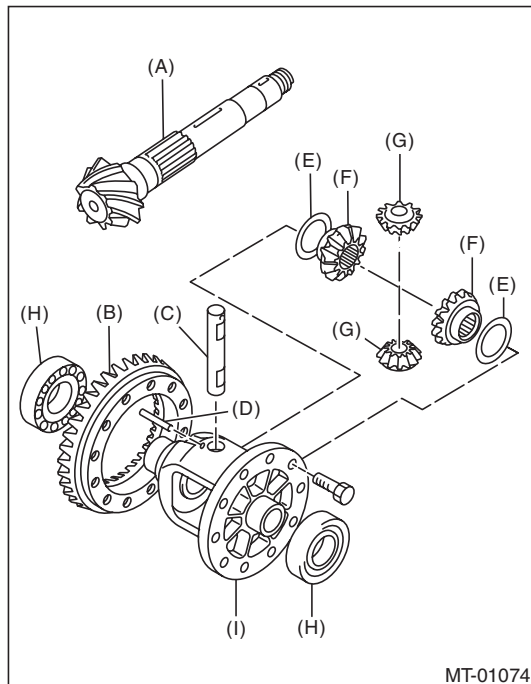
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

Repair or replace the differential gear in the following cases:

- When the hypoid drive gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
- When the roller bearing on the drive pinion shaft has a worn or damaged roller path.
- When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft or straight pin.
- When the differential case sliding surfaces are worn or damaged.



- (A) Drive pinion shaft
- (B) Hypoid driven gear
- (C) Pinion shaft
- (D) Straight pin
- (E) Washer
- (F) Differential bevel gear
- (G) Differential bevel pinion
- (H) Roller bearing
- (I) Differential case

1. BEVEL PINION GEAR BACKLASH

Measure the backlash between the differential bevel gear and differential bevel pinion. If backlash is out of specifications, install a suitable washer to adjust. <Ref. to 5MT-73, ADJUSTMENT, Front Differential Assembly.>

NOTE:

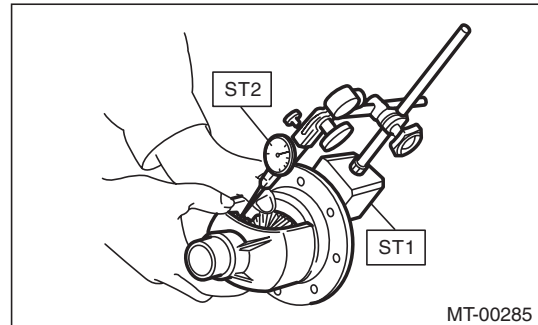
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface on the right corner, and check the backlash.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

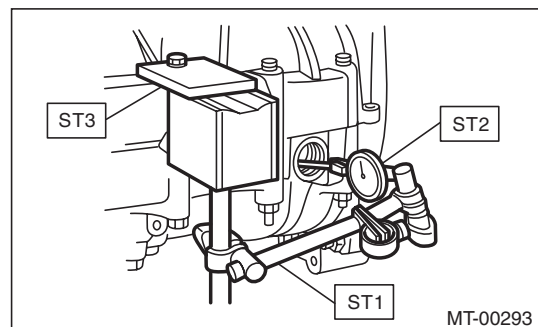
ST3 498255400 PLATE

2) Install SUBARU genuine axle shafts to both sides, rotate in the inversion direction so that the gauge contacts the tooth surface, and read the dial gauge

Part No. 38415AA100 Axle shaft

Backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)



NOTE:

If the backlash is outside the specified range, adjust it by turning the side retainer in the right side case.

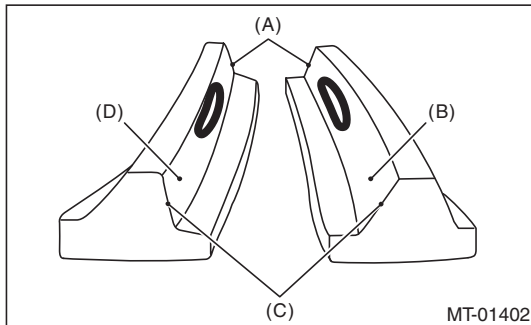
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3. TOOTH CONTACT OF HYPOID GEAR

Check tooth contact of hypoid gear as follows: Apply a thin uniform coat of red lead on both teeth surfaces on 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on the hypoid gear, and judge whether face contact is correct. When the contact pattern is not correct, adjust. <Ref. to 5MT-73, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



- (A) Toe
- (B) Coast side
- (C) Heel
- (D) Drive side

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential assembly. <Ref. to 5MT-69, DISASSEMBLY, Front Differential Assembly.>

2) Select a suitable washer for the differential bevel gear from the table and install.

Washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) Adjust until the standard value is obtained.

Backlash:

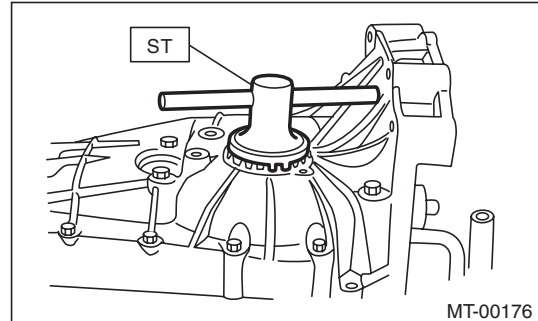
Standard

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

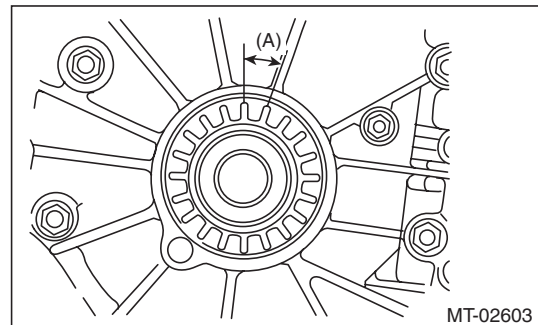
Adjust the backlash by turning the side retainer in the RH side case.

ST 18630AA010 WRENCH COMPL RETAINER



NOTE:

Each time the side retainer rotates by one notch (A), the backlash changes by 0.05 mm (0.020 in).

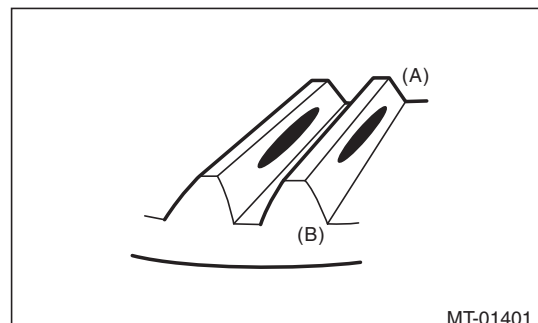


3. TOOTH CONTACT OF HYPOID GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact, and perform the adjustment as follows.

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)



- (A) Toe side
- (B) Heel side

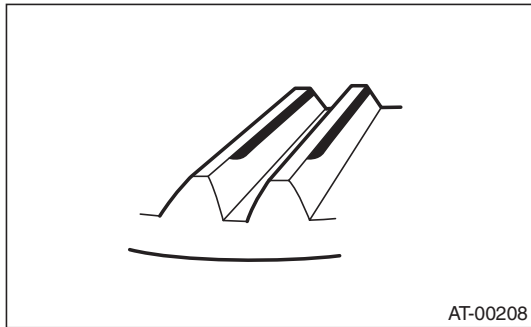
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

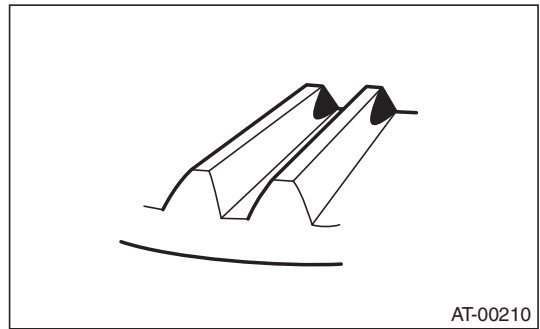
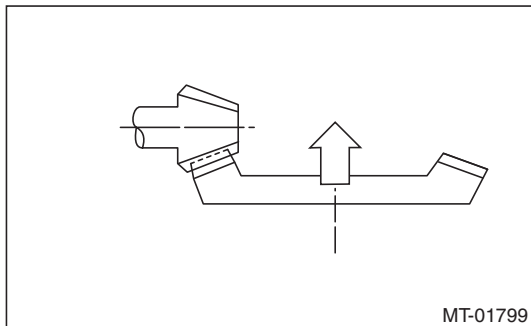
- Face contact

Check item: Backlash is too large.

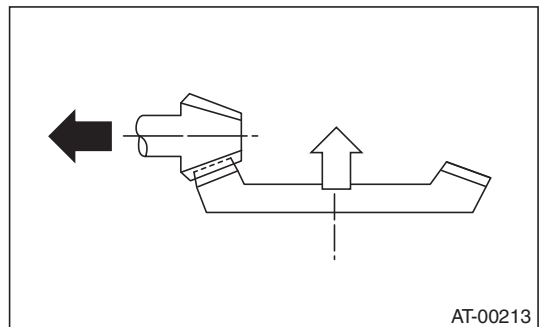
Contact pattern



Corrective action: Tighten the side retainer to move the driven gear closer to the drive pinion shaft.



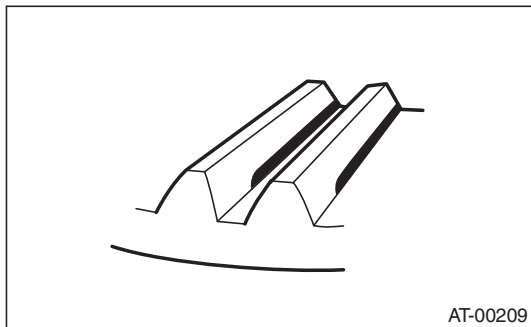
Corrective action: Increase the thickness of drive pinion shim and tighten the side retainer to move the driven gear closer to the drive pinion shaft according to the procedure for bringing drive pinion shaft away from driven gear.



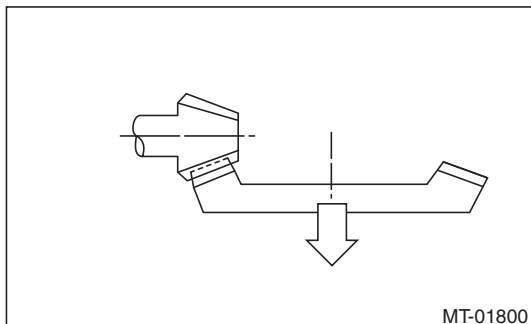
- Flank contact

Check item: Backlash is too small.

Contact pattern



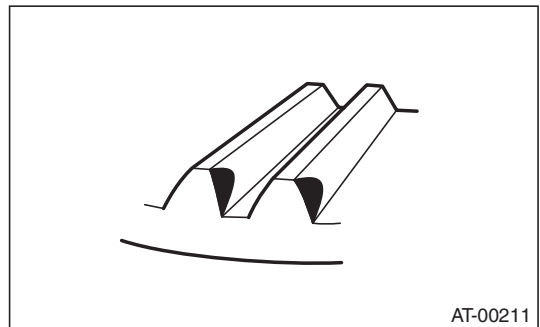
Corrective action: Loosen the side retainer to move the driven gear away from the drive pinion shaft.



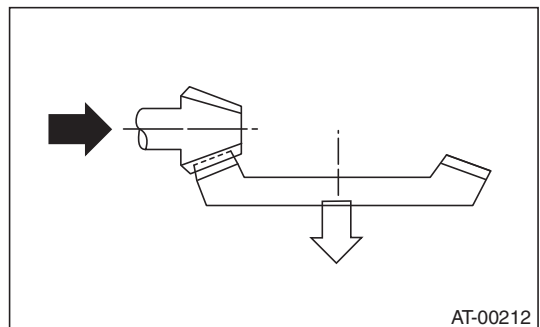
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Reduce the thickness of drive pinion shim and loosen the side retainer to move the driven gear away from the drive pinion according to the procedure for moving drive pinion shaft closer to the driven gear.



- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern

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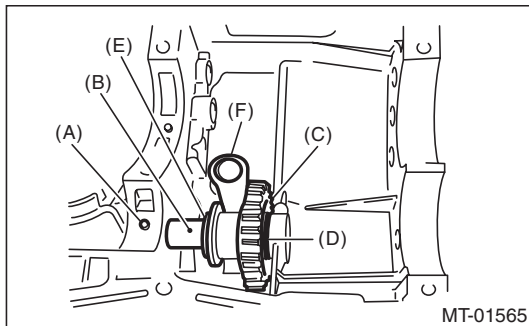
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

18.Reverse Idler Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-49, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-58, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly for single-range. <Ref. to 5MT-53, REMOVAL, Main Shaft Assembly for Single-Range.>
- 7) Remove the front differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
- 8) Remove the shifter forks and rods. <Ref. to 5MT-77, REMOVAL, Shifter Fork and Rod.>
- 9) Pull out the straight pin, and remove the reverse idler gear shaft, washer, reverse idler gear and washer.



- (A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Washer
(E) Washer
(F) Reverse shifter lever

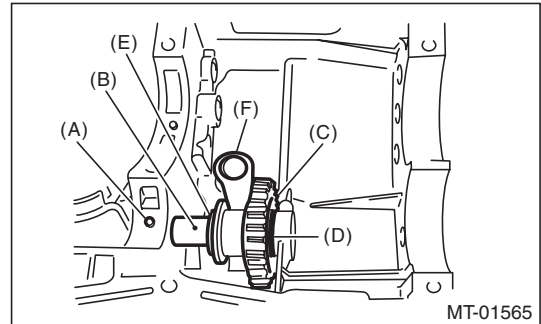
- 10) Remove the reverse shifter lever.

B: INSTALLATION

- 1) Install the reverse shifter lever, washer, reverse idler gear, washer and reverse idler gear shaft, and secure them with the straight pin.

NOTE:

- Be sure to install the reverse idler gear shaft from rear side.
- Use a new straight pin.



- (A) Straight pin
(B) Reverse idler gear shaft
(C) Reverse idler gear
(D) Washer
(E) Washer
(F) Reverse shifter lever

- 2) Check and adjust clearance between the reverse idler gear and the timing case wall surface. <Ref. to 5MT-75, INSTALLATION, Reverse Idler Gear.> <Ref. to 5MT-76, ADJUSTMENT, Reverse Idler Gear.>
- 3) Install the shifter forks and rods. <Ref. to 5MT-77, INSTALLATION, Shifter Fork and Rod.>
- 4) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>
- 5) Install the main shaft assembly for single-range. <Ref. to 5MT-53, INSTALLATION, Main Shaft Assembly for Single-Range.>
- 6) Install the drive pinion shaft assembly. <Ref. to 5MT-58, INSTALLATION, Drive Pinion Shaft Assembly.>
- 7) Install the transmission case. <Ref. to 5MT-49, INSTALLATION, Transmission Case.>
- 8) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 9) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-33, INSTALLATION, Switches and Harness.>
- 10) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

Reverse Idler Gear

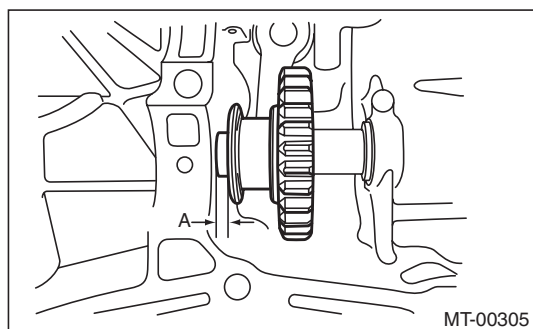
MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

1) Move the reverse shifter rod toward the reverse side. Check the clearance between the reverse idler gear and the transmission case wall surface. If out of specification, select the appropriate reverse shifter lever and adjust.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

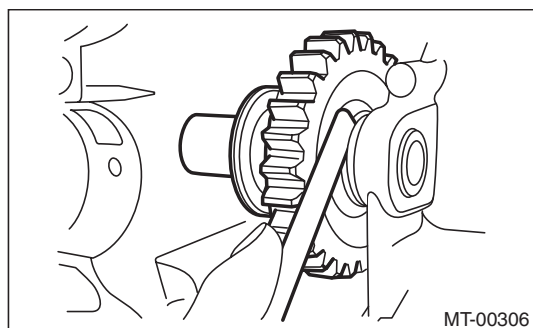


2) After installing a suitable reverse shifter lever, shift into neutral. Check the clearance between the reverse idler gear and the transmission case wall surfaces.

If out of specification, select the appropriate washer and adjust.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



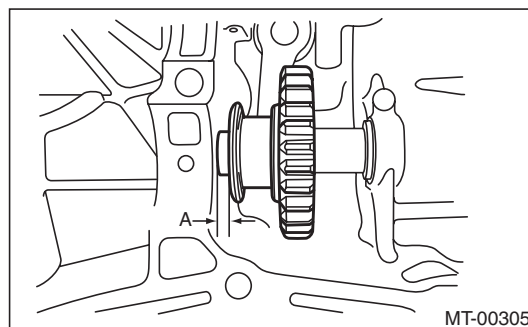
3) Check the reverse idler gear and shaft for damage. Replace if it is damaged.

D: ADJUSTMENT

1) Select the appropriate reverse shifter lever from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

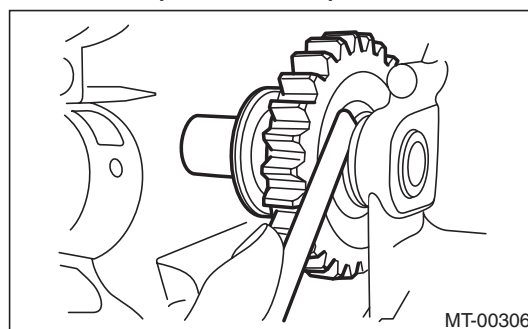


Reverse shifter lever		
Part No.	Mark	Remarks
32820AA070	7	Far from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select the appropriate washer from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



Washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

Shifter Fork and Rod

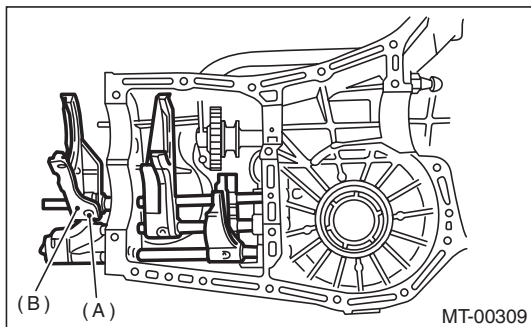
MANUAL TRANSMISSION AND DIFFERENTIAL

19.Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 5MT-33, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-35, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-49, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-58, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly for single-range. <Ref. to 5MT-53, REMOVAL, Main Shaft Assembly for Single-Range.>
- 7) Remove the front differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
- 8) Drive out the straight pin by tapping with the ST, and remove the 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER 2



- (A) Straight pin
(B) 5th shifter fork

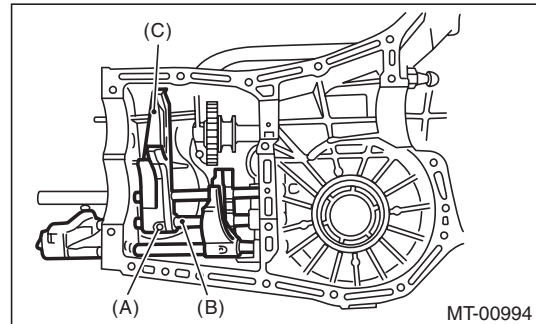
- 9) Remove the plugs, springs and check balls.
- 10) Drive out the straight pin by tapping with the ST, and remove the 3rd – 4th fork rod and shifter fork.

NOTE:

- When removing the rod, keep other rods in neutral.

- When removing the straight pin, remove it toward the inside of case so that it does not hit against the case.

ST 398791700 STRAIGHT PIN REMOVER 2



- (A) Straight pin
(B) 3rd-4th fork rod
(C) Shifter fork

- 11) Drive out the straight pin by tapping with the ST, and remove the 1st – 2nd fork rod and shifter fork.

ST 398791700 STRAIGHT PIN REMOVER 2

- 12) Remove the snap ring (outer), and pull out the reverse fork rod from the reverse fork rod arm. Then take out the ball, spring and interlock plunger from the reverse fork rod arm. And then remove the rod.

NOTE:

When pulling out the reverse fork rod arm, be careful not to let the ball pop out of arm.

- 13) Remove the reverse shifter lever.

B: INSTALLATION

- 1) Install the spring and ball to the reverse fork rod arm, and press in the ST.

ST 399411700 ACCENT BALL INSTALLER

- 2) Install the reverse fork rod through the hole on the rear of the transmission case. Press out the ST using the reverse fork rod, and fix with outer snap ring.
- 3) Install the interlock plunger to reverse fork rod arm.

NOTE:

Apply grease to the plunger to prevent it from falling.

- 4) Position the ball, spring and gasket in the reverse fork rod hole on the left side of transmission case, and tighten the checking ball plug.

NOTE:

Use a new gasket.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Install the 1st-2nd fork rod to the 1st-2nd shifter fork through the hole on the rear of the transmission case.

NOTE:

- Set other rods to neutral.
- Check that the positions of interlock plunger is correct.

6) Align the holes in the rod and the fork, and drive in the straight pin using the ST.

NOTE:

Use a new straight pin.

ST 398791700 STRAIGHT PIN REMOVER 2

7) Install the interlock plunger (thin) onto the 3rd-4th fork rod.

NOTE:

Apply grease to the plunger to prevent it from falling.

8) Install the 3rd-4th fork rod to the 3rd-4th shifter fork and reverse fork rod arm through the hole on the rear of the transmission case.

9) Align the holes in the rod and the fork, and drive the straight pin into these holes.

NOTE:

- Use a new straight pin.
- Set other fork rods to neutral.
- Check that the positions of interlock plunger is correct.

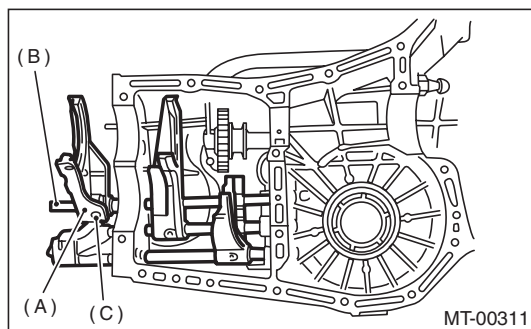
ST 398791700 STRAIGHT PIN REMOVER 2

10) Install the 5th shifter fork onto the rear of reverse fork rod. Align the holes in the two parts and drive straight pin into the specified place.

NOTE:

Use a new straight pin.

ST 398791700 STRAIGHT PIN REMOVER 2



- (A) 5th shifter fork
- (B) Reverse fork rod
- (C) Straight pin

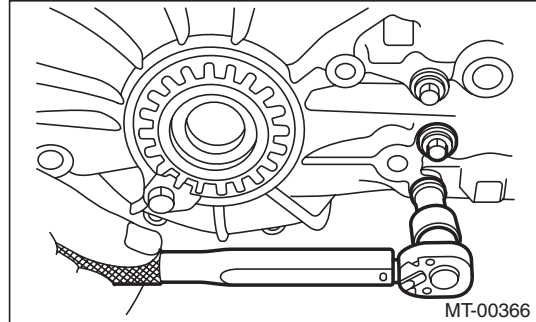
11) Position the balls, checking ball springs and gaskets to the 3rd-4th fork rod and 1st-2nd fork rod holes, and install plugs.

NOTE:

Use a new gasket.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



12) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

13) Install the main shaft assembly for single-range. <Ref. to 5MT-53, INSTALLATION, Main Shaft Assembly for Single-Range.>

14) Install the drive pinion shaft assembly. <Ref. to 5MT-58, INSTALLATION, Drive Pinion Shaft Assembly.>

15) Install the transmission case. <Ref. to 5MT-49, INSTALLATION, Transmission Case.>

16) Install the transfer case together with the extension case assembly. <Ref. to 5MT-35, INSTALLATION, Transfer Case and Extension Case Assembly.>

17) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-33, INSTALLATION, Switches and Harness.>

18) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1) Check the fork and rod for damage. Replace if it is damaged.

2) Gearshift mechanism

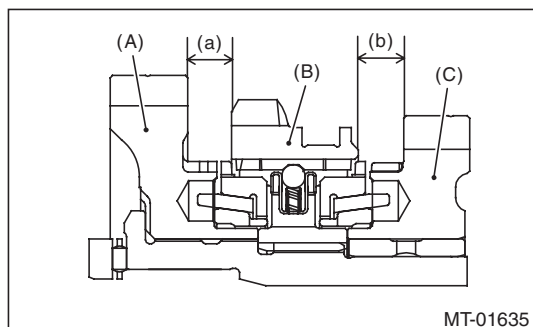
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

3) Inspect the clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace the shifter fork as required.

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

Clearance (a) and (b):
9.5 mm (0.374 in)

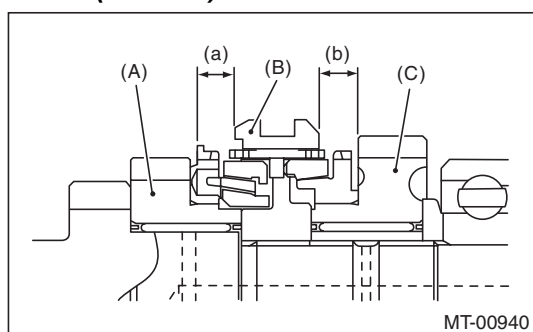


- (A) 1st driven gear
 (B) Reverse driven gear
 (C) 2nd driven gear

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approaches 1st gear by 0.2 mm (0.008 in)
32804AA070	No mark	Standard
32804AA080	3	Approaches 2nd gear by 0.2 mm (0.008 in)

4) Inspect the clearance between the 3rd, 4th drive gear and the coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.3 mm (0.366 in)

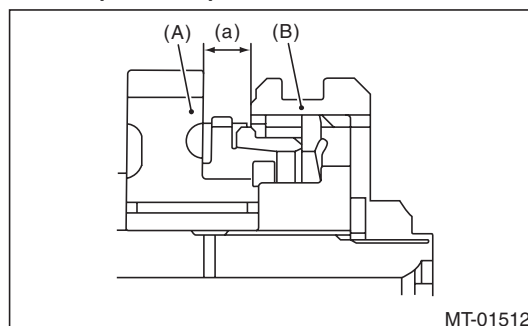


- (A) 3rd drive gear
 (B) Coupling sleeve
 (C) 4th drive gear

3rd-4th shifter fork		
Part No.	Mark	Remarks
32810AA061	1	Approaches 4th gear by 0.2 mm (0.008 in)
32810AA071	No mark	Standard
32810AA101	3	Approaches 3rd gear by 0.2 mm (0.008 in)

5) Inspect the clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a):
9.3 mm (0.366 in)



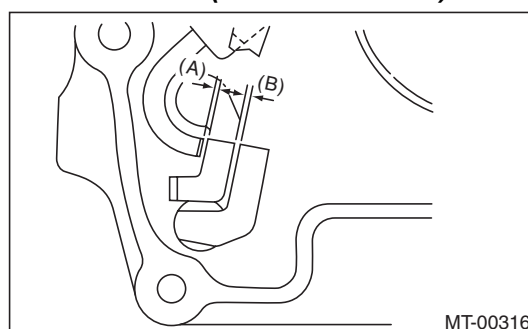
- (A) 5th drive gear
 (B) Coupling sleeve

5th shifter fork		
Part No.	Mark	Remarks
32812AA201	7	Approaches 5th gear by 0.2 mm (0.008 in)
32812AA211	No mark	Standard
32812AA221	9	Moves away from 5th gear by 0.2 mm (0.008 in)

6) Inspect the rod end clearances (A) and (B). If any clearance is not within specifications, replace the rod or fork as required.

Clearance (A):
3rd-4th — 5th
0.5 — 1.3 mm (0.020 — 0.051 in)

Clearance (B):
1st-2nd — 3rd-4th
0.4 — 1.4 mm (0.016 — 0.055 in)



General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

20. General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptoms	Possible cause	Corrective action
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two types: One is a defective gear shift system and the other is defective transmission. However, if the operation is heavy and engagement of the gears is difficult, a defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer at internal spline of the sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of gear spline	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact or wear between synchronizer ring and gear cone	Repair or replace.
2. Gear slip-out • Gear slips out when coasting on rough road • Gear slips out during acceleration	(a) Defective pitching stopper adjustment	Replace.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn shifter fork or broken check ball spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn tooth step of synchronizer hub (caused by slip-out of 3rd gear)	Replace.
	(g) Worn 1st driven gear and driven shaft	Replace.
	(h) Worn 2nd driven gear and bushing	Replace.
	(i) Worn 3rd drive gear and needle bearing	Replace.
	(j) Worn 4th drive gear and needle bearing	Replace.
	(k) Worn reverse idler gear and bushing	Replace.
3. Noise emitted from transmission NOTE: If a noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise is coming from the transmission.	(a) Insufficient or improper lubrication	Lubricate with specified oil or replace.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the gear teeth surfaces, only a high whirring noise will occur at high speeds, but if any part is broken, rhythmical clicking sounds will be heard even at low speeds.	Replace.

General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DIFFERENTIAL

Symptoms	Possible cause	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will occur, and eventually the differential will not be able to operate due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load or improper use of the clutch	Readjust the preload and backlash of the bearing, and the contact surface of gear.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of the drive pinion and the hypoid driven gear	Adjust.
	(e) Excessive backlash of a vehicle under severe operating conditions due to worn differential side gear, washer or differential pinion.	Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of trouble. However, noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases, it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to misadjusted bearings and incorrect shim adjustment. • Bearing noise when driving or coasting: Cracked, broken or damaged bearings • Noise mainly when turning: Noise from differential side gear, differential pinion or differential pinion shaft, etc.	(a) Insufficient oil	Add recommended oil to the specified level.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check the tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the backlash of the hypoid driven gear to drive pinion, and check the tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn washer and differential pinion shaft	Replace.

General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

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MANUAL TRANSMISSION AND DIFFERENTIAL

6MT

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND FRONT DIFFERENTIAL

Type		6-forward speeds and 1-reverse	
Transmission gear ratio	1st		3.636
	2nd		2.235
	3rd		1.521
	4th		1.137
	5th		0.971
	6th		0.756
	Reverse		3.545
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	3.900
Rear reduction gear	Transfer	Type of gear	Helical
		Gear ratio	1.103
	Final	Type of gear	Hypoid
		Gear ratio	3.545
Front differential	Type and number of gear		Planetary gear (pinion gear: 8, gear: 2)
	LSD type		Helical
Center differential	Type and number of gear		Planetary gear (Internal gear: 1, pinion gear: 6, sun gear: 1, and solenoid compression variable control multiplate clutch)
Transmission gear oil		GL-5	
Transmission gear oil capacity		4.1 ℓ (4.3 US qt, 3.6 Imp qt)	

2. TRANSMISSION GEAR OIL

Recommended oil:

GL-5 (75W-90) or equivalent

6MT-2

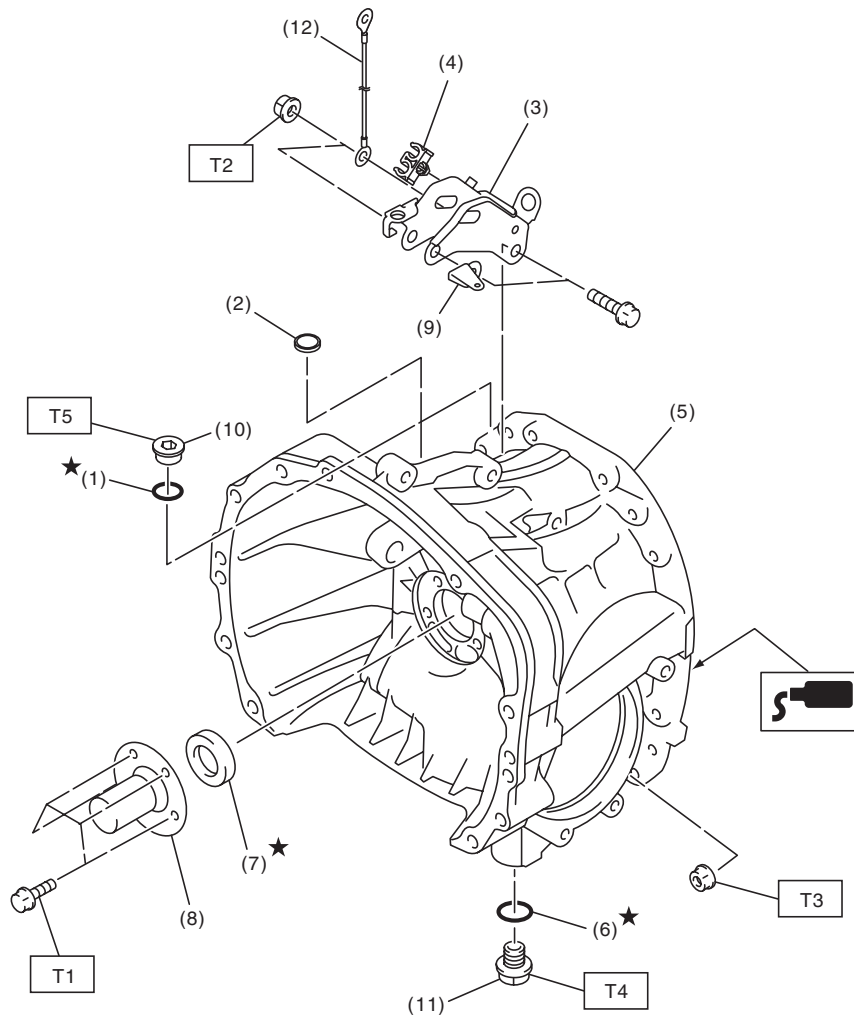
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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

B: COMPONENT

1. CLUTCH HOUSING



MT-02307

- | | |
|------------------------------|--------------------------------------|
| (1) Gasket | (7) Oil seal |
| (2) Plug | (8) Clutch release bearing guide |
| (3) Pitching stopper bracket | (9) Return spring bracket |
| (4) Clip | (10) Plug |
| (5) Clutch housing | (11) Drain plug |
| (6) Gasket | (12) Transmission radio ground cable |

Tightening torque:N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

T2: 41 (4.2, 30.2)

T3: 50 (5.1, 36.9)

T4: 70 (7.1, 51.6)

T5: 46 (4.7, 33.9)

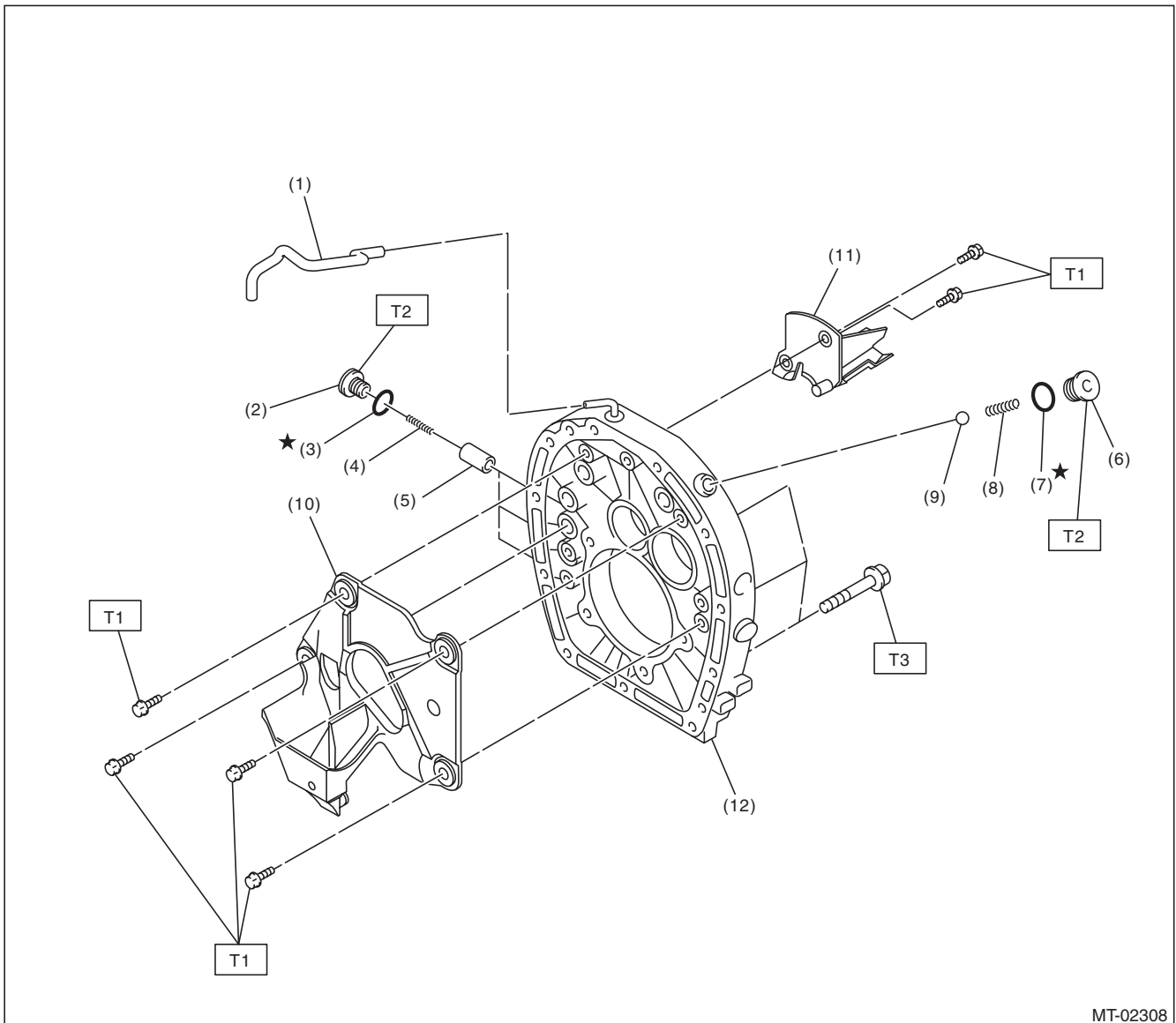
6MT-3

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

2. ADAPTER PLATE



- | | |
|---------------------|---------------------|
| (1) Breather hose | (7) O-ring |
| (2) Check plug | (8) Checking spring |
| (3) O-ring | (9) Check ball |
| (4) Checking spring | (10) Oil guide A |
| (5) Plunger | (11) Oil guide B |
| (6) Check plug | (12) Adapter plate |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.3)

T2: 25 (2.5, 18.4)

T3: 50 (5.1, 36.9)

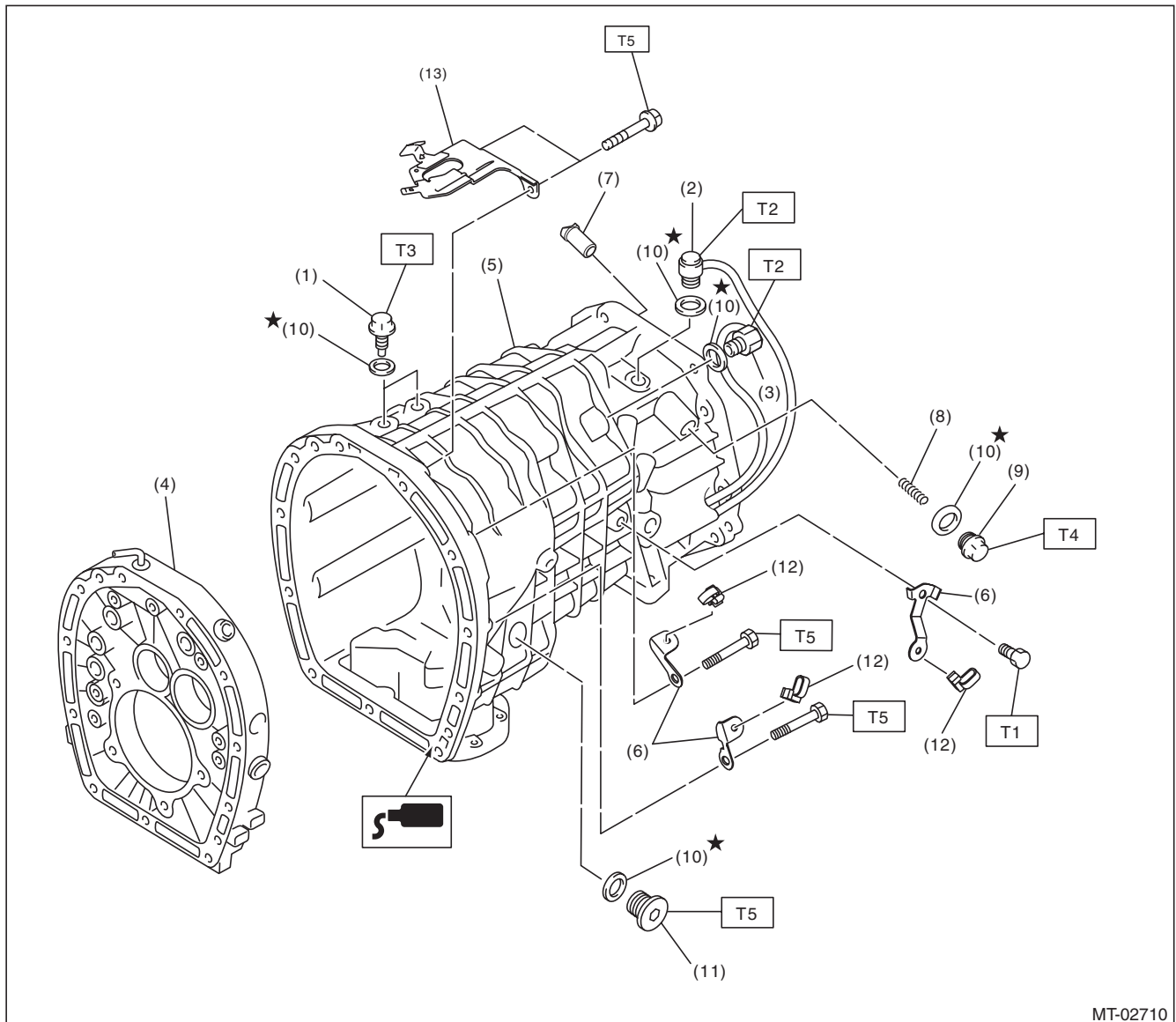
6MT-4

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

3. TRANSMISSION CASE



MT-02710

- | | |
|--------------------------|--------------------------------|
| (1) Pilot bolt | (8) Spring |
| (2) Neutral switch | (9) Plug |
| (3) Back-up light switch | (10) Gasket |
| (4) Adapter plate | (11) Filler plug |
| (5) Transmission case | (12) Band clip |
| (6) Harness bracket | (13) Transmission harness stay |
| (7) Selector plunger | |

Tightening torque:N-m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

T2: 32 (3.3, 23.6)

T3: 34 (3.5, 25.1)

T4: 41 (4.2, 30.2)

T5: 50 (5.1, 36.9)

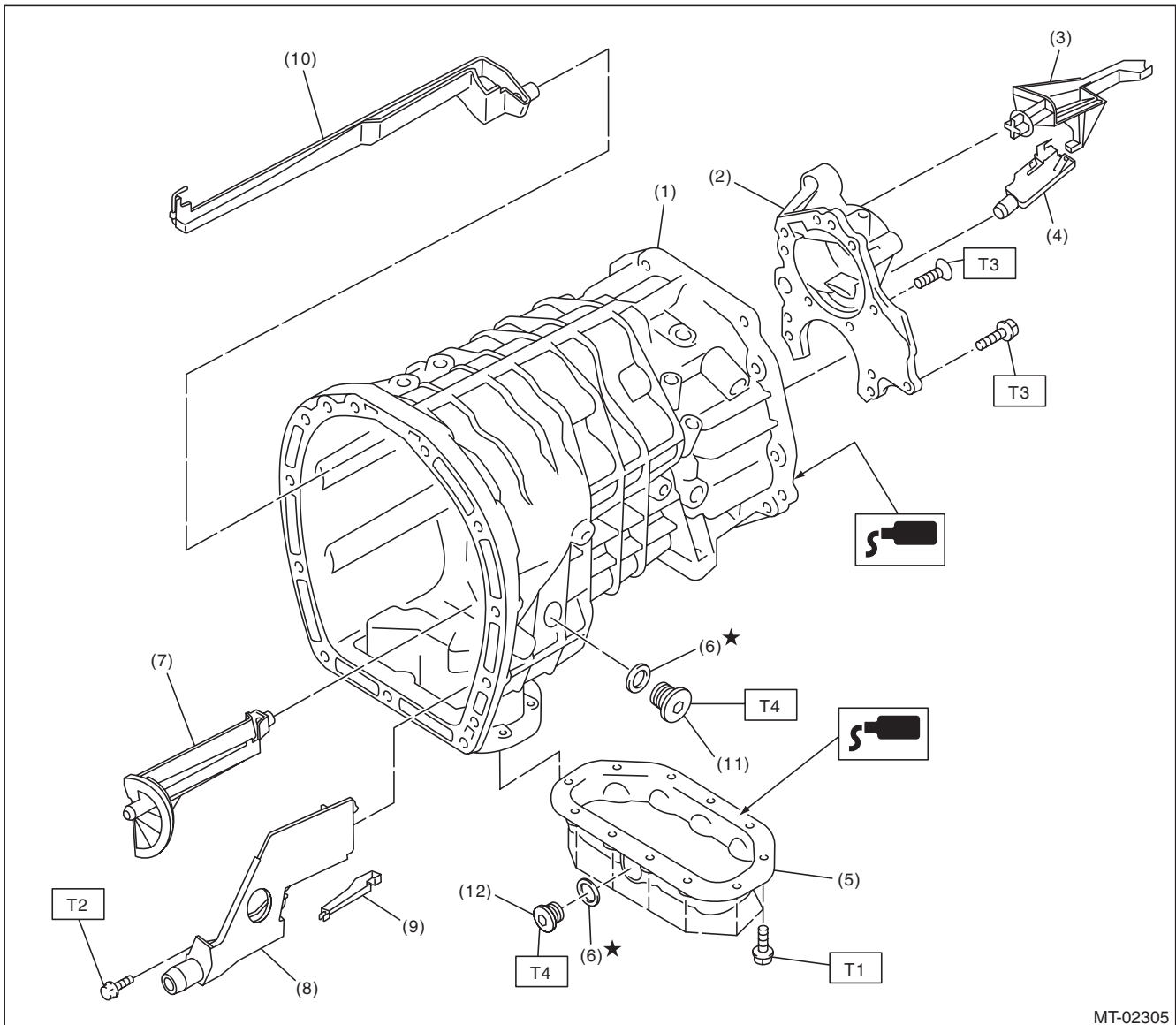
6MT-5

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

4. OIL PAN & OIL GUIDE



- | | |
|-----------------------------|------------------|
| (1) Transmission case | (7) Oil guide F |
| (2) Transfer bearing holder | (8) Oil guide D |
| (3) Oil guide G | (9) Oil guide E |
| (4) Oil guide H | (10) Oil guide C |
| (5) Oil pan | (11) Filler plug |
| (6) Gasket | (12) Drain plug |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

T2: 18 (1.8, 13.3)

T3: 25 (2.5, 18.4)

T4: 50 (5.1, 36.9)

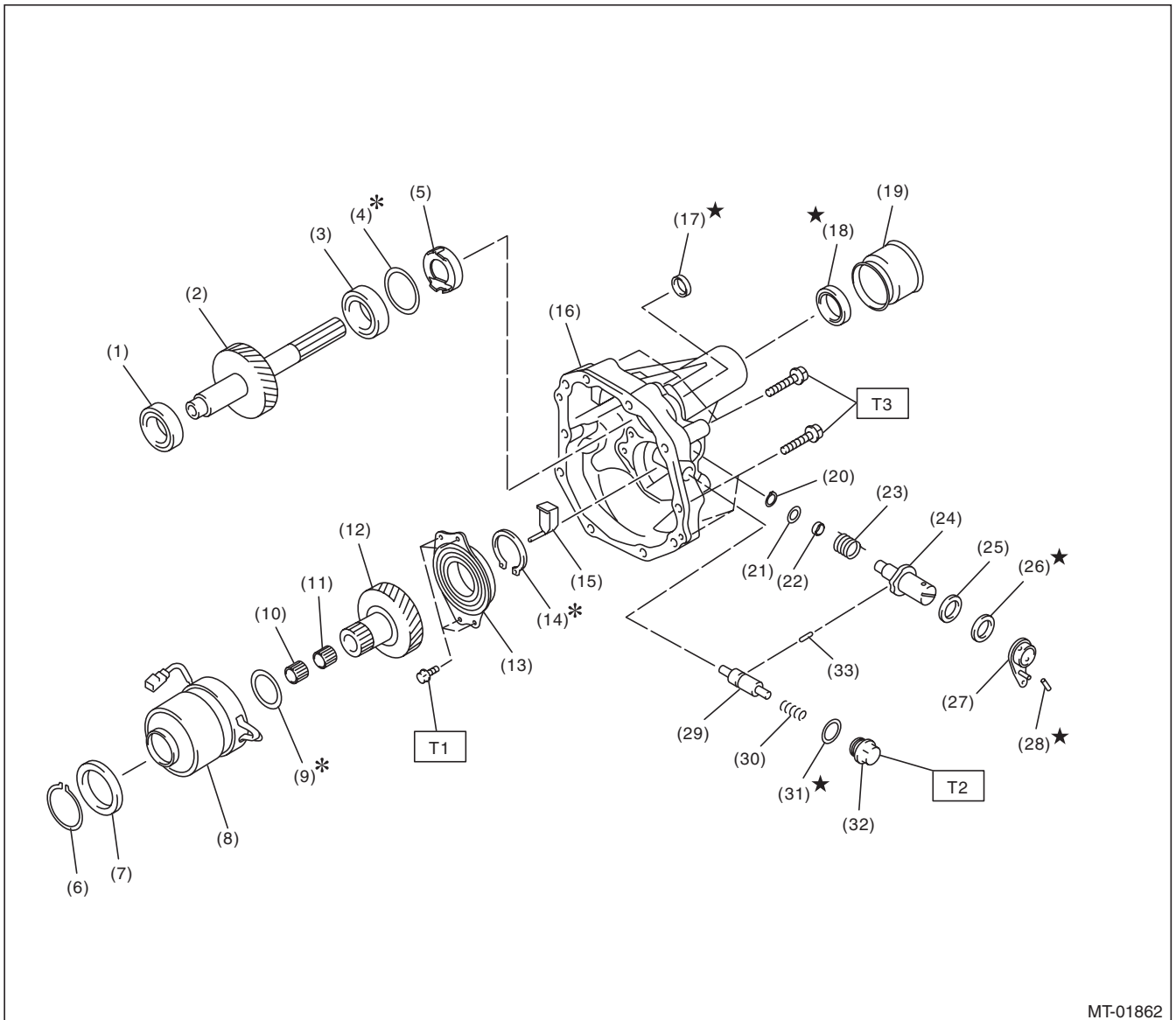
6MT-6

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

5. EXTENSION CASE AND CENTER DIFFERENTIAL



MT-01862

(1) Taper roller bearing	(14) Snap ring	(27) Reverse check lever COMPL
(2) Transfer driven gear	(15) Oil guide	(28) Straight pin
(3) Taper roller bearing	(16) Extension case	(29) Reverse check plug
(4) Shim	(17) Oil seal	(30) Spring
(5) Oil plate	(18) Oil seal	(31) Gasket
(6) Snap ring	(19) Dust cover	(32) Plug
(7) Collar	(20) Snap ring	(33) Plunger
(8) Center differential	(21) Washer	
(9) Shim	(22) Bushing	
(10) Needle bearing	(23) Spring	
(11) Needle bearing	(24) Reverse check shaft	
(12) Transfer drive gear	(25) Ball bearing	
(13) Ball bearing (with flange)	(26) Oil seal	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)

T2: 41 (4.2, 30.2)

T3: 48 (4.9, 35.4)

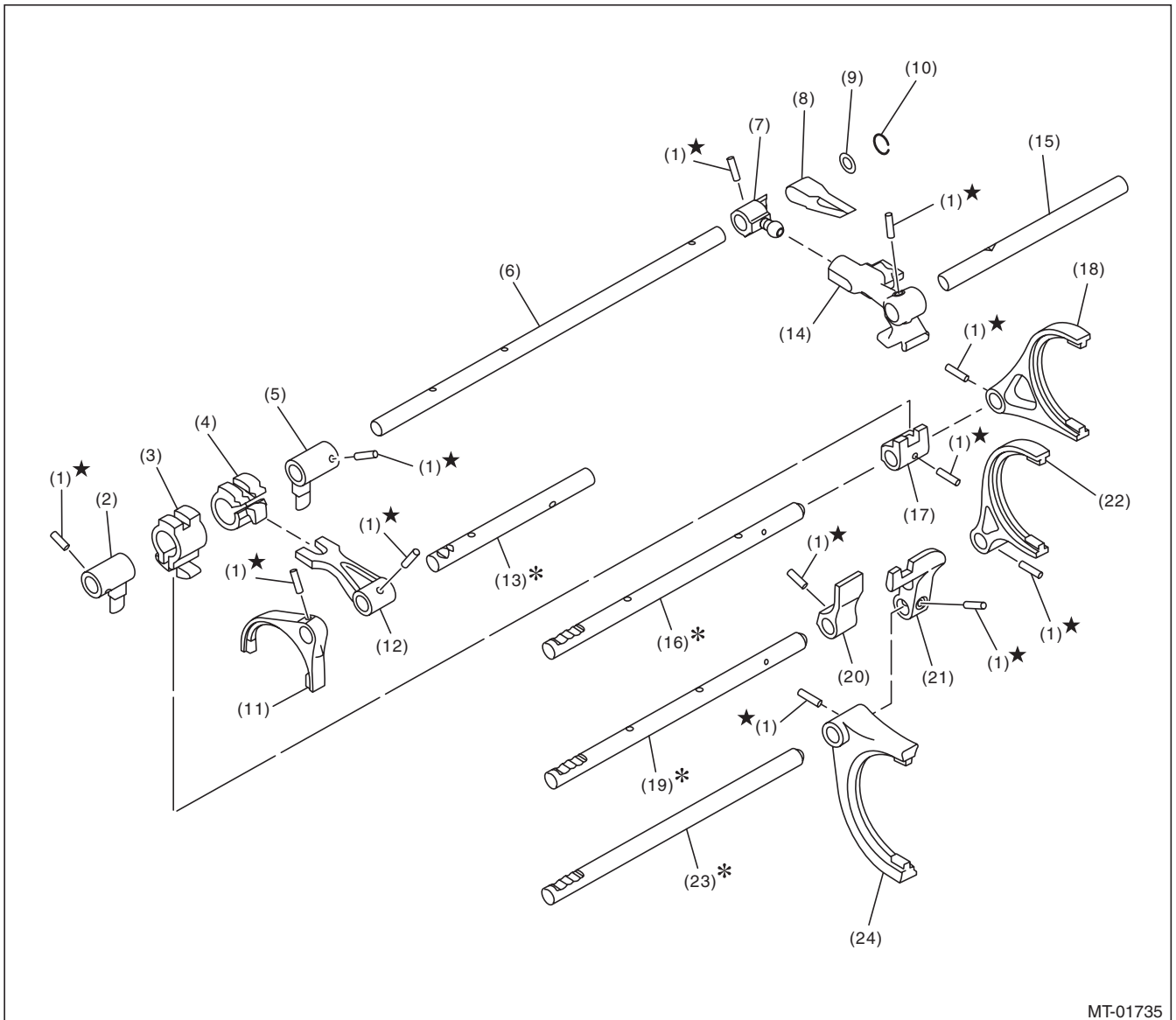
6MT-7

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

6. SHIFTER FORK AND FORK ROD



- | | | |
|-----------------------------|--------------------------|--------------------------|
| (1) Spring pin | (9) Washer | (17) 5th-6th shifter arm |
| (2) Interlock arm | (10) Snap ring | (18) 5th-6th fork COMPL |
| (3) Interlock block | (11) Reverse fork COMPL | (19) 3rd-4th fork rod |
| (4) Reverse interlock block | (12) Reverse shifter arm | (20) 3rd-4th shifter arm |
| (5) Interlock arm | (13) Reverse fork rod | (21) 1st-2nd shifter arm |
| (6) Striking rod | (14) Selector arm | (22) 3rd-4th fork COMPL |
| (7) Selector arm No. 2 | (15) Shifter arm shaft | (23) 1st-2nd fork rod |
| (8) Neutral set spring | (16) 5th-6th fork rod | (24) 1st-2nd fork COMPL |

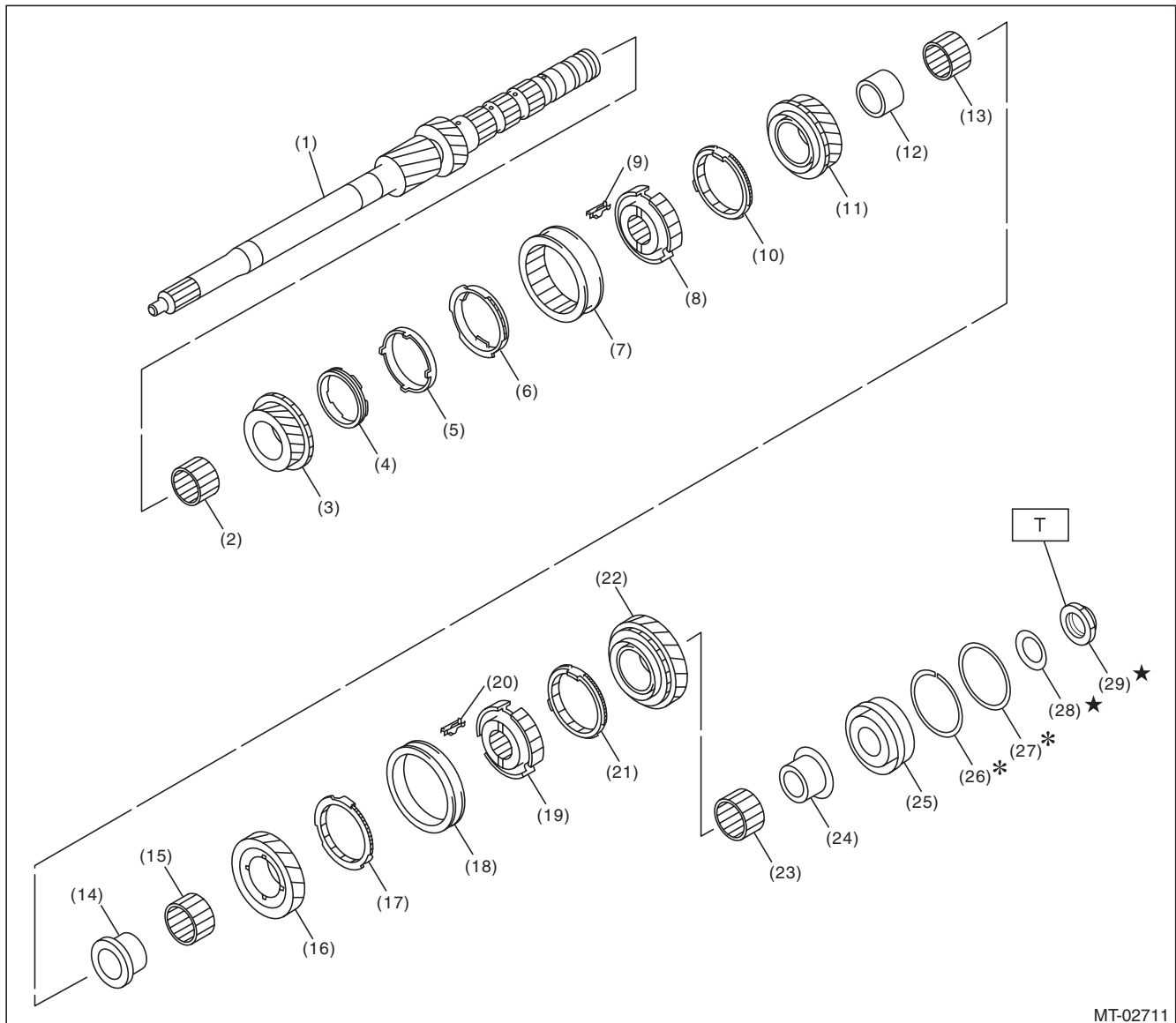
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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

7. MAIN SHAFT ASSY



MT-02711

- | | | |
|----------------------|----------------------|---------------------------|
| (1) Main shaft | (12) 4th bushing | (23) Needle bearing |
| (2) Needle bearing | (13) Needle bearing | (24) 6th bushing |
| (3) 3rd drive gear | (14) 5th bushing | (25) Taper roller bearing |
| (4) Inner baulk ring | (15) Needle bearing | (26) Snap ring |
| (5) Synchro cone | (16) 5th drive gear | (27) Washer |
| (6) Outer baulk ring | (17) 5th baulk ring | (28) Lock washer |
| (7) 3rd-4th sleeve | (18) 5th-6th sleeve | (29) Lock nut |
| (8) 3rd-4th hub | (19) 5th-6th hub | |
| (9) Shifting insert | (20) Shifting insert | |
| (10) 4th baulk ring | (21) 6th baulk ring | |
| (11) 4th gear | (22) 6th drive gear | |

Tightening torque: N·m (kgf-m, ft-lb)
T: 392 (40.0, 289.1)

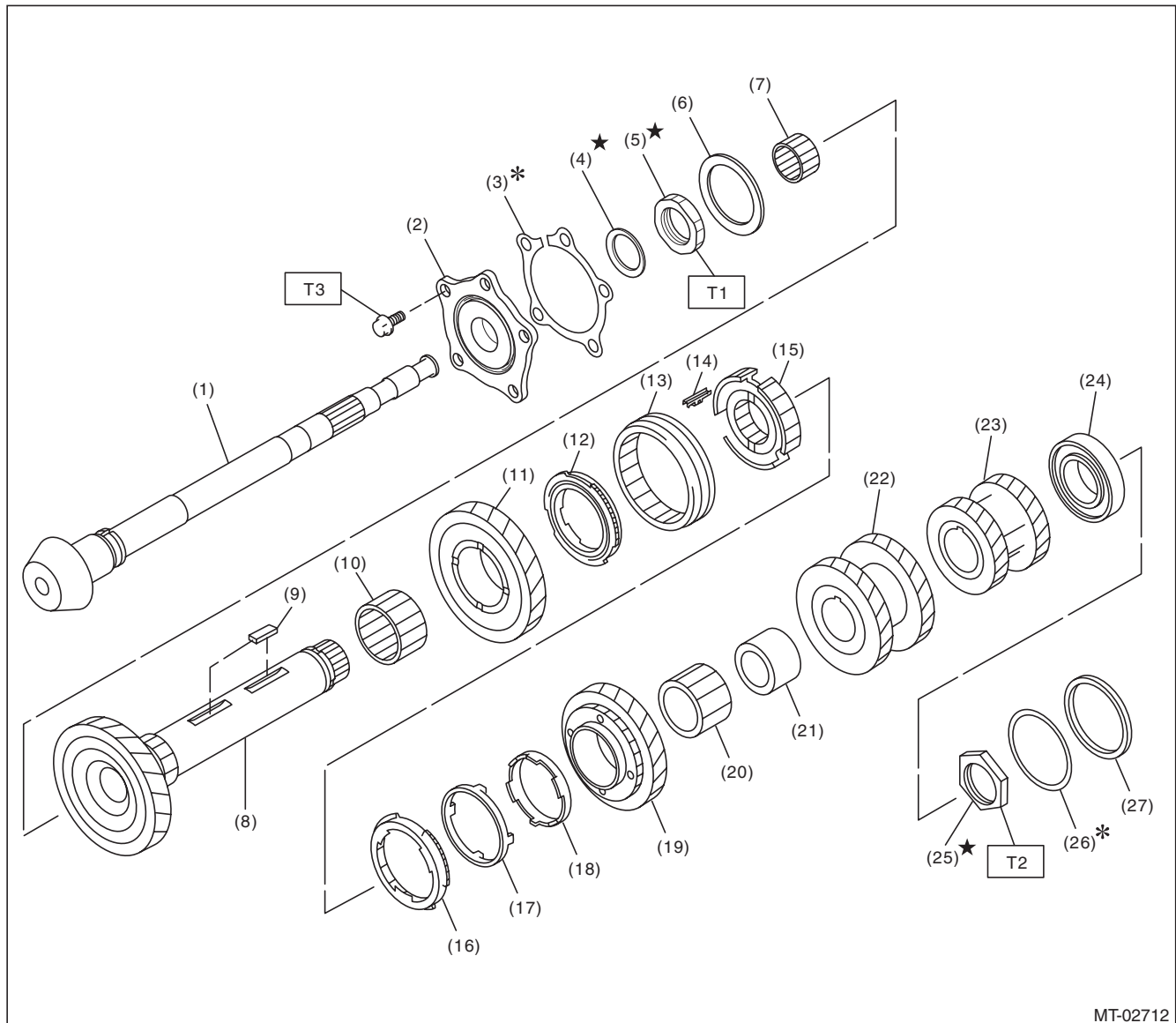
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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

8. DRIVE PINION SHAFT ASSY & DRIVEN GEAR ASSY



MT-02712

- | | |
|---------------------------|--------------------------|
| (1) Drive pinion shaft | (13) 1st-2nd sleeve |
| (2) Taper roller bearing | (14) Shifting insert |
| (3) Drive pinion shim | (15) 1st-2nd hub |
| (4) Lock washer | (16) Outer baulk ring |
| (5) Lock nut | (17) Synchro cone |
| (6) Thrust bearing | (18) Inner baulk ring |
| (7) Needle bearing | (19) 2nd driven gear |
| (8) Driven shaft | (20) Needle bearing |
| (9) Key | (21) 2nd bushing |
| (10) Needle bearing | (22) 3rd-4th driven gear |
| (11) 1st driven gear | (23) 5th-6th driven gear |
| (12) 1st synchronizer set | (24) Ball bearing |

- | |
|---------------|
| (25) Lock nut |
| (26) Shim |
| (27) Collar |

Tightening torque:N-m (kgf-m, ft-lb)

T1: 285 (29.1, 210.2)

*** 265 (27.0, 195.4)**

T2: 570 (58.1, 420.4)

*** 530 (54.0, 390.9)**

T3: 54 (5.5, 39.8)

* Tightening torque when using the ST

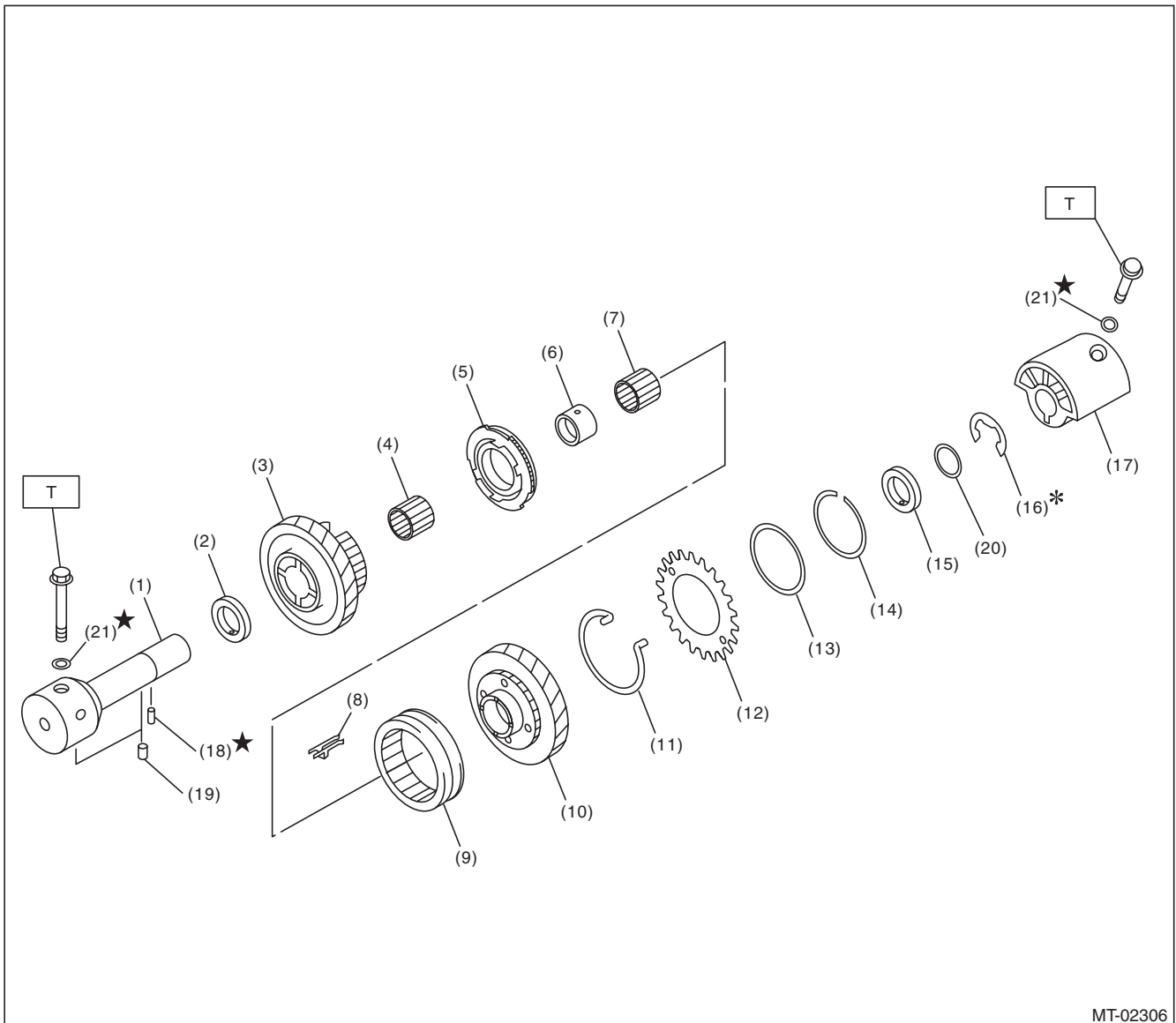
6MT-10

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

9. REVERSE IDLER GEAR ASSY



- | | | |
|---------------------------------|----------------------------------|---------------------------|
| (1) Base COMPL | (9) Reverse coupling sleeve | (17) Reverse idler holder |
| (2) Counter high and low washer | (10) Reverse idler gear | (18) Spring pin |
| (3) Reverse idler gear No. 2 | (11) Spring | (19) Knock pin |
| (4) Needle bearing | (12) Sub gear | (20) Washer |
| (5) Reverse idler synchro set | (13) Friction plate | (21) Gasket |
| (6) Reverse idler gear bushing | (14) Snap ring | |
| (7) Needle bearing | (15) Counter high and low washer | |
| (8) Shifting insert | (16) Snap ring | |

Tightening torque: N·m (kgf-m, ft-lb)

T: 25 (2.5, 18.4)

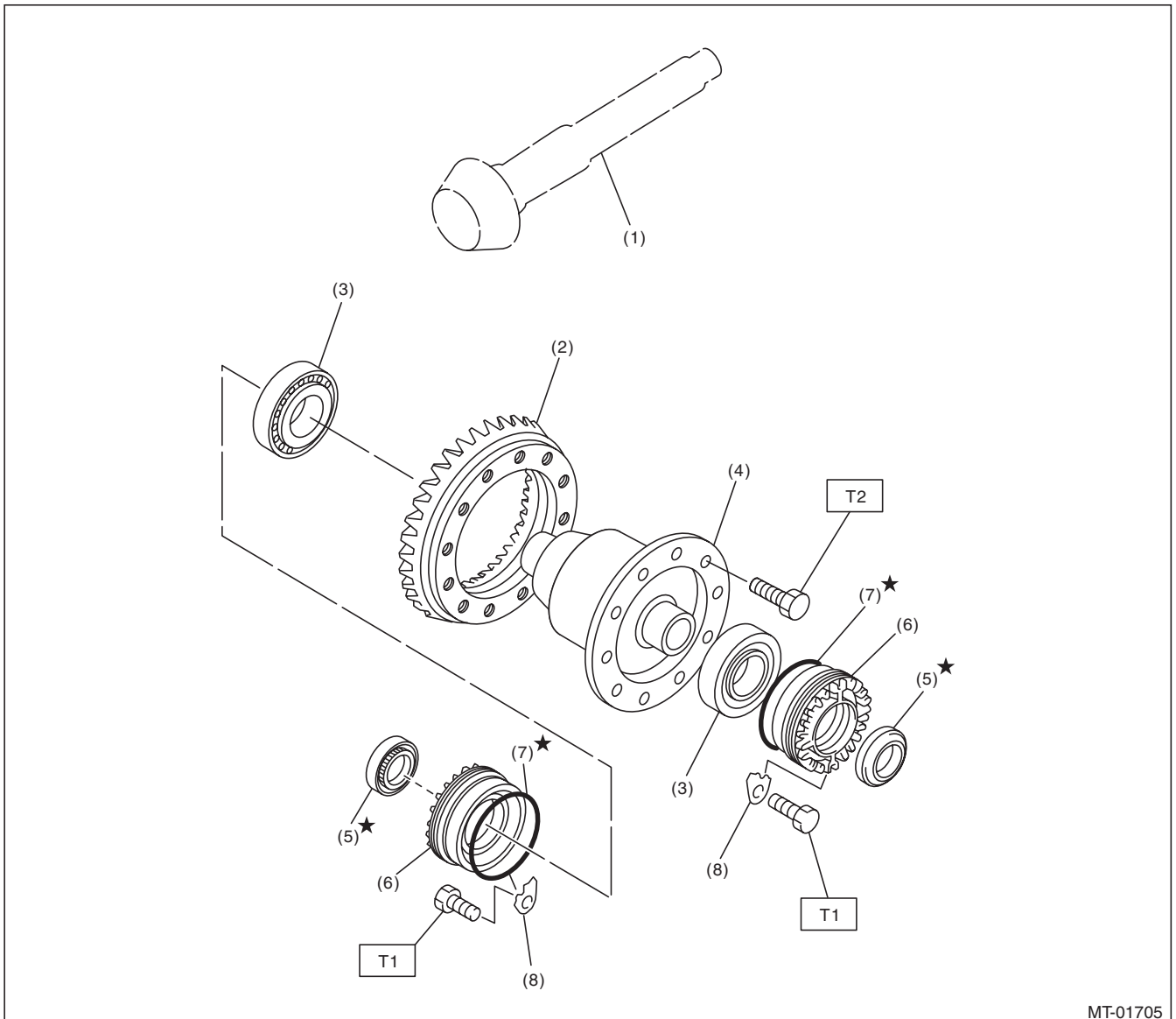
6MT-11

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

10.FRONT DIFFERENTIAL ASSY



MT-01705

- | | |
|------------------------|--------------------------------|
| (1) Drive pinion shaft | (5) Oil seal |
| (2) Hypoid driven gear | (6) Differential side retainer |
| (3) Roller bearing | (7) O-ring |
| (4) Differential ASSY | (8) Retainer lock plate |

Tightening torque: N-m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)

T2: 69 (7.0, 50.9)

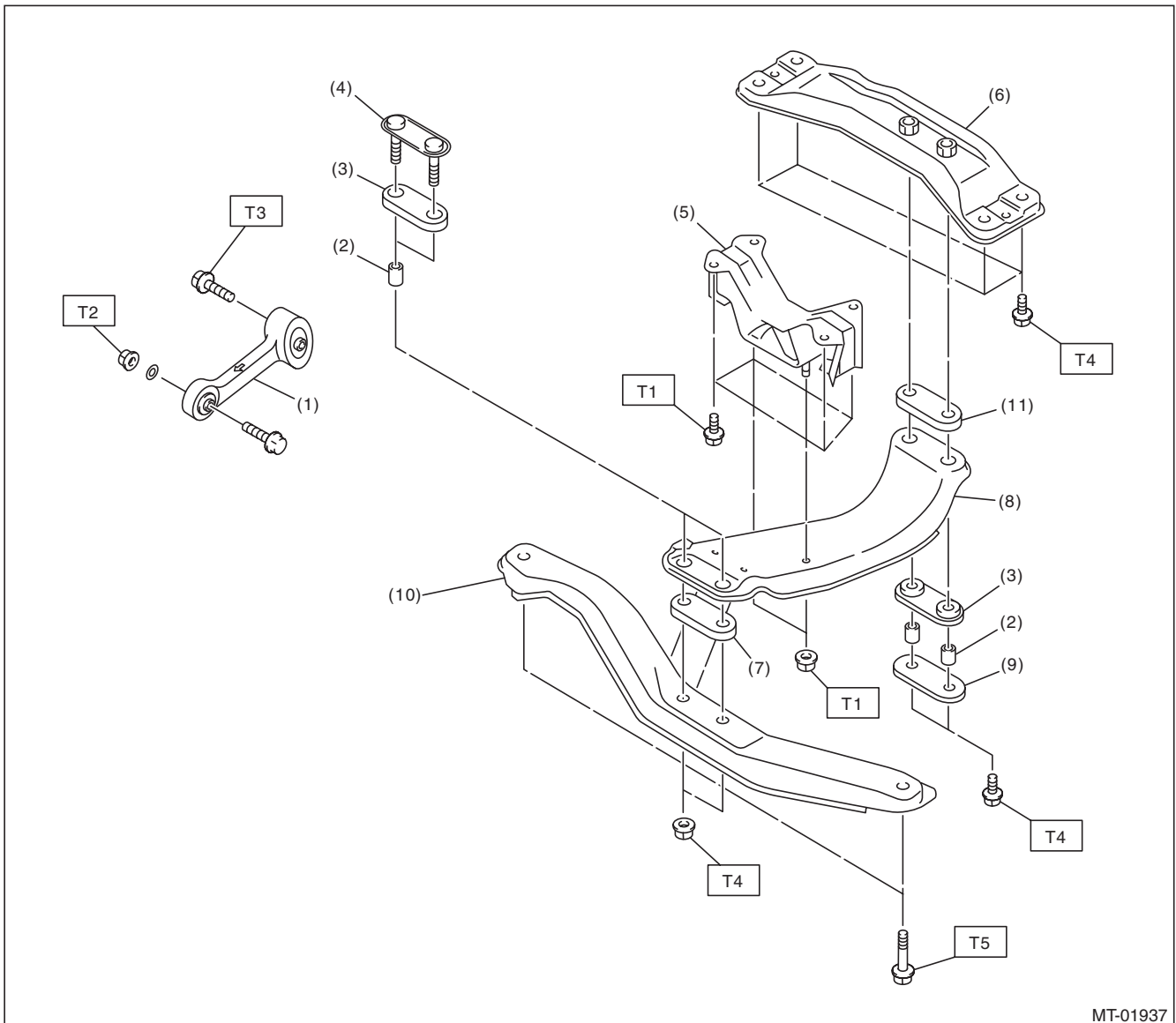
6MT-12

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

11.TRANSMISSION MOUNTING



MT-01937

- | | |
|---------------------------------|--------------------------|
| (1) Pitching stopper | (7) Upper cushion rubber |
| (2) Spacer | (8) Center crossmember |
| (3) Lower cushion rubber | (9) Rear plate |
| (4) Front plate | (10) Front crossmember |
| (5) Transmission cushion rubber | (11) Rear cushion rubber |
| (6) Rear crossmember | |

Tightening torque: N-m (kgf-m, ft-lb)

T1: 35 (3.6, 25.8)

T2: 50 (5.1, 36.9)

T3: 58 (5.9, 42.8)

T4: 70 (7.1, 51.6)

T5: 140 (14.3, 103.3)

6MT-13

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

C: CAUTION

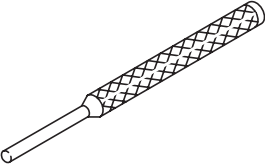
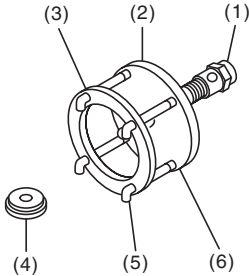
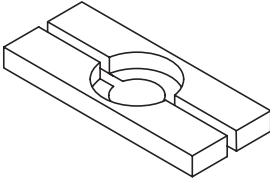
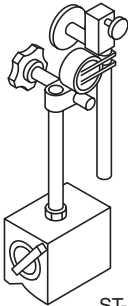
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, disassemble by using a plastic hammer. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine transmission gear oil, grease or equivalent. Do not mix transmission gear oil, grease etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply transmission gear oil onto sliding or revolving surfaces before installation.
- Always replace deformed or damaged snap rings.
- Before installing O-rings or oil seals, apply sufficient amount of transmission gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning materials such as wood blocks, aluminum plates, or waste cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the old liquid gasket.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

D: PREPARATION TOOL

1. SPECIAL TOOL

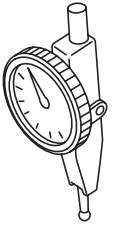
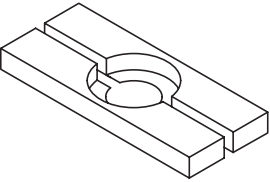
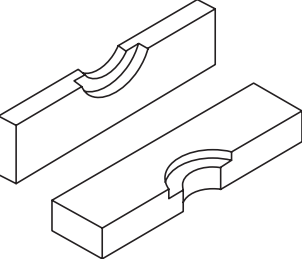
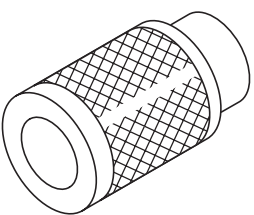
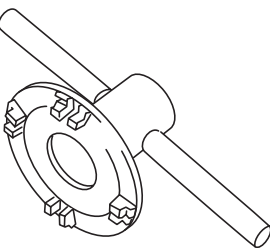
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398791700	398791700	REMOVER	Used for removing and installing the spring pin (6 mm).
 ST-399527700	399527700	PULLER SET	Used for removing and installing the roller bearing (differential). (1) BOLT (899521412) (2) PULLER (399527702) (3) HOLDER (399527703) (4) ADAPTER (398497701) (5) BOLT (899520107) (6) NUT (021008000)
 ST-498515700	498515700	REMOVER	Used for removing the roller bearing of the transfer driven gear.
 ST-498247001	498247001	MAGNET BASE	- Used for measuring the backlash between hypoid gears. - Used with DIAL GAUGE (498247100).

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

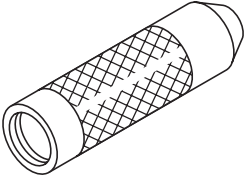
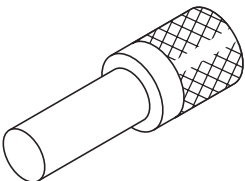
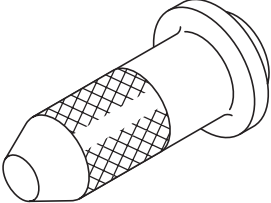
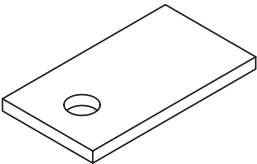
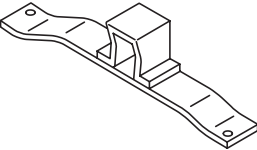
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring the backlash between hypoid gears. - Used with MAGNET BASE (498247001).
 ST-498077000	498077000	REMOVER	Used for removing the differential taper roller bearing.
 ST-899858600	899858600	REMOVER	Used for removing the roller bearing.
 ST-499757002	499757002	INSTALLER	Used for installing the bearing cone of transfer driven gear (transmission case side).
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	- Used for removing and installing the differential side retainer RH. - WRENCH ASSY (499787000) can also be used.

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

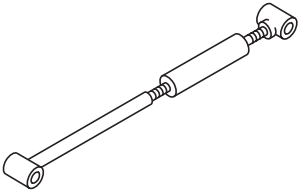
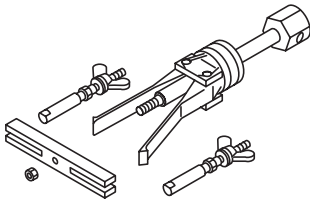
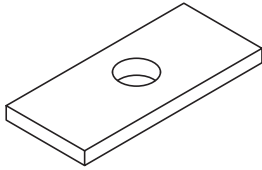
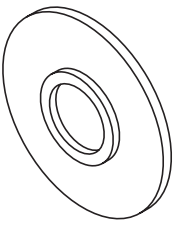
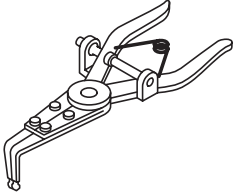
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499877000	499877000	RACE 4-5 INSTALLER	Used for disassembling the driven shaft and transfer driven gear.
 ST-899864100	899864100	REMOVER	Used for removing the transmission main shaft and drive pinion parts.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.

6MT-17

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

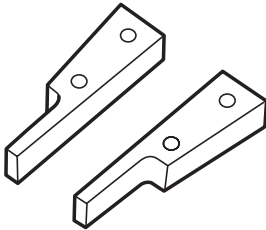
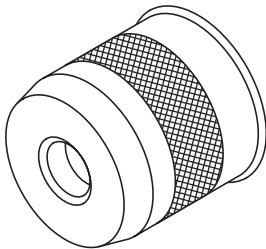
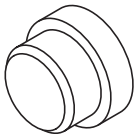
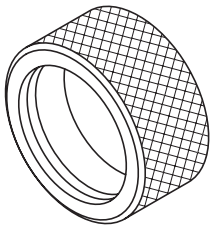
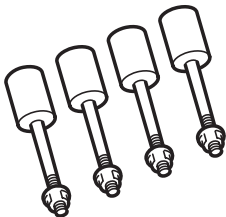
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AA020	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 ST-398527700	398527700	PULLER ASSY	• Used for removing the extension case oil seal. • Used for removing the front differential side bearing outer race. (Used together with 18760AA000 (CLAW).)
 ST-398643600	398643600	GAUGE	Used for adjusting total end play, extension end play and drive pinion shim.
 ST-398177700	398177700	INSTALLER	• Used for assembling the main shaft. • Used for installing the roller bearing of transfer driven gear (extension case side).
 ST-399893600	399893600	PLIER	• Used for removing and installing the neutral set spring. • Used together with CLAW (18756AA000).

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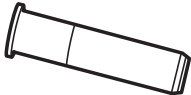
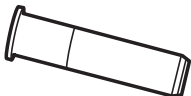
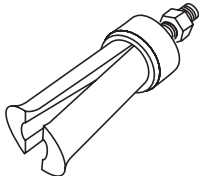
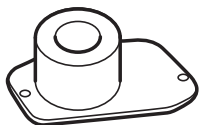
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18756AA000	18756AA000	CLAW	- Used for removing and installing the neutral set spring. - Used together with PLIER (399893600).
 ST-499247400	499247400	INSTALLER	Used for installing the ball bearing of the transfer drive gear.
 ST-398497701	398497701	SEAT	- Used for installing the ball bearing of the transfer drive gear. - Used for installing the front differential side bearing.
 ST-398437700	398437700	INSTALLER	Used for installing the front differential side bearing.
 ST18632AA000	18632AA000	STAND ASSY	Used for disassembling and assembling the transmission.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

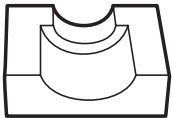
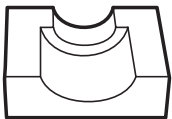
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18671AA000	18671AA000	OIL SEAL GUIDE	- Used for installing the reverse check shaft oil seal. - Used for installing the shifter arm oil seal. - Used together with INSTALLER (18657AA010).
 ST18657AA010	18657AA010	INSTALLER	- Used for installing the reverse check shaft oil seal. - Used together with OIL SEAL GUIDE (18671AA000).
 ST18657AA000	18657AA000	INSTALLER	- Used for installing the shifter arm oil seal. - Used together with OIL SEAL GUIDE (18671AA000).
 ST18758AA000	18758AA000	PULLER	Used for removing the transfer driven gear bearing outer race.
 ST18831AA000	18831AA000	GAUGE	Used for selecting the transfer driven gear bearing thrust washer.

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

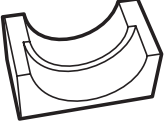
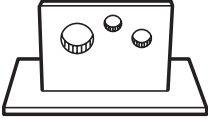
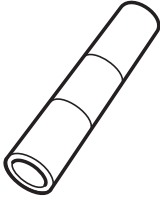
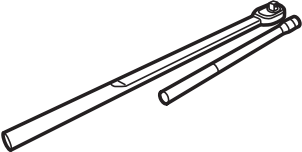
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18631AA000	18631AA000	HANDLE	Used for measuring the front differential backlash.
 ST18754AA000	18754AA000	REMOVER	Used to remove parts of the driven gear.
 ST18757AA000	18757AA000	STRAIGHT PIN REMOVER	Used for installing the reverse idler gear.
 ST18665AA000	18665AA000	HOLDER	- Used for removing and installing the main shaft lock nut. - Used together with BASE (18664AA000).
 ST18666AA000	18666AA000	HOLDER	- Used for removing and installing the driven shaft lock nut. - Used together with BASE (18664AA000).

6MT-21

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18667AA000	18667AA000	HOLDER	- Used for removing and installing the drive pinion shaft lock nut. - Used together with BASE (18664AA000).
 ST18664AA000	18664AA000	BASE	- Used for removing and installing the main shaft lock nut. - Used for removing and installing the drive pinion shaft lock nut. - Used for removing and installing the driven shaft lock nut.
 ST18722AA010	18722AA010	REMOVER	Used for disassembling the main shaft.
 ST18651AA000	18651AA000	INSTALLER	Used for assembling the main shaft.
 ST18852AA000	18852AA000	TORQUE WRENCH	- Used to tighten the main shaft lock nut. - Used to tighten the drive pinion shaft lock nut. - Used to tighten the driven shaft lock nut.

6MT-22

Brought to you by Ebay Seller "SubaruManuals"

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

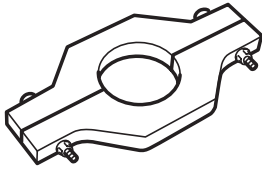
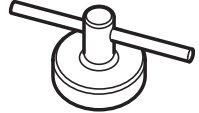
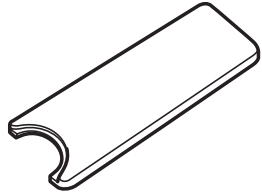
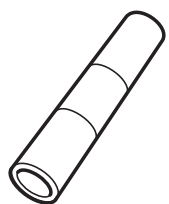
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18668AA000	18668AA000	PUNCH	Used to crimp the main shaft lock nut.
 ST18669AA000	18669AA000	PUNCH	Used to crimp the driven shaft lock nut.
 ST18670AA000	18670AA000	PUNCH	Used to crimp the drive pinion shaft lock nut.
 ST18620AA000	18620AA000	ADAPTER WRENCH	Used for removing and installing the driven gear shaft lock nut.
 ST18621AA000	18621AA000	ADAPTER WRENCH	Used for removing and installing the drive pinion shaft lock nut.

6MT-23

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

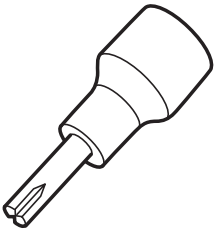
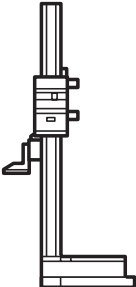
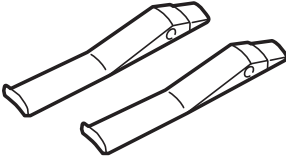
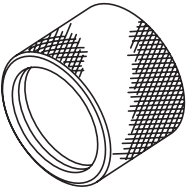
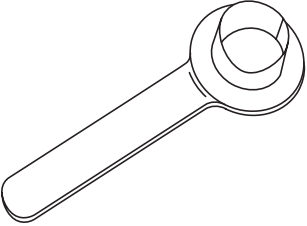
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18723AA000	18723AA000	REMOVER	Used for disassembling the driven shaft.
 ST18630AA000	18630AA000	WRENCH ASSY	Used for removing and installing the differential side retainer LH.
 ST18672AA000	18672AA000	GUIDE CLIP	Used for installing the reverse idler snap ring.
 ST18720AA000	18720AA000	REMOVER	Used for disassembling the main shaft.
 ST18654AA000	18654AA000	INSTALLER	Used for assembling the driven shaft.

6MT-24

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

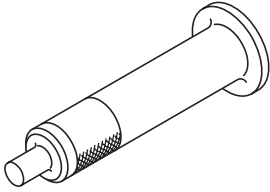
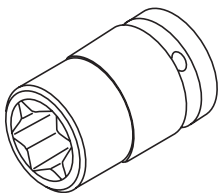
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18663AA000	18663AA000	SOCKET	Used for removing and installing the transfer bearing holder.
 ST18853AA000	18853AA000	HEIGHT GAUGE	• Used for selecting the shift rod. • Used for selecting the snap ring and washer of the main shaft.
 ST18760AA000	18760AA000	CLAW	• Used for removing the front differential side bearing outer race. • Used together with PULLER ASSY (398527700).
 ST18675AA000	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.

6MT-25

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18657AA020	18657AA020	OIL SEAL INSTALLER	Used for installing the oil seal.
 ST18270KA020	18270KA020	SOCKET (E20)	Used for removing and installing the hypoid driven gear.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
TORX® bit T70	Used for removing and installing transmission gear oil drain plug.
Depth gauge	Used for measuring the transmission end play.

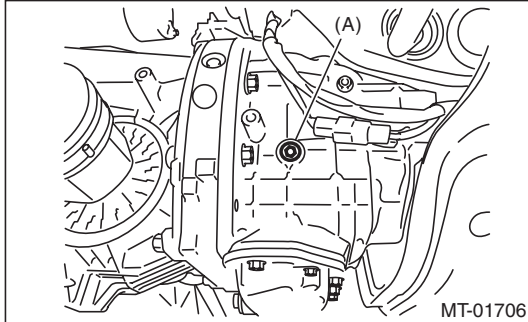
Transmission Gear Oil

MANUAL TRANSMISSION AND DIFFERENTIAL

2. Transmission Gear Oil

A: INSPECTION

- 1) Lift up the vehicle.
- 2) Remove the transmission under cover.
- 3) Remove the filler plug, and then check the transmission gear oil.



(A) Filler plug

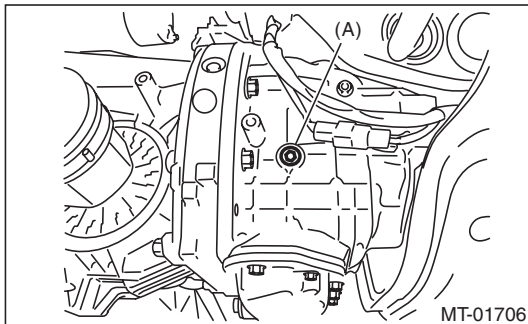
- 4) Check that the transmission gear oil level is up to the bottom of the filler plug. If the transmission gear oil level is low, refill up to the bottom of filler plug.
- 5) Using a new gasket, and tighten the filler plug.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

B: REPLACEMENT

- 1) Lift up the vehicle.
- 2) Remove the transmission under cover.
- 3) Remove the filler plug.



(A) Filler plug

- 4) Remove the two drain plugs (oil pan side, clutch housing side), and then drain the transmission gear oil completely.

CAUTION:

- Immediately after running the vehicle or after idling for a long time, the transmission gear oil will be hot. Be careful not to receive burns.
- Be careful not to spill the transmission gear oil on exhaust pipe to prevent it from emitting smoke or causing fires. If transmission gear oil is spilled on the exhaust pipe, wipe it off completely.

NOTE:

- Tighten the drain plug of the transmission gear oil after draining the transmission gear oil.
- Always use a new gasket.
- Use TORX® bit T70 to remove and install the drain plug on clutch housing side.

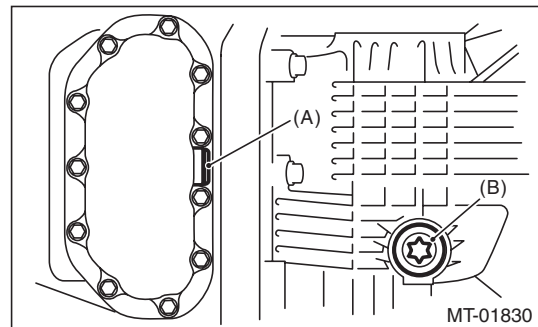
Tightening torque:

Oil pan side

50 N·m (5.1 kgf-m, 36.9 ft-lb)

Clutch housing side

70 N·m (7.1 kgf-m, 51.6 ft-lb)



(A) Drain plug (oil pan side)

(B) Drain plug (clutch housing side)

- 5) Pour transmission gear oil to the bottom end of filler plug.

NOTE:

Carefully refill transmission gear oil while checking the level. Excessive or insufficient oil must be avoided.

Recommended gear oil

GL-5 (75W-90) or equivalent

Transmission gear oil capacity

4.1 ℓ (4.3 US qt, 3.6 Imp qt)

- 6) Check the level of the transmission gear oil.
- 7) Using a new gasket, and tighten the filler plug.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

3. Oil Seal

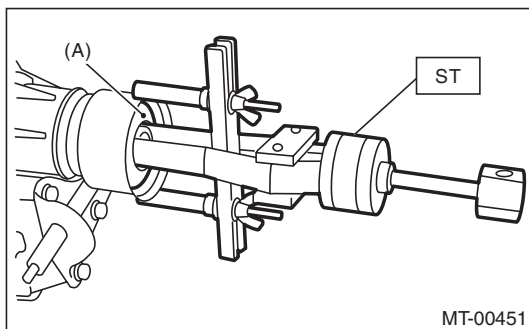
A: INSPECTION

Check that there is no oil leaking from the oil seal. If there is any deformation, hardening, wear or other malfunctions of the oil seal, perform the following:

- Replace the oil seal.
- Inspect the propeller shaft.

B: REPLACEMENT

- 1) Clean the transmission exterior.
- 2) Drain transmission gear oil completely. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>
- 3) Remove the rear exhaust pipe and muffler. <Ref. to EX(STI)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(STI)-15, REMOVAL, Muffler.>
- 4) Remove the heat shield cover.
- 5) Remove the propeller shaft. <Ref. to DS-11, REMOVAL, Propeller Shaft.>
- 6) Using the ST, remove the oil seal.
ST 398527700 PULLER ASSY



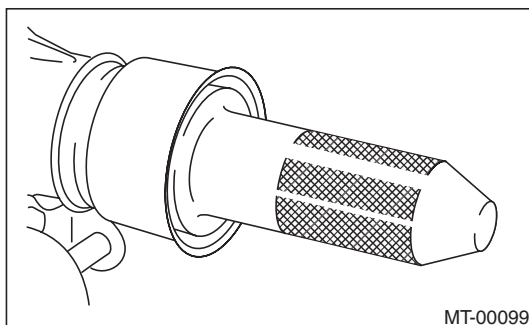
(A) Oil seal

- 7) Using the ST, install the oil seal.

NOTE:

- When grease is not applied to the oil seal lips, apply the transmission gear oil to the oil seal lips.
- Use a new oil seal.

- ST 498057300 INSTALLER



- 8) Install the propeller shaft. <Ref. to DS-12, INSTALLATION, Propeller Shaft.>
- 9) Install the heat shield cover.

- 10) Install the rear exhaust pipe and muffler. <Ref. to EX(STI)-13, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(STI)-15, INSTALLATION, Muffler.>

- 11) Pour in transmission gear oil and check the oil level. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>

4. Differential Side Retainer Oil Seal

A: INSPECTION

Check that there is no oil leaking from the differential side retainer oil seal. If there is oil leakage, perform the following procedures.

- Replace the oil seal.
- Check the front drive shaft.

B: REPLACEMENT

- 1) Lift up the vehicle.
- 2) Remove the front exhaust pipe and center exhaust pipe. <Ref. to EX(STI)-6, REMOVAL, Front Exhaust Pipe.>
- 3) Drain transmission gear oil completely. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>
- 4) Separate the front drive shaft from the transmission. <Ref. to DS-27, REMOVAL, Front Drive Shaft.>
- 5) Remove the differential side retainer oil seal by using a flat tip screwdriver or similar tools.
- 6) Using the ST, install the differential side retainer oil seal by lightly tapping with a hammer.
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER
- 7) Apply transmission gear oil to the oil seal lips.
- 8) Set the ST to the side retainer.
ST 28399SA010 OIL SEAL PROTECTOR
- 9) Install the front drive shaft into the transmission.

NOTE:

Replace the circlip of drive shaft with a new part.

- 10) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.

ST 28399SA010 OIL SEAL PROTECTOR

- 11) Install the front exhaust pipe and the center exhaust pipe. <Ref. to EX(STI)-6, INSTALLATION, Front Exhaust Pipe.>

- 12) Pour transmission gear oil to the bottom end of filler plug. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>

- 13) Lower the vehicle.

Transmission Mounting System

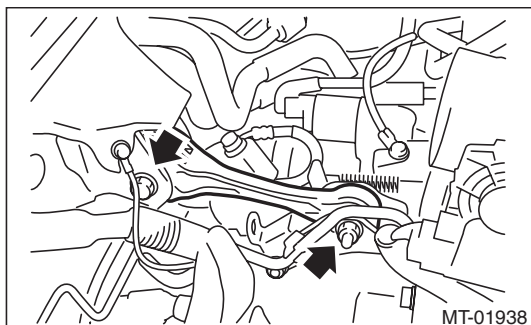
MANUAL TRANSMISSION AND DIFFERENTIAL

5. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.>
- 3) Remove the pitching stopper.



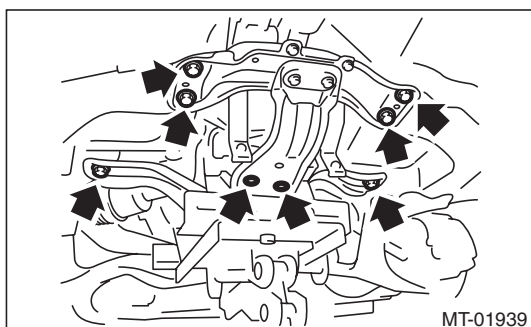
2. CROSSMEMBER AND CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the transmission under cover.
- 4) Remove the center exhaust pipe. <Ref. to EX(STI)-8, REMOVAL, Center Exhaust Pipe.>
- 5) Remove the rear exhaust pipe and muffler. <Ref. to EX(STI)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(STI)-15, REMOVAL, Muffler.>
- 6) Remove the heat shield cover.
- 7) Set the transmission jack under the transmission body.

CAUTION:

Always support the transmission case with a transmission jack.

- 8) Remove the rear crossmember.



- 9) Remove the transmission cushion rubber.

B: INSTALLATION

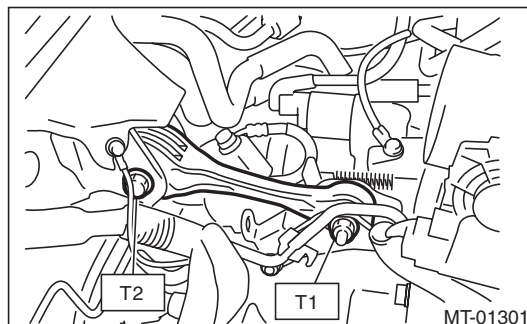
1. PITCHING STOPPER

- 1) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



- 2) Install the intercooler. <Ref. to IN(STI)-13, INSTALLATION, Intercooler.>
- 3) Connect the ground cable to battery.

2. CROSSMEMBER AND CUSHION RUBBER

- 1) Install the transmission cushion rubber.

Tightening torque:

35 N·m (3.6 kgf-m, 25.8 ft-lb)

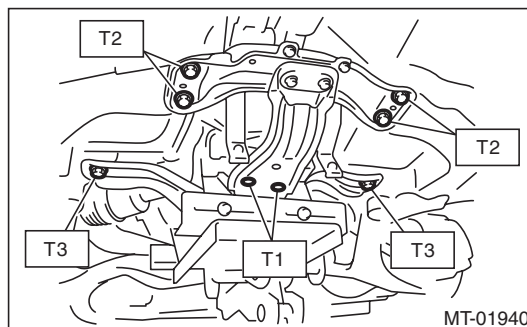
- 2) Install the crossmember.

Tightening torque:

T1: 35 N·m (3.6 kgf-m, 25.8 ft-lb)

T2: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

T3: 140 N·m (14.3 kgf-m, 103 ft-lb)



- 3) Remove the transmission jack.
- 4) Install the heat shield cover.
- 5) Install the rear exhaust pipe and muffler. <Ref. to EX(STI)-13, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(STI)-15, INSTALLATION, Muffler.>
- 6) Install the center exhaust pipe. <Ref. to EX(STI)-9, INSTALLATION, Center Exhaust Pipe.>

Transmission Mounting System

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

Perform the following inspection procedures and repair or replace faulty parts.

1. PITCHING STOPPER

Check the pitching stopper for bends or damage.
Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER

Check the crossmember for bending or damage.
Check that the cushion rubber is not stiff, cracked, or otherwise damaged.

Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

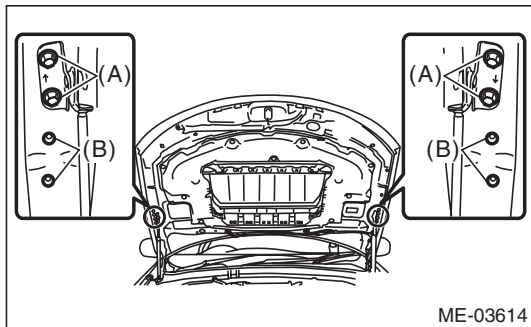
6. Manual Transmission Assembly

A: REMOVAL

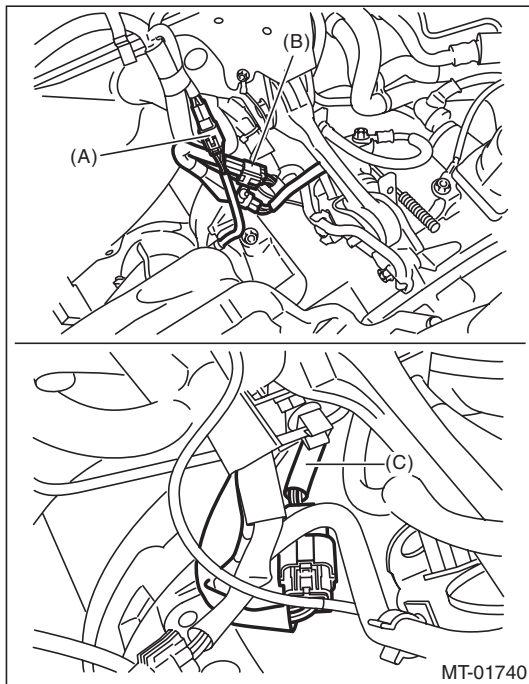
1) Change the bolt installation position from (A) to (B), then open the front hood completely.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



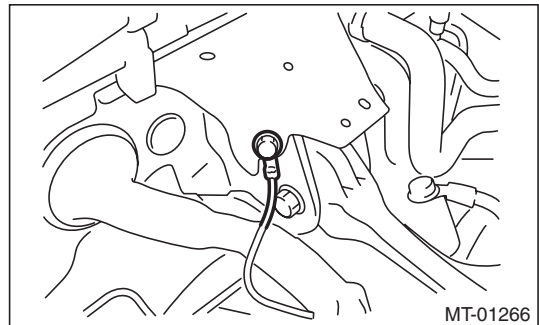
- 2) Disconnect the ground cable from battery.
3) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.>
4) Disconnect the following harness connectors, and then remove the engine hanger rear.



- (A) Front oxygen (A/F) sensor connector
(B) Rear oxygen sensor connector
(C) Neutral position switch backup light switch connector

5) Remove the secondary air combination valve. <Ref. to EC(STI)-29, SECONDARY AIR COMBINATION VALVE LH, REMOVAL, Secondary Air Combination Valve.>

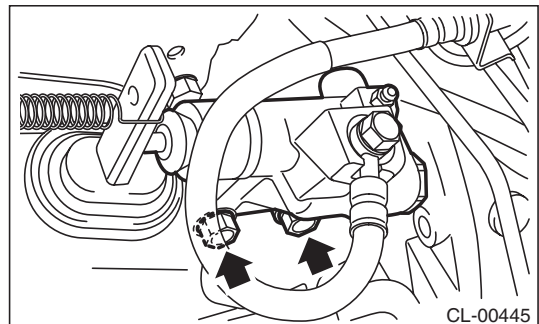
6) Disconnect the transmission radio ground terminal.



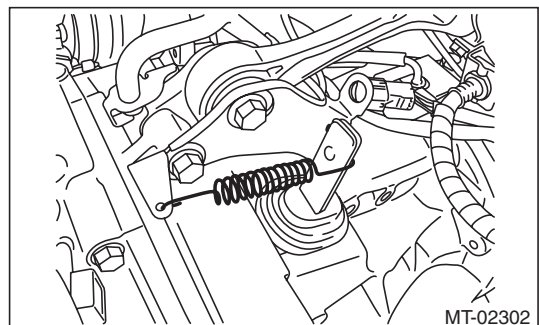
- 7) Remove the starter assembly. <Ref. to SC(STI)-7, REMOVAL, Starter.>
8) Remove the operating cylinder from the transmission.

NOTE:

Hang the removed operating cylinder with a piece of wire.



9) Remove the return spring from the release fork.



10) Remove the pitching stopper. <Ref. to 6MT-30, PITCHING STOPPER, REMOVAL, Transmission Mounting System.>

11) Remove the pitching stopper bracket, return spring bracket, and transmission radio ground cable.

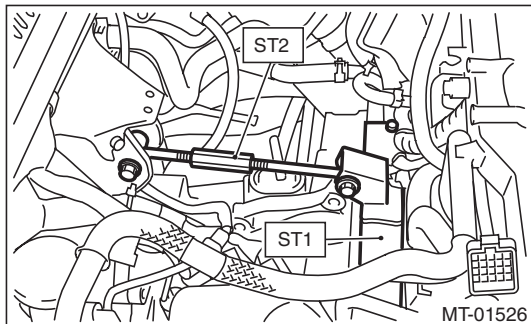
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Set the ST.

ST1 41099AA010 ENGINE SUPPORT BRACKET

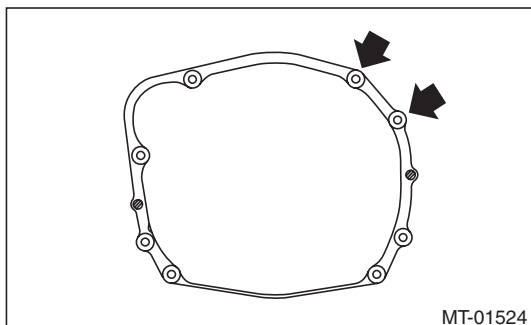
ST2 41099AA020 ENGINE SUPPORT



13) Remove the clutch release shaft.

- (1) Remove the plug using a hexagon wrench.
- (2) Attach a 6 mm (0.24 in) bolt to the release shaft, and pull out the release shaft.
- (3) Lift the release fork, and remove from the claw of the release bearing. Pull the release fork to the engine side, and make it so that it moves freely.

14) Remove the bolts which hold upper side of transmission to engine.



15) Remove the front wheels.

16) Lift up the vehicle, and remove the transmission under cover.

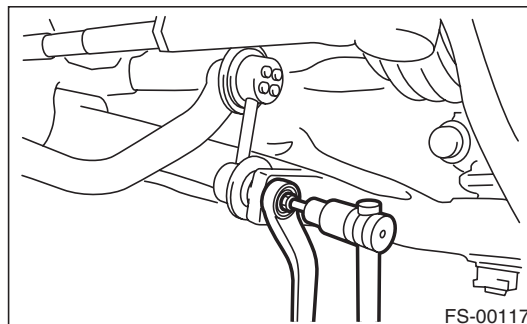
17) Drain transmission gear oil completely. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>

18) Remove the center exhaust pipe. <Ref. to EX(STI)-8, REMOVAL, Center Exhaust Pipe.>

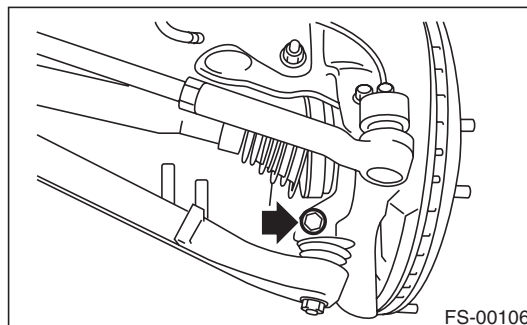
19) Remove the heat shield cover.

20) Remove the propeller shaft. <Ref. to DS-11, REMOVAL, Propeller Shaft.>

21) Remove the front stabilizer link.

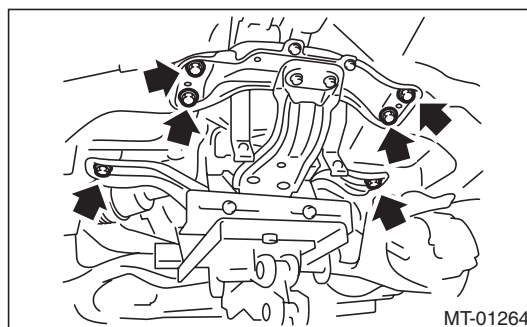


22) Remove the ball joint of front arm from the housing.



23) Remove the front drive shaft. <Ref. to DS-27, REMOVAL, Front Drive Shaft.>

24) Set the transmission jack under the transmission, and remove the front crossmember and rear crossmember.



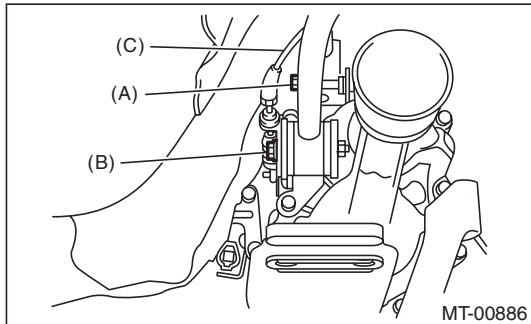
25) Move the transmission to the right side of the vehicle, and remove the joint COMPL, stay bolts and reverse check cable.

Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

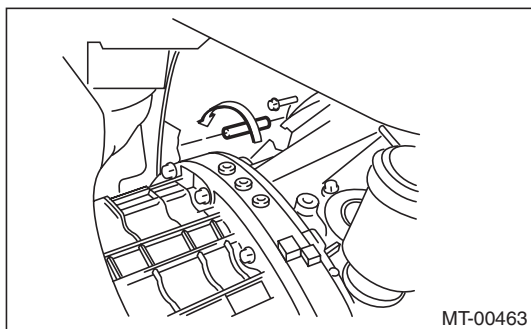
NOTE:

If the transmission is not moved aside, the joint COMPL and stay bolts may contact the body and cause damage.



- (A) Joint COMPL bolt
- (B) Stay bolt
- (C) Reverse check cable

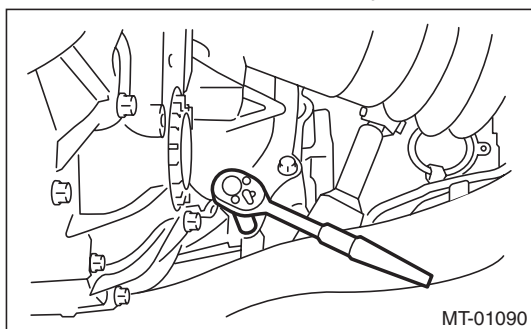
26) Tighten the turnbuckle of the ST to tilt the engine assembly towards the back.



27) Remove the bolts and nuts holding the bottom of transmission to the engine, and remove the transmission from the vehicle.

NOTE:

- During removal, be careful not to hit the transmission against the body when pulling towards the rear.
- The clutch pipe and breather pipe may interfere with each other. Remove carefully.



B: INSTALLATION

1) Set the release fork, release bearing and release shaft to the transmission. <Ref. to CL-15, INSTALLATION, Release Bearing and Lever.>

2) Replace the front differential side retainer oil seal. <Ref. to 6MT-29, REPLACEMENT, Differential Side Retainer Oil Seal.>

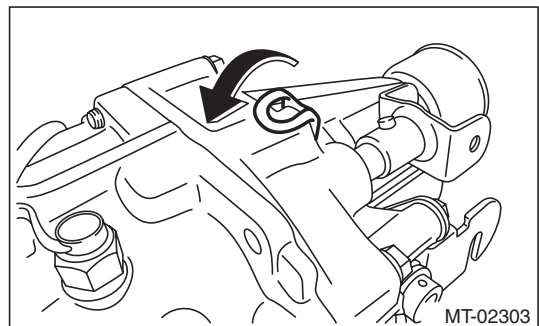
NOTE:

Be sure to replace the differential side oil seal after the procedure of removing front drive shaft from transmission.

3) Strike and bend the transmission hanger of transmission rear with a rubber hammer etc. so that it gets in contact with the transmission case.

CAUTION:

Do not apply extra overload or impact to the transmission case.



4) Install the transmission onto the engine.

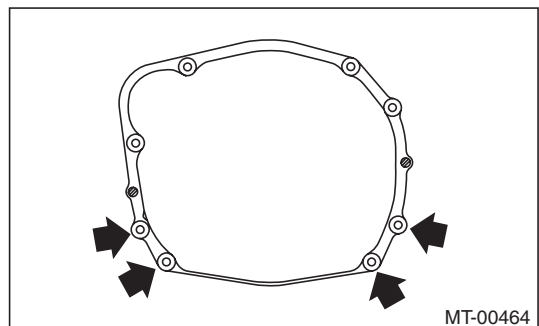
5) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

NOTE:

- Make sure that the main shaft spline is completely inserted.
- Make sure that the rear end of the engine is set low.

Tightening torque:

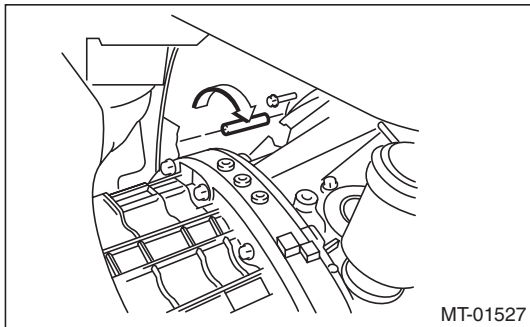
50 N·m (5.1 kgf-m, 36.9 ft-lb)



Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Loosen the turnbuckle of ST to return the engine to its original position.

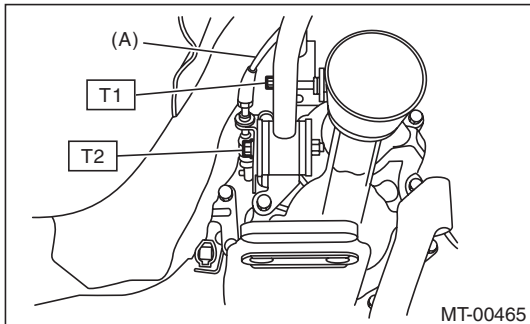


7) Move the transmission to the right side of the vehicle, and attach the joint COMPL, stay bolts and reverse check cable.

Tightening torque:

T1: 12 N·m (1.2 kgf-m, 8.9 ft-lb)

T2: 32 N·m (3.3 kgf-m, 23.6 ft-lb)



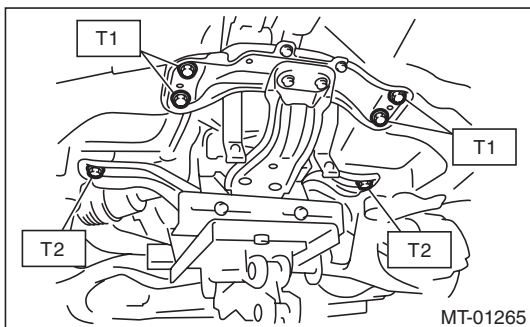
(A) Reverse check cable

8) Install the front crossmember and rear crossmember.

Tightening torque:

T1: 70 N·m (7.1 kgf-m, 51.6 ft-lb)

T2: 140 N·m (14.3 kgf-m, 103 ft-lb)

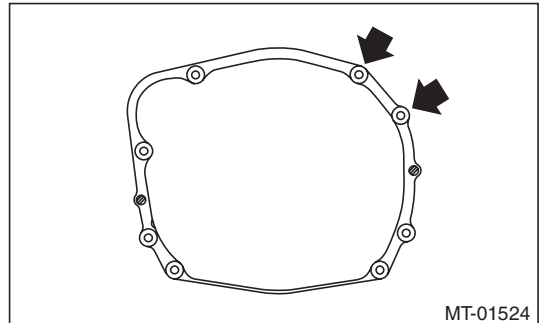


9) Lower the vehicle.

10) Tighten the bolts which hold the upper side of the transmission to the engine.

Tightening torque:

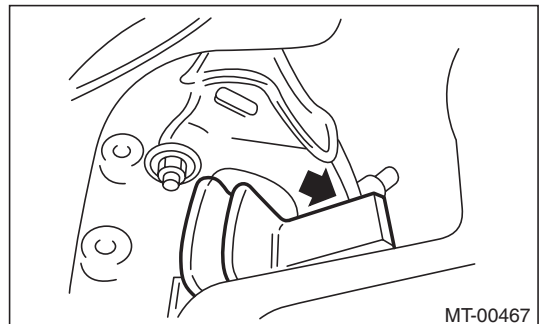
50 N·m (5.1 kgf-m, 36.9 ft-lb)



11) Make sure that the release bearing is completely inserted.

NOTE:

- Push the release fork towards the operating cylinder side until a clicking sound is heard. Pull the release fork towards the engine side. If the release fork is not in contact with the case, the setting is complete.
- Confirm that the boot cover is set securely.



12) Install the pitching stopper bracket, return spring bracket, and transmission radio ground cable.

Tightening torque:

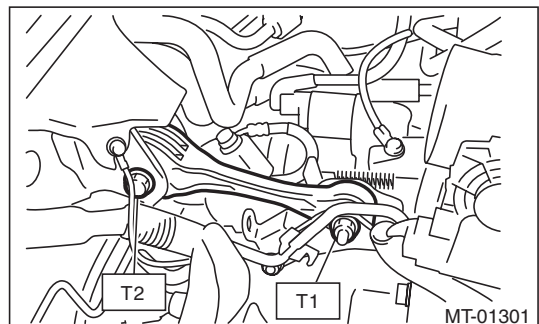
41 N·m (4.2 kgf-m, 30.2 ft-lb)

13) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

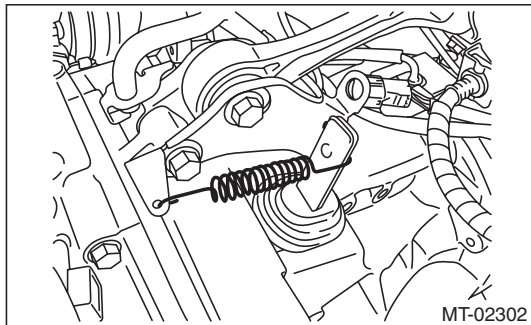
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

14) Install the return spring.



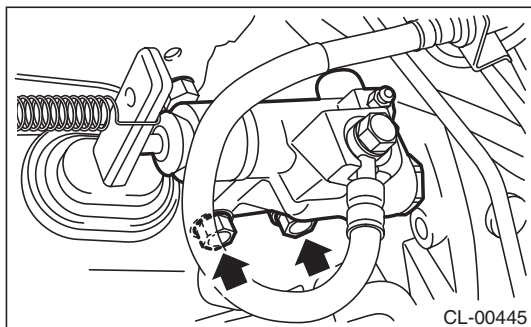
15) Install the clutch operating cylinder.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

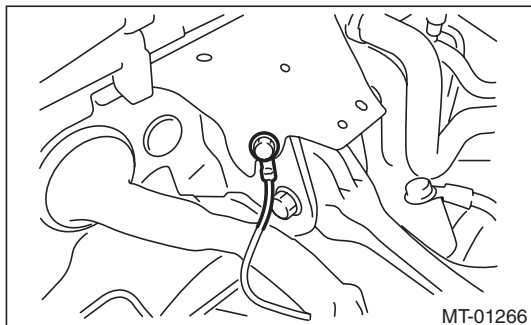
NOTE:

Check that the clutch hose is routed properly.



16) Install the starter assembly. <Ref. to SC(STI)-7, INSTALLATION, Starter.>

17) Install the transmission radio ground terminal.



18) Install the secondary air combination valve. <Ref. to EC(STI)-30, SECONDARY AIR COMBINATION VALVE LH, INSTALLATION, Secondary Air Combination Valve.>

19) Connect the following harness connectors, then attach the engine hanger rear.



- (A) Front oxygen (A/F) sensor connector
- (B) Rear oxygen sensor connector
- (C) Neutral position switch backup light switch connector

20) Lift up the vehicle.

21) Set the ST to side retainer.

ST 28399SA010 OIL SEAL PROTECTOR

22) Install the front drive shaft into the transmission.

NOTE:

Replace the circlip of drive shaft with a new part.

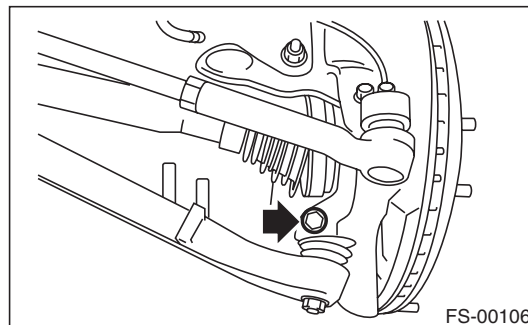
23) Install the front drive shaft into transmission, remove the ST and insert the drive shaft securely.

ST 28399SA010 OIL SEAL PROTECTOR

24) Install the ball joint of the front arm.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

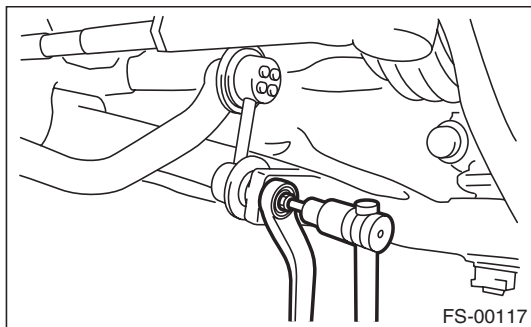
25) Install the front stabilizer link.

Tightening torque:

45 N·m (4.6 kgf-m, 33.2 ft-lb)

NOTE:

Use a new self-locking nut.



26) Install the propeller shaft. <Ref. to DS-12, INSTALLATION, Propeller Shaft.>

27) Install the heat shield cover.

28) Install the center exhaust pipe. <Ref. to EX(STI)-9, INSTALLATION, Center Exhaust Pipe.>

29) Fill the transmission gear oil. <Ref. to 6MT-27, REPLACEMENT, Transmission Gear Oil.>

30) Install the transmission under cover.

31) Install the intercooler. <Ref. to IN(STI)-13, INSTALLATION, Intercooler.>

32) Connect the battery ground terminal.

Preparation for Overhaul

MANUAL TRANSMISSION AND DIFFERENTIAL

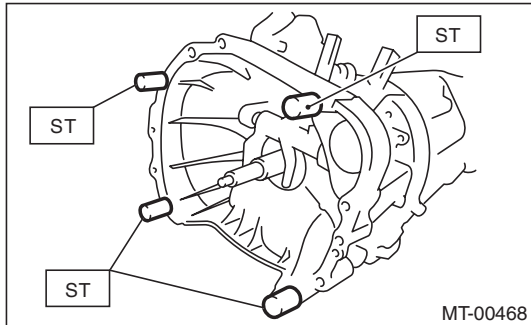
7. Preparation for Overhaul

A: PROCEDURE

1) Clean oil, grease, dirt and dust from the transmission.

2) Attach the transmission to the ST.

ST 18632AA000 STAND ASSY



3) Apply oil to rotating parts before assembly.

4) When reusing disassembled parts, reinstall in the original positions and directions.

5) Gaskets, lock washers and lock nuts must be replaced with new parts.

6) Apply liquid gasket to the specified areas to prevent leakage.

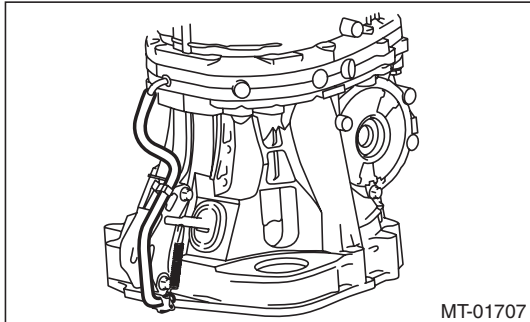
Air Breather Hose

MANUAL TRANSMISSION AND DIFFERENTIAL

8. Air Breather Hose

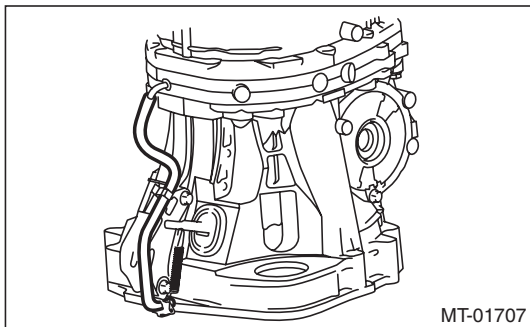
A: REMOVAL

Disconnect the air breather hose.



B: INSTALLATION

Connect the air breather hose.



C: INSPECTION

Make sure the hose is not cracked or clogged.

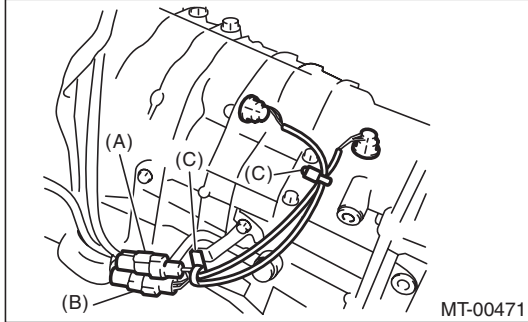
Back-up Light Switch

MANUAL TRANSMISSION AND DIFFERENTIAL

9. Back-up Light Switch

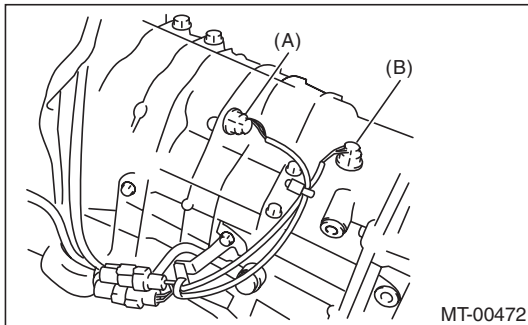
A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Disconnect the back-up light switch connector.



- (A) Back-up light switch connector (Gray)
- (B) Neutral position switch connector (Brown)
- (C) Clip

- 3) Disconnect the back-up light switch.



- (A) Back-up light switch
- (B) Neutral position switch

B: INSTALLATION

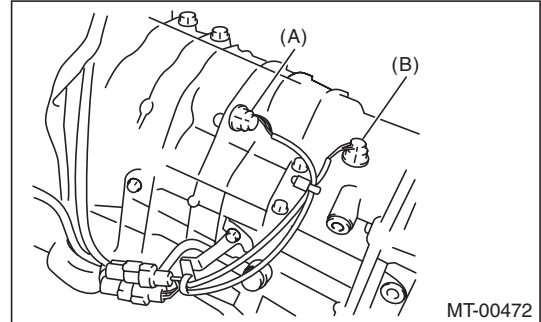
- 1) Install the back-up light switch.

NOTE:

Use a new gasket.

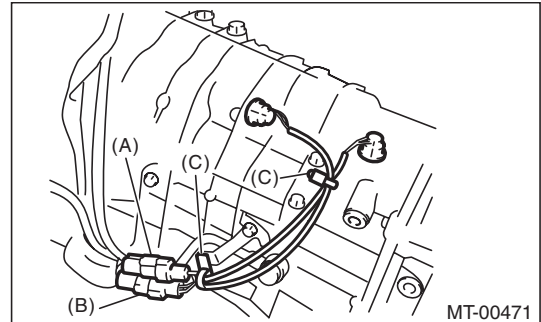
Tightening torque:

32 N·m (3.3 kgf-m, 23.6 ft-lb)



- (A) Back-up light switch
- (B) Neutral position switch

- 2) Connect the back-up light switch connector.



- (A) Back-up light switch connector (Gray)
- (B) Neutral position switch connector (Brown)
- (C) Clip

- 3) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

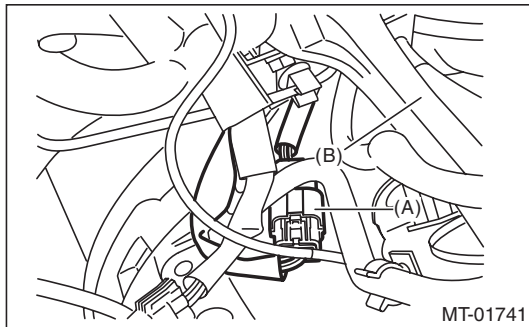
C: INSPECTION

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.>

Back-up Light Switch

MANUAL TRANSMISSION AND DIFFERENTIAL

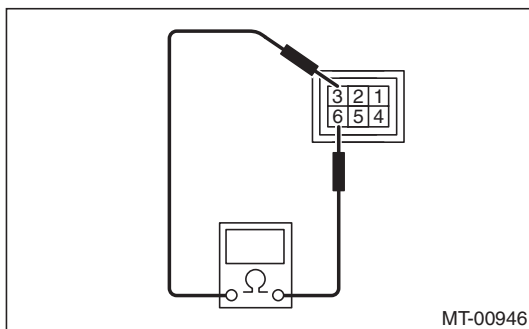
3) Disconnect the transmission harness and chassis harness.



- (A) Transmission harness connectors
(B) Pitching stopper

4) Measure the resistance between the back-up light switch terminals. If it is not within the specification, replace the back-up light switch.

Gear shift position	Terminal No.	Standard
Back position	3 and 6	Less than 1 Ω
Other positions		1 M Ω or more



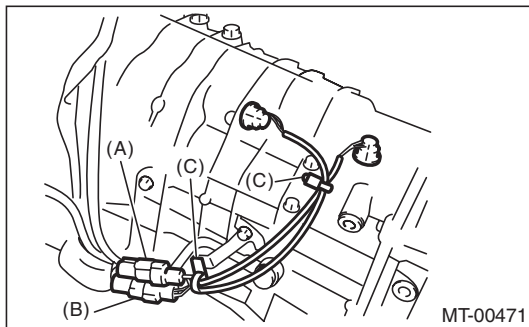
Neutral Position Switch

MANUAL TRANSMISSION AND DIFFERENTIAL

10. Neutral Position Switch

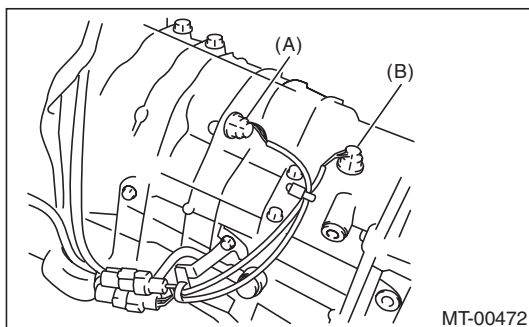
A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Disconnect the connector and clip of the neutral position switch.



- (A) Back-up light switch connector (Gray)
- (B) Neutral position switch connector (Brown)
- (C) Clip

- 3) Remove the neutral position switch.



- (A) Back-up light switch
- (B) Neutral position switch

B: INSTALLATION

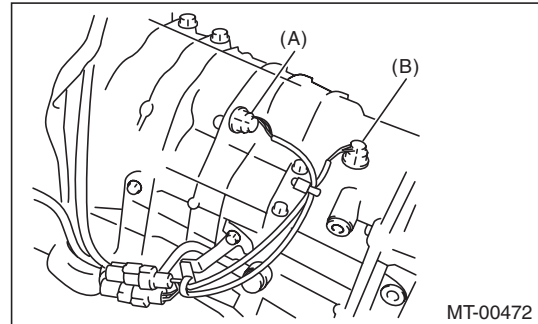
- 1) Install the neutral position switch.

NOTE:

Use a new gasket.

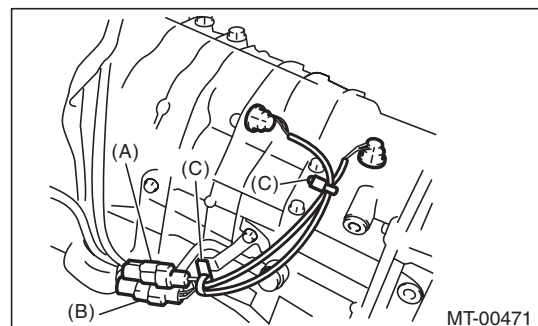
Tightening torque:

32 N·m (3.3 kgf-m, 23.6 ft-lb)



- (A) Back-up light switch
- (B) Neutral position switch

- 2) Connect the connector and clip of the neutral position switch.



- (A) Back-up light switch connector (Gray)
- (B) Neutral position switch connector (Brown)
- (C) Clip

- 3) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

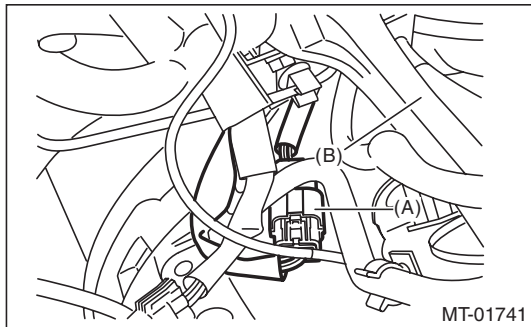
C: INSPECTION

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.>

Neutral Position Switch

MANUAL TRANSMISSION AND DIFFERENTIAL

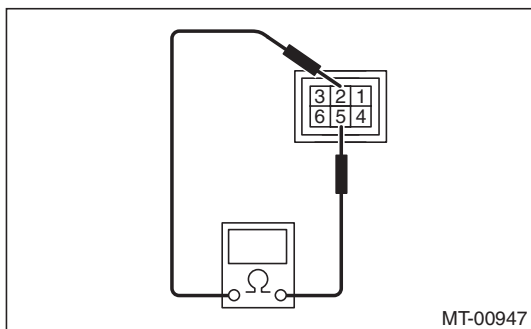
3) Disconnect the transmission harness and chassis harness.



- (A) Transmission harness connectors
(B) Pitching stopper

4) Measure the resistance between neutral position switch terminals. If not within the standard values, replace the neutral position switch.

Gear shift position	Terminal No.	Standard
Neutral position	2 and 5	Less than 1 Ω
Other positions		1 M Ω or more



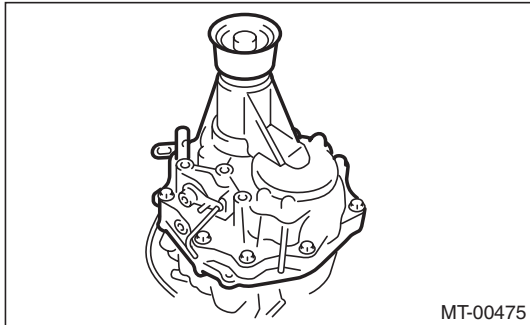
Extension Case

MANUAL TRANSMISSION AND DIFFERENTIAL

11.Extension Case

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the extension case.



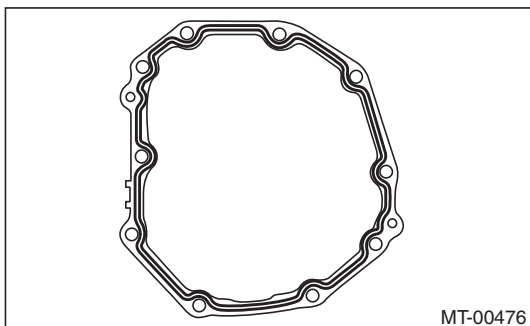
- 4) Remove any remaining liquid gasket from the extension case and transmission case.

B: INSTALLATION

- 1) Select the thrust washer of the transfer driven gear, and attach to the extension case. <Ref. to 6MT-46, ADJUSTMENT, Extension Case.>
- 2) Apply a thin coat of oil to the outer surface of the bearing cone, and attach to the extension case.
- 3) Select the thrust washer of the transfer drive gear, and attach to the center differential.
- 4) Apply liquid gasket to the transmission case.

Liquid gasket:

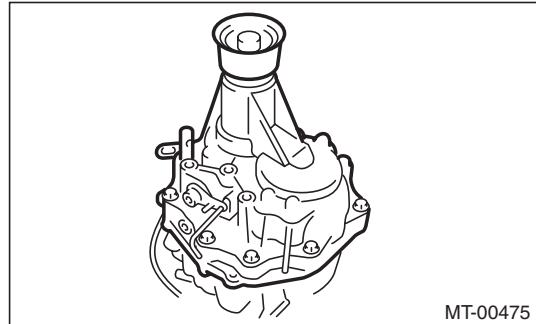
THREE BOND 1215 (Part No. 004403007) or equivalent



- 5) Install the extension case.

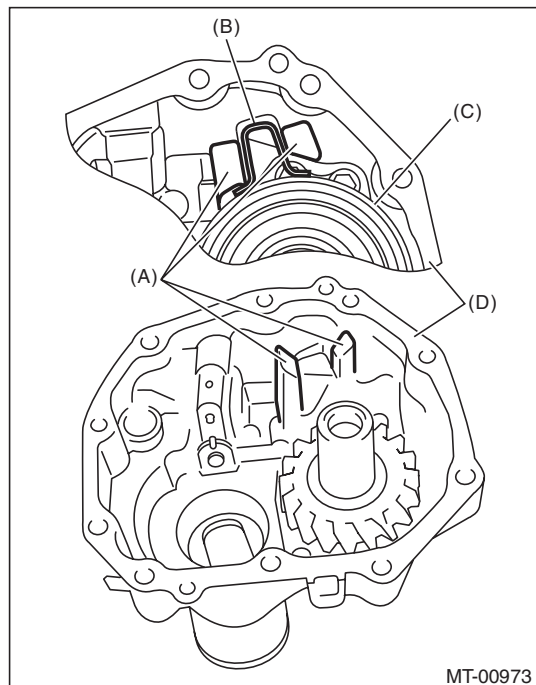
Tightening torque:

48 N·m (4.9 kgf-m, 35.4 ft-lb)



NOTE:

Insert the stopper section of the center differential between the oil guide.



- (A) Oil guide
- (B) Stopper
- (C) Center differential
- (D) Extension case

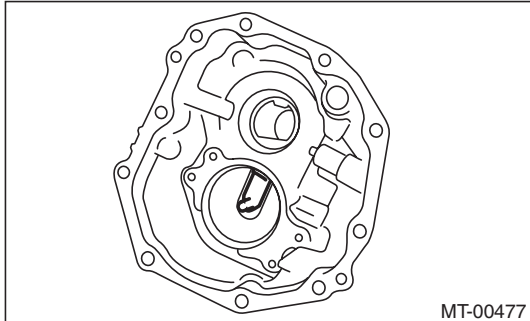
- 6) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

Extension Case

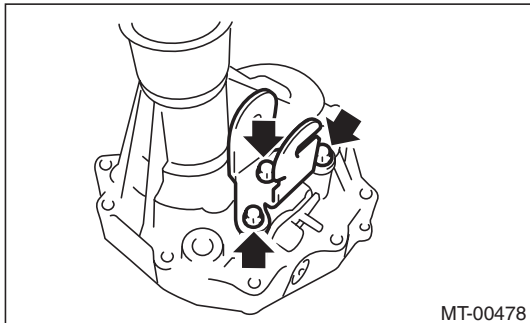
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

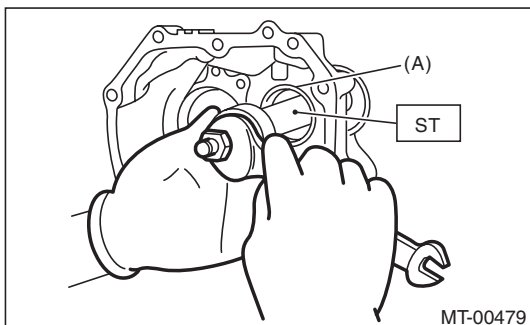
- 1) Remove the transfer drive gear. <Ref. to 6MT-53, REMOVAL, Transfer Drive Gear.>
- 2) Remove the oil guide.



- 3) Remove the shift bracket.

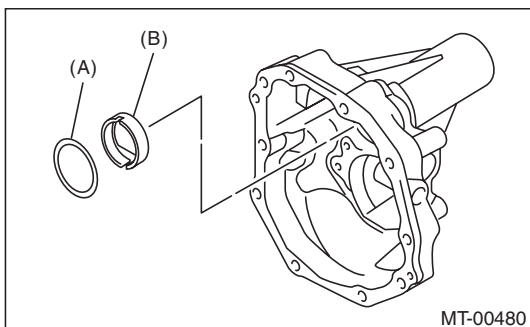


- 4) Remove the bearing cone using the ST.
ST 18758AA000 PULLER



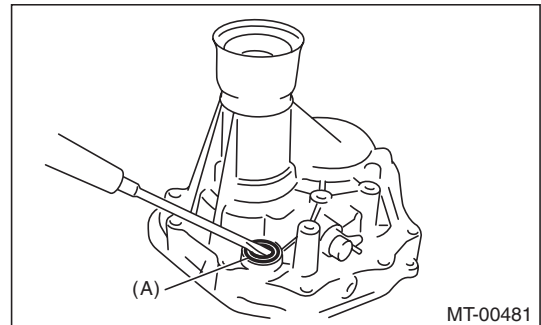
(A) Bearing cone

- 5) Remove the thrust washer and oil plate.



(A) Thrust washer
(B) Oil plate

- 6) Remove the shifter arm oil seal.

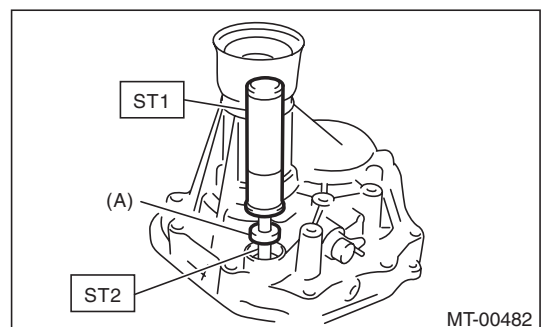


(A) Oil seal

- 7) Remove the reverse check system. <Ref. to 6MT-50, REMOVAL, Reverse Check System.>
- 8) Remove the extension oil seal. <Ref. to 6MT-28, REPLACEMENT, Oil Seal.>

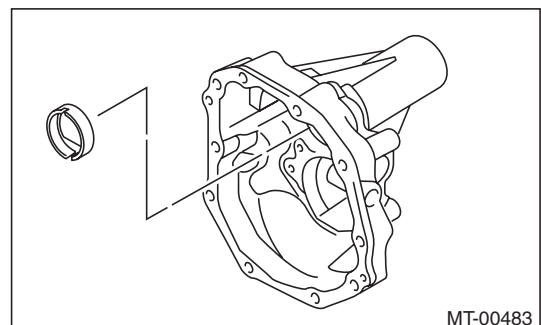
D: ASSEMBLY

- 1) Install the reverse check system. <Ref. to 6MT-51, INSTALLATION, Reverse Check System.>
- 2) Install the extension case oil seal. <Ref. to 6MT-28, REPLACEMENT, Oil Seal.>
- 3) Install a shifter arm oil seal using the ST.
ST1 18657AA000 INSTALLER
ST2 18671AA000 OIL SEAL GUIDE



(A) Oil seal

- 4) Install the oil plate.



- 5) Select the thrust washer of the bearing, and attach to the extension case. <Ref. to 6MT-46, ADJUSTMENT, Extension Case.>

6MT-45

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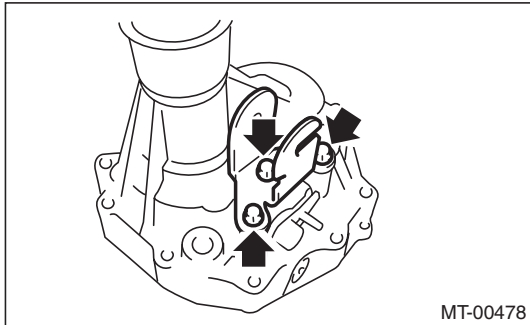
Extension Case

MANUAL TRANSMISSION AND DIFFERENTIAL

- 6) Apply a thin coat of oil to the outer surface of the bearing cone, and attach to the extension case.
- 7) Install the shift bracket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



- 8) Attach the oil guide and the transfer driven gear. <Ref. to 6MT-53, INSTALLATION, Transfer Drive Gear.>

E: INSPECTION

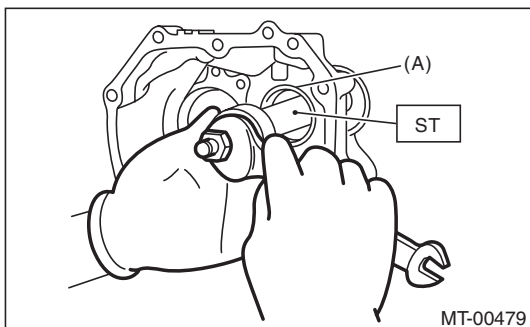
- 1) Check to make sure there is no damage or cracks on the extension case. If damage or cracking is found, replace the extension case.
- 2) Inspect for oil leaks at the extension case and transmission case oil seals and mating surfaces. If there are oil leaks, replace the oil seal and liquid gasket.

F: ADJUSTMENT

1. TRANSFER DRIVEN GEAR BEARING THRUST WASHER ADJUSTMENT

- 1) Remove the bearing cone from the extension case using the ST.

ST 18758AA000 PULLER



(A) Bearing cone

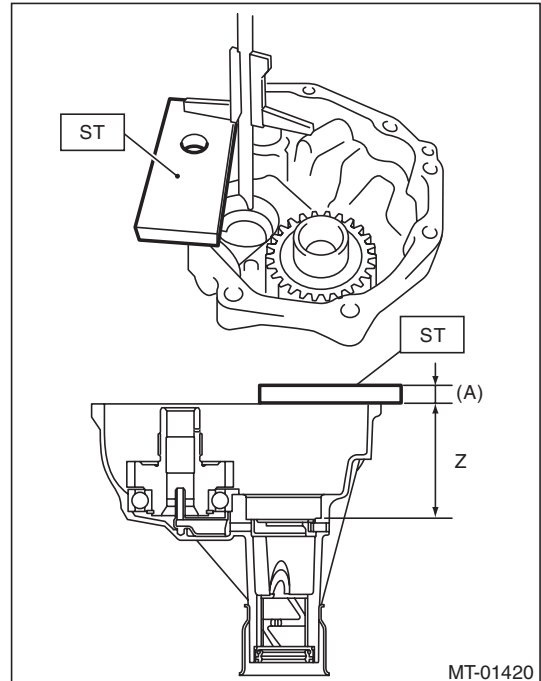
- 2) Remove the thrust washer.

- 3) Measure depth "Z" between the extension case end area and bearing cone contact area.

ST 398643600 GAUGE

NOTE:

When measuring depth "Z", subtract the thickness of the ST [15 mm (0.59 in)] from the measured value.

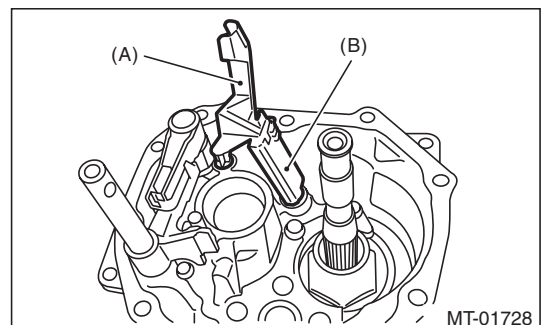


(A) 15 mm (0.59 in)

- 4) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>

- 5) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>

- 6) Remove the oil guides G and H.



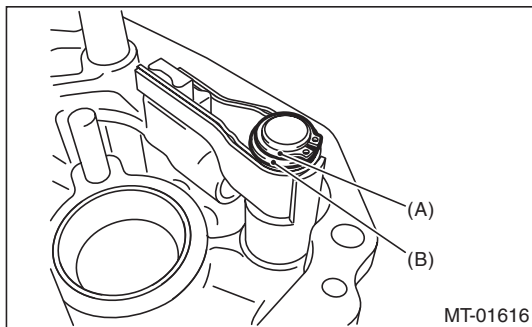
(A) Oil guide G

(B) Oil guide H

Extension Case

MANUAL TRANSMISSION AND DIFFERENTIAL

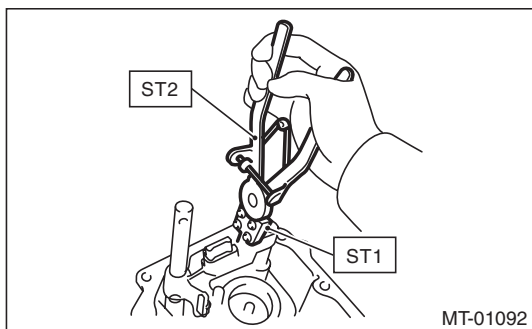
7) Remove the snap ring and flat washer from the selector arm area.



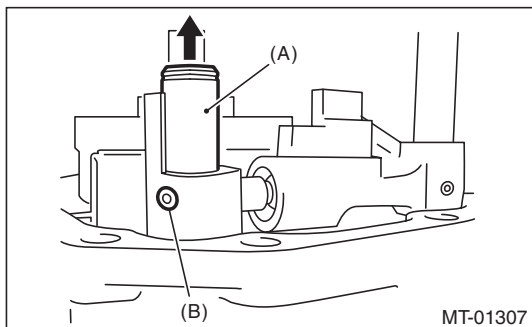
- (A) Snap ring
- (B) Flat washer

8) Using an ST, remove the neutral set spring and support.

ST1 18756AA000 CLAW
ST2 399893600 PLIER

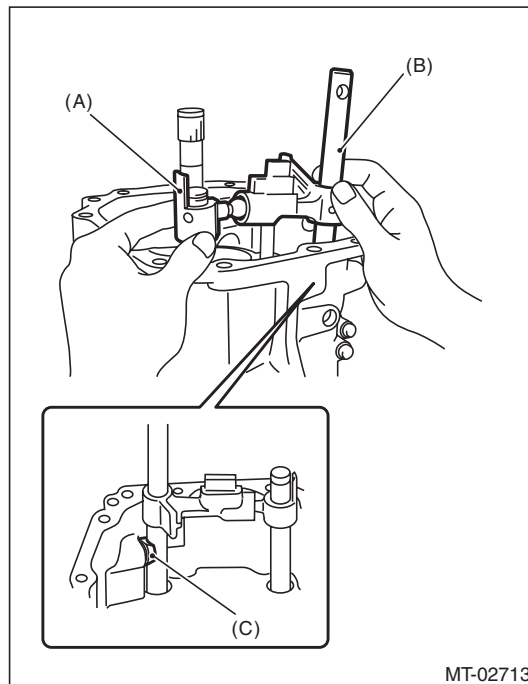


9) Lift the striking rod, and remove the spring pin.



- (A) Striking rod
- (B) Spring pin

10) Remove the selector arm No. 2, shifter arm, selector plunger and spring.

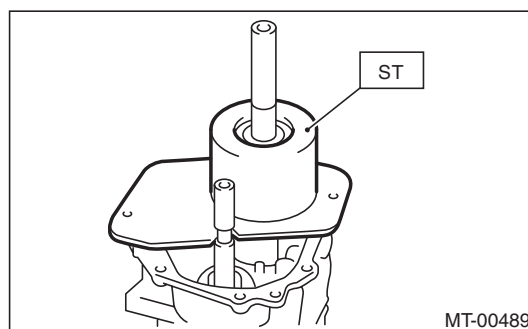


- (A) Selector arm No. 2
- (B) Shifter arm
- (C) Selector plunger

11) Attach the bearing cone to the transfer driven gear.

12) Set the ST.

ST 18831AA000 GAUGE



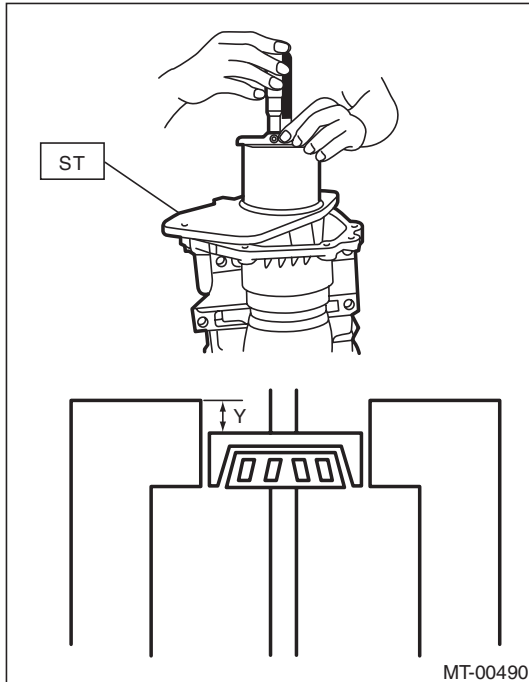
13) Turn the transfer driven gear 10 or more times to seat the bearing properly.

Extension Case

MANUAL TRANSMISSION AND DIFFERENTIAL

14) Measure depth "Y" between the end of the ST and the bearing cone.

ST 18831AA000 GAUGE



15) Using the following calculation, calculate the transfer driven gear bearing thrust washer value "t".
 $t = Z - (100 - Y) - \{0.02 - 0.11 \text{ mm (0.0008 - 0.0043 in)}\}$

t mm (in)	Transfer driven gear bearing thrust washer thickness
Y mm (in)	Depth between the end of the ST and the bearing cone
Z mm (in)	Depth between the end of the extension case and the bearing cone contact area
0.02 — 0.11 mm (0.0008 — 0.0043 in)	Standard clearance between the thrust washer and taper roller bearing
100 mm (3.94 in)	Height of ST

16) Refer to the calculated value "t" to select the closest thrust washer from the following table.

Standard clearance between the thrust washer and taper roller bearing

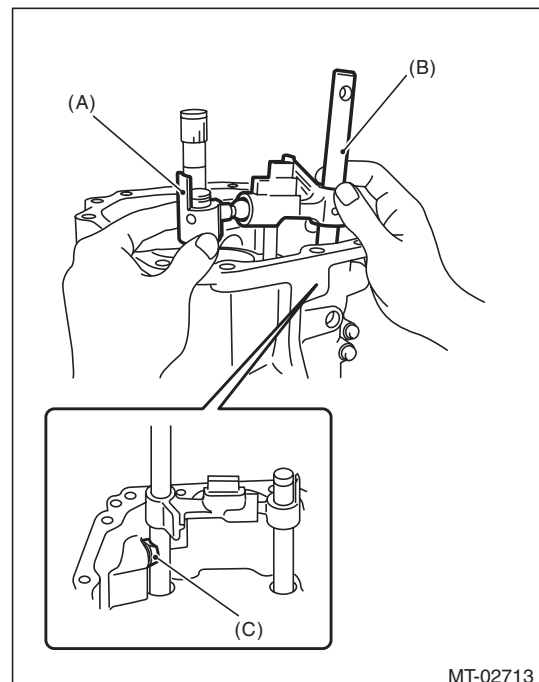
0.02 — 0.11 mm (0.0008 — 0.0043 in)

NOTE:

Match to be within the standard clearance range.

Thrust washer (50 × 61 × t)	
Part No.	Thickness t mm (in)
803050060	0.50 (0.0197)
803050061	0.55 (0.0217)
803050062	0.60 (0.0236)
803050063	0.65 (0.0256)
803050064	0.70 (0.0276)
803050065	0.75 (0.0295)
803050066	0.80 (0.0315)
803050067	0.85 (0.0335)
803050068	0.90 (0.0354)
803050069	0.95 (0.0374)
803050070	1.00 (0.0394)
803050071	1.05 (0.0413)
803050072	1.10 (0.0433)
803050073	1.15 (0.0453)
803050074	1.20 (0.0472)
803050075	1.25 (0.0492)
803050076	1.30 (0.0512)
803050077	1.35 (0.0531)
803050078	1.40 (0.0551)
803050079	1.45 (0.0570)

17) Install the selector arm No. 2, shifter arm, selector plunger and spring.



- (A) Selector arm No. 2
- (B) Shifter arm
- (C) Selector plunger

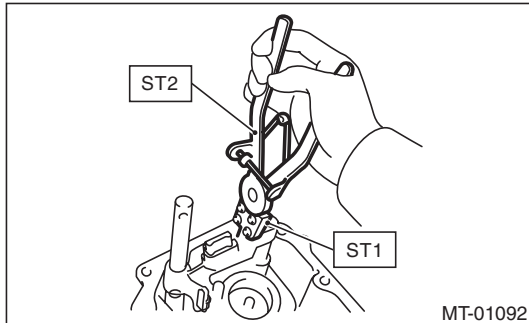
Extension Case

MANUAL TRANSMISSION AND DIFFERENTIAL

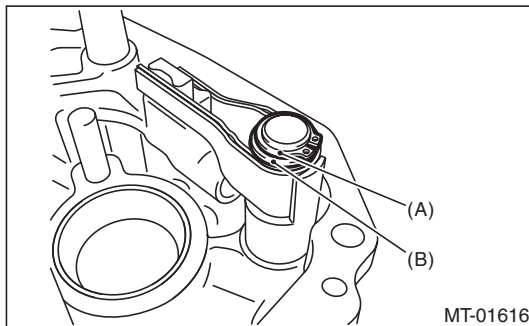
- 18) Install a new spring pin.
- 19) Using the ST, install the neutral set spring and support.

ST1 18756AA000 CLAW

ST2 399893600 PLIER



- 20) Install the flat washer and snap ring to the selector arm area.



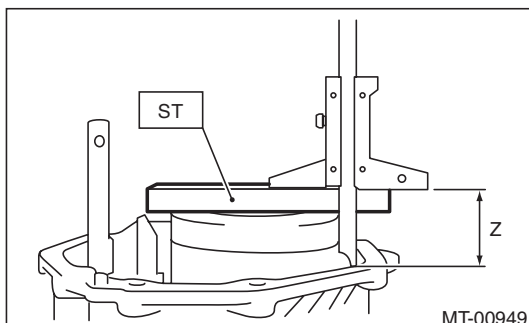
- (A) Snap ring
(B) Flat washer

- 21) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>

2. TRANSFER DRIVE GEAR THRUST WASHER SELECTION

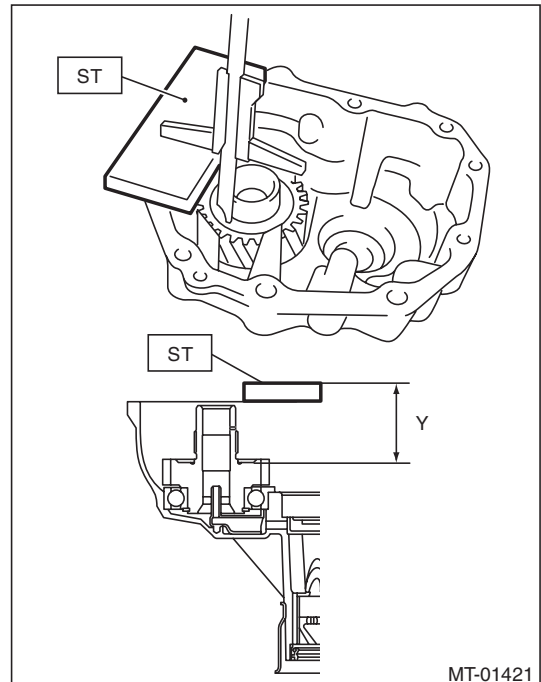
- 1) Measure height "Z" between the transmission case end area and ST.

ST 398643600 GAUGE



- 2) Measure depth "Y" between the end of the ST and the transfer drive gear.

ST 398643600 GAUGE



- 3) Using the following calculation, calculate the transfer drive gear thrust washer value "t".

$$t = \{Y - 15 \text{ mm (0.59 in)}\} - \{Z - 15 \text{ mm (0.59 in)}\} - 0.75 - 0.95 \text{ mm (0.030 - 0.037 in)}$$

t mm (in)	Transfer drive gear thrust washer thickness
Y mm (in)	Depth between the end of the ST and the transfer drive gear
Z mm (in)	Height from the end of the transmission case to the end of the ST.
0.75 — 0.95 mm (0.030 — 0.037 in)	Standard clearance between the thrust washer and transfer drive gear
15 mm (0.591 in)	Thickness of ST

- 4) Refer to the calculated value "t" to select the closest thrust washer from the following table.

Standard clearance between the thrust washer and transfer drive gear

0.75 — 0.95 mm (0.030 — 0.037 in)

NOTE:

Match to be within the standard clearance range.

Thrust washer (36.3 × 52 × t)	
Part No.	Thickness mm (in)
803036070	0.80 (0.0315)
803036071	0.95 (0.0374)
803036072	1.10 (0.0433)
803036073	1.25 (0.0492)
803036074	1.40 (0.0551)
803036075	0.65 (0.0256)

- 5) Install the selected thrust washer.

6MT-49

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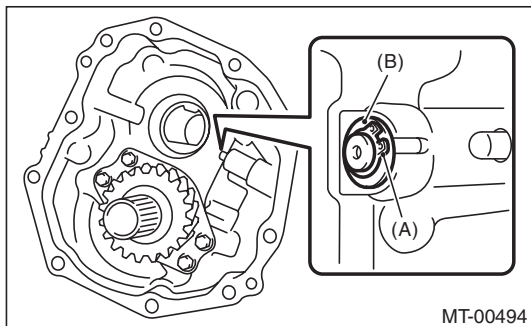
Reverse Check System

MANUAL TRANSMISSION AND DIFFERENTIAL

12.Reverse Check System

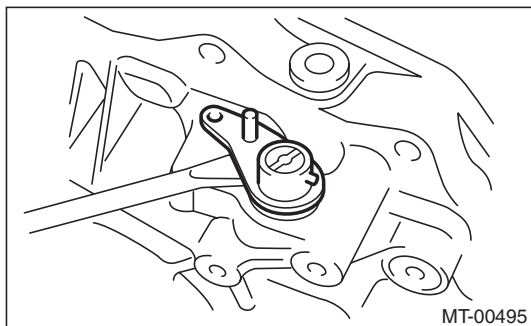
A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 4) Remove the snap ring and washer from the reverse check shaft.



- (A) Snap ring
- (B) Washer

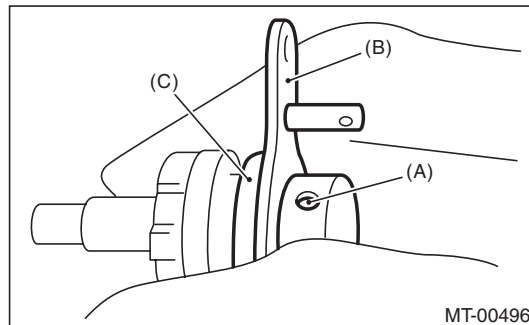
- 5) Remove the reverse check shaft and spring from the extension case.



- 6) Remove the spring pin, and remove the reverse check lever and oil seal from the reverse check shaft.

NOTE:

Do not reuse the oil seal.

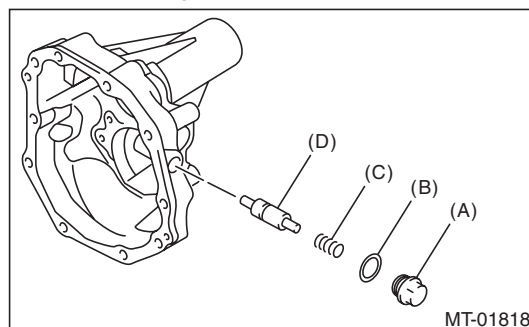


- (A) Spring pin
- (B) Reverse check lever
- (C) Oil seal

- 7) Remove the plug from the extension case, and remove the gasket, spring and plunger.

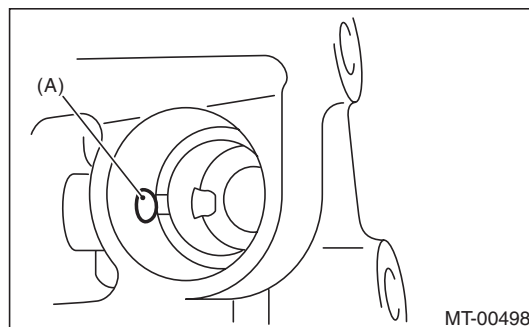
NOTE:

Do not reuse the gasket.



- (A) Plug
- (B) Gasket
- (C) Spring
- (D) Plunger

- 8) Remove the reverse lock plunger.



- (A) Reverse lock plunger

Reverse Check System

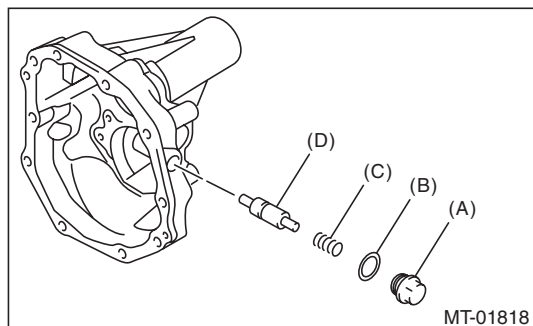
MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

- 1) Insert the reverse lock plunger.
- 2) Install the reverse check plug, spring, gasket, and plug in order.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)

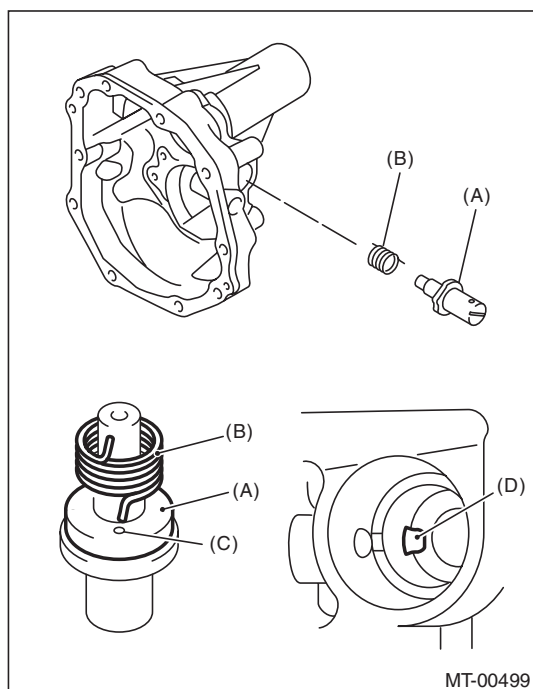


- (A) Plug
- (B) Gasket
- (C) Spring
- (D) Reverse check plug

- 3) Install the spring and reverse check shaft to the extension case.

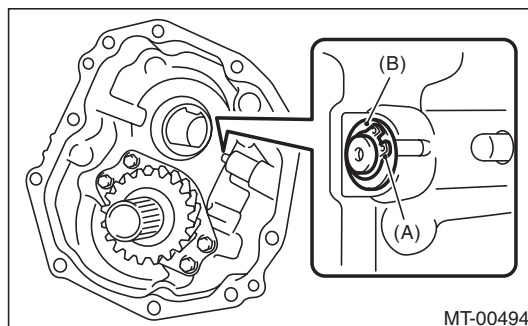
NOTE:

Confirm that the end of the spring matches the hole of the reverse check shaft and the cut out of the extension case.



- (A) Reverse check shaft
- (B) Spring
- (C) Hole
- (D) Cut out

- 4) Install the washer and snap ring.

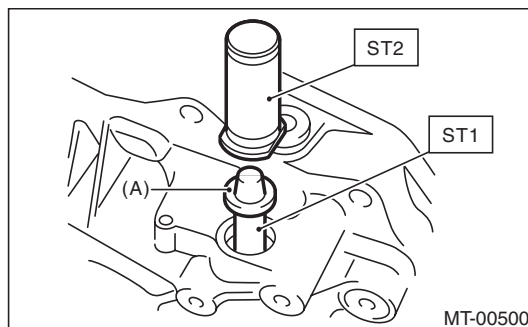


- (A) Snap ring
- (B) Washer

- 5) Attach ST1 to the reverse check shaft. Install the new oil seal, and push it in using ST2.

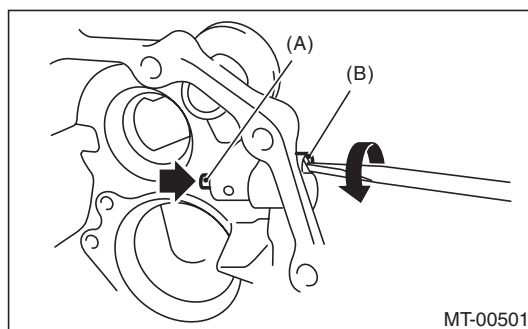
ST1 18671AA000 OIL SEAL GUIDE

ST2 18657AA010 INSTALLER



- (A) Oil seal

- 6) Insert the reverse check lever, and turn the reverse check shaft until the plunger is first pushed in.



- (A) Plunger
- (B) Reverse check shaft

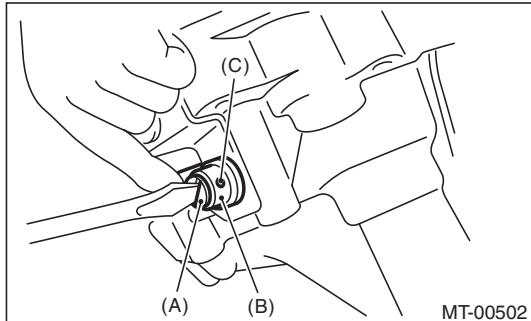
Reverse Check System

MANUAL TRANSMISSION AND DIFFERENTIAL

7) Match the hole of the reverse check lever and the reverse check shaft, and attach the straight pin.

NOTE:

Use a new straight pin.



- (A) Reverse check shaft
- (B) Reverse check lever
- (C) Hole

8) Check that the reverse check is operating correctly. <Ref. to 6MT-52, INSPECTION, Reverse Check System.>

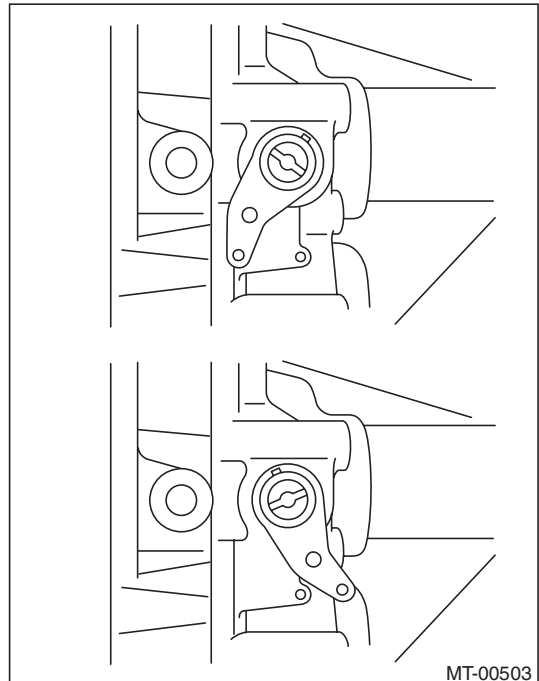
9) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>

10) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

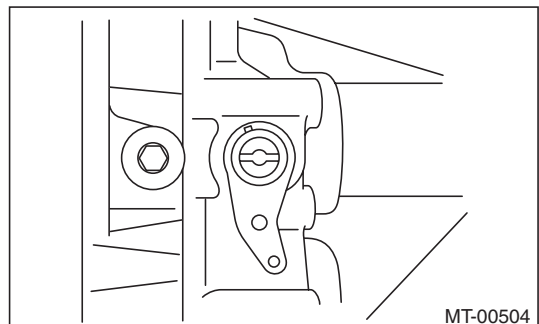
C: INSPECTION

- 1) Check that there is no damage on any parts.
- 2) Check that the reverse check lever is operating smoothly.
- 3) Inspect that there is no oil leak at the oil seal section of the reverse check shaft. If there is oil leakage, replace the oil seal.
- 4) Check the operation of the reverse check.

(1) When the reverse check lever is in the following position, the plunger is pressed, or the gear can shift into reverse.



(2) When the reverse check lever is in the following position, the plunger is not pressed, or the gear cannot shift into reverse.



5) If it is not as specified, reassemble the reverse check system.

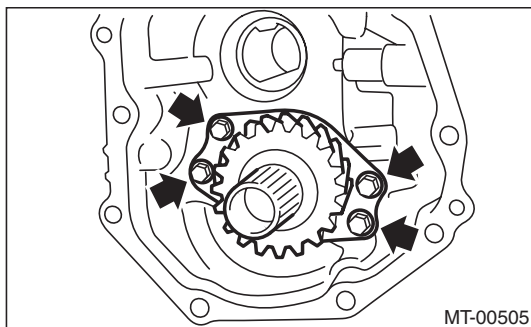
Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

13. Transfer Drive Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 4) Remove the transfer drive gear.

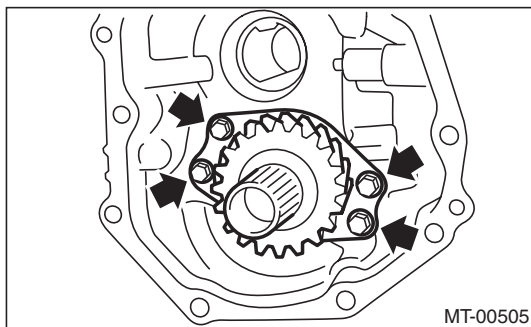


B: INSTALLATION

- 1) Install the transfer drive gear.

Tightening torque:

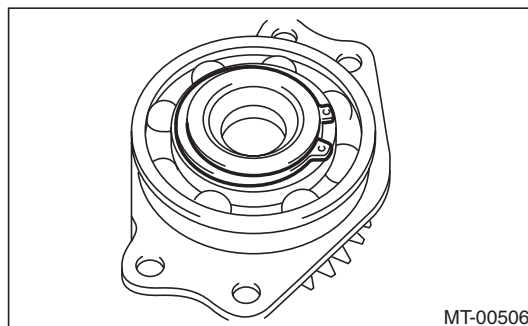
25 N·m (2.5 kgf-m, 18.4 ft-lb)



- 2) When the ball bearing, transfer drive gear or snap ring are replaced, select an appropriate thrust washer for the transfer drive gear. <Ref. to 6MT-45, ASSEMBLY, Extension Case.>
- 3) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 4) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

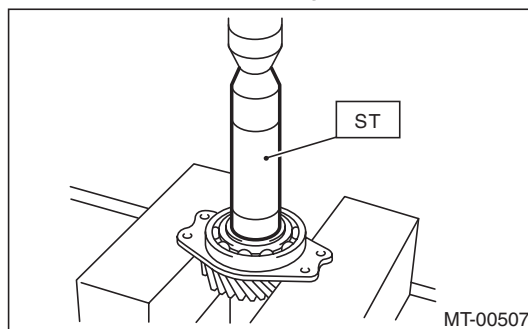
- 1) Remove the snap ring.



- 2) Remove the bearing using the ST.
ST 499877000 RACE 4-5 INSTALLER

NOTE:

Do not reuse the ball bearing.



D: ASSEMBLY

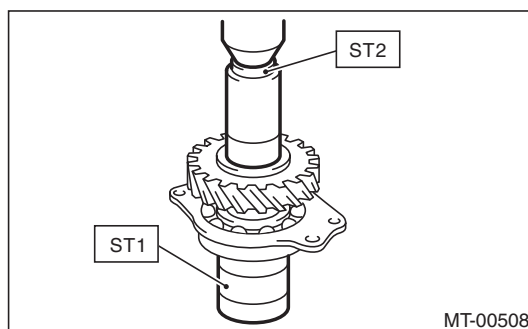
- 1) Using the ST, install the ball bearing.

NOTE:

Use a new ball bearing.

ST1 499247400 INSTALLER

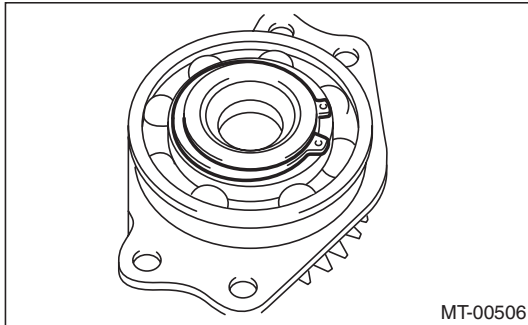
ST2 398497701 SEAT



Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Install the snap ring.



3) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 6MT-54, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

1) Bearing

Replace the bearings in the following cases.

- Damage or rust on the bearings
- Wear, or damage
- The bearing does not rotate smoothly or an abnormal noise is emitted.

2) Drive gear

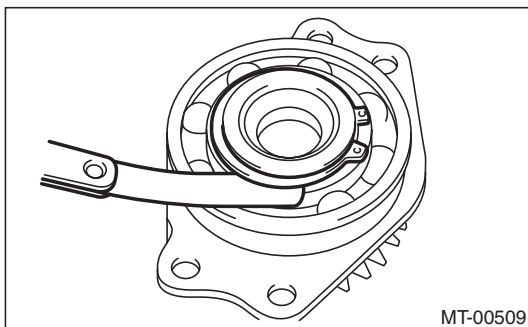
Replace the drive gear in following case:

- If the drive gear tooth surface and shaft are excessively damaged or broken.

3) Measure the clearance between the snap ring and ball bearing inner race with a thickness gauge.

Standard clearance between the snap ring and inner race:

0 — 0.15 mm (0 — 0.0059 in)



4) If the measurement is out of specifications, reselect an appropriate snap ring.

Snap ring	
Part No.	Thickness mm (in)
805045050	1.76 (0.069)
805045060	1.88 (0.074)
805045070	2.00 (0.079)

After replacing the snap ring, reinspect the clearance.

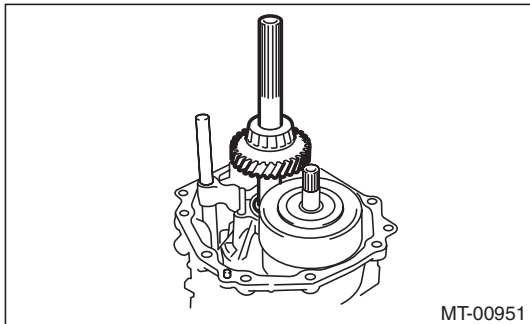
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

14. Transfer Driven Gear

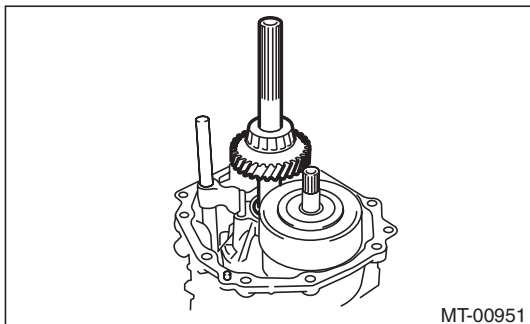
A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 4) Remove the transfer driven gear.



B: INSTALLATION

- 1) Install the transfer driven gear.

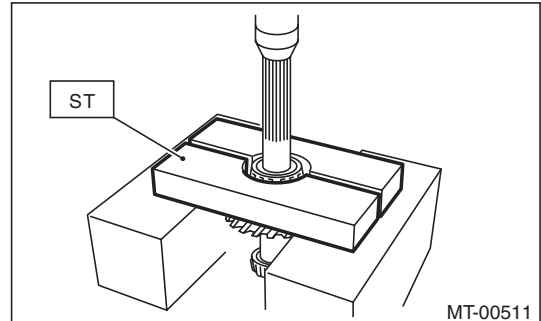


- 2) When the bearing or the transfer driven gear is replaced, select an appropriate thrust washer for the transfer driven gear. <Ref. to 6MT-46, ADJUSTMENT, Extension Case.>
- 3) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 4) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Using the ST, remove the roller bearing (extension case side).

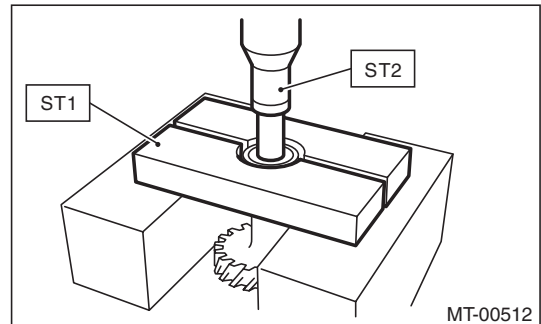
ST 498515700 REMOVER



- 2) Using the ST, remove the roller bearing (transmission case side).

ST1 899858600 REMOVER

ST2 899864100 REMOVER



D: ASSEMBLY

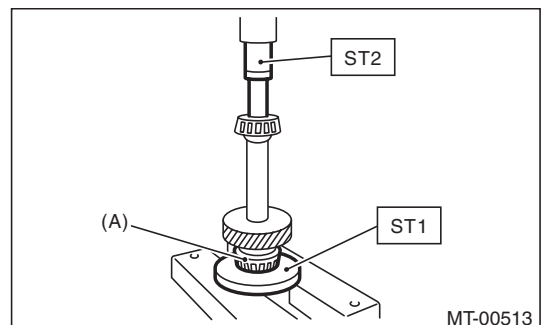
- 1) Using the ST, install the roller bearing (extension case side).

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

Transfer Driven Gear

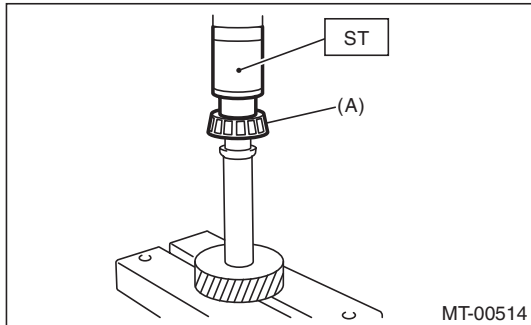
MANUAL TRANSMISSION AND DIFFERENTIAL

2) Using the ST, install the roller bearing (transmission case side).

ST 499757002 INSTALLER

CAUTION:

Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).



(A) Roller bearing

E: INSPECTION

1) Bearing

Replace the bearings in the following cases.

- Damage or rust on the bearings
- Wear or damage
- After applying transmission gear oil, bearing does not rotate smoothly or an abnormal noise is emitted.

2) Driven gear

Replace the driven gear in the following cases.

- If the driven gear tooth surface and shaft are excessively damaged or broken.

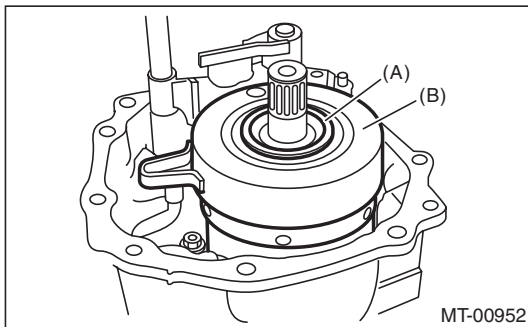
Center Differential

MANUAL TRANSMISSION AND DIFFERENTIAL

15.Center Differential

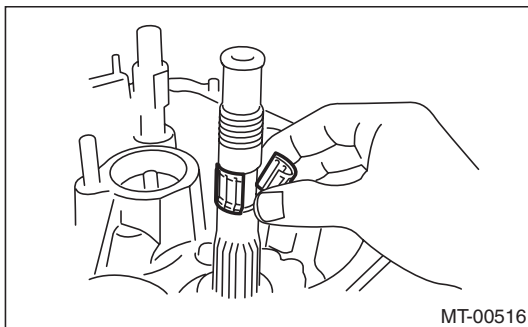
A: REMOVAL

- 1) Remove the manual transmission case from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 4) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 5) Disconnect the center differential connector.
- 6) Remove the thrust washer and center differential.



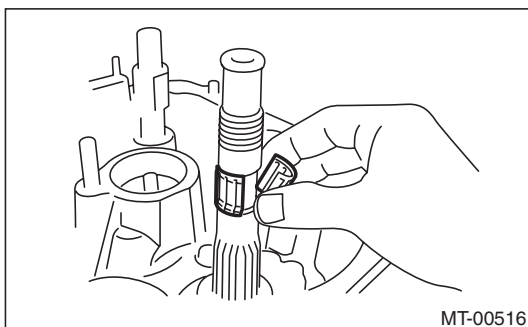
- (A) Thrust washer
(B) Center differential

- 7) Remove the needle bearing.

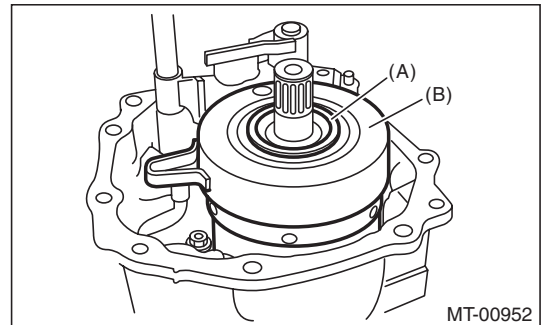


B: INSTALLATION

- 1) Install the needle bearing.



- 2) Install the thrust washer and center differential.



- (A) Thrust washer
(B) Center differential

- 3) When replacing the center differential, select and install the appropriate transfer drive gear and thrust washer. <Ref. to 6MT-46, ADJUSTMENT, Extension Case.>
- 4) Connect the center differential connector, and affix to the oil guide.
- 5) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 6) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 7) Install the manual transmission case assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check that there is no damage on the center differential. Replace if damaged.

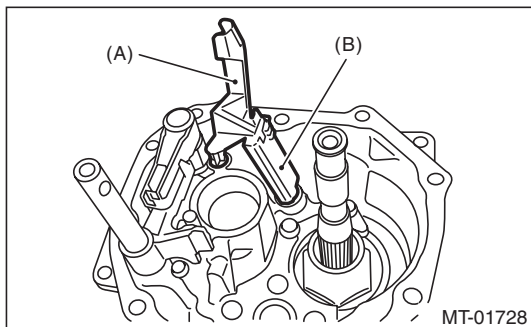
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

16. Transmission Case

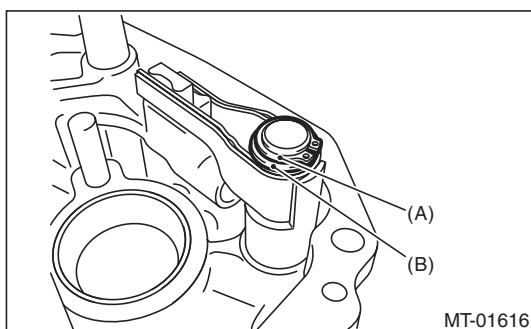
A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the oil guides G and H.



- (A) Oil guide G
(B) Oil guide H

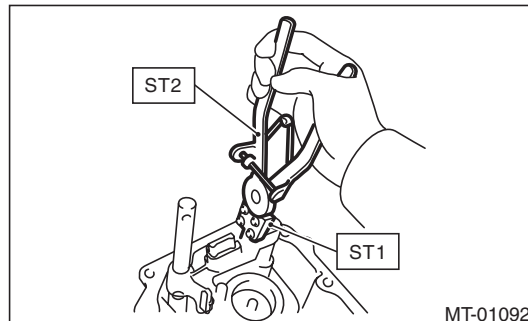
- 8) Remove the snap ring and flat washer from the selector arm area.



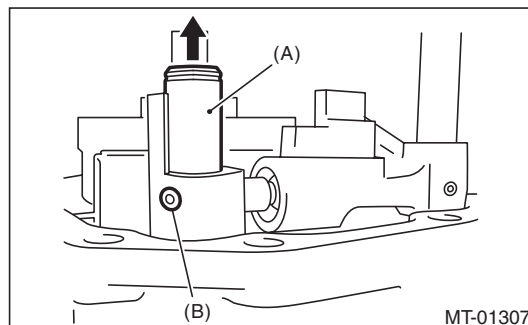
- (A) Snap ring
(B) Flat washer

- 9) Using an ST, remove the neutral set spring and support.

ST1 18756AA000 CLAW
ST2 399893600 PLIER



- 10) Lift the striking rod, and remove the spring pin.

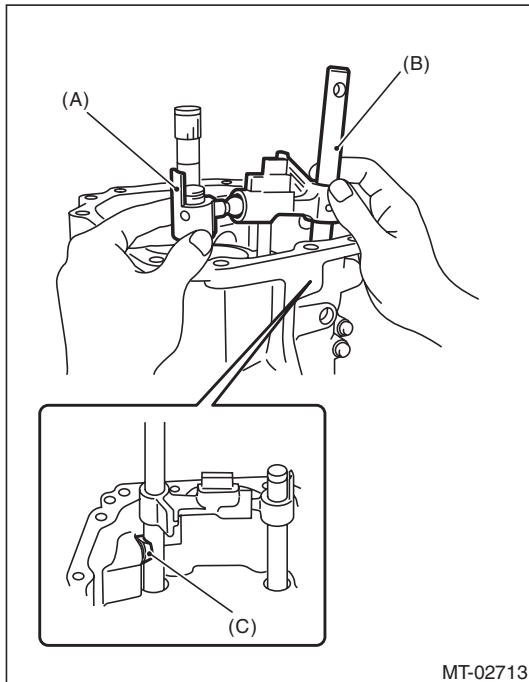


- (A) Striking rod
(B) Spring pin

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Remove the selector arm No. 2, shifter arm, selector plunger and spring.



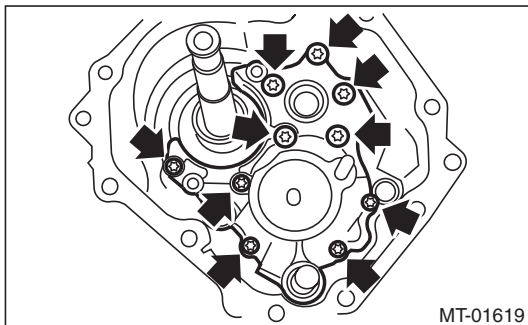
- (A) Selector arm No. 2
- (B) Shifter arm
- (C) Selector plunger

12) Remove the transfer bearing holder.

NOTE:

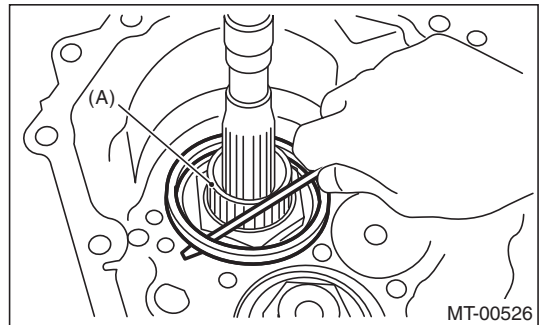
Using a general tool may cause damage. Remove the bolt using the ST.

ST 18663AA000 SOCKET



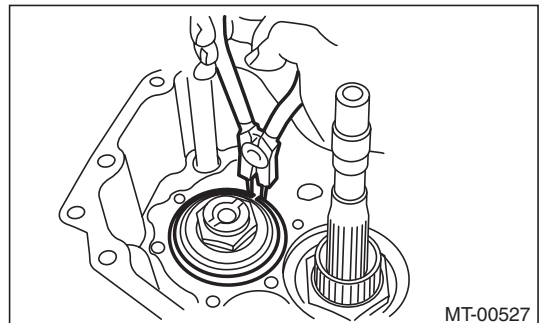
13) Remove the washer on the main shaft section.

14) Remove the driven gear assembly shim and spacer.

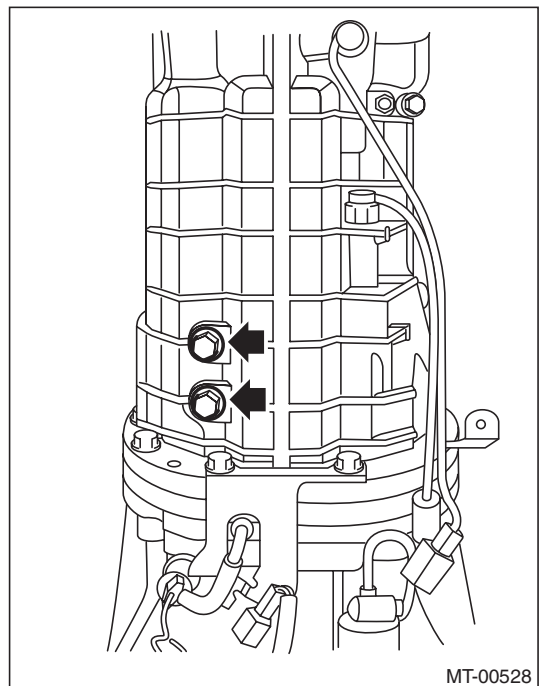


- (A) Driven gear ASSY

15) Remove the snap ring.



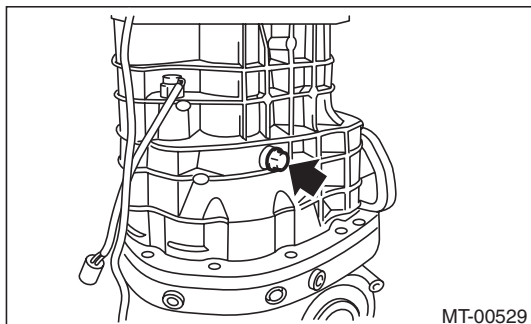
16) Remove the pilot bolt.



Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

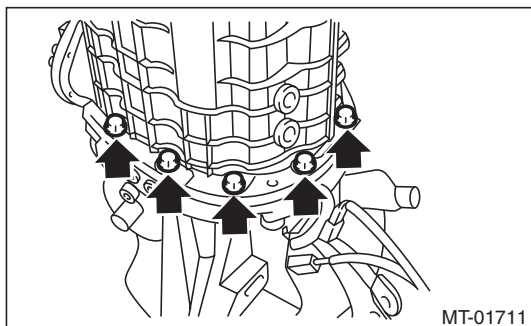
17) Remove the holder reverse bolt.



18) Remove the transmission case.

NOTE:

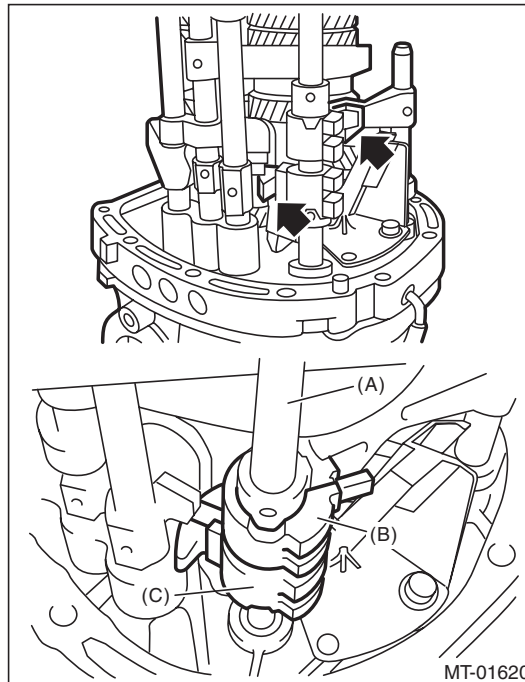
If the oil guide is caught between the shift fork, it may be difficult to remove the transmission case. Move the oil guide, then remove. Do not pull on the transmission case with excessive force.



19) Remove any remaining liquid gasket from the transmission case and adapter plate.

B: INSTALLATION

1) Check that the shifter fork and the interlock block are both shifted into the neutral position. If they are not, shift into the neutral position.

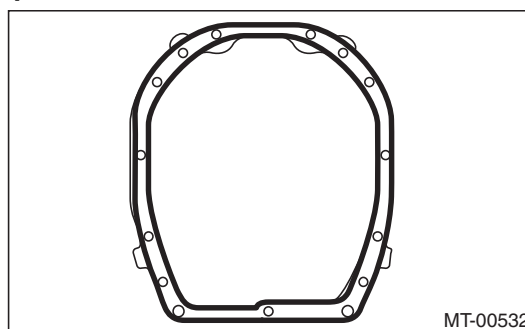


- (A) Striking rod
- (B) Reverse interlock block
- (C) Interlock block

2) Apply liquid gasket to the adapter plate.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



3) Install the transmission case.

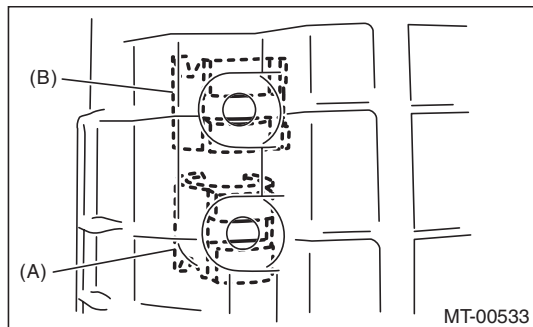
6MT-60

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Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

4) By inspecting from the pilot bolt attachment hole, check that the interlock block and the reverse interlock block are aligned to the neutral position. If not aligned, remove the transmission case, and shift the shifter fork and interlock block to the neutral position.



(A) Interlock block

(B) Reverse interlock block

5) Use a new gasket to temporarily attach the pilot bolt.

6) Affix the transmission case with the bolts and nuts.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

7) Tighten the pilot bolt.

Tightening torque:

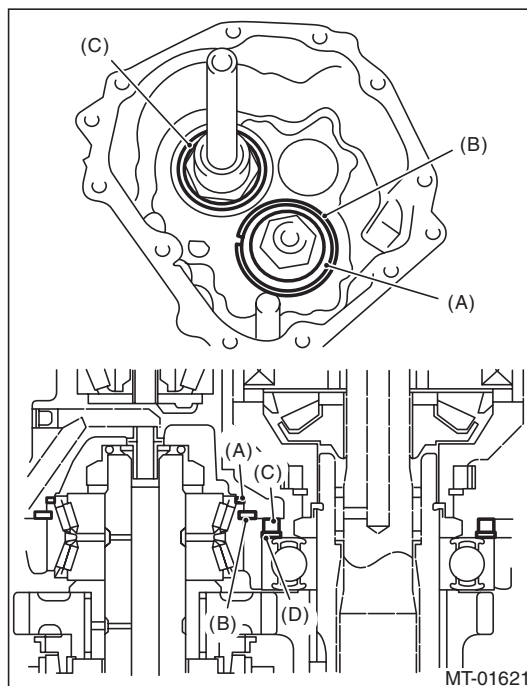
34 N·m (3.5 kgf-m, 25.1 ft-lb)

8) Tighten the holder reverse bolt.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

9) Install the snap ring and washer for the main shaft assembly, and washer and collar for the driven gear assembly.



(A) Washer

(B) Snap ring

(C) Collar

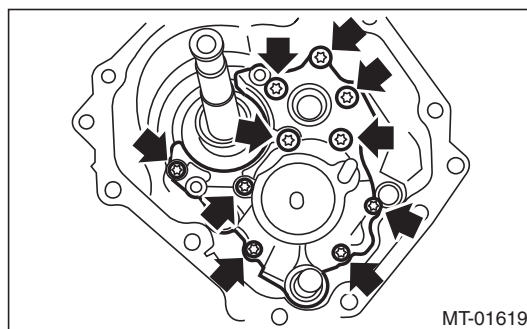
(D) Washer

10) Install the transfer bearing holder.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

ST 18663AA000 SOCKET

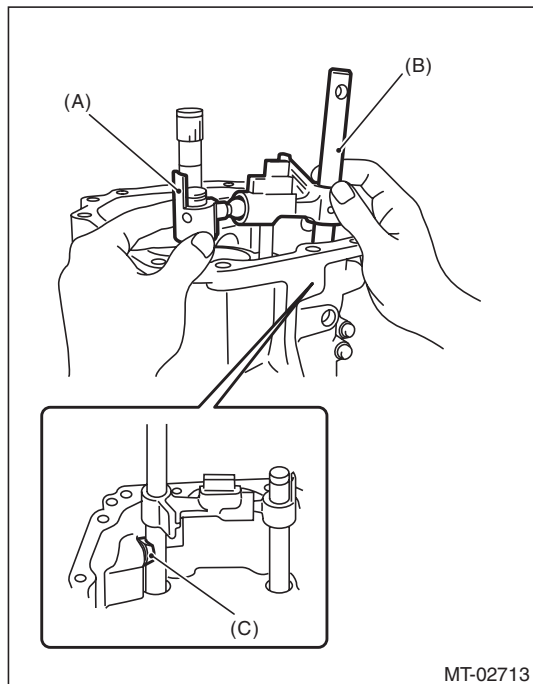


11) When replacing the transfer bearing holder, select the appropriate transfer driven gear and thrust washer, and install to the extension case. <Ref. to 6MT-46, ADJUSTMENT, Extension Case.>

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Install the selector arm No. 2, shifter arm, selector plunger and spring.



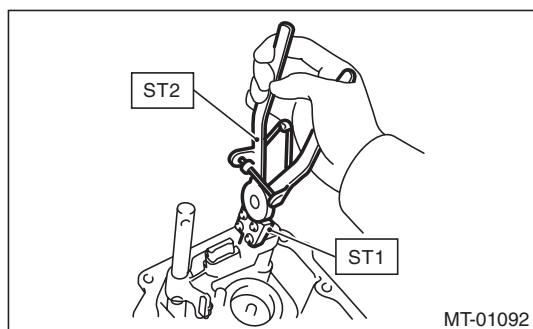
- (A) Selector arm No. 2
- (B) Shifter arm
- (C) Selector plunger

13) Install a new spring pin.

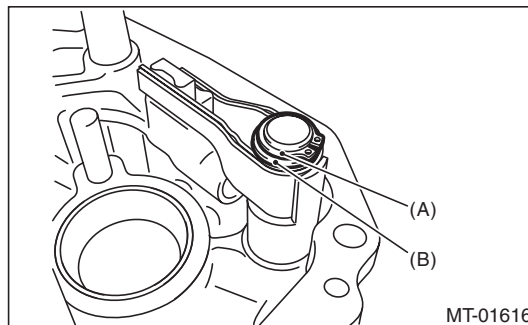
14) Using the ST, install the neutral set spring.

ST1 18756AA000 CLAW

ST2 399893600 PLIER

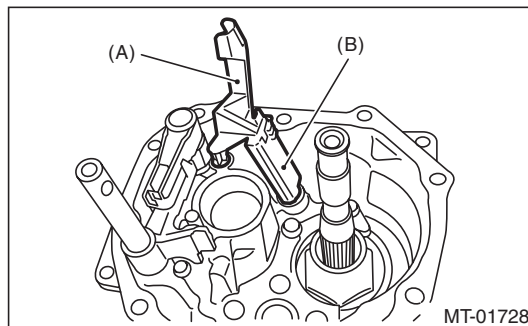


15) Install the snap ring and flat washer to the selector arm area.



- (A) Snap ring
- (B) Flat washer

16) Install the oil guides G and H.



- (A) Oil guide G
- (B) Oil guide H

17) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>

18) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>

19) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>

20) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>

21) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1) Remove the transmission harness from the transmission case.

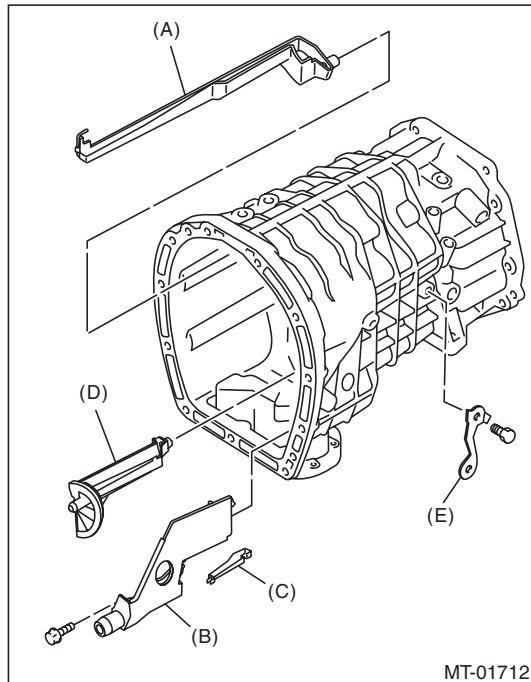
NOTE:

Remove the connector by disengaging the connector claw from the inside of the transmission.

Transmission Case

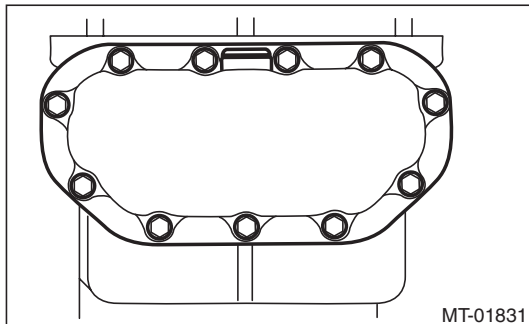
MANUAL TRANSMISSION AND DIFFERENTIAL

2) Remove the oil guides C, D, E, F and harness bracket.



- (A) Oil guide C
- (B) Oil guide D
- (C) Oil guide E
- (D) Oil guide F
- (E) Harness bracket

3) Remove the oil pan.



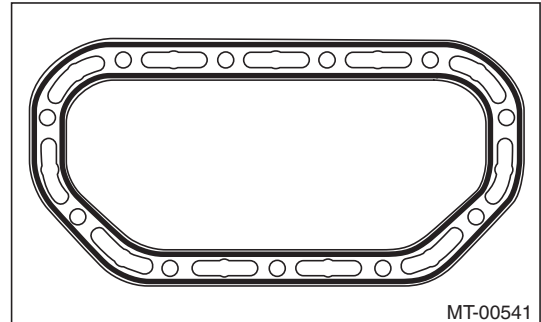
4) Remove any remaining liquid gasket from the transmission case and oil pan.

D: ASSEMBLY

1) Apply liquid gasket to the oil pan.

Liquid gasket:

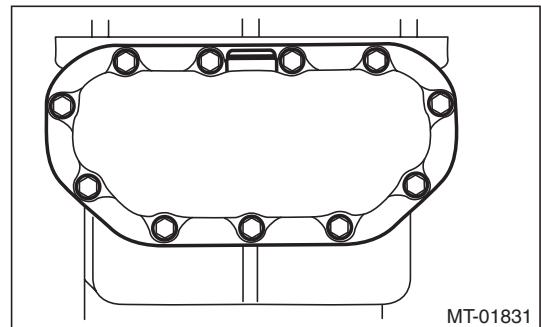
THREE BOND 1215 (Part No. 004403007) or equivalent



2) Install the oil pan.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



Transmission Case

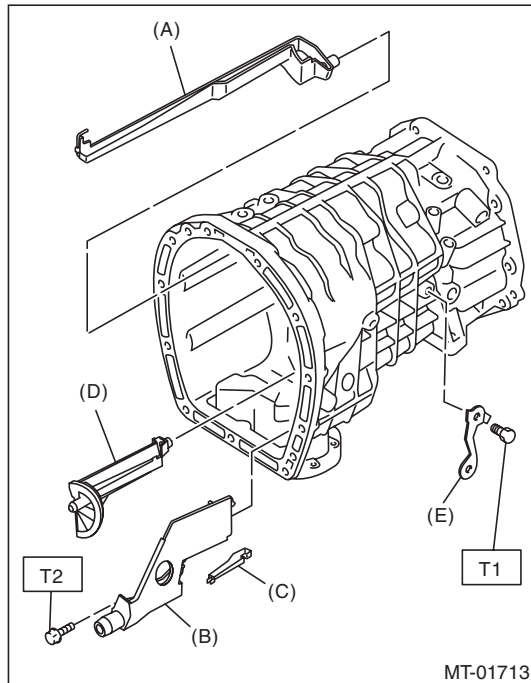
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the oil guides C, D, E, F and harness bracket.

Tightening torque:

T1: 16 N·m (1.6 kgf-m, 11.8 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

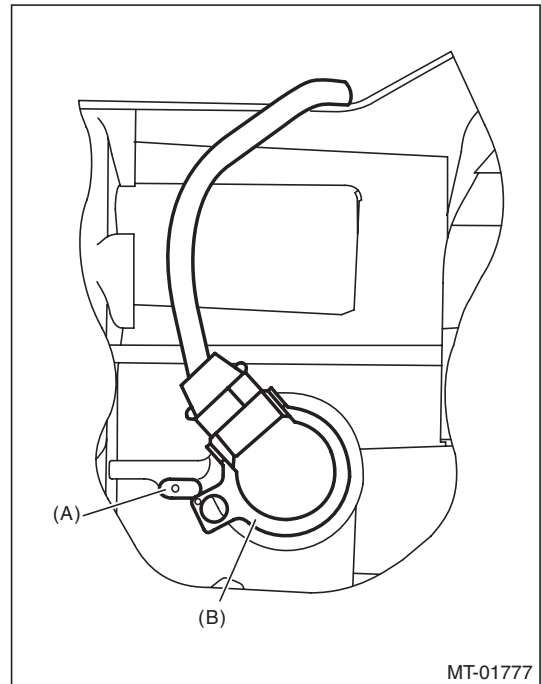


- (A) Oil guide C
- (B) Oil guide D
- (C) Oil guide E
- (D) Oil guide F
- (E) Harness bracket

4) Attach the transmission harness to the transmission.

NOTE:

Install the transmission harness connector by aligning the protrusions of the transmission and transmission harness connector.



- (A) Protrusion
- (B) Transmission harness connectors

E: INSPECTION

- 1) If the sludge is accumulated in the oil pan, use a waste cloth to wipe it off completely.
- 2) Check that there is no damage on any parts. Replace damaged parts with new parts.

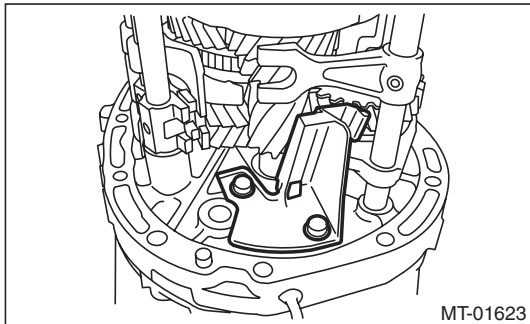
Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

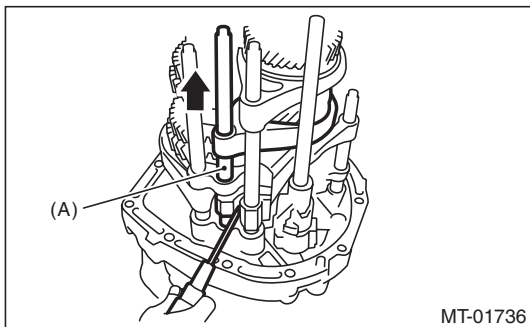
17. Main Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the striking rod.
- 9) Remove the oil guide B.

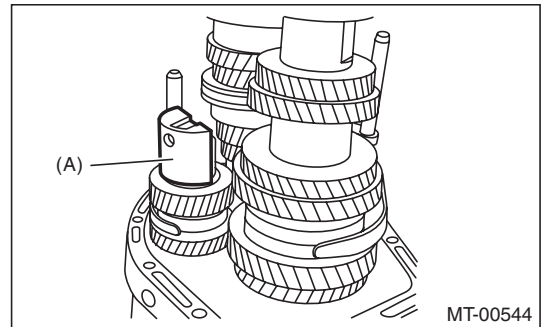


- 10) Use a screwdriver to shift to the 4th gear position.



(A) 3rd-4th shift rod

- 11) Remove the reverse idler holder.

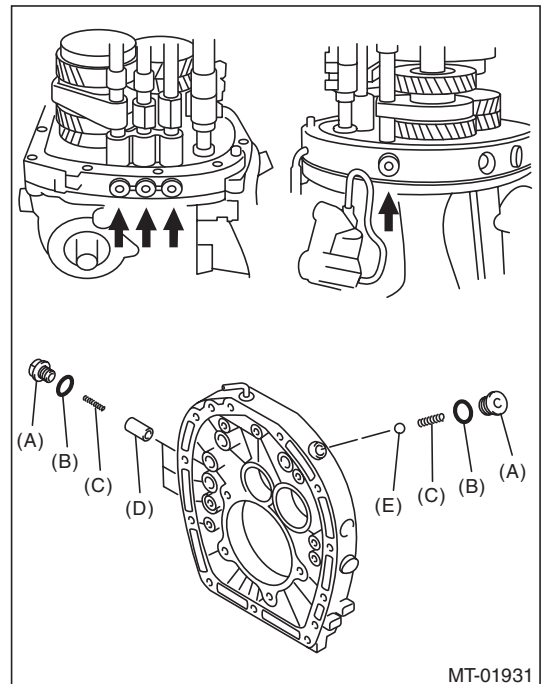


(A) Reverse idler holder

- 12) Remove the check plug, O-ring, check spring, plunger and check ball from the adapter plate.

NOTE:

Do not reuse the gasket.

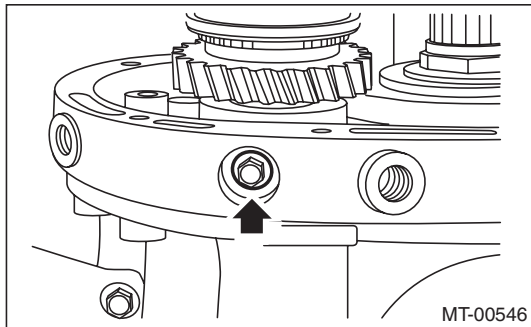


- (A) Check plug
- (B) O-ring
- (C) Checking spring
- (D) Plunger
- (E) Check ball

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

13) Remove the bolt and gasket holding the reverse idler shaft.



14) Push the main shaft assembly, driven gear assembly, reverse idler gear and shifter forks to remove from the adapter plate all at once.

NOTE:

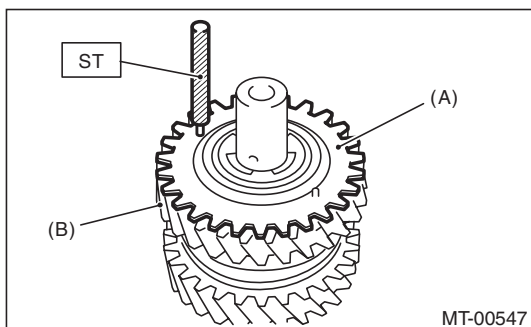
A helper is required to perform this work.

B: INSTALLATION

1) Adjust the 3rd-4th and 5th-6th shifter fork rods.
<Ref. to 6MT-109, ADJUSTMENT, Shifter Fork and Rod.>

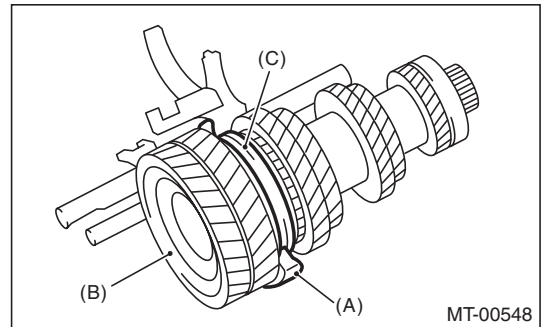
2) Turn the sub gear counterclockwise for approximately 3 teeth. Match the sub gear and reverse idler gear holes, and insert the ST.

ST 18757AA000 STRAIGHT PIN



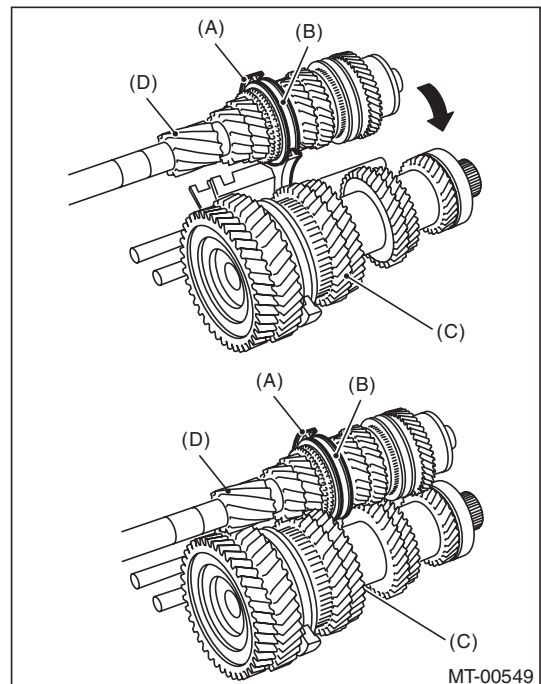
- (A) Sub gear
- (B) Reverse idler gear

3) Attach the driven gear assembly to the 1st-2nd shifter fork assembly.



- (A) 1st-2nd shifter fork
- (B) Driven gear ASSY
- (C) 1st-2nd sleeve

4) Attach the main shaft assembly to the 3rd-4th shifter fork, and assemble to the driven gear assembly.

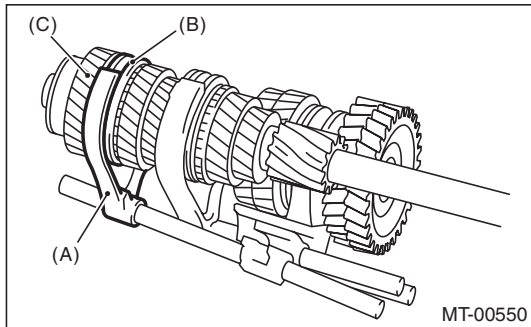


- (A) 3rd-4th shifter fork
- (B) 3rd-4th sleeve
- (C) Driven gear ASSY
- (D) Main shaft ASSY

Main Shaft Assembly

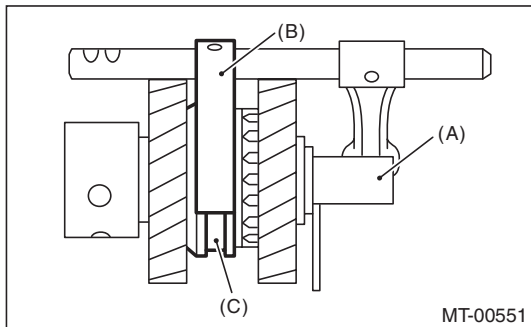
MANUAL TRANSMISSION AND DIFFERENTIAL

5) Attach the 5th-6th shifter fork assembly to the main shaft assembly.



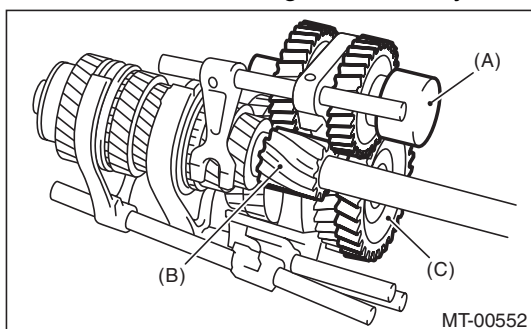
- (A) 5th-6th shifter fork
- (B) 5th-6th sleeve
- (C) Main shaft ASSY

6) Attach the reverse shifter fork assembly to the reverse idler gear assembly.



- (A) Reverse idler gear ASSY
- (B) Reverse shifter fork
- (C) Reverse sleeve

7) Install the reverse idler gear assembly.



- (A) Reverse idler gear ASSY
- (B) 1st drive gear
- (C) Reverse gear

8) Install the thrust bearing of the driven gear assembly.

9) Push on the shifter forks, main shaft assembly, driven gear assembly and reverse idler gear assemblies, to attach to the adapter plate all at once.

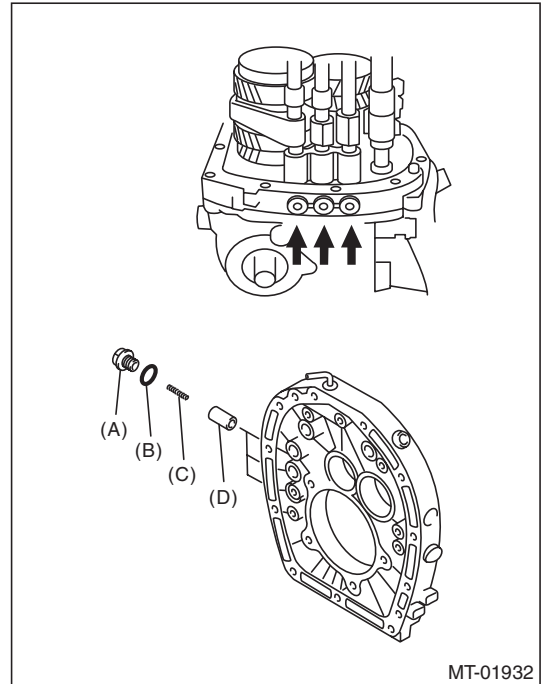
NOTE:

A helper is required to perform this work.

10) Install the plunger, check spring, new O-ring and check plugs.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



- (A) Check plug
- (B) O-ring
- (C) Checking spring
- (D) Plunger

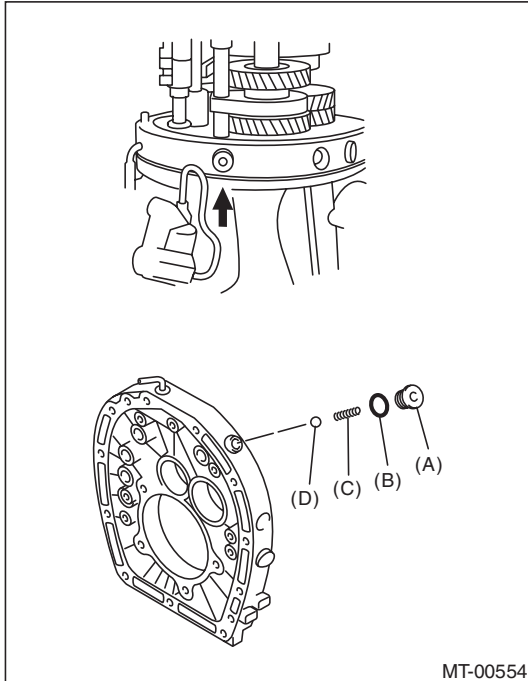
Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Install the check ball, check spring, new O-ring and check plugs.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

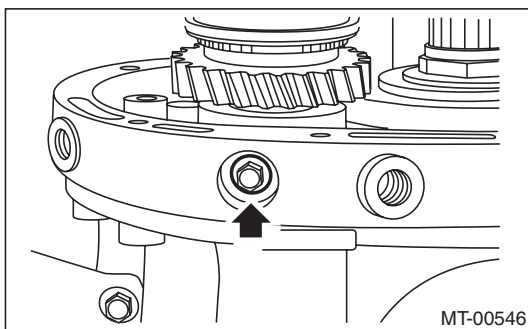


- (A) Check plug
- (B) O-ring
- (C) Checking spring
- (D) Check ball

12) Attach the bolt and a new gasket.

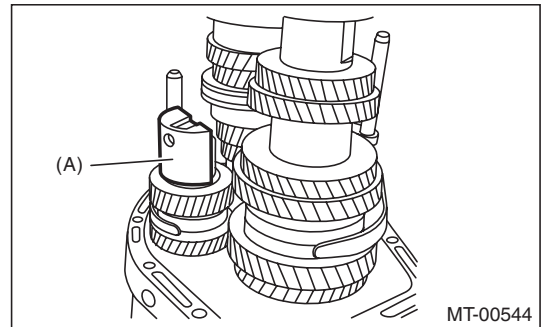
Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



13) Use a screwdriver to shift to the 4th gear position.

14) Install the reverse idler holder.

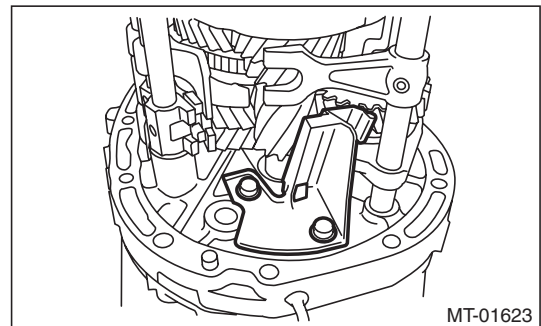


(A) Reverse idler holder

15) Install the oil guide B.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



16) Install the striking rod.

17) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>

18) Install the selected main shaft snap ring and washers.

19) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>

20) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>

21) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>

22) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>

23) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

Individual sleeves and hubs meet at a specified position. Before disassembly, mark the meeting position of the sleeve and hub.

1) Affix the ST to the work table.

ST 18664AA000 BASE

2) Flatten the tab of the lock nut.

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

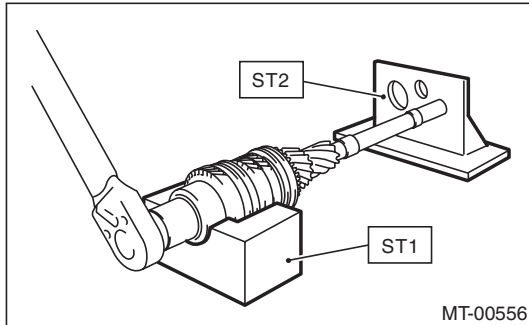
3) Set the main shaft assembly to the ST, and remove the lock nut and lock washer.

ST1 18665AA000 HOLDER

ST2 18664AA000 BASE

NOTE:

Use a 38 mm socket wrench.

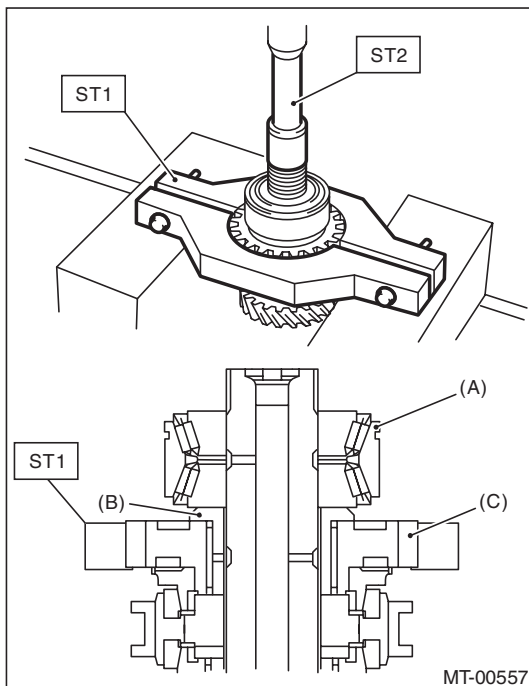


4) Remove the main shaft assembly from the ST.

5) Set the ST1 to the 6th drive gear, and use a press to remove the taper roller bearing, bushing and 6th drive gear.

ST1 18722AA010 REMOVER

ST2 899864100 REMOVER

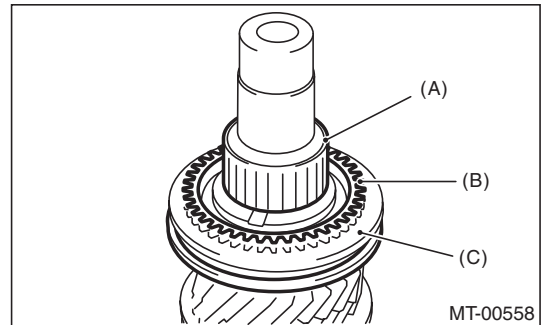


(A) Taper roller bearing

(B) Bushing

(C) 6th drive gear

6) Remove the 5th-6th sleeve, 6th needle bearing and 6th baulk ring.



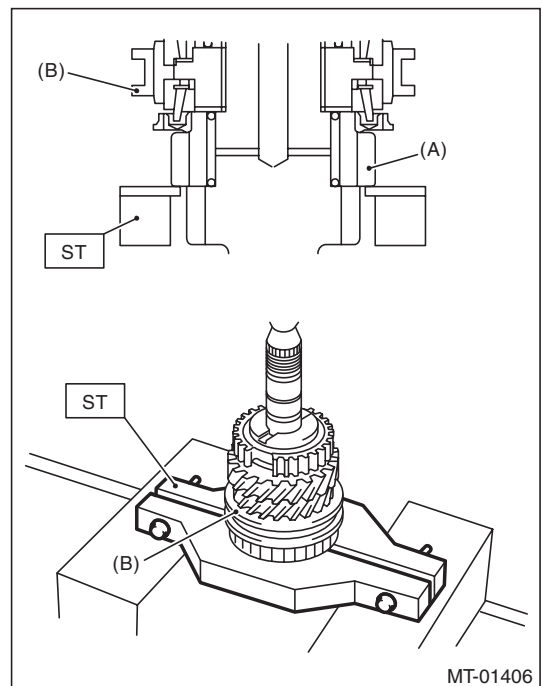
(A) Needle bearing

(B) 6th baulk ring

(C) 5th-6th sleeve

7) Set the ST to the 3rd drive gear, and use a press to remove individual parts.

ST 18720AA000 REMOVER



(A) 3rd drive gear

(B) 3rd-4th sleeve

D: ASSEMBLY

NOTE:

When replacing the following parts, replace as a set.

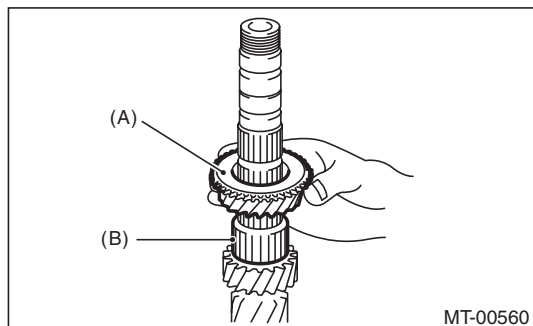
- Sleeve and hub
- Outer baulk ring, 3rd synchro cone and inner baulk ring
- Taper roller bearing

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

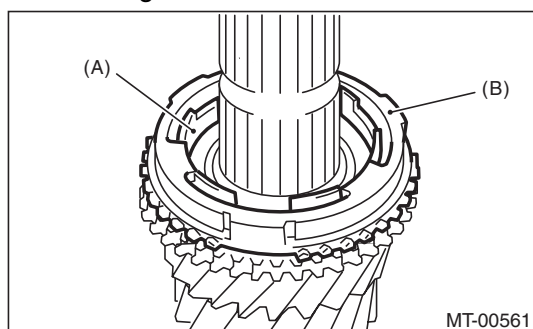
1) Apply adequate transmission gear oil to the main shaft, 3rd needle bearing and 3rd drive gear inner surface.

2) Install the 3rd needle bearing and 3rd drive gear to the main shaft.



- (A) 3rd drive gear
- (B) 3rd needle bearing

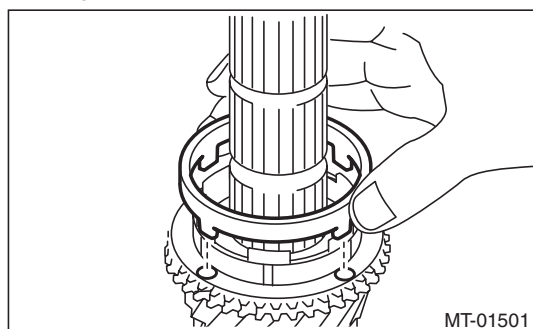
3) Install the inner baulk ring, 3rd synchro cone and outer baulk ring.



- (A) Inner baulk ring
- (B) Outer baulk ring

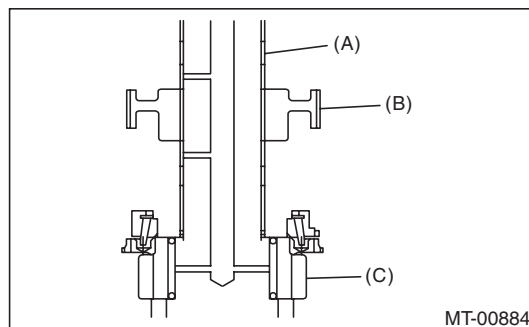
NOTE:

Install the 3rd synchro cone by aligning the protrusion of the 3rd synchro cone with the hole on the 3rd drive gear.



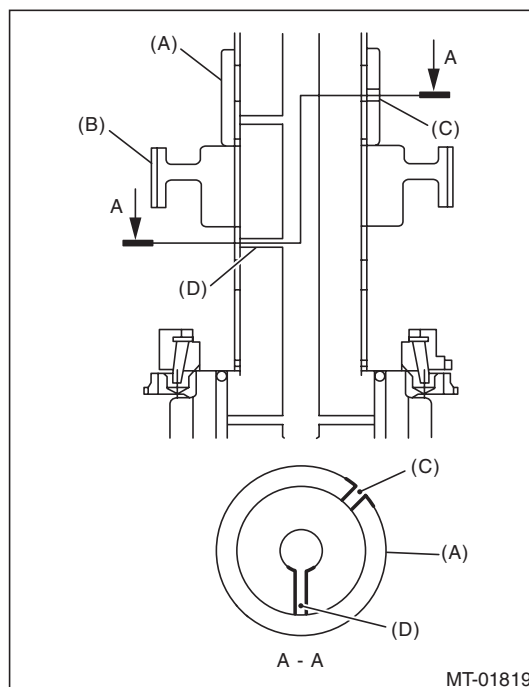
4) Install the 3rd-4th hub and 4th bushing.

(1) Being careful of the install direction of the 3rd-4th hub, set to the main shaft.



- (A) Main shaft
- (B) 3rd-4th hub
- (C) 3rd drive gear

(2) With the main shaft oil hole and 4th bushing oil hole out of alignment, attach to the main shaft.



- (A) 4th bushing
- (B) 3rd-4th hub
- (C) 4th bushing oil hole
- (D) Main shaft oil hole

(3) Using the ST, push in to the 3rd-4th hub and 4th bushing all at once.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

6MT-70

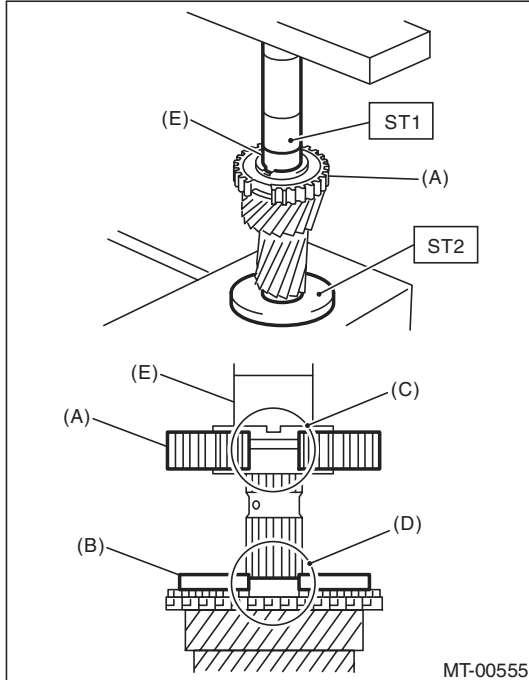
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Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

When pushing into the 3rd-4th hub and 4th bushing, move the outer baulk ring to match the protrusion of the outer baulk ring and the cut out on the 3rd-4th bushing.



- (A) 3rd-4th hub
- (B) Outer baulk ring
- (C) Cut out on the 3rd-4th hub
- (D) Protrusion of the outer baulk ring
- (E) 4th bushing

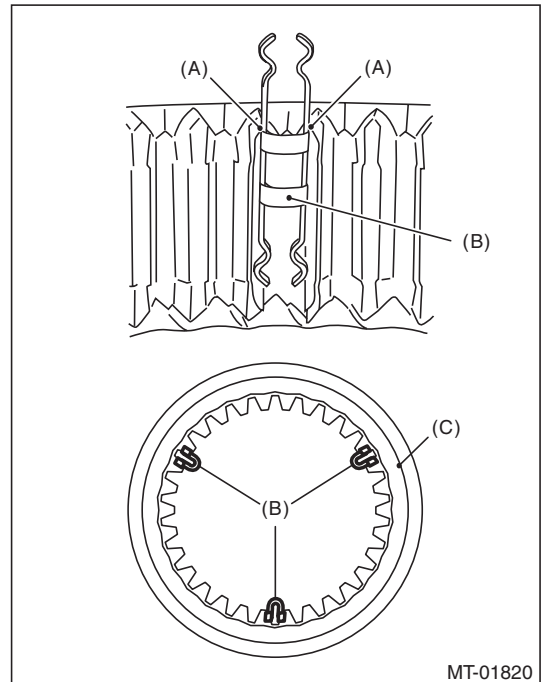
5) Make sure that the 3rd drive gear can be turned smoothly by hand. If it does not turn smoothly, re-assemble.

6) Attach the 3rd-4th shifting insert key at the appropriate position of the 3rd-4th sleeve.

NOTE:

- The location angle of each shifting insert key is 120°.

- Refer to the following figure to install the shifting insert key.

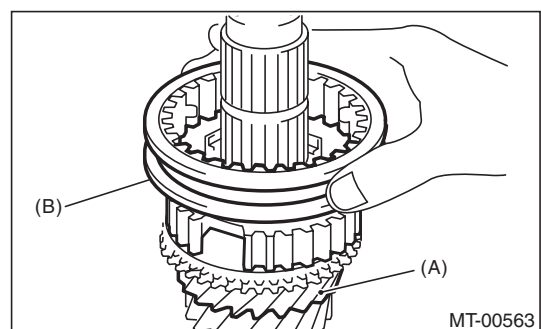


- (A) Attach the straight part of the shifting insert key to the sleeve convex portion.
- (B) 3rd-4th shifting insert key
- (C) 3rd-4th sleeve

7) Attach the 3rd-4th sleeve to the 3rd-4th hub.

NOTE:

- There is an identification groove on the 3rd-4th sleeve.
- Place the groove towards the 3rd drive gear, and attach the 3rd-4th sleeve.



- (A) 3rd drive gear
- (B) 3rd-4th sleeve identification groove (1)

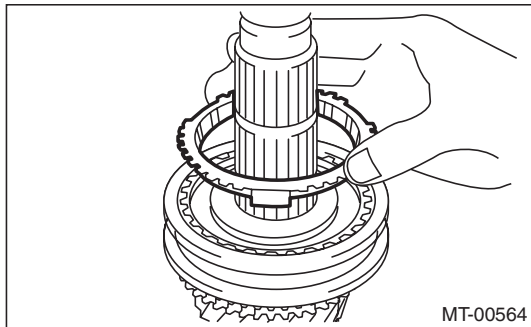
6MT-71

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Main Shaft Assembly

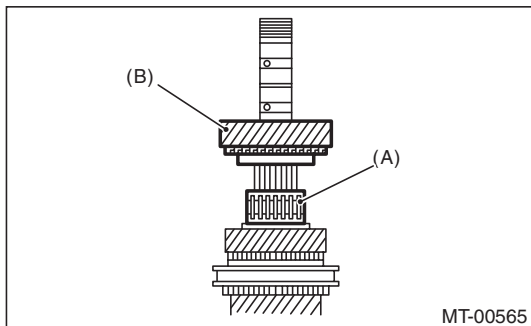
MANUAL TRANSMISSION AND DIFFERENTIAL

8) Install the 4th baulk ring.



9) Apply adequate transmission gear oil to the main shaft, 4th needle bearing and 4th drive gear inner surface.

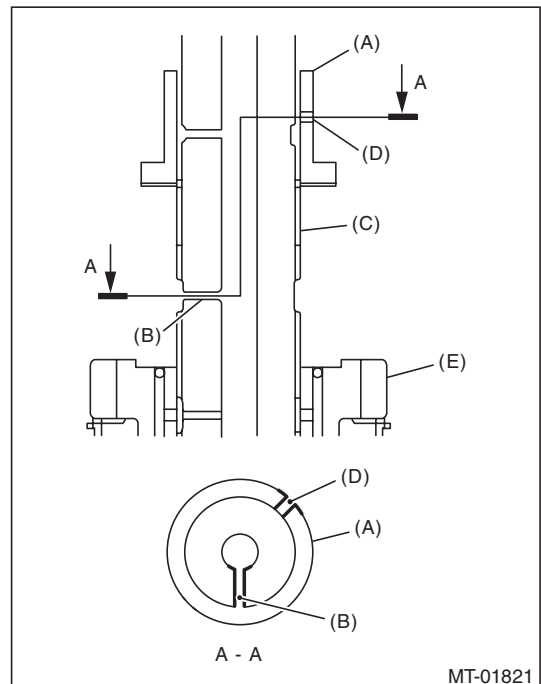
10) Install the 4th needle bearing and 4th drive gear.



- (A) 4th needle bearing
- (B) 4th drive gear

11) Install the 5th bushing.

(1) With the main shaft oil hole and 5th bushing oil hole out of alignment, attach to the main shaft.

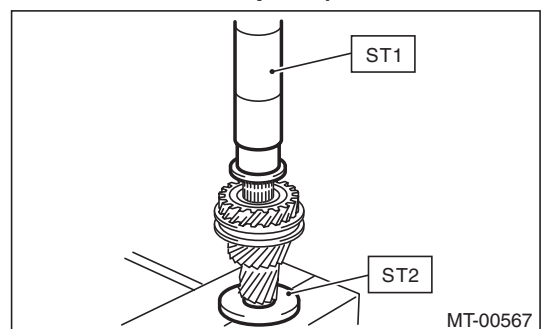


- (A) 5th bushing
- (B) Main shaft oil hole
- (C) Main shaft
- (D) 5th bushing oil hole
- (E) 4th drive gear

(2) Using the ST, push into the 5th bushing.
ST1 18651AA000 INSTALLER
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



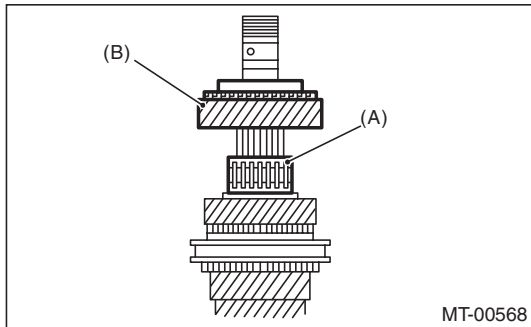
12) Make sure that the 4th drive gear can be turned smoothly by hand. If it does not turn smoothly, re-assemble.

13) Apply adequate transmission gear oil to the main shaft, 5th needle bearing and 5th drive gear inner surface.

Main Shaft Assembly

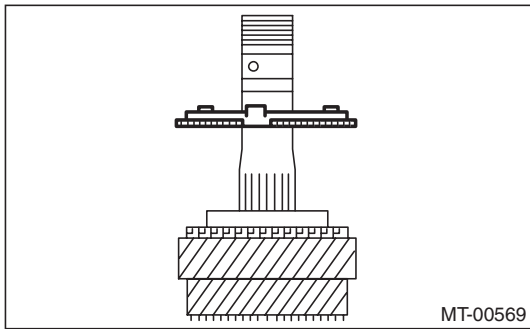
MANUAL TRANSMISSION AND DIFFERENTIAL

14) Install the 5th needle bearing and 5th drive gear.



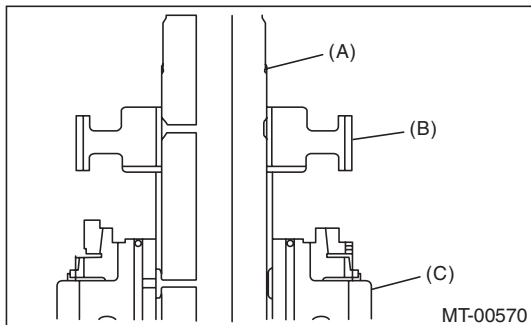
- (A) 5th needle bearing
- (B) 5th drive gear

15) Install the 5th baulk ring.



16) Install the 5th-6th hub.

(1) Being careful of the install direction of the 5th-6th hub, set to the main shaft.



- (A) Main shaft
- (B) 5th-6th hub
- (C) 5th drive gear

(2) Using the ST, push into the 5th-6th hub.

ST1 18651AA000 INSTALLER

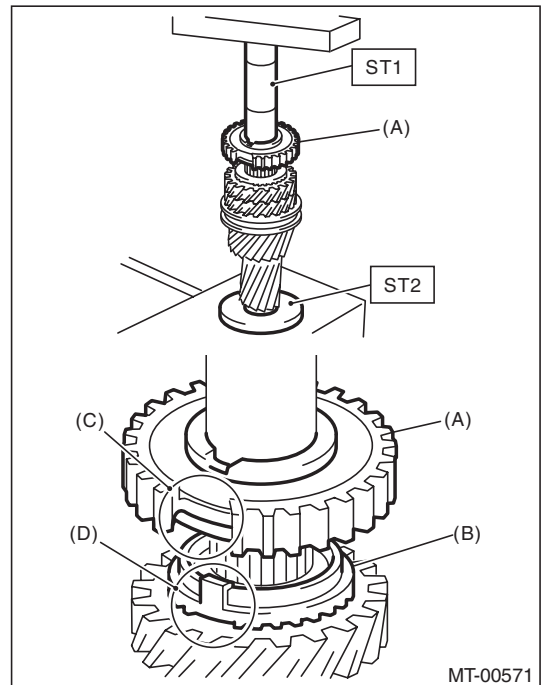
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

When pushing into the 5th-6th hub, move the outer baulk ring to match the protrusion of the outer baulk ring and the cut out on the 5th-6th bushing.



- (A) 5th-6th hub
- (B) Outer baulk ring
- (C) Cut out on the 5th-6th hub
- (D) Protrusion of the outer baulk ring

17) Make sure that the 5th drive gear can be turned smoothly by hand. If it does not turn smoothly, re-assemble.

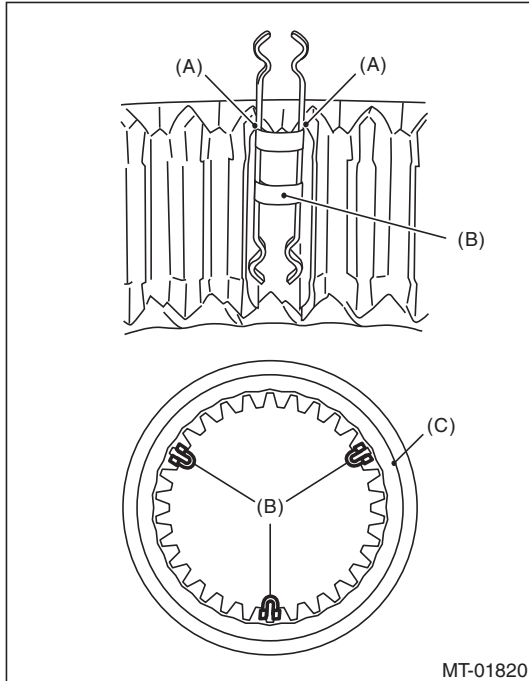
Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

18) Attach the 5th-6th shifting insert key at the appropriate position of the 5th-6th sleeve.

NOTE:

- The location angle of each shifting insert key is 120°.
- Refer to the following figure to install the shifting insert key.

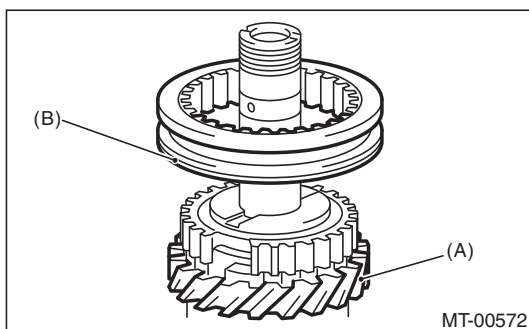


- (A) Attach the straight part of the shifting insert key to the sleeve convex portion.
 (B) 5th-6th shifting insert key
 (C) 5th-6th sleeve

19) Attach the 5th-6th sleeve to the 5th-6th hub.

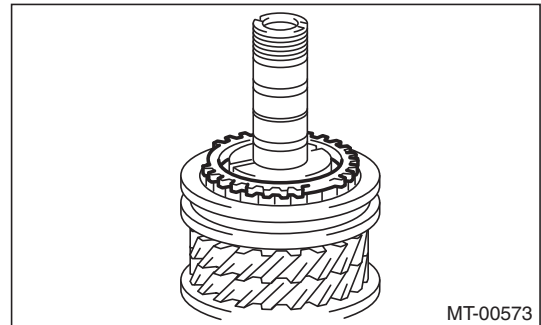
NOTE:

- There are two identification grooves on the 5th-6th sleeve.
- Place the grooves towards the 5th drive gear, and attach the 5th-6th sleeve.



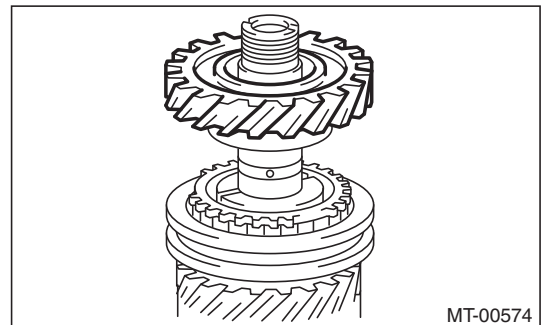
- (A) 5th drive gear
 (B) 5th-6th sleeve identification groove (2)

20) Install the 6th baulk ring.

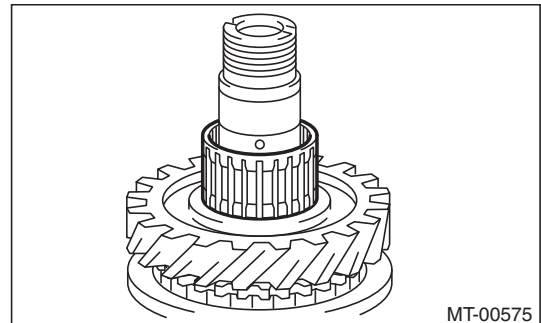


21) Apply adequate transmission gear oil to the main shaft, 6th needle bearing and 6th drive gear inner surface.

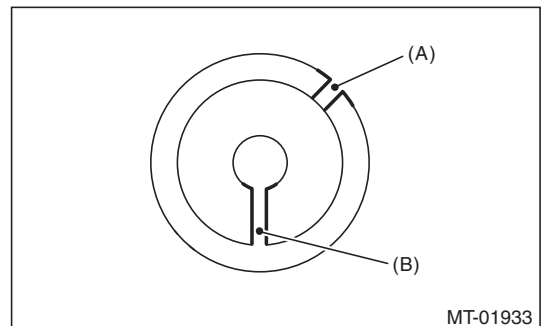
22) Install the 6th drive gear.



23) Install the 6th needle bearing.



24) With 6th bushing oil hole and the main shaft oil hole out of alignment, attach to the main shaft.



- (A) 6th bushing oil hole
 (B) Main shaft oil hole

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

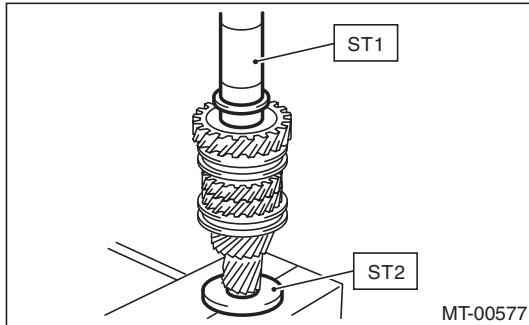
25) Using the ST, install the 6th bushing.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



26) Make sure that the 6th drive gear can be turned smoothly by hand. If it does not turn smoothly, re-assemble.

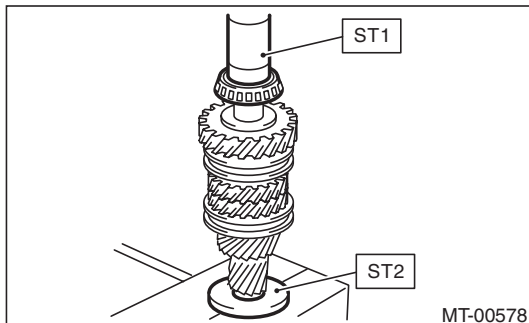
27) Using the ST, install the inner bearing of the taper roller bearing.

ST1 18651AA000 INSTALLER

ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



28) Using the ST, install the outer race and the outer bearing of the taper roller bearing.

ST1 18651AA000 INSTALLER

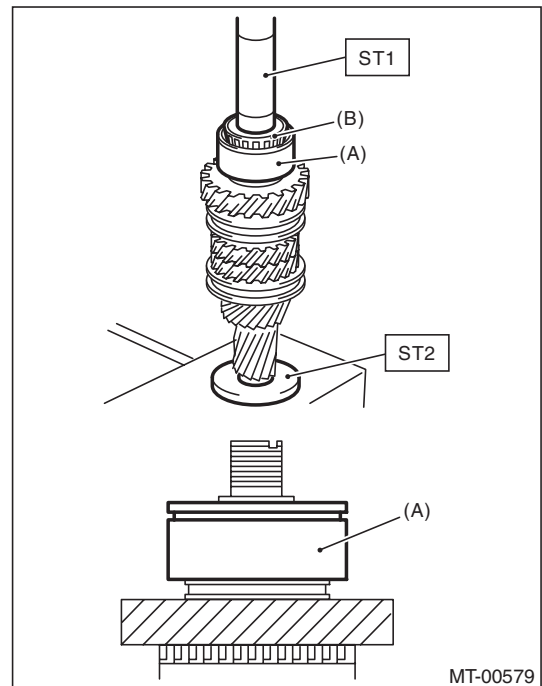
ST2 398177700 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

- Confirm that the outer race is installed in the proper direction.
- Push in until there is no backlash on the outer race and the bearing turns smoothly by hand.



(A) Outer race

(B) Outer bearing of the taper roller bearing

29) Make sure that the taper roller bearing turns smoothly by hand. If it does not rotate smoothly, replace the taper roller bearing as a set, and re-assemble.

30) Attach a new lock washer and a new lock nut.

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

31) Set the main shaft assembly to the ST, and tighten the lock nut.

ST1 18665AA000 HOLDER

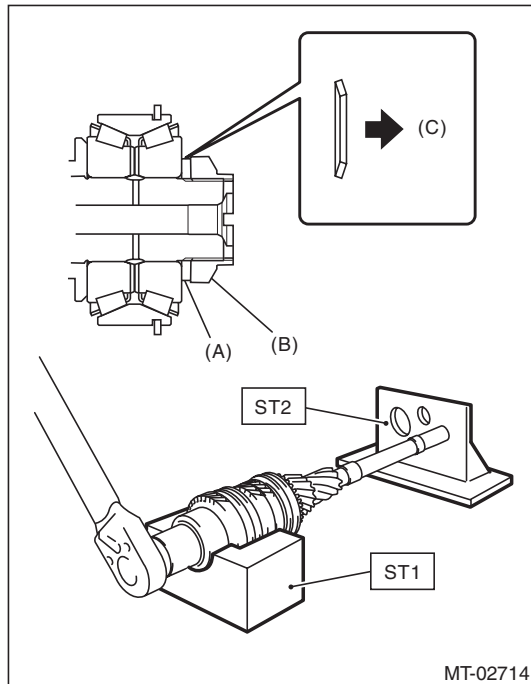
ST2 18664AA000 BASE

NOTE:

Make sure the lock washer is installed in the proper direction.

Tightening torque:

392 N·m (40.0 kgf-m, 289.1 ft-lb)



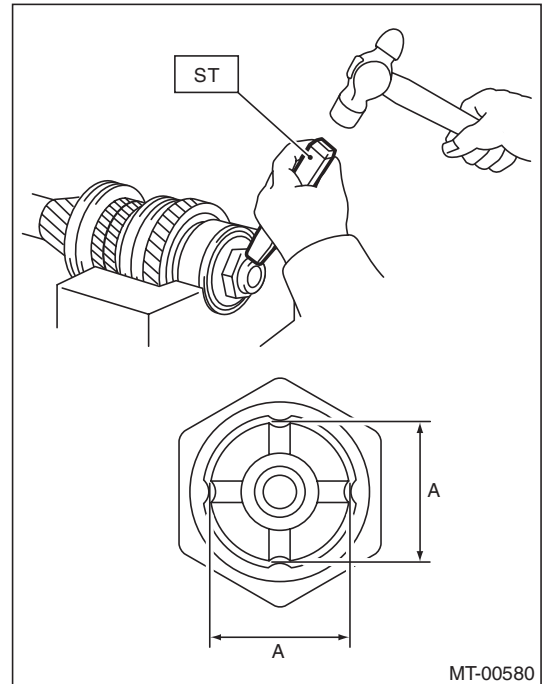
- (A) Lock washer
- (B) Lock nut
- (C) Nut side

32) Using the ST, crimp the lock nut in 4 locations, with dimensions within $A \ 27 \pm 0.3 \text{ mm}$ ($1.06 \pm 0.01 \text{ in}$).

ST 18668AA000 PUNCH

NOTE:

Do not damage the crimp area of the lock nut.



E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- Wear, rusting or damage of the bearings
- The bearing does not rotate smoothly or an abnormal noise is emitted when turning.
- The bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- The sliding surface is damaged or abnormally worn.

3) Gear

Replace gears in the following cases.

- The gear teeth surface is damaged or excessively worn.
- The contact area of the baulk ring is damaged.
- The inner face of the gear is worn.

4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following cases.

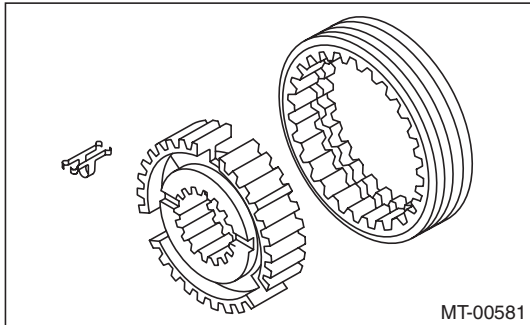
- Wear, rusting or damage of the baulk ring

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Shifting insert key

Replace the shifting insert key if deformed, excessively worn or defective in any way.



F: ADJUSTMENT

1. MAIN SHAFT SNAP RING & WASHER SELECTION

NOTE:

In the following conditions, perform the procedures below.

- 1st to 6th driven gear replacement
- 1st and 2nd synchro ring assembly replacement
- Ball bearing replacement
- Adapter plate replacement
- Driven shaft replacement

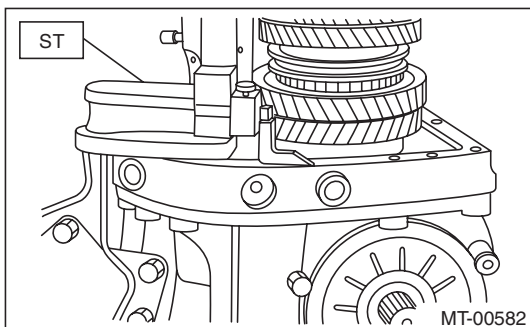
1) Insert the drive pinion assembly into the adapter plate.

NOTE:

Confirm that the thrust bearing outer race has not been removed and the drive pinion is not lifted.

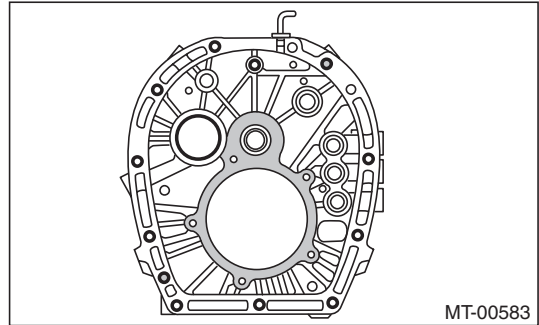
2) Set the height gauge to the adapter plate. Lower the height gauge indicator to the mating surface of the adapter plate and case, and set to zero points.

ST 18853AA000 HEIGHT GAUGE

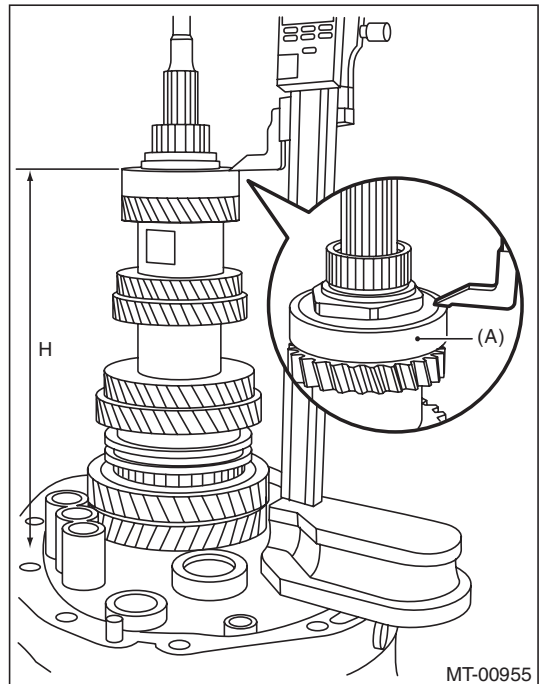


NOTE:

- The adapter plate will be the base point for the measurement. Use a scraper to remove any gasket material remaining on the end face.
- During measurement, do not place the height gauge in the shaded area shown in the figure.



3) Measure the height to the ball bearing end face (height H).



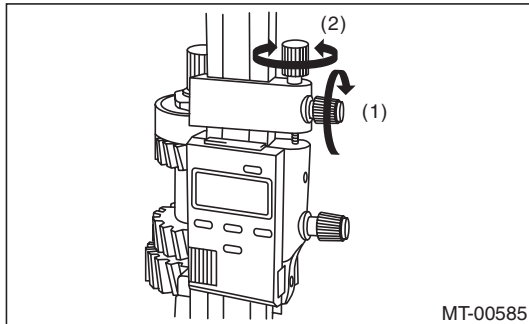
(A) Ball bearing

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the end face of the bearing.



Turn approximately 120° at a time, and measure the ball bearing in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.

4) According to the measurement value, select the snap ring and washer from the following table.

Snap ring		
H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	805072010	1.65 (0.065)
271.41 — 271.98 (10.69 — 10.71)	805072011	1.95 (0.077)
271.99 — 272.56 (10.71 — 10.73)	805072012	2.25 (0.089)

Washer		
H: mm (in)	Part No.	Thickness: mm (in)
270.83 — 271.40 (10.66 — 10.69)	803067012	1.6 (0.063)
271.41 — 271.98 (10.69 — 10.71)	803067011	1.3 (0.051)
271.99 — 272.56 (10.71 — 10.73)	803067010	1.0 (0.039)

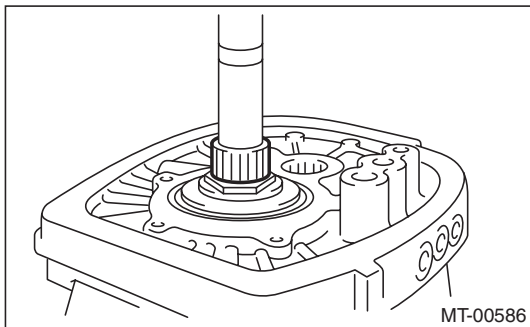
Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

18. Driven Gear Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the driven gear assembly. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>
- 9) Remove the 1st needle bearing.



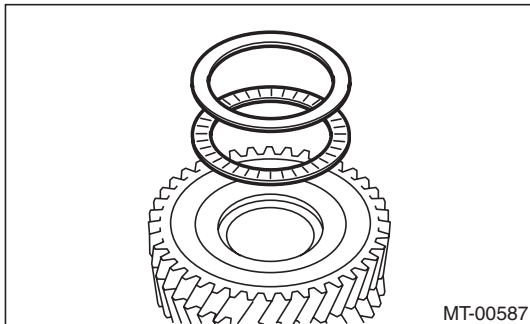
- 10) Remove the thrust needle bearing.

B: INSTALLATION

- 1) Adjust the main shaft snap ring. <Ref. to 6MT-77, ADJUSTMENT, Main Shaft Assembly.>
- 2) Adjust the 1st-2nd shifter rod. <Ref. to 6MT-109, ADJUSTMENT, Shifter Fork and Rod.>
- 3) Install the thrust needle bearing.

NOTE:

Confirm that the thrust needle bearing is installed in the proper direction.



- 4) Install the 1st needle bearing.
- 5) Install the driven gear assembly. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>
- 7) Adjust the backlash of the driven gear assembly in the axial direction. <Ref. to 6MT-86, ADJUSTMENT, Driven Gear Assembly.>
- 8) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>
- 9) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 10) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 11) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>
- 12) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

Individual sleeves and hubs meet at a specified position. Before disassembly, mark the meeting position of the sleeve and hub.

- 1) Affix the ST to the work table.

ST 18664AA000 BASE

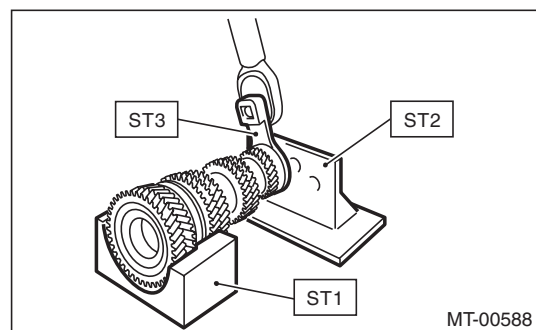
- 2) Flatten the tab of the lock nut.

- 3) Attach ST3 to the lock nut, set the driven gear assembly to the ST, and remove the lock nut.

ST1 18666AA000 HOLDER

ST2 18664AA000 BASE

ST3 18620AA000 ADAPTER WRENCH



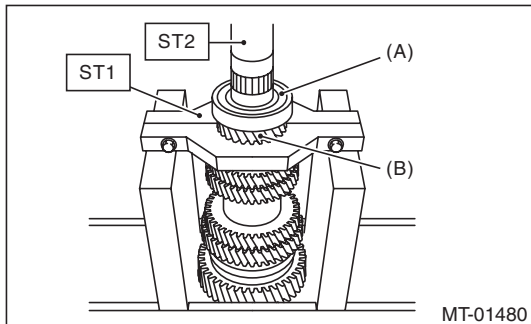
Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Attach ST1 to the 6th driven gear, then remove the ball bearing and 5th-6th driven gear.

ST1 18723AA000 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



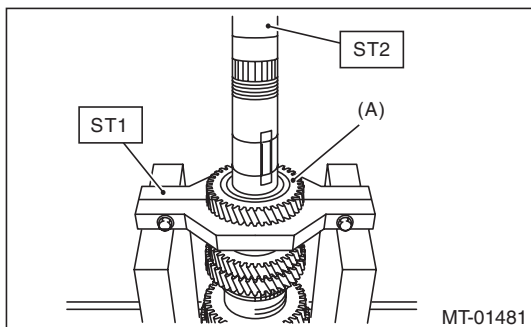
(A) Ball bearing

(B) 5th-6th driven gear

5) Attach ST1 to the 4th driven gear, then remove the 3rd-4th driven gear.

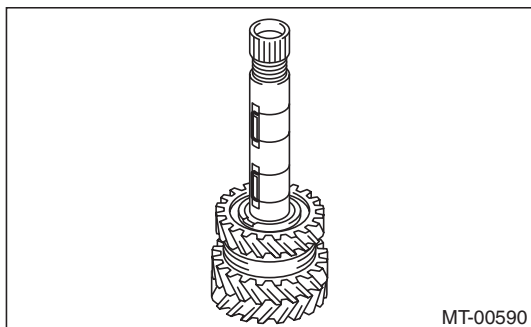
ST1 18723AA000 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

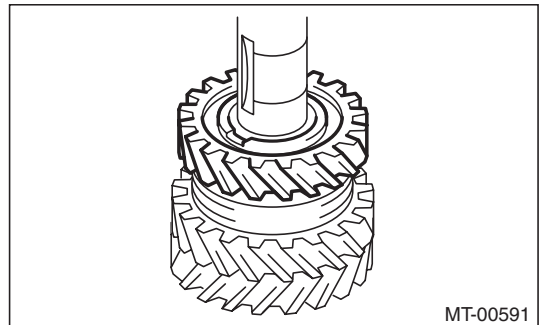


(A) 3rd-4th driven gear

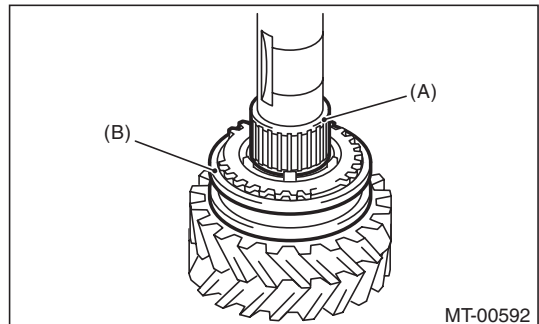
6) Remove the driven gear key.



7) Remove the 2nd gear.



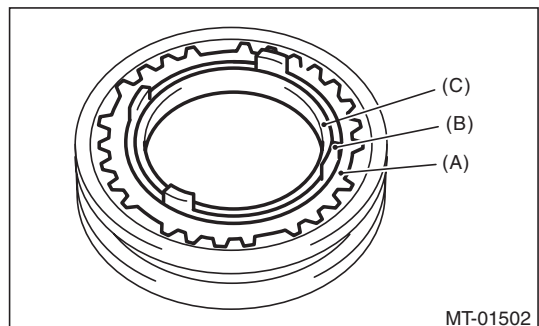
8) Remove the needle bearing and 1st-2nd sleeve.



(A) Needle bearing

(B) 1st-2nd sleeve

9) Remove the outer baulk ring, 2nd synchro cone and inner baulk ring.



(A) Outer baulk ring

(B) 2nd synchro cone

(C) Inner baulk ring

6MT-80

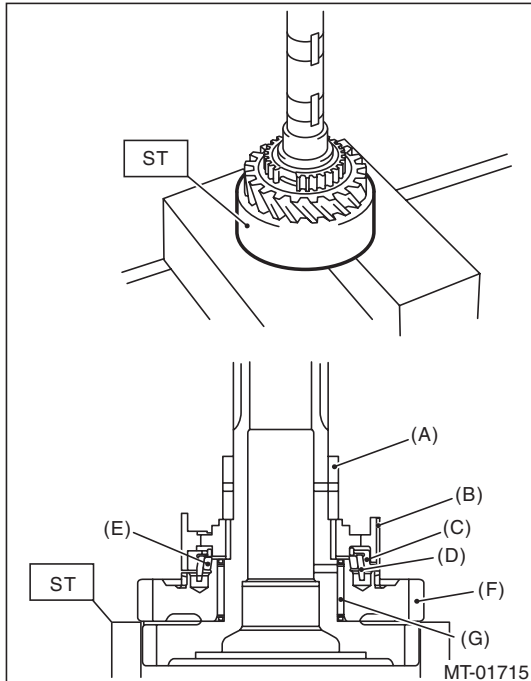
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Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

10) Using the ST, remove individual parts.

ST 18754AA000 REMOVER



- (A) 2nd bushing
- (B) 1st-2nd hub
- (C) Outer baulk ring
- (D) 1st synchro cone
- (E) Inner baulk ring
- (F) 1st driven gear
- (G) 1st needle bearing

D: ASSEMBLY

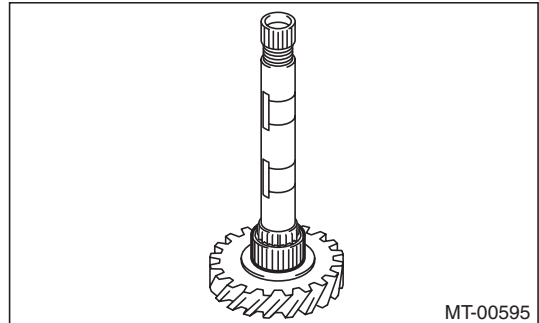
NOTE:

When replacing the following parts, replace as a set.

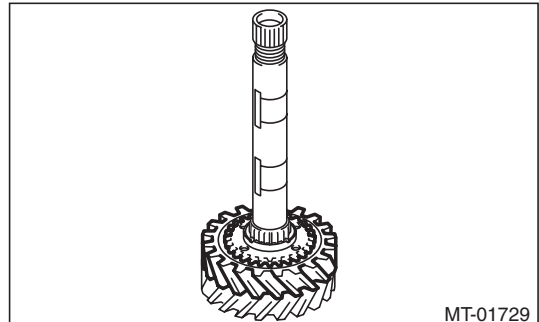
- Sleeve and hub
- Outer baulk ring, 1st synchro cone and inner baulk ring
- Outer baulk ring, 2nd synchro cone and inner baulk ring

1) Apply adequate transmission gear oil to the main shaft, 1st needle bearing and 1st driven gear inner surface.

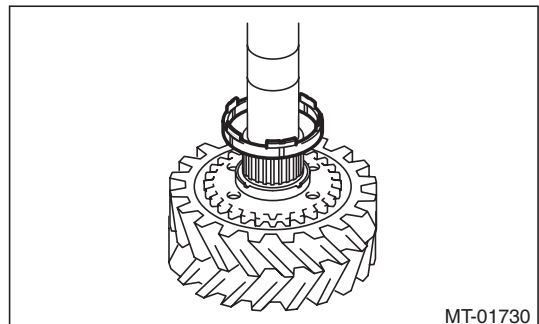
2) Install the 1st needle bearing.



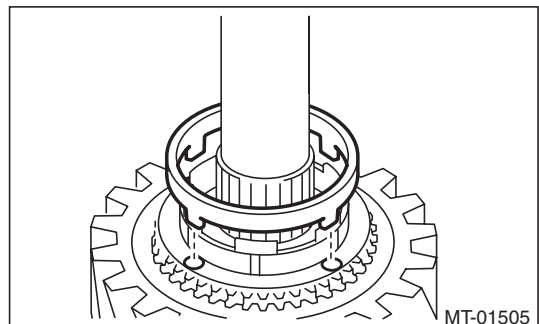
3) Attach the 1st driven gear to the driven shaft.



4) Install the inner baulk ring.



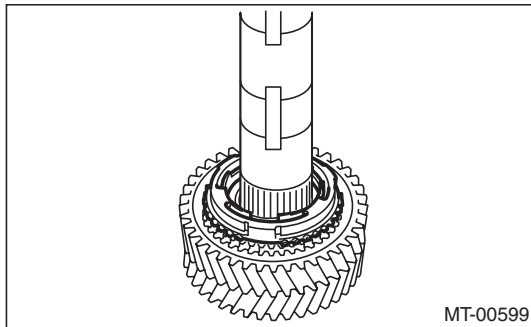
5) Match the protrusion of the 1st synchro cone to the hole of the 1st driven gear, then install.



Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

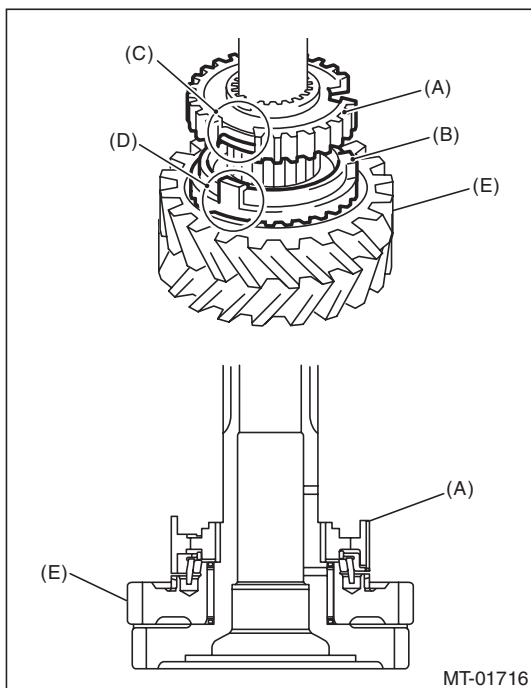
6) Install the outer baulk ring.



7) Install the 1st-2nd hub.

NOTE:

- Match the cut out of the 1st-2nd hub with the protrusion on the outer baulk ring, then install.
- Make sure that the 1st-2nd hub is installed in the correct direction.



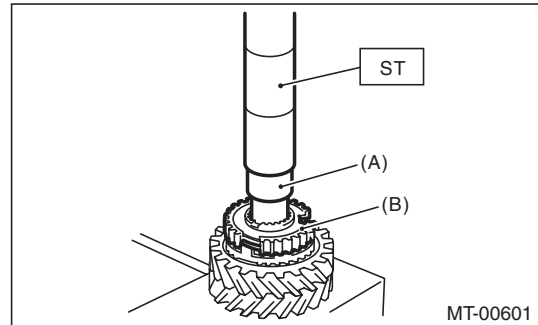
- (A) 1st-2nd hub
- (B) Outer baulk ring
- (C) 1st-2nd hub cut out section
- (D) Protrusion of the outer baulk ring
- (E) 1st driven gear

8) Using the ST, install the 1st-2nd hub and 2nd bush.

ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).



- (A) 2nd bushing
- (B) 1st-2nd hub

9) Make sure that the 1st driven gear can be turned smoothly by hand. If it does not turn smoothly, re-assemble.

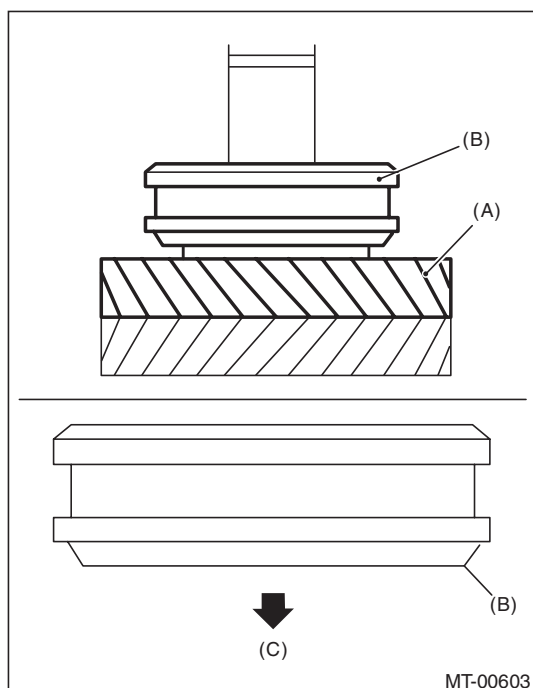
10) Attach the 1st-2nd sleeve to the 1st-2nd hub.

NOTE:

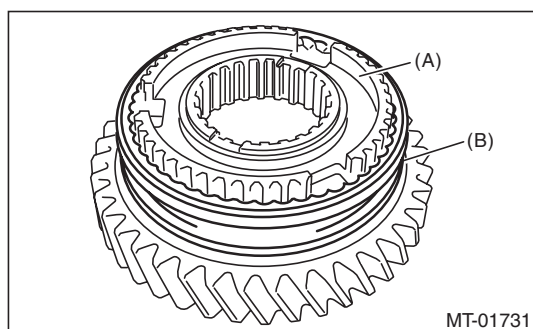
- Make sure that the 1st-2nd sleeve is installed in the correct direction.
- Align the 1st-2nd hub cut out section (three places) and the key grooves (three places) of shifting insert key that are located inside the 1st-2nd sleeve.
- Set the 1st-2nd sleeve and 1st driven gear so that they contact each other.

Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL



- (A) 1st driven gear
- (B) 1st-2nd sleeve
- (C) 1st driven gear side

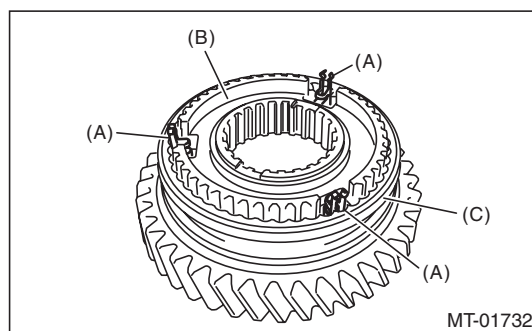


- (A) 1st-2nd hub
- (B) 1st-2nd sleeve

11) Attach the shifting insert key to the appropriate position of the 1st-2nd sleeve.

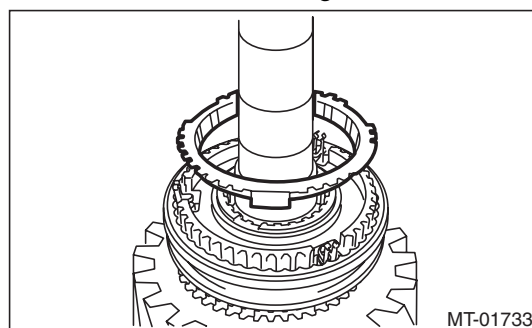
NOTE:

- The location angle of each shifting insert key is 120°.
- Install the shifting insert key to the key grooves (three places) of shifting insert key that are located inside the 1st-2nd sleeve.

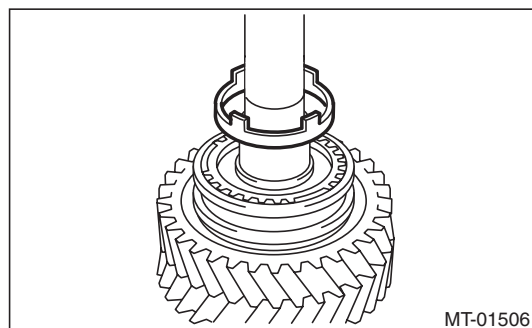


- (A) Shifting insert key
- (B) 1st-2nd hub
- (C) 1st-2nd sleeve

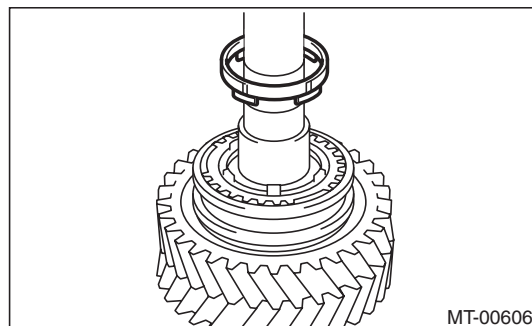
12) Install the outer baulk ring.



13) Install the 2nd synchro cone.



14) Install the inner baulk ring.



15) Apply adequate transmission gear oil to the bushing, 2nd needle bearing and 2nd driven gear inner surface.

6MT-83

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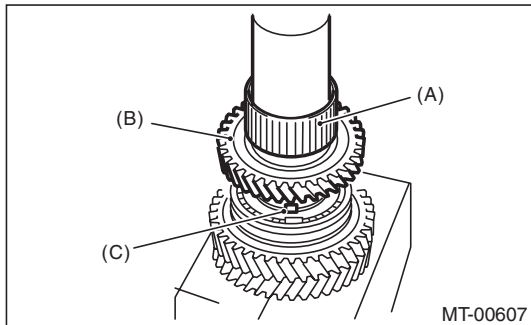
Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

16) Install the 2nd needle bearing and 2nd driven gear.

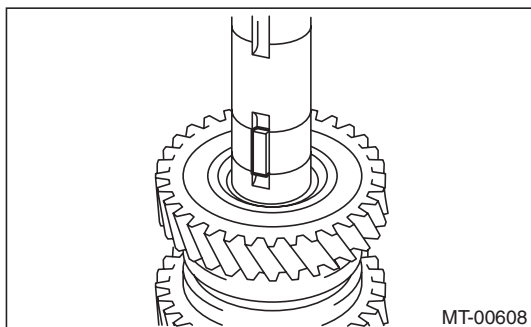
NOTE:

Match the protrusion of the 2nd synchro cone to the hole of the 2nd driven gear, then install.



- (A) 2nd needle bearing
- (B) 2nd driven gear
- (C) Protrusion of the 2nd synchro cone

17) Attach the key.



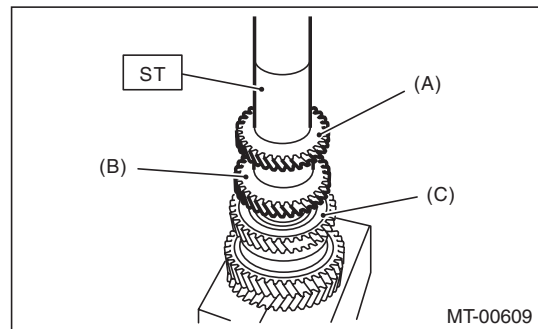
18) Using the ST, install the 3rd-4th driven gear.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

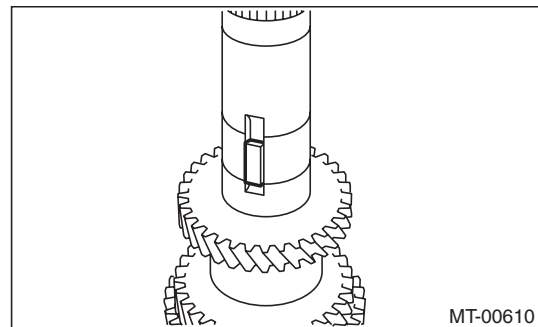
- Make sure that the 3rd-4th driven gear is installed in the correct direction.
- Match the groove on the 3rd-4th driven gear to the key.



- (A) 4th gear
- (B) 3rd gear
- (C) 2nd gear

19) Make sure that the 2nd driven gear can be turned smoothly by hand. If it does not turn smoothly, reassemble.

20) Attach the key.



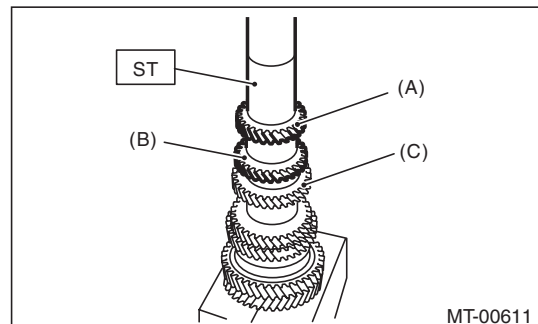
21) Using the ST, install the 5th-6th driven gear.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

- Make sure that the 5th-6th driven gear is installed in the correct direction.
- Match the groove on the 5th-6th driven gear to the key.



- (A) 6th gear
- (B) 5th gear
- (C) 4th gear

Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

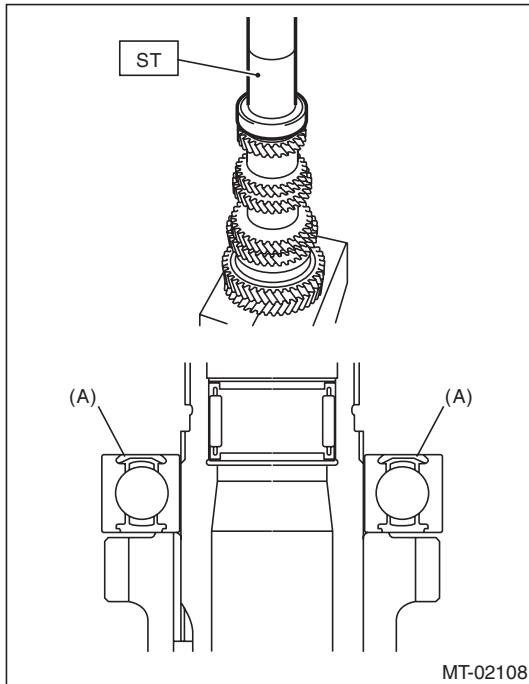
22) Using the ST, install the ball bearing.
ST 18654AA000 INSTALLER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

Face the sealing section of the ball bearing to the lock nut side, and install the ball bearing.



(A) Sealing

23) Make sure that the ball bearing turns smoothly by hand. If it does not turn smoothly, reassemble.

24) Install a new lock nut.

25) Attach ST3 to the lock nut, attach ST to the driven gear assembly, and tighten the lock nut.

ST1 18666AA000 HOLDER

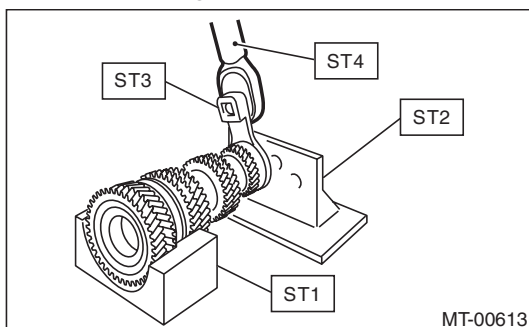
ST2 18664AA000 BASE

ST3 18620AA000 ADAPTER WRENCH

ST4 18852AA000 TORQUE WRENCH

Tightening torque:

530 N·m (54.0 kgf-m, 390.9 ft-lb)

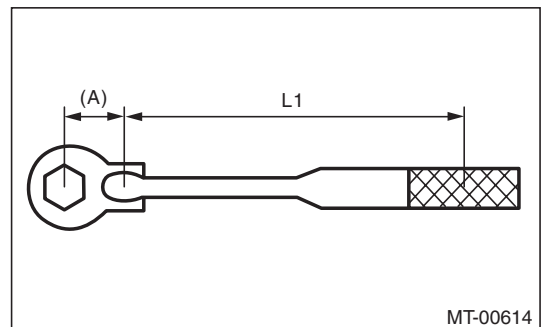


NOTE:

When using a torque wrench other than ST4, use the calculation below to calculate and tighten the lock nut.

$$T = L1 / (0.1 + L1) \times 570$$

T	N·m (kgf-m, ft-lb)	Torque wrench setting
L1	m (in)	Torque wrench length
0.1 m (3.94 in)		Length of ST
570 N·m (58.1 kgf-m, 420 ft-lb)		Tightening torque (lock nut)



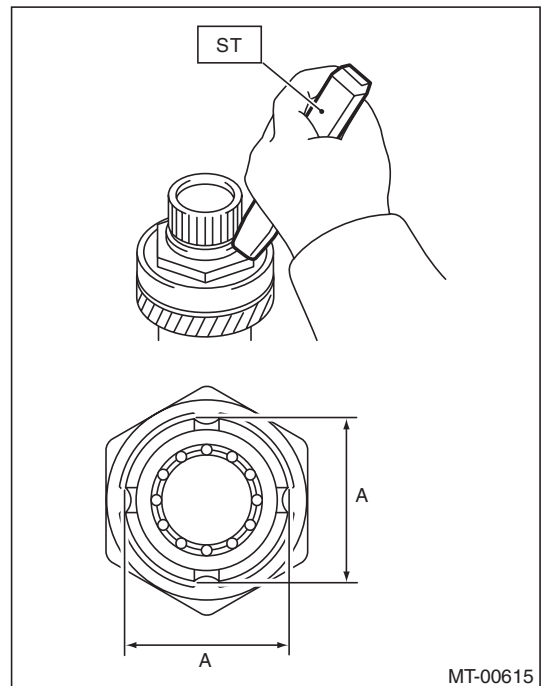
(A) 0.1 m (3.94 in)

26) Using the ST, crimp the lock nut in 4 locations, with dimensions within A 44±0.5 mm (1.73±0.02 in).

ST 18669AA000 PUNCH DRIVEN SHAFT

NOTE:

Do not damage the crimp area of the lock nut.



Driven Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- Wear, rusting or damage of the bearings
- The bearing does not rotate smoothly or an abnormal noise is emitted when turning.
- The bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- The sliding surface is damaged or abnormally worn.

3) Gear

Replace gears in the following cases.

- The gear teeth surface is damaged or excessively worn.
- The contact area of the baulk ring is damaged.
- The inner face of the gear is worn.

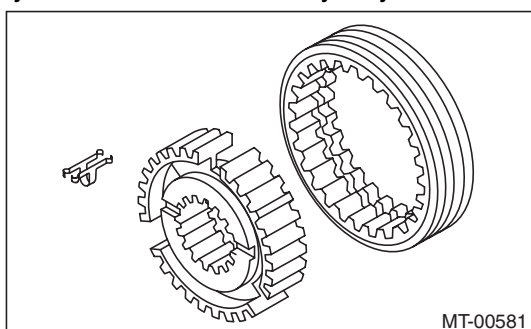
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following cases.

- Wear, rusting or damage of the baulk ring

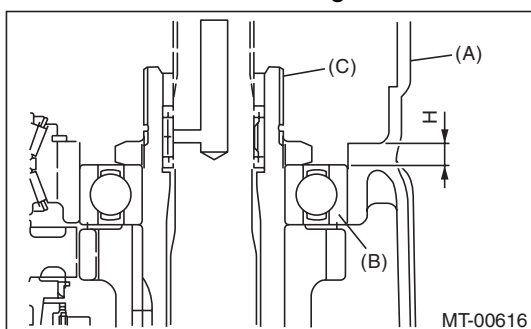
5) Shifting insert key

Replace the shifting insert key if deformed, excessively worn or defective in any way.



F: ADJUSTMENT

1) Measure the length "H" from the transmission case and transfer bearing holder mating surface, to the end face of the ball bearing.



- (A) Transmission case
(B) Ball bearing
(C) Driven gear ASSY

2) Using the following calculation, calculate the thickness of the driven gear assembly washer.

$$T = H - \{5.8 \pm 0.05 \text{ mm (0.23} \pm 0.002 \text{ in)}\} - \{0.1 - 0.3 \text{ mm (0.0039} - 0.0118 \text{ in)}\}$$

T	Washer thickness
H	Length from the transmission case and transfer bearing holder mating surface to the end face of the ball bearing
5.8±0.05 mm (0.23±0.002 in)	Collar thickness
0.1 — 0.3 mm (0.0039 — 0.0118 in)	Driven gear assembly axial direction backlash standard

3) Select 0 to 3 washers from the following table, and adjust to the backlash that is closest to the standard value.

Driven gear assembly axial direction backlash standard:

0.1 — 0.3 mm (0.0039 — 0.0118 in)

Washer	
Part No.	Thickness T mm (in)
803072030	0.15 (0.0059)
803072031	0.30 (0.0118)
803072032	0.45 (0.0177)
803072033	0.60 (0.0236)

Reverse Idler Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

19.Reverse Idler Gear Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the reverse idler gear assembly. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

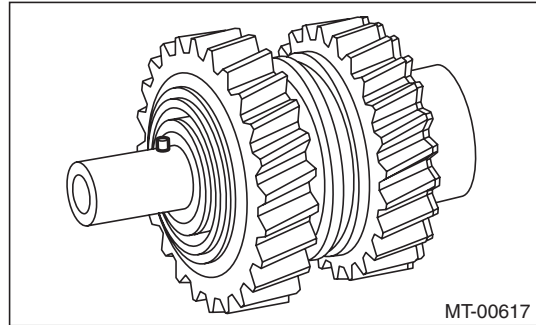
- 1) Select the reverse fork rod. <Ref. to 6MT-109, ADJUSTMENT, Shifter Fork and Rod.>
- 2) Install the reverse idler gear assembly. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>
- 3) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>
- 4) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>
- 5) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 6) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 7) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>
- 8) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

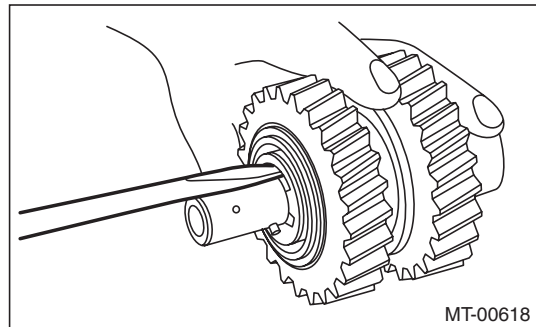
NOTE:

Sleeves and reverse gears meet at a specified position. Before disassembly, mark the meeting position of the sleeve and hub.

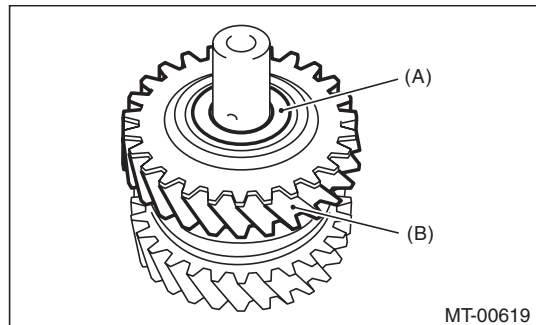
- 1) Remove the spring pin.



- 2) Remove the snap ring and washer.



- 3) Remove the counter high & low washer and reverse idler gear.

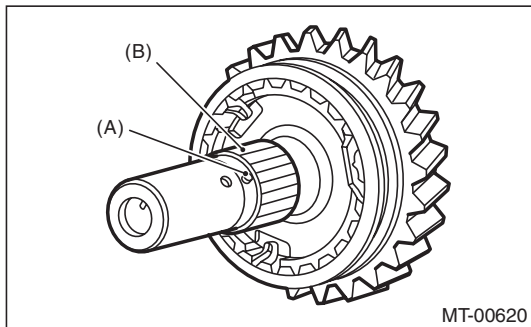


- (A) Counter high and low washer
(B) Reverse idler gear

Reverse Idler Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

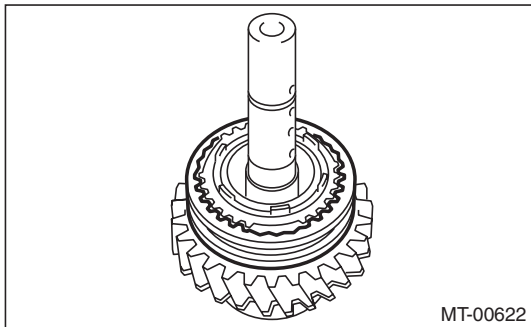
4) Remove the knock pin and reverse idler gear needle bearing.



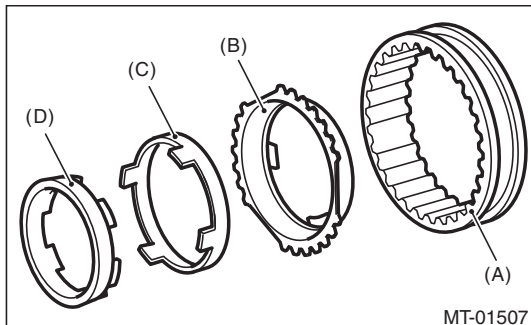
- (A) Knock pin
- (B) Reverse idler gear needle bearing

5) Remove the collar.

6) Remove the reverse sleeve.

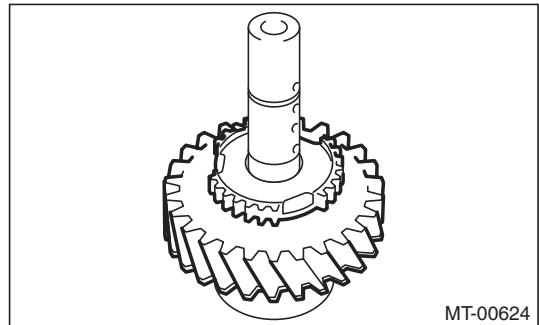


7) Remove the outer baulk ring, reverse synchro cone and inner baulk ring from the reverse sleeve.

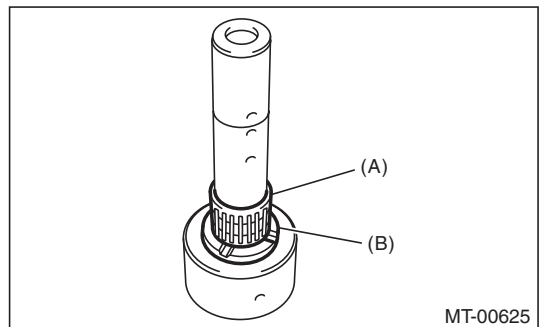


- (A) Reverse sleeve
- (B) Outer baulk ring
- (C) Reverse synchro cone
- (D) Inner baulk ring

8) Remove reverse idler gear No. 2.

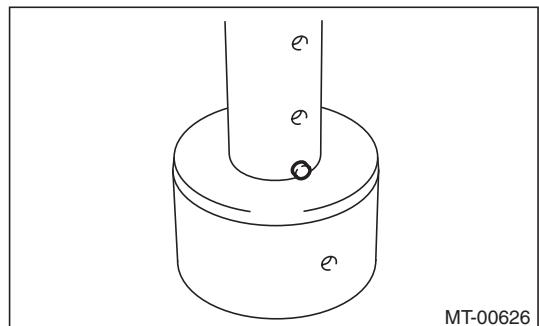


9) Remove the counter high & low washer and needle bearing.

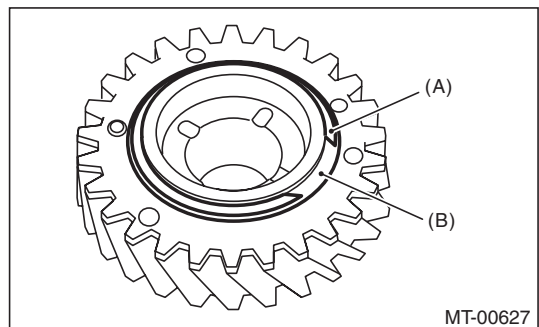


- (A) Needle bearing
- (B) Counter high and low washer

10) Remove the knock pin.



11) Remove the snap ring and friction plate from reverse gear.

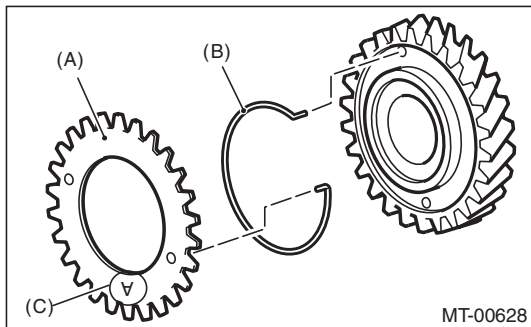


- (A) Snap ring
- (B) Friction plate

Reverse Idler Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Remove the sub gear and spring.



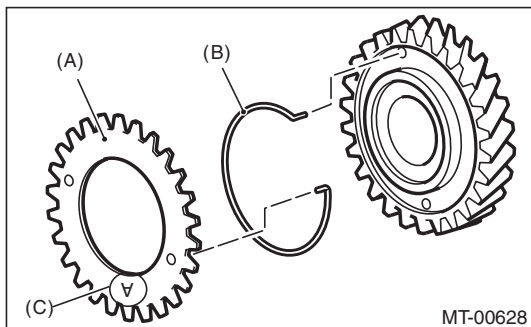
- (A) Sub gear
- (B) Spring
- (C) Stamp (marking A)

D: ASSEMBLY

1) Attach the sub gear and spring.

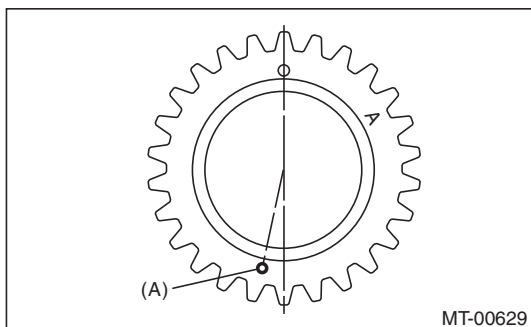
NOTE:

- Turn the white marking on the hook section towards the sub gear side, and attach the spring.
- Point the stamp (marking A) towards the outside, and install the sub gear.



- (A) Sub gear
- (B) Spring
- (C) Stamp (marking A)

- While paying attention to the direction of the sub gear attachment hole, attach the spring and sub gear.

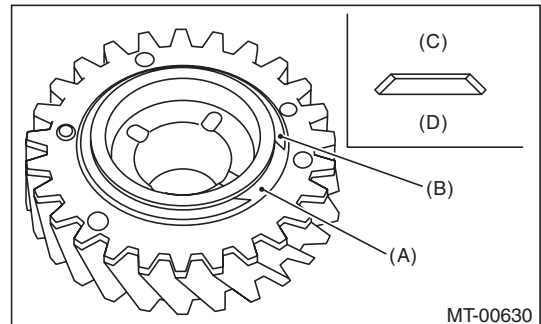


- (A) Attachment hole

2) Install the friction plate and snap ring.

NOTE:

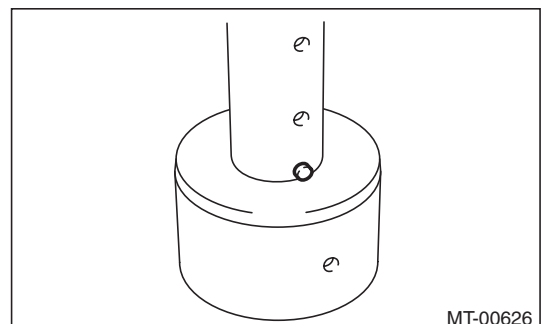
Confirm that the friction plate is installed in the proper direction.



- (A) Friction plate
- (B) Snap ring
- (C) Snap ring side
- (D) Sub gear side

3) Apply adequate transmission gear oil to the shaft, needle bearing and reverse drive gear inner surface.

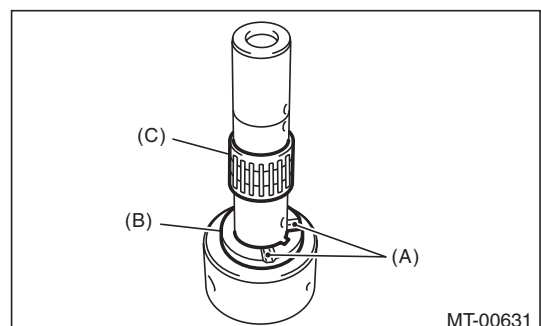
4) Install the knock pin.



5) Install the counter high & low washer and needle bearing.

NOTE:

Point the groove towards the reverse idler gear, and attach the washer.



- (A) Groove
- (B) Counter high and low washer
- (C) Needle bearing

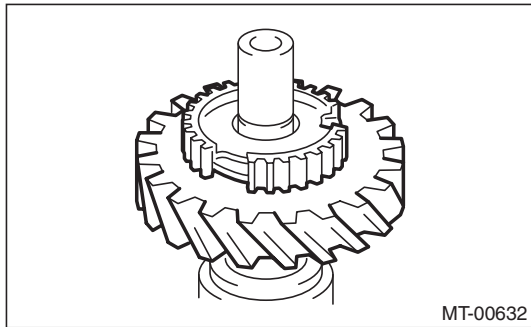
6MT-89

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Reverse Idler Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

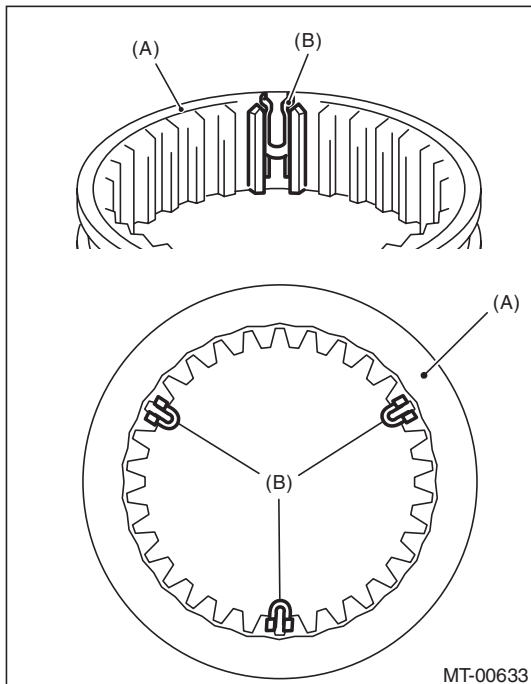
6) Install the reverse idler gear No. 2.



7) Attach the shifting insert key to the appropriate location of the reverse sleeve.

NOTE:

- The location angle of each shifting insert key is 120°.
- Refer to the following figure to install the shifting insert key.

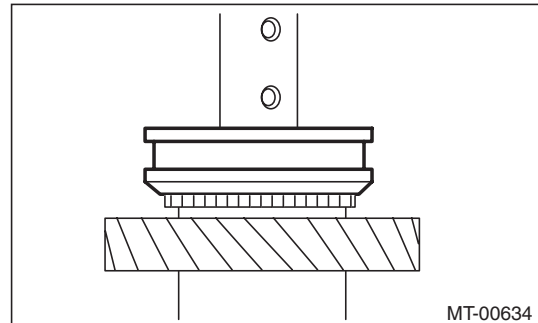


- (A) Reverse sleeve
(B) Shifting insert key

8) Attach the reverse sleeve to the reverse idler gear No. 2.

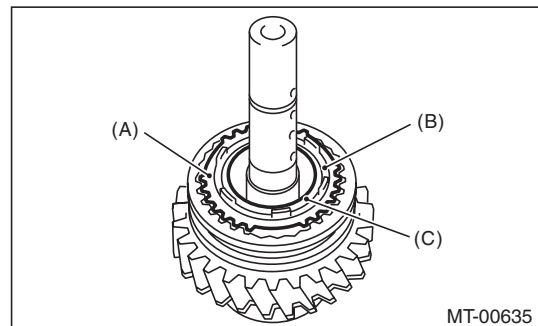
NOTE:

Confirm that the reverse sleeve is installed in the proper direction.



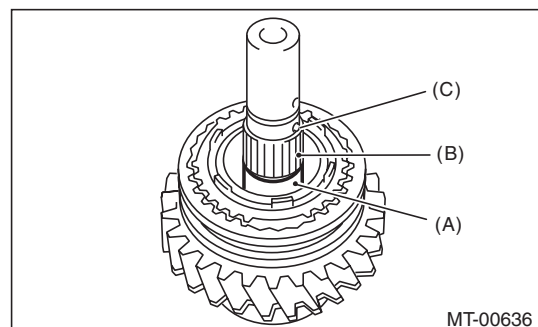
9) Apply adequate transmission gear oil to the collar, needle bearing and reverse drive gear inner surface.

10) Install the outer baulk ring, reverse synchro cone and inner baulk ring.



- (A) Outer baulk ring
(B) Reverse synchro cone
(C) Inner baulk ring

11) Install the collar and needle bearing, then the knock pin.

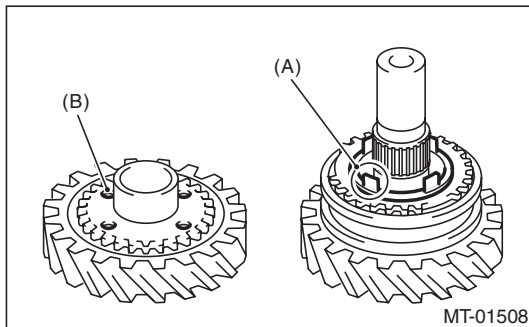


- (A) Collar
(B) Needle bearing
(C) Knock pin

Reverse Idler Gear Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

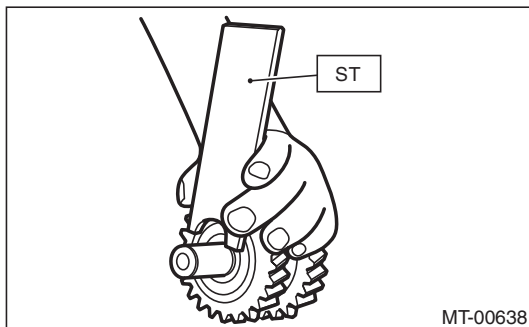
12) Match the protrusion of the reverse synchro cone to the hole on the reverse idler gear, and install the reverse idler gear.



- (A) Protrusion on the reverse synchro cone
(B) Hole of the reverse idler gear

13) Point the groove towards the reverse idler gear, and attach the counter high & low washer and the washer.

14) Using the ST, install the snap ring.
ST 18672AA000 GUIDE CLIP



15) Inspect and adjust the clearance between the snap ring and the washer. <Ref. to 6MT-91, INSPECTION, Reverse Idler Gear Assembly.>

16) Install a new spring pin.

E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

Replace the bearings in the following cases.

- Wear, rusting or damage of the bearings
- The bearing does not rotate smoothly or an abnormal noise is emitted when turning.
- The bearing has other defects.

2) Bushing (each gear)

Replace the bushing in following cases.

- The sliding surface is damaged or abnormally worn.

3) Gear

Replace gears in the following cases.

- The gear teeth surface is damaged or excessively worn.
- The contact area of the baulk ring is damaged.
- The inner face of the gear is worn.

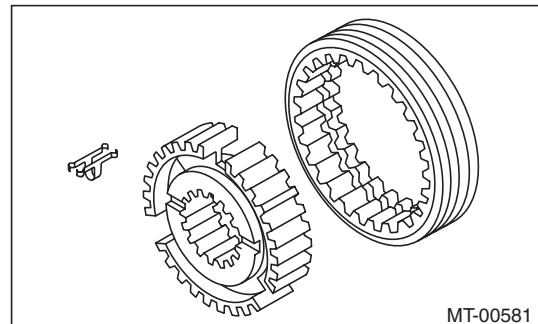
4) Baulk ring, synchro cone

Replace the baulk ring and synchro cone in the following cases.

- Wear, rusting or damage of the baulk ring

5) Shifting insert key

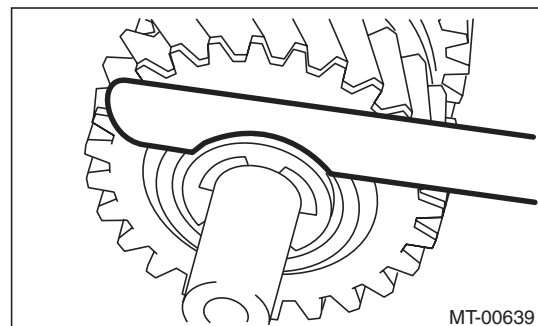
Replace the shifting insert key if deformed, excessively worn or defective in any way.



6) Check clearance between the snap ring and washer.

Clearance specification:

0.1 — 0.3 mm (0.0039 — 0.0118 in)



If the clearance is out of the specification, select a snap ring from the following table and replace it.

Snap ring	
Part No.	Thickness mm (in)
031319000	1.50 (0.059)
805019030	1.60 (0.062)
805019010	1.72 (0.068)

After replacing the snap ring, inspect the clearance.

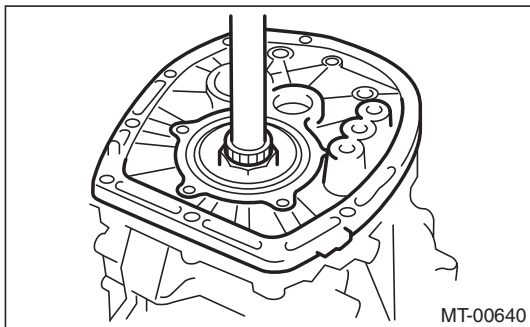
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

20. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the individual gear assemblies. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>
- 9) Remove the drive pinion shaft assembly.

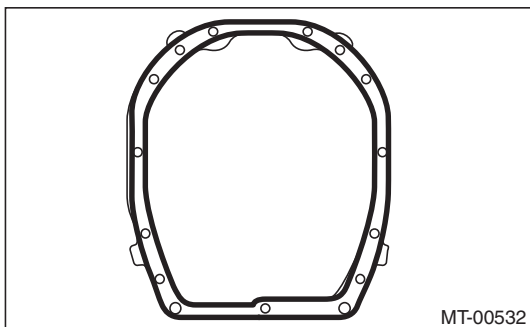


B: INSTALLATION

- 1) Remove any remaining gasket material from the drive plate and clutch housing.
- 2) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



- 3) Install the individual gear assemblies. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>

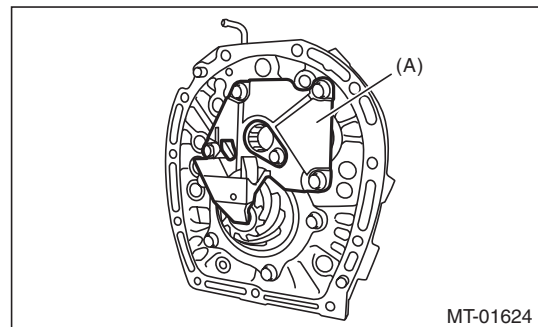
- 4) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>
- 5) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>
- 6) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 7) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 8) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>
- 9) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

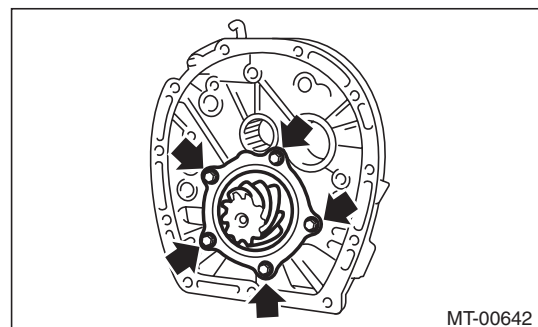
Replace the drive pinion shaft and hypoid driven gear as a set.

- 1) Remove the oil guide A.



(A) Oil guide A

- 2) Remove the drive pinion shaft and shim from the adapter plate.



- 3) Affix the ST to the work table.
ST 18664AA000 BASE
- 4) Flatten the tab of the lock nut.

Drive Pinion Shaft Assembly

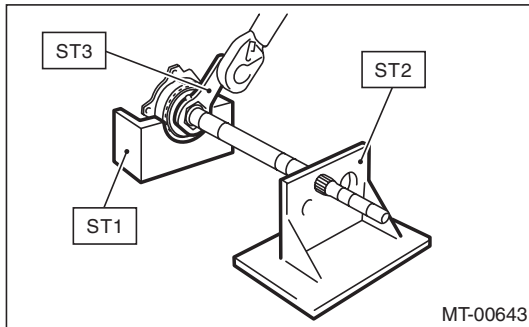
MANUAL TRANSMISSION AND DIFFERENTIAL

5) Attach ST3 to the lock nut, and set the drive pinion shaft to ST. Remove the lock nut and lock washer.

ST1 18667AA000 HOLDER

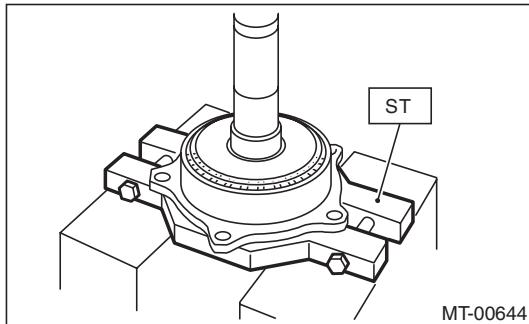
ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH



6) Using the ST, remove the taper roller bearing assembly.

ST 18723AA000 REMOVER



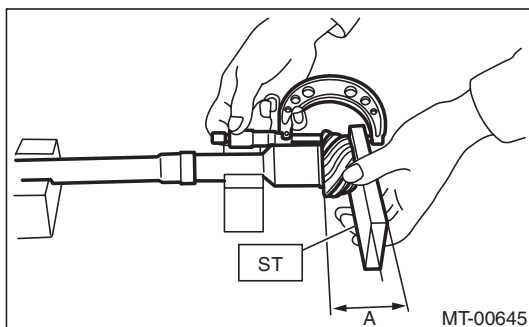
D: ASSEMBLY

1) Using the ST, measure drive pinion measurement A.

NOTE:

When selecting the drive pinion shim, refer to measurement A.

ST 398643600 GAUGE

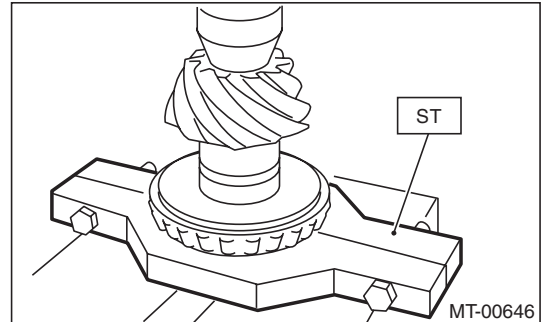


2) Using the ST and a press, attach the inner bearing of the taper roller bearing to the drive pinion shaft.

ST 18723AA000 REMOVER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

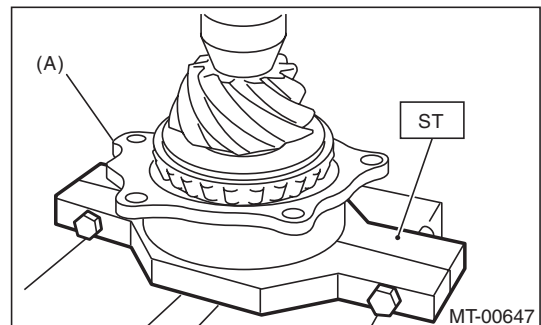


3) Using the ST and a press, attach the outer race and the taper roller bearing to the drive pinion shaft.

ST 18723AA000 REMOVER

NOTE:

Push in to a position where the bearing rotates smoothly.



(A) Outer race

4) Attach a new lock washer and a new lock nut.

5) Set the ST to the drive pinion, and tighten the lock nut.

ST1 18667AA000 HOLDER

ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH

ST4 18852AA000 TORQUE WRENCH

NOTE:

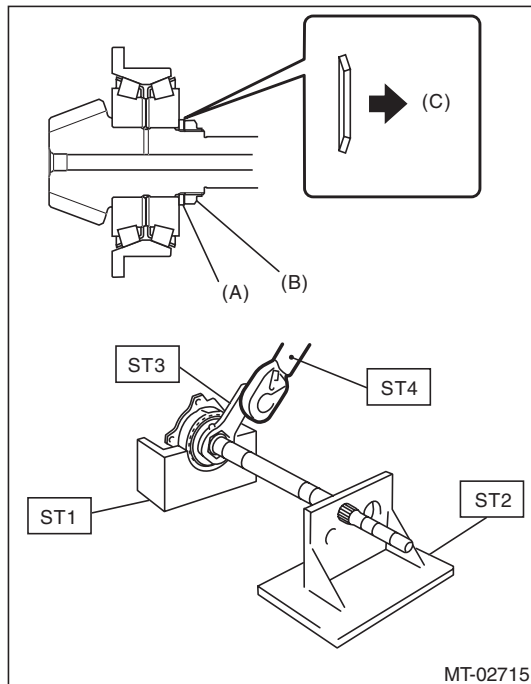
- Tighten using the ST and the straight line torque wrench.
- Make sure the lock washer is installed in the proper direction.

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

Tightening torque:

265 N·m (27.0 kgf-m, 195.4 ft-lb)



- (A) Lock washer
- (B) Lock nut
- (C) Nut side

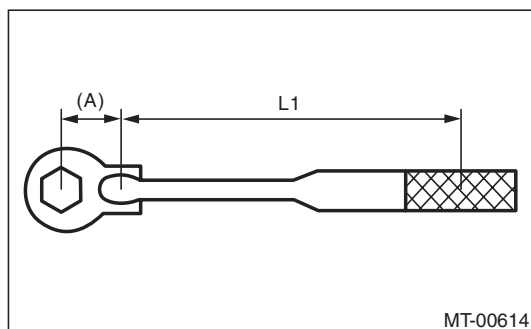
NOTE:

When using a torque wrench other than ST4, use the calculation below to calculate and tighten the lock nut.

Tighten using the ST and the straight line torque wrench.

$$T = L1 / (0.1 + L1) \times 285$$

T	N·m (kgf-m, ft-lb)	Torque wrench setting
L1	m (in)	Torque wrench length
0.1 m (3.94 in)		Length of ST
285 N·m (29.0 kgf-m, 210 ft-lb)		Tightening torque (lock nut)



- (A) 0.1 m (3.94 in)

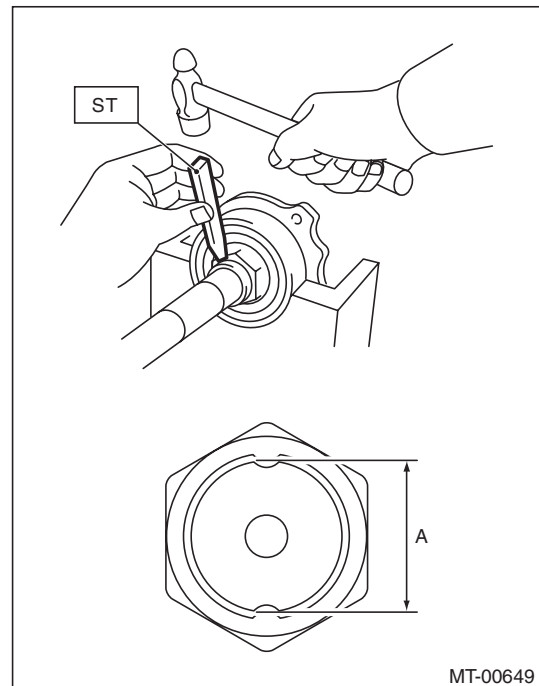
6) Measure the starting torque. <Ref. to 6MT-95, INSPECTION, Drive Pinion Shaft Assembly.>

7) Using the ST, crimp the lock nut in 2 locations, with dimensions within A 37 ± 0.5 mm (1.46 ± 0.02 in).

ST 18670AA000 PUNCH

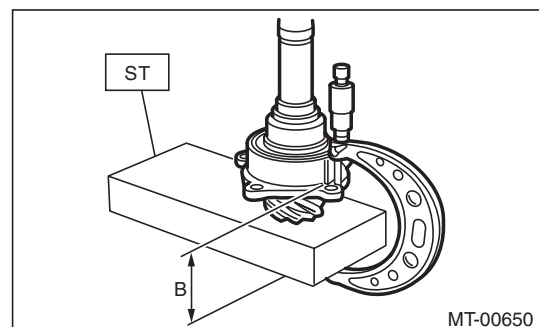
NOTE:

Do not damage the crimp area of the lock nut.



8) Using the ST, measure drive pinion measurement B.

ST 398643600 GAUGE



6MT-94

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Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Calculate from the calculation below to select 1 or 2 drive pinion shims from the following table.
 $6.5 \pm 0.0625 \text{ mm} - (B - A)$ [$0.26 \pm 0.0025 \text{ in} - (B - A)$]

NOTE:

A: Measurement value in step 1)

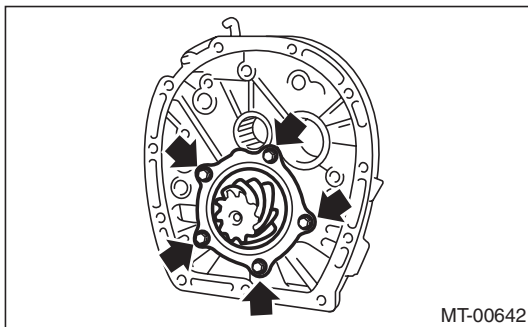
B: Measurement value in step 8)

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA270	0.15 (0.0059)
32295AA280	0.175 (0.0069)
32295AA290	0.20 (0.0079)
32295AA300	0.225 (0.0089)
32295AA310	0.25 (0.0098)
32295AA320	0.275 (0.0108)

10) Apply transmission gear oil to the side face of the taper roller bearing, and attach the drive pinion shaft and the selected shims to the adapter plate.

Tightening torque:

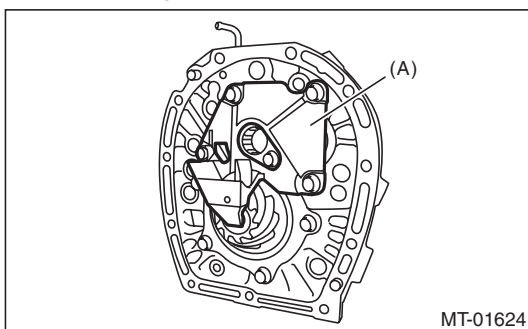
54 N·m (5.5 kgf-m, 39.8 ft-lb)



11) Install the oil guide A.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



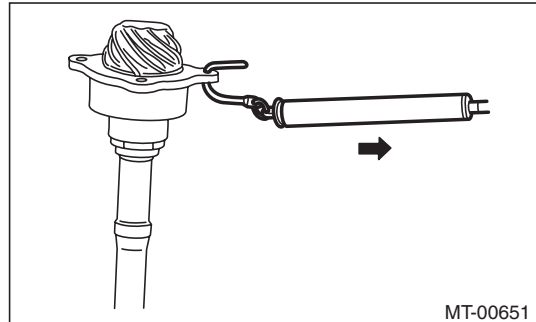
(A) Oil guide A

E: INSPECTION

1) Using a spring scale, measure the starting torque. If the starting torque is outside the specification range, replace the taper roller bearing.

Starting torque:

0 — 0.95 N (0 — 0.097 kgf, 0 — 0.21 lbf)



2) Gear

Replace gears in the following cases.

- The gear teeth surface is damaged or excessively worn.

3) Bearing

Replace the bearings in the following cases.

- Wear, rusting or damage of the bearings
- The bearing does not rotate smoothly or an abnormal noise is emitted when turning.

4) Adapter plate

Replace the adapter plate in the following cases:

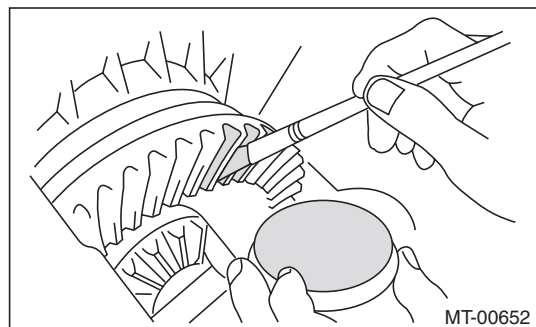
- Wear, rusting or damage of the bearings
- Damage of the adapter plate

5) Check that the pipes and pipe chambers are not damaged or clogged. Repair or replace if damaged or clogged.

F: ADJUSTMENT

1) Inspect and adjust the hypoid driven gear-to-drive pinion backlash. <Ref. to 6MT-102, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2) Apply a thin uniform coat of lead-free red dye on the surfaces of 3 or 4 hypoid driven gear teeth.



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the drive pinion shaft assembly to the clutch housing, and tighten at least 4 bolts.

NOTE:

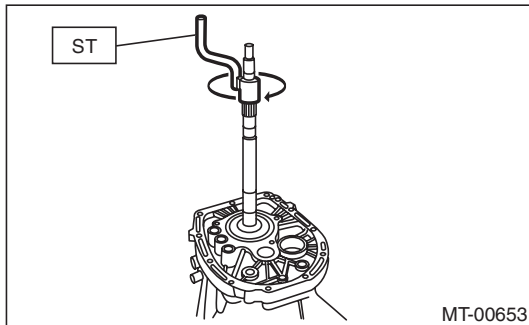
Install with the remaining liquid gasket, so that the clutch housing and the adapter plate will not be damaged.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

4) Turn a few times using the ST.

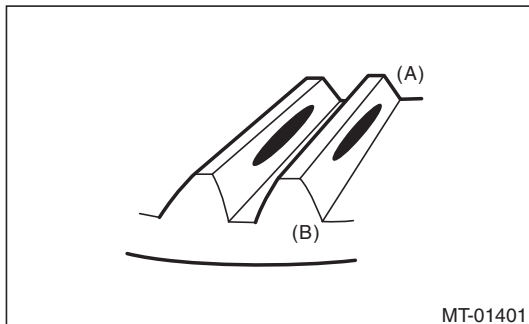
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and inspect the mating condition of the teeth. If the tooth contact is not correct, adjust the backlash or shim thickness.

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

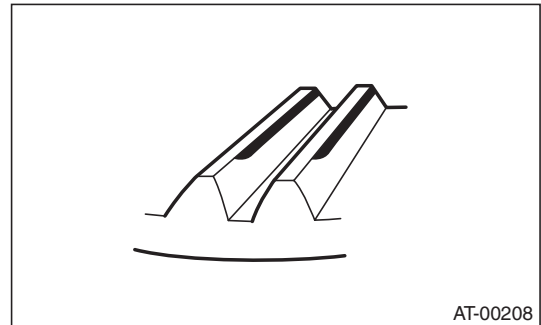


- (A) Toe side
(B) Heel side

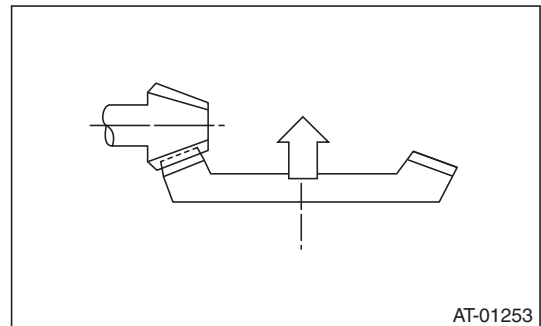
- Face contact

Check item: Backlash is too large.

Contact pattern



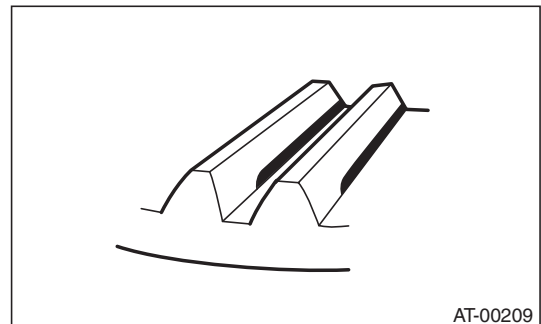
Corrective action: Tighten the side retainer to move the driven gear closer to the drive pinion shaft.



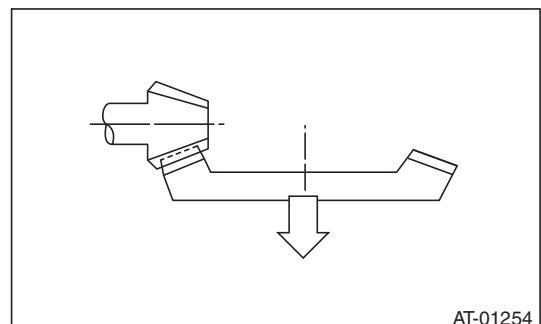
- Flank contact

Check item: Backlash is too small.

Contact pattern



Corrective action: Loosen the side retainer to move the driven gear away from the drive pinion shaft.



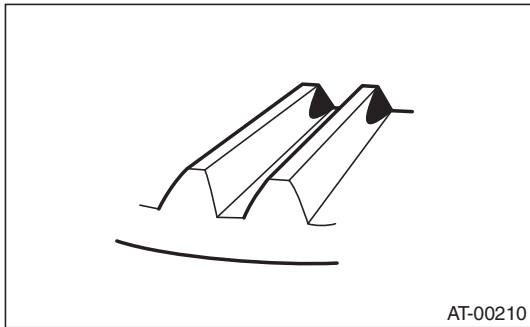
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

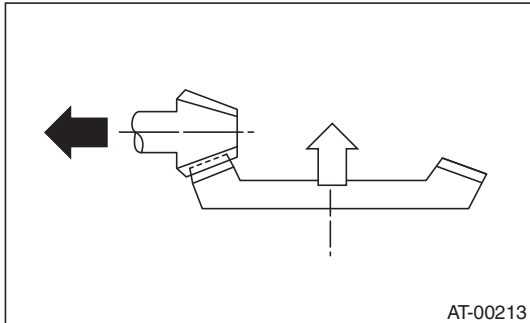
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



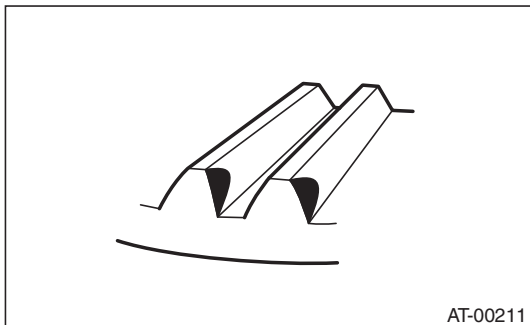
Adjustment: Reduce the thickness of the drive pinion shim according to the procedure for moving the drive pinion away from the driven gear.



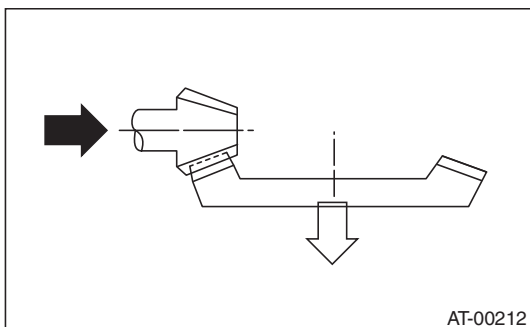
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Adjustment: Increase thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the driven gear.



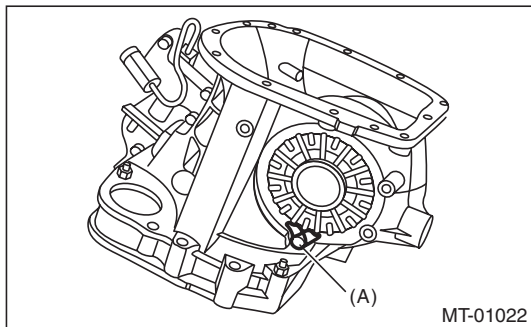
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

21. Front Differential Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the individual gear assemblies. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>
- 9) Remove the drive pinion shaft assembly. <Ref. to 6MT-92, REMOVAL, Drive Pinion Shaft Assembly.>
- 10) Remove the lock plates on both sides.



(A) Lock plate

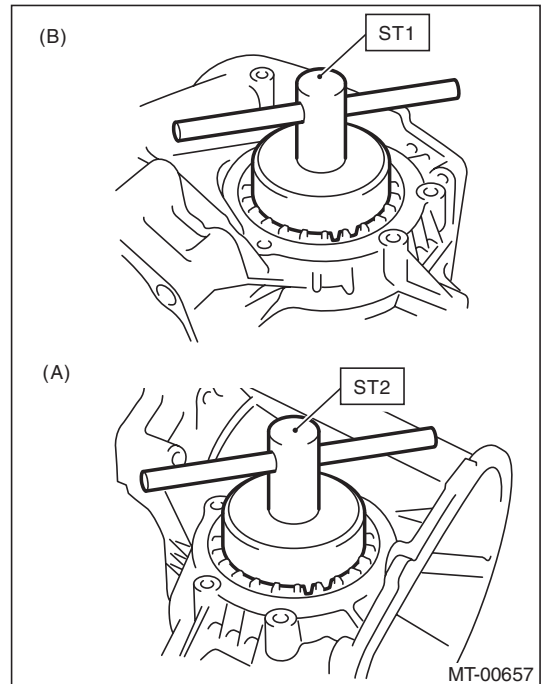
- 11) Remove the differential side retainers on both sides using the ST.

ST1 18630AA010 WRENCH COMPL RETAINER (RH SIDE)

ST2 18630AA000 WRENCH ASSY (LH SIDE)

NOTE:

Be careful not to damage the section where the clutch case retainer will be attached.



(A) LH side

(B) RH side

- 12) Remove the front differential.

B: INSTALLATION

- 1) Install the differential assembly to the clutch housing.
- 2) Apply oil to the screw threads of the side retainer.
- 3) Remove the O-rings on both sides of the side retainer.
- 4) Install the differential side retainers to both sides, using the ST.

ST1 18630AA010 WRENCH COMPL RETAINER (RH SIDE)

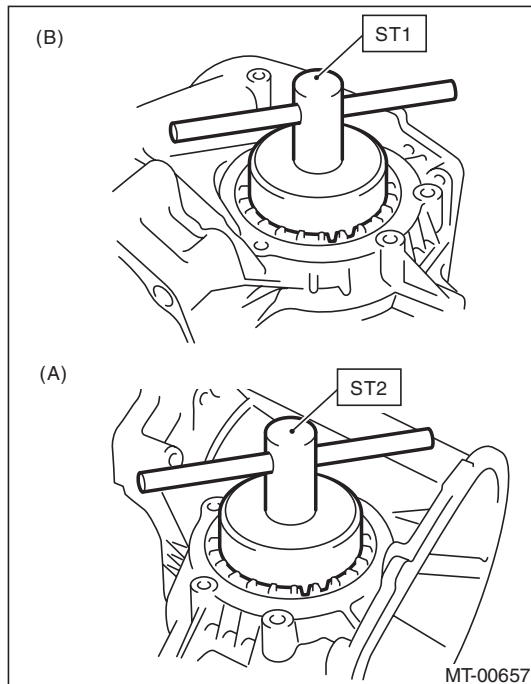
ST2 18630AA000 WRENCH ASSY (LH SIDE)

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Be careful not to damage the oil seal.



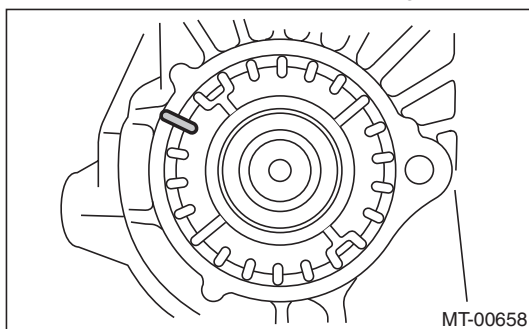
(A) LH side

(B) RH side

5) Inspect and adjust the hypoid gear backlash. <Ref. to 6MT-102, HYPOID GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

6) Inspect and adjust the tooth contact. <Ref. to 6MT-95, ADJUSTMENT, Drive Pinion Shaft Assembly.>

7) Mark the mating positions of the left and right side retainers and the clutch housing.



8) Remove the differential side retainers from both sides.

NOTE:

When removing the side retainer, record how many times it was turned to remove.

9) Install new O-rings to the side retainers on both sides.

10) Attach the differential side retainers to both sides.

NOTE:

When attaching, turn the side retainer the same number of turns it took to remove, and align the marks.

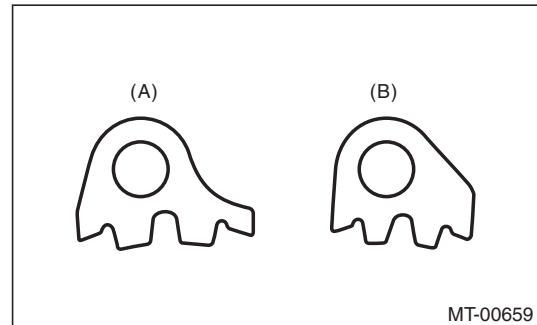
11) Install the lock plate.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

NOTE:

Be careful not to confuse the left and right side lock plates.



(A) LH

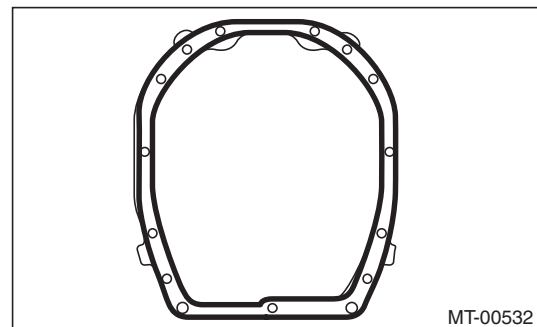
(B) RH

12) Remove any remaining liquid gasket from the clutch housing and adapter plate.

13) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



14) Install the drive pinion shaft assembly. <Ref. to 6MT-92, INSTALLATION, Drive Pinion Shaft Assembly.>

15) Install the individual gear assemblies all at once. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>

16) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>

17) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>

18) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>

19) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>

6MT-99

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Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

20) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>

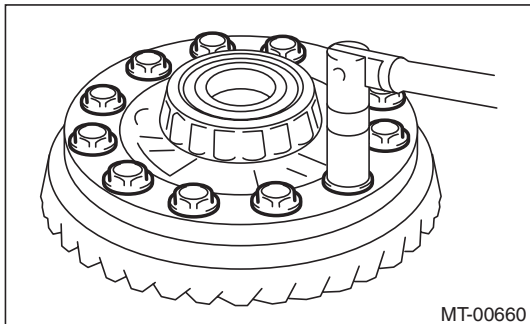
21) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

1. DIFFERENTIAL CASE

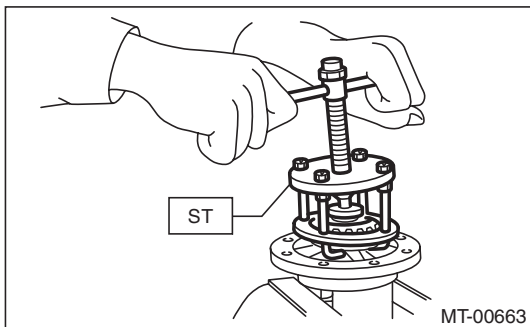
1) Fix the differential assembly on a vice, and remove the hypoid driven gear.

ST 18270KA020 SOCKET (E20)



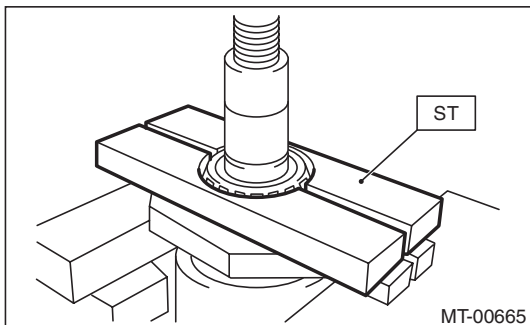
2) Remove the side bearing of the hypoid driven gear using the ST.

ST 399527700 PULLER SET



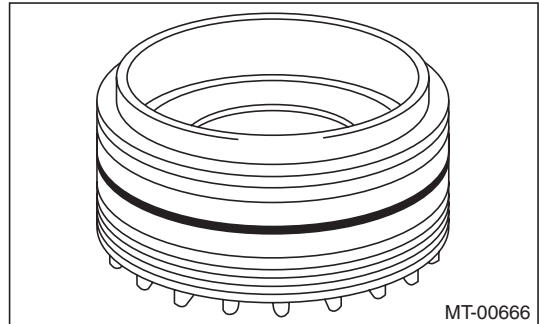
3) Using the ST, remove the roller bearing.

ST 498077000 REMOVER

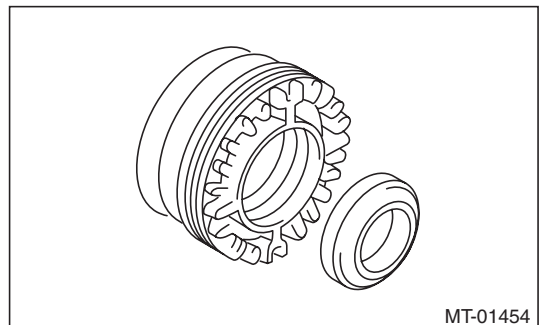


2. SIDE RETAINER

1) Remove the O-ring.



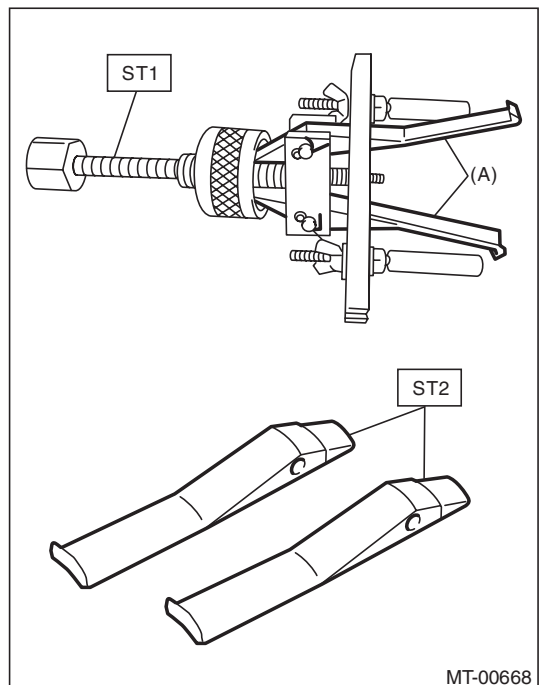
2) Remove the oil seal.



3) Remove the claw of ST1, and attach the claw of ST2.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



(A) CLAW

6MT-100

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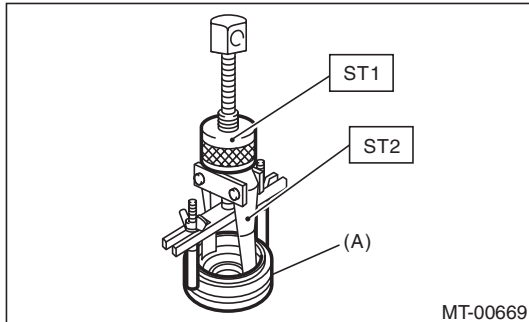
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Remove the bearing outer race from the side retainer, using the ST.

ST1 398527700 PULLER ASSY

ST2 18760AA000 CLAW



(A) Side retainer

D: ASSEMBLY

1. DIFFERENTIAL CASE

1) Use the ST to attach the RH and LH bearing inner races to the differential case.

ST1 398437700 INSTALLER

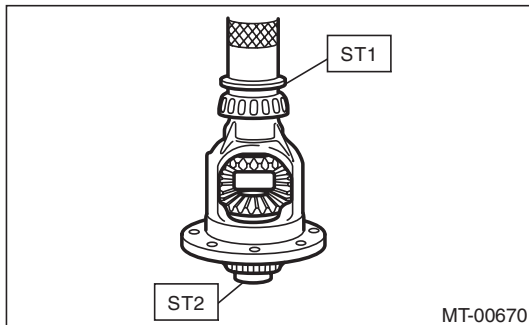
ST2 398497701 SEAT

CAUTION:

Do not apply pressure in excess of 20 kN (2.0 ton, 2.2 US ton, 2.0 Imp ton).

NOTE:

Always replace inner races and outer races as a set.

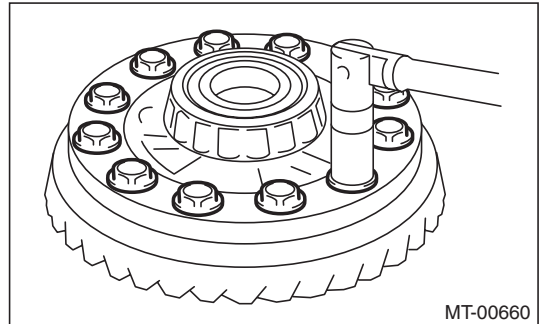


2) Attach the hypoid driven gear to the differential case.

ST 18270KA020 SOCKET (E20)

Tightening torque:

69 N·m (7.0 kgf-m, 50.9 ft-lb)



2. SIDE RETAINER

NOTE:

Install the oil seal and O-ring of side retainer after the adjustment of backlash and tooth contact.

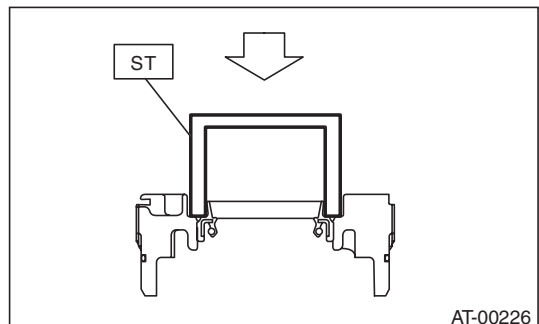
1) Install the bearing outer race to side retainer.

2) Using the ST, install the oil seal.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:

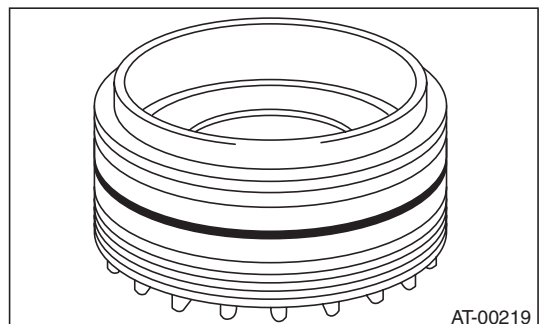
- Use a new oil seal.
- Apply oil to the oil seal lips.



3) Install the O-ring.

NOTE:

Use new O-rings.



Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

Repair or replace the differential in the following cases:

- If gears are damaged, seized, or are excessively worn.
- If differential case sliding surfaces are damaged, seized, or are excessively worn.
- If there is damage, rust or wear in the bearings or bearing locations.
- If the bearing does not rotate smoothly or an abnormal noise is emitted when turning.

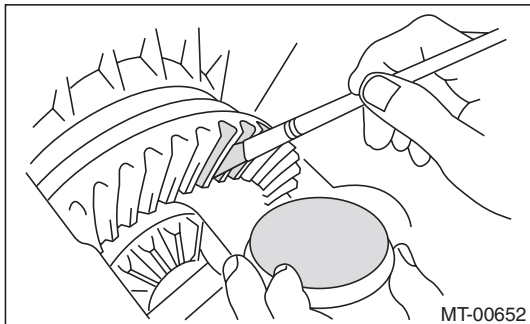
1. HYPOID GEAR BACKLASH

Inspect the hypoid gear backlash. Adjust if out of standard. <Ref. to 6MT-102, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2. TOOTH CONTACT OF HYPOID GEAR

1) Check that the hypoid gear backlash is within the standard value. Adjust if out of standard. <Ref. to 6MT-102, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2) Apply a thin uniform coat of lead-free red dye on the surfaces of 3 or 4 hypoid driven gear teeth.



3) Attach the drive pinion shaft assembly, and affix with at least 4 bolts.

NOTE:

Use old gaskets and washers to prevent the mating surfaces of the housing from becoming damaged.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

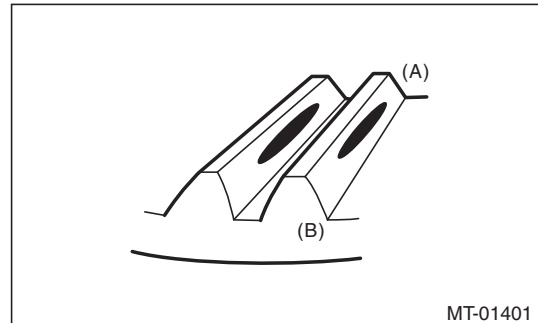
4) Turn the drive pinion shaft to the left and right for several turns.

5) Remove the drive pinion shaft assembly, and inspect the mating condition of the teeth. If tooth contact is not correct, perform adjustment. <Ref. to 6MT-95, ADJUSTMENT, Drive Pinion Shaft Assembly.>

- Correct tooth contact

NOTE:

In a no load condition, the tooth contact from the center to the toe side is 50-60% (While driving, the tooth contact will shift towards the heel side).



(A) Toe side

(B) Heel side

F: ADJUSTMENT

1. HYPOID GEAR BACKLASH

1) Attach the RH and LH side retainers.

ST1 18630AA010 WRENCH COMPL RETAINER (RH SIDE)

ST2 18630AA000 WRENCH ASSY (LH SIDE)

NOTE:

• Twist in the RH side side retainer a little further than the LH side.

• WRENCH ASSY (499787000) can also be used.

2) Attach the drive pinion shaft assembly, and affix with 5 bolts.

NOTE:

Use old gaskets and washers to prevent the mating surfaces of the housing from becoming damaged.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

3) Using the ST, loosen the differential side retainer RH, and twist in the differential side retainer LH until the hypoid driven gear just contacts the drive pinion.

ST1 18630AA010 WRENCH COMPL RETAINER (RH SIDE)

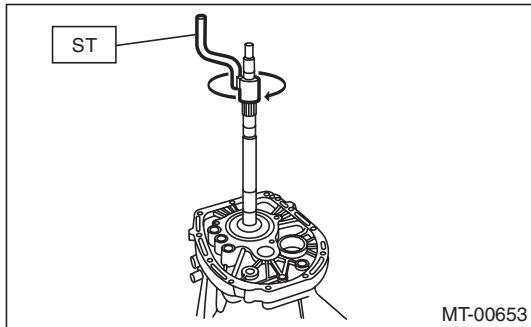
ST2 18630AA000 WRENCH ASSY (LH SIDE)

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

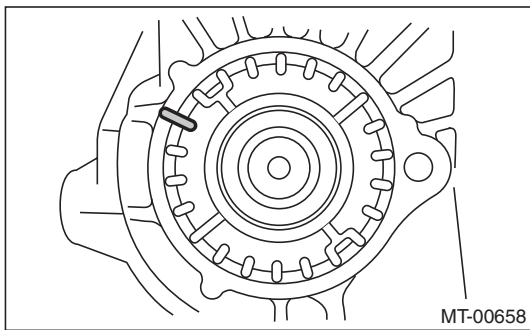
4) Use the ST to turn the drive pinion shaft a few times.

ST 18631AA000 HANDLE



5) Repeat steps 3) and 4) until differential side retainer LH does not turn anymore. For differential side retainer RH, screw in until the inner race and outer race just comes into contact. This is the “zero” backlash state.

6) Mark the mating positions of the left and right side retainers and the clutch housing.



7) Turn the back differential side retainer LH by 3 notches, and screw in the differential side retainer RH by 3 notches.

8) Temporarily attach the LH side retainer lock plate.

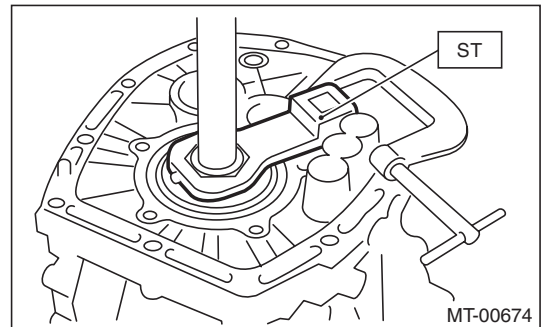
9) Turn the differential side retainer RH by 1.25 notches.

10) Temporarily attach the RH side retainer lock plate.

NOTE:

- If the lock plate cannot be aligned, adjust the position toward the tightened side.
- The notch on the lock plate moves by 0.5 notch if the lock plate is turned upside down when installed.

11) Use the ST to fix the drive pinion shaft in place.
ST 18621AA000 ADAPTER WRENCH



12) Install the SUBARU genuine axle shaft to the front differential left and right sides.
Part No. 38415AA000 Axle shaft

13) Move the axle shaft, and measure the hypoid gear backlash.

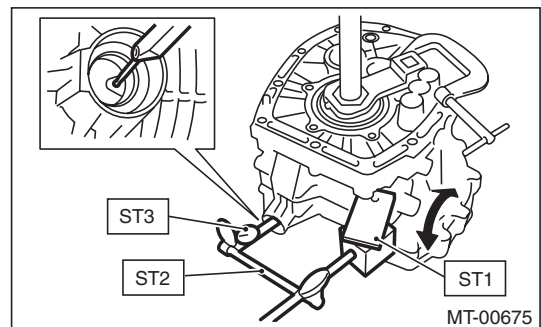
ST1 498255400 PLATE

ST2 498247001 MAGNET BASE

ST3 498247100 DIAL GAUGE

Hypoid gear backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



14) If the backlash is out of specified range, remove the left and right retainer lock plates and loosen RH side differential side retainer. Then, adjust the LH side differential side retainer by turning it, and attach the LH side retainer lock plate.

15) Screw in the RH side differential side retainer until the inner race and outer race just come into contact.

2. TOOTH CONTACT OF HYPOID GEAR

Regarding teeth contact conditions, refer to the drive pinion section. <Ref. to 6MT-102, TOOTH CONTACT OF HYPOID GEAR, INSPECTION, Front Differential Assembly.>

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

22.Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the individual gear assemblies. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>

B: INSTALLATION

- 1) Install the individual gear assemblies all at once. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>
- 2) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>
- 3) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>
- 4) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 5) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 6) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>
- 7) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

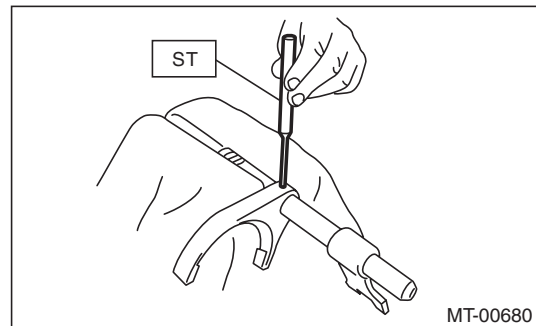
C: DISASSEMBLY

NOTE:

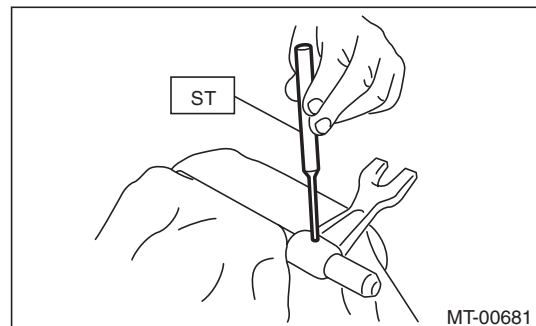
Discard the removed spring pin, and replace with a new part.

1. REVERSE SHIFTER FORK

- 1) Remove the reverse fork using the ST.
ST 398791700 REMOVER

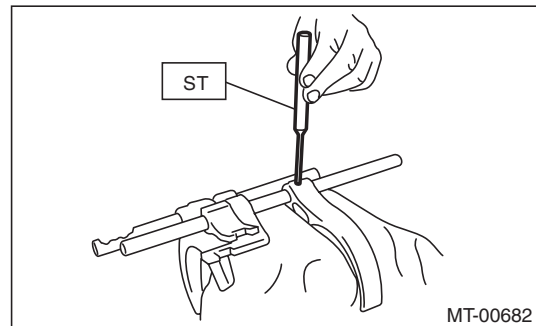


- 2) Remove the reverse shifter arm using the ST.
ST 398791700 REMOVER

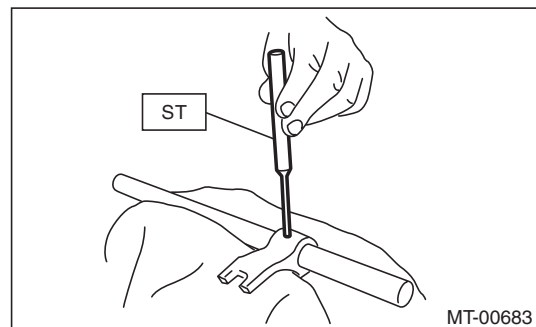


2. 1ST-2ND, 3RD-4TH SHIFTER FORK

- 1) Using the ST, remove the 3rd-4th shifter fork.
ST 398791700 REMOVER



- 2) Using the ST, remove the 3rd-4th shifter arm.
ST 398791700 REMOVER

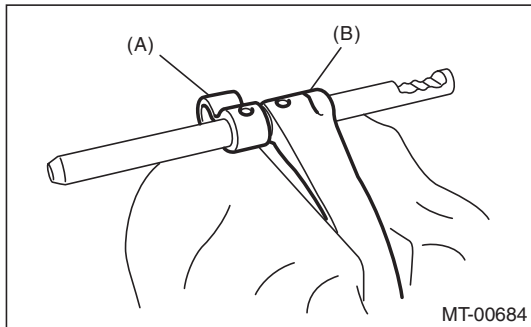


Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Using the ST, remove the 1st-2nd shifter arm and 1st-2nd shifter fork.

ST 398791700 REMOVER



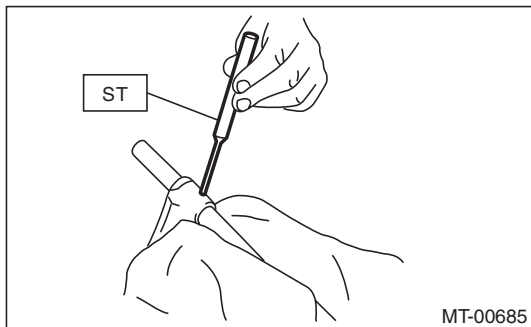
(A) 1st-2nd shifter arm

(B) 1st-2nd shifter fork

3. 5TH-6TH SHIFTER FORK

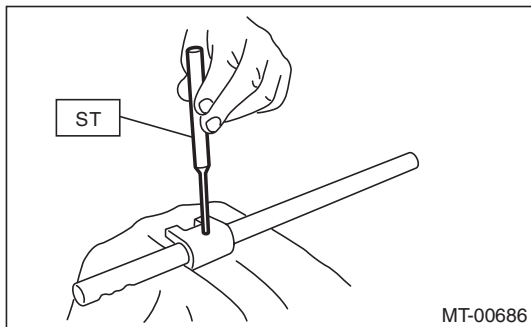
1) Using the ST, remove the 5th-6th shifter fork.

ST 398791700 REMOVER



2) Using the ST, remove the 5th-6th shifter arm.

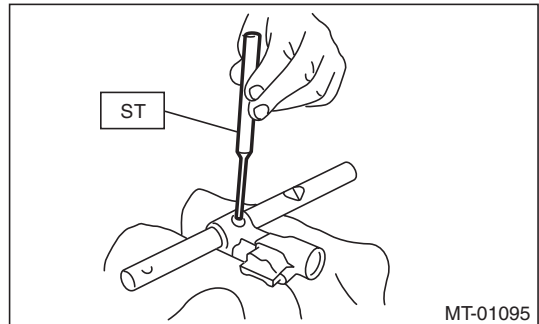
ST 398791700 REMOVER



4. SHIFTER ARM SHAFT

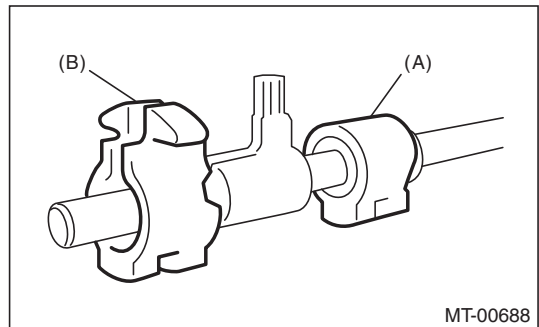
Remove the selector arm using the ST.

ST 398791700 REMOVER



5. STRIKING ROD

1) Remove the reverse interlock block and the interlock block from the striking rod.

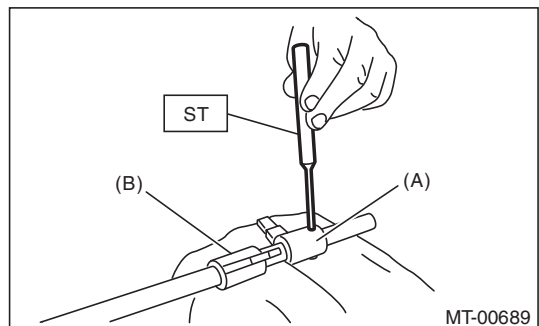


(A) Reverse interlock block

(B) Interlock block

2) Remove the reverse interlock arm using the ST.

ST 398791700 REMOVER



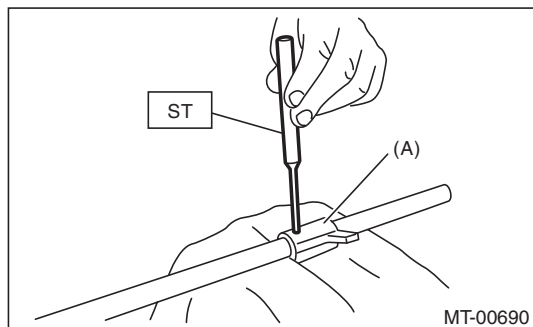
(A) Reverse interlock arm

(B) Interlock arm

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

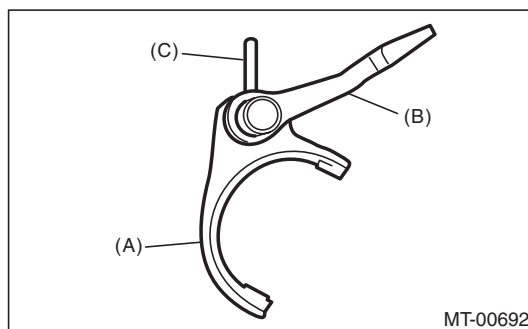
- 3) Remove the interlock arm using the ST.
ST 398791700 REMOVER



(A) Interlock arm

NOTE:

Confirm that the reverse arm and rod are installed in the proper direction.



- (A) Reverse arm
- (B) Reverse rod
- (C) Spring pin

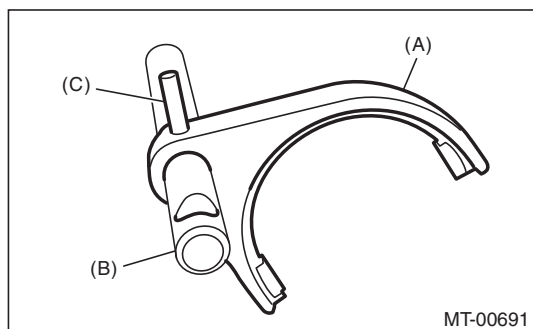
D: ASSEMBLY

1. REVERSE SHIFTER FORK

- 1) Using the ST, install the reverse fork.
ST 398791700 REMOVER

NOTE:

Confirm that the reverse fork and rod are installed in the proper direction.



- (A) Reverse fork
- (B) Reverse rod
- (C) Spring pin

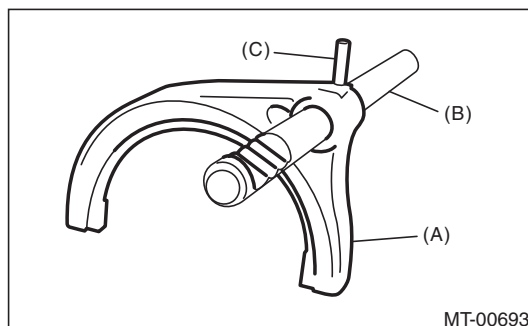
- 2) Using the ST, install the reverse arm.
ST 398791700 REMOVER

2. 1ST-2ND, 3RD-4TH SHIFTER FORK

- 1) Using the ST, install the 1st-2nd shifter fork.
ST 398791700 REMOVER

NOTE:

Make sure that the 1st-2nd shifter fork and rod are installed in the correct direction.



- (A) 1st-2nd shifter fork
- (B) 1st-2nd shifter rod
- (C) Spring pin

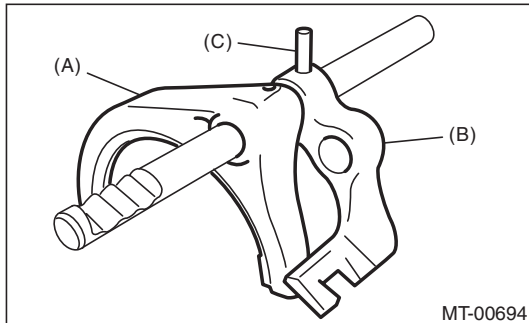
Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Using the ST, install the 1st-2nd shifter arm.
ST 398791700 REMOVER

NOTE:

Make sure that the 1st-2nd shifter arm and fork are installed in the correct direction.

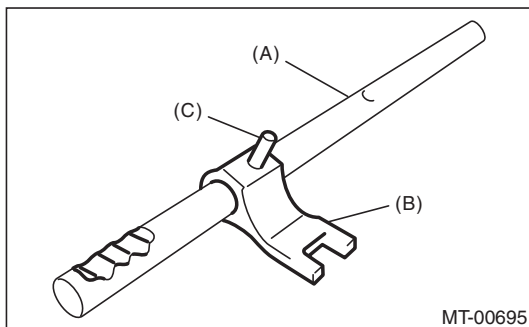


- (A) 1st-2nd shifter fork
- (B) 1st-2nd shifter arm
- (C) Spring pin

3) Using the ST, install the 3rd-4th shifter arm.
ST 398791700 REMOVER

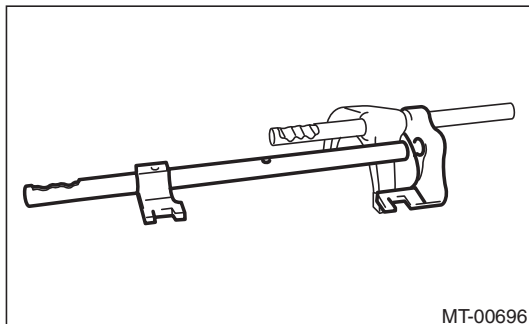
NOTE:

Make sure that the 3rd-4th shifter arm and rod are installed in the correct direction.



- (A) 3rd-4th shifter rod
- (B) 3rd-4th shifter arm
- (C) Spring pin

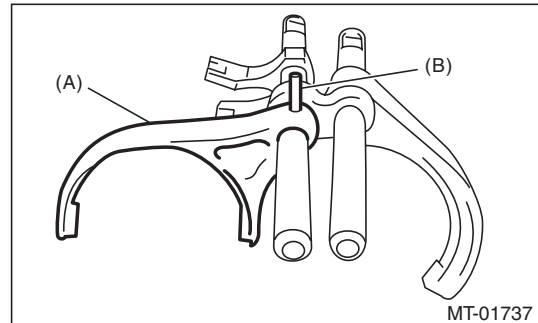
4) Attach the 3rd-4th fork rod to the 1st-2nd shifter arm.



5) Using the ST, install the 3rd-4th shifter fork.
ST 398791700 REMOVER

NOTE:

Make sure that the 3rd-4th shifter fork is installed in the correct direction.



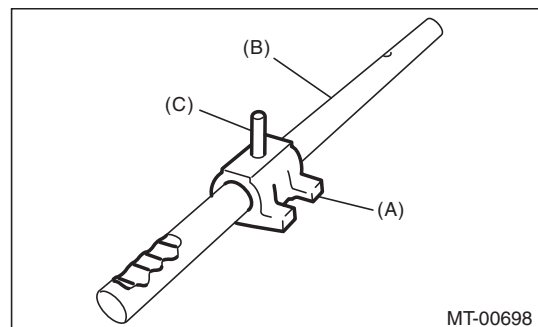
- (A) 3rd-4th shifter fork
- (B) Spring pin

3. 5TH-6TH SHIFTER FORK

1) Using the ST, install the 5th-6th shifter arm.
ST 398791700 REMOVER

NOTE:

Make sure that the 5th-6th shifter arm and rod are installed in the correct direction.



- (A) 5th-6th shifter arm
- (B) 5th-6th shifter rod
- (C) Spring pin

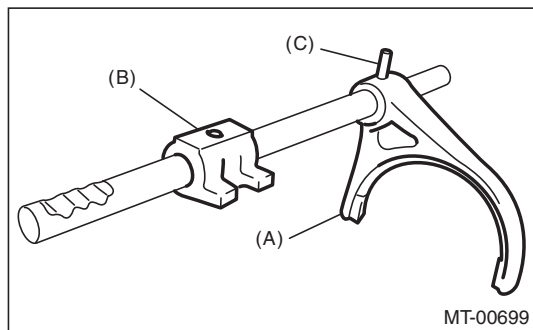
2) Using the ST, install the 5th-6th shifter fork.
ST 398791700 REMOVER

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

Check that the 5th-6th shifter fork and arm are installed.



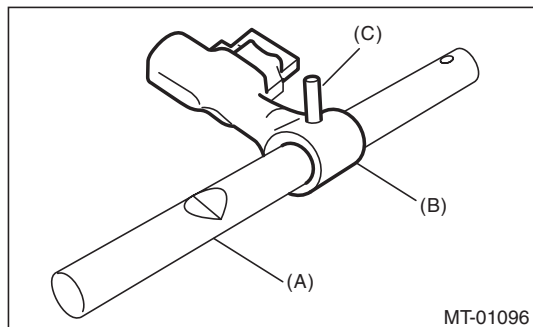
- (A) 5th-6th shifter fork
- (B) 5th-6th shifter arm
- (C) Spring pin

4. SHIFTER ARM SHAFT

Using the ST, install the selector arm.
ST 398791700 REMOVER

NOTE:

Confirm that the selector arm and rod are installed in the proper direction.



- (A) Selector rod
- (B) Selector arm
- (C) Spring pin

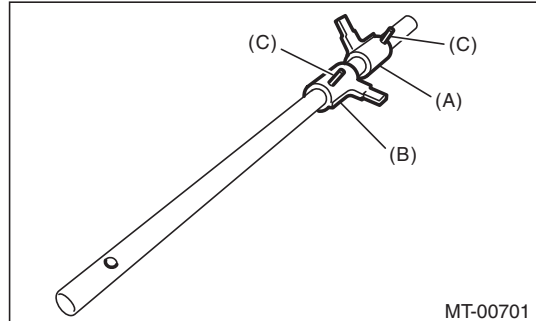
5. STRIKING ROD

1) Using the ST, install the reverse interlock arm and interlock arm.

ST 398791700 REMOVER

NOTE:

- Confirm that the reverse interlock arm and rod are installed in the proper direction.
- Confirm that the interlock arm and rod are installed in the proper direction.

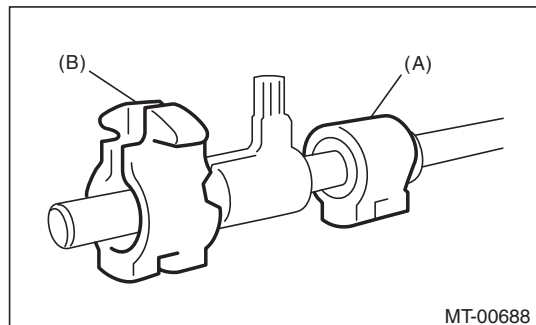


- (A) Reverse interlock arm
- (B) Interlock arm
- (C) Spring pin

2) Attach the reverse interlock block and interlock block to the striking rod.

NOTE:

Confirm that the reverse interlock block and interlock block are installed in the proper direction.



- (A) Reverse interlock block
- (B) Interlock block

E: INSPECTION

- 1) Check the shift shaft and shift rod for damage. Replace if damaged.
- 2) Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1. 1ST-2ND FORK ROD SELECTION

NOTE:

In the following conditions, perform the procedures below.

- Replacement of the 1st and 2nd driven gear
- 1st and 2nd synchro ring assembly replacement
- Adapter plate replacement
- Driven shaft replacement
- 1st-2nd hub and sleeve assembly replacement.

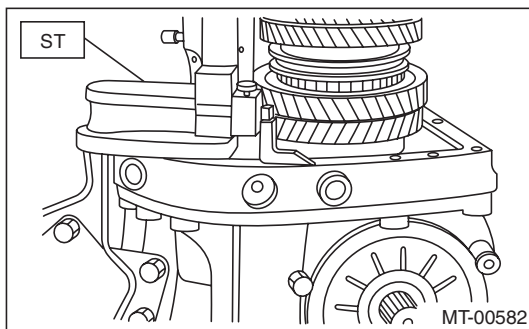
1) Insert the drive pinion assembly into the adapter plate.

NOTE:

Confirm that the thrust bearing outer race has not been removed and the drive pinion is not lifted.

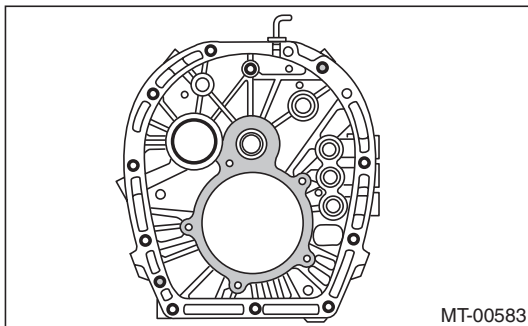
2) Set the height gauge to the adapter plate. Lower the height gauge indicator to the mating surface of the adapter plate and case, and set to zero points.

ST 18853AA000 HEIGHT GAUGE



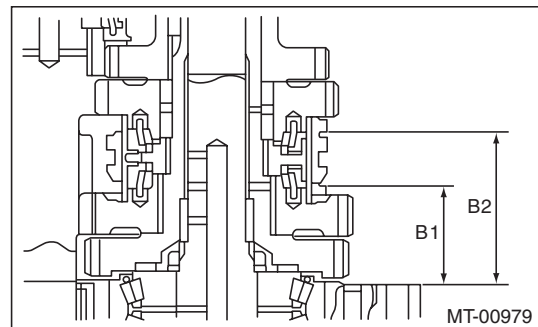
NOTE:

- The adapter plate will be the base point for the measurement. Use a scraper to remove any gasket material remaining on the end face.
- During measurement, do not place the height gauge in the shaded area shown in the figure.

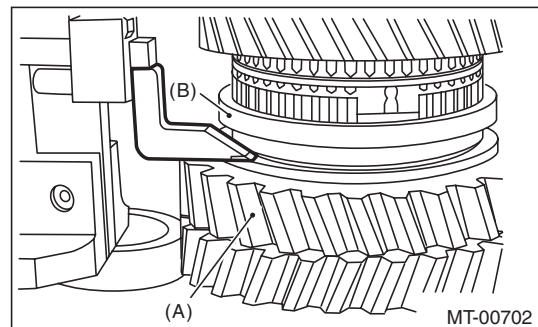


3) Select the main shaft snap ring. <Ref. to 6MT-77, ADJUSTMENT, Main Shaft Assembly.>

4) Measure "B1" and "B2" as shown in the figure.



5) Shift down the 1st-2nd sleeve all the way to the 1st driven gear side, and measure "B1".

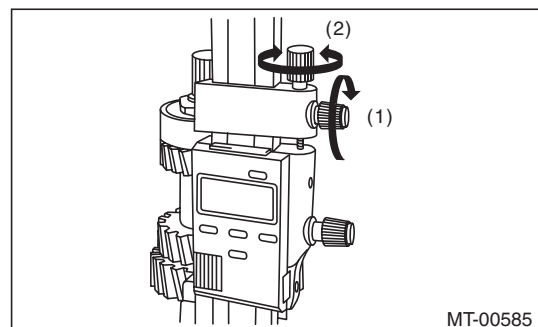


(A) 1st driven gear

(B) 1st-2nd sleeve

NOTE:

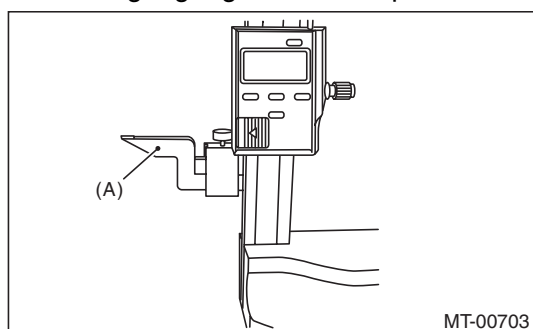
- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the 1st side end surface of the sleeve.
- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.



Shifter Fork and Rod

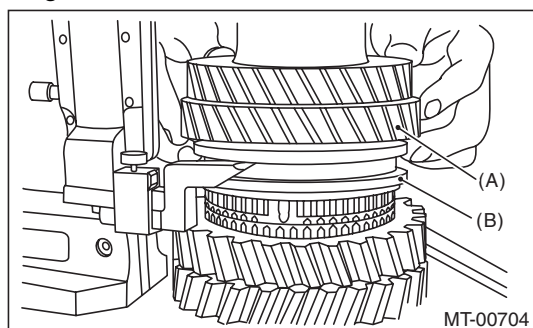
MANUAL TRANSMISSION AND DIFFERENTIAL

6) Set the height gauge indicator upside down.



(A) Indicator

7) Shift up the 1st-2nd sleeve all the way to the 2nd driven gear side, and measure "B2".

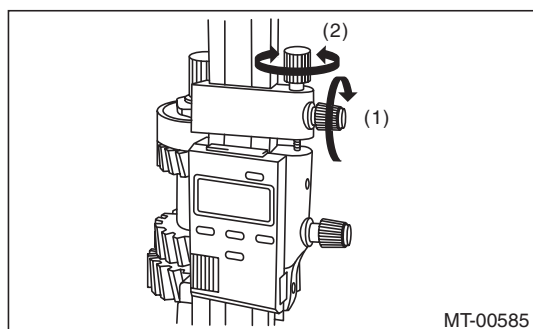


(A) 2nd driven gear

(B) 1st-2nd sleeve

NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the 2nd side end surface of the sleeve.
- The measurement is to be performed with two persons, while holding the sleeve straight.
- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.



8) According to both of the measurements, calculate the neutral position of the 1st-2nd sleeve. From the following calculation, select a fork rod which matches the calculated value.

$$\text{Calculation: } T = (B1 + B2) / 2$$

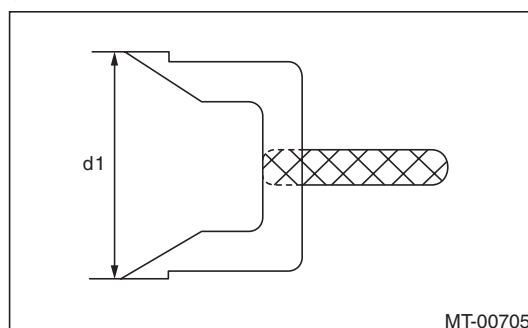
T: 1st-2nd sleeve center position

B1: Height from the adapter plate end to the sleeve end, when shifted to 1st gear

B2: Measured height from the adapter plate end to the sleeve end, when shifted to 2nd gear: +55 mm (2.17 in)

NOTE:

Attach the indicator upside down in comparison to the setting procedures for the zero point. Add "d1" [Value: 55 mm (2.17 in)] from the figure below to "B2", and measure "B2".



T mm (in)	Lot No. (marking)
62.58 — 62.78 (2.4638 — 2.4717)	32801AA310 (5)
62.78 — 62.98 (2.4717 — 2.4795)	32801AA320 (4)
62.98 — 63.18 (2.4795 — 2.4874)	32801AA330 (2)
63.18 — 63.38 (2.4874 — 2.4953)	32801AA340 (1)
63.38 — 63.58 (2.4953 — 2.5031)	32801AA350 (3)

2. 3RD-4TH FORK ROD SELECTION

NOTE:

In the following conditions, perform the procedures below.

- Main shaft replacement
- 3rd, and 3rd to 6th drive gear and bushing replacement
- 3rd, and 3rd to 6th synchro assembly replacement
- 3rd-4th hub and sleeve assembly replacement

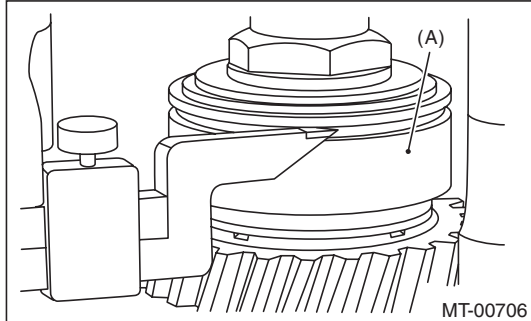
1) Insert the main shaft assembly into the adapter plate.

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Set the height gauge to the adapter plate. Lower the height gauge indicator to the top surface of the snap ring groove, and set to the zero point on the upper side of the main rear bearing.

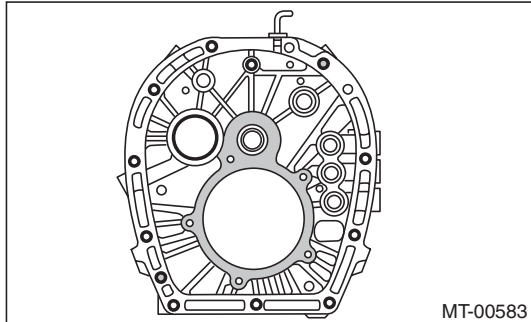
ST 18853AA000 HEIGHT GAUGE



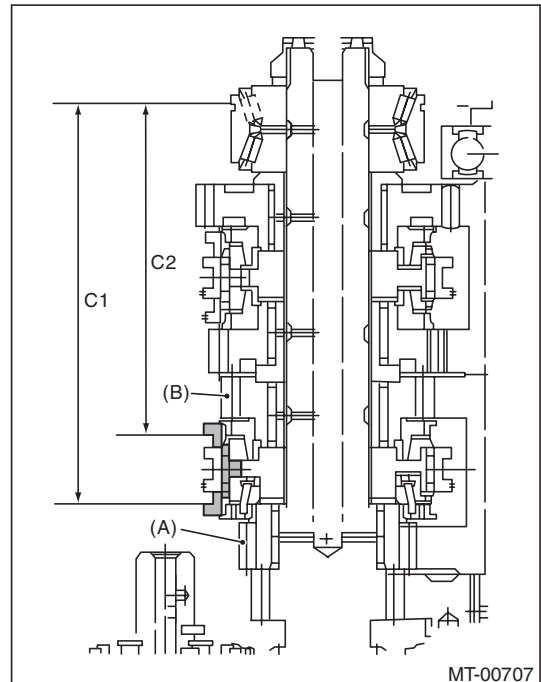
(A) Ball bearing

NOTE:

- The height gauge will be set on the adapter plate during the measurement. Use a scraper to remove any gasket material remaining on the end face.
- During measurement, do not place the height gauge in the shaded area shown in the figure.



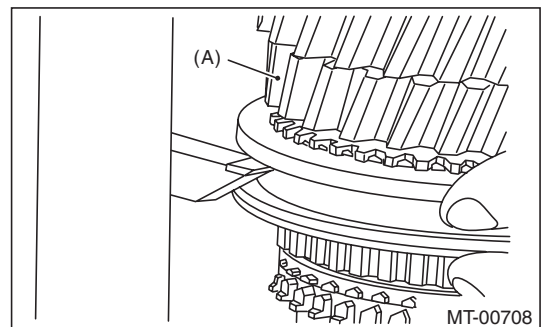
3) Use a height gauge to measure "C1" and "C2" as shown in the figure.



(A) 3rd drive gear

(B) 4th drive gear

(1) Shift up the 3rd-4th sleeve all the way to the 4th drive gear side, and measure "C2".



(A) 4th drive gear

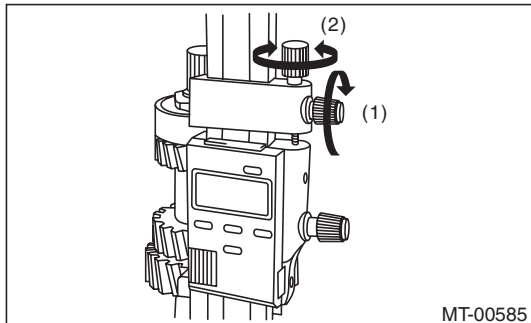
NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure.
- Turn dial (2), and set the indicator to the 4th side end surface of the sleeve.
- The measurement is to be performed with two persons, while holding the sleeve straight.

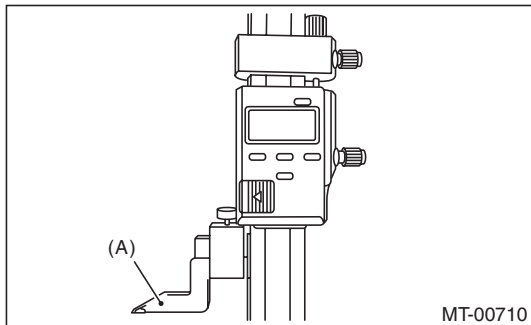
Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.

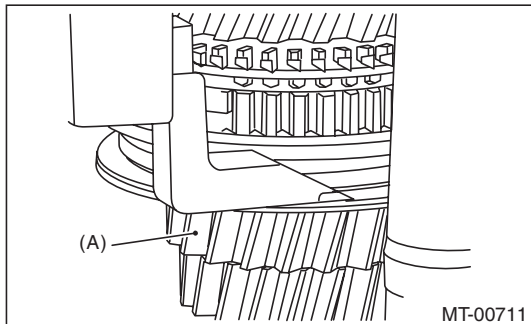


(2) Set the height gauge indicator upside down.



(A) Indicator

(3) Shift down the 3rd-4th sleeve all the way to the 3rd drive gear side, and measure "C1".

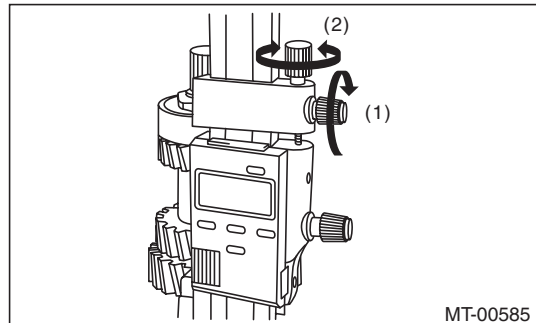


(A) 3rd drive gear

NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the 3rd side end surface of the sleeve.

- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.



4) According to both of the measurements, calculate the neutral position of the 3rd-4th sleeve. From the following calculation, select a fork rod which matches the calculated value.

$$\text{Calculation: } T = (C1 + C2) / 2$$

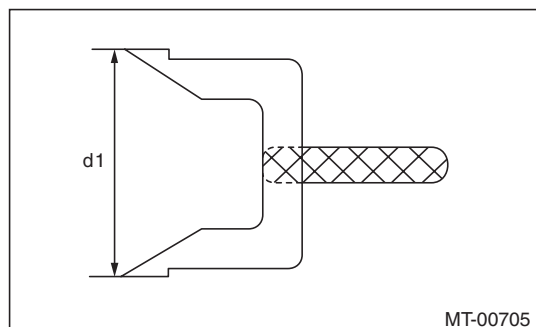
T: 3rd-4th sleeve center position

C1: Measured depth from the main shaft rear bearing snap ring groove to the sleeve end, when shifted to 3rd gear: +55 mm (2.17 in)

C2: Measured depth from the main shaft rear bearing snap ring groove to the sleeve end, when shifted to 4th gear

NOTE:

Attach the indicator upside down in comparison to the setting procedures for the zero point. Add "d1" [Value: 55 mm (2.17 in)] from the figure below to "C1", and measure "C1".



Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

T mm (in)	Lot No. (marking)		
	M.SFT Snap ring 805072010 [t = 1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t = 1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t = 2.25 mm (0.089 in)]
137.22 — 137.52 (5.4024 — 5.4142)	32809AA171 (none)	32809AA181 (2)	32809AA191 (4)
137.52 — 137.82 (5.4142 — 5.4260)	32809AA161 (1)	32809AA171 (none)	32809AA181 (2)
137.82 — 138.12 (5.4260 — 5.4379)	32809AA141 (3)	32809AA161 (1)	32809AA171 (none)

T = Thickness

3. 5TH-6TH FORK ROD SELECTION

NOTE:

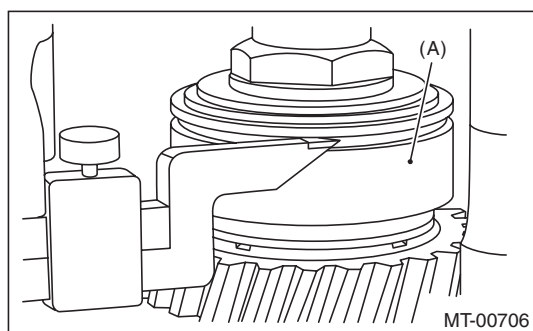
In the following conditions, perform the procedures below.

- Main shaft replacement
- 3rd to 6th drive gear and bushing replacement
- 3rd to 6th synchro ring assembly replacement
- 3rd-4th hub and sleeve assembly replacement
- 5th-6th hub and sleeve assembly replacement

1) Insert the main shaft assembly into the adapter plate.

2) Set the height gauge to the adapter plate. Lower the height gauge indicator to the upper face of the snap ring groove or the upper side of the main rear bearing. Set to zero point.

ST 18853AA000 HEIGHT GAUGE

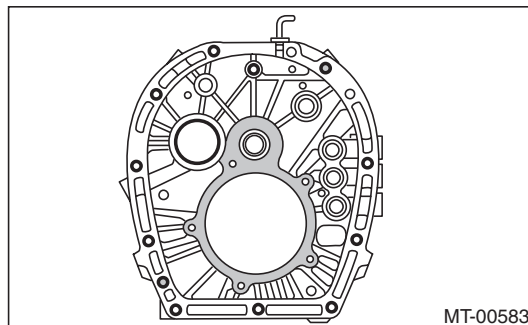


(A) Ball bearing

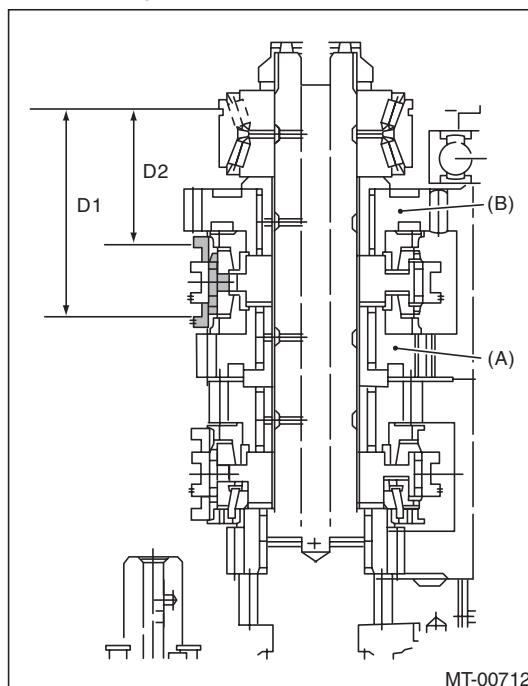
NOTE:

- The height gauge will be set on the adapter plate during the measurement. Use a scraper to remove any gasket material remaining on the end face.

- During measurement, do not place the height gauge in the shaded area shown in the figure.



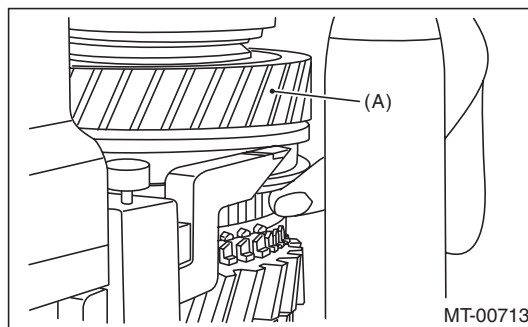
3) Use a height gauge to measure "D1" and "D2" as shown in the figure.



(A) 5th drive gear

(B) 6th drive gear

(1) Shift up the 5th-6th sleeve all the way to the 6th drive gear side, and measure "D2".



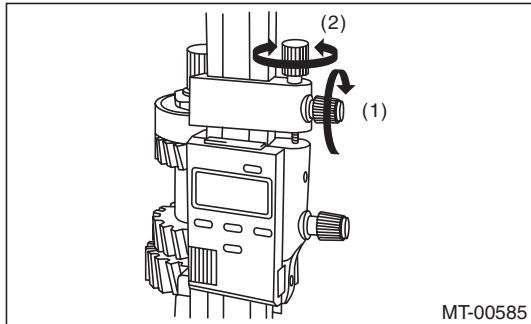
(A) 6th drive gear

Shifter Fork and Rod

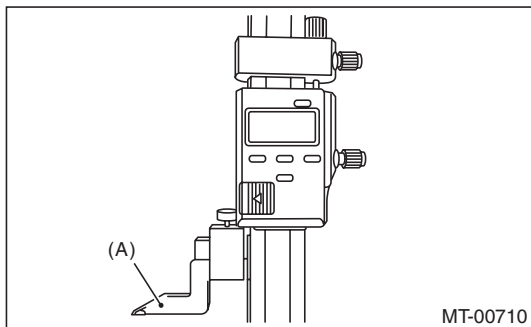
MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the 6th side end surface of the sleeve.
- The measurement is to be performed with two persons, while holding the sleeve straight.
- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.

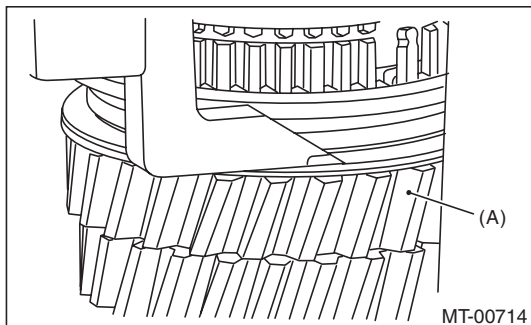


(2) Set the height gauge indicator upside down.



(A) Indicator

(3) Shift down the 5th-6th sleeve all the way to the 5th drive gear side, and measure "D1".

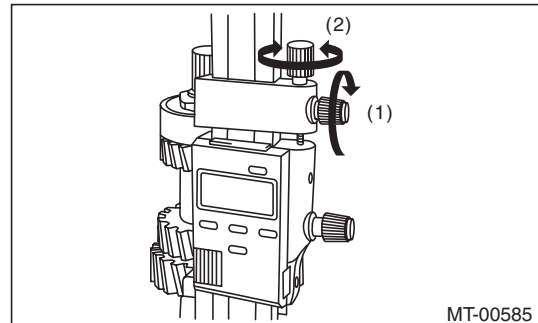


(A) 5th drive gear

NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the 5th side end surface of the sleeve.

- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.



4) According to both of the measurements, calculate the neutral position of the 5th-6th sleeve. From the following calculation, select a fork rod which matches the calculated value.

Calculation: $T = (D1 + D2) / 2$

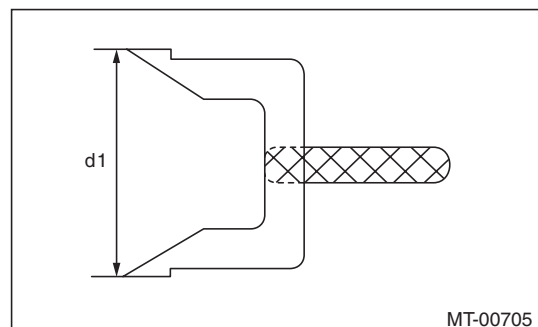
T: 5th-6th sleeve center position

D1: Measured length from the shaft rear bearing snap ring groove to the sleeve groove end, when shifted to 5th gear [Value: +55 mm (2.17 in)]

D2: Measured length from the main shaft rear bearing snap ring groove to the sleeve groove end, when shifted to 6th gear

NOTE:

Attach the indicator upside down in comparison to the setting procedures for the zero point. Add "d1" [Value: 55 mm (2.17 in)] from the figure below to "D1", and measure "D1".



Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

T mm (in)	Lot No. (marking)		
	M.SFT Snap ring 805072010 [t = 1.65 mm (0.065 in)]	M.SFT Snap ring 805072011 [t = 1.95 mm (0.077 in)]	M.SFT Snap ring 805072012 [t = 2.25 mm (0.089 in)]
64.12 — 64.42 (2.5244 — 2.5362)	32945AA021 (none)	32945AA031 (2)	32945AA041 (4)
64.42 — 64.72 (2.5362 — 2.5480)	32945AA011 (1)	32945AA021 (none)	32945AA031 (2)
64.72 — 65.02 (2.5480 — 2.5598)	32945AA001 (3)	32945AA011 (1)	32945AA021 (none)

T = Thickness

4. REVERSE FORK ROD SELECTION

NOTE:

In the following conditions, perform the procedures below.

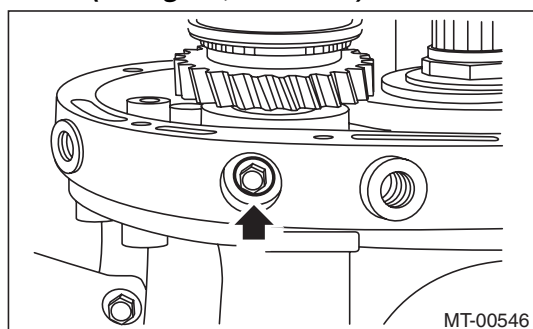
- Reverse idler gear replacement.
- Reverse idler gear No. 2 replacement.
- Adapter plate replacement.
- Base replacement.

1) Insert the reverse idler gear assembly into the adapter plate.

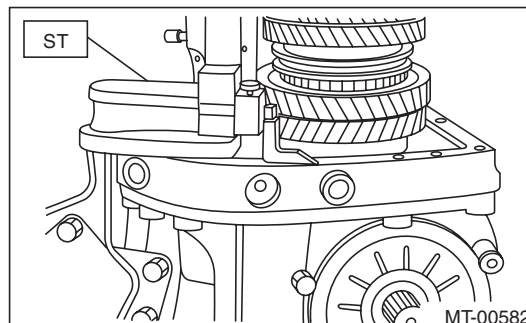
2) Tighten the base COMPL attachment bolts.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

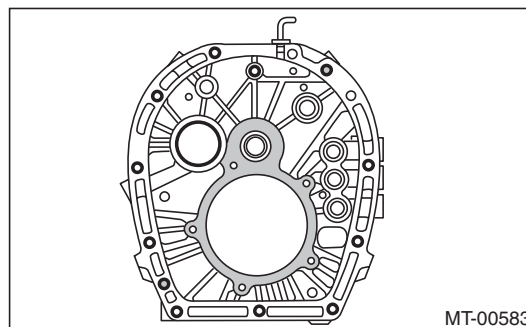


3) Set the height gauge to the adapter plate. Lower the height gauge indicator to the mating surface of the adapter plate and case, and set to zero points.
ST 18853AA000 HEIGHT GAUGE



NOTE:

- The adapter plate will be the base point for the measurement. Use a scraper to remove any gasket material remaining on the end face.
- During measurement, do not place the height gauge in the shaded area shown in the figure.



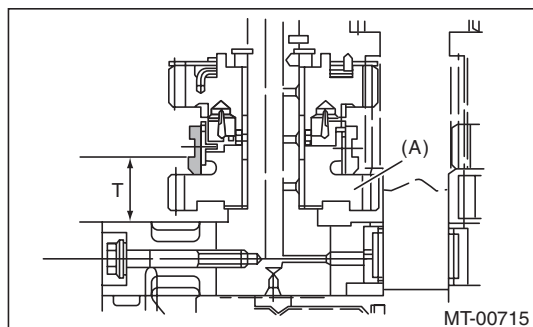
6MT-115

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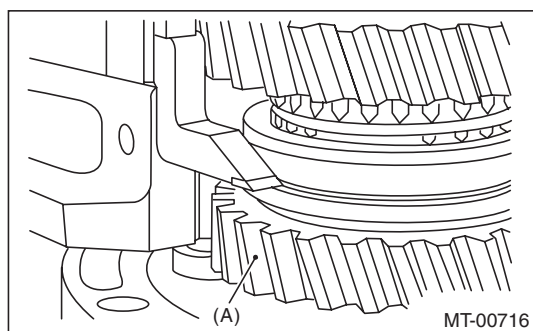
Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Shift the reverse sleeve to the reverse idler gear No. 2, and measure "T".



(A) Reverse idler gear No. 2



(A) Reverse idler gear No. 2

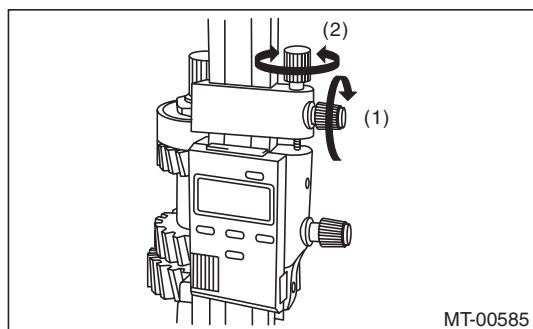
5) Calculate the neutral position of the reverse sleeve according to the measurement. From the following calculation, select a fork rod which matches the calculated value.

Calculation: $T + 4.8 \text{ mm (0.189 in)}$

$T + 4.8 \text{ mm (0.189 in)}$ mm (in)	Lot No. (marking)
33.50 — 33.80 (1.3189 — 1.3307)	32816AA110 (1)
33.80 — 34.10 (1.3307 — 1.3425)	32816AA130 (none)
34.10 — 34.40 (1.3425 — 1.3543)	32816AA140 (2)
T = Thickness	

NOTE:

- Set the height gauge indicator near the measurement target, and lock dial (1) as shown in the figure. Turn dial (2), and set the indicator to the end face of the reverse sleeve side.
- Turn approximately 72° at a time, and measure the sleeve in 5 locations. Round down the 2 highest and 2 lowest measurement values. The remaining center value is used as the measurement value.



Clutch Housing

MANUAL TRANSMISSION AND DIFFERENTIAL

23. Clutch Housing

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Neutral Position Switch.> <Ref. to 6MT-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-44, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-55, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-57, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT-58, REMOVAL, Transmission Case.>
- 8) Remove the individual gear assemblies. <Ref. to 6MT-65, REMOVAL, Main Shaft Assembly.>
- 9) Remove the drive pinion shaft assembly. <Ref. to 6MT-92, REMOVAL, Drive Pinion Shaft Assembly.>
- 10) Remove the front differential assembly. <Ref. to 6MT-98, REMOVAL, Front Differential Assembly.>

B: INSTALLATION

- 1) Install the pitching stopper bracket.

Tightening torque:

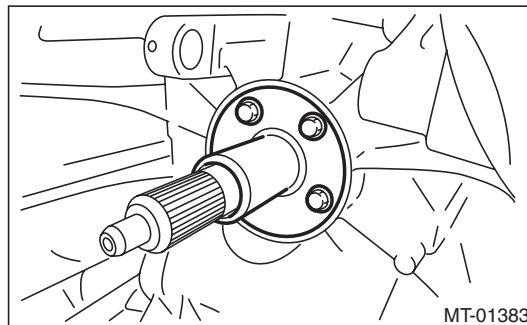
41 N·m (4.2 kgf-m, 30.2 ft-lb)

- 2) Install the front differential assembly. <Ref. to 6MT-98, INSTALLATION, Front Differential Assembly.>
- 3) Install the drive pinion shaft assembly. <Ref. to 6MT-92, INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install the individual gear assemblies all at once. <Ref. to 6MT-66, INSTALLATION, Main Shaft Assembly.>
- 5) Install the transmission case. <Ref. to 6MT-60, INSTALLATION, Transmission Case.>
- 6) Install the center differential. <Ref. to 6MT-57, INSTALLATION, Center Differential.>
- 7) Install the transfer driven gear. <Ref. to 6MT-55, INSTALLATION, Transfer Driven Gear.>
- 8) Install the extension case. <Ref. to 6MT-44, INSTALLATION, Extension Case.>
- 9) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT-40, INSTALLATION, Back-up Light Switch.>

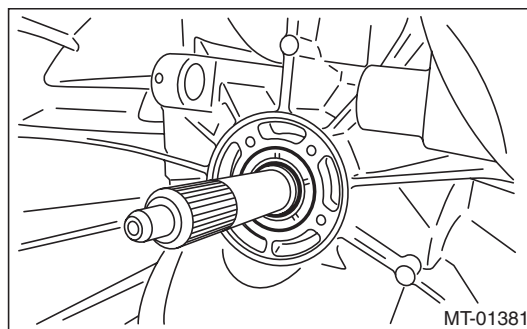
- 10) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the clutch release bearing guide.



- 2) Remove the oil seal.



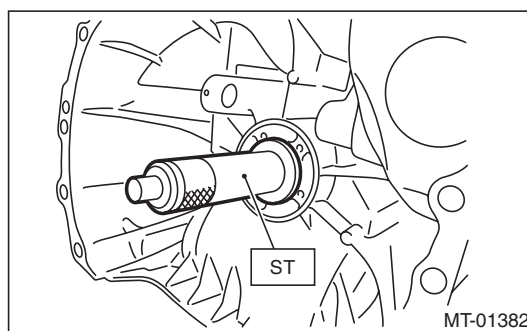
D: ASSEMBLY

- 1) Attach the oil seal to the clutch housing, being careful not to damage the seal.

NOTE:

Use a new oil seal.

ST 18657AA020 OIL SEAL INSTALLER



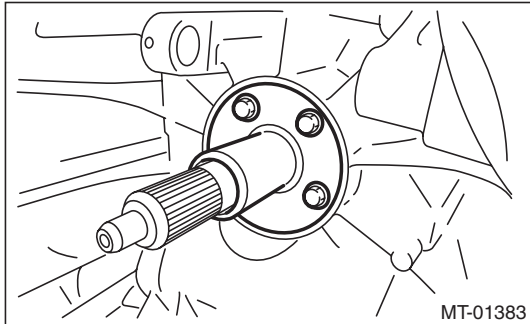
Clutch Housing

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Install the clutch release bearing guide.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



E: INSPECTION

1) Check to make sure there is no damage or cracks on the clutch housing. If there is excessive damage, replace the clutch housing.

2) Inspect the clutch housing for transmission gear oil leakage. If any oil leaks are found, repair or replace the applicable part.

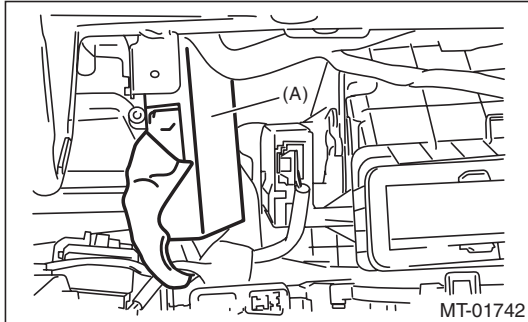
Driver's Control Center Differential Control Module

MANUAL TRANSMISSION AND DIFFERENTIAL

24.Driver's Control Center Differential Control Module

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower. <Ref. to EI-54, INSTRUMENT PANEL LOWER, REMOVAL, Center Console.>
- 3) Remove the driver's control center differential control module by disconnecting the connector.



(A) Driver's control center differential control module

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

15 N·m (1.5 kgf-m, 11.1 ft-lb)

General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

25. General Diagnostic Table

A: INSPECTION

1. MANUAL TRANSMISSION

Symptoms	Possible cause	Corrective action
1. Gears are difficult to engage. NOTE: If it is difficult to shift, there are two possible causes. One is a defective gear shift system and the other is defective transmission. However, if the operation is heavy and engagement of the gears is difficult, a defective clutch function may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer at internal spline of the sleeve	Replace.
	(b) Gear spline wear, damage, dents	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact or wear between synchronizer ring and gear cone	Repair or replace.
2. Gear slip-out • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Adjust.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn shifter fork, broken shifter fork rail spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn in the synchronizer hub chamfer angle	Replace.
	(g) Worn 1st driven gear, needle bearing and race	Replace.
	(h) Worn 2nd driven gear, needle bearing and race	Replace.
	(i) Worn 3rd drive gear and bushing	Replace.
	(j) Worn 4th drive gear and bushing	Replace.
	(k) Worn 5th drive gear and bushing	Replace.
	(l) Worn 6th drive gear and bushing	Replace.
3. Noise emitted from transmission NOTE: If a noise is heard when the vehicle is parked with its engine idling and ceases when the clutch is disengaged, it may be considered that the noise is coming from the transmission.	(a) Insufficient or improper lubrication	Replenish or replace with the specified amount of recommended oil.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the gear teeth surfaces, only a high whirring noise will occur at high speeds, but if any part is broken, rhythmical clicking sounds will be heard even at low speeds.	Replace.

General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DIFFERENTIAL

Symptoms	Possible cause	Corrective action
1. Broken differential (case, gear, bearing, etc.) NOTE: Noise will occur, and eventually the differential will not be able to operate due to broken pieces obstructing the gear revolution.	(a) Insufficient or improper oil	Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of the clutch	Readjust the preload and backlash of the bearing, and the contact surface of gear.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of the drive pinion and the hypoid driven gear	Adjust.
	(e) Loose hypoid driven gear clamping bolts	Tighten.
2. Differential and hypoid gear noise Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of trouble. However, noise from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for noise from the differential. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. • Gear noise when driving: If noise increases as the vehicle speed increases, it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise during coasting: Damaged gears due to misadjusted bearings and incorrect shim adjustment. • Bearing noise when driving or coasting: Cracked, broken or damaged bearings.	(a) Insufficient oil	Replenish or replace with the specified amount of recommended oil.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check the tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the backlash of the hypoid driven gear to drive pinion, and check the tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.

General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

6MT-122

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MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

6MT(diag)

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2. Check List for Interview	3
3. General Description	4
4. Electrical Component Location	5
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6. Subaru Select Monitor	10
7. Read Current Data	11
8. Read Diagnostic Trouble Code (DTC)	12
9. Clear Memory Mode	13
10. Driver's Control Center Differential (DCCD) Manual Mode Display	14
11. Diagnostic Procedure for Subaru Select Monitor Communication	17
12. List of Diagnostic Trouble Code (DTC)	20
13. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	21
14. Diagnostic Procedure without Diagnostic Trouble Code (DTC)	32
15. Diagnostics with Phenomenon	38

Basic Diagnostic Procedure

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

Step	Check	Yes	No
1 START INSPECTIONS. 1) Use the Check List for Interview to confirm the condition of the problem from the user. <Ref. to 6MT(diag)-3, Check List for Interview.> 2) Check the items related to DCCD. • General inspection <Ref. to 6MT(diag)-4, INSPECTION, General Description.> • Disconnection of harness connector • Visual check for harness connector damage • Oil leakage	Are items related to DCCD OK?	Go to step 2.	Repair the defective items.
2 CHECK DTC. Read the DTC. <Ref. to 6MT(diag)-10, Subaru Select Monitor.> NOTE: • Refer to "List of Diagnostic Trouble Code (DTC)" for DTC. <Ref. to 6MT(diag)-20, List of Diagnostic Trouble Code (DTC).> • If the communication function of Subaru Select Monitor cannot be executed normally, check communication circuit. <Ref. to 6MT(diag)-10, Subaru Select Monitor.>	Is DTC displayed?	Record all DTC. Go to step 3.	Inspect based on the general diagnosis table. <Ref. to 6MT(diag)-38, Diagnostics with Phenomenon.>
3 CHECK FREEZE FRAME DATA. Using the Subaru Select Monitor, check the Freeze Frame Data.	Are freeze frame data recorded?	Record the Freeze Frame Data. Go to step 4.	Go to step 4.
4 PERFORM DIAGNOSIS. 1) Inspect and repair all DTC using the "Diagnostic Procedure with Diagnostic Trouble Code (DTC)". <Ref. to 6MT(diag)-21, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> NOTE: Refer to "List of Diagnostic Trouble Code (DTC)" for DTC. <Ref. to 6MT(diag)-20, List of Diagnostic Trouble Code (DTC).> 2) Start the engine. 3) Read the DTC using Subaru Select Monitor. <Ref. to 6MT(diag)-10, Subaru Select Monitor.>	Is DTC displayed?	Record all DTC using the "Diagnostic Procedure with Diagnostic Trouble Code (DTC)" for the inspection. <Ref. to 6MT(diag)-21, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> Repeat execute diagnosis until DTC no longer appears.	Inspect based on the general diagnosis table. <Ref. to 6MT(diag)-38, Diagnostics with Phenomenon.>

Check List for Interview

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

2. Check List for Interview

A: CHECK

Check the following items when a problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

Customer's name									
Date of purchase									
Date of repair									
Transmission model	Transmission	V.I.N.							
Odometer distance	km or miles								
Frequency	☐ Continuous ☐ Intermittent (times a day)								
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other ()								
Place	☐ Highland ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Rough road ☐ Other ()								
Ambient air temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold								
Vehicle speed	km/h (MPH)								
DCCD manual mode display	☐ Flashing ☐ Other than flashing								
Driving condition	<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; border: none;">☐ Not affected</td> <td style="width: 33%; border: none;">☐ At starting</td> <td style="width: 34%; border: none;">☐ While turning (☐ RH/☐ LH)</td> </tr> <tr> <td style="border: none;">☐ While decelerating</td> <td style="border: none;">☐ While accelerating</td> <td style="border: none;">☐ When cruising</td> </tr> </table>			☐ Not affected	☐ At starting	☐ While turning (☐ RH/ ☐ LH)	☐ While decelerating	☐ While accelerating	☐ When cruising
☐ Not affected	☐ At starting	☐ While turning (☐ RH/ ☐ LH)							
☐ While decelerating	☐ While accelerating	☐ When cruising							
Symptoms	☐ Will not change to AUTO or MANUAL								
	☐ The forward/rear torque distribution does not change								
	☐ Will not become differential free								
	☐ Will not become differential lock								
	☐ A tight corner braking symptom occurs in AUTO mode or in MANUAL mode with differential free								
	☐ Noise or vibration								
	☐ Other ()								

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

3. General Description

A: CAUTION

The airbag system wiring harness is routed near the DCCD control module.

CAUTION:

- Airbag system wiring harnesses and connectors are yellow. Do not use an electric test equipment to check these circuits.
- Be careful not to damage the airbag system wiring harness when performing diagnostics or repair of the DCCD control module.
- When measuring the voltage and resistance of each control module or each sensor, use a tapered pin with a diameter of less than 0.64 mm (0.025 in) in order to avoid poor contact. Also, do not insert the pin more than 5 mm (0.2 in) into the part.

B: INSPECTION

1. POWER SUPPLY

1) Measure the battery voltage and specific gravity of the electrolyte.

Standard voltage: 12 V or more

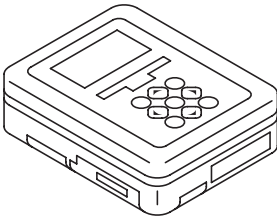
Specific gravity: 1.260 or more

2) Check the fuse condition.

3) Check the connecting condition of harness and harness connector.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Troubleshooting for electrical system

2. GENERAL TOOL

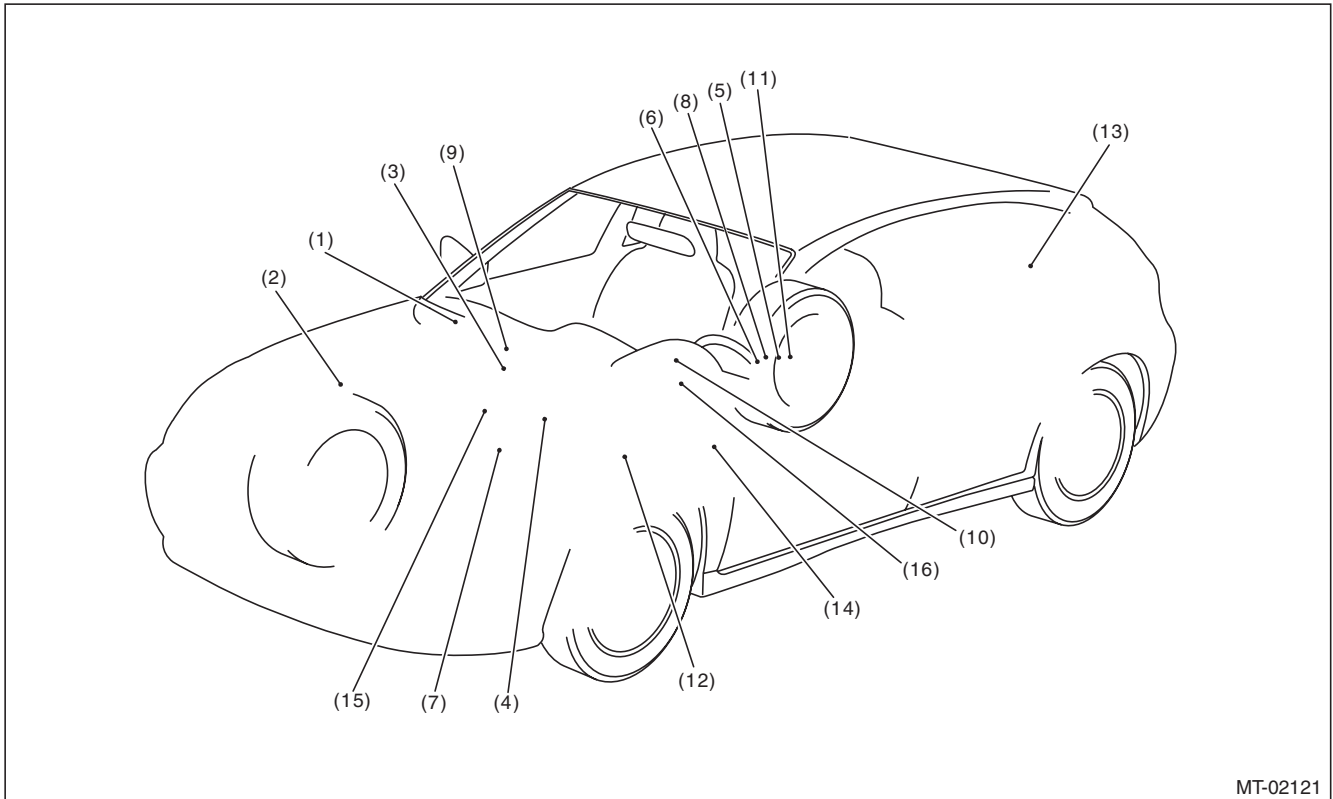
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.

Electrical Component Location

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

4. Electrical Component Location

A: LOCATION



MT-02121

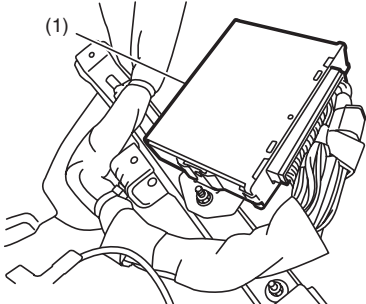
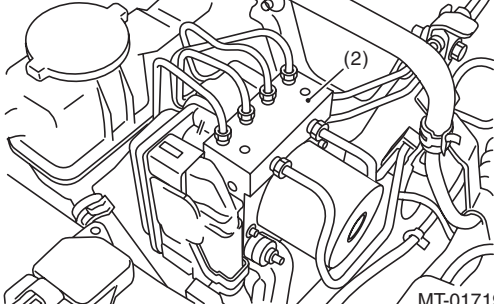
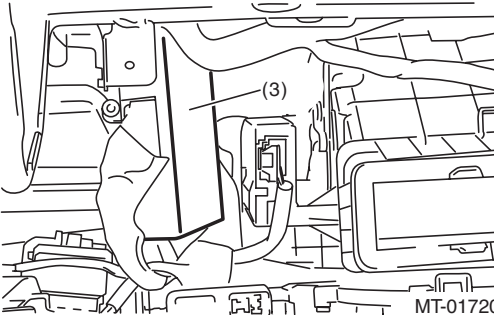
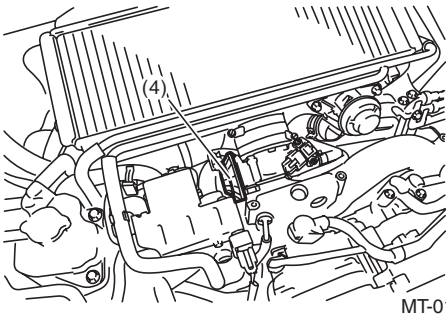
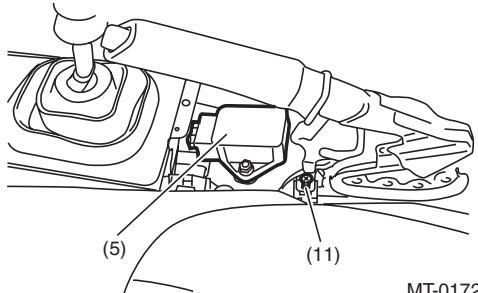
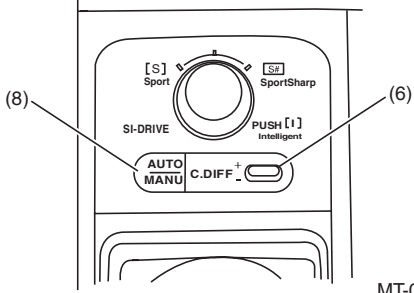
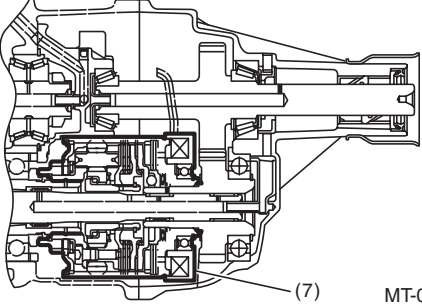
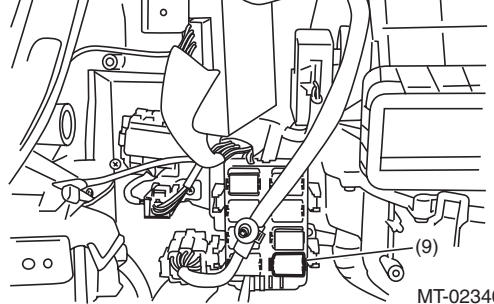
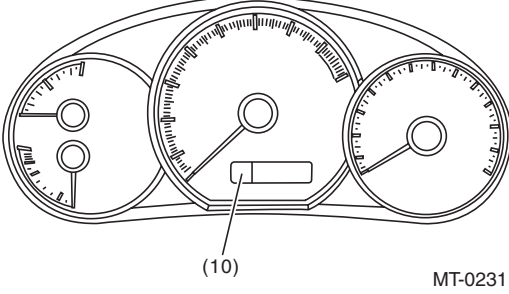
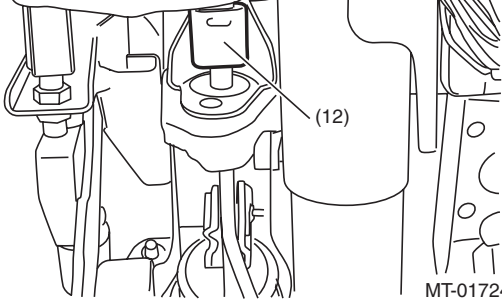
- | | | |
|---|-------------------------------|---|
| (1) Engine control module (ECM) | (7) Center differential | (12) Stop light switch |
| (2) VDC control module and hydraulic control unit (VDCCM&H/U) | (8) Mode change switch | (13) Rear differential oil temperature switch |
| (3) DCCD control module | (9) DCCD relay | (14) Data link connector |
| (4) Throttle position sensor | (10) DCCD manual mode display | (15) Neutral position switch |
| (5) Yaw rate & G sensor | (11) Parking brake switch | (16) Steering angle sensor |
| (6) C.DIFF +/- switch | | |

6MT(diag)-5

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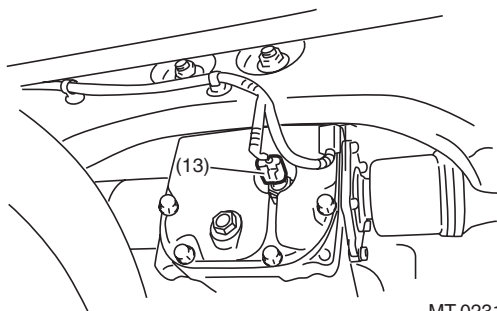
Electrical Component Location

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

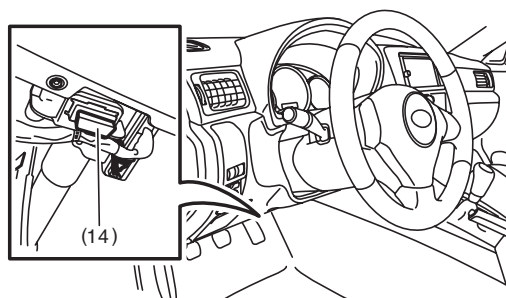
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 MT-01720	 MT-01721
 MT-01722	 MT-01693
 MT-01455	 MT-02340
 MT-02311	 MT-01724

Electrical Component Location

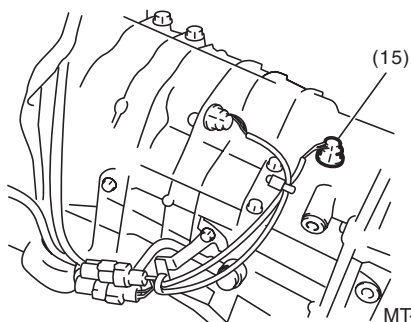
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)



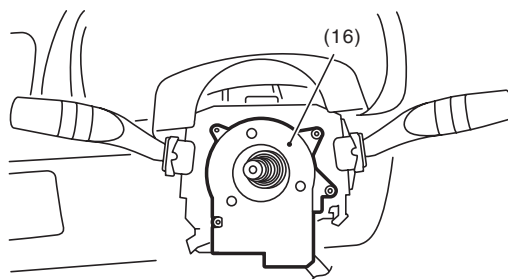
MT-02310



MT-02339



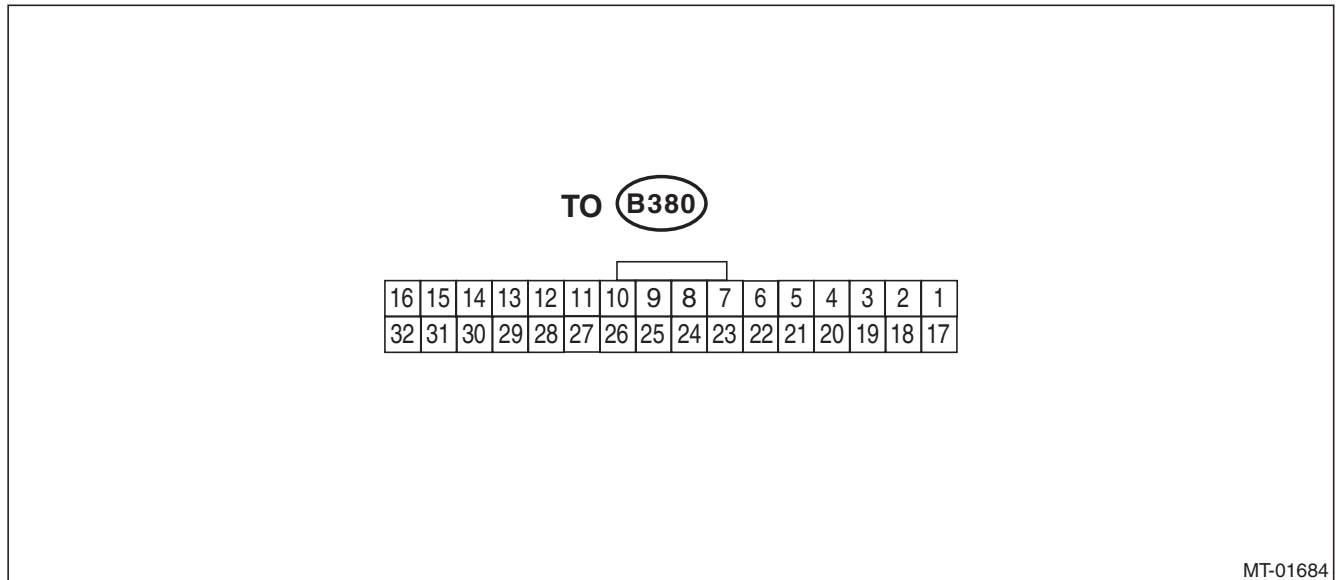
MT-02130



MT-02117

5. Driver's Control Center Differential (DCCD) Control Module I/O Signal

A: ELECTRICAL SPECIFICATION



MT-01684

Check with ignition switch ON.					
Item	Measured terminal (Connector & Terminal No.)		Measuring condition	Voltage (V)	Resistance (Ω)
	Positive terminal	Ground terminal			
DCCD output	(B380) No. 15	(B380) No. 32	When differential is locked (when DCCD manual mode display is locked)	5.5 — 8.0	1.2 — 2.5
			When differential is free (When the parking brake is pulled)	Less than 0.5	
DCCD power supply	(B380) No. 13 (B380) No. 14	Chassis ground	Ignition switch ON	10 — 13	— —
Backup power supply	(B380) No. 12	Chassis ground	—	10 — 13	—
Ignition power supply	(B380) No. 11	Chassis ground	Ignition switch ON	10 — 13	—
DCCD relay	(B380) No. 7	Chassis ground	Ignition switch ON	Less than 1.0	—
Mode change switch	(B380) No. 6	Chassis ground	When the switch is not pressed	8.0 or more	—
			When the switch is pressed	Less than 1	—
Rear differential oil temperature switch	(B380) No. 5	Chassis ground	When the rear differential switch is ON	0.4 or more	—
			When the rear differential switch is OFF	Less than 8.0	—
CAN communication signal (+)	(B380) No. 2	Chassis ground	Ignition switch ON	Pulse signal	
CAN communication signal (—)	(B380) No. 18	Chassis ground	Ignition switch ON	Pulse signal	
Data link signal (Subaru Select Monitor)	(B380) No. 1	Chassis ground	—	—	—

Driver's Control Center Differential (DCCD) Control Module I/O Signal

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Check with ignition switch ON.					
Item	Measured terminal (Connector & Terminal No.)		Measuring condition	Voltage (V)	Resistance (Ω)
	Positive terminal	Ground terminal			
System ground circuit	(B380) No. 28	Chassis ground	—	0	Less than 1.0
	(B380) No. 29	Chassis ground			
	(B380) No. 30	Chassis ground			
	(B380) No. 31	Chassis ground			
System ground circuit	(B380) No. 17	Chassis ground	—	0	Less than 1.0
Up switch	(B380) No. 22	Chassis ground	When the switch is not pressed/is pressed	8.0/1.0	
Down switch	(B380) No. 4	Chassis ground	When the switch is not pressed/is pressed	8.0/1.0	

B: WIRING DIAGRAM

Refer to "WIRING DIAGRAM". <Ref. to WI-72, Driver's Control Center Differential Control System.>

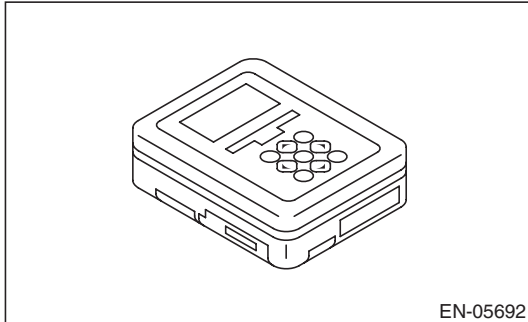
Subaru Select Monitor

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

6. Subaru Select Monitor

A: OPERATION

1) Prepare the Subaru Select Monitor kit.



2) Prepare PC with Subaru Select Monitor installed.

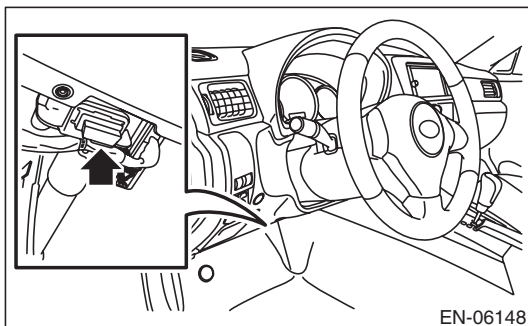
3) Connect the USB cable to SDI (Subaru Diagnosis Interface) and USB port on the personal computer (dedicated port for the Subaru Select Monitor).

NOTE:

The dedicated port for the Subaru Select Monitor means the USB port which was used to install the Subaru Select Monitor.

4) Connect the diagnosis cable to SDI.

5) Connect SDI to data link connector located in the lower portion of the instrument panel (on the driver's side).



CAUTION:

Do not connect scan tools other than the Subaru Select Monitor.

6) Start the PC.

7) Turn the ignition switch to ON.

8) Run the "PC application for Subaru Select Monitor".

Read Current Data

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

7. Read Current Data

A: OPERATION

- 1) Using the Subaru Select Monitor, on the «Main Menu» display, select {Each System Check}.
 - 2) On «System Selection Menu» display, select {Transmission Control System}.
 - 3) After the {Center Differential Control} is displayed, select [OK].
 - 4) On «Transmission Diagnosis» display, select {Current Data Display & Save}.
 - 5) Select {Normal sampling} on the «Current Data Display & Save» screen.
 - 6) Using the scroll key, scroll the display screen up or down until the desired data is shown.
- A list of the support data is shown in the following table.

Item	Display	Unit of measure
Center differential actual current	C-Diff. Real Current	A
Center differential indicated current	C-Diff. Indicate Current	A
Front vehicle speed sensor (RH)	FR Wheel Speed	km/h or MPH
Front vehicle speed sensor (LH)	FL Wheel Speed	km/h or MPH
Rear vehicle speed sensor (RH)	RR Wheel Speed	km/h or MPH
Rear vehicle speed sensor (LH)	RL Wheel Speed	km/h or MPH
Yaw rate & G sensor	Lateral G	m/s ²
Yaw rate & G sensor	Yaw Rate	deg/s
Steering angle	Steering Angle Sensor	deg
Engine speed signal	Engine Speed	rpm
Stop light switch signal	Stop Light Switch	ON or OFF
Rear differential oil temperature switch signal	RR Diff. Oil Temp SW	ON or OFF
Down shift signal	Down Switch	ON or OFF
Up shift signal	Up Switch	ON or OFF
AUTO selection mode	DCCD Mode	*1
Manual mode torque distribution	DCCD Torque Distribution	*2
Battery voltage	Battery Voltage	V
Accelerator position	Accel. Opening Angle	%
Parking switch	Parking Position Switch	ON or OFF
Center differential relay	Center Diff. Relay	ON or OFF
Mode change switch	AUTO/MANUAL Mode Switch	ON or OFF
Neutral signal	Neutral Position Switch	Neutral or other than neutral

*1: Displayed by the number

0 in the manual mode

1 in AUTO[-] / 2 in AUTO / 3 in AUTO[+]

*2: Displayed by the number

0 in AUTO mode

1 (Free), 2, 3, 4, 5, 6 (LOCK) in manual mode

NOTE:

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

Read Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

8. Read Diagnostic Trouble Code (DTC)

A: OPERATION

- 1) Using the Subaru Select Monitor, on the «Main Menu» display, select {Each System Check}.
- 2) On «System Selection Menu» display, select {Transmission Control System}.
- 3) After the {Center Differential Control} is displayed, select [OK].
- 4) On «Transmission Diagnosis» display, select {Diagnostic Code(s) Display}.
- 5) On the «Diagnostic Code(s) Display» screen, select the {Temporary Diagnostic Code(s)} or {Memorized Diagnostic Code(s)}

NOTE:

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- For details concerning DTCs, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to 6MT(diag)-20, List of Diagnostic Trouble Code (DTC).>

Clear Memory Mode

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

9. Clear Memory Mode

A: OPERATION

- 1) Place the shift lever in neutral.
- 2) Using the Subaru Select Monitor, on the «Main Menu» display, select {Each System Check}.
- 3) On «System Selection Menu» display, select {Transmission Control System}.
- 4) After the {Center Differential Control} is displayed, select [OK].
- 5) On «Transmission Diagnosis» display, select {Clear Memory}.
- 6) When “Done. Turn off the ignition switch.” is displayed, select [OK].
- 7) Turn the Subaru Select Monitor and ignition switch to OFF. To turn the ignition switch to ON again, wait for 10 seconds or more.

NOTE:

- To clear the previous DTC, use {Clear Memory}.
- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.

Driver's Control Center Differential (DCCD) Manual Mode Display

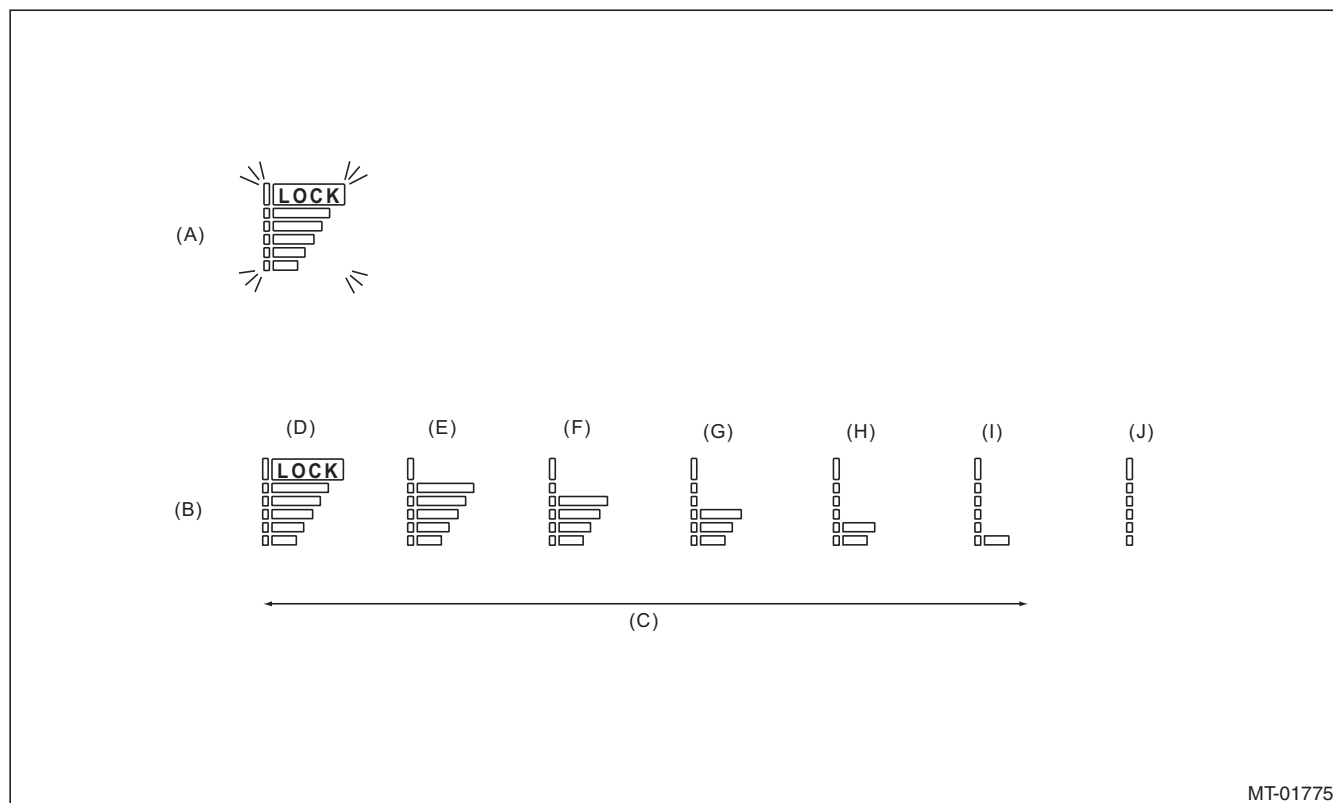
MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

10.Driver's Control Center Differential (DCCD) Manual Mode Display

A: OPERATION

When there is a problem with a part or module, DCCD manual mode display blinks. (DCCD manual mode display blinks even in AUTO mode condition.) The blinking starts from when the problem is detected, and continues until the ignition switch is turned OFF. The faulty parts can be recognized by reading DTC with the Subaru Select Monitor.

DCCD manual mode display is as shown in the figure.



MT-01775

- | | | |
|--------------------------------------|-------|----------------------------|
| (A) If faulty (blinks at 1 Hz cycle) | (E) 5 | (H) 2 |
| (B) If normal | (F) 4 | (I) 1 (FREE) |
| (C) Manual mode display | (G) 3 | (J) No display (AUTO mode) |
| (D) 6 (LOCK) | | |

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Driver's Control Center Differential (DCCD) Manual Mode Display

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK INDICATION OF DCCD MANUAL MODE DISPLAY. Press the mode change switch to enter the manual mode.	Does the DCCD manual mode display illuminate?	Go to step 8 .	Check the poor contact.
8 CHECK INDICATION OF DCCD MANUAL MODE DISPLAY. Read the data of «DCCD Torque Allocation» using the Subaru Select Monitor.	Does the DCCD manual mode display change according to the C.DIFF +/- switch operation?	Go to step 9 .	Check the poor contact.
9 CHECK OTHER DTC.	Is any other DTC displayed?	Perform the diagnosis according to DTC.	DCCD manual mode display is OK.

Diagnostic Procedure for Subaru Select Monitor Communication

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

11.Diagnostic Procedure for Subaru Select Monitor Communication

A: COMMUNICATION FOR INITIALIZING IMPOSSIBLE

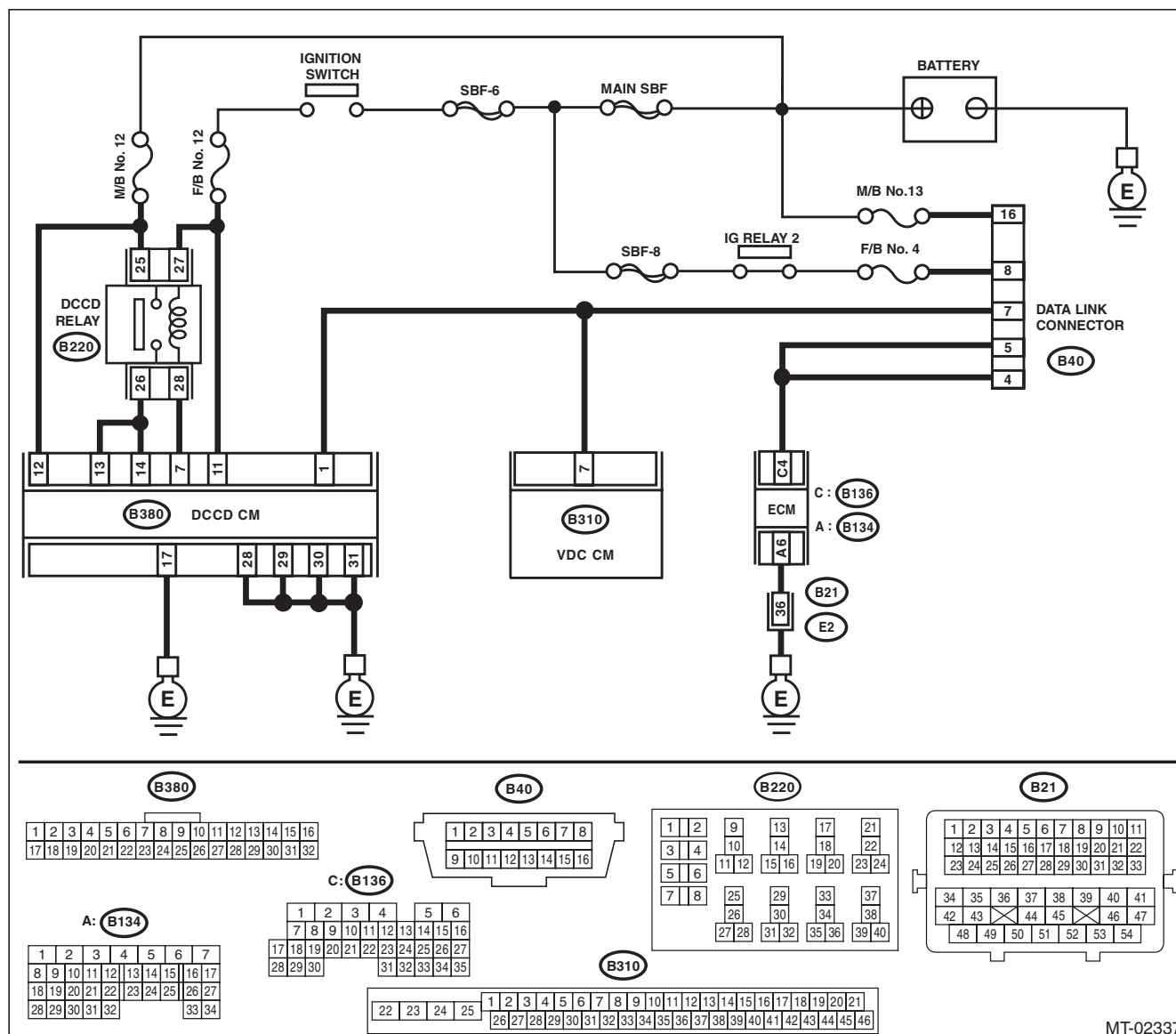
DIAGNOSIS:

Defective harness connector

TROUBLE SYMPTOM:

Subaru Select Monitor communication failure

WIRING DIAGRAM:



Step	Check	Yes	No
1	CHECK INSTALLATION OF DCCD CONTROL MODULE. Turn the ignition switch to OFF.	Go to step 2.	Connect the DCCD control module connector to DCCD control module.

6MT(diag)-17

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Diagnostic Procedure for Subaru Select Monitor Communication

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK SUBARU SELECT MONITOR POWER SUPPLY CIRCUIT. Measure the voltage between data link connector and chassis ground. Connector & terminal (B40) No. 16 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 3.	Repair harness connector between the battery and data link connector, and poor contact of the connector.
3 CHECK SUBARU SELECT MONITOR GROUND CIRCUIT. Measure the resistance of harness between data link connector and chassis ground. Connector & terminal (B40) No. 4 — Chassis ground: (B40) No. 5 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between data link connector and ground terminal, and poor contact of connector.
4 CHECK COMMUNICATION OF SUBARU SELECT MONITOR. 1) Turn the ignition switch to ON. 2) Check communication with the transmission system.	Is the name of system displayed on Subaru Select Monitor?	System is normal.	Go to step 5.
5 CHECK COMMUNICATION OF SUBARU SELECT MONITOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from DCCD control module. 3) Turn the ignition switch to ON. 4) Check communication with the engine system.	Is the name of system displayed on Subaru Select Monitor?	Go to step 7.	Go to step 6.
6 CHECK COMMUNICATION OF SUBARU SELECT MONITOR. 1) Turn the ignition switch to OFF. 2) Connect the DCCD control module connector. 3) Disconnect the connector from ECM. 4) Turn the ignition switch to ON. 5) Check communication with the transmission system.	Is the name of system displayed on Subaru Select Monitor?	Inspect the ECM.	Go to step 7.
7 CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from DCCD control module and ECM. 3) Measure the resistance between data link connector and chassis ground. Connector & terminal (B40) No. 7 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 8.	Check harness and connector between each control module and data link connector.
8 CHECK HARNESS CONNECTOR BETWEEN EACH CONTROL MODULE AND DATA LINK CONNECTOR. 1) Disconnect the all modules that communicate with Subaru Select Monitor. 2) Turn the ignition switch to ON. 3) Measure the voltage between data link connector and chassis ground. Connector & terminal (B40) No. 7 (+) — Chassis ground (-):	Is the voltage 1 V or more?	Check harness and connector between each control module and data link connector.	Go to step 9.

Diagnostic Procedure for Subaru Select Monitor Communication

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
9 CHECK HARNESS CONNECTOR BETWEEN DCCD CONTROL MODULE AND DATA LINK CONNECTOR. Measure the resistance between DCCD control module connector and data link connector. Connector & terminal (B380) No. 1 — (B40) No. 7:	Is the resistance less than 1 Ω ?	Go to step 10.	Check harness and connector between DCCD control module and data link connector.
10 CHECK POOR CONTACT OF DCCD CONTROL MODULE CONNECTOR.	Is there poor contact of connector?	Repair the poor contact.	Go to step 11.
11 CHECK POWER SUPPLY OF DCCD CONTROL MODULE. 1) Disconnect the connector from DCCD control module. 2) Turn the ignition switch to ON. 3) Measure the voltage between DCCD control module connector and chassis ground. Connector & terminal (B380) No. 12 (+) — Chassis ground (-): (B380) No. 13 (+) — Chassis ground (-): (B380) No. 14 (+) — Chassis ground (-):	Are the voltages 10 — 13 V?	Go to step 15.	Go to step 12.
12 CHECK POWER SUPPLY CIRCUIT OF FUSE (M/B NO. 12). 1) Turn the ignition switch to OFF. 2) Remove the fuse (M/B No. 12).	Is the fuse (M/B No. 12) blown out?	Replace the fuse (M/B No. 12). If the new fuse (M/B No. 12) has blown out easily, repair the short circuit of harness between fuse (M/B No. 12) and DCCD control module.	Go to step 13.
13 CHECK POWER SUPPLY CIRCUIT OF FUSE (F/B NO. 12). Remove the fuse (F/B No. 12).	Is the fuse (F/B No. 12) blown out?	Replace the fuse (F/B No. 12). If the new fuse (F/B No. 12) has blown out easily, repair the short circuit of harness between fuse (F/B No. 12) and DCCD control module.	Go to step 14.
14 CHECK POWER SUPPLY CIRCUIT OF DCCD CONTROL MODULE. Measure the resistance between the battery (+) terminal and fuse. Battery & terminal Battery (+) — M/B No. 12: Battery (+) — F/B No. 12:	Is the resistance less than 1 Ω ?	Repair the open circuit.	Go to step 15.
15 CHECK HARNESS CONNECTOR BETWEEN DCCD CONTROL MODULE AND CHASSIS GROUND. 1) Turn the ignition switch to OFF. 2) Measure the resistance between DCCD control module and chassis ground. Connector & terminal (B380) No. 28 — Chassis ground: (B380) No. 29 — Chassis ground: (B380) No. 30 — Chassis ground: (B380) No. 31 — Chassis ground:	Is the resistance less than 1 Ω ?	Check the poor contact.	Repair the short circuit or poor contact of harness between DCCD control module and transmission connector.

List of Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

12. List of Diagnostic Trouble Code (DTC)

A: LIST

1. SUBARU SELECT MONITOR DISPLAY

DTC	Item	Content of diagnosis	Reference
P1521	Brake Switch Circuit Range	Stop light switch circuit is open or shorted.	<Ref. to 6MT(diag)-21, DTC P1521 BRAKE SWITCH CIRCUIT RANGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1720	DCCD CAN System Circuit	CAN communication circuit is open or shorted.	<Ref. to 6MT(diag)-23, DTC P1720 DCCD CAN SYSTEM CIRCUIT, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1767	DCCD Steering Angle Sensor	Open, short or communication failure of the steering angle sensor circuit	<Ref. to 6MT(diag)-24, DTC P1767 DCCD STEERING ANGLE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1769	Yaw Rate & Lateral G Sensor Malfunction	Yaw rate & lateral G sensor malfunction	<Ref. to 6MT(diag)-26, DTC P1769 YAW RATE & LATERAL G SENSOR MALFUNCTION, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1875	Circuit of Center Diff	Open or short in the driver's control center differential circuit	<Ref. to 6MT(diag)-28, DTC P1875 CIRCUIT OF CENTER DIFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

13. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC P1521 BRAKE SWITCH CIRCUIT RANGE

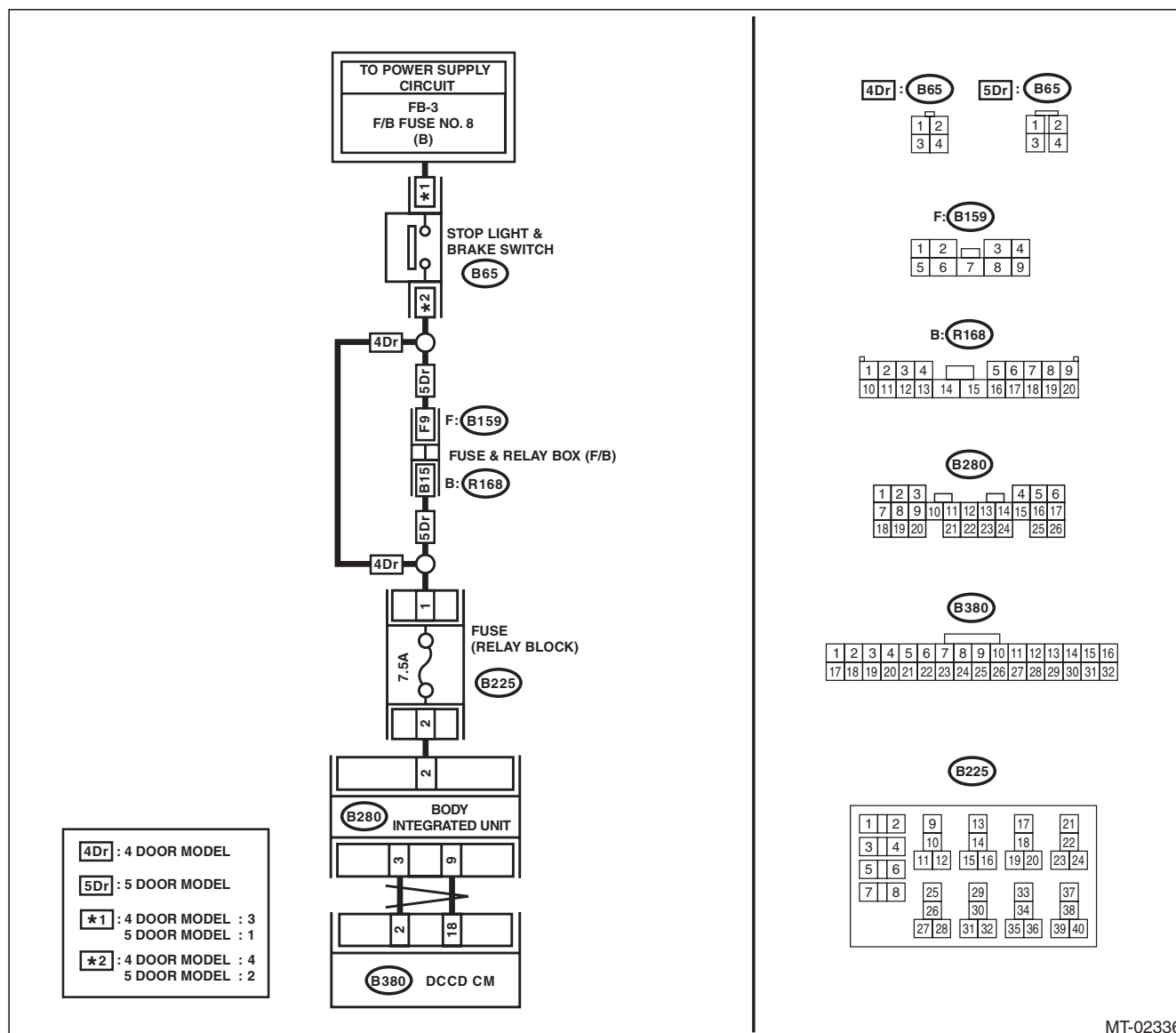
DIAGNOSIS:

Stop light switch circuit is open or shorted.

TROUBLE SYMPTOM:

ABS does not operate.

WIRING DIAGRAM:



MT-02336

Step	Check	Yes	No
1	CHECK DTC.	Does the DTC related to stop light SW appear in the VDC diagnostics test mode?	Perform the diagnosis according to DTC.
			Go to step 2.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
2 CHECK IGNITION POWER SUPPLY CIRCUIT OF DCCD CONTROL MODULE. 1) Connect the Subaru Select Monitor to the vehicle. 2) Turn the ignition switch to ON. 3) Read the data of «Battery voltage» using Subaru Select Monitor.	Is the voltage 11 V or more?	Go to step 3.	Repair the open circuit of harness between fuse (F/B No. 12) and DCCD control module, or between fuse (F/B No. 12) and battery.
3 CHECK DTC.	Is DTC P1720 displayed?	Perform the diagnosis according to DTC.	Go to step 4.
4 CHECK DCCD CONTROL MODULE. 1) Turn the ignition switch to ON. 2) Read the data of «Stop Light Switch» using Subaru Select Monitor.	Does the «Stop Light Switch» change to ON/OFF according to the depressing/releasing operation of brake?	Go to step 5.	Check the poor contact.
5 CHECK OTHER DTC.	Is a DTC other than DTC P1521 displayed?	Perform the diagnosis according to DTC.	The stop light switch is currently normal.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

B: DTC P1720 DCCD CAN SYSTEM CIRCUIT

NOTE:

For the diagnostic procedure, refer to DTC U1216. <Ref. to LAN(diag)-56, DTC U1216 HIGH-SPEED CAN (DCCD) DATA ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

C: DTC P1767 DCCD STEERING ANGLE SENSOR

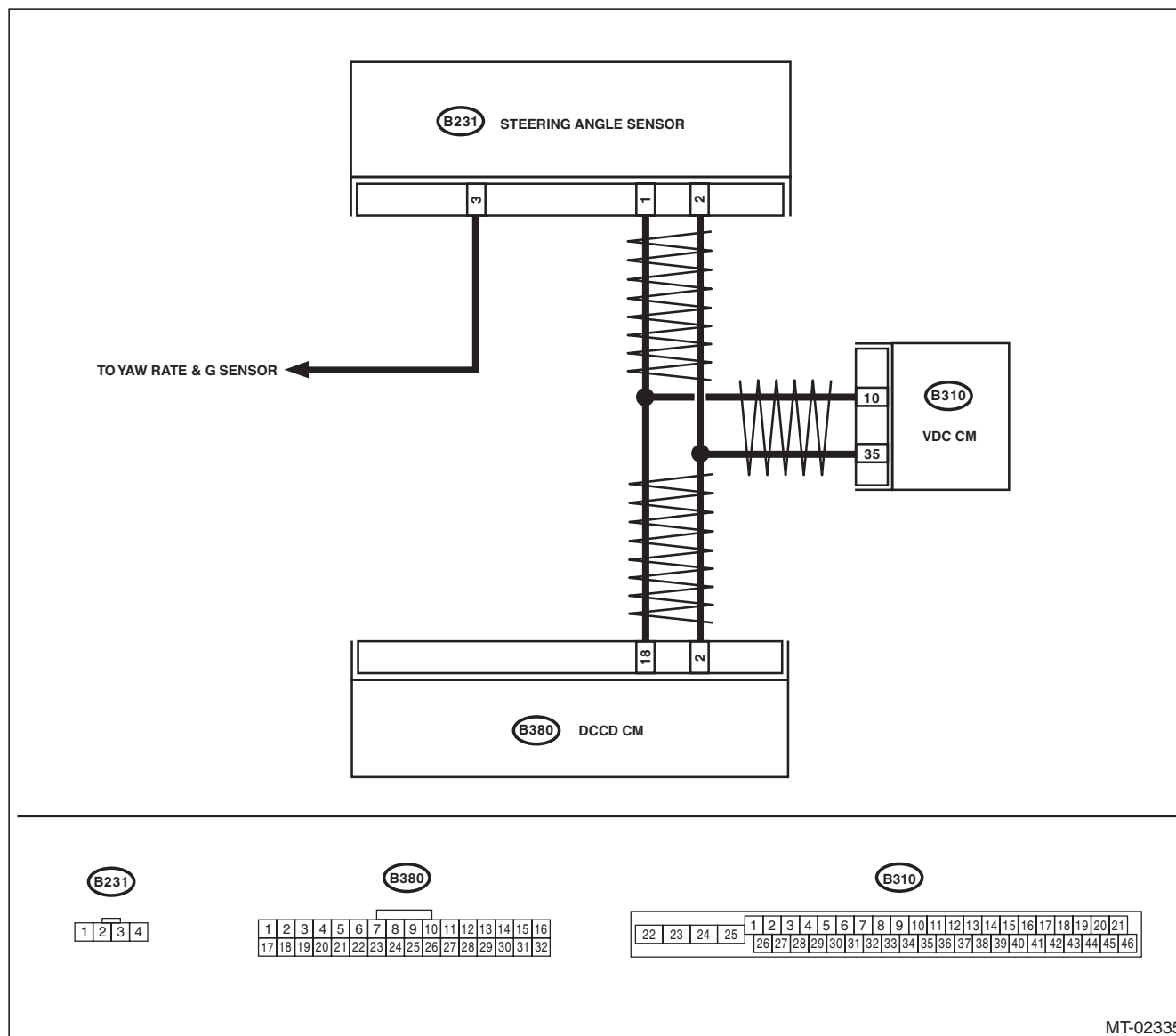
DIAGNOSIS:

Open, short or communication failure of the steering angle sensor circuit

TROUBLE SYMPTOM:

A tight corner braking symptom occurs.

WIRING DIAGRAM:



MT-02335

Step	Check	Yes	No
1	CHECK DTC.	Does the DTC related to steering angle sensor appear in the VDC diagnostics test mode?	Perform the diagnosis according to DTC.
2	CHECK IGNITION POWER SUPPLY CIRCUIT OF DCCD CONTROL MODULE. 1) Connect the Subaru Select Monitor to the vehicle. 2) Turn the ignition switch to ON. 3) Read the data of «Battery voltage» using Subaru Select Monitor.	Is the voltage 11 V or more?	Go to step 2.
		Go to step 3.	Repair the open circuit of harness between fuse (F/B No. 12) and DCCD control module, or between fuse (F/B No. 12) and battery.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

	Step	Check	Yes	No
3	CHECK DTC.	Is DTC P1720 displayed?	Perform the diagnosis according to DTC.	Go to step 4.
4	CHECK DCCD CONTROL MODULE. 1) Turn the ignition switch to ON. 2) Read the data of «Steering Angle Sensor» using Subaru Select Monitor.	Does the Subaru Select Monitor value change according to the input from the steering to the right and left?	Go to step 5.	Go to step 6.
5	CHECK DTC. 1) Clear the memory. 2) Start the engine. 3) Read the DTC.	Is DTC P1767 displayed?	Replace the steering angle sensor.	Go to step 6.
6	CHECK OTHER DTC.	Is a DTC other than DTC P1767 displayed?	Perform the diagnosis according to DTC.	The steering angle sensor circuit is currently operating properly.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

D: DTC P1769 YAW RATE & LATERAL G SENSOR MALFUNCTION

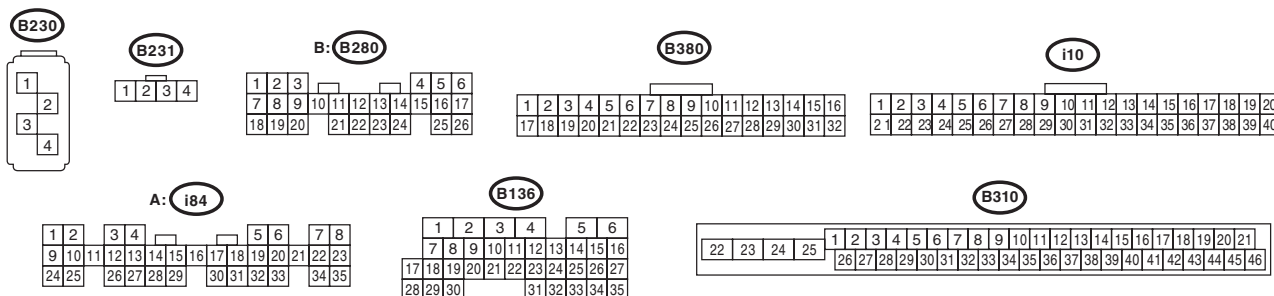
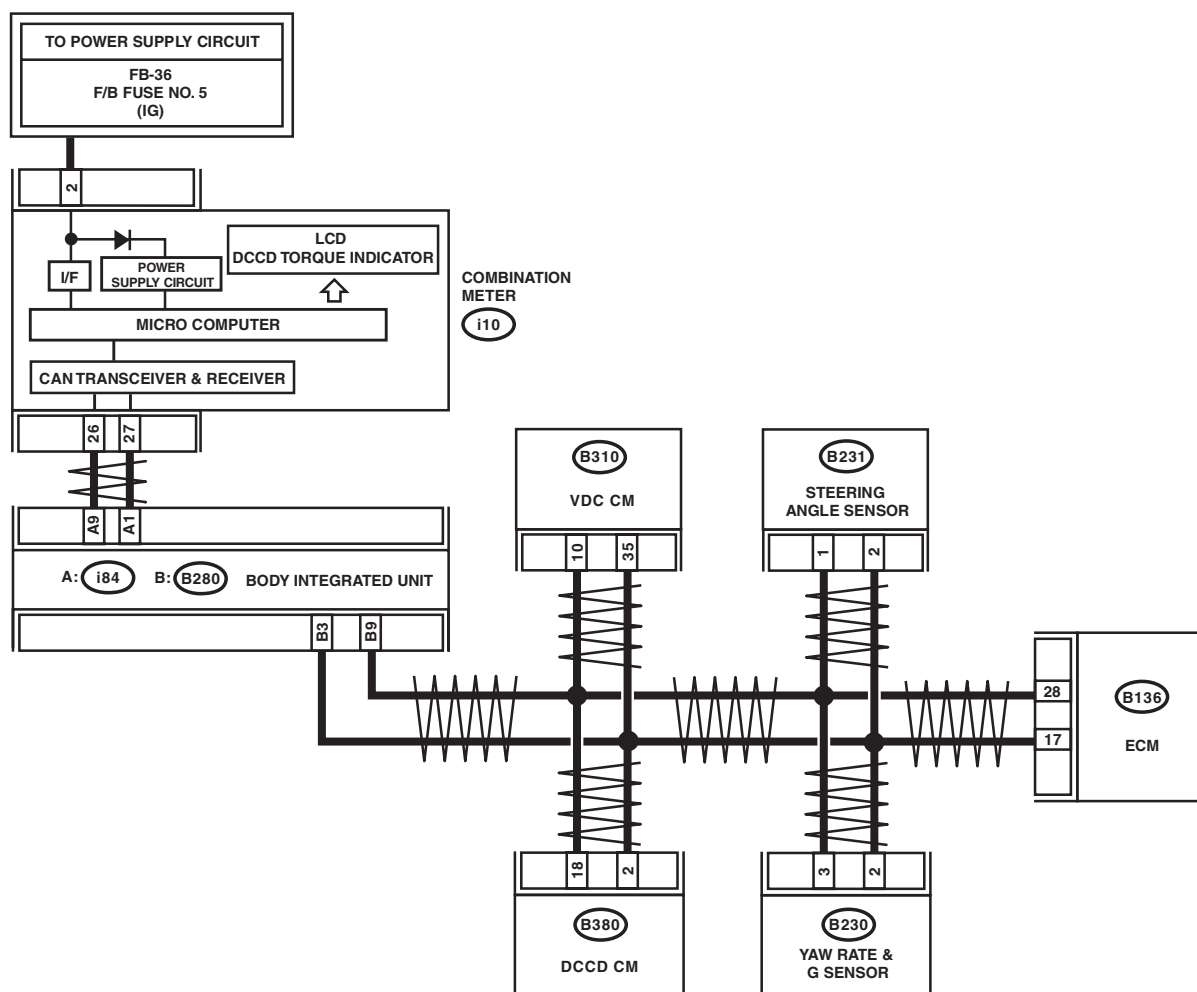
DIAGNOSIS:

Malfunction information transmitted from the yaw rate & G sensor

TROUBLE SYMPTOM:

A tendency to understeer occurs during high speed cornering.

WIRING DIAGRAM:



MT-02334

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK DTC.	Does the DTC related to G sensor or yaw rate sensor appear in the VDC diagnostics test mode?	Perform the diagnosis according to DTC.	Go to step 2.
2 CHECK IGNITION POWER SUPPLY CIRCUIT OF DCCD CONTROL MODULE. 1) Connect the Subaru Select Monitor to the vehicle. 2) Turn the ignition switch to ON. 3) Read the data of «Battery voltage» using Subaru Select Monitor.	Is the voltage 11 V or more?	Go to step 3.	Repair the open circuit of harness between fuse (F/B No. 12) and DCCD control module, or between fuse (F/B No. 12) and battery.
3 CHECK DTC.	Is DTC P1720 displayed?	Perform the diagnosis according to DTC.	Go to step 4.
4 CHECK DCCD CONTROL MODULE. 1) Drive the vehicle on a flat road. 2) Stop the vehicle with the front wheels in a straight forward direction. 3) Read the data of «Yaw Rate» and «Lateral G» using the Subaru Select Monitor.	Does the yaw rate and lateral G value change according to the vehicle behavior? When the vehicle stops, is the yaw rate value within $-4 \text{ — } 4 \text{ deg/s}$, and also is the lateral G value within $-1.5 \text{ — } 1.5 \text{ m/s}^2$?	Go to step 5.	Go to step 6.
5 CHECK DTC. 1) Clear the memory. 2) Start the engine. 3) Read the DTC.	Is DTC P1769 displayed?	Replace the yaw rate & G sensor.	Go to step 6.
6 CHECK OTHER DTC.	Is a DTC other than DTC P1769 displayed?	Perform the diagnosis according to DTC.	Yaw rate & G sensors are currently normal.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

E: DTC P1875 CIRCUIT OF CENTER DIFF

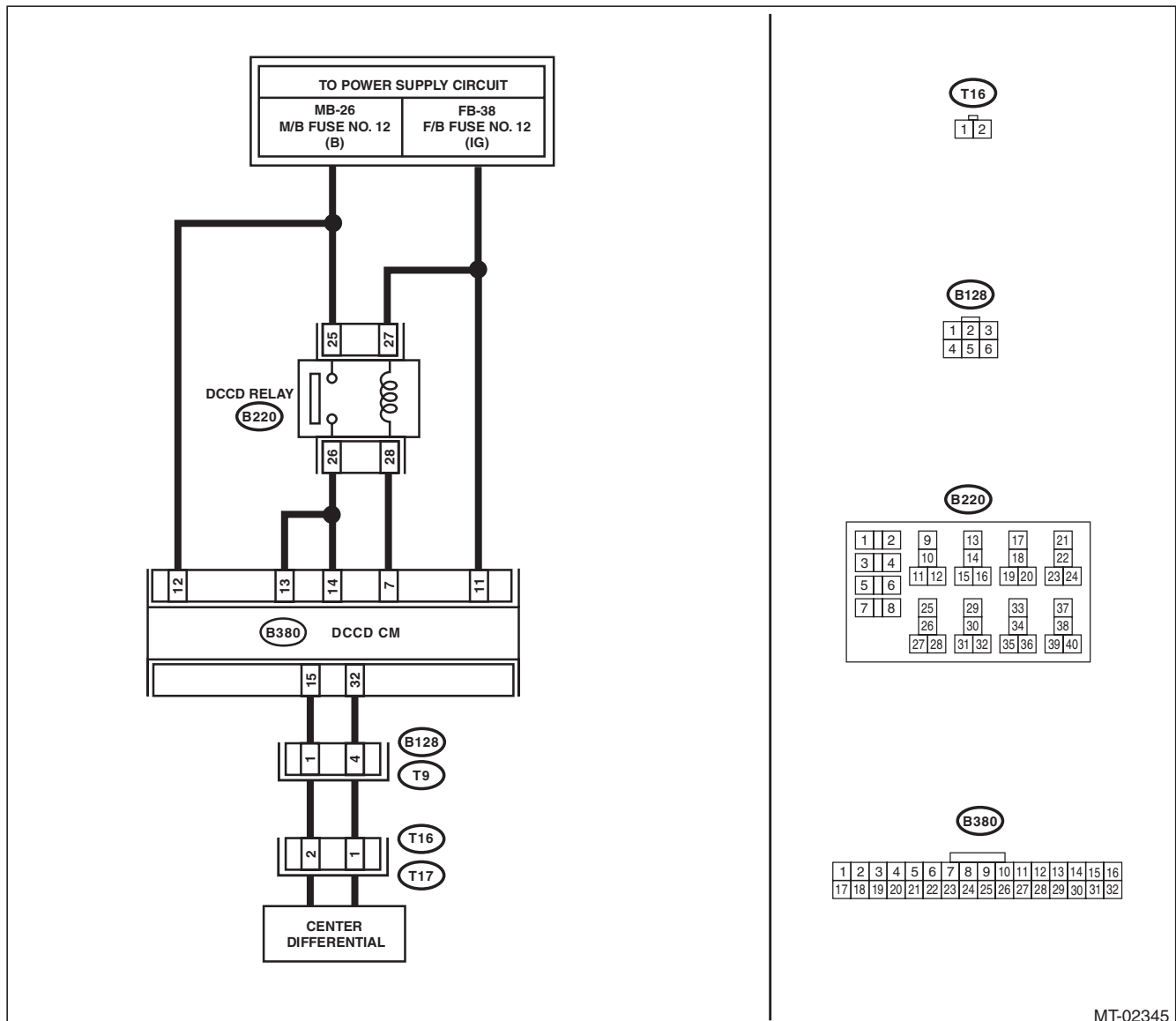
DIAGNOSIS:

Center differential output signal circuit is open or shorted.

TROUBLE SYMPTOM:

- Center differential does not operate.
- The lock ratio of the center differential does not change, or malfunction occurs.
- A tight corner braking symptom occurs.
- An oversteer tendency will become apparent.
- A tendency to understeer occurs during high speed cornering.

WIRING DIAGRAM:



MT-02345

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND TRANSMISSION HARNESS. 1) Turn the ignition switch to OFF. 2) Disconnect the DCCD control module harness connector. 3) Disconnect the transmission harness connector and the bulk harness connector. 4) Measure resistance of the harness between DCCD control module harness connector and the transmission harness connector. Connector & terminal (B380) No. 15 — (B128) No. 1: (B380) No. 32 — (B128) No. 4:	Is the resistance less than 1 Ω ?	Go to step 2.	Repair the bulk harness open circuit between DCCD control module and transmission harness.
2 CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND TRANSMISSION HARNESS. Measure the resistance between DCCD control module harness connector and chassis ground. Connector & terminal (B380) No. 15 — Chassis ground: (B380) No. 32 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 3.	Repair the bulk harness short circuit between DCCD control module and transmission harness.
3 CHECK CENTER DIFFERENTIAL. Measure the resistance between transmission harness connector terminals. Connector & terminal (T9) No. 1 — No. 4:	Is the resistance 1.2 — 2.5 Ω ?	Go to step 4.	Replace the center differential.
4 CHECK OUTPUT SIGNAL OF DCCD CONTROL MODULE. 1) Connect all harness connectors. 2) Turn the ignition switch to ON. 3) Release the parking brake. 4) Press the mode change switch to enter the manual mode. 5) Press the C.DIFF +/- switch to enter the lock position. 6) Measure the voltage between DCCD control module harness connectors. Connector & terminal (B380) No. 15 (+) — No. 32 (-):	Is the voltage 5.5 — 8.0 V?	Go to step 5.	Go to step 6.
5 CHECK OUTPUT SIGNAL OF DCCD CONTROL MODULE. 1) Move the C.DIFF +/- switch from the differential lock position to the differential free position. 2) Read the voltage between DCCD control module harness connectors. Connector & terminal (B380) No. 15 (+) — No. 32 (-):	Does the voltage drop in stages according to the DCCD manual mode display?	Circuit is currently operating properly.	Go to step 6.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
6 CHECK FUSE (M/B NO. 12). 1) Turn the ignition switch to OFF. 2) Remove the fuse (M/B No. 12).	Is the fuse (M/B No. 12) blown out?	Replace the fuse (M/B No. 12). If the new fuse (M/B No. 12) has blown out easily, check for the short circuit to chassis ground of harness between fuse (M/B No. 12) and DCCD control module, or between fuse (M/B No. 12) and relay.	Go to step 7.
7 CHECK POWER SUPPLY CIRCUIT OF DCCD RELAY. 1) Install the fuse. 2) Turn the ignition switch to OFF. 3) Disconnect the DCCD relay harness connector. 4) Measure the voltage between DCCD relay harness connector and chassis ground. Connector & terminal (B220) No. 25 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 8.	Repair the open or short circuit between fuse (M/B No. 12), DCCD relay, and battery.
8 CHECK IGNITION POWER SUPPLY CIRCUIT OF DCCD RELAY. 1) Turn the ignition switch to ON. 2) Measure the voltage between DCCD relay and chassis ground. Connector & terminal (B220) No. 27 (+) — Chassis ground (-):	Is the voltage 10 V or more?	Go to step 9.	Repair the open circuit between fuse (F/B No. 12), DCCD relay, and battery.
9 CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND DCCD RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from DCCD control module. 3) Measure resistance of the harness between DCCD control module connector and DCCD relay connector. Connector & terminal (B380) No. 7 — (B220) No. 28: (B380) No. 13 — (B220) No. 26: (B380) No. 14 — (B220) No. 26:	Is the resistance less than 1 Ω ?	Go to step 10.	Repair the open circuit of harness between DCCD control module connector and DCCD relay connector.
10 CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND DCCD RELAY. Measure the resistance of harness between DCCD control module connector and chassis ground. Connector & terminal (B380) No. 7 — Chassis ground: (B380) No. 13 — Chassis ground: (B380) No. 14 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 11.	Repair the short circuit of harness between DCCD control module connector and DCCD relay connector.
11 CHECK DCCD RELAY. Measure the resistance between DCCD relay terminals. Connector & terminal (B220) No. 25 — No. 26:	Is the resistance 1 M Ω or more?	Go to step 12.	Replace the DCCD relay.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
12 CHECK DCCD RELAY. Connect the battery positive lead to terminal No. 27 and the negative lead to terminal No. 28, then measure the resistance between DCCD relay terminals. Connector & terminal (B220) No. 25 — No. 26:	Is the resistance less than 1 Ω ?	Go to step 13.	Replace the DCCD relay.
13 CHECK DCCD CONTROL MODULE RELAY DRIVE CIRCUIT. 1) Connect all connectors. 2) Turn the ignition switch to ON. 3) Measure the voltage between DCCD control module and chassis ground. Connector & terminal (B380) No. 7 (+) — Chassis ground (-):	Is the voltage less than 1 V?	Go to step 14.	Go to step 17.
14 CHECK IGNITION POWER SUPPLY CIRCUIT OF DCCD CONTROL MODULE. Measure the voltage between DCCD control module and chassis ground. Connector & terminal (B380) No. 13 (+) — Chassis ground (-): (B380) No. 14 (+) — Chassis ground (-):	Is the voltage 8 V or more?	Go to step 15.	Go to step 17.
15 CHECK CENTER DIFFERENTIAL. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON. 4) Run the Subaru Select Monitor. 5) Press the mode change switch to enter the manual mode. 6) Release the parking brake. 7) Press the C.DIFF +/- switch to enter the lock position. 8) Read the data of «C-Diff. Indicate Current» and «C-Diff. Real Current» using Subaru Select Monitor.	Are «C-Diff. Indicate Current» and «C-Diff. Real Current» both approximately 3.6 — 4.0 A?	Go to step 16.	Go to step 17.
16 CHECK CENTER DIFFERENTIAL. 1) Using Subaru Select Monitor, operate the C.DIFF +/- switch so that «C-Diff. Indicate Current» becomes 1.6A. 2) Read the data of «C-Diff. Real Current» using Subaru Select Monitor.	Is «C-Diff. Real Current» about the same as «C-Diff. Indicate Current»?	Go to step 18.	Go to step 17.
17 CHECK POOR CONTACT OF HARNESS CONNECTORS.	Is there poor contact of the harness connector?	Repair the poor contact.	Go to step 18.
18 CHECK DTC. 1) Clear the memory. <Ref. to 6MT(diag)-13, Clear Memory Mode.> 2) Read the DTC using the Select Monitor. <Ref. to 6MT(diag)-12, Read Diagnostic Trouble Code (DTC).>	Is P1875 displayed?	Check the poor contact.	Go to step 19.
19 CHECK DTC.	Are DTCs other than P1875 displayed?	Perform the diagnosis according to DTC.	The center differential circuit is currently operating properly.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

14. Diagnostic Procedure without Diagnostic Trouble Code (DTC)

A: CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH

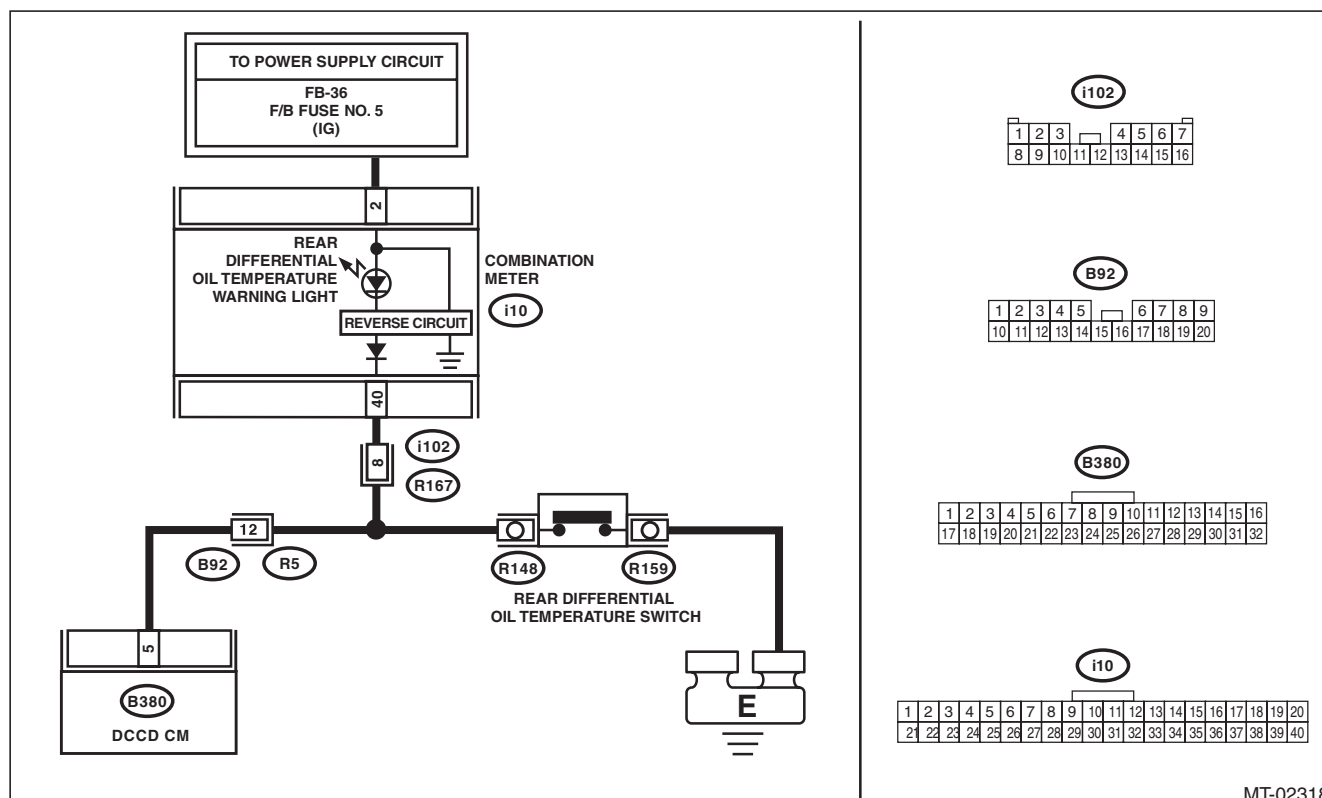
DIAGNOSIS:

Input signal circuit of rear differential oil temperature switch is open or shorted.

TROUBLE SYMPTOM:

- Center differential remains free
- An oversteer tendency will become apparent.
- Rear differential oil temperature warning light illuminates.

WIRING DIAGRAM:



Step	Check	Yes	No
1 CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH WARNING LIGHT CIRCUIT. 1) Turn the ignition switch to OFF. 2) Disconnect the DCCD control module harness connector. 3) Turn the ignition switch to ON. 4) Measure the voltage of the rear differential oil temperature switch. Connector & terminal (B380) No. 5 (+) — Chassis ground (-):	Is the voltage less than 0.4 V?	Go to step 6.	Go to step 2.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

	Step	Check	Yes	No
2	CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Disconnect the harness connector from the combination meter. 3) Disconnect the connector from the rear differential oil temperature switch. 4) Measure the resistance between combination meter and DCCD control module harness connectors. Connector & terminal (B380) No. 5 — (i10) No. 40:	Is the resistance less than 1 Ω ?	Go to step 3.	Repair the open circuit between DCCD control module and the combination meter.
3	CHECK HARNESS BETWEEN DCCD CONTROL MODULE AND REAR DIFFERENTIAL OIL TEMPERATURE SWITCH. Measure the resistance between DCCD control module harness connector and rear differential oil temperature switch harness connector. Connector & terminal (B380) No. 5 — (R148) No. 1:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit between DCCD control module and rear differential oil temperature switch.
4	CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH GROUND CIRCUIT. 1) Disconnect the harness connector from the bracket ground of the rear differential. 2) Measure the resistance between the rear differential oil temperature switch ground harness connector and chassis ground. Connector & terminal (R159) No. 1 — Chassis ground:	Is the resistance 1 M Ω or more?	Repair the open circuit of the rear differential oil temperature ground circuit, and contact failure of the harness connector.	Go to step 5.
5	CHECK REAR DIFFERENTIAL OIL TEMPERATURE SWITCH. Measure the resistance between the rear differential oil temperature switch and the rear differential oil temperature switch body. Connector & terminal (R148) No. 1 — Rear differential oil temperature switch body:	Is the resistance less than 1 Ω ?	Go to step 6.	Replace the rear differential oil temperature switch.
6	CHECK REAR DIFFERENTIAL OIL TEMPERATURE WARNING LIGHT. 1) Turn the ignition switch to ON. 2) Short the chassis ground and the combination meter harness connector. Connector & terminal (i10) No. 40 (+) — Chassis ground (-):	Does the rear differential oil temperature light turn OFF?	Check the poor contact.	Check the combination meter.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

B: CHECK PARKING BRAKE SWITCH

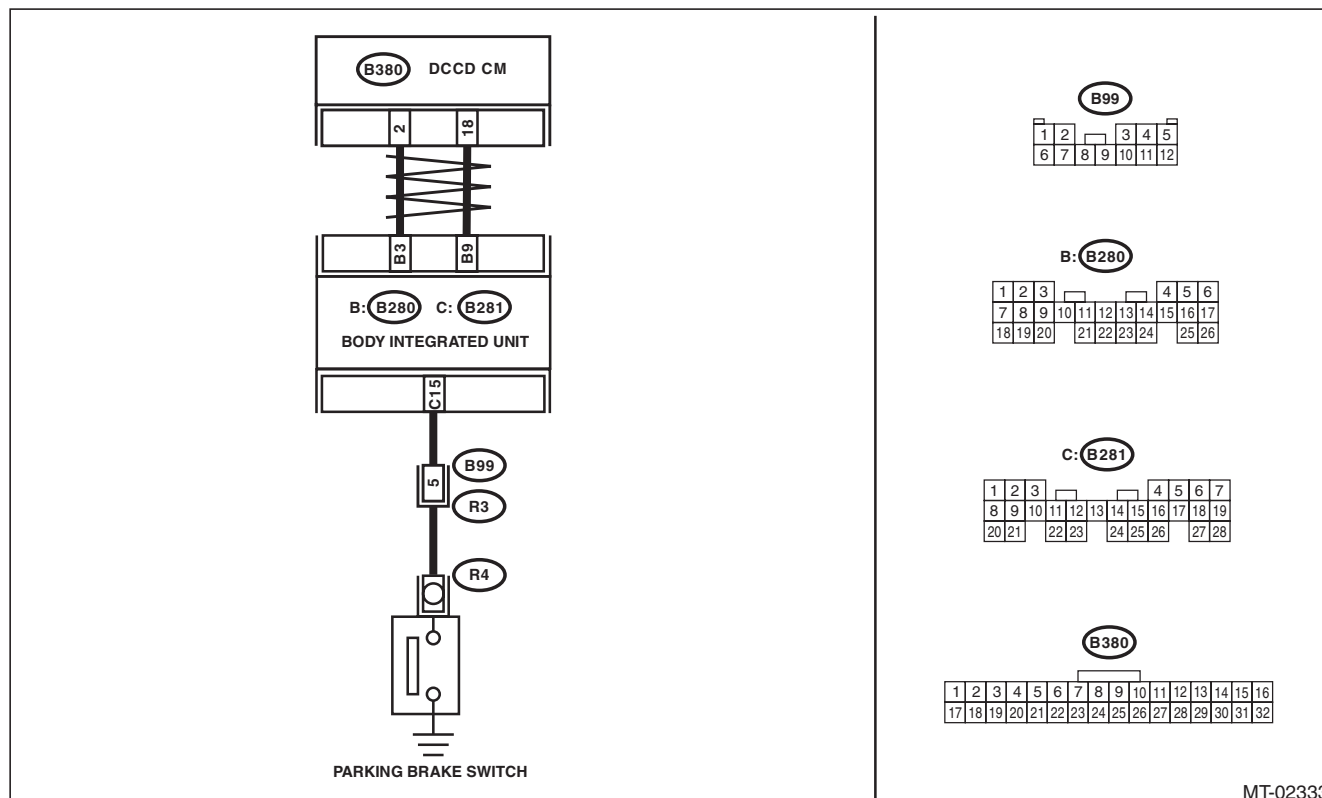
DIAGNOSIS:

Input signal circuit of parking brake switch is open or shorted.

TROUBLE SYMPTOM:

- It does not show a differential free tendency even when the parking brake switch is applied.
- Remains differential free even when the parking brake switch is released.

WIRING DIAGRAM:



MT-02333

Step	Check	Yes	No
1 CHECK IGNITION CIRCUIT OF DCCD CONTROL MODULE. 1) Connect the Subaru Select Monitor to the vehicle. 2) Turn the ignition switch to ON. 3) Read the data of «Battery voltage» using Subaru Select Monitor.	Is the voltage 11 V or more?	Go to step 2.	Repair the open circuit of harness between fuse (F/B No. 12) and DCCD control module, or between fuse (F/B No. 12) and battery.
2 CHECK DTC.	Is DTC P1720 displayed?	Perform the diagnosis according to DTC.	Go to step 3.
3 CHECK DCCD CONTROL MODULE. 1) Operate the parking brake lever. 2) Read the data of «Parking Position Switch» using Subaru Select Monitor.	Is the ON/OFF normally detected?	The parking brake switch circuit is currently operating properly.	Go to step 4.
4 CHECK BODY INTEGRATED UNIT. 1) Operate the parking brake lever. 2) Read the data of «Parking Position Switch» using Subaru Select Monitor.	Is the ON/OFF normally detected?	Go to step 7.	Go to step 5.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
5 CHECK HARNESS BETWEEN BODY INTEGRATED UNIT AND PARKING BRAKE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from body integrated unit. 3) Check for open circuit, short circuit to battery and short circuit to ground between the body integrated unit connector and parking brake switch connector. Connector & terminal (B281) No. 15 — (R4) No. 1:	Is the harness normal?	Go to step 6.	Repair or replace the harness.
6 CHECK PARKING BRAKE SWITCH. Measure the resistance between parking brake switch terminals.	Is the resistance less than 10 Ω when the parking brake lever is pulled? Is the resistance 1 M Ω or more when the parking brake lever is lowered?	Replace the body integrated unit.	Replace the parking brake switch.
7 CHECK DTC. Check DTC of body integrated unit.	Is the DTC related to CAN displayed?	Perform the diagnosis according to DTC.	Check the poor contact of DCCD system.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

C: CHECK DCCD MULTI SELECT SWITCH

DIAGNOSIS:

Input signal of DCCD multi select switch is open or shorted.

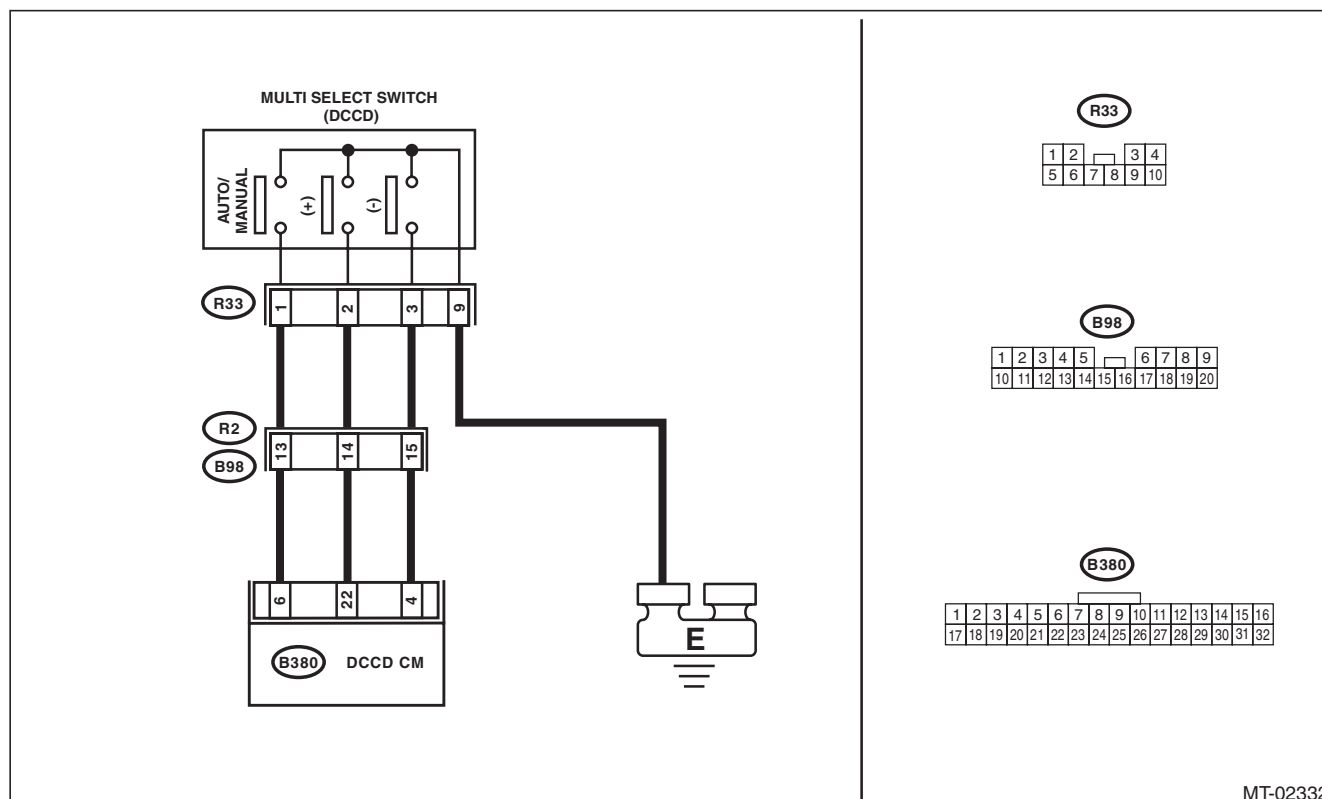
TROUBLE SYMPTOM:

- Does not enter the manual mode or auto mode when the mode change switch is pressed.
- Mode does not change in AUTO mode.
- Initial torque can not be changed in manual mode.

NOTE:

Other switch input can not be received if either mode change switch or C.DIFF +/- switch is stuck ON.

WIRING DIAGRAM:



Step	Check	Yes	No
1 CHECK DCCD CONTROL MODULE. 1) Display the current data «AUTO/MANUAL Mode Switch» of DCCD control module, using Subaru Select Monitor. 2) Press the manual mode change switch.	Does the data change from OFF/ON?	Go to step 2.	Go to step 4.
2 CHECK DCCD CONTROL MODULE. 1) Display the current data «Up Switch» of DCCD control module, using Subaru Select Monitor. 2) Push the multi select switch toward plus.	Does the data change from OFF/ON?	Go to step 3.	Go to step 5.
3 CHECK DCCD CONTROL MODULE. 1) Display the current data «Down Switch» of DCCD control module, using Subaru Select Monitor. 2) Push the multi select switch toward minus.	Does the data change from OFF/ON?	The switch circuit is normal.	Go to step 6.

Diagnostic Procedure without Diagnostic Trouble Code (DTC)

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Step	Check	Yes	No
4 CHECK MODE CHANGE SWITCH. 1) Disconnect the multi select switch connector. 2) Press the mode change switch. 3) Using the tester, measure the resistance between terminals. Connector & terminal (R33) No. 1 — No. 9:	Is the resistance less than 1 Ω ?	Go to step 7.	Replace the multi select switch. <Ref. to FU(STI)-58, SI-DRIVE (SUBARU Intelligent Drive) Selector.>
5 CHECK MULTI SELECT SWITCH. 1) Push the multi select switch toward plus. 2) Using the tester, measure the resistance between terminals. Connector & terminal (R33) No. 2 — No. 9:	Is the resistance less than 1 Ω ?	Go to step 7.	Replace the multi select switch. <Ref. to FU(STI)-58, SI-DRIVE (SUBARU Intelligent Drive) Selector.>
6 CHECK MULTI SELECT SWITCH. 1) Push the multi select switch toward minus. 2) Using the tester, measure the resistance between terminals. Connector & terminal (R33) No. 3 — No. 9:	Is the resistance less than 1 Ω ?	Go to step 7.	Replace the multi select switch. <Ref. to FU(STI)-58, SI-DRIVE (SUBARU Intelligent Drive) Selector.>
7 CHECK HARNESS. Use a tester to measure the resistance between the multi select switch harness connector and chassis ground. Connector & terminal (R33) No. 9 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 8.	Repair or replace the ground circuit.
8 CHECK HARNESS. 1) Disconnect the connector from DCCD control module. 2) Use a tester to measure the resistance between the DCCD control module and the multi select switch. Connector & terminal (R33) No. 1 — (B380) No. 6: (R33) No. 2 — (B380) No. 22: (R33) No. 3 — (B380) No. 4:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair or replace the open circuit of the harness.
9 CHECK HARNESS. Using the tester, measure the resistance between terminals. Connector & terminal (R33) No. 1 — (R33) No. 2: (R33) No. 1 — (R33) No. 3: (R33) No. 3 — (R33) No. 2:	Is the resistance 1 M Ω or more?	Go to step 10.	Repair or replace the short of harness.
10 CHECK HARNESS. Using the tester, measure the resistance between terminals. Connector & terminal (R33) No. 1 — Chassis ground: (R33) No. 2 — Chassis ground: (R33) No. 3 — Chassis ground:	Is the resistance 1 M Ω or more?	Check the poor contact.	Repair or replace the short of harness.

Diagnostics with Phenomenon

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

15. Diagnostics with Phenomenon

A: INSPECTION

Symptoms	Faulty parts
A tight corner braking symptom occurs.	• VDCCM&H/U • ABS wheel speed sensor • Yaw rate & G sensor • Steering angle sensor • CAN communication signal • Center differential • C.DIFF +/- switch • Mode change switch • Tire/Wheel • DCCD control module • ECM • Body integrated unit
An oversteer tendency will become apparent.	• Throttle position sensor • ECM • C.DIFF +/- switch • Mode change switch • Tire/Wheel • DCCD control module • Center differential • DCCD relay • Rear differential oil temperature switch • Neutral position switch • Steering angle sensor • VDCCM&H/U • CAN communication signal • Body integrated unit • Yaw rate & G sensor
A tendency to understeer occurs during high speed cornering.	• VDCCM&H/U • ABS wheel speed sensor • CAN communication signal • Throttle position sensor • Yaw rate & G sensor • Center differential • ECM • Engine speed signal • Neutral position switch • Steering angle sensor • Body integrated unit
Torque characteristics of the center differential do not change.	• C.DIFF +/- switch • DCCD relay • Center differential • DCCD control module
DCCD indicator does not operate. (is not displayed)	• Combination meter • DCCD control module
DCCD indicator does not operate even when the C.DIFF +/- switch is operated. (Displayed but does not change. or, the display blinks.)	• C.DIFF +/- switch • Combination meter • DCCD control module
DCCD AUTO mode does not operate even when the C.DIFF +/- switch is operated. (Displayed but does not change.)	• Mode change switch • Combination meter • DCCD control module • Body integrated unit • CAN communication signal

Diagnostics with Phenomenon

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

Symptoms	Faulty parts
DCCD AUTO mode display does not illuminate.	• Mode change switch • Combination meter • DCCD control module • Body integrated unit • CAN communication signal
Will not become differential free or remains differential free.	• Parking brake switch • Center differential • Mode change switch • C.DIFF +/- switch • Rear differential • Tire/Wheel • DCCD relay • Rear differential oil temperature switch • DCCD control module • ECM • Body integrated unit • VDCCM&H/U • Yaw rate & G sensor • CAN communication signal
ABS does not operate.	• VDCCM&H/U • CAN communication signal • Stop light switch • DCCD control module • ECM • Body integrated unit • Yaw rate & G sensor
Will not lock the differential or the differential is continually locked.	• VDCCM&H/U • ABS wheel speed sensor • CAN communication signal • Center differential • C.DIFF +/- switch • Mode change switch • Tire/Wheel • DCCD control module • DCCD relay • ECM • Body integrated unit • Yaw rate & G sensor

Diagnostics with Phenomenon

MANUAL TRANSMISSION AND DIFFERENTIAL (DIAGNOSTICS)

6MT(diag)-40

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CLUTCH SYSTEM

CL

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General Description

CLUTCH SYSTEM

1. General Description

A: SPECIFICATION

Model			STI	Except for STI
Transmission type			6MT	5MT
Clutch cover	Type		Pull type	Push type
	Diaphragm set load	N (kgf, lbf)	9,120 (930, 2051)	7,450 (760, 1,675)
Clutch disc	Facing material		Woven (Non-asbestos)	
	O.D. × I.D. × thickness mm (in)	Clutch cover side	240 × 160 × 3.5 (9.45 × 6.30 × 0.138)	230 × 155 × 3.5 (9.06 × 6.10 × 0.138)
		Flywheel side	240 × 160 × 3.2 (9.45 × 6.30 × 0.126)	230 × 155 × 3.2 (9.06 × 6.10 × 0.126)
	Spline outer diameter mm (in)		25.2 (0.992), (Number of teeth: 24)	
	Depth of rivet head mm (in)	Clutch cover side	1.65 — 2.25 (0.065 — 0.089)	
		Flywheel side	1.35 — 1.95 (0.053 — 0.077)	
		Limit of sinking	0.3 (0.012)	
	Deflection limit mm (in)		0.7 (0.028) at R = 115 (4.53)	0.7 (0.028) at R = 110 (4.33)
Release bearing			Grease-packed self-aligning	
Clutch pedal	Full stroke	mm (in)	130 — 135 (5.12 — 5.31)	135 — 140 (5.31 — 5.51)
	Free play	mm (in)	5 — 11 (0.20 — 0.43)	
Flywheel	Type		Conventional	Flexible

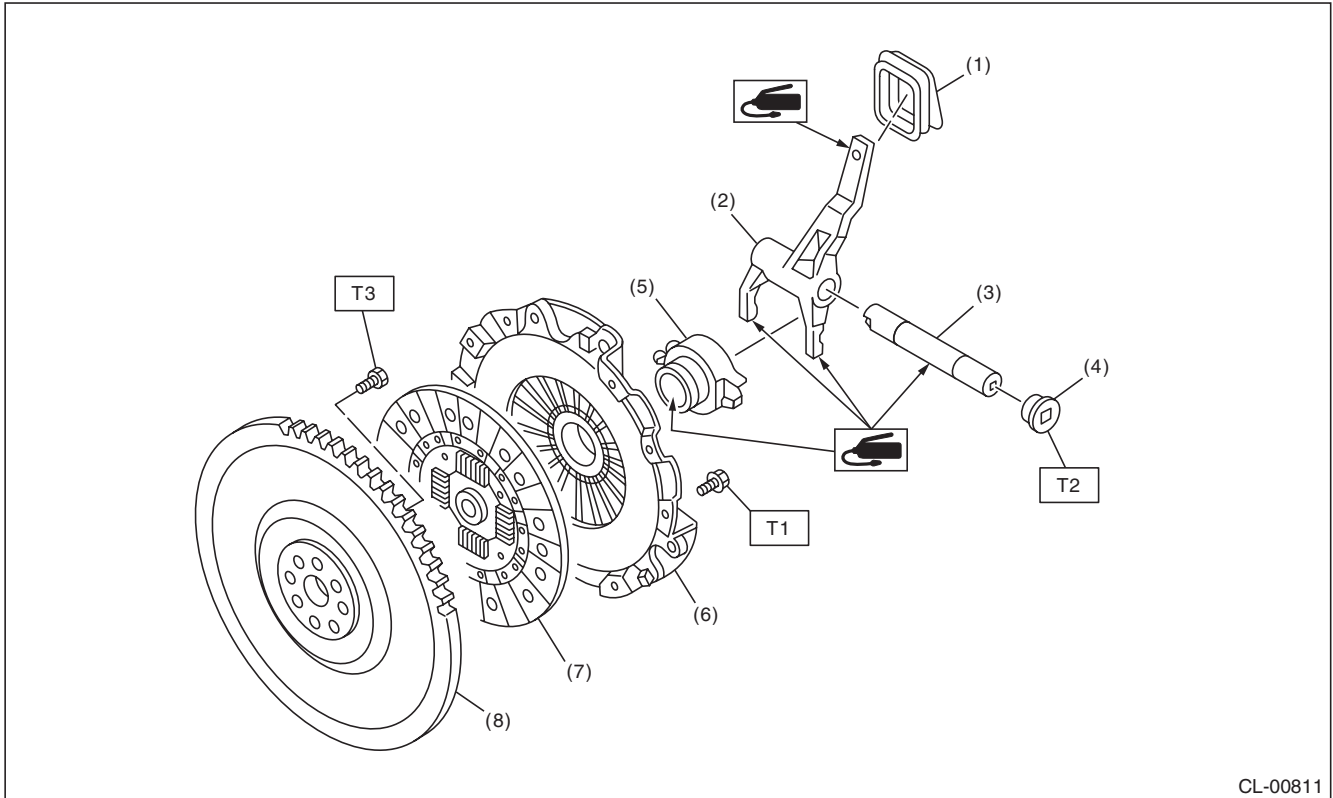
General Description

CLUTCH SYSTEM

B: COMPONENT

1. CLUTCH ASSEMBLY

- STI model



- | | |
|--------------------------------|---------------------------|
| (1) Dust cover | (5) Release bearing |
| (2) Release lever | (6) Clutch cover |
| (3) Clutch release lever shaft | (7) Clutch disc |
| (4) Plug | (8) Conventional flywheel |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

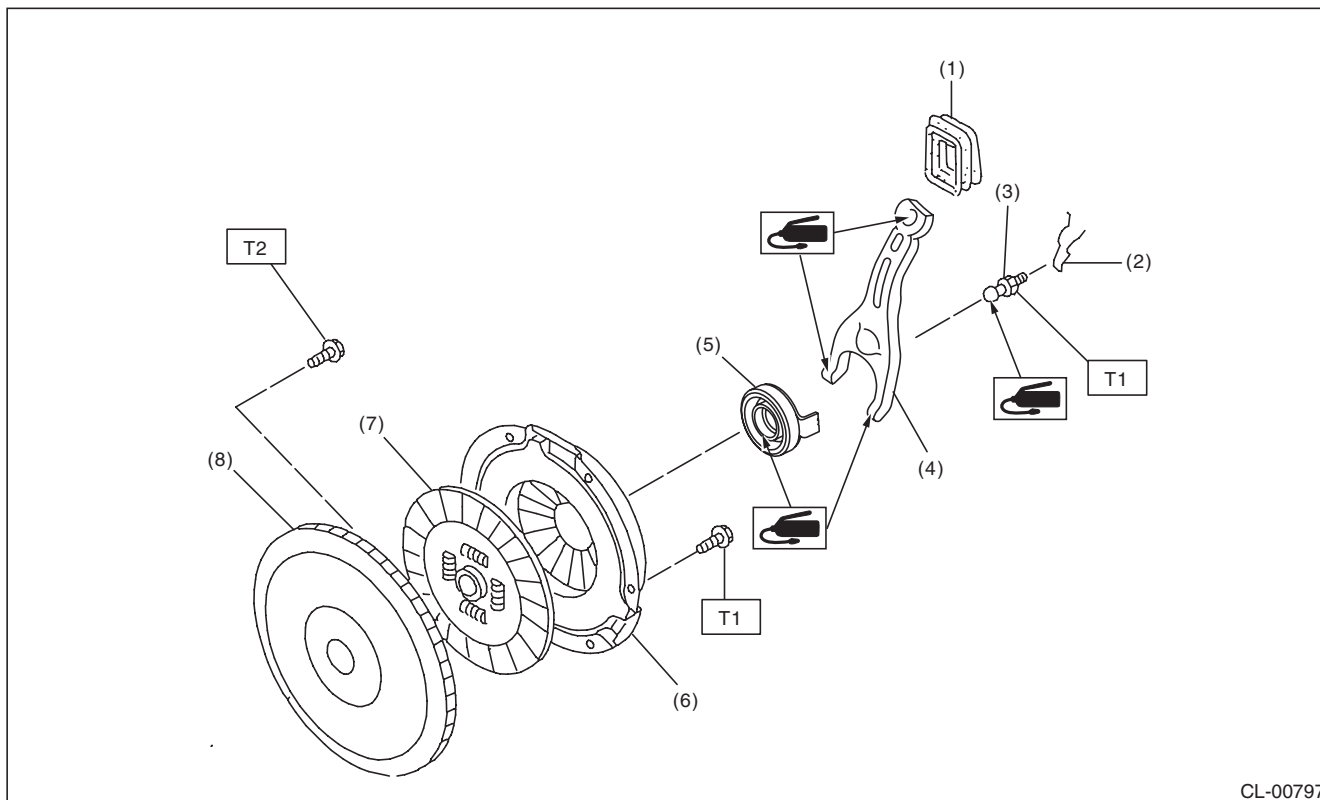
T2: 48 (4.9, 35.4)

T3: 75 (7.6, 55.3)

General Description

CLUTCH SYSTEM

- Except for STI model



CL-00797

- | | |
|-------------------|---------------------|
| (1) Dust cover | (5) Release bearing |
| (2) Lever spring | (6) Clutch cover |
| (3) Pivot | (7) Clutch disc |
| (4) Release lever | (8) Flywheel |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 16 (1.6, 11.8)

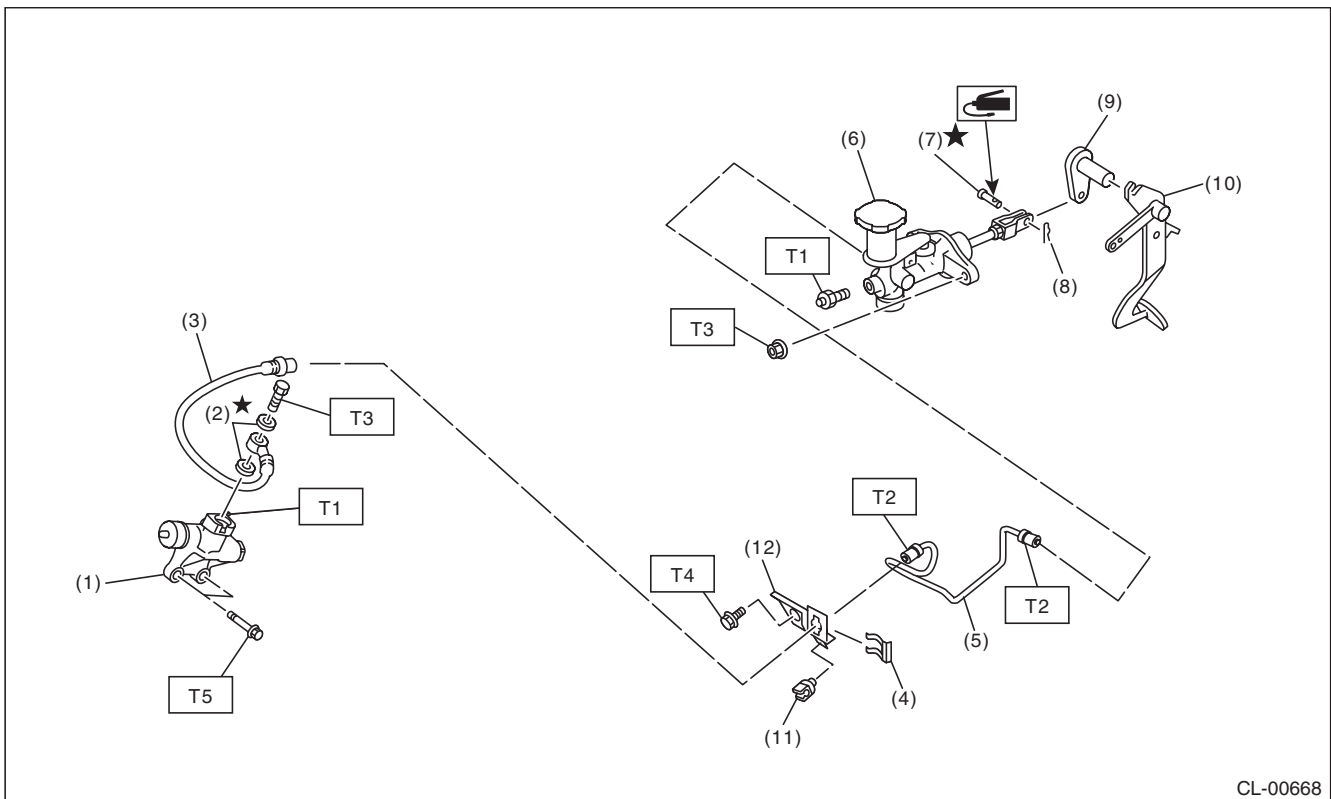
T2: 75 (7.6, 55.3)

General Description

CLUTCH SYSTEM

2. CLUTCH PIPE AND HOSE

- STI model



- | | |
|--------------------------|----------------|
| (1) Operating cylinder | (7) Clevis pin |
| (2) Washer | (8) Snap pin |
| (3) Clutch hose | (9) Lever |
| (4) Clip | (10) Pedal |
| (5) Clutch pipe | (11) Clamp |
| (6) Master cylinder ASSY | (12) Bracket |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.8 (0.8, 5.8)

T2: 15 (1.5, 11.1)

T3: 18 (1.8, 13.3)

T4: 25 (2.5, 18.4)

T5: 41 (4.2, 30.2)

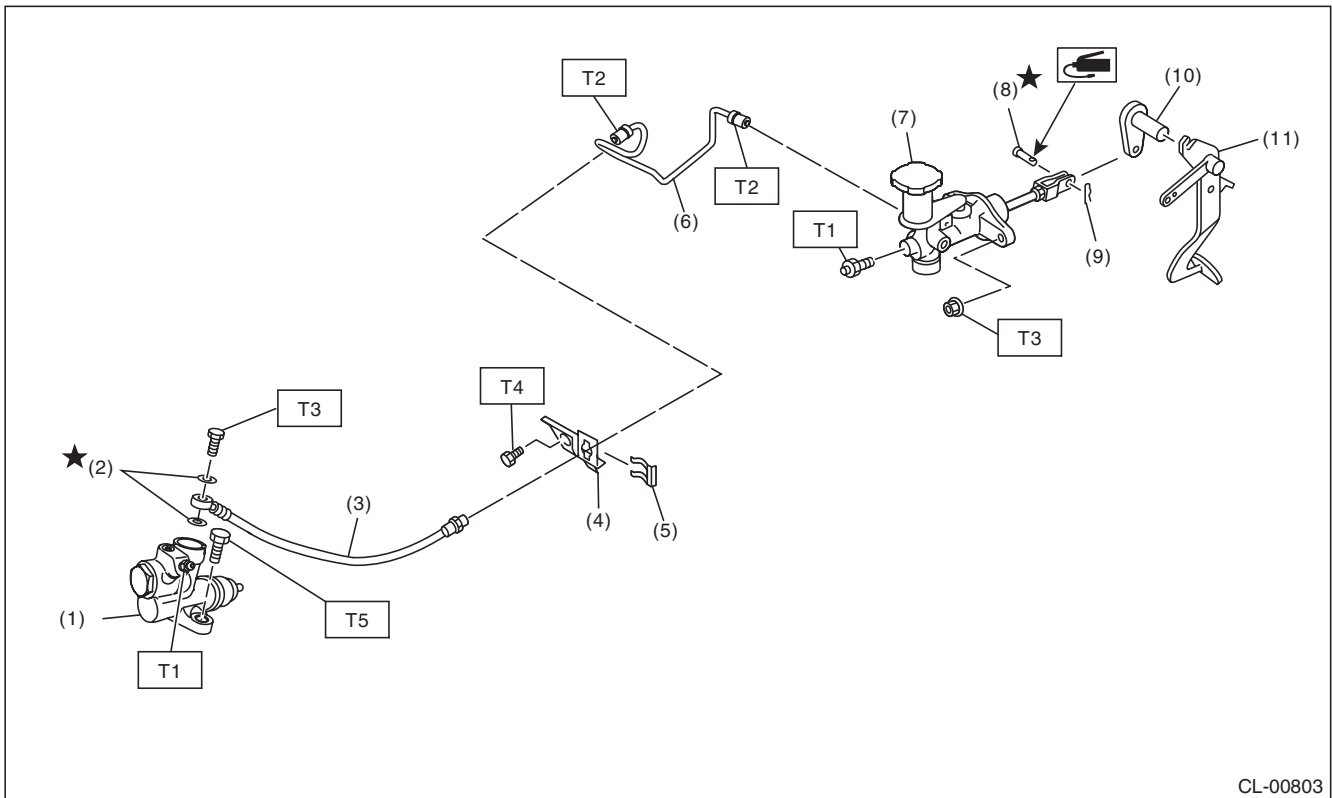
CL-5

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General Description

CLUTCH SYSTEM

- Except for STI model



- (1) Operating cylinder
- (2) Washer
- (3) Clutch hose
- (4) Bracket
- (5) Clip
- (6) Clutch pipe

- (7) Master cylinder ASSY
- (8) Clevis pin
- (9) Snap pin
- (10) Lever
- (11) Pedal

Tightening torque:N-m (kgf-m, ft-lb)

T1: 7.8 (0.8, 5.8)

T2: 15 (1.5, 11.1)

T3: 18 (1.8, 13.3)

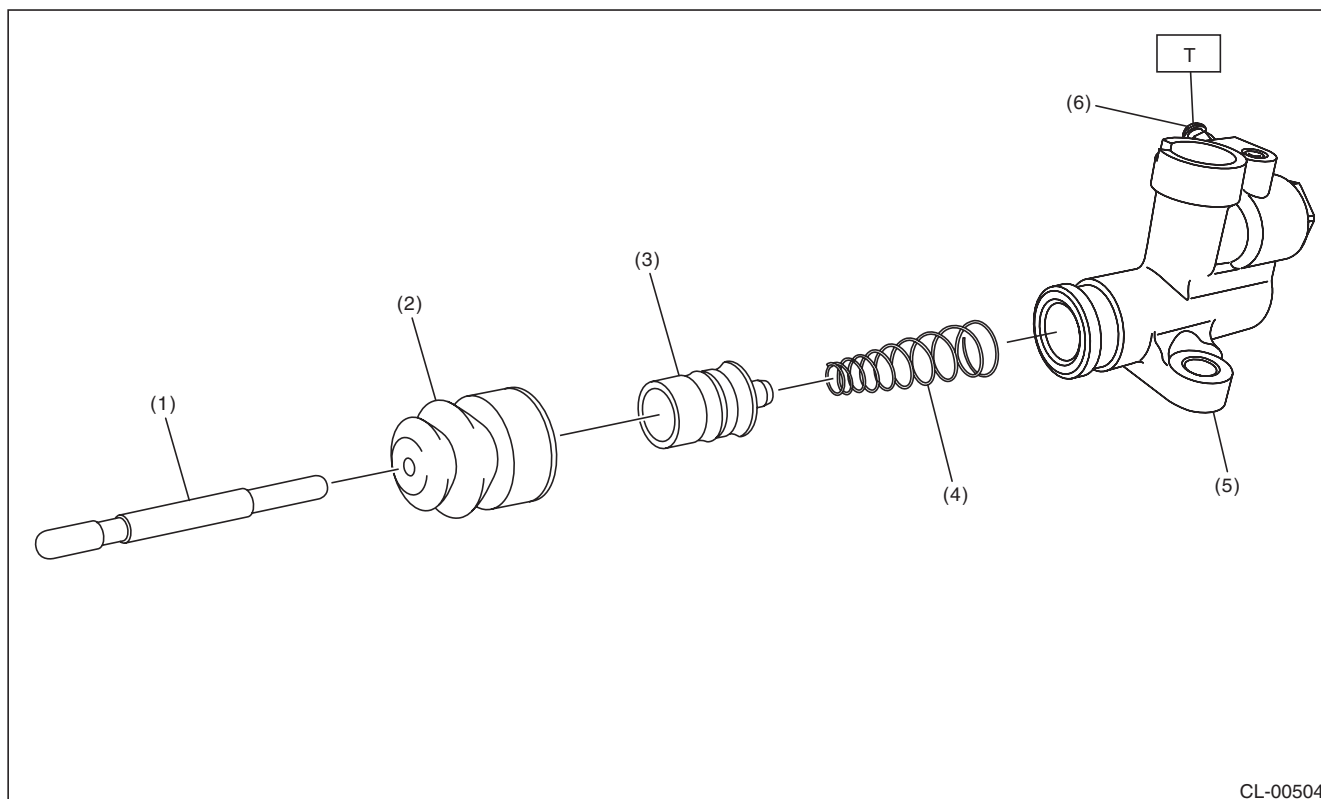
T4: 25 (2.5, 18.4)

T5: 37 (3.8, 27.3)

General Description

CLUTCH SYSTEM

3. OPERATING CYLINDER



CL-00504

- | | |
|--------------|------------------------|
| (1) Push rod | (4) Piston spring |
| (2) Boot | (5) Operating cylinder |
| (3) Piston | (6) Breather screw |

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.8 (0.8, 5.8)

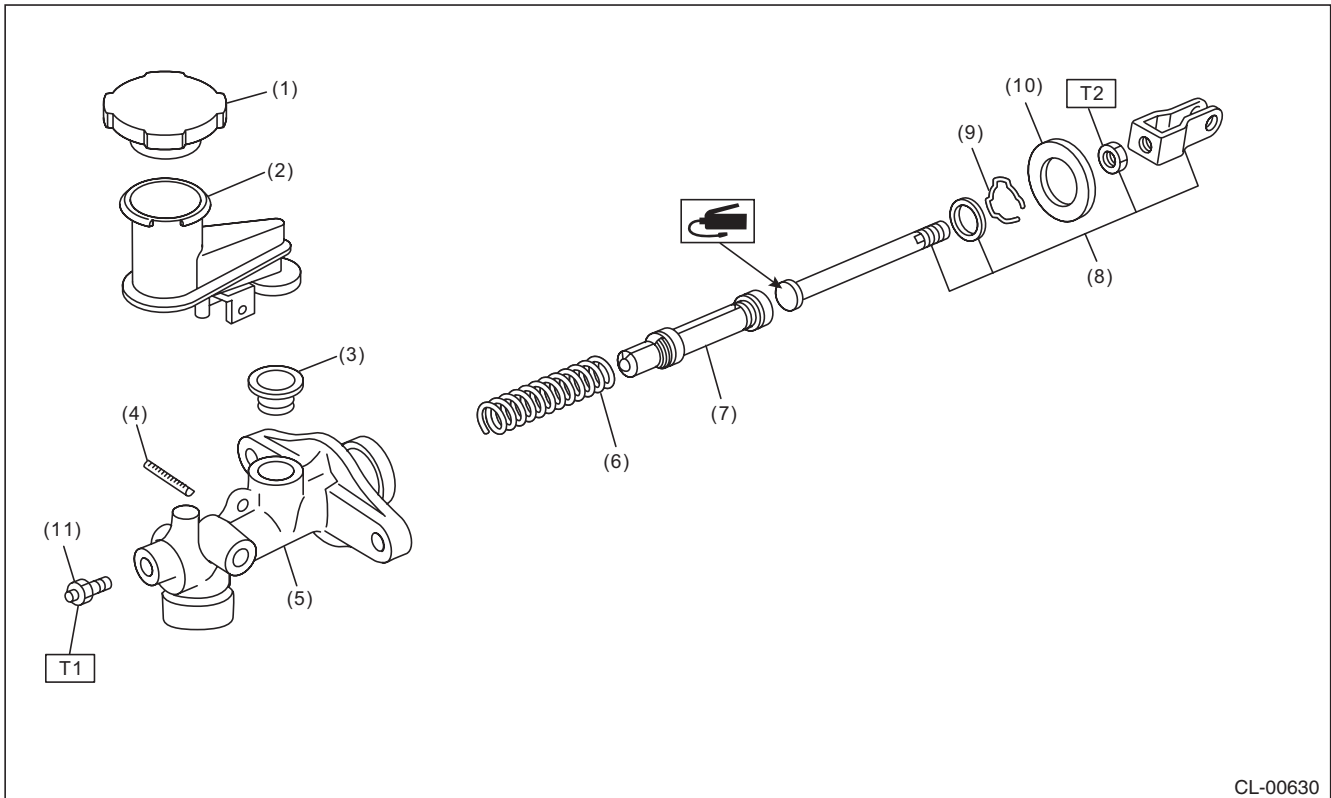
CL-7

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General Description

CLUTCH SYSTEM

4. MASTER CYLINDER



- (1) Reservoir cap
- (2) Reservoir tank
- (3) Oil seal
- (4) Straight pin
- (5) Master cylinder

- (6) Return spring
- (7) Piston
- (8) Push rod ASSY
- (9) Piston stop ring
- (10) Seat

- (11) Breather screw

Tightening torque: N·m (kgf-m, ft-lb)

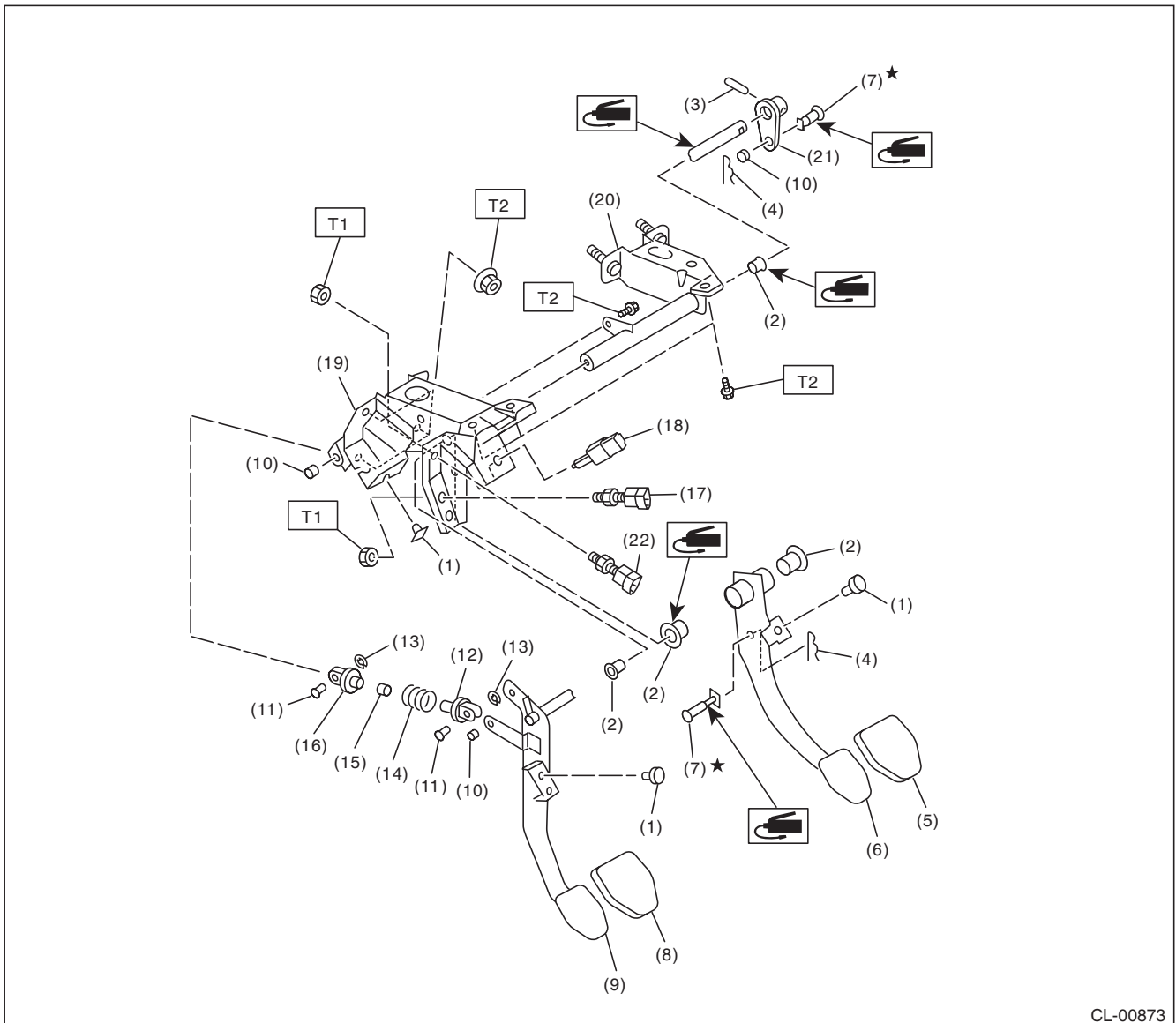
T1: 7.8 (0.8, 5.8)

T2: 10 (1.0, 7.4)

General Description

CLUTCH SYSTEM

5. CLUTCH PEDAL



CL-00873

(1) Stopper	(10) Bushing C	(19) Pedal bracket
(2) Bushing	(11) Clutch clevis pin	(20) Clutch master cylinder bracket
(3) Spring pin	(12) Assist rod A	(21) Lever
(4) Snap pin	(13) Clip	(22) Clutch start switch
(5) Brake pedal pad	(14) Assist spring	
(6) Brake pedal	(15) Assist bushing	
(7) Clevis pin	(16) Assist rod B	
(8) Clutch pedal pad	(17) Clutch switch	
(9) Clutch pedal	(18) Stop light switch	

Tightening torque:N-m (kgf-m, ft-lb)

T1: 8 (0.8, 5.9)

T2: 18 (1.8, 13.3)

CL-9

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General Description

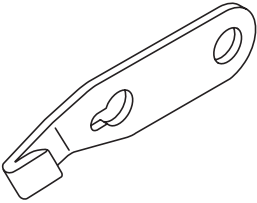
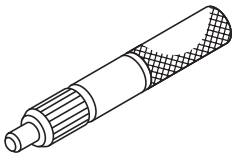
CLUTCH SYSTEM

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of the flywheel.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing the clutch disc to the flywheel.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and ampere.
Dial gauge	Used for measuring clutch disc run-out.
Depth gauge	Used for measuring clutch disc wear.

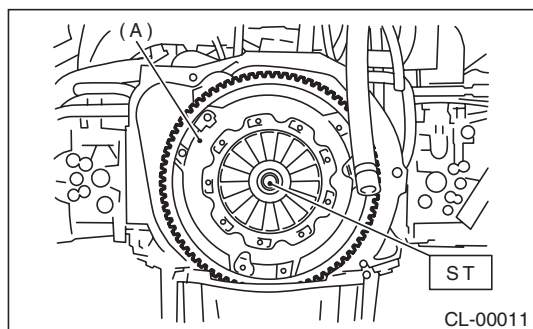
2. Clutch Disc and Cover

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.> <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>

2) Attach the ST on the flywheel.

ST 499747100 CLUTCH DISC GUIDE



(A) Clutch cover

3) Remove the clutch cover and clutch disc.

NOTE:

- Take care not to allow oil to touch the clutch disc face.
- Do not disassemble the clutch cover or clutch disc.

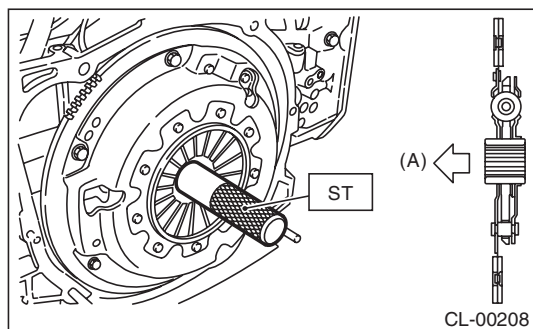
B: INSTALLATION

1) Insert the ST into the clutch disc and attach to the flywheel by inserting the ST end into pilot bearing.

NOTE:

When installing the clutch disc, be careful to attach in the correct direction.

ST 499747100 CLUTCH DISC GUIDE



(A) Flywheel side

2) Install the clutch cover to the flywheel and tighten the bolts to the specified torque.

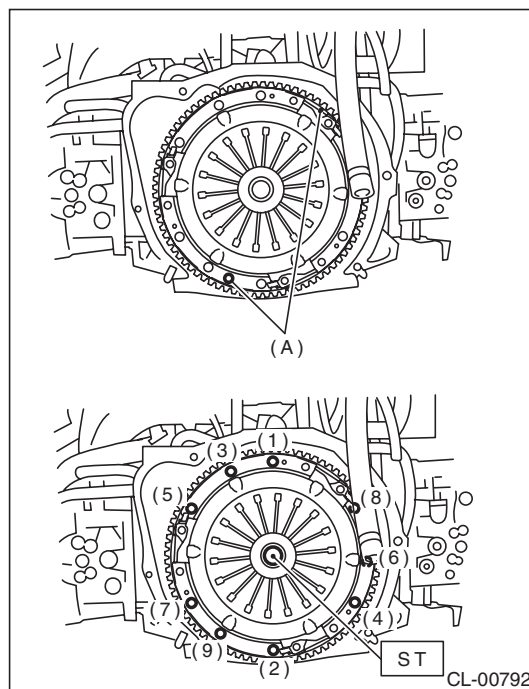
NOTE:

- When installing a clutch cover to the flywheel, position the clutch cover so that the spacing between the unbalance marks (paint mark) on the flywheel and clutch cover is 120° or more apart. (The unbalance mark indicates the direction of residual unbalance.)
- Note the front and rear of the clutch disc when installing.
- Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

- STI model

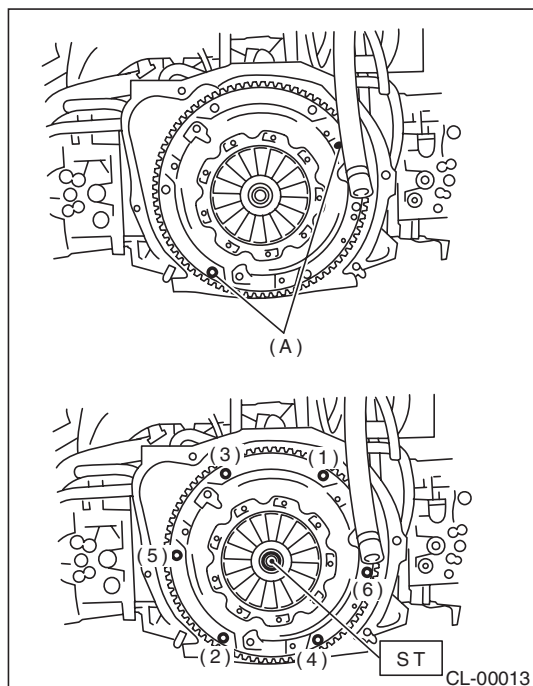


(A) Unbalance mark (paint)

Clutch Disc and Cover

CLUTCH SYSTEM

- Except for STI model



(A) Unbalance mark (paint)

3) Remove the ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install the transmission assembly. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.> <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1. CLUTCH DISC

1) Facing wear

Measure the depth from the facing surface to the rivet head. Replace if the face is worn locally or worn down to less than the specified value.

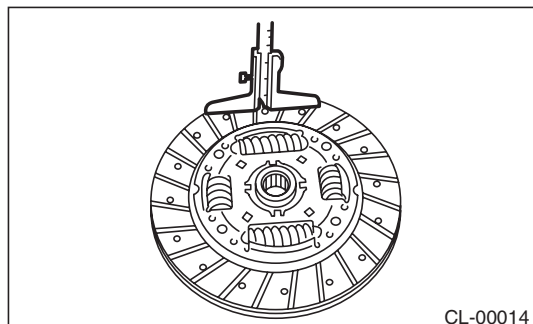
Depth to rivet head:

Limit of sinking

0.3 mm (0.012 in)

NOTE:

Do not wash the clutch disc with any type of cleaning fluid.

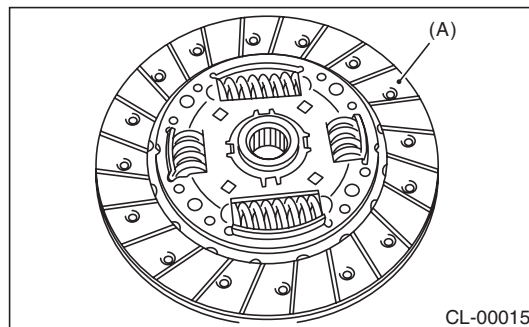


2) Hardened facing

Replace the clutch disc.

3) Oil soakage on facing

Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other locations for oil leakage.



(A) Clutch facing

4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of the facing, replace the clutch disc.

ST 499747100 CLUTCH DISC GUIDE

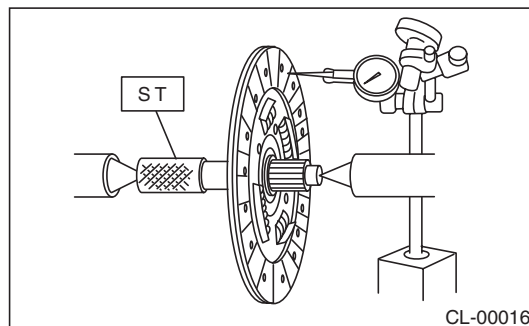
Limit for deflection:

STI model

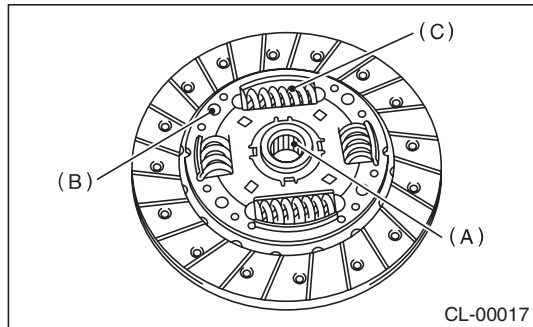
0.7 mm (0.028 in) at R = 115 mm (4.53 in)

Except for STI model

0.7 mm (0.028 in) at R = 110 mm (4.33 in)



5) If there is spline wear, loose rivets, failed damper springs, etc., replace the clutch disc.



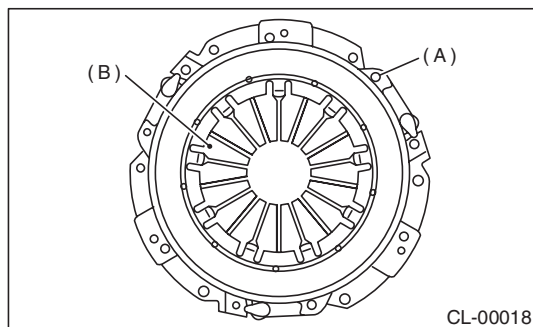
- (A) Spline
- (B) Rivet
- (C) Damper spring

2. CLUTCH COVER

NOTE:

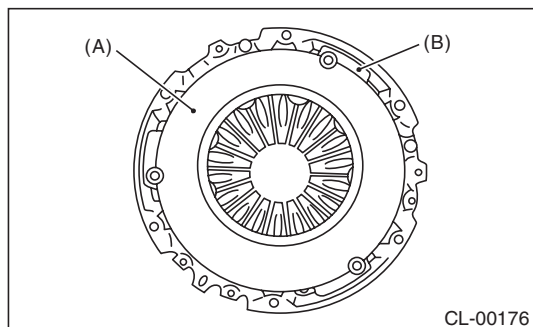
Visually check the following items without disassembling, and replace or repair if defective.

- 1) Loose thrust rivet
- 2) Damaged or worn bearing contact area at the center of diaphragm spring



- (A) Thrust rivet
- (B) Diaphragm spring

- 3) Damaged or worn disc contact surface of the pressure plate
- 4) Loose strap plate installation area
- 5) Worn diaphragm sliding area



- (A) Pressure plate
- (B) Strap plate

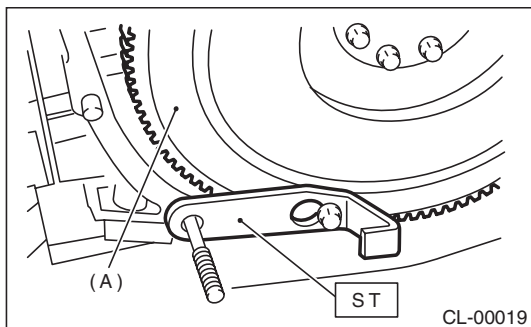
Flywheel

CLUTCH SYSTEM

3. Flywheel

A: REMOVAL

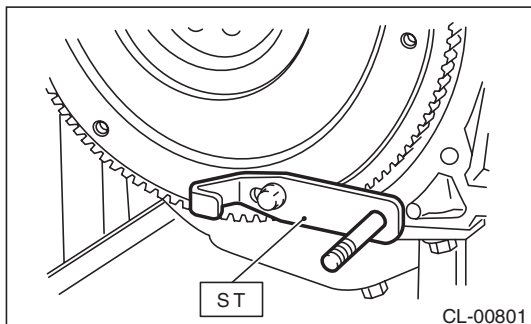
- 1) Remove the transmission assembly. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.> <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch cover and clutch disc. <Ref. to CL-11, REMOVAL, Clutch Disc and Cover.>
- 3) Using the ST, remove the flywheel.
ST 498497100 CRANKSHAFT STOPPER



(A) Flywheel

B: INSTALLATION

- 1) Install the flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



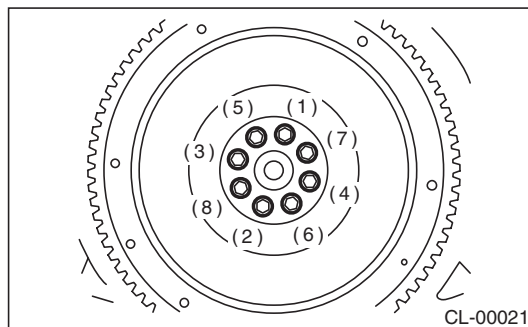
- 2) Tighten the flywheel mounting bolts to the specified torque.

NOTE:

Tighten the flywheel attachment bolts gradually. Each bolt should be tightened to the specified torque in crisscross order.

Tightening torque:

75 N·m (7.6 kgf-m, 55.3 ft-lb)



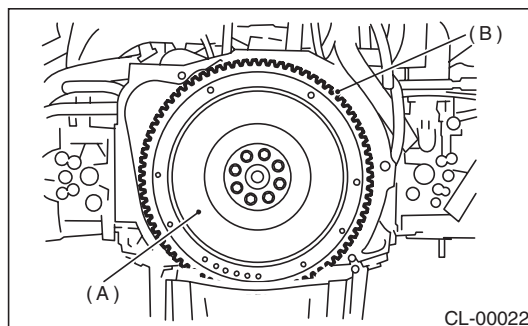
- 3) Install the clutch disc and cover. <Ref. to CL-11, INSTALLATION, Clutch Disc and Cover.>
- 4) Install the transmission assembly. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.> <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

CAUTION:

Because the center bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or solvents.

- 1) If there is damage or defectiveness in the facing sliding surface or ring gear, replace the flywheel.



- (A) Flywheel
(B) Ring gear

- 2) Smoothness of rotation

Rotate the ball bearing while applying pressure in the thrust direction.

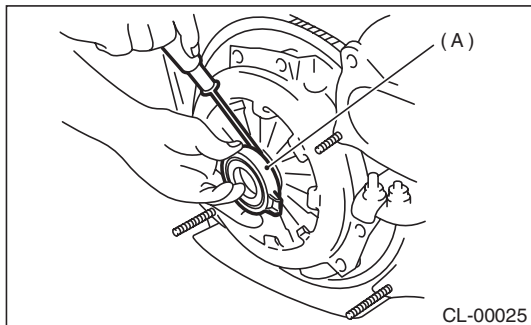
- 3) If noise or excessive play is noted, replace the flywheel.

4. Release Bearing and Lever

A: REMOVAL

1. STI MODEL

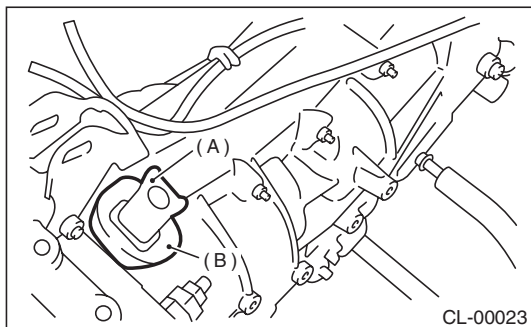
- 1) Remove the transmission assembly from the vehicle. <Ref. to 6MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the release lever from the transmission.
- 3) Using a flat tip screwdriver, remove the release bearing from the clutch cover.



(A) Release bearing

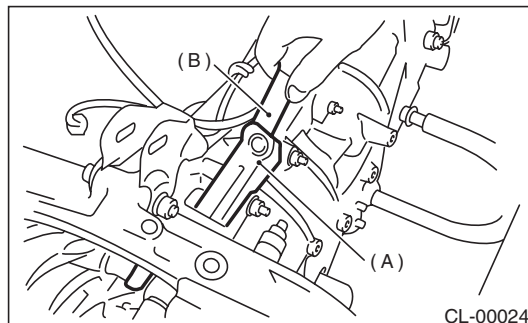
2. EXCEPT FOR STI MODEL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 5MT-23, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the dust cover.



(A) Release lever
(B) Dust cover

- 3) Remove the lever spring from the pivot with a screwdriver by accessing it through the clutch housing release lever hole. Then remove the release lever and release bearing as a unit.



(A) Release lever
(B) Screwdriver

B: INSTALLATION

1. STI MODEL

NOTE:

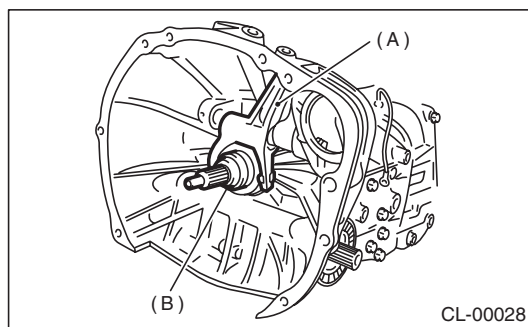
Apply the specified grease to lubricate to the following points before installation.

- Release lever shaft
- Contact surface of release lever and bearing
- Transmission main shaft spline
- Contact surface of release bearing and clutch release bearing guide

Grease:

NICHIMOLY N-130 or equivalent

- 1) Attach the release bearing to the transmission.
- 2) Insert the release lever into the release bearing tab.



(A) Release lever
(B) Release bearing

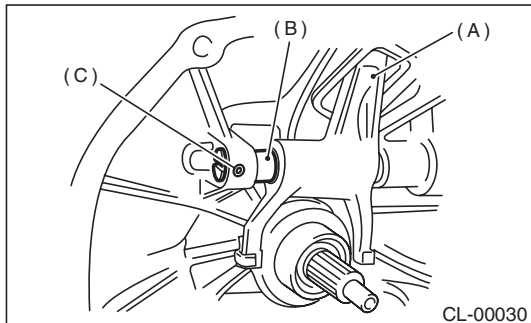
Release Bearing and Lever

CLUTCH SYSTEM

3) Insert the release lever shaft into the release lever.

NOTE:

Make sure the cut portion of the release lever shaft comes into contact with the spring pin.

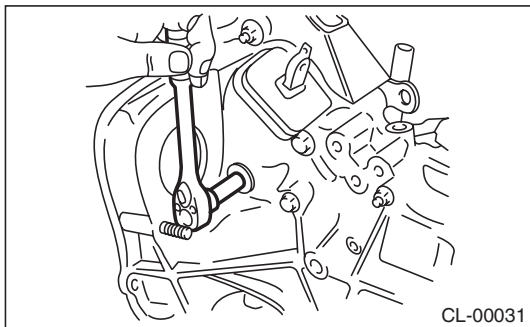


- (A) Release lever
- (B) Release lever shaft
- (C) Spring pin

4) Tighten the plugs.

Tightening torque:

48 N·m (4.9 kgf-m, 35.4 ft-lb)



5) Check the bearing for smooth movement by operating the release lever.

6) Apply grease to the contact surface of the release lever and operating cylinder.

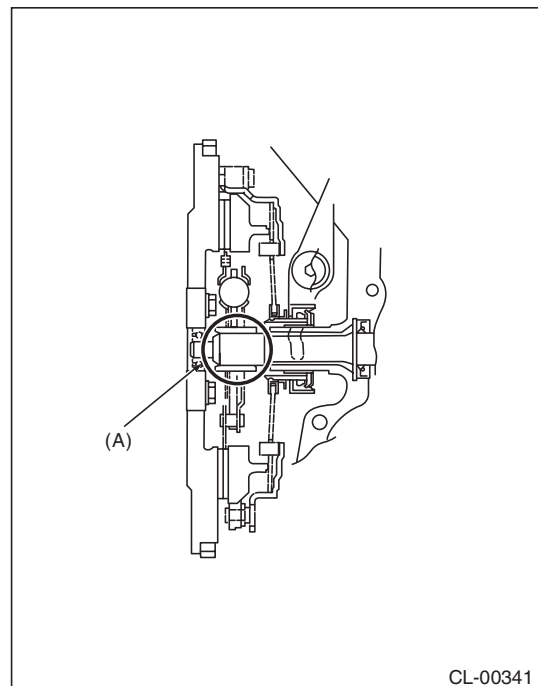
Grease:

NICHIMOLY N-130 or equivalent

7) Apply grease to splines.

Grease:

NICHIMOLY N-130 or equivalent



- (A) Spline

8) Install the transmission assembly. <Ref. to 6MT-34, INSTALLATION, Manual Transmission Assembly.>

2. EXCEPT FOR STI MODEL

NOTE:

Apply the specified grease to lubricate to the following points before installation.

- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline
- Contact surface of release bearing and transmission case

Grease:

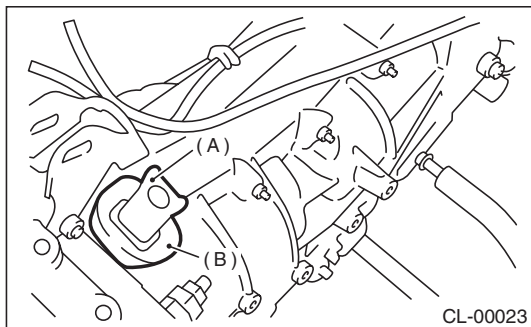
NICHIMOLY N-130 or equivalent

1) Install the release bearing by inserting the release lever into the clutch housing release lever hole. Then, fit the lever spring onto the raised portion of the pivot by pushing the release lever to the pivot and twisting it to both sides.

Release Bearing and Lever

CLUTCH SYSTEM

2) Install the dust cover.



- (A) Release lever
(B) Dust cover

3) Check the bearing for smooth movement by operating the release lever.

4) Apply grease to the contact surface of the release lever and operating cylinder.

Grease:

NICHIMOLY N-130 or equivalent

5) Install the transmission assembly. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1. RELEASE BEARING

CAUTION:

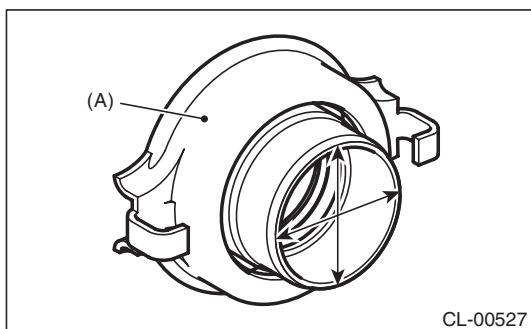
Since this bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or any other solvent when servicing the clutch.

1) Check the bearing for smooth movement by applying force to the bearing in the radial direction.

Radial direction stroke:

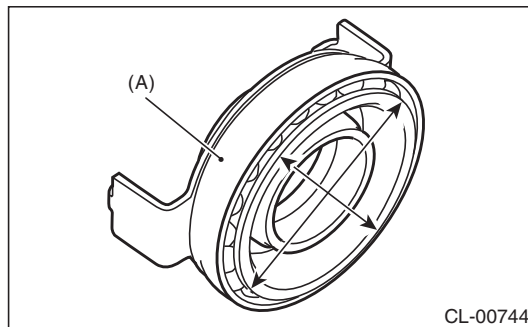
1.6 mm (0.063 in)

• STI model



- (A) Bearing case

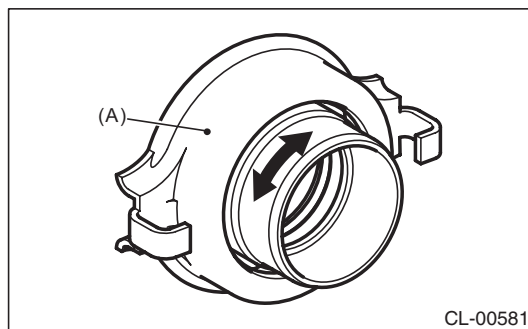
• Except for STI model



- (A) Bearing case

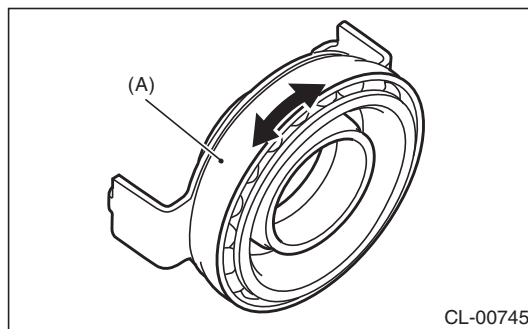
2) While applying force to the bearing in the rotational direction, check the bearing for smooth rotation.

• STI model



- (A) Bearing case

• Except for STI model



- (A) Bearing case

3) Check for wear and damage at the bearing case surface in contact with the lever.

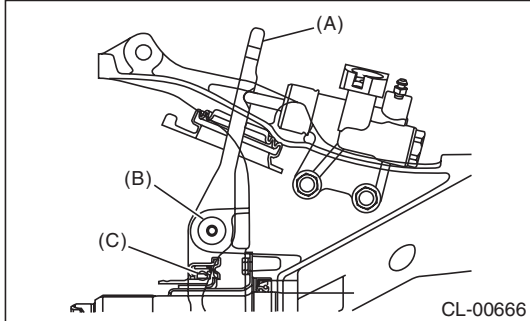
Release Bearing and Lever

CLUTCH SYSTEM

2. RELEASE LEVER

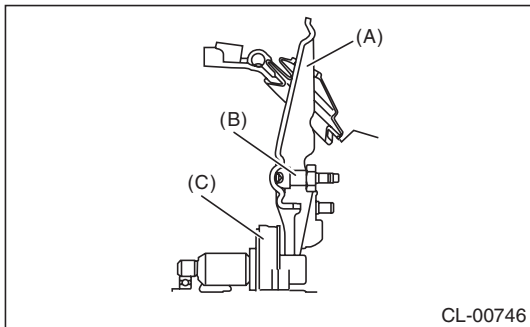
Check for wear in release shaft contact area and release bearing case contact area of the lever.

- **STI model**



- (A) Release lever
- (B) Release shaft
- (C) Release bearing

- **Except for STI model**



- (A) Release lever
- (B) Pivot
- (C) Release bearing

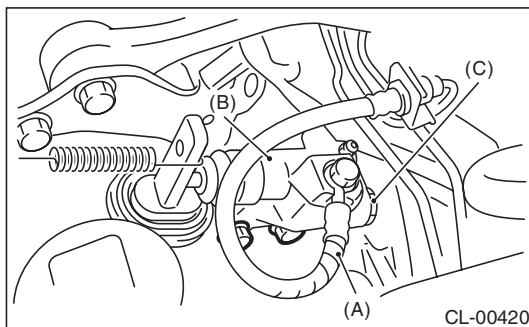
5. Operating Cylinder

A: REMOVAL

- 1) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.> <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 2) Disconnect the clutch hose from the operating cylinder.

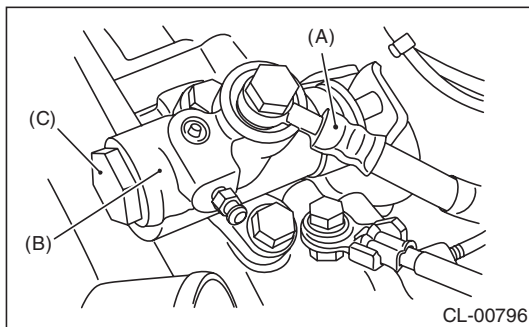
CAUTION:

- Cover the hose joint to prevent the clutch fluid from flowing out.
- Do not loosen or remove the cap bolts.
- STI model



- (A) Clutch hose
- (B) Operating cylinder
- (C) Cap bolt

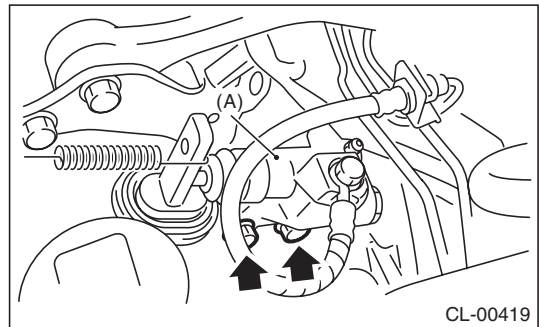
- Except for STI model



- (A) Clutch hose
- (B) Operating cylinder
- (C) Cap bolt

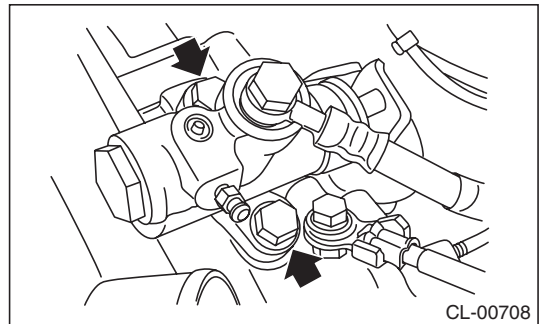
- 3) Remove the operating cylinder from the transmission.

- STI model



- (A) Operating cylinder

- Except for STI model



Operating Cylinder

CLUTCH SYSTEM

B: INSTALLATION

1) Install in the reverse order of removal.

NOTE:

- Use a new gasket.
- Before installing the operating cylinder, apply grease to the contact point of the release lever and operating cylinder.

Grease

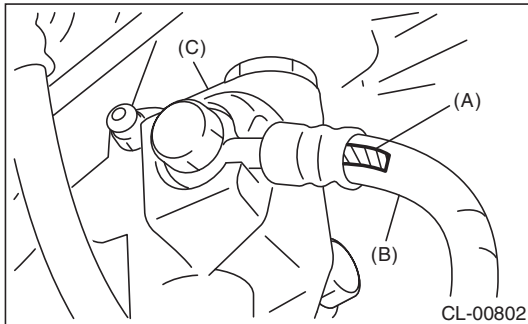
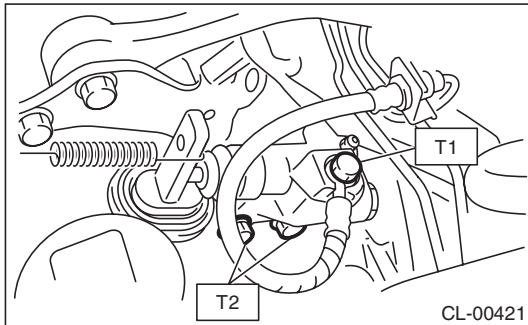
NICHIMOLY N-130 or equivalent

- Be sure to install the clutch hose with the mark side facing upward.
- Be careful not to twist the clutch hose during installation.
- STI model

Tightening torque:

T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

T2: 41 N·m (4.2 kgf-m, 30.2 ft-lb)



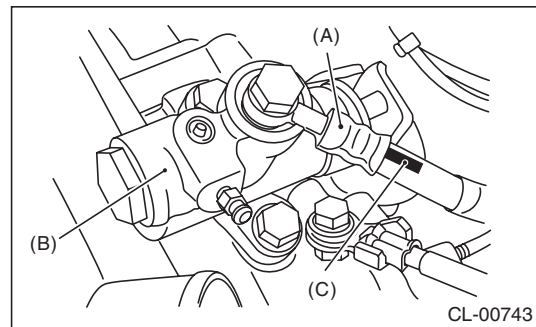
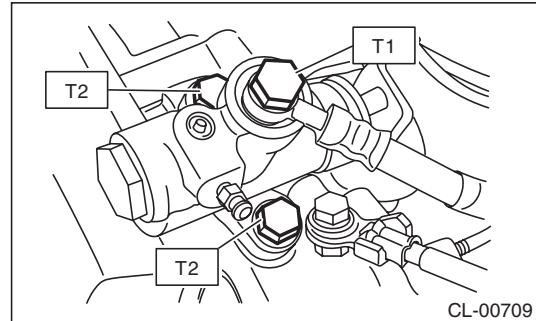
- (A) Mark
- (B) Clutch hose
- (C) Operating cylinder

- Except for STI model

Tightening torque:

T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)



- (A) Clutch hose
- (B) Operating cylinder
- (C) Mark

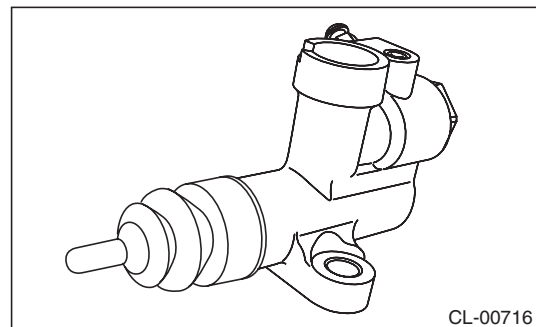
2) After bleeding air from the operating cylinder, ensure that the clutch operates properly.
<Ref. to CL-27, Clutch Fluid Air Bleeding.>

C: DISASSEMBLY

CAUTION:

Do not disassemble the STI model.

1) Remove the boot and push rod.



Operating Cylinder

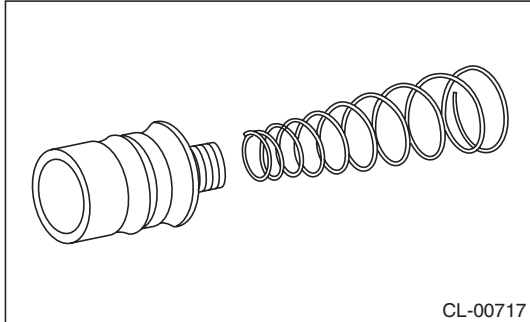
CLUTCH SYSTEM

2) Apply compressed air through clutch hose attachment hole.

NOTE:

Face the piston hole down and place a piece of wood underneath to prevent the piston from popping out.

3) Separate the piston and piston spring.



D: ASSEMBLY

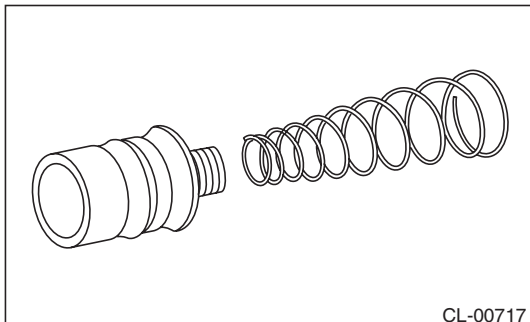
NOTE:

During assembly, apply hydraulic oil to all parts.

Recommended clutch fluid:

New FMVSS No. 116 DOT3 or DOT4

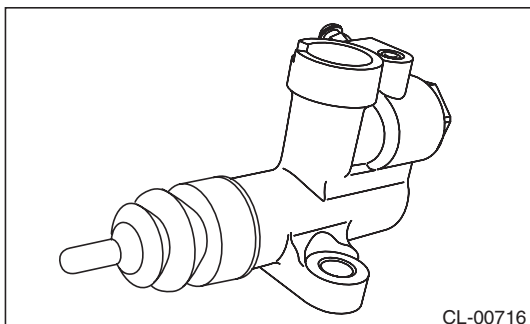
1) Install the piston spring onto the piston.



2) Insert piston into the operating cylinder.

3) Install push rod to the boot.

4) Install boot and push rod to the operating cylinder.



E: INSPECTION

1) Check that the operating cylinder is not damaged. If operating cylinder is damaged, replace it.

2) Check the operating cylinder for fluid leakage or damage on the boot. Replace the operating cylinder if leaks or damages are noted.

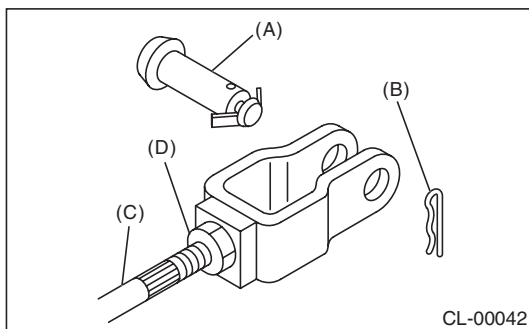
Master Cylinder

CLUTCH SYSTEM

6. Master Cylinder

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Thoroughly drain the clutch fluid from the reservoir tank.
- 3) Remove the instrument panel lower cover. <Ref. to EI-49, REMOVAL, Instrument Panel Lower Cover.>
- 4) Remove the instrument panel lower cover. <Ref. to EI-49, REMOVAL, Instrument Panel Lower Cover.>
- 5) Remove the snap pin and clevis pin, and then separate the push rod of the master cylinder from clutch pedal.



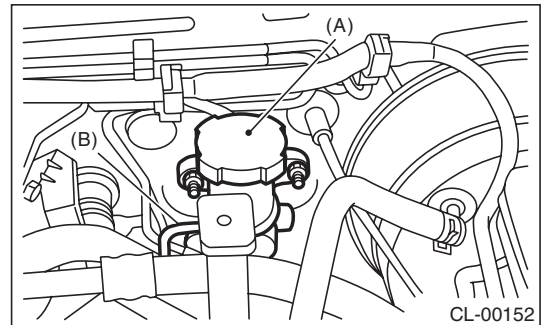
- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

- 6) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.> <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 7) Remove the clutch pipe from the master cylinder.

- 8) Remove the master cylinder and reservoir tank as a unit.

CAUTION:

Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.



- (A) Master cylinder
- (B) Clutch pipe

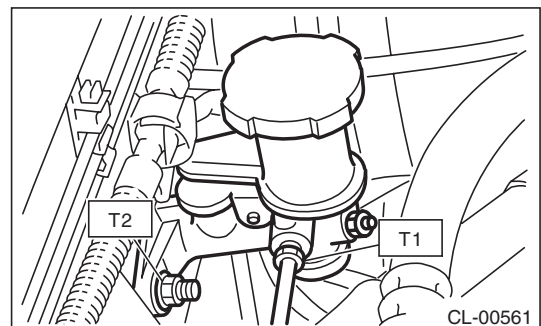
B: INSTALLATION

- 1) Install the master cylinder to the vehicle body, and connect the clutch pipe to the master cylinder.

Tightening torque:

T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



Master Cylinder

CLUTCH SYSTEM

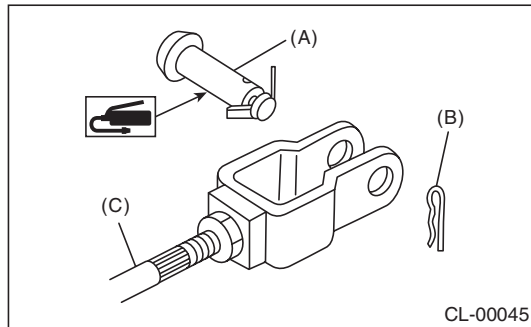
2) Connect the push rod of the master cylinder to the clutch pedal, and install the clevis pin and snap pin.

CAUTION:

Always use a new clevis pin.

NOTE:

Apply grease to the clevis pin.



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

3) Refill the reservoir tank with recommended clutch fluid.

4) After bleeding air from the clutch system, ensure that the clutch operates properly.

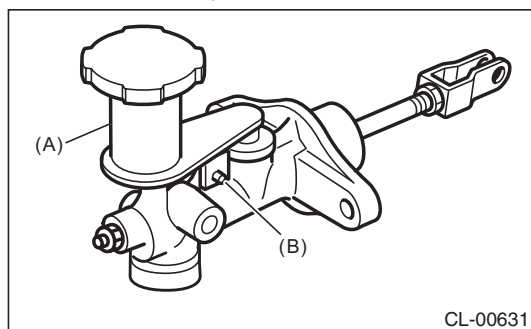
<Ref. to CL-27, Clutch Fluid Air Bleeding.>

5) Install the intercooler. <Ref. to IN(STI)-13, INSTALLATION, Intercooler.> <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>

6) Connect the battery ground terminal.

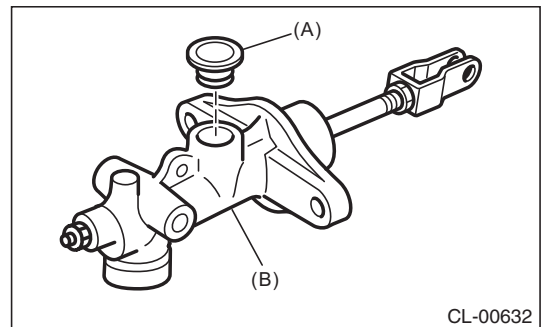
C: DISASSEMBLY

1) Remove the straight pin and reservoir tank.



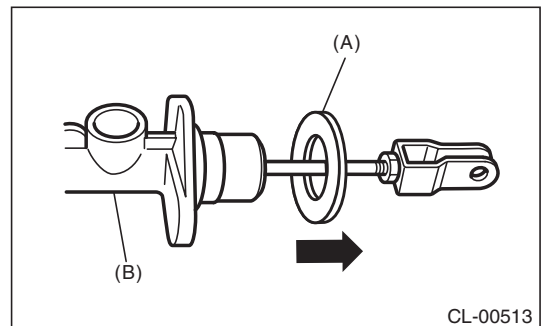
- (A) Reservoir tank
- (B) Straight pin

2) Remove the oil seal.



- (A) Oil seal
- (B) Master cylinder

3) Move the seat towards the rear.



- (A) Seat
- (B) Master cylinder

4) Remove the piston stop ring.

CAUTION:

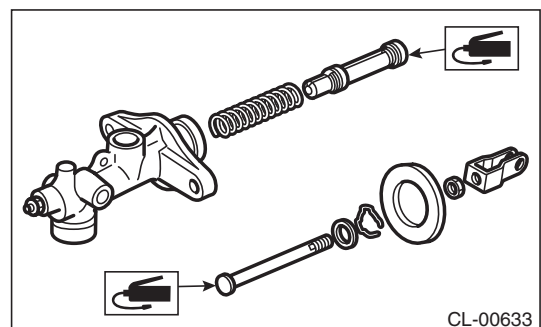
When removing the piston stop ring, be careful to prevent the rod, washer, piston and return spring from popping out.

D: ASSEMBLY

1) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:

SILICONE GREASE G-40M (Part No. 004404003) or equivalent



Master Cylinder

CLUTCH SYSTEM

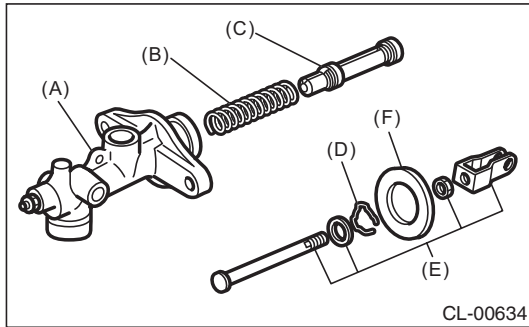
2) Assemble in the reverse order of disassembly.

Tightening torque:

10 N·m (1.0 kgf-m, 7.4 ft-lb)

E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, reservoir tank, return spring, breather screw, seat or hose, replace the faulty part.

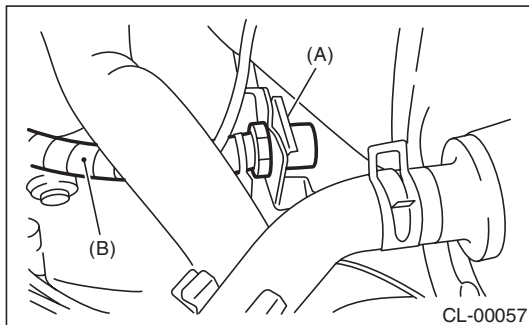


- (A) Master cylinder body
- (B) Return spring
- (C) Piston
- (D) Piston stop ring
- (E) Push rod ASSY
- (F) Seat

7. Clutch Pipe and Hose

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.> <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 3) Drain the clutch fluid. <Ref. to CL-26, Clutch Fluid.>
- 4) Disconnect the clutch pipe from the clutch hose and master cylinder.
- 5) Remove the clip, then remove the clutch hose from the bracket.



- (A) Clip
(B) Clutch hose

- 6) Disconnect the hose from operating cylinder.
- 7) Remove the clutch bracket.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

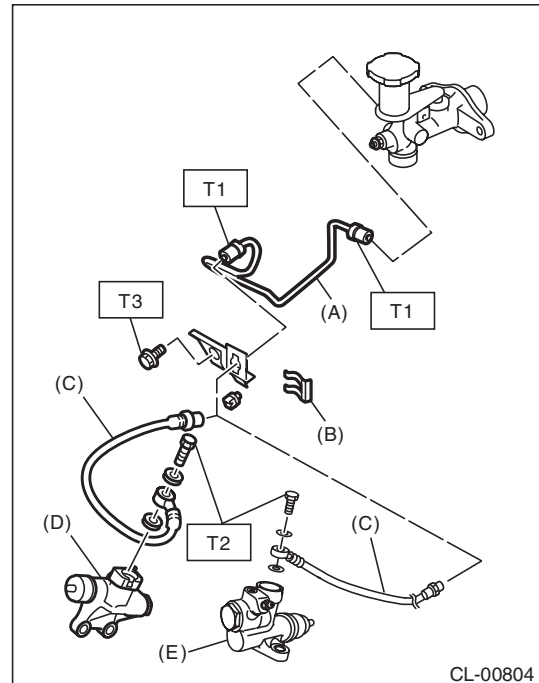
Bleed air from the clutch fluid. <Ref. to CL-27, Clutch Fluid Air Bleeding.>

Tightening torque:

T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



- (A) Clutch pipe
(B) Clip
(C) Clutch hose
(D) STI model
(E) Except for STI model

C: INSPECTION

Check the pipes and hoses for breaks and damage. Check joints for fluid leakage. If crack, breakage or damage is found, repair or replace the faulty pipe or hose.

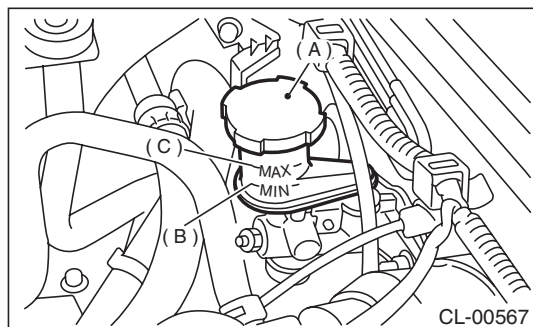
Clutch Fluid

CLUTCH SYSTEM

8. Clutch Fluid

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Inspect the fluid level using the scale on the outside of the reservoir tank. If the level is below "MIN", add fluid to bring it up to "MAX", and also inspect for leakage.



- (A) Reservoir tank
(B) MIN. level
(C) MAX. level

B: REPLACEMENT

CAUTION:

- Use new FMVSS No. 116 DOT3 or DOT4.
- Cover the breather with cloth to prevent brake fluid from being splashed on surrounding parts when loosening the breather.
- Avoid mixing brake fluid of different brands to prevent fluid performance from degrading.
- Be careful not to allow dirt or dust to enter the reservoir tank.

NOTE:

- During bleeding operation, keep the clutch reservoir tank filled with brake fluid to prevent entry of air.
- Clutch pedal must be operated very slowly.
- Bleed air from the oil line with help of a co-worker.
- The amount of brake fluid required is approximately 70 mℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.

1) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.> <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>

2) Drain the brake fluid from the reservoir tank.

3) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:

New FMVSS No. 116 DOT3 or DOT4

4) If necessary, bleed air from the clutch fluid. <Ref. to CL-27, Clutch Fluid Air Bleeding.>

5) Install the intercooler. <Ref. to IN(STI)-13, INSTALLATION, Intercooler.> <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>

9. Clutch Fluid Air Bleeding

A: PROCEDURE

1. STI MODEL

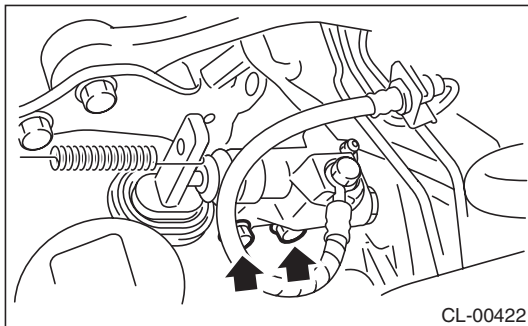
NOTE:

Bleed air from the oil line with help of a co-worker.
1) Remove the intercooler. <Ref. to IN(STI)-12, REMOVAL, Intercooler.>

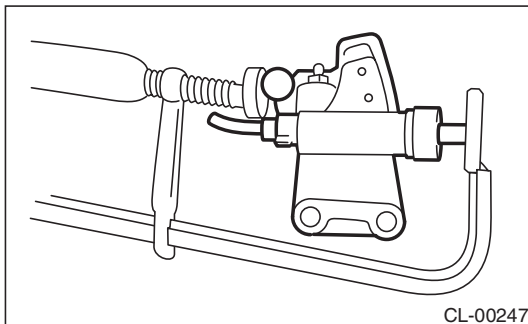
2) Remove the operating cylinder.

NOTE:

Do not remove the clutch hose.



3) Hold the piston with a clamp to prevent piston from popping out.

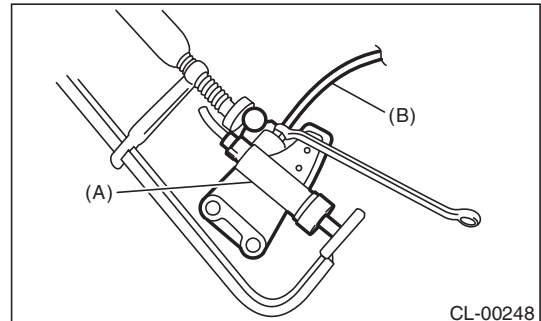


4) Fit one end of a vinyl tube into the air breather of the operating cylinder, and put the other end into a clutch fluid container.

5) Slowly depress the clutch pedal and keep it depressed. Open the air breather to discharge air together with the clutch fluid. Release the air breather for 1 or 2 seconds. Next, close the air breather, and slowly release the clutch pedal.

NOTE:

When performing this procedure, place the screw portion of the air breather higher than the end of operating cylinder.



(A) Operating cylinder

(B) Vinyl tube

6) Repeat procedure 5), until there are no more air bubbles appearing from the air breather.

CAUTION:

Cover the air breather with cloth to prevent clutch fluid from being splashed on surrounding parts when loosening the breather.

7) Tighten the air breather.

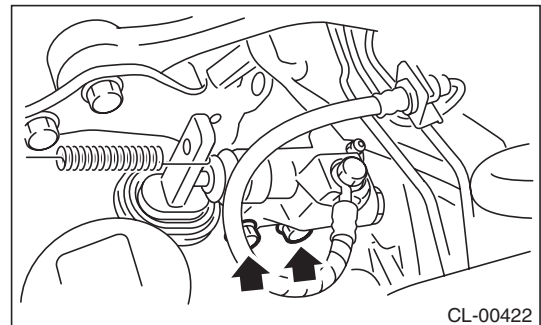
Tightening torque:

7.8 N·m (0.8 kgf-m, 5.8 ft-lb)

8) Install the operating cylinder.

Tightening torque:

41 N·m (4.2 kgf-m, 30.2 ft-lb)



9) After stepping on the clutch pedal, make sure that there are no leaks evident in the entire clutch system.

10) After bleeding the air from clutch system, ensure that the clutch operates properly.

11) Install the intercooler. <Ref. to IN(STI)-13, INSTALLATION, Intercooler.>

Clutch Fluid Air Bleeding

CLUTCH SYSTEM

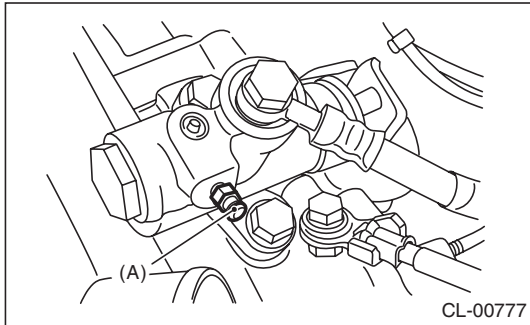
2. EXCEPT FOR STI MODEL

NOTE:

Bleed air from the oil line with help of a co-worker.

1) Remove the intercooler. <Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>

2) Fit one end of a vinyl tube into the air breather of the operating cylinder, and put the other end into a clutch fluid container.

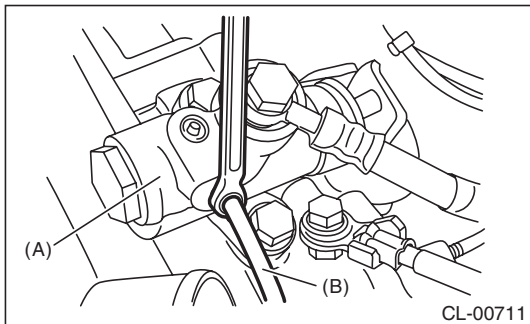


(A) Air breather

3) Slowly depress the clutch pedal several times and keep it depressed. Open the air breather to discharge air together with the clutch fluid. Release the air breather for 1 or 2 seconds. Next, close the air breather, and slowly release the clutch pedal.

CAUTION:

Cover the air breather with cloth to prevent clutch fluid from being splashed on surrounding parts when loosening the breather.



(A) Operating cylinder

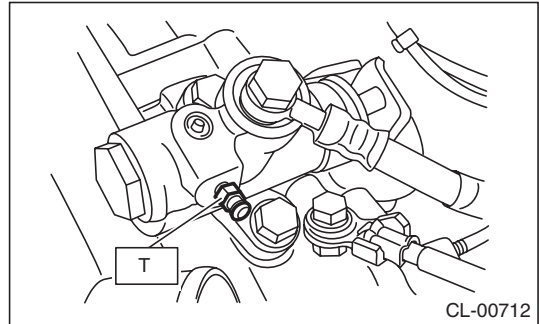
(B) Vinyl tube

4) Repeat procedure 3), until there are no more air bubbles appearing from the air breather.

5) Tighten the air breather.

Tightening torque:

T: 7.8 N·m (0.8 kgf-m, 5.8 ft-lb)



6) After stepping on the clutch pedal, make sure that there are no leaks evident in the entire clutch system.

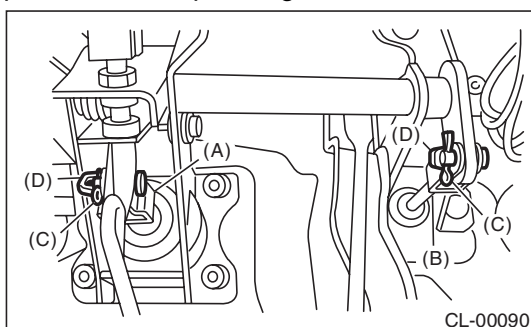
7) After bleeding the air from clutch system, ensure that the clutch operates properly.

8) Install the intercooler. <Ref. to IN(w/o STI)-12, INSTALLATION, Intercooler.>

10.Clutch Pedal

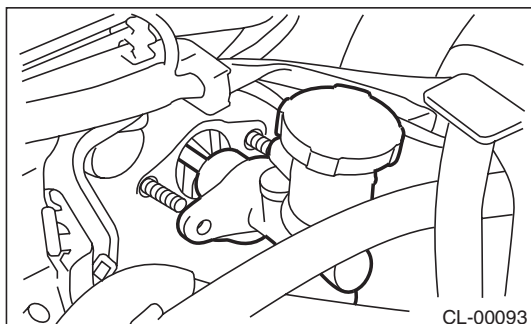
A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the steering column. <Ref. to PS-15, REMOVAL, Steering Column.>
- 3) Disconnect the connector from the stop light switch and clutch switch.
- 4) Remove the snap pins from clevis pins which secure the lever to the push rod and operating rod.
- 5) Pull out the clevis pins which secures the lever to the push rod and operating rod.



- (A) Operating rod
- (B) Push rod
- (C) Snap pin
- (D) Clevis pin

- 6) Remove the intercooler.
<Ref. to IN(STI)-12, REMOVAL, Intercooler.>
<Ref. to IN(w/o STI)-12, REMOVAL, Intercooler.>
- 7) Remove the nut which secures the clutch master cylinder.



- 8) Remove the bolts and nuts which secure the brake pedal and clutch pedal, and remove the pedal assembly.

B: INSTALLATION

- 1) Install in the reverse order of removal.

CAUTION:

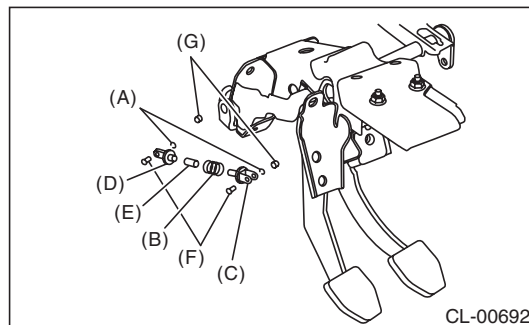
Always use a new clevis pin.

- 2) Adjust the clutch pedal after installation. <Ref. to CL-30, ADJUSTMENT, Clutch Pedal.>

- 3) Adjust the clutch start switch. <Ref. to CL-35, ADJUSTMENT, Clutch Switch.>

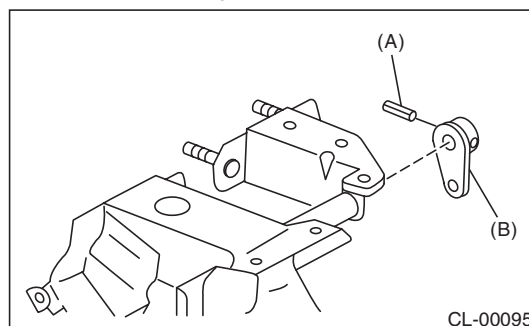
C: DISASSEMBLY

- 1) Remove the clutch switches.
- 2) Remove the clip, assist spring, rod and bushing.



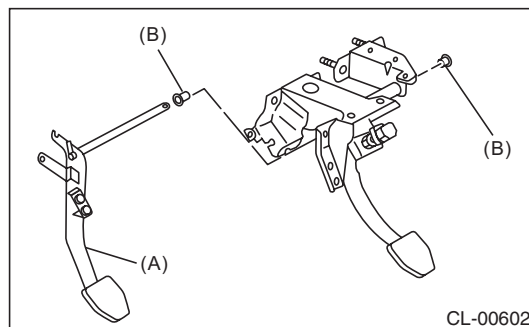
- (A) Clip
- (B) Assist spring
- (C) Assist rod A
- (D) Assist rod B
- (E) Assist bushing
- (F) Clutch clevis pin
- (G) Bushing

- 3) Remove the spring pin and lever.



- (A) Spring pin
- (B) Lever

- 4) Remove the clutch pedal and bushings.

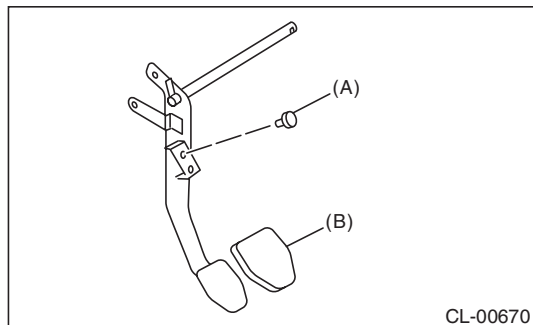


- (A) Clutch pedal
- (B) Bushing

Clutch Pedal

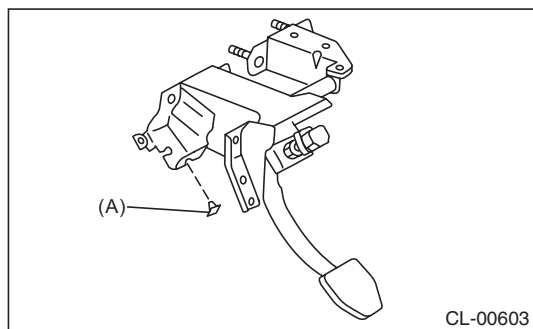
CLUTCH SYSTEM

5) Remove the stopper and clutch pedal pad from the clutch pedal.



- (A) Stopper
(B) Clutch pedal pad

6) Remove the stopper from the clutch pedal bracket.



- (A) Stopper

D: ASSEMBLY

- 1) Attach the stopper and clutch pedal pad to the clutch pedal.
- 2) Install the clutch switch to the pedal bracket.
- 3) Clean the pedal bushing holes of the clutch pedal and the brake pedal, apply grease, and install the pedal bushings.
- 4) Install the clutch pedal, brake pedal and lever to the pedal bracket, and fix with a spring pin.
- 5) Install the assist rod A, assist rod B, assist bushing and assist spring to the clutch pedal and pedal bracket.

E: INSPECTION

Move the clutch pedal pads in the lateral direction with a force of approximately 10 N (1 kgf, 2 lbf) to check that the clutch pedal deflection is within the service limit.

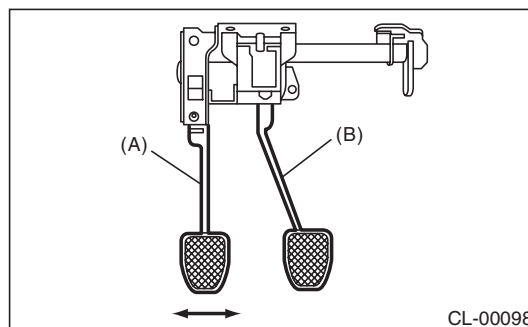
CAUTION:

If the play exceeds the service limit, replace the bushing with a new part.

Deflection of the clutch pedal:

Service limit

4.0 mm (0.157 in) or less



- (A) Clutch pedal
(B) Brake pedal

F: ADJUSTMENT

- 1) Turn the lock nut until the full stroke of clutch pedal becomes within the specification.

CAUTION:

When adjusting the full stroke of clutch pedal, do not turn the clutch switch.

NOTE:

If the lock nut cannot adjust the full stroke of clutch pedal to the specified value, adjust it by turning the master cylinder push rod.

Clutch pedal full stroke A:

STI model

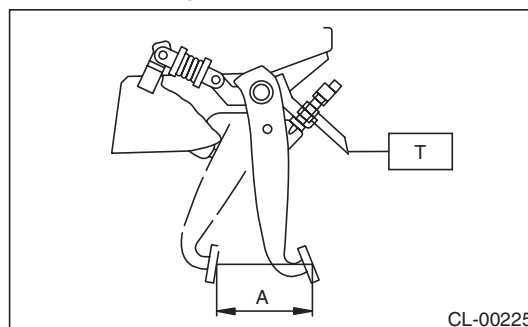
130 — 135 mm (5.12 — 5.31 in)

Except for STI model

135 — 140 mm (5.31 — 5.51 in)

Tightening torque (Clutch switch lock nut):

T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



- 2) If the full stroke is not within the specified value, loosen the clutch switch lock nut to adjust.

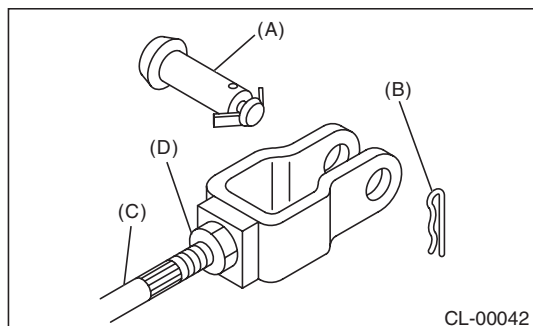
Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

Clutch Pedal

CLUTCH SYSTEM

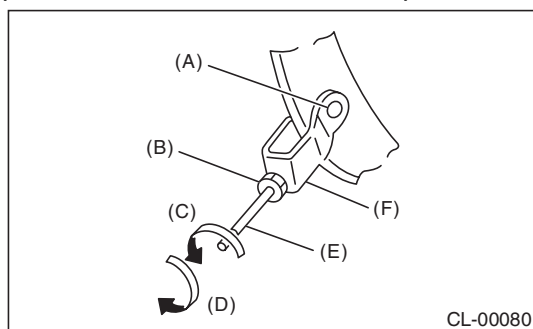
3) Loosen the push rod lock nuts.



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Push rod lock nut

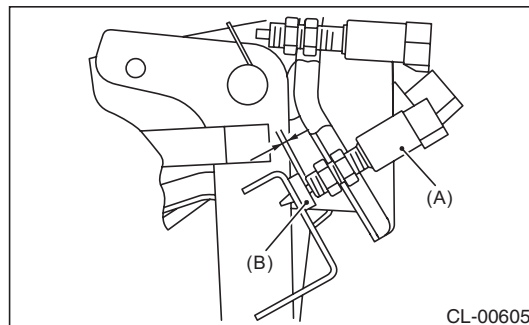
4) Rotate the push rod to adjust.

- (1) Make sure that the clutch pedal contacts the clutch switch side when the pedal is released.
- (2) Make sure that the clutch pedal contacts the clutch pedal bracket stopper when the clutch pedal is at the maximum stroke position.



- (A) Clevis hole
- (B) Push rod lock nut
- (C) In the shorter direction
- (D) In the longer direction
- (E) Push rod
- (F) Clevis

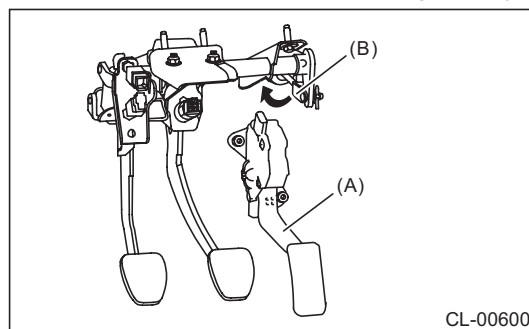
5) Turn the push rod to shorten until a clearance is gained on the clutch switch side.



- (A) Clutch switch
- (B) Stopper

6) Turn the push rod to lengthen until clutch pedal contacts the clutch switch.

7) Turn further in the direction that will shorten the push rod (arrow direction shown in figure) by 270°.



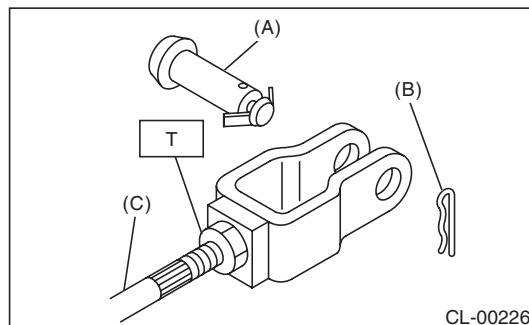
- (A) Accelerator pedal
- (B) Clevis

8) Check that the clevis pin moves smoothly by moving it in the left and right directions.

9) Tighten the push rod lock nut.

Tightening torque (Push rod lock nut):

T: 10 N·m (1.0 kgf-m, 7.4 ft-lb)



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

Clutch Pedal

CLUTCH SYSTEM

10) Depress and release the clutch pedal two or three times to ensure that the clutch pedal and release lever operate smoothly. If the clutch pedal and release lever do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-27, Clutch Fluid Air Bleeding.>

11) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat adjustment procedures again from the beginning.

Clutch pedal full stroke:

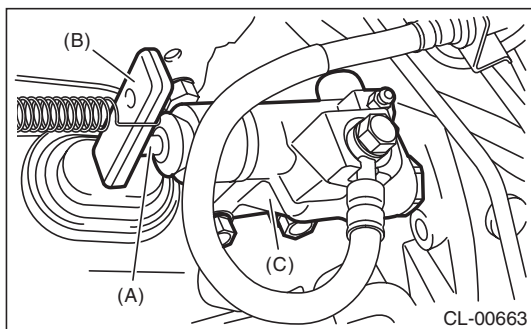
STI model

130 — 135 mm (5.12 — 5.31 in)

Except for STI model

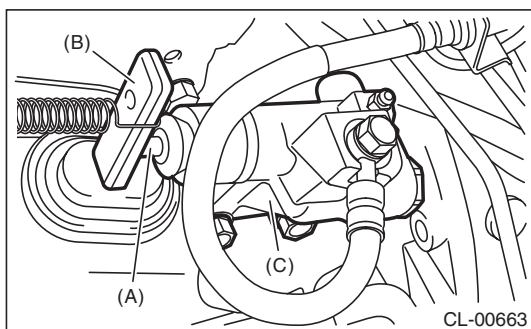
135 — 140 mm (5.31 — 5.51 in)

12) Push the release lever until the operating cylinder push rod retracts. Make sure that the clutch fluid level in the reservoir tank increases. If the clutch fluid level increases, the hydraulic clutch is properly adjusted. If the fluid level does not increase or the push rod does not retract, replace the master cylinder with a new part. <Ref. to CL-22, Master Cylinder.>



- (A) Push rod
- (B) Release lever
- (C) Operating cylinder

13) Push the release lever until the operating cylinder push rod retracts. Check that the clutch fluid level in the reservoir tank increases.



- (A) Push rod
- (B) Release lever
- (C) Operating cylinder

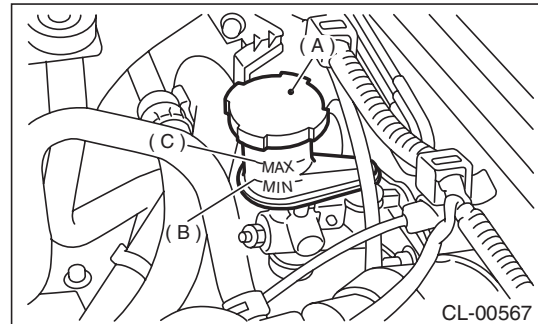
14) If the clutch fluid level increases, hydraulic clutch play is correct.

15) If the clutch fluid level does not increase or push rod does not retract, readjust the clutch pedal.

16) Check the fluid level using the scale on the outside of the reservoir tank. If the level is below "MIN", fill fluid up to "MAX" level.

Recommended clutch fluid:

New FMVSS No. 116 DOT3 or DOT4



- (A) Reservoir tank
- (B) MIN. level
- (C) MAX. level

11. Clutch Switch

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower cover.
- 3) Disconnect the connector from the clutch switch.
- 4) Remove the clutch switches.

B: INSTALLATION

1. CLUTCH SWITCH (CRUISE CONTROL)

- 1) Move the clevis pin of push rod to left and right, retain it at the position where it moves smoothly, and measure the clutch pedal stroke.

Clutch pedal full stroke A:

STI model

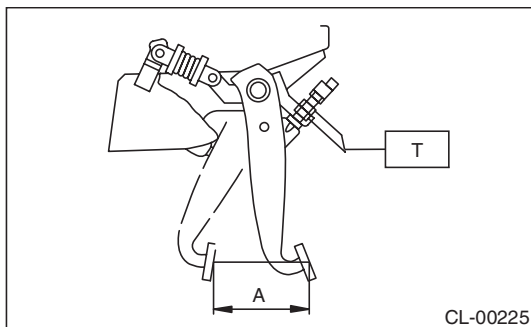
130 — 135 mm (5.12 — 5.31 in)

Except for STI model

135 — 140 mm (5.31 — 5.51 in)

Tightening torque:

T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



- 2) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-30, ADJUSTMENT, Clutch Pedal.>
- 3) Connect the clutch switch connector.

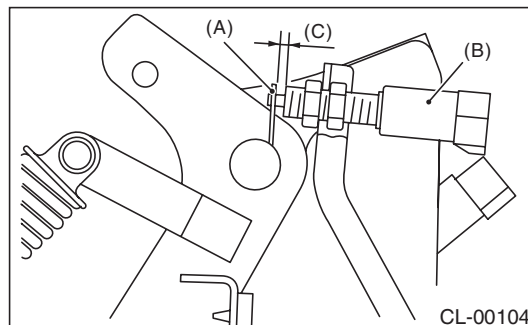
2. CLUTCH START SWITCH

- 1) Fully depress the clutch pedal and hold it.

- 2) Install the clutch pedal plate and clutch switch so that the gap between them is 1.1 — 2.1 mm (0.04 — 0.08 in), and then tighten the lock nut.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)



- (A) Plate
- (B) Clutch start switch
- (C) 1.1 — 2.1 mm (0.04 — 0.08 in)

- 3) Connect the clutch switch connector.
- 4) Make sure that engine does not start with clutch pedal not depressed.
- 5) Make sure that engine starts with clutch pedal fully depressed.

C: INSPECTION

1. CLUTCH START SWITCH

- 1) Perform the following inspections. If the clutch start switch does not operate normally, adjust the switch, and check it again. <Ref. to CL-35, ADJUSTMENT, Clutch Switch.>
 - Make sure that engine does not start with clutch pedal not depressed.
 - Make sure that engine starts with clutch pedal fully depressed.

Clutch Switch

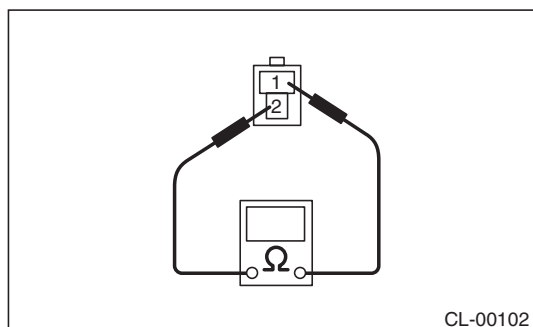
CLUTCH SYSTEM

2) When the clutch start switch does not operate normally even if it is adjusted, check the clutch start switch for continuity.

(1) Remove the clutch start switch. <Ref. to CL-33, REMOVAL, Clutch Switch.>

(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

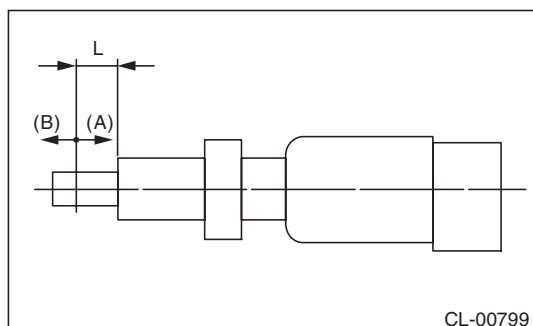
Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 M Ω or more



(3) Check that the switch is turned on and off in Dimension L.

Dimension L:

4 — 5.5 mm (0.16 — 0.22 in)



- (A) ON
(B) OFF

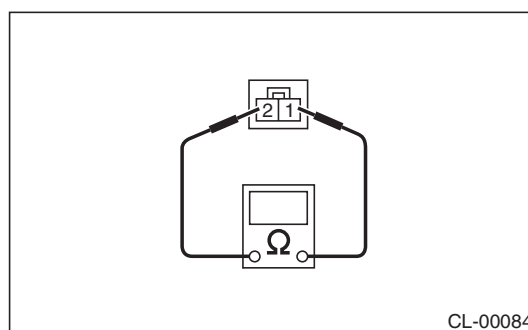
2. CLUTCH SWITCH

1) Check the clutch switch for continuity.

(1) Disconnect the connector of clutch switch.

(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not within the specification, check the clutch stroke and installation condition, and check the clutch switch again.

Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	1 M Ω or more
When the clutch pedal is not depressed	No. 1 — No. 2	Less than 1 Ω

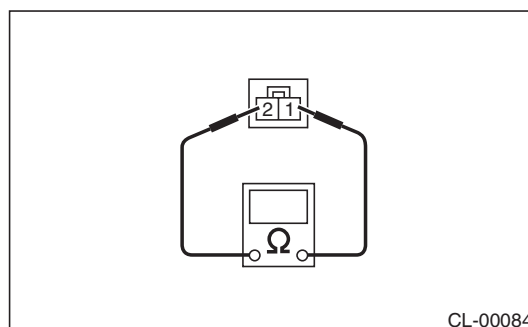


2) When the clutch switch does not operate normally even if the clutch stroke and installation condition are normal, check the clutch switch for continuity.

(1) Remove the clutch switches. <Ref. to CL-33, REMOVAL, Clutch Switch.>

(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 M Ω or more



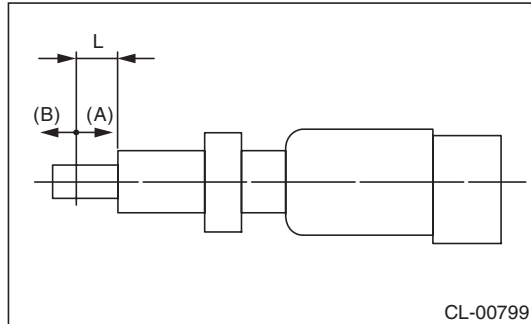
(3) Check that the switch is turned on and off in Dimension L.

Clutch Switch

CLUTCH SYSTEM

Dimension L:

5 — 6.5 mm (0.2 — 0.26 in)

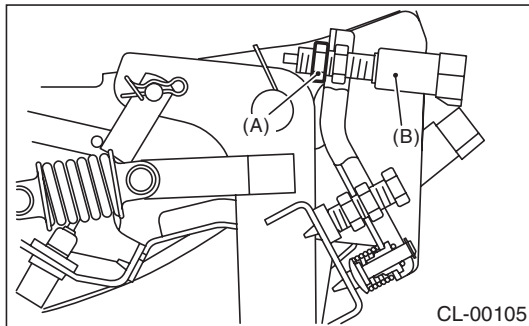


(A) ON

(B) OFF

D: ADJUSTMENT

1) Loosen the lock nut of clutch start switch.

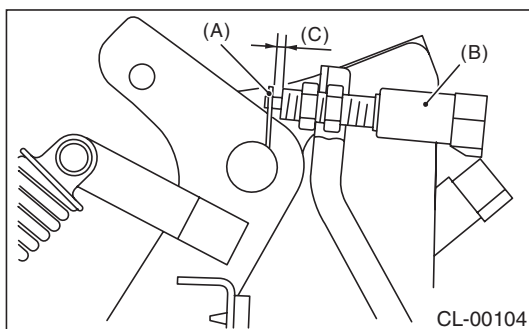


(A) Lock nut

(B) Clutch start switch

2) Fully depress the clutch pedal and hold it.

3) Adjust the gap of the clutch pedal plate and the clutch switch to be 1.1 — 2.1 mm (0.04 — 0.08 in).



(A) Plate

(B) Clutch start switch

(C) 1.1 — 2.1 mm (0.04 — 0.08 in)

4) Tighten the lock nut.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

CL-35

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General Diagnostic Table

CLUTCH SYSTEM

12. General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptoms	Possible cause	Corrective action
1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms. • Engine speeds up when shifting. • High-speed driving is not possible; especially rapid acceleration is not possible and vehicle speed does not increase in proportion to the increase in engine speed. • Power drops particularly when ascending a slope, and there is a burning smell of the clutch plate. • Method of testing: Park the vehicle and fully apply the parking brake. Disengage the clutch and shift the transmission gear into the 1st. Gradually increase the engine speed while gradually allowing the clutch to engage. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not move forward and the engine does not stall.	(a) Oil on the clutch face	Replace.
	(b) Worn clutch face	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Defective release bearing holder	Repair or replace.
2. Clutch drags. As a symptom of this trouble, a harsh scratching noise occurs and control becomes difficult when shifting gears. The symptom becomes more apparent when shifting into the 1st gear. However, because most trouble of this sort is due to a defective synchronization mechanism, perform the following tests. • Method of testing: <Ref. to CL-37, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.> The problem is caused by insufficient disengagement of the clutch if an abnormal noise occurs during this test.	(a) Worn or rusty clutch disc hub spline	Replace the clutch disc.
	(b) Excessive deflection of clutch disc face	Repair or replace.
	(c) Crankshaft pilot needle bearing sticking	Replace.
	(d) Cracked clutch disc face	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole vehicle when the vehicle is just started with clutch partially engaged.	(a) Adhesion of oil on the clutch face	Replace the clutch disc.
	(b) Weak or broken damper spring	Replace the clutch disc.
	(c) Poor contact of the disc surface or excessively worn disc	Replace the faulty clutch disc.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Loose pitching stopper	Retighten or replace the pitching stopper.

General Diagnostic Table

CLUTCH SYSTEM

Symptoms	Possible cause	Corrective action
4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or insufficiently lubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of the pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose damper spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken damper spring	Replace the clutch disc.
5. Clutch grabs suddenly. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace the clutch disc.
	(b) Deteriorated cushioning spring	Replace the clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace clutch disc or main shaft.
	(d) Deteriorated or broken damper spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Symptoms	Corrective action
Insufficient pedal play	Adjust the free play of the pedal.
Insufficient clutch pedal free play	Adjust the free play of the pedal.
Excessively worn and damaged pedal shaft and/or bushing	Replace the bushing or shaft with a new part.

3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
1 CHECK GEAR NOISE. 1) Start the engine. 2) While idling the engine, step on the clutch pedal and quickly shift from neutral to reverse.	Is there any abnormal noise from the transmission gear?	Go to step 2.	Clutch is normal.
2 CHECK GEAR NOISE. Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second.	Is there any abnormal noise from the transmission gear?	Go to step 3.	Defective transmission or excessive clutch drag torque. Inspect pilot bearing, clutch disc, transmission and clutch disc hub spline.
3 CHECK GEAR NOISE. 1) Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second. 2) While stepping on the clutch pedal, shift from neutral to reverse, reverse to neutral several times.	Is there any abnormal noise from the transmission gear?	Inadequate clutch disengage. Inspect the clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and fly-wheel seizure. Inspect the clutch disc and the spline of the clutch disc hub.

General Diagnostic Table

CLUTCH SYSTEM
