

MANUAL TRANSMISSION AND DIFFERENTIAL

6MT

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General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Type		6-forward speeds and 1-reverse	
Transmission gear ratio	1st		3.454
	2nd		1.888
	3rd		1.296
	4th		0.972
	5th		0.780
	6th		0.695
	Rev.		3.636
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	4.444
Rear reduction gear	Transfer	Type of gear	Hypoid
		Gear ratio	1.000
	Final	Type of gear	Hypoid
		Gear ratio	4.444
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, viscous coupling)
Transmission gear oil		SUBARU EXTRA MT or equivalent gear oil	
Transmission gear oil capacity		3.3 L (3.5 US qt, 2.9 Imp qt)	

2. TRANSMISSION GEAR OIL

Recommended oil:

SUBARU EXTRA MT

Alternative:

GL-5 (75W-90)

CAUTION:

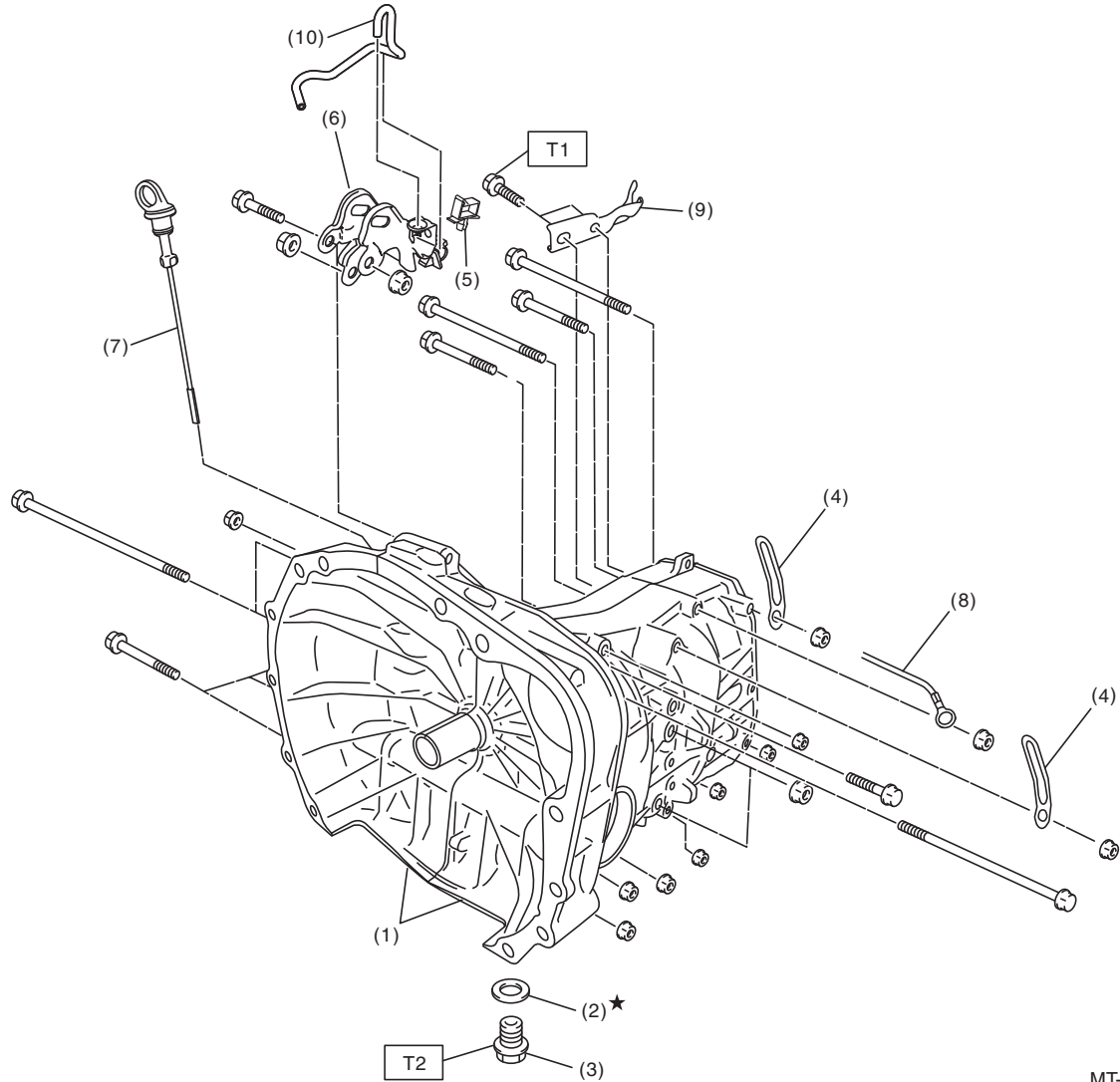
If an alternative transmission gear oil is used, you may not have expected functionality and performance.

General Description

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B: COMPONENT

1. TRANSMISSION CASE



MT-02984

- | | |
|----------------------------|------------------------------------|
| (1) Transmission case ASSY | (6) Pitching stopper bracket |
| (2) Gasket | (7) Oil level gauge |
| (3) Drain plug | (8) Transmission radio ground cord |
| (4) Harness clip | (9) Select bracket |
| (5) Clamp | (10) Air breather hose |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.3)

T2: 44 (4.5, 32.5) (aluminum gasket, silver)

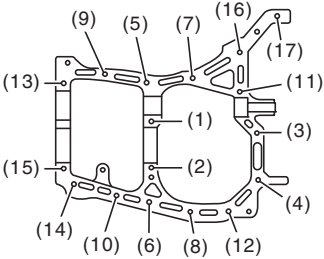
70 (7.1, 51.6) (copper gasket, brown)

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

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

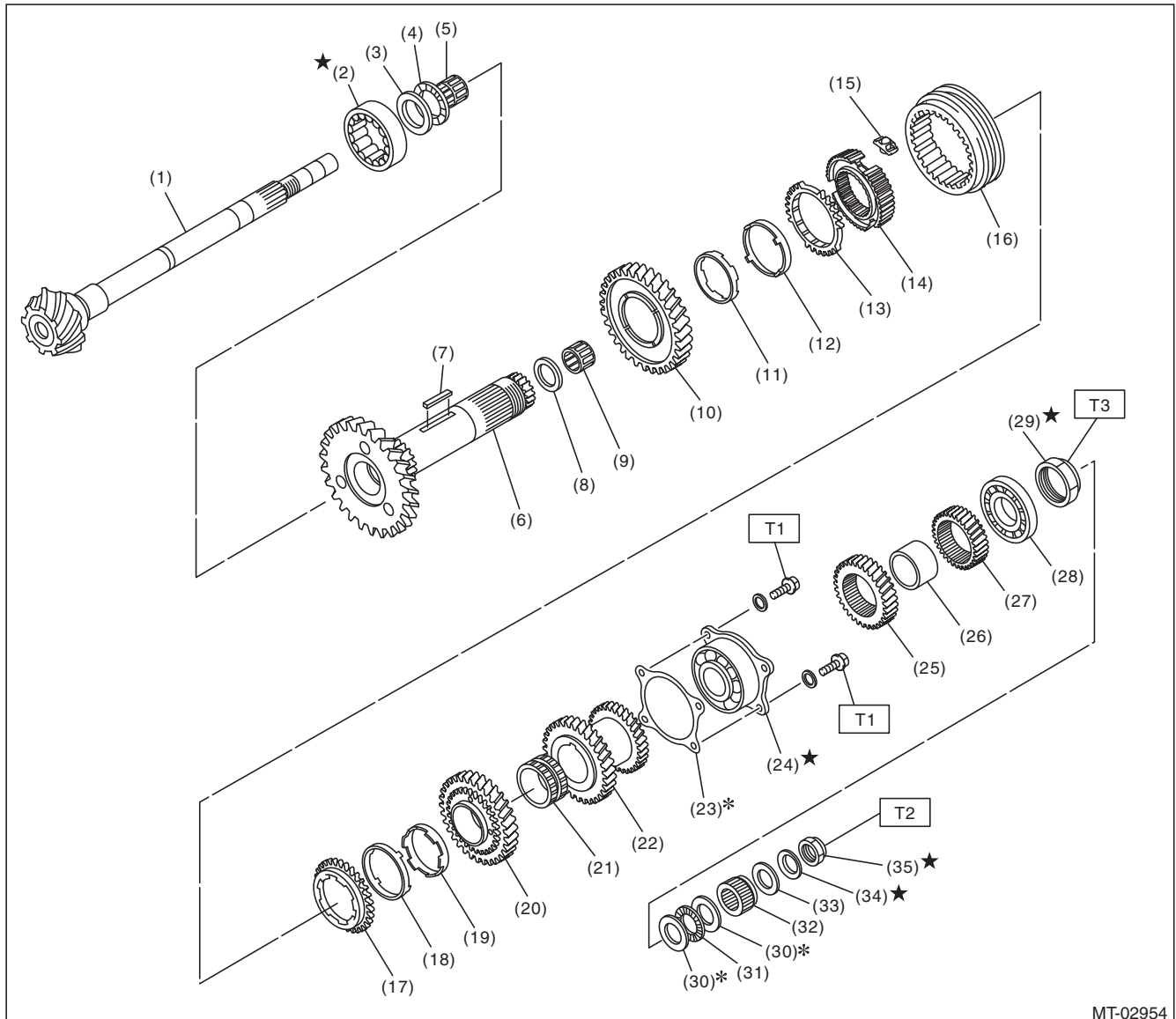
Transmission case tightening torque

 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	40 (4.1, 29.5)

General Description

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2. DRIVE PINION ASSEMBLY



MT-02954

- | | | |
|-------------------------------|------------------------------|-------------------------------------|
| (1) Drive pinion shaft | (15) 1st-2nd shifting insert | (29) Lock nut |
| (2) Roller bearing | (16) 1st-2nd coupling sleeve | (30) Adjusting washer |
| (3) Washer | (17) Outer baulk ring | (31) Thrust bearing |
| (4) Thrust bearing | (18) 2nd synchro cone | (32) Differential bevel gear sleeve |
| (5) Needle bearing | (19) Inner baulk ring | (33) Washer |
| (6) Driven shaft | (20) 2nd driven gear | (34) Lock washer |
| (7) Key | (21) 2nd driven gear bushing | (35) Lock nut |
| (8) Drive pinion collar | (22) 3rd-4th driven gear | |
| (9) Needle bearing | (23) Drive pinion shim | |
| (10) 1st driven gear | (24) Double ball bearing | |
| (11) Inner baulk ring | (25) 5th driven gear | |
| (12) 1st synchro cone | (26) Drive pinion spacer | |
| (13) Outer baulk ring | (27) 6th driven gear | |
| (14) 1st-2nd synchronizer hub | (28) Ball bearing | |

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

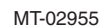
T1: 30 (3.1, 22.1)

T2: 126 (12.8, 92.9)

T3: 440 (44.9, 324.5)

6MT-5

3. MAIN SHAFT FOR SINGLE-RANGE



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by Seller "4SubaruManuals"

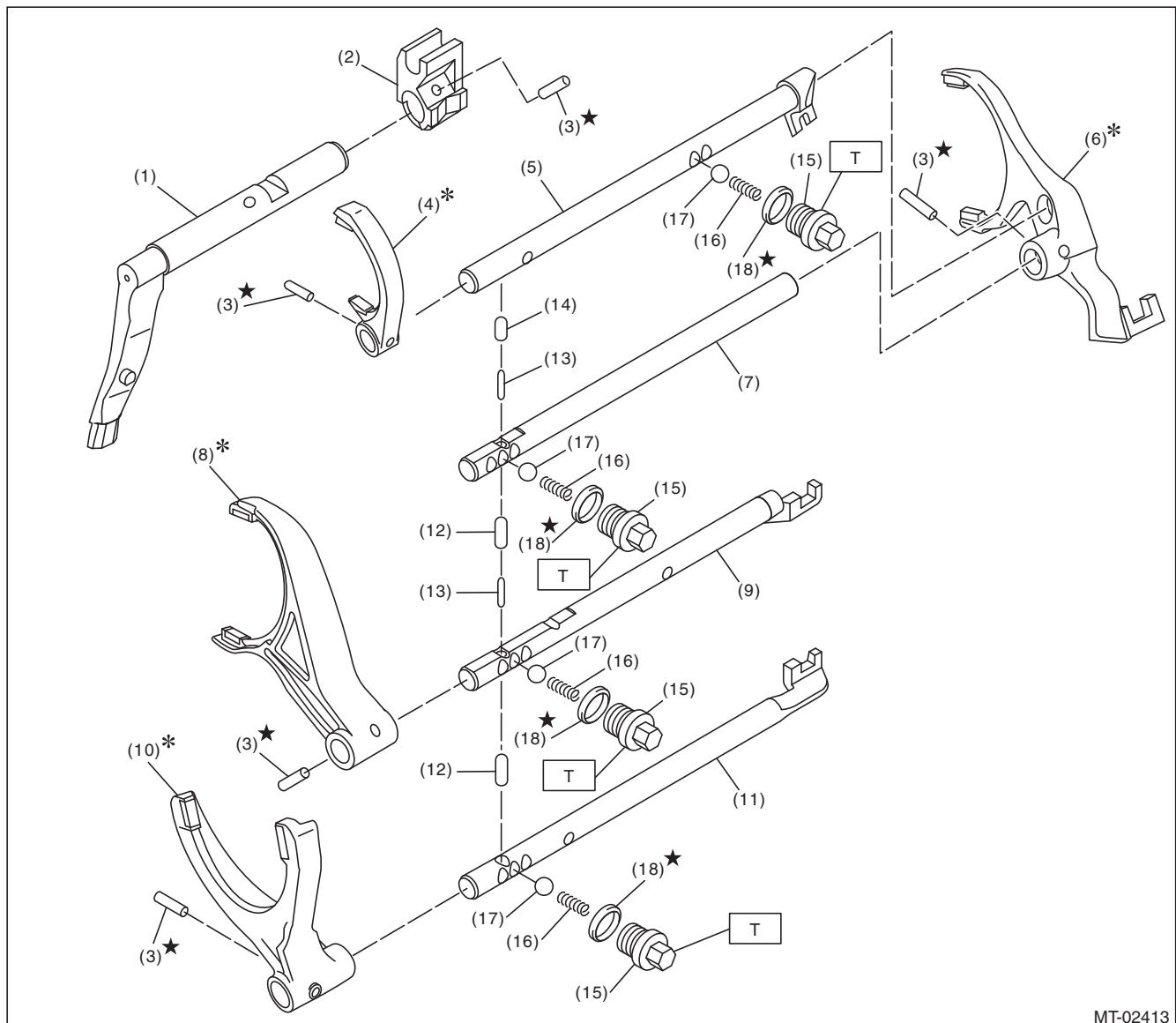
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- ## 6MT-7

General Description

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5. SHIFTER FORK AND SHIFTER ROD



MT-02413

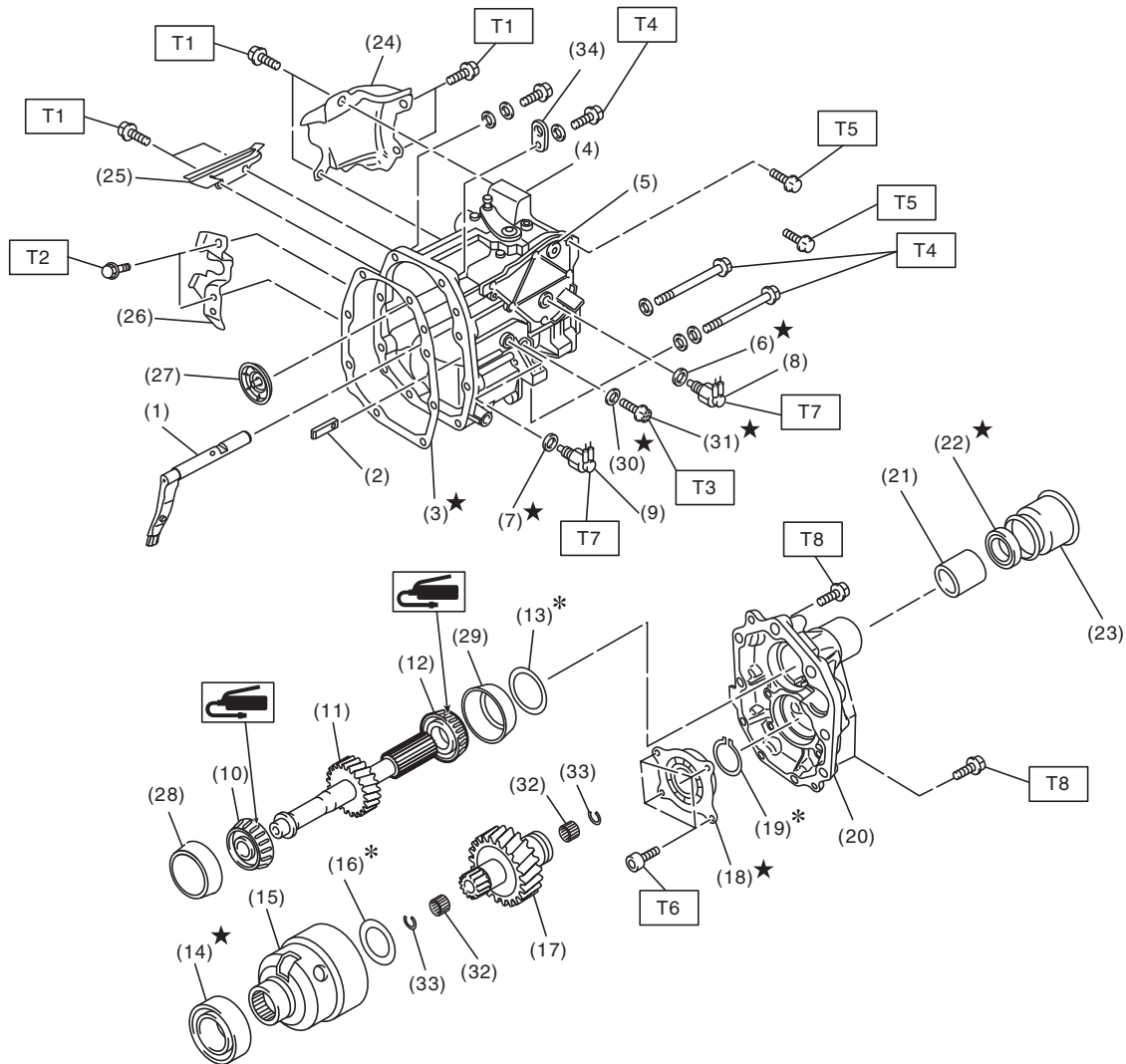
- | | | |
|--------------------------|---------------------------|---------------------------|
| (1) Shifter arm | (8) 3rd-4th shifter fork | (15) Checking ball plug |
| (2) Selector arm | (9) 3rd-4th fork rod | (16) Checking ball spring |
| (3) Spring pin | (10) 1st-2nd shifter fork | (17) Check ball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

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

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

6. TRANSFER CASE AND EXTENSION



MT-02980

- | | | |
|-----------------------------|--------------------------|--------------------------|
| (1) Shifter arm | (16) Adjusting washer | (31) Precoat bolt |
| (2) Interlock plate | (17) Transfer drive gear | (32) Needle bearing |
| (3) Gasket | (18) Ball bearing | (33) Snap ring |
| (4) Transfer case | (19) Snap ring | (34) Transmission hanger |
| (5) Transmission cover | (20) Extension case | |
| (6) Gasket | (21) Bushing | |
| (7) Gasket | (22) Oil seal | |
| (8) Neutral position switch | (23) Dust cover | |
| (9) Back-up light switch | (24) Transfer cover | |
| (10) Roller bearing | (25) Dust cover | |
| (11) Transfer driven gear | (26) Shift bracket | |
| (12) Roller bearing | (27) Oil guide | |
| (13) Adjusting washer | (28) Outer race | |
| (14) Ball bearing | (29) Outer race | |
| (15) Center differential | (30) Gasket | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 15 (1.5, 11.1)

T2: 18 (1.8, 13.3)

T3: 20 (2.0, 14.8)

T4: 24.5 (2.5, 18.1)

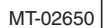
T5: 25 (2.5, 18.4)

T6: 26 (2.7, 19.2)

T7: 32.3 (3.3, 23.8)

T8: 40 (4.1, 29.5)

6MT-9



- | | |
|--------------------------|---------------------------|
| (1) Selector lever COMPL | (11) Thrust bearing |
| (2) Selector arm No. 2 | (12) Oil seal |
| (3) Shifter arm collar | (13) Straight pin |
| (4) Neutral set spring | (14) Transfer case |
| (5) Spring pin | (15) Gasket |
| (6) Selector arm | (16) Checking ball spring |
| (7) Shifter arm | (17) Plunger |
| (8) Shift lever COMPL | (18) Seal bolt |
| (9) Shifter arm No. 2 | (19) Interlock plate |
| (10) Washer | (20) Transmission cover |

- (21) Seal ring
- (22) Needle bearing
- (23) Roller bearing
- (24) Precoat bolt

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

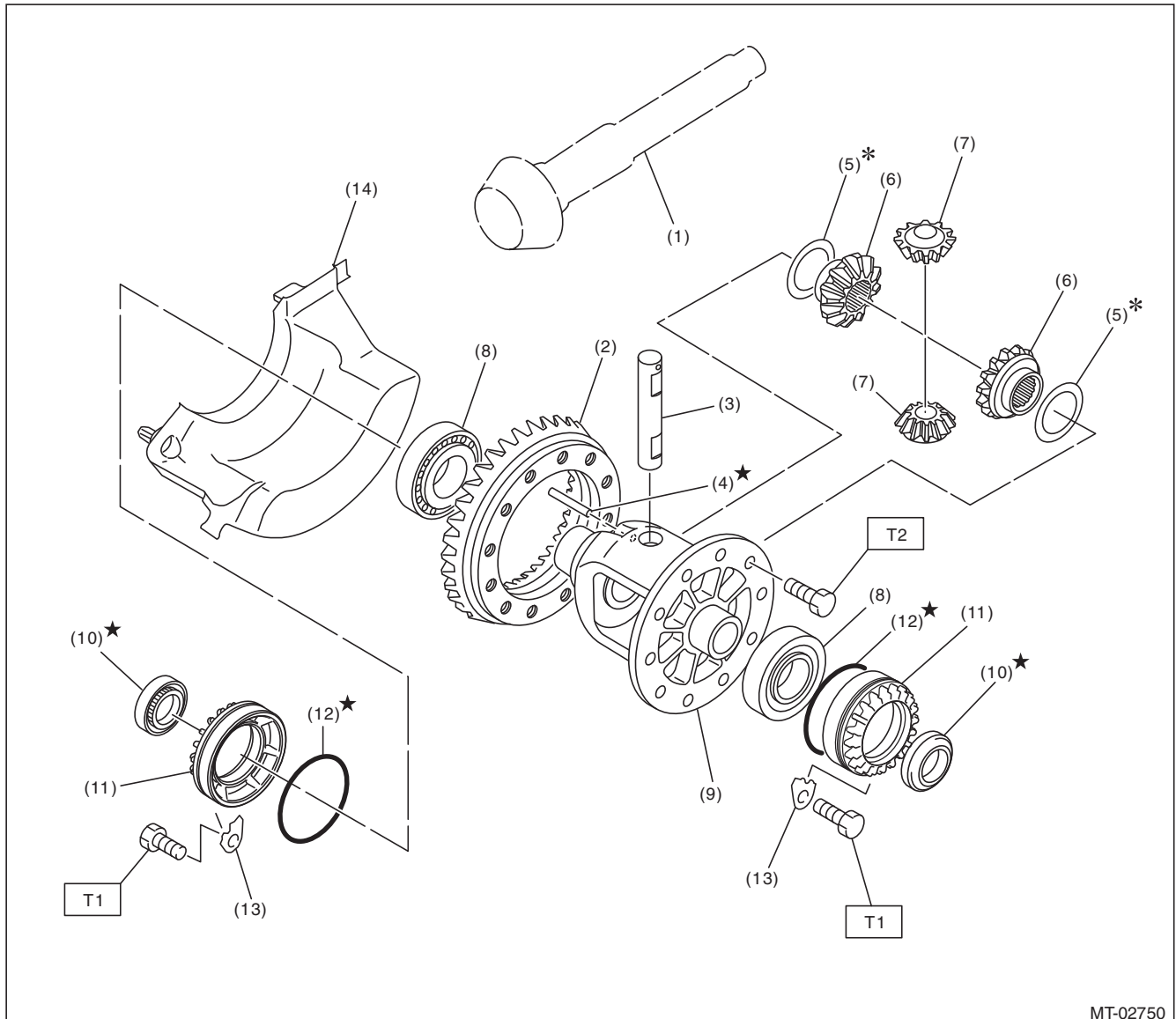
T2: 20 (2.0, 14.8)

T3: 25 (2.5, 18.4)

General Description

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8. FRONT DIFFERENTIAL



MT-02750

- | | | |
|-----------------------------|---------------------------------|--------------------------|
| (1) Drive pinion shaft | (7) Differential bevel pinion | (13) Retainer lock plate |
| (2) Hypoid driven gear | (8) Roller bearing | (14) Front oil guide |
| (3) Pinion shaft | (9) Differential case | |
| (4) Straight pin | (10) Oil seal | |
| (5) Washer | (11) Differential side retainer | |
| (6) Differential bevel gear | (12) O-ring | |

Tightening torque: N·m (kgf-m, ft-lb)

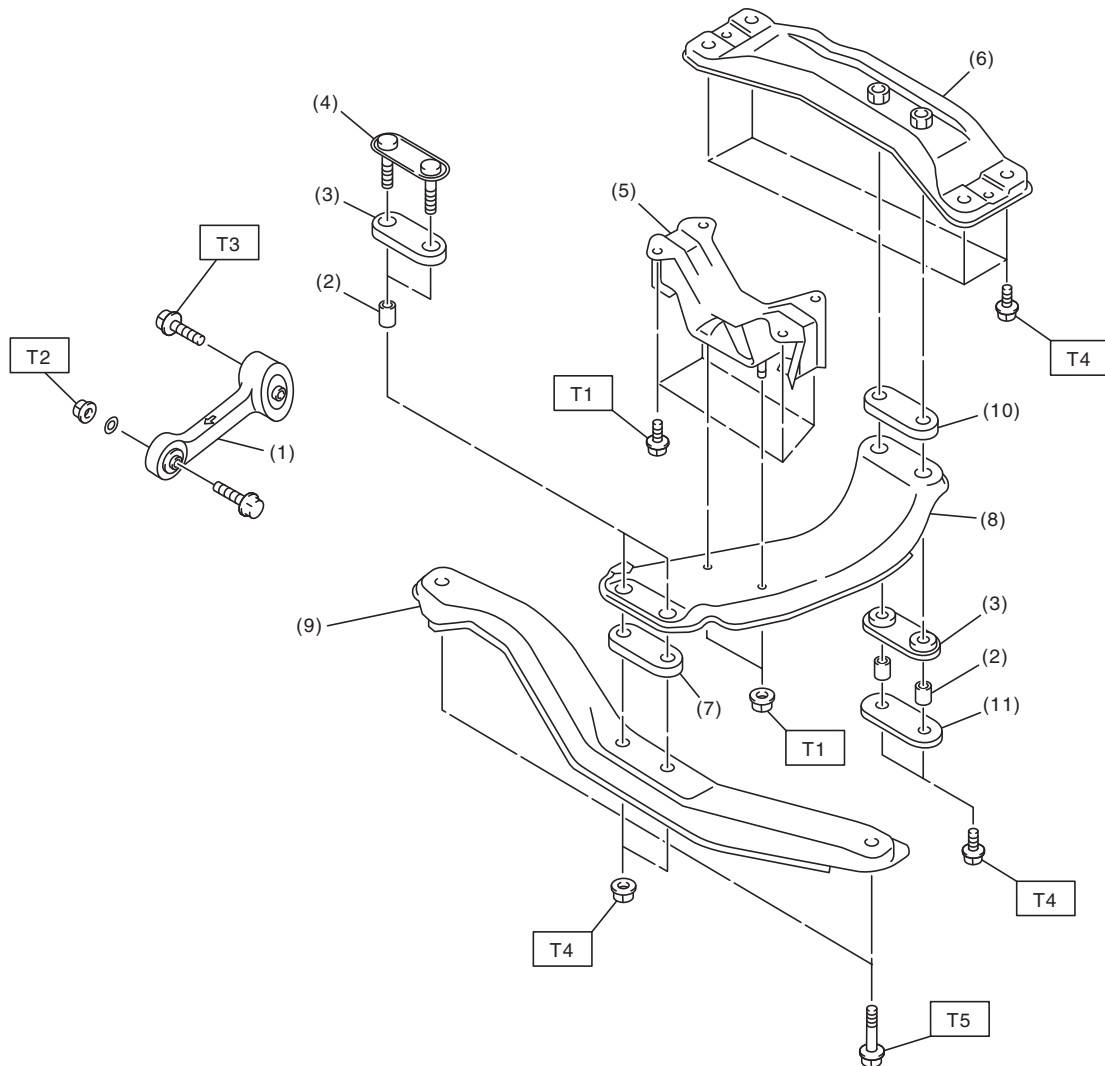
T1: 25 (2.5, 18.4)

T2: 62 (6.3, 45.7)

General Description

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9. TRANSMISSION MOUNTING



MT-01795

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

General Description

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C: CAUTION

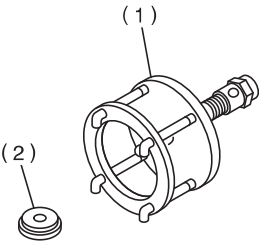
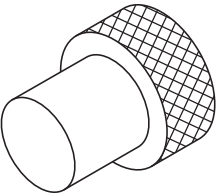
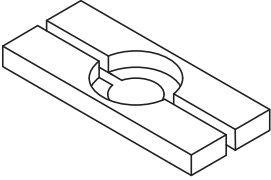
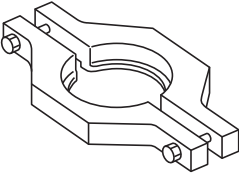
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, 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.

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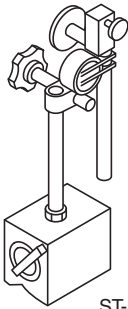
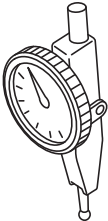
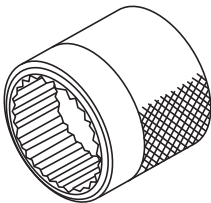
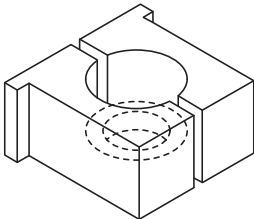
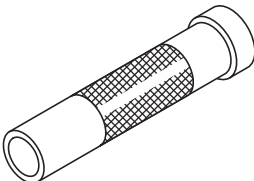
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899524100	899524100	PULLER SET	Used for removing the front differential roller bearing. (1) Puller (2) Cap
 ST-399780104	399780104	WEIGHT	Used for adjusting preload on the front differential roller bearing.
 ST-498077000	498077000	REMOVER	- Used for removing the roller bearing and washer of the drive pinion shaft. - Used for removing the transfer driven gear taper roller bearing.
 ST-498077600	498077600	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential ball bearing.

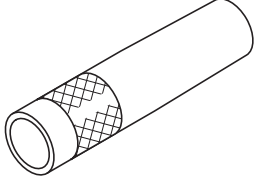
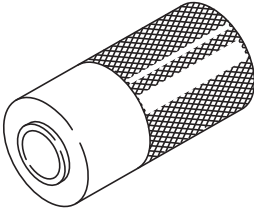
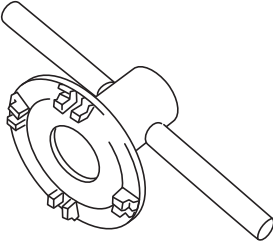
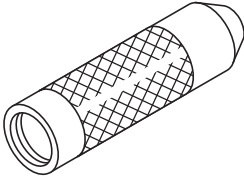
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	- Used for measuring the backlash of bevel pinion gear and hypoid gear. - Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	- Used for measuring the backlash of bevel pinion gear and hypoid gear. - Used together with MAGNET BASE (498247001).
 ST18667AA020	18667AA020	HOLDER	- Used for removing and installing the drive pinion shaft lock nut. - Used for measuring the backlash of hypoid gear. - Used for adjusting preload on the front differential roller bearing.
 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 drive pinion shaft washer. - Used for installing the front differential roller bearing outer race.

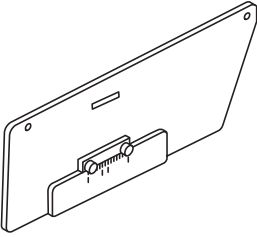
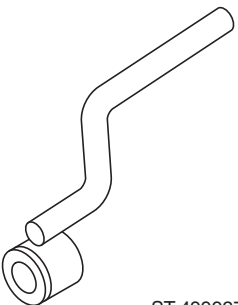
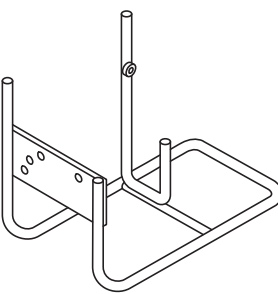
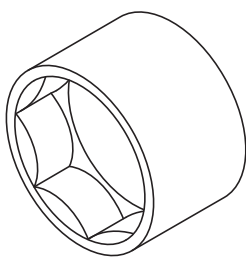
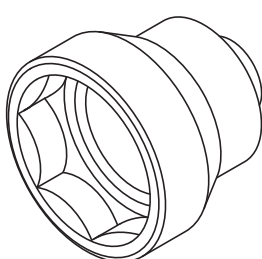
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499277200	499277200	INSTALLER	- Used for installing the 3rd-4th driven gear, 5th driven gear, ball bearing and 6th driven gear onto the driven shaft. - Used for installing the drive pinion shaft washer.
 ST-927640000	927640000	INSTALLER	Used for installing the roller bearing (transfer case side) of transfer driven gear.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	- Used for removing and installing the differential side retainer. - Used for adjusting preload on the front differential roller bearing. - WRENCH COMPL RETAINER (499787000) can also be used.
 ST18722AA010	18722AA010	REMOVER	Used for removing the 5th drive gear and 6th drive gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	- Used for installing the 4th, 5th and 6th drive gear needle bearing races and the main shaft double taper roller bearings. - Used together with REMOVER (899714110).

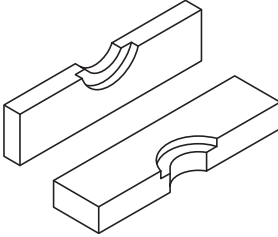
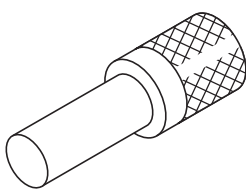
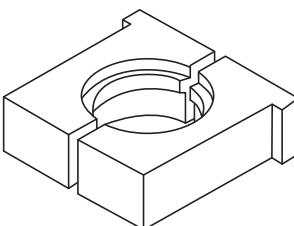
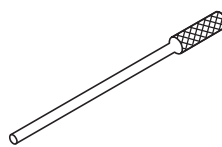
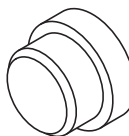
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 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 hypoid gear and preload adjustment of the front differential roller bearing.
 ST-499937100	499937100	TRANSMISSION STAND	Used for disassembling and assembling the transmission.
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the main shaft lock nut.
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven shaft lock nut.

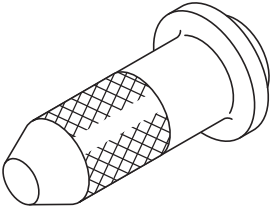
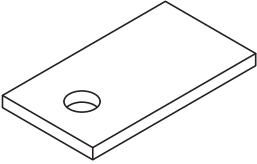
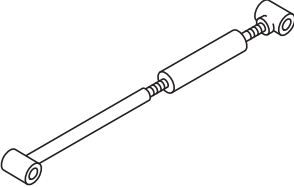
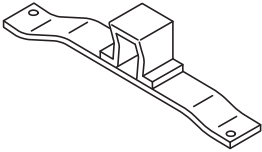
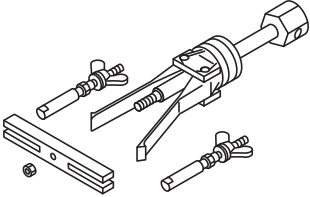
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899714110	899714110	REMOVER	Used for removing and installing the parts of main shaft and driven shaft.
 ST-899864100	899864100	REMOVER	• Used for removing the parts of the main shaft. • Used for removing the transfer driven gear roller bearing (transfer case side) and for installing it (extension case side). • Used for removing the transfer drive gear ball bearing. • Used for installing the transfer case roller bearing.
 ST18680AA020	18680AA020	HOLDER	• Used for removing and installing the drive pinion shaft lock nut. • Used for removing and installing the driven shaft lock nut.
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the straight pin.
 ST-398497701	398497701	ADAPTER	• Used for installing the front differential roller bearing. • Used together with BUSHING 1-2 INSTALLER (499277100).

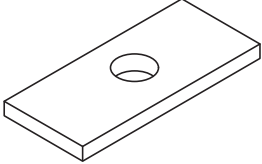
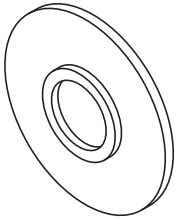
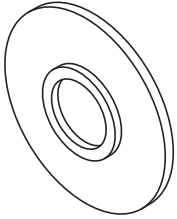
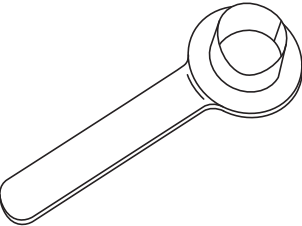
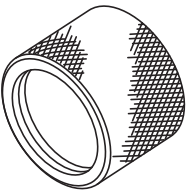
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498057300	498057300	INSTALLER	Used for installing the extension case oil seal.
 ST-498255400	498255400	PLATE	Used for measuring the hypoid gear backlash.
 ST41099AA020	41099AA020	ENGINE SUPPORT	- Used for removing and installing transmission. - Used together with ENGINE SUPPORT (41099AA010).
 ST41099AA010	41099AA010	ENGINE SUPPORT BRACKET	- Used for removing and installing transmission. - Used together with ENGINE SUPPORT (41099AA020).
 ST-398527700	398527700	PULLER ASSY	- Used for removing the extension case oil seal. - Used for removing the front differential side retainer bearing outer race. - Used for removing the front differential side retainer oil seal.

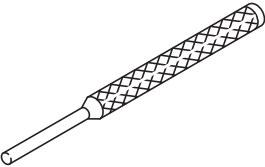
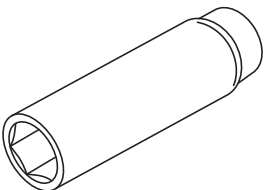
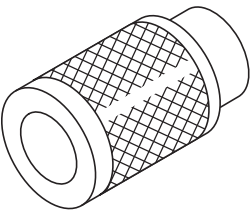
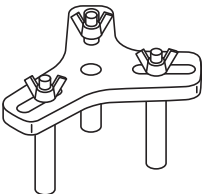
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398643600	398643600	GAUGE	Used for adjusting the extension end play.
 ST-398177700	398177700	INSTALLER	- Used for installing the transfer drive gear ball bearing. - Used for installing the 4th drive gear needle bearing race.
 ST-498175500	498175500	INSTALLER	Used for installing the roller bearing of transfer driven gear (extension case side).
 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 front differential side retainer oil seal.

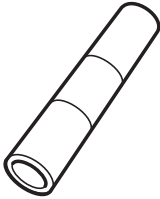
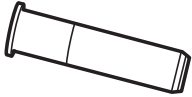
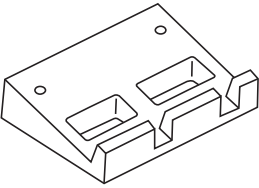
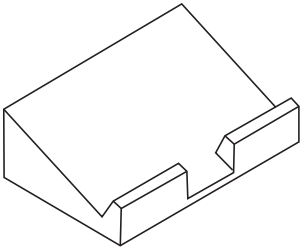
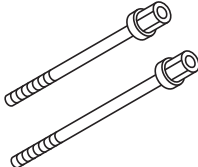
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398791700	398791700	SPRING PIN REMOVER 2	Used for removing and installing the spring pin.
 ST18662AA010	18662AA010	SOCKET (27)	- Used for removing and installing the drive pinion shaft lock nut. - Used for measuring the starting torque of the drive pinion shaft.
 ST-899754112	899754112	PRESS	- Used for removing driven shaft parts. - Used to install the main shaft ball bearing.
 ST18631AA000	18631AA000	HANDLE	Used for installing transfer case assembly and extension case assembly.
 ST18762AA000	18762AA000	COMPRESSOR SPECIAL TOOL	Used for removing the 1st driven gear.

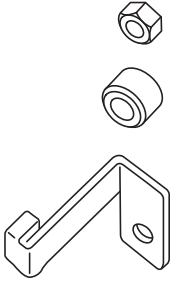
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18654AA000	18654AA000	INSTALLER	Used for installing the 2nd driven gear bushing.
 ST18657AA000	18657AA000	INSTALLER	Used for installing the transfer case oil seal.
 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.
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for removing and installing the needle bearing of the transfer case.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498277200	498277200	STOPPER SET	- Used for installing the needle bearing of the transfer case. - Use only the spacer.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance.
TORX® bit T70	Used for removing and installing differential gear oil drain plug.
Spring pin remover	Used for removing and installing the spring pin. (3 — 3.3 mm)
Socket driver (TORX® 45 size, tamper resistant type)	Used for removing and installing interlock plate.



Transmission Gear Oil

MANUAL TRANSMISSION AND DIFFERENTIAL

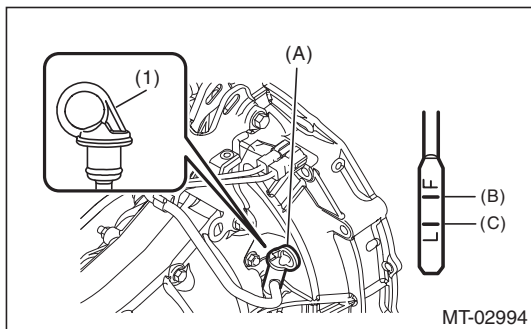
2. Transmission Gear Oil

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, check for oil leakage and add oil through the oil level gauge hole to bring the level up to the upper level.

CAUTION:

The length of the oil level gauge varies depending on models and destinations. Make sure to use the appropriate oil level gauge.

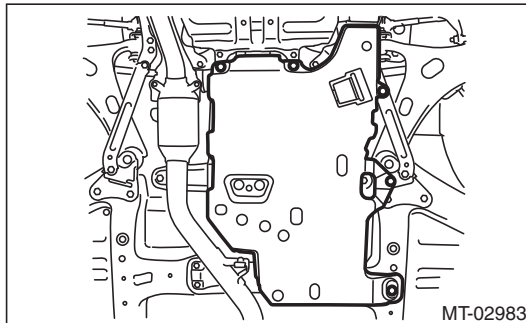


- (A) Oil level gauge
(B) Upper level
(C) Lower level

- (1) Gray

B: REPLACEMENT

- 1) Pull out the oil level gauge.
- 2) Lift up the vehicle.
- 3) Remove the transmission under cover.



- 4) 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 spilt, wipe it off completely.

- 5) Tighten the drain plug using TORX® bit T70.

NOTE:

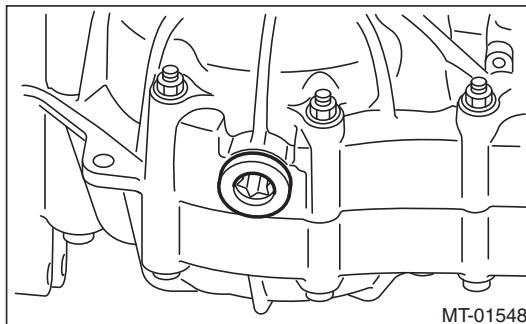
- Tighten the drain plug after draining the transmission gear oil.
- Use a new gasket.

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)



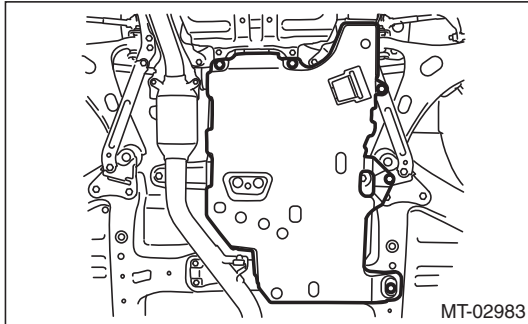
Transmission Gear Oil

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Install the transmission under cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



7) Lower the vehicle.

8) Pour gear oil through the oil level gauge hole.

Recommended gear oil:

SUBARU EXTRA MT

Alternative:

GL-5 (75W-90)

CAUTION:

If an alternative transmission gear oil is used, you may not have expected functionality and performance.

Gear oil capacity:

3.3 L (3.5 US qt, 2.9 Imp qt)

9) Check the transmission gear oil amount, and confirm that it is within the specification.

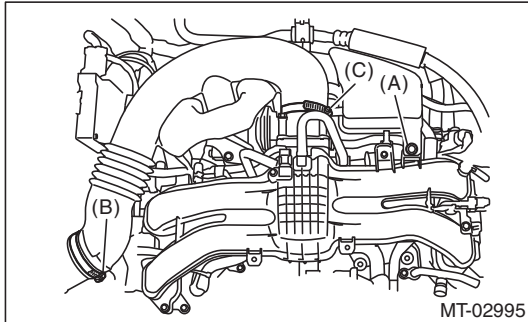
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

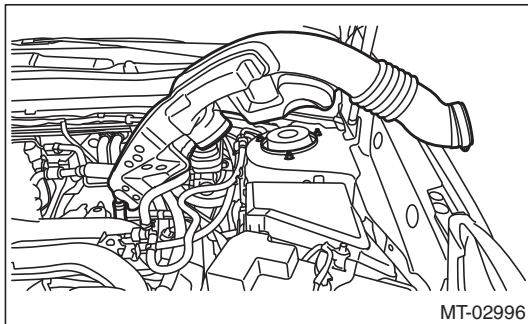
3. Manual Transmission Assembly

A: REMOVAL

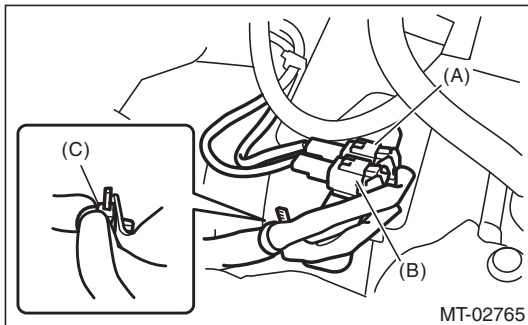
- 1) Disconnect the ground cable from battery.
- 2) Remove the clip (A) from the air intake boot.
- 3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 4) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

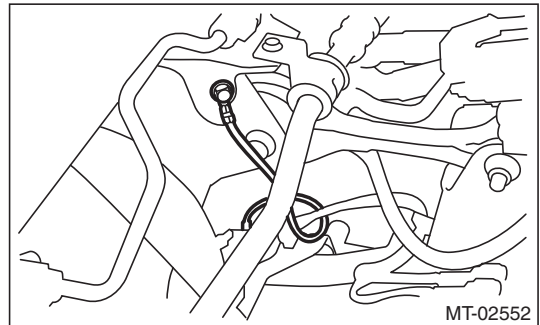


- 6) Disconnect the following connectors and remove the clip from the bracket.

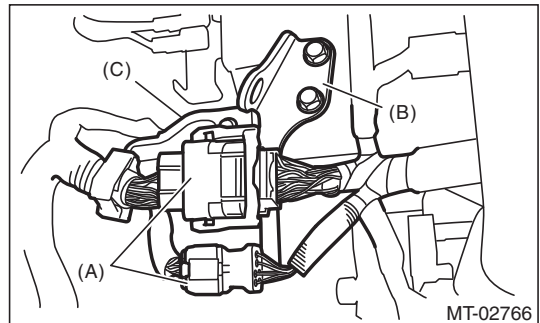


- (A) Neutral position switch connector (brown)
- (B) Back-up light switch connector (gray)
- (C) Clip

- 7) Disconnect the transmission radio ground cord terminal.



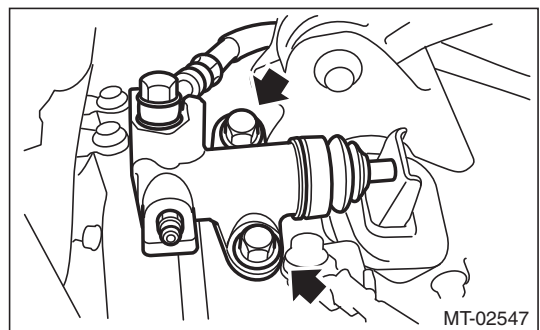
- 8) Remove the harness bracket and disconnect the engine harness connectors, and then remove the engine hanger rear.



- (A) Engine harness connectors
- (B) Engine hanger rear
- (C) Harness bracket

- 9) Remove the starter. <Ref. to SC(H4DO)-8, REMOVAL, Starter.>

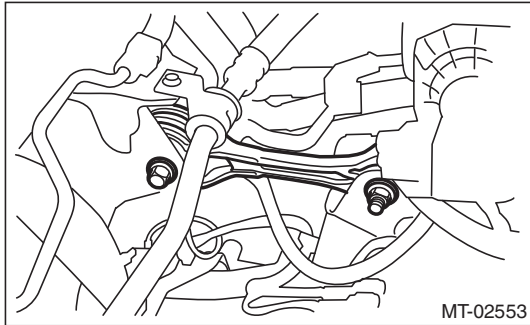
- 10) Remove the operating cylinder from the transmission, and suspend on a wire.



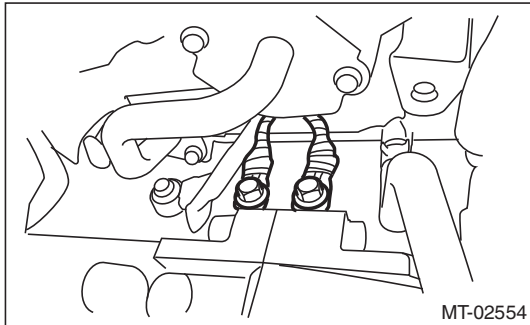
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

11) Remove the pitching stopper.

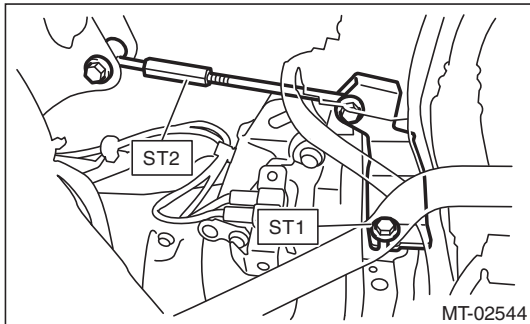


12) Disconnect two ground cables from rear end of the engine.

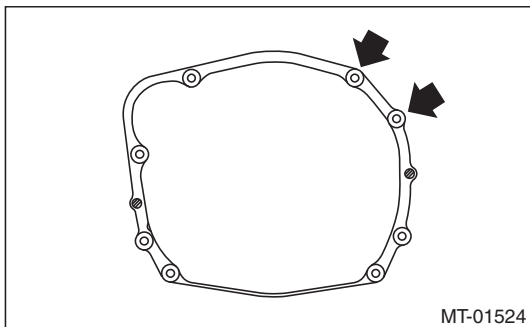


13) Set the ST.

ST1 41099AA010 ENGINE SUPPORT BRACKET
ST2 41099AA020 ENGINE SUPPORT



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

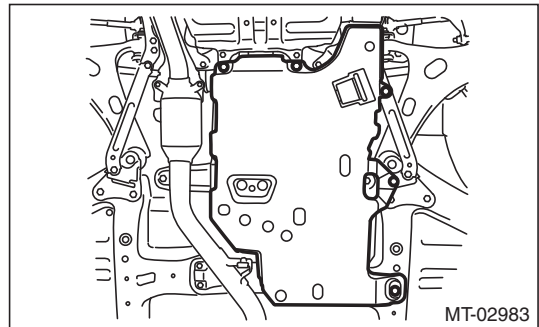


15) Lift up the vehicle.

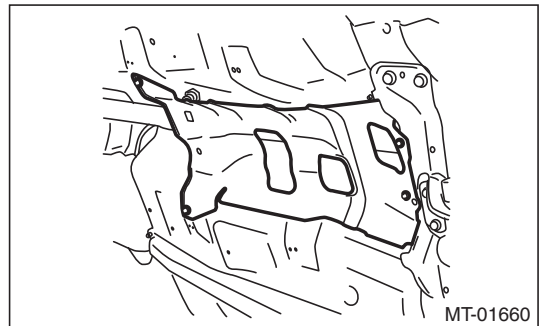
16) Remove the under cover. <Ref. to EI-22, REMOVAL, Front Under Cover.>

17) Remove the center exhaust pipe. <Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>

18) Remove the transmission under cover.

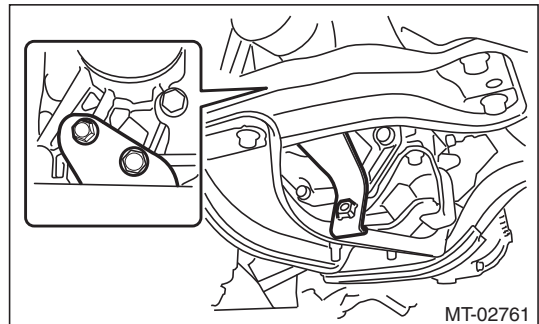


19) Remove the center exhaust cover.



20) Drain transmission gear oil completely. <Ref. to 6MT-24, REPLACEMENT, Transmission Gear Oil.>

21) Remove the hangar bracket from the transmission.



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

23) Remove the MT gear shift cable and MT gear select cable from MT gear shift lever. <Ref. to CS-58, REMOVAL, MT Gear Shift Lever.>

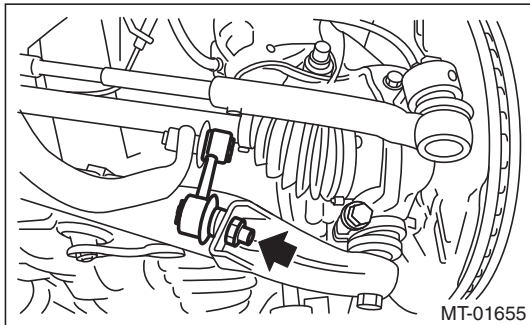
CAUTION:

- Do not bend MT gear shift cable and MT gear select cable at a sharp angle.
- If the MT gear select cable is removed from the selector lever COMPL on the transmission side, replace with new MT gear select cable.

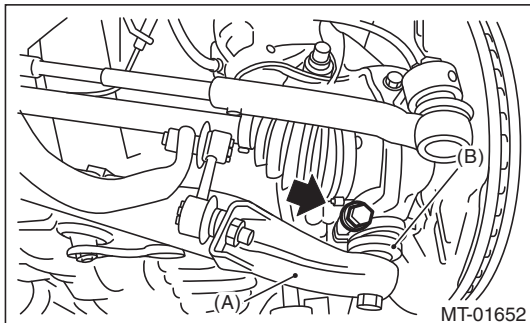
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

24) Disconnect the stabilizer link from the front arm.

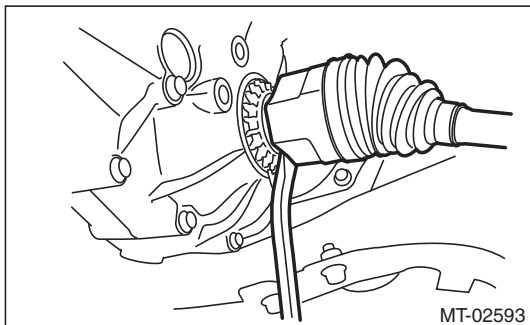


25) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.

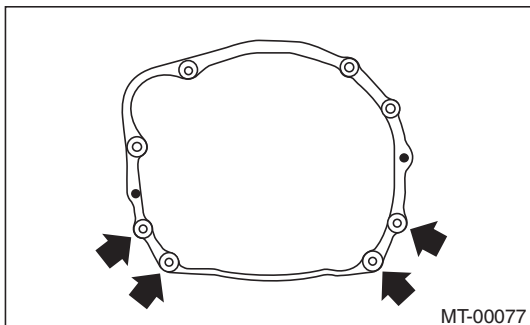


- (A) Front arm
- (B) Ball joint

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



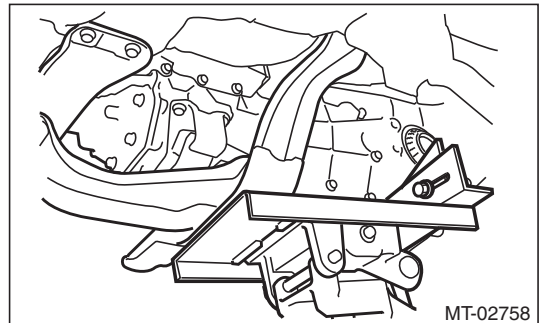
27) Remove the bolts and nuts which hold lower side of transmission to engine.



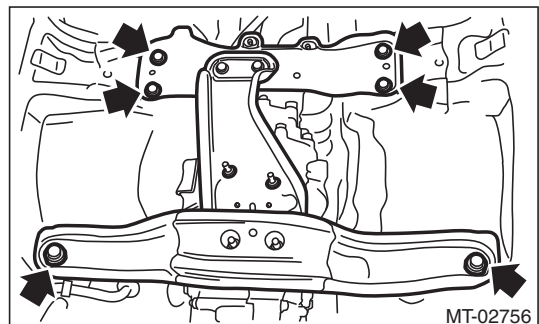
28) Place the transmission jack under the transmission.

CAUTION:

Always support the transmission case with a transmission jack.



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



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

31) Remove the transmission.

NOTE:

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

32) Remove the transmission cushion rubber from the transmission assembly.

Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

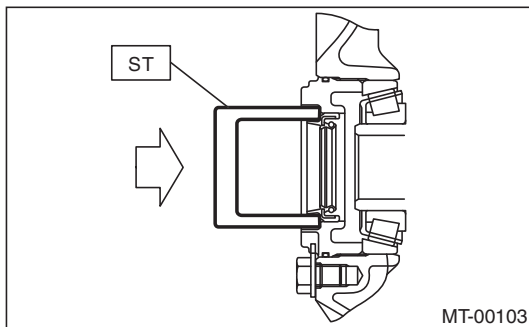
B: INSTALLATION

1) Replace the differential side retainer oil seal.
<Ref. to 6MT-38, REPLACEMENT, Differential Side Retainer Oil Seal.>

NOTE:

- Be sure to replace the differential side retainer oil seal after removing the front drive shaft.
- When a new oil seal has been installed, replacement is not required.

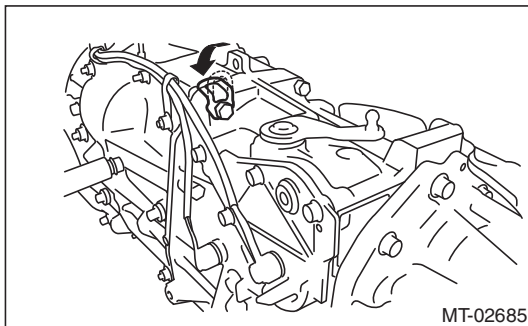
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



2) 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 excessive load or impact to the transmission case.



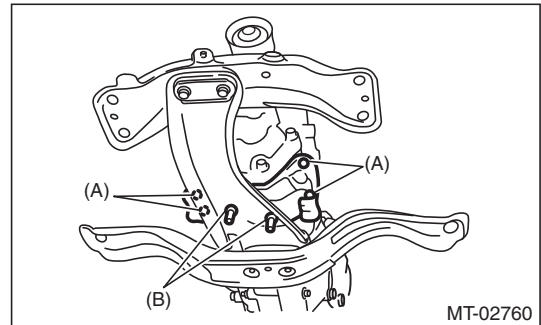
3) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).

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

Tightening torque:

Bolt (A)

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) Tighten the mounting bolts for front crossmember and rear crossmember.

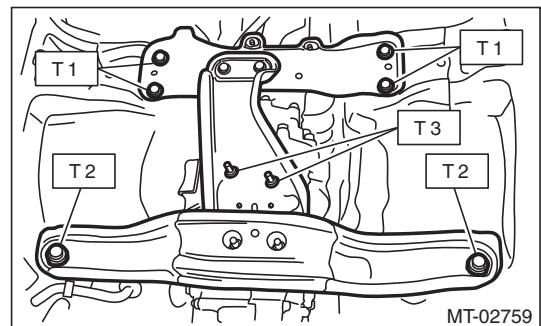
8) Tighten the transmission cushion rubber mounting nut.

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)

T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



9) Take out the transmission jack.

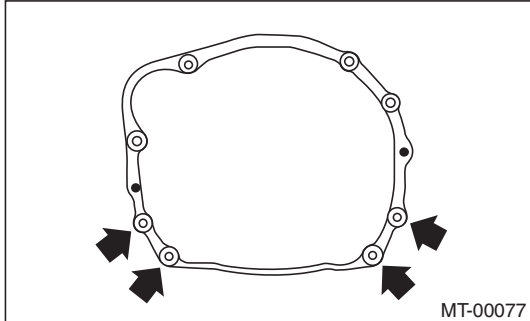
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

10) 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)



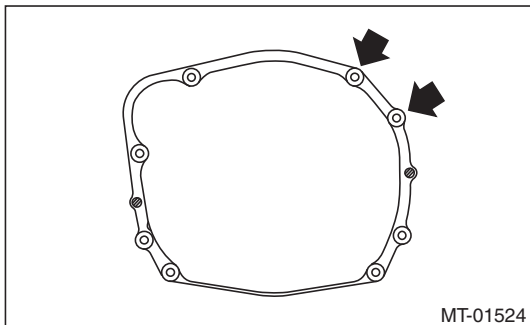
11) Lower the vehicle.

12) Install the starter. <Ref. to SC(H4DO)-12, INSTALLATION, Starter.>

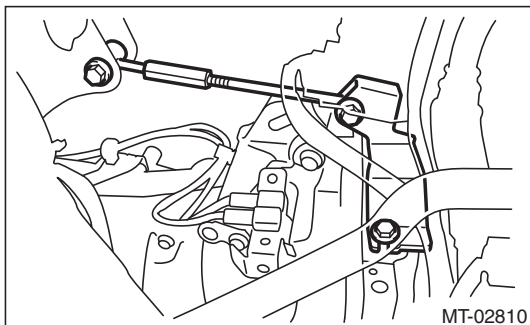
13) Tighten the bolts which hold the upper side of the transmission to the engine.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)



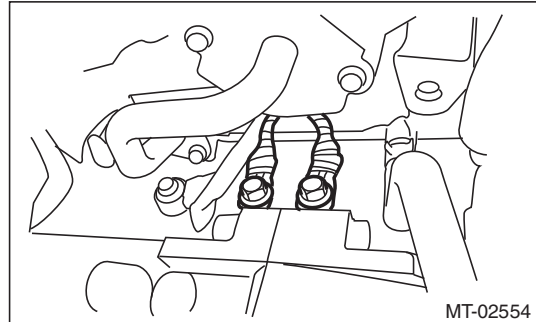
14) Remove the ST.



15) Install the ground cable.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

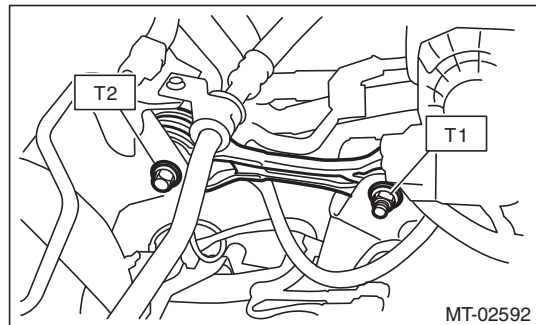


16) Install the pitching stopper.

Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

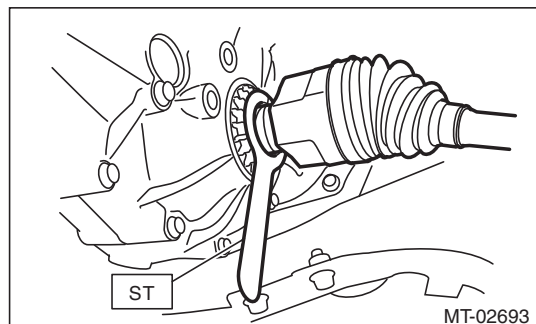
T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



17) Lift up the vehicle.

18) Install the ST to the transmission, and then install the front drive shaft to the transmission.

ST 28399SA010 OIL SEAL PROTECTOR



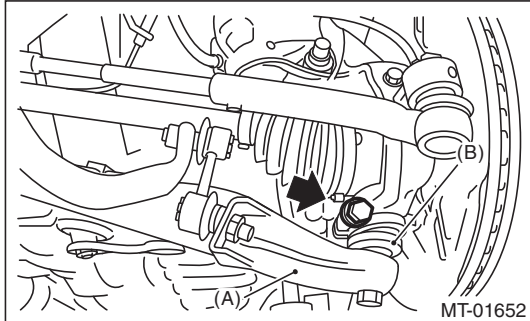
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

19) 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)

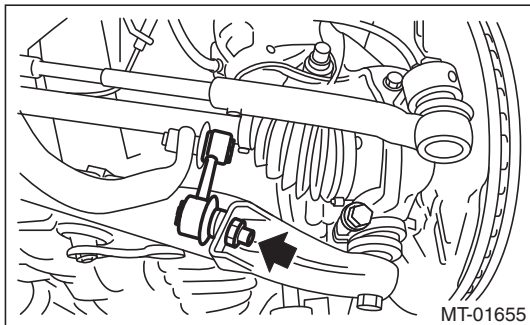


- (A) Front arm
(B) Ball joint

20) Attach the stabilizer link to the front arm.

Tightening torque:

60 N·m (6.1 kgf-m, 44.3 ft-lb)



21) Install the MT gear shift cable and MT gear select cable to MT gear shift lever. <Ref. to CS-60, INSTALLATION, MT Gear Shift Lever.>

CAUTION:

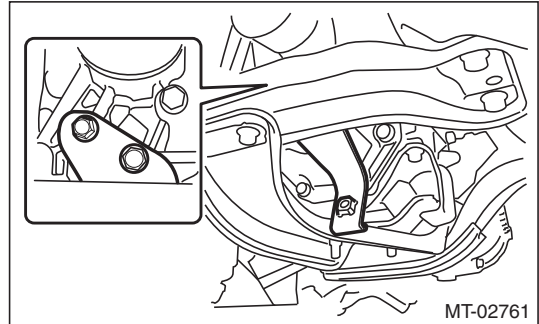
- Do not bend MT gear shift cable and MT gear select cable at a sharp angle.
- If the MT gear select cable is removed from the selector lever COMPL on the transmission side, replace with new MT gear select cable.

22) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

23) Install the hanger bracket to the transmission.

Tightening torque:

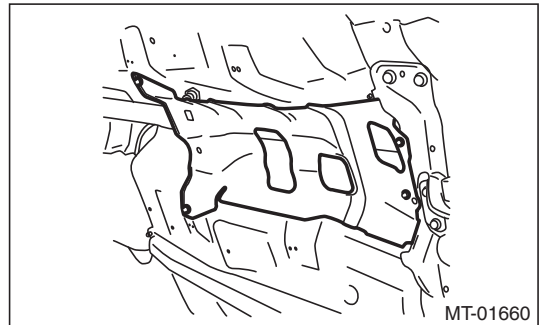
23 N·m (2.3 kgf-m, 17.0 ft-lb)



24) Install the center exhaust cover.

Tightening torque:

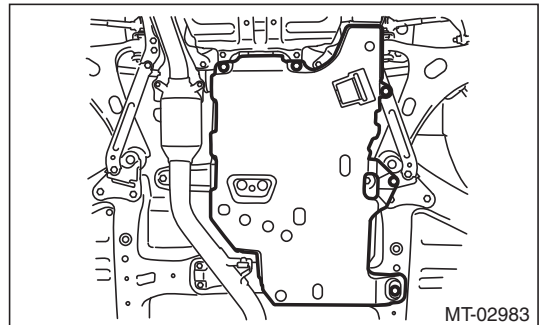
18 N·m (1.8 kgf-m, 13.3 ft-lb)



25) Install the transmission under cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



26) Install the center exhaust pipe. <Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

27) Install the under cover. <Ref. to EI-22, INSTALLATION, Front Under Cover.>

28) Lower the vehicle.

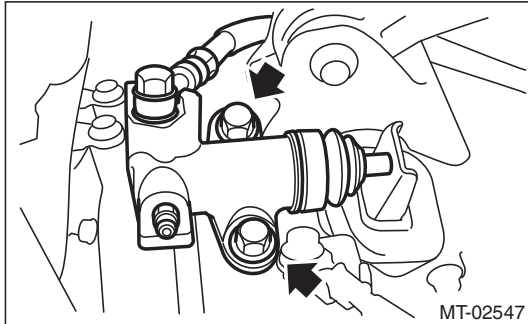
Manual Transmission Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

29) Install the operating cylinder.

Tightening torque:

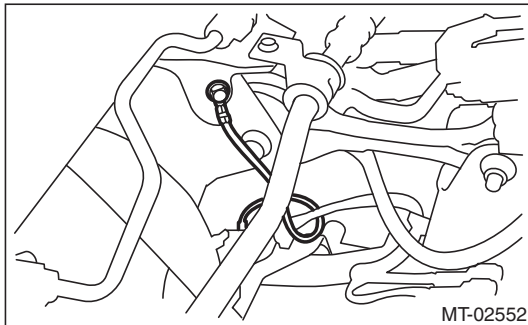
37 N·m (3.8 kgf-m, 27.3 ft-lb)



30) Install the transmission radio ground cord terminal.

Tightening torque:

13 N·m (1.3 kgf-m, 9.6 ft-lb)



31) Install the engine hanger rear.

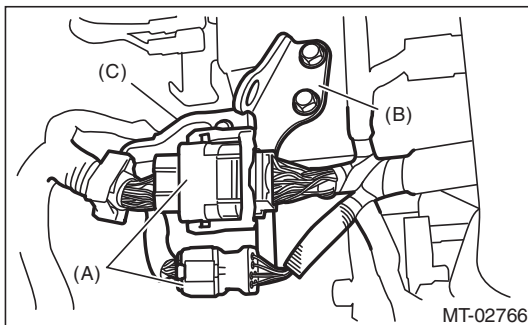
Tightening torque:

21 N·m (2.1 kgf-m, 15.5 ft-lb)

32) Connect the engine harness connector, then attach the harness bracket.

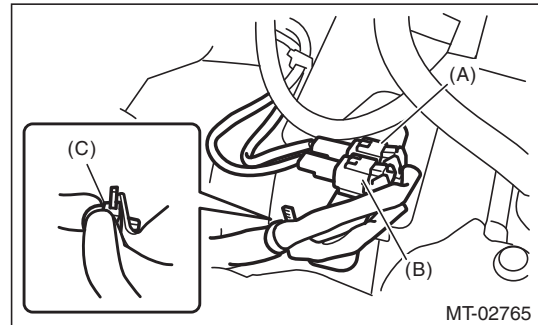
Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



- (A) Engine harness connectors
- (B) Engine hanger rear
- (C) Harness bracket

33) Connect the following connectors and secure the clip on the bracket.



- (A) Neutral position switch connector (brown)
- (B) Back-up light switch connector (gray)
- (C) Clip

34) Pour in transmission gear oil and check the oil level. <Ref. to 6MT-24, Transmission Gear Oil.>

35) Install the air intake boot. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

36) Connect the battery ground terminal.

Transmission Mounting System

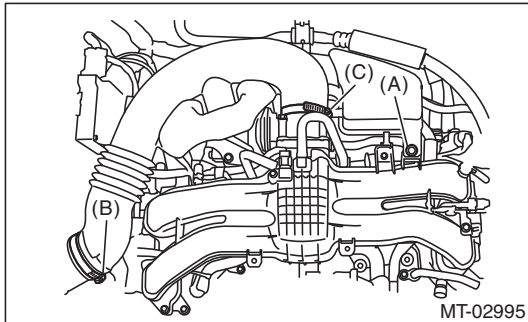
MANUAL TRANSMISSION AND DIFFERENTIAL

4. Transmission Mounting System

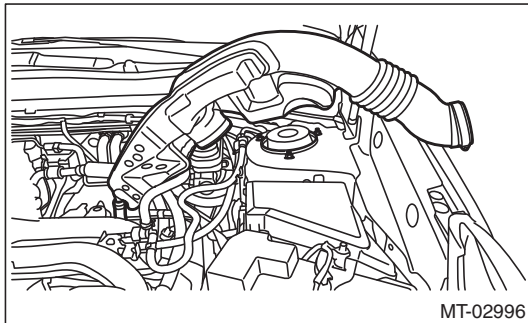
A: REMOVAL

1. PITCHING STOPPER

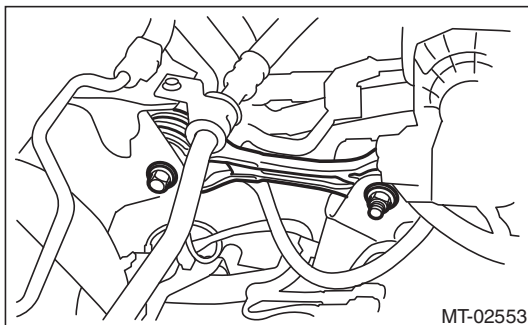
- 1) Disconnect the ground cable from battery.
- 2) Remove the clip (A) from the air intake boot.
- 3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 4) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.

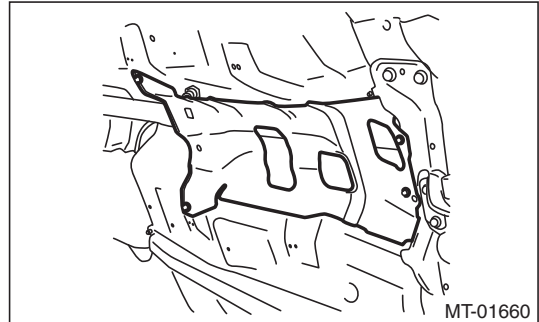


- 6) Remove the pitching stopper.

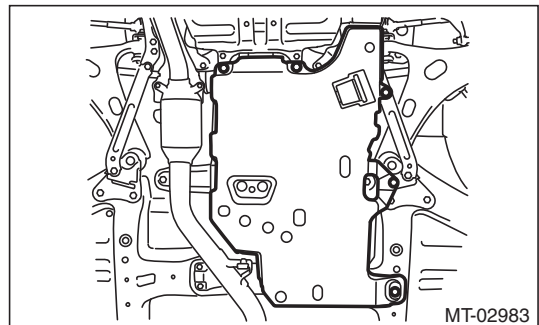


2. CROSSMEMBER AND CUSHION RUBBER

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the center exhaust pipe. <Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>
- 4) Remove the center exhaust cover.



- 5) Remove the transmission under cover.

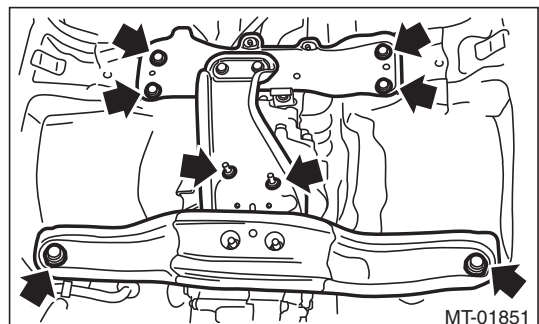


- 6) Set the transmission jack under the transmission case.

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.

Transmission Mounting System

MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

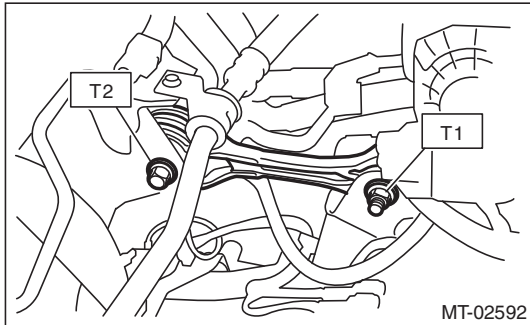
1. PITCHING STOPPER

- 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 air intake boot. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>
- 3) Connect the battery ground terminal.

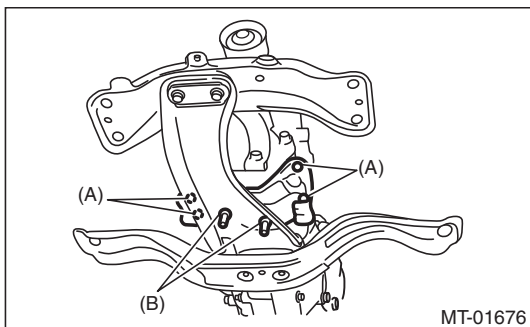
2. CROSSMEMBER AND CUSHION RUBBER

- 1) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).
- 2) Install the transmission cushion rubber to the center crossmember, and temporarily tighten the nut (B).

Tightening torque:

Bolt (A)

35 N·m (3.6 kgf-m, 25.8 ft-lb)



- 3) Tighten the mounting bolts for front crossmember and rear crossmember.

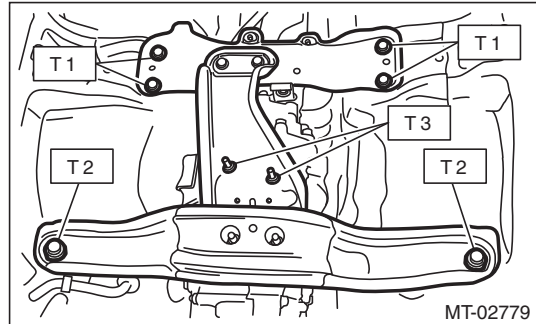
- 4) Tighten the transmission cushion rubber mounting nut.

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)

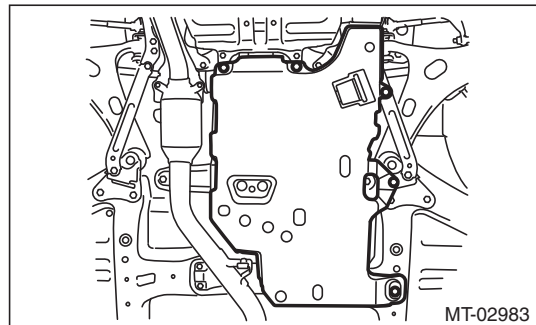
T3: 35 N·m (3.6 kgf-m, 25.8 ft-lb)



- 5) Remove the transmission jack.
- 6) Install the transmission under cover.

Tightening torque:

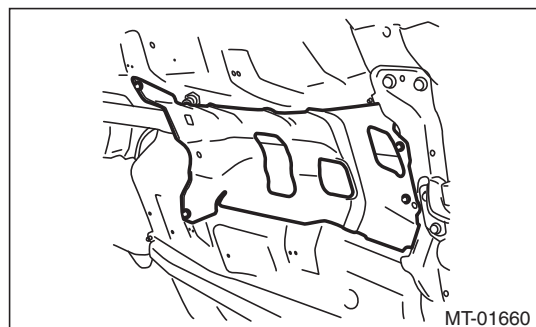
18 N·m (1.8 kgf-m, 13.3 ft-lb)



- 7) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



- 8) Install the center exhaust pipe. <Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>
- 9) Lower the vehicle.
- 10) Connect the battery ground terminal.

Transmission Mounting System

MANUAL TRANSMISSION AND DIFFERENTIAL

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 bends or damage.
Check that the cushion rubber is not stiff, cracked or otherwise damaged.

Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

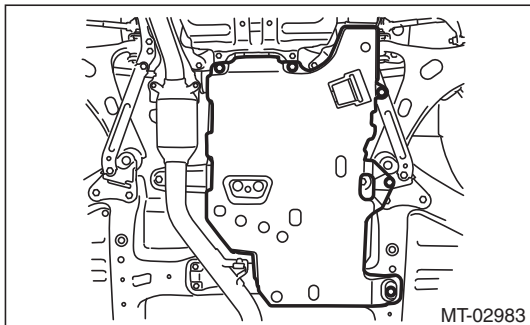
5. Oil Seal

A: INSPECTION

Check for transmission gear oil leaks at oil seal area. If there is an oil leak, replace the oil seal with new one and check the propeller shaft.

B: REPLACEMENT

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the transmission under cover.



- 4) Clean the transmission exterior.
- 5) 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.

- 6) Tighten the drain plug using TORX® bit T70.

NOTE:

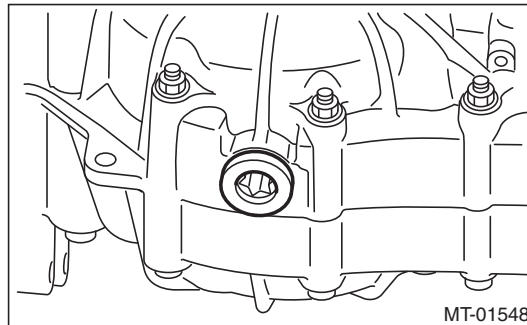
Use a new gasket.

Tightening torque:

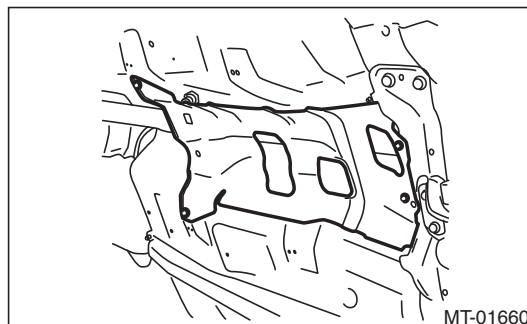
44 N·m (4.5 kgf-m, 32.5 ft-lb) (aluminum gasket, silver)

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)

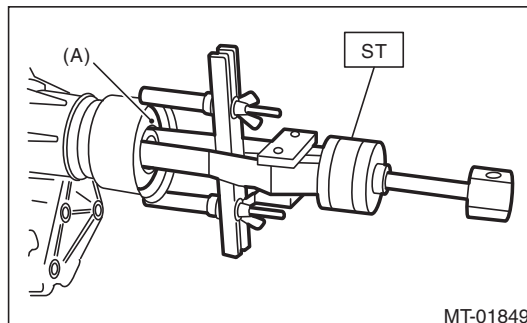


- 7) Remove the rear exhaust pipe. <Ref. to EX(H4DO)-18, REMOVAL, Rear Exhaust Pipe.>
- 8) Remove the center exhaust cover.



- 9) Remove the propeller shaft. <Ref. to DS-11, REMOVAL, Propeller Shaft.>
- 10) Using the ST, remove the oil seal.

ST 398527700 PULLER ASSY



(A) Oil seal

Oil Seal

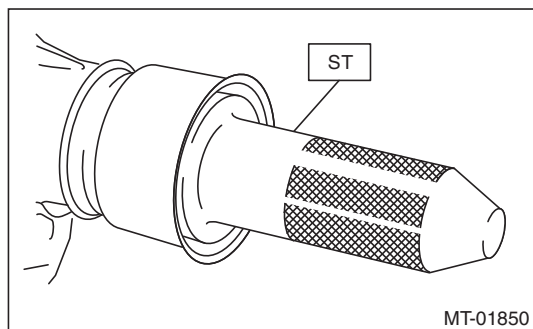
MANUAL TRANSMISSION AND DIFFERENTIAL

11) 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

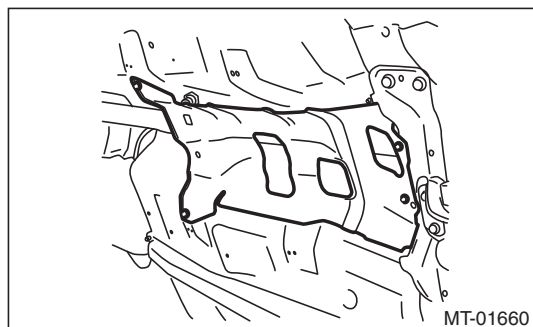


12) Install the propeller shaft. <Ref. to DS-13, INSTALLATION, Propeller Shaft.>

13) Install the center exhaust cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

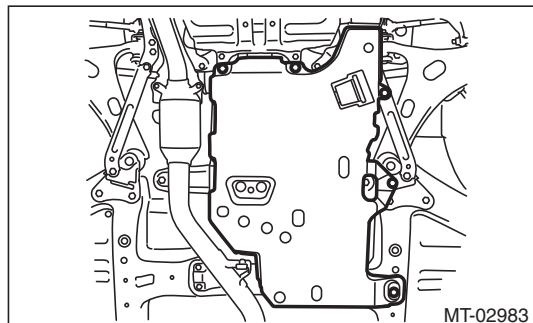


14) Install the rear exhaust pipe. <Ref. to EX(H4DO)-19, INSTALLATION, Rear Exhaust Pipe.>

15) Install the transmission under cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



16) Lower the vehicle.

17) Pour in transmission gear oil and check the oil level. <Ref. to 6MT-24, Transmission Gear Oil.>

18) Connect the battery ground terminal.

Differential Side Retainer Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

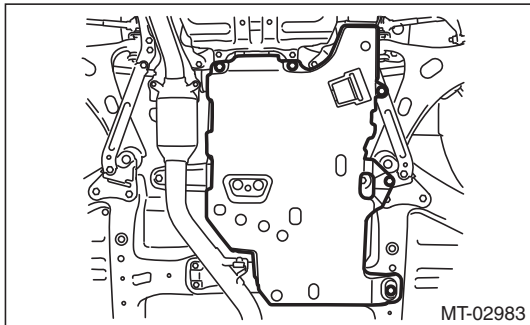
6. Differential Side Retainer Oil Seal

A: INSPECTION

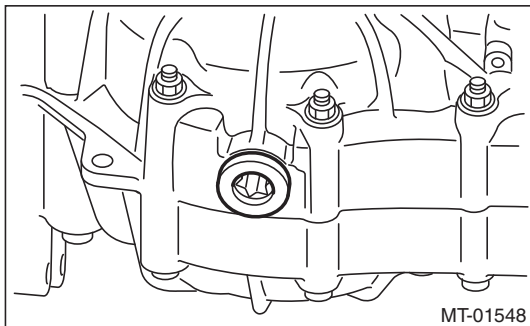
Check for transmission gear oil leaks at differential side retainer oil seal. If there is oil leakage, replace the oil seal with the new part and check the drive shaft.

B: REPLACEMENT

- 1) Disconnect the ground cable from battery.
- 2) Lift up the vehicle.
- 3) Remove the transmission under cover.



- 4) 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.

- 5) Tighten the drain plug using TORX® bit T70.

NOTE:

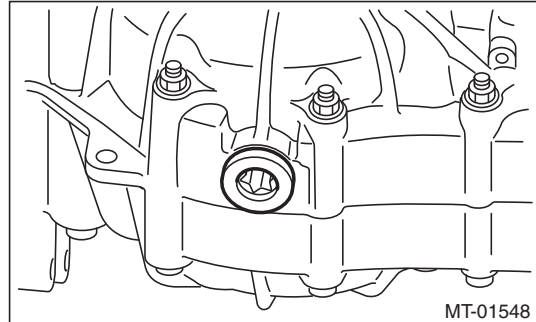
Use a new gasket.

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)



- 6) Remove the center exhaust pipe. <Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>

- 7) Separate the front drive shaft from the transmission. <Ref. to DS-55, REMOVAL, Front Drive Shaft.>

- 8) 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.

Differential Side Retainer Oil Seal

MANUAL TRANSMISSION AND DIFFERENTIAL

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

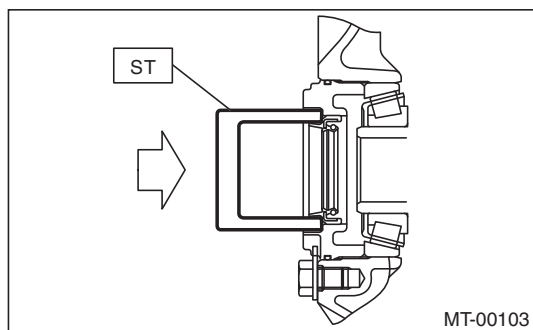
CAUTION:

- Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Check the identification marks (L, R) during installation not to mix up the oil seals RH and LH.

NOTE:

Use a new oil seal.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



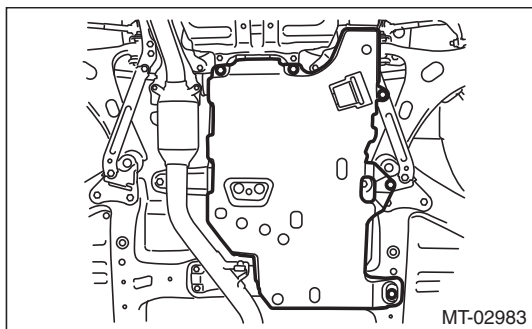
10) Install the front drive shaft. <Ref. to DS-56, INSTALLATION, Front Drive Shaft.>

11) Install the center exhaust pipe. <Ref. to EX(H4DO)-15, INSTALLATION, Center Exhaust Pipe.>

12) Install the transmission under cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



13) Lower the vehicle.

14) Pour in transmission gear oil and check the oil level. <Ref. to 6MT-24, Transmission Gear Oil.>

15) Connect the battery ground terminal.

Switches and Harness

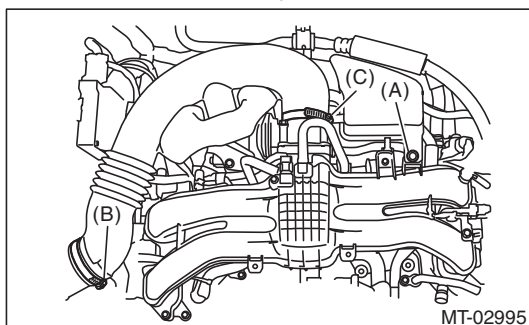
MANUAL TRANSMISSION AND DIFFERENTIAL

7. Switches and Harness

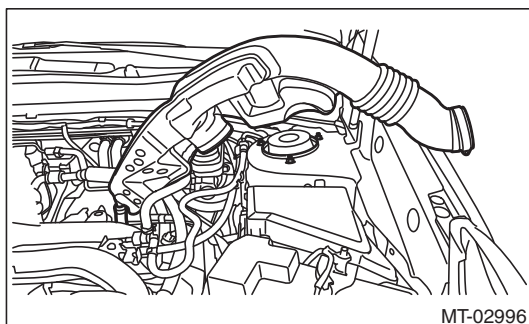
A: REMOVAL

1. BACK-UP LIGHT AND NEUTRAL POSITION SWITCH

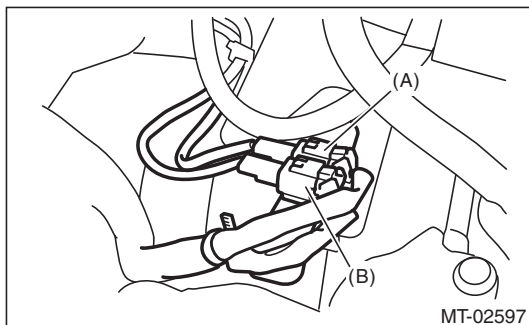
- 1) Disconnect the ground cable from battery.
- 2) Remove the clip (A) from the air intake boot.
- 3) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 4) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 5) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



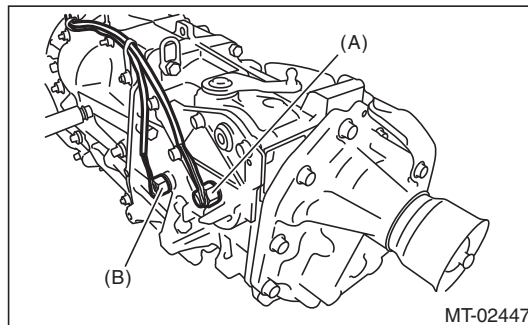
- 6) Disconnect the connector back-up light switch & neutral position switch.



- (A) Neutral position switch connector (brown)
(B) Back-up light switch connector (gray)

- 7) Remove the harness connector from bracket.
- 8) Lift up the vehicle.
- 9) Remove the harness from each clip.

- 10) 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

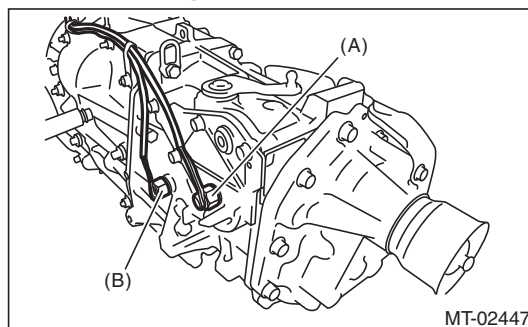
- 1) Install the back-up light switch & neutral position switch with the harness.

NOTE:

Use a new gasket.

Tightening torque:

32.3 N·m (3.3 kgf-m, 23.8 ft-lb)



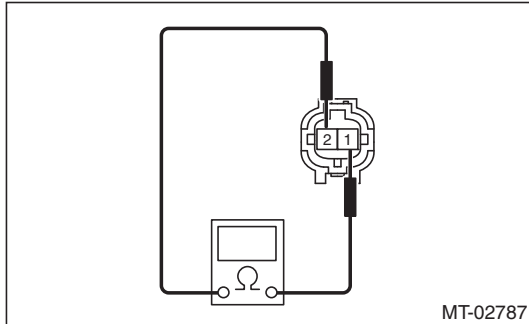
- (A) Neutral position switch
(B) Back-up light switch

- 2) Secure the harness on each clip.
- 3) Connect the connectors of back-up light switch & neutral position switch.
- 4) Install the air intake boot. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>
- 5) Connect the battery ground terminal.

C: INSPECTION

1. BACK-UP LIGHT SWITCH

- 1) Turn the ignition switch to OFF.
- 2) Disconnect the back light switch connector.
- 3) Measure the resistance between the back-up light switch terminals.

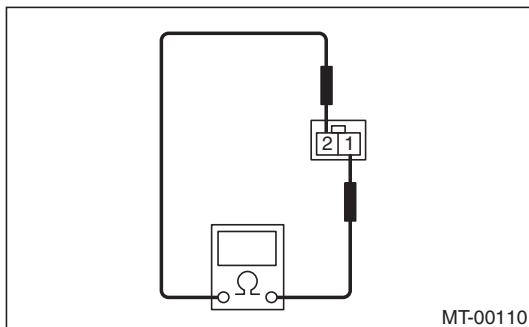


Gear shift position	Terminal No.	Specified resistance
Reverse position	1 and 2	Less than 1 Ω
Other positions		1 M Ω or more

- 4) Replace faulty parts.

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 2	Less than 1 Ω
Other positions		1 M Ω or more

- 4) Replace faulty parts.

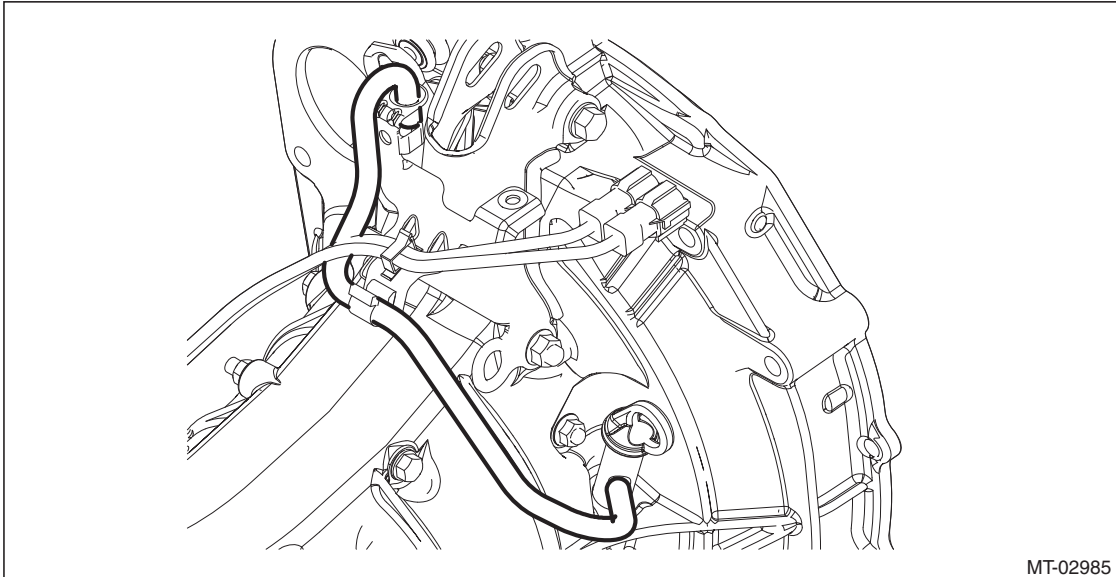
Air Breather Hose

MANUAL TRANSMISSION AND DIFFERENTIAL

8. Air Breather Hose

A: REMOVAL

- 1) Remove the air intake boot assembly. <Ref. to IN(H4DO)-11, REMOVAL, Air Intake Boot.>
- 2) Remove the air breather hose.

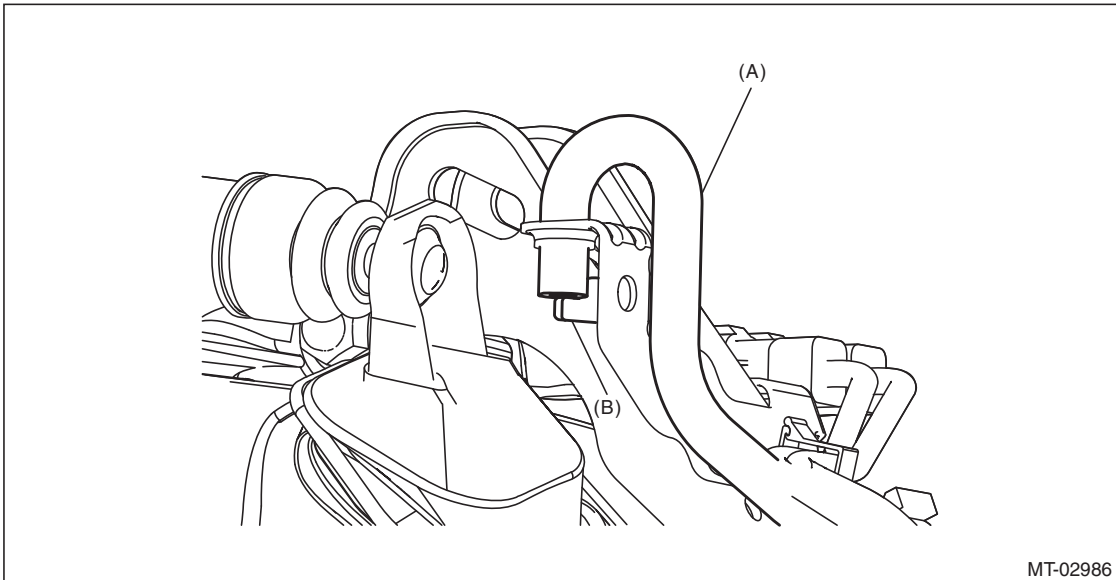


B: INSTALLATION

Install in the reverse order of removal.

NOTE:

- When installing the air breather hose, pay attention to the positions of the two markings on the hose and make sure the markings come to the same position as when removed.
- Securely insert the air breather hose until the hose end contacts the catch of the pitching stopper bracket.



(A) Air breather hose

(B) Catch

C: INSPECTION

Check the hose for peeling, crack or clogging.

9. Preparation for Overhaul

A: PROCEDURE

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

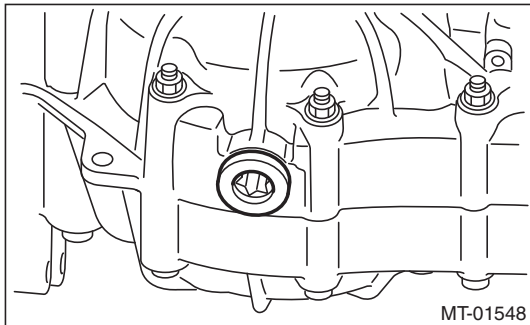
Use a new gasket.

Tightening torque:

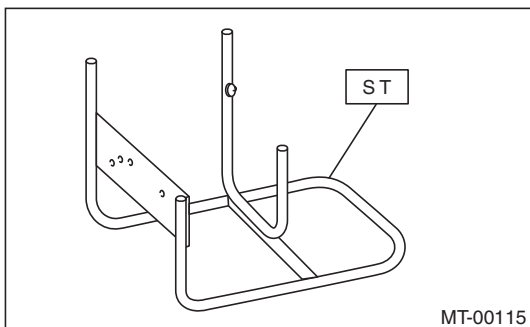
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket silver)

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) 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

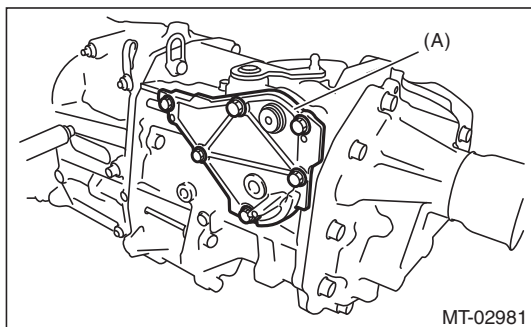
MANUAL TRANSMISSION AND DIFFERENTIAL

10. Transfer Case and Extension Case Assembly

A: REMOVAL

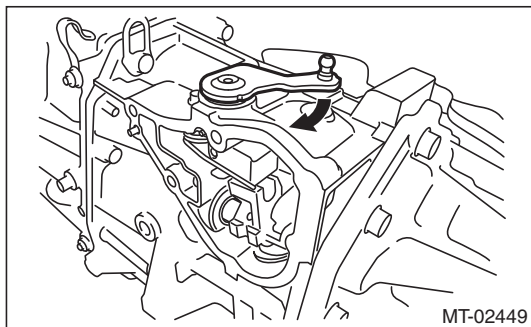
- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly.

- (1) Remove the transmission cover.

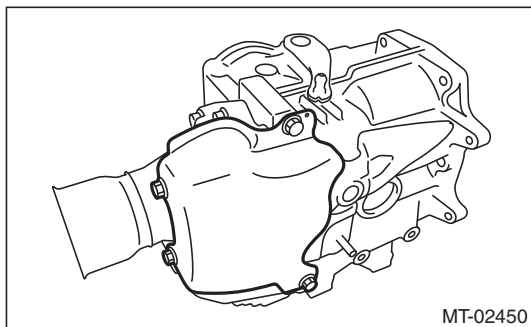


(A) Transmission cover

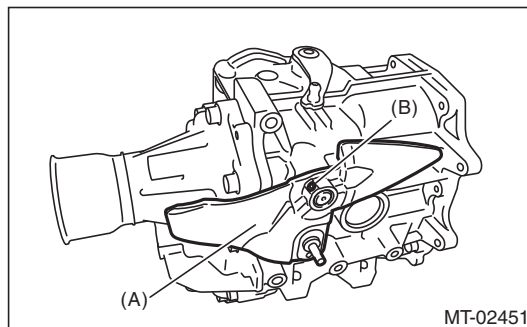
- (2) Set and hold the selector lever COMPL to the 1st-2nd side, and remove the transfer case and extension case assembly as a unit.



- 4) Remove the transfer cover.



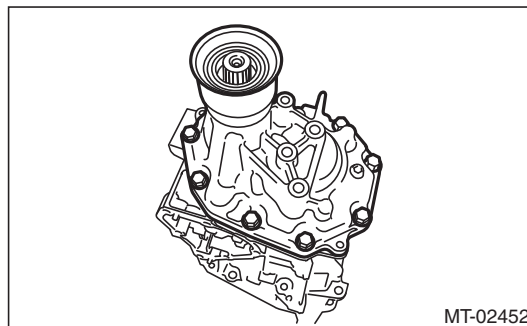
- 5) Use the ST to push out the spring pin and remove the shift lever COMPL from shifter arm No. 2.
ST 398791700 SPRING PIN REMOVER 2



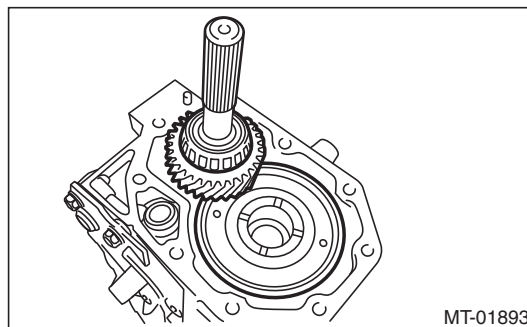
(A) Shift lever COMPL

(B) Spring pin

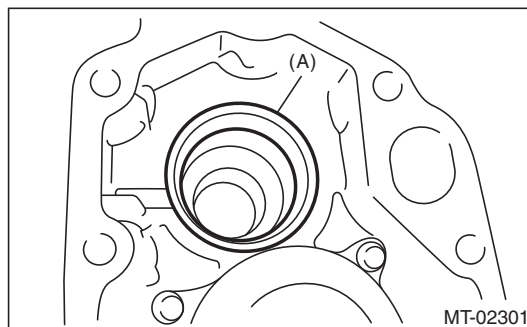
- 6) Remove the extension case assembly.



- 7) Remove the transfer driven gear and center differential as a unit.



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



(A) Bearing outer race

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

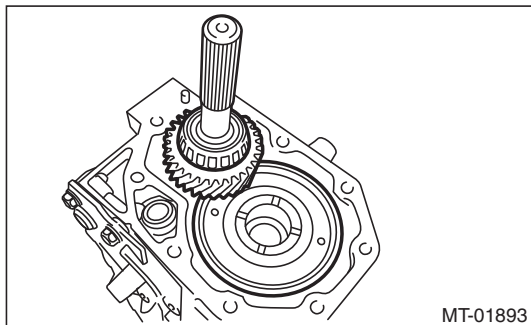
B: INSTALLATION

- 1) Clean the mating surfaces of the transmission case, transfer case and extension case.
- 2) Apply a coat of grease to the front roller bearing and rear roller bearing of the transfer driven gear.

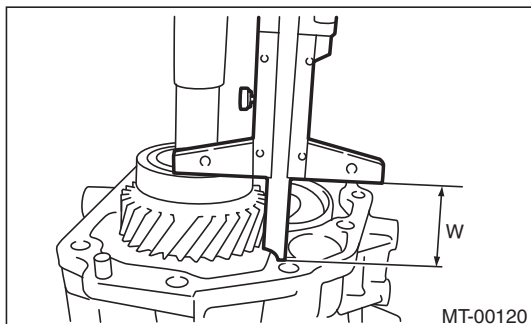
Grease:

NICHIMOLY N-130 or equivalent

- 3) Install the center differential and transfer driven gear to the transfer case.



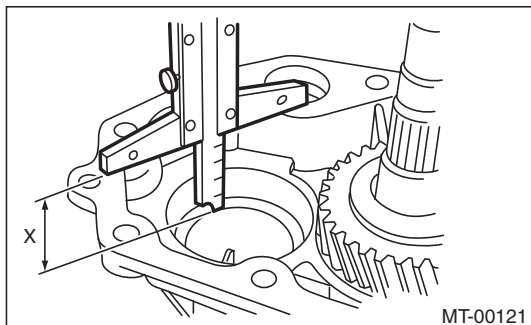
- 4) Install the bearing outer race to transfer driven gear.
- 5) While pressing the bearing outer race horizontally, rotate the driven shaft for ten turns.
- 6) Measure the height "W" between transfer case and taper roller bearing on the transfer driven gear.



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

NOTE:

Measure with bearing outer race and thrust washer removed.



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

$$t = X - W + (0.15 - 0.2 \text{ mm (0.006 - 0.008 in)})$$

X: Depth of bearing insertion part of the extension case

W: Height between transfer case and taper roller bearing on the transfer driven gear

0.15 — 0.20 mm (0.006 — 0.008 in): Amount of standard protrusion

- 9) Select the washer with the nearest value in the following table.

NOTE:

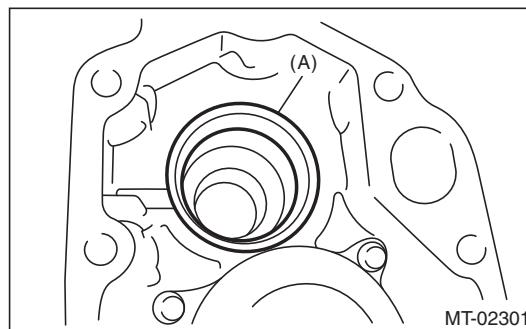
Be sure that it is always within the preload.

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

0.15 — 0.20 mm (0.006 — 0.008 in)

Thrust washer (50 x 61 x 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)

- 10) Install the selected thrust washer and bearing outer race to the extension case.



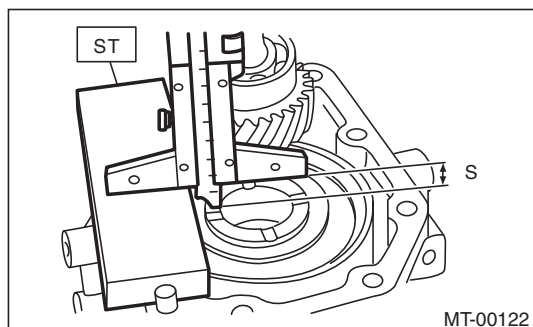
(A) Bearing outer race

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

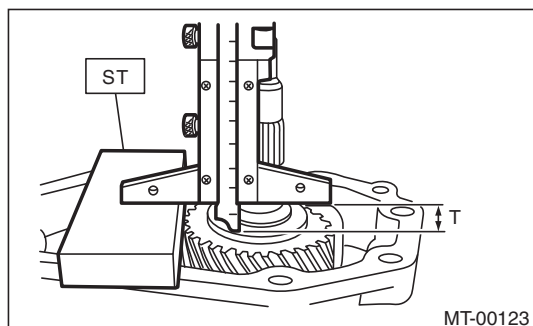
11) Measure the depth "S" between the transfer case + ST and the center differential.

ST 398643600 GAUGE



12) Measure the height "T" between the extension case + ST and the transfer drive gear.

ST 398643600 GAUGE



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

$U = S + T - 30 \text{ mm (1.18 in)} - (0.15 - 0.35 \text{ mm (0.0059 - 0.0138 in)})$

S: Depth between the transfer case + ST and the center differential

T: Height between the extension case + ST and the transfer gear

30 mm (1.18 in): Thickness of ST 15 mm (0.59 in) $\times$ 2

0.15 — 0.35 mm (0.0059 — 0.0138 in): Clearance

14) Select a suitable thrust washer in the following table.

Clearance:

0.15 — 0.35 mm (0.0059 — 0.0138 in)

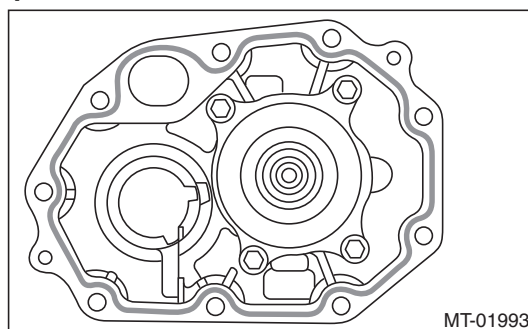
Thrust washer	
Part No.	Thickness mm (in)
803036050	0.9 (0.035)
803036054	1.0 (0.039)
803036051	1.1 (0.043)
803036055	1.2 (0.047)
803036052	1.3 (0.051)
803036056	1.4 (0.055)
803036053	1.5 (0.059)
803036057	1.6 (0.063)
803036058	1.7 (0.067)
803036080	1.8 (0.071)
803036081	1.9 (0.075)

15) Fit the thrust washer onto the center differential.

16) Apply liquid gasket seamlessly to the mating surface of transfer case.

Liquid gasket:

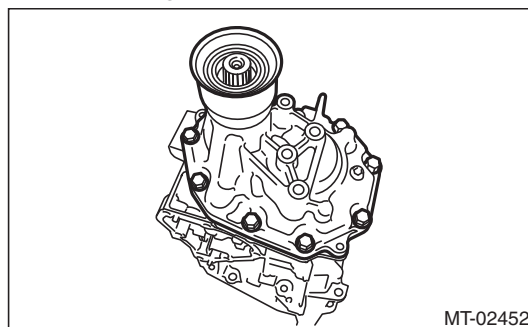
THREE BOND 1215 (Part No. 004403007) or equivalent



17) Install the extension case assembly to the transfer case.

Tightening torque:

40 N·m (4.1 kgf·m, 29.5 ft·lb)



Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

18) Temporarily install the gasket to the transmission case side.

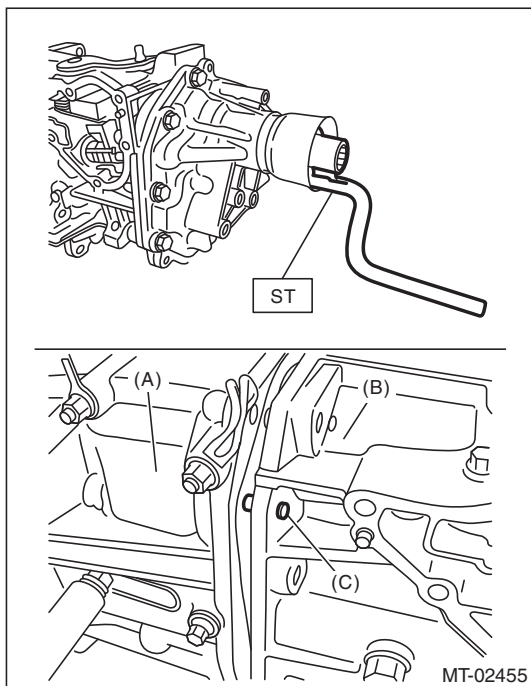
NOTE:

Use a new gasket.

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

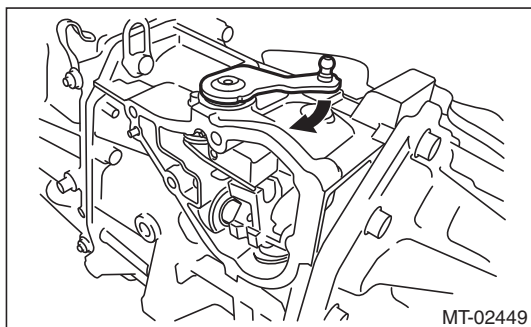
(1) While moving the HANDLE to align the spline position, press in the transfer case assembly until the knock pin comes slightly out of transfer case.

ST 18631AA000 HANDLE



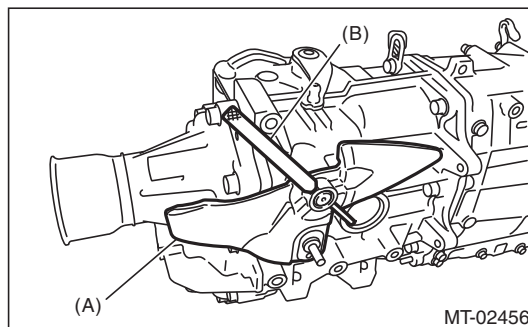
- (A) Transmission case
- (B) Transfer case
- (C) Knock pin

(2) Set and hold the selector lever to the 1st-2nd side, and install the transfer case assembly so that the shifter arm edge and fork rod does not contact.



20) Temporarily tighten the transfer case assembly.

21) Install the shift lever COMPL to the shifter arm No. 2, then insert the remover or similar tool instead of spring pin.



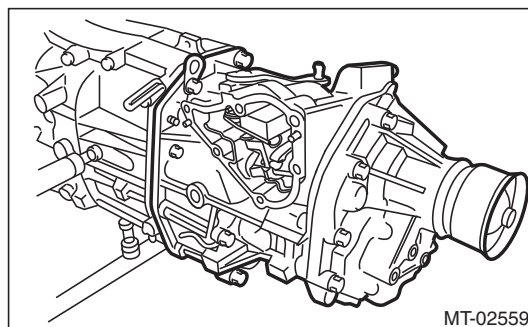
- (A) Shift lever COMPL
- (B) Remover

22) Operate the selector arm and remover to confirm the correct shifting into each gear is possible.

23) Tighten the transfer case assembly to the specified torque.

Tightening torque:

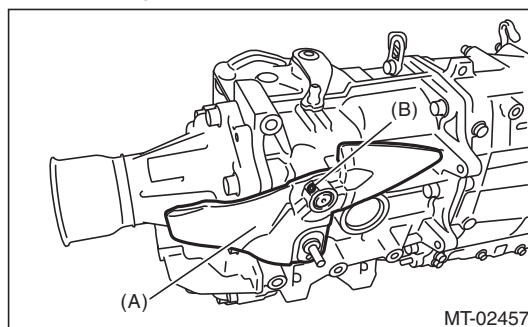
24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



24) Secure the shift lever COMPL to the shifter arm No. 2 using a spring pin.

NOTE:

Use new spring pin.



- (A) Shift lever COMPL
- (B) Spring pin

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

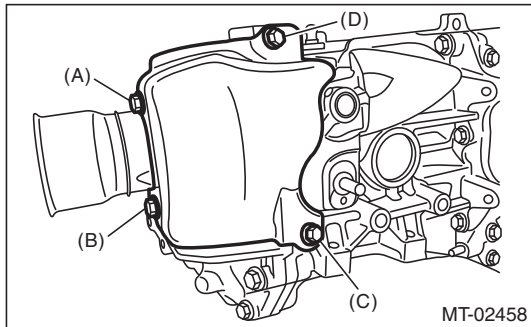
25) Install the transfer cover.

(1) Temporarily tighten the transfer cover mounting bolts.

(2) Tighten bolts in order of (B), (A), (C), (D) to the specified torque.

Tightening torque:

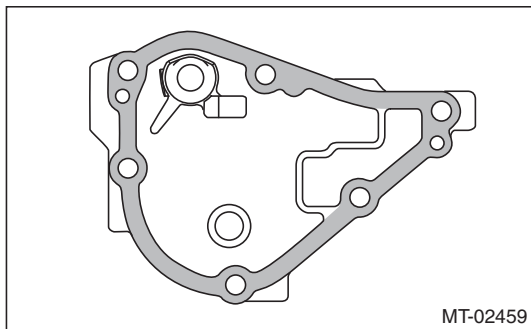
15 N·m (1.5 kgf-m, 11.1 ft-lb)



26) Apply liquid gasket seamlessly to the mating surface of transmission cover.

Liquid gasket:

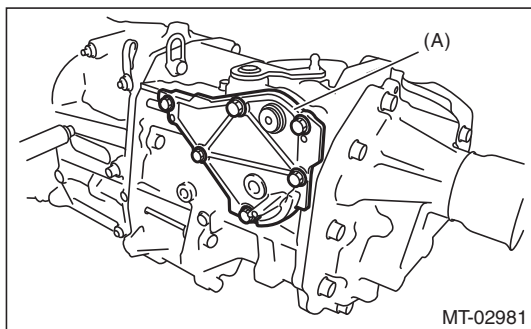
THREE BOND 1215 (Part No. 004403007) or equivalent



27) Install the transmission cover to transfer case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Transmission cover

28) Install the back-up light switch and the neutral switch. <Ref. to 6MT-40, BACK-UP LIGHT AND NEUTRAL POSITION SWITCH, INSTALLATION, Switches and Harness.>

29) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

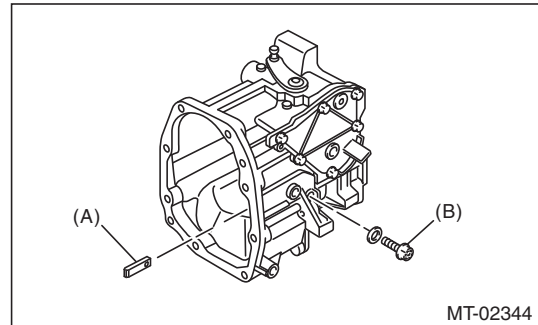
C: DISASSEMBLY

1. TRANSFER CASE

1) Remove the interlock plate.

NOTE:

Do not remove the precoat bolt (B) if the parts are assembled as a transmission assembly.



(A) Interlock plate

(B) Precoat bolt

2) Remove the shift link assembly. <Ref. to 6MT-55, REMOVAL, Shift Link Assembly.>

2. EXTENSION CASE

1) Remove the transfer drive gear assembly. <Ref. to 6MT-50, REMOVAL, Transfer Drive Gear.>

2) Remove the oil seal from the extension case. <Ref. to 6MT-36, REPLACEMENT, Oil Seal.>

3) Remove the dust cover.

Transfer Case and Extension Case Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

1. TRANSFER CASE

1) Install the shift link assembly to the transfer case. <Ref. to 6MT-58, INSTALLATION, Shift Link Assembly.>

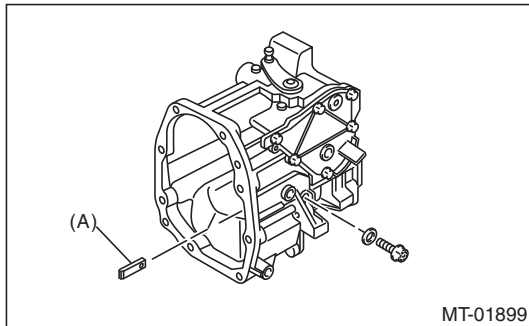
2) Attach the interlock plate to transfer case.

NOTE:

- Use a new bolt and gasket.
- Clean the bolt threads before installing the interlock plate.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



(A) Interlock plate

2. EXTENSION CASE

1) Using the ST, install the oil seal to the extension case. <Ref. to 6MT-36, REPLACEMENT, Oil Seal.>

NOTE:

Use a new oil seal.

2) Install the dust cover.

3) Install the transfer drive gear to the extension case. <Ref. to 6MT-50, INSTALLATION, Transfer Drive Gear.>

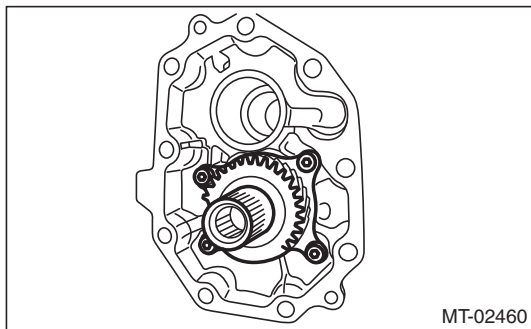
Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

11. Transfer Drive Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear. <Ref. to 6MT-52, REMOVAL, Transfer Driven Gear.>
- 6) Remove the transfer drive gear.

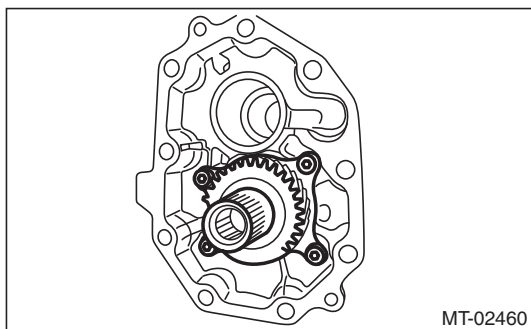


B: INSTALLATION

- 1) Install the transfer drive gear.

Tightening torque:

26 N·m (2.7 kgf-m, 19.2 ft-lb)



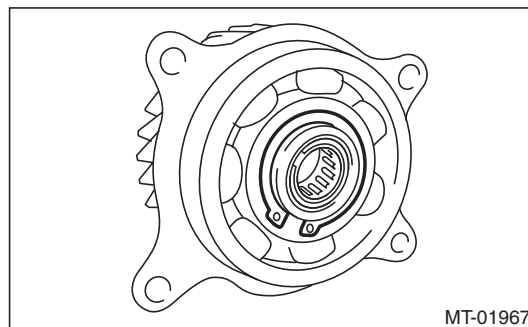
- 2) Install the transfer driven gear. <Ref. to 6MT-52, INSTALLATION, Transfer Driven Gear.>
- 3) Select a thrust washer. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the transfer case and the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 6) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>

- 7) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

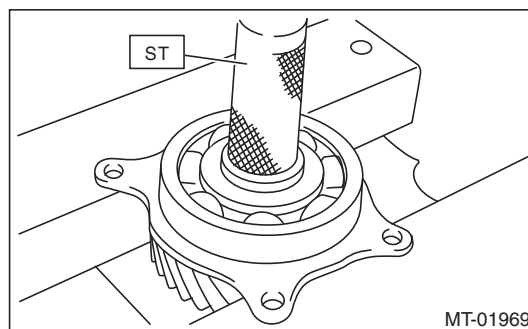
C: DISASSEMBLY

- 1) Remove the snap ring.



- 2) Remove the ball bearing.

ST 899864110 REMOVER



- 3) Remove the snap ring from transfer drive gear, and remove the needle bearing.

Transfer Drive Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

- 1) Install the needle bearing and snap ring to the transfer drive gear.
- 2) Set the ST to the bearing inner race, then install the transfer drive gear to the bearing.

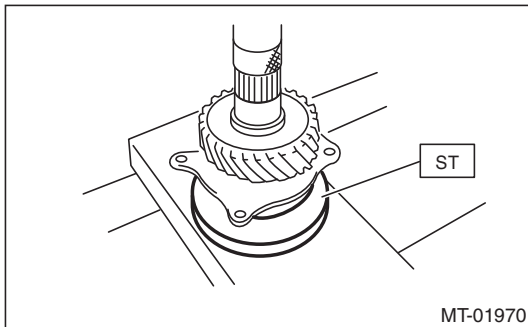
CAUTION:

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

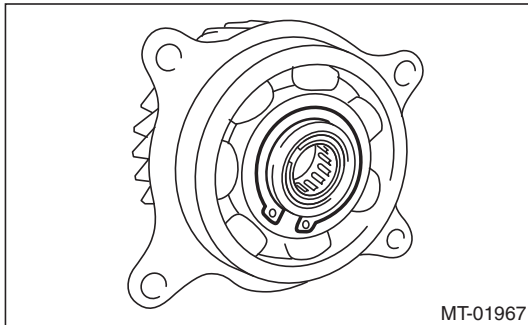
NOTE:

Use a new ball bearing.

ST 398177700 INSTALLER



- 3) Install the snap ring on the transfer drive shaft.



- 4) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 6MT-51, INSPECTION, Transfer Drive Gear.>

E: INSPECTION

- 1) Bearing

Replace the bearings in the following cases.

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

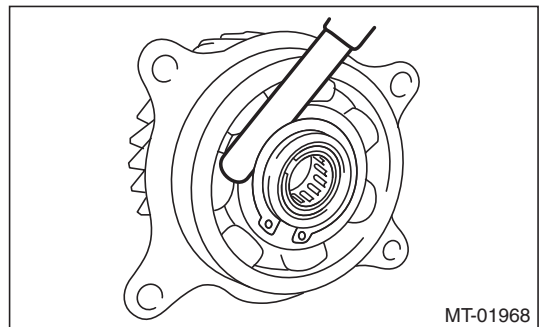
- 2) Drive gear

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)

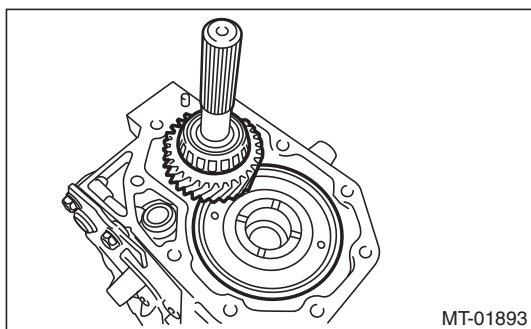
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

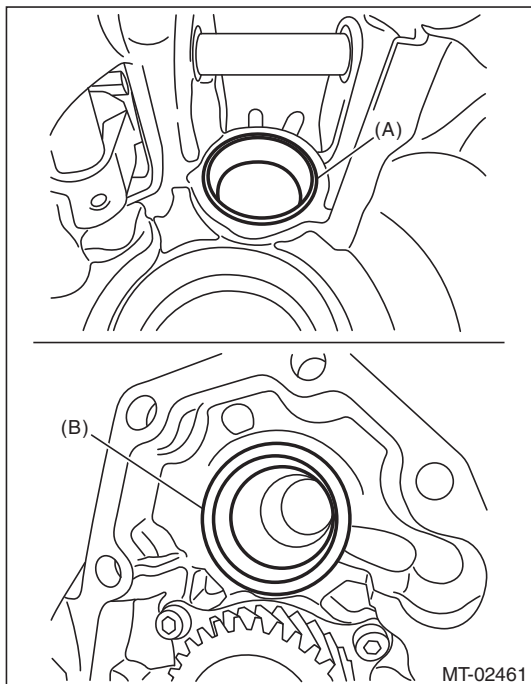
12. Transfer Driven Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Remove the transfer driven gear and center differential as a unit.



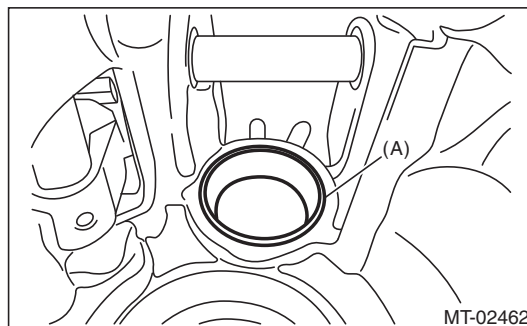
- 6) Remove the bearing outer race from the extension case and transfer case.



- (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.



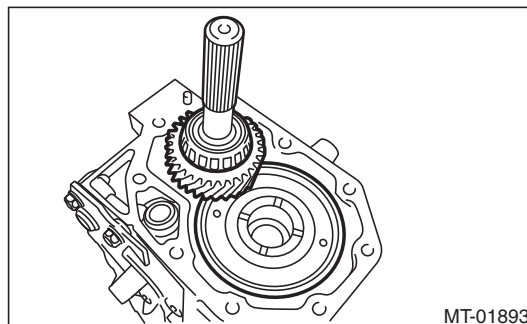
(A) Bearing outer race

- 2) Apply a coat of grease to the front roller bearing and rear roller bearing of the transfer driven gear.

Grease:

NICHIMOLY N-130 or equivalent

- 3) Install the transfer driven gear and center differential as a unit.



- 4) Select a thrust washer. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the selected thrust washer and bearing outer race to the extension case.
- 6) Install the transfer case and the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>
- 8) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

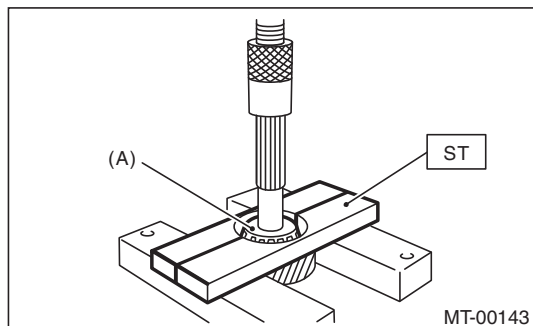
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

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

ST 498077000 REMOVER

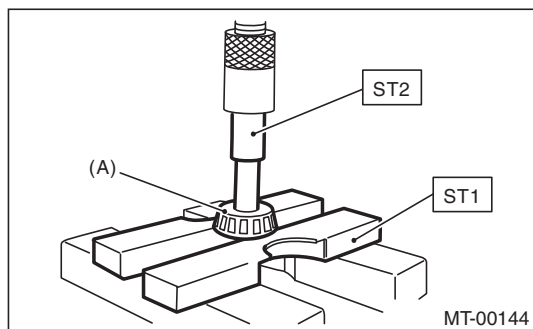


(A) Roller bearing

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

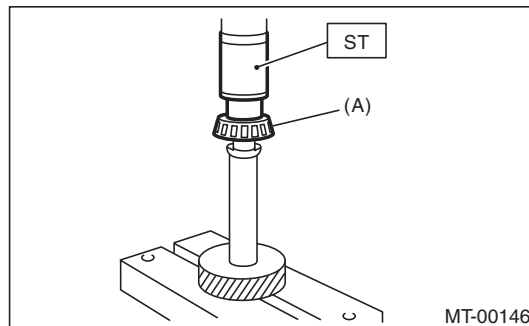
NOTE:

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

CAUTION:

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

ST 927640000 INSTALLER



(A) Roller bearing

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

NOTE:

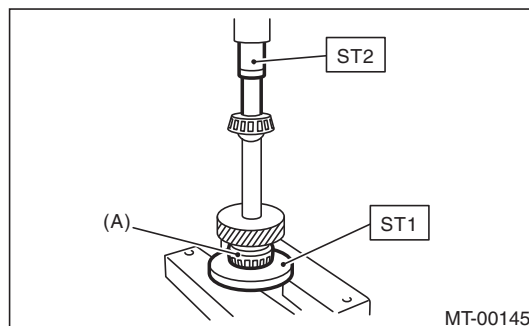
Be careful when handling because the roller bearing outer races are used with roller bearing as a set.

CAUTION:

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

ST1 498175500 INSTALLER

ST2 899864100 REMOVER



(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

13.Center Differential

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Remove the center differential and transfer driven gear as a unit. <Ref. to 6MT-52, REMOVAL, Transfer Driven Gear.>

B: INSTALLATION

- 1) Install the center differential and transfer driven gear into the transfer case as a unit. <Ref. to 6MT-52, INSTALLATION, Transfer Driven Gear.>
- 2) Select a thrust washer. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 3) Install the transfer driven gear. <Ref. to 6MT-52, INSTALLATION, Transfer Driven Gear.>
- 4) Install the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>
- 7) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

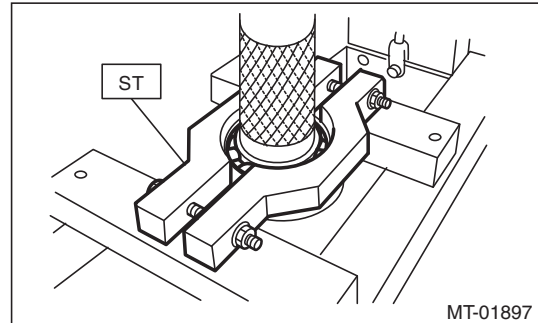
C: DISASSEMBLY

Remove the ball bearing using ST.

NOTE:

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

ST 498077600 CENTER DIFFERENTIAL BEARING REMOVER



D: ASSEMBLY

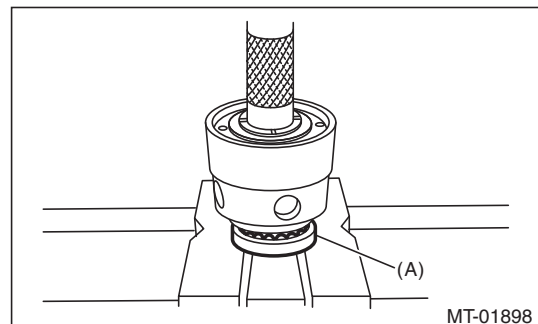
Install the ball bearing to the center differential assembly.

CAUTION:

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

NOTE:

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 wear or damage
- 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 assembly.

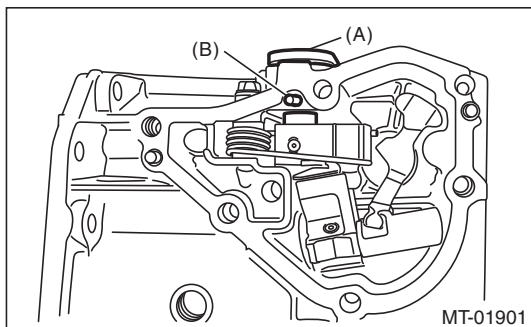
Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

14. Shift Link Assembly

A: REMOVAL

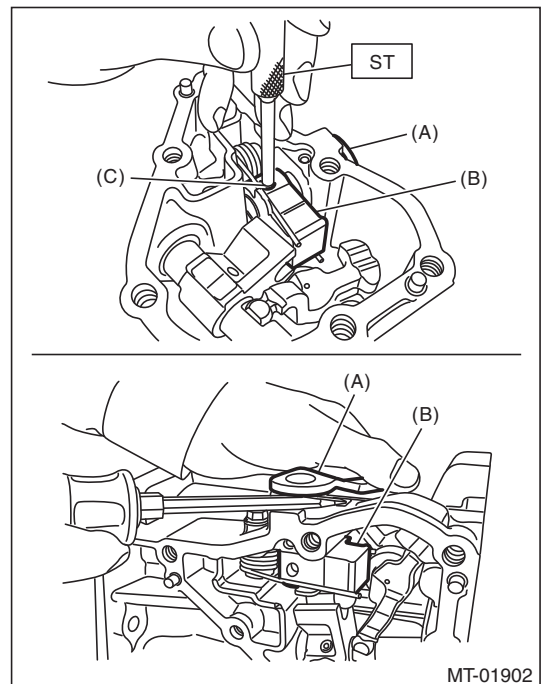
- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 5) Remove the center differential and transfer driven gear as a unit. <Ref. to 6MT-52, REMOVAL, Transfer Driven Gear.>
- 6) Pull out the straight pin.



- (A) Selector lever COMPL
(B) Straight pin

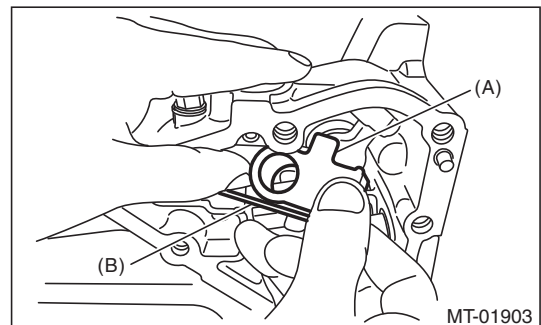
- 7) Use the ST to remove the spring pin, and remove the selector lever COMPL.

ST 398791700 SPRING PIN REMOVER 2



- (A) Selector lever COMPL
(B) Selector arm No. 2
(C) Spring pin

- 8) Pull out the selector arm No. 2 from neutral set spring.

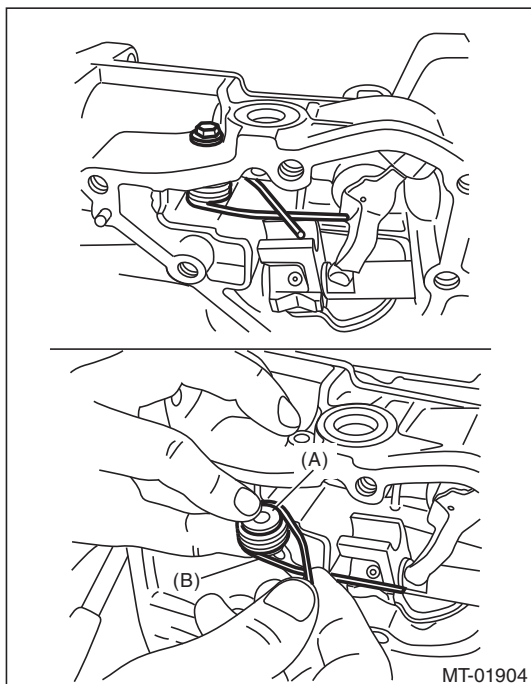


- (A) Selector arm No. 2
(B) Neutral set spring

Shift Link Assembly

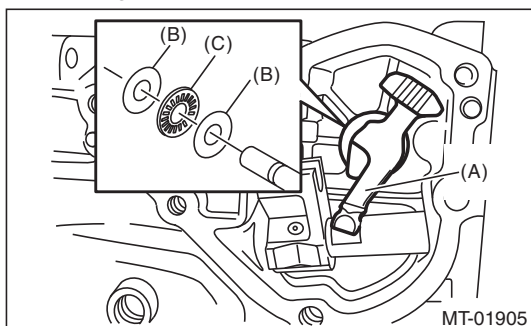
MANUAL TRANSMISSION AND DIFFERENTIAL

9) Remove the bolts and remove the shifter arm collar and neutral set spring from transfer case.



- (A) Shifter arm collar
- (B) Neutral set spring

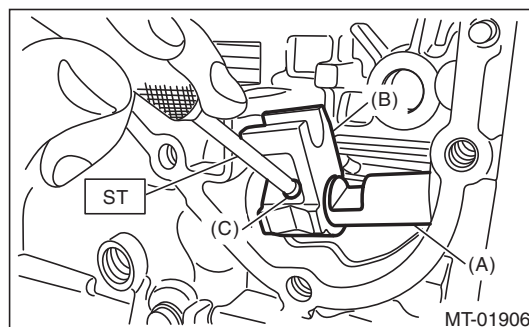
10) Remove the shifter arm No. 2, washers and thrust bearing from transfer case.



- (A) Shifter arm No. 2
- (B) Washer
- (C) Thrust bearing

11) Use the ST to remove the spring pin, and remove the shifter arm and selector arm.

ST 398791700 SPRING PIN REMOVER 2

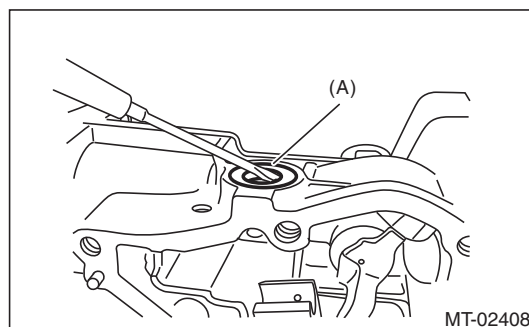


- (A) Shifter arm
- (B) Selector arm
- (C) Spring pin

12) Remove the oil seal from the transfer case by using a screwdriver wrapped with vinyl tape etc.

NOTE:

The illustration shows the oil seal of selector lever COMPL. Perform the same procedures for removing the shifter arm No. 2.



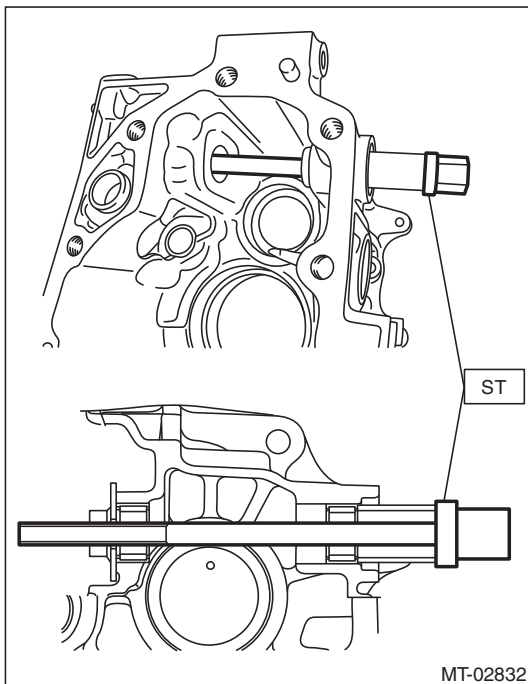
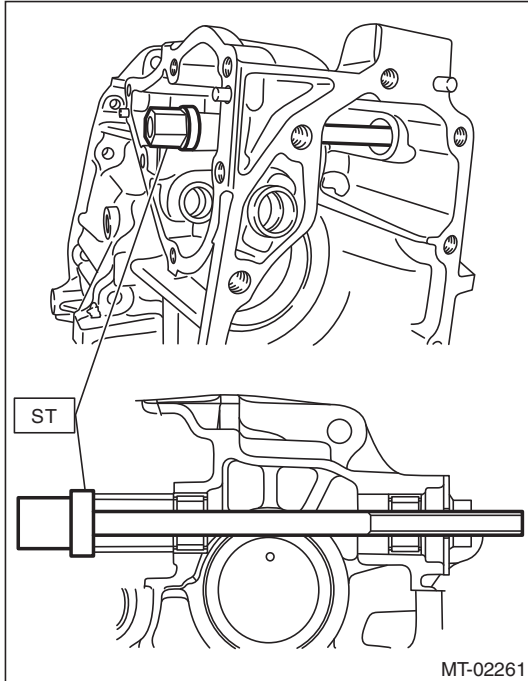
- (A) Oil seal

Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

13) Remove the needle bearing from the transfer case by using a tube with the diameter of 20 mm (0.79 in) or 21 mm (0.83 in) and the ST.

ST 18763AA000 COMPRESSOR SHAFT



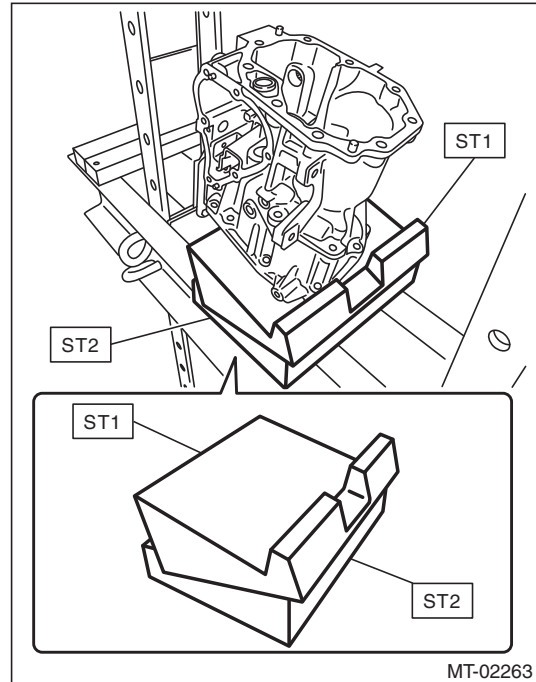
14) Set ST1, ST2 and transfer case to a press.

NOTE:

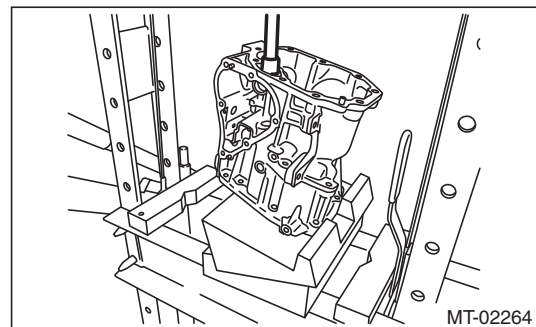
- Set the ST2 under ST1.
- Set the transfer case so that the hole for shifter arm is positioned vertically.

ST1 498267300 CYLINDER HEAD TABLE

ST2 498267200 CYLINDER HEAD TABLE



15) Remove the roller bearing by using a round bar with the diameter of 22 mm (0.87 in) or 23 mm (0.91 in).



16) Flip over the transfer case, and set an iron plate between transfer case and ST.

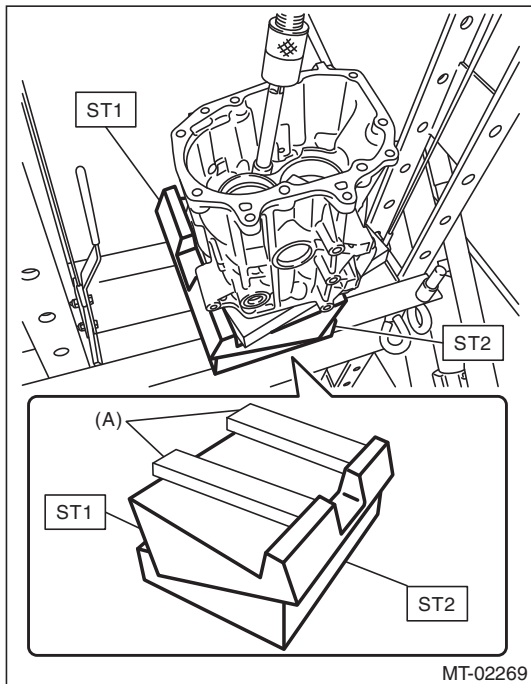
NOTE:

- 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.

Shift Link Assembly

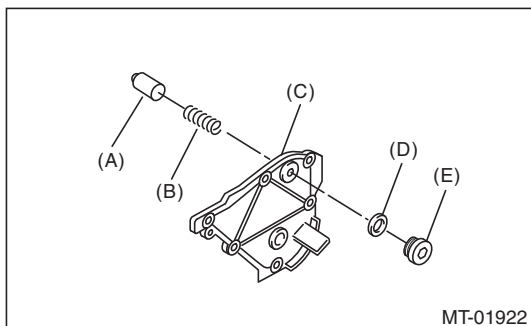
MANUAL TRANSMISSION AND DIFFERENTIAL

17) Remove the roller bearing by using a tube with the diameter of 22 mm (0.87 in) or 23 mm (0.91 in).



(A) Iron plate

18) Remove the plunger and check ball spring from transmission cover.



- (A) Plunger
- (B) Checking ball spring
- (C) Transmission cover
- (D) Seal ring
- (E) Seal bolt

B: INSTALLATION

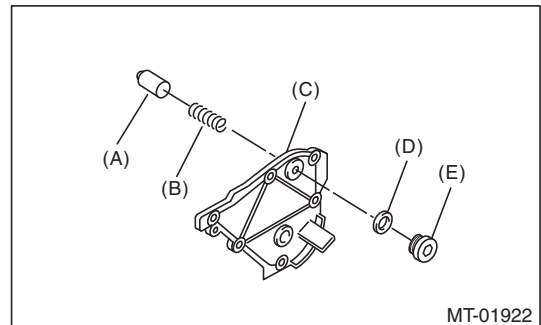
- 1) Clean the mating surface of the transmission cover and transfer case.
- 2) Install the plunger and check ball spring to transmission cover.

NOTE:

Use a new seal ring.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



- (A) Plunger
- (B) Checking ball spring
- (C) Transmission cover
- (D) Seal ring
- (E) Seal bolt

Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Using the ST, install the needle bearing to the transfer case.

NOTE:

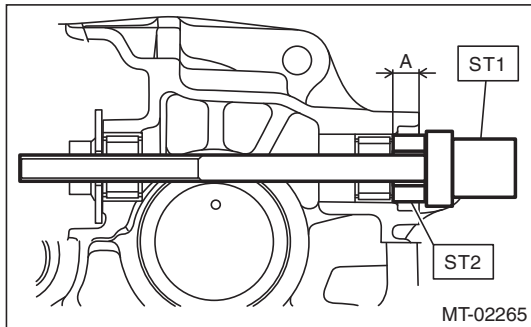
- Use a new needle bearing.
- If the press-fit depth exceeds the service limit, replace with a new needle bearing.

ST1 18763AA000 COMPRESSOR SHAFT

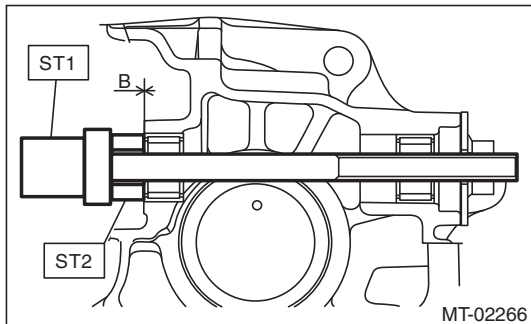
ST2 498277200 STOPPER SET

Press-fit depth of needle bearing:

A: 8.5 ± 0.2 mm (0.33 ± 0.01 in) from the end of transfer case



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



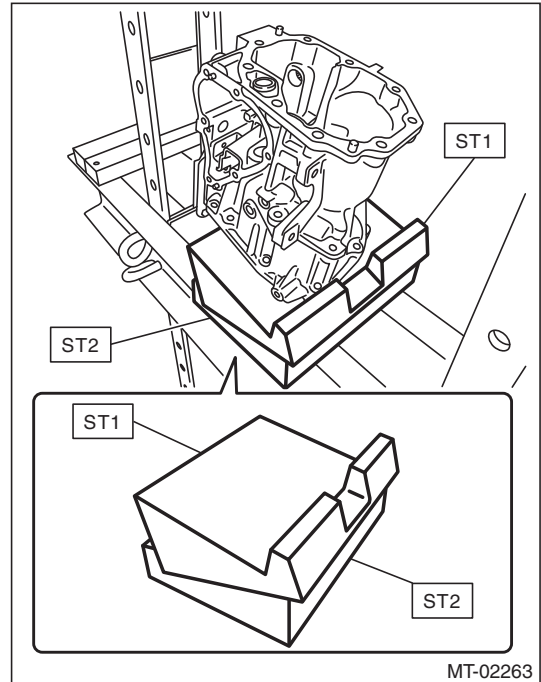
4) Set ST1, ST2 and transfer case to a press.

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



Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Using the ST, install the roller bearing to the transfer case.

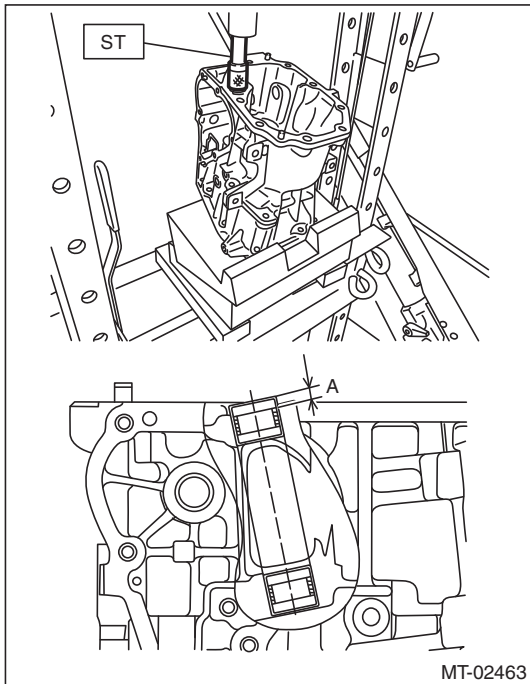
NOTE:

- Use a new roller bearing.
- Gradually perform the press-fit operation while measuring the press-fit depth.
- If the press-fit depth exceeds the service limit, replace with a new bearing.

ST 899864100 REMOVER

Press-fit depth of roller bearing:

A: 5.1 ± 0.2 mm (0.20 ± 0.01 in) from the finished surface of transfer case



6) Flip over the transfer case, and set an iron plate between transfer case and ST.

NOTE:

- 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 parts while taking care that the transfer case knock pin and the roller bearing do not ride over the iron plate.

7) Using the ST, install the roller bearing to the transfer case.

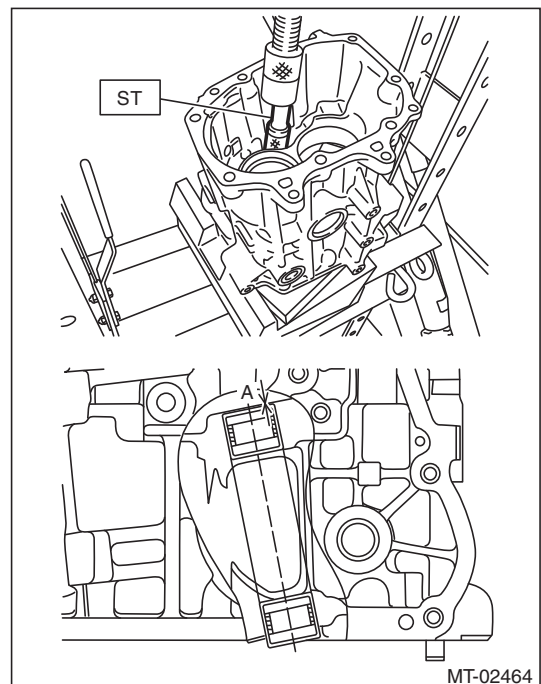
NOTE:

- Use a new roller bearing.
- Gradually perform the press-fit operation while measuring the press-fit depth.
- If the press-fit depth exceeds the service limit, replace with a new bearing.

ST 899864100 REMOVER

Press-fit depth of roller bearing:

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



Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Using the ST, install the oil seal to the transfer case.

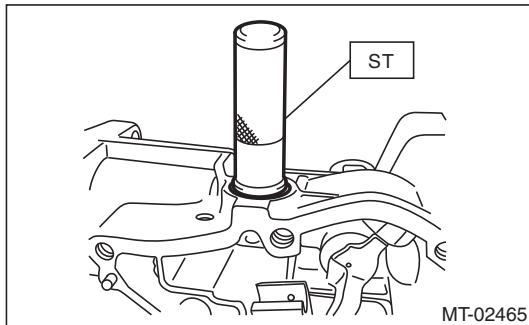
NOTE:

- Use a new oil seal.
- The illustration shows the oil seal of selector lever COMPL. Perform the same procedures for installing the oil seal of shifter arm No. 2.
- Apply transmission gear oil to the oil seal lips.

ST 18657AA000 INSTALLER

Press-fit depth of oil seal:

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

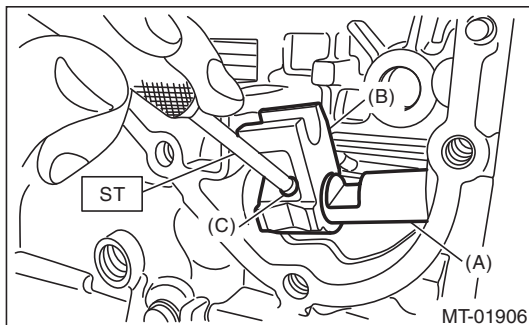


9) Insert the shifter arm into the selector arm, and fix with a spring pin.

NOTE:

Use new spring pin.

ST 398791700 SPRING PIN REMOVER 2

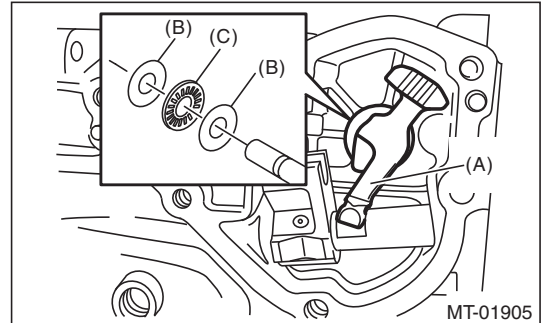


- (A) Shifter arm
- (B) Selector arm
- (C) Spring pin

10) Install the shifter arm No. 2, washers and thrust bearing to transfer case.

CAUTION:

Be careful not to damage the oil seal.



- (A) Shifter arm No. 2
- (B) Washer
- (C) Thrust bearing

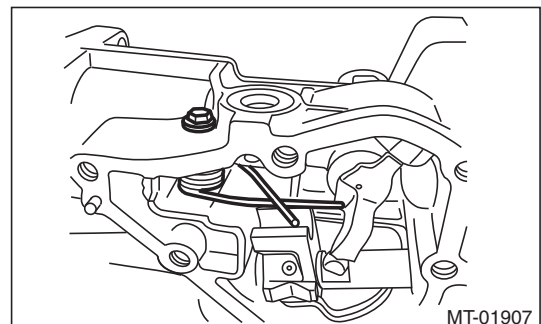
11) Install the shifter arm collar and neutral set spring to transfer case.

NOTE:

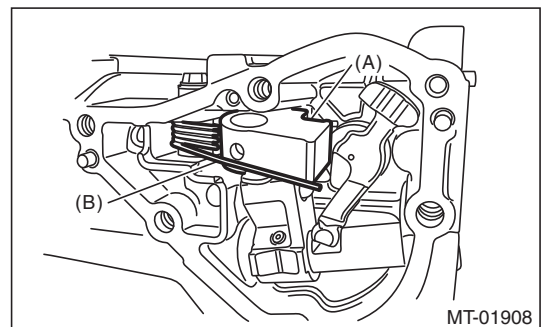
Use a new gasket.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



12) Install the selector arm No. 2 to neutral set spring.



- (A) Selector arm No. 2
- (B) Neutral set spring

Shift Link Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

13) Insert the selector lever COMPL into the selector arm No. 2, and fix with a spring pin.

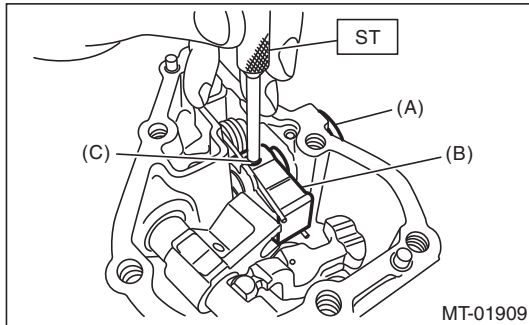
CAUTION:

Be careful not to damage the oil seal.

NOTE:

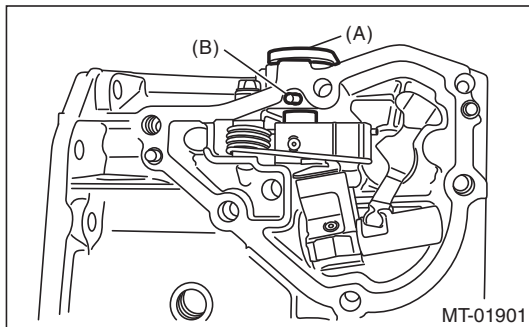
Use new spring pin.

ST 398791700 SPRING PIN REMOVER 2



- (A) Selector lever COMPL
- (B) Selector arm No. 2
- (C) Spring pin

14) Insert a new straight pin.



- (A) Selector lever COMPL
- (B) Straight pin

15) Install the center differential and transfer driven gear as a unit.

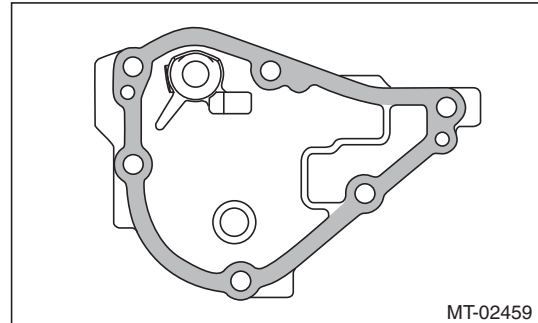
16) Install the extension case assembly to the transfer case. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

17) Install the transfer case and the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

18) Apply liquid gasket seamlessly to the mating surface of transmission cover.

Liquid gasket:

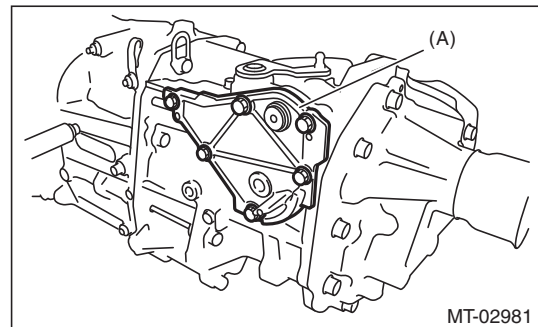
THREE BOND 1215 (Part No. 004403007)



19) Install the transmission cover to transfer case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Transmission cover

20) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>

21) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

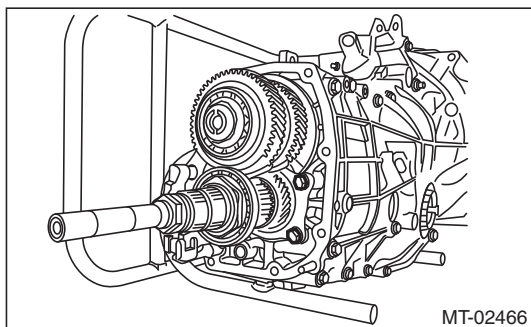
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

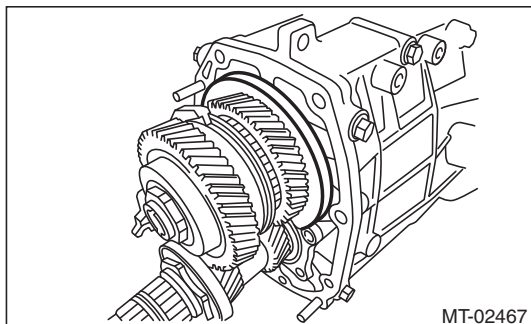
15. Transmission Case

A: REMOVAL

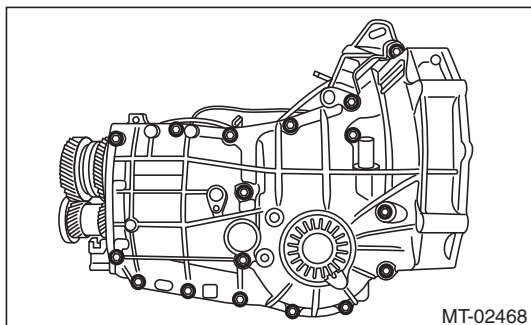
- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-14, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the bearing mounting bolt.



- 5) Remove the main shaft rear plate.



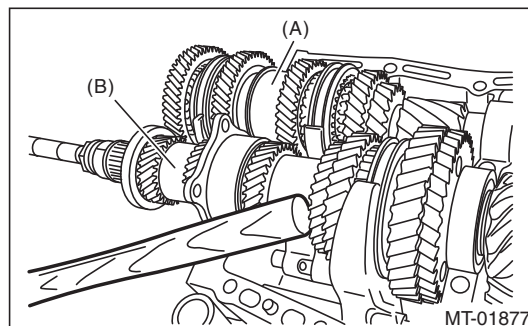
- 6) Remove the bolts and nuts, and separate the transmission case into the right and left case.



- 7) Remove the drive pinion shaft assembly.

NOTE:

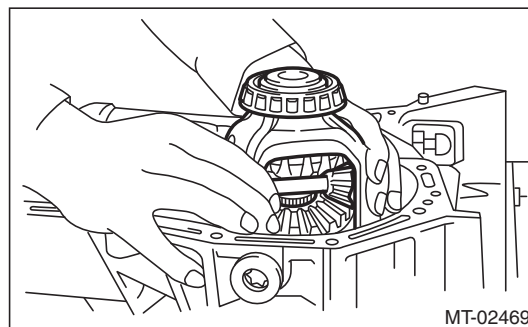
Use a hammer handle, etc. to remove if too tight.



(A) Main shaft ASSY

(B) Drive pinion shaft ASSY

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

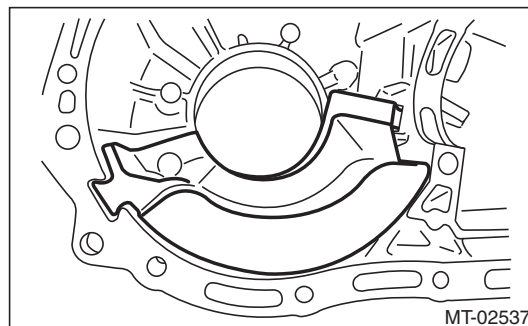


- 10) Remove the differential side retainers and bearing outer races on the left and right side. <Ref. to 6MT-87, REMOVAL, Front Differential Assembly.>

NOTE:

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

- 11) Remove the reverse idler gear. <Ref. to 6MT-95, REMOVAL, Reverse Idler Gear.>
- 12) Remove the shifter fork and rod. <Ref. to 6MT-102, REMOVAL, Shifter Fork and Rod.>
- 13) Remove the front oil guide.



Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

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 6MT-103, INSTALLATION, Shifter Fork and Rod.>
- 3) Install the reverse idler gear. <Ref. to 6MT-96, INSTALLATION, Reverse Idler Gear.>
- 4) Select the drive pinion shim. <Ref. to 6MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the bearing outer race to the transmission case LH side, and install the differential side retainer with the O-ring removed.
- 6) Install the front differential assembly.
- 7) Install the main shaft assembly.

NOTE:

Align to install the needle bearing knock pin hole to the transmission case knock pin.

- 8) 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.

- 9) Align the left and right side of the transmission case, and tighten it with 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.

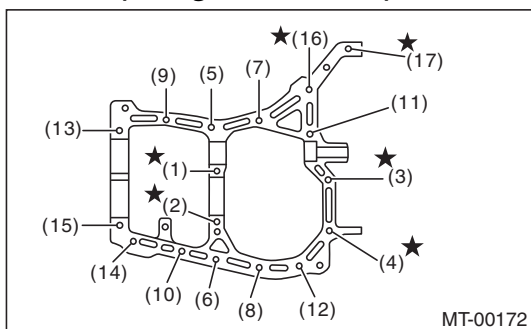
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.4 ft-lb)

★ **10 mm bolt**

40 N·m (4.1 kgf-m, 29.5 ft-lb)

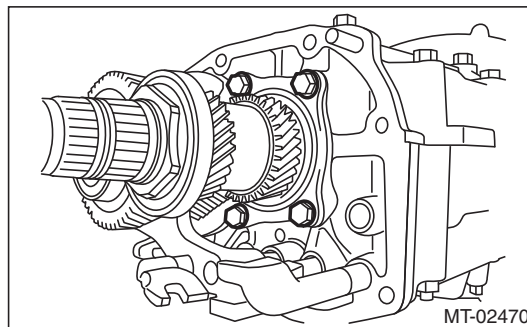


- 10) Install the bearing outer race to the RH side of the transmission case.

- 11) Tighten the bearing mounting bolts.

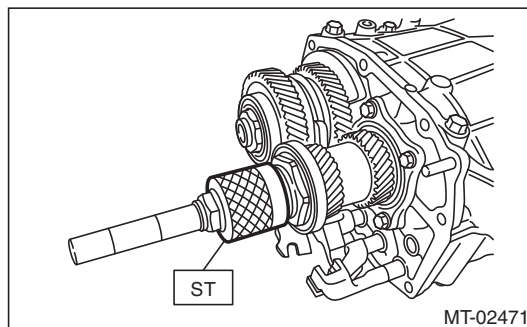
Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



- 12) Perform backlash adjustment of the hypoid gear and preload adjustment of the roller bearing.

- (1) Attach the ST on drive pinion assembly.
ST 18667AA020 HOLDER



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

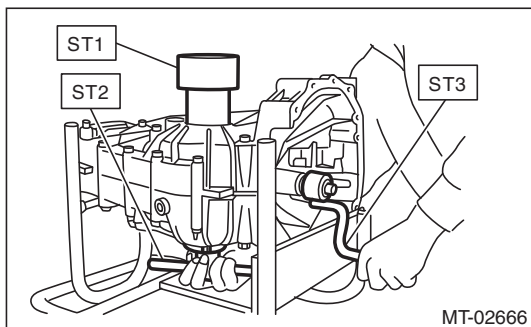
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

(3) Screw the side retainer from the bottom into LH side case using ST2. Fit the ST3 on the main shaft. Shift the gear into 4th or 5th, and turn the shaft several times. Screw in the side 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 RETAIN-
ER
ST3 499927100 HANDLE

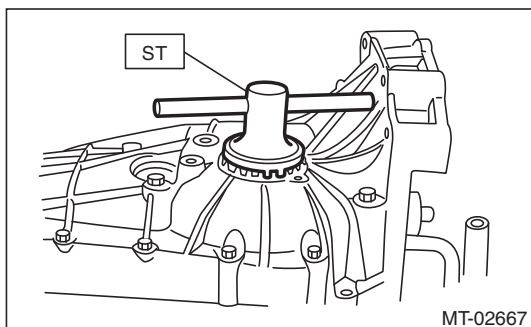


(4) Remove the WEIGHT, and screw in the side retainer without the O-ring into the RH side of the transmission case, and stop at the point where a slight resistance is felt.

NOTE:

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

ST 18630AA010 WRENCH COMPL RETAIN-
ER



(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 3 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 lock plates LH and RH, 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.

13) Inspect and adjust backlash and tooth contact of the hypoid gear. <Ref. to 6MT-91, INSPECTION, Front Differential Assembly.>

14) Separate the transmission case into left and right parts. <Ref. to 6MT-63, REMOVAL, Transmission Case.>

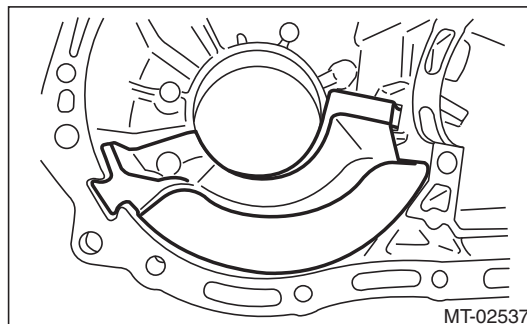
15) Check each shifter fork. <Ref. to 6MT-104, INSPECTION, Shifter Fork and Rod.>

16) Select a main shaft rear plate. <Ref. to 6MT-75, ADJUSTMENT, Main Shaft Assembly for Single-Range.>

17) Install the front oil guide to the RH side of the transmission case.

NOTE:

Fit in all the way.



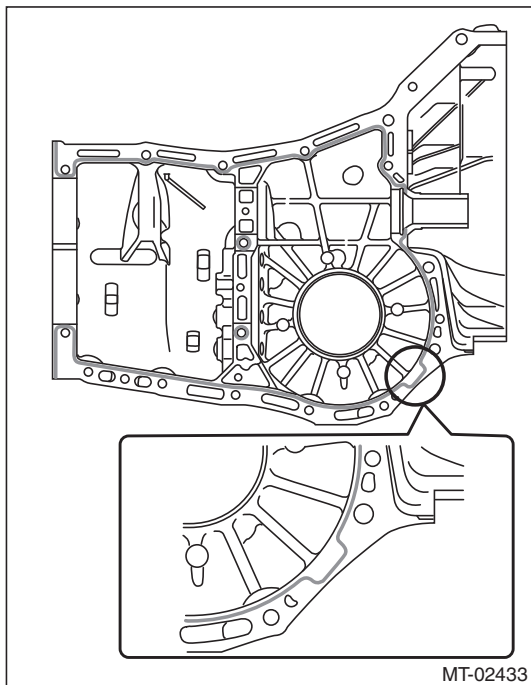
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

18) 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



19) 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.

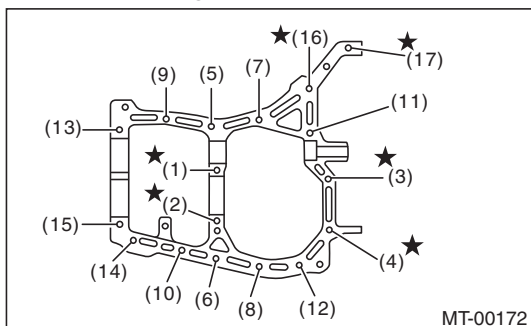
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.4 ft-lb)

★ **10 mm bolt**

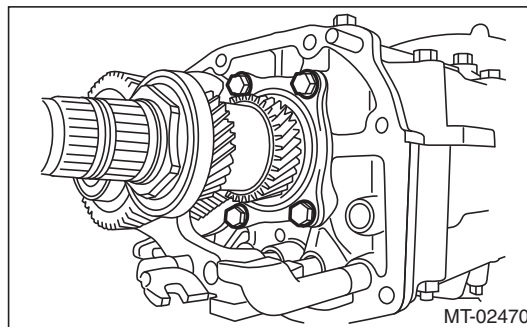
40 N·m (4.1 kgf-m, 29.5 ft-lb)



20) Tighten the bearing mounting bolts.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



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

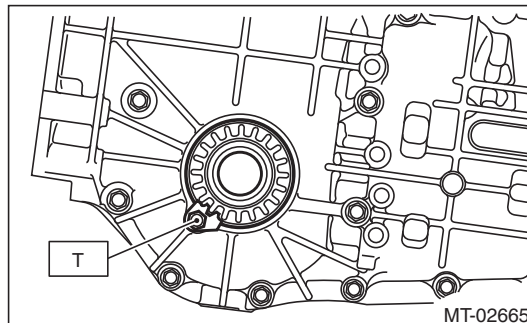
NOTE:

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

22) Install the lock plate.

Tightening torque:

T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



23) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

24) Install the clutch release lever and bearing. <Ref. to CL-14, INSTALLATION, Release Bearing and Lever.>

25) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, 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

16. Main Shaft Assembly for Single-Range

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 6MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.

B: INSTALLATION

- 1) Attach the needle bearing and oil seal to the front of the main shaft assembly.

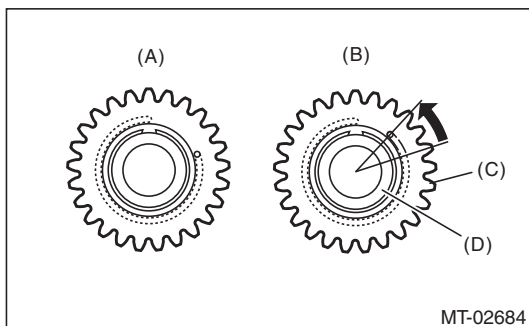
NOTE:

- 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) Rotate the reverse idler sub gear by two teeth from free status in the direction of the arrow to make it engage with the reverse gear of the main shaft and install the main shaft assembly.

(1) When the reverse idler sub gear is at free status, put alignment marks on reverse idler sub gear and reverse idler gear.

(2) Rotate the alignment mark on the reverse idler sub gear side in the arrow direction by two teeth, and secure it with a wire.

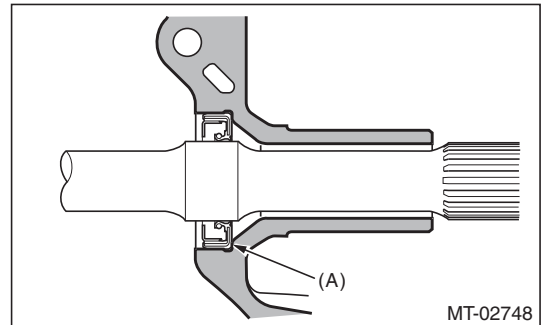


- (A) Free status
(B) Set status
(C) Reverse idler sub gear
(D) Reverse idler gear

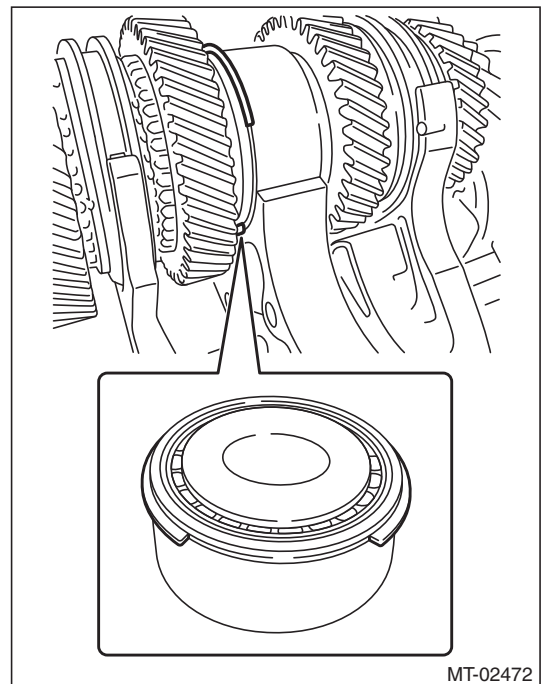
- 3) Fit the transmission case knock pin to the knock pin hole of the needle bearing outer race and install the main shaft assembly.

NOTE:

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



- Face the cutout portion of the snap ring for the double taper roller bearing to the drive pinion shaft assembly.



- 4) After installing the main shaft, check that the reverse idler gear and reverse idler sub gear are misaligned by two teeth and remove the wire.
- 5) Install the drive pinion shaft assembly. <Ref. to 6MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Check each shifter fork. <Ref. to 6MT-104, INSPECTION, Shifter Fork and Rod.>
- 7) Select a main shaft rear plate. <Ref. to 6MT-75, ADJUSTMENT, Main Shaft Assembly for Single-Range.>
- 8) Install the transmission case. <Ref. to 6MT-64, INSTALLATION, Transmission Case.>

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

10) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

When replacing the coupling sleeve and synchronizer hub, replace them as a set. Because these must engage at the specified point, avoid disassembly as much as possible. If it is necessary to disassemble, mark the engaging points on the splines beforehand.

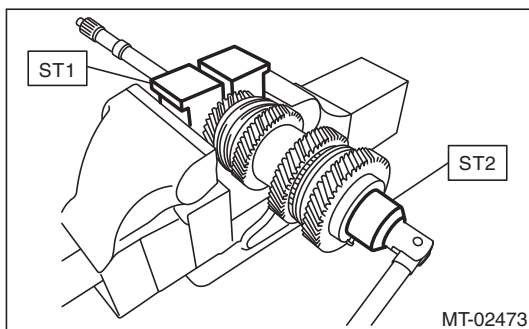
1) Put vinyl tape around the main shaft spline and pull out the oil seal and needle bearing by hand to prevent the oil seal from being damaged.

2) Flatten the tab of the lock nut.

3) Remove the lock nut and lock washer from the main shaft assembly using ST1 and ST2.

ST1 498937000 TRANSMISSION HOLDER

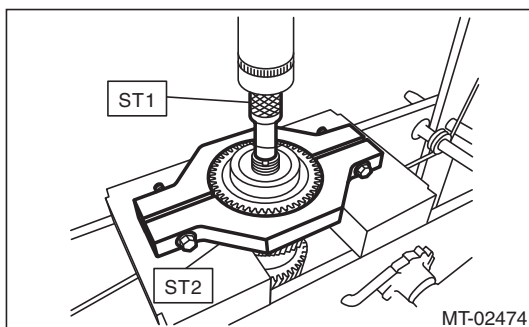
ST2 499987003 SOCKET WRENCH (35)



4) Remove the 6th drive gear and ball bearing using the ST1, ST2 and a press.

ST1 899864100 REMOVER

ST2 18722AA010 REMOVER



5) Remove the needle bearing, 6th baulk ring, shifting insert and 5th-6th coupling sleeve.

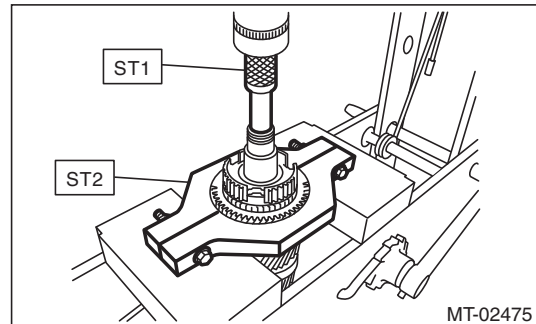
CAUTION:

When removing 5th-6th coupling sleeve, be careful not to lose the shifting insert.

6) Remove the 5th drive gear, 6th needle bearing race, 5th baulk ring, 5th-6th synchronizer hub and needle bearing using the ST1, ST2 and a press.

ST1 899864100 REMOVER

ST2 18722AA010 REMOVER

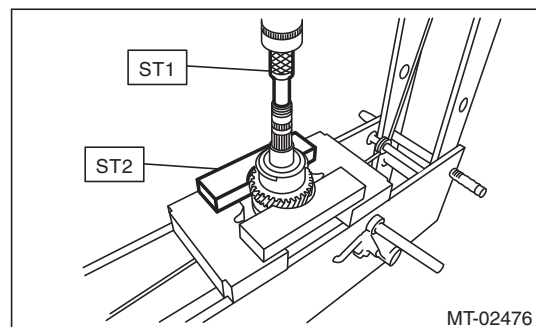


7) Shift the 3rd-4th coupling sleeve to the 3rd side.

8) Remove the 4th drive gear, 4th gear thrust washer, double taper roller bearing and 5th needle bearing race using the ST1, ST2 and a press.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



9) Remove the 4th baulk ring, needle bearing, shifting insert and 3rd-4th coupling sleeve.

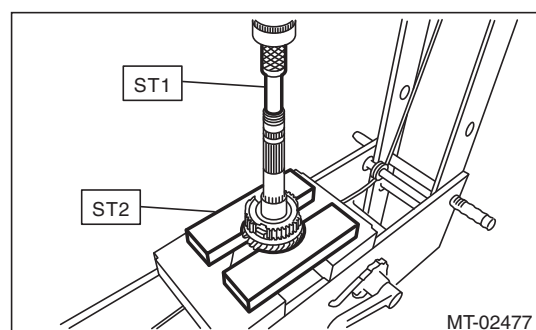
CAUTION:

When removing 3rd-4th coupling sleeve, be careful not to lose the shifting insert.

10) Remove the 3rd drive gear, 4th needle bearing race, 3rd-4th synchronizer hub, inner baulk ring, 3rd synchro cone, outer baulk ring and needle bearing using the ST1, ST2 and a press.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



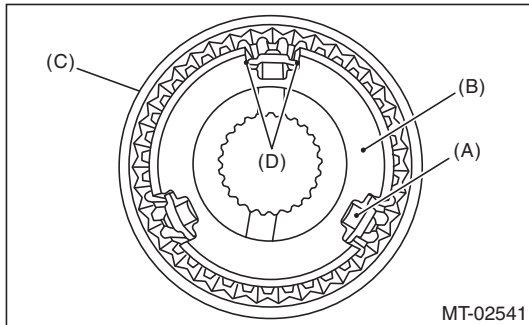
Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

NOTE:

- Match the alignment marks, and install the coupling sleeve to the synchronizer hub and then install the shifting insert.
- Make sure that there is no large clearance at both sides of the shifting insert after assembly.

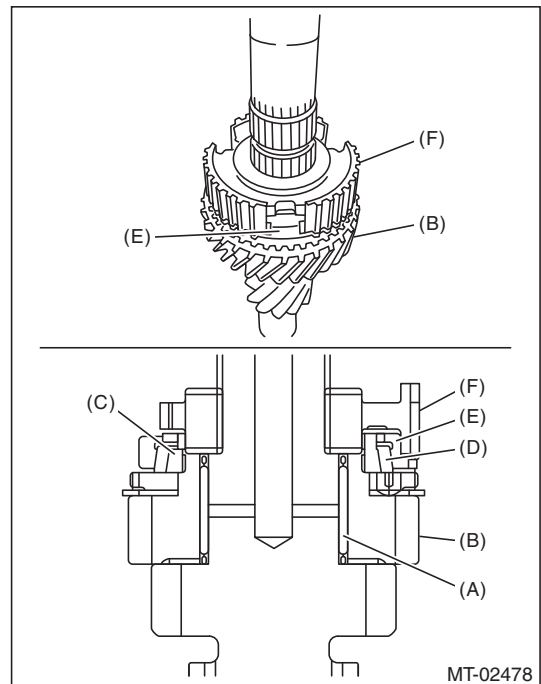


- (A) Shifting insert
- (B) Synchronizer hub
- (C) Coupling sleeve
- (D) There is no large clearance at this part.

1) Install the needle bearing, 3rd drive gear, outer baulk ring, 3rd synchro cone, inner baulk ring and 3rd-4th synchronizer hub to the main shaft.

NOTE:

- Install the 3rd-4th synchronizer hub in the correct direction.
- Align the protrusion of the outer baulk ring into the groove of the 3rd-4th synchronizer hub.



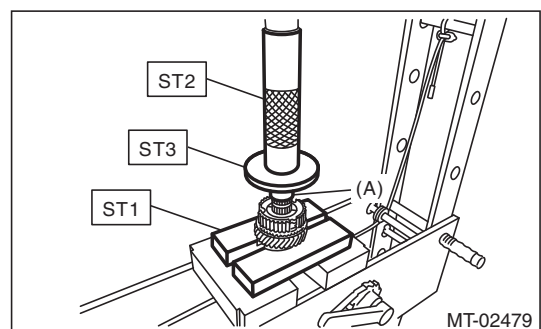
- (A) 3rd needle bearing
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) 3rd synchro cone
- (E) Outer baulk ring
- (F) 3rd-4th synchronizer hub

2) Install the 4th needle bearing race onto the main shaft using ST1, ST2, ST3 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
ST3 398177700 INSTALLER



- (A) 4th needle bearing race

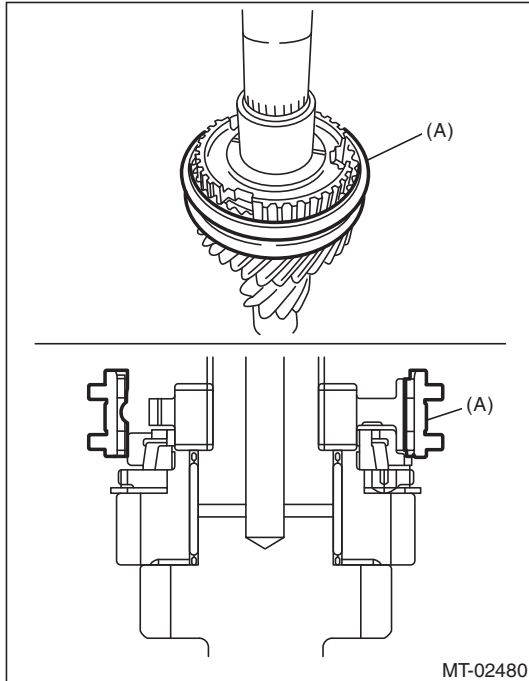
Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the 3rd-4th coupling sleeve to the 3rd-4th synchronizer hub.

NOTE:

- Install the 3rd-4th coupling sleeve in the correct direction.
- Align the alignment marks of 3rd-4th coupling sleeve and the 3rd-4th synchronizer hub.

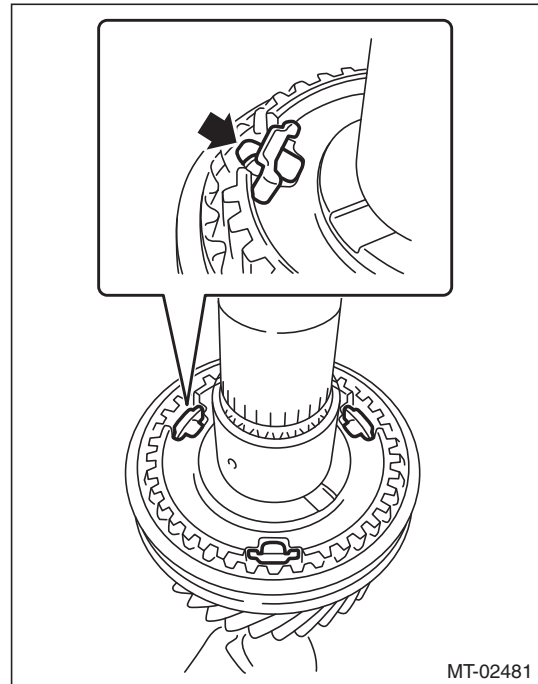


(A) 3rd-4th coupling sleeve

4) Install the shifting insert.

NOTE:

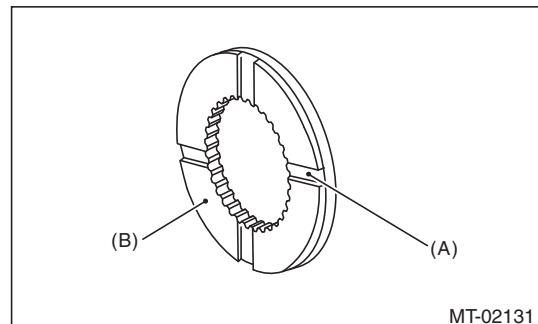
Press in the ball part to install.



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

NOTE:

- Align the protrusion of the 4th baulk ring into the groove of the 3rd-4th synchronizer hub.
- Install the 4th gear thrust washer with the groove side facing the 4th drive gear.

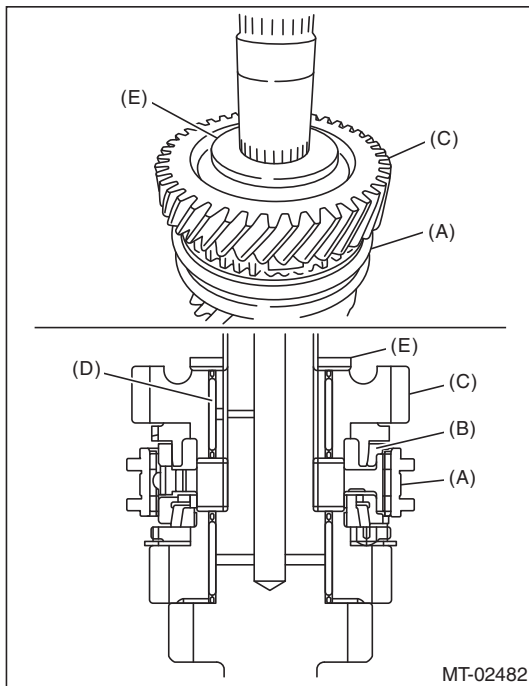


(A) Groove

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

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL



- (A) 3rd-4th coupling sleeve
- (B) 4th baulk ring
- (C) 4th drive gear
- (D) Needle bearing
- (E) 4th gear thrust washer

6) Install the double taper roller bearing into the rear section of main shaft using ST1, ST2 and a press.

CAUTION:

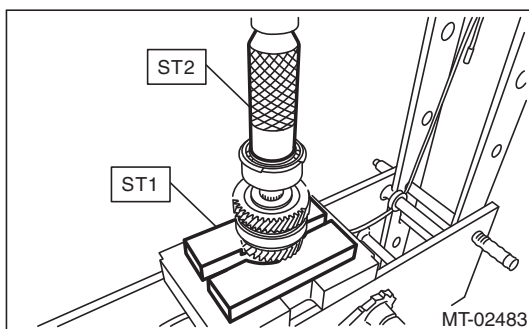
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

- Use a new double taper roller bearing.
- Install the double taper roller bearing with snap ring side facing the 5th drive gear side.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



7) Make sure that the double taper roller bearing turns smoothly.

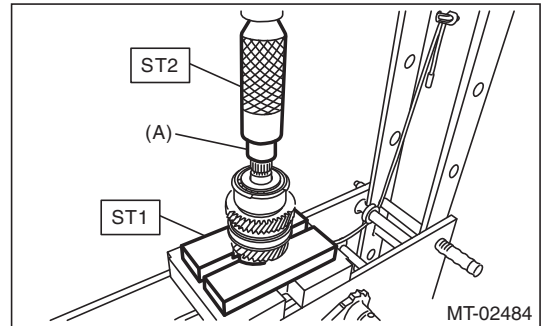
8) Install the 5th needle bearing race onto the main shaft using ST1, ST2 and press.

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

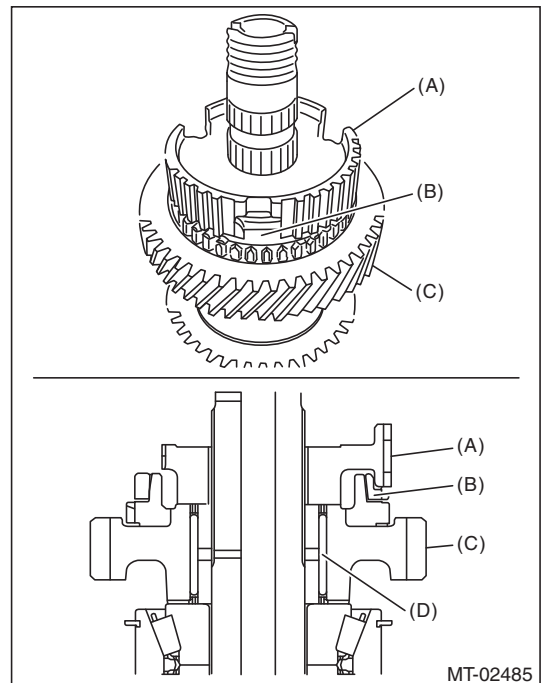


(A) 5th needle bearing race

9) Install the needle bearing, 5th drive gear, 5th baulk ring, and 5th-6th synchronizer hub on the main shaft.

NOTE:

- Align the protrusion part of the 5th baulk ring with the groove of the 5th-6th synchronizer hub.
- Install the 5th-6th synchronizer hub in the correct direction.



- (A) 5th-6th synchronizer hub
- (B) 5th baulk ring
- (C) 5th drive gear
- (D) 5th needle bearing (cage: black)

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

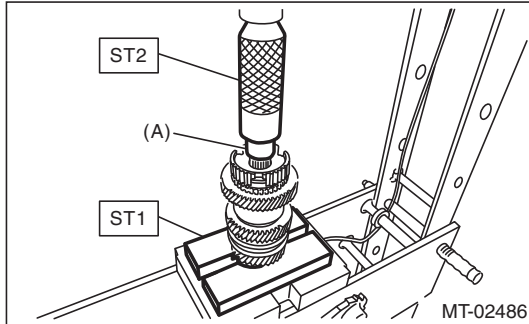
10) Install the 6th needle bearing race onto the main shaft using ST1, ST2 and press.

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

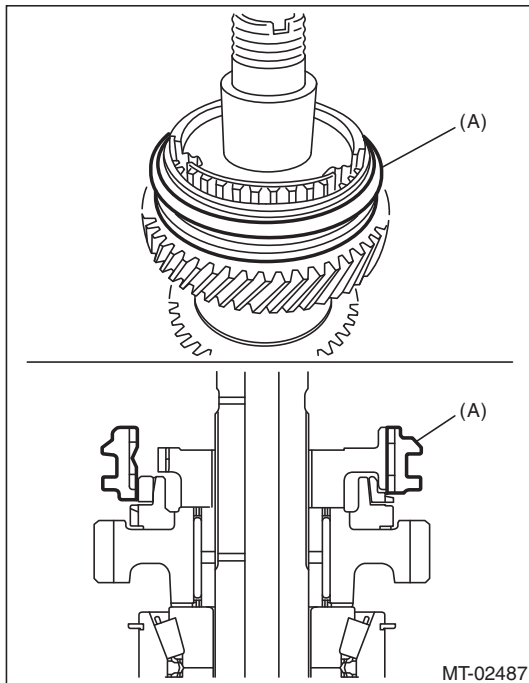


(A) 6th needle bearing race

11) Install the 5th-6th coupling sleeve to the 5th-6th synchronizer hub.

NOTE:

- Install the 5th-6th coupling sleeve in the correct direction.
- Align the alignment marks of 5th-6th coupling sleeve and the 5th-6th synchronizer hub.

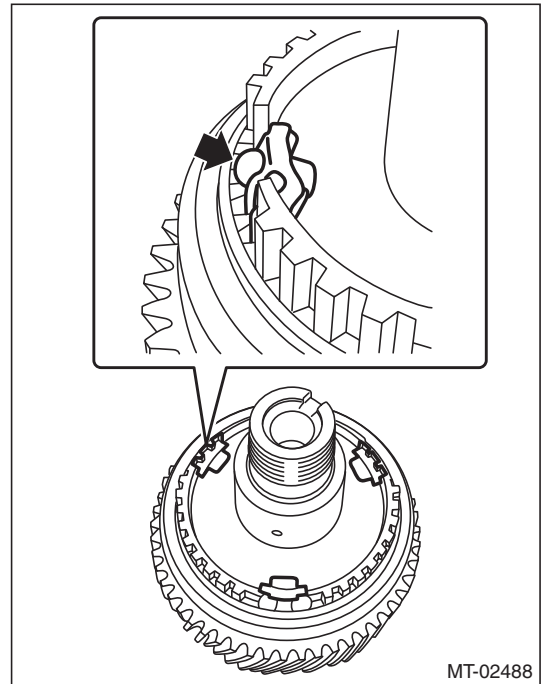


(A) 5th-6th coupling sleeve

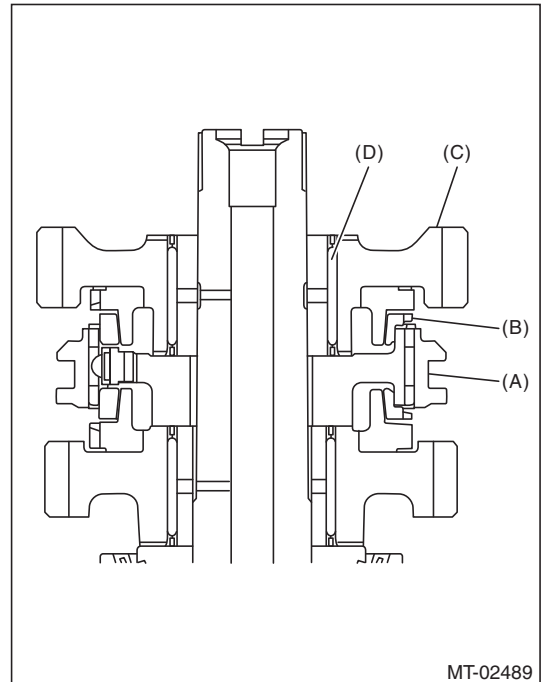
12) Install the shifting insert.

NOTE:

Press in the ball part to install.



13) Install the 6th baulk ring, 6th drive gear and needle bearing to the main shaft.



- (A) 5th-6th coupling sleeve
- (B) 6th baulk ring
- (C) 6th drive gear
- (D) 6th needle bearing (cage: silver)

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

14) Install the ball bearing onto main shaft using ST2 and a press.

CAUTION:

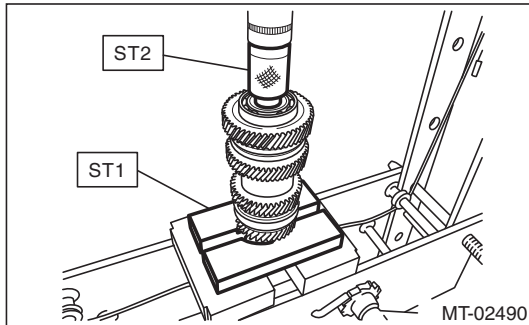
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Install the ball bearing with the side which does not have lock nut mounting dent facing 6th drive gear.

ST1 899714110 REMOVER

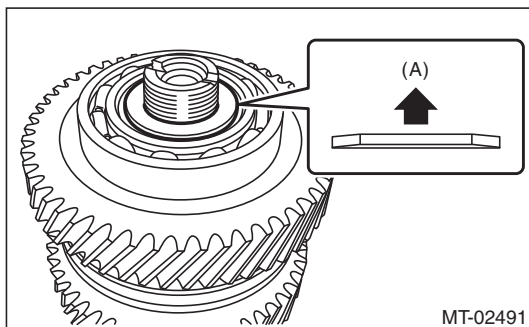
ST2 899754112 PRESS



15) Install the lock washer.

NOTE:

- Use a new lock washer.
- Install the lock washer in the correct direction.



(A) Lock nut side

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

NOTE:

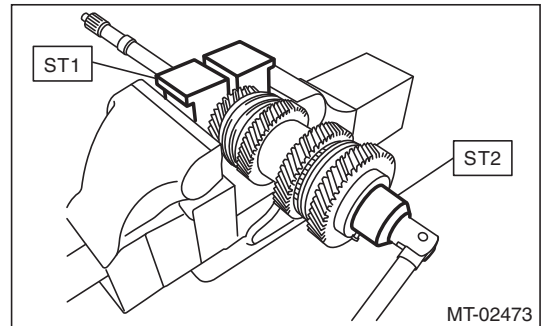
Use a new lock nut.

Tightening torque:

160 N·m (16.3 kgf-m, 118.0 ft-lb)

ST1 498937000 TRANSMISSION HOLDER

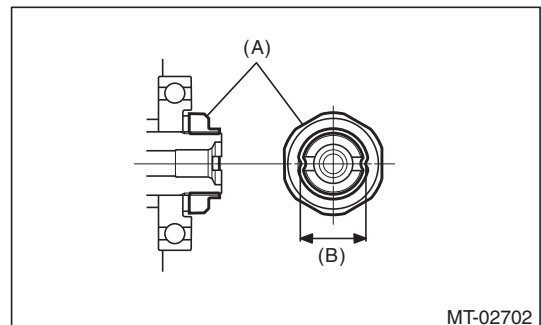
ST2 499987003 SOCKET WRENCH (35)



17) Crimp the lock nut at two locations so that the dimension (B) becomes 23.3 mm (0.92 in) or less.

CAUTION:

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



(A) Lock nut

(B) Outer dimension after crimping

Main Shaft Assembly for Single-Range

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.

- 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.
- Repair or replace if the inner surface or end face is damaged.

4) Baulk ring, synchro cone

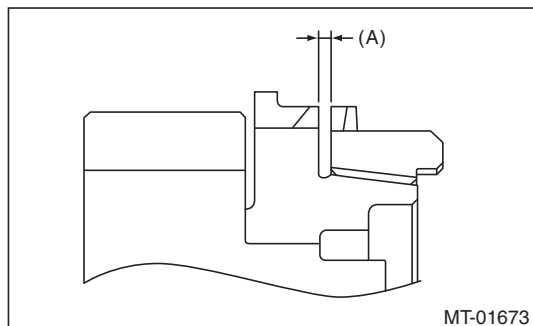
Replace the baulk ring and synchro cone in the following cases.

- When the inner surface or end face is 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.

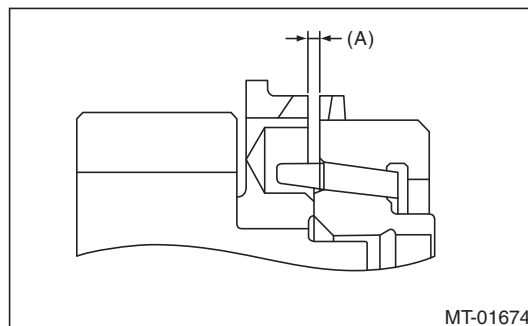
Clearance (A):

0.5 mm (0.020 in) or more

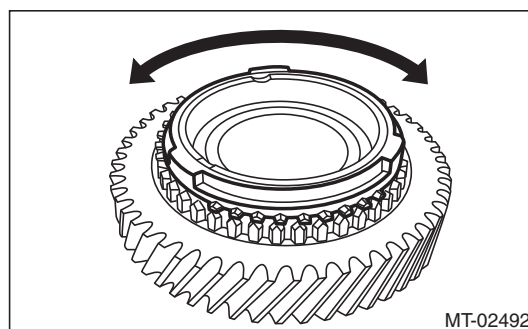
- Single cone



- Double cone



- 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.

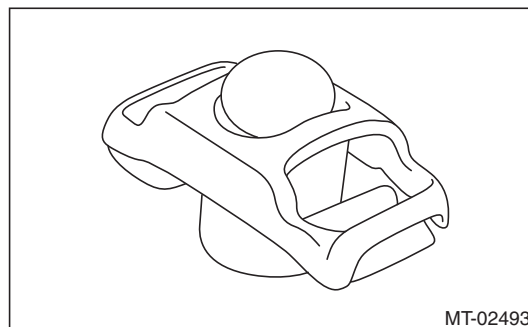


5) Coupling sleeve and synchronizer hub

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

6) Shifting insert

Replace the shifting insert if there is deformation, excessive wear on the ball section or any defectiveness.



7) Oil seal

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

8) Gearshift mechanism

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

Main Shaft Assembly for Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

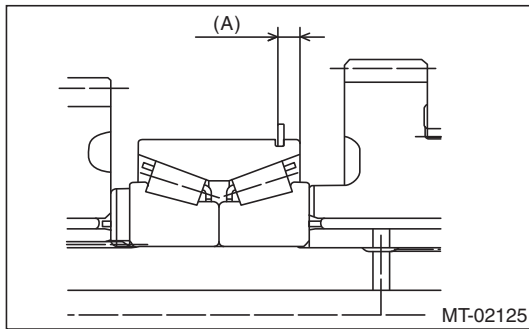
Selection of main shaft rear plate:

Measure the protrusion amount (A) of 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

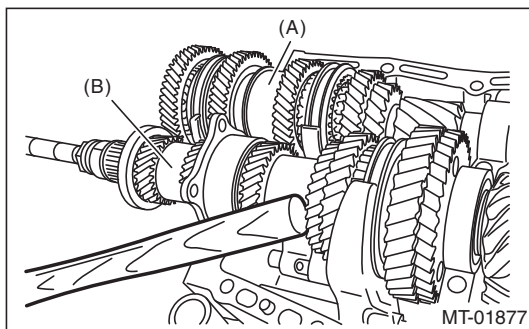
17. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly.

NOTE:

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

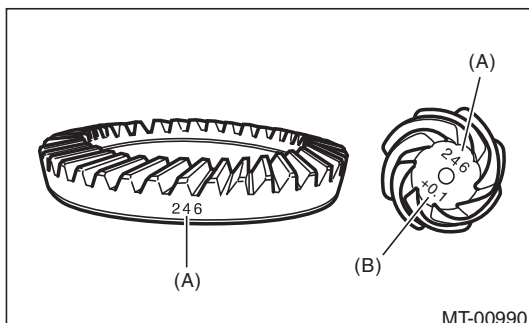


- (A) Main shaft ASSY
(B) Drive pinion shaft ASSY

- 5) Remove the main shaft assembly.

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.



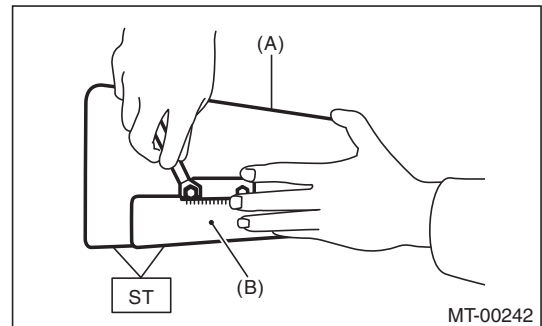
- (A) Set number
(B) Number for shim adjustment

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

- 4) Perform the adjustment of 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.

ST 499917500 DRIVE PINION GAUGE ASSY



- (A) Plate
(B) Scale

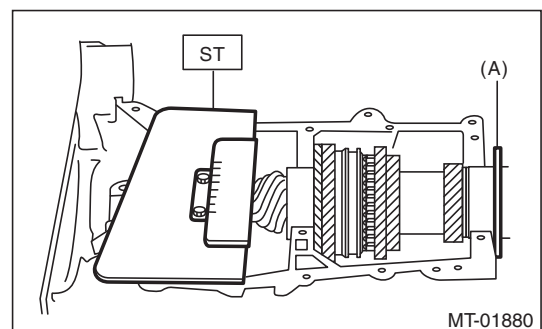
- (2) Tighten the two bolts.

- 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 -.)

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) whose thickness is closest to the said value.

NOTE:

Install the shim with it's cut in facing the shifter fork & rod side.

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 6MT-87, 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. <Ref. to 6MT-67, INSTALLATION, Main Shaft Assembly for Single-Range.>

12) Check each shifter fork. <Ref. to 6MT-104, INSPECTION, Shifter Fork and Rod.>

13) Install the transmission case. <Ref. to 6MT-64, INSTALLATION, Transmission Case.>

14) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, 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.
- When replacing the coupling sleeve and synchronizer hub, replace them as a set. Because these must engage at the specified point, avoid disassembly as much as possible. If it is necessary to disassemble, mark the engaging points on the splines beforehand.

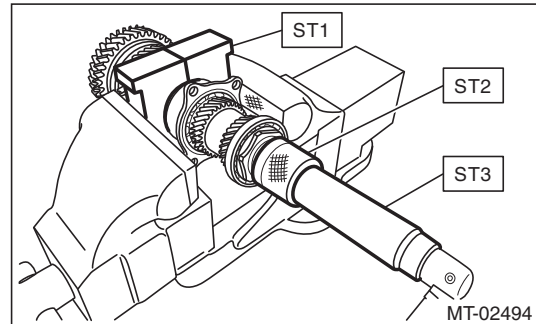
1) Flatten the tab of the lock nut.

2) Remove the lock nut using ST1, ST2 and ST3.

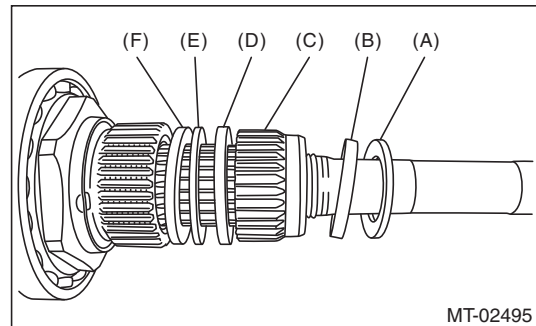
ST1 18680AA020 HOLDER

ST2 18667AA020 HOLDER

ST3 18662AA010 SOCKET WRENCH (27)



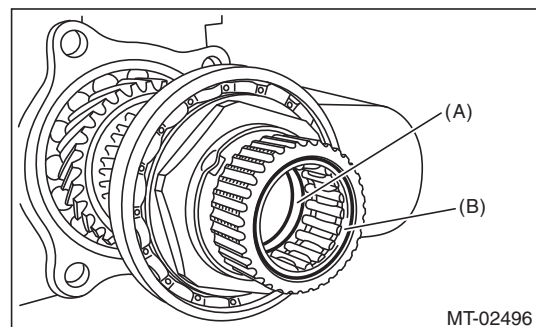
3) Remove the lock washer, washer, differential bevel gear sleeve, adjusting washer No. 1, thrust bearing and adjusting washer No. 2.



- (A) Lock washer
- (B) Washer
- (C) Differential bevel gear sleeve
- (D) Adjusting washer No. 1 (25 × 36 × t)
- (E) Thrust bearing (25 × 36 × 2)
- (F) Adjusting washer No. 2 (25 × 36 × t)

4) Draw out the drive pinion shaft from driven shaft.

5) Remove the needle bearing and drive pinion collar from driven shaft.

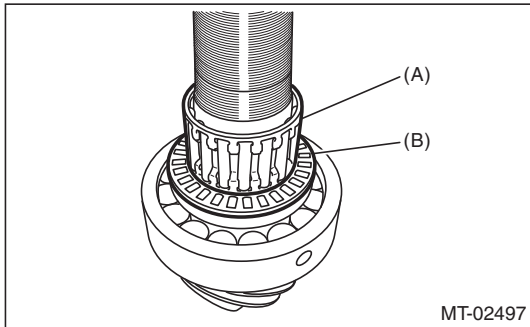


- (A) Drive pinion collar
- (B) Needle bearing (25 × 30 × 20)

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

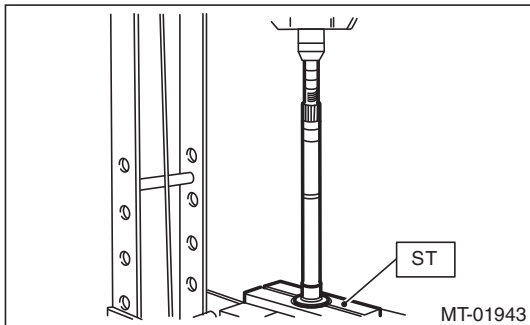
6) Remove the needle bearing and thrust bearing from drive pinion shaft.



- (A) Needle bearing (30 × 37 × 23)
(B) Thrust bearing (33 × 50 × 3)

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

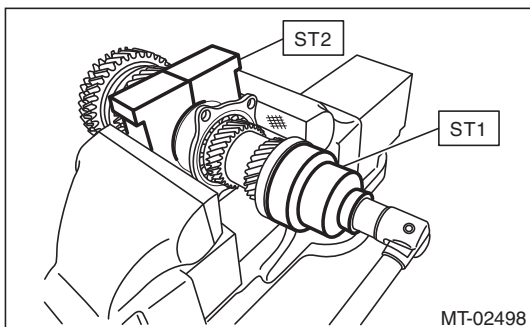
ST 498077000 REMOVER



8) Flatten the tab of the lock nut.

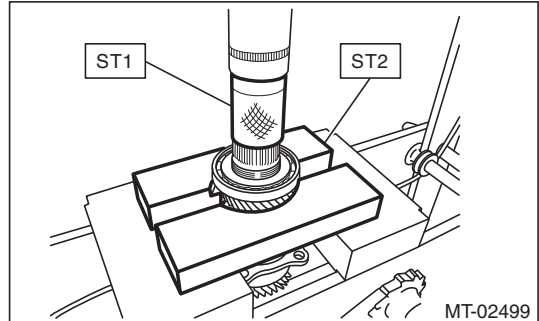
9) Remove the lock nut using ST1 and ST2.

ST1 499987300 SOCKET WRENCH (50)
ST2 18680AA020 HOLDER



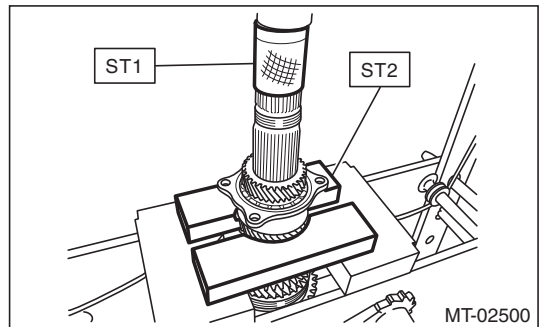
10) Remove the ball bearing, 6th driven gear and drive pinion spacer using the ST1, ST2 and a press.

ST1 899754112 PRESS
ST2 899714110 REMOVER



11) Remove the 5th driven gear, double ball bearing and 3rd-4th driven gear using ST1, ST2 and a press.

ST1 899754112 PRESS
ST2 899714110 REMOVER



12) Remove the key.

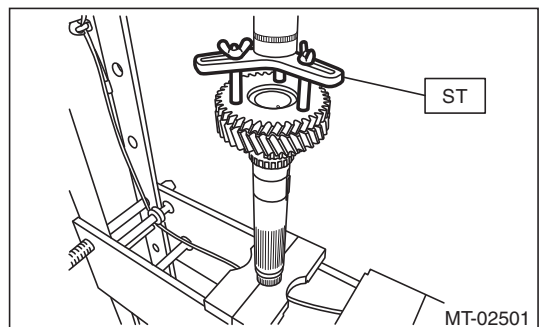
13) Remove the 2nd driven gear, inner baulk ring, synchro cone, outer baulk ring, shifting insert and 1st-2nd coupling sleeve.

CAUTION:

When removing 1st-2nd coupling sleeve, be careful not to lose the shifting insert.

14) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd driven gear bushing and 1st-2nd synchronizer hub using ST and a press.

ST 18762AA000 COMPRESSOR SPECIAL TOOL



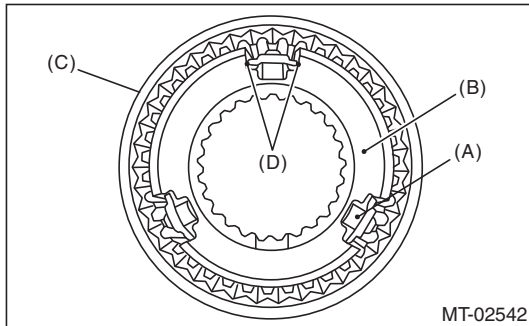
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

NOTE:

- Match the alignment marks, and install the coupling sleeve to the synchronizer hub and then install the shifting insert.
- Make sure that there is no large clearance at both sides of the shifting insert after assembly.

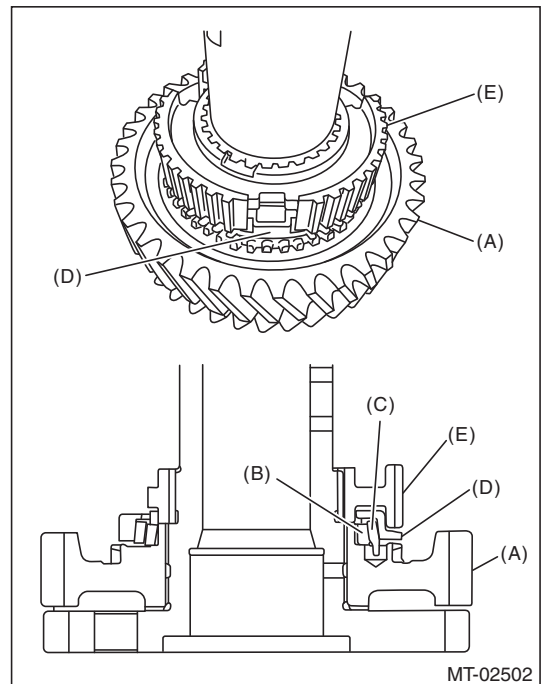


- (A) Shifting insert
(B) Synchronizer hub
(C) Coupling sleeve
(D) There is no large clearance at this part.

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

NOTE:

- Install the 1st-2nd synchronizer hub in proper direction.
- Align the protrusion of the outer baulk ring into the groove of the 1st-2nd synchronizer hub.



- (A) 1st driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring
(E) 1st-2nd synchronizer hub

2) Install the 2nd driven gear bushing onto driven shaft using ST and a press.

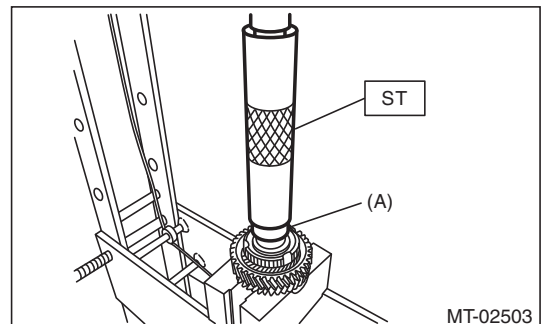
CAUTION:

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.

ST 18654AA000 INSTALLER



- (A) 2nd driven gear bushing

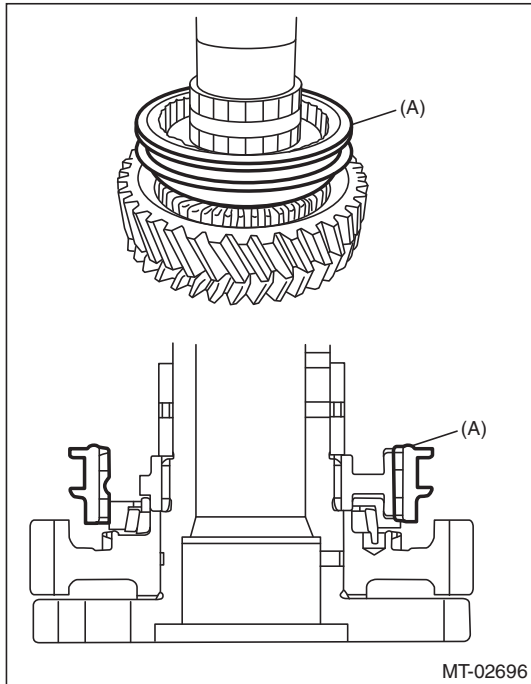
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the 1st-2nd coupling sleeve.

NOTE:

- Install the 1st-2nd coupling sleeve in proper direction.
- Align the alignment marks of 1st-2nd coupling sleeve and the 1st-2nd synchronizer hub.

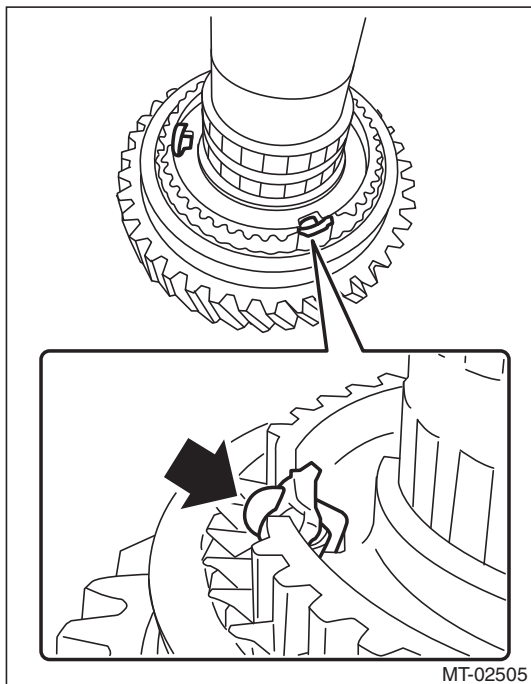


(A) 1st-2nd coupling sleeve

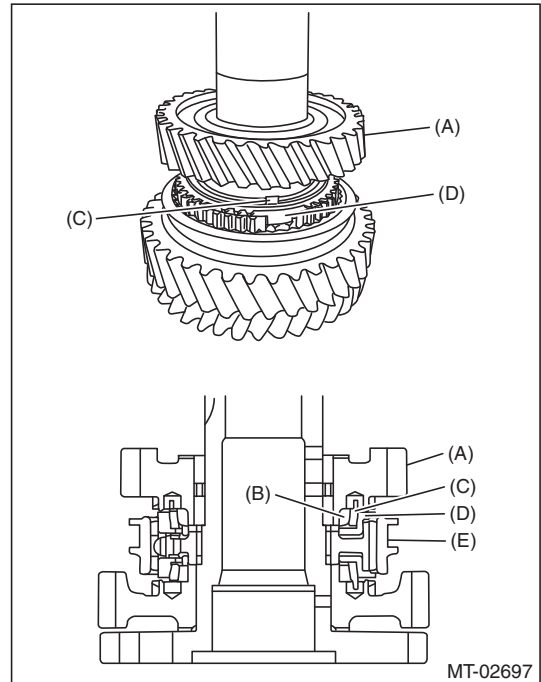
4) Install the 1st-2nd shifting insert.

NOTE:

Press in the ball part to install.



5) Install the outer baulk ring, synchro cone, inner baulk ring and 2nd driven gear to driven shaft.



- (A) 2nd driven gear
- (B) Inner baulk ring
- (C) Synchro cone
- (D) Outer baulk ring
- (E) 1st-2nd coupling sleeve

6) Install the key to the driven shaft.

7) Using the ST and a press, install the 3rd-4th driven gear.

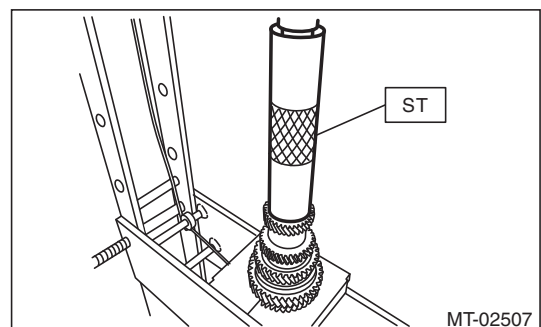
CAUTION:

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

NOTE:

- Match the groove on the 3rd-4th driven gear to the key.
- Install the 3rd-4th driven gear in the proper direction.

ST 499277200 INSTALLER



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Install the double ball bearing onto driven shaft using ST and a press.

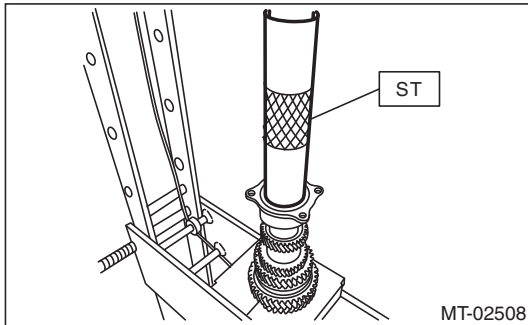
CAUTION:

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

NOTE:

Use a new double ball bearing.

ST 499277200 INSTALLER



9) Install the 5th driven gear onto driven shaft using ST and a press.

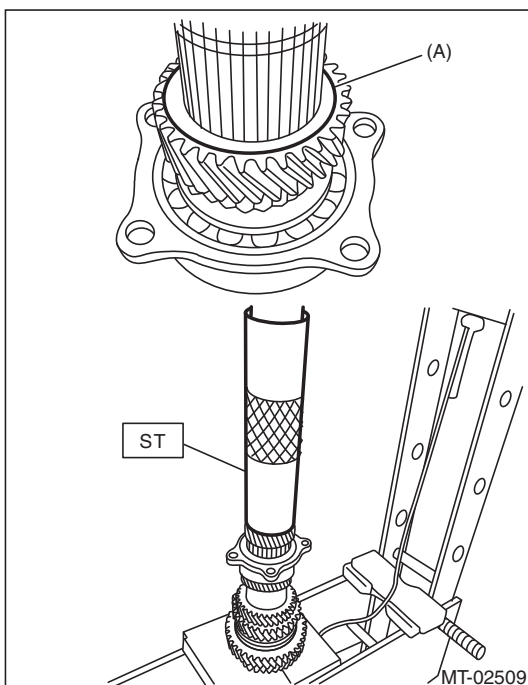
CAUTION:

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

NOTE:

Install the 5th driven gear with the groove side facing the 6th driven gear.

ST 499277200 INSTALLER



(A) Install with the groove side facing the 6th driven gear.

10) Install the drive pinion spacer to the driven shaft.

11) Install the 6th driven gear onto driven shaft using ST and a press.

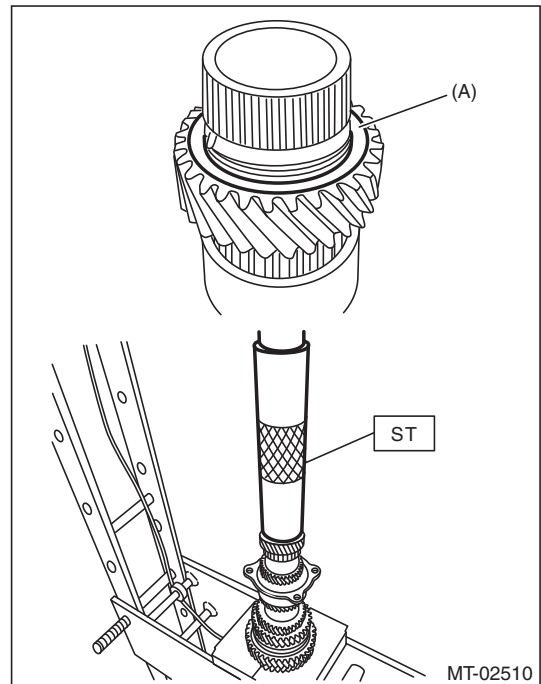
CAUTION:

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

NOTE:

Install with the stepped side on the end surface of the 6th driven gear facing the rear ball bearing side.

ST 499277200 INSTALLER



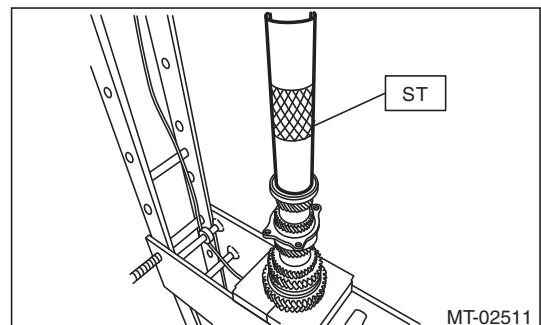
(A) Install with the stepped side facing the rear ball bearing.

12) Install the ball bearing onto driven shaft using ST and a press.

CAUTION:

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

ST 499277200 INSTALLER



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

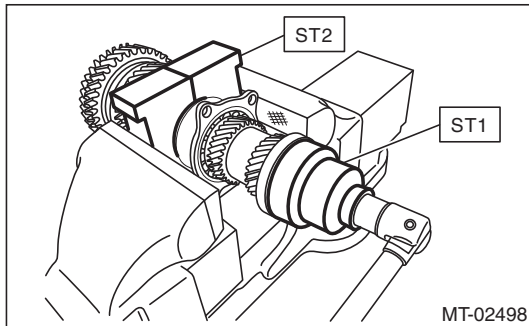
Use a new lock nut.

Tightening torque:

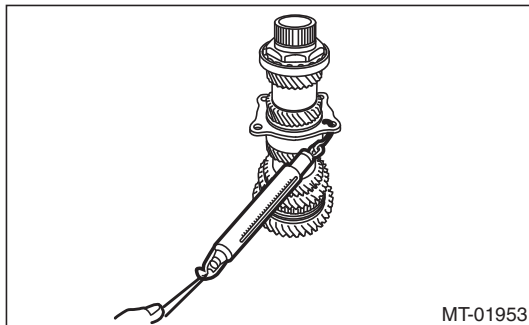
440 N·m (44.9 kgf-m, 324.5 ft-lb)

ST1 499987300 SOCKET WRENCH (50)

ST2 18680AA020 HOLDER



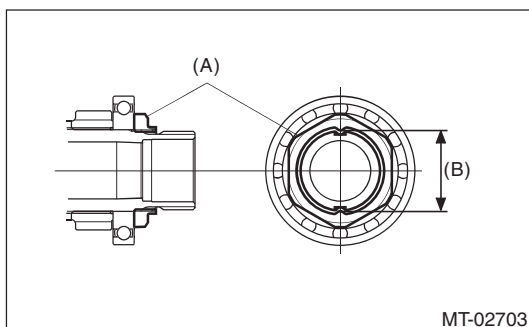
14) Using a spring scale, check that starting load of the ball bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.34 lbf).



15) Crimp the lock nut at two locations so that the dimension (B) becomes 39.1 mm (1.54 in) or less.

CAUTION:

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



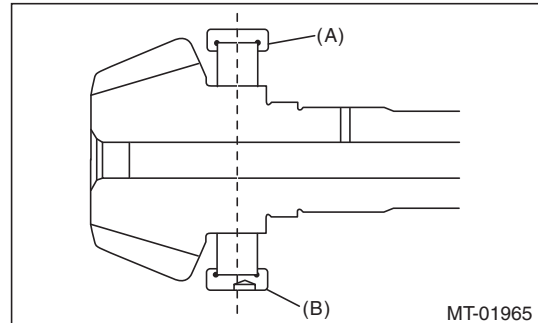
(A) Lock nut

(B) Outer dimension after crimping

16) Install the roller bearing onto drive pinion.

NOTE:

- Use a new roller bearing.
- Install the knock pin hole of the roller bearing outer race, facing the rear side.



(A) Roller bearing

(B) Knock pin hole

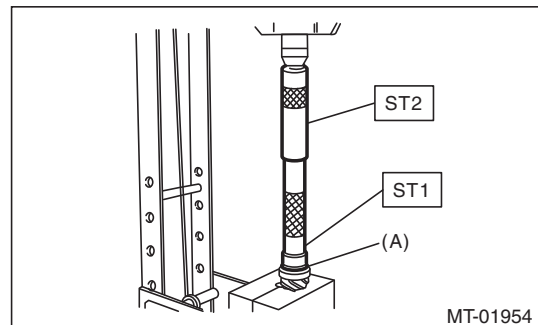
17) Install the washer using ST1, ST2 and a press.

CAUTION:

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

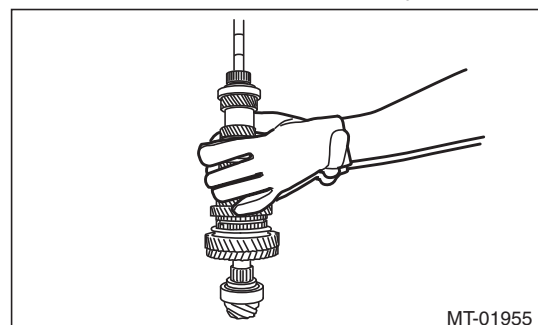
ST1 499277100 BUSHING 1-2 INSTALLER

ST2 499277200 INSTALLER



(A) Washer

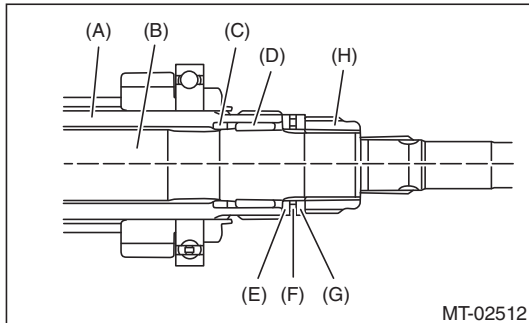
18) Install the thrust bearing and needle bearing and install the driven shaft assembly.



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

19) 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.



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

20) Adjust the thrust bearing preload. <Ref. to 6MT-84, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

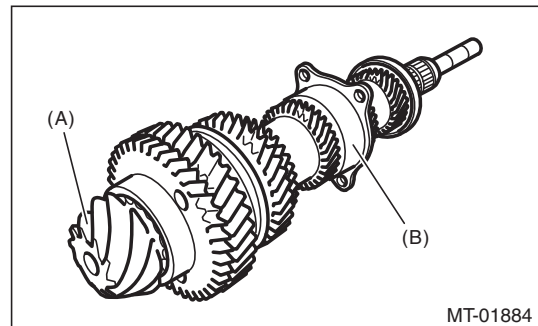
E: INSPECTION

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 roller bearing or 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

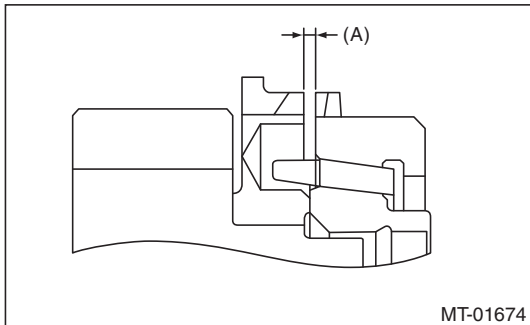
4) Baulk ring, synchro cone

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.
- 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



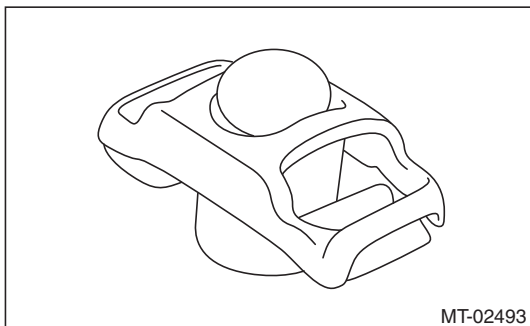
- When the contact surface of the baulk ring insert section is damaged or abnormally worn.
- Apply gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.

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

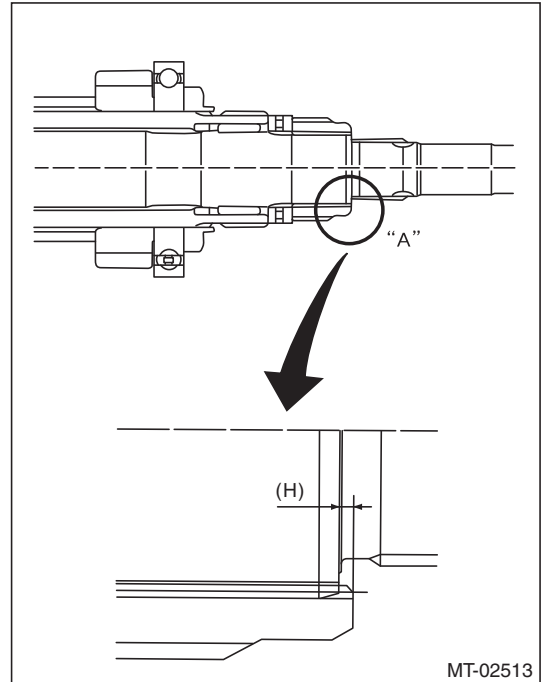
Replace the shifting insert if there is deformation, excessive wear on the ball section or any defectiveness.



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 (20 × 31 × 4) and lock washer (20 × 31 × 2.3) and attach the lock nut (20 × 11).



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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

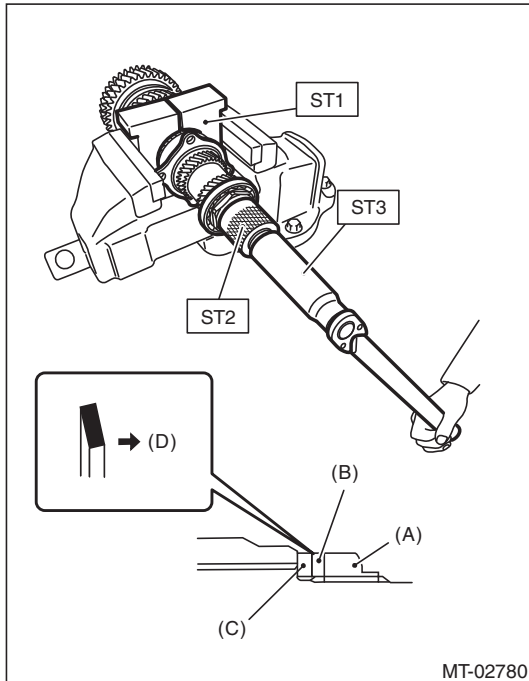
NOTE:

- Use new lock nuts and lock washers.
- Install the lock washer in the correct direction.

Tightening torque:

126 N·m (12.8 kgf-m, 92.9 ft-lb)

ST1 18680AA020 HOLDER
ST2 18667AA020 HOLDER
ST3 18662AA010 SOCKET (27)



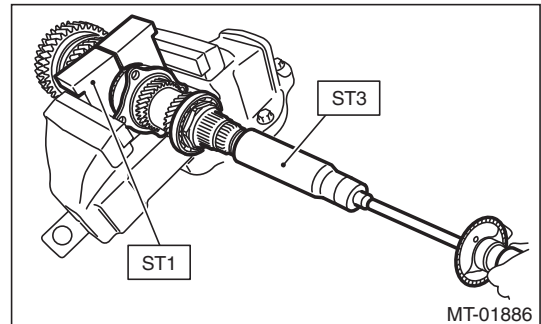
- (A) Lock nut
(B) Lock washer
(C) Washer
(D) Lock nut side

3) After removing the ST2 used in step 2), measure the starting torque using torque driver.

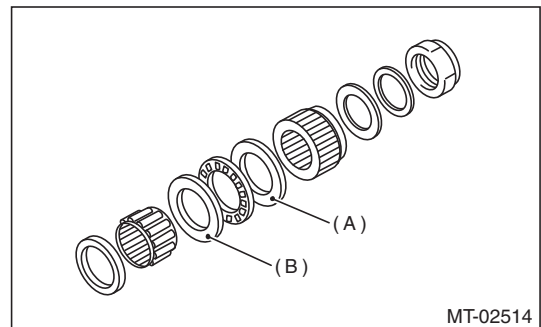
Starting torque:

0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.2 — 0.6 ft-lb)

ST1 18680AA020 HOLDER
ST3 18662AA010 SOCKET (27)



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



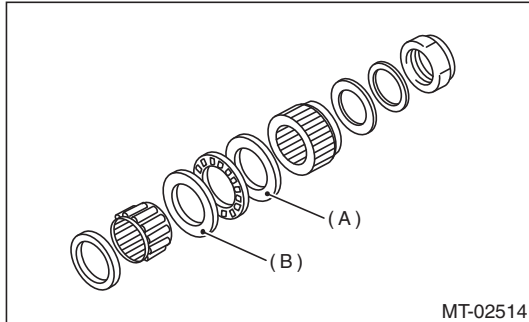
- (A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025071	2.925 (0.1152)
803025072	2.950 (0.1161)
803025073	2.975 (0.1171)
803025074	3.000 (0.1181)
803025075	3.025 (0.1191)
803025076	3.050 (0.1201)
803025077	3.075 (0.1211)

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

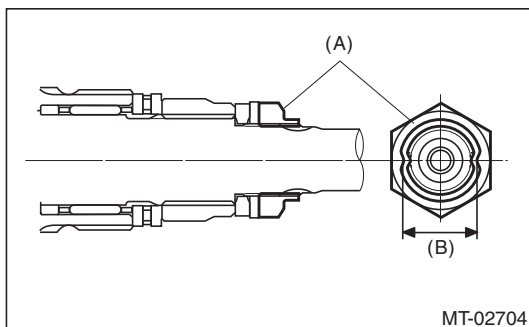
Starting torque	Dimension H	Adjusting washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025070	2.850 (0.1122)
803025074	3.000 (0.1181)
803025078	3.150 (0.1240)

6) Recheck that the starting torque is within the specified range, and crimp the lock nut at two locations so that the dimension (B) becomes 20.1 mm (0.79 in) or less.

CAUTION:

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



(A) Lock nut

(B) Outer dimension after crimping

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

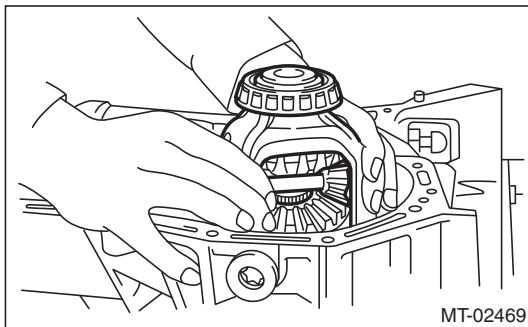
18. Front Differential Assembly

A: REMOVAL

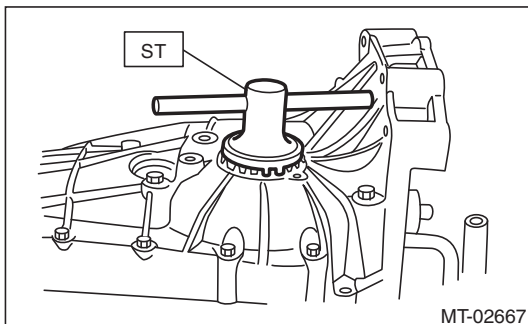
- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 6MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly. <Ref. to 6MT-67, 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 18630AA010 WRENCH COMPL RETAINER



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

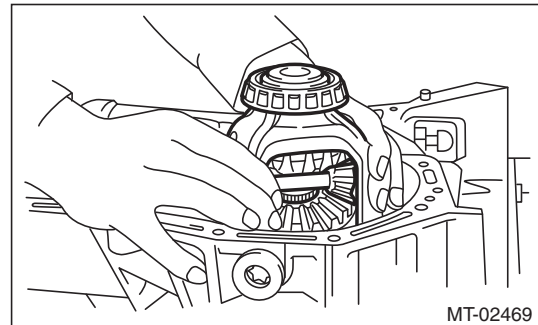
ST 398527700 PULLER ASSY

B: INSTALLATION

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

CAUTION:

Make sure the oil seal lip is not folded.



- 4) Install the main shaft assembly. <Ref. to 6MT-67, INSTALLATION, Main Shaft Assembly for Single-Range.>
- 5) Install the drive pinion shaft assembly. <Ref. to 6MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 6MT-64, INSTALLATION, Transmission Case.>
- 7) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

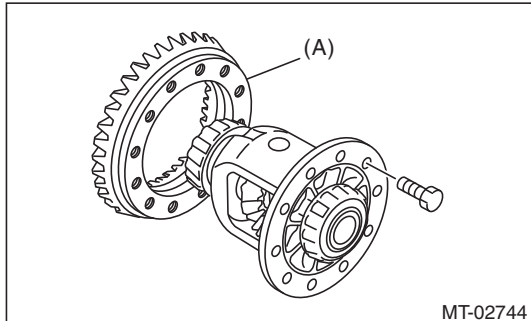
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

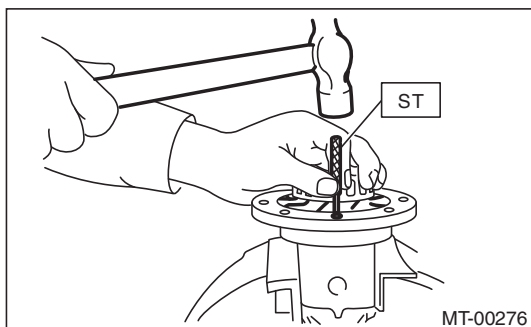
1) Loosen the twelve bolts and remove hypoid driven gear.



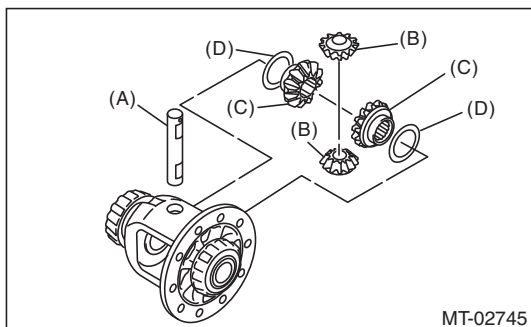
(A) Hypoid driven gear

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

ST 899904100 STRAIGHT PIN REMOVER

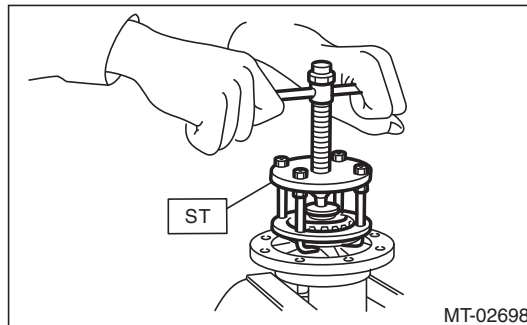


3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and washer.



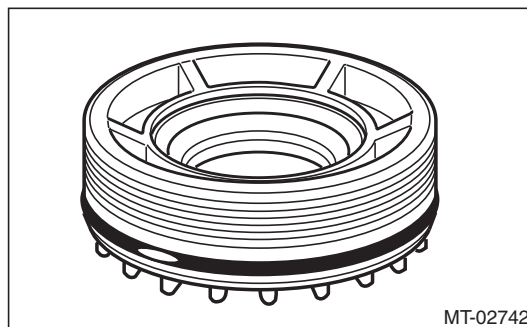
- (A) Pinion shaft
- (B) Differential bevel pinion
- (C) Differential bevel gear
- (D) Washer

4) Using the ST, remove the roller bearing.
ST 899524100 PULLER SET



2. SIDE RETAINER

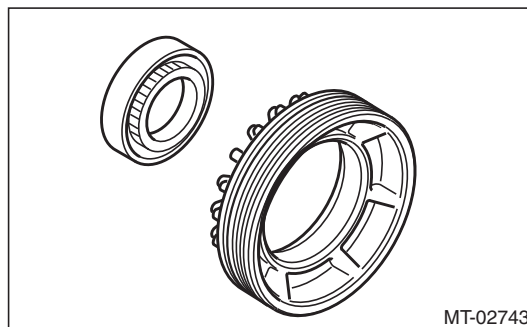
1) Remove the O-ring.



2) Remove the oil seal.

NOTE:

Remove using the flat tip screwdriver.



Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

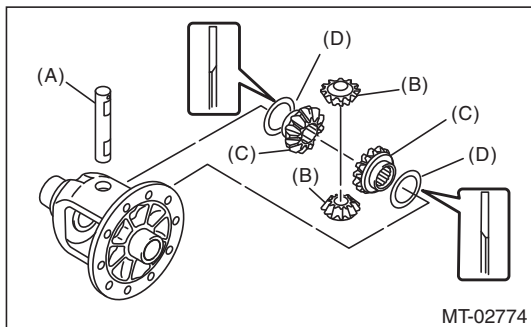
D: ASSEMBLY

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 bevel gear.



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

2) Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 6MT-91, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

NOTE:

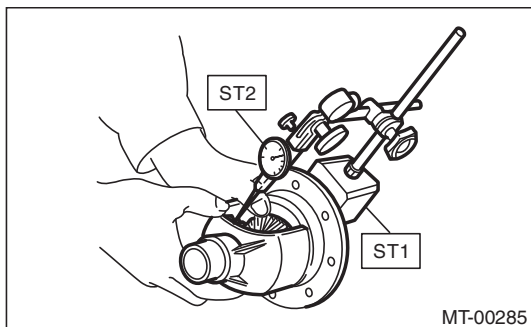
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

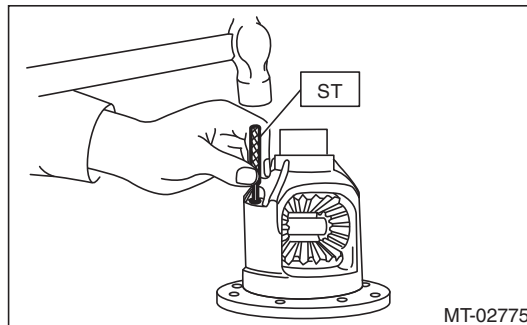


3) Align the pinion shaft pin hole with the differential case pin hole, and drive the straight pin into the holes from the hypoid driven gear side using the ST.

NOTE:

Use a new straight pin.

ST 899904100 STRAIGHT PIN REMOVER



4) Install the roller bearing to differential case.

CAUTION:

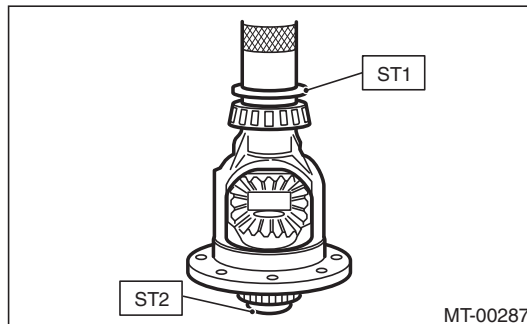
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

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

ST1 499277100 BUSHING 1-2 INSTALLER

ST2 398497701 ADAPTER



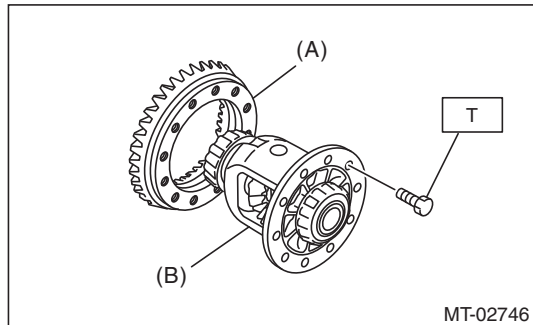
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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)

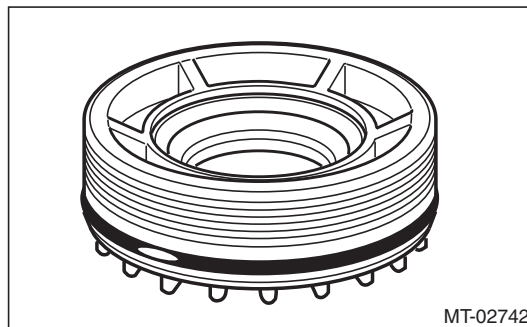


- (A) Hypoid driven gear
(B) Differential case

2) Install the O-ring.

NOTE:

- Use new O-rings.
- Apply gear oil to O-ring.
- Do not stretch or damage the O-ring.
- Install the O-ring after hypoid gear backlash adjustment and completion of tooth contact inspection.



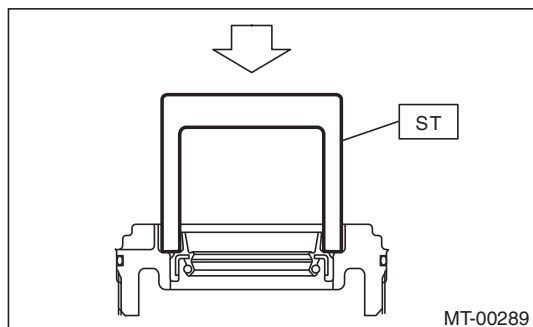
2. SIDE RETAINER

1) Using the ST, install the oil seal by lightly tapping with a plastic hammer.

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.
- Check the identification marks (L, R), and attach the oil seals RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



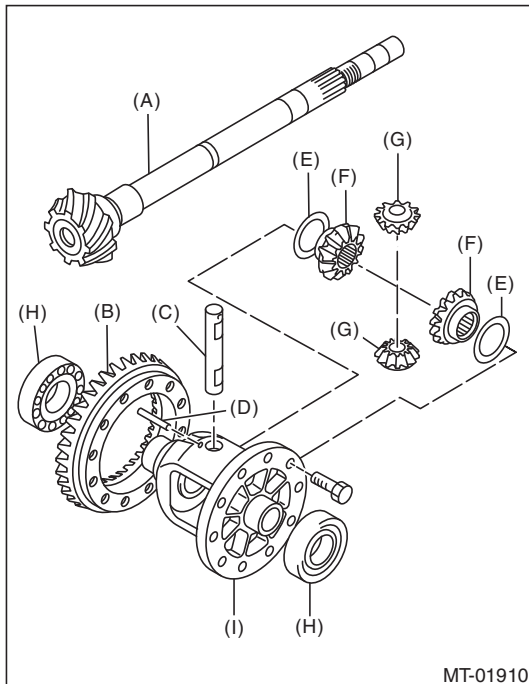
Front Differential Assembly

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

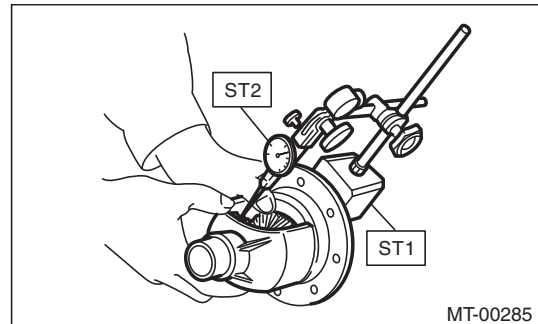
Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 6MT-92, ADJUSTMENT, Front Differential Assembly.>

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE



2. HYPOID GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the dial gauge probe through drain plug hole so that the probe 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

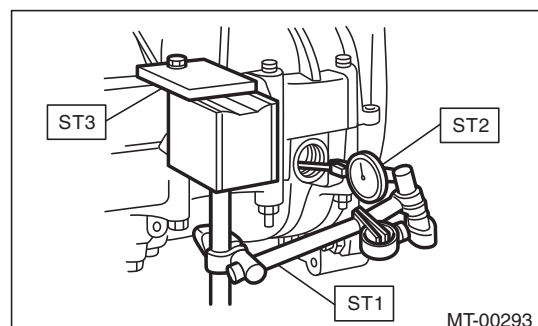
NOTE:

If the backlash is outside the specified range, adjust it by turning the side retainers on the left and right side.

Backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

Part No. 38415AA100 Axle shaft



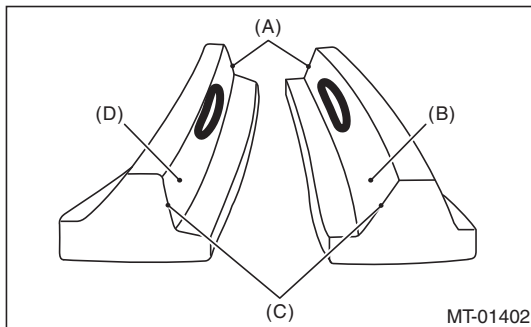
Front Differential Assembly

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 6MT-92, 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 6MT-88, DISASSEMBLY, Front Differential Assembly.>
- 2) Select a washer 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:

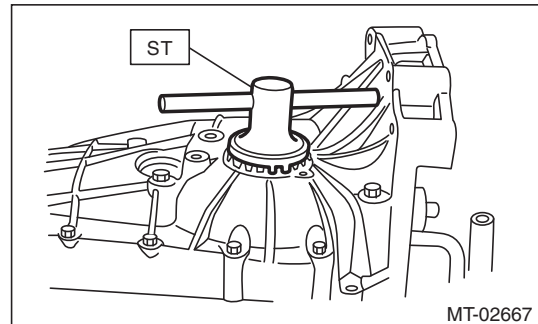
Standard

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

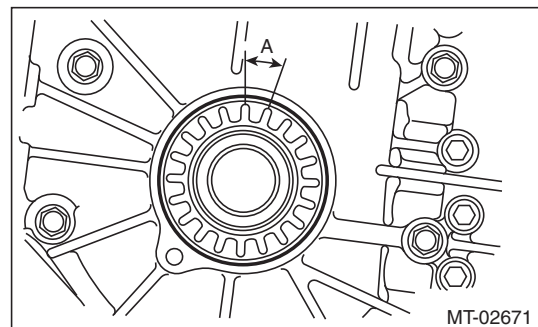
Adjust the backlash by turning the side retainers on the left and right side.

ST 18630AA010 WRENCH COMPL RETAINER



NOTE:

Each time the side retainer rotates by one notch (A), the backlash changes by 0.05 mm (0.0020 in).

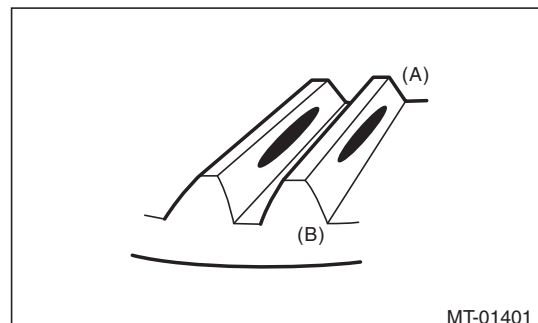


3. TOOTH CONTACT OF HYPOID GEAR

- 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

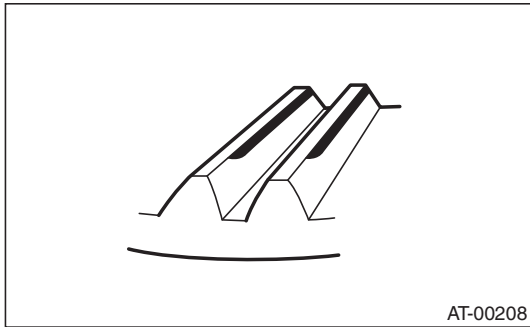
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

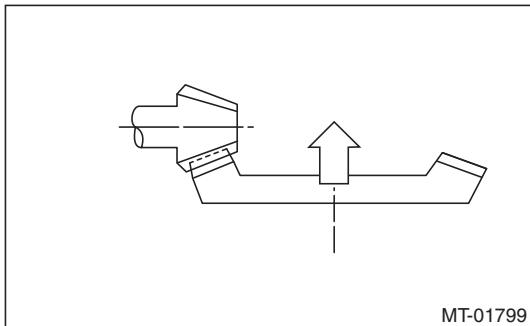
- Face contact

Check item: Backlash is too large.

Contact pattern



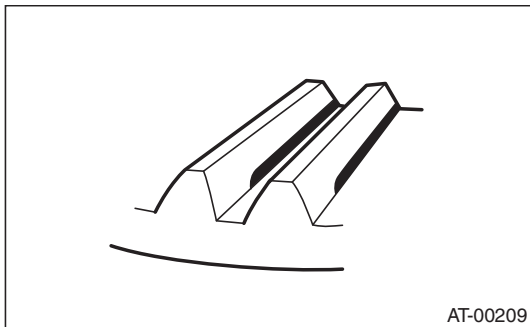
Corrective action: Tighten the side retainer to move the driven gear closer to the drive pinion.



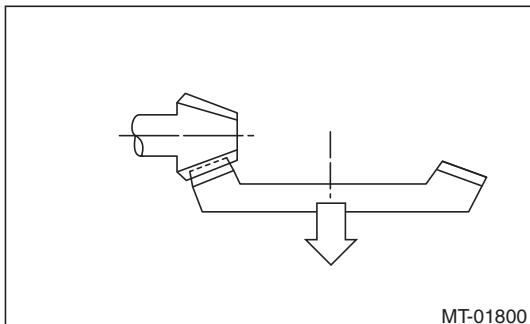
- Flank contact

Check item: Backlash is too small.

Contact pattern



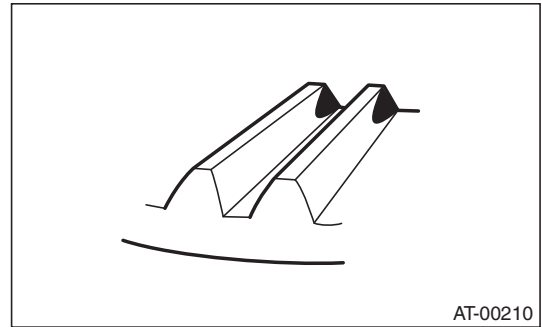
Corrective action: Loosen the side retainer to move the driven gear away from the drive pinion.



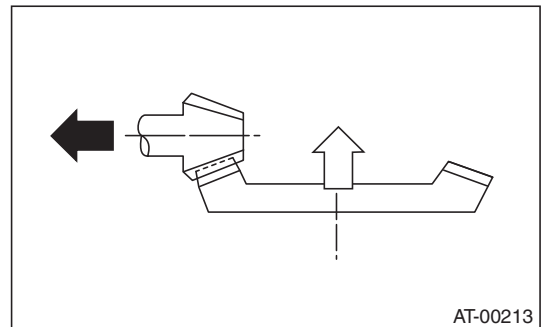
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



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.



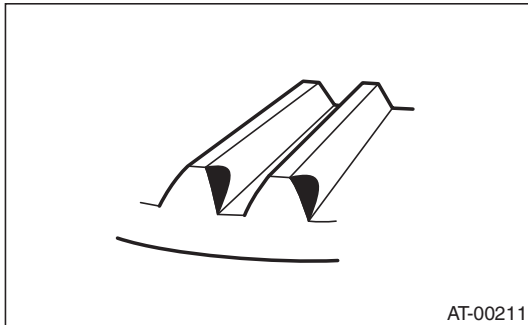
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

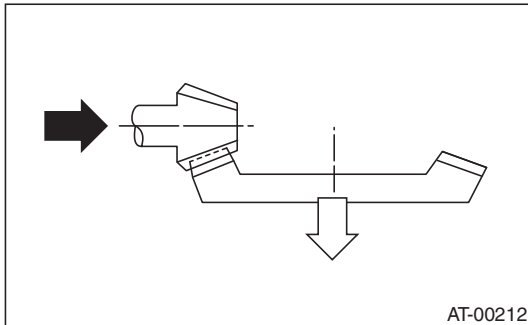
- Heel contact (outside end contact)

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.



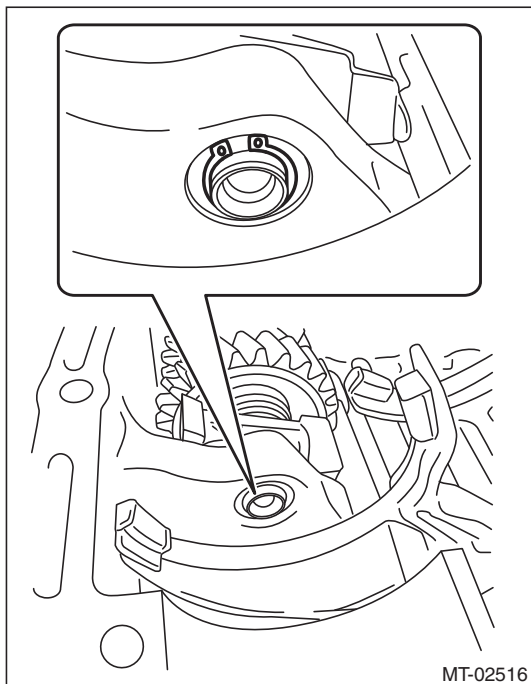
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

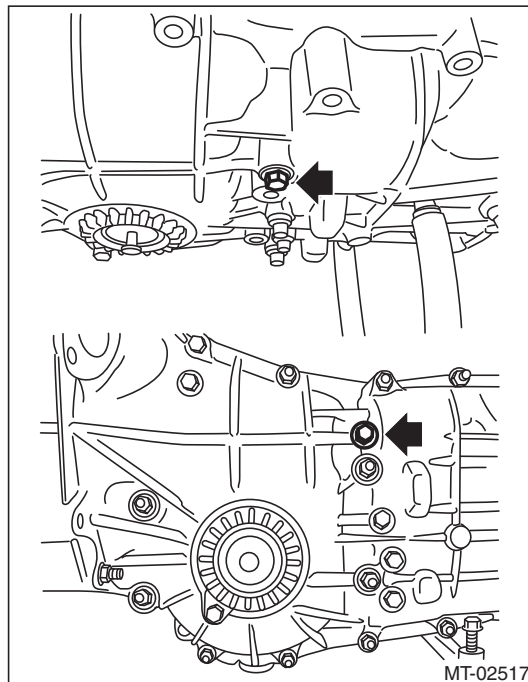
19.Reverse Idler Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 6MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly. <Ref. to 6MT-67, REMOVAL, Main Shaft Assembly for Single-Range.>
- 7) Remove the front differential assembly. <Ref. to 6MT-87, REMOVAL, Front Differential Assembly.>
- 8) Shift into 4th.
- 9) Remove the snap ring.



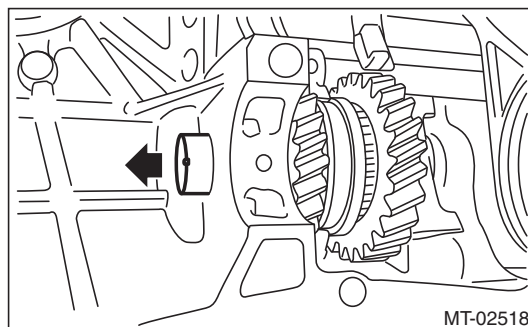
- 10) Remove the reverse idler gear shaft securing bolt.



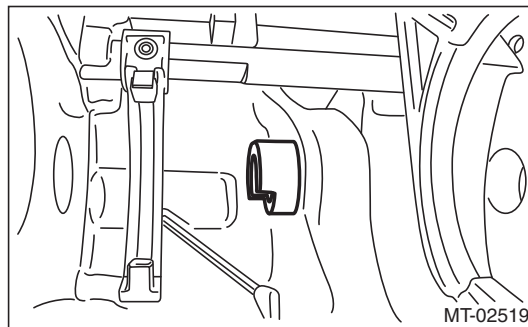
- 11) Press out the reverse idler gear shaft from the backside of the transmission to remove.

NOTE:

Support the reverse idler gear assembly with hands to avoid collapsing.



- 12) Remove the reverse idler gear.
- 13) Remove the reverse idler gear bushing.



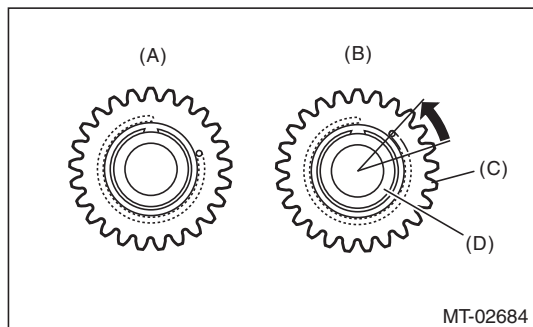
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

B: INSTALLATION

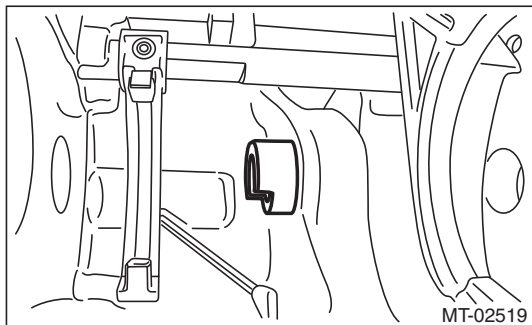
NOTE:

Rotate the reverse idler sub gear by two teeth from free status in the direction of the arrow to make it engage with the reverse gear of the main shaft and install the main shaft assembly.



- (A) Free status
- (B) Set status
- (C) Reverse idler sub gear
- (D) Reverse idler gear

1) Install the reverse idler gear bushing with the cutout portion of the reverse idler gear bushing facing the front of the transmission.

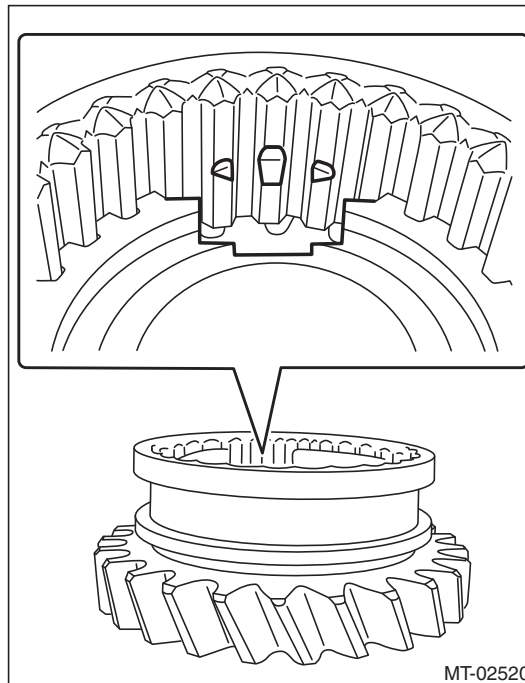


2) Assembling reverse idler gear assembly

(1) Install the reverse coupling sleeve to the reverse idler gear No. 2.

NOTE:

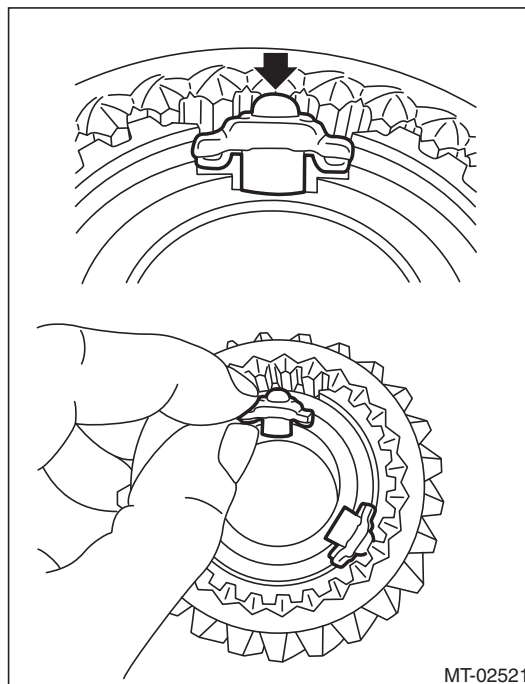
- Install the reverse coupling sleeve in the correct direction.
- Make sure that the oval-shaped cutout portion inside the reverse coupling sleeve matches the center of the reverse idler gear No. 2 groove.



(2) Install the shifting insert.

NOTE:

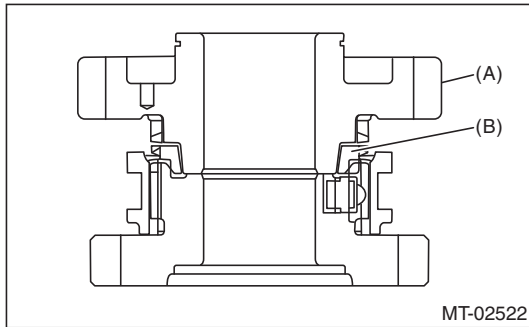
Press in the ball part to install.



Reverse Idler Gear

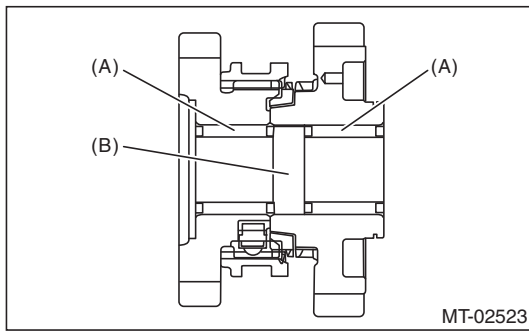
MANUAL TRANSMISSION AND DIFFERENTIAL

(3) Install the baulk ring and reverse idler gear.



- (A) Reverse idler gear
- (B) Baulk ring

(4) Install the needle bearing and reverse idler gear collar.

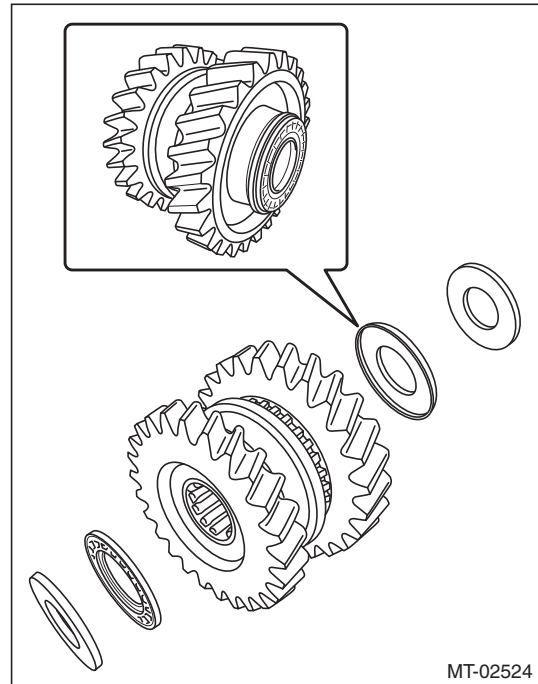


- (A) Needle bearing
- (B) Reverse idler gear collar

(5) Install the thrust bearing and washer.

NOTE:

Install the thrust bearing in the correct direction.



3) Install the assembled reverse idler gear assembly to the transmission case and hold it with hands.

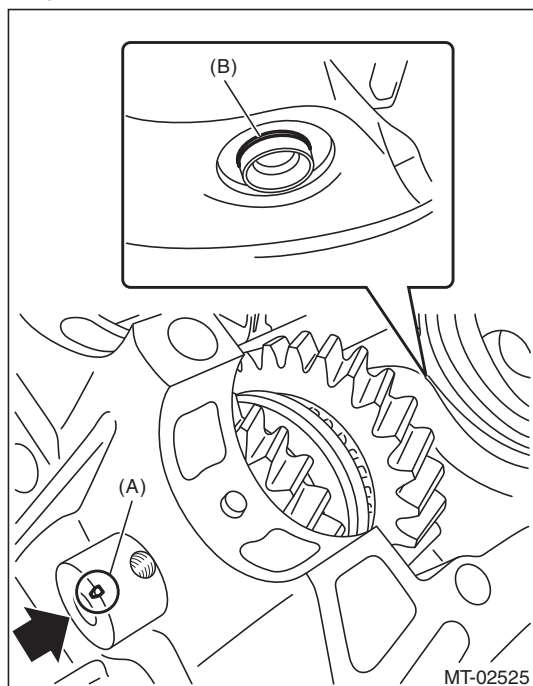
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Install the reverse idler gear shaft.

NOTE:

- Install with the cutout portion of the reverse idler gear shaft facing the RH side of the transmission case.
- Make sure that the groove of the reverse idler gear shaft comes out of the reverse idler gear bushing.

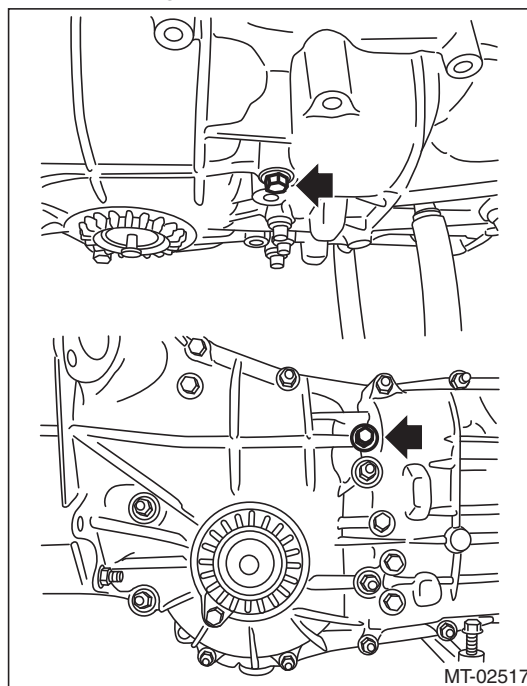


- (A) Cutout portion of the reverse idler gear shaft
(B) Snap ring installation groove

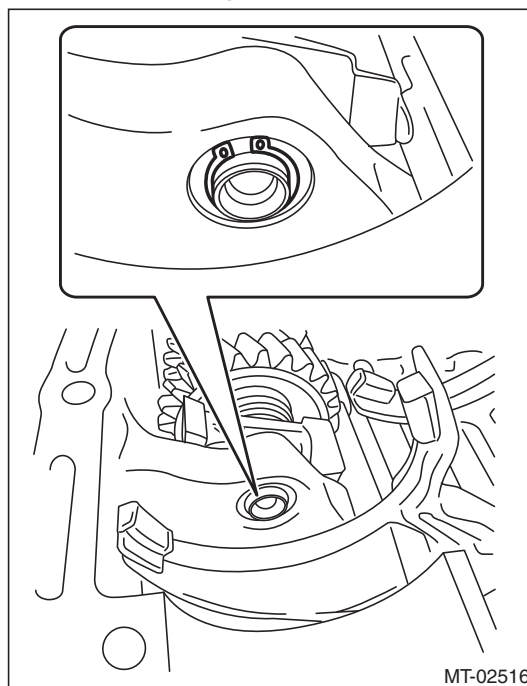
5) Install the reverse idler gear shaft securing bolt.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



6) Install the snap ring.



7) Select the reverse idler gear bushing. <Ref. to 6MT-101, ADJUSTMENT, Reverse Idler Gear.>

8) Remove the reverse idler gear assembly and replace with the selected bushing. <Ref. to 6MT-95, REMOVAL, Reverse Idler Gear.>

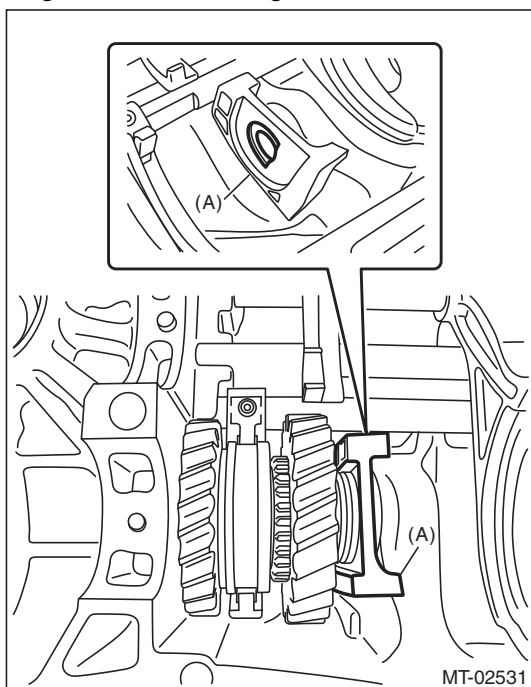
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Install the reverse idler gear assembly, oil case guide and reverse idler gear shaft.

NOTE:

- Install with the cutout portion of the reverse idler gear shaft facing the RH side of the transmission case.
- Make sure that the groove of the reverse idler gear shaft comes out of the reverse idler gear bushing.
- Insert the cutout portion of the reverse idler gear bushing into the oil case guide.



(A) Oil case guide

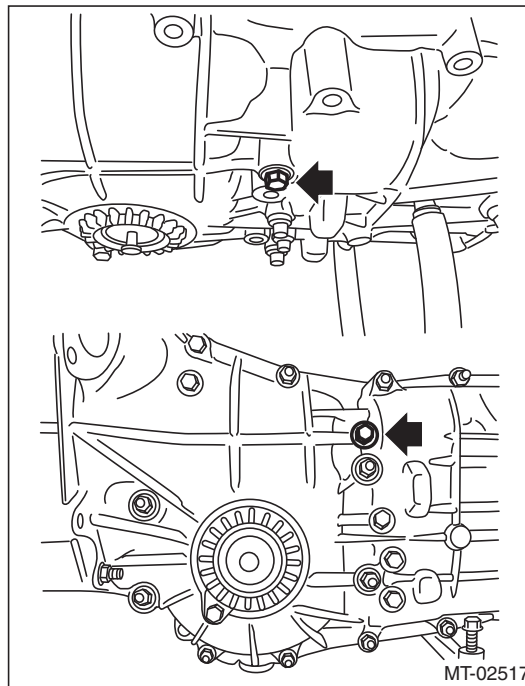
10) Install the reverse idler gear shaft securing bolt.

NOTE:

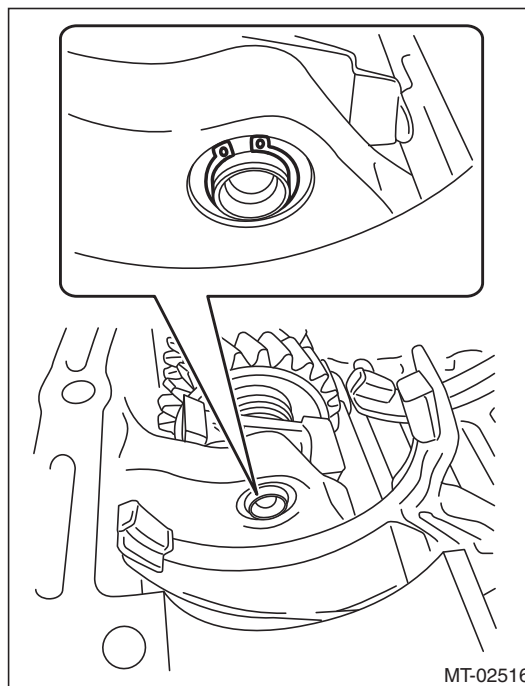
Use a new gasket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)



11) Install the snap ring.



12) Check the reverse shifter fork. <Ref. to 6MT-104, INSPECTION, Shifter Fork and Rod.>

13) Install the front differential assembly. <Ref. to 6MT-87, INSTALLATION, Front Differential Assembly.>

Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

14) Install the main shaft assembly. <Ref. to 6MT-67, INSTALLATION, Main Shaft Assembly for Single-Range.>

15) Install the drive pinion shaft assembly. <Ref. to 6MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>

16) Install the transmission case. <Ref. to 6MT-64, INSTALLATION, Transmission Case.>

17) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

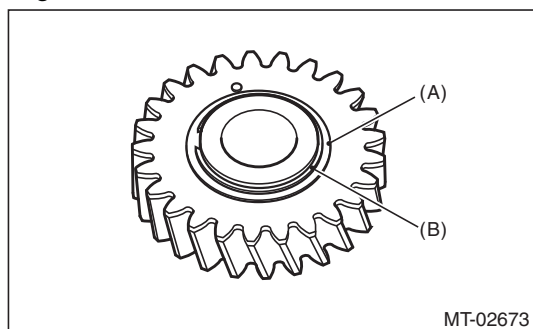
18) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>

19) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

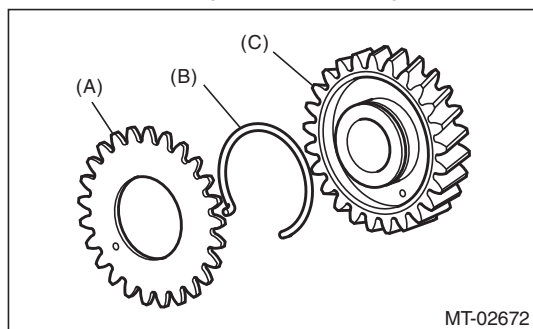
1. REVERSE IDLER GEAR ASSY

1) Remove the snap ring and friction plate from reverse gear.



- (A) Friction plate
- (B) Snap ring

2) Remove the sub gear and spring.



- (A) Reverse idler sub gear
- (B) Reverse idler spring
- (C) Reverse idler gear

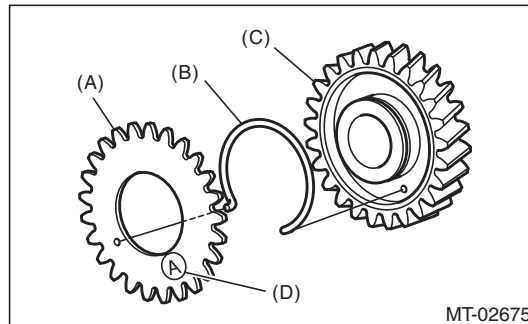
D: ASSEMBLY

1. REVERSE IDLER GEAR ASSY

1) Attach the sub gear and spring.

NOTE:

Point the stamp (marking A) towards the outside, and install the sub gear.

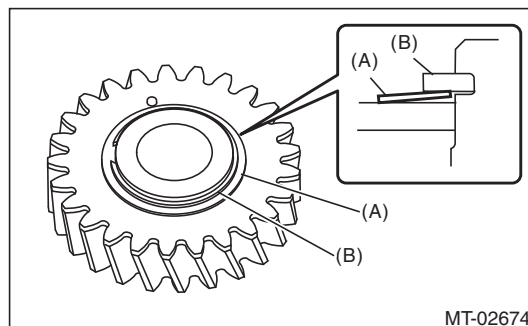


- (A) Reverse idler sub gear
- (B) Reverse idler spring
- (C) Reverse idler gear
- (D) Stamp (marking A)

2) Install the friction plate and snap ring.

NOTE:

Make sure the friction plate is installed in the proper direction.



- (A) Friction plate
- (B) Snap ring

Reverse Idler Gear

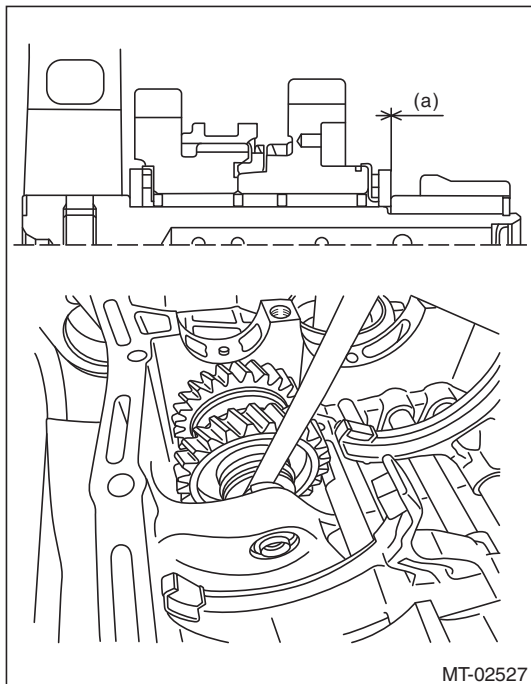
MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

1) Check the clearance between the reverse idler gear bushing and reverse idler gear washer. If out of specification, select the appropriate reverse idler gear bushing and adjust.

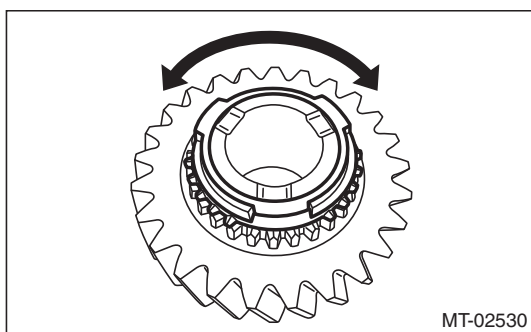
Clearance (a):

0.1 — 0.3 mm (0.004 — 0.012 in)



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

3) 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.

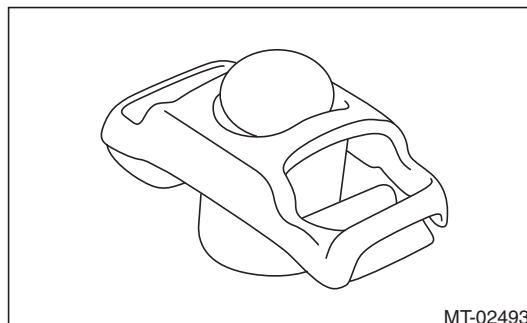


4) Coupling sleeve and synchronizer hub

- Check the slipping condition of the coupling sleeve.
- Check the splines on the coupling sleeve and reverse idler gear for wear.

5) Shifting insert

Replace the shifting insert if there is deformation, excessive wear on the ball section or any defectiveness.

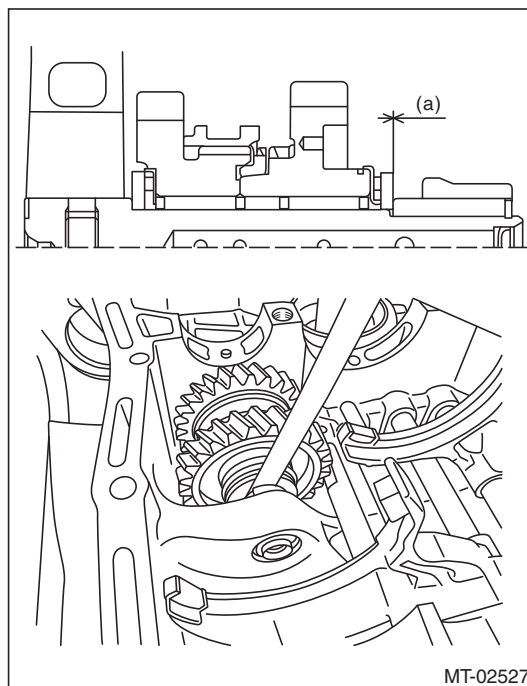


F: ADJUSTMENT

1) Select the appropriate reverse idler gear bushing from the table below, and adjust until the clearance between the reverse idler gear and reverse idler gear washer is within specification.

Clearance (a):

0.1 — 0.3 mm (0.004 — 0.012 in)



Reverse idler gear bushing

Part No.	Length mm (in)	Groove for identification
32289AA080	27.75 (1.093)	None
32289AA090	27.90 (1.098)	1
32289AA100	28.05 (1.104)	2
32289AA110	28.20 (1.110)	3
32289AA120	28.35 (1.116)	4

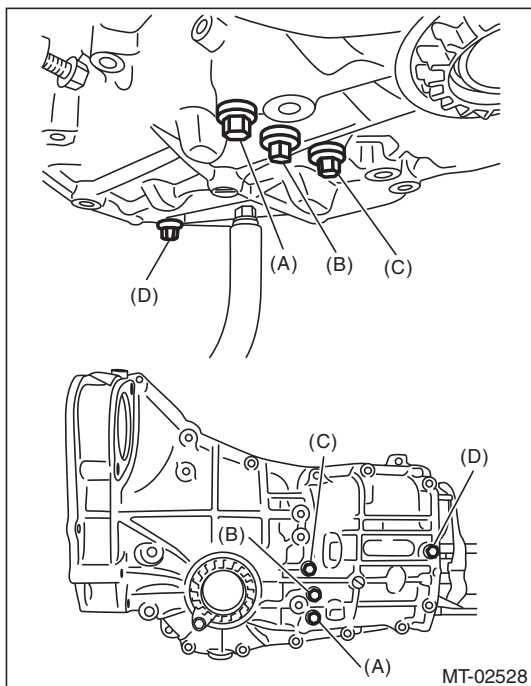
Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

20.Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and the neutral position switch. <Ref. to 6MT-40, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 6MT-76, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly. <Ref. to 6MT-67, REMOVAL, Main Shaft Assembly for Single-Range.>
- 7) Remove the front differential assembly. <Ref. to 6MT-87, REMOVAL, Front Differential Assembly.>
- 8) Remove the reverse idler gear assembly. <Ref. to 6MT-95, REMOVAL, Reverse Idler Gear.>
- 9) Remove the check ball plugs, check ball springs and check balls.



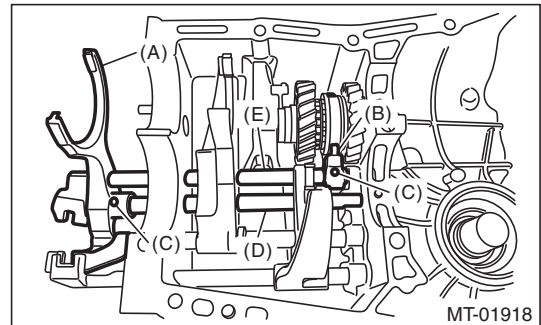
- (A) 1st-2nd
- (B) 3rd-4th
- (C) 5th-6th
- (D) Rev.

- 10) Use the ST to push out the spring pin of 5th-6th shifter fork and reverse shifter fork, and remove the 5th-6th shifter fork, reverse shifter fork, 5th-6th fork rod and reverse fork rod.

NOTE:

Tap out the reverse shifter fork spring pin, after setting the gear into reverse position. In the neutral position, removing is impossible because the clearance between transmission case is narrow.

ST 398791700 SPRING PIN REMOVER 2



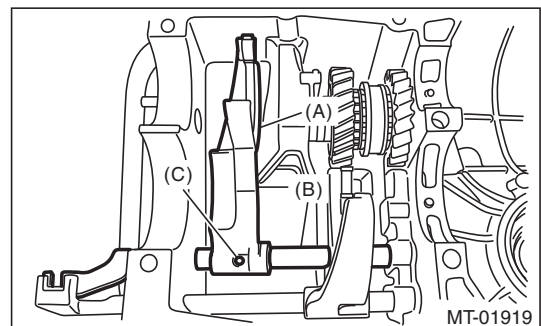
- (A) 5th-6th shifter fork
- (B) Reverse shifter fork
- (C) Spring pin
- (D) 5th-6th fork rod
- (E) Reverse fork rod

- 11) Drive out the spring pin by tapping it with the ST, and remove the 3rd-4th shifter fork and fork rod.

NOTE:

When removing the rod, keep other rods in neutral.

ST 398791700 SPRING PIN REMOVER 2



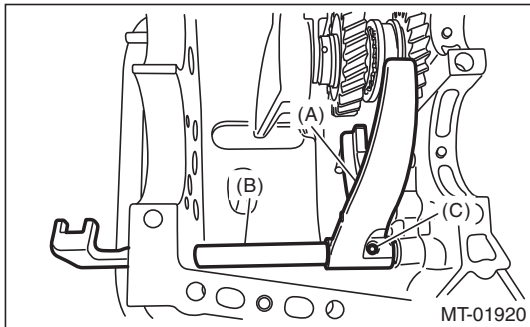
- (A) 3rd-4th shifter fork
- (B) 3rd-4th fork rod
- (C) Spring pin

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

12) Drive out the spring pin tapping by the ST, and remove the 1st-2nd shifter fork and fork rod.

ST 398791700 SPRING PIN REMOVER 2



- (A) 1st-2nd shifter fork
- (B) 1st-2nd fork rod
- (C) Spring pin

B: INSTALLATION

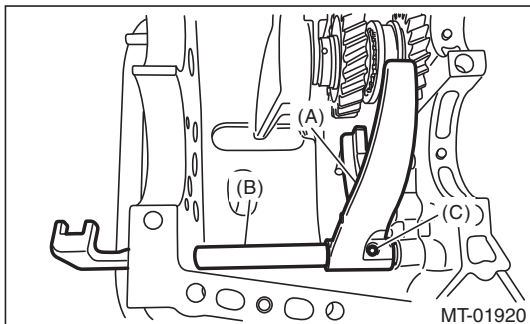
1) Install the 1st-2nd fork rod to the 1st-2nd shifter fork through the hole on the rear of the transmission case.

2) Align the holes in the rod and the fork, and drive the spring pin into these holes using the ST to fix.

NOTE:

Use new spring pin.

ST 398791700 SPRING PIN REMOVER 2



- (A) 1st-2nd shifter fork
- (B) 1st-2nd fork rod
- (C) Spring pin

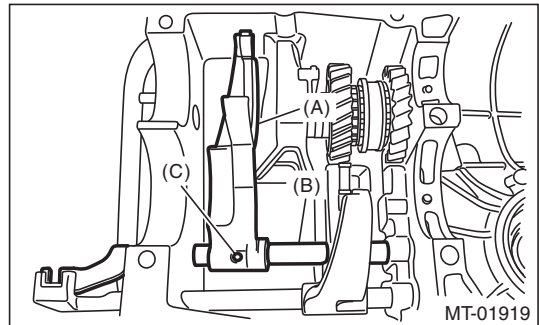
3) Install the 3rd-4th fork rod to the 3rd-4th shifter fork through the hole on the rear of the transmission case.

4) Align the holes in the rod and the fork, and drive the spring pin into these holes using the ST to fix.

NOTE:

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

ST 398791700 SPRING PIN REMOVER 2



- (A) 3rd-4th shifter fork
- (B) 3rd-4th fork rod
- (C) Spring pin

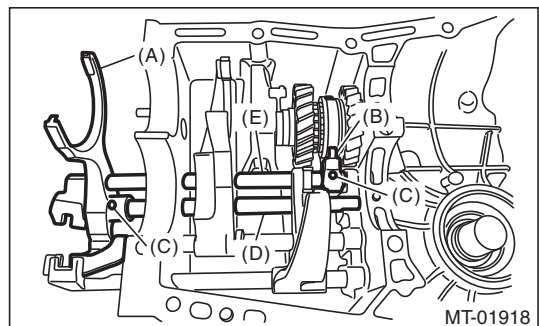
5) Install the 5th-6th fork rod into 5th-6th shifter fork, then insert through the hole on the rear of transmission case. Align the hole of the 5th-6th shifter fork with the hole on the transmission case, then insert the reverse fork rod to install the reverse shifter fork.

6) Align the holes in the rod and the fork, and drive the spring pin into these holes using the ST to fix.

NOTE:

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

ST 398791700 SPRING PIN REMOVER 2



- (A) 5th-6th shifter fork
- (B) Reverse shifter fork
- (C) Spring pin
- (D) 5th-6th fork rod
- (E) Reverse fork rod

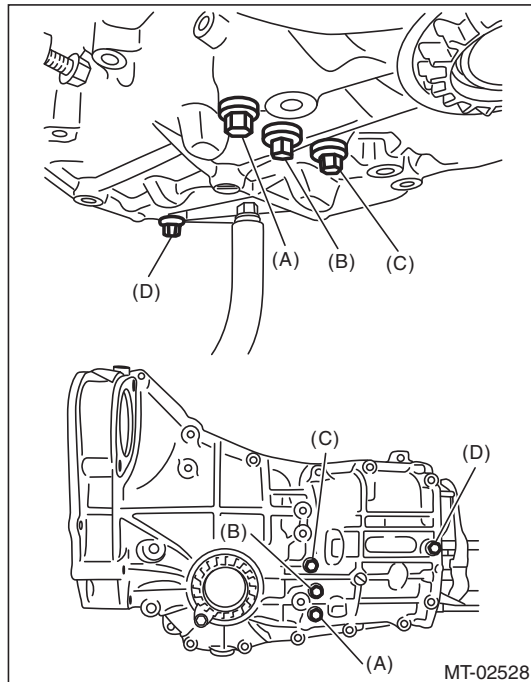
Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

7) Install the check ball plugs, check ball springs and check balls.

Tightening torque:

20 N·m (2.0 kgf-m, 14.8 ft-lb)



- (A) 1st-2nd
- (B) 3rd-4th
- (C) 5th-6th
- (D) Rev.

8) Install the reverse idler gear assembly. <Ref. to 6MT-96, INSTALLATION, Reverse Idler Gear.>

9) Install the front differential assembly. <Ref. to 6MT-87, INSTALLATION, Front Differential Assembly.>

10) Install the main shaft assembly. <Ref. to 6MT-67, INSTALLATION, Main Shaft Assembly for Single-Range.>

11) Install the drive pinion shaft assembly. <Ref. to 6MT-76, INSTALLATION, Drive Pinion Shaft Assembly.>

12) Install the transmission case. <Ref. to 6MT-64, INSTALLATION, Transmission Case.>

13) Install the transfer case together with the extension case assembly. <Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>

14) Install the back-up light switch and the neutral position switch. <Ref. to 6MT-40, INSTALLATION, Switches and Harness.>

15) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

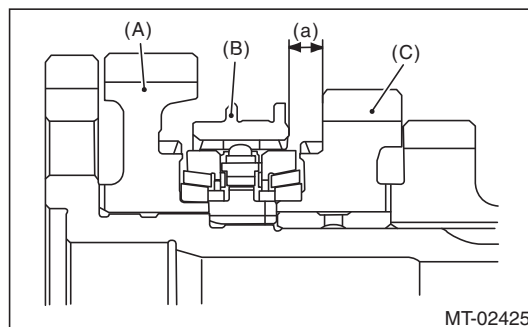
2) Gearshift mechanism

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

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

Clearance (a):

7.4 — 7.8 mm (0.291 — 0.307 in)



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

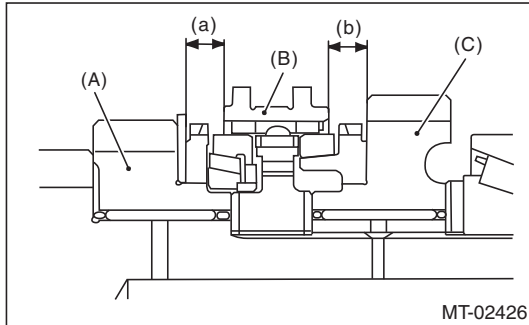
1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA120	1	Approaches 2nd gear by 0.2 mm (0.008 in)
32804AA130	No mark	Standard
32804AA140	2	Approaches 1st gear by 0.2 mm (0.008 in)

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

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), (b):
7.5 mm (0.295 in)

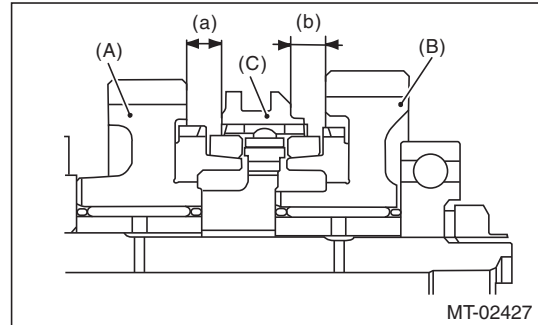


- (A) 3rd drive gear
- (B) Coupling sleeve
- (C) 4th drive gear

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, 6th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a), (b):
7.5 mm (0.295 in)



- (A) 5th drive gear
- (B) Coupling sleeve
- (C) 6th drive gear

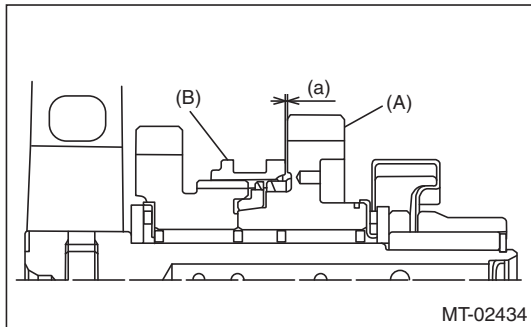
5th-6th shifter fork		
Part No.	Mark	Remarks
32940AA050	1	Approaches 5th gear by 0.2 mm (0.008 in)
32940AA060	No mark	Standard
32940AA070	2	Approaches 6th gear by 0.2 mm (0.008 in)

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Check the clearance between the reverse idler gear and reverse coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a):
0.50 mm (0.020 in) or less



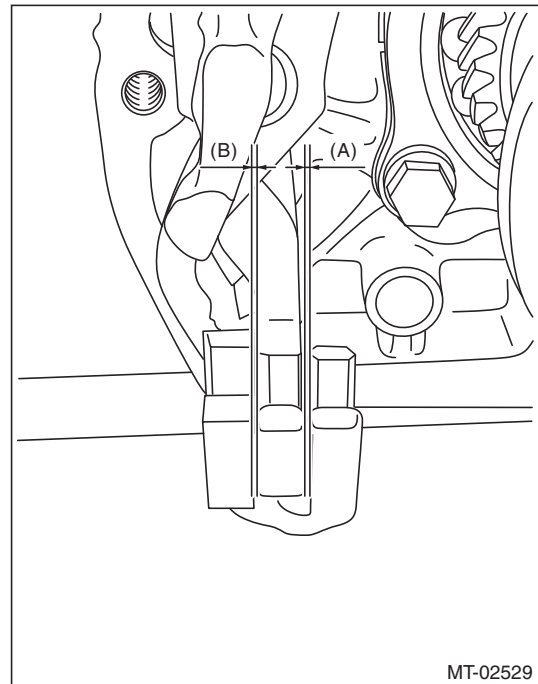
- (A) Reverse idler gear
 (B) Reverse coupling sleeve

Reverse shifter fork		
Part No.	Mark	Remarks
32941AA070	2	Approaches reverse idler gear by 0.3 mm (0.012 in)
32941AA060	No mark	Standard
32941AA050	1	Approaches reverse idler gear No. 2 by 0.3 mm (0.012 in)

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

Clearance (A):
1st-2nd — 3rd-4th
0.1 — 0.9 mm (0.004 — 0.035 in)

Clearance (B):
3rd-4th — 5th-6th
0.2 — 1.0 mm (0.008 — 0.039 in)



General Diagnostic Table

MANUAL TRANSMISSION AND DIFFERENTIAL

21. 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	Replace.
	(b) Worn, damaged or burred chamfer of gear spline	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact or wear between baulk 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) Synchronizer hub tooth step wear	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 5th drive gear and needle bearing	Replace.
	(l) Worn 6th drive gear and needle bearing	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 the broken component parts. At the same time, check other component parts 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	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.
	(f) Worn washer and differential pinion shaft	Replace.