

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model			Except for OUTBACK		OUTBACK	
Type			6-forward speeds and 1-reverse			
Transmission gear ratio			1st	3.454		
			2nd	1.947		
			3rd	1.296		
			4th	0.972		
			5th	0.825		
			6th	0.695		
			Rev.	3.636		
Front reduction gear	Final	Type of gear	Hypoid			
		Gear ratio	4.111		4.444	
Rear reduction gear	Transfer	Type of gear	Helical			
		Gear ratio	1.000			
	Final	Type of gear	Hypoid			
		Gear ratio	4.111		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		Single-range model	3.3 L (3.5 US qt, 2.9 Imp qt)			

2. TRANSMISSION GEAR OIL

Recommended oil:
SUBARU EXTRA MT

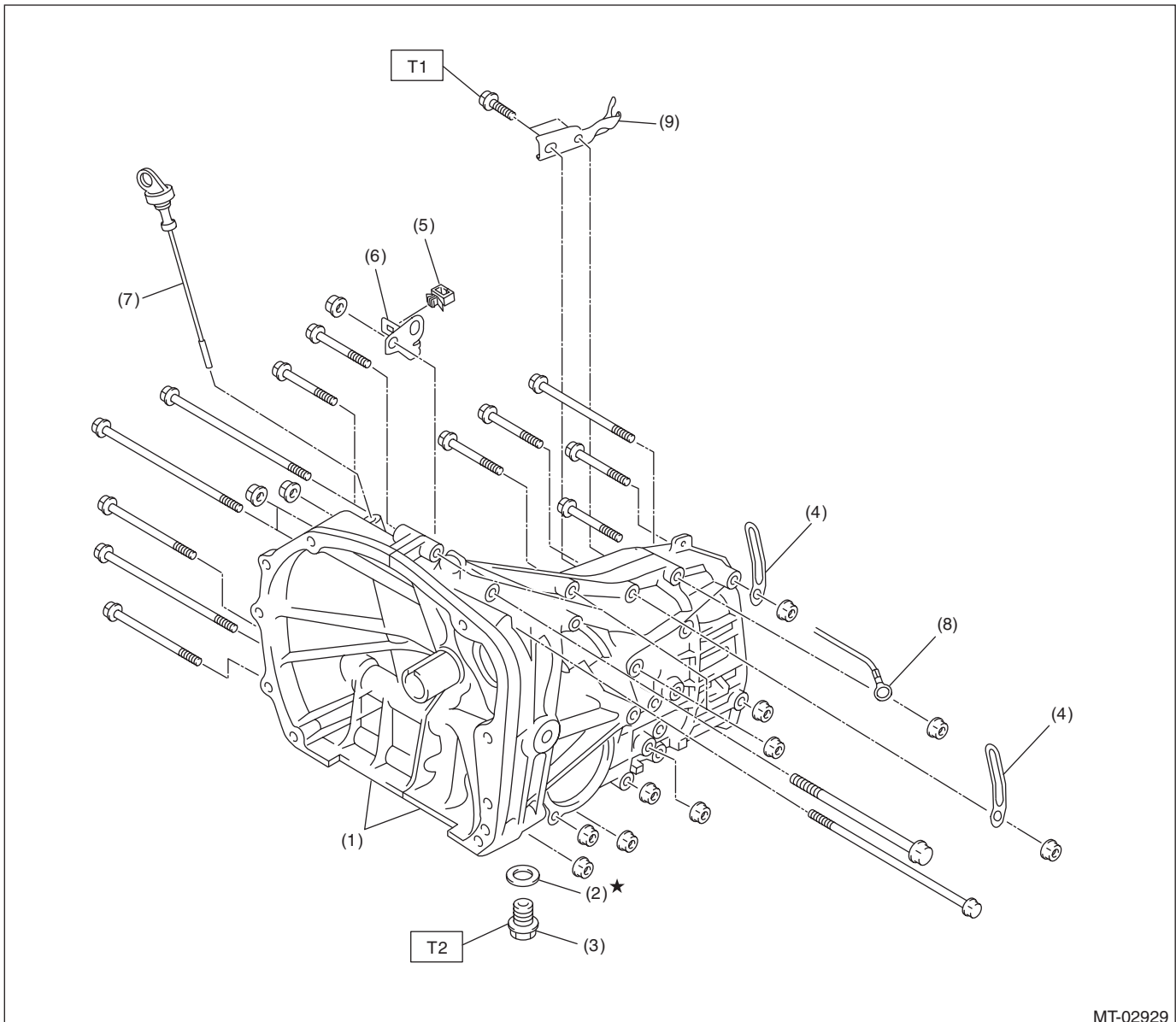
Alternative:
GL-5 (75W-90)

CAUTION:

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

B: COMPONENT

1. TRANSMISSION CASE



MT-02929

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

Tightening torque: N·m (kgf-m, ft-lb)

T1: 18 (1.8, 13.3)

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

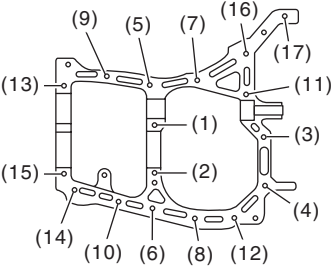
70 (7.1, 51.6) (Copper gasket, brown)

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

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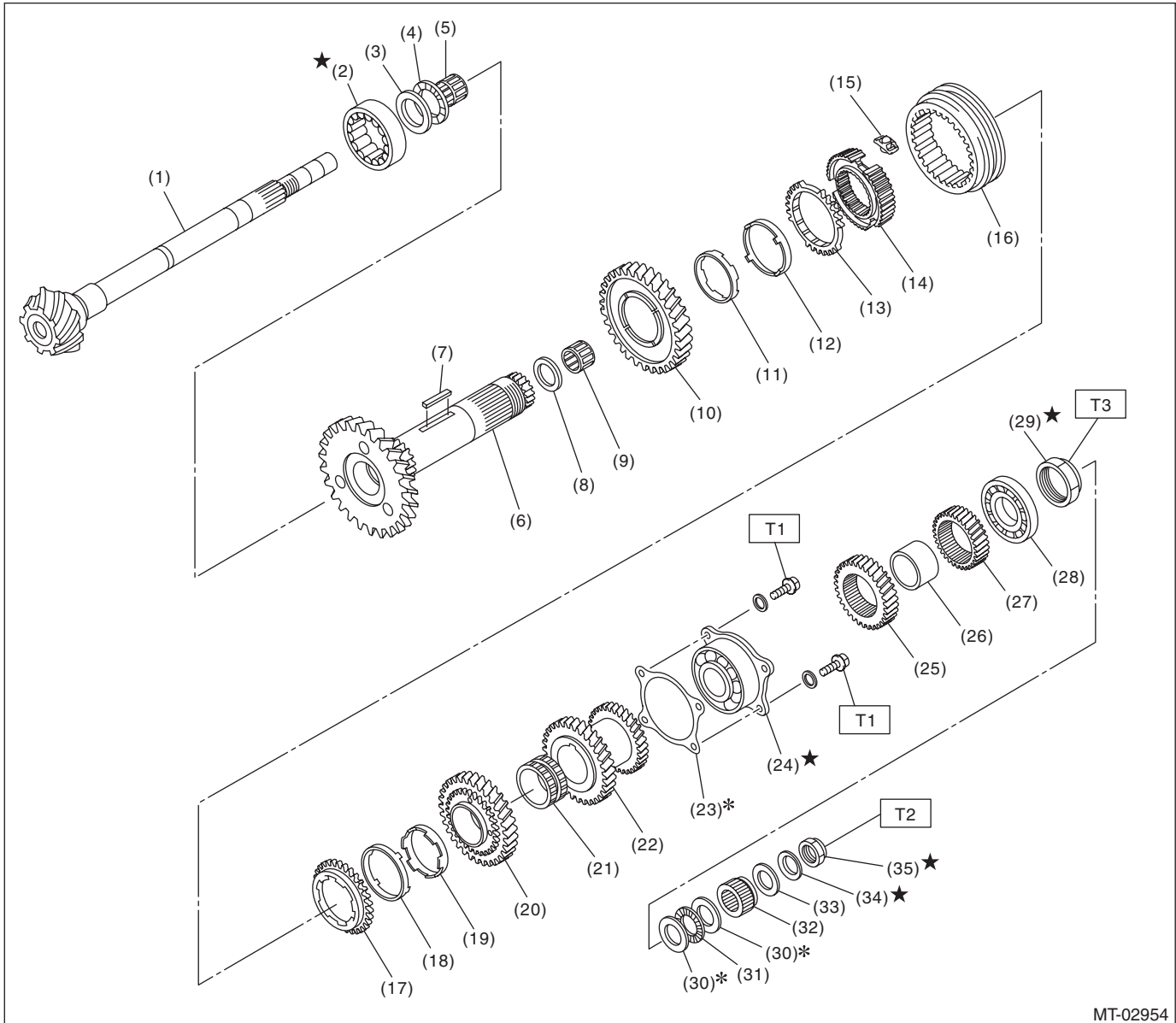
Transmission case tightening torque

 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)

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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)

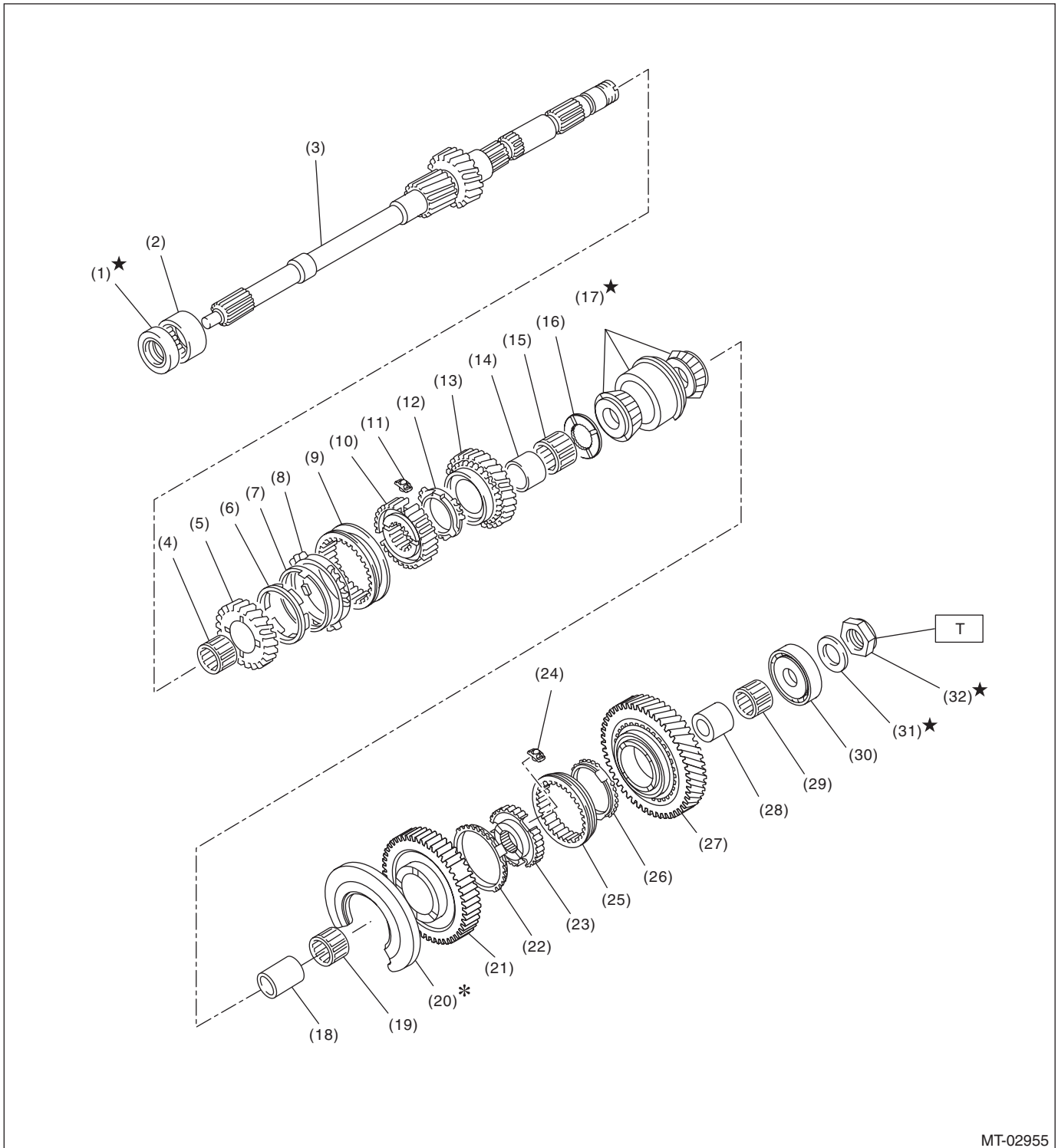
T2: 126 (12.8, 92.9)

T3: 440 (44.9, 324.5)

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3. MAIN SHAFT FOR SINGLE-RANGE



MT-02955

General Description

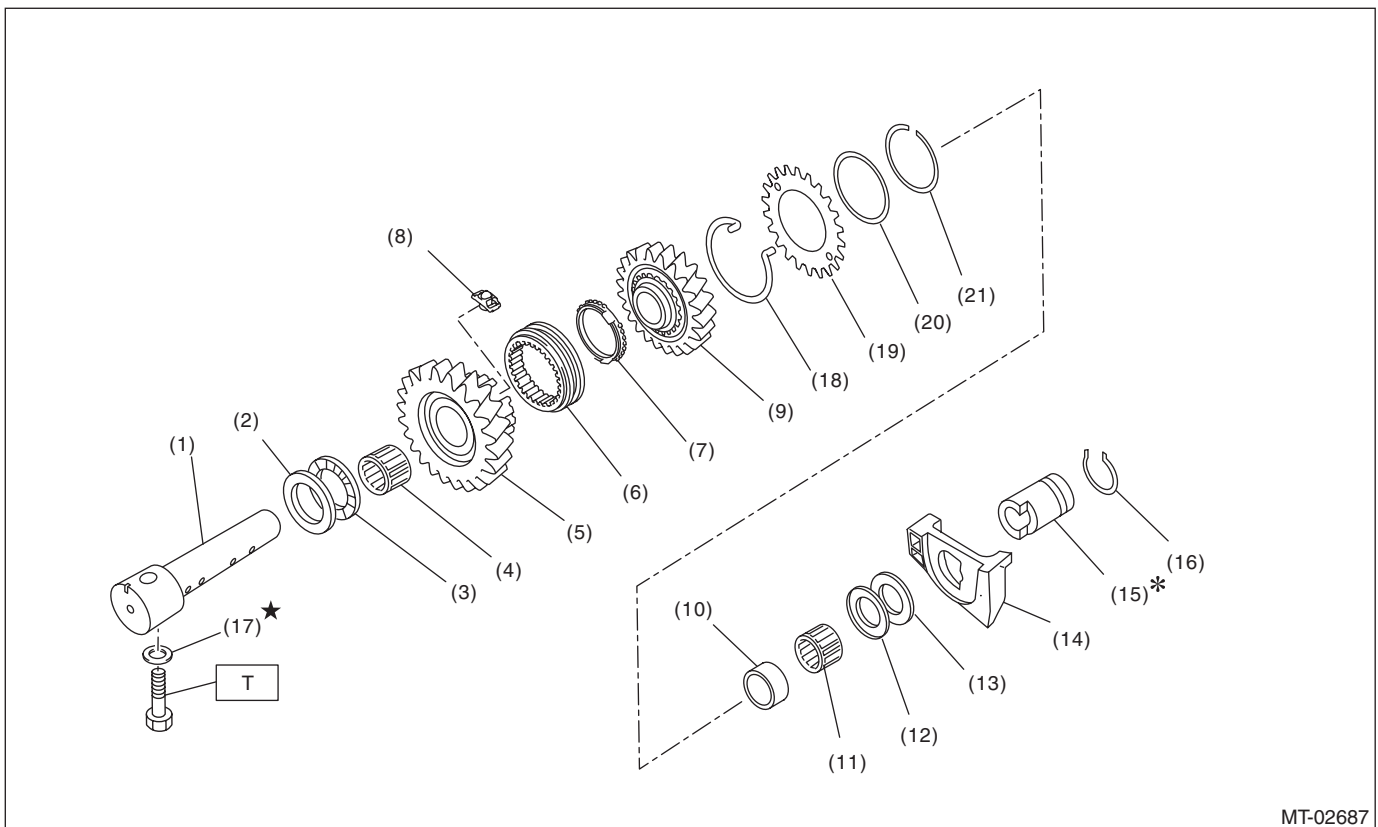
MANUAL TRANSMISSION AND DIFFERENTIAL

- | | | |
|-------------------------------|----------------------------------|------------------------------|
| (1) Oil seal | (13) 4th drive gear | (25) 5th-6th coupling sleeve |
| (2) Needle bearing | (14) 4th needle bearing race | (26) 6th baulk ring |
| (3) Main shaft | (15) Needle bearing | (27) 6th drive gear |
| (4) Needle bearing | (16) 4th gear thrust washer | (28) 6th needle bearing race |
| (5) 3rd drive gear | (17) Double taper roller bearing | (29) Needle bearing |
| (6) Inner baulk ring | (18) 5th needle bearing race | (30) Ball bearing |
| (7) 3rd synchro cone | (19) Needle bearing | (31) Lock washer |
| (8) Outer baulk ring | (20) Main shaft rear plate | (32) Lock nut |
| (9) 3rd-4th coupling sleeve | (21) 5th drive gear | |
| (10) 3rd-4th synchronizer hub | (22) 5th baulk ring | |
| (11) 3rd-4th shifting insert | (23) 5th-6th synchronizer hub | |
| (12) 4th baulk ring | (24) 5th-6th shifting insert | |

Tightening torque: N·m (kgf-m, ft-lb)

T: 160 (16.3, 118.0)

4. REVERSE IDLER GEAR ASSY



MT-02687

- | | | |
|------------------------------|---------------------------------|---------------------|
| (1) Reverse idler gear shaft | (9) Reverse idler gear | (17) Gasket |
| (2) Idler gear washer | (10) Reverse idler gear collar | (18) Spring |
| (3) Thrust bearing | (11) Needle bearing | (19) Sub gear |
| (4) Needle bearing | (12) Thrust bearing | (20) Friction plate |
| (5) Reverse idler gear No. 2 | (13) Idler gear washer | (21) Snap ring |
| (6) Reverse coupling sleeve | (14) Oil case guide | |
| (7) Baulk ring | (15) Reverse idler gear bushing | |
| (8) Reverse shifting insert | (16) Snap ring | |

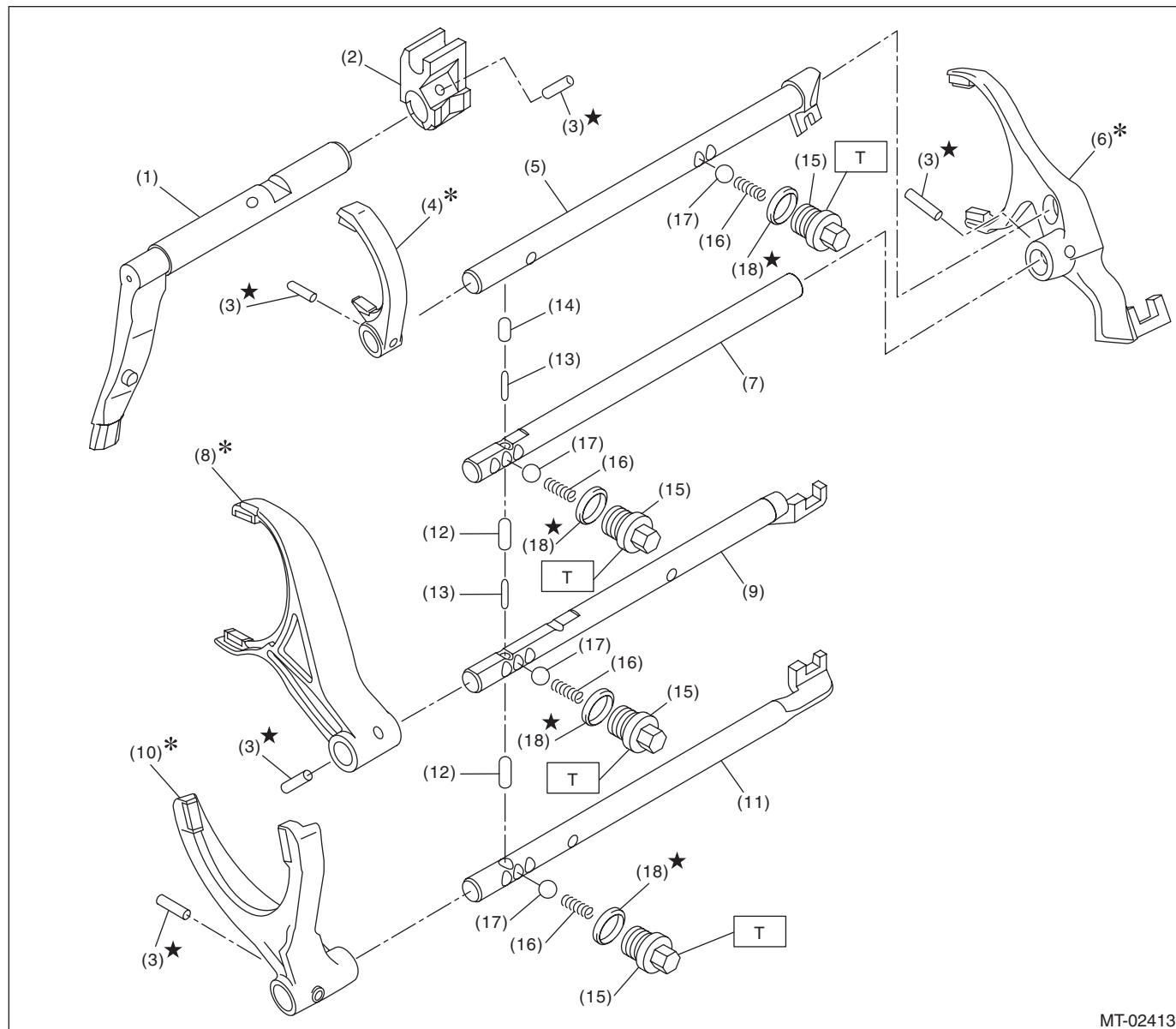
Tightening torque: N·m (kgf-m, ft-lb)

T: 25 (2.5, 18.4)

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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 | |

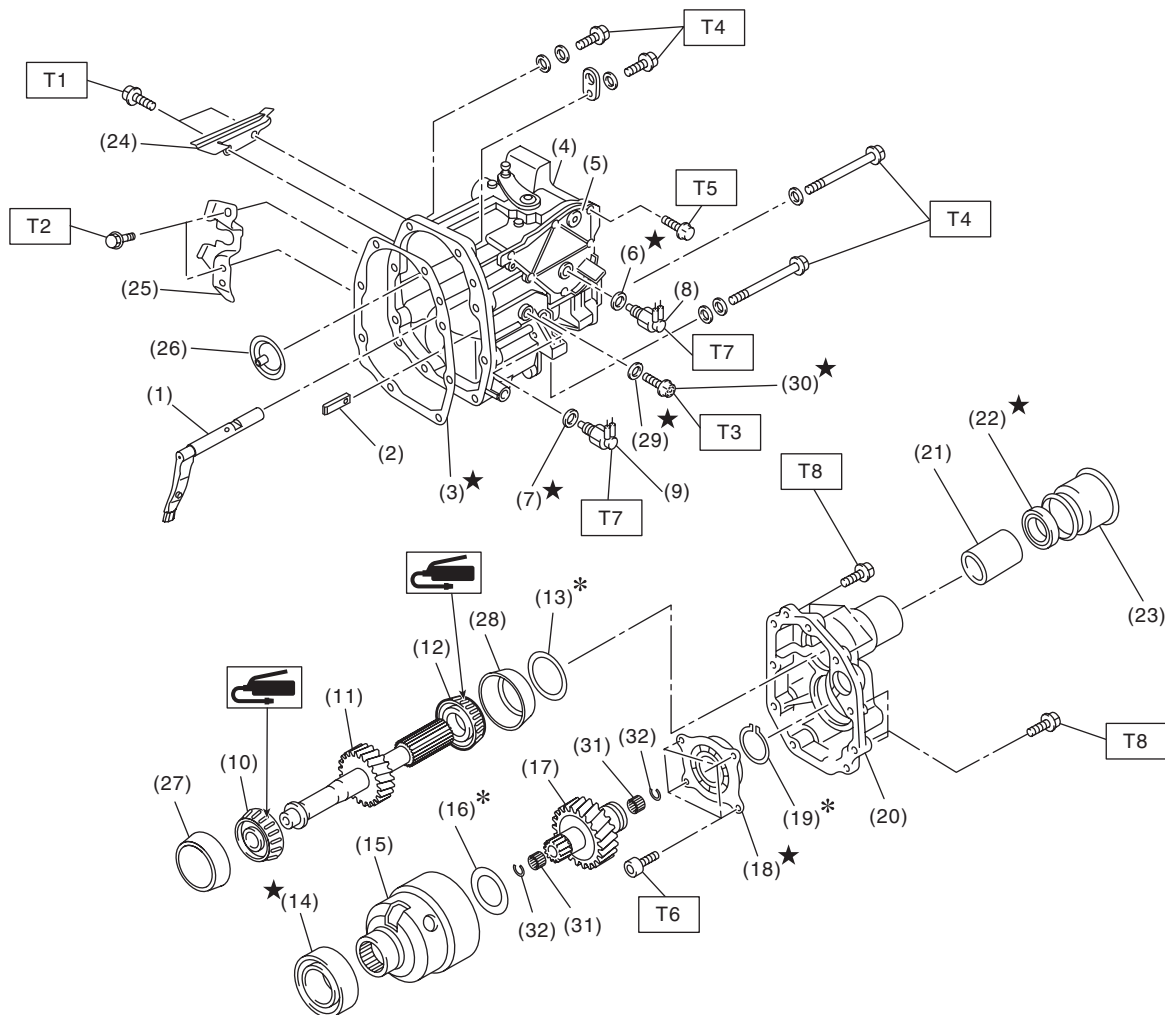
Tightening torque: N·m (kgf-m, ft-lb)

T: 20 (2.0, 14.8)

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6. TRANSFER CASE AND EXTENSION



MT-03018

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

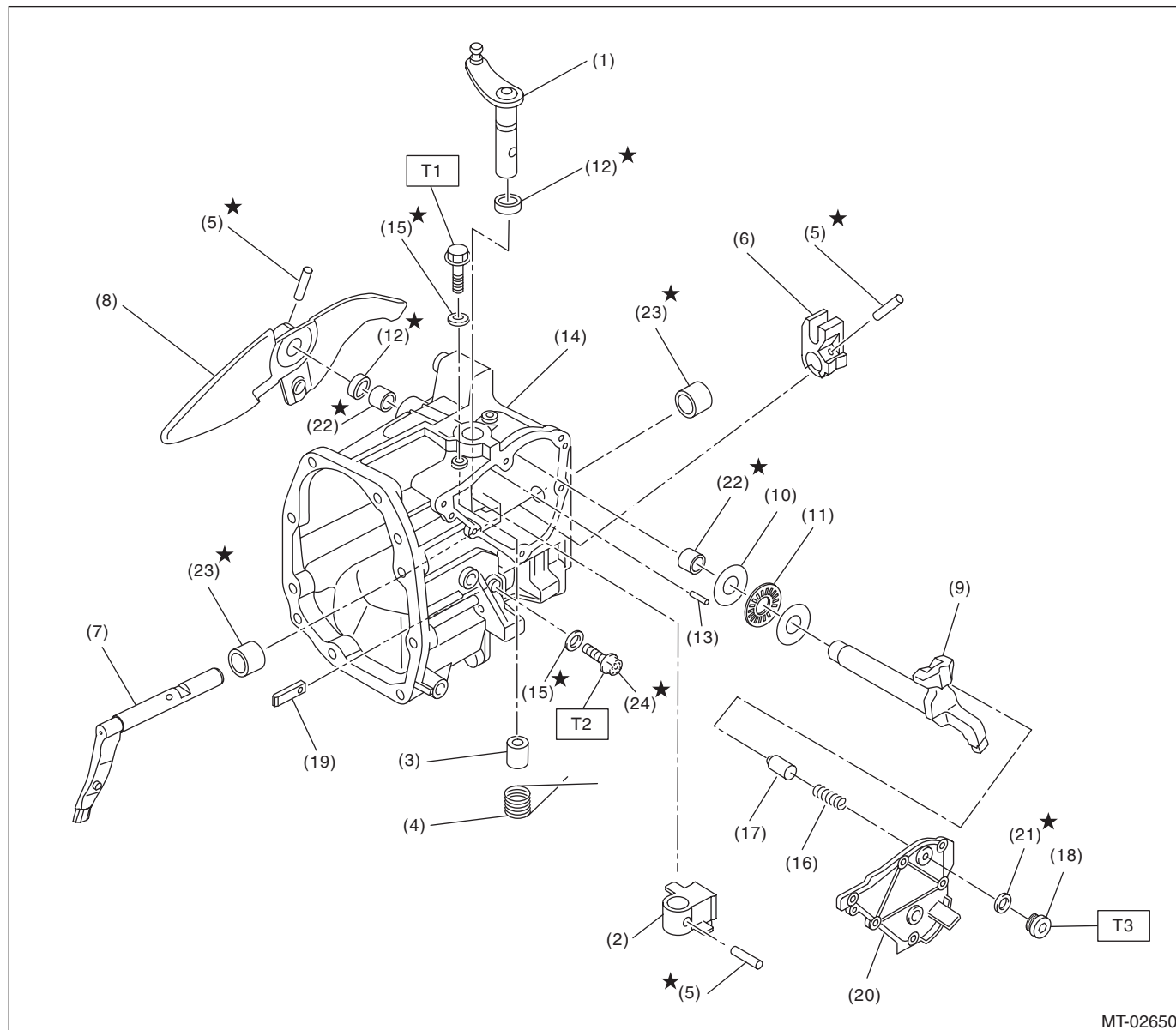
Tightening torque: N·m (kgf-m, ft-lb)

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)

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7. SHIFT LINK ASSEMBLY



MT-02650

- (1) Selector lever COMPL
- (2) Selector arm No. 2
- (3) Shifter arm collar
- (4) Neutral set spring
- (5) Spring pin
- (6) Selector arm
- (7) Shifter arm
- (8) Shift lever COMPL
- (9) Shifter arm No. 2
- (10) Washer

- (11) Thrust bearing
- (12) Oil seal
- (13) Straight pin
- (14) Transfer case
- (15) Gasket
- (16) Checking ball spring
- (17) Plunger
- (18) Seal bolt
- (19) Interlock plate
- (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)

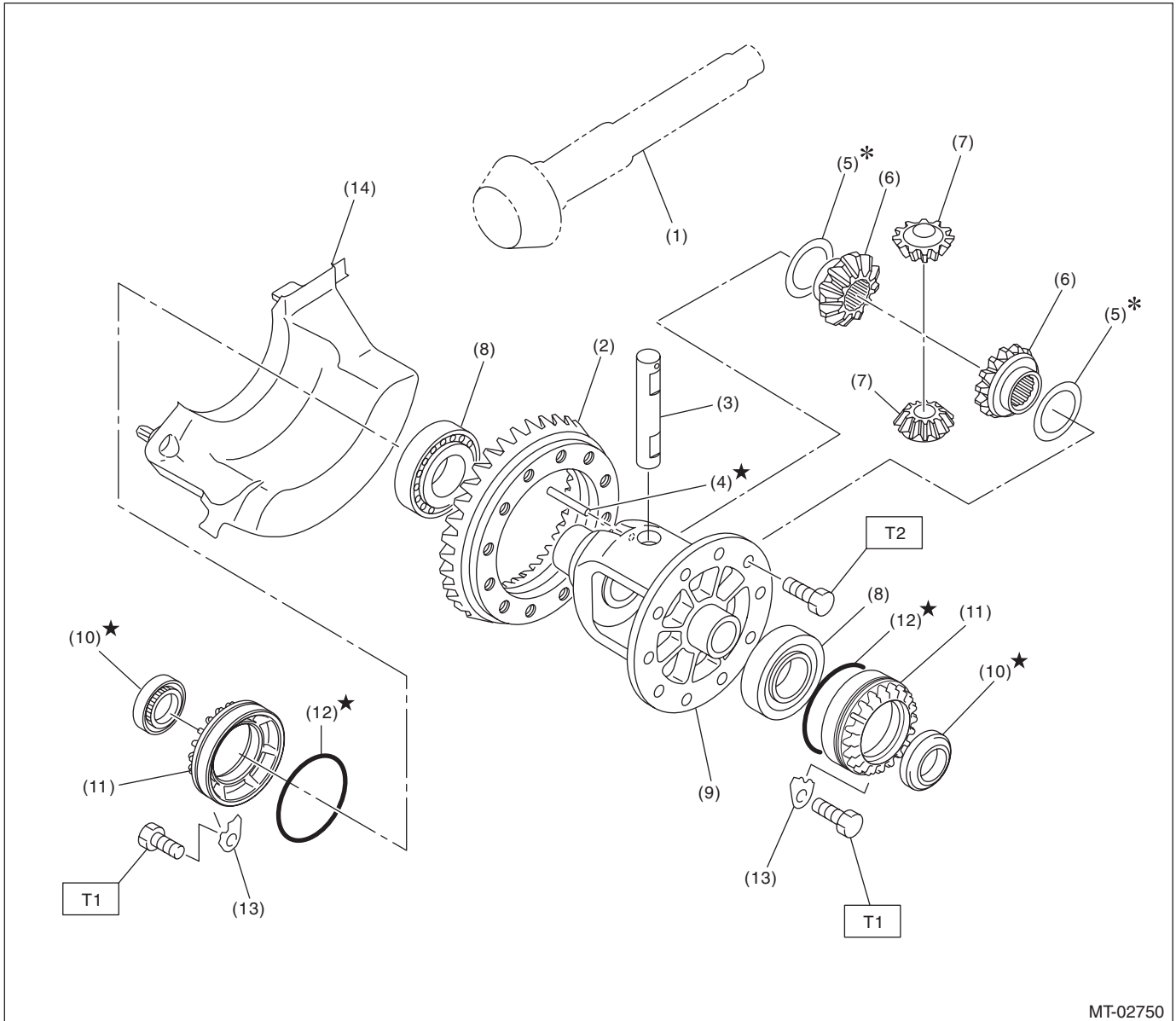
T2: 20 (2.0, 14.8)

T3: 25 (2.5, 18.4)

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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)

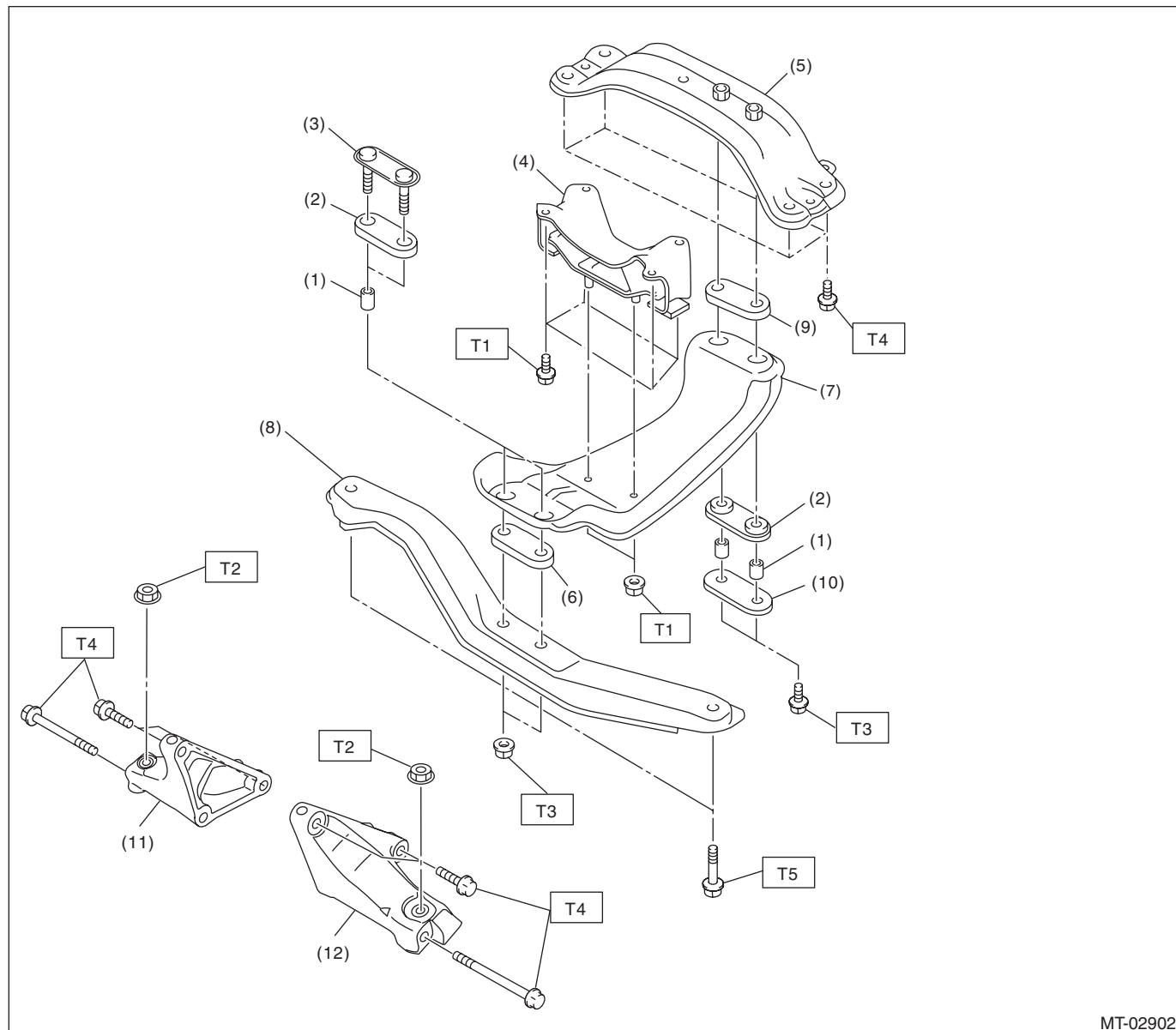
T1: 25 (2.5, 18.4)

T2: 62 (6.3, 45.7)

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9. TRANSMISSION MOUNTING



MT-02902

- (1) Spacer
- (2) Lower cushion rubber
- (3) Front plate
- (4) Transmission cushion rubber
- (5) Rear crossmember
- (6) Upper cushion rubber

- (7) Center crossmember
- (8) Front crossmember
- (9) Rear cushion rubber
- (10) Rear plate
- (11) Transmission main mounting bracket (RH)
- (12) Transmission main mounting bracket (LH)

Tightening torque: N·m (kgf-m, ft-lb)

T1: 35 (3.6, 25.8)

T2: 45 (4.6, 33.2)

T3: 70 (7.1, 51.6)

T4: 75 (7.6, 55.3)

T5: 140 (14.3, 103.3)

C: CAUTION

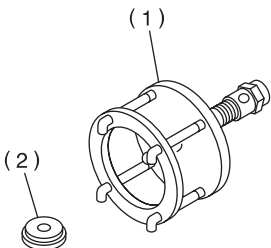
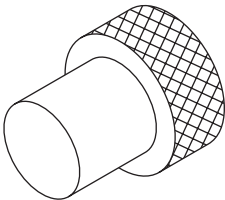
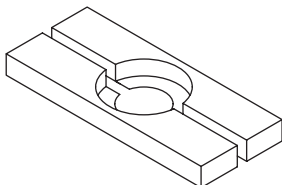
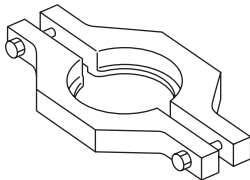
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- 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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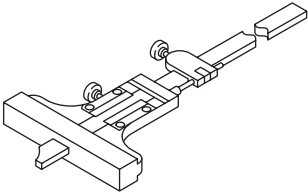
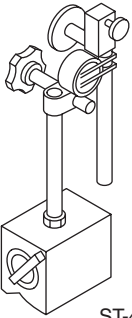
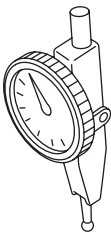
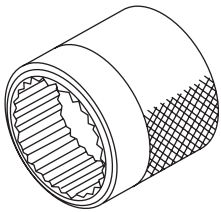
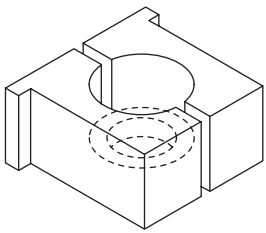
D: PREPARATION TOOL

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 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.

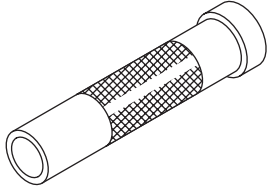
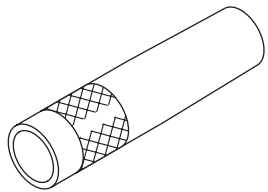
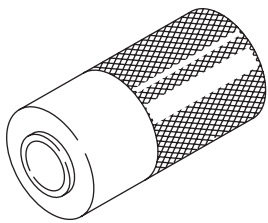
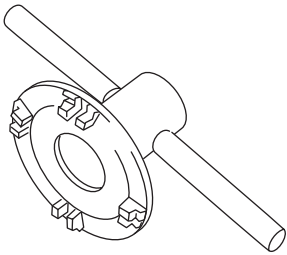
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498147001	498147001	DEPTH GAUGE	Used for adjusting the extension end play and main shaft end play.
 ST-498247001	498247001	MAGNET BASE	- Used for measuring the backlash of bevel pinion gear and hypoid 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.

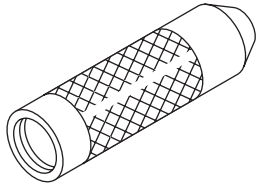
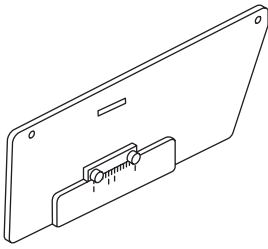
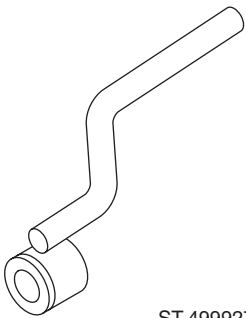
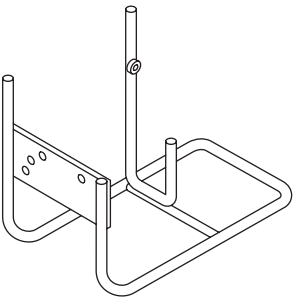
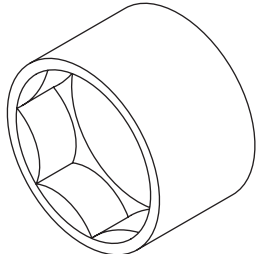
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	- Used for installing the drive pinion shaft washer. - Used for installing the front differential roller bearing outer race.
 ST-499277200	499277200	INSTALLER	- Used for installing the 2nd driven gear bushing, roller bearings, 3rd-4th driven gear, 5th driven gear and the 6th driven gear. - 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 (18630AA020) can also be used.
 ST18722AA000	18722AA000	REMOVER	Used for removing the 5th drive gear and 6th drive gear.

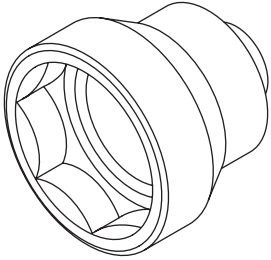
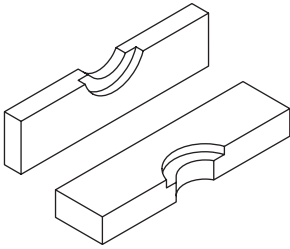
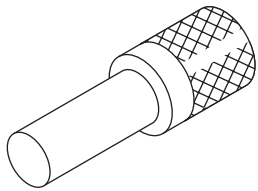
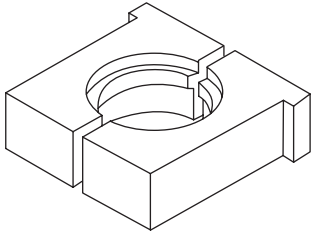
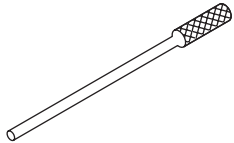
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499877000	499877000	RACE 4-5 INSTALLER	- Used for installing the 4th, 5th and 6th drive gear needle bearing races and the main shaft double taper roller bearings. - Used together with REMOVER (899714110).
 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.

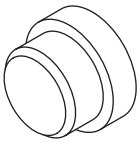
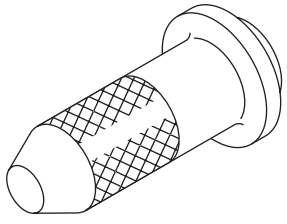
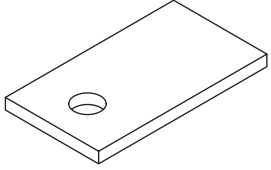
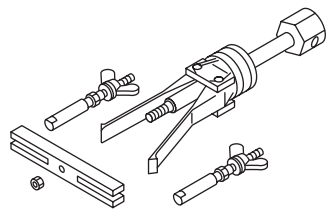
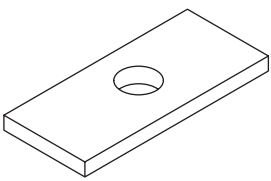
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven shaft lock nut.
 ST-899714110	899714110	REMOVER	Used for removing and installing the parts of main shaft and driven 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.
 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.

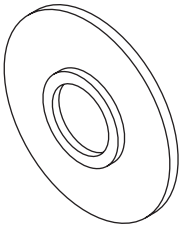
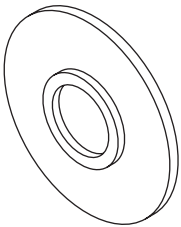
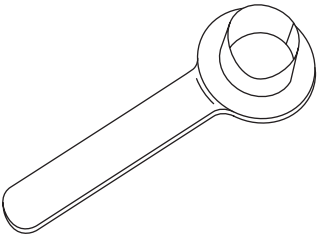
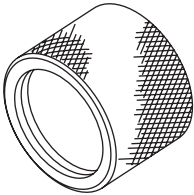
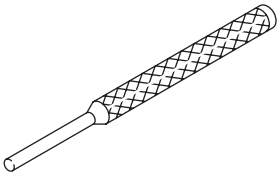
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398497701	398497701	ADAPTER	- Used for installing the front differential roller bearing. - Used together with BUSHING 1-2 INSTALLER (499277100).
 ST-498057300	498057300	INSTALLER	Used for installing the extension case oil seal.
 ST-498255400	498255400	PLATE	Used for measuring the hypoid gear backlash.
 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.
 ST-398643600	398643600	GAUGE	Used for adjusting the extension end play.

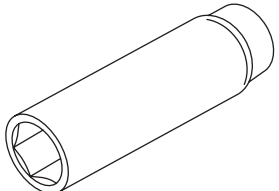
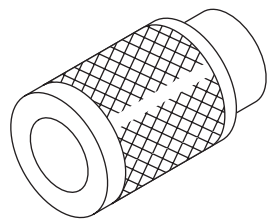
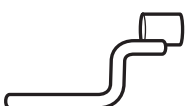
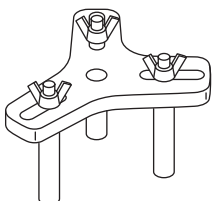
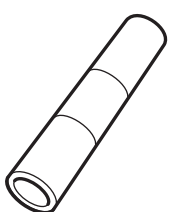
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 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.
 ST-398791700	398791700	SPRING PIN REMOVER 2	Used for removing and installing the spring pin.

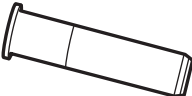
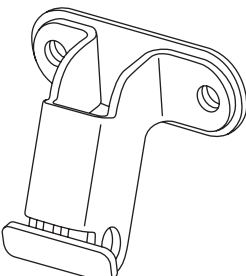
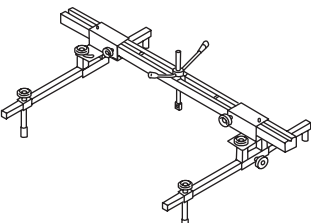
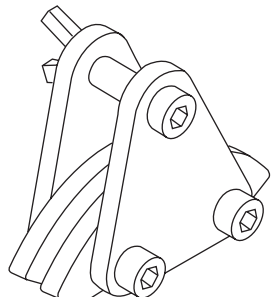
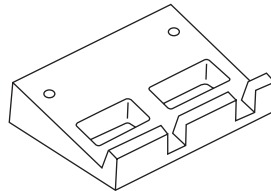
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18662AA010	18662AA010	SOCKET (27)	Used for removing and installing the drive pinion shaft lock nut.
 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.
 ST18654AA000	18654AA000	INSTALLER	Used for installing the 2nd driven gear bushing.

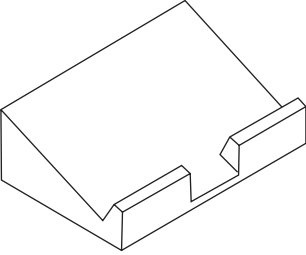
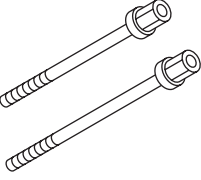
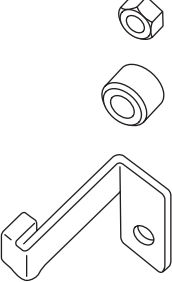
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18657AA000	18657AA000	INSTALLER	Used for installing the transfer case oil seal.
 ST41099AJ130	41099AJ130	SPECIAL TOOL FB	Used for removing and installing transmission.
 ST99099AJ000	99099AJ000	ENGINE HANGER	• Used for removing and installing transmission. • Used together with CHAIN BALANCER (99099AJ010) and sling chain (general tool).
 ST99099AJ010	99099AJ010	CHAIN BALANCER	• Used for removing and installing transmission. (Weight of 350 kg (772 lb) is supported) • Used together with ENGINE HANGER (99099AJ000) and sling chain (general tool). • Used to hang the engine while balancing it with the sling chain inserted in this tool.
 ST-498267200	498267200	CYLINDER HEAD TABLE	Used for removing and installing the roller bearing of the transfer case.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 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.
 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 the 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.
Sling chain	Used for removing and installing transmission. - Length: 0.8 — 1 m (2.6 — 3.3 ft) - Load capacity: 1.2 t (2,646 lb) or more - Diameter: 6 mm (0.24 in) or 6.3 mm (0.25 in) - Chain external width: 23.5 mm (0.93 in) or less - Chain internal width: 8.5 mm (0.33 in) or more
Screw shackle	Used for removing and installing transmission. - Load capacity: 250 kg (551 lb) or more - Use two pieces.