

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model		2.5 L non-turbo		2.5 L turbo
		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	0.780
		6th	0.695	0.666
		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 and viscous coupling)	
Transmission gear oil		GL-5		
Transmission gear oil capacity	Single-range model	3.7 ℓ (3.9 US qt, 3.3 Imp qt)		

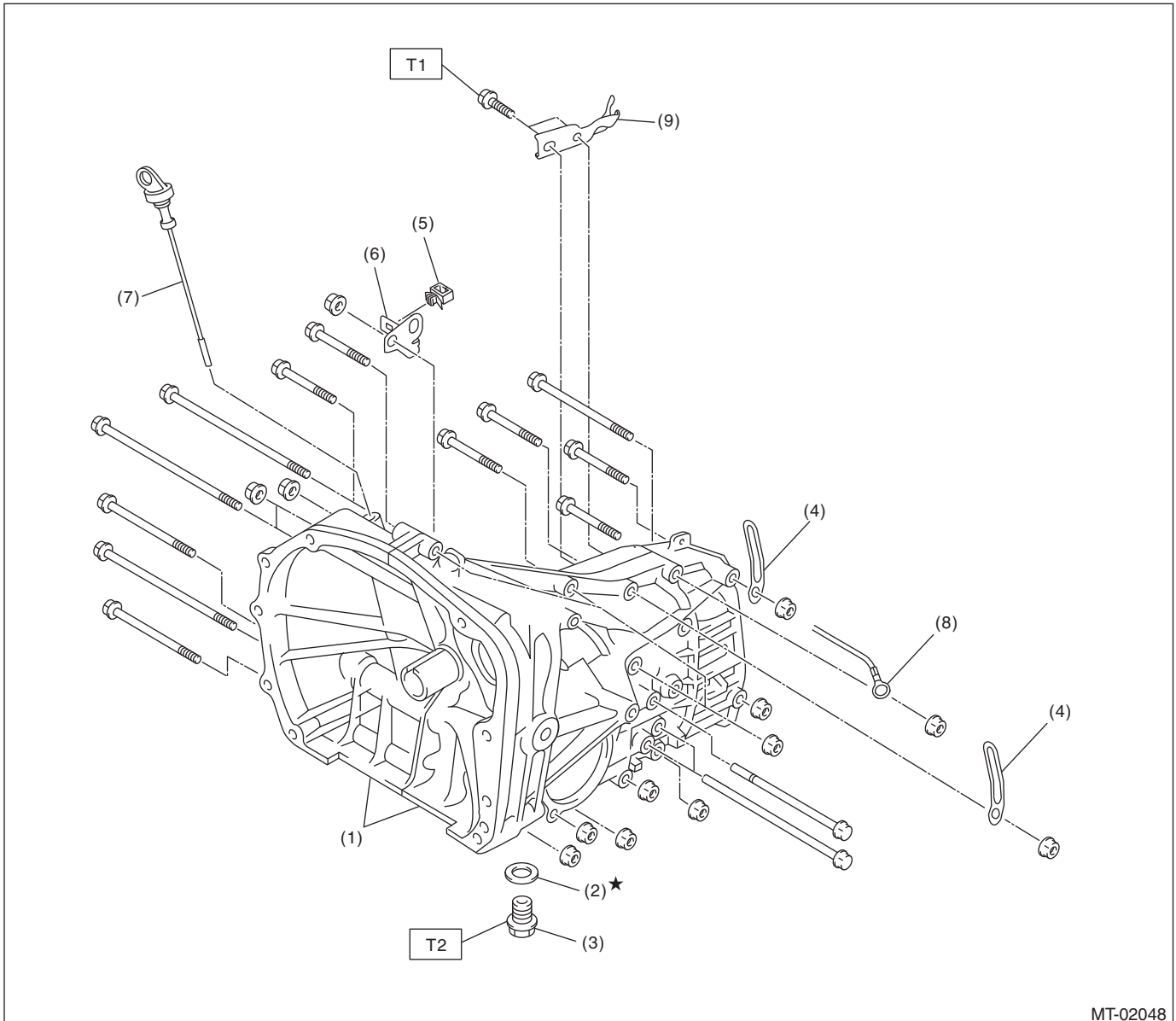
2. TRANSMISSION GEAR OIL

Recommended oil:

GL-5 (75W-90) or equivalent

B: COMPONENT

1. TRANSMISSION CASE



MT-02048

- | | |
|----------------------------|---------------------|
| (1) Transmission case ASSY | (6) Harness bracket |
| (2) Gasket | (7) Oil level gauge |
| (3) Drain plug | (8) Ground cable |
| (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)

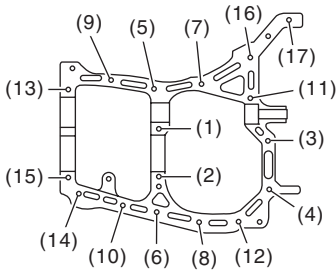
70 (7.1, 51.6) (Copper gasket brown)

70 (7.1, 51.6) (Metal gasket black)

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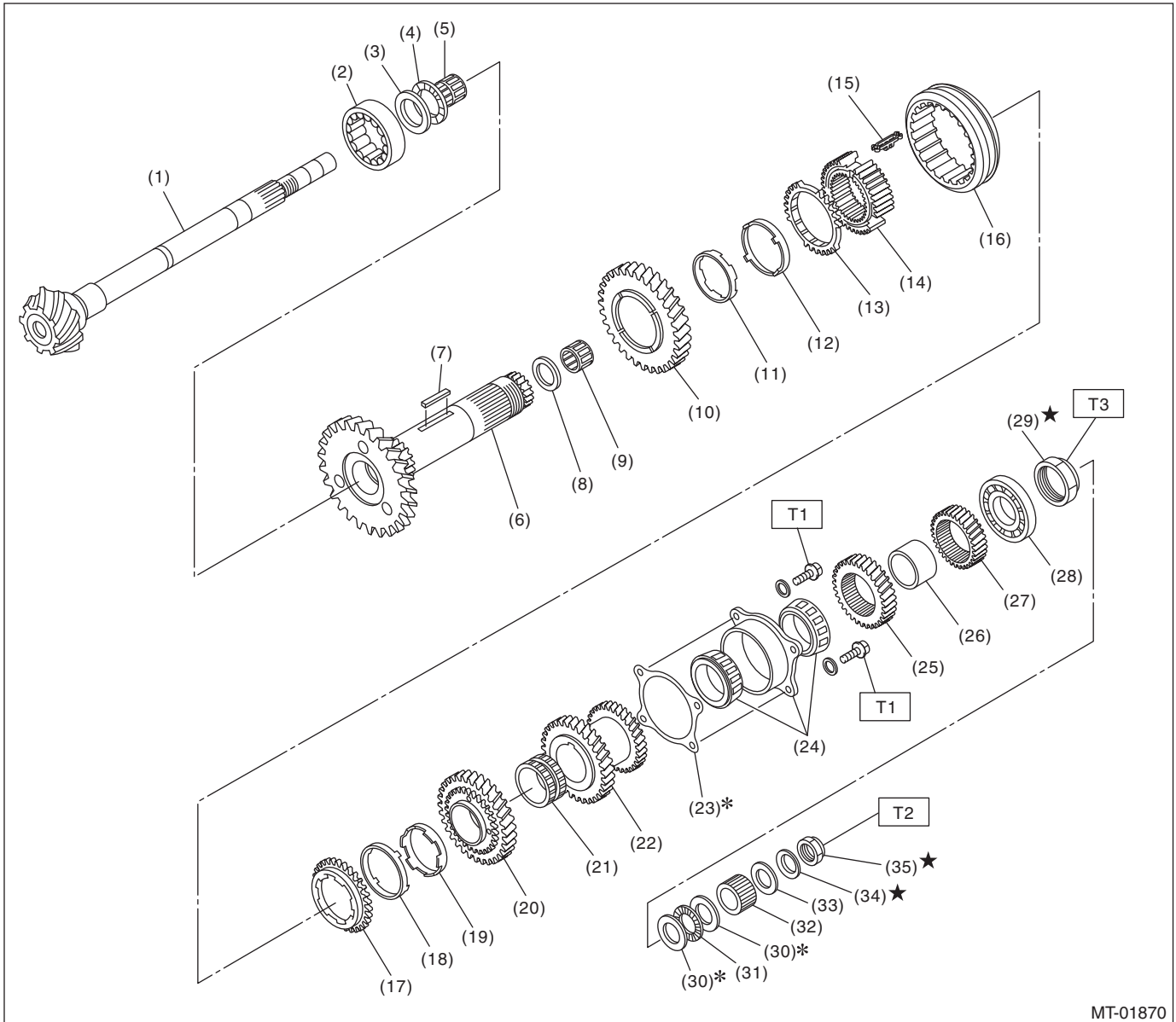
Transmission case tightening torque

 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-01870

(1) Drive pinion shaft	(15) 1st-2nd shifting insert key	(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) Adjusting 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) Driven pinion shim	
(10) 1st driven gear	(24) Double-row tapered roller 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)

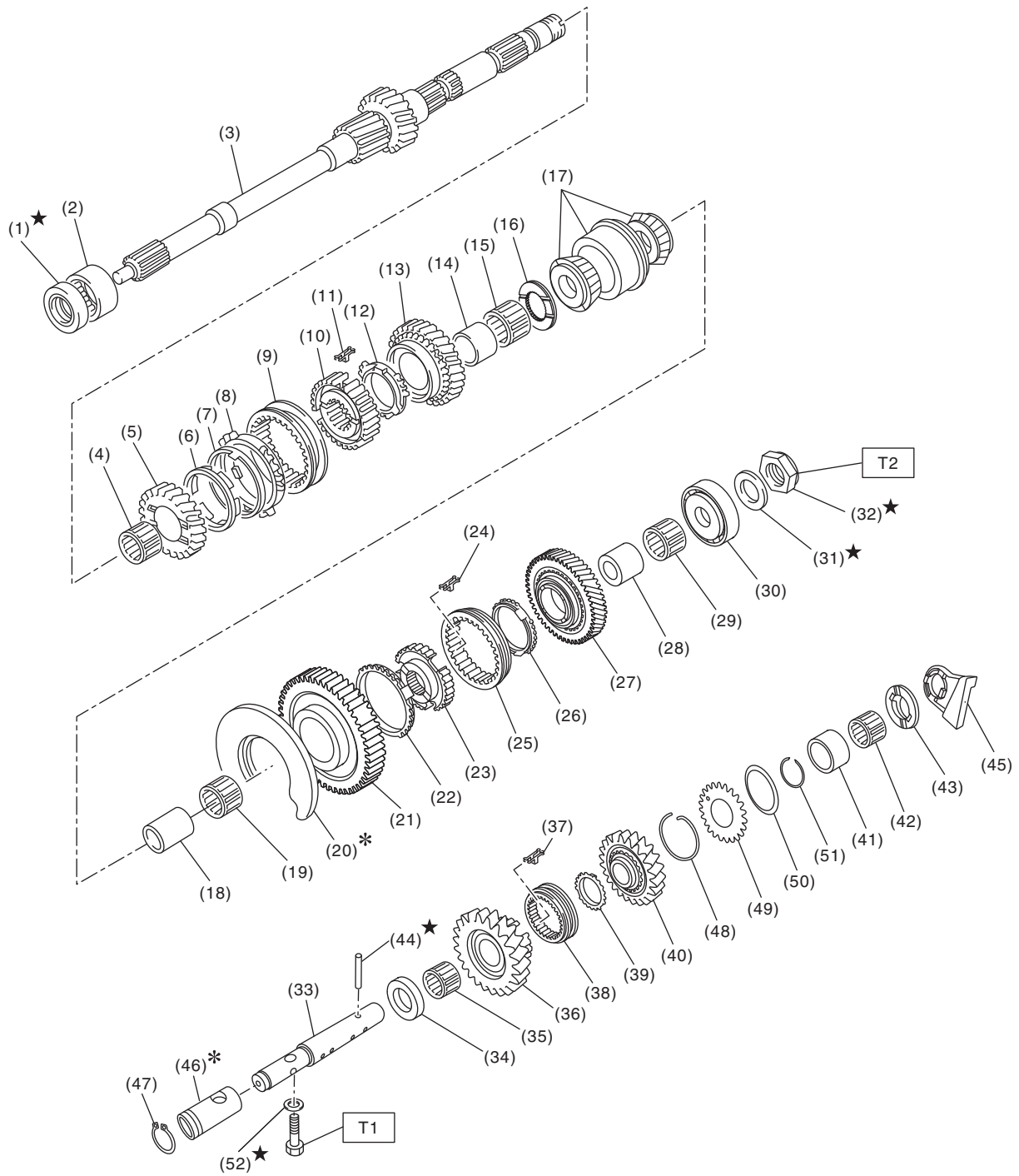
T2: 126 (12.8, 92.9)

T3: 440 (44.9, 324.5)

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3. MAIN SHAFT FOR SINGLE-RANGE



MT-02040

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(1) Oil seal	(20) Main shaft rear plate	(39) Baulk ring
(2) Needle bearing	(21) 5th drive gear	(40) Reverse idler gear
(3) Transmission main shaft	(22) 5th baulk ring	(41) Reverse idler gear collar
(4) Needle bearing	(23) 5th-6th synchronizer hub	(42) Needle bearing
(5) 3rd drive gear	(24) 5th-6th shifting insert key	(43) Washer
(6) Inner baulk ring	(25) 5th-6th coupling sleeve	(44) Straight pin
(7) 3rd synchro cone	(26) 6th baulk ring	(45) Oil case guide
(8) Outer baulk ring	(27) 6th drive gear	(46) Reverse idler gear bushing
(9) 3rd-4th coupling sleeve	(28) 6th needle bearing race	(47) Snap ring
(10) 3rd-4th synchronizer hub	(29) Needle bearing	(48) Reverse idler spring
(11) 3rd-4th shifting insert key	(30) Ball bearing	(49) Reverse idler sub gear
(12) 4th baulk ring	(31) Lock washer	(50) Friction plate
(13) 4th drive gear	(32) Lock nut	(51) Snap ring
(14) 4th needle bearing race	(33) Reverse idler gear shaft	(52) Gasket
(15) Needle bearing	(34) Washer	
(16) 4th gear thrust washer	(35) Needle bearing	
(17) Double-row tapered roller bearing	(36) Reverse idler gear No. 2	
(18) 5th needle bearing race	(37) Reverse shifting insert key	
(19) Needle bearing	(38) Reverse coupling sleeve	

Tightening torque:N·m (kgf-m, ft-lb)

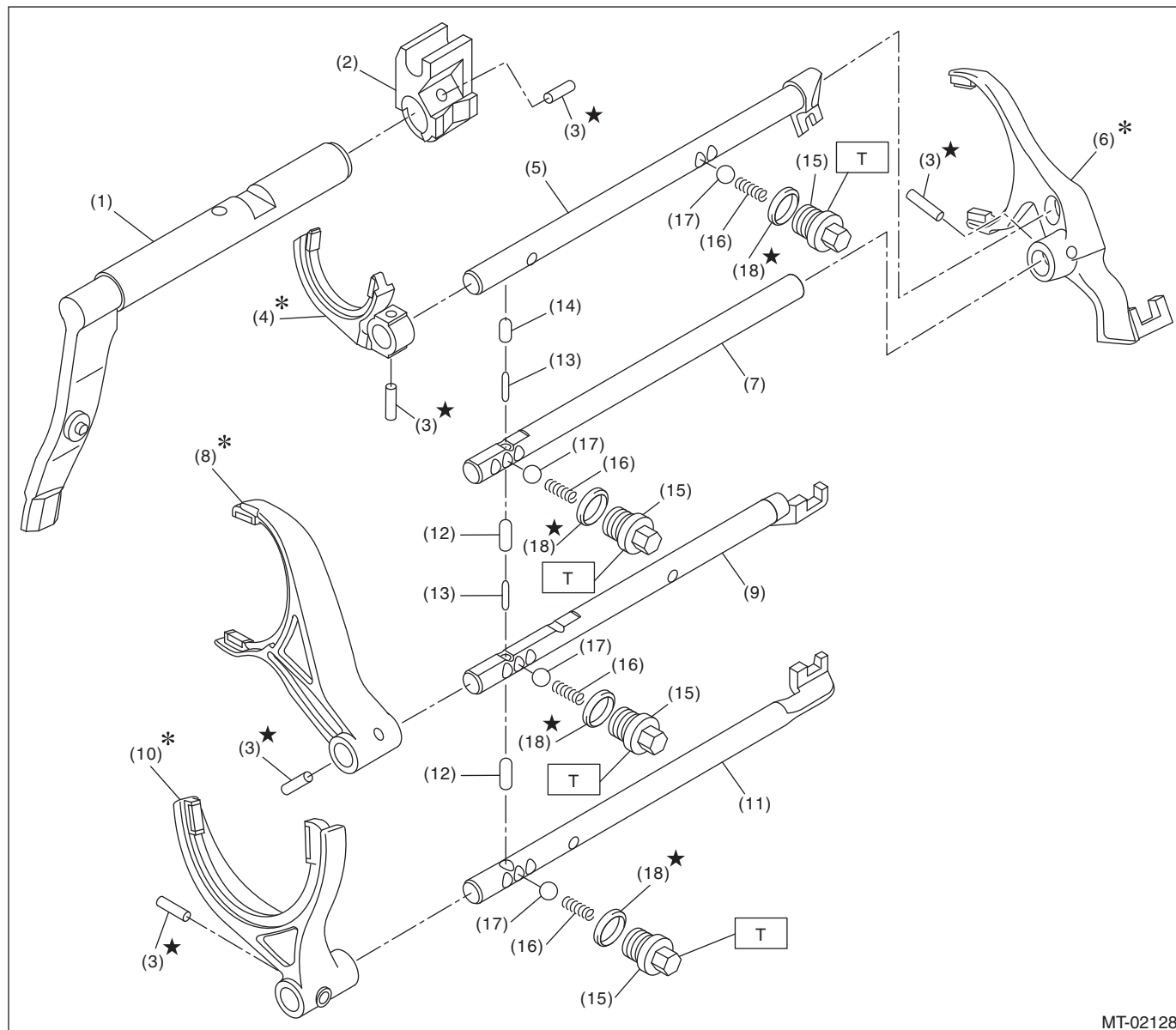
T1: 25 (2.5, 18.4)

T2: 160 (16.3, 118.0)

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4. SHIFTER FORK AND SHIFTER ROD



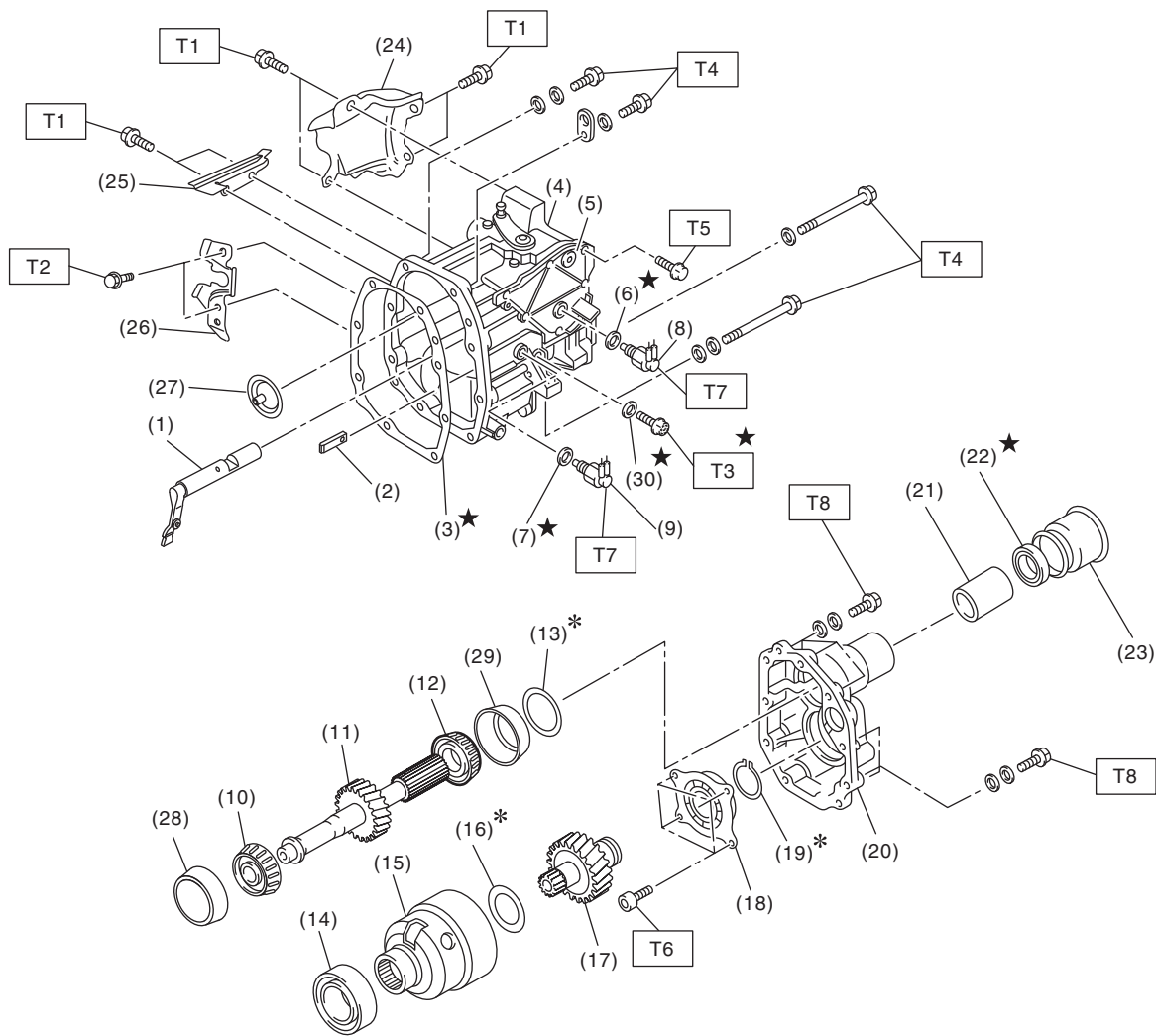
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|--------------------------|---------------------------|---------------------------|
| (1) Shifter arm | (8) 3rd-4th shifter fork | (15) Checking ball plug |
| (2) Selector arm | (9) 3rd-4th fork rod | (16) Checking ball spring |
| (3) Spring pin | (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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5. TRANSFER CASE AND EXTENSION



MT-02094

- | | | |
|-----------------------------|--------------------------|-----------------|
| (1) Shifter arm | (15) Center differential | (29) Outer race |
| (2) Interlock plate | (16) Adjusting washer | (30) Gasket |
| (3) Gasket | (17) Transfer drive gear | |
| (4) Transfer case | (18) Ball bearing | |
| (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) Transfer cover | |
| (11) Transfer driven gear | (25) Dust cover | |
| (12) Roller bearing | (26) Shift bracket | |
| (13) Adjusting washer | (27) Oil guide | |
| (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)

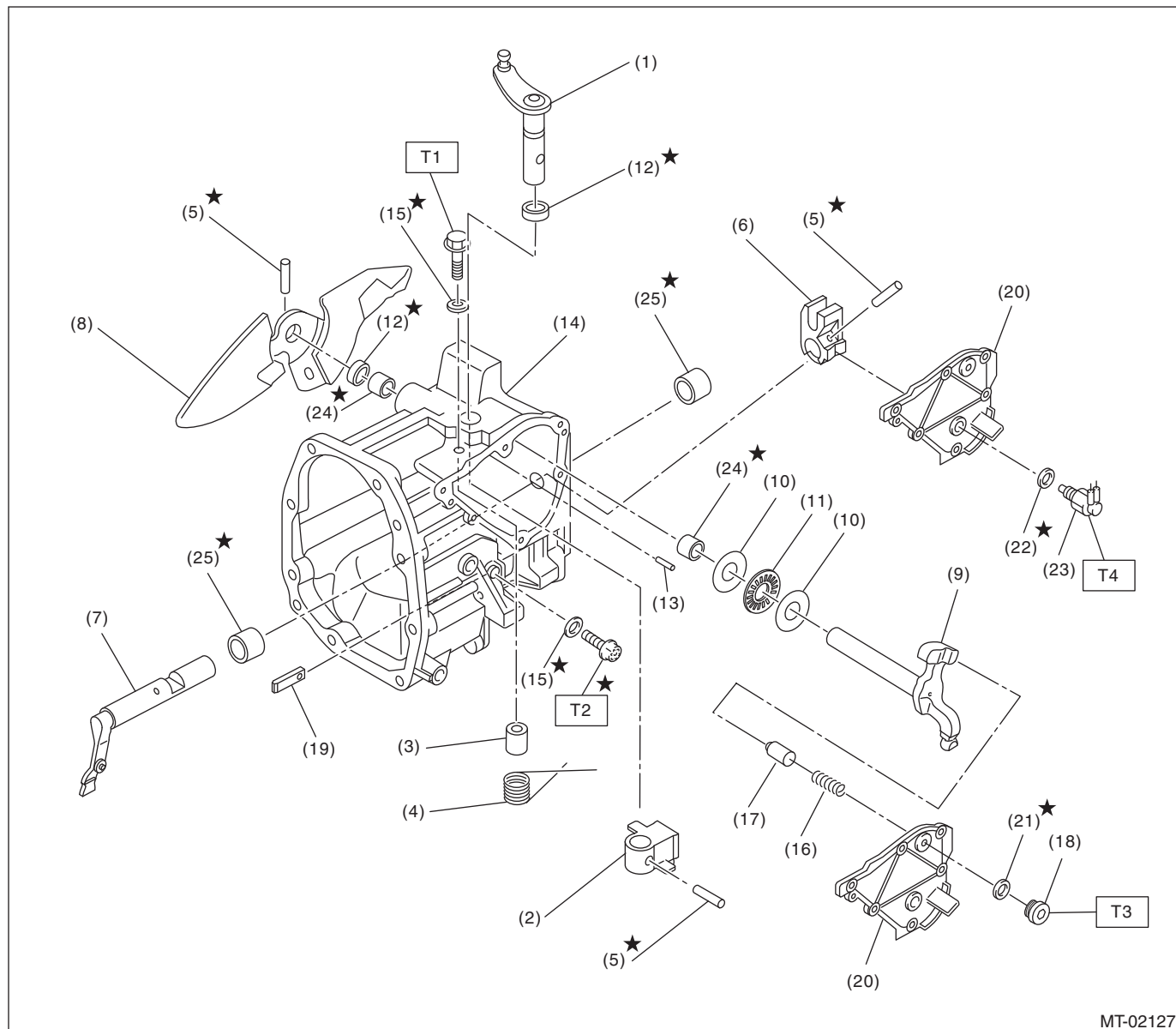
T7: 32.3 (3.3, 23.8)

T8: 40 (4.1, 29.5)

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6. SHIFT LINK ASSEMBLY



- | | |
|--------------------------|---------------------------|
| (1) Selector lever COMPL | (12) Oil seal |
| (2) Selector arm No. 2 | (13) Straight pin |
| (3) Shifter arm collar | (14) Transfer case |
| (4) Neutral set spring | (15) Gasket |
| (5) Spring pin | (16) Checking ball spring |
| (6) Selector arm | (17) Plunger |
| (7) Shifter arm | (18) Seal bolt |
| (8) Shift lever COMPL | (19) Interlock plate |
| (9) Shifter arm No. 2 | (20) Transmission cover |
| (10) Washer | (21) Seal ring |
| (11) Thrust bearing | (22) Washer |

- | |
|------------------------------|
| (23) Neutral position switch |
| (24) Needle bearing |
| (25) Roller bearing |

Tightening torque:N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

T2: 20 (2.0, 14.8)

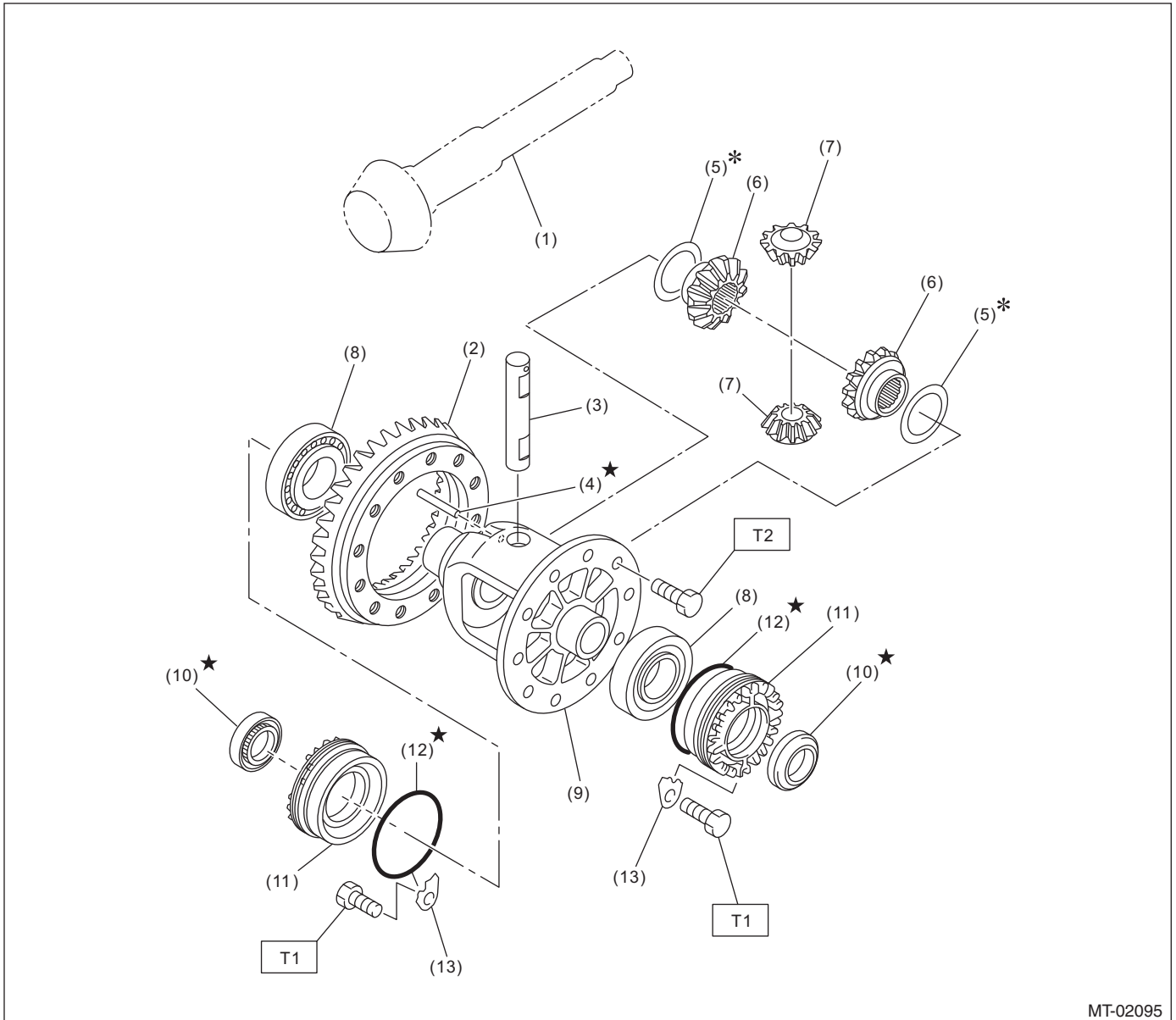
T3: 25 (2.5, 18.4)

T4: 32.3 (3.3, 23.8)

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7. FRONT DIFFERENTIAL



MT-02095

- | | | |
|-----------------------------|---------------------------------|--------------------------|
| (1) Drive pinion shaft | (7) Differential bevel pinion | (13) Retainer lock plate |
| (2) Hypoid driven gear | (8) Roller bearing | |
| (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)

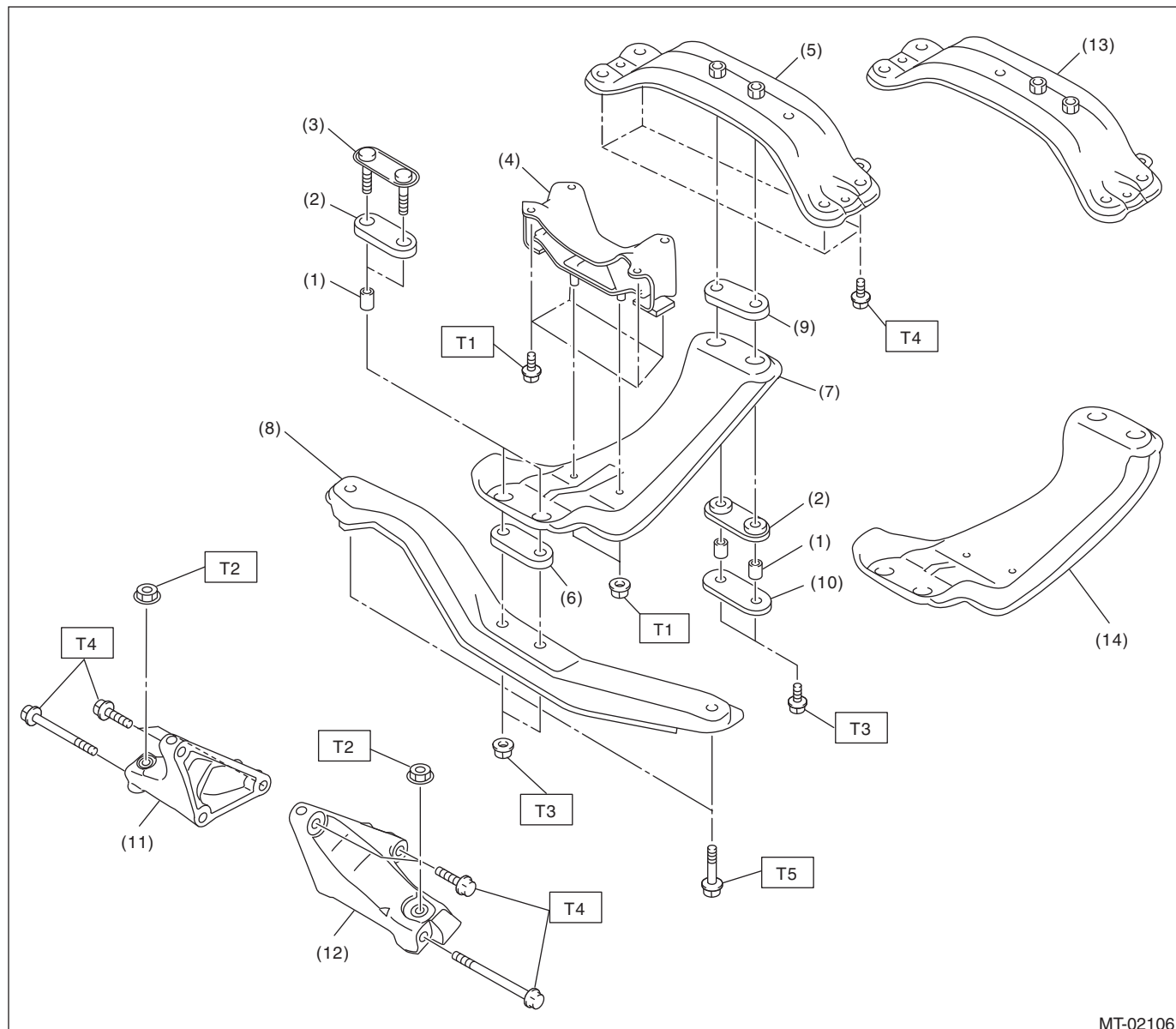
T1: 25 (2.5, 18.4)

T2: 62 (6.3, 45.7)

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8. TRANSMISSION MOUNTING



MT-02106

- | | |
|--------------------------------------|--|
| (1) Spacer | (8) Front crossmember |
| (2) Lower cushion rubber | (9) Rear cushion rubber |
| (3) Front plate | (10) Rear plate |
| (4) Transmission cushion rubber | (11) Transmission main mounting bracket (RH) |
| (5) Rear crossmember (turbo model) | (12) Transmission main mounting bracket (LH) |
| (6) Upper cushion rubber | (13) Rear crossmember (non-turbo model) |
| (7) Center crossmember (turbo model) | (14) Center crossmember (non-turbo model) |

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

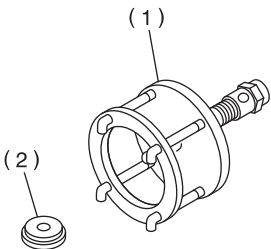
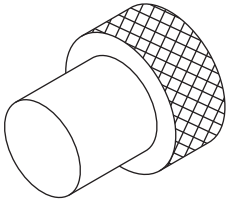
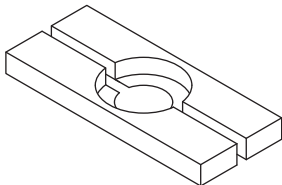
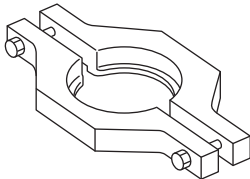
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal,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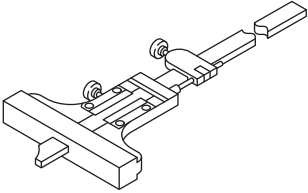
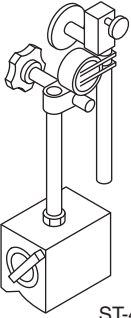
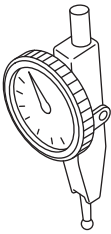
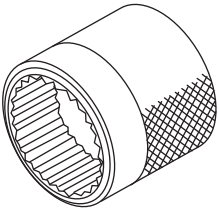
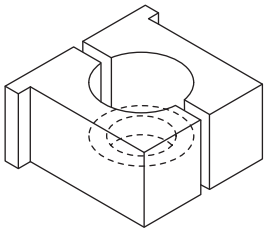
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-899524100</p>	899524100	PULLER SET	Used for removing the roller bearing (differential). (1) Puller (2) Cap
 <p>ST-399780104</p>	399780104	WEIGHT	Used for measuring preload on the roller bearing.
 <p>ST-498077000</p>	498077000	REMOVER	<ul style="list-style-type: none"> Used for removing the roller bearing of the drive pinion shaft. Used for removing the transfer driven gear taper roller bearing.
 <p>ST-498077600</p>	498077600	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.

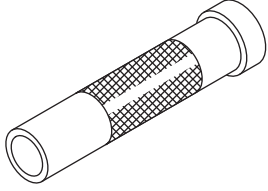
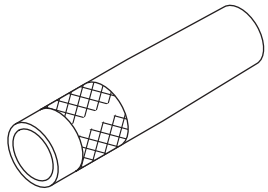
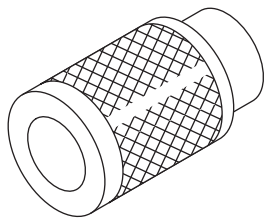
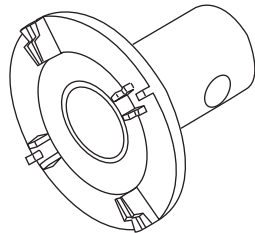

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498147001</p>	498147001	DEPTH GAUGE	Used for measuring the main shaft play.
 <p>ST-498247001</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> Used for measuring backlash between the side gear and pinion, and the hypoid gear. Used together with DIAL GAUGE (498247100).
 <p>ST-498247100</p>	498247100	Dial gauge	<ul style="list-style-type: none"> Used for measuring backlash between the side gear and pinion, and the hypoid gear. Used together with MAGNET BASE (498247001).
 <p>ST18667AA020</p>	18667AA020 (Newly adopted tool)	HOLDER	Used for securing the drive pinion shaft assembly and the driven gear assembly when removing the drive pinion shaft assembly lock nut.
 <p>ST-498937000</p>	498937000	TRANSMISSION HOLDER	Used for removing and installing the lock nut of the transmission main shaft.

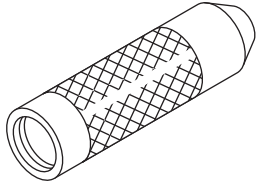
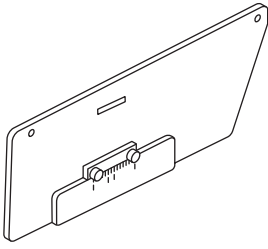
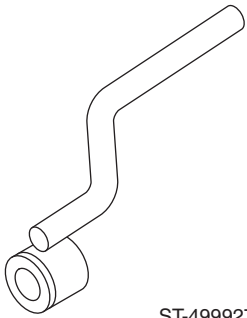
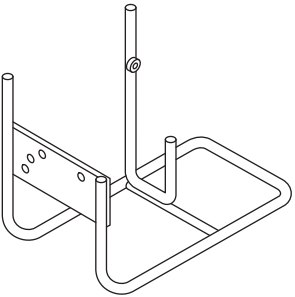
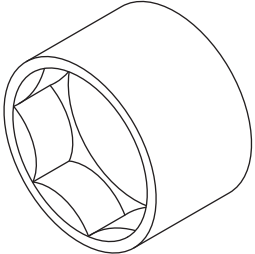
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	<ul style="list-style-type: none"> Used for installing the 1st driven gear thrust plate and the 1st-2nd driven gear bushing. Used for installing the roller bearing outer race to the differential case.
 ST-499277200	499277200	INSTALLER	Used for press-fitting the 2nd driven gear, roller bearings, 3rd-4th driven gear, 5th driven gear and the 6th driven gear onto the driven shaft.
 ST-499757002	499757002	INSTALLER	Used for installing the roller bearing of transfer driven gear (transfer case side).
 ST18658AA020	18658AA020 (Newly adopted tool)	WRENCH COMPL RETAINER	<ul style="list-style-type: none"> Used for removing and installing the differential side retainer. Existing SST (18630AA010) with the handle bar removed. Use together with a commercially sold spinner handle. WRENCH COMPL RETAINER (18630AA010) can also be used.
 ST18722AA000	18722AA000	REMOVER	Used for removing the 5th drive gear and 6th drive gear.

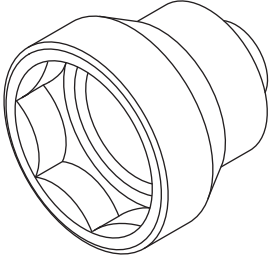
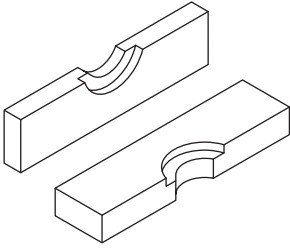
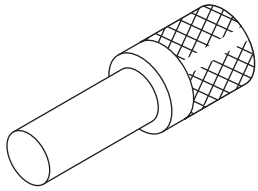
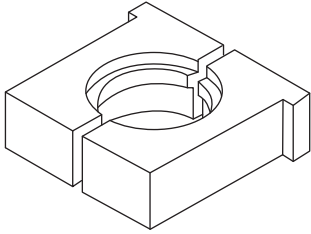
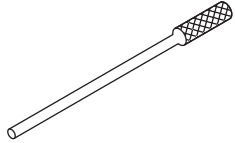
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499877000</p>	499877000	RACE 4-5 INSTALLER	<ul style="list-style-type: none"> Used for installing the 4th, 5th and 6th needle bearing races and ball bearings onto the transmission main shaft. Used together with REMOVER (899714110).
 <p>ST-499917500</p>	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting the drive pinion shim.
 <p>ST-499927100</p>	499927100	Handle	Used for backlash adjustment of the hypoid gear and preload measurement of the roller bearing.
 <p>ST-499937100</p>	499937100	TRANSMISSION STAND	Used for disassembling and assembling the transmission.
 <p>ST-499987003</p>	499987003	SOCKET WRENCH (35)	Used for removing and installing the main shaft lock nut.

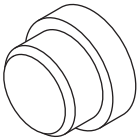
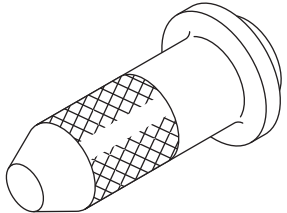
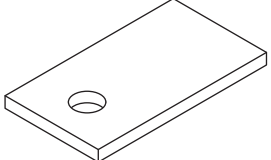
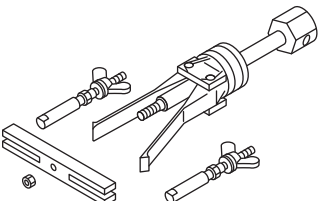
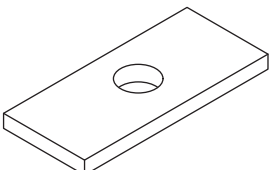
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499987300</p>	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven gear assembly lock nut.
 <p>ST-899714110</p>	899714110	REMOVER	Used for removing and installing the parts of transmission main shaft, drive pinion and rear drive shaft.
 <p>ST-899864100</p>	899864100	REMOVER	Used for removing and installing the parts of transmission main shaft, and the transfer driven gear roller bearing.
 <p>ST18680AA020</p>	18680AA020 (Newly adopted tool)	HOLDER	Used for removing and installing the drive pinion lock nut.
 <p>ST-899904100</p>	899904100	REMOVER	Used for removing and installing the straight pin.

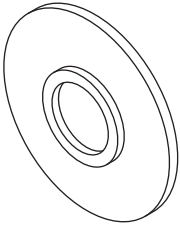
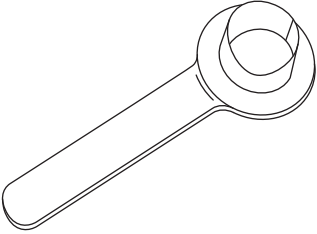
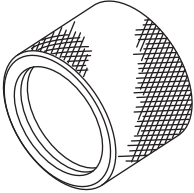
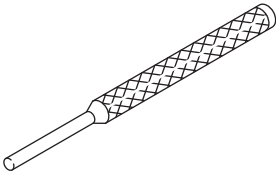
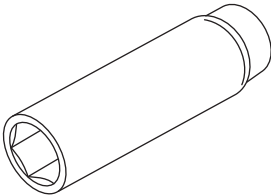
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398497701</p>	398497701	Adapter	<ul style="list-style-type: none"> Used for installing roller bearing onto the differential case. Used together with BUSHING 1-2 INSTALLER (499277100).
 <p>ST-498057300</p>	498057300	INSTALLER	Used for installing the extension oil seal.
 <p>ST-498255400</p>	498255400	PLATE	Used for measuring backlash.
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> Used for removing the extension case roller bearing. Used for removing the extension oil seal. Used for removing the front differential side retainer bearing outer race. Used for removing the front differential side retainer oil seal.
 <p>ST-398643600</p>	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.

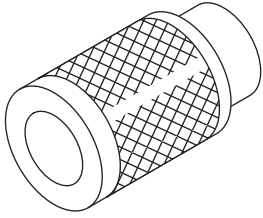
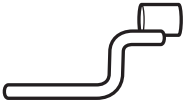
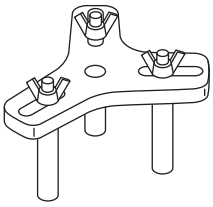
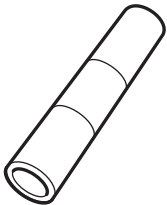
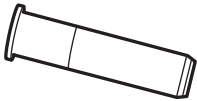
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398177700</p>	398177700	INSTALLER	<ul style="list-style-type: none"> Used for fitting the transfer drive shaft. Used for installing the roller bearing of the transfer driven gear. Used for installing the 4th needle bearing race of transmission main shaft.
 <p>ST28399SA010</p>	28399SA010	OIL SEAL PROTECTOR	Used for protecting the oil seal from damage when inserting the front drive shaft.
 <p>ST18675AA000</p>	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 <p>ST-398791700</p>	398791700	SPRING PIN REMOVER 2	Used for installing and removing the spring pin.
 <p>ST18662AA010</p>	18662AA010 (Newly adopted tool)	SOCKET (27)	Used for removing and installing the drive pinion lock nut.

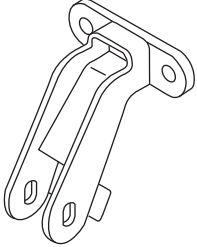
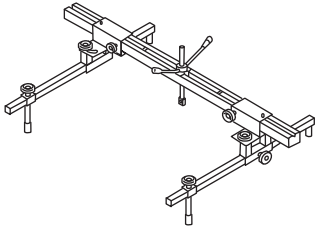
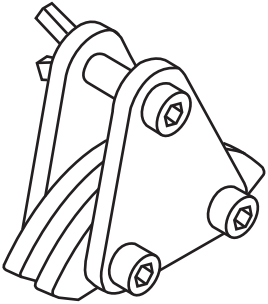
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899754112	899754112	PRESS	<ul style="list-style-type: none"> Used for removing the driven gear and roller bearing of the driven shaft. 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 of drive pinion.
 ST18654AA000	18654AA000	INSTALLER	Used for installing the 2nd driven gear bushing of driven shaft.
 ST18657AA000	18657AA000	INSTALLER	Used for installing the transfer case oil seal.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41099AJ000	41099AJ000 (Newly adopted tool)	SPECIAL TOOL H4	Used for removing and installing transmission.
 ST99099AJ000	99099AJ000 (Newly adopted tool)	SPECIAL TOOL ENGINE HANGER	<ul style="list-style-type: none"> Used for removing and installing transmission. (Weight of 350 kg (772 lb) is supported) Used together with SPECIAL TOOL CHAIN BALANCER (99099AJ010) and sling chain (general tool).
 ST99099AJ010	99099AJ010 (Newly adopted tool)	SPECIAL TOOL CHAIN BALANCER	<ul style="list-style-type: none"> Used for removing and installing transmission. (Weight of 350 kg (772 lb) is supported) Used together with SPECIAL TOOL ENGINE HANGER (99099AJ000) and sling chain (general tool). Used to hang the engine while balancing it with the sling chain inserted in this tool.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance.
TORX® bit T70	Used for installing and removing the 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.
Sling chain	Used for removing and installing transmission. <ul style="list-style-type: none"> Length: 0.8 — 1 m (2.6 — 3.3 ft) Load capacity: 1.2 t (2646 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. <ul style="list-style-type: none"> Load capacity: 250 kg (551 lb) or more Use two pieces.