

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

1. General Description

A: SPECIFICATION

1. MANUAL TRANSMISSION AND DIFFERENTIAL

Model			Non-turbo model
Type			5-forward speeds with synchromesh and 1-reverse
Transmission gear ratio		1st	3.454
		2nd	2.062
		3rd	1.448
		4th	1.088
		5th	0.780
		Reverse	3.333
Front reduction gear	Final	Type of gear	Hypoid
		Gear ratio	4.111
Rear reduction gear	Transfer	Type of gear	Helical
		Gear ratio	1.000
	Final	Type of gear	Hypoid
		Gear ratio	4.111
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)
Center differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, bevel gear: 2 and viscous coupling)
Transmission gear oil			GL-5
Transmission gear oil capacity			3.5 ℓ (3.7 US qt, 3.1 Imp qt)

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2. TRANSMISSION GEAR OIL

Recommended oil:

GL-5 (75W-90) or equivalent

3. TRANSMISSION CASE ASSEMBLY

Drive pinion shim adjustment

Hypoid gear backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

Drive pinion shim			
Part number	Thickness mm (in)	Part number	Thickness mm (in)
32295AA031	0.150 (0.0059)	32295AA071	0.250 (0.0098)
32295AA041	0.175 (0.0069)	32295AA081	0.275 (0.0108)
32295AA051	0.200 (0.0079)	32295AA091	0.300 (0.0118)
32295AA061	0.225 (0.0089)	32295AA101	0.500 (0.0197)

Selection of main shaft rear plate

Main shaft rear plate		
Dimension "A" mm (in)	Part number	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2

4. DRIVE PINION ASSEMBLY

Preload adjustment of thrust bearing

Starting torque:

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

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

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

5. REVERSE IDLER GEAR

Adjustment of reverse idler gear position

Reverse idler gear to transmission case (LH) wall clearance:

6.0 — 7.5 mm (0.236 — 0.295 in)

Reverse shifter lever		
Part number	Mark	Remarks
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	Closer to the case wall

After installing a suitable reverse shifter lever, adjust the clearance using washers.

Reverse idler gear to transmission case wall clearance:

0 — 0.5 mm (0 — 0.020 in)

Washer (20.5 × 26 × t)			
Part number	Thickness mm (in)	Part number	Thickness mm (in)
803020151	0.4 (0.016)	803020154	1.9 (0.075)
803020152	1.1 (0.043)	803020155	2.3 (0.091)
803020153	1.5 (0.059)	—	—

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6. SHIFTER FORK AND ROD

Select a suitable shifter fork so that both the coupling sleeve and reverse driven gear are positioned in the center of their synchromesh mechanisms.

Rod end clearance:

A: 3rd-4th — 5th

0.5 — 1.3 mm (0.020 — 0.051 in)

B: 1st-2nd — 3rd-4th

0.4 — 1.4 mm (0.016 — 0.055 in)

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

3rd-4th shifter fork		
Part number	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).

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

7. TRANSFER CASE

Neutral position adjustment

Adjusting shim	
Part number	Thickness mm (in)
32190AA000	0.15 (0.0059)
32190AA010	0.30 (0.0118)

Reverse accent shaft		
Part number	Mark	Remarks
32188AA130	S	Neutral position is closer to 1st.
32188AA140	T	Standard
32188AA150	U	Neutral position is closer to reverse gear.

Reverse check plate adjustment

Reverse check plate			
Part number	Mark	Angleθ	Remarks
32189AA001	0	28°	Arm stops closer to 5th gear.
32189AA011	1	31°	Arm stops closer to 5th gear.
33189AA021	2	34°	Arm stops in the center.
32189AA031	3	37°	Arm stops closer to reverse gear.
32189AA041	4	40°	Arm stops closer to reverse gear.

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8. EXTENSION ASSEMBLY

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

0.15 — 0.25 mm (0.006 — 0.010 in)

NOTE:

Be sure that the amount of preload is within the standard value.

Thrust washer (50 × 61 × t)	
Part number	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)

Thrust washer to center differential side clearance:

0.15 — 0.35 mm (0.0059 — 0.0138 in)

Thrust washer	
Part number	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)

9. FRONT DIFFERENTIAL

Bevel gear to pinion backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

Washer (38.1 × 50 × t)			
Part number	Thickness mm (in)	Part number	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)	803038023	1.025 — 1.050 (0.0404 — 0.0413)
803038022	0.975 — 1.000 (0.0384 — 0.0394)	—	—

10. TRANSFER DRIVE GEAR

Snap ring (Outer-30) to ball bearing clearance:

0.01 — 0.15 mm (0.0004 — 0.0059 in)

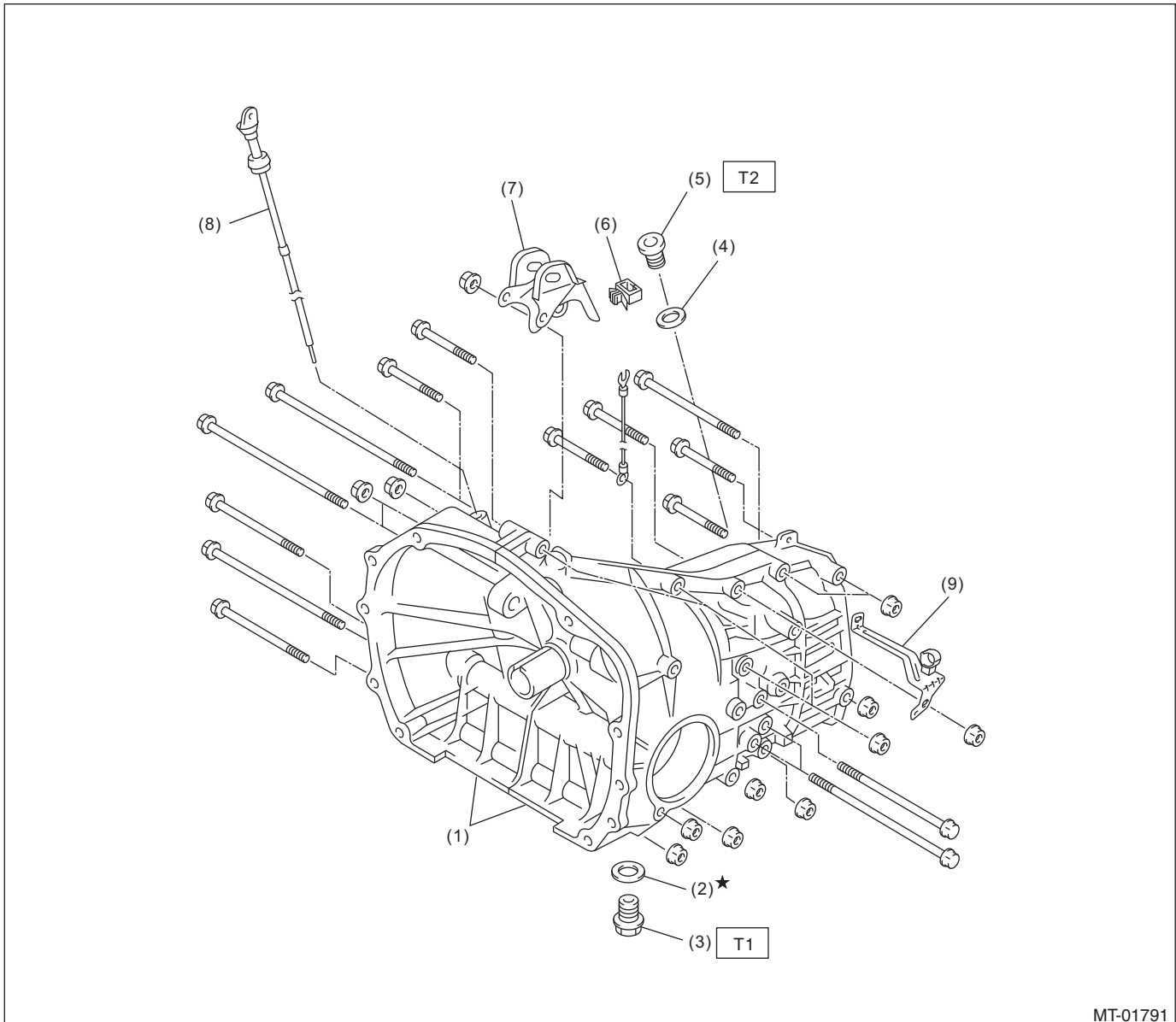
Snap ring (Outer-30)	
Part number	Thickness mm (in)
805030041	1.53 (0.0602)
805030042	1.65 (0.0650)
805030043	1.77 (0.0697)

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B: COMPONENT

1. TRANSMISSION CASE



MT-01791

- | | |
|----------------------------|------------------------------|
| (1) Transmission case ASSY | (6) Clamp |
| (2) Gasket | (7) Pitching stopper bracket |
| (3) Drain plug | (8) Oil level gauge |
| (4) Gasket | (9) Harness bracket |
| (5) Plug | |

Tightening torque:N·m (kgf-m, ft-lb)

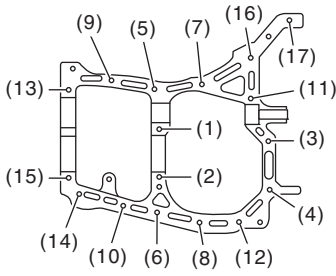
T1: 44 (4.5, 32.5) (Aluminum gasket)

70 (7.1, 51.6) (Copper gasket)

T2: 60 (6.1, 44.3)

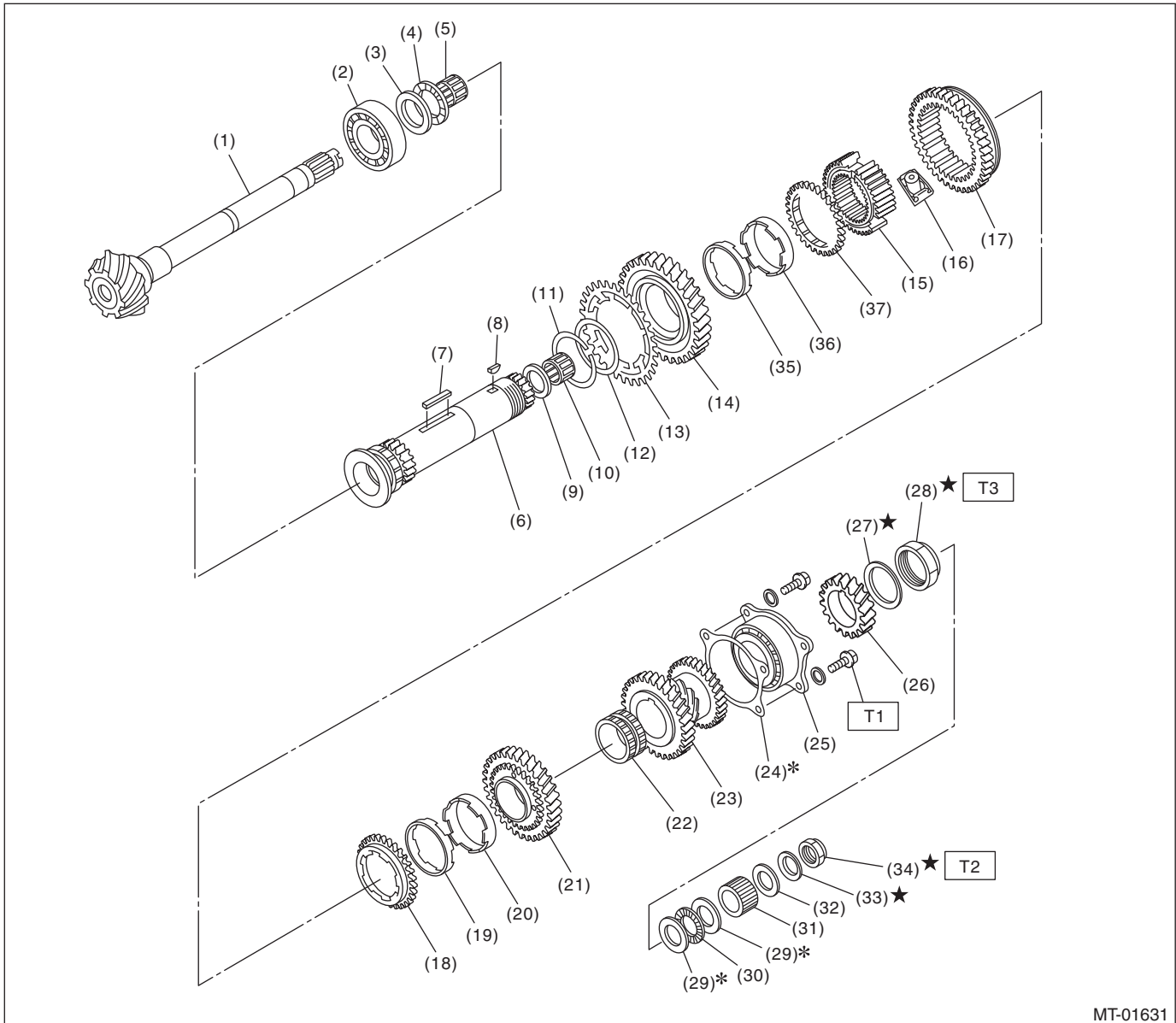
General Description

Transmission case tightening torque

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

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2. DRIVE PINION ASSEMBLY



- | | | | | | |
|------|---------------------|------|--------------------------|------|--------------------------------|
| (1) | Drive pinion shaft | (15) | 1st-2nd synchronizer hub | (29) | Adjusting washer |
| (2) | Roller bearing | (16) | Ball detent | (30) | Thrust bearing |
| (3) | Washer | (17) | Reverse driven gear | (31) | Differential bevel gear sleeve |
| (4) | Thrust bearing | (18) | Outer baulk ring | (32) | Washer |
| (5) | Needle bearing | (19) | Synchro cone | (33) | Lock washer |
| (6) | Driven shaft | (20) | Inner baulk ring | (34) | Lock nut |
| (7) | Key | (21) | 2nd driven gear | (35) | Inner baulk ring |
| (8) | Woodruff key | (22) | 2nd driven gear bushing | (36) | Synchro cone |
| (9) | Drive pinion collar | (23) | 3rd-4th driven gear | (37) | Outer baulk ring |
| (10) | Needle bearing | (24) | Driven pinion shim | | |
| (11) | Snap ring (Outer) | (25) | Roller bearing | | |
| (12) | Washer | (26) | 5th driven gear | | |
| (13) | Sub gear | (27) | Lock washer | | |
| (14) | 1st driven gear | (28) | Lock nut | | |
-
- Tightening torque:N-m (kgf-m, ft-lb)**

T1: 30 (3.1, 22.1)

T2: 120 (12.2, 88.5)

T3: 260 (26.5, 191.8)

Tightening torque:N·m (kgf-m, ft-lb)

T1: 30 (3.1, 22.1)

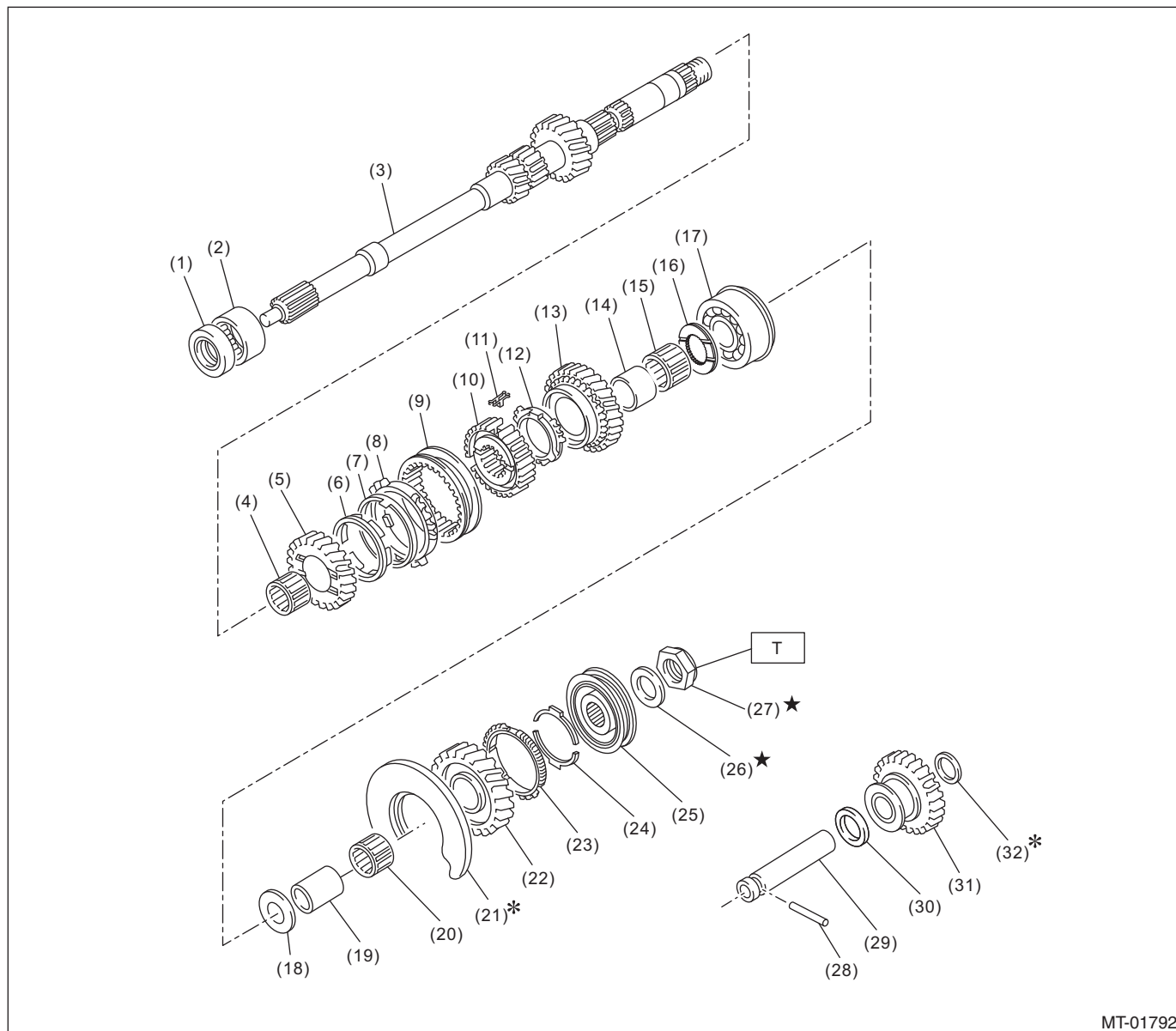
T2: 120 (12.2, 88.5)

T3: 260 (26.5, 191.8)

General Description

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3. MAIN SHAFT FOR SINGLE-RANGE



MT-01792

- | | | |
|----------------------------------|------------------------------|-------------------------------|
| (1) Oil seal | (13) 4th drive gear | (25) 5th hub & sleeve No. 2 |
| (2) Needle bearing | (14) 4th needle bearing race | (26) Lock washer |
| (3) Transmission main shaft | (15) Needle bearing | (27) Lock nut |
| (4) Needle bearing | (16) 4th gear thrust washer | (28) Straight pin |
| (5) 3rd drive gear | (17) Ball bearing | (29) Reverse idler gear shaft |
| (6) Inner baulk ring | (18) 5th gear thrust washer | (30) Washer |
| (7) 3rd synchro cone | (19) 5th needle bearing race | (31) Reverse idler gear |
| (8) Outer baulk ring | (20) Needle bearing | (32) Washer |
| (9) 3rd-4th coupling sleeve | (21) Main shaft rear plate | |
| (10) 3rd-4th synchronizer hub | (22) 5th drive gear | |
| (11) 3rd-4th shifting insert key | (23) 5th baulk ring | |
| (12) 4th baulk ring | (24) Baulk lever | |

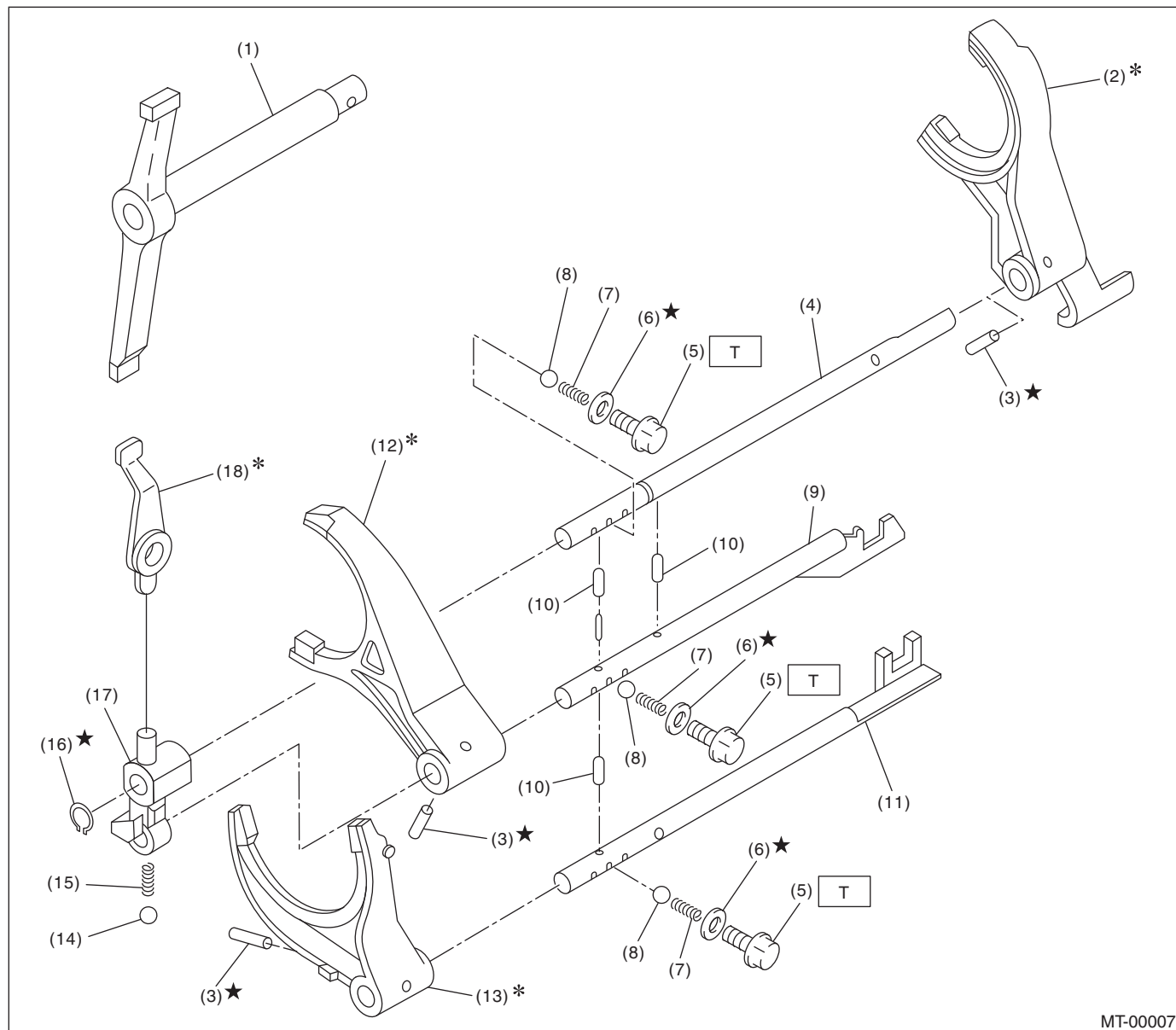
Tightening torque: N·m (kgf·m, ft·lb)

T: 120 (12.2, 88.5)

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4. SHIFTER FORK AND SHIFTER ROD



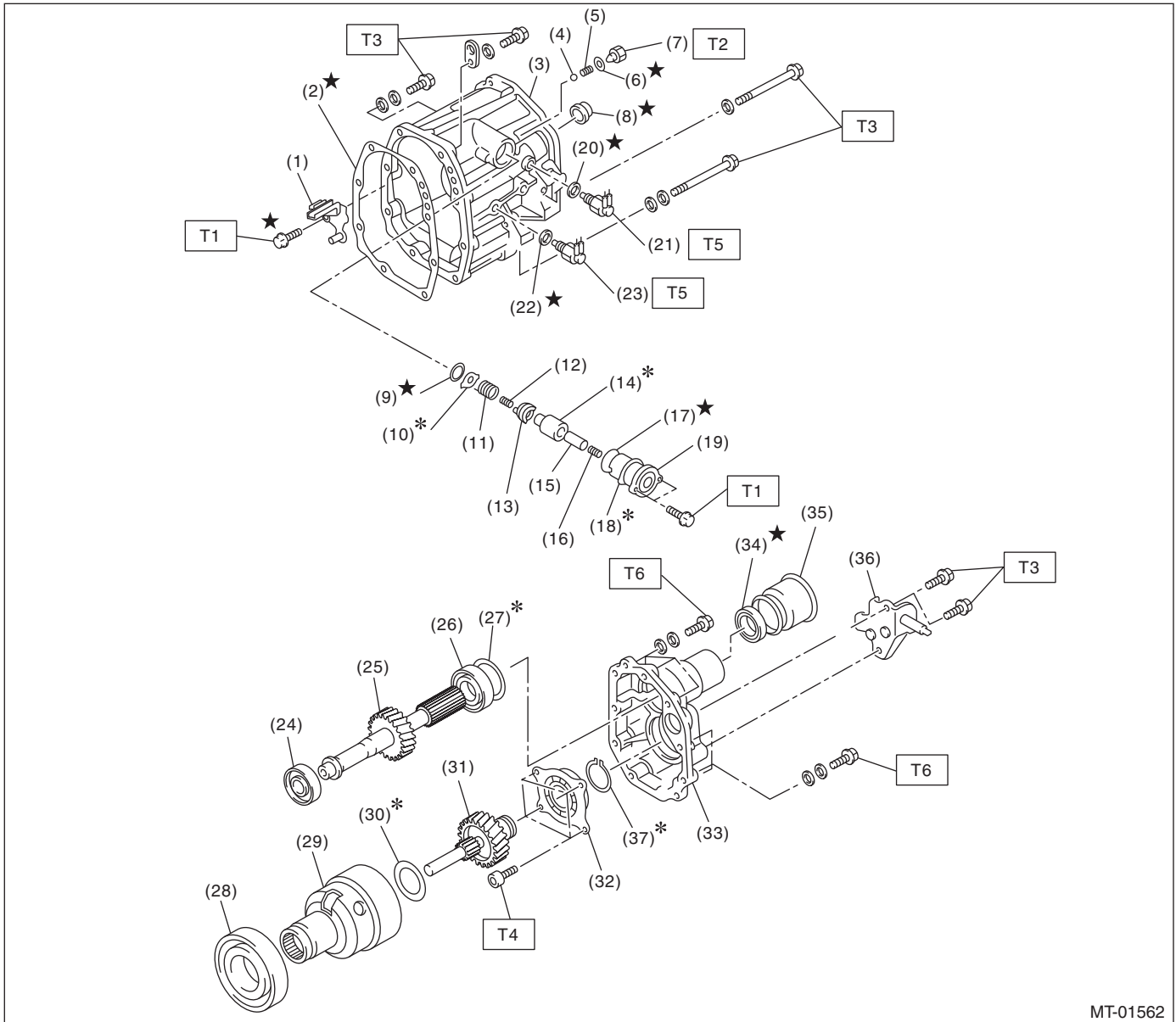
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|--------------------------|---------------------------|----------------------------|
| (1) Shifter arm | (8) Ball | (15) Spring |
| (2) 5th shifter fork | (9) 3rd-4th fork rod | (16) Snap ring (Outer) |
| (3) Straight pin | (10) Interlock plunger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

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

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5. TRANSFER CASE AND EXTENSION



MT-01562

(1) Oil guide	(16) Return spring	(31) Transfer drive gear
(2) Gasket	(17) O-ring	(32) Ball bearing
(3) Transfer case	(18) Adjusting select shim	(33) Extension case
(4) Ball	(19) Reverse check sleeve	(34) Oil seal
(5) Reverse accent spring	(20) Gasket	(35) Dust cover
(6) Gasket	(21) Neutral position switch	(36) Shift bracket
(7) Plug	(22) Gasket	(37) Snap ring
(8) Oil seal	(23) Back-up light switch	
(9) Snap ring (Inner)	(24) Roller bearing	
(10) Reverse check plate	(25) Transfer driven gear	
(11) Reverse check spring	(26) Roller bearing	
(12) Reverse return spring	(27) Adjusting washer	
(13) Reverse check cam	(28) Ball bearing	
(14) Reverse accent shaft	(29) Center differential	
(15) Return spring cap	(30) Adjusting washer	

Tightening torque:N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

T2: 9.75 (1.0, 7.2)

T3: 24.5 (2.5, 18.1)

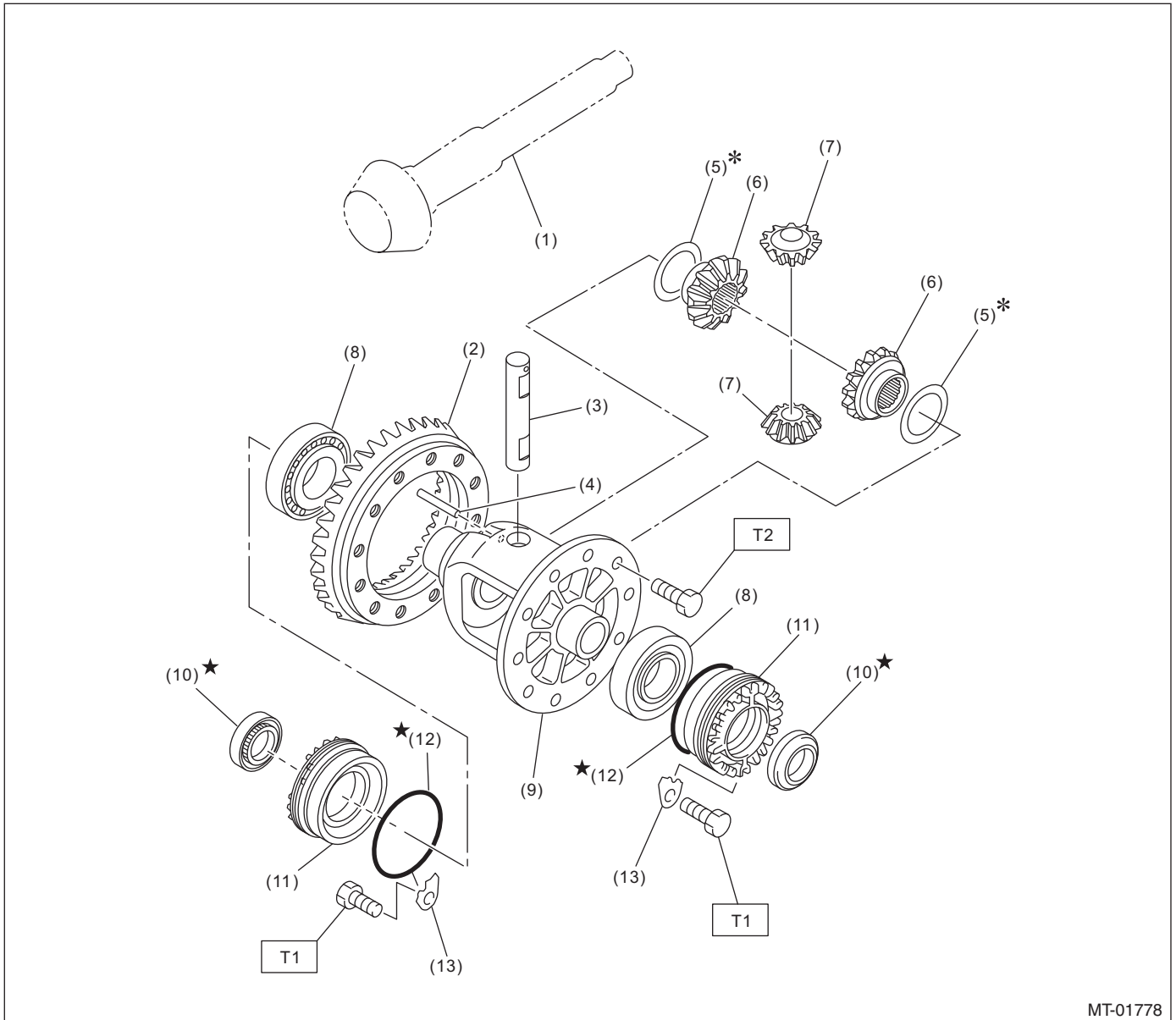
T4: 26 (2.7, 19.2)

T5: 32.3 (3.3, 23.8)

T6: 40 (4.1, 29.5)

MANUAL TRANSMISSION AND DIFFERENTIAL

6. FRONT DIFFERENTIAL



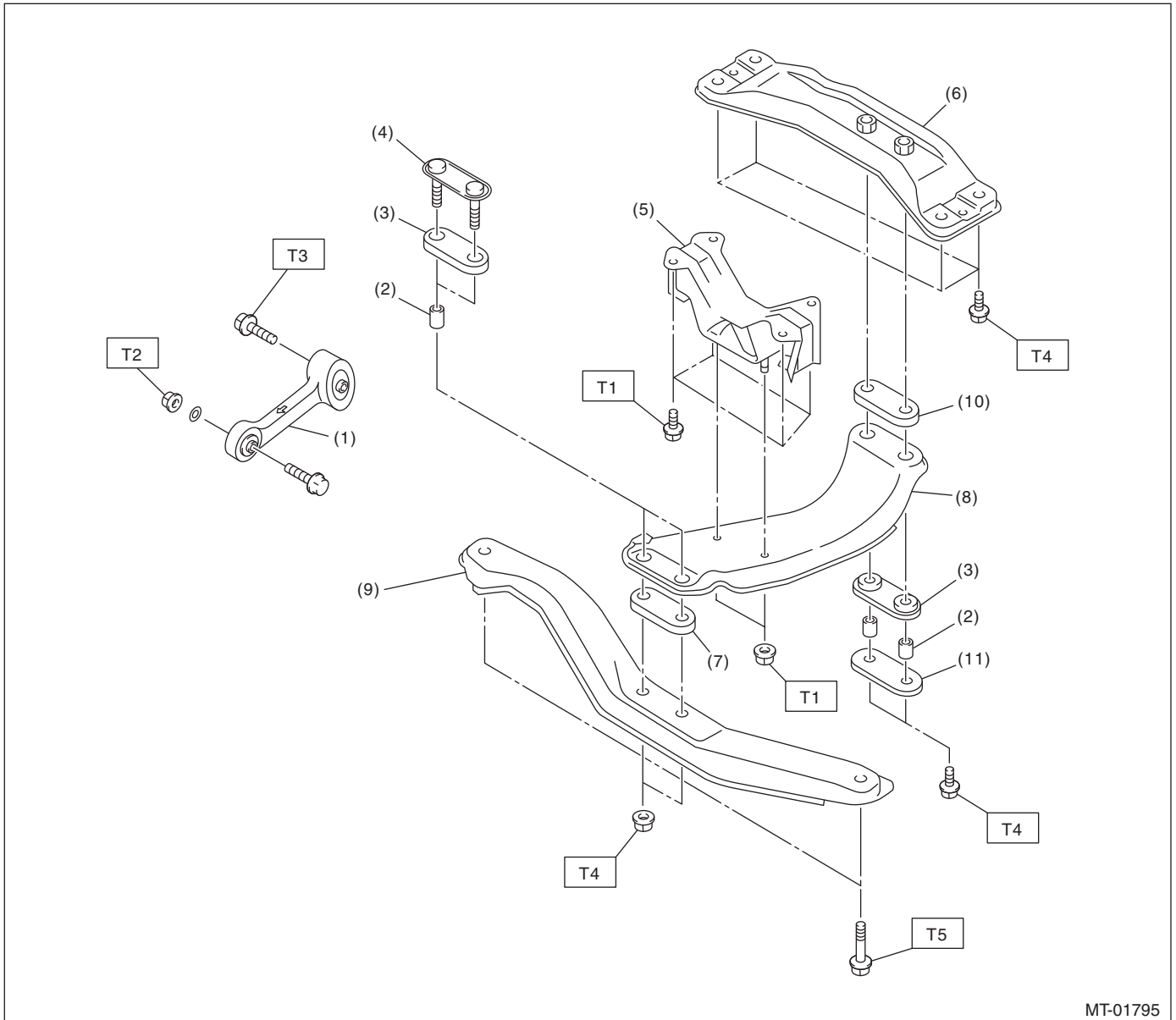
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|-----------------------------|---------------------------------|---------------------------------------|
| (1) Drive pinion shaft | (7) Differential bevel pinion | (13) Retainer lock plate |
| (2) Hypoid driven gear | (8) Roller bearing | |
| (3) Pinion shaft | (9) Differential case | Tightening torque:N·m (lbf·ft) |
| (4) Straight pin | (10) Oil seal | T1: 25 (2.5, 18.4) |
| (5) Washer | (11) Differential side retainer | T2: 62 (6.3, 45.7) |
| (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)

7. TRANSMISSION MOUNTING



MT-01795

- | | |
|---------------------------------|--------------------------|
| (1) Pitching stopper | (7) Cushion rubber |
| (2) Spacer | (8) Center crossmember |
| (3) 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)

C: CAUTION

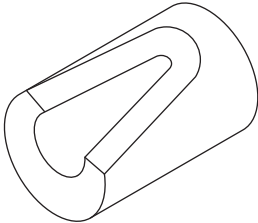
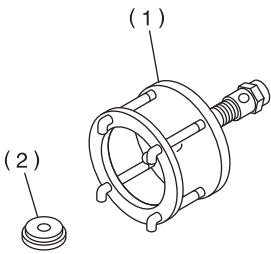
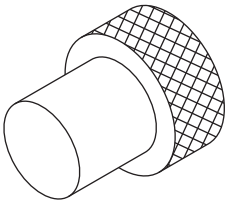
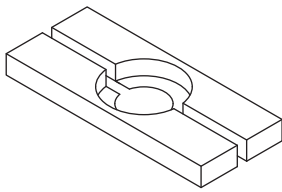
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal,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

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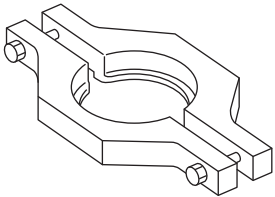
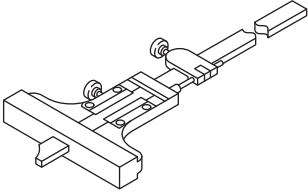
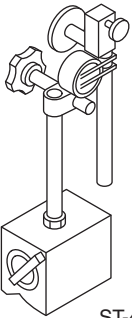
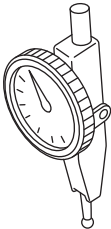
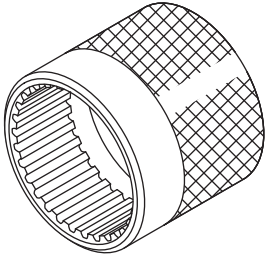
D: PREPARATION TOOL

1. SPECIAL TOOL

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

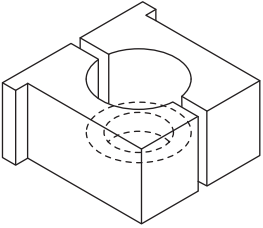
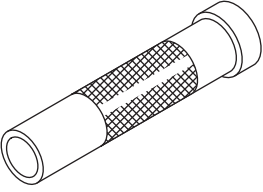
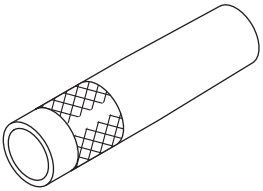
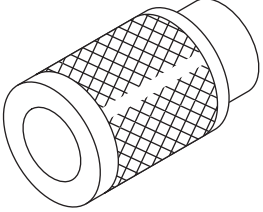
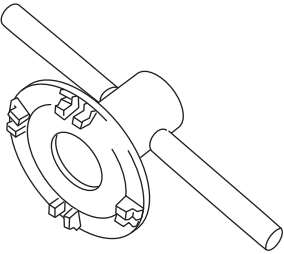
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498077300	498077300	CENTER DIFFERENTIAL BEARING REMOVER	Used for removing the center differential cover ball bearing.
 ST-498147001	498147001	DEPTH GAUGE	Used for adjusting the main shaft axial end play.
 ST-498247001	498247001	MAGNET BASE	• Used for measuring backlash between the side gear and pinion, and the hypoid gear. • Used together with the DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	• Used for measuring backlash between the side gear and pinion, and the hypoid gear. • Used together with the MAGNET BASE (498247001).
 ST-498427100	498427100	STOPPER	Used for securing the drive pinion shaft assembly and the driven gear assembly when removing the drive pinion shaft assembly lock nut.

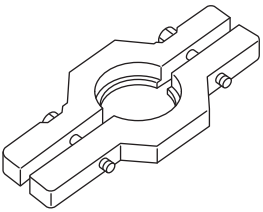
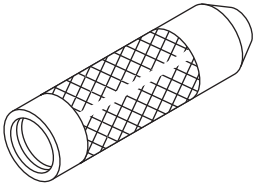
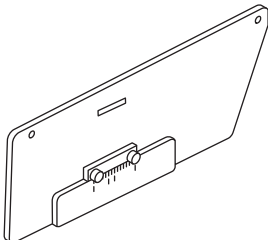
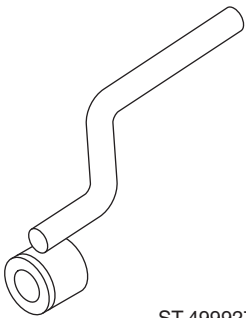
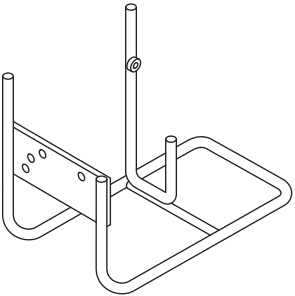
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498937000	498937000	TRANSMISSION HOLDER	Used for removing and installing the lock nut of the transmission main shaft.
 ST-499277100	499277100	BUSHING 1-2 INSTALLER	• Used for installing the 1st driven 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 and the 5th driven gear onto the driven shaft.
 ST-499757002	499757002	INSTALLER	• Used for installing the snap ring (OUT 25), and ball bearing (25 × 26 × 17). • Used for installing the bearing cone of the transfer driven gear (extension core side).
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	• Used for removing and installing the differential side retainer. • WRENCH ASSEMBLY (499787000) can also be used.

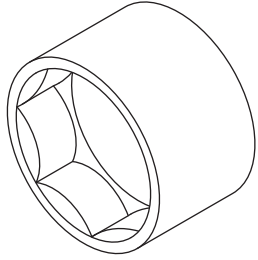
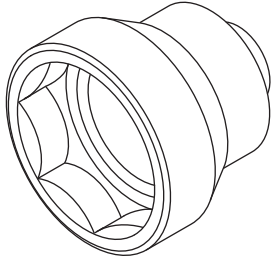
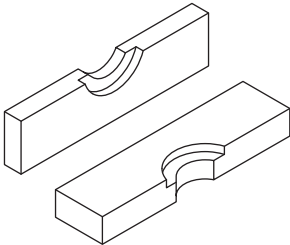
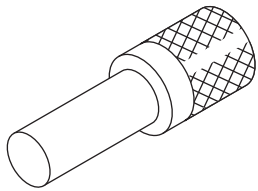
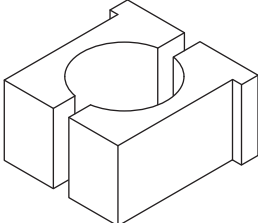
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499857000	499857000	5TH DRIVEN GEAR REMOVER	Used for removing the 5th driven gear.
 ST-499877000	499877000	RACE 4-5 INSTALLER	- Used for installing the 4th needle bearing race and ball bearing onto the transmission main shaft. - Used together with the REMOVER (899714110).
 ST-499917500	499917500	DRIVE PINION GAUGE ASSY	Used for adjusting the drive pinion shim.
 ST-499927100	499927100	HANDLE	Used for fitting the transmission main shaft.
 ST-499937100	499937100	TRANSMISSION STAND SET	Used for disassembling and assembling the transmission.

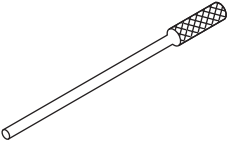
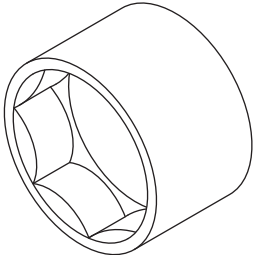
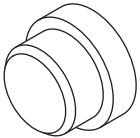
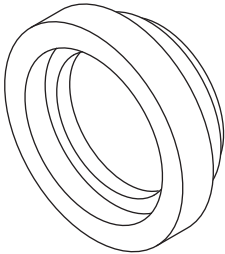
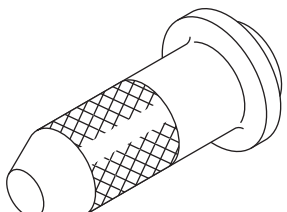
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499987003	499987003	SOCKET WRENCH (35)	Used for removing and installing the driven pinion lock nut and main shaft lock nut.
 ST-499987300	499987300	SOCKET WRENCH (50)	Used for removing and installing the driven gear assembly lock nut.
 ST-899714110	899714110	REMOVER	Used for fixing the transmission main shaft, drive pinion and rear drive shaft.
 ST-899864100	899864100	REMOVER	Used for removing transmission main shaft and drive pinion parts.
 ST-899884100	899884100	HOLDER	Used for tightening the lock nut on the sleeve.

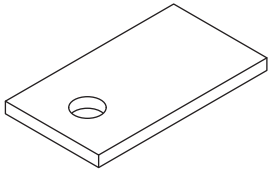
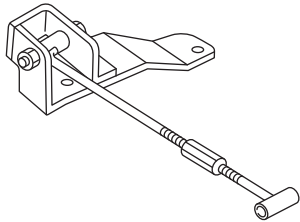
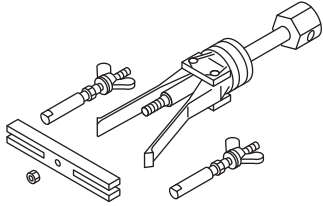
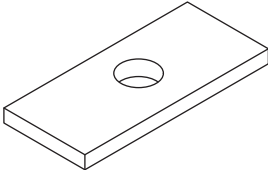
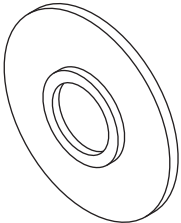
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-899904100	899904100	STRAIGHT PIN REMOVER	Used for removing and installing the straight pin.
 ST-899988608	899988608	SOCKET WRENCH (27)	Used for removing and installing the drive pinion lock nut.
 ST-398497701	398497701	ADAPTER	• Used for installing roller bearing onto the differential case. • Used together with the INSTALLER (499277100).
 ST-499587000	499587000	INSTALLER	Used for installing the driven gears to the driven shaft.
 ST-498057300	498057300	INSTALLER	Used for installing the extension oil seal.

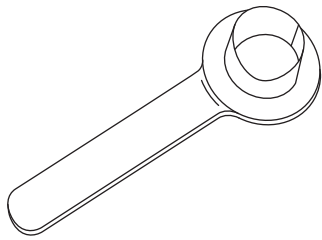
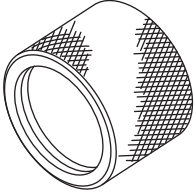
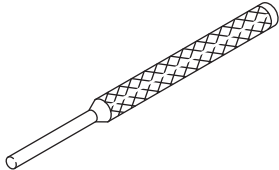
General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498255400	498255400	PLATE	Used for measuring backlash.
 ST41099AC000	41099AC000	ENGINE SUPPORT ASSY	Used for supporting the engine.
 ST-398527700	398527700	PULLER ASSY	Used for removing the extension case roller bearing.
 ST-398643600	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 ST-398177700	398177700	INSTALLER	• Used for installing the bearing cone of transfer driven gear (transfer case side). • Used for installing the ball bearing of the transfer drive gear.

General Description

MANUAL TRANSMISSION AND DIFFERENTIAL

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

2. GENERAL TOOL

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