

General Description

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Type	Symmetric, 3 element, single stage, 2 phase torque converter
Stall torque ratio	1.8
Nominal diameter	246 mm (9.69 in)
Stall speed (at sea level)	2,100 — 2,600 rpm
One-way clutch	Sprag type one-way clutch

2. OIL PUMP

Type	Internal gear fixed displacement pump	
Driving method	Driven by engine	
Number of teeth	Inner rotor	9
	Outer rotor	10

3. TRANSMISSION CONTROL ELEMENT

Type	5-forward, 1-reverse, double-row planetary gears
Multi-plate clutch	3 sets
Multi-plate brake	3 sets
One-way clutch (sprag type)	2 sets

4. TRANSMISSION GEAR RATIO

1st	3.540
2nd	2.264
3rd	1.471
4th	1.000
5th	0.834
Rev.	2.370

5. PLANETARY GEAR AND PLATE

Number of front internal gear teeth	106
Number of front carrier teeth	28
Number of front sun gear teeth	50
Number of mid internal gear teeth	78
Number of mid carrier teeth	18
Number of mid sun gear teeth	42
Number of rear internal gear teeth	110
Number of rear carrier teeth	24
Number of rear sun gear teeth	62
Number of front brake drive plates	2
Number of input clutch drive plates	6
Number of high & low reverse clutch drive plates	4
Number of direct clutch drive plates	5
Number of reverse brake drive plates	5
Number of forward brake drive plates	5

6. SELECTOR POSITION

P (Park)	Transmission is in neutral, output member is immovable, engine start is possible
R (Reverse)	Transmission in reverse for backing
N (Neutral)	Transmission is in neutral and engine start is possible
D (Drive)	Automatic gear change 1st ↔ 2nd ↔ 3rd ↔ 4th ↔ 5th
Manual mode (+)	Manual gear change 1st → 2nd → 3rd → 4th → 5th
Manual mode (–)	Manual gear change 1st ← 2nd ← 3rd ← 4th ← 5th
Control method	Wire cable type

7. HYDRAULIC CONTROL AND LUBRICATION

Type	Electronic/hydraulic control [5 forward gear changes made by electronic signals of vehicle speed and accelerator (throttle) opening]
Fluid	Specified fluid: SUBARU ATF HP Recommended fluid: IDE-MITSU ATF HP NOTE: Use of the recommended fluid is permitted only in regions where the specified fluid is not available.
Fluid capacity ℓ (US qt, Imp qt)	9.6 — 10.0 (10.1 — 10.6, 8.4 — 8.8)
Lubrication system	Forced feed lubrication with oil pump

8. COOLING AND HARNESS

Cooling system	Liquid-cooler incorporated in radiator
Transmission harness	20 + 8 poles

9. TRANSFER

Transfer type	Variable torque distribution (VTD)
Number of transfer clutch drives & driven plates	4
Reduction gear ratio	1.000 (41/41)

10.FINAL REDUCTION GEAR

Front final reduction gear ratio	3.583
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11.RECOMMENDED GEAR OIL

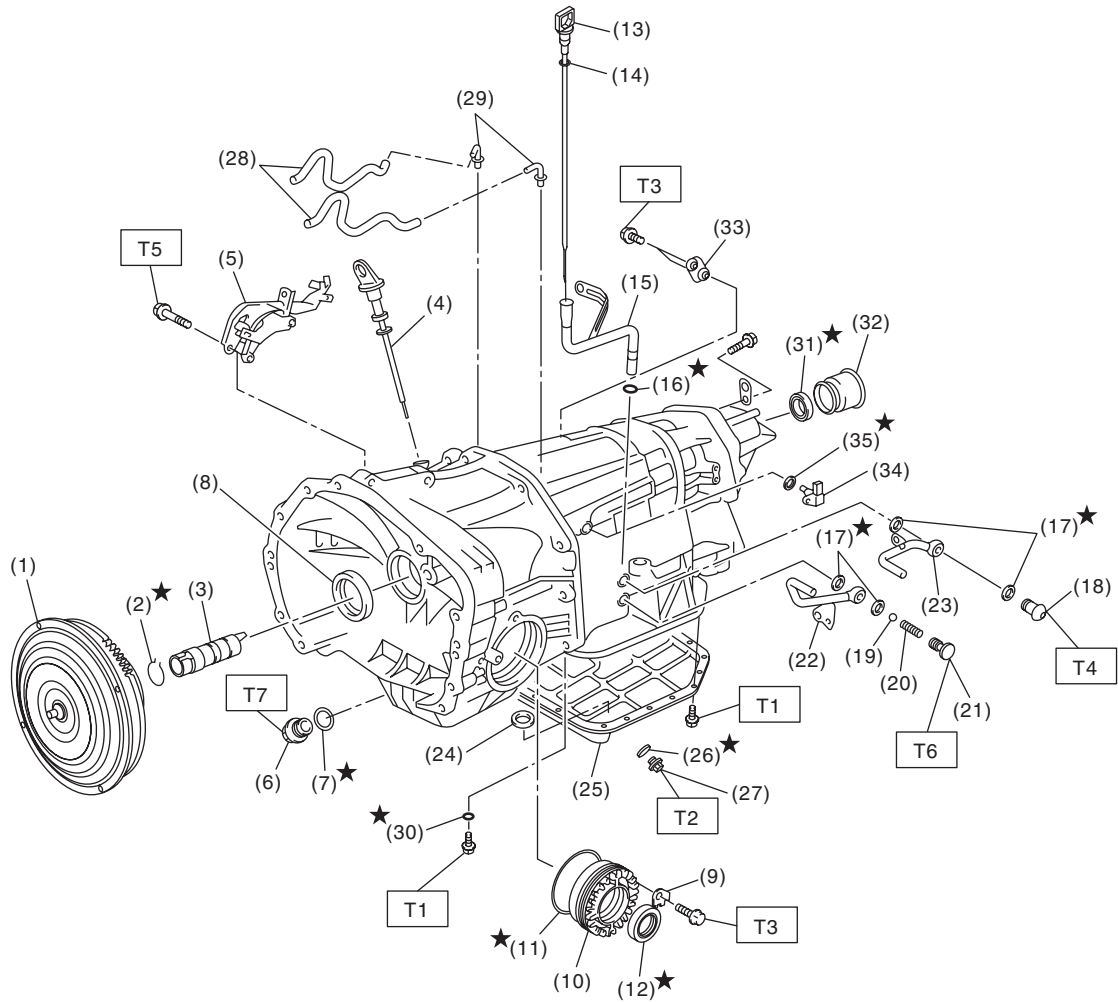
Lubrication oil	<div><div><div><div><div></div><div>(1)</div></div><div><div></div><div>(2)</div></div><div><div></div><div>(3)</div></div><div><div></div><div>GL-5</div></div><div><div></div><div>(4)</div></div></div><div><div><div>(°C)</div><div>-30</div><div>-26</div><div>-15</div><div>-5</div><div>0</div><div>15</div><div>25</div><div>30</div></div><div><div>(°F)</div><div>-22</div><div>-15</div><div>5</div><div>23</div><div>32</div><div>59</div><div>77</div><div>86</div></div></div><div><div><div></div><div>85W</div><div></div></div><div><div></div><div>80W</div><div></div></div><div><div></div><div>75W -90</div><div></div></div></div><div>MT-00001</div></div><div><div><div>(1) Item</div><div>(2) Front differential gear oil</div></div><div><div>(3) API standard</div><div>(4) SAE viscosity No. and applica- ble temperature</div></div></div></div>
Front differential gear oil capacity ℓ (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

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B: COMPONENT

1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-05725

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(1) Torque converter ASSY	(16) O-ring	(31) Oil seal
(2) Circlip	(17) Gasket	(32) Dust cover
(3) Oil pump shaft	(18) Union screw	(33) Floating bracket
(4) Differential oil level gauge	(19) Ball	(34) Turbine speed sensor 1
(5) Pitching stopper bracket	(20) Spring	(35) O-ring
(6) Differential oil drain plug	(21) Union screw	
(7) Gasket	(22) ATF outlet pipe	
(8) Oil seal	(23) ATF inlet pipe	
(9) Lock plate	(24) Magnet	
(10) Side retainer	(25) Oil pan	
(11) O-ring	(26) Gasket	
(12) Oil seal	(27) ATF drain plug	
(13) ATF level gauge	(28) Breather hose	
(14) O-ring	(29) Nipple	
(15) Oil charge pipe	(30) O-ring	

Tightening torque:N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.7)

T2: 20 (2.0, 14.8)

T3: 25 (2.5, 18.4)

T4: 40 (4.1, 29.5)

T5: 41 (4.2, 30.2)

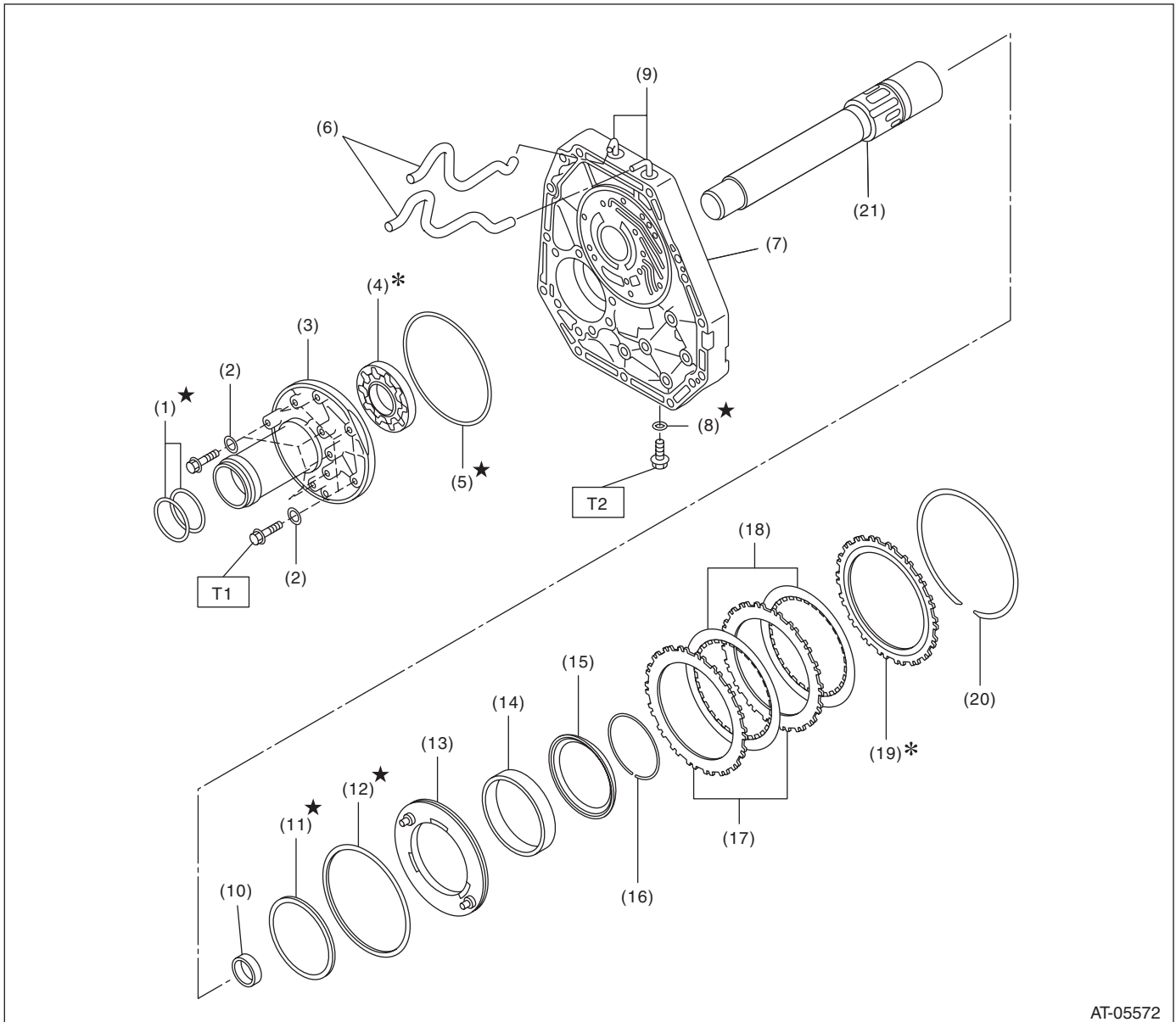
T6: 45 (4.6, 33.2)

T7: 70 (7.1, 51.6)

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2. OIL PUMP & FRONT BRAKE



- (1) O-ring
- (2) Washer
- (3) Oil pump housing
- (4) Oil pump rotor
- (5) O-ring
- (6) Air breather hose
- (7) Oil pump cover
- (8) O-ring
- (9) Nipple

- (10) Needle bearing
- (11) D-ring (Inner)
- (12) D-ring (Outer)
- (13) Front brake piston
- (14) Return spring
- (15) Retainer
- (16) Snap ring
- (17) Driven plate
- (18) Drive plate

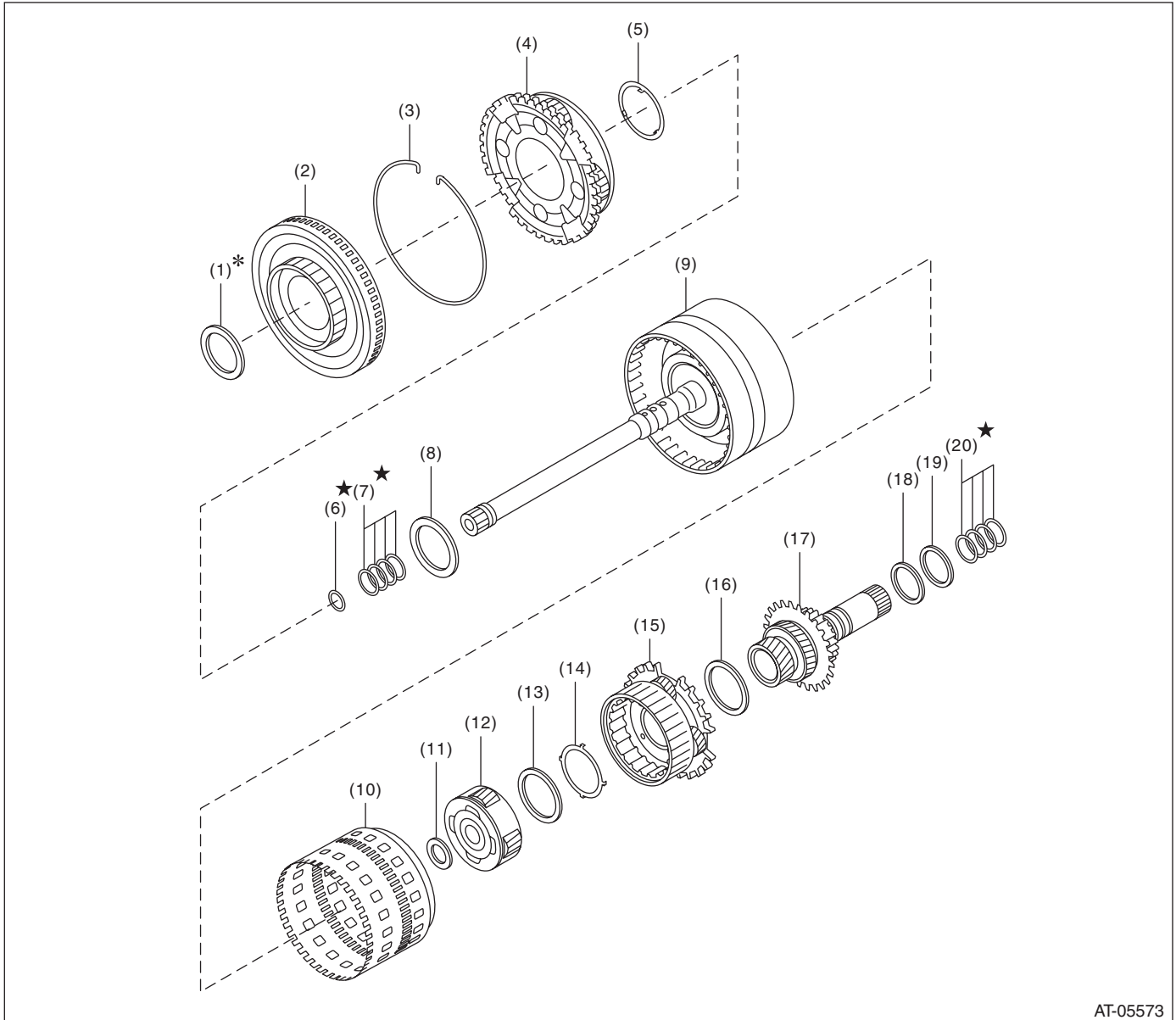
- (19) Retaining plate
- (20) Snap ring
- (21) Stator shaft

Tightening torque: N·m (kgf-m, ft-lb)

T1: 10 (1.0, 7.4)

T2: 13 (1.3, 9.6)

3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



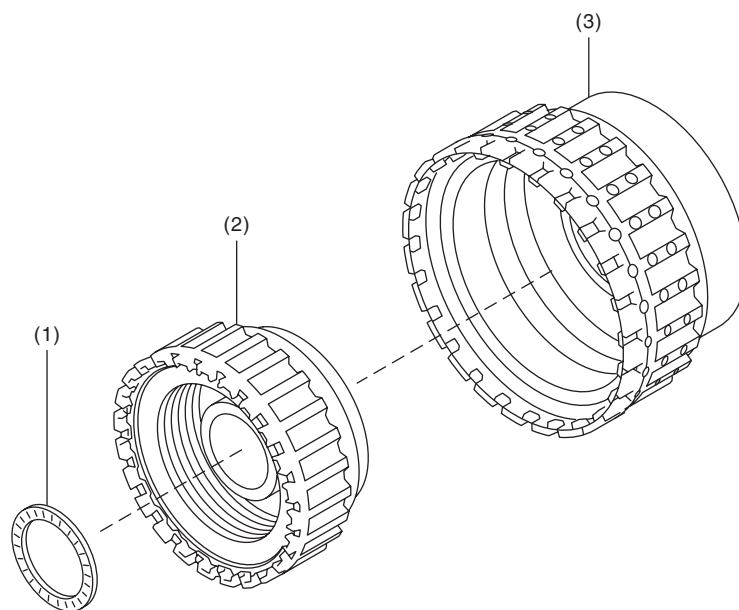
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- | | | |
|-------------------------|------------------------------|----------------------------------|
| (1) Thrust bearing | (8) Thrust bearing | (15) Rear carrier ASSY |
| (2) Front sun gear ASSY | (9) Input clutch ASSY | (16) Thrust bearing |
| (3) Snap ring | (10) Rear internal gear ASSY | (17) Middle & rear sun gear ASSY |
| (4) Front carrier ASSY | (11) Thrust bearing | (18) Washer |
| (5) Race bearing | (12) Middle carrier ASSY | (19) Thrust bearing |
| (6) O-ring | (13) Thrust bearing | (20) Seal ring |
| (7) Seal ring | (14) Race bearing | |

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4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



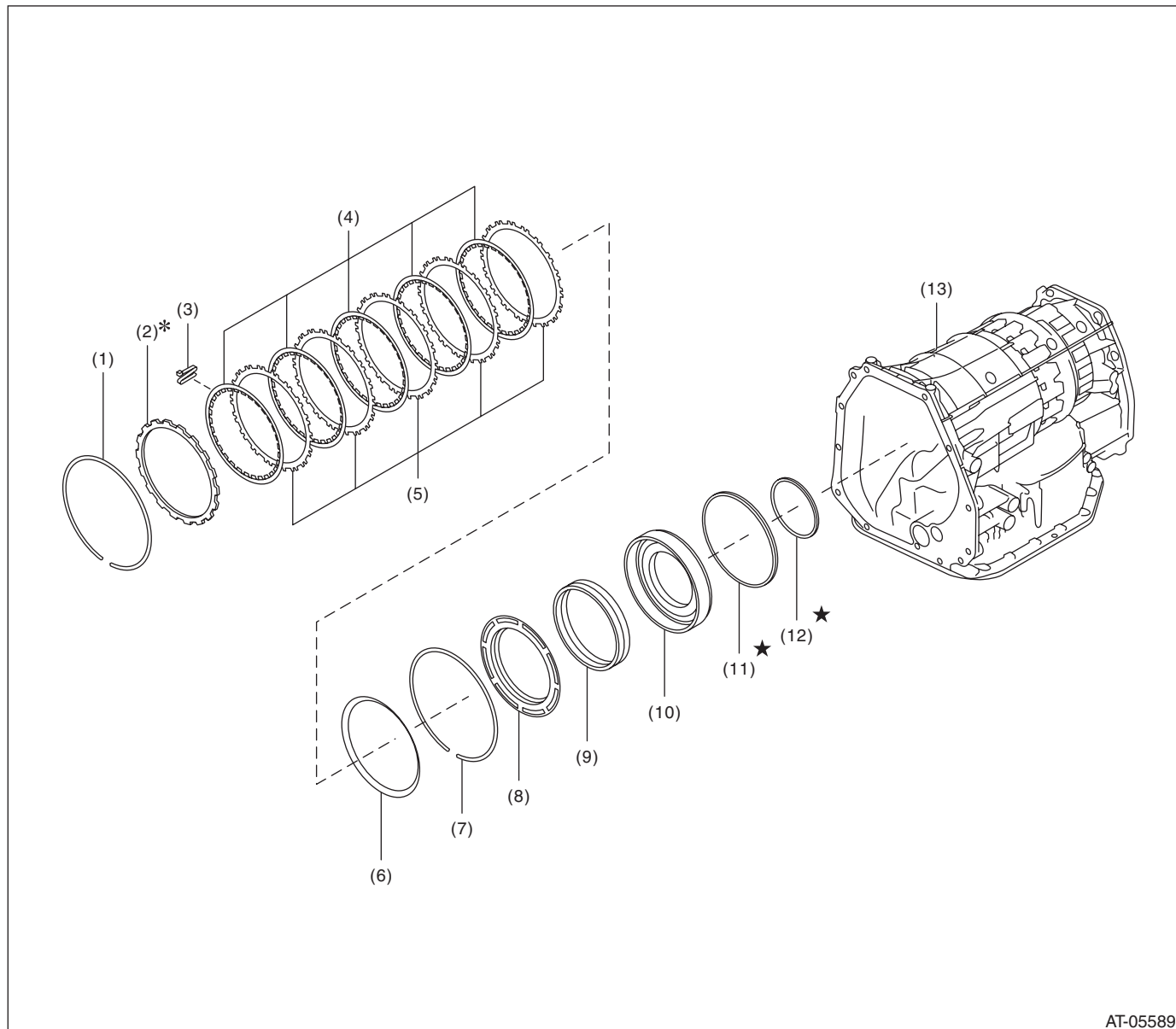
AT-02018

(1) Thrust bearing

(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

5. REVERSE BRAKE



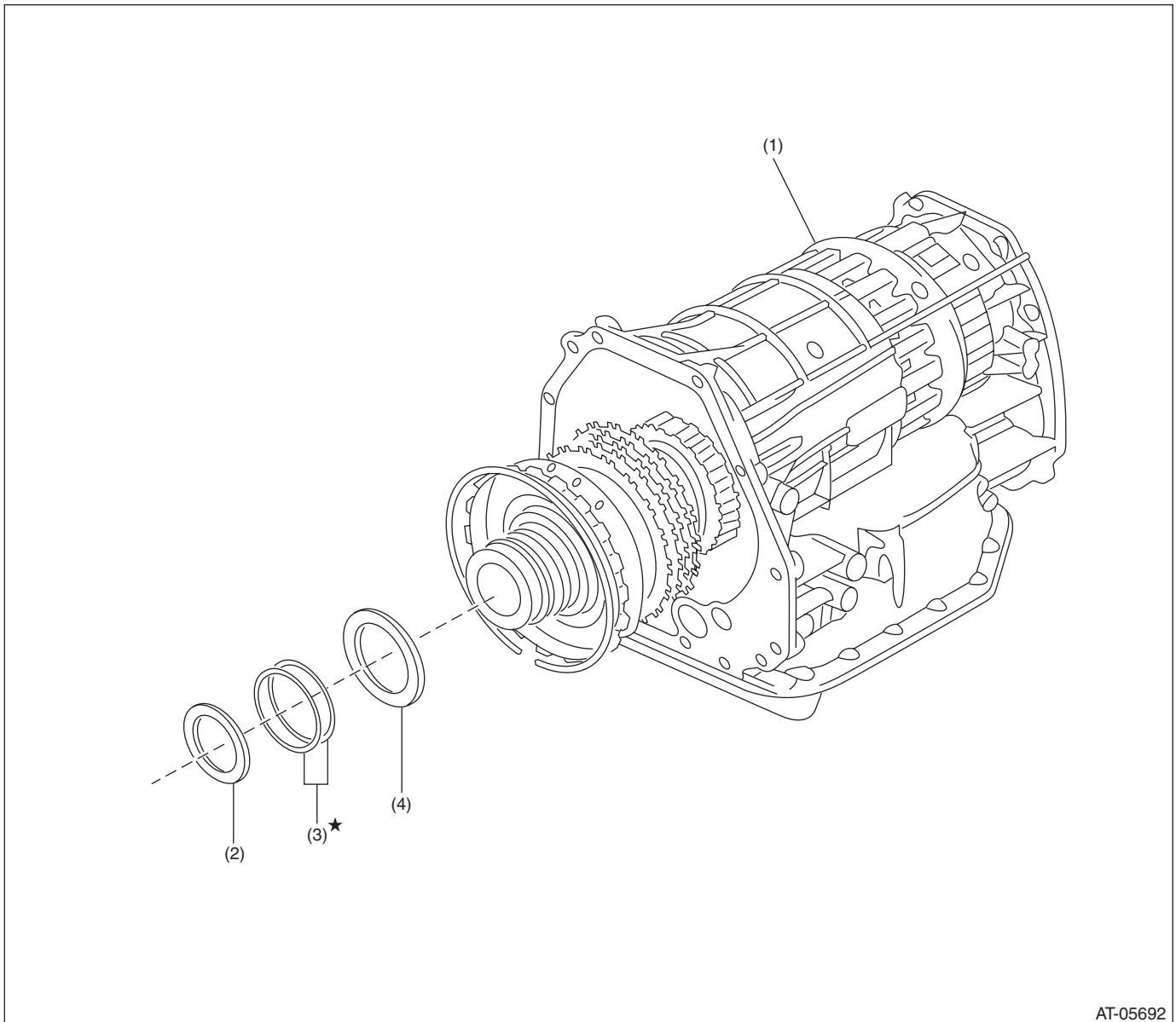
AT-05589

- | | | |
|---------------------|-----------------|---------------------------|
| (1) Snap ring | (6) Dish plate | (10) Reverse brake piston |
| (2) Retaining plate | (7) Snap ring | (11) D-ring (Outer) |
| (3) Leaf spring | (8) Retainer | (12) D-ring (Inner) |
| (4) Drive plate | (9) Leaf spring | (13) AT main case |
| (5) Driven plate | | |

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6. SHORT AT ASSEMBLY

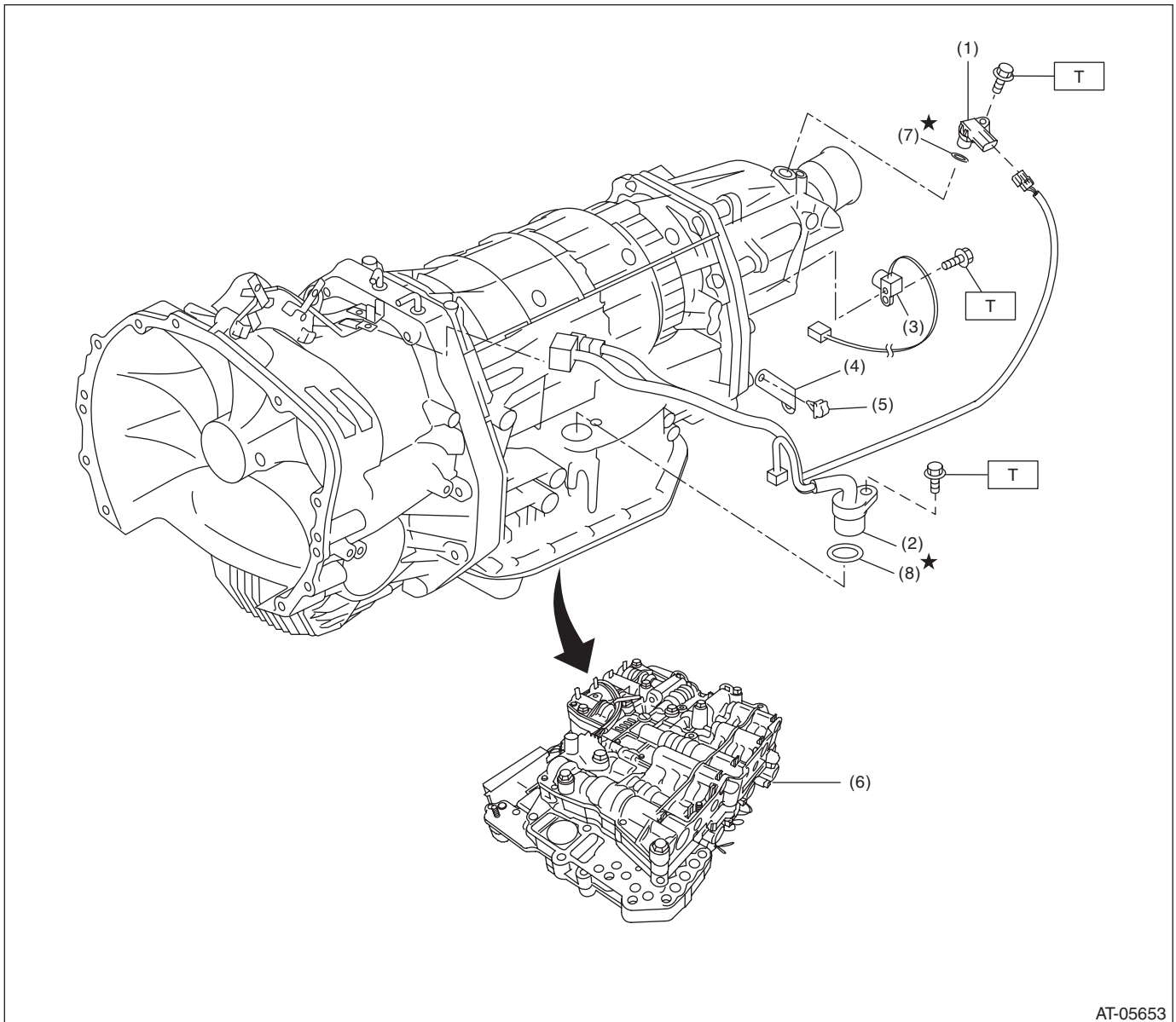


AT-05692

- (1) Short AT ASSY (non-disassembly) (3) Seal ring
(2) Thrust bearing

- (4) Thrust bearing

7. CONTROL VALVE & TRANSMISSION HARNESS



AT-05653

- | | |
|--------------------------------|------------------------|
| (1) Rear vehicle speed sensor | (5) Clip |
| (2) Transmission harness ASSY | (6) Control valve ASSY |
| (3) Front vehicle speed sensor | (7) O-ring |
| (4) Harness bracket | (8) O-ring |

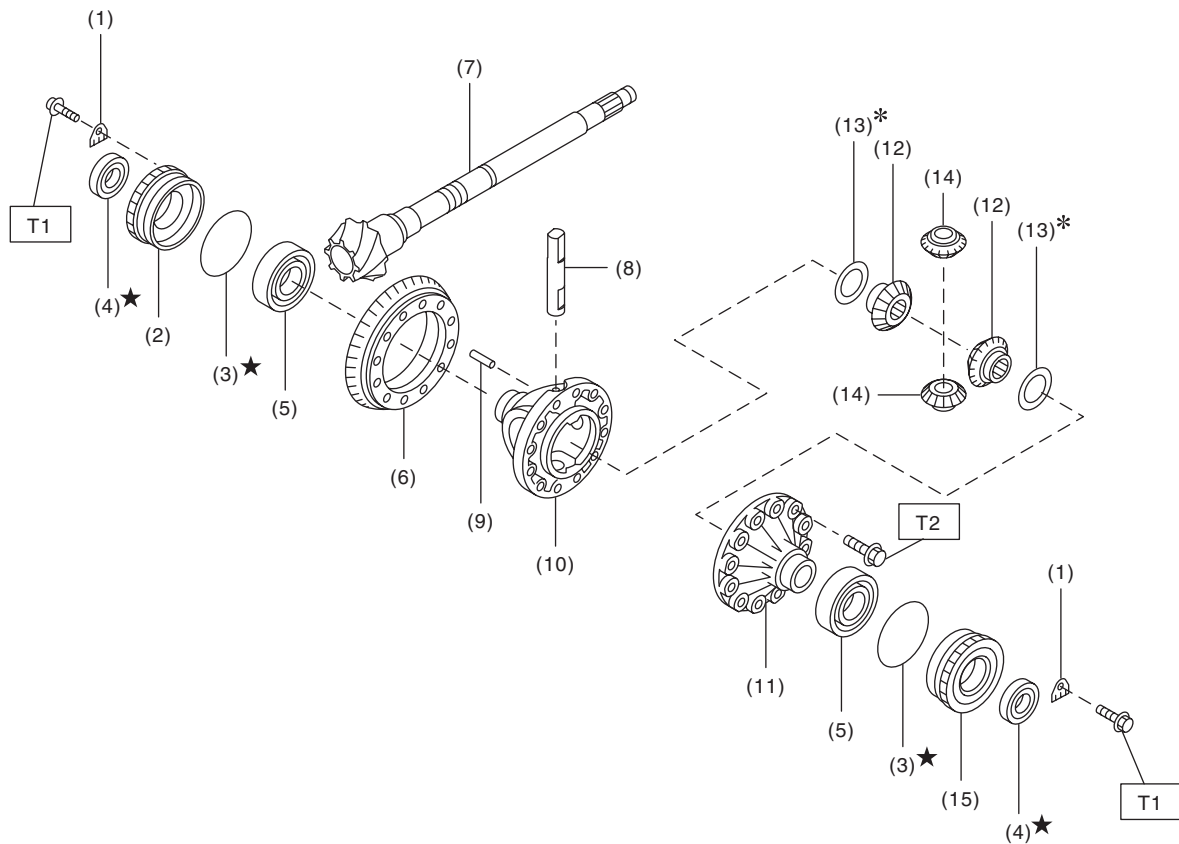
Tightening torque: N·m (kgf-m, ft-lb)

T: 7 (0.7, 5.2)

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8. DIFFERENTIAL GEAR



AT-03807

- | | |
|-----------------------------------|------------------------------------|
| (1) Lock plate | (9) Straight pin |
| (2) Differential side retainer RH | (10) Differential case RH |
| (3) O-ring | (11) Differential case LH |
| (4) Oil seal | (12) Differential bevel gear |
| (5) Taper roller bearing | (13) Washer |
| (6) Hypoid driven gear | (14) Differential bevel pinion |
| (7) Drive pinion shaft | (15) Differential side retainer LH |
| (8) Pinion shaft | |

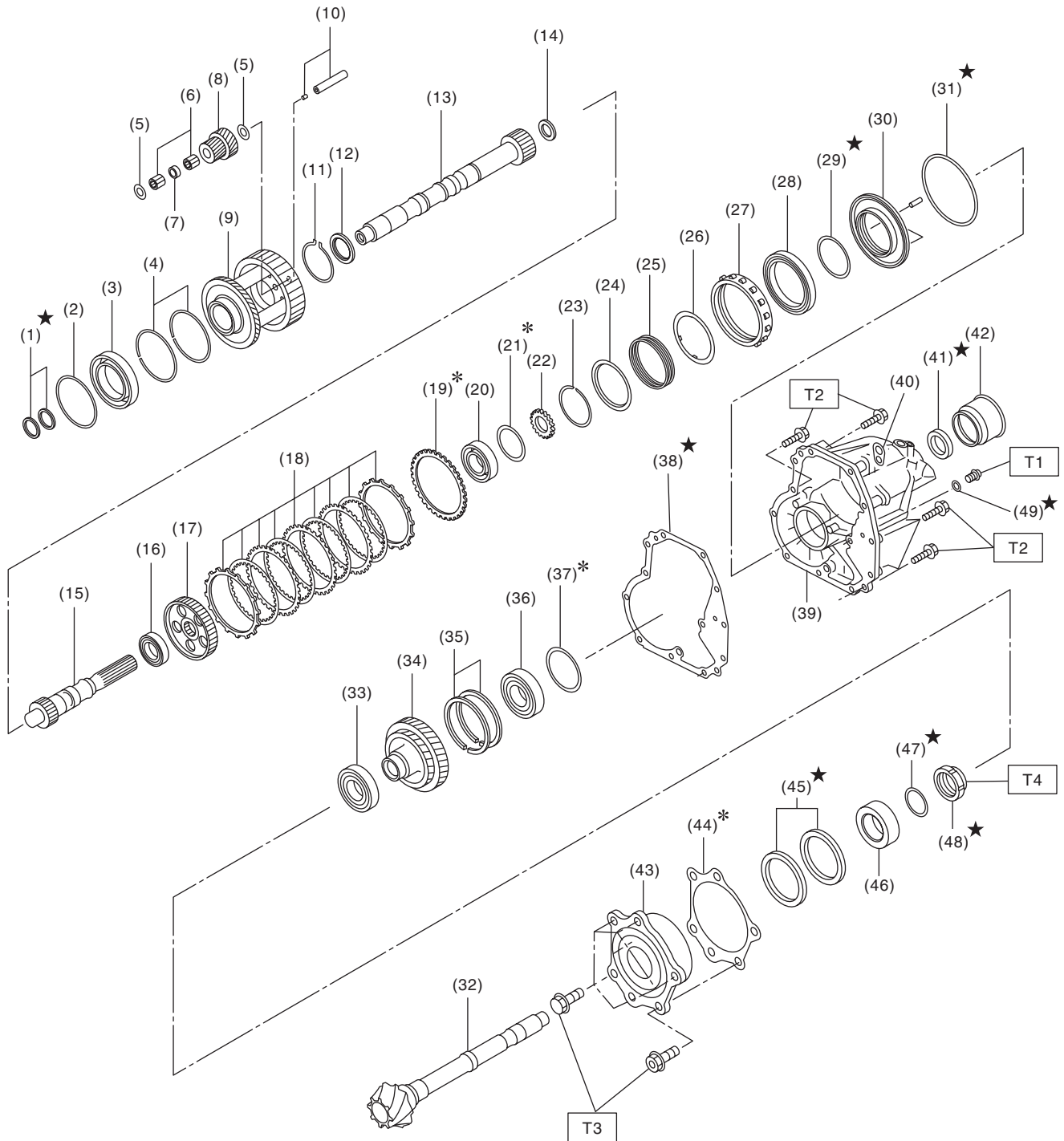
Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)

T2: 70 (7.1, 51.6)

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(1) Seal ring	(20) Ball bearing	(39) Extension case
(2) Reduction gear shim	(21) Rear drive shaft shim	(40) Transmission hanger
(3) Ball bearing	(22) Revolution gear	(41) Oil seal
(4) Snap ring	(23) Snap ring	(42) Dust cover
(5) Planetary pinion washer	(24) Clutch spring retainer	(43) Taper roller bearing
(6) Needle bearing	(25) Return spring	(44) Drive pinion shim
(7) Spacer	(26) Spring retainer	(45) Oil seal
(8) Pinion gear	(27) Pressure plate	(46) Drive pinion collar
(9) Planetary carrier ASSY	(28) Ball bearing	(47) O-ring
(10) Planetary pinion shaft ASSY	(29) O-ring	(48) Lock nut
(11) Snap ring	(30) Transfer clutch piston	(49) O-ring
(12) Thrust bearing	(31) D-ring	
(13) Intermediate shaft	(32) Drive pinion shaft	
(14) Thrust washer	(33) Ball bearing	
(15) Rear drive shaft	(34) Reduction driven gear	
(16) Ball bearing	(35) Snap ring	
(17) Transfer clutch hub	(36) Ball bearing	
(18) Transfer clutch plate	(37) Shim	
(19) Driven plate No. 3.	(38) Gasket	

Tightening torque:N·m (kgf-m, ft-lb)

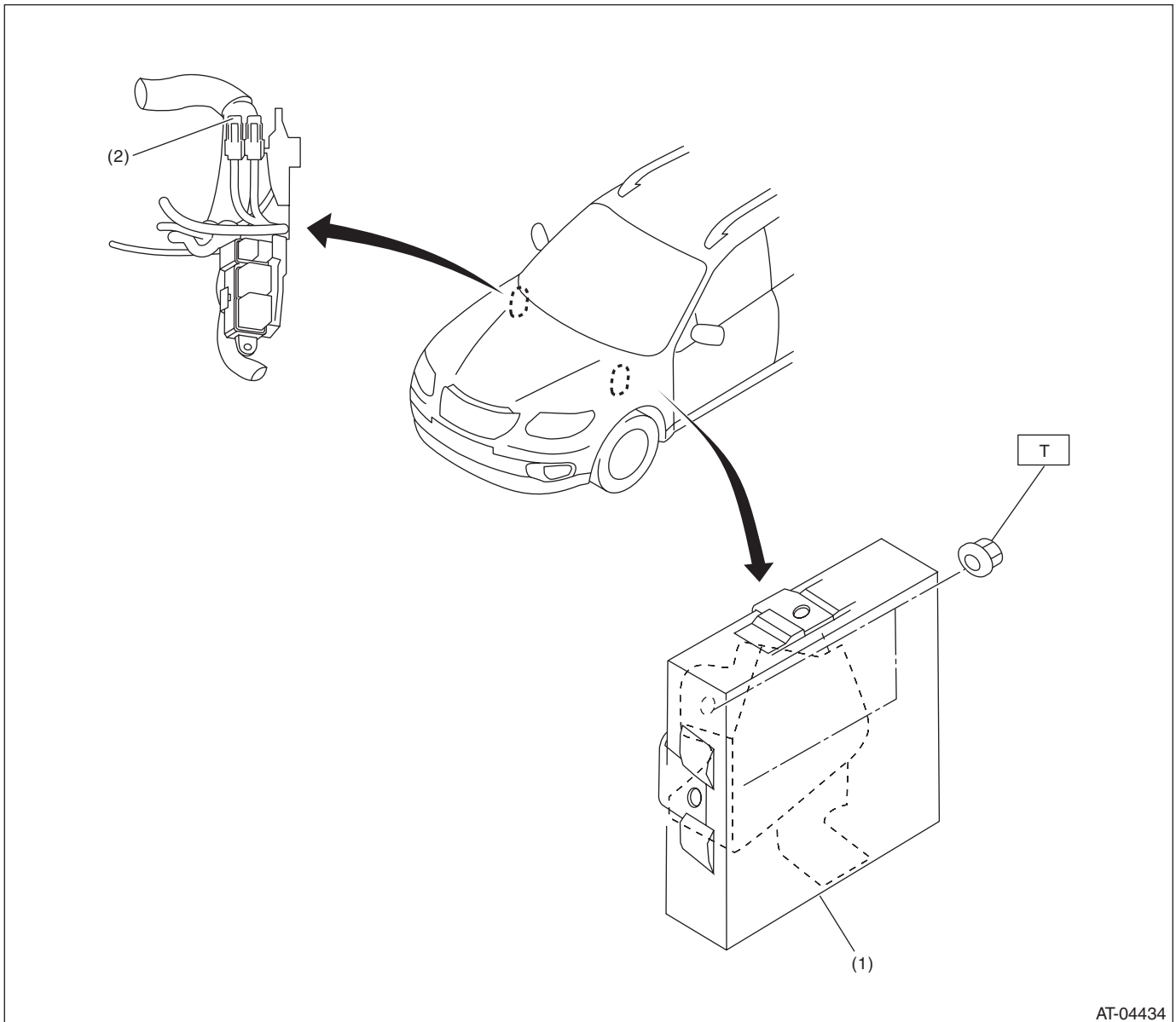
T1: 13 (1.3, 9.6)

T2: 25 (2.5, 18.4)

T3: 70 (7.1, 51.6)

T4: 116 (11.8, 85.6)

9. TRANSMISSION CONTROL MODULE



AT-04434

(1) Transmission control module (TCM)

(2) Relay

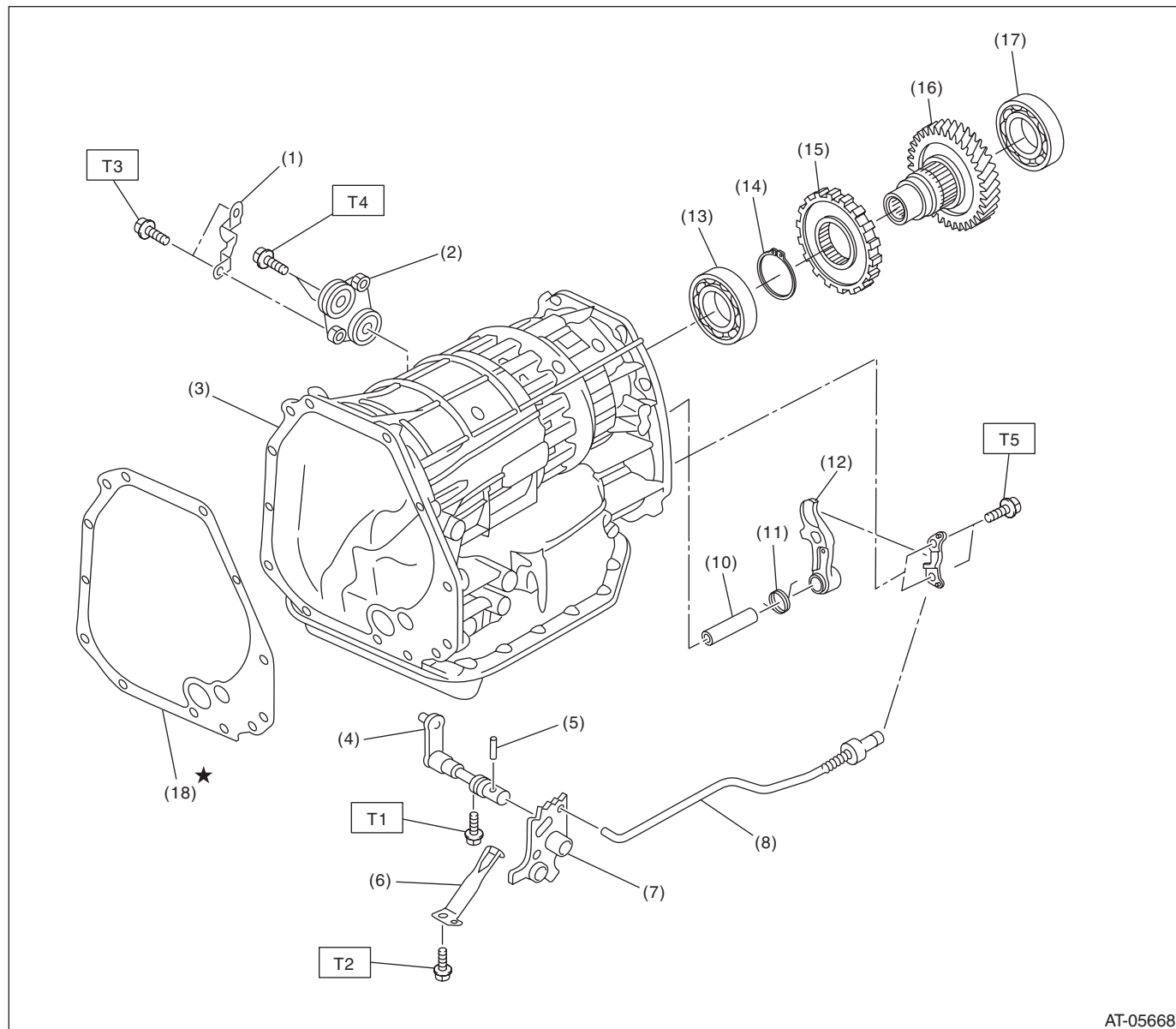
Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

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10.TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



- | | |
|------------------------------|----------------------------|
| (1) Bracket | (10) Parking pawl shaft |
| (2) Floating bracket | (11) Return spring |
| (3) AT main case | (12) Parking pawl |
| (4) Range select lever | (13) Ball bearing |
| (5) Straight pin | (14) Snap ring |
| (6) Detent spring | (15) Parking gear |
| (7) Manual plate | (16) Reduction driven gear |
| (8) Parking rod | (17) Ball bearing |
| (9) Parking support actuator | (18) Gasket |

Tightening torque:N·m (kgf-m, ft-lb)

T1: 6 (0.6, 4.4)

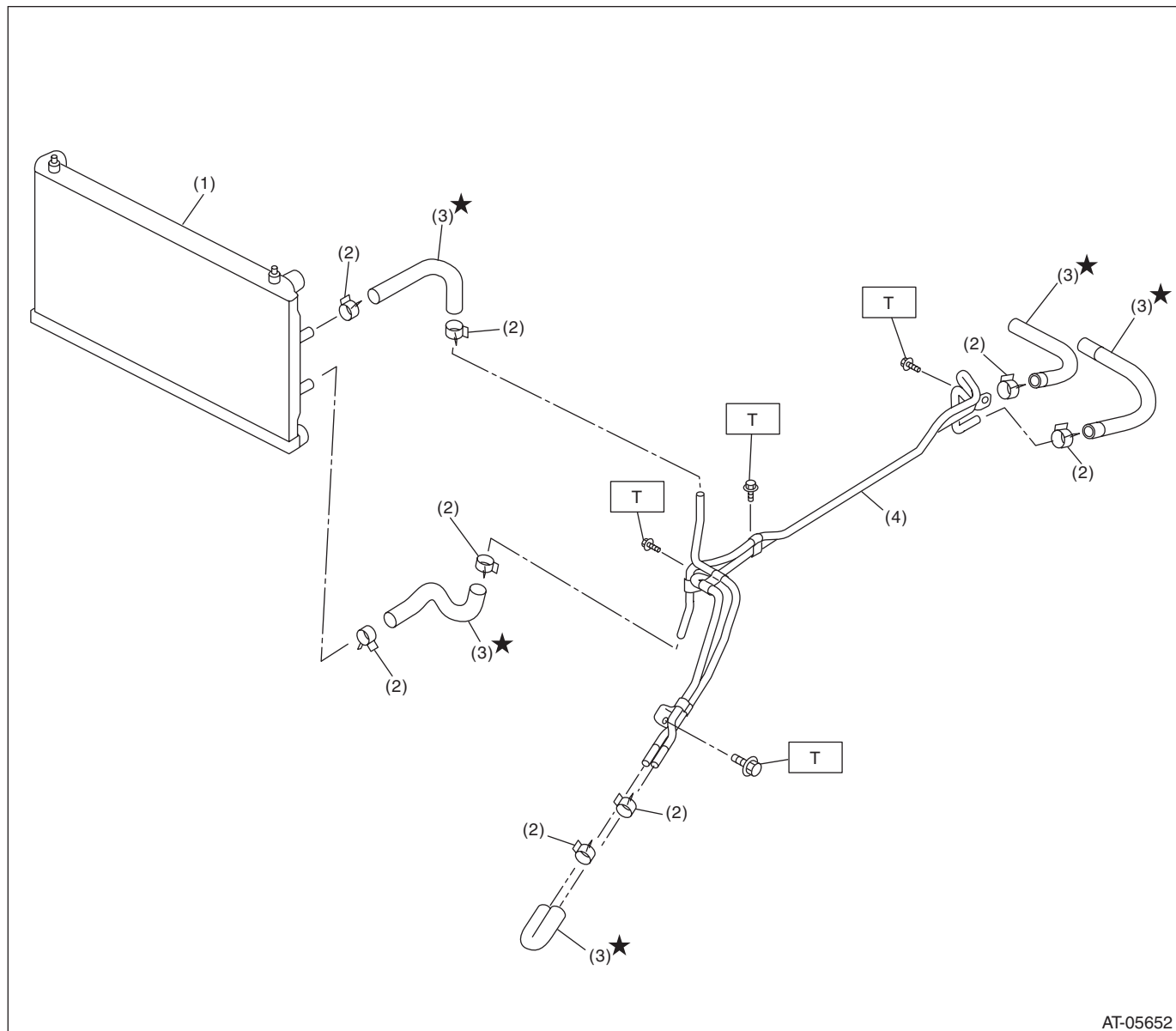
T2: 7 (0.7, 5.2)

T3: 18 (1.8, 13.3)

T4: 25 (2.5, 18.4)

T5: <Ref. to 5AT-76, Parking Pawl.>

11.OIL COOLER PIPE AND OIL COOLER



(1) Radiator

(2) Clip

(3) ATF hose

(4) ATF cooler pipe

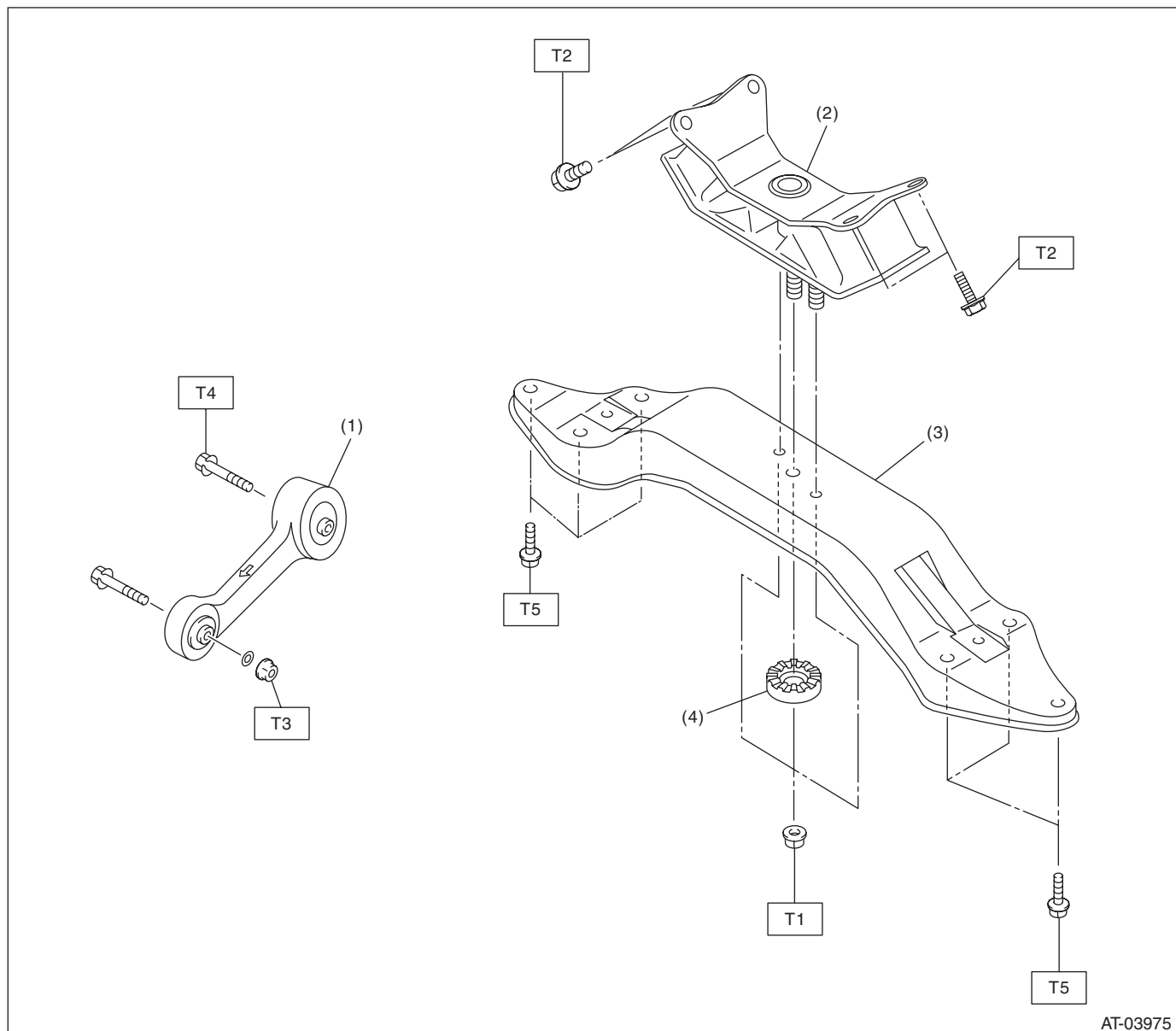
Tightening torque:N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

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12.TRANSMISSION MOUNTING



- (1) Pitching stopper
(2) Rear cushion rubber

- (3) Crossmember
(4) Stopper

Tightening torque:N·m (kgf-m, ft-lb)

T1: 35 (3.6, 25.8)

T2: 40 (4.1, 29.5)

T3: 50 (5.1, 36.9)

T4: 58 (5.9, 42.8)

T5: 75 (7.6, 55.3)

C: CAUTION

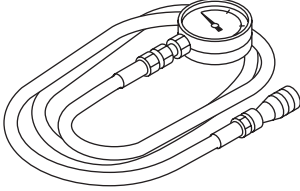
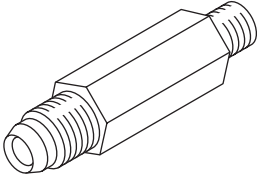
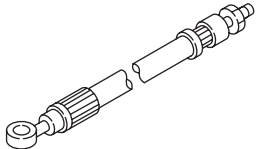
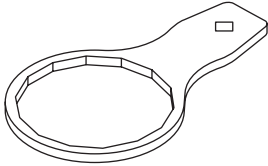
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Until the oil pan is removed, do not place with the oil pan side facing up to prevent foreign matter from entering the valve body.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, disassembly and replacement.
- When disassembling the case and other light alloy parts, disassemble them by slightly tapping with a plastic hammer. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or equivalent. Do not mix them of different grades or manufacturers.
- Be sure to tighten 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 ATF fluid 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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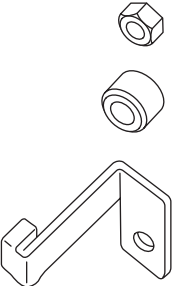
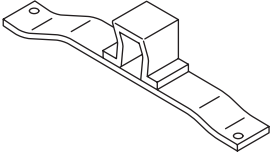
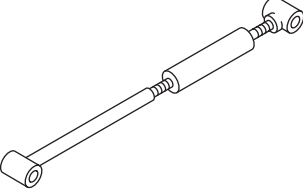
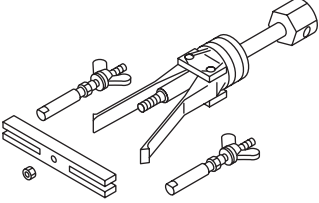
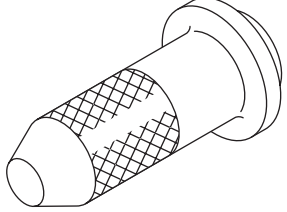
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	OIL PRESSURE ADAPTER	Used together with oil pump cover installed on when measuring line pressure.
 ST-498897800	498897800	OIL PRESSURE ADAPTER SET	Used for measuring transfer clutch pressure.
 ST-498545400	498545400	FILTER WRENCH	Used for removing and installing the ATF filter.

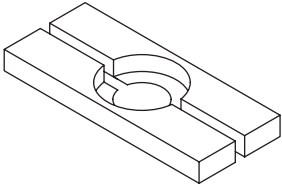
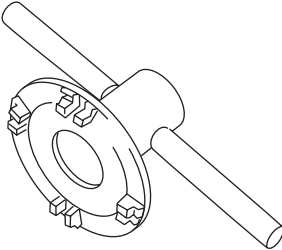
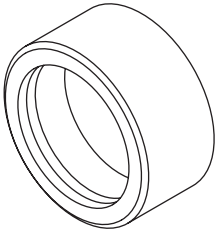
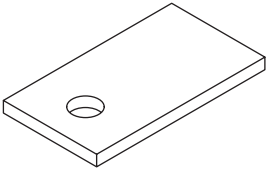
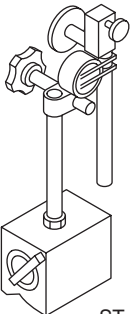
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498277200</p>	498277200	STOPPER SET	Used for preventing the torque converter assembly from falling when removing and installing the automatic transmission assembly.
 <p>ST41099AA010</p>	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 <p>ST41099AA020</p>	41099AA020	ENGINE SUPPORT	Used for supporting engine.
 <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-498057300</p>	498057300	INSTALLER	Used for installing the extension oil seal.

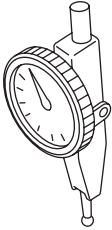
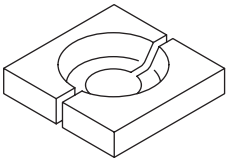
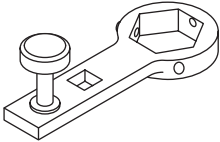
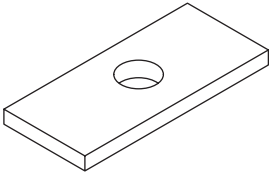
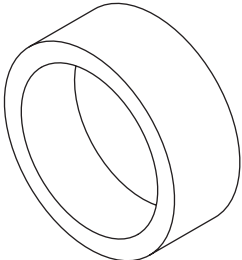
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498077000</p>	498077000	REMOVER	Used for removing the differential taper roller bearing.
 <p>ST18630AA010</p>	18630AA010	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 <p>ST-398487700</p>	398487700	DRIFT	Used for installing the front differential taper roller bearing.
 <p>ST-498255400</p>	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 <p>ST-498247001</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> Used for measuring the gear backlash. Used together with DIAL GAUGE (498247100).

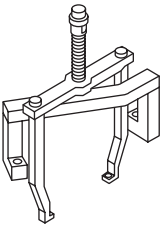
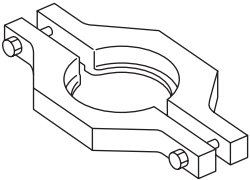
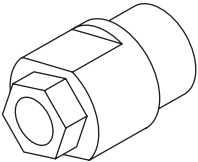
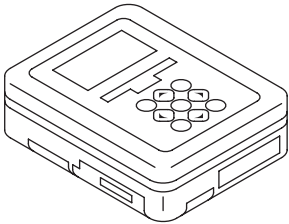
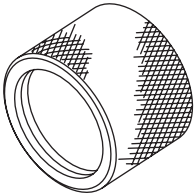
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AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> Used for measuring the gear backlash. Used together with MAGNET BASE (498247001).
 <p>ST-498517000</p>	498517000	REPLACER	Used for removing the front roller bearing.
 <p>ST-499787700</p>	499787700	WRENCH	Used for removing and installing the drive pinion lock nut.
 <p>ST-398643600</p>	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 <p>ST-398744300</p>	398744300	PISTON GUIDE	Used for measuring height from mating surface of the main case to pressure plate.

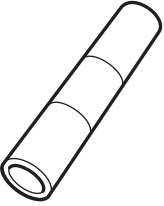
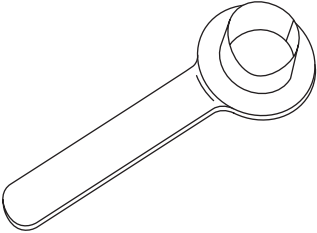
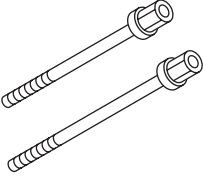

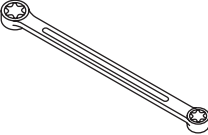
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499737100</p>	499737100	PULLER SET	Used for removing the reduction driven gear assembly.
 <p>ST-498077600</p>	498077600	REMOVER	Used for removing the ball bearing.
 <p>ST18667AA010</p>	18667AA010	HOLDER	<ul style="list-style-type: none"> • Used for removing and installing the drive pinion lock nut. • Used as a handle to rotate gear when checking tooth contact.
 <p>ST1B022XU0</p>	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.
 <p>ST18675AA000</p>	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.

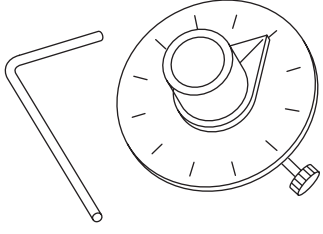
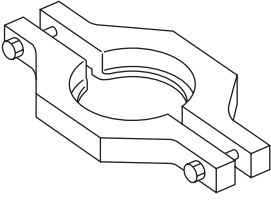
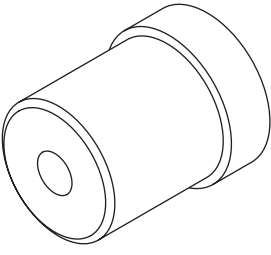
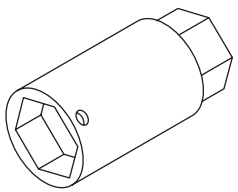
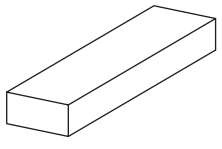
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18654AA000	18654AA000	INSTALLER	Used for removing and installing the ball bearing.
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for disassembling multi-plate clutch for shift transmission.
 ST18765AA000	18765AA000	COMPRESSOR SUPPORT	Used for disassembling multi-plate clutch for shift transmission.
 ST18676AA020	18676AA020	TORX® WRENCH	Used for disassembling torque converter case.

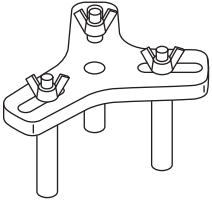
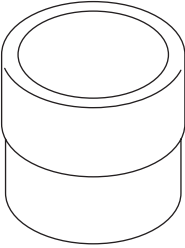
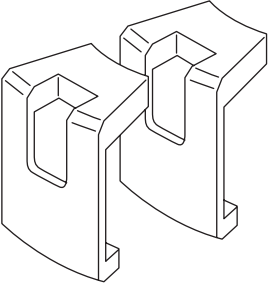
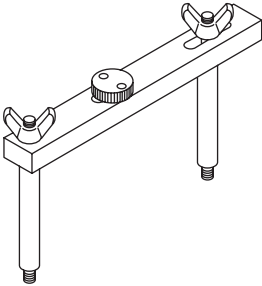
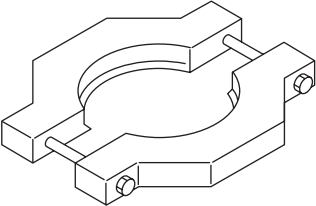
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18854AA000</p>	18854AA000	ANGLE GAUGE	Used for tightening parking support.
 <p>ST-498077300</p>	498077300	REMOVER	Used for removing ball bearing of reduction driven gear.
 <p>ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing the oil seal.
 <p>ST-499787500</p>	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 <p>ST-499575400</p>	499575400	GAUGE	Used for measuring height of total end play.

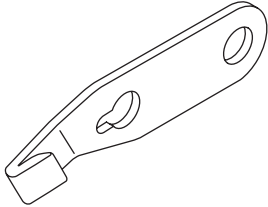
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18762AA000</p>	18762AA000	COMPRESSOR SPECIAL TOOL	Used for disassembling multi-plate clutch for shift transmission.
 <p>ST-499755602</p>	499755602	PRESS	Used for installing the parking gear.
 <p>ST18680AA010</p>	18680AA010	HOLDER GEAR	Used for removing reduction driven gear assembly. (2-piece set)
 <p>ST18766AA000</p>	18766AA000	SUPPORT PULLER	Used for removing reduction driven gear assembly.
 <p>ST18767AA000</p>	18767AA000	REMOVER	<ul style="list-style-type: none"> • Used to pull out the parking gear. • Used to pull out the bearing from the VTD assembly.

General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498497100</p>	498497100	CRAKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.

2. GENERAL TOOL

TOOL NAME	REMARKS
Depth gauge	Used for measuring the transmission end play.
Thickness gauge	Used for measuring clearance of the clutch, brake and oil pump.
Micrometer	Used for measuring thickness of the drive pinion.
Spring scale	Used for measuring the starting torque of the drive pinion.
Circuit tester	Used for measuring resistance and voltage.
TORX® T70	Used for removing and installing differential gear oil drain plug.
Snap ring pliers	Used for removing and installing each snap ring.