

General Description

AUTOMATIC TRANSMISSION

1. General Description

A: SPECIFICATION

1. TORQUE CONVERTER CLUTCH

Model	3.6 L non-turbo	
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	Sprague 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 (sprague 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

Model	3.6 L non-turbo
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 is in reverse.
N (Neutral)	Transmission is in neutral and engine start is possible
D (Drive)	Automatic gear change 1st ↔ 2nd ↔ 3rd ↔ 4th ↔ 5th
M (Manual mode), Paddle shift (+)	Manual gear change 1st → 2nd → 3rd → 4th → 5th
M (Manual mode), Paddle shift (–)	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	Recommended materials	SUBARU ATF
	Alternative	IDEMITSU “ATF HP” CAUTION: Be sure to use the recommended or equivalent ATF. Using material except recommended one or substitute would cause trouble.
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	3
Reduction gear ratio	1.000 (41/41)

10.FINAL REDUCTION GEAR

Model	3.6 L non-turbo
Front final reduction gear ratio	3.083

General Description

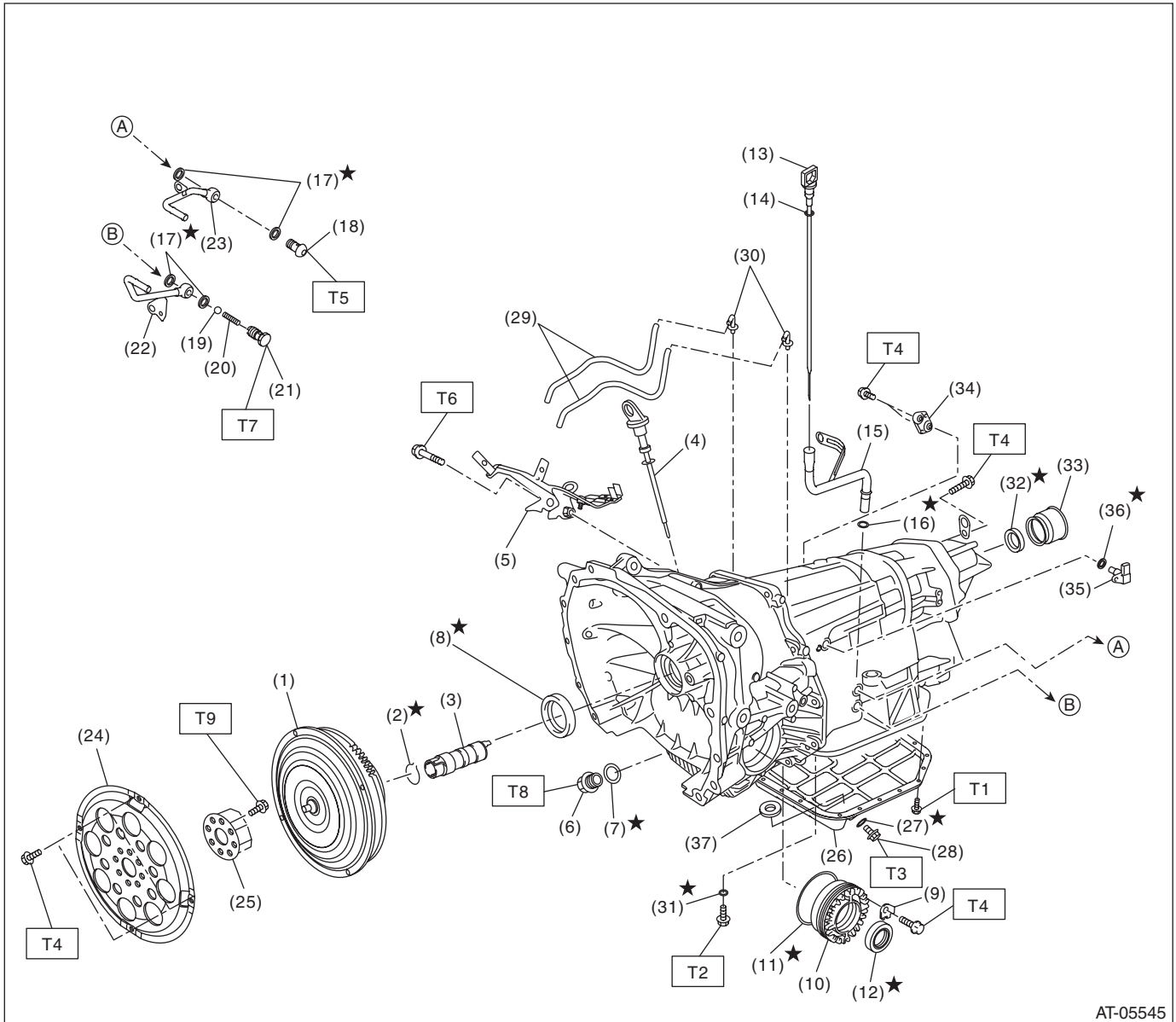
AUTOMATIC TRANSMISSION

11.RECOMMENDED GEAR OIL

Lubrication oil		<div><div><div><div><div>(1)</div><div>(2)</div><div>(3)</div><div>GL-5</div><div>(4)</div></div><div><div>(°C)</div><div>-30</div><div>-15</div><div>0</div><div>15</div><div>30</div></div><div><div>(°F)</div><div>-22</div><div>5</div><div>32</div><div>59</div><div>86</div></div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div><div><div></div><div>75W -90</div><div>90</div></div><div>MT-03000</div></div></div> <div><div>(1) Item</div><div>(2) Front differential gear oil</div><div>(3) API standard</div><div>(4) SAE viscosity No. and applicable temperature</div></div>
Front differential oil capacity	L (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

B: COMPONENT

1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-05545

General Description

AUTOMATIC TRANSMISSION

(1) Torque converter ASSY	(17) Gasket	(33) Dust cover
(2) Circlip	(18) Union screw	(34) Floating bracket
(3) Oil pump shaft	(19) Ball	(35) Turbine speed sensor 1
(4) Differential oil level gauge	(20) Spring	(36) O-ring
(5) Transmission hanger COMPL	(21) Union screw	(37) Magnet
(6) Drain plug	(22) ATF outlet pipe	
(7) Gasket	(23) ATF inlet pipe	
(8) Oil seal	(24) Drive plate	
(9) Lock plate	(25) Reinforcement drive plate	
(10) Side retainer	(26) Oil pan	
(11) O-ring	(27) Gasket	
(12) Oil seal	(28) ATF drain plug	
(13) ATF level gauge	(29) Breather hose	
(14) O-ring	(30) Nipple	
(15) Oil charge pipe	(31) O-ring	
(16) O-ring	(32) Oil seal	

Tightening torque: N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.7)

T2: 13 (1.3, 9.6)

T3: 20 (2.0, 14.8)

T4: 25 (2.5, 18.4)

T5: 40 (4.1, 29.5)

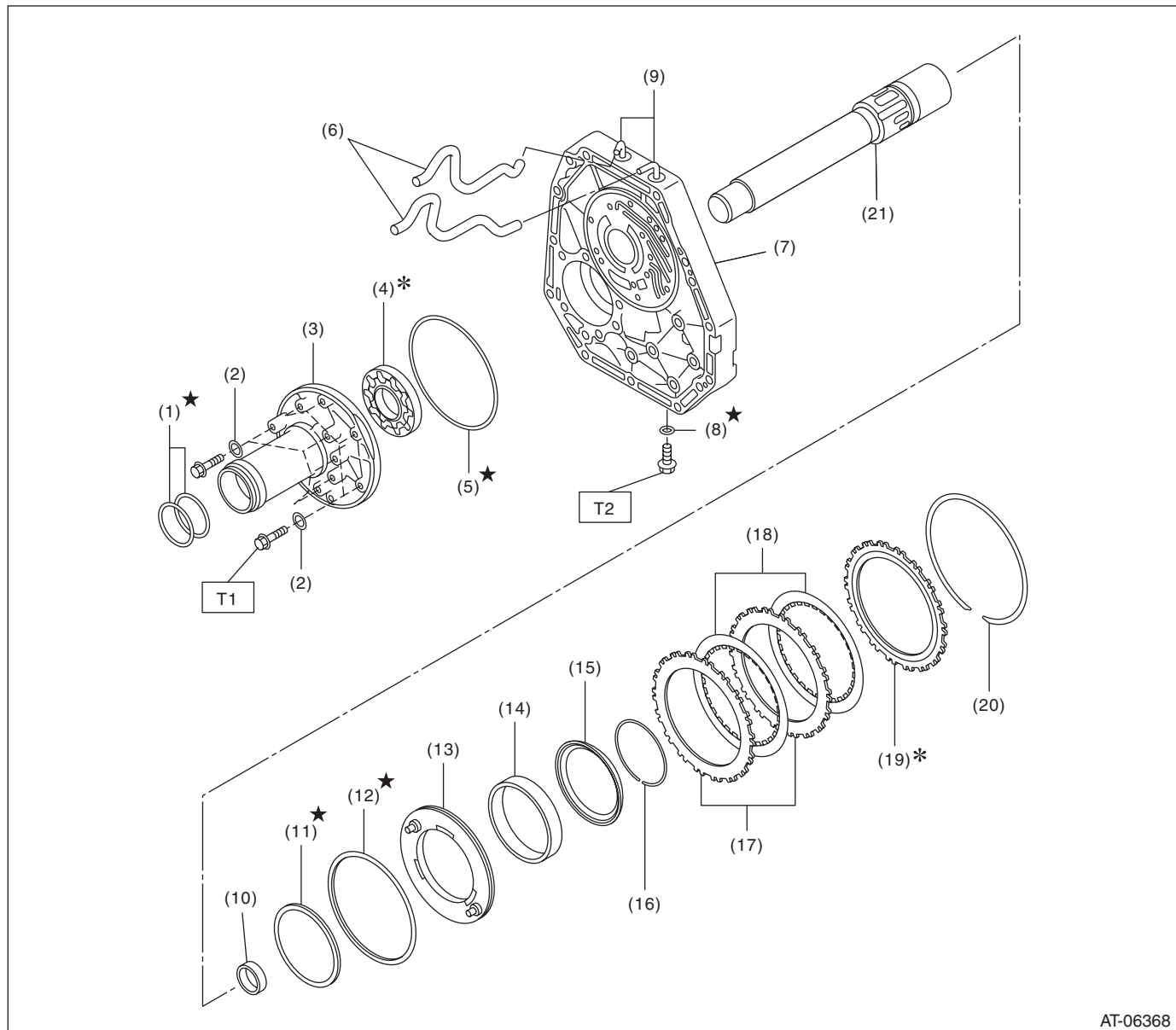
T6: 41 (4.2, 30.2)

T7: 45 (4.6, 33.2)

T8: 70 (7.1, 51.6)

T9: 90 (9.2, 66.4)

2. OIL PUMP & FRONT BRAKE



AT-06368

- | | | |
|-----------------------|-------------------------|----------------------|
| (1) O-ring | (10) Needle bearing | (19) Retaining plate |
| (2) Washer | (11) D-ring (inner) | (20) Snap ring |
| (3) Oil pump housing | (12) D-ring (outer) | (21) Stator shaft |
| (4) Oil pump rotor | (13) Front brake piston | |
| (5) O-ring | (14) Return spring | |
| (6) Air breather hose | (15) Retainer | |
| (7) Oil pump cover | (16) Snap ring | |
| (8) O-ring | (17) Driven plate | |
| (9) Nipple | (18) Drive plate | |

Tightening torque: N·m (kgf-m, ft-lb)

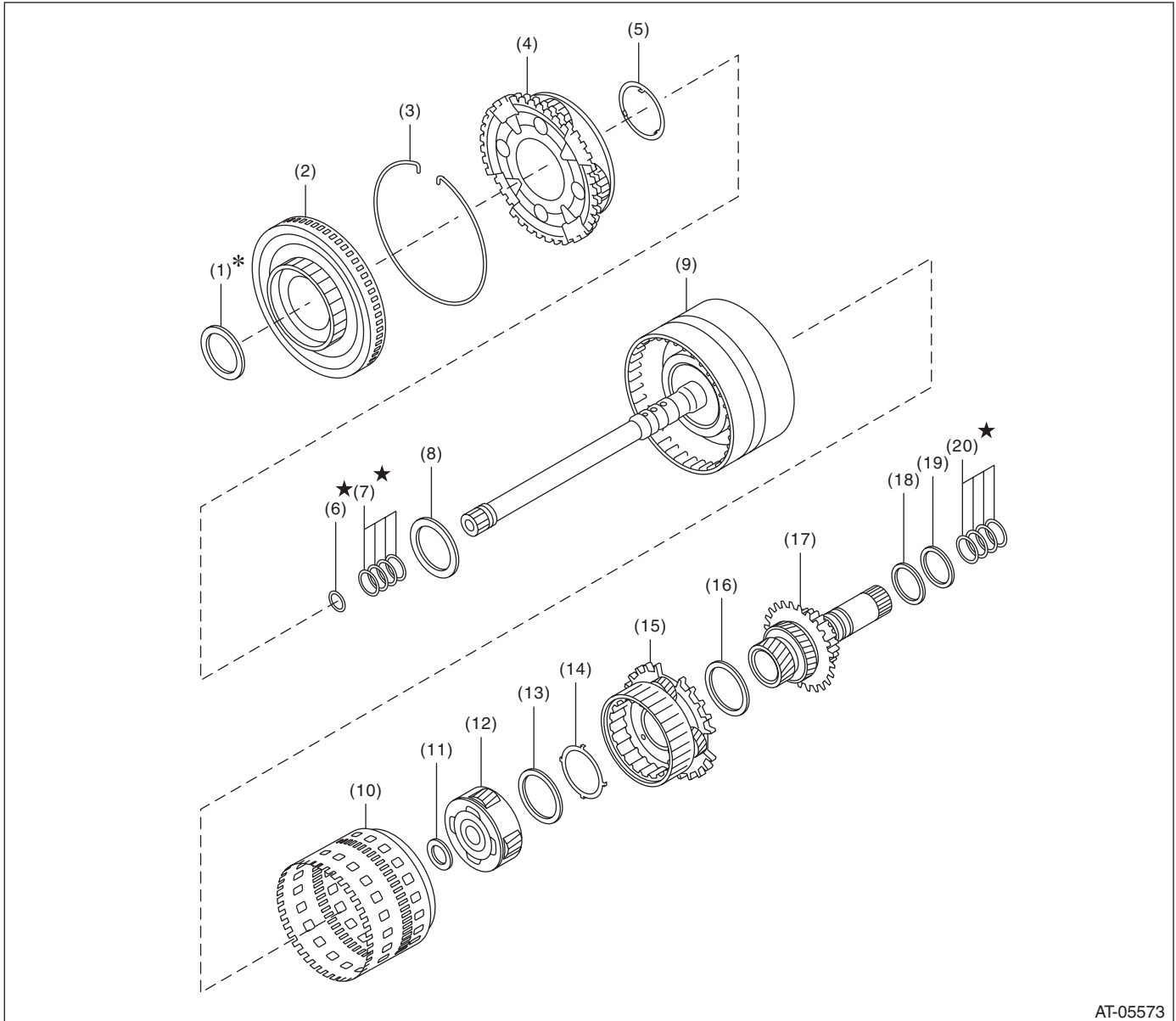
T1: 10 (1.0, 7.4)

T2: 13 (1.3, 9.6)

General Description

AUTOMATIC TRANSMISSION

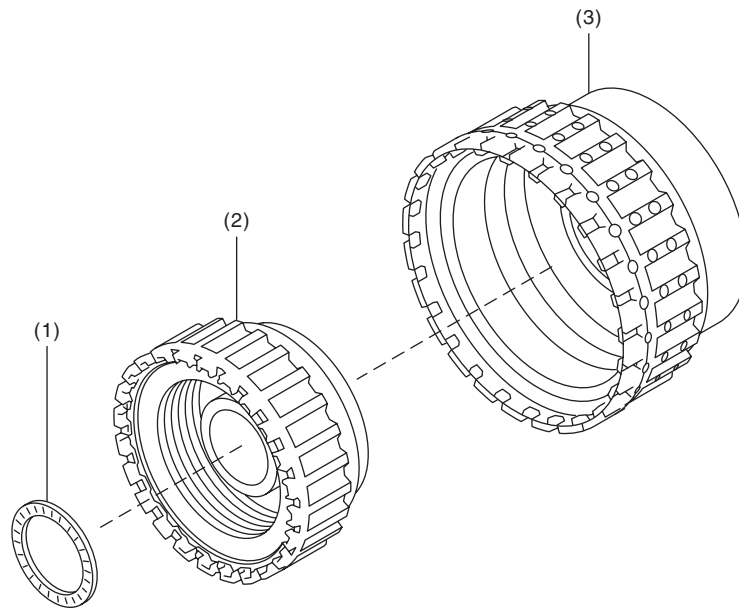
3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



AT-05573

- | | | |
|-------------------------|------------------------------|----------------------------------|
| (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 | |

4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



AT-02018

(1) Thrust bearing

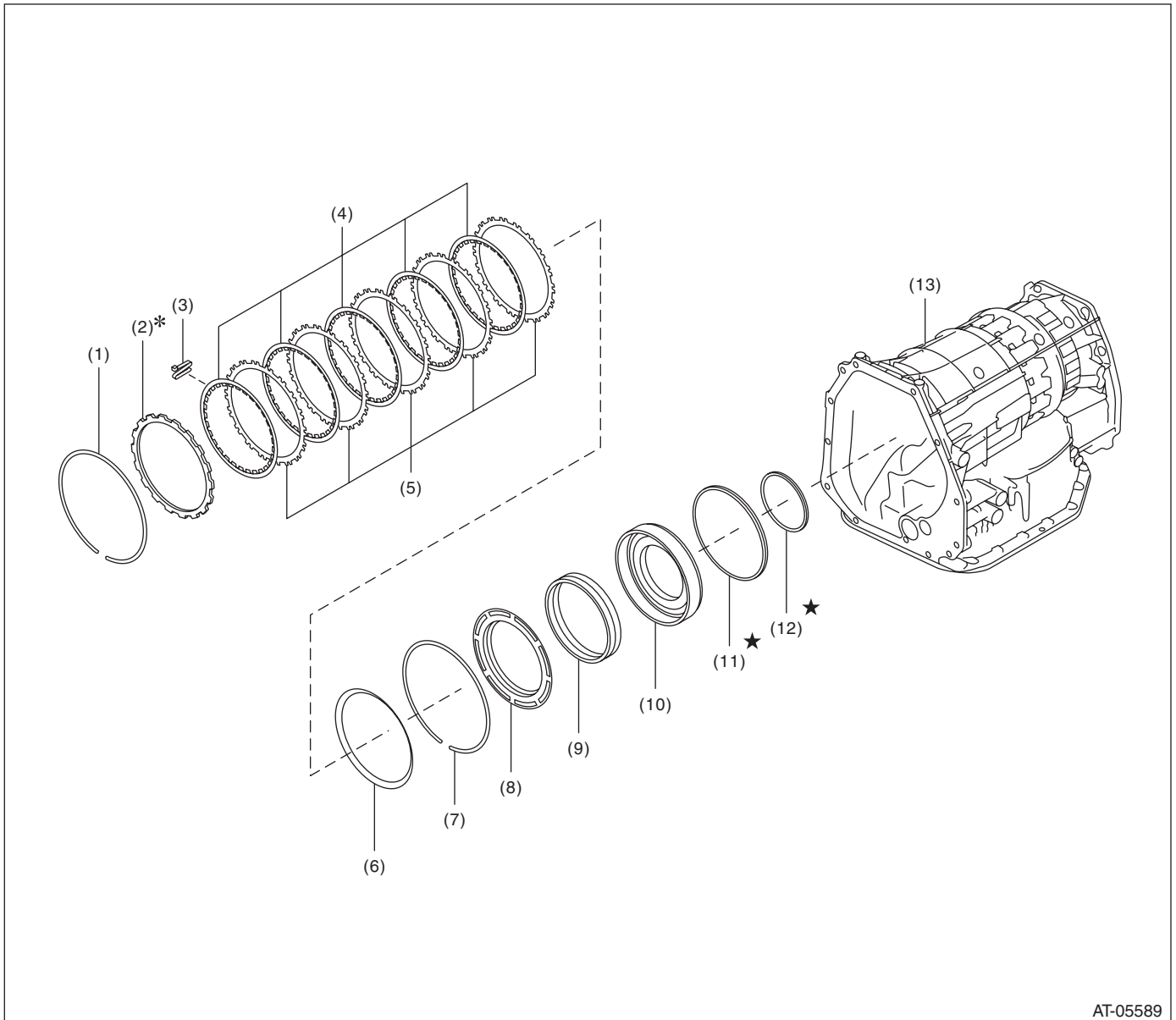
(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

General Description

AUTOMATIC TRANSMISSION

5. REVERSE BRAKE



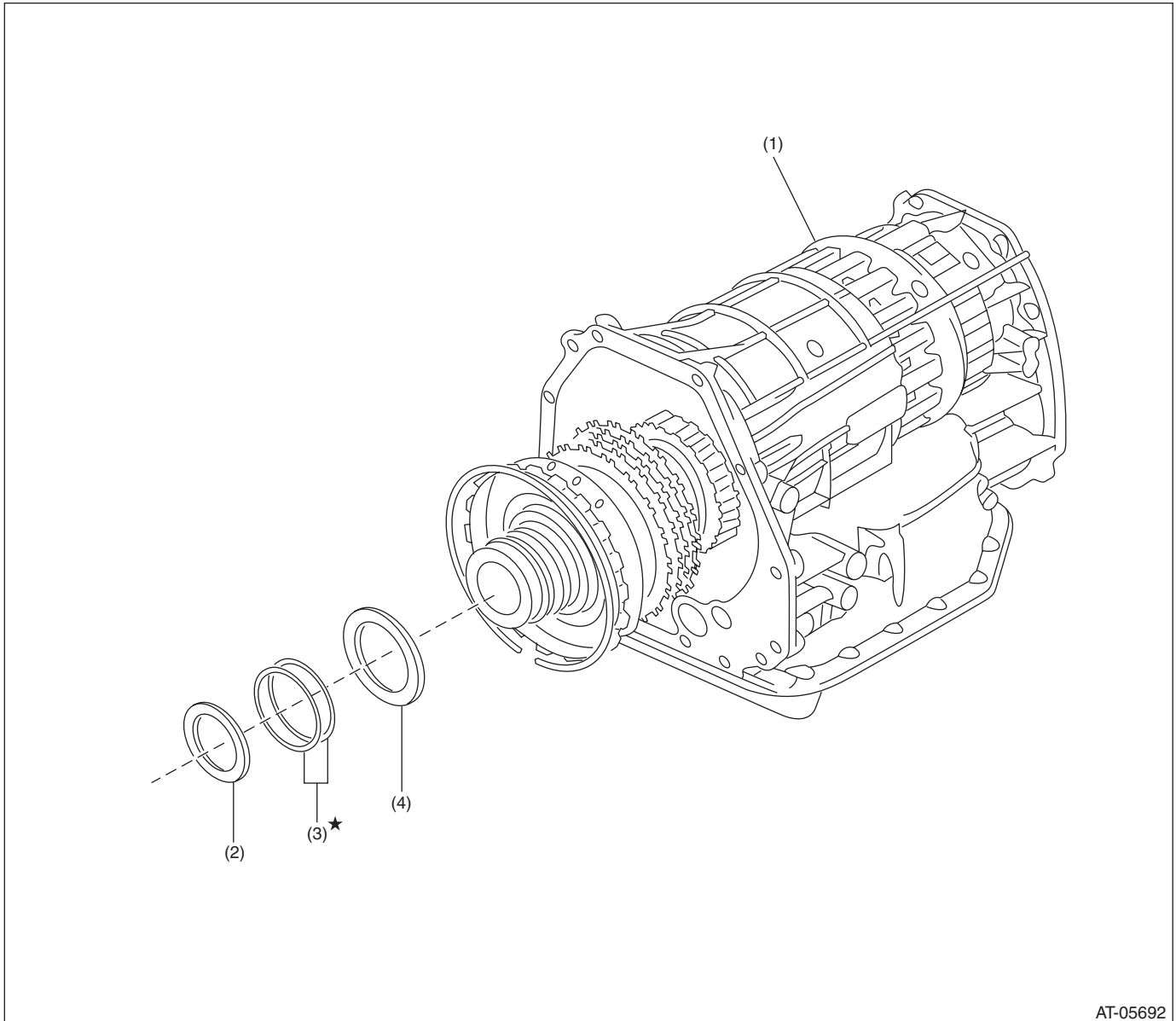
AT-05589

- (1) Snap ring
- (2) Retaining plate
- (3) Leaf spring
- (4) Drive plate
- (5) Driven plate

- (6) Dish plate
- (7) Snap ring
- (8) Retainer
- (9) Return spring
- (10) Reverse brake piston

- (11) D-ring (outer)
- (12) D-ring (inner)
- (13) AT main case

6. SHORT AT ASSEMBLY



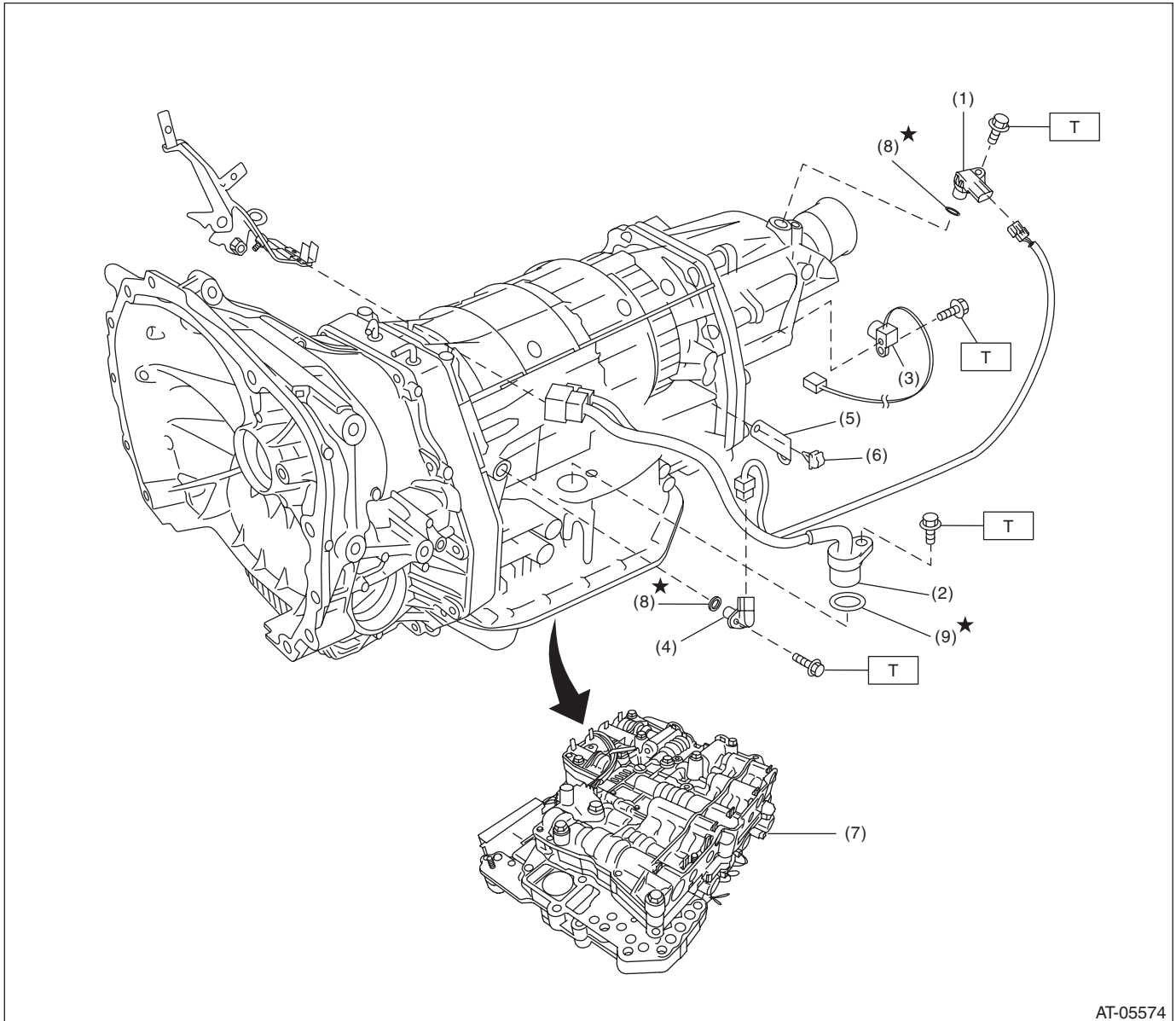
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- | | | |
|-------------------------------------|---------------|--------------------|
| (1) Short AT ASSY (non-disassembly) | (3) Seal ring | (4) Thrust bearing |
| (2) Thrust bearing | | |

General Description

AUTOMATIC TRANSMISSION

7. CONTROL VALVE & TRANSMISSION HARNESS



AT-05574

- (1) Rear vehicle speed sensor
- (2) Transmission harness ASSY
- (3) Front vehicle speed sensor
- (4) Turbine speed sensor 1

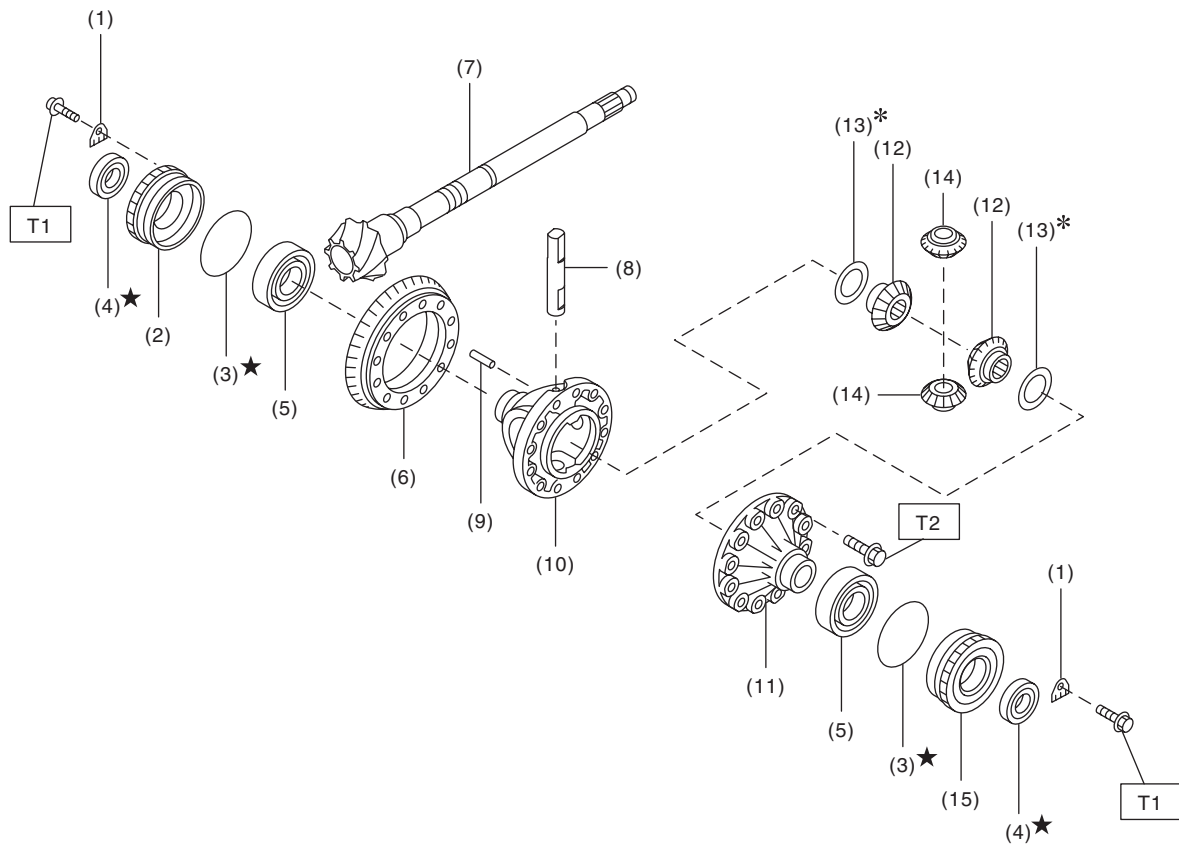
- (5) Harness bracket
- (6) Clip
- (7) Control valve ASSY
- (8) O-ring

- (9) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T: 7 (0.7, 5.2)

8. DIFFERENTIAL GEAR



AT-03807

- | | |
|-----------------------------------|------------------------------------|
| (1) Retainer 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)

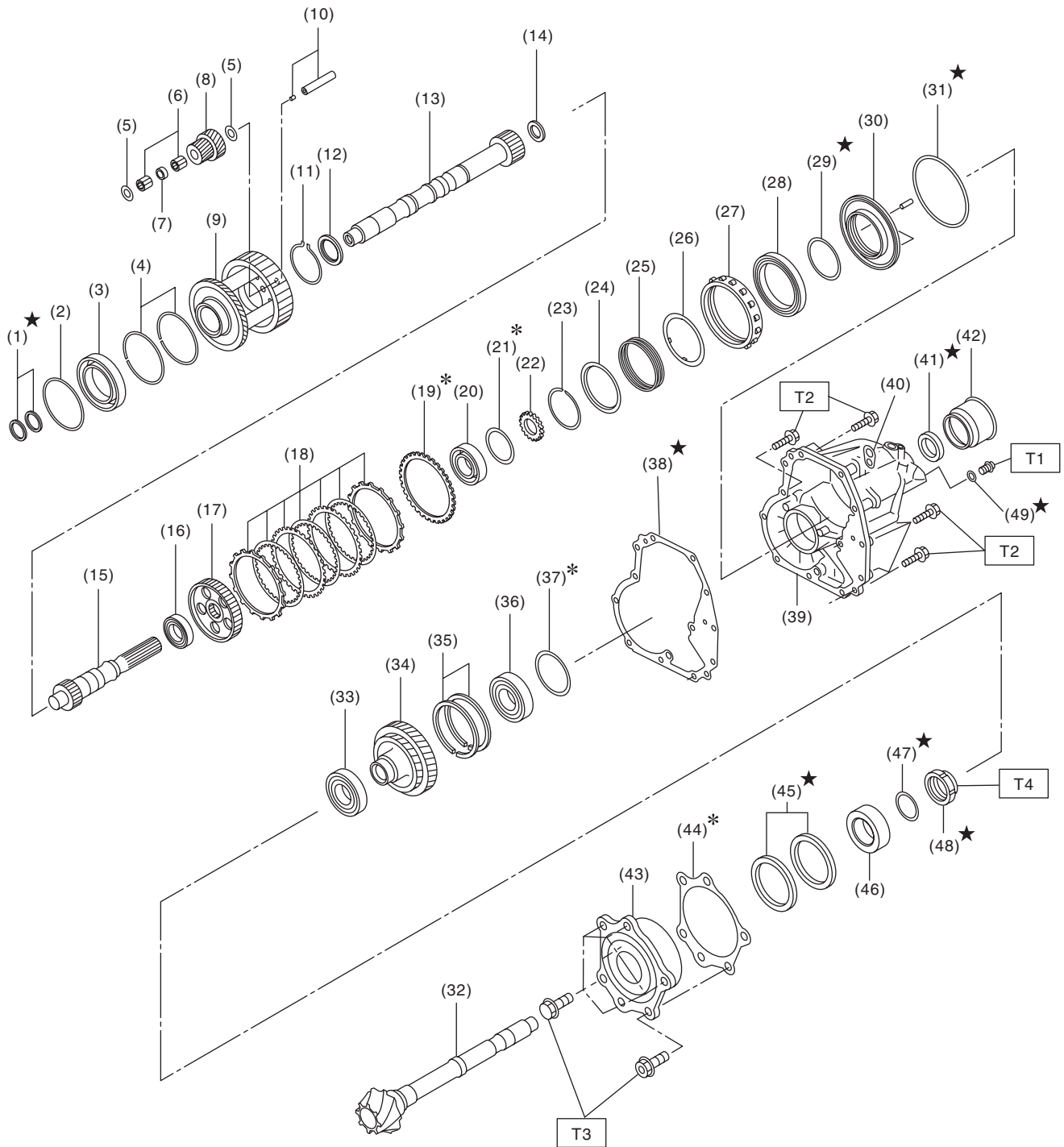
T1: 25 (2.5, 18.4)

T2: 70 (7.1, 51.6)

General Description

AUTOMATIC TRANSMISSION

9. TRANSFER CASE, EXTENSION CASE & REDUCTION GEAR



AT-05595

General Description

AUTOMATIC TRANSMISSION

(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)

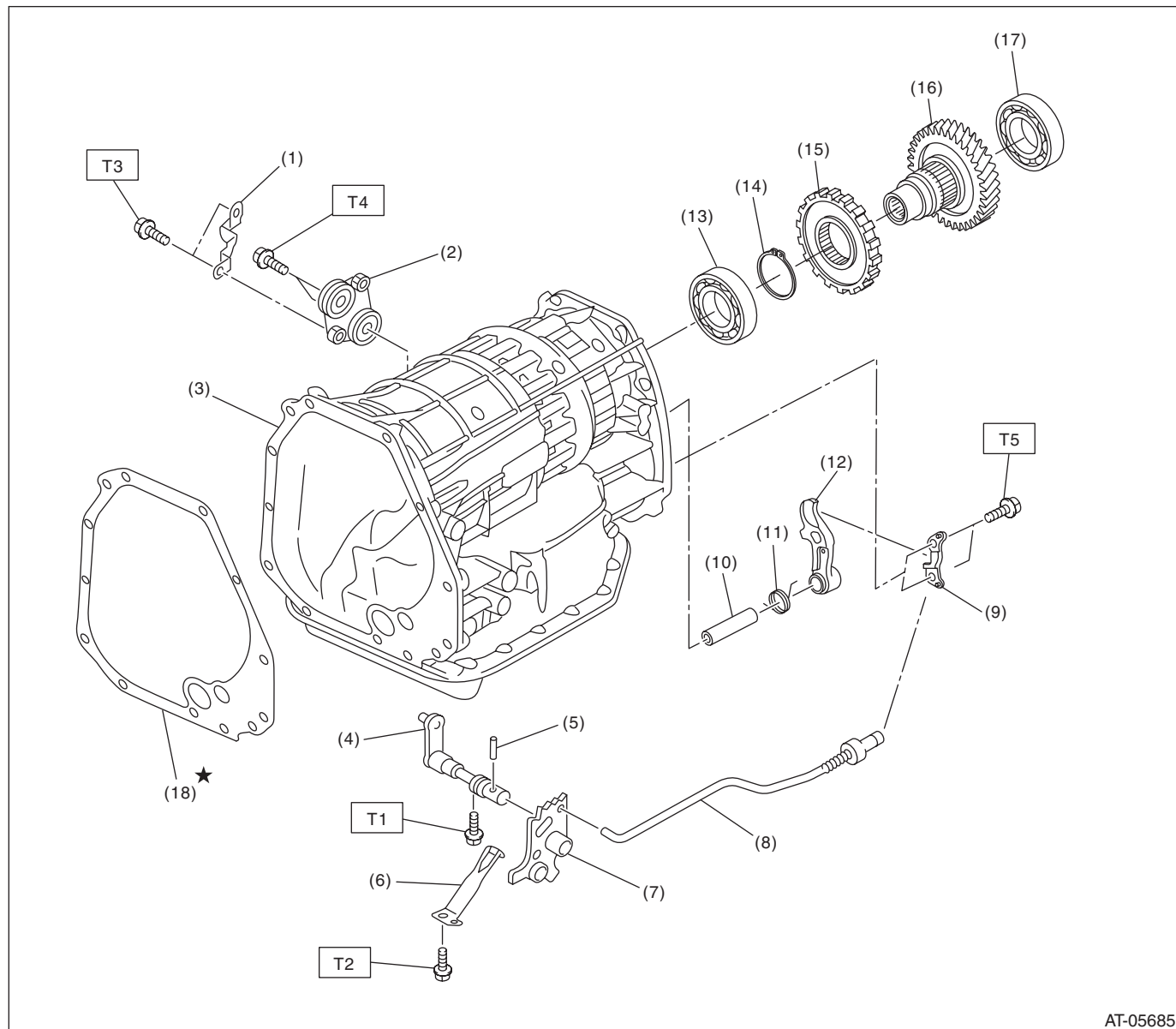
T3: 70 (7.1, 51.6)

T4: 116 (11.8, 85.6)

General Description

AUTOMATIC TRANSMISSION

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)

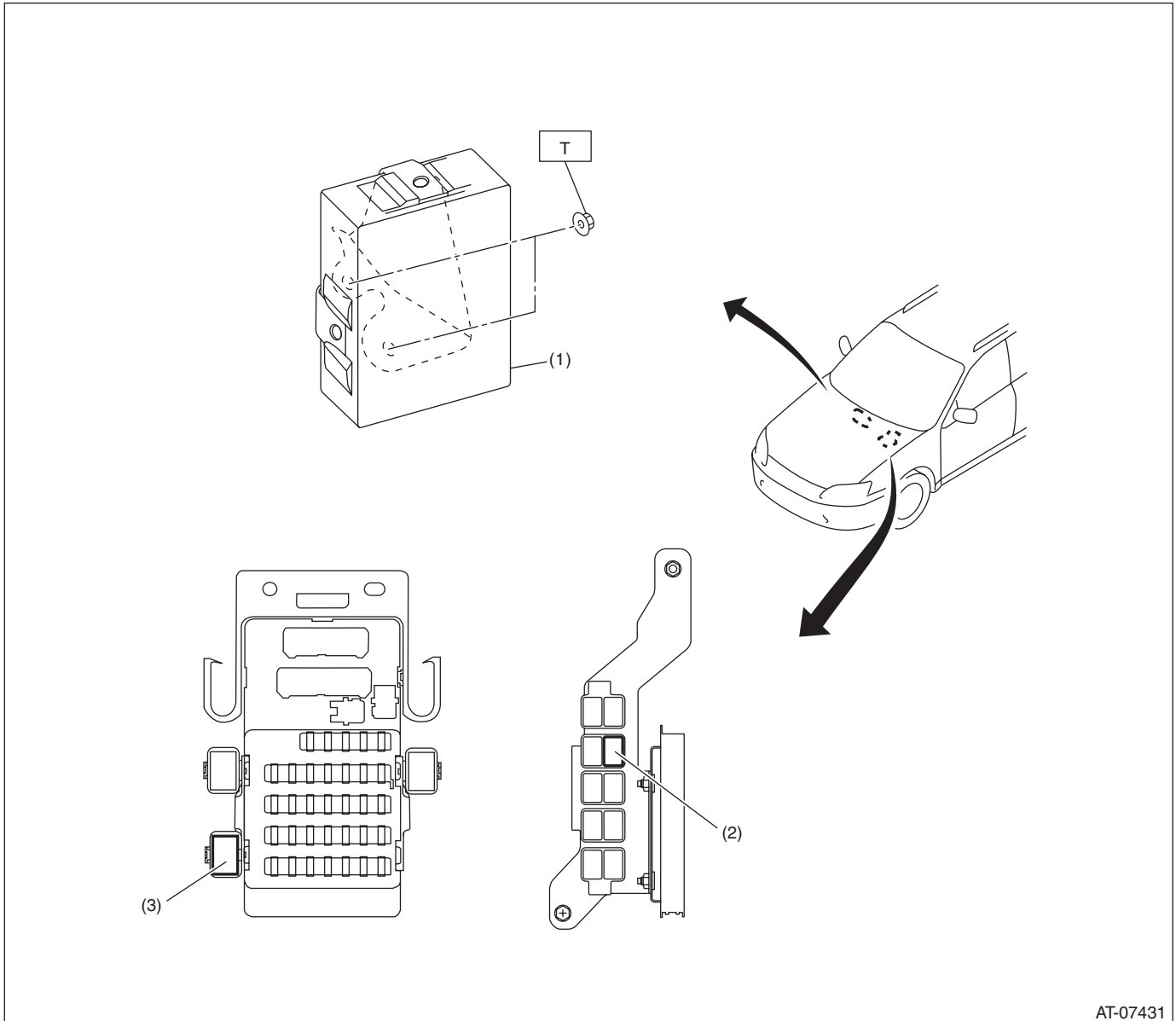
T2: 7 (0.7, 5.2)

T3: 18 (1.8, 13.3)

T4: 25 (2.5, 18.4)

T5: <Ref. to 5AT-75, Parking Pawl.>

11.TRANSMISSION CONTROL MODULE



AT-07431

(1) Transmission control module (TCM)

(3) Back-up light relay (model without push button ignition switch)

(2) Buck-up light relay (model with push button ignition switch)

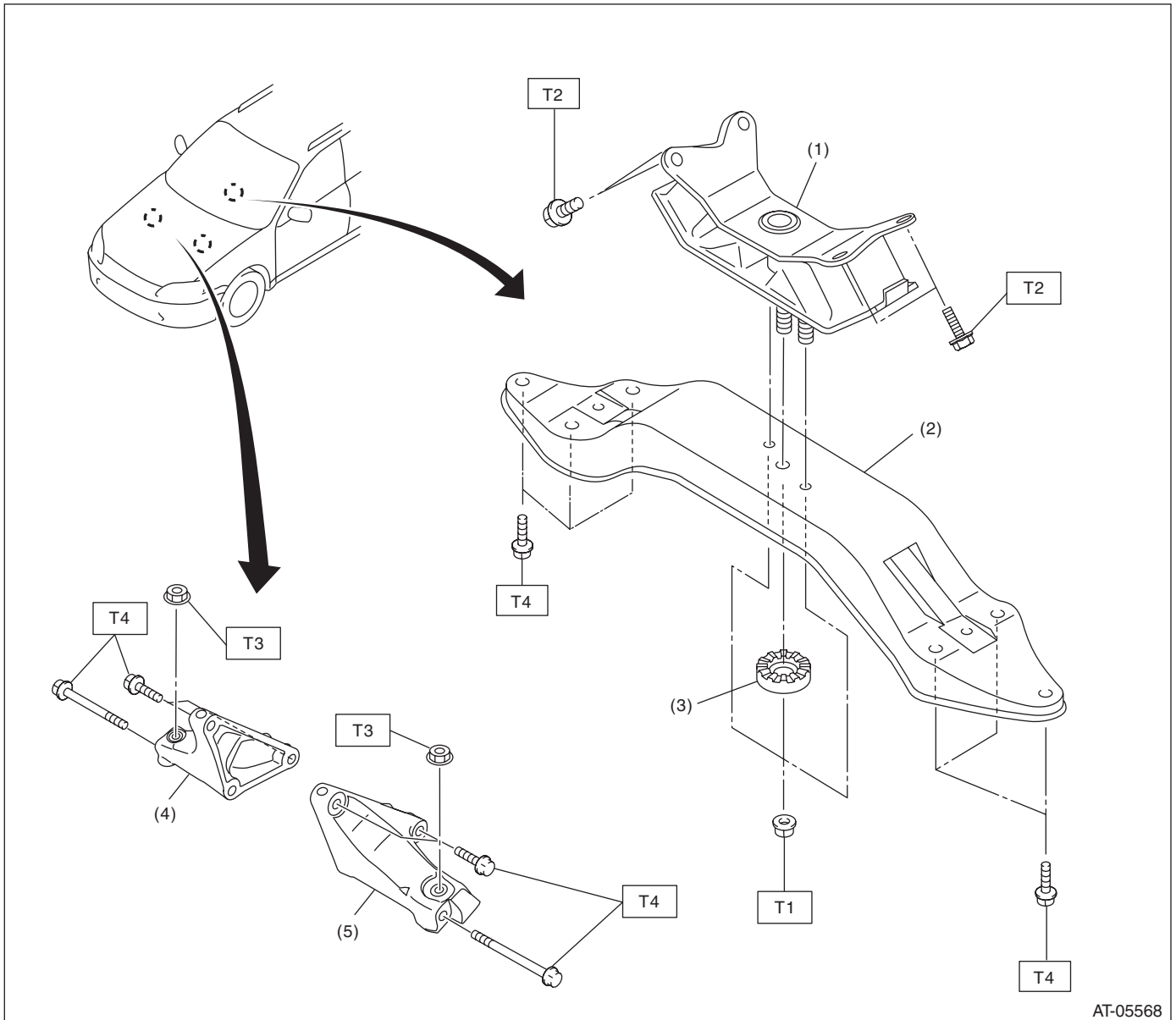
Tightening torque: N·m (kgf-m, ft-lb)

T: 7.5 (0.8, 5.5)

General Description

AUTOMATIC TRANSMISSION

12.TRANSMISSION MOUNTING



- | | |
|-------------------------|---|
| (1) Rear cushion rubber | (4) Transmission main mounting bracket (RH) |
| (2) Crossmember | (5) Transmission main mounting bracket (LH) |
| (3) Stopper | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 35 (3.6, 25.8)

T2: 40 (4.1, 29.5)

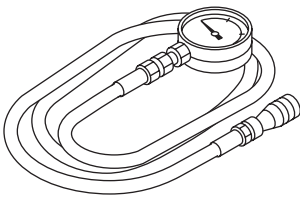
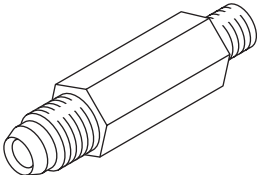
T3: 45 (4.6, 33.2)

T4: 75 (7.6, 55.3)

C: CAUTION

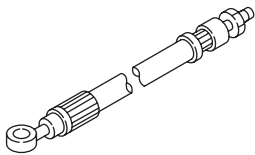
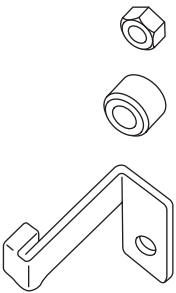
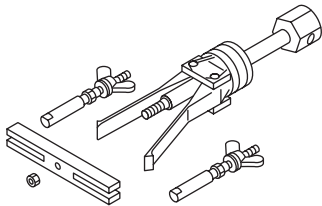
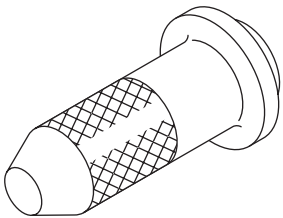
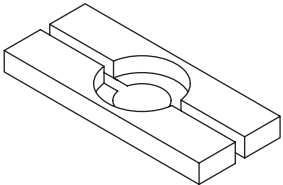
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Until the 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.
- During disassembly or assembly, be sure to use nylon gloves or paper towels. Do not use cloth gloves or waste cloth.

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.

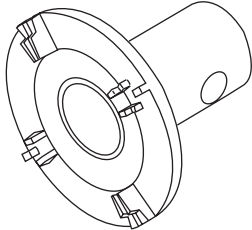
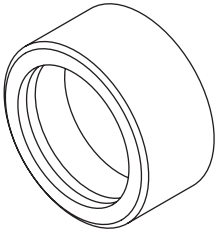
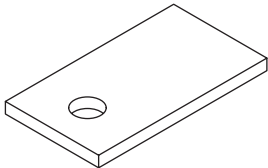
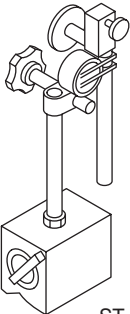
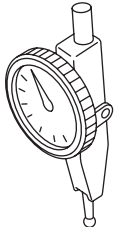
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498897800</p>	498897800	OIL PRESSURE ADAPTER SET	Used for measuring the transfer clutch pressure.
 <p>ST-498277200</p>	498277200	STOPPER SET	<ul style="list-style-type: none"> • Used for removing and installing the automatic transmission assembly. • Used for preventing the torque converter from dropping off.
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> • Used for removing the extension oil seal. • Used for removing the front differential side retainer bearing outer race.
 <p>ST-498057300</p>	498057300	INSTALLER	Used for installing the extension oil seal.
 <p>ST-498077000</p>	498077000	REMOVER	<ul style="list-style-type: none"> • Used for removing the front differential taper roller bearing. • Used for installing the center differential ball bearing.

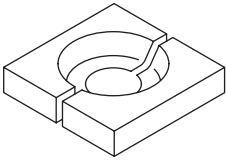
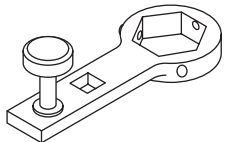
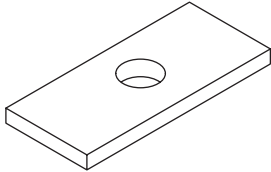
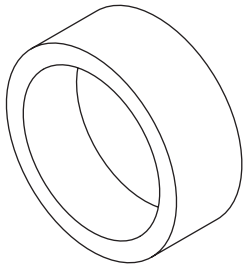
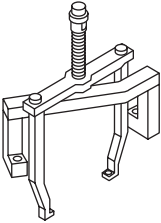
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18658AA020</p>	18658AA020	WRENCH COMPL RETAINER	<ul style="list-style-type: none"> Used for removing and installing the differential side retainer. WRENCH COMPL RETAINER (18630AA010) can also be used.
 <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).
 <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).

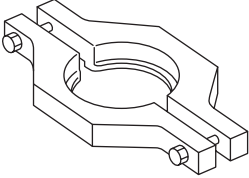
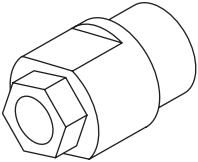
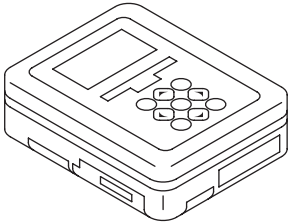
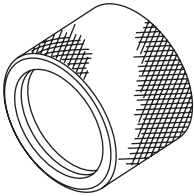
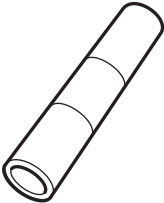
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498517000	498517000	REPLACER	Used for removing the drive pinion shaft front roller bearing.
 ST-499787700	499787700	WRENCH	<ul style="list-style-type: none"> • Used for removing and installing the drive pinion shaft lock nut. • Used for adjusting the front differential hypoid gear backlash.
 ST-398643600	398643600	GAUGE	Used for measuring total end play, extension end play and drive pinion height.
 ST-398744300	398744300	PISTON GUIDE	Used for measuring height from mating surface of the main case to pressure plate.
 ST-499737100	499737100	PULLER SET	<ul style="list-style-type: none"> • Used for removing the reduction driven gear assembly. • Used together with GEAR HOLDER (18680AA010) and SUPPORT PULLER (18766AA000).

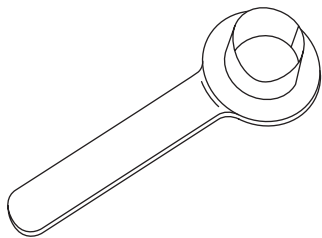
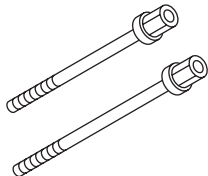
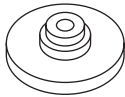
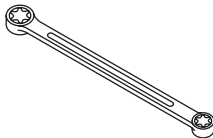
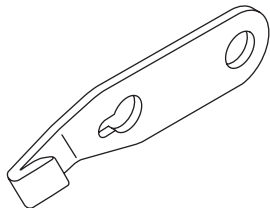
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498077600</p>	498077600	REMOVER	Used for removing the center differential 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. • Used for adjusting preload on the front differential side bearing.
 <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.
 <p>ST18654AA000</p>	18654AA000	INSTALLER	Used for installing the reduction driven gear ball bearing.

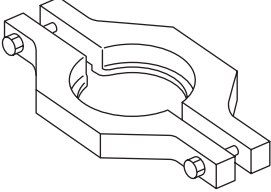
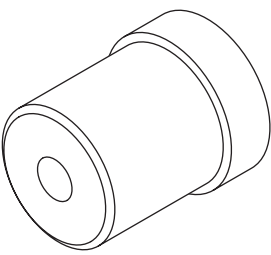
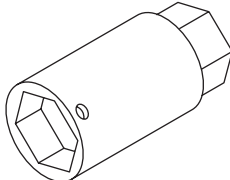
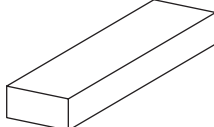
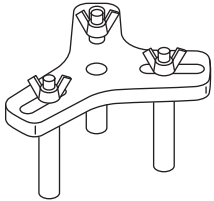
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST28399SA010	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.
 ST18763AA000	18763AA000	COMPRESSOR SHAFT	Used for disassembling and assembling front brake clutch and reverse brake clutch.
 ST18765AA000	18765AA000	COMPRESSOR SUPPORT	Used for disassembling and assembling front brake clutch and reverse brake clutch.
 ST18676AA020	18676AA020	TORX® WRENCH	Used for removing and installing the torque converter case.
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping the drive plate rotation when removing and installing the drive plate.

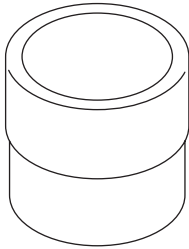
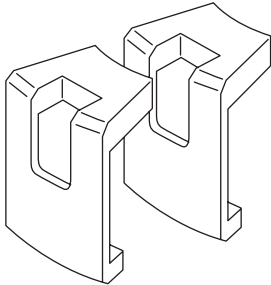
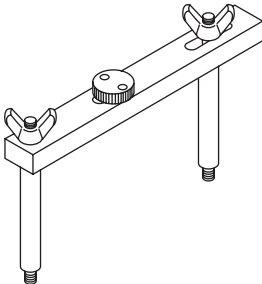
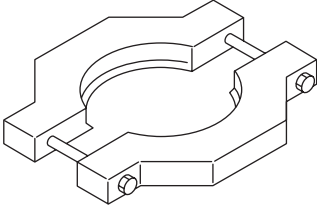
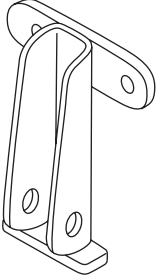
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <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 converter case oil seal.
 <p>ST-499787500</p>	499787500	ADAPTER	<ul style="list-style-type: none"> • Used for installing and removing drive pinion shaft lock nut. • Used for adjusting preload on the front differential side bearing.
 <p>ST-499575400</p>	499575400	GAUGE	Used for adjusting the total end play (selecting the reduction driven gear shim).
 <p>ST18762AA000</p>	18762AA000	COMPRESSOR SPECIAL TOOL	<ul style="list-style-type: none"> • Used for disassembling and assembling front brake clutch and reverse brake clutch. • Used together with COMPRESSOR SHAFT (18763AA000) and COMPRESSOR SUPPORT (18765AA000).

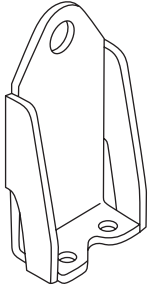
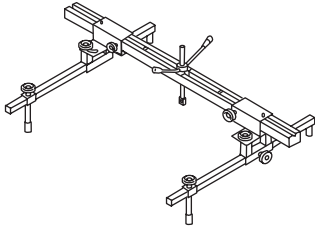
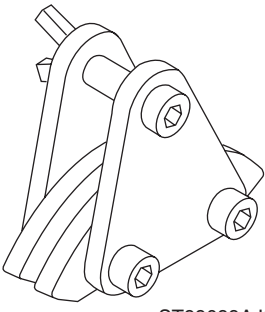
General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499755602</p>	499755602	PRESS	Used for installing the parking gear.
 <p>ST18680AA010</p>	18680AA010	GEAR HOLDER	Used for removing the reduction driven gear assembly. (2-piece set)
 <p>ST18766AA000</p>	18766AA000	SUPPORT PULLER	Used for removing the reduction driven gear assembly.
 <p>ST18767AA000</p>	18767AA000	REMOVER	Used for removing the parking gear.
 <p>ST41099AJ010</p>	41099AJ010	SPECIAL TOOL H6	<ul style="list-style-type: none"> • Used for removing and installing transmission. • For H6 engine.

General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18360AA020</p>	18360AA020	HANGER	<ul style="list-style-type: none"> Used for removing and installing transmission. For H6 engine.
 <p>ST99099AJ000</p>	99099AJ000	ENGINE HANGER	<ul style="list-style-type: none"> Used for removing and installing transmission. Used together with CHAIN BALANCER (99099AJ010) and sling chain (general tool).
 <p>ST99099AJ010</p>	99099AJ010	CHAIN BALANCER	<ul style="list-style-type: none"> Used for removing and installing transmission. 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.

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 the differential gear oil drain plug.
Snap ring pliers	Used for removing and installing each snap ring.
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 (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. <ul style="list-style-type: none"> Load capacity: 250 kg (551 lb) or more Use two pieces.
Angle gauge	Used for tightening parking support.