

# 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	1.9
Nominal diameter	250 mm (9.84 in)
Stall speed (at sea level)	2,300 — 2,800 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	4 sets	
One-way clutch (sprague type)	3 sets	

##### 4. TRANSMISSION GEAR RATIO

1st	3.841
2nd	2.352
3rd	1.529
4th	1.000
5th	0.839
Rev.	2.764

##### 5. PLANETARY GEAR AND PLATE

Number of front internal gear teeth	102
Number of front carrier teeth	24
Number of front sun gear teeth	54
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	98
Number of rear carrier teeth	18
Number of rear sun gear teeth	62
Number of front brake drive plates	2
Number of input clutch drive plates	5
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	4
Number of low coast brake drive plates	3

##### 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 (Part No. K0140Y0700) Recommended fluid: IDEMITSU ATF HP CASTROL TRANSMAX J PENNZOIL QUAKERSTATE • PENNZOIL ATF-J NOTE: Using of recommended fluid is permitted only on the area where the specified 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

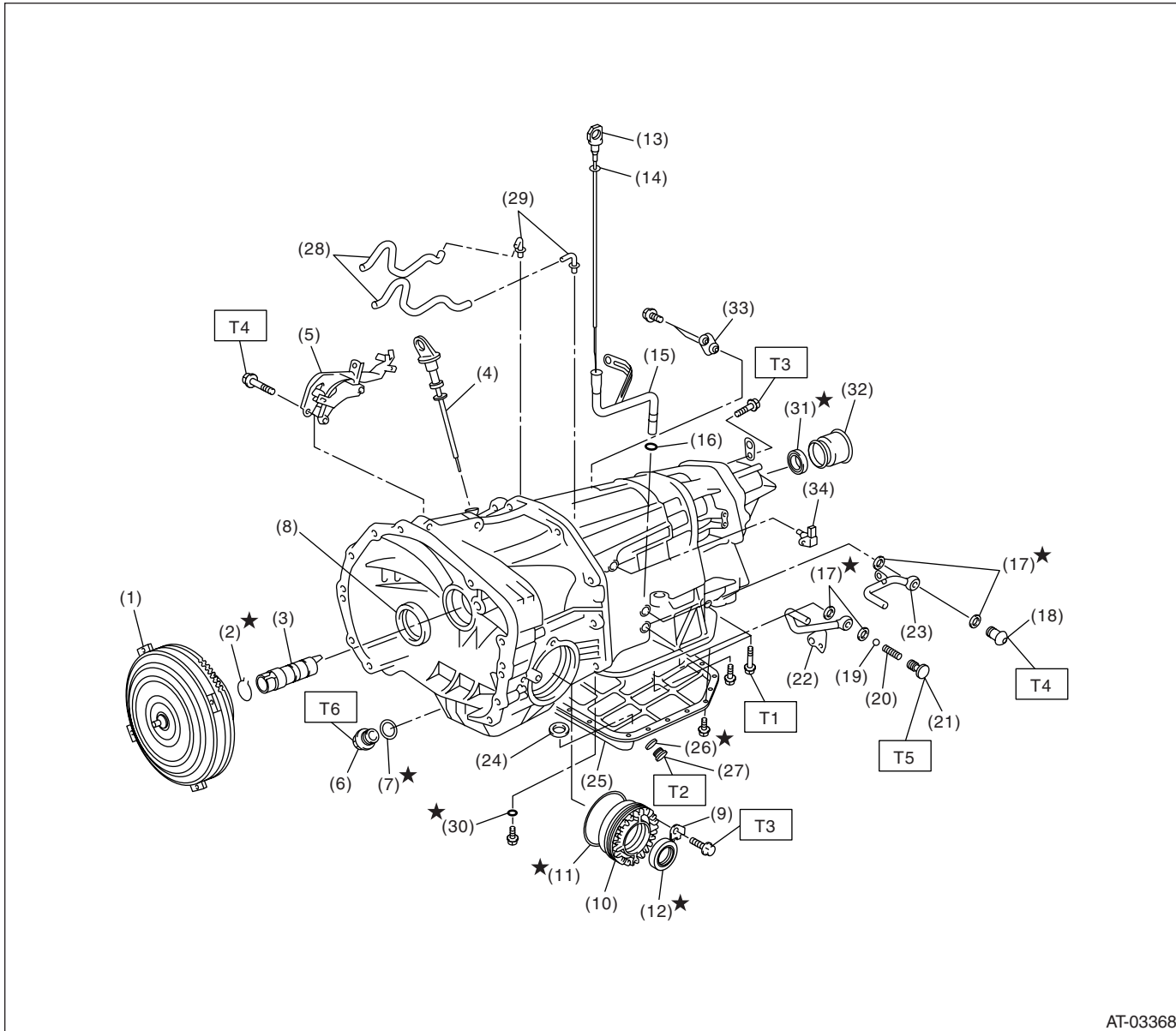
Lubrication oil	
	<p>(1) Item</p> <p>(2) Front differential gear oil</p> <p>(3) API standard</p> <p>(4) SAE viscosity No. and applicable temperature</p>
Front differential gear oil capacity ℓ (US qt, Imp qt)	1.3 — 1.5 (1.4 — 1.6, 1.1 — 1.3)

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### B: COMPONENT

#### 1. TORQUE CONVERTER CLUTCH & TRANSMISSION ASSEMBLY



AT-03368

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

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

**T1: 5 (0.5, 3.7)**

**T2: 20 (2.0, 14.8)**

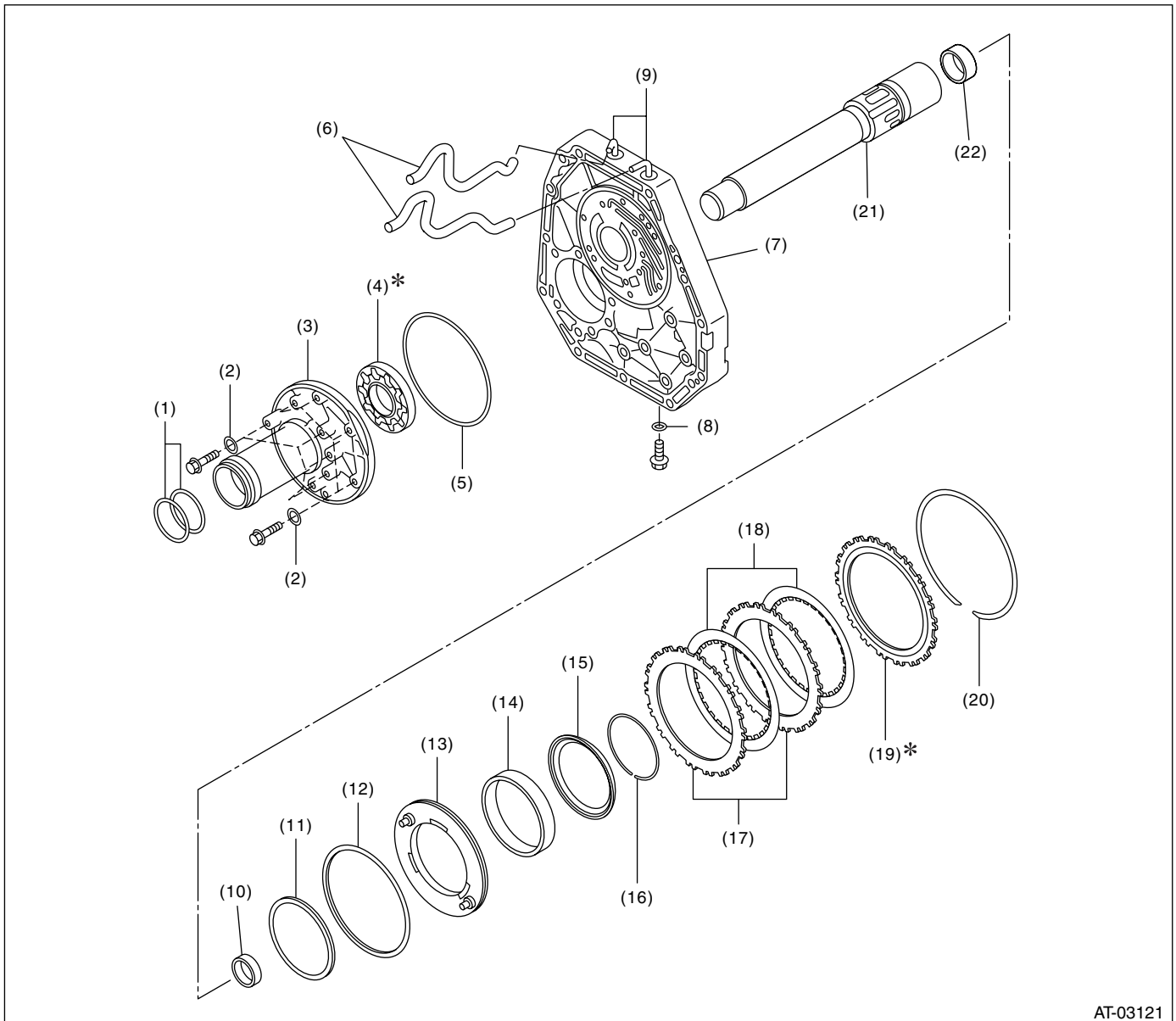
**T3: 25 (2.5, 18)**

**T4: 40 (4.1, 29.5)**

**T5: 45 (4.6, 33.2)**

**T6: 70 (7.1, 51.6)**

## 2. OIL PUMP & FRONT BRAKE



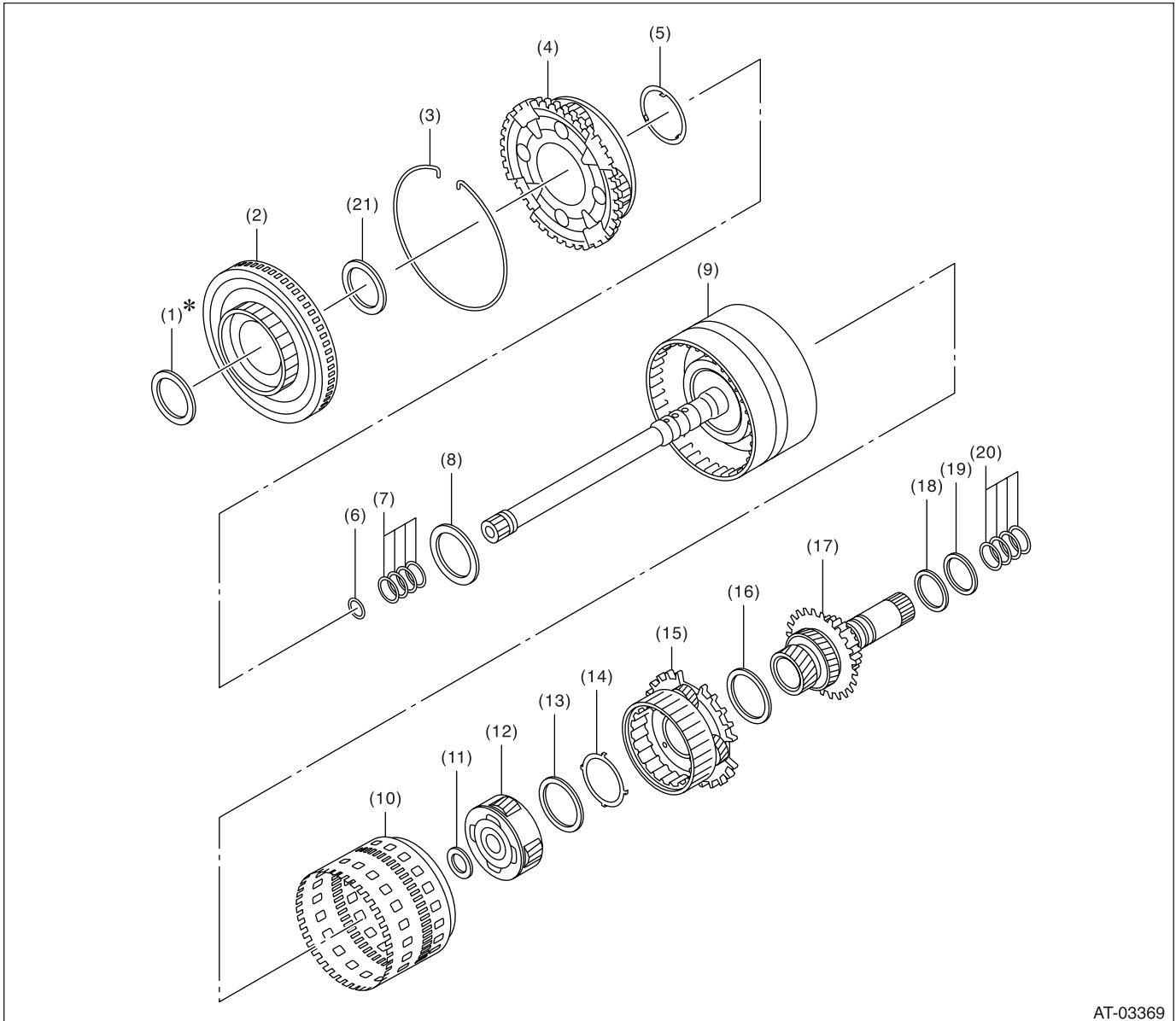
AT-03121

- |                       |                         |                     |
|-----------------------|-------------------------|---------------------|
| (1) O-ring            | (9) Nipple              | (16) Snap ring      |
| (2) Washer            | (10) Needle bearing     | (17) Driven plate   |
| (3) Oil pump housing  | (11) D-ring (Inner)     | (18) Drive plate    |
| (4) Oil pump rotor    | (12) D-ring (Outer)     | (19) Retainer plate |
| (5) O-ring            | (13) Front brake piston | (20) Snap ring      |
| (6) Air breather hose | (14) Return spring      | (21) Stator shaft   |
| (7) Oil pump cover    | (15) Retainer           | (22) Needle bearing |
| (8) O-ring            |                         |                     |

# General Description

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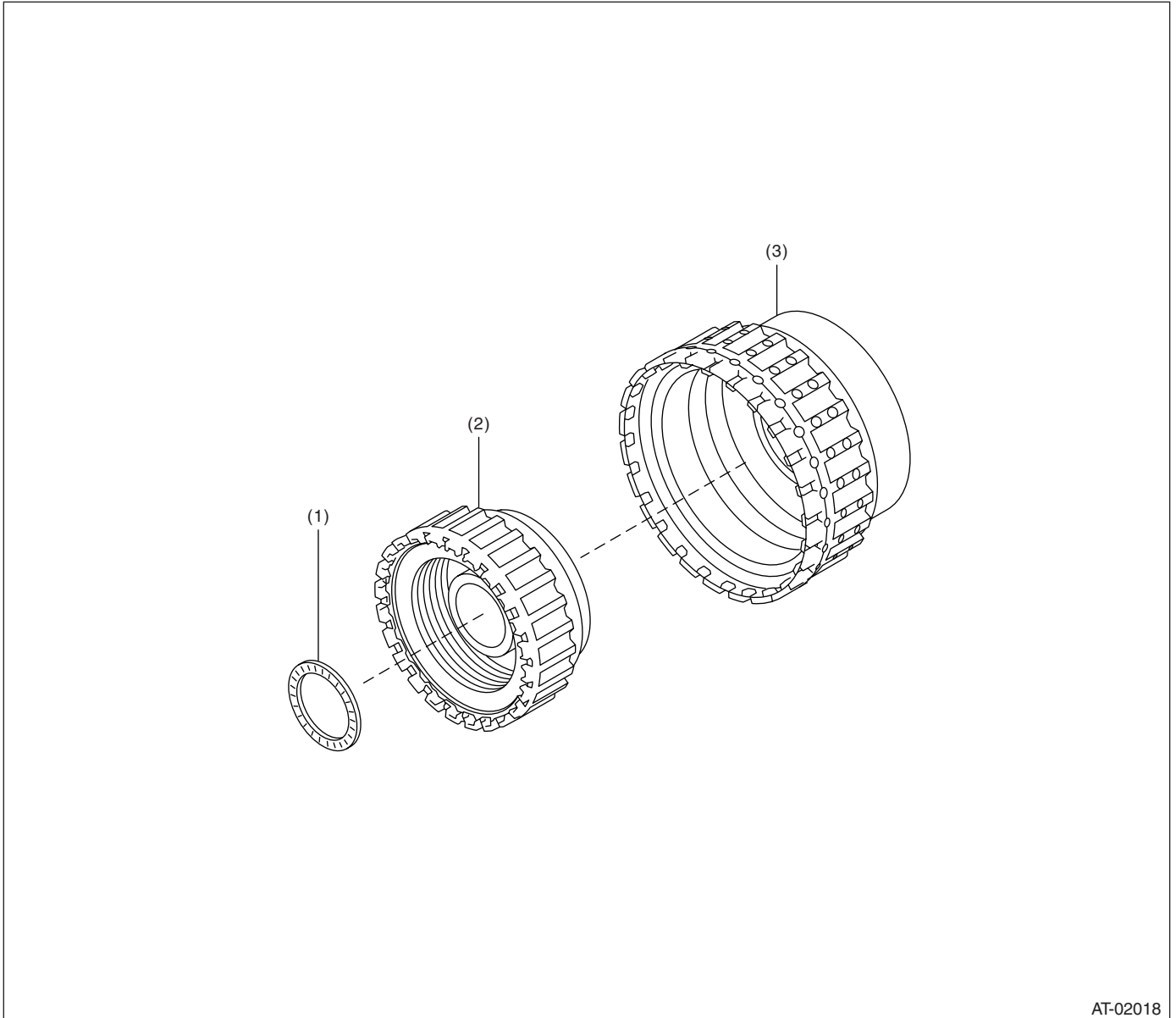
## 3. FRONT PLANETARY CARRIER AND MIDDLE & REAR PLANETARY CARRIER



AT-03369

- |                         |                              |                                  |
|-------------------------|------------------------------|----------------------------------|
| (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            | (21) Thrust bearing              |

## 4. DIRECT CLUTCH AND HIGH & LOW REVERSE CLUTCH



AT-02018

(1) Thrust bearing

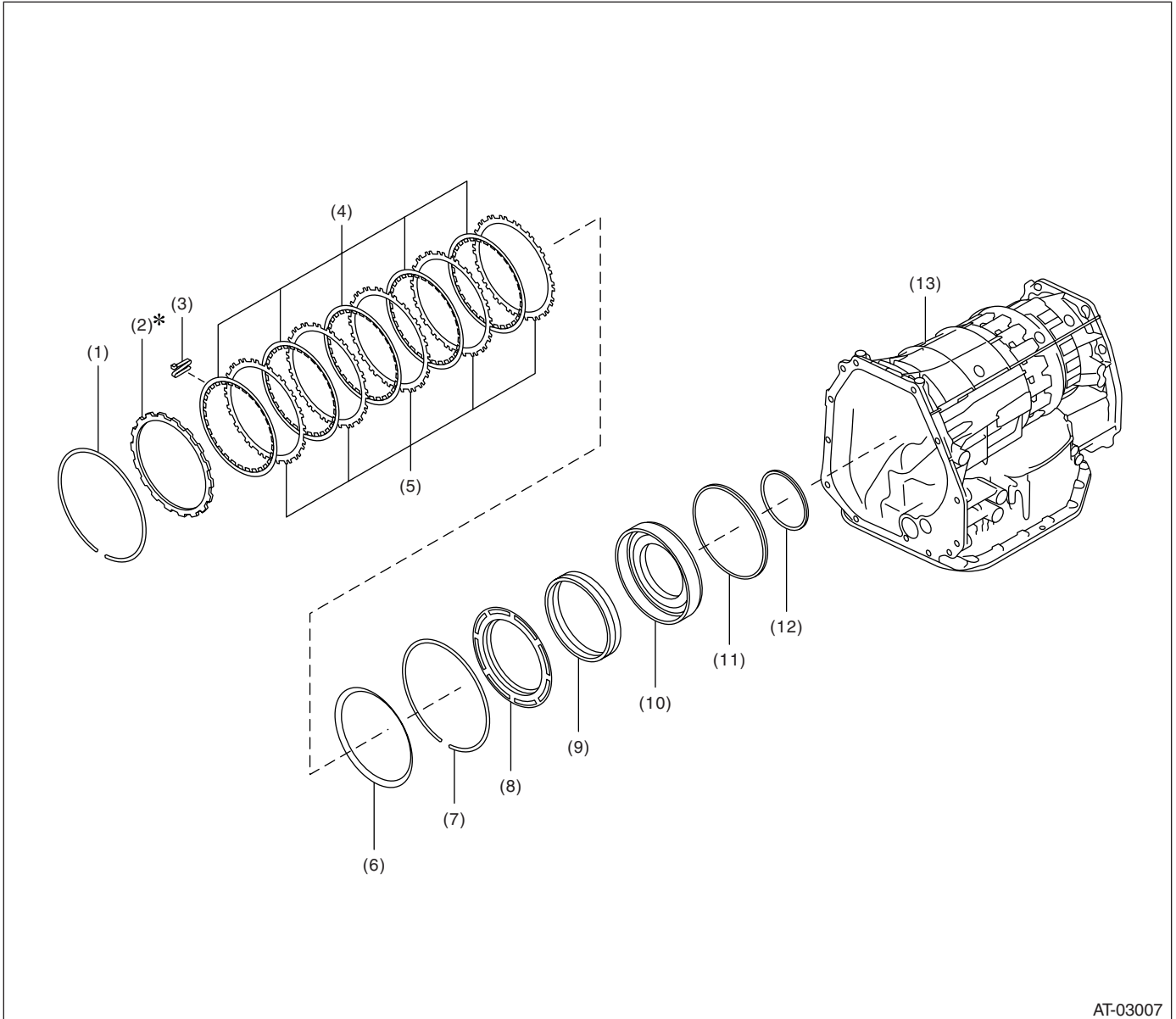
(2) High & low reverse clutch ASSY

(3) Direct clutch ASSY

# General Description

## AUTOMATIC TRANSMISSION

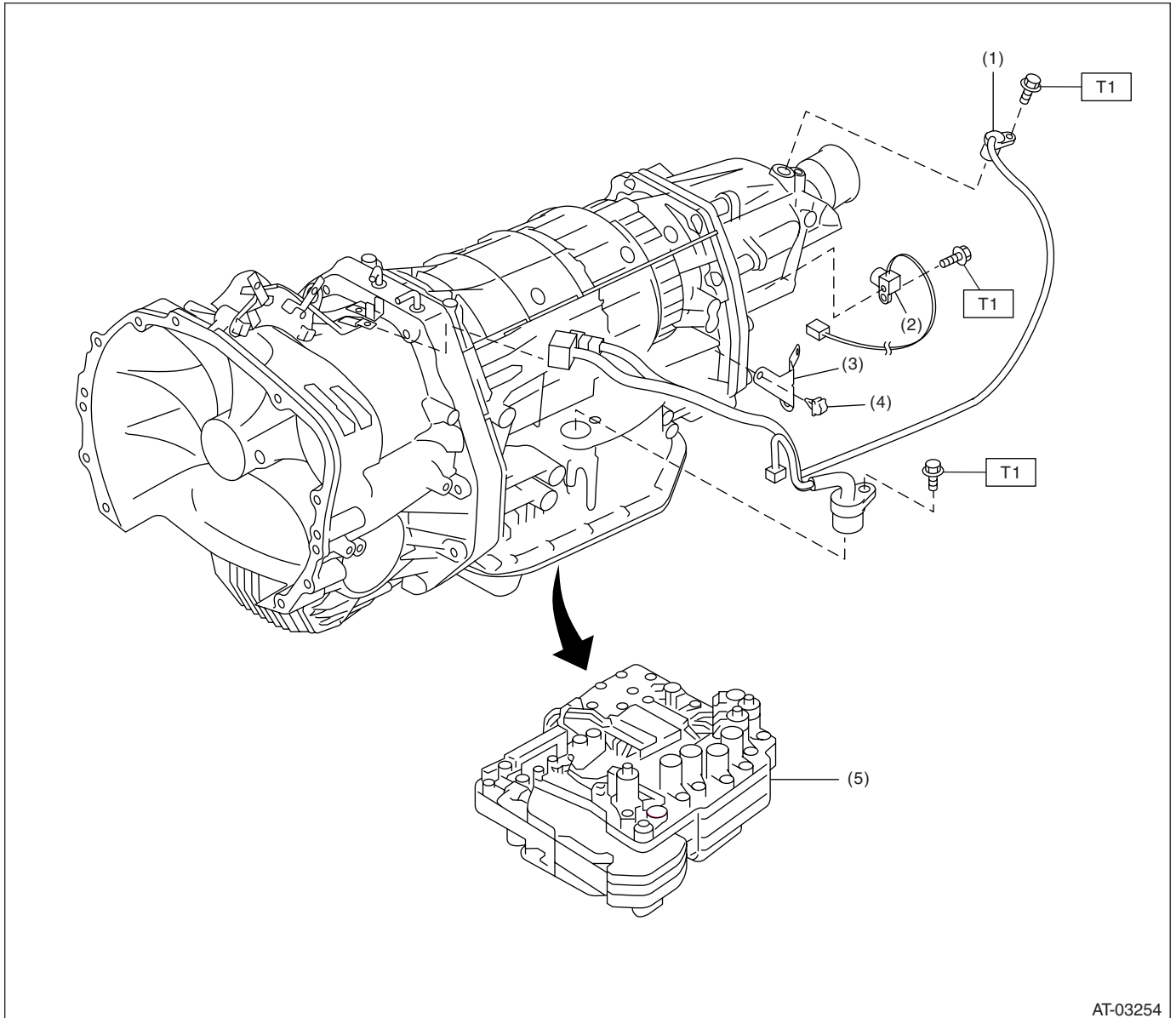
### 5. REVERSE BRAKE



AT-03007

- |                    |                 |                           |
|--------------------|-----------------|---------------------------|
| (1) Snap ring      | (6) Dish plate  | (10) Reverse brake piston |
| (2) Retainer 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   |                 |                           |

## 6. CONTROL VALVE & TRANSMISSION HARNESS



AT-03254

- |                                |                        |
|--------------------------------|------------------------|
| (1) Transmission harness ASSY  | (4) Clip               |
| (3) Harness bracket            | (5) Control valve ASSY |
| (2) Front vehicle speed sensor |                        |

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

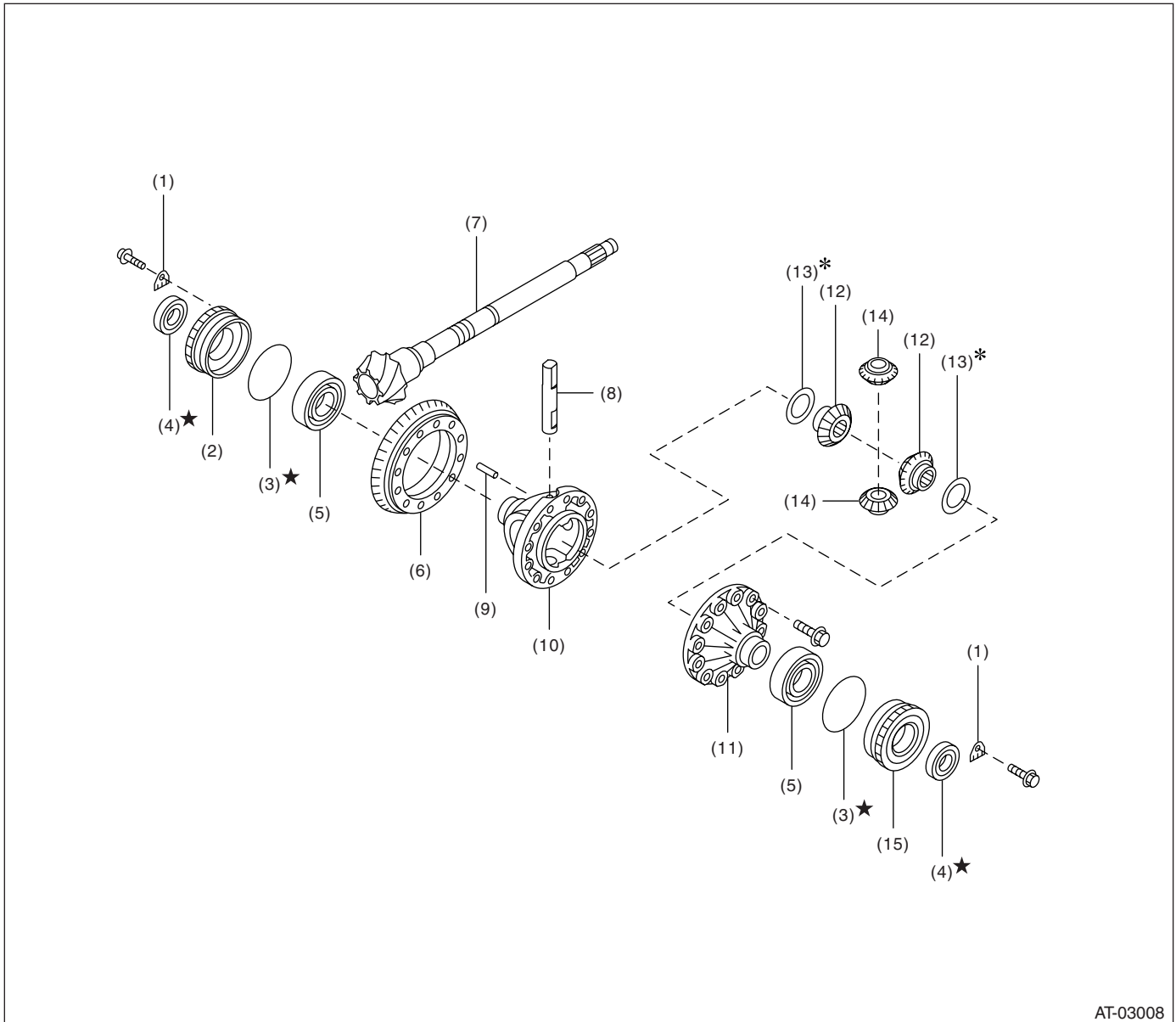
**T1: 7(0.7, 5.2)**



# General Description

## AUTOMATIC TRANSMISSION

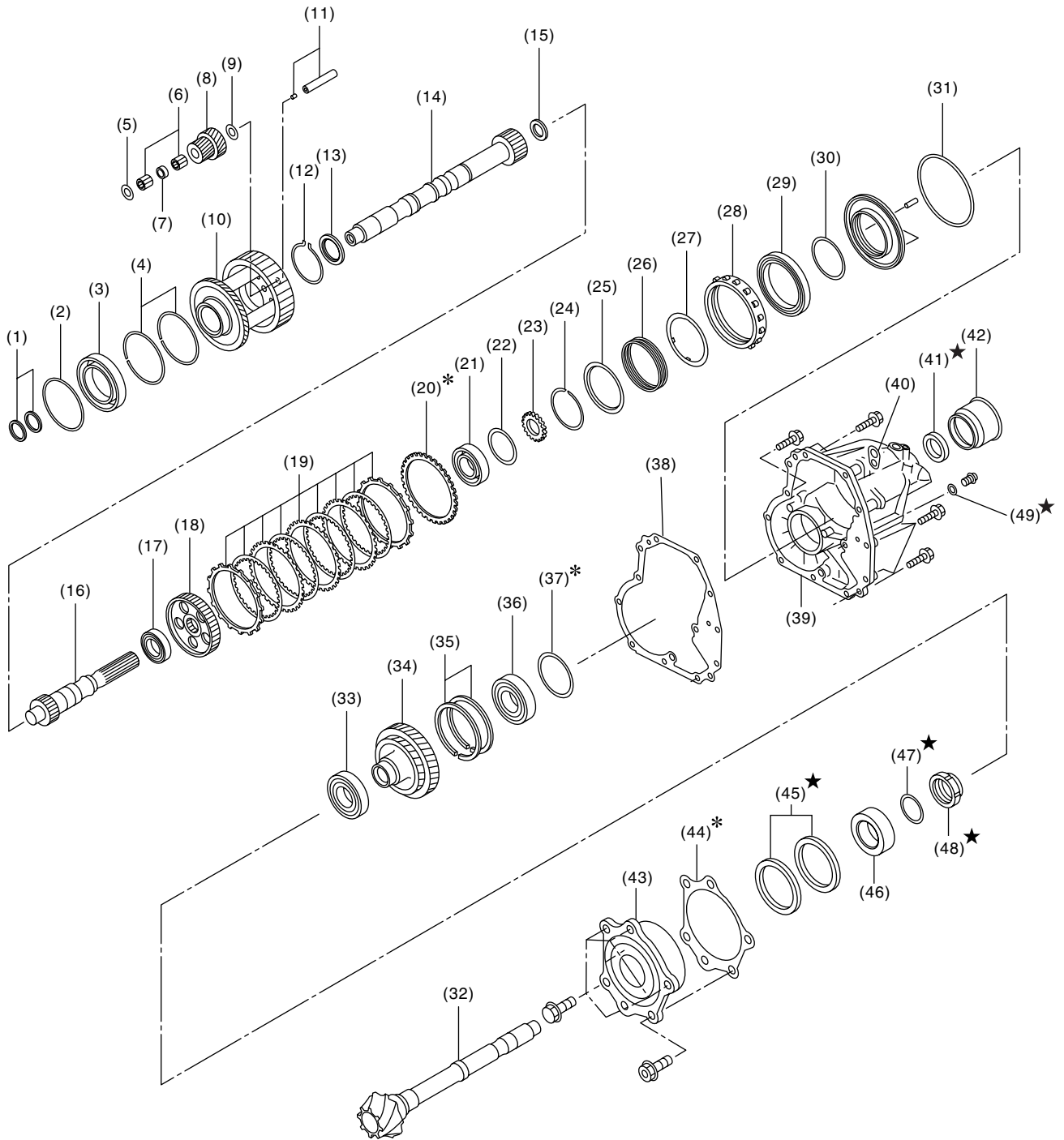
### 7. DIFFERENTIAL GEAR



AT-03008

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

### 8. TRANSFER CASE, EXTENSION CASE & REDUCTION GEAR



AT-03247

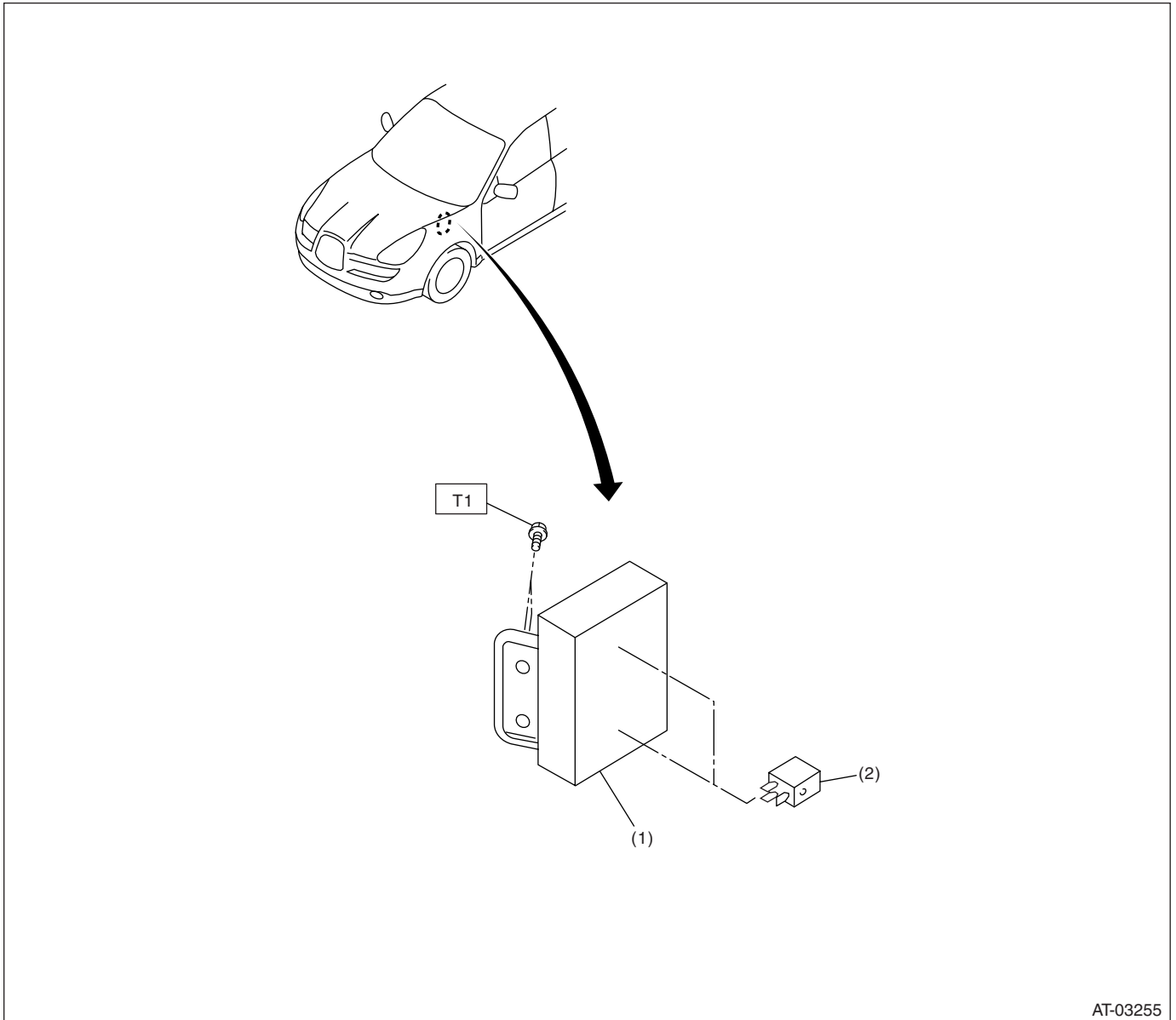
# General Description

## AUTOMATIC TRANSMISSION

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

## 9. TRANSMISSION CONTROL MODULE



AT-03255

(1) Transmission control module  
(TCM)

(2) Relay

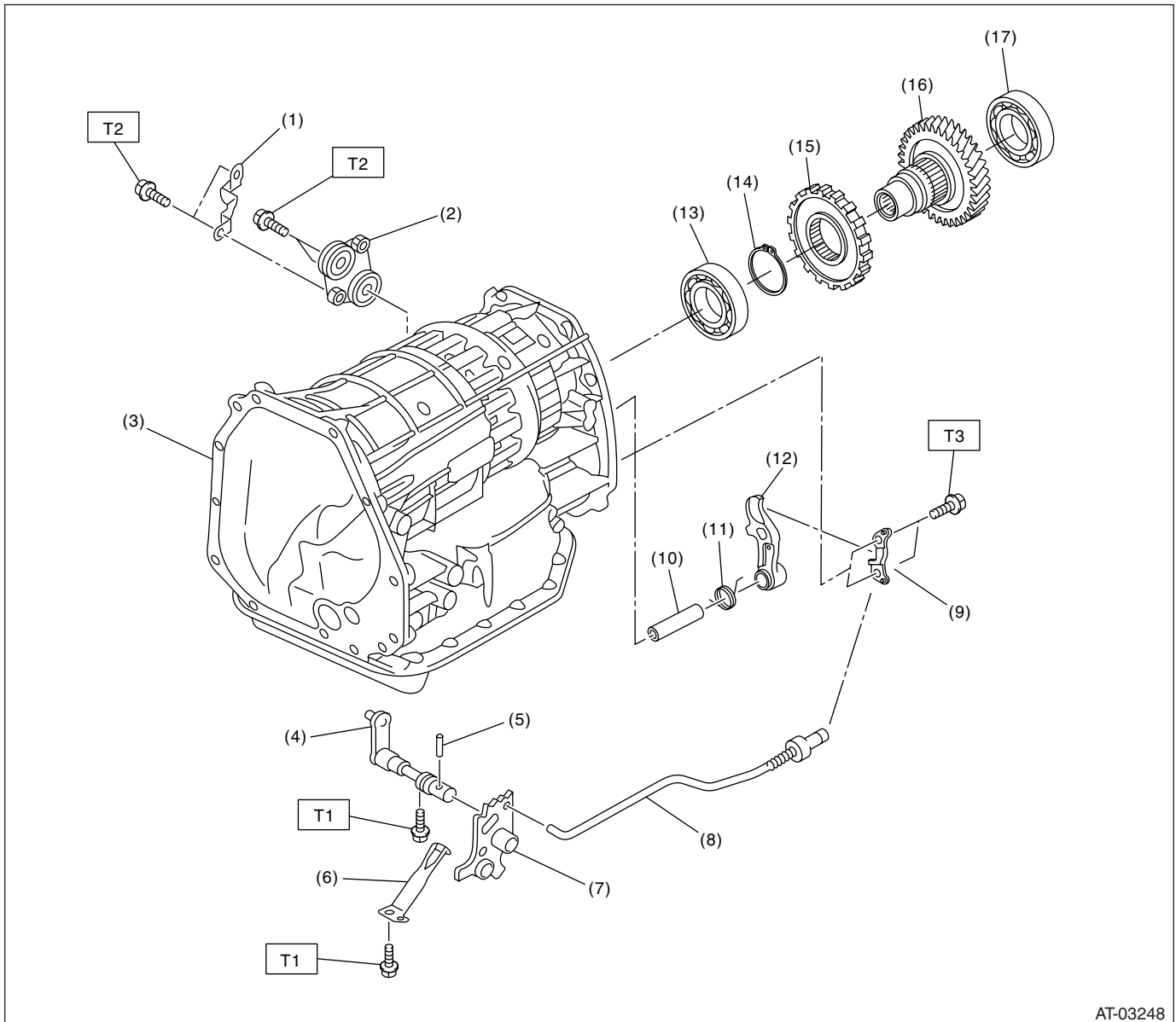
**Tightening torque: N·m (kgf·m, ft·lb)**

**T1: 7.5 (0.76, 5.5)**

# General Description

AUTOMATIC TRANSMISSION

## 10. TRANSMISSION CONTROL DEVICE & PARKING SUPPORT



AT-03248

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

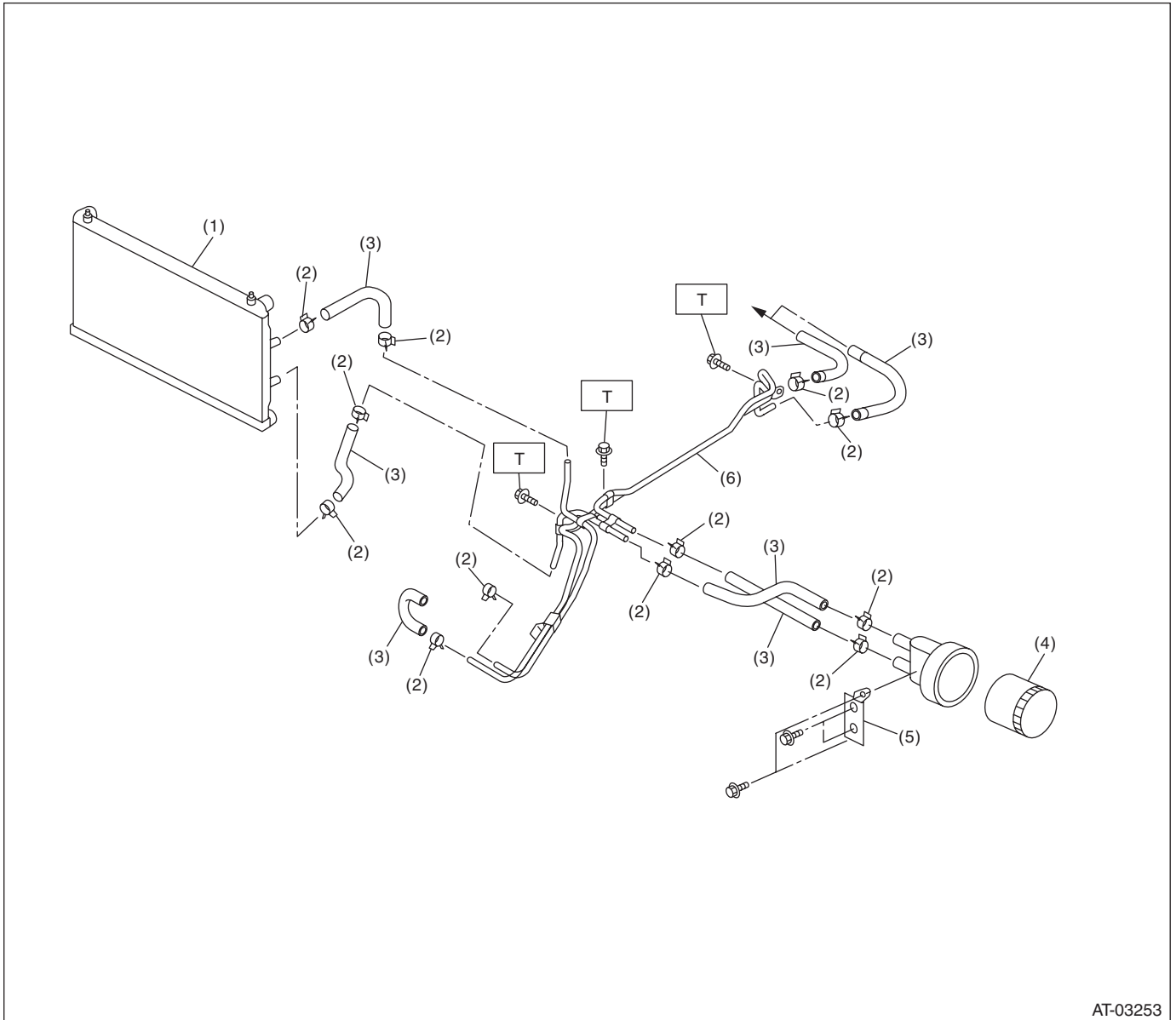
**Tightening torque: N-m (kgf-m, ft-lb)**

**T1: 6 (0.6, 4.4)**

**T2: 25 (2.5, 18)**

**T3: <Ref. to 5AT-73, Parking Pawl.>**

## 11.OIL COOLER PIPE AND OIL COOLER



AT-03253

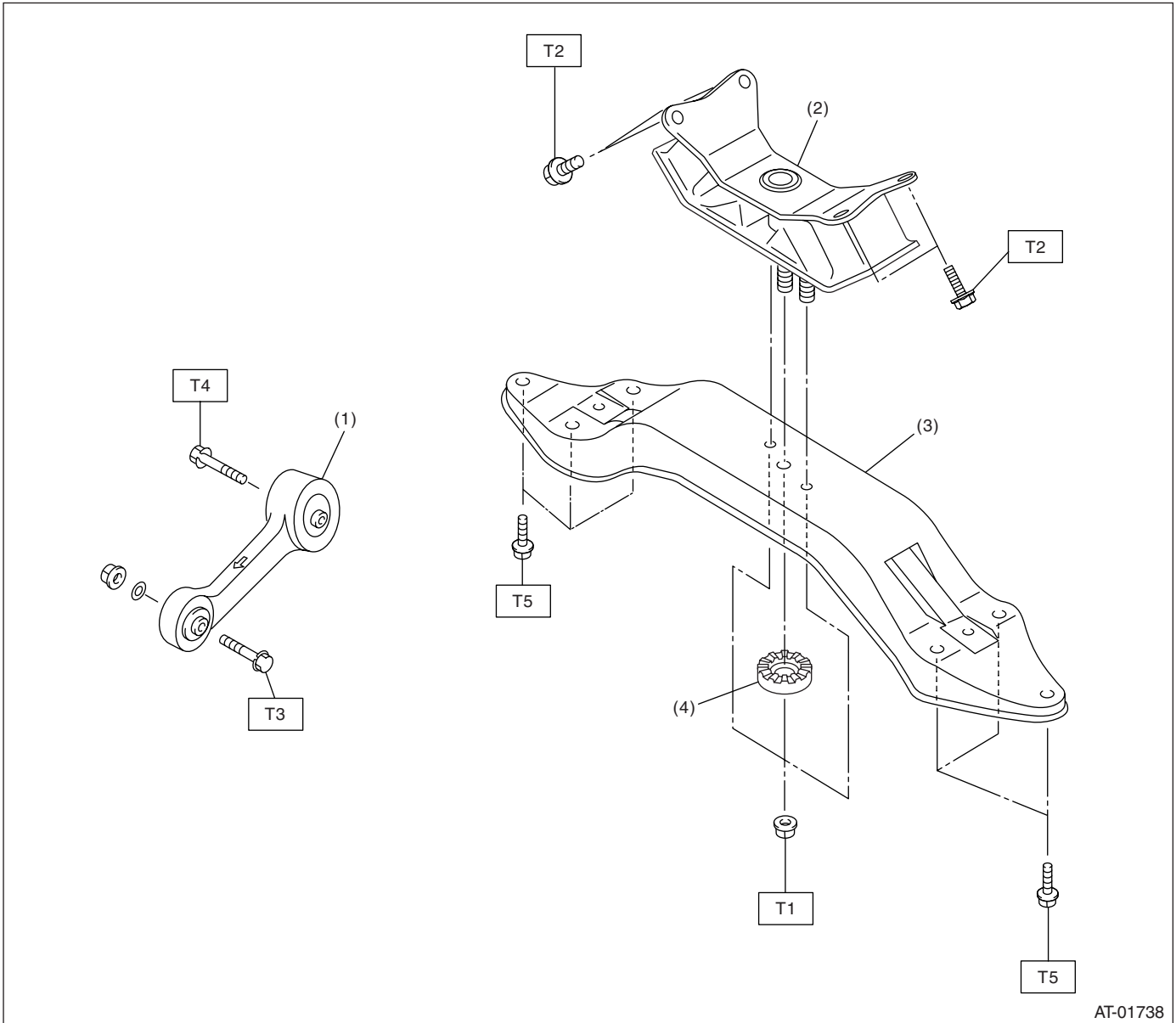
- |              |                        |
|--------------|------------------------|
| (1) Radiator | (4) ATF filter         |
| (2) Clip     | (5) ATF filter bracket |
| (3) ATF hose | (6) ATF cooler pipe    |

**Tightening torque: N·m (kgf·m, ft·lb)**  
**T: 7.5 (0.76, 5.5)**

# General Description

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## 12. TRANSMISSION MOUNTING



AT-01738

- (1) Pitching stopper
- (2) Rear cushion rubber
- (3) Crossmember
- (4) Stopper

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

**T1: 35 (3.6, 26)**

**T2: 40 (4.1, 29.5)**

**T3: 50 (5.1, 36.9)**

**T4: 58 (5.9, 42.8)**

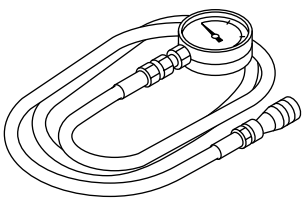
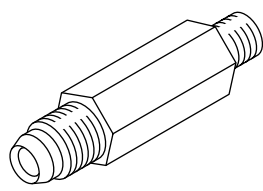
**T5: 75 (7.6, 55.3)**

## C: CAUTION

- Wear work clothing, including a cap, protective goggles and protective shoes during operation.
- 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.
- Be careful not to burn yourself, because each part on the vehicle is hot after running.
- Use SUBARU genuine gear oil, grease or the equivalent. Do not mix them with that of another grade or from other 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 revolution 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 seal.

## D: PREPARATION TOOL

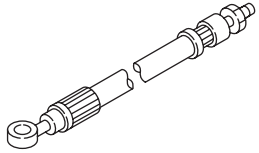
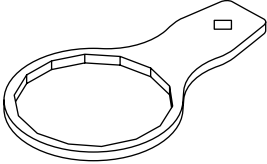
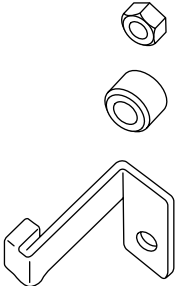
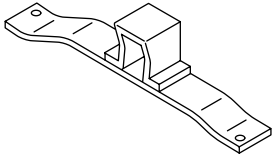
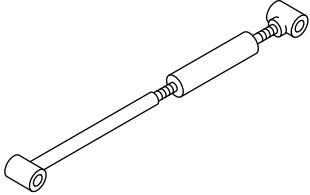
### 1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498575400	498575400	OIL PRESSURE GAUGE ASSY	Used for measuring oil pressure.
 ST-498897200	498897200	ADAPTER	Used with oil pump cover installed on when measuring line pressure.



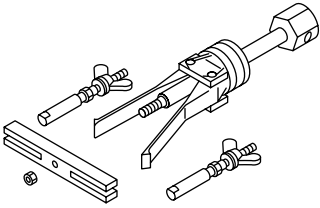
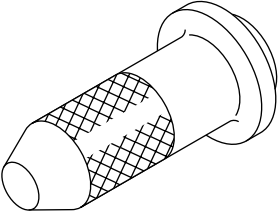
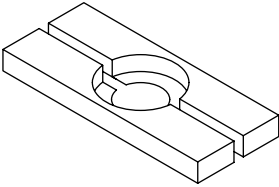
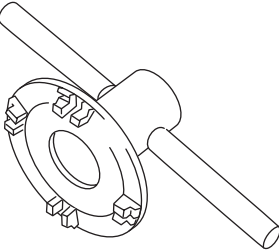
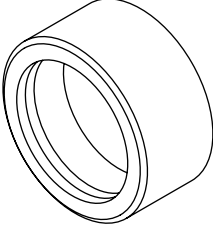
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498897700</p>	498897700	OIL PRESSURE ADAPTER	Used for measuring transfer clutch pressure.
 <p style="text-align: center;">ST-498545400</p>	498545400	FILTER WRENCH	Used for removing and installing the ATF filter.
 <p style="text-align: center;">ST-498277200</p>	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine.
 <p style="text-align: center;">ST41099AA010</p>	41099AA010	ENGINE SUPPORT BRACKET	Used for supporting engine.
 <p style="text-align: center;">ST41099AA020</p>	41099AA020	ENGINE SUPPORT	Used for supporting engine.

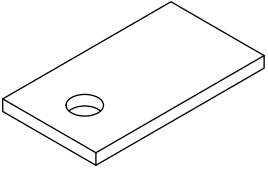
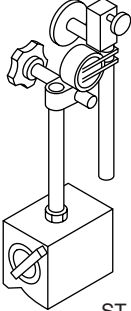
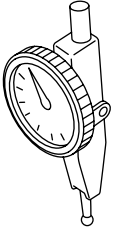
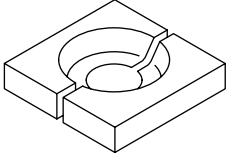
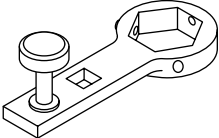
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="337 516 467 537">ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> <li>• Used for removing the extension case roller bearing.</li> <li>• Used for removing the extension oil seal.</li> <li>• Used for removing the front differential side retainer bearing outer race.</li> <li>• Used for removing the front differential side retainer oil seal.</li> </ul>
 <p data-bbox="337 867 467 888">ST-498057300</p>	498057300	INSTALLER	Used for installing the extension oil seal.
 <p data-bbox="337 1218 467 1239">ST-498077000</p>	498077000	REMOVER	Used for removing the differential taper roller bearing.
 <p data-bbox="324 1568 467 1589">ST18630AA010</p>	18630AA010	WRENCH COMPL RETAINER	Used for removing and installing the differential side retainer.
 <p data-bbox="337 1919 467 1940">ST-398487700</p>	398487700	DRIFT	Used for installing the front differential taper roller bearing.

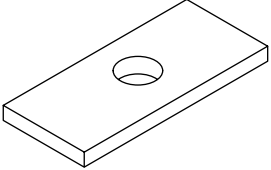
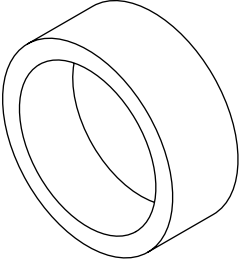
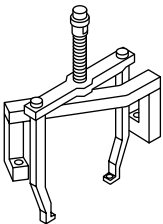
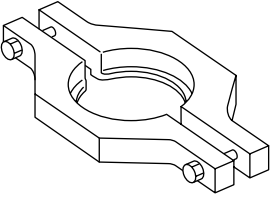
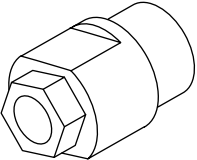
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-498255400</p>	498255400	PLATE	Used for measuring the backlash of hypoid gear.
 <p style="text-align: center;">ST-498247001</p>	498247001	MAGNET BASE	<ul style="list-style-type: none"> <li>• Used for measuring the gear backlash.</li> <li>• Used with DIAL GAUGE (498247100).</li> </ul>
 <p style="text-align: center;">ST-498247100</p>	498247100	DIAL GAUGE	<ul style="list-style-type: none"> <li>• Used for measuring the gear backlash.</li> <li>• Used with MAGNET BASE (498247001).</li> </ul>
 <p style="text-align: center;">ST-498517000</p>	498517000	REPLACER	Used for removing the front roller bearing.
 <p style="text-align: center;">ST-499787700</p>	499787700	WRENCH	Used for removing and installing the drive pinion lock nut.

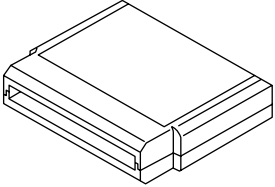

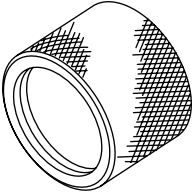
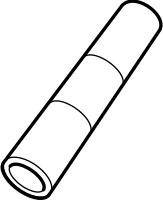
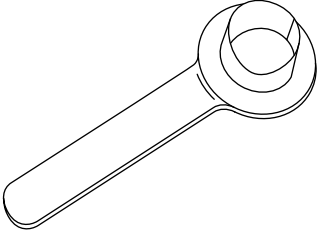
# General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="337 516 467 537">ST-398643600</p>	398643600	GAUGE	Used for measuring the total end play, extension end play and drive pinion height.
 <p data-bbox="337 867 467 888">ST-378744300</p>	378744300	PISTON GUIDE	Used for measuring height from mating surface of the main case to pressure plate.
 <p data-bbox="337 1218 467 1239">ST-499737100</p>	499737100	PULLER SET	Used for removing the reduction driven gear assembly.
 <p data-bbox="337 1566 467 1587">ST-498077300</p>	498077600	REMOVER	Used for removing the ball bearing.
 <p data-bbox="324 1917 467 1938">ST18667AA010</p>	18667AA010	HOLDER	<ul style="list-style-type: none"> <li>• Used for removing and installing the drive pinion lock nut.</li> <li>• Used as a handle to rotate gear when checking tooth contact.</li> </ul>

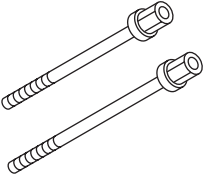
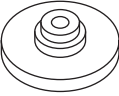
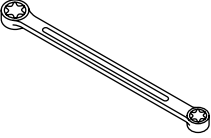
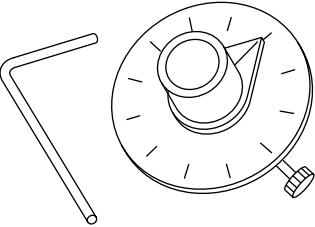
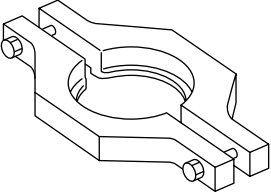
# General Description

## AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST18482AA010</p>	18482AA010	CARTRIDGE	Troubleshooting for the electrical system.
 <p style="text-align: center;">ST22771AA030</p>	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for the electrical system.
 <p style="text-align: center;">ST18675AA000</p>	18675AA000	DIFFERENTIAL SIDE OIL SEAL INSTALLER	Used for installing the differential side retainer oil seal.
 <p style="text-align: center;">ST18654AA000</p>	18654AA000	INSTALLER	Used for removing and installing the ball bearing.
 <p style="text-align: center;">ST28399SA010</p>	28399SA010	OIL SEAL PROTECTOR	Used for protecting oil seal when installing front drive shaft.

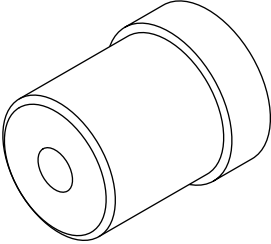
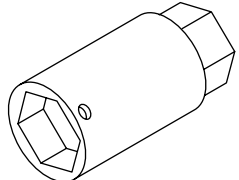
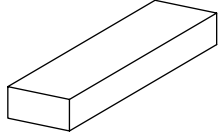
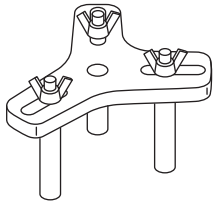
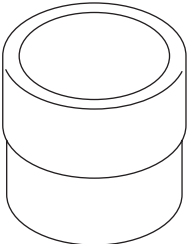
# General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="326 516 467 541">ST18763AA000</p>	18763AA000	COMPRESSOR SHAFT	Used for disassembling multi-plate clutch for shift transmission.
 <p data-bbox="326 867 467 892">ST18765AA000</p>	18765AA000	COMPRESSOR SUPPORT	Used for disassembling multi-plate clutch for shift transmission.
 <p data-bbox="326 1218 467 1243">ST18676AA020</p>	18676AA020	TORX® WRENCH	Used for disassembling torque converter case.
 <p data-bbox="326 1568 467 1593">ST18854AA000</p>	18854AA000	ANGLE GAUGE	Used for tightening parking support.
 <p data-bbox="337 1921 467 1944">ST-498077300</p>	498077300	REMOVER	Used for removing ball bearing of reduction driven gear.

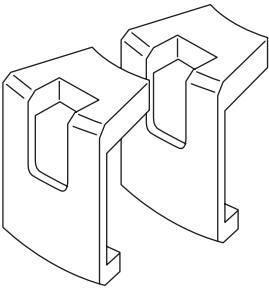
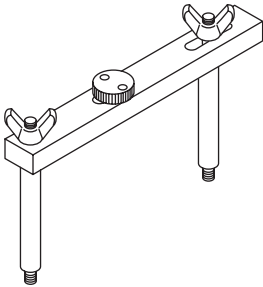
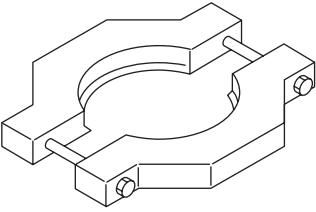
# General Description

## AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing the oil seal.
 <p style="text-align: center;">ST-499787500</p>	499787500	ADAPTER	Used for removing and installing drive pinion lock nut.
 <p style="text-align: center;">ST-499575400</p>	499575400	GAUGE	Used for measuring height of total end play.
 <p style="text-align: center;">ST18762AA000</p>	18762AA000	COMPRESSOR SPECIAL TOOL	Used for disassembling multi-plate clutch for shift transmission.
 <p style="text-align: center;">ST-499755602</p>	499755602 (Newly adopted tool)	PRESS	Used for installing the parking gear.

# General Description

AUTOMATIC TRANSMISSION

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18680AA010</p>	18680AA010 (Newly adopted tool)	HOLDER GEAR	Used for removing reduction driven gear assembly. (2-piece set)
 <p>ST18766AA000</p>	18766AA000 (Newly adopted tool)	SUPPORT PULLER	Used for removing reduction driven gear assembly.
 <p>ST18767AA000</p>	18767AA000 (Newly adopted tool)	REMOVER	<ul style="list-style-type: none"> <li>• Used to pull out the parking gear.</li> <li>• Used to pull out the bearing from the VTD assembly.</li> </ul>

## 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 balance	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.