

# General Description

## DIFFERENTIALS

### 1. General Description

#### A: SPECIFICATION

##### 1. REAR DIFFERENTIAL

When replacing a rear differential assembly, select the correct one according to the following table.

NOTE:

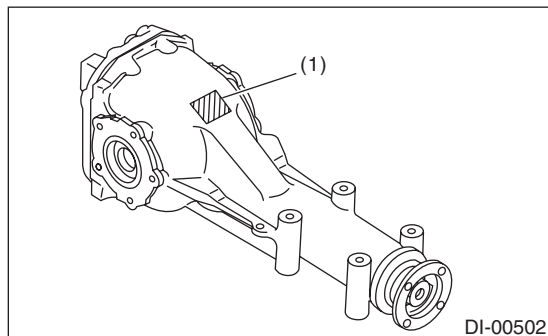
Using a different rear differential assembly will cause the drive train and tires to drag or emit abnormal noise.

Model	2.5 L non-turbo	
	4AT	5MT
Rear differential type	T-type	
Identification	T2	T1
Type of gear	Hypoid gear	
Gear ratio (Number of gear teeth)	4.111 (37/9)	3.900 (39/10)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5	

Model	2.5 L Turbo	
	4AT	5MT
Rear differential type	T-type	
Identification	B2	
Type of gear	Hypoid gear	
Gear ratio (Number of gear teeth)	3.900 (39/10)	
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)	
Rear differential gear oil	GL-5	

##### 2. IDENTIFICATION

Identification positions are shown in the following figures. For details concerning identification, refer to the "ID" section.



(1) Identification

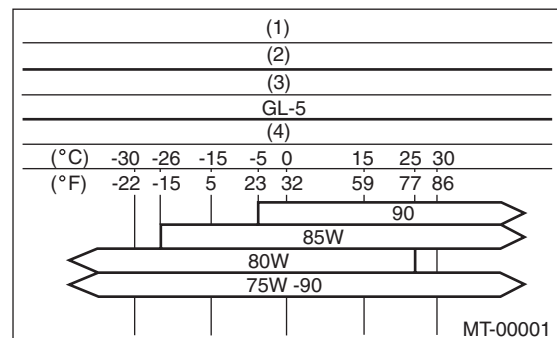
##### 3. REAR DIFFERENTIAL GEAR OIL

**Recommended gear oil:**

**GL-5 (75W-90)**

**CAUTION:**

**Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.**



- (1) Item
- (2) Rear differential gear oil
- (3) API classification
- (4) SAE viscosity No. and applicable temperature

### 4. SERVICE DATA

Drive pinion bearing preload (For new bearing)	Measure with spring measurement. (Measured from the companion flange bolt)	N (kgf, lbf)	17.7 — 38.8 (1.8 — 4.0, 4.0 — 8.7)
	Measure with torque wrench	N·m (kgf-m, ft-lb)	0.67 — 1.47 (0.07 — 0.15, 0.49 — 1.08)
Side gear backlash	mm (in)	0.10 — 0.20 (0.004 — 0.008)	
Side bearing standard width	mm (in)	20.00 (0.7874)	
Hypoid driven gear to drive pinion backlash	mm (in)	0.10 — 0.20 (0.004 — 0.008)	
Hypoid driven gear runout on its back surface	mm (in)	0.05 (0.002)	

### 5. ADJUSTING PARTS

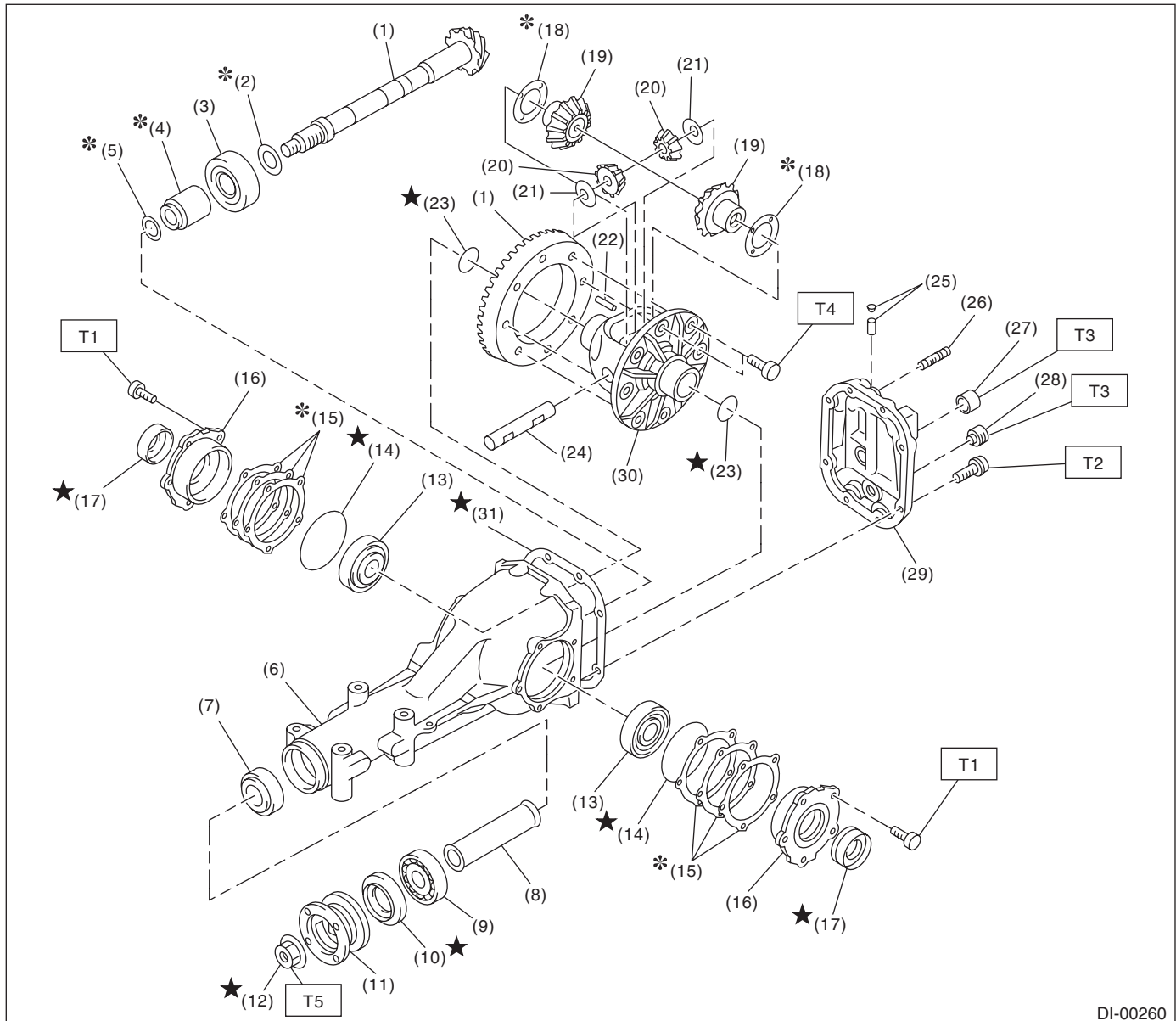
Preload adjusting spacer	Part No.	Length mm (in)
	383695201	56.2 (2.213)
	383695202	56.4 (2.220)
	383695203	56.6 (2.228)
	383695204	56.8 (2.236)
	383695205	57.0 (2.244)
	383695206	57.2 (2.252)

Preload adjusting washer	Part No.	Thickness mm (in)
	383705200	2.59 (0.1020)
	383715200	2.57 (0.1012)
	383725200	2.55 (0.1004)
	383735200	2.53 (0.0996)
	383745200	2.51 (0.0988)
	383755200	2.49 (0.0980)
	383765200	2.47 (0.0972)
	383775200	2.45 (0.0965)
	383785200	2.43 (0.0957)
	383795200	2.41 (0.0949)
	383805200	2.39 (0.0941)
	383815200	2.37 (0.0933)
	383825200	2.35 (0.0925)
	383835200	2.33 (0.0917)
	383845200	2.31 (0.0909)

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Pinion height adjusting washer	383495200	3.09 (0.1217)
	383505200	3.12 (0.1228)
	383515200	3.15 (0.1240)
	383525200	3.18 (0.1252)
	383535200	3.21 (0.1264)
	383545200	3.24 (0.1276)
	383555200	3.27 (0.1287)
	383565200	3.30 (0.1299)
	383575200	3.33 (0.1311)
	383585200	3.36 (0.1323)
	383595200	3.39 (0.1335)
	383605200	3.42 (0.1346)
	383615200	3.45 (0.1358)
	383625200	3.48 (0.1370)
	383635200	3.51 (0.1382)
	383645200	3.54 (0.1394)
	383655200	3.57 (0.1406)
	383665200	3.60 (0.1417)
	383675200	3.63 (0.1429)
	383685200	3.66 (0.1441)
Side gear thrust washer	383445201	0.75 — 0.80 (0.0295 — 0.0315)
	383445202	0.80 — 0.85 (0.0315 — 0.0335)
	383445203	0.85 — 0.90 (0.0335 — 0.0354)
Side bearing retainer shim	383475201	0.20 (0.0079)
	383475202	0.25 (0.0098)
	383475203	0.30 (0.0118)
	383475204	0.40 (0.0157)
	383475205	0.50 (0.0197)

**B: COMPONENT****1. REAR DIFFERENTIAL (T-TYPE)**

DI-00260

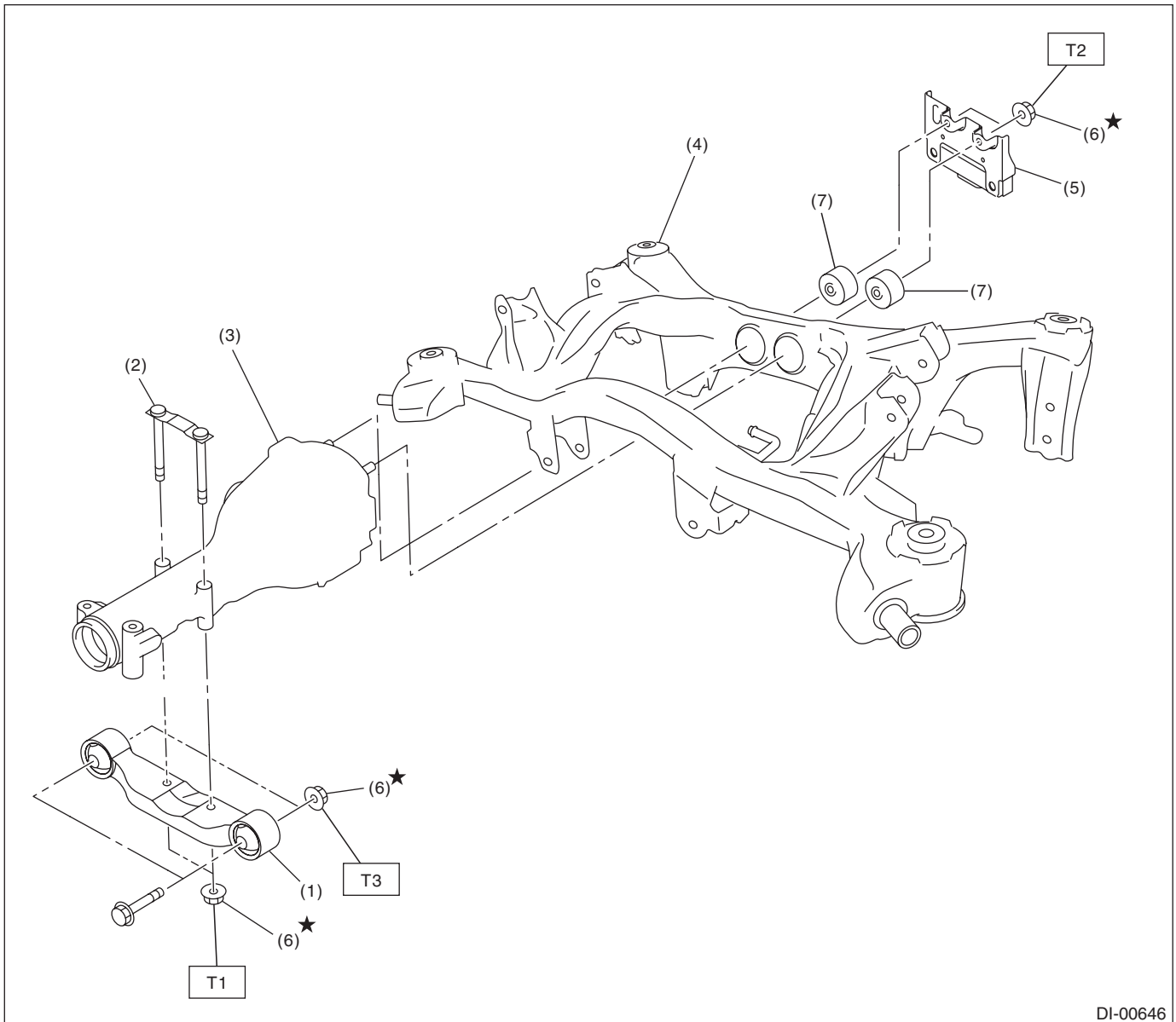
- |   |                              |                        |
|---|------------------------------|------------------------|
| (1) Hypoid driven gear and drive pinion set | (14) O-ring                  | (27) Oil filler plug   |
| (2) Pinion height adjusting washer          | (15) Side retainer shim      | (28) Oil drain plug    |
| (3) Rear bearing                            | (16) Side retainer           | (29) Rear cover        |
| (4) Bearing preload adjusting spacer        | (17) Side oil seal           | (30) Differential case |
| (5) Bearing preload adjusting washer        | (18) Side gear thrust washer | (31) Gasket            |
| (6) Differential carrier                    | (19) Side gear               |                        |
| (7) Front bearing                           | (20) Pinion mate gear        |                        |
| (8) Spacer                                  | (21) Pinion mate gear washer |                        |
| (9) Pilot bearing                           | (22) Pinion shaft lock pin   |                        |
| (10) Front oil seal                         | (23) Snap ring               |                        |
| (11) Companion flange                       | (24) Pinion mate shaft       |                        |
| (12) Self-locking nut                       | (25) Air breather cap        |                        |
| (13) Side bearing                           | (26) Stud bolt               |                        |

**Tightening torque: N·m (kgf-m, ft-lb)****T1: 10.5 (1.1, 7.7)****T2: 29.5 (3.0, 21.8)****T3: 49 (5.0, 36.2)****T4: 103 (10.5, 76.0)****T5: 181.5 (18.5, 134.0)**

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### 2. REAR DIFFERENTIAL MOUNTING SYSTEM



- |                                    |   |
|------------------------------------|---|
| (1) Rear differential front member | (5) Dynamic damper ASSY (5 door AT model) |
| (2) Rear differential member plate | (6) Self-locking nut                      |
| (3) Rear differential ASSY         | (7) Rear differential mounting bushing    |
| (4) Sub frame                      |   |

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

**T1: 50 (5.1, 36.9)**

**T2: 70 (7.1, 51.6)**

**T3: 110 (11.2, 81.1)**

### **C: CAUTION**

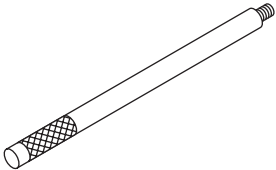
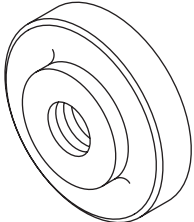
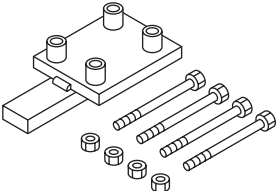
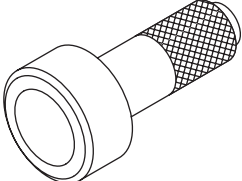
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Before installing the O-ring or snap ring, apply a sufficient amount of gear oil to avoid damage and deformation.
- 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.

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### D: PREPARATION TOOL

#### 1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	Used for installing the front and rear bearing cones.
 ST-398477702	398477702	DRIFT	Used for press-fitting the bearing race (front) of the differential carrier.
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.

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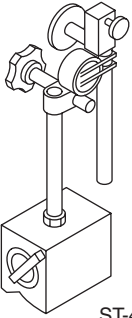
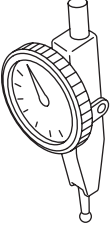
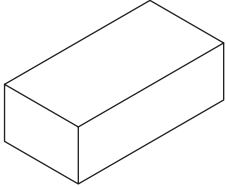
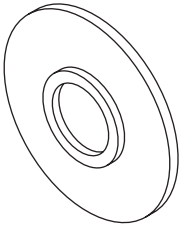
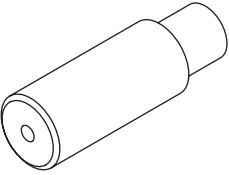
## DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
<p>ST-498427200</p>	498427200	FLANGE WRENCH	Used for preventing rotation of companion flange when loosening and tightening self-lock nut.
<p>ST-398467700</p>	398467700	DRIFT	Used for removing pinion, pilot bearing and front bearing cone.
<p>ST-399780104</p>	399780104	WEIGHT	Used for installing the front bearing cone and the pilot bearing companion flange.
<p>ST-899580100</p>	899580100	INSTALLER	Used for press-fitting the front bearing cone and pilot bearing.
<p>ST-899904100</p>	899904100	STRAIGHT PIN REMOVER	Used for driving out differential pinion shaft lock pin.



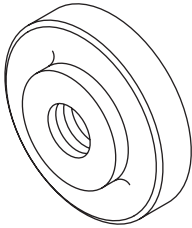
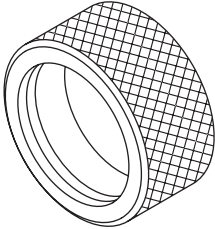
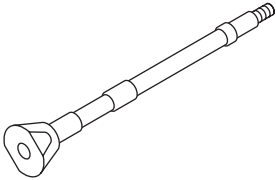
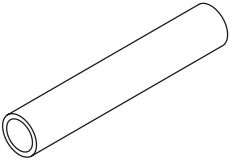
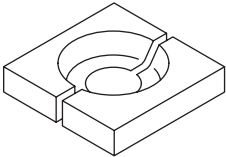
# General Description

## DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	<ul style="list-style-type: none"> <li>Used for measuring backlash between side gear and pinion, and hypoid gear.</li> <li>Used together with DIAL GAUGE (498247100).</li> </ul>
 ST-498247100	498247100	DIAL GAUGE	<ul style="list-style-type: none"> <li>Used for measuring backlash between side gear and pinion, and hypoid gear.</li> <li>Used together with MAGNET BASE (498247001).</li> </ul>
 ST-398507704	398507704	BLOCK	Used for adjusting pinion height and preload.
 ST-398177700	398177700	INSTALLER	Used for installing the rear bearing cone.
 ST-398457700	398457700	ATTACHMENT	Used for removing the side bearing retainer.

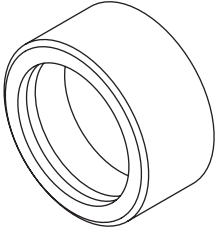
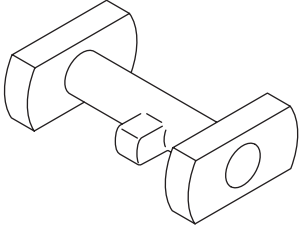
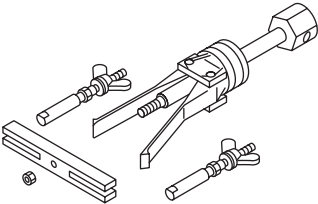
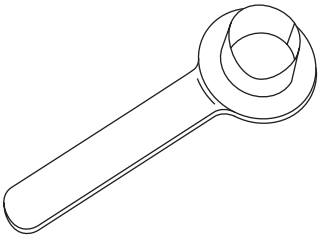
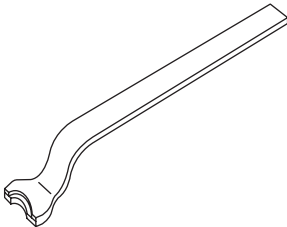
# General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398477703</p>	398477703	DRIFT 2	Used for press-fitting bearing race (rear) of differential carrier.
 <p>ST-398437700</p>	398437700	DRIFT	Used for installing the side oil seal.
 <p>ST-398507702</p>	398507702	DUMMY SHAFT	Used for adjusting pinion height and preload.
 <p>ST-398507703</p>	398507703	DUMMY COLLAR	Used for adjusting pinion height and preload.
 <p>ST-398517700</p>	398517700	REPLACER	Used for removing rear bearing cone.

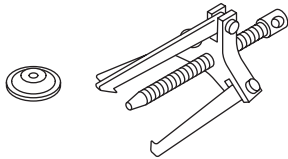
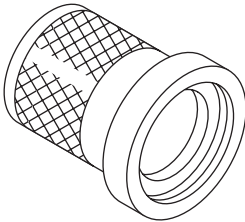
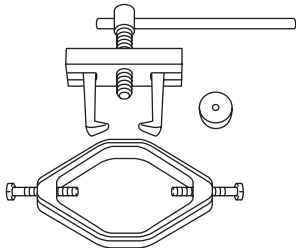
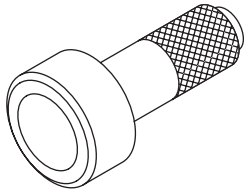
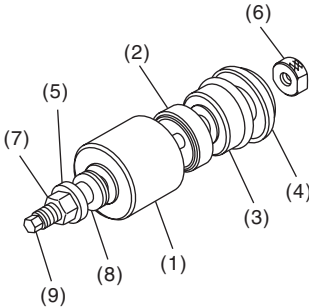
# General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398487700	398487700	DRIFT	Used for press-fitting side bearing cone.
 ST-398507701	398507701	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height.
 ST-398527700	398527700	PULLER ASSY	<ul style="list-style-type: none"> <li>• Used for removing front oil seal.</li> <li>• Used for removing side bearing cup.</li> </ul>
 ST28099PA090	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> <li>• Used for installing the rear drive shaft to the rear differential.</li> <li>• For oil seal protection</li> </ul>
 ST28099PA100	28099PA100	DRIVE SHAFT REMOVER	Used for removing the rear drive shaft from rear differential.

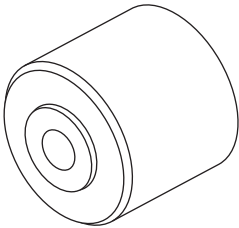
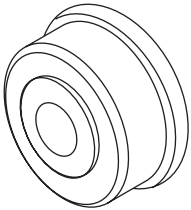
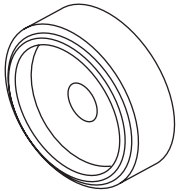
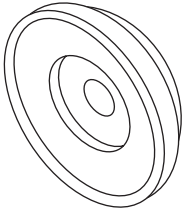
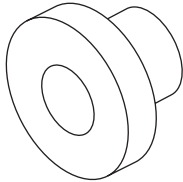
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-399703600</p>	399703600	PULLER ASSY	Used for removing companion flange.
 <p>ST-899874100</p>	899874100	INSTALLER	Used for installing the companion flange.
 <p>ST18759AA000</p>	18759AA000	PULLER ASSY	Used for removing the differential side bearing cone.
 <p>ST-398417700</p>	398417700	DRIFT	Used for installing side bearing race.
 <p>ST41399FG000</p>	41399FG000	Special tool ASSY	<ul style="list-style-type: none"> <li>• Used for removing and installing the rear differential mounting bushing.</li> <li>• Use (1) (3) (5) (6) (7) (8) (9) for removal.</li> <li>• Use (2) (4) (5) (6) (7) (8) (9) for installation.</li> </ul> <p>(1) Special tool A (41399FG010)  (2) Special tool B (41399FG020)  (3) Special tool C (41399FG030)  (4) Special tool D (41399FG040)  (5) Special tool sleeve (41399FG050)  (6) Special tool ring (41399FG060)  (7) Special tool nut (41399FG070)  (8) Special tool bearing (41399FG080)  (9) Special tool shaft (41399FG090)</p>

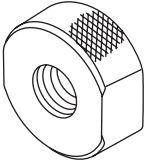
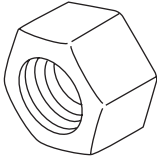
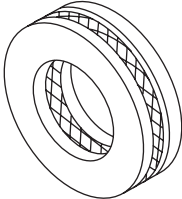
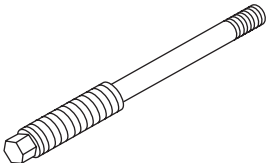
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG010	41399FG010	Special tool A	<ul style="list-style-type: none"> <li>Used for removing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal tools.</li> </ul>
 ST41399FG020	41399FG020	Special tool B	<ul style="list-style-type: none"> <li>Used for installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of installation tools.</li> </ul>
 ST41399FG030	41399FG030	Special tool C	<ul style="list-style-type: none"> <li>Used for removing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal tools.</li> </ul>
 ST41399FG040	41399FG040	Special tool D	<ul style="list-style-type: none"> <li>Used for installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of installation tools.</li> </ul>
 ST41399FG050	41399FG050	Special tool sleeve	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal and installation tools.</li> </ul>

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST41399FG060</p>	41399FG060	Special tool ring	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal and installation tools.</li> </ul>
 <p>ST41399FG070</p>	41399FG070	Special tool nut	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal and installation tools.</li> </ul>
 <p>ST41399FG080</p>	41399FG080	Special tool bearing	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal and installation tools.</li> </ul>
 <p>ST41399FG090</p>	41399FG090	Special tool shaft	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mounting bushing.</li> <li>Refer to the special tool ASSY (41399FG000) for the combination of removal and installation tools.</li> </ul>

## 2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for assembly/disassembly of the rear differential.
Puller	Used for removing the side bearing retainer.
Thickness gauge	Used for measuring clearance.