

# 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.

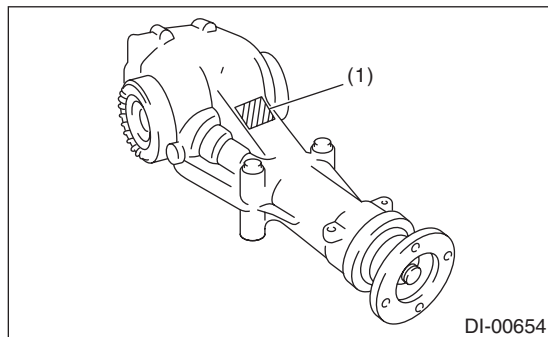
NOTE:

- Using a different rear differential assembly will cause the drive train and tires to drag or emit abnormal noise.
- For option code, refer to “ID” section. <Ref. to ID-2, IDENTIFICATION, Identification.>

Rear differential type	VA2-type
Identification	XB
LSD type	—
Type of gear	Hypoid gear
Gear ratio (Number of gear teeth)	3.583 (43/12)
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

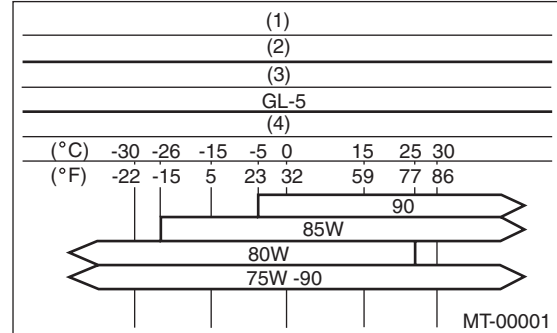
##### 3. REAR DIFFERENTIAL GEAR OIL

**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

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## 4. SERVICE DATA

Drive pinion bearing preload	Measure with spring measurement. (Measured from the companion flange bolt) N (kgf, lb)	12.7 — 32.2 (1.3 — 3.3, 2.9 — 7.2)
	Measure with torque wrench N·m (kgf-m, ft-lb)	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Side gear backlash	mm (in)	0.13 — 0.18 (0.005 — 0.007)
Hypoid driven gear to drive pinion backlash	mm (in)	0.10 — 0.15 (0.004 — 0.006)

## 5. ADJUSTING PARTS

Drive pinion bearing preload	Measure with spring scale. (Measured at the companion flange bolt hole) N (kgf, lb)	12.7 — 32.2 (1.3 — 3.3, 2.9 — 7.2)
	Measure with torque wrench N·m (kgf-m, ft-lb)	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Preload adjusting spacer	Part No.	Length mm (in)
	31454AA250	51.05 (2.010)
	31454AA260	51.25 (2.018)
	31454AA270	51.35 (2.022)
	31454AA280	51.45 (2.026)
	31454AA290	51.55 (2.030)
	31454AA300	51.65 (2.033)
	31454AA310	51.75 (2.037)
	31454AA320	51.85 (2.041)
	31454AA330	52.05 (2.049)

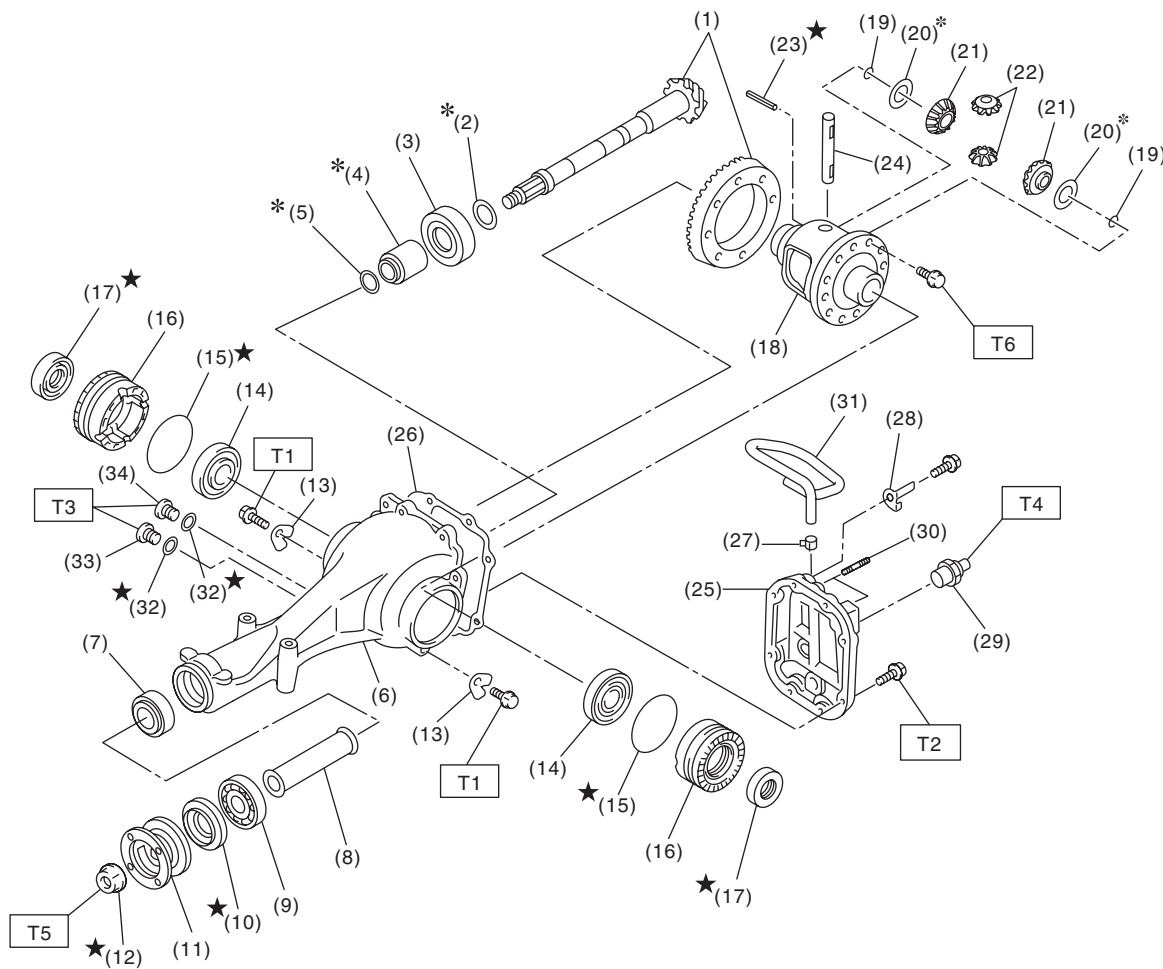
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Preload adjusting washer	Part No.	Thickness mm (in)
	38336AA430	1.500 (0.0591)
	38336AA440	1.513 (0.0596)
	38336AA450	1.525 (0.0600)
	38336AA460	1.538 (0.0606)
	38336AA470	1.550 (0.0610)
	38336AA480	1.563 (0.0615)
	38336AA490	1.575 (0.0620)
	38336AA500	1.588 (0.0625)
	38336AA510	1.600 (0.0630)
	38336AA520	1.613 (0.0635)
	38336AA530	1.625 (0.0640)
	38336AA540	1.638 (0.0645)
	38336AA550	1.650 (0.0650)
	38336AA560	1.663 (0.0655)
	38336AA570	1.675 (0.0659)
	38336AA580	1.688 (0.0665)
	38336AA590	1.700 (0.0669)
	38336AA600	1.713 (0.0674)
	38336AA610	1.725 (0.0679)
	38336AA620	1.738 (0.0684)
	38336AA630	1.750 (0.0689)
	38336AA640	1.763 (0.0694)
	38336AA650	1.775 (0.0699)
Pinion height adjusting washer	Part No.	Thickness mm (in)
	32295AA350	0.150 (0.0059)
	32295AA360	0.175 (0.0069)
	32295AA370	0.200 (0.0079)
	32295AA380	0.225 (0.0089)
	32295AA390	0.250 (0.0098)
	32295AA400	0.275 (0.0108)
Hypoid driven gear to drive pinion backlash	Limit mm (in)	0.10 — 0.15 (0.004 — 0.006)

## B: COMPONENT

### 1. REAR DIFFERENTIAL (VA2-TYPE)



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(1) Hypoid driven gear and drive pinion set	(16) Side retainer	(30) Stud bolt
(2) Pinion height adjusting washer	(17) Side oil seal	(31) Air breather hose
(3) Rear bearing	(18) Differential case	(32) Gasket
(4) Bearing preload adjusting spacer	(19) Circlip	(33) Oil filler plug
(5) Bearing preload adjusting washer	(20) Side gear thrust washer	(34) Oil drain plug
(6) Differential carrier	(21) Side gear	
(7) Front bearing	(22) Pinion mate gear	
(8) Spacer	(23) Spring pin	
(9) Pilot bearing	(24) Pinion mate shaft	
(10) Front oil seal	(25) Rear cover	
(11) Companion flange	(26) Gasket	
(12) Self-locking nut	(27) Clip	
(13) Lock plate	(28) Stay ground	
(14) Side bearing	(29) Rear differential oil temperature switch	
(15) O-ring		

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

***T1: 25 (2.5, 18.4)***

***T2: 34 (3.5, 25.1)***

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

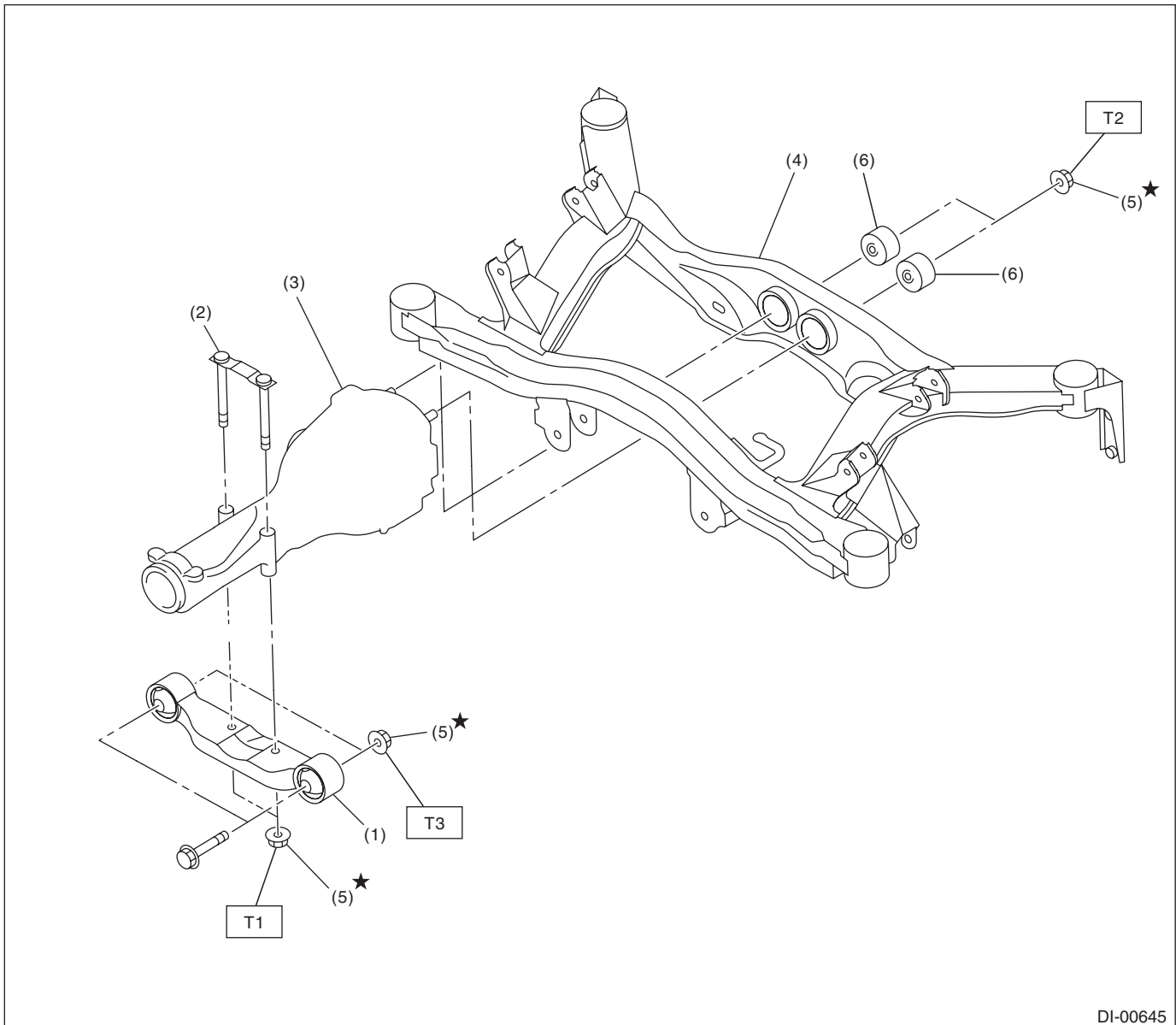
***T4: 60 (6.1, 44.3)***

***T5: 191 (19.5, 140.9)***

***T6: <Ref. to DI-25, ASSEMBLY, Rear Differential (VA-type).>***

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### 2. REAR DIFFERENTIAL MOUNTING SYSTEM



DI-00645

- |                                    |                                     |
|------------------------------------|-------------------------------------|
| (1) Rear differential front member | (4) Sub frame                       |
| (2) Rear differential member plate | (5) Self-locking nut                |
| (3) Rear differential ASSY         | (6) Rear differential mount bushing |

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

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

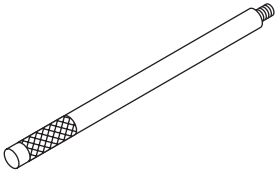
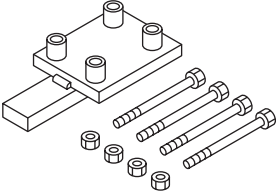
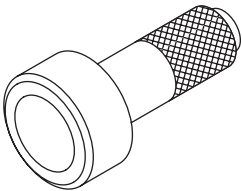
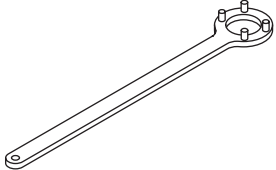
**T2: 70 (7.1, 51.6)**

**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 etc. or equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- 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.

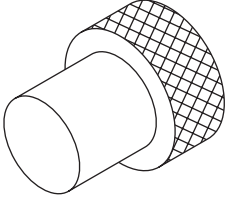
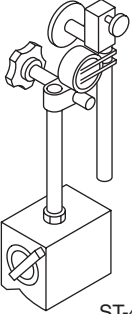
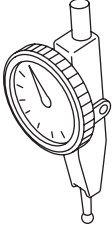
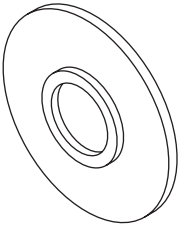
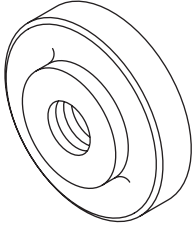
**D: PREPARATION TOOL****1. SPECIAL TOOL**

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477701	398477701	HANDLE	Used for installing the front and rear bearing cones.
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.
 ST-498427200	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when removing and tightening self-lock nut.



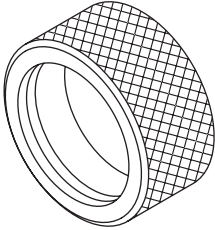
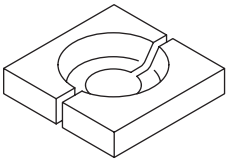
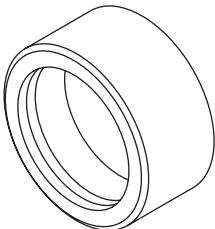
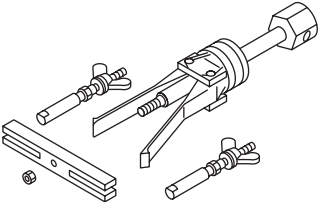
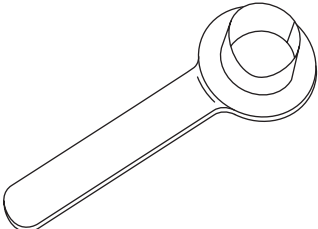
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-399780104	399780104	WEIGHT	Used for installing the front bearing cone and the pilot bearing companion flange.
 ST-498247001	498247001	MAGNET BASE	<ul style="list-style-type: none"> <li>• Used for measuring 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-398177700	398177700	INSTALLER	Used for installing the rear bearing cone.
 ST-398477703	398477703	DRIFT 2	Used for press-fitting bearing race (rear) of differential carrier.

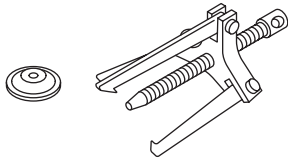
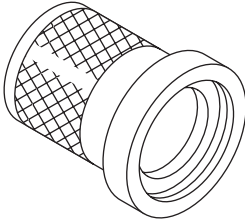
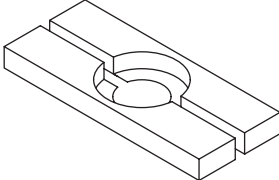
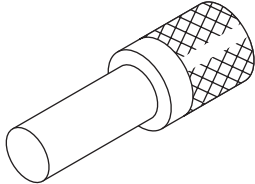
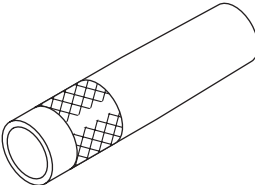
# General Description

## DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398437700	398437700	DRIFT	Used for installing the side oil seal.
 ST-398517700	398517700	REPLACER	Used for removing rear bearing cone.
 ST-398487700	398487700	DRIFT	Used for press-fitting side bearing cone.
 ST-398527700	398527700	PULLER ASSY	Used for removing front oil seal.
 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>

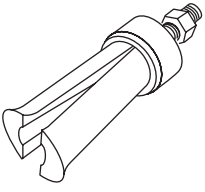
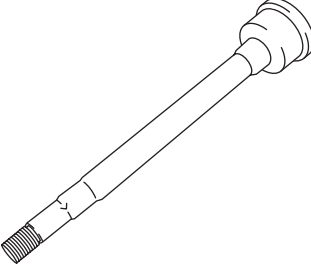
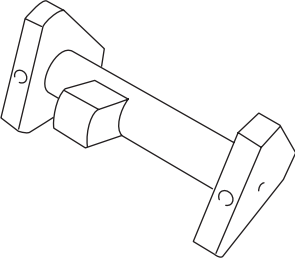
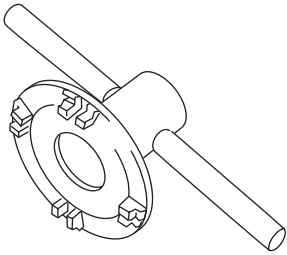
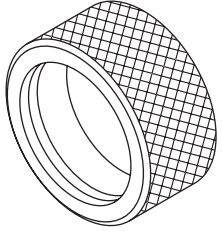
# General Description

## DIFFERENTIALS

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>ST-498077000</p>	498077000	REMOVER	Used for removing the differential side bearing cone.
 <p>ST-899864100</p>	899864100	REMOVER	Used for removing the differential side bearing.
 <p>ST-499277200</p>	499277200	INSTALLER	Used for installing the front bearing cone.

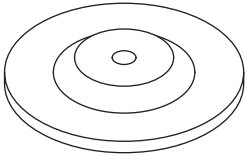
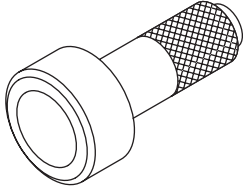
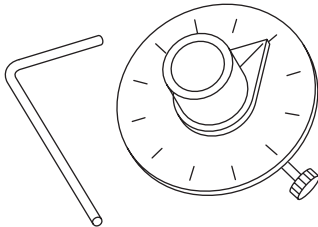
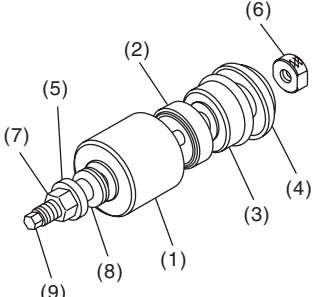
# General Description

## DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18758AA000	18758AA000	PULLER	Used for removing side bearing cup.
 ST18678AA000	18678AA000	DUMMY SHAFT	Used for adjusting pinion height and preload.
 ST18831AA010	18831AA010	DIFFERENTIAL CARRIER GAUGE	Used for adjusting pinion height.
 ST18630AA010	18630AA010	WRENCH COMPL RETAINER	Used for removing and installing the side oil seal holder.
 ST-498447100	498447100	INSTALLER	Used for installing the oil seal.

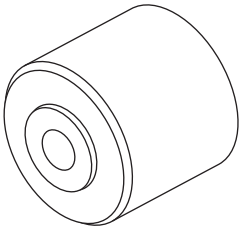
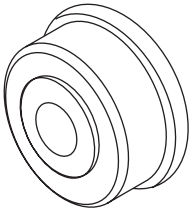
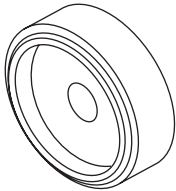
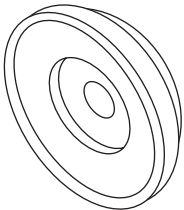
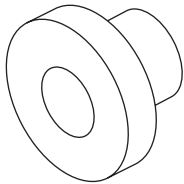
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-399520105</p>	399520105	SEAT	Used for removing the side bearing cone.
 <p>ST-398417700</p>	398417700	DRIFT	Used for installing side bearing race.
 <p>ST18854AA000</p>	18854AA000	ANGLE GAUGE	Used for installing the hypoid driven gear.
 <p>ST41399FG000</p>	41399FG000	SPECIAL TOOL ASSY	<ul style="list-style-type: none"> <li>• Used for removing and installing the rear differential mount bushing.</li> <li>• Use (1), (3), (5), (6), (7), (8) and (9) for removal.</li> <li>• Use (2), (4), (5), (6), (7), (8) and (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>

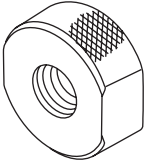
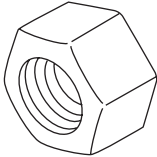
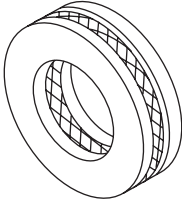
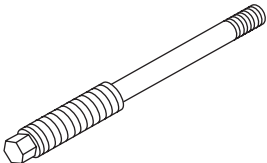
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG010	41399FG010	SPECIAL TOOL A	<ul style="list-style-type: none"> <li>Used for removing the rear differential mount bushing.</li> <li>For combination of tools for removal, refer to "SPECIAL TOOL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

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG060	41399FG060	SPECIAL TOOL RING	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mount bushing.</li> <li>For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG000)".</li> </ul>
 ST41399FG070	41399FG070	SPECIAL TOOL NUT	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mount bushing.</li> <li>For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG000)".</li> </ul>
 ST41399FG080	41399FG080	SPECIAL TOOL BEARING	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mount bushing.</li> <li>For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG000)".</li> </ul>
 ST41399FG090	41399FG090	SPECIAL TOOL SHAFT	<ul style="list-style-type: none"> <li>Used for removing and installing the rear differential mount bushing.</li> <li>For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG000)".</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.
Hexagon wrench	Used for installing and removing the filler and drain plug.
Tire lever	Used for removing the front drive shaft.