

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:

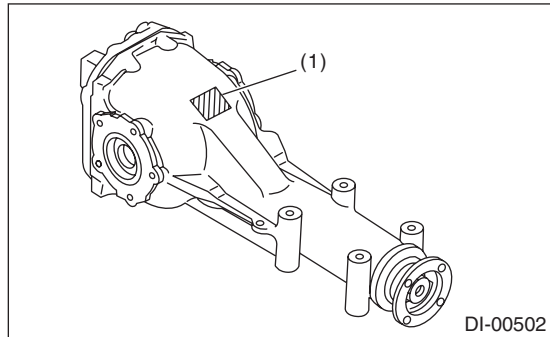
- Using a different rear differential assembly will cause the drive train and tires to drag or emit abnormal noise.
- For option code, refer to “ID” section. <Ref. to ID-2, IDENTIFICATION, Identification.>

Model	Sedan				OUTBACK		
	2.5 L SOHC		2.5 L DOHC turbo	3.6 L	2.5 L SOHC		3.6 L
	CVT	6MT	6MT	5AT	CVT	6MT	5AT
Rear differential type	VA1-type	T-type	T-type	VA2-TYPE	T-type	T-type	VA2-TYPE
Identification	XD	T2	B1	XC	B2	TP	XC
LSD type	—						
Type of gear	Hypoid gear						
Gear ratio (Number of gear teeth)	3.700 (37/10)	4.111 (37/9)	4.111 (37/9)	3.083 (37/12)	3.900 (39/10)	4.444 (40/9)	3.083 (37/12)
Oil capacity	0.8 ℓ (0.8 US qt, 0.7 Imp qt)						
Rear differential gear oil	GL-5 (75W-90)						

2. IDENTIFICATION

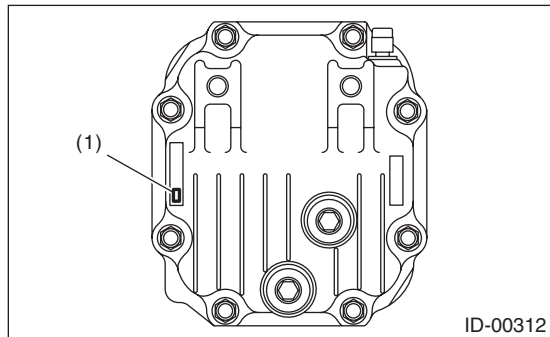
Identification positions are shown in the following figures. For details concerning identification, refer to the "ID" section.

- T-type



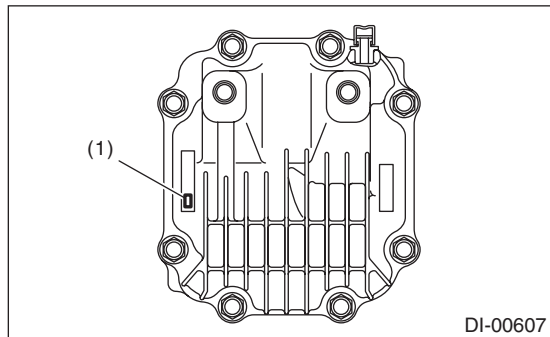
(1) Identification

- VA1-type



(1) Identification

- VA2-type



(1) Identification

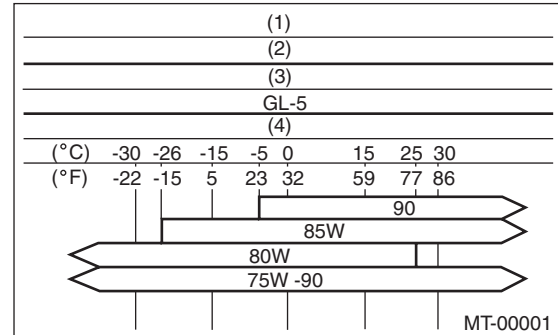
3. REAR DIFFERENTIAL GEAR OIL

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.



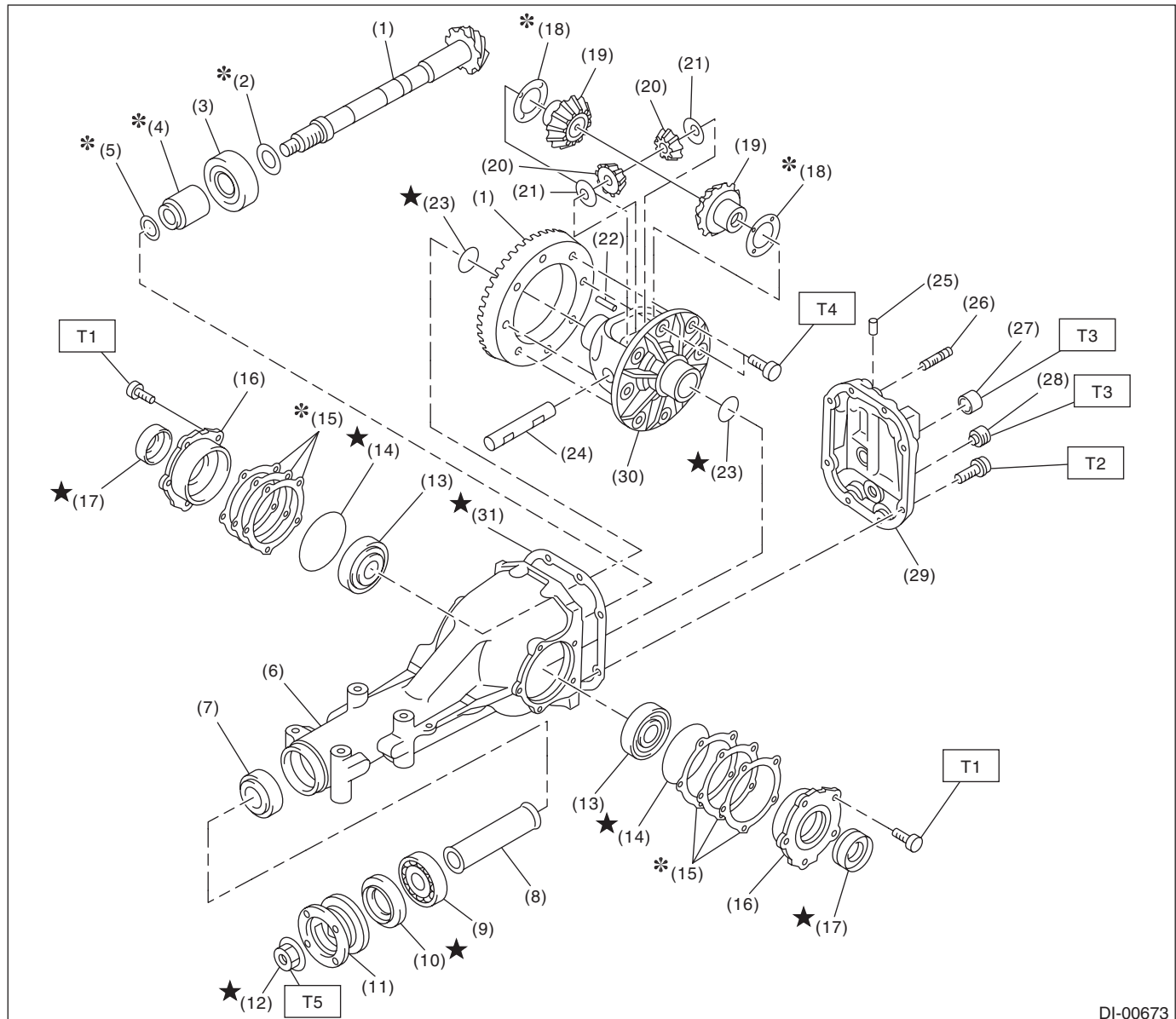
- (1) Item
- (2) Rear differential gear oil
- (3) API classification
- (4) SAE viscosity No. and applicable temperature

General Description

DIFFERENTIALS

4. SERVICE DATA

Drive pinion bearing preload (For new bearing)	Measured with spring measurement (measured at companion flange bolt hole) N (kgf, lbf)	T-type	17.7 — 38.8 (1.8 — 4.0, 4.0 — 8.7)
		VA-type	12.7 — 32.2 (1.3 — 3.3, 2.9 — 7.2)
	Measured with torque wrench N·m (kgf-m, ft-lb)	T-type	0.67 — 1.47 (0.07 — 0.15, 0.49 — 1.08)
		VA-type	0.48 — 1.22 (0.05 — 0.12, 0.35 — 0.90)
Side gear backlash	mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
		VA1-type	0.05 — 0.15 (0.002 — 0.006)
		VA2-type	0.13 — 0.18 (0.005 — 0.007)
Side bearing standard width	mm (in)		20.00 (0.7874)
Hypoid driven gear to drive pinion backlash	mm (in)	T-type	0.10 — 0.20 (0.004 — 0.008)
		VA-type	0.10 — 0.15 (0.004 — 0.006)
Hypoid driven gear runout on its back surface	mm (in)		0.05 (0.002)

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

DI-00673

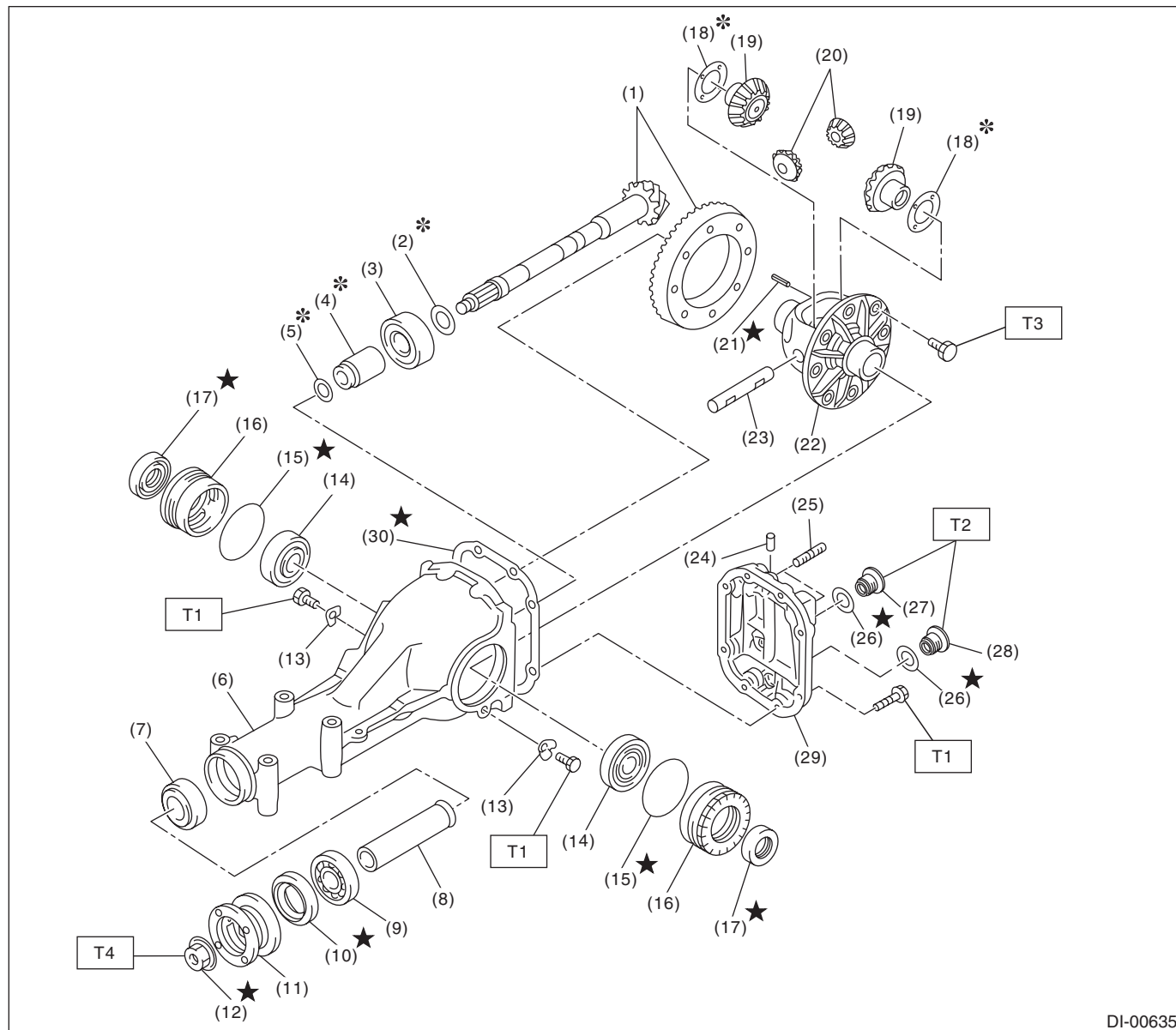
- | | | |
|---|------------------------------|------------------------|
| (1) Hypoid driven gear and drive pinion set | (14) O-ring | (27) Filler plug |
| (2) Pinion height adjusting washer | (15) Side retainer shim | (28) Drain plug |
| (3) Rear bearing | (16) Side retainer | (29) Rear cover |
| (4) Preload adjusting spacer | (17) Side oil seal | (30) Differential case |
| (5) 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, 36.1)****T4: 103 (10.5, 76.0)****T5: 181.5 (18.5, 133.9)**

General Description

DIFFERENTIALS

2. REAR DIFFERENTIAL (VA1-TYPE)



DI-00635

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

Tightening torque: N·m (kgf·m, ft·lb)

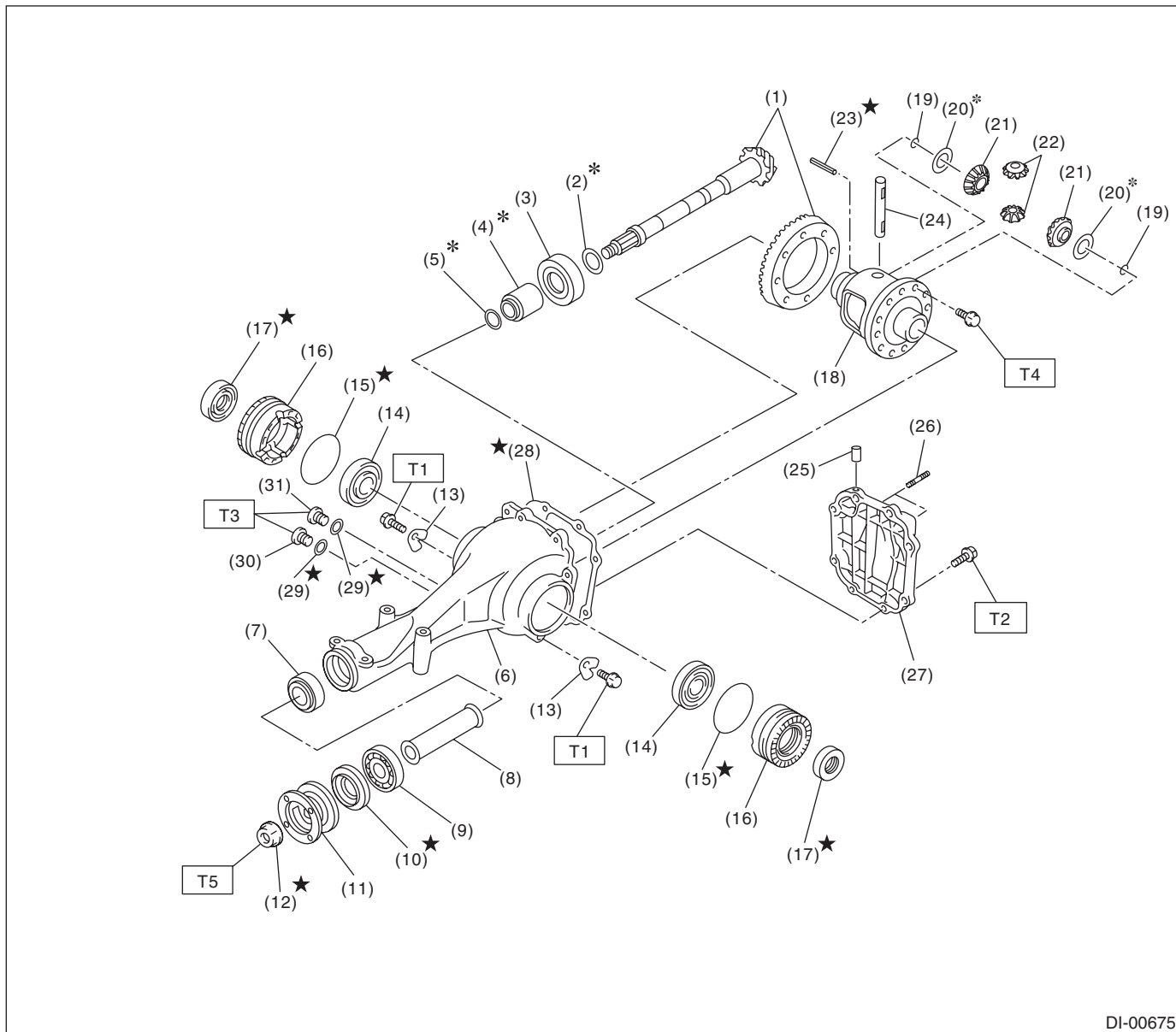
T1: 25 (2.5, 18.4)

T2: 50 (5.1, 36.9)

T3: 62 (6.3, 45.7)

T4: 191 (19.5, 140.9)

3. REAR DIFFERENTIAL (VA2-TYPE)



DI-00675

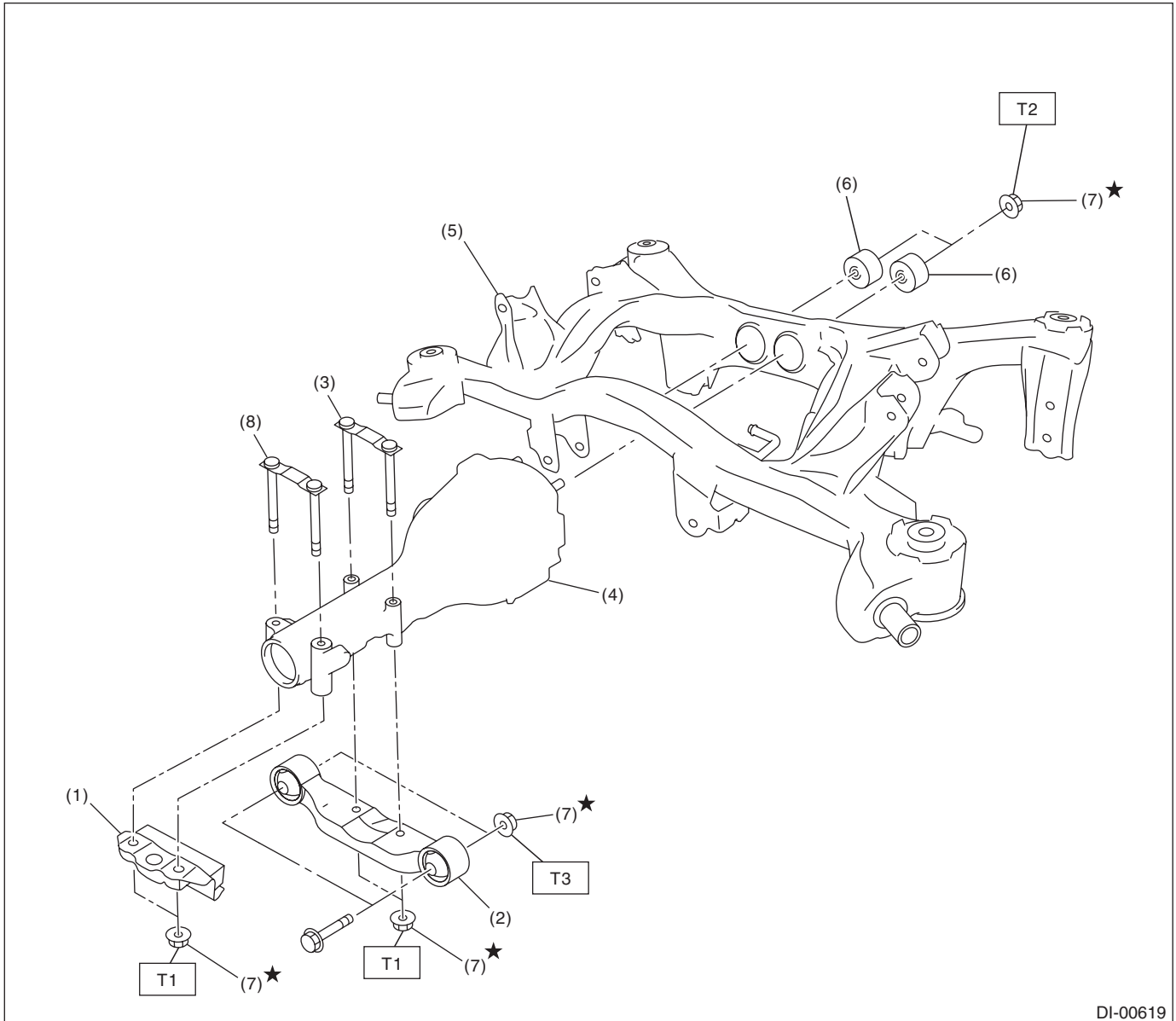
- | | | |
|---|------------------------------|------------------|
| (1) Hypoid driven gear and drive pinion set | (14) Side bearing | (27) Rear cover |
| (2) Pinion height adjusting washer | (15) O-ring | (28) Gasket |
| (3) Rear bearing | (16) Side retainer | (29) Gasket |
| (4) Preload adjusting spacer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

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: <Ref. to DI-52, ASSEMBLY, Rear Differential (VA-type).>****T5: 191 (19.5, 140.9)**

General Description

DIFFERENTIALS

4. REAR DIFFERENTIAL MOUNTING SYSTEM



DI-00619

- | | |
|------------------------------------|--|
| (1) Mass damper (CVT model) | (5) Sub frame |
| (2) Rear differential front member | (6) Rear differential mount bushing |
| (3) Rear differential member plate | (7) Self-locking nut |
| (4) Rear differential ASSY | (8) Rear differential member plate (CVT model) |

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

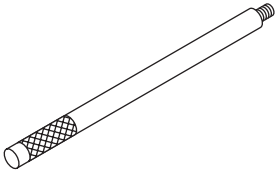
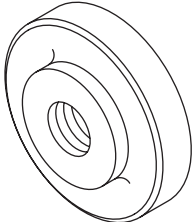
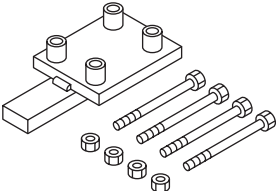
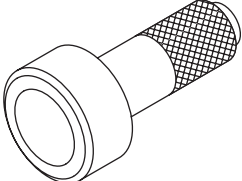
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, 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 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.

General Description

DIFFERENTIALS

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	<ul style="list-style-type: none"> • Used for press-fitting the bearing race of differential carrier (front). (T-type) • Used for press-fitting bearing race of differential carrier (rear). (VA1-type) • Used for press-fitting side bearing race. (VA1-type)
 ST-398217700	398217700	ATTACHMENT SET	Stand for rear differential carrier disassembly and assembly.
 ST-498447120	498447120	INSTALLER	Used for installing the front oil seal.

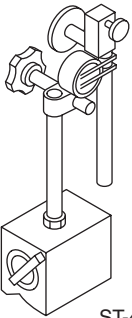
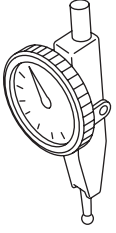
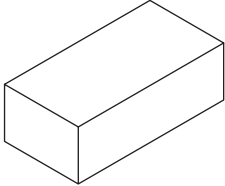
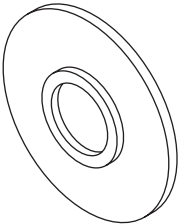
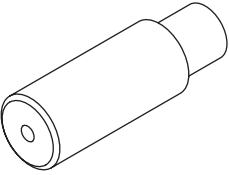
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
<p>ST-498427200</p>	498427200	FLANGE WRENCH	Used for stopping rotation of companion flange when removing and tightening self-lock nut.
<p>ST-398467700</p>	398467700	DRIFT	<ul style="list-style-type: none"> • Used for removing pinion, pilot bearing and rear bearing cone. • For T-type and VA1-type
<p>ST-399780104</p>	399780104	WEIGHT	Used for installing the front bearing cone and the pilot bearing and the 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 removing the spring pin of the differential pinion shaft.

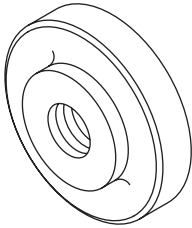
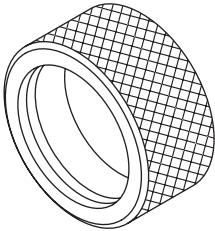
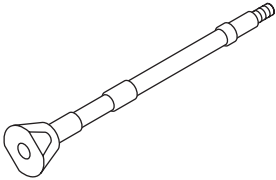
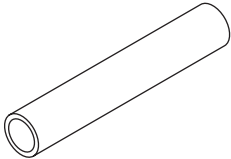
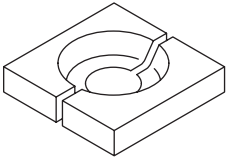
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498247001	498247001	MAGNET BASE	<ul style="list-style-type: none"> Used for measuring backlash between side gear and pinion, and hypoid gear. Used together with DIAL GAUGE (498247100).
 ST-498247100	498247100	DIAL GAUGE	<ul style="list-style-type: none"> Used for measuring backlash between side gear and pinion, and hypoid gear. Used together with MAGNET BASE (498247001).
 ST-398507704	398507704	BLOCK	<ul style="list-style-type: none"> Used for adjusting pinion height and preload. For T-type and VA1-type
 ST-398177700	398177700	INSTALLER	<ul style="list-style-type: none"> Used for installing the rear bearing cone. For T-type and VA2-type
 ST-398457700	398457700	ATTACHMENT	<ul style="list-style-type: none"> Used for removing the side retainer. For T-type

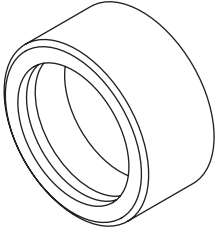
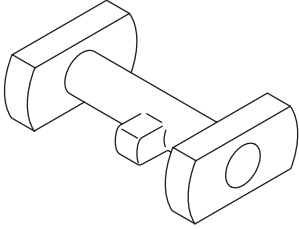
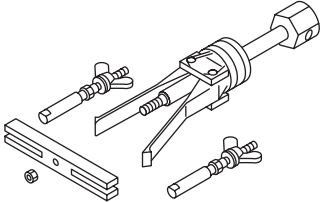
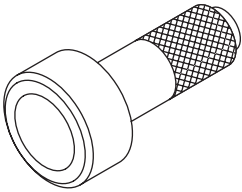
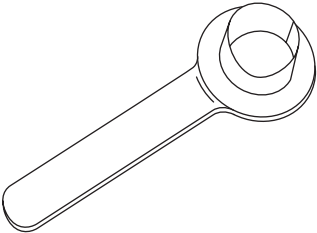
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-398477703	398477703	DRIFT 2	<ul style="list-style-type: none"> Used for press-fitting bearing race (rear) of differential carrier. For T-type and VA2-type
 ST-398437700	398437700	DRIFT	<ul style="list-style-type: none"> Used for installing the side oil seal. For T-type and VA2-type
 ST-398507702	398507702	DUMMY SHAFT	<ul style="list-style-type: none"> Used for adjusting pinion height and preload. For T-type
 ST-398507703	398507703	DUMMY COLLAR	<ul style="list-style-type: none"> Used for adjusting pinion height and preload. For T-type
 ST-398517700	398517700	REPLACER	<ul style="list-style-type: none"> Used for removing rear bearing cone. For T-type and VA2-type

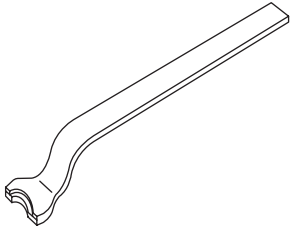
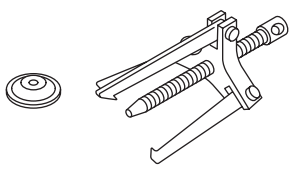
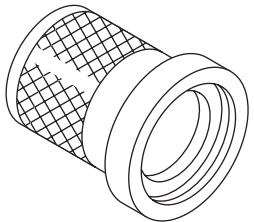
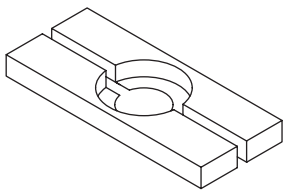
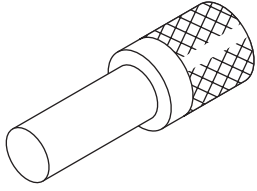
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398487700</p>	398487700	DRIFT	<ul style="list-style-type: none"> Used for press-fitting side bearing cone. For T-type and VA2-type
 <p>ST-398507701</p>	398507701	DIFFERENTIAL CARRIER GAUGE	<ul style="list-style-type: none"> Used for adjusting pinion height. For T-type
 <p>ST-398527700</p>	398527700	PULLER ASSY	<ul style="list-style-type: none"> Used for removing the front and side oil seals. Used for removing side bearing cup. (T-type)
 <p>ST-398417700</p>	398417700	DRIFT	<ul style="list-style-type: none"> Used for installing side bearing race. For T-type and VA2-type
 <p>ST28099PA090</p>	28099PA090	OIL SEAL PROTECTOR	<ul style="list-style-type: none"> Used for installing the rear drive shaft to the rear differential. For oil seal protection

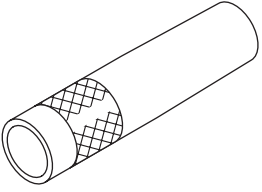
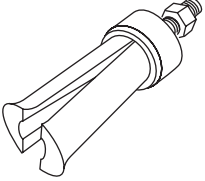
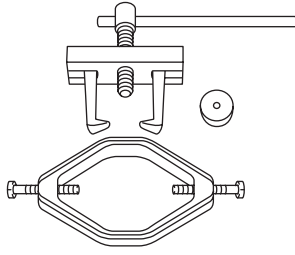
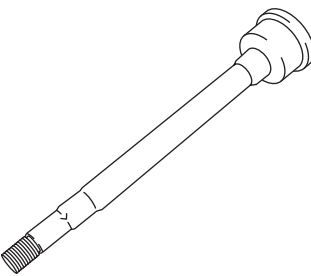
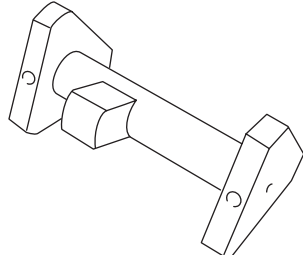
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST28099PA100</p>	28099PA100	DRIVE SHAFT REMOVER	<ul style="list-style-type: none"> Used for removing the rear drive shaft from rear differential. For T-type
 <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	<ul style="list-style-type: none"> Used for removing the differential side bearing cone. For VA2-type
 <p>ST-899864100</p>	899864100	REMOVER	Used for removing the differential side bearing.

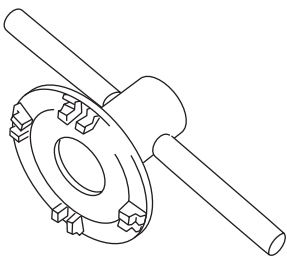
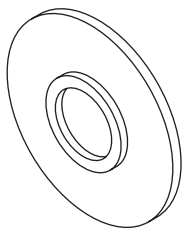
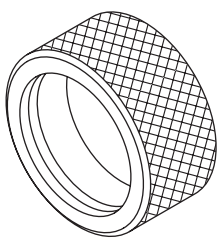
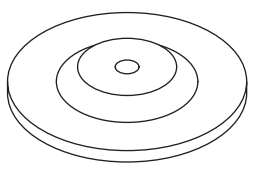
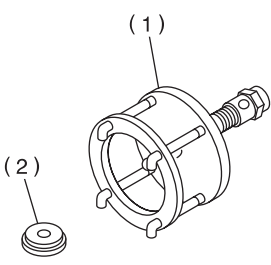
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499277200</p>	499277200	INSTALLER	<ul style="list-style-type: none"> Used for installing the front bearing cone. For VA2-type
 <p>ST18758AA000</p>	18758AA000	PULLER	<ul style="list-style-type: none"> Used for removing side bearing cup. For VA2-type
 <p>ST18759AA000</p>	18759AA000	PULLER ASSY	<ul style="list-style-type: none"> Used for removing the differential side bearing cone. For T-type
 <p>ST18678AA000</p>	18678AA000	DUMMY SHAFT	<ul style="list-style-type: none"> Used for adjusting pinion height and preload. For VA2-type
 <p>ST18831AA010</p>	18831AA010	DIFFERENTIAL CARRIER GAUGE	<ul style="list-style-type: none"> Used for adjusting pinion height. For VA2-type

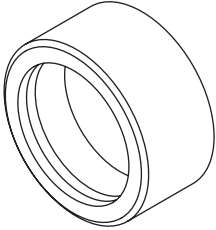
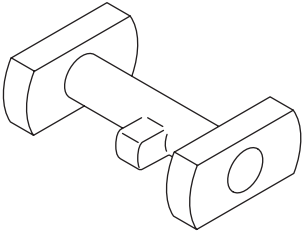
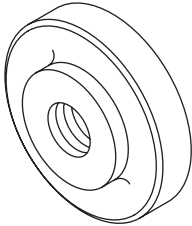
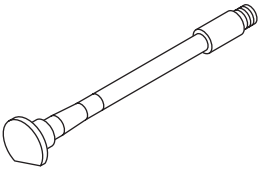
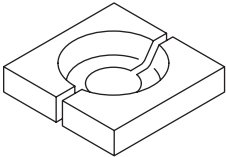
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18630AA010</p>	18630AA010	WRENCH COMPL RETAINER	<ul style="list-style-type: none"> Used for removing and installing the side oil seal holder. For VA-type WRENCH ASSY (499787000) can also be used.
 <p>ST-498175500</p>	498175500	INSTALLER	<ul style="list-style-type: none"> Used for installing the rear bearing cone. For VA1-type
 <p>ST-498447100</p>	498447100	INSTALLER	<ul style="list-style-type: none"> Used for installing the oil seal. For VA1-type
 <p>ST-399520105</p>	399520105	SEAT	<ul style="list-style-type: none"> Used for removing the side bearing cone. Used together with PULLER SET (899524100). For VA-type
 <p>ST-899524100</p>	899524100	PULLER SET	<ul style="list-style-type: none"> Used for removing the differential side bearing cone. For VA-type (1) Puller (2) Cap

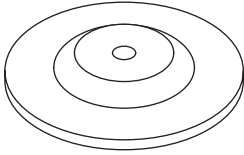
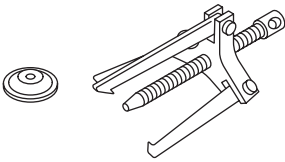
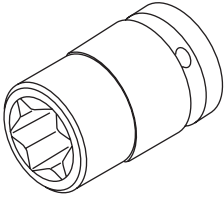
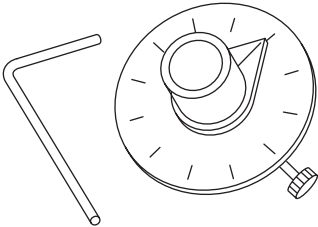
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498485400	498485400	DRIFT	<ul style="list-style-type: none"> Used for installing side bearing cone. For VA1-type
 ST-498505501	498505501	DIFFERENTIAL CARRIER GAUGE	<ul style="list-style-type: none"> Used for adjusting pinion height. For VA1-type
 ST-498447110	498447110	DRIFT	<ul style="list-style-type: none"> Used for press-fitting the bearing race (front) of the differential carrier. For VA1-type
 ST-498447150	498447150	DUMMY SHAFT	<ul style="list-style-type: none"> Used for adjusting pinion height and preload. For VA1-type
 ST-498515500	498515500	REPLACER	<ul style="list-style-type: none"> Used for removing rear bearing cone. For VA1-type

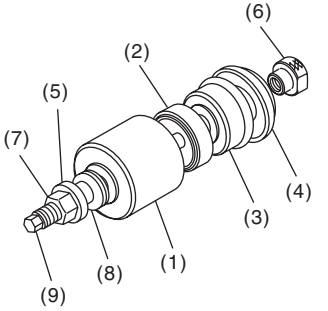
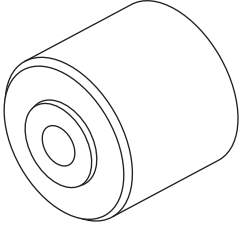
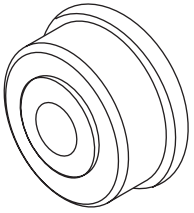
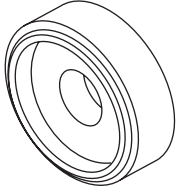
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499705404	499705404	SEAT	<ul style="list-style-type: none"> Used for removing the side bearing race. Used together with PULLER ASSY (499705401). For VA1-type
 ST-499705401	499705401	PULLER ASSY	<ul style="list-style-type: none"> Used for removing the side bearing race. Used together with SEAT (499705404). For VA-type
 ST18270KA020	18270KA020	SOCKET (E20)	<ul style="list-style-type: none"> Used for removing and installing the hypoid driven gear. For VA2-type
 ST18854AA000	18854AA000	ANGLE GAUGE	<ul style="list-style-type: none"> Used for installing the hypoid driven gear. For VA2-type

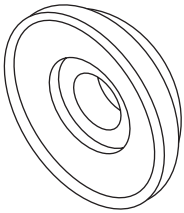
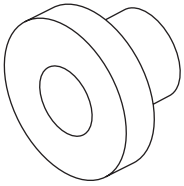
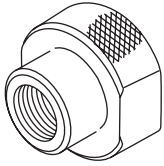
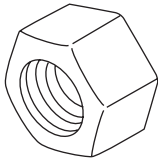
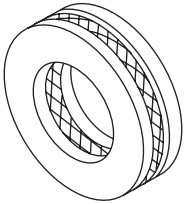
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST41399FG001</p>	41399FG001	SPECIAL TOOL ASSY	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. Use (1), (3), (5), (6), (7), (8) and (9) for removal. Use (2), (4), (5), (6), (7), (8) and (9) for installation. <p>(1) SPECIAL TOOL A (41399FG010) (2) SPECIAL TOOL B (41399FG020) (3) SPECIAL TOOL C (41399FG031) (4) SPECIAL TOOL D (41399FG041) (5) SPECIAL TOOL SLEEVE (41399FG050) (6) SPECIAL TOOL RING (41399FG061) (7) SPECIAL TOOL NUT (41399FG070) (8) SPECIAL TOOL BEARING (41399FG080) (9) SPECIAL TOOL SHAFT (41399FG091)</p>
 <p>ST41399FG010</p>	41399FG010	SPECIAL TOOL A	<ul style="list-style-type: none"> Used for removing the rear differential mount bushing. For combination of tools for removal, refer to "SPECIAL TOOL ASSY (41399FG001)".
 <p>ST41399FG020</p>	41399FG020	SPECIAL TOOL B	<ul style="list-style-type: none"> Used for installing the rear differential mount bushing. For combination of tools for installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 <p>ST41399FG031</p>	41399FG031	SPECIAL TOOL C	<ul style="list-style-type: none"> Used for removing the rear differential mount bushing. For combination of tools for removal, refer to "SPECIAL TOOL ASSY (41399FG001)".

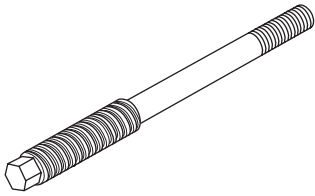
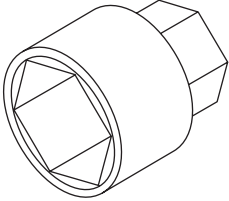
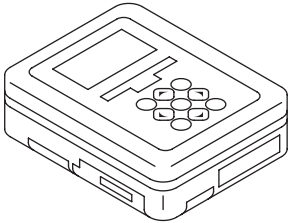
General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG041	41399FG041	SPECIAL TOOL D	<ul style="list-style-type: none"> Used for installing the rear differential mount bushing. For combination of tools for installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG050	41399FG050	SPECIAL TOOL SLEEVE	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG061	41399FG061	SPECIAL TOOL RING	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG070	41399FG070	SPECIAL TOOL NUT	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399FG080	41399FG080	SPECIAL TOOL BEARING	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".

General Description

DIFFERENTIALS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST41399FG091	41399FG091	SPECIAL TOOL SHAFT	<ul style="list-style-type: none"> Used for removing and installing the rear differential mount bushing. For combination of tools for removal and installation, refer to "SPECIAL TOOL ASSY (41399FG001)".
 ST41399YC000	41399YC000	SOCKET WRENCH (17)	Used for tightening the self-locking nut.
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.

2. GENERAL TOOL

TOOL NAME	REMARKS
Transmission jack	Used for removing and installing 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 oil filler plug and oil drain plug.
Tire lever	Used for removing the rear drive shaft. (VA-type)