

# General Description

## LUBRICATION

### 1. General Description

#### A: SPECIFICATION

Lubrication method			Forced lubrication
Oil pump	Pump type		Trochoid type
	Number of teeth	Inner rotor	9
		Outer rotor	10
	Outer rotor diameter × thickness		78 × 10 mm (3.07 × 0.39 in)
	Tip clearance between inner and outer rotors	Specification	0.04 — 0.14 mm (0.0016 — 0.0055 in)
		Limit	0.18 mm (0.0071 in)
	Side clearance between inner rotor and pump case	Specification	0.02 — 0.07 mm (0.0008 — 0.0028 in)
		Limit	0.12 mm (0.0047 in)
	Case clearance between outer rotor and pump case	Specification	0.10 — 0.175 mm (0.0039 — 0.0069 in)
		Limit	0.20 mm (0.0079 in)
	Performance (Oil temperature 80°C (176°F))	600 rpm	Discharge pressure
Discharge rate			4.6 ℓ (4.9 US qt, 4.0 Imp qt)/min.
5,000 rpm		Discharge pressure	294 kPa (3.0 kgf/cm <sup>2</sup> , 43 psi)
		Discharge rate	47.0 ℓ (49.7 US qt, 41.4 Imp qt)/min.
Relief valve working pressure			588 kPa (6.0 kgf/cm <sup>2</sup> , 85 psi)
Oil filter	Filter type		Full-flow filter type
	Filtration area	Outer diameter: 68 mm (2.68 in)	800 cm <sup>2</sup> (124 sq in)
		Outer diameter: 65 mm (2.56 in)	470 cm <sup>2</sup> (73 sq in)
	By-pass valve opening pressure		160 kPa (1.63 kgf/cm <sup>2</sup> , 23.2 psi)
	Outer diameter × width	Outer diameter: 68 mm (2.68 in)	68 × 65 mm (2.68 × 2.56 in)
		Outer diameter: 65 mm (2.56 in)	65 × 74.4 mm (2.56 × 2.93 in)
Installation bolt specifications			M 20 × 1.5
Oil pressure switch	Type		Immersed contact point type
	Operating voltage — wattage		12 V — 3.4 W or less
	Warning light operating pressure		14.7 kPa (0.15 kgf/cm <sup>2</sup> , 2.1 psi)
	Proof pressure		981 kPa (10 kgf/cm <sup>2</sup> , 142 psi) or more
Engine oil	Capacity (at overhaul)	Non-turbo	5.0 ℓ (5.4 US qt, 4.5 Imp qt)
		Turbo	5.0 ℓ (5.4 US qt, 4.5 Imp qt)
	When replacing engine oil and oil filter	Non-turbo	4.2 ℓ (4.4 US qt, 3.7 Imp qt)
		Turbo	4.3 ℓ (4.5 US qt, 3.8 Imp qt)
	When replacing engine oil only	Non-turbo	4.0 ℓ (4.2 US qt, 3.5 Imp qt)
		Turbo	4.0 ℓ (4.2 US qt, 3.5 Imp qt)

**Recommended oil:**

**Items having the API standard SM “Energy Conserving” logo**

**ILSAC standard GF-4 “starburst mark” displayed on container top.**

SAE (1)						
(°C)	-30	-20	-15	0	15	30 40
(°F)	-22	-4	5	32	59	86 104

LU-02203

- (1) SAE viscosity No. and applicable temperature
- (2) Recommended

**CAUTION:**

**It is acceptable to fill an engine with oil of another name when replacing oil, but use an API standard specified by Subaru or one that has SAE viscosity number.**

**NOTE:**

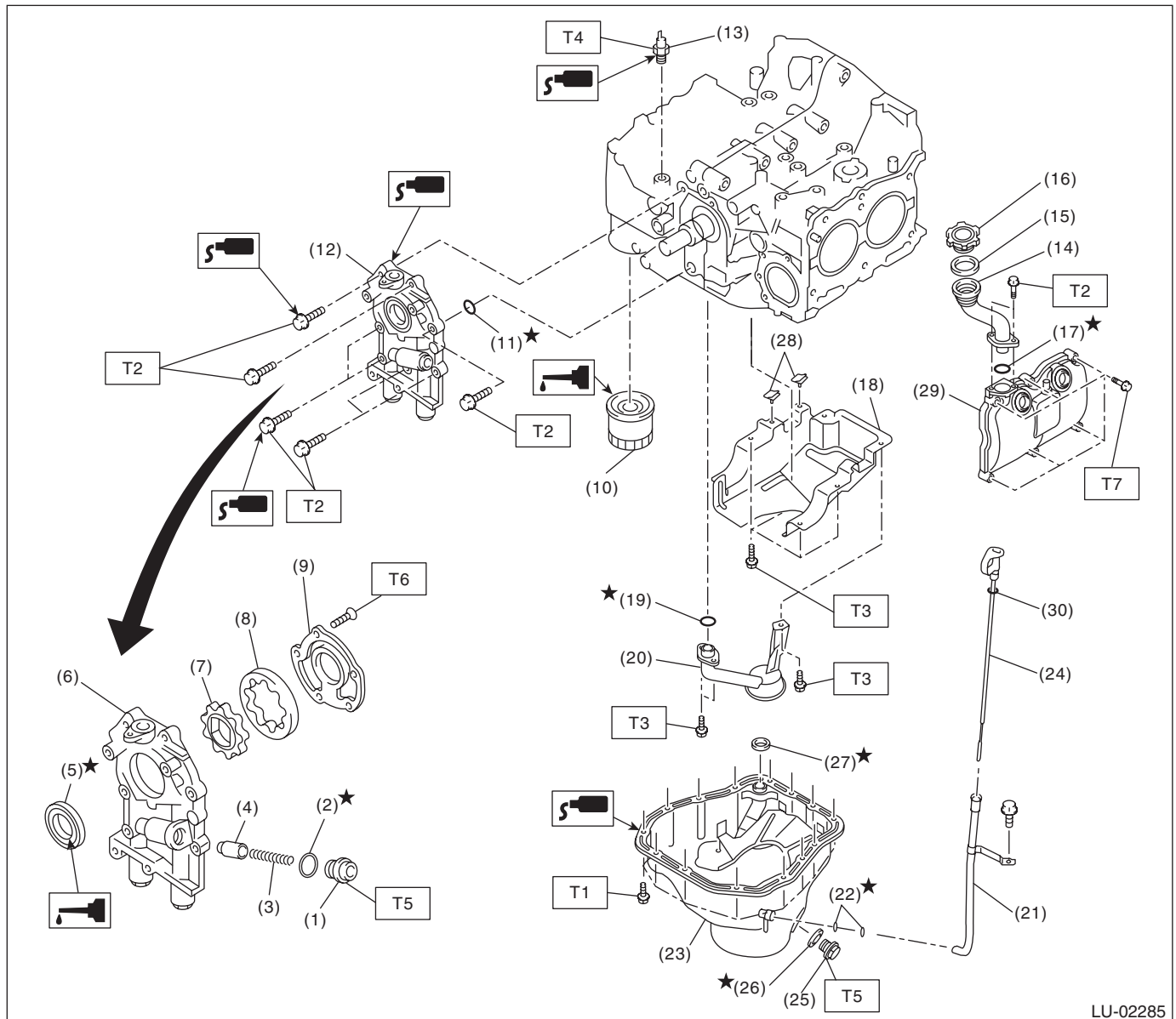
Use an oil with the viscosity shown below if the vehicle is used in regions of high temperature, or in severe environments. API standard: SM or SL  
 SAE viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50

# General Description

## LUBRICATION

### B: COMPONENT

#### 1. NON-TURBO MODEL



LU-02285

- |                          |                            |
|--------------------------|----------------------------|
| (1) Plug                 | (15) O-ring                |
| (2) Gasket               | (16) Oil filler cap        |
| (3) Relief valve spring  | (17) O-ring                |
| (4) Relief valve         | (18) Baffle plate          |
| (5) Oil seal             | (19) O-ring                |
| (6) Oil pump case        | (20) Oil strainer          |
| (7) Inner rotor          | (21) Oil level gauge guide |
| (8) Outer rotor          | (22) O-ring                |
| (9) Oil pump cover       | (23) Oil pan               |
| (10) Oil filter          | (24) Oil level gauge       |
| (11) O-ring              | (25) Drain plug            |
| (12) Oil pump ASSY       | (26) Metal gasket          |
| (13) Oil pressure switch | (27) Gasket                |
| (14) Oil filler duct     |                            |

- |                   |
|-------------------|
| (28) Seal         |
| (29) Rocker cover |
| (30) O-ring       |

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

**T1: 5 (0.5, 3.6)**

**T2: 6.4 (0.65, 4.7)**

**T3: 10 (1.0, 7.2)**

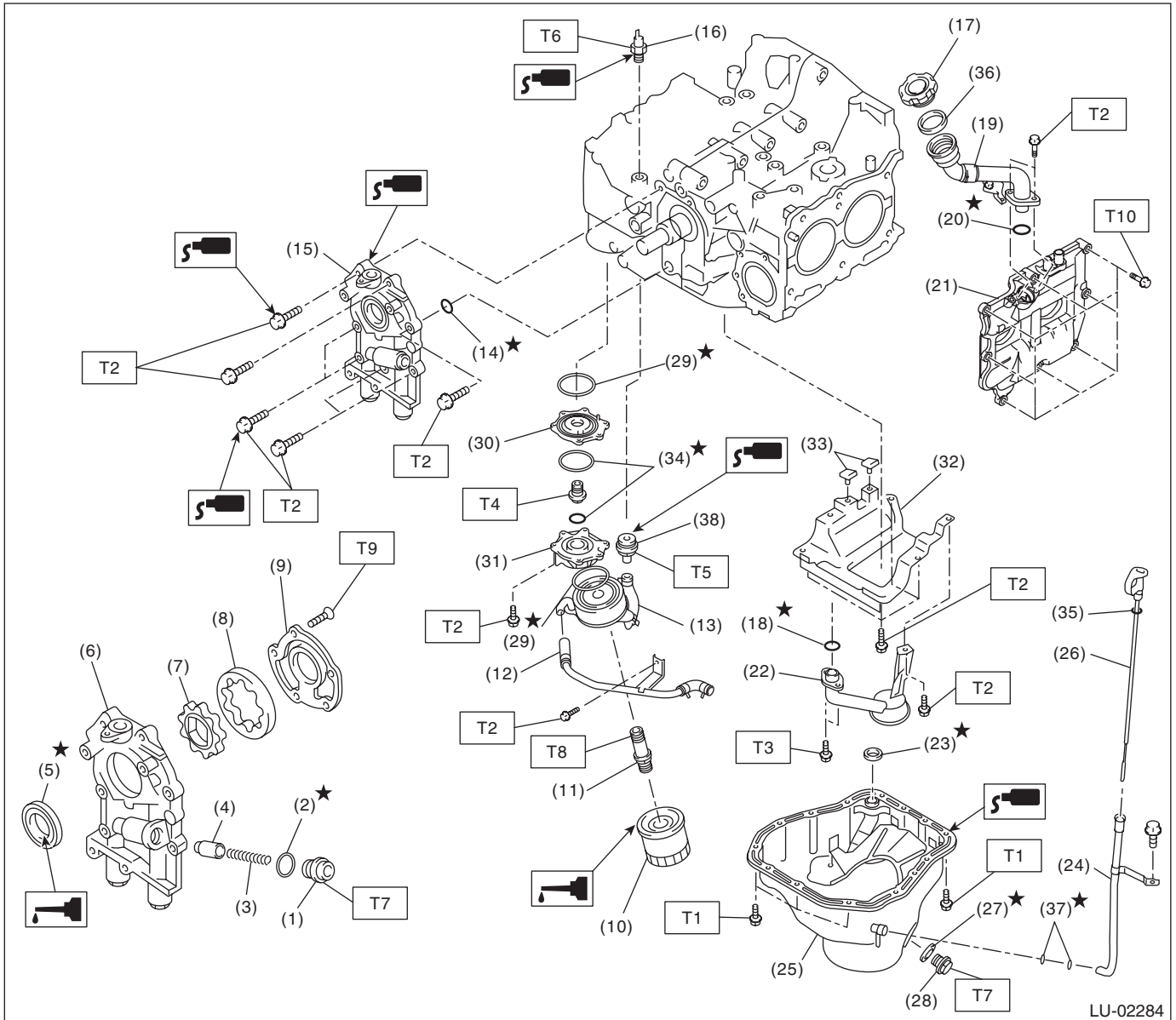
**T4: 25 (2.5, 18.1)**

**T5: 44 (4.5, 32.5)**

**T6: 5.4 (0.55, 4.0)**

**T7: <Ref. to ME(H4SO)-55, INSTALLATION, Camshaft.>**

## 2. TURBO MODEL



# General Description

## LUBRICATION

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(1) Plug	(18) O-ring	(35) O-ring
(2) Gasket	(19) Oil filler duct	(36) O-ring
(3) Relief valve spring	(20) O-ring	(37) O-ring
(4) Relief valve	(21) Rocker cover	(38) Plug
(5) Oil seal	(22) Oil strainer	
(6) Oil pump case	(23) Gasket	
(7) Inner rotor	(24) Oil level gauge guide	
(8) Outer rotor	(25) Oil pan	
(9) Oil pump cover	(26) Oil level gauge	
(10) Oil filter	(27) Metal gasket	
(11) Oil cooler connector	(28) Drain plug	
(12) Water by-pass pipe	(29) Gasket	
(13) Oil cooler	(30) Adapter (1)	
(14) O-ring	(31) Adapter (2)	
(15) Oil pump ASSY	(32) Baffle plate	
(16) Oil pressure switch	(33) Seal	
(17) Oil filler cap	(34) O-ring	

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**Tightening torque: N-m (kgf-m, ft-lb)****T1: 5 (0.5, 3.6)****T2: 6.4 (0.65, 4.7)****T3: 10 (1.0, 7.2)****T4: 45 (4.6, 33.2)****T5: 69 (7.0, 51)****T6: 25 (2.5, 18.1)****T7: 44 (4.5, 32.5)****T8: 54 (5.5, 40)****T9: 5.4 (0.55, 4.0)****T10: <Ref. to ME(H4DOTC)-55,  
INSTALLATION, Camshaft.>**

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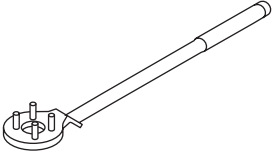
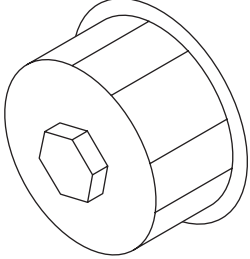
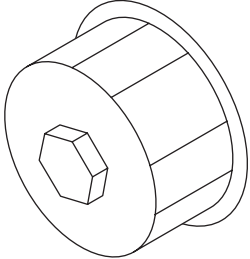
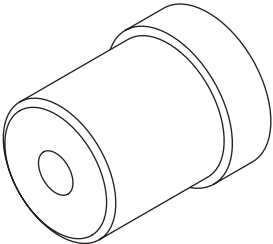
## C: CAUTION

- 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.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from the battery.

# General Description

LUBRICATION

## D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499977100</p>	499977100	CRANK PULLEY WRENCH	Used for stopping rotation of crank pulley when loosening and tightening the crank pulley bolt.
 <p>ST18332AA000</p>	18332AA000	OIL FILTER WRENCH	Used for removing and installing oil filter. (Outer diameter: 68 mm (2.68 in))
 <p>ST18332AA010</p>	18332AA010	OIL FILTER WRENCH	Used for removing and installing oil filter. (Outer diameter: 65 mm (2.56 in))
 <p>ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing oil seal into oil pump.