

# General Description

## LUBRICATION

### 1. General Description

#### A: SPECIFICATION

- 2.5 L non-turbo model

Lubrication method				Forced lubrication		
Oil pump	Pump type			Trochoid type		
	Number of teeth	Inner rotor		9		
		Outer rotor		10		
	Outer rotor diameter × thickness			mm (in)		76 × 10 (2.99 × 0.39)
	Tip clearance between inner and outer rotors		mm (in)	Standard	0.04 — 0.14 (0.0016 — 0.0055)	
	Case clearance between outer rotor and pump case		mm (in)	Standard	0.10 — 0.175 (0.0039 — 0.0069)	
	Side clearance between inner rotor and pump case		mm (in)	Standard	0.02 — 0.07 (0.0008 — 0.0028)	
	Relief valve spring	Free length		mm (in)		73.7 (2.902)
		Installed length		mm (in)		54.7 (2.154)
		Load when installed		N (kgf, lbf)		93.1 (9.49, 20.93)
	Performance (Oil temperature 80°C (176°F))	600 rpm	Discharge pressure	kPa (kgf/cm <sup>2</sup> , psi)		98 (1.0, 14)
			Discharge rate	ℓ (US qt, Imp qt)/min.		4.6 (4.9, 4.0) or more
		5,000 rpm	Discharge pressure	kPa (kgf/cm <sup>2</sup> , psi)		294 (3.0, 43)
			Discharge rate	ℓ (US qt, Imp qt)/min.		47.0 (49.7, 41.4) or more
	Relief valve working pressure			kPa (kgf/cm <sup>2</sup> , psi)		588 (6.0, 85)
Oil filter	Filter type			Full-flow filter type		
	Filtration area	cm <sup>2</sup> (sq in)	Outer diameter: 68 mm (2.68 in) (black)		800 (124)	
			Outer diameter: 67.4 mm (2.65 in) (blue)		555 (86)	
	By-pass valve opening pressure			kPa (kgf/cm <sup>2</sup> , psi)		160 (1.63, 23.2)
	Outer diameter × width	mm (in)	Outer diameter: 68 mm (2.68 in) (black)		68 × 65 (2.68 × 2.56)	
			Outer diameter: 67.4 mm (2.65 in) (blue)		67.4 × 65.3 (2.65 × 2.57)	
	Installation screw specifications			M 20 × 1.5		
Oil pressure switch	Type			Immersed contact point type		
	Operating voltage — power consumption			12 V — 3.4 W or less		
	Warning light operating pressure			kPa (kgf/cm <sup>2</sup> , psi)		14.7 (0.15, 2.1)
	Proof pressure			kPa (kgf/cm <sup>2</sup> , psi)		981 (10, 142) or more
Engine oil	Total capacity (at overhaul)			ℓ (US qt, Imp qt)		4.8 (5.1, 4.2)
	When replacing engine oil and oil filter			ℓ (US qt, Imp qt)		4.2 (4.4, 3.7)
	When replacing engine oil only			ℓ (US qt, Imp qt)		4.0 (4.2, 3.5)

# General Description

LUBRICATION

- Turbo model

Lubrication method					Forced lubrication		
Oil pump	Pump type				Trochoid type		
	Number of teeth	Inner rotor			9		
		Outer rotor			10		
	Outer rotor diameter × thickness				mm (in)		78 × 11 (3.07 × 0.43)
	Tip clearance between inner and outer rotors		mm (in)	Standard		0.04 — 0.14 (0.0016 — 0.0055)	
	Case clearance between outer rotor and pump case		mm (in)	Standard		0.10 — 0.175 (0.0039 — 0.0069)	
	Side clearance between inner rotor and pump case		mm (in)	Standard		0.02 — 0.07 (0.0008 — 0.0028)	
	Relief valve spring	Free length			mm (in)		73.7 (2.902)
		Installed length			mm (in)		54.7 (2.154)
		Load when installed			N (kgf, lbf)		93.1 (9.49, 20.93)
	Performance (Oil temperature 80°C (176°F))	600 rpm	Discharge pressure		kPa (kg/cm <sup>2</sup> , psi)		98 (1.0, 14)
			Discharge rate		ℓ (US qt, Imp qt)/min.		6.4 (6.8, 5.6) or more
		6,000 rpm	Discharge pressure		kPa (kg/cm <sup>2</sup> , psi)		392 (4.0, 56.8)
Discharge rate			ℓ (US qt, Imp qt)/min.		63.0 (66.6, 55.4) or more		
Relief valve working pressure				kPa (kg/cm <sup>2</sup> , psi)		538 (5.5, 78)	
Oil filter	Filter type				Full-flow filter type		
	Filtration area	cm <sup>2</sup> (sq in)	Outer diameter: 68 mm (2.68 in) (black)		800 (124)		
			Outer diameter: 67.4 mm (2.65 in) (blue)		555 (86)		
	By-pass valve opening pressure				kPa (kg/cm <sup>2</sup> , psi)		160 (1.63, 23.2)
	Outer diameter × width	mm (in)	Outer diameter: 68 mm (2.68 in) (black)		68 × 65 (2.68 × 2.56)		
			Outer diameter: 67.4 mm (2.65 in) (blue)		67.4 × 65.3 (2.65 × 2.57)		
	Installation screw specifications				M 20 × 1.5		
Oil pressure switch	Type				Immersed contact point type		
	Operating voltage — power consumption				12 V — 3.4 W or less		
	Warning light operating pressure				kPa (kg/cm <sup>2</sup> , psi)		14.7 (0.15, 2.1)
	Proof pressure				kPa (kg/cm <sup>2</sup> , psi)		981 (10, 142) or more
Engine oil	Total capacity (at overhaul)				ℓ (US qt, Imp qt)		5.2 (5.5, 4.6)
	When replacing engine oil and oil filter				ℓ (US qt, Imp qt)		4.3 (4.5, 3.8)
	When replacing engine oil only				ℓ (US qt, Imp qt)		4.0 (4.2, 3.5)

LU(H4SO)-3

## General Description

### LUBRICATION

#### **Recommended oil:**

**Oil corresponding to either of the following standards.**

- **Those with SM “Energy Conserving” logo in case of API standard.**
- **Those with GF-4 “starburst mark” displayed on top of the container in case of IL-SAC standard.**

SAE (1)							
(°C)	-30	-20	-15	0	15	30	40
(°F)	-22	-4	5	32	59	86	104
<div><div>10W-30, 10W-40, 10W-50</div><div>5W-30 (2), 5W-40</div></div>							
LU-02488							

(1) SAE viscosity No. and applicable temperature

(2) Recommended

#### **CAUTION:**

**It is acceptable to fill an engine with oil of another brand when replacing the oil, but make sure to use an oil with an API standard and SAE viscosity number specified by Subaru.**

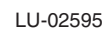
#### **NOTE:**

- The proper viscosity oil helps the engine maintain its ideal temperature, and cranking speed increased by reducing viscosity friction in hot condition.
- If the vehicle is used in regions of high temperatures or in other severe environments, use oil with the viscosities shown below.

API standard: SM or SL

SAE viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50

- 2.5 L non-turbo model

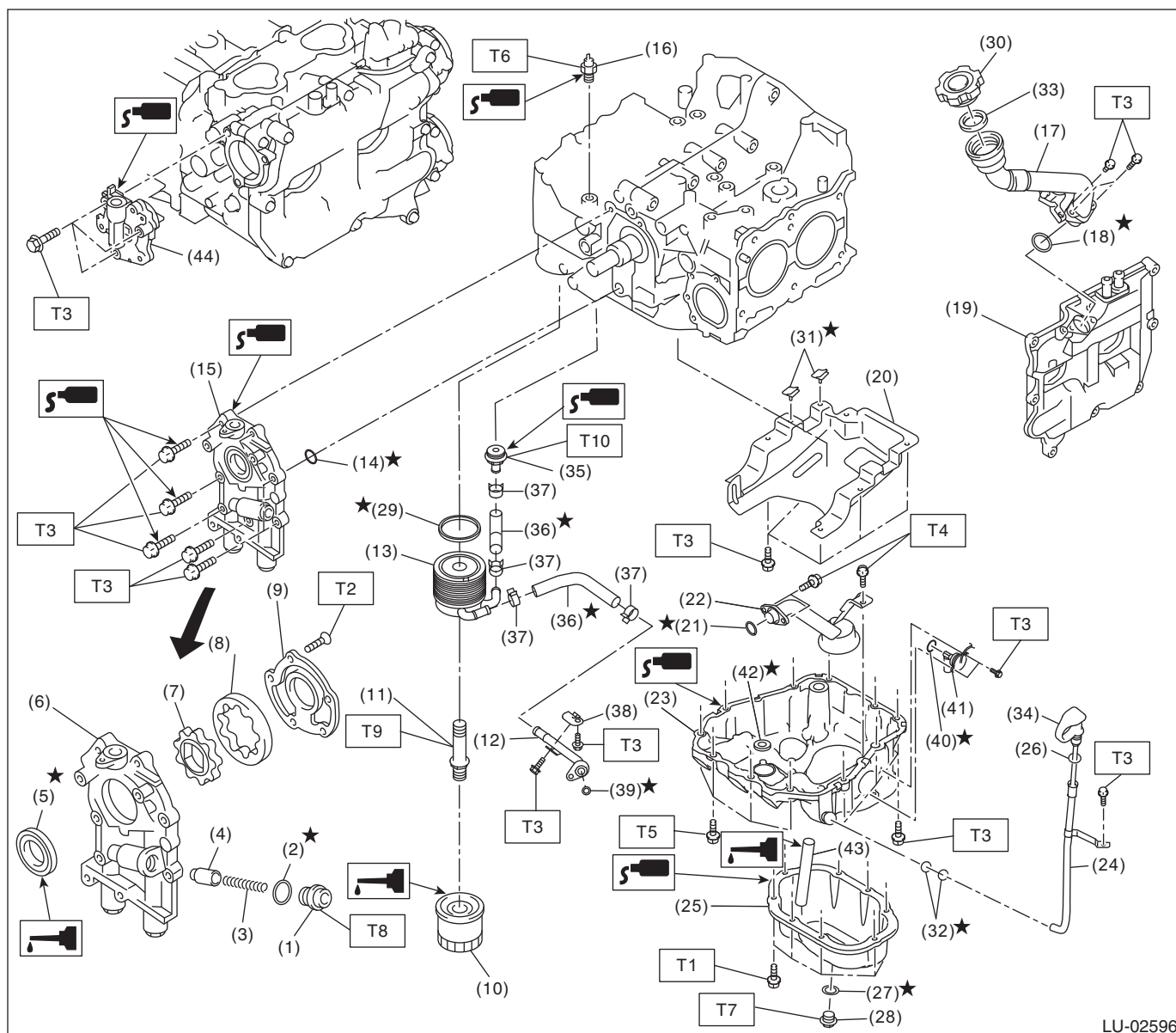


## General Description

### LUBRICATION

(1) PLUG	(17) O-ring	(33) O-ring
(2) Gasket	(18) Baffle plate	(34) Oil drain pipe
(3) Relief valve spring	(19) O-ring	(35) O-ring
(4) Relief valve	(20) Oil strainer	(36) Oil level switch
(5) Front oil seal	(21) Oil level gauge guide	
(6) Oil pump case	(22) O-ring	<b><i>Tightening torque:N·m (kgf-m, ft-lb)</i></b>
(7) Inner rotor	(23) Oil pan	<b><i>T1: 5 (0.5, 3.7)</i></b>
(8) Outer rotor	(24) Oil level gauge	<b><i>T2: 5.4 (0.6, 4.0)</i></b>
(9) Oil pump cover	(25) Drain plug	<b><i>T3: 6.4 (0.7, 4.7)</i></b>
(10) Oil filter	(26) Drain plug gasket	<b><i>T4: 10 (1.0, 7.4)</i></b>
(11) O-ring	(27) Cylinder block lower	<b><i>T5: 16 (1.6, 11.8)</i></b>
(12) Oil pump ASSY	(28) Seal	<b><i>T6: 25 (2.5, 18.4)</i></b>
(13) Oil pressure switch	(29) Rocker cover	<b><i>T7: 41.7 (4.3, 30.8)</i></b>
(14) Oil filler duct	(30) O-ring	<b><i>T8: 44 (4.5, 32.5)</i></b>
(15) Gasket	(31) Oil filter connector	<b><i>T9: 45 (4.6, 33.2)</i></b>
(16) Oil filler cap	(32) PLUG	<b><i>T10: 70 (7.1, 51.6)</i></b>

- Turbo model



LU-02596

## General Description

### LUBRICATION

(1) PLUG	(21) O-ring	(41) Oil level switch
(2) Gasket	(22) Oil strainer	(42) O-ring
(3) Relief valve spring	(23) Cylinder block lower	(43) Oil drain pipe
(4) Relief valve	(24) Oil level gauge guide	(44) Scavenge pump
(5) Front oil seal	(25) Oil pan	
(6) Oil pump case	(26) Oil level gauge	
(7) Inner rotor	(27) Drain plug gasket	
(8) Outer rotor	(28) Drain plug	
(9) Oil pump cover	(29) Gasket	
(10) Oil filter	(30) Oil filler cap	
(11) Oil cooler connector	(31) Seal	
(12) Oil cooler pipe	(32) O-ring	
(13) Oil cooler	(33) Gasket	
(14) O-ring	(34) O-ring	
(15) Oil pump ASSY	(35) PLUG	
(16) Oil pressure switch	(36) Oil cooler hose	
(17) Oil filler duct	(37) Clip	
(18) O-ring	(38) Oil cooler pipe stay	
(19) Rocker cover	(39) O-ring	
(20) Baffle plate	(40) O-ring	

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

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

**T2: 5.4 (0.6, 4.0)**

**T3: 6.4 (0.7, 4.7)**

**T4: 10 (1.0, 7.0)**

**T5: 16 (1.6, 11.8)**

**T6: 25 (2.5, 18.4)**

**T7: 41.7 (4.3, 30.8)**

**T8: 44 (4.5, 32.5)**

**T9: 54 (5.5, 39.8)**

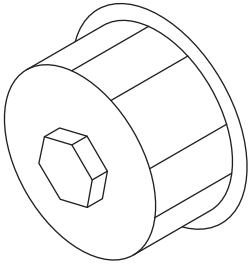
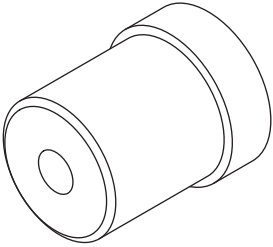
**T10: 69 (7.0, 50.9)**

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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 battery.
- If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emitting smoke or causing a fire.
- Prepare a container and cloth when performing work which oil possibly spills. If oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Follow all government and local regulations concerning disposal of refuse when disposing of oil.

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

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18332AA000</p>	18332AA000	OIL FILTER WRENCH	Used for removing and installing black oil filter (outer diameter: 68 mm (2.68 in)).
 <p>ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.

**2. GENERAL TOOL**

TOOL NAME	REMARKS
Oil filter wrench (65/67 mm 14 flutes)	Used for removing and installing blue oil filter (outer diameter: 67.4 mm (2.65 in)).
Circuit tester	Used for measuring resistance and voltage.