

# **MECHANICAL**

# General Description

MECHANICAL

## 1. General Description

### A: SPECIFICATION

		Model	2.5 L	
		Cylinder arrangement	Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine	
		Valve system mechanism	Belt driven, double overhead camshaft, 4-valve/cylinder	
		Bore × Stroke	mm (in) 99.5 × 79.0 (3.92 × 3.11)	
		Piston displacement	cm <sup>3</sup> (cu in) 2,457 (149.94)	
		Compression ratio	8.2	
		Compression pressure (at 200 — 300 rpm)	kPa (kg/cm <sup>2</sup> , psi) 981 — 1,177 (10 — 12, 142 — 171)	
		Number of piston rings	Pressure ring: 2, Oil ring: 1	
Engine	Intake valve timing	Open	Max. retard	ATDC 5°
			Min. advance	BTDC 25°
		Close	Max. retard	ABDC 65°
			Min. advance	ABDC 35°
	Exhaust valve timing	Open	Max. retard	BBDC 32°
			Min. advance	BBDC 72°
		Close	Max. retard	ATDC 28°
			Min. advance	BTDC 12°
	Valve clearance	Inspection value	Intake	0.20 <sup>+0.04</sup> <sub>-0.06</sub> (0.0079 <sup>+0.0016</sup> <sub>-0.0024</sub> )
			Exhaust	0.35±0.05 (0.0138±0.0020)
Adjustment value		Intake	0.20 <sup>+0.01</sup> <sub>-0.03</sub> (0.0079 <sup>+0.0004</sup> <sub>-0.0012</sub> )	
		Exhaust	0.35±0.02 (0.0138±0.0008)	
Idling speed [at neutral position]	rpm	No load	700±100	
		A/C ON	750±100	
		Ignition order	1 → 3 → 2 → 4	
		Ignition timing	BTDC/rpm 15°±10°/700	

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NOTE:

OS: Oversize    US: Undersize

Belt tension adjuster	Protrusion of adjuster rod		mm (in)	5.2 — 6.2 (0.205 — 0.244)	
Belt tensioner	Spacer O.D.		mm (in)	17.955 — 17.975 (0.7069 — 0.7077)	
	Tensioner bushing I.D.		mm (in)	18.0 — 18.08 (0.7087 — 0.7118)	
	Clearance between spacer and bushing	mm (in)	Standard	0.025 — 0.125 (0.0010 — 0.0049)	
	Side clearance of spacer	mm (in)	Standard	0.20 — 0.55 (0.0079 — 0.0217)	
Camshaft	Bending limit		mm (in)	0.020 (0.0079) or less	
	Thrust clearance		mm (in)	Standard	0.068 — 0.116 (0.0027 — 0.0047)
	Cam lobe height	mm (in)	Intake	Standard	46.55 — 46.65 (1.833 — 1.837)
			Exhaust	Standard	46.75 — 46.85 (1.841 — 1.844)
	Journal O.D.	mm (in)	Standard	Front	37.946 — 37.963 (1.4939 — 1.4946)
				Center rear	29.946 — 29.963 (1.1790 — 1.1796)
Journal clearance		mm (in)	Standard	0.037 — 0.072 (0.0015 — 0.0028)	
Cylinder head	Surface warpage limit		mm (in)	0.035 (0.0014)	
	Grinding limit		mm (in)	0.3 (0.012)	
	Standard height		mm (in)	127.5 (5.02)	
Valve seat	Seating angle			90°	
	Contacting width	mm (in)	Intake	Standard	0.6 — 1.4 (0.024 — 0.055)
			Exhaust	Standard	1.2 — 1.8 (0.047 — 0.071)
Valve guide	Inside diameter		mm (in)	6.000 — 6.012 (0.2362 — 0.2367)	
	Protrusion above head		mm (in)	15.8 — 16.2 (0.622 — 0.638)	
Valve	Head edge thickness	mm (in)	Intake	Standard	1.0 — 1.4 (0.039 — 0.055)
			Exhaust	Standard	1.3 — 1.7 (0.051 — 0.067)
	Stem outer diameter	mm (in)	Intake		5.955 — 5.970 (0.2344 — 0.2350)
			Exhaust		5.945 — 5.960 (0.2341 — 0.2346)
	Valve stem gap	mm (in)	Standard	Intake	0.030 — 0.057 (0.0012 — 0.0022)
				Exhaust	0.040 — 0.067 (0.0016 — 0.0026)
Overall length	mm (in)	Intake		104.4 (4.110)	
		Exhaust		104.65 (4.1201)	
Valve spring	Free length		mm (in)	53.48 (2.106)	
	Squareness			2.5°, 2.3 mm (0.091 in) or less	
	Tension/spring height	N (kgf, lb)/mm (in)	Set	204.6 — 235.4 (20.86 — 24.00, 46.00 — 52.93)/36.0 (1.417)	
			Lift	363.5 — 401.7 (37.07 — 40.96, 81.73 — 90.32)/26.7 (1.051)	
Valve lifter	Outer diameter	mm (in)	Standard	34.959 — 34.975 (1.3763 — 1.3770)	
	Inner diameter (cylinder head)	mm (in)	Standard	34.994 — 35.016 (1.3777 — 1.3786)	
	Valve lifter clearance	mm (in)	Standard	0.019 — 0.057 (0.0007 — 0.0022)	
Cylinder block	Surface warpage limit (Mating surface with cylinder head)		mm (in)	0.025 (0.0098)	
	Grinding limit		mm (in)	0.1 (0.004)	
	Standard height		mm (in)	201.0 (7.91)	
	Cylinder inner diameter	mm (in)	Standard	A	99.505 — 99.515 (3.9175 — 3.9179)
				B	99.495 — 99.505 (3.9171 — 3.9175)
	Taper	mm (in)	Standard	0.015 (0.0006)	
	Out-of-roundness	mm (in)	Standard	0.010 (0.0004)	
	Piston clearance	mm (in)	Standard	-0.010 — 0.010 (-0.00039 — 0.00039)	
Cylinder inner diameter boring limit (diameter)		mm (in)		To 100.005 (3.9372)	

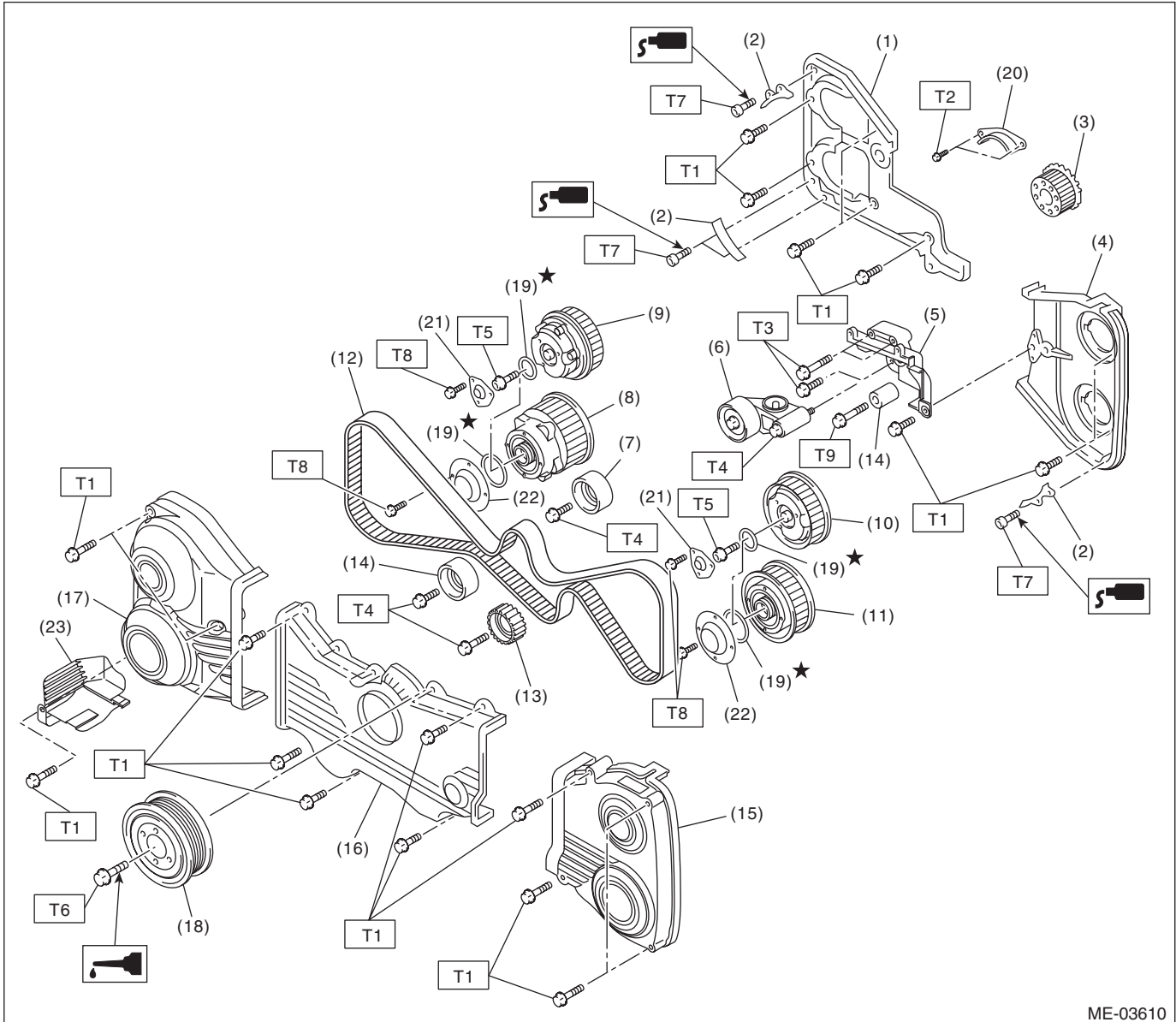
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Piston	Outer diameter	mm (in)	Standard	A	99.505 — 99.515 (3.9175 — 3.9179)
				B	99.495 — 99.505 (3.9171 — 3.9175)
			0.25 (0.0098) OS		99.745 — 99.765 (3.9270 — 3.9278)
			0.50 (0.0197) OS		99.995 — 100.015 (3.9368 — 3.9376)
Piston pin	Standard clearance between piston and piston pin		mm (in)	Standard	0.004 — 0.008 (0.0002 — 0.0003)
	Degree of fit				Piston pin must be fitted into position with thumb at 20°C (68°F).
Piston ring	Ring closed gap	mm (in)	Top ring	Standard	0.23 — 0.28 (0.0091 — 0.0110)
			Second ring	Standard	0.37 — 0.52 (0.015 — 0.0203)
			Oil ring	Standard	0.20 — 0.50 (0.0079 — 0.0197)
	Ring groove gap	mm (in)	Top ring	Standard	0.040 — 0.080 (0.0016 — 0.0031)
			Second ring	Standard	0.030 — 0.070 (0.0012 — 0.0028)
Connecting rod	Bend or twist per 100 mm (3.94 in) in length		mm (in)	Limit	0.1 (0.0039)
	Thrust clearance		mm (in)	Standard	0.070 — 0.330 (0.0028 — 0.0130)
Bearing of large end	Oil clearance		mm (in)	Standard	0.017 — 0.045 (0.0007 — 0.0018)
	Bearing size (Thickness at center)	mm (in)	Standard		1.490 — 1.502 (0.0587 — 0.0591)
			0.03 (0.0012) US		1.504 — 1.512 (0.0592 — 0.0595)
			0.05 (0.0020) US		1.514 — 1.522 (0.0596 — 0.0599)
			0.25 (0.0098) US		1.614 — 1.622 (0.0635 — 0.0639)
Bushing of small end	Clearance between piston pin and bushing		mm (in)	Standard	0 — 0.022 (0 — 0.0009)
	Bending limit			mm (in)	0.035 (0.0014)
Crankshaft	Crank pin	Out-of-roundness		mm (in)	0.003 (0.0001)
		Cylindricality		mm (in)	0.004 (0.0002)
		Grinding limit (dia.)		mm (in)	To 51.750 (2.0374)
	Crank journal	Out-of-roundness		mm (in)	0.005 (0.0002)
		Cylindricality		mm (in)	0.006 (0.0002)
		Grinding limit (dia.)		mm (in)	To 59.758 (2.3527)
	Crank pin outer diameter	mm (in)	Standard		51.984 — 52.000 (2.0466 — 2.0472)
			0.03 (0.0012) US		51.954 — 51.970 (2.0454 — 2.0461)
			0.05 (0.0020) US		51.934 — 51.950 (2.0447 — 2.0453)
			0.25 (0.0098) US		51.734 — 51.750 (2.0368 — 2.0374)
	Crank journal outer diameter	mm (in)	Standard		59.992 — 60.008 (2.3619 — 2.3625)
			0.03 (0.0012) US		59.962 — 59.978 (2.3607 — 2.3613)
			0.05 (0.0020) US		59.942 — 59.958 (2.3599 — 2.3605)
0.25 (0.0098) US				59.742 — 59.758 (2.3520 — 2.3527)	
Thrust clearance		mm (in)	Standard	0.030 — 0.115 (0.0012 — 0.0045)	
Oil clearance			mm (in)	0.010 — 0.030 (0.00039 — 0.0012)	
Main bearing	Bearing size (Thickness at center)	#1, #3	Standard		1.998 — 2.011 (0.0787 — 0.0792)
			0.03 (0.0012) US		2.017 — 2.020 (0.0794 — 0.0795)
			0.05 (0.0020) US		2.027 — 2.030 (0.0798 — 0.0799)
			0.25 (0.0098) US		2.127 — 2.130 (0.0837 — 0.0839)
		#2, #4, #5	Standard		2.000 — 2.013 (0.0787 — 0.0793)
			0.03 (0.0012) US		2.019 — 2.022 (0.0795 — 0.0796)
			0.05 (0.0020) US		2.029 — 2.032 (0.0799 — 0.0800)
			0.25 (0.0098) US		2.129 — 2.132 (0.0838 — 0.0839)

## B: COMPONENT

### 1. TIMING BELT



ME-03610

- |  |                             |
|--|-----------------------------|
| (1) Timing belt cover No. 2 RH           | (12) Timing belt            |
| (2) Timing belt guide                    | (13) Belt idler No. 2       |
| (3) Crank sprocket                       | (14) Belt idler             |
| (4) Timing belt cover No. 2 LH           | (15) Timing belt cover LH   |
| (5) Tensioner bracket                    | (16) Front belt cover       |
| (6) Automatic belt tension adjuster ASSY | (17) Timing belt cover RH   |
| (7) Belt idler                           | (18) Crank pulley           |
| (8) Exhaust cam sprocket RH              | (19) O-ring                 |
| (9) Intake cam sprocket RH               | (20) Timing belt guide      |
| (10) Intake cam sprocket LH              | (21) Intake actuator cover  |
| (11) Exhaust cam sprocket LH             | (22) Exhaust actuator cover |
|  | (23) Engine harness cover   |

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

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

**T2: 9.75 (1.0, 7.2)**

**T3: 24.5 (2.5, 18.1)**

**T4: 39 (4.0, 28.8)**

**T5: <Ref. to ME(STI)-57, INSTALLATION, Cam Sprocket.>**

**T6: <Ref. to ME(STI)-46, INSTALLATION, Crank Pulley.>**

**T7: 6.4 (0.7, 4.7)**

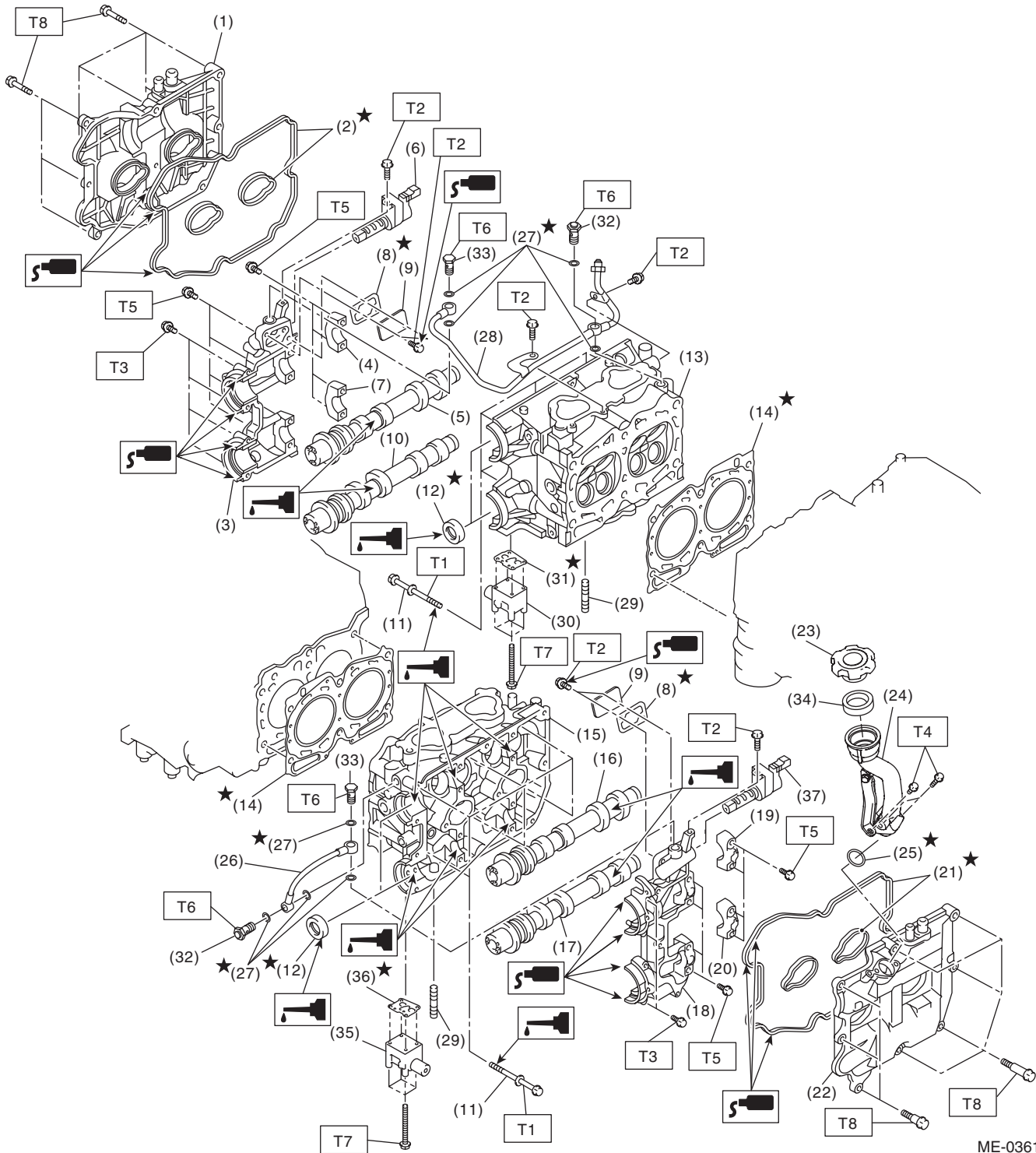
**T8: 3.4 (0.3, 2.5)**

**T9: 25 (2.5, 18.4)**

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## 2. CYLINDER HEAD AND CAMSHAFT



ME-03611

ME(STI)-6

# General Description

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(1) Rocker cover RH	(19) Intake camshaft cap LH	(34) Gasket
(2) Rocker cover gasket RH	(20) Exhaust camshaft cap LH	(35) Exhaust oil flow control solenoid valve LH
(3) Front camshaft cap RH	(21) Rocker cover gasket LH	(36) Gasket LH
(4) Intake camshaft cap RH	(22) Rocker cover LH	(37) Intake oil flow control solenoid valve LH
(5) Intake camshaft RH	(23) Oil filler cap	
(6) Intake oil flow control solenoid valve RH	(24) Oil filler duct	
(7) Exhaust camshaft cap RH	(25) O-ring	
(8) Gasket	(26) Oil pipe LH	
(9) Oil return cover	(27) Gasket	
(10) Exhaust camshaft RH	(28) Oil pipe RH	
(11) Cylinder head bolt	(29) Stud bolt	
(12) Oil seal	(30) Exhaust oil flow control solenoid valve RH	
(13) Cylinder head RH	(31) Gasket RH	
(14) Cylinder head gasket	(32) Union screw with filter (with protrusion)	
(15) Cylinder head LH	(33) Union screw without filter (without protrusion)	
(16) Intake camshaft LH		
(17) Exhaust camshaft LH		
(18) Front camshaft cap LH		

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

**T1: <Ref. to ME(STI)-66, INSTALLATION, Cylinder Head.>**

**T2: 8 (0.8, 5.9)**

**T3: 9.75 (1.0, 7.2)**

**T4: 6.4 (0.7, 4.7)**

**T5: 20 (2.0, 14.8)**

**T6: 29 (3.0, 21.4)**

**T7: 10 (1.0, 7.4)**

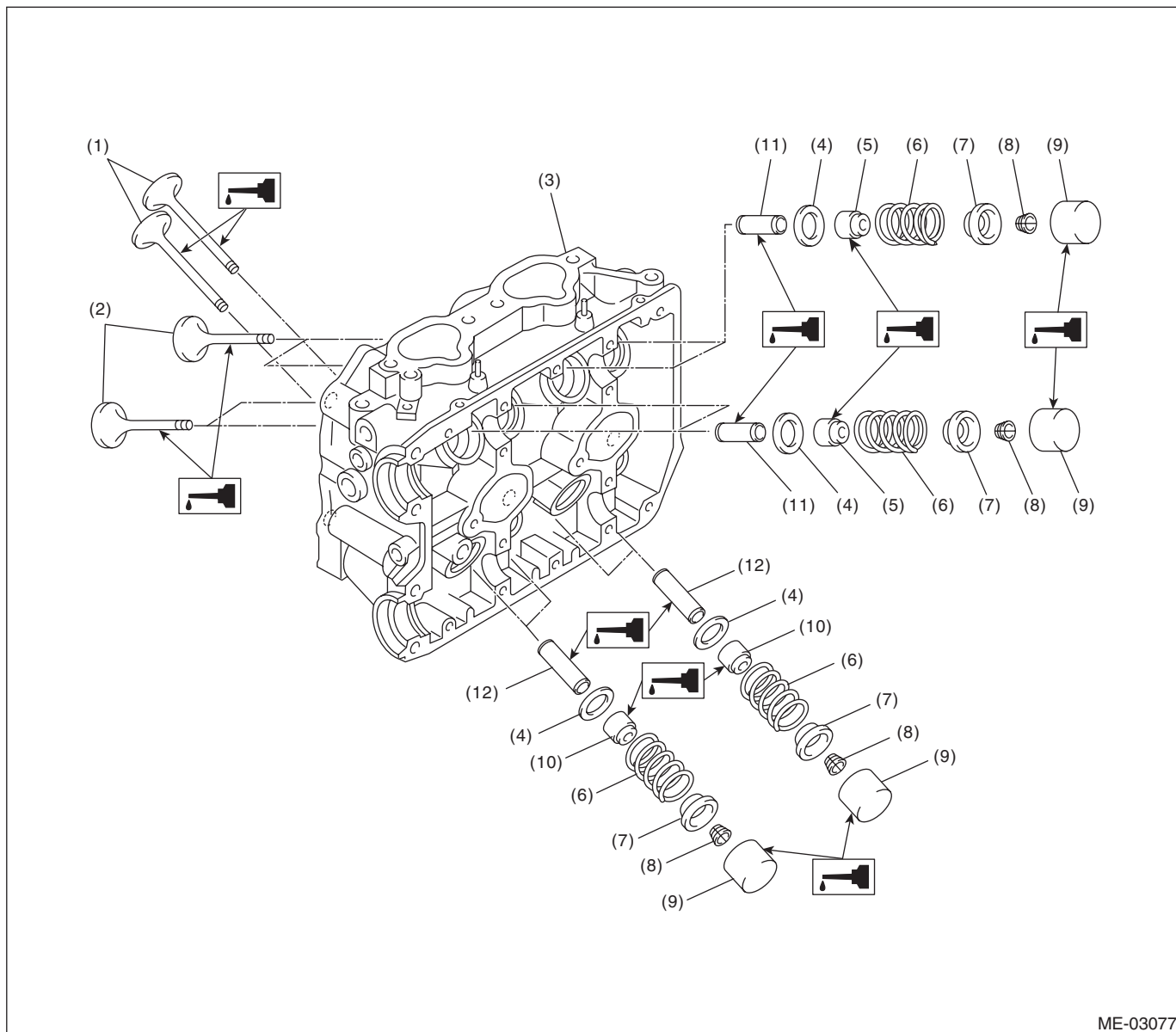
**T8: <Ref. to ME(STI)-60, INSTALLATION, Camshaft.>**

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# General Description

MECHANICAL

## 3. CYLINDER HEAD AND VALVE ASSEMBLY

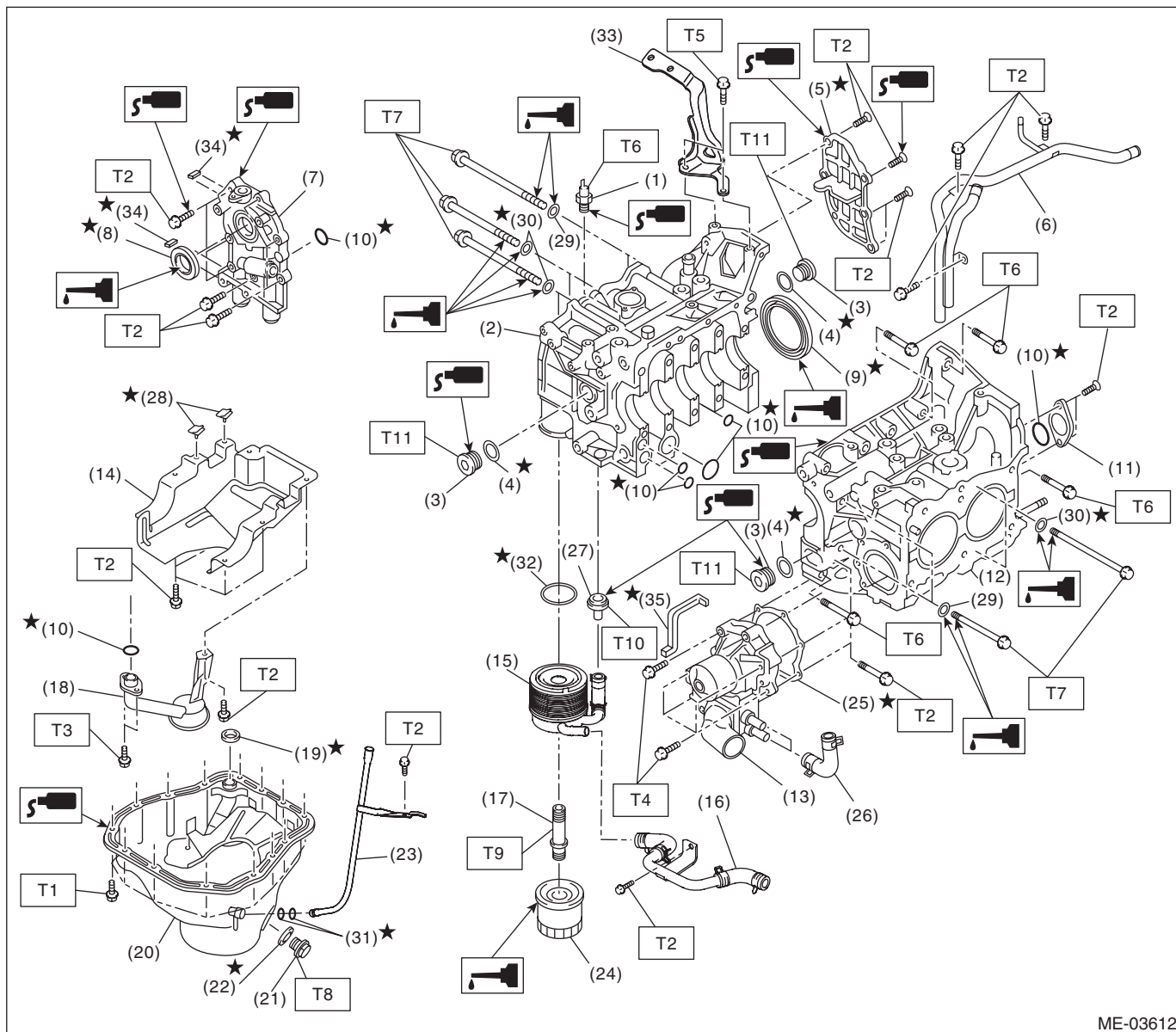


ME-03077

- |                       |                           |                             |
|-----------------------|---------------------------|-----------------------------|
| (1) Exhaust valve     | (5) Intake valve oil seal | (9) Valve lifter            |
| (2) Intake valve      | (6) Valve spring          | (10) Exhaust valve oil seal |
| (3) Cylinder head     | (7) Retainer              | (11) Intake valve guide     |
| (4) Valve spring seat | (8) Retainer key          | (12) Exhaust valve guide    |



## 4. CYLINDER BLOCK



ME-03612

# General Description

## MECHANICAL

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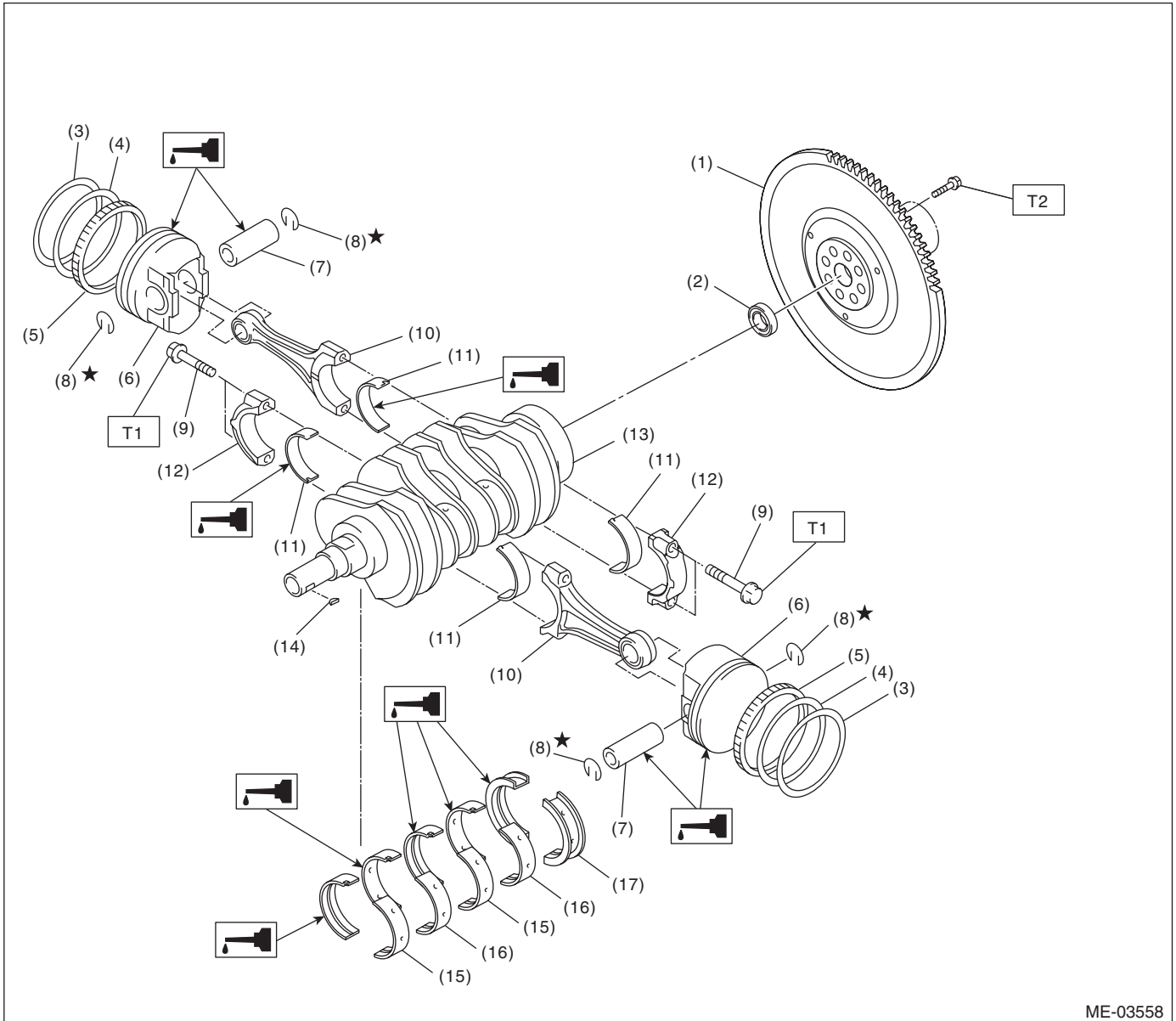
(1) Oil pressure switch	(18) Oil strainer	(34) Oil pump seal
(2) Cylinder block RH	(19) Gasket	(35) Water pump sealing
(3) Service hole plug	(20) Oil pan	
(4) Gasket	(21) Drain plug	
(5) Oil separator cover	(22) Drain plug gasket	
(6) Water by-pass pipe	(23) Oil level gauge guide	
(7) Oil pump	(24) Oil filter	
(8) Front oil seal	(25) Gasket	
(9) Rear oil seal	(26) Water pump hose	
(10) O-ring	(27) Nipple	
(11) Service hole cover	(28) Seal	
(12) Cylinder block LH	(29) Washer	
(13) Water pump	(30) Seal washer	
(14) Baffle plate	(31) O-ring	
(15) Oil cooler	(32) Gasket	
(16) Oil cooler pipe	(33) Intercooler stay (Engine rear hanger)	

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**Tightening torque:N·m (kgf-m, ft-lb)****T1: 5 (0.5, 3.7)****T2: 6.4 (0.7, 4.7)****T3: 10 (1.0, 7.4)****T4: First 12 (1.2, 8.9)****Second 12 (1.2, 8.9)****T5: 16 (1.6, 11.8)****T6: 25 (2.5, 18.4)****T7: <Ref. to ME(STI)-78, INSTAL-  
LATION, Cylinder Block.>****T8: 44 (4.5, 32.5)****T9: 54 (5.5, 39.8)****T10: 69 (7.0, 50.9)****T11: 70 (7.1, 51.6)**

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## 5. CRANKSHAFT AND PISTON



ME-03558

- |                  |                             |                                |
|------------------|-----------------------------|--------------------------------|
| (1) Flywheel     | (8) Snap ring               | (15) Crankshaft bearing #1, #3 |
| (2) Ball bearing | (9) Connecting rod bolt     | (16) Crankshaft bearing #2, #4 |
| (3) Top ring     | (10) Connecting rod         | (17) Crankshaft bearing #5     |
| (4) Second ring  | (11) Connecting rod bearing |                                |
| (5) Oil ring     | (12) Connecting rod cap     |                                |
| (6) Piston       | (13) Crankshaft             |                                |
| (7) Piston pin   | (14) Woodruff key           |                                |

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

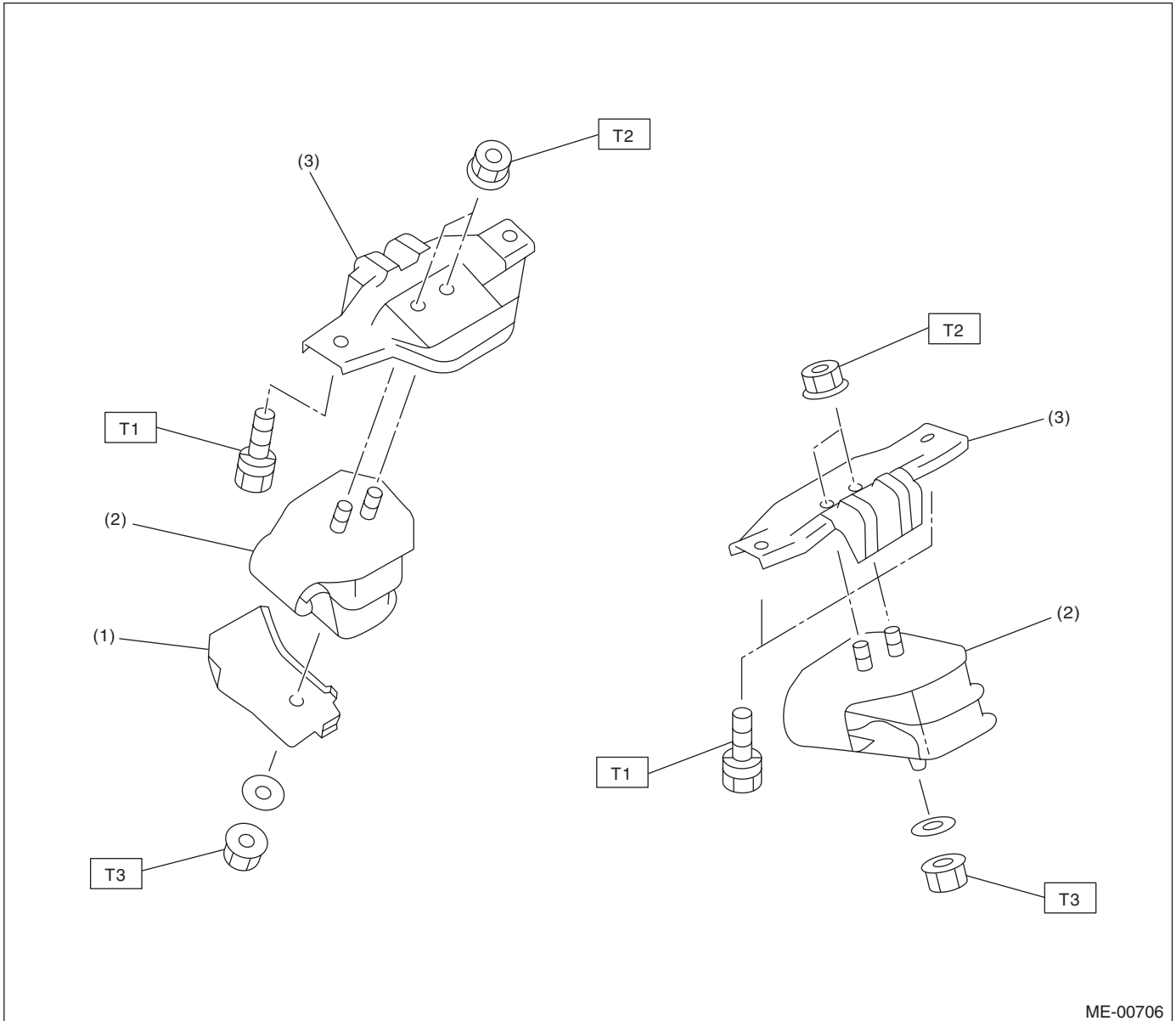
**T1: 52 (5.3, 38.4)**

**T2: 72 (7.3, 53.1)**

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## 6. ENGINE MOUNTING



ME-00706

- (1) Heat shield cover
- (2) Front cushion rubber

- (3) Front engine mounting bracket

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

**T1: 35 (3.6, 25.8)**

**T2: 42 (4.3, 31.0)**

**T3: 85 (8.7, 62.7)**

## C: CAUTION

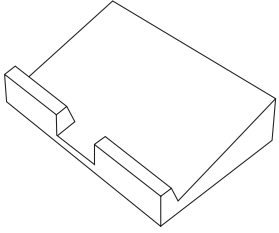
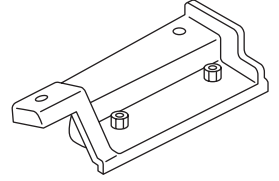
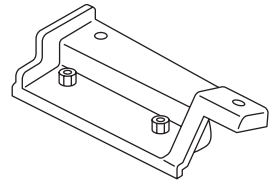
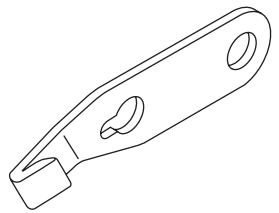
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, 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.
- All parts should be thoroughly cleaned, paying special attention to engine oil passages, pistons and bearings.
- Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil prior to assembly.
- Be careful not to let oil, grease or engine coolant contact the timing belt, clutch disc and flywheel.
- All removed parts, if to be reused, should be reinstalled in the original positions and directions.
- Bolts, nuts and washers should be replaced with new parts as required.
- Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.
- Remove or install the engine in an area where chain hoists, lifting devices, etc. are available for ready use.
- Be sure not to damage coated surfaces of body panels with tools, or not to stain seats and windows with coolant or oil. Place a cover over fender, as required, for protection.
- Prior to starting work, prepare the following:  
Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
- Lift up or lower the vehicle when necessary. Make sure to support the correct positions.

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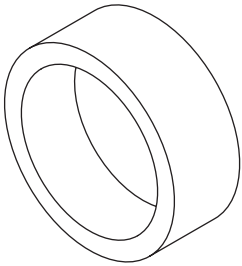
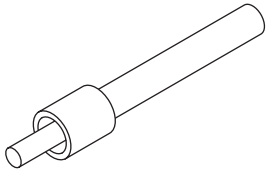
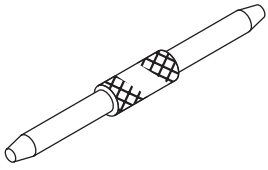
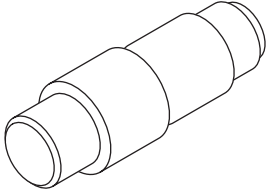
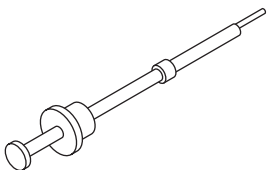
## D: PREPARATION TOOL

### 1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498267600	498267600	CYLINDER HEAD TABLE	<ul style="list-style-type: none"><li>• Used for replacing valve guides.</li><li>• Used for removing and installing valve spring.</li></ul>
 ST-498457000	498457000	ENGINE STAND ADAPTER RH	Used together with the ENGINE STAND (499817100).
 ST-498457100	498457100	ENGINE STAND ADAPTER LH	Used together with the ENGINE STAND (499817100).
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for removing and installing flywheel.

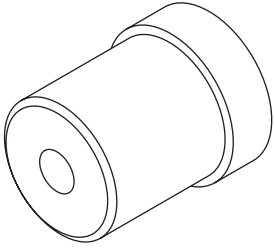
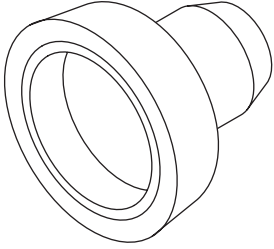
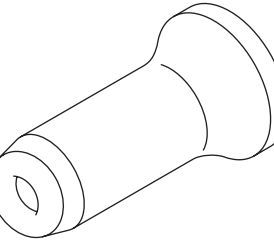
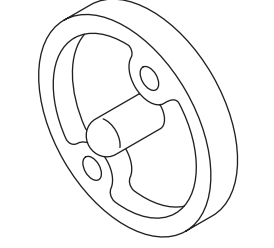
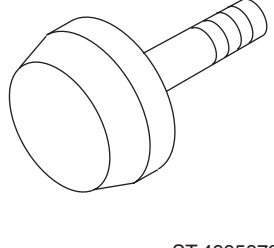
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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-498747300</p>	498747300	PISTON GUIDE	Used for installing the cup to the wheel cylinder piston.
 <p>ST-498857100</p>	498857100	VALVE OIL SEAL GUIDE	Used for press-fitting of intake and exhaust valve guide oil seals.
 <p>ST-499017100</p>	499017100	PISTON PIN GUIDE	Used for installing piston pin, piston and connecting rod.
 <p>ST-499037100</p>	499037100	CONNECTING ROD BUSHING REMOVER AND INSTALLER	Used for removing and installing connecting rod bushing.
 <p>ST-499097700</p>	499097700	PISTON PIN REMOVER ASSY	Used for removing piston pin.

# General Description

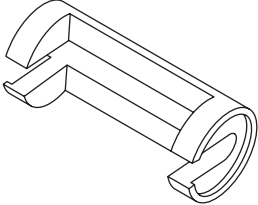
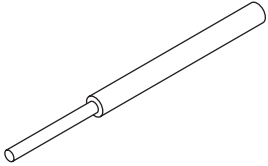
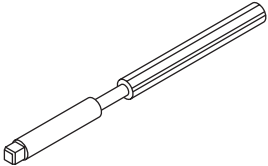
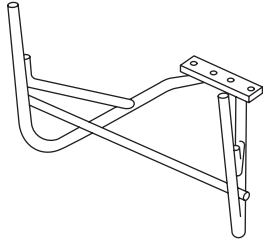
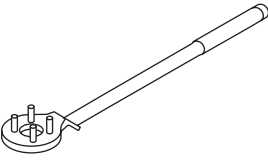
## MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499587100</p>	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.
 <p style="text-align: center;">ST-499587200</p>	499587200	CRANKSHAFT OIL SEAL INSTALLER	<ul style="list-style-type: none"> <li>• Used for installing crankshaft oil seal.</li> <li>• Used together with the CRANKSHAFT OIL SEAL GUIDE (499597100).</li> </ul>
 <p style="text-align: center;">ST-499587600</p>	499587600	OIL SEAL INSTALLER	Used for installing camshaft oil seal for DOHC engine.
 <p style="text-align: center;">ST-499597100</p>	499597100	CRANKSHAFT OIL SEAL GUIDE	<ul style="list-style-type: none"> <li>• Used for installing crankshaft oil seal.</li> <li>• Used together with the CRANKSHAFT OIL SEAL INSTALLER (499587200).</li> </ul>
 <p style="text-align: center;">ST-499597200</p>	499597200	OIL SEAL GUIDE	<ul style="list-style-type: none"> <li>• Used for installing camshaft oil seal for DOHC engine.</li> <li>• Used together with the OIL SEAL INSTALLER (499587600).</li> </ul>



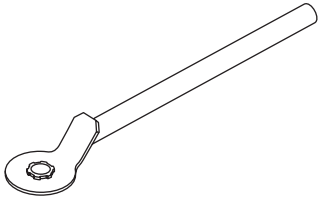
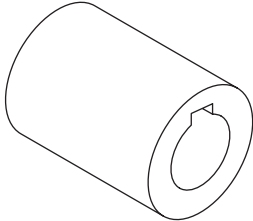
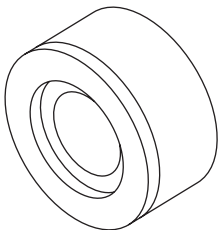
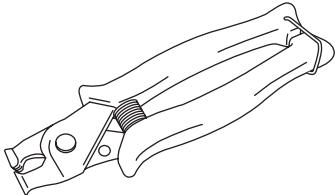
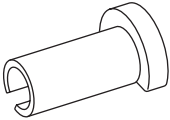
# General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499718000</p>	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.
 <p style="text-align: center;">ST-499767200</p>	499767200	VALVE GUIDE REMOVER	Used for removing valve guides.
 <p style="text-align: center;">ST-499767400</p>	499767400	VALVE GUIDE REAMER	Used for reaming valve guides.
 <p style="text-align: center;">ST-499817100</p>	499817100	ENGINE STAND	<ul style="list-style-type: none"> <li>• Stand used for engine disassembly and assembly.</li> <li>• Used together with the ENGINE STAND ADAPTER RH (498457000) &amp; LH (498457100).</li> </ul>
 <p style="text-align: center;">ST-499977100</p>	499977100	CRANK PULLEY WRENCH	Used to stop rotation of the crank pulley when loosening or tightening crank pulley bolts.

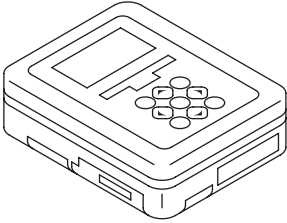
# General Description

## MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST-499977500</p>	499977500	CAM SPROCKET WRENCH	Used for removing and installing intake cam sprocket and exhaust cam sprocket.
 <p style="text-align: center;">ST-499987500</p>	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 <p style="text-align: center;">ST18251AA020</p>	18251AA020	VALVE GUIDE ADJUSTER	Used for installing intake and exhaust valve guides.
 <p style="text-align: center;">ST18353AA000</p>	18353AA000	CLAMP PLIERS	<ul style="list-style-type: none"> <li>• Used for removing and installing the PCV hose.</li> <li>• This is a general tool made by the French company CAILLAU.(code) 54.0.000.205 To make this easier to obtain in the same way as genuine Subaru parts, it has been provided with a tool number as an ST.</li> </ul>
 <p style="text-align: center;">ST42099AE000</p>	42099AE000	QUICK CONNECTOR RELEASE	Used for disconnecting quick connector of the engine compartment.

# General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B021XU0	1B021XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.

## 2. GENERAL TOOL

TOOL NAME	REMARKS
Compression gauge	Used for measuring compression.
Timing light	Used for measuring ignition timing.
Vacuum gauge	Used for measuring intake manifold vacuum.
Oil pressure gauge	Used for measuring engine oil pressure.
Fuel pressure gauge	Used for measuring fuel pressure.

## E: PROCEDURE

It is possible to conduct the following service procedures with engine on vehicle, however, the procedures described in this section are based on the condition that the engine is removed from vehicle.

- V-belt
- Timing belt
- Camshaft
- Cylinder head

## 2. Compression

### A: INSPECTION

#### CAUTION:

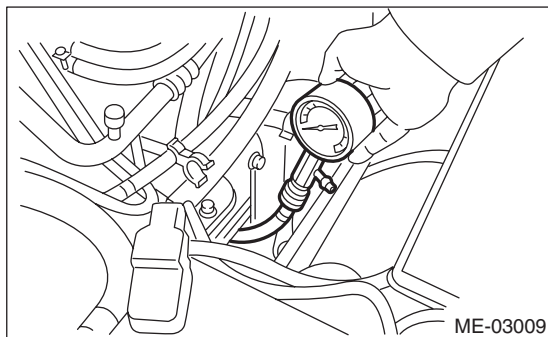
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.

- 1) After warming-up the engine, turn the ignition switch to OFF.
- 2) Make sure that the battery is fully charged.
- 3) Release the fuel pressure. <Ref. to FU(STI)-54, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 4) Remove all the spark plugs.  
<Ref. to IG(STI)-4, REMOVAL, Spark Plug.>
- 5) Fully open the throttle valve.
- 6) Check the starter motor for satisfactory performance and operation.
- 7) Hold the compression gauge tightly against the spark plug hole.

#### NOTE:

When using a screw-in type compression gauge, the screw should be less than 18 mm (0.71 in) long.

- 8) Crank the engine by the starter motor, and read the maximum value on the gauge when the needle of gauge is steady.



- 9) Perform at least two measurements per cylinder, and make sure that the values are correct.

#### **Compression (throttle full open):**

##### **Standard**

**981 — 1,177 kPa (10 — 12 kgf/cm<sup>2</sup>,  
142 — 171 psi)**

##### **Difference between cylinders**

**49 kPa (0.5 kgf/cm<sup>2</sup>, 7 psi), or less**

- 10) After inspection, install the related parts in the reverse order of removal.

### 3. Idle Speed

#### A: INSPECTION

1) Before checking the idle speed, check the following item:

(1) Check the air cleaner element is free from clogging, ignition timing is correct, spark plugs are in good condition, and hoses are connected properly.

(2) Check the malfunction indicator light does not illuminate.

2) Warm-up the engine.

3) Read the engine idle speed using Subaru Select Monitor. <Ref. to EN(STI)(diag)-36, READ CURRENT DATA FOR ENGINE (NORMAL MODE), OPERATION, Subaru Select Monitor.>

4) Check the idle speed when no-loaded. (Headlight, heater fan, rear defroster, radiator fan, A/C and etc. are OFF)

***Idle speed [No load and gears in neutral]:***

***700±100 rpm***

5) Check the idle speed when loaded. (Turn the A/C switch to "ON" and operate the compressor for at least one minute before measurement.)

***Idle speed [A/C ON and gears in neutral]:***

***750±100 rpm***

NOTE:

Idle speed cannot be adjusted manually, because the idle speed is automatically adjusted. If the prescribed idle speed cannot be maintained, refer to the General On-board Diagnosis Table under "Engine Control System". <Ref. to EN(STI)(diag)-2, Basic Diagnostic Procedure.>