

General Description

MECHANICAL

1. General Description

A: SPECIFICATION

Engine	Model			3.6 L	
	Cylinder arrangement			Horizontally opposed, liquid cooled, 6-cylinder, 4-stroke gasoline engine	
	Valve system mechanism			Chain driven, double overhead camshaft, 4-valve/cylinder	
	Bore × Stroke			mm (in)	92 × 91 (3.622 × 3.583)
	Displacement			cm ³ (cu in)	3,630 (221.5)
	Compression ratio			10.5	
	Compression (350 rpm and fully open throttle)		kPa (kgf/cm ² , psi)	Standard	1,275 — 1,471 (13.0 — 15.0, 185 — 213)
	Number of piston rings			Pressure ring: 2, Oil ring: 1	
	Intake valve timing		Open	Max. retard	ATDC 10°
				Min. advance	BTDC 40°
			Close	Max. retard	ABDC 74°
				Min. advance	ABDC 24°
	Exhaust valve timing		Open	Max. retard	BBDC 4°
				Min. advance	BBDC 44°
			Close	Max. retard	ATDC 44°
				Min. advance	ATDC 4°
	Valve clearance		mm (in)		0.20 ^{+0.04} _{−0.06} (0.0079 ^{+0.0016} _{−0.0024})
Intake			0.35±0.05 (0.0138±0.0020)		
		Exhaust			
Idle speed [“P” or “N” range]		rpm		700±100	
		No load	Standard		700 — 910±100
		A/C ON	Standard		
Ignition order					1 → 6 → 3 → 2 → 5 → 4
Ignition timing			BTDC/rpm	Standard	15°±8°/700

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NOTE:

OS: Oversize

US: Undersize

Camshaft	Bending limit		mm (in)	0.020 (0.00079)	
	Cam lobe height	mm (in)	Intake	Standard	45.90 — 46.00 (1.8071 — 1.8110)
			Exhaust	Standard	44.65 — 44.75 (1.7579 — 1.7618)
	Cam base circle diameter	mm (in)	Intake	Standard	36.00 (1.4173)
			Exhaust	Standard	36.00 (1.4173)
	Journal O.D.	mm (in)	Front	Standard	37.946 — 37.963 (1.4939 — 1.4946)
			Except for front	Standard	25.946 — 25.963 (1.0215 — 1.0222)
	Oil clearance			mm (in)	Standard
Thrust clearance	mm (in)	Intake	Standard	0.075 — 0.135 (0.0030 — 0.0053)	
		Exhaust	Standard	0.075 — 0.135 (0.0030 — 0.0053)	
Cylinder head	Warping limit (Mating surface with cylinder block)			mm (in)	0.020 (0.0008)
	Standard height			mm (in)	124±0.05 (4.88±0.0020)
Valve seat	Seating angle between valve and valve seat				90°
	Contacting width between valve and valve seat	mm (in)	Intake	Standard	1.0 (0.039)
			Exhaust	Standard	1.5 (0.059)
Valve guide	Clearance between the valve guide and valve stem	mm (in)	Intake	Standard	0.030 — 0.057 (0.0012 — 0.0022)
			Exhaust	Standard	0.040 — 0.067 (0.0016 — 0.0026)
	Inside diameter			mm (in)	5.500 — 5.512 (0.2165 — 0.2170)
	Valve stem outer diameters	mm (in)	Intake		5.455 — 5.470 (0.2148 — 0.2154)
			Exhaust		5.445 — 5.460 (0.2144 — 0.2150)
	Valve guide protrusion amount		Intake	mm (in)	8.6 — 9.0 (0.3386 — 0.3543)
Exhaust			mm (in)	10.7 — 11.1 (0.4213 — 0.4370)	
Valve	Head edge thickness	mm (in)	Intake	Standard	1.0 (0.039)
			Exhaust	Standard	1.2 (0.047)
	Overall length	mm (in)	Intake		103.5 (4.075)
			Exhaust		103.2 (4.063)
Valve spring	Free length	mm (in)	Intake		49.06 (1.9315)
			Exhaust		49.06 (1.9315)
	Tension/spring height	N (kgf, lb)/mm (in)	Set		182 — 210 (18.6 — 21.4, 40.9 — 47.2) / 31.0 (1.220)
			Lift		316 — 350 (32.2 — 35.7, 71.0 — 78.7) / 21.0 (0.827)
Squareness					2.5°, 2.1 mm (0.083 in)
Valve lifter	Outer diameter		mm (in)	Standard	32.959 — 32.975 (1.2976 — 1.2982)
	Valve lifter mating surface inner diameter		mm (in)	Standard	32.994 — 33.016 (1.2990 — 1.2998)
	Valve lifter and valve lifter mating surface clearance		mm (in)	Standard	0.019 — 0.057 (0.0007 — 0.0022)
Cylinder block	Warping limit (Mating surface with cylinder head)			mm (in)	0.020 (0.0008)
	Standard height			mm (in)	202 (7.95)
	Cylindricity		mm (in)	Limit	0.030 (0.0012)
	Out-of-roundness		mm (in)	Limit	0.010 (0.0004)
	Clearance between cylinder and piston at 20°C (68°F)		mm (in)	Standard	−0.010 — 0.010 (−0.0004 — 0.0004)
	Cylinder inner diameter boring limit (diameter)			mm (in)	92.515 (3.6717)

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Piston	Piston grade point		mm (in)	37.3 (1.4685)		
	Outer diameter	mm (in)	Standard	A	92.005 — 92.015 (3.6222 — 3.6226)	
				B	91.995 — 92.005 (3.6218 — 3.6222)	
				0.25 (0.0098) OS		92.245 — 92.265 (3.6317 — 3.6325)
			0.50 (0.0197) OS		92.495 — 92.515 (3.6415 — 3.6423)	
Inner diameter of piston pin hole			mm (in)	Standard	22.000 — 22.006 (0.8661 — 0.8664)	
Piston pin	Degree of fit				Piston pin must be fitted into position with thumb at 20°C (68°F).	
	Outer diameter			mm (in)	Standard	21.994 — 22.000 (0.8659 — 0.8661)
	Clearance between piston and piston pin			mm (in)	Standard	0.004 — 0.008 (0.0002 — 0.0003)
Piston ring	Piston ring gap	mm (in)	Top ring	Standard	0.20 — 0.35 (0.0079 — 0.0138)	
			Second ring	Standard	0.40 — 0.50 (0.0157 — 0.0197)	
			Oil ring	Standard	0.20 — 0.50 (0.0079 — 0.0197)	
	Clearance between piston ring and piston ring groove	mm (in)	Top ring	Standard	0.040 — 0.080 (0.0016 — 0.0031)	
			Second ring	Standard	0.030 — 0.070 (0.0012 — 0.0028)	
			Oil ring	Standard	0.065 — 0.165 (0.0026 — 0.0065)	
Connecting rod and connecting rod bearing	Bend or twist per 100 mm (3.94 in) in length			mm (in)	Limit	0.10 (0.0039 in)
	Thrust clearance			mm (in)	Standard	0.070 — 0.330 (0.0028 — 0.0130)
	Oil clearance			mm (in)	Standard	0.016 — 0.043 (0.0006 — 0.0017)
	Bearing size (Thickness at center)	mm (in)	Standard		1.489 — 1.505 (0.0586 — 0.0593)	
			0.03 (0.0012) US		1.507 — 1.515 (0.0593 — 0.0596)	
			0.05 (0.0020) US		1.517 — 1.525 (0.0597 — 0.0600)	
			0.25 (0.0098) US		1.617 — 1.625 (0.0637 — 0.0640)	
Bushing of small end	Clearance between piston pin and bushing			mm (in)	Standard	0 — 0.022 (0 — 0.0009)

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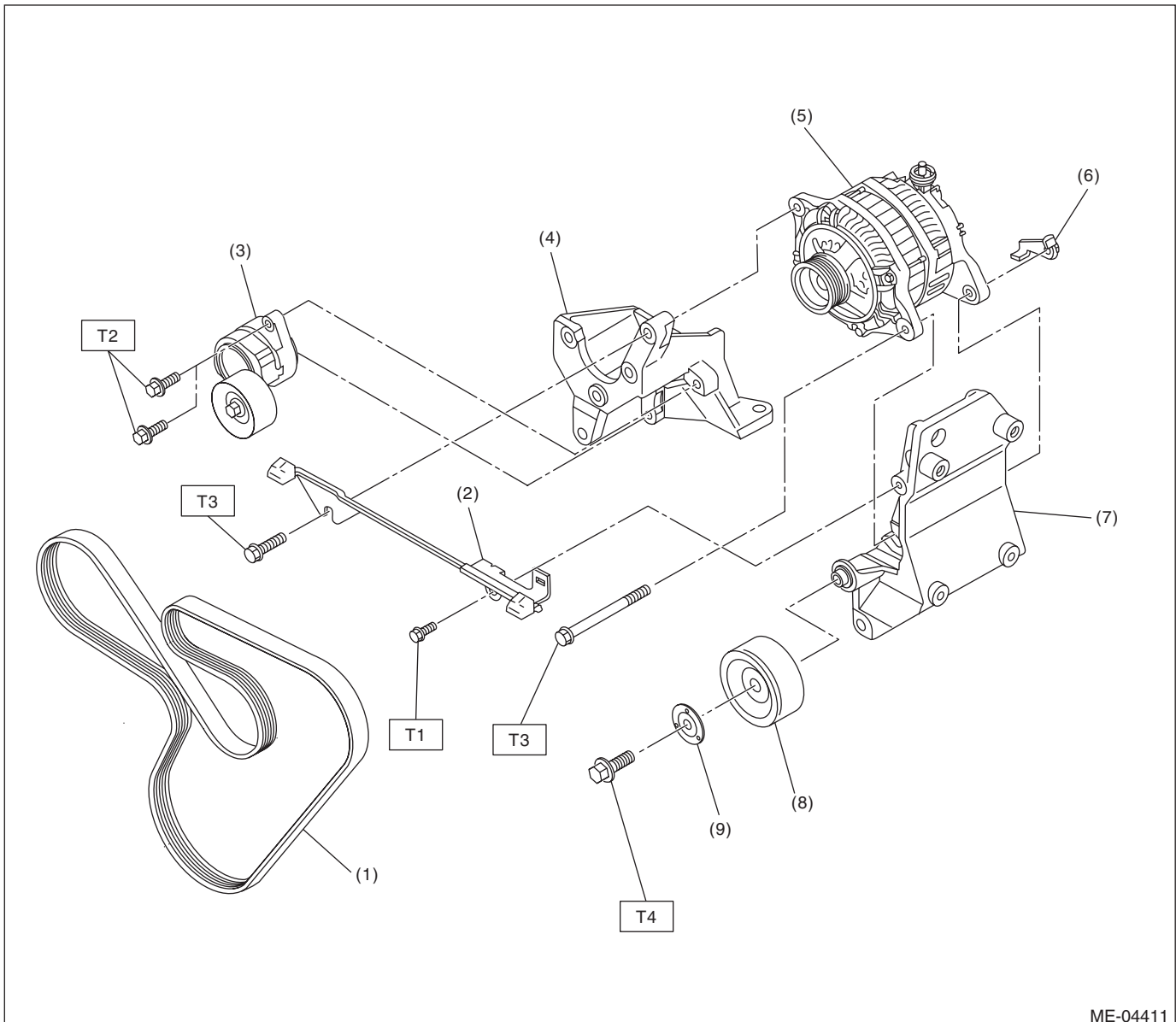
Crankshaft and crankshaft bearing	Bending limit		mm (in)		0.035 (0.0014)	
	Crank pin	Out-of-roundness	mm (in)	Limit	0.005 (0.0002)	
		Cylindricality	mm (in)	Limit	0.006 (0.0002)	
		Grinding limit	mm (in)		51.734 (2.0368)	
	Crank journal	Out-of-roundness	mm (in)	Limit	0.005 (0.0002)	
		Cylindricality	mm (in)	Limit	0.006 (0.0002)	
		Grinding limit	mm (in)		63.742 (2.5095)	
	Crank pin outer diameter		mm (in)		Standard	51.976 — 52.000 (2.0463 — 2.0472)
			0.03 (0.0012) US		51.954 — 51.970 (2.0454 — 2.0461)	
			0.05 (0.0020) US		51.934 — 51.950 (2.0446 — 2.0453)	
			0.25 (0.0098) US		51.734 — 51.750 (2.0368 — 2.0374)	
	Crank journal outer diameter		mm (in)	#1, #3, #5, #7	Standard	63.992 — 64.016 (2.5194 — 2.5203)
					0.03 (0.0012) US	63.962 — 63.978 (2.5182 — 2.5188)
					0.05 (0.0020) US	63.942 — 63.958 (2.5174 — 2.5180)
					0.25 (0.0098) US	63.742 — 63.758 (2.5095 — 2.5102)
			#2, #4, #6	Standard	63.992 — 64.016 (2.5194 — 2.5203)	
				0.03 (0.0012) US	63.962 — 63.978 (2.5182 — 2.5188)	
				0.05 (0.0020) US	63.942 — 63.958 (2.5174 — 2.5180)	
				0.25 (0.0098) US	63.742 — 63.758 (2.5095 — 2.5102)	
	Bearing size (Thickness at center)		mm (in)	#1, #3, #5	Standard	1.996 — 2.013 (0.0786 — 0.0793)
					0.03 (0.0012) US	2.011 — 2.014 (0.0792 — 0.0793)
					0.05 (0.0020) US	2.021 — 2.024 (0.0796 — 0.0797)
					0.25 (0.0098) US	2.121 — 2.124 (0.0835 — 0.0836)
			#2, #4, #6	Standard	1.996 — 2.013 (0.0786 — 0.0793)	
				0.03 (0.0012) US	2.015 — 2.018 (0.0793 — 0.0794)	
				0.05 (0.0020) US	2.025 — 2.028 (0.0797 — 0.0798)	
				0.25 (0.0098) US	2.125 — 2.128 (0.0837 — 0.0838)	
			#7	Standard	1.992 — 2.009 (0.0784 — 0.0791)	
				0.03 (0.0012) US	2.011 — 2.014 (0.0792 — 0.0793)	
				0.05 (0.0020) US	2.021 — 2.024 (0.0796 — 0.0797)	
				0.25 (0.0098) US	2.121 — 2.124 (0.0835 — 0.0836)	
	Thrust clearance		mm (in)		Standard	0.030 — 0.115 (0.0012 — 0.0045)
	Oil clearance		mm (in)		Standard	0.010 — 0.030 (0.0004 — 0.0012)

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B: COMPONENT

1. V-BELT



- | | |
|---------------------------------|-------------------------|
| (1) V-belt | (6) Generator plate |
| (2) Collector cover bracket | (7) A/C compressor stay |
| (3) Belt tensioner ASSY | (8) Idler pulley |
| (4) Power steering pump bracket | (9) Idler pulley cover |
| (5) Generator | |

Tightening torque: N·m (kgf-m, ft-lb)

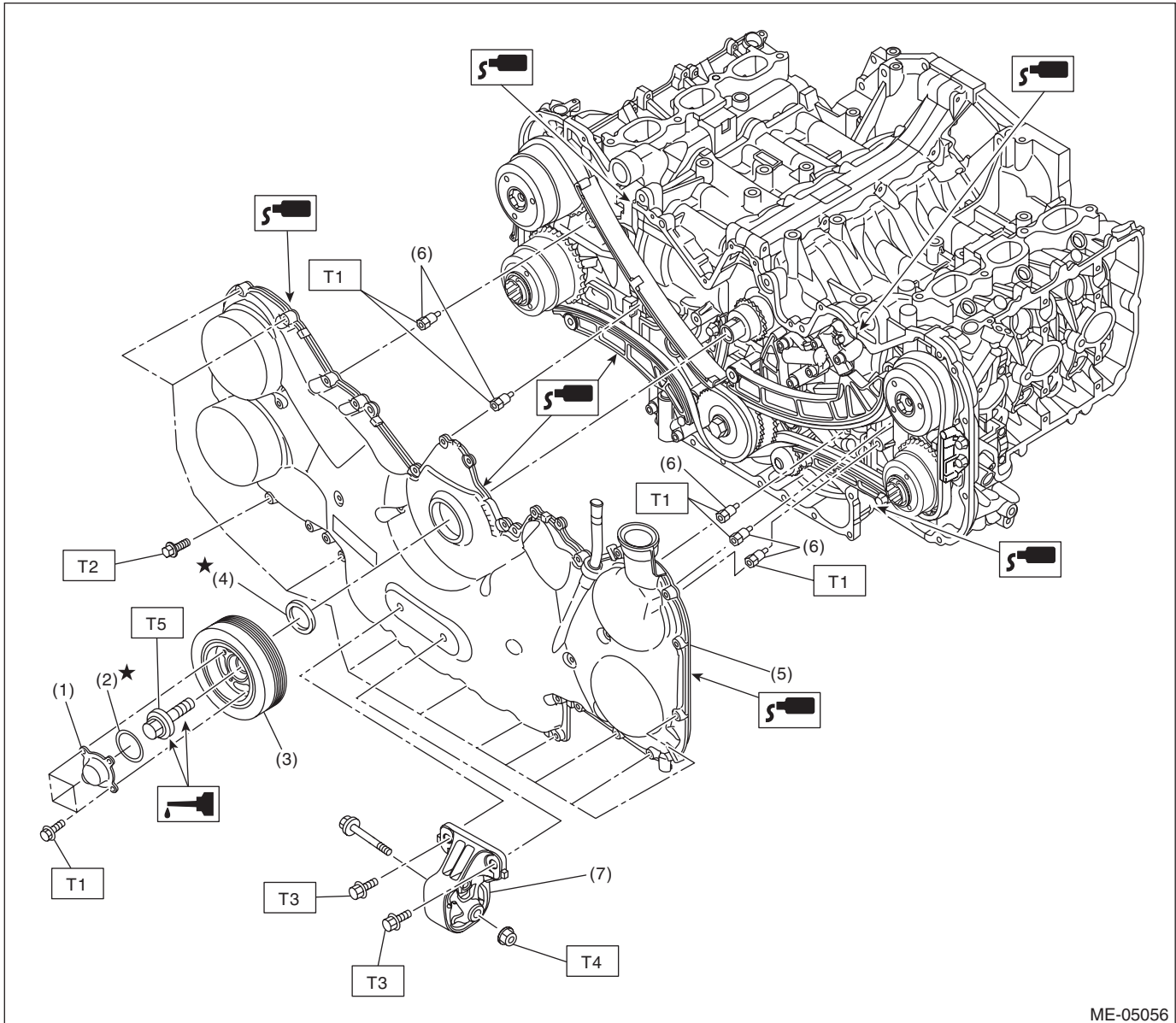
T1: 6.4 (0.7, 4.7)

T2: 20 (2.0, 14.8)

T3: 25 (2.5, 18.4)

T4: 33 (3.4, 24.3)

2. CHAIN COVER



ME-05056

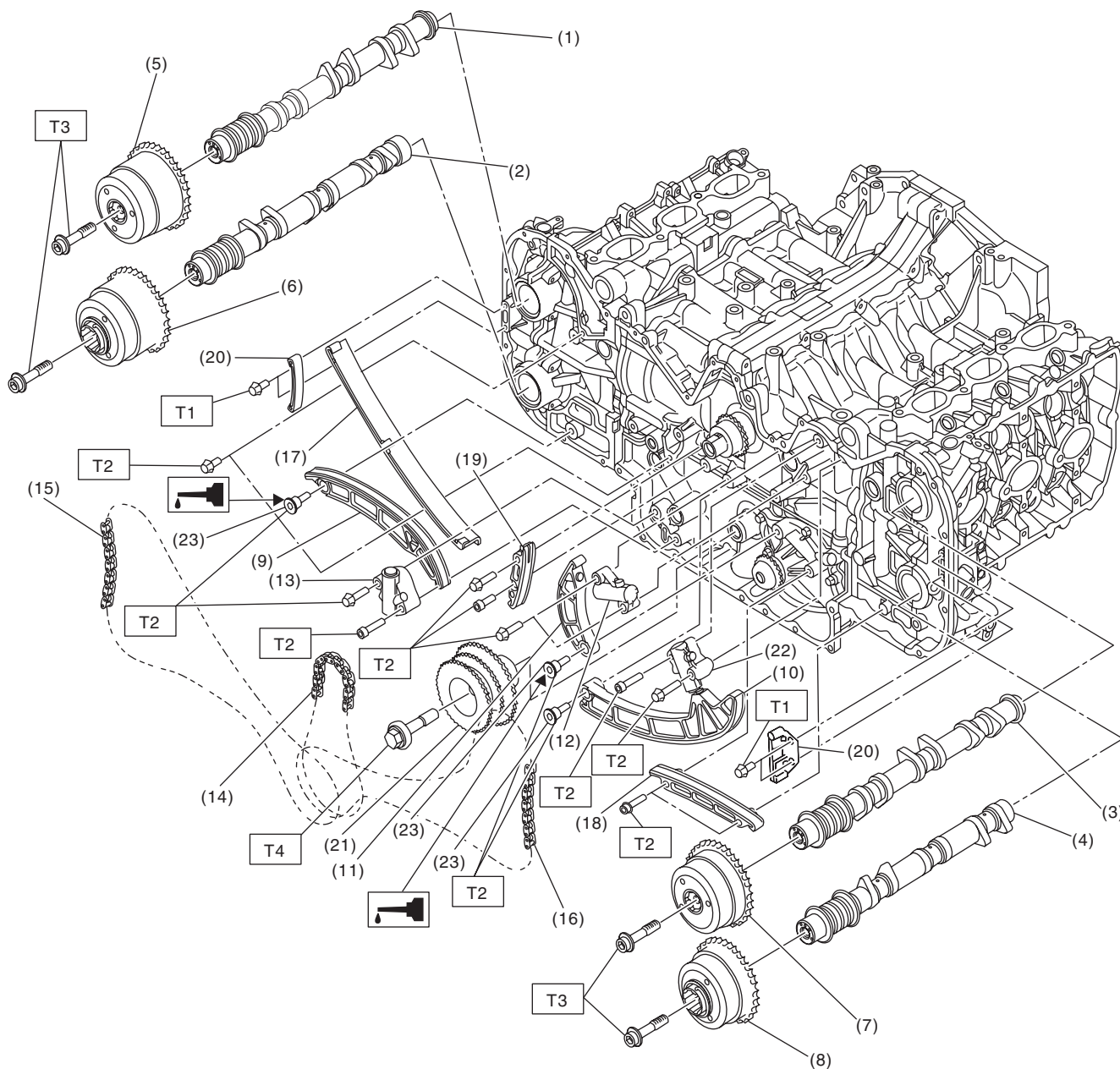
- | | |
|------------------------|-----------------|
| (1) Crank pulley cover | (7) Front mount |
| (2) O-ring | |
| (3) Crank pulley | |
| (4) Oil seal | |
| (5) Chain cover | |
| (6) Bolt | |

Tightening torque: N·m (kgf-m, ft-lb)**T1: 6.4 (0.7, 4.7)****T2: 10 (1.0, 7.4)****T3: 25 (2.5, 18.4)****T4: 45 (4.6, 33.2)****T5: 195 (19.9, 143.8)**

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3. TIMING CHAIN



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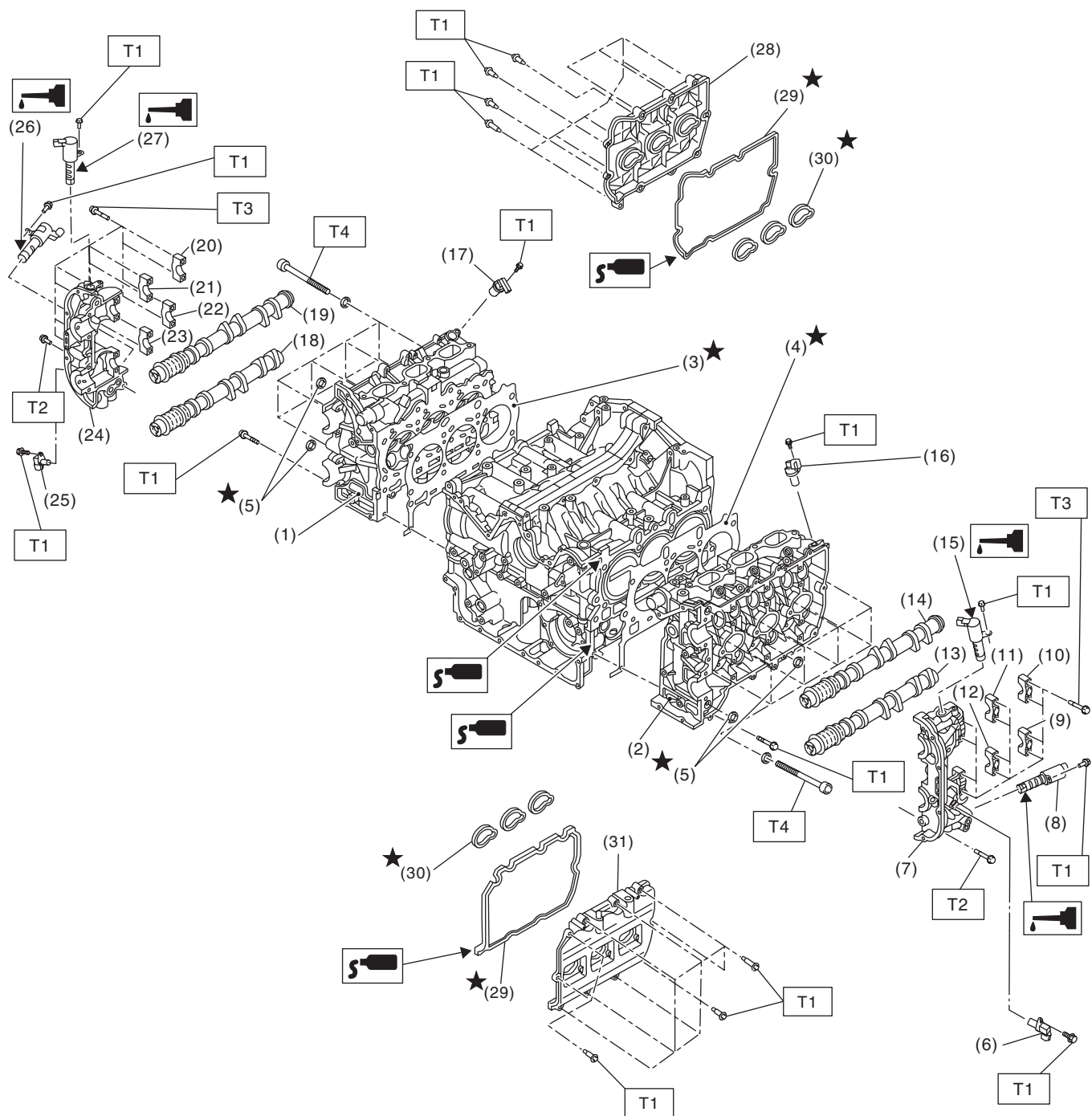
(1) Intake camshaft (RH)	(11) Chain tensioner lever (main)	(21) Idler sprocket
(2) Exhaust camshaft (RH)	(12) Chain tensioner (main)	(22) Chain tensioner (LH)
(3) Intake camshaft (LH)	(13) Chain tensioner (RH)	(23) Chain tensioner lever shaft
(4) Exhaust camshaft (LH)	(14) Timing chain (main)	
(5) Intake cam sprocket (RH)	(15) Timing chain (RH)	
(6) Exhaust cam sprocket (RH)	(16) Timing chain (LH)	
(7) Intake cam sprocket (LH)	(17) Chain guide (RH)	
(8) Exhaust cam sprocket (LH)	(18) Chain guide (LH)	
(9) Chain tensioner lever (RH)	(19) Chain guide (main)	
(10) Chain tensioner lever (LH)	(20) Chain guide (between cams)	

Tightening torque: N·m (kgf-m, ft-lb)***T1: 6.4 (0.7, 4.7)******T2: 16 (1.6, 11.8)******T3: <Ref. to ME(H6DO)-81, Cam Sprocket.>******T4: 120 (12.2, 88.5)***

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4. CYLINDER HEAD AND CAMSHAFT



ME-04916

ME(H6DO)-10

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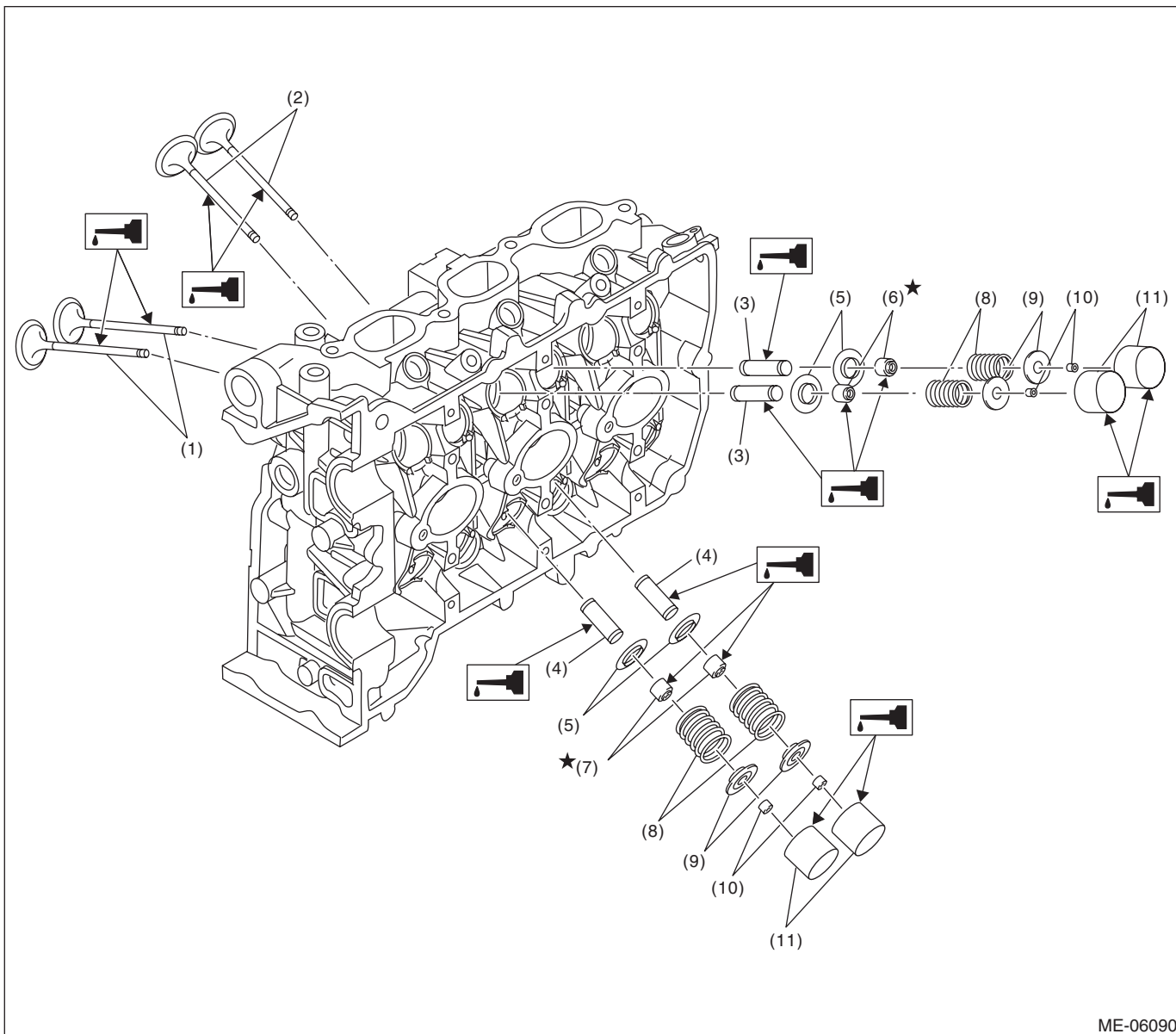
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(1) Cylinder head (RH)	(14) Intake camshaft (LH)	(27) Intake oil flow control solenoid valve (RH)
(2) Cylinder head (LH)	(15) Intake oil flow control solenoid valve (LH)	(28) Rocker cover (RH)
(3) Cylinder head gasket (RH)	(16) Intake camshaft position sensor (LH)	(29) Gasket
(4) Cylinder head gasket (LH)	(17) Intake camshaft position sensor (RH)	(30) Gasket
(5) O-ring	(18) Exhaust camshaft (RH)	(31) Rocker cover (LH)
(6) Exhaust camshaft position sensor (LH)	(19) Intake camshaft (RH)	
(7) Front camshaft cap (LH)	(20) Intake camshaft cap (rear RH)	<hr/> Tightening torque: N·m (kgf-m, ft-lb) T1: 6.4 (0.7, 4.7) T2: 9.75 (1.0, 7.2) T3: 16 (1.6, 11.8) T4: <Ref. to ME(H6DO)-92, Cylinder Head.> <hr/>
(8) Exhaust oil flow control solenoid valve (LH)	(21) Intake camshaft cap (center RH)	
(9) Exhaust camshaft cap (rear LH)	(22) Exhaust camshaft cap (rear RH)	
(10) Intake camshaft cap (rear LH)	(23) Exhaust camshaft cap (center RH)	
(11) Intake camshaft cap (center LH)	(24) Front camshaft cap (RH)	
(12) Exhaust camshaft cap (center LH)	(25) Exhaust camshaft position sensor (RH)	
(13) Exhaust camshaft (LH)	(26) Exhaust oil flow control solenoid valve (RH)	

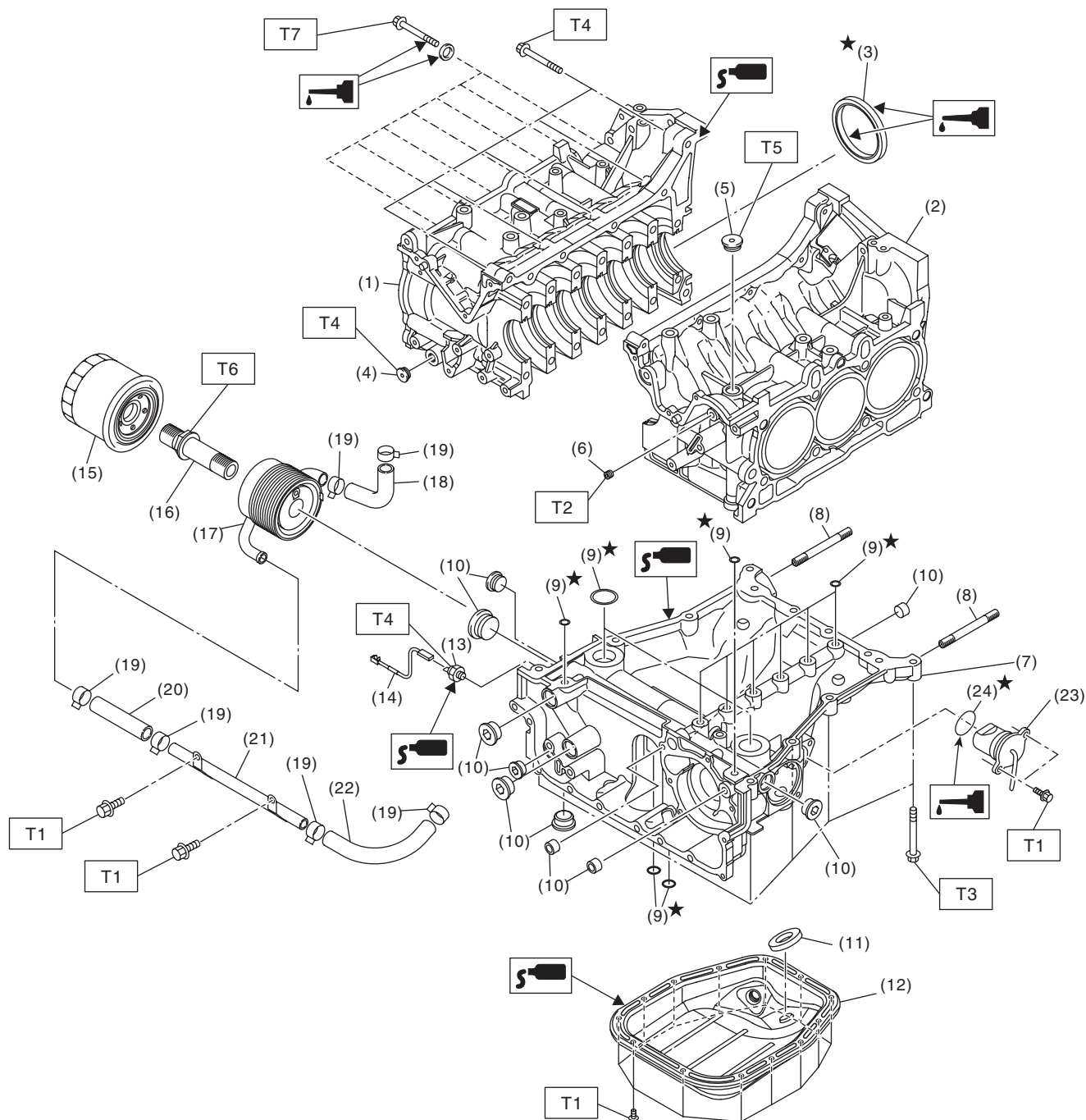
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5. CYLINDER HEAD AND VALVE ASSEMBLY



- | | | |
|---------------------------|-------------------------|---------------------------|
| (1) Intake valve | (5) Valve spring seat | (9) Valve spring retainer |
| (2) Exhaust valve | (6) Stem seal (intake) | (10) Valve collet |
| (3) Valve guide (intake) | (7) Stem seal (exhaust) | (11) Valve lifter |
| (4) Valve guide (exhaust) | (8) Valve spring | |



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- (1) Cylinder block (RH)
- (2) Cylinder block (LH)
- (3) Oil seal
- (4) Plug
- (5) Plug
- (6) Orifice
- (7) Oil pan upper
- (8) Stud bolt
- (9) O-ring
- (10) Plug
- (11) Magnet

- (12) Oil pan lower
- (13) Oil pressure switch
- (14) Oil pressure switch harness
- (15) Oil filter
- (16) Oil cooler connector
- (17) Oil cooler
- (18) Hose
- (19) Clamp
- (20) Hose
- (21) Oil cooler pipe
- (22) Hose

- (23) Oil level switch
- (24) O-ring

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

T2: 17 (1.7, 12.5)

T3: 18 (1.8, 13.3)

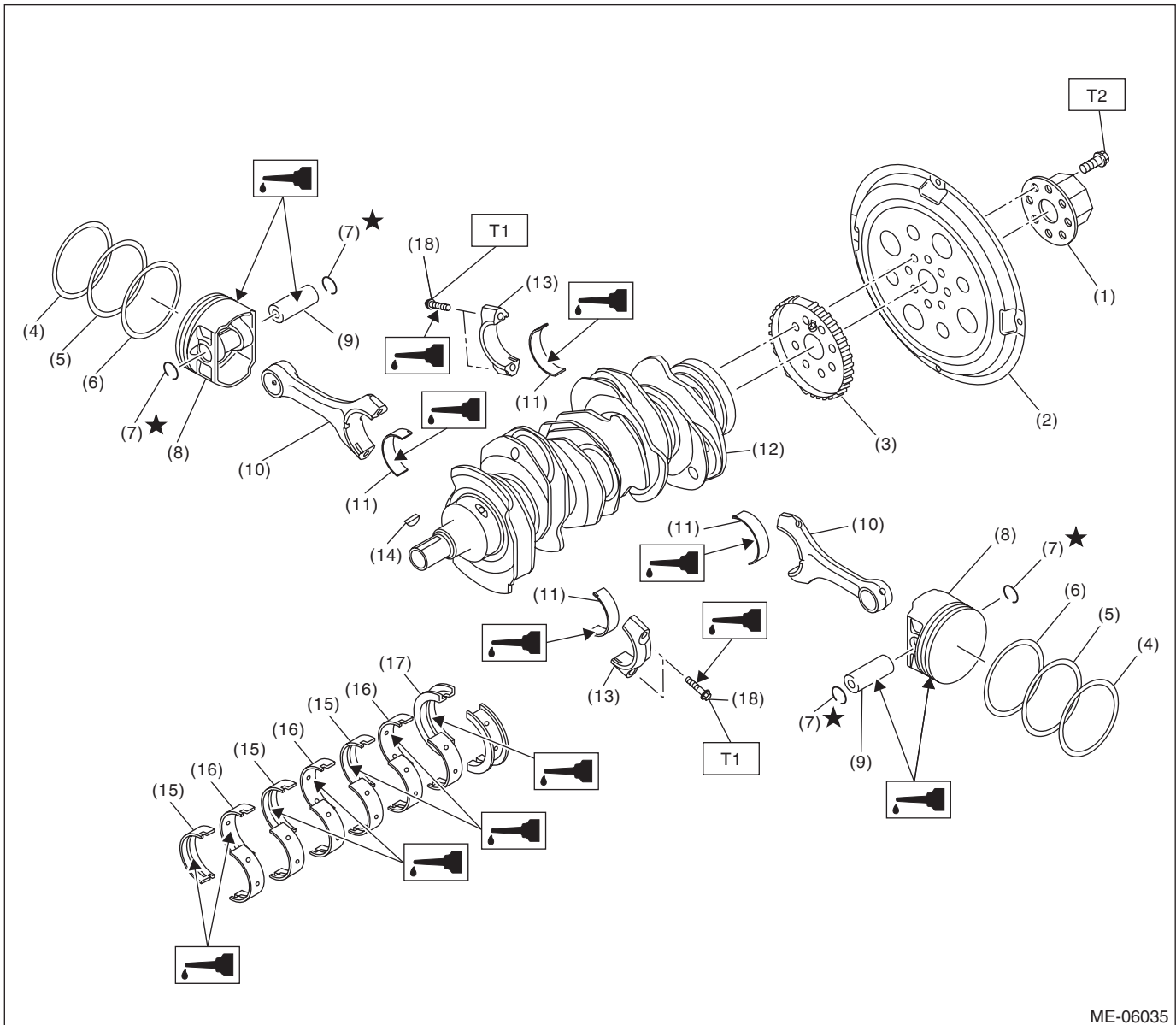
T4: 25 (2.5, 18.4)

T5: 37 (3.8, 27.3)

T6: 54 (5.5, 39.8)

T7: <Ref. to ME(H6DO)-105, Cylinder Block.>

7. CRANKSHAFT AND PISTON



- | | | |
|-----------------------------|------------------------------------|------------------------------|
| (1) Reinforcement | (9) Piston pin | (17) Crankshaft bearing #7 |
| (2) Drive plate | (10) Connecting rod | (18) Connecting rod cap bolt |
| (3) Crankshaft sensor plate | (11) Connecting rod bearing | |
| (4) Top ring | (12) Crankshaft | |
| (5) Second ring | (13) Connecting rod cap | |
| (6) Oil ring | (14) Woodruff key | |
| (7) Circlip | (15) Crankshaft bearing #1, #3, #5 | |
| (8) Piston | (16) Crankshaft bearing #2, #4, #6 | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 60 (6.1, 44.3)

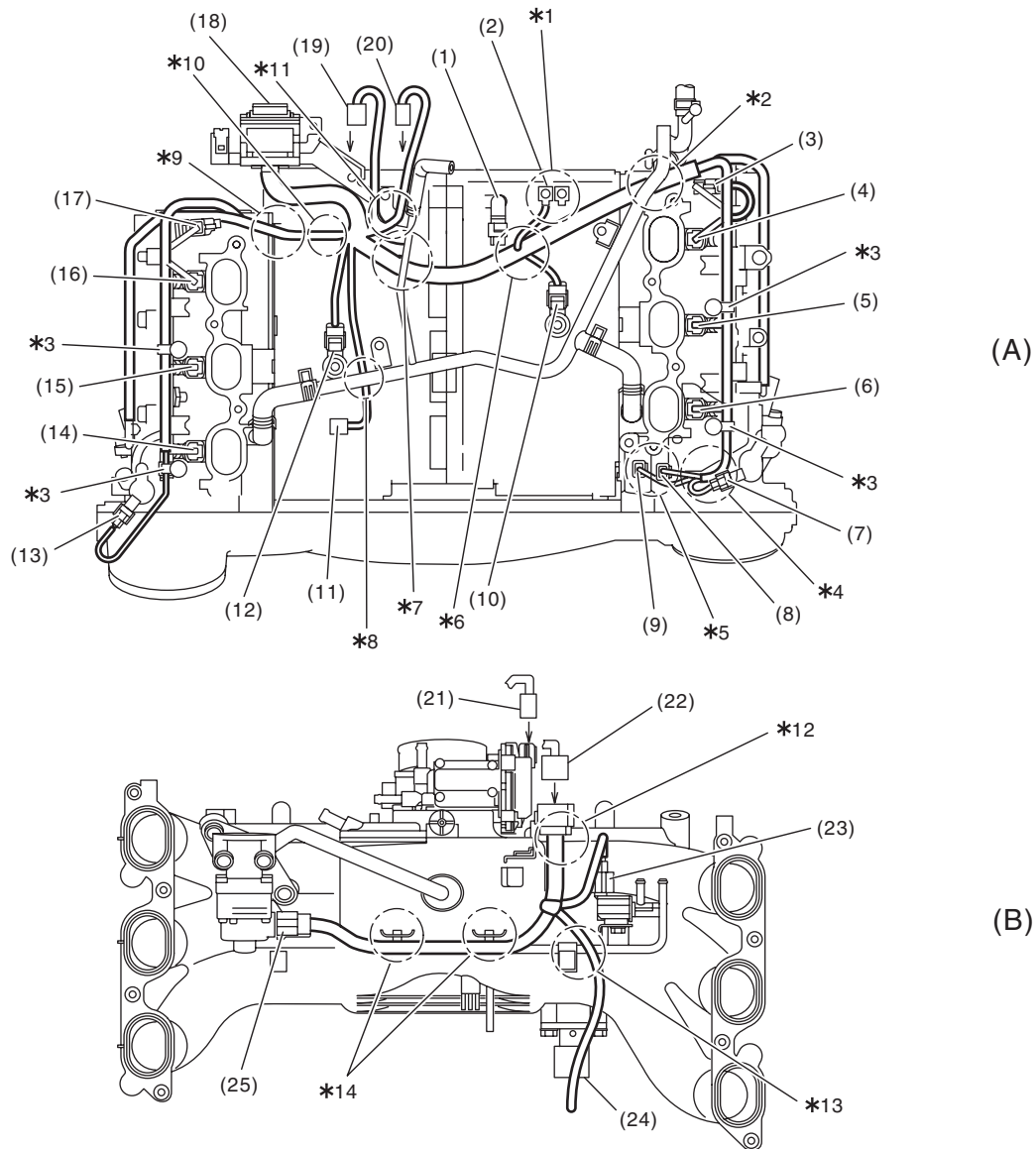
T2: <Ref. to 5AT-63, INSTALLATION, Drive Plate.>

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8. ENGINE HARNESS

Engine harness assembly diagram 1



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(A) Cylinder block upper face	(B) Intake manifold back surface	
(1) Crankshaft position sensor connector	(10) Knock sensor LH connector	(19) Upper/lower connection connector (to intake manifold)
(2) Engine ground	(11) Power steering switch connector	(20) Electronic throttle control connector (to intake manifold)
(3) Intake camshaft position sensor LH connector	(12) Knock sensor RH connector	(21) Electronic throttle control connector (from upper part of the cylinder block)
(4) #6 injector connector	(13) Intake oil flow control solenoid valve RH connector	(22) Upper/lower connection connector (from upper part of the cylinder block)
(5) #4 injector connector	(14) #1 injector connector	(23) Purge control solenoid valve connector
(6) #2 injector connector	(15) #3 injector connector	(24) Manifold absolute pressure sensor connector
(7) Intake oil flow control solenoid valve LH connector	(16) #5 injector connector	(25) EGR valve connector
(8) Oil temperature sensor connector	(17) Intake camshaft position sensor RH connector	
(9) Engine coolant temperature sensor connector	(18) Engine harness docking connector	

*1: Install so that engine ground terminals face the rear side of vehicle.

*2: Route under the heater pipe.

*3: Attach the engine harness fixing clip to the fuel pipe stay.

*4: Route from the cutout portion on the fuel pipe protector LH.

*5: Be careful not to mix up the connectors of oil temperature sensor and engine coolant temperature sensor.

*6: Route between crankshaft position sensor and knock sensor LH.

*7: Route under the heater pipe.

*8: Route under the heater pipe.

*9: Route under the fuel pipe.

*10: Attach the engine harness fixing clip to the fixing boss on the cylinder block.

*11: Route over the heater pipe stay.

*12: Securely install the engine harness fixing stay.

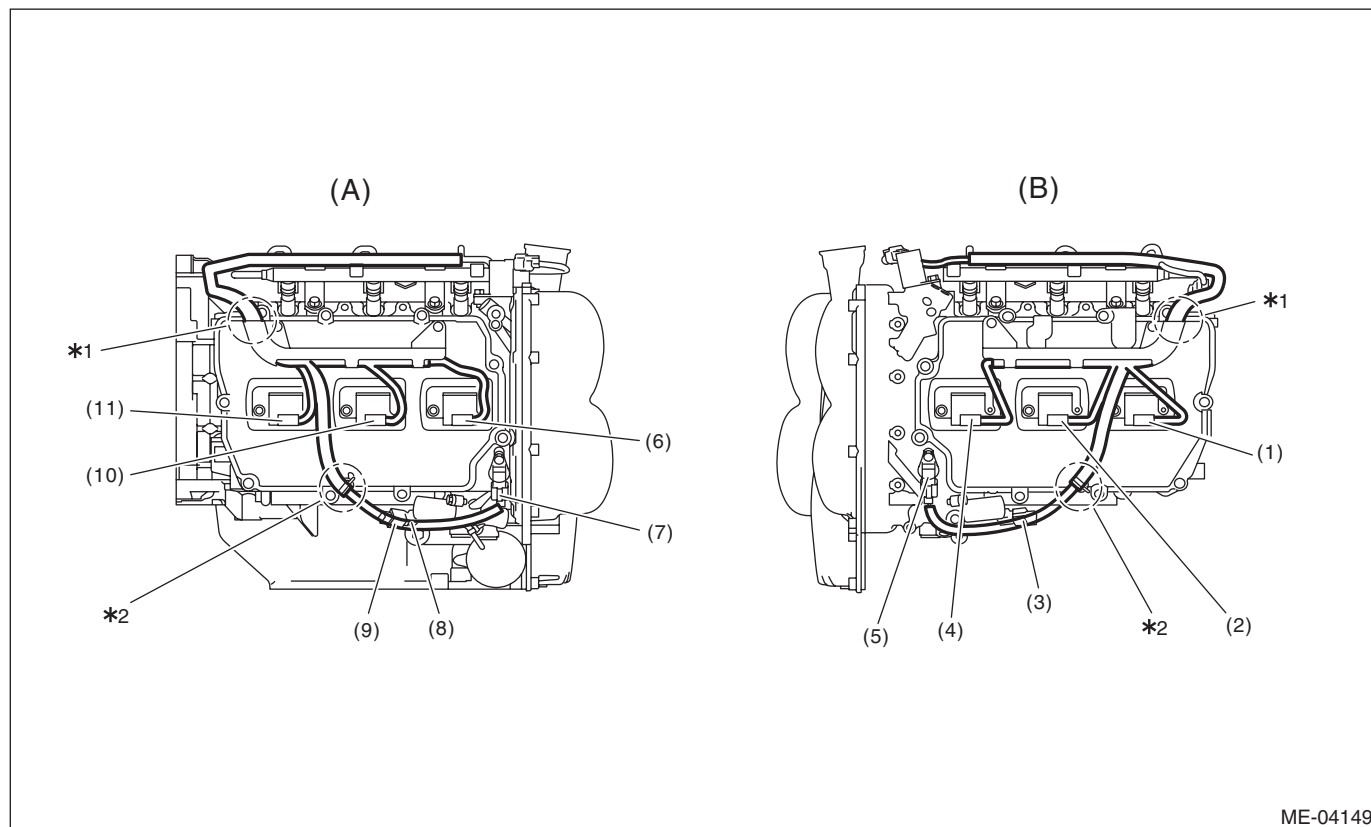
*13: Route outside the fuel pipe.

*14: Attach the engine harness fixing clip to the fixing stay on the intake manifold.

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Engine harness assembly diagram 2



(A) Right side of the engine

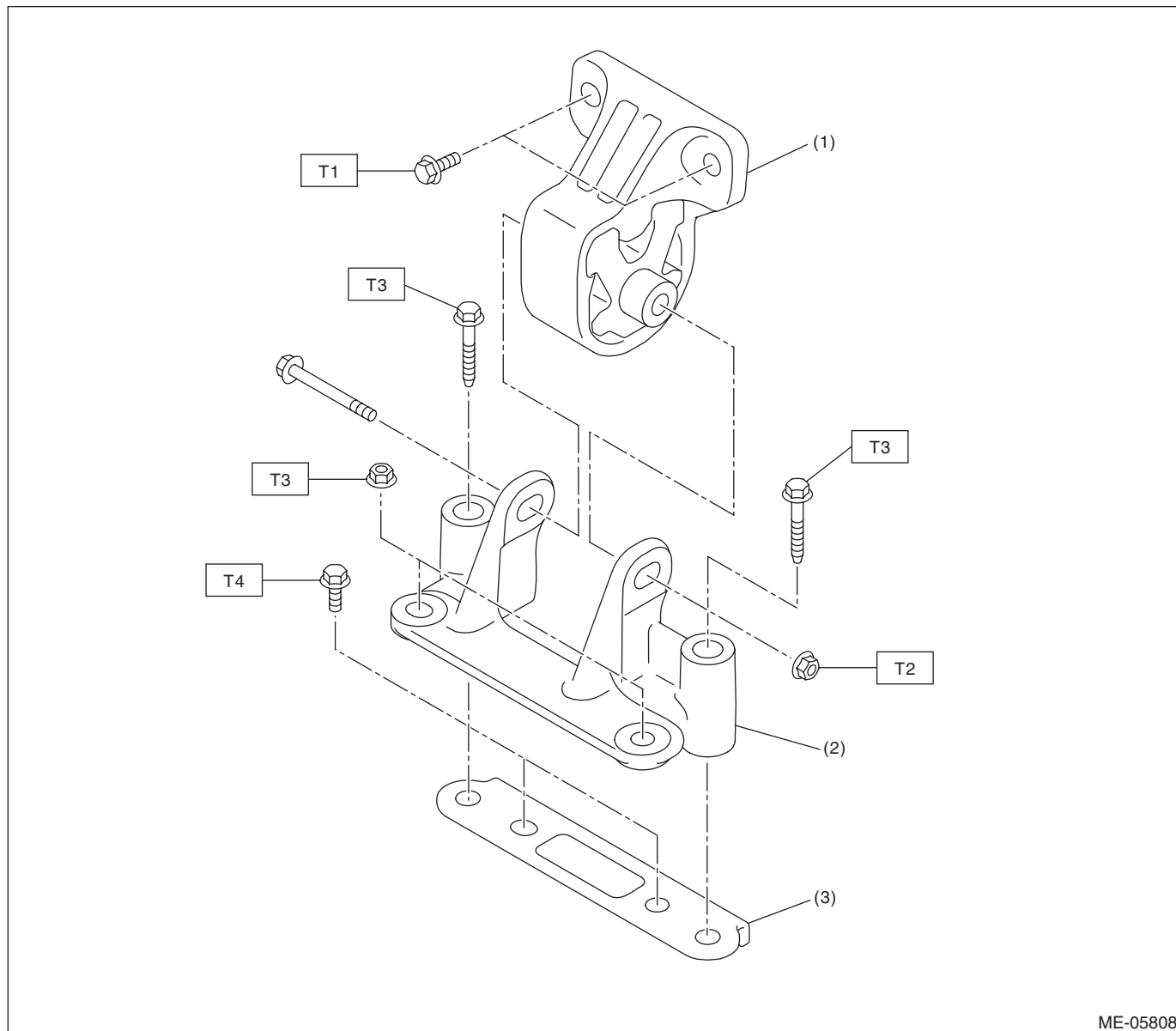
(B) Left side of the engine

- | | | |
|--|---|--|
| (1) #6 ignition coil connector | (5) Exhaust camshaft position sensor LH connector | (9) Exhaust oil flow control valve solenoid RH connector |
| (2) #4 ignition coil connector | (6) #1 injector connector | (10) #3 ignition coil connector |
| (3) Exhaust oil flow control valve solenoid LH connector | (7) Exhaust camshaft position sensor RH connector | (11) #5 ignition coil connector |
| (4) #2 ignition coil connector | (8) Oil pressure switch connector | |

*1: Align the engine harness stay end with the end of engine harness identification tape.

*2: Attach the engine harness fixing clip to the fixing boss on the rocker cover.

9. ENGINE MOUNTING



- (1) Front mount
(2) Front mounting bracket

- (3) Bracket

Tightening torque: N·m (kgf-m, ft-lb)

T1: 25 (2.5, 18.4)

T2: 45 (4.6, 33.2)

T3: 60 (6.1, 44.3)

T4: 65 (6.6, 47.9)

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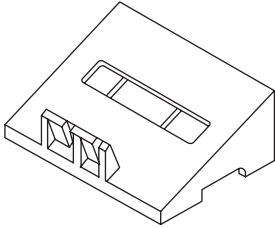
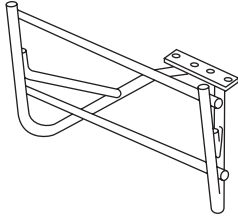
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C: CAUTION

- Prior to starting work, pay special attention to the following:
 1. Always wear work clothes, a safety cap, protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
 2. Protect the vehicle using a seat cover, fender cover, etc.
 3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove or install the engine in an area where chain hoists, lifting devices, etc. are available for ready use. When lifting up the vehicle, make sure to support the vehicle at the jack-up points.
- Be careful not to let any oil or grease contact the clutch disc or flywheel.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil when being assembled.
- Bolts, nuts and washers should be replaced with new parts as required.
- Be sure to tighten the fasteners including bolts and nuts to the specified torque.

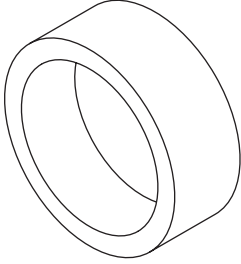
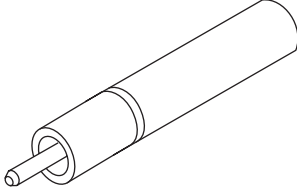
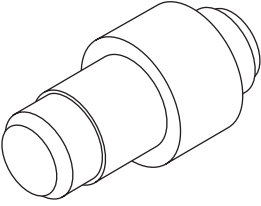
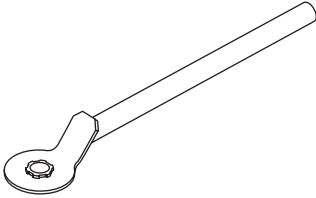
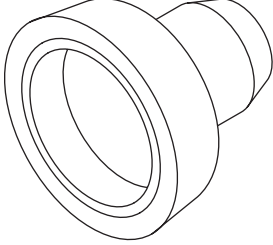
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18250AA010	18250AA010	CYLINDER HEAD TABLE	<ul style="list-style-type: none">• Used for replacing valve guides.• Used for removing and installing valve spring.
 ST18232AA000	18232AA000	ENGINE STAND	Used for disassembling and assembling engine.

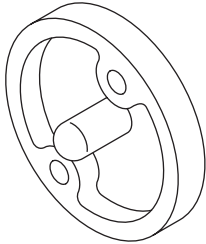
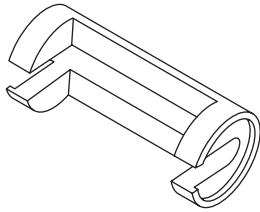
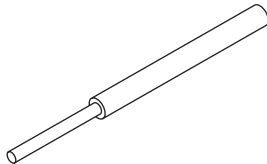
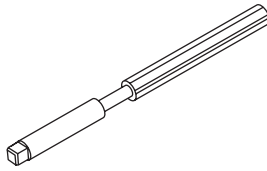
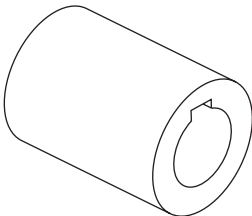
General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-398744300</p>	398744300	PISTON GUIDE	Used for installing piston in cylinder.
 <p>ST18261AA010</p>	18261AA010	VALVE OIL SEAL GUIDE	Used for press-fitting of intake valve guide oil seals and exhaust valve guide oil seals.
 <p>ST18350AA000</p>	18350AA000	CONNECTING ROD BUSHING REMOVER AND INSTALLER	Used for removing and installing connecting rod bushing.
 <p>ST-499977500</p>	499977500	CAM SPROCKET WRENCH	Used for removing and installing cam sprocket.
 <p>ST-499587200</p>	499587200	CRANKSHAFT OIL SEAL INSTALLER	<ul style="list-style-type: none"> Used for installing crankshaft oil seal. Used together with CRANKSHAFT OIL SEAL GUIDE (499597100).

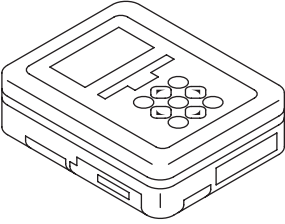
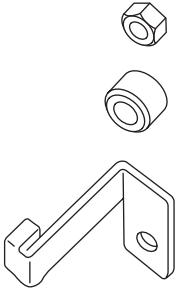
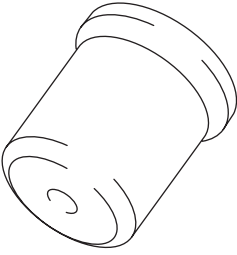
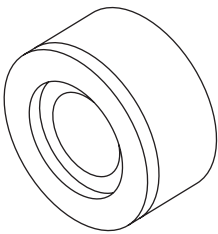
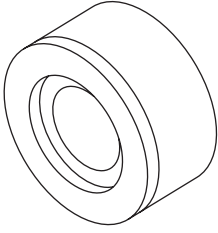
General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST-499597100</p>	499597100	CRANKSHAFT OIL SEAL GUIDE	<ul style="list-style-type: none"> Used for installing crankshaft oil seal. Used together with CRANKSHAFT OIL SEAL INSTALLER (499587200).
 <p>ST-499718000</p>	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.
 <p>ST-499765700</p>	499765700	VALVE GUIDE REMOVER	Used for removing valve guides.
 <p>ST-499765900</p>	499765900	VALVE GUIDE REAMER	Used for reaming valve guides.
 <p>ST18252AA000</p>	18252AA000	CRANKSHAFT SOCKET	Used for rotating crankshaft.

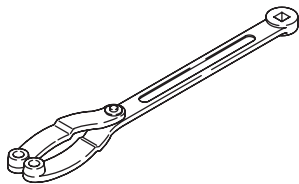
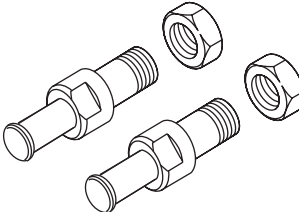
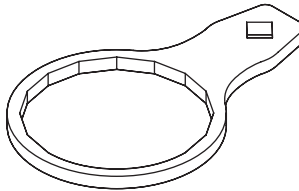
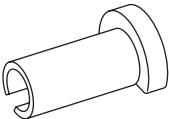
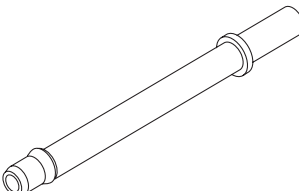
General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST1B022XU0</p>	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for various inspections.
 <p>ST-498277200</p>	498277200	STOPPER SET	Used for installing automatic transmission assembly to engine.
 <p>ST-499585700</p>	499585700	OIL SEAL GUIDE	Used for installing the chain cover oil seal.
 <p>ST18251AA050</p>	18251AA050	VALVE GUIDE ADJUSTER	Used for installing intake valve guides.
 <p>ST18251AA060</p>	18251AA060	VALVE GUIDE ADJUSTER	Used for installing exhaust valve guides.

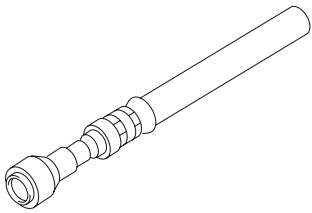
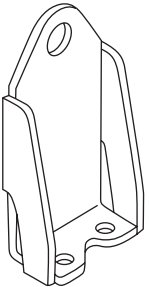
General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18355AA000</p>	18355AA000	PULLEY WRENCH	<ul style="list-style-type: none"> Used for removing and installing the crank pulley. Used for removing and installing the idler sprocket. Used together with PULLEY WRENCH PIN SET (18334AA000).
 <p>ST18334AA000</p>	18334AA000	PULLEY WRENCH PIN SET	<ul style="list-style-type: none"> Used for removing and installing the crank pulley. Used for removing and installing the idler sprocket. Used together with PULLEY WRENCH (18355AA000).
 <p>ST18332AA020</p>	18332AA020	OIL FILTER WRENCH	Used for removing and installing oil filter.
 <p>ST42099AE000</p>	42099AE000	QUICK CONNECTOR RELEASE	Used for disconnecting quick connector of the engine compartment.
 <p>ST18471AA000</p>	18471AA000	FUEL PIPE ADAPTER	Used for inspecting the fuel pressure.

General Description

MECHANICAL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST42075AG690	42075AG690	FUEL HOSE	Used for inspecting the fuel pressure. NOTE: This is the SUBARU genuine part.
 ST18360AA020	18360AA020	HANGER	Used for hanging the engine.

2. GENERAL TOOL

TOOL NAME	REMARKS
Compression gauge	Used for inspecting compression pressure.
Timing light	Used for inspecting the ignition timing.
Vacuum gauge	Used for inspecting intake manifold vacuum.
Oil pressure gauge	Used for inspecting engine oil pressure.
Fuel pressure gauge	Used for inspecting fuel pressure.
TORX® socket (E12)	Used for removing and installing connecting rod cap.