

General Description

MECHANICAL

1. General Description

A: SPECIFICATION

| | | | | | |
|---|---|----------|---|---------------------------|--|
| Engine | 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) | |
| | Displacement | | cm ³ (cu in) | 2,457 (149.94) | |
| | Compression ratio | | 9.5 | | |
| | Compression pressure (at 200 — 300 rpm) | | kPa (kg/cm ² , psi) | Standard | 981 — 1,177 (10 — 12, 142 — 171) |
| | Number of piston rings | | Pressure ring: 2, Oil ring: 1 | | |
| | Intake valve timing | | Open | Max. retard | ATDC 5° |
| | | | | Min. advance | BTDC 35° |
| | | | Close | Max. retard | ABDC 65° |
| | | | | Min. advance | ABDC 25° |
| | 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 ^{+0.04} _{-0.06} (0.0079 ^{+0.0016} _{-0.0024}) |
| | | | | Exhaust | 0.35±0.05 (0.0138±0.0020) |
| | | | Adjustment value | Intake | 0.20 ^{+0.01} _{-0.03} (0.0079 ^{+0.0004} _{-0.0012}) |
| | | | | Exhaust | 0.35±0.02 (0.0138±0.0008) |
| Idle speed (gear shift lever in neutral position) | | No load | Standard | 700±100 | |
| | | A/C ON | Standard | 700 — 850±100 | |
| Ignition order | | | | 1 → 3 → 2 → 4 | |
| Ignition timing | | BTDC/rpm | Standard | 15°±10°/700 | |

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NOTE:

OS: Oversize US: Undersize

| | | | | | |
|-------------------------------|--|---------------------|---------------------------------|-------------------------------------|---|
| Belt tension adjuster | Adjuster rod protrusion amount | mm (in) | | 5.2 — 6.2 (0.205 — 0.244) | |
| Camshaft | Bending limit | mm (in) | | 0.020 (0.00079) | |
| | Cam lobe height | mm (in) | Intake | Standard | 46.55 — 46.65 (1.833 — 1.837) |
| | | | Exhaust | Standard | 45.85 — 45.95 (1.805 — 1.809) |
| | Cam base circle diameter | mm (in) | Standard | 37.0 (1.457) | |
| | Journal O.D. | mm (in) | Front | Standard | 37.946 — 37.963 (1.4939 — 1.4946) |
| | | | Center, rear | Standard | 29.946 — 29.963 (1.1790 — 1.1796) |
| | Oil clearance | mm (in) | Standard | 0.037 — 0.072 (0.0015 — 0.0028) | |
| Thrust clearance | mm (in) | Standard | 0.068 — 0.116 (0.0027 — 0.0047) | | |
| Cylinder head | Warping limit (Mating surface with cylinder block) | 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 between valve and valve seat | | | 90° | |
| | Contacting width of valve and valve seat | mm (in) | Intake | Standard | 0.6 — 1.4 (0.024 — 0.055) |
| | | | Exhaust | Standard | 1.2 — 1.8 (0.047 — 0.071) |
| 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) | | 6.000 — 6.012 (0.2362 — 0.2367) | |
| | Valve stem outer diameter | mm (in) | Intake | | 5.955 — 5.970 (0.2344 — 0.2350) |
| | | | Exhaust | | 5.945 — 5.960 (0.2341 — 0.2346) |
| Valve guide protrusion amount | 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) |
| | Overall length | mm (in) | Intake | | 104.4 (4.110) |
| | | | Exhaust | | 104.65 (4.1201) |
| Valve spring | Free length | mm (in) | | 47.32 (1.863) | |
| | Tension/spring height | N (kgf, lb)/mm (in) | Set | | 205 — 235 (20.90 — 23.96, 46.09 — 52.84)/36.0 (1.417) |
| | | | Lift | | 426 — 490 (43.44 — 49.96, 95.78 — 110.17)/26.5 (1.043) |
| | Squareness | | | 2.5°, 2.1 mm (0.083 in) or less | |
| Valve lifter | Outer diameter | mm (in) | Standard | 34.959 — 34.975 (1.3763 — 1.3770) | |
| | Inner diameter of valve lifter mating surface | mm (in) | Standard | 34.994 — 35.016 (1.3777 — 1.3786) | |
| | Clearance between valve lifter and valve lifter mating surface | mm (in) | Standard | 0.019 — 0.057 (0.0007 — 0.0022) | |
| Cylinder block | Warping 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) | |
| | Taper | mm (in) | Standard | 0.015 (0.0006) | |
| | Out-of-roundness | mm (in) | Standard | 0.010 (0.0004) | |
| | Cylinder to piston clearance at 20°C (68°F): | mm (in) | Standard | -0.010 — 0.010 (-0.00039 — 0.00039) | |
| | Cylinder inner diameter boring limit (diameter) | mm (in) | | To 100.005 (3.9372) | |

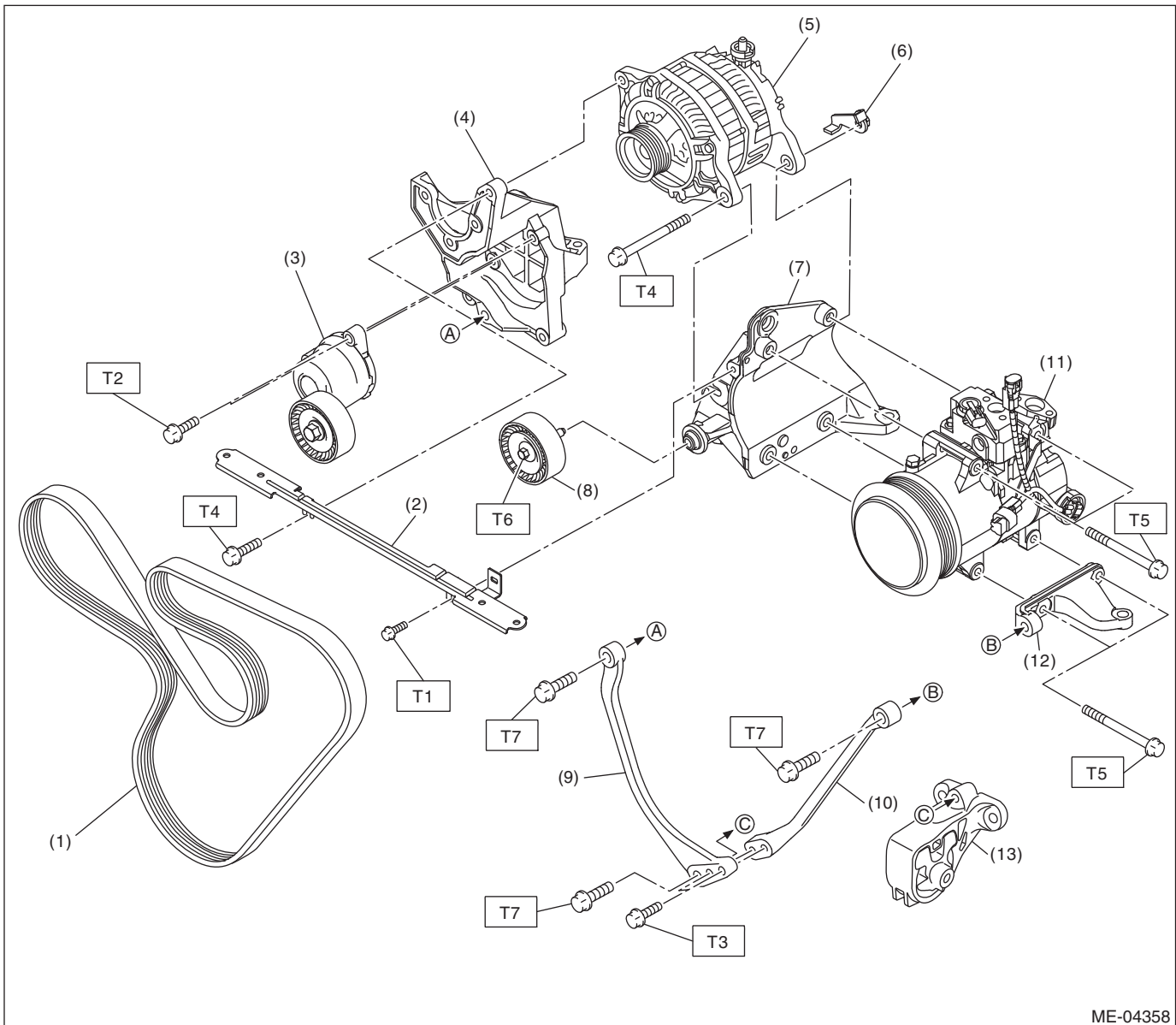
General Description

MECHANICAL

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|---|--|-----------------------|---------------------------------|--|-----------------------------------|------------------------------------|
| Piston | Piston grade point | | mm (in) | 38.2 (1.50) | | |
| | 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 | Degree of fit | | | Piston pin must be fitted into position with thumb at 20°C (68°F). | | |
| | Clearance between piston pin hole 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 — 0.25 (0.0079 — 0.0098) | |
| | | | Second ring | Standard | 0.37 — 0.52 (0.015 — 0.0203) | |
| | | | 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) | |
| Connecting rod and connecting rod bearing | Bend or twist per 100 mm (3.94 in) in length | | mm (in) | Service limit | 0.1 (0.0039) | |
| | Thrust clearance | | mm (in) | Standard | 0.070 — 0.330 (0.0028 — 0.0130) | |
| | Oil clearance | | mm (in) | Standard | 0.017 — 0.045 (0.0007 — 0.0018) | |
| | Bearing size (Thickness at center) | mm (in) | Standard | | 1.490 — 1.506 (0.0587 — 0.0593) | |
| | | | 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) | |
| Crankshaft and crankshaft bearing | Bending limit | | mm (in) | | 0.035 (0.0014) | |
| | 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 | | 51.976 — 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 (2.0447 — 2.0453) | |
| | | | 0.25 (0.0098) US | | 51.734 — 51.750 (2.0368 — 2.0374) | |
| | Crank journal outer diameter | mm (in) | Standard | | 59.984 — 60.008 (2.3616 — 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) | |
| | Bearing size (Thickness at center) | #1, #3 | mm (in) | Standard | | 1.998 — 2.015 (0.0787 — 0.0793) |
| | | | | 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 | mm (in) | Standard | | 2.000 — 2.017 (0.0787 — 0.0794) |
| 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) | | |
| Thrust clearance | | mm (in) | Standard | 0.030 — 0.115 (0.0012 — 0.0045) | | |
| Oil clearance | | mm (in) | Standard | 0.010 — 0.030 (0.00039 — 0.0012) | | |

B: COMPONENT

1. V-BELT



ME-04358

- | | |
|---------------------------------|-------------------------------|
| (1) V-belt | (8) Idler pulley ASSY |
| (2) Collector cover bracket | (9) Stopper rod RH |
| (3) V-belt tensioner ASSY | (10) Stopper rod LH |
| (4) Power steering pump bracket | (11) A/C compressor |
| (5) Generator | (12) A/C compressor bracket B |
| (6) Generator plate | (13) Front cushion rubber |
| (7) A/C compressor bracket A | |

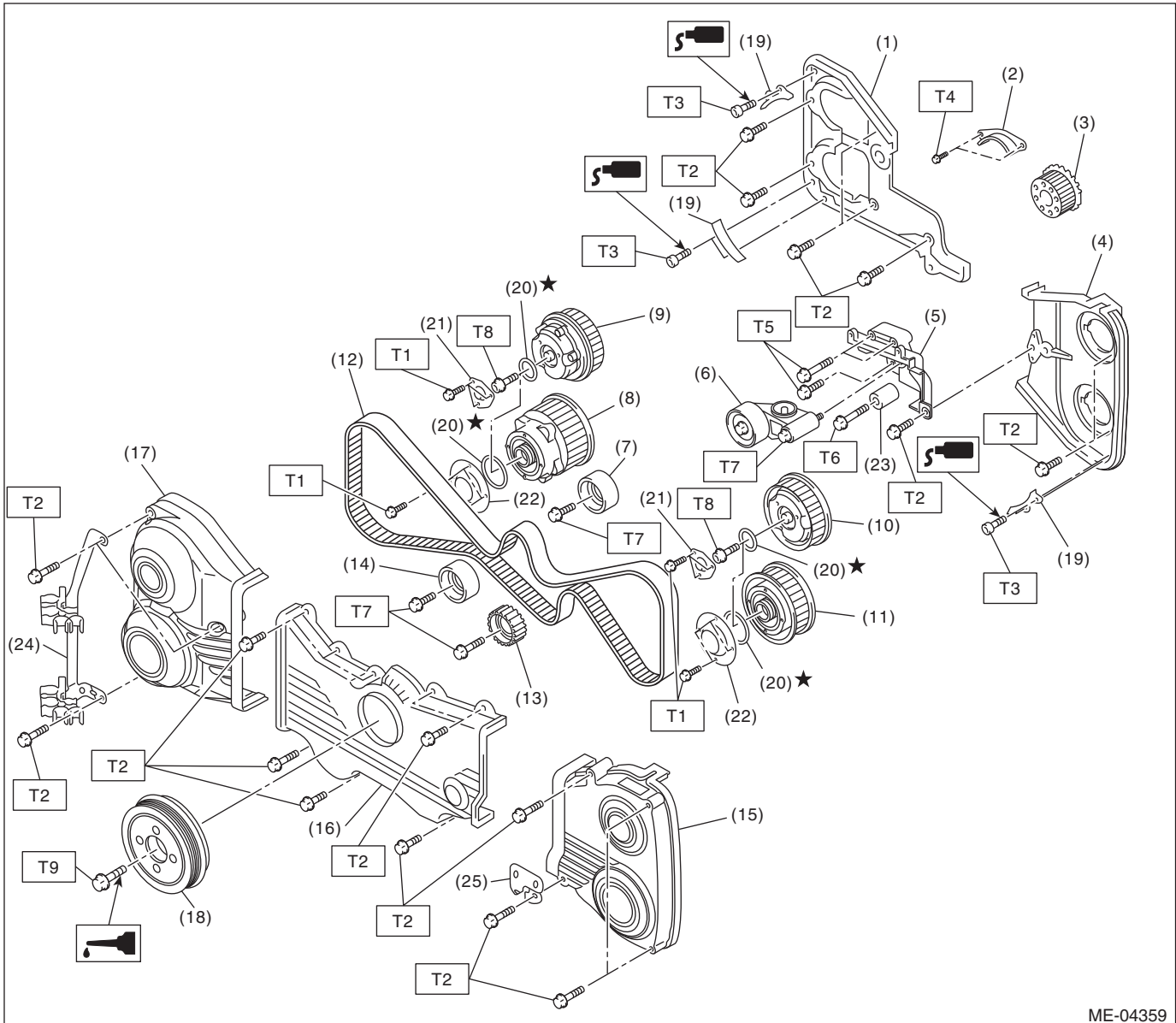
Tightening torque: N·m (kgf·m, ft·lb)

- T1: 6.4 (0.7, 4.7)**
T2: 20 (2.0, 14.8)
T3: 22 (2.2, 16.2)
T4: 25 (2.5, 18.4)
T5: 26.5 (2.7, 19.5)
T6: 33 (3.4, 24.3)
T7: 36 (3.7, 26.6)

General Description

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2. TIMING BELT



ME-04359

- | | | |
|--|-----------------------------|----------------------------|
| (1) Timing belt cover No. 2 RH | (13) Belt idler No. 2 | (25) Oxygen sensor bracket |
| (2) Timing belt guide | (14) Belt idler | |
| (3) Crank sprocket | (15) Timing belt cover LH | |
| (4) Timing belt cover No. 2 LH | (16) Front belt cover | |
| (5) Tensioner bracket | (17) Timing belt cover RH | |
| (6) Automatic belt tension adjuster ASSY | (18) Crank pulley | |
| (7) Belt idler | (19) Timing belt guide | |
| (8) Exhaust cam sprocket RH | (20) O-ring | |
| (9) Intake cam sprocket RH | (21) Intake actuator cover | |
| (10) Intake cam sprocket LH | (22) Exhaust actuator cover | |
| (11) Exhaust cam sprocket LH | (23) Belt idler | |
| (12) Timing belt | (24) Hose clip stay ASSY | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 3.4 (0.3, 2.5)

T2: 5 (0.5, 3.7)

T3: 6.4 (0.7, 4.7)

T4: 9.75 (1.0, 7.2)

T5: 24.5 (2.5, 18.1)

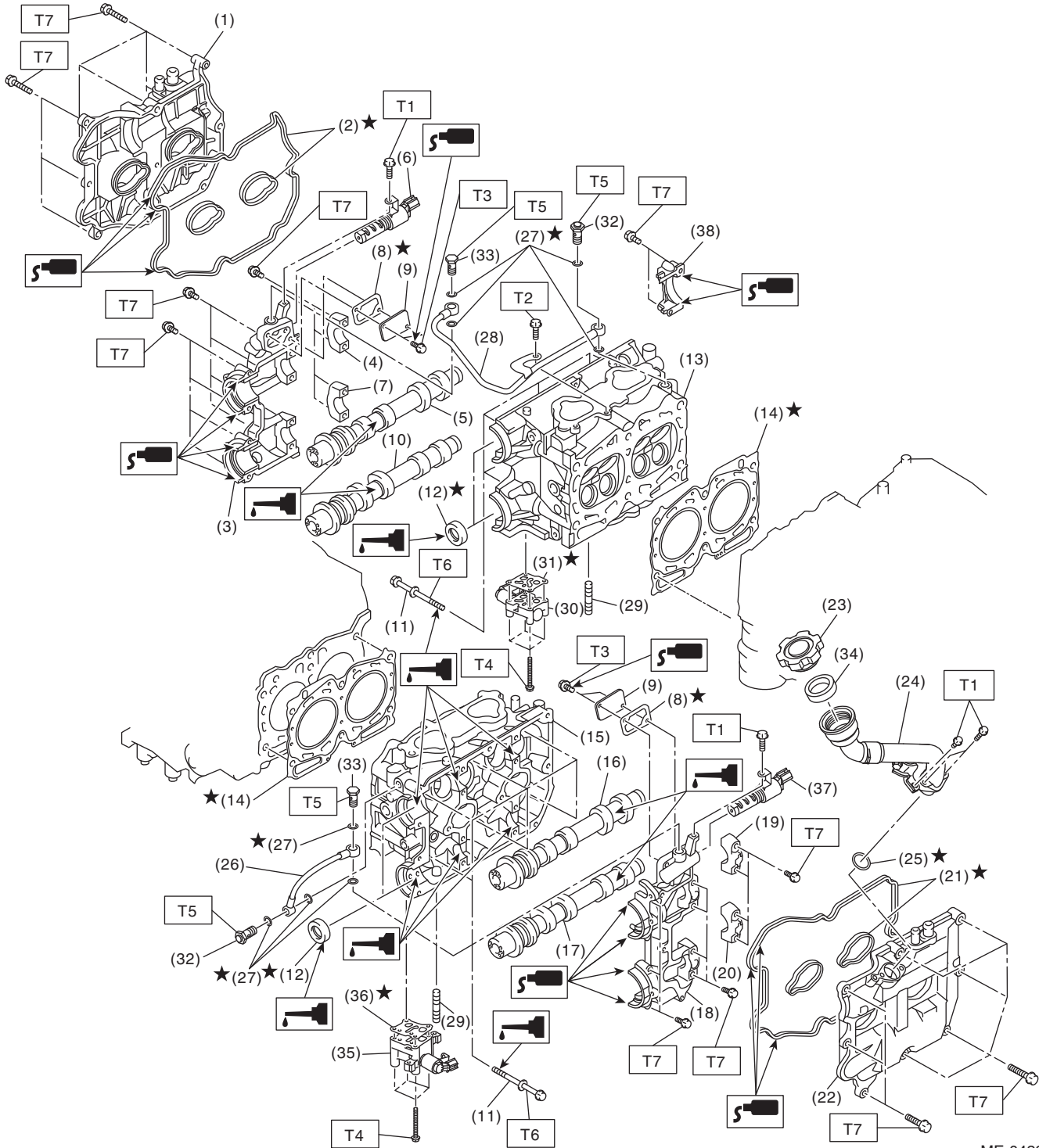
T6: 25 (2.5, 18.4)

T7: 39 (4.0, 28.8)

T8: <Ref. to ME(H4DOTC)-60, INSTALLATION, Cam Sprocket.>

T9: <Ref. to ME(H4DOTC)-44, INSTALLATION, Crank Pulley.>

3. CYLINDER HEAD AND CAMSHAFT



ME-04224

General Description

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| | | |
|---|---|---|
| (1) Rocker cover RH | (17) Exhaust camshaft LH | (33) Union bolt without filter (without protrusion) |
| (2) Rocker cover gasket RH | (18) Front camshaft cap LH | (34) Gasket |
| (3) Front camshaft cap RH | (19) Intake camshaft cap LH | (35) Exhaust oil flow control solenoid valve LH |
| (4) Intake camshaft cap RH | (20) Exhaust camshaft cap LH | (36) Gasket (LH) |
| (5) Intake camshaft RH | (21) Rocker cover gasket LH | (37) Intake oil flow control solenoid valve LH |
| (6) Intake oil flow control solenoid valve RH | (22) Rocker cover LH | (38) Rear camshaft cap |
| (7) Exhaust camshaft cap RH | (23) Oil filler cap | |
| (8) Gasket | (24) Oil filler duct | |
| (9) Oil return cover | (25) O-ring | |
| (10) Exhaust camshaft RH | (26) Oil pipe LH | |
| (11) Cylinder head bolt | (27) Gasket | |
| (12) Oil seal | (28) Oil pipe RH | |
| (13) Cylinder head RH | (29) Stud bolt | |
| (14) Cylinder head gasket | (30) Exhaust oil flow control solenoid valve RH | |
| (15) Cylinder head LH | (31) Gasket (RH) | |
| (16) Intake camshaft LH | (32) Union bolt with filter (with protrusion) | |

Tightening torque:N·m (kgf·m, ft·lb)

T1: 6.4 (0.7, 4.7)

T2: 8 (0.8, 5.9)

T3: 9 (0.9, 6.6)

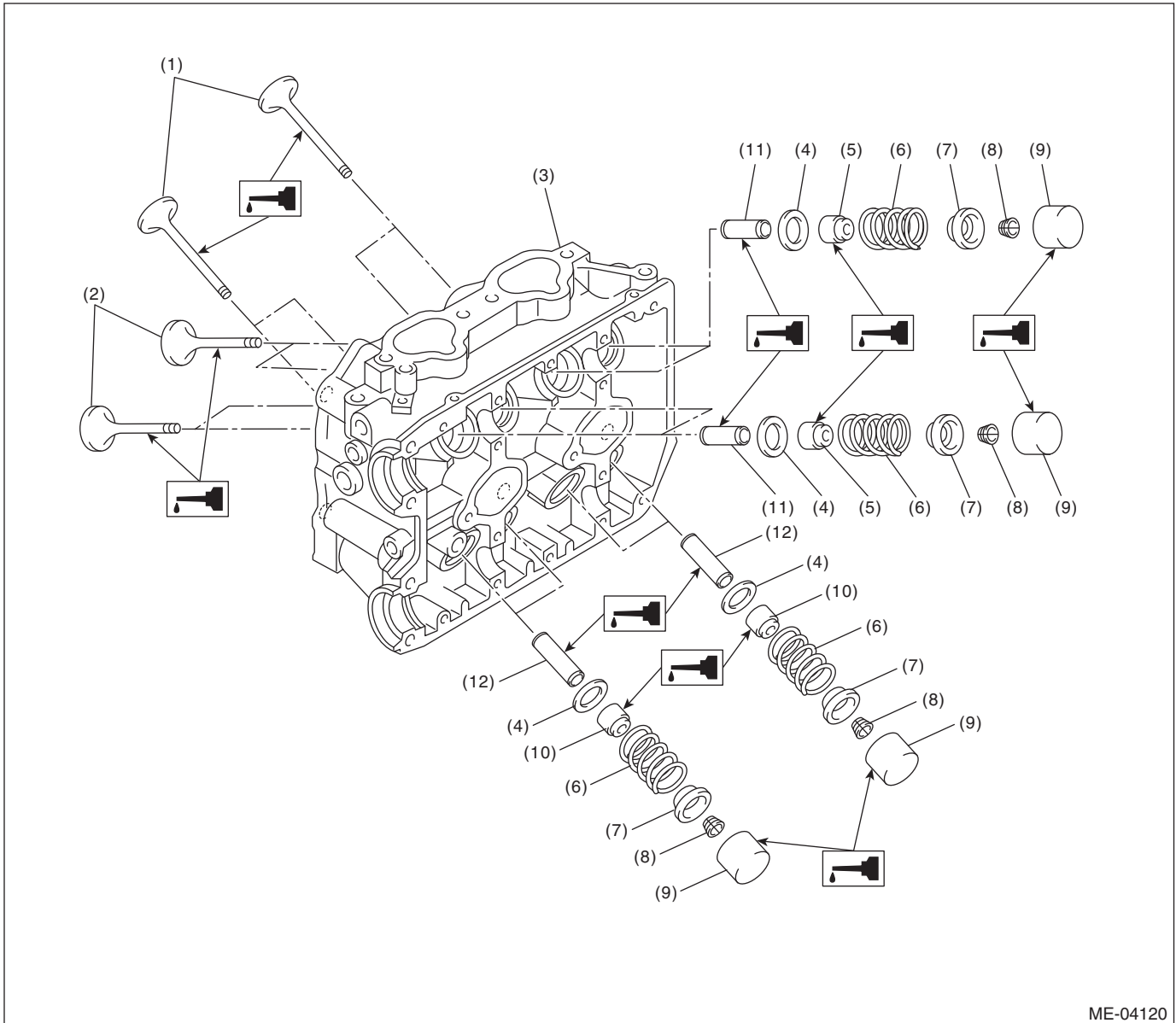
T4: 10 (1.0, 7.4)

T5: 29 (3.0, 21.4)

T6: <Ref. to ME(H4DOTC)-73, INSTALLATION, Cylinder Head.>

T7: <Ref. to ME(H4DOTC)-65, INSTALLATION, Camshaft.>

4. CYLINDER HEAD AND VALVE ASSEMBLY



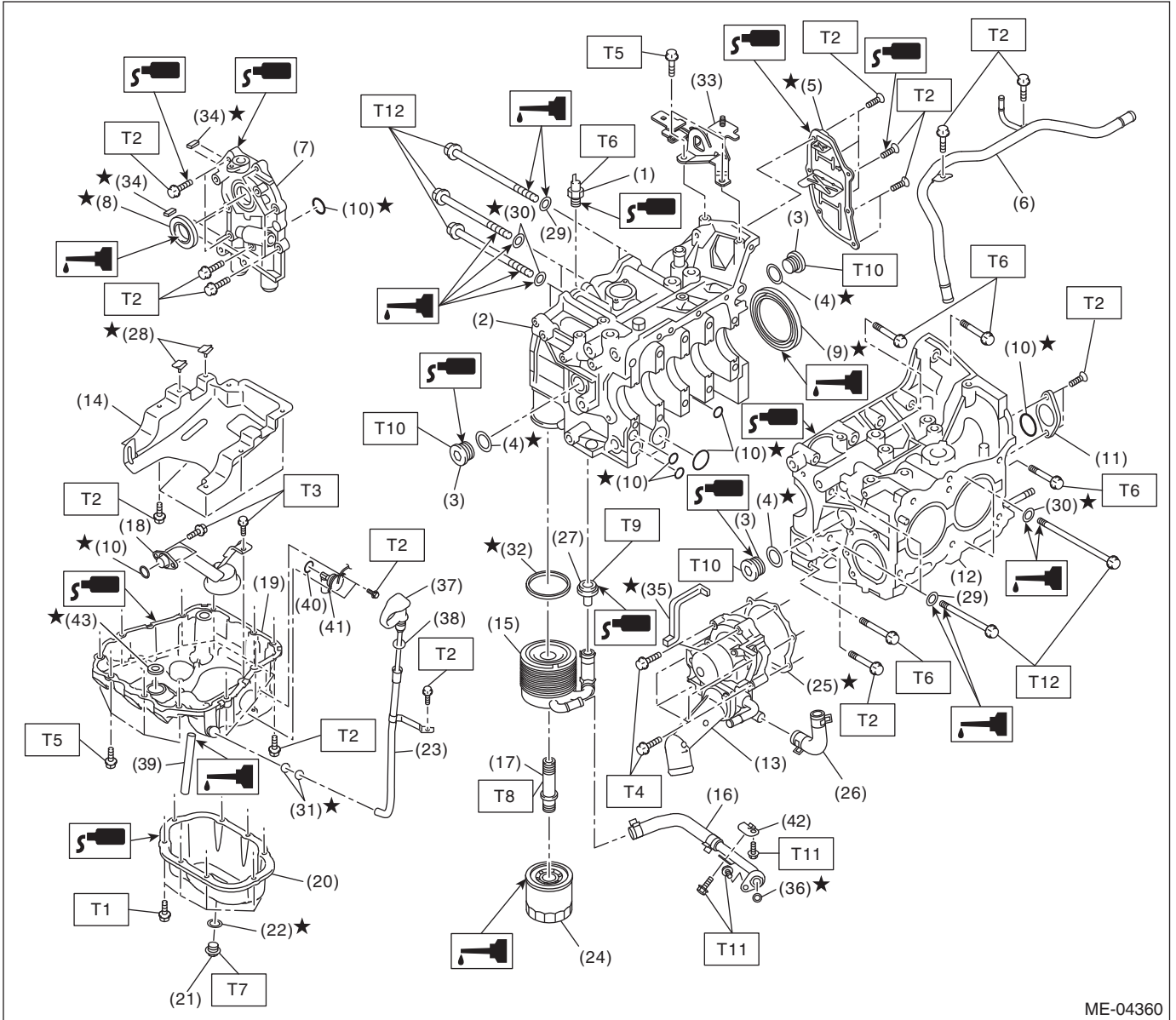
ME-04120

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|-----------------------|---------------------------|-----------------------------|
| (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 |

General Description

MECHANICAL

5. CYLINDER BLOCK



ME-04360

General Description

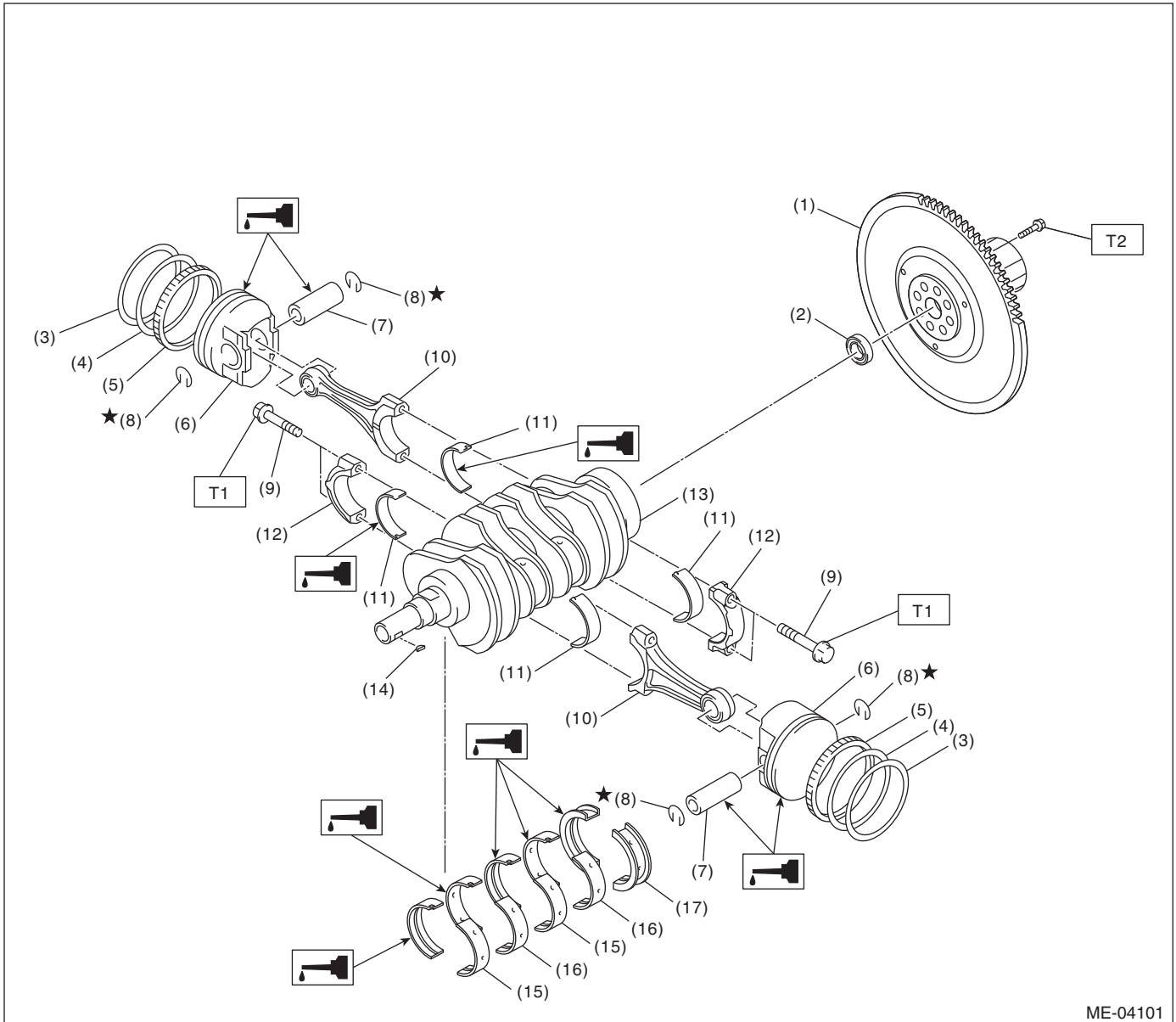
MECHANICAL

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|---------------------------|----------------------------|---|
| (1) Oil pressure switch | (21) Drain plug | (41) Oil level switch |
| (2) Cylinder block RH | (22) Drain plug gasket | (42) Oil cooler pipe stay |
| (3) Service hole plug | (23) Oil level gauge guide | (43) O-ring |
| (4) Gasket | (24) Oil filter | |
| (5) Oil separator cover | (25) Gasket | <hr/> Tightening torque:N-m (kgf-m, ft-lb) |
| (6) Water by-pass pipe | (26) Water pump hose | T1: 5 (0.5, 3.7) |
| (7) Oil pump | (27) Nipple | T2: 6.4 (0.7, 4.7) |
| (8) Front oil seal | (28) Seal | T3: 10 (1.0, 7.4) |
| (9) Rear oil seal | (29) Washer | T4: First 12 (1.2, 8.9) |
| (10) O-ring | (30) Seal washer | Second 12 (1.2, 8.9) |
| (11) Service hole cover | (31) O-ring | T5: 16 (1.6, 11.8) |
| (12) Cylinder block LH | (32) Gasket | T6: 25 (2.5, 18.4) |
| (13) Water pump | (33) Engine rear hanger | T7: 41.7 (4.3, 30.8) |
| (14) Baffle plate | (34) Oil pump seal | T8: 54 (5.5, 39.8) |
| (15) Oil cooler | (35) Water pump sealing | T9: 69 (7.0, 50.9) |
| (16) Oil cooler pipe | (36) O-ring | T10: 70 (7.1, 51.6) |
| (17) Connector | (37) Oil level gauge | T11: <Ref. to LU(H4SO)-26, INSTAL- |
| (18) Oil strainer | (38) O-ring | LATION, Engine Oil Cooler.> |
| | | T12: <Ref. to ME(H4DOTC)-85, |
| (19) Cylinder block lower | (39) Oil drain pipe | INSTALLATION, Cylinder |
| (20) Oil pan | (40) O-ring | Block.> |

General Description

MECHANICAL

6. CRANKSHAFT AND PISTON



ME-04101

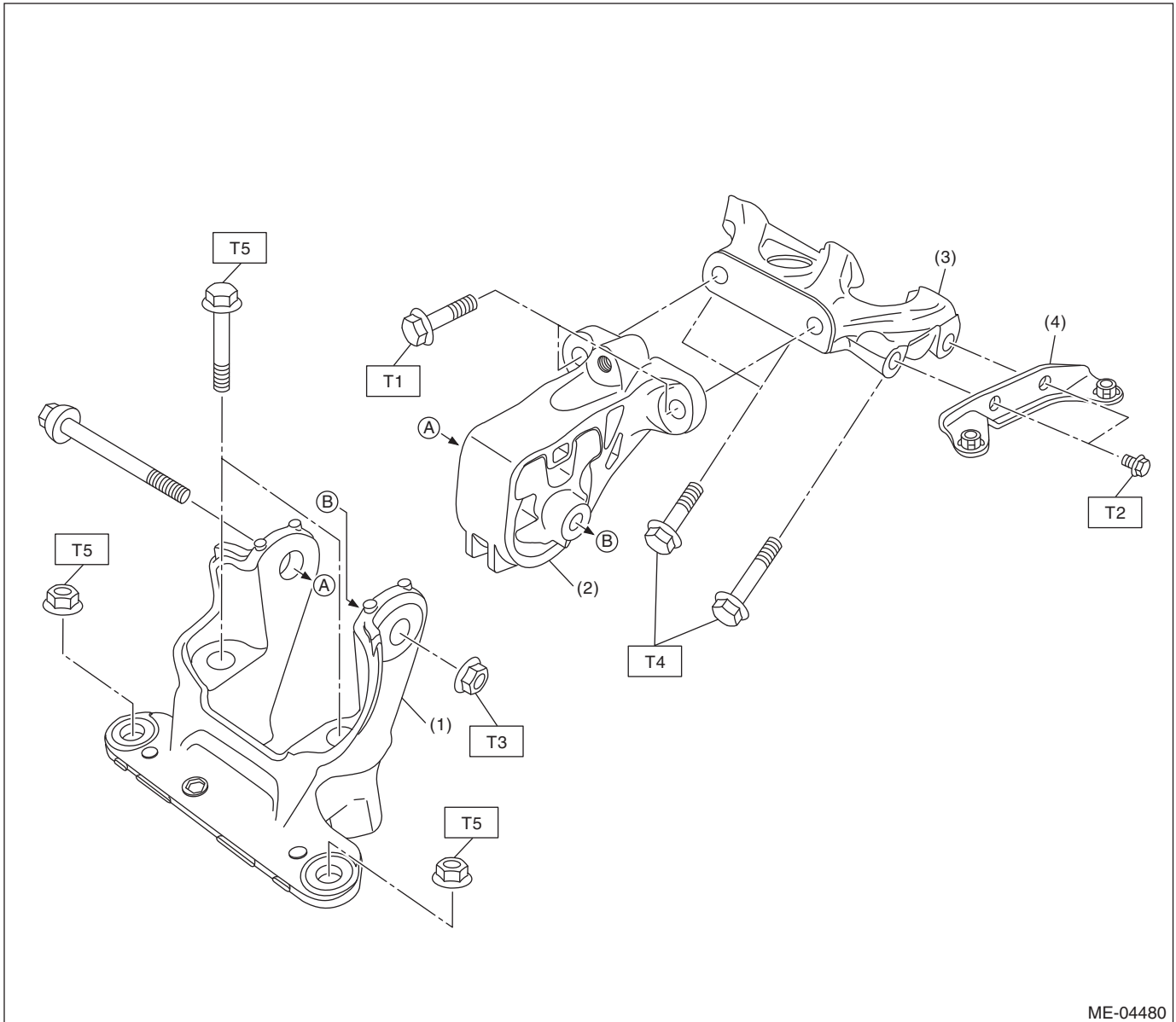
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|------------------|-----------------------------|--------------------------------|
| (1) Flywheel | (8) Snap ring | (15) Crankshaft bearing #1, #3 |
| (2) Ball bearing | (9) Connecting rod bolt | (16) Crankshaft bearing #2, #4 |
| (3) Top ring | (10) 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: <Ref. to CL-14, INSTALLATION, Flywheel.>

7. ENGINE MOUNTING



ME-04480

- | | |
|----------------------------|-----------------------------|
| (1) Front mounting bracket | (3) Engine mounting bracket |
| (2) Front cushion rubber | (4) Turbocharger upper stay |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 25 (2.5, 18.4)

T2: 33 (3.4, 24.3)

T3: 45 (4.6, 33.2)

T4: 58 (5.9, 42.8)

T5: 60 (6.1, 44.3)

General Description

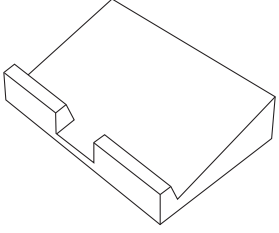
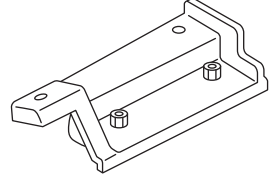
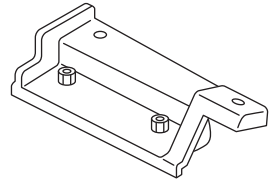
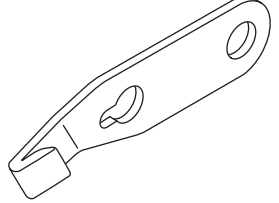
MECHANICAL

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 re-installed 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.

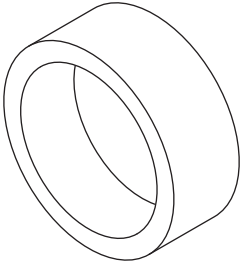
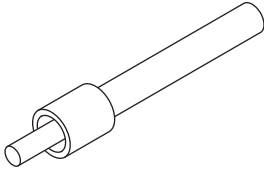
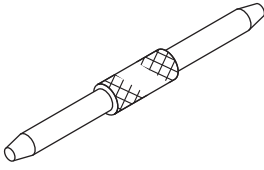
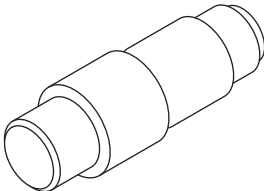
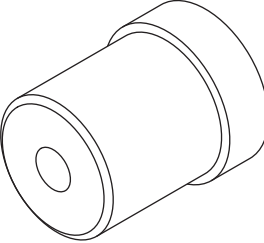
D: PREPARATION TOOL

1. SPECIAL TOOL

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

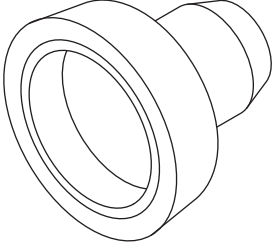
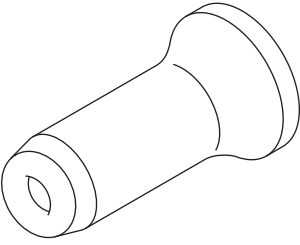
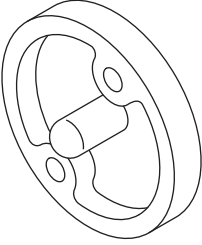
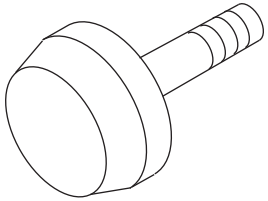
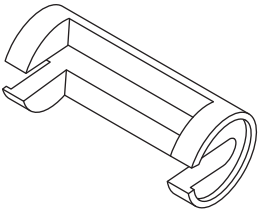
General Description

MECHANICAL

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|--|---|
|  <p style="text-align: center;">ST-498747300</p> | 498747300 | PISTON GUIDE | Used for installing piston to cylinder. |
|  <p style="text-align: center;">ST-498857100</p> | 498857100 | VALVE OIL SEAL GUIDE | Used for press-fitting of intake and exhaust valve guide oil seals. |
|  <p style="text-align: center;">ST-499017100</p> | 499017100 | PISTON PIN GUIDE | Used for installing piston pin, piston and connecting rod. |
|  <p style="text-align: center;">ST-499037100</p> | 499037100 | CONNECTING ROD BUSHING REMOVER AND INSTALLER | Used for removing and installing connecting rod bushing. |
|  <p style="text-align: center;">ST-499587100</p> | 499587100 | OIL SEAL INSTALLER | Used for installing oil pump oil seal. |

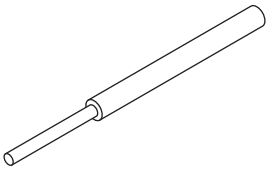
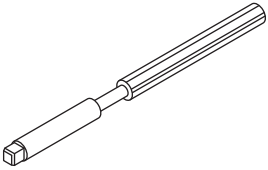
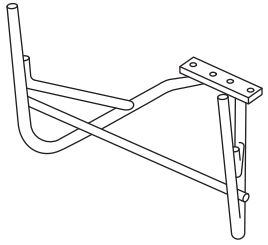
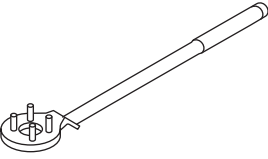
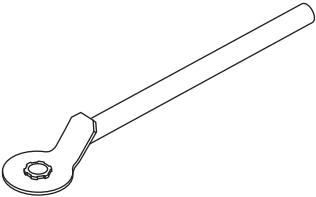
General Description

MECHANICAL

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|-------------------------------|---|
|  <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). |
|  <p>ST-499587600</p> | 499587600 | OIL SEAL INSTALLER | Used for installing the camshaft oil seal. |
|  <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-499597200</p> | 499597200 | OIL SEAL GUIDE | <ul style="list-style-type: none"> • Used for installing the camshaft oil seal. • Used together with OIL SEAL INSTALLER (499587600). |
|  <p>ST-499718000</p> | 499718000 | VALVE SPRING REMOVER | Used for removing and installing valve spring. |

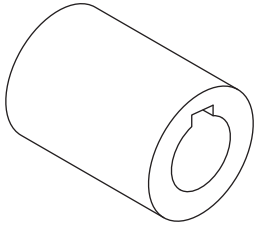
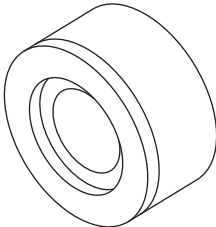
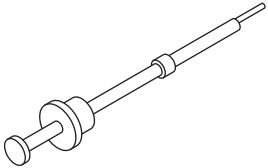
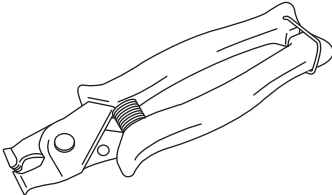
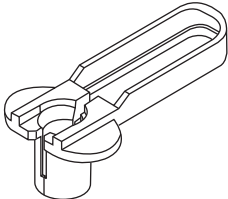
General Description

MECHANICAL

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|---------------------|---|
|  <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"> • Used for disassembling and assembling engine. • Used together with ENGINE STAND ADAPTER RH (498457000) & LH (498457100). |
|  <p style="text-align: center;">ST-499977100</p> | 499977100 | CRANK PULLEY WRENCH | Used for removing and installing the crank pulley. |
|  <p style="text-align: center;">ST-499977500</p> | 499977500 | CAM SPROCKET WRENCH | Used for removing and installing intake cam sprocket and exhaust cam sprocket. |

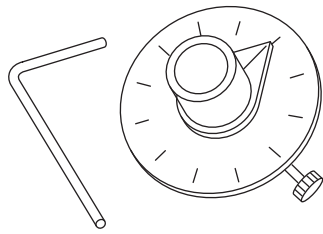
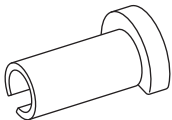
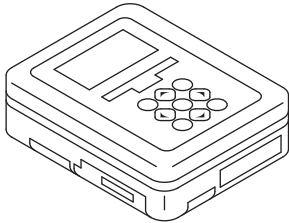
General Description

MECHANICAL

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|----------------------------|--|
|  <p>ST-499987500</p> | 499987500 | CRANKSHAFT SOCKET | Used for rotating crankshaft. |
|  <p>ST18251AA020</p> | 18251AA020 | VALVE GUIDE ADJUSTER | Used for installing intake and exhaust valve guides. |
|  <p>ST-499097700</p> | 499097700 | PISTON PIN REMOVER ASSY | Used for removing piston pin. |
|  <p>ST18353AA000</p> | 18353AA000 | CLAMP PLIERS | <ul style="list-style-type: none"> • Used for removing and installing the PCV hose. • This tool is made by the French company CAILLAU. (code) 54.0.000.205 To make it easier to obtain, it has been provided with a tool number. |
|  <p>ST18371AA000</p> | 18371AA000 | CONNECTOR REMOVER | Used for disconnecting the quick connector on the fuel return hose of the engine compartment (intake manifold). |

General Description

MECHANICAL

| ILLUSTRATION | TOOL NUMBER | DESCRIPTION | REMARKS |
|---|-------------|-------------------------------|---|
|  <p style="text-align: center;">ST18854AA000</p> | 18854AA000 | ANGLE GAUGE | Used for installing the crank pulley. |
|  <p style="text-align: center;">ST42099AE000</p> | 42099AE000 | QUICK CONNECTOR RELEASE | Used for disconnecting quick connector of the engine compartment. |
|  <p style="text-align: center;">ST1B022XU0</p> | 1B022XU0 | SUBARU SELECT MONITOR III KIT | Used for each inspection. |

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. |