

GENERAL DESCRIPTION

Mechanical

1. General Description S103001

A: SPECIFICATIONS S103001E49

Engine	Type		Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine
	Valve arrangement		Belt driven, single over-head camshaft, 4-valve/cylinder
	Bore x Stroke		mm (in) 99.5 x 79.0 (3.917 x 3.110)
	Displacement		cm ³ (cu in) 2,457 (150)
	Compression ratio		10.0
	Compression pressure (at 200 — 300 rpm)		kPa (kg/cm ² , psi) 1,079 — 1,275 (11.0 — 13.0, 156 — 185)
	Number of piston rings		Pressure ring: 2, Oil ring: 1
	Intake valve timing	Opening	1° BTDC
		Closing	51° ABDC
	Exhaust valve timing	Opening	50° BBDC
		Closing	6° ATDC
	Valve clearance	Intake	mm (in) 0.20±0.02 (0.0079±0.0008)
		Exhaust	mm (in) 0.25±0.02 (0.0098±0.0008)
	Idling speed [At neutral position on MT, or "P" or "N" position on AT]		rpm MT: 650±100 (No load) AT: 700±100 (No load) 850±100 (A/C switch ON)
Firing order		1 → 3 → 2 → 4	
Ignition timing		BTDC/rpm MT: 10°±8°/650 AT: 15°±8°/700	

NOTE:

STD: Standard I.D.: Inner Diameter O.D.: Outer Diameter US: Undersize OS: Oversize

Belt tensioner adjuster	Protrusion of adjuster rod		5.2 — 6.2 mm (0.205 — 0.244 in)	
Belt tensioner	Spacer O.D.		17.955 — 17.975 mm (0.7069 — 0.7077 in)	
	Tensioner bush I.D.		18.00 — 18.08 mm (0.7087 — 0.7118 in)	
	Clearance between spacer and bush	STD	0.025 — 0.125 mm (0.0010 — 0.0049 in)	
		Limit	0.175 mm (0.0069 in)	
Side clearance of spacer	STD	0.20 — 0.55 mm (0.0079 — 0.0217 in)		
	Limit	0.81 mm (0.0319 in)		
Valve rocker arm	Clearance between shaft and arm		STD 0.020 — 0.054 mm (0.0008 — 0.0021 in)	
	Limit		0.10 mm (0.0039 in)	
Camshaft	Bend limit		0.020 mm (0.0008 in)	
	Thrust clearance	STD	0.030 — 0.090 mm (0.0012 — 0.0035 in)	
		Limit	0.11 mm (0.0043 in)	
	Cam lobe height	Intake	STD	39.485 — 39.585 mm (1.5545 — 1.5585 in)
			Limit	39.385 mm (1.5506 in)
		Exhaust	STD	39.257 — 39.357 mm (1.5455 — 1.5495 in)
			Limit	39.157 mm (1.5416 in)
	Camshaft journal O.D.		31.928 — 31.945 mm (1.2570 — 1.2577 in)	
Camshaft journal hole I.D.		32.000 — 32.018 mm (1.2598 — 1.2605 in)		
Oil clearance	STD	0.055 — 0.090 mm (0.0022 — 0.0035 in)		
	Limit	0.10 mm (0.0039 in)		

ME(H4)-2

GENERAL DESCRIPTION

Mechanical

Cylinder head	Surface warpage limit			0.05 mm (0.0020 in)	
	Surface grinding limit			0.1 mm (0.004 in)	
	Standard height			98.3 mm (3.870 in)	
Valve set	Refacing angle			90°	
	Contacting width	Intake	STD	1.0 mm (0.039 in)	
			Limit	1.7 mm (0.067 in)	
		Exhaust	STD	1.4 mm (0.055 in)	
			Limit	2.1 mm (0.083 in)	
Valve guide	Inner diameter		6.000 — 6.012 mm (0.2362 — 0.2367 in)		
	Protrusion above head	Intake	20.0 — 20.5 mm (0.787 — 0.807 in)		
		Exhaust	16.5 — 17.0 mm (0.650 — 0.669 in)		
Valve	Head edge thickness	Intake	STD	1.0 mm (0.039 in)	
			Limit	0.6 mm (0.024 in)	
		Exhaust	STD	1.2 mm (0.047 in)	
			Limit	0.6 mm (0.024 in)	
	Stem diameter		Intake	5.950 — 5.965 mm (0.2343 — 0.2348 in)	
			Exhaust	5.945 — 5.960 mm (0.2341 — 0.2346 in)	
	Stem oil clearance		STD	Intake	0.035 — 0.062 mm (0.0014 — 0.0024 in)
				Exhaust	0.040 — 0.067 mm (0.0016 — 0.0026 in)
			Limit	—	0.15 mm (0.0059 in)
Overall length		Intake	120.6 mm (4.75 in)		
		Exhaust	121.7 mm (4.79 in)		
Valve spring	Free length			54.30 mm (2.1378 in)	
	Squareness			2.5°, 2.4 mm (0.094 in)	
	Tension/spring height			214.8 — 246.2 N (21.9 — 25.1 kg, 48.3 — 55.3 lb)/ 45.0 mm (1.772 in) 526.6 — 581.6 N (53.7 — 59.3 kg, 118.4 — 130.8 lb)/34.7 mm (1.366 in)	
Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm (0.0020 in)	
	Surface grinding limit			0.1 mm (0.004 in)	
	Cylinder bore	STD	A	99.505 — 99.515 mm (3.9175 — 3.9179 in)	
			B	99.495 — 99.505 mm (3.9171 — 3.9175 in)	
	Taper		STD	0.015 mm (0.0006 in)	
			Limit	0.050 mm (0.0020 in)	
	Out-of-roundness		STD	0.010 mm (0.0004 in)	
			Limit	0.050 mm (0.0020 in)	
	Piston clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)	
Limit			0.050 mm (0.0020 in)		
Enlarging (boring) limit			0.5 mm (0.020 in)		
Piston	Outer diameter	STD	A	99.485 — 99.495 mm (3.9167 — 3.9171 in)	
			B	99.475 — 99.485 mm (3.9163 — 3.9167 in)	
		0.25 mm (0.0098 in) OS		99.725 — 99.735 mm (3.9262 — 3.9266 in)	
		0.50 mm (0.0197 in) OS		99.975 — 99.985 mm (3.9360 — 3.9364 in)	
Standard inner diameter of piston pin hole			23.000 — 23.006 mm (0.9055 — 0.9057 in)		
Piston pin	Outer diameter			22.994 — 23.000 mm (0.9053 — 0.9055 in)	
	Standard clearance between piston pin and hole in piston			0.004 — 0.008 mm (0.0002 — 0.0003 in)	
	Degree of fit			Piston pin must be fitted into position with thumb at 20°C (68°F).	

ME(H4)-3

GENERAL DESCRIPTION

Mechanical

Piston ring	Piston ring gap	Top ring	STD	0.20 — 0.35 mm (0.0079 — 0.0138 in)
			Limit	1.0 mm (0.039 in)
		Second ring	STD	0.35 — 0.50 mm (0.0138 — 0.0197 in)
			Limit	1.0 mm (0.039 in)
	Clearance between piston ring and piston ring groove	Oil ring	STD	0.20 — 0.70 mm (0.0079 — 0.0276 in)
			Limit	1.5 mm (0.059 in)
		Top ring	STD	0.040 — 0.080 mm (0.0016 — 0.0031 in)
			Limit	0.15 mm (0.0059 in)
Second ring	STD	0.030 — 0.070 mm (0.0012 — 0.0028 in)		
	Limit	0.15 mm (0.0059 in)		
Connecting rod	Bend twist per 100 mm (3.94 in) in length	Limit	0.10 mm (0.0039 in)	
	Side clearance	STD	0.070 — 0.330 mm (0.0028 — 0.0130 in)	
Limit		0.4 mm (0.016 in)		
	Connecting rod bearing	Oil clearance	STD	0.020 — 0.046 mm (0.0008 — 0.0018 in)
Limit			0.05 mm (0.0020 in)	
Thickness at center portion		STD	1.486 — 1.498 mm (0.0585 — 0.0590 in)	
		0.03 mm (0.0012 in) US	1.504 — 1.512 mm (0.0592 — 0.0595 in)	
		0.05 mm (0.0020 in) US	1.514 — 1.522 mm (0.0596 — 0.0599 in)	
		0.25 mm (0.0098 in) US	1.614 — 1.622 mm (0.0635 — 0.0639 in)	
Connecting rod bushing	Clearance between piston pin and bushing	STD	0 — 0.022 mm (0 — 0.0009 in)	
		Limit	0.030 mm (0.0012 in)	
Crankshaft	Bend limit		0.035 mm (0.0014 in)	
	Crank pin and crank journal	Out-of-roundness	0.020 mm (0.0008 in) or less	
		Grinding limit	0.250 mm (0.0098 in)	
	Crank pin outer diameter	STD	51.984 — 52.000 mm (2.0466 — 2.0472 in)	
		0.03 mm (0.0012 in) US	51.954 — 51.970 mm (2.0454 — 2.0461 in)	
		0.05 mm (0.0020 in) US	51.934 — 51.950 mm (2.0446 — 2.0453 in)	
		0.25 mm (0.0098 in) US	51.734 — 51.750 mm (2.0368 — 2.0374 in)	
	Crank journal outer diameter	#1, #5, #3	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
		#2, #4	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
	Thrust clearance	STD	0.030 — 0.115 mm (0.0012 — 0.0045 in)	
		Limit	0.25 mm (0.0098 in)	
	Oil clearance	STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)	
		Limit	0.040 mm (0.0016 in)	

ME(H4)-4

GENERAL DESCRIPTION

Mechanical

Crankshaft bearing	Crankshaft bearing thickness	#1, #5	STD	1.998 — 2.011 mm (0.0787 — 0.0792 in)
			0.03 mm (0.0012 in) US	2.017 — 2.020 mm (0.0794 — 0.0795 in)
			0.05 mm (0.0020 in) US	2.027 — 2.030 mm (0.0798 — 0.0799 in)
			0.25 mm (0.0098 in) US	2.127 — 2.130 mm (0.0837 — 0.0839 in)
		#2, #3, #4	STD	2.000 — 2.013 mm (0.0787 — 0.0793 in)
			0.03 mm (0.0012 in) US	2.019 — 2.022 mm (0.0795 — 0.0796 in)
			0.05 mm (0.0020 in) US	2.029 — 2.032 mm (0.0799 — 0.0800 in)
			0.25 mm (0.0098 in) US	2.129 — 2.132 mm (0.0838 — 0.0839 in)

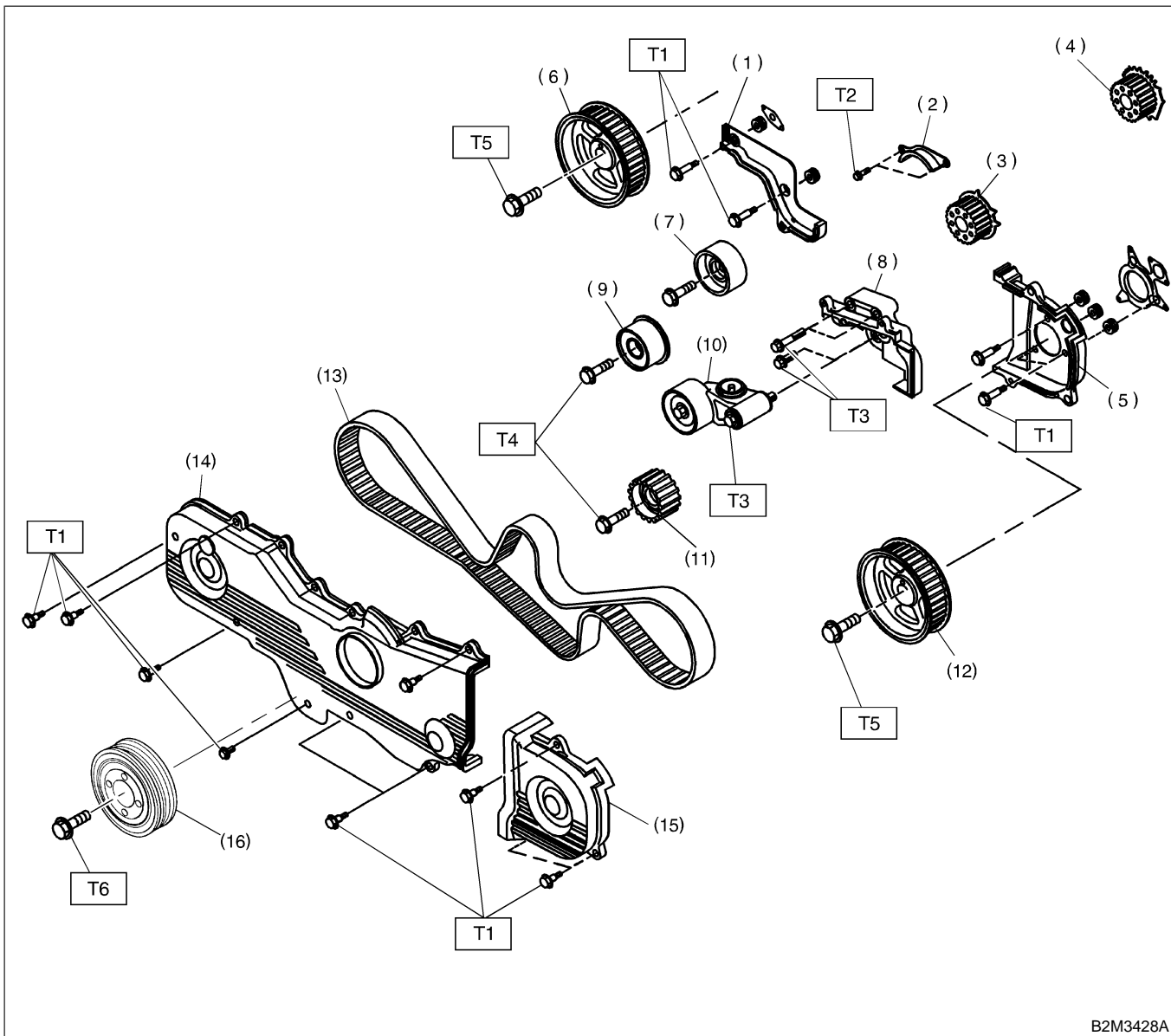
ME(H4)-5

GENERAL DESCRIPTION

Mechanical

B: COMPONENT S103001A05

1. TIMINGBELT S103001A0501



B2M3428A

- | | |
|--|---|
| (1) Belt cover No. 2 (RH) | (8) Tensioner bracket |
| (2) Timing belt guide (MT vehicles only) | (9) Belt idler (No. 2) |
| (3) Crankshaft sprocket (AT vehicles) | (10) Automatic belt tension adjuster ASSY |
| (4) Crankshaft sprocket (MT vehicles) | (11) Belt idler No. 2 |
| (5) Belt cover No. 2 (LH) | (12) Camshaft sprocket No. 2 |
| (6) Camshaft sprocket No. 1 | (13) Timing belt |
| (7) Belt idler (No. 1) | (14) Front belt cover |
| | (15) Belt cover (LH) |
| | (16) Crankshaft pulley |

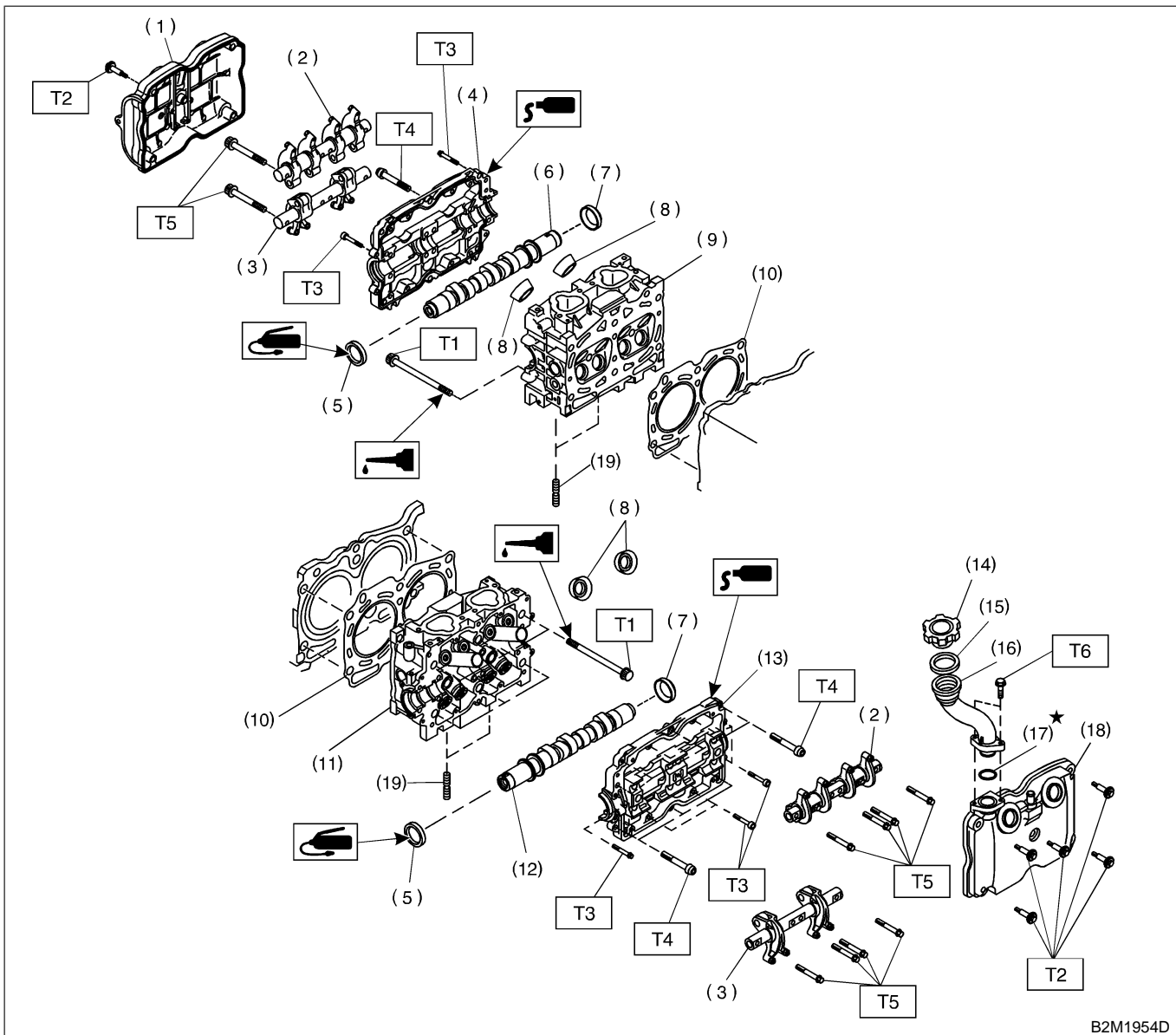
Tightening torque: N-m (kgf-m, ft-lb)

- | |
|------------------------------|
| T1: 5 (0.5, 3.6) |
| T2: 9.8 (1.0, 7.2) |
| T3: 25 (2.5, 18.1) |
| T4: 39 (4.0, 28.9) |
| T5: 78 (8.0, 57.9) |
| T6: 177 (18.0, 130.2) |

ME(H4)-6

2. CYLINDER HEAD AND CAMSHAFT

S103001A0502



B2M1954D

- | | |
|-------------------------------|-------------------------|
| (1) Rocker cover (RH) | (11) Cylinder head (LH) |
| (2) Intake valve rocker ASSY | (12) Camshaft (LH) |
| (3) Exhaust valve rocker ASSY | (13) Camshaft cap (LH) |
| (4) Camshaft cap (RH) | (14) Oil filler cap |
| (5) Oil seal | (15) Gasket |
| (6) Camshaft (RH) | (16) Oil filler pipe |
| (7) Plug | (17) O-ring |
| (8) Spark plug pipe gasket | (18) Rocker cover (LH) |
| (9) Cylinder head (RH) | (19) Stud bolt |
| (10) Cylinder head gasket | |

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

T1: <Ref. to ME(H4)-59 CYLINDER HEAD, INSTALLATION, Cylinder Head Assembly.>

T2: 5 (0.5, 3.6)

T3: 10 (1.0, 7.2)

T4: 18 (1.8, 13.0)

T5: 25 (2.5, 18.1)

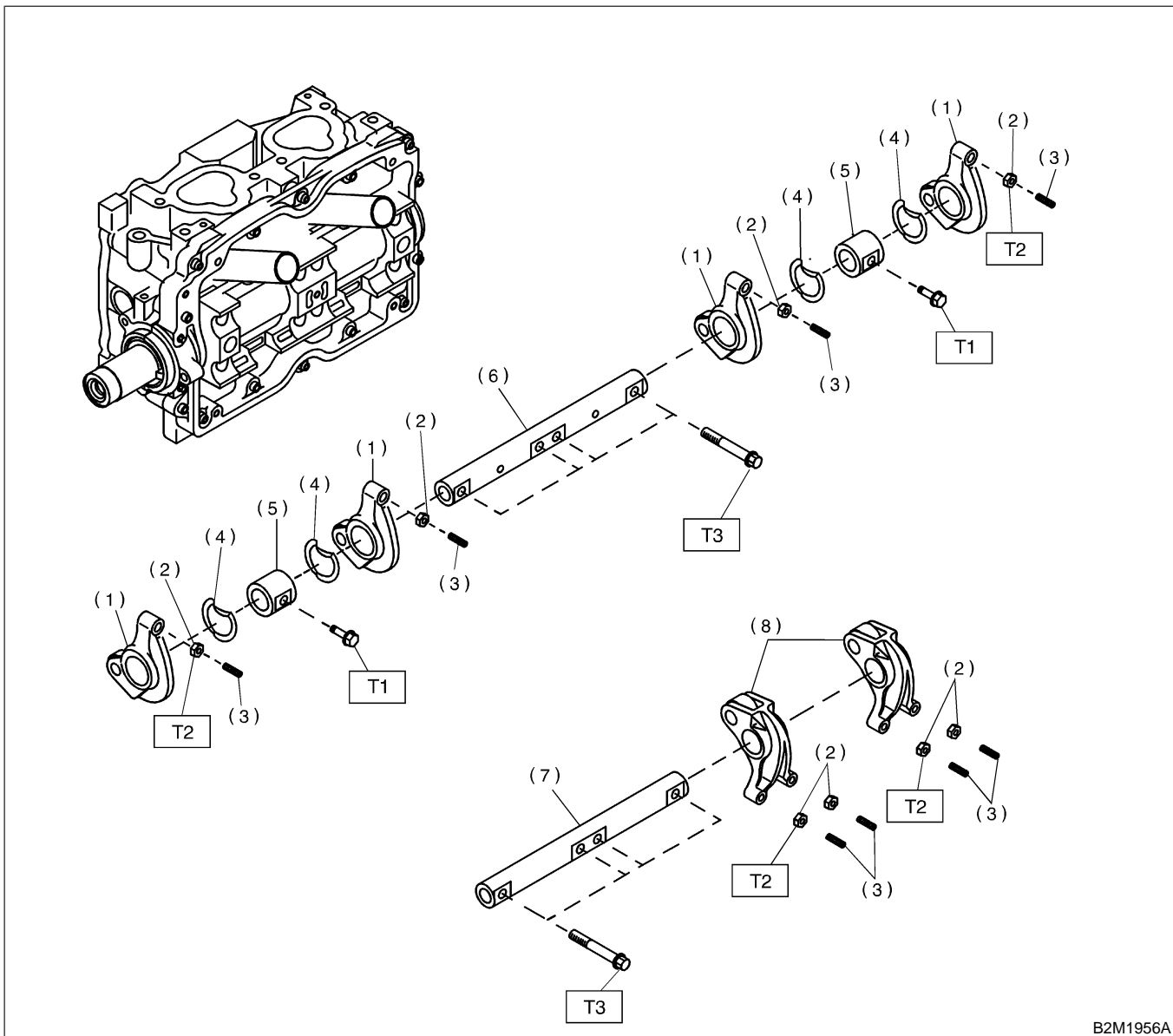
T6: 6.4 (0.65, 4.7)

ME(H4)-7

GENERAL DESCRIPTION

Mechanical

3. VALVE ROCKER ASSEMBLY S103001A0503



B2M1956A

- | | |
|-------------------------------|------------------------------|
| (1) Intake valve rocker arm | (6) Intake rocker shaft |
| (2) Valve rocker nut | (7) Exhaust rocker shaft |
| (3) Valve rocker adjust screw | (8) Exhaust valve rocker arm |
| (4) Spring | |
| (5) Rocker shaft support | |

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

T1: 5 (0.5, 3.6)

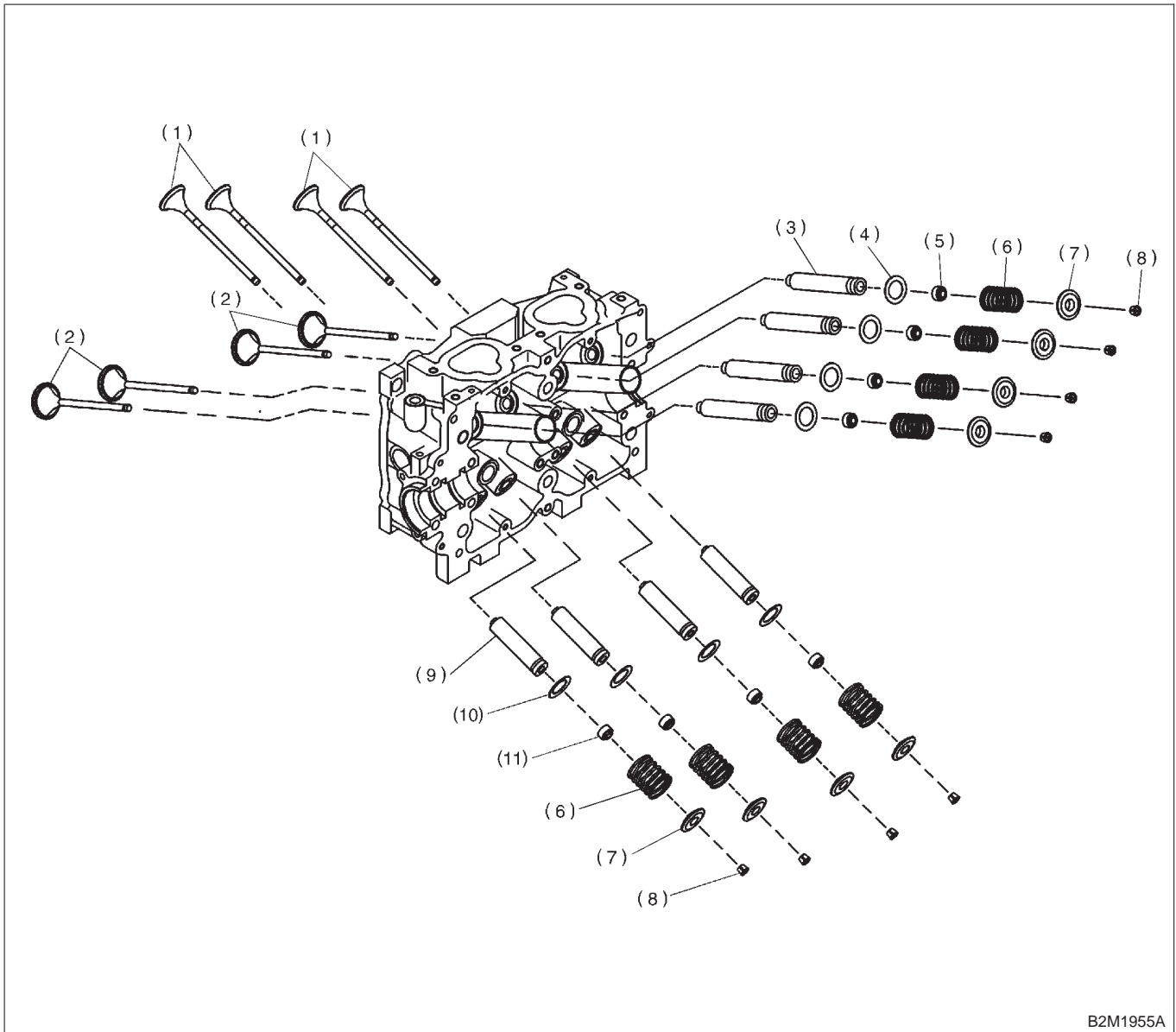
T2: 10 (1.0, 7.2)

T3: 25 (2.5, 18.1)

ME(H4)-8

4. CYLINDER HEAD AND VALVE ASSEMBLY

S103001A0504



B2M1955A

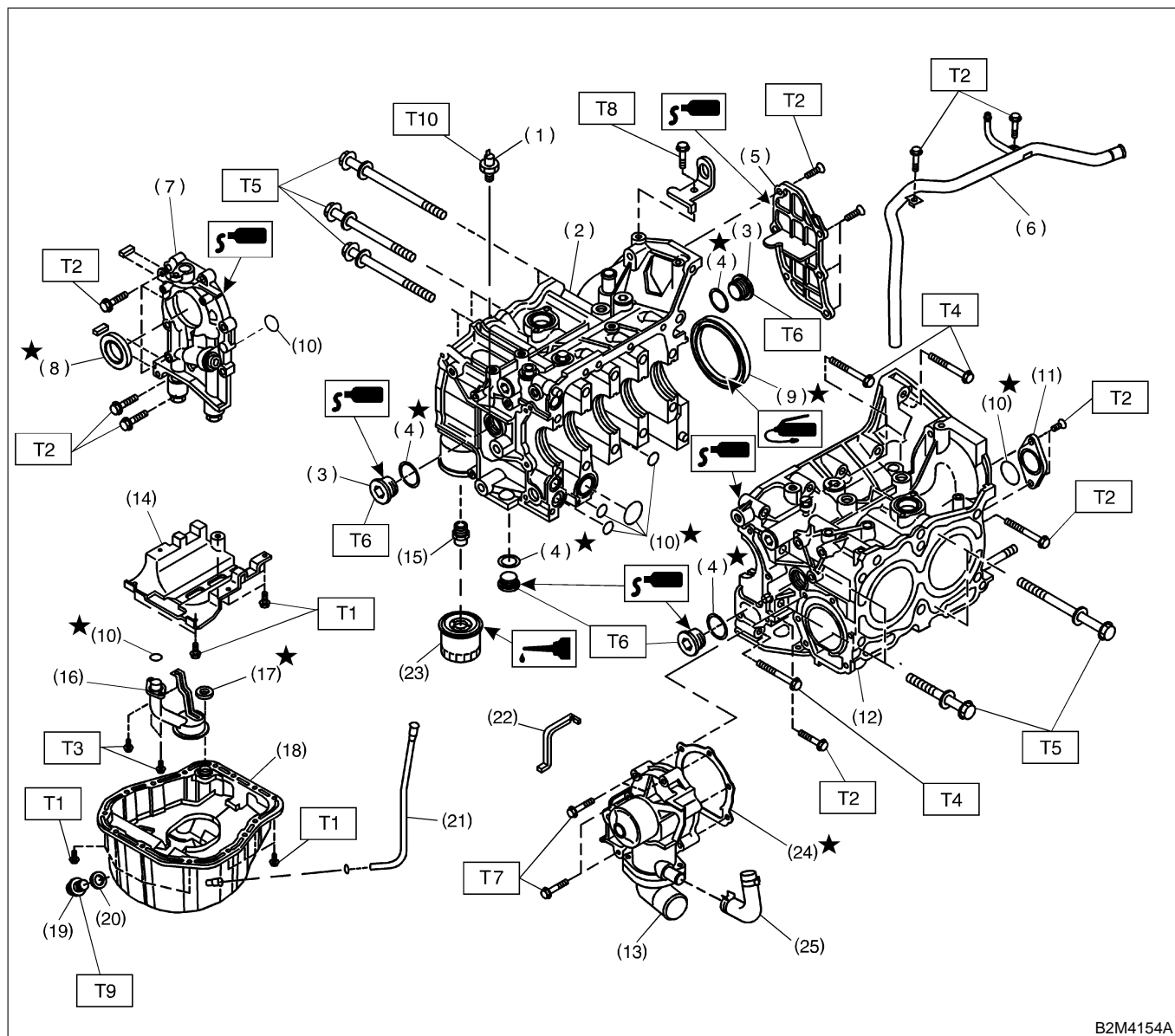
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|------------------------------|---------------------------|--------------------------------|
| (1) Exhaust valve | (5) Intake valve oil seal | (9) Exhaust valve guide |
| (2) Intake valve | (6) Valve spring | (10) Exhaust valve spring seat |
| (3)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

ME(H4)-9

GENERAL DESCRIPTION

Mechanical

5. CYLINDER BLOCK S103001A0505



B2M4154A

- (1) Oil pressure switch
- (2) Cylinder block (RH)
- (3) Service hole plug
- (4) Gasket
- (5) Oil separator cover
- (6) Water by-pass pipe
- (7) Oil pump
- (8) Front oil seal
- (9) Rear oil seal
- (10) O-ring
- (11) Service hole cover
- (12) Cylinder block (LH)
- (13) Water pump

- (14) Baffle plate
- (15) Oil filter connector
- (16) Oil strainer
- (17) Gasket
- (18) Oil pan
- (19) Drain plug
- (20) Metal gasket
- (21) Oil level gauge guide
- (22) Water pump sealing
- (23) Oil filter
- (24) Gasket
- (25) Water pump hose

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

T1: 5 (0.5, 3.6)

T2: 6.4 (0.65, 4.7)

T3: 10 (1.0, 7)

T4: 25 (2.5, 18.1)

T5: 47 (4.8, 34.7)

T6: 69 (7.0, 50.6)

**T7: First 12 (1.2, 8.7)
Second 12 (1.2, 8.7)**

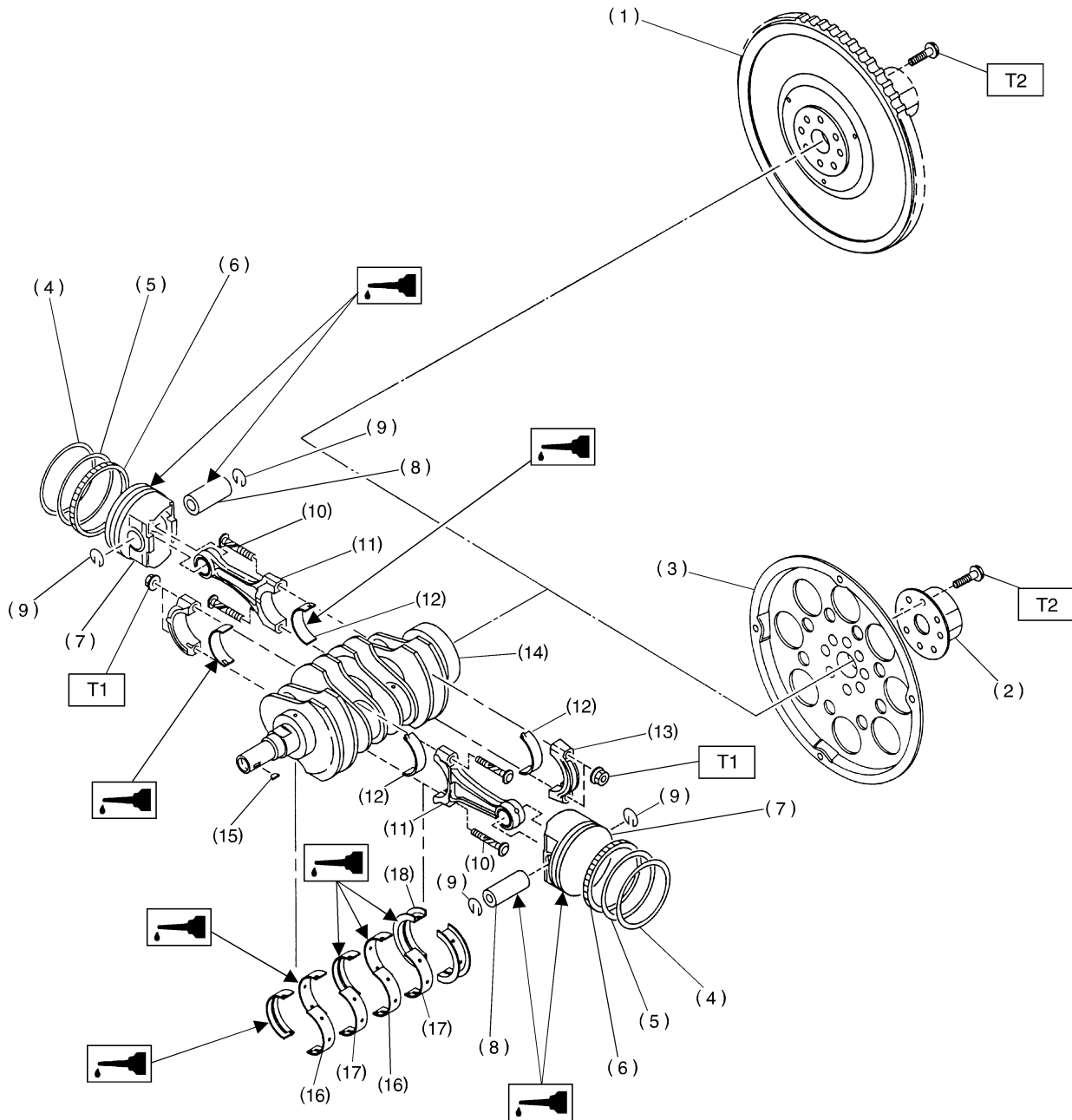
T8: 16 (1.6, 11.6)

T9: 44 (4.5, 33)

T10: 25 (2.5, 18.1)

ME(H4)-10

6. CRANKSHAFT AND PISTON S103001A0506



B2M3429A

ME(H4)-11

GENERAL DESCRIPTION

Mechanical

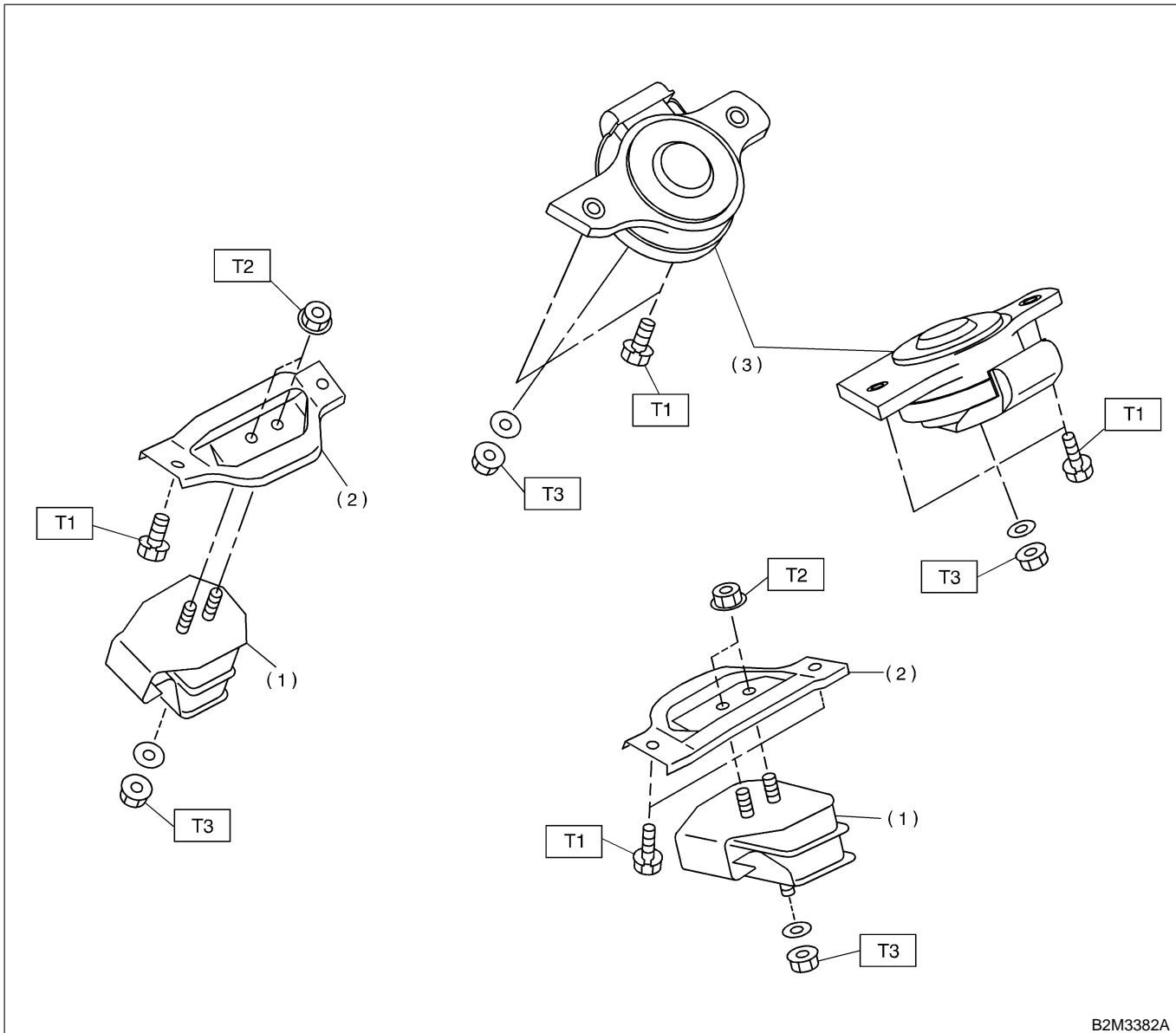
- | | | |
|------------------------|--------------------------------|--------------------------------|
| (1) Flywheel (MT) | (9) Circlip | (17) Crankshaft bearing #2, #4 |
| (2) Reinforcement (AT) | (10) Connecting rod bolt | (18) Crankshaft bearing #5 |
| (3) Drive plate (AT) | (11) Connecting rod |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

Tightening torque: N·m (kgf·m, ft·lb)

T1: 44.6 (4.55, 32.9)

T2: 72 (7.3, 52.8)

7. ENGINE MOUNTING S103001A0507



B2M3382A

- (1) Front cushion rubber (BRIGHTON and L AT vehicles)
- (2) Front engine mounting bracket (BRIGHTON and L AT vehicles)
- (3) Front cushion rubber (Except BRIGHTON and L AT vehicles)

Tightening torque: N·m (kgf·m, ft·lb)

T1: 34 (3.5, 25.3)

T2: 41 (4.2, 30)

T3: 74 (7.5, 54)

C: CAUTION S103001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary

removal, installation, disassembly, and replacement.

- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

ME(H4)-13

GENERAL DESCRIPTION

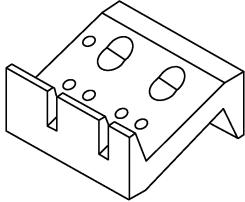
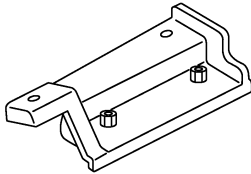
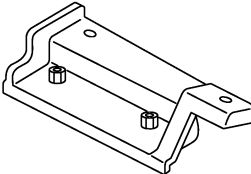
Mechanical

- All parts should be thoroughly cleaned, paying special attention to the 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 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 ones as required.
- Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.

- Remove or install 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 stain seats and windows with coolant or oil. Place a cover over fenders, 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.

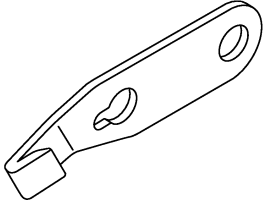
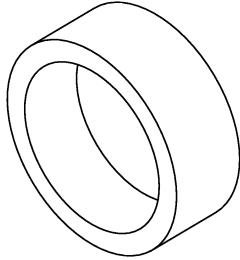
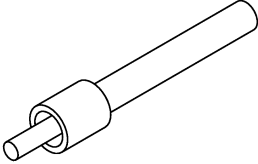
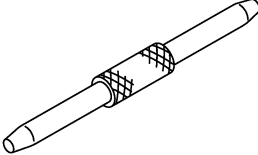
D: PREPARATION TOOL S103001A17

1. SPECIAL TOOLS S103001A1701

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B2M3850</p>	498267800	CYLINDER HEAD TABLE	<ul style="list-style-type: none"> ● Used for replacing valve guides. ● Used for removing and installing valve springs.
 <p style="text-align: center;">B2M3851</p>	498457000	ENGINE STAND ADAPTER RH	Used with ENGINE STAND (499817000).
 <p style="text-align: center;">B2M3852</p>	498457100	ENGINE STAND ADAPTER LH	Used with ENGINE STAND (499817000).

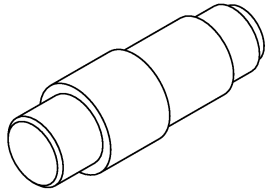
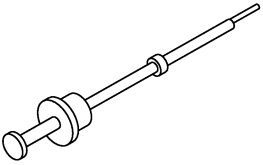
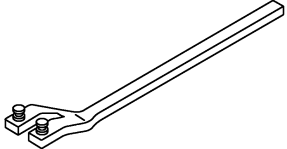
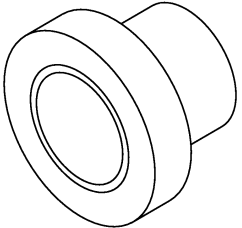
GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="402 527 483 548">B2M3853</p>	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening and tightening crankshaft pulley bolt, etc.
 <p data-bbox="402 898 483 919">B2M3854</p>	498747300	PISTON GUIDE	Used for installing piston in cylinder.
 <p data-bbox="402 1270 483 1291">B2M3855</p>	498857100	VALVE OIL SEAL GUIDE	Used for press-fitting of intake and exhaust valve guide oil seals.
 <p data-bbox="402 1646 483 1667">B2M3856</p>	499017100	PISTON PIN GUIDE	Used for installing piston pin, piston and connecting rod.

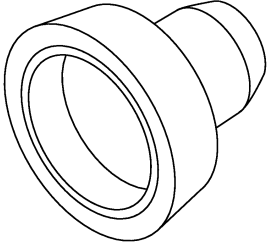
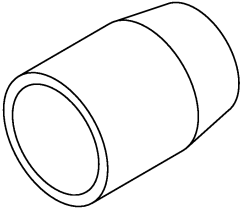
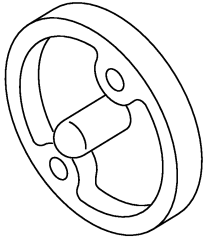
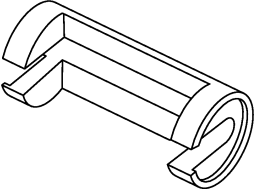
GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B2M3857</p>	499037100	CONNECTING ROD BUSHING REMOVER & INSTALLER	Used for removing and installing connecting rod bushing.
 <p style="text-align: center;">B2M3858</p>	499097700	PISTON PIN REMOVER ASSY	Used for removing piston pin.
 <p style="text-align: center;">B2M3859</p>	499207100	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket.
 <p style="text-align: center;">B2M3860</p>	499587700	CAMSHAFT OIL SEAL INSTALLER	Used for installing cylinder head plug.

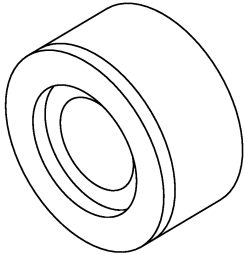
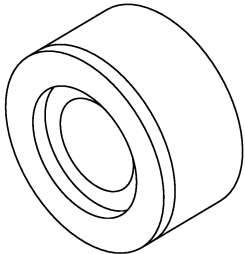
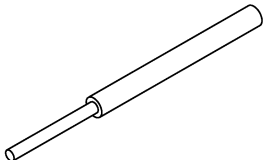
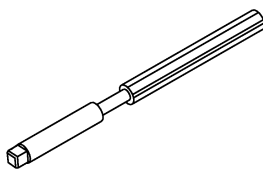
GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>B2M3861</p>	499587200	CRANKSHAFT OIL SEAL INSTALLER	<ul style="list-style-type: none"> ● Used for installing crankshaft oil seal. ● Used with CRANKSHAFT OIL SEAL GUIDE (499597100).
 <p>B2M3862</p>	499597000	OIL SEAL GUIDE	<ul style="list-style-type: none"> ● Used for installing camshaft oil seal. ● Used with CAMSHAFT OIL SEAL INSTALLER (499587100).
 <p>B2M3863</p>	499597100	CRANKSHAFT OIL SEAL GUIDE	<ul style="list-style-type: none"> ● Used for installing crankshaft oil seal. ● Used with CRANKSHAFT OIL SEAL INSTALLER (499587200).
 <p>B2M3864</p>	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.

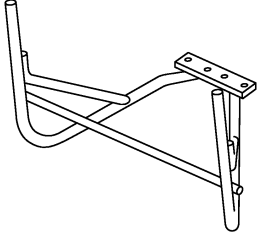
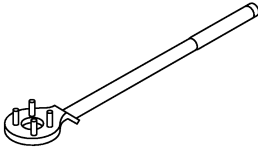
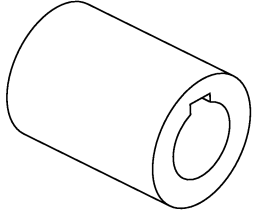
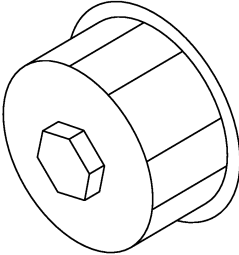
GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B2M3865</p>	499767700	VALVE GUIDE ADJUSTER	Used for installing intake valve guides.
 <p style="text-align: center;">B2M3865</p>	499767800	VALVE GUIDE ADJUSTER	Used for installing exhaust valve guide.
 <p style="text-align: center;">B2M3867</p>	499767200	VALVE GUIDE REMOVER	Used for removing valve guides.
 <p style="text-align: center;">B2M3868</p>	499767400	VALVE GUIDE REAMER	Used for reaming valve guides.

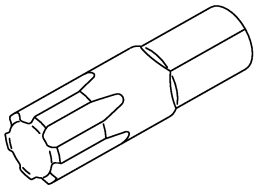
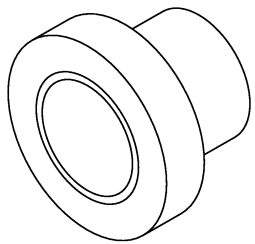
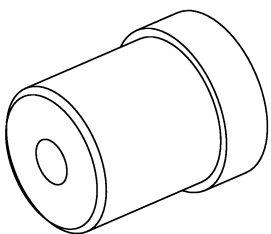
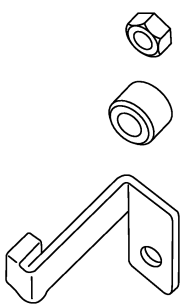
GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p data-bbox="402 527 483 548">B2M3869</p>	499817100	ENGINE STAND	<ul style="list-style-type: none"> ● Stand used for engine disassembly and assembly. ● Used with ENGINE STAND ADAPTER RH (498457000) & LH (498457100).
 <p data-bbox="402 900 483 921">B2M3870</p>	499977100	CRANK PULLEY WRENCH	Used for stopping rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts.
 <p data-bbox="402 1274 483 1295">B2M3871</p>	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 <p data-bbox="402 1648 483 1669">B2M3872</p>	498547000	OIL FILTER WRENCH	Used for removing and installing oil filter.

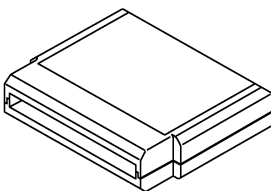

GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">B2M3873</p>	499497000	TORX PLUS	Used for removing and installing camshaft cap.
 <p style="text-align: center;">B2M3874</p>	499587500	OIL SEAL INSTALLER	Used for installing front camshaft oil seal.
 <p style="text-align: center;">B2M3875</p>	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.
 <p style="text-align: center;">B3M2043</p>	498277200	STOPPER SET	Used for installing automatic transmission assembly to engine.

GENERAL DESCRIPTION

Mechanical

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>B2M3876</p>	24082AA150	CARTRIDGE	Troubleshooting for electrical systems.
 <p>B2M3877</p>	22771AA030	SELECT MONI-TOR KIT	Troubleshooting for electrical systems. <ul style="list-style-type: none"> • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL PURPOSE TOOLS S103001A1702

TOOL NAME	REMARKS
Compression gauge	Used for measuring compression.
Tachometer (Secondary pick-up type)	Used for measuring idle speed.
Timing light	Used for measuring ignition timing.

E: PROCEDURE S103001E45

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

- Timing Belt
- Valve Rocker Assembly
- Camshaft
- Cylinder Head