YAMAHA 2004

XT660R(S)
XT660X(S)

5VK1-AE1

SERVICE MANUAL

EAS00010

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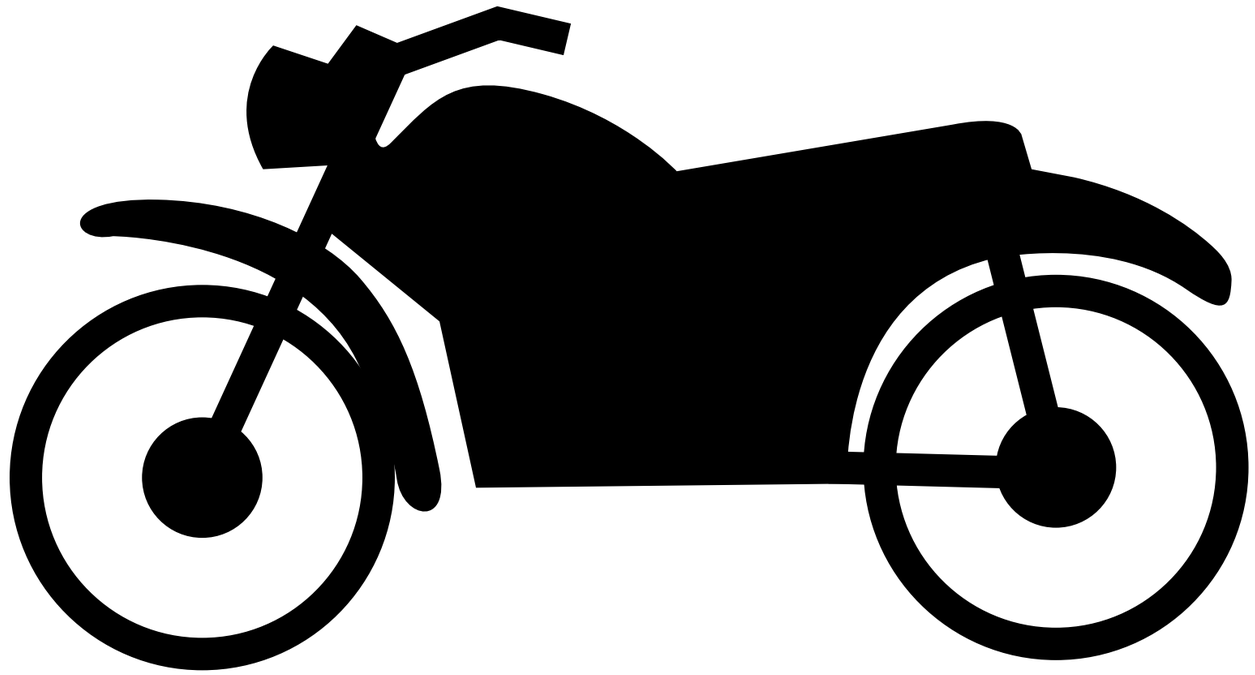
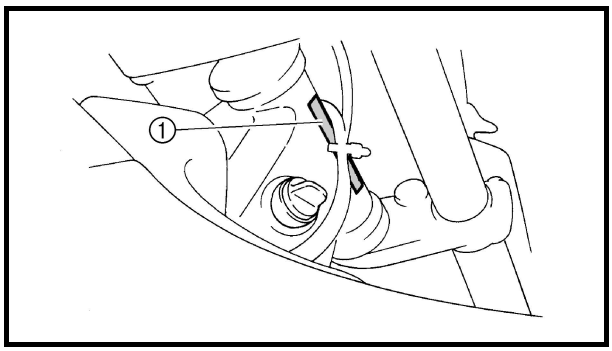
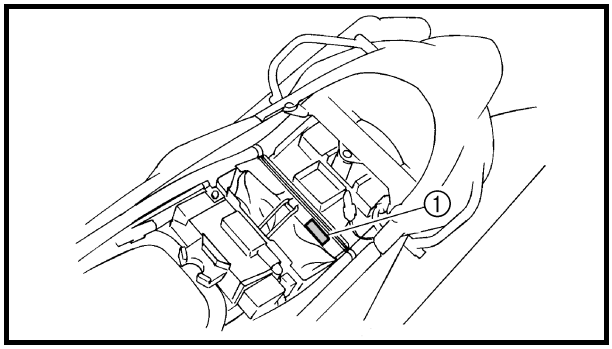


GEN INFO

1

CHAPTER 1
GENERAL INFORMATION





EAS00014

GENERAL INFORMATION

MOTORCYCLE IDENTIFICATION

EAS00017

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the right side of the steering head pipe.

EAS00018

MODEL LABEL

The model label ① is affixed to the frame. This information will be needed to order spare parts.

EAS00019
FEATURES

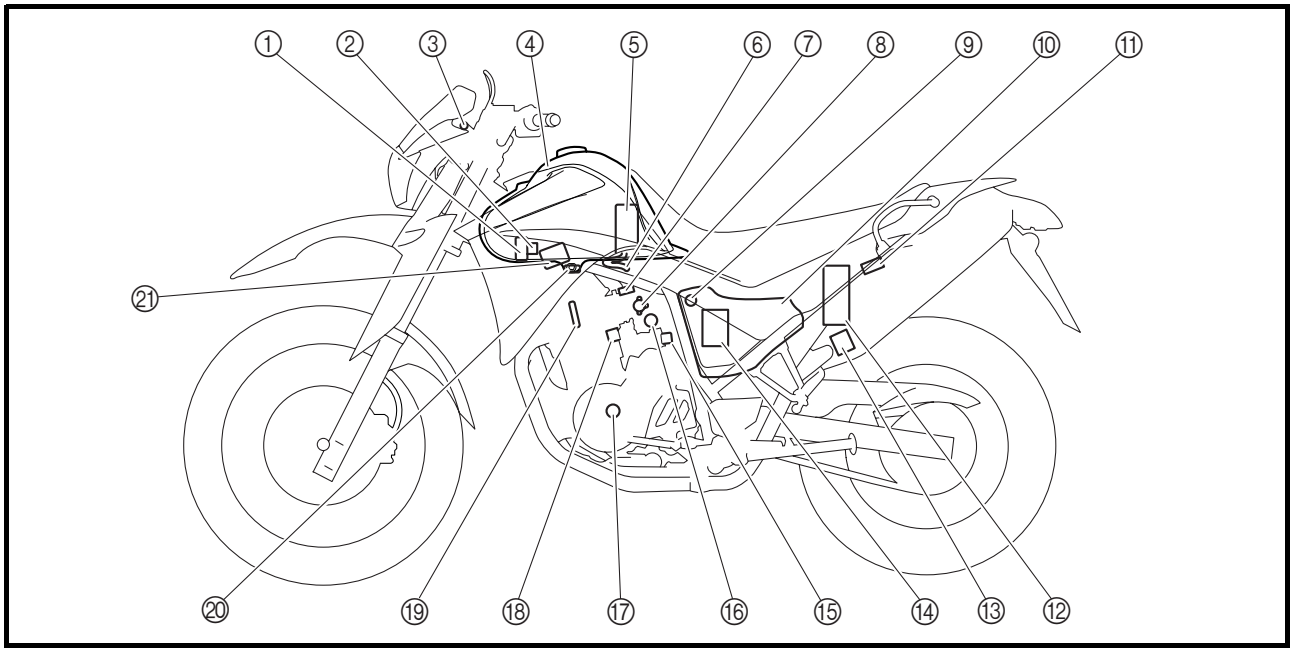
EAS00896
OUTLINE

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In a conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective chamber.

Despite the same volume of intake air, the fuel volume requirement varies with the engine operating conditions, such as acceleration, deceleration, or operation under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for engines to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system in place of a conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

Adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions. Furthermore, the air induction system (AI system) has been placed under computer control together with the FI system in order to realize cleaner exhaust gases.



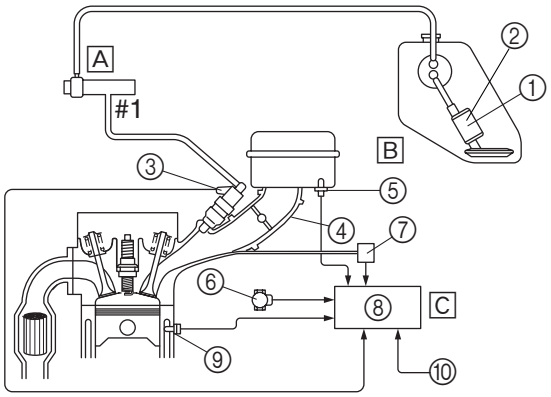
① Air cut-off valve
② Air induction system solenoid
③ Engine trouble warning light
④ Fuel tank
⑤ Fuel pump
⑥ Fuel hose
⑦ Fuel injector
⑧ Throttle position sensor
⑨ Intake air temperature sensor
⑩ Air filter case
⑪ Fuel injection system relay
⑫ Battery
⑬ Catalytic converter
⑭ ECU
⑮ Lean angle cut-off switch
⑯ Fast idle unit
⑰ Crankshaft position sensor
⑱ Coolant temperature sensor
⑲ Spark plug
⑳ Intake air pressure sensor
㉑ Ignition coil

EAS00897
FI SYSTEM

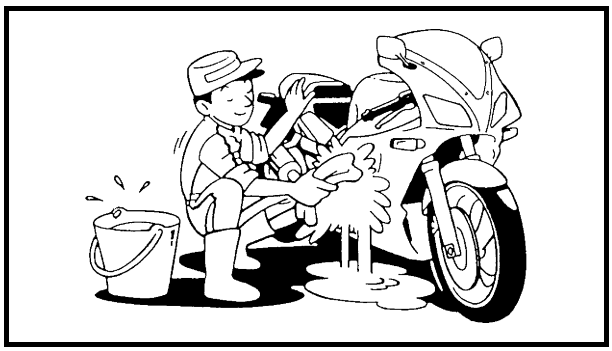
The fuel pump delivers fuel to the injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the injector at 324 kPa (3.24 kg/cm^2, 46.1 psi) higher than the intake manifold pressure. Accordingly, when the energizing signal from the ECU energizes the injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the injector is energized (injection duration), the lesser the volume of fuel that is supplied.

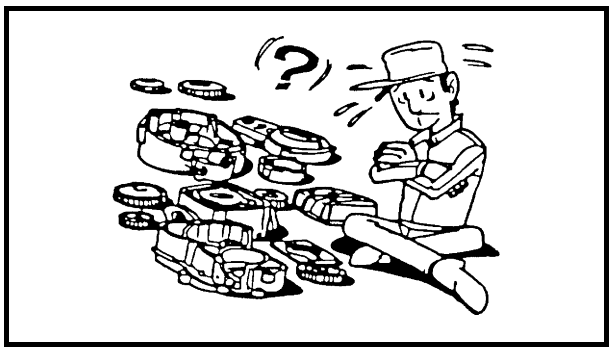
The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, and coolant temperature sensor enable the ECU to determine the injection duration. The injection timing is determined through the signal from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.

Illustration is for reference only.



① Fuel pump
② Pressure regulator
③ Fuel injector
④ Throttle body
⑤ Intake air temperature sensor
⑥ Throttle position sensor
⑦ Intake air pressure sensor
⑧ ECU
⑨ Coolant temperature sensor
⑩ Crankshaft position sensor
A Fuel system
B Air system
C Control system



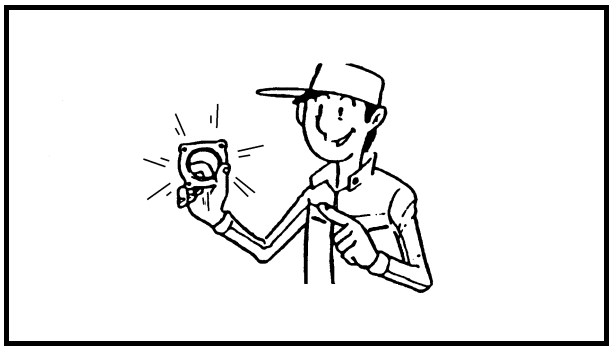


EAS00020

IMPORTANT INFORMATION

PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.
2. Use only the proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS”.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been “mated” through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.



EAS00021

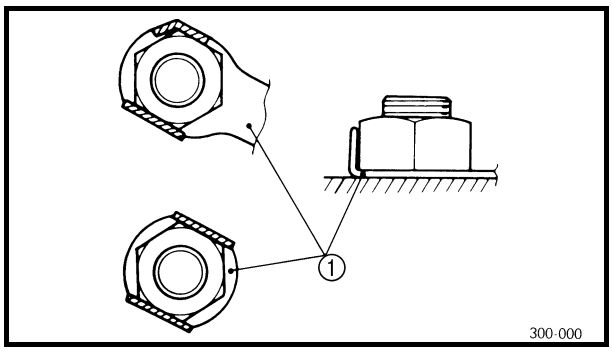
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

EAS00022

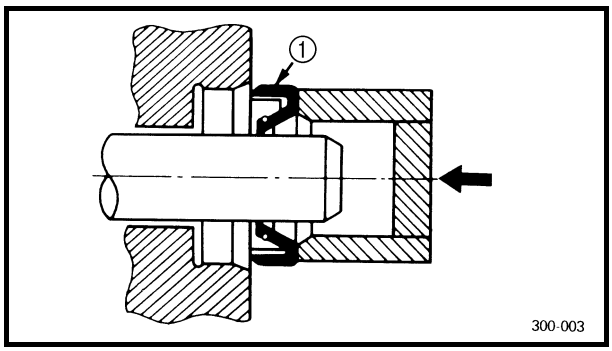
GASKETS, OIL SEALS AND O-RINGS

1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



EAS00023
LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates ① and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



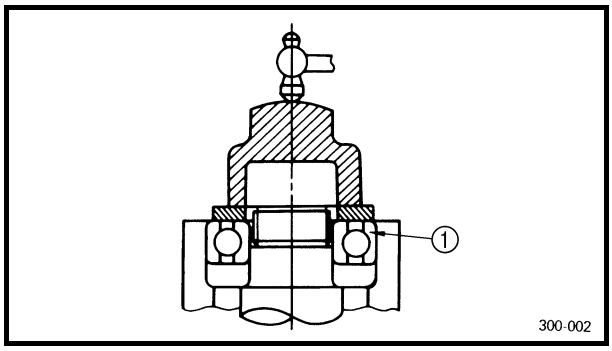
EAS00024
BEARINGS AND OIL SEALS

Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

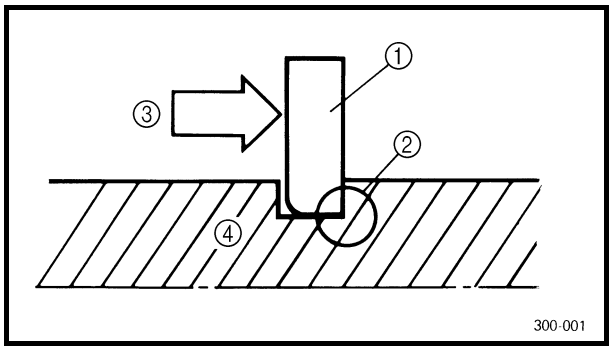
① Oil seal

CAUTION:

Do not spin the bearing with compressed air because this will damage the bearing surfaces.



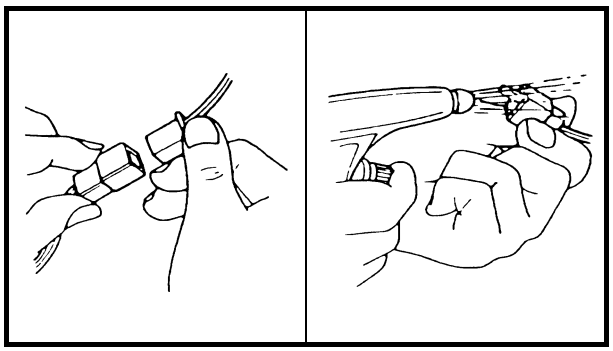
① Bearing

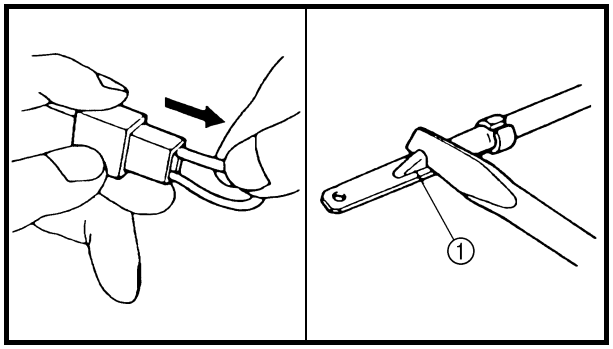


EAS00025
CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip ①, make sure the sharp-edged corner ② is positioned opposite the thrust ③ that the circlip receives.

④ Shaft





EAS00026
CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - lead
   - coupler
   - connector
2. Check:
   - lead
   - coupler
   - connector

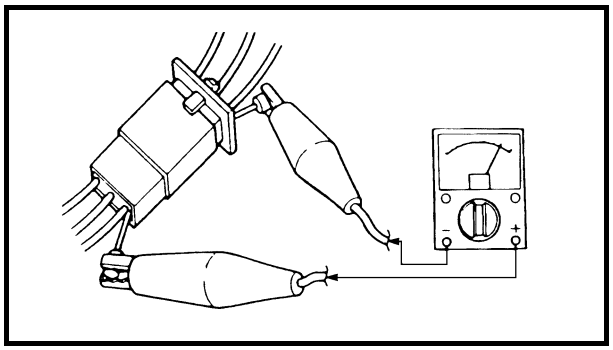
   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.
3. Check:
   - all connections

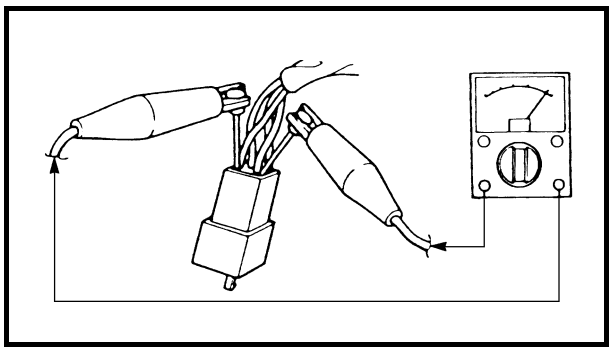
   Loose connection → Connect properly.

NOTE:
If the pin ① on the terminal is flattened, bend it up.

4. Connect:
   - lead
   - coupler
   - connector

NOTE:
Make sure all connections are tight.





5. Check:
   - continuity

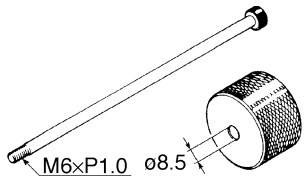
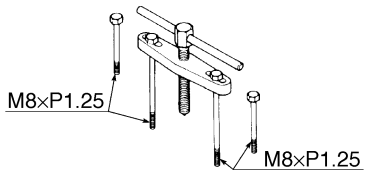
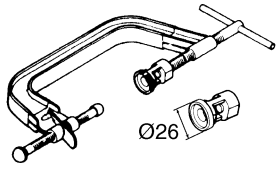
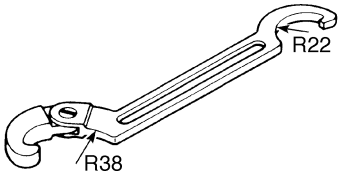
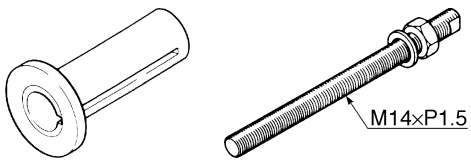
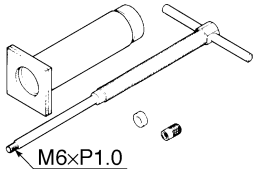
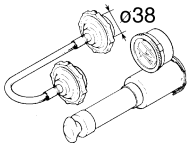
   (with the pocket tester)

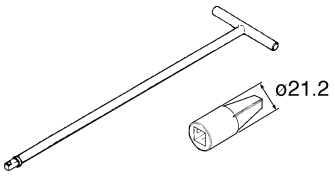
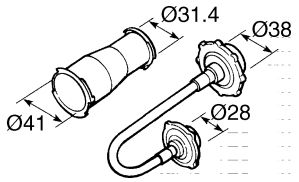
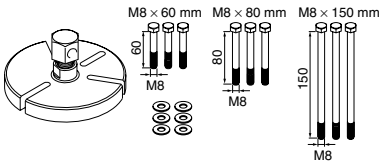
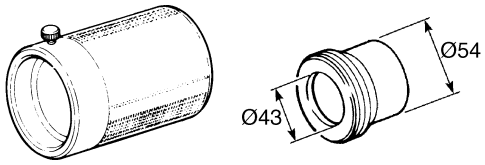
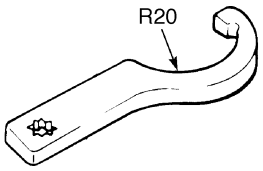
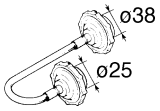
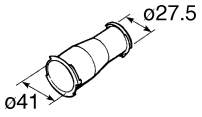
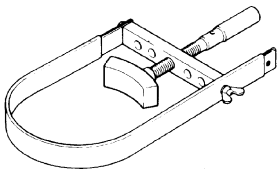
	Pocket tester **90890-03112**

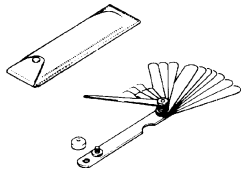
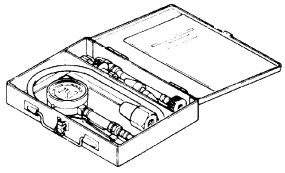
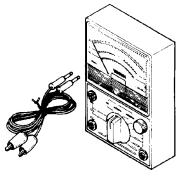
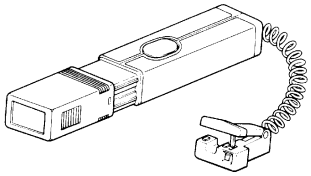
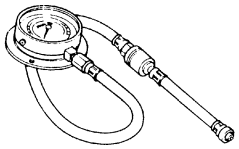
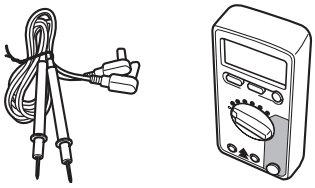
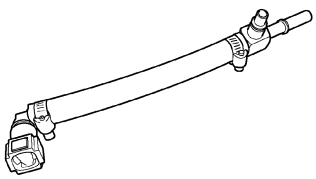
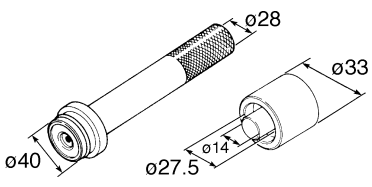
NOTE:
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

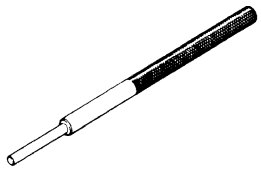
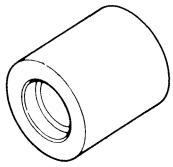
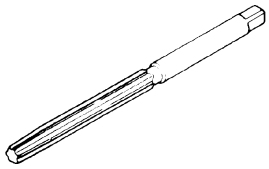
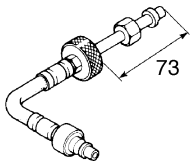
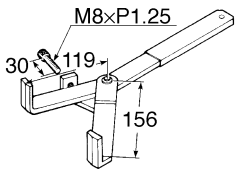
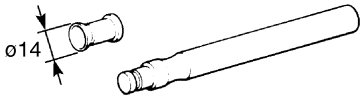
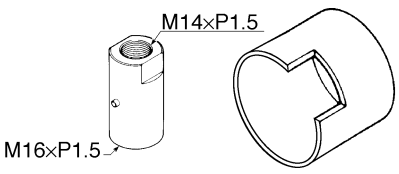
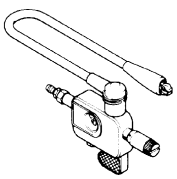
EAS00027
SPECIAL TOOLS

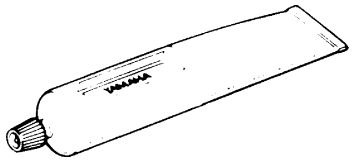
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.
When placing an order, refer to the list provided below to avoid any mistakes.

Tool No.	Tool name/Function	Illustration
Slide hammer bolt 90890-01083 Weight 90890-01084	Slide hammer bolt Weight These tools are used to remove or install the rocker arm shafts.	
90890-01135	Crankcase separating tool This tool is used to remove the crankshaft.	
Attachment 90890-01243 Compressor 90890-04019	Valve spring compressor attachment Valve spring compressor These tools are used to remove or install the valve assemblies.	
90890-01268	Ring nut wrench This tool is used to loosen or tighten the steering ring nuts.	
Pot 90890-01274 Bolt 90890-01275	Crankshaft installer pot Crankshaft installer bolt These tools are used to install the crankshaft.	
90890-01304	Piston pin puller set This tool is used to remove the piston pin.	
90890-01325	Radiator cap tester This tool is used to check the cooling system.	

Tool No.	Tool name/Function	Illustration
T-handle 90890-01326 Holder 90890-01460	T-handle Damper rod holder These tools are used to hold the damper rod holder when removing or installing the damper rod.	
90890-01352	Radiator cap tester adaptor This tool is used to check the cooling system.	
90890-01362	Flywheel puller This tool is used to remove the A.C. magneto rotor.	
Weight 90890-01367 Attachment 90890-01374	Fork seal driver weight Fork seal driver attachment (ø43) These tools are used to install the oil seal, dust seal, and the outer tube bushing of the front fork legs.	
90890-01403	Steering nut wrench This tool is used to loosen or tighten the steering ring nuts.	
90890-01496	Radiator tester adapter This tool is used to check the cooling system.	
90890-01497	Radiator cap tester adapter This tool is used to check the cooling system.	
90890-01701	Sheave holder This tool is used to hold the A.C. magneto rotor when loosen or tighten the A.C. magneto rotor nut.	

Tool No.	Tool name/Function	Illustration
90890-03079	Thickness gauge This tool is used to measure the valve clearance.	
90890-03081	Compression gauge These tools are used to measure the engine compression.	
90890-03112	Pocket tester This tool is used to check the electrical system.	
90890-03141	Timing light This tool is used to check the ignition timing.	
90890-03153	Pressure gauge This tool is needed to measure fuel pressure.	
90890-03174	Digital circuit tester This tool is used to check electrical system.	
90890-03176	Fuel pressure adapter This tool is needed to measure fuel pressure.	
Driver 90890-04058 Installer 90890-04132	Middle driven shaft bearing driver Mechanical seal installer These tools are used to install the mechanical seal.	

Tool No.	Tool name/Function	Illustration
90890-04064	Valve guide remover (ø 6) This tool is needed to remove and install the valve guides.	
90890-04065	Valve guide installer (ø 6) This tool is needed to install the valve guides.	
90890-04066	Valve guide reamer (ø 6) This tool is needed to rebore the new valve guides.	
90890-04082	Adaptor (Compression gauge) This tool is needed to measure engine compression.	
90890-04086	Universal clutch holder This tool is needed to hold the clutch boss when removing or installing the boss nut.	
90890-04101	Valve lapper This tool is used for lapping the valve.	
Adapter 90890-04130 Spacer 90890-04144	Adapter Spacer (crankshaft installer) These tools are used to install the crankshaft.	
90890-06754	Ignition checker This tool is used to check the ignition system components.	

Tool No.	Tool name/Function	Illustration
90890-85505	Yamaha bond No. 1215 This bond is used to seal two mating surfaces (e.g., crankcase mating surfaces).	

SPEC 2

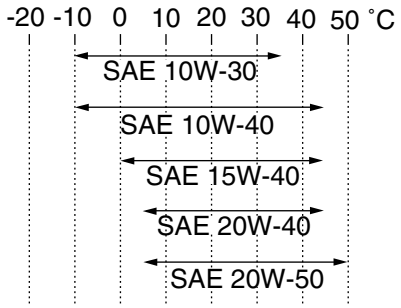
CHAPTER 2
SPECIFICATIONS

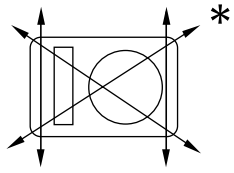
SPECIFICATIONS

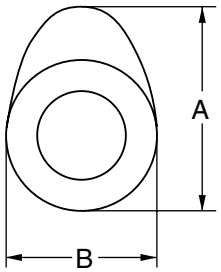
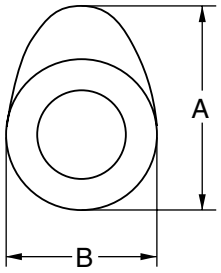
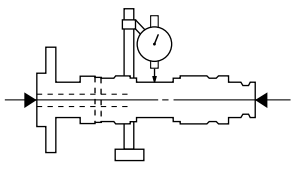
GENERAL SPECIFICATIONS

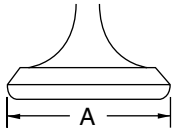
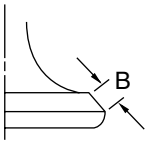
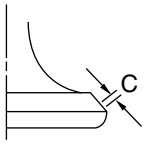
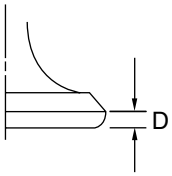
Item	Standard	Limit
Model code	XT660R: 5VK1 (Europe)	----
	5VK2 (AUS)	----
	5VK3 (GB)	----
	XT660X: 1D21 (Europe)	----
	1D22 (AUS)	----
	1D23 (GB)	----
Dimensions		
Overall length	2,240 mm (88.2 in) (XT660R)	----
	2,150 mm (84.6 in) (XT660X)	----
Overall width	845 mm (33.3 in) (XT660R)	----
	865 mm (34.1 in) (XT660X)	----
Overall height	1,230 mm (48.4 in) (XT660R)	----
	1,210 mm (47.6 in) (XT660X)	----
Seat height	865 mm (34.1 in) (XT660R)	----
	870 mm (34.3 in) (XT660X)	----
Wheelbase	1,505 mm (59.3 in) (XT660R)	----
	1,490 mm (58.7 in) (XT660X)	----
Minimum ground clearance	210 mm (8.27 in) (XT660R)	----
	205 mm (8.07 in) (XT660X)	----
Minimum turning radius	2,400 mm (94.5 in)	----
Weight		
Wet (with oil and a full fuel tank)	181 kg (399 lb) (XT660R)	----
	186 kg (410 lb) (XT660X)	----
Maximum load (total of cargo, rider, passenger, and accessories)	186 kg (410 lb)	----

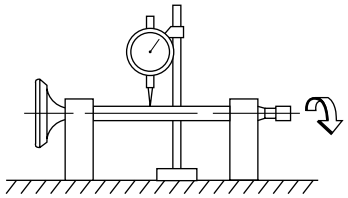
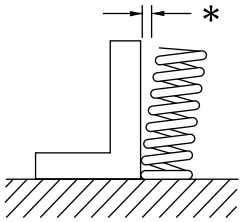
ENGINE SPECIFICATIONS

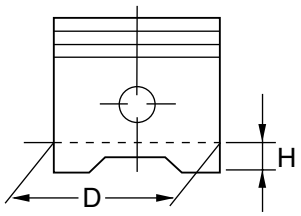
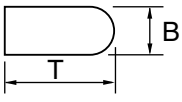
Item	Standard	Limit
Engine		
Engine type	Liquid-cooled, 4-stroke, SOHC	----
Displacement	660 cm^3 (40.27 cu · in)	----
Cylinder arrangement	Forward-inclined single cylinder	----
Bore × stroke	100.0 × 84.0 mm (3.94 × 3.31 in)	----
Compression ratio	10.00 : 1	----
Engine idling speed	1,300 ~ 1,500 r/min	----
Water temperature	80 °C (176 °F)	----
Oil temperature	55 ~ 60 °C (131 ~ 140 °F)	----
Standard compression pressure (at sea level)	650 kPa (6.5 kg/cm^2, 92.4 psi) at 800 r/min	----
Fuel		
Recommended fuel	Premium unleaded gasoline only	----
Fuel tank capacity		
Total (including reserve)	15.0 L (3.30 Imp gal, 3.96 US gal)	----
Reserve only	5.0 L (1.10 Imp gal, 1.32 US gal)	----
Engine oil		
Lubrication system	Dry sump	----
Recommended oil		
	Refer to the chart for engine oil grade. API service SE, SF, SG type or higher	----
Quantity		
Total amount	2.90 L (2.55 Imp qt, 3.07 US qt)	----
Periodic oil change	2.50 L (2.20 Imp qt, 2.64 US qt)	----
With oil filter replacement	2.60 L (2.29 Imp qt, 2.75 US qt)	----
Oil filter		
Oil filter type	Paper	----
Bypass valve opening pressure	40.0 ~ 80.0 kPa (0.40 ~ 0.80 kg/cm^2, 5.8 ~ 11.6 psi)	----
Pressure check location	Oil filter chamber	----

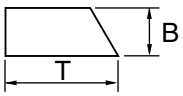
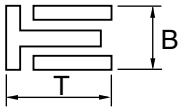
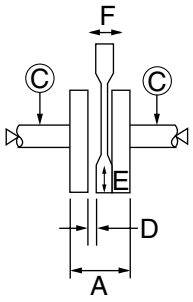
Item	Standard	Limit
Oil pump		
Oil pump type	Trochoid	----
Inner-rotor-to-outer-rotor-tip clearance	0.07 ~ 0.12 mm (0.0028 ~ 0.0047 in)	0.2 mm (0.008 in)
Outer-rotor-to-oil-pump-housing clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)	0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance	0.03 ~ 0.08 mm (0.0012 ~ 0.0031 in)	0.15 mm (0.0059 in)
Cooling system		
Radiator capacity	1.00 L (0.88 Imp, 1.06 US qt)	----
Radiator cap opening pressure	110.0 ~ 140.0 kPa (1.10 ~ 1.40 kg/cm^2, 16.0 ~ 20.3 psi)	----
Radiator core		
Width	280.0 mm (11.02 in)	----
Height	158.0 mm (6.22 in)	----
Depth	23.0 mm (0.91 in)	----
Coolant reservoir		
Capacity	0.25 L (0.22 Imp, 0.26 US qt)	----
<From low to full level>	0.15 L (0.13 Imp, 0.16 US qt)	----
Water pump		
Water pump type	Single-suction centrifugal pump	----
Reduction ratio	27/28 (0.964)	----
Maximum impeller shaft tilt	----	0.15 mm (0.006 in)
Starting system type	Electric starter	----
Fuel injector		
Model/manufacturer	297500-0390/DENSO	----
Quantity	1	----
Spark plug		
Model/manufacturer × quantity	CR7E/NGK × 1	----
Spark plug gap	0.7 ~ 0.8 mm (0.028 ~ 0.031 in)	----
Cylinder head		
Volume	59.10 ~ 60.50 cm^3 (3.61 ~ 3.69 cu · in)	----
Maximum warpage * 	----	0.03 mm (0.0012 in)

Item	Standard	Limit
Camshaft		
Drive system	Chain drive (left)	----
Intake camshaft lobe dimensions 		
Measurement A	43.488 ~ 43.588 mm (1.7121 ~ 1.7161 in)	43.338 mm (1.7062 in)
Measurement B	36.959 ~ 37.059 mm (1.4551 ~ 1.4590 in)	36.840 mm (1.4504 in)
Exhaust camshaft lobe dimensions 		
Measurement A	43.129 ~ 43.229 mm (1.6980 ~ 1.7019 in)	42.983 mm (1.6922 in)
Measurement B	37.007 ~ 37.107 mm (1.4570 ~ 1.4609 in)	36.886 mm (1.4522 in)
Valve timing		
Intake - open (B.T.D.C.)	25°	----
Intake - closed (A.B.D.C.)	55°	----
Exhaust - open (B.B.D.C.)	60°	----
Exhaust - closed (A.T.D.C.)	20°	----
Overlap angle “A”	45°	----
Maximum camshaft runout 	----	0.040 mm (0.0016 in)
Timing chain		
Model/number of links	98 × RH2010/126	----
Tensioning system	Automatic	----

Item	Standard	Limit
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)	12.036 mm (0.4739 in)
Shaft outside diameter	11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)	11.955 mm (0.4707 in)
Arm-to-shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.081 mm (0.0032 in)
Valves, valve seats, valve guides		
Valve clearance (cold)		
Intake	0.09 ~ 0.13 mm (0.0035 ~ 0.0051 in)	----
Exhaust	0.16 ~ 0.20 mm (0.0063 ~ 0.0079 in)	----
Valve dimensions		
 Head Diameter	 Face Width	 Seat Width	 Margin Thickness
Valve head diameter A		
Intake	37.90 ~ 38.10 mm (1.4921 ~ 1.5000 in)	----
Exhaust	31.90 ~ 32.10 mm (1.2559 ~ 1.2638 in)	----
Valve face width B		
Intake	2.260 mm (0.0890 in)	----
Exhaust	1.91 ~ 2.62 mm (0.075 ~ 0.103 in)	----
Valve seat width C		
Intake	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.06 in)
Exhaust	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.06 in)
Valve margin thickness D		
Intake	0.80 ~ 1.20 mm (0.0315 ~ 0.0472 in)	----
Exhaust	0.80 ~ 1.20 mm (0.0315 ~ 0.0472 in)	----
Valve stem diameter		
Intake	5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in)	5.945 mm (0.2341 in)
Exhaust	5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)	5.930 mm (0.2335 in)
Valve guide inside diameter		
Intake	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.05 mm (0.2382 in)
Exhaust	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.05 mm (0.2382 in)

Item	Standard	Limit
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.10 mm (0.0039 in)
Valve stem runout	----	0.010 mm (0.0004 in)
		
Valve seat width		
Intake	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.06 in)
Exhaust	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.6 mm (0.06 in)
Valve springs		
Free length		
Intake	40.38 mm (1.59 in)	38.36 mm (1.51 in)
Exhaust	40.38 mm (1.59 in)	38.36 mm (1.51 in)
Installed length (valve closed)		
Intake	35.00 mm (1.38 in)	----
Exhaust	35.00 mm (1.38 in)	----
Compressed spring force (installed)		
Intake	171 ~ 197 N (17.44 ~ 20.09 kg, 38.44 ~ 44.29 lb)	----
Exhaust	171 ~ 197 N (17.44 ~ 20.09 kg, 38.44 ~ 44.29 lb)	----
Spring tilt *		
		
Intake	----	2.5°/1.8 mm (2.5°/0.071 in)
Exhaust	----	2.5°/1.8 mm (2.5°/0.071 in)
Winding direction (top view)		
Intake	Clockwise	----
Exhaust	Clockwise	----

Item	Standard	Limit
Cylinder		
Cylinder arrangement	Forward-inclined single cylinder	----
Bore × stroke	100.0 × 84.0 mm (3.94 × 3.31 in)	----
Compression ratio	10 : 1	----
Bore	100.000 ~ 100.010 (3.9370 ~ 3.9374 in)	100.080 mm (3.9402 in)
Maximum taper	----	0.05 mm (0.002 in)
Maximum out-of-round	----	0.05 mm (0.002 in)
Piston		
Piston-to-cylinder clearance	0.030 ~ 0.055 mm (0.0012 ~ 0.0022 in)	0.13 mm (0.0051 in)
Diameter D	99.955 ~ 99.970 mm (3.9352 ~ 3.9358 in)	----
		
Height H	10.0 mm (0.39 in)	----
Piston pin bore (in the piston)		
Diameter	23.004 ~ 23.015 mm (0.9057 ~ 0.9061 in)	23.045 mm (0.9073 in)
Offset	0.50 mm (0.0197 in)	----
Offset direction	Intake side	----
Piston pin		
Outside diameter	22.991 ~ 23.000 (0.9052 ~ 0.9055 in)	22.971 mm (0.9044 in)
Piston-pin-to-piston-pin-bore clearance	0.004 ~ 0.024 mm (0.0002 ~ 0.0009 in)	0.074 mm (0.0029 in)
Piston rings		
Top ring		
		
Ring type	Barrel	----
Dimensions (B × T)	1.20 × 3.80 mm (0.047 × 0.150 in)	----
End gap (installed)	0.20 ~ 0.35 mm (0.0079 ~ 0.0138 in)	0.60 mm (0.0236 in)
Ring side clearance	0.030 ~ 0.080 mm (0.0012 ~ 0.0031 in)	0.13 mm (0.0051 in)

Item	Standard	Limit
2nd ring 		
Ring type	Taper	----
Dimensions (B × T)	1.20 × 4.00 mm (0.047 × 0.157 in)	----
End gap (installed)	0.35 ~ 0.50 mm (0.0138 ~ 0.0197 in)	0.85 mm (0.0335 in)
Ring side clearance	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	0.11 mm (0.0043 in)
Oil ring 		
Dimensions (B × T)	2.50 × 3.40 mm (0.098 × 0.134 in)	----
End gap (installed)	0.20 ~ 0.70 mm (0.0079 ~ 0.0276 in)	----
Ring side clearance	0.060 ~ 0.150 mm (0.0024 ~ 0.0059 in)	----
Crankshaft 		
Width A	74.95 ~ 75.00 mm (2.9508 ~ 2.9528 in)	----
Maximum runout C	----	0.04 mm (0.0016 in)
Big end side clearance D	0.350 ~ 0.650 mm (0.0138 ~ 0.0256 in)	1.0 mm (0.04 in)
Big end radial clearance E	0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in)	----
Small end free play F	0.16 ~ 0.40 (0.0063 ~ 0.0157 in)	----
Balancer		
Balancer drive method	Gear	----

Item	Standard	Limit
Clutch		
Clutch type	Wet, multiple disc	----
Clutch release method	Outer pull, rack and pinion pull	----
Operation	Left-hand operation	----
Clutch cable free play (at the end of the clutch lever)	10.0 ~ 15.0 mm (0.39 ~ 0.59 in)	----
Friction plates 1 (inside dia.: 120 mm)		
Thickness	2.90 ~ 3.10 mm (0.114 ~ 0.122 in)	2.80 mm (0.110 in)
Plate quantity	4	----
Friction plates 2		
Thickness	2.92 ~ 3.08 mm (0.115 ~ 0.121 in)	2.80 mm (0.110 in)
Plate quantity	2	----
Friction plates 3 (inside dia.: 128 mm)		
Thickness	2.90 ~ 3.10 mm (0.114 ~ 0.122 in)	2.80 mm (0.110 in)
Plate quantity	1	----
Clutch plates		
Thickness	1.50 ~ 1.70 mm (0.059 ~ 0.067 in)	----
Plate quantity	6	----
Maximum warpage	----	0.20 mm (0.0079 in)
Clutch spring		
Free length	55.6 mm (2.19 in)	52.82 mm (2.08 in)
Spring quantity	5	----
Transmission		
Transmission type	Constant mesh, 5-speed	----
Primary reduction system	Spur gear	----
Primary reduction ratio	75/36 (2.083)	----
Secondary reduction system	Chain drive	----
Secondary reduction ratio	45/15 (3.000)	----
Operation	Left-foot operation	----
Gear ratios		
1st gear	30/12 (2.500)	----
2nd gear	26/16 (1.625)	----
3rd gear	23/20 (1.150)	----
4th gear	20/22 (0.909)	----
5th gear	20/26 (0.769)	----

Item	Standard	Limit
Maximum main axle runout	----	0.08 mm (0.0031 in)
Maximum drive axle runout	----	0.08 mm (0.0031 in)
Shifting mechanism		
Shift mechanism type	Shift drum and guide bar	----
Decompression device		
Device type	Auto decomp	----
Air filter type	Oil-coated paper element	----
Fuel pump		
Pump type	Electrical	----
Model/manufacturer	5VK/DENSO	----
Consumption amperage <maximum>	3.5 A	----
Output pressure	294 kPa (2.94 kg/cm^2, 41.8 psi)	----
Throttle body		
Model/manufacturer × quantity	44EHS/MIKUNI × 1	----
Intake vacuum pressure	37.6 ~ 40.2 kPa (282 ~ 302 mmHg, 11.1 ~ 11.9 inHg)	----
Throttle cable free play (at the flange of the throttle grip)	3.0 ~ 5.0 mm (0.12 in ~ 0.20 mm)	----
ID mark	5VK1 00	----
Throttle valve size	#50	----

CHASSIS SPECIFICATIONS

Item	Standard	Limit
Frame		
Frame type	Diamond	----
Caster angle	27.25° (XT660R)	----
	26° (XT660X)	----
Trail	107 mm (4.21 in) (XT660R)	----
	94 mm (3.70 in) (XT660X)	----
Front wheel		
Wheel type	Spoke wheel	----
Rim		
Size	21 × 1.85 (XT660R)	----
	17M/C × MT3.50 (XT660X)	----
Material	Aluminum	----
Wheel travel	225 mm (8.86 in) (XT660R)	----
	200 mm (7.87 in) (XT660X)	----
Wheel runout		
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)
Wheel axle bending limit	----	0.25 mm (0.01 in)
Rear wheel		
Wheel type	Spoke wheel	----
Rim		
Size	17M/C × MT2.75 (XT660R)	----
	17M/C × MT4.25 (XT660X)	----
Material	Aluminum	----
Wheel travel	200.0 mm (7.87 in)	----
Wheel runout		
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)
Wheel axle bending limit	----	0.25 mm (0.01 in)

Item	Standard	Limit
Front tire		
Tire type	With tube	----
Size	90/90-21M/C 54S, 90/90-21M/C 54T (XT660R)	----
	120/70R 17M/C 58 H (XT660X)	----
Model/manufacturer	TOURANCE FRONT/METZELER, SIRAC/MICHELIN (XT660R)	----
	DRAGON/PIRELLI (XT660X)	----
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	200 kPa (2.00 kgf/cm, 29 psi) (XT660R)	----
	210 kPa (2.10 kgf/cm, 30 psi) (XT660X)	----
90 (198 lb) ~ Maximum load*	200 kPa (2.00 kgf/cm, 29 psi) (XT660R)	----
	220 kPa (2.20 kgf/cm, 31 psi) (XT660X)	----
	* Load is the total weight of the cargo, rider, passenger and accessories.	
Off-road riding	200 kPa (2.00 kgf/cm, 29 psi) (XT660R)	----
Minimum tire tread depth	----	1.6 mm (0.063 in)
Rear tire		
Tire type	With tube	----
Size	130/80-17M/C 65S, 130/80-17M/C 65T (XT660R)	----
	160/60R 17M/C 69H (XT660X)	----
Model/manufacturer	TOURANCE/METZELER, SIRAC A/ MICHELIN (XT660R)	----
	DRAGON/PIRELLI (XT660X)	----
Tire pressure (cold)		
0 ~ 90 kg (0 ~ 198 lb)	200 kPa (2.00 kgf/cm, 29 psi) (XT660R)	----
	210 kPa (2.10 kgf/cm, 30 psi) (XT660X)	----
90 (198 lb) ~ Maximum load*	225 kPa (2.25 kgf/cm, 33 psi) (XT660R)	----
	230 kPa (2.30 kgf/cm, 33 psi) (XT660X)	----
	* Load is the total weight of the cargo, rider, passenger and accessories.	
Off-road riding	200 kPa (2.00 kgf/cm, 29 psi) (XT660R)	----
Minimum tire tread depth	----	1.6 mm (0.063 in)

Item	Standard	Limit
Front brakes		
Brake type	Single-disc brake	----
Operation	Right-hand operation	----
Recommended fluid	DOT 4	----
Brake discs		
Diameter × thickness	298.0 × 4.5 mm (11.73 × 0.18 in) (XT660R)	----
	320.0 × 4.5 mm (12.60 × 0.18 in) (XT660X)	----
Minimum thickness	----	4.0 mm (0.16 in)
Maximum deflection	----	0.15 mm (0.006 in)
Pad thickness inner	4.1 mm (0.16 in) (XT660R)	1.0 mm (0.04 in)
	5.2 mm (0.20 in) (XT660X)	1.0 mm (0.04 in)
Pad thickness outer	4.1 mm (0.16 in) (XT660R)	1.0 mm (0.04 in)
	5.2 mm (0.20 in) (XT660X)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)	----
Caliper cylinder inside diameter	32.00 mm × 1 (1.26 in × 1) and 30.00 mm × 1 (1.18 in × 1) (XT660R)	----
	34.00 mm × 2 (1.34 in × 2) and 30.00 mm × 2 (1.18 in × 2) (XT660X)	----
Rear brake		
Brake type	Single-disc brake	----
Operation	Right-foot operation	----
Brake pedal position (below the top of the rider footrest)	12.0 mm (0.47 in)	----
Recommended fluid	DOT 4	----
Brake discs		
Diameter × thickness	245 × 5.0 mm (9.65 × 0.20 in)	----
Minimum thickness	----	4.5 mm (0.18 in)
Maximum deflection	----	0.15 mm (0.006 in)
Pad thickness inner	5.5 mm (0.22 in)	1.0 mm (0.04 in)
Pad thickness outer	5.5 mm (0.22 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.7 mm (0.50 in)	----
Caliper cylinder inside diameter	34.00 mm × 1 (1.34 in × 1)	----

Item	Standard	Limit
Steering		
Steering bearing type	Taper roller bearing	----
Lock to lock angle (left)	44.0°	----
Lock to lock angle (right)	44.0°	----
Front suspension		
Suspension type	Telescopic fork	----
Front fork type	Coil spring/oil damper	----
Front fork travel	225.0 mm (8.86 in) (XT660R)	----
	200.0 mm (7.87 in) (XT660X)	----
Spring		
Free length	633.0 mm (24.92 in) (XT660R)	620 mm (24.41 in)
	593.0 mm (23.35 in) (XT660X)	581 mm (22.87 in)
Spacer length	0 mm (0 in)	----
Installed length	628.0 mm (24.72 in) (XT660R)	----
	588.0 mm (23.15 in) (XT660X)	----
Spring rate (K1)	3.75 N/mm (0.38 kg/mm, 21.41 lb/in) (XT660R)	----
	3.75 N/mm (0.38 kg/mm, 21.41 lb/in) (XT660X)	----
Spring stroke (K1)	0 ~ 120.0 mm (0 ~ 4.72 in) (XT660R)	----
	0 ~ 120.0 mm (0 ~ 4.72 in) (XT660X)	----
Spring rate (K2)	6.00 N/mm (0.61 kg/mm, 34.26 lb/in) (XT660R)	----
	6.00 N/mm (0.61 kg/mm, 34.26 lb/in) (XT660X)	----
Spring stroke (K2)	120.0 ~ 225.0 mm (4.72 ~ 8.86 in) (XT660R)	----
	120.0 ~ 200.0 mm (4.72 ~ 7.87 in) (XT660X)	----
Optional spring available	No	----
Fork oil		
Recommended oil	Fork oil 10 W or equivalent	----
Quantity (each front fork leg)	640.0 cm^3 (22.53 Imp oz, 21.64 US oz) (XT660R)	----
	600.0 cm^3 (21.12 Imp oz, 20.29 US oz) (XT660X)	----
Level (from the top of the inner tube, with the inner tube fully compressed, and without the fork spring)	125.0 mm (4.92 in) (XT660R)	----
	125.0 mm (4.92 in) (XT660X)	----
Inner tube outer diameter	43.0 mm (1.69 in)	----
Inner tube bearing	----	0.2 mm (0.0079 in)

Item	Standard	Limit
Rear suspension		
Suspension type	Swingarm (monocross)	----
Rear shock absorber assembly type	Coil spring/gas-oil damper	----
Rear shock absorber assembly travel	65.0 mm (2.56 in)	----
Spring		
Free length	216.0 mm (8.50 in)	205 mm (8.07 in)
Installed length	206.0 mm (8.11 in)	----
Spring rate (K1)	125.00 N/mm (12.75 kg/mm, 713.75 lb/in)	----
Spring stroke (K1)	0 ~ 65.0 mm (0 ~ 2.56 in)	----
Optional spring available	No	----
Standard spring preload gas/air pressure	980 kPa (9.8 kg/cm^2, 139.4 psi)	----
Swingarm		
Free play (at the end of the swingarm)		
Radial	----	1.0 mm (0.04 in)
Axial	----	1.0 mm (0.04 in)
Drive chain		
Type/manufacturer	DID520VP/DAIDO	----
Link quantity	110	----
Drive chain slack	40.0 ~ 55.0 mm (1.57 ~ 2.17 in)	----
Maximum 15-link section	240.5 mm (9.47 in)	----

ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	----
Ignition system		
Ignition system type	Transistorized coil ignition (digital)	----
Ignition timing	9.0° BTDC at 1,400 r/min	----
Advancer type	Electric	----
Crankshaft position senor resistance/ color	192 ~ 288 Ω at 20 °C (68 °F) blue/yellow–green/white	----
Transistorized coil ignition unit model/manufacturer	TBDF08/DENSO	----
Ignition coil		
Model/manufacturer	JO300/DENSO	----
Minimum ignition spark gap	6.0 mm (0.24 in)	----
Primary coil resistance	3.4 ~ 4.6 Ω at 20 °C (68 °F)	----
Secondary coil resistance	10.4 ~ 15.6 kΩ at 20 °C (68 °F)	----
Spark plug cap		
Material	Rubber	----
Resistance	10.0 kΩ at 20 °C (68 °F)	----
Charging system		
System type	A.C. magneto	----
Model/manufacturer	LMX51/DENSO	----
Nominal output	14.0 V/20.8 A at 5,000 r/min	----
Stator coil resistance/color	0.224 ~ 0.336 Ω at 20 °C (68 °F) white–white	----
Rectifier/regulator		
Regulator type	Semiconductor, short circuit	----
Model/manufacturer	SH713AA/SHINDENGEN	----
No-load regulated voltage	14.1 ~ 14.9 V	----
Rectifier capacity	35.0 A	----
Withstand voltage	200.0 V	----
Battery		
Battery type/manufacturer	GT9B-4/GS	----
Battery voltage/capacity	12 V/8.0 AH	----
Ten hour rate amperage	0.8 A	----
Headlight type	Halogen bulb	----
Indicator light (voltage/wattage × quantity)		
Neutral indicator light	LED × 1	----
High beam indicator light	LED × 1	----
Fuel level warning light	LED × 1	----
Turn signal indicator light	LED × 1	----
Engine trouble warning light	LED × 1	----
Coolant temperature warning light	LED × 1	----
Immobilizer system indicator light	LED × 1	----

Item	Standard	Limit
Bulbs (voltage/wattage × quantity)		
Headlight	12 V 55.0 W/60.0 W × 1	----
Auxiliary light	12 V 5.0 W × 1	----
Tail/brake light	12 V 5.0 W/21.0 W × 1	----
Front turn signal light	12 V 10.0 W × 2	----
Rear turn signal light	12 V 10.0 W × 2	----
Meter lighting	EL	----
Electric starting system		
System type	Constant mesh	----
Starter motor		
Model/manufacturer	SM-13/MITSUBA	----
Power output	0.80 kW	----
Armature coil resistance	0.025 ~ 0.035 Ω at 20 °C (68 °F)	----
Brushes		
Overall length	12.5 mm (0.49 in)	5.00 mm (0.20 in)
Spring force	7.65 ~ 10.01 N (780 ~ 1,021 gf, 27.51 ~ 36.01 oz)	----
Commutator diameter	28.0 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.70 mm (0.028 in)	----
Starter relay		
Model /manufacturer	MS5F-561/JIDECO	----
Amperage	180.0 A	----
Coil resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)	----
Horn		
Horn type	Plane	----
Model/manufacturer × quantity	YF-12/NIKKO × 1	----
Maximum amperage	3.0 A	----
Performance	105 ~ 120 db/2 m (6.6 ft)	----
Coil resistance	1.15 ~ 1.25 Ω at 20 °C (68 °F)	----
Turn signal/hazard relay		
Relay type	Full-transistor	----
Model/manufacturer	FE218BH /DENSO	----
Self-cancelling device built-in	No	----
Turn signal blinking frequency	75 ~ 95 cycles/min.	----
Wattage	10 W × 2 + 3.4 W	----
Relay unit		
Model/manufacturer	G8R-30Y-V4/OMRON	----
Coil resistance	162 ~ 198 Ω	----
Diode	Yes	----
Throttle position sensor		
Model/manufacturer	5PS1/MIKUNI	----
Resistance	4.0 ~ 6.0 kΩ	----

Item	Standard	Limit
Headlight relay		
Model/manufacturer	ACM33211 M04/MATSUSHITA	----
Radiator fan		
Model/manufacturer	5VW/KTM	----
Fan motor relay		
Model/manufacturer	ACM33211 M04/MATSUSHITA	----
Intake air pressure sensor		
Thermostat type/manufacturer	5PS1/DENSO	----
Output voltage	3.4 ~ 3.8 V	----
Intake air temperature sensor		
Model/manufacturer	5VU1/DENSO	----
Resistance	2.21 ~ 2.69 kΩ at 20 °C (68 °F)	----
	0.290 ~ 0.354 kΩ at 80 °C (176 °F)	----
Coolant temperature sensor		
Model/manufacturer	5PS1/DENSO	----
Resistance	2.32 ~ 2.59 kΩ at 20 °C (68 °F)	----
	0.310 ~ 0.326 kΩ at 80 °C (176 °F)	----
	0.140 ~ 0.145 kΩ at 110 °C (230 °F)	----
Fuses (amperage × quantity)		
Main fuse	30 A × 1	----
Signaling system fuse	10 A × 1	----
Headlight fuse	20 A × 1	----
Ignition fuse	10 A × 1	----
Fuel injection system fuse	10 A × 1	----
Radiator fan motor fuse	7.5 A × 1	----
Parking lighting fuse	10 A × 1	----
Backup fuse (immobilizer unit, meter assembly)	10 A × 1	----
Reserve fuse	30 A × 1	----
	20 A × 1	----
	10 A × 1	----
	7.5 A × 1	----

EAS00028
CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.
Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

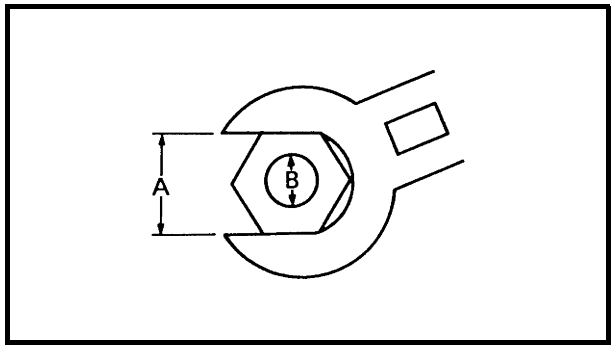
METRIC		MULTIPLIER		IMPERIAL
** mm	×	0.03937	=	** in
2 mm	×	0.03937	=	0.08 in

CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Tightening torque	m · kg m · kg cm · kg cm · kg	7.233 86.794 0.0723 0.8679	ft · lb in · lb ft · lb in · lb
Weight	kg g	2.205 0.03527	lb oz
Speed	km/hr	0.6214	mph
Distance	km m m cm mm	0.6214 3.281 1.094 0.3937 0.03937	mi ft yd in in
Volume/ Capacity	cc (cm^3) cc (cm^3) lt (liter) lt (liter)	0.03527 0.06102 0.8799 0.2199	oz (IMP liq.) cu · in qt (IMP liq.) gal (IMP liq.)
Misc.	kg/mm kg/cm^2 Centigrade (°C)	55.997 14.2234 9/5+32	lb/in psi (lb/in^2) Fahrenheit (°F)

EAS00030
GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A: Distance between flats
B: Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		Nm	m · kg	ft · lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

TIGHTENING TORQUE

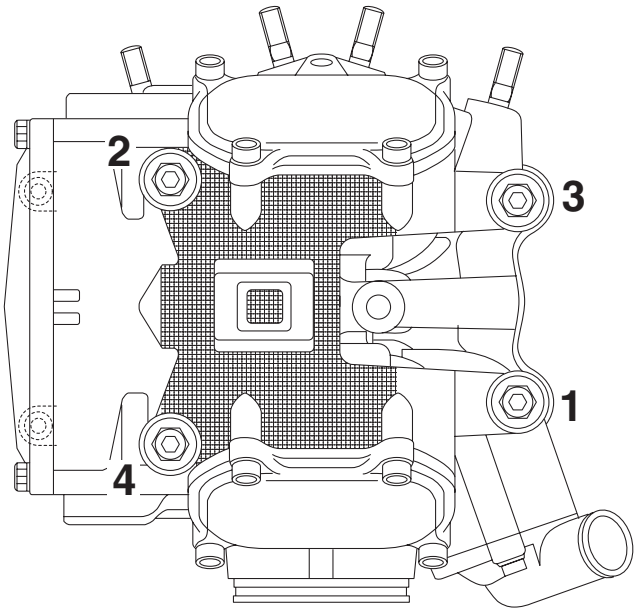
ENGINE TIGHTENING TORQUE

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Cylinder head (exhaust pipe)	Stud bolt	M8	4	15	1.5	11	
Cylinder head (left side) ℓ = 145 mm (5.71 in)	Bolt	M9	2	50	5.0	36	E
Cylinder head (right side) ℓ = 135 mm (5.31 in)	Bolt	M9	2	50	5.0	36	E
Cylinder head (center lower side)	Bolt	M9	2	45	4.5	32	E
Cylinder head	Bolt	M6	2	10	1.0	7.2	
Spark plug	—	M10S	1	13	1.3	9.4	
Cylinder (left side) ℓ = 116 mm (4.57 in) 1st	Bolt	M10	2	15	1.5	11	E
2nd				50	5.0	36	
Cylinder (right side) ℓ = 109 mm (4.29 in) 1st	Bolt	M10	2	15	1.5	11	E
2nd				50	5.0	36	
Cylinder	Bolt	M6	2	10	1.0	7.2	
Tappet cover (exhaust side)	Bolt	M6	4	10	1.0	7.2	
Tappet cover (intake side)	Bolt	M6	4	10	1.0	7.2	
Camshaft sprocket cover	Bolt	M6	2	10	1.0	7.2	
Camshaft sprocket	Bolt	M7	2	20	2.0	14	
Camshaft retainer	Bolt	M6	2	10	1.0	7.2	G
Valve adjusting screw	Nut	M6	4	14	1.4	10	
Balancer driven gear	Nut	M18	1	70	7.0	50	Use a lock washer. E
Primary drive gear	Nut	M20	1	80	8.0	58	Use the lock washer. M
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Timing chain tensioner cap	Bolt	M16	1	20	2.0	14	
Timing chain guide (intake)	Bolt	M6	2	8	0.8	5.8	
Thermostat cover	Bolt	M6	2	10	1.0	7.2	
Coolant temperature sensor	—	M12	1	18	1.8	13	
Water pump cover	Bolt	M6	3	10	1.0	7.2	
Water pump assembly	Bolt	M6	2	10	1.0	7.2	
Water pump outlet pipe	Bolt	M6	1	10	1.0	7.2	
Water jacket joint	Bolt	M6	2	10	1.0	7.2	
Crankcase cover (right)	Bolt	M6	9	10	1.0	7.2	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Oil strainer	Bolt	M6	3	10	1.0	7.2	
Oil pump	Screw	M6	3	10	1.0	7.2	
Oil baffle plate 2	Bolt	M5	2	4	0.4	2.9	
Oil pump assembly	Screw	M6	1	7	0.7	5.1	
Engine oil drain bolt (crankcase)	Bolt	M14	1	30	3.0	22	
Oil filter element cover	Bolt	M6	2	10	1.0	7.2	
Oil filter drain bolt	Bolt	M6	1	10	1.0	7.2	
Engine oil drain bolt (oil tank)	Bolt	M8	1	18	1.8	13	
Bleed bolt (oil filter element)	Bolt	M5	1	5	0.5	3.6	
Oil delivery pipe 1	Union Bolt	M10	2	20	2.0	14	
	Bolt	M6	1	10	1.0	7.2	
Oil delivery pipe 2	Union Bolt	M8	2	18	1.8	13	
Oil delivery hose 1	Bolt	M6	1	10	1.0	7.2	
Oil delivery hose 2	Bolt	M6	2	10	1.0	7.2	Sealant
Throttle body joint clamp screw	—	M4	2	6	0.6	4.3	
Air filter case joint clamp screw	—	M5	1	4	0.4	2.9	
Air filter case	Bolt	M6	4	10	1.0	7.2	
Exhaust pipe and exhaust pipe bracket	Bolt	M8	2	27	2.7	19	
Exhaust pipe bracket and frame	Bolt	M8	2	23	2.3	17	
Exhaust pipe and muffler	Bolt	M8	1	12	1.2	8.7	
Exhaust pipe	Nut	M8	4	20	2.0	14	
Muffler	Bolt	M8	4	27	2.7	19	
Exhaust pipe and muffler	Bolt	M8	2	20	2.0	14	
Air cut-off valve outlet pipe	Bolt	M6	2	10	1.0	7.2	
Clutch cover	Bolt	M6	7	10	1.0	7.2	
Clutch cable holder	Bolt	M6	2	10	1.0	7.2	
Clutch spring	Bolt	M6	5	9	0.9	6.5	
Clutch boss	Nut	M20	1	90	9.0	65	
Shift shaft spring stopper	Bolt	M8	1	22	2.2	16	
Torque limiter cover	Bolt	M6	4	10	1.0	7.2	
A.C. magneto cover	Bolt	M6	8	10	1.0	7.2	
A.C. magneto rotor	Nut	M16	1	80	8.0	58	
A.C. magneto lead holder	Bolt	M6	1	10	1.0	7.2	
Crankcase (left side)	Bolt	M6	6	10	1.0	7.2	
Crankcase (right side)	Bolt	M6	8	10	1.0	7.2	
Lead holder	Bolt	M6	2	10	1.0	7.2	
Bearing retainer	Bolt	M6	3	10	1.0	7.2	

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Starter clutch	Bolt	M8	3	30	3.0	22	
Stator coil	Bolt	M6	3	10	1.0	7.2	
Crankshaft position sensor	Bolt	M5	2	7	0.7	5.1	
Starter motor and crankcase	Bolt	M6	2	10	1.0	7.2	
Starter motor lead	Nut	M6	1	5	0.5	3.6	
Brush holder and starter motor yoke	Nut	M6	1	11	1.1	8	
Starter motor assembly	Bolt	M5	2	5	0.5	3.6	
Drive axle oil seal retainer	Nut	M6	2	10	1.0	7.2	Sealant
Drive sprocket	Nut	M18	1	120	12.0	85	Use the lock washer.
Neutral switch	Bolt	M6	2	4	0.4	2.9	
Speed sensor	Bolt	M6	1	10	1.0	7.2	
Shift pedal	Bolt	M6	1	16	1.6	11	
Intake air pressure sensor	Nut	M6	2	7	0.7	5.1	

Cylinder head tightening sequence:



CHASSIS TIGHTENING TORQUES

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Engine mounting:					
Engine upper bracket and frame	M10	73	7.3	53	
Engine upper bracket and engine	M10	55	5.5	40	
Engine front bracket and frame	M10	73	7.3	53	
Engine front bracket and engine	M10	73	7.3	53	
Engine and frame	M10	73	7.3	53	
Radiator cap retainer	M6	7	0.7	5.1	
Coolant reservoir	M6	5	0.5	3.6	
Chain tensioner (upper and lower)	M8	23	2.3	17	
Pivot shaft and nut	M14	92	9.2	66	LS
Rear shock absorber and frame	M14	59	5.9	43	
Relay arm and frame	M14	59	5.9	43	LS
Relay arm and connecting arm	M14	59	5.9	43	LS
Swingarm and connecting arm	M14	59	5.9	43	LS
Relay arm and rear shock absorber	M10	42	4.2	30	LS
Chain cover and swingarm	M6	7	0.7	5.1	
Stabilizer (XT660X)	M6	7	0.7	5.1	
Chain protector and swingarm	M6	7	0.7	5.1	
Drive sprocket cover	M6	10	1.0	7.2	
Upper bracket pinch bolt	M8	23	2.3	17	
Lower handlebar holder and upper bracket	M10	32	3.2	23	
Steering stem nut	M22	130	13.0	94	
Lower ring nut (steering stem)	M25	—	—	—	See NOTE.
Upper handlebar holder and lower handlebar holder	M8	23	2.3	17	
Front brake master cylinder holder	M6	7	0.7	5.1	
Clutch lever holder	M5	7	0.7	5.1	
Front brake master cylinder and brake lever	M6	6	0.6	4.3	LS
Grip end	M6	7	0.7	5.1	
Front brake hose union bolt	M10	30	3.0	22	
Front mud guard (XT660R)	M6	7	0.7	5.1	
Front mud guard and front fork protector (XT660R)	M6	7	0.7	5.1	
Stabilizer and front mud guard (XT660X)	M6	7	0.7	5.1	
Stabilizer, front mud guard, and front fork (XT660R)	M8	16	1.6	11	
Front brake hose holder and front fork	M6	10	1.0	7.2	
Upper bracket pinch bolt	M8	23	2.3	17	
Lower bracket pinch bolt	M8	23	2.3	17	
Cap bolt	M50	18	1.8	13	
Damper rod bolt	M12	30	3.0	22	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Fuel tank and frame	M6	10	1.0	7.2	
Fuel pump and fuel tank	M5	4	0.4	2.9	
Rectifier/regulator and air filter case	M6	7	0.7	5.1	
ECU and air filter case	M6	7	0.7	5.1	
Horn bracket and frame	M6	10	1.0	7.2	
Side panels (left and right) and frame	M6	7	0.7	5.1	
Grab bar, rear cover and frame	M8	23	2.3	17	
Rear mud guard and frame	M6	7	0.7	5.1	
Tail/brake light and rear mud guard	M6	4	0.4	2.9	
Rear mud guard and rear fender	M6	7	0.7	5.1	
Rear fender and frame	M6	7	0.7	5.1	
Front fender and frame	M6	7	0.7	5.1	
Front fork protector and front cowling assembly	M6	8	0.8	5.8	
Front brake disc and wheel	M8	23	2.3	17	
Front wheel axle	M16	59	5.9	43	
Front wheel axle pinch bolt	M8	18	1.8	13	
Front brake caliper	M10	40	4.0	29	
Brake caliper bleed screw	M10	14	1.4	10	
Rear wheel axle nut	M16	105	10.5	75	
Chain drive adjusting locknut	M8	16	1.6	11	
Rear wheel sprocket and hub	M10	69	6.9	50	
Rear brake disc and wheel	M6	13	1.3	9.4	
Left side heel plate	M6	10	1.0	7.2	
Right side heel plate and rear brake master cylinder	M8	23	2.3	17	
Brake pedal position locknut	M8	18	1.8	13	
Footrest bracket and frame (right)	M10	48	4.8	35	
Rear brake hose holder and swingarm	M6	7	0.7	5.1	
Rear brake hose union bolt	M10	30	3.0	22	
Rear brake caliper protector (front side)	M6	7	0.7	5.1	
Rear brake caliper protector (rear side)	M6	4	0.4	2.9	

NOTE:

1. First, tighten the lower ring nut approximately 43 Nm (4.3 m · kg, 31 ft · lb) by using the torque wrench, then loosen the ring nut completely.
2. Retighten the lower ring nut 7 Nm (0.7 m · kg, 5.1 ft · lb) by using the torque wrench.

EAS00031
LUBRICATION POINTS AND LUBRICANT TYPES
ENGINE

Lubrication Point	Symbol
Oil seal lips	LS
O-rings	LS
Bearings	E
Cylinder head tightening bolts	E
Cylinder tightening bolts	E
Crankshaft pin	E
Timing chain sprocket inner surface	M
Connecting rod big end thrust surface	E
Piston pin	E
Piston and ring groove	E
Balancer weight tightening nut	E
A.C. magnet rotor tightening nut inner surface	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Rocker arm shaft	E
Camshaft lobes	M
Decompressor lever pin	E
Decompressor lever spring	E
Water pump impeller shaft	E
Oil pump rotors (inner and outer)	E
Oil pump shaft	E
Torque limiter	E
Starter clutch idle gear thrust surface	E
Starter clutch idle gear inner surface	E
Starter clutch gear (inner and outer)	E
Starter clutch assembly	E
Primary drive gear tightening nut	M
Primary driven gear	E
Clutch boss tightening nut	E
Push rod	M
Transmission gears (wheel and pinion)	M
Main and drive axle	M
Shift forks	E
Shift drum	E
Shift shaft	E
Shift shaft spacer	E

Lubrication Point	Symbol
Crankcase mating surface	Yamaha bond No.1215
A.C. magnet lead grommet (A.C. magneto cover)	Yamaha bond No.1215
Oil seal holder tightening bolt	Yamaha bond No.1215
Oil delivery hose 2 tightening bolt	Yamaha bond No.1215

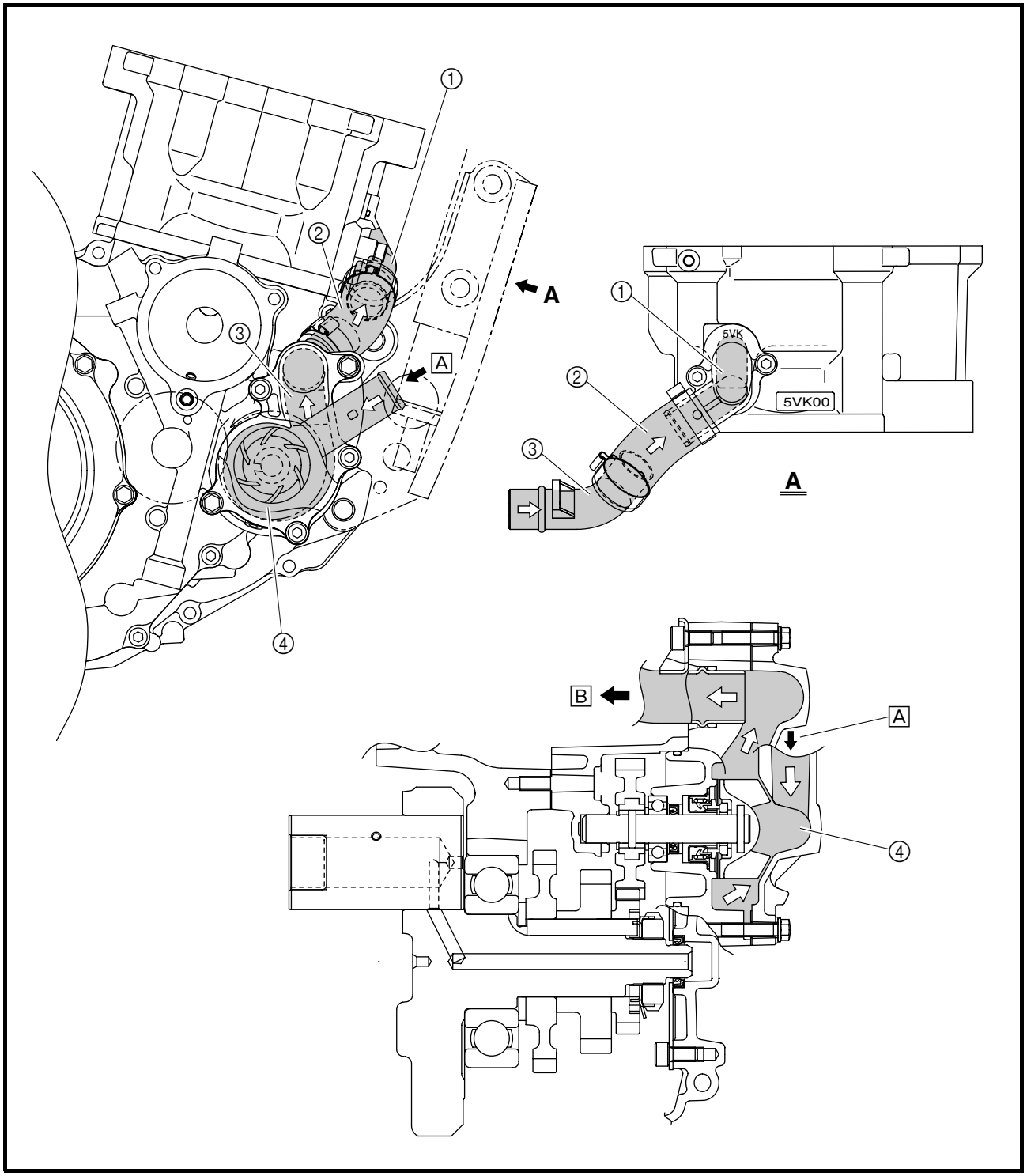
EAS00032
CHASSIS

Lubrication Point	Symbol
Front wheel oil seal lips (left and right)	LS
Rear wheel oil seal lips (left and right)	LS
Rear wheel drive hub contact surface	LS
Rear arm pivot shaft outer surface and bush outer surface and oil seal lip	LS
Dust cover thrust surface	LS
Relay arm and rear shock absorber mounting bolt outer surface	LS
Relay arm and rear shock absorber oil seal lips	LS
Relay arm and swingarm mounting bolt outer surface	LS
Relay arm and swingarm oil seal lips	LS
Relay arm and connecting arm mounting bolt outer surface	LS
Relay arm and connecting arm oil seal lips	LS
Brake pedal outer surface	LS
Rear brake master cylinder pin outer surface	LS
Steering head pipe bearings (upper and lower)	LS
Steering head pipe bearing races (upper and lower)	LS
Tube guide (throttle grip) inner surface	LS
Clutch lever pivot bolt outer surface	LS
Sidestand sliding surface and collar outer surface	LS
Footrest pivoting point	LS
Footrest spring end	LS
Chain tensioner collar (upper and lower) outer surface	LS
Rear axle shaft outer surface	LS
Passenger footrest pivoting point	LS

EAS00033
COOLING SYSTEM DIAGRAMS

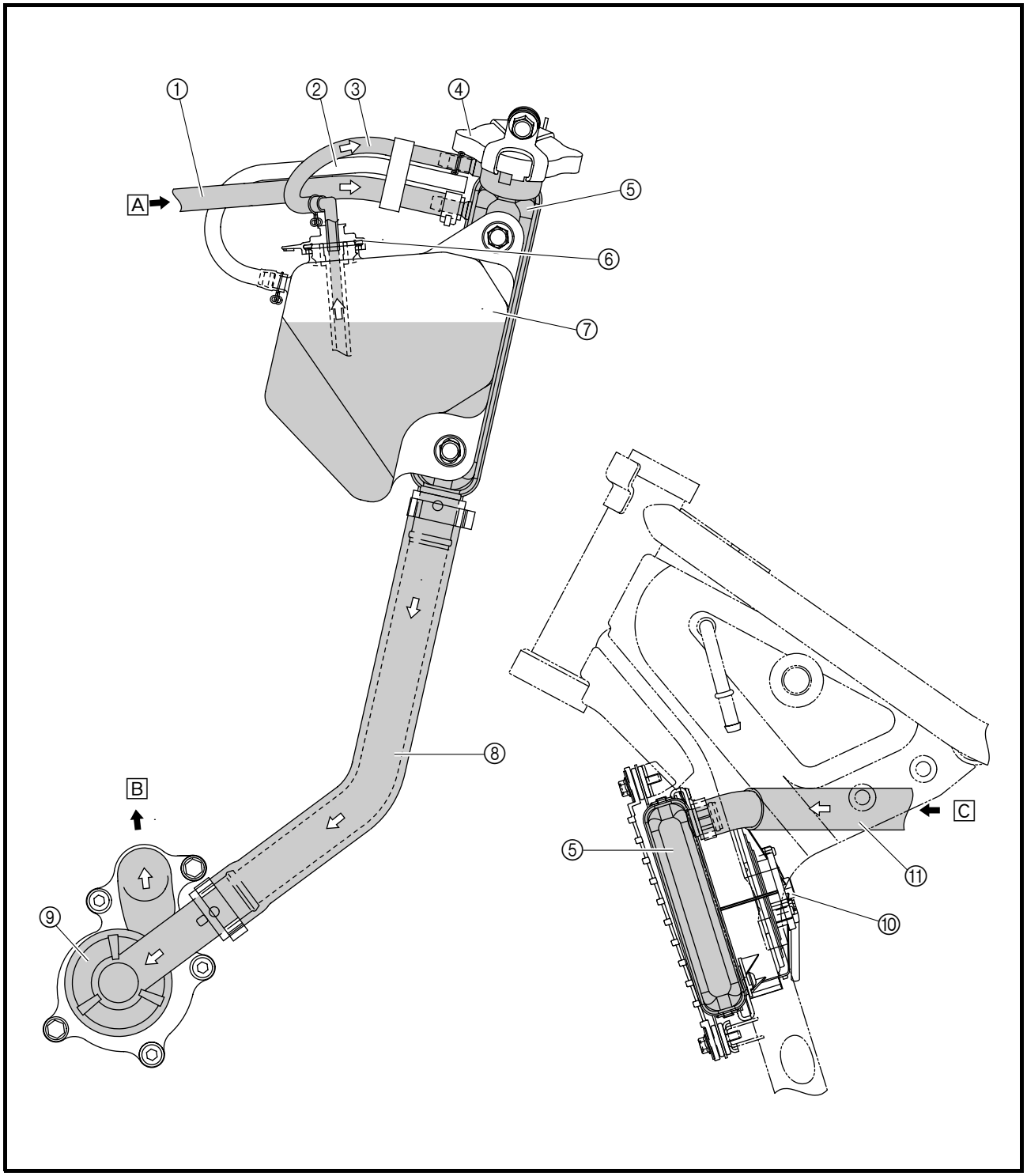
① Water jacket joint
② Water pump outlet hose
③ Water pump outlet pipe
④ Water pump

A From the radiator
B To the cylinder

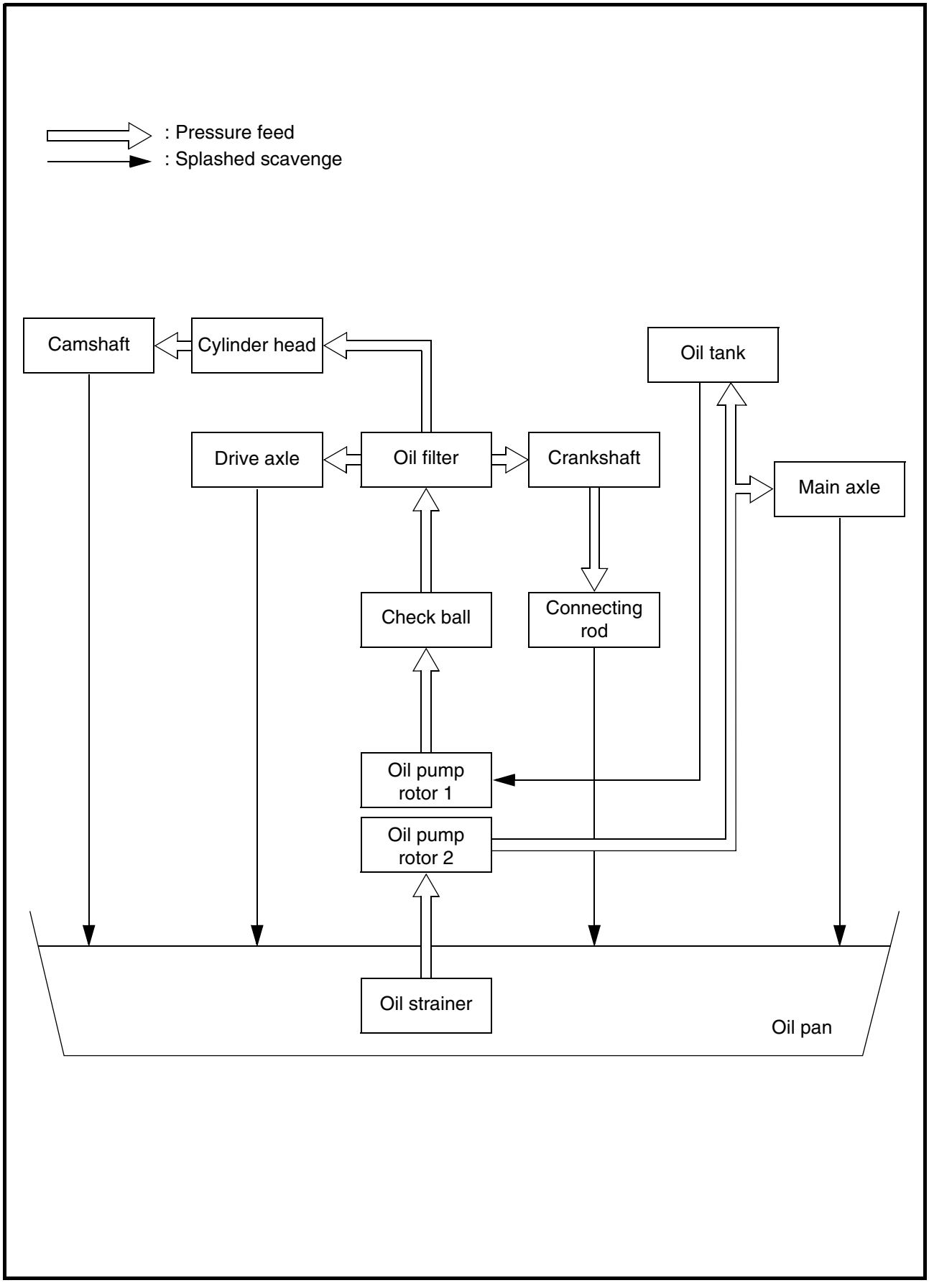


① Fast idle plunger outlet hose
② Coolant reservoir breather hose
③ Coolant reservoir hose
④ Radiator cap
⑤ Radiator
⑥ Coolant reservoir cap
⑦ Coolant reservoir
⑧ Radiator outlet hose
⑨ Water pump
⑩ Radiator fan
⑪ Radiator inlet hose

Ⓐ From the fast idle plunger
Ⓑ To the cylinder
Ⓒ From the thermostat

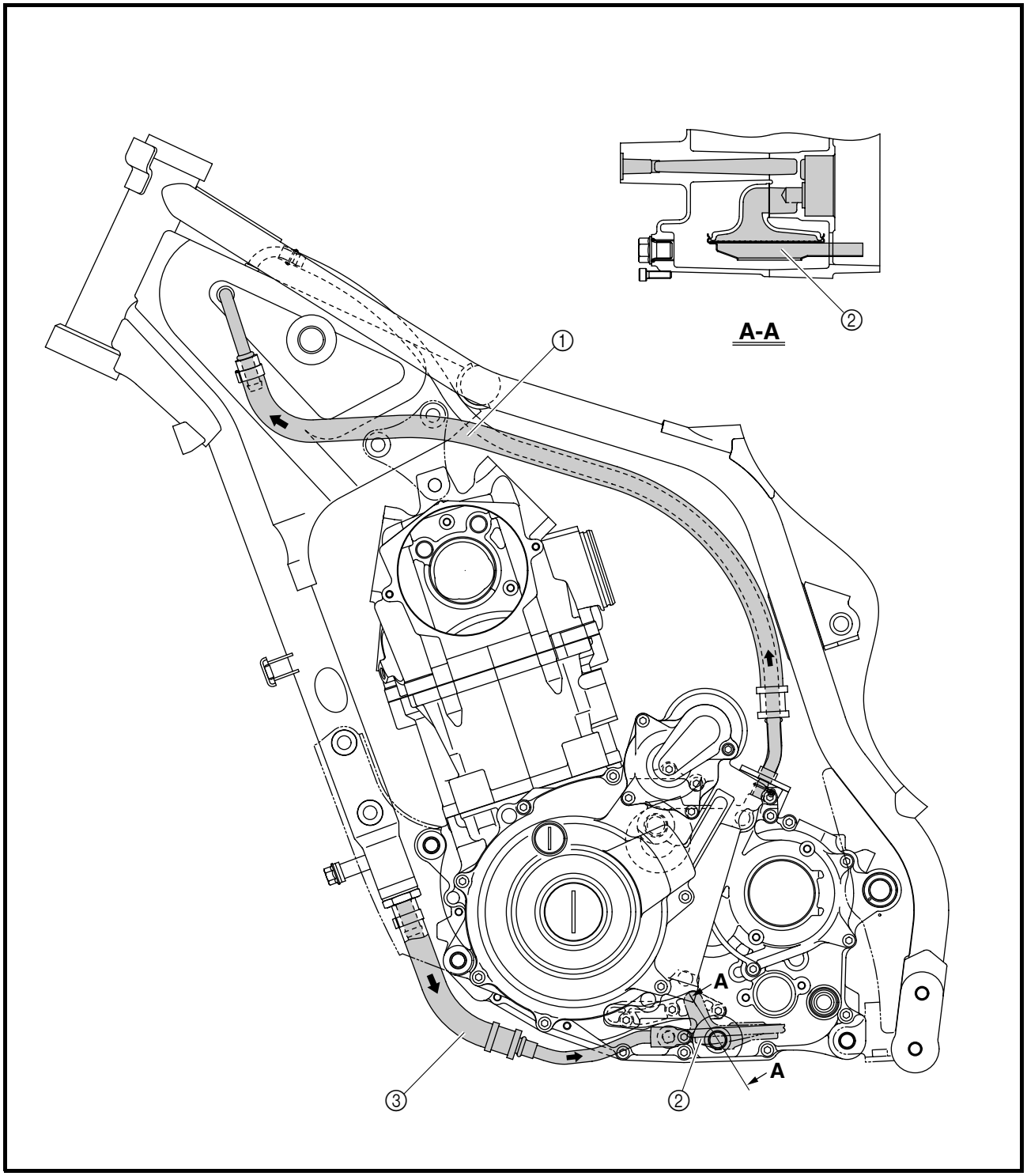


LUBRICATION CHART

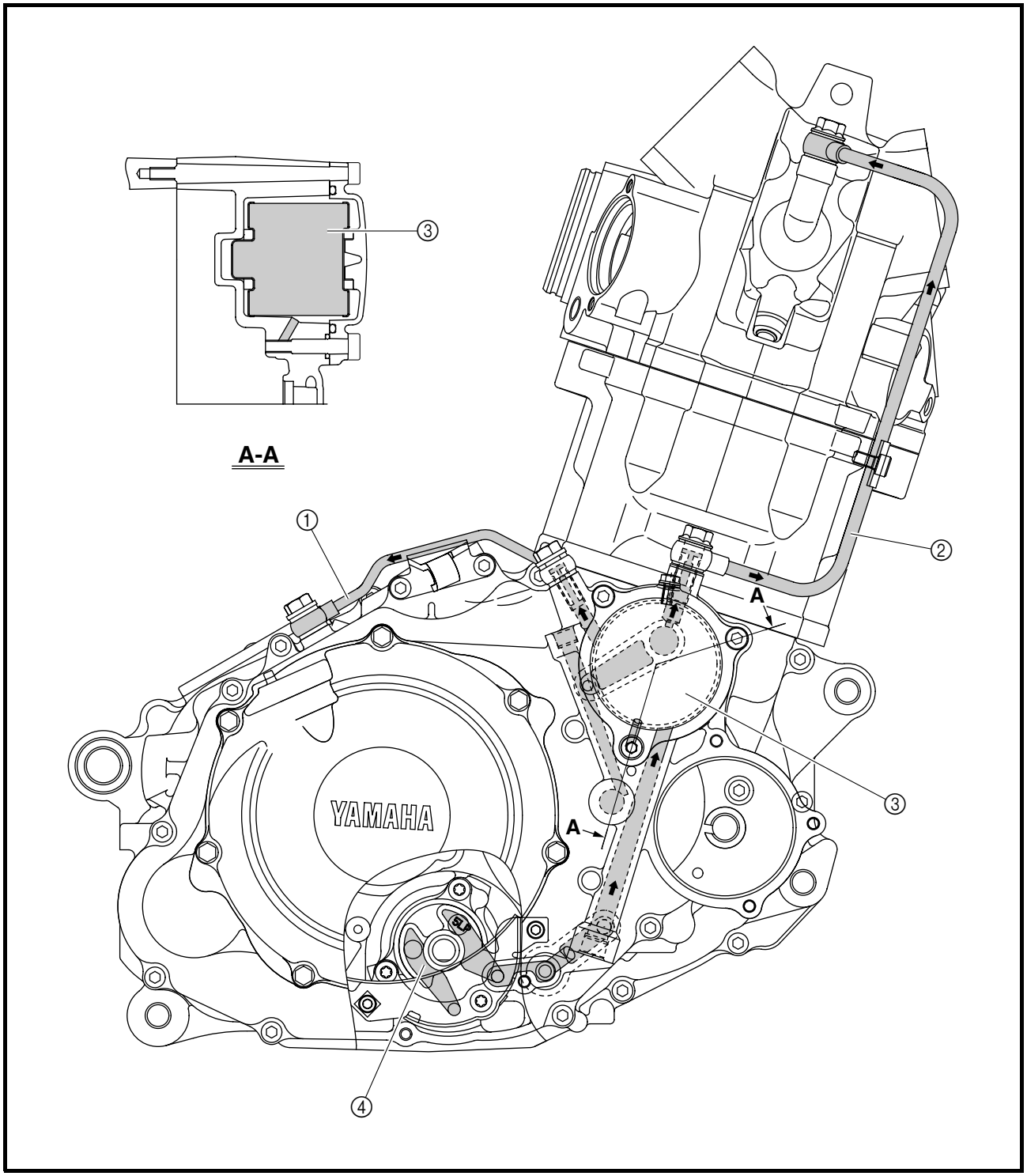


EAS00034
LUBRICATION DIAGRAMS

① Oil delivery hose 2
② Oil strainer
③ Oil delivery hose 1

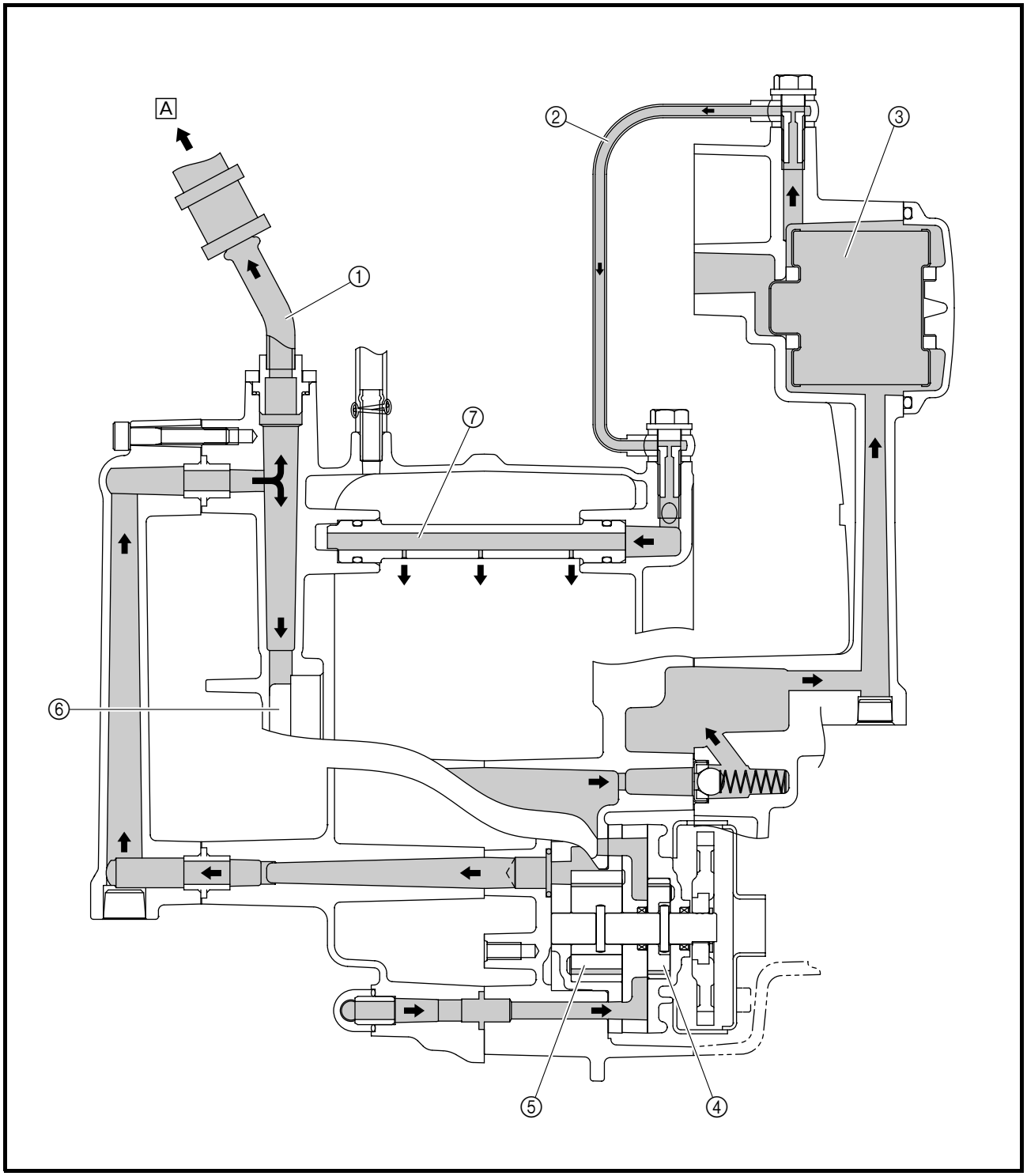


① Oil delivery pipe 2
② Oil delivery pipe 1
③ Oil filter
④ Oil pump

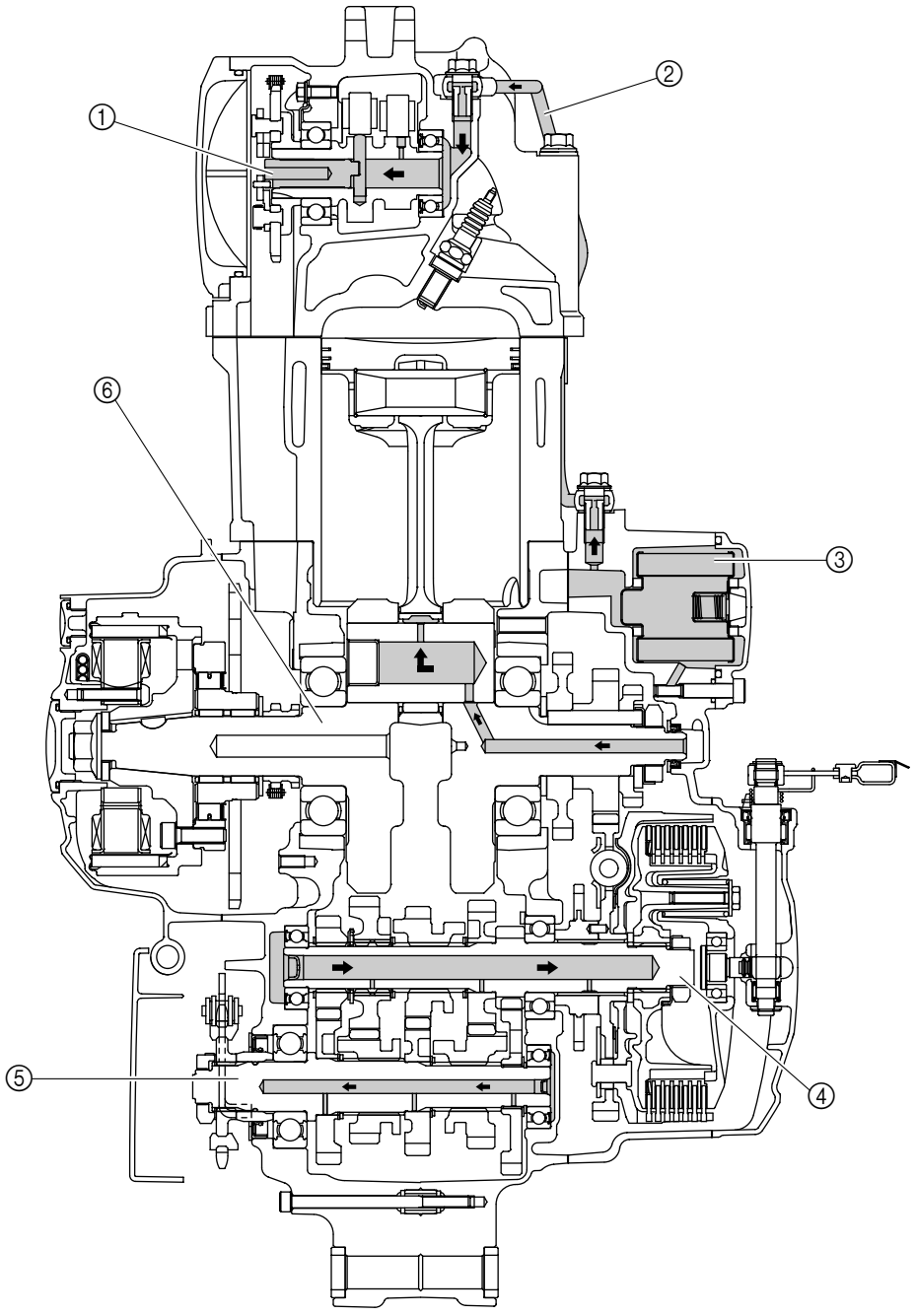


① Oil delivery hose 2
② Oil delivery pipe 2
③ Oil filter
④ Oil pump rotor 1
⑤ Oil pump rotor 2
⑥ Main axle
⑦ Oil delivery pipe 3

Ⓐ To oil tank



① Camshaft
② Oil delivery pipe 1
③ Oil filter
④ Main axle
⑤ Drive axle
⑥ Crankshaft



EAS00035
CABLE ROUTING

① Left handlebar switch lead
② Clutch switch lead
③ Clutch cable
④ Front brake light switch lead
⑤ Right handlebar switch lead
⑥ Throttle cable
⑦ Headlight lead
⑧ Meter assembly lead
⑨ Main switch lead
⑩ Immobilizer unit lead