YAMAHA

YFM7FGPW

SERVICE MANUAL

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EBS00001

YFM7FGPW
SERVICE MANUAL

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LIT-11616-20-11

EBS00002

NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha vehicle has a basic understanding of the mechanical ideas and the procedures of vehicle repair. Repairs attempted by anyone without this knowledge are likely to render the vehicle unsafe and unfit for use.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

NOTE:

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

EBS00003

IMPORTANT INFORMATION

Particularly important information is distinguished in this manual by the following notations.

⚠	The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!
⚠ WARNING	Failure to follow WARNING instructions could result in severe injury or death to the vehicle operator, a bystander or a person checking or repairing the vehicle.
CAUTION:	A CAUTION indicates special precautions that must be taken to avoid damage to the vehicle.
NOTE:	A NOTE provides key information to make procedures easier or clearer.

EBS00004

HOW TO USE THIS MANUAL

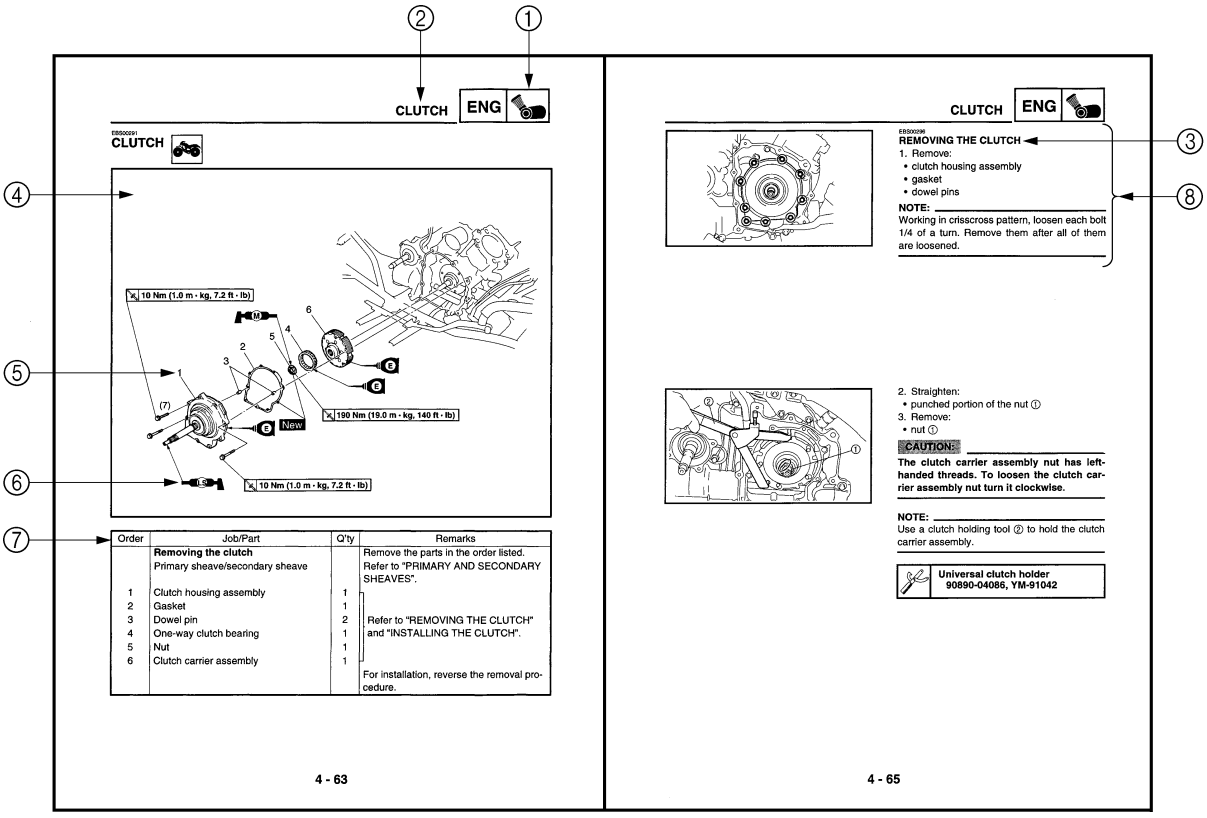
MANUAL ORGANIZATION

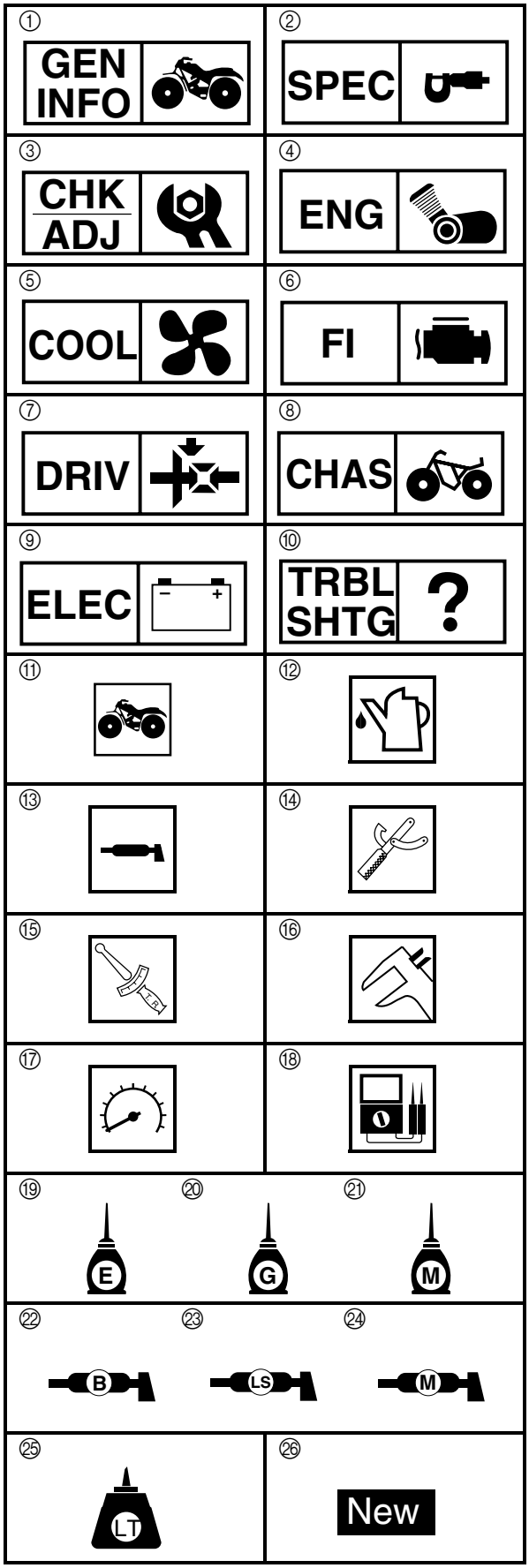
This manual consists of chapters for the main categories of subjects. (See “symbols”)
1st title ①: This is the title of the chapter with its symbol in the upper right corner of each page.
2nd title ②: This title indicates the section of the chapter and only appears on the first page of each section. It is located in the upper left corner of the page.
3rd title ③: This title indicates a sub-section that is followed by step-by-step procedures accompanied by corresponding illustrations.

EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each removal and disassembly section.

1. An easy-to-see exploded diagram ④ is provided for removal and disassembly jobs.
2. Numbers ⑤ are given in the order of the jobs in the exploded diagram. A number that is enclosed by a circle indicates a disassembly step.
3. An explanation of jobs and notes is presented in an easy-to-read way by the use of symbol marks ⑥. The meanings of the symbol marks are given on the next page.
4. A job instruction chart ⑦ accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
5. For jobs requiring more information, the step-by-step format supplements ⑧ are given in addition to the exploded diagram and the job instruction chart.





EBS00006

SYMBOLS

The following symbols are not relevant to every vehicle.

Symbols ① to ⑩ indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Engine
⑤ Cooling system
⑥ Fuel injection system
⑦ Drive train
⑧ Chassis
⑨ Electrical
⑩ Troubleshooting

Symbols ⑪ to ⑱ indicate the following

⑪ Can be serviced with engine mounted
⑫ Filling fluid
⑬ Lubricant
⑭ Special tool
⑮ Torque
⑯ Wear limit, clearance
⑰ Engine speed
⑱ Electrical data (Ω, V, A)

Symbols ⑲ to ㉔ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑲ Apply engine oil
⑳ Apply gear oil
㉑ Apply molybdenum disulfide oil
㉒ Apply wheel bearing grease
㉓ Apply lithium-soap-based grease
㉔ Apply molybdenum disulfide grease

Symbols ㉕ to ㉖ in the exploded diagrams indicate where to apply a locking agent ㉕ and when to install a new part ㉖.

㉕ Apply the locking agent (LOCTITE®)
㉖ Replace

EBS00008

TABLE OF CONTENTS

CONTENTS

CHAPTER 1
GENERAL INFORMATION

CHAPTER 2
SPECIFICATIONS

CHAPTER 3
PERIODIC CHECKS AND ADJUSTMENTS

CHAPTER 4
ENGINE

CHAPTER 5
COOLING SYSTEM

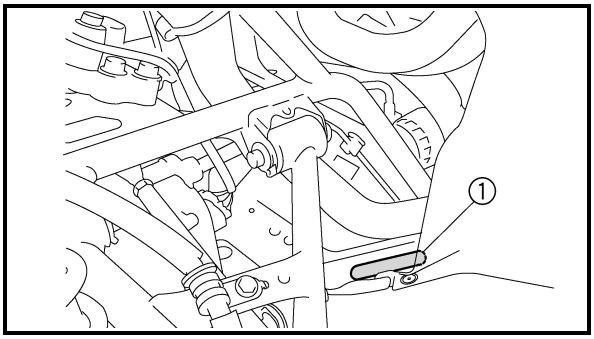
CHAPTER 6
FUEL INJECTION SYSTEM

CHAPTER 7
DRIVE TRAIN

CHAPTER 8
CHASSIS

CHAPTER 9
ELECTRICAL

CHAPTER 10
TROUBLESHOOTING



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GENERAL INFORMATION

VEHICLE IDENTIFICATION

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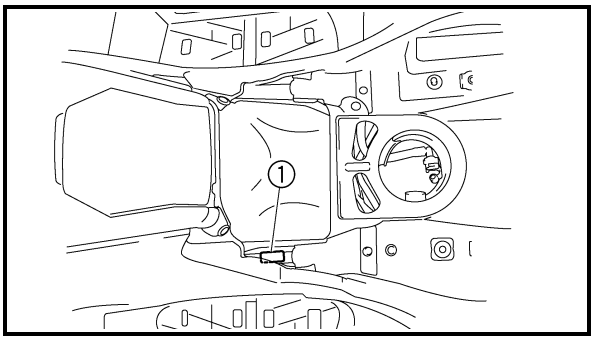
VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the front left side of the frame.



EBS00011

MODEL LABEL

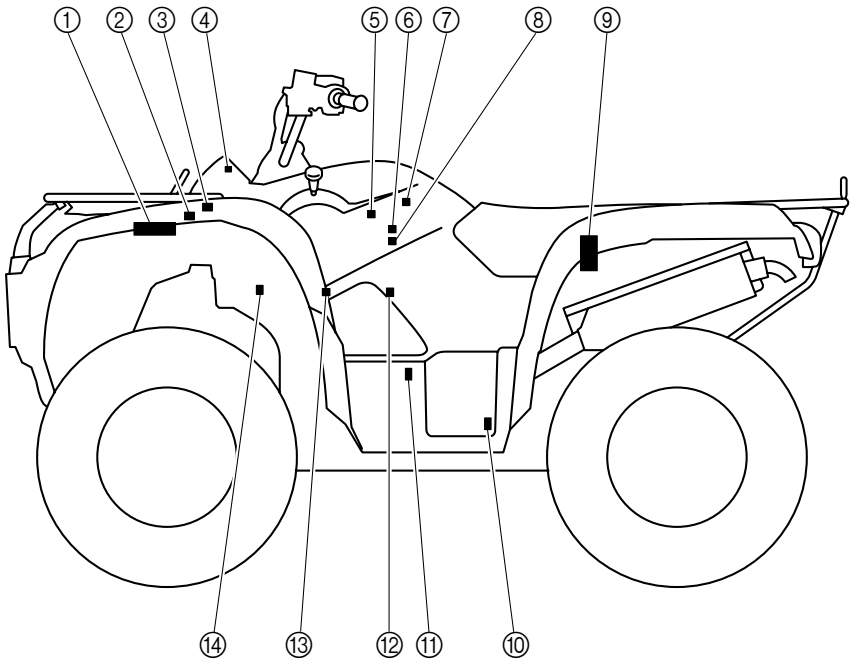
The model label ① is affixed at the location in the illustration. This information will be needed to order spare parts.

EAS20170
FEATURES
OUTLINE OF THE FI SYSTEM
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 the 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 carburetor.

Despite the same volume of intake air, the fuel volume requirement varies with the engine operating conditions, such as acceleration, deceleration, or operating 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 the engine 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 the 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.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions.



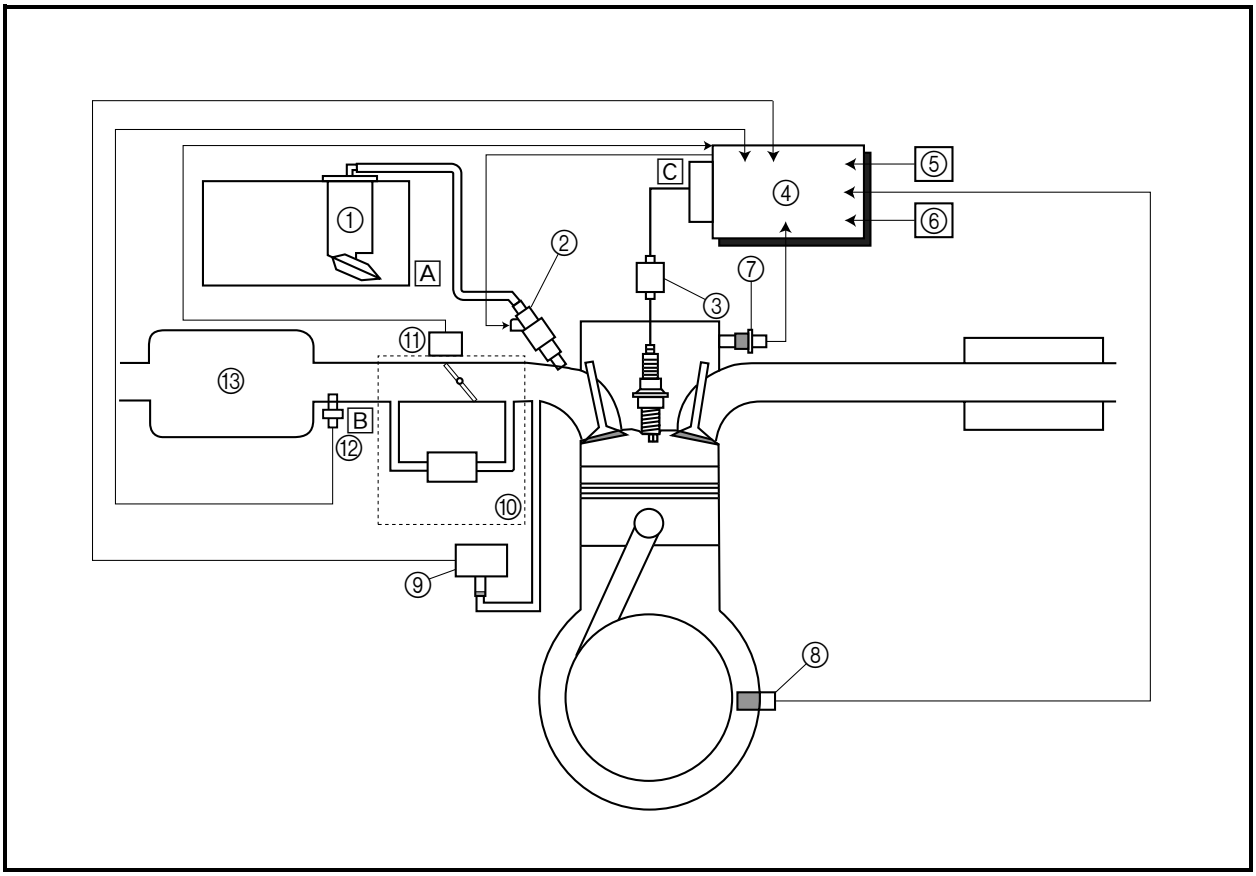
① ECU (engine control unit)
② Lean angle sensor
③ Fuel injection system relay
④ Engine trouble warning light
⑤ Intake air pressure sensor
⑥ TPS (throttle position sensor)
⑦ Intake air temperature sensor
⑧ Fuel injector
⑨ Fuel pump
⑩ Speed sensor
⑪ Crankshaft position sensor
⑫ Coolant temperature sensor
⑬ Spark plug
⑭ Ignition coil

FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kg/cm^2, 46.1 psi). Accordingly, when the energizing signal from the ECU energizes the fuel 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 fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel 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, coolant temperature sensor, lean angle sensor and speed sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals 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.

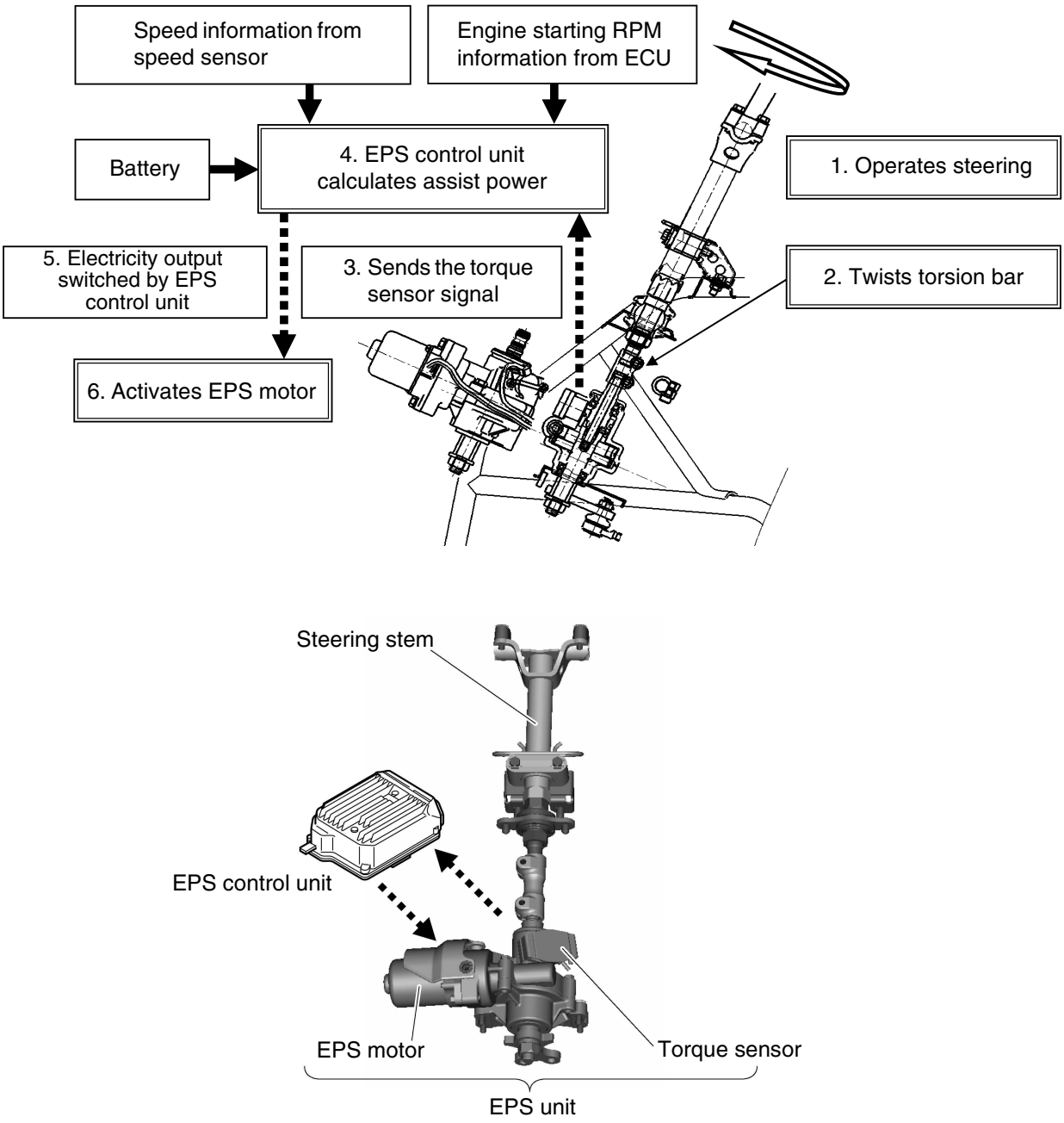
Illustration is for reference only.



① Fuel pump
② Fuel injector
③ Ignition coil
④ ECU (engine control unit)
⑤ Speed sensor
⑥ Lean angle sensor
⑦ Coolant temperature sensor
⑧ Crankshaft position sensor
⑨ Intake air pressure sensor
⑩ Throttle body
⑪ Throttle position sensor
⑫ Intake air temperature sensor
⑬ Air filter case

A Fuel system
B Air system
C Control system

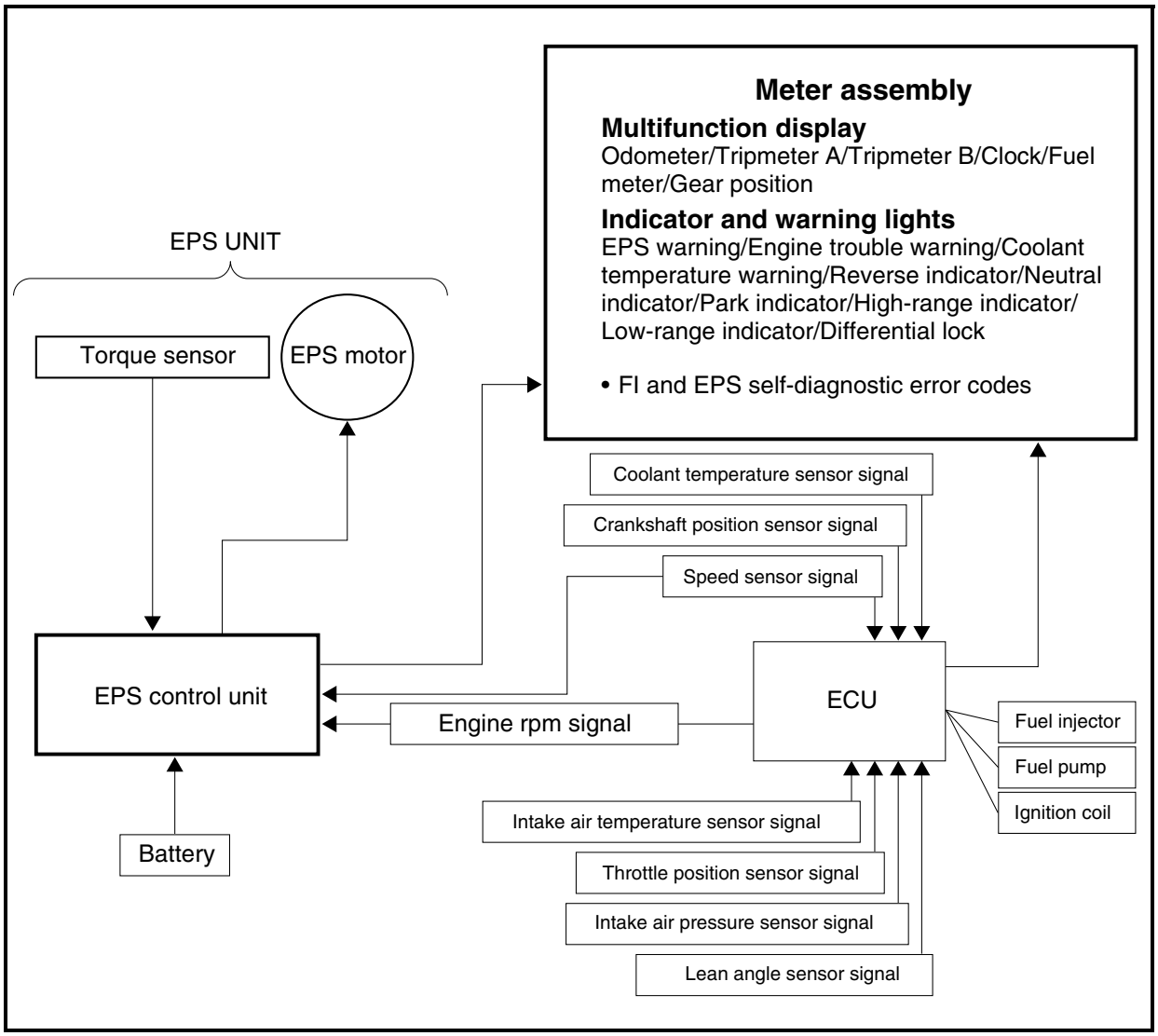
OUTLINE OF THE EPS (ELECTRIC POWER STEERING) SYSTEM

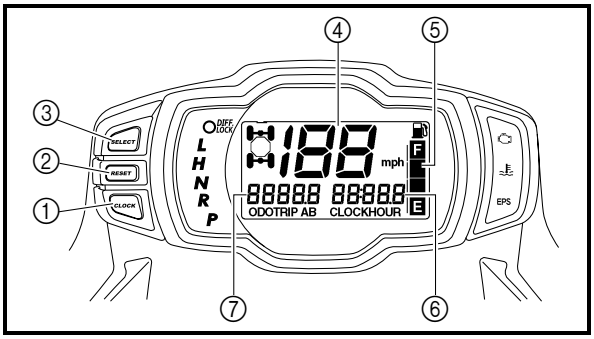


CAUTION:

To prevent accidental damage to the EPS unit, it must not be disassembled.

EPS (ELECTRIC POWER STEERING) SYSTEM BLOCK DIAGRAM





INSTRUMENT FUNCTIONS

EBU27291

Multifunction display

① "CLOCK" button
② "RESET" button
③ "SELECT" button
④ Speedometer
⑤ Fuel meter
⑥ Clock/Hour meter
⑦ Odometer/Tripmeter A/Tripmeter B

The multifunction display is equipped with the following:

- a speedometer (which shows the riding speed)
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a clock
- an hour meter (which shows the total time the key has been turned to "ON")
- a fuel meter
- a self-diagnosis device

Odometer and tripmeter modes

Pushing the "SELECT" button switches the display between the odometer mode "ODO" and the tripmeter modes "A" and "B" in the following order:

ODO → TRIP A → TRIP B → ODO

To reset a tripmeter, select it by pushing the "SELECT" button, and then push the "RESET" button for at least three seconds. The tripmeters can be used to estimate the distance that can be traveled with a full tank of fuel. This information will enable you to plan future fuel stops.

NOTE:

Holding in the "SELECT" button and then turning the key to "ON" switches the display between "mph" and "km/h".

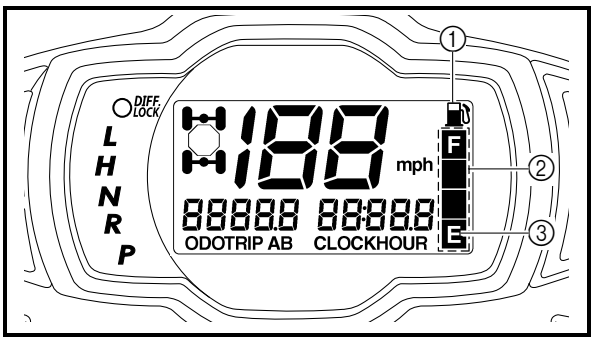
Clock mode

Pushing the “CLOCK” button switches the display between the clock mode “CLOCK” and the hour meter mode “HOUR” in the following order:

CLOCK → HOUR → CLOCK

To set the clock

1. Set the display to the clock mode.
2. Push the “SELECT” button and “RESET” button together for at least three seconds.
3. When the hour digits start flashing, push the “RESET” button to set the hours.
4. Push the “SELECT” button, and the minute digits will start flashing.
5. Push the “RESET” button to set the minutes.
6. Push the “SELECT” button and then release it to start the clock.



Fuel meter

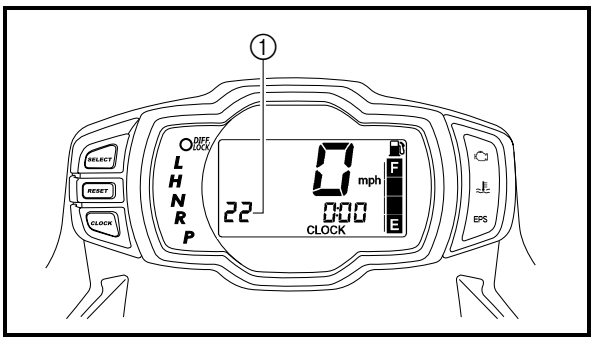
The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear from “F” (full) towards “E” (empty) as the fuel level decreases. When the “E” segment disappears and the fuel level warning indicator flashes, refuel as soon as possible.

NOTE:

This fuel meter is equipped with a self-diagnosis system. If the electrical circuit is defective, all the display segments and fuel level warning indicator will start flashing. If this occurs, check the electrical circuit.

Refer to “SIGNALING SYSTEM” in chapter 9.

① Fuel level warning indicator
② Fuel meter
③ “E” segment



Self-diagnosis device

This model is equipped with a self-diagnosis device for various electrical circuits.

If any of those circuits are defective, the multifunction display will indicate a two-digit error code. If the multifunction display indicates such an error code, note the code number, and check the vehicle.

ECB00810

CAUTION:

If the multifunction display indicates an error code, the vehicle should be checked as soon as possible in order to avoid engine damage.

① Error code display

EBS00013

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.

EBS00014

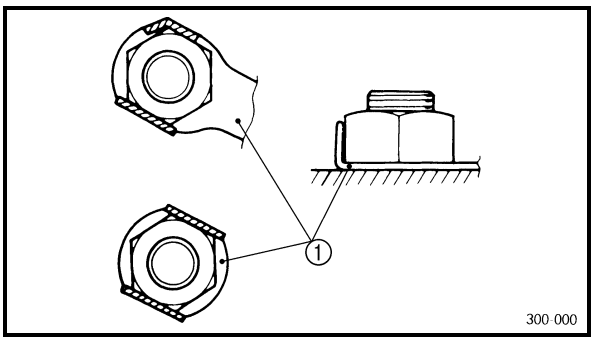
REPLACEMENT PARTS

1. 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.

EBS00015

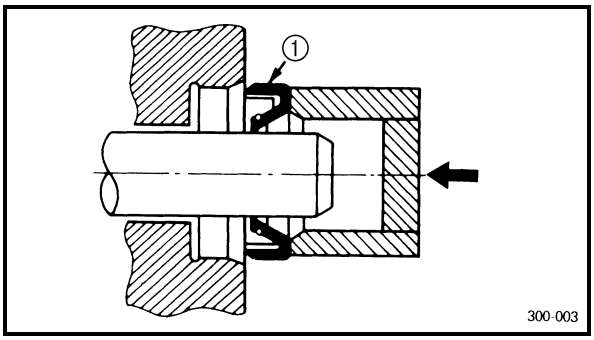
GASKETS, OIL SEALS AND O-RINGS

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.



EBS00016
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.



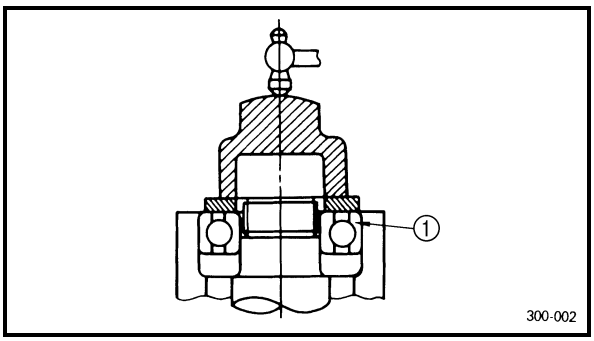
EBS00017
BEARINGS AND OIL SEALS

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.

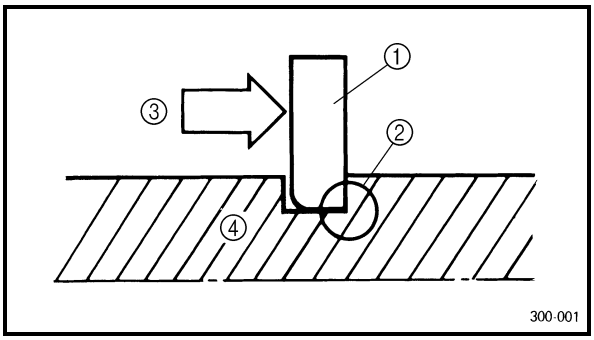
① Oil seal

CAUTION:

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



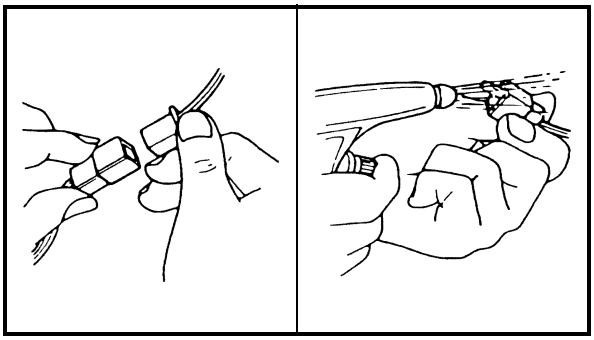
① Bearing

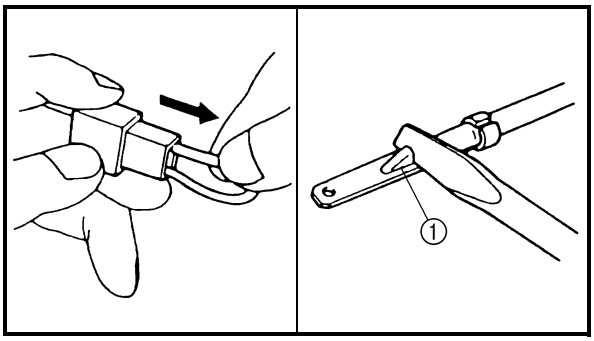


EBS00018
CIRCLIPS

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



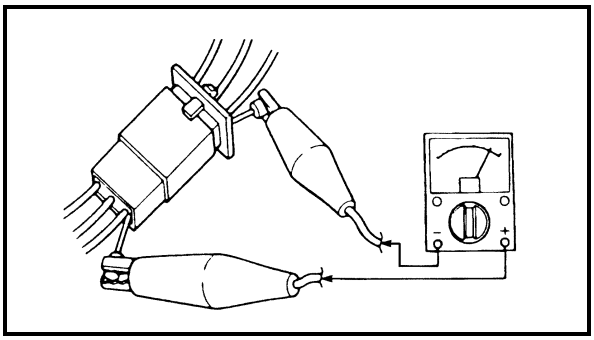


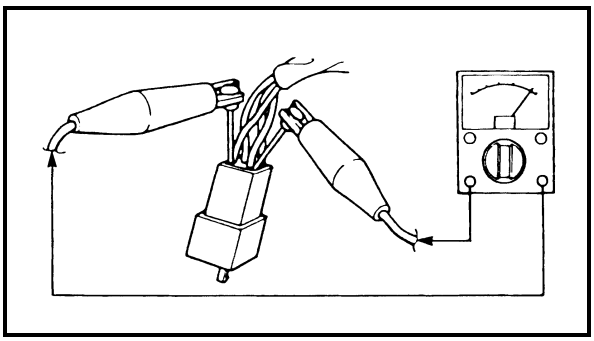
EBS00019
CHECKING THE CONNECTIONS
Check the leads, couplers, and connectors for stains, rust, moisture, etc.
1. Disconnect:
   - lead
   - coupler
   - connector
2. Check:
   - lead
   - coupler
   - connector
     Moisture → Dry with an air blower.
     Rust/stains → Connect and disconnect several times.
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.





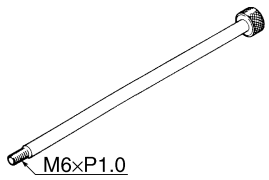
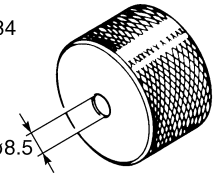
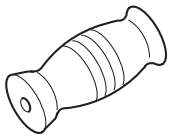
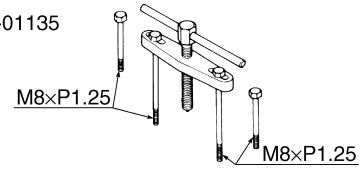
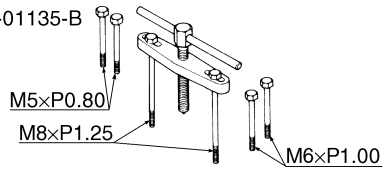
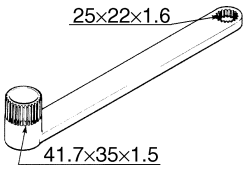
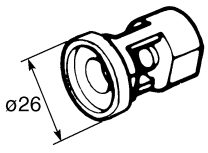
5. Check:
   - continuity (with the pocket tester)

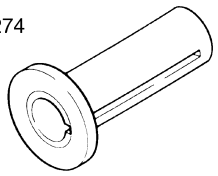
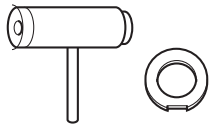
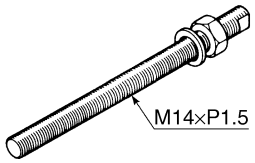
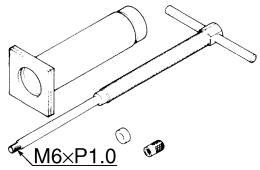
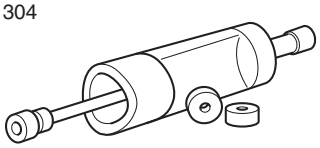
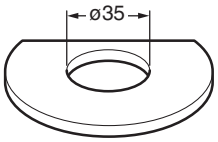
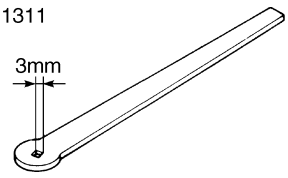
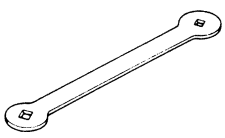
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

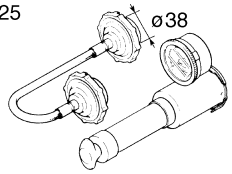
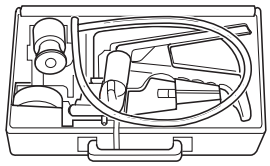
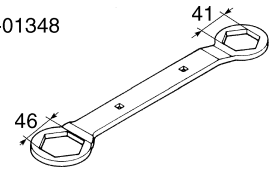
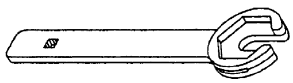
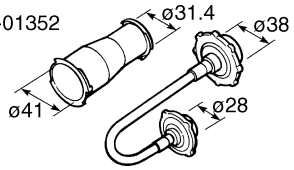
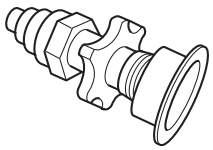
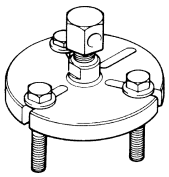
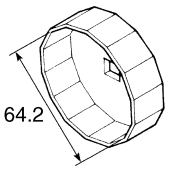
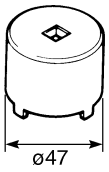
NOTE:
- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.

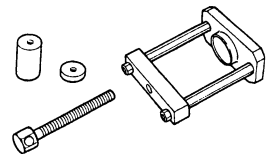
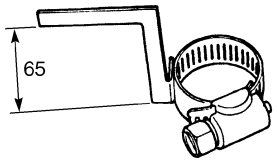
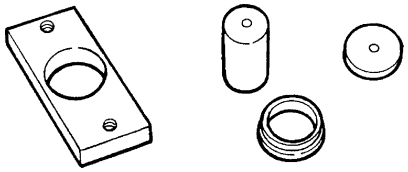
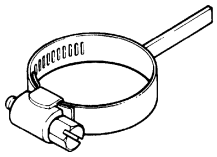
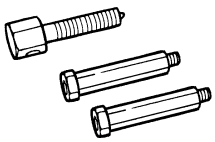
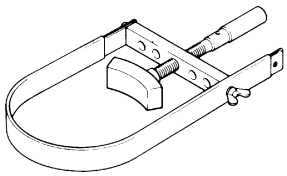
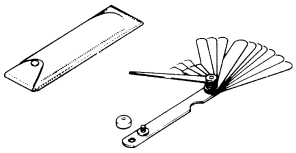
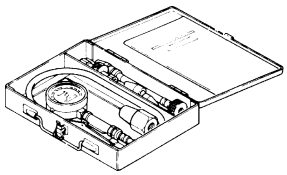
EBS00021
SPECIAL TOOLS

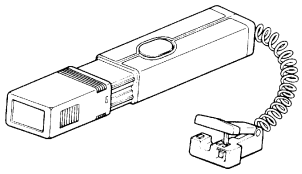
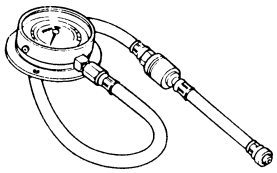
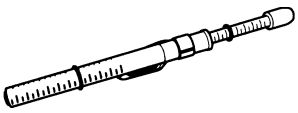
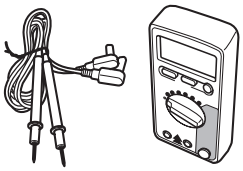
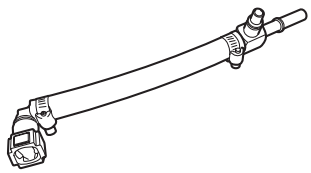
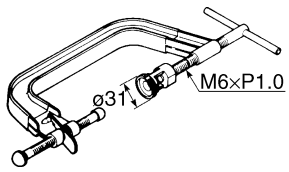
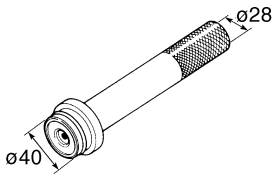
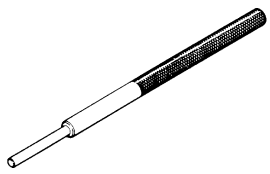
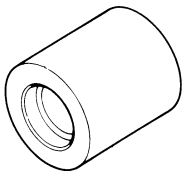
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided.
When placing an order, refer to the list provided below to avoid any mistakes.
For US and CDN
P/N. YM-, YU-, YS-, YK-, ACC-
Except for US and CDN
P/N. 90890-

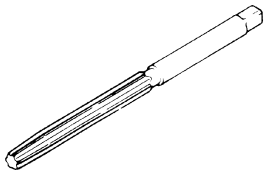
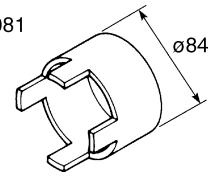
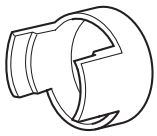
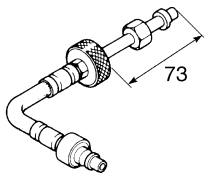
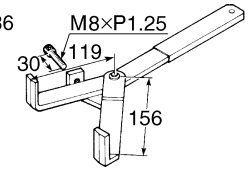
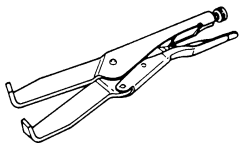
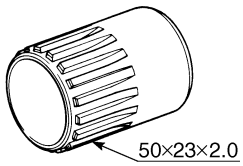
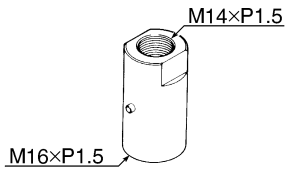
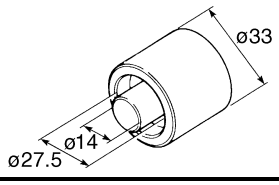
Tool No.	Tool name/How to use	Illustration
90890-01083 YU-01083-1	Slide hammer bolt Slide hammer bolt 6 mm This tool is used to remove the rocker arm shaft.	
90890-01084 YU-01083-3	Weight This tool is used to remove the rocker arm shaft.	90890-01084  YU-01083-3 
90890-01135 YU-01135-B	Crankcase separating tool Crankcase separator This tool is used to separate the crankcase.	90890-01135  YU-01135-B 
90890-01229 YM-01229	Coupling gear/middle shaft tool Gear holder This tool is needed when removing or installing the coupling gear nut.	
90890-01243 YM-01253-1	Valve spring compressor attachment Valve spring compressor adapter (26 mm) This tool is needed to remove and install the valve assemblies.	

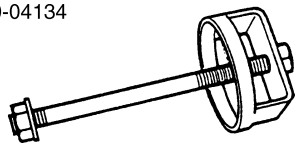
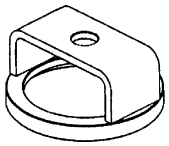
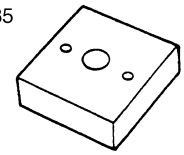
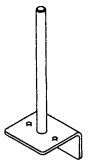
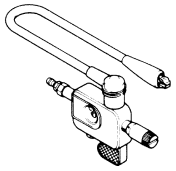
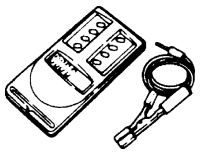
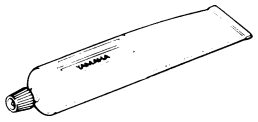
Tool No.	Tool name/How to use	Illustration
90890-01274 YU-90058 YU-90059	Crankshaft installer pot Installing pot Pot installer This tool is used to install the crankshaft.	90890-01274  YU-90058/YU-90059 
90890-01275 YU-90060	Crankshaft installer bolt Bolt This tool is used to install the crankshaft.	
90890-01304 YU-01304	Piston pin puller set Piston pin puller This tool is used to remove the piston pin.	90890-01304  YU-01304 
90890-01309 YU-90059	Spacer Pot spacer This tool is used to install the crankshaft.	
90890-01311 YM-08035-A	Tappet adjusting tool Valve adjuster 3 mm & 4 mm This tool is necessary for adjusting the valve clearance.	90890-01311  YM-08035-A 

Tool No.	Tool name/How to use	Illustration
90890-01325 YU-24460-01	Radiator cap tester Radiator pressure tester This tool is used to check the cooling system.	90890-01325  YU-24460-01 
90890-01348 YM-01348	Locknut wrench This tool is needed when removing or installing the secondary sheave spring.	90890-01348  YM-01348 
90890-01352 YU-33984	Radiator cap tester adapter Radiator pressure tester adapter This tool is used to check the cooling system.	90890-01352  YU-33984 
90890-01362 YU-33270-B	Flywheel puller Heavy duty puller This tool is used to remove the AC magneto rotor.	
90890-01426 YU-38411	Oil filter wrench This tool is needed to loosen or tighten the oil filter cartridge.	
90890-01430 YM-38404	Ring nut wrench This tool is needed to removing and installing the middle driven shaft bearing retainer.	

Tool No.	Tool name/How to use	Illustration
90890-01474 YM-01474	Ball joint remover These tools are used to removing or installing the ball joints.	
90890-01475 YM-01475	Gear lash measurement tool Middle drive gear lash tool This tool is used to measure the gear lash.	
90890-01480 YM-01480	Ball joint remover attachment set Ball joint adapter set These tools are used to removing or installing the ball joints.	
90890-01511	Final gear backlash band This tool is needed when measuring the final gear backlash.	
90890-01514	Ball joint remover short shaft set These tools are used to removing or installing the ball joints.	
90890-01701 YS-01880-A	Sheave holder Primary clutch holder This tool is needed to hold the primary sheave when removing or installing the sheave nuts.	
90890-03079 YM-34483	Thickness gauge Narrow gauge set This tool is used to measure the valve clearance.	
90890-03081 YU-33223	Compression gauge Engine compression tester This tool is needed to measure engine compression.	
90890-03112 YU-03112-C	Pocket tester Analog pocket tester This instrument is needed for checking the electrical systems.	

Tool No.	Tool name/How to use	Illustration
90890-03141 YU-03141	Timing light Inductive clamp timing light This tool is necessary for checking ignition timing.	
90890-03153 YU-03153	Pressure gauge This tool is used to measure fuel pressure.	
90890-03170 YM-03170	Belt tension gauge Rear drive belt tension gauge This tool is used to measure the steering tension.	
90890-03174 YU-A1927	Digital circuit tester Model 88 Multimeter with tachometer This tool is used to check the electrical systems.	
90890-03176 YM-03176	Fuel pressure adapter This tool is used to measure fuel pressure.	
90890-04019 YM-04019	Valve spring compressor This tool is used to remove or install the valve assemblies.	
90890-04058 YM-04058	Middle driven shaft bearing driver Bearing driver 40 mm This tool is used to install the water pump seal.	
90890-04064 YM-04064-A	Valve guide remover (ø6) Valve guide remover (6.0 mm) This tool is needed to remove and install the valve guides.	
90890-04065 YM-04065-A	Valve guide installer (ø6) Valve guide installer (6.0 mm) This tool is needed to install the valve guides.	

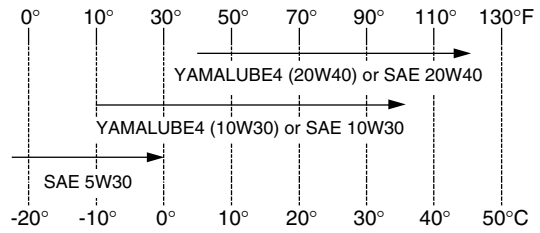
Tool No.	Tool name/How to use	Illustration
90890-04066 YM-04066	Valve guide reamer (ø6) Valve guide reamer (6.0 mm) This tool is needed to rebore the new valve guides.	
90890-04081 YM-91044	Spacer (crankshaft installer) Pot spacer This tool is used to install the crankshaft.	90890-04081  YM-91044 
90890-04082	Extension This tool is used to measure engine compression.	
90890-04086 YM-91042	Universal clutch holder This tool is needed to hold the clutch carrier when removing or installing the carrier nut.	90890-04086  YM-91042 
90890-04128 YM-04128	Bearing retainer wrench Middle gear bearing retainer This tool is needed when removing or installing the bearing retainers.	
90890-04130 YM-04059	Adapter (M16) Adapter #13 This tool is used to install the crankshaft.	
90890-04132 YM-33221-A	Mechanical seal installer Water pump seal installer This tool is used to install the water pump seal.	

Tool No.	Tool name/How to use	Illustration
90890-04134 YM-04134	Sheave spring compressor This tool is needed when removing or installing the secondary sheave spring.	90890-04134  YM-04134 
90890-04135 YM-04135	Sheave fixed block Sheave fixed bracket This tool is needed when removing or installing the secondary sheave spring.	90890-04135  YM-04135 
90890-06754 YM-34487	Ignition checker Opama pet-4000 spark checker This instrument is necessary for checking the ignition system components.	
90890-06760 YU-39951-B	Digital tachometer This tool is needed for checking engine rpm.	
90890-85505	Yamaha bond No. 1215 (Three bond No.1215®) This bond is used on crankcase mating surfaces, etc.	

EBS01001

SPECIFICATIONS

GENERAL SPECIFICATIONS

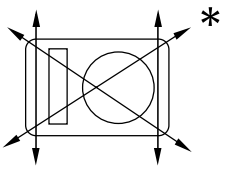
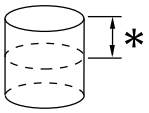
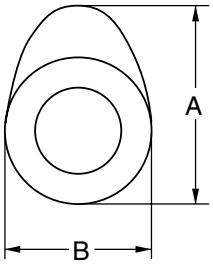
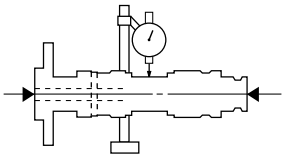
Item	Standard
Model code	3B41 3B45 3B48
Dimensions	
Overall length	2,065 mm (81.3 in)
Overall width	1,180 mm (46.5 in)
Overall height	1,240 mm (48.8 in)
Seat height	905 mm (35.6 in)
Wheelbase	1,250 mm (49.2 in)
Minimum ground clearance	275 mm (10.8 in)
Minimum turning radius	3,200 mm (126.0 in)
Basic weight	
With oil and fuel	294.0 kg (648 lb)
Engine	
Engine type	Liquid-cooled 4-stroke, SOHC
Cylinder arrangement	Forward-inclined single cylinder
Displacement	686.0 cm^3 (41.86 cu. in)
Bore × stroke	102.0 × 84.0 mm (4.02 × 3.31 in)
Compression ratio	9.20 : 1
Standard compression pressure (at sea level)	450 kPa (4.50 kg/cm^2, 64.0 psi)
Starting system	Electric starter
Lubrication system	Wet sump
Oil type or grade	
Engine oil	 API service SE, SF, SG type or higher JASO standard MA
Final gear oil	SAE 80 API GL-4 Hypoid gear oil
Differential gear oil	SAE 80 API GL-4 Hypoid gear oil

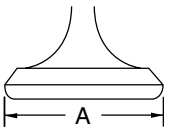
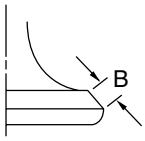
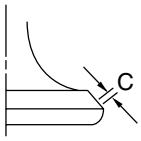
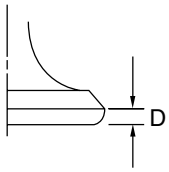
Item		Standard
Oil quantity		
Engine oil		
Periodic oil change		2.00 L (1.76 Imp qt, 2.11 US qt)
With oil filter replacement		2.10 L (1.85 Imp qt, 2.22 US qt)
Total amount		2.40 L (2.11 Imp qt, 2.54 US qt)
Final gear oil		
Periodic oil change		0.20 L (0.18 Imp qt, 0.21 US qt)
Total amount		0.25 L (0.22 Imp qt, 0.26 US qt)
Differential gear case oil		
Periodic oil change		0.215 L (0.19 Imp qt, 0.23 US qt)
Total amount		0.23 L (0.20 Imp qt, 0.24 US qt)
Radiator capacity (including all routes)		1.99 L (1.75 Imp qt, 2.10 US qt)
Air filter		Wet type element
Fuel		
Type		Unleaded gasoline only
Fuel tank capacity		20.0 L (4.40 Imp gal, 5.28 US gal)
Fuel reserve amount		4.5 L (0.99 Imp gal, 1.19 US gal)
Fuel injector		
Type/quantity		297500-1010/1
Manufacturer		DENSO
Spark plug		
Type/manufacturer		CR8E/NGK
Spark plug gap		0.7 ~ 0.8 mm (0.028 ~ 0.031 in)
Clutch type		Wet, centrifugal automatic
Transmission		
Primary reduction system		V-belt
Secondary reduction system		Shaft drive
Secondary reduction ratio		41/21 × 24/18 × 33/9 (9.544)
Transmission type		V-belt automatic
Operation		Left hand operation
Single speed automatic		2.380 ~ 0.700 : 1
Sub transmission ratio	low	31/16 (1.938)
	high	29/25 (1.160)
Reverse gear		23/14 × 28/23 (2.000)
Chassis		
Frame type		Steel tube frame
Caster angle		5.0°
Camber angle		0°
Kingpin angle		11.0°
Kingpin offset		0 mm (0 in)
Trail		26.0 mm (1.02 in)
Tread front (STD)		940.0 mm (37.01 in)
Tread rear (STD)		915.0 mm (37.01 in)
Toe-in (with tires touching the ground)		0 ~ 10.0 mm (0 ~ 0.39 in)

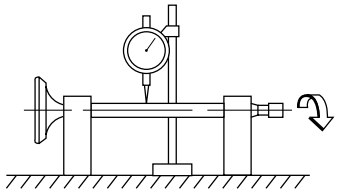
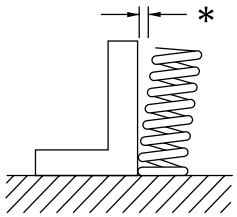
Item		Standard
Tire		
Type	front	Tubeless
	rear	Tubeless
Size	front	AT25 × 8-12
	rear	AT25 × 10-12
Manufacturer/model	front	DUNLOP/KT421
	rear	DUNLOP/KT425
Tire pressure (cold tire)		
Maximum load*		220.0 kg (485 lb)
Off-road riding	front	32 ~ 38 kPa (0.32 ~ 0.38 kg/cm^2, 4.6 ~ 5.5 psi)
	rear	27 ~ 33 kPa (0.27 ~ 0.33 kg/cm^2, 3.9 ~ 4.8 psi)
*Load is total weight of cargo, rider, accessories, and tongue		
Brake		
Front brake	type	Dual disc brake
	operation	Right hand operation
Rear brake	type	Dual disc brake
	operation	Left hand and right foot operation
Suspension		
Front suspension		Double wishbone
Rear suspension		Double wishbone
Shock absorber		
Front shock absorber		Coil spring/oil damper
Rear shock absorber		Coil spring/oil damper
Wheel travel		
Front wheel travel		180 mm (7.1 in)
Rear wheel travel		230 mm (9.1 in)
Electrical system		
Ignition system		Transistorized coil ignition (digital)
Generator system		AC magneto
Battery type		YTX20L-BS
Battery capacity		12 V 18.0 Ah
Bulb type		Halogen bulb

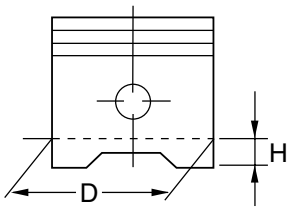
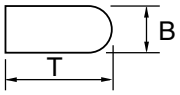
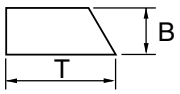
Item	Standard
Bulb voltage/wattage × quantity	
Headlight	12 V 35.0 W/35.0 W × 2
Tail/brake light	12 V 21.0/5.0 W × 1
Indicator light	
Neutral indicator light	LED
Reverse indicator light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
EPS warning light	LED
Park indicator light	LED
On-command four-wheel drive/differential gear lock indicator	LCD
High-range indicator light	LED
Low-range indicator light	LED
Differential gear lock indicator light	LED

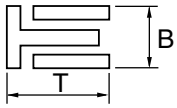
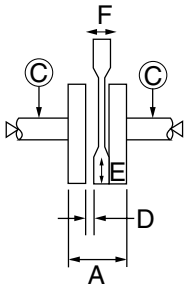
EBS01002
ENGINE SPECIFICATIONS

Item	Standard	Limit
Cylinder head		
Maximum warpage ∗ 	----	0.03 mm (0.0012 in)
Cylinder		
Bore	102.000 ~ 102.010 mm (4.0157 ~ 4.0161 in)	102.080 mm (4.0189 in)
Measuring point ∗ 	50.0 mm (1.97 in)	----
Maximum taper		0.05 mm (0.002 in)
Out of round		0.05 mm (0.002 in)
Camshaft		
Drive system	Chain drive (left)	----
Camshaft lobe dimensions 		
Intake measurement “A”	43.488 ~ 43.588 mm (1.7121 ~ 1.7161 in)	43.388 mm (1.7082 in)
“B”	36.959 ~ 37.059 mm (1.4551 ~ 1.4590 in)	36.859 mm (1.4511 in)
Exhaust measurement “A”	43.129 ~ 43.229 mm (1.6980 ~ 1.7019 in)	43.029 mm (1.6941 in)
“B”	37.007 ~ 37.107 mm (1.4570 ~ 1.4609 in)	36.907 mm (1.4530 in)
Maximum camshaft runout 	----	0.015 mm (0.0006 in)

Item	Standard	Limit
Timing chain		
Model/number of links	98XRH2010/126	----
Tensioning system	Automatic	----
Rocker arm/rocker arm shaft		
Rocker arm inside diameter	12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)	----
Shaft outside diameter	11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)	----
Arm-to-shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	----
Rocker-arm-to-rocker-arm-shaft clearance	0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)	----
Valve, valve seat, valve guide		
Valve clearance–intake (cold)	0.09 ~ 0.13 mm (0.0035 ~ 0.0051 in)	----
Valve clearance–exhaust (cold)	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	2.26 mm (0.0890 in)	----
Exhaust	2.26 mm (0.0890 in)	----
Valve seat width “C”		
Intake	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.60 mm (0.0630 in)
Exhaust	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.60 mm (0.0630 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)	6.050 mm (0.2382 in)
Exhaust	6.000 ~ 6.012 mm (0.2362 ~ 0.2367 in)	6.050 mm (0.2382 in)

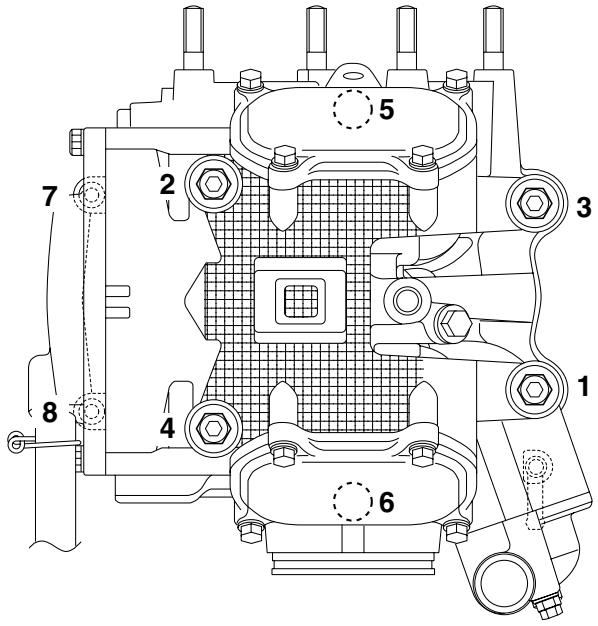
Item	Standard	Limit
Valve-stem-to-valve-guide clearance		
Intake	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.080 mm (0.0031 in)
Exhaust	0.025 ~ 0.052 mm (0.0010 ~ 0.0020 in)	0.100 mm (0.0039 in)
Valve stem runout	----	0.040 mm (0.0016 in)
		
Valve seat width		
Intake	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.60 mm (0.0630 in)
Exhaust	1.00 ~ 1.20 mm (0.0394 ~ 0.0472 in)	1.60 mm (0.0630 in)
Valve spring		
Free length		
Intake	38.79 mm (1.53 in)	36.85 mm (1.45 in)
Exhaust	38.79 mm (1.53 in)	36.85 mm (1.45 in)
Installed length (valve closed)		
Intake	35.00 mm (1.38 in)	----
Exhaust	35.00 mm (1.38 in)	----
Compressed spring force (installed)		
Intake	169 ~ 199 N (17.23 ~ 20.29 kgf, 37.99 ~ 44.73 lb)	----
Exhaust	169 ~ 199 N (17.23 ~ 20.29 kgf, 37.99 ~ 44.73 lb)	----
Spring tilt *		
		
Intake	----	2.5°/1.70 mm (2.5°/0.067 in)
Exhaust	----	2.5°/1.70 mm (2.5°/0.067 in)
Winding direction (top view)		
Intake	Clockwise	----
Exhaust	Clockwise	----

Item	Standard	Limit
Piston		
Piston-to-cylinder clearance	0.030 ~ 0.055 mm (0.0012 ~ 0.0022 in)	0.13 mm (0.0051 in)
Diameter "D" 	101.955 ~ 101.970 mm (4.0140 ~ 4.0146 in)	----
Height "H"	10.0 mm (0.39 in)	----
Offset	0.50 mm (0.0197 in)	----
Offset direction	Intake side	----
Piston pin bore inside diameter	23.004 ~ 23.015 mm (0.9057 ~ 0.9061 in)	23.045 mm (0.9073 in)
Piston pin outside diameter	22.991 ~ 23.000 mm (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 (0.05 × 0.15 in)	----
End gap (installed)	0.20 ~ 0.35 mm (0.008 ~ 0.014 in)	0.60 mm (0.024 in)
Ring side clearance	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	0.12 mm (0.0047 in)
2nd ring 		
Ring type	Taper	----
Dimensions (B × T)	1.20 × 4.00 mm (0.05 × 0.16 in)	----
End gap (installed)	0.75 ~ 0.90 mm (0.030 ~ 0.035 in)	1.25 mm (0.049 in)
Ring side clearance	0.030 ~ 0.070 mm (0.0012 ~ 0.0028 in)	0.13 mm (0.0051 in)

Item	Standard	Limit
Oil ring  		
Dimensions (B × T)	2.50 × 2.80 mm (0.10 × 0.11 in)	----
End gap (installed)	0.20 ~ 0.70 mm (0.008 ~ 0.028 in)	----
Ring side clearance	0.060 ~ 0.150 mm (0.0024 ~ 0.0059 in)	----
Crankshaft  		
Crank width “A”	74.95 ~ 75.00 mm (2.951 ~ 2.953 in)	----
Maximum runout “C”	----	0.030 mm (0.0012 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 mm (0.0063 ~ 0.0157 in)	----
Balancer		
Balancer drive method	Gear	----
Automatic centrifugal clutch		
Clutch shoe thickness	1.5 mm (0.06 in)	1.0 mm (0.04 in)
Clutch-in revolution	1,850 ~ 2,250 r/min	----
Clutch-stall revolution	3,500 ~ 4,100 r/min	----
Transmission		
Maximum main axle runout	----	0.06 mm (0.0024 in)
Maximum drive axle runout	----	0.06 mm (0.0024 in)
Shifting mechanism		
Shift mechanism type	Shift drum and guide bar	----
Decompression device		
Device type	Auto decomp	----
Air filter oil grade	Foam air filter oil or equivalent oil	----
Throttle body		
Model/manufacturer × quantity	44EIS/MIKUNI × 1	----
Engine idle speed	1,350 ~ 1,450 r/min	----
Intake vacuum	35.0 kPa (263 mmHg, 10.3 inHg)	----

Item	Standard	Limit
Fuel pump		
Pump type	Electrical	----
Model/manufacturer	3B4/DENSO	----
Oil filter type	Cartridge (paper)	----
Oil pump		
Oil pump type	Trochoid	----
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (0.0047 in)	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090 ~ 0.170 mm (0.0035 ~ 0.0067 in)	0.24 mm (0.0094 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.03 ~ 0.10 mm (0.0012 ~ 0.0039 in)	0.17 mm (0.0067 in)
Oil pressure (hot)	50.0 kPa at 1,600 r/min (0.50 kg/cm^2 at 1,600 r/min, 7.1 psi at 1,600 r/min)	----
Pressure check location	Cylinder head	----
Cooling system		
Radiator core		
Width	340.0 mm (13.39 in)	----
Height	248.2 mm (9.77 in)	----
Depth	22.0 mm (0.87 in)	----
Radiator cap opening pressure	93.3 ~ 122.7 kPa (0.933 ~ 1.227 kg/cm^2, 13.27 ~ 17.45 psi)	----
Coolant reservoir capacity		
Up to the maximum level mark	0.17 L (0.15 Imp qt, 0.18 US qt)	----
From low to full level	0.14 L (0.12 Imp qt, 0.15 US qt)	----
Water pump		
Water pump type	Single-suction centrifugal pump	----
Reduction ratio	32/31 (1.032)	----
Shaft drive		
Middle gear backlash	0.10 ~ 0.30 mm (0.004 ~ 0.012 in)	----
Final gear backlash	0.10 ~ 0.20 mm (0.0039 ~ 0.0079 in)	----
Differential gear backlash	0.05 ~ 0.25 mm (0.0020 ~ 0.0098 in)	----

Cylinder head tightening sequence



EBS01003
CHASSIS SPECIFICATIONS

Item	Standard	Limit
Steering system		
Steering bearing type	Ball and race bearing	----
Steering tension	50 N (5.0 kgf)	----
Front suspension		
Shock absorber travel	90.7 mm (3.57 in)	----
Spring free length	292.0 mm (11.50 in)	----
Installed length	237.0 mm (9.33 in)	----
Spring rate (K1)	23.00 N/mm (2.35 kg/mm, 131.33 lb/in)	----
Spring stroke (K1)	0 ~ 90.7 mm (0 ~ 3.57 in)	----
Optional spring available	No	----
Rear suspension		
Shock absorber travel	109.2 mm (4.30 in)	----
Spring free length	314.5 mm (12.38 in)	----
Installed length	271.0 mm (10.67 in)	----
Spring rate (K1)	33.50 N/mm (3.42 kg/mm, 191.28 lb/in)	----
Spring rate (K2)	36.00 N/mm (3.67 kg/mm, 205.56 lb/in)	----
Spring stroke (K1)	0 ~ 46.5 mm (0 ~ 1.83 in)	----
Spring stroke (K2)	46.5 ~ 109.2 mm (1.83 ~ 4.30 in)	----
Optional spring available	No	----
Front wheel		
Type	Panel wheel	----
Rim size	12 × 6.0 AT	----
Rim material	Aluminum	----
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)
Rear wheel		
Type	Panel wheel	----
Rim size	12 × 7.5 AT	----
Rim material	Aluminum	----
Maximum radial wheel runout	----	2.0 mm (0.08 in)
Maximum lateral wheel runout	----	2.0 mm (0.08 in)

Item	Standard	Limit
Front disc brake		
Type	Dual	----
Disc outside diameter × thickness	220.0 × 3.5 mm (8.66 × 0.14 in)	----
Brake disc minimum thickness	3.0 mm (0.12 in)	----
Brake disc maximum deflection	0.1 mm (0.004 in)	----
Pad thickness inner	4.4 mm (0.17 in)	1.0 mm (0.04 in)
Pad thickness outer	4.4 mm (0.17 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.70 mm (0.50 in)	----
Caliper cylinder inside diameter	33.96 mm (1.34 in)	----
Brake fluid type	DOT 4	----
Rear disc brake		
Type	Dual	----
Disc outside diameter × thickness	205.0 × 3.5 mm (8.07 × 0.14 in)	----
Brake disc minimum thickness	3.0 mm (0.12 in)	----
Brake disc maximum deflection	0.1 mm (0.004 in)	----
Pad thickness inner	5.8 mm (0.23 in)	1.0 mm (0.04 in)
Pad thickness outer	5.8 mm (0.23 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	12.70 mm (0.50 in)	----
Caliper cylinder inside diameter	33.96 mm (1.34 in)	----
Brake fluid type	DOT 4	----
Brake lever and brake pedal		
Brake pedal position	56.7 mm (2.23 in)	----
Brake pedal free play	0 ~ 5.0 mm (0 ~ 0.20 in)	----
Throttle lever free play	3.0 ~ 5.0 mm (0.12 ~ 0.20 in)	----

EBS01004
ELECTRICAL SPECIFICATIONS

Item	Standard	Limit
System voltage	12 V	----
Ignition system		
Ignition timing (B.T.D.C.)	12°/1,400 r/min	----
Advancer type	Digital	----
Transistorized coil ignition		
Crankshaft position sensor resistance/color	459 ~ 561 Ω at 20 °C (68 °F)/ black-green/yellow	----
ECU		
Model/manufacturer	3B4/MITSUBISHI	----
Ignition coil		
Model/manufacturer	JO226/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	Resin	----
Resistance	10.0 kΩ	----
AC magneto		
Model/manufacturer	F4T393/MITSUBISHI	----
Standard output	14.0 V 35.0 A at 5,000 r/min	----
Stator coil resistance/color	0.108 ~ 0.132 Ω at 20 °C (68 °F)/ white-white	----
Rectifier/regulator		
Type	Semiconductor-short-circuit	----
Model/manufacturer	FH012AA/SHINDENGEN	----
No load regulated voltage (DC)	14.2 ~ 14.8 V	----
Rectifier capacity	50.0 A	----
Withstand voltage	40.0 V	----
Electric starting system		
Type	Constant mesh	----
Starter motor		
Model/manufacturer	SM-13/MITSUBA	----
Power output	0.80 kW	----
Armature coil resistance	0.0250 ~ 0.0350 Ω at 20 °C (68 °F)	----
Brush 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, 27.54 ~ 36.03 oz)	----
Commutator diameter	28.0 mm (1.10 in)	27.0 mm (1.06 in)
Mica undercut	0.70 mm (0.03 in)	----

Item	Standard	Limit
Starter relay		
Model/manufacturer	2768113-A/JIDECO	----
Amperage rating	180.0 A	----
Coil winding resistance	4.18 ~ 4.62 Ω at 20 °C (68 °F)	----
Fuel gauge		
Sender unit resistance (full)	19.00 ~ 21.00 Ω	----
Sender unit resistance (empty)	139.00 ~ 141.00 Ω	----
Starting circuit cut-off relay		
Model/manufacturer	ACM33211/MATSUSHITA	----
Coil resistance	96.0 Ω	----
Radiator fan motor relay		
Model/manufacturer	ACM33211/MATSUSHITA	----
Coil resistance	96.0 Ω	----
Circuit breaker		
Circuit breaker type	Fuse	----
Fuses		
Main fuse	40.0 A	----
Headlight fuse	15.0 A	----
Signaling system fuse	5.0 A	----
Ignition fuse	10.0 A	----
Auxiliary DC jack fuse	15.0 A	----
Fuel injection system fuse	15.0 A	----
Four-wheel-drive motor fuse	10.0 A	----
EPS fuse	40.0 A	----
Radiator fan motor fuse	15.0 A	----
Spare fuse	40.0 A	----
	15.0 A	----
	10.0 A	----
	5.0 A	----

EBS01005

TIGHTENING TORQUES

ENGINE TIGHTENING TORQUES

Item	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	Bolt	M9	4	35	3.5	25	M
Cylinder head	Bolt	M9	2	38	3.8	27	E
Cylinder head	Bolt	M6	2	10	1.0	7.2	
Spark plug	—	M10	1	13	1.3	9.4	
Oil gallery bolt	Union bolt	M8	1	10	1.0	7.2	
Cylinder	Bolt	M10	4	50	5.0	36	See NOTE. E
AC magneto rotor	Nut	M16	1	70	7.0	50	
Balancer driven gear	Nut	M18	1	80	8.0	58	Use a lock washer.
Thermostat cover	Bolt	M6	2	10	1.0	7.2	
Cylinder head air bleed bolt	Bolt	M6	1	10	1.0	7.2	
Valve adjusting screw	Nut	M6	4	14	1.4	10	
Decompression assembly	Bolt	M7	2	20	2.0	14	
Timing chain guide (intake side)	Bolt	M6	2	10	1.0	7.2	L
Timing chain tensioner cap	Bolt	M16	1	20	2.0	14	
Timing chain tensioner	Bolt	M6	2	10	1.0	7.2	
Bearing retainer (camshaft)	Bolt	M6	2	10	1.0	7.2	L
Camshaft sprocket cover	Bolt	M6	2	10	1.0	7.2	
Tappet cover	Bolt	M6	8	10	1.0	7.2	
Camshaft sprocket	Bolt	M7	2	20	2.0	14	
Crankcase	Bolt	M8	2	26	2.6	19	
	Bolt	M6	4	10	1.0	7.2	
	Bolt	M6	8	10	1.0	7.2	
Engine oil drain bolt	Bolt	M14	1	30	3.0	22	
Oil filter cartridge	—	M20	1	17	1.7	12	
Oil filter cartridge union bolt	Union bolt	M20	1	68	6.8	49	E
Oil delivery pipe	Union bolt	M14	2	35	3.5	25	
Oil delivery pipe	Union bolt	M10	1	20	2.0	14	
Oil pump	Bolt	M6	3	10	1.0	7.2	
Oil pump driven gear	Nut	M10	1	22	2.2	16	Use a lock washer.
Bearing retainer (crankcase)	Bolt	M6	2	10	1.0	7.2	L
Exhaust pipe protector	Bolt	M6	2	7	0.7	5.1	
Muffler and frame	Bolt	M8	1	20	2.0	14	
Muffler and muffler bracket	Bolt	M8	2	20	2.0	14	
Exhaust pipe	Nut	M8	4	20	2.0	14	
Water pump housing	Bolt	M6	2	10	1.0	7.2	
Coolant drain bolt	Bolt	M6	1	10	1.0	7.2	
Water pump air bleed bolt	Bolt	M6	1	10	1.0	7.2	

Item	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m · kg	ft · lb	
Water pump outlet pipe	Bolt	M6	1	10	1.0	7.2	
Water jacket joint	Bolt	M6	2	10	1.0	7.2	
Timing chain guide	Bolt	M6	2	10	1.0	7.2	
Crankshaft end accessing screw	—	M36	1	10	1.0	7.2	
Timing mark accessing screw	—	M14	1	6	0.6	4.3	
Drive belt cover	Bolt	M6	12	10	1.0	7.2	
Bearing housing (primary sheave assembly)	Bolt	M6	4	10	1.0	7.2	
AC magneto/crankshaft position sensor lead holder	Bolt	M5	2	7	0.7	5.1	
Starter one-way clutch	Screw	M8	3	30	3.0	22	
Clutch housing assembly	Bolt	M6	9	10	1.0	7.2	
Clutch carrier assembly	Nut	M22	1	190	19.0	140	Left-hand thread Stake. (M)
Middle drive pinion gear nut	Nut	M22	1	180	18.0	130	Stake.
Middle driven shaft bearing housing	Bolt	M8	4	32	3.2	23	
Middle drive shaft bearing retainer	Bolt	M6	4	29	2.9	21	
Front drive shaft coupling gear nut (middle gear side)	Nut	M16	1	115	11.5	85	
Middle driven shaft bearing retainer	Nut	M55	1	80	8.0	58	Left-hand thread
Middle driven pinion gear bearing retainer	Nut	M60	1	130	13.0	94	Left-hand thread
Rear drive shaft coupling gear nut (middle gear side)	Nut	M16	1	150	15.0	110	
Middle driven pinion gear bearing housing	Bolt	M8	4	25	2.5	18	
Primary sheave assembly	Nut	M16	1	140	14.0	100	
Secondary sheave spring retainer	Nut	M36	1	90	9.0	65	
Secondary sheave assembly	Nut	M16	1	100	10.0	72	
Shift lever 2 assembly	Bolt	M6	1	14	1.4	10	
Shift drum stopper	Bolt	M14	1	18	1.8	13	
Stopper lever stopper	Bolt	M14	1	18	1.8	13	
Stator coil assembly	Bolt	M6	3	7	0.7	5.1	
Crankshaft position sensor	Bolt	M5	2	7	0.7	5.1	
Coolant temperature sensor	—	M12	1	18	1.8	13	
Gear position switch	Bolt	M6	2	7	0.7	5.1	
Reverse switch	—	M10	1	17	1.7	12	
Speed sensor	Bolt	M6	1	10	1.0	7.2	

NOTE:
Temporarily tighten the cylinder bolts to 15 Nm (1.5 m · kg, 11 ft · lb) and then tighten them to 50 Nm (5.0 m · kg, 36 ft · lb).

EBS01006
CHASSIS TIGHTENING TORQUES

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Engine and front rubber damper	M10	42	4.2	30	
Engine and front rubber damper	M6	10	1.0	7.2	LG
Engine and rear rubber damper	M10	42	4.2	30	
Engine and rear rubber damper	M6	10	1.0	7.2	LG
Rubber damper and frame	M10	42	4.2	30	
Differential gear case and frame	M10	55	5.5	40	
Differential gear case and frame	M10	55	5.5	40	LG
Final gear case and frame	M10	55	5.5	40	
Radiator and frame	M6	7	0.7	5.1	
Coolant reservoir and frame	M6	7	0.7	5.1	
Shift arm	M6	14	1.4	10	
Select lever shift rod locknut	M8	15	1.5	11	
Select lever unit and frame	M6	7	0.7	5.1	
Select lever guide and frame	M6	7	0.7	5.1	
Front grill and front grill bracket	M6	7	0.7	5.1	
Front grill bracket and frame	M6	7	0.7	5.1	
Front fender and frame	M6	7	0.7	5.1	
Rear fender and frame	M6	7	0.7	5.1	
Radiator bracket and frame	M6	7	0.7	5.1	
Rear upper arm and frame	M10	45	4.5	32	LS
Rear lower arm and frame	M10	45	4.5	32	LS
Rear shock absorber and frame	M10	45	4.5	32	
Rear shock absorber and rear lower arm	M10	45	4.5	32	
Rear knuckle and rear upper arm	M10	45	4.5	32	
Rear knuckle and rear lower arm	M10	45	4.5	32	
Rear brake hose guide and rear lower arm	M6	7	0.7	5.1	
Stabilizer joint and stabilizer	M10	50	5.0	36	
Stabilizer joint and rear lower arm	M10	50	5.0	36	
Stabilizer holder and frame	M8	30	3.0	22	
Rear arm protector and rear lower arm	M6	7	0.7	5.1	
Front upper arm and frame	M10	45	4.5	32	LS
Front lower arm and frame	M10	45	4.5	32	LS
Front shock absorber and frame	M10	45	4.5	32	
Front shock absorber and front lower arm	M10	45	4.5	32	
Front brake hose holder and front upper arm	M6	7	0.7	5.1	
Select lever shift rod end	M10	15	1.5	11	Left-hand thread
Steering stem bushing and steering stem bracket	M8	23	2.3	17	
Steering stem joint bolt	M8	30	3.0	22	LG
EPS unit and frame	M8	30	3.0	22	LG
Steering stem bracket and frame	M10	50	5.0	36	LG
Steering stem bearing and frame	M10	50	5.0	36	LG

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Pitman arm nut	M16	210	21.0	150	
EPS motor cover	M6	7	0.7	5.1	
Pitman arm and tie-rod	M10	25	2.5	18	
Steering knuckle and tie-rod	M10	25	2.5	18	
Steering knuckle and front lower arm	M12	30	3.0	22	
Front arm protector and front lower arm	M6	7	0.7	5.1	
Fuel tank and fuel pump	M6	7	0.7	5.1	
Fuel tank and frame	M6	7	0.7	5.1	
Fuel tank side cover and frame	M6	7	0.7	5.1	
Front wheel and front wheel hub	M10	55	5.5	40	
Front wheel axle nut	M20	260	26.0	190	Stake.
Front brake caliper and steering knuckle	M8	30	3.0	22	
Front brake caliper bleed screw	M8	5	0.5	3.6	
Front brake disc and front wheel hub	M8	30	3.0	22	
Rear brake disc and rear wheel hub	M8	30	3.0	22	
Rear wheel and rear wheel hub	M10	55	5.5	40	
Rear wheel axle nut	M20	260	26.0	190	Stake.
Rear brake caliper and rear knuckle	M8	30	3.0	22	
Rear brake caliper bleed screw	M8	5	0.5	3.6	
Brake pad holding bolt	M6	17	1.7	12	
Rear knuckle and brake disc guard	M6	7	0.7	5.1	
Steering knuckle and brake disc guard	M6	7	0.7	5.1	
Brake master cylinder and brake master cylinder holder	M6	7	0.7	5.1	
Brake lever pivot	M6	6	0.6	4.3	Silicone grease
Handlebar holder and steering shaft	M8	20	2.0	14	
Brake hose joint and frame	M6	10	1.0	7.2	
Brake hose joint and brake hose	M10	19	1.9	13	
Brake hose union bolt	M10	27	2.7	19	
Rear knuckle and brake hose protector	M6	7	0.7	5.1	
Footrest bracket and frame	M10	53	5.3	38	
Footrest board and footrest bracket	M6	7	0.7	5.1	
Footrest and footrest board	M6	7	0.7	5.1	
Brake pedal adjusting nut	M6	7	0.7	5.1	
Shift control cable and shift lever cover	M14	17	1.7	12	
Front guard and frame	M8	26	2.6	19	
Front carrier and front guard	M8	26	2.6	19	
Front carrier and front carrier bracket	M8	26	2.6	19	
Front carrier bracket and frame	M8	26	2.6	19	
Front carrier and front fender	M6	7	0.7	5.1	
Rear carrier and rear carrier bracket	M8	34	3.4	24	
Rear carrier bracket and frame	M10	48	4.8	35	

Part to be tightened	Thread size	Tightening torque			Remarks
		Nm	m · kg	ft · lb	
Rear carrier and rear fender	M6	7	0.7	5.1	
Engine skid plates	M6	7	0.7	5.1	
Trailer hitch and frame	M10	55	5.5	40	
Battery holding bracket	M6	7	0.7	5.1	
Battery bracket and fitting screw	M6	7	0.7	5.1	
Fitting screw and frame	M6	7	0.7	5.1	
Electrical components tray and frame	M6	7	0.7	5.1	
Differential gear case filler bolt	M14	23	2.3	17	
Differential gear case drain bolt	M10	10	1.0	7.2	
Differential gear case cover and differential gear case	M8	24	2.4	17	
Differential gear motor and differential gear case cover	M6	11	1.1	8.0	
Front drive shaft coupling gear and differential drive pinion gear	M14	62	6.2	45	
Final gear case filler plug	M14	23	2.3	17	
Final gear case drain bolt	M14	23	2.3	17	
Final gear oil level check bolt	M8	10	1.0	7.2	
Final gear case and final gear case cover	M8	23	2.3	17	
Final drive pinion gear bearing housing and final gear case	M8	23	2.3	17	

EBS00022

HOW TO USE THE 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
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)

EBS00023

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

EBS00024

LUBRICATION POINTS AND LUBRICANT TYPES

ENGINE

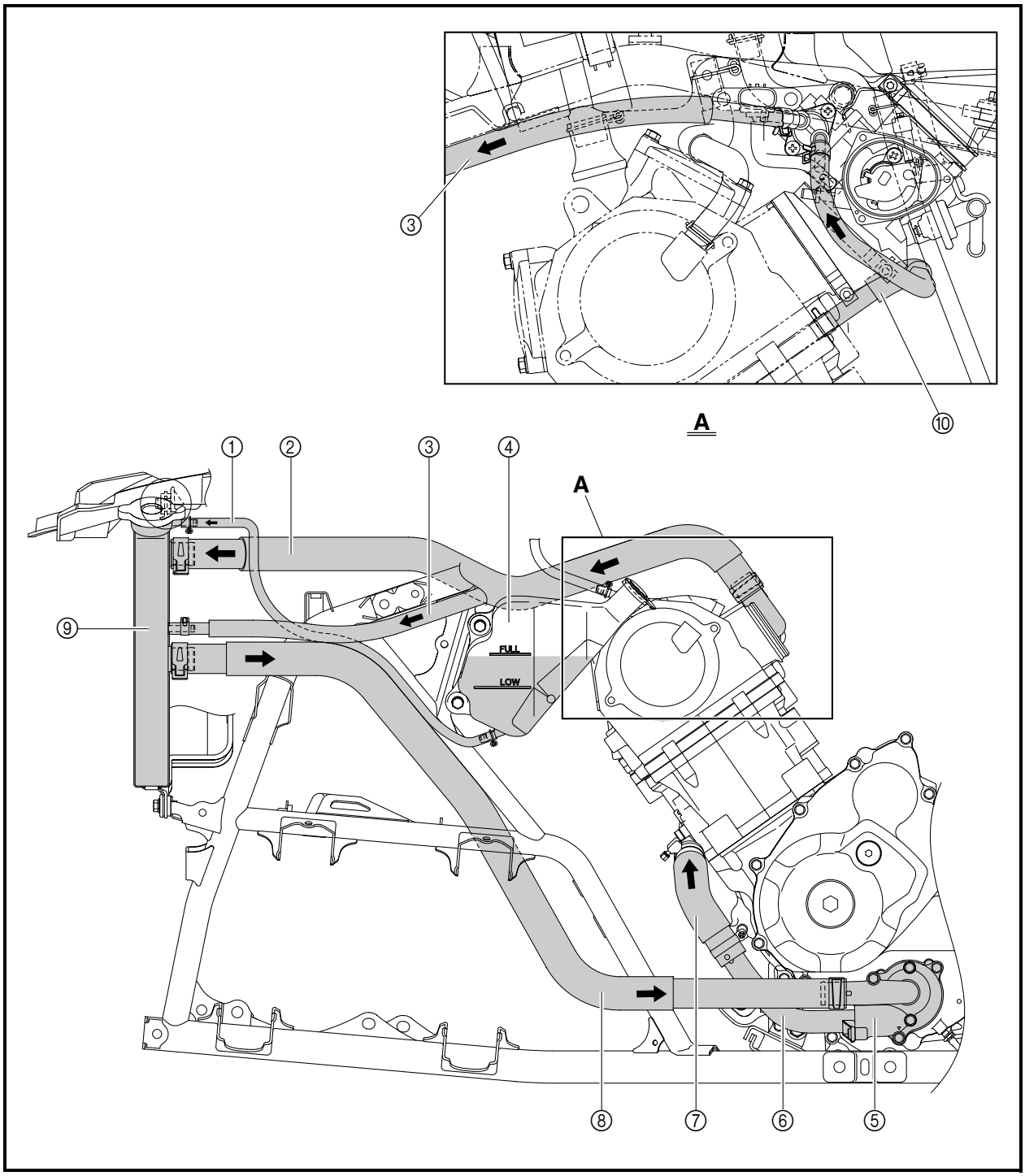
Lubrication point	Lubricant
Oil seal lips	LS
Bearings	E
O-ring	LS
Cylinder head bolts	M
Crankshaft pin	E
Connecting rod big end thrust surface	E
Crankshaft sprocket	M
Inner race (crankshaft)	E
Buffer boss (crankshaft)	E
Crankshaft seal	E
Piston pin	E
Piston and ring groove	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Rocker arm shafts	E
Camshaft lobes	M
Decompressor lever pin	E
Decompressor lever spring	E
Rocker arms (intake and exhaust)	M
Oil pump shaft	E
O-ring (oil filter cartridge)	LS
Water pump impeller shaft	M
Dipstick mating surface	E
Starter idler gear inner surface	E
Starter idler gear shaft	E
Starter wheel gear	E
Torque limiter	E
Clutch housing shaft end	LS
Clutch carrier assembly	E
One-way clutch bearing	E
Clutch dog and middle drive gear	M
Reverse idle gear shaft	E
Middle driven shaft splines	M
Shift drum	E
Shift forks and shift fork guide bar	E
Ball (shift drum stopper)	E
Stopper lever and stopper lever shaft	E

Lubrication point	Lubricant
Shift lever 2 inner surface	LS
Shift lever 1	E
Shift lever 1 gear teeth and shift lever 2 gear teeth	E
Stopper lever stopper	E
Bearing (final drive pinion gear assembly)	G
Bearing (final gear)	G
AC magneto lead grommet	Yamaha bond No.1215 (Three bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three bond No.1215®)

EBS00025

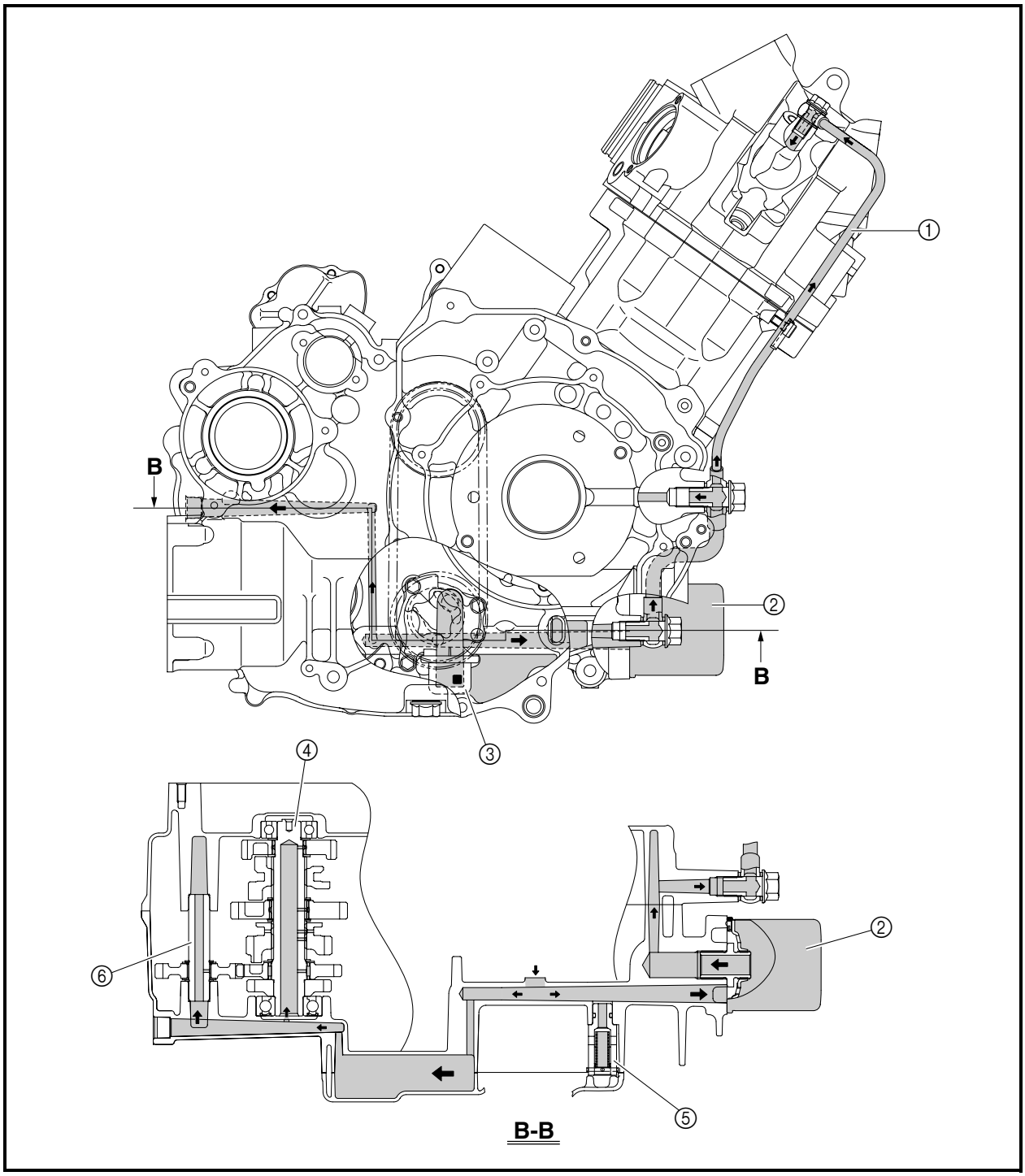
COOLANT FLOW DIAGRAMS

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

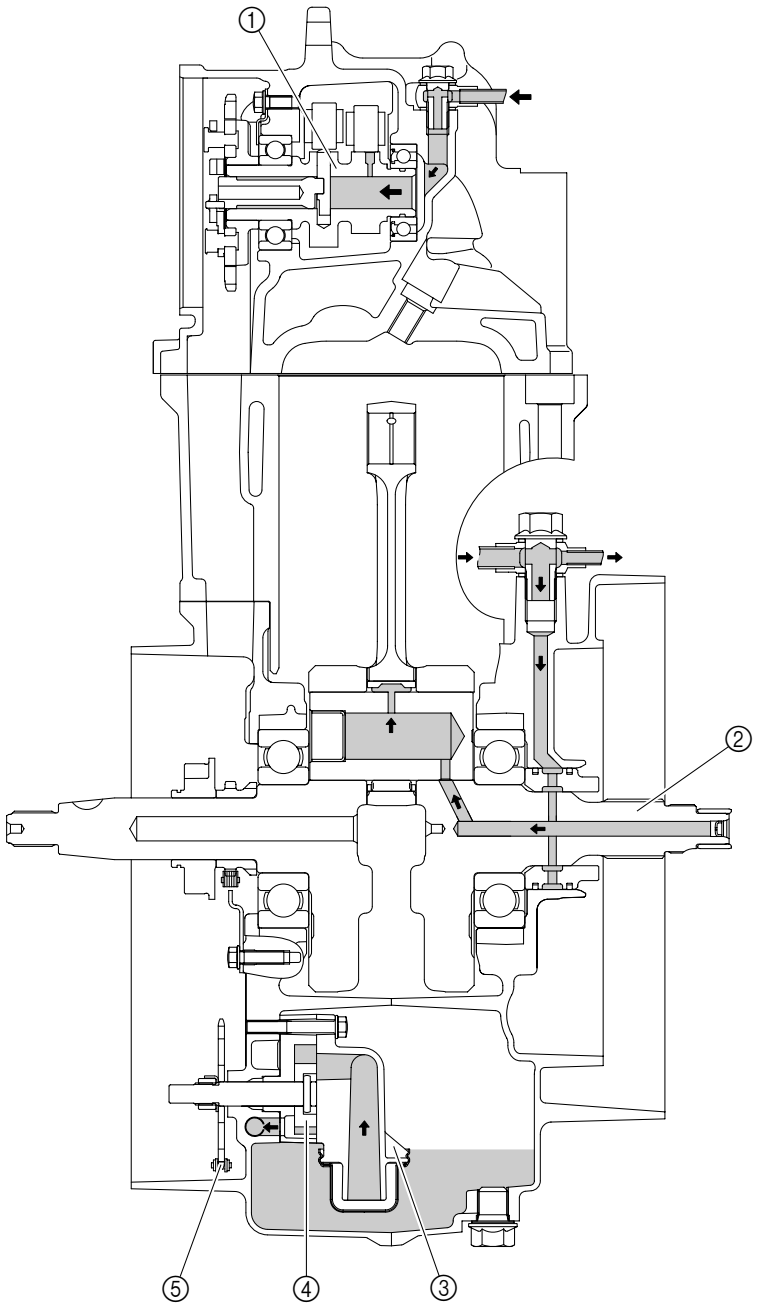


EBS00026
OIL FLOW DIAGRAMS

① Oil delivery pipe
② Oil filter cartridge
③ Oil strainer
④ Drive axle
⑤ Relief valve assembly
⑥ Reverse idle gear shaft



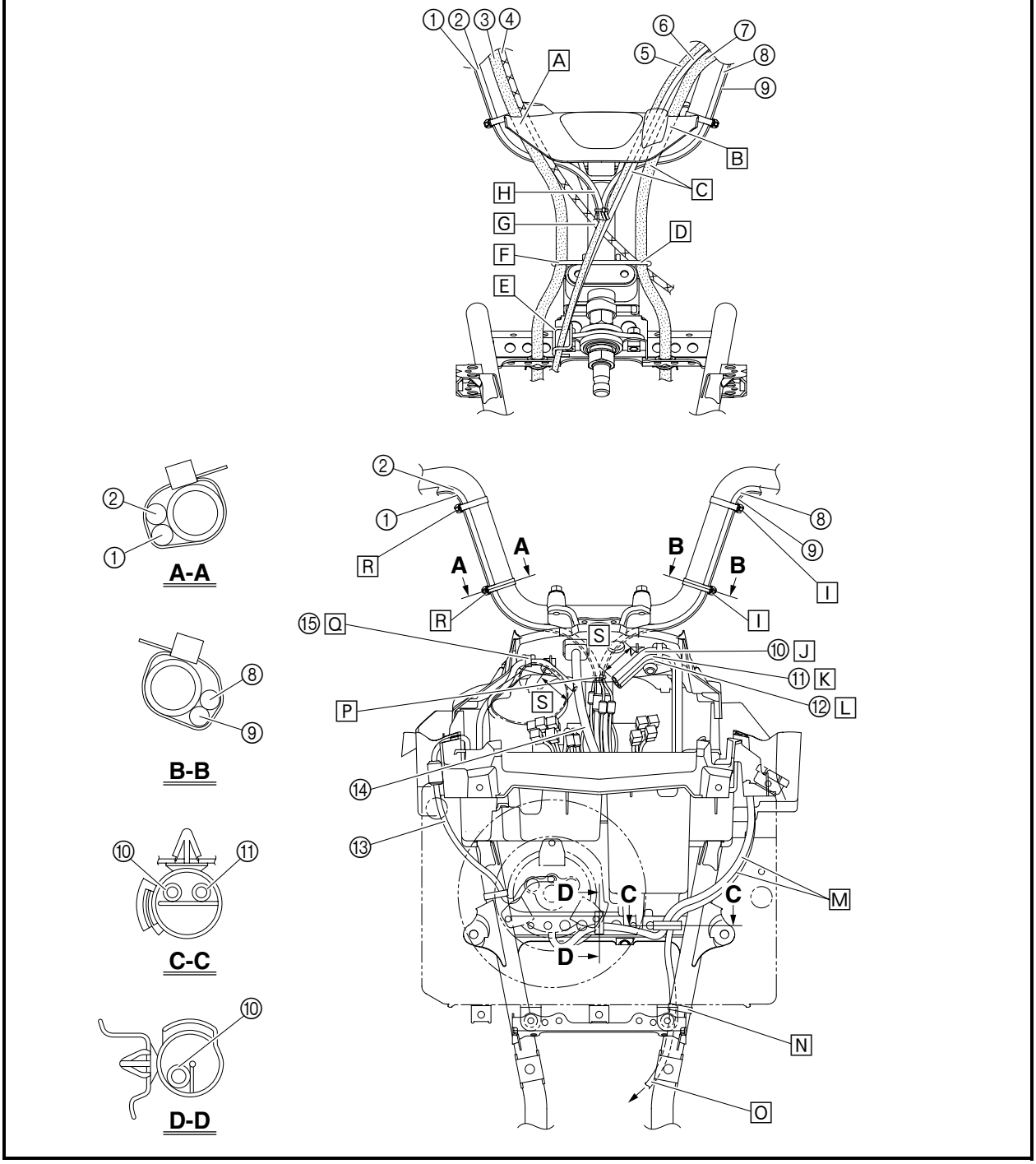
① Camshaft
② Crankshaft
③ Oil strainer
④ Oil pump rotor
⑤ Oil pump driven gear



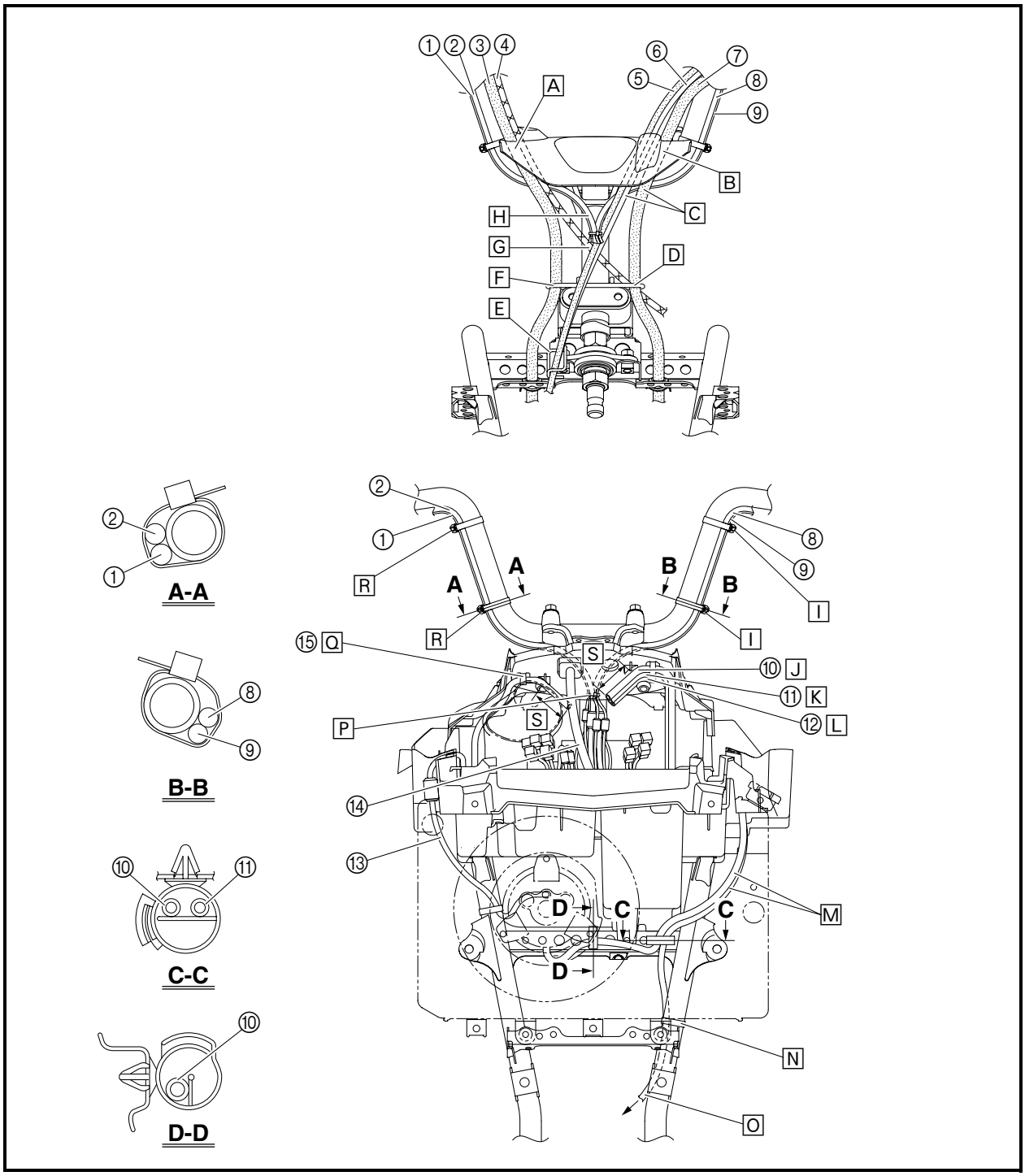
EBS00028

CABLE ROUTING

① Front brake light switch lead
② On-command four-wheel-drive motor switch and differential gear lock switch lead
③ Front brake hose
④ Throttle cable
⑤ Rear brake cable
⑥ Shift control cable
⑦ Rear brake hose
⑧ Left handlebar switch lead
⑨ Rear brake light switch lead
⑩ Radiator fan motor breather hose
⑪ Differential gear case breather hose
⑫ EPS motor breather hose
⑬ Radiator fan motor lead
⑭ Meter assembly lead
⑮ Final gear case breather hose



A Pass the front brake hose and throttle cable through the guide on the handlebar cover.
B Pass the rear brake cable, shift control cable, and rear brake hose through the guide on the handlebar cover.
C Route the rear brake cable, shift control cable, and rear brake hose in front of the left handlebar switch lead and rear brake light switch lead.
D Pass the rear brake hose and throttle cable through the guide, making sure to route the cable behind the hose.
E Pass the rear brake cable and shift control cable through the guide.
F Pass the front brake hose through the guide.
G Route the throttle cable behind the rear brake cable and shift control cable.

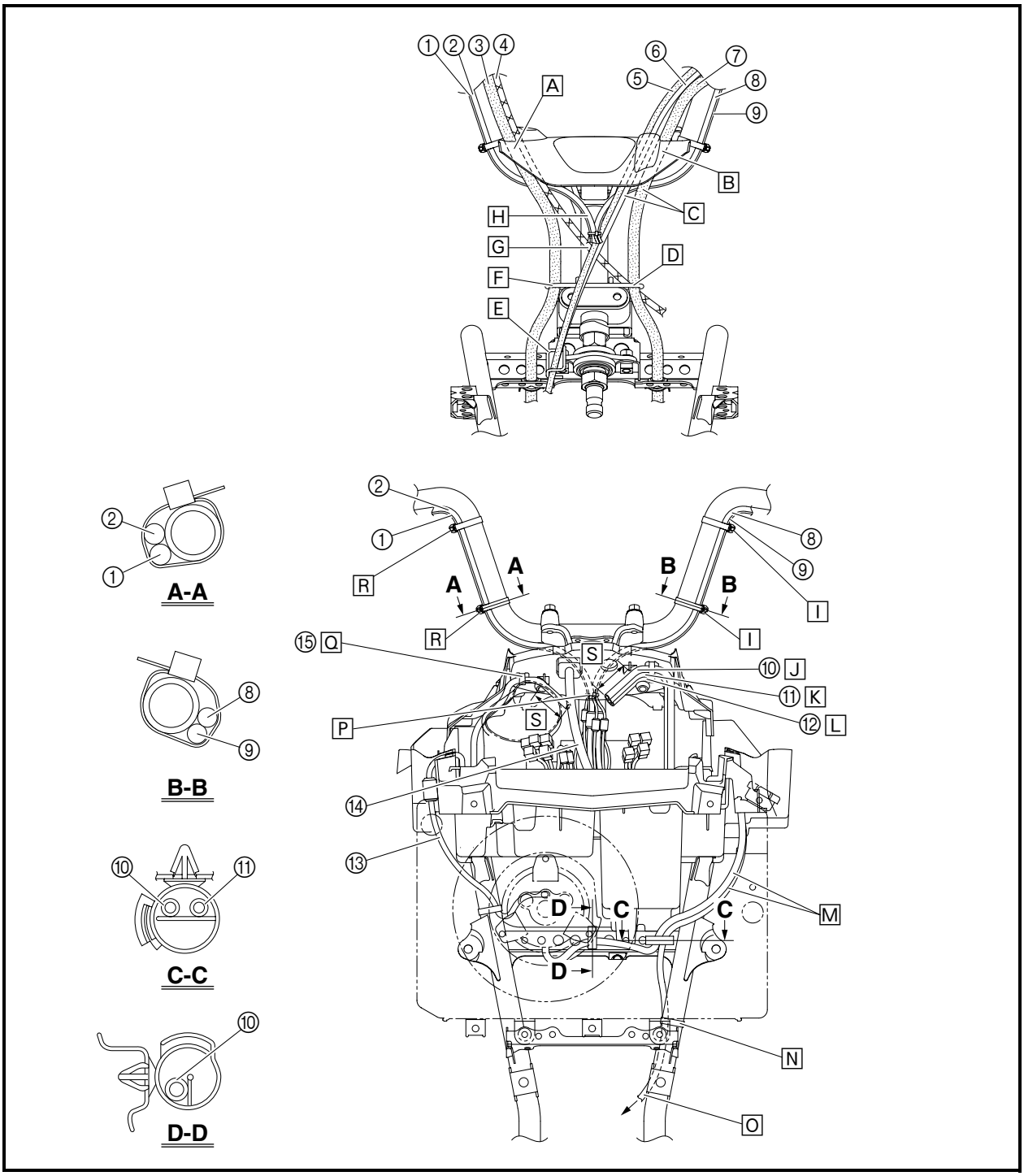


[H] Route the front brake light switch lead, on-command four-wheel-drive motor switch and differential gear lock switch lead, left handlebar switch lead, and rear brake light switch lead over the throttle cable, rear brake cable, and shift control cable, then to the front of where the cables cross.

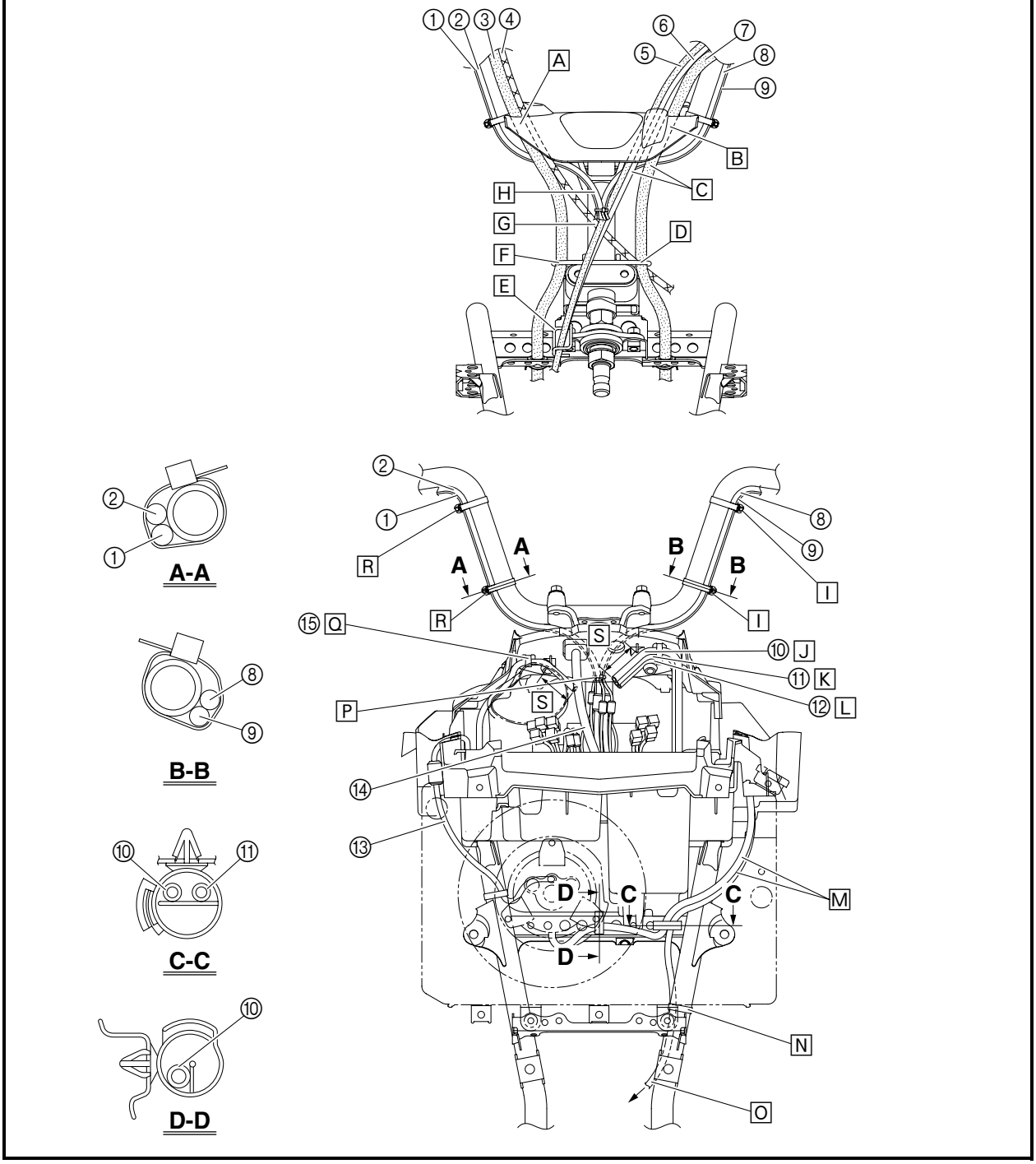
[I] Fasten the left handlebar switch lead and rear brake light switch lead with the plastic bands at the bends in the handlebar, making sure to route the leads under the handlebar and to face the ends of the bands forward.

[J] Pass the radiator fan motor breather hose through the guide on the meter bracket, making sure to face the end of the hose downward.

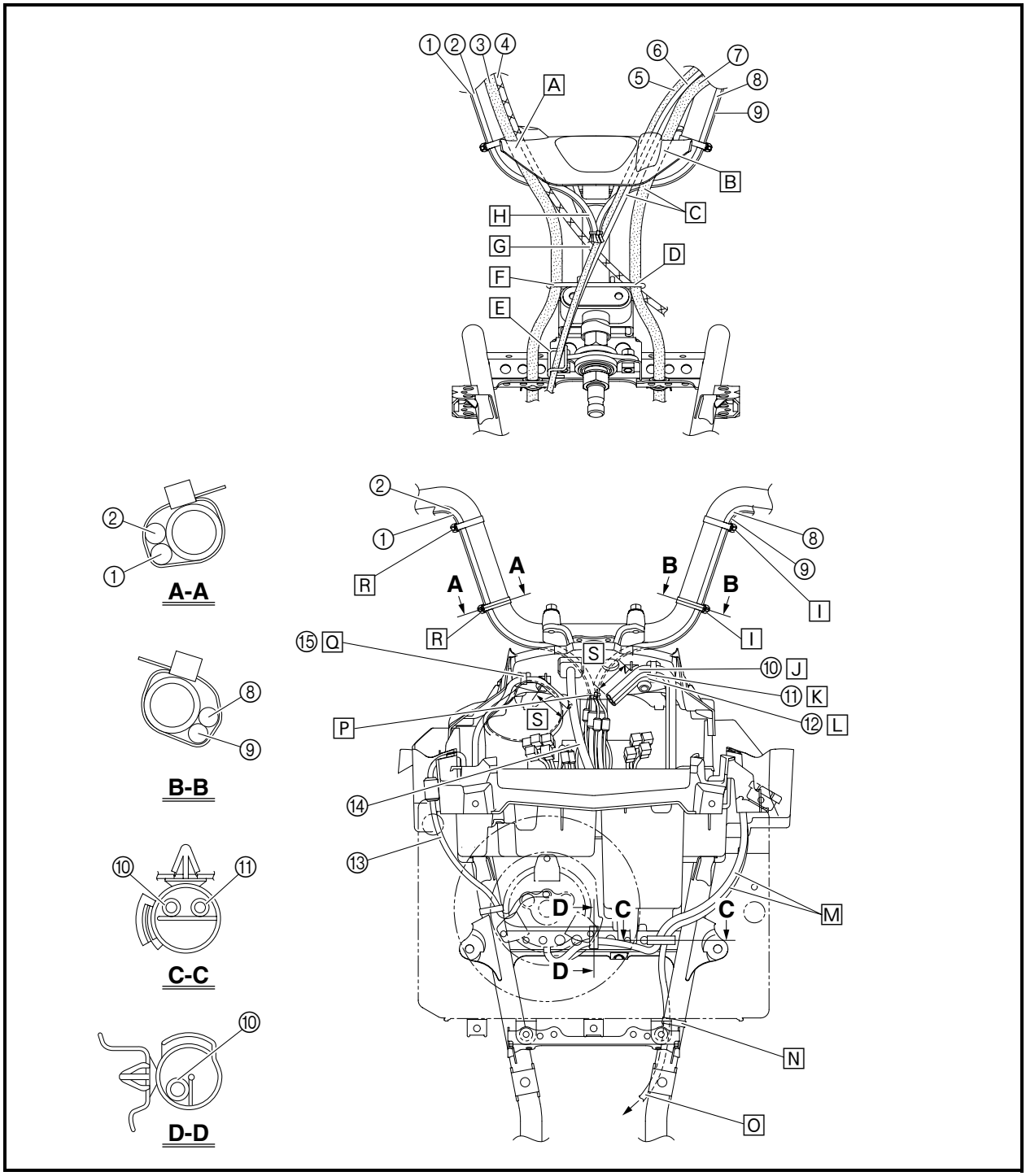
[K] Pass the differential gear case breather hose through the guide on the meter bracket, making sure to face the end of the hose downward.



L Pass the EPS motor breather hose through the guide on the meter bracket, making sure to face the end of the hose downward.
M Route the radiator fan motor breather hose and differential gear case breather hose in front of the frame.
N Fasten the differential gear case breather hose to the frame with the plastic band, making sure to face the end of the band inward.
O Route the differential gear case breather hose to the inside of the frame.
P Fasten the front brake light switch lead, on-command four-wheel-drive motor switch and differential gear lock switch lead, left handlebar switch lead, and rear brake light switch lead with a plastic locking tie. Be sure to fasten the plastic locking tie above the couplers and fasten it around the protective sleeves of the leads, not the leads themselves.
Q Pass the final gear case breather hose through the guide on the meter bracket, making sure to face the end of the hose downward.

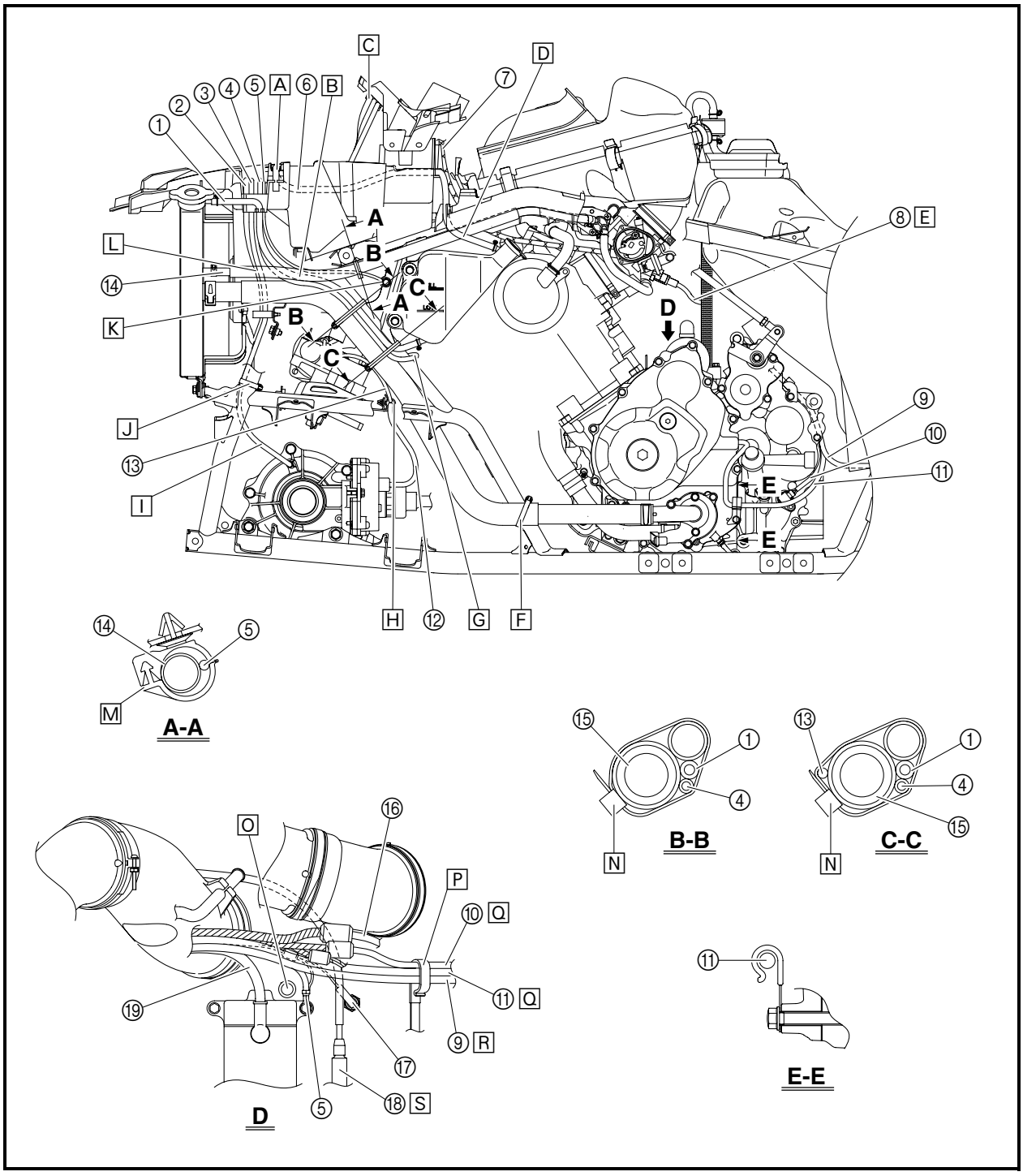


[R] Fasten the front brake light switch lead and on-command four-wheel-drive motor switch and differential gear lock switch lead with the plastic bands at the bends in the handlebar, making sure to route the leads under the handlebar and to face the ends of the bands forward.
[S] 20 ~ 50 mm (0.79 ~ 1.97 in)

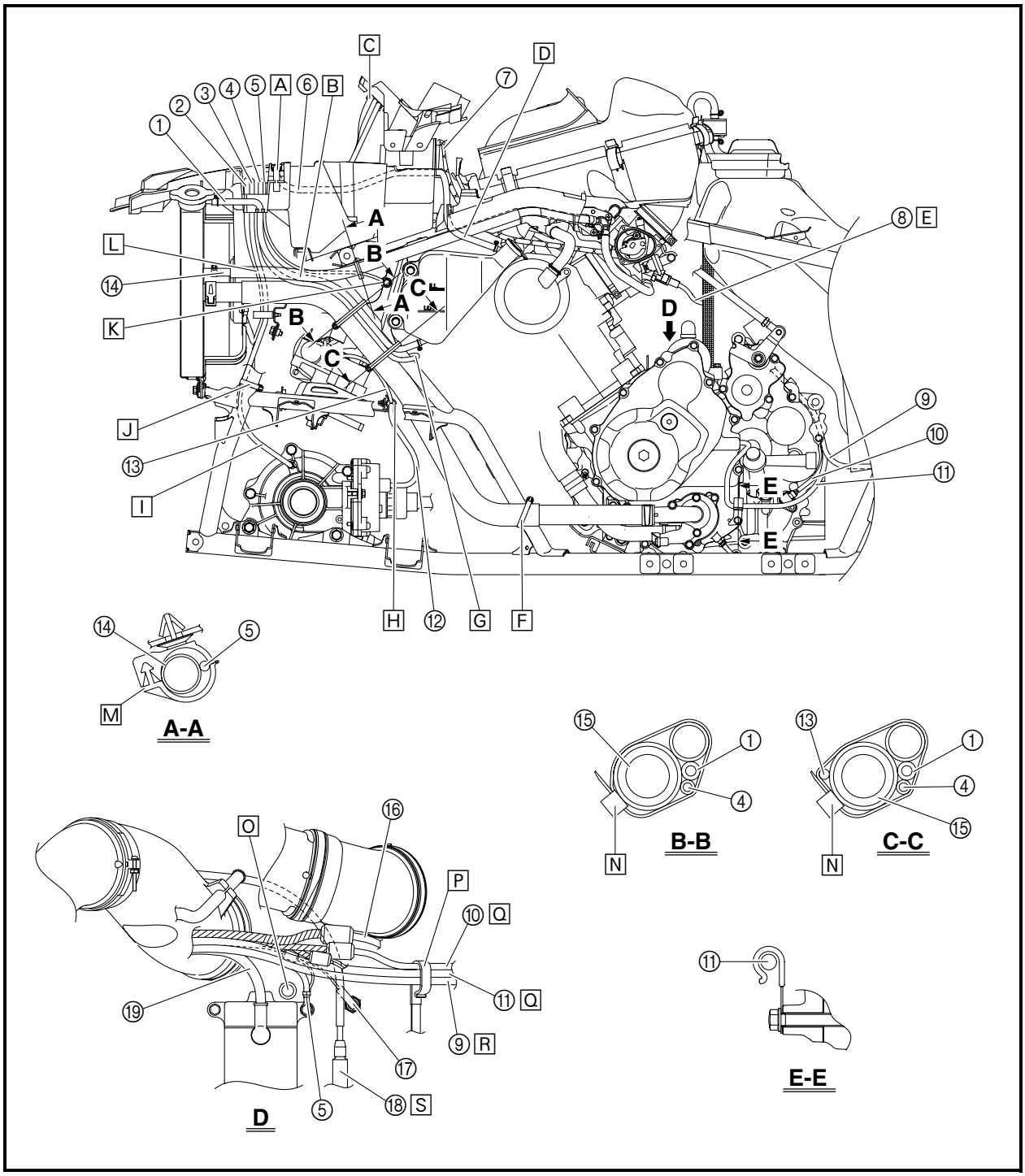


① Coolant reservoir hose
② Radiator fan motor breather hose
③ Differential gear case breather hose
④ EPS motor breather hose
⑤ Ground lead
⑥ Coolant reservoir breather hose
⑦ Throttle cable
⑧ Fuel injector lead
⑨ Final gear case breather hose
⑩ Speed sensor lead
⑪ Crankshaft position sensor lead
⑫ Differential gear motor lead
⑬ EPS torque sensor lead
⑭ Fast idle plunger outlet hose
⑮ Radiator outlet hose
⑯ Gear position switch lead
⑰ Reverse switch lead
⑱ Shift control cable
⑲ Starter motor lead

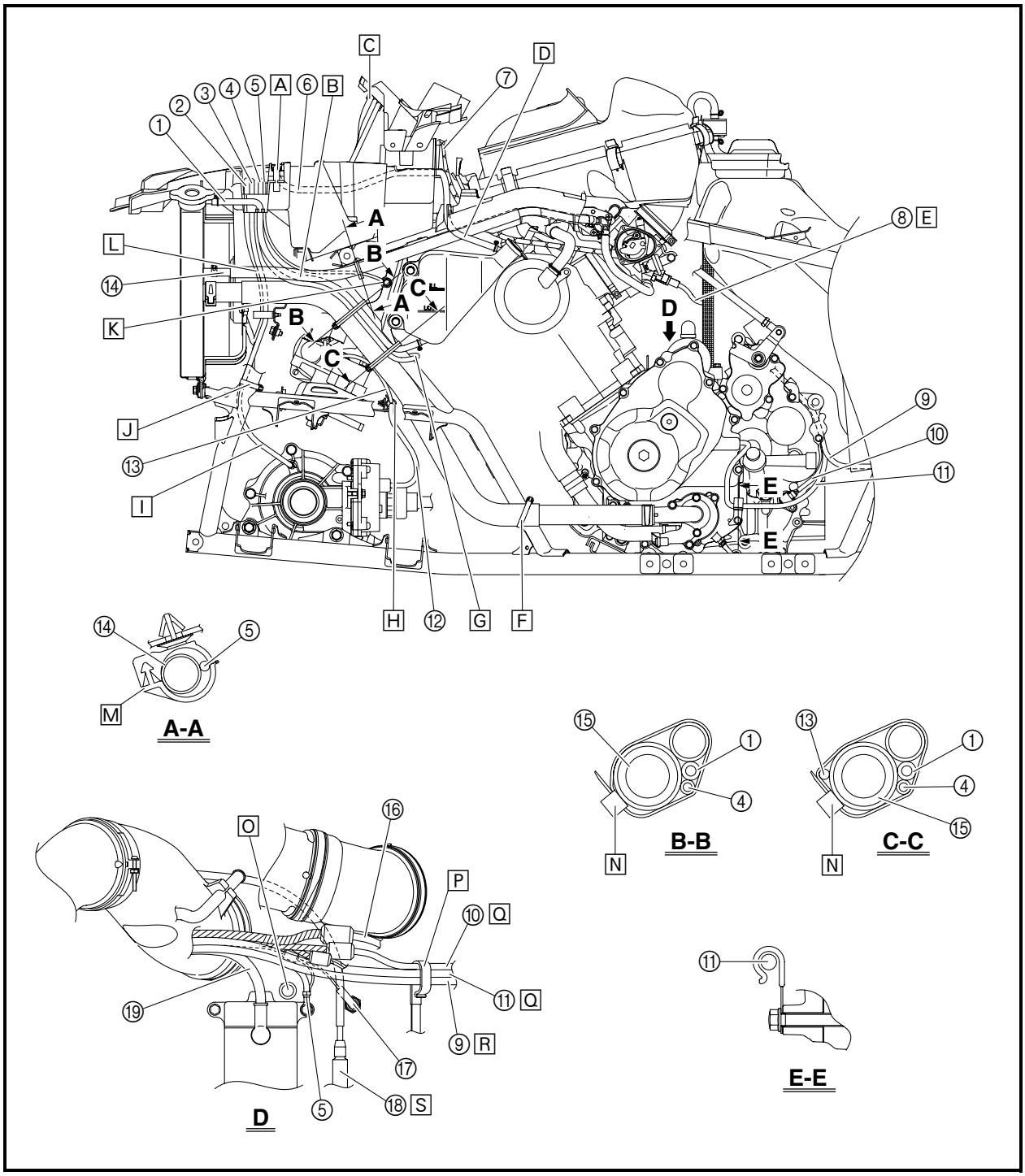
[A] Face the end of the coolant reservoir breather hose downward.



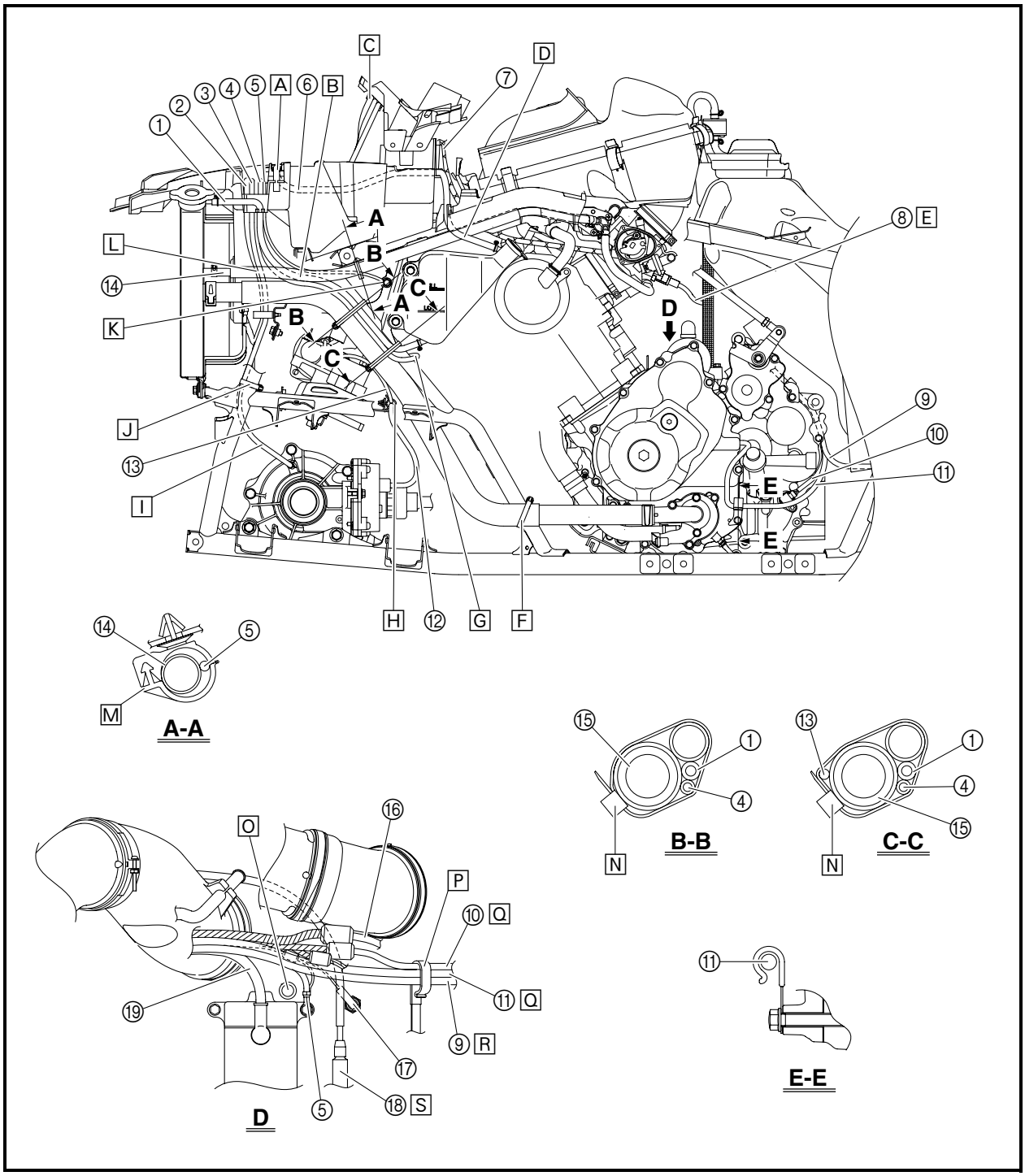
[B] Route the ground lead, radiator fan motor breather hose, differential gear case breather hose, and EPS motor breather hose to the inside of the fast idle plunger outlet hose.
[C] Pass the radiator fan motor breather hose through the larger diameter guide.
[D] Route the coolant reservoir breather hose to the outside of the fast idle plunger outlet hose.
[E] Route the fuel injector lead under the fuel hose.
[F] Fasten the radiator outlet hose to the frame with the plastic band, making sure to face the end of the band inward.
[G] Route the EPS motor breather hose under the coolant reservoir hose.
[H] Place the EPS torque sensor lead and differential gear motor lead in the holder, and then insert the ends of the holder into the hole in the stay on the frame.
[I] Route the differential gear case breather hose to the inside of the frame.



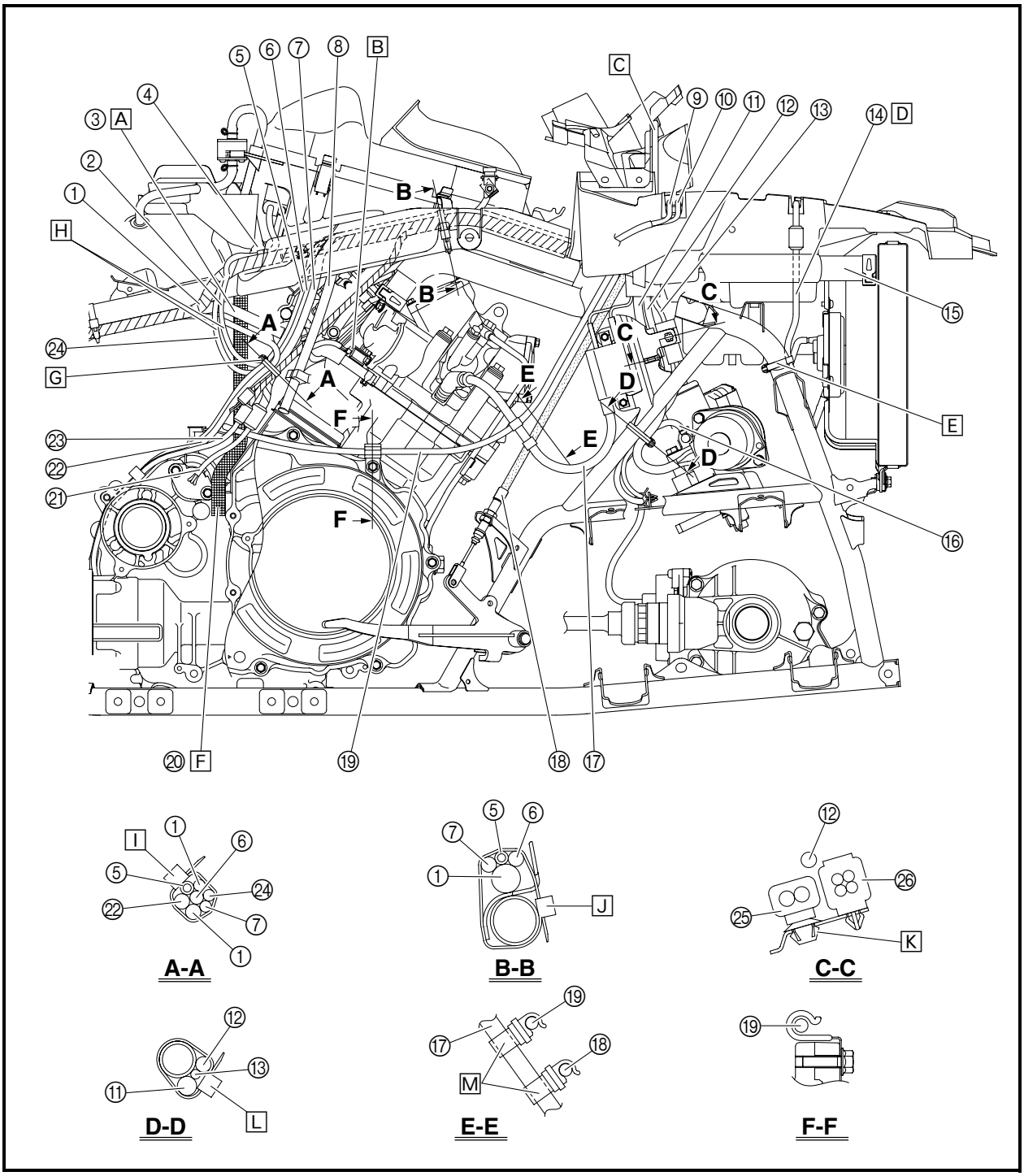
[J] Fasten the differential gear case breather hose to the frame with the plastic band, making sure to face the end of the band inward.
[K] Attach the ground lead terminal to the frame using the bolt.
[L] Route the radiator fan motor breather hose and differential gear case breather hose to the inside of the fast idle plunger outlet hose and radiator outlet hose.
[M] Make sure that the catch of the holder is facing outward.
[N] Face the end of the plastic band inward.
[O] Route the fuel tank drain hose and position the end of the hose as shown in the illustration.
[P] Pass the speed sensor lead, AC magneto lead, and final gear case breather hose through the guide in the order listed.
[Q] Route the speed sensor lead, AC magneto lead, and final gear case breather hose to the right of the reverse switch.
[R] Route the final gear case breather hose above the reverse switch lead and ground leads.



[S] Route the shift control cable under the gear position switch lead, speed sensor lead, and crankshaft position sensor lead.

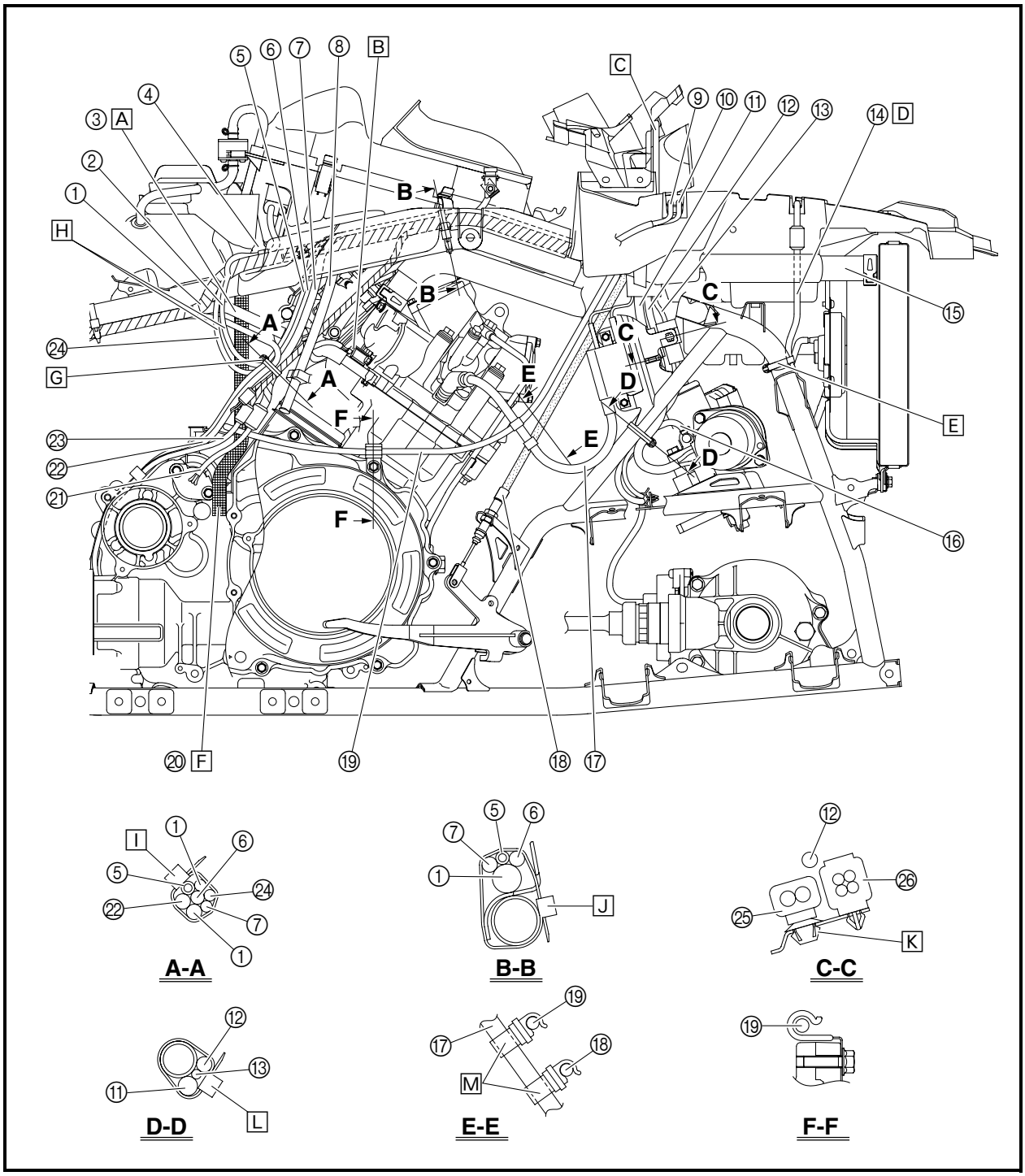


① Wire harness
② Fuel injector lead
③ Fuel hose
④ Intake air temperature sensor lead
⑤ Final gear case breather hose
⑥ Ground lead
⑦ Starter motor lead
⑧ Air filter case breather hose
⑨ Main switch lead
⑩ Auxiliary DC jack lead
⑪ EPS motor lead
⑫ Differential gear motor lead
⑬ EPS torque sensor lead
⑭ Radiator fan motor lead
⑮ Radiator inlet hose
⑯ EPS motor breather hose
⑰ Spark plug lead
⑱ Rear brake cable
⑲ Shift control cable
⑳ Fuel tank drain hose
㉑ Gear position switch lead
㉒ AC magneto lead

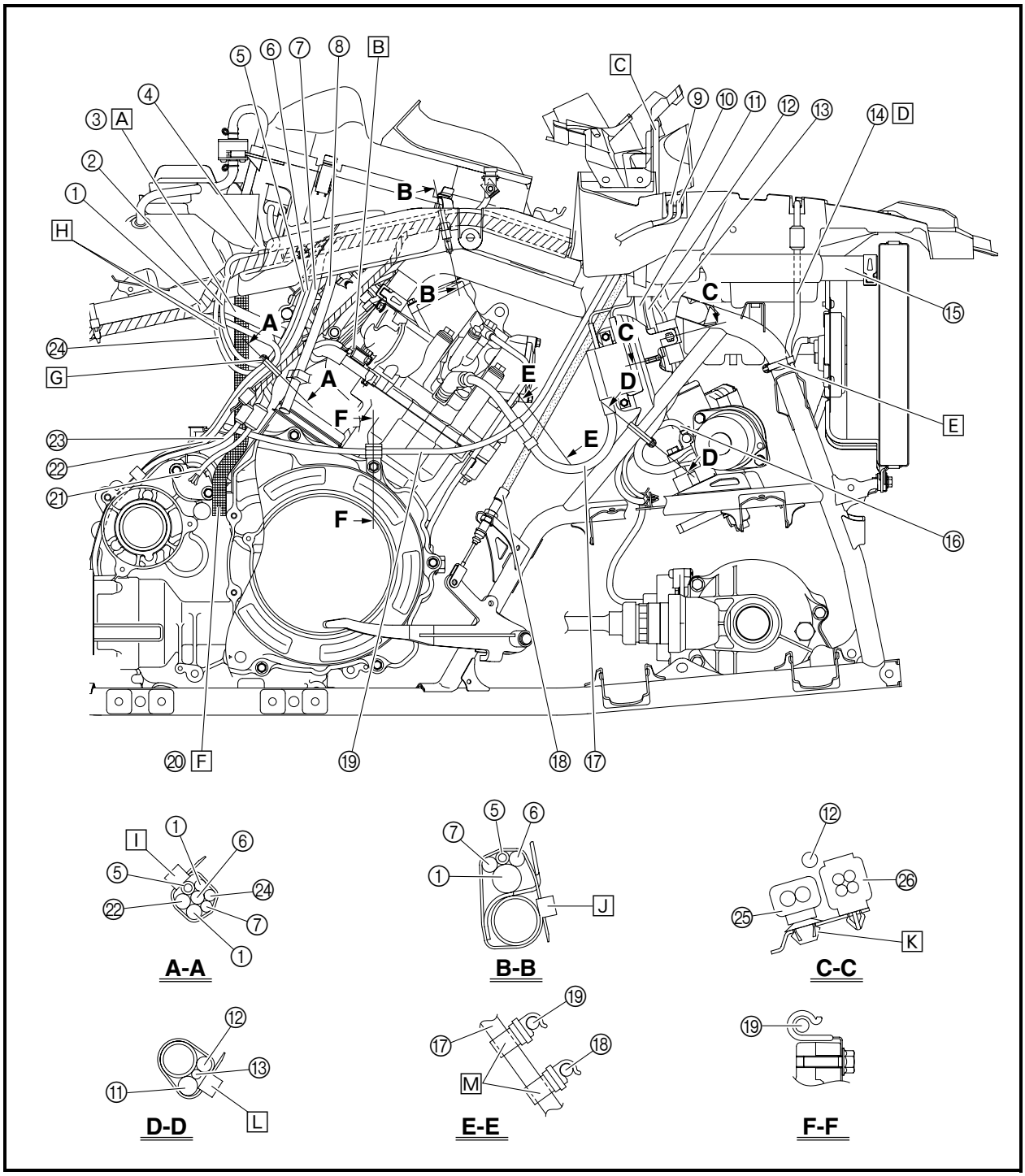


㉓ Speed sensor lead
㉔ Coolant temperature sensor lead
㉕ EPS motor lead coupler
㉖ EPS torque sensor lead coupler

[A] Route the fuel hose between the wire harness and the fuel tank drain hose.
[B] Route the coolant temperature sensor lead above the fast idle plunger inlet hose.
[C] Route the final gear case breather hose above the V-belt cooling duct 1.
[D] Route the radiator fan motor lead between the electrical components tray and the radiator inlet hose.
[E] Fasten the radiator fan motor lead to the frame with the plastic band, making sure to face the end of the band inward.
[F] Route the fuel tank drain hose to the inside of the leads and fuel hose, making sure to position the end of the drain hose as shown in the illustration.

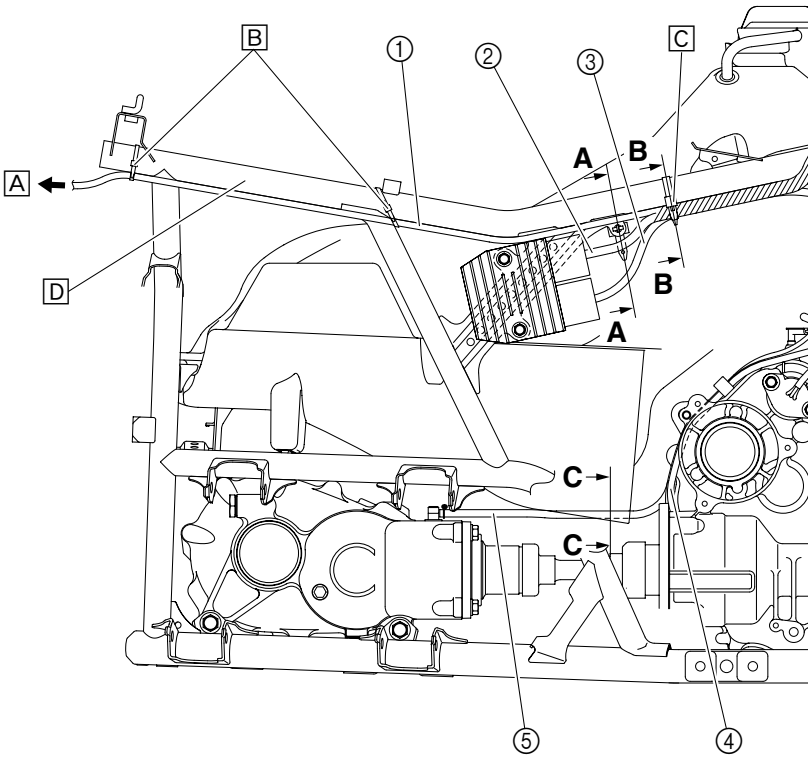


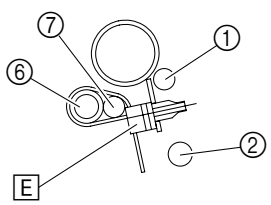
[G] Fasten the final gear case breather hose, ground lead, starter motor lead, fuel injector lead, coolant temperature sensor lead, AC magneto lead, and wire harness with the plastic band, making sure to position the band near the split in the wire harness.
[H] Route the fuel injector lead and coolant temperature sensor lead to the inside of the ground lead, starter motor lead, final drive gear case breather hose, and wire harness.
[I] Face the end of the plastic band inward.
[J] Pass the plastic band through the hole in the plastic cover, and then fasten the leads and hose with the band, making sure to face the end of the band downward.
[K] Insert the projection on the coupler into the hole in the frame from the inside of the frame.
[L] Face the end of the plastic band inward.
[M] Fasten the spark plug lead with the larger diameter section of each holder.



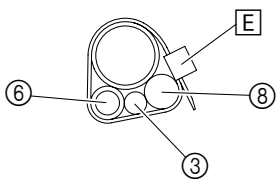
① Tail/brake light lead
② Rectifier/regulator lead
③ AC magneto lead
④ Speed sensor lead
⑤ Final gear case breather hose
⑥ Fuel hose
⑦ Fuel pump lead
⑧ Wire harness

A To tail/brake light
B Fasten the tail/brake light lead to the frame with a plastic locking tie, making sure to face the end of the tie downward.
C Install the plastic band near the split in the wire harness.
D Route the tail/brake light lead to the outside of the frame.
E Face the end of the plastic band downward.
F Pass the final gear case breather hose through the guide.

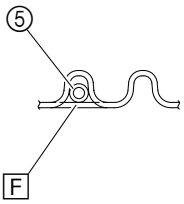




A-A

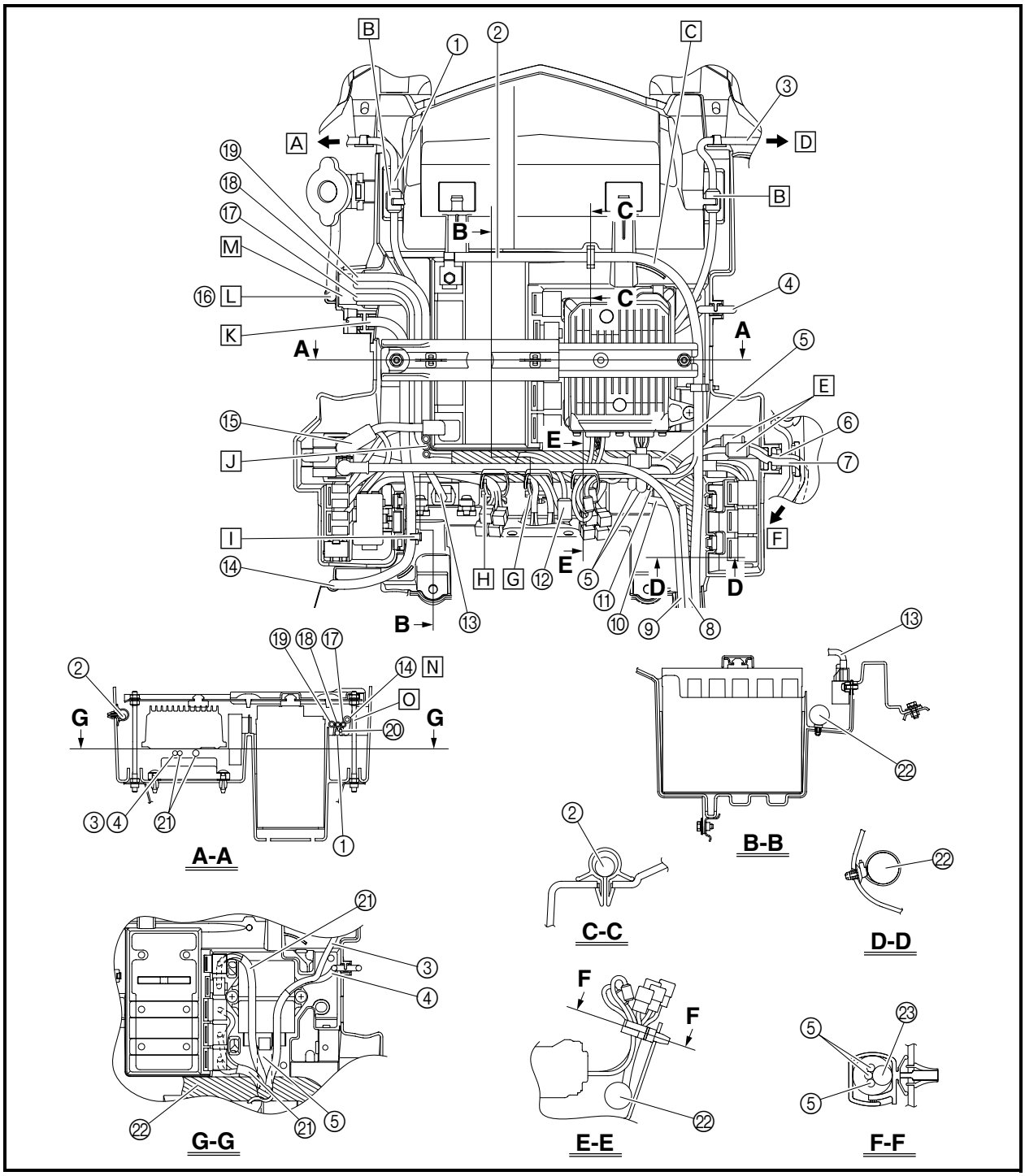


B-B



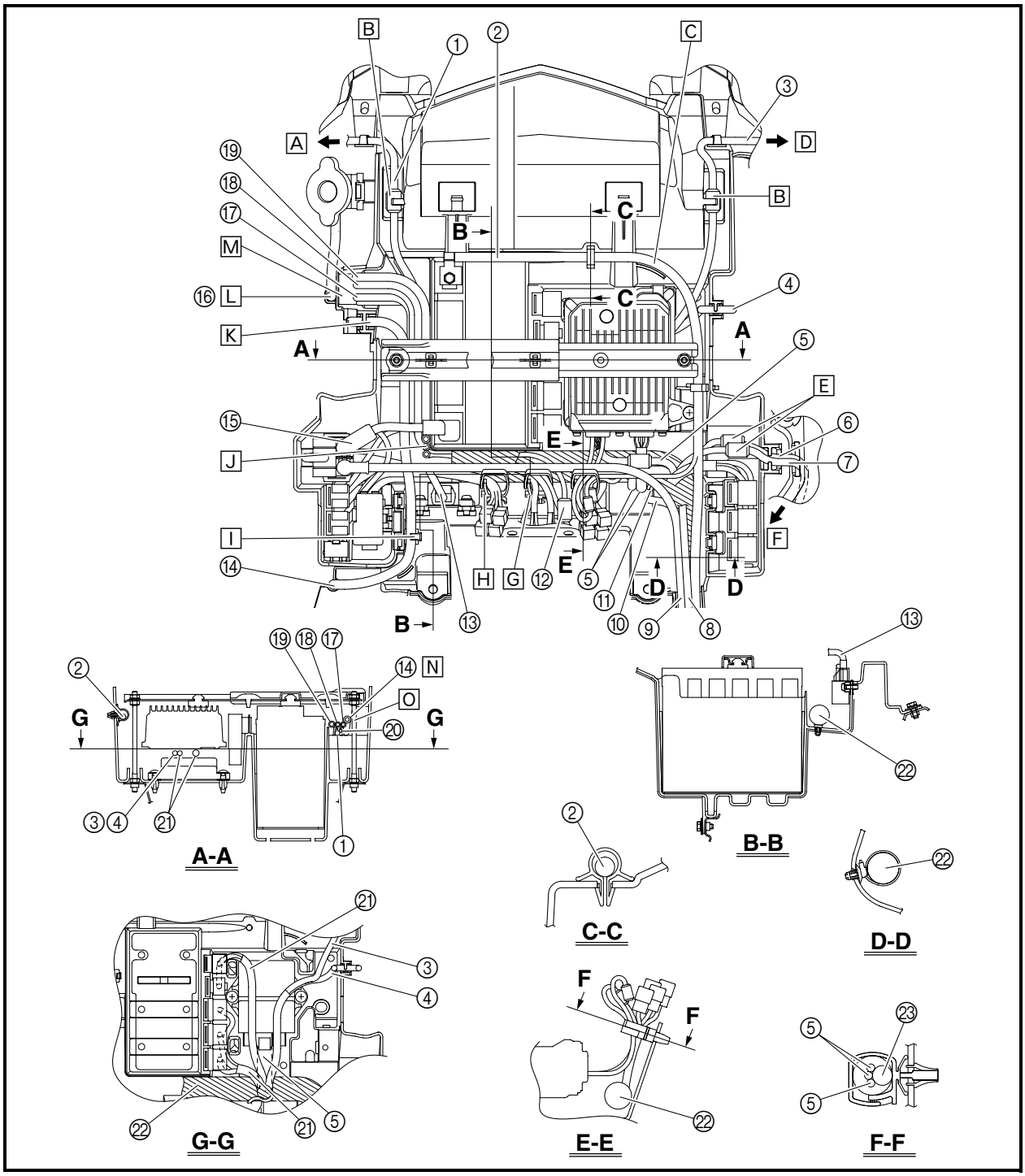
C-C

① Left headlight lead
② Negative battery lead
③ Right headlight lead
④ Radiator fan motor lead
⑤ EPS control unit lead
⑥ Auxiliary DC jack lead
⑦ Main switch lead
⑧ Final gear case breather hose
⑨ Starter motor lead
⑩ Differential gear motor lead
⑪ Ignition coil lead
⑫ Meter lead
⑬ Lean angle sensor lead
⑭ Coolant reservoir breather hose
⑮ Positive battery lead
⑯ Coolant reservoir hose
⑰ EPS motor breather hose
⑱ Differential gear case breather hose
⑲ Radiator fan motor breather hose
⑳ Ground lead
㉑ Relay lead
㉒ Wire harness

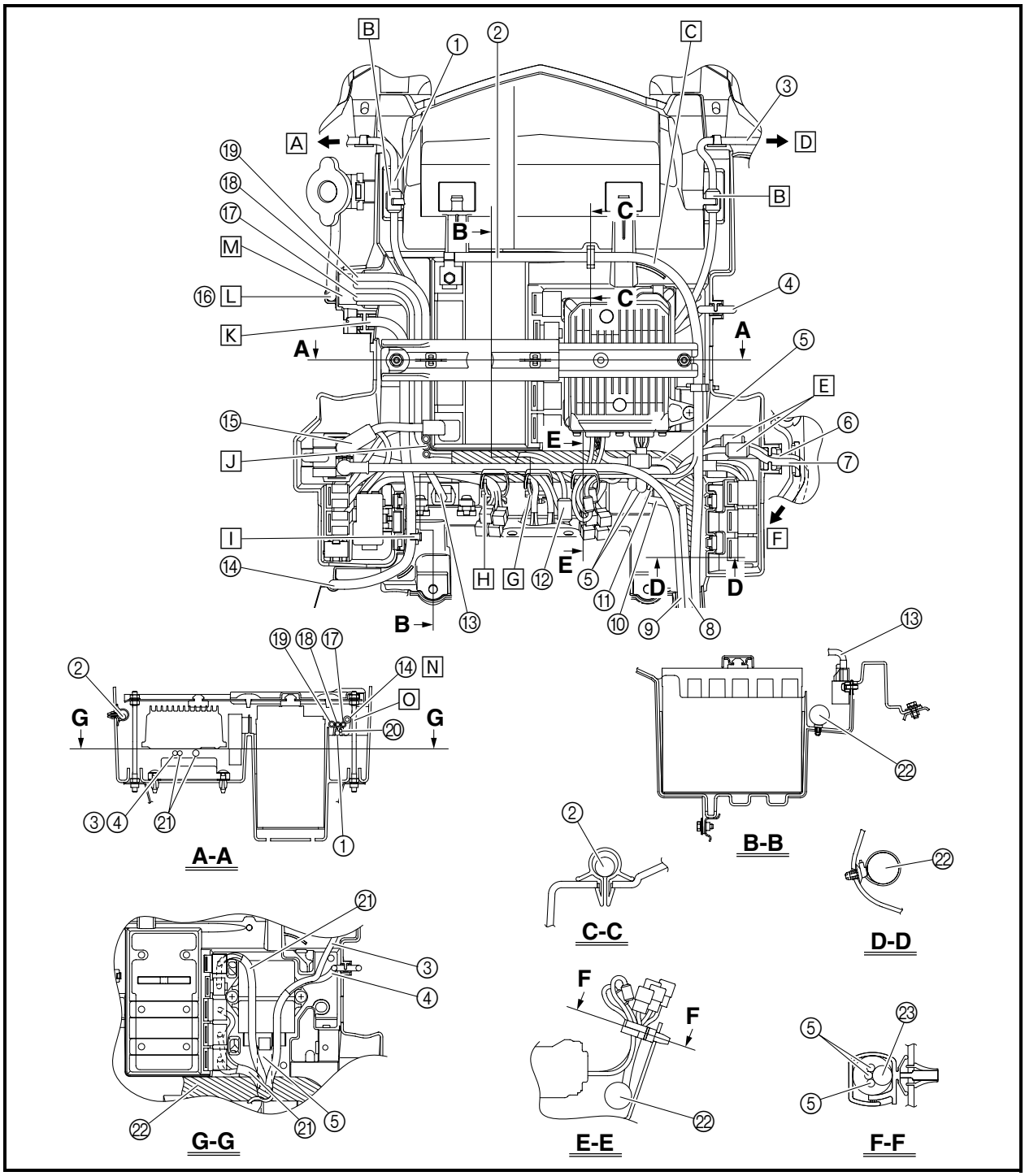


㉓ Joint coupler lead

A To left headlight
B Connect the headlight lead coupler, and then fasten the coupler with the holder on the electrical components tray.
C Route the negative battery lead along the guide on the electrical components tray.
D To right headlight
E Place the couplers on the inside of the electrical components tray.
F To main switch and auxiliary DC jack
G Fasten the left handlebar switch lead, on-command four-wheel-drive motor switch and differential gear lock switch lead, front brake light switch lead, and rear brake light switch lead with the clamp.
H Fasten the joint coupler lead with the clamp.
I Pass the coolant reservoir breather hose through the guides on the plastic cover and electrical components tray and route it under the positive battery lead and starter motor lead.

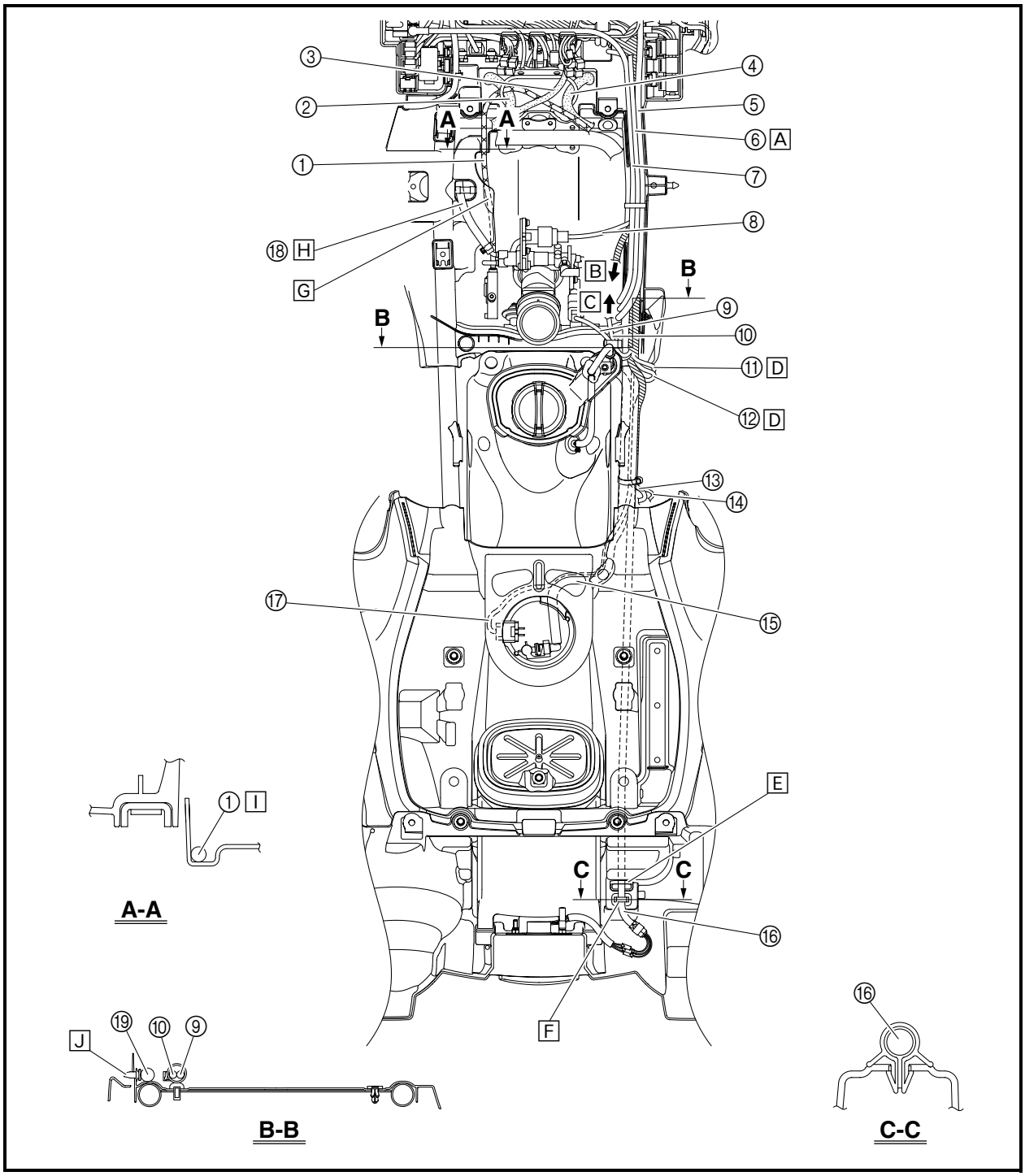


J Route the hoses under the positive battery lead, and then route them upward, to the inside of the coolant reservoir breather hose.
K Fasten the coolant reservoir breather hose with the holder on the electrical components tray.
L Fasten the coolant reservoir hose with the holder on the electrical components tray.
M Pass the hoses and ground lead through the opening in the electrical components tray.
N Route the coolant reservoir breather hose above the other hoses.
O Route the hoses to the inside of the bolt.

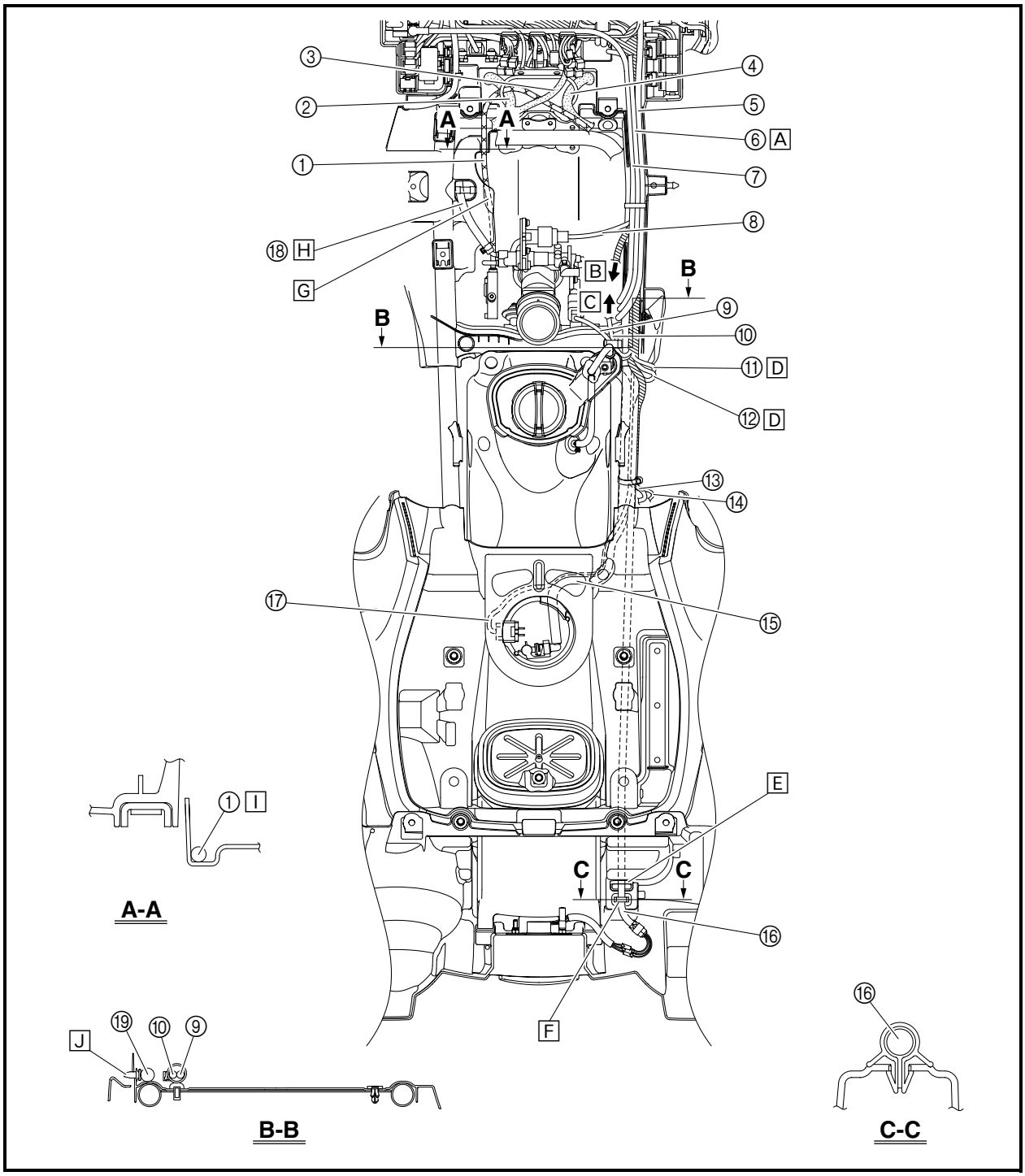


① Throttle cable
② Rear brake hose
③ Rear brake cable
④ Front brake hose
⑤ Negative battery lead
⑥ Final gear case breather hose
⑦ Starter motor lead
⑧ Intake air pressure sensor lead
⑨ TPS lead
⑩ Intake air temperature sensor lead
⑪ Fuel injector lead
⑫ Coolant temperature sensor lead
⑬ Rectifier/regulator lead
⑭ AC magneto lead
⑮ Fuel hose
⑯ Tail/brake light lead
⑰ Fuel pump lead
⑱ Fast idle plunger outlet hose
⑲ Wire harness

[A] Route the final gear case breather hose on top of the leads.



[B] To engine
[C] To air filter case
[D] Route the fuel injector lead and coolant temperature sensor lead to the outside of the frame.
[E] Pass the tail/brake light lead through the hole in the rear fender.
[F] Fasten the tail/brake light lead with the holder, making sure that the coupler is positioned to the rear of the holder.
[G] Route the throttle cable under the plastic cover.
[H] Route the fast idle plunger outlet hose above the plastic cover.
[I] Pass the throttle cable through the guide on the plastic cover.
[J] Insert the projection on the wire harness holder into the hole in the plastic cover.



EBS00029

PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EBU21742

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

NOTE:

- For ATVs not equipped with an odometer or an hour meter, follow the month maintenance intervals.
- For ATVs equipped with an odometer or an hour meter, follow the km (mi) or hours maintenance intervals. However, keep in mind that if the ATV isn't used for a long period of time, the month maintenance intervals should be followed.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

NO.		ITEM	CHECK OR MAINTENANCE JOB	Whichever comes first ⇨		INITIAL			EVERY	
					month	1	3	6	6	12
					km (mi)	320 (200)	1300 (800)	2500 (1600)	2500 (1600)	5000 (3200)
					hours	20	80	160	160	320
1	*	Fuel line	• Check fuel hoses for cracks or other damage, and replace if necessary.					√	√	√
2		Spark plug	• Check condition and clean, regap, or replace if necessary.			√	√	√	√	√
3	*	Valves	• Check valve clearance and adjust if necessary.			√		√	√	√
4	*	Fuel injection	• Check and adjust engine idle speed.			√	√	√	√	√
5	*	Crankcase breather system	• Check breather hose for cracks or other damage, and replace if necessary.					√	√	√
6	*	Exhaust system	• Check for leakage and replace gasket(s) if necessary. • Check for looseness and tighten all screw clamps and joints if necessary.					√	√	√
7		Spark arrester	• Clean.					√	√	√

EBU21863

GENERAL MAINTENANCE AND LUBRICATION CHART

NO.		ITEM	CHECK OR MAINTENANCE JOB	Whichever comes first ⇨		INITIAL			EVERY	
					month	1	3	6	6	12
					km (mi)	320 (200)	1300 (800)	2500 (1600)	2500 (1600)	5000 (3200)
					hours	20	80	160	160	320
1		Air filter element	• Clean and replace if necessary.			Every 20–40 hours (more often in wet or dusty areas)				
2	*	Front brake	• Check operation and correct if necessary. • Check fluid level and ATV for fluid leakage, and correct if necessary.			√	√	√	√	√
			• Replace brake pads.			Whenever worn to the limit				
3	*	Rear brake	• Check operation and correct if necessary. • Check brake pedal free play and adjust if necessary. • Check fluid level and ATV for fluid leakage, and correct if necessary.			√	√	√	√	√
			• Replace brake pads.			Whenever worn to the limit				
4	*	Brake hoses	• Check for cracks or other damage, and replace if necessary.				√	√	√	√
			• Replace.			Every 4 years				
5	*	Rear brake hose protectors	• Check for wear, cracks or other damage, and replace if necessary.			√	√	√	√	√
6	*	Wheels	• Check runout and for damage, and replace if necessary.			√		√	√	√
7	*	Tires	• Check tread depth and for damage, and replace if necessary. • Check air pressure and balance, and correct if necessary.			√		√	√	√
8	*	Wheel bearings	• Check for looseness or damage, and replace if necessary.			√		√	√	√
9	*	Upper and lower arm pivots	• Lubricate with lithium-soap-based grease.					√	√	√
10	*	V-belt	• Check for wear, cracks or other damage, and replace if necessary.			√		√	√	√
11	*	Drive shaft universal joint	• Lubricate with lithium-soap-based grease.					√	√	√
12	*	Chassis fasteners	• Make sure that all nuts, bolts, and screws are properly tightened.			√	√	√	√	√
13	*	Shock absorber assemblies	• Check operation and correct if necessary. • Check for oil leakage and replace if necessary.					√	√	√
14	*	Stabilizer bushes	• Check for cracks or other damage, and replace if necessary.					√	√	√
15	*	Knuckle pivots	• Lubricate with lithium-soap-based grease.					√	√	√
16	*	Knuckle shafts	• Lubricate with lithium-soap-based grease.					√	√	√
17	*	Steering shaft	• Lubricate with lithium-soap-based grease.					√	√	√
18	*	Steering system	• Check operation and repair or replace if damaged. • Check toe-in and adjust if necessary.			√	√	√	√	√
19	*	Engine mount	• Check for cracks or other damage, and replace if necessary.					√	√	√
20	*	Axle boots	• Check for cracks or other damage, and replace if necessary.			√	√	√	√	√
21		Engine oil	• Change. • Check ATV for oil leakage, and correct if necessary.			√		√	√	√

NO.		ITEM	CHECK OR MAINTENANCE JOB	Whichever comes first ⇨		INITIAL			EVERY	
					month	1	3	6	6	12
					km (mi)	320 (200)	1300 (800)	2500 (1600)	2500 (1600)	5000 (3200)
					hours	20	80	160	160	320
22		Engine oil filter cartridge	• Replace.			√		√		√
23		Differential gear oil	• Change. • Check ATV for oil leakage, and correct if necessary.			√				√
24		Final gear oil	• Change. • Check ATV for oil leakage, and correct if necessary.			√				√
25		Cooling system	• Check coolant level and ATV for coolant leakage, and correct if necessary.			√	√	√	√	√
			• Replace coolant.			Every 2 years				
26	*	Moving parts and cables	• Lubricate.				√	√	√	√
27	*	Drive select lever safety system cable	• Check operation and adjust or replace if necessary.					√	√	√
28	*	Throttle lever housing and cable	• Check operation and correct if necessary. • Check throttle cable free play and adjust if necessary. • Lubricate throttle lever housing and cable.			√	√	√	√	√
29	*	Front and rear brake switches	• Check operation and correct if necessary.			√	√	√	√	√
30	*	Lights and switches	• Check operation and correct if necessary. • Adjust headlight beams.			√	√	√	√	√

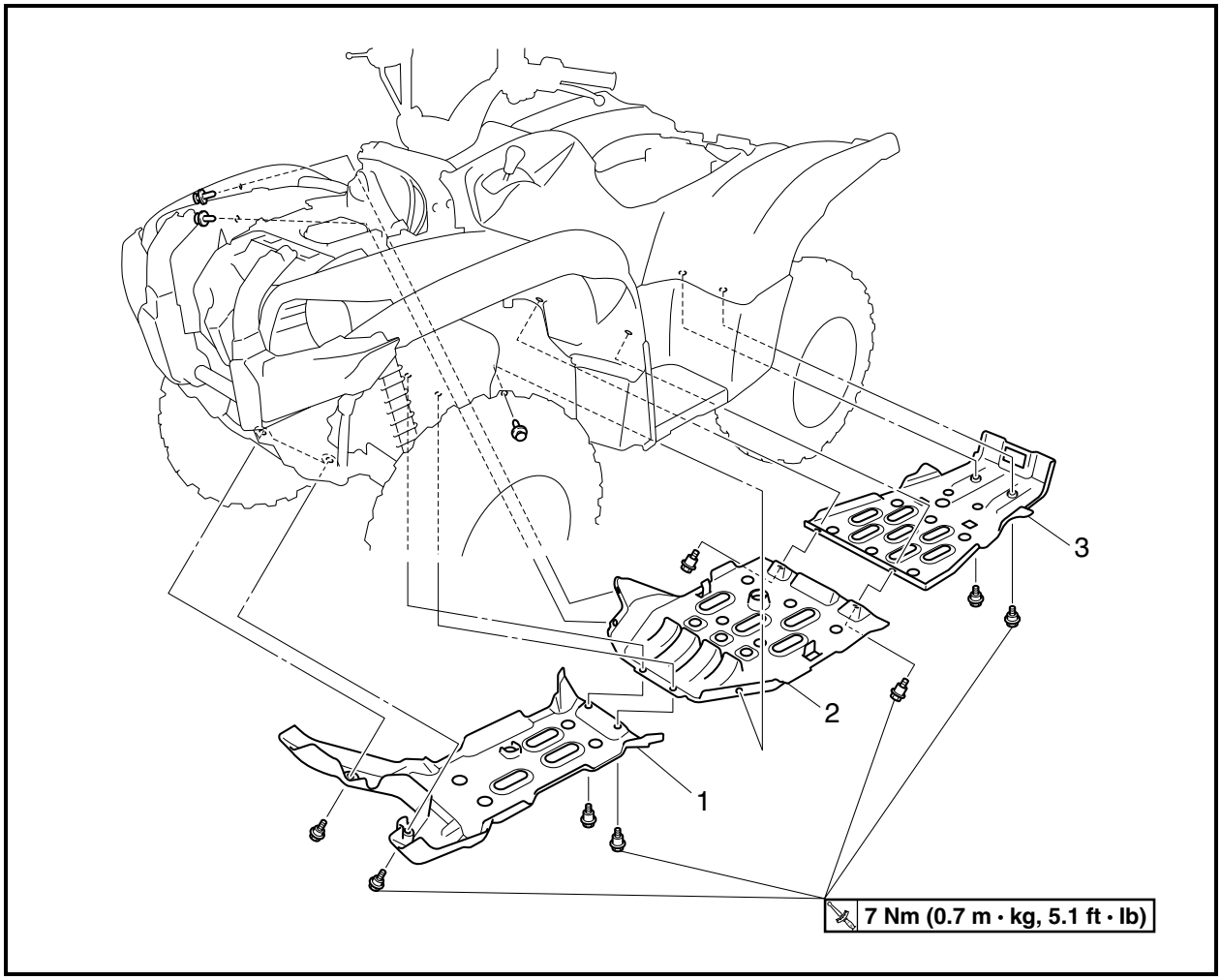
EBU23070

NOTE:

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake service
  - Regularly check and, if necessary, correct the brake fluid level.
  - Every two years replace the internal components of the brake master cylinders and calipers, and change the brake fluid.
  - Replace the brake hoses every four years and if cracked or damaged.

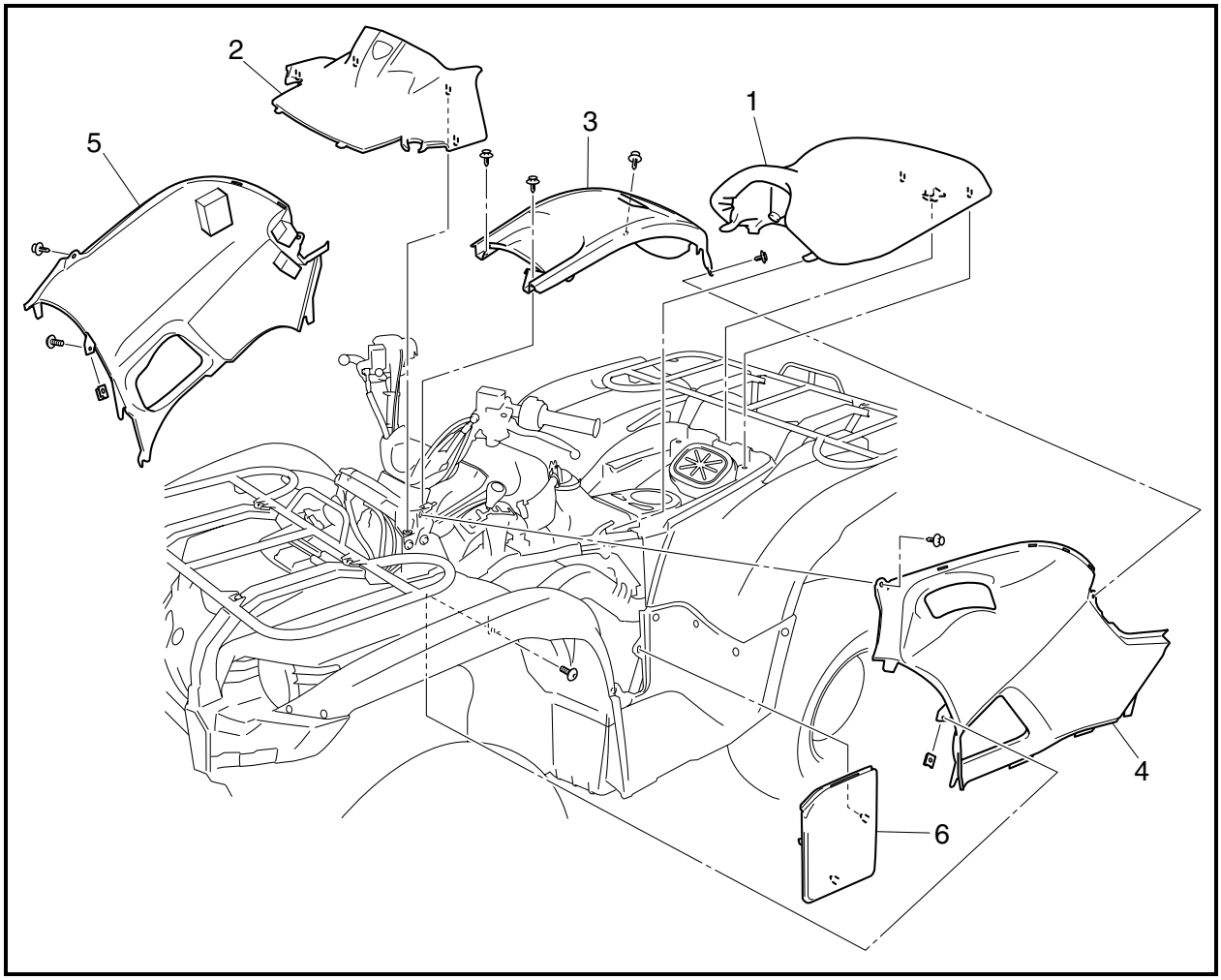
ENGINE SKID PLATES, SEAT, CARRIERS AND FENDERS

ENGINE SKID PLATES



Order	Job/Part	Q'ty	Remarks
	Removing the engine skid plates		Remove the parts in the order listed.
1	Front engine skid plate	1	
2	Center engine skid plate	1	
3	Rear engine skid plate	1	
			For installation, reverse the removal procedure.

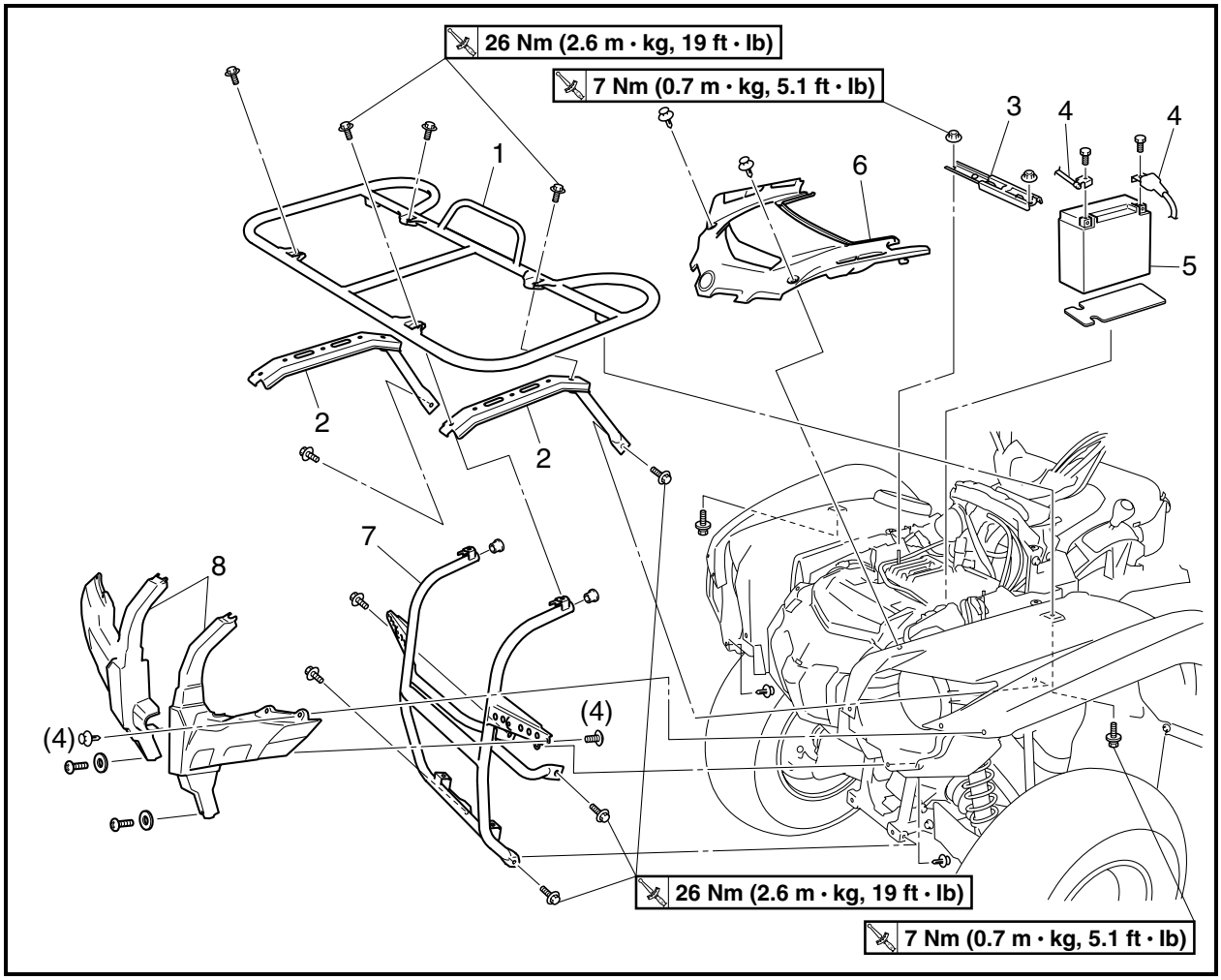
SEAT AND SIDE PANELS



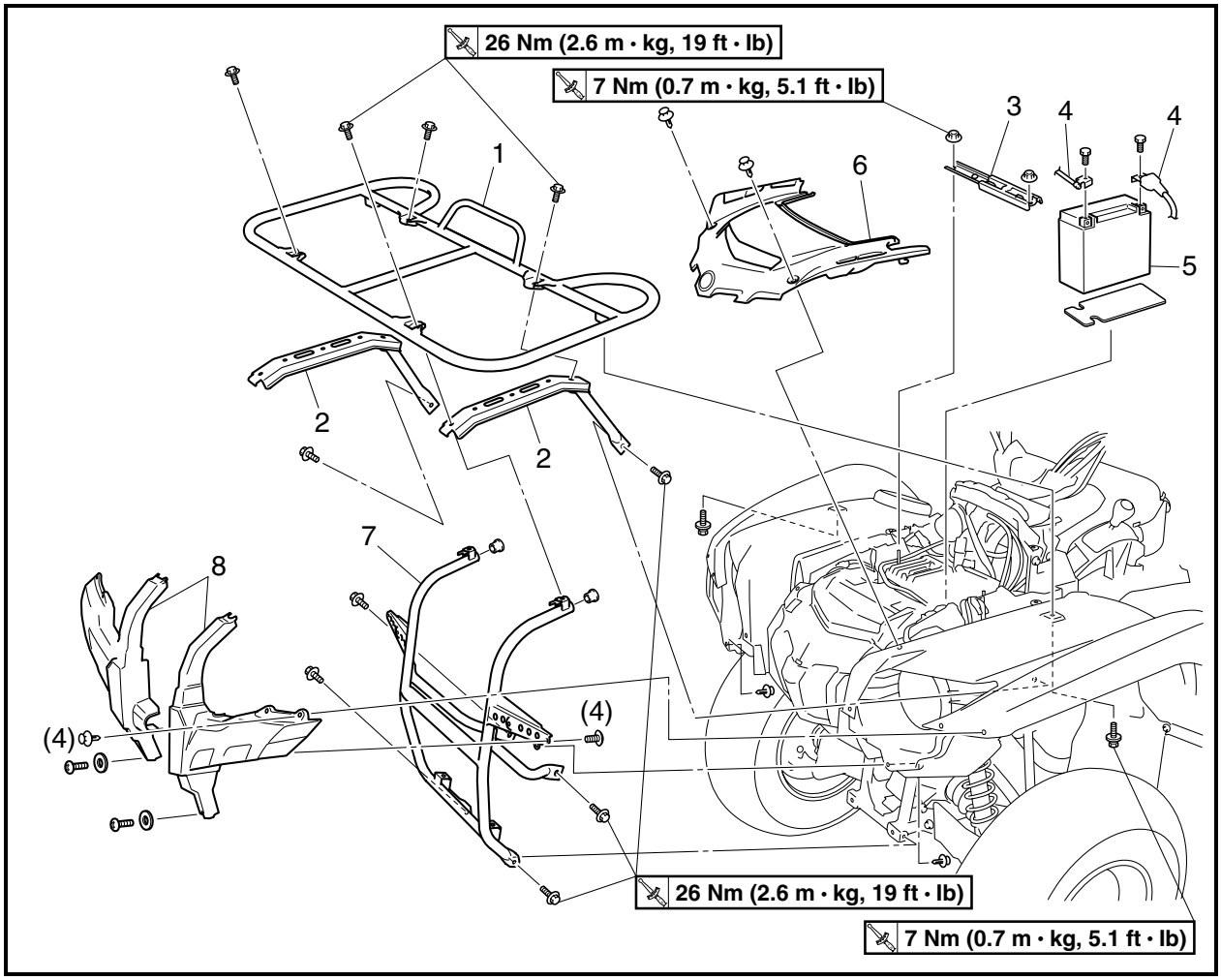
Order	Job/Part	Q'ty	Remarks
	Removing the seat and side panels		Remove the parts in the order listed.
1	Seat	1	**NOTE:** Pull up the seat lock lever, then pull up on the rear of the seat.
2	Battery cover	1	
3	Fuel tank cover	1	
4	Left side panel	1	
5	Right side panel	1	
6	Dipstick accessing panel	1	
			For installation, reverse the removal procedure.

EBS00037

FRONT CARRIER AND FRONT GUARD

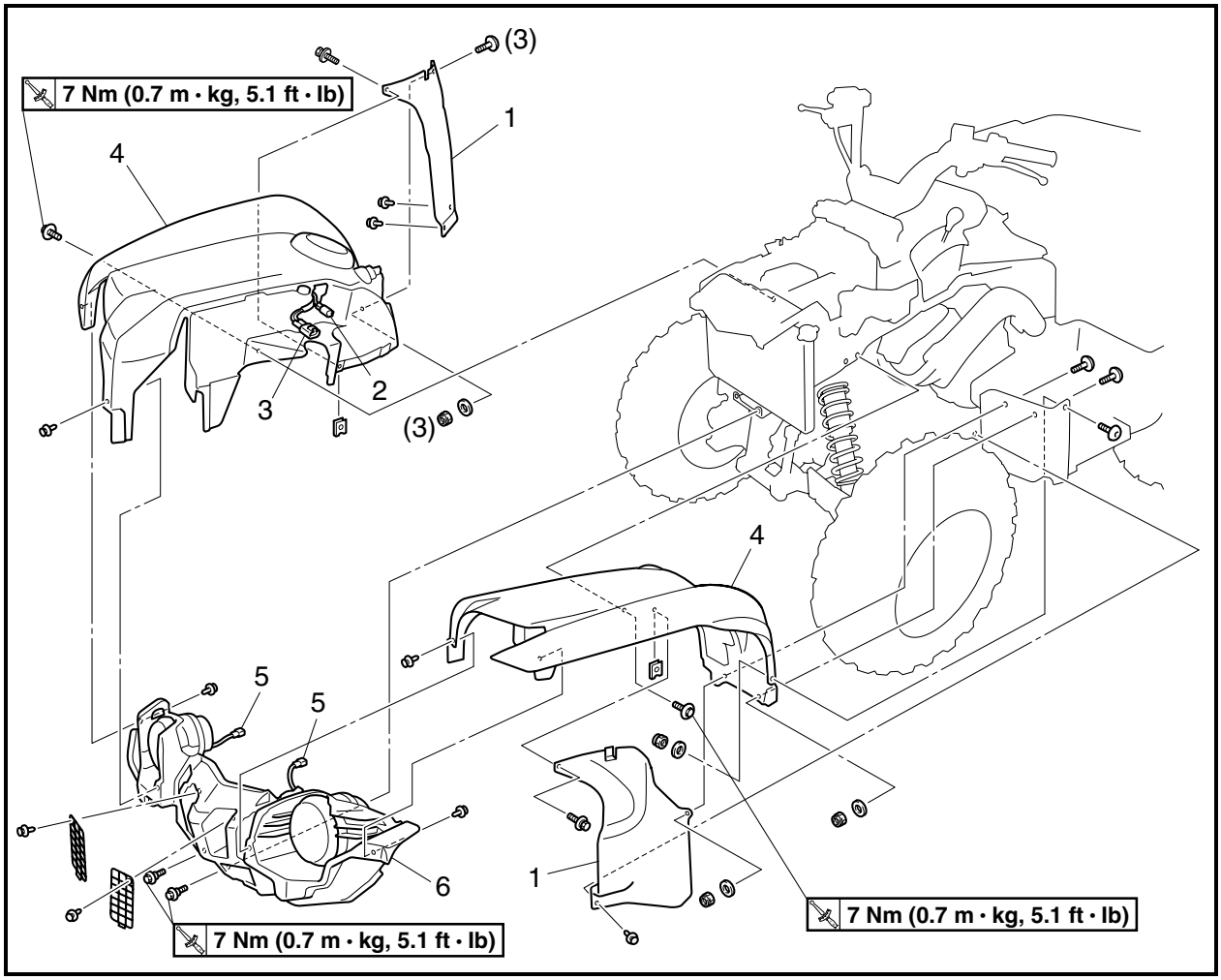


Order	Job/Part	Q'ty	Remarks
	Removing the front carrier and front guard		Remove the parts in the order listed.
	Front engine skid plate		Refer to "ENGINE SKID PLATES".
	Seat/side panels		Refer to "SEAT AND SIDE PANELS".
1	Front carrier	1	
2	Front carrier bracket	2	
3	Battery holding bracket	1	
4	Battery lead	2	Disconnect. **CAUTION:** **First disconnect the negative battery lead, then disconnect the positive lead.**
5	Battery	1	
6	Upper panel	1	



Order	Job/Part	Q'ty	Remarks
7	Front guard	1	
8	Front guard cover	2	
			For installation, reverse the removal procedure.

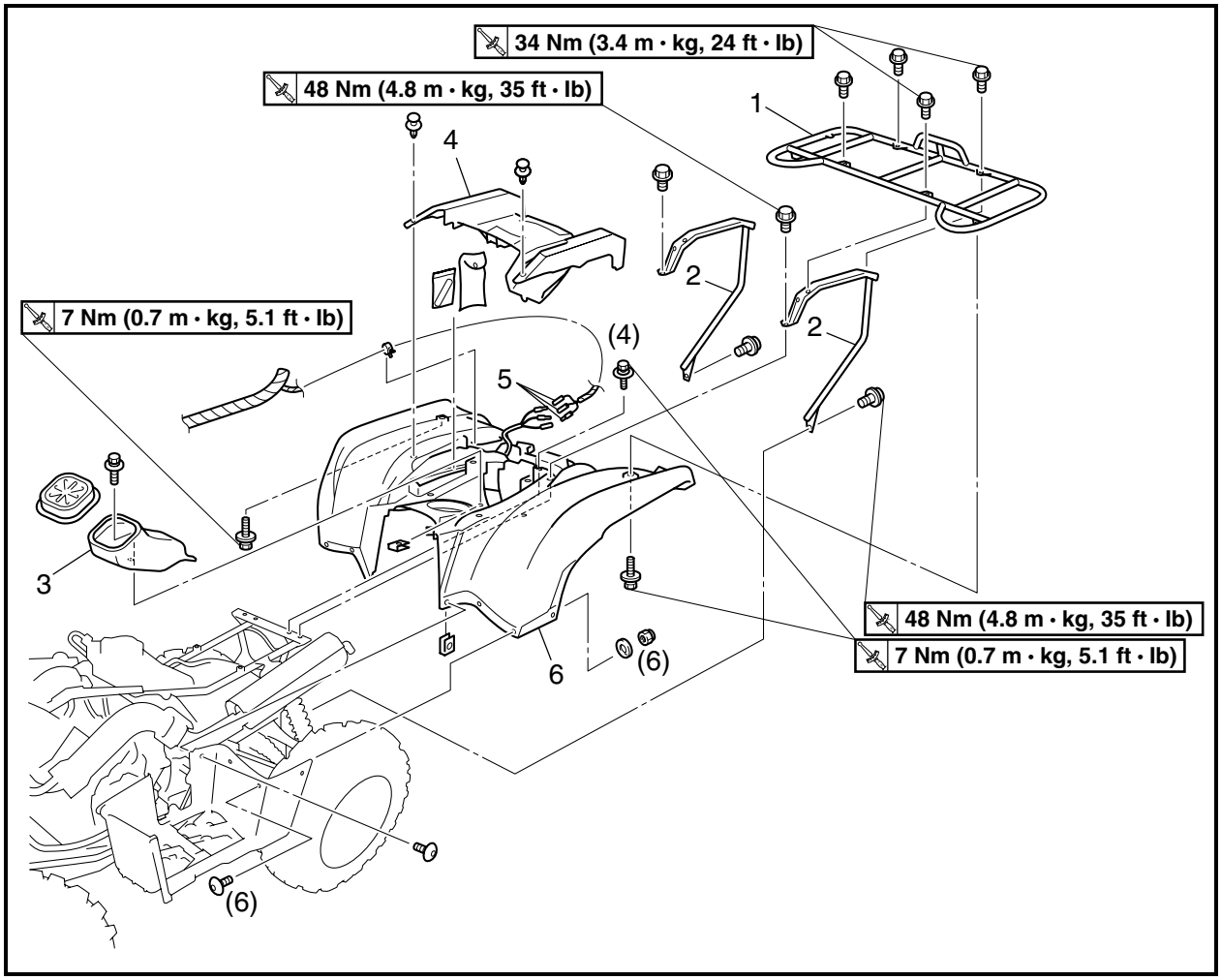
FRONT FENDERS AND FRONT GRILL



Order	Job/Part	Q'ty	Remarks
	Removing the front fenders and front grill		Remove the parts in the order listed.
	Seat/side panels		Refer to "SEAT AND SIDE PANELS".
	Front carrier/front guard		Refer to "FRONT CARRIER AND FRONT GUARD".
1	Front fender inner panel	2	
2	Auxiliary DC jack coupler	1	Disconnect.
3	Main switch coupler	1	Disconnect.
4	Front fender	2	
5	Headlight coupler	2	Disconnect.
6	Front grill	1	
			For installation, reverse the removal procedure.

EBS00040

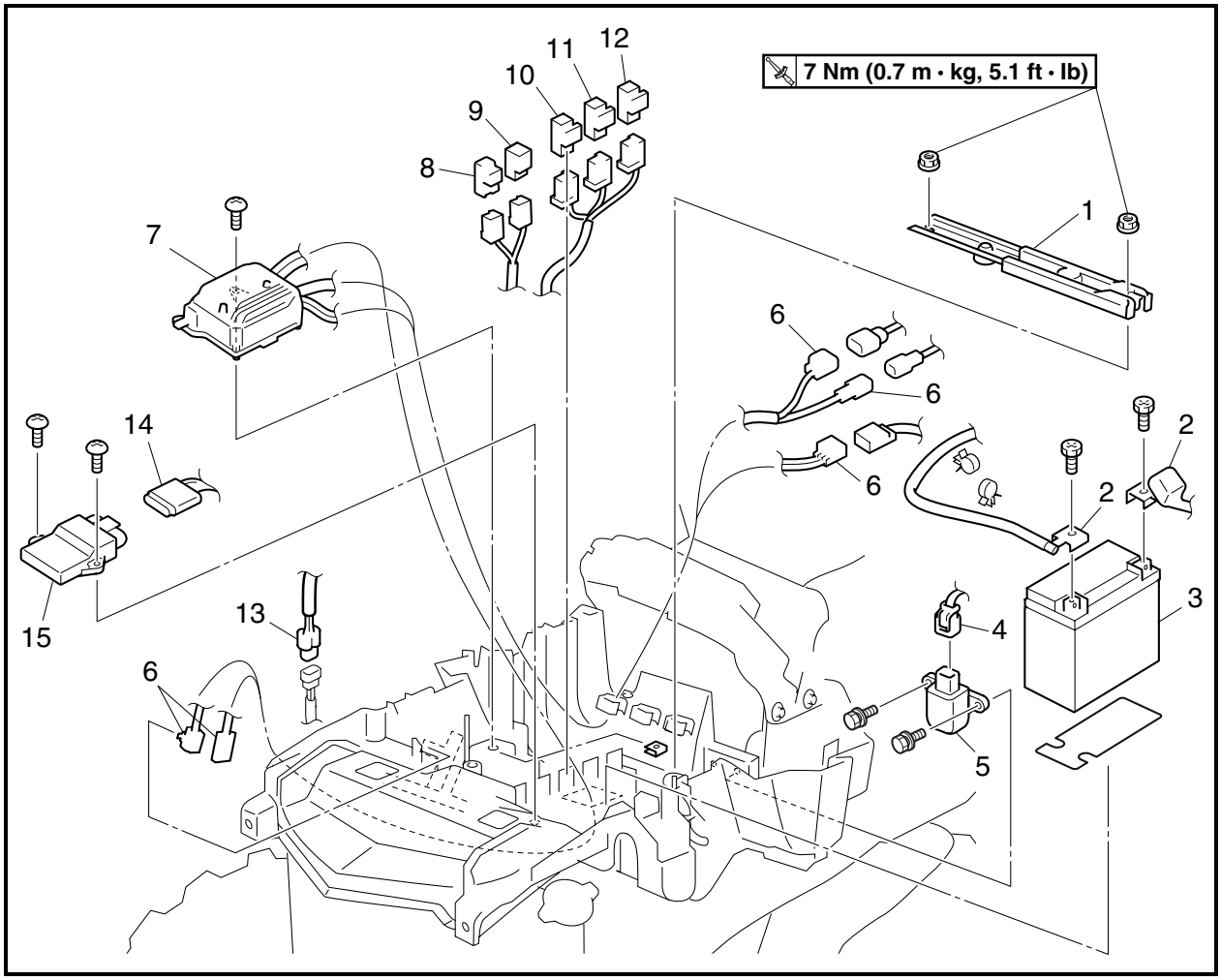
REAR CARRIER AND REAR FENDER



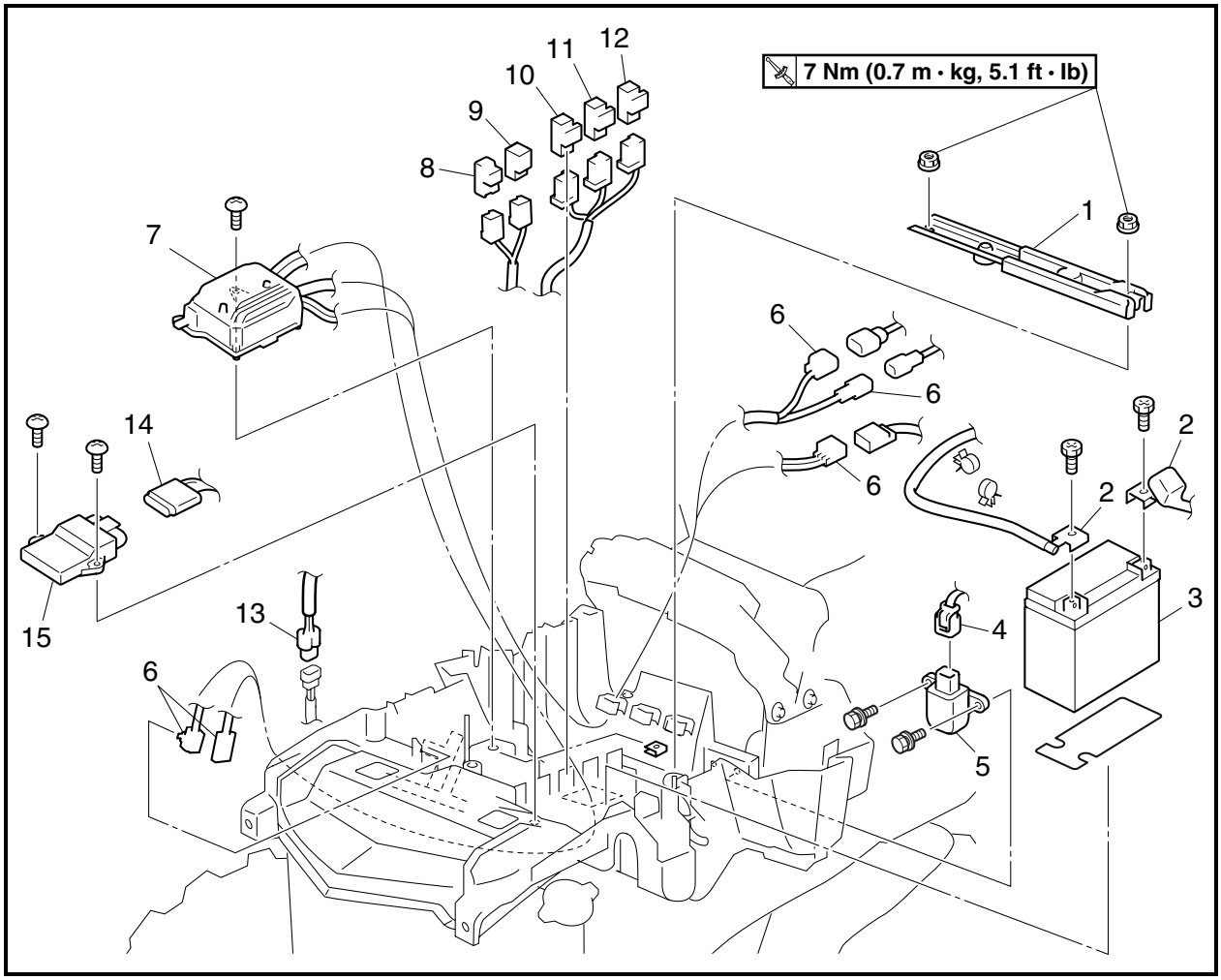
Order	Job/Part	Q'ty	Remarks
	Removing the rear carrier and rear fender		Remove the parts in the order listed.
	Seat/side panels		Refer to "SEAT AND SIDE PANELS".
1	Rear carrier	1	
2	Rear carrier bracket	2	
3	Storage compartment	1	
4	Tail/brake light cover	1	
5	Tail/brake light connector	3	Disconnect.
6	Rear fender	1	
			For installation, reverse the removal procedure.

ELECTRICAL COMPONENTS TRAY

ELECTRICAL COMPONENTS TRAY 1/2

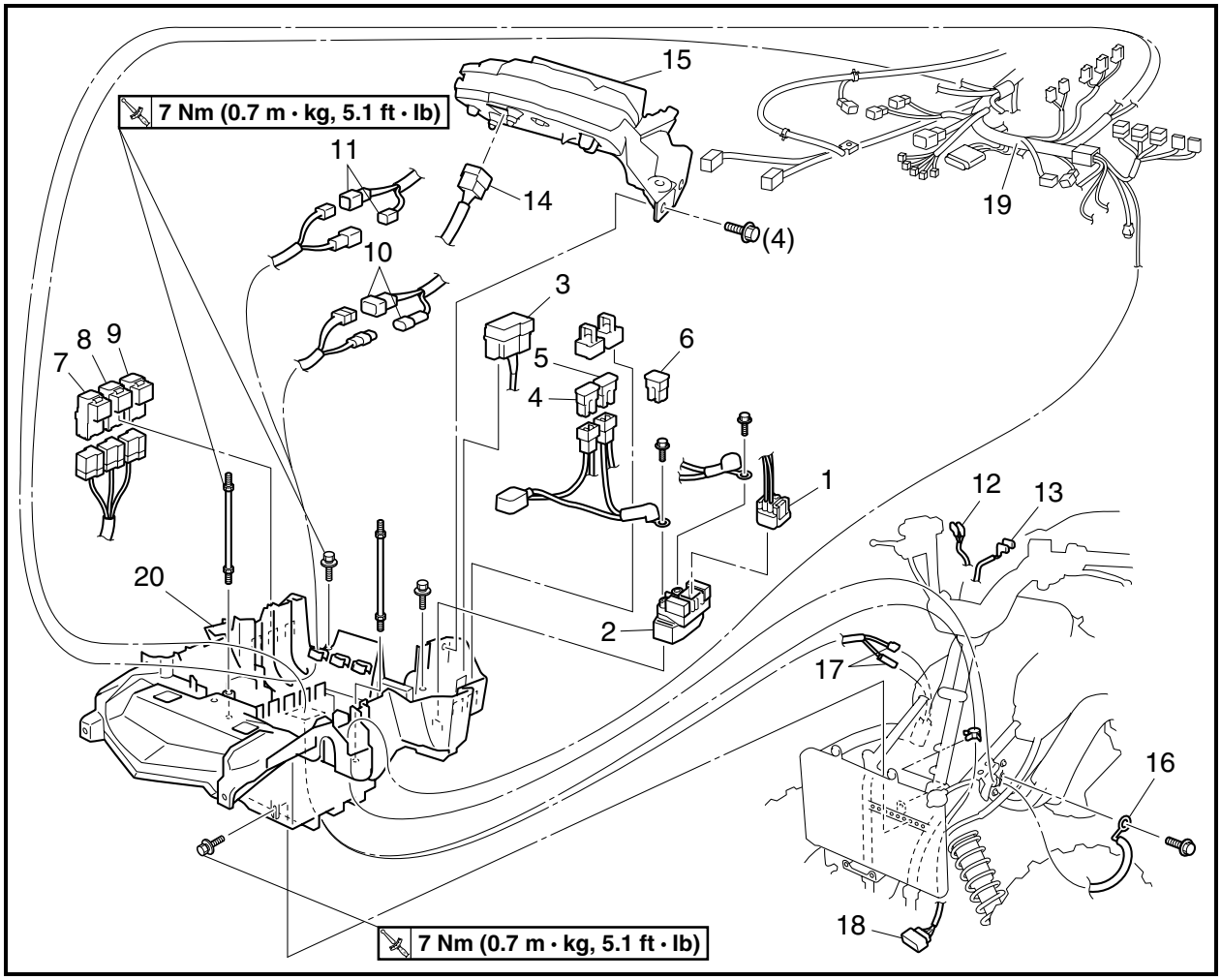


Order	Job/Part	Q'ty	Remarks
	Removing the electrical components tray		Remove the parts in the order listed.
	Front fender/front grill		Refer to "FRONT FENDERS AND FRONT GRILL".
1	Battery holding bracket	1	
2	Battery lead	2	Disconnect. **CAUTION:** **First disconnect the negative battery lead, then disconnect the positive lead.**
3	Battery	1	
4	Lean angle sensor coupler	1	Disconnect.
5	Lean angle sensor	1	
6	EPS control unit coupler	5	Disconnect.

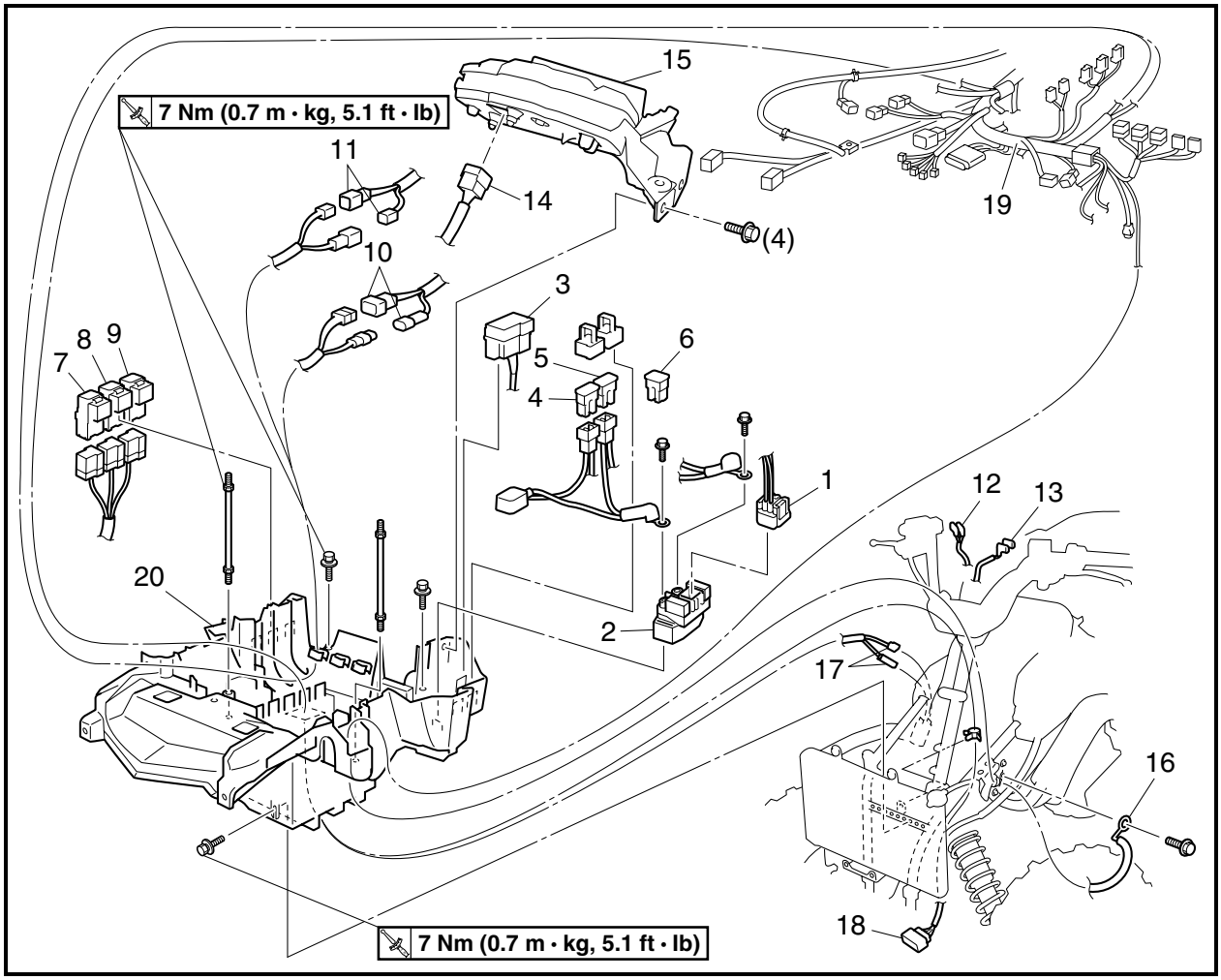


Order	Job/Part	Q'ty	Remarks
7	EPS (electric power steering) control unit	1	
8	Four-wheel-drive motor relay 3	1	
9	Rear brake relay	1	
10	Four-wheel-drive motor relay 2	1	
11	Four-wheel-drive motor relay 1	1	
12	Headlight relay	1	
13	Radiator fan motor coupler	1	Disconnect.
14	ECU coupler	1	Disconnect.
15	ECU (engine control unit)	1	For installation, reverse the removal procedure.

ELECTRICAL COMPONENTS TRAY 2/2

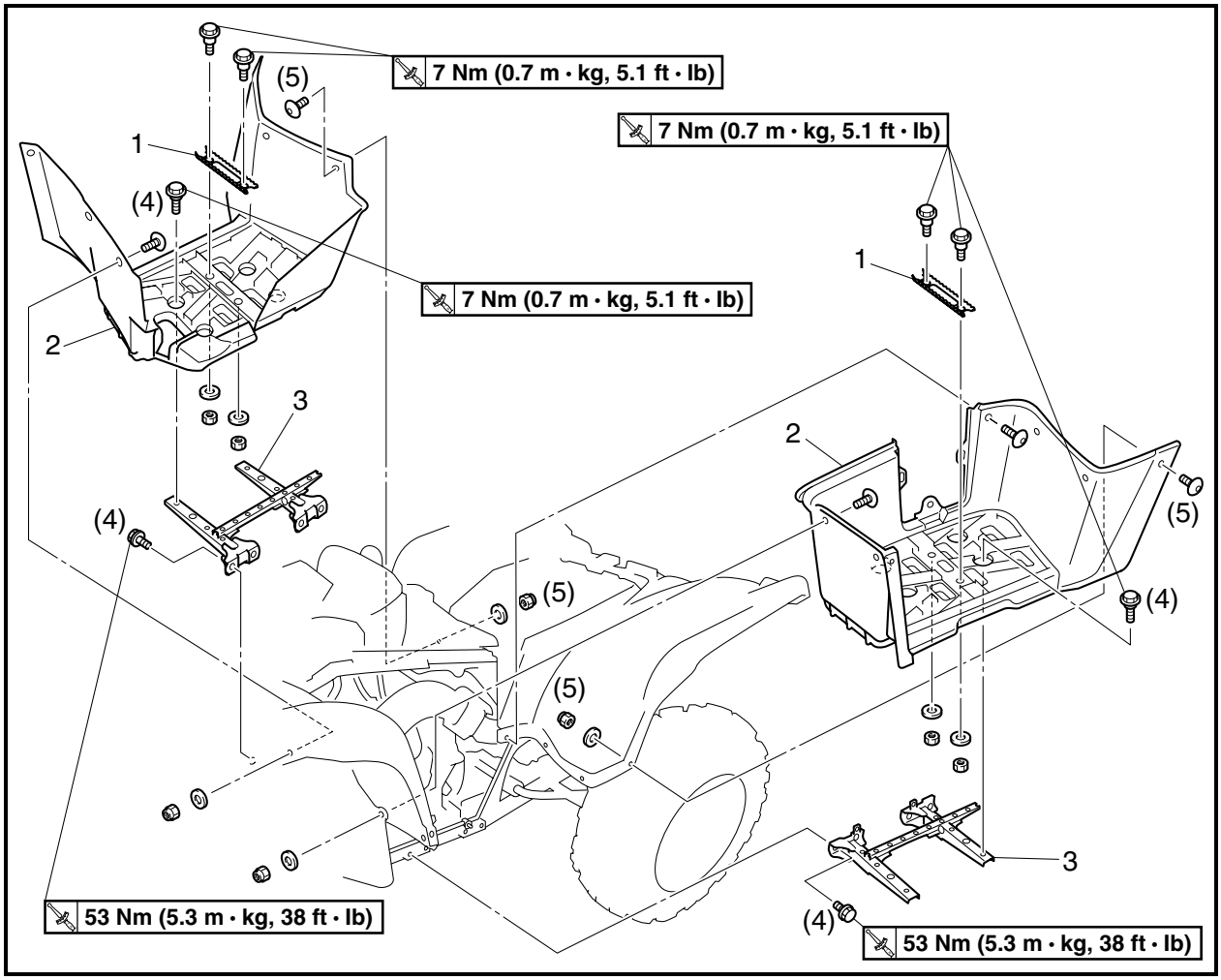


Order	Job/Part	Q'ty	Remarks
	Removing the electrical components tray		Remove the parts in the order listed.
1	Starter relay coupler	1	Disconnect.
2	Starter relay	1	
3	Fuse box	1	
4	EPS fuse	1	
5	Main fuse	1	
6	Spare fuse	1	
7	Radiator fan motor relay	1	
8	Fuel injection system relay	1	
9	Starting circuit cut-off relay	1	
10	Left handlebar switch coupler	2	Disconnect.
11	On-command four-wheel-drive motor switch and differential gear lock switch coupler	2	Disconnect.



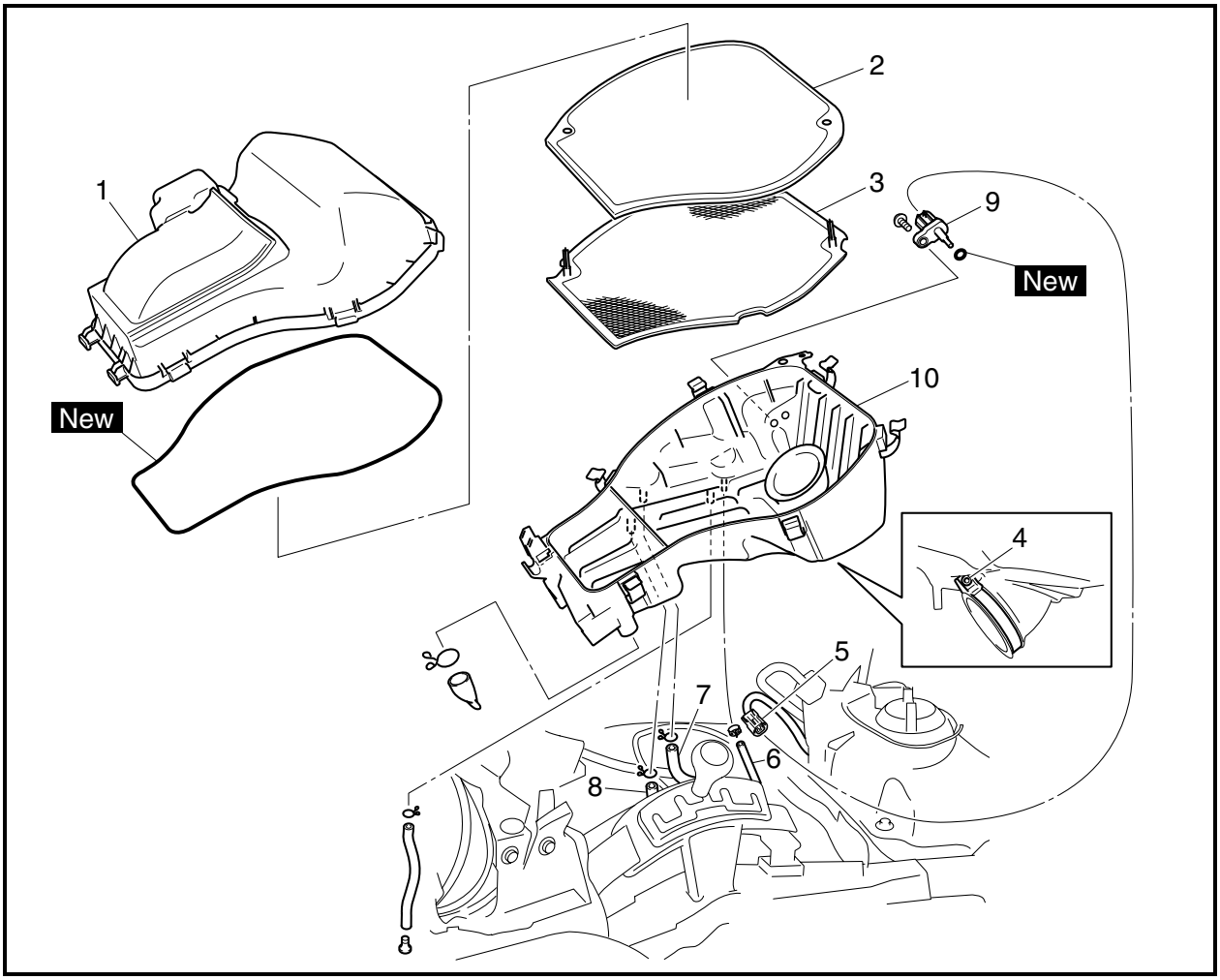
Order	Job/Part	Q'ty	Remarks
12	Front brake light switch connector	2	Disconnect.
13	Rear brake light switch connector	2	Disconnect.
14	Meter assembly coupler	1	Disconnect.
15	Meter assembly	1	
16	Frame ground terminal	1	
17	Ignition coil connector	2	Disconnect.
18	Differential gear motor coupler	1	Disconnect.
19	Wire harness	1	
20	Electrical components tray	1	For installation, reverse the removal procedure.

EBS00045
FOOTREST BOARDS



Order	Job/Part	Q'ty	Remarks
	Removing the footrest boards		Remove the parts in the order listed.
	Seat/side panels		Refer to "SEAT AND SIDE PANELS".
1	Footrest	2	
2	Footrest board	2	
3	Footrest bracket	2	
			For installation, reverse the removal procedure.

AIR FILTER CASE



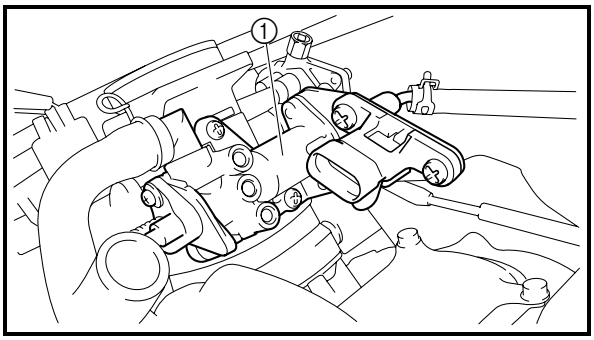
Order	Job/Part	Q'ty	Remarks
	Removing the air filter case		Remove the parts in the order listed.
	Seat/side panels		Refer to "SEAT AND SIDE PANELS".
1	Air filter case cover	1	
2	Air filter element	1	
3	Air filter element frame	1	
4	Air filter case joint clamp screw	1	Loosen.
5	Intake air temperature sensor coupler	1	Disconnect.
6	Breather hose (air filter case to throttle body)	1	Disconnect.
7	Breather hose (air filter case to fast idle plunger unit)	1	Disconnect.
8	Cylinder head breather hose	1	Disconnect.
9	Intake air temperature sensor	1	
10	Air filter case	1	
			For installation, reverse the removal procedure.

EAS00049
ENGINE
ADJUSTING THE VALVE CLEARANCE

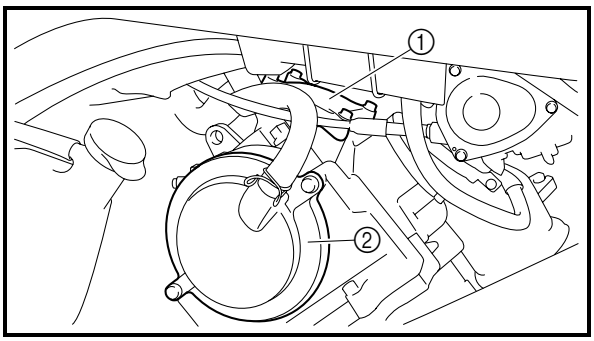
The following procedure applies to all of the valves.

NOTE:
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

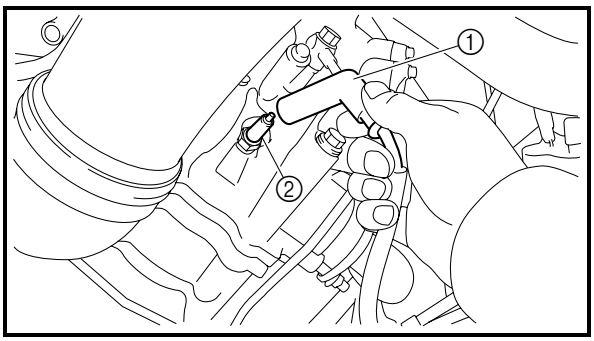
1. Remove:
   - left side panel
     Refer to “SEAT AND SIDE PANELS”.
   - front fender
     Refer to “FRONT FENDERS AND FRONT GRILL”.
   - footrest board
     Refer to “FOOTREST BOARDS”.
   - air filter case
     Refer to “AIR FILTER CASE”.



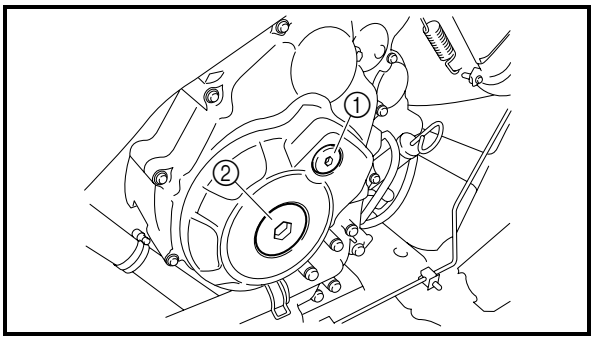
2. Remove:
   - fast idle plunger unit ①



3. Remove:
   - intake tappet cover ①
   - exhaust tappet cover
   - camshaft sprocket cover ②



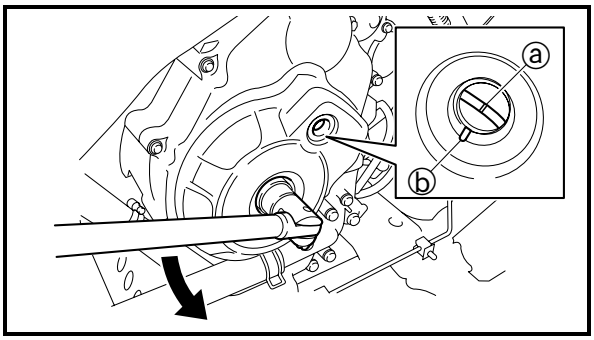
4. Disconnect:
   • spark plug cap ①
5. Remove:
   • spark plug ②



6. Remove:
   • timing mark accessing screw ①
   • crankshaft end accessing screw ②

7. Measure:
   • valve clearance
   Out of specification → Adjust.

Valve clearance (cold)
Intake valve
0.09 ~ 0.13 mm
(0.0035 ~ 0.0051 in)
Exhaust valve
0.16 ~ 0.20 mm
(0.0063 ~ 0.0079 in)



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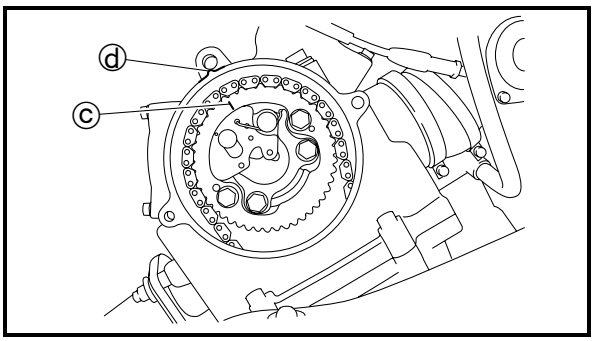
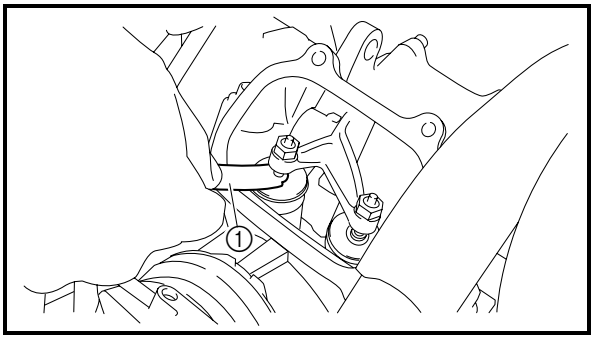
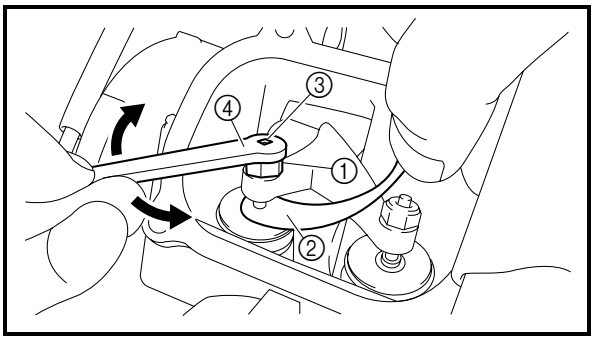
a. Turn the crankshaft counterclockwise.
b. When the piston is at the top dead center (TDC) on the compression stroke, align the "I" mark ⓐ on the AC magneto rotor with the stationary pointer ⓑ on the AC magneto cover.

NOTE:
To position the piston at top dead center (TDC) on the compression stroke, align the "I" mark ⓒ on the camshaft sprocket with the stationary pointer ⓓ on the cylinder head, as shown in the illustration.







c. Measure the valve clearance with a thickness gauge ①.

Thickness gauge
90890-03079
Narrow gauge set
YM-34483

Out of specification → Adjust.

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8. Adjust:
   • valve clearance

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a. Loosen the locknut ①.
b. Insert a thickness gauge ② between the end of the adjusting screw and the valve tip.
c. Turn the adjusting screw ③ with the tappet adjusting tool ④ until the specified valve clearance is obtained.

Tappet adjusting tool
90890-01311
Valve adjuster 3 mm & 4 mm
YM-08035-A

d. Hold the adjusting screw to prevent it from moving and tighten the locknut to the specified torque.

Locknut
14 Nm (1.4 m · kg, 10 ft · lb)

e. Measure the valve clearance again.
f. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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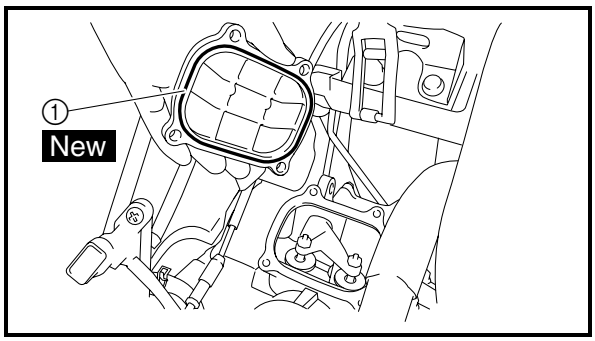
9. Install:
   • timing mark accessing screw
     6 Nm (0.6 m · kg, 4.3 ft · lb)
   • crankshaft end accessing screw
     10 Nm (1.0 m · kg, 7.2 ft · lb)
10. Install:
   • spark plug
     13 Nm (1.3 m · kg, 9.4 ft · lb)
11. Connect:
   • spark plug cap



12.Install:
- O-ring New
- camshaft sprocket cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

- O-ring ① New
- intake tappet cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

- O-ring New
- exhaust tappet cover

10 Nm (1.0 m · kg, 7.2 ft · lb)

13.Install:
- fast idle plunger unit

14.Install:
- air filter case
  Refer to “AIR FILTER CASE”.
- footrest board
  Refer to “FOOTREST BOARDS”.
- front fender
  Refer to “FRONT FENDERS AND FRONT GRILL”.
- left side panel
  Refer to “SEAT AND SIDE PANELS”.

EBS00051

ADJUSTING THE ENGINE IDLING SPEED

1. Remove:
   - fuel tank cover
     Refer to “SEAT AND SIDE PANELS”.
2. Start the engine and let it warm up for several minutes.
3. Attach:
   - tachometer
     (to the spark plug lead)

Digital tachometer
90890-06760, YU-39951-B

4. Measure:
   - engine idling speed
     Out of specification → Adjust.

Engine idling speed
1,350 ~ 1,450 r/min