



YAMAHA

2017

SERVICE MANUAL

GDR155/GDR155-A



B63-F8197-EZ

IMPORTANT

This manual was produced by the Yamaha Motor Vietnam Co.,Ltd. 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. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

Yamaha Motor Vietnam Co.,Ltd. is continually striving to improve all of 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.

TIP

Designs and specifications are subject to change without notice.

IMPORTANT MANUAL INFORMATION

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

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
 WARNING	A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.
TIP	A TIP provides key information to make procedures easier or clearer.

NVX
SERVICE MANUAL
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HOW TO USE THIS MANUAL

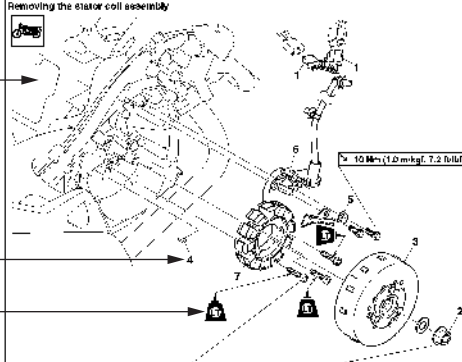
This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- The manual is divided into chapters and each chapter is divided into sections. The current section title “1” is shown at the top of each page.
- Sub-section titles “2” appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams “3” at the start of each removal and disassembly section.
- Numbers “4” are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols “5” indicate parts to be lubricated or replaced.
- Refer to “SYMBOLS”.
- A job instruction chart “6” accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc. This step explains removal and disassembly procedure only. For installation and assembly procedure, reverse the steps.
- Jobs “7” requiring more information (such as special tools and technical data) are described sequentially.

1
AC MAGNETO

3

AC MAGNETO
Removing the stator coil assembly



4

5

6

Order	Job/Parts to remove	Qty	Remarks
	Coolant		Refer to "COOLANT" in the COOLANT section on page 5-16.
	Battery		Refer to "BATTERY" in the BATTERY section on page 4-1.
	Engine oil cover gasket		Refer to "ENGINE OIL COVER GASKET" on page 4-4.
	Head tank cover		Refer to "HEAD TANK COVER" on page 4-7.
	Storage box		Refer to "STORAGE BOX" on page 4-6.
	Engine frame assembly (right) (Radiator cover)		Refer to "ENGINE FRAME ASSEMBLY (RIGHT)" on page 4-15.
	Radiator fan		Refer to "RADIATOR FAN" on page 4-1.
1	Crankshaft position sensor (Stator coil assembly) (right)	1	Disassemble
2	AC magnet rotor nut	1	
3	AC magnet rotor	1	
4	Washer	1	

5-51

AC MAGNETO

2

REMOVING THE AC MAGNETO

1. Remove:

- AC magnet rotor nut "1"
- Washer

TIP
While holding the AC magnet rotor "2" with the rotor holding tool "3", loosen the AC magnet rotor nut.

2. Remove:

- AC magnet rotor "1"
- AC magnet rotor nut "2"
- Washer

TIP
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller center bolt and the crankshaft.

3

INSTALLING THE AC MAGNETO

1. Install:

- Washer
- AC magnet rotor
- Washer
- AC magnet rotor nut

TIP
• Clean the tapered portion of the crankshaft and the AC magnet rotor hub.
• When installing the AC magnet rotor, make sure the washer key is properly seated in the keyway of the crankshaft.

2. Tighten:

- AC magnet rotor nut "1"

TIP
While holding the AC magnet rotor "2" with the rotor holding tool "3", tighten the AC magnet rotor nut.

4

5

6

7

5-53

SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.

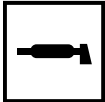
SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil		Replace the part with a new one.
	Silicone fluid		

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GENERAL INFORMATION

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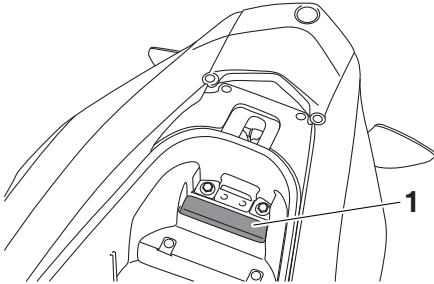
EAS20007

IDENTIFICATION

EAS30002

VEHICLE IDENTIFICATION NUMBER

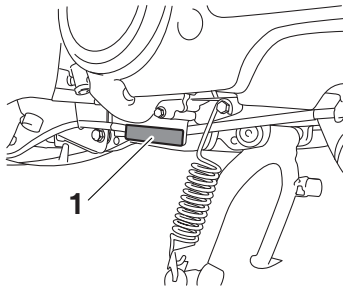
The vehicle identification number “1” is stamped into the frame.



EAS30004

ENGINE SERIAL NUMBER

The engine serial number “1” is stamped into the crankcase.



EAS20009

IMPORTANT INFORMATION

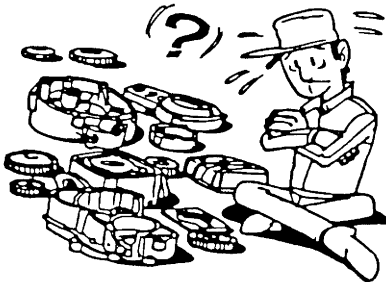
EAS30006

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" on page 1-10.
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.

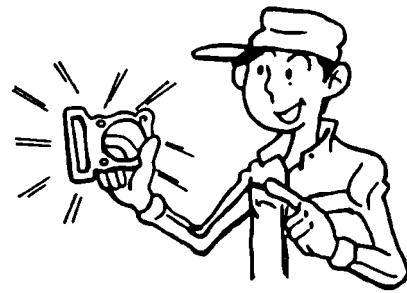


4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EAS30007

REPLACEMENT PARTS

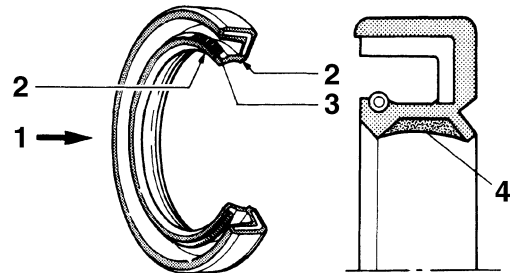
Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS30008

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.

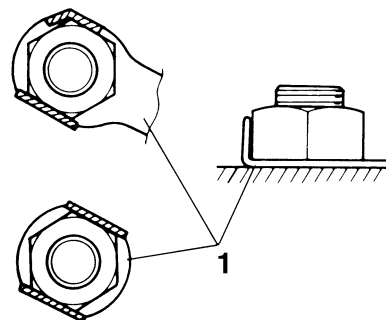


1. Oil
2. Lip
3. Spring
4. Grease

EAS30009

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.



EAS30010

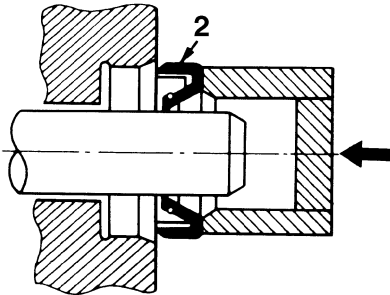
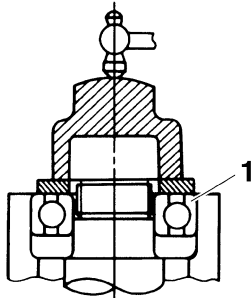
BEARINGS AND OIL SEALS

Install bearings "1" and oil seals "2" 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.

ECA13300

NOTICE

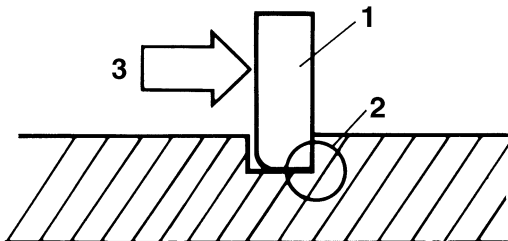
Do not spin the bearing with compressed air because this will damage the bearing surfaces.



EAS30011

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.



EAS20010

BASIC SERVICE INFORMATION

EAS30013

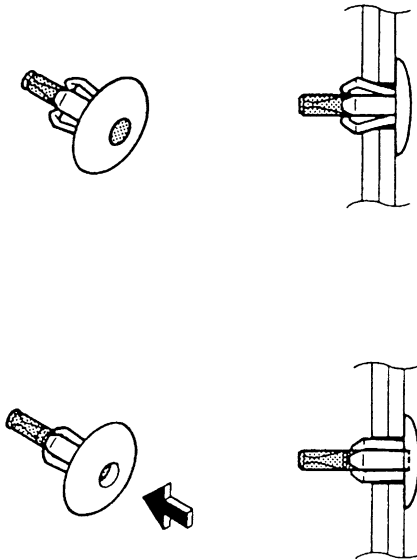
QUICK FASTENERS

Rivet type

1. Remove:
 - Quick fastener

TIP

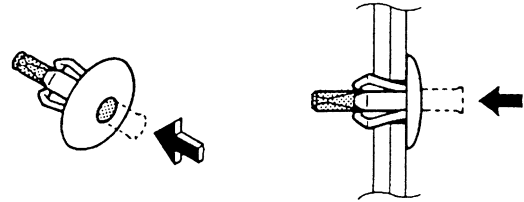
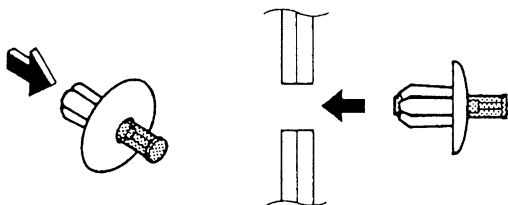
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.



2. Install:
 - Quick fastener

TIP

To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the part to be secured and push the pin in with a screwdriver. Make sure that the pin is flush with the fastener's head.

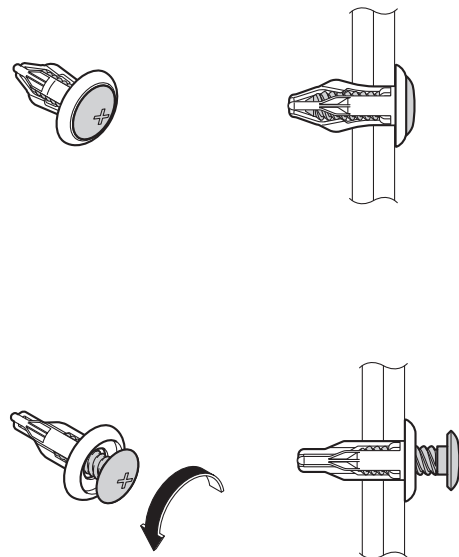


Screw type

1. Remove:
 - Quick fastener

TIP

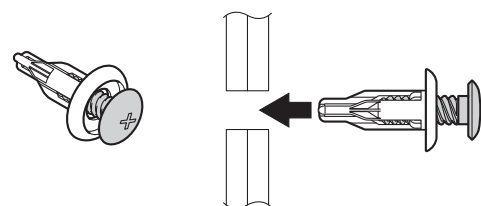
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.

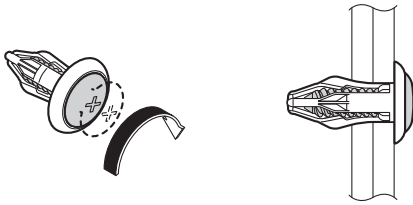


2. Install:
 - Quick fastener

TIP

To install the quick fastener, insert the fastener into the part to be secured and tighten the screw.





EAS30014

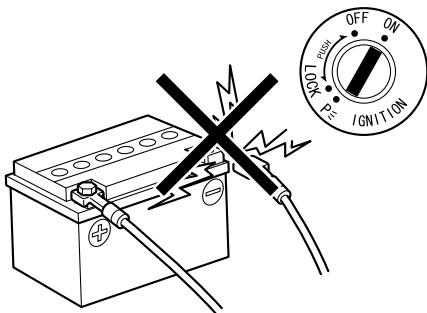
ELECTRICAL SYSTEM

Electrical parts handling

ECA16600

NOTICE

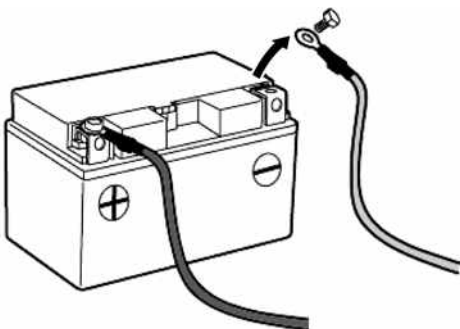
Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



ECA16751

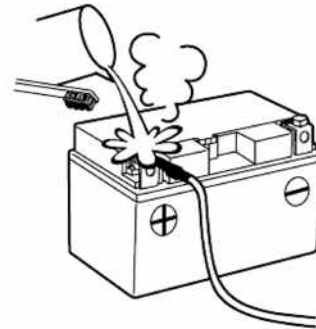
NOTICE

When disconnecting the battery leads from the battery, be sure to disconnect the negative battery lead first, then the positive battery lead. If the positive battery lead is disconnected first and a tool or similar item contacts the vehicle, a spark could be generated, which is extremely dangerous.



TIP

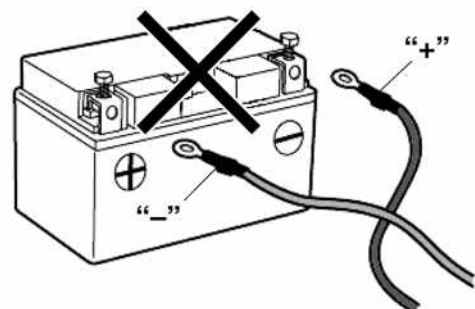
If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



ECA16760

NOTICE

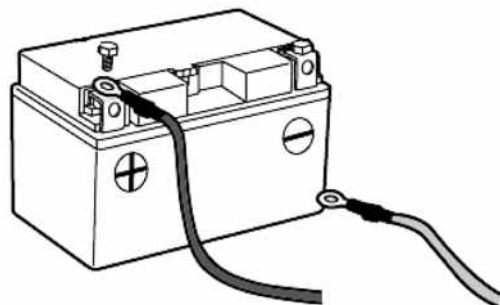
Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



ECA16771

NOTICE

When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated, which is extremely dangerous.

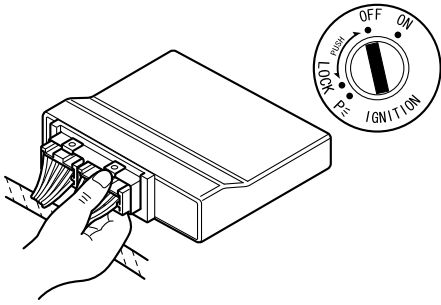


ECA16610

NOTICE

Turn the main switch to "OFF" before disconnecting or connecting an electrical component.

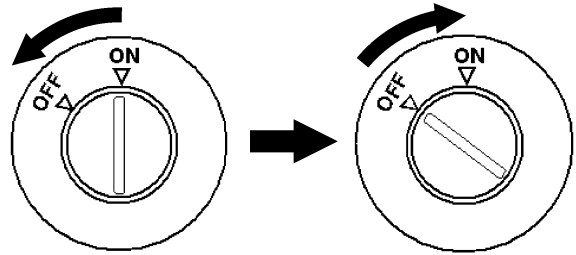
BASIC SERVICE INFORMATION



ECA16620

NOTICE

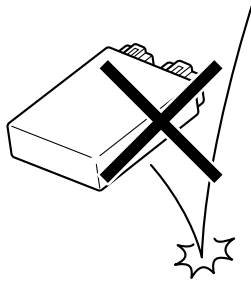
Handle electrical components with special care, and do not subject them to strong shocks.



Checking the electrical system

TIP

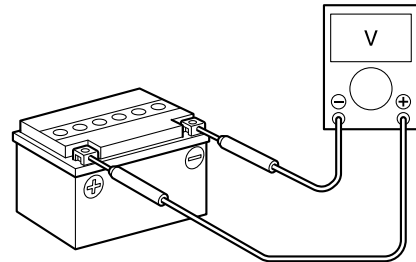
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA16630

NOTICE

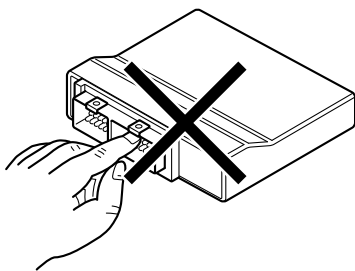
Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



ECA14371

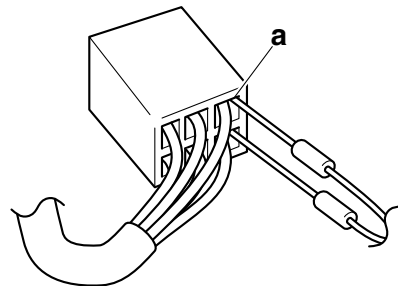
NOTICE

Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.



TIP

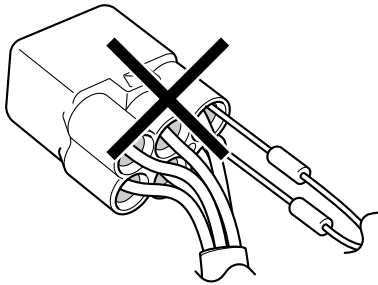
When resetting the ECU by turning the main switch to “OFF”, be sure to wait approximately 5 seconds before turning the main switch back to “ON”.



ECA16640

NOTICE

For waterproof couplers, never insert the tester probes directly into the coupler. When performing any checks using a waterproof coupler, use the specified test harness or a suitable commercially available test harness.



Checking the connections

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

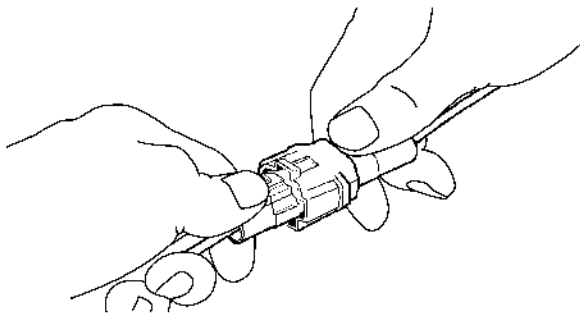
1. Disconnect:

- Lead
- Coupler
- Connector

ECA16780

NOTICE

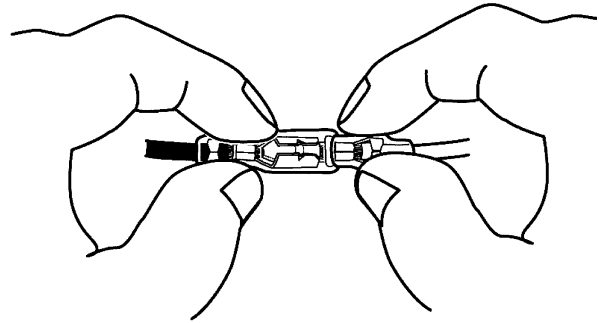
- When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
- There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790

NOTICE

When disconnecting a connector, do not pull the leads. Hold both sections of the connector securely, and then disconnect the connector.

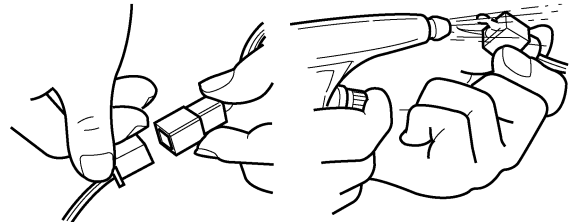


2. Check:

- Lead
- Coupler
- Connector

Moisture → Dry with an air blower.

Rust/stains → Connect and disconnect several times.

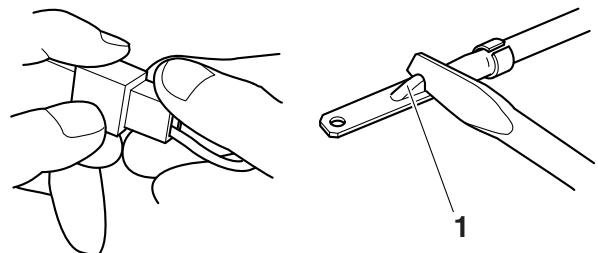


3. Check:

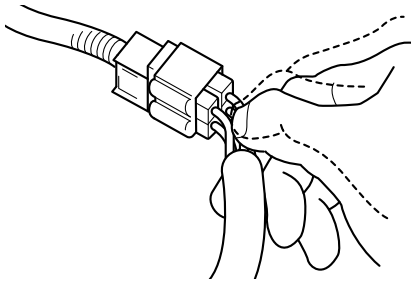
- All connections
- Loose connection → Connect properly.

TIP

- If the pin “1” on the terminal is flattened, bend it up.
- After disassembling and assembling a coupler, pull on the leads to make sure that they are installed securely.



BASIC SERVICE INFORMATION

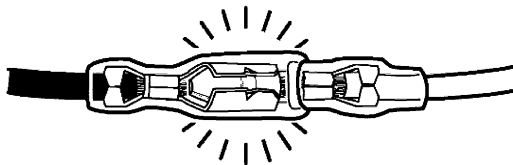
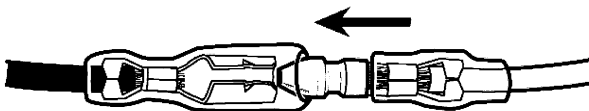
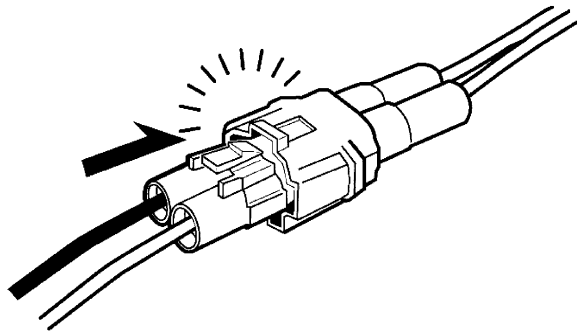


4. Connect:

- Lead
- Coupler
- Connector

TIP

- When connecting a coupler or connector, push both sections of the coupler or connector together until they are connected securely.
- Make sure all connections are tight.



5. Check:

- Continuity
(with the pocket tester)

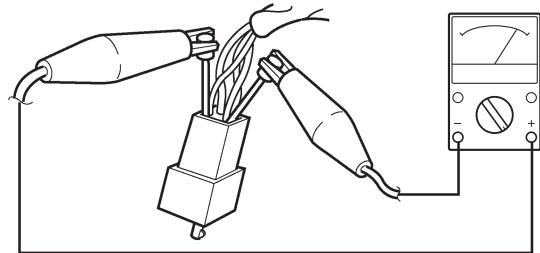
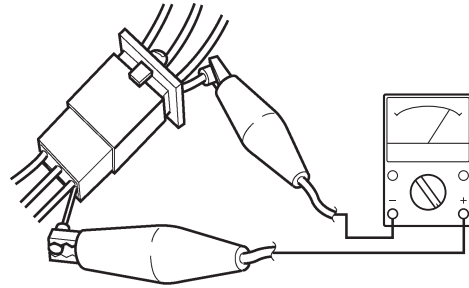


Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

- 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.



6. Check:

- Resistance



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

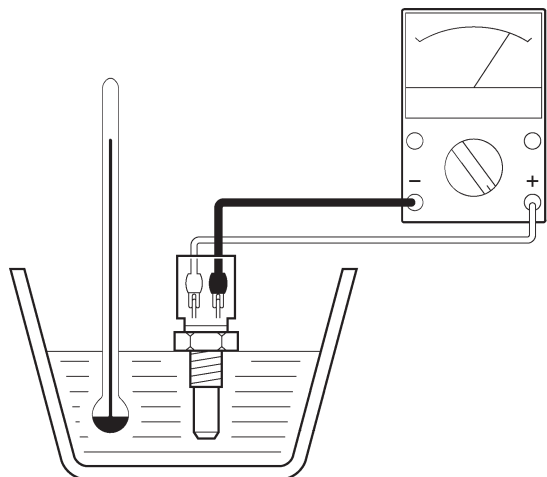
TIP

The resistance values shown were obtained at the standard measuring temperature of 20 °C (68 °F). If the measuring temperature is not 20 °C (68 °F), the specified measuring conditions will be shown.



Coolant temperature sensor re-
sistance
2512-2777 Ω at 20 °C (2512-2777
 Ω at 68 °F)
Coolant temperature sensor re-
sistance
210-221 Ω at 100 °C (210-221 Ω
at 212 °F)

BASIC SERVICE INFORMATION



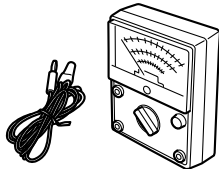
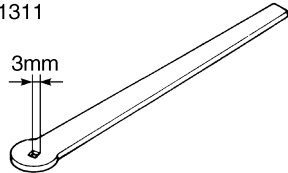
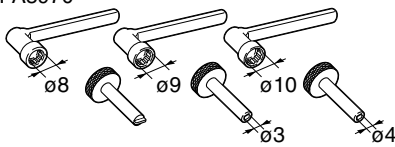
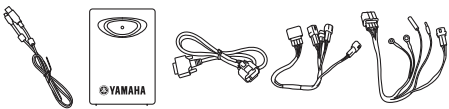
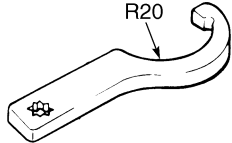
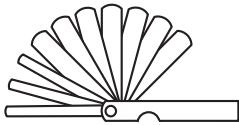
EAS20012

SPECIAL TOOLS

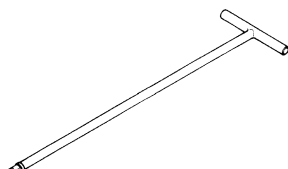
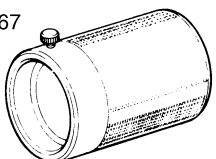
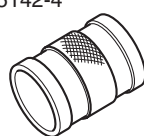
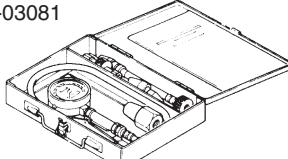
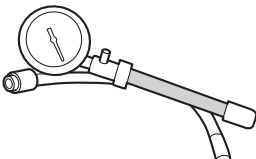
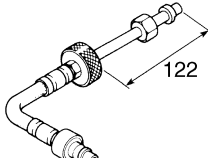
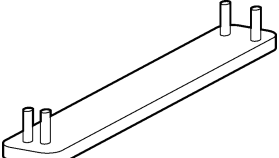
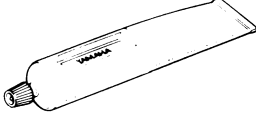
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country.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

TIP

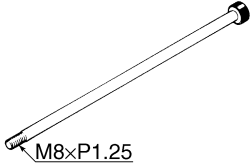
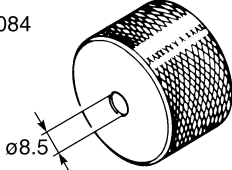
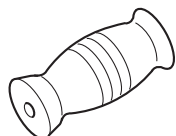
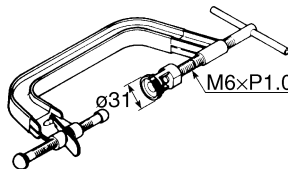
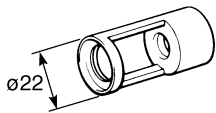
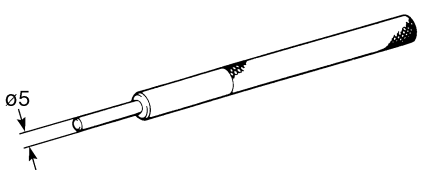
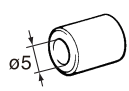
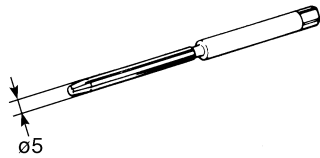
- For U.S.A. and Canada, use part numbers starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part numbers starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-8, 1-8, 8-97, 8-98, 8-98, 8-99, 8-102, 8-103, 8-103, 8-103, 8-104, 8-104, 8-105, 8-105, 8-106, 8-107, 8-108, 8-108
Tappet adjusting tool 90890-01311 Six piece tappet set YM-A5970	90890-01311  YM-A5970 	3-7
Yamaha diagnostic tool USB 90890-03250		3-7, 3-8, 4-51, 4-55, 7-14, 7-14, 8-28, 8-69, 8-90
Yamaha diagnostic tool (A/I) 90890-03252		3-7, 3-8, 4-51, 4-55, 7-14, 7-14, 8-28, 8-69, 8-90
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-14, 3-15, 4-69
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		4-26

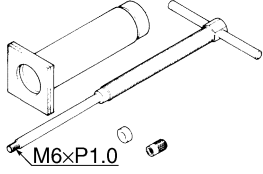
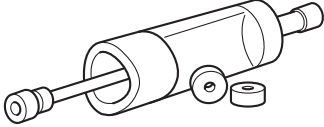
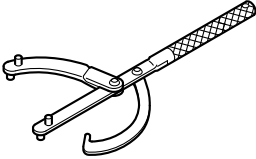
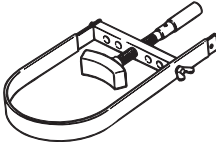
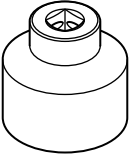
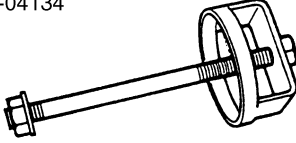
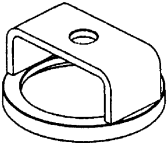
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
T-handle 90890-01326 T-handle 3/8" drive 60 cm long YM-01326		4-63, 4-64
Fork seal driver weight 90890-01367 Replacement hammer YM-A9409-7	90890-01367  YM-A9409-7/YM-A5142-4 	4-64, 4-65
Fork seal driver attachment (ø30) 90890-01400		4-64, 4-65
Compression gauge 90890-03081 Engine compression tester YU-33223	90890-03081  YU-33223 	5-1
Extension 90890-04136		5-1
Camshaft wrench 90890-04162 Camshaft wrench YM-04162		5-13, 5-17
Yamaha bond No. 1215 90890-85505 (Three bond No.1215®)		5-16, 5-55

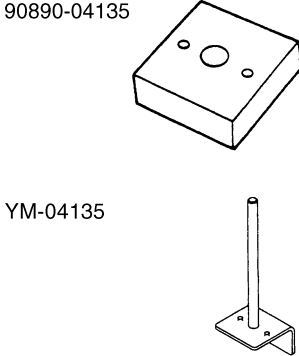
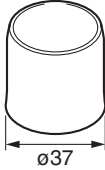
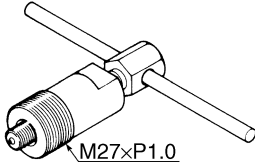
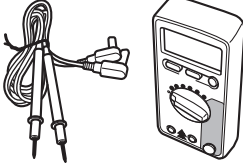
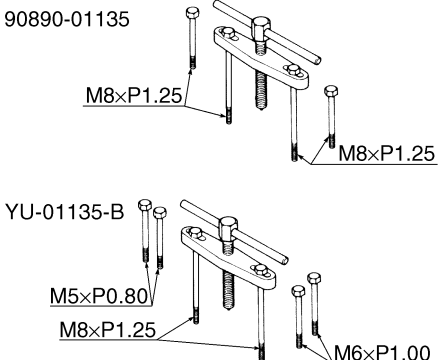
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Slide hammer bolt 90890-01085 Slide hammer bolt 8 mm YU-01083-2		5-19
Weight 90890-01084 Weight YU-01083-3	90890-01084  YU-01083-3 	5-19
Valve spring compressor 90890-04019 Valve spring compressor YM-04019		5-23, 5-28
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-23, 5-28
Valve guide remover (ø5) 90890-04097 Valve guide remover (5.0 mm) YM-04097		5-24
Valve guide installer (ø5) 90890-04098 Valve guide installer (5.0 mm) YM-04098		5-24
Valve guide reamer (ø5) 90890-04099 Valve guide reamer (5.0 mm) YM-04099		5-24

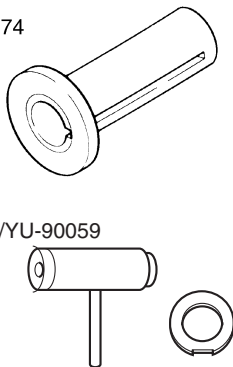
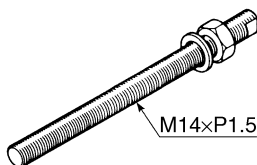
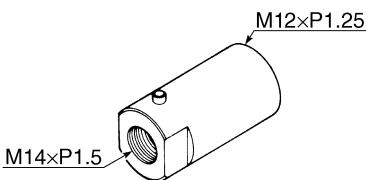
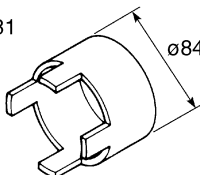
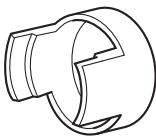
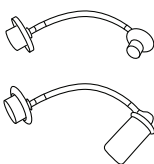
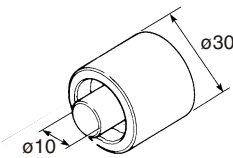
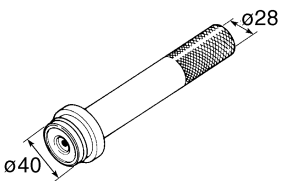
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-30
Rotor holding tool 90890-01235 Universal magneto and rotor holder YU-01235		5-37, 5-42, 5-44, 5-44
Rotor holding tool 90890-01701		5-37, 5-41
Socket wrench (39 mm) 90890-01493		5-37, 5-41
Sheave spring compressor 90890-04134 Sheave spring compressor YM-04134	90890-04134  YM-04134 	5-37, 5-40

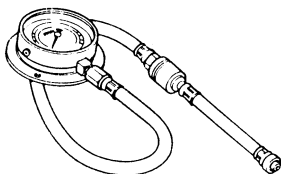
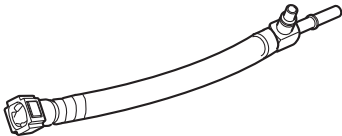
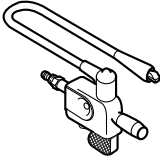
SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Sheave fixed block 90890-04135 Sheave fixed bracket YM-04135	 90890-04135 YM-04135	5-37, 5-40
Oil seal guide (37 mm) 90890-04177	 ø37	5-40
Flywheel puller 90890-01189 Flywheel puller YM-01189	 M27xP1.0	5-44
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-51, 8-106, 8-109
Crankcase separating tool 90890-01135 Crankcase separator YU-01135-B	 90890-01135 M8xP1.25 M8xP1.25 YU-01135-B M5xP0.80 M8xP1.25 M6xP1.00	5-53

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Crankshaft installer pot 90890-01274 Installing pot YU-90058	90890-01274  YU-90058/YU-90059	5-54
Crankshaft installer bolt 90890-01275 Bolt YU-90060	 M14xP1.5	5-54
Adapter (M12) 90890-01278 Adapter #3 YU-90063	 M12xP1.25 M14xP1.5	5-54
Spacer (crankshaft installer) 90890-04081 Pot spacer YM-91044	90890-04081  ø84 YM-91044 	5-54
Radiator cap tester 90890-05375		6-3, 6-3
Mechanical seal installer 90890-04145	 ø30 ø10	6-8
Middle driven shaft bearing driver 90890-04058 Middle drive bearing installer 40 & 50 mm YM-04058	 ø40 ø28 ø28	6-8

SPECIAL TOOLS

Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 Pressure gauge YU-03153		7-4
Fuel pressure adapter 6.3mm 90890-03227		7-4
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		8-105

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GENERAL SPECIFICATIONS

EAS20013

GENERAL SPECIFICATIONS

Model	
Model	B631/B633
Dimensions	
Overall length	1990 mm (78.3 in)
Overall width	700 mm (27.5 in)
Overall height	1125 mm (44.3 in)
Seat height	790 mm (31.1 in)
Wheelbase	1350 mm (53.1 in)
Ground clearance	140 mm (5.50 in)
Minimum turning radius	2.0 m
Weight	
Curb weight	116 kg (255 lb) (GDR155)
	118 kg (260 lb) (GDR155-A)
Maximum load	154 kg (339 lb) (GDR155)
	153 kg (336 lb) (GDR155-A)

ENGINE SPECIFICATIONS

EAS20014

ENGINE SPECIFICATIONS

Engine

Engine type	Liquid cooled 4-stroke, SOHC
Displacement	155 cm ³
Cylinder arrangement	Single cylinder
Bore × stroke	58.0 × 58.7 mm (2.28 × 2.31 in)
Compression ratio	10.5 : 1
Compression pressure	1374–1769 kPa/1393 r/min
Starting system	Electric starter

Fuel

Recommended fuel	Regular unleaded gasoline (Gasohol [E10] acceptable)
Fuel tank capacity	4.6 L (1.2 US gal, 1.1 Imp.gal)
Fuel reserve amount	0.8 L

Engine oil

Lubrication system	Wet sump
Recommended brand	YAMALUBE
Type	SAE 10W-40
Recommended engine oil grade	API service SG type or higher, JASO standard MA or MB
Engine oil quantity	
Quantity (disassembled)	1.00 L (1.06 US qt, 0.88 Imp.qt)
Periodic oil change	0.90 L (0.95 US qt, 0.79 Imp.qt)

Final transmission oil

Type	Motor oil SAE 10W-30 type SE or higher or Gear oil SAE 85W GL-3
Quantity (disassembled)	0.16 L (0.17 US qt, 0.14 Imp.qt)
Quantity	0.15 L (0.16 US qt, 0.13 Imp.qt)

Oil filter

Oil filter type	Centrifugal
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Oil pump

Inner-rotor-to-outer-rotor-tip clearance	0.150 mm (0.0059 in)
Limit	0.23 mm (0.0091 in)
Outer-rotor-to-oil-pump-housing clearance	0.13–0.18 mm (0.0051–0.0071 in)
Limit	0.22 mm (0.0086 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.11 mm (0.0024–0.0043 in)
Limit	0.18 mm (0.0071 in)

Coolant quantity

Radiator (including all routes)	0.46 L (0.49 US qt, 0.40 Imp.qt)
Coolant reservoir (up to the maximum level mark)	0.13 L (0.13 US qt, 0.11 Imp.qt)

ENGINE SPECIFICATIONS

Radiator cap valve opening pressure	78.6–137.4 kPa (0.79–1.37 kgf/cm ² , 11.4–19.9 psi)
Thermostat	
Valve opening temperature	74.0–78.0 °C (165.20–172.40 °F)
Valve full open temperature	90.0 °C (194.00 °F)
Valve lift (full open)	7.0 mm (0.28 in)
Water pump	
Water pump type	Single suction centrifugal pump
Spark plug(s)	
Manufacturer/model	NGK/CPR8EA-9 DENSO/U24EPR-9
Spark plug gap	0.8–0.9 mm (0.031–0.035 in)
Cylinder head	
Warping limit	0.05 mm (0.0020 in)
Camshaft	
Camshaft lobe dimensions	
Lobe height (Intake)	32.211–32.311 mm (1.2681–1.2721 in)
Limit	32.111 mm (1.2642 in)
Lobe height (Intake high speed)	32.587–32.687 mm (1.2830–1.2869 in)
Limit (High speed)	32.487 mm (1.2790 in)
Lobe height (Exhaust)	29.420–29.520 mm (1.1583–1.1622 in)
Limit	29.320 mm (1.1543 in)
Camshaft runout limit	0.030 mm (0.0012 in)
Rocker arm/rocker arm shaft	
Rocker arm inside diameter	9.985–10.000 mm (0.3931–0.3937 in)
Limit	10.015 mm (0.3943 in)
Rocker arm shaft outside diameter	9.966–9.976 mm (0.3924–0.3928 in)
Limit	9.935 mm (0.3911 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.10–0.14 mm (0.0039–0.0055 in)
Exhaust	0.21–0.25 mm (0.0083–0.0098 in)
Valve dimensions	
Valve seat contact width (intake)	0.90–1.20 mm (0.0354–0.0472 in)
Limit	1.7 mm (0.068 in)
Valve seat contact width (exhaust)	0.90–1.20 mm (0.0354–0.0472 in)
Limit	1.7 mm (0.068 in)

ENGINE SPECIFICATIONS

Valve stem diameter (intake)	4.975–4.990 mm (0.1959–0.1965 in)
Limit	4.945 mm (0.1946 in)
Valve stem diameter (exhaust)	4.960–4.975 mm (0.1953–0.1959 in)
Limit	4.930 mm (0.1940 in)
Valve guide inside diameter (intake)	5.000–5.012 mm (0.1969–0.1973 in)
Valve guide inside diameter (exhaust)	5.000–5.012 mm (0.1969–0.1973 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)
Valve spring	
Free length (intake)	33.81 mm (1.33 in)
Limit	32.11 mm (1.26 in)
Free length (exhaust)	33.81 mm (1.33 in)
Limit	32.11 mm (1.26 in)
Spring tilt (intake)	1.7 mm (0.068 in)
Spring tilt (exhaust)	1.7 mm (0.068 in)
Cylinder	
Bore	58.000–58.010 mm (2.2835–2.2839 in)
Wear limit	58.060 mm (2.3224 in)
Piston	
Diameter	57.962–57.985 mm (2.2820–2.2829 in)
Measuring point (from piston skirt bottom)	6.0 mm (0.24 in)
Piston pin bore inside diameter	14.002–14.013 mm (0.5513–0.5517 in)
Limit	14.043 mm (0.5529 in)
Piston pin outside diameter	13.995–14.000 mm (0.5510–0.5512 in)
Limit	13.975 mm (0.5502 in)
Piston-pin-to-piston-pin-bore clearance	0.002–0.018 mm (0.0001–0.0007 in)
Piston ring	
Top ring	
Ring type	Barrel
End gap (installed)	0.10–0.25 mm (0.0039–0.0098 in)
Limit	0.50 mm (0.0197 in)
Ring side clearance	0.030–0.065 mm (0.0012–0.0026 in)
Limit	0.115 mm (0.0045 in)
2nd ring	
Ring type	Taper
End gap (installed)	0.35–0.50 mm (0.0138–0.0197 in)
Limit	0.85 mm (0.0335 in)
Ring side clearance	0.020–0.055 mm (0.0008–0.0022 in)
Limit	0.115 mm (0.0045 in)
Crankshaft	
Crank assembly width	51.45–51.50 mm (2.026–2.028 in)
Runout limit	0.030 mm (0.0012 in)

ENGINE SPECIFICATIONS

Clutch

Clutch type	Dry, centrifugal automatic
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Automatic centrifugal clutch

Clutch shoe thickness	4.0 mm (0.16 in)
Limit	2.5 mm (0.10 in)
Clutch shoe spring free length	29.5 mm (1.16 in)
Clutch housing inside diameter	125.0 mm (4.92 in)
Limit	125.5 mm (4.94 in)
Compression spring free length	116.4 mm (4.58 in)
Limit	104.8 mm (4.12 in)
Weight outside diameter	20.0 mm (0.79 in)
Limit	19.5 mm (0.77 in)
Clutch-in revolution	2200–2600 r/min
Clutch-stall revolution	5000–5600 r/min

V-belt

V-belt width	24.1 mm (0.95 in)
Limit	21.7 mm (0.85 in)

Transmission

Transmission type	V-belt automatic
Primary reduction ratio	1.000
Secondary reduction ratio	10.769 (56/16 × 40/13)
Final drive	Gear
Gear ratio	2.300–0.724 : 1

Air filter

Air filter element	Oil-coated paper element
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Fuel injector

Resistance	12.2 Ω
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Throttle body

ID mark	B631 00
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Fuel injection sensor

Intake air pressure sensor output voltage	3.88–4.12 V at 101.3 kPa (3.88–4.12 V at 1.01 kgf/cm ² , 3.88–4.12 V at 14.7 psi)
Intake air temperature sensor resistance	5850.0–6150.0 Ω at 0 °C (5850.0–6150.0 Ω at 32 °F)
Coolant temperature sensor resistance	2512–2777 Ω at 20 °C (2512–2777 Ω at 68 °F)
Coolant temperature sensor resistance	210–221 Ω at 100 °C (210–221 Ω at 212 °F)

Idling condition

Fuel line pressure at idling	220–300 kPa (2.2–3.0 kgf/cm ² , 31.9–43.5 psi)
Engine idling speed	1500–1700 r/min
CO% (Muffler tail pipe)	0.0–1.0 %
Water temperature	80 °C (175.2 °F)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

CHASSIS SPECIFICATIONS

EAS20015

CHASSIS SPECIFICATIONS

Chassis

Frame type	Underbone
Caster angle	26.5°
Trail	95 mm (3.7 in)

Front wheel

Wheel type	Cast wheel
Rim size	14M/C × MT2.50
Rim material	Aluminum
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	1.0 mm (0.04 in)

Rear wheel

Wheel type	Cast wheel
Rim size	14M/C × MT3.50
Rim material	Aluminum
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	1.0 mm (0.04 in)

Front tire

Type	Tubeless
Size	110/80-14M/C 53P
Manufacturer/model	IRC/SCT-005F
Wear limit (front)	1.0 mm (0.04 in)

Rear tire

Type	Tubeless
Size	140/70-14M/C 62P
Manufacturer/model	IRC/SCT-005R
Wear limit (rear)	1.0 mm (0.04 in)

Tire air pressure (measured on cold tires)

Front (1 person)	200 kPa (2.00 kgf/cm ² , 29 psi)
Rear (1 person)	225 kPa (2.25 kgf/cm ² , 33 psi)
Front (2 persons)	200 kPa (2.00 kgf/cm ² , 29 psi)
Rear (2 persons)	225 kPa (2.25 kgf/cm ² , 33 psi)

Front brake

Type	Hydraulic single disc brake
Front disc brake	
Disc outside diameter × thickness	230.0 × 4.0 mm (9.06 × 0.16 in)
Brake disc thickness limit	3.5 mm (0.14 in)
Brake disc runout limit (as measured on wheel)	0.15 mm (0.0059 in)
Brake pad lining thickness	4.4 mm (0.17 in)
Limit	0.8 mm (0.03 in)

CHASSIS SPECIFICATIONS

Master cylinder inside diameter	11.00 mm (0.43 in)
Caliper cylinder inside diameter	33.34 mm (1.31 in)
Specified brake fluid	YAMAHA GENUINE BRAKE FLUID: DOT3 or DOT 4 (GDR155) YAMAHA GENUINE BRAKE FLUID: DOT 4-Plus (GDR155-A)

Rear brake

Type	Drum brake
Rear brake lever free play	10.0–20.0 mm (0.39–0.79 in)
Rear drum brake	
Drum brake type	Leading, trailing
Brake drum inside diameter	130.0 mm (5.12 in)
Limit	131.0 mm (5.16 in)
Lining thickness	4.5 mm (0.18 in)
Limit	2.0 mm (0.08 in)
Shoe spring length	52.0 mm (2.05 in)
Shoe spring length 2	48.0 mm (1.89 in)

Steering

Steering bearing type	Angular bearing
Center to lock angle (left)	47.5°
Center to lock angle (right)	47.5°

Front suspension

Type	Telescopic fork
Spring/shock absorber type	Coil spring/hydraulic damper
Wheel travel	100.0 mm (3.94 in)
Fork spring free length	282.1 mm (11.10 in)
Limit	276 mm (10.88 in)
Recommended oil	Fork oil 10W or equivalent Yamaha Suspension Oil G10
Quantity	55.0 cm ³ (1.86 US oz, 1.93 Imp.oz)
Level	87.0 mm (3.06 in)

Rear suspension

Type	Unit swing
Spring/shock absorber type	Coil spring/hydraulic damper
Wheel travel	86.0 mm (3.39 in)

ELECTRICAL SPECIFICATIONS

EAS20016

ELECTRICAL SPECIFICATIONS

Voltage

System voltage	12 V
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Ignition system

Ignition system	TCI
Advancer type	Digital
Ignition timing (B.T.D.C.)	5.0°/1600 r/min

Ignition coil

Primary coil resistance	2.16–2.64 Ω
Secondary coil resistance	8.64–12.96 k Ω

Spark plug cap

Resistance	3.75–6.25 k Ω
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AC magneto

Standard output	14.0 V, 705 W at 5000 r/min
Stator coil resistance	0.048–0.072 Ω

Battery

Model	GTZ7V
Voltage, capacity	12 V, 6.0 Ah (10HR)

Bulb voltage, wattage × quantity

Headlight	LED
Auxiliary light	12 V, 5.0 W × 2
Tail/brake light	LED
Front turn signal light	12 V, 10.0 W × 2
Rear turn signal light	12 V, 10.0 W × 2
Meter lighting	LED
License plate light	12 V, 5.0 W × 1

Indicator light

Turn signal indicator light	LED
High beam indicator light	LED
Coolant temperature warning light	LED
Engine trouble warning light	LED
ABS warning light	LED (GDR155-A)
Stop and Start System indicator light	LED (GDR155-A)
Smart key system indicator light	LED (GDR155-A)

Starter generator

Power output	0.29 kW
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Fuel sender unit

Sender unit resistance (full)	10–14.0 Ω
Sender unit resistance (empty)	267–273.0 Ω

ELECTRICAL SPECIFICATIONS

Fuses

Main fuse	30.0 A
Headlight fuse	7.5 A
Fuel injection system fuse	7.5 A
Signaling system fuse	7.5 A
Ignition fuse	7.5 A
Backup fuse	7.5 A
Terminal fuse 1	2.0 A
ABS motor fuse	10.0 A (GDR155-A)
ABS control unit fuse	2.0 A (GDR155-A)
ABS solenoid fuse	7.5 A (GDR155-A)
Smart key system fuse	2.0 A (GDR155-A)
Spare fuse	10.0 A (GDR155-A)
Spare fuse	30.0 A
Spare fuse	7.5 A
Spare fuse	2.0 A

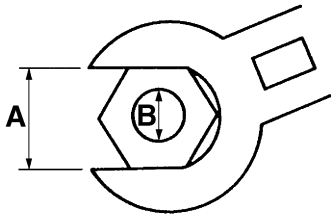
EAS20017

TIGHTENING TORQUES

EAS30015

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		
		N·m	kgf·m	lb·ft
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

TIGHTENING TORQUES

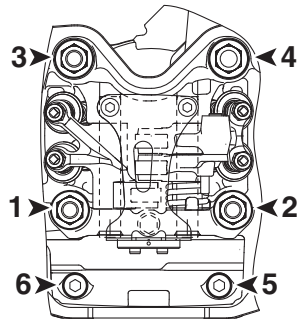
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ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Muffler nut	M8	2	20 N·m (2.0 kgf·m, 14 lb·ft)	
Muffler bolt	M10	3	57 N·m (5.7 kgf·m, 41 lb·ft)	
Muffler protector bolt	M6	2	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Cylinder head bolt	M6	2	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Cylinder head nut	M8	4	24 N·m (2.4 kgf·m, 17 lb·ft)	
VVA (variable valve actuator) solenoid bolt	M6	2	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Cylinder head cover bolt	M6	4	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Engine oil check bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Camshaft sprocket bolt	M8	1	30 N·m (3.0 kgf·m, 22 lb·ft)	
Spark plug	M10	1	13 N·m (1.3 kgf·m, 9.4 lb·ft)	
Valve clearance adjusting screw locknut	M5	4	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Coolant drain bolt (cylinder side)	M6	1	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Radiator fan case bolt	M6	5	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Radiator fan bolt	M6	3	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Radiator bolt	M6	4	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Coolant drain bolt (radiator side)	M12	1	1.0 N·m (0.10 kgf·m, 0.72 lb·ft)	
Radiator cover bolt	M6	3	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Fuel injector bolt	M6	1	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
ISC (Idle Speed Control) unit holder screw	M6	1	5 N·m (0.5 kgf·m, 3.6 lb·ft)	
Air filter case bolt	M6	2	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
AC magneto rotor nut	M12	1	70 N·m (7.0 kgf·m, 51 lb·ft)	
Transmission case cover bolt	M8	6	20 N·m (2.0 kgf·m, 14 lb·ft)	
Final transmission oil drain bolt	M8	1	20 N·m (2.0 kgf·m, 14 lb·ft)	
V-belt case bolt	M6	10	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Engine oil drain bolt	M12	1	20 N·m (2.0 kgf·m, 14 lb·ft)	
V-belt case air filter element cover bolt	M6	6	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Primary fixed sheave nut	M12	1	49 N·m (4.9 kgf·m, 35 lb·ft)	
Clutch housing nut	M12	1	45 N·m (4.5 kgf·m, 33 lb·ft)	
Secondary sheave nut	M28	1	55 N·m (5.5 kgf·m, 40 lb·ft)	

TIGHTENING TORQUES

Cylinder head tightening sequence:



TIGHTENING TORQUES

EAS30017

CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine bracket nut	M10	1	54 N·m (5.4 kgf·m, 39 lb·ft)	
Engine mounting nut (front side)	M10	2	50 N·m (5.0 kgf·m, 36 lb·ft)	
Engine mounting nut (rear side)	M10	2	54 N·m (5.4 kgf·m, 39 lb·ft)	
Grab bar bolt	M8	4	11 N·m (1.1 kgf·m, 8.0 lb·ft)	
Seat hinge nut	M6	2	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Storage box bolt	M6	4	9 N·m (0.9 kgf·m, 6.5 lb·ft)	
Front brake master cylinder holder bolt	M6	2	10 N·m (1.0 kgf·m, 7.2 lb·ft)	
Brake master cylinder reservoir cap screw	M4	2	1.5 N·m (0.15 kgf·m, 1.1 lb·ft)	
Front brake hose union bolt (master cylinder side)	M10	1	29 N·m (2.9 kgf·m, 21 lb·ft)	
Throttle cable holder bolt (handlebar switch side)	M5	1	3.5 N·m (0.35 kgf·m, 2.5 lb·ft)	
Lower ring nut	M25	1	See TIP.	
Upper ring nut	M25	1	See TIP.	
Horn bracket bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Horn bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Lower bracket pinch bolt	M10	4	53 N·m (5.3 kgf·m, 38 lb·ft)	
Front fork damper rod bolt	M10	2	23 N·m (2.3 kgf·m, 17 lb·ft)	
Front wheel sensor bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Front brake caliper bolt	M10	2	35 N·m (3.5 kgf·m, 25 lb·ft)	
Front brake hose union bolt (brake caliper side)	M10	1	29 N·m (2.9 kgf·m, 21 lb·ft)	
Brake caliper bleed screw	M8	1	6 N·m (0.6 kgf·m, 4.3 lb·ft)	
Front wheel axle nut	M10	1	26 N·m (2.6 kgf·m, 19 lb·ft)	
Front brake hose holder bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Front brake disc bolt	M8	3	23 N·m (2.3 kgf·m, 17 lb·ft)	
Front wheel sensor rotor bolt	M5	3	8 N·m (0.8 kgf·m, 5.8 lb·ft)	
Camshaft lever bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Rear wheel axle nut	M16	1	95 N·m (9.5 kgf·m, 69 lb·ft)	
Hydraulic unit assembly bolt	M6	2	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Front brake hose union bolt (hydraulic unit assembly side)	M10	2	29 N·m (2.9 kgf·m, 21 lb·ft)	
Starter generator control unit assembly bolt	M6	2	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Rear shock absorber assembly nut (upper)	M8	2	23 N·m (2.3 kgf·m, 17 lb·ft)	
Rear shock absorber assembly bolt (lower)	M8	2	23 N·m (2.3 kgf·m, 17 lb·ft)	
Swingarm mounting bolt	M10	2	57 N·m (5.7 kgf·m, 41 lb·ft)	
Fuel tank bolt	M6	4	9 N·m (0.9 kgf·m, 6.5 lb·ft)	

TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Throttle cable holder bolt (throttle body side)	M6	2	5 N·m (0.5 kgf·m, 3.6 lb·ft)	
Sidestand switch bolt	M5	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Centerstand spring hook bolt	M6	1	7 N·m (0.7 kgf·m, 5.1 lb·ft)	
Sidestand nut	M8	1	32 N·m (3.2 kgf·m, 23 31 lb·ft)	

TIP

Steering column ring nut

1. Tighten the lower ring nut 38 N·m (3.8 kgf·m, 27 lb·ft) with a torque wrench and the steering nut wrench, and then loosen the nut 1/4 turn.
2. Tighten the lower ring nut 16 N·m (1.6 kgf·m, 12 lb·ft) with a torque wrench and the steering nut wrench.
3. Install the rubber washer and the center ring nut.
4. Finger tighten the center ring nut, align the slots of both ring nuts, and then install the lock washer.
5. Hold the lower and center ring nuts, and then tighten the upper ring nut 75 N·m (7.5 kgf·m, 54 lb·ft) with a torque wrench and the steering nut wrench.

LUBRICATION POINTS AND LUBRICANT TYPES

EAS20018

LUBRICATION POINTS AND LUBRICANT TYPES

EAS30018

ENGINE

Lubrication point	Lubricant
Bearings	
O-rings	
O-rings (cam shaft)	
Oil seals	
Rocker arm stopper pin	
Cylinder head nut contact face and stud bolt thread	
Camshaft lobes	
Decompression cam	
Rocker arm shafts	
Valve stems and valve guide (intake and exhaust)	
Valve stem seals	
Valve stem ends (intake and exhaust)	
Rocker arm valve inner surface	
Camshaft sprocket	
Connecting rod big end face	
Piston pin outer surface	
Piston, piston ring, and cylinder inner surface	
Crank pin	
Cam chain sprocket inner surface	
Oil pump drive gear inner surface	
Oil pump shaft	
O-ring (fuel injector)	
Starter wheel and bearing	
Starter clutch idle gear inner surface	
Drive axle and bearings	
Crankshaft threads and conical spring washer outer mating surface	
Timing chain tensioner bolts	Yamaha bond No.1215®
Crankcase mating surfaces	Yamaha bond No.1215®
Crankcase bolt	Yamaha bond No.1215®

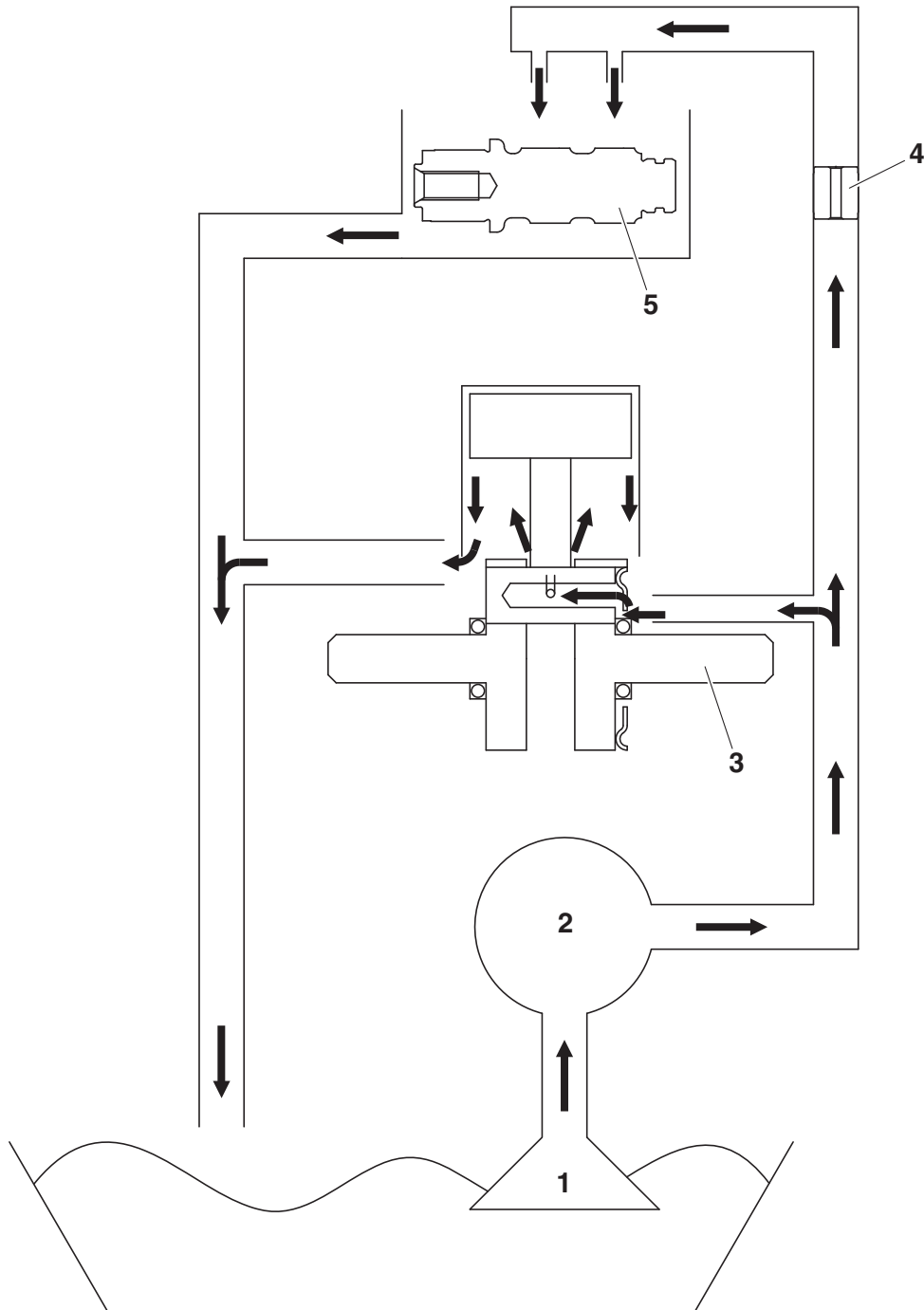
LUBRICATION SYSTEM CHART AND DIAGRAMS

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LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS30020

ENGINE OIL LUBRICATION CHART

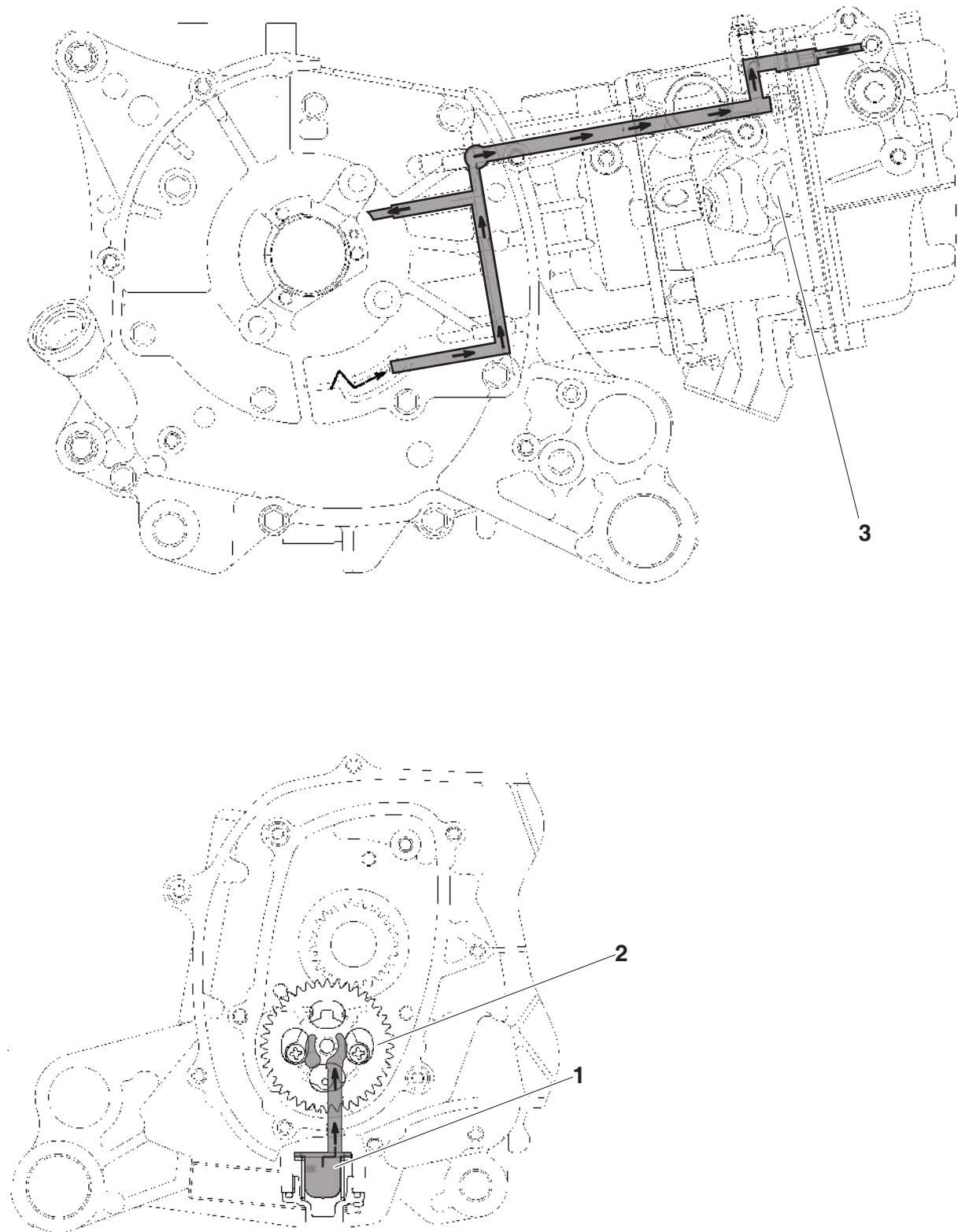


1. Oil strainer
2. Oil pump assembly
3. Crankshaft
4. Oil nozzle
5. Camshaft

LUBRICATION SYSTEM CHART AND DIAGRAMS

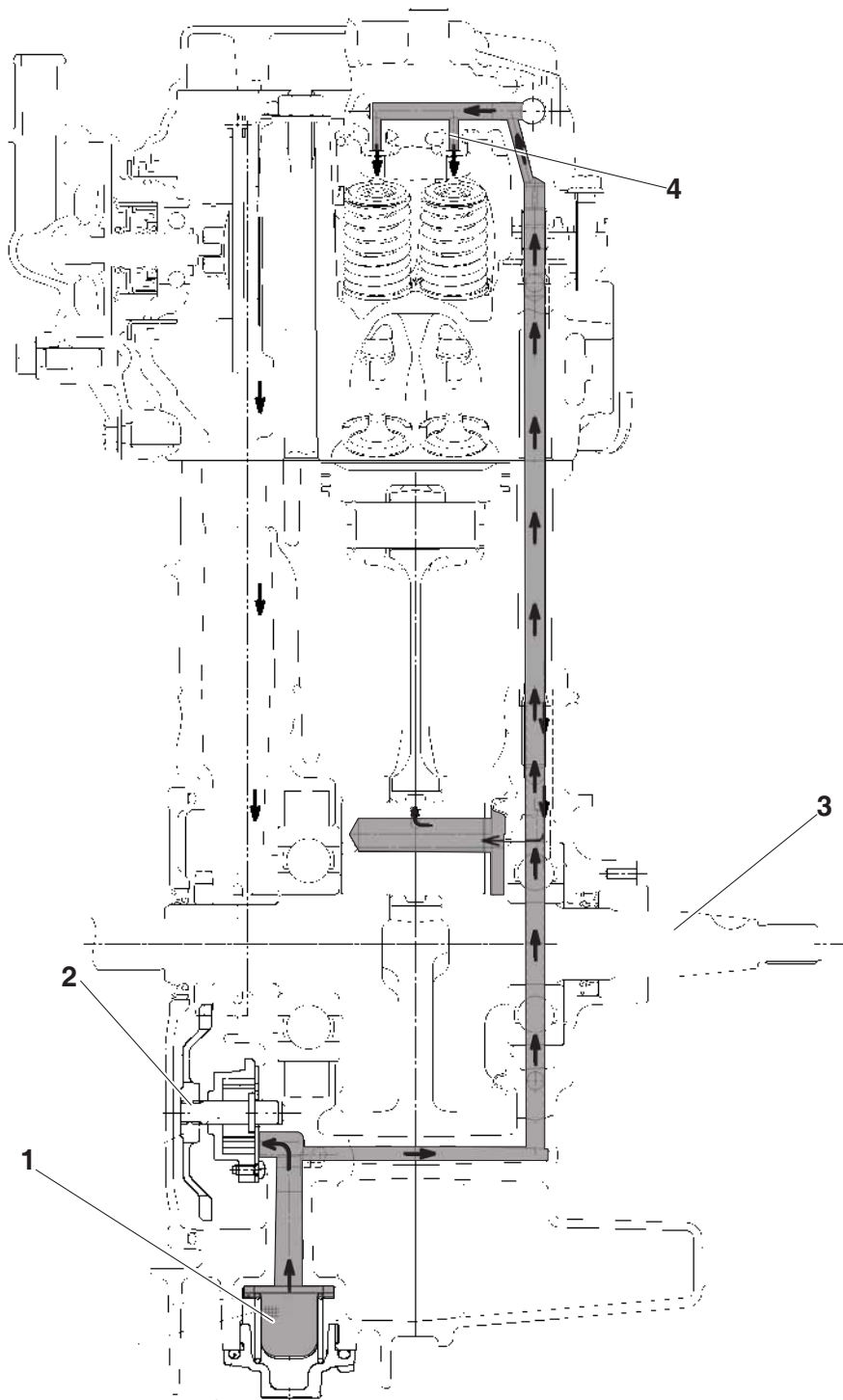
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LUBRICATION DIAGRAMS



- 1. Oil strainer
- 2. Oil pump assembly
- 3. Camshaft

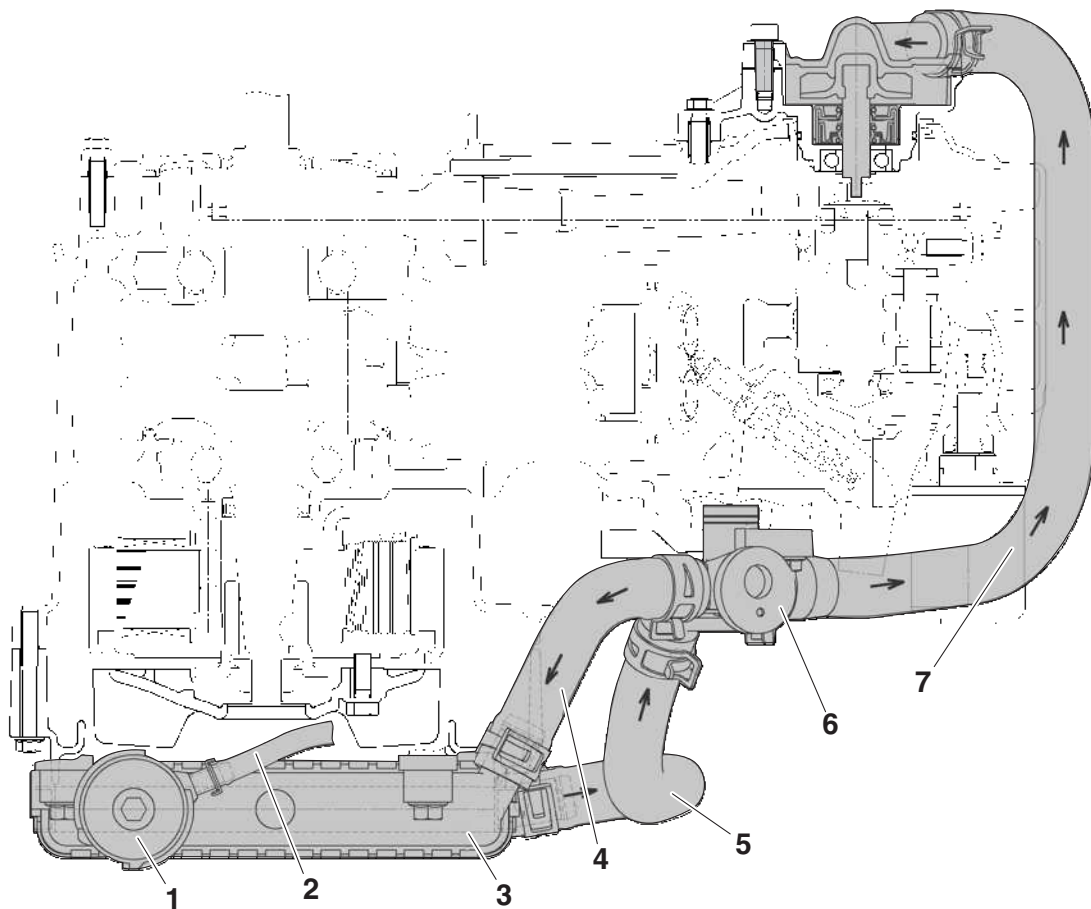
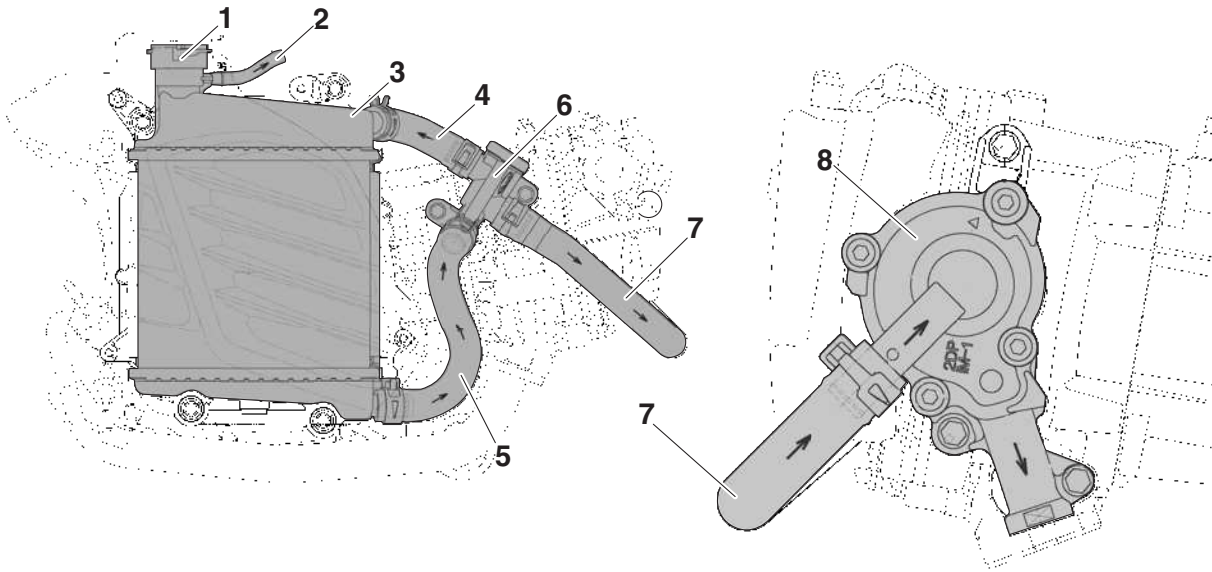
LUBRICATION SYSTEM CHART AND DIAGRAMS



1. Oil strainer
2. Oil pump assembly
3. Crankshaft
4. Rocker arm/Valve stem end

EAS20020

COOLING SYSTEM DIAGRAMS



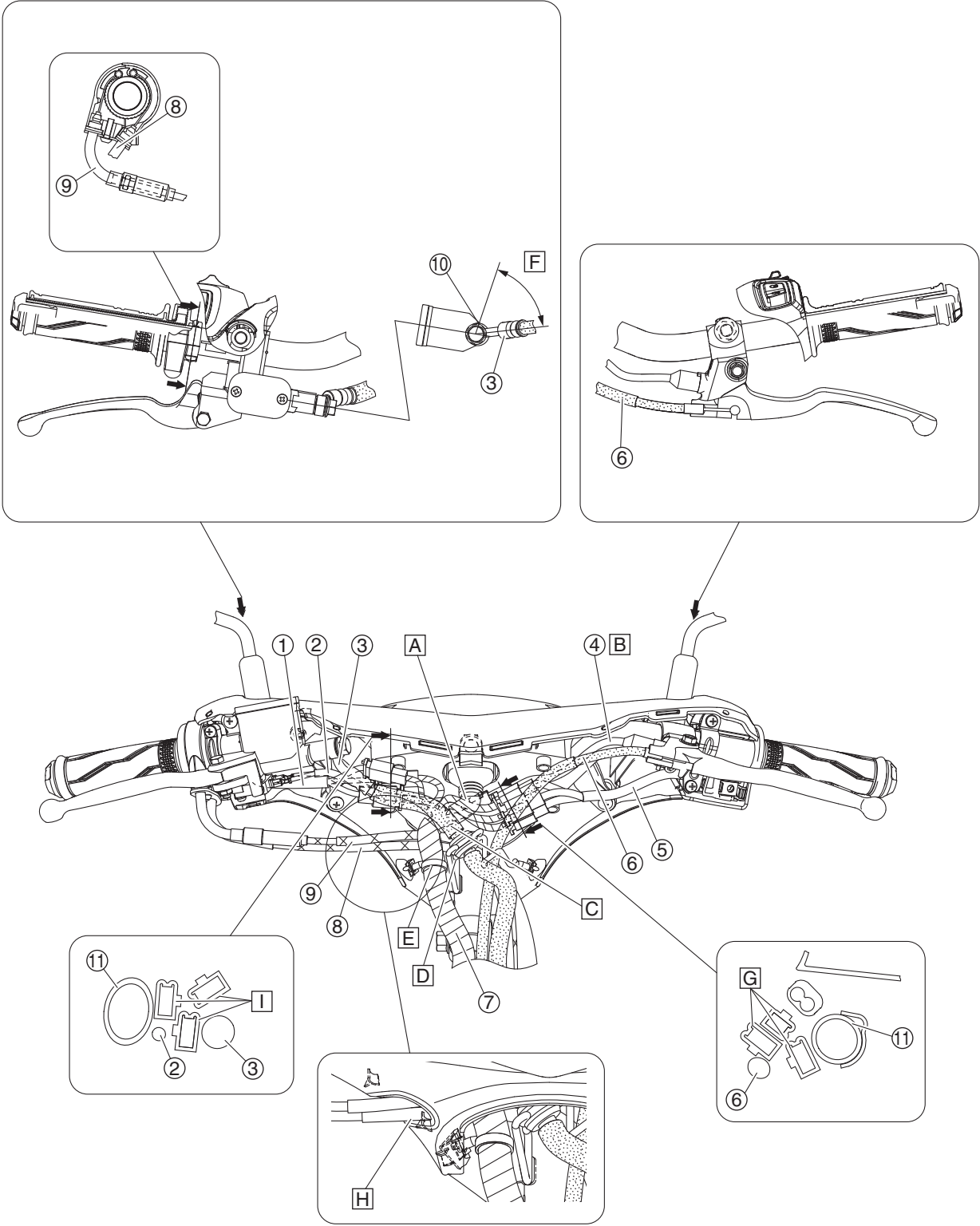
- 1. Radiator cap
- 2. Coolant reservoir hose
- 3. Radiator
- 4. Radiator inlet hose
- 5. Radiator outlet hose
- 6. Thermostat assembly

- 7. Water pump inlet hose
- 8. Water pump assembly

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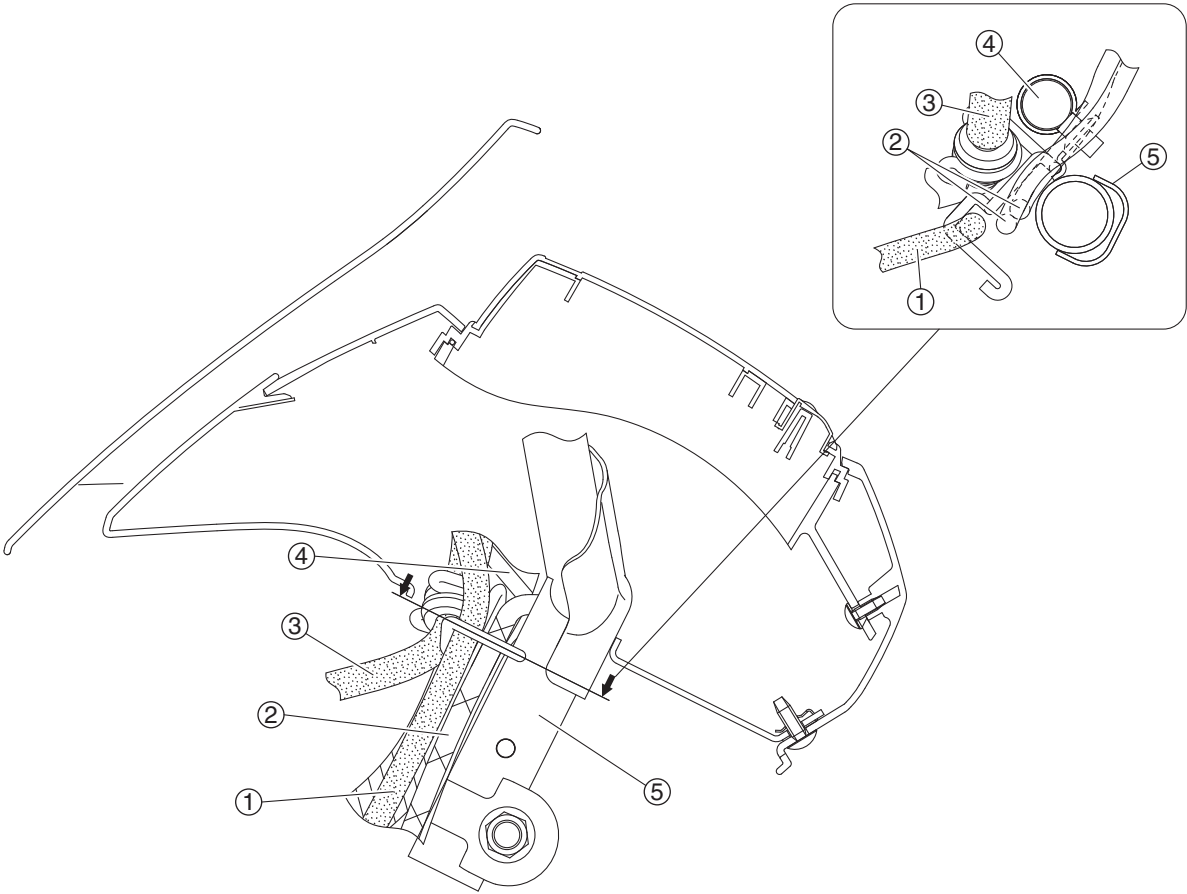
CABLE ROUTING

Handlebar (front view)



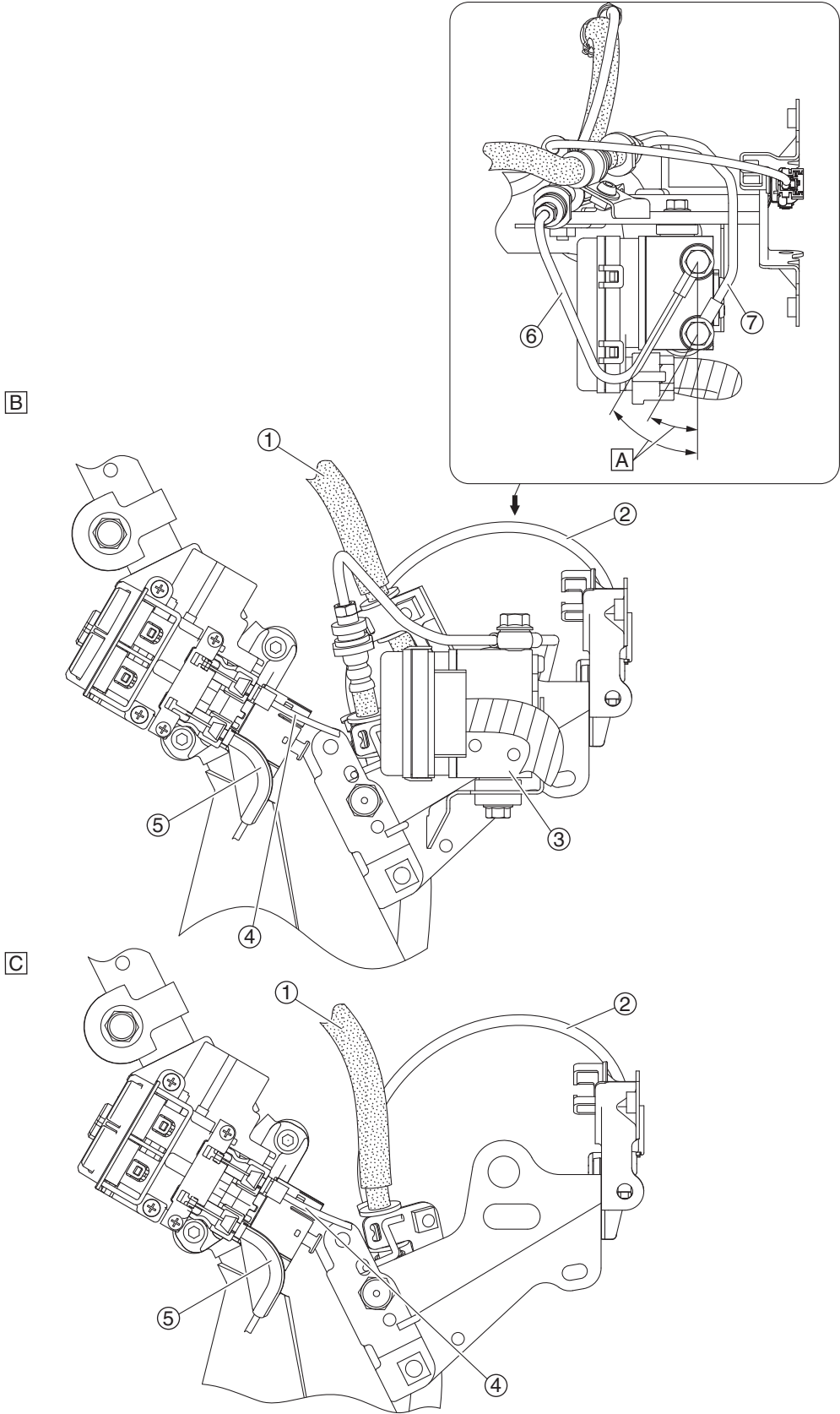
1. Handlebar switch lead (right)
2. Front brake light switch lead
3. Front brake hose
4. Rear brake light switch lead
5. Handlebar switch lead (left)
6. Rear brake cable
7. Wire harness
8. Throttle cable (decelerator cable)
9. Throttle cable (accelerator cable)
10. Projection mark
11. Handlebar
 - A. Cover the meter coupler with the meter coupler cover.
 - B. Route the rear brake light switch lead above the left handlebar switch lead.
 - C. Route the wire harness to the rear of the front brake hose.
 - D. Secure the grommet by inserting the front brake hose grommet into the hose guide.
 - E. Secure the holder by inserting the projection on the holder into the hole in the steering pipe.
 - F. 73.5°
 - G. Route the left handlebar switch couplers to the rear of the rear brake cable.
 - H. Route the throttle cables through the hole of the handlebar cover.
 - I. Route the right handlebar switch couplers to the rear of the front brake hose.

Handlebar (left side view)



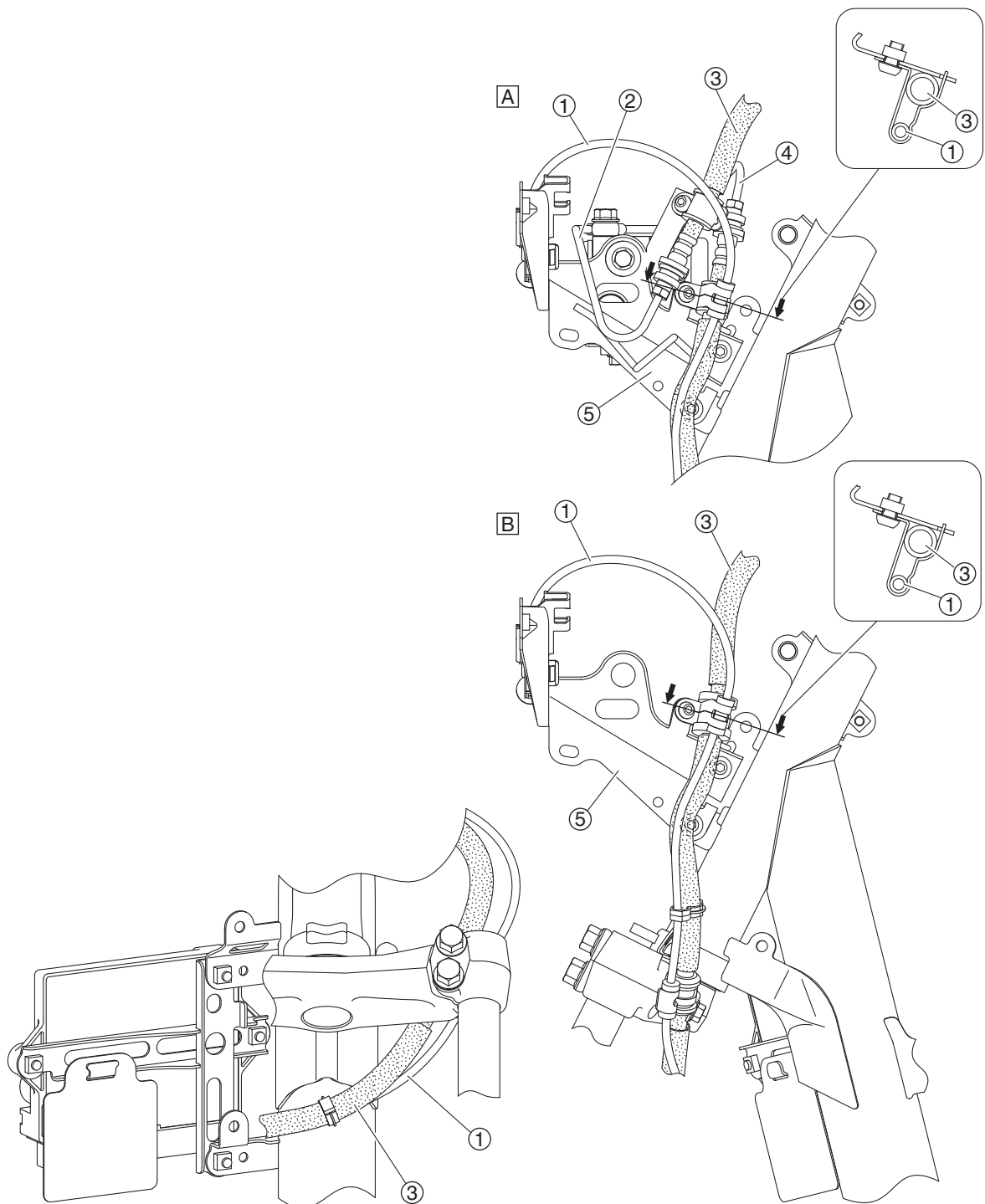
1. Rear brake cable
2. Throttle cable
3. Front brake hose
4. Wire harness
5. Handlebar

Headlight stay (right side view)



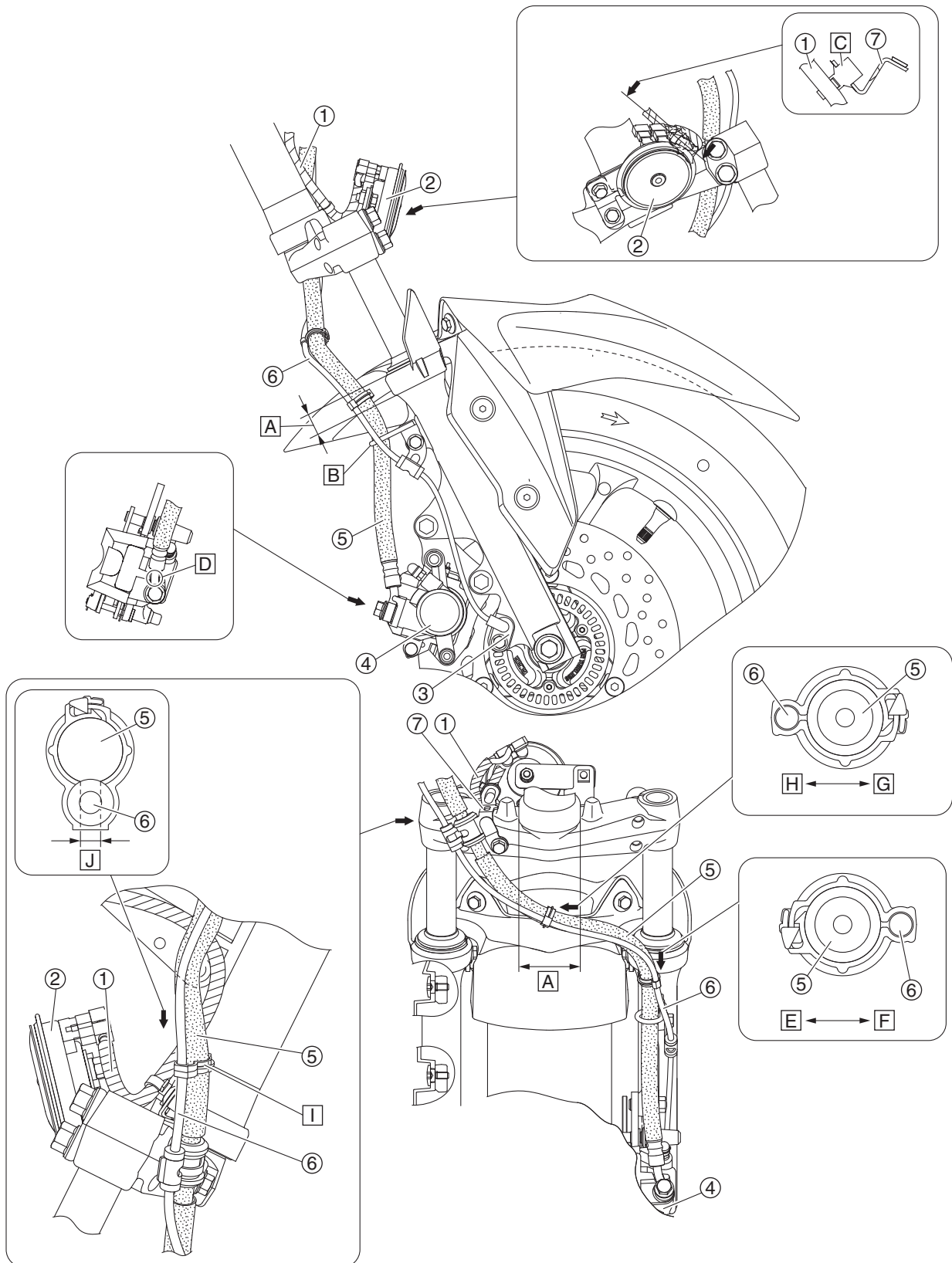
1. Front brake hose
 2. Front wheel sensor lead
 3. Hydraulic unit
 4. Fuel lid cable
 5. Seat lock cable
 6. Front brake pipe (hydraulic unit to front brake caliper)
 7. Front brake pipe (front brake master cylinder to hydraulic unit)
- A. 30°
 - B. GDR155-A
 - C. GDR155

Headlight stay (left side view)



1. Front wheel sensor lead
2. Front brake pipe (front brake master cylinder to hydraulic unit)
3. Front brake hose
4. Front brake pipe (hydraulic unit to front brake caliper)
5. Headlight stay
 - A. GDR155-A
 - B. GDR155

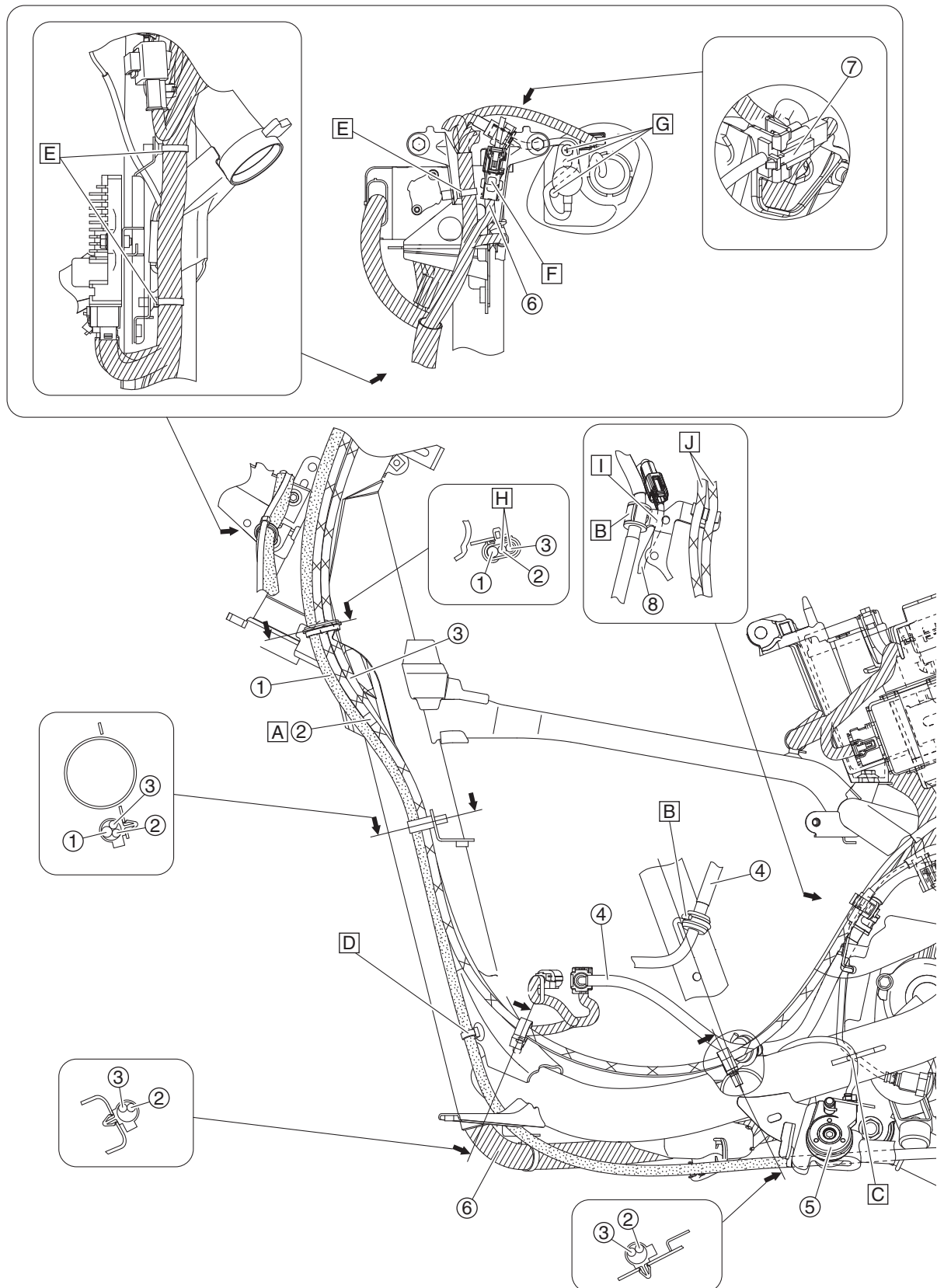
Front fork (rear and right side view)



1. Horn lead
2. Horn
3. Front wheel sensor
4. Front brake caliper
5. Front brake hose
6. Front wheel sensor lead
7. Front brake hose holder
- A. Position the holder within the range shown in the illustration.
- B. Route the front brake hose through the guide.
- C. Secure the clamp by hooking the horn lead clamp into the hole of the front brake hose holder.
- D. Make sure the brake pipe touches the projection on the brake caliper.
- E. Inward
- F. Outward
- G. Forward
- H. Rearward
- I. Align the holder with the white paint mark on the brake hose.
- J. Align the gap in the holder with the white paint mark on the brake hose.

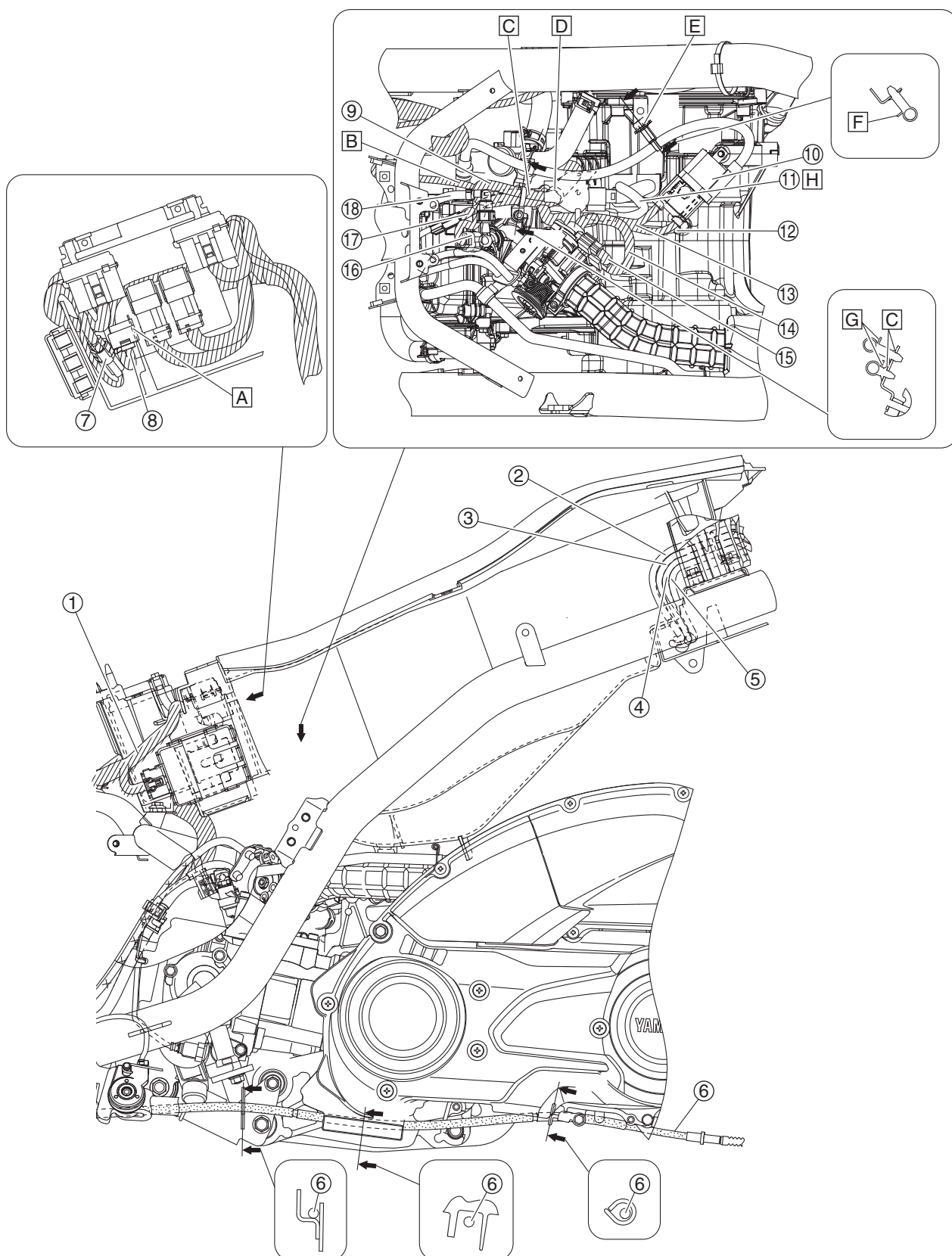
CABLE ROUTING

Front frame (left side view)



1. Rear brake cable
2. Throttle cable (decelerator cable)
3. Throttle cable (accelerator cable)
4. Fuel hose
5. Sidestand switch
6. Wire harness
7. Buzzer coupler (GDR155-A)
8. O₂ sensor lead
- A. White tape
- B. Secure the grommet by inserting the fuel hose grommet into the hose guide.
- C. Route the sidestand switch lead through the cable guide.
- D. Insert the projection on the brake cable holder completely into the hole in the frame.
- E. Insert the projection on the wire harness holder completely into the hole in the headlight stay.
- F. Install the front wheel sensor coupler to the headlight stay.
- G. Route the buzzer lead as shown in the illustration. (GDR155-A)
- H. Fasten the rear brake cable and throttle cables with the holder.
- I. Route the O₂ sensor lead between the cylinder head cover and the fuel hose bracket.
- J. Fasten the throttle cables with the holder.

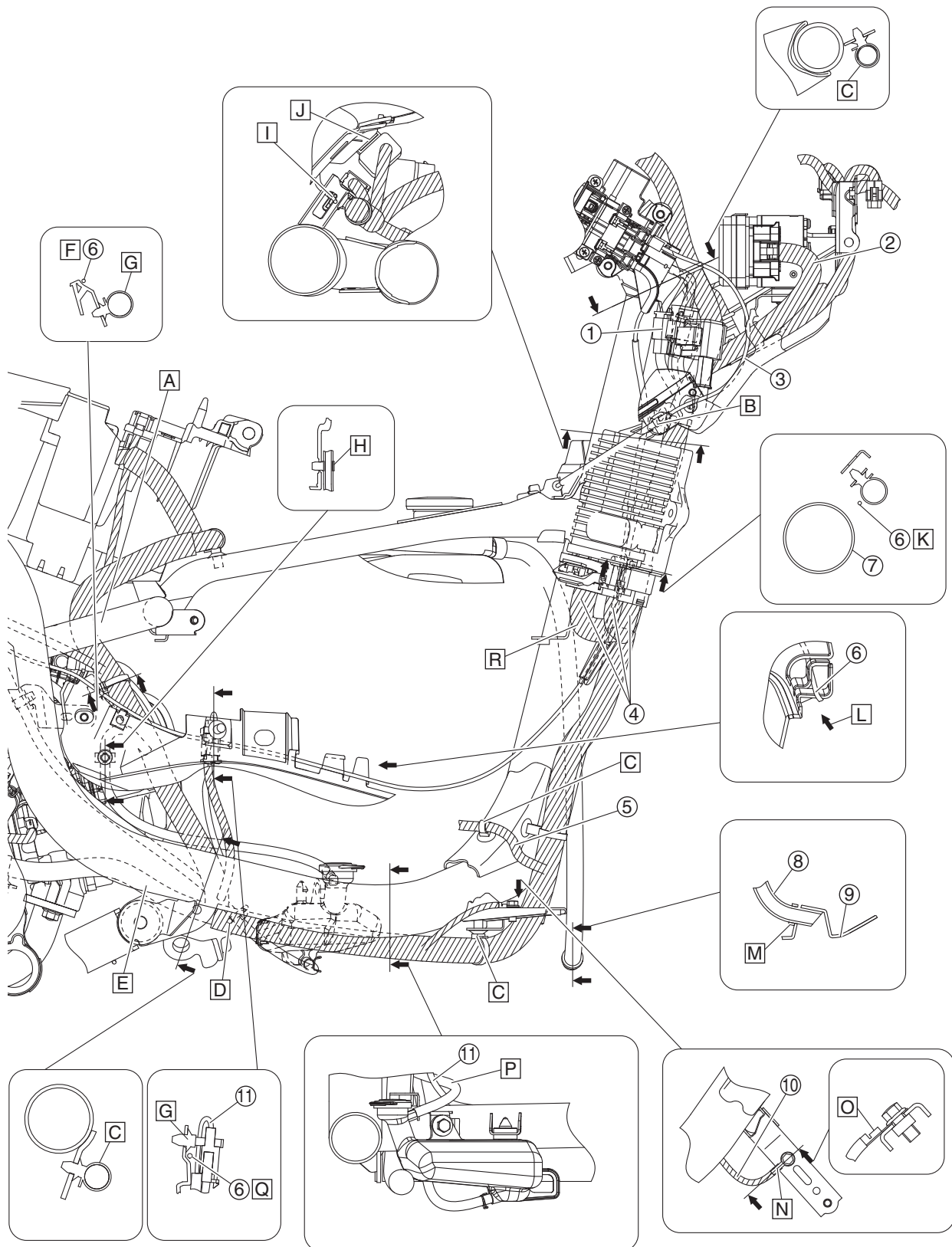
Rear frame (left side view)



1. Wire harness
2. License light lead
3. Rear turn signal light lead (left)
4. Rear turn signal light lead (right)
5. Tail/brake light lead
6. Rear brake cable
7. Yamaha diagnostic tool coupler
8. ABS test coupler (GDR155-A)
9. Starter generator lead
10. Ignition coil
11. Crankshaft position sensor lead
12. Engine ground
13. Ignition coil lead
14. Throttle body sensor assembly lead
15. ISC unit lead
16. Injector lead
17. O₂ sensor lead
18. Fuel hose
- A. Fit the slot in the ABS test coupler onto the battery case rib. (GDR155-A)
- B. Route the VVA solenoid lead under the fuel hose.
- C. Route the starter generator lead above the wire harness.
- D. Secure the holder by inserting the wire harness holder into the hole of the bracket.
- E. Fasten the spark plug lead with the band and then secure the holder to the coolant reservoir hose bracket.
- F. Cut off the excess end of the band to less than 5 mm (0.20 in).
- G. Cut off the excess end of the band.
- H. Route the crankshaft position sensor lead above the starter generator lead.

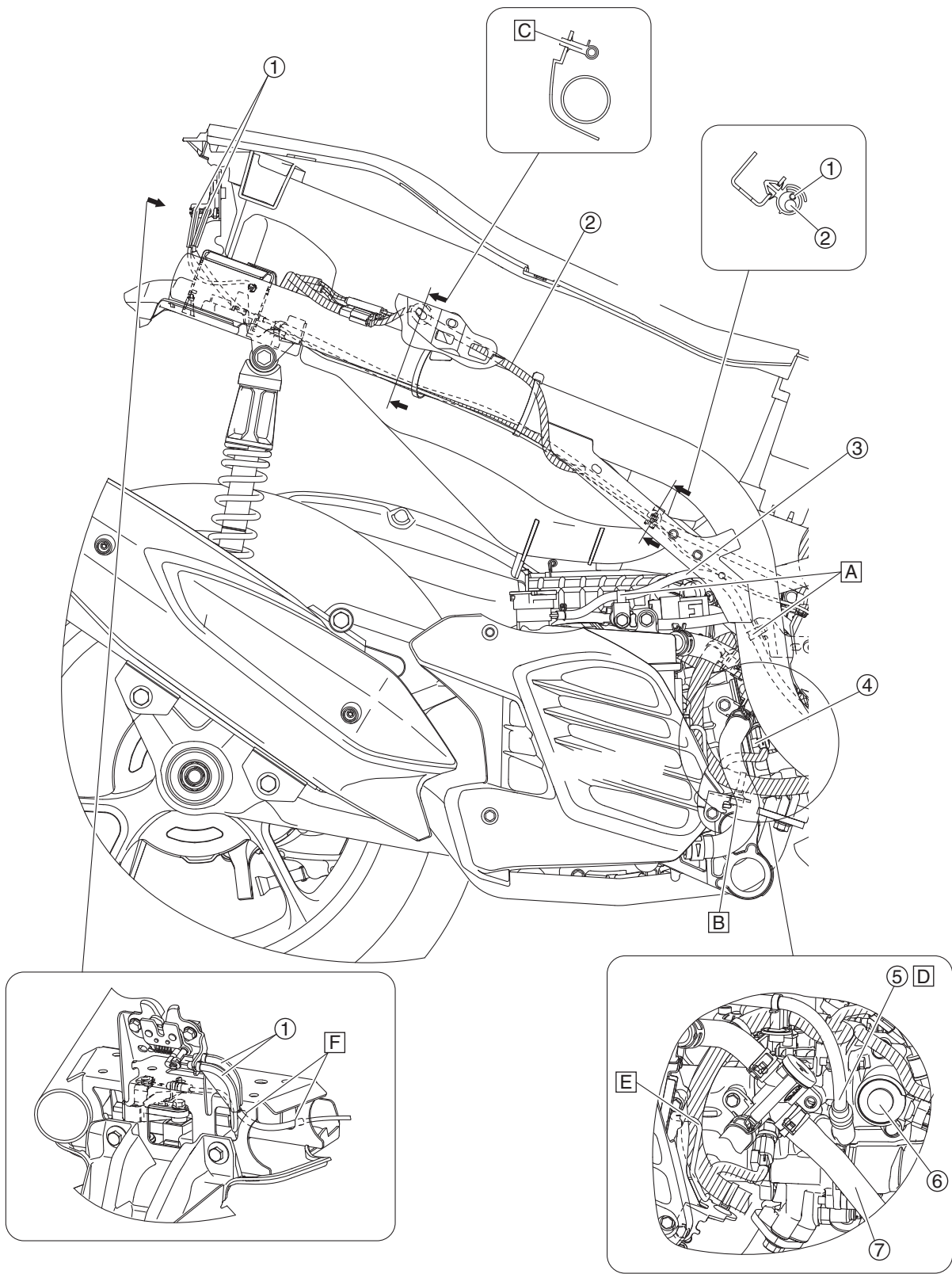
CABLE ROUTING

Front frame (left side view)



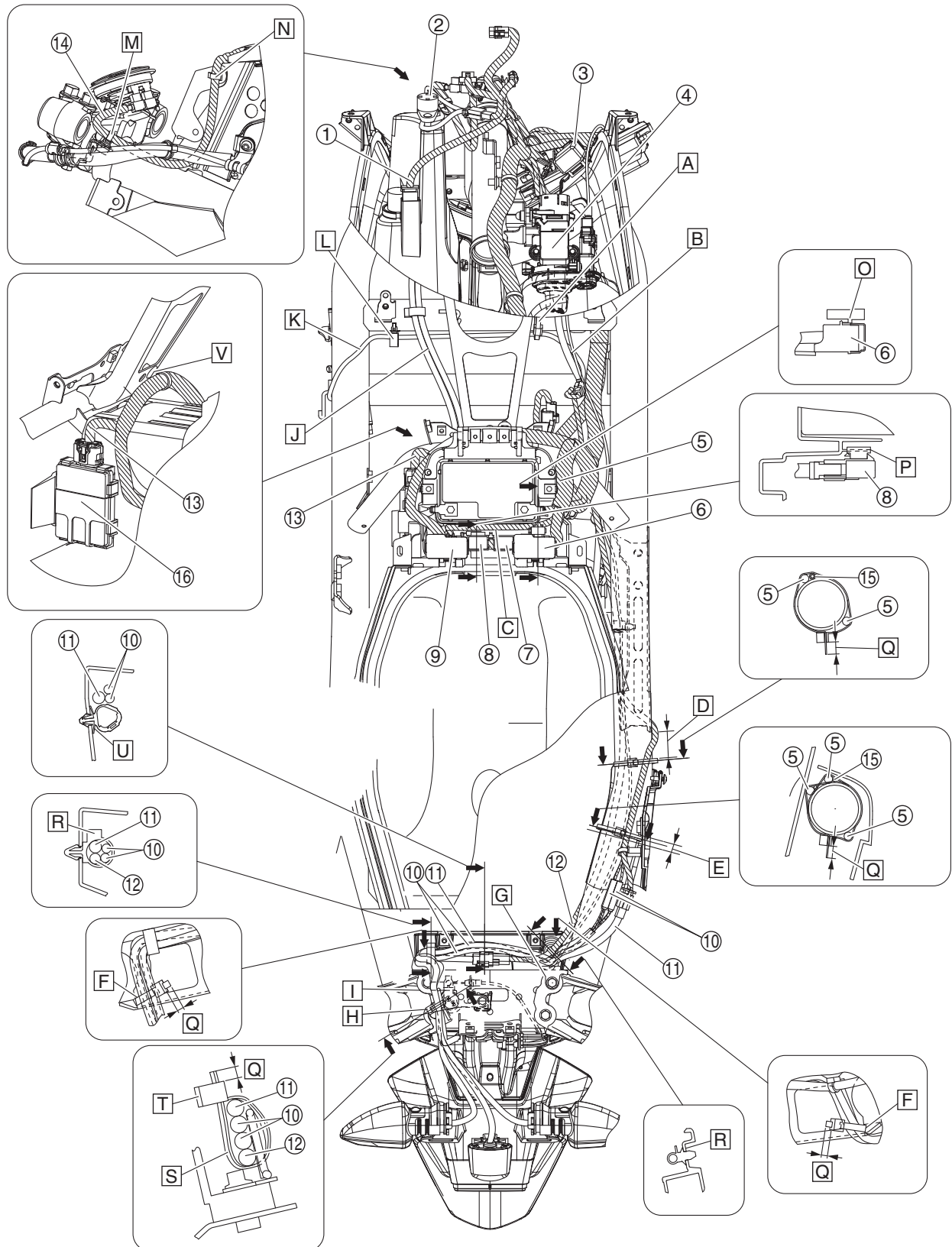
1. Main switch coupler
 2. Hydraulic unit lead (GDR155-A)
 3. Fuel lid cable
 4. SGCU lead
 5. Fuel pump lead
 6. Seat lock cable
 7. Frame
 8. Fuel tank overflow hose
 9. Inner fender
 10. Frame ground lead
 11. Sidestand switch lead
- A. Route the wire harness to the inside of the cross tube.
 - B. Insert the projection on the fuel lid cable holder into the hole in the cover.
 - C. Insert the projection on the wire harness holder into the hole in the frame.
 - D. Route the coolant reservoir hose through the guide of the frame.
 - E. Route the wire harness above the engine bracket.
 - F. Route the seat lock cable to the outside of the holder.
 - G. Insert the projection on the wire harness holder into the hole in the footrest board.
 - H. Fasten the coolant reservoir hose at the white paint mark with the holder. Position the hose end facing forward.
 - I. Route the seat lock cable through the bracket hole and route the cable between the wire harness and the frame.
 - J. Fit the slot in the turn signal relay onto the leg shield rib.
 - K. Route the seat lock cable between the wire harness holder and the frame.
 - L. Route the seat lock cable to the inside of the footrest board.
 - M. Insert the end of the fuel tank overflow hose into the inner fender. Make sure that the end of the hose protector on the fuel tank overflow hose contacts the edge of the hole in the inner fender.
 - N. Install the frame ground lead terminal as shown in the illustration.
 - O. Install the frame ground lead terminal so that the crimped section of the terminal that secures the lead is facing upward.
 - P. Route the coolant reservoir hose to the inside of the sidestand switch lead.
 - Q. Route the seat lock cable between the sidestand switch lead and the footrest board.
 - R. Do not route this SGCU lead above the other SGCU leads.

Rear frame (right side view)



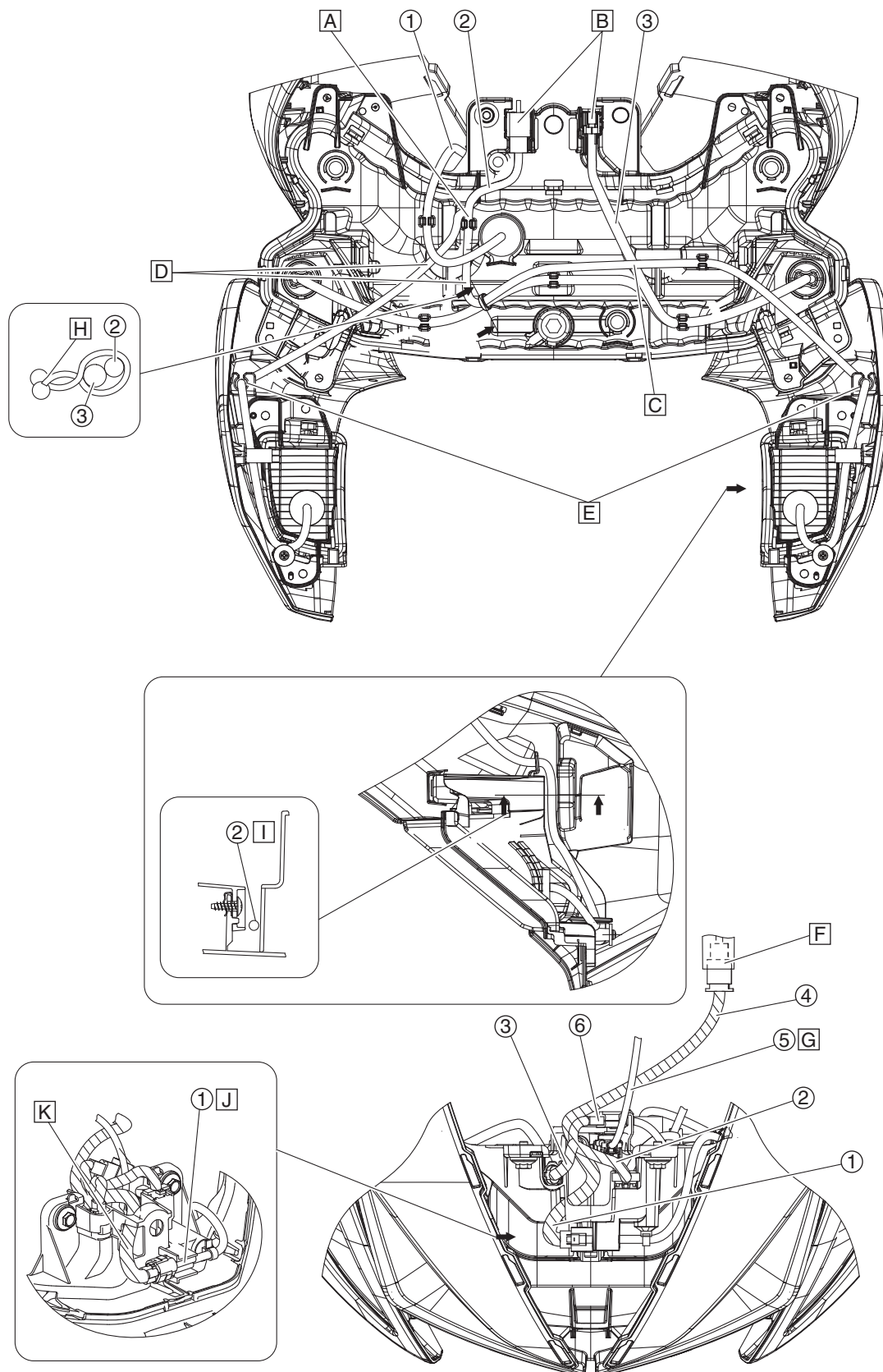
1. Seat lock cable
2. Wire harness
3. Coolant reservoir hose
4. Coolant temperature sensor lead
5. Spark plug lead
6. VVA solenoid
7. Radiator hose
- A. Fasten the coolant reservoir hose at the white paint mark with the holder.
- B. Insert the projection on the wire harness holder into the hole in the crankcase bracket.
- C. Insert the projection on the wire harness holder into the hole in the rear side cover.
- D. Route the spark plug lead between the VVA solenoid and the radiator hose.
- E. Route the wire harness through the guide of the frame.
- F. Route the seat lock cable through the hole of the rear frame.

Frame (top view)



1. Auxiliary DC jack lead
2. Buzzer (GDR155-A)
3. Turn signal relay
4. Main switch
5. Wire harness
6. Fuse box
7. Main relay
8. Starter charge relay
9. Fuse box 2 (GDR155-A)
10. Rear turn signal light lead
11. License light lead
12. Tail/brake light lead
13. Smart key unit lead (GDR155-A)
14. Horn lead
15. Seat lock cable
16. Smart key unit (GDR155-A)
- A. Fasten the sidestand switch lead with the band. Point the end of the band rearward.
- B. Route the sidestand switch lead between the wire harness and the coolant reservoir hose.
- C. Route the ABS test coupler lead above the relay. (GDR155-A)
- D. 30–40 mm (1.18–1.57 in)
- E. 10 mm (0.39 in)
- F. Fasten the license light lead, rear turn signal light lead, and tail/brake light lead with the plastic locking tie to the hole of the frame.
- G. Route the seat lock cable outside of the wire harness.
- H. Position the plastic locking tie to the rear of the rib on the grab bar.
- I. Be sure not to pinch the leads when installing the grab bar.
- J. Route the sidestand switch lead under the throttle cable and the fuel hose.
- K. Route the sidestand switch lead over the frame.
- L. Fasten the sidestand switch lead with the holder.
- M. Insert the projection on the wire harness holder into the hole in the front brake hose holder.
- N. Insert the projection on the wire harness holder into the hole in the main switch bracket.
- O. Install the fuse to the fuse box as shown in the illustration.
- P. Fit the slot in the relay onto the rib on the battery box.
- Q. 5 mm (0.20 in)
- R. Insert the projection on the wire harness holder into the hole in the rear fender.
- S. Fasten the license light lead, rear turn signal light lead, and tail/brake light lead with the plastic locking tie to the guide.
- T. Position the buckle of the plastic locking tie to the outside of the guide.
- U. Insert the projection on the tail/brake light coupler into the hole in the rear fender.
- V. Insert the projection on the wire harness holder into the hole in the frame.

Headlight



1. Headlight lead
2. Front turn signal light lead
3. Auxiliary light lead
4. Auxiliary DC jack lead
5. Front wheel sensor lead
6. Buzzer lead (GDR155-A)
 - A. Insert the front turn signal light lead into the groove in the headlight unit. Be sure to fasten the front turn signal light lead before the split in the lead.
 - B. Insert the coupler into the groove in the headlight unit.
 - C. Route the front turn signal light lead above the headlight lead and the auxiliary light lead.
 - D. Route the front turn signal light lead under the headlight lead and the auxiliary light lead.
 - E. Route the front turn signal light lead through the hole of the front side panel.
 - F. Insert the auxiliary DC jack coupler into the slot in the leg shield.
 - G. Route the front wheel sensor lead above the auxiliary DC jack lead.
 - H. Fasten the front turn signal light lead and the auxiliary light lead with the clamp, making sure to align the clamp with the white tape on the front turn signal light lead. Point the ends of the clamp forward.
 - I. Be sure not to pinch the front turn signal light lead when installing the front side panel.
 - J. Insert the headlight lead into the groove in the headlight unit.
 - K. Route the headlight lead through the hole of the headlight unit.

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PERIODIC MAINTENANCE

EAS20022

PERIODIC MAINTENANCE

EAS30022

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. 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.

EAU46932

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM

TIP

- The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.
- From 16000 km, repeat the maintenance intervals starting from 4000 km.
- 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	ODOMETER READING (whichever comes first)					ANNUAL CHECK
			1000 km or 1 month	4000 km or 4 months	7000 km or 7 months	10000 km or 10 months	13000 km or 13 months	
1	* Fuel line	• Check fuel hoses for cracks or damage.		✓	✓	✓	✓	✓
2	* Fuel filter	• Check condition. • Replace if necessary.	Every 12000 km (7500 mi)					
3	Spark plug	• Check condition. • Clean and regap.		✓	✓	✓	✓	
		• Replace.	Every 10000 km (6000 mi)					
4	* Valves	• Check valve clearance. • Adjust if necessary.			✓		✓	
5	* Fuel injection	• Check engine idle speed.		✓	✓	✓	✓	✓
6	* Exhaust system	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		✓	✓	✓	✓	✓

EAUN0284

GENERAL MAINTENANCE AND LUBRICATION CHART

TIP

- The annual checks must be performed every year, except if a kilometer-based maintenance is performed instead.
- From 16000 km, repeat the maintenance intervals starting from 4000 km.
- 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	ODOMETER READING (whichever comes first)					ANNUAL CHECK
			1000 km or 1 month	4000 km or 4 months	7000 km or 7 months	10000 km or 10 months	13000 km or 13 months	
1	* Diagnostic system check	• Perform dynamic inspection using Yamaha diagnostic tool. • Check the error codes.	✓	✓	✓	✓	✓	✓
2	Air filter element	• Replace.	Every 16000 km (10000 mi)					
3	Air filter check hose	• Clean.	✓	✓	✓	✓	✓	

PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (whichever comes first)					ANNUAL CHECK
			1000 km or 1 month	4000 km or 4 months	7000 km or 7 months	10000 km or 10 months	13000 km or 13 months	
4	* V-belt case air filter element	- Clean. - Replace if necessary.		√	√	√	√	
5	* Battery	- Check voltage. - Charge if necessary.	√	√	√	√	√	√
6	* Front brake	Check operation, fluid level and vehicle for fluid leakage.	√	√	√	√	√	√
		Replace brake pads.	Whenever worn to the limit					
7	* Rear brake	Check operation and adjust brake lever free play.	√	√	√	√	√	√
		Replace brake shoes.	Whenever worn to the limit					
8	* Brake hoses	- Check for cracks or damage. - Check for correct routing and clamping.		√	√	√	√	√
		Replace.	Every 4 years					
9	* Brake fluid	Change.	Every 2 years					
10	* Wheels	Check runout and for damage.		√	√	√	√	
11	* Tires	- Check tread depth and for damage. - Replace if necessary. - Check air pressure. - Correct if necessary.		√	√	√	√	√
12	* Wheel bearings	Check bearings for looseness or damage.		√	√	√	√	
13	* Steering bearings	Check bearing play and steering for roughness.	√	√	√	√	√	
		Lubricate with lithium-soap-based grease.	Every 12000 km (7500 mi)					
14	* Chassis fasteners	Make sure that all nuts, bolts and screws are properly tightened.		√	√	√	√	√
15	Front brake lever pivot shaft	Lubricate with silicone grease.		√	√	√	√	√
16	Rear brake lever pivot shaft	Lubricate with silicone grease.		√	√	√	√	√
17	Sidestand, center-stand	- Check operation. - Lubricate with lithium-soap-based grease.		√	√	√	√	√
18	* Sidestand switch	Check operation.	√	√	√	√	√	√
19	* Front fork	Check operation and for oil leakage.		√	√	√	√	
		Change the front fork oil.	Every 20000 km (12000 mi)					
20	* Shock absorber assemblies	Check operation and shock absorbers for oil leakage.		√	√	√	√	
21	Engine oil	- Change. - Check oil level and vehicle for oil leakage.	√	Every 3000 km (1800 mi)				
22	* Engine oil strainer	Clean.	√					√
23	* Cooling system	Check coolant level and vehicle for coolant leakage.		√	√	√	√	√
		Change with Yamaha genuine coolant.	Every 3 years					
24	Final transmission oil	Check vehicle for oil leakage.	√	√	√	√	√	
		Change.	√	Every 10000 km (6000 mi)				
25	* V-belt	Check for damage and wear.			√	√	√	√
		Replace.	Every 25000 km (15500 mi)					
26	* V-belt secondary sheave	Lubricate.	Every 12000 km (7500 mi)					
27	* Front and rear brake switches	Check operation.	√	√	√	√	√	√
28	Moving parts and cables	Lubricate.		√	√	√	√	√

PERIODIC MAINTENANCE

NO.	ITEM	CHECK OR MAINTENANCE JOB	ODOMETER READING (whichever comes first)					ANNUAL CHECK
			1000 km or 1 month	4000 km or 4 months	7000 km or 7 months	10000 km or 10 months	13000 km or 13 months	
29	* Throttle grip	• Check operation. • Check throttle grip free play, and adjust if necessary. • Lubricate cable and grip housing.		√	√	√	√	√
30	* Lights, signals and switches	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

EAU62401

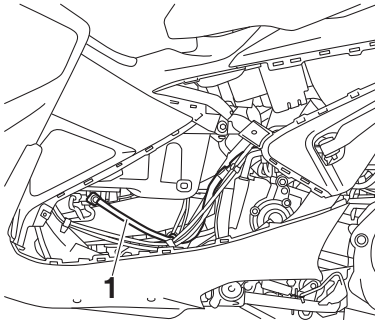
TIP

- Air filter
 - This model's air filter is equipped with a disposable oil-coated paper element, which must not be cleaned with compressed air to avoid damaging it.
 - The air filter element needs to be replaced more frequently when riding in unusually wet or dusty areas.
- V-belt case air filter
 - 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. After disassembling the brake master cylinders and calipers, always change the brake fluid.
 - Every two years replace the internal components of the brake master cylinder and caliper, and change the brake fluid.
 - Replace the brake hose every four years and if cracked or damaged.

EAS30619

CHECKING THE FUEL LINE

1. Remove:
 - Front side cover assembly (left)
Refer to "GENERAL CHASSIS (2)" on page 4-3.
 - Footrest board (left)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
2. Check:
 - Fuel hose "1"
Cracks/damage → Replace.
Loose connections → Connect properly.



3. Install:
 - Footrest board (left)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
 - Front side cover assembly (left)
Refer to "GENERAL CHASSIS (2)" on page 4-3.

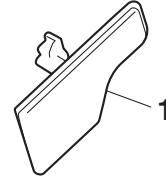
EAS31178

CHECKING THE FUEL FILTER

1. Remove:
 - Front side cover assembly (left)
Refer to "GENERAL CHASSIS (2)" on page 4-3.
 - Footrest board (left)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
 - Fuel filter
Refer to "FUEL TANK" on page 7-1.
2. Check:
 - Fuel filter "1"
Damage/contaminants → Replace.

TIP

Replace the fuel filter every 12000 km (7500 mi) of operation.



3. Install:
 - Fuel filter
Refer to "FUEL TANK" on page 7-1.
 - Footrest board (left)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
 - Front side cover assembly (left)
Refer to "GENERAL CHASSIS (2)" on page 4-3.

EAS30620

CHECKING THE SPARK PLUG

1. Remove:
 - Front side cover assembly (right)
Refer to "GENERAL CHASSIS (2)" on page 4-3.
 - Footrest board (right)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
2. Remove:
 - Spark plug cap
 - Spark plug

ECA13330

NOTICE

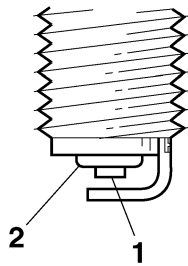
Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

3. Check:
 - Spark plug type
Incorrect → Change.

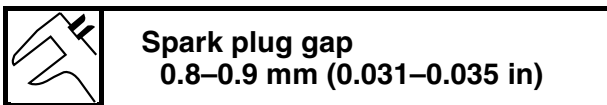


Manufacturer/model
NGK/CPR8EA-9
DENSO/U24EPR-9

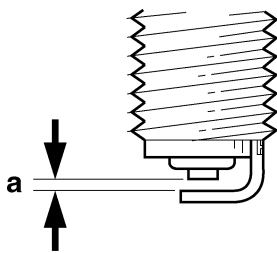
4. Check:
 - Electrode "1"
Damage/wear → Replace the spark plug.
 - Insulator "2"
Abnormal color → Replace the spark plug.
Normal color is medium-to-light tan.



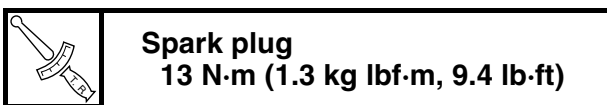
5. Clean:
 - Spark plug
(with a spark plug cleaner or wire brush)
6. Measure:
 - Spark plug gap "a"
(with a wire thickness gauge)
Out of specification → Regap.



Spark plug gap
0.8–0.9 mm (0.031–0.035 in)

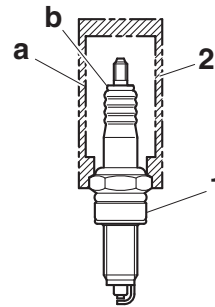


7. Install:
 - Spark plug "1"
 - Spark plug cap



Spark plug
13 N·m (1.3 kg lbf·m, 9.4 lb·ft)

- TIP**
- Before installing the spark plug, clean the spark plug and gasket surface.
 - When tightening the spark plug, make sure that the inside "a" of the spark plug wrench "2" does not contact the portion "b" of the spark plug.
 - To route the spark plug lead, refer to "CONNECTING THE LEADS" on page 5-8.



8. Install:
 - Footrest board assembly (right)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
 - Front side cover (right)
Refer to "GENERAL CHASSIS (2)" on page 4-3.

EAS30622

ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

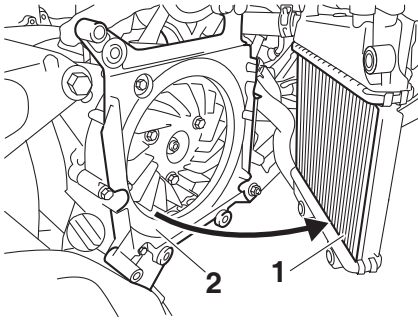
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
 - Front side covers (left and right)
Refer to "GENERAL CHASSIS (2)" on page 4-3.
 - Footrest boards (left and right)
Refer to "GENERAL CHASSIS (6)" on page 4-16.
 - Radiator cover and radiator fan case
Refer to "RADIATOR" on page 6-1.
2. Move:
 - Radiator "1"
 - Radiator fan case "2"

TIP

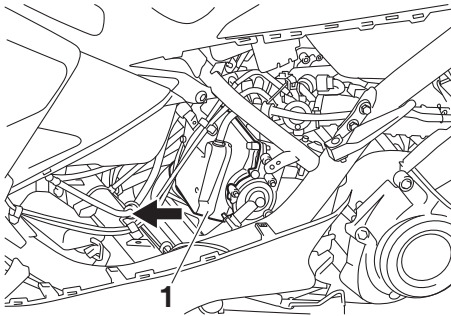
Move the rear of the radiator outward.

PERIODIC MAINTENANCE



3. Move:

- Cylinder head cover "1"



4. Measure:

- Valve clearance
- Out of specification → Adjust.



Valve clearance (cold)

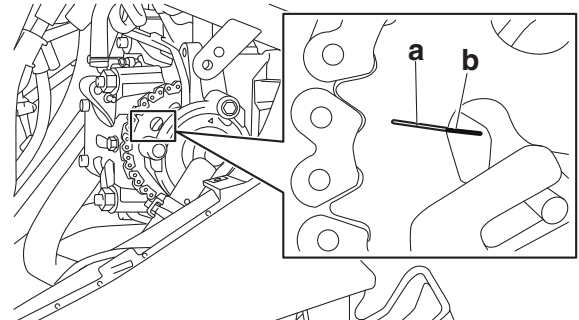
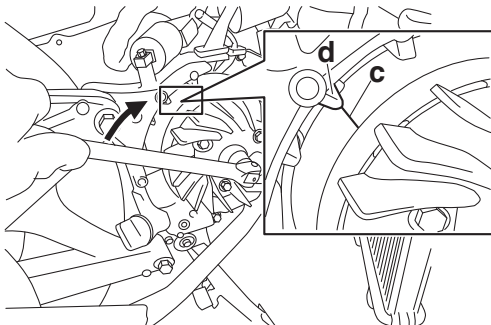
Intake

0.10–0.14 mm (0.0039–0.0055 in)

Exhaust

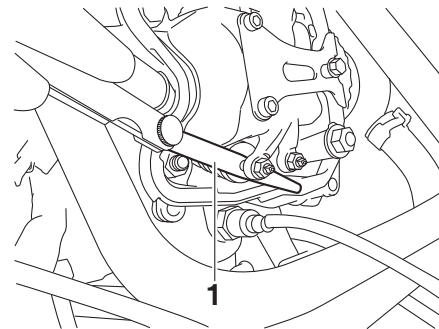
0.21–0.25 mm (0.0083–0.0098 in)

- Turn the crankshaft clockwise.
- When the piston is at the Top Dead Center (TDC) on the compression stroke, align the "I" mark "a" on the camshaft sprocket with the match mark "b" on the camshaft stopper plate.
- Align the "I" mark "c" on the A.C. magneto rotor with the stationary pointer "d" on the crankcase.



- Measure the valve clearance with a thickness gauge "1".

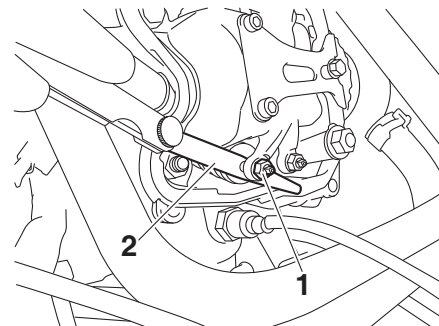
Out of specification → Adjust.



5. Adjust:

- Valve clearance

- Loosen the locknut "1".
- Insert a thickness gauge "2" between the end of the adjusting screw and the valve tip.



- Turn the adjusting screw "3" in direction "a" or "b" with the tappet adjusting tool "4" until the specified valve clearance is obtained.

Direction "a"

Valve clearance is increased.

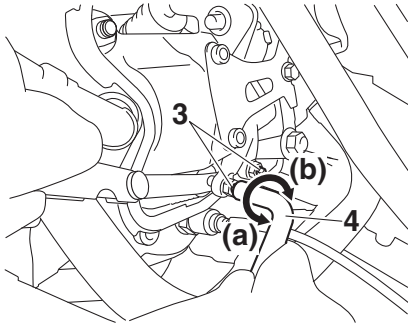
Direction "b"

Valve clearance is decreased.

PERIODIC MAINTENANCE



Tappet adjusting tool
90890-0131m, 1
Six piece tappet set
YM-A5970



- d. Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.



Valve clearance adjusting screw locknut
7 N·m (0.7 kgf·m, 5.1 lb·ft)

- 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.

6. Install:
• All removed parts

TIP

For installation, reverse the removal procedure.

EAS31017

CHECKING THE ENGINE IDLING SPEED

TIP

Prior to checking the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Check:
 - Engine idling speed
 Out of specification → Go to next step.



Engine idling speed
1500–1700 r/min

3. Check:
 - ISC (idle speed control) learning value
 “00” or “01” → Check the intake system.

“02” → Clean the ISC (idle speed control) unit and throttle body.

Refer to “CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY” on page 7-12.

- a. Connect the Yamaha diagnostic tool. Use the diagnostic code number “67”. Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.



Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

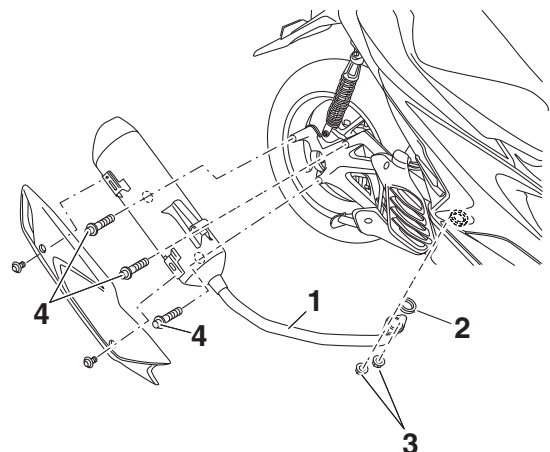
EAS30625

CHECKING THE EXHAUST SYSTEM

1. Check:
 - Muffler “1”
Cracks/damage → Replace.
 - Gasket “2”
Exhaust gas leaks → Replace.
2. Check:
 - Tightening torque
 - Muffler nuts “3”
 - Muffler bolts “4”



Muffler nut
20 N·m (2.0 kgf·m, 14 lb·ft)
Muffler bolt
57 N·m (5.7 kgf·m, 41 lb·ft)



EAS30799

ADJUSTING THE EXHAUST GAS VOLUME

TIP

- Be sure to set the CO density level to standard, and then adjust the exhaust gas volume.
- To adjust the exhaust gas volume, use the CO adjustment mode of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.

1. Connect the Yamaha diagnostic tool to the connector. For information about connecting the Yamaha diagnostic tool, refer to “YAMAHA DIAGNOSTIC TOOL” on page 8-46.



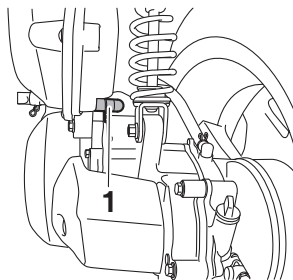
Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

EAS31130

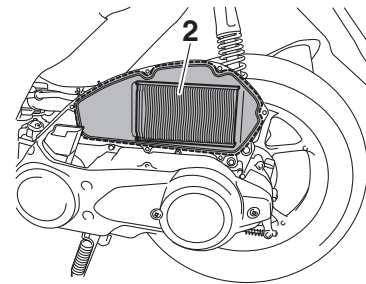
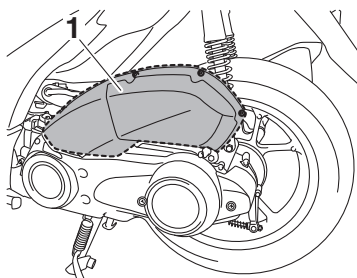
REPLACING THE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

TIP

Check the air filter check hose “1” that is located on the rear side of the air filter case. If dust or water or both collects in the hose, clean the hose and replace the air filter element.



1. Remove:
 - Air filter case cover “1”
 - Air filter element “2”



2. Check:

- Air filter element
Damage → Replace.

TIP

- Replace the air filter element every 16000 km (1000 mi) of operation.
- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

3. Install:

- Air filter element
- Air filter case cover



Air filter case cover screw
1.2 N·m (0.12 kgf·m, 0.87 lb·ft)

ECA20480

NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body tuning, leading to poor engine performance and possible overheating.

TIP

When installing the air filter element into the air filter case, make sure that the sealing surfaces are aligned to prevent any air leaks.

EAS31179

CHECKING THE BREATHER HOSES

1. Remove:

- Front side cover assembly (left)
Refer to “GENERAL CHASSIS (2)” on page 4-3.

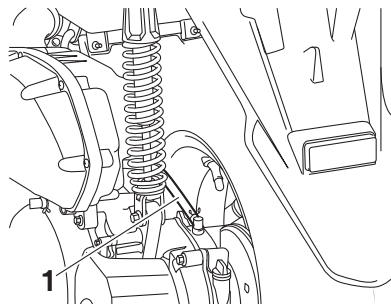
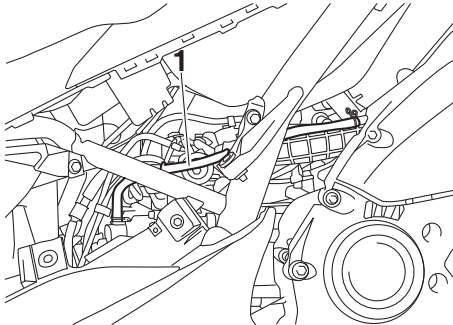
2. Check:

- Cylinder head breather hose “1”
- Transmission case breather hose “2”
Cracks/damage → Replace.
Loose connections → Connect properly.

ECA21600

NOTICE

Make sure the cylinder head breather hose and transmission case breather hose are routed correctly.



3. Install:

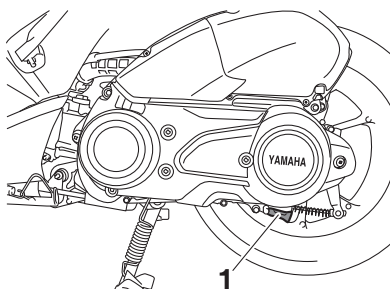
- Front side cover assembly (left)
Refer to "GENERAL CHASSIS (2)" on page 4-3.

EAS31704

CLEANING THE V-BELT CASE AIR FILTER ELEMENT AND CLEANING THE CHECK HOSE

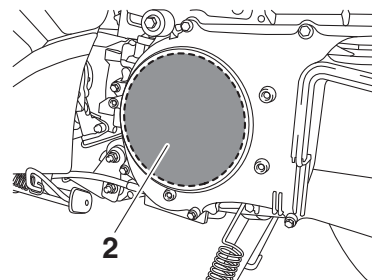
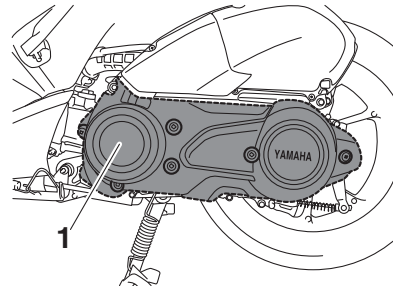
TIP

Check the V-belt case air filter check hose "1" that is located on the rear side of the V-belt case. If dust or water or both collects in the hose, clean the hose and replace the V-belt case air filter element.



1. Remove:

- V-belt case air filter element cover "1"
- V-belt case air filter element "2"



2. Clean:

- V-belt case air filter element (with solvent)

EWA17971

WARNING

Never use low flash point solvents, such as gasoline, to clean the V-belt case air filter element. Such solvents may cause a fire or an explosion.

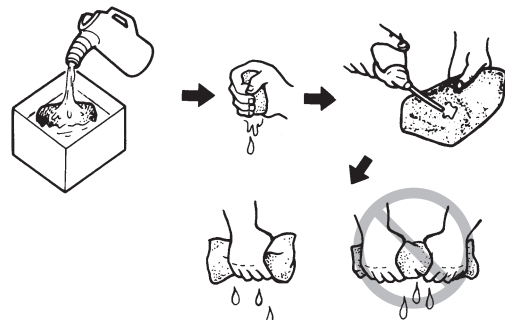
TIP

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- After cleaning, gently squeeze the V-belt case air filter element to remove the excess solvent.

ECA21590

NOTICE

Do not twist the V-belt case air filter element when squeezing it.



3. Check:

- V-belt case air filter element
Damage → Replace.

4. Apply the recommended oil to the entire surface of the V-belt case air filter element and squeeze out the excess oil. The V-belt case air filter element should be wet but not dripping.



Recommended oil
Engine oil

5. Install:

- V-belt case air filter element
- V-belt case air filter element cover



V-belt case air filter element cover bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

EAS30816

CHECKING AND CHARGING THE BATTERY

Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.

EAS30801

CHECKING THE BRAKE OPERATION

1. Check:

- Brake operation
Brake not working properly → Check the brake system.
Refer to "FRONT BRAKE" on page 4-30 and "REAR BRAKE" on page 4-43.

TIP

Drive on the road, operate the front and rear brakes separately and check to see if the brakes are operating properly.

EAS30633

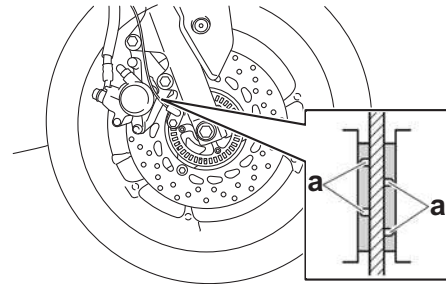
CHECKING THE FRONT BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.

2. Check:

- Front brake pad
Wear indicator grooves "a" almost disappeared → Replace the brake pads as a set.
Refer to "FRONT BRAKE" on page 4-30.



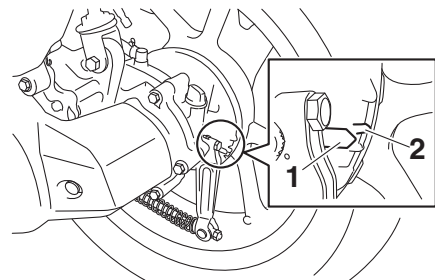
EAS00126

CHECKING THE REAR BRAKE SHOES

1. Operate the brake.

2. Check:

- Wear indicator "1"
Reaches the wear limit line "2" → Replace the brake shoes as a set.
Refer to "REAR WHEEL AND BRAKE" in chapter 4.



EAS30632

CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.
- In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

2. Check:

- Brake fluid level
Below the minimum level mark "1" → Add the specified brake fluid to the proper level.



Specified brake fluid
YAMAHA GENUINE BRAKE FLUID
(DOT 3 or DOT 4)-GDR155
YAMAHA GENUINE BRAKE
FLUID (DOT 4-plus)-GDR155-A

WARNING

- ## NOTICE

CHECKING THE FRONT BRAKE HOSES

-
- A line drawing of a motorcycle from a side-front perspective. A callout line points from the right towards the front fork assembly, with the number '1' at the end of the line.

- WARNING**

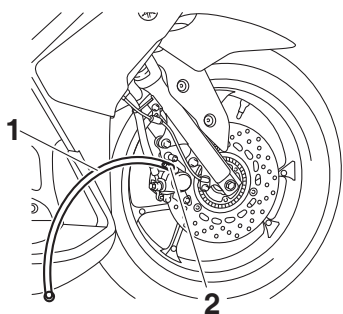
NOTICE

- WARNING**

TIP

- ABS

- 3-11



- d. Place the other end of the hose into a container.
- e. Slowly apply the brake several times.
- f. Fully squeeze the brake lever and hold it in position.
- g. Loosen the bleed screw.

TIP

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or handlebar grip.

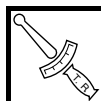
- h. Tighten the bleed screw and then release the brake lever.
- i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
- j. Check the operation of the hydraulic unit. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-51.

ECA18060

NOTICE

Make sure that the main switch is turned to “OFF” before checking the operation of the hydraulic unit.

- k. After operating the ABS, repeat steps (e) to (i), and then fill the brake master cylinder reservoir to the proper level with the specified brake fluid.
- l. Tighten the bleed screw to specification.



Brake caliper bleed screw
6 N·m (0.6 kgf·m, 4.3 lb·ft)

- m. Fill the brake master cylinder reservoir to the proper level with the specified brake fluid. Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-10.

EWA13110

WARNING

After bleeding the hydraulic brake system, check the brake operation.

FAS30638

CHECKING THE WHEELS

The following procedure applies to all of the wheels.

1. Check:
 - Wheel Damage/out-of-round → Replace.

FWA13260

WARNING

Never attempt to make any repairs to the wheel.

TIP

After a tire or wheel has been changed or replaced, always balance the wheel.

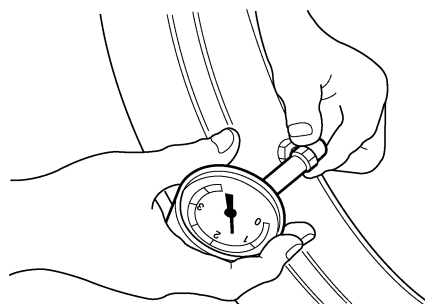
2. Measure:
- Radial wheel runout
 - Lateral wheel runout
- Refer to “CHECKING THE FRONT WHEEL” on page 4-22 and “CHECKING THE REAR WHEEL” on page 4-29.

EAS30640

CHECKING THE TIRES

The following procedure applies to all of the tires.

1. Check:
 - Tire pressure
Out of specification → Regulate.



EWA13181

WARNING

- The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.
 - The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.
 - Operation of an overloaded vehicle could cause tire damage, an accident or an injury.
- NEVER OVERLOAD THE VEHICLE.**

PERIODIC MAINTENANCE



Tire air pressure (measured on cold tires)

Front (1 person)
200 kPa (2.00 kgf/cm², 29 psi)

Rear (1 person)
225 kPa (2.25 kgf/cm², 33 psi)

Front (2 persons)
200 kPa (2.00 kgf/cm², 29 psi)

Rear (2 persons)
225 kPa (2.25 kgf/cm², 33 psi)

Maximum load
154 kg (339 lb) (GDR155)
153 kg (336 lb) (GDR155-A)

* Total weight of rider, passenger, cargo and accessories

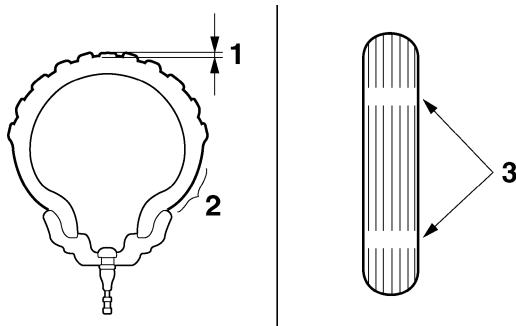
EWA13190

WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

2. Check:

- Tire surfaces
Damage/wear → Replace the tire.



- Tire tread depth
- Side wall
- Wear indicator



Wear limit (front)
1.0 mm (0.04 in)
Wear limit (rear)
1.0 mm (0.04 in)

EWA14080

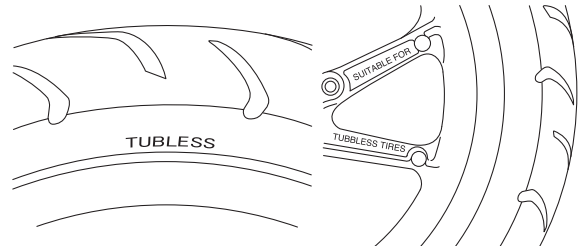
WARNING

- Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.
- When using a tube tire, be sure to install the correct tube.
- Always replace a new tube tire and a new tube as a set.

- To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.
- Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.

A

B



- Tire
- Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

WARNING

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.



Front tire
Size
110/80-14M/C 53P
Manufacturer/model
IRC/SCT-005F



Rear tire
Size
140/70-14M/C 62P
Manufacturer/model
IRC/SCT-005R

EWA13210

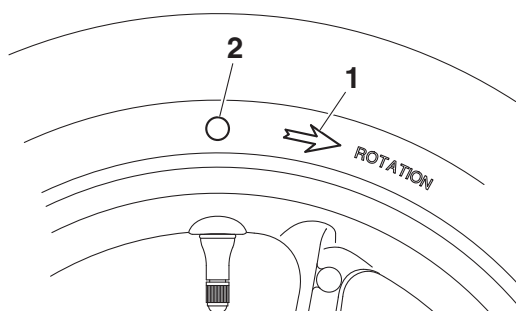
WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

TIP

For tires with a direction of rotation mark "1":

- Install the tire with the mark pointing in the direction of wheel rotation.
- Align the mark "2" with the valve installation point.



EAS30641

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
 - Wheel bearings
 Refer to "CHECKING THE FRONT WHEEL" on page 4-22.

EAS30645

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on a suitable stand so that the front wheel elevated.

2. Check:
 - Steering head
 Grasp the handlebar and gently rock the handlebar.
 Binding/looseness → Adjust the steering head.

3. Remove:

- Front cover assembly
 - Front cowling assembly
- Refer to "GENERAL CHASSIS (4)" on page 4-9.

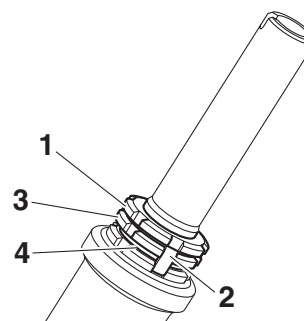
- Handlebar

Refer to "HANDLEBAR" on page 4-55.

4. Adjust:

- Steering head

- a. Remove the upper ring nut "1", lock washer "2", center ring nut "3" and rubber washer "4".



- b. Loosen the lower ring nut "5" and then tighten it to specification with a steering nut wrench "6".

TIP

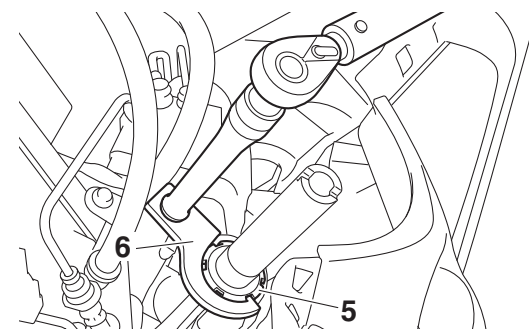
Set the torque wrench at a right angle to the steering nut wrench.



Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



Lower ring nut (initial tightening torque)
38 N·m (3.8 kgf·m, 27 lb·ft)



- c. Loosen the lower ring nut 1/4 of a turn, and then tighten it to specification with a steering nut wrench.

EWA13140

WARNING

Do not overtighten the lower ring nut.

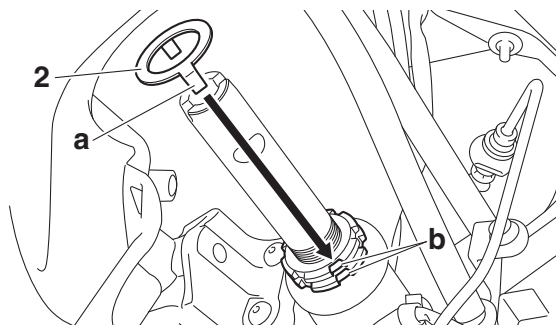


Lower ring nut (final tightening torque)
16 N·m (1.6 kgf·m, 12 lb·ft)

- d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
Refer to "STEERING HEAD" on page 4-67.
- e. Install the rubber washer.
- f. Install the center ring nut.
- g. Finger tighten the center ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the center ring nut until their slots are aligned.
- h. Install the lock washer "2".

TIP

Make sure the lock washer tabs "a" sit correctly in the ring nut slots "b".



- i. Hold the lower and center ring nuts with a steering nut wrench and tighten the upper ring nut with a another steering nut wrench.



Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



Upper ring nut
75 N·m (7.5 kgf·m, 54 lb·ft)



5. Install:

- Handlebar
Refer to "HANDLEBAR" on page 4-55.
- Front cowling assembly
- Front cover assembly
Refer to "GENERAL CHASSIS (4)" on page 4-9.

EAS30646

LUBRICATING THE STEERING HEAD

1. Lubricate:

- Upper bearing
- Lower bearing
- Lower bearing dust seal



Recommended lubricant
Lithium-soap-based grease

EAS31186

CHECKING THE CHASSIS FASTENERS

Make sure that all nuts, bolts, and screws are properly tightened.

Refer to "CHASSIS TIGHTENING TORQUES" on page 2-13.

EAS30648

LUBRICATING THE LEVERS

Lubricate the pivoting point and metal-to-metal moving parts of the levers.



Recommended lubricant
Silicone grease

EAS30650

CHECKING THE SIDESTAND

1. Check:

- Sidestand operation
Check that the sidestand moves smoothly.
Rough movement → Repair or replace.

EAS30651

LUBRICATING THE SIDESTAND

Lubricate the pivoting point, metal-to-metal moving parts, and spring contact point of the side-stand.



Recommended lubricant
Lithium-soap-based grease

EAS30856

CHECKING THE CENTERSTAND

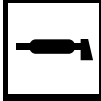
1. Check:

- Centerstand operation
Check that the centerstand moves smoothly.
Rough movement → Repair or replace.

EAS30857

LUBRICATING THE CENTERSTAND

Lubricate the pivoting point, metal-to-metal moving parts, and spring contact points of the centerstand.



Recommended lubricant
Lithium-soap-based grease

EAS30652

CHECKING THE SIDESTAND SWITCH

Refer to "CHECKING THE SWITCHES" on page 8-120.

EAS30653

CHECKING THE FRONT FORK

1. Stand the vehicle on a level surface.

EWA13120



Securely support the vehicle so that there is no danger of it falling over.

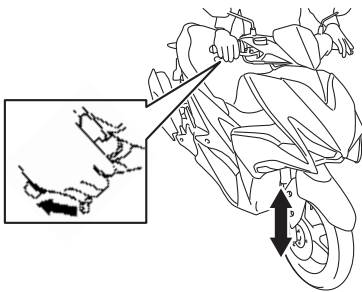
2. Check:

- Inner tube
Damage/scratches → Replace.
- Oil seal
Oil leakage → Replace.

3. Hold the vehicle upright and apply the front brake.

4. Check:

- Front fork operation
Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
Rough movement → Repair.
Refer to "FRONT FORK" on page 4-60.



EAS30808

CHECKING THE REAR SHOCK ABSORBER ASSEMBLIES

The following procedure applies to both of the rear shock absorber assemblies.

1. Stand the vehicle on a level surface.

EWA13120



Securely support the vehicle so that there is no danger of it falling over.

2. Check:

- Rear shock absorber assembly
Oil leaks → Replace the rear shock absorber assembly.

Refer to "CHECKING THE REAR SHOCK ABSORBER ASSEMBLY" on page 4-81.

3. Check:

- Rear shock absorber assembly operation
Push down seat on the vehicle several times and check if the rear shock absorber assembly rebounds smoothly.

Rough movement → Replace.

Refer to "REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM" on page 4-79.

EAS30656

CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Start the engine, warm it up for several minutes, and then turn it off.

3. Remove:

- Dipstick "1"

4. Check:

- Engine oil level

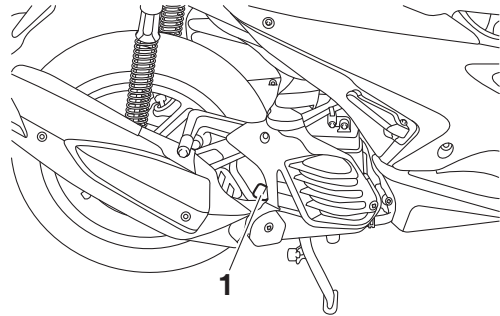
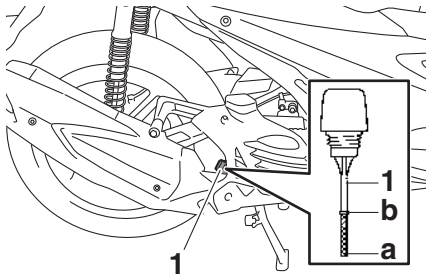
The engine oil level should be between the minimum level mark "a" and maximum level mark "b".

Below the minimum level mark → Add the recommended engine oil to the proper level.

TIP

- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the dipstick in when inspecting the oil level.

PERIODIC MAINTENANCE

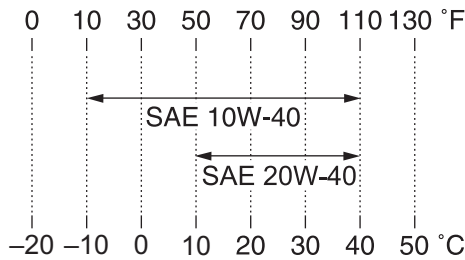


**Recommended brand
YAMALUBE**

Type

SAE 10W-40

**Recommended engine oil grade
API service SG type or higher,
JASO standard MA or MB**



ECA13370

NOTICE

Do not allow foreign materials to enter the crankcase.

- Start the engine, warm it up for several minutes, and then turn it off.
- Check the engine oil level again.

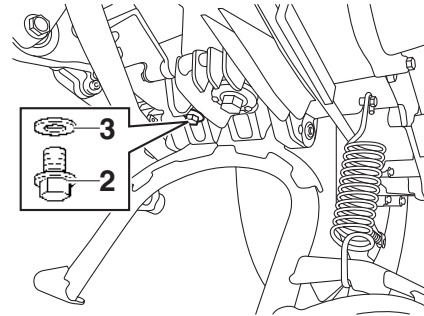
TIP

Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS30657

CHANGING THE ENGINE OIL

- Start the engine, warm it up for several minutes, and then turn it off.
- Place a container under the engine oil drain bolt.
- Remove:
 - Dipstick "1"
 - Engine oil drain bolt "2"
 - (along with the gasket "3")

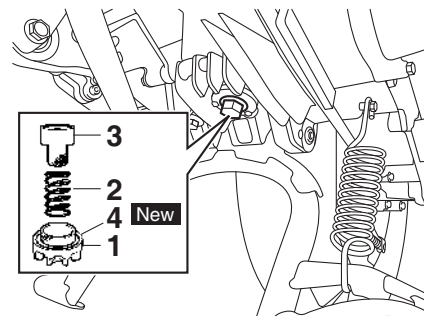


- Drain:
 - Engine oil (completely from the crankcase)
- If the oil strainer is also to be cleaned, perform the following procedure.

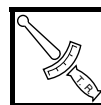
- Remove the oil strainer cover "1", spring "2", and oil strainer "3".
- Install a new O-ring "4".

TIP

Lubricate the O-ring with lithium-soap-based grease.



- Clean the engine oil strainer with solvent, and then check it for damage and replace it if necessary.
- Install the oil strainer, spring, and oil strainer cover.



**Oil strainer cover
32 N·m (3.2 kgf·m, 23 lb·ft)**

PERIODIC MAINTENANCE

6. Install:

- Engine oil drain bolt
(along with the gasket **New**)



Engine oil drain bolt
20 N·m (2.0 kgf·m, 14 lb·ft)

7. Fill:

- Crankcase
(with the specified amount of the recommended engine oil)



Engine oil quantity
Quantity (disassembled)
1.00 L (1.06 US qt, 0.88 Imp.qt)
Periodic oil change
0.90 L (0.95 US qt, 0.79 Imp.qt)

8. Install:

- Dipstick

9. Start the engine, warm it up for several minutes, and then turn it off.

10. Check:

- Engine
(for engine oil leaks)

11. Check:

- Engine oil level
Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-16.

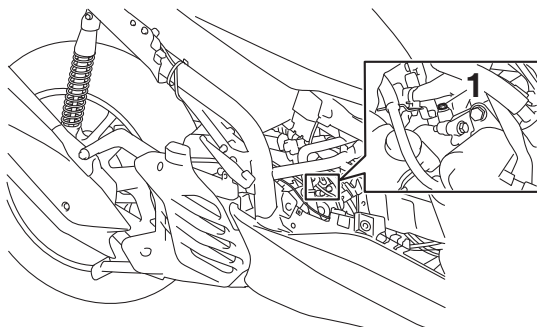
12. Remove:

- Front side cover assembly (right)
Refer to "GENERAL CHASSIS (2)" on page 4-3.

13. Check:

- Engine oil pressure

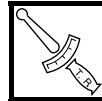
a. Slightly loosen the oil check bolt "1".



b. Start the engine and keep it idling until engine oil starts to seep from the oil check bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.

c. Check the engine oil passages and the oil pump for damage or leakage. Refer to "OIL PUMP" on page 5-45.

- d. Start the engine after solving the problem(s) and check the engine oil pressure again.
- e. Tighten the oil check bolt to specification.



Engine oil check bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

EAS30811

CHECKING THE COOLANT LEVEL

1. Stand the vehicle on a level surface.

TIP

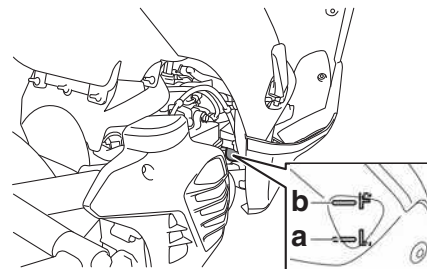
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Check:

- Coolant level

The coolant level should be between the minimum level mark "a" and maximum level mark "b".

Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

NOTICE

- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.**
- **Use only distilled water. However, if distilled water is not available, soft water may be used.**

3. Start the engine, warm it up for several minutes, and then turn it off.

4. Check:

- Coolant level

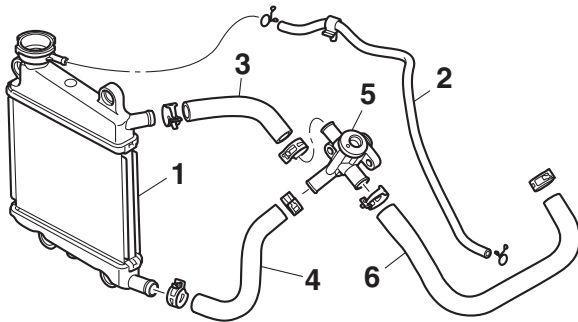
TIP

Before checking the coolant level, wait a few minutes until the coolant has settled.

EAS30812

CHECKING THE COOLING SYSTEM

1. Remove:
 - Radiator cover
 Refer to "RADIATOR" on page 6-1.
2. Check:
 - Radiator "1"
 - Coolant reservoir hose "2"
 - Radiator inlet hose "3"
 - Radiator outlet hose "4"
 - Thermostat assembly "5"
 - Water pump inlet hose "6"
 Cracks/tears → Replace.
 Refer to "RADIATOR" on page 6-1 and
 "THERMOSTAT" on page 6-4.



3. Install:
 - Radiator cover
 Refer to "RADIATOR" on page 6-1.

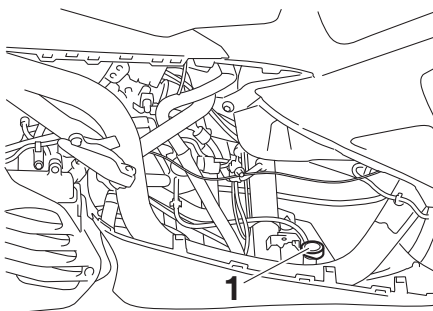
EAS30813

CHANGING THE COOLANT

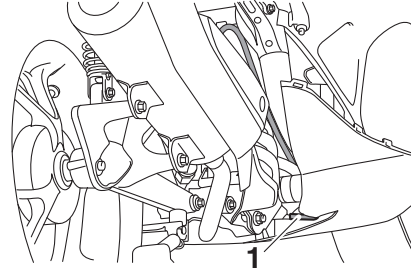
1. Remove:
 - Front side cover assembly (right)
 Refer to "GENERAL CHASSIS (2)" on page 4-3.
- Footrest board (right)

Refer to "GENERAL CHASSIS (6)" on page 4-16.

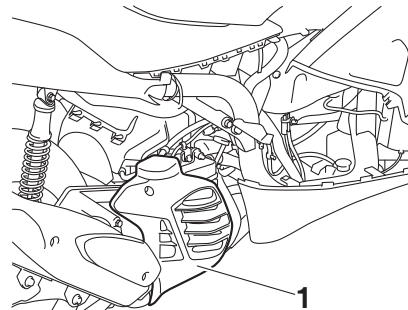
 2. Remove:
 - Coolant reservoir cap "1"



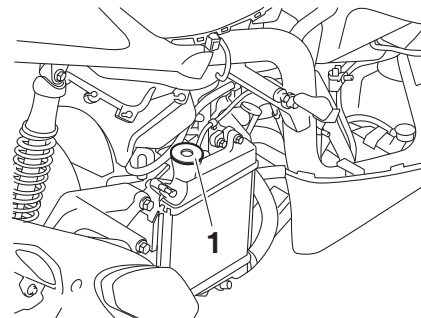
3. Disconnect:
 - Coolant reservoir hose "1"



4. Drain:
 - Coolant
(from the coolant reservoir)
5. Remove:
 - Radiator cover "1"



6. Remove:
 - Radiator cap "1"



EWA13030

WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:

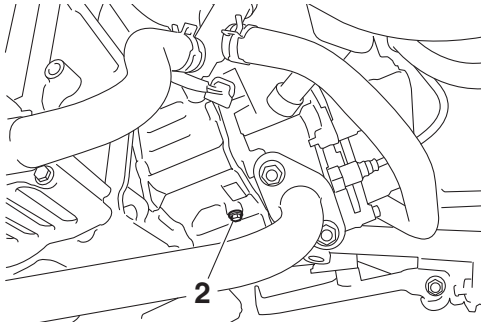
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counter-clockwise toward the detent to allow any residual pressure to escape. When the hissing

PERIODIC MAINTENANCE

sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

7. Remove:

- Coolant drain bolt (radiator side) “1” (along with the O-ring)
- Coolant drain bolt (cylinder side) “2” (along with the copper washer)



8. Drain:

- Coolant (from the engine and radiator)

9. Install:

- Coolant drain bolt (cylinder side) (along with the copper washer **New**)
- Coolant drain bolt (radiator side) (along with the O-ring **New**)



Coolant drain bolt (cylinder side)
10 N·m (1.0 kgf·m, 7.2 lb·ft)
Coolant drain bolt (radiator side)
1.0 N·m (0.10 kgf·m, 0.72 lb·ft)

10. Connect:

- Coolant reservoir hose

11. Fill:

- Cooling system (with the specified amount of the recommended coolant)



Recommended antifreeze

YAMAHA GENUINE COOLANT

Mixing ratio

1:1 (antifreeze: water)

Radiator (including all routes)

0.46 L (0.49 US qt, 0.40 Imp. qt)

Coolant reservoir (up to the maximum level mark)

0.13 L (0.13 US qt, 0.11 Imp. qt)

Handling notes for coolant

Coolant is potentially harmful and should be handled with special care.

EWA13040

WARNING

- If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.
- If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.
- If coolant is swallowed, induce vomiting and get immediate medical attention.

ECA13481

NOTICE

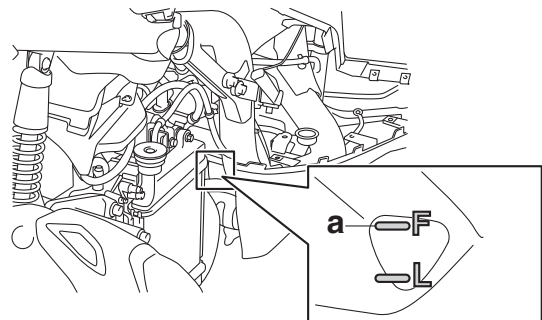
- Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant, check, and if necessary, correct the antifreeze concentration of the coolant.
- Use only distilled water. However, if distilled water is not available, soft water may be used.
- If coolant comes into contact with painted surfaces, immediately wash them with water.
- Do not mix different types of antifreeze.

12. Install:

- Radiator cap

13. Fill:

- Coolant reservoir (with the recommended coolant to the maximum level mark “a”)



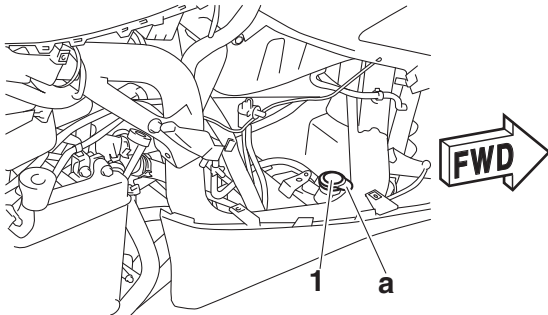
PERIODIC MAINTENANCE

14. Install:

- Coolant reservoir cap “1”

TIP

Point the tab “a” on the coolant reservoir cap forward.



15. Start the engine, warm it up for several minutes, and then turn it off.

16. Check:

- Coolant level

Refer to “CHECKING THE COOLANT LEVEL” on page 3-18.

TIP

Before checking the coolant level, wait a few minutes until the coolant has settled.

17. Install:

- Radiator cover



Radiator cover bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

18. Install:

- Footrest board (right)
Refer to “GENERAL CHASSIS (6)” on page 4-16.
- Front side cover assembly (right)
Refer to “GENERAL CHASSIS (2)” on page 4-3.

EAS31187

CHANGING THE FINAL TRANSMISSION OIL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

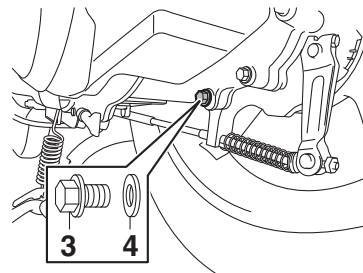
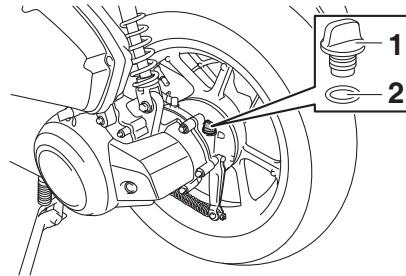
2. Start the engine, warm it up for several minutes, and then turn it off.

3. Place a container under the final transmission.

4. Remove:

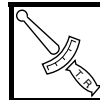
- Final transmission oil filler cap “1”
(along with the O-ring “2”)

- Final transmission oil drain bolt “3”
(along with the copper washer “4”)
Completely drain the final transmission oil.



5. Install:

- Final transmission oil drain bolt
(along with the copper washer **New**)



Final transmission oil drain bolt
20 N·m (2.0 kgf·m, 14 lb·ft)

6. Fill:

- Final transmission oil
(with the specified amount of the recommended final transmission oil)



Final transmission oil
Type
Motor oil SAE 10W-30 type SE
or higher or Gear oil SAE 85W
GL-3
Quantity
0.15 L (0.16 US qt, 0.13 Imp. qt)

7. Install:

- Final transmission oil filler cap
(along with the O-ring **New**)

TIP

Lubricate the O-ring with lithium-soap-based grease.

8. Start the engine, warm it up for several minutes, and then turn it off.

9. Check:

- Final transmission oil leakage

EAS31188

REPLACING THE V-BELT

1. Remove:
 - Air filter case
Refer to "AIR FILTER CASE" on page 7-7.
 - V-belt case
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
2. Check:
 - V-belt
Damage/wear → Replace.
Grease/oil → Clean the primary and secondary pulleys.
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.

TIP

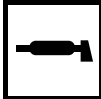
Replace the V-belt every 25000 km (15500 mi) of operation.

3. Install:
 - V-belt case
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
 - Air filter case
Refer to "AIR FILTER CASE" on page 7-7.

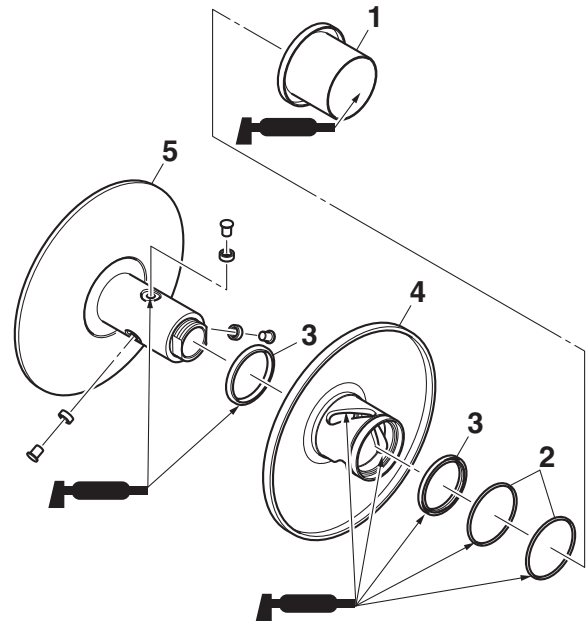
EAS31705

LUBRICATING THE SECONDARY SHEAVE

1. Remove:
 - Air filter case
Refer to "AIR FILTER CASE" on page 7-7.
 - Secondary sheave assembly
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
2. Disassemble:
 - Secondary sheave assembly
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
3. Lubricate:
 - Spring seat "1"
 - O-rings "2"
 - Oil seals "3"
 - Secondary sliding sheave "4"
 - Secondary fixed sheave "5"



Recommended lubricant
Shell dolium grease R®



4. Assemble:
 - Secondary sheave assembly
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
5. Install:
 - Secondary sheave assembly
Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
 - Air filter case
Refer to "AIR FILTER CASE" on page 7-7.

EAS30658

CHECKING THE BRAKE LIGHT SWITCHES

1. Check:
 - Front brake light switch operation
 - Rear brake light switch operationWhen operating the brake levers, confirm that the brake light comes on.
Faulty → Refer to "CHECKING THE SWITCHES" on page 8-120.

EAS30660

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

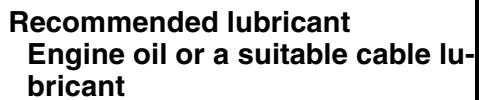
EWA13270



WARNING

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
 - Outer cable
Damage → Replace.
2. Check:
 - Cable operation
Rough movement → Lubricate.



TIP

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS30861

CHECKING THE THROTTLE GRIP OPERATION

1. Check:
 - Throttle cables
Damage/deterioration → Replace.
 - Throttle cable installation
Incorrect → Reinstall the throttle cables.
Refer to “HANDLEBAR” on page 4-55.
2. Check:
 - Throttle grip movement
Rough movement → Lubricate or replace the defective part(s).

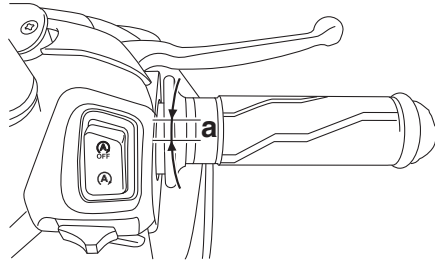
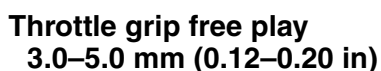


TIP

With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.

Repeat this check with the handlebar turned all the way to the left and right.

3. Check:
- Throttle grip free play “a”
Out of specification → Adjust.

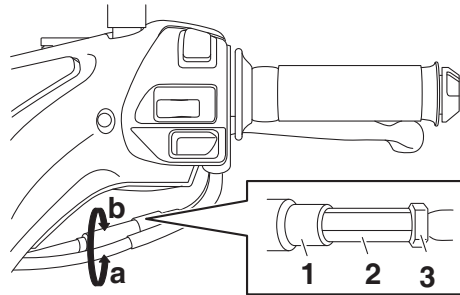


- 4. Adjust:
 - Throttle grip free play

- a. Slide back the rubber cover "1".
- b. Loosen the locknut "3".
- c. Turn the adjusting nut "2" in direction "a" or "b" until the specified throttle grip free play is obtained.

Direction “a”
Throttle grip free play is increased.

Direction “b”
Throttle grip free play is decreased.



- d. Tighten the locknut.



- e. Slide the rubber cover its original position.

TIP

Make sure that the adjusting nut is covered completely by the rubber cover.

EWA17990



After adjusting the throttle grip free play, start the engine and turn the handlebars to the right and to the left to ensure that this does not cause the engine idling speed to change.

1. Check that all switches operate and that all lights come on.
Refer to "INSTRUMENT AND CONTROL FUNCTIONS" in Owner's manual.
Faulty → Refer to "CHECKING THE SWITCHES" on page 8-120 and "CHECKING THE BULBS AND BULB SOCKETS" on page 8-123.

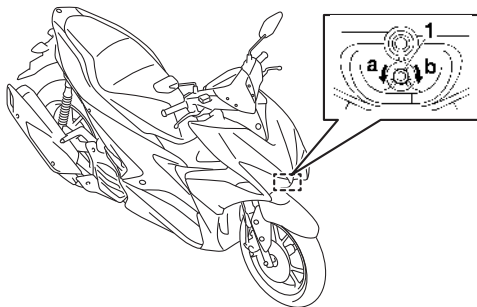
EAS30664

1. Adjust:
 - Headlight beam (vertically)

- a. Turn the adjusting bolt “1” in direction “a” or “b”.

Direction “a”
Headlight beam is raised.

Direction “b”
Headlight beam is lowered.



CHASSIS

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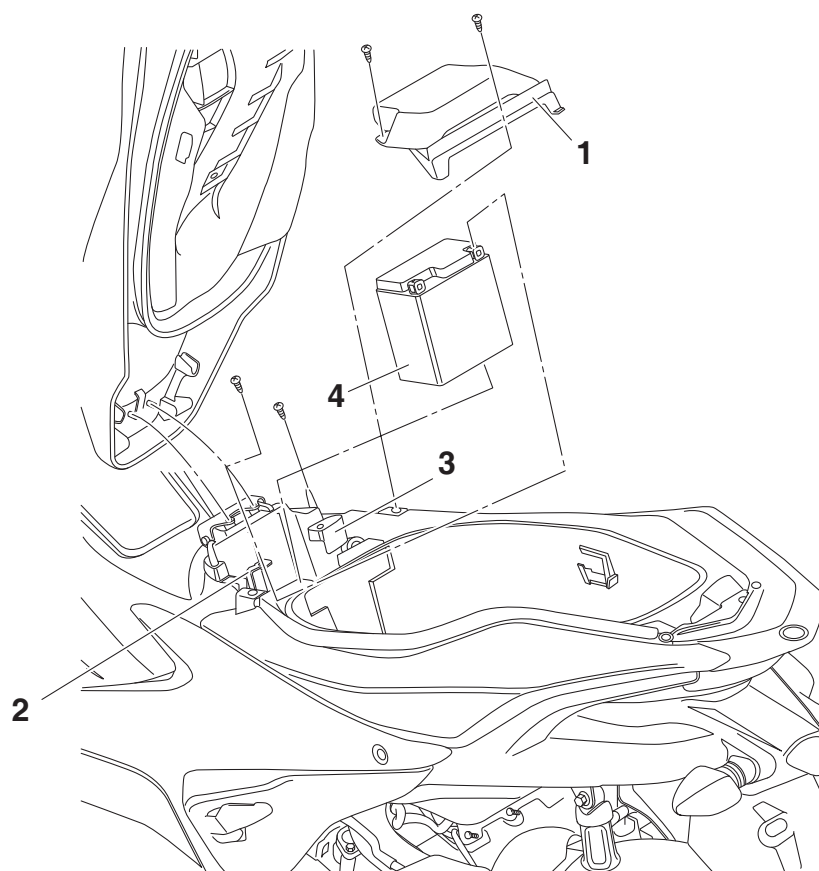
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EAS20026

GENERAL CHASSIS (1)

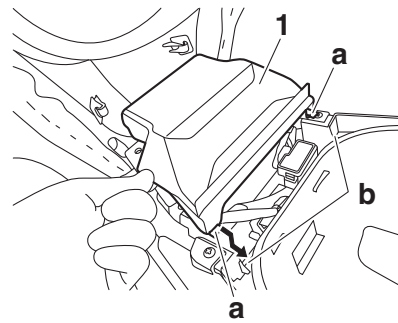
Removing the battery and battery cover



Order	Job/Parts to remove	Q'ty	Remarks
	Seat		Open.
1	Battery cover	1	
2	Negative battery lead	1	Disconnect.
3	Positive battery lead	1	Disconnect.
4	Battery	1	

1. Remove:

-
- A detailed line drawing of a motorcycle, viewed from the side. The drawing shows the engine, seat, handlebars, and wheels. The motorcycle is oriented towards the right. The drawing is composed of clean, black lines on a white background.



-

EAS31678

1. Install:

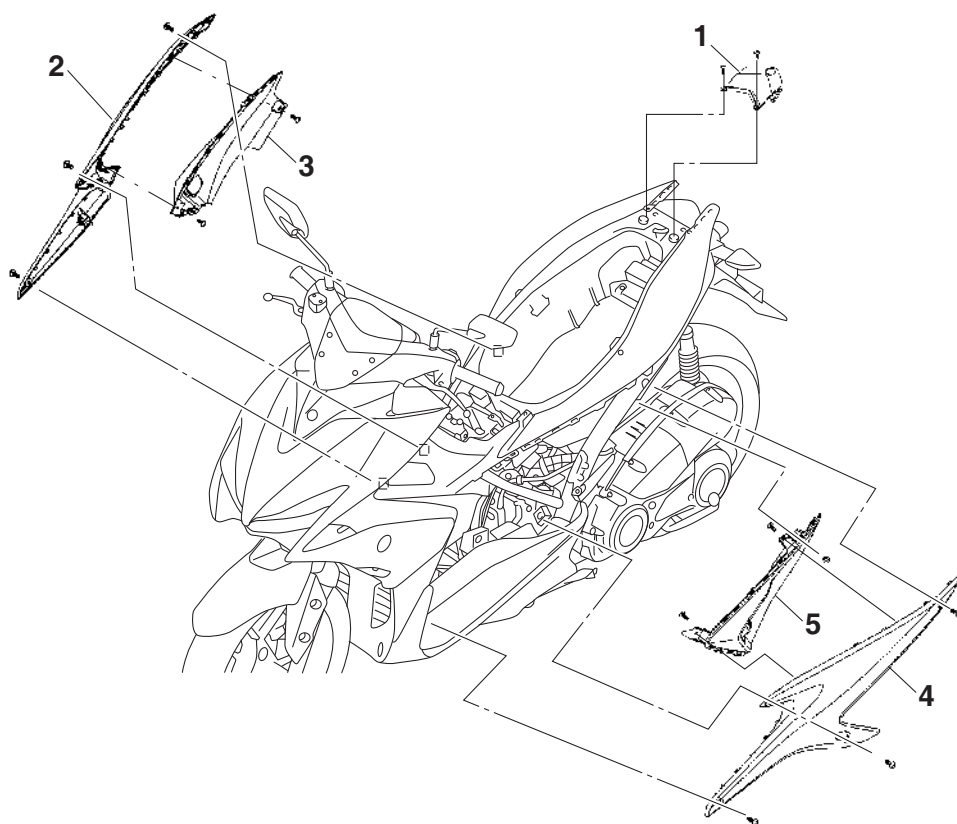
-
- A detailed line drawing of a motorcycle, viewed from the side. The drawing shows the engine, seat, handlebars, and wheels. The motorcycle is oriented towards the right. The drawing is composed of clean, black outlines on a white background.

- 4-2**

EAS20155

GENERAL CHASSIS (2)

Removing the front side cover assembly and tail/brake light outer cover



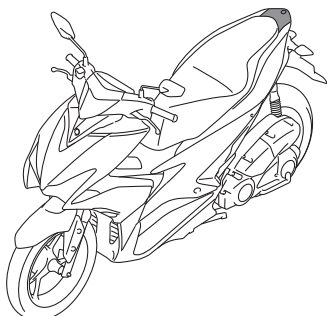
Order	Job/Parts to remove	Q'ty	Remarks
1	Tail/brake light outer cover	1	
2	Front side cover (right)	1	
3	Mole side cover (right)	1	
4	Front side cover (left)	1	
5	Mole side cover (left)	1	

EAS31681

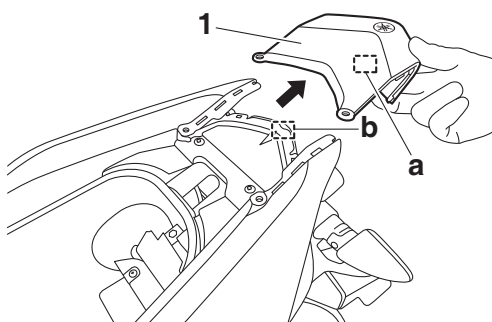
REMOVING THE TAIL/BRAKE LIGHT OUTER COVER

1. Remove:

- Tail/brake light outer cover “1”



- Remove the tail/brake light outer cover screws.
- Slide the tail/brake light outer cover rearward to remove the projection “a” on the cover from the hole “b” in the tail/brake light.

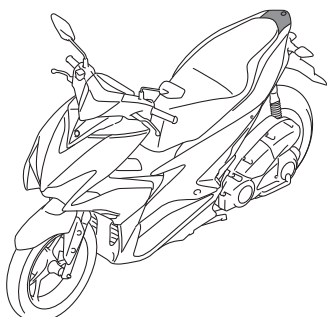


EAS31682

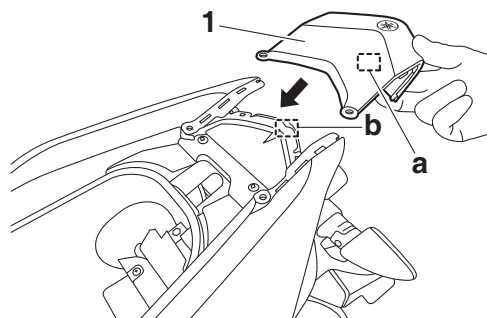
INSTALLING THE TAIL/BRAKE LIGHT OUTER COVER

1. Install:

- Tail/brake light outer cover “1”



- Slide the tail/brake light outer cover forward, fit the projection “a” on the cover into the hole “b” in the tail/brake light.



- Install the tail/brake light outer cover screws, and then tighten the screws to specification.



Tail/brake light outer cover screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)



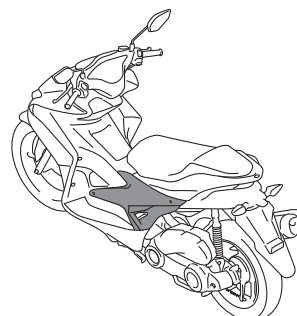
EAS31683

REMOVING THE FRONT SIDE COVER ASSEMBLY

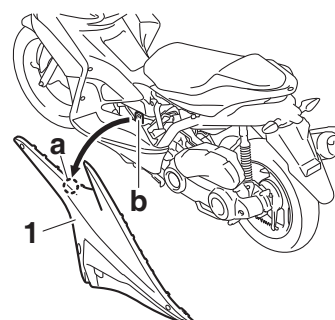
The following procedure applies to both of the front side cover assembly.

1. Remove:

- Front side cover assembly “1”



- Remove the front side cover assembly screws.
- Pull the front side cover assembly outward to remove the projections “a” from the grommets “b”.

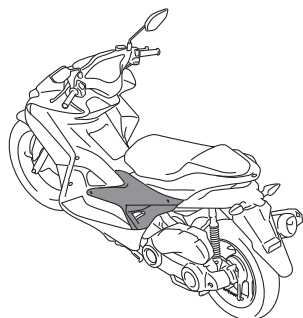


FAS31684

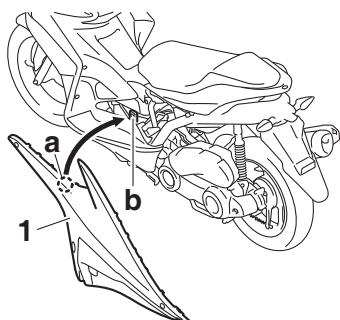
INSTALLING THE FRONT SIDE COVER ASSEMBLY

The following procedure applies to both of the front side cover assembly.

1. Install:
 - Front side cover assembly “1”



- a. Fit the projections “a” on the front side cover assembly into the grommets “b”.



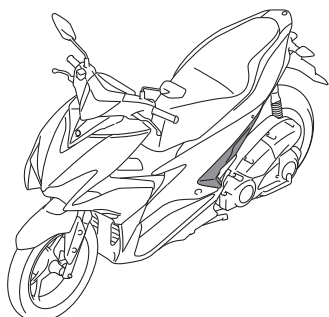
- b. Install the front side cover assembly screws, and then tighten the screw to specification.



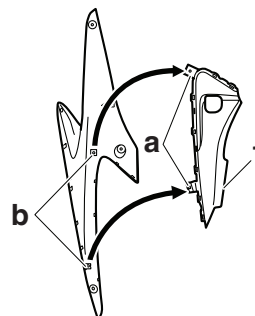
Front side cover screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

REMOVING THE MOLE SIDE COVER

1. Remove:
 - Mole side cover “1”

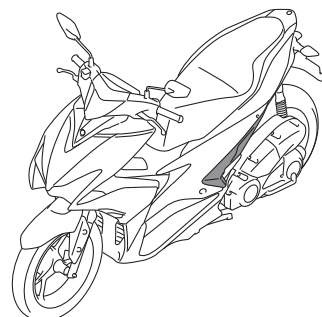


- Remove the mole side cover screws.
- Pull the mole side cover outward to remove the projections “a” from the grommets “b”.

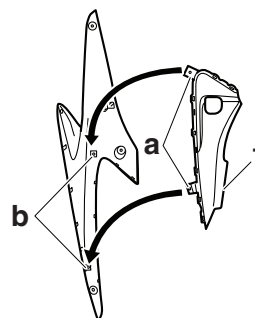


INSTALLING THE MOLE SIDE COVER

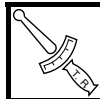
1. Install:
 - Mole side cover “1”



- a. Fit the projections “a” on the mole side cover into the grommets “b”.



- b. Install the mole side cover screws and then tighten the screws to specification.

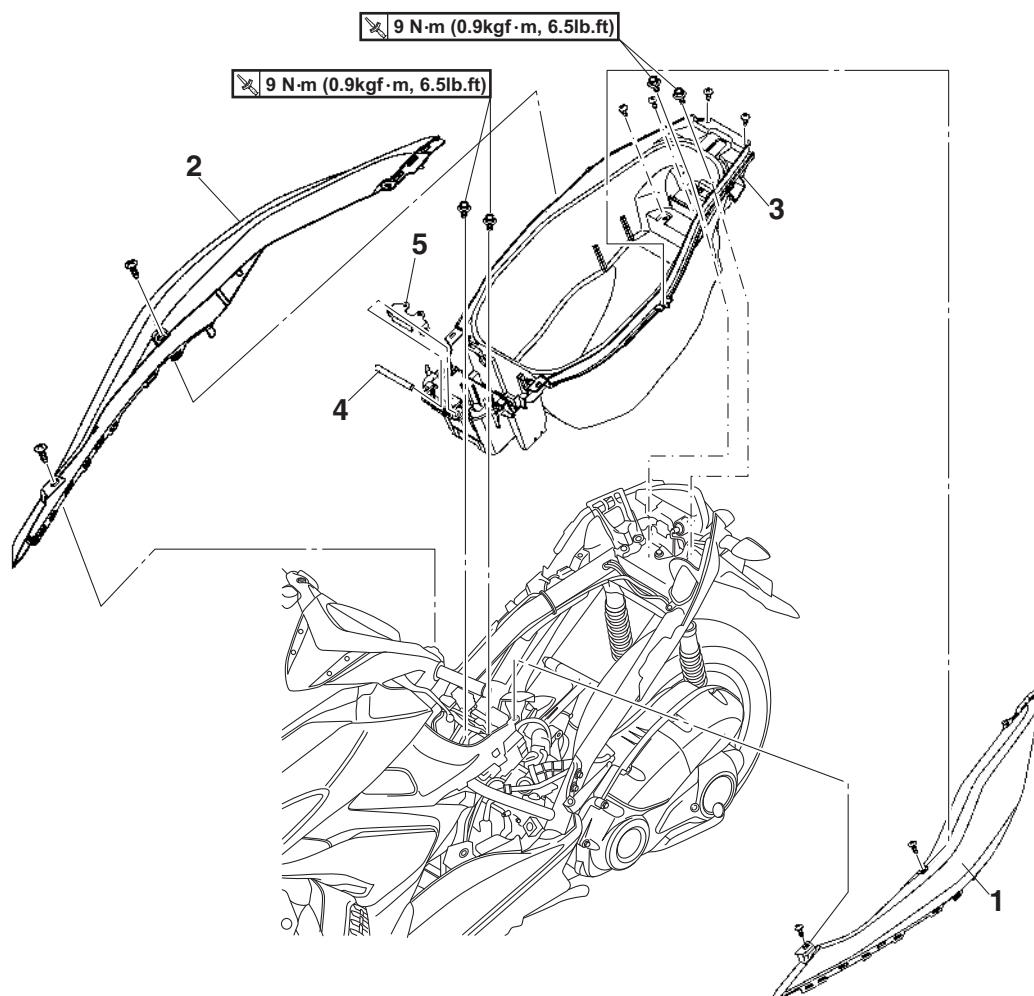


Front side cover screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

EAS20157

GENERAL CHASSIS (3)

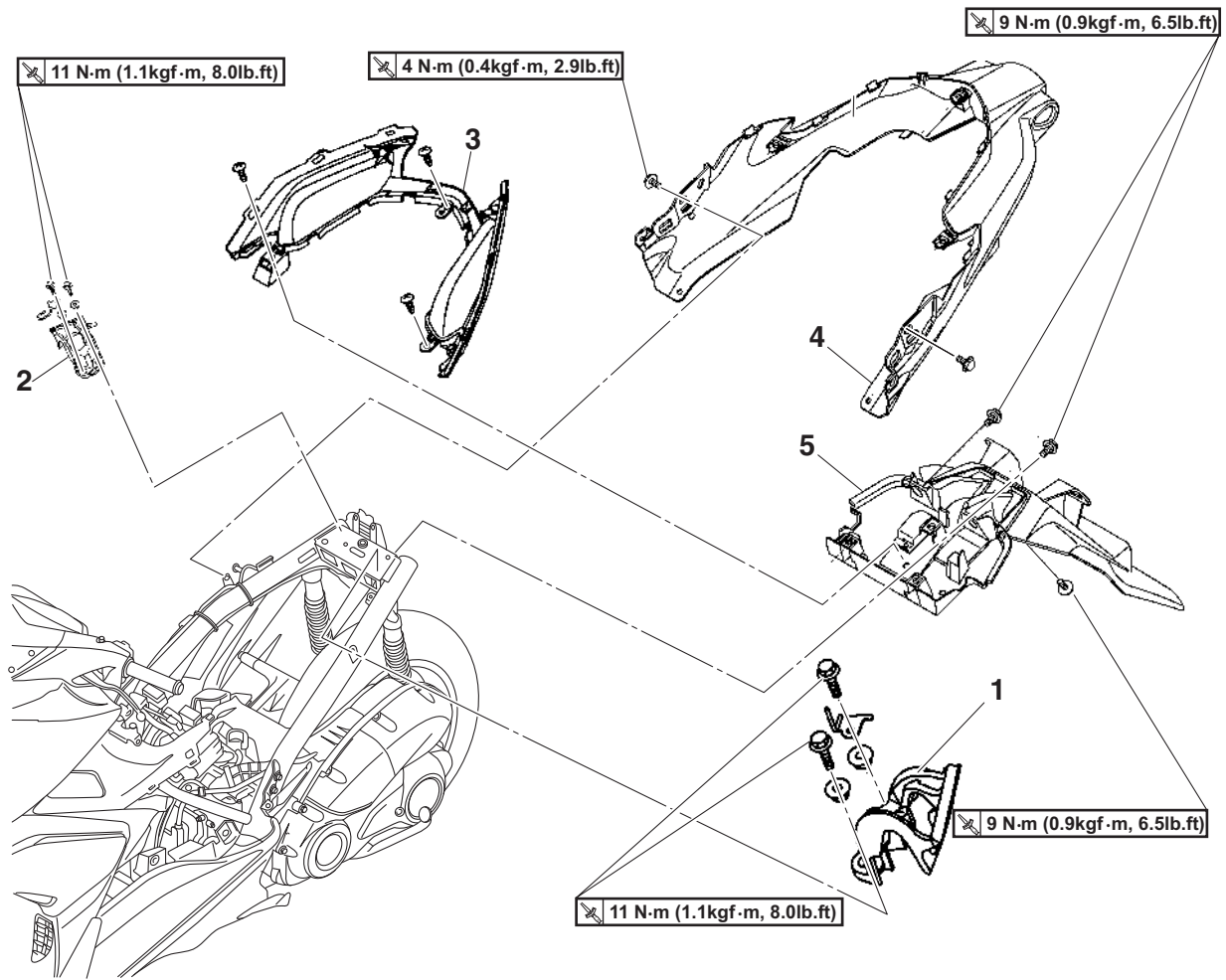
Removing the rear side covers and storage box



Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side cover		Refer to "GENERAL CHASSIS (2)" on page 4-3.
1	Rear side cover (left)	1	
2	Rear side cover (right)	1	
3	Storage box	1	
4	Pin (seat)	1	
5	Hinge (seat)	1	

GENERAL CHASSIS (3)

Removing the rear fender



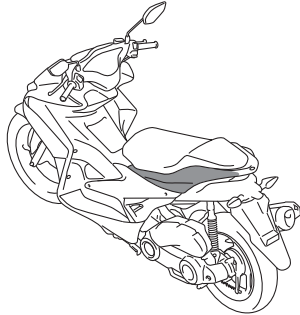
Order	Job/Parts to remove	Q'ty	Remarks
1	Grab bar (left)	1	
2	Grab bar (right)	1	
3	Tail cover	1	
4	Rear fender 1	1	
5	Rear fender 2	1	

EAS31687

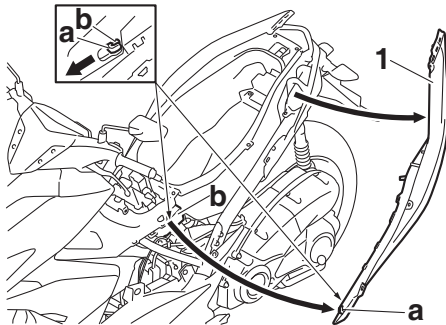
REMOVING THE REAR SIDE COVER ASSEMBLY

The following procedure applies to both of the rear side cover assembly.

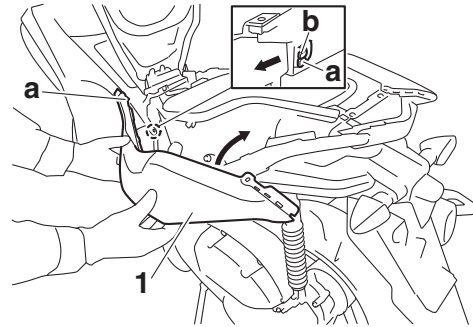
1. Remove:
 - Rear side cover assembly “1”



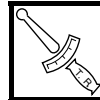
- a. Remove the screws.
- b. Remove the projections “a” on the rear side cover assembly from the holes “b” in the storage box.



- a. Fit the projections “a” on the rear side cover assembly into the holes “b” in the storage box.



- b. Install the screws, and then tighten the screws to specification.

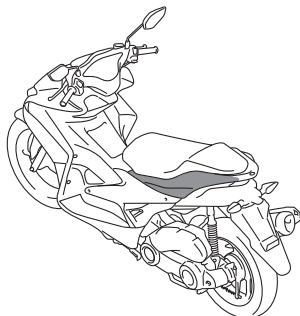


Rear side cover assembly screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

INSTALLING THE REAR SIDE COVER ASSEMBLY

The following procedure applies to both of the rear side cover assembly.

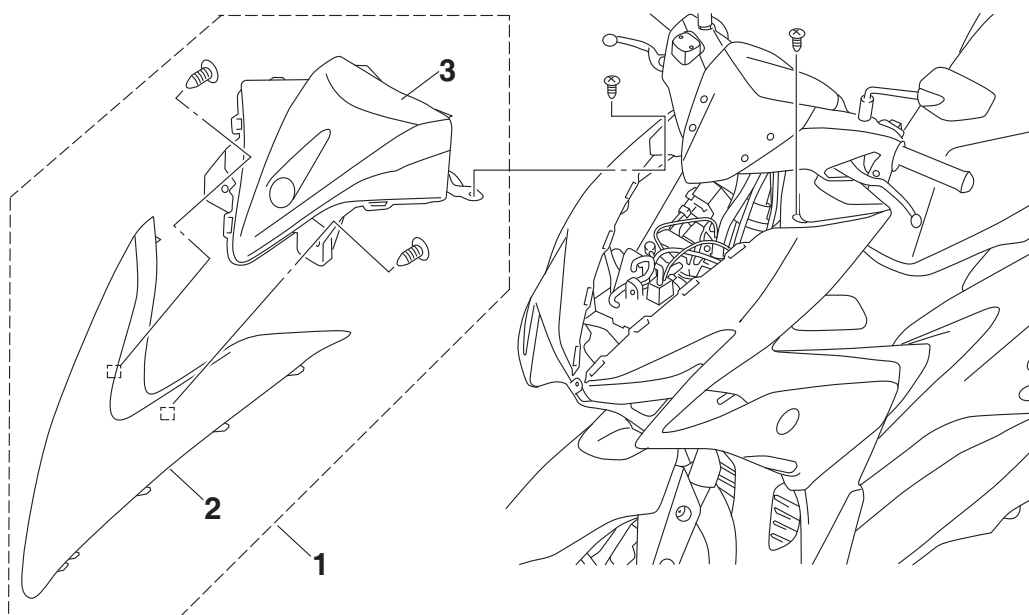
1. Install:
 - Rear side cover assembly “1”



EAS20159

GENERAL CHASSIS (4)

Removing the front upper cowling assembly



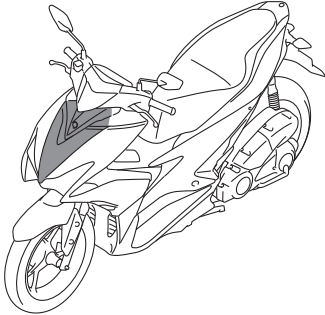
Order	Job/Parts to remove	Q'ty	Remarks
1	Front upper cowling assembly	1	
2	Front upper cowling 1	1	
3	Front upper cowling 2	1	

GENERAL CHASSIS (4)

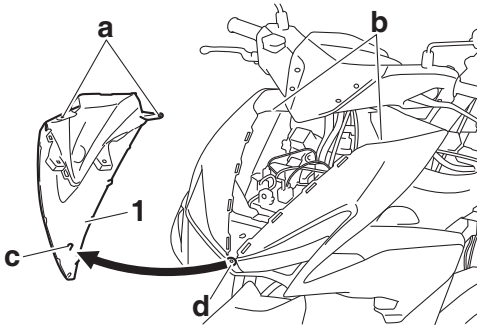
EAS31692

REMOVING THE FRONT UPPER COWLING ASSEMBLY

1. Remove:
 - Front upper cowling assembly “1”

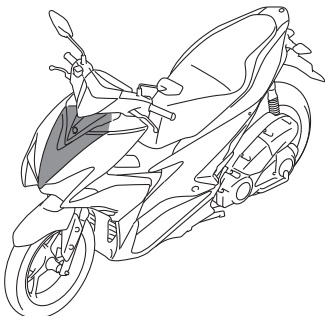


- Remove the front upper cowling assembly screw.
- Remove the projections “a” on the front upper cowling assembly from the holes “b” in the leg shield and remove the projections “c” from the holes “d” in the headlight unit.

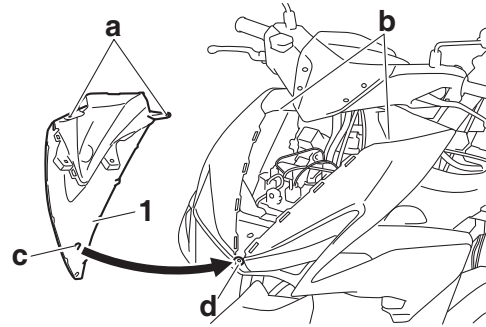


- ## EAS31693
- # INSTALLING THE FRONT UPPER COWLING ASSEMBLY

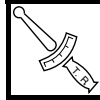
1. Install:
 - Front upper cowling assembly “1”



- a. Fit the projections “a” on the front upper cowling assembly into the holes “b” in the headlight unit and fit the projections “c” into the holes “d” in the leg shield.



- b. Install the front upper cowling assembly screw, and then tighten the screw to specification.



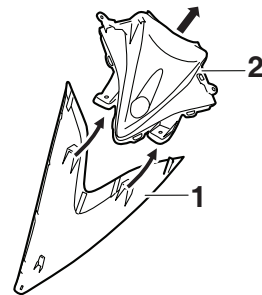
Front upper cowl assembly screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

- ## EAS31694
- # DISASSEMBLING THE FRONT UPPER COWLING ASSEMBLY

1. Disassemble:
 - Front upper cowling “1”
 - Front upper panel “2”

TIP

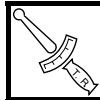
Remove the projections “a” on the front upper cowling from the holes “b” in the front upper panel, slide the panel in the direction shown in the illustration, and remove the projections “c” on the panel from the holes “d” in the cowling.



EAS31695

ASSEMBLING THE FRONT UPPER COWLING ASSEMBLY

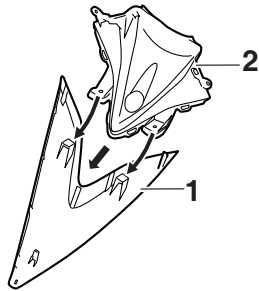
1. Assemble:
 - Front upper panel “1”
 - Front upper cowling “2”



Front upper panel screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

TIP

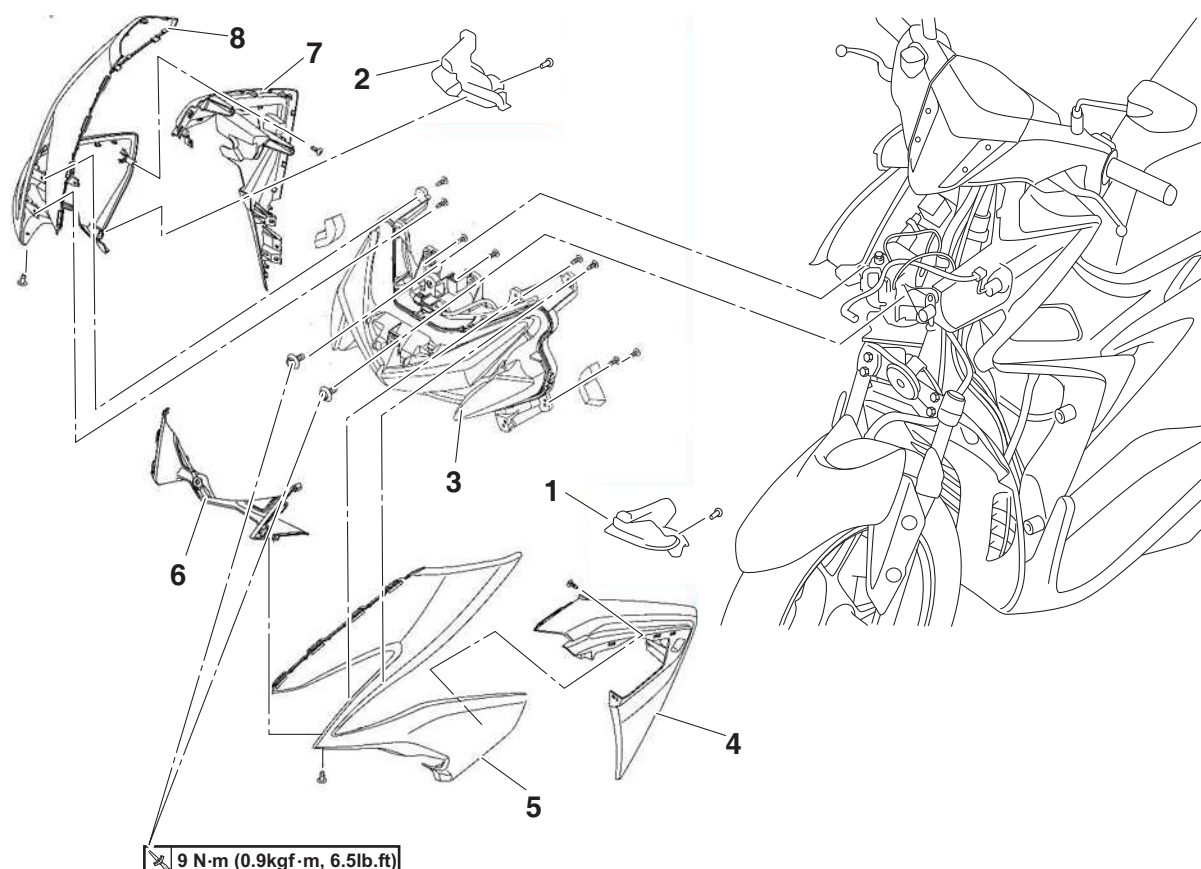
Slide the front upper panel in the direction shown in the illustration, fit the projections “a” on the panel into the holes “b” in the front upper cowling, and fit the projections “c” on the cowling into the holes “d” in the panel.



EAS20193

GENERAL CHASSIS (5)

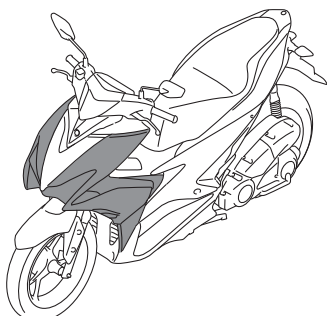
Removing the front cowling assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Front upper cowling assembly		Refer to "GENERAL CHASSIS (4)" on page 4-9.
1	Front turn signal light (left)	1	Disconnect
2	Front turn signal light (right)	1	Disconnect
3	Headlight unit assembly	1	Disconnect
4	Front side cowling (left)	1	
5	Front body cowling (left)	1	
6	Front lower cowling	1	
7	Front side cowling (right)	1	
8	Front body cowling (right)	1	

1. Remove:

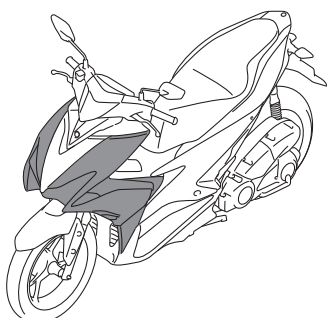
1. Remove:
 - Front cowling assembly “1”
 - Disconnect turn signal light coupler
 - Disconnect head light coupler
 - Disconnect auxiliary coupler



-

1. Install:

- Disconnect turn signal light coupler
- Disconnect head light coupler
- Disconnect auxiliary coupler
- Front cowling assembly "1"



-

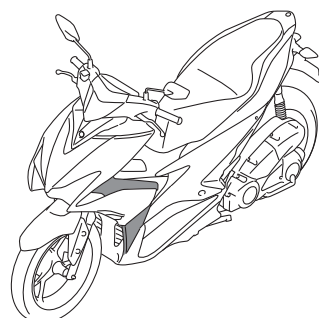
-

1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

EAS31696

The following procedure applies to both of the front side cowling.

1. Remove:
 - Front side cowling “1”



-

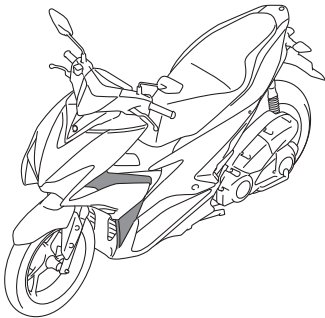
GENERAL CHASSIS (5)

EAS31697

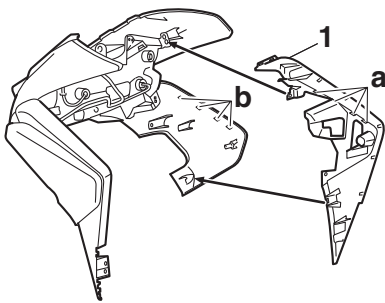
INSTALLING THE FRONT SIDE COWLING

The following procedure applies to both of the front side cowling.

1. Install:
 - Front side cowling “1”



- a. Fit the projections “a” on the front side cowl-
ing into the holes “b” in the front lower cowl-
ing.



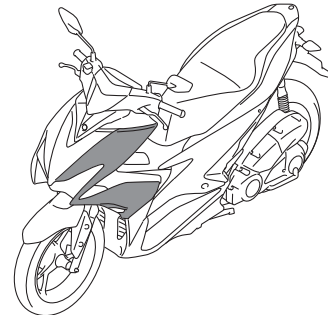
- b. Install the front side cowl screws, and then tighten the screws to specification.



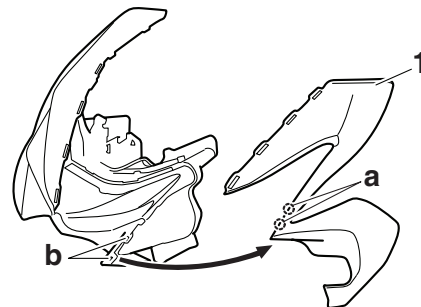
Front side cowling screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

REMOVING THE FRONT BODY COWLING

1. Remove:
 - Front body cowling “1”

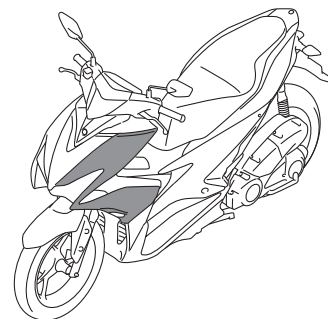


- a. Remove the front body cowling screws.
- b. Pull the front body cowling forward to remove the projections “a” on the front cowling assembly from the holes “b” in the front body cowling.

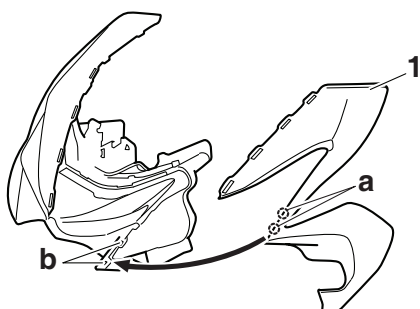


INSTALLING THE FRONT BODY COWLING

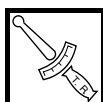
1. Install:
- Front body cowling “1”



- a. Fit the projections “a” on the front body cowl-
ing into the holes “b” in the front cowling as-
sembly.



- b. Install the front body cowling screws and then tighten the screws to specification.



Front body cowling screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)



EAS31698

INSTALLING THE FRONT TURN SIGNAL LIGHT

The following procedure applies to both of the front turn signal light.

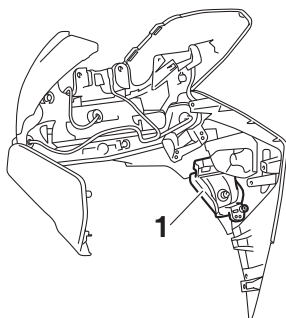
1. Install:
 - Turn signal light “1”



Turn signal light screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

TIP

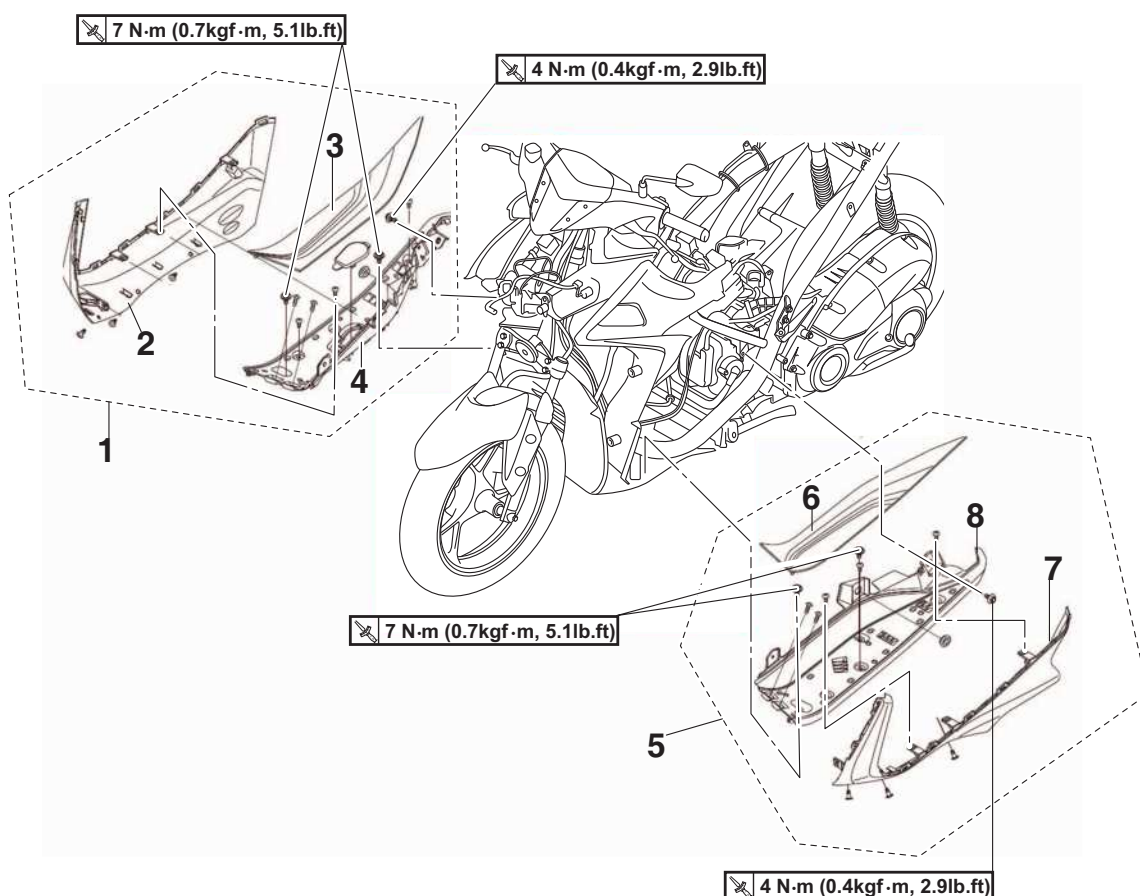
Tighten the turn signal light screw in the proper tightening sequence as shown.



EAS20158

GENERAL CHASSIS (6)

Removing the footrest board assembly



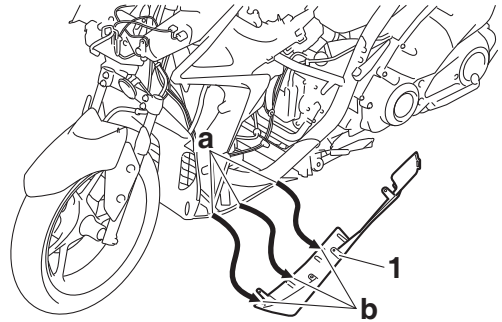
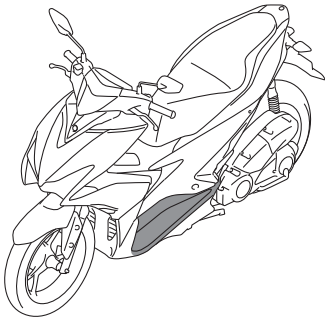
Order	Job/Parts to remove	Q'ty	Remarks
	Front upper cowling assembly		Refer to "GENERAL CHASSIS (4)" on page 4-9.
	Front cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-12.
1	Footrest board assembly (right)	1	
2	Front lower cover (right)	1	
3	Footrest board mat (right)	1	
4	Footrest board (right)	1	
5	Footrest board assembly (left)	1	
6	Footrest board mat (left)	1	
7	Front lower cover (left)	1	
8	Footrest board (left)	1	

EAS31690

INSTALLING THE FOOTREST BOARD

1. Install:

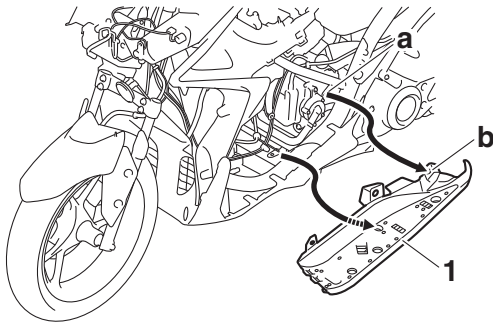
- Footrest board “1”



Footrest board assembly bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

Make sure that the projection “a” on the frame fits into the hole “b” in the footrest board assembly.

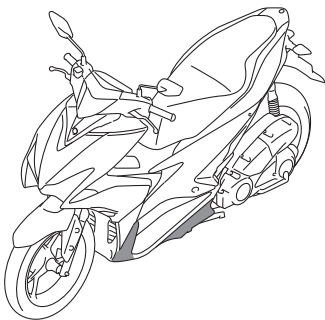


EAS31691

INSTALLING THE LOWER MOLE COVER

1. Install:

- Lower mole cover “1”



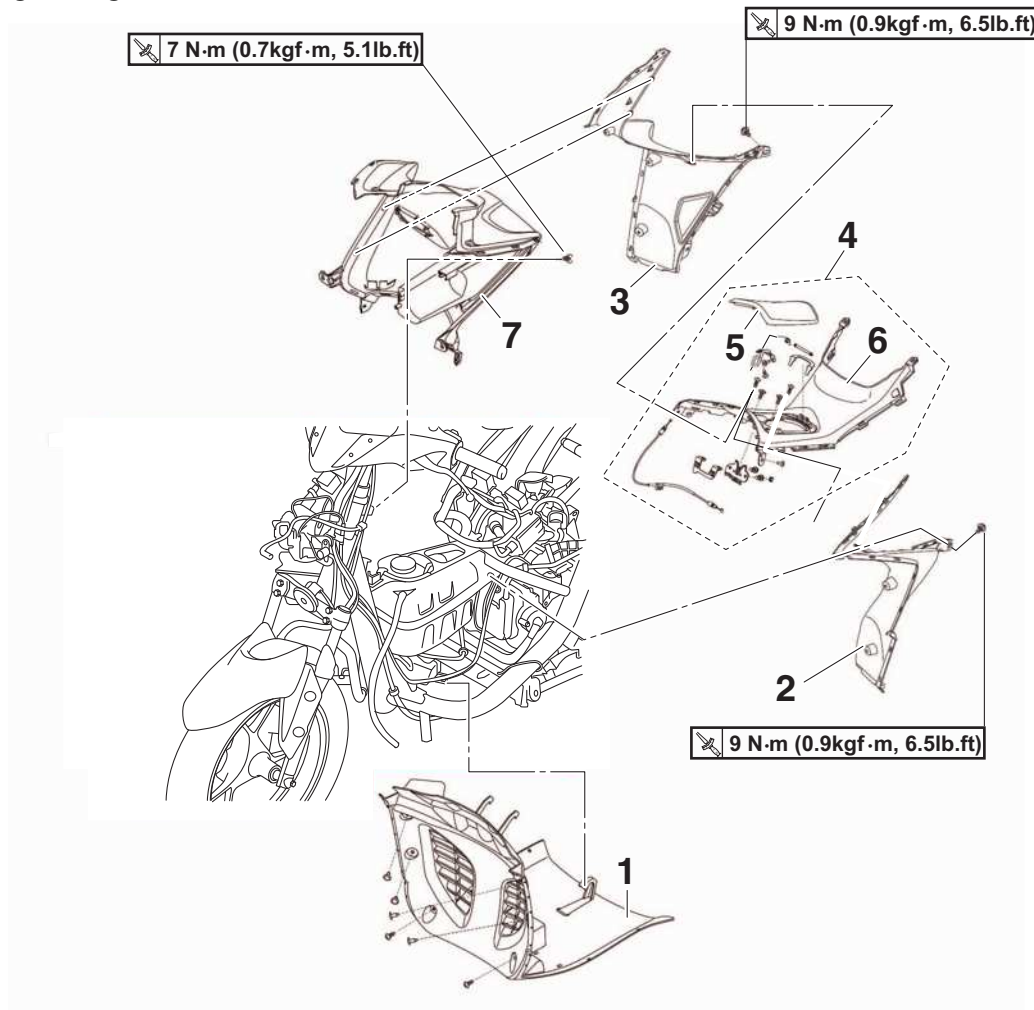
TIP

Make sure that the projections “a” on the center lower cover fit into the holes “b” in the bottom cover.

EAS20194

GENERAL CHASSIS (7)

Removing the leg shield



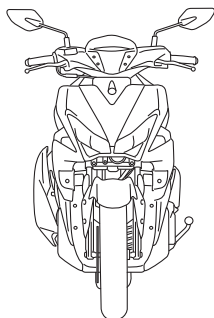
Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Seat assembly		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Front cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-12.
1	Center lower cover	1	
2	Side cover (left)	1	
3	Side cover (right)	1	
4	Center cover assembly	1	
5	Fuel tank cover	1	
6	Center cover	1	
7	Leg shield	1	

EAS31689

INSTALLING THE CENTER LOWER COVER

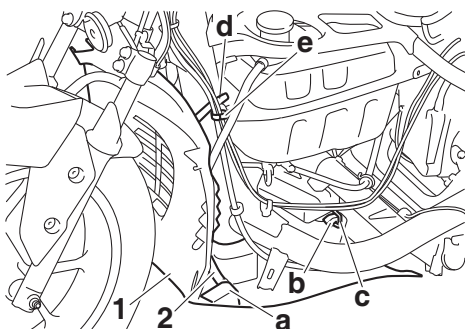
1. Install:

- Center lower cover “1”



TIP

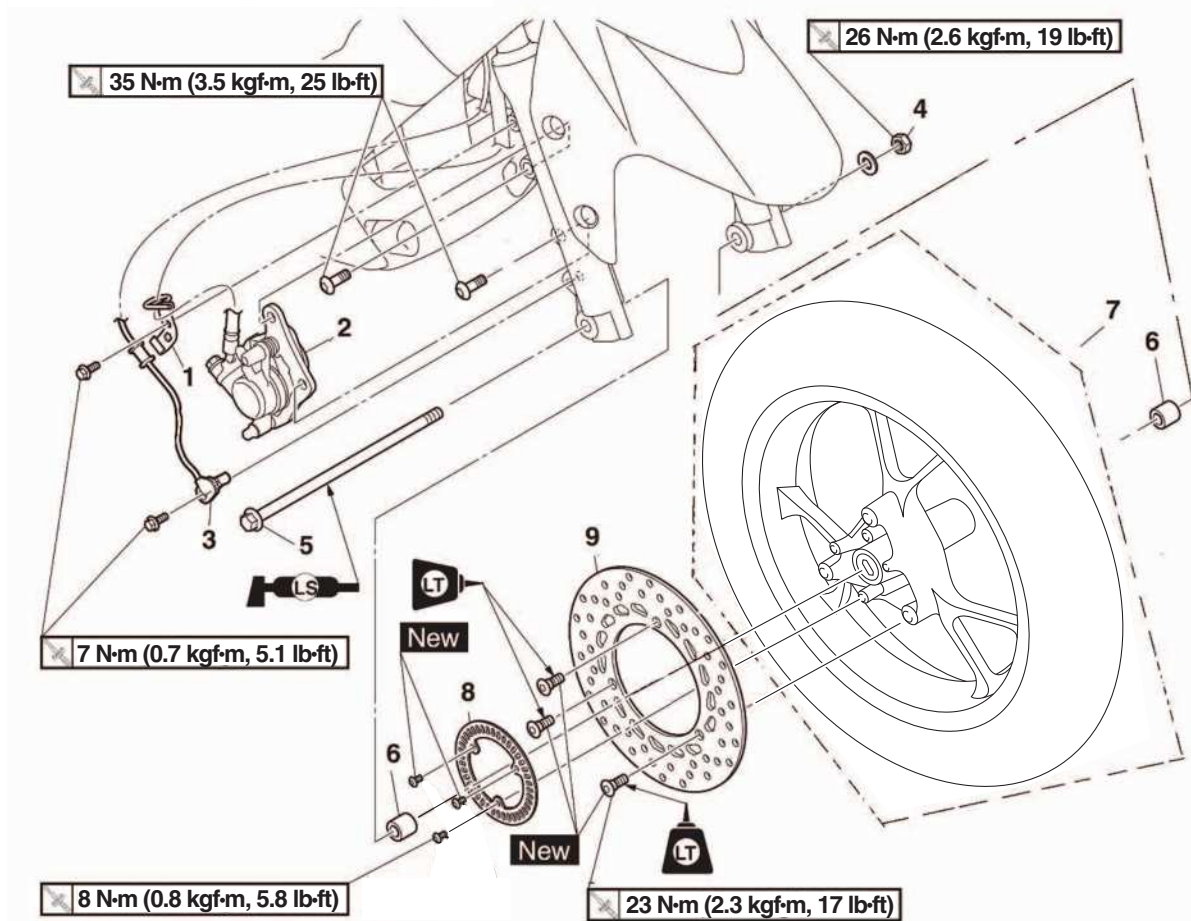
- Fit the end of the fuel tank overflow hose “2” into the hole “a” in the center lower cover.
 - Fit the hole “b” in the center lower cover over the hook “c” on the frame.
-



EAS20028

FRONT WHEEL

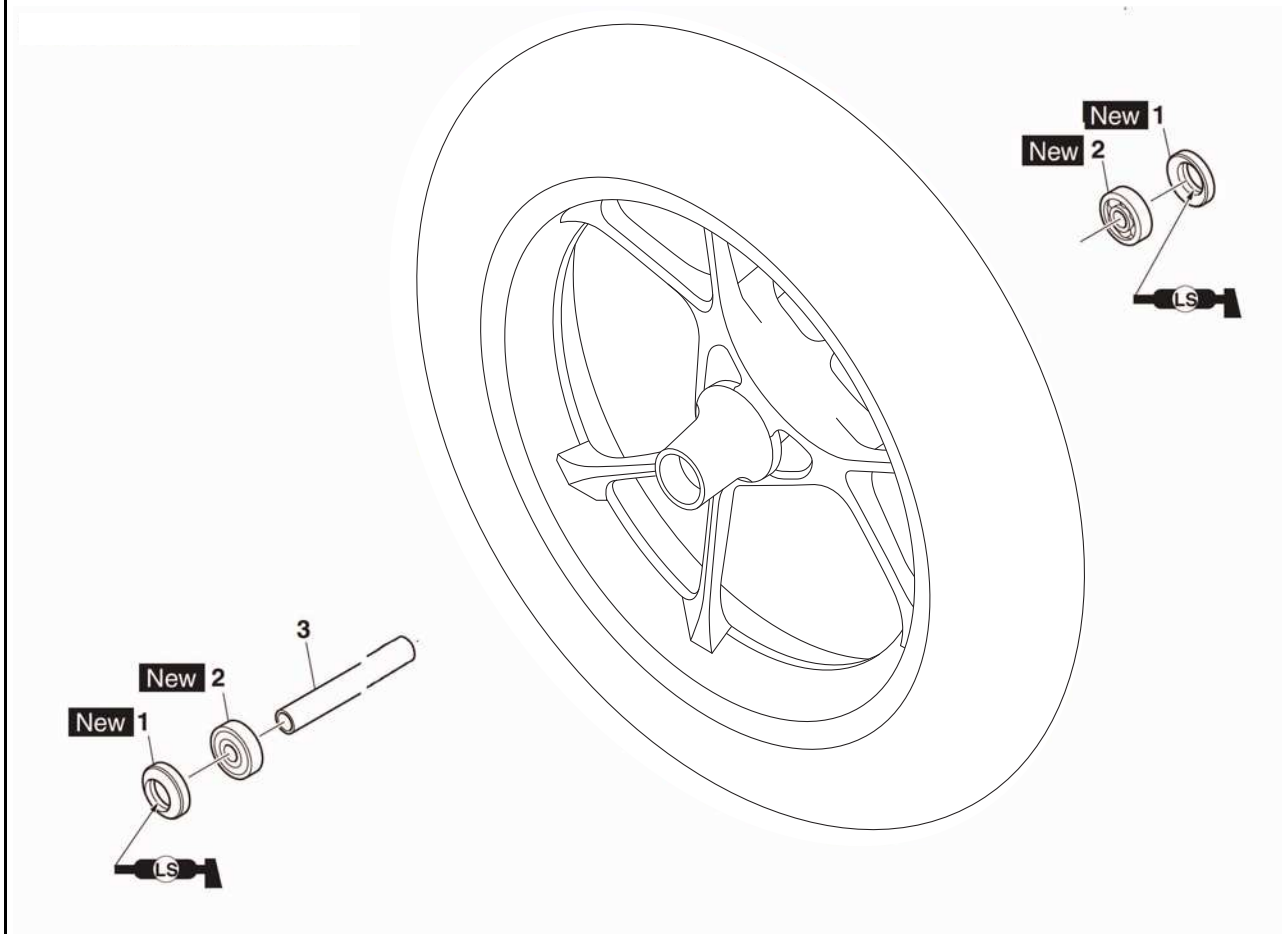
Removing the front wheel and brake disc



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake hose guide	1	
2	Front brake caliper	1	
3	Front wheel sensor	1	
4	Front wheel axle nut	1	
5	Front wheel axle	1	
6	Collar	2	
7	Front wheel	1	
8	Front wheel sensor rotor	1	
9	Front brake disc	1	

FRONT WHEEL

Disassembling the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Wheel bearing	2	
3	Spacer	1	

EAS30145

REMOVING THE FRONT WHEEL

ECA20981

NOTICE

- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor; otherwise, the sensor or rotor may be damaged, resulting in improper performance of the ABS system.
- Do not drop the front wheel sensor rotor or subject it to shocks.
- If any solvent gets on the front wheel sensor rotor, wipe it off immediately.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
 - Front brake caliper

ECA21830

NOTICE

Do not apply the brake lever when removing the brake caliper.

3. Elevate:
 - Front wheel

TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

EAS30146

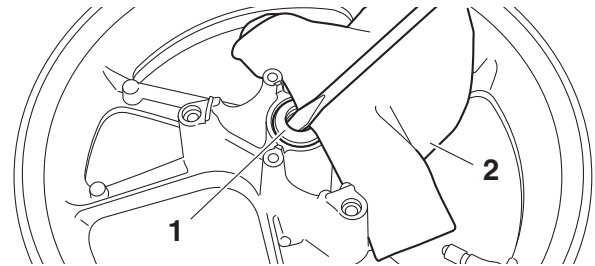
DISASSEMBLING THE FRONT WHEEL

1. Remove:
 - Oil seals
 - Wheel bearings

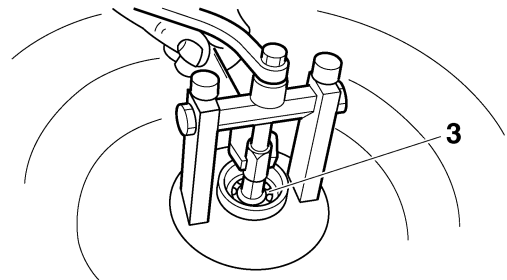
- a. Clean the surface of the front wheel hub.
- b. Remove the oil seals "1" with a flat-head screwdriver.

TIP

To prevent damaging the wheel, place a rag "2" between the screwdriver and the wheel surface.



- c. Remove the wheel bearings "3" with a general bearing puller.



EAS30147

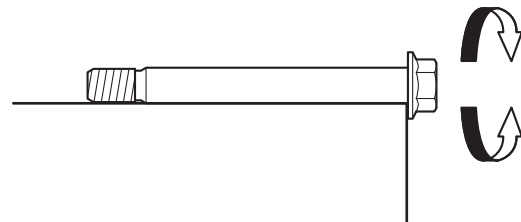
CHECKING THE FRONT WHEEL

1. Check:
 - Wheel axle
 - Roll the wheel axle on a flat surface.
 - Bends → Replace.

EWA13460

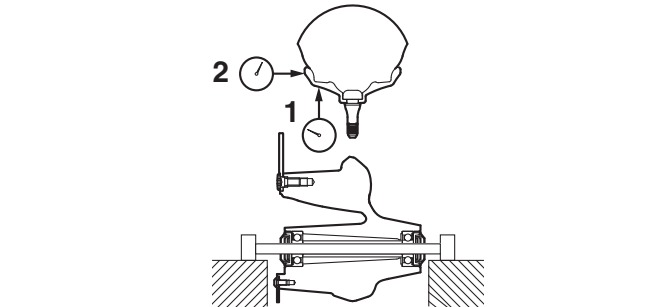
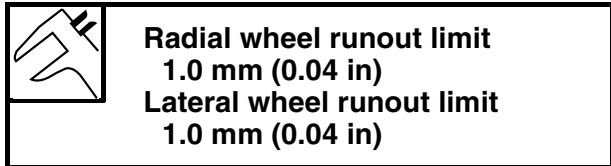
WARNING

Do not attempt to straighten a bent wheel axle.

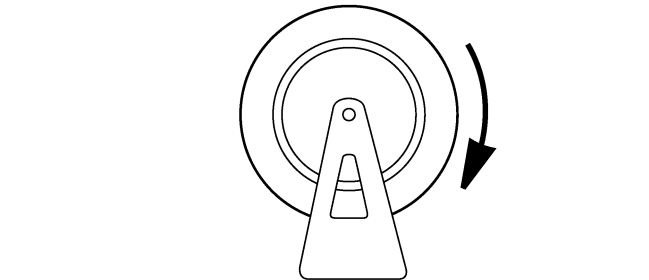


2. Check:
 - Tire
 - Front wheel
 - Damage/wear → Replace.
 - Refer to "CHECKING THE TIRES" on page 3-12 and "CHECKING THE WHEELS" on page 3-12.
3. Measure:
 - Radial wheel runout "1"

- Lateral wheel runout “2”
Over the specified limits → Replace.



4. Check:
- Wheel bearings
Front wheel turns roughly or is loose → Replace the wheel bearings.
 - Oil seals
Damage/wear → Replace.



EAS30155 MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

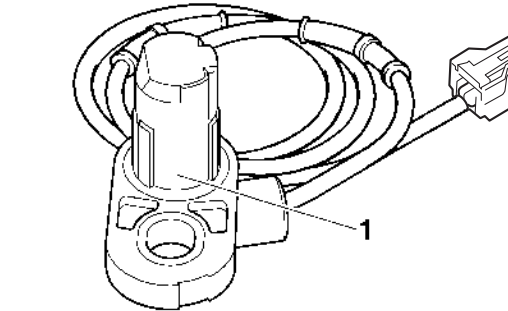
ECA21070

NOTICE

NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**
- **Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel sensor or front wheel sensor rotor.**
- **Do not drop or shock the wheel sensor or the wheel sensor rotor.**

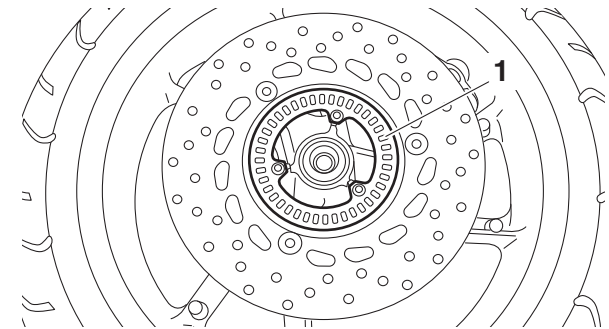
1. Check:
 - Front wheel sensor “1”
Cracks/bends/distortion → Replace.
Iron powder/dust → Clean.



2. Check:
- Front wheel sensor rotor “1”
Cracks/damage/scratches → Replace the front wheel sensor rotor.
Iron powder/dust/solvent → Clean.

TIP

When cleaning the wheel sensor rotor, be careful not to damage the surface of the sensor rotor.



ASSEMBLING THE FRONT WHEEL

ASSEMBLING THE FRONT WHEEL

1. Lubricate:
 - Oil seal lips



- Wheel bearings **New**
- Oil seals **New**

a. Install the new wheel bearing (right side).

ECA18110

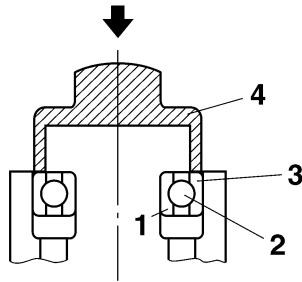
NOTICE

Do not contact the wheel bearing inner race “1” or balls “2”. Contact should be made only with the outer race “3”.

FRONT WHEEL

TIP

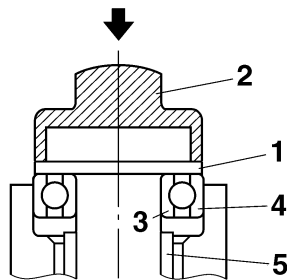
Use a socket "4" that matches the diameter of the wheel bearing outer race.



- b. Install the spacer.
- c. Install the new wheel bearing (left side).

TIP

Place a suitable washer "1" between the socket "2" and the bearing so that both the inner race "3" and outer race "4" are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer "5".



EAS30152

ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake disc installed.

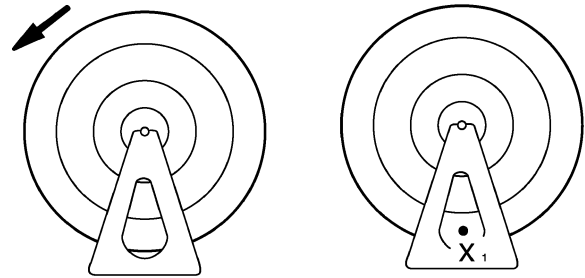
1. Remove:
 - Balancing weight(s)
2. Find:
 - Front wheel's heavy spot

TIP

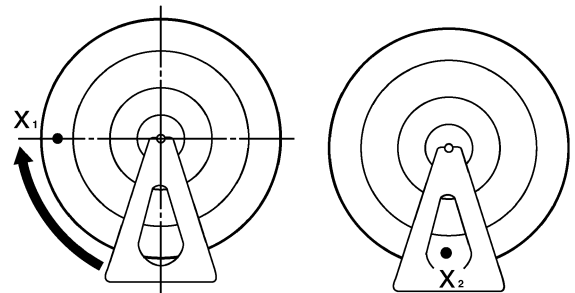
Place the front wheel on a suitable balancing stand.

- a. Spin the front wheel.

- b. When the front wheel stops, put an "X₁" mark at the bottom of the wheel.



- c. Turn the front wheel 90° so that the "X₁" mark is positioned as shown.
- d. Release the front wheel.
- e. When the wheel stops, put an "X₂" mark at the bottom of the wheel.



- f. Repeat steps (c) through (e) several times until all the marks come to rest at the same spot.
- g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

3. Adjust:

- Front wheel static balance

TIP

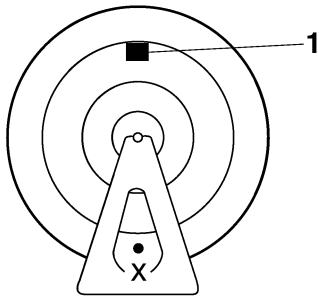
- Install the balancing weights on the rim of the brake disc side of the wheel.
- Install up to four balancing weights on the rim.

- a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

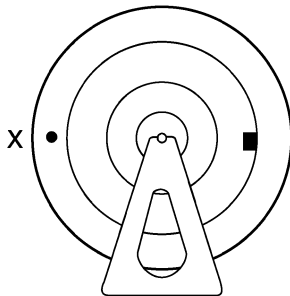
TIP

Start with the lightest weight.

FRONT WHEEL



- b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



- c. If the heavy spot does not stay in that position, install a heavier weight.
d. Repeat steps (b) and (c) until the front wheel is balanced.

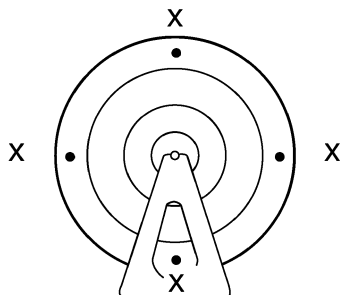


4. Check:

- Front wheel static balance



- a. Turn the front wheel and make sure it stays at each position shown.



- b. If the front wheel does not remain stationary at all of the positions, rebalance it.

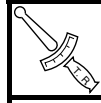


EAS30154

INSTALLING THE FRONT WHEEL (FRONT BRAKE DISC)

1. Install:

- Front brake disc "1"
- Front wheel sensor rotor "2"



Front wheel sensor rotor bolt
8 N·m (0.8 kgf·m, 5.8 lb·ft)
Front brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)

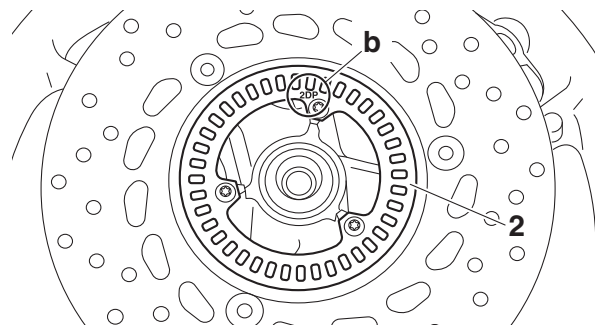
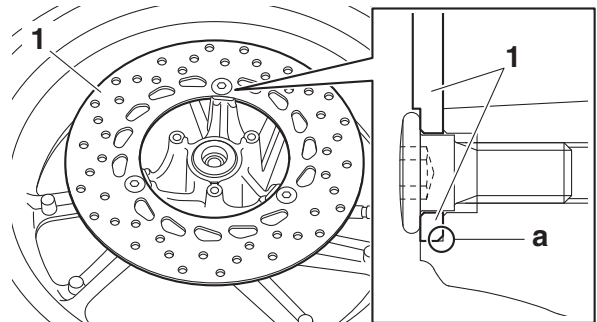
ECA21011

NOTICE

- Do not drop the wheel sensor rotor or subject it to shocks.
- If any solvent gets on the wheel sensor rotor, wipe it off immediately.
- Replace the brake disc bolts and wheel sensor rotor bolts with new ones.

TIP

- Install the brake disc with its chamfered side "a" facing inward.
- Install the front wheel sensor rotor with the stamped mark "b" facing away from the wheel.
- Tighten the bolts in stages.



2. Check:

- Front brake disc
Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-36.

3. Lubricate:

- Wheel axle



Recommended lubricant
Lithium-soap-based grease

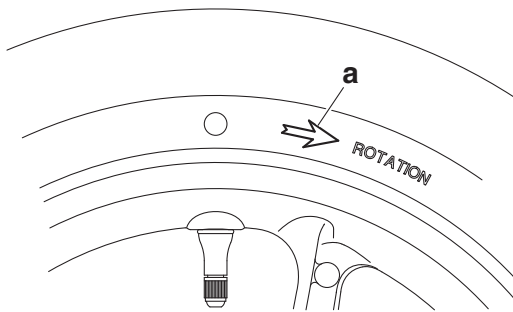
FRONT WHEEL

4. Install:

- Front wheel
- Collars
- Front wheel axle

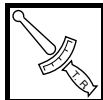
TIP

Install the front wheel with the mark “a” on the front tire pointing in the direction of wheel rotation.



5. Tighten:

- Front wheel axle nut



Front wheel axle nut
26 N·m (2.6 kgf·m, 19 lb·ft)

ECA14140

NOTICE

Before tightening the wheel axle nut, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.

6. Install:

- Front wheel sensor



Front wheel sensor bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

ECA21020

NOTICE

Make sure there are no foreign materials in the front wheel sensor rotor and front wheel sensor. Foreign materials cause damage to the front wheel sensor rotor and front wheel sensor.

TIP

- When installing the front wheel sensor, check the wheel sensor lead for twists.
- To route the front wheel sensor lead, refer to “CABLE ROUTING” on page 2-20.

7. Measure:

- Distance “a”
(between the front wheel sensor rotor “1” and front wheel sensor “2”)

Out of specification → Check the wheel bearing for looseness, and the front wheel sensor and sensor rotor installation conditions (warpage caused by overtorque, wrong installation direction, rotor decentering, LOCTITE® on the mounting surface of the rotor, deformation caused by an impact during service and caught foreign materials). If there is any defective part, repair or replace the defective part.



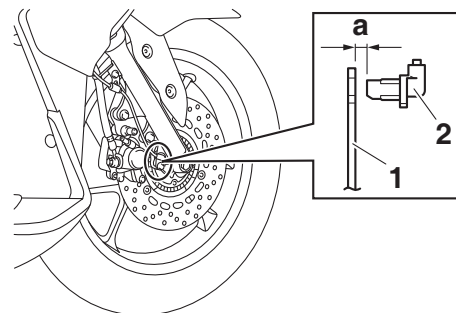
Distance “a” (between the front wheel sensor rotor and front wheel sensor)
0.81–1.57 mm (0.032–0.062 in)

TIP

Measure the distance between the front wheel sensor rotor and front wheel sensor in several places in one rotation of the front wheel. Do not turn the front wheel while the thickness gauge is installed. This may damage the front wheel sensor rotor and the front wheel sensor.



Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



8. Install:

- Front brake caliper
- Front brake hose guide “1”



Front brake caliper bolt
35 N·m (3.5 kgf·m, 25 lb·ft)
Front brake hose guide bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

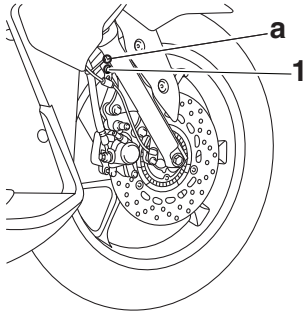
EWA13500

WARNING

Make sure the brake hose is routed properly.

TIP

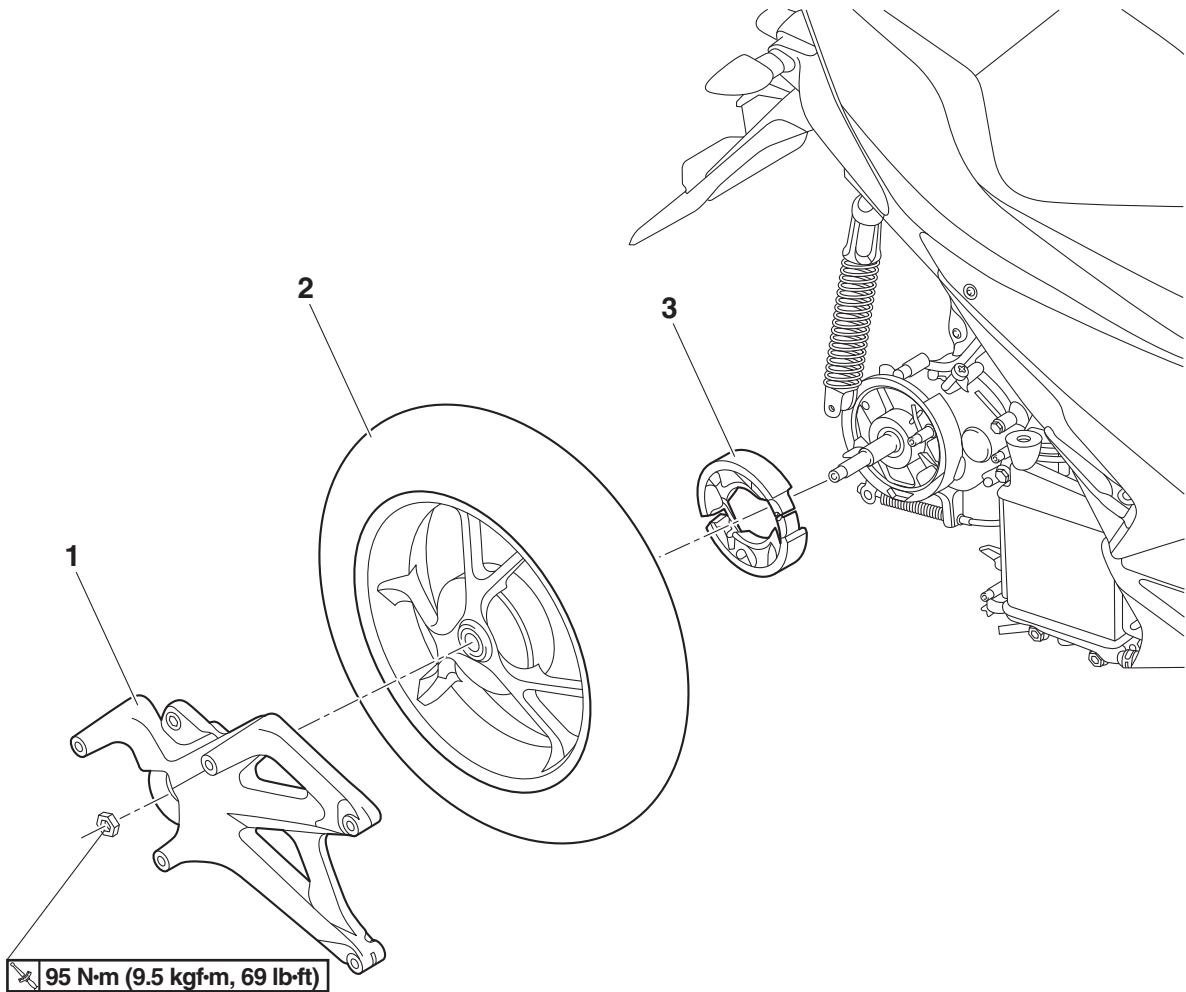
While holding the front brake hose guide and front wheel sensor lead holder so that the portions “a” of the guide and holder contact the front fork outer tube, tighten the bolts to specification.



EAS22020

REAR WHEEL

Removing the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
			Place the vehicle on the centerstand so that the rear wheel is elevated.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
1	Rear arm	1	
2	Rear wheel	1	
3	Rear brake shoe assembly	1	

EAS22090

CHECKING THE REAR WHEEL

1. Check:

- Tire
- Rear wheel
Damage/wear → Replace.
Refer to “CHECKING THE TIRES” on page 3-12 and “CHECKING THE WHEELS” on page 3-12.

2. Measure:

- Radial wheel runout
- Lateral wheel runout
Refer to “CHECKING THE FRONT WHEEL” on page 4-22.

EAS22150

ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

After replacing the tire, wheel or both, the rear wheel static balance should be adjusted.

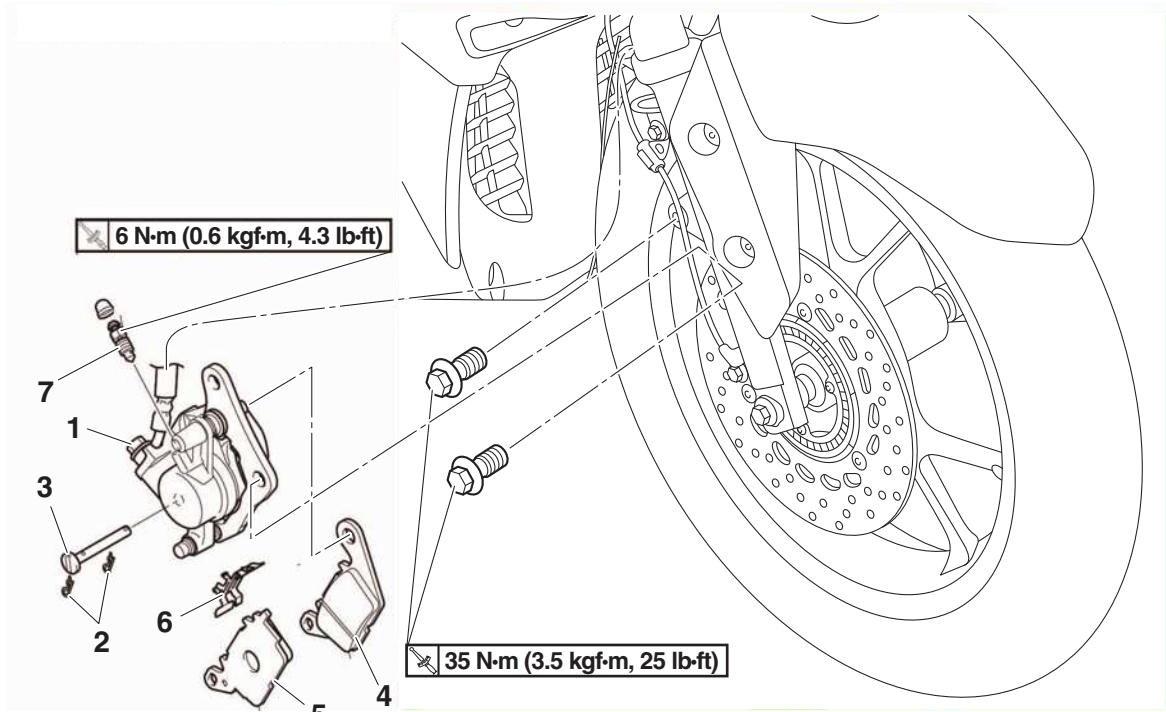
1. Adjust:

- Rear wheel static balance
Refer to “ADJUSTING THE FRONT WHEEL STATIC BALANCE” on page 4-24.

EAS20030

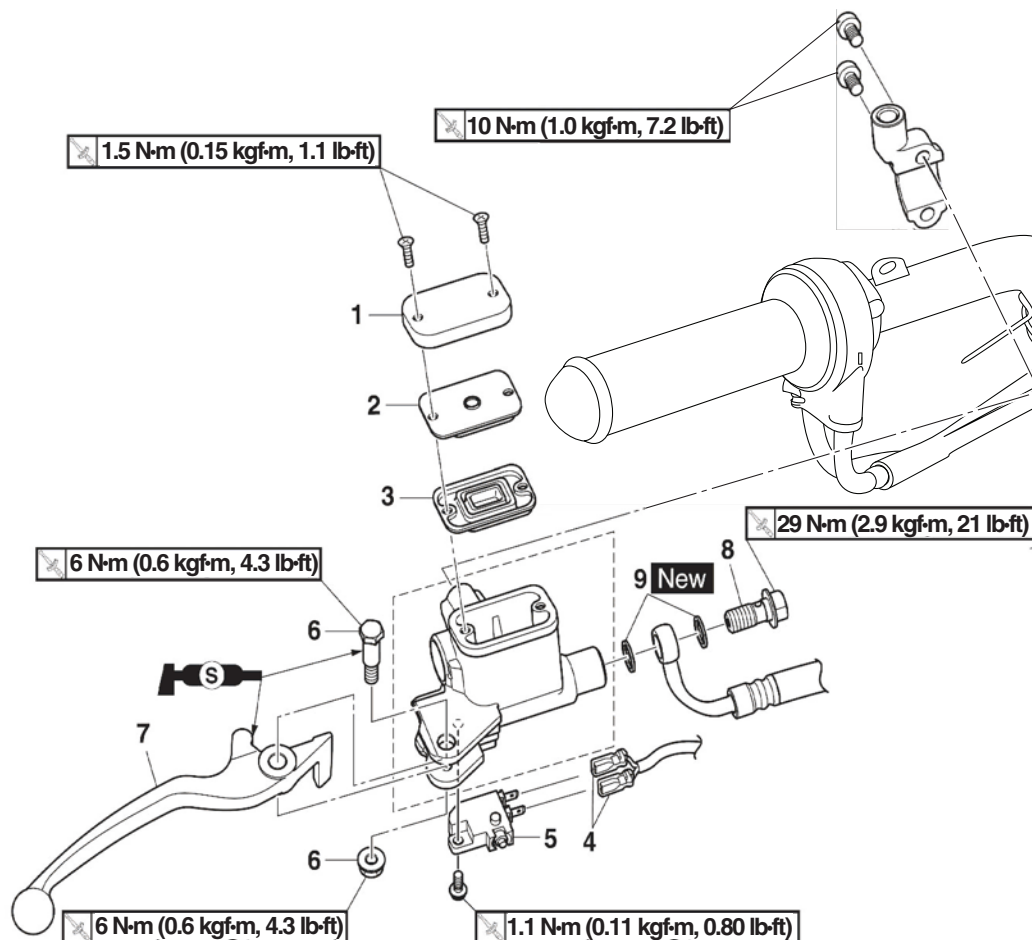
FRONT BRAKE

Removing the front brake pads



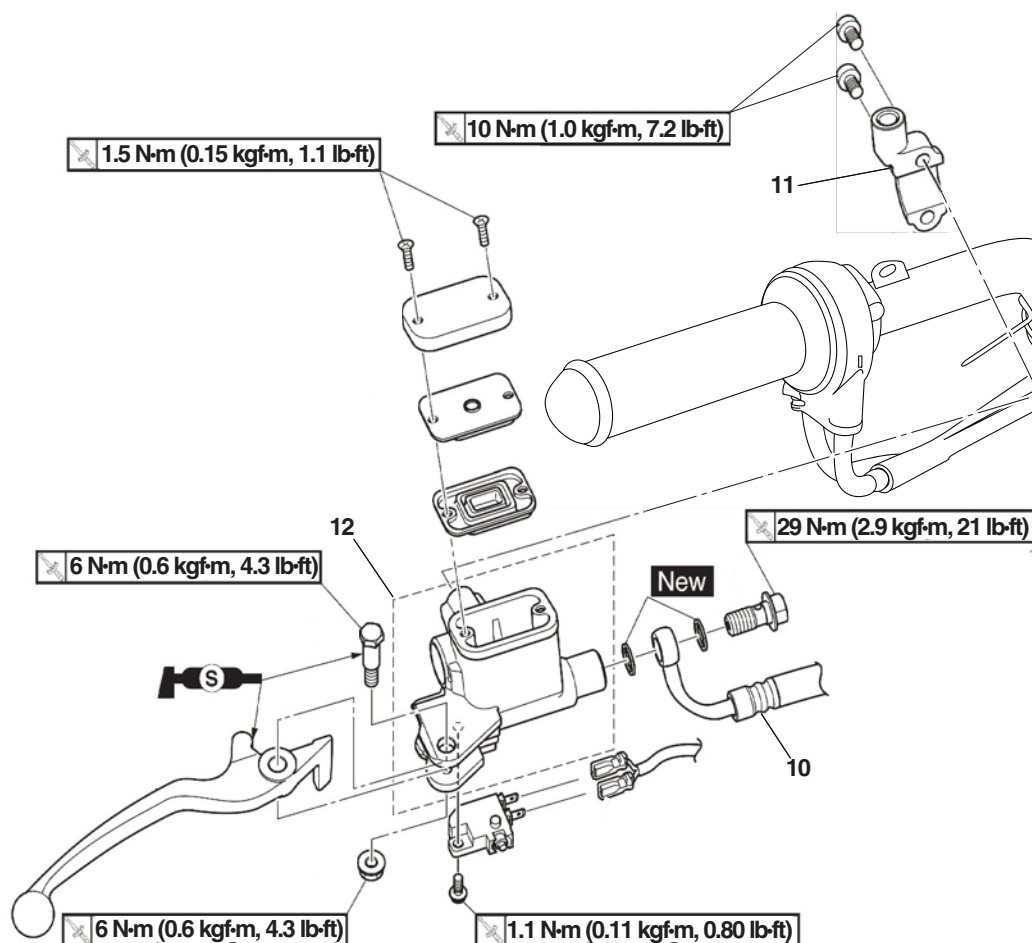
Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake caliper	1	
2	Brake pad clip	2	
3	Brake pad pin	1	
4	Brake pad (inner)	1	
5	Brake pad (outer)	1	
6	Brake pad spring	1	
7	Brake caliper bleed screw	1	

Removing the front brake master cylinder



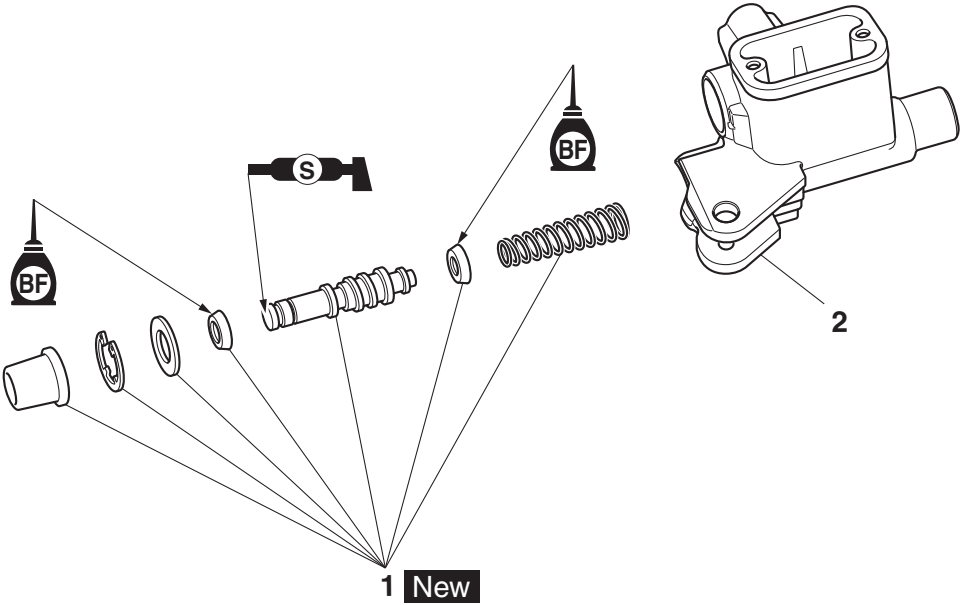
Order	Job/Parts to remove	Q'ty	Remarks
	Upper handlebar cover assembly		Refer to "HANDLEBAR" on page 4-55.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm holder	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Front brake light switch connector	2	Disconnect.
5	Front brake light switch	1	
6	Front brake lever pivot bolt/nut	1/1	
7	Front brake lever	1	
8	Front brake hose union bolt (master cylinder side)	1	
9	Brake hose gasket	2	

Removing the front brake master cylinder



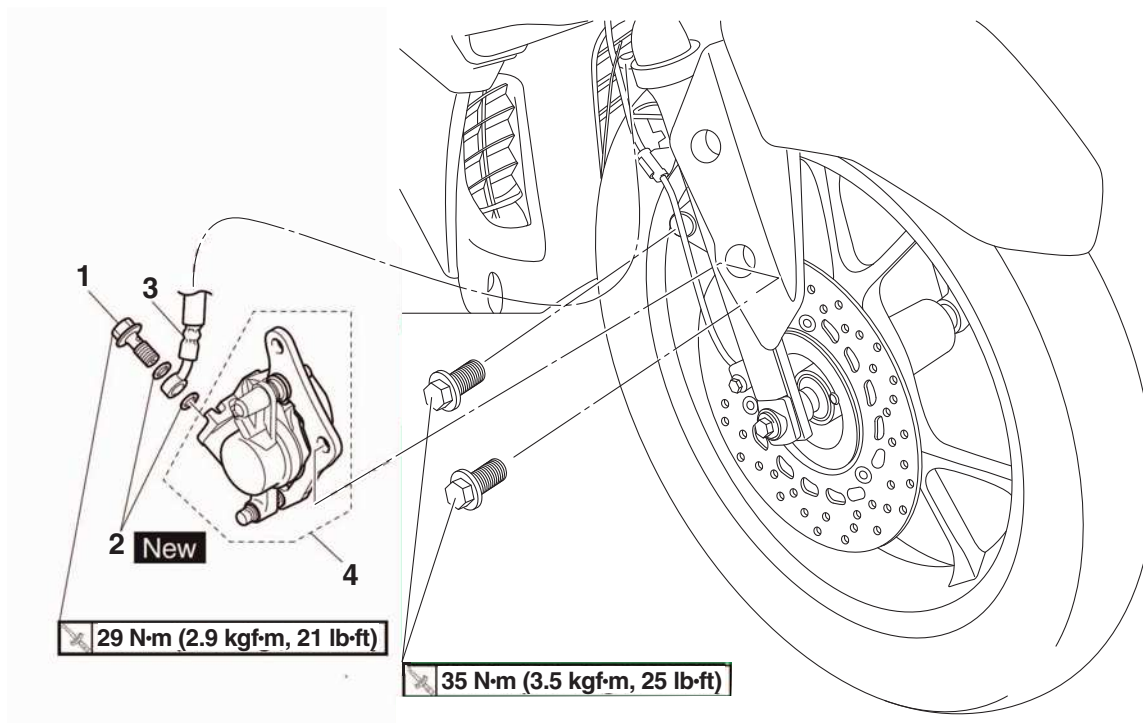
Order	Job/Parts to remove	Q'ty	Remarks
10	Front brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
11	Front brake master cylinder holder	1	
12	Front brake master cylinder assembly	1	

Disassembling the front brake master cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder kit	1	
2	Brake master cylinder body	1	

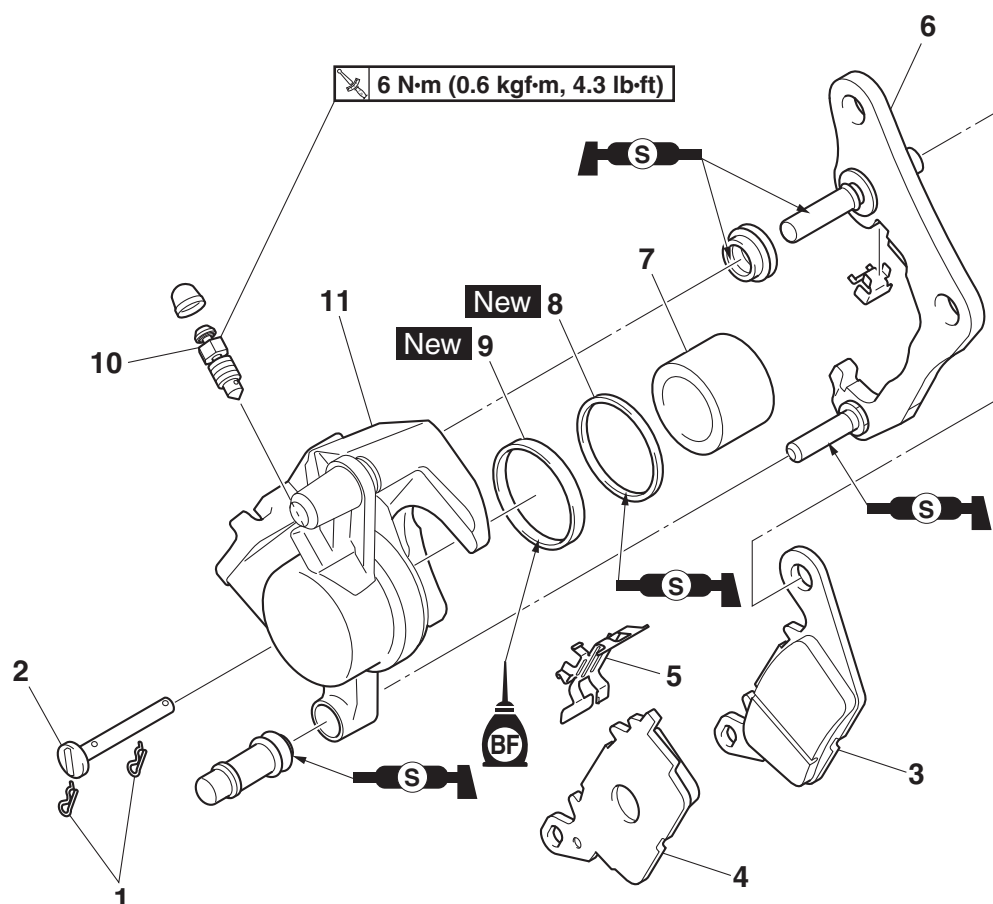
Removing the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.
1	Front brake hose union bolt (brake caliper side)	1	
2	Brake hose gasket	2	
3	Front brake hose (hydraulic unit to front brake caliper)	1	Disconnect.
4	Front brake caliper	1	

FRONT BRAKE

Disassembling the front brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pad clip	2	
2	Brake pad pin	1	
3	Brake pad (inner)	1	
4	Brake pad (outer)	1	
5	Brake pad spring	1	
6	Front brake caliper bracket	1	
7	Brake caliper piston	1	
8	Brake caliper piston dust seal	1	
9	Brake caliper piston seal	1	
10	Brake caliper bleed screw	1	
11	Brake caliper body	1	

EAS30168

INTRODUCTION

EWA14101

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- Never disassemble brake components unless absolutely necessary.
- If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.
- Never use solvents on internal brake components.
- Use only clean or new brake fluid for cleaning brake components.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.
- Avoid brake fluid coming into contact with the eyes as it can cause serious injury.

FIRST AID FOR BRAKE FLUID ENTERING THE EYES:

- Flush with water for 15 minutes and get immediate medical attention.

EAS30169

CHECKING THE FRONT BRAKE DISC

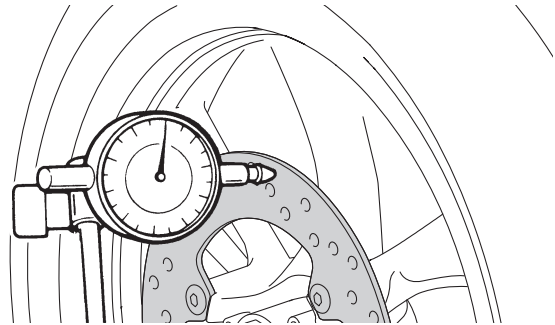
1. Remove:
 - Front wheel
Refer to "FRONT WHEEL" on page 4-20.
2. Check:
 - Brake disc
Damage/galling → Replace.
3. Measure:
 - Brake disc runout
Out of specification → Correct the brake disc runout or replace the brake disc.



Brake disc runout limit (as measured on wheel)
0.15 mm (0.0059 in)

- a. Place the vehicle on a suitable stand so that the front wheel is elevated.
- b. Before measuring the front brake disc runout, turn the handlebar to the left or right to ensure that the front wheel is stationary.
- c. Remove the brake caliper.
- d. Hold the dial gauge at a right angle against the brake disc surface.

- e. Measure the runout 1.5 mm (0.06 in) below the edge of the brake disc.



4. Measure:

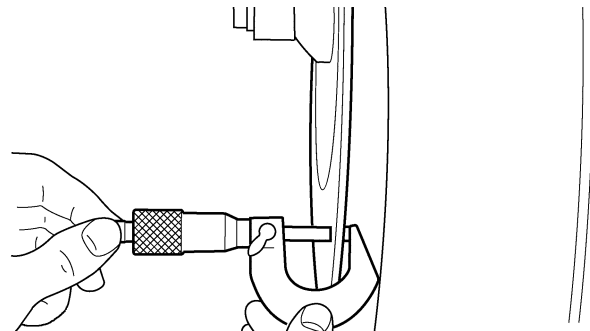
- Brake disc thickness

Measure the brake disc thickness at a few different locations.

Out of specification → Replace.



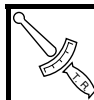
Brake disc thickness limit
3.5 mm (0.14 in)



5. Adjust:

- Brake disc runout

- a. Remove the brake disc.
- b. Rotate the brake disc by one bolt hole.
- c. Install the brake disc.



Front brake disc bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®

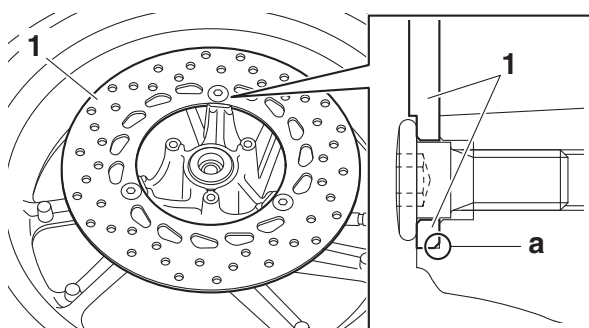
ECA19150

NOTICE

Replace the brake disc bolts with new ones.

TIP

- Install the brake disc "1" with its chamfered side "a" facing inward.
- Tighten the brake disc bolts in stages.



- d. Measure the brake disc runout.
- e. If out of specification, repeat the adjustment steps until the brake disc runout is within specification.
- f. If the brake disc runout cannot be brought within specification, replace the brake disc.



6. Install:
 - Front wheel
 Refer to "FRONT WHEEL" on page 4-20.

EAS30170

REPLACING THE FRONT BRAKE PADS

TIP

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Measure:
 - Brake pad wear limit "a"
 Out of specification → Replace the brake pads as a set.



Brake pad lining thickness (inner)

4.4 mm (0.17 in)

Limit

0.8 mm (0.03 in)

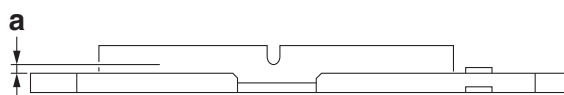
Brake pad lining thickness (outer)

4.4 mm (0.17 in)

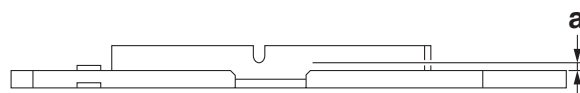
Limit

0.8 mm (0.03 in)

A



B



- A. Inner
- B. Outer

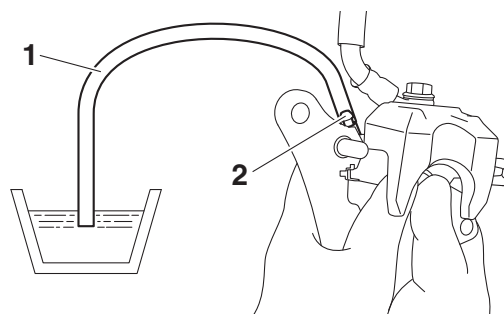
2. Install:
 - Brake pad spring "1"
 - Brake pads

TIP

Always install new brake pads, and new brake pad spring, as a set.



- a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.
- b. Loosen the bleed screw and push the brake caliper piston into the brake caliper with your finger.



- c. Tighten the bleed screw.

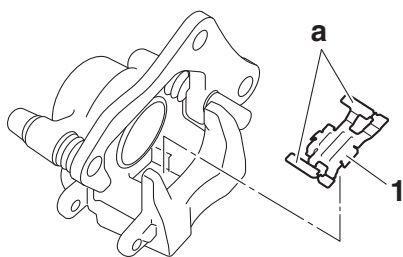


Brake caliper bleed screw
6 N·m (0.6 kgf·m, 4.3 lb·ft)

- d. Install new brake pad spring and new brake pads.

TIP

The longer tangs "a" of the brake pad spring must point in the direction of the brake caliper piston.

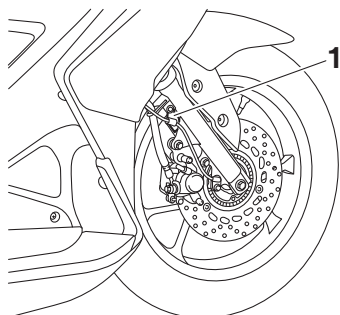


3. Install:

- Brake pad pin
- Brake pad clips
- Front brake caliper
- Front brake hose guide "1"
- Front brake caliper bolts

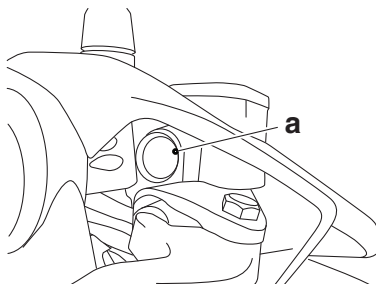


Front brake caliper bolt
35 N·m (3.5 kgf·m, 25 lb·ft)



4. Check:

- Brake fluid level
Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-10.



5. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.

EAS31328

REMOVING THE FRONT BRAKE CALIPER

TIP

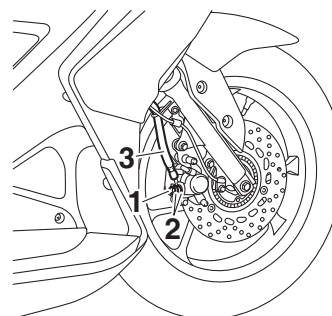
Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:

- Brake hose union bolt "1"
- Brake hose gaskets "2"
- Front brake hose "3"

TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.

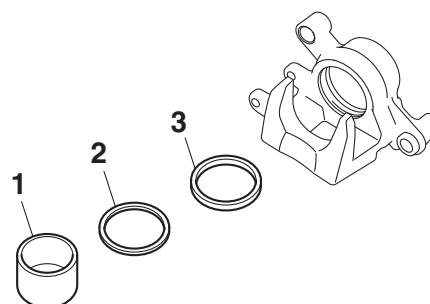


EAS30172

DISASSEMBLING THE FRONT BRAKE CALIPER

1. Remove:

- Brake caliper piston "1"
- Brake caliper piston dust seal "2"
- Brake caliper piston seal "3"



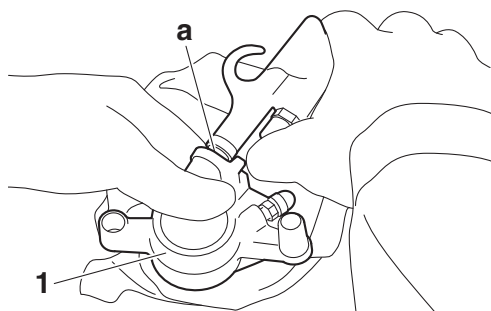
- Blow compressed air into the brake hose joint opening "a" to force out the piston from the brake caliper "1".

EWA13550



WARNING

- Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.
- Never try to pry out the brake caliper piston.



- b. Remove the brake caliper piston dust seal and brake caliper piston seal.



EAS30173

CHECKING THE FRONT BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston seal	Every two years
Piston dust seal	Every two years
Brake hose	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

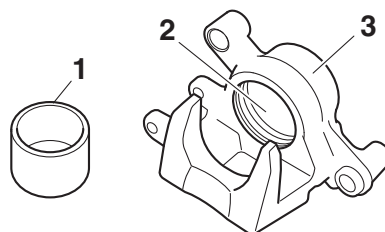
1. Check:

- Brake caliper piston “1”
Rust/scratches/wear → Replace the brake caliper piston.
- Brake caliper cylinder “2”
Scratches/wear → Replace the brake caliper assembly.
- Brake caliper body “3”
Cracks/damage → Replace the brake caliper assembly.
- Brake fluid delivery passages (brake caliper body)
Obstruction → Blow out with compressed air.

EWA17070

WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



2. Check:

- Brake caliper bracket
Cracks/damage → Replace.

EAS30174

ASSEMBLING THE FRONT BRAKE CALIPER

EWA13621

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components as they will cause the brake caliper piston dust seals and brake caliper piston seals to swell and distort.
- Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.



Specified brake fluid
YAMAHA GENUINE BRAKE FLUID : DOT 3 or Dot 4 (GDR155)
YAMAHA GENUINE BRAKE FLUID : Dot 4-Plus (GDR155-A)

EAS30934

INSTALLING THE FRONT BRAKE CALIPER

1. Install:

- Front brake caliper “1” (temporarily)
- Brake hose gaskets “2” **New**
- Front brake hose “3”
- Brake hose union bolt “4”



Front brake hose union bolt (brake caliper side)
29 N·m (2.9 kgf·m, 21 lb·ft)

EWA13531

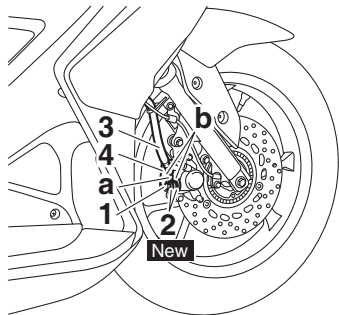
WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

ECA19080

NOTICE

When installing the brake hose onto the brake caliper "1", make sure the brake pipe "a" passes between the projections "b" on the brake caliper.



2. Remove:
 - Front brake caliper
3. Install:
 - Brake pad spring
 - Brake pads
 - Brake pad pin
 - Brake pad clips
 - Front brake caliper
 - Front wheel sensor lead holder
 - Front brake caliper bolts



Front brake caliper bolt
35 N·m (3.5 kgf·m, 25 lb·ft)

Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-37.

4. Fill:
 - Brake master cylinder reservoir
(with the specified amount of the specified brake fluid)



Specified brake fluid
**YAMAHA GENUINE BRAKE FLU-
ID: DOT 3 or DOT 4 (GDR155)**
**YAMAHA GENUINE BRAKE FLU-
ID: DOT 4-Plus (GDR155-A)**

EWA13540

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.

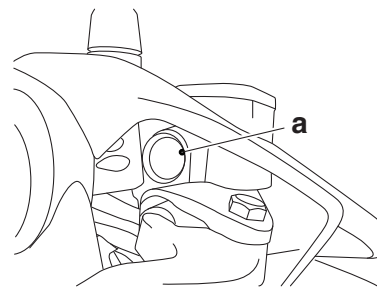
- When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
 - Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.
6. Check:
 - Brake fluid level
Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.



7. Check:
 - Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.

EAS30179

REMOVING THE FRONT BRAKE MASTER CYLINDER

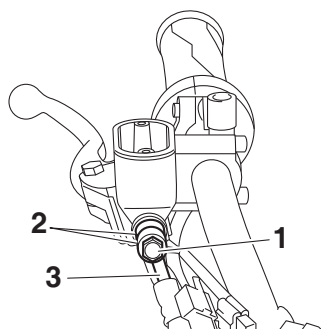
TIP

Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
 - Brake hose union bolt "1"
 - Brake hose gaskets "2"
 - Front brake hose "3"

TIP

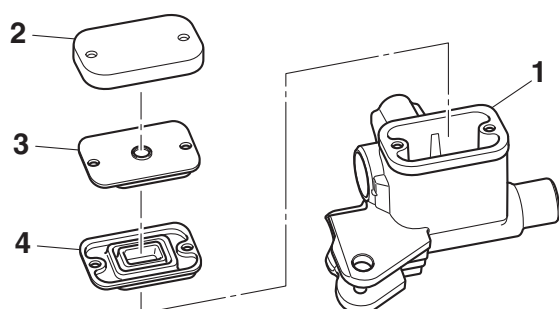
To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS30725

CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
 - Brake master cylinder
Damage/scratches/wear → Replace.
 - Brake fluid delivery passages
(brake master cylinder body)
Obstruction → Blow out with compressed air.
2. Check:
 - Brake master cylinder kit
Damage/scratches/wear → Replace.
3. Check:
 - Brake master cylinder reservoir “1”
 - Brake master cylinder reservoir cap “2”
 - Brake master cylinder reservoir diaphragm holder “3”
 - Brake master cylinder reservoir diaphragm “4”
Damage/wear → Replace.



4. Check:
 - Front brake hose
Cracks/damage/wear → Replace.

EAS30181

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

WARNING

- Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.
- Never use solvents on internal brake components.



Specified brake fluid
YAMAHA GENUINE BRAKE
FLUID: DOT 3 or DOT 4 (GDR155)
YAMAHA GENUINE BRAKE
FLUID: DOT 4-Plus (GDR155-A)

EAS30182

INSTALLING THE FRONT BRAKE MASTER CYLINDER

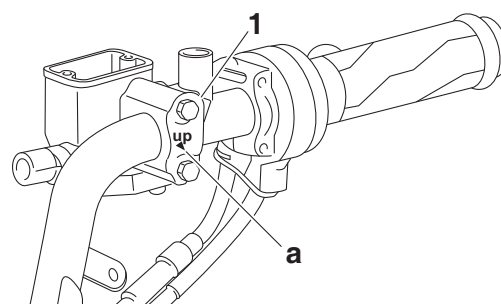
1. Install:
 - Brake master cylinder
 - Brake master cylinder holder “1”



Front brake master cylinder holder bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Install the brake master cylinder holder with the “UP” mark “a” facing up.
- First, tighten the upper bolt, then the lower bolt.



2. Install:
 - Brake hose gaskets “1” **New**
 - Front brake hose “2”
 - Brake hose union bolt “3”



Front brake hose union bolt (master cylinder side)
29 N·m (2.9 kgf·m, 21 lb·ft)

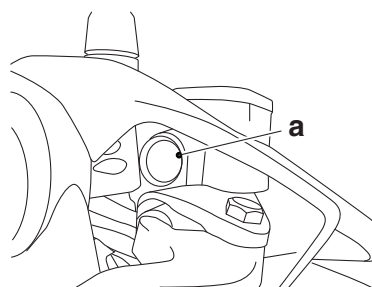
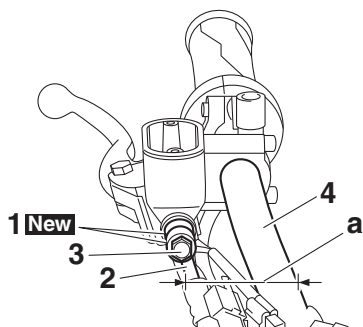
EWA13531

WARNING

Proper brake hose routing is essential to insure safe vehicle operation.

TIP

- Make sure that the distance “a” between the brake hose and the handlebar “4” is 40–44 mm (1.57–1.73 in) as shown in the illustration.
- Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:

- Brake master cylinder reservoir (with the specified amount of the specified brake fluid)



Specified brake fluid
YAMAHA GENUINE BRAKE
FLUID: DOT 3 or DOT 4 (GDR155)
YAMAHA GENUINE BRAKE
FLUID: DOT 4-Plus (GDR155-A)

EWA13540

⚠ WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake master cylinder reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.

5. Check:

- Brake fluid level
Below the minimum level mark "a" → Add the specified brake fluid to the proper level.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-10.

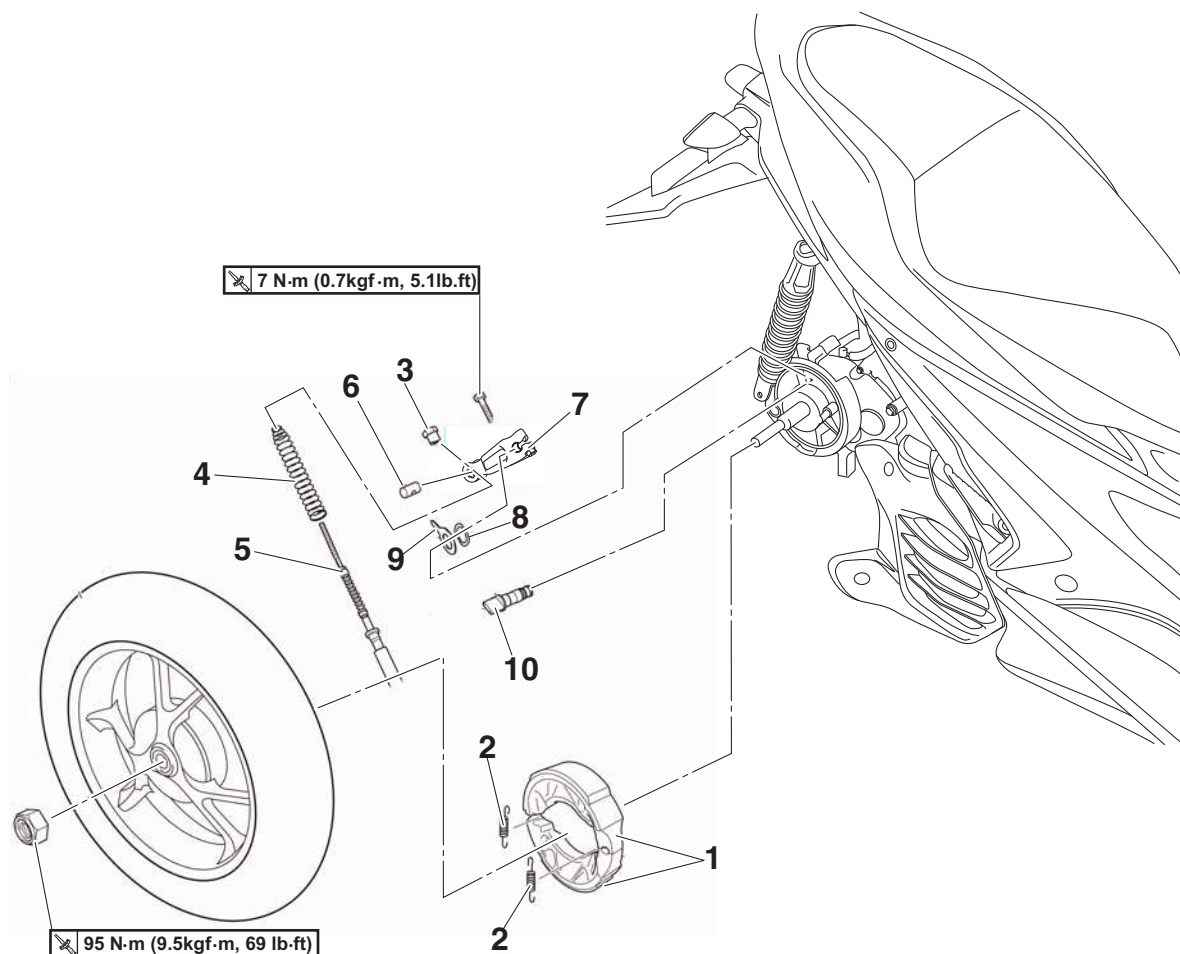
6. Check:

- Brake lever operation
Soft or spongy feeling → Bleed the brake system.
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.

EASSP03037

REAR BRAKE

Disassembling the brake shoe



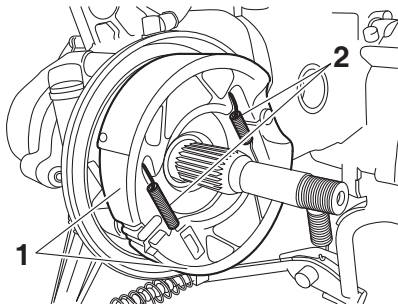
Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-28.
1	Brake shoe	2	
2	Brake shoe spring	2	
3	Rear brake cable adjusting nut	1	
4	Compression spring	1	
5	Rear brake cable assembly	1	
6	Pin	1	
7	Brake camshaft lever	1	
8	Washer	1	
9	Brake shoe wear indicator	1	
10	Brake camshaft	1	

EAS5P03038

REMOVING THE REAR BRAKE

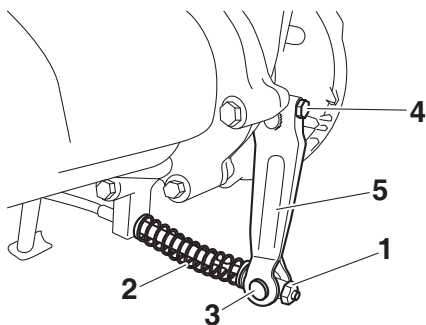
1. Remove:

- Brake shoes "1"
- Brake shoe spring "2"



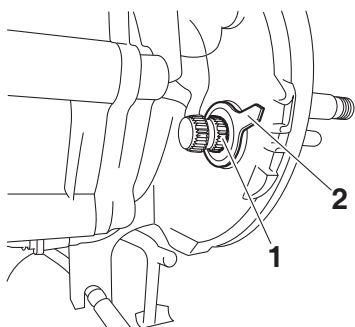
2. Remove:

- Adjusting nut "1"
- Rear brake cable "2"
- Pin "3"
- Brake camshaft lever bolt "4"
- Brake camshaft lever "5"



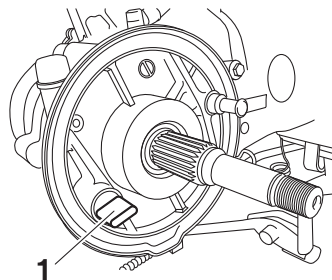
3. Remove:

- Wave washer "1"
- Brake shoe wear indicator "2"



4. Remove:

- Brake camshaft "1"



EAS5P03039

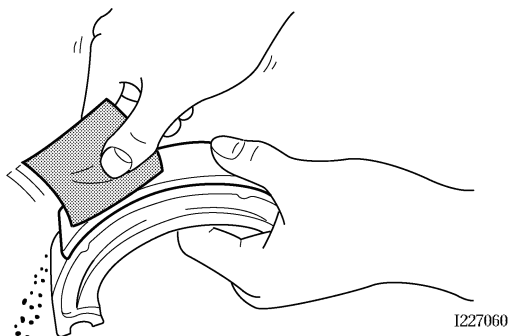
CHECKING THE REAR BRAKE SHOES

1. Check:

- Brake shoe lining
Glazed areas → Repair.
Sand the glazed areas with coarse sandpaper.

TIP

After sanding the glazed areas, clean the brake shoe with a cloth.



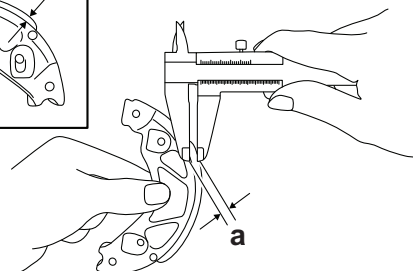
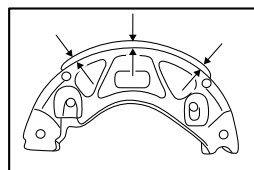
12270603

2. Measure:

- Brake shoe lining thickness "a"
Out of specification → Replace.



Lining thickness
4.0 mm (0.16 in)
Limit
2.0 mm (0.08 in)



EWA3C11004

⚠ WARNING

Do not allow oil or grease on the brake shoes.

TIP

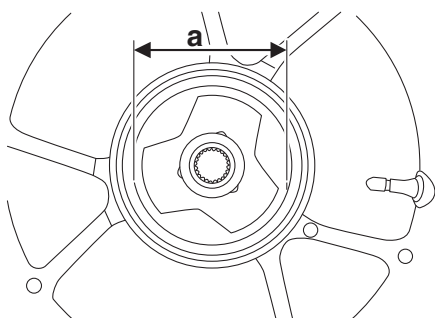
Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:

- Brake drum inside diameter “a”
Out of specification → Replace the wheel.



Brake drum inside diameter
130.0 mm (5.12 in)
Limit
131.0 mm (5.16 in)



4. Check:

- Brake drum inner surface
Oil deposits → Clean.
Remove the oil with a rag soaked in lacquer thinner or solvent.
Scratches → Repair.
Lightly and evenly polish the scratches with an emery cloth.

5. Check:

- Brake camshaft
Damage/wear → Replace.

EAS5P03040

ASSEMBLING THE REAR BRAKE SHOE PLATE

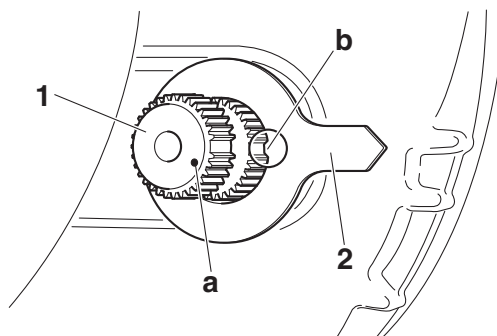
1. Install:

- Brake camshaft “1”
- Brake shoe wear indicator “2”
- Wave washer

a. Install the brake camshaft so its punch mark “a” is positioned as shown.

b. Align the projection “b” on the brake shoe wear indicator with the notch in the brake camshaft.

c. Check that the brake shoes are properly positioned.



EWA5P03004

⚠ WARNING

After installing the brake camshaft, remove any excess grease.

2. Install:

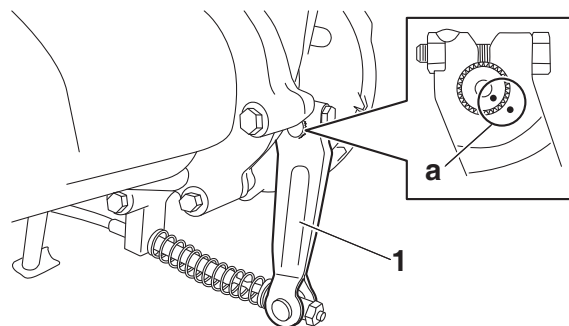
- Brake camshaft lever “1”



Brake camshaft lever pinch bolt
7 N·m (0.7 kgf·m, 5.2 lb·ft)

TIP

Align the punch mark on the brake camshaft with the mark on the brake camshaft lever positioned as shown “a”.



3. Install:

- Brake shoe springs “1” **New**
- Brake shoes

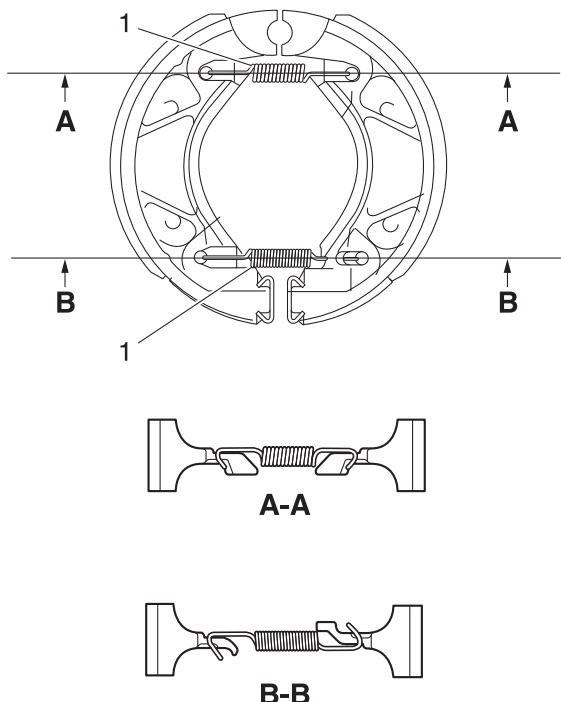
TIP

- Lubricate the pivot pin with a thin coat of silicone grease.
- Do not damage the springs during installation.
- Install the brake shoe springs as shown.

EWA3C11005

⚠ WARNING

Do not apply grease to the brake shoe linings.



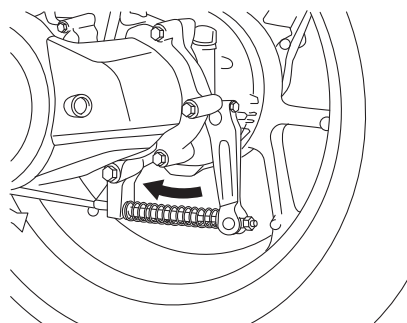
2. Check:

- Brake pedal free play

If the free play is out of specification.

Refer to “ADJUSTING THE REAR DRUM BRAKE” on page 3-10.

3. While pressing the brake pedal all the way down, push the brake camshaft lever fully in the arrow indicated direction and check that the brake shoe wear indicator does not reach the brake drum wear indicator.
Not reaching → Still usable.
Reaching → Replace the wheel.



EAS5P03041

CHECKING THE REAR BRAKE DRUM WEAR LIMIT

TIP

After the new brake shoes are installed, the brake drum inside diameter can be checked as to whether it is within the wear limit “a” by means of the brake drum wear indicator on the brake shoe plate.

1. Check:

- Position at which to install the brake camshaft lever

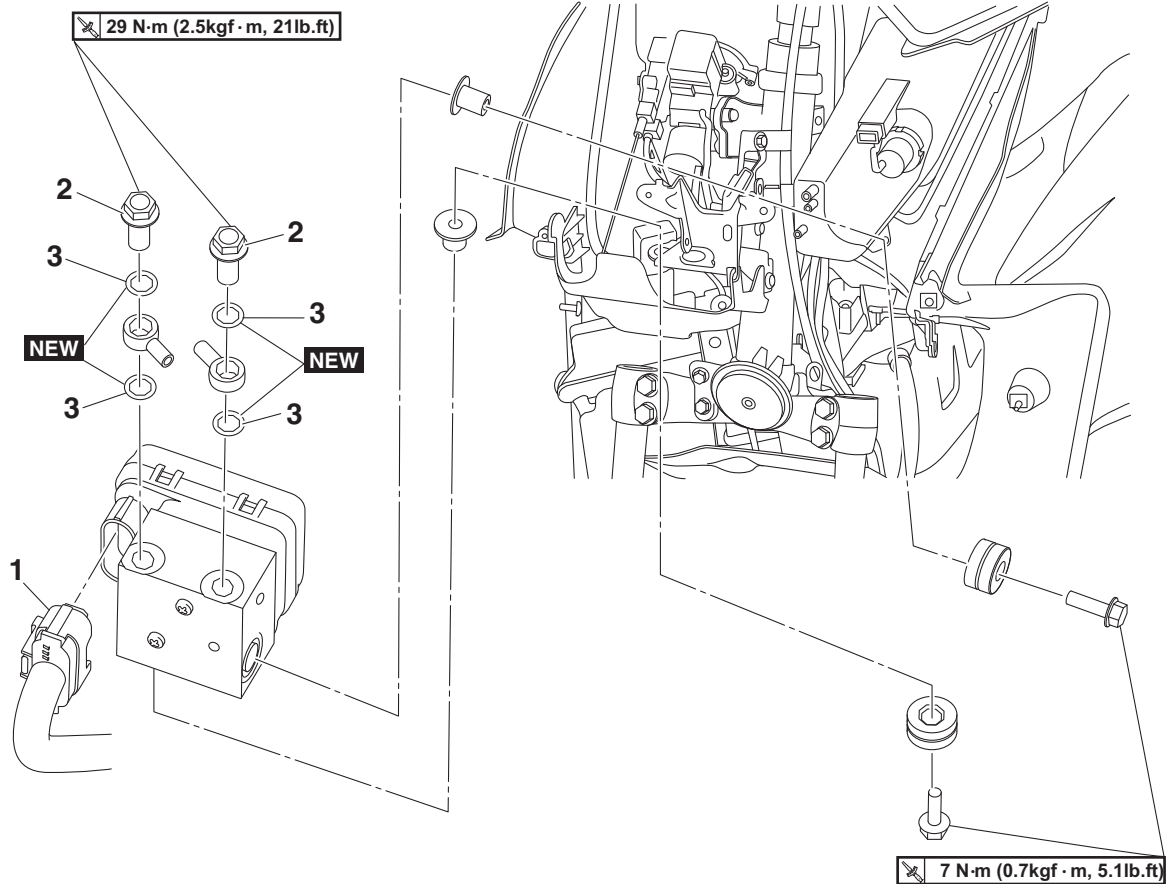
Reinstall the brake camshaft lever if its installed position is out of specification.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS20032

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

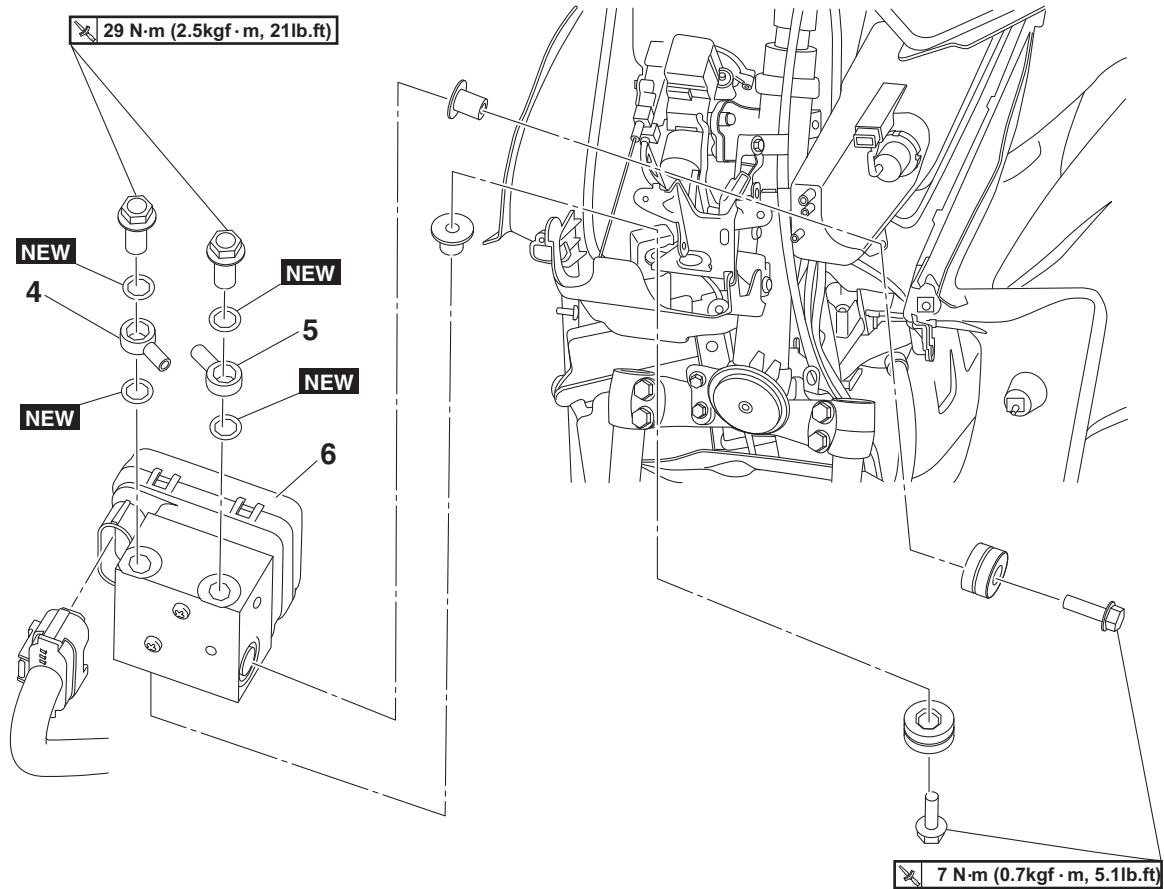
Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.
	Front cowling assembly		Refer to "GENERAL CHASSIS (5)" on page 4-15.
	Front upper cowling assembly		Refer to "GENERAL CHASSIS (4)" on page 4-9.
1	ABS ECU coupler	1	Disconnect.
2	Front brake hose union bolt (hydraulic unit assembly side)	2	
3	Brake hose gasket	4	

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
4	Front brake hose (front brake master cylinder to hydraulic unit)	1	Disconnect.
5	Front brake hose (hydraulic unit to front brake caliper)	1	Disconnect.
6	Hydraulic unit assembly	1	

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS30197

REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA21091

NOTICE

Unless necessary, avoid removing and installing the brake hoses of the hydraulic unit assembly.

EWA13930

WARNING

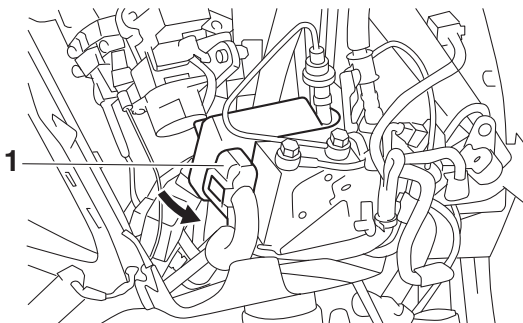
Refill with the same type of brake fluid that is already in the system. Mixing fluids may result in a harmful chemical reaction, leading to poor braking performance.

ECA18241

NOTICE

- Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.
- Do not turn the main switch to “ON” when removing the hydraulic unit assembly.
- Do not clean with compressed air.
- Do not reuse the brake fluid.
- Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spill brake fluid immediately.
- Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.
- If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.

1. Disconnect:
 - ABS ECU coupler “1”



2. Remove:
 - Brake hoses

TIP

Do not operate the brake levers while removing the brake hoses.

ECA14530

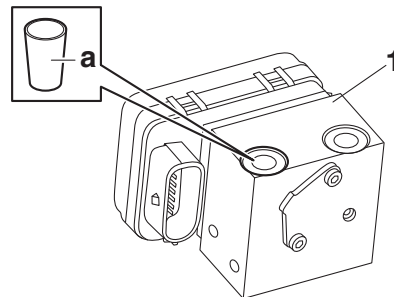
NOTICE

When removing the brake hoses, cover the area around the hydraulic unit to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

3. Remove:
 - Hydraulic unit assembly “1”

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug “a” or a bolt (M10 × 1.25) into each brake hose union bolt hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake hose union bolt seating surface could be deformed.



EAS30198

CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:
 - Hydraulic unit assembly
Cracks/damage → Replace the hydraulic unit assembly and the brake hoses set that are connected to the assembly as a set.

EAS30200

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
 - Hydraulic unit assembly



Hydraulic unit assembly bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

ECA21110

NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.25) installed in the brake hose union bolt holes before installing the hydraulic unit assembly.

TIP

Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses when installing the hydraulic unit assembly.

2. Remove:

- Rubber plugs or bolts (M10 × 1.25)

3. Install:

- Front brake hose (front brake master cylinder to hydraulic unit) "1"
- Front brake hose (hydraulic unit to front brake caliper) "2"



**Front brake hose union bolt
(hydraulic unit assembly side)
29 N·m (2.9 kgf·m, 21 lb·ft)**

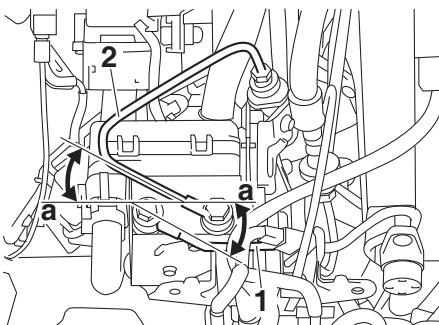
ECA21121

NOTICE

If the brake hose union bolt does not turn easily, replace the hydraulic unit assembly, brake hoses, and related parts as a set.

TIP

Position the pipe sections of the brake hoses at a 30° angle from the line "a" as shown in the illustration, and then tighten the brake hose union bolts to specification.

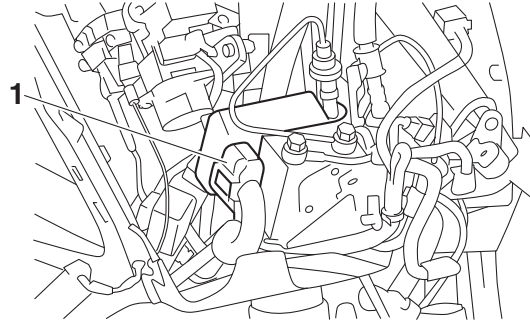


4. Connect:

- ABS ECU coupler "1"

TIP

- Connect the ABS ECU coupler 1.
- Make sure that the ABS ECU coupler is connected in the correct position.



5. Fill:

- Brake master cylinder reservoir
- Brake fluid reservoir
(with the specified amount of the specified brake fluid)



**Specified brake fluid
YAMAHA GENUINE BRAKE
FLUID: DOT 3 or DOT 4 (GDR155)
YAMAHA GENUINE BRAKE
FLUID: DOT 4-Plus (GDR155-A)**

EWA13090

WARNING

- Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.
- When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

6. Bleed:

- Brake system
Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM" on page 3-11.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

7. Check the operation of the hydraulic unit according to the brake levers response. (Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-51.)

ECA14550

NOTICE

Always check the operation of the hydraulic unit according to the brake lever response.

8. Delete the fault codes. (Refer to "[B-3] DELETING THE FAULT CODES" on page 8-102.)
9. Perform a trial run. (Refer to "CHECKING THE ABS WARNING LIGHT" on page 4-54.)

EAS30201

HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake levers when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

- Brake line routing confirmation: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- ABS reaction-force confirmation: this test generates the same reaction-force pulsating action that is generated in the front brake lever when the ABS is front activated.

Brake line routing confirmation

EWA13120

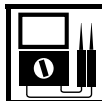
WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

- For the brake line routing confirmation, use the diagnosis mode of the Yamaha diagnostic tool.
- Before performing the brake line routing confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

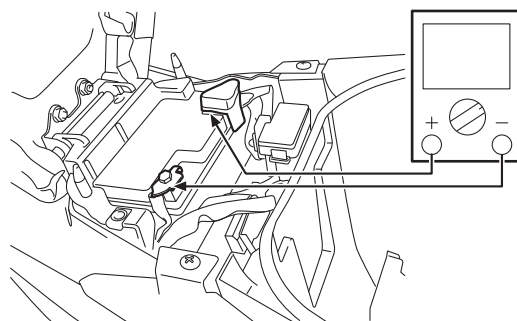
1. Place the vehicle on a center stand.
2. Turn the main switch to "OFF".
3. Open the seat.
4. Remove:
 - Battery cover
Refer to "GENERAL CHASSIS (1)" on page 4-1.
5. Check:
 - Battery voltage
Lower than 12.8 V → Charge or replace the battery.



**Battery voltage
Higher than 12.8 V**

TIP

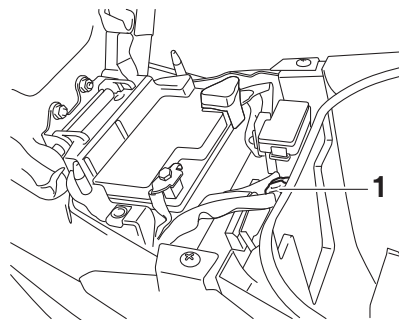
If the battery voltage is lower than 12.8 V, charge the battery, and then perform brake line routing confirmation.



6. Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler (4P).



**Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252**



7. Start the Yamaha diagnostic tool and display the diagnosis mode screen.
8. Select code No. 2, "Brake line routing confirmation".
9. Click "Action" "1", and then operate the front brake lever "2" simultaneously.

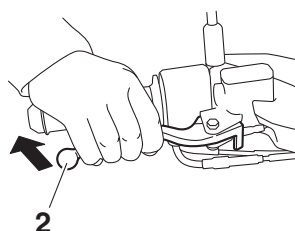
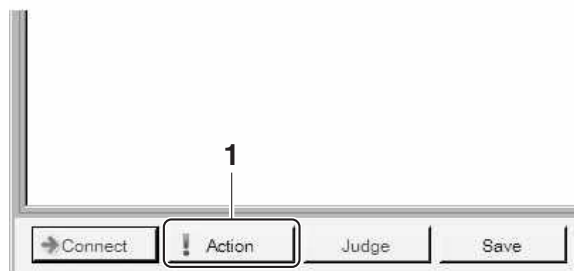
TIP

- The hydraulic unit operates 1 second after the front brake lever operated and continues for approximately 1 second.
- The operation of the hydraulic unit can be confirmed using the indicator.
On: The hydraulic unit is operating.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Flashing: The conditions for operating the hydraulic unit have not been met.

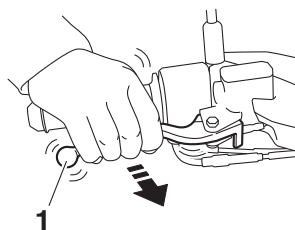
Off: The front brake lever is not being operated.



10. Check:

- Hydraulic unit operation

Click "Action", a single pulse will be generated in the front brake lever "1", operate only once.



TIP

"ON" and "OFF" on the tool screen indicate when the brakes are being applied and released respectively.

ECA22080

NOTICE

- Check that the pulse is felt in the front brake lever.

11. If the operation of the hydraulic unit is normal, delete all of the fault codes.

ABS reaction-force confirmation

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

- For the ABS reaction-force confirmation, use the diagnosis mode of the Yamaha diagnostic tool. For more information, refer to the operation manual of the Yamaha diagnostic tool.
- Before performing the ABS reaction-force confirmation, make sure that no malfunctions have been detected in the ABS ECU and that the wheels are not rotating.

1. Place the vehicle on a center stand.
2. Turn the main switch to "OFF".
3. Open the seat.
4. Remove:
 - Battery coverRefer to "GENERAL CHASSIS (1)" on page 4-1.
5. Check:
 - Battery voltageLower than 12.8 V → Charge or replace the battery.

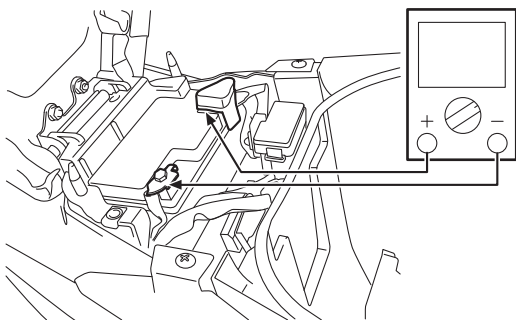


**Battery voltage
Higher than 12.8 V**

TIP

If the battery voltage is lower than 12.8 V, charge the battery, and then perform ABS reaction-force confirmation.

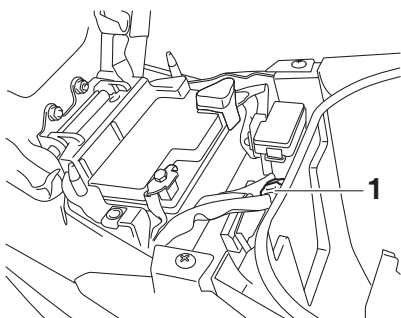
ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)



6. Removing the protective cap “1”, and then connect the Yamaha diagnostic tool to the Yamaha diagnostic tool coupler (4P).



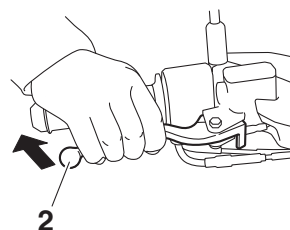
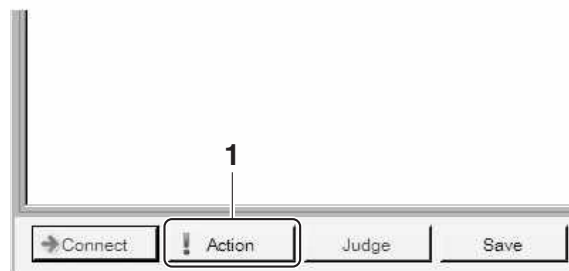
Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252



7. Start the Yamaha diagnostic tool and display the diagnosis mode screen.
8. Select code No. 1, “ABS reaction-force confirmation”.
9. Click “Action” “1”, and then operate the front brake lever “2” simultaneously.

TIP

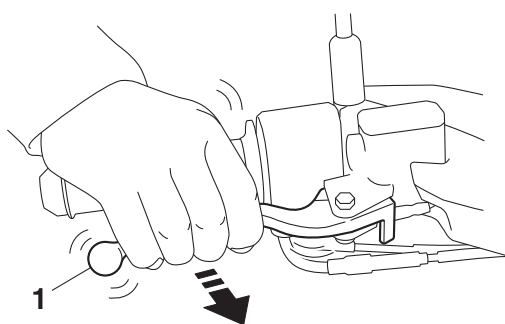
- The hydraulic unit operates 1 second after the front brake lever operated and continues for approximately 1 second.
- The operation of the hydraulic unit can be confirmed using the indicator.
On: The hydraulic unit is operating.
Flashing: The conditions for operating the hydraulic unit have not been met.
Off: The front brake lever is not being operated.



10. A reaction-force pulsating action is generated in the front brake lever “1” and continues for a few seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the front brake lever even after the pulsating action has stopped.
- “ON” and “OFF” on the tool screen indicate when the brakes are being applied and released respectively.



ECA22080

NOTICE

- Check that the pulse is felt in the front brake lever.
- If the pulse is hardly felt in either the front brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

11. Turn the main switch to "OFF".
12. Remove the Yamaha diagnostic tool from the Yamaha diagnostic tool coupler, and then install the protective cap.
13. Turn the main switch to "ON".
14. Check for brake fluid leakage around the hydraulic unit.
Brake fluid leakage → Replace the hydraulic unit, brake hoses, and related parts as a set.
15. If the operation of the hydraulic unit is normal, delete all of the fault codes.

EAS30202

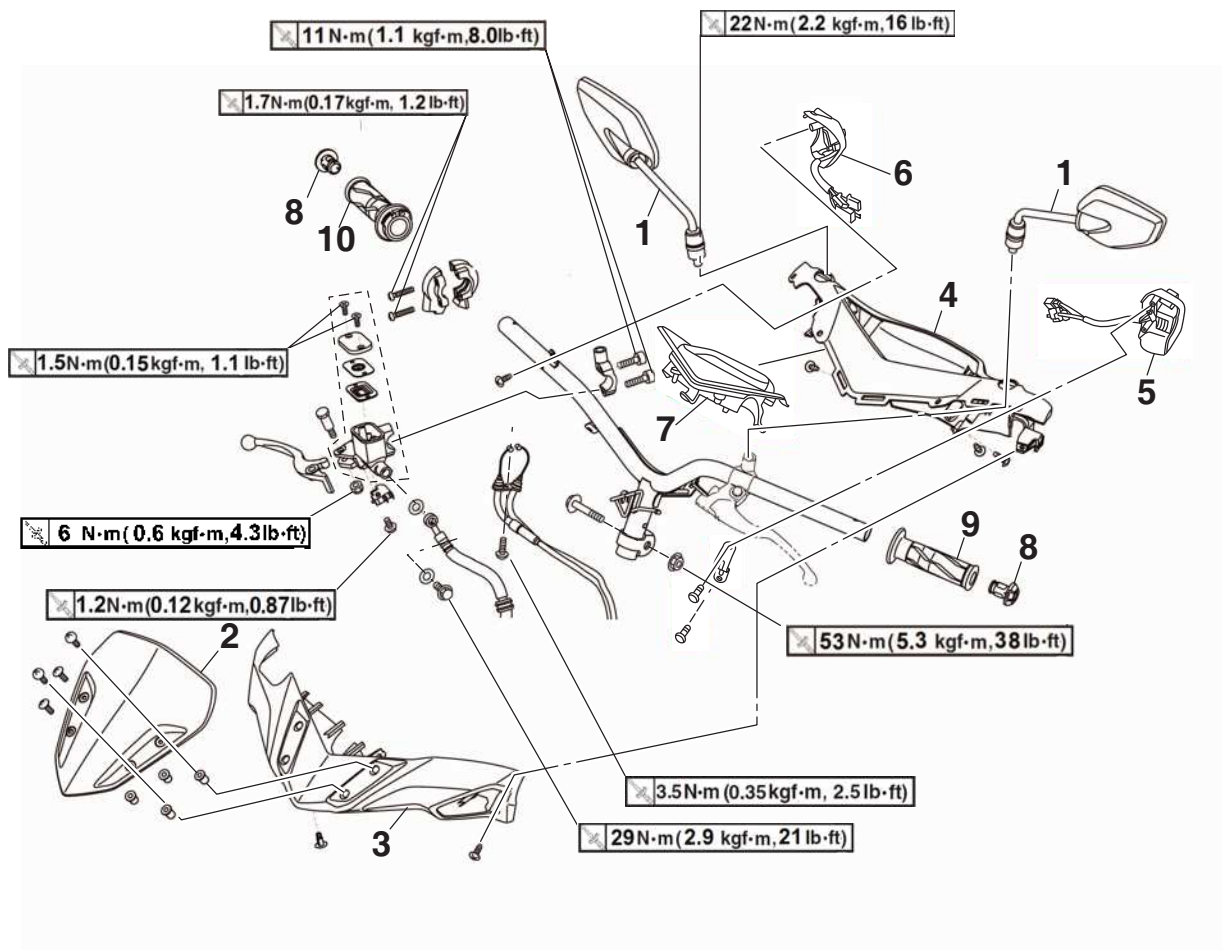
CHECKING THE ABS WARNING LIGHT

After all checks and servicing are completed, ensure that the ABS warning light goes off by walking the vehicle at a speed of faster than 10 km/h (6 mph) or performing a trial run.

EAS20033

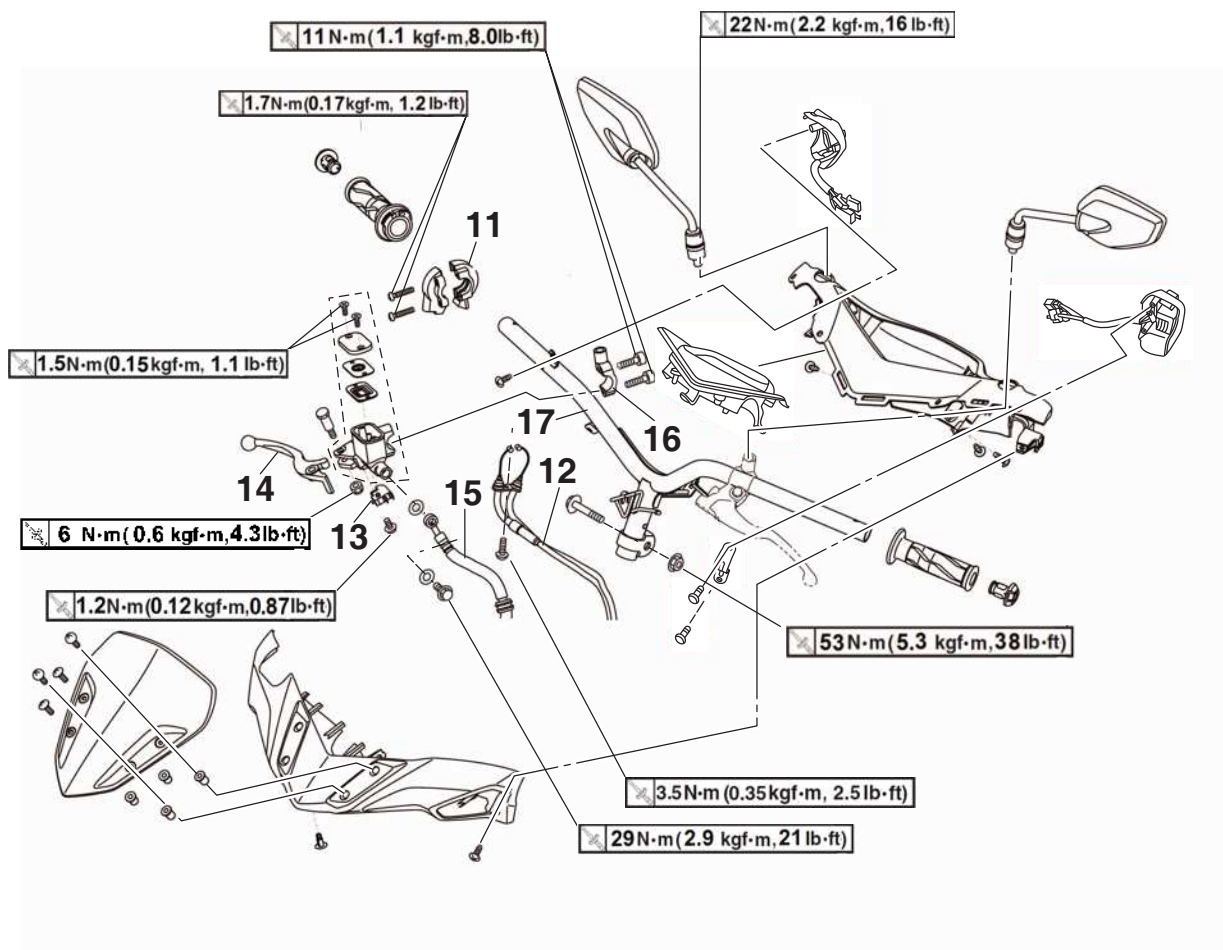
HANDLEBAR

Removing the rear view mirror and handlebar cover



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear view mirror (left and right)	2	
2	Front handlebar cover 1	1	
3	Front handlebar cover 2	1	
4	Rear handlebar cover	1	
5	Left handlebar switch	1	Disconnect.
6	Right handlebar switch	1	Disconnect.
7	Meter assembly	1	
8	Grip end (left and right)	2	
9	Left handlebar grip	1	
10	Throttle grip	1	

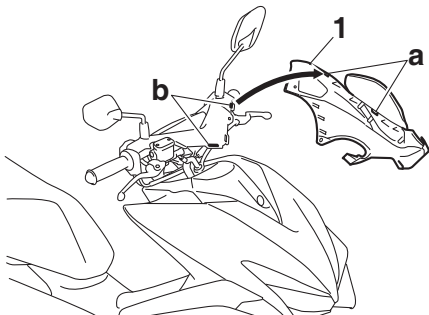
Removing the rear view mirror and handlebar cover



Order	Job/Parts to remove	Q'ty	Remarks
11	Throttle cable housing	1	
12	Throttle cable	1	Disconnect.
13	Front brake switch	1	
14	Front brake lever	1	
15	Brake hose	1	
16	Front brake master cylinder holder	1	
17	Handlebar	1	

1. Remove:

- Remove the quick fastener and front handlebar cover assembly screws.
- Unhook the projections “a” on the front handlebar cover assembly from the slots “b” in the lower handlebar cover.



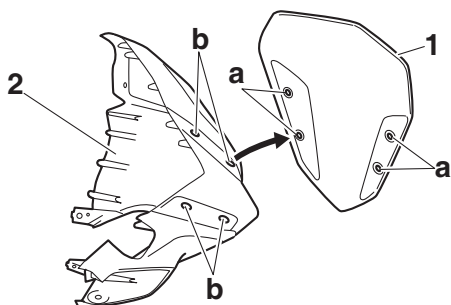
EAS31701

1. Disassemble:

- Front handlebar cover “1”
- Front handlebar cover “2”

TIP

Unhook the projections “a” on the front handlebar cover from the slots “b” in the front handlebar cover.



EAS30203

1. Stand the vehicle on a level surface.



WARNING

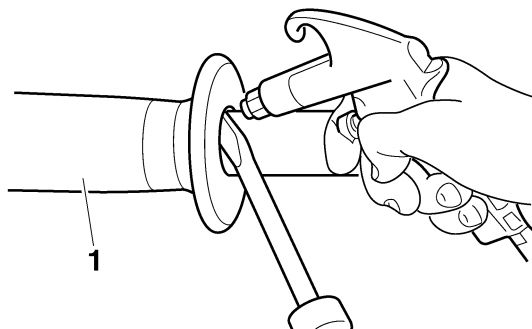
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
- Grip end

3. Remove:
- Handlebar grip “1”

TIP

Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



EAS30204

1. Check:

- Handlebar
Bends/cracks/damage → Replace.



WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS30205

1. Stand the vehicle on a level surface.



WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
- Handlebar “1”



Handlebar bolt
53 N·m (5.3 kgf·m, 38 lb·ft)

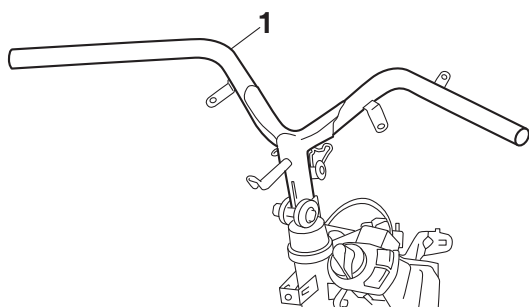


NOTICE

First, tighten the bolts on the front side of the handlebar holder, and then on the rear side.

TIP

- Make sure that the projection “a” of the handlebar contacts the lower handlebar holder.
- The front handlebar holders should be installed with the punch mark “b” facing forward.

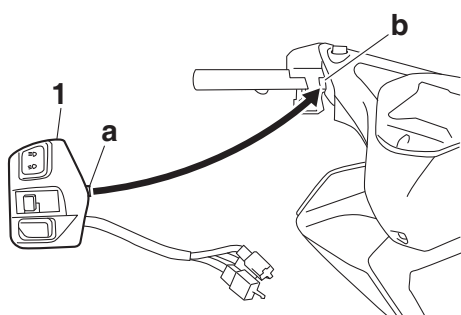


3. Install:

- Handlebar switch (left) “1”

TIP

Align the projection “a” on the left handlebar switch with the hole “b” in the rear handlebar cover.



4. Install:

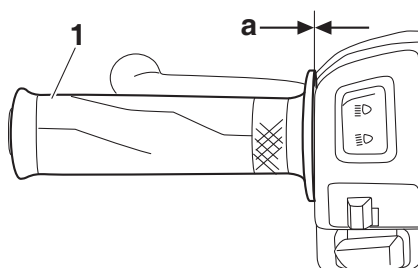
- Handlebar grip “1”
- Grip end (left) “2”

a. Apply a thin coat of a rubber adhesive to the left end of the handlebar.

b. Slide the handlebar grip over the left end of the handlebar.

TIP

Make sure that the distance “a” between the end of the left handlebar switch and the end of the handlebar grip is 0 mm (0 in).



c. Wipe off any excess rubber adhesive with a clean rag.

EWA13700

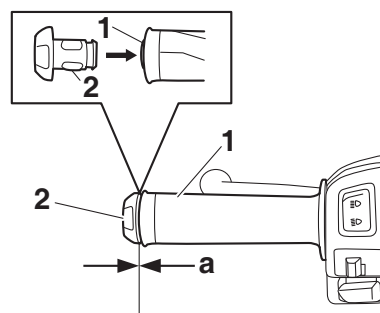
WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

d. Install the left grip end.

TIP

There should be 1.0–3.0 mm (0.04–0.12 in) of clearance “c” between the handlebar grip and the grip end.



5. Install:

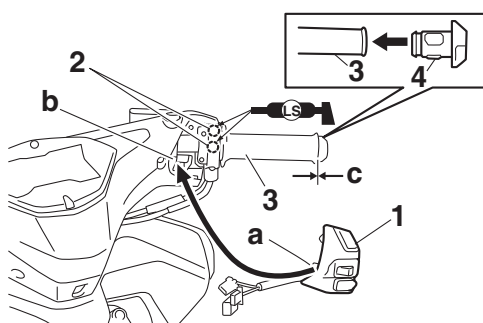
- Handlebar switch (right) “1”
- Throttle cables “2”
- Throttle grip “3”
- Grip end (right) “4”



Throttle cable holder bolt (handlebar switch side)
3.5 N·m (0.35 kgf·m, 2.5 lb·ft)

TIP

- Lubricate the end of the throttle cables and the inside of the throttle grip with a thin coat of lithium-soap-based grease.
- Align the projection “a” on the right handlebar switch with the hole “b” in the rear handlebar cover.
- There should be 1.0–3.0 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.



6. Install:

- Front brake master cylinder
- Front brake master cylinder holder “1”



**Front brake master cylinder
holder bolt**
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Install the brake master cylinder holder with the “UP” mark “a” facing up.
- Align the edge “b” of the brake master cylinder holder with the edge “c” of the stay on the handlebar as shown in the illustration.
- First, tighten the upper bolt, then the lower bolt.

7. Adjust:

- Throttle grip free play
Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-23.



Throttle grip free play
3.0–5.0 mm (0.12–0.20 in)

EAS31702

EAS31702

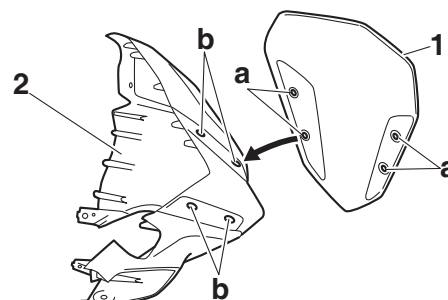
ASSEMBLING THE FRONT HANDLEBAR COVER ASSEMBLY

1. Assemble:

- Front handlebar cover “1”
- Front handlebar cover “2”

TIP

Fit the projections “a” on the front handlebar cover into the slots “b” in the front handlebar cover.



FAS31623

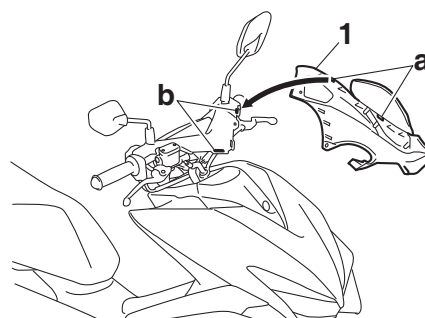
EAS31623

INSTALLING THE FRONT HANDLEBAR COVER ASSEMBLY

1. Install:

- Front handlebar cover assembly “1”

- a. Fit the projections “a” on the front handlebar cover into the slots “b” in the lower handlebar cover.



- b. Install the front handlebar cover assembly screws and quick fasteners, and then tighten the screws to specification.

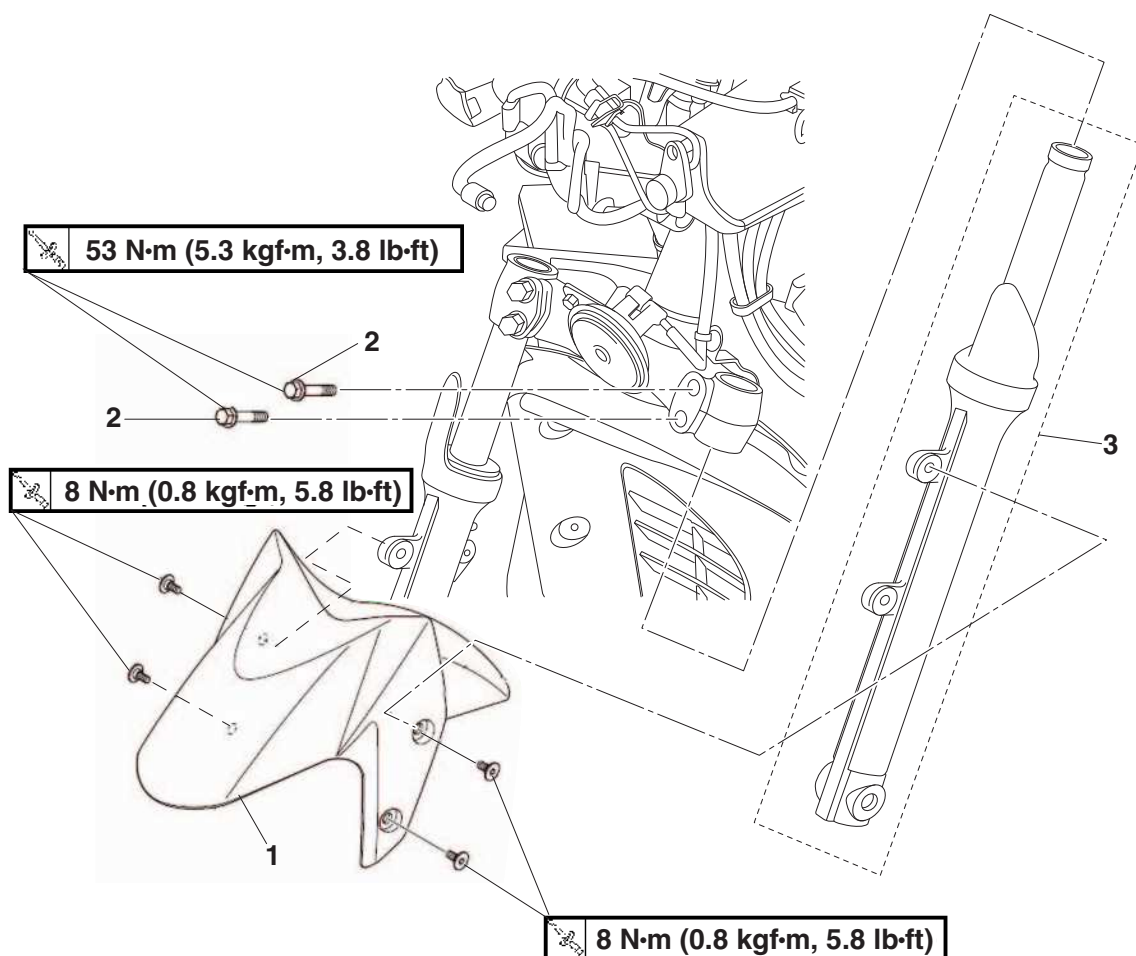


Upper handlebar cover assembly screw
1.8 N·m (0.18 kgf·m, 1.3 lb·ft)

EAS20034

FRONT FORK

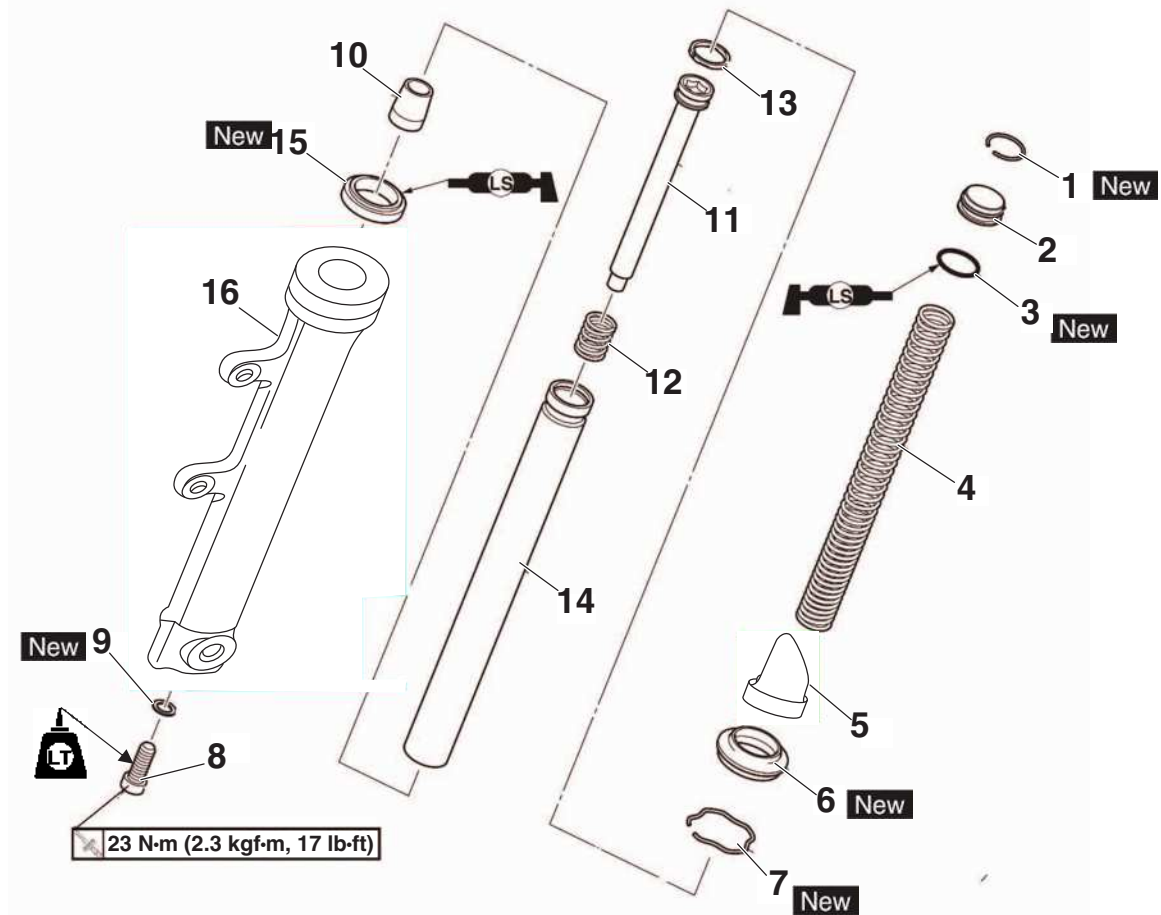
Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front wheel		Refer to "FRONT WHEEL" on page 4-20.
1	Front fender	1	
2	Lower bracket pinch bolt	2	
3	Front fork leg	1	

FRONT FORK

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Front fork cap clip	1	
2	Front fork cap	1	
3	O-ring	1	
4	Fork spring	1	
5	Tip guard	1	
6	Dust seal	1	
7	Oil seal clip	1	
8	Front fork damper rod bolt	1	
9	Copper washer	1	
10	Oil flow stopper	1	
11	Damper rod	1	
12	Rebound spring	1	
13	Damper rod ring	1	
14	Inner tube	1	
15	Oil seal	1	
16	Outer tube	1	

EAS30206

REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on a suitable stand so that the front wheels are elevated.

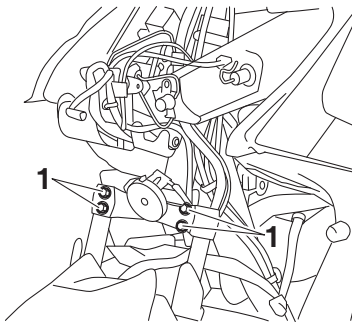
2. Loosen:

- Lower bracket pinch bolts "1"

EWA18000

WARNING

Before loosening the lower bracket pinch bolts, support the front fork leg.



EAS30207

DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

ECA19110

NOTICE

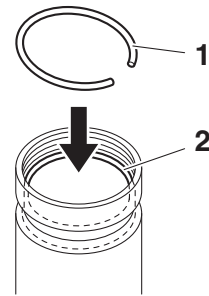
- The front fork leg has a very sophisticated internal construction, which are particularly sensitive to foreign material.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

1. Remove:

- Front fork cap clip "1"
- Front fork cap "2"

TIP

Push the front fork cap in the direction of the arrow shown in the illustration to remove the front fork cap clip.

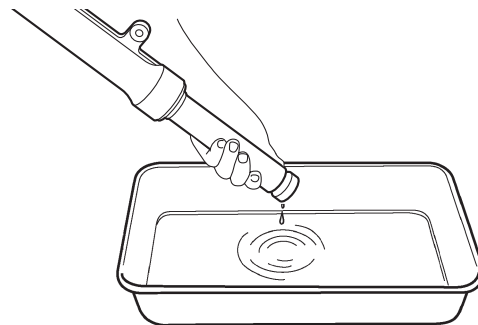


2. Drain:

- Fork oil

TIP

Stroke the outer tube several times while draining the fork oil.



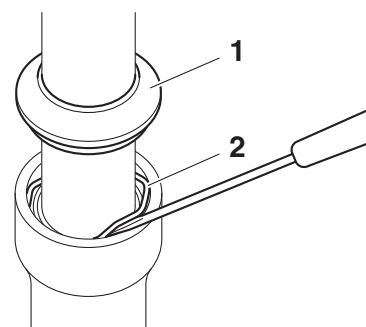
3. Remove:

- Dust seal "1"
- Oil seal clip "2" (with a flathead screwdriver)

ECA14180

NOTICE

Do not scratch the inner tube.



4. Remove:

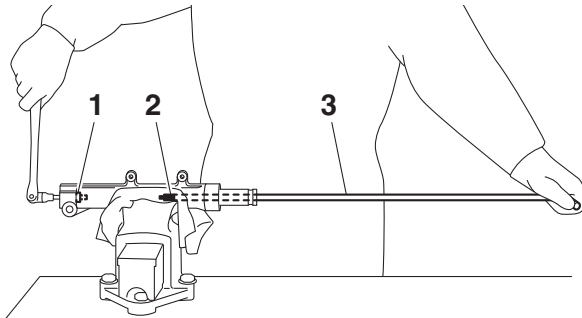
- Front fork damper rod bolt "1"
- Copper washer

TIP

While holding the damper rod with the hexagon bit socket (14 mm) "2" and T-handle "3", loosen the front fork damper rod bolt.



T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326



EAS30208

CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:
 - Inner tube
 - Outer tube
 Bends/damage/scratches → Replace.

EWA13650

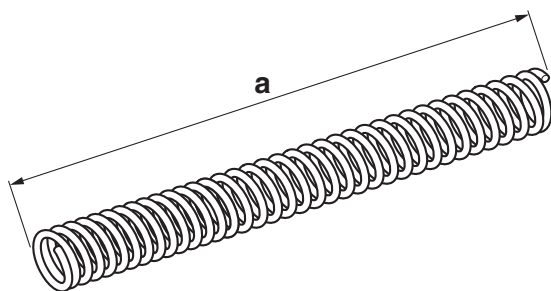
WARNING

Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
 - Fork spring free length "a"
 Out of specification → Replace.



Fork spring free length
282.1 mm (11.10 in)
Limit
276.0 mm (10.88 in)



3. Check:
 - Damper rod
 Damage/wear → Replace.
 Obstruction → Blow out all of the oil passages with compressed air.
 - Oil flow stopper
 Damage → Replace.

EAS30209

ASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA13660

WARNING

- Make sure the oil levels in both front fork legs are equal.
- Uneven oil levels can result in poor handling and a loss of stability.

TIP

- When assembling the front fork leg, be sure to replace the following parts:
 - Front fork cap clip
 - Oil seal
 - Oil seal clip
 - Dust seal
 - Copper washer
 - O-ring
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
 - Damper rod ring "1"
 - Damper rod "2"
 - Rebound spring "3"
 - (in the inner tube "4")
 - Oil flow stopper "5"

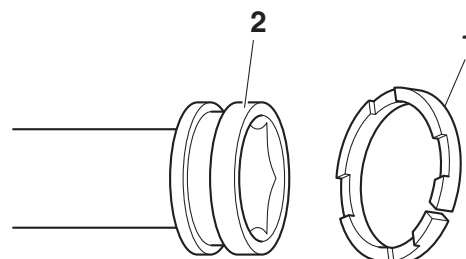
ECA22740

NOTICE

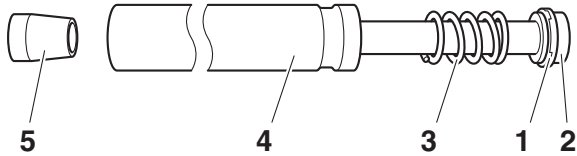
Allow the damper rod to slide slowly down the inner tube until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

TIP

Fit the damper rod ring into the damper rod groove so that the side of the ring with the projections is facing in the direction shown in the illustration.



FRONT FORK



2. Install:

- Oil seal “1” **New**
(with the fork seal driver attachment “2” and fork seal driver weight “3”)

ECA14220

NOTICE

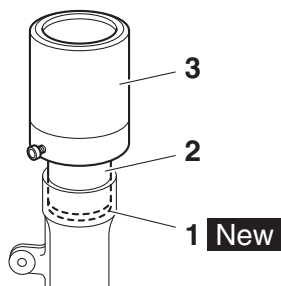
Make sure the numbered side of the oil seal faces up.

TIP

- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.



**Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø30)
90890-01400**



3. Lubricate:

- Inner tube's outer surface



**Recommended oil
Fork oil 10W or equivalent**

4. Install:

- Inner tube
(in the outer tube)

5. Install:

- Copper washer **New**
- Front fork damper rod bolt “1”



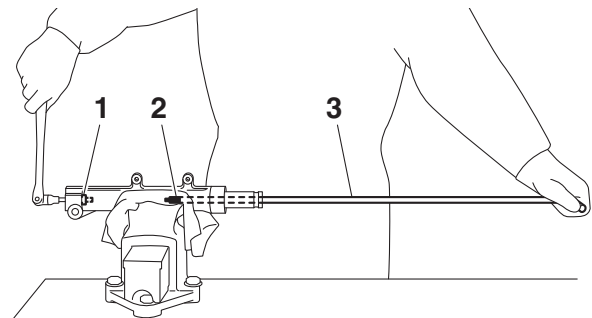
**Front fork damper rod bolt
23 N·m (2.3 kgf·m, 17 lb·ft)
LOCTITE®**

TIP

While holding the damper rod assembly with the hexagon bit socket (14 mm) “2” and T-handle “3”, tighten the front fork damper rod bolt.



**T-handle
90890-01326
T-handle 3/8" drive 60 cm long
YM-01326**

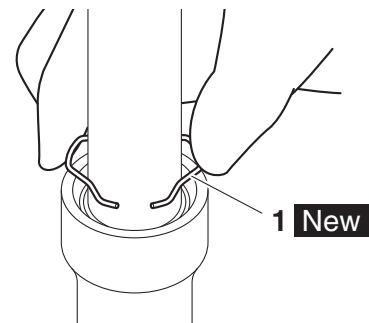


6. Install:

- Oil seal clip “1” **New**

TIP

Adjust the oil seal clip so that it fits into the outer tube's groove.

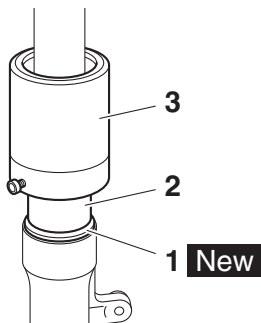


7. Install:

- Dust seal "1" **New**
(with the fork seal driver attachment "2" and fork seal driver weight "3")



Fork seal driver weight
90890-01367
Replacement hammer
YM-A9409-7
Fork seal driver attachment (ø30)
90890-01400



8. Fill:

- Front fork leg
(with the specified amount of the recommended fork oil)



Recommended oil
Fork oil 10W or equivalent
Quantity
86.0 cm³ (2.91 US oz, 3.03 Imp.oz)

ECA14230

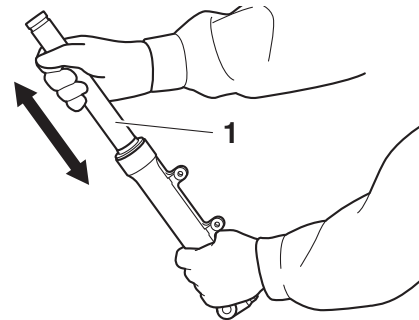
NOTICE

- Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.
- When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.

9. After filling the front fork leg, slowly stroke the inner tube "1" up and down (at least ten times) to distribute the fork oil.

TIP

Be sure to stroke the inner tube slowly because the fork oil may spurt out.



10. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

TIP

Be sure to bleed the front fork leg of any residual air.

11. Measure:

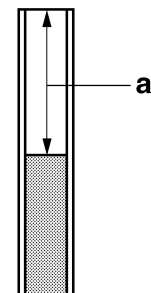
- Front fork leg oil level "a"
(from the top of the inner tube, with the inner tube fully compressed and without the fork spring)
Out of specification → Correct.



Level
78.0 mm (3.07 in)

TIP

- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.

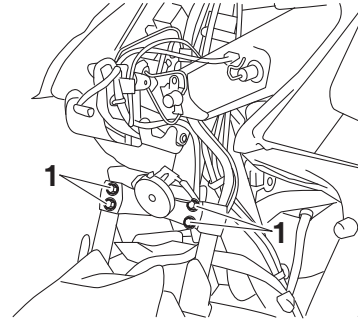
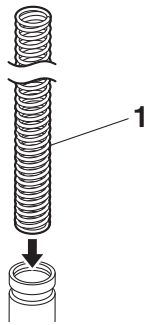


12. Install:

- Fork spring "1"
- O-ring **New**
- Front fork cap
- Front fork cap clip **New**

TIP

Install the fork spring with its smaller pitch downward.



EAS30210

INSTALLING THE FRONT FORK LEGS

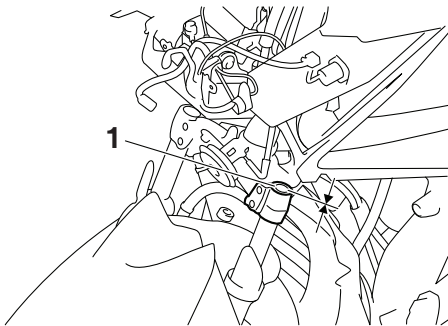
The following procedure applies to both of the front fork legs.

1. Remove:
 - Front side cover
 - Refer to “GENERAL CHASSIS (2)” on page 4-3.
2. Install:
 - Front fork leg “1”

Temporarily tighten the lower bracket pinch bolts.

TIP

Make sure the inner tube end is flush with the top of the lower bracket.



3. Tighten:
 - Lower bracket pinch bolts “1”



Lower bracket pinch bolt
53 N·m (5.3 kgf·m, 38 lb·ft)

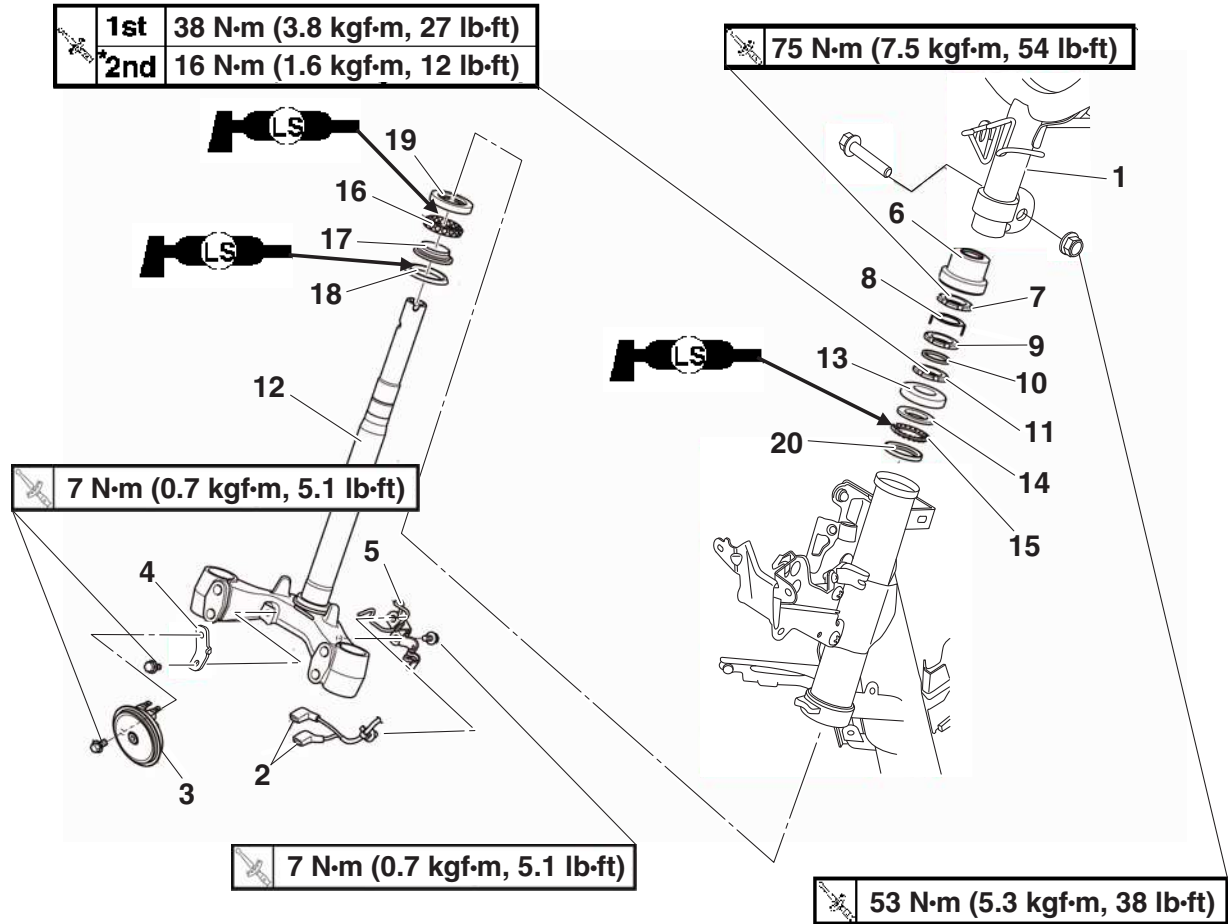
TIP

Tighten the lower bracket pinch bolts to specification twice. Tighten the upper and lower bolts alternately, starting with the upper bolts.

EAS20035

STEERING HEAD

Removing the lower bracket

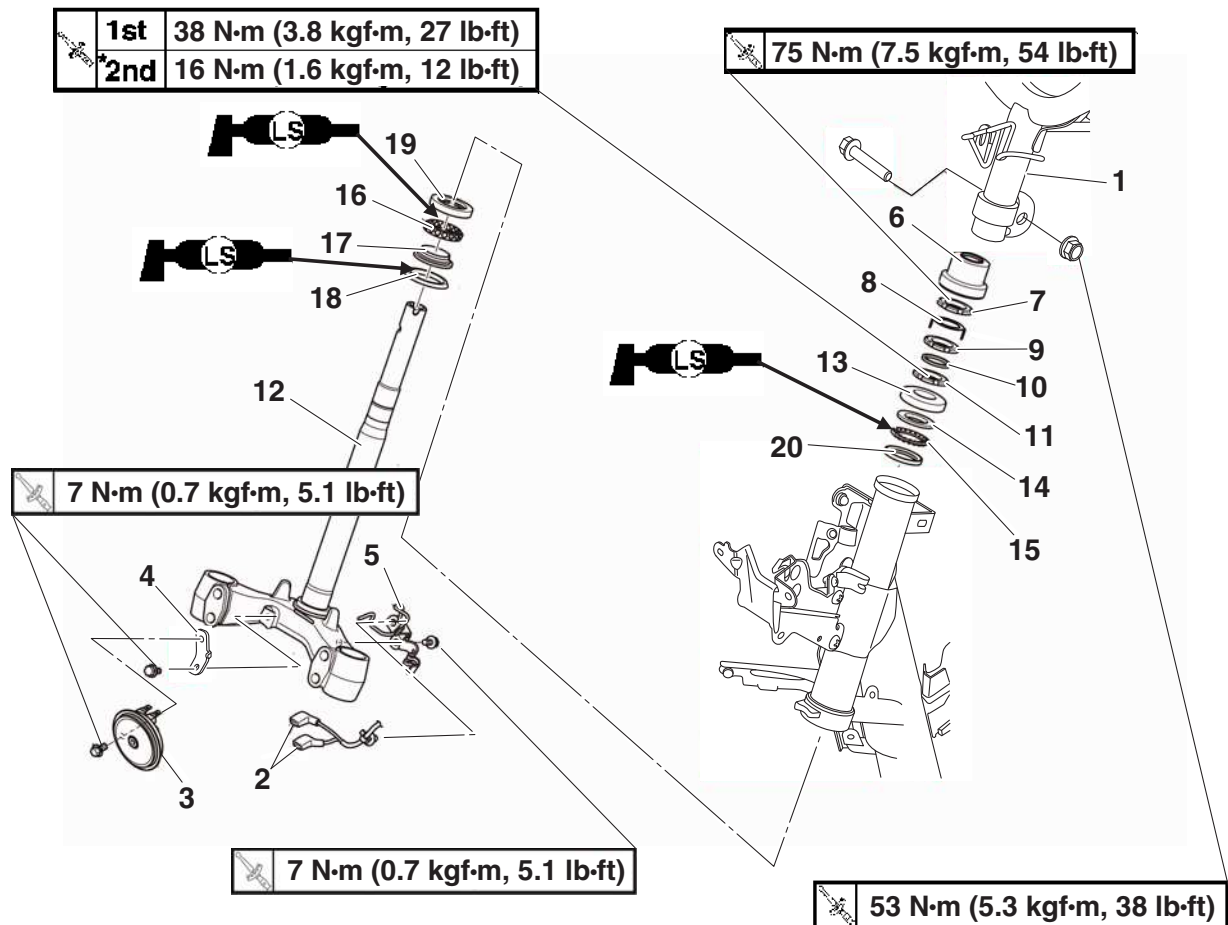


* Loosen the lower ring nut 1/4 of a turn, and then tighten it to specification.

Order	Job/Parts to remove	Q'ty	Remarks
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Center lower cover		Refer to "GENERAL CHASSIS (6)" on page 4-16.
	Front upper cowling assembly		Refer to "GENERAL CHASSIS (4)" on page 4-9.
	Front wheel		Refer to "FRONT WHEEL" on page 4-20.
	Handlebar		Refer to "HANDLEBAR" on page 4-55.
	Front fork legs		Refer to "FRONT FORK" on page 4-60.
1	Handlebar bracket	1	
2	Horn connector	2	Disconnect.
3	Horn	1	
4	Horn bracket	1	
5	Front brake hose holder	1	

STEERING HEAD

Removing the lower bracket



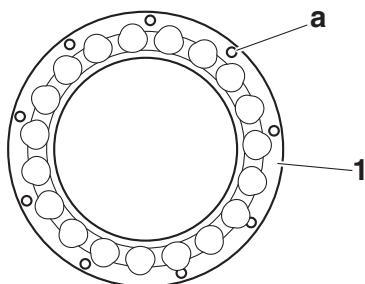
* Loosen the lower ring nut 1/4 of a turn, and then tighten it to specification.

Order	Job/Parts to remove	Q'ty	Remarks
6	Ring nut cover	1	
7	Upper ring nut	1	
8	Lock washer	1	
9	Center ring nut	1	
10	Rubber washer	1	
11	Lower ring nut	1	
12	Lower bracket	1	
13	Bearing cover	1	
14	Upper bearing inner race	1	
15	Upper bearing	1	
16	Lower bearing	1	
17	Lower bearing inner race	1	
18	Dust seal	1	
19	Lower bearing outer race	1	
20	Upper bearing outer race	1	

STEERING HEAD

TIP

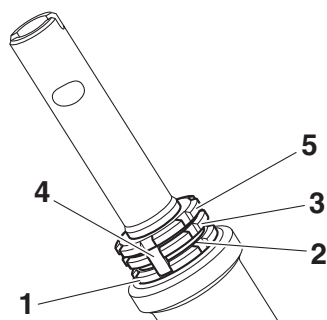
- Apply lithium-soap-based grease to each part.
- Be sure to install the upper bearing so that the marks "a" on the bearing are facing upward.



2. Install:

- Lower ring nut "1"
- Rubber washer "2"
- Center ring nut "3"
- Lock washer "4"
- Upper ring nut "5"

Refer to "CHECKING AND ADJUSTING THE STEERING HEAD" on page 3-14.



3. Install:

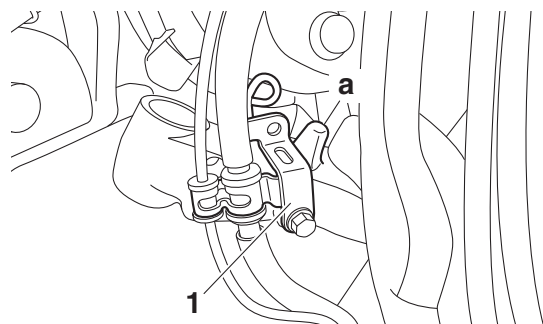
- Front brake hose holder "1"



Front brake hose holder bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

While holding the front brake hose holder so that the holder contacts the projection "a" on the lower bracket, tighten the bolt to specification.



4. Install:

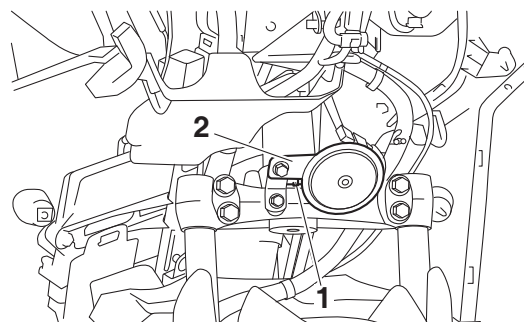
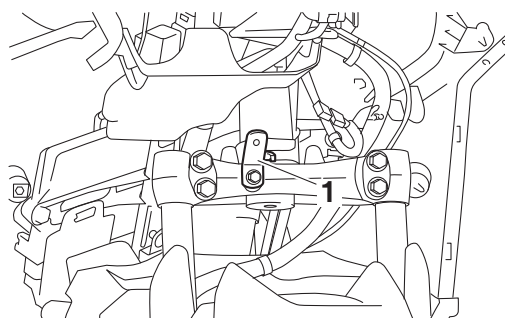
- Horn bracket "1"
- Horn "2"



Horn bracket bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)
Horn bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

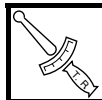
TIP

While holding the horn so that the horn contacts the portion "a" of the horn bracket, tighten the bolt to specification.



5. Install:

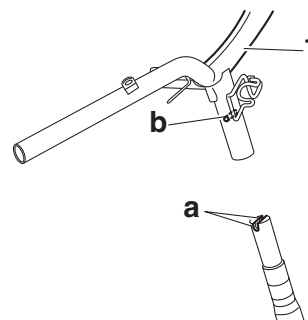
- Handlebar bracket "1"



Handlebar bracket nut
53 N·m (5.3 kgf·m, 38 lb·ft)

TIP

Align the slots "a" in the lower bracket with the pin "b" on the handlebar bracket.

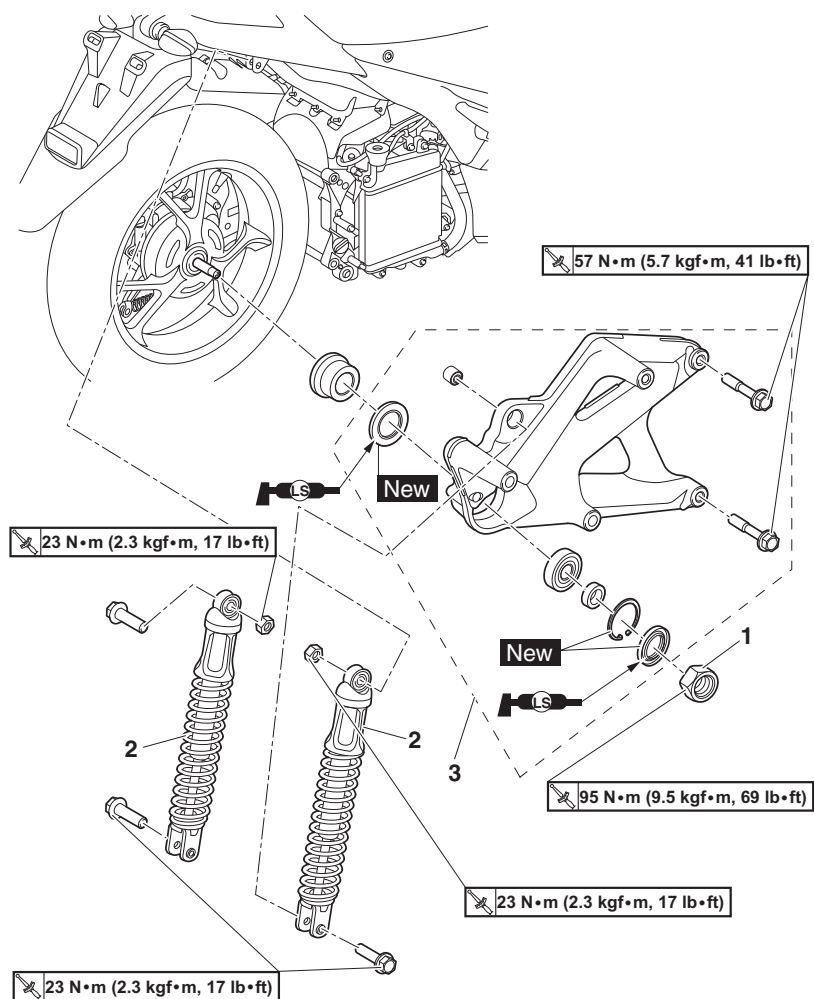


REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

EAS20189

REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

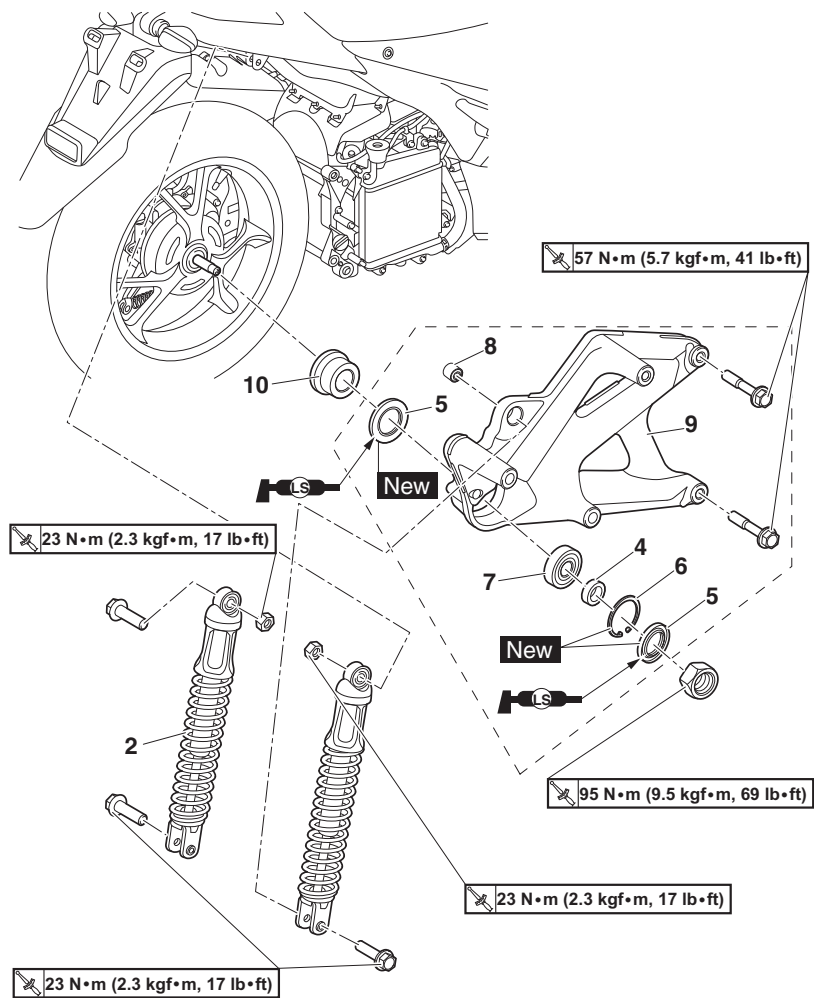
Removing the rear shock absorber assemblies and swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Radiator cover		Refer to "RADIATOR" on page 6-1.
1	Rear wheel axle nut	1	
2	Rear shock absorber assembly	2	
3	Swingarm assembly	1	

REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

Removing the rear shock absorber assemblies and swingarm



Order	Job/Parts to remove	Q'ty	Remarks
4	Spacer	1	
5	Oil seal	1	
6	Circlip	1	
7	Bearing	1	
8	Bush rear shock absorber	1	
9	Swingarm	1	
10	Collar	1	

REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

EAS31228

REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

WARNING

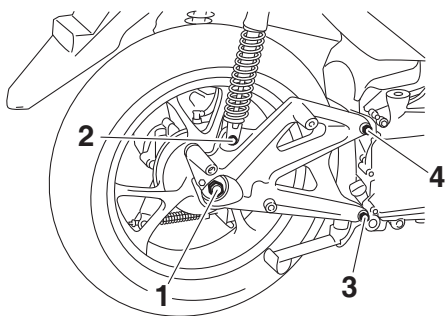
Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on the centerstand so that the rear wheel is elevated.

2. Remove:

- Rear wheel axle nut “1”
- Rear shock absorber assembly lower bolt (right side)
- Swingarm mounting bolt (lower side) “3”
- Swingarm mounting bolt (upper side) “4”



3. Remove:

- Swingarm

EAS31229

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:

- Rear shock absorber rod
Bends/damage → Replace the rear shock absorber assembly.
- Rear shock absorber assembly
Oil leaks → Replace the rear shock absorber assembly.
- Spring
Damage/wear → Replace the rear shock absorber assembly.
- Bushings
Damage/wear → Replace the rear shock absorber assembly.
- Bolts
Bends/damage/wear → Replace.

EAS31230

CHECKING THE SWINGARM

1. Check:

- Swingarm
Bends/cracks/damage → Replace.

2. Check:

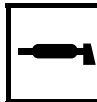
- Spacer
 - Collar
 - Oil seal
 - Circlip
 - Bearing
- Damage/wear → Replace.

EAS31231

INSTALLING THE SWINGARM

1. Lubricate:

- Oil seal lips



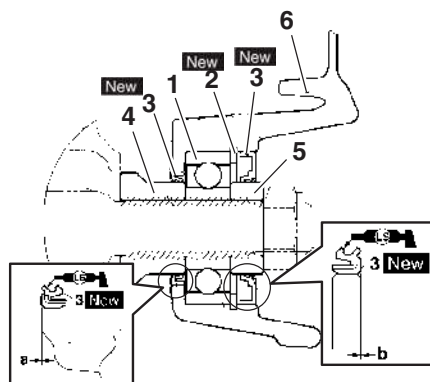
Recommended lubricant
Lithium-soap-based grease

2. Assemble:

- Bearing “1”
- Circlip “2” **New**
- Oil seals “3” **New**
- Collar “4”
- Spacer “5”
(to the swingarm “6”)

TIP

- Install the oil seal until it is flush with the surface “a” of the swingarm.
- Install the oil seal until it is flush with the surface “b” of the swingarm.



REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

3. Install:

- Swingarm assembly “1”
- Rear wheel axle nut “2”
(temporarily tighten)
- Swingarm mounting bolt (upper side) “3”
(temporarily tighten)
- Swingarm mounting bolt (lower side) “4”
(temporarily tighten)

4. Tighten:

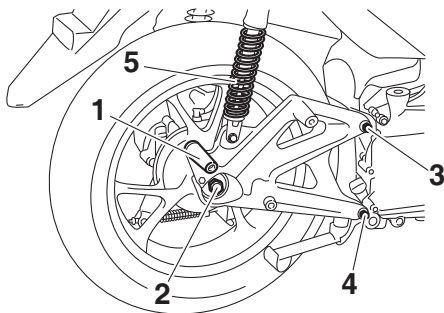
- Rear wheel axle nut “2”
- Swingarm mounting bolt (upper side) “3”
- Swingarm mounting bolt (lower side) “4”



Rear wheel axle nut
95 N·m (9.5 kgf·m, 69 lb·ft)
Swingarm mounting bolt
57 N·m (5.7 kgf·m, 41 lb·ft)

TIP

Tighten the rear wheel axle nut “2”, then the swingarm mounting bolts “3”, “4”.



5. Install:

- Rear shock absorber assemblies “5”



Rear shock absorber assembly nut
23 N·m (2.3 kgf·m, 41 lb·ft)
Rear shock absorber assembly bolt
23 N·m (2.3 kgf·m, 41 lb·ft)

TIP

Tighten the rear shock absorber assembly nuts and bolts temporarily, and then tighten them to specification.

REAR SHOCK ABSORBER ASSEMBLIES AND SWINGARM

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EAS20041

ENGINE INSPECTION

EAS30249

MEASURING THE COMPRESSION PRESSURE

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
 - Valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-5.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
 - Front side cover assembly (right)
Refer to “GENERAL CHASSIS (2)” on page 4-3.
 - Footrest board (right)
Refer to “GENERAL CHASSIS (6)” on page 4-16.
4. Disconnect:
 - Spark plug cap
5. Remove:
 - Spark plug
6. Install:
 - Compression gauge “1”
 - Extension “2”

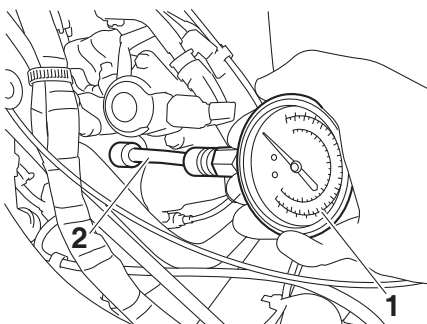
ECA20470

NOTICE

Before removing the spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.



Compression gauge
90890-03081
Engine compression tester
YU-33223
Extension
90890-04136



7. Measure:

- Compression pressure
Out of specification → Refer to steps (c) and (d).



Standard compression pressure (at sea level)

1800 kPa/860 r/min (18.0 kgf/cm²/860 r/min, 256.0 psi/860 r/min)

Minimum–Maximum

1570–2020 kPa/860 r/min (15.7–20.2 kgf/cm²/860 r/min, 223.3–287.3 psi/860 r/min)



- a. Turn the main switch to “ON”.
- b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

EWA12960

WARNING

To prevent sparking, ground the spark plug lead before cranking the engine.

- c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
Carbon deposits → Eliminate.
- d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Piston, valves, cylinder head gasket or piston ring(s) possibly defective → Repair.



8. Install:

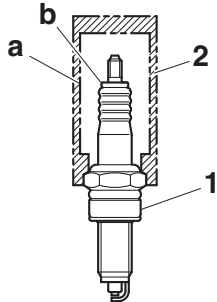
- Spark plug “1”



Spark plug
13 N·m (1.3 kgf·m, 9.4 lb·ft)

TIP

When tightening the spark plug, make sure that the inside “a” of the spark plug wrench “2” does not contact the portion “b” of the spark plug.



9. Connect:

- Spark plug cap

TIP

To route the spark plug lead, refer to “CONNECTING THE LEADS” on page 5-8.

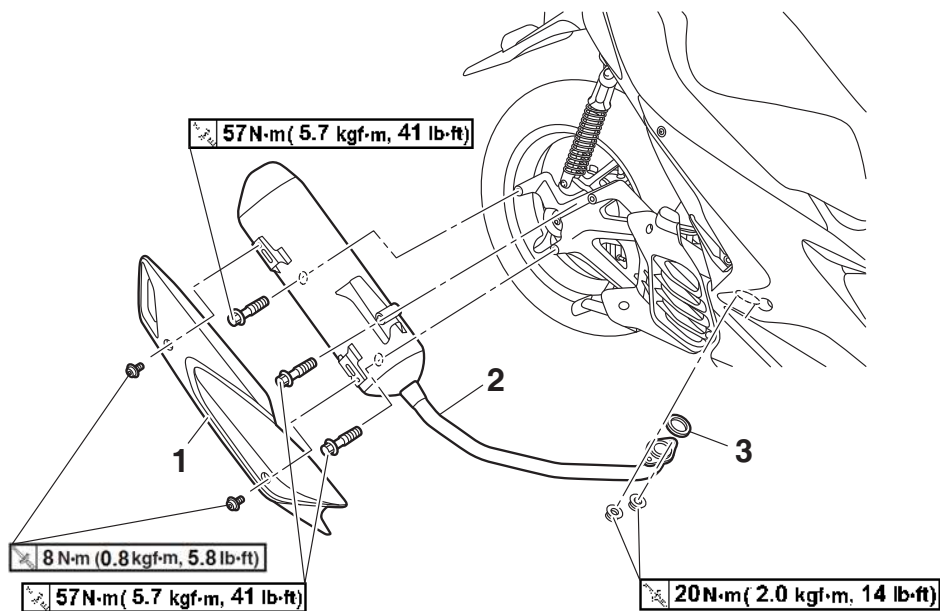
10. Install:

- Footrest board (right)
Refer to “GENERAL CHASSIS (6)” on page 4-16.
- Front side cover assembly (right)
Refer to “GENERAL CHASSIS (2)” on page 4-3.

EAS20042

ENGINE REMOVAL

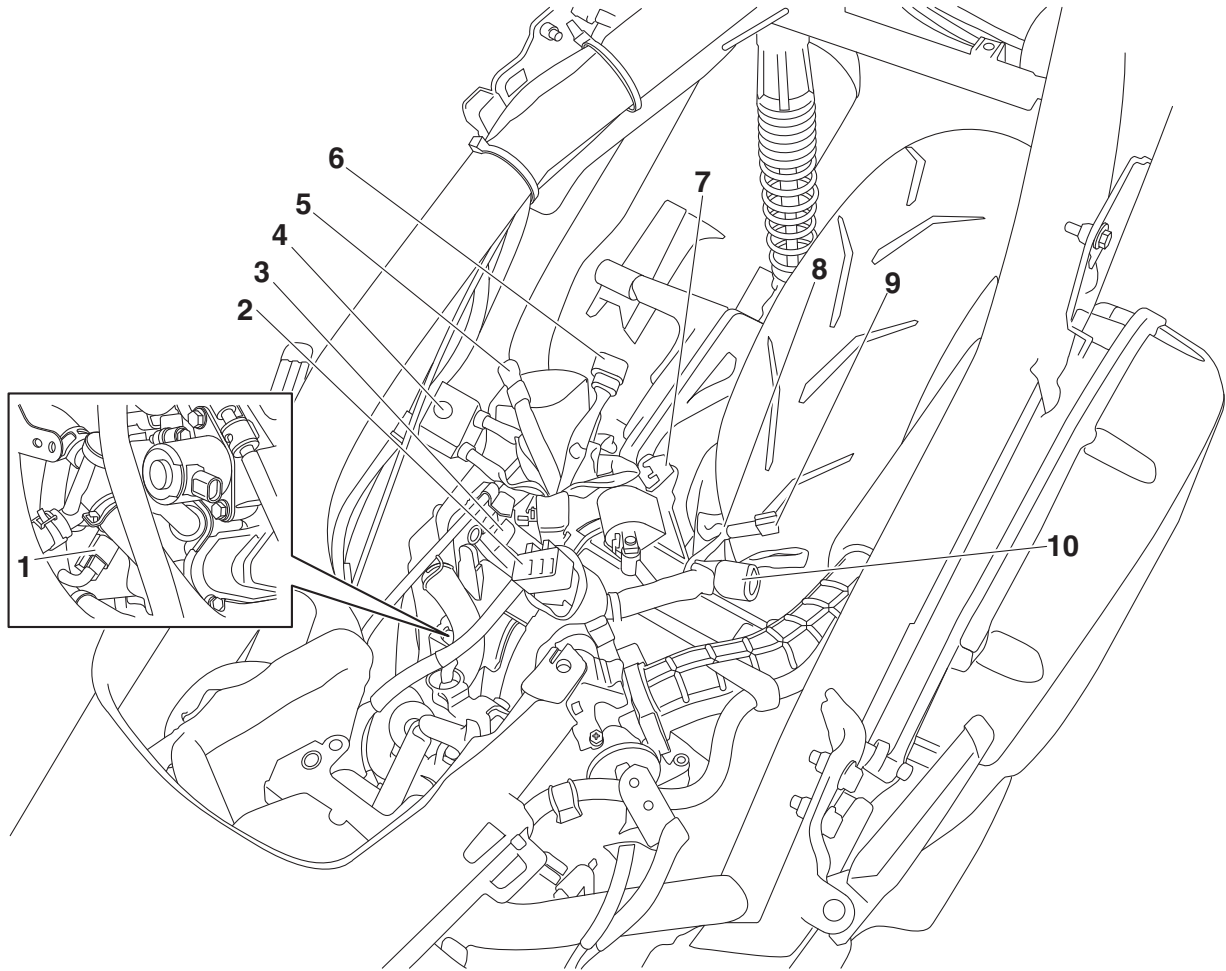
Removing the muffler



Order	Job/Parts to remove	Q'ty	Remarks
1	Muffler protector	1	
2	Muffler	1	
3	Exhaust gasket	1	

ENGINE REMOVAL

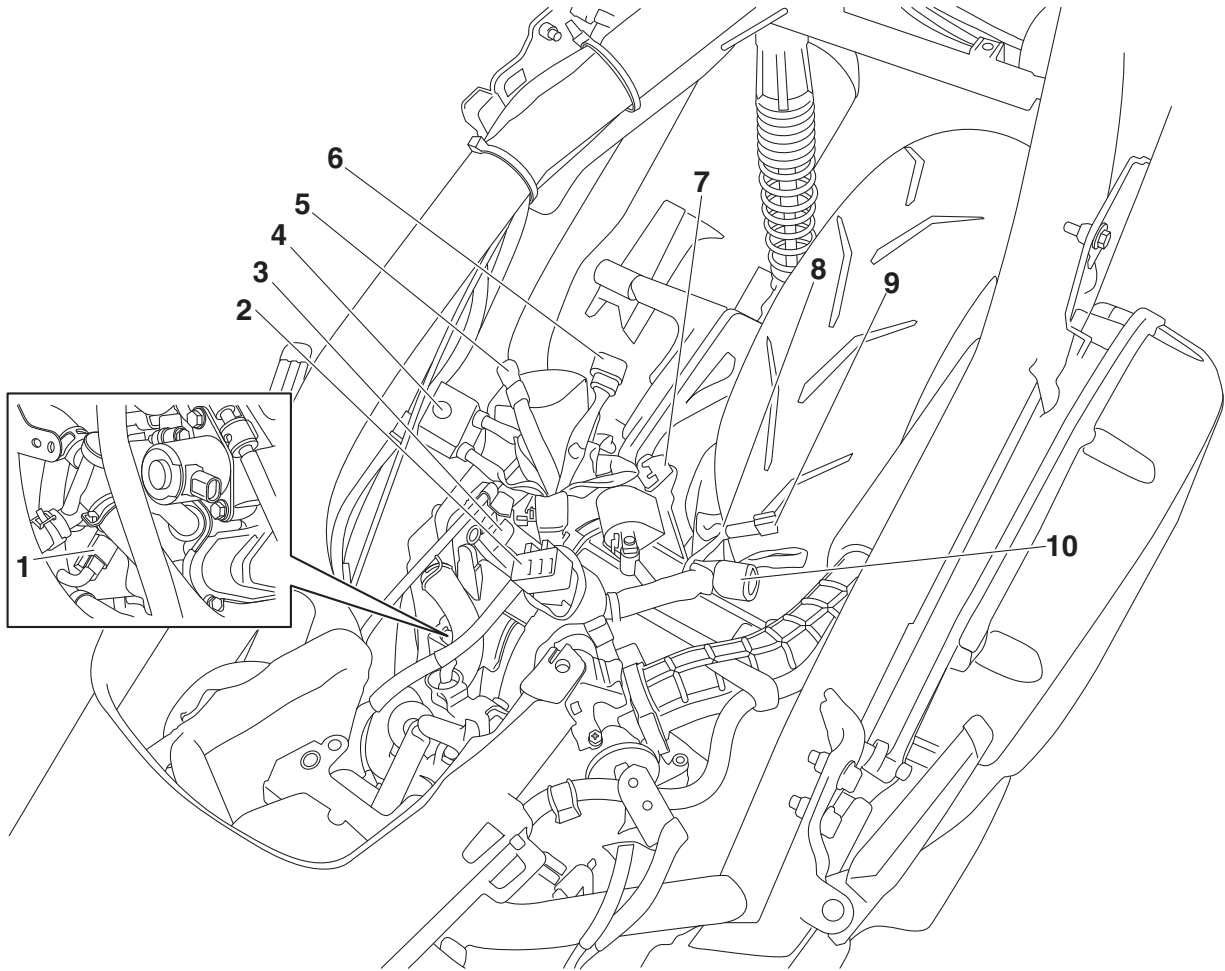
Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-17.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Rear side cover assembly		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Air filter case		Refer to "AIR FILTER CASE" on page 7-7.
	V-belt case air duct		Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
	Fuel injector		Refer to "FUEL INJECTOR" on page 7-5.
	Throttle body		Refer to "THROTTLE BODY" on page 7-10.
	Rear brake caple		Refer to "REAR BRAKE" on page 4-43.

ENGINE REMOVAL

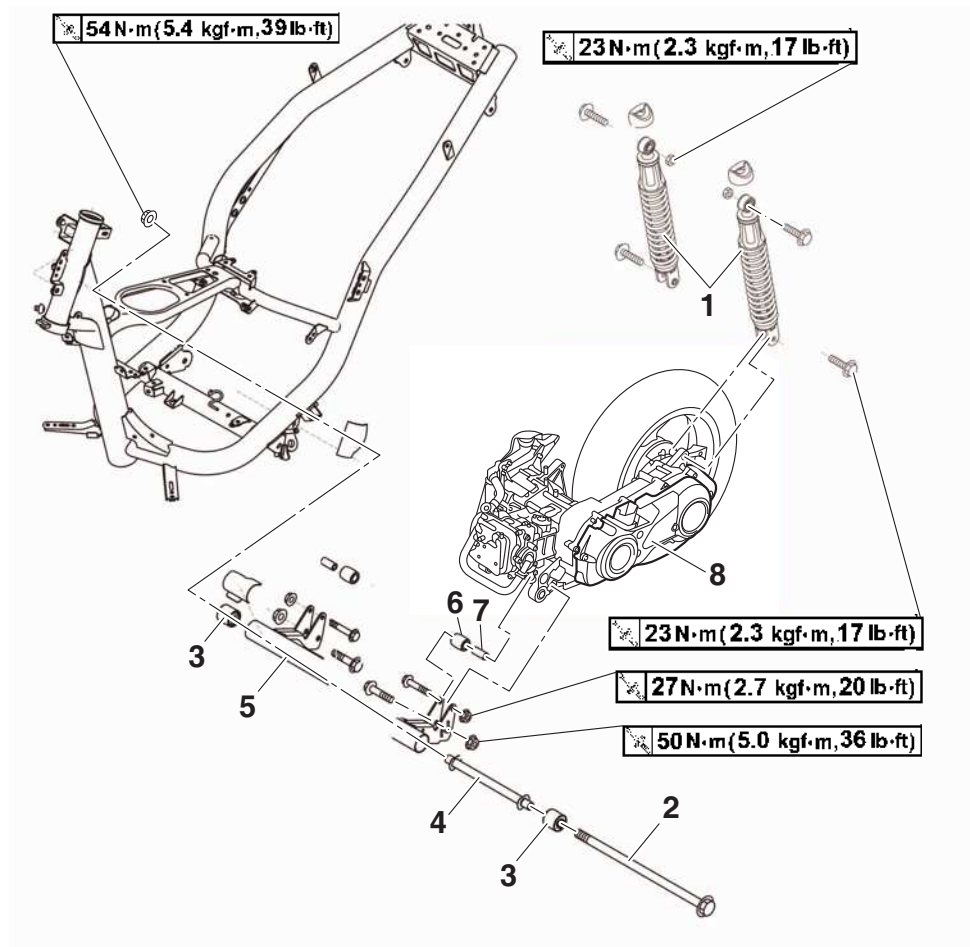
Disconnecting the leads



Order	Job/Parts to remove	Q'ty	Remarks
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Rear wheel		Refer to "REAR WHEEL" on page 4-28
1	Coolant temperature sensor coupler	1	Disconnect.
2	Crankshaft position sensor coupler	1	Disconnect.
3	Starter generator lead coupler	1	Disconnect.
4	Ignition coil coupler	1	Disconnect.
5	Engine ground lead	1	Disconnect.
6	Module sensor coupler	1	Disconnect.
7	ISC unit couler	1	Disconnect.
8	VVA (variable valve actuator) solenoid coupler	1	Disconnect.
9	O ₂ sensor coupler	1	Disconnect.
10	Injector coupler	1	Disconnect.

ENGINE REMOVAL

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear shock absorber assembly	2	
2	Engine bracket bolt	1	
3	Damper	2	
4	Spacer	1	
5	Engine bracket	1	
6	Collar	2	
7	Pin	2	
8	Engine	1	

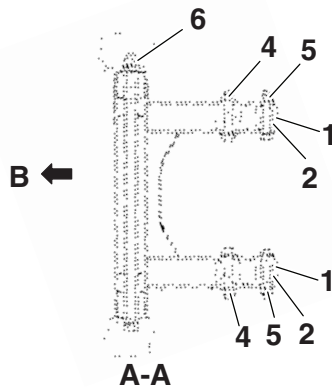
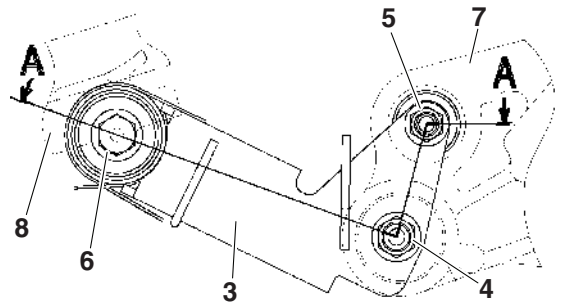
ENGINE REMOVAL

EAS23720

INSTALLING THE ENGINE

1. Install:

- Stopper "1"
- Collars "2"
- Engine bracket "3"
- Engine bracket bolt/nut (center) "4"
- Engine bracket bolt/nut (rear) "5"
- Engine bracket bolt/nut (front) "6"

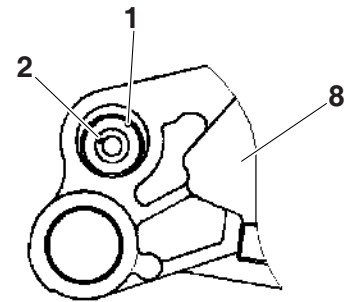


- 7. Engine assembly
- 8. Frame complete
- B. Front

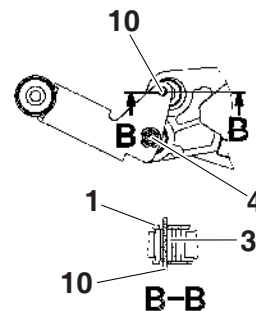
TIP

Follow the installation procedure below to properly function the engine mount.

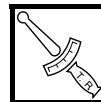
- Temporarily put the stopper "1" and collar "2" on the engine assembly "8".



- Temporarily install the engine bracket bolt/nut (center) "4" and route the $\varnothing 4$ pin "10" through the hole of the engine bracket bolt (rear) and the hole of the inner collar.

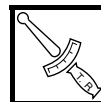


- Tighten the engine bracket nut (center) from the right side first, then the left side.

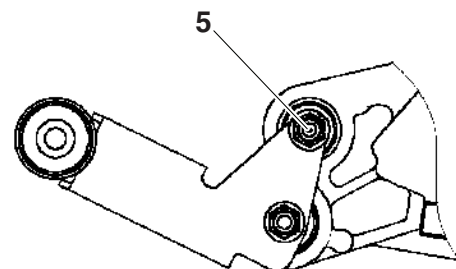


Engine bracket nut (center)
54 N·m (5.4 kgf·m, 39 lb·ft)

- Remove the $\varnothing 4$ pin, insert the engine bracket bolt (rear) "5", and then tighten the nut "5".

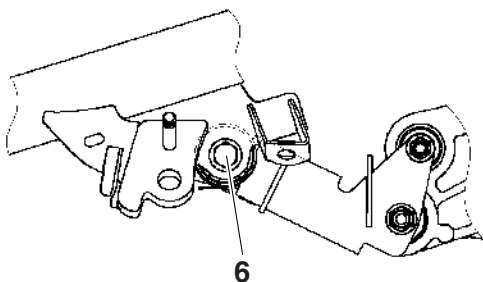


Engine bracket nut (rear)
27 N·m (2.7 kgf·m, 20 lb·ft)



- Temporarily install the engine bracket bolt/nut (front) "6".

ENGINE REMOVAL



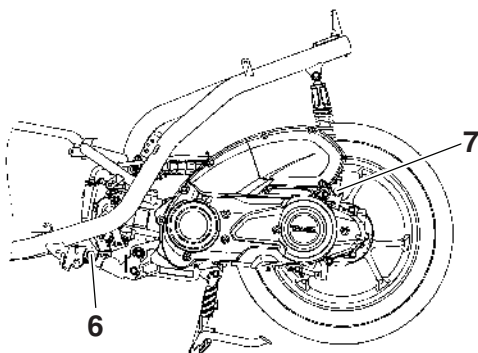
- f. Tighten the rear shock absorber lower bolt "7", lift the rear tire up using the centerstand, and then tighten the engine bracket nut (front) "6".



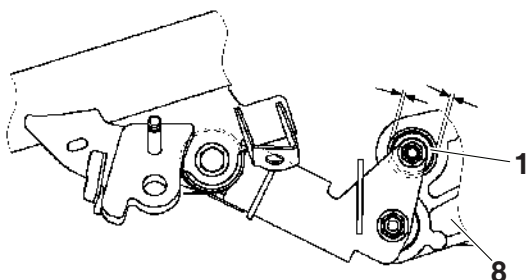
Rear shock absorber lower bolt
23 N·m (2.3 kgf·m, 17 lb·ft)



Engine bracket nut (front)
50 N·m (5.0 kgf·m, 36 lb·ft)



- g. Remove the centerstand and then make sure that the stopper "1" is not touching the engine assembly "8".



EAS31717

CONNECTING THE LEADS

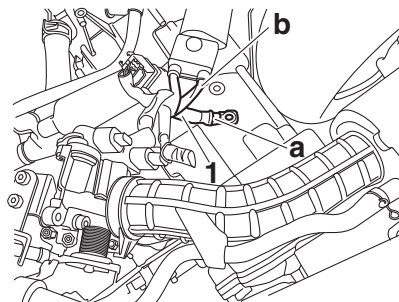
1. Connect:
- Engine ground lead "1"



Engine ground lead bolt
7 N·m (0.7 kgf·m, 5.1 lb·ft)

TIP

Make sure that the engine ground lead terminal "a" contacts the stopper "b" on the crankcase.

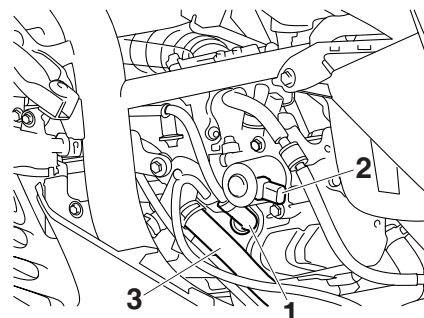


2. Connect:

- Spark plug cap "1"

TIP

Route the spark plug lead between the VVA (variable valve actuator) solenoid "2" and the water pump inlet hose "3". Make sure that the spark plug lead does not contact the VVA (variable valve actuator) solenoid or water pump inlet hose.



EAS31588

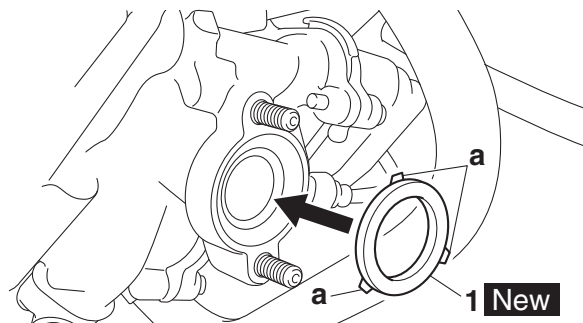
INSTALLING THE MUFFLER

1. Install:

- Exhaust gaskets "1" **New** (to the cylinder head)

TIP

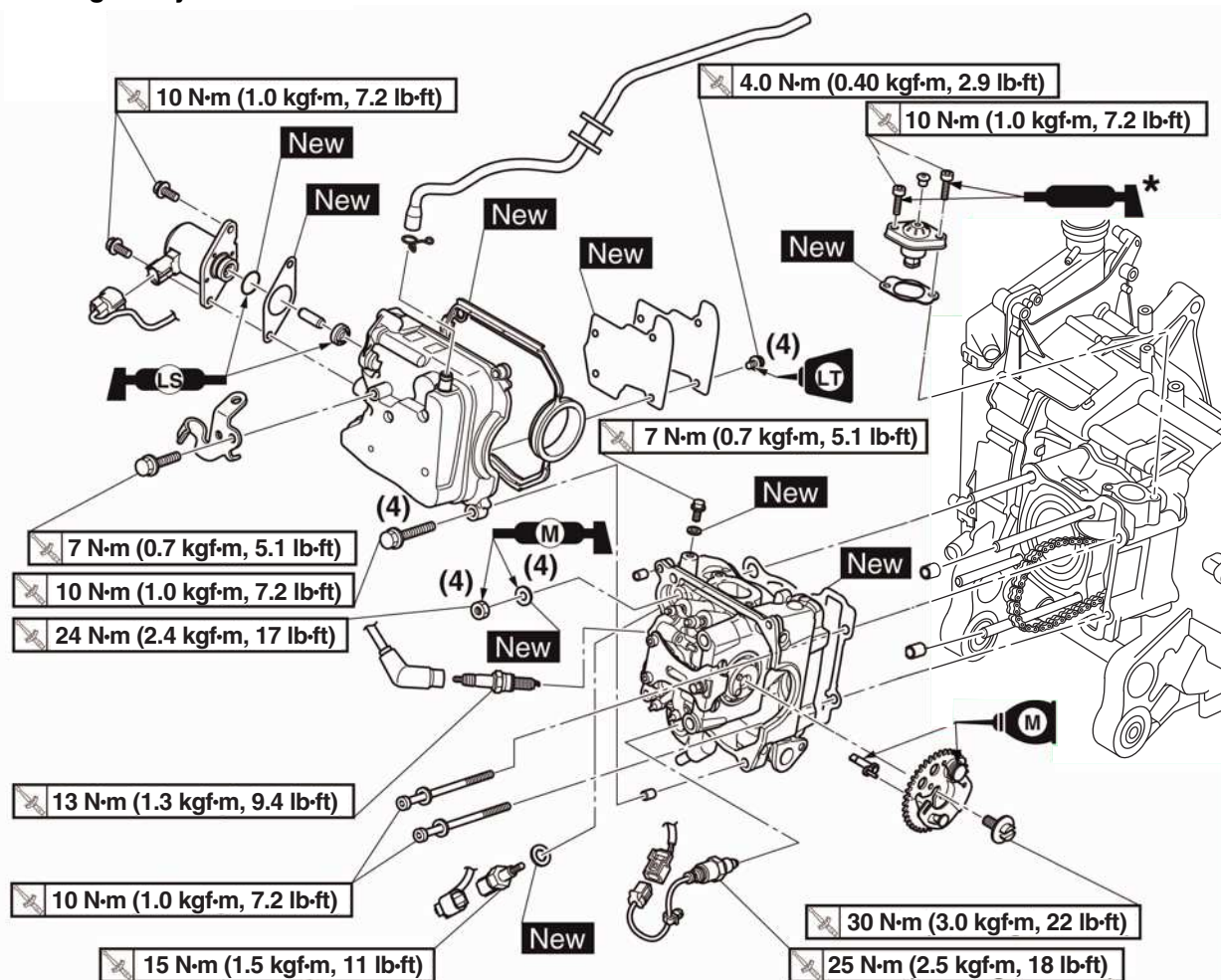
Install the exhaust gasket with its projections "a" facing toward the cylinder head.



EAS20044

CYLINDER HEAD

Removing the cylinder head

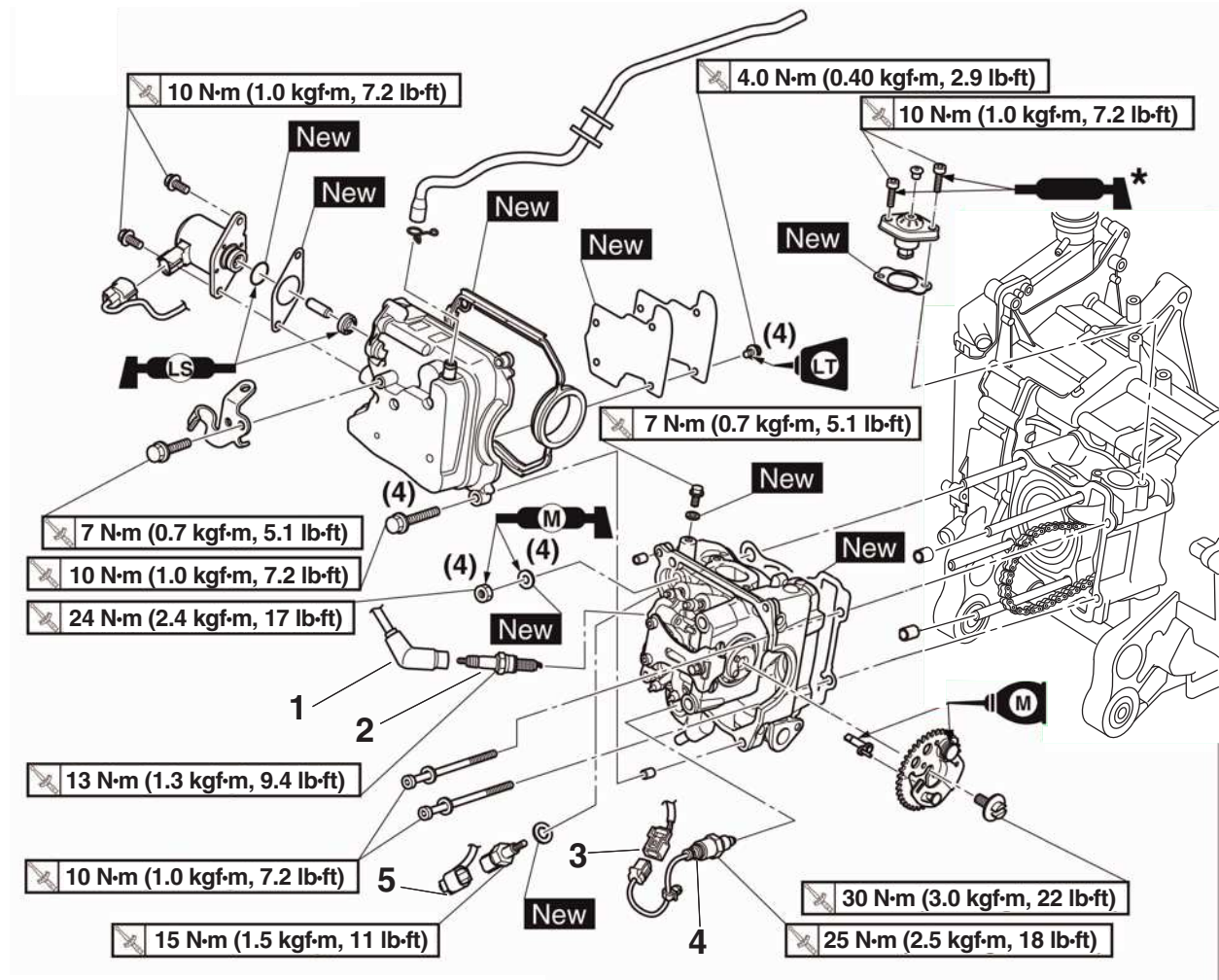


* Apply Yamaha bond No.1215 (90890-85505).

Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Fuel tank cover		Refer to "GENERAL CHASSIS (7)" on page 4-18.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Center lower cover		Refer to "GENERAL CHASSIS (6)" on page 4-16.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Radiator		Refer to "RADIATOR" on page 6-1.
	Thermostat assembly		Refer to "THERMOSTAT" on page 6-4.
	Water pump		Refer to "WATER PUMP" on page 6-6.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.

CYLINDER HEAD

Removing the cylinder head

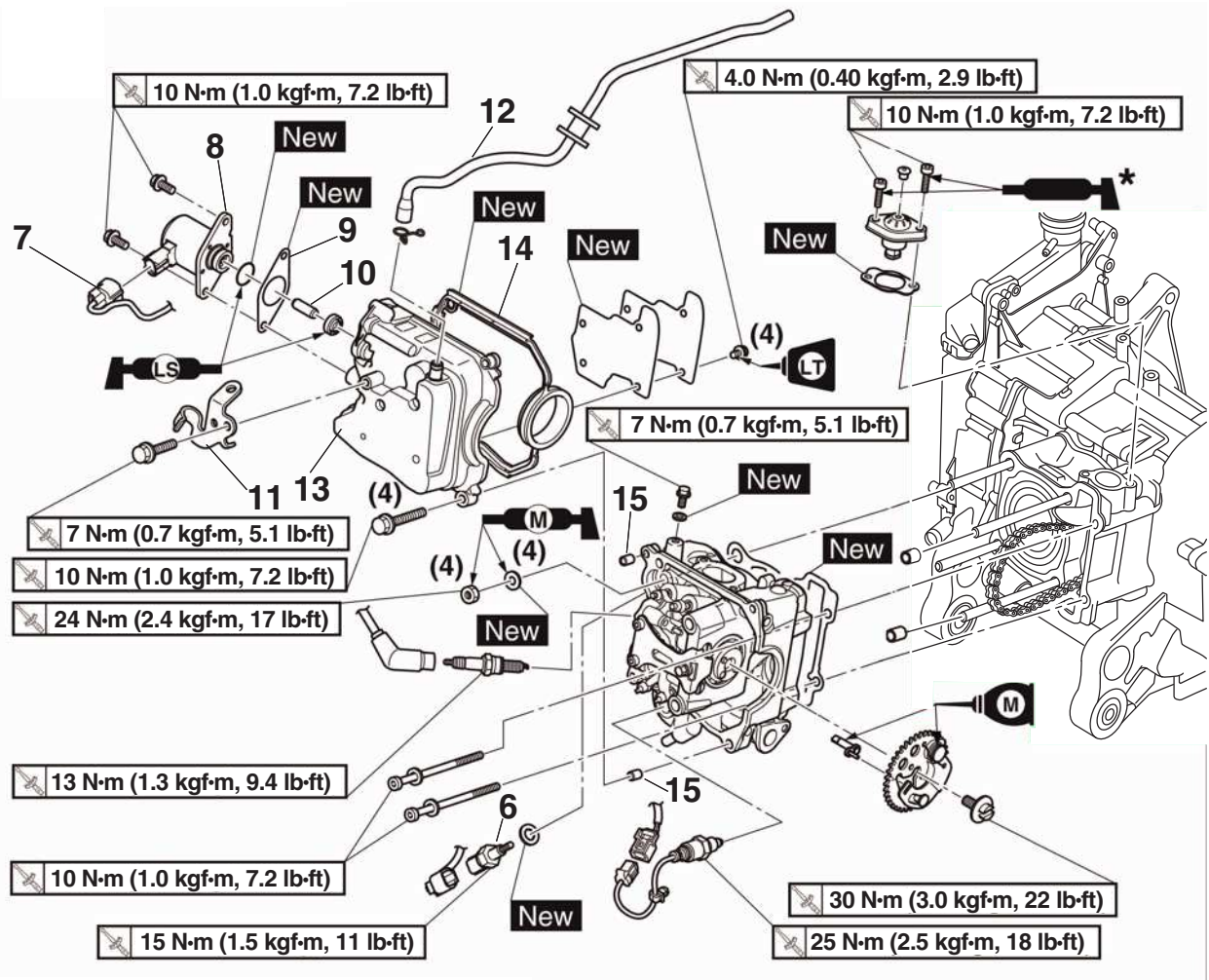


* Apply Yamaha bond No.1215 (90890-85505).

Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "AIR FILTER CASE" on page 7-7.
	Fuel injector		Refer to "FUEL INJECTOR" on page 7-5.
	Intake manifold		Refer to "THROTTLE BODY" on page 7-10.
1	Spark plug cap	1	Disconnect.
2	Spark plug	1	
3	O ₂ sensor coupler	1	Disconnect.
4	O ₂ sensor	1	TIP Remove the O ₂ sensor only when necessary.
5	Coolant temperature sensor coupler	1	Disconnect.

CYLINDER HEAD

Removing the cylinder head

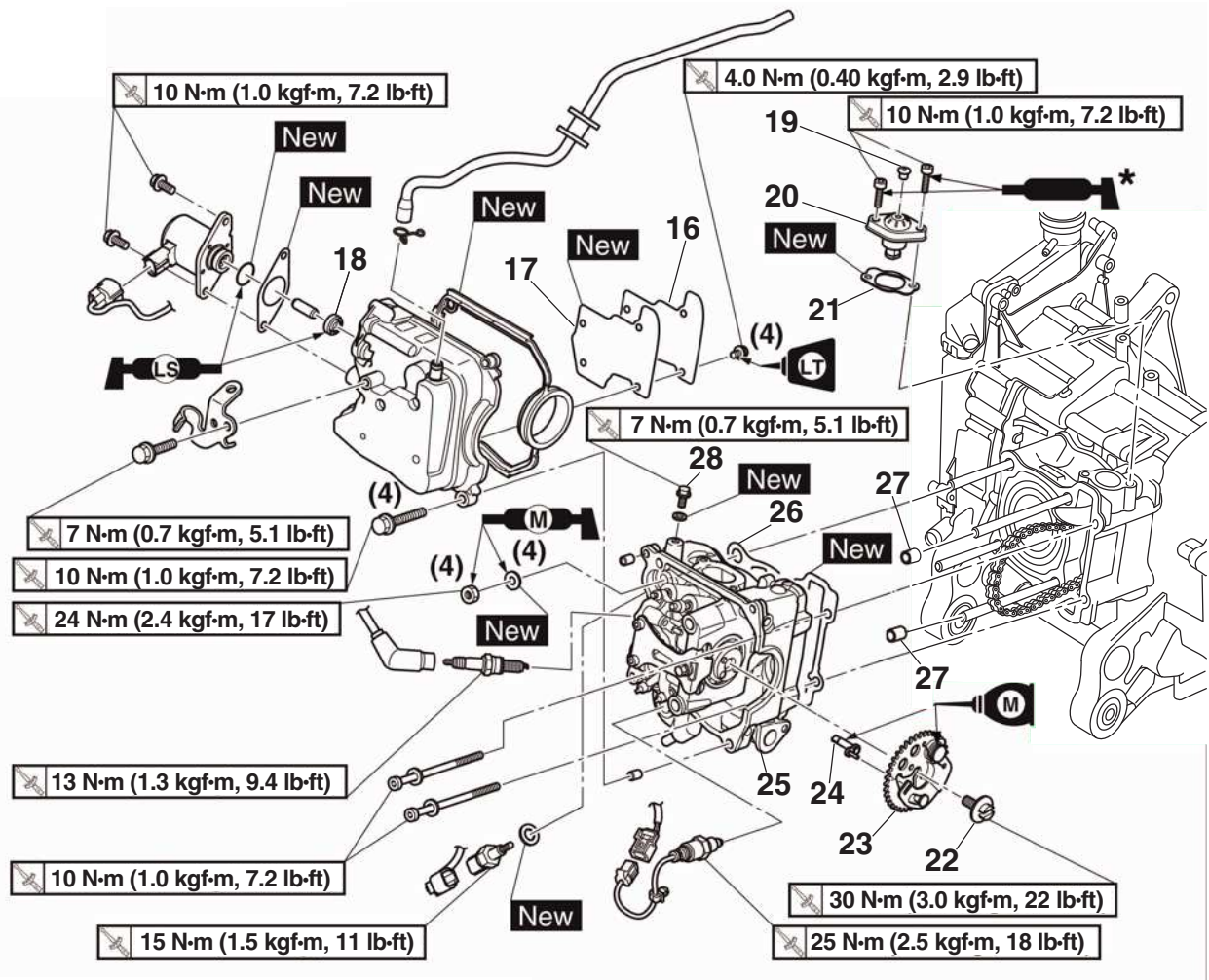


* Apply Yamaha bond No.1215 (90890-85505).

Order	Job/Parts to remove	Q'ty	Remarks
6	Coolant temperature sensor	1	
7	VVA (variable valve actuator) solenoid coupler	1	Disconnect.
8	VVA (variable valve actuator) solenoid	1	
9	VVA (variable valve actuator) solenoid gasket	1	
10	VVA (variable valve actuator) solenoid rod	1	
11	Fuel hose holder	1	
12	Cylinder head breather hose	1	
13	Cylinder head cover	1	
14	Cylinder head cover gasket	1	
15	Dowel pin	2	

CYLINDER HEAD

Removing the cylinder head



* Apply Yamaha bond No.1215 (90890-85505).

Order	Job/Parts to remove	Q'ty	Remarks
16	Cylinder head cover breather plate	1	
17	Cylinder head cover breather plate gasket	1	
18	Oil seal	1	
19	Timing chain tensioner plug	1	
20	Timing chain tensioner	1	
21	Timing chain tensioner gasket	1	
22	Camshaft sprocket bolt	1	
23	Camshaft sprocket	1	
24	Decompression cam	1	
25	Cylinder head	1	
26	Cylinder head gasket	1	
27	Dowel pin	2	
28	Engine oil check bolt	1	

EAS30276

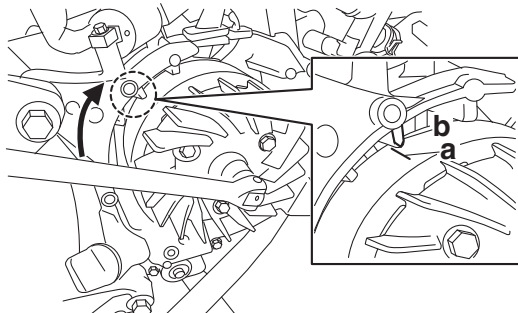
REMOVING THE CYLINDER HEAD

1. Align:

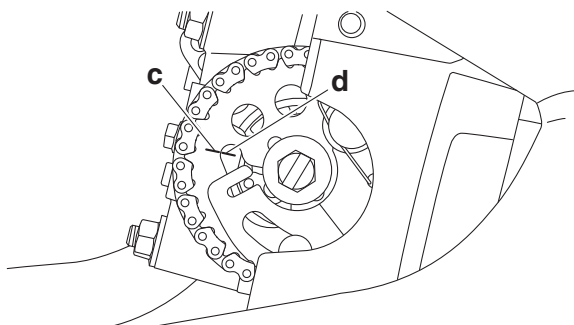
- “I” mark “a” on the AC magneto rotor (with the match mark “b” on the right crank-case)



a. Turn the crankshaft clockwise.



- b. When the piston is at TDC on the compression stroke, align the “I” mark “c” on the camshaft sprocket with the match mark “d” on the camshaft stopper plate.



2. Loosen:

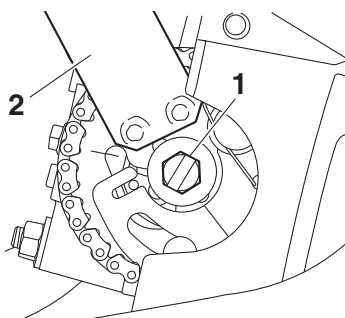
- Camshaft sprocket bolt “1”

TIP

Use the camshaft wrench “2” and loosen the camshaft sprocket bolt.



Camshaft wrench
90890-04162
Camshaft wrench
YM-04162

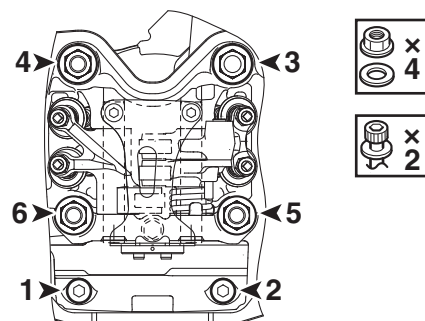


3. Remove:

- Cylinder head

TIP

- Loosen the bolts and nuts in the proper sequence as shown.
- Loosen each bolt and nuts 1/2 of a turn at a time. After all of the bolts and nuts are fully loosened, remove them.



EAS30277

CHECKING THE CYLINDER HEAD

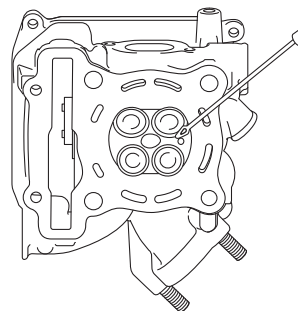
1. Eliminate:

- Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug bore threads
- Valve seats



2. Check:

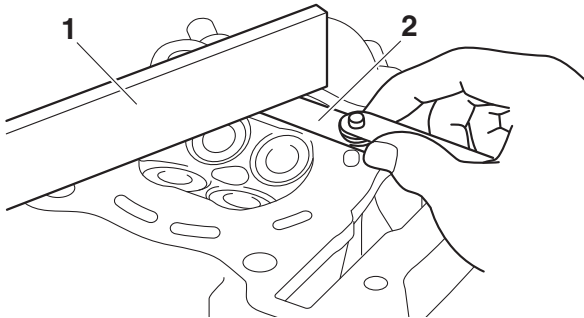
- Cylinder head
Damage/scratches → Replace.
- Cylinder head water jacket
Mineral deposits/rust → Eliminate.

3. Measure:

- Cylinder head warpage
Out of specification → Resurface the cylinder head.

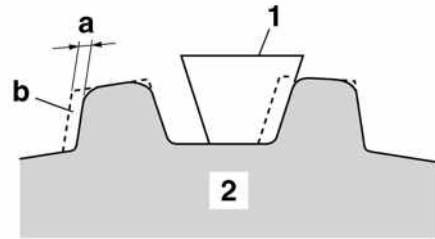


Warpage limit
0.05 mm (0.0020 in)



- TIP**

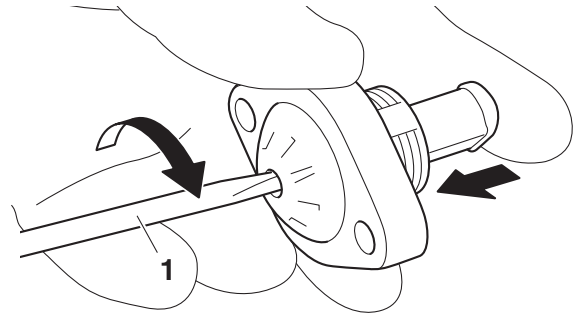
To ensure an even surface, rotate the cylinder head several times.



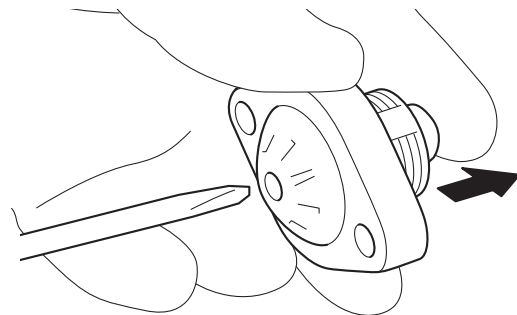
- EAS30279

1. Check:

- a. Remove the timing chain tensioner plug.
- b. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".



- c. While holding the timing chain tensioner rod in place with your hand, turn the screwdriver counterclockwise, remove the screwdriver, and slowly release the timing chain tensioner rod.



- 5-14**

CYLINDER HEAD

e. Install the timing chain tensioner plug.



EAS30280

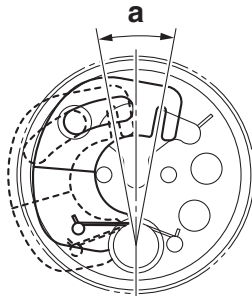
CHECKING THE DECOMPRESSION SYSTEM

1. Check:

- Decompression system

TIP

- Check that the decompression lever moves smoothly.
- Check that the operating range “a” of the decompression lever is the same as the range shown in the illustration.



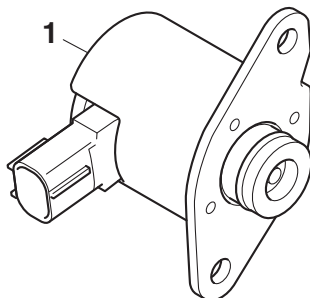
a. 20.88°

EAS31624

CHECKING THE VVA SOLENOID

1. Check:

- VVA (variable valve actuator) solenoid “1”
Cracks/damage → Replace.



EAS30282

INSTALLING THE CYLINDER HEAD

1. Tighten:

- Cylinder head nuts “1”
- Cylinder head bolts “2”

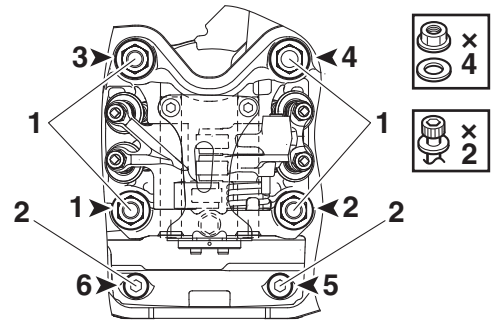


Cylinder head nut
24 N·m (2.4 kgf·m, 17 lb·ft)
Cylinder head bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Lubricate the cylinder head nuts and washers with molybdenum disulfide grease.

- Tighten the cylinder head nuts and bolts in the proper tightening sequence as shown and torque them in two stages.

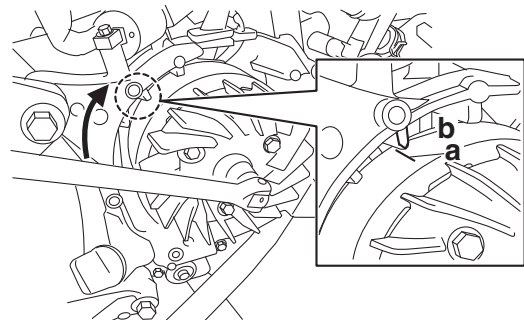


2. Install:

- Decompression cam “1”
- Camshaft sprocket “2”
- Timing chain
- Camshaft sprocket bolt

a. Turn the crankshaft clockwise.

b. Align the “I” mark “a” on the AC magneto rotor with the match mark “b” on the right crankcase.



c. Install the decompression cam.

d. Install the timing chain onto the camshaft sprocket, then the camshaft sprocket onto the camshaft, and then finger tighten the camshaft sprocket bolt.

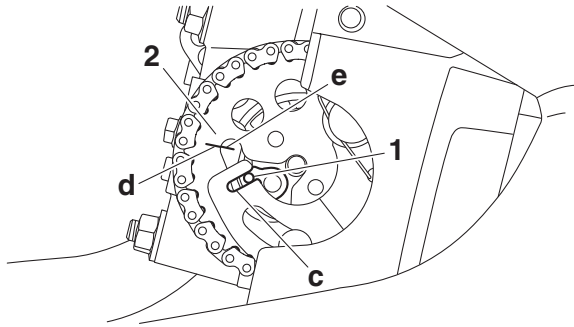
ECA20600

NOTICE

Do not turn the crankshaft when installing the camshaft sprocket to avoid damage or improper valve timing.

TIP

- Fit the pin on the decompression cam into the slot “c” in the decompression lever on the camshaft sprocket.
- Align the “I” mark “d” on the camshaft sprocket with the match mark “e” on the camshaft stopper plate.



e. While holding the camshaft, temporarily tighten the camshaft sprocket bolt.



3. Install:

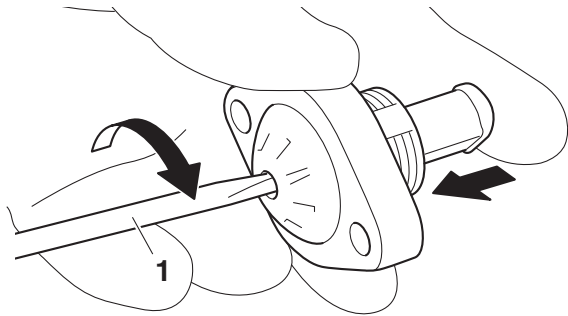
- Timing chain tensioner gasket **New**
- Timing chain tensioner



- a. Remove the timing chain tensioner plug.
b. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".

TIP

Make sure that the tensioner rod has been fully turned clockwise.



- c. Install the gasket and the timing chain tensioner "2" onto the cylinder.

EWA17620



WARNING

Always use a new gasket.

TIP

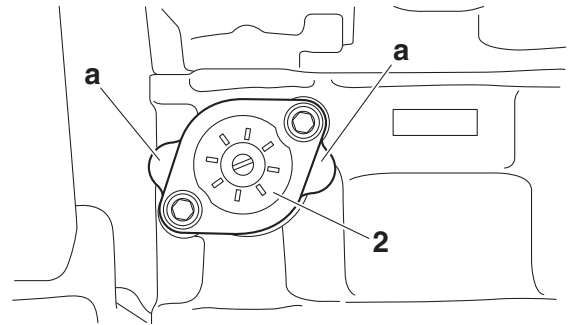
- Install the timing chain tensioner gasket so that the tabs "a" on the gasket are protruding in the directions shown in the illustration.
- Apply Yamaha bond No. 1215 to the threads of the timing chain tensioner bolts.



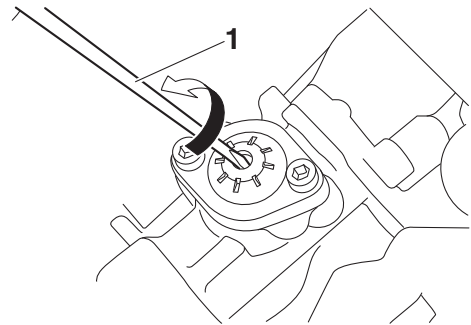
Yamaha bond No. 1215
90890-85505
(Three bond No.1215®)



Timing chain tensioner bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)



- d. Turn the timing chain tensioner rod counter-clockwise with a thin screwdriver "1", make sure it releases, and then install the timing chain tensioner plug.



4. Turn:

- Crankshaft
(several turns clockwise)

5. Check:

- "I" mark "a"

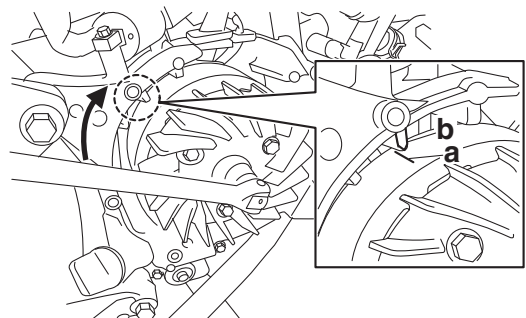
Make sure the "I" mark "a" on the AC magnetorotor is aligned with the match mark "b" on the right crankcase.

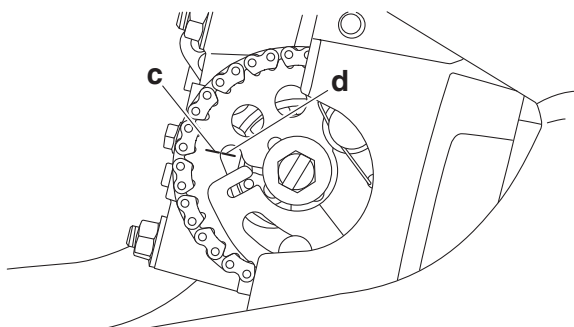
- "I" mark "c"

Make sure the "I" mark "c" on the camshaft sprocket is aligned with the match mark "d" on the camshaft stopper plate.

Out of alignment → Correct.

Refer to the installation steps above.





6. Tighten:

- Camshaft sprocket bolt “1”



Camshaft sprocket bolt
30 N·m (3.0 kgf·m, 22 lb·ft)



Camshaft wrench
90890-04162
Camshaft wrench
YM-04162

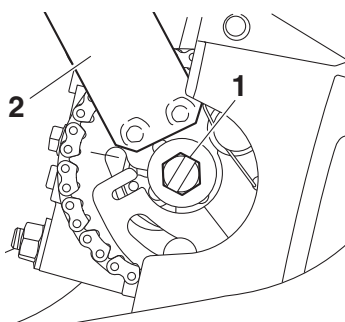
ECA20610

NOTICE

Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolt coming loose and damaging the engine.

TIP

Tighten the camshaft sprocket bolt with the camshaft wrench “2”.



7. Measure:

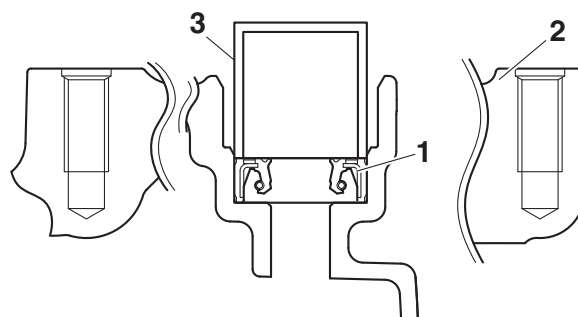
- Valve clearance
Out of specification → Adjust.
Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-5.

8. Install:

- Oil seal “1”
(into the cylinder head cover “2”)

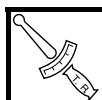
TIP

Install the oil seal so that it is facing in the direction shown in the illustration. Press the oil seal into the cylinder head cover using a suitable diameter socket “3”.



9. Install:

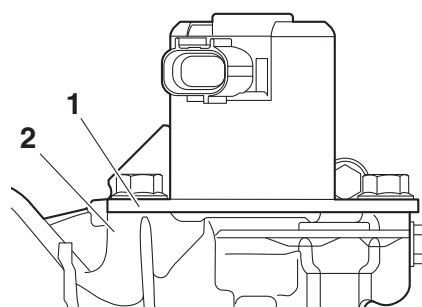
- VVA (variable valve actuator) solenoid “1”



VVA (variable valve actuator) solenoid bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

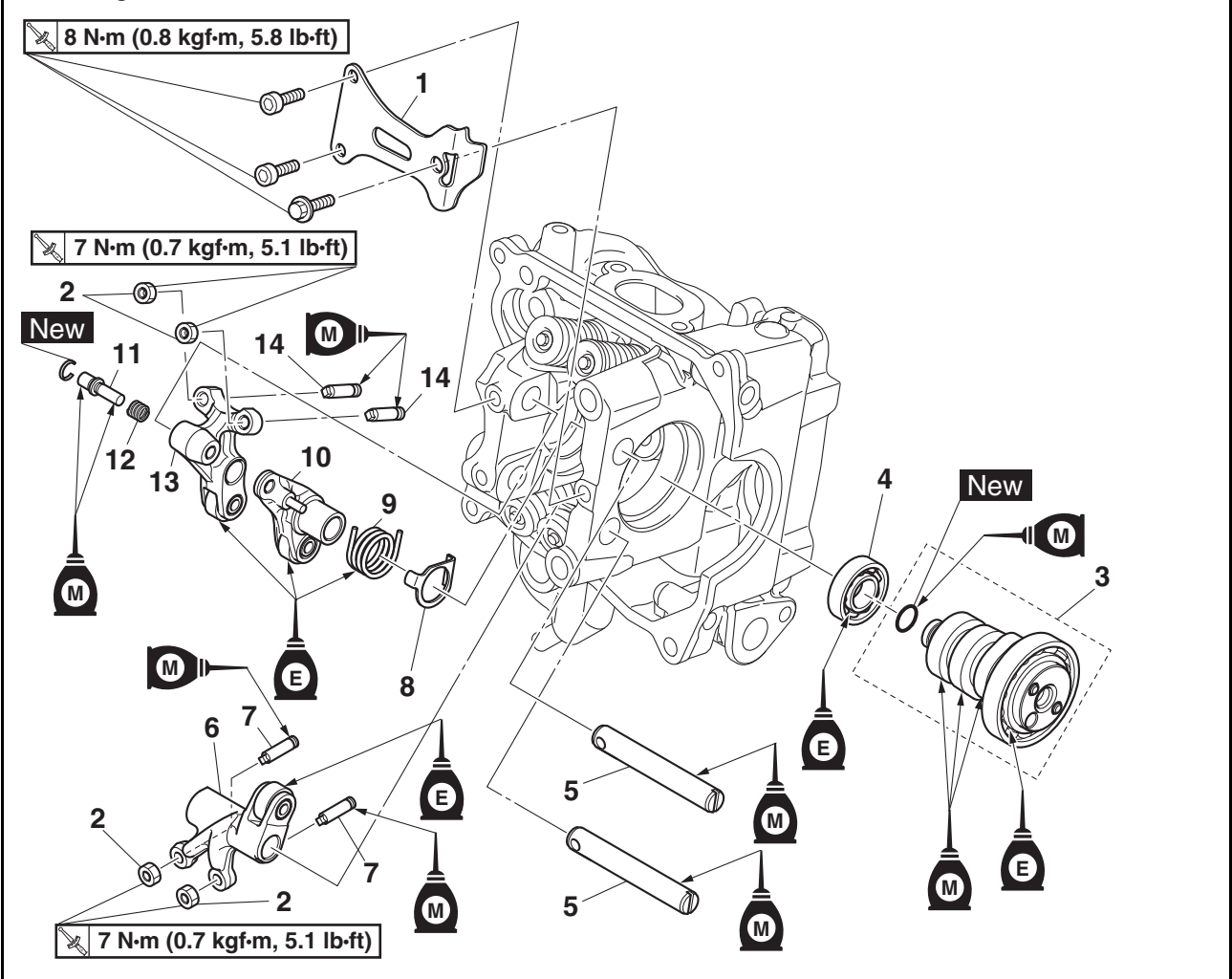
While holding the VVA (variable valve actuator) solenoid so that it is contacting the cylinder head cover “2”, tighten the bolts to specification.



EAS20043

CAMSHAFT

Removing the rocker arms and camshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-9.
1	Camshaft stopper plate	1	
2	Locknut	4	
3	Camshaft assembly	1	
4	Bearing	1	
5	Rocker arm shaft	2	
6	Exhaust rocker arm	1	
7	Adjusting screw (exhaust side)	2	
8	Plate	1	
9	Spring	1	
10	Intake rocker arm 1	1	
11	Intake rocker arm stopper pin	1	
12	Spring	1	
13	Intake rocker arm 2	1	
14	Adjusting screw (intake side)	2	

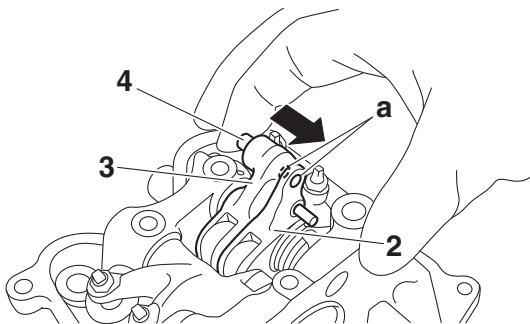
1. Loosen:

- Adjusting screws (intake/exhaust)
2. Remove:
- Camshaft assembly “1”

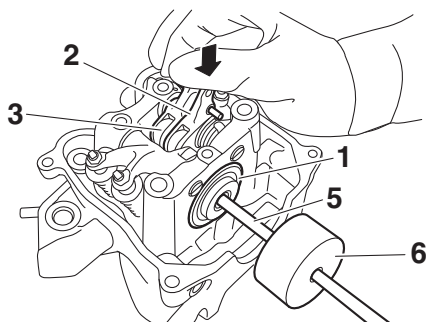


Slide hammer bolt
90890-01085
Slide hammer bolt 8 mm
YU-01083-2
Weight
90890-01084
Weight
YU-01083-3

- a. Align the holes “a” in intake rocker arm 1 “2” and intake rocker arm 2 “3”, and then push the intake rocker arm stopper pin “4” in the direction of the arrow shown in the illustration.



- b. While pushing intake rocker arm 1 “2” and intake rocker arm 2 “3” in the direction of the arrow shown in the illustration, remove the camshaft assembly using a slide hammer bolt “5” and weight “6”.



FAS30257

1. Check:

- Camshaft lobes
Blue discoloration/pitting/scratches → Replace the camshaft.

- ## 2. Measure:

- Camshaft lobe dimensions “a” and “b”
Out of specification → Replace the camshaft.



Lobe height (Intake)

32.211–32.311 mm (1.2681–1.2721 in)

Limit

32.111 mm (1.2642 in)

Lobe height (Intake high speed)

32.587–32.687 mm (1.2830–1.2869 in)

Limit (High speed)

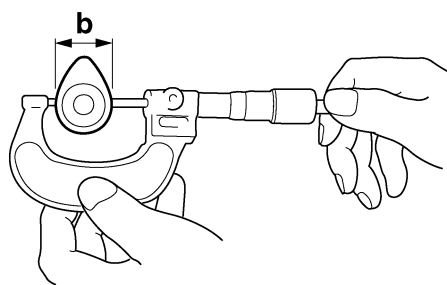
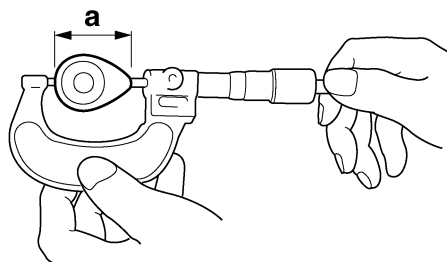
32.487 mm (1.2790 in)

Lobe height (Exhaust)

29.420–29.520 mm (1.1583–1.1622 in)

Limit

29.320 mm (1.1543 in)

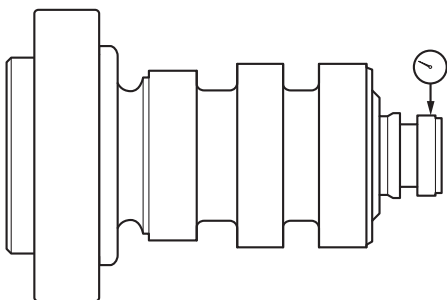


- ### 3. Measure:

- Camshaft runout
Out of specification → Replace the camshaft.



Camshaft runout limit
0.030 mm (0.0012 in)



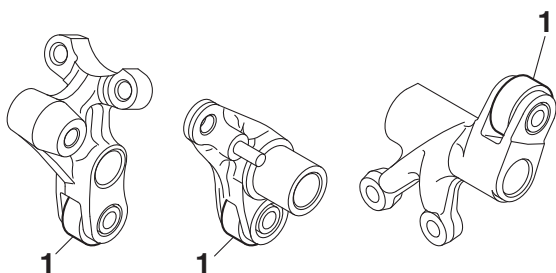
4. Check:
- Camshaft oil passage
- Obstruction → Blow out with compressed air.

EAS30259

CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

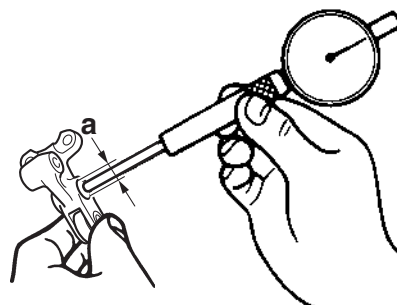
1. Check:
- Rocker arm
 - Rocker arm roller "1"
- Damage/wear → Replace.



2. Check:
- Rocker arm shaft
- Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Measure:
- Rocker arm inside diameter "a"
- Out of specification → Replace.



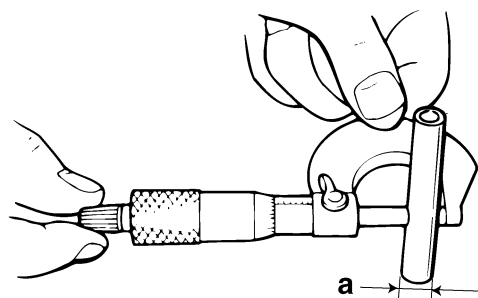
Rocker arm inside diameter
9.985–10.000 mm (0.3931–0.3937 in)
Limit
10.015 mm (0.3943 in)



4. Measure:
- Rocker arm shaft outside diameter "a"
- Out of specification → Replace.



Rocker arm shaft outside diameter
9.966–9.976 mm (0.3924–0.3928 in)
Limit
9.935 mm (0.3911 in)



5. Calculate:
- Rocker-arm-to-rocker-arm-shaft clearance

TIP

Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Out of specification → Replace the defective part(s).



Rocker-arm-to-rocker-arm-shaft clearance
0.009–0.034 mm (0.0004–0.0013 in)
Limit
0.080 mm (0.0032 in)

EAS30270

INSTALLING THE CAMSHAFT AND ROCKER ARMS

1. Lubricate:
- Camshaft assembly



Recommended lubricant
Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil

2. Lubricate:

- Rocker arms
- Rocker arm shafts
- Spring
- Intake rocker arm stopper pin



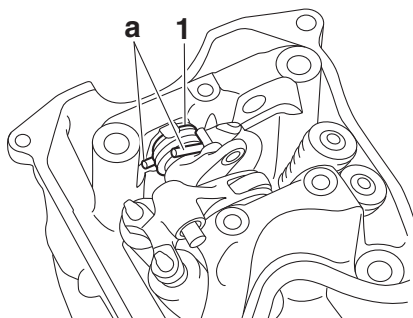
Recommended lubricant
Rocker arm shaft
Intake rocker arm stopper pin
Molybdenum disulfide oil
Spring
Rocker arm roller
Engine oil

3. Install:

- Spring "1"

TIP

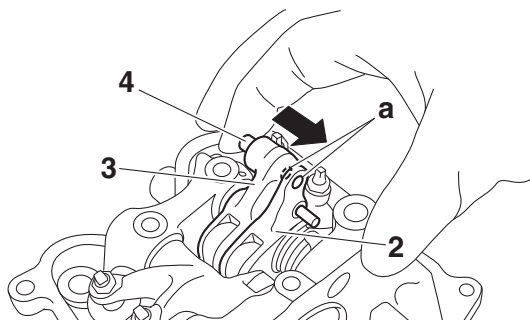
Install the spring so that the ends "a" of the spring are positioned at the locations shown in the illustration.



4. Install:

- Camshaft assembly "1"

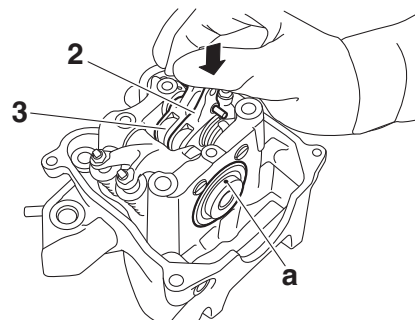
- a. Align the holes "a" in intake rocker arm 1 "2" and intake rocker arm 2 "3", and then push the intake rocker arm stopper pin "4" in the direction of the arrow shown in the illustration.



- b. While pushing intake rocker arm 1 "2" and intake rocker arm 2 "3" in the direction of the arrow shown in the illustration, install the camshaft assembly.

TIP

Install the camshaft with the punch mark "a" facing upward.



5. Install:

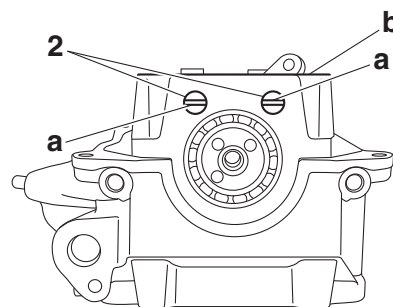
- Camshaft stopper plate



Camshaft stopper plate bolt (M5 $\times$ 16)
8 N·m (0.8 kgf·m, 5.8 lb·ft)
Camshaft stopper plate bolt (M6 $\times$ 14)
8 N·m (0.8 kgf·m, 5.8 lb·ft)

TIP

Before installing the camshaft stopper plate, make sure that the slots "a" in the rocker arm shafts "2" are parallel with the edge "b" of the cylinder head and that the camshaft stopper plate bolt holes in the cylinder head and rocker arm shafts are aligned.

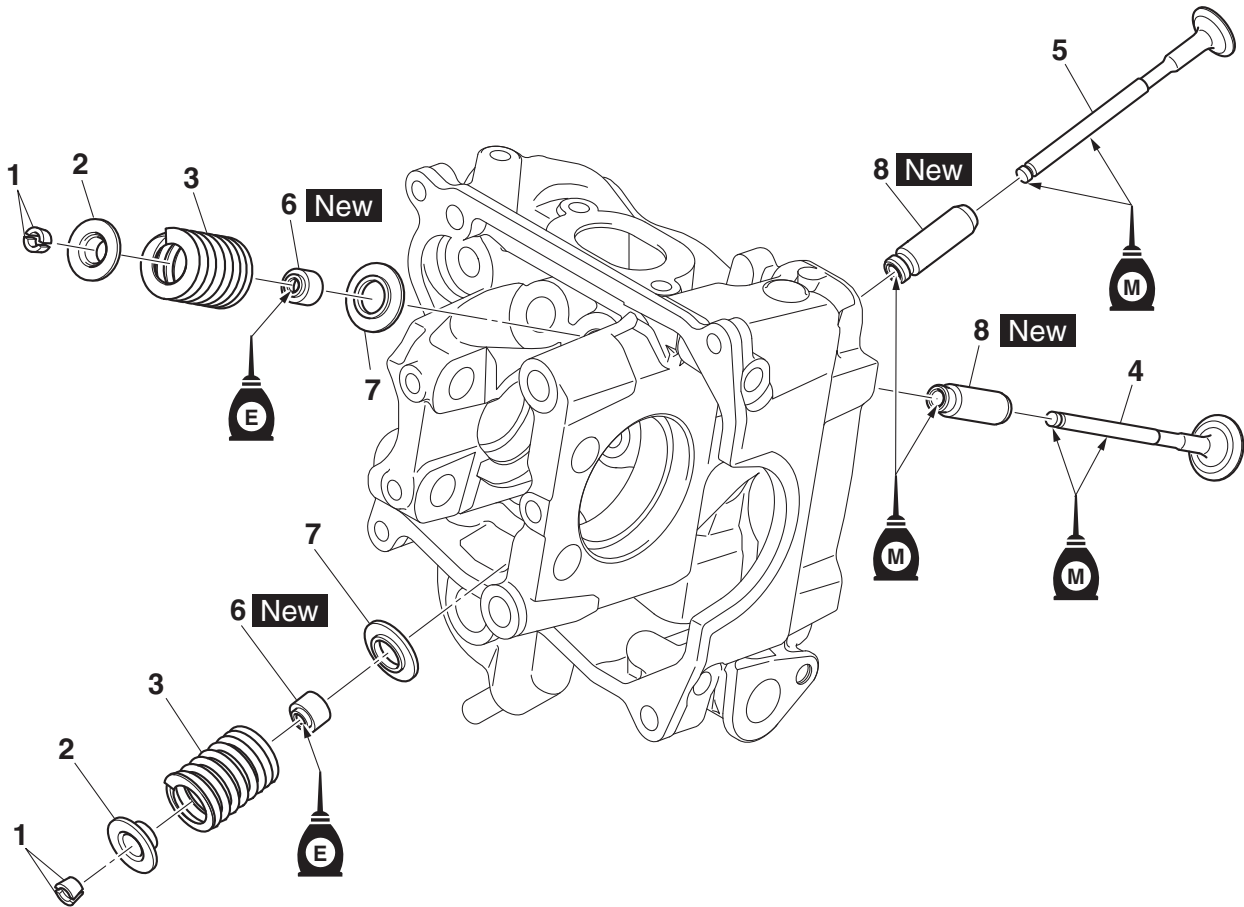


VALVES AND VALVE SPRINGS

EAS20045

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-9.
	Camshaft/Rocker arms		Refer to "CAMSHAFT" on page 5-18.
1	Valve cotter	8	
2	Valve spring retainer	4	
3	Valve spring	4	
4	Intake valve	2	
5	Exhaust valve	2	
6	Valve stem seal	4	
7	Valve spring seat	4	
8	Valve guide	4	

VALVES AND VALVE SPRINGS

EAS30283

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Check:

- Valve sealing

Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.

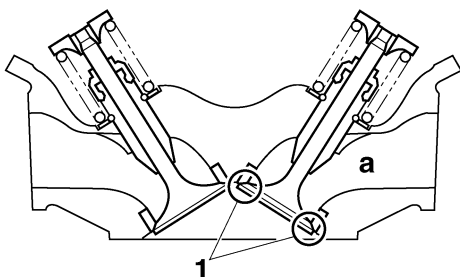
Refer to "CHECKING THE VALVE SEATS" on page 5-25.

a. Pour a clean solvent "a" into the intake and exhaust ports.

b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



2. Remove:

- Valve cotters "1"

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment "2".



Valve spring compressor
90890-04019

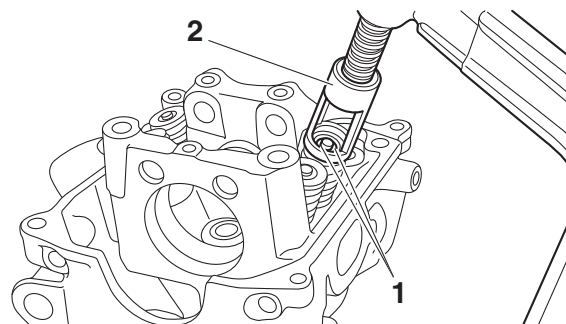
Valve spring compressor
YM-04019

Valve spring compressor attachment

90890-04108

Valve spring compressor adapter 22 mm

YM-04108

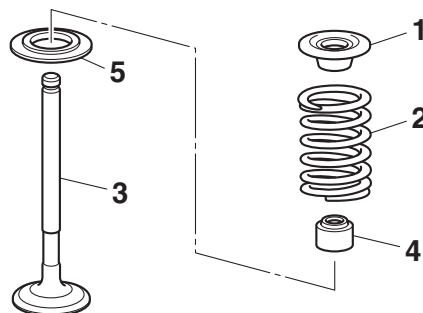


3. Remove:

- Valve spring retainer "1"
- Valve spring "2"
- Valve "3"
- Valve stem seal "4"
- Valve spring seat "5"

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



EAS30284

CHECKING THE VALVES AND VALVE GUIDES

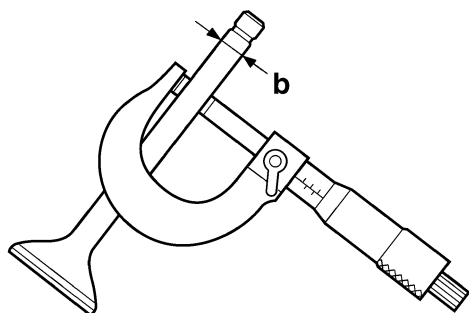
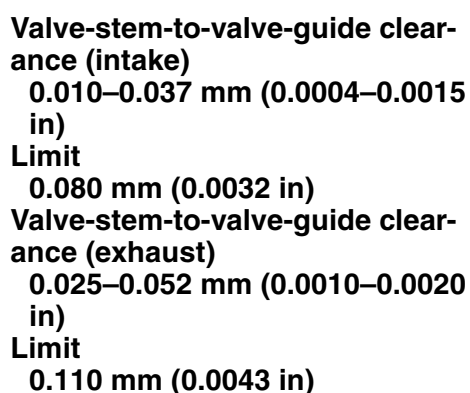
The following procedure applies to all of the valves and valve guides.

1. Measure:

- Valve-stem-to-valve-guide clearance
Out of specification → Replace the valve guide.

Valve-stem-to-valve-guide clearance =
Valve guide inside diameter "a" -
Valve stem diameter "b"

VALVES AND VALVE SPRINGS



- Valve guide **New**

To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

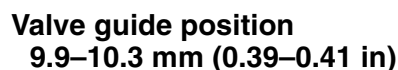
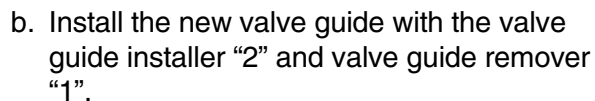
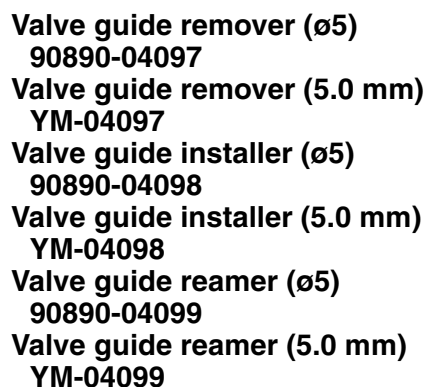
[illegible]

Diagram 3 shows a hand holding the handle of the tool. The handle is labeled with the number '3'.

After replacing the valve guide, reface the valve seat.



- Carbon deposits
(from the valve face and valve seat)

VALVES AND VALVE SPRINGS

4. Check:

- Valve face
Pitting/wear → Grind the valve face.
- Valve stem end
Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.

5. Measure:

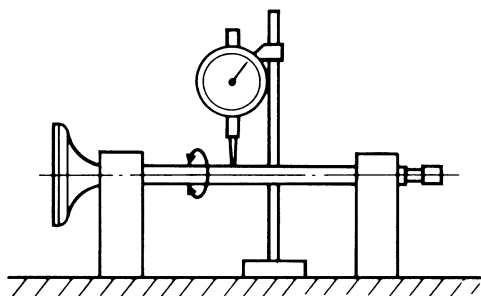
- Valve stem runout
Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.



Valve stem runout
0.010 mm (0.0004 in)



EAS30285

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

1. Eliminate:

- Carbon deposits
(from the valve face and valve seat)

2. Check:

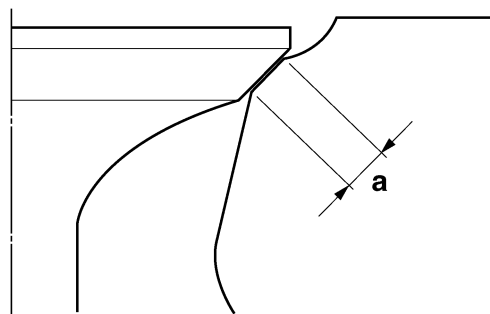
- Valve seat
Pitting/wear → Replace the cylinder head.

3. Measure:

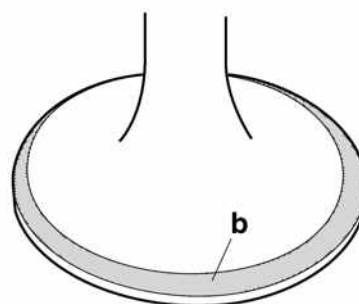
- Valve seat width "a"
Out of specification → Replace the cylinder head.



Valve seat contact width (intake)
0.90–1.20 mm (0.0354–0.0472 in)
Limit
1.7 mm (0.068 in)
Valve seat contact width (exhaust)
0.90–1.20 mm (0.0354–0.0472 in)
Limit
1.7 mm (0.068 in)



a. Apply Blue layout fluid "b" onto the valve face.



b. Install the valve into the cylinder head.

c. Press the valve through the valve guide and onto the valve seat to make a clear impression.

d. Measure the valve seat width.

TIP

Where the valve seat and valve face contacted one another, the blue layout fluid will have been removed.

4. Lap:

- Valve face
- Valve seat

TIP

After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

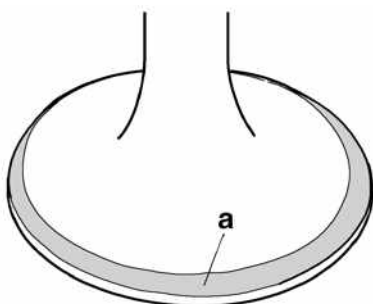
a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

NOTICE

Do not let the lapping compound enter the gap between the valve stem and the valve guide.

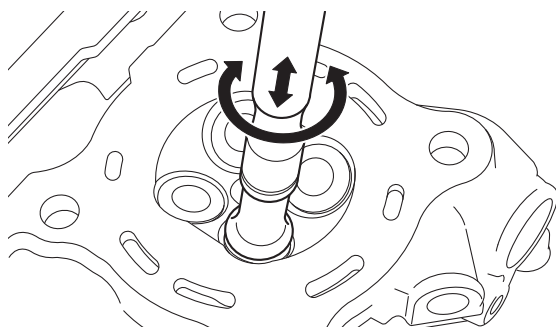
VALVES AND VALVE SPRINGS



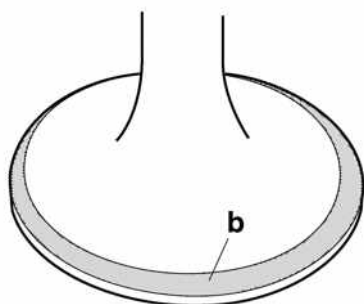
- b. Apply molybdenum disulfide oil onto the valve stem.
- c. Install the valve into the cylinder head.
- d. Turn the valve until the valve face and valve seat are evenly polished, and then clean off all of the lapping compound.

TIP

For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



- e. Apply a fine lapping compound to the valve face and repeat the above steps.
- f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
- g. Apply blue layout fluid "b" onto the valve face.



- h. Install the valve into the cylinder head.
- i. Press the valve through the valve guide and onto the valve seat to make a clear impression.

- j. Measure the valve seat width again. If the valve seat width is out of specification, reface and lap the valve seat.



EAS30286

CHECKING THE VALVE SPRINGS

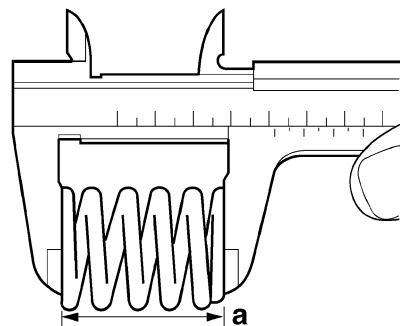
The following procedure applies to all of the valve springs.

1. Measure:

- Valve spring free length "a"
- Out of specification → Replace the valve spring.



Free length (intake)
33.81 mm (1.33 in)
Limit
32.11 mm (1.26 in)
Free length (exhaust)
33.81 mm (1.33 in)
Limit
32.11 mm (1.26 in)



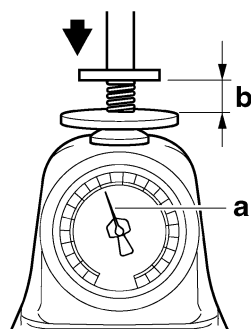
2. Measure:

- Compressed valve spring force "a"
- Out of specification → Replace the valve spring.



Installed compression spring force (intake)
139.50–160.50 N (14.22–16.37 kgf, 31.36–36.08 lbf)
Installed compression spring force (exhaust)
139.50–160.50 N (14.22–16.37 kgf, 31.36–36.08 lbf)
Installed length (intake)
28.90 mm (1.14 in)
Installed length (exhaust)
28.90 mm (1.14 in)

VALVES AND VALVE SPRINGS



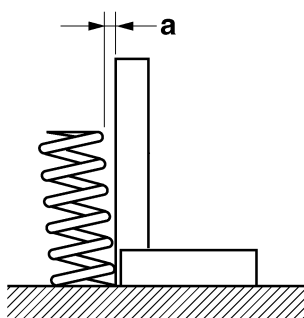
b. Installed length

3. Measure:

- Valve spring tilt "a"
Out of specification → Replace the valve spring.



Spring tilt (intake)
1.7 mm (0.068 in)
Spring tilt (exhaust)
1.7 mm (0.068 in)

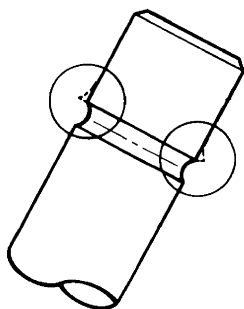


EAS30288

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

- Valve stem end
(with an oil stone)



4. Lubricate:

- Valve stem "1"

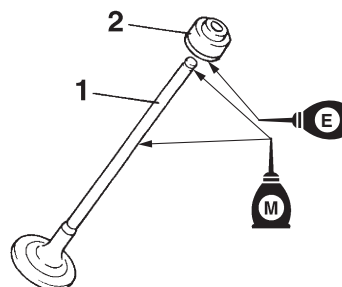


Recommended lubricant
Molybdenum disulfide oil

- Valve stem seal "2"
(with the recommended lubricant)



Recommended lubricant
Engine oil

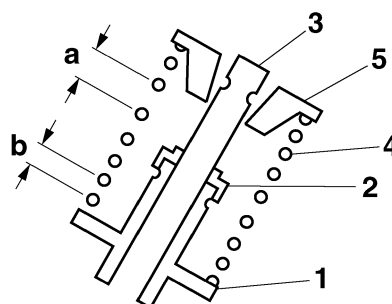
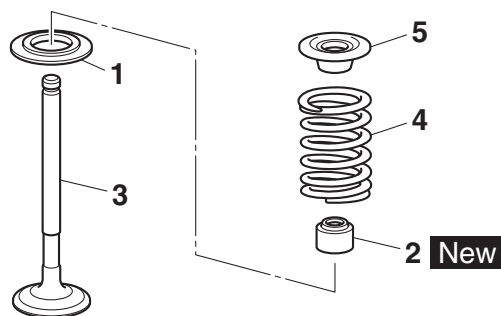


5. Install:

- Valve spring seat "1"
- Valve stem seal "2" **New**
- Valve "3"
- Valve spring "4"
- Valve spring retainer "5"
(into the cylinder head)

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch "a" facing up.



b. Smaller pitch

6. Install:

- Valve cotter pins "1"

TIP

Install the valve cotteners by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment “2”.



Valve spring compressor

90890-04019

Valve spring compressor

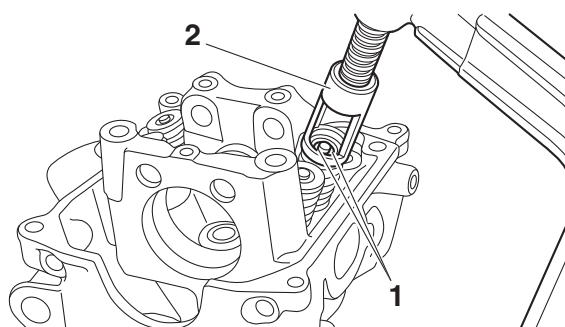
YM-04019

Valve spring compressor attachment

90890-04108

Valve spring compressor adapter 22 mm

YM-04108

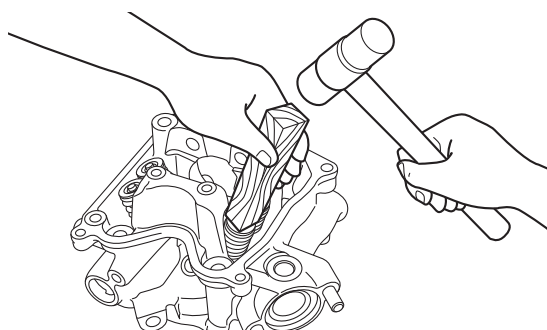


7. To secure the valve cotteners onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

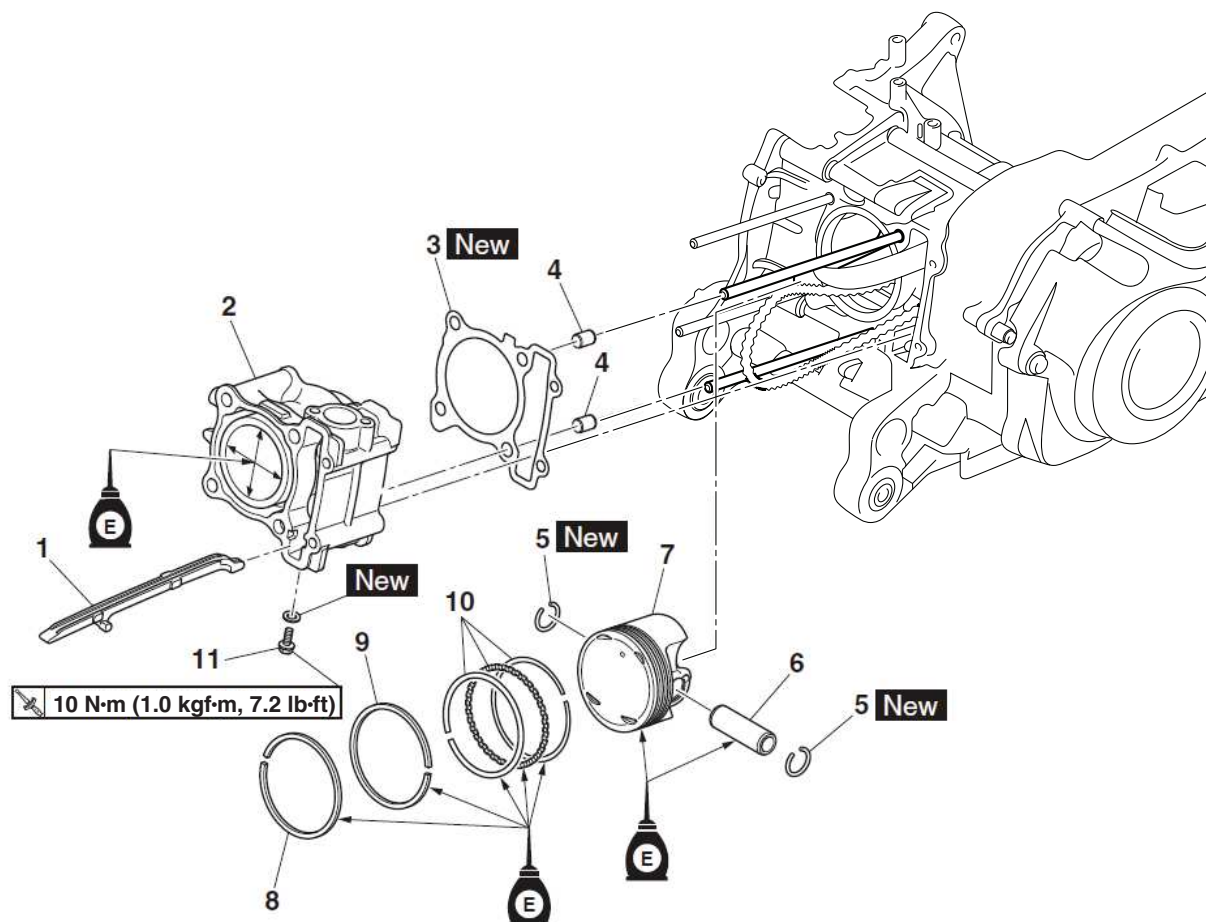
Hitting the valve tip with excessive force could damage the valve.



EAS20046

CYLINDER AND PISTON

Removing the cylinder and piston



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-9.
1	Timing chain guide (exhaust side)	1	
2	Cylinder	1	
3	Cylinder gasket	1	
4	Dowel pin	2	
5	Piston pin clip	2	
6	Piston pin	1	
7	Piston	1	
8	Top ring	1	
9	2nd ring	1	
10	Oil ring	1	
11	Coolant drain bolt (cylinder side)	1	

CYLINDER AND PISTON

EAS30289

REMOVING THE PISTON

1. Remove:

- Piston pin clips "1"
- Piston pin "2"
- Piston "3"

ECA13810

NOTICE

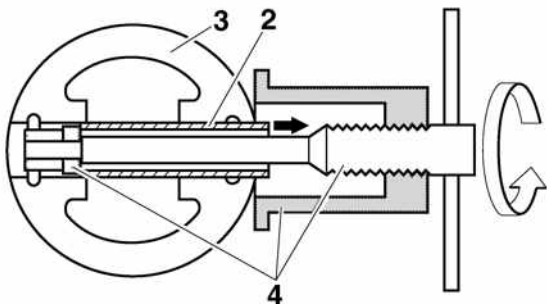
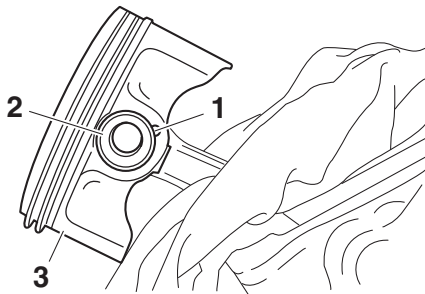
Do not use a hammer to drive the piston pin out.

TIP

- Before removing the piston pin clips, cover the crankcase opening with a clean rag to prevent them from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip groove and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "4".



**Piston pin puller set
90890-01304
Piston pin puller
YU-01304**

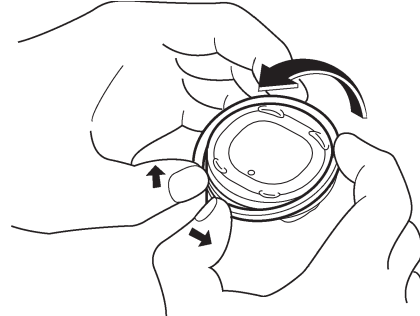


2. Remove:

- Top ring
- 2nd ring
- Oil ring

TIP

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS30291

CHECKING THE CYLINDER AND PISTON

1. Check:

- Piston wall
- Cylinder wall

Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.

2. Measure:

- Piston-to-cylinder clearance

a. Measure cylinder bore "C" with the cylinder bore gauge.

TIP

Measure cylinder bore "C" by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.



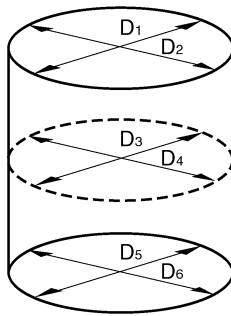
Bore
58.000–58.010 mm
(2.2835–2.2839 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

"C" = maximum of $D_1 - D_2$

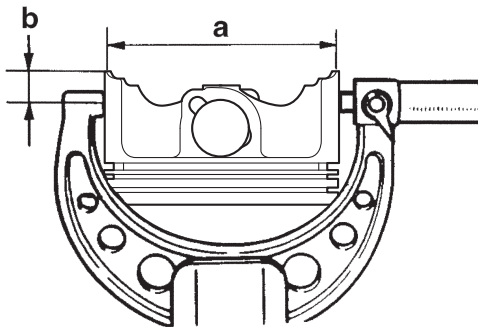
"T" = maximum of D_1 or D_2 - maximum of D_5 or D_6

"R" = maximum of D_1, D_3 or D_5 - minimum of D_2, D_4 or D_6

CYLINDER AND PISTON



- b. If out of specification, rebores or replace the cylinder, and replace the piston and piston rings as a set.
- c. Measure piston skirt diameter D "a" with the micrometer.



- b. 6.0 mm (0.24 in) from the bottom edge of the piston

Piston Diameter
57.962–57.985 mm
(2.2820–2.2829 in)

- d. If out of specification, replace the piston and piston rings as a set.
- e. Calculate the piston-to-cylinder clearance with the following formula.

Piston-to-cylinder clearance =
 Cylinder bore "C" -
 Piston skirt diameter "D"

Piston-to-cylinder clearance
0.015–0.048 mm
(0.0006–0.0019 in)

- f. If out of specification, rebores or replace the cylinder, and replace the piston and piston rings as a set.



EAS30292

CHECKING THE PISTON RINGS

1. Measure:

- Piston ring side clearance
 Out of specification → Replace the piston and piston rings as a set.

TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.



Piston ring

Top ring

Ring side clearance

0.030–0.065 mm

(0.0012–0.0026 in)

Limit

0.115 mm (0.0045 in)

2nd ring

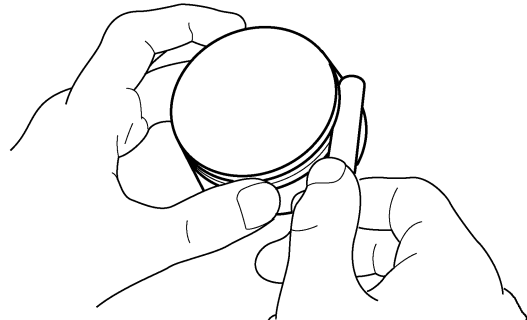
Ring side clearance

0.020–0.055 mm

(0.0008–0.0022 in)

Limit

0.115 mm (0.0045 in)



2. Install:

- Piston ring
 (into the cylinder)

TIP

Use the piston crown to level the position ring near the bottom of the cylinder where the cylinder wear is lowest.

3. Measure:

- Piston ring end gap
 Out of specification → Replace the piston ring.

TIP

The oil ring expander spacer end gap cannot be measured. If the oil ring rail gap is excessive, replace all three piston rings.

CYLINDER AND PISTON



Piston ring

Top ring

End gap (installed)
0.10–0.25 mm
(0.0039–0.0098 in)

Limit

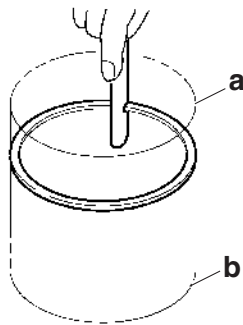
0.50 mm (0.0197 in)

2nd ring

End gap (installed)
0.35–0.50 mm
(0.0138–0.0197 in)

Limit

0.85 mm (0.0335 in)



- a. Bottom of cylinder
- b. Upper of cylinder

EAS30293

CHECKING THE PISTON PIN

1. Check:

- Piston pin
Blue discoloration/grooves → Replace the piston pin, and then check the lubrication system.

2. Measure:

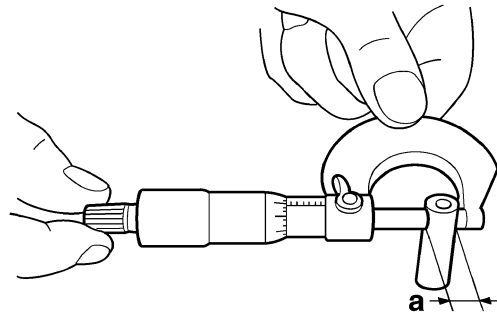
- Piston pin outside diameter “a”
Out of specification → Replace the piston pin.



Piston pin outside diameter
13.995–14.000 mm
(0.5510–0.5512 in)

Limit

13.975 mm (0.5502 in)



3. Measure:

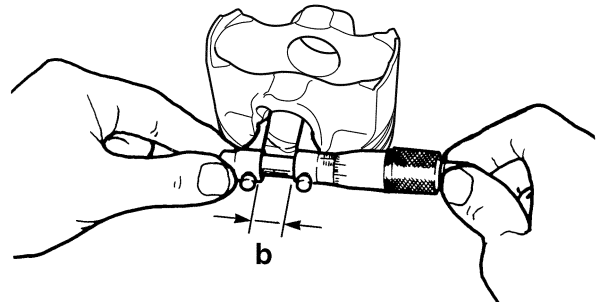
- Piston pin bore diameter “b”
Out of specification → Replace the piston.



Piston pin bore inside diameter
14.002–14.013 mm
(0.5513–0.5517 in)

Limit

14.043 mm (0.5529 in)



4. Calculate:

- Piston-pin-to-piston-pin-bore clearance
Out of specification → Replace the piston pin and piston as a set.

Piston-pin-to-piston-pin-bore clearance =
Piston pin bore diameter “b” -
Piston pin outside diameter “a”



Piston-pin-to-piston-pin-bore
clearance

0.002–0.018 mm
(0.0001–0.0007 in)

EAS30290

CHECKING THE TIMING CHAIN GUIDE (EXHAUST SIDE)

1. Check:

- Timing chain guide (exhaust side)
Damage/wear → Replace.

EAS30294

INSTALLING THE PISTON AND CYLINDER

1. Install:

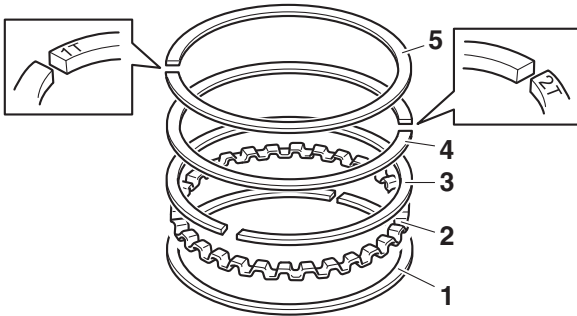
- Lower oil ring rail “1”
- Oil ring expander “2”

CYLINDER AND PISTON

- Upper oil ring rail “3”
- 2nd ring “4”
- Top ring “5”

TIP

Be sure to install the piston rings so that the manufacturer marks face up.

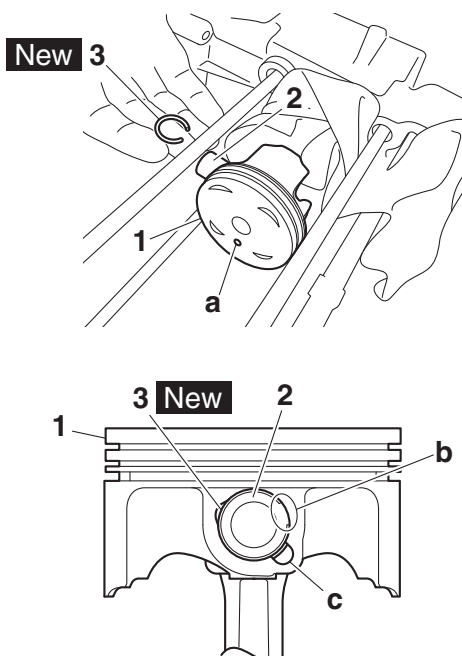


2. Install:

- Piston “1”
- Piston pin “2”
- Piston pin clips “3” **New**

TIP

- Apply engine oil to the piston pin.
- Make sure the punch mark “a” on the piston points towards the exhaust side of the cylinder.
- Before installing the piston pin clips, cover the crankcase opening with a clean rag to prevent the clips from falling into the crankcase.
- When installing a piston pin clip, make sure that the clip ends “b” are positioned away from the cutout “c” in the piston as shown in the illustration.



3. Lubricate:

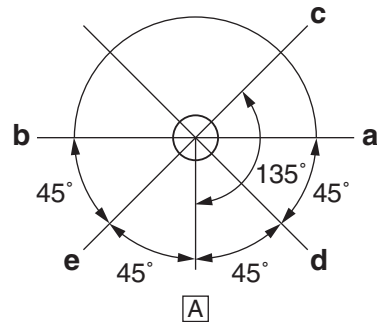
- Piston
- Piston rings
- Cylinder (with the recommended lubricant)



**Recommended lubricant
Engine oil**

4. Offset:

- Piston ring end gaps



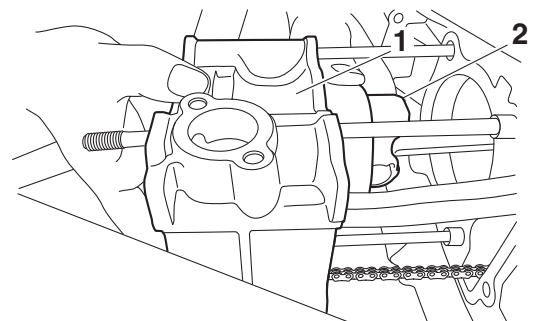
- a. Top ring
- b. 2nd ring
- c. Upper oil ring rail
- d. Oil ring expander
- e. Lower oil ring rail
- A. Exhaust side

5. Install:

- Dowel pins
- Cylinder gasket **New**
- Cylinder “1”

TIP

- While holding the piston “2” with one hand, install the cylinder with the other hand.
- Pass the timing chain and timing chain guide (intake side) through the timing chain cavity.

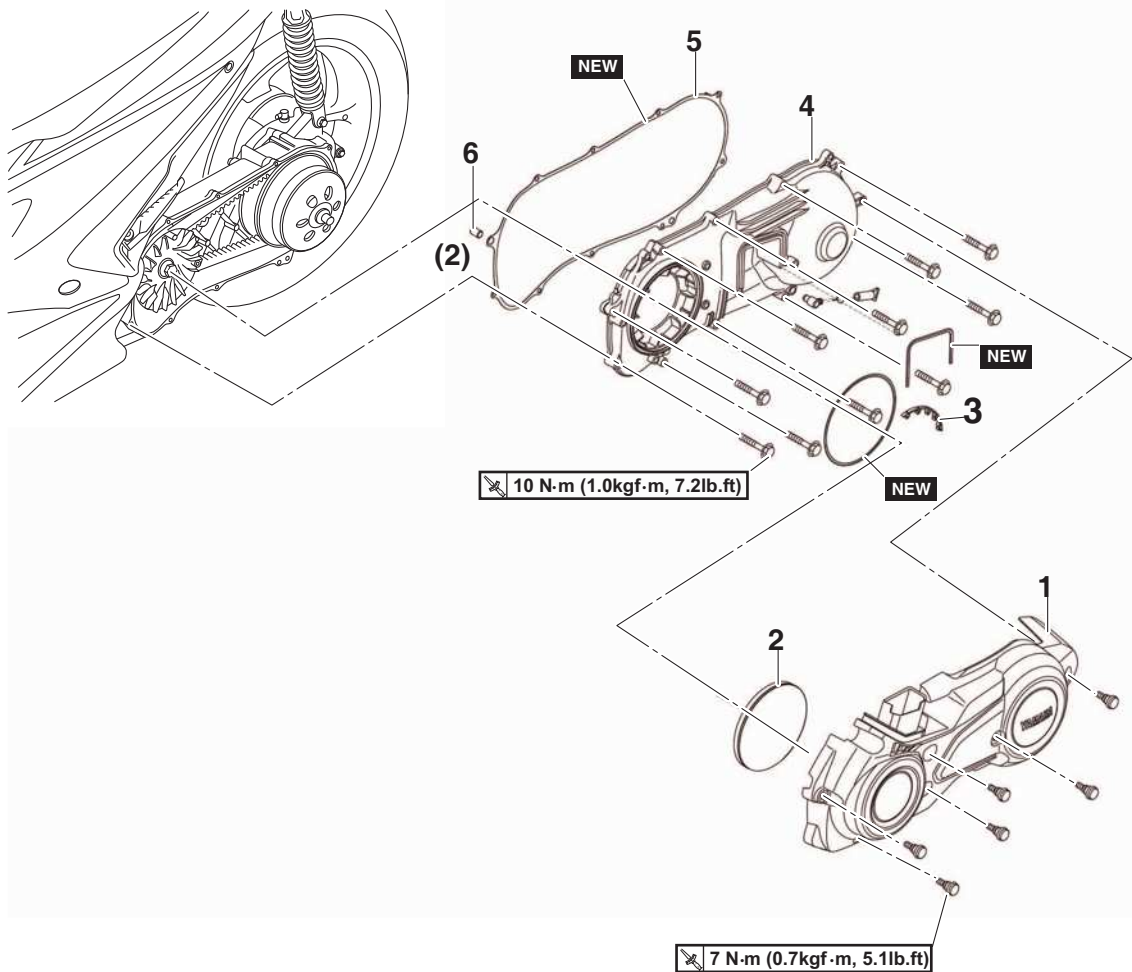


V-BELT AUTOMATIC TRANSMISSION

EAS20050

V-BELT AUTOMATIC TRANSMISSION

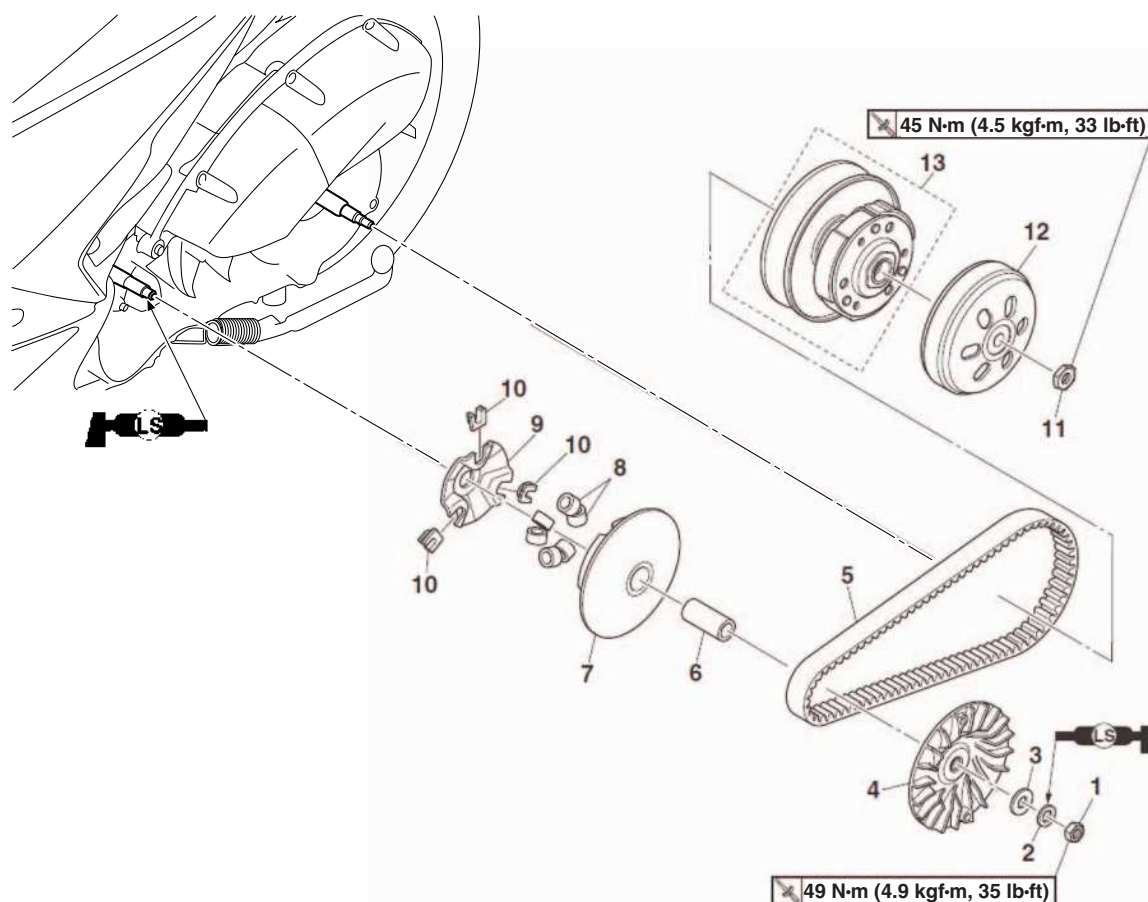
Removing the V-belt case



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "AIR FILTER CASE" on page 7-7.
1	V-belt case air filter element cover	1	
2	V-belt case air filter element	1	
3	V-belt case air filter element support	1	
4	V-belt case	1	
5	Gasket	1	
6	Dowel pin	2	

V-BELT AUTOMATIC TRANSMISSION

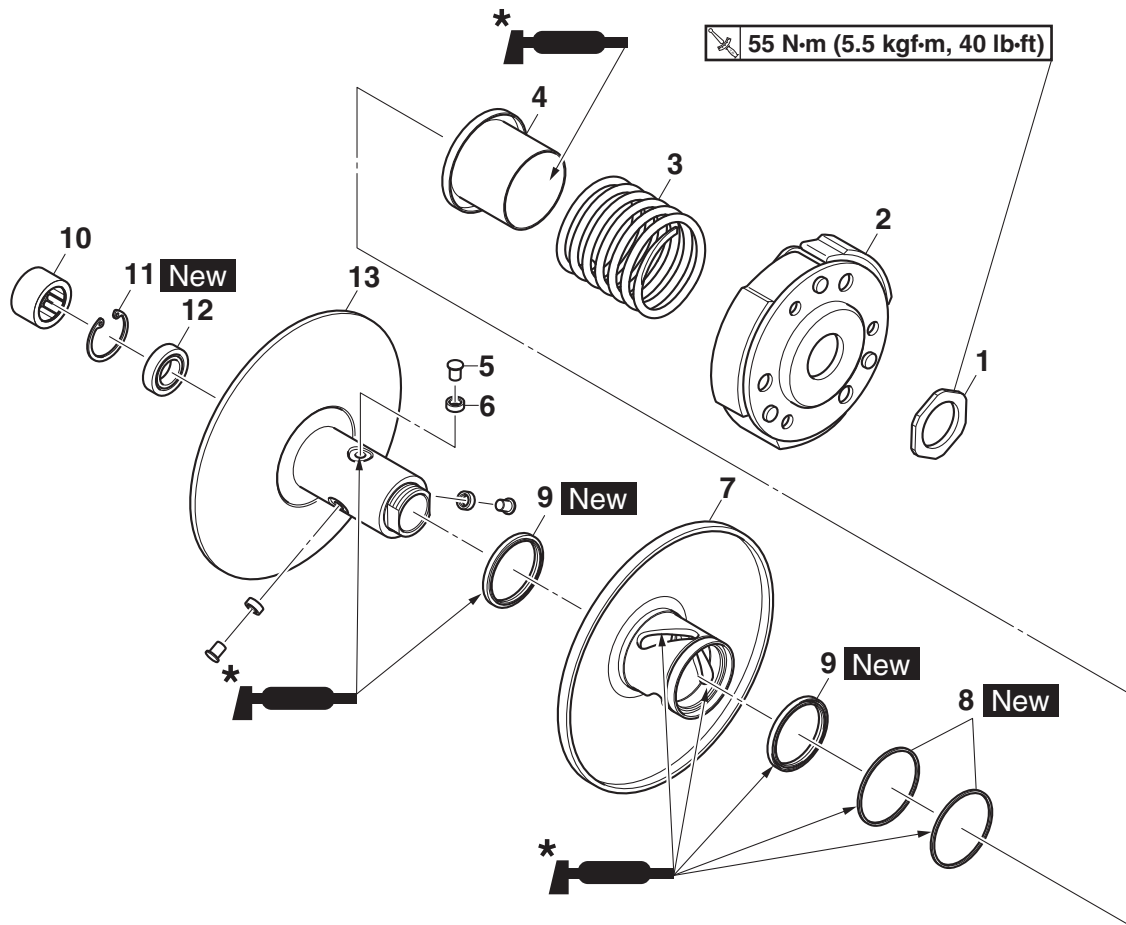
Removing the V-belt, primary sheave and secondary sheave



Order	Job/Parts to remove	Q'ty	Remarks
1	Primary fixed sheave nut	1	
2	Conical spring washer	1	
3	Washer	1	
4	Primary fixed sheave	1	
5	V-belt	1	
6	Collar	1	
7	Primary sliding sheave	1	
8	Primary sheave weight	6	
9	Cam	1	
10	Slider	3	
11	Clutch housing nut	1	
12	Clutch housing	1	
13	Secondary sheave assembly	1	

V-BELT AUTOMATIC TRANSMISSION

Disassembling the secondary sheave



* Apply Shell dolium grease R®.

Order	Job/Parts to remove	Q'ty	Remarks
1	Secondary sheave nut	1	
2	Clutch carrier assembly	1	
3	Compression spring	1	
4	Spring seat	1	
5	Guide pin	3	
6	Collar	3	
7	Secondary sliding sheave	1	
8	O-ring	2	
9	Oil seal	2	
10	Bearing	1	
11	Circlip	1	
12	Bearing	1	
13	Secondary fixed sheave	1	

V-BELT AUTOMATIC TRANSMISSION

EAS30310

REMOVING THE PRIMARY SHEAVE

1. Remove:

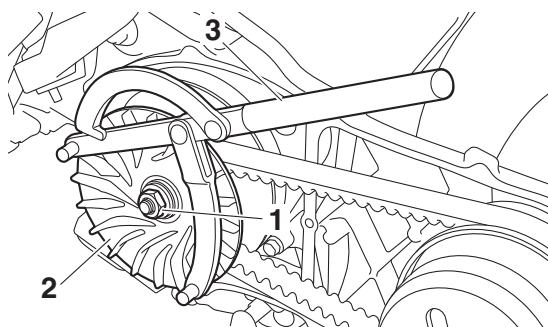
- Primary fixed sheave nut "1"
- Conical spring washer
- Washer
- Primary fixed sheave "2"

TIP

While holding the primary fixed sheave with the rotor holding tool "3", loosen the primary fixed sheave nut.



Rotor holding tool
90890-01235
Universal magneto and rotor holder
YU-01235



EAS30311

REMOVING THE SECONDARY SHEAVE

1. Remove:

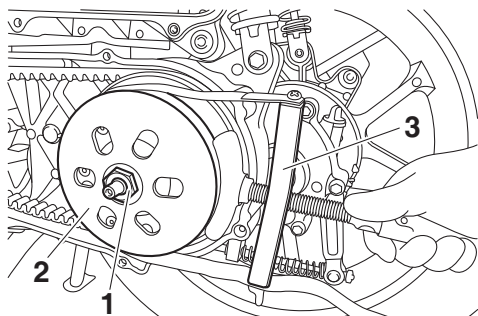
- Clutch housing nut "1"
- Clutch housing "2"

TIP

While holding the clutch housing with the rotor holding tool "3", loosen the clutch housing nut.



Rotor holding tool
90890-01701



2. Loosen:

- Secondary sheave nut "1"

ECA21820

NOTICE

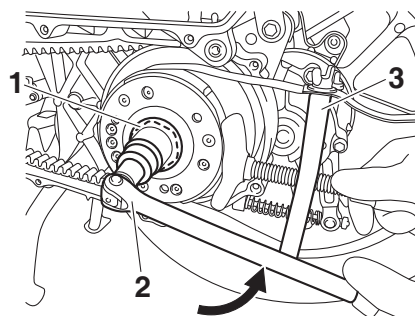
Do not remove the secondary sheave nut at this stage.

TIP

While holding the secondary sheave with the rotor holding tool "2", loosen the secondary sheave nut one full turn with the socket wrench "3".



Rotor holding tool
90890-01701
Socket wrench (39 mm)
90890-01493



EAS30312

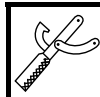
DISASSEMBLING THE SECONDARY SHEAVE

1. Remove:

- Secondary sheave nut "1"

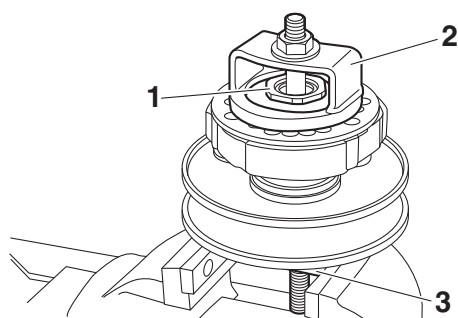
TIP

Install the sheave spring compressor "2" and sheave fixed block "3" onto the secondary sheave as shown. Then, compress the spring, and remove the secondary sheave nut.



Sheave spring compressor
90890-04134
Sheave spring compressor
YM-04134
Sheave fixed block
90890-04135
Sheave fixed bracket
YM-04135

V-BELT AUTOMATIC TRANSMISSION



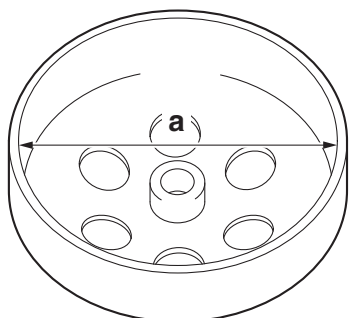
EAS30313

CHECKING THE CLUTCH HOUSING

1. Check:
 - Clutch housing
Damage/wear → Replace.
2. Measure:
 - Clutch housing inside diameter “a”
Out of specification → Replace the clutch housing.



Clutch housing inside diameter
125.0 mm (4.92 in)
Limit
125.5 mm (4.94 in)



EAS30314

CHECKING THE CLUTCH SHOES

The following procedure applies to all of the clutch shoes.

1. Check:
 - Clutch shoe
Damage/wear → Replace the clutch shoes and springs as a set.
Glazed areas → Sand with coarse sandpaper.

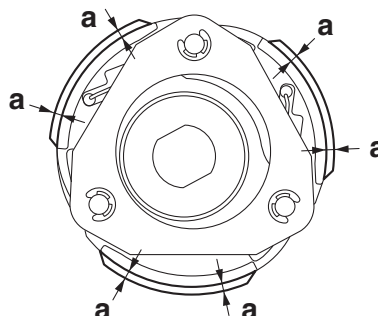
TIP

After sanding the glazed areas, clean the clutch with a cloth.

2. Measure:
 - Clutch shoe thickness “a”
Out of specification → Replace the clutch shoes and springs as a set.



Clutch shoe thickness
4.0 mm (0.16 in)
Limit
2.5 mm (0.10 in)



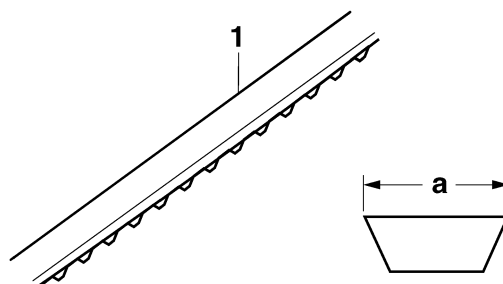
EAS30315

CHECKING THE V-BELT

1. Check:
 - V-belt “1”
Cracks/damage/wear → Replace.
Grease/oil → Clean the primary and secondary sheave.
2. Measure:
 - V-belt width “a”
Out of specification → Replace.



V-belt width
24.1 mm (0.95 in)
Limit
21.7 mm (0.85 in)



EAS30316

CHECKING THE PRIMARY SHEAVE

1. Check:
 - Primary sliding sheave
 - Primary fixed sheave
 - Collar
Cracks/damage/wear → Replace the primary sliding sheave, primary fixed sheave, and collar as a set.

V-BELT AUTOMATIC TRANSMISSION

EAS30317

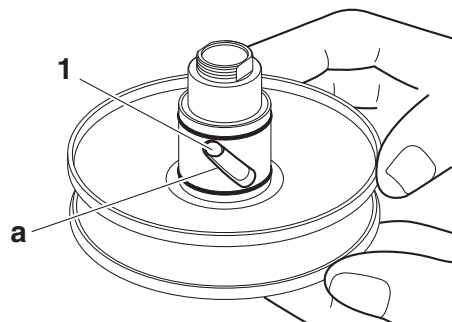
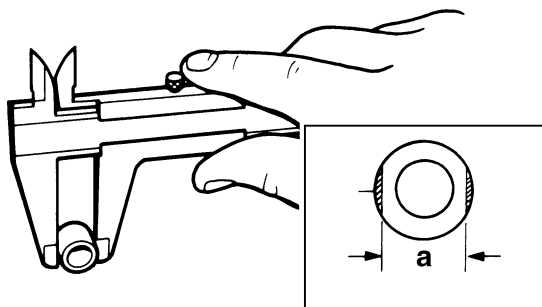
CHECKING THE PRIMARY SHEAVE WEIGHTS

The following procedure applies to all of the primary sheave weights.

1. Check:
 - Primary sheave weight
Cracks/damage/wear → Replace.
2. Measure:
 - Primary sheave weight outside diameter “a”
Out of specification → Replace.



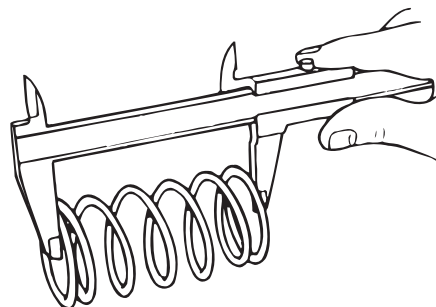
Weight outside diameter
20.0 mm (0.79 in)
Limit
19.5 mm (0.77 in)



4. Check:
 - Spring free length
Out of specification → Replace the spring.



Compression spring free length
116.4 mm (4.58 in)
Limit
104.8 mm (4.12 in)



EAS31233

CHECKING THE PRIMARY SHEAVE SLIDERS

1. Check:
 - Primary sheave slider
Cracks/damage/wear → Replace.

EAS30319

CHECKING THE SECONDARY SHEAVE

1. Check:
 - Secondary fixed sheave
 - Secondary sliding sheave
Cracks/damage/wear → Replace the secondary fixed and sliding sheaves as a set.
2. Check:
 - Torque cam groove “a”
Damage/wear → Replace the secondary fixed and sliding sheaves as a set.
3. Check:
 - Guide pin “1”
Damage/wear → Replace the secondary fixed and sliding sheaves as a set.

EAS30320

ASSEMBLING THE PRIMARY SHEAVE

1. Clean:
 - Primary fixed sheave
 - Primary sliding sheave
 - Primary sheave weights
 - Cam

EAS30321

ASSEMBLING THE SECONDARY SHEAVE

1. Lubricate:
 - Secondary sliding sheave inner surface
 - Oil seals “1”
(with the recommended lubricant)

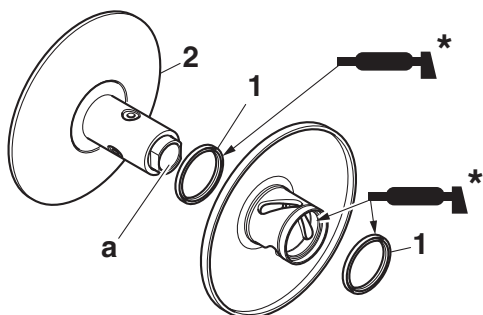


Recommended lubricant
Shell dolium grease R®

TIP

Do not apply grease to the inner surface “a” of the secondary fixed sheave “2”. If any grease gets on the inner surface of the secondary fixed sheave, be sure to wipe it off thoroughly.

V-BELT AUTOMATIC TRANSMISSION



2. Install:

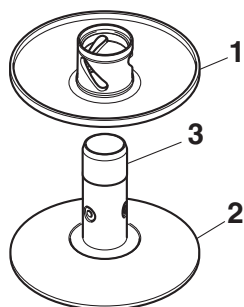
- Oil seals **New**
- Secondary sliding sheave "1"

TIP

Install the secondary sliding sheave onto the secondary fixed sheave "2" with the oil seal guide "3".



Oil seal guide (37 mm)
90890-04177

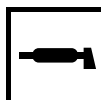


3. Install:

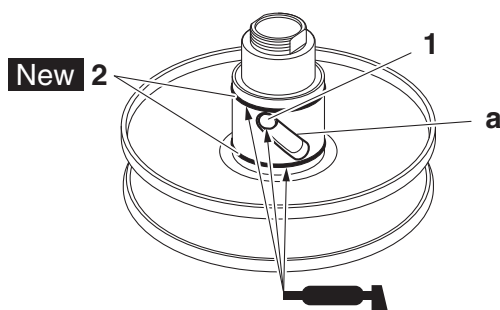
- Guide pins "1"

4. Lubricate:

- Guide pin grooves "a"
- O-rings "2" **New**
(with the recommended lubricant)



Recommended lubricant
Shell dolium grease R®



5. Install:

- Spring seat

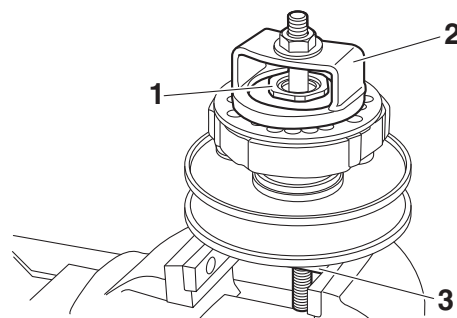
- Compression spring
- Clutch carrier assembly
- Secondary sheave nut "1"

TIP

- Install the sheave spring compressor "2" and sheave fixed block "3" onto the secondary sheave as shown. Then, compress the spring, and install the secondary sheave nut.
- Install the secondary sheave nut "1" with its tapered side facing the clutch carrier.



Sheave spring compressor
90890-04134
Sheave spring compressor
YM-04134
Sheave fixed block
90890-04135
Sheave fixed bracket
YM-04135



EAS31234

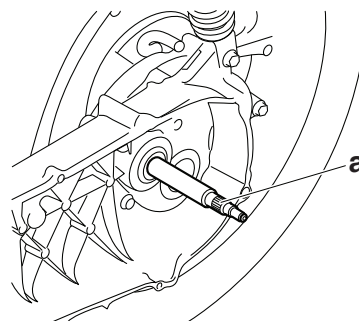
INSTALLING THE PRIMARY SHEAVE, V-BELT AND SECONDARY SHEAVE

1. Install:

- Secondary sheave assembly

TIP

Before installing the secondary sheave assembly, check that there is no grease on the splines "a" of the primary drive gear. If there is any grease on the splines, be sure to wipe it off thoroughly.



2. Tighten:

- Secondary sheave nut "1"

V-BELT AUTOMATIC TRANSMISSION



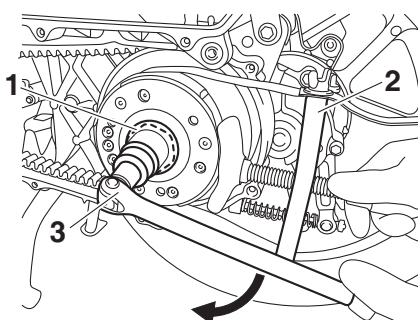
Secondary sheave nut
55 N·m (5.5 kgf·m, 40 lb·ft)

TIP

While holding the secondary sheave with the rotor holding tool “2”, tighten the secondary sheave nut with the socket wrench “3”.



Rotor holding tool
90890-01701
Socket wrench (39 mm)
90890-01493



3. Install:

- Clutch housing “1”
- Clutch housing nut “2”



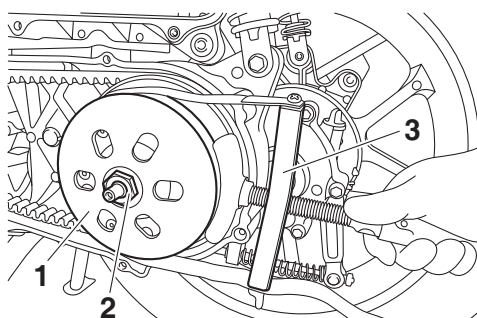
Clutch housing nut
45 N·m (4.5 kgf·m, 33 lb·ft)

TIP

While holding the clutch housing with the rotor holding tool “3”, tighten the clutch housing nut.



Rotor holding tool
90890-01701

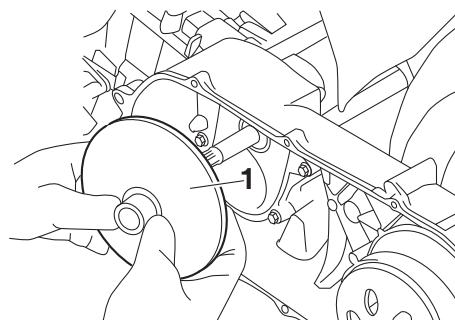


4. Install:

- Primary sliding sheave assembly “1”

TIP

When installing the primary sliding sheave assembly, hold the cam to prevent the primary sheave weights from falling out of the primary sliding sheave.



5. Install:

- V-belt “1”

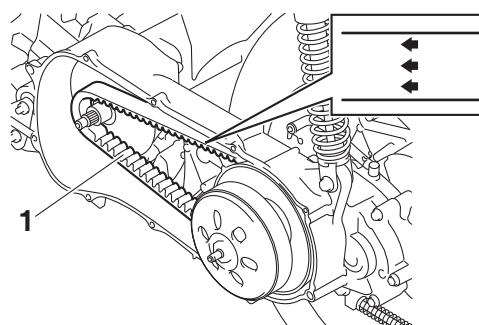
ECA21720

NOTICE

Do not allow grease to come in contact with the V-belt.

TIP

- Install the V-belt with the printed arrow mark on the V-belt facing in the direction shown in the illustration.
- Install the V-belt onto the primary sheave side.



6. Install:

- Primary fixed sheave “1”
- Washer
- Conical spring washer “2”
- Primary fixed sheave nut

ECA21730

NOTICE

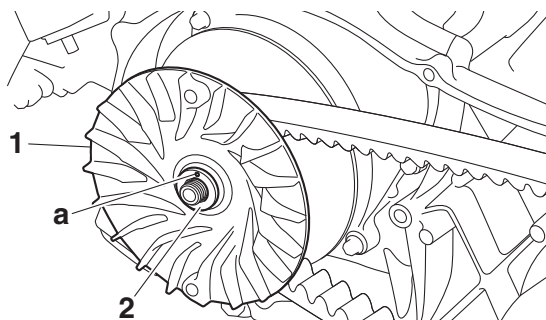
Do not allow grease to contact the primary sheave assembly.

TIP

- Apply lithium-soap-based grease to the primary fixed sheave nut side of the conical spring washer and to the threaded portion of the crankshaft.

V-BELT AUTOMATIC TRANSMISSION

- Install the conical spring washer with the mark “a” facing outward.
- Install the V-belt in the primary sheave (when the pulley is at its widest position) and in the secondary sheave (when the pulley is at its narrowest position), and make sure the V-belt is tight.



7. Tighten:

- Primary fixed sheave nut “1”



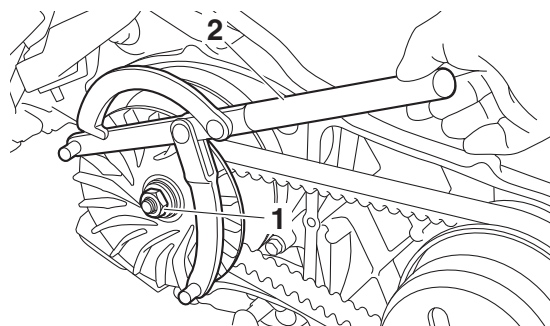
Primary fixed sheave nut
49 N·m (4.9 kgf·m, 35 lb·ft)

TIP

While holding the primary fixed sheave with the rotor holding tool “2”, tighten the primary fixed sheave nut.



Rotor holding tool
90890-01701
Universal magneto and rotor
holder
YU-01235

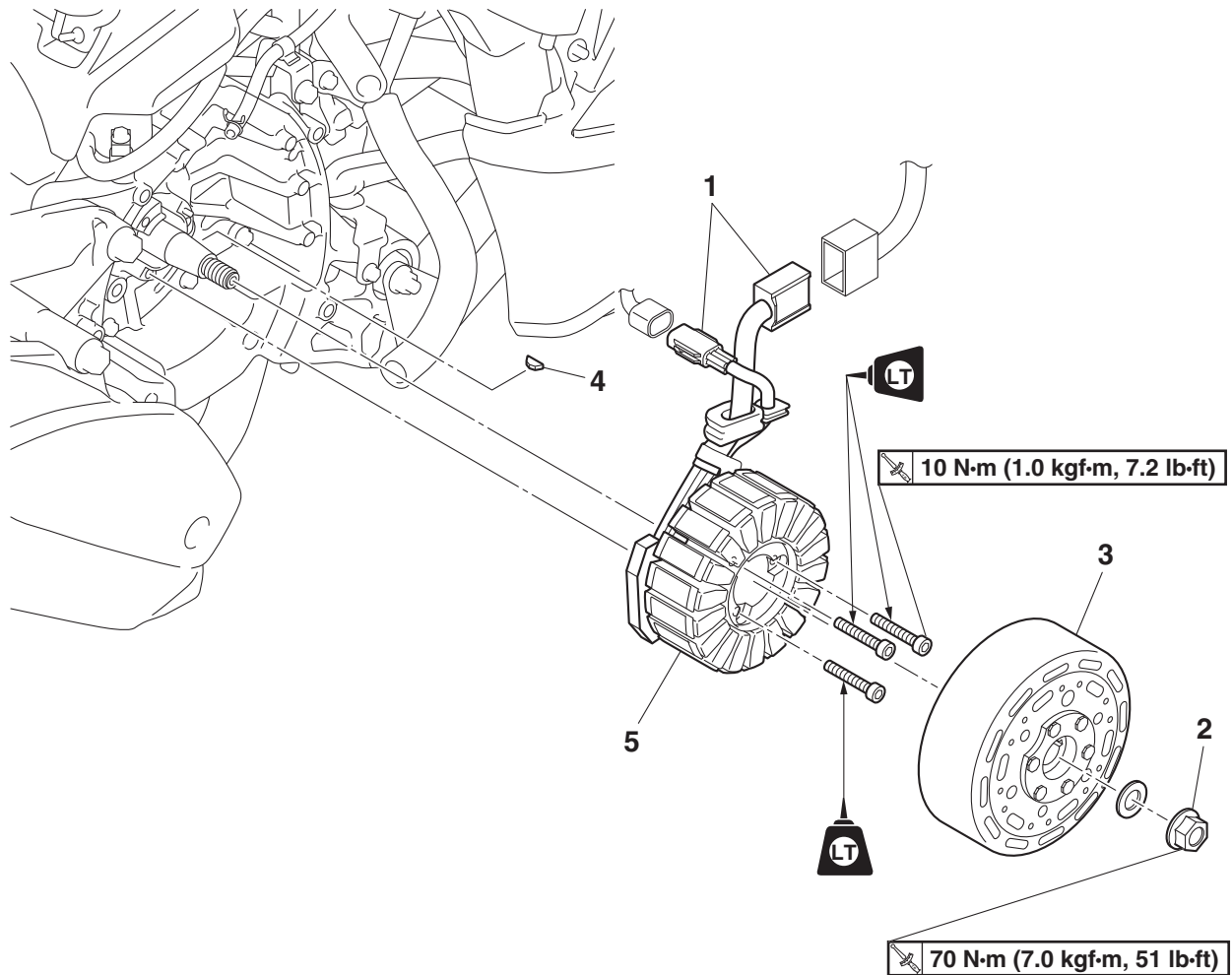


STARTER GENERATOR

EAS20190

STARTER GENERATOR

Removing the starter generator assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side cover (right)		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Radiator fan		Refer to "RADIATOR" on page 6-1
1	Crankshaft position sensor coupler /Starter generator coupler	1/1	Disconnect.
2	Starter generator rotor nut	1	
3	Starter generator rotor	1	
4	Woodruff key	1	
5	Starter generator/ Crankshaft position sensor	1	

STARTER GENERATOR

EAS31239

REMOVING THE STARTER GENERATOR

1. Remove:

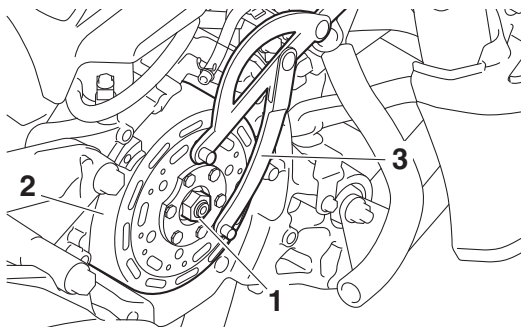
- Starter generator rotor nut “1”
- Washer

TIP

While holding the starter generator rotor “2” with the rotor holding tool “3”, loosen the starter generator rotor nut.



Rotor holding tool
90890-01235
Universal magneto and rotor
holder
YU-01235



2. Remove:

- Starter generator rotor “1”
(with the flywheel puller “2”)
- Woodruff key

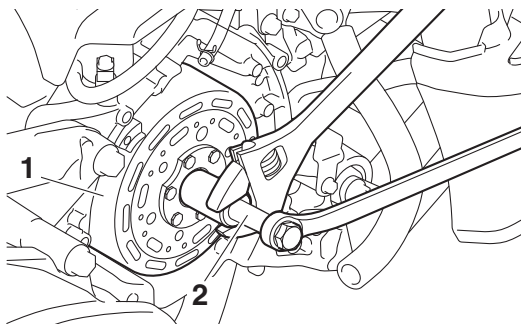
ECA21740

NOTICE

To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller center bolt and the crankshaft.



Flywheel puller
90890-01189
Flywheel puller
YM-01189



EAS31240

INSTALLING THE STARTER GENERATOR

1. Install:

- Woodruff key
- Starter generator rotor
- Washer
- Starter generator rotor nut

TIP

- Clean the tapered portion of the crankshaft and the starter generator rotor hub.
- When installing the starter generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.

2. Tighten:

- Starter generator rotor nut “1”



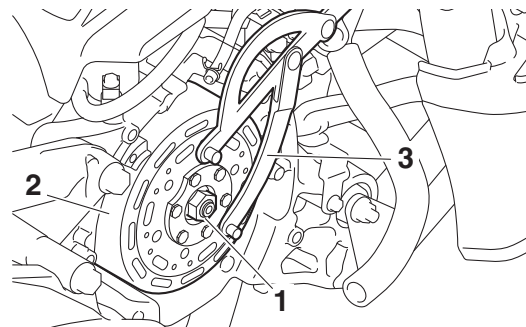
Starter generator rotor nut
70 N·m (7.0 kgf·m, 51 lb·ft)

TIP

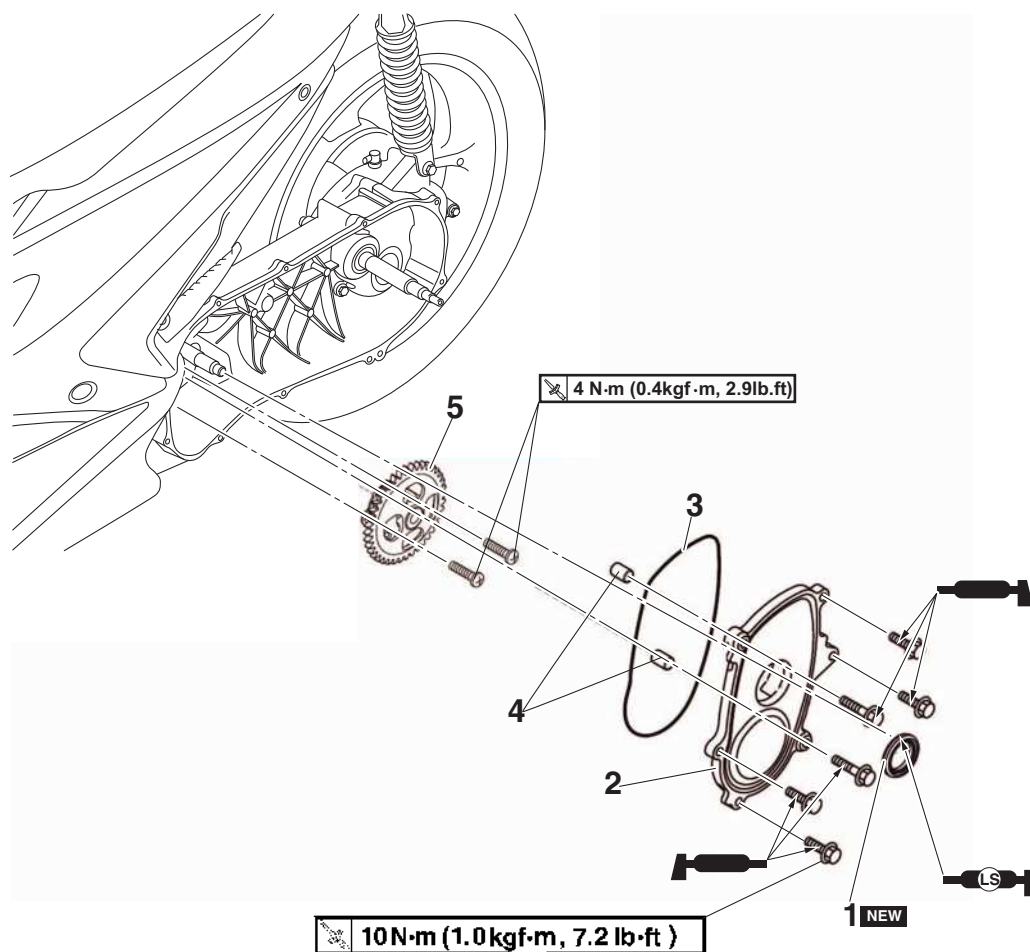
While holding the starter generator rotor “2” with the rotor holding tool “3”, tighten the starter generator rotor nut.



Rotor holding tool
90890-01235
Universal magneto and rotor
holder
YU-01235



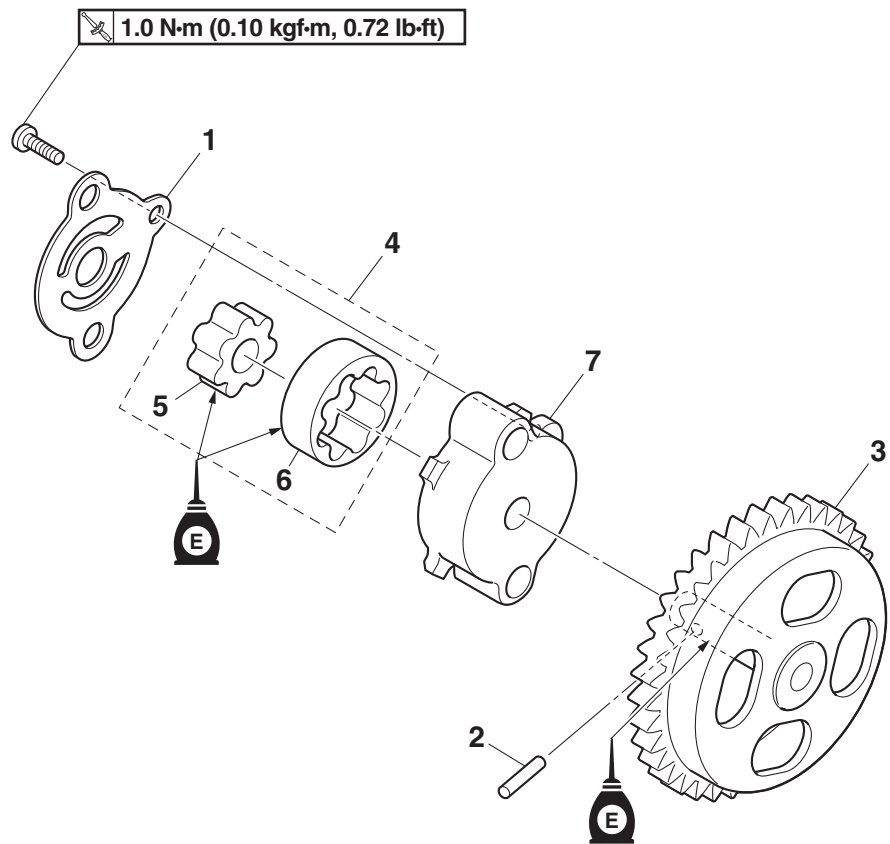
EAS20054

OIL PUMP**Removing the oil pump**

* Apply Yamaha bond No. 1215 (90890-85505).

Order	Job/Parts to remove	Q'ty	Remarks
	V-Belt automatic transmission		Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
1	Oil seal	1	
2	Oil pump cover	1	
3	Gasket	1	
4	Dowel pin	2	
5	Oil pump assembly	1	

Disassembling the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin	1	
3	Oil pump driven gear	1	
4	Oil pump rotor assembly	1	
5	Oil pump inner rotor	1	
6	Oil pump outer rotor	1	
7	Oil pump housing	1	

EAS30340

CHECKING THE OIL STRAINER

1. Check:

- Oil strainer
Damage → Replace.
Contaminants → Clean with solvent.

EAS30337

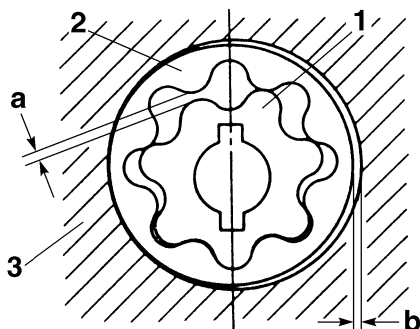
CHECKING THE OIL PUMP

1. Check:

- Oil pump drive gear
- Oil pump driven gear
- Oil pump housing
- Oil pump housing cover
Cracks/damage/wear → Replace the oil pump.

2. Measure:

- Inner-rotor-to-outer-rotor-tip clearance "a"
 - Outer-rotor-to-oil-pump-housing clearance "b"
- Out of specification → Replace the oil pump.



1. Inner rotor
2. Outer rotor
3. Oil pump housing



Inner-rotor-to-outer-rotor-tip clearance

0.150 mm (0.0059 in)

Limit

0.23 mm (0.0091 in)

Outer-rotor-to-oil-pump-housing clearance

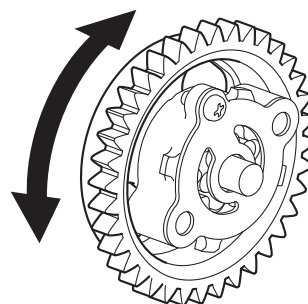
0.13–0.18 mm (0.0051–0.0071 in)

Limit

0.22 mm (0.0086 in)

3. Check:

- Oil pump operation
Rough movement → Repeat steps (1) and (2) or replace the oil pump.



EAS30342

ASSEMBLING THE OIL PUMP

1. Lubricate:

- Inner rotor
- Outer rotor
- Oil pump shaft



Recommended lubricant
Engine oil

2. Install:

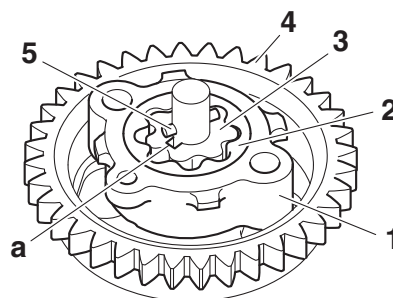
- Oil pump housing "1"
- Oil pump outer rotor "2"
- Oil pump inner rotor "3"
- Oil pump driven gear "4"
- Pin "5"
- Oil pump housing cover



Oil pump housing cover screw
1.0 N·m (0.10 kgf·m, 0.72 lb·ft)

TIP

When installing the inner rotor, align the pin in the oil pump driven gear with the groove "a" in the inner rotor.



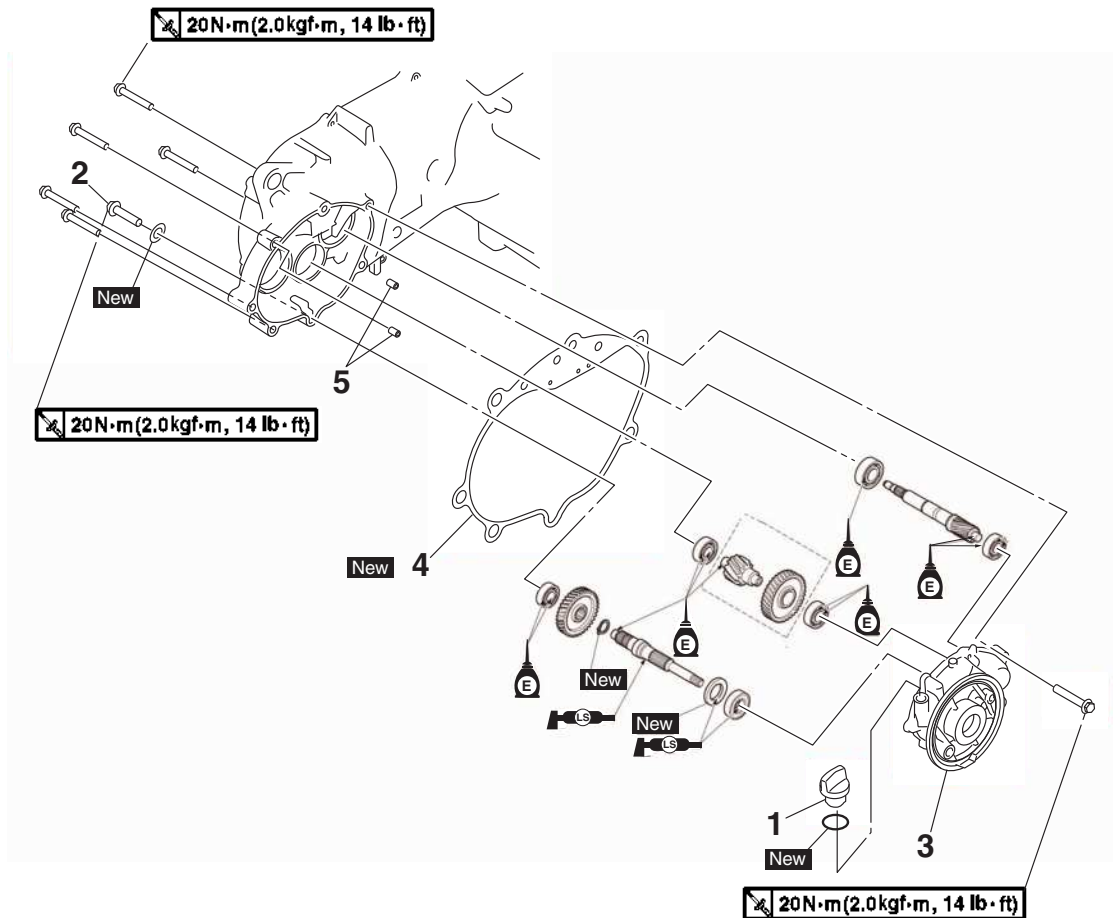
3. Check:

- Oil pump operation
Refer to "CHECKING THE OIL PUMP" on page 5-47.

EAS20062

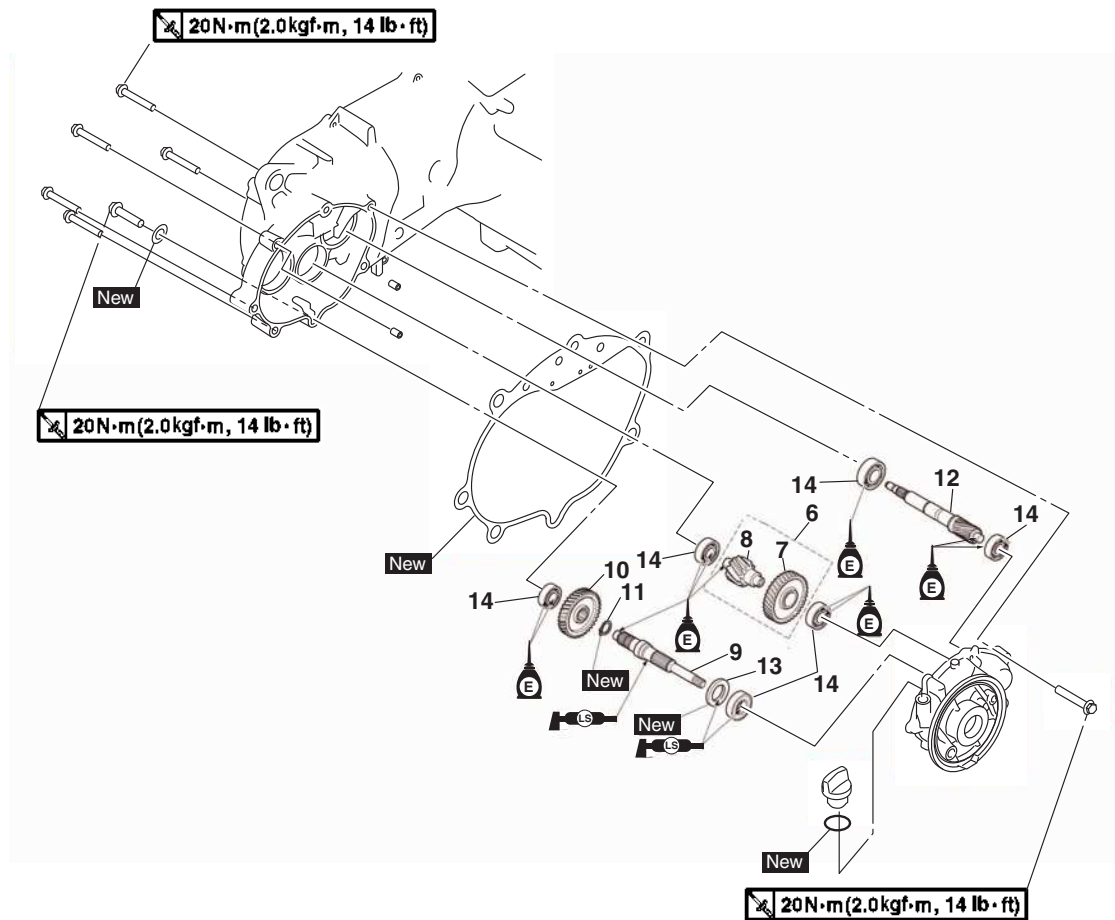
TRANSMISSION

Removing the transmission



Order	Job/Parts to remove	Q'ty	Remarks
	Muffler		Refer to "ENGINE REMOVAL" on page 5-3.
	Radiator cover		Refer to "RADIATOR" on page 6-1.
	Secondary sheave assembly		Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
	Swingarm		Refer to "REAR WHEEL" on page 4-28.
	Rear wheel		Refer to "REAR WHEEL" on page 4-28.
1	Final transmission oil filler cap	1	
2	Final transmission oil drain bolt	1	
3	Transmission case cover	1	
4	Transmission case cover gasket	1	
5	Dowel pin	2	

Removing the transmission

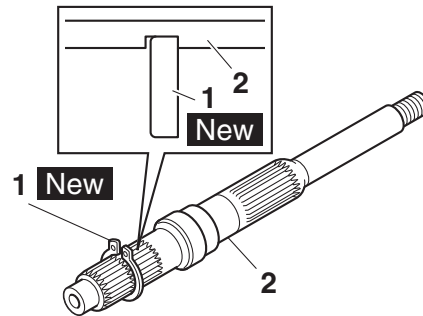


Order	Job/Parts to remove	Q'ty	Remarks
6	Main axle assembly	1	
7	Primary driven gear	1	
8	Main axle	1	
9	Drive axle	1	
10	1st wheel gear	1	
11	Circlip	1	
12	Primary drive gear	1	
13	Oil seal	2	
14	Bearing	6	

EAS30433

CHECKING THE TRANSMISSION

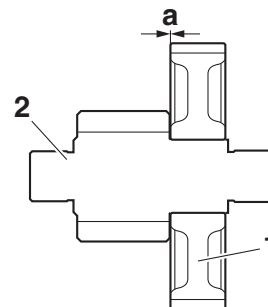
1. Check:
 - Transmission gears
Blue discoloration/pitting/wear → Replace the defective gear(s).
 - Transmission gear dogs
Cracks/damage/rounded edges → Replace the defective gear(s).
2. Check:
 - Transmission gear engagement
(each pinion gear to its respective wheel gear)
Incorrect → Reassemble the transmission axle assemblies.
3. Check:
 - Transmission gear movement
Rough movement → Replace the defective part(s).



3. Install:
 - Primary driven gear “1”
(to the main axle “2”)



Primary driven gear installed depth “a”
0.5–0.9 mm (0.020–0.035 in)



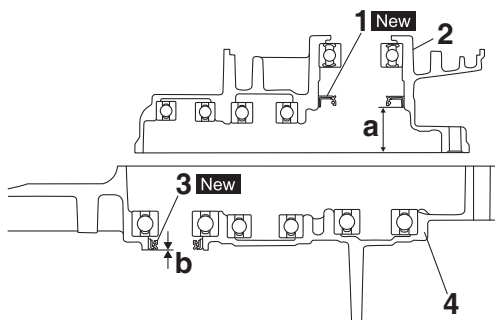
EAS30438

INSTALLING THE TRANSMISSION

1. Install:
 - Oil seal “1” **New**
(to the transmission case cover “2”)
 - Oil seal “3” **New**
(to the right crankcase “4”)



Installed depth “a”
21.7–21.8 mm (0.85–0.86 in)
Installed depth “b”
0.25–0.75 mm (0.01–0.03 in)



2. Install:
 - Circlip “1” **New**
(to the drive axle “2”)

TIP

Install the circlip with its chamfered side facing as shown.

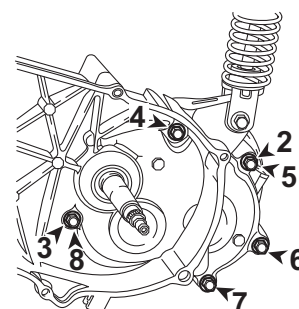
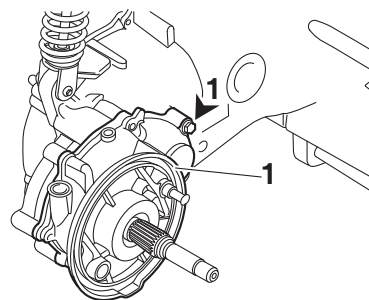
4. Install:
 - Transmission case cover “1”



Transmission case cover bolt
20 N·m (2.0 kgf·m, 14 lb·ft)

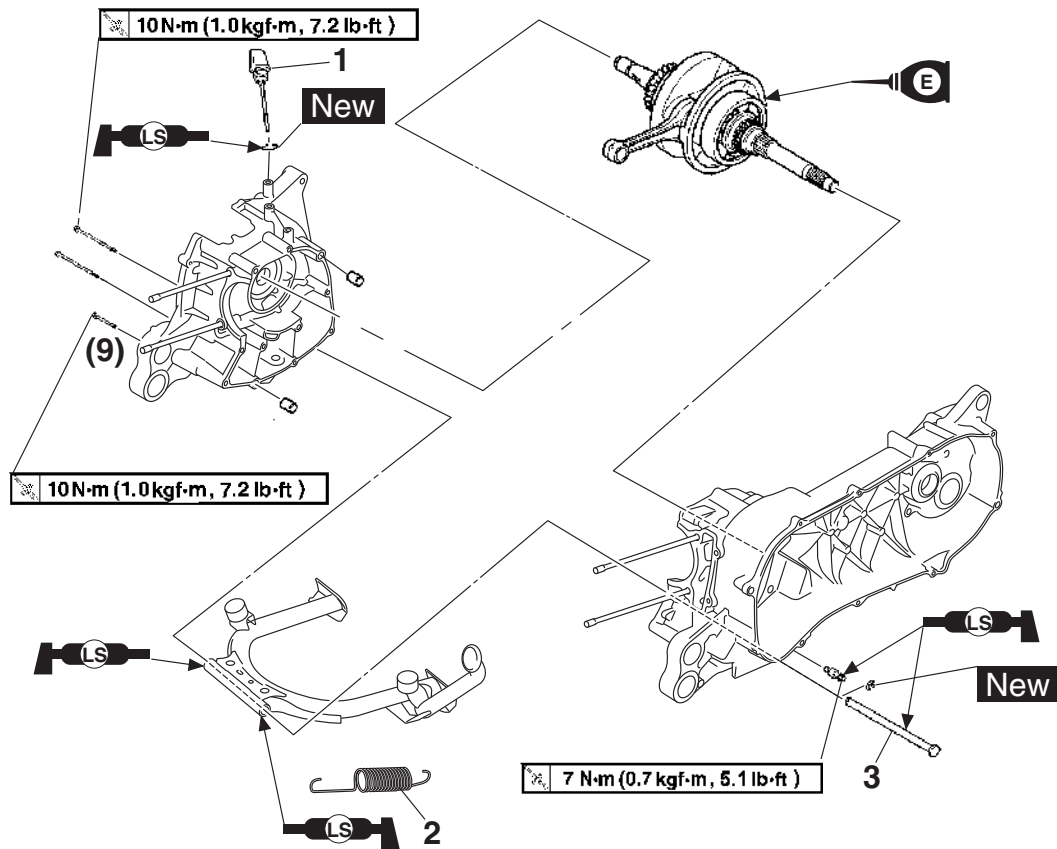
TIP

Tighten the transmission case cover bolts in the proper tightening sequence as shown.



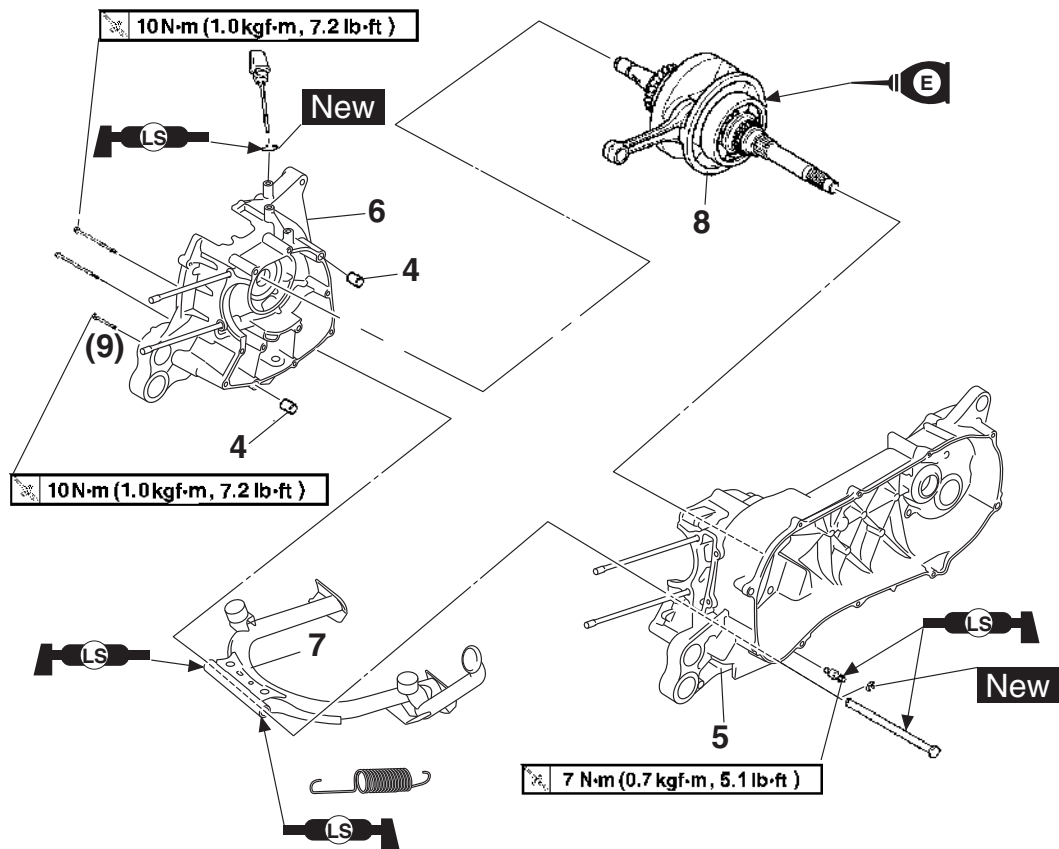
CRANKSHAFT

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-3.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-9.
	Piston		Refer to "CYLINDER AND PISTON" on page 5-29.
	Secondary sheave assembly		Refer to "V-BELT AUTOMATIC TRANSMISSION" on page 5-34.
	Oil pump		Refer to "OIL PUMP" on page 5-45.
1	Dipstick	1	
2	Centerstand spring	1	
3	Centerstand shaft	1	

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
4	Dowel pin	2	
5	Crankcase (left)	1	
6	Crankcase (right)	1	
7	Centerstand	1	
8	Crankshaft assembly	1	

EAS31241

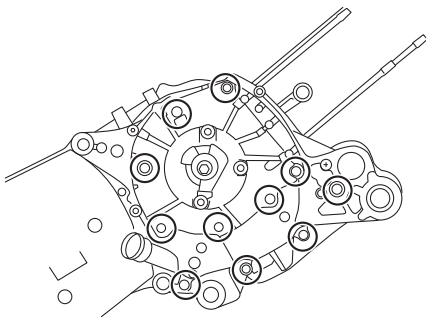
DISASSEMBLING THE CRANKCASE

1. Remove:

- Crankcase bolts

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



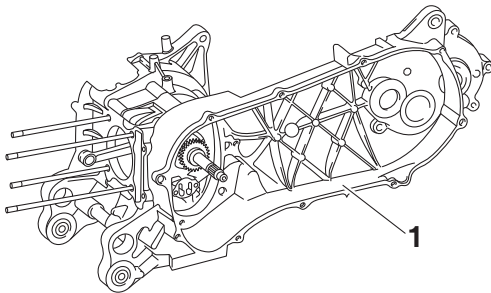
2. Remove:

- Crankcase (left) "1"

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.



EAS30414

REMOVING THE CRANKSHAFT ASSEMBLY

1. Remove:

- Crankshaft assembly "1"

TIP

- Remove the crankshaft assembly with the crankcase separating tool "2" and M6 bolts "3".
- Make sure that the crankcase separating tool is centered over the crankshaft assembly.

ECA20630

NOTICE

- To protect the end of the crankshaft, place an appropriate sized socket between the crankcase separating tool bolt and the crankshaft.
- Do not tap on the crankshaft.



Crankcase separating tool
90890-01135
Crankcase separator
YU-01135-B

EAS31242

CHECKING THE CRANKSHAFT ASSEMBLY

1. Measure:

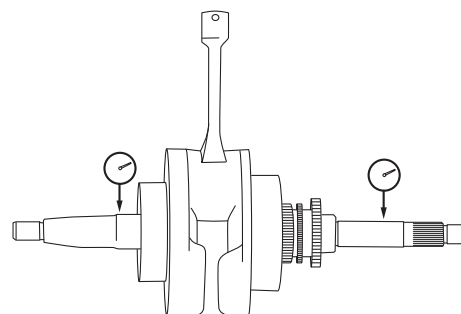
- Crankshaft runout
Out of specification → Replace the crankshaft assembly.

TIP

Turn the crankshaft slowly.



Runout limit
0.030 mm (0.0012 in)

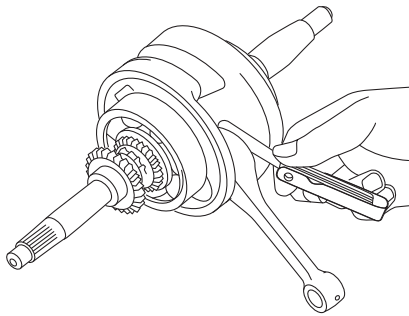


2. Measure:

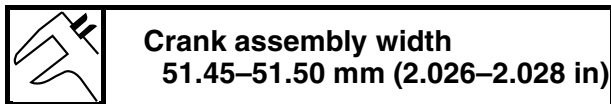
- Big end side clearance
Out of specification → Replace the crankshaft assembly.



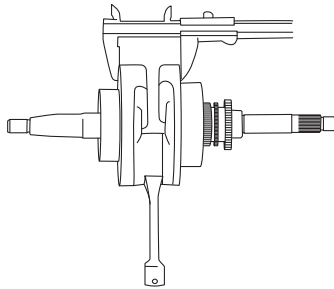
Big end side clearance
0.150–0.450 mm
(0.0059–0.0177 in)



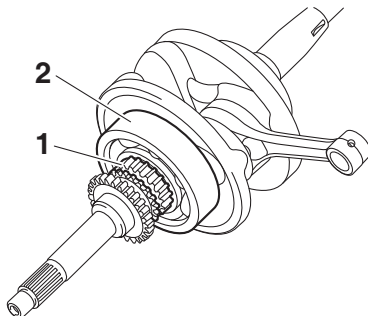
3. Measure:
- Crankshaft width
Out of specification → Replace the crankshaft assembly.



Crank assembly width
51.45–51.50 mm (2.026–2.028 in)



4. Check:
- Crankshaft sprocket “1”
Damage/wear → Replace the crankshaft assembly.
 - Bearing “2”
Cracks/damage/wear → Replace the crankshaft assembly.



EAS31243

CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
 - Crankcase
Cracks/damage → Replace.

EAS31244

CHECKING THE BEARING

1. Check:
 - Bearing
Clean and lubricate the bearings, and then rotate the inner race with your finger.
Rough movement → Replace.

EAS31245

CHECKING THE OIL PUMP DRIVE GEAR

1. Check:
 - Oil pump drive gear
Damage/wear → Replace.

EAS30791

INSTALLING THE CRANKSHAFT

1. Install:
 - Crankshaft assembly “1”

TIP

- Install the crankshaft assembly with the crankshaft installer pot “2”, crankshaft installer bolt “3”, adapter “4”, and crankshaft installer spacer “5”.
- Hold the connecting rod at top dead center (TDC) with one hand while turning the nut of the crankshaft installer bolt with the other. Turn the crankshaft installer bolt until the crankshaft assembly bottoms against the bearing.



Crankshaft installer pot
90890-01274
Installing pot
YU-90058
Crankshaft installer bolt
90890-01275
Bolt
YU-90060
Adapter (M12)
90890-01278
Adapter #3
YU-90063
Spacer (crankshaft installer)
90890-04081
Pot spacer
YM-91044

EAS31246

ASSEMBLING THE CRANKCASE

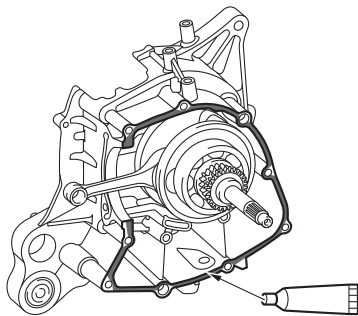
1. Thoroughly clean all the gasket mating surfaces and crankcase mating surfaces.
2. Apply:
 - Sealant
(onto the crankcase mating surfaces)



Yamaha bond No. 1215
90890-85505
(Three bond No.1215®)

TIP

Do not allow any sealant to come into contact with the oil gallery.



3. Install:
 - Crankcase (right)
(onto the crankcase (left))
 - Crankcase bolts



Crankcase bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Thoroughly wipe off any sealant that protrudes from between the left crankcase and the right crankcase.
- Tighten the crankcase bolts in stages and in a crisscross pattern.

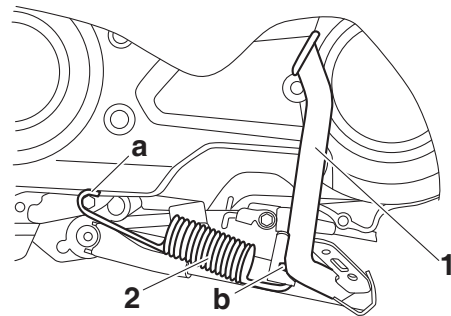
EAS31247

INSTALLING THE CENTERSTAND

1. Install:
 - Centerstand "1"
 - Spring "2"

TIP

- Make sure that the hooked end "a" of the spring is positioned to the outside.
- Make sure that the hooked end "b" of the spring is positioned to the outside.



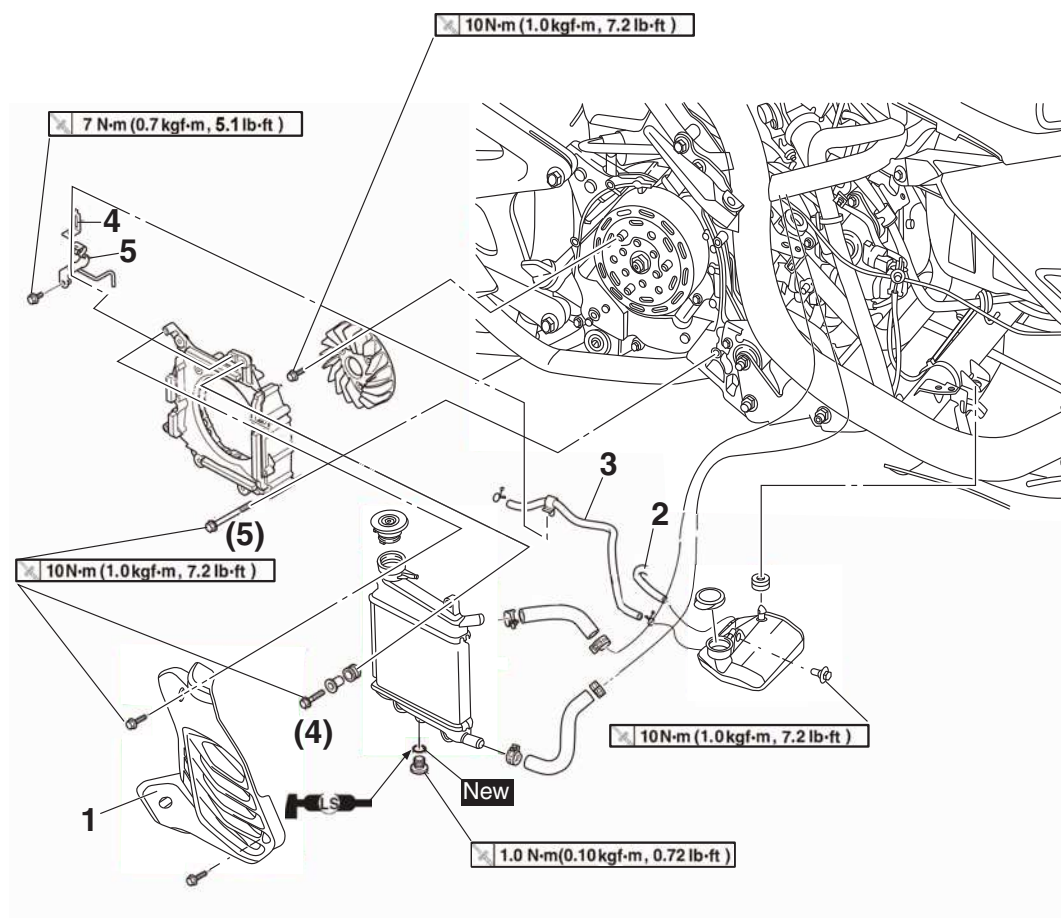
COOLING SYSTEM

RADIATOR	6-1
CHECKING THE RADIATOR.....	6-3
INSTALLING THE RADIATOR.....	6-3
 THERMOSTAT	6-4
CHECKING THE THERMOSTAT ASSEMBLY	6-5
INSTALLING THE THERMOSTAT ASSEMBLY	6-5
 WATER PUMP	6-6
DISASSEMBLING THE WATER PUMP.....	6-8
CHECKING THE WATER PUMP	6-8
ASSEMBLING THE WATER PUMP.....	6-8
INSTALLING THE WATER PUMP	6-8

EAS20063

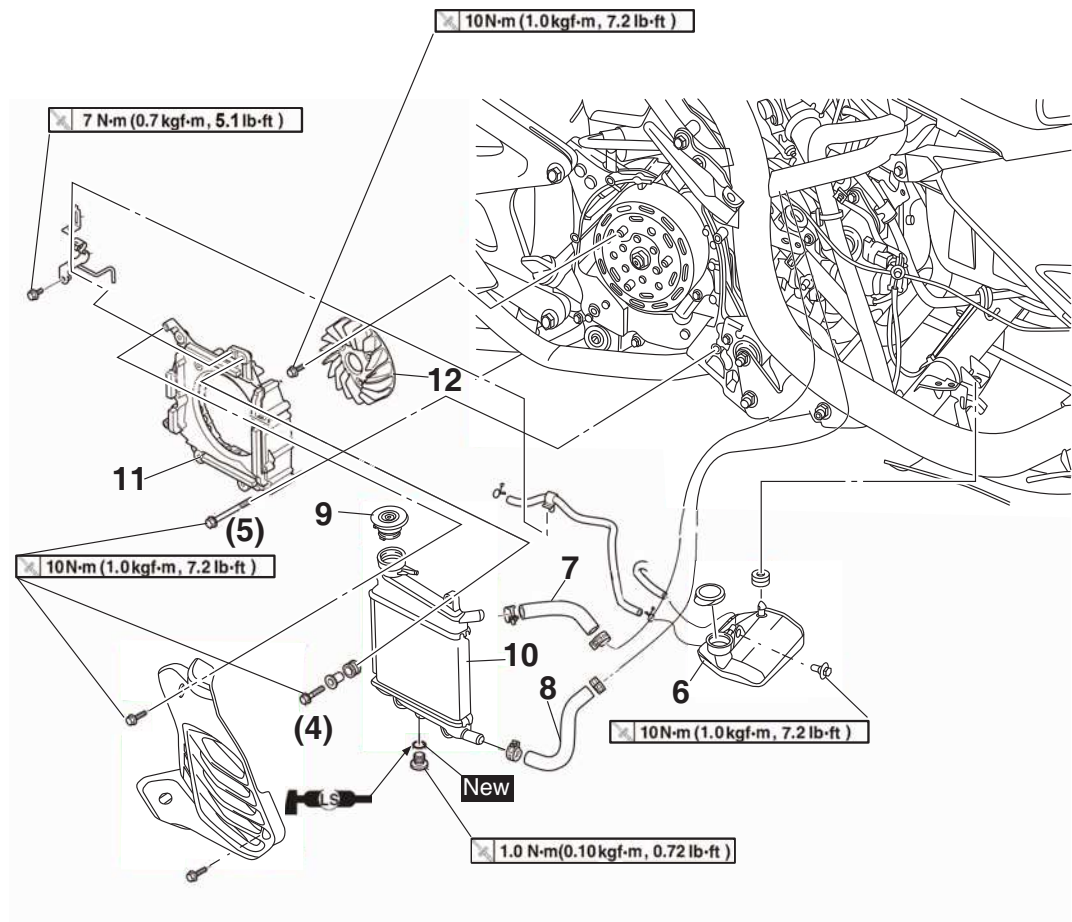
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Front side cover (right)		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Footrest board assembly (right)/Bottom cover		Refer to "GENERAL CHASSIS (6)" on page 4-16.
1	Radiator cover	1	
2	Coolant reservoir breather hose	1	
3	Coolant reservoir hose	1	
4	Rear brake hose bracket	1	
5	Rear brake hose holder (front side)	1	

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
6	Coolant reservoir	1	
7	Radiator inlet hose	1	
8	Radiator outlet hose	1	
9	Radiator cap	1	
10	Radiator	1	
11	Radiator fan case	1	
12	Radiator fan	1	

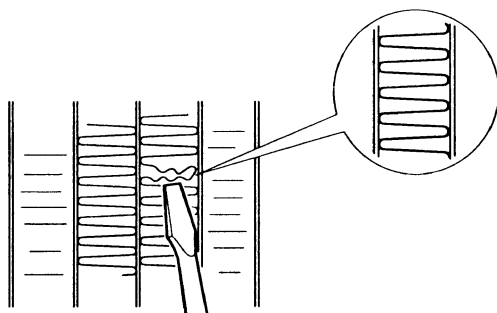
FAS30439

CHECKING THE RADIATOR

1. Check:
 - Radiator fins
Obstruction → Clean.
Apply compressed air to the rear of the radiator.
Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flathead screwdriver.



2. Check:
 - Radiator hoses
 - Coolant reservoir hoseCracks/damage → Replace.
3. Measure:
 - Radiator cap valve opening pressureBelow the specified pressure → Replace the radiator cap.



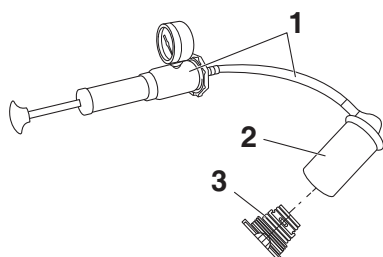
Radiator cap valve opening pressure

**108.0–137.4 kPa (1.08–1.37
kgf/cm², 15.7–19.9 psi)**

- a. Install the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator cap “3”.



Radiator cap tester
90890-05375



- b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.



4. Check:
- Radiator fan
Damage → Replace.

FAS30440

EAS30440

INSTALLING THE RADIATOR

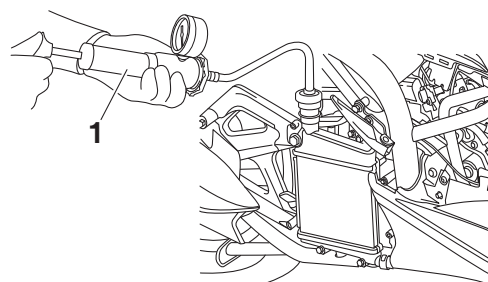
1. Fill:
 - Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-19.
2. Check:
 - Cooling system
Leaks → Repair or replace any faulty part.



- a. Attach the radiator cap tester “1” to the radiator.



Radiator cap tester
90890-05375



- b. Apply 196 kPa (1.96 kg/cm², 27.87 psi) of pressure.
- c. Measure the pressure to check its maintaining applied pressure.

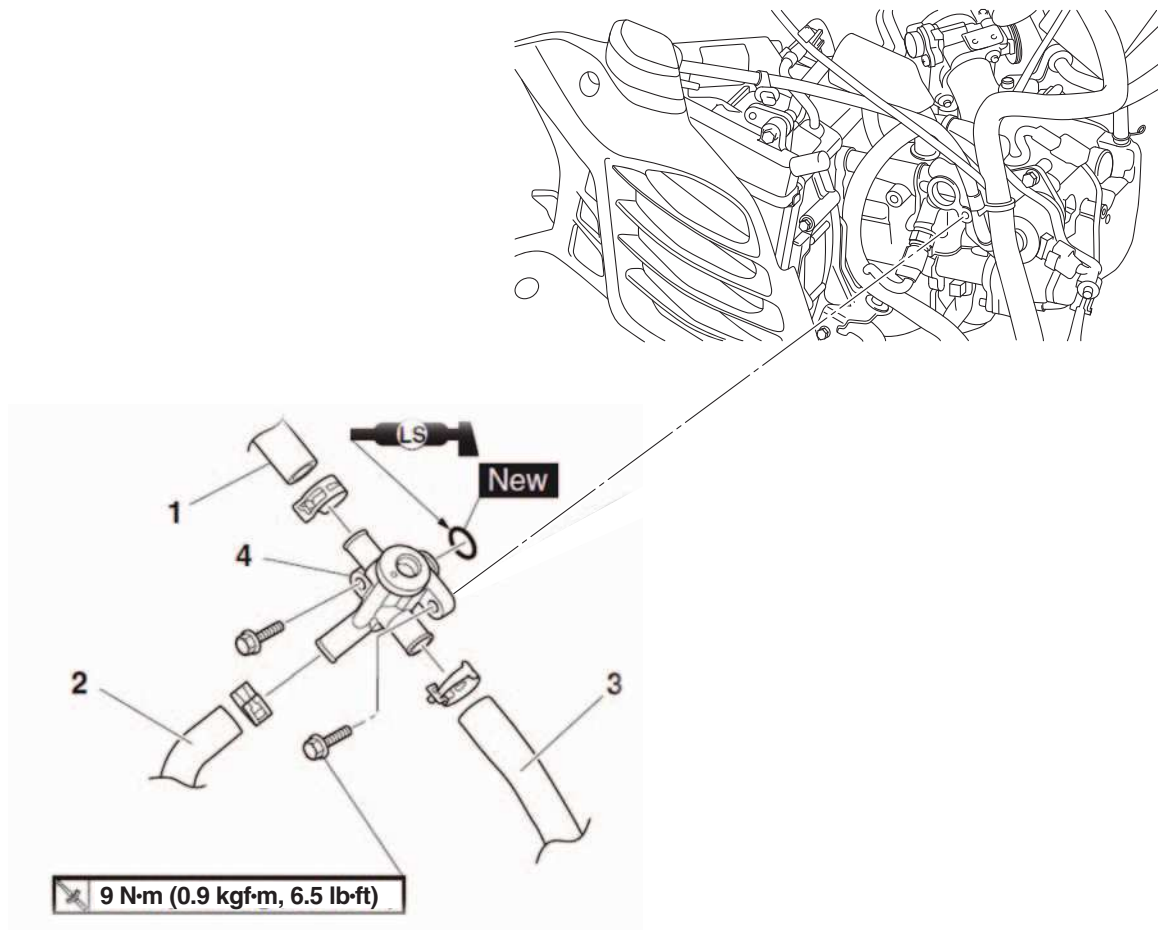


3. Measure:
- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS20065

THERMOSTAT

Removing the thermostat assembly



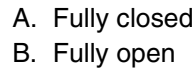
Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Front side cover (right)		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Footrest board (right)		Refer to "GENERAL CHASSIS (6)" on page 4-16.
1	Radiator inlet hose	1	Disconnect.
2	Radiator outlet hose	1	Disconnect.
3	Water pump inlet hose	1	Disconnect.
4	Thermostat assembly	1	

1. Check:

-
- 1

-

-



EAS30445

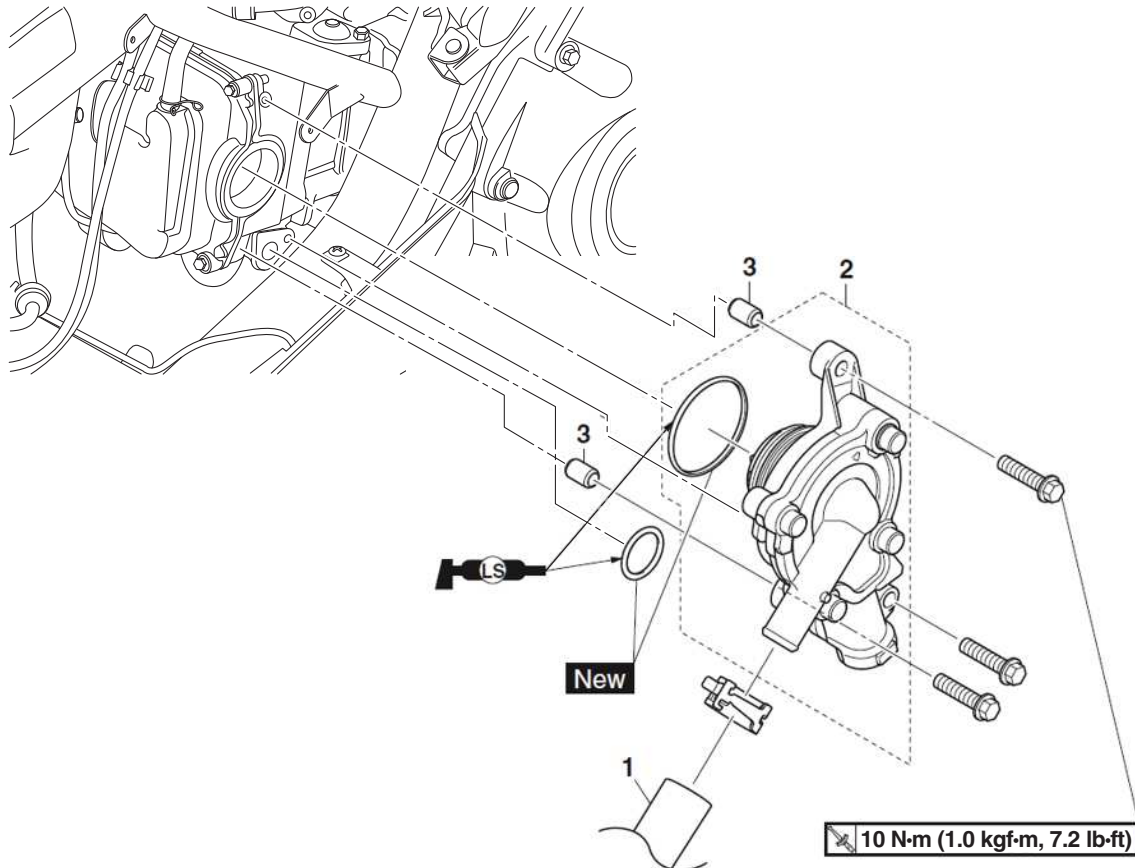
1. Fill:

- 6-5**

EAS20066

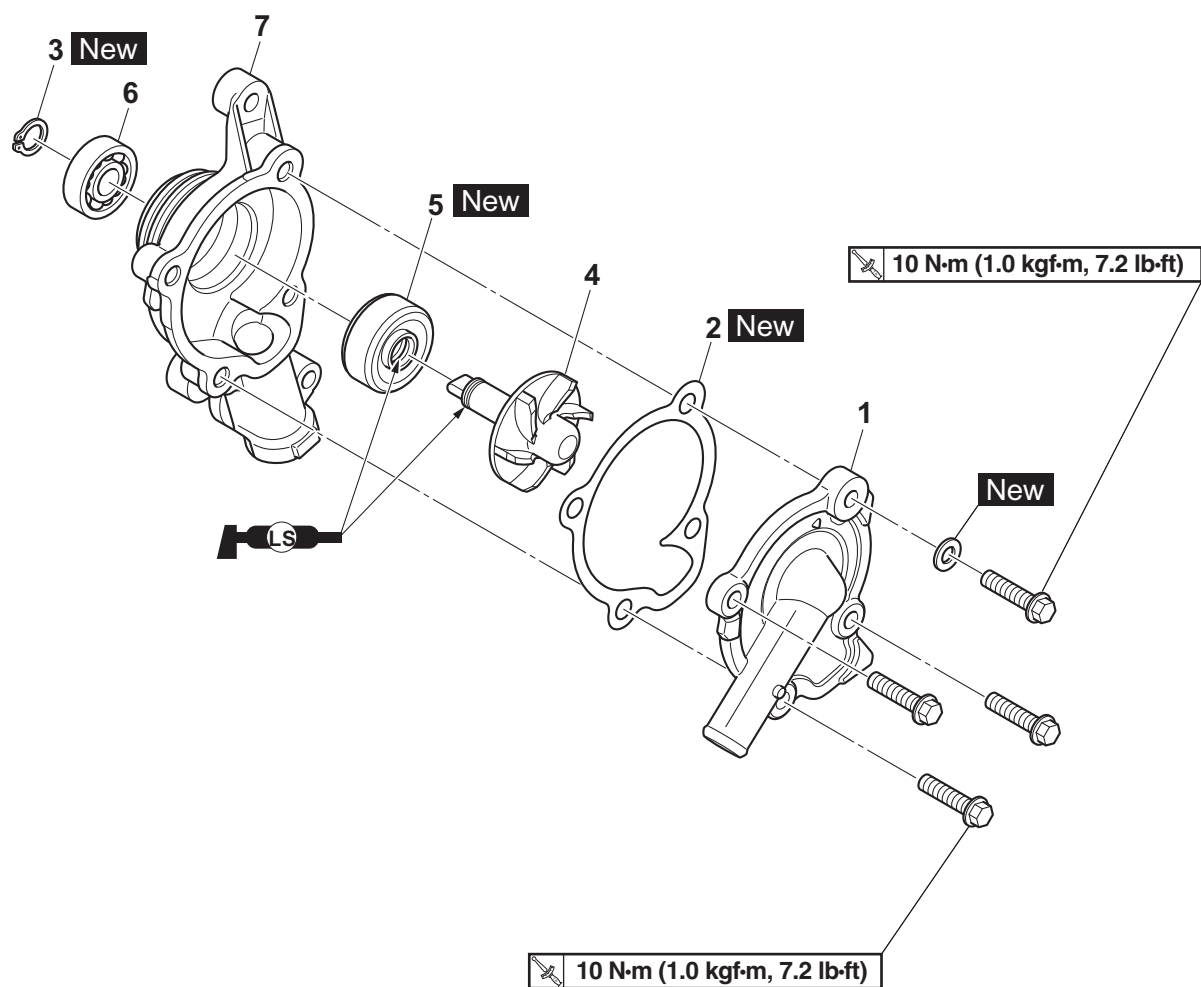
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-19.
	Front side cover (left)		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Footrest board (left)		Refer to "GENERAL CHASSIS (3)" on page 4-6.
1	Water pump inlet hose	1	Disconnect.
2	Water pump assembly	1	
3	Dowel pin	2	

Disassembling the water pump



Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	Water pump housing gasket	1	
3	Circlip	1	
4	Impeller shaft	1	
5	Water pump seal	1	
6	Bearing	1	
7	Water pump housing	1	

EAS30446

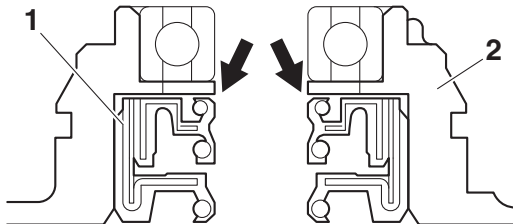
DISASSEMBLING THE WATER PUMP

1. Remove:

- Water pump seal “1”

TIP

Remove the water pump seal from the inside of the water pump housing “2”.



EAS30447

CHECKING THE WATER PUMP

1. Check:

- Water pump housing cover
 - Water pump housing
 - Impeller shaft
- Cracks/damage/wear → Replace.

EAS30448

ASSEMBLING THE WATER PUMP

1. Install:

- Water pump seal “1” **New**
(into the water pump housing “2”)

TIP

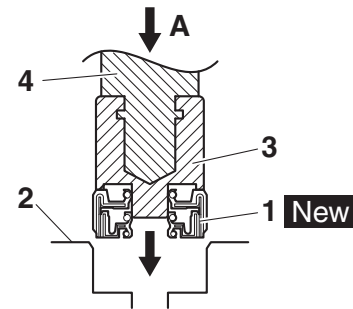
Install the water pump seal with the special tools to the specified depth as shown in the illustration.



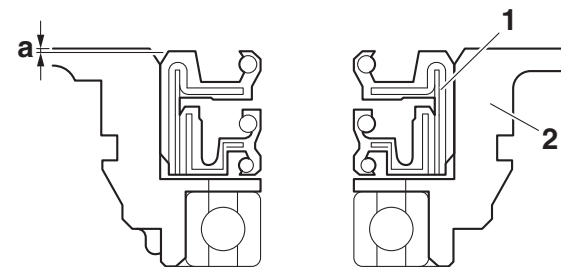
Installed depth of water pump seal
0–0.5 mm (0–0.02 in)



Mechanical seal installer
90890-04145
Middle driven shaft bearing driver
90890-04058
Middle drive bearing installer 40 & 50 mm
YM-04058



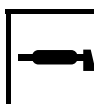
- A. Push down
3. Mechanical seal installer
4. Middle driven shaft bearing driver



- a. Installed depth of water pump seal

2. Lubricate:

- Water pump seal



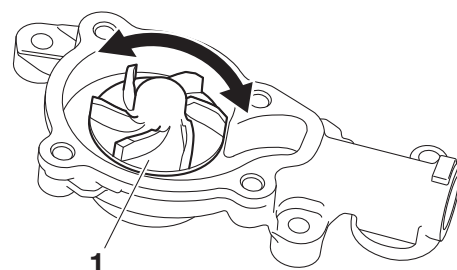
Recommended lubricant
Lithium-soap-based grease

3. Install:

- Impeller shaft “1”
- Circlip **New**

TIP

After installation, check that the impeller shaft rotates smoothly.



EAS30449

INSTALLING THE WATER PUMP

1. Install:

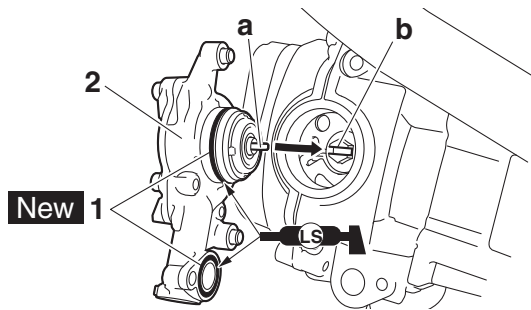
- O-rings “1” **New**
- Water pump assembly “2”



Water pump assembly bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Align the projection “a” on the impeller shaft with the slit “b” on the camshaft sprocket bolt.
- Lubricate the O-ring with a thin coat of lithium-soap-based grease.



2. Fill:

- Cooling system
(with the specified amount of the recommended coolant)
Refer to “CHANGING THE COOLANT” on page 3-19.

3. Check:

- Cooling system
Leaks → Repair or replace any faulty part.
Refer to “INSTALLING THE RADIATOR” on page 6-3.

4. Measure:

- Radiator cap opening pressure
Below the specified pressure → Replace the radiator cap.
Refer to “CHECKING THE RADIATOR” on page 6-3.

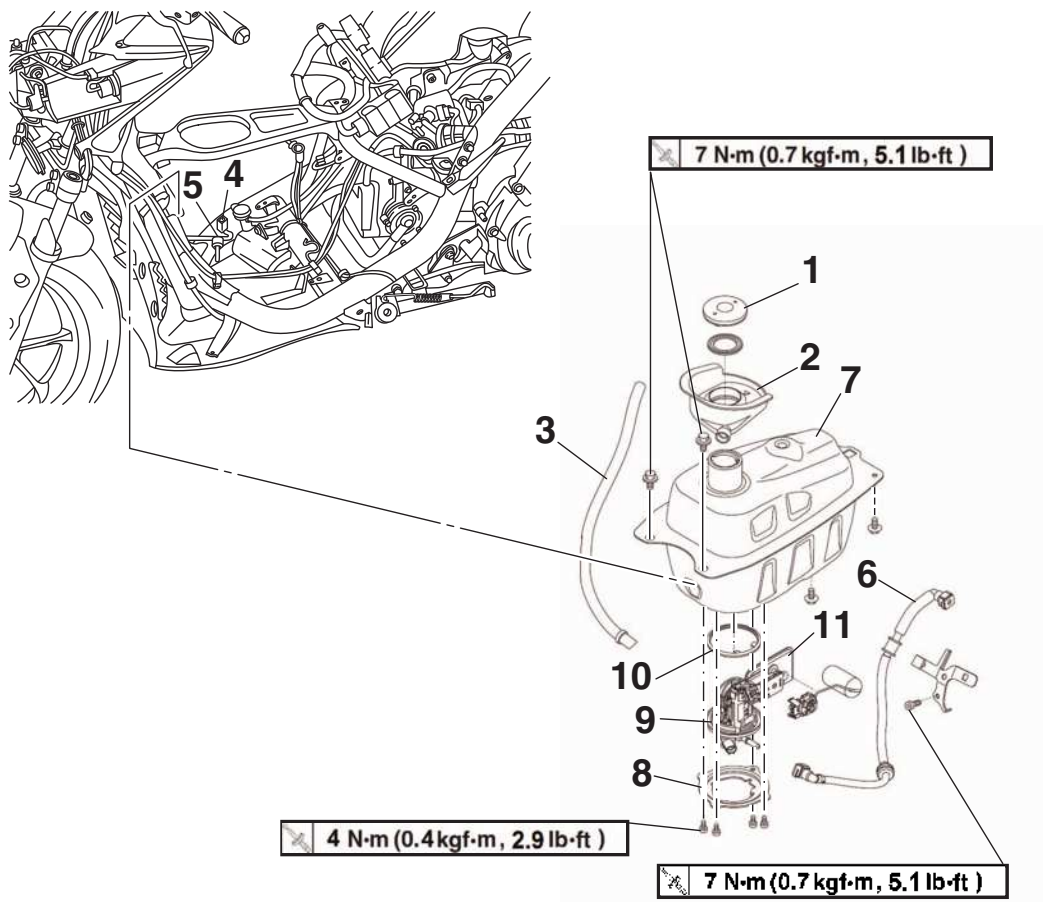
FUEL SYSTEM

FUEL TANK	7-1
REMOVING THE FUEL TANK.....	7-2
REMOVING THE FUEL PUMP.....	7-2
REMOVING THE FUEL FILTER.....	7-2
CHECKING THE FUEL PUMP BODY.....	7-2
CHECKING THE FUEL FILTER.....	7-2
INSTALLING THE FUEL FILTER.....	7-2
INSTALLING THE FUEL PUMP.....	7-3
INSTALLING THE FUEL TANK.....	7-3
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 FUEL INJECTOR	7-5
REMOVING THE FUEL HOSE.....	7-6
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EAS20067

FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Fuel tank cover		Refer to "GENERAL CHASSIS (7)" on page 4-18.
1	Fuel tank cap	1	
2	Fuel tank overflow tray	1	
3	Fuel tank overflow hose	1	
4	Fuel sender coupler	1	Disconnect.
5	Fuel pump coupler	1	Disconnect.
6	Fuel hose	1	Disconnect.
7	Fuel tank	1	
8	Fuel pump bracket	1	
9	Fuel pump	1	
10	Fuel pump gasket	1	
11	Fuel filter	1	

EAS30450

REMOVING THE FUEL TANK

1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Disconnect:
 - Fuel sender coupler
 - Fuel pump coupler
 - Fuel hose

EWA18020



WARNING

Cover the fuel hose connection with a cloth when disconnecting it. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

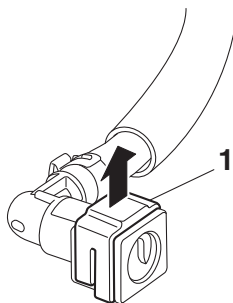
ECA20020

NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

- To remove the fuel hose from the fuel pump, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.



3. Remove:
 - Fuel tank

EAS30451

REMOVING THE FUEL PUMP

1. Remove:
 - Fuel pump

ECA14721

NOTICE

- Do not drop the fuel pump or give it a strong shock.
- Do not touch the base section of the fuel sender.

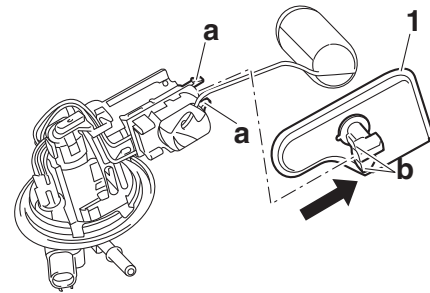
EAS31376

REMOVING THE FUEL FILTER

1. Remove:
 - Fuel filter "1"

TIP

Remove the projections "a" on the fuel pump from the holes "b" in the fuel filter and slide the fuel filter in the direction of the arrow shown to remove it.



EAS30454

CHECKING THE FUEL PUMP BODY

1. Check:
 - Fuel pump body
 - Obstruction → Clean.
 - Cracks/damage → Replace fuel pump assembly.

EAS31249

CHECKING THE FUEL FILTER

1. Check:
 - Fuel filter
 - Damage → Replace.
 - Contaminants → Clean with solvent.

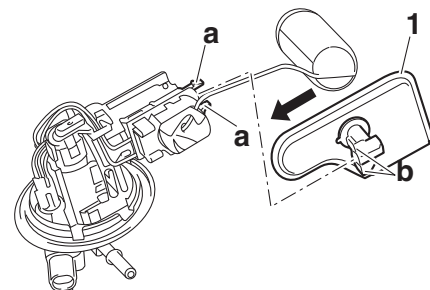
EAS31377

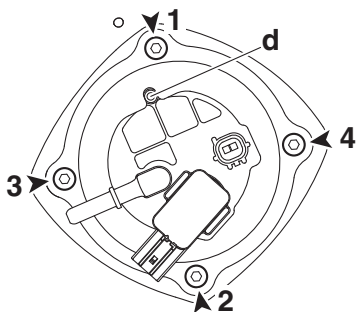
INSTALLING THE FUEL FILTER

1. Install:
 - Fuel filter "1"

TIP

Fit the projections "a" on the fuel pump into the holes "b" in the fuel filter and slide the fuel filter in the direction of the arrow shown to install it.





EAS30457

[illegible]

ECA17500

EAS30703

- Footrest board (right)
Refer to “GENERAL CHASSIS (6)” on page 4-16.

2. Check:

- Pressure regulator operation

a. Disconnect the fuel hose from the fuel pump.

EWA18020



Cover the fuel hose connection with a cloth when disconnecting it. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hose.

ECA20020

NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

Before removing the hose, place a few rags in the area under where it will be removed.

- b. Connect the pressure gauge “1” and fuel pressure adapter “2” to the fuel hose “3”.



Pressure gauge

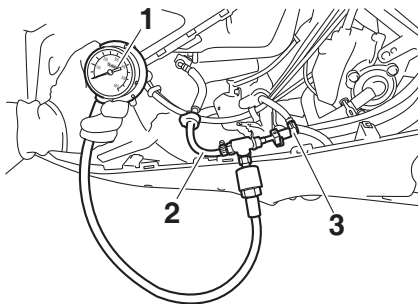
90890-03153

Pressure gauge

YU-03153

Fuel pressure adapter 6.3mm

90890-03227



- c. Start the engine.
- d. Measure the fuel pressure.



Fuel line pressure at idling

220–300 kPa (2.2–3.0 kgf/cm²,

31.9–43.5 psi)

Faulty → Replace the fuel pump.

e. Connect the fuel hose.

Refer to "INSTALLING THE FUEL TANK" on page 7-3.

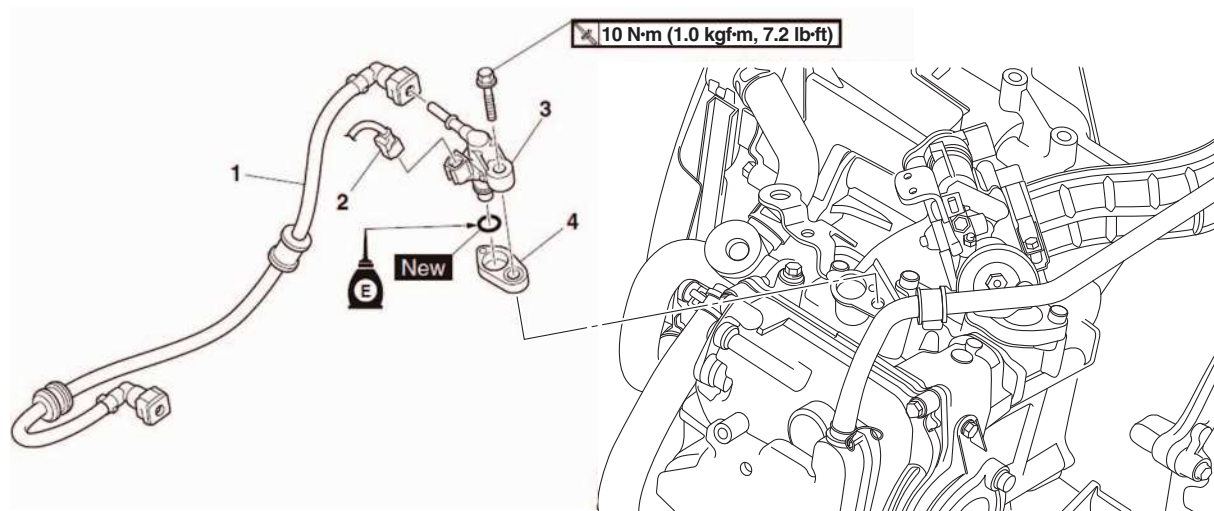


3. Install:
 - Footrest board (left)
Refer to “GENERAL CHASSIS (6)” on page 4-16.
 - Front side cover assembly (left)
Refer to “GENERAL CHASSIS (2)” on page 4-3.

EAS20191

FUEL INJECTOR

Removing the fuel injector



Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (7)" on page 4-18.
	Fuel tank cover		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Center lower cover		Refer to "GENERAL CHASSIS (6)" on page 4-16.
1	Fuel hose	1	
2	Fuel injector coupler	1	Disconnect.
3	Fuel injector	1	
4	Fuel injector adaptor	1	

EAS31250

REMOVING THE FUEL HOSE

1. Disconnect:

- Fuel hose

EWA17610



WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

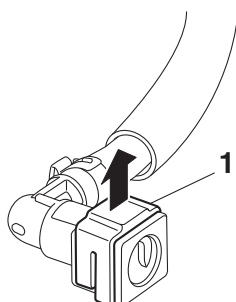
ECA20020

NOTICE

Although the fuel has been removed from the fuel tank, be careful when removing the fuel hose, since there may be fuel remaining in it.

TIP

- To remove the fuel hose from the fuel injector, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown, and then remove the hose.
- Before removing the hose, place a few rags in the area under where it will be removed.



EAS31251

CHECKING THE FUEL INJECTOR

1. Check:

- Injector
 - Obstruction → Replace and check the fuel pump/fuel supply system.
 - Deposit → Replace.
 - Damage → Replace.

2. Check:

- Injector resistance
 - Refer to "CHECKING THE FUEL INJECTOR" on page 7-6.

EAS31617

INSTALLING THE FUEL INJECTOR

1. Install:

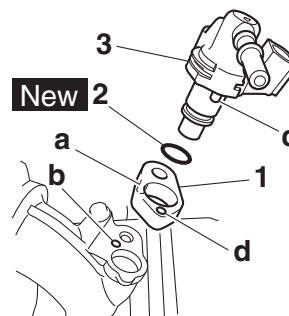
- Fuel injector adaptor "1"
- O-ring "2" **New** (to the fuel injector)
- Fuel injector "3"



Fuel injector bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

- Lubricate the O-ring with engine oil.
- Align the projection "a" on the fuel injector adapter with the hole "b" in the intake manifold.
- Align the projection "c" on the fuel injector with the hole "d" in the fuel injector adapter.



EAS31253

INSTALLING THE FUEL HOSE

1. Install:

- Fuel hose

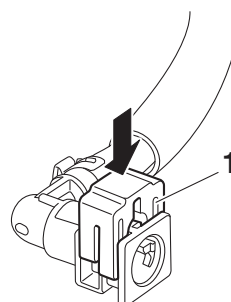
ECA17500

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

TIP

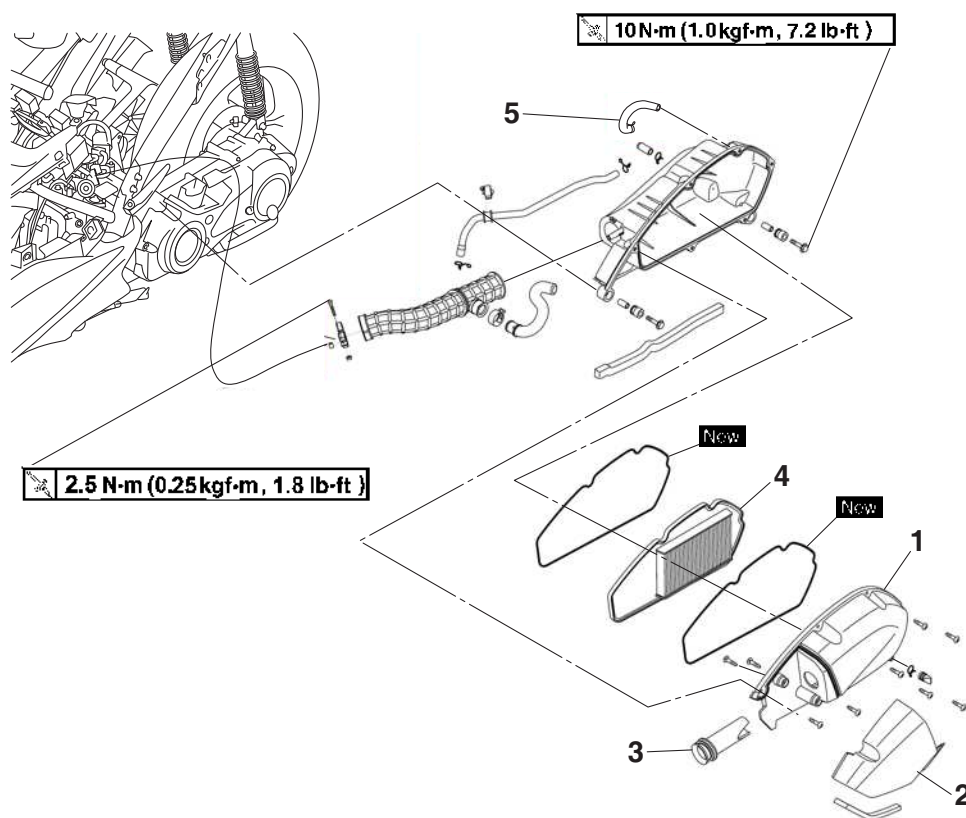
- Install the fuel hose securely onto the fuel injector until a distinct "click" is heard.
- To install the fuel hose onto the fuel injector, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.



EAS20068

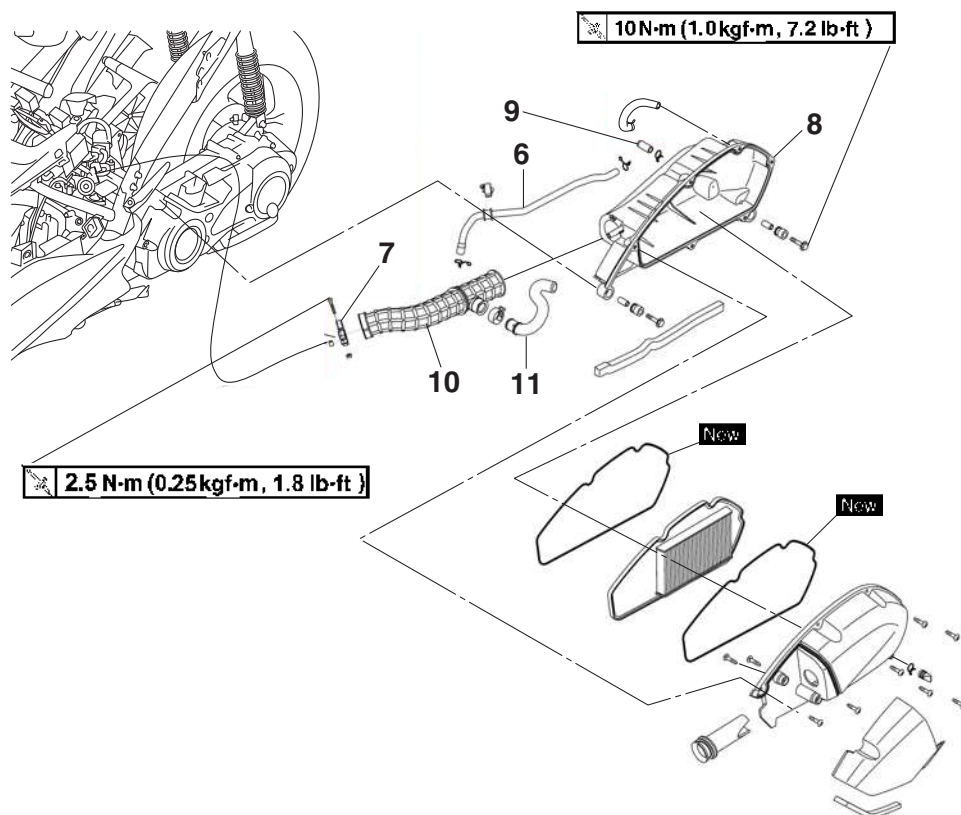
AIR FILTER CASE

Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Fuel tank cover		Refer to "GENERAL CHASSIS (7)" on page 4-18.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
1	Air filter case cover	1	
2	Air filter case duct cover	1	
3	Air filter case duct	1	
4	Air filter element	1	
5	Transmission case breather hose	1	

Removing the air filter case



Order	Job/Parts to remove	Q'ty	Remarks
6	Cylinder head breather hose	1	Disconnect.
7	Air filter case joint clamp screw	1	Loosen.
8	Air filter case	1	
9	Air filter check hose	1	
10	Air filter case joint	1	
11	Hose	1	

AIR FILTER CASE

EAS31618

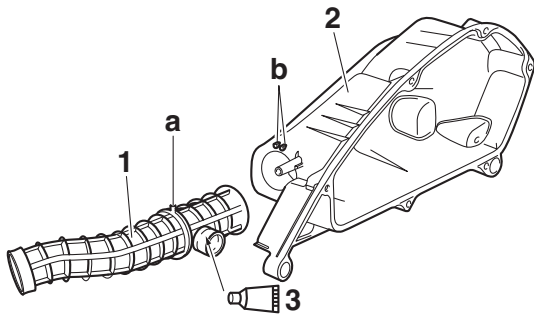
INSTALLING THE AIR FILTER CASE

1. Install:

- Hose "1"
(to the air filter case joint "2")
- Clamp "3"

TIP

- Apply Three bond 1521 "4" onto the mating surfaces of the hose and air filter case joint.
- Align the slot "a" on the air filter case joint with the projection "b" in the hose.

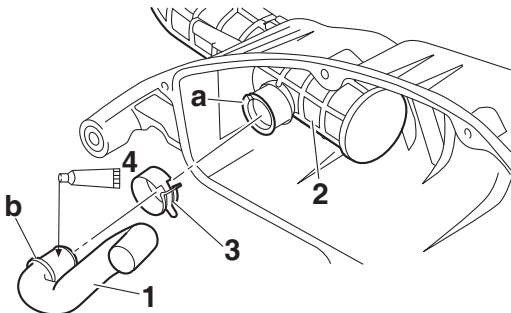


2. Install:

- Air filter case joint "1"
(to the air filter case "2")

TIP

- Apply Three Bond 1521 "3" onto the mating surfaces of the air filter case joint and air filter case.
- Fit the projection "a" on the air filter case joint between the projections "b" on the air filter case.



3. Install:

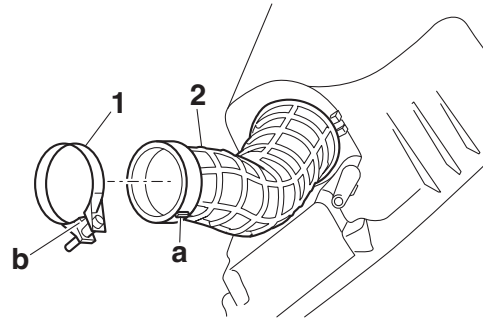
- Air filter case joint clamp "1"
(to the air filter case joint "2")



Air filter case joint clamp screw
2.5 N·m (0.25 kgf·m, 1.8 lb·ft)

TIP

Align the projection "a" on the air filter case joint with the slot "b" in the air filter case joint clamp.

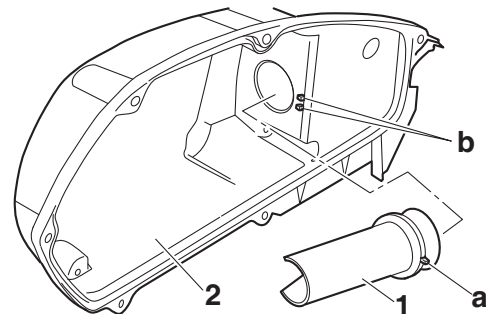


4. Install:

- Air filter case duct "1"

TIP

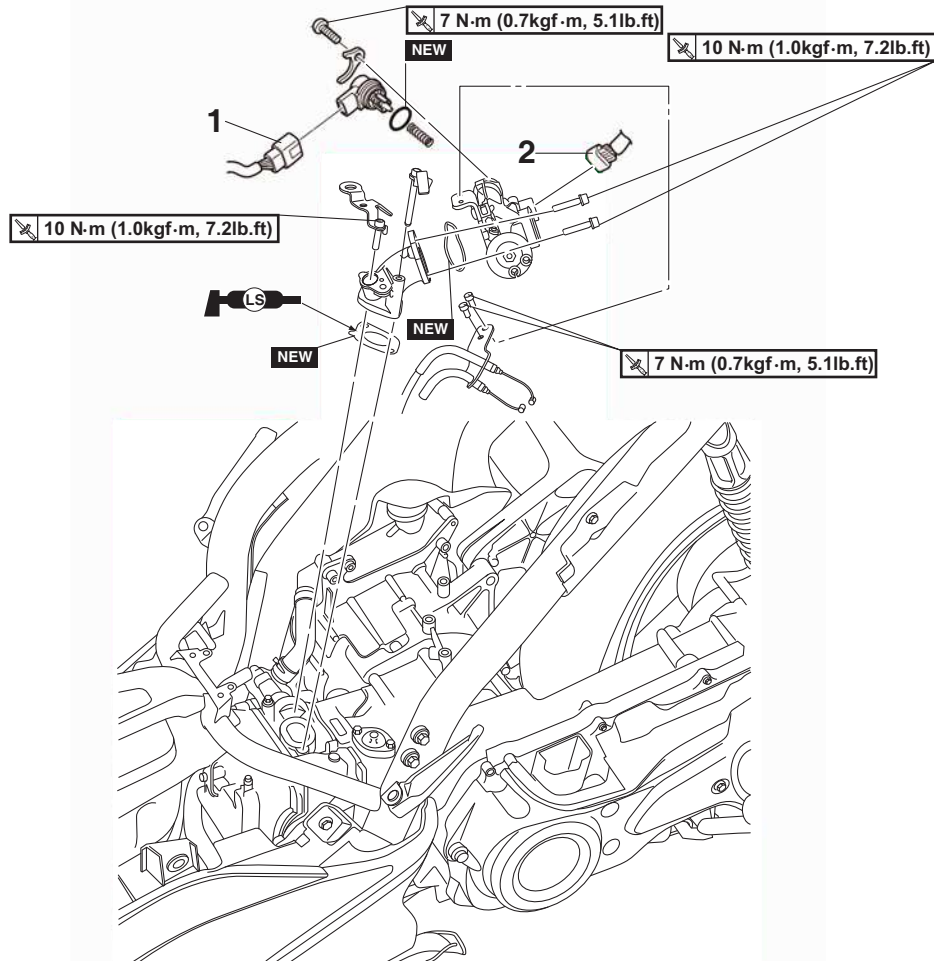
Fit the projection "a" on the air filter case duct between the projections "b" on the air filter case cover "2".



EAS20070

THROTTLE BODY

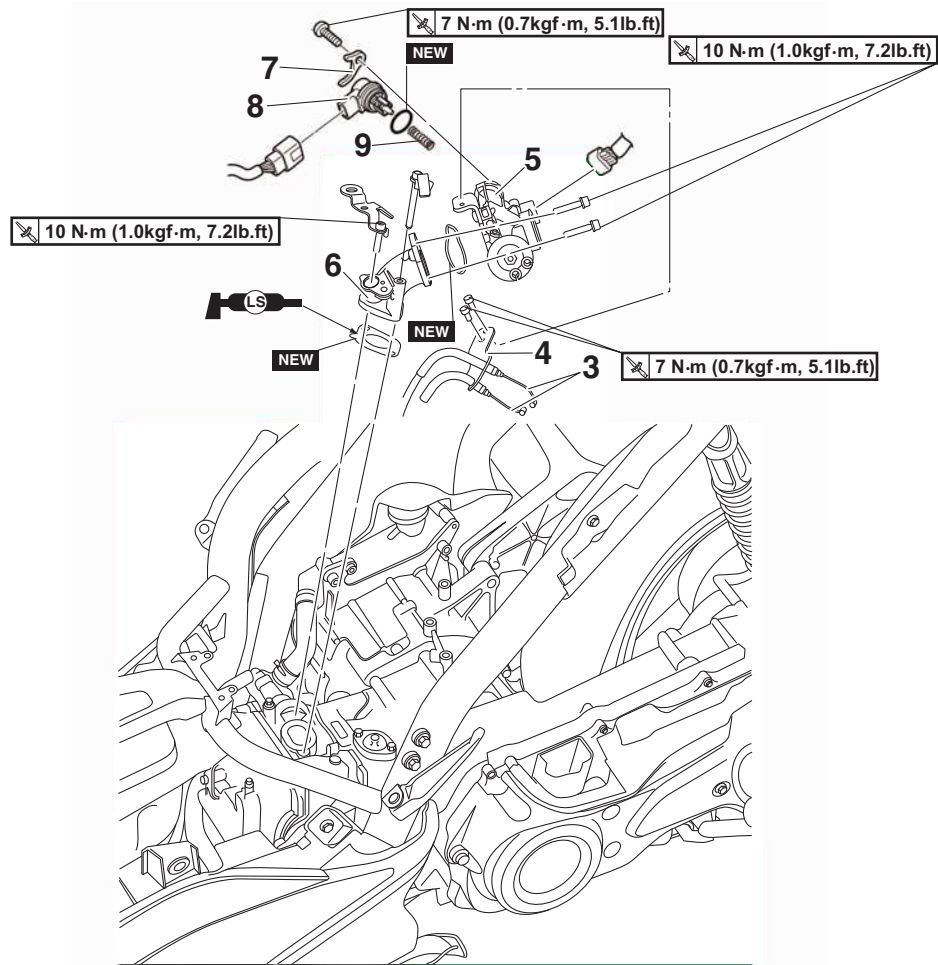
Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
	Battery		Refer to "GENERAL CHASSIS (1)" on page 4-1.
	Front side covers		Refer to "GENERAL CHASSIS (2)" on page 4-3.
	Fuel tank cover		Refer to "GENERAL CHASSIS (7)" on page 4-18.
	Storage box		Refer to "GENERAL CHASSIS (3)" on page 4-6.
	Center lower cover		Refer to "GENERAL CHASSIS (6)" on page 4-16.
	Air filter case joint		Refer to "AIR FILTER CASE" on page 7-7.
	Fuel injector		Refer to "FUEL INJECTOR" on page 7-5.
1	ISC (Idle Speed Control) unit coupler	1	Disconnect.
2	Throttle body sensor assembly coupler	1	Disconnect.

THROTTLE BODY

Removing the throttle body



Order	Job/Parts to remove	Q'ty	Remarks
3	Throttle cable	2	Disconnect.
4	Throttle cable holder	1	
5	Throttle body	1	Loosen.
6	Intake manifold	1	
7	ISC (Idle Speed Control) unit holder	1	
8	ISC (Idle Speed Control) unit	1	
9	Spring	1	

THROTTLE BODY

EAS30979

REMOVING THE THROTTLE BODY

1. Remove:
 - Throttle body

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

EAS30479

CHECKING THE THROTTLE BODY

TIP

Before checking the throttle body, check the following items:

- Valve clearance
- Spark plug
- Air filter element
- Intake manifold
- Fuel hose
- Exhaust system
- Cylinder head breather hose

EWA18030

WARNING

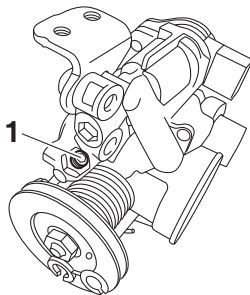
If the throttle body is subjected to strong shocks or dropped during, replace it.

1. Check:
 - Throttle body
Cracks/damage → Replace the throttle body.
2. Check:
 - Butterfly valve
Damage/scratches/wear → Replace the throttle body.

ECA21770

NOTICE

Do not adjust the stop screw "1".



EAS31254

CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY

1. Remove the throttle body from the vehicle.

TIP

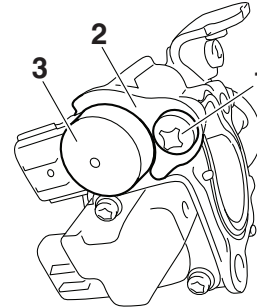
Before removing the throttle body, disconnect the throttle cables and couplers.

2. Remove:
 - Screw "1"
 - ISC (Idle Speed Control) unit holder "2"
 - ISC (Idle Speed Control) unit "3"

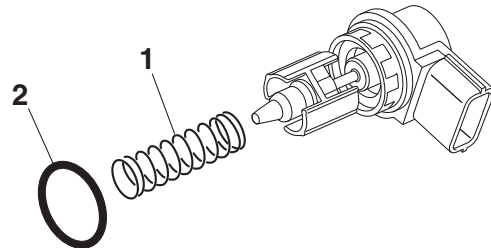
ECA21780

NOTICE

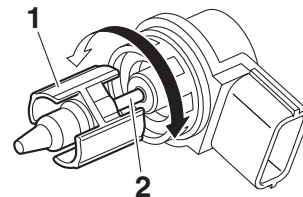
Because the force of the spring may push out the ISC unit unexpectedly, be sure to hold the ISC unit when removing the components.



3. Remove:
 - Spring "1"
 - O-ring "2"



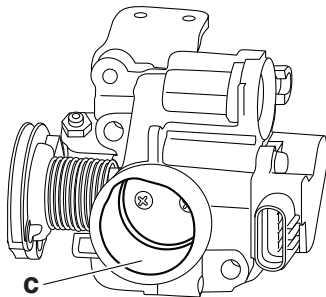
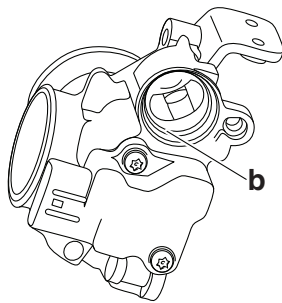
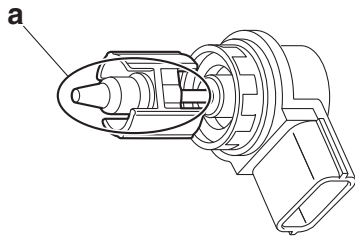
4. Check:
 - ISC (Idle Speed Control) unit
Plunger "1" does not rotate smoothly/plunger rotates together with the motor shaft "2" → Replace.



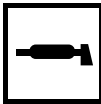
5. Check:
 - Spring
Damage/bent → Replace.
6. Clean:
 - Area "a" of the ISC unit

THROTTLE BODY

- Areas “b” and “c” of the throttle body
Clogs or foreign materials cannot be removed → Replace.



- a. Use a rag soaked in the recommended cleaning agent to wipe off any deposits and foreign materials.



Recommended cleaning agent
Yamaha oil & brake cleaner

ECA21790

NOTICE

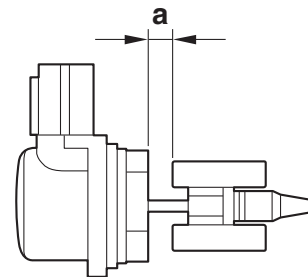
- **Be sure to use the recommended cleaning agent.**
- **Do not spray the cleaning agent directly onto the ISC unit or throttle body and do not immerse them in the cleaning agent.**
- **To prevent scratching the components, do not use a brush, metal file, or other abrasive tool.**
- **Do not clean with compressed air.**

- Do not allow the removed deposits or foreign materials to adhere to the sealing surfaces of the O-ring.
- Do not scratch or deform the ISC valve or air passage; otherwise, poor starting performance, an unstable engine idling speed, or uncontrollable engine speed could result.
- Do not clean any areas other than the areas “a”, “b”, and “c”. If the cleaning agent enters the ISC unit or throttle body, thoroughly wipe it off.

- Adjust the ISC unit plunger to the specified distance “a” from the motor assembly body.



Distance “a”
0.0–3.0 mm (0.0–0.12 in)



- Spring
- O-ring “1” **New**
- ISC (Idle Speed Control) unit “2”

ECA21800

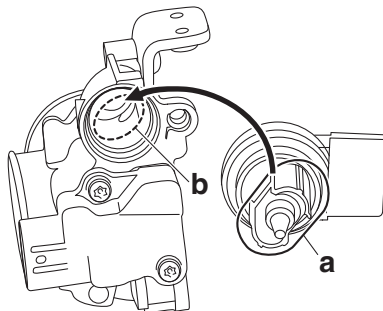
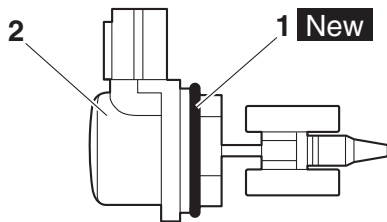
NOTICE

- **Do not use the ISC unit if it was dropped.**
- **Do not allow water to enter the ISC unit and do not allow foreign materials to adhere to the assembly.**
- **Do not touch the terminals of the coupler directly.**
- **Because the force of the spring may push out the ISC unit unexpectedly, be sure to hold the motor assembly when installing the components.**

TIP

- Install the new O-ring until it contacts the raised portion of the ISC unit body.
- When installing the ISC unit, be sure to align the oval portion “a” of the ISC unit with the oval hole “b” in the throttle body.

THROTTLE BODY



9. Install:

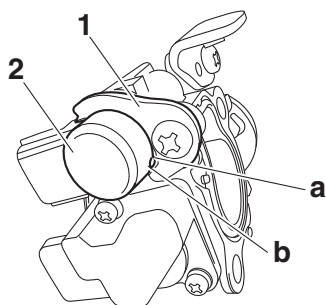
- ISC (Idle Speed Control) unit holder “1”
- Screw



ISC (Idle Speed Control) unit holder screw
5 N·m (0.5 kgf·m, 3.6 lb·ft)

TIP

Align the slot “a” in the ISC unit holder with the projection “b” on the ISC unit “2”.



10. Install the throttle body to the vehicle.

11. Reset:

- ISC learning valves
Use the diagnostic code number “67”.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
- ISC valve position
Use the diagnostic code number “54”.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.



Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

12. Place the vehicle on the centerstand so that the rear wheel is elevated.

13. Check:

- Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed. Within specification → Service is finished.
Out of specification → Replace the throttle body.
Refer to “REPLACING THE THROTTLE BODY” on page 7-14.



Engine idling speed
1500–1700 r/min

EAS31160

REPLACING THE THROTTLE BODY

1. Remove the throttle body from the vehicle.
2. Install a new throttle body to the vehicle.
3. Reset:
 - ISC learning valves
Use the diagnostic code number “67”.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.
 - ISC valve position
Use the diagnostic code number “54”.
Refer to “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.



Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

4. Place the vehicle on the centerstand so that the rear wheel is elevated.

5. Check:

- Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.



Engine idling speed
1500–1700 r/min

EAS30980

INSTALLING THE THROTTLE BODY

1. Install:

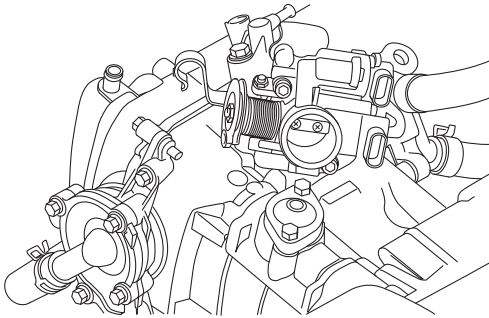
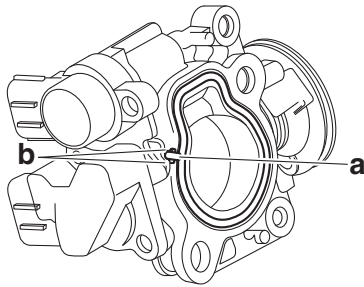
- Throttle body



Throttle body bolt
10 N·m (1.0 kgf·m, 7.2 lb·ft)

TIP

Align the projection “a” on the O-ring with the slot “b” in the throttle body.



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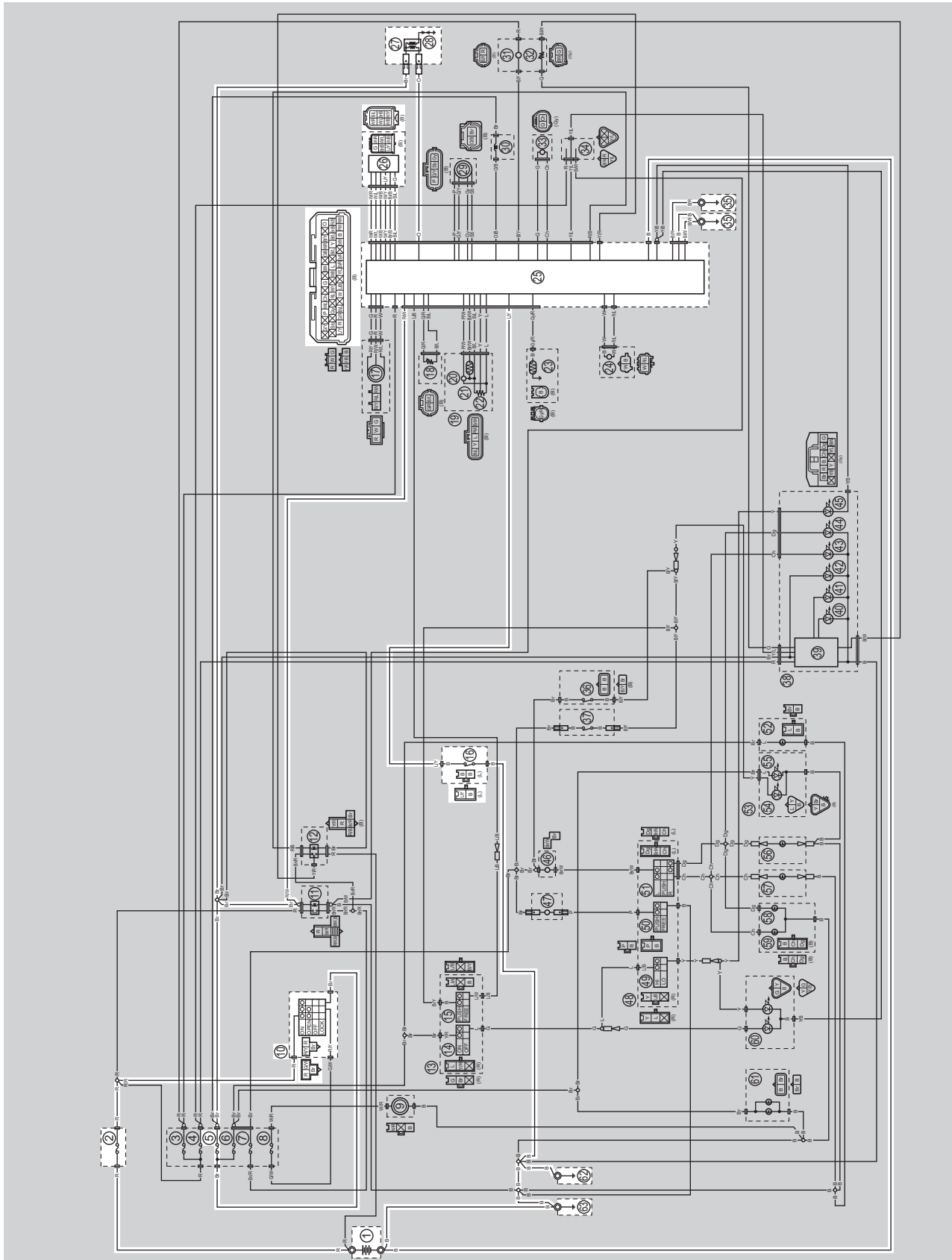
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EAS20072

IGNITION SYSTEM

EAS30490

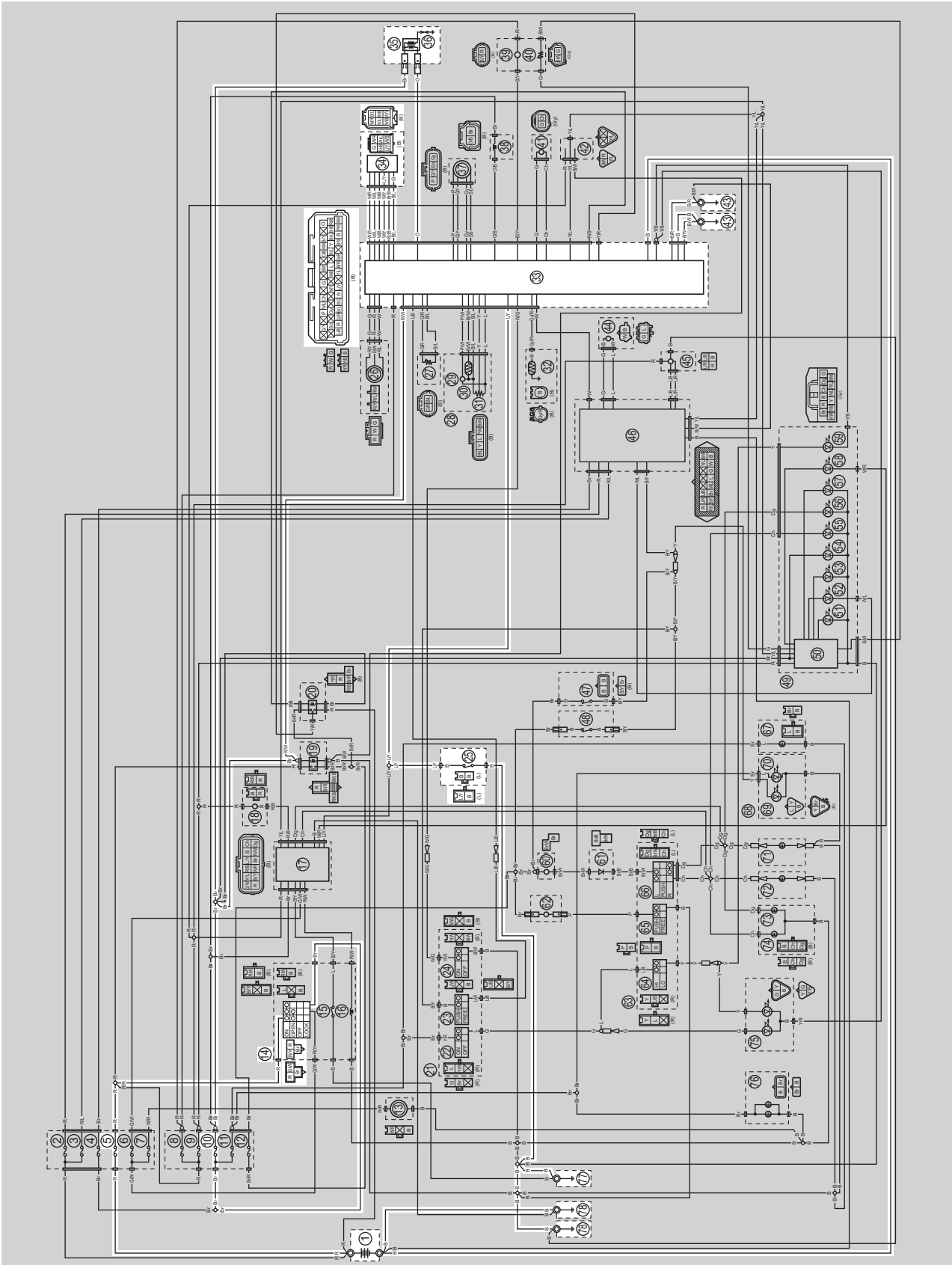
CIRCUIT DIAGRAM (GDR155)



- 1. Battery
- 2. Main fuse
- 5. Ignition fuse
- 10. Main switch
- 16. Sidestand switch
- 25. SGCU (starter generator control unit)
- 26. Crankshaft position sensor
- 27. Ignition coil
- 28. Spark plug
- 35. Engine ground 2
- 62. Frame ground
- 63. Engine ground 1

EASB631001

CIRCUIT DIAGRAM (GDR155-A)



- 1. Battery
- 5. Main fuse
- 10. Ignition fuse
- 14. Main switch
- 25. Sidestand switch
- 33. SGCU (starter generator control unit)
- 34. Crankshaft position sensor
- 35. Ignition coil
- 36. Spark plug
- 43. Engine ground 2
- 77. Frame ground
- 78. Engine ground 1

EAS30492

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

• Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Fuel tank cover
4. Storage box
5. Front cowling assembly

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-4.	NG →	Re-gap or replace the spark plug.
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-129.	OK →	Ignition system is OK.
NG ↓		
5. Check the spark plug cap. Refer to "CHECKING THE SPARK PLUG CAP" on page 8-130.	NG →	Replace the spark plug cap.
OK ↓		
6. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 8-130.	NG →	Replace the ignition coil.
OK ↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the main switch.
OK ↓		
8. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the sidestand switch.
OK ↓		

9. Check the entire ignition system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-1 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-3.

OK ↓

Replace the starter generator assembly or the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.

NG →

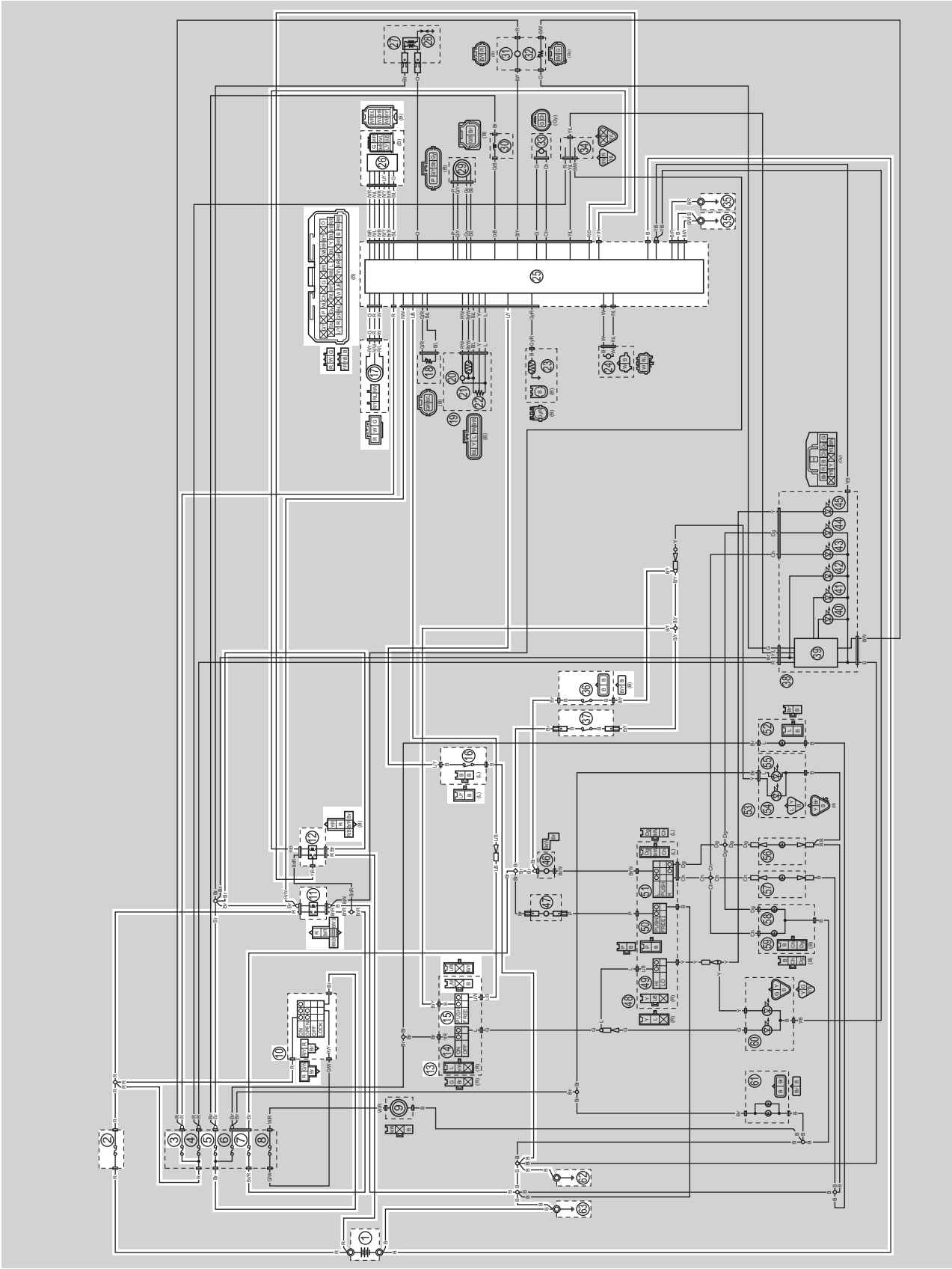
Properly connect or replace the wire harness.

EAS20073

ELECTRIC STARTING SYSTEM

EAS30493

CIRCUIT DIAGRAM (GDR155)



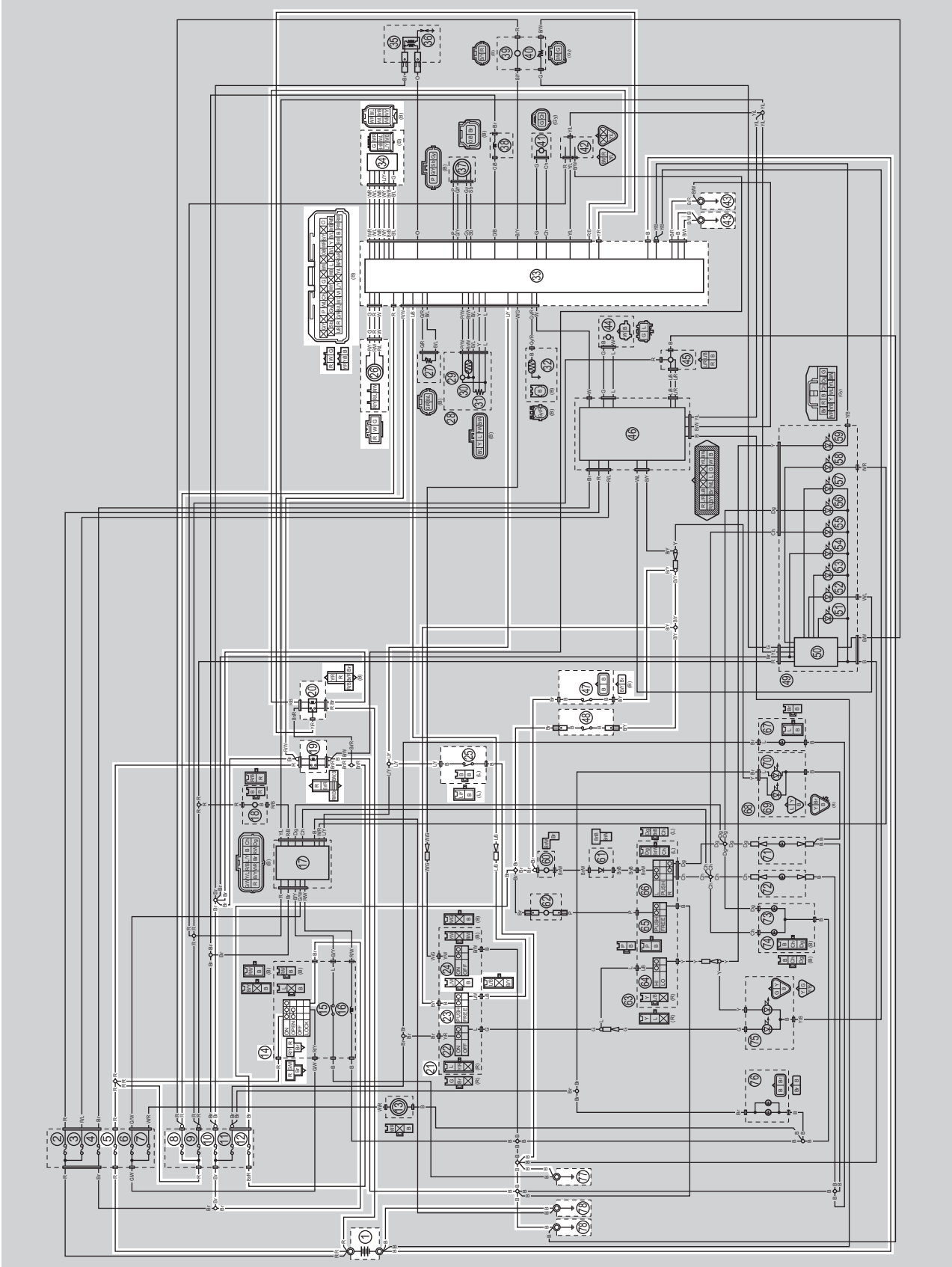
ELECTRIC STARTING SYSTEM

1. Battery
2. Main fuse
3. Fuel injection system fuse
5. Ignition fuse
7. Signaling system fuse
10. Main switch
11. Main relay
12. Starter charge relay
13. Handlebar switch (right)
15. Start switch
16. Sidestand switch
17. Starter generator
25. SGCU (starter generator control unit)
26. Crankshaft position sensor
35. Engine ground 2
36. Rear brake light switch
37. Front brake light switch
62. Frame ground
63. Engine ground 1

ELECTRIC STARTING SYSTEM

EASB631002

CIRCUIT DIAGRAM (GDR155-A)



ELECTRIC STARTING SYSTEM

- 1. Battery
- 5. Main fuse
- 8. Fuel injection system fuse
- 10. Ignition fuse
- 12. Signaling system fuse
- 14. Main switch
- 19. Main relay
- 20. Starter charge relay
- 21. Handlebar switch (right)
- 23. Start switch
- 25. Sidestand switch
- 26. Starter generator
- 33. SGCU (starter generator control unit)
- 34. Crankshaft position sensor
- 43. Engine ground 2
- 47. Rear brake light switch
- 48. Front brake light switch
- 77. Frame ground
- 78. Engine ground 1

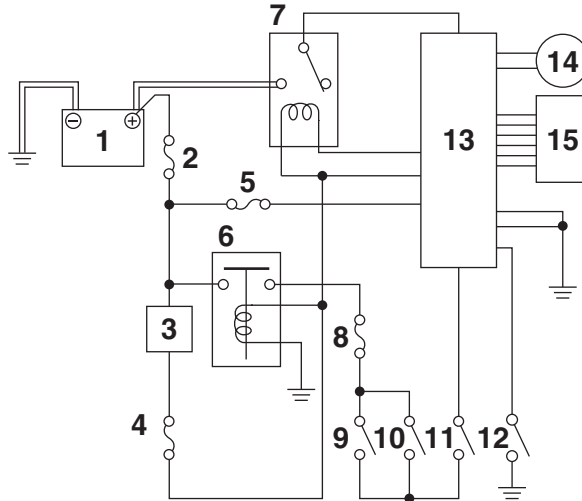
ELECTRIC STARTING SYSTEM

EAS30494

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION

If the main switch is turned to “ON” and the start switch “” is pushed, the starter generator can only operate if at least one of the following conditions is met:

- The front brake lever is pulled to the handlebar (the front brake light switch is closed) and the side-stand is up (the sidestand switch is closed).
- The rear brake lever is pulled to the handlebar (the rear brake light switch is closed) and the sidestand is up (the sidestand switch is closed).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Fuel injection system fuse
6. Main relay
7. Starter charge relay
8. Signaling system fuse
9. Rear brake light switch
10. Front brake light switch
11. Start switch
12. Sidestand switch
13. SGCU (starter generator control unit)
14. Starter generator
15. Crankshaft position sensor

EAS30495

TROUBLESHOOTING

The starter generator fails to turn.

TIP

- Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Fuel tank cover
4. Storage box
5. Front cowling assembly

1. Check the fuses. (Main, ignition, fuel injection system, and signaling system) Refer to "CHECKING THE FUSES" on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter generator. Refer to "CHECKING THE STARTER GENERATOR" on page 8-131.	NG →	Replace the starter generator assembly.
OK ↓		
4. Check the main relay. Refer to "CHECKING THE RELAYS" on page 8-128.	NG →	Replace the main relay.
OK ↓		
5. Check the starter charge relay. Refer to "CHECKING THE RELAYS" on page 8-128.	NG →	Replace the starter charge relay.
OK ↓		
6. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the main switch.
OK ↓		
7. Check the sidestand switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the sidestand switch.
OK ↓		

ELECTRIC STARTING SYSTEM

8. Check the start switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

The start switch is faulty. Replace the right handlebar switch.

OK ↓

9. Check the brake light switches.
(Front and rear)
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

Replace the brake light switch(es).

OK ↓

10. Check the entire starting system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-7 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-9.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the starter generator assembly or SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.

ELECTRIC STARTING SYSTEM

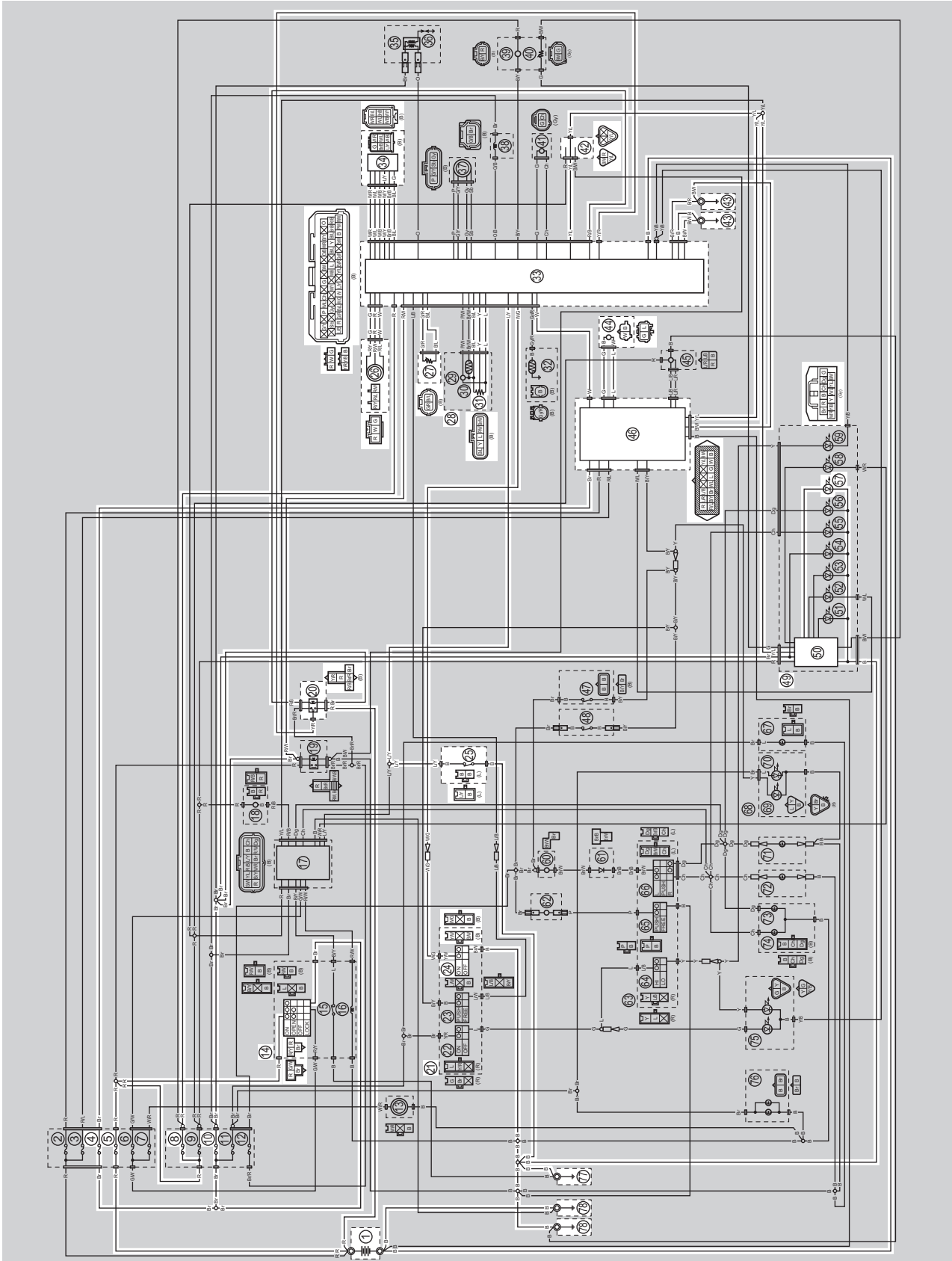
STOP AND START SYSTEM (GDR155-A)

EASB631003

STOP AND START SYSTEM (GDR155-A)

EASB631004

CIRCUIT DIAGRAM



STOP AND START SYSTEM (GDR155-A)

- 1. Battery
- 4. ABS control unit fuse
- 5. Main fuse
- 8. Fuel injection system fuse
- 10. Ignition fuse
- 14. Main switch
- 20. Starter charge relay
- 21. Handlebar switch (right)
- 24. Stop and Start System switch
- 25. Sidestand switch
- 26. Starter generator
- 27. Coolant temperature sensor
- 28. Throttle body sensor assembly
- 31. Throttle position sensor
- 33. SGCU (starter generator control unit)
- 34. Crankshaft position sensor
- 42. Yamaha diagnostic tool coupler
- 43. Engine ground 2
- 44. Front wheel sensor
- 46. ABS ECU
- 49. Meter assembly
- 50. Multi-function meter
- 57. Stop and Start System indicator light
- 77. Frame ground
- 78. Engine ground 1

STOP AND START SYSTEM (GDR155-A)

EASB631005

STOP AND START SYSTEM OPERATION

If the main switch is turned to "ON" and the Stop and Start System switch is set to "ON" (both switches are closed), the following functions operate when the conditions for each function are met.

Engine stop function:

When all of the following conditions are met, this function cuts off the fuel after 5 seconds (or 0 seconds depending on the circumstances) to stop the engine.

- Vehicle speed: stopped
- Engine speed: idling
- Throttle valve: fully closed
- Coolant temperature: 70°C or more
- Operating condition: vehicle has traveled at a speed of more than 10 km/h after the engine was started

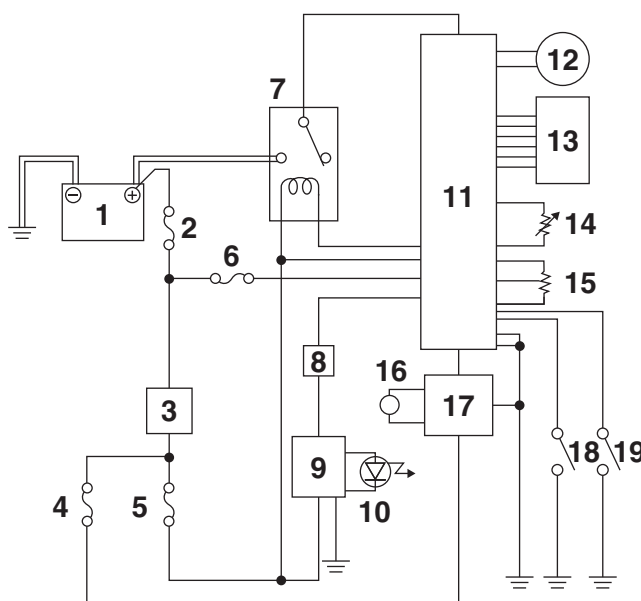
TIP

The engine stop function may not operate when the vehicle is traveling at a speed of 10 km/h or less, such as when traveling in heavy traffic. This, however, does not indicate a malfunction.

Engine start function:

When all of the following conditions are met, this function restarts the engine.

- Sidestand: UP
- Throttle valve: opened



- | | |
|---|----------------------------------|
| 1. Battery | 14. Coolant temperature sensor |
| 2. Main fuse | 15. Throttle position sensor |
| 3. Main switch | 16. Front wheel sensor |
| 4. ABS control unit fuse | 17. ABS ECU |
| 5. Ignition fuse | 18. Sidestand switch |
| 6. Fuel injection system fuse | 19. Stop and Start System switch |
| 7. Starter charge relay | |
| 8. Yamaha diagnostic tool coupler | |
| 9. Multi-function meter | |
| 10. Stop and Start System indicator light | |
| 11. SGCU (starter generator control unit) | |
| 12. Starter generator | |
| 13. Crankshaft position sensor | |

STOP AND START SYSTEM (GDR155-A)

EASB631006

TROUBLESHOOTING

- The engine stop function does not operate.
- The engine start function does not operate.
- The Stop and Start System indicator light fails to come on.

TIP

- Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Fuel tank cover
4. Storage box
5. Front cowling assembly

1. Check the fuses.
(Main, ignition, fuel injection system, and ABS control unit)
Refer to "CHECKING THE FUSES" on page 8-124.

NG →

Replace the fuse(s).

OK ↓

2. Check the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

OK ↓

3. Check the main switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

Replace the main switch.

OK ↓

4. Check the Stop and Start System switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

The Stop and Start System switch is faulty.
Replace the right handlebar switch.

OK ↓

5. Check the entire starting system wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-15.

NG →

Properly connect or replace the wire harness.

OK ↓

Check the condition of each of the Stop and Start System circuits. Refer to "Checking the Stop and Start System".

STOP AND START SYSTEM (GDR155-A)

Checking the Stop and Start System

The engine stop function does not operate.

1. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-132.	NG →	Replace the coolant temperature sensor.
OK ↓		
2. Check the throttle position sensor.	NG →	The throttle position sensor is faulty. Replace the throttle body assembly.
OK ↓		
3. Check the front wheel sensor.	NG →	Replace the front wheel sensor.
OK ↓		
4. Check the entire wiring. Refer to TIP.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the SGCU or ABS ECU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.		

TIP

Replace the wire harness if there is an open or short circuit.

- Between front speed sensor coupler and ABS ECU coupler.
(Green–Green)
(Blue–Blue)
- Between ABS ECU coupler and SGCU coupler.
(White–White)

The engine start function does not operate.

1. Check the side stand switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the side stand switch.
OK ↓		
2. Check the starter generator. Refer to "CHECKING THE STARTER GENERATOR" on page 8-131.	NG →	Replace the starter generator assembly.
OK ↓		

STOP AND START SYSTEM (GDR155-A)

3. Check the start charge relay. Refer to "CHECKING THE RELAYS" on page 8-128.	NG →	Replace the start charge relay.
OK ↓		
4. Check the throttle position sensor.	NG →	The throttle position sensor is faulty. Replace the throttle body assembly.
OK ↓		
5. Check the entire Stop and Start System wiring. Refer to "CIRCUIT DIAGRAM" on page 8-15.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the starter generator assembly or the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.		

The Stop and Start System indicator light fails to come on.

1. Check the entire wiring. Refer to TIP.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the SGCU or meter assembly. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.		

TIP

Replace the wire harness if there is an open or short circuit.

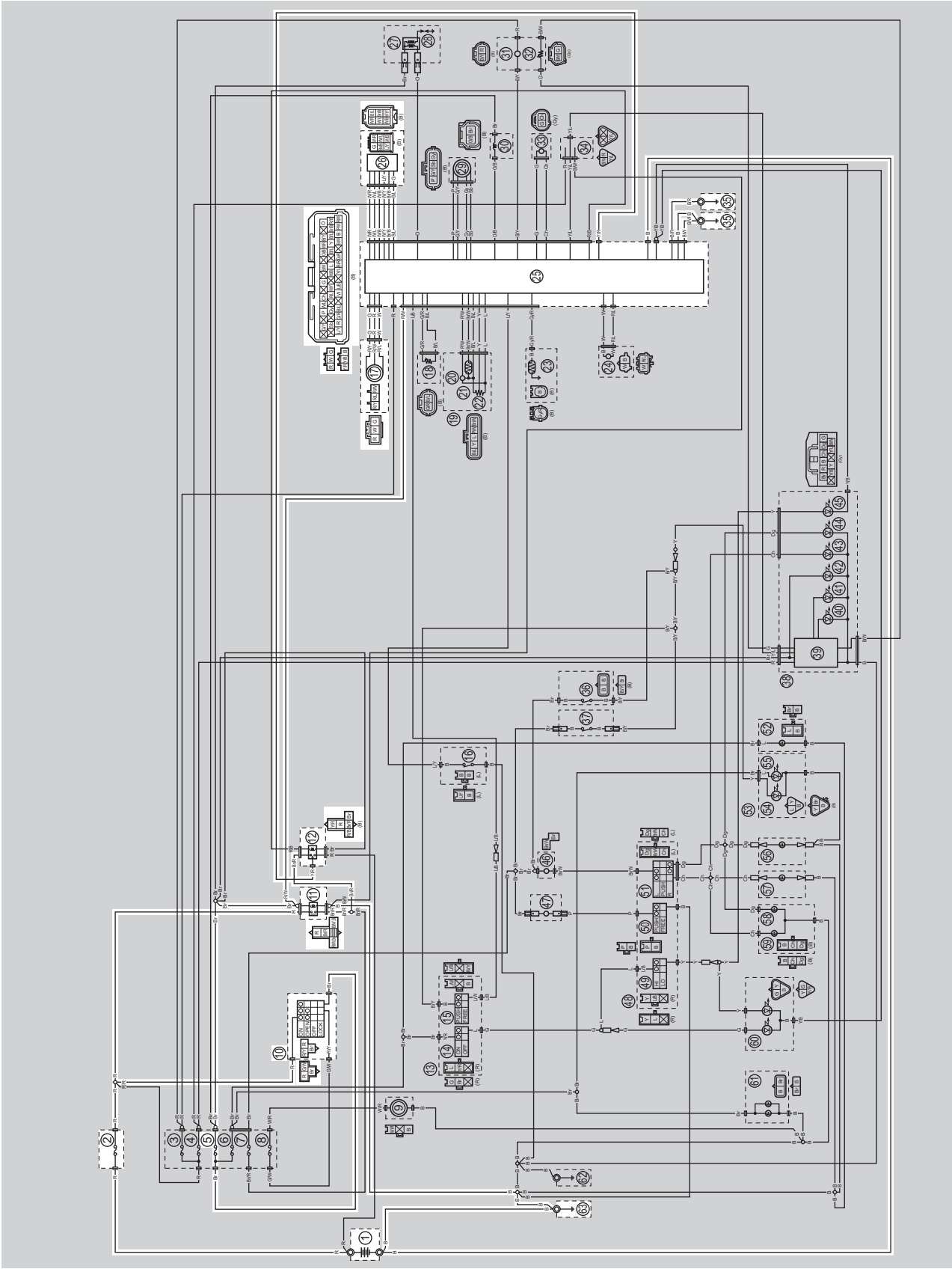
- Between SGCU coupler and meter assembly coupler.
(Yellow/Blue–Yellow/Blue)

EAS20074

CHARGING SYSTEM

EAS30496

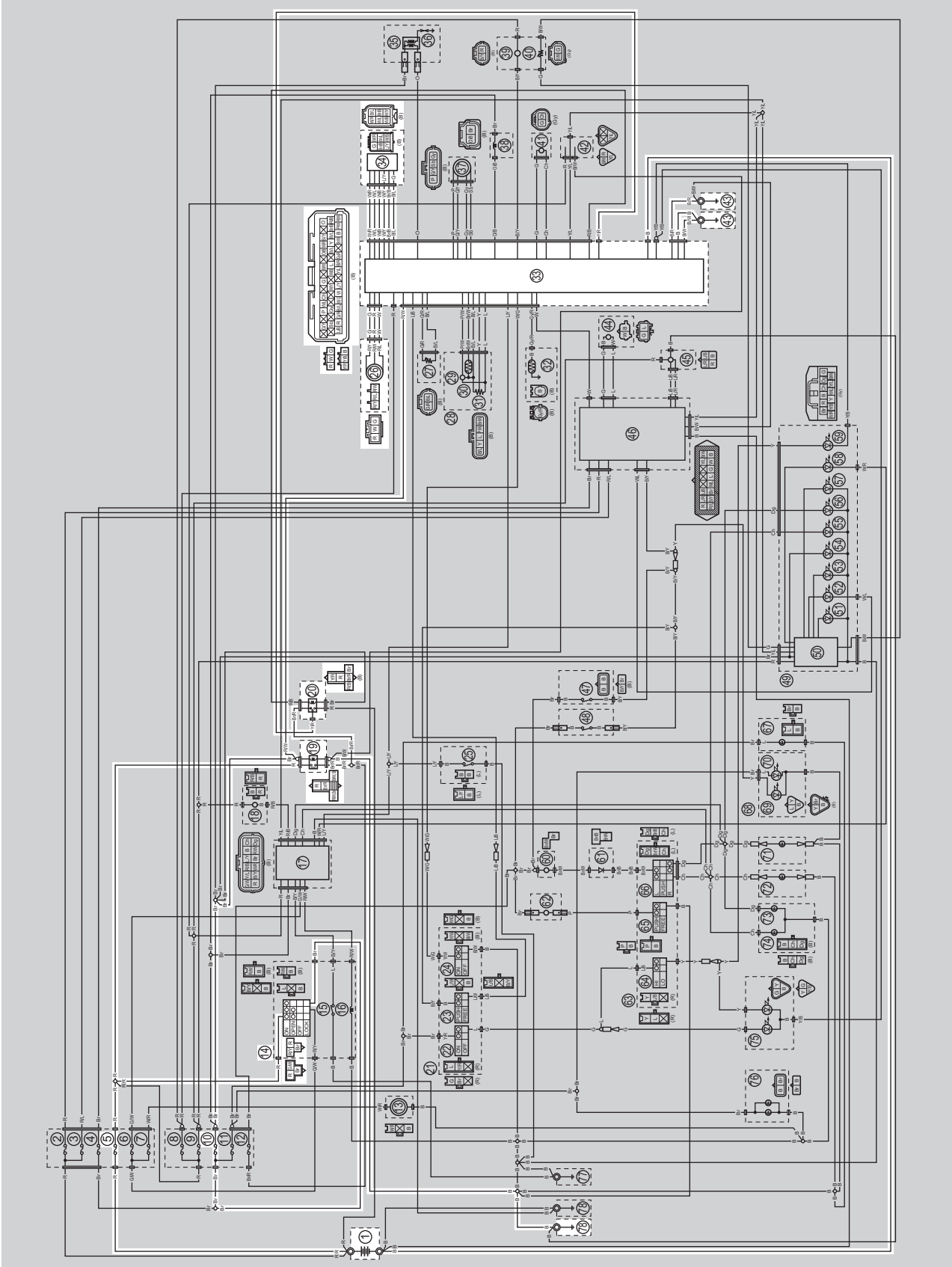
CIRCUIT DIAGRAM (GDR155)



- 1. Battery
- 2. Main fuse
- 5. Ignition fuse
- 10. Main switch
- 11. Main relay
- 12. Starter charge relay
- 17. Starter generator
- 25. SGCU (starter generator control unit)
- 26. Crankshaft position sensor
- 35. Engine ground 2
- 63. Engine ground 1

EASB631007

CIRCUIT DIAGRAM (GDR155-A)



- 1. Battery
- 5. Main fuse
- 10. Ignition fuse
- 14. Main switch
- 19. Main relay
- 20. Starter charge relay
- 26. Starter generator
- 33. SGCU (starter generator control unit)
- 34. Crankshaft position sensor
- 43. Engine ground 2
- 78. Engine ground 1

EAS30497

TROUBLESHOOTING

The battery is not being charged.

TIP

• Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Fuel tank cover
4. Storage box
5. Front cowling assembly

1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter generator. Refer to "CHECKING THE STARTER GENERATOR" on page 8-131.	NG →	Replace the starter generator assembly.
OK ↓		
4. Check the main relay. Refer to "CHECKING THE RELAYS" on page 8-128.	NG →	Replace the main relay.
OK ↓		
5. Check the starter charge relay. Refer to "CHECKING THE RELAYS" on page 8-128.	NG →	Replace the starter charge relay.
OK ↓		
6. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the main switch.
OK ↓		

CHARGING SYSTEM

7. Check the entire charging system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-21 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-23.

NG →

Properly connect or replace the wire harness.

OK ↓

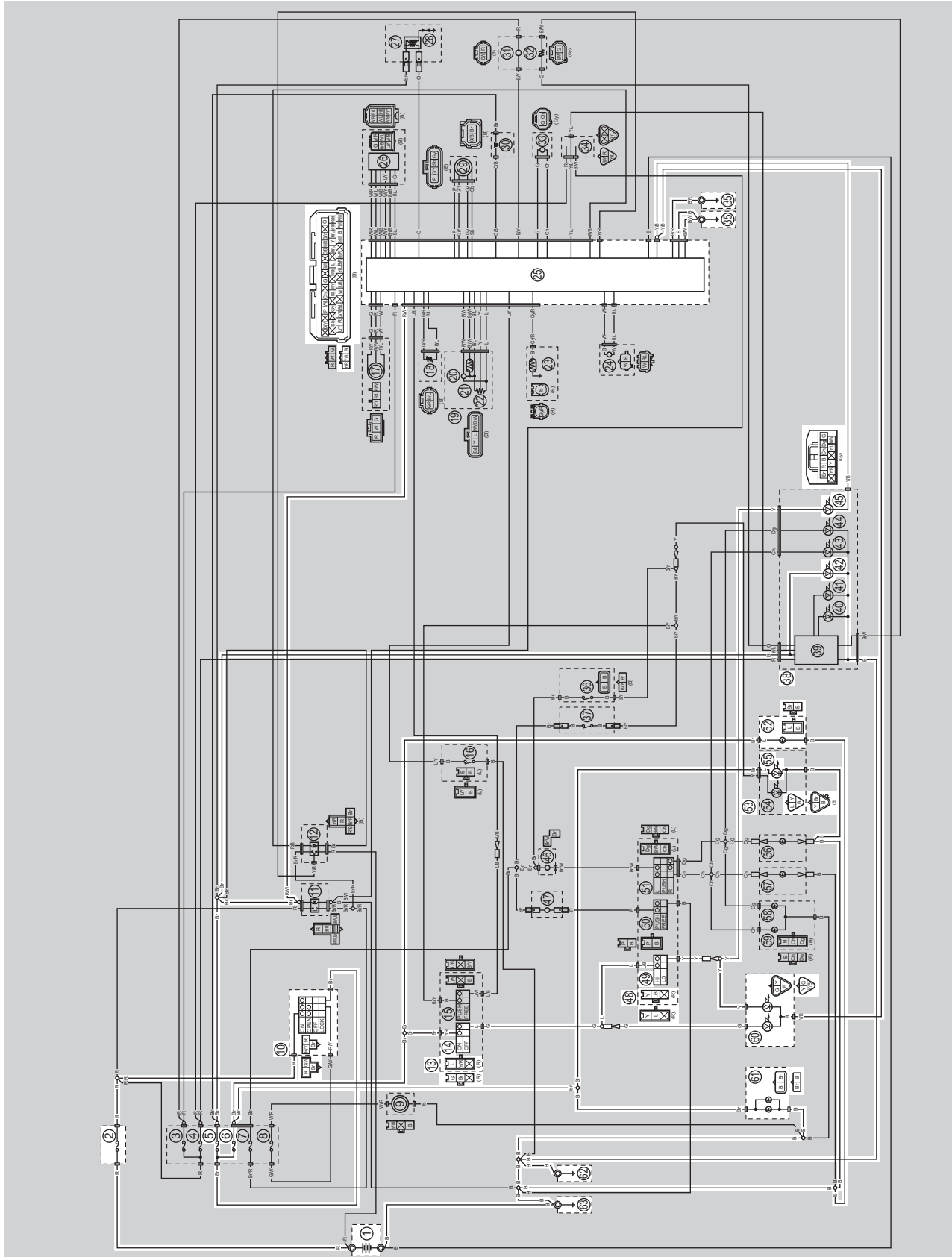
Replace the starter generator assembly or the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.

EAS20075

LIGHTING SYSTEM

EAS30498

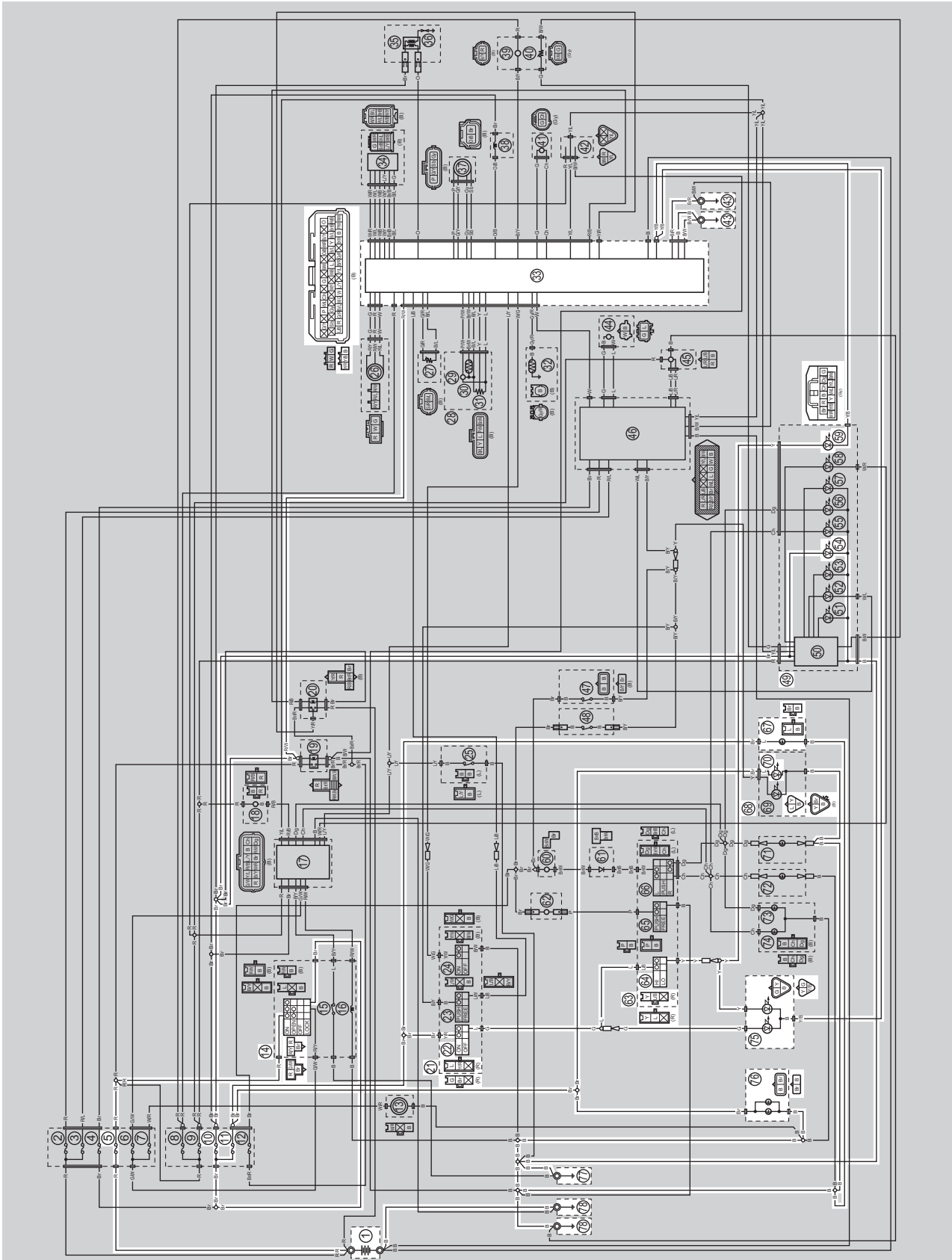
CIRCUIT DIAGRAM (GDR155)



- 1. Battery
- 2. Main fuse
- 5. Ignition fuse
- 6. Headlight fuse
- 10. Main switch
- 13. Handlebar switch (right)
- 14. Light switch
- 25. SGCU (starter generator control unit)
- 35. Engine ground 2
- 38. Meter assembly
- 42. Meter light
- 45. High beam indicator light
- 48. Handlebar switch (left)
- 49. Dimmer switch
- 52. License light
- 53. Tail/brake light assembly
- 55. Taillight
- 60. Headlight
- 61. Auxiliary light
- 62. Frame ground
- 63. Engine ground 1

EASB631008

CIRCUIT DIAGRAM (GDR155-A)



- 1. Battery
- 5. Main fuse
- 10. Ignition fuse
- 11. Headlight fuse
- 14. Main switch
- 21. Handlebar switch (right)
- 22. Light switch
- 33. SGCU (starter generator control unit)
- 43. Engine ground 2
- 49. Meter assembly
- 54. Meter light
- 59. High beam indicator light
- 63. Handlebar switch (left)
- 64. Dimmer switch
- 67. License light
- 68. Tail/brake light assembly
- 70. Taillight
- 75. Headlight
- 76. Auxiliary light
- 77. Frame ground
- 78. Engine ground 1

EAS30499

TROUBLESHOOTING

Any of the following fail to light: headlight, high beam indicator light, taillight, auxiliary lights, license light or meter light.

TIP

• Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Storage box
4. Front cowling assembly
5. Handlebar cover assembly

1. Check the condition of each bulb and bulb socket. Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-123.	NG →	Replace the bulb(s) and bulb socket(s).
OK ↓		
2. Check the fuses. (Main, ignition, and headlight) Refer to "CHECKING THE FUSES" on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the main switch.
OK ↓		
5. Check the light switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	The light switch is faulty. Replace the right handlebar switch.
OK ↓		
6. Check the dimmer switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	The dimmer switch is faulty. Replace the left handlebar switch.
OK ↓		

7. Check the entire lighting system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-27 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-29.

NG →

Properly connect or replace the wire harness.

OK ↓

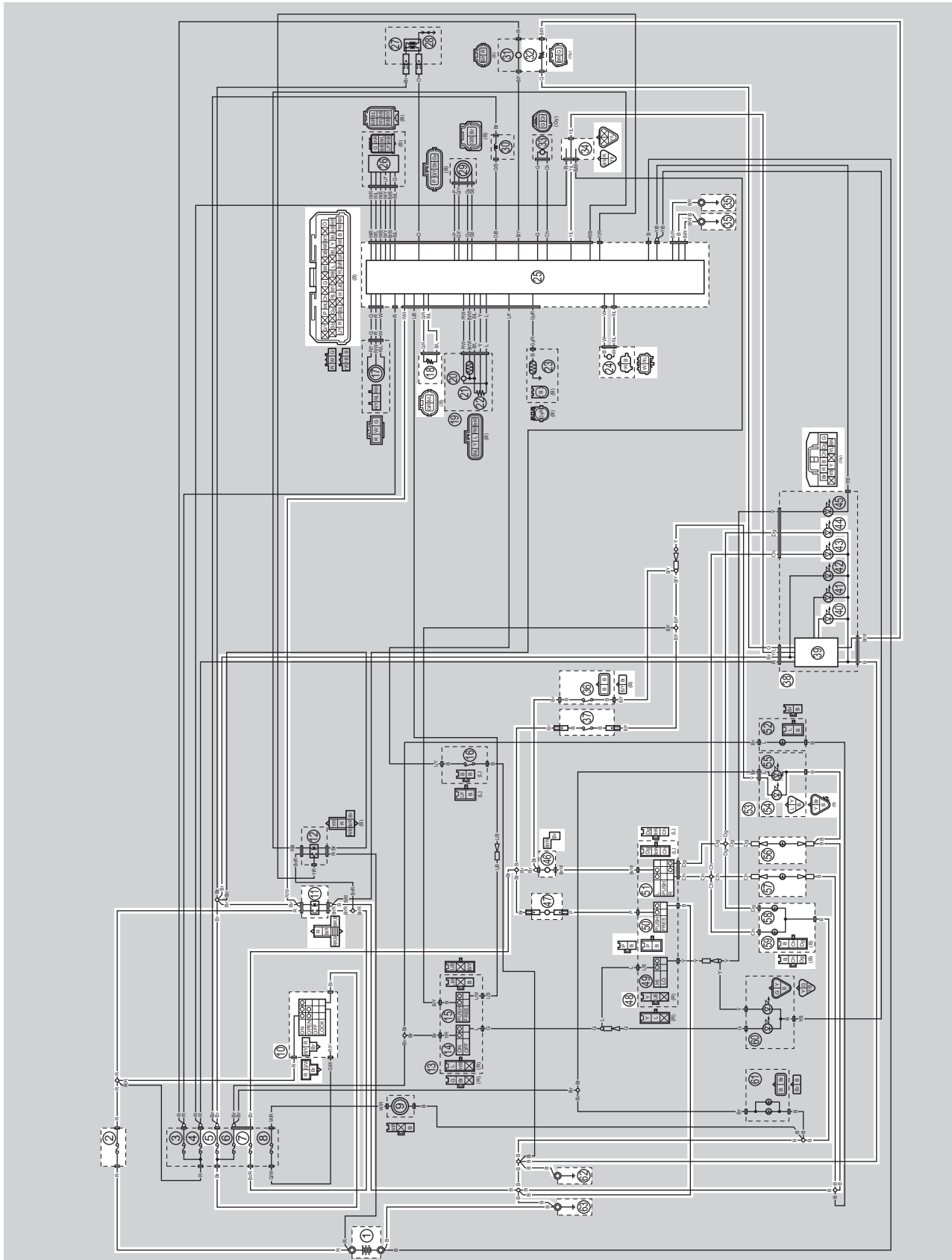
Replace the SGCU, meter assembly, tail/brake light assembly or headlight unit. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.

EAS20076

SIGNALING SYSTEM

EAS30500

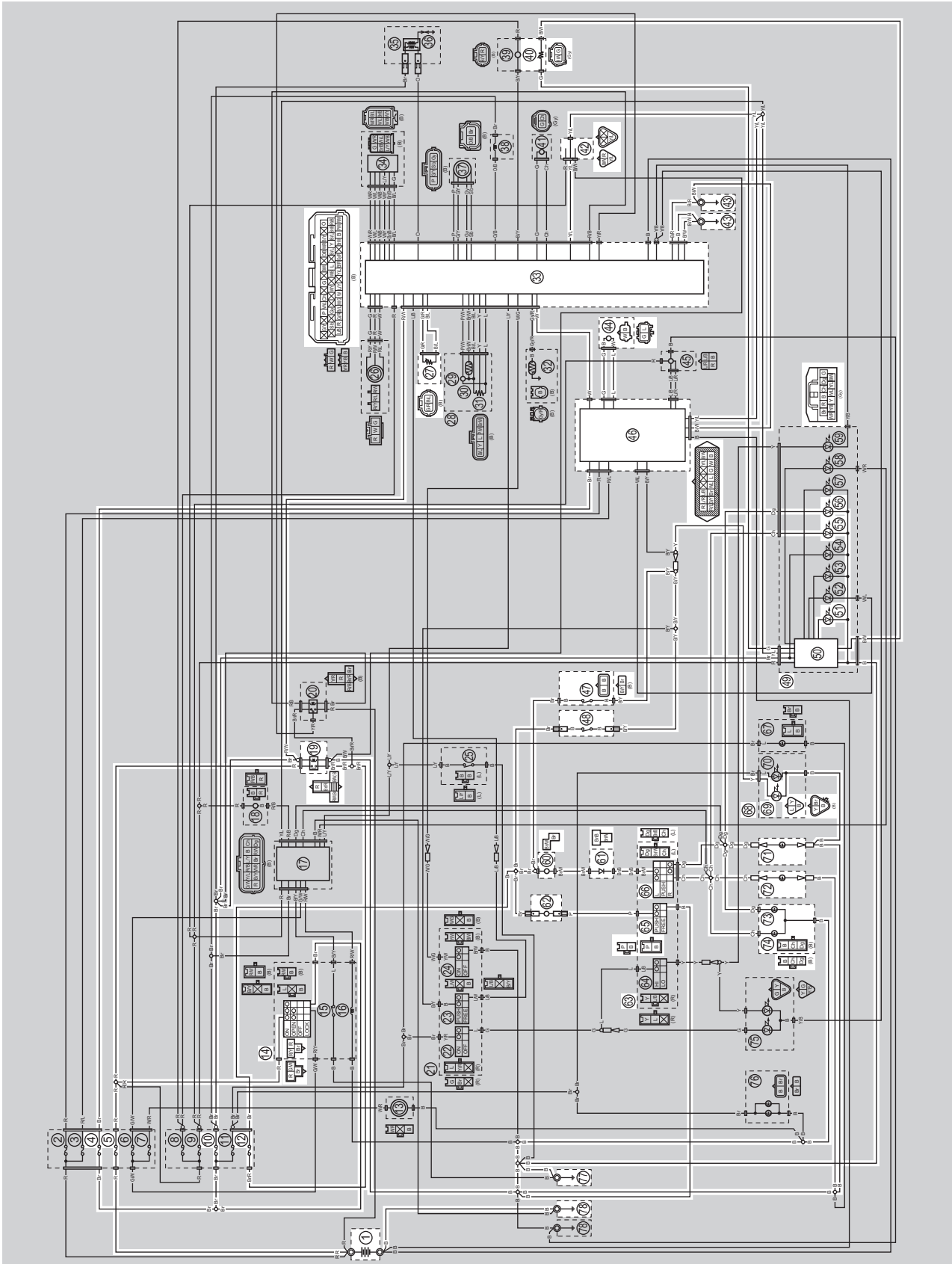
CIRCUIT DIAGRAM (GDR155)



1. Battery
2. Main fuse
5. Ignition fuse
7. Signaling system fuse
10. Main switch
11. Main relay
18. Coolant temperature sensor
24. Front wheel sensor
25. SGCU (starter generator control unit)
32. Fuel sender
34. Yamaha diagnostic tool coupler
35. Engine ground 2
36. Rear brake light switch
37. Front brake light switch
38. Meter assembly
39. Multi-function meter
40. Coolant temperature warning light
43. Turn signal indicator light (left)
44. Turn signal indicator light (right)
46. Turn signal relay
47. Horn
48. Handlebar switch (left)
50. Horn switch
51. Turn signal switch
53. Tail/brake light assembly
54. Brake light
56. Rear turn signal light (right)
57. Rear turn signal light (left)
58. Front turn signal light (right)
59. Front turn signal light (left)
62. Frame ground
63. Engine ground 1

EASB631009

CIRCUIT DIAGRAM (GDR155-A)



1. Battery
4. ABS control unit fuse
5. Main fuse
10. Ignition fuse
12. Signaling system fuse
14. Main switch
19. Main relay
27. Coolant temperature sensor
33. SGCU (starter generator control unit)
40. Fuel sender
42. Yamaha diagnostic tool coupler
43. Engine ground 2
44. Front wheel sensor
46. ABS ECU
47. Rear brake light switch
48. Front brake light switch
49. Meter assembly
50. Multi-function meter
51. Coolant temperature warning light
55. Turn signal indicator light (left)
56. Turn signal indicator light (right)
60. Turn signal relay
61. Diode
62. Horn
63. Handlebar switch (left)
65. Horn switch
66. Turn signal switch
68. Tail/brake light assembly
69. Brake light
71. Rear turn signal light (right)
72. Rear turn signal light (left)
73. Front turn signal light (right)
74. Front turn signal light (left)
77. Frame ground
78. Engine ground 1

EAS30501

TROUBLESHOOTING

- Any of the following fail to light: turn signal lights, brake light, warning lights or indicator lights.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.
- The instantaneous fuel consumption meter fails to operation.

TIP

- Before troubleshooting, remove the following part(s):

1. Battery cover
2. Front side covers
3. Fuel tank cover
4. Storage box
5. Front cowling assembly
6. Handlebar cover assembly

1. Check the fuses. (Main, ignition, signaling system, and ABS control unit) Refer to "CHECKING THE FUS- ES" on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-120.	NG →	Replace the main switch.
OK ↓		
4. Check the main relay. Refer to "CHECKING THE RE- LAYS" on page 8-128.	NG →	Replace the main relay.
OK ↓		
5. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-35.	NG →	Properly connect or replace the wire har- ness.
OK ↓		
Check the condition of each of the sig- naling system circuits. Refer to "Checking the signaling system".		

Checking the signaling system

The horn fails to sound.

1. Check the horn switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

The horn switch is faulty. Replace the left handlebar switch.

OK ↓

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-35.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the horn.

The brake light fails to come on.

1. Check the front brake light switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

Replace the front brake light switch.

OK ↓

2. Check the rear brake light switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

Replace the rear brake light switch.

OK ↓

3. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-35.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the tail/brake light assembly.

The turn signal light, turn signal indicator light or both fail to blink.

1. Check the turn signal light bulbs and sockets.
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-123.

NG →

Replace the turn signal light bulb, socket or both.

OK ↓

2. Check the turn signal switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

The turn signal switch is faulty. Replace the left handlebar switch.

OK ↓

SIGNALING SYSTEM

3. Check the turn signal relay. Refer to "CHECKING THE TURN SIGNAL RELAY" on page 8-128.	NG →	Replace the turn signal relay.
OK ↓		
4. Check the diode (GDR155-A). Refer to "CHECKING THE DIODE (GDR155-A)" on page 8-129.	NG →	Replace the diode.
OK ↓		
5. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-35.	NG →	Properly connect or replace the wire harness.
OK ↓		
Replace the meter assembly.		
<u>The coolant temperature warning light fails to come on.</u>		
1. Check the coolant temperature sensor. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-132.	NG →	Replace the coolant temperature sensor.
OK ↓		
2. Check the entire signaling system wiring. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33 or refer to "CIRCUIT DIAGRAM (GDR155-A)" on page 8-35.	NG →	Properly connect or replace the wire harness.
OK ↓		
Replace the meter assembly or SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.		
<u>The fuel meter fails to come on.</u>		
1. Check the fuel sender. Refer to "CHECKING THE FUEL SENDER" on page 8-131.	NG →	Replace the fuel pump.
OK ↓		

SIGNALING SYSTEM

2. Check the entire signaling system wiring.
Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-33.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the meter assembly.

The speedometer, instantaneous fuel consumption meter fails to operate.

1. Check the front wheel sensor.
Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

NG →

Replace the front wheel sensor.

OK ↓

2. Check the entire wiring.
Refer to TIP.

NG →

Properly connect or replace the wiring harness.

OK ↓

Replace the SGCU, ABS ECU (GDR155-A), or meter assembly. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.

TIP

Replace the wire harness if there is an open or short circuit.

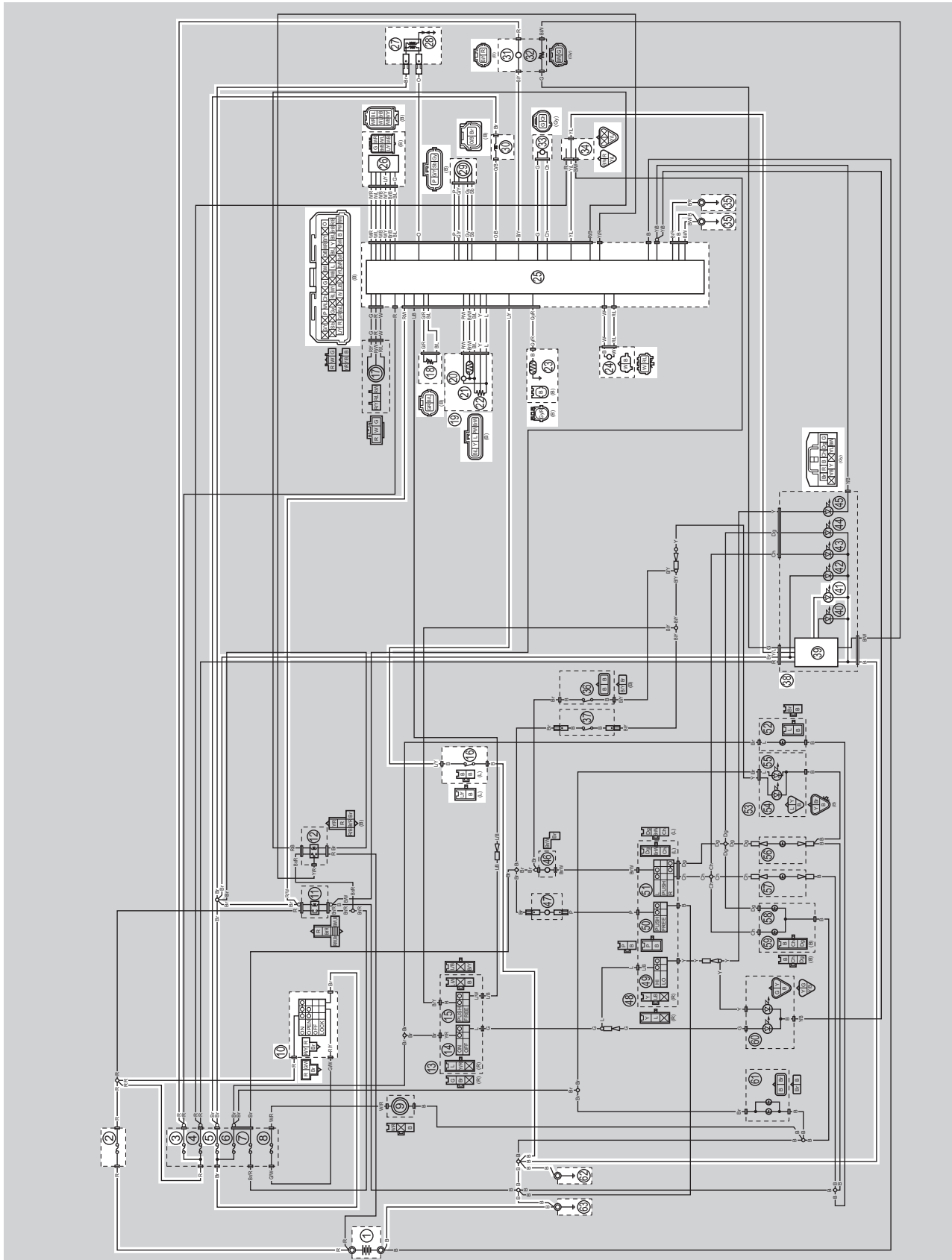
- Between front speed sensor coupler and SGCU coupler. (GDR155)
(White–White)
(Red/Blue–Red/Blue)
- Between front speed sensor coupler and ABS ECU coupler. (GDR155-A)
(Green–Green)
(Blue–Blue)
- Between ABS ECU coupler and SGCU coupler. (GDR155-A)
(White–White)
- Between SGCU coupler and meter assembly coupler.
(Yellow/Blue–Yellow/Blue)

EAS20078

FUEL INJECTION SYSTEM

EAS30504

CIRCUIT DIAGRAM (GDR155)

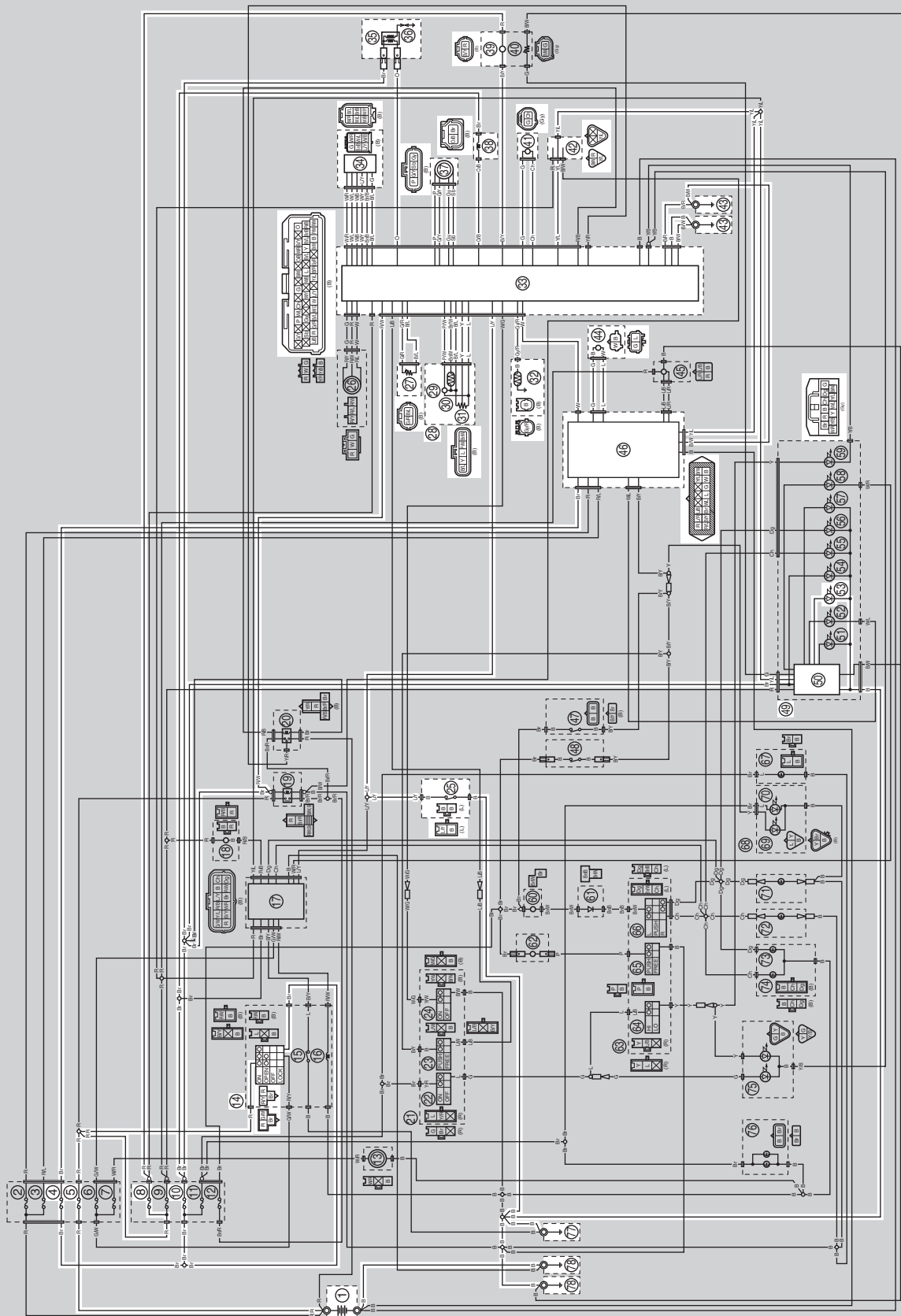


1. Battery
2. Main fuse
3. Fuel injection system fuse
5. Ignition fuse
10. Main switch
16. Sidestand switch
18. Coolant temperature sensor
19. Throttle body sensor assembly
20. Intake air pressure sensor
21. Intake air temperature sensor
22. Throttle position sensor
23. O₂ sensor
24. Front wheel sensor
25. SGCU (starter generator control unit)
26. Crankshaft position sensor
27. Ignition coil
28. Spark plug
29. ISC (idle speed control) unit
30. Injector
31. Fuel pump
33. VVA (variable valve actuator) solenoid
34. Yamaha diagnostic tool coupler
35. Engine ground 2
38. Meter assembly
39. Multi-function meter
41. Engine trouble warning light
62. Frame ground
63. Engine ground 1

FUEL INJECTION SYSTEM

EASB631010

CIRCUIT DIAGRAM (GDR155-A)



1. Battery
4. ABS control unit fuse
5. Main fuse
8. Fuel injection system fuse
10. Ignition fuse
14. Main switch
25. Sidestand switch
27. Coolant temperature sensor
28. Throttle body sensor assembly
29. Intake air pressure sensor
30. Intake air temperature sensor
31. Throttle position sensor
32. O₂ sensor
33. SGCU (starter generator control unit)
34. Crankshaft position sensor
35. Ignition coil
36. Spark plug
37. ISC (idle speed control) unit
38. Injector
39. Fuel pump
41. VVA (variable valve actuator) solenoid
42. Yamaha diagnostic tool coupler
43. Engine ground 2
44. Front wheel sensor
46. ABS ECU
49. Meter assembly
50. Multi-function meter
53. Engine trouble warning light
77. Frame ground
78. Engine ground 1

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes while the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the SGCU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the meter display. This number remains stored in the memory of the SGCU until it is deleted.

* The warning light flashes when any one of the following conditions is present and the start switch is pushed:

FUEL INJECTION SYSTEM

- c. Identify the probable cause of the malfunction.

2. Check and repair the probable cause of the malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to “TROUBLESHOOTING DETAILS” on page 8-47. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to “TROUBLESHOOTING DETAILS” on page 8-47 and “SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE” on page 9-5.	Check and repair.

3. Perform the reinstatement action for the fuel injection system.

Refer to “Confirmation of service completion” in the appropriate table in “TROUBLESHOOTING DETAILS” on page 8-47.

4. Set the main switch to “OFF”, then to “ON” again, and then check that no fault code number is displayed.

TIP

If another fault code number is displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to “Sensor operation table (Diagnostic code No. 62)”.

TIP

Turning the main switch to “OFF” will not erase the malfunction history.

The engine operation is not normal, but the engine trouble warning light does not come on.

1. Check the operation of the following sensors and actuators in the diagnostic mode. Refer to “TROUBLESHOOTING DETAILS” on page 8-47.

01: Throttle position sensor signal (throttle angle)
30: Ignition coil
36: Fuel injector

If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.

If no malfunction is detected in the sensors and actuators, check and repair the inner parts of the engine.

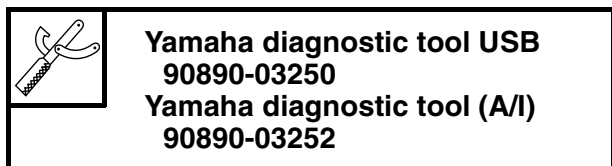
EAS30951

EAS30951

YAMAHA DIAGNOSTIC TOOL

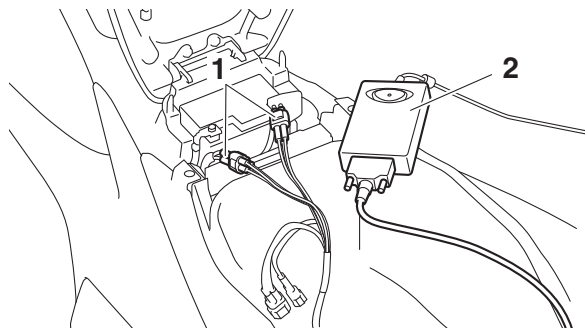
This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



Connecting the Yamaha diagnostic tool

Disconnect the Yamaha diagnostic tool coupler “1”, and then connect the Yamaha diagnostic tool “2” to the coupler.



EAS30508

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the computer. Check and service the items or components that are the probable cause of the malfunction following the order given. Fault code No.:

Fault code number displayed on the computer when the engine failed to work normally.

Diagnostic code No.:

Diagnostic code number to be used when the diagnostic mode is operated. Refer to "SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE" on page 9-5.

Fault code No. 12

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of crankshaft position sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.		12	
Item		Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.	
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between crankshaft position sensor coupler and SGCU coupler. White/Red–White/Red White/Blue–White/Blue White/Black–White/Black White/Yellow–White/Yellow Brown/Black–Brown/Black Black/Blue–Black/Blue	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of crankshaft position sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the starter generator assembly. Refer to “STARTER GENERATOR” on page 5-43.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective crankshaft position sensor.	Replace the starter generator assembly.	Crank the engine. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in SGCU.	Replace the SGCU. Refer to “REPLACING THE SGCU (starter generator control unit)” on page 8-124.	

Fault code No. 13

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

TIP

If fault code numbers “13” and “14” are both indicated, take the actions specified for fault code number “13” first.

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Tool display		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch “  ”. (If the display value changes, the performance is OK.)	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
1	Connection of throttle body sensor assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle body sensor assembly coupler and SGCU coupler. Black/Blue–Black/Blue Pink/White–Pink/White Blue–Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Installed condition of throttle body sensor assembly. Check for looseness or pinching.	Improperly installed sensor → Replace the throttle body. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		13	
Item		Intake air pressure sensor: open or short circuit detected.	
6	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Replace the throttle body if defective. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 14

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

TIP

If fault code numbers "13" and "14" are both indicated, take the actions specified for fault code number "13" first.

Fault code No.		14	
Item		Intake air pressure sensor: system malfunction (clogged hole or detached).	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		03	
Tool display		Displays the intake air pressure.	
Procedure		Operate the throttle while pushing the start switch "⊗". (If the display value changes, the performance is OK.)	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		14	
Item		Intake air pressure sensor: system malfunction (clogged hole or detached).	
1	Installed condition of throttle body sensor assembly. Check for looseness or pinching.	Improperly installed sensor → Replace the throttle body. Refer to "THROTTLE BODY" on page 7-10.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Defective intake air pressure sensor.	Execute the diagnostic mode. (Code No. 03) When engine is stopped: Atmospheric pressure at the current altitude and weather conditions is indicated. At sea level: Approx. 101 kPa (757.6 mmHg, 29.8 inHg) 1000 m (3300 ft) above sea level: Approx. 90 kPa (675.1 mmHg, 26.6 inHg) 2000 m (6700 ft) above sea level: Approx. 80 kPa (600.0 mmHg, 23.6 inHg) 3000 m (9800 ft) above sea level: Approx. 70 kPa (525.0 mmHg, 20.7 inHg) When engine is cranking: Make sure that the indication value changes. The value does not change when engine is cranking. → Replace the throttle body if defective. Refer to "THROTTLE BODY" on page 7-10.	

Fault code No. 15

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		01	
Tool display		Throttle position sensor signal • 13–21 (fully closed position) • 97–107 (fully open position)	
Procedure		• Check with throttle valves fully closed. • Check with throttle valves fully open.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		15	
Item		Throttle position sensor: open or short circuit detected.	
1	Connection of throttle body sensor assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle body sensor assembly coupler and SGCU coupler. Black/Blue–Black/Blue Yellow–Yellow Blue–Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Installed condition of throttle body sensor assembly. Check for looseness or pinching.	Improperly installed sensor → Replace the throttle body. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Defective throttle position sensor.	Check throttle position sensor signal. Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 13–21 is indicated. When throttle valves are fully open: A value of 97–107 is indicated. An indicated value is out of the specified range → Replace the throttle body if defective. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

FUEL INJECTION SYSTEM

Fault code No. 16

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

Fault code No.		16	
Item		Throttle position sensor: stuck throttle position sensor is detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		01	
Tool display		Throttle position sensor signal • 13–21 (fully closed position) • 97–107 (fully open position)	
Procedure		• Check with throttle valves fully closed. • Check with throttle valves fully open.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of throttle body sensor assembly. Check for looseness or pinching.	Improperly installed sensor → Replace the throttle body. Refer to “THROTTLE BODY” on page 7-10.	Turn the main switch to “ON” and then open and close the throttle valves. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Defective throttle position sensor.	Execute the diagnostic mode. (Code No. 01) When the throttle valves are fully closed: A value of 13–21 is indicated. When throttle valves are fully open: A value of 97–107 is indicated. An indicated value is out of the specified range → Replace the throttle body. Refer to “THROTTLE BODY” on page 7-10.	Turn the main switch to “ON” and then open and close the throttle valves. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Malfunction in SGCU.	Replace the SGCU. Refer to “REPLACING THE SGCU (starter generator control unit)” on page 8-124.	

Fault code No. 21

TIP

Perform this procedure when the engine is cold.

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		06	
Tool display		When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	

FUEL INJECTION SYSTEM

Fault code No.		21	
Item		Coolant temperature sensor: open or short circuit detected.	
Procedure		Compare the actually measured coolant temperature with the computer display value.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of coolant temperature sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between coolant temperature sensor coupler and SGCU coupler. Green/Red–Green/Red Black/Blue–Black/Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of coolant temperature sensor. Check for looseness or pinching.	Improperly installed sensor → Reinstall or replace the sensor. Refer to "CYLINDER HEAD" on page 5-9.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective coolant temperature sensor.	Execute the diagnostic mode. (Code No. 06) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature → Check the coolant temperature sensor. Replace if defective. Refer to "CHECKING THE COOLANT TEMPERATURE SENSOR" on page 8-132.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.
6	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

FUEL INJECTION SYSTEM

Fault code No. 22

ECA20500

NOTICE

Do not remove the throttle body sensor assembly from the throttle body.

TIP

Perform this procedure when the engine is cold.

Fault code No.	22		
Item	Intake air temperature sensor: open or short circuit detected.		
Fail-safe system	Able to start engine		
	Able to drive vehicle		
Diagnostic code No.	05		
Tool display	Displays the intake air temperature.		
Procedure	When engine is cold: Displays temperature closer to air temperature When engine is hot: Air temperature + approx. 20 °C (68 °F)		
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of throttle body sensor assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between throttle body sensor assembly coupler and SGCU coupler. Black/Blue–Black/Blue Brown/White–Brown/White	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Installed condition of throttle body sensor assembly. Check for looseness or pinching.	Improperly installed sensor → Replace the throttle body. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Defective intake air temperature sensor.	Execute the diagnostic mode. (Code No. 05) When engine is cold: Displayed temperature is close to the ambient temperature. The displayed temperature is not close to the ambient temperature. → Replace the throttle body if defective. Refer to "THROTTLE BODY" on page 7-10.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		22	
Item		Intake air temperature sensor: open or short circuit detected.	
6	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 24

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Installed condition of O ₂ sensor. Check for looseness or pinching.	Improperly installed sensor → Replace the sensor. Refer to "ENGINE REMOVAL" on page 5-3.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of O ₂ sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between O ₂ sensor coupler and SGCU coupler. Gray/Red–Gray/Red	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Check fuel pressure.	Refer to "CHECKING THE FUEL PRESSURE" on page 7-3.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 6.

FUEL INJECTION SYSTEM

Fault code No.		24	
Item		O₂ sensor: no normal signals are received from the O₂ sensor.	
6	Defective O ₂ sensor.	Check the O ₂ sensor. Replace if defective. Refer to "ENGINE REMOVAL" on page 5-3.	Start the engine, warm it up, and then race it, or execute the diagnostic mode. (Code No. 62) Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 7.
7	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 37

TIP

- If fault code numbers "37" and "46" are both indicated, take the actions specified for fault code number "46" first.
- If fault code numbers "37" and "42" are both indicated, take the actions specified for fault code number "42" first.
- If fault code numbers "37" and "61" are both indicated, take the actions specified for fault code number "61" first.

Fault code No.		37	
Item	A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
	B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		54	
Actuation		Fully closes the ISC valve, and then opens the valve. This operation takes approximately 3 seconds.	
Procedure		The ISC unit vibrates when the ISC valve operates.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
A-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then opens the valve. This operation takes approximately 3 seconds.	ISC operating sound is heard → Go to item A-2. ISC operating sound is not heard → Go to item B-2 for the defective ISC (idle speed control) unit.
A-2	Incorrect front wheel sensor signal.	Check the front wheel sensor. Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value does not increase → Go to fault code No. 42.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-3.

FUEL INJECTION SYSTEM

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
A-3	Throttle valve does not fully close due to malfunction in throttle cables.	Check the throttle grip free play. Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-23.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-4.
A-4	Air leak from the throttle body.	Check the throttle body. Refer to "CHECKING THE THROTTLE BODY" on page 7-12.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-5.
A-5	Air leak from the ISC (idle speed control) unit.	Improperly installed ISC (idle speed control) unit → Reinstall the ISC (idle speed control) unit. Check the intake air passages for air leaks.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-6.
A-6	The air volume for the throttle body and ISC (idle speed control) unit is excessive.	Clean the throttle body and ISC (idle speed control) unit. Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-7.
A-7	ISC (idle speed control) unit is not moving correctly.	Replace the ISC (idle speed control) unit. Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.	Start the engine and let it idle for approximately 10 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item A-8.
A-8	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No.		37	
Item	A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).	
	B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		54	
Actuation		Fully closes the ISC valve, and then opens the valve. This operation takes approximately 3 seconds.	
Procedure		The ISC unit vibrates when the ISC valve operates.	

FUEL INJECTION SYSTEM

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
B-1	Locate the malfunction.	Execute the diagnostic mode. (Code No. 54) Fully closes the ISC (idle speed control) valve, and then opens the valve. This operation takes approximately 3 seconds.	ISC operating sound is heard → Go to item A-2 for the component other than ISC (idle speed control) unit is defective. ISC operating sound is not heard → Go to item B-2.
B-2	Connection of ISC (idle speed control) unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-3.
B-3	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-4.
B-4	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ISC (idle speed control) unit coupler and SGCU coupler. Pink–Pink Green/Yellow–Green/Yellow Gray–Gray Sky blue–Sky blue	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-5.
B-5	Installed condition of ISC (idle speed control) unit. Check for looseness or pinching.	Improperly installed ISC (idle speed control) unit → Reinstall the ISC (idle speed control) unit. Check the intake air passages for air leaks.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-6.
B-6	Battery malfunction	Check the battery voltage. Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-7.

FUEL INJECTION SYSTEM

Fault code No.		37	
Item		A	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
		B	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
B-7	ISC (idle speed control) unit is not moving correctly.	Replace the ISC (idle speed control) unit. Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.	Execute the diagnostic mode. (Code No. 54) ISC operating sound is heard → Go to item B-9 and delete the fault code. ISC operating sound is not heard → Go to item B-8.
B-8	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	Execute the diagnostic mode. (Code No. 54) Return the ISC (idle speed control) valve to the initial opening position.
B-9	Delete the fault code.		Start the engine and let it idle for approximately 10 seconds. Check that the fault code number is not displayed.

Fault code No. 39

Fault code No.		39	
Item		Fuel injector: open or short circuit detected.	
Fail-safe system		Unable to start engine.	
		Unable to drive vehicle.	
Diagnostic code No.		36	
Actuation		Actuates fuel injector five times at one-second intervals. The "⚡" and "CHECK" indicator on the Yamaha diagnostic tool screen comes on each time the fuel injector is actuated.	
Procedure		Disconnect the fuel pump coupler. Check that fuel injector is actuated five times by listening for the operating sound.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of fuel injector coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 2.
2	Defective fuel injector.	Measure the fuel injector resistance. Replace if out of specification. Refer to "CHECKING THE FUEL INJECTOR" on page 8-132.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 3.

FUEL INJECTION SYSTEM

Fault code No.		39	
Item		Fuel injector: open or short circuit detected.	
3	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 4.
4	Connection of sub-wire harness coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 5.
5	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between fuel injector coupler and SGCU coupler. Orange/Black–Orange/Black Between fuel injector coupler and main switch coupler. Brown–Brown	Execute the diagnostic mode. (Code No. 36) Operating sound → Go to item 7. No operating sound → Go to item 6.
6	Malfunction in SGCU.	Replace the SGCU. Refer to “REPLACING THE SGCU (starter generator control unit)” on page 8-124.	
7	Delete the fault code.		Start the engine and let it idle for approximately 5 seconds. Check that the fault code number is not displayed.

Fault code No. 42 (GDR155)

Fault code No.		42	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		07	
Tool display		Front wheel sensor pulse 0–999	
Procedure		Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
1	Connection of front wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON" and rotate the front wheel by hand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON" and rotate the front wheel by hand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between front wheel sensor coupler and SGCU coupler. White-White Red/Blue-Red/Blue	Turn the main switch to "ON" and rotate the front wheel by hand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective front wheel sensor.	Installed condition of front wheel sensor. Check the front wheel sensor. Execute the diagnostic mode. (Code No. 07) Front wheel stop: The pulse integrated value should be constant. Rotate the front wheel by hand and check that the indicated value increases. Value does not increase → Replace the front wheel sensor.	Turn the main switch to "ON" and rotate the front wheel by hand. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 42 (GDR155-A)

Fault code No.	42
Item	Front wheel sensor: no normal signals are received from the front wheel sensor.
Fail-safe system	Able to start engine
	Able to drive vehicle
Diagnostic code No.	07
Tool display	Front wheel sensor pulse 0-999
Procedure	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of front wheel sensor coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 7 and delete the fault code. Value does not increase → Go to item 2.
2	Connection of ABS ECU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 7 and delete the fault code. Value does not increase → Go to item 3.
3	Connection of SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 7 and delete the fault code. Value does not increase → Go to item 4.
4	Front wheel sensor lead continuity or detective front wheel sensor.	Open or short circuit or detective front wheel sensor → Replace the front wheel sensor. Between front wheel sensor coupler and ABS ECU coupler. Green–Green Blue–Blue Between ABS ECU coupler and SGCU coupler. White–White	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 7 and delete the fault code. Value does not increase → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to “REPLACING THE SGCU (starter generator control unit)” on page 8-124.	Execute the diagnostic mode. (Code No. 07) Rotate the front wheel by hand and check that the indicated value increases. Value increases → Go to item 7 and delete the fault code. Value does not increase → Go to item 6.
6	Malfunction in ABS ECU.	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 8-79.	Go to item 7 and delete the fault code.

FUEL INJECTION SYSTEM

Fault code No.		42	
Item		Front wheel sensor: no normal signals are received from the front wheel sensor.	
7	Turn the main switch to "ON" and then rotate the front wheel by hand. Check that the fault code number is not displayed.		

Fault code No. 44

Fault code No.		44	
Item		EEPROM fault code number: an error is detected while reading or writing on EEPROM.	
Fail-safe system		Able/Unable to start engine	
		Able/Unable to drive vehicle	
Diagnostic code No.		60	
Tool display		EEPROM fault code display • 00 (no history): No malfunctions detected (If the self-diagnosis fault code 44 is indicated, the SGCU is defective.) • 11: ISC (idle speed control) learning is being carried out.	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Locate the malfunction	Execute the diagnostic mode. (Code No. 60) 00: Go to item 3. 11: Go to item 2.	
2	"11" is indicated in diagnostic mode (code No. 60). Flash memory data error for ISC (idle speed control) control values.	Turn the main switch to "OFF".	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat item 1. If the same number is indicated, go to item 3.
3	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 46

Fault code No.		46	
Item		Charging voltage is abnormal.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		46	
Item		Charging voltage is abnormal.	
1	Malfunction in charging system.	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-21. Defective starter generator or SGCU → Replace. Defective connection in the charging system circuit → Properly connect or replace the wire harness.	Start the engine and let it idle for approximately 5 seconds. Fault code number is not displayed → Service is finished. Fault code number is displayed → Repeat the maintenance job.

Fault code No. 50

Fault code No.		50	
Item		Faulty SGCU memory. (When this malfunction is detected in the SGCU, the fault code number might not appear on the tool display.)	
Fail-safe system		Unable to start engine	
		Unable to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	Turn the main switch to "ON". Check that the fault code number is not displayed.

Fault code No. 61

Fault code No.		61	
Item		ISC (idle speed control) unit: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Action		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion
1	Connection of ISC unit coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.

FUEL INJECTION SYSTEM

Fault code No.		61	
Item		ISC (idle speed control) unit: open or short circuit detected.	
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between ISC unit coupler and SGCU coupler. Pink–Pink Green/Yellow–Green/Yellow Gray–Gray Sky blue–Sky blue	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Faulty ISC unit operation.	Execute the diagnostic mode. (Code No. D54) ISC unit operation sound is not heard. → Replace the ISC unit. Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.	Set the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. 84

Fault code No.		84	
Item		VVA (variable valve actuator) solenoid: open or short circuit detected.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		45	
Action		Actuates the VVA (variable valve actuator) solenoid five times at five-second intervals. The "点検" and "CHECK" indicator on the Yamaha diagnostic tool screen come on each time the VVA (variable valve actuator) solenoid is actuated.	
Procedure		Remove the VVA (variable valve actuator) solenoid from the cylinder head, and then connect the VVA (variable valve actuator) solenoid coupler. Refer to "CYLINDER HEAD" on page 5-9. Visually check that the VVA (variable valve actuator) solenoid is actuated five times.	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		84	
Item		VVA (variable valve actuator) solenoid: open or short circuit detected.	
1	Connection of VVA (variable valve actuator) solenoid coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Set the main switch to "ON". Start the engine and accelerate to 6000 r/min. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Set the main switch to "ON". Start the engine and accelerate to 6000 r/min. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between VVA (variable valve actuator) solenoid coupler and SGCU coupler. Green-Green Chocolate-Chocolate Between engine ground and SGCU coupler. Black/Red-Black/Red	Set the main switch to "ON". Start the engine and accelerate to 6000 r/min. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective VVA (variable valve actuator) solenoid.	Measure the VVA (variable valve actuator) solenoid resistance. Replace it out of specification. Refer to "CHECKING THE VVA SOLENOID" on page 8-133.	Set the main switch to "ON". Start the engine and accelerate to 6000 r/min. Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. Er-1 (fault code display)

Fault code No.		Er-1 (fault code display)	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): signals cannot be transmitted between the SGCU and the multi-function meter.	
Fail-safe system		Able to start engine (unable when SGCU is malfunctioning)	
		Able to drive vehicle (unable when SGCU is malfunctioning)	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		Er-1 (fault code display)	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): signals cannot be transmitted between the SGCU and the multi-function meter.	
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between SGCU coupler and Yamaha diagnostic tool coupler. Yellow/Blue–Yellow/Blue Between Yamaha diagnostic tool coupler and meter assembly coupler. Yellow/Blue–Yellow/Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. Er-2

Fault code No.		Er-2	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): no signals are received from the SGCU within the specified duration.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		Er-2	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): no signals are received from the SGCU within the specified duration.	
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between SGCU coupler and Yamaha diagnostic tool coupler. Yellow/Blue–Yellow/Blue Between Yamaha diagnostic tool coupler and meter assembly coupler. Yellow/Blue–Yellow/Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. Er-3

Fault code No.		Er-3	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): data from the SGCU cannot be received correctly.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

Fault code No.		Er-3	
Item		SGCU (starter generator control unit) internal malfunction (output signal error): data from the SGCU cannot be received correctly.	
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between SGCU coupler and Yamaha diagnostic tool coupler. Yellow/Blue–Yellow/Blue Between Yamaha diagnostic tool coupler and meter assembly coupler. Yellow/Blue–Yellow/Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

Fault code No. Er-4 (fault code display)

Fault code No.		Er-4 (fault code display)	
Item		SGCU (starter generator control unit) internal malfunction (input signal error): non-registered data has been received from the meter.	
Fail-safe system		Able to start engine	
		Able to drive vehicle	
Diagnostic code No.		—	
Tool display		—	
Procedure		—	
Item	Probable cause of malfunction and check	Maintenance job	Confirmation of service completion

FUEL INJECTION SYSTEM

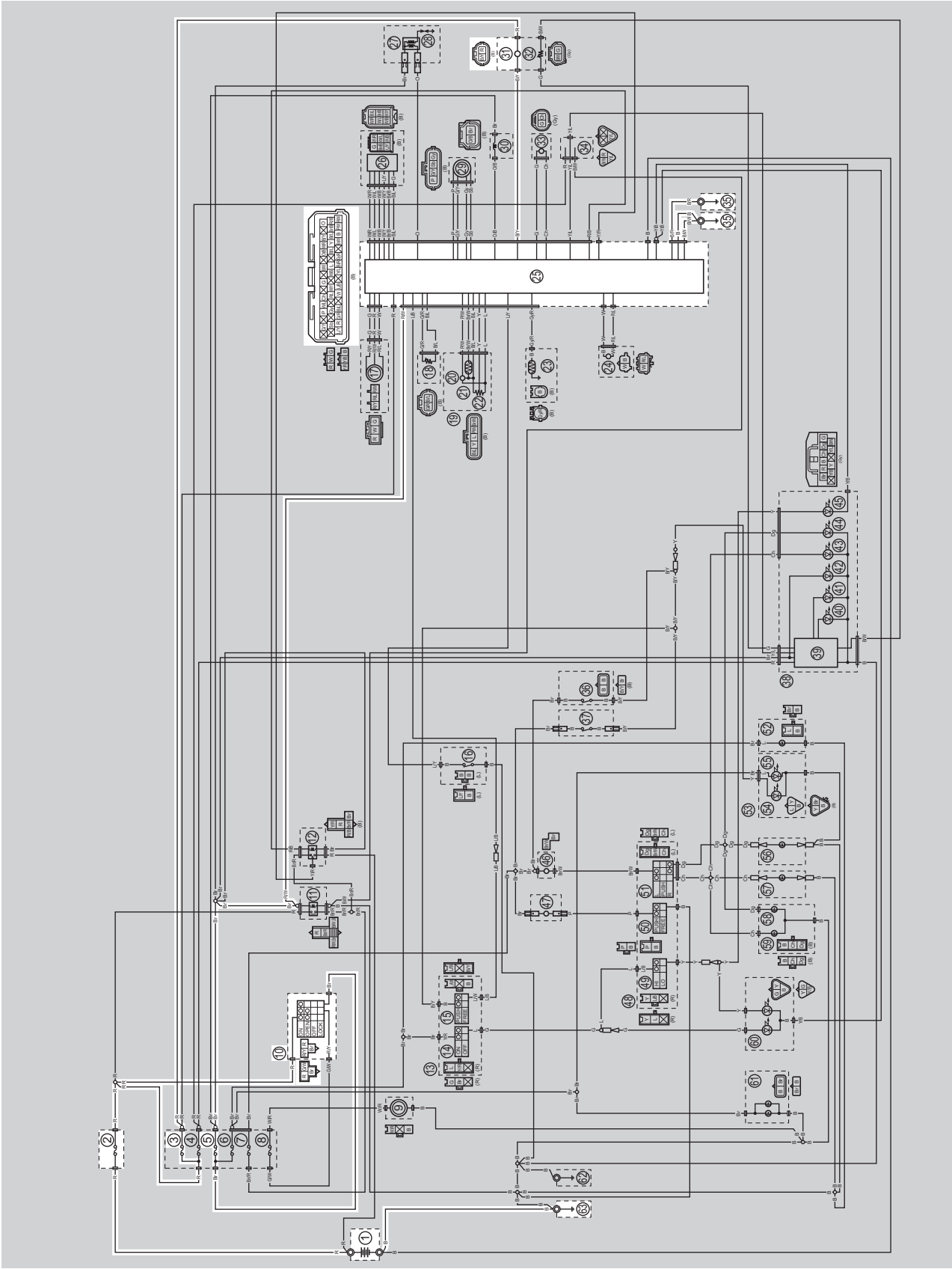
Fault code No.		Er-4 (fault code display)	
Item		SGCU (starter generator control unit) internal malfunction (input signal error): non-registered data has been received from the meter.	
1	Connection of meter assembly coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 2.
2	Connection of wire harness SGCU coupler. Check the locking condition of the coupler. Disconnect the coupler and check the pins (bent or broken terminals and locking condition of the pins).	Improperly connected → Connect the coupler securely or replace the wire harness.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 3.
3	Wire harness continuity.	Open or short circuit → Replace the wire harness. Between SGCU coupler and Yamaha diagnostic tool coupler. Yellow/Blue–Yellow/Blue Between Yamaha diagnostic tool coupler and meter assembly coupler. Yellow/Blue–Yellow/Blue	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 4.
4	Defective meter assembly.	Replace the meter assembly.	Turn the main switch to "ON". Fault code number is not displayed → Service is finished. Fault code number is displayed → Go to item 5.
5	Malfunction in SGCU.	Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.	

EAS20081

FUEL PUMP SYSTEM

EAS30513

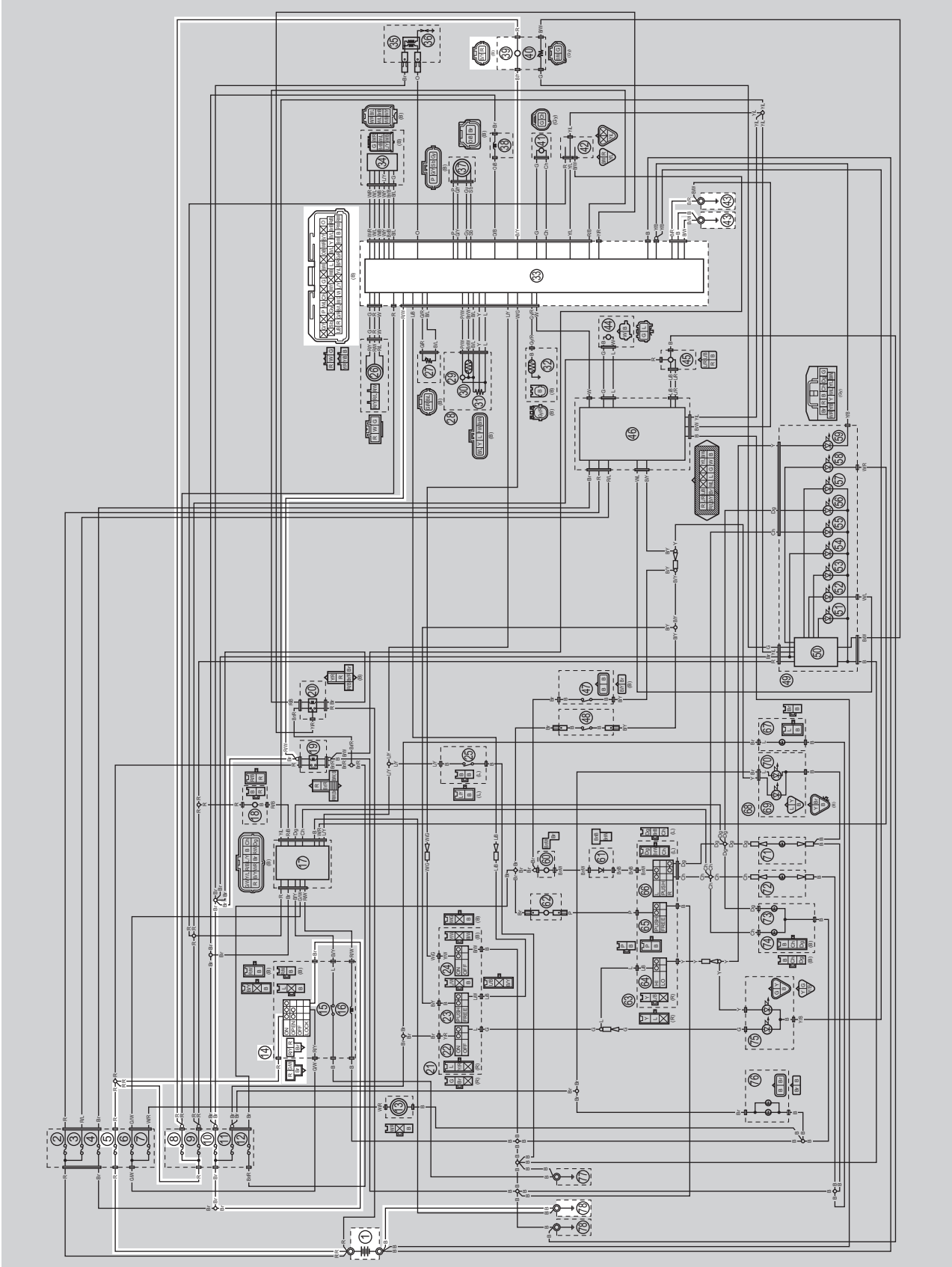
CIRCUIT DIAGRAM (GDR155)



- 1. Battery
- 2. Main fuse
- 3. Fuel injection system fuse
- 5. Ignition fuse
- 10. Main switch
- 25. SGCU (starter generator control unit)
- 31. Fuel pump
- 35. Engine ground 2
- 63. Engine ground 1

EASB631011

CIRCUIT DIAGRAM (GDR155-A)



- 1. Battery
- 5. Main fuse
- 8. Fuel injection system fuse
- 10. Ignition fuse
- 14. Main switch
- 33. SGCU (starter generator control unit)
- 39. Fuel pump
- 43. Engine ground 2
- 78. Engine ground 1

EAS30514

TROUBLESHOOTING

If the fuel pump fails to operate.

TIP

- Before troubleshooting, remove the following part(s):
- Battery cover
 - Front side covers
 - Footrest board assemblies
 - Fuel tank

1. Check the fuses. (Main ignition, and fuel injection system) Refer to “CHECKING THE FUSES” on page 8-124.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-124.	NG →	- Clean the battery terminals. - Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-120.	NG →	Replace the main switch.
OK ↓		
4. Check the fuel pump. Refer to “CHECKING THE FUEL PRESSURE” on page 7-3.	NG →	Replace the fuel pump.
OK ↓		
5. Check the entire fuel pump system wiring. Refer to “CIRCUIT DIAGRAM (GDR155)” on page 8-73 or refer to “CIRCUIT DIAGRAM (GDR155-A)” on page 8-75.	NG →	Properly connect or replace the wiring harness.
OK ↓		
Replace the SGCU. Refer to “REPLACING THE SGCU (starter generator control unit)” on page 8-124.		

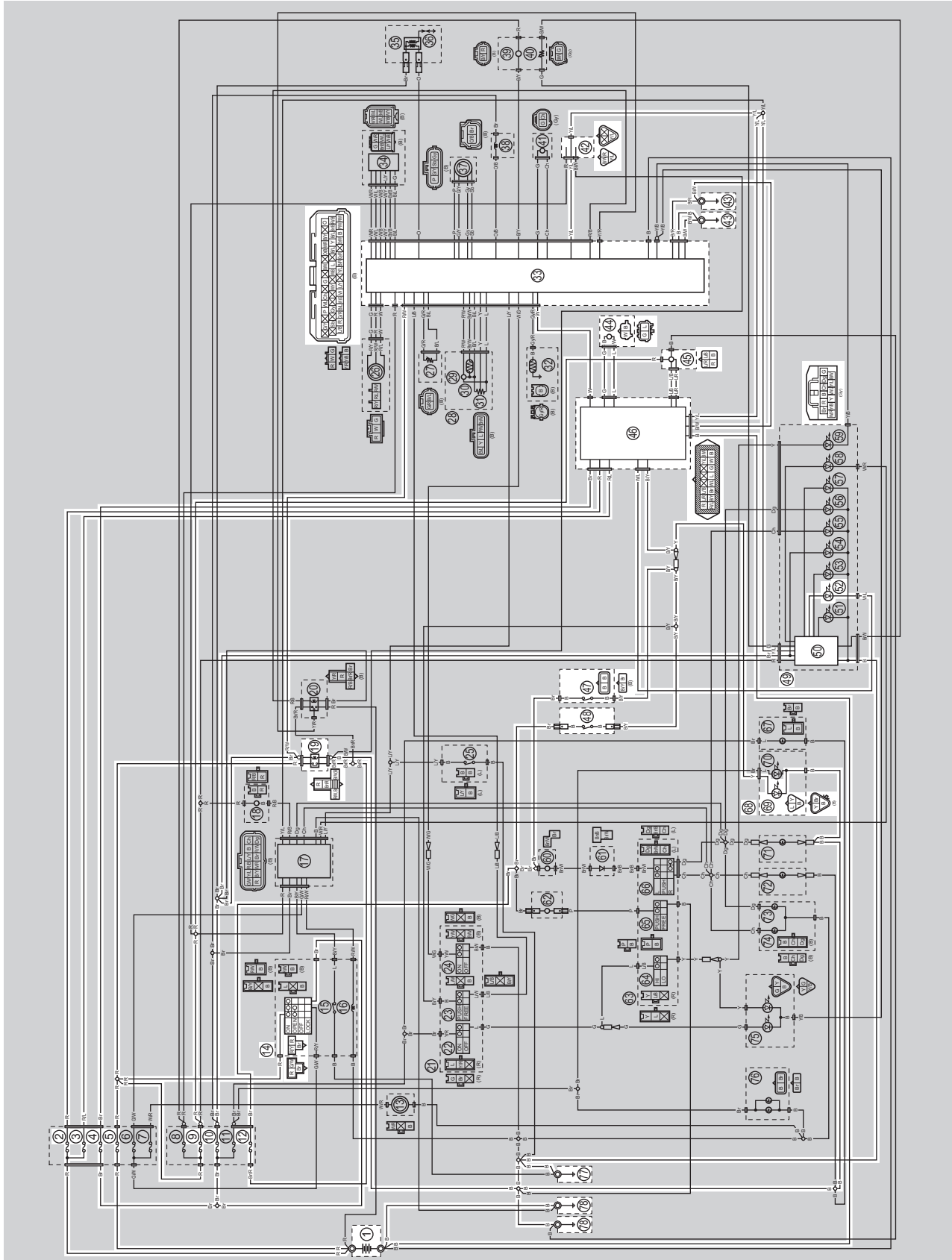
ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS20085

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS30843

CIRCUIT DIAGRAM



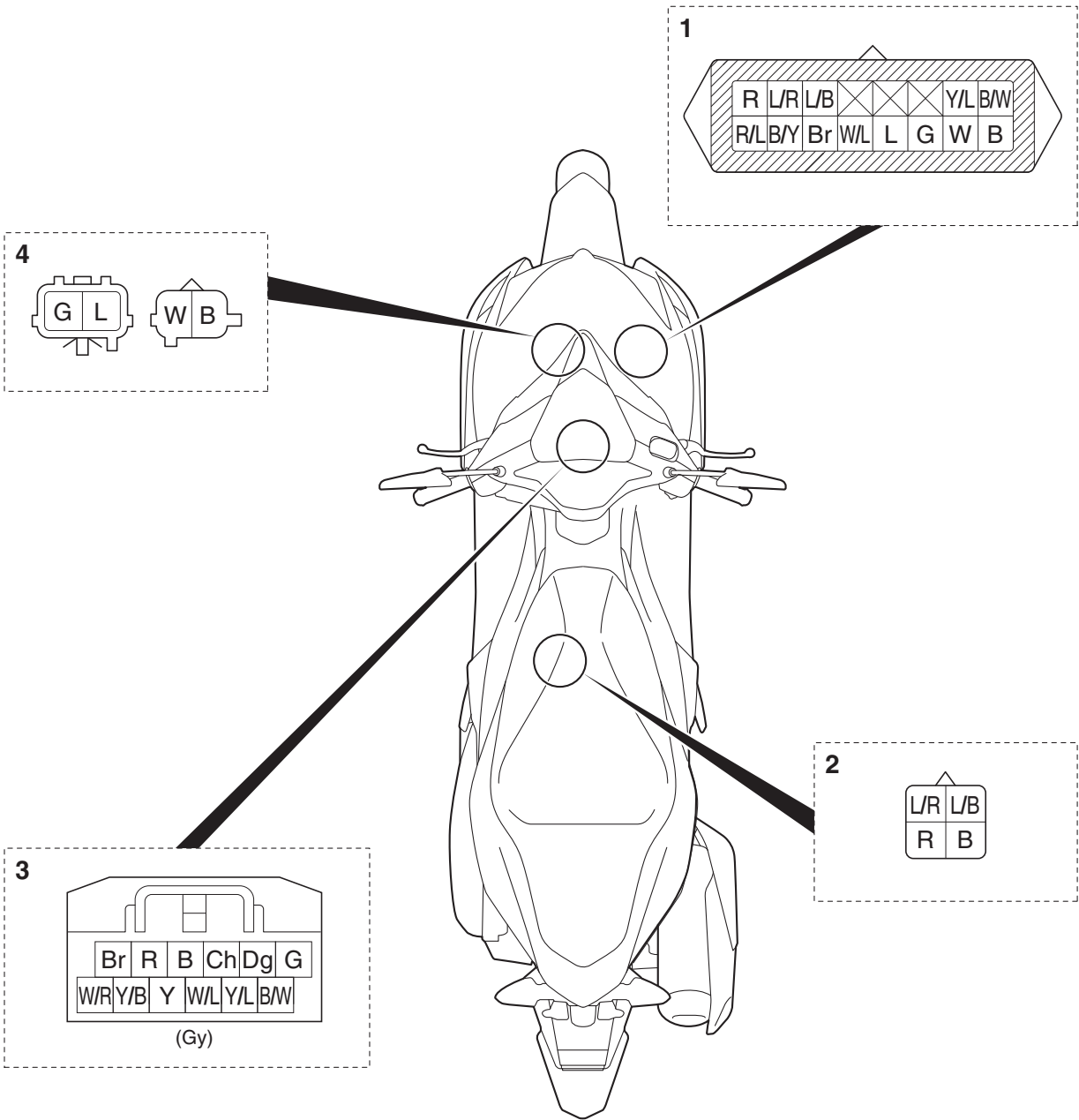
ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

1. Battery
2. ABS solenoid fuse
3. ABS motor fuse
4. ABS control unit fuse
5. Main fuse
9. Backup fuse
10. Ignition fuse
12. Signaling system fuse
14. Main switch
19. Main relay
33. SGCU (starter generator control unit)
42. Yamaha diagnostic tool coupler
43. Engine ground 2
44. Front wheel sensor
45. ABS test coupler
46. ABS ECU
47. Rear brake light switch
48. Front brake light switch
49. Meter assembly
50. Multi-function meter
52. ABS warning light
68. Tail/brake light assembly
69. Brake light
77. Frame ground
78. Engine ground 1

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS30844

ABS COUPLER LOCATION CHART



ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

1. ABS ECU coupler
2. ABS test coupler
3. Meter assembly coupler
4. Front wheel sensor coupler

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS30845

MAINTENANCE OF THE ABS ECU

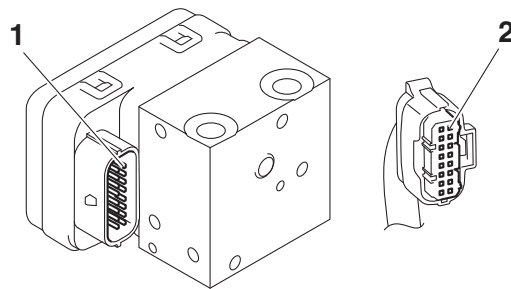
Checking the ABS ECU

1. Check:

- Terminals “1” of the ABS ECU
Cracks/damages → Replace the hydraulic unit assembly, brake hoses, and brake pipes that are connected to the assembly as a set.
- Terminals “2” of the ABS ECU coupler
Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS30528

ABS TROUBLESHOOTING OUTLINE

This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.

The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.

The following troubleshooting describes the problem identification and service method using the Yamaha diagnostic tool. For information about using the Yamaha diagnostic tool, refer to “[B-2] DIAGNOSIS USING THE FAULT CODES” on page 8-87. For troubleshooting items other than the following items, follow the normal service method.

EWA16710



When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to “[C-1] FINAL CHECK” on page 8-102.

ABS operation when the ABS warning light comes on

1. The ABS warning light remains on → ABS operates as a normal brake system.
 - A malfunction was detected using the ABS self-diagnosis function.
 - The ABS self-diagnosis has not been completed.
The ABS self-diagnosis starts when the main switch is turned to “ON” and finishes when the vehicle has traveled at a speed of approximately 10 km/h (6 mi/h).
2. The ABS warning light comes on after the engine starts, and then goes off when the vehicle starts moving (traveling at a speed of approximately 10 km/h (6 mi/h)). → ABS operation is normal.
3. The ABS warning light flashes → ABS operation is normal.
 - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-84.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.

The fault codes recorded in the ABS ECU can be checked using the Yamaha diagnostic tool. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). For information about deleting the fault codes, refer to “[B-3] DELETING THE FAULT CODES” on page 8-102. By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned to “ON”. During this test, a “clicking” noise can be heard from front side, and if the front brake lever is even slightly applied, a vibration can be felt at the lever, but these do not indicate a malfunction.

Self-diagnosis using the ABS ECU

The ABS ECU performs a static check of the entire system when the main switch is turned to “ON”. It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the Yamaha diagnostic tool when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

ECA18490

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS30529

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EWA17420

WARNING

- **Perform the troubleshooting [A]→[B]→[C] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.**
- **Use sufficiently charged regular batteries only.**

[A] Malfunction check using the ABS warning light

[B] Use the Yamaha diagnostic tool and determine the location of the malfunction and the cause from the recorded fault code.

Determine the cause of the malfunction from the condition and place where the malfunction occurred.

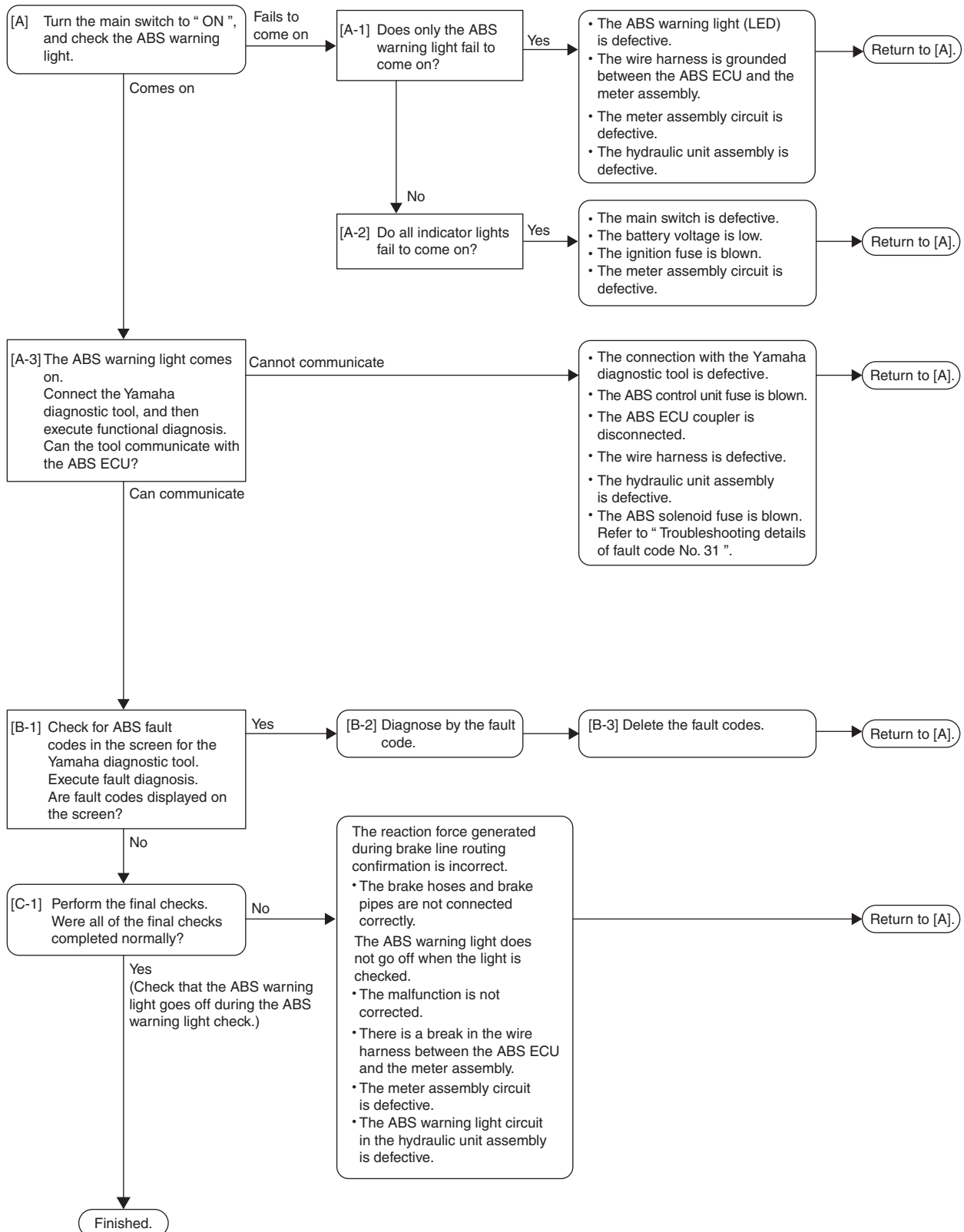
[C] Servicing the ABS

Execute the final check after disassembly and assembly.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS30530

BASIC PROCESS FOR TROUBLESHOOTING



ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EWA16710



WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer.

TIP

To final check, refer to "[C-1] FINAL CHECK" on page 8-102.

EAS30531

[A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

1. The ABS warning light does not come on.
 - Only the ABS warning light fails to come on. [A-1]
 - The ABS warning light and all other indicator lights fail to come on. [A-2]
2. The ABS warning light comes on. [A-3]

EAS30532

[A-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the White/Blue terminal of the ABS ECU coupler and White/Blue terminal of the meter assembly.
 - If there is short circuit to the ground, the wire harness is defective. Replace the wire harness.
2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to "ON".
 - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
 - If the ABS warning light comes on, the ABS ECU is defective. Replace the hydraulic unit assembly.

EAS30964

[A-2] ALL INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
 - Check the main switch for continuity.
Refer to "CHECKING THE SWITCHES" on page 8-120.
 - If there is no continuity, replace the main switch.
2. Battery
 - Check the condition of the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.
 - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
3. Ignition fuse
 - Check the fuse for continuity.
Refer to "CHECKING THE FUSES" on page 8-124.
 - If the ignition fuse is blown, replace the fuse.
4. Circuit
 - Check the meter assembly circuit.
Refer to "CIRCUIT DIAGRAM" on page 8-79.
 - If the meter assembly circuit is open, replace the wire harness.

EAS31162

[A-3] THE ABS WARNING LIGHT COMES ON

Connect the Yamaha diagnostic tool to the ABS test coupler and execute functional diagnosis. (For information about how to execute functional diagnosis, refer to the operation manual that is included with the tool.)

Check that communication with the ABS ECU is possible.

- Only the ABS ECU fails to communicate. [A-4]
- ABS ECU and SGCU fail to communicate. [A-5]
- Communication is possible with the ABS ECU. [B-1] (The ABS is displayed on the select unit screen.)

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

EAS31163

[A-4] ONLY THE ABS ECU FAILS TO COMMUNICATE (The select unit screen does not appear.)

1. ABS control unit fuse
 - Check the ABS control unit fuse for continuity.
Refer to “CHECKING THE FUSES” on page 8-124.
 - If the ABS control unit fuse is blown, replace the fuse.
2. ABS ECU coupler
 - Check that the ABS ECU coupler is connected properly.
For information about connecting the ABS ECU coupler properly, refer to “INSTALLING THE HYDRAULIC UNIT ASSEMBLY” on page 4-49.
3. Wire harness
 - Open circuit between the main switch and the ABS ECU, or between the ABS ECU and the ground.
Check for continuity between Brown terminal of the main switch coupler and Brown/White terminal of the ABS ECU coupler.
Check for continuity between Black/White terminal of the ABS ECU coupler and the ground, and between the Black terminal of the ABS ECU coupler and ground.
If there is no continuity, the wire harness is defective. Replace the wire harness.
 - Open circuit in the wire harness between the ABS ECU coupler and the ABS test coupler.
Check for continuity between Blue/Red terminal of the ABS ECU coupler and Blue/Red terminal of the ABS test coupler. (CANH)
Check for continuity between Blue/Black terminal of the ABS ECU coupler and Blue/Black terminal of the ABS test coupler. (CANL)
4. ABS ECU malfunction
 - Replace the hydraulic unit assembly.

EAS31164

[A-5] ABS ECU AND SGCU FAIL TO COMMUNICATE (Cannot connect due to a tool error.)

1. Yamaha diagnostic tool
 - Check that the Yamaha diagnostic tool is properly connected.
2. Wire harness
 - Open circuit in the wire harness between the ABS ECU coupler and the ABS test coupler.
Check for continuity between Blue/Red terminal of the ABS ECU coupler and Blue/Red terminal of the ABS test coupler. (CANH)
Check for continuity between Blue/Black terminal of the ABS ECU coupler and Blue/Black terminal of the ABS test coupler. (CANL)

EAS31165

[B-1] MALFUNCTION ARE CURRENTLY DETECTED

When the Yamaha diagnostic tool is connected to the ABS test coupler, the fault codes will be displayed on the computer screen.

- A fault code is displayed. [B-2]
- A fault code is not displayed. [C-1]

EAS31166

[B-2] DIAGNOSIS USING THE FAULT CODES

This model uses the Yamaha diagnostic tool to identify malfunctions.

For information about using the Yamaha diagnostic tool, refer to the operation manual that is included with the tool.



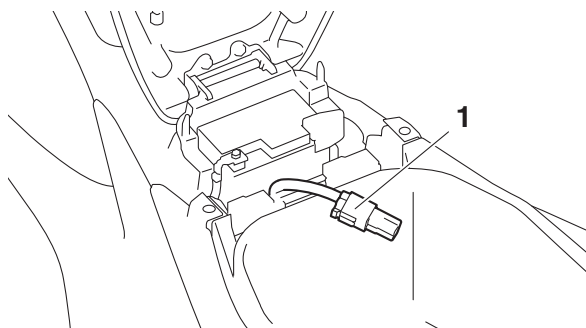
Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

Connecting the Yamaha diagnostic tool

Removing the battery cover. Refer to “GENERAL CHASSIS (1)” on page 4-1.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Removing the protective cap "1", and then connect the Yamaha diagnostic tool to the ABS test coupler.



Details about the displayed fault codes are shown in the following chart. Refer to this chart and check the vehicle.

Once all the work is complete, delete the fault codes. [B-3]

TIP

Check the inspection points after terminating the connection with the Yamaha diagnostic tool and turning the main switch off.

Fault code table

TIP

Record all of the fault codes displayed and inspect the check points.

Fault code No.	Item	Symptom	Check point
11* 25*	Front wheel sensor (intermittent pulses or no pulses)	Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
13* 26*	Front wheel sensor (abnormal pulse period)	Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
15	Front wheel sensor (open or short circuit)	Open or short circuit is detected in the front wheel sensor.	• Defective coupler between the front wheel sensor and the hydraulic unit assembly • Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor or hydraulic unit assembly

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Fault code No.	Item	Symptom	Check point
17* 45*	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
21	Hydraulic unit assembly (defective solenoid drive circuit)	Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.	• Defective hydraulic unit assembly
24	Brake light switch or brake light	Brake light signal is not received properly while the vehicle is traveling. (Brake light circuit, or front or rear brake light switch circuit)	• Defective signaling system (brake light or brake light switch) • Defective coupler between the signaling system (brake light or brake light switch) and the hydraulic unit assembly • Open or short circuit in the wire harness between the signaling system (brake light or brake light switch) and the hydraulic unit assembly • Defective hydraulic unit assembly
31	Hydraulic unit assembly (abnormal ABS solenoid power supply)	Power is not supplied to the solenoid circuit in the hydraulic unit assembly.	• Blown ABS solenoid fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
32	Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)	Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.	• Defective hydraulic unit assembly
33	Hydraulic unit assembly (abnormal ABS motor power supply)	Power is not supplied to the motor circuit in the hydraulic unit assembly.	• Blown ABS motor fuse • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective hydraulic unit assembly
34	Hydraulic unit assembly (short circuit in ABS motor power supply circuit)	Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.	• Defective hydraulic unit assembly

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Fault code No.	Item	Symptom	Check point
41	Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)	• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.	• Incorrect installation of the front wheel sensor • Incorrect rotation of the front wheel • Front brake dragging • Defective hydraulic unit assembly
43	Front wheel sensor (missing pulses)	Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)	• Foreign material adhered around the front wheel sensor • Incorrect installation of the front wheel • Defective sensor rotor or incorrect installation of the rotor • Defective front wheel sensor or incorrect installation of the sensor
51	Vehicle system power supply (voltage of ABS ECU power supply is high)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high.	• Defective battery • Disconnected battery terminal • Defective charging system
52	Vehicle system power supply (voltage of wheel sensor power supply is high)	Power voltage supplied to the wheel sensor is too high.	• Defective battery • Disconnected battery terminal • Defective charging system
53	Vehicle system power supply (voltage of ABS ECU power supply is low)	Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.	• Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system
54	Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)	Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.	• Defective battery • Defective coupler between the battery and the hydraulic unit assembly • Open or short circuit in the wire harness between the battery and the hydraulic unit assembly • Defective charging system • Defective hydraulic unit assembly
55	Hydraulic unit assembly (defective ABS ECU)	Abnormal data is detected in the hydraulic unit assembly.	• Defective hydraulic unit assembly
56	Hydraulic unit assembly (abnormal internal circuit.	Abnormality is detected in the internal circuit in the hydraulic unit assembly.	• Defective hydraulic unit assembly

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No.	Item	Symptom	Check point
63	Front wheel sensor power supply (voltage of power supply is low)	Power voltage supplied from the ABS ECU to the front wheel sensor is too low.	• Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly • Defective front wheel sensor • Defective hydraulic unit assembly
95	K-Line communication	K-Line data is not received properly.	• Defective coupler in the K-Line communication circuit (SGCU, meter assembly, and ABS ECU) • Open or short circuit in the wire harness in the K-Line communication circuit (SGCU, meter assembly, and ABS ECU) • Defective unit (SGCU or meter assembly) connected to the K-Line communication circuit • Defective hydraulic unit assembly

* The fault code number varies according to the vehicle conditions.

Fault code No. 11, 25

TIP

If the rear wheel was rotated with the front wheel stopped, fault code No. 11 or 25 may be recorded.

Fault code No.		11 25
Item		Front wheel sensor (intermittent pulses or no pulses)
Symptom		Front wheel sensor signal is not received properly. (Pulses are not received or are received intermittently while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-22.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

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Fault code No. 13, 26

TIP

- If the front brake ABS operates continuously for 20 seconds or more, fault code No. 26 will be recorded. If the front brake ABS operates continuously for 36 seconds or more, fault code No. 13 will be recorded.
- Vehicle possibly ridden on uneven roads.

Fault code No.		13 26
Item		Front wheel sensor (abnormal pulse period)
Symptom		Front wheel sensor signal is not received properly. (The pulse period is abnormal while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-22.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

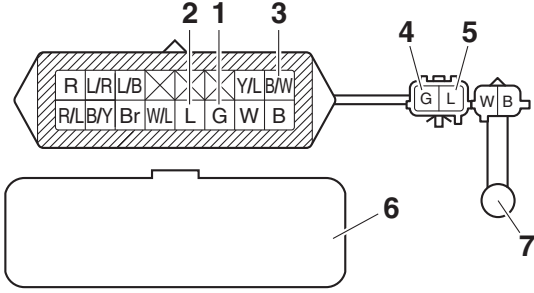
Fault code No. 15

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Fault code No.		15
Item		Front wheel sensor (open or short circuit)
Symptom		Open or short circuit is detected in the front wheel sensor.
Order	Item/components and probable cause	Check or maintenance job
1	Defective coupler between the front wheel sensor and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See "TIP".

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No.	15	
Item	Front wheel sensor (open or short circuit)	
Symptom	Open or short circuit is detected in the front wheel sensor.	
Order	Item/components and probable cause	Check or maintenance job
2	Open or short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	• Check for continuity between the Green terminal “1” and the Green terminal “4” and between the Blue terminal “2” and the Blue terminal “5”. • If there is no continuity, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the Green terminal “1” and the Blue terminal “2” and between the Green terminal “4” and the Blue terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness. • Check that there is no short circuit between the Black/White terminal “3” and the Green terminal “4” and between the Black/White terminal “3” and the Blue terminal “5”. • If there is short circuit, the wire harness is defective. Replace the wire harness.  6. ABS ECU 7. Front wheel sensor
3	Defective front wheel sensor or hydraulic unit assembly	If the above items were performed and no malfunctions were found, the wheel sensor or hydraulic unit assembly is defective. Replace the wheel sensor or hydraulic unit assembly. Refer to “FRONT WHEEL” on page 4-20 and “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-47.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 17, 45

TIP

If pulse gaps are detected when the vehicle is traveling at a speed of 30 km/h (19 mi/h) or more, fault code No. 17 will be recorded. If the vehicle is traveling at a speed of 29 km/h (18 mi/h) or less, fault code No. 45 will be recorded first and fault code No. 17 will be recorded if the condition continues.

Fault code No.		17 45
Item		Front wheel sensor (missing pulses)
Symptom		Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-22.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

Fault code No. 21

Fault code No.		21
Item		Hydraulic unit assembly (defective solenoid drive circuit)
Symptom		Solenoid drive circuit in the hydraulic unit assembly is open or short-circuited.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM)" on page 4-47.

Fault code No. 24

Fault code No.		24
Item		Brake light switch or brake light
Symptom		Brake light signal is not received properly while the vehicle is traveling (Brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause	Check or maintenance job
1	Defective signaling system (brake light or brake light switch)	Check the brake light switches. Refer to "CHECKING THE SWITCHES" on page 8-120.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No.		24
Item		Brake light switch or brake light
Symptom		Brake light signal is not received properly while the vehicle is traveling (Brake light circuit, or front or rear brake light switch circuit).
Order	Item/components and probable cause	Check or maintenance job
2	Defective coupler between the signaling system (brake light or brake light switch) and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.
3	Open or short circuit in the wire harness between the signaling system (brake light or brake light switch) and the hydraulic unit assembly	• Between front brake light switch connector and rear brake light switch connector. (Black/Yellow–Black/Yellow) • Between ABS ECU coupler and rear brake light switch connector. (Black/Yellow–Black/Yellow)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-47.

Fault code No. 31

TIP

Turn the main switch to “OFF” before disconnecting or connecting a coupler.

Fault code No.		31
Item		Hydraulic unit assembly (abnormal ABS solenoid power supply)
Symptom		Power is not supplied to the solenoid circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Blown ABS solenoid fuse	Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 8-124.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See TIP.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (Red–Red)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-47.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 32

Fault code No.		32
Item		Hydraulic unit assembly (short circuit in ABS solenoid power supply circuit)
Symptom		Short circuit is detected in the solenoid power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

Fault code No. 33

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Fault code No.		33
Item		Hydraulic unit assembly (abnormal ABS motor power supply)
Symptom		Power is not supplied to the motor circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Blown ABS motor fuse	Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to "CHECKING THE FUSES" on page 8-124.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See TIP.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS motor fuse. (Red/Blue–Red/Blue) • Between ABS ECU coupler and ground. (Black–Black)
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

Fault code No. 34

Fault code No.		34
Item		Hydraulic unit assembly (short circuit in ABS motor power supply circuit)
Symptom		Short circuit is detected in the motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 41

Fault code No.		41
Item		Front wheel ABS (intermittent wheel speed pulses or incorrect depressurization)
Symptom		• Pulses from the front wheel sensor are received intermittently while the vehicle is traveling. • Front wheel will not recover from the locking tendency even though the signal is transmitted from the ABS ECU to reduce the hydraulic pressure.
Order	Item/components and probable cause	Check or maintenance job
1	Incorrect installation of the front wheel sensor	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-22.
2	Incorrect rotation of the front wheel	Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. Refer to "CHECKING THE FRONT WHEEL" on page 4-22 and "CHECKING THE FRONT BRAKE DISC" on page 4-36.
3	Front brake dragging	Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake lever is operated and that the pressure decreases when the lever is released. Refer to "CHECKING THE FRONT BRAKE DISC" on page 4-36.
4	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

Fault code No. 43

Fault code No.		43
Item		Front wheel sensor (missing pulses)
Symptom		Front wheel sensor signal is not received properly. (Missing pulses are detected in the signal while the vehicle is traveling.)
Order	Item/components and probable cause	Check or maintenance job
1	Foreign material adhered around the front wheel sensor	Check the surface of the sensor rotor and wheel sensor for foreign material, such as metal particles. Clean the sensor rotor and wheel sensor if necessary.
2	Incorrect installation of the front wheel	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-22.
3	Defective sensor rotor or incorrect installation of the rotor	Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.
4	Defective front wheel sensor or incorrect installation of the sensor	Check the wheel sensor for damage and the installed condition of the sensor. Repair or replace the wheel sensor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-23.

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Fault code No. 51

Fault code No.		51
Item		Vehicle system power supply (voltage of ABS ECU power supply is high)
Symptom		Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too high.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.
2	Disconnected battery terminal	Check the connection. Replace or reconnect the terminal if necessary.
3	Defective charging system	Check the charging system. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-21.

Fault code No. 52

Fault code No.		52
Item		Vehicle system power supply (voltage of wheel sensor power supply is high)
Symptom		Power voltage supplied to the wheel sensor is too high.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.
2	Disconnected battery terminal	Check the connection. Replace or reconnect the terminal if necessary.
3	Defective charging system	Check the charging system. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-21.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 53

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Fault code No.		53
Item		Vehicle system power supply (voltage of ABS ECU power supply is low)
Symptom		Power voltage supplied to the ABS ECU in the hydraulic unit assembly is too low.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See TIP.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS control unit fuse. (Brown–Brown)
4	Defective charging system	Check the charging system. Refer to "CIRCUIT DIAGRAM (GDR155)" on page 8-21.

Fault code No. 54

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Fault code No.		54
Item		Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)
Symptom		Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective battery	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.
2	Defective coupler between the battery and the hydraulic unit assembly	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See TIP.
3	Open or short circuit in the wire harness between the battery and the hydraulic unit assembly	• Replace if there is an open or short circuit. • Between ABS ECU coupler and ABS motor fuse. (Red/Blue–Red/Blue) • Between ABS ECU coupler and ABS solenoid fuse. (Red–Red)
4	Defective charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-21.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No.		54
Item		Hydraulic unit assembly (defective ABS solenoid and ABS motor power supply circuits)
Symptom		Abnormality is detected in the solenoid or motor power supply circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
5	Defective hydraulic unit assembly	If the above items were performed and no malfunctions were found, replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

Fault code No. 55

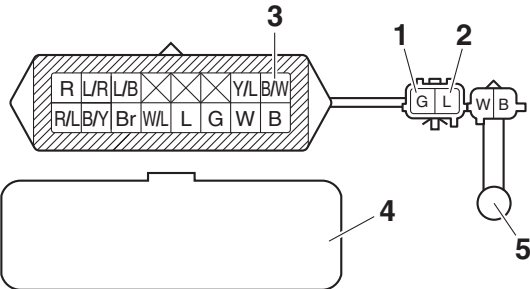
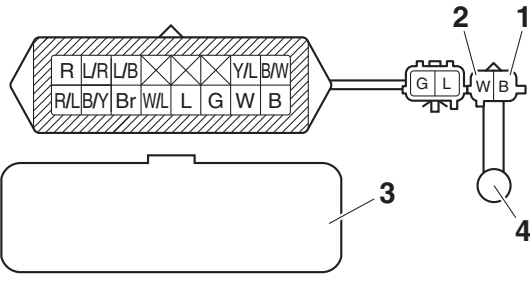
Fault code No.		55
Item		Hydraulic unit assembly (defective ABS ECU)
Symptom		Abnormal data is detected in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

Fault code No. 56

Fault code No.		56
Item		Hydraulic unit assembly (abnormal internal circuit)
Symptom		Abnormality is detected in the internal circuit in the hydraulic unit assembly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 63

Fault code No.		63
Item		Front wheel sensor power supply (voltage of power supply is low)
Symptom		Power voltage supplied from the ABS ECU to the front wheel sensor is too low.
Order	Item/components and probable cause	Check or maintenance job
1	Short circuit in the wire harness between the front wheel sensor and the hydraulic unit assembly	• Check that there is no short circuit between the Green terminal “1” and the Blue terminal “2”. • Check that there is no short circuit between the Black/White terminal “3” and the Green terminal “1”. • If there is a short circuit, the wire harness is defective. Replace the wire harness.  4. ABS ECU 5. Front wheel sensor
2	Defective front wheel sensor	• Check that there is no short circuit between the Black terminal “1” and the White terminal “2”. • If there is a short circuit, the wheel sensor is defective. Repair or replace the wheel sensor.  3. ABS ECU 4. Front wheel sensor
3	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to “ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)” on page 4-47.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Fault code No. 95

TIP

Turn the main switch to "OFF" before disconnecting or connecting a coupler.

Fault code No.		95
Item		K-Line communication
Symptom		K-Line data is not received properly.
Order	Item/components and probable cause	Check or maintenance job
1	Defective coupler in the K-Line communication circuit (SGCU, meter assembly, and ABS ECU)	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. See TIP.
2	Open or short circuit in the wire harness in the K-Line communication circuit (SGCU, meter assembly, and ABS ECU)	• Replace if there is open or short circuit. • Between SGCU coupler, meter assembly coupler, and ABS ECU coupler. (Yellow/Blue–Yellow/Blue)
3	Defective unit (SGCU or meter assembly) connected to the K-Line communication circuit	Replace the SGCU or meter assembly. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124.
4	Defective hydraulic unit assembly	Replace the hydraulic unit assembly. Refer to "ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)" on page 4-47.

EAS31167

[B-3] DELETING THE FAULT CODES

To delete the fault codes, use the Yamaha diagnostic tool. For information about deleting the fault codes, refer to the operation manual of the Yamaha diagnostic tool.

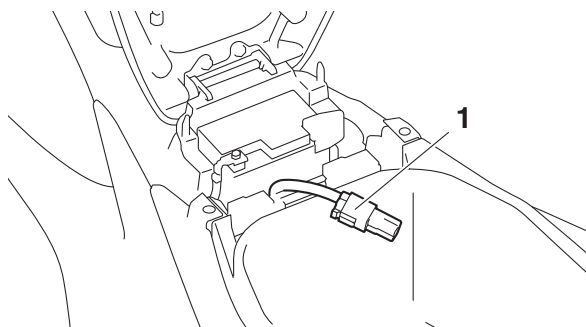
Check that all the displayed fault codes are deleted.



Yamaha diagnostic tool USB
90890-03250
Yamaha diagnostic tool (A/I)
90890-03252

Connecting the Yamaha diagnostic tool

Remove the protective cap "1", and then connect the Yamaha diagnostic tool to the coupler.



EAS31168

[C-1] FINAL CHECK

Check all the following items to complete the inspection.

If the process is not completed properly, start again from the beginning.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

Checking procedures

1. Check the brake fluid level in the front brake master cylinder reservoir.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-10.
2. Check the wheel sensor for proper installation.
Refer to "INSTALLING THE FRONT WHEEL (FRONT BRAKE DISC)" on page 4-25.
3. Perform brake line routing confirmation.
Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-51.
If it does not have reaction-force properly, the brake hose is not properly routed or connected.
4. Delete the fault codes.
Refer to "[B-3] DELETING THE FAULT CODES" on page 8-102.
5. Checking the ABS warning light.
Check that the ABS warning light goes off.
If the ABS warning light does not come on or if it does not go off, refer to "CHECKING THE ABS WARNING LIGHT" on page 4-54.
If the ABS warning light does not turn off, the possible causes are following:
 - The problem is not solved.
 - Open circuit between the ABS ECU and the meter assembly.
Check for continuity between White/Blue terminal of the ABS ECU coupler and White/Blue terminal of the meter assembly coupler.
 - Malfunction in the meter assembly circuit.
 - Malfunction in the ABS warning light circuit in the hydraulic unit assembly.

ABS (ANTI-LOCK BRAKE SYSTEM) (GDR155-A)

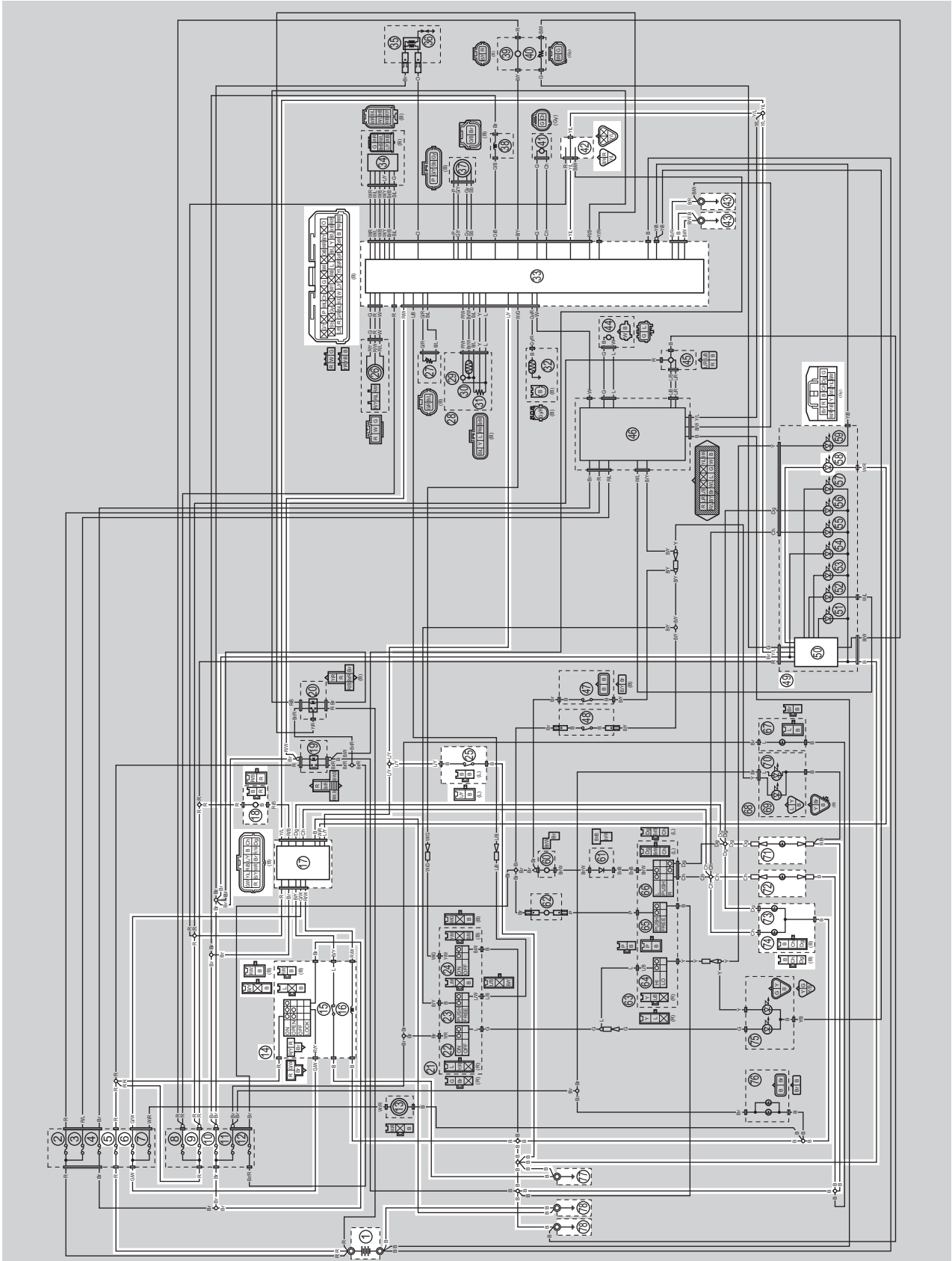
SMART KEY SYSTEM (GDR155-A)

EAS20201

SMART KEY SYSTEM (GDR155-A)

EAS31452

CIRCUIT DIAGRAM



- 1. Battery
- 5. Main fuse
- 6. Smart key system fuse
- 9. Backup fuse
- 10. Ignition fuse
- 14. Main switch
- 15. Request switch
- 16. Main switch solenoid
- 17. Smart key unit
- 18. Buzzer
- 25. Sidestand switch
- 33. SGCU (starter generator control unit)
- 42. Yamaha diagnostic tool coupler
- 43. Engine ground 2
- 49. Meter assembly
- 50. Multi-function meter
- 58. Smart key system indicator light
- 71. Rear turn signal light (right)
- 72. Rear turn signal light (left)
- 73. Front turn signal light (right)
- 74. Front turn signal light (left)
- 77. Frame ground
- 78. Engine ground 1

EAS31453

TROUBLESHOOTING

Vehicle power does not turn on. (Meter light and tail/brake light do not come on.)

Engine does not start even though vehicle power is turned on.

Seat does not open. (Vehicle power is turned on.)

Fuel lid does not open. (Vehicle power is turned on.)

Answer back function does not operate.

TIP

Before troubleshooting, remove the following part(s):

1. Battery cover
2. Storage box
3. Front cowl assembly

Checking the vehicle power

1. Check the smart key.
→ The smart key indicator light comes on when the smart key button is pushed.
→ Check the button cell battery.
Refer to "CHECKING THE SMART KEY BATTERY (GDR155-A)" on page 8-133.

NG →

Replace the button cell battery of the smart key. Standard battery: CR2032

OK ↓

2. Check the fuses.
(Main, backup, ignition, and smart key system)
Refer to "CHECKING THE FUSES" on page 8-124.

NG →

Replace the fuse(s).

OK ↓

3. Check the battery.
Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-124.

NG →

- Clean the battery terminals.
- Recharge or replace the battery.

OK ↓

4. Check the main switch and request switch.
Refer to "CHECKING THE SWITCHES" on page 8-120.

NG →

Replace the main switch.

OK ↓

5. Check the main switch solenoid.
Refer to "CHECKING THE MAIN SWITCH SOLENOID (GDR155-A)" on page 8-134.

NG →

Replace the main switch.

OK ↓

SMART KEY SYSTEM (GDR155-A)

6. Check the entire smart key system's wiring.
Refer to "CIRCUIT DIAGRAM" on page 8-105.

NG →

Properly connect or replace the wire harness.

OK ↓

Replace the smart key unit.

Checking the smart key system

Before checking the smart key system, make sure that the smart key is located within the operating range of the smart key system and that the key is turned on.

Vehicle power does not turn on. (Meter light and tail light do not come on.)

TIP

- Before performing this procedure, make sure that there are no sources of strong electromagnetic waves in the vicinity. (Because the amount of electromagnetic waves will change if the vehicle is moved a short distance, move the vehicle away from sources of strong electromagnetic waves before performing the procedure.)
- Use the smart key that is registered to the vehicle.

1. Check the vehicle power.
Refer to "Checking the vehicle power".

NG →

Repair or replace any defective parts.

OK ↓

- There are sources of strong electromagnetic waves in the vicinity → Move the vehicle.
- Smart key malfunction → Register and use a different smart key.
- Smart key unit malfunction → Replace the smart key unit.

Engine does not start even though vehicle power is turned on.

1. When the vehicle power is turned on, the smart key system indicator light " " flashes 4 times.
Refer to "SMART KEY SYSTEM SELF-DIAGNOSIS" on page 8-111.

NO →

Check and repair the electric starting system. Refer to "ELECTRIC STARTING SYSTEM" on page 8-7.

YES ↓

2. Turn the main switch to "OFF", and then push the main switch and check that it can be turned back to "ON".

NG →

Repair or replace any defective parts. Refer to "Checking the vehicle power".

OK ↓

SMART KEY SYSTEM (GDR155-A)

3. Check for continuity in the communication line between the SGCU and the smart key unit (Yellow/Blue).	NG →	Replace the wire harness.
OK ↓ • Replace the SGCU. Refer to "REPLACING THE SGCU (starter generator control unit)" on page 8-124. • Replace the smart key unit.		
<u>Seat does not open. (Vehicle power is turned on.)</u>		
1. Check the vehicle power. Refer to "Checking the vehicle power".	NG →	Repair or replace any defective parts.
OK ↓ • Check the mechanical components of the lock for malfunctions. Repair or replace any defective parts. • Adjust or replace the seat lock cable.		
<u>Fuel lid does not open. (Vehicle power is turned on.)</u>		
1. Check the vehicle power. Refer to "Checking the vehicle power".	NG →	Repair or replace any defective parts.
OK ↓ • Check the mechanical components of the lock for malfunctions. Repair or replace any defective parts. • Adjust or replace the fuel lid cable.		
<u>Answer back function does not operate.</u>		
1. Check the vehicle power. Refer to "Checking the vehicle power".	NG →	Repair or replace any defective parts.
OK ↓ 2. Check the buzzer operation. Refer to "CHECKING THE BUZZER (GDR155-A)" on page 8-133.	NG →	Replace the buzzer.
OK ↓		

SMART KEY SYSTEM (GDR155-A)

3. Check the turn signal light bulbs and sockets.
Refer to "CHECKING THE BULBS AND BULB SOCKETS" on page 8-123.

NG →

Replace the turn signal light bulb, socket or both.

OK ↓

Replace the smart key unit.

SMART KEY SYSTEM (GDR155-A)

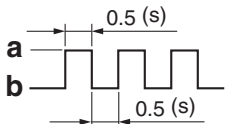
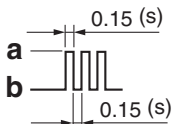
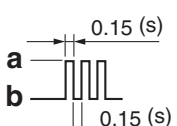
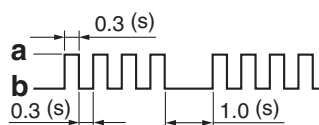
EAS31534

SMART KEY SYSTEM SELF-DIAGNOSIS

The smart key system is equipped with a self-diagnostic function. If a malfunction is detected in the system, the malfunction will be indicated by the flash pattern of the smart key system indicator light “”.

TIP

The smart key system indicator light “” comes on for about 2 seconds when the vehicle power is on. If one of the following malfunctions is detected, the indicator light starts flashing.

Item	Flash pattern	Flashing time/number of flashes	Malfunction and check point
Low voltage of smart key button cell battery	 a.LED on b.LED off	20 (seconds)	Replace the button cell battery of the smart key. Refer to “SMART KEY SYSTEM (GDR155-A)” on page 8-105.
Vehicle power off verification error	 a.LED on b.LED off	30 (seconds)	The smart key cannot be recognized. Check that there are no sources of strong electromagnetic waves in the vicinity, the smart key is not lost, and the battery is not discharged.
Running detection error*	 a.LED on b.LED off	Flashes continuously until the error is resolved.	The smart key cannot be recognized. Check that there are no sources of strong electromagnetic waves in the vicinity, the smart key is not lost, and the battery is not discharged.
• SGCU communication error • Data error • SGCU malfunction	 a.LED on b.LED off	Flashes continuously until the error is resolved./flashes 4 times in a repeating cycle	Check the wire harness. Check the SGCU. Check the smart key unit.

* The running detection error

If the smart key is dropped or can no longer be recognized while the vehicle is traveling. If the vehicle travels while the smart key cannot be recognized, the smart key system indicator light “” flashes in 0.15-second intervals.

The vehicle can be ridden, but the vehicle power cannot be turned off.

Although a forced shutdown can be performed to turn off the vehicle power (the main switch is pushed for 4 times within 2 seconds while the smart key system indicator light “” is flashing in 0.15-second intervals), the vehicle power cannot be turned back on.

Communication error between the SGCU and the smart key unit

If a communication error between the SGCU and the smart key unit is detected, the following fault code numbers will be displayed on the meter to indicate the location of the malfunction.

SMART KEY SYSTEM (GDR155-A)

TIP

These fault code numbers are not stored in the memory of the SGCU. Note all of the displayed fault code numbers, and then check the vehicle.

Fault code No.	Device that detected the malfunction	Symptom	Cause	Check or maintenance job
51	Smart key unit	Communication error between the smart key and the smart key unit.	Radio wave noise interference. • Lock condition in the smart key • Defective smart key • Defective smart key unit	Perform the checks and maintenance job for "Engine does not start even though vehicle power is turned on."
53	Smart key unit	Communication error between the SGCU and the smart key unit.	Radio wave noise interference or disconnected lead. • Obstruction due to radio wave noise • Disconnection in the wire harness • Defective SGCU • Defective smart key unit	Perform the checks and maintenance job for "Engine does not start even though vehicle power is turned on."
54	Smart key unit	Codes transmitted between the SGCU and the smart key unit do not match.	Radio wave noise interference or disconnected lead. • Obstruction due to radio wave noise. • Disconnection in the wire harness • Defective SGCU (when the SGCU or smart key unit is replaced with a unit from a different vehicle) • Defective smart key unit	Perform the checks and maintenance job for "Engine does not start even though vehicle power is turned on."
56	SGCU	Unidentified code is received.	Radio wave noise interference or disconnected lead. • Obstruction due to radio wave noise • Disconnection in the wire harness • Defective SGCU • Defective smart key unit	Perform the checks and maintenance job for "Engine does not start even though vehicle power is turned on."

EAS31535

SMART KEY SYSTEM EMERGENCY MODE

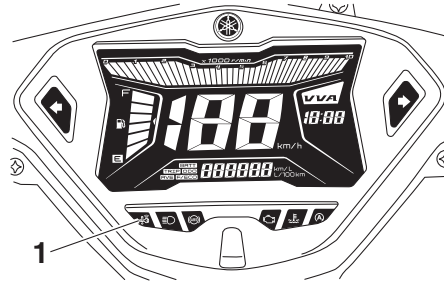
If the smart key is lost or if it cannot be used due a discharged battery or malfunction, this mode can be used to turn on the smart key system.

TIP

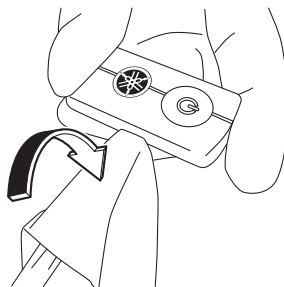
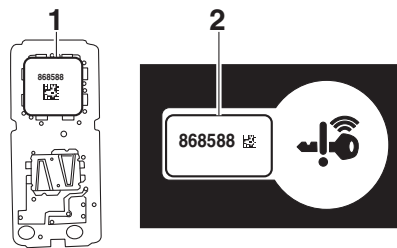
The emergency mode operation will be canceled if the respective steps are not carried out within the time set for each operation.

SMART KEY SYSTEM (GDR155-A)

1. Stop the vehicle in a safe place and turn the main switch to “OFF”.
2. Push the main switch for 5 seconds until the smart key system indicator light flashes once, then release it. Repeat two more times. The smart key system indicator light “1” will come on for 3 seconds to indicate the transition to emergency mode.



3. After the smart key system indicator light “ ” goes off, use the main switch to enter the smart key identification number “1” located inside the smart key case (open the smart key case as shown) or the identification number “2” located on the identification number card. (Refer to the following procedure on how to input the identification number.)



4. The input identification number is indicated by the number of flashes of the smart key system indicator light “ ” while the main switch is pushed.
For example, if the smart key identification number is 123456:
Push and hold the main switch. →
The smart key system indicator light “ ” will start to flash. →



Release the main switch after the smart key system indicator light “” flashes 1 time. →
The first digit of the identification number has been set as 1. →
Push and hold the main switch again. →



Release the main switch after the smart key system indicator light “” flashes 2 times. →
The second digit of the identification number has been set as 2. →
Repeat the above procedure until all 6 digits of the identification number have been set.

5. The smart key system indicator light “” will come on for 10 seconds if the correct 6-digit identification number was entered.

TIP

When one of the following situations applies, emergency mode will be terminated and the smart key system indicator light will flash quickly for 3 seconds. In this case, start over again from step 2.

- When there are no main switch operations for 10 seconds during the identification number input process.
 - When the smart key system indicator light is allowed to flash nine or more times.
 - The identification number is not entered correctly.
-

6. While the smart key system indicator light is on, push the main switch once more to complete emergency mode access. The smart key indicator light will go off and then come back on for approximately 4 seconds.
7. While the smart key system indicator light is on, turn the main switch to “ON”. The vehicle can now be operated normally.

EAS31536

REGISTERING A SMART KEY

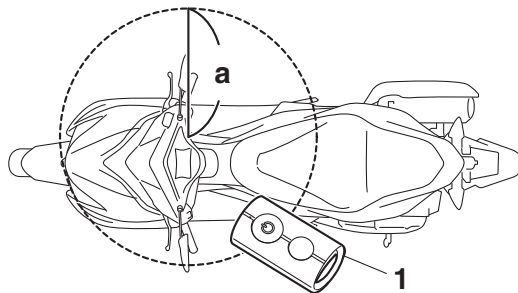
The following procedure can be used to register additional smart keys or a new smart key in case the original smart key is lost.

TIP

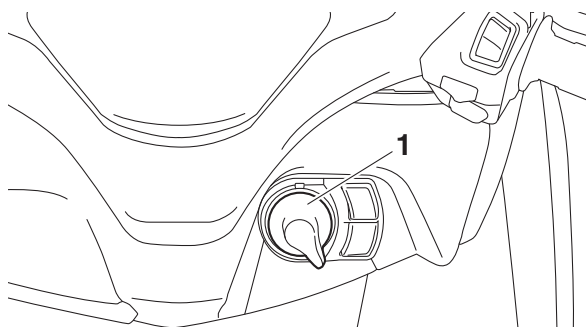
- A maximum of 6 smart keys can be registered to the smart key unit.
 - Be sure to register the smart keys one at a time. Do not register multiple smart keys at the same time.
-

SMART KEY SYSTEM (GDR155-A)

1. Place the smart key "1" that will be registered within 80 cm (31.5 in) "a" of the main switch.



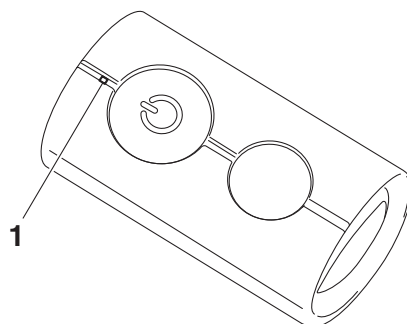
2. Perform steps 1–5 in "SMART KEY SYSTEM EMERGENCY MODE" on page 8-112.
3. While the smart key system indicator light " " is on for 10 seconds, push the main switch "1" for 5 seconds until buzzer sounds once.



4. The smart key indicator light (red) "1" on the new smart key comes on for 10 seconds.

TIP

While the smart key indicator light on the smart key is on, the smart key system indicator light " " flashes according to the number of currently registered smart keys. (For example, if 5 smart keys are registered, the indicator light flashes 5 times.)



5. While the smart key indicator light is on for 10 seconds, push the button on the smart key to transmit a signal from the smart key to the smart key unit.
6. If the smart key is registered successfully, the smart key system indicator light " " will come on for 3 seconds, and then the smart key system will turn off.
If the smart key was not registered successfully, the smart key system indicator light " " will flash for 3 seconds, and then the smart key system will turn off.

TIP

If this registration procedure is performed for a smart key that is already registered, the smart key system indicator light " " will flash for 7 seconds (on for 0.2 second and off for 0.8 second).

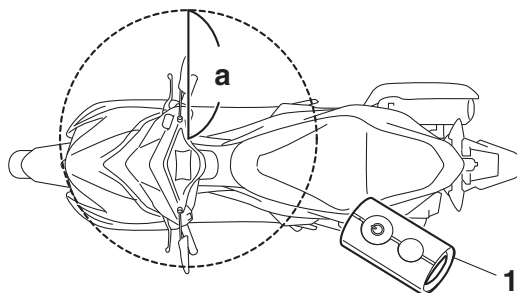
EAS31537

DISABLING A SMART KEY

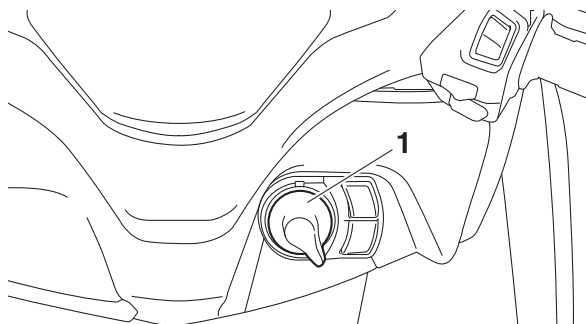
If a smart key is lost or stolen, the smart key can be disabled.

SMART KEY SYSTEM (GDR155-A)

1. Place all of the smart keys “1” 300 cm (118.1 in) “a” or more away from the vehicle or lock the communication.



- [illegible]



4. Check that the smart key system indicator light “

TIP

The number of smart keys that currently can be used will be indicated.

Number of flashes = Number of verified smart keys. (1 cycle of on for 0.3 second and off for 0.3 second = 1 smart key)

7. Push the main switch for 5 seconds or more. The use of only the verified smart keys will be enabled. The use of all other smart keys will be disabled.

TIP

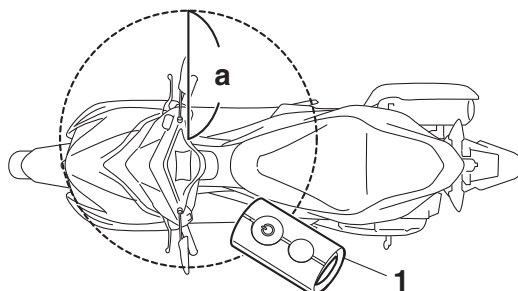
If the procedure was not completed successfully, repeat the procedure from step 1.

SMART KEY SYSTEM (GDR155-A)

EASB631013

DISABLING THE POWER-ON ALARM

1. Place the smart key "1" that will be registered within 80 cm (31.5 in) "a" of the main switch.



2. Push the main switch and the smart key system indicator light will come on for approximately 4 seconds.
3. While the smart key system indicator light is on, turn the main switch to "ON".
4. Extend and retract the sidestand by hand for 10 times or more within 15 seconds from vehicle power on.
5. When the buzzer sounds, the setting is complete.
 - If the buzzer sounds 2 times: The power-on alarm is turned off.
 - If the buzzer sounds 1 times: The power-on alarm is turned on.

EAS31719

REPLACEMENT PARTS LIST

TIP

When replacing the parts, refer to the following sections.

- Refer to "SMART KEY SYSTEM EMERGENCY MODE" on page 8-112.
- Refer to "REGISTERING A SMART KEY" on page 8-114.

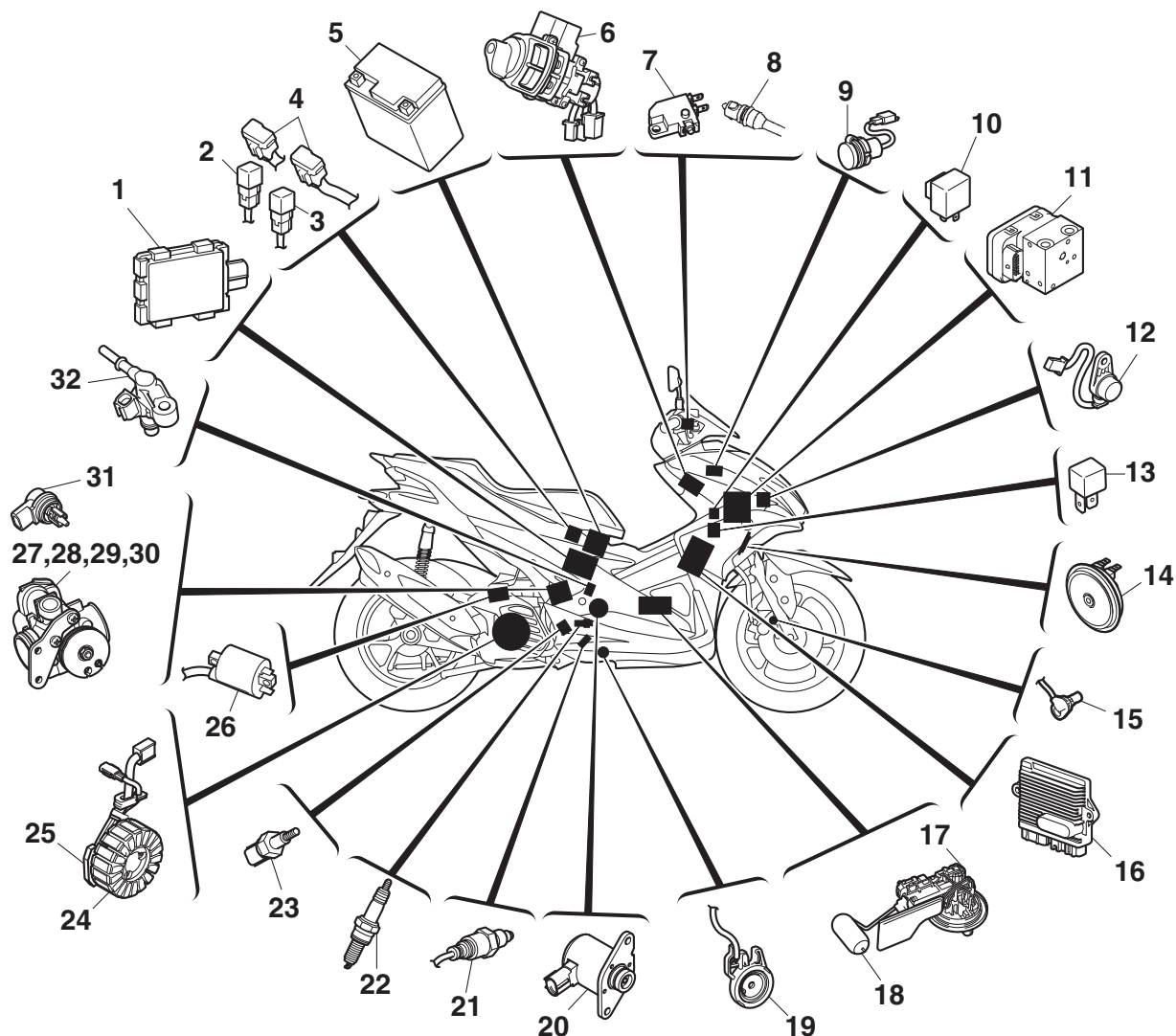
Faulty part	Required item when replacing parts		Replacement parts (when an item is required in order to replace parts)			Remarks
	○ : Required. △ : Smart key identification number or smart key is required. × : Not required.		○ : Replace. × : Do not replace. * : This part must be replaced even if it is not faulty.			
	Smart key identification number	Smart key	Smart key	Smart key unit	SGCU	
Smart key	○	×	○	×	×	Register the smart key identification number in the emergency mode.
Smart key unit	×	×	○*	○	○*	Replace the smart key, smart key unit, and SGCU as a set.
SGCU	△	△	×	×	○	When the vehicle system is turned on, the smart key identification number is automatically registered to the SGCU.
Smart key unit/SGCU	×	×	○*	○	○	Replace the smart key, smart key unit, and SGCU as a set.
Smart key/Smart key unit	×	×	○	○	○*	Replace the smart key, smart key unit, and SGCU as a set.

SMART KEY SYSTEM (GDR155-A)

Faulty part	Required item when replacing parts		Replacement parts (when an item is required in order to replace parts)			Remarks
	Smart key identification number	Smart key	Smart key	Smart key unit	SGCU	
	○ : Required. △ : Smart key identification number or smart key is required. × : Not required.		○ : Replace. × : Do not replace. * : This part must be replaced even if it is not faulty.			
Smart key/SGCU	○	×	○	×	○	Register the smart key identification number in the emergency mode. When the vehicle system is turned on, the smart key identification number is automatically registered to the SGCU.
Smart key/Smart key unit/SGCU	×	×	○	○	○	Replace the smart key, smart key unit, and SGCU as a set.

EAS20089

ELECTRICAL COMPONENTS



1. Smart key unit (GDR155-A)

2. Main relay

3. Starter charge relay

4. Fuse box

5. Battery

6. Main switch

7. Front brake light switch

8. Rear brake light switch

9. Auxiliary DC jack

10. Turn signal relay

11. ABS ECU (GDR155-A)

12. Buzzer (GDR155-A)

13. Diode (GDR155-A)

14. Horn

15. Front wheel sensor

16. SGCU (starter generator control unit)

17. Fuel pump

18. Fuel sender

19. Sidestand switch

20. VVA (variable valve actuator) solenoid

21. O₂ sensor

22. Spark plug

23. Coolant temperature sensor

24. Starter generator

25. Crankshaft position sensor

26. Ignition coil

27. Throttle body sensor assembly

28. Intake air pressure sensor

29. Intake air temperature sensor

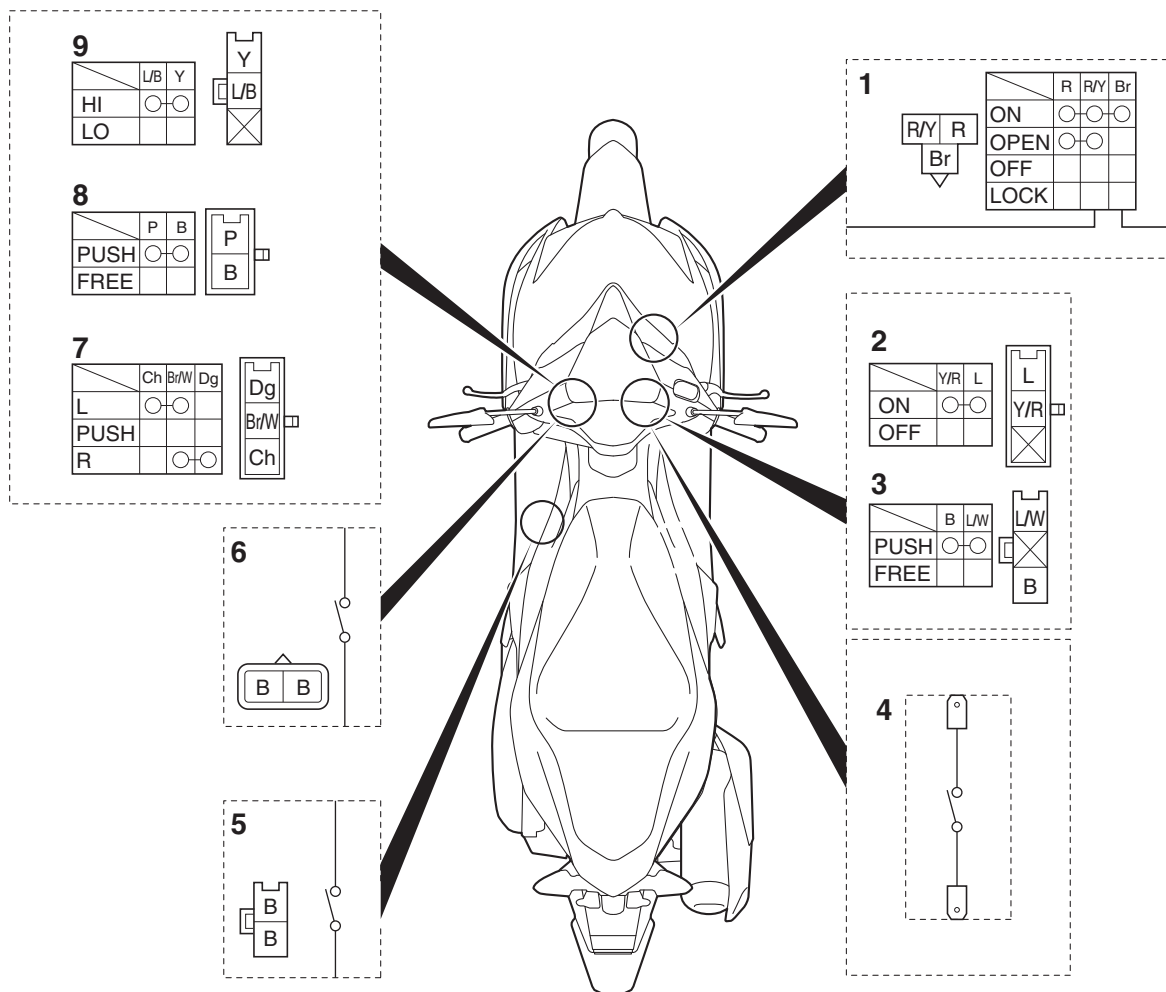
30. Throttle position sensor

31. ISC (idle speed control) unit

32. Fuel injector

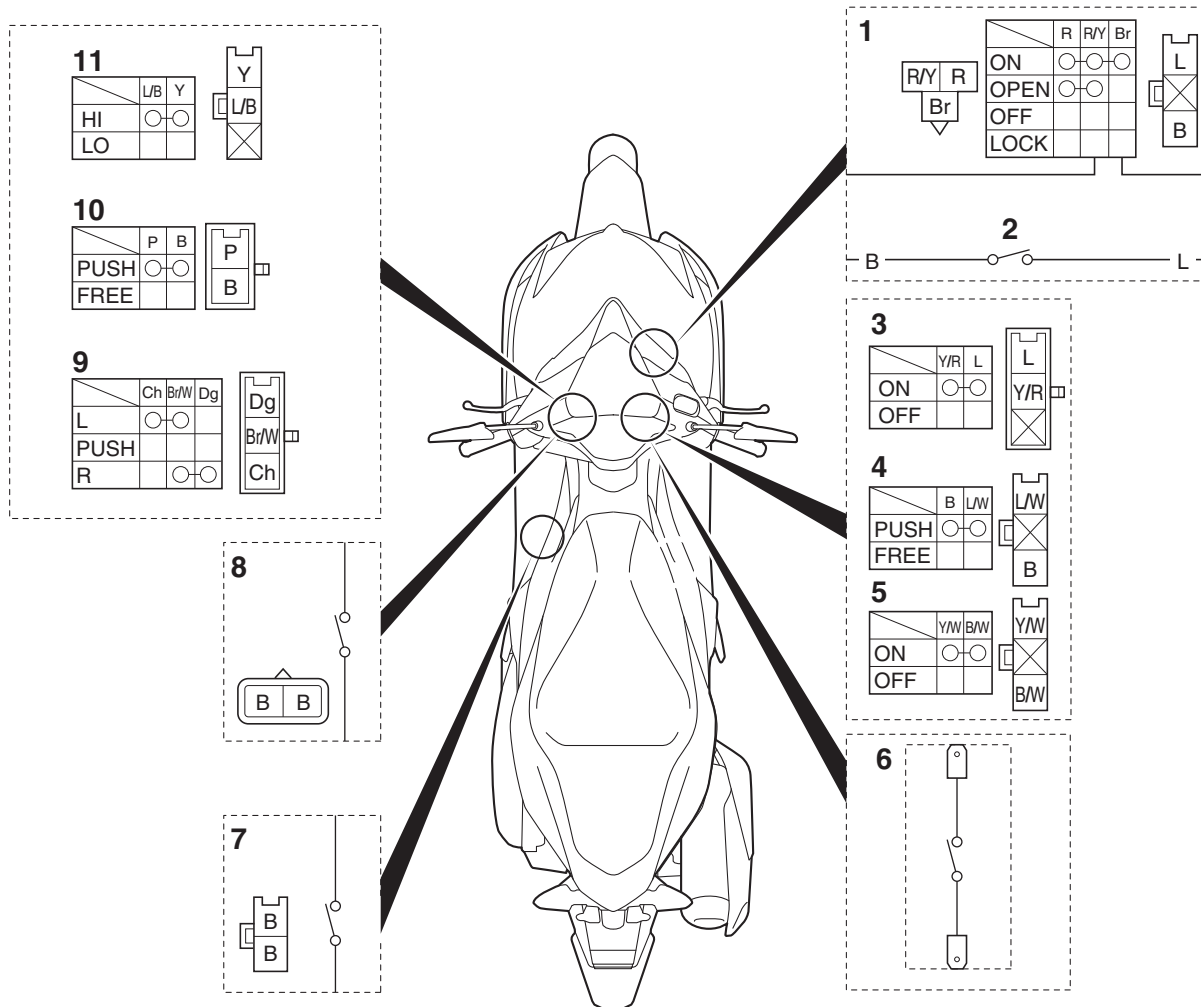
EAS30549

CHECKING THE SWITCHES GDR155



1. Main switch
2. Light switch
3. Start switch
4. Front brake light switch
5. Sidestand switch
6. Rear brake light switch
7. Turn signal switch
8. Horn switch
9. Dimmer switch

GDR155-A



1. Main switch
2. Request switch
3. Light switch
4. Start switch
5. Stop and Start switch
6. Front brake light switch
7. Sidestand switch
8. Rear brake light switch
9. Turn signal switch
10. Horn switch
11. Dimmer switch

ELECTRICAL COMPONENTS

Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14371

NOTICE

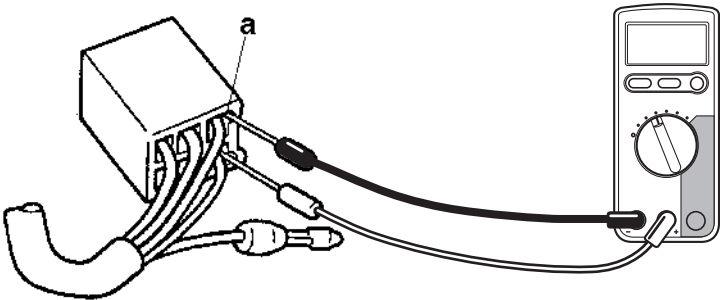
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end “a” of the coupler, taking care not to loosen or damage the leads.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

TIP

When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions “a” are shown in the far left column and the switch lead colors “b” are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by “○—○”. There is continuity between red and brown when the switch is turned to “ON”.

a	b		
	R	R/Y	Br
	ON	○—○	
	OPEN	○—○	
	OFF		
	LOCK		
		R/Y	R
		Br	

FCA22810

CHECKING THE FUSES

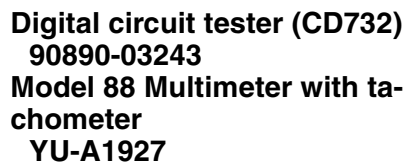
The following procedure applies to all of the fuses.

NOTICE

To avoid a short circuit, always turn the main switch to “OFF” when checking or replacing a fuse.

1. Remove:
 - Battery coverRefer to “GENERAL CHASSIS (1)” on page 4-1.
2. Check:
 - Fuse

- a. Connect the digital circuit tester to the fuse and check the continuity.



- b. If there is no continuity, replace the fuse.

3. Replace:
- Blown fuse

- Turn the main switch to "OFF".
- Install a new fuse of the correct amperage rating.
- Set on the switches to verify if the electrical circuit is operational.
- If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	30 A	1
ABS motor (GDR155-A)	10 A	1
Fuel injection system	7.5 A	1
Ignition	7.5 A	1
Signaling system	7.5 A	1
Backup	7.5 A	1
Headlight	7.5 A	1
ABS solenoid (GDR155-A)	7.5 A	1
Auxiliary DC jack	2 A	1
Smart key system (GDR155-A)	2 A	1

Fuses	Amperage rating	Q'ty
ABS control unit (GDR155-A)	2 A	1
Spare	30 A	1
Spare	10 A	1
Spare	7.5 A	1
Spare	2 A	1

 WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

4. Install:
- Battery cover
- Refer to “GENERAL CHASSIS (1)” on page 4-1.

REPLACING THE SGCU (starter generator control unit)

1. Turn the main switch to "OFF".
2. Replace the SGCU (starter generator control unit).
3. Clean the throttle body.
Refer to "CLEANING THE ISC (IDLE SPEED CONTROL) UNIT AND THROTTLE BODY" on page 7-12.
4. Check:
 - Engine idling speed
Start the engine, warm it up, and then measure the engine idling speed.



CHECKING AND CHARGING THE BATTERY

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**

- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE** when charging or handling batteries.
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT: EXTERNAL

- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL

- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

ECA20530

NOTICE

- This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.
- Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

TIP

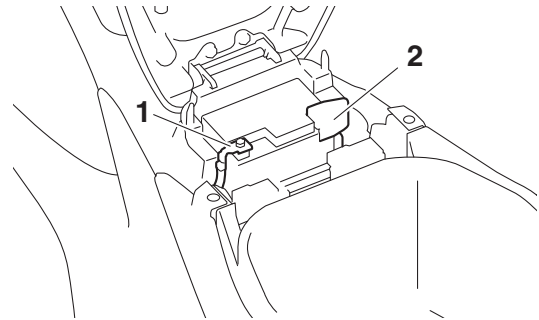
Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
 - Battery coverRefer to “GENERAL CHASSIS (1)” on page 4-1.
2. Disconnect:
 - Battery leads
(from the battery terminals)

ECA13640

NOTICE

First, disconnect the negative battery lead “1”, and then positive battery lead “2”.



3. Remove:
 - Battery
4. Check:
 - Battery charge

- a. Connect a digital circuit tester to the battery terminals.

- Positive tester probe → positive battery terminal
- Negative tester probe → negative battery terminal

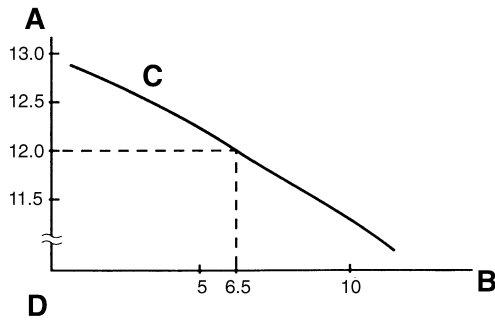
TIP

- The charge state of an VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

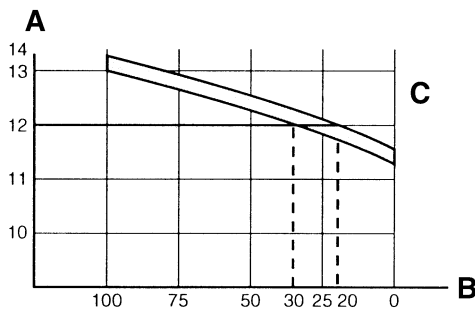
- b. Check the charge of the battery, as shown in the charts and the following example.

Example

Open-circuit voltage = 12.0 V
Charging time = 6.5 hours
Charge of the battery = 20–30%



- A. Open-circuit voltage (V)
 B. Charging time (hours)
 C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
 D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



- A. Open-circuit voltage (V)
 B. Charging condition of the battery (%)
 C. Ambient temperature 20 °C (68 °F)



5. Charge:
 • Battery
 (refer to the appropriate charging method)

EWA13300



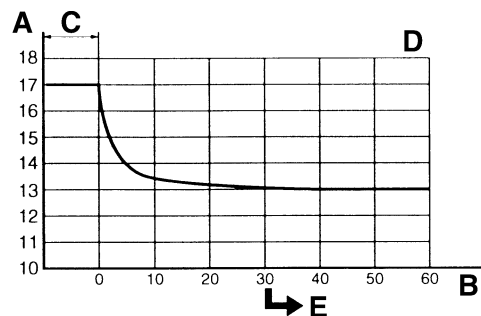
Do not quick charge a battery.

ECA13671

NOTICE

- Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.
- If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.
- When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)

- To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.
- Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.
- Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.
- If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!
- As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Regulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.



- A. Open-circuit voltage (V)
 B. Time (minutes)
 C. Charging
 D. Ambient temperature 20 °C (68 °F)
 E. Check the open-circuit voltage.

Charging method using a variable-current (voltage) charger

- a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.

TIP

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

- c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached
Battery is good.
- Standard charging current is not reached
Replace the battery.

- d. Adjust the voltage so that the current is at the standard charging level.
- e. Set the time according to the charging time suitable for the open-circuit voltage.
- f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
- g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.



Charging method using a constant voltage charger

- a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

- b. Connect a charger and ammeter to the battery and start charging.
- c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regulated Lead Acid) battery. A variable voltage charger is recommended.

- d. Charge the battery until the battery's charging voltage is 15 V.

TIP

Set the charging time at 20 hours (maximum).

- e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

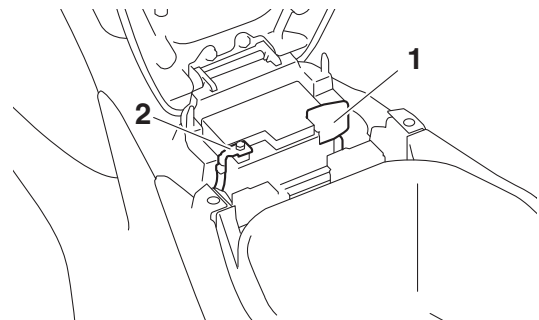


6. Install:
 - Battery
7. Connect:
 - Battery leads
(to the battery terminals)

ECA13630

NOTICE

First, connect the positive battery lead “1”, and then the negative battery lead “2”.



8. Check:
 - Battery terminals
Dirt → Clean with a wire brush.
Loose connection → Connect properly.
9. Lubricate:
 - Battery terminals



**Recommended lubricant
Dielectric grease**

10. Install:
 - Battery cover
Refer to “GENERAL CHASSIS (1)” on page 4-1.

ELECTRICAL COMPONENTS

EAS30553

CHECKING THE RELAYS

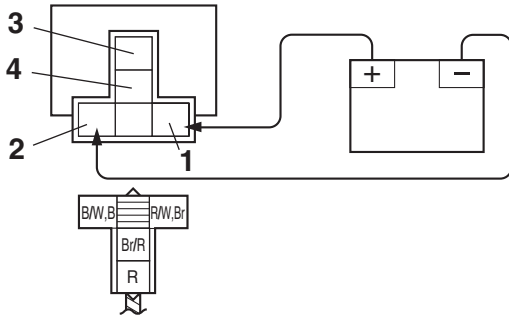
Check each switch for continuity with the digital circuit tester. If the continuity reading is incorrect, replace the relay.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

1. Disconnect the relay from the wire harness.
2. Connect the digital circuit tester and battery (12 V) to the relay terminals as shown. Check the relay operation. Out of specification → Replace.

Main relay



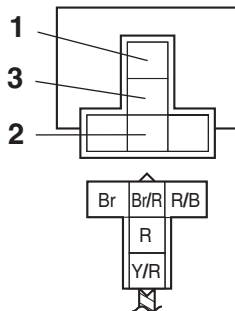
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe



Result
Continuity
(between “3” and “4”)

Starter charge relay

First step:

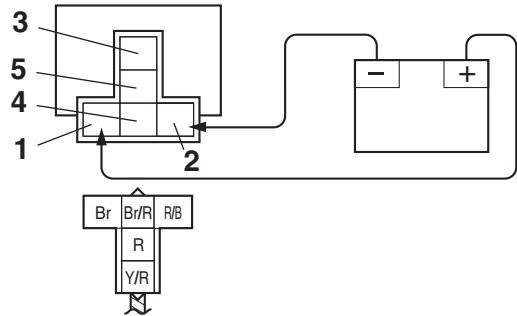


1. Positive tester probe
2. Negative tester probe
3. Negative tester probe

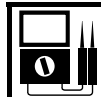


Result
Continuity
(between “1” and “2”)
No continuity
(between “1” and “3”)

Second step:



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe
5. Negative tester probe



Result
No continuity
(between “3” and “4”)
Continuity
(between “3” and “5”)

EAS30554

CHECKING THE TURN SIGNAL RELAY

1. Check:

- Turn signal relay input voltage
- Out of specification → The wiring circuit from the main switch to the turn signal relay coupler is faulty and replace the wire harness.



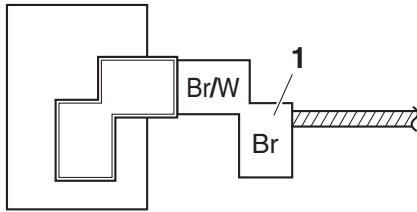
Turn signal relay input voltage
DC 12V

- a. Connect the digital circuit tester to the turn signal relay terminal as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe
Brown “1”
- Negative tester probe
Ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal relay input voltage.

[illegible]

2. Check:
- Turn signal relay output voltage
Out of specification → Replace.



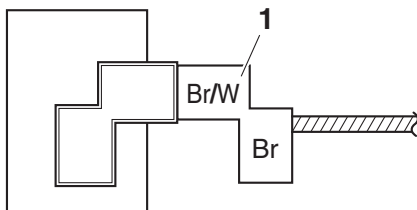
Turn signal relay output voltage
DC 12V

- a. Connect the digital circuit tester to the turn signal relay terminal as shown.



**Digital circuit tester (CD732)
90890-03243**
**Model 88 Multimeter with ta-
chometer
YU-A1927**

- Positive tester probe Brown/White "1"
- Negative tester probe Ground



- b. Turn the main switch to “ON”.
- c. Measure the turn signal relay output voltage.

FAS30555

CHECKING THE DIODE (GDR155-A)

1. Check:
 - Diode
Out of specification → Replace.

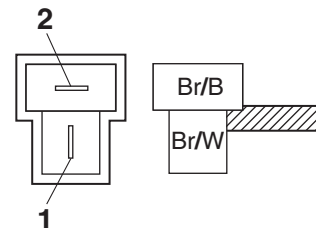


**Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927**



Continuity
Positive tester probe →
Brown/White “1”
Negative tester probe →
Brown/Black “2”

No continuity
Positive tester probe →
Blue/Black “2”
Negative tester probe →
Brown/White “1”



- Disconnect the diode from the wire harness.
- Connect the digital circuit tester to the diode terminals.
- Check the diode for continuity.
- Check the diode for no continuity.

EAS30556

CHECKING THE IGNITION SPARK GAP

1. Check:
 - Ignition spark gap
Out of specification → Perform the ignition system troubleshooting, starting with step 5.
Refer to “TROUBLESHOOTING” on page 8-5.



**Minimum ignition spark gap
6.0 mm (0.24 in)**

TIP

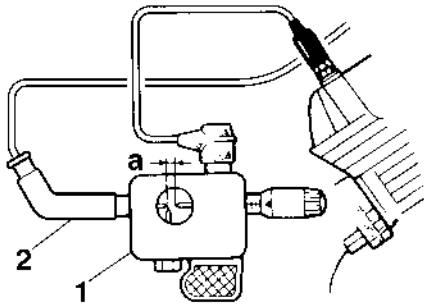
If the ignition spark gap is within specification, the ignition system circuit is operating normally.

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker "1" as shown.

ELECTRICAL COMPONENTS



Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



2. Ignition coil

- c. Turn the main switch to "ON".
- d. Measure the ignition spark gap "a".
- e. Crank the engine by pushing the "⊞" of the start switch and gradually increase the spark gap until a misfire occurs.



EAS30557

CHECKING THE SPARK PLUG CAP

1. Check:
 - Spark plug cap resistance
 Out of specification → Replace.



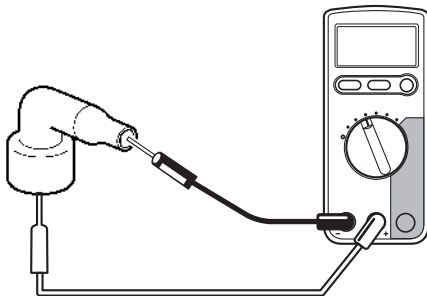
Resistance
3.75–6.25 kΩ



- a. Remove the spark plug cap from the spark plug lead.
- b. Connect the digital circuit tester to the spark plug cap as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927



- c. Measure the spark plug cap resistance.



EAS30558

CHECKING THE IGNITION COIL

1. Check:
 - Primary coil resistance
 Out of specification → Replace.



Primary coil resistance
2.16–2.64 Ω

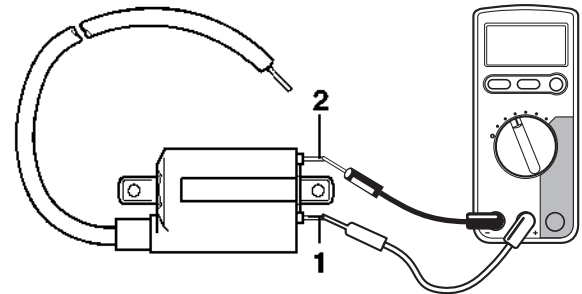


- a. Disconnect the ignition coil connectors from the ignition coil terminals.
- b. Connect the digital circuit tester to the ignition coil as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe → Brown "1"
- Negative tester probe → Orange "2"



- c. Measure the primary coil resistance.



2. Check:
 - Secondary coil resistance
 Out of specification → Replace.



Secondary coil resistance
8.64–12.96 kΩ

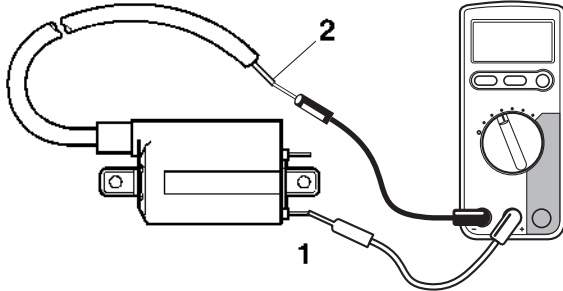


- a. Connect the digital circuit tester to the ignition coil as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with ta-
chometer
YU-A1927

- Positive tester probe → Brown "1"
- Negative tester probe → High tension cord "2"



b. Measure the secondary coil resistance.



EAS30566

CHECKING THE STARTER GENERATOR

1. Disconnect:
 - Starter generator coupler (from the wire harness)
2. Check:
 - Starter generator resistance
Out of specification → Replace the starter generator assembly.



Starter generator resistance
0.048–0.072 Ω



a. Connect the digital circuit tester to the starter generator coupler as shown.

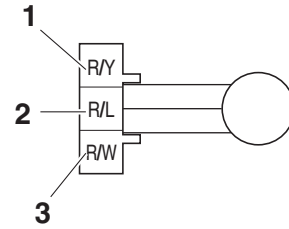


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Red/Yellow "1"
- Negative tester probe → Red/Blue "2"

- Positive tester probe → Red/Yellow "1"
- Negative tester probe → Red/White "3"

- Positive tester probe → Red/Blue "2"
- Negative tester probe → Red/White "3"



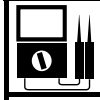
b. Measure the starter generator resistance.



EAS30573

CHECKING THE FUEL SENDER

1. Remove:
 - Fuel pump (from the fuel tank)
2. Check:
 - Fuel sender resistance
Out of specification → Replace the fuel pump assembly.



Fuel sender
Sender unit resistance (full)
10.0–14.0 Ω
Sender unit resistance (empty)
267.0–273.0 Ω

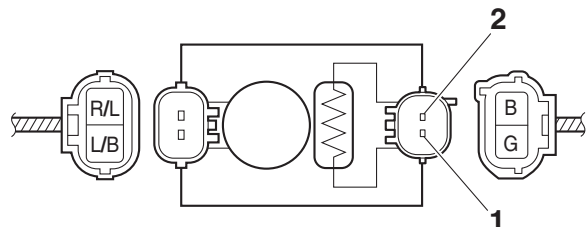


a. Connect the digital circuit tester to the fuel sender terminals as shown.

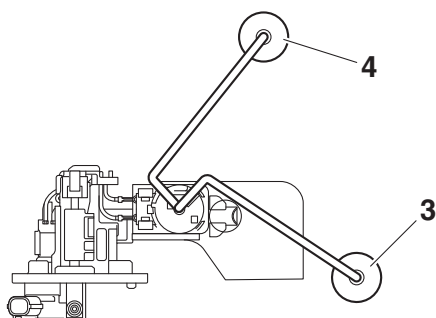


Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe → Green "1"
- Negative tester probe → Black "2"



b. Move the fuel sender float to minimum "3" and maximum "4" level position.



c. Measure the fuel sender resistance.



EAS30578

CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:

- Coolant temperature sensor

Refer to "CYLINDER HEAD" on page 5-9.

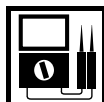
EWA14130

WARNING

- Handle the coolant temperature sensor with special care.
- Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.

2. Check:

- Coolant temperature sensor resistance
Out of specification → Replace.



Coolant temperature sensor resistance

2512–2777 Ω at 20 °C (2512–2777 Ω at 68 °F)

Coolant temperature sensor resistance

210–221 Ω at 100 °C (210–221 Ω at 212 °F)



a. Connect the digital circuit tester to the coolant temperature sensor terminals as shown.



Digital circuit tester (CD732)

90890-03243

Model 88 Multimeter with tachometer

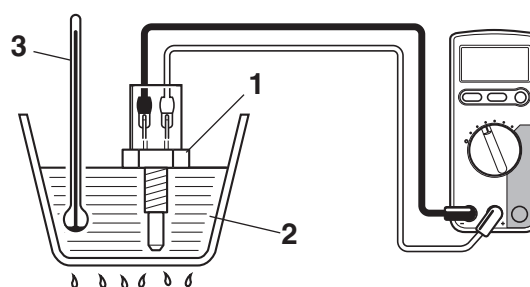
YU-A1927

b. Immerse the coolant temperature sensor "1" in a container filled with coolant "2".

TIP

Make sure that the coolant temperature sensor terminals do not get wet.

c. Place a thermometer "3" in the coolant.



d. Heat the coolant or let it cool down to the specified temperatures.

e. Measure the coolant temperature sensor resistance.



3. Install:

- Coolant temperature sensor



Coolant temperature sensor
15 N·m (1.5 kg·m, 11 lb·ft)

EAS30681

CHECKING THE FUEL INJECTOR

1. Check:

- Fuel injector resistance

Out of specification → Replace the fuel injector.



Resistance

12.0 Ω at 20 °C (12.0 Ω at 68 °F)



a. Disconnect the fuel injector coupler from fuel injector.

b. Connect the digital circuit tester to the fuel injector terminals as shown.



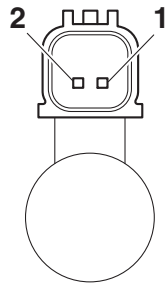
Digital circuit tester (CD732)

90890-03243

Model 88 Multimeter with tachometer

YU-A1927

- Positive tester probe
Injector terminal "1"
- Negative tester probe
Injector terminal "2"



c. Measure the fuel injector resistance.



EAS31612

CHECKING THE VVA SOLENOID

1. Check:

- VVA solenoid resistance
Out of specification → Replace.



Resistance
1.8–2.2 Ω at 20 °C (1.8–2.2 Ω at 68 °F)

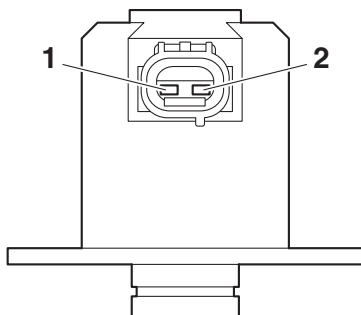


- Disconnect the VVA solenoid coupler from the VVA solenoid.
- Connect the digital circuit tester to the VVA solenoid terminal as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe
Solenoid terminal “1”
- Negative tester probe
Solenoid terminal “2”



c. Measure the VVA solenoid resistance.



EAS31553

CHECKING THE SMART KEY BATTERY (GDR155-A)

1. Check:

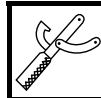
- Smart key battery voltage
Out of specification → Replace the smart key battery.



Smart key battery voltage
2.7–3.2 V

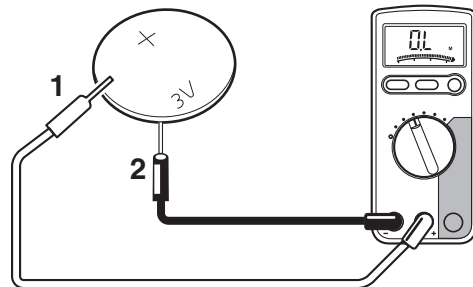


- Remove the smart key battery from the smart key.
- Connect the digital circuit tester to the smart key battery as shown.



Digital circuit tester (CD732)
90890-03243
Model 88 Multimeter with tachometer
YU-A1927

- Positive tester probe →
positive battery terminal “1”
- Negative tester probe →
negative battery terminal “2”



c. Measure the smart key battery voltage.



EAS31555

CHECKING THE BUZZER (GDR155-A)

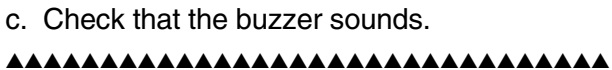
1. Check:

- Buzzer operation
Buzzer does not sound → Replace.



- Disconnect the buzzer coupler from the wire harness.
- Connect the battery (12 V) to the buzzer coupler as shown.

- Positive battery lead →
Red “1”
- Negative battery lead →
Black “2”



- 

- Positive tester probe→
Red/White “1”
- Negative tester probe→
Black “2”



TROUBLESHOOTING

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EAS20090

TROUBLESHOOTING

EAS30599

GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS31258

STARTING FAILURE/HARD STARTING

Engine

1. Cylinder and cylinder head
 - Loose spark plug
 - Loose cylinder head or cylinder
 - Damaged cylinder head gasket
 - Damaged cylinder gasket
 - Worn or damaged cylinder
 - Incorrect valve clearance
 - Improperly sealed valve
 - Incorrect valve-to-valve-seat contact
 - Incorrect valve timing
 - Faulty valve spring
 - Seized valve
2. Piston and piston ring(s)
 - Improperly installed piston ring
 - Damaged, worn or fatigued piston ring
 - Seized piston ring
 - Seized or damaged piston
3. Air filter
 - Improperly installed air filter
 - Clogged air filter element
4. Crankcase and crankshaft
 - Improperly assembled crankcase
 - Seized crankshaft

Fuel system

1. Fuel tank
 - Empty fuel tank
 - Clogged fuel tank cap breather hole
 - Deteriorated or contaminated fuel
 - Clogged or damaged fuel hose
2. Fuel pump
 - Faulty fuel pump
 - Clogged fuel pump filter
3. Throttle body
 - Deteriorated or contaminated fuel
 - Sucked-in air

Electrical system

1. Battery
 - Discharged battery
 - Faulty battery
2. Fuse(s)
 - Blown, damaged or incorrect fuse
 - Improperly installed fuse
3. Spark plug
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Worn or damaged insulator
 - Faulty spark plug cap
4. Ignition coil
 - Cracked or broken ignition coil body
 - Broken or shorted primary or secondary coils
 - Faulty spark plug lead
5. Ignition system
 - Faulty SGCU
 - Faulty crankshaft position sensor
 - Broken starter generator rotor woodruff key
6. Switches and wiring
 - Faulty main switch
 - Broken or shorted wiring
 - Faulty front, rear or both brake light switches
 - Faulty start switch
 - Faulty sidestand switch
 - Improperly grounded circuit
 - Loose connections
7. Starting system
 - Faulty starter generator
 - Faulty starter charge relay
 - Faulty main relay

EAS30601

INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder and cylinder head
 - Incorrect valve clearance
 - Damaged valve train components
2. Air filter
 - Clogged air filter element

Fuel system

1. Throttle body
 - Damaged or loose throttle body joint
 - Faulty ISC (idle speed control) unit
 - Improper throttle grip free play

Electrical system

1. Battery
 - Discharged battery

- Faulty battery
- 2. Spark plug
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
 - Fouled spark plug
 - Worn or damaged electrode
 - Worn or damaged insulator
 - Faulty spark plug cap
- 3. Ignition coil
 - Broken or shorted primary or secondary coil
 - Faulty spark plug lead
- 4. Ignition system
 - Faulty SGCU
 - Faulty crankshaft position sensor

EAS30602

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURE/HARD STARTING” on page 9-1.

Engine

1. Air filter
 - Clogged air filter element

Fuel system

1. Throttle body
 - Faulty throttle body
2. Fuel pump
 - Faulty fuel pump

EAS30849

FAULTY CLUTCH

Engine operates but vehicle will not move

1. V-belt
 - Bent, damaged or worn V-belt
 - Slipping V-belt
2. Primary sheave cam and primary sheave slider(s)
 - Damaged or worn primary sheave cam
 - Damaged or worn primary sheave slider
3. Clutch spring
 - Damaged clutch spring
4. Transmission gear(s)
 - Damaged transmission gear

Clutch slips

1. Clutch shoe spring(s)
 - Damaged, loose or worn clutch shoe spring
2. Clutch shoe(s)
 - Damaged or worn clutch shoe
3. Primary sliding sheave
 - Seized primary sliding sheave

Poor starting performance

1. V-belt
 - Slipping V-belt
 - Oil or grease on the V-belt
2. Primary sliding sheave
 - Faulty operation
3. Clutch shoe(s)
 - Bent, damaged or worn clutch shoe

Poor speed performance

1. V-belt
 - Slipping V-belt
 - Oil or grease on the V-belt
2. Primary sheave weight(s)
 - Faulty operation
 - Worn primary sheave weight
3. Primary fixed sheave
 - Worn primary fixed sheave
4. Primary sliding sheave
 - Worn primary sliding sheave
5. Secondary fixed sheave
 - Worn secondary fixed sheave
6. Secondary sliding sheave
 - Worn secondary sliding sheave

EAS30607

OVERHEATING

Engine

1. Clogged coolant passages
2. Cylinder head and piston
 - Heavy carbon buildup
3. Engine oil
 - Incorrect oil level
 - Incorrect oil viscosity
 - Inferior oil quality

Cooling system

1. Coolant
 - Low coolant level
2. Radiator
 - Damaged or leaking radiator
 - Faulty radiator cap
 - Bent or damaged radiator fin
3. Water pump
 - Damaged or faulty water pump
4. Thermostat
 - Thermostat stays closed
5. Hose(s) and pipe(s)
 - Damaged hose
 - Improperly connected hose
 - Damaged pipe
 - Improperly connected pipe

Fuel system

1. Throttle body
 - Damaged or loose throttle body joint
2. Air filter
 - Clogged air filter element

Chassis

1. Brake(s)
 - Dragging brake

Electrical system

1. Spark plug
 - Incorrect spark plug gap
 - Incorrect spark plug heat range
2. Ignition system
 - Faulty SGCU

EAS30608

OVERCOOLING

Cooling system

1. Thermostat
 - Thermostat stays open

EAS30609

POOR BRAKING PERFORMANCE

1. Disc brake
 - Worn brake pad
 - Worn brake disc
 - Air in hydraulic brake system
 - Leaking brake fluid
 - Faulty brake caliper kit
 - Faulty brake caliper seal
 - Loose union bolt
 - Damaged brake hose
 - Oil or grease on the brake disc
 - Oil or grease on the brake pad
 - Incorrect brake fluid level
2. Drum brake
 - Worn brake shoe
 - Worn or rusty brake drum
 - Incorrect brake lever free play
 - Incorrect brake camshaft lever position
 - Incorrect brake shoe position
 - Damaged or fatigued brake shoe spring
 - Oil or grease on the brake shoe
 - Oil or grease on the brake drum

EAS30610

FAULTY FRONT FORK LEGS

Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal

- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod bolt
- Damaged damper rod bolt copper washer
- Cracked or damaged front fork cap O-ring

Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS30611

UNSTABLE HANDLING

1. Handlebar
 - Bent or improperly installed handlebar
2. Steering head components
 - Improperly installed lower bracket (improperly tightened ring nut)
 - Damaged ball bearing or bearing race
3. Front fork leg(s)
 - Uneven oil levels (both front fork legs)
 - Unevenly tensioned fork spring (both front fork legs)
 - Broken fork spring
 - Bent or damaged inner tube
 - Bent or damaged outer tube
4. Swingarm
 - Worn bearing or bushing
 - Bent or damaged swingarm
5. Rear shock absorber assembly(-ies)
 - Faulty rear shock absorber spring
 - Leaking oil
6. Tire(s)
 - Uneven tire pressures (front and rear)
 - Incorrect tire pressure
 - Uneven tire wear
7. Wheel(s)
 - Incorrect wheel balance
 - Deformed cast wheel
 - Damaged wheel bearing
 - Bent or loose wheel axle
 - Excessive wheel runout
8. Frame
 - Bent frame
 - Damaged steering head pipe
 - Improperly installed bearing race

EAS30612

FAULTY LIGHTING OR SIGNALING SYSTEM

Headlight does not come on

- Wrong headlight LED

- Too many electrical accessories
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main switch or light switch)

Tail/brake light does not come on

- Wrong tail/brake light LED
- Too many electrical accessories
- Incorrect connection

Turn signal does not come on

- Faulty turn signal switch
- Faulty turn signal relay
- Faulty diode (GDR155-A)
- Burnt-out turn signal light bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

Turn signal blinks slowly

- Faulty turn signal relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal light bulb

Turn signal remains lit

- Faulty turn signal relay
- Burnt-out turn signal light bulb

Turn signal blinks quickly

- Incorrect turn signal light bulb
- Faulty turn signal relay
- Burnt-out turn signal light bulb

Horn does not sound

- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS20116

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS31118

SELF-DIAGNOSTIC FUNCTION TABLE

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 8-45.

Fault code No.	Item
12	Crankshaft position sensor: no normal signals are received from the crankshaft position sensor.
13	Intake air pressure sensor: open or short circuit detected.
14	Intake air pressure sensor: system malfunction (clogged hole or detached).
15	Throttle position sensor: open or short circuit detected.
16	Throttle position sensor: stuck throttle position sensor is detected.
21	Coolant temperature sensor: open or short circuit detected.
22	Intake air temperature sensor: open or short circuit detected.
24	O ₂ sensor: no normal signals are received from the O ₂ sensor.
37	Component other than ISC (idle speed control) unit is defective (ISC operating sound is heard).
	Defective ISC (idle speed control) unit (ISC operating sound is not heard).
39	Fuel injector: open or short circuit detected.
42	Front wheel sensor: no normal signals are received from the front wheel sensor.
44	EEPROM fault code number: an error is detected while reading or writing on EEPROM.
46	Charging voltage is abnormal.
50	Faulty SGCU memory. (When this malfunction is detected in the SGCU, the fault code number might not appear on the tool display.)
61	ISC (idle speed control) unit: open or short circuit detected.
84	VVA (variable valve actuator) solenoid: open or short circuit detected.

EAS31259

COMMUNICATION ERROR WITH THE YAMAHA DIAGNOSTIC TOOL

TIP

For details of the fault code, refer to “TROUBLESHOOTING METHOD” on page 8-45.

Fault code No.	Item
Er-1 (fault code display)	SGCU (starter generator control unit) internal malfunction (output signal error): signals cannot be transmitted between the SGCU and the multi-function meter.
Waiting for connection (Yamaha diagnostic tool)	SGCU (starter generator control unit) internal malfunction (output signal error): Signals cannot be transmitted between the SGCU and Yamaha diagnostic tool.
Er-2	SGCU (starter generator control unit) internal malfunction (output signal error): no signals are received from the SGCU within the specified duration.
Er-3	SGCU (starter generator control unit) internal malfunction (output signal error): data from the SGCU cannot be received correctly.
Er-4 (fault code display)	SGCU (starter generator control unit) internal malfunction (input signal error): non-registered data has been received from the meter.
Er-4 (Yamaha diagnostic tool)	SGCU (starter generator control unit) internal malfunction (input signal error): no normal signals are received from the Yamaha diagnostic tool.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

EAS31120

DIAGNOSTIC CODE: SENSOR OPERATION TABLE

Diagnostic code No.	Item	Tool display	Procedure
01	Throttle position sensor signal - Fully closed position - Fully open position	13–21 97–107	Check with throttle valve fully closed. Check with throttle valve fully open.
03	Intake air pressure	Displays the intake air pressure.	Operate the throttle while pulling the brake lever and pushing the start switch “  ”. (If the display value changes, the performance is OK.)
05	Intake air temperature	When engine is cold: Displays temperature closer to air temperature When engine is hot: Air temperature + approx. 20 °C (68 °F)	Compare the actually measured air temperature with the computer display value.
06	Coolant temperature	When engine is cold: Displays temperature closer to air temperature. When engine is hot: Displays current coolant temperature.	Compare the actually measured coolant temperature with the computer display value.
07	Front wheel speed pulse	Front wheel speed pulse 0–999	Check that the number increases when the front wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
09	Fuel system voltage (battery voltage)	Approximately 12.0	Compare the actually measured battery voltage with the computer display value. (If the actually measured battery voltage is low, recharge the battery.)
20	Sidestand switch - Stand retracted - Stand extended	ON OFF	Extend and retract the side-stand.
60	EEPROM fault code display No history History exists	00 No malfunctions detected (If the self-diagnosis fault code 44 is indicated, the SGCU is defective.) 11(ISC (idle speed control) learning is being carried out)	—

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Tool display	Procedure
61	Malfunction history code display • No history • History exists	00 Fault codes 12–84 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—
62	Malfunction history code erasure • No history • History exists	00 • Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, “03” is displayed.)	— To erase the history, click “Actuator Check” on the Yamaha diagnostic tool screen.
67	ISC (idle speed control) learning condition display ISC (idle speed control) learning data erasure	00 ISC (idle speed control) learning data has been erased. 01 It is not necessary to erase the ISC (idle speed control) learning data. 02 It is necessary to erase the ISC (idle speed control) learning data.	To erase the ISC (idle speed control) learning data, click “Actuator Check” on the Yamaha diagnostic tool screen 3 times in 5 seconds.
70	Control number	0–254 [-]	—
90 (GDR155-A)	Stop and Start System switch • Set to “ON” • Set to “OFF”	ON OFF	Set to “ON” and “OFF” the Stop and Start System switch.

EAS31121

DIAGNOSTIC CODE: ACTUATOR OPERATION TABLE

Diagnostic code No.	Item	Actuation	Procedure
30	Ignition coil	Actuates ignition coil five times at one-second intervals. The “  ” and “CHECK” indicator on the Yamaha diagnostic tool screen come on each time the ignition coil is actuated.	Check that a spark is generated five times. • Connect an ignition checker.

SELF-DIAGNOSTIC FUNCTION AND DIAGNOSTIC CODE TABLE

Diagnostic code No.	Item	Actuation	Procedure
36	Fuel injector	Actuates fuel injector five times at one-second intervals. The “  ” and “CHECK” indicator on the Yamaha diagnostic tool screen come on each time the fuel injector is actuated.	Disconnect the fuel pump coupler. Check that fuel injector is actuated five times by listening for the operating sound.
45	VVA (variable valve actuator) solenoid	Actuates the VVA (variable valve actuator) solenoid five times at five-second intervals. The “  ” and “CHECK” indicator on the Yamaha diagnostic tool screen come on each time the VVA (variable valve actuator) solenoid is actuated.	Remove the VVA (variable valve actuator) solenoid from the cylinder head, and then connect the VVA (variable valve actuator) solenoid coupler. Refer to “CYLINDER HEAD” on page 5-9. Visually check that the VVA (variable valve actuator) solenoid is actuated five times.
52	Headlight relay	Actuates the headlight five times at five-second intervals. The “  ” and “CHECK” indicator on the Yamaha diagnostic tool screen come on each time the headlight is actuated.	Check that the headlight is on five times.
54	ISC (idle speed control) unit	Fully closes the ISC valve, and then opens the valve. This operation takes approximately 3 seconds.	Check that the ISC (idle speed control) unit operates by listening for the operating sound while the ISC unit operates for 3 seconds.

EVENT CODE TABLE

EAS20164

EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
192	Intake air pressure sensor	Brief abnormality detected in intake air pressure sensor	Same as for fault code number 13	Perform the checks and maintenance jobs for fault code number 13.
193	Throttle position sensor	Brief abnormality detected in throttle position sensor	Same as for fault code number 15	Perform the checks and maintenance jobs for fault code number 15.
196	Coolant temperature sensor	Brief abnormality detected in coolant temperature sensor	Same as for fault code number 21	Perform the checks and maintenance jobs for fault code number 21.
197	Intake air temperature sensor	Brief abnormality detected in intake air temperature sensor	Same as for fault code number 22	Perform the checks and maintenance jobs for fault code number 22.
218	Crankshaft position sensor	Brief abnormality detected in crankshaft position sensor	Same as for fault code number 12	Perform the checks and maintenance jobs for fault code number 12.
240	O ₂ sensor (Correction value remains at upper limit)	Correction value remains at upper limit during O ₂ feedback	• Open or short circuit in the wire harness between the sensor and the SGCU Gray/Red–Gray/Red • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective SGCU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 240 may be indicated even if the system is normal.
241	O ₂ sensor (Correction value remains at lower limit)	Correction value remains at lower limit during O ₂ feedback	• Open or short circuit in the wire harness between the sensor and the SGCU Gray/Red–Gray/Red • Low fuel pressure • Clogged fuel injector • Sensor malfunction • Defective SGCU • Defective fuel injection system	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 241 may be indicated even if the system is normal.
242	ISC (idle speed control) (Correction value remains at upper limit)	Correction value remains at upper limit while the engine is idling	• Low engine idling speed • Clogged throttle body • Improperly adjusted throttle cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective SGCU	• Execute the diagnostic mode (diagnostic code number 67) and check the ISC maintenance requirements. • If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 242 may be indicated even if the system is normal.

EVENT CODE TABLE

No.	Item	Symptom	Possible cause	Remarks
243	ISC (idle speed control) (Correction value remains at lower limit)	Correction value remains at lower limit while the engine is idling	High engine idling speed • Improperly adjusted throttle cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective SGCU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 243 may be indicated even if the system is normal.
244	Difficult/unable to start engine	Engine starting difficult/unable condition detected	• Empty fuel tank • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective SGCU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 244 may be indicated even if the system is normal.
245	Engine stall	Engine stall detected	• Empty fuel tank • Improperly adjusted throttle cable • Defective fuel injection system • Dirty or worn spark plug • Defective battery • Defective SGCU	• If a fault code is indicated, perform the checks and maintenance jobs for the fault code first. * Event code number 245 may be indicated even if the system is normal.

WIRING DIAGRAM

GDR155 2017

1. Battery
2. Main fuse
3. Fuel injection system fuse
4. Backup fuse
5. Ignition fuse
6. Headlight fuse
7. Signaling system fuse
8. Auxiliary DC jack fuse
9. Auxiliary DC jack
10. Main switch
11. Main relay
12. Starter charge relay
13. Handlebar switch (right)
14. Light switch
15. Start switch
16. Side stand switch
17. Starter generator
18. Coolant temperature sensor
19. Throttle body sensor assembly
20. Intake air pressure sensor
21. Intake air temperature sensor
22. Throttle position sensor
23. O₂ sensor
24. Front wheel sensor
25. SGCU (starter generator control unit)
26. Crankshaft position sensor
27. Ignition coil
28. Spark plug
29. ISC (idle speed control) unit
30. Injector
31. Fuel pump
32. Fuel sender
33. VVA (variable valve actuator) solenoid
34. Yamaha diagnostic tool coupler
35. Engine ground 2
36. Rear brake light switch
37. Front brake light switch
38. Meter assembly
39. Multi-function meter
40. Coolant temperature warning light
41. Engine trouble warning light
42. Meter light
43. Turn signal indicator light (left)
44. Turn signal indicator light (right)
45. High beam indicator light
46. Turn signal relay
47. Horn
48. Handlebar switch (left)
49. Dimmer switch
50. Horn switch
51. Turn signal switch
52. License light

53. Tail/brake light assembly
54. Brake light
55. Taillight
56. Rear turn signal light (right)
57. Rear turn signal light (left)
58. Front turn signal light (right)
59. Front turn signal light (left)
60. Headlight
61. Auxiliary light
62. Frame ground
63. Engine ground 1

GDR155-A 2017

1. Battery
2. ABS solenoid fuse
3. ABS motor fuse
4. ABS control unit fuse
5. Main fuse
6. Smart key system fuse
7. Auxiliary DC jack fuse
8. Fuel injection system fuse
9. Backup fuse
10. Ignition fuse
11. Headlight fuse
12. Signaling system fuse
13. Auxiliary DC jack
14. Main switch
15. Request switch
16. Main switch solenoid
17. Smart key unit
18. Buzzer
19. Main relay
20. Starter charge relay
21. Handlebar switch (right)
22. Light switch
23. Start switch
24. Stop and Start System switch
25. Side stand switch
26. Starter generator
27. Coolant temperature sensor
28. Throttle body sensor assembly
29. Intake air pressure sensor
30. Intake air temperature sensor
31. Throttle position sensor
32. O₂ sensor
33. SGCU (starter generator control unit)
34. Crankshaft position sensor
35. Ignition coil
36. Spark plug
37. ISC (idle speed control) unit
38. Injector
39. Fuel pump
40. Fuel sender
41. VVA (variable valve actuator) solenoid
42. Yamaha diagnostic tool coupler
43. Engine ground 2
44. Front wheel sensor
45. ABS test coupler
46. ABS ECU
47. Rear brake light switch
48. Front brake light switch
49. Meter assembly
50. Multi-function meter
51. Coolant temperature warning light
52. ABS warning light
53. Engine trouble warning light
54. Meter light
55. Turn signal indicator light (left)

-
- 56. Turn signal indicator light (right)
 - 57. Stop and Start System indicator light
 - 58. Smart key system indicator light
 - 59. High beam indicator light
 - 60. Turn signal relay
 - 61. Diode
 - 62. Horn
 - 63. Handlebar switch (left)
 - 64. Dimmer switch
 - 65. Horn switch
 - 66. Turn signal switch
 - 67. License light
 - 68. Tail/brake light assembly
 - 69. Brake light
 - 70. Taillight
 - 71. Rear turn signal light (right)
 - 72. Rear turn signal light (left)
 - 73. Front turn signal light (right)
 - 74. Front turn signal light (left)
 - 75. Headlight
 - 76. Auxiliary light
 - 77. Frame ground
 - 78. Engine ground 1

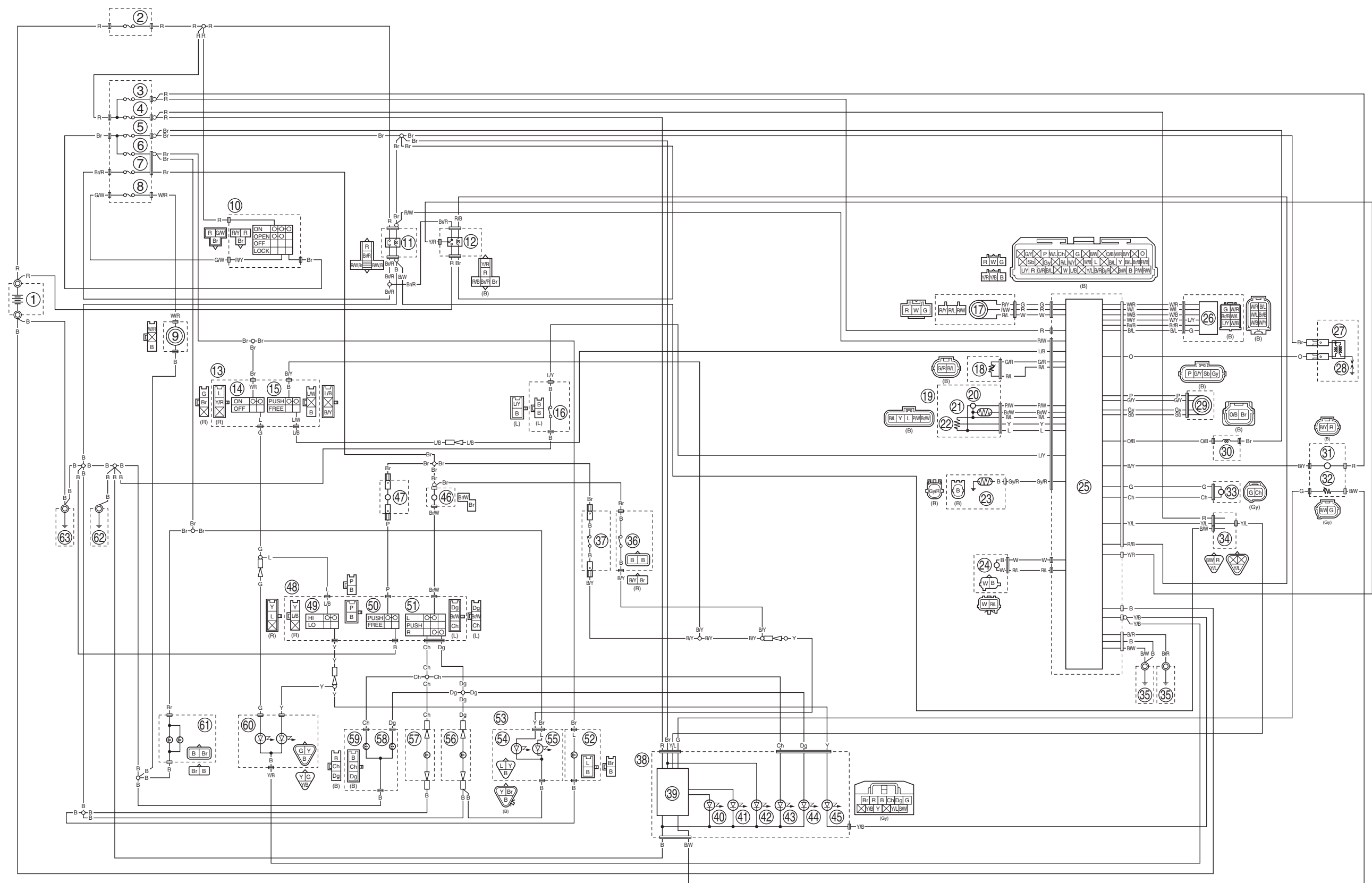
EAS30613

COLOR CODE

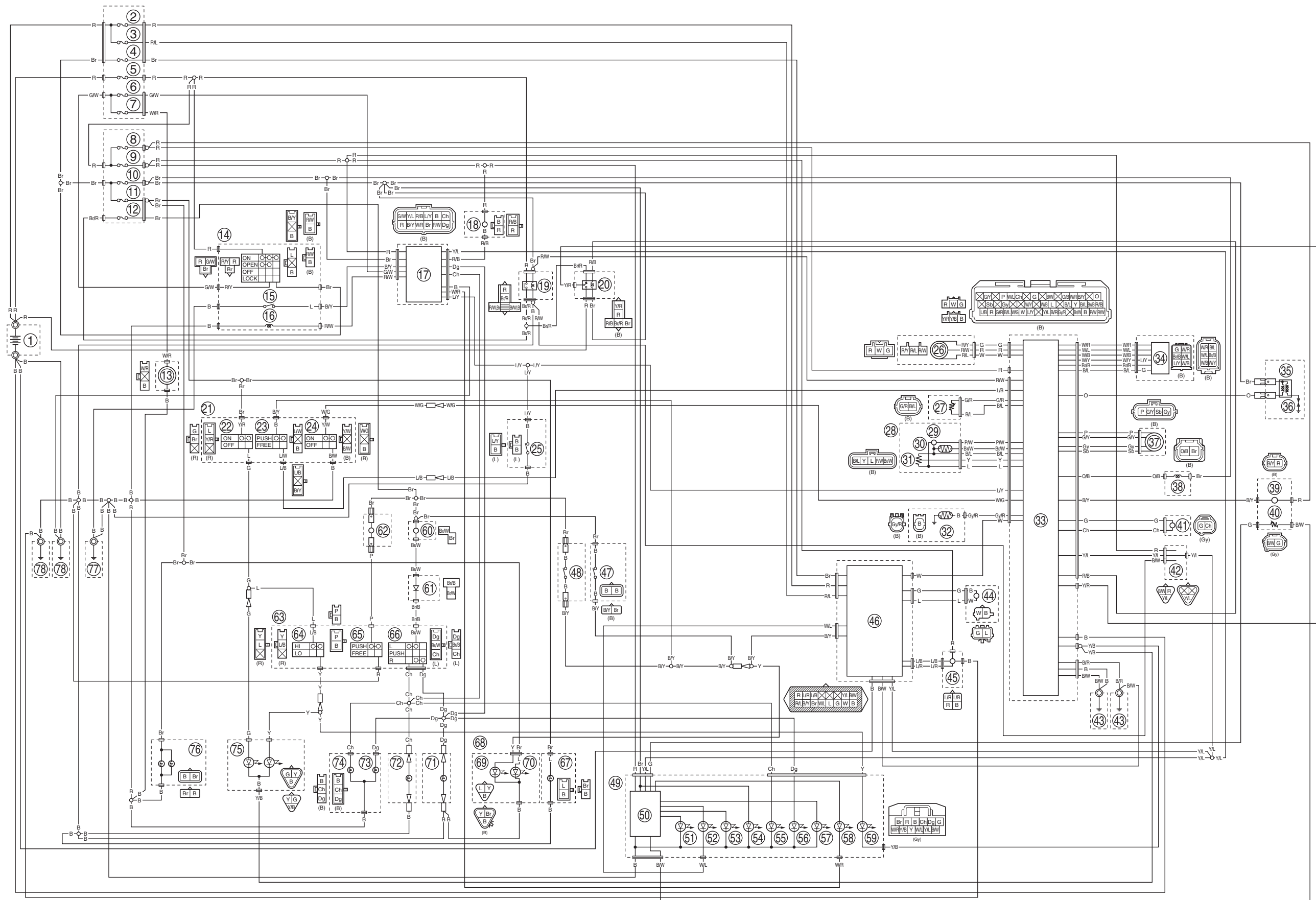
B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/R	Brown/Red
Br/W	Brown/White
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/R	Gray/Red
L/B	Blue/Black
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
O/B	Orange/Black
P/W	Pink/White
R/B	Red/Black
R/L	Red/Blue
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Y/W	Yellow/White



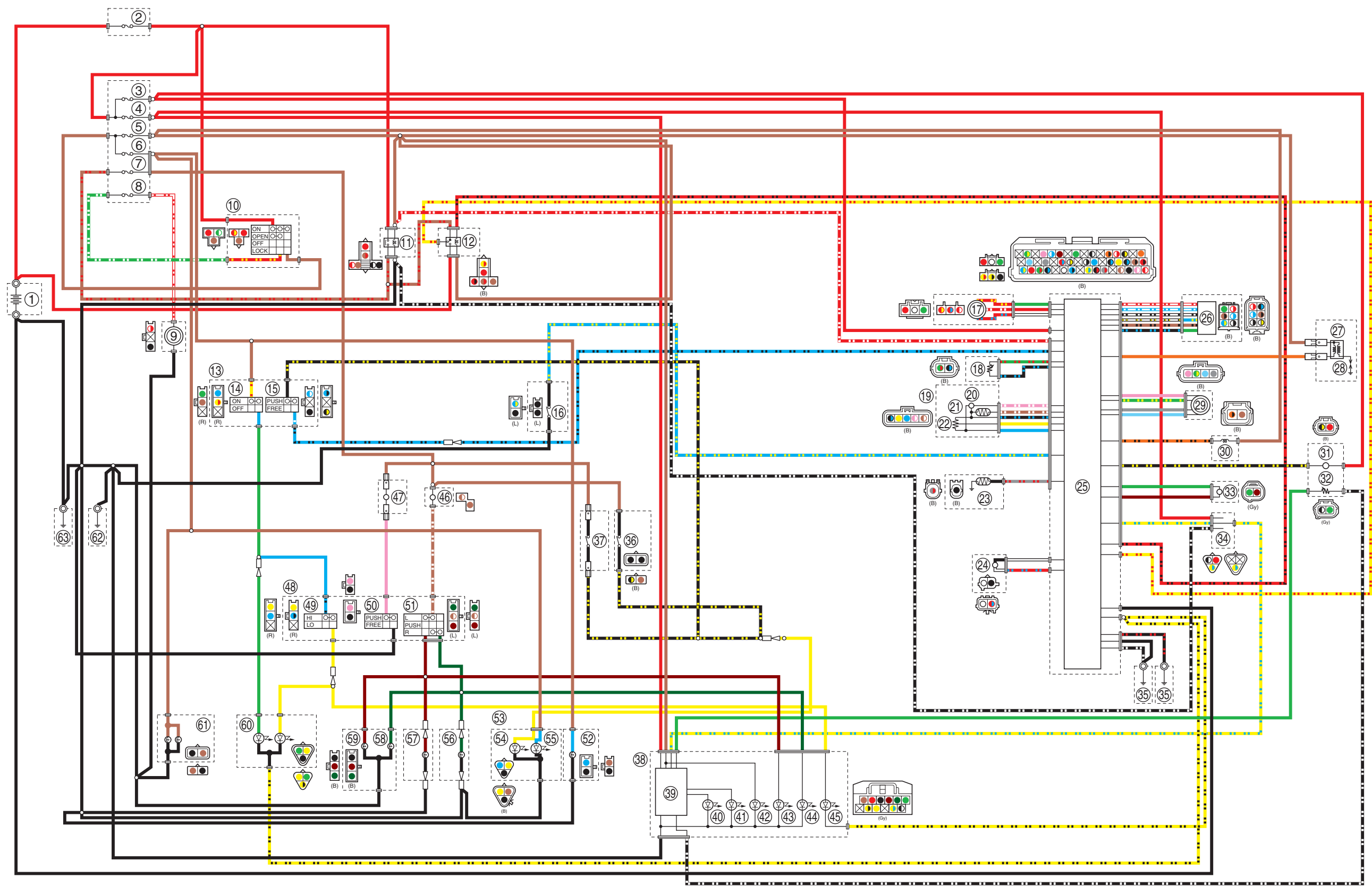
GDR155 2017
WIRING DIAGRAM



GDR155-A 2017 WIRING DIAGRAM



GDR155 2017
WIRING DIAGRAM



GDR155-A 2017 WIRING DIAGRAM

