YAMAHA

YFM350XP

SUPPLEMENTARY SERVICE MANUAL

LIT-11616-15-09 3GD-28197-16

FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and new data for the YFM350XP. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manual.

YFM350XA SERVICE MANUAL: 3GD-28197-12
YFM350XE SUPPLEMENTARY SERVICE MANUAL: 3GD-28197-13
YFM350XJ SUPPLEMENTARY SERVICE MANUAL: 3GD-28197-14
YFM350XKC (for California) SUPPLEMENTARY SERVICE MANUAL: 3GD-28197-15

YFM350XP
SUPPLEMENTARY
SERVICE MANUAL

First Edition, May 2001

Printed in U.S.A.
LIT-11616-15-09

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NOTICE

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

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

NOTE:
Designs and specifications are subject to change without notice.

IMPORTANT INFORMATION

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

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander or a person inspecting or repairing the machine.

CAUTION: A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

NOTE: A NOTE provides key information to make procedures easier or clearer.

HOW TO USE THIS MANUAL

CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See “Illustrated symbols”)

1st title ①: This is a chapter with its symbol on the upper right of each page.

2nd title ②: This title appears on the upper of each page on the left of the chapter symbol. (For the chapter “Periodic inspection and adjustment” the 3rd title appears.)

3rd title ③: This is a final title.

MANUAL FORMAT

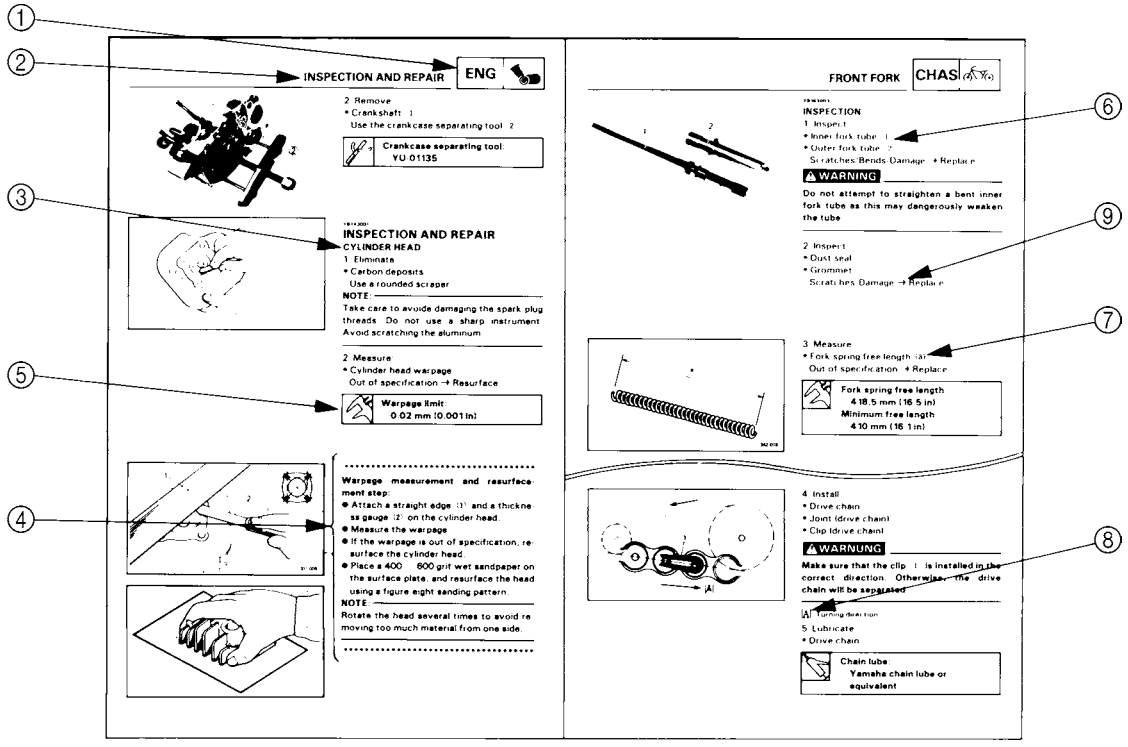
All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.
A set of particularly important procedure ④ is placed between a line of asterisks “*” with each procedure preceded by “●”.

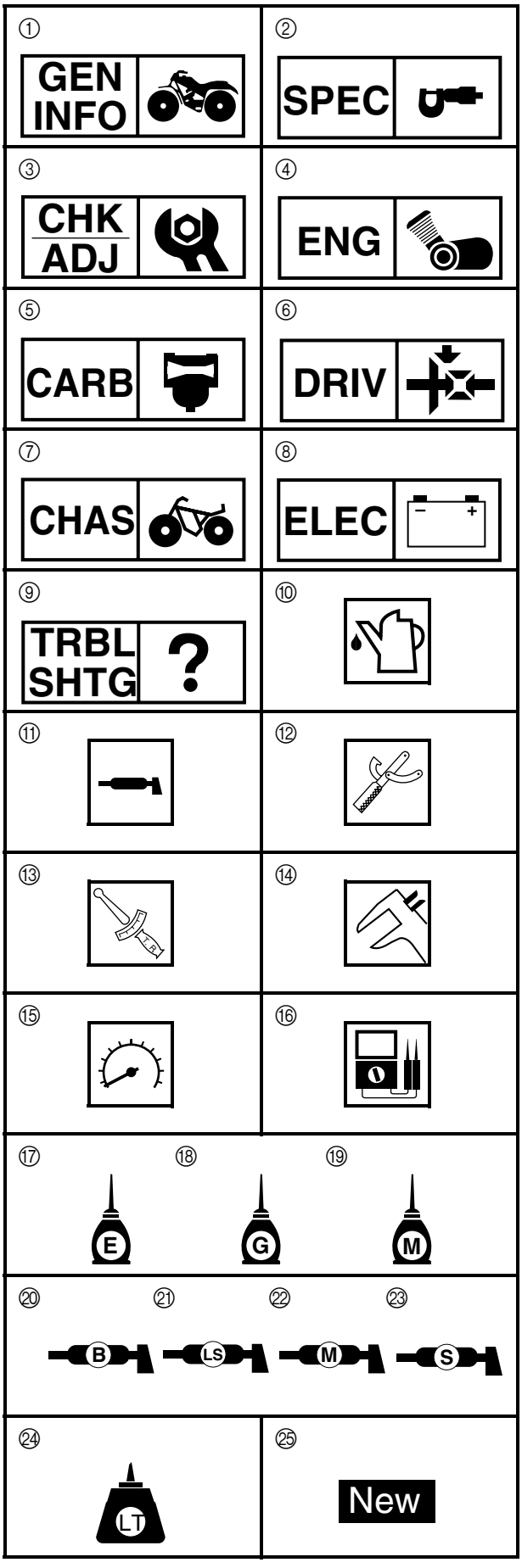
IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤.
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧.
- A condition of a faulty component will precede an arrow symbol ⑨ and the course of action will follow it.

EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.





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ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on the top right of each page and indicate the subject of each chapter.

① General information
② Specifications
③ Periodic checks and adjustments
④ Engine
⑤ Carburetion
⑥ Drive train
⑦ Chassis
⑧ Electrical
⑨ Troubleshooting

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

⑩ Filling fluid
⑪ Lubricant
⑫ Special tool
⑬ Torque
⑭ Wear limit, clearance
⑮ Engine speed
⑯ Ω, V, A

Illustrated symbols ⑰ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

⑰ Apply engine oil
⑱ Apply gear oil
⑲ Apply molybdenum disulfide oil
⑳ Apply wheel bearing grease
㉑ Apply lightweight lithium soap base grease
㉒ Apply molybdenum disulfide grease
㉓ Apply silicon grease

Illustrated symbols ㉔ to ㉕ in the exploded diagrams indicate where to apply a locking agent ㉔ and when to install a new part ㉕.

㉔ Apply the locking agent (LOCTITE®)
㉕ Replace

CONTENTS

SPECIFICATIONS

GENERAL SPECIFICATIONS

Model	YFM350XP
Model code number:	5NF4 (except for California) 5NF5 (for California)
Spark plug:	
Type/manufacturer	DR8EA (NGK)
Gap	0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Electrical:	
Ignition system	DC. C.D.I.
Charging system	A.C. magneto
Battery capacity	12 V 12AH
Battery type	GM12CZ-4A-2
Bulb wattage × quantity:	
Headlight	12 V 30 W/30 W × 2
Tail/brake light	12 V 5 W/21 W × 1
Neutral indicator light	12 V 3.4 W × 1
Reverse indicator light	12 V 3.4 W × 1

MAINTENANCE SPECIFICATIONS

ENGINE

Model	YFM350XP
Cylinder:	
Bore size	82.97 ~ 83.02 mm (3.267 ~ 3.269 in)
Taper limit	<0.05 mm (0.002 in)>
Piston:	
Piston size “D”	82.92 ~ 82.97 mm (3.265 ~ 3.267 in)
Measuring point “H”	5.5 mm (0.22 in) (From bottom line of piston skirts)
Piston clearance	0.040 ~ 0.060 mm (0.00157 ~ 0.00236 in)
Oversize 2nd	83.5 mm (3.287 in)
Oversize 4th	84.0 mm (3.307 in)
Piston off-set	0.5 mm (0.02 in)
Piston off-set direction	Intake side
Inside diameter (piston pin bore)	19.004 ~ 19.015 mm (0.7481 ~ 0.7486 in)
Outside diameter (piston pin)	18.991 ~ 19.000 mm (0.7477 ~ 0.7480 in)
Piston ring:	
Sectional sketch	
Top ring:	Barrel
B	1.2 mm (0.047 in)
T	3.3 mm (0.130 in)
2nd ring:	Tapper
B	1.5 mm (0.059 in)
T	3.4 mm (0.134 in)
Oil ring: B	2.8 mm (0.110 in)
Oil ring: T	2.8 mm (0.110 in)
End gap (installed)	
Top ring	0.20 ~ 0.40 mm (0.00787 ~ 0.0157 in)
2nd ring	0.20 ~ 0.40 mm (0.00787 ~ 0.0157 in)
Oil ring	0.30 ~ 0.90 mm (0.012 ~ 0.035 in)
Side clearance: Top ring	0.03 ~ 0.09 mm (0.0012 ~ 0.0035 in)
Side clearance: 2nd ring	0.03 ~ 0.07 mm (0.0012 ~ 0.0028 in)
Clutch:	
Friction plate thickness/quantity	2.74 ~ 2.86 mm (0.107 ~ 0.113 in)/6
Warp limit	<2.64 mm (0.104 in)>
Friction plate thickness/quantity	2.94 ~ 3.06 mm (0.116 ~ 0.120 in)/1
Warp limit	<2.84 mm (0.112 in)>
Clutch plate thickness/quantity	1.5 ~ 1.7 mm (0.059 ~ 0.066 in)/4 1.9 ~ 2.1 mm (0.0748 ~ 0.0827 in)/2
Max. warpage	<0.2 mm (0.00787 in)>
Clutch spring free length/quantity	47.8 mm (1.882 in)/5
Clutch spring minimum free length	46.5 mm (1.831 in)
Clutch release method	Outer push (rack and pinon)

Model		YFM350XP
Carburetor:		
I. D. mark		3GD 00 (except for California) 3GD 10 (for California)
Main jet	(M.J)	#145
Main air jet	(M.A.J)	0.6
Jet needle	(J.N)	5J18-3 (except for California) 5J31-1 (except for California)
Needle jet	(N.J)	O-6 (except for California) O-6M (for California)
Pilot jet	(P.J)	#42.5
Pilot air jet	(P.A.J.1)	1.0
	(P.A.J.2)	0.7
Pilot outlet	(P.O)	0.75
Bypass 1	(B.P.1)	0.8
Bypass 2	(B.P.2)	0.8
Bypass 3	(B.P.3)	0.8
Valve seat	(V.S)	2.5
Starter jet	(G.S.)	#62.5
Throttle valve size	(Th.V)	#125
Fuel level	(F.L)	2 ~ 3 mm (0.08 ~ 0.12 in)
Float height		11.4 ~ 13.4 mm (0.45 ~ 0.53 in)
Engine idling speed		1,450 ~ 1,550 r/min
Intake vacuum		33.3 kPa (250 mmHg, 9.83 inHg)

CHASSIS

Model	YFM350XP
Brake lever and brake pedal:	
Brake lever free play	0 mm (0 in) at lever end
Brake pedal position	10 mm (0.4 in)
Brake pedal free play	8 mm (0.315 in)

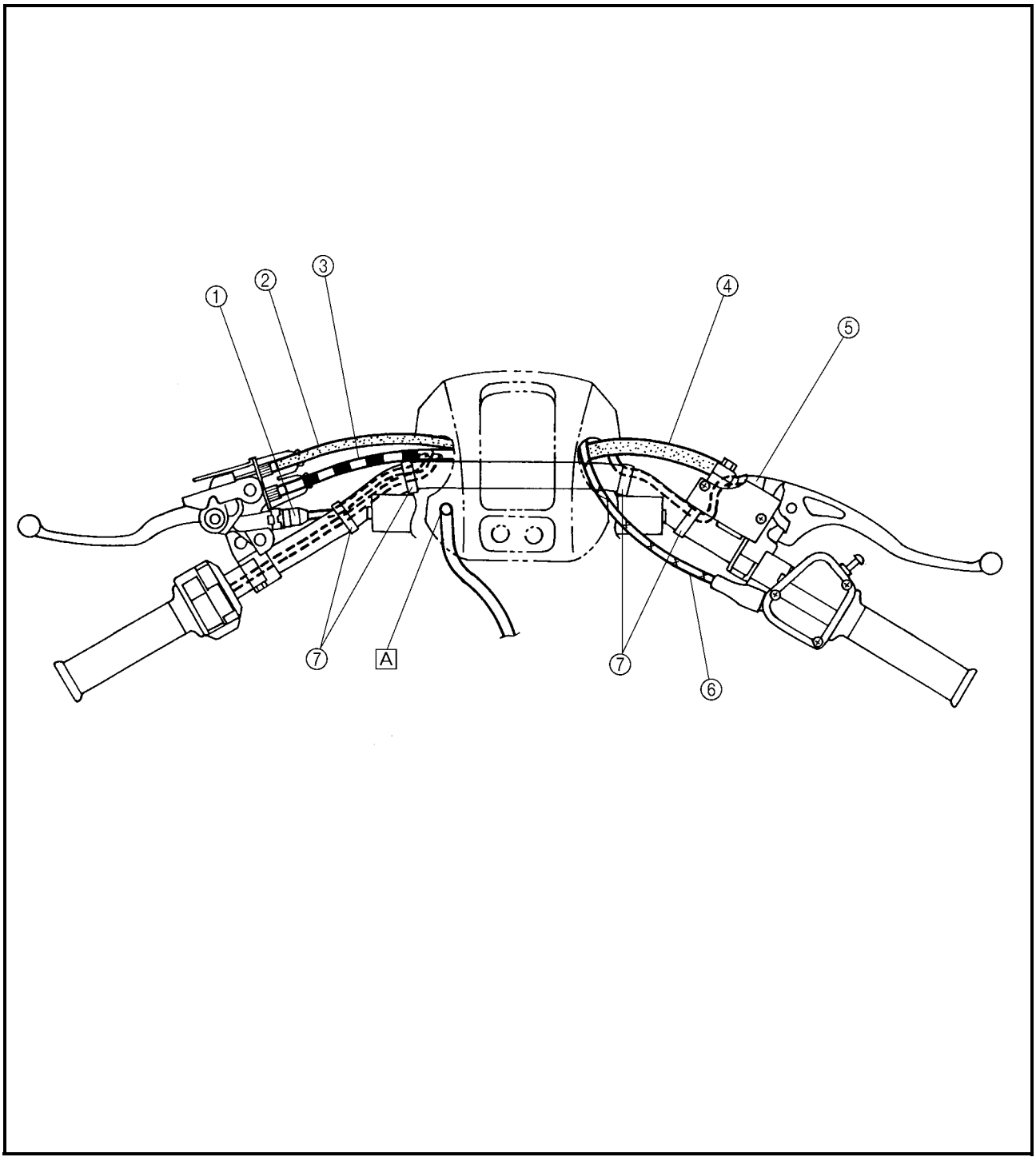
ELECTRICAL

Model	YFM350XP
C.D.I.:	
Magneto model/manufacturer	F4T466/MITSUBISHI
Pickup coil resistance	459 ~ 561 Ω at 20 °C (68 °F)
(Color)	(White/Red-White/Green)
Rotor rotation direction detection coil resistance	0.083 ~ 0.101 Ω at 20 °C (68 °F)
(Color)	(Red-White/Blue)
C.D.I. unit-model/manufacturer	F8T38675/MITSUBISHI
Ignition coil:	
Model/manufacturer	2JN/YAMAHA
Minimum spark gap	6 mm (0.24 in)
Primary winding resistance	0.18 ~ 0.28 Ω at 20 °C (68 °F)
Secondary winding resistance	6.32 ~ 9.48 kΩ at 20 °C (68 °F)
Charging system:	
Model/manufacturer	F4T466/MITSUBISHI
Nominal output	14 V 15 A at 5,000 r/min
Charging coil resistance/color	0.51 ~ 0.63 Ω at 20 °C (68 °F)/White-White 0.47 ~ 0.57 Ω at 20 °C (68 °F)/White-White
Rectifier/regulator:	
Regulator type	Semi conductor-short circuit
Model/manufacturer	SH640-11/SHINDENGEN
No load regulated voltage	14.1 ~ 14.9 V
Rectifier capacity	14 A
Withstand voltage	200 V
Starter relay:	
Model/manufacturer	MS5D-611/JIDECO
Amperage rating	100 A
Coil winding resistance	3.9 ~ 4.7 Ω

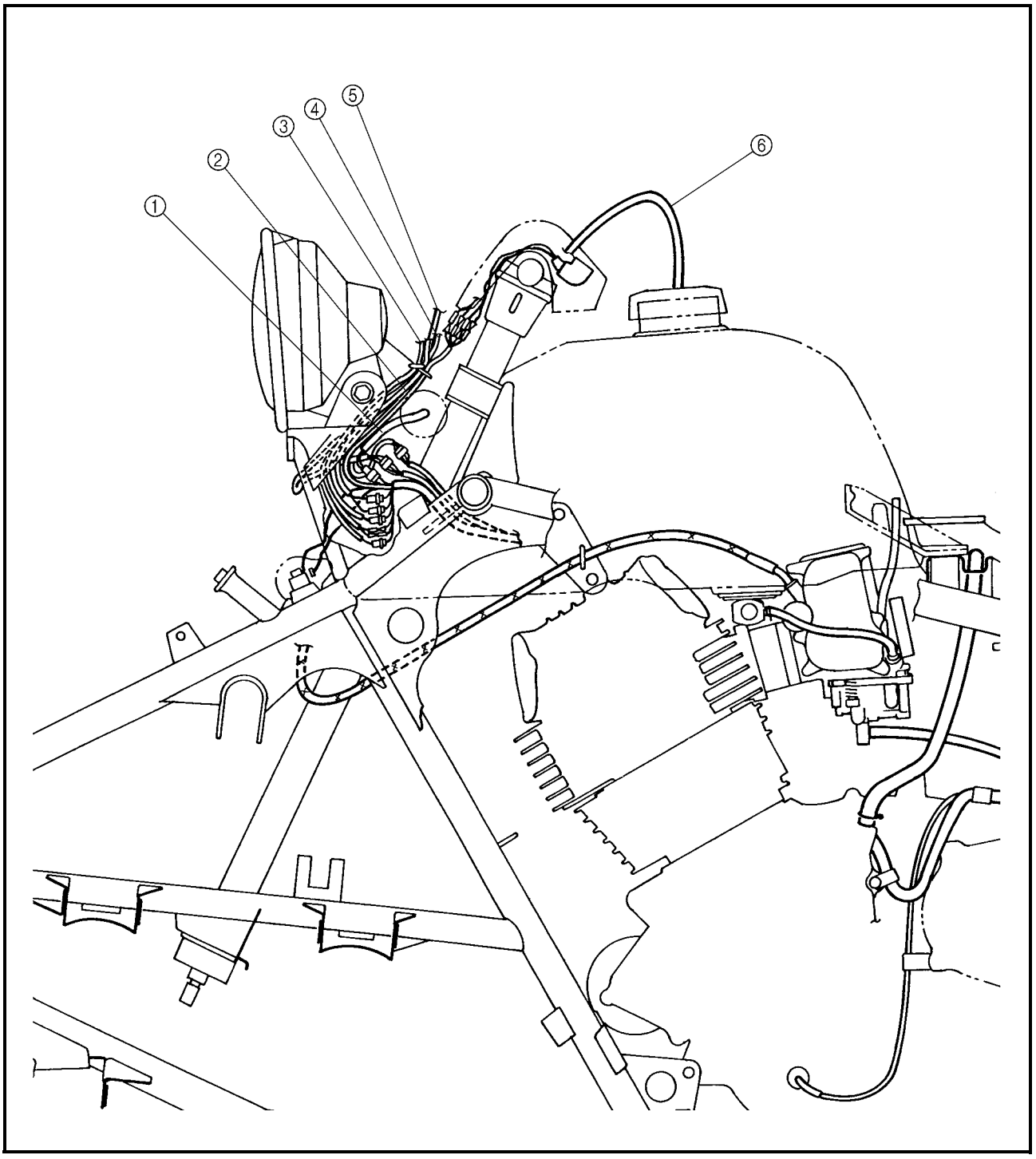
CABLE ROUTING

① Clutch switch
② Rear brake cable
③ Clutch cable
④ Front brake hose
⑤ Front brake light switch
⑥ Throttle cable
⑦ Band

[A] Install the fuel tank breather hose into the hole of the handlebar cover.

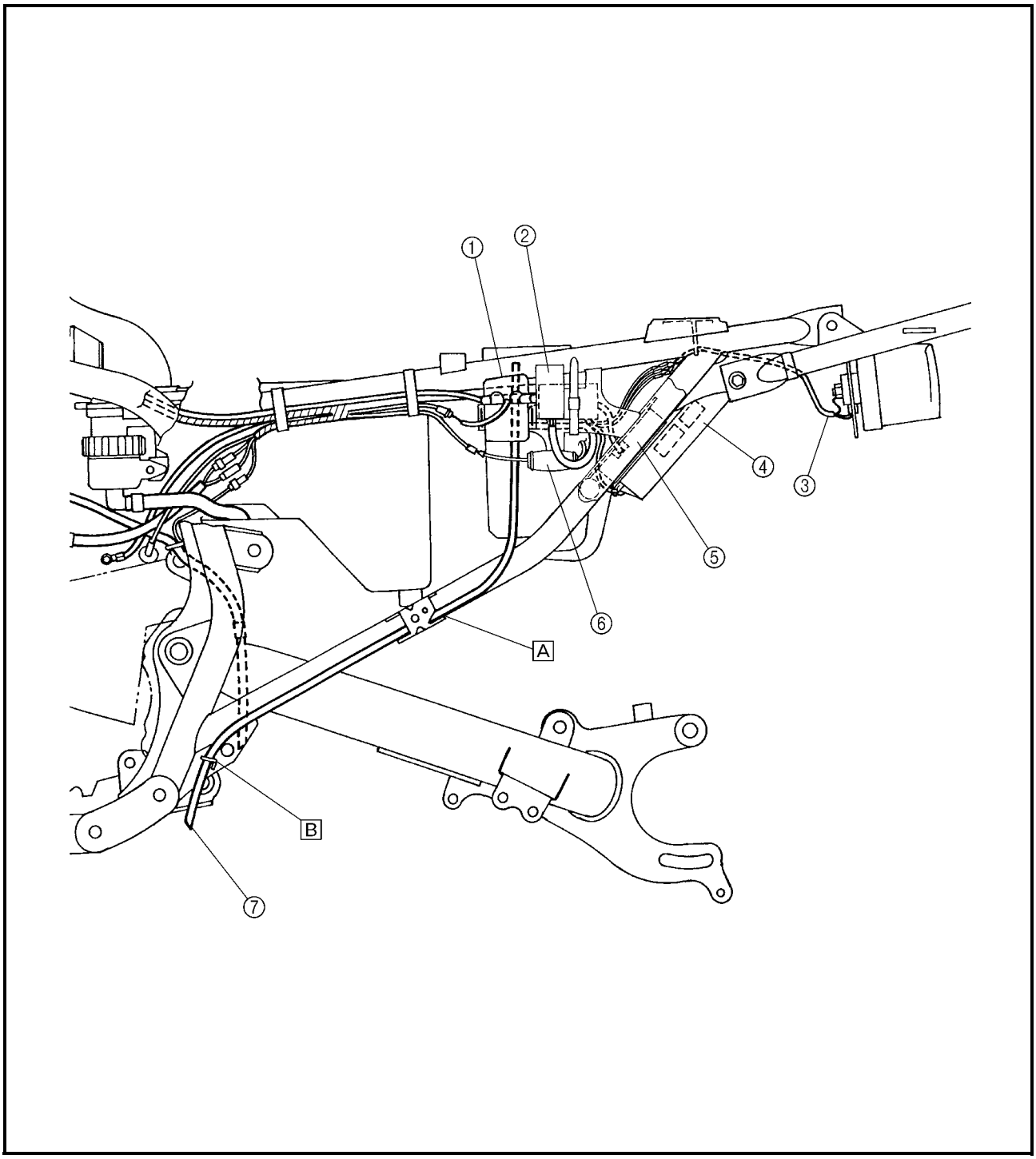


① Main switch lead
② Handlebar switch lead
③ Clutch switch lead
④ Park switch lead
⑤ Front brake light switch lead
⑥ Fuel tank breather hose



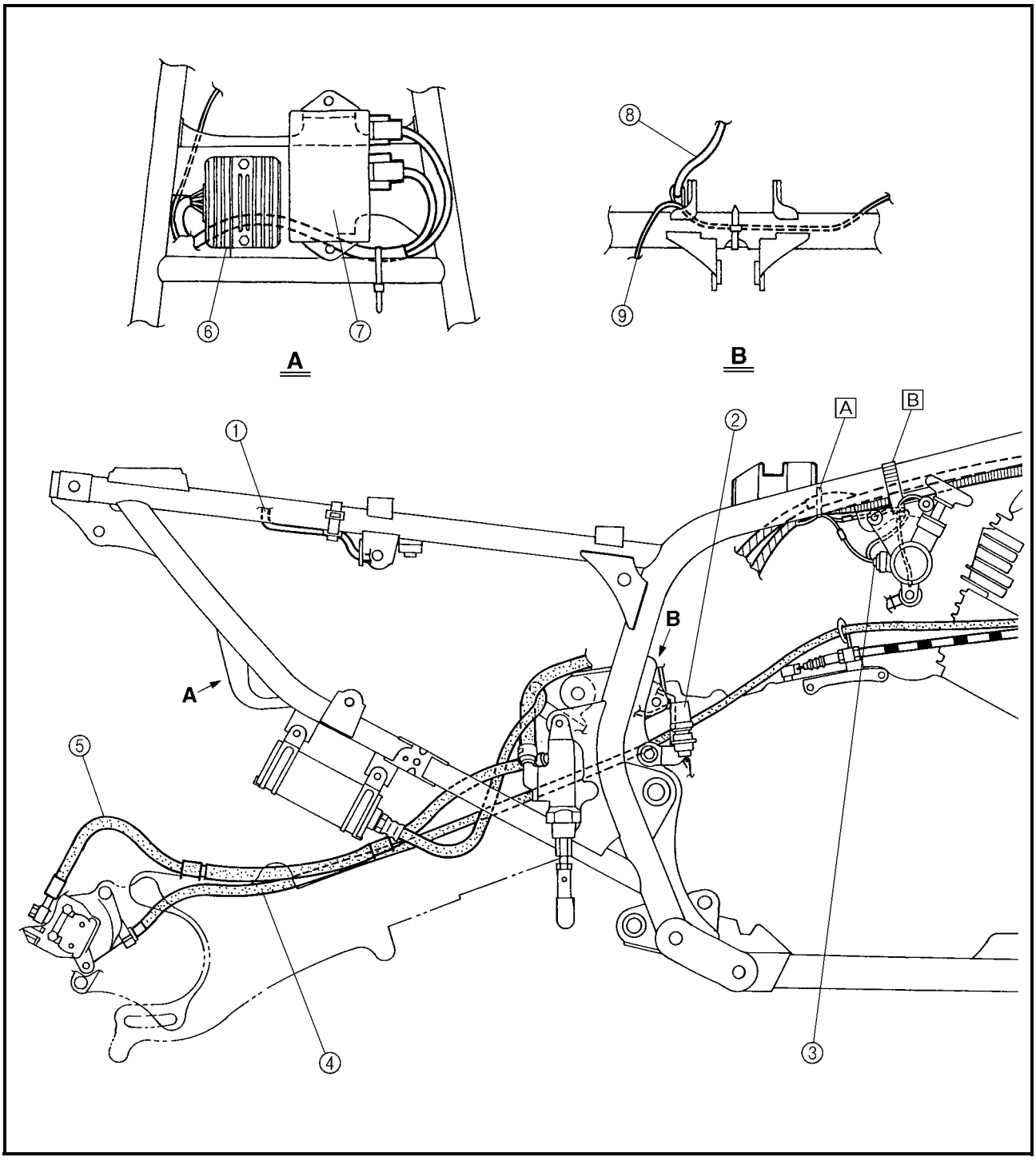
① Starter relay
② Neutral relay
③ Tail/brake light
④ CDI unit
⑤ Rectifier/regulator
⑥ Fuse
⑦ Battery breather hose

[A] Pass the battery breather hose through the inside of the frame bracket.
[B] Pass the battery breather hose through the guide.



① Battery negative lead
② Rear brake light switch
③ Drive select lever switch
④ Rear brake cable
⑤ Rear brake hose
⑥ Rectifier/regulator
⑦ CDI unit
⑧ Carburetor overflow hose
⑨ Rear brake light switch lead

Ⓐ Pass the wire harness and starter motor lead through the holder.
Ⓑ Fasten the wire harness, starter motor lead and handlebar switch lead with the band.



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PERIODIC CHECKS AND ADJUSTMENTS

INTRODUCTION

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

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PERIODIC MAINTENANCE/LUBRICATION INTERVALS

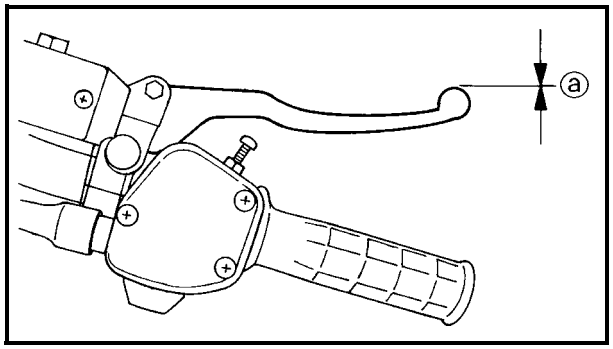
ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Valves*	• Check valve clearance. • Adjust if necessary.	○		○	○	○
Spark plug	• Check condition. • Adjust gap and clean. • Replace if necessary.	○	○	○	○	○
Air filter	• Clean. • Replace if necessary.	Every 20~40 hours (More often in wet or dusty areas.)				
Carburetor*	• Check idle speed/starter operation. • Adjust if necessary.		○	○	○	○
Crankcase breather system*	• Check breather hose for cracks or damage. • Replace if necessary.			○	○	○
Exhaust system*	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.			○	○	○
Spark arrester	• Clean.			○	○	○
Fuel line*	• Check fuel hose for cracks or damage. • Replace if necessary.			○	○	○
Engine oil	• Replace (Warm engine before draining).	○		○	○	○
Engine oil filter element	• Clean. • Replace if necessary.			○	○	○
Engine oil strainer	• Clean.	○		○		○
Drive chain	• Check and adjust slack/alignment/clean/lube.	○	○	○	○	○
Brake*	• Check operation/fluid leakage/See NOTE Page 10. • Correct if necessary.	○	○	○	○	○
Clutch*	• Check operation. • Adjust if necessary.	○		○	○	○
Wheels*	• Check balance/damage/runout. • Replace if necessary.	○		○	○	○
Wheel bearings*	• Check bearing assembly for looseness/damage. • Replace if damaged.	○		○	○	○
Steering system*	• Check operation. • Repair if damaged. • Check toe-in. • Adjust if necessary.	○	○	○	○	○
Upper and lower arm pivot and steering shaft*	• Lubricate every 6 months.**			○	○	○
Rear arm pivot*	• Lubricate every 6 months.**			○	○	○
Fittings and Fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.	○	○	○	○	○
Battery*	• Check specific gravity. • Check breather pipe for proper routing. • Correct if necessary.	○	○	○	○	○

* It is recommended that these items be serviced by a Yamaha dealer.
** Lithium-soap-based grease

NOTE:

- Recommended brake fluid: DOT4
- Brake fluid replacement:

1. When disassembling the master cylinder or caliper, replace the brake fluid. Normally check the brake fluid level and add fluid as required.
2. On the inner parts of the master cylinder and caliper, replace the oil seals every two years.
3. Replace the brake hoses every four years, or if cracked or damaged.



CHASSIS

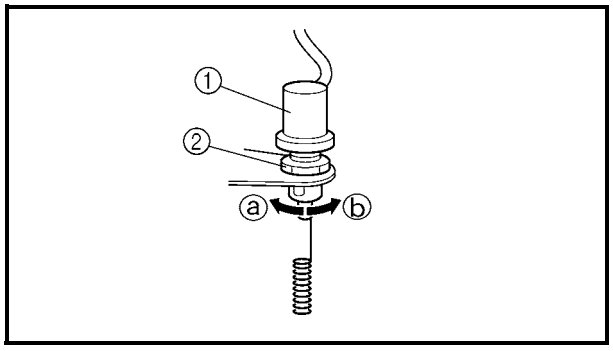
ADJUSTING THE FRONT BRAKE

1.Check:
- Brake lever free play ⓐ
  Out of specification → Bleed the front brake system.
  Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)" in CHAPTER 3. (Manual No.: 3GD-28197-12)

Brake lever free play (at brake lever end):
0 mm (0 in)

ADJUSTING THE REAR BRAKE LIGHT SWITCH

NOTE:
The rear brake light switch is operated by movement of the brake pedal.
The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.



1.Check:
- Rear brake light operation timing
  Incorrect → Adjust.

2.Adjust:
- Rear brake light operation timing

****

● Hold the main body ① of the rear brake light switch so that it does not rotate and turn the adjusting nut ② in direction ⓐ or ⓑ until the rear brake light comes on at the proper time.

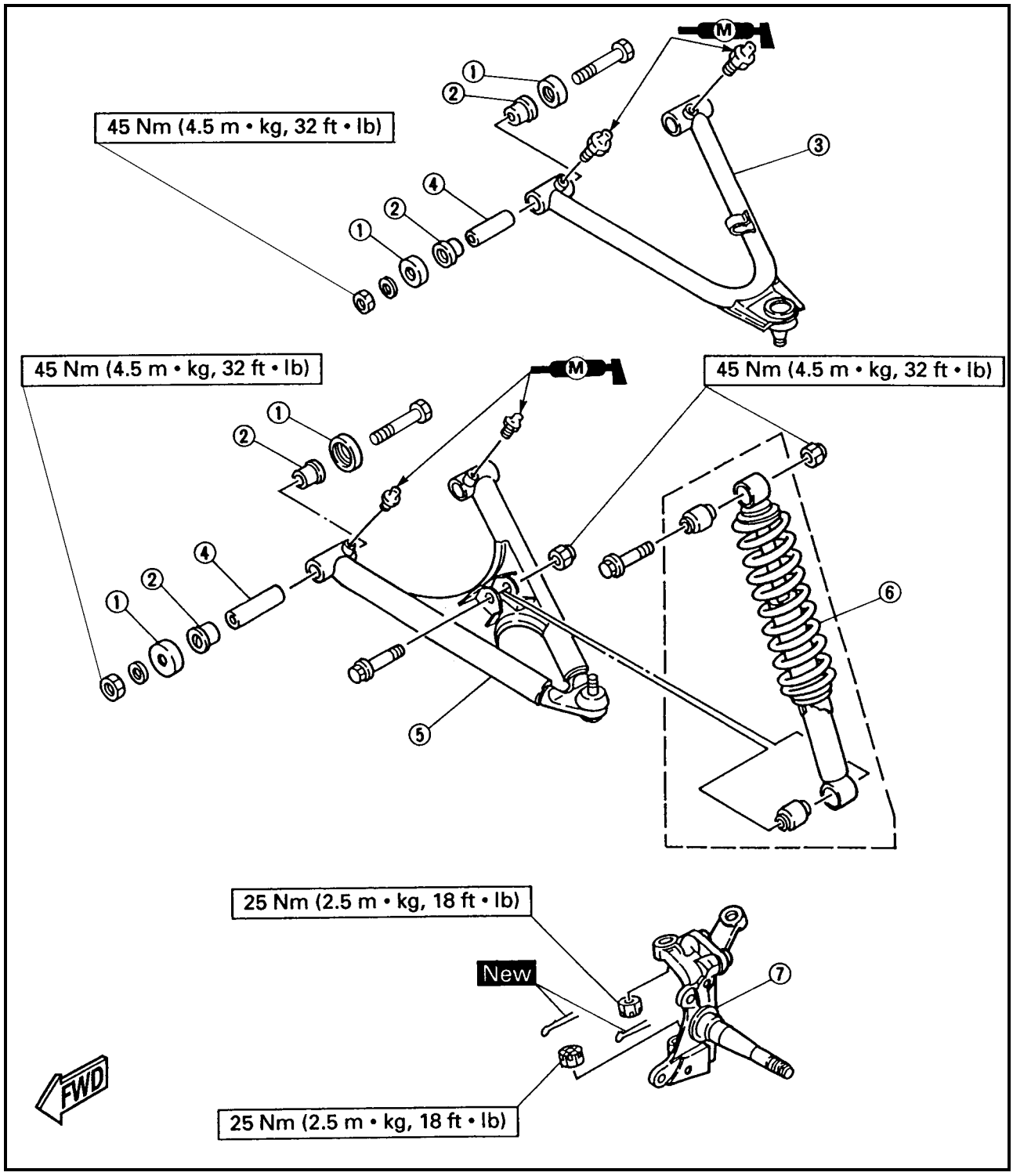
Direction ⓐ	**Brake light comes on sooner.**
Direction ⓑ	**Brake light comes on later.**

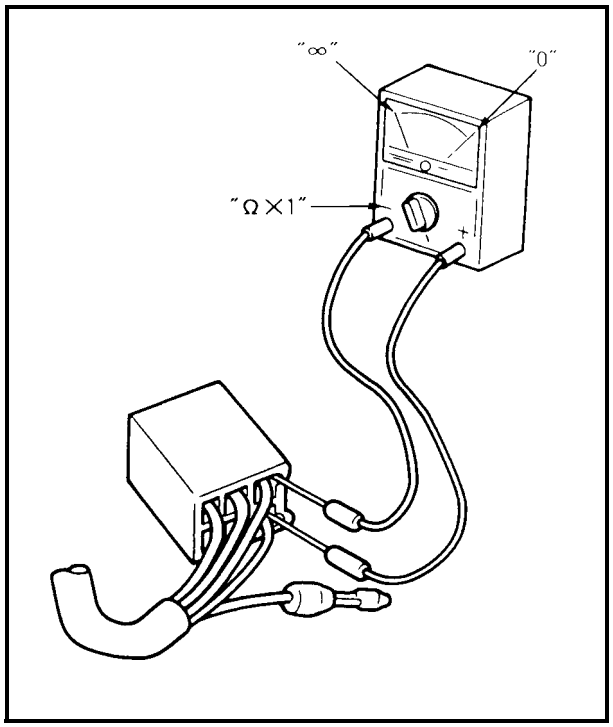
****

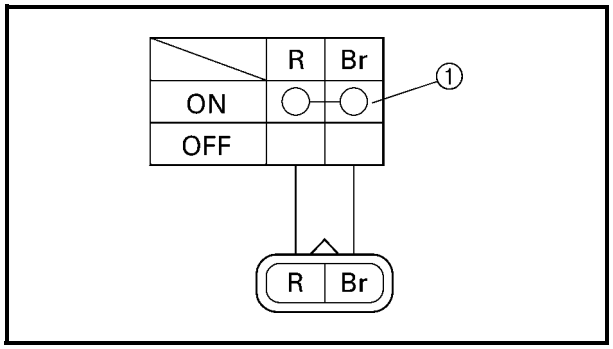
CHASSIS

FRONT SUSPENSION

① Thrust cover
② Bushing
③ Front upper arm
④ Collar
⑤ Front lower arm
⑥ Shock absorber
⑦ Steering knuckle







ELECTRICAL

CHECKING THE SWITCH

CHECKING THE SWITCH

Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.

	Pocket tester: **P/N. YU-03112, 90890-03112**

NOTE:

- Set the pocket tester to "0" before starting the test.
- The pocket tester should be set to the "Ω × 1" range when testing the switch for continuity.
- Turn the switch on and off a few times when checking it.

CHECKING A SWITCH SHOWN IN THE MANUAL

The terminal connections for switches (main switch, handlebar switch, engine stop switch, light switch, etc.) are shown in a chart similar to the one on the left.

This chart shows the switch positions in the column and the switch lead colors in the top row.

For each switch position, "○——○" indicates the terminals with continuity.

The example chart shows that:

① There is continuity between the "Red and Brown" leads when the switch is set to "ON".

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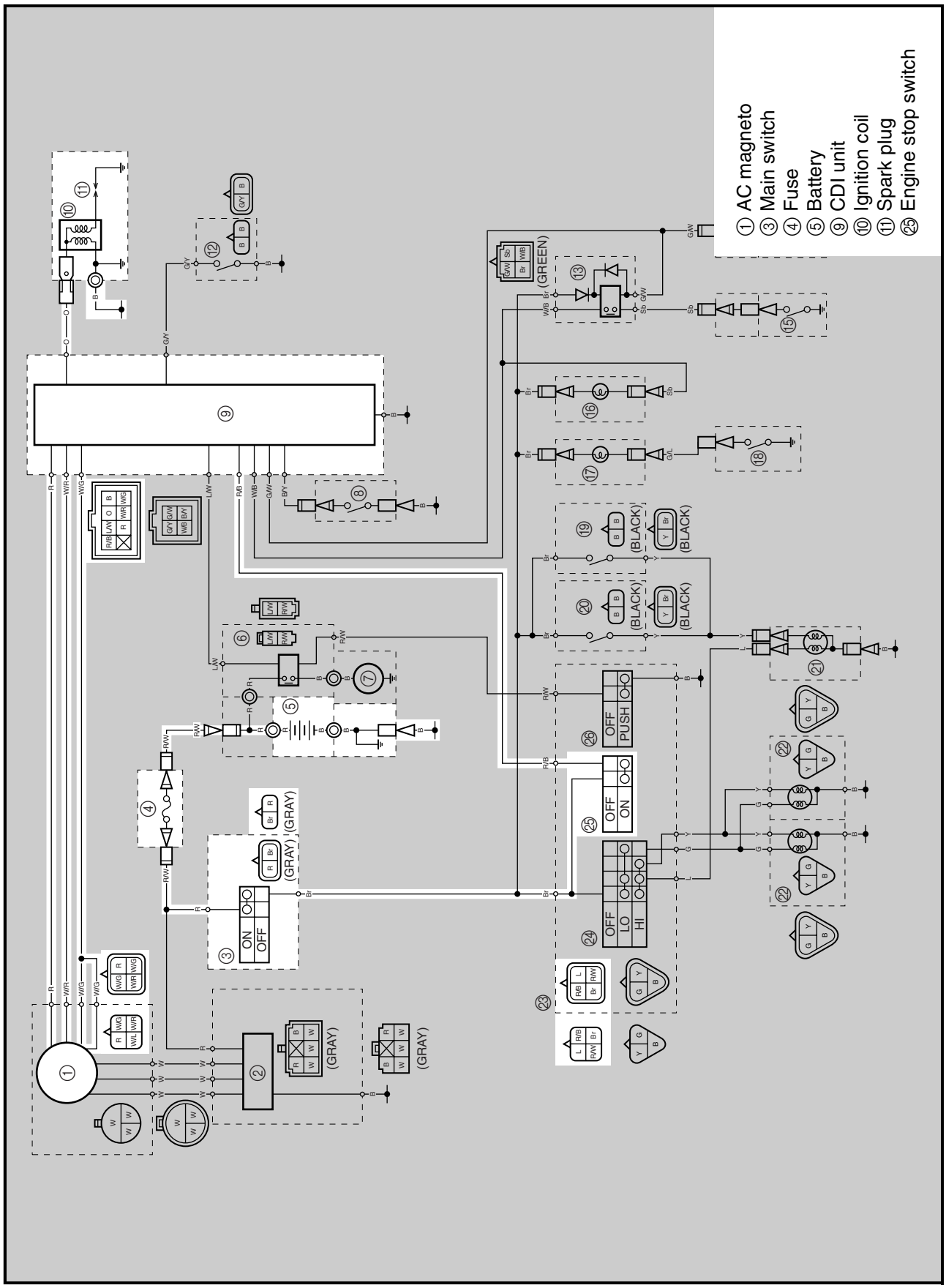
IGNITION SYSTEM

CIRCUIT DIAGRAM



EB802010
TROUBLESHOOTING

IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):

Procedure
Check:
1. Fuse
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Engine stop switch
8. Main switch
9. Pickup coil resistance
10. Charging/rotor rotation direction detection coil resistance
11. Wiring connection (the entire ignition system)

NOTE:
- Remove the following part(s) before troubleshooting:
1) Seat
2) Front fender
- Use the following special tool(s) for troubleshooting.

Dynamic spark tester:
P/N. YM-34487
Ignition checker:
P/N. 90890-06754
Pocket tester:
P/N. YU-03112, 90890-03112

EB802011

1.Fuse

Refer to “CHECKING THE SWITCH”.

NO CONTINUITY → Replace the fuse.

CONTINUITY ↓

EB802012

2.Battery

- Check the battery condition.
  Refer to “BATTERY INSPECTION” in CHAPTER 3. (Manual No.: 3GD-28197-12)

Open-circuit voltage:
12.8 V or more at 20 °C (68 °F)

INCORRECT →
- Refill with battery fluid.
- Clean the battery terminals.
- Recharge or replace the battery.

CORRECT ↓

3.Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.
  Refer to “SPARK PLUG INSPECTION” in CHAPTER 3. (Manual No.: 3GD-28197-12)

Standard spark plug:
DR8EA

Spark plug gap:
0.8 ~ 0.9 mm (0.031 ~ 0.035 in)

INCORRECT

Repair or replace the spark plug.

CORRECT

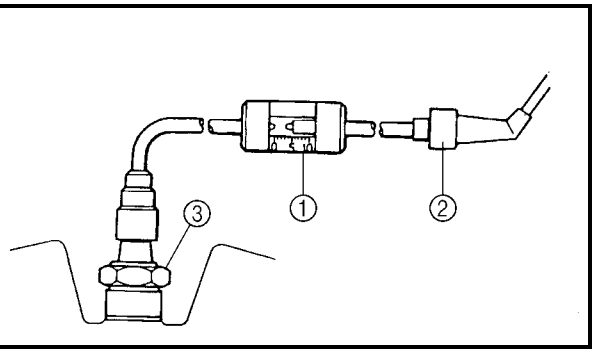
For USA and CDN

4.Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.

② Spark plug cap
③ Spark plug

- Turn the main switch to “ON”.
- Check the ignition spark gap.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.



Minimum spark gap:
6.0 mm (0.24 in)

MEETS SPECIFICATION

The ignition system is not faulty.

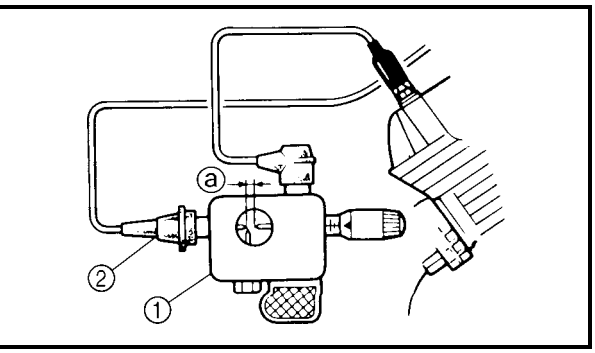
For Europe and Oceania

4.Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.

② Spark plug cap

- Turn the main switch to “ON”.
- Check the ignition spark gap ⓐ.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.



Minimum spark gap:
6.0 mm (0.24 in)

MEETS SPECIFICATION

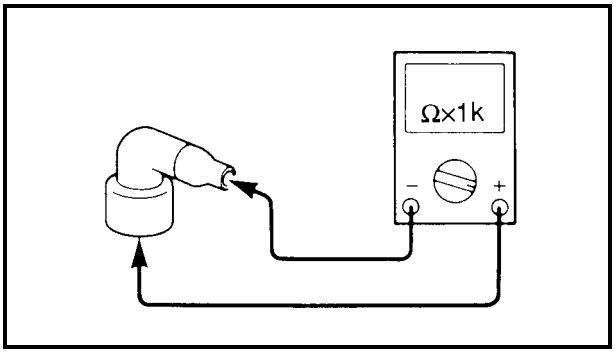
The ignition system is not faulty.

OUT OF SPECIFICATION OR NO SPARK
*

*

5.Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester (Ω × 1k) to the spark plug cap.



- Check that the spark plug cap has the specified resistance.

Spark plug cap resistance:
10 kΩ at 20 °C (68 °F)

OUT OF SPECIFICATION

Replace the spark plug cap.

MEETS SPECIFICATION

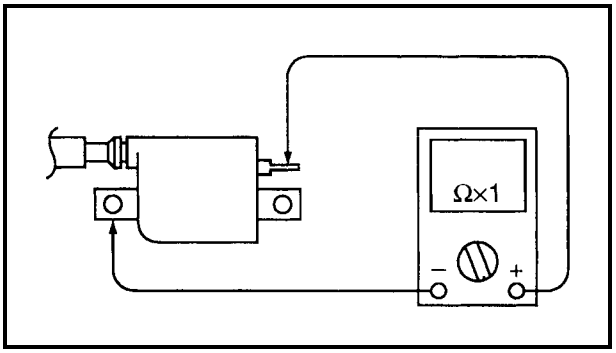
6.Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester (Ω × 1) to the ignition coil.

Tester (+) lead → Orange lead terminal
Tester (–) lead → Ignition coil base

- Check that the primary coil has the specified resistance.

Primary coil resistance:
0.18 ~ 0.28 Ω at 20 °C (68 °F)

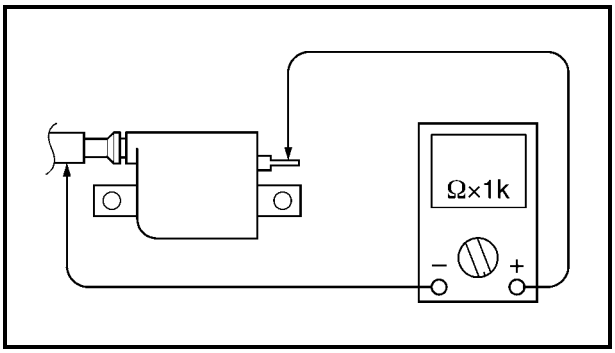


- Connect the pocket tester (Ω × 1k) to the ignition coil.

Tester (+) lead → Orange lead terminal
Tester (–) lead → Spark plug lead

- Check that the secondary coil has the specified resistance.

Secondary coil resistance:
6.32 ~ 9.48 kΩ at 20 °C (68 °F)



BOTH MEET SPECIFICATION

Replace the ignition coil.

7.Engine stop switch

Refer to “CHECKING THE SWITCH”.

INCORRECT

Replace the handlebar switch (left).

CORRECT

8.Main switch

Refer to “CHECKING THE SWITCH”.

INCORRECT

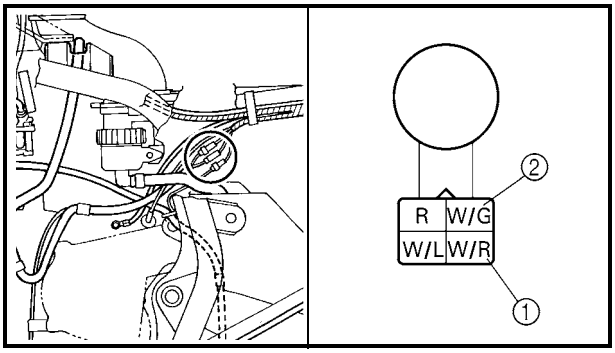
Replace the main switch.

CORRECT

9.Pickup coil resistance

- Disconnect the AC magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the pickup coil terminal.

Tester (+) lead → White/Red terminal ①
Tester (–) lead → White/Green terminal ②



- Check the pickup coil for the specified resistance.

Pickup coil resistance:
459 ~ 561 Ω at 20 °C (68 °F)
(White/Red – White/Green)

OUT OF SPECIFICATION

Replace the pickup coil/starter assembly.

MEETS SPECIFICATION

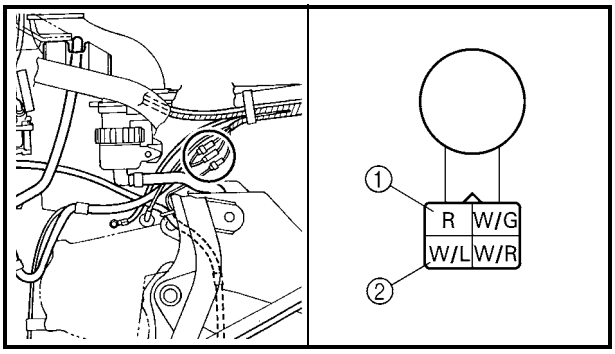
*

*

10.Charging/rotor rotation direction detection coil resistance

- Disconnect the AC magneto coupler from the wire harness.
- Connect the pocket tester (Ω × 100) to the charging/rotor rotation direction detection coil terminal.

Tester (+) lead → Red terminal ①
Tester (–) lead → White/Blue terminal ②



- Check the charging/rotor rotation direction detection coil for the specified resistance.

Rotor rotation direction detection coil resistance:
0.083 ~ 0.101 Ω at 20 °C (68 °F)
(Red – White/Blue)

OUT OF SPECIFICATION → Replace the pickup coil/stator assembly.

MEETS SPECIFICATION

11.Wiring connection

- Check the connections of the entire ignition system.
  Refer to “CIRCUIT DIAGRAM”.

POOR CONNECTION → Properly connect the ignition system.

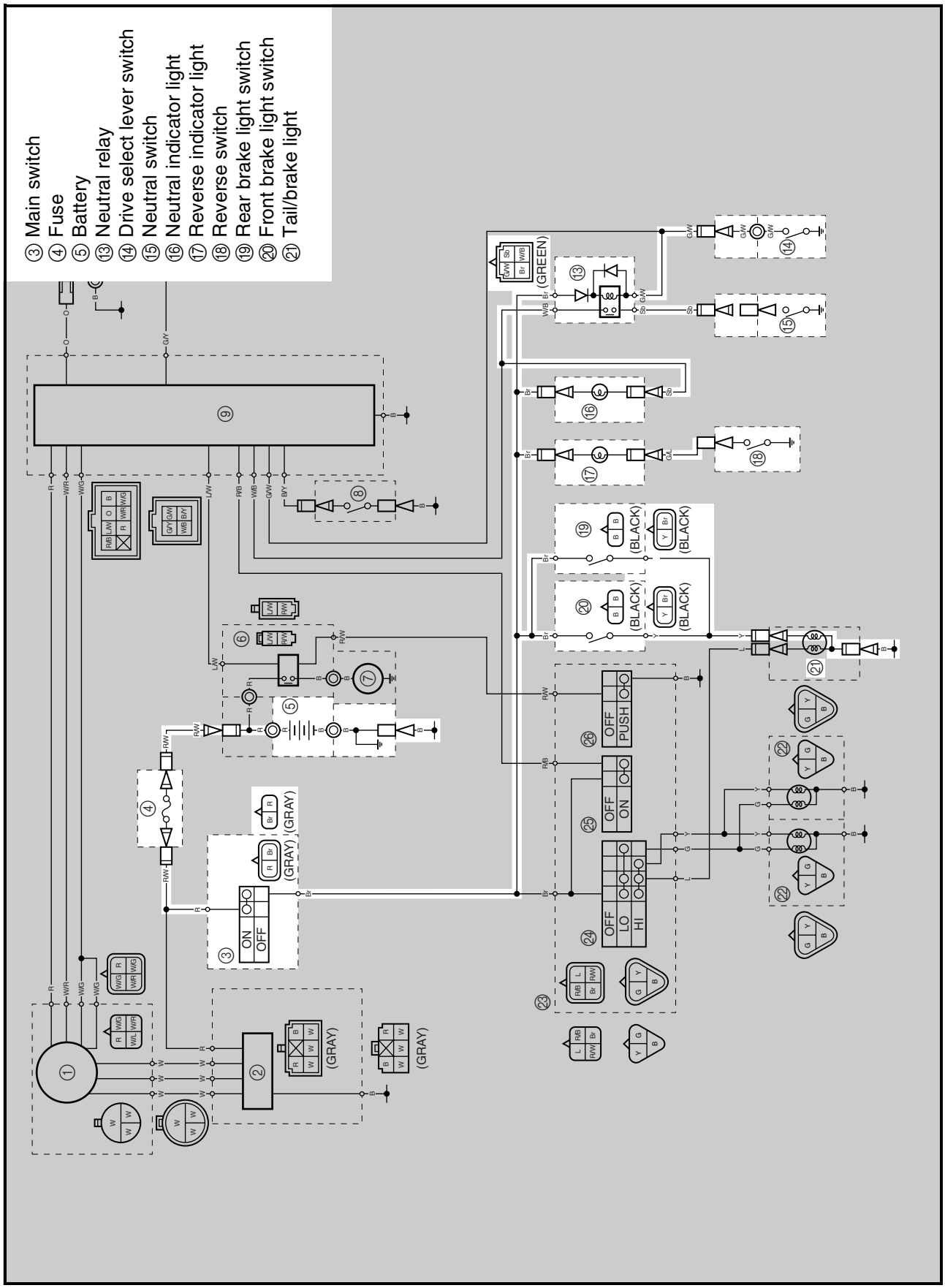
CORRECT

Replace the CDI unit.

EB806000

SIGNAL SYSTEM

CIRCUIT DIAGRAM



CHECKING THE SIGNAL SYSTEM

1.If the tail/brake light fails to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.

NO CONTINUITY → Replace the bulb and/or bulb socket.

CONTINUITY ⇩

2.Brake light switches

Refer to “CHECKING THE SWITCH”.

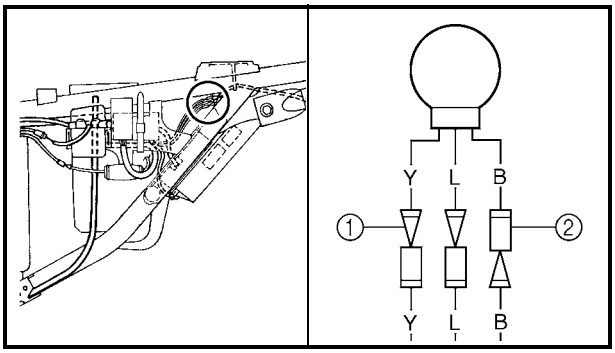
NO CONTINUITY → Replace the brake switch.

CONTINUITY ⇩

3.Voltage

- Connect the pocket tester (DC 20V) to the bulb socket connector.

Tester (+) lead → Yellow terminal ①
Tester (–) lead → Black terminal ②



- Turn the main switch to “ON”.
- Check the voltage (12 V) of the “Yellow” lead on the bulb socket connector.

OUT OF SPECIFICATION → The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

MEETS SPECIFICATION ⇩

This circuit is not faulty.

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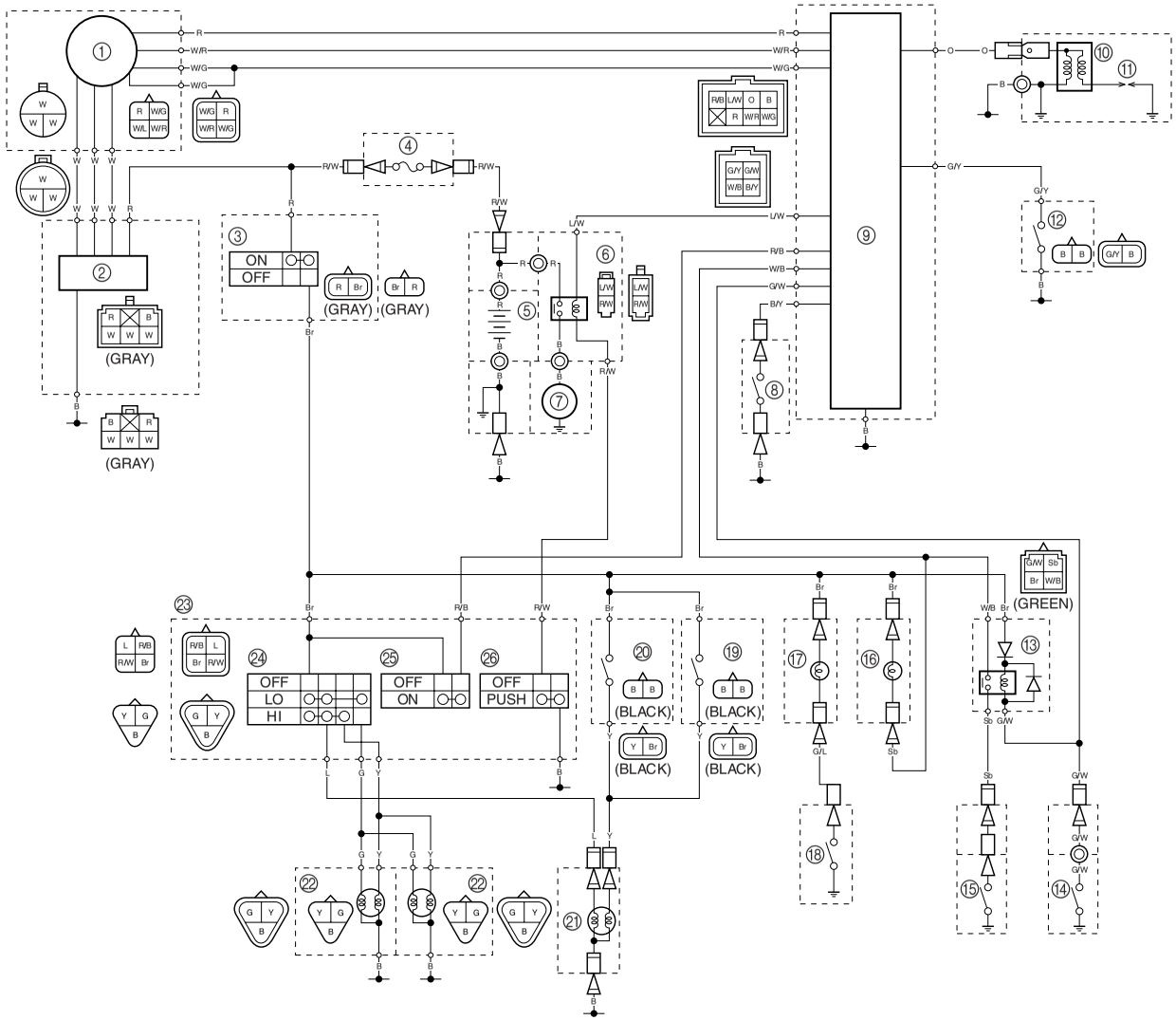
YFM350XP WIRING DIAGRAM



① AC magneto
② Rectifier/regulator
③ Main switch
④ Fuse
⑤ Battery
⑥ Starter relay
⑦ Starter motor
⑧ Clutch switch
⑨ CDI unit
⑩ Ignition coil
⑪ Spark plug
⑫ Park switch
⑬ Neutral relay
⑭ Drive select lever switch
⑮ Neutral switch
⑯ Neutral indicator light
⑰ Reverse indicator light
⑱ Reverse switch
⑲ Rear brake light switch
⑳ Front brake light switch
㉑ Tail/brake light
㉒ Headlight
㉓ Handlebar switch (left)
㉔ Lights switch
㉕ Engine stop switch
㉖ Start switch

COLOR CODE

B .....Black	Sb .....Sky blue	G/Y.....Green/Yellow	W/L ..... White/Blue
Br.....Brown	W .....White	L/W .....Blue/White	W/R..... White/Red
G.....Green	Y .....Yellow	R/B.....Red/Black	
L.....Blue	B/Y .....Black/Yellow	R/W.....Red/White	
O.....Orange	G/L .....Green/Blue	W/B.....White/Black	
R.....Red	G/W .....Green/White	W/G.....White/Green	