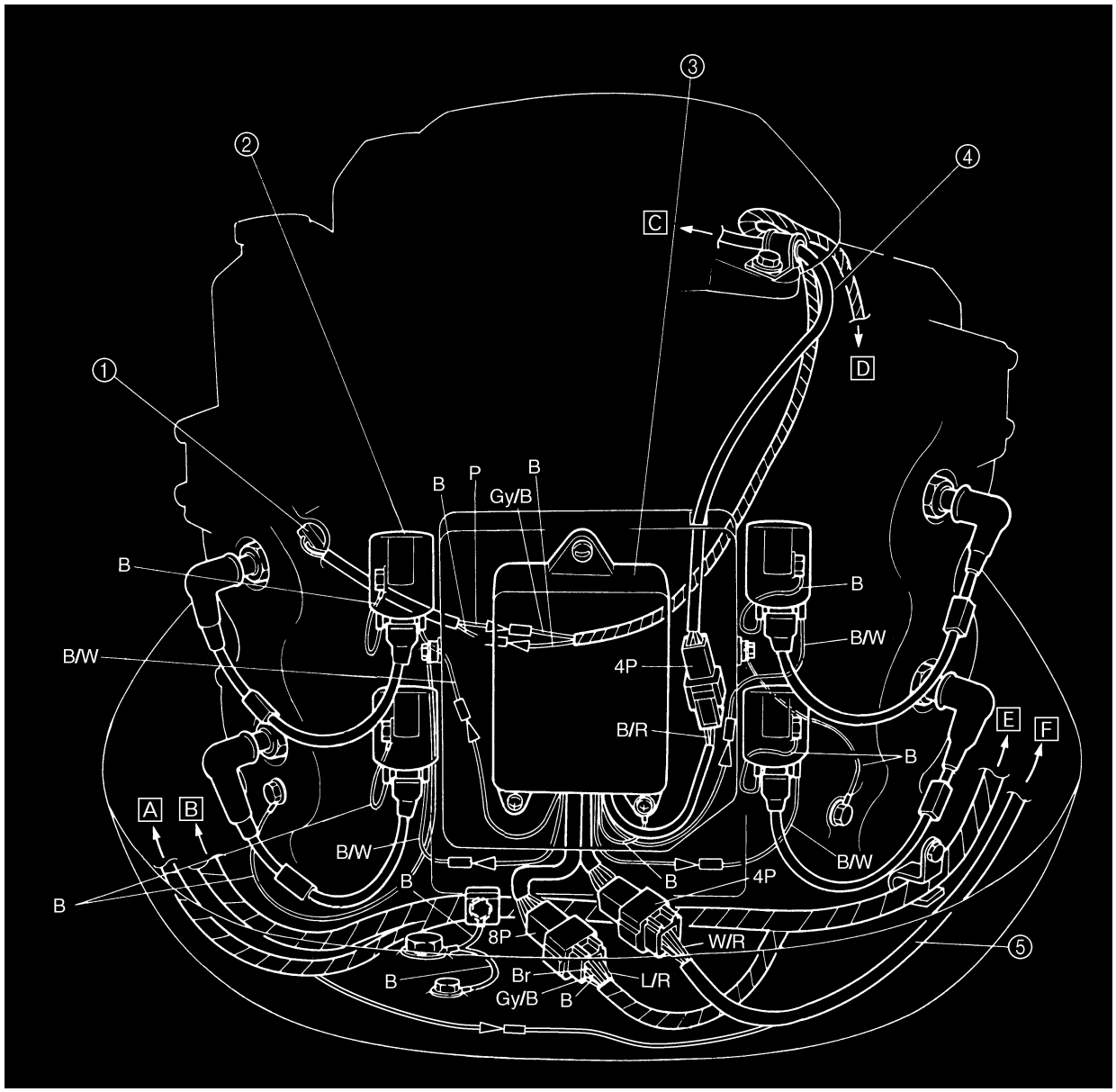
(Aft view)



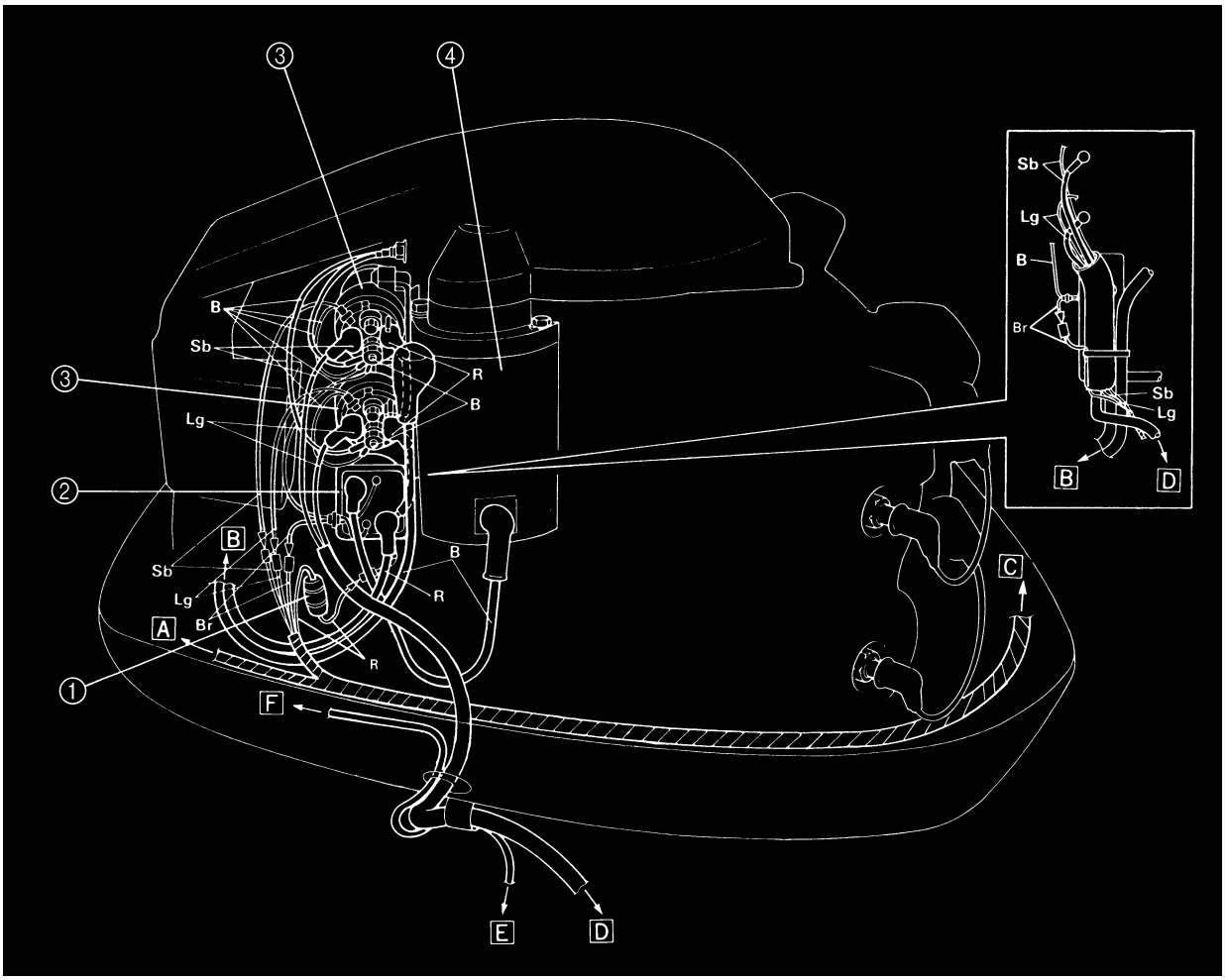
① Thermo switch
② Ignition coil
③ CDI unit
④ Charge coil lead
⑤ Pulser coil lead

A To oil pump control unit
B To relay assembly
C To charge coil
D To wire harness
E To 10P coupler
F To pulser coil

B : Black
Br : Brown
P : Pink
B/R : Black/red
B/W : Black/white
Gy/B : Gray/black
L/R : Blue/red
W/R : White/red

ELECTRICAL COMPONENTS (PRE-MIXED AND 115BETO MODELS)

(Port view)

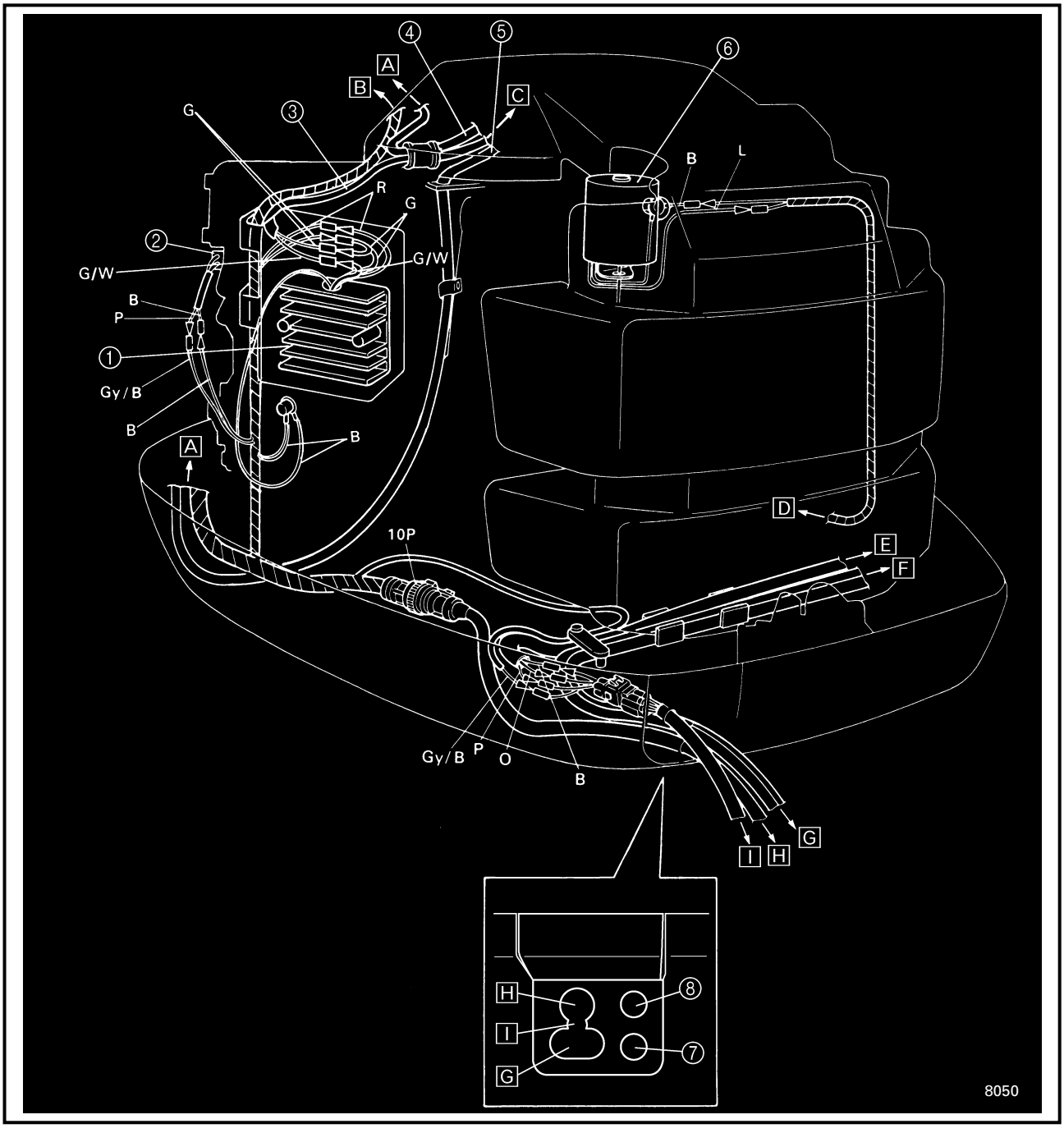


① Fuel (20A)
② Starter relay
③ Power trim and tilt relay
④ Starter motor

A To fuel enrichment valve
B To battery
C To CDI unit and 10P coupler
D To power trim and tilt motor
E To trim sensor
F To trim meter

B : Black
Br : Brown
Lg : Light green
R : Red
Sb : Sky blue

(Starboard view)

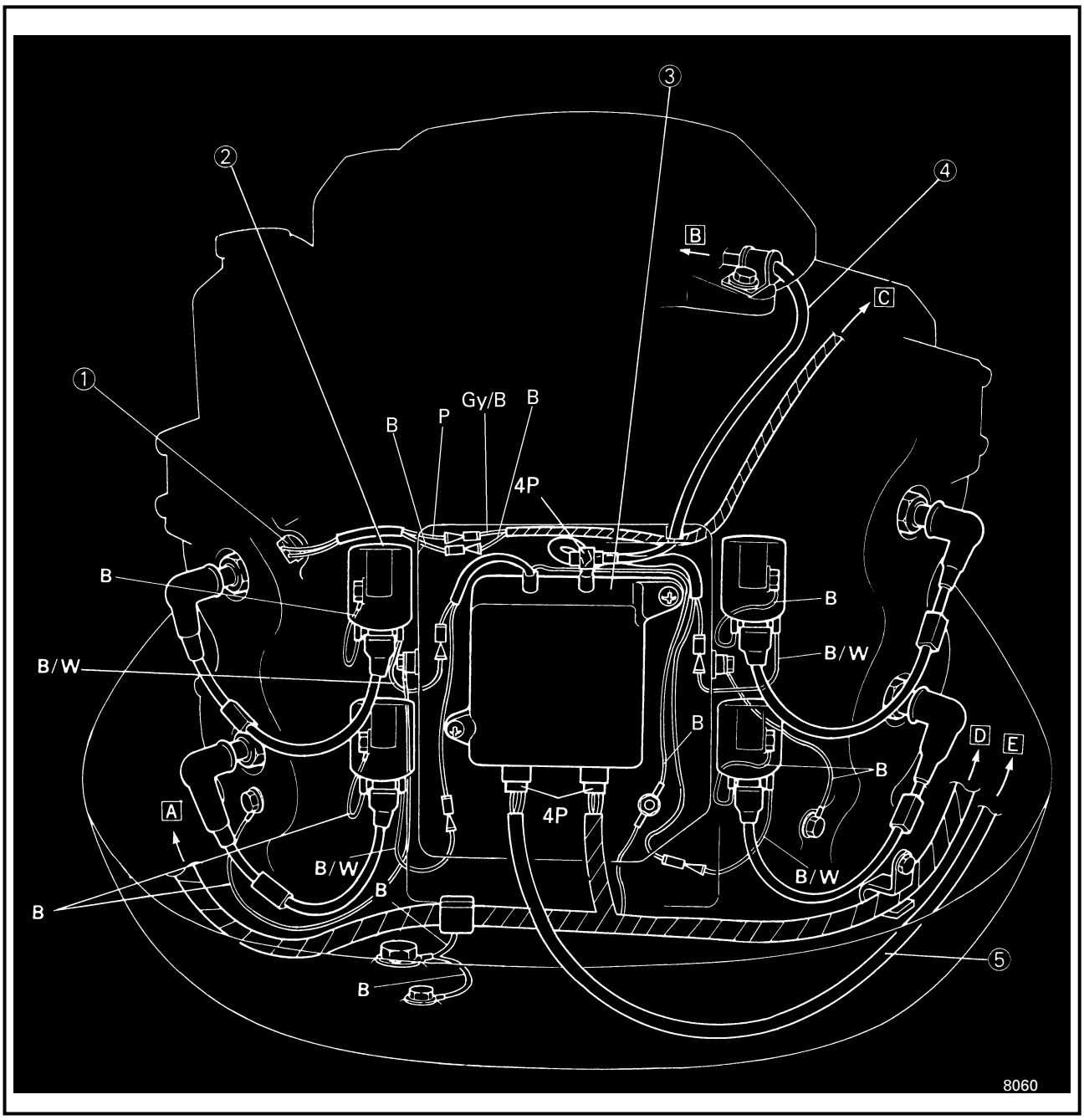


① Rectifier/regulator
② Thermo switch
③ Lighting coil lead
④ Charge coil lead
⑤ Pulser coil lead
⑥ Fuel enrichment valve
⑦ Shift cable
⑧ Throttle cable

A To CDI unit
B To thermo switch
C To starter assembly
D To wire harness
E To trim sensor
F To starter relay and starter motor
G To battery
H To remote control
I To trim meter

B : Black
G : Green
L : Blue
O : Orange
P : Pink
R : Red
G/W : Green/white
Gy/B : Gray/black

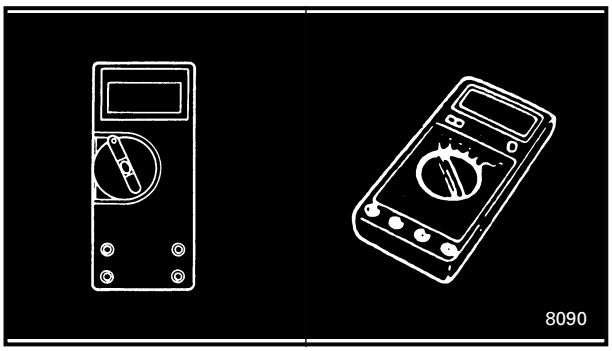
(Aft view)



① Thermo switch
② Ignition coil
③ CDI unit
④ Charge coil lead
⑤ Pulser coil lead

A To relay assembly
B To charge coil
C To wire harness
D To 10P coupler
E To pulser coil

B : Black
P : Pink
B/W : Black/white
Gy/B : Gray/black



ELECTRICAL COMPONENTS ANALYSIS

DIGITAL CIRCUIT TESTER

	Digital tester **J-39299 / 90890-06752**

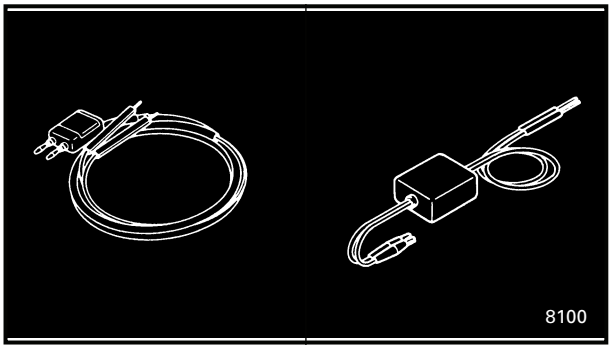
NOTE:

" ○——○ " indicates a continuity of electricity which means a closed circuit at the respective switch position.

MEASURING THE PEAK VOLTAGE

NOTE:

- When checking the condition of the ignition system it is useful to know the peak voltage.
- Cranking speed is dependant on many factors (e.g., fouled or weak spark plugs, a weak battery). If one of these is defective, the peak voltage will be lower than specification.
- If the peak voltage measurement is not within specification the engine will not operate properly.

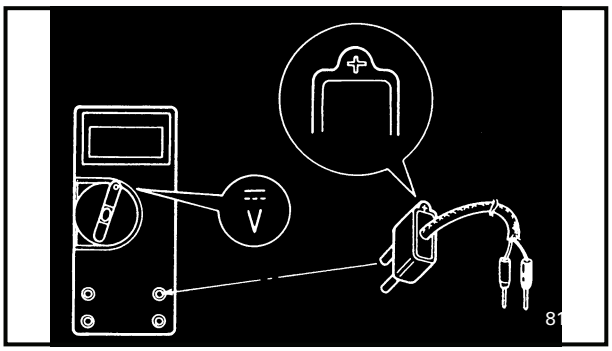


PEAK VOLTAGE ADAPTOR

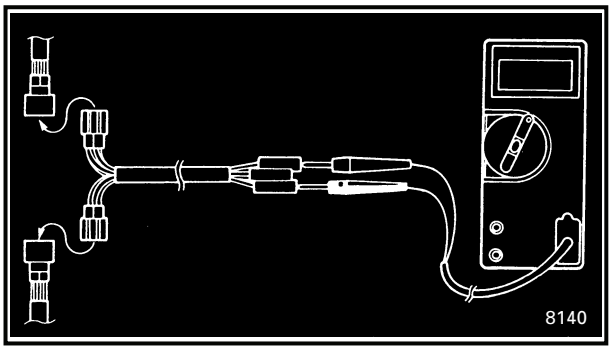
NOTE:

The peak voltage adaptor should be used with the digital circuit tester.

	Peak voltage adaptor **YU-39991 / 90890-03169**



NOTE:
- When measuring the peak voltage, set the selector to the DC voltage mode.
- Make sure the peak voltage adaptor leads are properly installed in the digital tester.
- Make sure the positive pin (the "+" mark facing up as shown) on the peak voltage adaptor is installed into the positive terminal of the digital tester.
- The test harness is needed for the following tests.



Measuring steps
(1) Disconnect the coupler connections.
(2) Connect the test harness between the couplers.
(3) Connect the peak voltage adaptor probes to the connectors which are being checked.
(4) Start or crank the engine and observe the measurement.

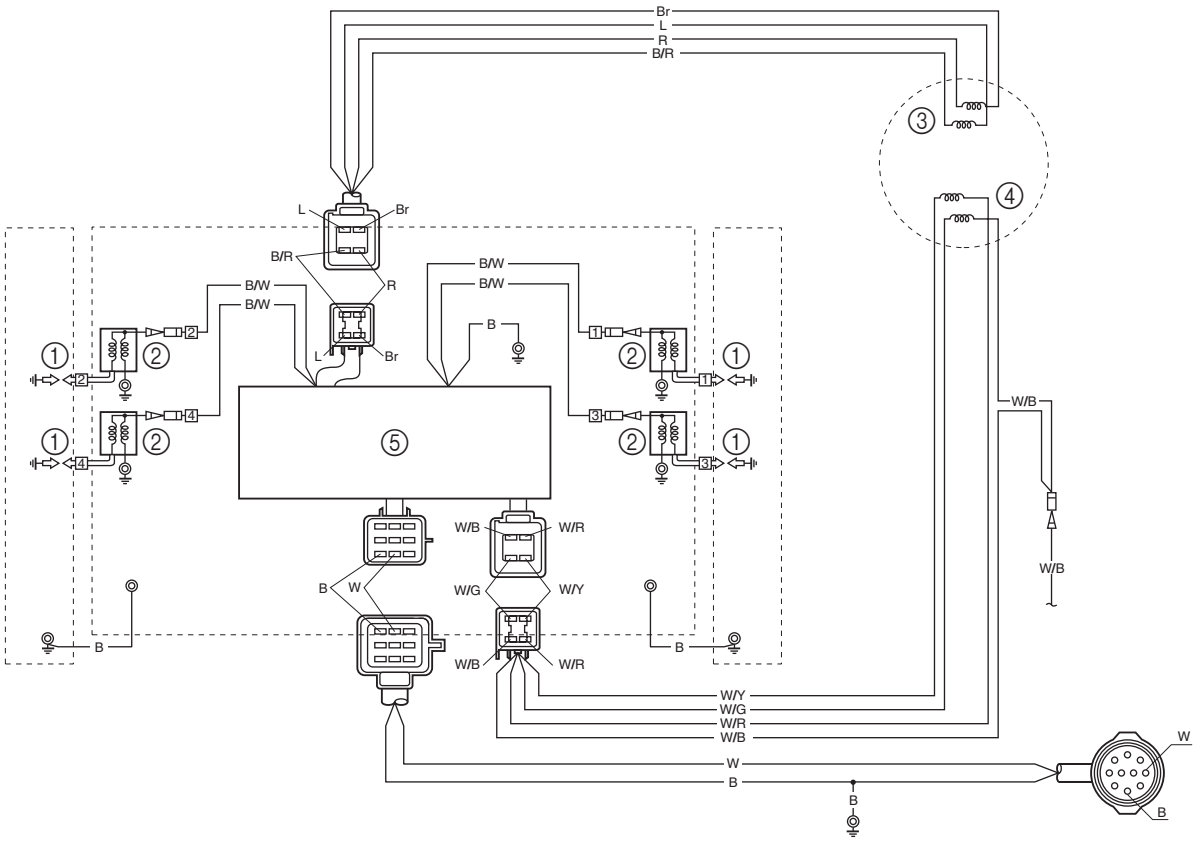
MEASURING A LOW RESISTANCE

When measuring a resistance of 10 Ω or less with the digital tester, the correct measurement cannot be obtained because of the tester's internal resistance.
To obtain the correct value, subtract the internal resistance from the displayed measurement.

Correct value
Displayed measurement – internal resistance

NOTE:
The internal resistance of the digital tester can be obtained by connecting both of its probes.

IGNITION SYSTEM (OIL INJECTION EXCEPT FOR 115BETO MODELS)

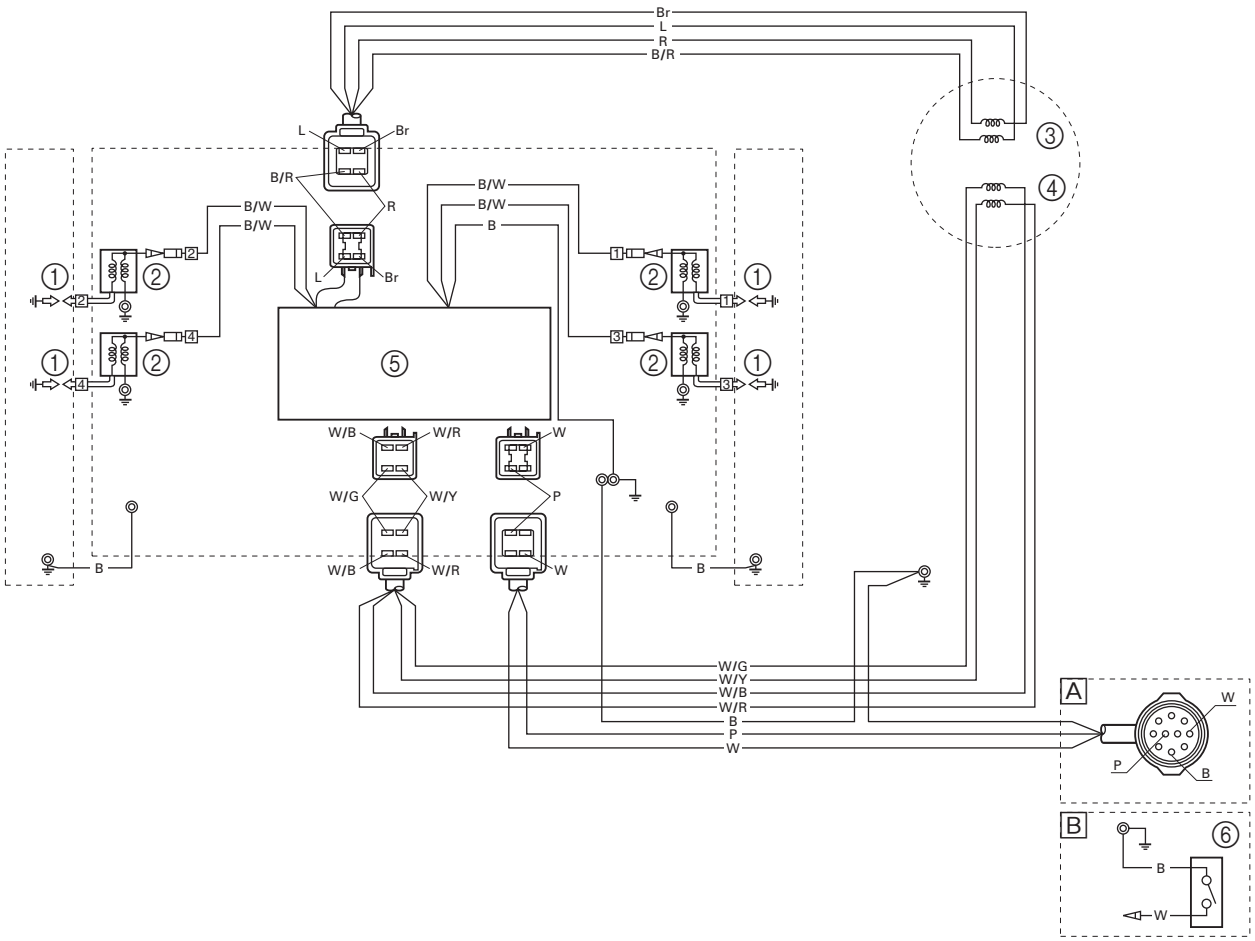


① Spark plugs
② Ignition coils
③ Charge coil
④ Pulser coil
⑤ CDI unit

B : Black
Br : Brown
L : Blue
R : Red
W : White

B/R : Black/red
B/W : Black/white
W/B : White/black
W/G : White/green
W/R : White/red
W/Y : White/yellow

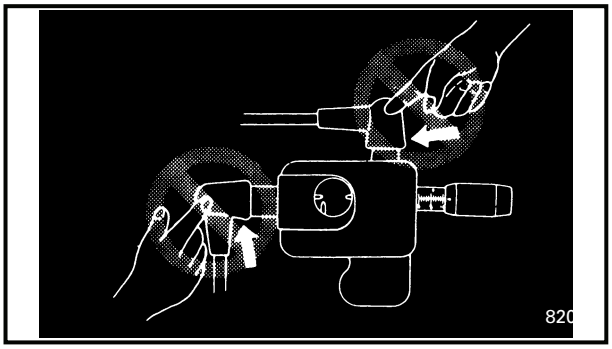
IGNITION SYSTEM (PRE-MIXED AND 115BETO MODELS)

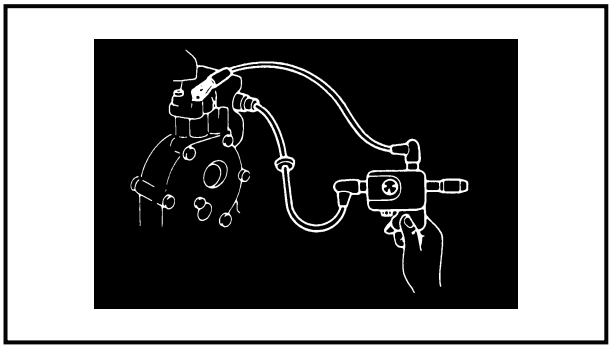


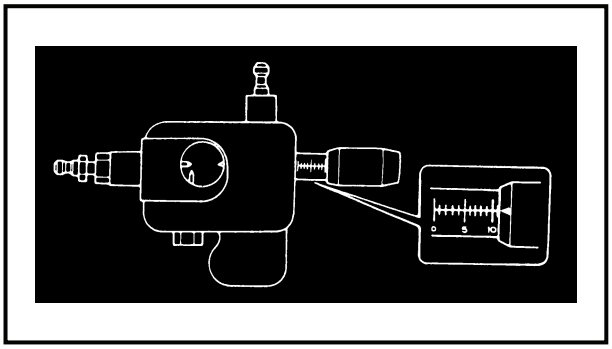
① Spark plugs
② Ignition coils
③ Charge coil
④ Pulser coil
⑤ CDI unit
⑥ Engine stop lanyard switch

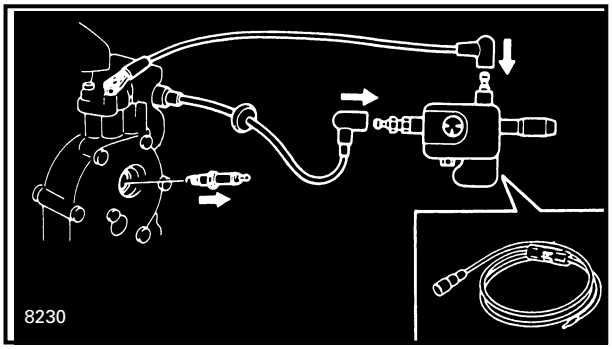
A Except for E115AMH, E115AWH
B For E115AMH, E115AWH

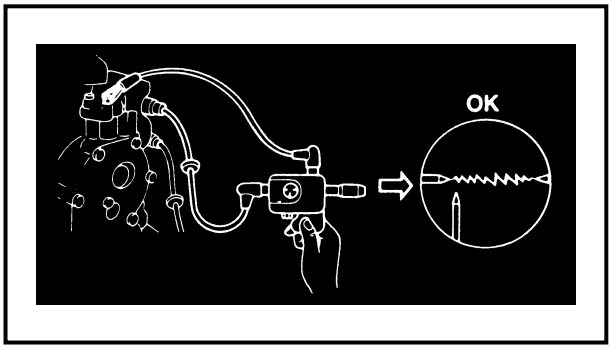
B : Black
Br : Brown
L : Blue
P : Pink
R : Red
W : White
B/R : Black/red
B/W : Black/white
W/B : White/black
W/G : White/green
W/R : White/red
W/Y : White/yellow











INSPECTING THE IGNITION SPARK GAP

⚠ WARNING

- **Do not touch any of the connections of the spark gap tester lead wires.**
- **Do not let sparks leak out of the removed spark plug cap.**
- **Keep flammable gas or liquids away, since this test can produce sparks.**

Inspect:
- Ignition spark gap
  Above specification → Replace the spark plug.
  Below specification → Inspect the CDI unit output.

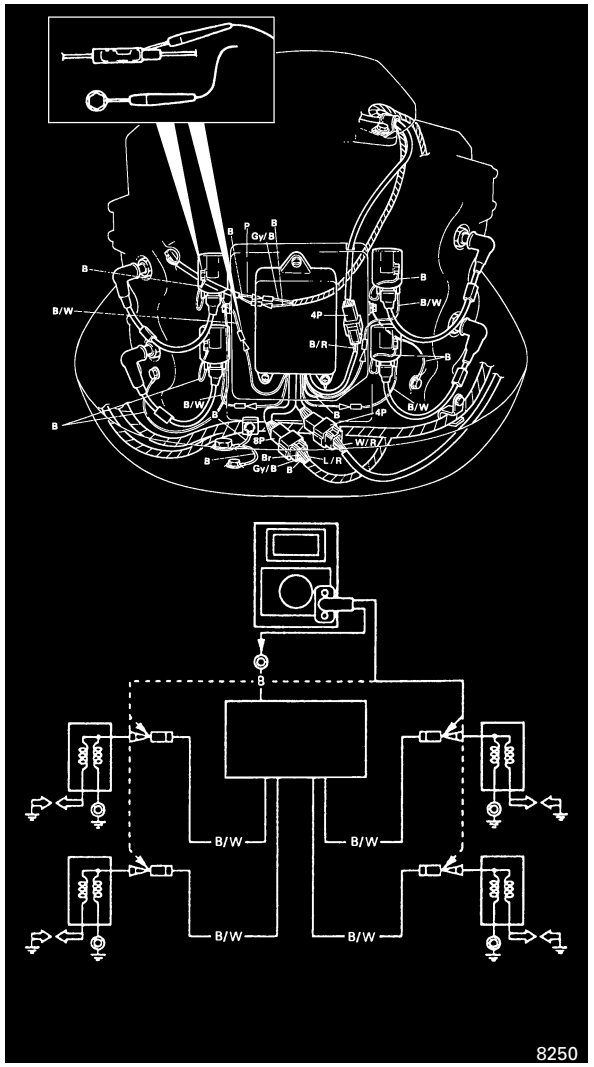
	Ignition spark gap **9 mm (0.4 in)**

Inspecting steps

(1) Remove the spark plugs from the engine.
(2) Connect a spark plug cap to the spark gap tester.
(3) Set the spark gap length on the adjusting knob.

	Spark gap tester **YM-34487 / 90890-06754**

(4) Crank the engine and observe the spark through the discharge window of the spark gap tester.



MEASURING THE IGNITION SYSTEM PEAK VOLTAGE

⚠ WARNING

When checking the peak voltage do not touch any of the connections of the digital tester lead wires.

NOTE:

- If there is no spark or the spark is weak, continue with the ignition system test.
- If a good spark is obtained, the problem is not with the ignition system, but possibly with the spark plug(s) or another component.

1. Measure:
   - CDI unit output peak voltage
     Above specification → Replace the ignition coil.
     Below specification → Measure the charge coil output peak voltage.

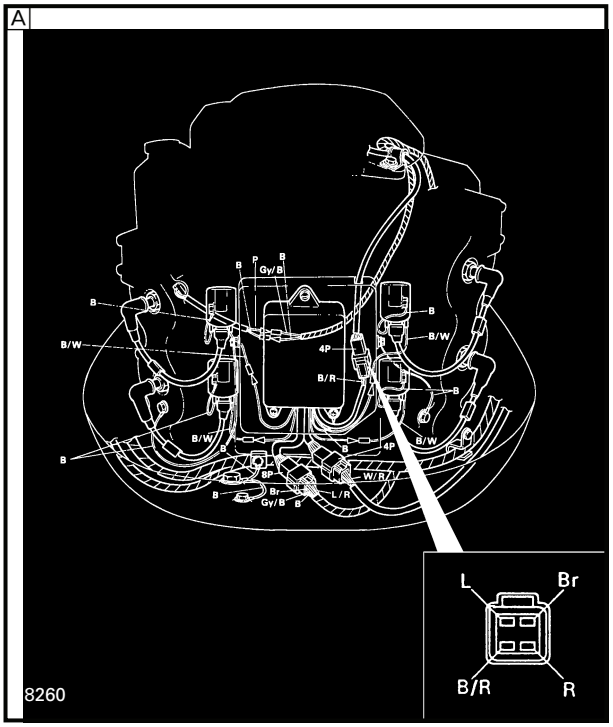
CDI unit output peak voltage (oil injection except for 115BETO models)
Black/white (B/W) – Black (B)

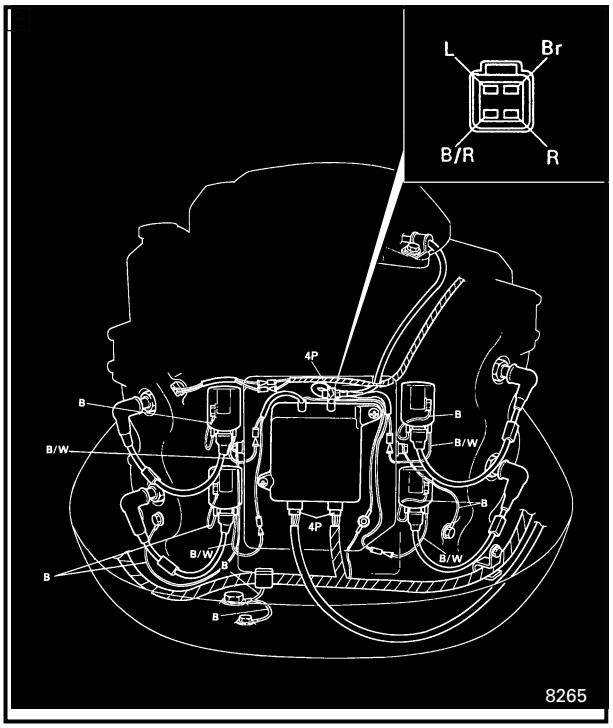
r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	—	125	140	145

CDI unit output peak voltage (pre-mixed and 115BETO models)
Black/white (B/W) – Black (B)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	—	85	140	135

A





2. Measure:
   • Charge coil output peak voltage
   Above specification → Measure the pulser coil output peak voltage.
   Below specification → Replace the charge coil.

Charge coil output peak voltage (oil injection except for 115BETO models)
Red (R) – Brown (Br)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	170	160	165	170

Black/red (B/R) – Blue (L)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	45	45	165	170

Test harness (4-pin)
YB-38831 / 90890-06771

Charge coil output peak voltage (pre-mixed and 115BETO models)
Red (R) – Brown (Br)

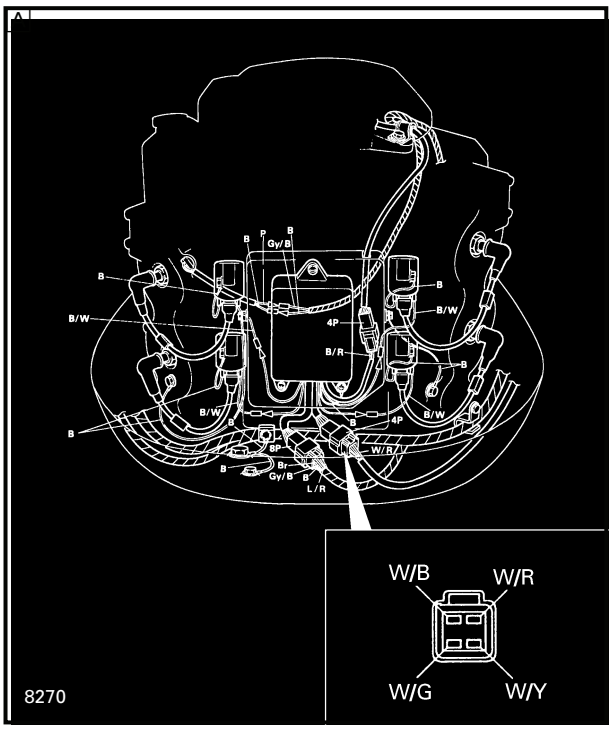
r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	95	105	160	160

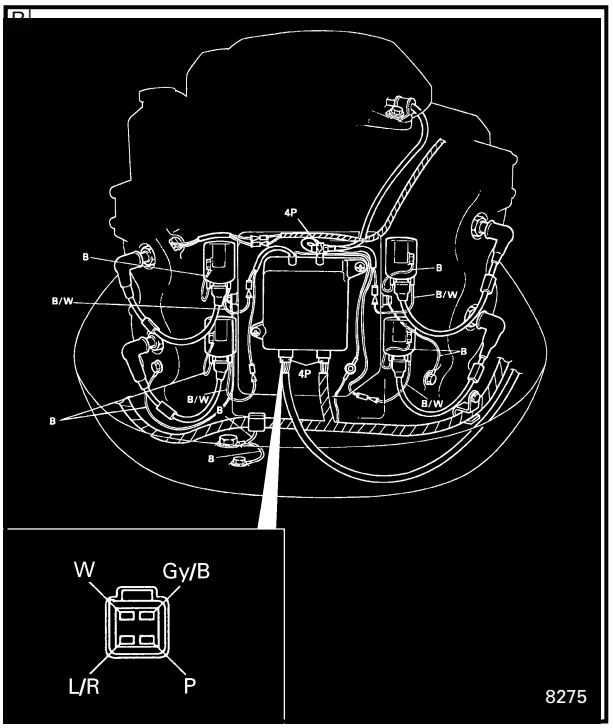
Black/red (B/R) – Blue (L)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	30	30	160	160

Test harness (4-pin)
YB-38831 / 90890-06771

A Oil injection except for 115BETO models
B Pre-mixed and 115BETO models





3. Measure:
   • Pulser coil output peak voltage
   Above specification → Replace the CDI unit.
   Below specification → Replace the pulser coil.

Pulser coil output peak voltage (oil injection except for 115BETO models)
White/red (W/R) – White/yellow (W/Y)
White/black (W/B) – White/green (W/G)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	2.5	2.5	7.0	12

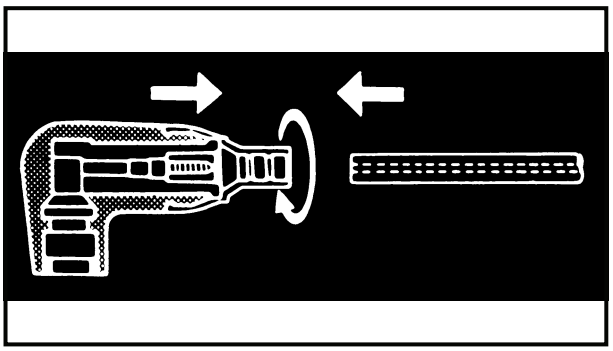
Test harness (4-pin)
YB-38831 / 90890-06771

Pulser coil output peak voltage (pre-mixed and 115BETO models)
White/red (W/R) – White/yellow (W/Y)
White/black (W/B) – White/green (W/G)

r/min	Circuit	Loaded		
	Cranking		1,500	3,500
V	3.0	2.5	8.0	12

Test harness (4-pin)
YB-38831 / 90890-06771

A Oil injection except for 115BETO models
B Pre-mixed and 115BETO models

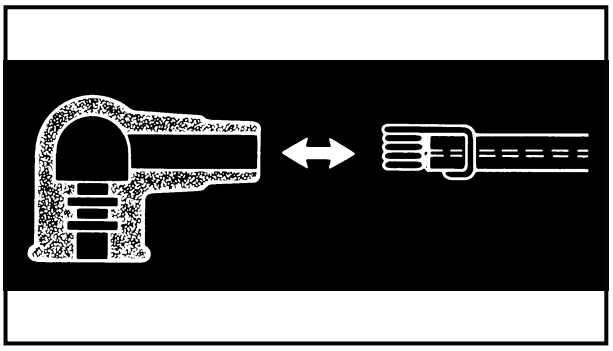


INSPECTING THE SPARK PLUG CAPS

1. Inspect:
   • Spark plug cap
   Loose connection → Tighten.
   Cracks/damage → Replace.

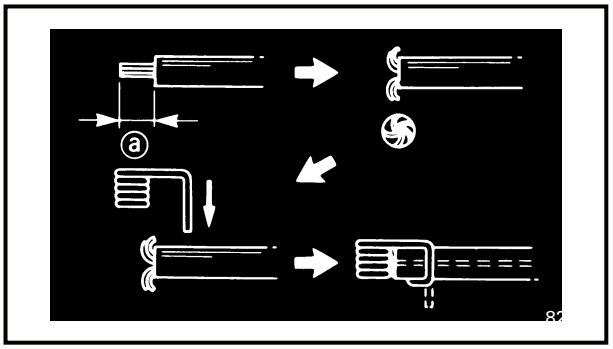
Replacement steps (for Canada, Europe and South Africa)

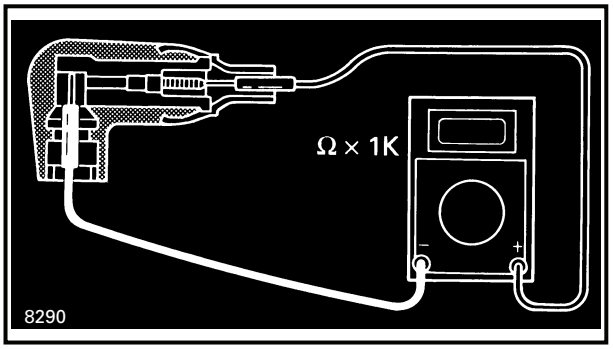
(1) To remove the spark plug cap turn it counterclockwise.
(2) To install the spark plug cap turn it clockwise until it is tight.



Replacement steps (except for Canada, Europe and South Africa)

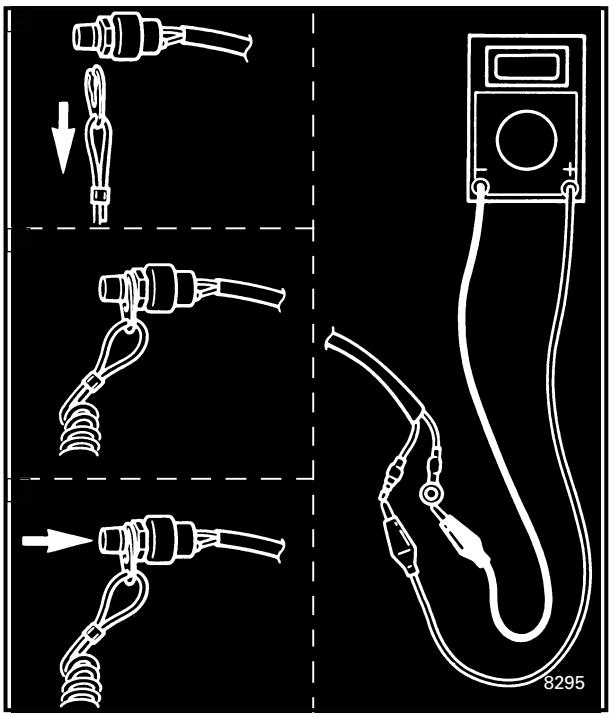
(1) Remove the spark plug cap off of the lead.
(2) Remove the spark plug cap spring.
(3) Strip the insulation cover 5 mm (0.2 in) ⓐ and spread the core wires outward.
(4) Fit the spark plug cap spring close to the spread core wires and bend the end of the spring around the lead.
(5) Install the spark plug cap spring into the spark plug cap.





2. Measure:
   (for Canada, Europe and South Africa)
   • Spark plug cap resistance
   Out of specification → Replace.

	Spark plug cap resistance **4.0 - 6.0 kΩ**



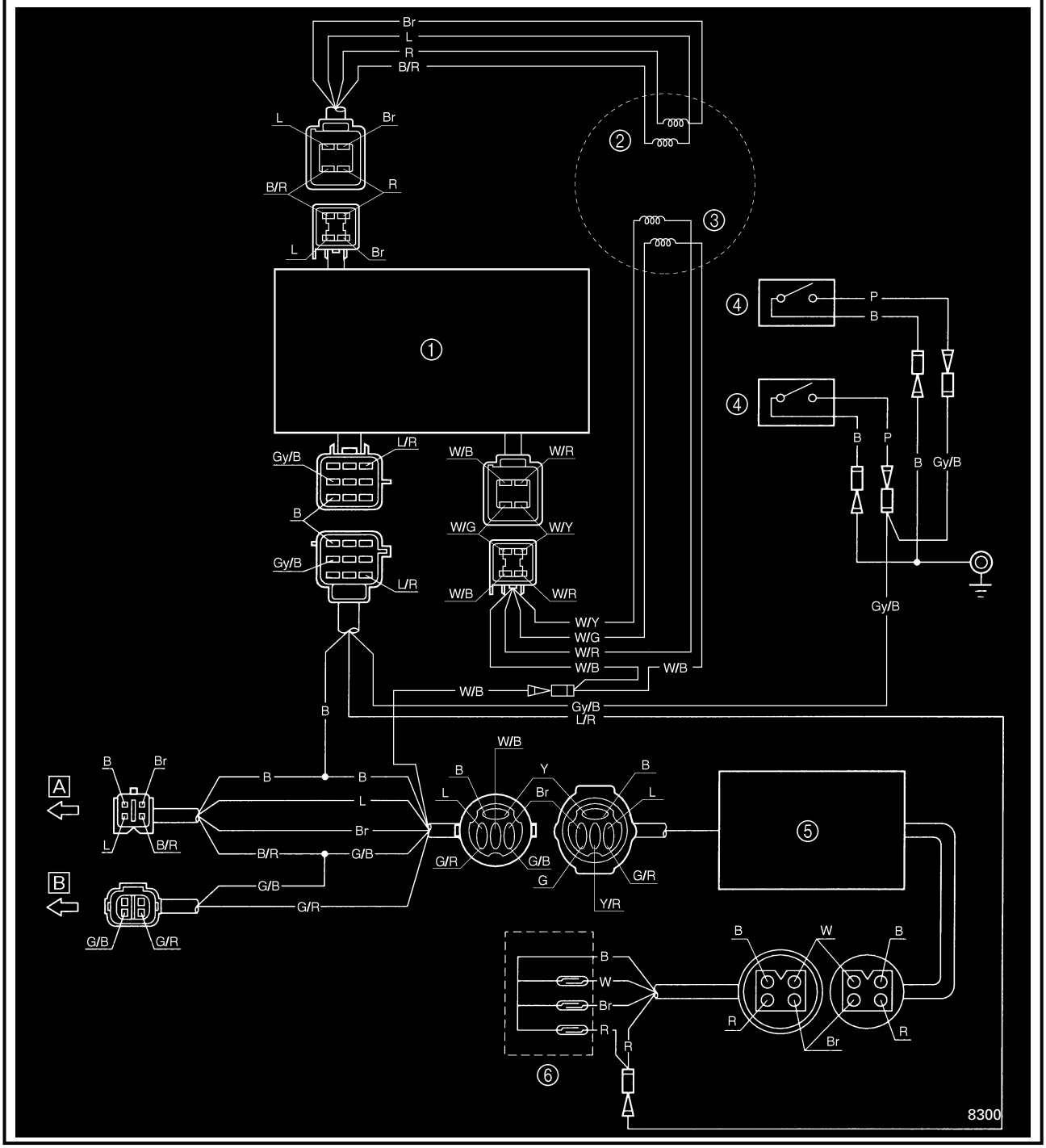
INSPECTING THE ENGINE STOP LANYARD SWITCH

Inspect:

- Engine stop lanyard switch continuity
  Out of specification → Replace.

	Lead color	
	White (W)	Black (B)
Remove the lock-plate A.	○———	———○
Install the lock-plate B.		
Push the button C.	○———	———○

IGNITION CONTROL SYSTEM (OIL INJECTION MODELS)

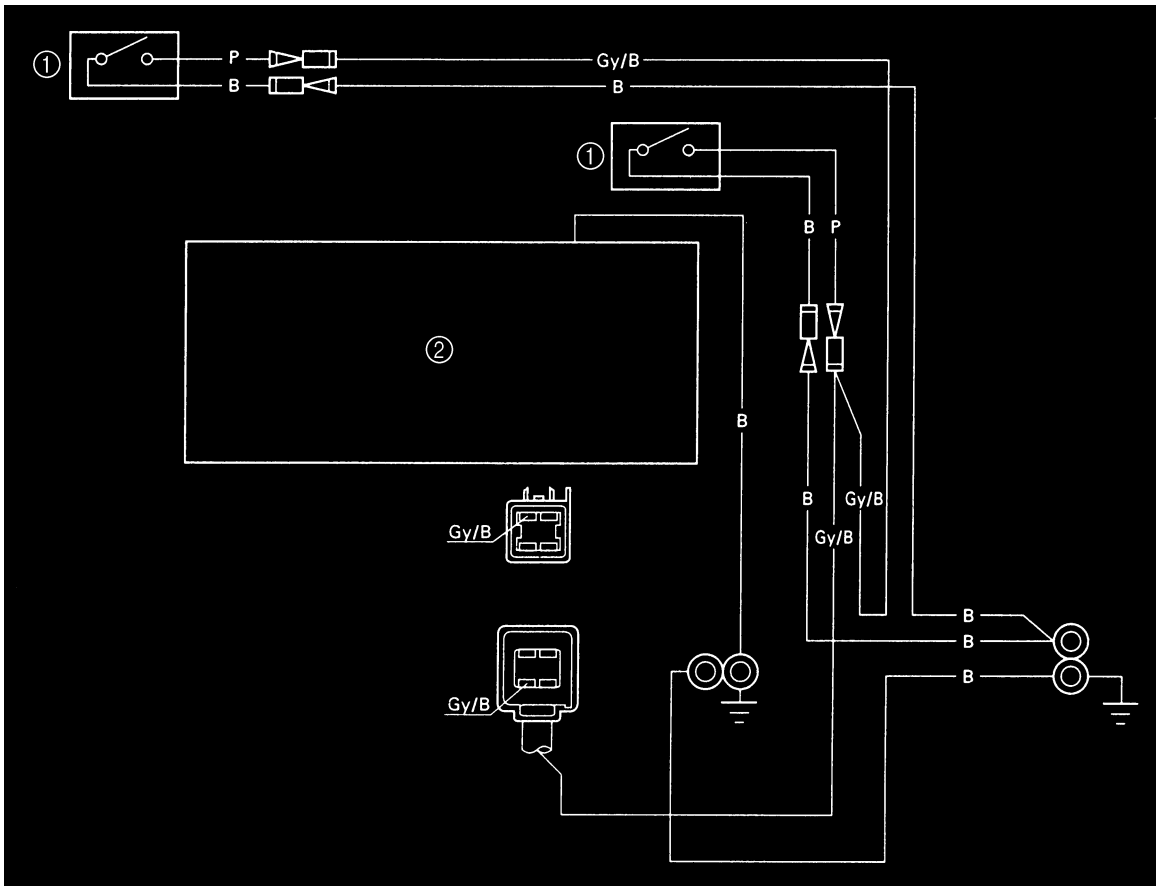


① CDI unit
② Charge coil
③ Pulser coil
④ Thermo switch
⑤ Oil pump control unit/ emergency switch
⑥ Oil level sensor

A To sub-oil tank
B To oil level meter

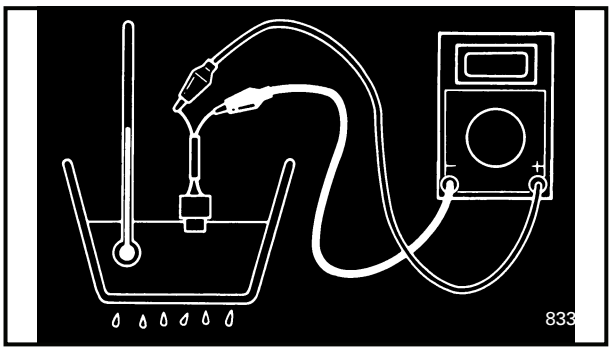
B : Black
Br : Brown
L : Blue
P : Pink
R : Red
W : White
Y : Yellow
B/R : Black/red
G/B : Green/black
G/R : Green/red
Gy/B : Gray/black
L/R : Blue/red
W/B : White/black
Y/R : Yellow/red

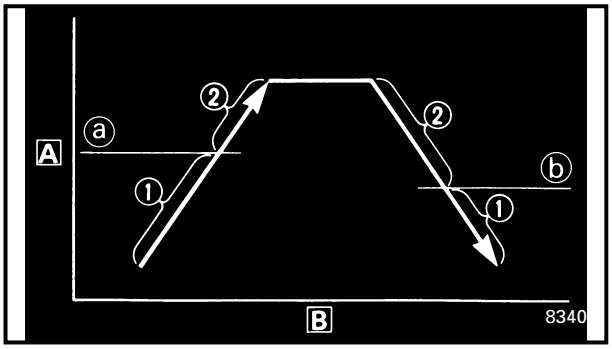
IGNITION CONTROL SYSTEM (PRE-MIXED MODELS)

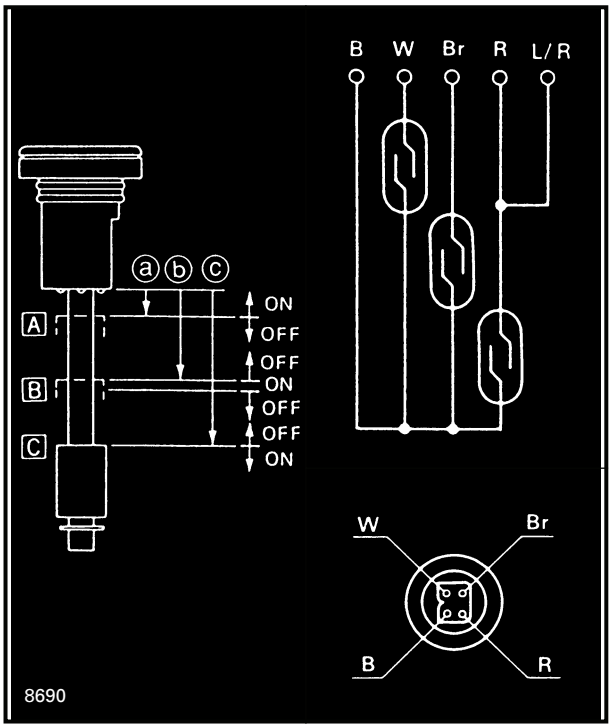


① Thermo switch
② CDI unit

B : Black
P : Pink
Gy/B : Gray/black







INSPECTING THE THERMO SWITCH CONTINUITY

Inspect:
- Thermo switch continuity
  Out of specification → Replace.

Thermo switch continuity temperature
Pink (P) – Black (B)
ⓐ 84 - 90 °C (183 - 194 °F)
ⓑ 60 - 74 °C (140 - 165 °F)

① No continuity
② Continuity
A Temperature
B Time

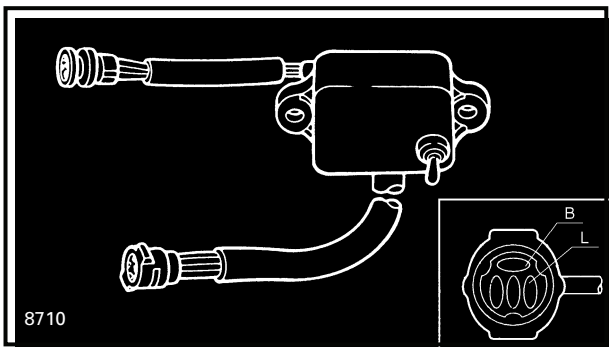
Measuring steps
(1) Place the thermo switch in a container filled with water.
(2) Place a thermometer in the water.
(3) Slowly heat the water.
(4) Measure the continuity when the specified temperature is reached.

INSPECTING THE OIL LEVEL SENSOR CONTINUITY

Inspect:
- Oil level sensor continuity
  Out of specification → Replace.

Float position	Lead color			
	Black (B)	White (W)	Brown (Br)	Red (R)
A ON	○——	——○		
A OFF				
B ON	○——		——○	
B OFF				
C ON	○——			——○
C OFF				

Float distance
ⓐ: 3.3 - 6.3 mm (0.13 - 0.25 in)
ⓑ: 33.3 - 36.3 mm (1.31 - 1.43 in)
ⓒ: 53.3 - 56.3 mm (2.10 - 2.22 in)

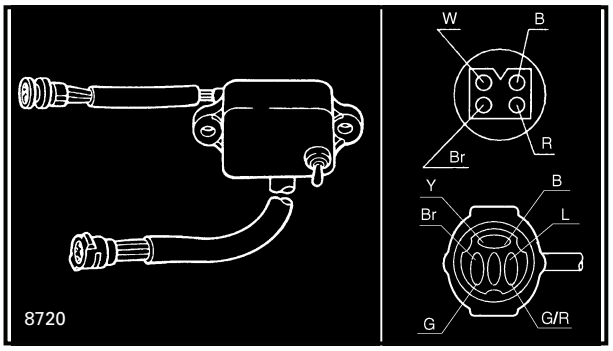


INSPECTING THE EMERGENCY SWITCH

1. Inspect:
   - Emergency switch continuity
     Out of specification → Replace.

Switch position	Lead color
	Blue (L) – Black (B)
Home ⓐ	No continuity
On ⓑ	Continuity

2. Inspect:
   - Emergency switch
     Does not automatically return to the home position → Replace.



MEASURING THE OIL PUMP CONTROL UNIT

Measure:
- Oil pump control unit resistance
  Out of specification → Replace.

Oil pump control unit resistance kΩ at 20˚C (68˚F)

⊖ \ ⊕	Yellow (Y)	*Yellow (Y)	Brown (Br)	Blue (L)	*Blue (L)	Black (B)	Green/red (G/R)	Green (G)	White (W)	Brown (Br)	Red (R)
Yellow (Y)			3.2 - 4.8	12.0 - 18.0	4.8 - 7.2	4.8 - 7.2	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0
Brown (Br)	∞	∞		4.8 - 7.2	1.6 - 2.4	1.6 - 2.4	8.0 - 12.0	6.4 - 9.6	8.0 - 12.0	8.0 - 12.0	8.0 - 12.0
Blue (L)	∞	∞	3.2 - 4.8			4.8 - 7.2	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0
Black (B)	∞	∞	1.6 - 2.4	3.2 - 4.8	0		8.0 - 12.0	8.0 - 12.0	8.0 - 12.0	8.0 - 12.0	8.0 - 12.0
Green/red (G/R)	∞	∞	∞	∞	∞	∞		∞	∞	∞	0
Green (G)	∞	∞	∞	∞	∞	∞	∞		∞	∞	∞
White (W)	∞	∞	8.0 - 12.0	16.0 - 24.0	8.0 - 12.0	8.0 - 12.0	16.0 - 24.0	16.0 - 24.0		16.0 - 24.0	16.0 - 24.0
Brown (Br)	∞	∞	8.0 - 12.0	16.0 - 24.0	8.0 - 12.0	8.0 - 12.0	16.0 - 24.0	16.0 - 24.0	16.0 - 24.0		16.0 - 24.0
Red (R)	∞	∞	∞	∞	∞	∞	0	∞	∞	∞	