**ELECTRICAL SYSTEM** 

ETV mille USA \_\_\_\_\_

**ELECTRICAL SYSTEM** 

6

# **ELECTRICAL SYSTEM**

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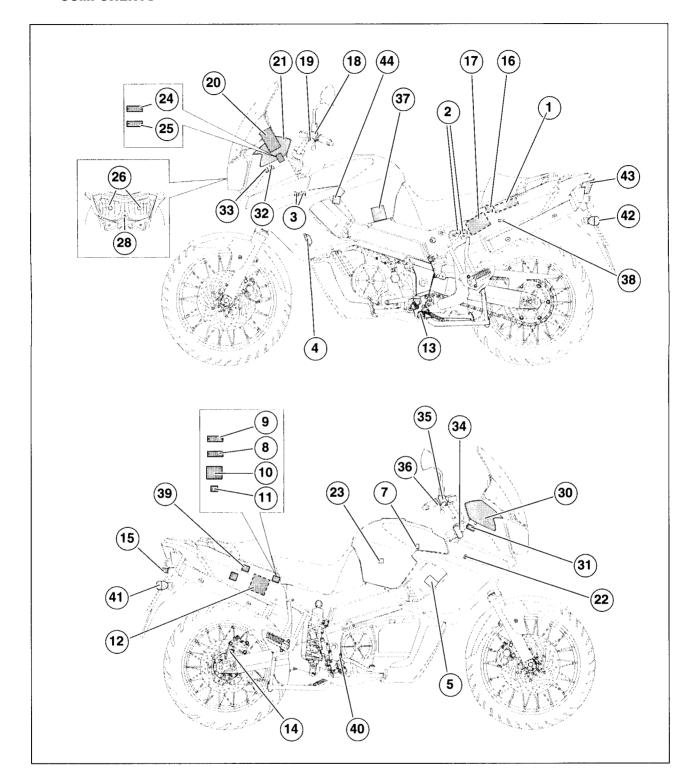
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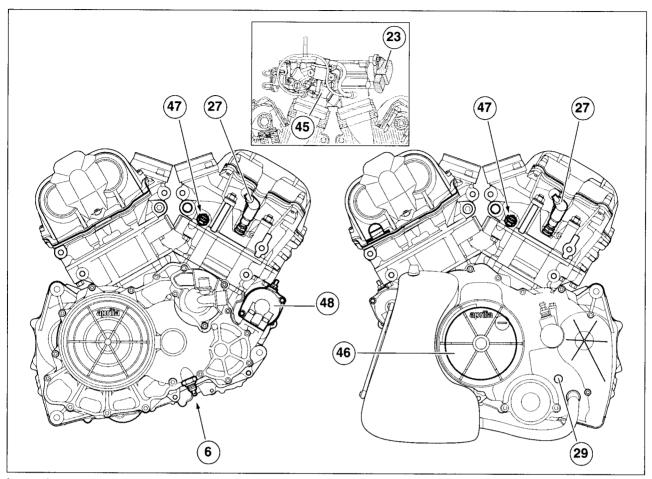
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# 6.1 LOCATIONS OF ELECTRICAL **COMPONENTS**







# Legend

- 1) Electronic control unit
- 2) Front cylinder coils
- 3) Rear cylinder coils
- 4)Horn
- 5)Fan
- 6)Oil pressure sensor
- 7) Intake air thermistor
- 8) Fuel pump relay
- 9) Engine stop relay
- 10)Injection relay
- 11)Diode module
- 12)Voltage regulator
- 13)Side stand switch
- 14)Speed sensor
- 15)License plate lamp
- 16)Start relay
- 17)Battery
- 18)Left dimmer switch
- 19)Clutch switch
- 20)Dashboard
- 21)Front left direction indicator
- 22)Air temperature sensor
- 23)Throttle valve position sensor
- 24)Headlight relay

- 25)High beam relay
- 26) Highbeam/headlight bulbs
- 27)Spark plugs
- 28) Front parking light bulb
- 29)Neutral switch
- 30)Front right direction indicator
- 31)Secondary fuses (15 A)
- 32)Flasher
- 33)Overturn sensor
- 34)Ignition switch
- 35)Right dimmer switch
- 36)Front brake switch
- 37) Fuel pump/sensor assembly
- 38)TEST and diagnostics connector
- 39)Main fuses (30 A)
- 40)Rear stop switch
- 41)Rear right direction indicator
- 42)Rear left direction indicator
- 43)Taillight
- 44)Stepper (choke)
- 45)Injector
- 46)Pick-up flywheel
- 47)Coolant temperature thermistor
- 48)Starter motor



#### 6.2 INTRODUCTION

The following instructions will help you in consulting this section.

NOTE The numbers that appear on the specific wiring diagrams match those given in the overall wiring diagram.

# 6.2.1 WIRE COLORS

Ar orange

Az light blue

**B** blue

Bi white

G yellow

Gr grey

M brown

N black

R red

Ro pink

V green

Vi purple

#### 6.2.2 ELECTRICAL CONNECTORS

Disconnect two electrical connectors as follows:

• Press the safety latches, if provided.

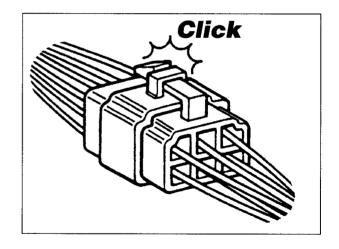
# A WARNING

Do not pull on the wires to disconnect the two connectors.

- Grasp the two connectors and disconnect them by pulling in opposite directions.
- If you see any dirt, rust, moisture, etc., carefully clean the inside of the connector using compressed air.
- ◆ Make sure that the cables are correctly crimped to the terminals placed inside the connectors.

NOTE The connectors are keyed to ensure that they are properly assembled.

• If the connectors are properly connected, you will hear the typical "click" sound for those connectors equipped with safety latch.





#### 6.3 CHECKING THE RECHARGING SYSTEM

#### 6.3.1 CHECKING THE RECHARGING VOLTAGE

- Check the battery voltage, see 2.4.2 (RECHARGING THE BATTERY).
- Start the engine and rev it to 4000 rpm.
- ◆ Set the light switch to "♡" and the light dimmer to "©".
- ASD Set the light dimmer to "

  ©".
- Use a tester to measure the DC voltage between the positive (+) and negative (-) terminals of the battery.

If the tester indicates voltages below 13 V or above 15 V:

· Check the open-circuit operation and continuity of the alternator. see 6.3.2 (CHECKING THE OPEN-CIRCUIT ALTERNATOR OPERATION). (CHECKING ALTERNATOR CONTINUITY) and the voltage regulator, see 6.3.5 (CHECKING THE **VOLTAGE REGULATOR).** 

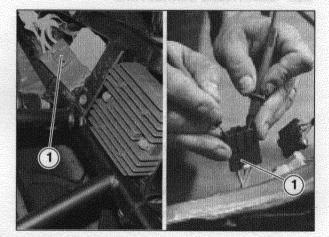
# Wiring diagram legend

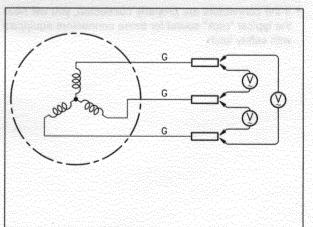
NOTE For the positions of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).

- 1)Battery
- 2) Main fuses (30 A)
- 3) Alternator
- 4) Voltage regulator
- 5) Ignition switch ( ) ⋈ ⊕ P ∈)

Standard charge voltage: 13 - 15 V (DC) at 4000 rpm.

# 5 3





#### 6.3.2 CHECKING THE **OPEN-CIRCUIT ALTERNATOR OPERATION**

- Remove the right rear side panel, see 7.1.3 (REMOVING THE SIDE PANELS).
- Disconnect the three-way connector (1) (brown) voltage regulator cables.

# **A WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

- Start the engine and rev it to 4000 rpm.
- Use a tester to measure the voltage (AC) from the three internal male terminals [yellow cables (G)] two at a time.

If the output voltage is less than 60 V, the alternator is faulty and must be replaced.

Standard open-circuit voltage:

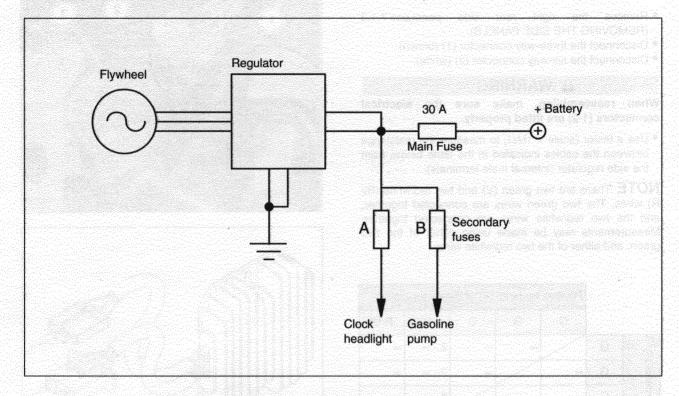
greater than 60 V (AC) at 4000 rpm.







# 6.3.3 RECHARGING SYSTEM DIAGRAM



# **6.3.4 CHECKING ALTERNATOR CONTINUITY** With the engine off:

- Remove the right rear side panel, see 7.1.3 (REMOVING THE SIDE PANELS).
- Disconnect the three-way connector (1) (brown) voltage regulator cables.

# **A** WARNING

When reassembling, make sure the electrical connector (1) is properly connected.

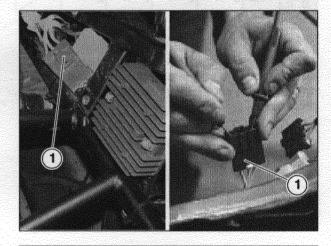
ullet Use a tester (scale  $\Omega$ ) to check the continuity between the cables of the stator [on the internal female terminals, yellow cables (G)].

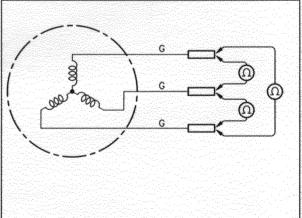
Also check the insulation of the stator mount.

Standard resistance value: 0.1 -1 $\Omega$ 

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Standard resistance value (between cables and stator mount): ∞.





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#### 6.3.5 CHECKING THE VOLTAGE REGULATOR

- Remove the right rear side panel, see 7.1.3 (REMOVING THE SIDE PANELS).
- Disconnect the three-way connector (1) (brown).
- Disconnect the six-way connector (2) (white).

# **A** WARNING

When reassembling, make sure the electrical connectors (1-2) are fitted properly.

• Use a tester (scale x  $1M\Omega$ ) to measure the resistance between the cables indicated in the table below, from the side regulator (internal male terminals).

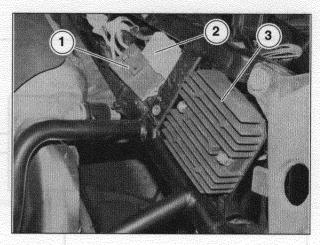
NOTE There are two green (V) and two red/white (Bi/ R) wires. The two green wires are connected together. and the two red/white wires are connected together. Measurements may be made using either of the two green, and either of the two red/white wires.

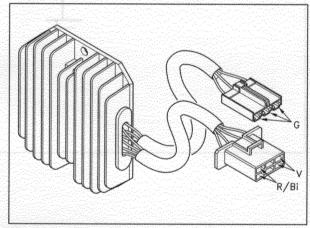
		Positiv	Positive terminal (+) of the tester on:				
		G	G	G	V	R/Bi	
÷	G		<b>8</b>	00	2 - ∞	œ	
inal ( n:	G	00		00	2 - ∞	œ	
term ter o	G	00	00		2-∞	· ·	
Negative terminal (-) of the tester on:	٧	00	∞	00		∞ <u> </u>	
Neg of th	R/Bi	2-∞	2-∞	2 - ∞	3-∞		

# **A WARNING**

This measurement method is only approximate; if possible, make sure the charger is in good working order by using another regulator you know functions properly.

If the resistance measured is incorrect, replace the voltage regulator (3), see 7.1.50 (REMOVING THE REAR SUBFRAME).

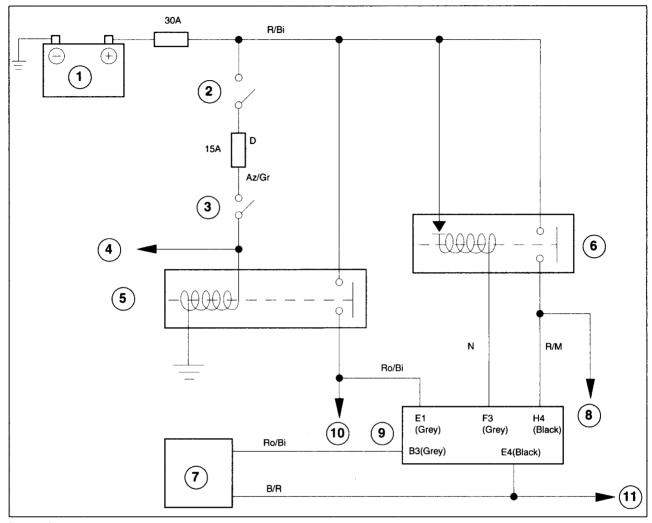






#### **6.4 INJECTION SYSTEM**

#### 6.4.1 FUEL INJECTION WIRING DIAGRAM



# Legend:

- 1)Battery
- 2) Key
- 3) Kill switch
- 4) Starter button
- 5) Engine stop relay
- 6) Injection relay

- 7) Fall sensor
- 8) Purge valve coil fan injector power .
- 9) ECU
- 10)To the fuel pump relay
- 11)Throttle valve position sensor, thermistors

#### 6.4.2 TROUBLESHOOTING

- ◆ Make sure that the 30-A main fuse and the 15-A fuse "D" are intact.
- Make sure the kill switch device is working properly, see 6.8 (IGNITION SAFETY SYSTEM) as well as the key, see 6.5 (IGNITION/INJECTION SYSTEM).
- ◆ Make sure the engine stop relay is in good working order, see 6.7.3 (CHECKING THE FUEL PUMP RELAY).
- ◆ Check the injection relay, see 6.4.3 (CHECKING THE INJECTION RELAY).
- ◆ Check the fall sensor, see 6.4.4 (CHECKING THE FALL SENSOR).



#### 6.4.3 CHECKING THE INJECTION RELAY

To check the relay:

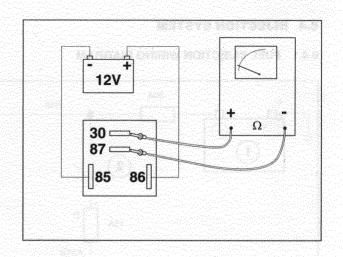
- Remove the rider saddle, see 7.1.2 (REMOVING THE SIDE FAIRINGS).
- Power the two male terminals (85-86) with a voltage of
- Use a tester (in ohm meter mode) to check the continuity between the other two terminals (87-30).

Correct value with relay energized: 0  $\Omega$ Correct value with relay not energized:  $\infty \Omega$ 

If the values do not match those indicated, replace the relay in question.

# **A WARNING**

Observe the polarity, connecting the "+" pole to terminal (86) and the "-" pole to terminal (85); there is a diode inside.



#### 6.4.4 CHECKING THE OVERTURN SENSOR

\* Remove the front fairing, see 7.1.2 (REMOVING THE RIDER SADDLE).

Make sure that the sensor (1) is assembled correctly (with the arrow engraved on the grommet facing upwards).

• Disconnect the two-way connector (2) (white/grey) and measure (on the sensor side terminals).

# **A** WARNING

When reassembling, make sure the electrical connector (2) is properly connected.

• Use a tester (scale x 100 k $\Omega$ ), to measure the resistance between the terminals of the black and white/black cables (N - Bi/N)

#### Standard value: resistance 62 k $\Omega$ ± 10%.

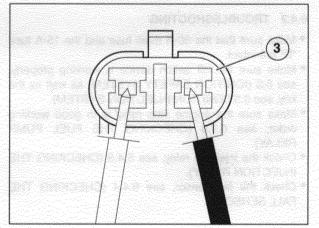
· Remove the sensor (1) with grommet from its seat and tilt it sideways by more than 45° (simulating the situation with the vehicle resting on the ground).

# Standard value: 0 - 1 k $\Omega$

**NOTE** If the operation of the sensor does not match the above description, replace it with a new one of the same type.

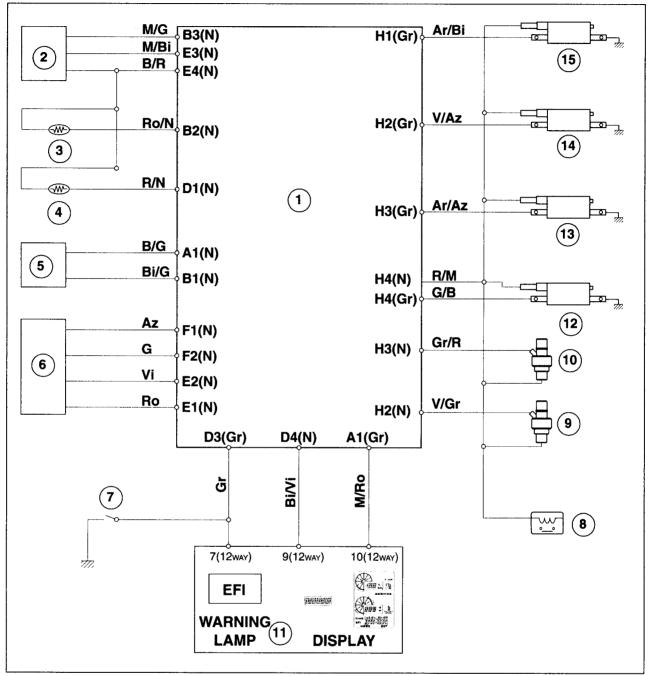
• Repeat the operations, tilting the sensor (1) on the opposite side.







# 6.5 IGNITION/INJECTION SYSTEM



#### Legend

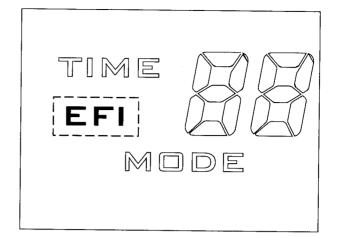
- 1) Electronic control unit (ECU)
- 2) Throttle valve position sensor
- 3) Coolant thermistor
- 4) Injection air thermistor
- 5) rpm sensor
- 6) Choke motor
- 7) Test connector
- 8) Injection relay

- 9) Rear cylinder injector
- 10)Front cylinder injector
- 11)Dashboard
- 12)Rear cylinder coil center spark plug
- 13)Rear cylinder coil side spark plug
- 14)Front cylinder coil side spark plug
- 15)Front cylinder coil center spark plug



#### 6.5.1 TROUBLESHOOTING

- ◆ Place the vehicle on the stand.
- ◆ Set the ignition switch to "○".
- ◆ The message "EFi" will appear on the display for approximately three seconds.
- ◆ If the LED "EFI" turns off, the control unit has not found any faults.

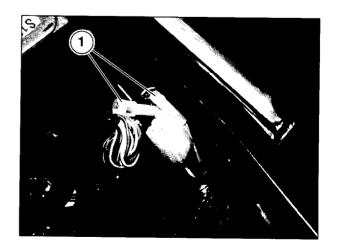


#### 6.5.2 FAULT SITUATIONS

- ◆ If the message "EFI" remains lit and the message "off", even after carrying out the operations described in paragraph 6.5.1 (TROUBLESHOOTING), the battery is probably low.
- ◆ if the message "EFI" remains lit, even after carrying out the operations described in paragraph 6.5.1 (TROUBLESHOOTING), the engine may be switched on but will not start.
- ◆ if the message "EFI" continues to flash even after you have carried out the operations described in 6.5.1 (TROUBLESHOOTING), proceed with checking the sensors.

# 6.5.3 VERIFYING FAULT CODES

- ◆ Raise the saddle, see 7.1.1 (REMOVING THE SADDLE).
- Connect together the two TEST connectors (1), located on the right-hand side of the motorcycle.
- Check on the dashboard, in the clock face, to see which numerical indications appear.
- Check the following table to determine which problem each fault code refers to.





#### **FAULT CODE TABLE:**

FAULT CODE	COMPONENT	CAUSE	
12	Crankshaft position sensor (pick-up)	- Sensor not connected Sensor broken.	
15	Throttle position sensor (TPS)	- Faulty wiring.	
21	Engine temperature sensor		
22	Air temperature sensor		
23	Barometric pressure sensor	- Sensor faulty.	
33	Coil 1	- Coil not working or not wired	
34	Coil 2		
35	Coil 3		
36	Coil 4		
42	Injector 1	- Injector not working or not wired.	
43	Injector 2		

# 6.5.4 TROUBLESHOOTING IN THE ELECTRONIC SYSTEM USING DISPLAYED INFORMATION

# <u>A</u> WARNING

Take care around the high voltage in the ignition system.

Never disconnect the connections with the engine running.

Whenever working on the ignition system, unless otherwise indicated, always leave the ignition switch set to "X" and the battery disconnected (when disconnecting the battery, disconnect the negative pole (-) first).

# **A WARNING**

All measurements should be taken with components at a temperature of 20°C (68°F). General troubleshooting instructions: as soon as you have identified the fault, remove the defective component.

Carry out the checks described in the following chapters:

- 6.6.7 (CHECKING THE CRANKSHAFT POSITION SENSOR);
- 6.6.3 (CHECKING THE THROTTLE VALVE POTENTIOMETER);
- 6.6.5 (CHECKING THE COOLANT THERMISTORS OPERATION).

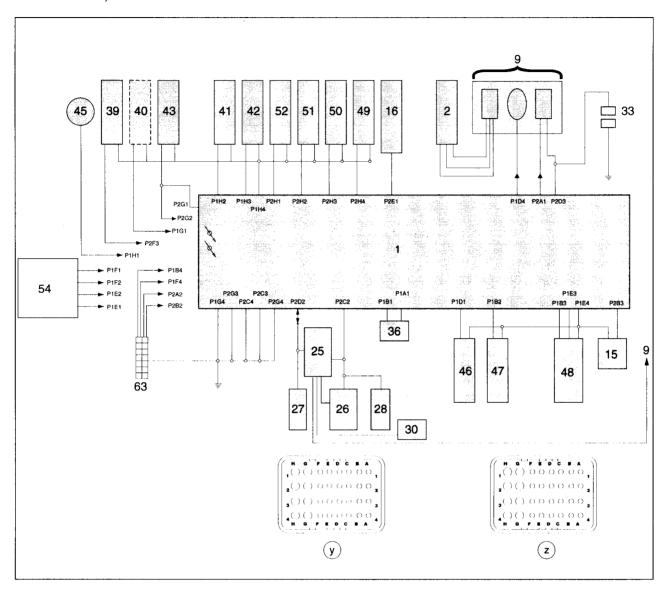
If the engine does not start and the diagnostics system detects no fault, check, in the order listed, whether:

- the fuel pump is working properly, see 6.7.2 (CHECKING THE FUEL PUMP);
- injectors are working properly. see 6.6.1 (CHECKING THE INJECTORS);
- the antitheft setup connector (located under the passenger saddle, white) is connected properly;
- the ignition switch is working properly, see 6.13.2 (SWITCHES);
- the engine stop switch is working properly, see 6.13.2 (SWITCHES):
- the 30-A main fuses and 15-A secondary fuses are intact, see 6.16 (CHANGING FUSES);
- the engine stop relay is working properly, see 6.7.3 (CHECKING THE FUEL PUMP RELAY AND ENGINE STOP RELAY):
- the battery is working properly, see 2.4 (BATTERY) and 6.14 (BATTERY);
- the safety operating logic is working properly, see 6.8 (IGNITION SAFETY SYSTEM);
- the fall sensor is working properly, see 6.4.4 (CHECKING THE OVERTURN SENSOR).

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# 6.6 CONNECTIONS TO THE ELECTRONIC CONTROL UNIT

**NOTE** For the locations of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS). For more information see 4.7.4 (ELECTRONIC CONTROL UNIT).



**NOTE** The abbreviations (y) and (z) that appear alongside the numbers in the diagram, mark corresponding terminals on both connectors.

- Y) Electronic control unit connector (32-way).
- Z) Electronic control unit connector (32-way).



Position	Component	Connector	Terminal #	Rated value	Wire Color
9	Dashboard	P1	D4		Bi/Vi
		P2	A1		M/Ro
15	Fall sensor	P2	E1		Ro/Bi
16	Fuel pump relay	P2	E1	_	Ro/Bi
05		P2	C2		M/V
25	Diode module	P2	D2		M
26	Clutch switch	P2	C2		M/V
27	Neutral gear switch	P2	D2		М
28	Side stand	P2	C2		M/V
30	Start relay	_	_		_
33	TEST connectors	P2	D3	-	Gr
	Crankshaft position	P1	B1		Bi/G
36	sensor	P1	A1	150 - 300 Ω	B/G
		P1	H4		M/R
39	Injection relay	P2	F3		N
	Purge Valve	P1	G1		M/Vi
40	(California only)	P1	H4		M/R
	Rear cylinder	P1	H4		M/R
41	injector	P1	H2	11 - 17 Ω	V/Gr
	Front cylinder	P1	H4		M/R
42	injector	P1	H3	11 -17 Ω	Gr/R
· · · · · · · · · · · · · · · · · · ·	Injector	P1	H4		
40	Electric fan				M/R
43		P2	G2		G/N
	1 - 0 - 1 - 1 - 1 - 1	P2	G1		G/N
45	Gasoline pump	P1	H1		B/Bi
46	Air thermistor	P1	E4	_	B/R
	7	P1	D1		R/N
47	Coolant thermistor	P1	E4	1,9 - 2,9 kΩ	B/R
		P1	B2		Ro/N
	Throttle valve potentiometer	P1	E4	2,8 - 3,4 kΩ	B/R
48		P1	E3	(variable depending	M/Bi
		P1	B3	on the angle)	M/G
49	Rear cylinder coil	P1	H4	4 - 5 Ω	M/R
	Trous Symmeon Com	P2	H4	, 0	G/B
50	Rear cylinder coil	P1	H4	4 - 5 Ω	M/R
	rical cylinael con	P2	H3	7 032	Ar/Az
51	Front cylinder coil	P1	H4	4 - 5 Ω	M/R
	r tont cylinder coll	P2	H2	4-032	V/Az
52	Front cylinder coil	P1	H4	4 - 5 Ω	M/R
32	Front cylinder coll	P2	H1	4-512	Ar/Bi
		P1	F1		Az
54	Engine idle settine	P1	F2		G
54	Engine idle setting	P1	E2		Vi
		P1	E1		Ro
***		P1	G4		B/V
		P1	B4	,	B/N
63	Diagnostic	P1	F4		Vi/M
	connector	P2	A2		B/Ar
		P2	B2		Gr/Bi



#### 6.6.1 CHECKING THE INJECTORS

#### With the engine off:

\* Raise the fuel tank, see 7.1.4 (REMOVING THE FUEL

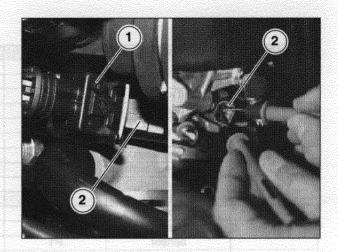
NOTE The following steps refer to a single injector, but are applicable for both.

- Disconnect the two-way connector (1) (black) and measure (on the injector side terminals).
- Use a tester (scale x100 Ω), to measure the resistance between the injector terminals.

Standard value: 11.5 – 13  $\Omega$  at 20 °C (68 °F).

If the resistance is infinite (∞) or below the prescribed value, the injector (2) must be replaced.

Repeat the operations for the other injector.

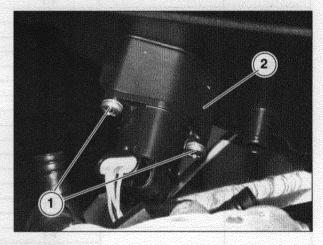


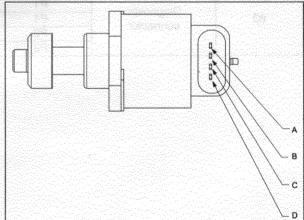
#### 6.6.2 CHOKE MOTOR

 Lift the air filter case, see (removing the air filter case) see 7.1.6 (REMOVING THE AIR FILTER CASE).

NOTE The stepper motor opens and closes the air passages, to alter the air/gasoline mixture as needed. Make sure the stepper motor (2) is working properly:

- Unscrew and remove the two screws (1) and detach it from the filter case.
- Set the key to "○" and then immediately to "⋈". After you have set the key to ">, the white cylinder comes all the way out (approximately 1.12 in), then returns in by a few millimeters (approximately 0.77 in), performing an automatic setting.
- If this does not occur, check using a tester as an ohm meter to measure the resistance between the two coils:
  - between pins A and D, correct measurement: 50  $\Omega$ ±10%;
- between pins B and C, correct measurement: 50  $\Omega$
- between the other pins, infinite resistance (∞).







#### **THROTTLE** 6.6.3 CHECKING THE VALVE **POTENTIOMETER**

#### With the engine off:

- Raise the fuel tank, see 7.1.4 (REMOVING THE FUEL
- Disconnect the three-way connector (black) (1).

# **A WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

- Set the ignition switch to "⋈".
- ullet Use a tester (scale  $k\Omega$ ) to measure the resistance between the terminals of the potentiometer (2).

#### **MEASUREMENT (A)**

Resistance between the two terminals A and B, regardless of the position of the throttle valves:

Standard value: 1.2 k $\Omega$  ± 10%.

# **MEASUREMENT (B)**

Resistance between the terminals, A and C:

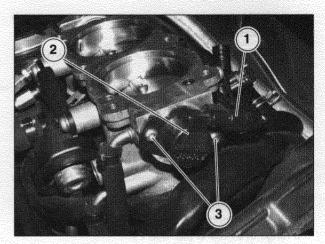
With throttle valves completely closed, accelerating gradually until they are fully open, the resistance will change as follows.

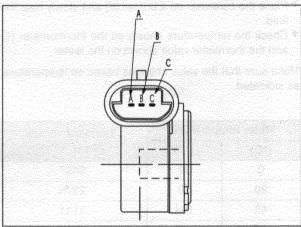
Standard value: from 1.2 k $\Omega$  to 2.4 k $\Omega$  ± 10%.

**NOTE** To make it easier to unscrew the two screws (3), which are cemented with LOCTITE® 243, heat them first with a blast of warm air.

- Unscrew and remove the screws (3).
- Remove the potentiometer (2).

If the resistance values differ from those prescribed, replace the potentiometer (2).





# 6.6.4 CHECKING THE AIR THERMISTOR OPERATION

- ◆ Raise the air filter case, see 7.1.6 (REMOVING THE AIR FILTER CASE).
- Disconnect the two-way connector (1) (green).

# **A WARNING**

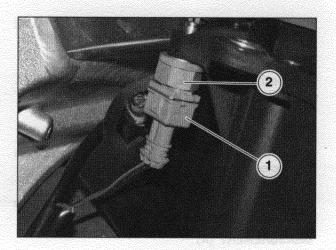
When reassembling, make sure the electrical connector (1) is properly connected.

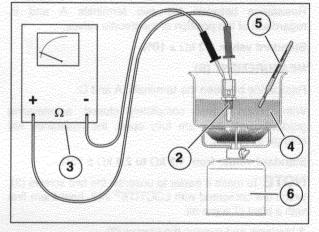
- Remove the thermistor (2).
- \* As shown in the figure, connect a tester (3) (in ohm meter mode) to the thermistor (2).
- Immerse the thermistor in a container (4) of water.
- In the same container, immerse a thermometer (5) with a range of 0 -150°C (32 -302°F).
- Place the container on a burner (6) and slowly heat the fluid.
- Check the temperature shown on the thermometer (5) and the thermistor value shown on the tester.

Make sure that the value changes based on temperature, as indicated.

Water ten	perature	Standard values	
(°C)	(°F)	(W) (± 10%)	
0	32	5457	
20	68	2375	
40	104	1111	
60	140	563,8	
80	176	306,4	
100	212	176,7	

**NOTE** If the standard values do not change as the temperature varies, or if they are significantly different from those indicated in the table, replace the thermistor (2).







#### 6.6.5 CHECKING THE COOLANT THERMISTORS **OPERATION**

NOTE The temperature measured by the front cylinder thermistor (right side) is sent to the right display; the one measured by the rear cylinder thermistor (left side) is sent to the electronic control unit.

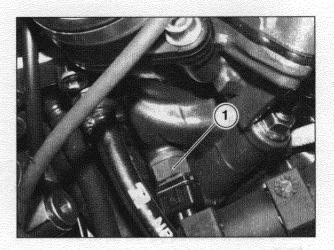
- Remove the thermistor (1), see 5.4 (REMOVING THE COOLANT THERMISTORS).
- As shown in the figure, connect a tester (2) (in ohm meter mode) to the thermistor (1).
- Immerse the thermistor (1) in a receptacle (3) containing coolant.
- In the same container, immerse a thermometer (4) with a range of 0 -150°C (32 -302°F).
- Place the container on a burner (5) and slowly heat the fluid.
- Check the temperature shown on the thermometer (4) and the thermistor (1) value shown on the tester.

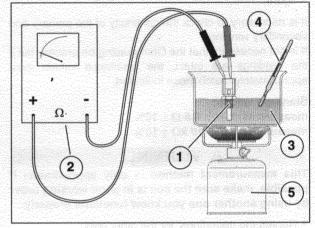
Make sure that the value changes based on temperature, as indicated.

Water ten	nperature	Standard values
(°C)	(°F)	(W) (± 10%)
0	32	5896
20	68	2500
40	104	1175
60	140	595,5
80	176	322,5
100	212	186,6

**NOTE** If the standard values do not change as the temperature varies, or if they are significantly different from those indicated in the table, replace the thermistor (1).

• Repeat the operations for the other thermistor.







#### 6.6.6 CHECKING THE IGNITION COILS

- · Remove the filter case to check the front coils. see 7.1.6 (REMOVING THE AIR FILTER CASE).
- Remove the saddle to check the rear coils, see 7.1.2 (REMOVING THE RIDER SADDLE).

NOTE The following steps refer to a single coil, but are applicable for all.

• Disconnect the connector (1) from the coil ignition (2).

# **A WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

- Pull the cable from the coil (2).
- Use a tester to measure (A) and (B) as shown in the figure.

It is necessary to check the continuity of the primary and secondary windings.

It is not necessary that the Ohm reading be precise, but if the windings are intact, the resistance values must approximately match those indicated.

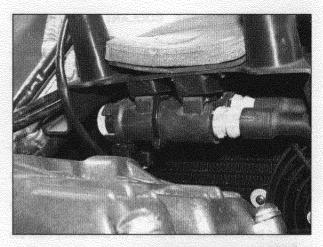
# Standard values:

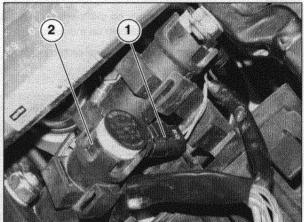
measurement (A): 0.6  $\Omega\pm$  10% measurement (B): 10 k $\Omega \pm$  10%

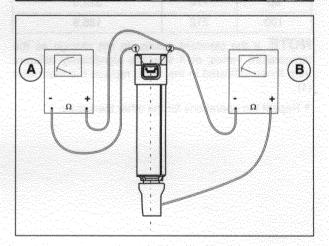
# **A WARNING**

This measurement method is only approximate; if possible, make sure the coil is in good working order by using another one you know functions properly.

• Repeat the operations for the other coils.









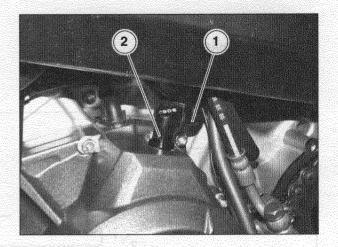
# 6.6.7 CHECKING THE CRANKSHAFT POSITION SENSOR

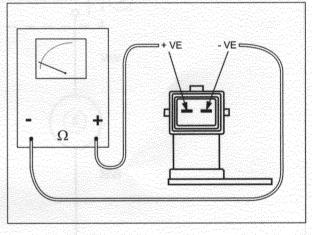
#### With the engine off:

- ◆ Disconnect the two-way connector (1) and measure directly on the sensor (2).
- ullet Use a tester (scale x 1000  $\Omega$ ) to measure the resistance between the sensor terminals, observing the polarity (see figure).

# Standard value: 560 $\Omega$ ± 10%.

• If the resistance is infinite or different from the prescribed value, the sensor must be replaced.



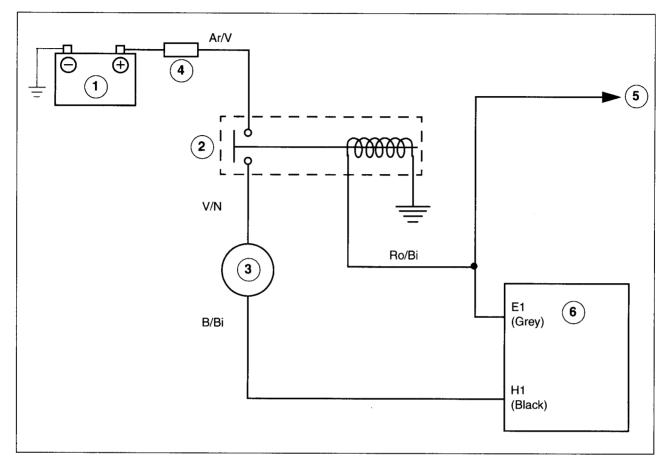




#### **6.7 FUEL PUMP SYSTEM**

# 6.7.1 WIRING DIAGRAM

**NOTE** For the positions of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



# Legend:

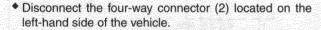
- 1)Battery
- 2) Fuel pump relay
- 3)Pump
- 4)Fuse
- 5) Engine stop relay
- 6)ECU



#### 6.7.2 CHECKING THE FUEL PUMP

To check the pump operation:

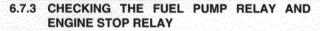
- Remove the lower dashboard panel, see 7.1.20 (REMOVING THE DASHBOARD PANEL).
- Open the cover (3) of the secondary fuse box.
- Make sure that the fuse (1) is intact.
- Raise the fuel tank, see 7.1.4 (REMOVING THE FUEL TANK).



# **A WARNING**

When reassembling, make sure the connector (2) is fitted properly.

- Connect the positive (+) green (V) and negative (-) blue (B) wires (on the pump assembly side) to a 12-VDC battery.
- Make sure that the pump works properly and emits its usual hum. Check the pressure gauge to make sure the intake pressure is at least 50.76 PSI (350 kPa) (3.5 bar).



To check the relay:

- Remove the rider saddle, see 7.1.2 (REMOVING THE RIDER SADDLE).
- Disconnect the four-way connector (1) (white) from the relay (2).

# **A WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

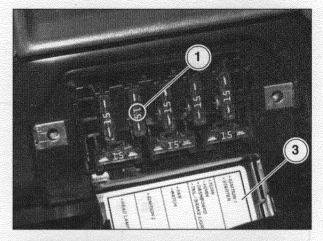
- Connect the two internal male terminals (A-B) to a 12 V battery.
- Use a tester (in ohm meter mode) to check the continuity between the other two terminals (C-D).

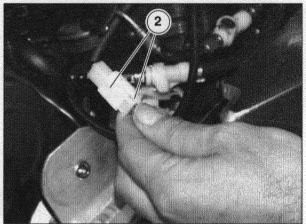
Correct value with relay energized: 0  $\Omega$ Correct value with relay not energized:  $\infty \Omega$ 

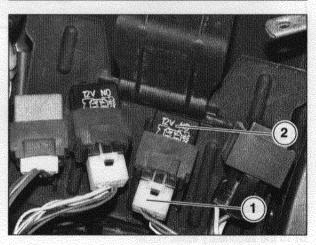
If the values do not match those indicated, replace the relay (2).

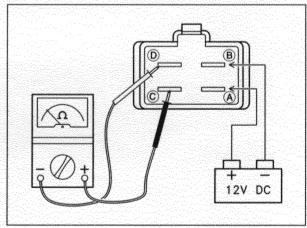
If all components are working properly, also check:

- fall sensor, see 6.4.4 (CHECKING THE OVERTURN SENSOR).
- Wiring is correct.







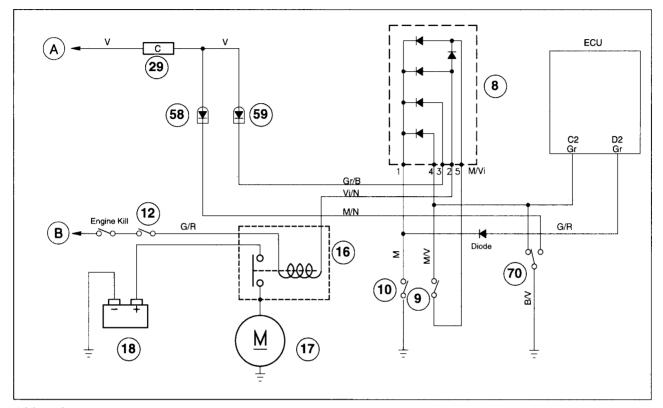




# **6.8 IGNITION SAFETY SYSTEM**

# 6.8.1 WIRING DIAGRAM

NOTE For the positions of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



# Wiring diagram legend

- 8) Diode module
- 9) Switch on clutch lever
- 10) Neutral gear switch
- 12) Starter button
- 16) Start relay
- 17) Starter motor
- 18) Battery
- 29) Secondary fuses (15A)
- 58) Stand down LED
- 59) Gear in neutral LED
- 70) Side stand switch
- A) To battery / ignition switch
- B) To the secondary fuses (15 A)



# 6.8.2 STARTING SAFETY OPERATING LOGIC

 $\mbox{\bf NOTE}$  With the engine stop switch set to " $\mbox{\it ps}$  " the starter motor does not turn over.

GEAR POSITION	STAND POSITION	CLUTCH LEVER	STAND WARNING LIGHT	ENGINE IGNITION	STARTER MOTOR
	RETRACTED	PULLED	OFF		TURNS OVER
IN NEUTRAL	RETRACTED	RELEASED	OFF	WORKING  DOES NOT WORK	
IN NEOTHAL	EXTENDED	PULLED	ON		
		RELEASED			
	RETRACTED	PULLED	OFF		
GEAR ENGAGED		RELEASED			
		PULLED	ON		DOES NOT TURN OVER
	EXTENDED	RELEASED			



#### 6.8.3 CHECKING THE STARTING RELAY

To check the relay operation:

- · Remove the saddle support lower molded cover, see 7.1.33 (REMOVING THE SADDLE SUPPORT LOWER MOLDED COVER).
- Move the start relay (2).

# **A WARNING**

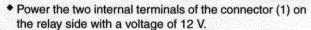
If the grommet is damaged, replace it.



# **A** WARNING

When reassembling, make sure the electrical connector (1) is properly connected.

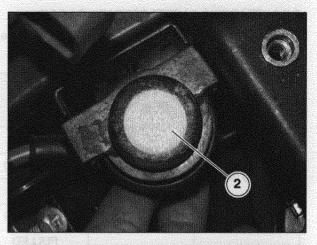
- Slip the relay (2) off the hooks provided.
- Slip off the two rubber boots (3-4).
- Disconnect the cables from the corresponding terminals on the relay (2).

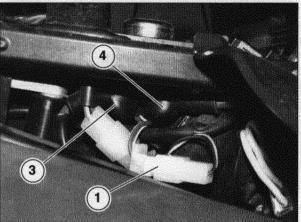


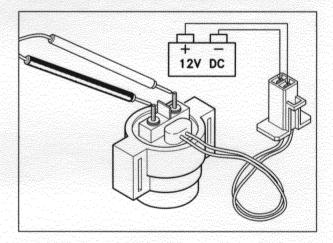
• Use a tester (in Ohm meter mode) to check the continuity between the two contact screws on the relay

Correct value with relay energized: 0  $\Omega$ Correct value with relay not energized: ∞€0.

If the resulting values do not match those indicated, replace the relay (2).









#### 6.8.4 CHECKING THE DIODE

To check the diode:

- ◆ Remove the left fairing, see 7.1.25 (REMOVING THE SIDE FAIRINGS).
- ◆ Disconnect the two-way connector (1) (white) (under the left fairing near the ECU).

# **A WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

Use a tester (in diode test mode) to check the values between the two internal male prongs of the diode as shown in the figure.

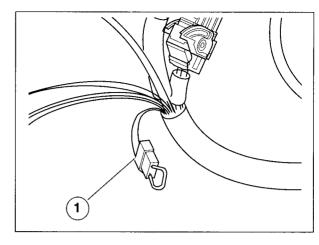
Correct value (measurement A):0 - 1  $\Omega$ Correct value (measurement B): ∞

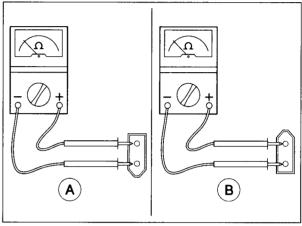
If the tester does not have a diode test function, connect to a 12 V battery, inserting a 12 V/2 W bulb on the positive cable, connecting the diode as shown in the figure.

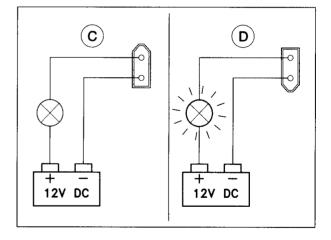
# **A** WARNING

Never use bulbs over 2 W as they could damage the diode.

Test (C): the bulb does not light. Test (D): the bulb lights.









#### 6.8.5 CHECKING THE SIDE STAND SWITCH

The side stand (1) must be able to rotate freely, without binding.

Carry out the following checks:

- ◆ The springs (2) must not be damaged, worn, rusted or weakened.
- ◆ The side stand must pivot freely. Grease the joint if necessary, see 1.12 (LUBRICANT TABLE).

A safety switch (3) is installed on the side stand (1) to prevent or stop the engine from running with the engine in any gear except neutral, with the side stand (1) down.

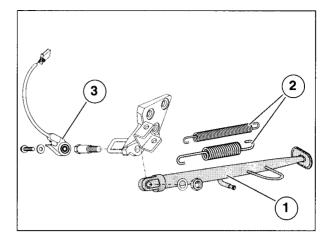
To check the side stand safety switch (3):

- Sit on the vehicle as though you were riding.
- ◆ Retract the side stand (1).
- Start the engine.
- ◆ With the throttle grip released and the engine idling, fully squeeze the clutch lever. Engage the first gear by pushing the gearshift lever down.
- ◆ Lower the side stand (1), which will activate the safety switch (3).

At this point:

- the engine must stop;
- the side stand down LED "2" must light on the dashboard.

If this does not occur, replace the switch (3).





# 6.8.6 CHECKING THE DIODE MODULE

- Remove the rider saddle, see 7.1.2 (REMOVING THE RIDER SADDLE).
- Disconnect the five-way connector (1) (white) from the module (2).

# **WARNING**

When reassembling, make sure the electrical connector (1) is properly connected.

 Connect the various terminals to a 12 V battery, inserting 12 V/2 W bulb on the positive cable (+) as indicated.

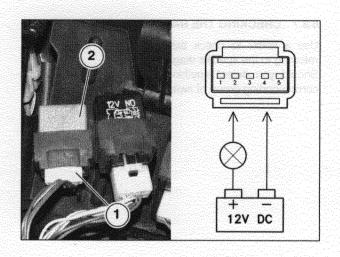
# **WARNING**

Never use bulbs over 2 W to avoid damaging the module.

- \ \	1	2	3	4	5
1		-;Q:-	-;Ö:-	-Ά-	- <b>Ω</b> -
2	0	/	0	0	0
3	0	0		0	•
4	- 0	0			0
5	0	-¤.	0	0	

# **WARNING**

The lamp must light only in the positions indicated. If not, replace the module (2).





#### 6.8.7 CHECKING THE SAFETY SYSTEM SWITCHES

Use a tester to check the continuity of the switches, referring to the specific diagram.

Should you detect anything out of order, replace the corresponding group of switches.



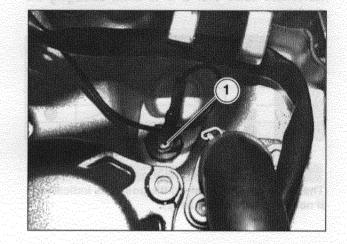
Pos.	Cables
103.	Screw 🛓
Neutral	$\bigcirc$

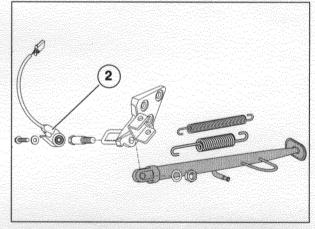


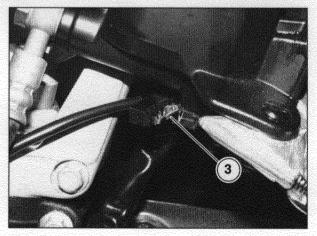
Pos.	Cables		
	M V N		
Lowered	0-1-0		
Raised	0-0		

# 3) CLUTCH LEVER SWITCH

Pos.	Cables		
	Gr M		
Activated	$O \leftarrow O$		





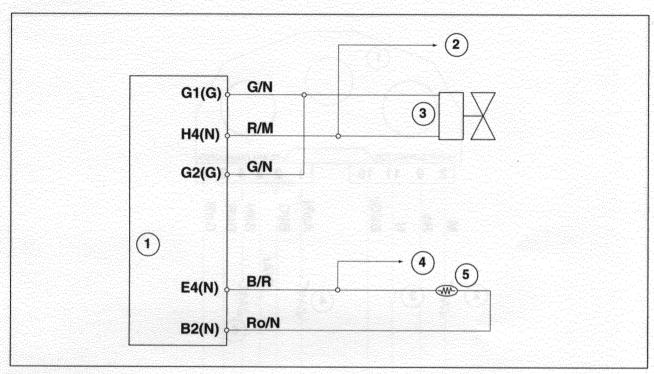




#### 6.9 ELECTRIC COOLING FAN

#### 6.9.1 WIRING DIAGRAM

NOTE For the locations of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



# Wiring diagram legend

- 1)ECU
- 2) Injection relay
- 3)Fan
- 4) Throttle valve position sensor
- 5)Coolant thermistor

# 6.9.2 CHECKING THE ELECTRIC FAN OPERATION

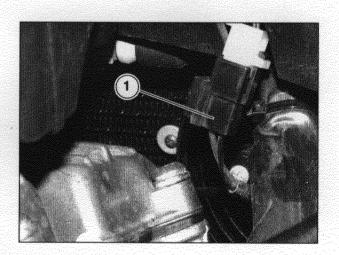
· Carry out the first three steps described in paragraph 5.3 (REMOVING THE ELECTRIC COOLING FAN).

# NOTE Have a 12 V battery ready.

- Connect the connector (black) (1) to the battery
- Make sure that the fan turns freely.

If the fan is working properly, check:

- coolant thermistor, see 6.6.5 (CHECKING THE COOLANT THERMISTORS OPERATION);
- injection system power supply;
- that they are correctly wired to the control unit.

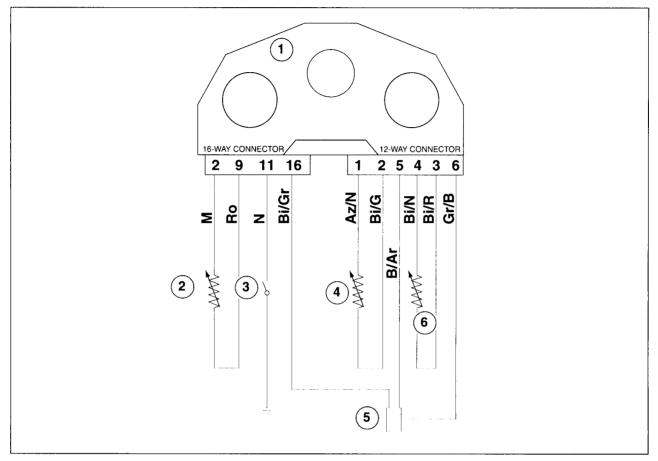




# **6.10 DASHBOARD INDICATORS**

#### **6.10.1 WIRING DIAGRAM**

**NOTE** For the locations of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



# Legend:

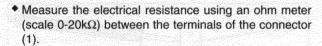
- 1)Dashboard
- 2) External temperature sensor
- 3) Oil pressure sensor
- 4) Fuel level sensor
- 5) Speed sensor
- 6) Coolant temperature sensor



#### 6.10.2 AIR TEMPERATURE SENSOR

To check the air temperature sensor:

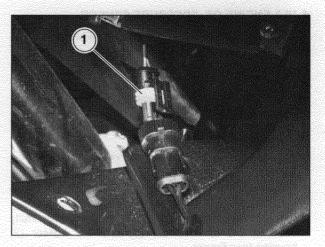
- Remove the left dashboard panel, see 7.1.20 (REMOVING THE DASHBOARD PANEL).
- Disconnect the two-way connector (1).
- · Check the sensor in a controlled environment with a temperature of 20°C (68°F).

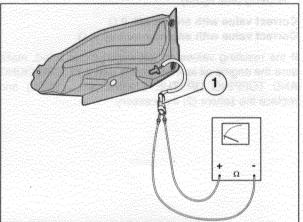


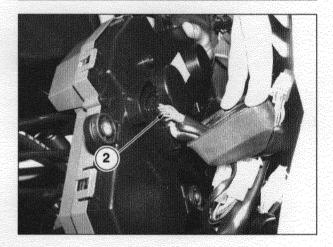
#### Correct value: 12.200 k $\Omega$ – 12.700 k $\Omega$

If the air temperature sensor is working properly, check the dashboard:

- ◆ Disconnect the 16-way connector (2), see 7.1.21 (REMOVING THE DASHBOARD).
- ullet Apply a resistance of 12.4 k  $\Omega$  between terminals 2 and
- If the dashboard is working properly, it should indicate a temperature of 20  $\pm$  1°C (68  $\pm$  3°F).









# 6.10.3 ENGINE OIL PRESSURE SENSOR

- ◆ Move the expansion tank, see 5.6 (REMOVING THE EXPANSION CHAMBER).
- Disconnect the electrical terminal (1) from the sensor (2) and ground it.

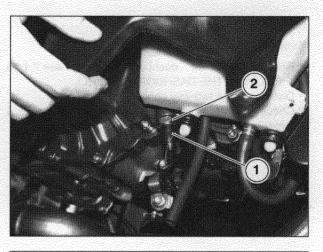
# **A WARNING**

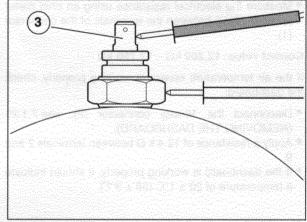
When reassembling, make sure the electrical terminal (1) is fitted properly.

- With the ignition switch set to "O", the red engine oil pressure LED " " should light.
- ♦ If the LED " does not light as described, check the
- \* Use a tester (scale x 100 Ω) to check the continuity between the terminal tab (3) and the sensor (2) housing (see figure).

Correct value with engine off: 0  $\Omega$ Correct value with engine running:  $\bowtie \Omega$ 

If the resulting values do not match those listed, make sure the engine oil level is correct, see 2.11 (CHECKING AND TOPPING UP THE ENGINE OIL LEVEL) and replace the sensor (2) if necessary.









#### 6.10.4 SPEED SENSOR

- Remove the fuel tank, see 7.1.4 (REMOVING THE FUEL TANK).
- Make sure the speed sensor connector (1) is properly
- Remove the front fairing, see 7.1.22 (REMOVING THE HEADLIGHT).
- Make sure the dashboard connectors (2) are properly coupled.
- Check the distance between the speed sensor (3) and the six holding screws (4) on the rear brake disc.

# Distance between sensor (3) and screws (4): $0.06 \pm 0.04$ in (1.5 ± 1mm).

Make sure that all six screws (4) are present.

With the engine off and the ignition switch set to "O", perform the following tests:

#### 1<sup>st</sup> Test

 Without disconnecting the speed sensor connector (1). connect a tester and measure the voltage between the green/purple (V/Vi) and blue/orange (B/Ar) cables.

# Correct value: > 9V (DC).

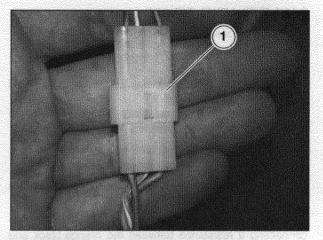
#### 2<sup>nd</sup> Test

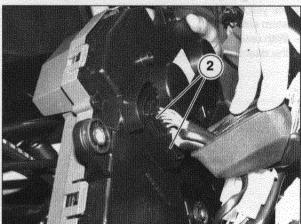
 Without disconnecting the speed sensor connector (1). connect a tester and measure the voltage between the grey/white (Gr/Bi) and blue/orange (B/Ar) cables.

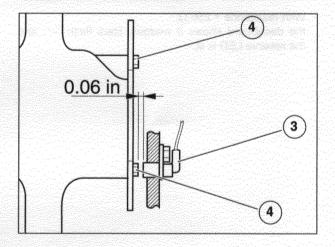
# Correct value: > 6V (DC).

# 3<sup>rd</sup> Test

- Place the vehicle on the center stand.
- Set the gearshift lever to neutral.
- Carry out the 2<sup>nd</sup> test.
- Turn the rear wheel by hand, bringing one of the six screws (4) even with the sensor (3).
  - On the tester, the reading will move to zero V for approximately two seconds, then return to > 6V.
- If the 1st test shows an incorrect value, disconnect the sensor (3) and repeat the 1st test if the incorrect value persists, the dashboard is faulty and must be replaced with one known to be functional, see 7.1.21 (REMOVING THE DASHBOARD);
- If the 1st test shows a correct value and the 2nd an incorrect value, the sensor (3) is faulty and must be replaced.
- If the 1st and 2nd tests give a correct value and the 3rd an incorrect value, the sensor (3) is faulty and must be
- If all the three tests give a correct value and the speed does not appear on the left display of the dashboard. the dashboard is faulty and must be replaced with one known to be functional, see 7.1.21 (REMOVING THE DASHBOARD):









#### 6.10.5 FUEL LEVEL SENSOR

Check the efficiency of the sensor:

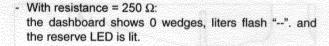
- \* raise the fuel tank, see 7.1.4 (REMOVING THE FUEL TANK).
- Disconnect the white four-way connector (1) located under the fuel tank (left side).
- Measure the electrical resistance between the orange and black wires on the sensor side:

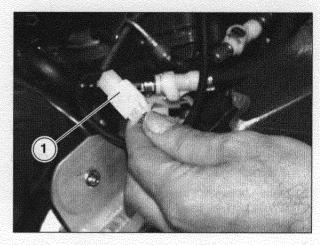
Correct value with the fuel tank full: less than 16  $\Omega$ . Correct value without fuel: between 240 and 400  $\Omega$ .

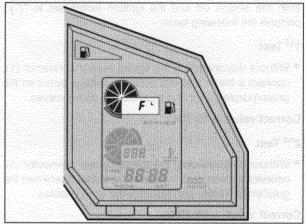
NOTE Replace the fuel level sensor if the values are incorrect.

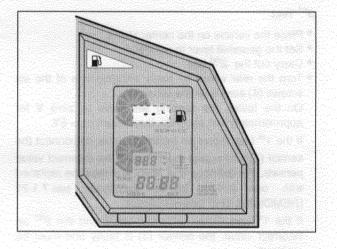
If the values are correct, test the dashboard operation by connecting a resistance between the orange-black and white-yellow wires of the 4-way connector (1) on the main system side.

- With resistance = 10  $\Omega$ : the dashboard shows 9 wedges and liters "F".





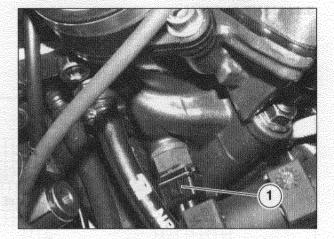






### 6.10.6 COOLANT TEMPERATURE SENSOR

- Make sure the sensor is in good working order, see 6.6.5 (CHECKING COOLANT THE THERMISTORS OPERATION).
- Test the dashboard operation by connecting a resistance between the white-black and white-red wires of the two-way connector (1):

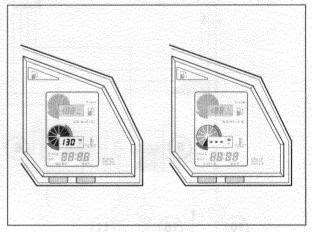


### With resistance = 90 $\Omega$ :

dashboard indicator: 9 wedges lit (the last two flashing). degree indicator:

- from 126°C to 135°C.
- from 258.8°F to 275°F.

With resistance = 1600  $\Omega$ dashboard indicator: 1 wedge lit. degree indicator: "- - -"

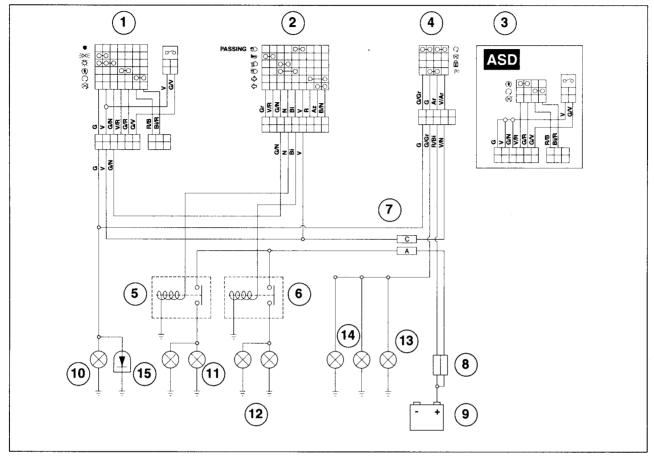




### **6.11 LIGHT SYSTEM**

### **6.11.1 WIRING DIAGRAM**

**NOTE** For the locations of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



- 1) Right dimmer switch
- 2) Left dimmer switch
- 3) Right dimmer switch version ASD
- 4) Key
- 5) Low beam relay
- 6) High beam relay
- 7) Fuses (15 A)
- 8) Fuses (30 A)

- 9) Battery
- 10)License plate lamp
- 11)Low beam
- 12)High beam
- 13)Front parking light
- 14)Rear parking light
- 15)Dashboard light LED



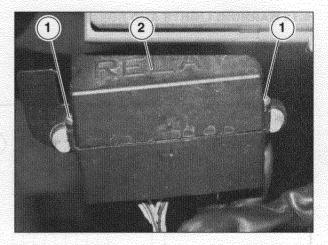
### 6.11.2 CHECKING THE LIGHT RELAY

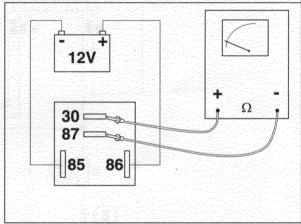
To check the relay operation:

- \* Remove the headlight, see 7.1.22 (REMOVING THE HEADLIGHT).
- Unscrew and remove the two screws (1).
- Remove the cover (2) of the relay box.
- Remove the relay in question.
- Power the two male terminals (85-86) with a voltage of
- Use a tester (in ohm meter mode) to check the continuity between the other two terminals (87-30).

Correct value with relay energized: 0  $\Omega$ Correct value with relay not energized:  $\infty \Omega$ 

If the values do not match those indicated, replace the relay in question.



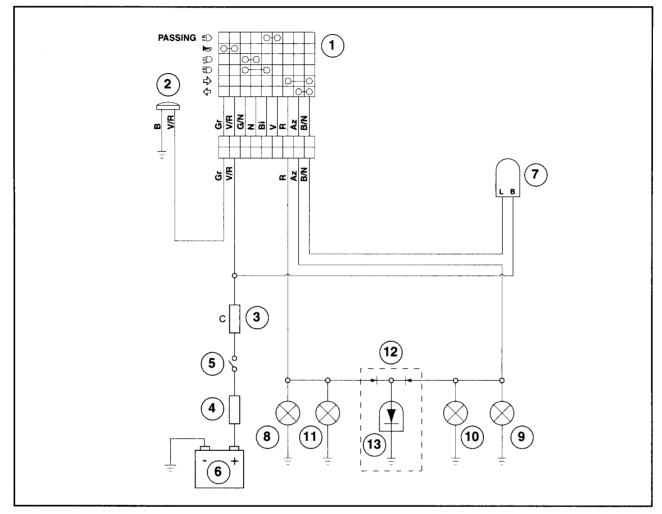




### **6.12 WARNING LIGHTS AND BUZZERS**

### **6.12.1 WIRING DIAGRAM**

NOTE For the positions of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



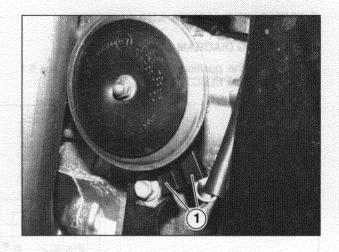
- 1)Left dimmer switch
- 2) Horn
- 3) Fuse (15 A)
- 4) Fuse (30 A)
- 5) Key
- 6) Battery
- 7) Flasher
- 8) Rear right direction indicator bulb
- 9) Rear left direction indicator bulb
- 10)Front right direction indicator bulb
- 11)Front left direction indicator bulb
- 12)Dashboard
- 13)Direction indicators (LED)



### **6.12.2 HORN TEST**

To check the horn efficiency:

- · Carry out the first three steps described in paragraph 7.1.27 (REMOVING THE HORN).
- Connect the two horn connectors (1) to a 12 V battery.
- Adjust the adjuster screw if needed.



### 6.12.3 FLASHER TEST

If neither of the direction indicator lamps is working, there is probably a problem with the flasher.

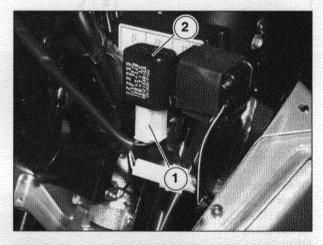
To test the flasher operation:

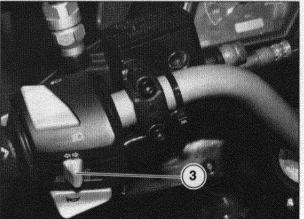
- \* Remove the front fairing, see 7.1.22 (REMOVING THE HEADLIGHT).
- Disconnect the connector (1) of the flasher (2).
- Jumper the connector (1).
- Activate the direction indicator controls (3).

If the lights remain steadily lit, replace the flasher (2).

- If necessary, check:
- the main fuses (30 A) and the electrical system.

If an indicator bulb is burnt, the other bulb and the LED on the dashboard remain continuously lit every time the control (3) is operated.



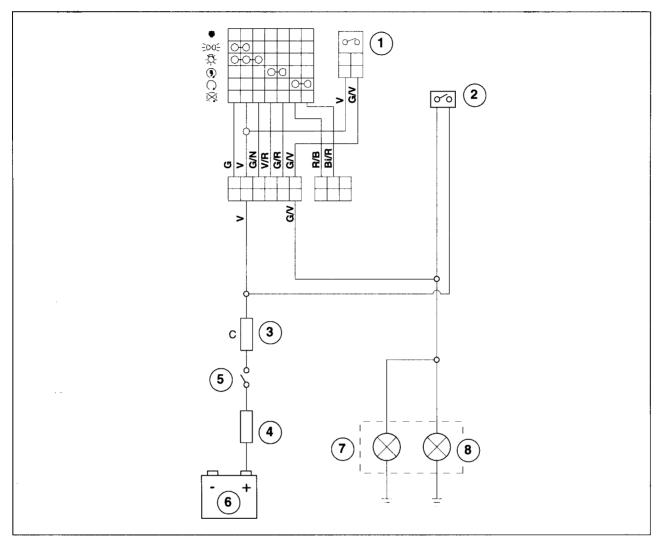




### 6.13 WARNING LIGHTS AND BUZZERS

### **6.13.1 WIRING DIAGRAM**

**NOTE** For the positions of the components, see 6.1 (LOCATIONS OF ELECTRICAL COMPONENTS).



- 1) Front stop switch
- 2) Rear stop switch
- 3) Fuse (15 A)
- 4) Fuse (30 A)
- 5) Key
- 6) Battery
- 7) Taillight
- 8) Brake lights



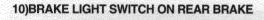
#### 6.13.2 SWITCHES

Use a tester to check the continuity of the switches, referring to the specific diagram.

Should you detect anything out of order, replace the corresponding group of switches.

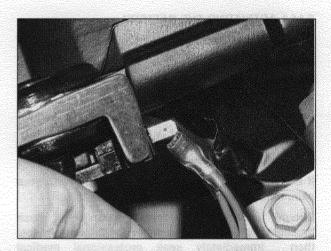
### 9) BRAKE LIGHT SWITCH ON FRONT BRAKE

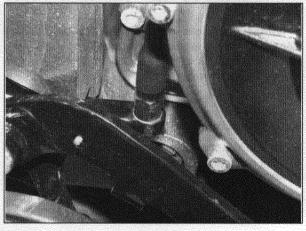
Pos.	Cables	
	V V/G	
Activated	0-0	



Pos.	Cables	
FUS.	Gr	M
Activated	-	-0

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### 6.14 BATTERY

NOTE This vehicle is equipped with a sealed maintenance-free battery. It requires no maintenance beyond occasional inspections and recharging if needed.

Always replace the battery with one of the same type.

Type: 12V - 12 Ah

Carefully read 2.4 (BATTERY).



### **6.14.1 ACTIVATING THE BATTERY**

Remove the battery from the vehicle, see 7.1.7 (REMOVING THE BATTERY).

## **A DANGER**

Battery electrolyte is toxic and caustic, and can severely burn your skin since it contains sulfuric

Always wear protective clothing, a safety mask and/ or goggles while activating the battery.

If the electrolyte fluid comes into contact with your skin, rinse thoroughly with cool running water.

Should it accidentally contact your eyes, flush immediately with running water for fifteen minutes, then immediately seek professional medical attention.

If someone should accidentally swallow battery electrolyte, drink large amounts of milk or water, then continue with milk of magnesia or vegetable oil. See a physician immediately.

Since the battery gives off explosive hydrogen gas, keep away from open flames, sparks or cigarettes, or any other source of heat.

When you are charging or using a battery, make sure that the room is properly ventilated; do not inhale the gases released during charging.

### KEEP OUT OF REACH OF CHILDREN

The battery fluid is corrosive.

Do not spill or spatter it, especially on plastic parts.

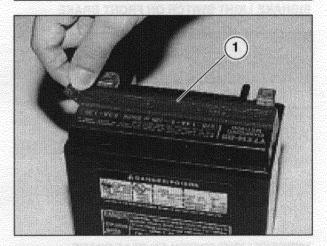
## **A WARNING**

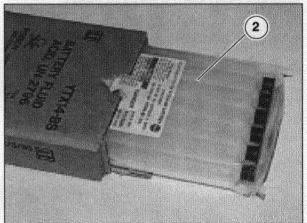
Make sure that the electrolyte liquid being used is specific for the battery to be activated.

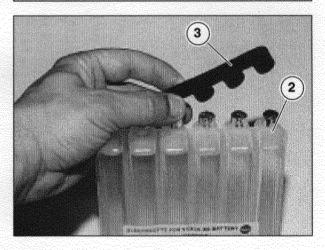
- Place the battery on a flat surface.
- Remove the adhesive sealing label (1).
- · Remove the sealed bag from the cardboard container containing the six reservoirs (2).
- Remove the reservoirs (2) from the bag.

NOTE Keep the row of stoppers (3) handy as you will need them later to cap the battery cells.

• Disconnect the row of stoppers (3) from the top of the reservoirs (2).









### A WARNING

Do not cut or make holes in the sealed parts on the reservoirs (2).

- ◆ Turn the reservoirs (2) upside down and place them so that the sealed parts are over the openings of the
- Press on the reservoirs (2) so that the seals break and the acid is allowed to drain into the battery cells.

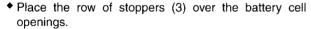
NOTE Ensure that the reservoirs (2) are placed above the battery vertically, to enable all of the liquid to flow into the battery.

◆ Leave the reservoirs (2) in place on the battery for approx. twenty minutes, making sure that the liquid drains out smoothly.

### **A WARNING**

Do not remove the reservoirs (2) from the battery until all of the liquid has drained.

- Should any liquid still be left in the reservoirs (2) once the twenty minutes are up, tap your fingers on the top of the reservoirs to help the remaining liquid out.
- ◆ Lift the reservoirs (2) with care, disengaging them from the battery.



• Press down firmly until the tops of the stoppers (3) are flush with the top of the battery.

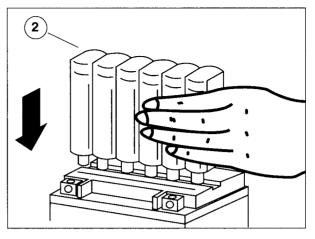
### **A WARNING**

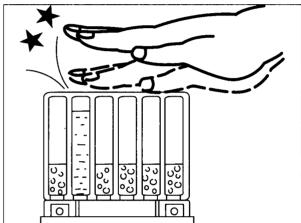
NEVER attempt to remove the row of stoppers (3) for any reason.

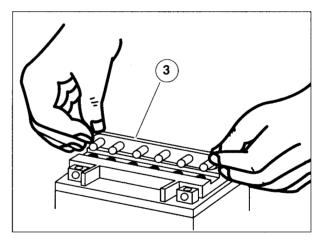
- Connect the battery to a battery charger.
- Subject the battery to a normal charge (see table).

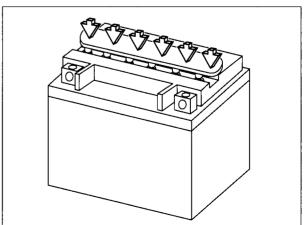
Type of charge	Voltage (Amperes)	Time (hours)
Normal	1.2	8 ÷ 10
Fast	12	0.5

• Re-install the battery on the vehicle upon return to the customer.











#### **6.14.2 MAINTENANCE**

- ◆ If the vehicle remains unused for more than fifteen days, the battery must be recharged to prevent sulphation. Recharge the battery using a normal charge, see 2.4.2 (RECHARGING THE BATTERY).
- ◆ Smear a thin film of neutral grease or Vaseline on the terminals.

### 6.14.3 CHECKING

Should you run into any difficulty with the battery maintaining a charge, first check the recharging circuit to make sure it is functioning correctly; see 6.3 (CHECKING THE RECHARGING SYSTEM).

Also make sure that:

- ◆ There are no signs of damage (external case cracked) and no electrolyte leak.
- The cables are firmly connected to the terminals.
- ◆ Apply a normal charge for at least 10 hours.

# **A** WARNING

After recharging, check the open-circuit voltage again: if it is below 12V, the battery must be replaced.

### **6.14.4 RETURN UNDER WARRANTY**

The warranty is void if the battery shows:

- ◆ Damage (container dented, poles bent, etc.).
- ◆ Widespread sulphation (incorrect activation and/or misuse of the battery).



#### **6.15 REPLACING THE BULBS**

Carefully read 1.3.9 (PRECAUTIONS AND GENERAL INFORMATION).

### **A** WARNING

Before replacing a bulb, turn the ignition switch to position "X" and wait a few minutes to allow it to cool off.

Always wear clean gloves or use a clean, dry cloth to change the bulb.

Do not leave fingerprints on the bulb, since the oils left by your skin may cause it to overheat and break. If you touch the bulb with your bare hands, clean it with alcohol to remove any fingerprints and thus avoid unnecessary damage.

DO NOT FORCE THE ELECTRICAL CABLES.

#### 6.15.1 REPLACING THE HEADLIGHT BULBS

Place the vehicle on the stand.

NOTE Before replacing a bulb, check the fuses, see 6.16 (CHANGING FUSES).

The headlight houses:

- two high beam/headlight bulbs (1) (side);
- a parking light bulb (2) (lower);

### To replace:

### HIGH BEAM/HEADLIGHT BULBS

NOTE Work on the same side as the bulb to be replaced.

NOTE Remove one connector at a time for avoid incorrect positioning during reassembly.

If the bulb sockets must all be removed at the same time. take great care to reassemble them in the proper location.

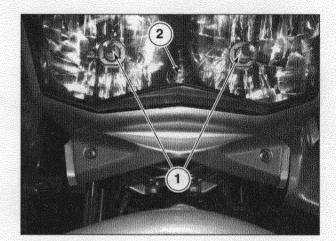
### **A** WARNING

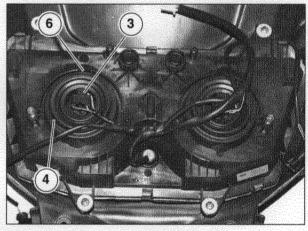
Do not pull the electrical cables to extract the bulb socket.

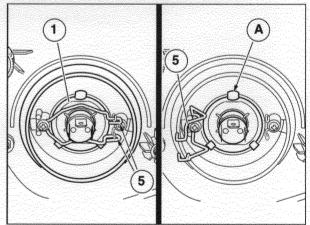
- Grasp the electrical connector (3) of the bulb to be replaced, pull it and disconnect it from the bulb (1).
- ◆ Pull back the boot (4) with your fingers.
- · Release the two ends of the retainer spring (5) located on the bulb socket.
- Remove the bulb (1) from its seat.

NOTE Insert the bulb in the bulb socket, lining up the positioning slots (A).

When reassembling, replace the boot (4) with the tabs (6) facing upwards.







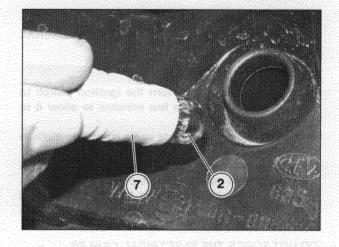


### **PARKING LIGHT BULB**

### **WARNING**

Do not pull on the wires to remove the bulb socket.

- Grasp the parking light socket (7), pull it and remove it from its seat.
- Remove the bulb (2) and replace it with another of the same type.





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#### 6.15.2 REPLACING THE **FRONT** DIRECTION **INDICATOR LAMPS**

- Place the vehicle on the stand.
- Unscrew and remove the three screws (1).

## **A WARNING**

While handling plastic or painted parts, be extra careful not to damage them.

• Remove the lens (2).

### **A WARNING**

Upon reassembly, place the lens correctly in its seat. Tighten the screws (1) gently and carefully to avoid damaging the lens.

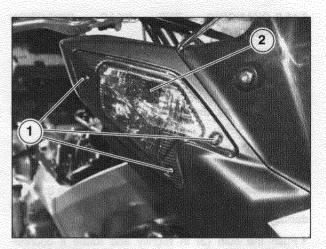
- Push the bulb (3) in slightly and rotate it counterclockwise.
- Remove the bulb (3) from its seat.

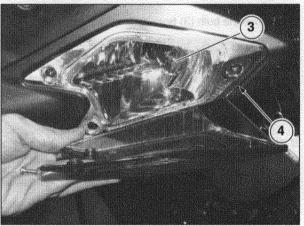
### **A WARNING**

Insert the bulb in the bulb socket, carefully aligning the two bulb pins with their guides in the socket.

Correctly install a new bulb of the same type.

NOTE When reassembling, make sure the gasket (4) is correctly positioned.





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#### 6.15.3 CHANGING THE REAR **DIRECTION INDICATOR LAMPS**

- Place the vehicle on the stand.
- Unscrew and remove the screw (1).

### **WARNING**

When removing the lens, be very careful to avoid breaking the tab.

• Remove the lens (2).

### **A WARNING**

Upon reassembly, place the lens correctly in its seat. Tighten the screw (1) gently and carefully to avoid damaging the lens.

- Push the bulb (3) in slightly and rotate it counterclockwise.
- Remove the bulb (3) from its seat.

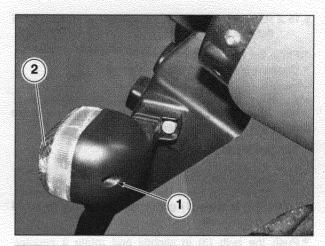
### **A WARNING**

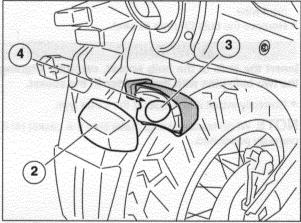
Insert the bulb in the bulb socket, carefully aligning the two bulb pins with their guides in the socket.

Correctly install a new bulb of the same type.

### **A** WARNING

If the bulb socket (4) leaves its seat, reinsert it correctly, lining up the radial opening of the bulb socket with the seat of the screw.







#### 6.15.4 REPLACING THE TAILLIGHT BULBS

### The taillight houses:

- two parking light/brake light bulbs (1).

#### To replace:

Before replacing a bulb, check the operation of the brake light switches, see 6.13.2 (SWITCHES).

NOTE The following operations refer to a single bulb, but are applicable for both.

### **A** DANGER

Wait until the exhaust silencer has completely cooled down.

- Place the vehicle on the stand.
- Unscrew and remove the two screws (2).
- Remove the lens (3).

### **WARNING**

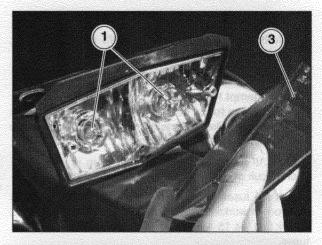
Upon reassembly, place the lens correctly in its seat. Use caution and moderation when tightening the screws (2), to avoid damaging the lens.

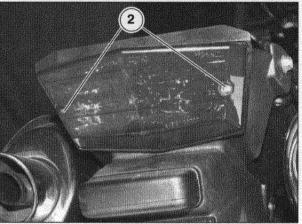
- Push the bulb (1) in slightly and rotate it counterclockwise.
- · Remove the bulb (1) from its seat.

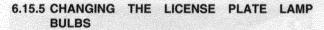
### **A WARNING**

Insert the bulb in the bulb socket, carefully aligning the two bulb pins with their guides in the socket.

Correctly install a new bulb of the same type.







Place the vehicle on the stand.

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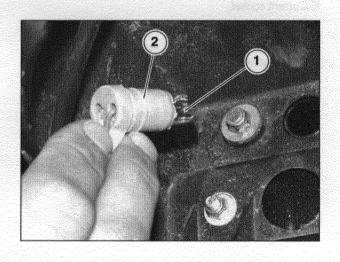
### A DANGER

Wait for the engine to cool completely.

### **A** WARNING

Do not pull on the wires to remove the bulb socket.

- Working on the inner side of the license plate holder, grasp the bulb socket (2), and pull to remove it from the seat.
- · Remove the bulb (1) and replace it with another of the same type.





#### **6.16 CHANGING FUSES**

Carefully read 1.3.9 (PRECAUTIONS AND GENERAL INFORMATION).

### **A WARNING**

Do not attempt to repair faulty fuses.

Never use any fuses other those specified. Such use could damage the electrical system or even cause a fire, in the event of a short-circuit.

NOTE If a fuse blows frequently, there is probably a short circuit or overload in the electrical system.

Check the fuses whenever an electric component does not work or works irregularly, or if the vehicle fails to start. Check first the 15-A secondary fuses, then the 30-A main fuses.

### To check:

- short-circuit.
- Remove the fuse box protection, see 7.1.20 (REMOVING THE DASHBOARD PANEL).
- Open the cover of the secondary fuse box (1).
- Remove the fuses one by one, and check to see whether the filament (2) is blown.
- · Before replacing the fuse, if possible, try to determine the cause of the problem.
- · Replace any blown fuse with a new fuse with the same amperage rating.

NOTE If you use the spare fuse, replace it as soon as convenient.

- Remove the saddle, see 7.1.2 (REMOVING THE RIDER SADDLE).
- Follow the same procedure described above for secondary fuses to check and replace the main fuses.

**NOTE** Removing the 30 A fuses will reset the function: digital clock. To restore this function, see 2.3 (MULTIFUNCTION COMPUTER).

### ARRANGEMENT OF 15 A SECONDARY FUSES

A Headlight, clock,

B Fuel pump.

C Parking lights, rear brake lights, horn, direction indicators and dashboard.

D From ignition switch to: starter, safety logic.

E Current socket.

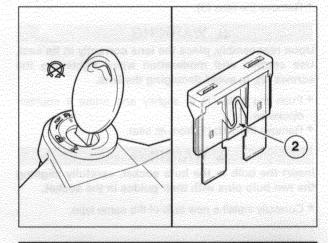
**NOTE** There are three spare fuses

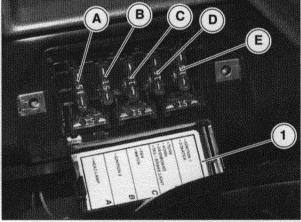
#### LAYOUT OF THE 30-A MAIN FUSES

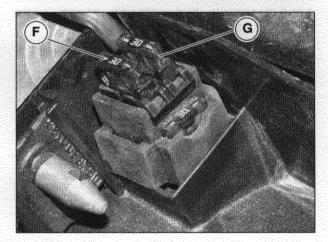
F From battery to: voltage regulator, fuse A, fuse B and

G From battery to: ignition switch, fuse C, fuse D.

NOTE There is one reserve fuse.









### **6.17 ADJUSTING THE HEADLIGHT BEAM VERTICALLY**

The headlight is made up of two units:

- right half-headlight (1);
- left half-headlight (2).

Each of the two half-units is equipped with a headlight beam adjustment system.

Perform the adjustment on both units. When finished, make sure that:

- the headlight beam is even;
- there are no shadow areas.

**NOTE** The procedure described here is in compliance with the Italian standard that establishes the maximum height of the headlight beam. For vehicles used in other countries, you must observe local regulations.

### To adjust the headlight beam:

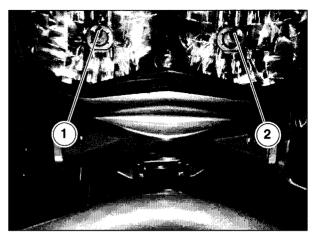
**NOTE** The following information refers to a single unit. but is applicable to both.

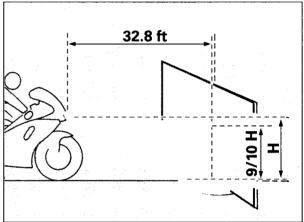
- ◆ Remove the dashboard panel, see 7.1.20 (REMOVING) THE DASHBOARD PANEL).
- Straddle the vehicle as though to ride it.
- ◆ For the right half-headlight (1): working from the right rear of the front fairing, turn the adjuster screw (3) provided:
- ◆TURNING IT CLOCKWISE will lower the headlight beam;
- ◆ TURNING IT COUNTER-CLOCKWISE will raise the headlight beam.
- ◆ For the left half-headlight (2): carry out the same adjustment described above, turning the screw (4):

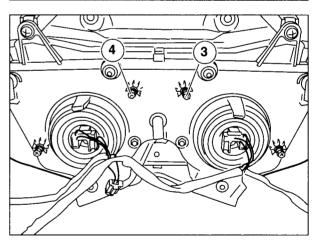
### After completing the adjustment:

### **A** DANGER

If the headlight is improperly adjusted, it could temporarily blind oncoming drivers, or fail to illuminate the road in front of you. Either of these conditions could cause you to lose control of the motorcycle, with subsequent upset, and serious accident and injury or even death. Never ride you motorcycle unless the headlight is properly adjusted.









### **6.18 ADJUSTING THE HEADLIGHT BEAM** HORIZONTALLY @

You must adopt specific procedures as prescribed to meet local legislation in effect in the country where the vehicle is used.

The headlight is made up of two units:

- right half-headlight (1);
- left half-headlight (2).

Each of the two half-units is equipped with a headlight beam adjustment system.

Perform the adjustment on both units. When finished, make sure that:

- the headlight beam is even;
- there are no shadow areas.

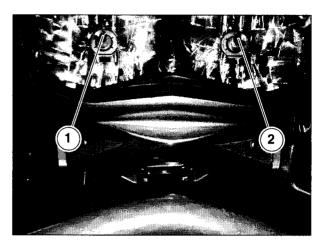
#### To adjust the headlight beam:

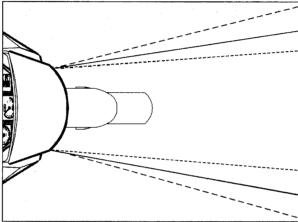
- ◆ Remove the dashboard panel, see 7.1.20 (REMOVING THE DASHBOARD PANEL).
- Straddle the vehicle as though to ride it.
- ◆ For the right half-headlight (1): working from the right rear of the front fairing, use a screwdriver to turn the adjuster screw (3) provided:
- ◆ TIGHTENING (clockwise), the headlight beam turns to the left.
- ◆ LOOSENING (counter-clockwise), the headlight beam turns to the right.
- ◆ For the left half-headlight (2): working from the left rear of the front fairing, turn the adjuster screw (4) provided:
- ◆ TIGHTENING (clockwise), the headlight beam turns to the right.
- ◆ LOOSENING (counter-clockwise), the headlight beam turns to the left.

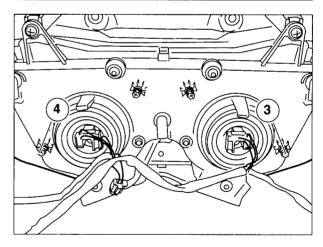
### After completing the adjustment:

### **A** DANGER

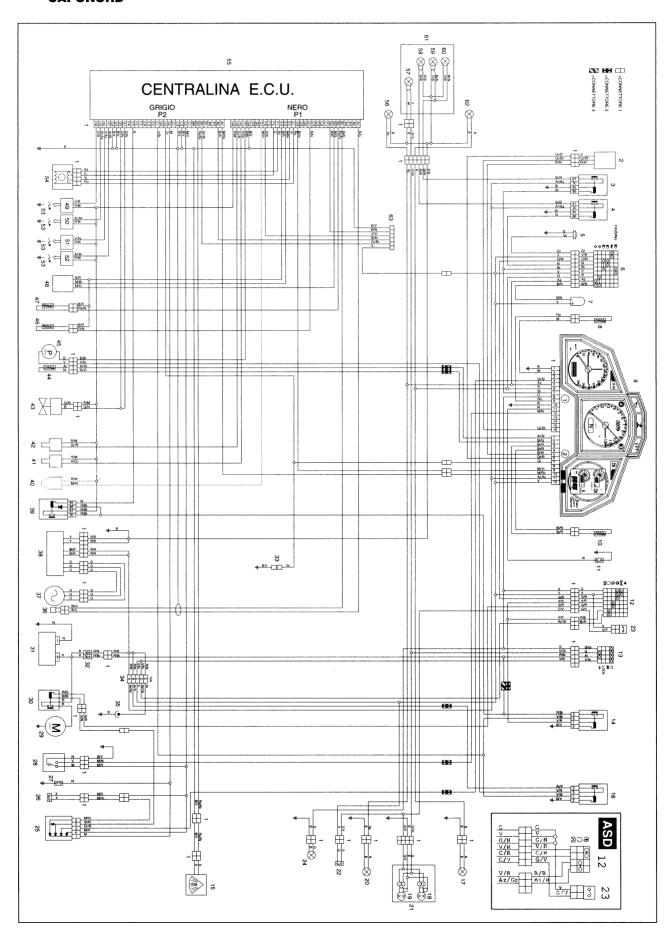
Make sure the headlight beam is properly adjusted horizontally.







# 6.19 WIRING DIAGRAM - ETV MILLE CAPONORD





- 1) Multiple connectors
- 2) Speed sensor
- 3) High beam relay
- 4) Low beam relay
- 5) Horn
- 6) Left dimmer switch
- 7) Flasher
- 8) Air thermistor (dashboard)
- 9) Dashboard
- 10)Coolant temperature thermistor (dashboard)
- 11)Engine oil pressure switch
- 12)Right dimmer switch
- 13)Ignition switch
- 14)Engine stop relay
- 15)Fall sensor
- 16)Fuel pump relay
- 17)Rear right direction indicator
- 18)Parking/brake light bulb
- 19)Parking/brake light bulb
- 20)Rear left direction indicator
- 21)Taillight
- 22)Rear stop switch
- 23)Front stop switch
- 24)License plate light bulb
- 25)Diode module
- 26)Clutch lever switch
- 27)Neutral gear switch
- 28)Side stand switch
- 29)Starter motor
- 30)Start relay
- 31)Battery
- 32)Main fuses (30 A) (Ignition)
- 33)TEST connectors
- 34)Secondary fuses (15A)
  - A headlight, clock
  - B fuel pump
  - C parking lights, rear brake lights, horn, direction
  - indicators, dashboard
  - D starting, safety logic
  - E-spare

- 35)-
- 36)Pick up
- 37)Alternator
- 38)Voltage regulator
- 39)Injection relay
- 40)-
- 41)Rear cylinder injector
- 42)Front cylinder injector
- 43)Cooling fan
- 44)Fuel reserve sensor
- 45)Fuel pump
- 46)Air thermistor (electronic control unit)
- 47)Coolant temperature thermistor (electronic control unit)
- 48)Throttle valve position sensor
- 49)Rear cylinder coil
- 50)Rear cylinder coil
- 51)Front cylinder coil
- 52)Front cylinder coil
- 53)Spark plugs
- 54)Choke
- 55)Electronic control unit
- 56)Front left direction indicator
- 57)Front parking light bulb
- 58)Low beam bulb
- 59)High beam bulbs
- 60)High beam bulb
- 61)Headlight
- 62)Front right direction indicator
- 63)Fuel reserve LED
- 64)Side stand down LED
- 65)Gear in neutral LED
- 66)Direction indicators LED
- 67) Engine oil pressure LED
- 68)High beam LED
- 69)Diagnostics LED
- 70)Tachometer
- 71) Multifunction display (right side)
- 72) Multifunction display (left side)
- 73)Diagnostics connection
- 74)Diode