WORKSHOP MANUAL

ECU-CONTROLLED CARBURETION SYSTEM
EURO 4
DELL'ORTO
TABLE OF CONTENTS

SYNOPTICS ................................................. 3
GENERAL VIEW ............................................... 4
DETAILED DESCRIPTION OF COMPONENTS ......................... 5
  ECU ............................................................. 5
  Battery ......................................................... 6
  Engine speed ................................................ 6
  Engine temperature sensor ........................................ 6
  Vehicle speed ................................................. 7
  Lambda sensor .............................................. 7
  Carburettor .................................................... 8
  Ignition coil ................................................... 9
  Diagnostic light ............................................. 9
DIAGNOSTIC .................................................. 10
WIRING DIAGRAM ........................................... 11
Operating principle
The system controls the carburetion and the ignition.
Carburetion is corrected according to:
- Engine load.
- Engine temperature.
- Correction of the mixture strength based on the Lambda sensor values.
- Richness regulated by the volume of air in the idle circuit and the main circuit.

System advantages
Better control of the carburetion and ignition.
Meeting the requirements of the new anti-pollution standards.

Miscellaneous
If the ECU's power supply is less than 8 volts, the vehicle cannot start.
The engine high-temperature warning light goes on at 105°C.
Maximum engine speed is restricted by ignition cut-off.
When the vehicle is on the centre stand and the rear wheel is turning alone, the MIL indicator light comes on due to lack of speed information from the front wheel. The indicator goes out when the ignition is switched back on.
SYNOPTICS

Lambda sensor

- Vehicle speed
- Engine speed
- Throttle position
- Engine temperature
- Battery voltage / Flywheel magneto voltage

ECU

- Carburettor solenoid valve
- Carburettor solenoid valve
- Ignition coil
- Diagnostic light

Software
It controls the system's operation

Calibrating Vehicle's specific values (mapping)

K line
1. ECU
2. Battery
3. Engine speed sensor
4. Throttle position sensor
5. Engine temperature sensor
6. Vehicle speed (Speedometer)
7. Lambda sensor
8. Diagnostic light
9. HT coil
10. Air solenoid valve
DETAILED DESCRIPTION OF COMPONENTS

ECU

According to the engine speed (measured by the engine speed sensor), to the engine temperature (measured by the temperature sensor), and to vehicle speed (measured by the speed sensor), the proportion of fuel is calculated by the ECU which determines the mixture strength which is required for the engine’s good operating efficiency. This mixture strength varies according to the control time of the air solenoid valve.

The air going through the air solenoid valve is added in the carburettor, inside the emulsion tube.

The injection ECU also controls the ignition system thanks to the information provided.

Maximum engine speed is restricted by ignition cut-off.

- Connection: 18 pins.
- Operating voltage: Between 8 and 14.7 volts.
- Protection against over voltage up to 24 volts.

To avoid any risk of damaging the ECU, the ECU or the components of the circuit must never be disconnected when the vehicle is under power.

Current generator

- Power: 100 W/5000 tr/mn.

The current generator supplies electricity to the vehicle and recharges its battery. It delivers alternating current which is transformed to direct current by the voltage regulator.

When the battery is low, the engine can be started using the kick starter. The generator supplies sufficient minimum voltage for the system to operate.
Battery

The battery is essential for the operation of the system. The minimum battery voltage necessary for the ECU to function is 8 volts.

Engine speed

The ECU uses the pick-up to calculate the engine speed and the spark advance.

Connection:
- Pin 1: To ECU pin 5.

Check: \( R = 110 \pm 10\% \, \Omega \)
Air-gap: 0.6 mm

Engine temperature sensor

Negative temperature coefficient thermistor (CTN).

Connection:
- Pin 1: To ECU pin 2.
- Pin 2: To ECU pin 13.

Check: \( R = 125 \pm 10\% \, k\Omega \) at 25°C
■ Vehicle speed

The speed information is sent by the instrument panel.

- To ECU pin 6.

When the vehicle is on the centre stand and the rear wheel is turning alone, the MIL indicator light comes on due to lack of speed information from the front wheel. The indicator goes out when the ignition is switched back on.

■ Lambda sensor

The oxygen sensor allows you to adapt the mixture strength in order to lower the amount of exhaust pollutants.

Connection:

- Pin 1: To ECU pin 2.
- Pin 2: To ECU pin 3.
DETAILED DESCRIPTION OF COMPONENTS

- Carburettor.

Including:
1. The air solenoid valves.
2. The throttle position sensor.

Air solenoid valve

Controlled simultaneously by the ECU, they control the air-fuel mixture strength by adding air into the mixture circuit and the main circuit according to the engine needs.

- Check: \( R = 75 \pm 20\% \, \Omega \)

Solenoid valve air filter

- To be replaced once every 5000 km.
If the filter is clogged, the mixture will be too rich.

Throttle position sensor

Connection:
- Pin 1: To ECU pin 4.
- Pin 2: To ECU pin 2.
- Pin 3: To ECU pin 10.

Check (Rest position):
- Between terminals 1 and 2: \( R = 0.84 \pm 10\% \, k\Omega \).
- Between terminals 1 and 3: \( R = 4.9 \pm 10\% \, k\Omega \).
- Between terminals 2 and 3: \( R = 5.42 \pm 10\% \, k\Omega \).

As the position sensor is set in the factory, do not remove it from the carburettor.
**Ignition coil**

Connection:
- Pin 1: To ECU pin 18.
- Pin 2: + Battery.

Check:
- Primary winding: 1 and 2: $R = 2.4 \pm 10\% \Omega$.
- Secondary coil: 1 and HT: $R = 9.75 \pm 10\% \text{k}\Omega$ (Without suppressor).

The ECU controls ignition. It uses the speed sensor to determine the ignition point. It calculates ignition-spark advance based on parameters such as engine load, RPM, temperature, etc.

A dwell time (coil charging time) correction is applied based on the battery voltage.

**Diagnostic light**

A diagnostic light informs the driver of a fault. Fault reading is carried out by "reading" the diagnostic warning light flashes.

Only one fault code is indicated during the test.

Connection:
- To ECU pin 16

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When the ignition is switched on, the diagnostic light goes on to check its operation.
# DIAGNOSTIC

<table>
<thead>
<tr>
<th>Faults</th>
<th>Fault codes</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throttle position sensor</td>
<td>1 Flashing</td>
<td>Throttle potentiometer circuit fault.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-circuit to the plus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-circuit to the earth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the electrical circuit of the throttle potentiometer (Rest position):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Between terminals 1 and 2: $R = 0.84 \pm 10% , \Omega$</td>
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<tr>
<td></td>
<td></td>
<td>- Between terminals 1 and 3: $R = 4.9 \pm 10% , \Omega$</td>
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<tr>
<td></td>
<td></td>
<td>- Between terminals 2 and 3: $R = 5.42 \pm 10% , \Omega$</td>
</tr>
<tr>
<td>Air solenoid valve</td>
<td>2 Flashing</td>
<td>Air solenoid valve fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-circuit to the plus</td>
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<tr>
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<td></td>
<td>- Short-circuit to the earth</td>
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<tr>
<td></td>
<td></td>
<td>Check the solenoid valve electrical circuit: $R = 75 \pm 20% , \Omega$</td>
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<tr>
<td>Engine temperature sensor</td>
<td>3 Flashing</td>
<td>Temperature sensor fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-circuit to the plus</td>
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<tr>
<td></td>
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<td>- Short-circuit to the earth</td>
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<td></td>
<td></td>
<td>Check the temperature sensor electrical circuit: $R = 125 \pm 10% , \Omega$ at $25^\circ$C</td>
</tr>
<tr>
<td>Lambda sensor</td>
<td>4 Flashing</td>
<td>the Lambda sensor is defective</td>
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<tr>
<td></td>
<td></td>
<td>- Short-circuit to the plus</td>
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<td></td>
<td></td>
<td>- Short-circuit to the earth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty lambda sensor circuit.</td>
</tr>
<tr>
<td>Speed sensor</td>
<td>6 Flashing</td>
<td>Speed sensor signal fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short-circuit to the plus</td>
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<td></td>
<td></td>
<td>- Short-circuit to the earth</td>
</tr>
</tbody>
</table>

Only one fault code is indicated during the test.
1. ECU
2. Ignition switch
3. Capacitor
4. Battery
5. Kickstand switch
6. Circuit breaker
7. Engine speed sensor
8. Air solenoid valve
9. Throttle position sensor
10. HT coil
11. Lambda sensor
12. Engine temperature sensor
13. K line
14. Diagnostic light
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