

WELCOME TO THE PEUGEOT SERVICE COURSE



WELCOME TO PEUGEOT SERVICE COURSE

- **Arrival and coffee**
- **Technical presentation of M3A2 engine**
- **Checking speed limits**
- **Troubleshooting and use TEP 2010 tester**
- **Use of OBD tests**
- **Service schedule**

- **Pause - test drive of scooters**

- **Technical presentation Dell'orto**
- **The sales department**
- **Collection and questions**

- **Thanks for today**
- **Test driving of scooters**

FUNCTIONAL DESCRIPTION OF M3A2

INJECTION SYSTEM 2 BATCH ENGINE

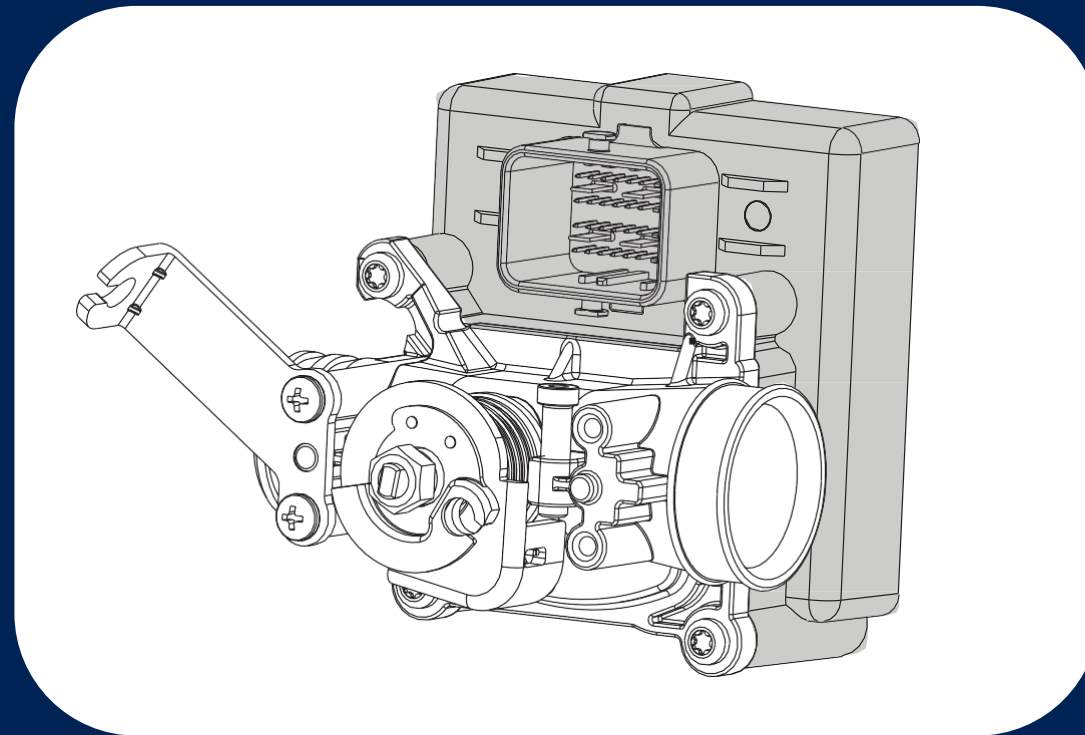


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- **SYSTEM BENEFITS**
- **QUALITY IMPROVEMENTS**
- **OVERVIEW VEHICLE**
- **COMPONENT DESCRIPTION**
- **SYSTEM DESCRIPTION**
- **DIAGNOSIS**
- **WIRE DIAGRAM**

2S Injection Technology

Despite the competition, the Peugeot Scooter has chosen to switch to injection on EU4 engines in order to continue to offer a 2-stroke engine.

Benefits of injection are well known:

- Automatic choker
- Stable idle
- Better gas response
- Better control of fuel consumption (-20%)
- And 2T oil consumption (-50%).

. . . but the cost is also higher.

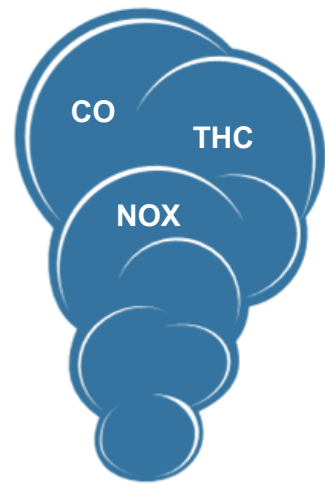
- The injection system calculates the optimal amount of petrol to be injected and the ignition time based on the engine speed, air volume and air pressure.



Excerpt from Euro4 Standard

Changes

EU2 -> EU4



Emission

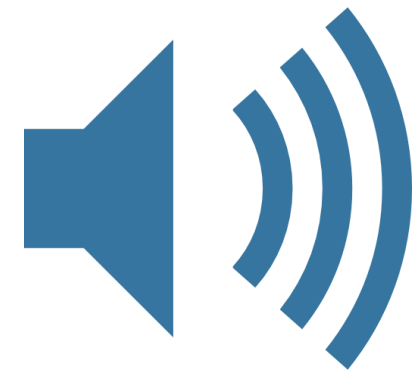
Change from EU2 to EU4:

- CO unchanged
- THC divided by 2
- NOX divided by 7



Durability

The emission limit must
could be complied with up to
10,000 km.



Noise

Amendment from EU2 and EU4: Noise
limit: unchanged

Changes

Result of change EU2 -> EU4



Same effect as
Euro2 Standard

**The most
powerful on
the market**

3.4 kW / 4.6 HP



lowered **20%**
compared with
carburetor version.

From 3.5l to 2.9l (per 100km)

(from 28.6 km / l to 34.5 km / l)



Same effect as
Euro 2 Standard

TEST OF VEHICLES



100,000km test on
way



In extreme weather (-10 ° C /
+ 40 ° C)



Up to a height of
2500m



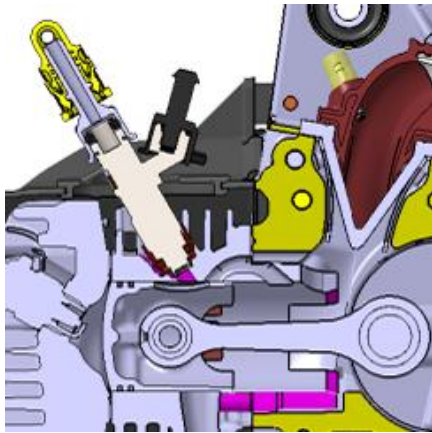
4000 hours on test
scroll field

Injection technology and new transmission

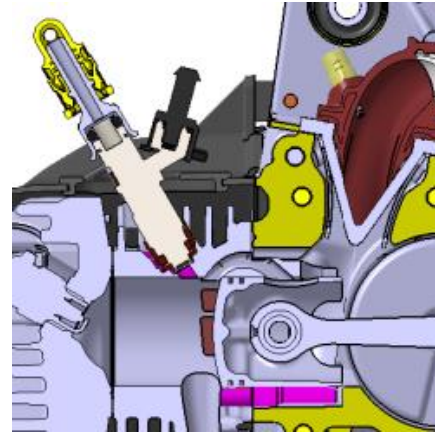
More than 50% of the engine is renewed

Injection technology

- Improved fuel consumption
- Better start at low temperature
- Mikuni system
- Mix Technology: Indirect and direct, benefits from both systems



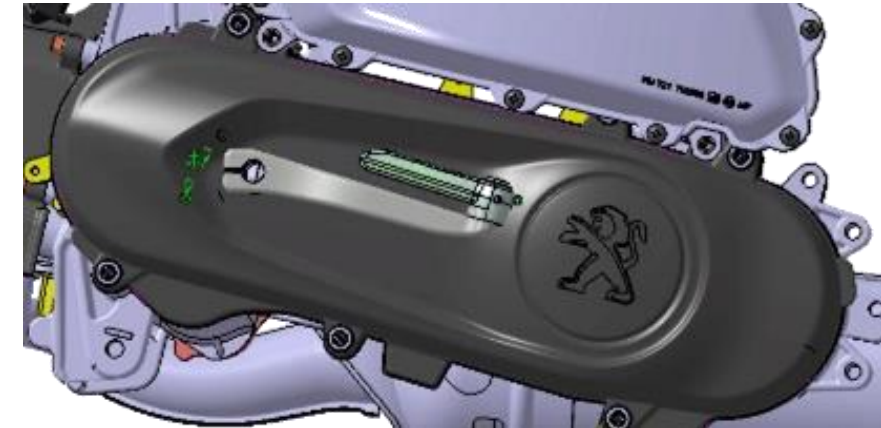
*Indirectly
injection by
idle and low
revolutions*



*Direct
injection by
full throttle and high
revs*

New transmission

- Reinforced
- Less noise thanks to new cover with rubber gasket



New cover

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Development of T21

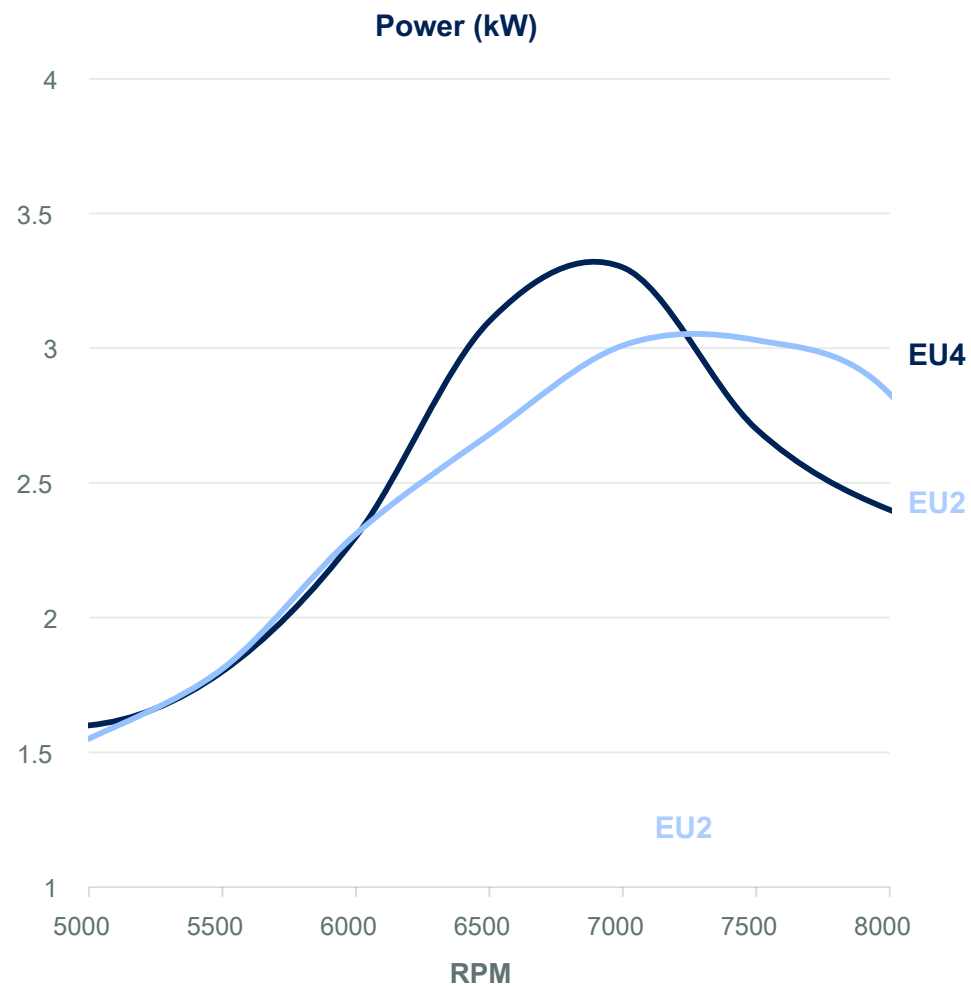
- **Oil consumption reduced by approx. 50%** (controlled by ECU M3A and calculated on the basis of load, speed, revolutions and temperature)
Advantage: less smoke at start-up, minimize engine failure
- **No exhaust air intake** (no direct injection required)
- Use of existing components from other models, Synerject M3A box (CTS and SAT 125, MA1), DK7 nozzle (from Peugeot car models)
- All petrol pressure hoses have quick couplings.
- Exhaust and front pipes are 100% stainless steel

Development of 50 cc 2S EU4 T21

- **Crankshaft main bearings SKF 6204 C4 MT: European produced.**
- **Aluminum cylinder *Nicasil* surface treatment, *Mahle* piston with anti-wear coating (graphite) developed by Mahle Germany**
- Crankcase: continuous quality control of cast crankcase item by supplier:
Material analysis, the condition of the material is checked by X-ray
(porosity).
NB: Supplier of cast item is also supplier to the auto industry (GM and VW)
- Greater power on charging coil (170 W against 90W); Same battery as 125cc vehicles.
- **Kickstarter maintained**, start is possible with flat battery (> 6V)
- ***Bando* reinforced drive belt (idem recent series)**

Power and torque curves: 50 cc 2S EU4 engine on Streetzone (EU4 compared to EU2)

Max effect
EU4: 3.4 kW at 7000 rpm
EU2: 3 kW at 7000 rpm



Max moment
EU4: 4.6 Nm at 6700 rpm
EU2: 4.3 Nm at 6500 rpm

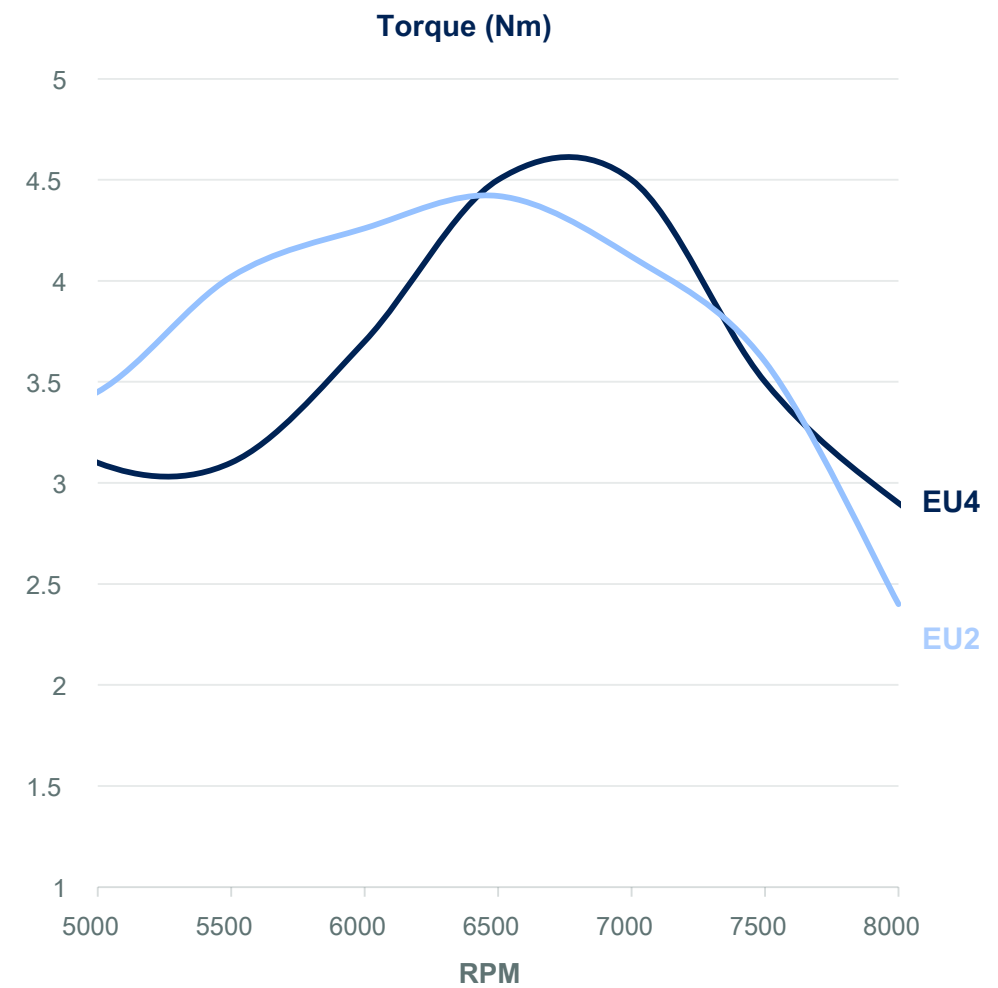
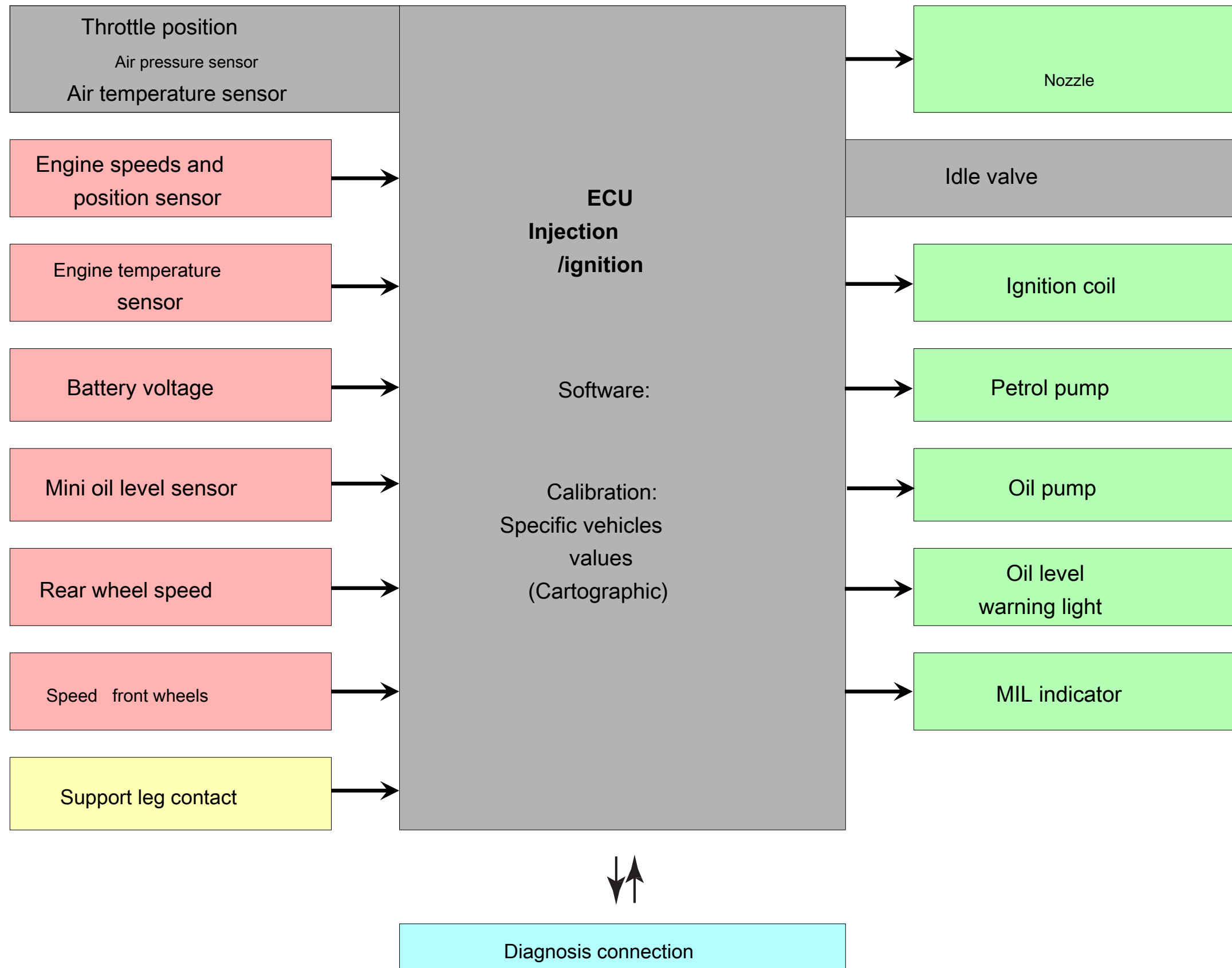


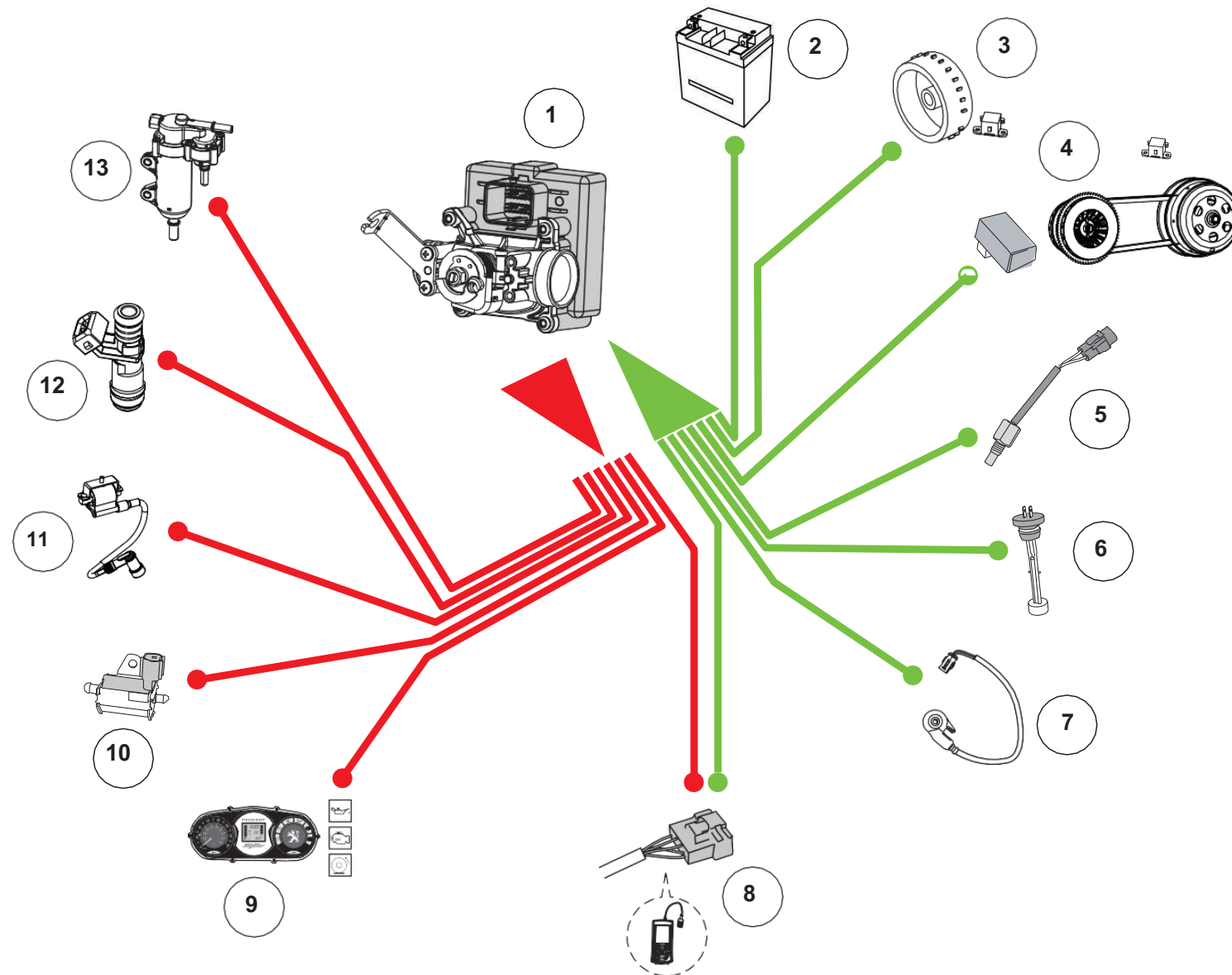
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SYSTEM



OVERVIEW COMPONENTS



- 1. ECU
- 2. Battery
- 3. Engine speed sensor
- 4. Speed sensor / rear wheel speed signal
- 5. Engine temperature sensor
- 6. Mini oil level sensor
- 7. Support leg contact
- 8. Diagnosis plug

- 9. Instrument panel
- 10. Oil pump
- 11. Ignition coil
- 12. Injection nozzle
- 13. Gas pump

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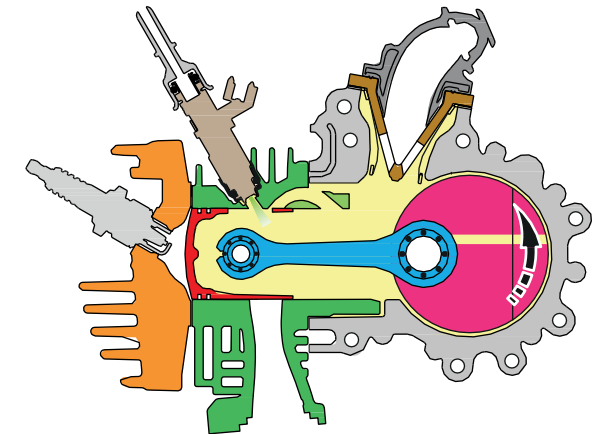
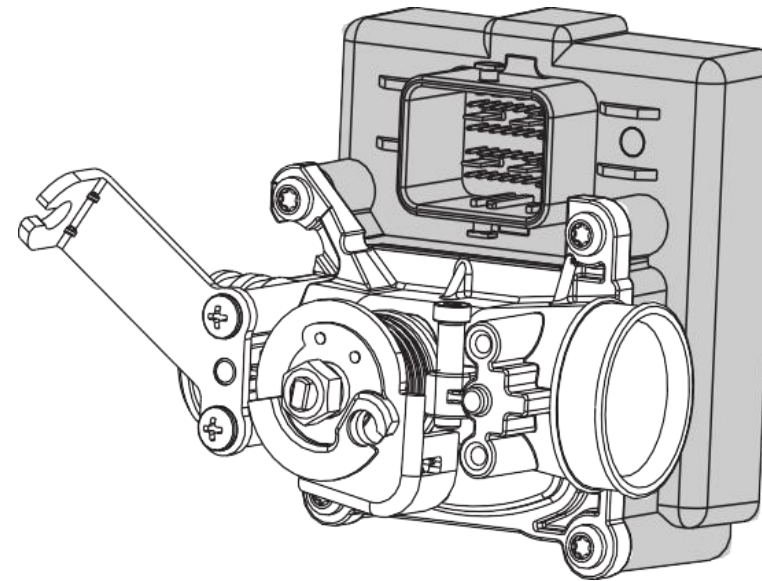
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DETAILED DESCRIPTION OF COMPONENTS

ECU, injection and ignition

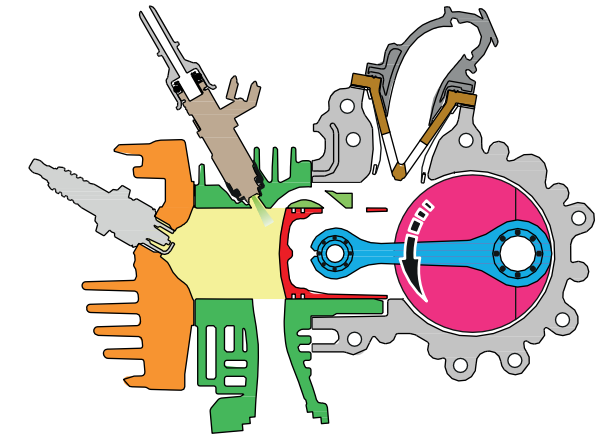
Includes:

- Throttle body
 - Air temperature sensor
 - Air pressure sensor
 - Idle valve
- 32 pin multistik.
 - Operating voltage: Between 8.5V and 14.7V
 - Protected against voltage up to 24 volts.



The fuel injection is controlled by the ECU, **which controls the nozzle opening time from the engine air intake** (measured in throttle body), engine speeds **and the necessary corrections** (cold start, acceleration, idle, etc ...) ...

The ECU controls the dosage of engine lubrication, by using all information to control **the amount of 2 stroke oil injected by the oil pump.**



Be careful not to damage the ECU, the ECU or the components of the circuit must never be disconnected when the vehicle is under voltage. To avoid any risk of damage to an electrical component, it is strongly recommended not to use a booster to start the vehicle. Never change throttle stop adjustment.



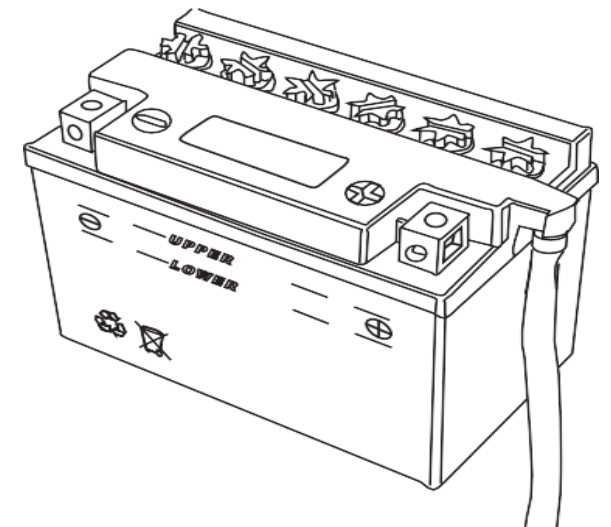
DETAILED DESCRIPTION OF COMPONENTS

Battery

The battery is important for the operation of the system.

Minimum battery voltage: 8.5 volts.

The ECU constantly needs to know the battery voltage in order to adjust the signal from the various components. The reaction time of a nozzle is directly related to its supply voltage. The ECU will therefore change the nozzle signal to compensate for battery voltage changes.



Charging coil

RPM: 170 W / 5000 rpm.

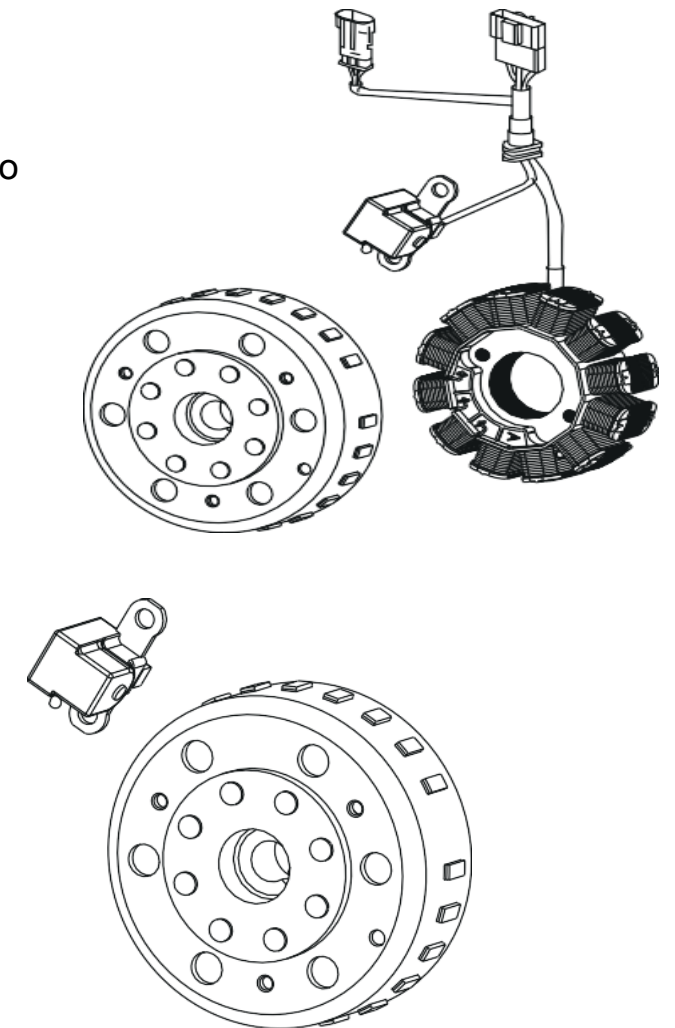
The charging coil supplies power to the vehicle and recharges the battery. It supplies alternating current, which is converted to direct current by the voltage regulator. When the battery voltage is low, the engine can be started using the kickstarter. The generator provides sufficient voltage for the system to operate.

Check: $R = 0.8 \pm 10\% \Omega$.

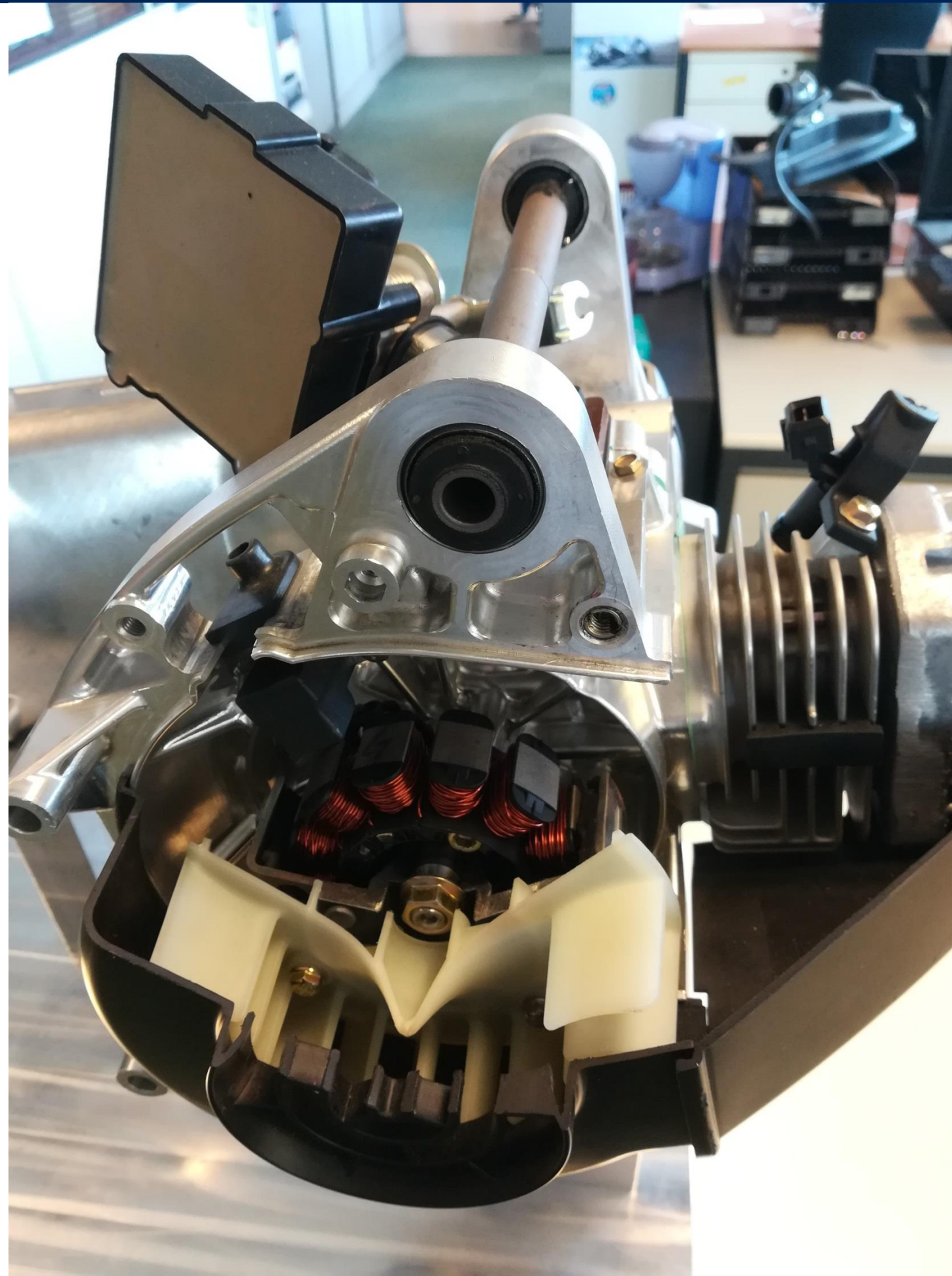
Engine speed sensor

Trigger wheels are attached to the flywheel. This wheel has 24 teeth and 1 is removed to mark the position of the piston. Signal voltage from 1.7 to 75 volts according to motor speed. Connection: Pin 1 to ECU pin B1 / Pin 2 to ECU pin B2.

- **Check: $R = 125 \pm 10\% \Omega$.**
- **Air-gap: 0.5 - 0.7 mm**



DETAILED DESCRIPTION OF COMPONENTS



DETAILED DESCRIPTION OF COMPONENTS

Speed information

The ECU needs to know the speed to limit the speed by adjusting the nozzle opening time and ignition timing. The speed is measured by the transmission sensor and the speed information from the instrument panel.

Transmission sensor

Located by the clutch wheel, this sensor measures the speed of the vehicle. Gear wheels: **4 trigger points**

Check: $R = 150 \pm 10\% \Omega$

Air-gap: 0.5 to 1.5 mm

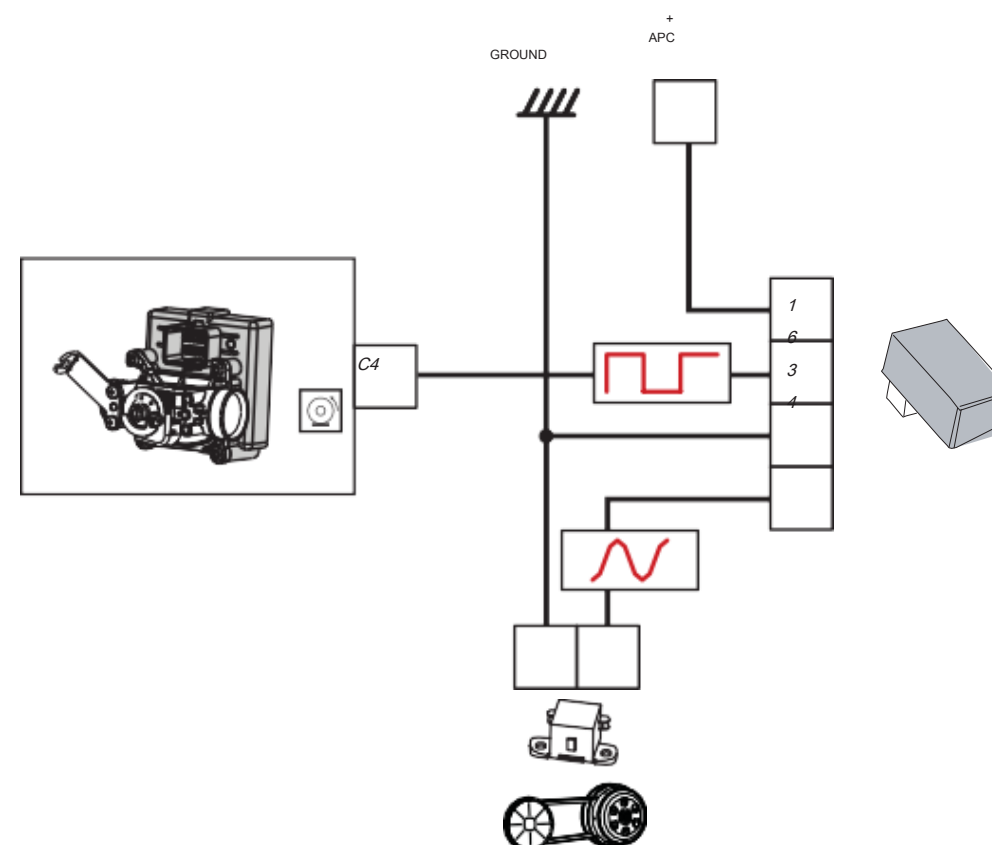
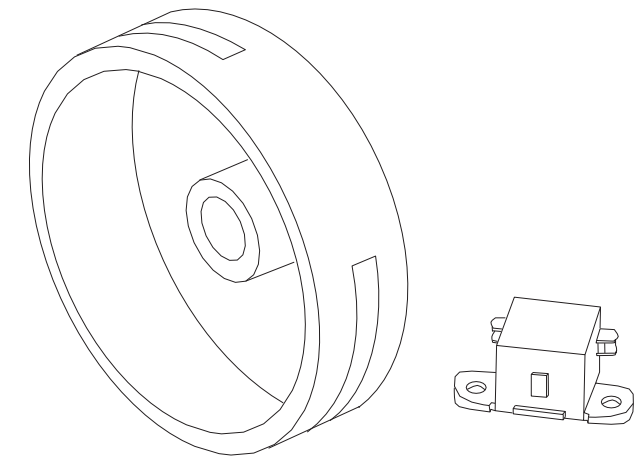
Voltage: From 35 to 100 V ~

As the transmission sensor is installed and adjusted at the factory, it should only be removed if absolutely necessary.

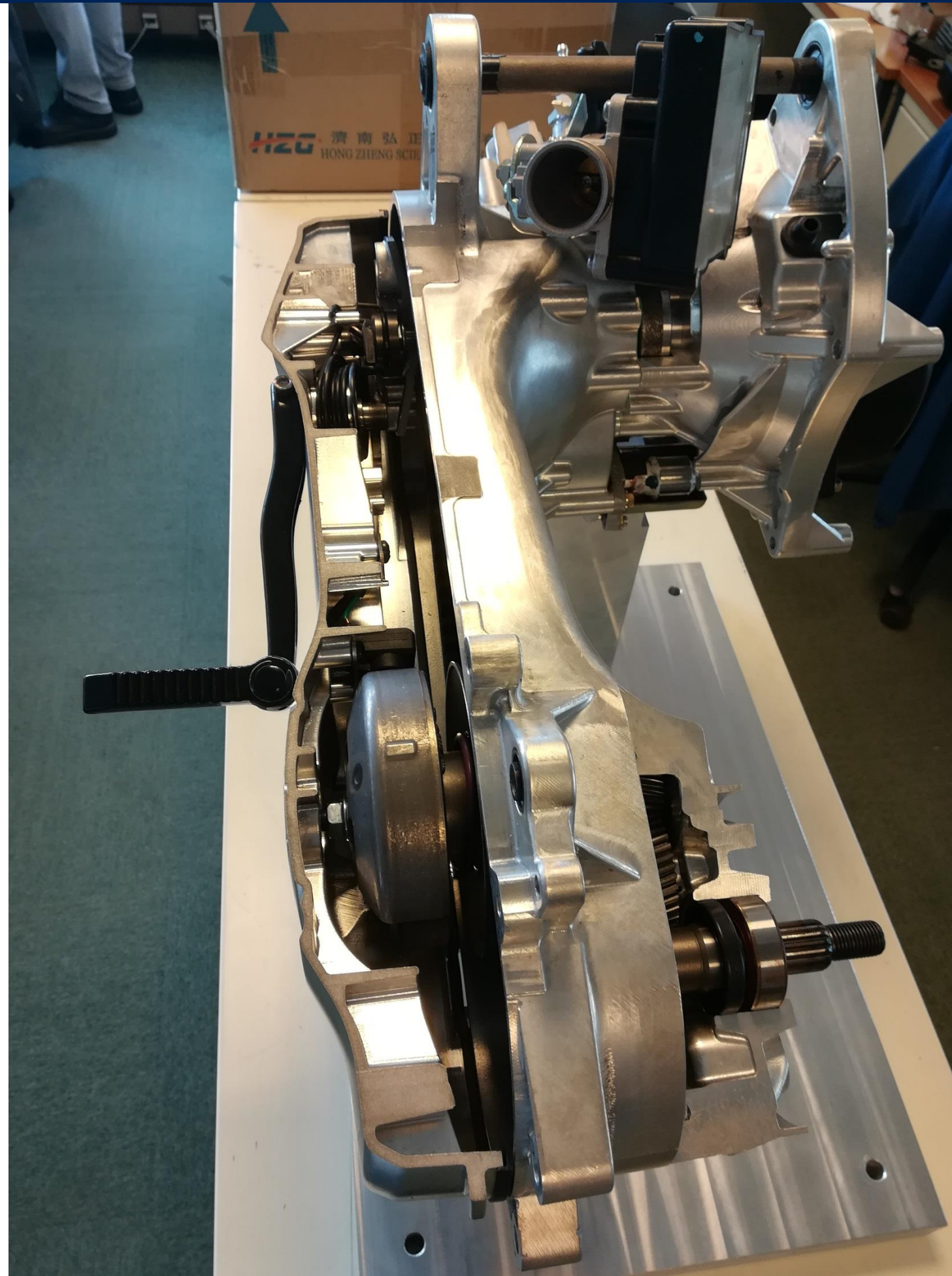
Transmission sensor box

This box converts the sinusoidal signal emitted by the transmission sensor into a square signal.

Connection: To ECU pin C4.



DETAILED DESCRIPTION OF COMPONENTS



DETAILED DESCRIPTION OF COMPONENTS

Instrument panel

Front wheel speed information

Measured by sensor on the front wheel, the speed information to the ECU is sent from the instrument panel (except mechanical speedometer)

- Connection: To ECU pin E3.

Diagnostic Warning Lamp (MIL)

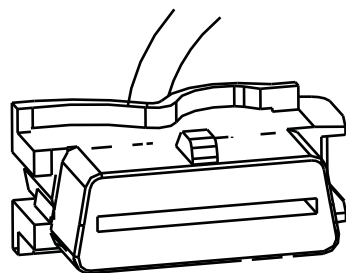
The diagnostic lamp warns the driver of faults in the fuel injection system.

- Connection: To ECU pin F3.

Oil level warning light

If the oil level in the oil tank is low, the warning light in the instrument panel illuminates.

- Connection: To ECU pin F1.



Diagnosis plug OBD

The OBD connector allows you to connect an approved diagnostic tool and check the ECU as well as components or error codes on the same.

Connection: To ECU pin B4.

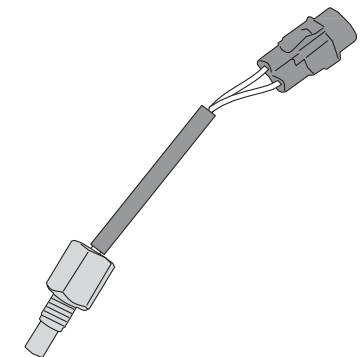
Engine temperature sensor

Located on the top piece.

The ECU corrects the opening time of the nozzle as well as the ignition time based on the signal from the engine temperature sensor.

Connection: Pin 1 to ECU pin C2 / Pin 2 to ECU pin D1.

- **Check: $R = 10.6 \pm 20\%$ to $20\text{ }^{\circ}\text{C}$.**



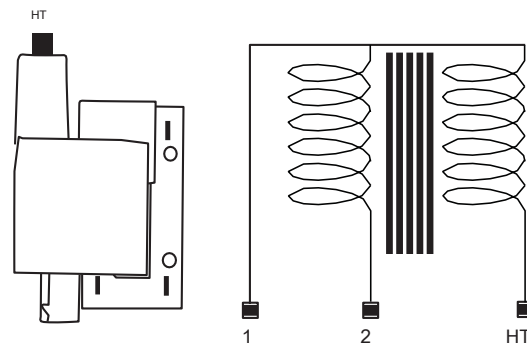
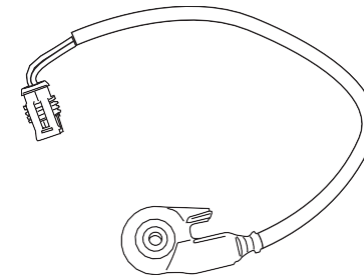
DETAILED DESCRIPTION OF COMPONENTS

Support leg contact (Django only)

The outrigger is fitted with a switch which makes it possible to start the engine if the outrigger is down, but only with limited engine speed

Engine speed limit: 2500 rpm. Connection:

- Pin 1: To ECU pin D4.
- Pin 2: To the ground.



Ignition coil:

- Connection: Pin 1: To ECU pin H3 / Pin 2: + G4.

Check:

- **Primary coil: 1 and 2: $R = 3.3 \pm 20\% \Omega$.**
- **Secondary coil: $R = 13 \pm 20\% k\Omega$.**

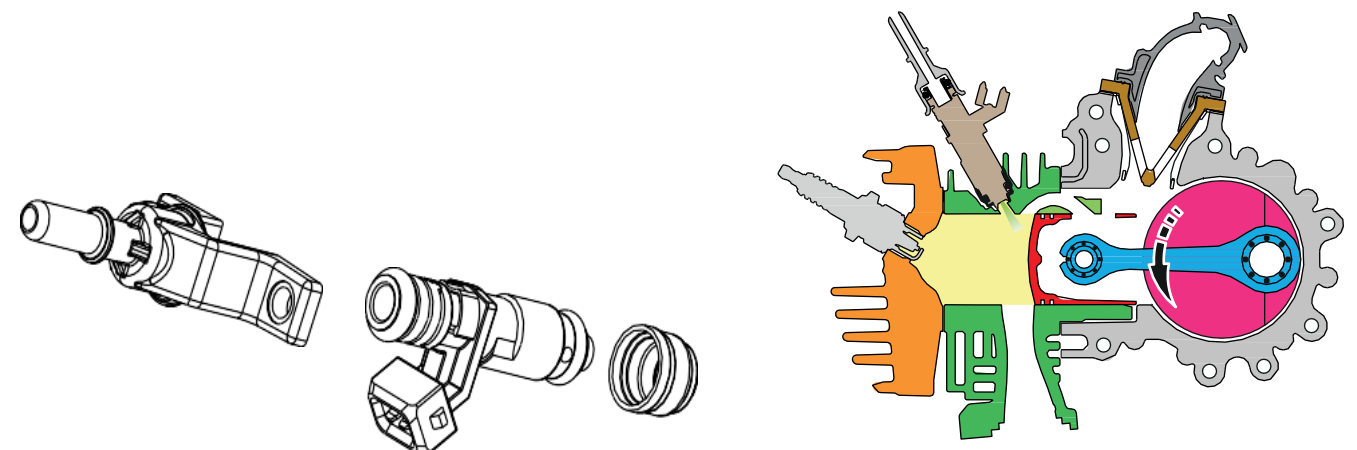
The ECU controls the ignition, it uses the speed sensor to determine the ignition point (relative to the missing tooth on the flywheel). It calculates the ignition timing based on parameters such as: engine load, speed, temperature, etc. Correction of opening time) is based on the battery voltage.

Injection nozzle

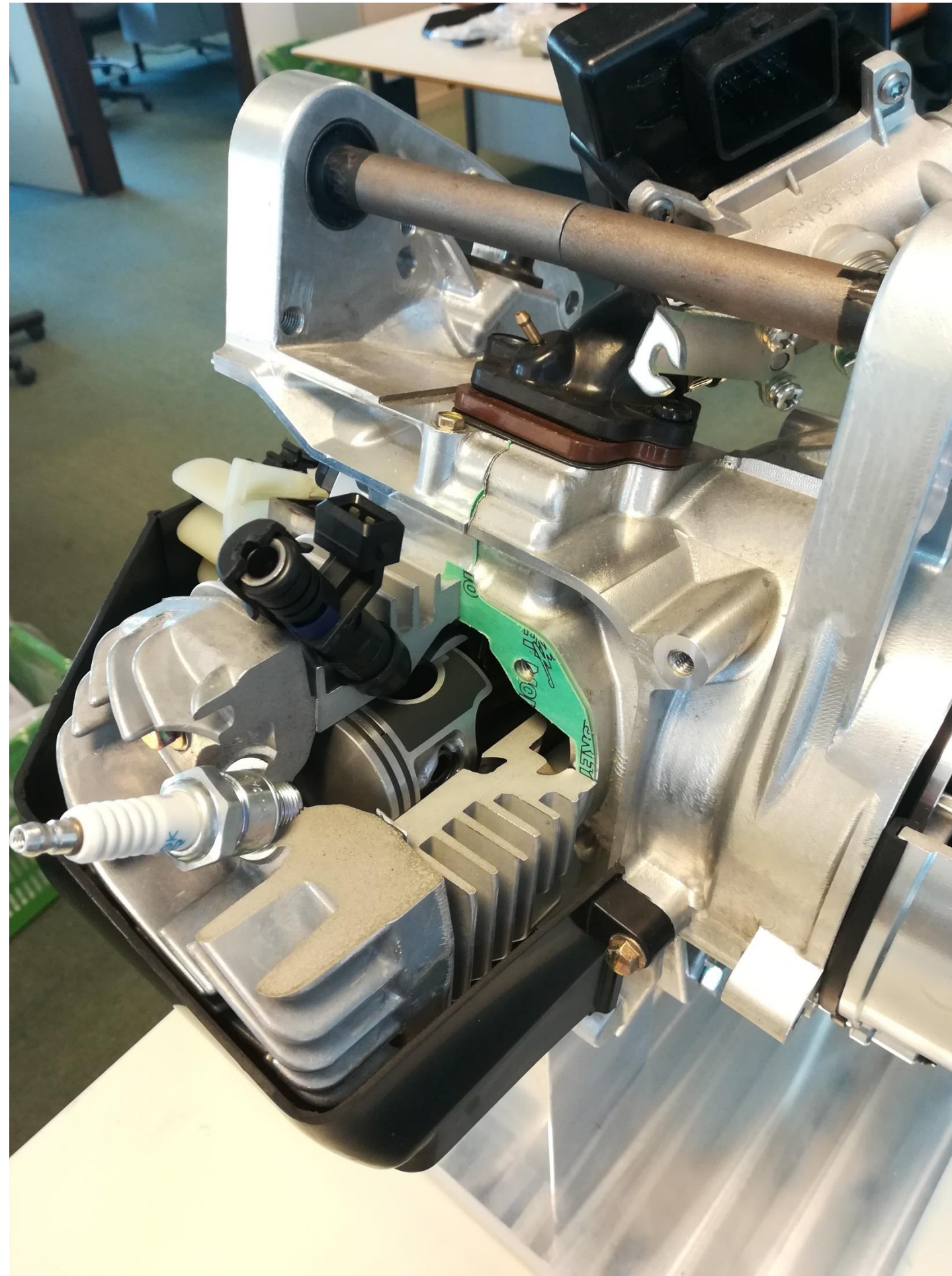
Connection:

- Pin 1: + G4.
- Pin 2: To ECU pin G1.

Check: $R = 13 \pm 10\% \Omega$.



DETAILED DESCRIPTION OF COMPONENTS



DETAILED DESCRIPTION OF COMPONENTS

Petrol pump

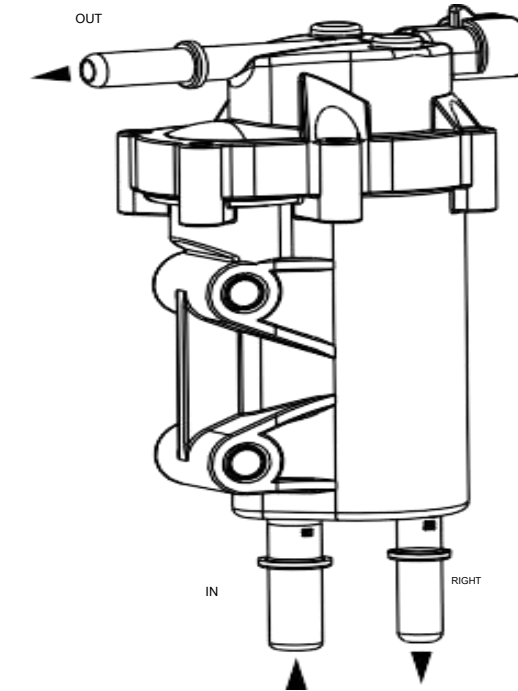
Fuel the injection nozzle.

5 bar pressure, limited and regulated by the pressure regulator integrated in the petrol pump.

The pump runs for 3 seconds when the ignition is turned to ON to pressurize the fuel system

Connection: Pin 1: two petrol pump relay / Pin 2: For frame.

- **Check: $R = 2.5 \pm 10\% \Omega$**

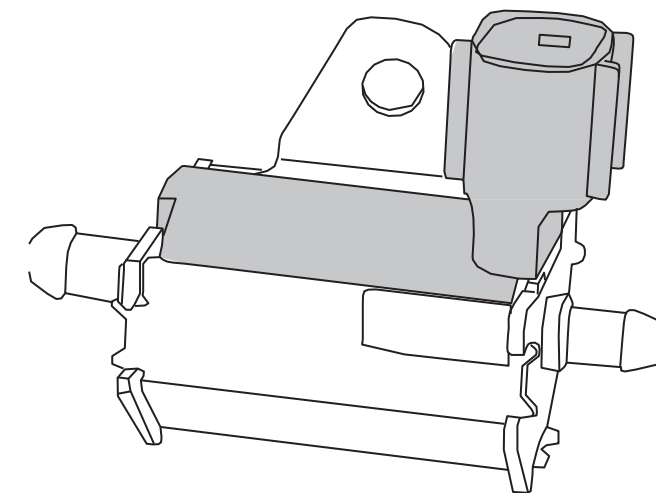


Electric oil pump

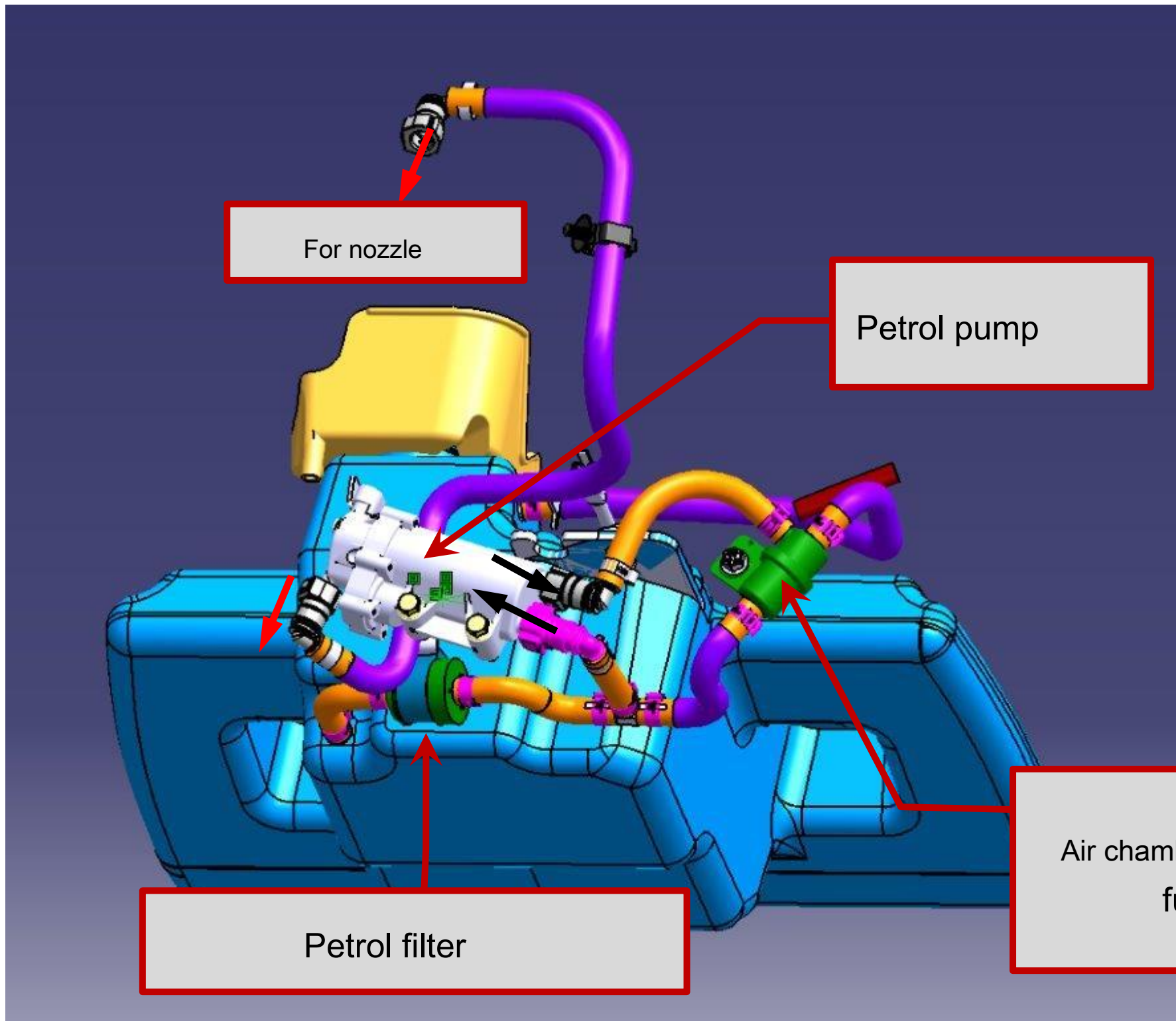
The lubricant is injected into the intake manifold by means of an electric pump controlled by the ECU. The oil flow is dosed according to the engine speed and the amount of air drawn in.

Connection: Pin 1: For ECU pin H2 / Pin 2: For frame.

- **Check: $R = 2.5 \pm 10\% \Omega$.**
- **Ventilation:**
 - **Use TEP2010 (service function)**
 - **Or key On / Off as often as required**



GASOLINE CIRCUIT - Citystar - Fight 4 - Django



For nozzle

Petrol pump

Petrol filter

Air chamber: removes air bubbles in fuel system

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SYSTEM DESCRIPTION

ECU software

- The software is the program that controls the components based on incoming data.

ECU calibration

- Adapting the system to the machine is by determining a certain number of vehicle-specific values. These values are determined by bench testing and entered in the calculation tables used by the ECU to adapt the system to the machine.

Cut-off engine braking

- During engine braking, the injection of petrol is interrupted to save fuel. The nozzle is closed.

Idle control

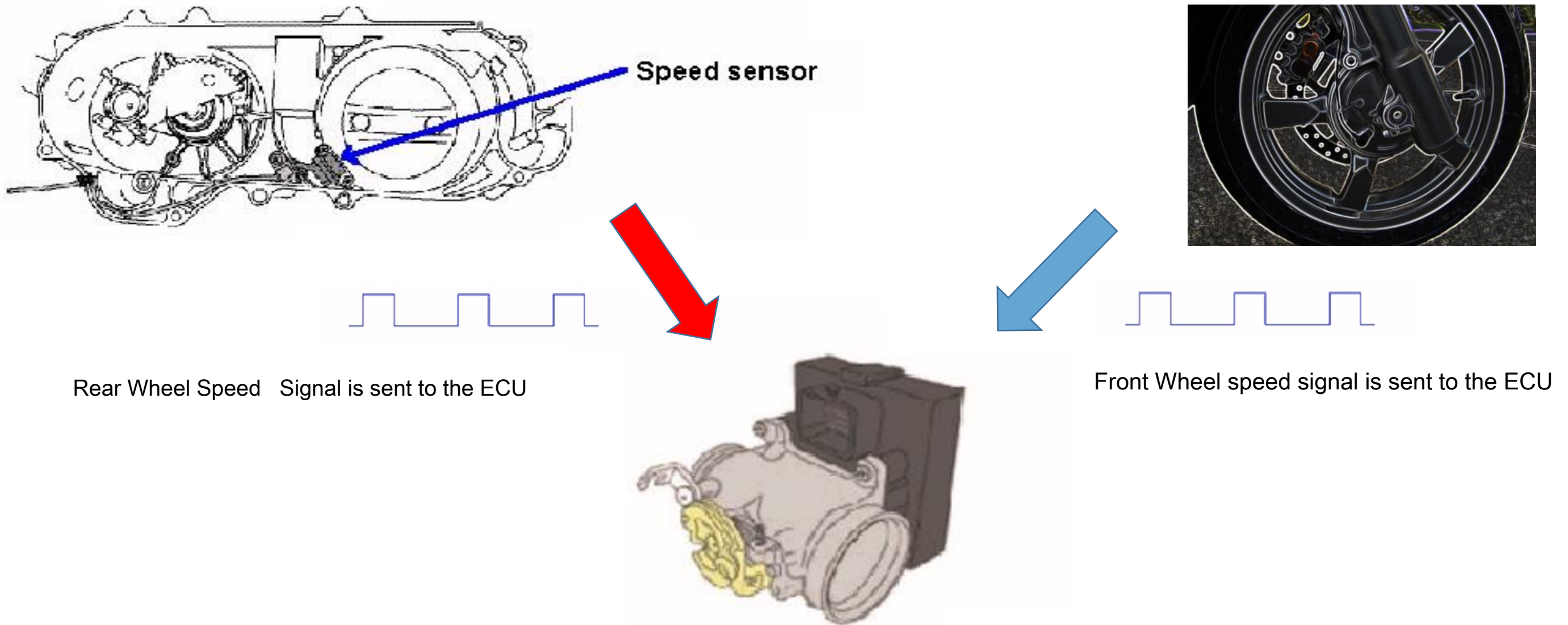
- **The idle speed is controlled solely by the system ECU** which corrects the idle valve to maintain the correct speed for both cold and hot engine. No adjustment is required.

Diagnosis indicator (MIL)

The indicator lights up when the ignition is turned ON to see that it works. As soon as the vehicle is started, the lamp goes out if there are no faults in the system.

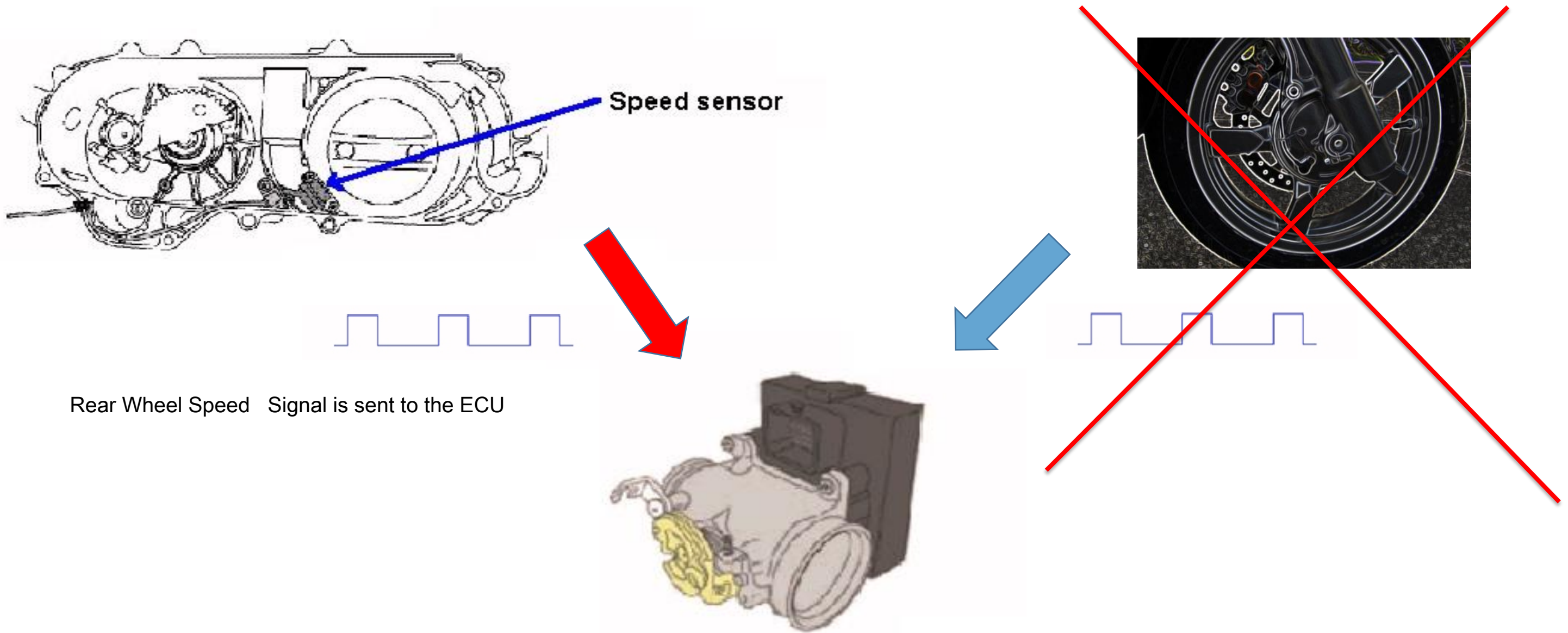
If the system detects a fault in the components while driving, the light comes on.

SPEED LIMIT (DJ / CTS / SF)



- 1) Internal calculation check the consistency between the front wheel speed (FWS) and the rear wheel speed (RWS)
- 2) RWS is considered as a reference to limit the vehicle speed.
- 3) In case of one sensor is faulty, maximum speed is ensured by changing the reference speed measurement
- 4) In case of both sensors are faulty, the engine revolution speed is limited (fuel cut off or enleanment from an engine speed threshold "eg <6500 RPM")

SPEED LIMIT (KISBEE)



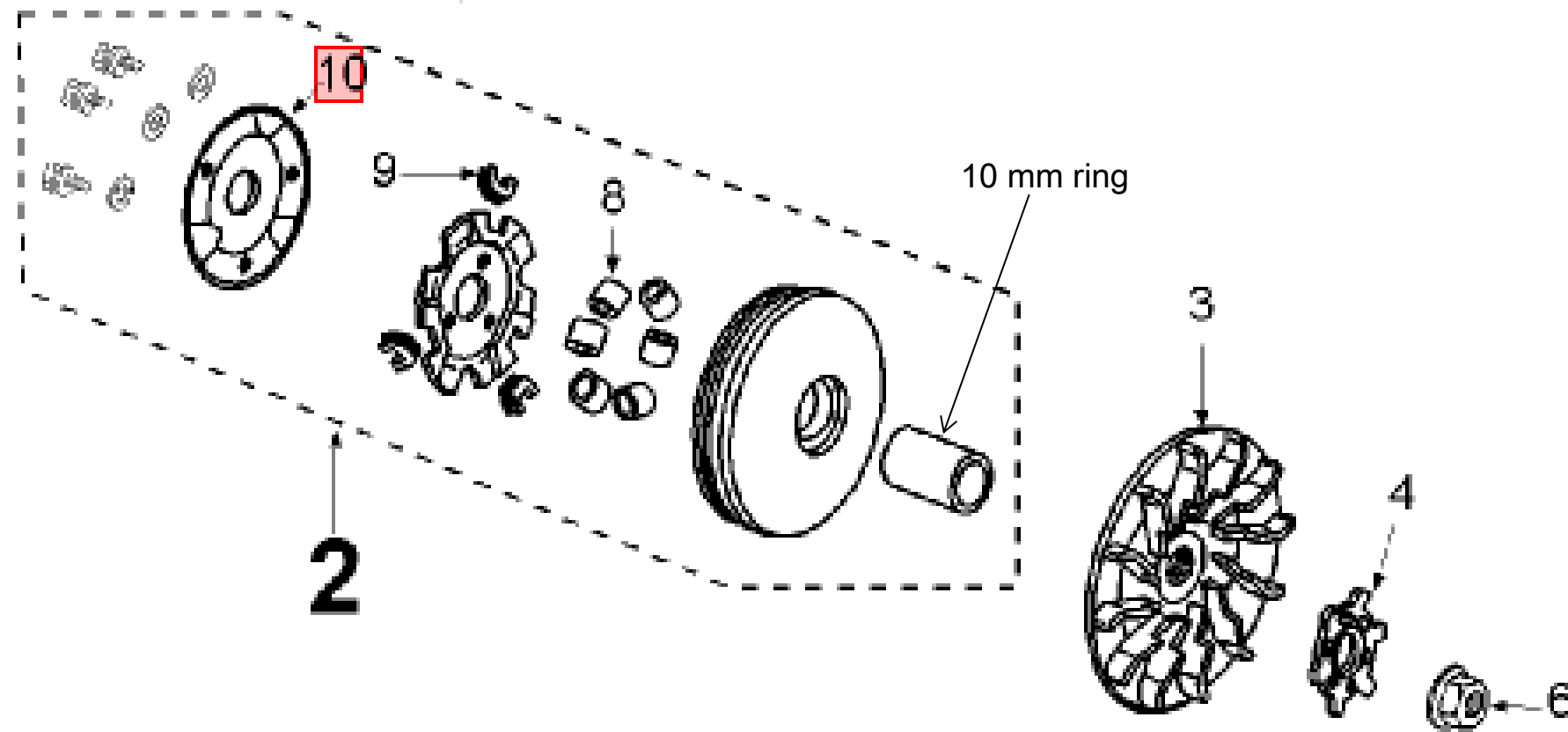
- 1) Internal and real time diagnosis on the rear wheel speed (RWS)
- 2) RWS is considered as a reference to limit the vehicle speed.
- 3) In case of RWS sensors is faulty, the engine revolution speed is limited (fuel cut off or enleanment from an engine speed threshold "eg <6500 RPM")

SPEED LIMIT (ALL)

45 km. Stuffed in variator:

- Is not mentioned in type approval, but is fitted to provide better driving comfort at maximum speed (45 km / h)

30 km. Stop plate in variator, 10 mm variator ring, stop on throttle:



Stop on throttle

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DIAGNOSIS

Reading out error codes

- This mode displays current data on an error. When an error is detected, the ECU records the data from the sensors at the moment the error occurred.

Diagnostic tool

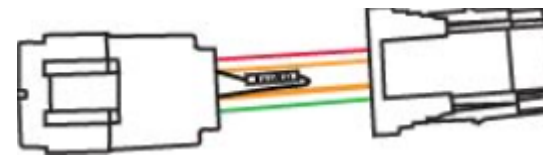
- The engine light illuminates the driver of a fault. A diagnostic tool can be connected to the ECU to "read" its memory, error codes and vehicle operating parameters. System diagnostics are performed by the ECU, which checks all the connected components.

Diagnosis procedure with diagnosis tool

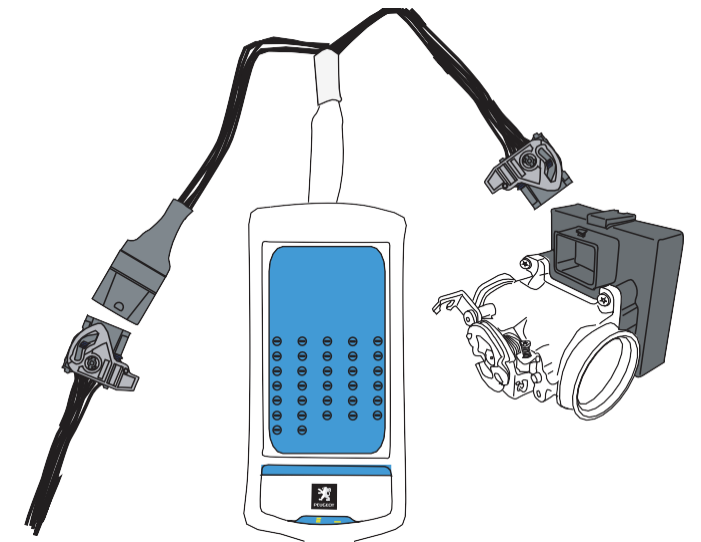
- Reference to service manual: Use of diagnostic tool TEP 2010.



Item no. PE802809



OBD adapter
Item no. PE788270



Item no. PE

ERROR CODES

| Fault codes | Designation | Cause |
|-------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| P0217 | Engine overheating | Value of the engine temperature sensor outside normal range. - Check: - The sensor, - The wiring harness. - That the cooling system is in compliance. |
| P0335 | Speed sensor circuit fault | - Check: - The engine speed sensor - The wiring harness. |
| P0120 | Potentiometer adaptation fault | Potentiometer value outside normal range. Change the ECU. |
| P0124 | Potentiometer variation fault | |
| P0122 P0123 | Potentiometer fault | |
| P0562 P0563 | Battery voltage fault | - Check: - The battery, - The regulator. - The wiring harness. |
| P0201 P0261 P0262 | Petrol injector fault | - Check: - The injector, - The wiring harness. |
| P0351 | Ignition fault | - Check: - The spark plug, - The coil, - The wiring harness. |
| P0230 P0231 P0232 | Petrol pump relay fault | - Check: - The fuel pump relay, - The wiring harness. |
| P0219 | Engine overspeed | Appears when the maximum engine speed threshold has been exceeded |
| P0507 | Abnormal idle | Check machine conformity, no air leaks, leaks on fuel system ... |
| P0505 | Idle adaptation. | |
| P0508 P0509 | Idle valve fault | Change the ECU. |

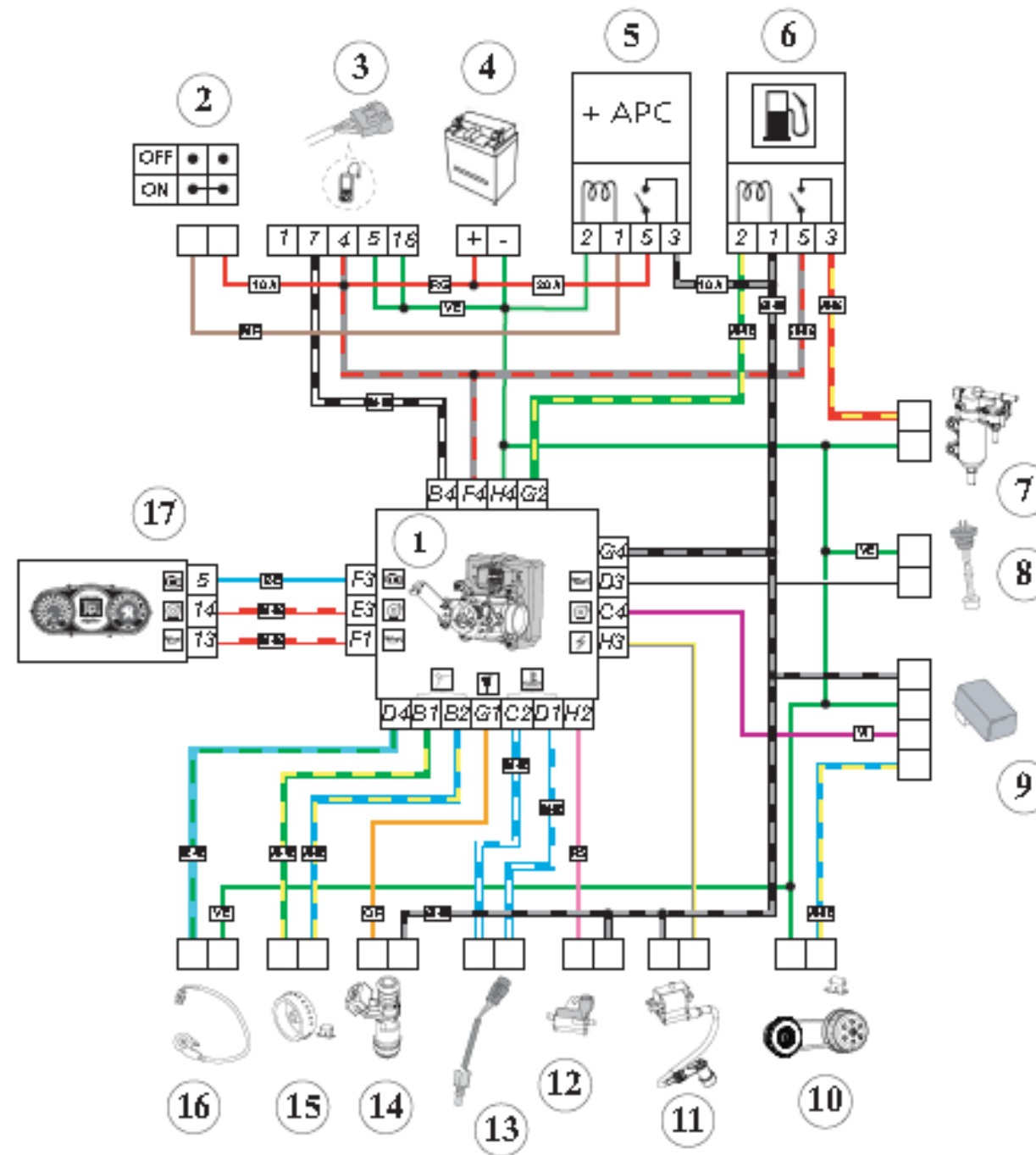
ERROR CODES

| | | |
|----------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------|
| P0117 P0118 | Engine temperature sensor | Value of the engine temperature sensor outside normal range. |
| P0119 | Engine temp. variation | - Check: - The sensor, - The wiring harness. - That the cooling system is in compliance. |
| P0112 P0113 | Air temperature sensor | Change the ECU. |
| P0114 | Air temp. variation | |
| P0650 | Warning LED | - Check: - The wiring harness. - The LED |
| P0107 P0108 P2228 P2229 | Intake pressure sensor | Change the ECU. |
| P0336 | Engine sensor teeth | - Check: - The engine speed sensor. - The magneto. - The wiring harness. |
| P0500 | Vehicle speed fault | - Check: - The speedo sensor. - The wiring harness. |
| P1687 P1688 P1689 | 2T oil indicator light fault | - Check: - The wiring harness. - The indicator light. |
| P1690 P1691 | Oil pump fault 2T | - Check: - The wiring harness. - Oil pump. |
| P1211 P1212 P1213 P1214 | Speed sensor signal fault | - Check: - The speedo sensor. - The wiring harness. |

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WIRE DIAGRAM



- | | |
|---------------------------------|--------------------------------------|
| 1. Injection ECU | 10. Drive sensor |
| 2. Ignition switch | 11. HT coil |
| 3. OBD socket | 12. Oil pump |
| 4. Battery | 13. Engine temperature sensor |
| 5. Power supply relay | 14. Petrol injector |
| 6. Fuel pump relay | 15. Engine speed and position sensor |
| 7. Fuel pump | 16. Kickstand switch |
| 8. Mini oil level switch | 17. Instrument panel |
| 9. Vehicle speed signal housing | |

DESIGN CHANGES



New front position light on Kisbee (same for all Kisbee)



New front position light and LED taillight on Speedfight



Front position lights on all Django 50cc



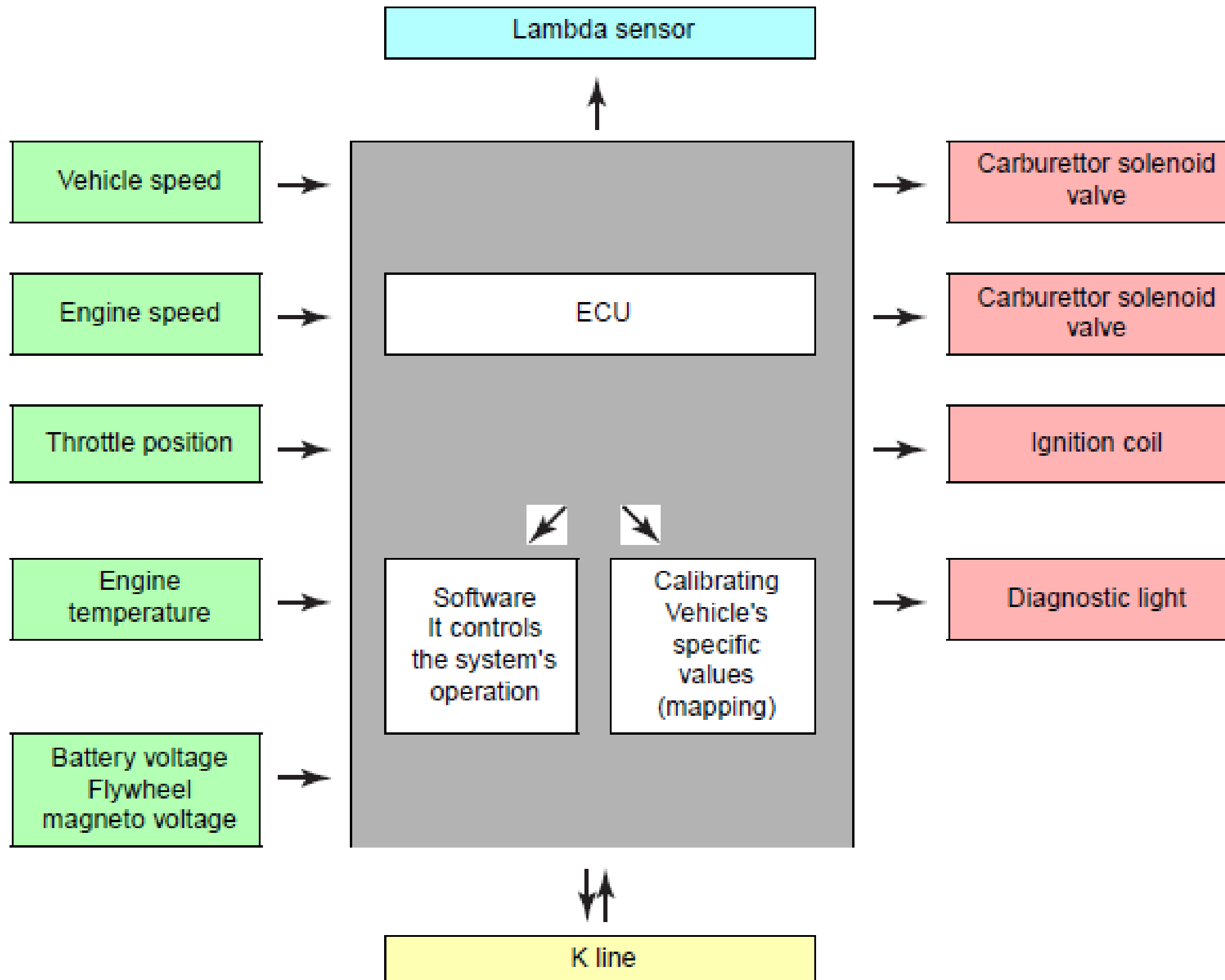
New exhaust cover on Django 50cc



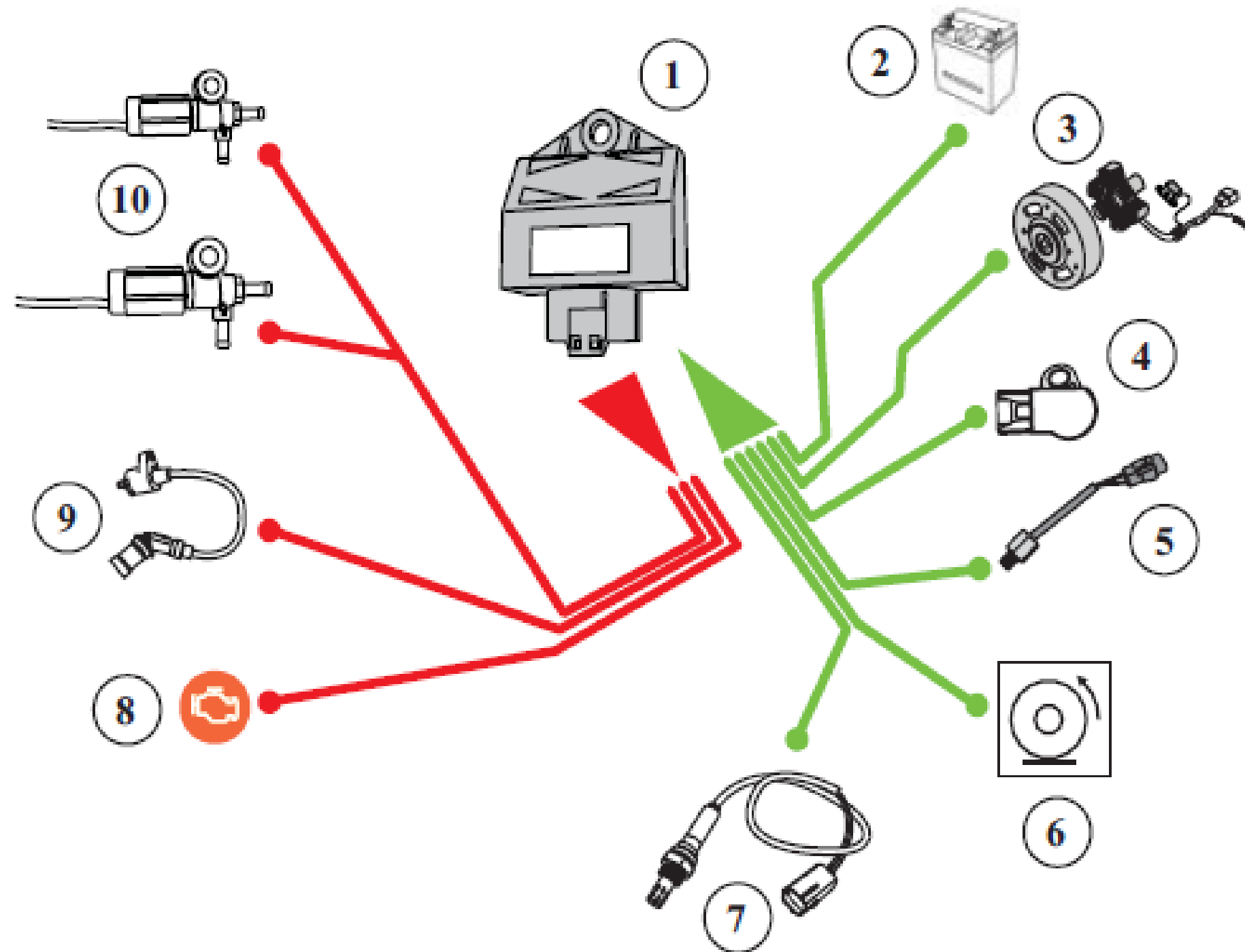
New exhaust shield



Dell'orto ECU Controlled Carburetor Tweet 4T EU4



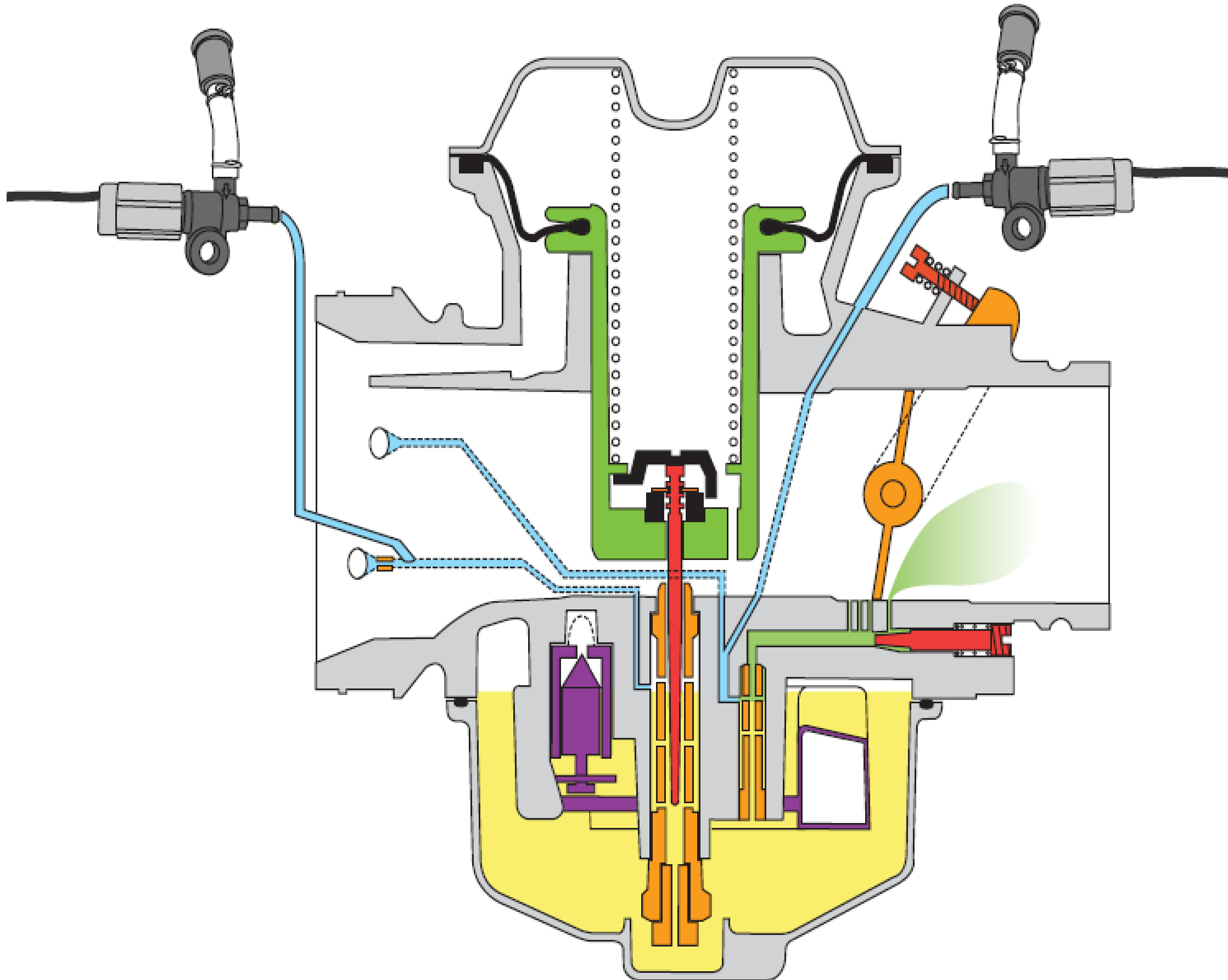
Dell'orto ECU Controlled Carburetor Tweet 4T EU4



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

Dell'orto ECU Controlled Carburetor Tweet 4T EU4



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DIAGNOSTIC

| Faults | Fault codes The indicator lights blinks | Cause |
|---------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Throttle position sensor | 1 Flashing | Throttle potentiometer circuit fault. <ul style="list-style-type: none"> - Short-circuit to the plus - Short-circuit to the earth Check the electrical circuit of the throttle potentiometer (Rest position): <ul style="list-style-type: none"> - Between terminals 1 and 2: $R = 0.84 \pm 10\% \text{ k}\Omega$. - Between terminals 1 and 3: $R = 4.9 \pm 10\% \text{ k}\Omega$. - Between terminals 2 and 3: $R = 5.42 \pm 10\% \text{ k}\Omega$. |
| Air solenoid valve | 2 Flashing | Air solenoid valve fault <ul style="list-style-type: none"> - Short-circuit to the plus - Short-circuit to the earth Check the solenoid valve electrical circuit: $R = 75 \pm 20\% \Omega$ |
| Engine temperature sensor | 3 Flashing | Temperature sensor fault <ul style="list-style-type: none"> - Short-circuit to the plus - Short-circuit to the earth Check the temperature sensor electrical circuit: $R = 125 \pm 10\% \text{ k}\Omega$ at 25°C |
| Lambda sensor | 4 Flashing | the Lambda sensor is defective <ul style="list-style-type: none"> - Short-circuit to the plus - Short-circuit to the earth Faulty lambda sensor circuit. |
| Speed sensor | 6 Flashing | Speed sensor signal fault <ul style="list-style-type: none"> - Short-circuit to the plus - Short-circuit to the earth |