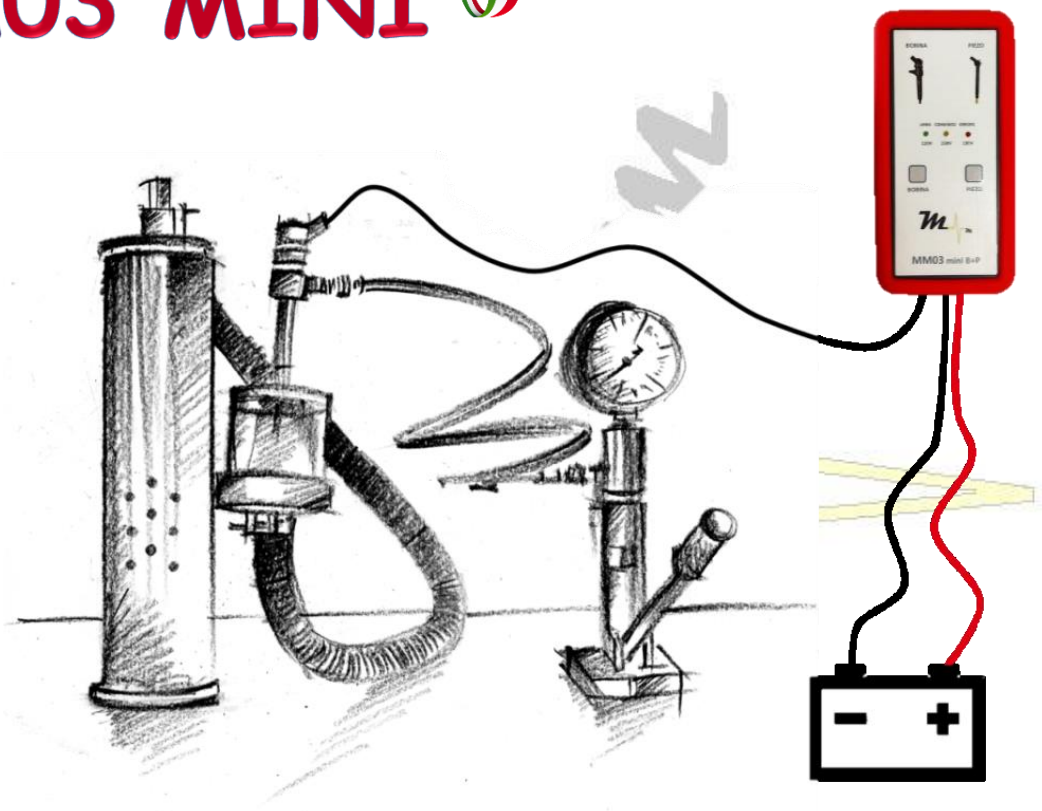
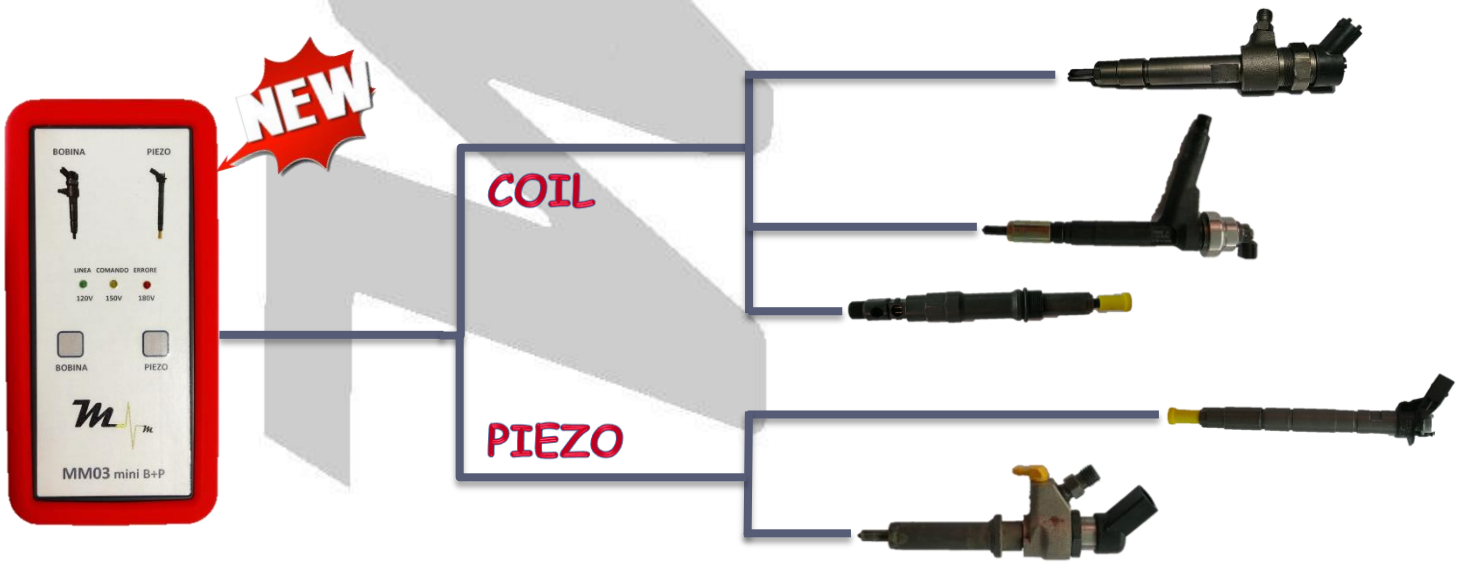
MM03 MINI

Made in Italy



Along with an injector test pump and an aspirator, it is able to test the functionality of coil and piezoelectric C.R, injectors controlling injection, opening pressure, spraying jet, sealing, and the amount of diesel recovery.



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MM03

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PATENTED BREVETTATO PATENTED

N.0001379460

WITH MM03 NO NEED TO REMOVE NOTHING,
IF NOT THE COMPONENT RESULTED FAULT!

Common Rail systems testable directly on the car:

- Bosch
- Delphi
- Denso
- VDO Siemens

ON CAR MM03 CAN CARRY OUT THE FOLLOWING FUNCTIONS:

- Manometer -> automatic recognition of the pressure sensor type;
- High pressure pump -> management and efficiency occurs with adjustment from zero to 1,500 bar;
- Efficiency of pressure and flow regulators -> command in complete autonomy from the control unit;
- Injectors -> leak test with burettes kit.

AT BENCH (combined with a hand pump) MM03 CAN PERFORM THE FOLLOWING FUNCTIONS:

- Opening pressure control;
- Spray atomization control;
- Injectors leak test;
- Injection timing variation (pilot injection, pre-injection, main injection);
- Injector opening frequency variation.

Possibility to test coil and piezo C.R. injectors.

Using a PC with a dedicated Software, are displayed in real time the parameters related to:

- Pressure;
- Regolation;
- Control and test times;
- Command regulators %;
- Injectors tensions and flow.

The PC software allows you to view test data, store them and print them.

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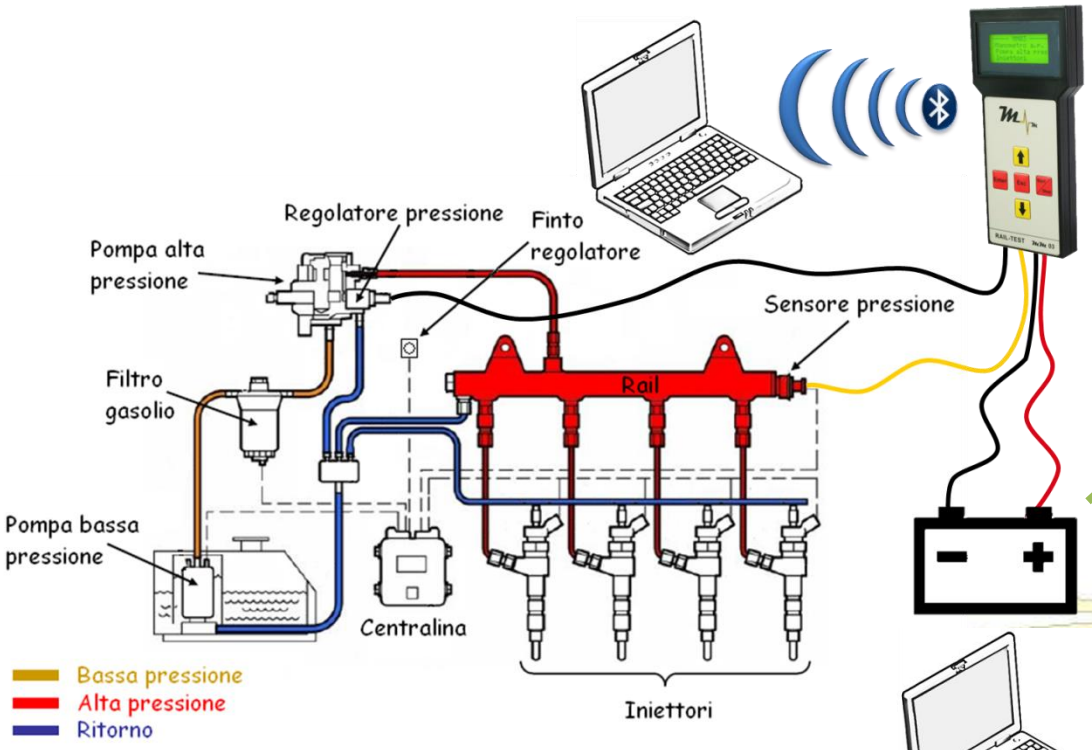
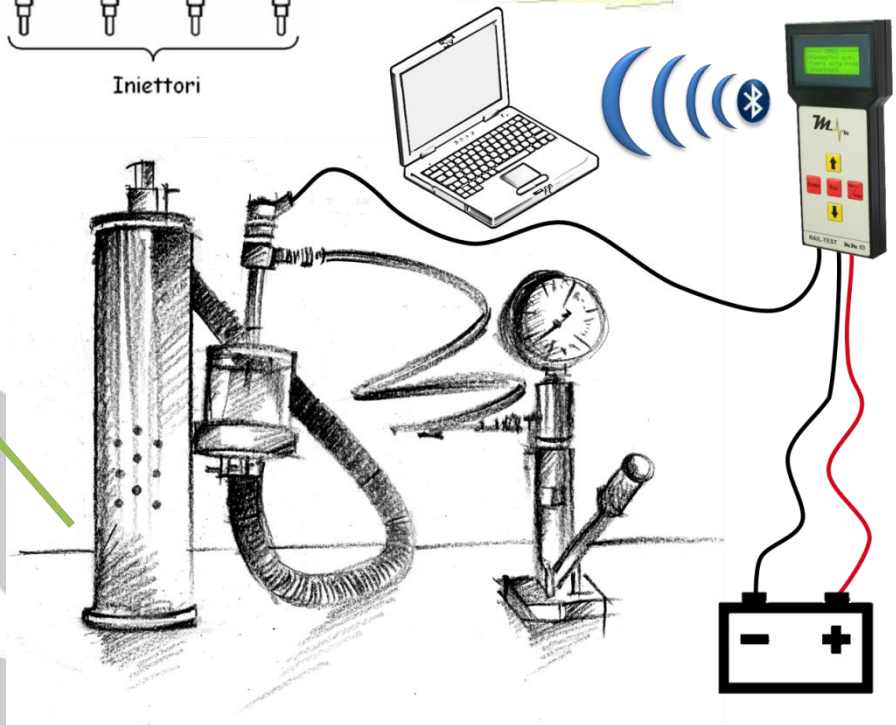


Connection MM03 on car

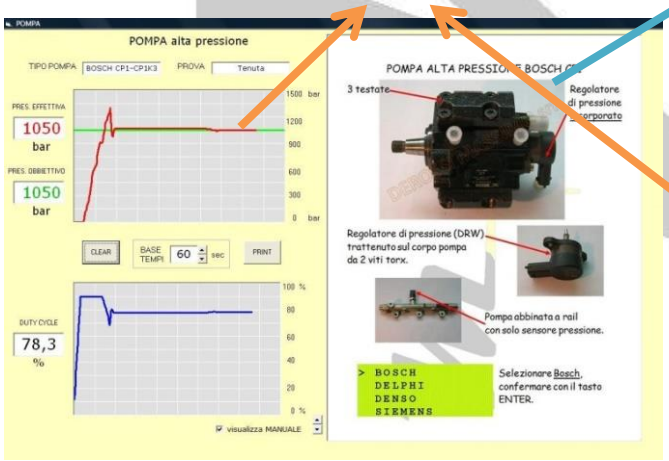


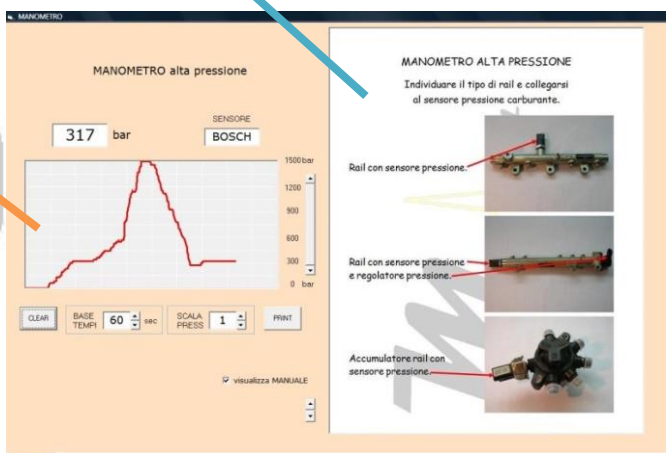
Connection MM03 on bench with aspirator and manual pump

Software

STEP BY STEP DIDACTIC EXPLANATION

DISPLAY TEST EXAMPLE





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MM104 DIAGNOSIS FOR THE PRE-HEATING SYSTEM

Made in Italy

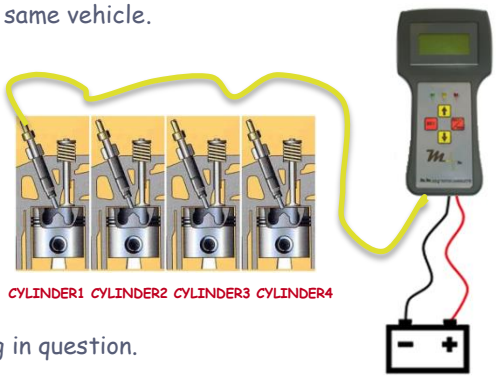
The tester is able to:

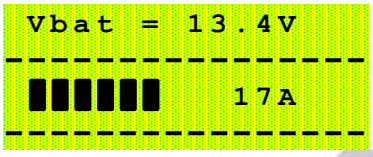
- Recognize automatically the type of the glow plug in question (no need to set anything to start the test) *Eg. Glow plugs controlled with duty cycle (PWM) and traditional glow plugs.*
- Check in a quickly and comparative way the glow plugs without removing them by the engine
- Measure the resistance in hundredths of ohm at the beginning of the test
- Follow the absorption trend for the whole time of the test
- Display in hundredths of ohm the resistance value at the end of the test, determining the efficiency

The single glow plug test is stored in the instrument and then is displayed in both numerical and graphical form.

N.B. It is also possible to **verify the command signal that comes from the pre-heating module** or from the control unit and store the values. At the end of the test, by connecting the instrument to a PC, you get a summary print of the stored graphics.

The **MM104** Tester is a portable instrument that allows you to check in a few minutes the efficiency of the glow plugs and of the control modules directly on the vehicle, drawing power from the battery of the same vehicle.
In particular, the Tester can measure the resistance of the glow plugs at the beginning and at the end of the heating phase and perform a comparison of the measured values on the individual glow plugs.
The measurement can be performed directly on the glow plugs of the vehicle using the probe included in the power cord, or on the management module glow plugs of the control unit, using the dedicated cable

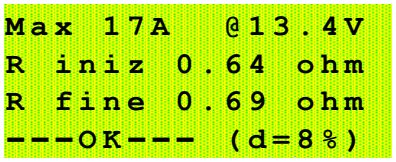


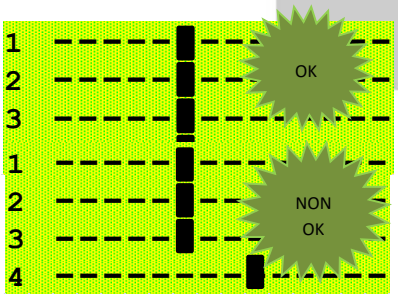


During the glow plugs test are shown the battery voltage and the current absorbed by the glow plug in question.

At the end of the test are shown the following results:

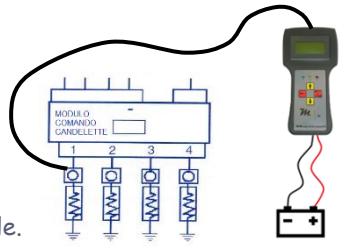
1. Maximum current absorbed by the glow plug;
2. Battery voltage;
3. . Resistance of the glow plug at the beginning of the test;
4. Resistance of the glow plug at the end of the test;
5. % variation of the resistance;
6. Result of the test.





Then is displayed a simple comparative graph where the resistance of the glow plugs is represented by one or more "squares" positioned in correspondence of the measured value.

By connecting the instrument to the control modules, you will see the effective voltage of the tested module.



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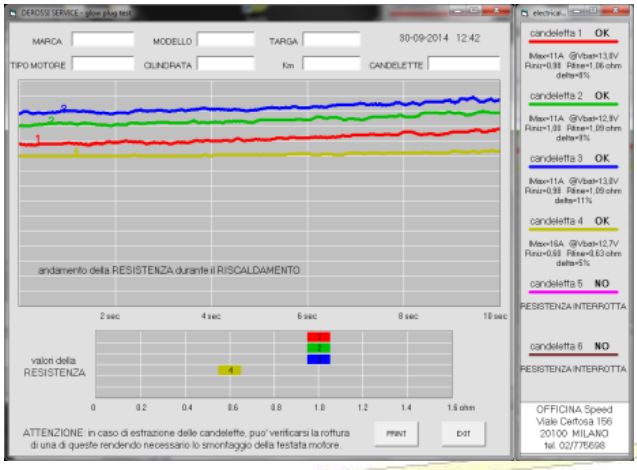
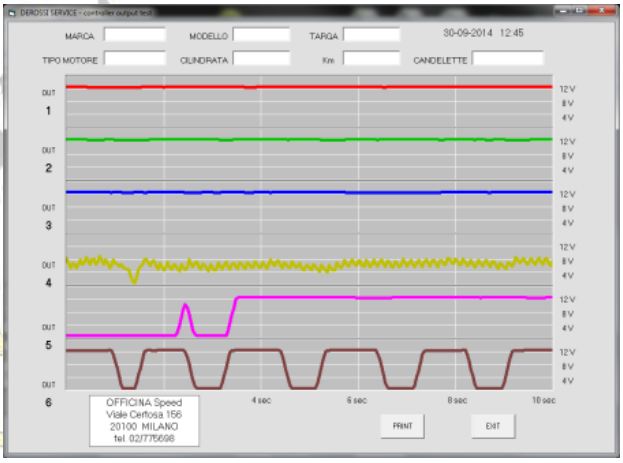
Using the PC program you can graphically display the trend of the resistance of the glow plugs and voltages previously measured on the various outputs of the controller.
An adjacent box shows all the measured electrical data.

Glow plugs chart



Control modules chart



In order to compare each other different glow plugs of the same type, verify that the colored lines on the chart are adjacent and parallel. More the lines are similar, more the characteristics of the examined glow plugs are uniform.

In recent years, the glow plugs have become one of the fundamental components of the cars. In addition to facilitating the ignition of the fuel in a cold engine, they improve combustion by adjusting the temperature in the combustion chamber and they are useful for reducing emissions.

N.B. Starting from euro 4 engines, glow plugs remain on until the complete heating of the engine; on some euro 5 engines they are even piloted (with a PWM signal) during deceleration to maintain a stable temperature into the combustion chamber.

- During the filter regeneration, both spontaneous and forced, the glow plugs are driven to their maximum performance to reach maximum temperatures.

- One or more burned or not efficient glow plugs make that the system fails to perform the regeneration, clogging even more the egr / dpf exhaust system.

- In the new generations of systems, in case of anomaly on a component that concerns anti-pollution or safety systems, the entire electronic system goes into recovery.

- The glow plugs are part of the anti-pollution system and, in case of a malfunction (burning or inefficient glow plugs), **they send in recovery the system without the problem is recognized as a specific defect by the control unit.**

- Testing new glow plugs in a traditional way (feeding them with a 12 volt or making them "torched") you may damage them because some of these are powered by low voltage (4 volts pwm).

Use the right equipment allows you to diagnose and fix possible malfunctions in a simple and timely way.

- Whereas the glow plugs are used to improve combustion, they should all have the same efficiency. **MM104 can test the glow plugs in hundredths of ohm, giving the possibility to compare them in a precise way between them.**
- Glow plugs faulty that do not heat up on the tip (but only in the rear) tend to get dirty carbonizing thickening and consequently the tip that, not reaching the right temperature, can't groom themselves. Once the tip of the glow plug is increased in diameter risks to break when it is extracted from its seat, making it necessary to dismantle the cylinder head. **With MM104 you can control the parameters of the glow plug while working.**

N.B. **MM 104 also allows you to test with certainty even the glow plug control module, especially those driven with a PWM signal.**

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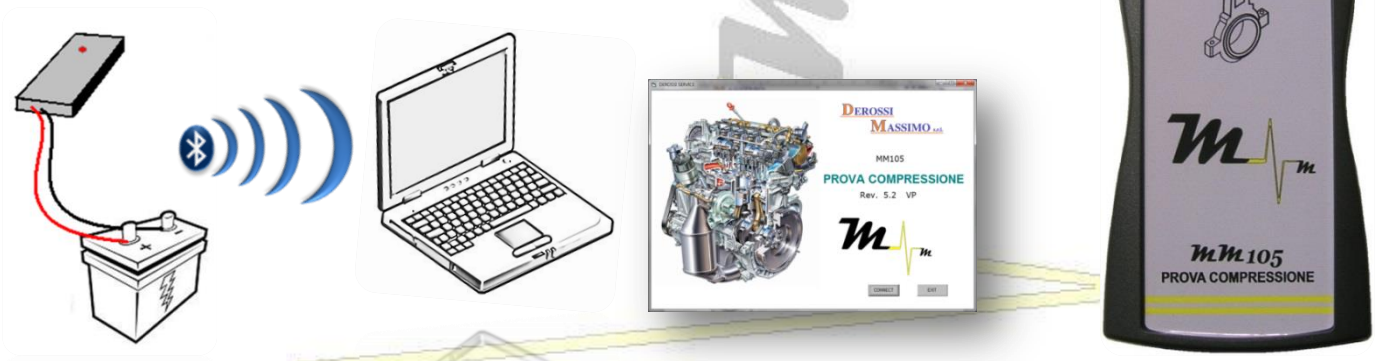
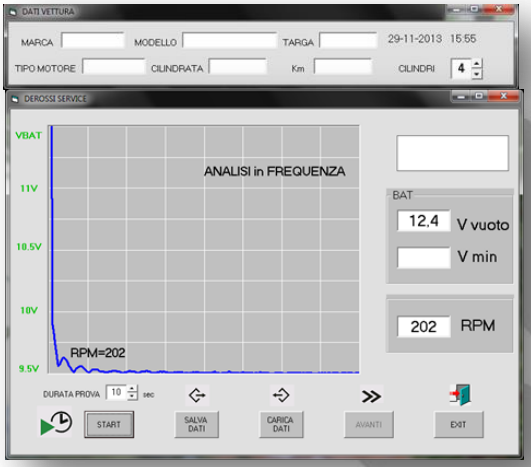
MM105 Made in Italy TESTS THE COMPRESSION IN 10 SECONDS

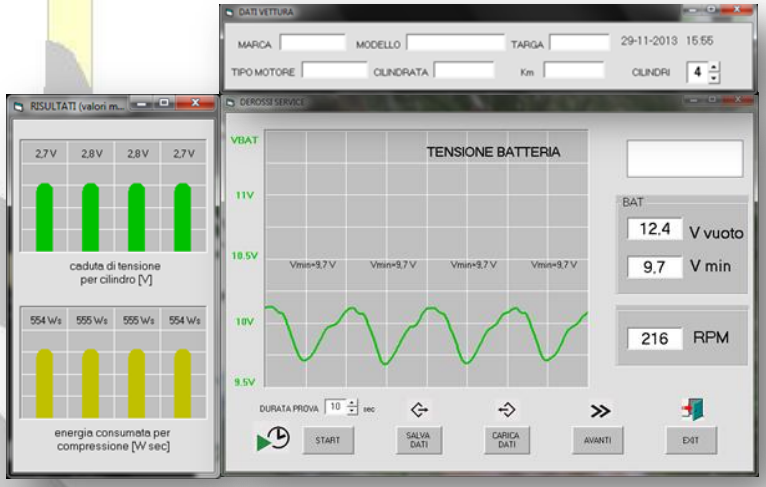
Instrument which, using the power supply from the vehicle battery and through a specific software, allows to verify, by **a few seconds** test, the compression efficiency of internal combustion engines directly in the vehicle



First of all, the speed of rotation of the engine is calculated with precision (RPM)

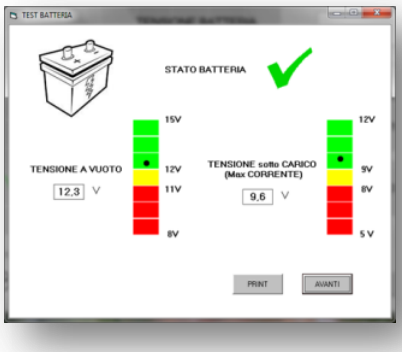


Then, the course of voltage of the battery is analyzed during each individual rotation



Display of the absorbed electric power and of the relative compression calculated from the work done by the plug for each piston

Condition of charge and "health" of battery.
Possibility to print a report of the test results



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MM106

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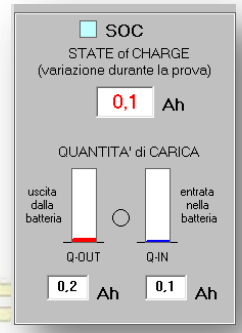
The MM106 Tester is a portable instrument that allows you to check in a few minutes the efficiency of the battery and the vehicle charging system (alternator and battery), drawing power from the battery of the vehicle.

Through a series of tests, you can check the following parameters:

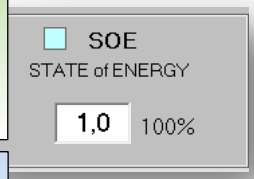
SOC
- State Of Charge -

STATE OF CHARGE:
It shows how much energy has been taken by the services and how much they have been restored in battery by the alternator.



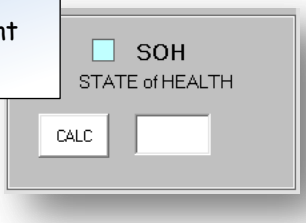
SOE
- State Of Energy -

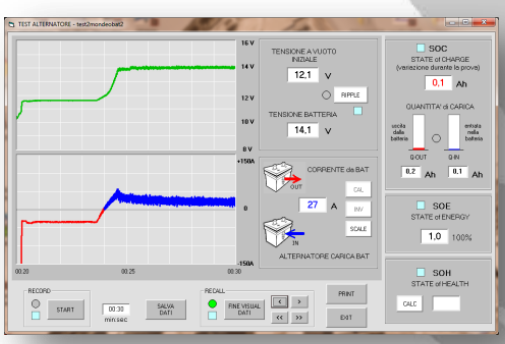
STATE OF ENERGY:
It indicates the total energy stored in a battery; It depends on the voltage available at terminals of the battery. Normally the value should not fall below 0.6-0.7.



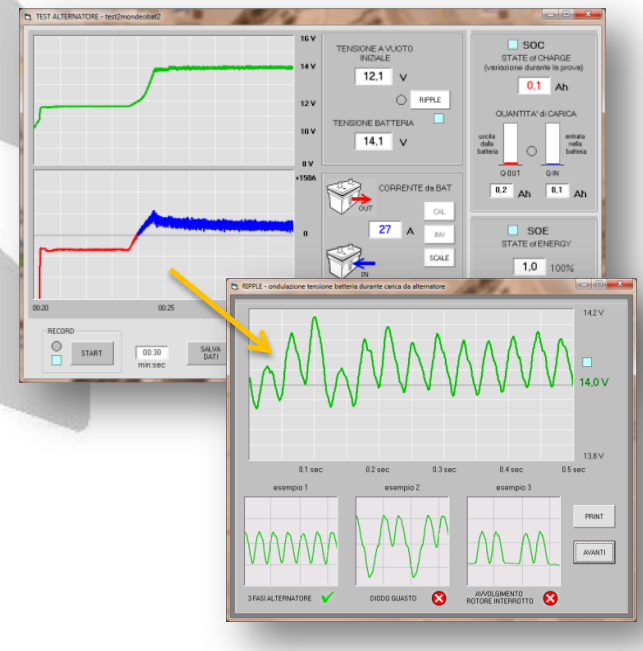
SOH
- State Of Health -

STATE OF HEALTH:
After inserting the battery data, indicates its real efficiency (depending on internal resistance), and the ability to provide current without voltage drops.





Ability to view snapshots of the test, divided into fractions of 10 seconds.



Ability to view the ripple on the voltage of the battery during charging from alternator.

They will see both the wave trend in detail at the selected point, and some comparison examples.

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Ability to view the progress of the current during the test, and the internal resistance of the test battery with a refund of the following data:

1. Initial unladen voltage
2. Maximum start-up discharge I MAX
3. Minimum voltage in start-up V MIN
4. Maximum charging current by alternator I MAX
5. Maximum charge voltage from alternator V MAX
6. Final unladen voltage

7. Internal nominal resistance (in milliohms) is calculated with the battery plate data
8. Internal maximum resistance (in milliohms) is measured at the moment of maximum current discharge
9. Internal average resistance (in milliohms): value that determines the battery aging state (marked with ✗ or ✓ or !)

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MM100

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It allows you to test the input for components such as: Common Rail electro injectors, petrol/lpg electro-injectors, piezo electric injectors, flow regulator solenoid valves/EGR solenoid valves/ variable geometry solenoid valves/ coils/etc..
MM100 in testing the electromechanical/electronic components of a box controlled motor allows you to establish that :

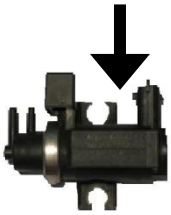
- The box is being fed and performs its control function.
- The wiring of the box to a component is in good working order.
- The component in question is not interrupted
- The component in question is not in short-circuit towards negative
- The component in question is not in short-circuit towards positive
- The component in question is electrically functioning

In order to perform the diagnosis on the individual components of the electrical system all you need to do is bring the probe near the component in question

Application examples

C.R. piezo-electric Siemens injector

C.R. Bosch injector



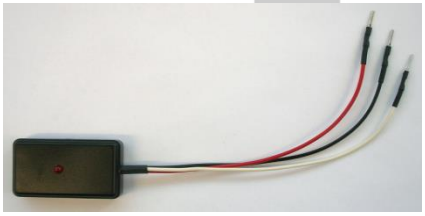
Solenoid valve

Delphi flow regulator

MM100/A

Made in Italy

pressure sensor simulator for common rail fuel



Combined with MM100, it enables the electric control to the common rail injectors in absence of fuel pressure, giving operator the certainty of electrical measurement.

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MM101

Made in Italy

EGR DRIVE - Solenoid valve control

It allows to test with a PWM command variable from 0 to 100% the efficiency of components such as:

- EGR solenoid valves
- variable geometry turbine solenoid valves
- new generation air conditioning compressors

- ✓ Possibility to control the component in complete autonomy from the control unit
- ✓ It is necessary to understand if the component is mechanically functional
- ✓ In conjunction with cleaning systems it can increase its effectiveness
- ✓ When controlling the air conditioners, it is essential to establish the efficiency of the compressor and its regulating valve

To diagnose the electrical system component, simply connect MM101 via the wiring to the component under test and change the command with the potentiometer.

Cable kit for compressor control with external regulation: combined with MM101 it allows to control the variable flow compressor, independently of the vehicle electronics.

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MM103

Made in Italy

Signal Peak Hold - Electronic Tester

MM103 allows testing the electronic control efficiency of components such as:

- common rail electro-injectors
- gasoline / gpl electro-injectors
- piezoelectric injectors
- flow regulation solenoid valves
- egr solenoid valves
- variable geometry solenoid valves, ecc...

Through a light and acoustic signal it allows you to measure the CONTROL VOLTAGE from 3 to 250 volts and the DUTY CICLE command in percentage from 10% to 100%

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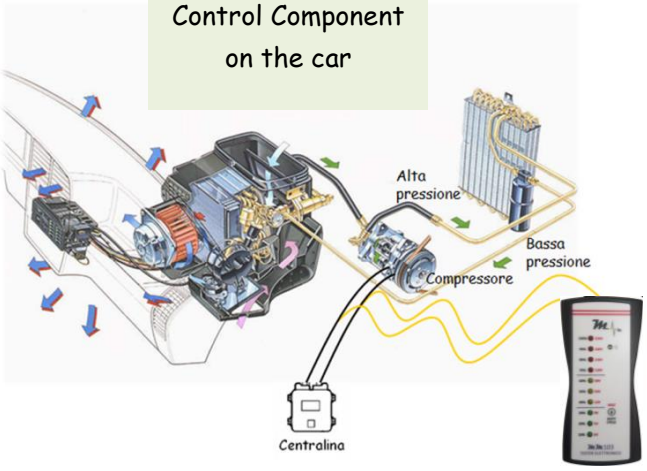
KIT PWM

Made in Italy

It represents a valid help in troubleshooting on PWM controlled components.

With its extensive range of cables you can connect to a multiple number of components: EGR valves, variable geometry, compressors for variable displacement air conditioners, latest generation lights, flow and pressure regulator, etc..

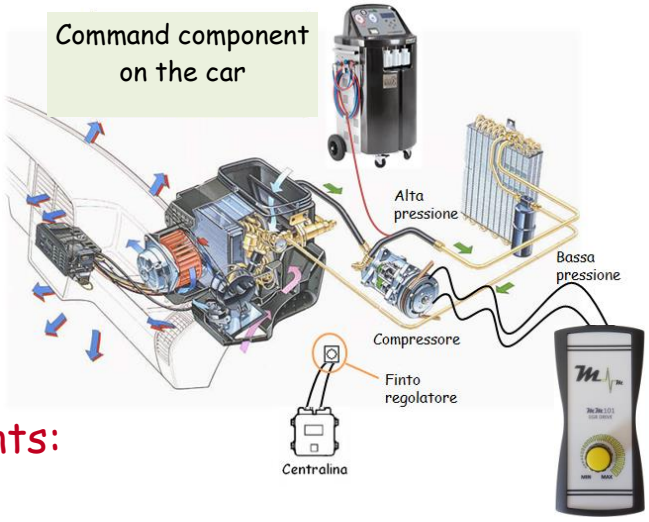
Control Component on the car



Cleaning component on the bench

Test component to the bench

Command component on the car



Other examples of examinable components:

Pneumatic actuators

Flow regulators

Alternators

LED lights

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MM12

Equipment to perform RISING TEST and ELECTRIC TESTS

It allows you to compare between them the injectors on the vehicle.

By connecting the system to the injector it is possible to perform two types of tests:

- By giving an electrical impulse, you can measure the resistance of the coil in hundredths of ohms, obtaining a much more precise electrical measurement than with the classic multimeter.
- By positioning the injector on a base with comparator (eg DDMM555), it is possible to measure the stroke of the internal part of the injector during the coil command.

MM03	MM12	DDMM555

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Rising test and electrical tests.

Because a car is working properly, all cylinders must have the same combustion. If all the injectors of the vehicle do not have the same parameters, this does not happen, causing numerous negative effects (the engine turns to three, the car consumes a lot, is noisy, etc.)

In addition to flow and reflow tests with MM01, MM02, MM03, etc. now we add some tests that facilitate the operator in the control and set-up phases of the injectors.

With MM12 you can check whether the injector parameters are correct and especially if they are the same.

Electrical test -> allows to measure the parameters of Bosch, Denso and Delphi coil injectors.

- ✓ If the controlled injector data are correct, check if the others are ok too.
- ✓ If the data are not correct, the injector is replaced.
- ✓ If there is an injector with apparently correct parameters but offset from the others, the injector is replaced.

Rising test -> allows measuring the excursion of the internal part of Bosch and Denso injectors.

- ✓ If the data of the injector in question are correct (compared to the values in a database), check that the others are ok too.
- ✓ If the data are incorrect, you shimming the injector until the parameters are correct.
- ✓ If there is an injector with seemingly correct parameters but offset with respect to others, shimming until the values are not aligned.
- ✓ The rising test also allows to measure the injector excursion before disassembling it to bring it back to the original parameters after having worked on it (eg. injector cleaning).

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