



## Advanced voltage regulators control device MasterAlt

### Operating Manual

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## General characteristics.

The device can be used to diagnose the charging circuit in cars with alternator charge current provided by the ECU.

The device generates currents resembling the actual conditions for the voltage regulators in the car.

The device is designed to test the alternators installed in vehicles or on testing tables as well as the regulators alone – with a standard testing device.

The device can provide the information on whether the voltage regulator can correctly communicate with the car's ECU and if it responds to required parameters appropriately.

Compatible control standards:

- COM - LIN, BSS(BSD) interfaces
- SIG – FORD
- P-D – Mazda
- L-RVC – GM
- RLO – Toyota

Ports description:

RC [blue]     - COM signal connection  
                  - PWM out

M [green]     - DFM monitoring in

B+ [red]      - battery positive end in tested circuit, device power supply. B- [black]  
                  - battery negative end in tested circuit, device power supply.

## Device operation.

The device powers on automatically after connecting power supply to B+ and B- ports. The test subject selection menu will appear. The desired parameter is selected by pressing the ▲ and ▼ buttons and confirmed by a short press on the OK button to enter the testing mode.

After pressing the OK, the display will present the following information:

1. voltage of the tested circuit (large digits)
2. required voltage (small digits on the top of the display)
3. alternator load DF/DFM [%]

The RC and M cables should be connected to the correct pins in the voltage regulator's socket. Some of the regulators require connecting other signals (usually B+) with a separate cable to operate correctly.

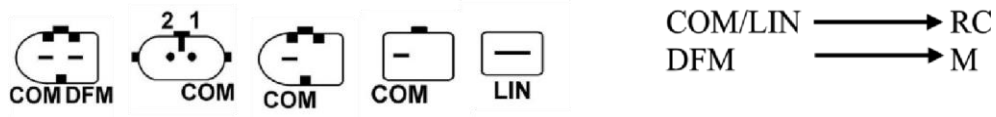
The M cable can be left disconnected in the COM mode.

In the testing mode, buttons ▲ and ▼ will change the required voltage value. It should be monitored whether changing the required voltage causes the correspondent change in the alternator/regulator output, and whether the DFM reading matches the actual state.

Hold the pressed OK to leave the testing mode.

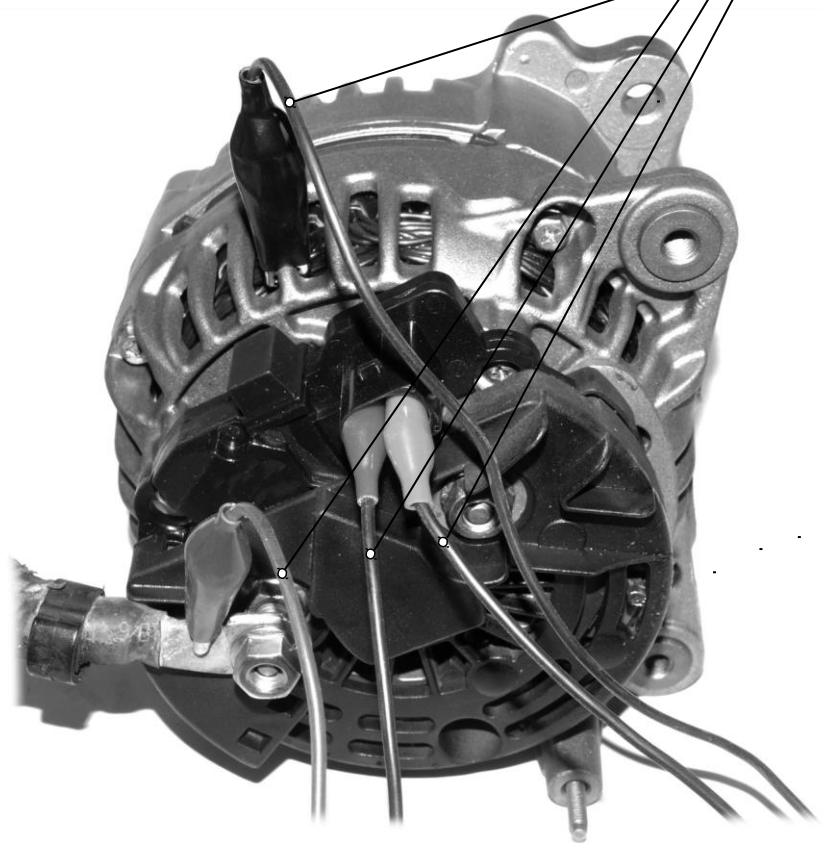
## Testing device connection examples.

### 1. COM – Mercedes, Opel, Audi, BMW, Renault, VW, Ford

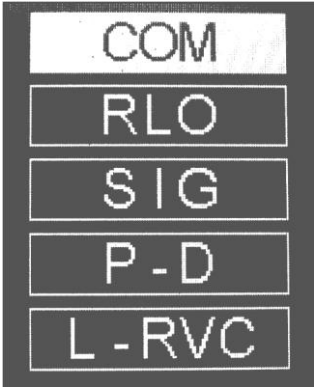


Testing device – alternator connection method:

- Wire connecting the DFM pin of the alternator with the M connector of the testing device
- Wire connecting the COM pin of the alternator with the RC connector of the testing device
- Wire connecting the B+ connector of the alternator with the B+ connector of the testing device
- Wire connecting the B- (enclosure) of the alternator with the B- connector of the testing device



Select the COM function from the main menu and confirm by pressing the OK button.



The device will go into the  
and display the following

COM testing mode  
information:

Selected  
function

DFM

additional  
informations

A screen with a dark background and white text. At the top is "LIN1" underlined. Below it are "14.5V" and "14.3V". Then "DFM 15%". At the bottom, "Manufacturer Valeo" and "Class 04" are shown side-by-side.

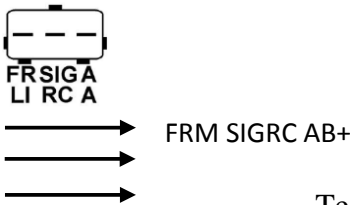
Required voltage

actual voltage

value

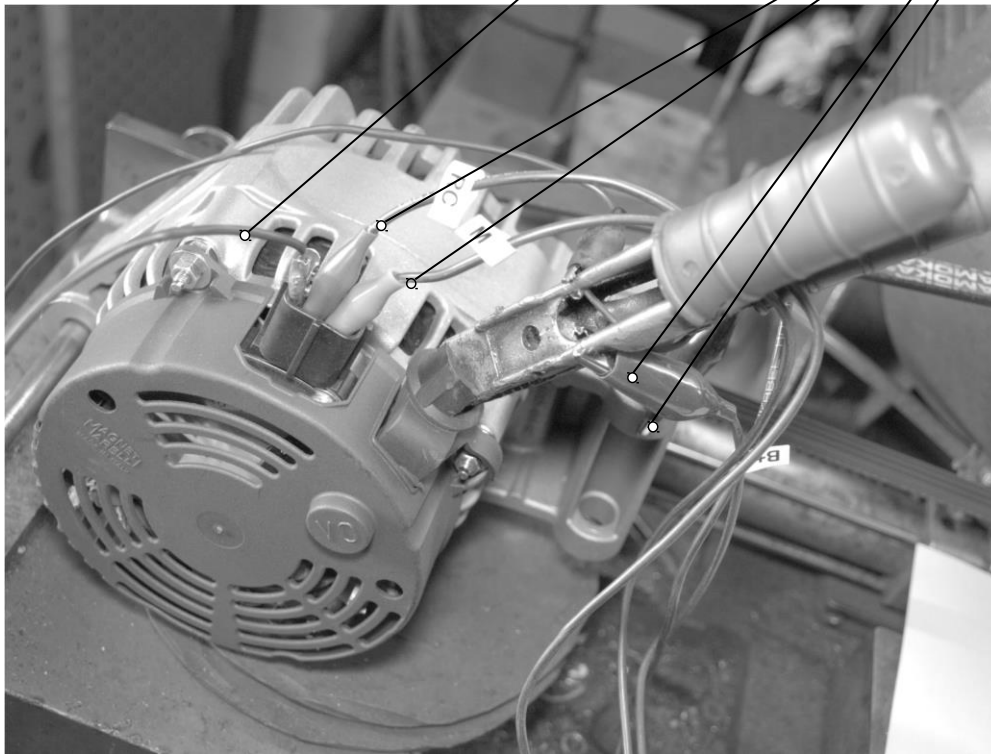
During the test, after starting the alternator drive, the actual voltage value should correspond to the required value and the DFM value should correspond to the current alternator load. Some discrepancies between the voltage values are acceptable. What is important is the appropriate reaction of the alternator – increasing or decreasing the output voltage according to the required voltage.

2. SIG – Ford, Mazda



Testing device – alternator connection method:

- Wire connecting the B- (enclosure) of the alternator with the B- connector of the testing device
- Wire connecting the B+ connector of the alternator with the B+ connector of the testing device
- Wire connecting the FR pin of the alternator with the M connector of the testing device
- Wire connecting the SIG pin of the alternator with the RC connector of the testing device
- Wire connecting the A pin of the alternator with the B+ clip

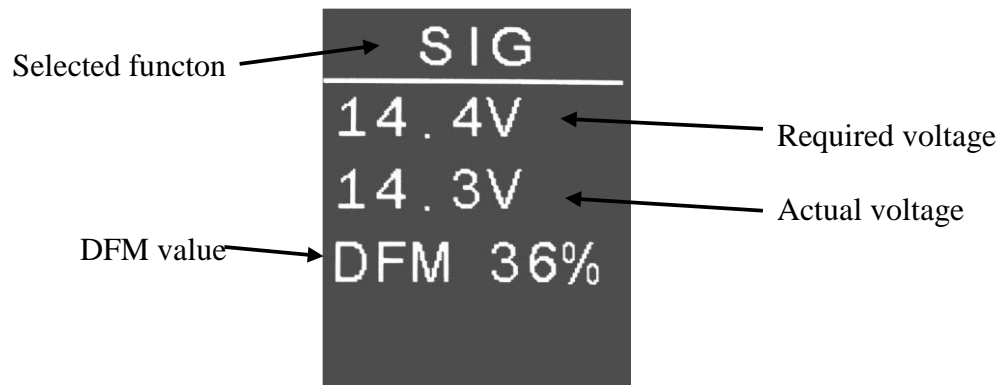


The connection of the A pin is to be implemented independently of the testing device, by using the connectors located in the vehicle or in the test point.

After connecting the testing device, the main menu will appear on the display:



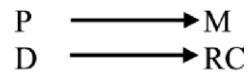
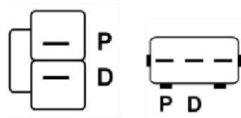
Select the SIG function and confirm by pressing the OK button. The device will go into the SIG testing mode and display the following information:



During the test, after starting the alternator drive, the actual voltage value should correspond to the required value and the DFM value should correspond to the current alternator load.

Some discrepancies between the voltage values are acceptable. What is important is the appropriate reaction of the alternator – increasing or decreasing the output voltage according to the required voltage.

### 3. P-D – Mazda



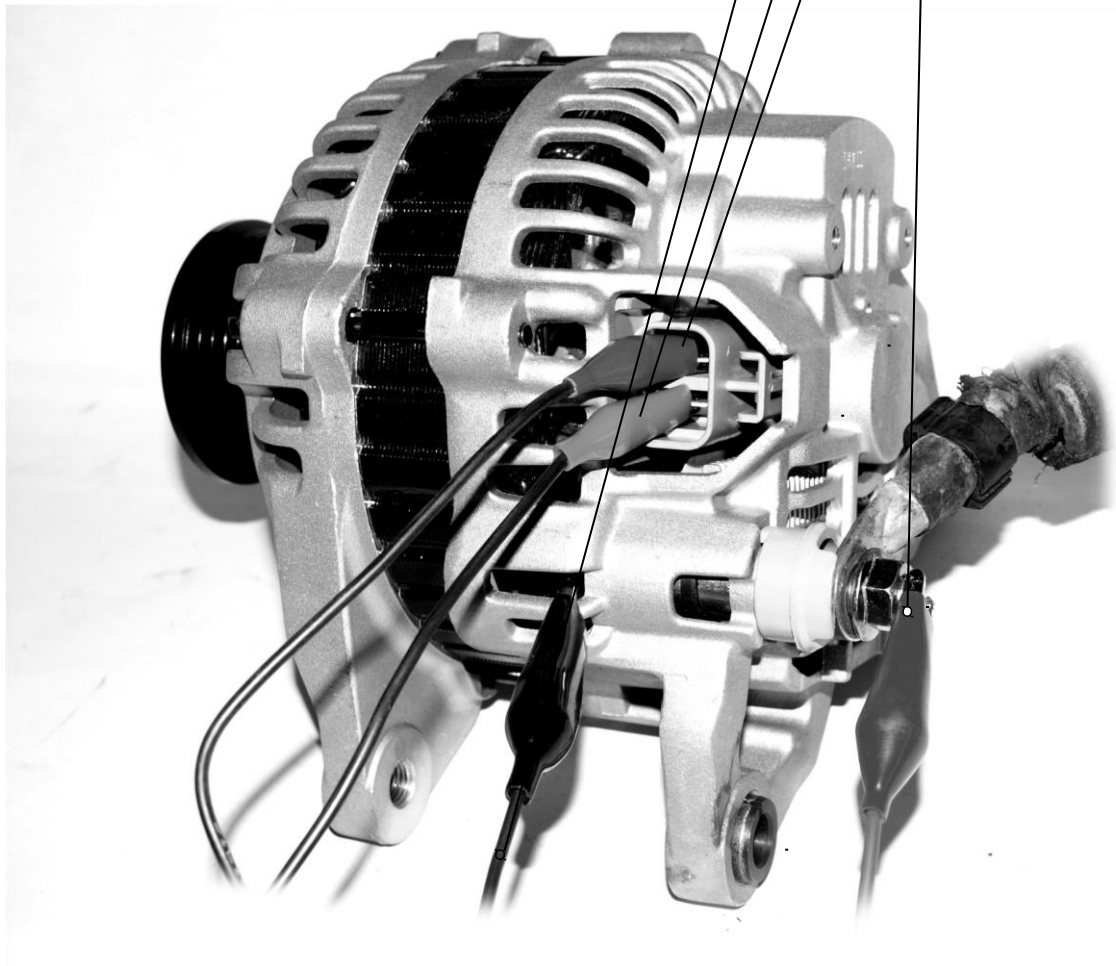
Testing device – alternator connection method:

Wire connecting the B+ connector of the alternator with the B+ connector of the testing device

Wire connecting the D pin of the alternator with the RC connector of the testing device

Wire connecting the P pin of the alternator with the M connector of the testing device

Wire connecting the B- (enclosure) of the alternator with the B- connector of the testing device



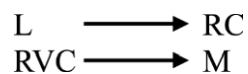
After connecting the testing device, the main menu will appear on the display:



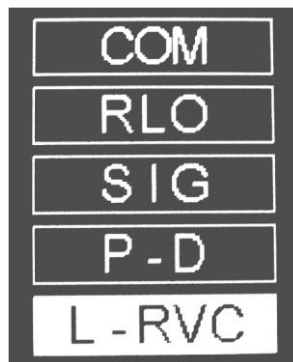
Select the P-D function and confirm by pressing the OK button. The device will go into the PD testing mode and display the following information:

During the test, after starting the alternator drive, the actual voltage value should correspond to the required value. Some discrepancies between the voltage values are acceptable. What is important is the appropriate reaction of the alternator – increasing or decreasing the output voltage according to the required voltage.

#### 4. L-RVC – GM



After connecting the testing device, the main menu will appear on the display:

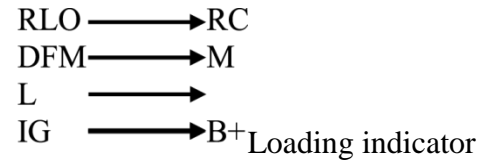
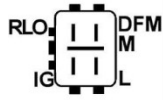


Select the L-RVC function and confirm by pressing the OK button. The device will go into the L-RVC testing mode and display the following information:

During the test, after starting the alternator drive, the actual voltage value should correspond to the required value and the DFM value should correspond to the current alternator load.

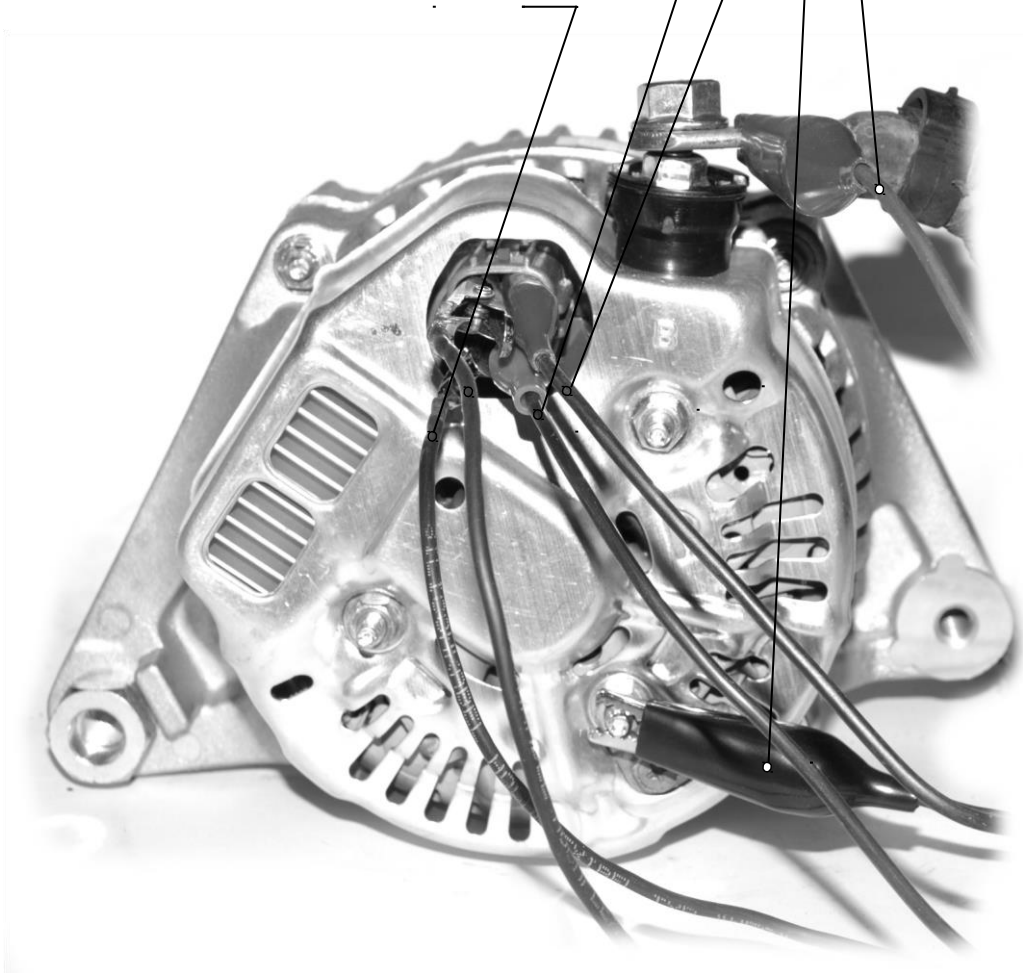
Some discrepancies between the voltage values are acceptable. What is important is the appropriate reaction of the alternator – increasing or decreasing the output voltage according to the required voltage.

## 5. RLO – Toyota



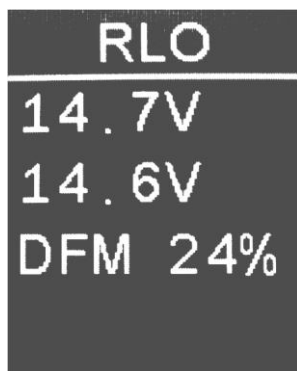
The connection of the L and IG pins is to be implemented independently of the testing device, by  
Testing device – alternator connection method:

- Wire connecting the B+ connector of the alternator with the B+ connector of the testing device
- Wire connecting the B- (enclosure) of the alternator with the B- connector of the testing device
- Wire connecting the RLO pin of the alternator with the RC connector of the testing device
- Wire connecting the DFM pin of the alternator with the M connector of the testing device
- Wire connecting the IG pin of the alternator with the B+ clip
- Loading indicator wire connected to the L pin

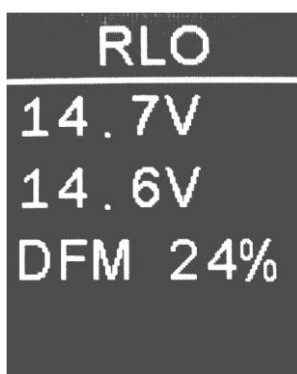


using the connectors located in the vehicle or in the test point.

After connecting the testing device, the main menu will appear on the display:



Select the RLO function and confirm by pressing the OK button. The device will go into the RLO testing mode and display the following information:



During the test, after starting the alternator drive, the actual voltage value should correspond to the required value and the DFM value should correspond to the current alternator load. Some discrepancies between the voltage values are acceptable. What is important is the appropriate reaction of the alternator – increasing or decreasing the output voltage according to the required voltage.

### Frequently asked questions:

#### **Can the device be damaged due to improper connection?**

The device is resistant to connection errors in its typical applications and voltage range.

#### **Can the device damage connected units?**

The device cannot directly damage any connected units, however the range of voltage sent to the alternator is very broad and includes prohibited values (over 15V), which can result in electrical system errors if the alternator is tested without removing it from the vehicle.

**Can the device or connected units be damaged by selecting an improper testing function?** The only consequence of selecting an improper testing mode is lack of response from the connected alternator.

#### **Does the M connector have to be connected at all times?**

Some alternators with a COM interface do not have an analog DFM out – in this case, the M wire is left unconnected.

**Is it possible to use longer wires to connect units?** The device works with wires up to 5 metres long.

**Can the testing device be used for 24V systems?** Yes.

**After connecting the device, the display does not illuminate, show the start screen or the main menu – what should I do?**

In this case, check if the testing device is properly connected, if the voltage of the connected system is correct, and if yes, check the continuity of the connection wires.

**How to store the testing device?**

The device is best stored in the included case, in a warm, dry room.

**How to remove stains from the enclosure?**

The device should be protected against exposure to any liquids or other substances that can penetrate the enclosure. Stains are to be removed with a soft, moist cloth and a mild detergent. Do not use naphtha or paint thinners / solvents as they may lead to fogging the display and damaging the coating.

**Can the testing device be mounted on a testing table?**

Yes, if it can be done without damaging the device's enclosure. Do not drill any holes or put any screws through the enclosure.

**Why does the device display an error in the COM mode when the alternator stops revolving?**

Digitally controlled voltage regulators generate error information, displayed on the testing device, upon detecting parameters outside the allowable range. In the case of alternator stoppage, this is a simple lack of revolutions error which should disappear once the rotor starts spinning again. This type of behaviour is standard and confirms the alternator is working properly.

**Why does an alternator with a COM interface start working only after I change the required voltage for the first time?**

This is due to the alternator voltage regulator function. This type of behaviour is standard and confirms the alternator is working properly.

**Can the testing device be used to test alternators with a F1 – F2 connector?**

Such alternators work with an external voltage regulator and require a different testing methodology.

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