

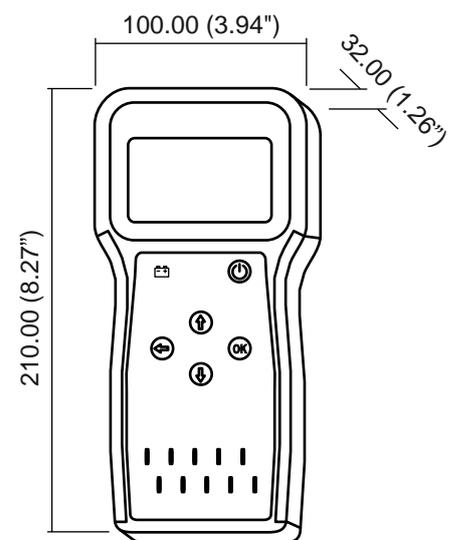
RT100

General Characteristics

- ◆ Voltage supply
 - 32Vdc (via power pack)
- ◆ Current consumption
 - 1 (max)
- ◆ Regulator type (communication protocol)
 - L
 - COM (LIN1, LIN1.1, LIN2, BSS1, BSS2)
 - RLO
 - RVC
 - P-D
 - C-Terminal
 - SIG
- ◆ Regulator voltage
 - 12V and 24V
- ◆ User interface
 - LCD Display (green backlight, 64x128 pixels)
 - Illuminated buttons (↑ ↓ ← ⏻)
 - Battery charge indicator (red LED)
- ◆ Functions
 - Regulator test (manual or automatic)
 - Rotor test
 - Alternator excitation LIN, BSS and P-D
- ◆ Connectivity
 - Power supply connector 32Vdc
 - 10 cables with crocodile clips for diagnosis function
 - USB A connector (for firmware update with USB memory stick FAT or FAT32)
 - 10 male faston type connectors (for self test function)
- ◆ Working temperature
 - 0-50 °C (32-122 °F)
- ◆ RT100 Dimensions
 - 100.00x210.00x32.00mm (3.94"x8.27"x1.26")
- ◆ RT100 Weight
 - 350 gr (0.77 pounds)

Package contents

- ◆ RT100 Alternator regulator tester
- ◆ RT100-PS Power pack 230Vac/50Hz
- ◆ RT100-CB10 Set of 10 colorful test cables
- ◆ RT100-CB1 One spare cable
- ◆ RT100-UM User manual
- ◆ RT100-DB Regulators and alternators data base



Dimensions in mm (inches)



SAFETY INSTRUCTIONS !!!

WHEN YOU USE THIS ELECTRONIC DEVICE, YOU MUST ALWAYS TAKE INTO ACCOUNT IMPORTANT ISSUES RELATING TO YOUR SAFETY AND TO THE SAFETY OF YOUR DEVICE

READ CAREFULLY AND FOLLOW THE SAFETY INSTRUCTIONS

- ◆ This device should only be used by highly trained personnel as instructed in this user manual.
- ◆ The device is not portable and works in conjunction with a 230Vac power supply.
- ◆ You should be always sure to connect the power plug to the appropriate socket on the device.
- ◆ The device has several connection points for which sufficient information is provided in the following pages of this user manual.
- ◆ Protect the device from dust, water or other liquids because it is not waterproof.
- ◆ The manufacturer guarantees the correct operation of the device when operating in the temperature range 0 ° C to 50 ° C (32-122 ° F).
- ◆ Before you begin the process of diagnosing a regulator, an alternator's excitation or an alternator's rotor, be sure you made the connections according to the instructions described in the following pages.
- ◆ The device is designed to detect any kind of electrical failure of the regulator to be tested but cannot detect mechanical failures (e.g. internal contact failure when the regulator is mounted on the alternator).
- ◆ Always clean the device with a dry and clean cloth by gently pressing. Never leave the device exposed to sunlight.
- ◆ After each use, place the device as well as the other parts of the device into the case.
- ◆ The user should be aware that the manufacturer provides firmware upgrades of the RT100 device as well as database upgrades incorporating new regulator codes.
- ◆ You should never make any operation/fixing to any part of the device such as fix cables or modify the other circuits.
- ◆ Any use of the device in a manner other than that described in this user manual, any unauthorized operation, or any failure not resulting from proper use of the device, voids the warranty of the device.
- ◆ In case of a problem, contact the manufacturer. www.diagsonic.com



Disposal of this product should be done only in special disposal bins of electronic devices.

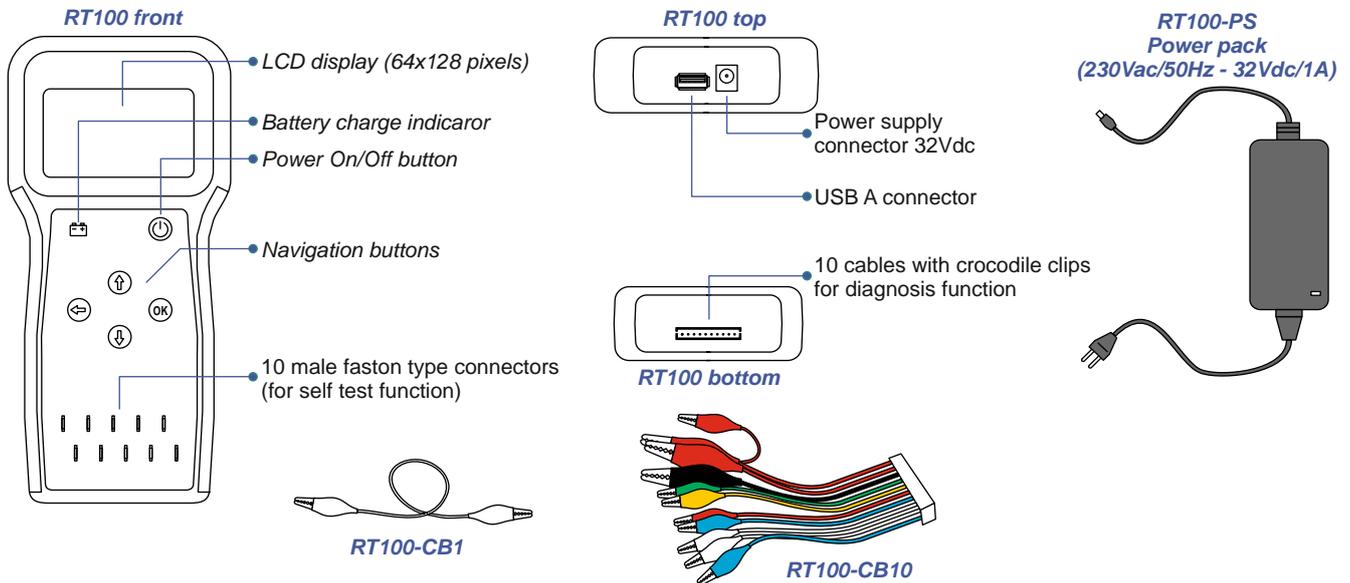


CAUTION! THIS DEVICE IS CONNECTED WITH A POWER SUPPLY. BE SURE THAT POWER SUPPLY CABLES ARE ALWAYS IN GOOD CONDITION.



Description

RT100 is a device which is used for testing rotors and regulators of an alternator and for exciting an alternator. This diagnostic tool aids the technician, as it is able to diagnose the operating status of a very wide range of regulators and alternators, as well as any rotor (12V or 24V) of the alternator.



Functions

Supported functions of the RT100 device are: Regulator Diagnosis (automatic or manual), Rotor diagnosis and Alternator excitation. Also RT100 device is able to make auto self check (self test) of its electronic circuits and cables. Cables **RT100-CB10**, which are included in the package, are used for all needed connections.

Regulator Diagnosis

During diagnosis testing, the RT100 device emulates the functionality of the electromechanical part of the alternator, the functionality of the Electronic Control Unit (ECU) of the vehicle, the functionality of the indicator lamp for battery charge of the vehicle  and the battery of the vehicle. The regulator which will be tested should be unconnected from the alternator and from any electronic circuit of the vehicle. Based on the manufacturer of the regulator, the manufacturer code of the regulator or the alternator code, the user should find the right connection info in the RT100 database (**RT100-DB**) and then he should follow the below instructions:

- Connect the RT100 device with the power supply
- Using the cables make the right connection between RT100 device and the regulator under test
- (based on the info given in the RT00 Database)
- Press one time the 
- Go to menu DIAGNOSIS/LEGULATORS/
- ◆ **AUTOMATIC DIAGNOSIS**
 - Choose the regulator type e.g. L1, L2,COM1, COM2,, RLO1, (it is mentioned in the RT100 database below the corresponding picture)
 - Choose the voltage regulator 12V or 24V (it is mentioned in the RT100 database)
 - Choose start diagnosis pressing the button 
- ◆ **MANUAL DIAGNOSIS (only for L type regulators)**
 - Choose the circuit type of the regulator A or B (it is mentioned in the RT100 database)
 - Choose the voltage regulator 12V or 24V (it is mentioned in the RT100 database)
 - Choose start diagnosis pressing the button 
 - Duration of the test is not the same for every type of regulator. In case of automatic diagnosis, the end of the test is done automatically.

In case of manual test the duration depends mainly on the user. If the user want to end the test, he should press the button . In case of high power consumption the test will be ended automatically. Pressing button  the user can change manually the operating voltage of the regulator and while pressing button  the user can enable/disable the output **ST**.



Any wrong connection between the RT100 device and the regulator under test will cause failure in the diagnosis. However a wrong connection cannot harm the regulator or the RT100 device. The RT100 device is internally protected from any malfunctions or short circuits, and also protects the auto-controlled from high-power consumption due to actual failure or faulty connection. Before starting the diagnosis, ensure that the **RT100-CB10** connector is properly plugged into the corresponding socket at the bottom of the RT100.

See below an example of how the user can find info for a specific regulator in our RT100 database.

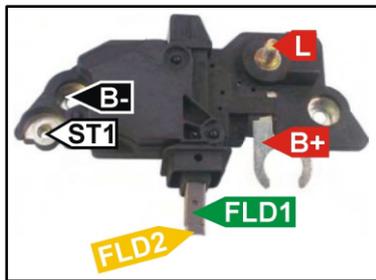
Lets assume that the user wants to test a regulator which was just removed from the alternator with the details:

- Regulator code (it is written on the regulator) F00M144140
- Manufacturer of the alternator or the regulator BOSCH
- Alternator code (it is written on the alternator) 0124225001

The user can find the regulator under test with three different ways:

- ◆ Find the regulator using the regulator code e.g. F00M144140

In this case the RT100 database will automatically open a window with all available data for the specific regulator. Those data include operating voltage (12V or 24V), electronic circuit type (A or B), picture with the connector (plug), alternative regulator and alternator codes, type of the regulator, picture with details about the connection with the RT100, picture with steps inside the menu in order to start testing the regulator with the right choice.



example regulator photo with connections



example RT100 automatic diagnosis selections

- ◆ Find the regulator using the manufacturer of the regulator or the alternator e.g. BOSCH

In this case the RT100 database will automatically open a window with all available regulators made by the specific manufacturer. The user should choose the right one based on the picture of the regulator and the drawing of the connector.

- ◆ Find the regulator using the alternator code e.g. 0124225001

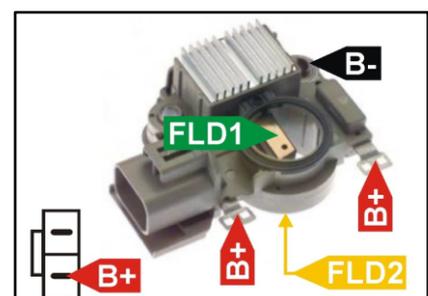
In this case the RT100 database will automatically open a window with all available data for the specific regulator like in the first way.

The user then should follow the steps described in the paragraph **Regulator diagnosis**, connecting the regulator with the RT100 device using the available cables according to the picture with details about the connection with the RT100 device. Connections should be done with caution in order to avoid mechanical damage of the alternator.

The above picture shows the regulator as it should be connected to the RT100 device. The colored arrows refer to the cables we need to connect by maintaining the same color and the same name. Before connecting the RT100 cables to the regulator under test, make sure that the electrical contacts are in good condition and free from oxidation or other damage.

NOTE! Cables **B+** and **L** have the same color (e.g. red) but they are two different signals. In other words, we cannot connect the **L** cable to the **B+** point just because they have the same color. The same rule applies to **DFM** and **COM** cables that are both blue. As far as the **ST1** and **ST2** cables are white, it does not matter if we will use ST1 or ST2. However we can not connect the ST1 and ST2 cables together in the same electrical contact.

Finally, in some photos there is an arrow such as the FLD2 cable on the photo on the right. In this case it means that the **FLD2** cable should be connected from the underside of the regulator and at the point indicated by the arrow, e.g. the lower brush.



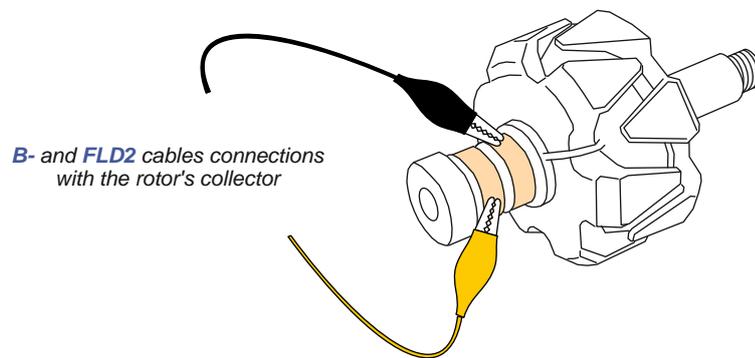


Rotor diagnosis

During alternator's rotor diagnosis the RT100 device measures the internal resistance (both ohmic and inductive) of the rotor. During testing, rotor should not be connected to any electrical or electronic circuit of the car. For rotor diagnosis, you should follow the instructions below:

- Connect the RT100 device with the power supply
- Press one time the button 
- Using the black cable **B-** and the yellow cable **FLD2** connect the RT100 device to the collector of the rotor under test like the below drawing.
- Go to **DIAGNOSIS/ROTORS**
- Choose the voltage of the rotor/alternator (12V or 24V)
- Start diagnosis by pressing the button

Rotor diagnosis takes up to 5 seconds to be completed. Any wrong connection will lead in fault results. RT100 device is designed so that any wrong connection or possible short circuit will not cause any harm in the device or in the rotor under test. Before you start the rotor test, be sure that the connector RT100-CB10 is well fitted in the relative connector in the bottom side of the RT100 device.



Alternator excitation

During alternator's excitation the R 100 device simulates the Electronic Control Unit (ECU) of the vehicle. Cables **COM**, **L** and **B-** are used in this function. For starting this function, please follow the steps below:

- Connect the RT100 device with the power supply
- Press one time the button 
- Go to menu **EXCITATION**
- Using the black cable **B-**, the red cable **L** and the blue cable **COM** connect the RT100 device with the alternator. Connect the cable **B-** with alternator's '-', connect the cable **L** with alternator's '+' and connect the cable **COM** with connector LIN or BSS (in COM type alternator) or with connector D (in P-D type alternator)
- Choose the alternator type between **COM** and **P-D**
- Choose the voltage of the alternator (12V or 24V)
- Start excitation function pressing the button

If you want to stop the excitation function you have to press the button . In case of COM type alternator, the user can change the desired charging voltage by pressing buttons  . In case of P-D type alternator, the user can start or stop manually the excitation command (**D**). During the test the user can see the voltage of the alternator (VOLT indication) and the communication protocol of the regulator (in case of COM type alternator, LIN, BSS).

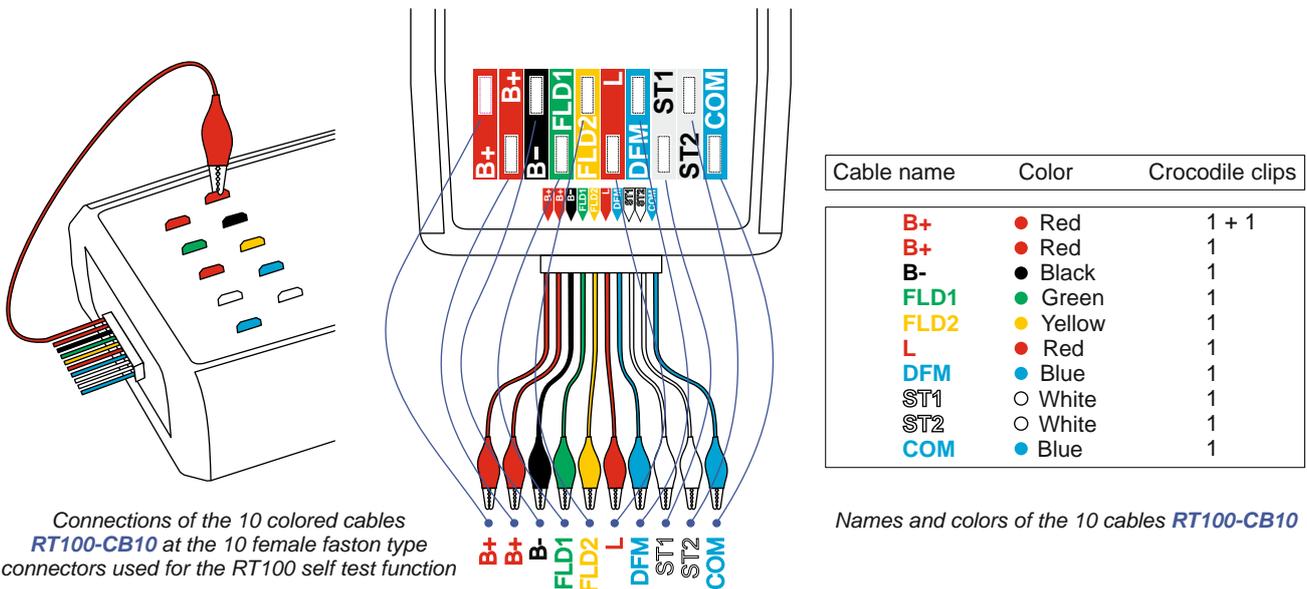
RT100 self test

During self test the RT100 device is tested for malfunctions in the electronic circuits and for damages in the 10 cables used for connection with the regulators under test. In order to start the self test function follow the below instructions:

- Connect the RT100 device with the power supply
- Press one time the button 
- Connect all ten cables following the drawings below
- Go to **SELF TEST**
- Start self test pressing the button



Self test takes few seconds to be completed. Any wrong connection will lead in in fault results. RT100 device is designed so that any wrong connection or possible short circuit will not cause any harm in the device. Before you start the self test, be sure that the connector **RT100-CB10** is well fitted in the relative connector in the bottom side of the device.



Connections of the 10 colored cables **RT100-CB10** at the 10 female faston type connectors used for the RT100 self test function

Control panel

The RT100 is designed to be user-friendly. The navigation and the options of the various functions and settings are made using the four illuminated buttons on the front of the device. Switching On and Off the device is done using the button . All options are displayed on a liquid crystal display (LCD 64x128pixels). Please see the description of each button below:

- ON / OFF button. With a single touch, you switch on the RT100. Press and hold for three seconds to switch off the RT100.
- Option / navigation buttons. Use them to navigate through the various options and functions as well as to change the device settings.
- ESCAPE button. Use it to return from a page or to cancel a function or a setting change. Use it to select an entry on a menu or to save a setting.

A red LED on the top left of the front panel of the device (marked with the vehicle's battery indicator) is also included. This indicator emulates the corresponding battery charge indicator on the vehicle's display and illuminates when there is a problem in the battery charging circuit. Thus, when a regulator is tested, if it works correctly and normally and it outputs the excitation command of the alternator rotor, then this indicator goes off. The control panel also includes illuminated indicators in the navigation / selection buttons as well as a built-in buzzer for additional audible alarm in case of errors.

Settings

RT100 device can be configured according to the needs of the user. To change the settings of the device you need to go to menu **SETTINGS**. See below a description of the available settings:

- **LANGUAGE** Choose the language of the menus
- **LUMINOSITY** Choose the luminosity of the display
- **CONTRAST** Choose the contrast of the display
- **BUZZER** Switch on or switch off the buzzer
- **LEDs** Switch on or switch off button's LEDs
- **SLEEP** Set the desired time in which the device will be automatically switched off
- **FIRMWARE UPGRADE** Upgrade the firmware of the device using a USB flash memory



Errors

There are three different error categories which can happen during the operation of the device:

- **Diagnosis Error.** It means that diagnosis is over and the regulator or rotor under test failed.
- **Self test Error.** It means that self test is over with error. It means that one or more of the 10 cables is broken or that there is an internal circuit error. You should contact the manufacturer.
- **Firmware upgrade error.** It means that firmware upgrade failed.

Possible symbols to be shown during test:

✓	Diagnosis finished without error	—	Switch connections between FLD1 and FLD2
✗	Error diagnosed	—/—	Rotor's cable is broken
ⓘ	Not known or not clear result	—✗	Rotor is short circuited

Indication ⓘ means that the RT100 device is not able to clearly decide about the correctness of the result. This could happen for example in case of testing of a regulator with L contact. In this case the test would finish, for example, with an indication **L OFF 4.5V ⓘ**. In this case the user has to decide if the L contact works well or not. He needs to take into account more info like if the indicator inside the vehicle ⓘ is going on or off, when it should remain off. In the case that the indicator inside ⓘ the vehicle remains off and there is no complain about the functionality of the vehicle's lamp, the regulator should be characterized as working.

Sleep mode

Sleep mode is a function where RT100 device is automatically switched off in order to save power. Sleep mode is enabled only if the device is not used. The time needed in order the device will go in sleep mode is configured into the setting menu **SETTINGS / SLEEP**. Press the button ⓘ in order to start up the RT100 again.

Firmware update

As technology progresses and new communication protocol come to market, there will always be the need for upgrading the RT100 device. With firmware update function, the user is able to have an up to date device which will support new regulator types. You need to visit our web site or contact the seller to take info about the latest available firmware version. Firmware update can be done with two ways:

◆ First way

- Connect the RT100 device with the power supply
- Press one time the button ⓘ
- Be sure that you have a USB flash memory with the latest firmware
- Connect the USB flash memory into the USB port
- Go to menu **SETTINGS / UPDATE** and press

◆ Second way

- Connect the RT100 device with the power supply
- Be sure that you have a USB flash memory with the latest firmware
- Connect the USB flash memory into the USB port
- Keep pressing the button ⓘ
- Press one time the button ⓘ
- Release both buttons ⓘ and ⓘ as soon as the LCD display will be illuminated

Don't press any button or remove the device from the power for the next 20 seconds. The upgrade of the device will finish and the device will boot and it will start working normally. Then you can remove the USB flash memory. In case of an error (e.g. file error, wrong file etc) the upgrade will fail, the button LEDs will flash and the buzzer will start beeping. In case of an error contact the manufacturer.

