



2021.11.01

Alternators, Starters & Parts

RTP9006S

USER MANUAL TESTER FOR AUTOMOTIVE ALTERNATORS



UNIQUENESS

TRAINING

SERVICE

INNOVATION

WARRANTY

QUALITY

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INTRODUCTION

RTP9006S Tester for diagnostics of automotive alternators is made of high-quality components and material through the use of advanced techniques of diagnostic equipment manufacture.

The User Manual contains information concerning RTP9006S usage, equipment set, design, function, technical characteristics and operation.

The Manufacturer reserves the right to change the design and software of the equipment without prior notice to users.

Read carefully User Manual before putting RTP9006S (hereafter referred to as tester) into use. Take a special training at the equipment manufacturing facility if necessary.

1. APPLICATION

RTP9006S Tester is designed to diagnose automotive alternators with a supply voltage of 12V in two ways:

- directly in the car;
- on the diagnostic test bench which provides its drive.

2. TECHNICAL CHARACTERISTICS

General	
Dimensions (L*W*H), mm	120×65×18
Weight, kg	0,15
Supply voltage, V	from 10 to 18
TFT-LCD Touch screen, color	2.8" screen size
Operating temperature, °C	from 0 to +40
Storage temperature, °C	from 0 to +40
Ingress protection rating	IP20
Alternator testing	
Types of tested alternators	«COM» («LIN», «BSS»), «SIG», «RLO», RVC» «C KOR.», «P-D», «C JAP.».
Tested parameters	- Stabilizing voltage - For COM voltage regulators: - ID; - Protocol type - Exchange rate - Errors
Supply voltage of tested alternators, V	12
Polarity reversal protection	Yes
Short-circuit sound alert	No
Battery pack	No

3. EQUIPMENT SET

RTP9006S Tester set includes:

- RTP9006S Tester – 1 pc.;
- MS0128 – Set of diagnostic cables:
 - Four-wire cable - 1 pc.;
 - Cable for connection of additional "+" - 1 pc.;
- User Manual – 1 pc.

Observe RTP9006S Tester. If any damage is detected, please contact the manufacturer or sales representative before launching the equipment.

 **WARNING!** In case of obvious damage, the operation of the equipment is forbidden.

4. DESCRIPTION



Fig.1.RTP9006S Tester. General view.

The tester is a compact device supplied with a touch screen. A connector for diagnostic cable connection is located in the upper part of the tester (Fig. 2), a MicroSD connector for software updates - in its lower part (Fig. 3).



Fig. 2. Connector for diagnostic cable.



Fig. 3. MicroSD connector.

Two diagnostic cables are also included in the equipment set (Fig. 4, 5): a diagnostic cable and an auxiliary cable to connect an additional positive contact.



Fig. 4. Four-wire diagnostic cable.

The cable has the following marking:

"GC" (Yellow) is intended for connection to the alternator voltage control terminal.

"FR" (Green) is intended for connection to the alternator load control terminal.

"-" (Black) - "B-." Battery negative pole (the alternator housing).

"+" (Red) - "B+." Battery positive pole, the alternator output. Used to power the device when testing the alternator on the test bench or in the car; it is also used for "B+" voltage indication.



Fig. 5. Cable for connection of additional "+".

4.1 Tester menu

The main menu consists conditionally of three sections (Fig. 6):

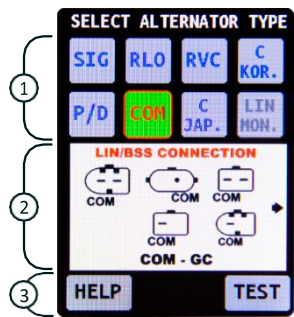


Fig. 6. Tester main menu.

- 1 – Selection of the alternator type. The alternator type can be selected by single-clicking on the corresponding icon. The selected type is being highlighted.
- 2 – Types of voltage regulator connectors are displayed as reference information.
- 3 – "HELP" and "TEST" buttons. Customer support contact information is displayed when the "HELP" button is pressed. Alternator testing mode is on when the "TEST" button is pressed.

4.2 Alternator testing modes

The following information is displayed when the testing mode for COM-type alternator is selected (Fig. 7):



Fig. 7. Diagnostic window of the "COM"-type alternator.

- 1) Type of the tested alternator;
- 2) "-V" and "+V" buttons are used to set the voltage on the voltage regulator, which is displayed as "set + numerical value". Each pressing of the button changes the value of preset voltage by 0.2V. The measured voltage is displayed in green below the preset voltage.
- 3) "COM PR.": voltage regulator protocol type. The following protocol titles appear on the display: LIN1.3 (displayed as LIN1), LIN2.0 (displayed as LIN2).
- 4) "ID": voltage regulator identification number. The manufacturer and the voltage regulator order number are encoded in it. The ID number should correspond to the original one, when mounting the voltage regulator on the car, otherwise the car will reject such a voltage regulator and the dashboard will display an error.
- 5) "COM SPEED": speed of data exchange between the voltage regulator and vehicle ECU. The following speed rates can be displayed in the "LIN" protocol:

User Manual - RTP9006S Tester

- "L" – 2400 baud (low);
 - "M" – 9600 baud (medium);
 - "H" – 19200 baud (high).
- 6) "TYPE" - voltage regulator connection type. The following protocol types are displayed: "BSS" or one of the 12 types of "LIN" protocol: A1, A2, A3, A4, B1, B2, B3, B4, C3, D1, D2, E1.
- 7) "EXCITATION" – stator excitation level (load).
- 8) "ERROR" –voltage regulator operation errors. There are three types of potential errors:
- "EL" – electric error;
 - "ME" – mechanic error;
 - "TM" – thermal error.

When detected, the error is indicated in red.

- 9) "BACK" –diagnostic mode exit.

The following information will be displayed when the testing mode for one of the alternator types ("SIG", "RLO", "RVC", "C KOR.", "P/D", "C JAP.") is selected: (Fig. 8):

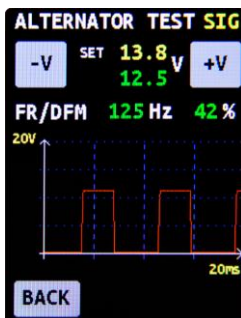


Fig. 8. Alternator diagnostic window when one of the following alternator types "SIG", "RLO", "RVC", "C KOR.", "P/D", "C JAP." is selected.

- 1) Type of the tested alternator.
- 2) "-V" and "+V" buttons are used to set the voltage on the voltage regulator which is displayed as "set + numerical value". Each press of the button changes the voltage value by 0.2V. The measured voltage is displayed in green below the set voltage.
- 3) "FR" – Field response.
- 4) "DFM" – digital field monitor.

5). An oscilloscope is displayed on the screen and shows the measured signal and its waveform. The measured signal is displayed on two scales: 20 and 200ms. Single-click on the diagram to switch from one scale to another.

 **WARNING!** Contact the support team in case you want to connect the type of alternator which is not on the list.

5. INTENDED USAGE

1. The tester is intended for indoor use. When used outdoor, external conditions and technical characteristics of the device set out in item 2 of this manual, should be taken into consideration.
2. To avoid damage or failure of the tester, do not make any changes in the electrical diagram of the device. In case of failure, please contact Technical Support or a sales representative.
3. The device enables to test the alternator assembly either directly on the car or on the test bench, which provides its drive. Further on, the option of testing the alternator directly on a car will be looked into. Diagnostics with the test bench is performed quite the same way.

 **WARNING!** DO NOT apply much force to the touch screen when using the device. DO NOT touch the screen with a stylus or other objects. Protect the touch screen from sharp and hard objects.

5.1 Safety measures

1. Only the personnel that has received special training in safety operation and been authorized to work with the particular equipment is allowed to use the device.
2. Make sure that measuring clamps do not have insulation damage or bare metal spots. Check the clamps for any breaks. In case of obvious damage, replace them with new ones before launching the device.
3. In order to avoid possible electric shock or injury as well as damage to the tester, do not apply voltage exceeding 20V to the device outputs (or between the earth and any of the outputs).
4. When measuring, try to connect outputs correctly, especially “B-“ones. The device has all kinds of protection against emergency situations, however not all voltage regulators have such a protection.

52 Testing of an alternator on a car

Testing of an alternator on a car is performed as follows:

1. Connect the tester to the automotive alternator. Observe the color marking in compliance with item 4.1 of the manual. The device is powered by the alternator battery. When the device is on, the main menu will be displayed.
2. For activation of the testing mode, select the appropriate terminal of the voltage regulator and press the "TEST" button.
 - 2.1. When testing a COM-type alternator, wait for the device to identify its ID number and TYPE.
3. Start the car engine and reset the load. Wait until the engine operates steadily at idle.

 **WARNING!** Testing of the alternator on a car should be performed on premises equipped with combined extract and input ventilation or fume offtake system. Alternatively, all the measurements should be carried out outdoor.

 **WARNING!** It is prohibited to exit the testing mode when the engine is running. Otherwise it will result in a sharp surge of voltage generated by the alternator.

 **WARNING!** In case of spontaneous disconnection of the black ("B-", battery negative terminal) and/or red ("B+", battery positive terminal) clamp it is strictly prohibited to connect it again when the engine is running.

4. Use "-V" and "+V" buttons to change the alternator voltage in the range between 13.2V and 14.8V. The measured voltage (displayed in green) should change in proportion to a possible deviation by $\pm 0.2V$.
5. Use "-V" and "+V" buttons to set any voltage in the range between 13.2V and 14.8V on the alternator. Increase the crankshaft rotation speed up to average rpm. In this case, the voltage value displayed on the device screen must not change (possible value fluctuations with a tolerance of $\pm 2 V$ are the norm).
6. Without reducing the crankshaft speed, increase the load on the alternator by switching on headlights and other lighting units. The voltage value displayed on the device screen must not change (possible voltage reduction is by 0.3V).
7. Shut the engine off.
8. Disconnect the MS015COM tester terminals.
9. Failure of one of the operational requirements described in items 2.1, 4- 6 of the manual, signs the alternator malfunction.

6. TESTER MAINTENANCE

RTP9006S is designed for a long-term operation 24/7. However, to ensure the test bench uptime, it is necessary to provide regular technical inspection and below described routine maintenance of the device.

Below are the main points that should be checked during a daily inspection:

- Environmental conditions for the tester operation (temperature, humidity, air pollution, vibration, etc.).
- Condition of the wires that should be connected to the device outputs (visual inspection).
- Do not store or use the device in places exposed to high temperature, humidity, danger of explosion or fire, strong magnetic field. Exposure to dampness may degrade the product's performance.

6.1 Tester software update

Update RTP9006S software as follows:

- Download a new version of the software.

***File with the latest software version can always be found on our website: servicems.eu.**

- Copy it to the root of 32 Gb MicroSD drive formatted in FAT32.
- Switch the tester off and insert the drive into the MicroSD connector of the device.
- Switch the tester on by connecting the red wire to the battery plus and the black one to its minus, or connect the device to 12V DC power supply.
- On launch, the device will automatically detect a new version of the software and start the installation.
- Wait until the installation is completed.

 **WARNING: Do not interrupt the software update process by disconnecting the unit or removing the MicroSD drive.**

- The device will boot up upon finishing the installation.
- Switch the device off.
- Extract the MicroSD drive.



62 Cleaning & Care

Soft tissues or wipe cloths should be used to clean the surface of the device with neutral detergents. The display should be cleaned with a special fiber cloth and a screen cleaning spray. No abrasives or solvents should be used to prevent corrosion, failure or damage to the tester

7. MAJOR FAULTS AND TROUBLESHOOTING TECHNIQUES

Possible malfunctions and ways to fix them are described in the below table:

Failure symptom	Potential cause	Troubleshooting tips
1 The tester fails to be switched on or Tested parameters are displayed incorrectly.	11 Poor contact with the diagnostic connector. 12 Diagnostic cable is broken. 13 Incorrect or poor connection to the generator connectors.	11 Check the connector for secure fixation. 12 Check diagnostic cable. Replace with new. 13 Restore the contact.
2 The display doesn't respond to the operator's touch.	2.1 The touch screen is damaged.	2.1 Contact the service department.
3 Diagnostics fails to be launched.	3.1 Operating system malfunction.	3.1 Contact the service department.

8. EQUIPMENT DISPOSAL

European WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment Directive) is applicable to RTP9006S Tester disposal. Obsolete electronic equipment and electric appliances including cables and fittings as well as batteries and accumulators must be disposed of separately from the household rubbish.

- Use available waste collection systems to dispose of outdated equipment.
- Proper disposal of old appliances will prevent harm to the environment and personal health.



APPENDIX 1

Terminals for connection to alternators

Indicial notation	Functional purpose	Connection
B+	Battery (+)	B+
30		
A	(Ignition) Input for switch starting	
IG		
15		
AS		
BVS	Battery Voltage Sense	
S	(Sense) Input for voltage comparison at control point	
B-	Battery (-)	B-
31		
E	Earth, battery (-)	
D+	Used for connection to an indicator lamp that transfers initial driving voltage, and indicates alternator operability	no connection
I	Indicator	
IL	Illumination	
L	(Lamp) Output for alternator operability indicator lamp	
61		
FR	(Field Report) Output for load control on an alternator by engine management block	FR
DFM	Digital Field Monitor	
M	Monitor	
LI	(Load Indicator) Same as FR, but with universal signal (Drive) Input of voltage regulator control with P-D terminals Mitsubishi	
D	(Drive) Input of voltage regulator control with terminal P-D Mitsubishi (Mazda) and Hitachi (Kia Sephia 1997-2000)	GC
	(Digital) Input of code voltage installation on American Ford, same as SIG	
RC	(Regulator Control) same as SIG	
SIG	(Signal) Input of code voltage installation	



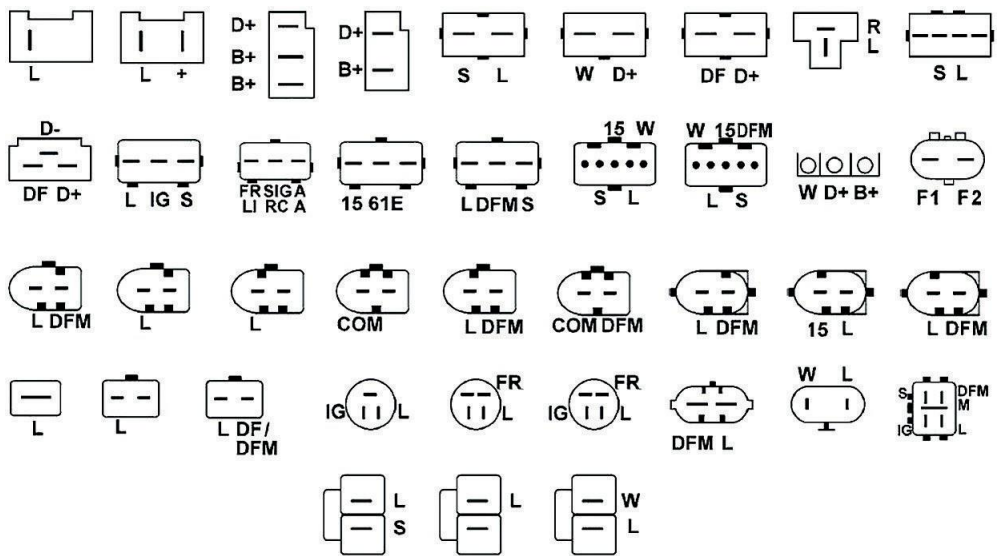
Indicial notation	Functional purpose	Connection
RVC(L)	(Regulated Voltage Control) Similar to SIG, but voltage change ranges from 11.0 V to 15.5 V. Control signal is sent to L terminal	GC
C	(Communication) Voltage regulator input to control engine operation block. Japanese cars	
G		
RLO	(Regulated Load Output) Input to control stabilizing voltage from 11,8 to 15 V (TOYOTA)	
COM	(Communication) General term for physical interface, alternator control and diagnostics. Protocols of use: BSD (Bit Serial Device), BSS (Bit Synchronized Signal) or LIN (Local Interconnect Network)	
LIN	Direct indication on control interface and alternator diagnostics, conducted under LIN protocol (Local Interconnect Network)	
DF	Output of voltage regulator	FR
F		
FLD		
67		
P	Output of one of alternator stator windings. Used for measuring alternator driving voltage	no connection
S		
STA		
Stator		
W	(Wave) Output of one of alternator stator windings for connection of tachometers in diesel engine cars	
N	(Null) Output of average stator winding point. Usually used to regulate alternator operability with mechanically regulated voltage by an indicator lamp	
D	(Dummy) Blank, no connection, mostly in Japanese cars	

Indicial notation	Functional purpose	Connection
N/C	(Load Response Control) Function of voltage regulator response delay on	no connection
Options of LRC voltage regulators	load increase on an alternator. Delay duration ranges from 2,5 to 15 seconds. On increasing the load (lights, cooler fan on), a voltage regulator adds driving voltage smoothly ensuring stability of engine drive rotation. Remarkably seen under idle running	

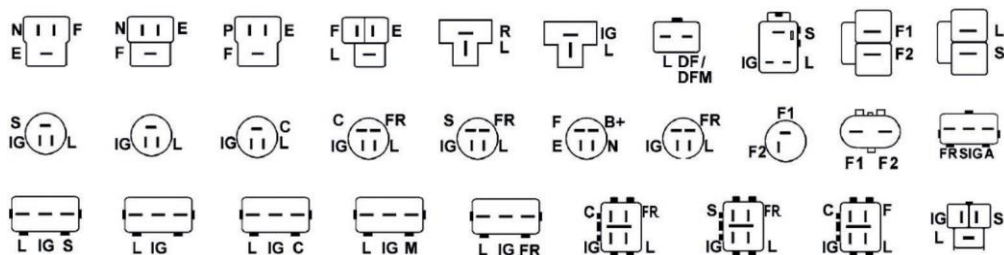
APPENDIX 2

Sockets of Alternators

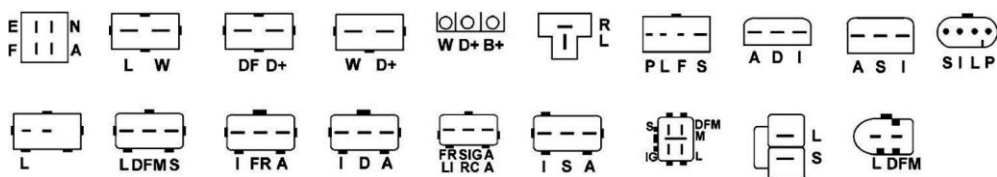
Bosch



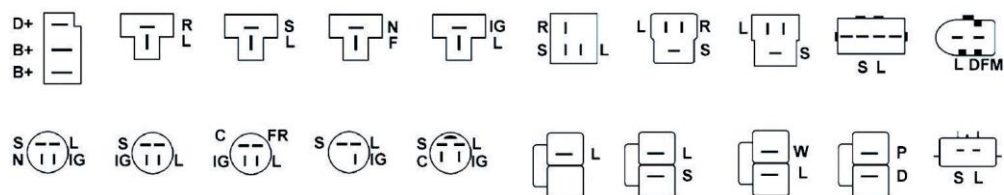
Denso



Ford/Lucas



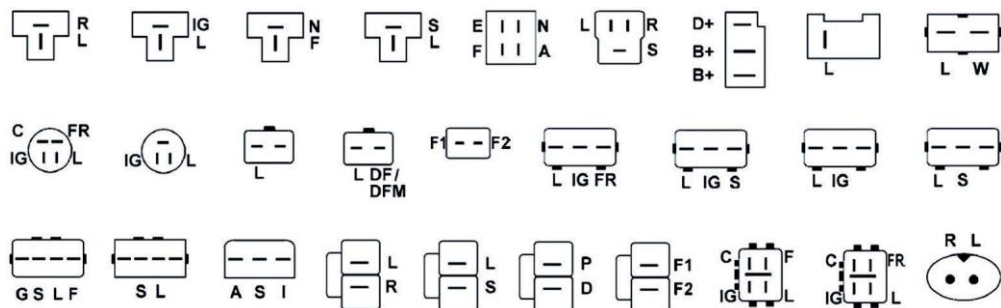
Hitachi



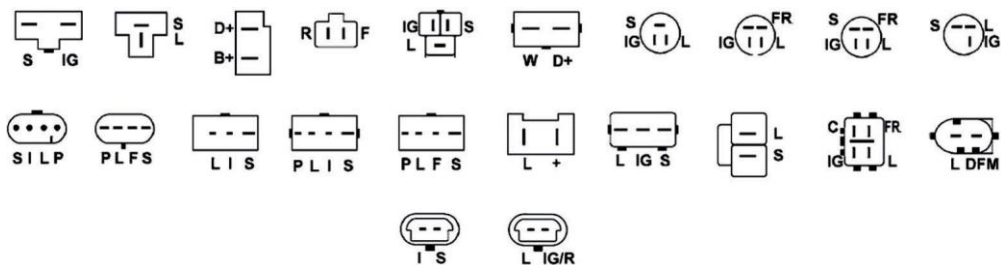
Magneti Marelli



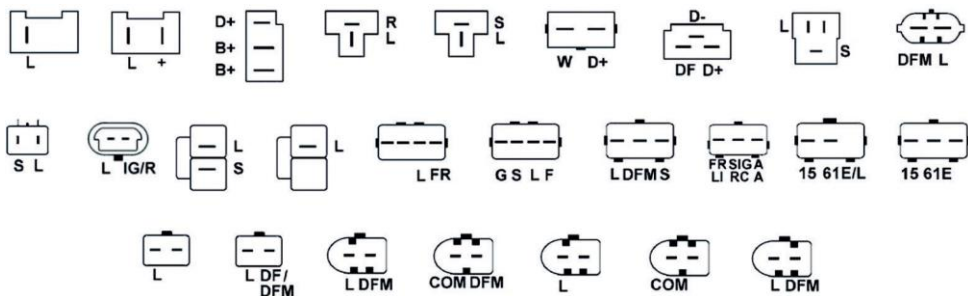
Mitsubishi



Delco Remy



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