MSG equipment MS021 Checking Diode Bridges Tester User Manual

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INTRODUCTION

Thank you for choosing the product by TM MSG Equipment.
The present user manual consists of the information on the application, supply slip, design, specifications and rules of usage of tester MS021.
Prior to using the tester MS021 (hereinafter, “the tester”), study the present user manual thoroughly. If required, get the special training at tester manufacturer facilities.
Testing rectifiers with the use of multimeter has always been the most common practice. This method has a significant drawback -it doesn’t help to identify the diode type and find the faulty one. A standard multimeter test with a direct current of about 0.002A, which is too low compared to the diode operating currents. The tester checks the diode with an alternating current of 0.9A, which allows you to reliably assess the technical condition of the diode bridge of the generator or the diode separately.

PURPOSE

The tester MS021 is used during the alternator repair for the diagnostics of diode bridges, and it can detect:

- diode breakdown;
- diode cut;
- diode type (common diode, avalanche diode);
- diode degradation (extreme drop of forward voltage);
- avalanche diode reverse breakdown voltage;
- bad diode connection with the bus bar.

TECHNICAL CHARACTERSISTICS

General	
Supply voltage, V	230/110
Supply frequency, Hz	50/60
Supply type	Single -phase
Power demand (max.), W	40
Dimensions (L×W×H), mm	219×214×80
Weight, kg	2
IP rate	IP20
Diode bridge diagnostics	
Voltage of the tested diode bridges, V	12/24
Testing current	alternating
Testing voltage, V	30
Testing current, A	0.9

EQUIPMENT SET

The equipment set includes:

Item name	Number of pcs
Tester MSG MS0121	1
MS0129 – diagnostic cable	1
Supply cable	1
Diode fuse – (type: 5*20mm, current: 0.5A)	1
User Manual (card with QR code)	1

TESTER DESCRIPTION

The tester is supplied with a touch screen (“1” – Fig.1) on which the tested parameters are displayed; the color indication of the screen signals the technical condition of the tested diode. There is a connection terminal (“2” – Fig.1) for a diagnostic cable (Fig.2). The encoder knob (“3” – Fig.1) is used for fine adjustment of the device for specific tasks. Button “4” turns the device on.

Fig.1 MS021 tester. General view:
1 – Touch screen; 2 – Connection terminal for a diagnostic cable; 3 – Encoder button; 4 – “ON” button.

Fig.2. Diagnostic cable

Diode fuse and power connectors are located at the rear of the device.

Fig.3. MS021 tester. Back view:
1 – Diode fuse; 2 – Power connector.

APPROPRIATE USE

1. Use the tester as intended (see Section 1).
2. The tester is designed for indoor use. Be aware of the following operating constraints:
    1. The tester should be used in the spaces equipped at the temperature range from +10 °C up to +30 °C.
    2. Do not use the device when the air temperature is negative or the humidity is high (over 75%). Do not turn on the tester immediately after moving it from a cold room (or from outdoors) into a warm one as its components may be covered with a condensate. Keep it off at room temperature for at least 30 min.
    3. Avoid leaving the device in direct sunlight.
    4. Keep away from heating devices, microwaves, and other temperature-raising equipment.
3. Avoid dropping the tester or spilling technical liquids on it.
4. Any interference with the electric diagram of the device is strictly prohibited.
5. Turn off the tester when it is not in operation.

6. Do not leave the device with closed probes for more than 2 minutes.
7. Working with a measuring probe, keep your fingers on the plastic part of it. Touching the metal part of the measuring probe may cause measurement errors.
8. The device is equipped with a system for diagnostics of the probes condition. If any fault is detected, the “PROBE PROBLEM” message will appear on the screen. The “DIODE BREAKDOWN” message that appears when the probes are open, signals the probe failure.

Safety regulations

1. Only the personnel that has received special training in safety operation and been authorized to work with the test benches (devices) of certain types 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 the new ones before launching the device.

Rectifier testing

Diagnostics of a rectifier should be performed as follows:

1. Turn the tester on. Connect the clamp to the rectifier housing. The following message will appear on the screen: “CONNECT PROBE TO DIODE”.
2. Touch the contact spot of the tested diode with a probe. The following information will be displayed:
   “Vf” – diode voltage drop (in volts);
   “Vr” – stabilizing voltage (in volts). If there are stabilitrons (avalanche diodes) in the rectifier structure, the “AVALANCHE” message will appear.

WARNING! Different contaminants and dirt on the tested contacts may lead to measurement errors.

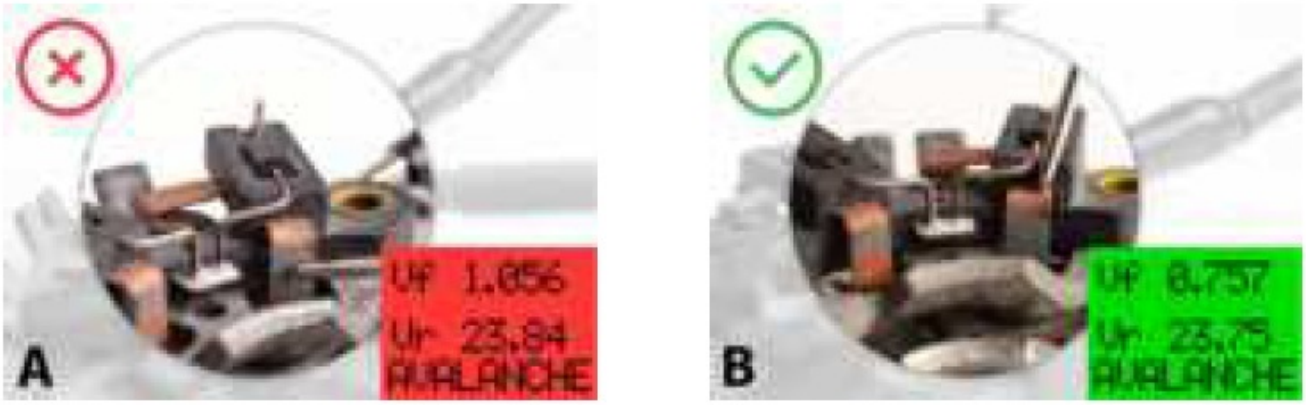

Fig.4. Taking measurements.

- A) – incorrect;
- B) – correct

1. If the diode is faultless, the screen will display “Vf” and “Vr” values. The screen color will be green.

2. If the “Vf” value is higher than normal, the screen color will be yellow.
   The operability of the rectifier should be decided on the basis of the “Vf” readings and type (model) of the diode (stabilitron). The “Vf” absolute value is not always a key parameter when checking the rectifier. It is important to pay attention to the spread between the “Vf” values of different diodes of the same rectifier. For example, for a rectifier that can carry 50 A, “Vf” = 0.850 V is quite typical. The rectifier can be considered faultless If the spread between “Vf” values of the diodes doesn’t exceed ± 0.020 V. For the 120A rectifier, “Vf” = 0.850V is already a critical value. The diode with such a “Vf” value shall be considered faulty.
3. If the diode is faulty, the screen color will be red.

4. In case of a short or open circuit failure, the screen color will be red and either the “SHORT CIRCUIT’ or ‘DIODE BREAKDOWN’ message will be displayed correspondingly.

Tester setup

The device assesses the diode performance on the basis of the forward voltage drop value (“Vf”) and is specially calibrated to make it usable for any operator who doesn’t have sufficient knowledge of the diode parameters and characteristics. Threshold values can be changed at the user’s option.

Enter the “Settings” menu as follows:

Fig.5. Color threshold setting menu.

1. Turn the device off.
2. Press and hold down the encoder button (“3” – Fig.1) 3)Turn the device on. A setup mode will be activated.
3. Threshold values for either a faultless diode (green color of the screen) or a faulty one (red color of the screen) can be changed in this mode.
4. The selected threshold value can be changed by turning the encoder button clockwise or counterclockwise.
5. To save the selected settings, press and hold down the encoder button until the device enters the operating mode and the “CONNECT PROBE TO DIODE” message appears on the screen.
6. Turn the tester off to exit the setup menu. The settings won’t be saved.

TESTER MAINTENANCE

The tester is designed for a long operation life and doesn’t have any special maintenance requirements. At the same time, to ensure the maximum operation life, the regular monitoring of the tester technical condition should be made as follows:

- Conformity of the environmental conditions to the requirements for tester operation (temperature, humidity, etc.);
- Diagnostic cable visual inspection;
- Condition of the supply cable (visual inspection).

Cleaning and Care

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

MAJOR FAULTS AND RECOVERY TECHNIQUES

The table below contains a description of potential faults and recovery techniques:

Failure symptom	Potential cause	Troubleshooting tips
1. Tester doesn't turn on.	The power connector came off.	Check whether the connection is securely maintained.
	The fuse burnt out.	Replace the fuse.
2. "PROBE PROBLEM" message appears when the tester is on.	The diagnostic cable is faulty (damaged).	Replace the diagnostic cable.
3. "DIODE BREAKDOWN" message appears when the probes are open.	Loose connection on the diagnostic cable connector.	Recover the contact.
		Replace the diagnostic cable.
4. The tested parameters are displayed incorrectly.	Loose connection on the diagnostic cable connector.	Recover the contact.
	Software error.	Contact the sales representative.

EQUIPMENT DISPOSAL

European WEEE (Waste Electrical and Electronic Equipment) Directive 2002/96/EC applies to Tester MS021 disposal.
Obsolete electronic equipment and electric appliances, including cables, hardware, and batteries must be disposed of separately from the household wastes.
Use available waste collection systems to dispose of outdated equipment.
Proper disposal of old appliances will prevent harm to the environment and personal health.

MSG equipment
HEADQUARTERS AND PRODUCTION 18 Biolohichna st., 61030 Kharkiv

Ukraine
+38 057 728 49 64
+38 063 745 19 68
E-mail: sales@servicems.eu
Website: servicems.eu

REPRESENTATIVE OFFICE IN POLAND STS Sp. z o.o.
ul. Modlińska, 209,
Warszawa 03-120
+48 833 13 19 70

+48 886 89 30 56
E-mail: sales@servicems.eu
Website: msgequipment.pl

TECHNICAL SUPPORT
+38 067 434 42 94

E-mail: support@servicems.eu

Documents / Resources

	MSG equipment MS021 Checking Diode Bridges Tester [pdf] User Manual MS021, Checking Diode Bridges Tester, Diode Bridges Tester, Checking Bridges Tester, Bridges Tester, Tester, MS021 Tester

References

- MSG Equipment - wyposażenie warsztatów TM MSG equipment. - msgequipment.pl