

MS112

**TEST BENCH FOR DIAGNOSTICS OF ELECTRIC
COMPRESSORS OF AUTOMOTIVE AIR CONDITIONERS
USER MANUAL**

**STANOWISKO DO DIAGNOSTYKI ELEKTRYCZNYCH
SPRĘŻAREK KLIMATYZACJI SAMOCHODOWEJ**

INSTRUKCJA OBSŁUGI

**СТЕНД ДЛЯ ДИАГНОСТИКИ ЭЛЕКТРОКОМПРЕССОРОВ
АВТОКОНДИЦИОНЕРОВ
РУКОВОДСТВО ПО ЭКСПЛУАТАЦИИ**



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Test bench MS112

INTRODUCTION

We appreciate you have chosen the products of TM MSG equipment.

The present user manual consists of the information on the application, supply slip, design, specifications and rules of usage of test bench MS112.

Prior to using the test bench MS112 (hereinafter, “the bench”), study the present user manual thoroughly. If required, get the special training at bench manufacturer facilities.

Due to the permanent improvements of the bench, the design, supply slip and software are subject to modifications that are not included to the present user manual. Pre-installed bench software is subject to update. In future, its support may be terminated without a prior notice.

1. APPLICATION

The test bench MS112 is designed for diagnostics of electric AC of hybrid cars and electric vehicles. The test bench checks any electrical compressors with built-in inverter and supply voltage from 100 to 400V (DC). The diagnosis of the compressor is carried out in a fully automatic mode, while checking the operation of the electrical part of the compressor and testing its performance. Nitrogen is used as a working gas for testing.

2. TECHNICAL CHARACTERISTICS

Main characteristics	
Supply voltage, VAC	230
Supply type	Single-phase
Supply frequency, Hz	50/60
Power, kW	3
Dimensions (L×W×H), mm	740×600×550
Weight, kg	40

Compressor check

Tested units	2-pin high voltage connection, with built-in inverters
Tested units supply voltage, VDC	from 100 to 400
Working substance	Compressed nitrogen (external source required)
Nitrogen source pressure	6..8 Bar (90..110 psi)
Nitrogen consumption	100L per one test
Nitrogen recovery	No. Waste gas is discharged into the atmosphere
Nitrogen connection	SAE 1/4"

Additional features

Software update	Available
Internet connection	Ethernet
Connecting flash drives	USB Type-C

3. EQUIPMENT SET

Test Bench set includes:

Item name	Number of pcs
Test Bench MSG MS112	1
A set of data and power cables	1
Test bench maintenance kit	1
User Manual (card with QR code)	1

Test bench MS112

4. TEST BENCH DESCRIPTION

The bench consists of the following main elements (fig. 1):



Figure 1. Overall view of test bench

1 - Belt fixation unit.

2 - High and low pressure sleeves.

3 - Signal light «**Danger**» - signals the danger of high voltage supply.

4 - Connector «CAB» for data cable connection (compressor control).

5 - Connector «HV» for connection of high-voltage compressor power cable.

6 - Touch screen - to display diagnostic parameters of a diagnosed unit and to control the bench functions.

7 - Button «**EMERGENCY STOP**» - emergency stop of diagnostic process and ending of high voltage supply to the diagnosed compressor.

8 - Button «**OFF/ON**» - is responsible for switching off/switching on the bench power.

A set of data cables (Fig. 2) and power cables (Fig. 3) is supplied with the bench.



Figure 2. Data cable

Each power cable is provided with a «crocodile» clamp, which must be connected to the compressor housing.



Clamp for connecting
to the compressor housing

Figure 3. High-voltage cable

Test bench MS112

5. APPROPRIATE USE

1. Use the bench for the specified purpose only (see sect. 1).
2. Use the «EMERGENCY STOP» emergency stop button only if necessary to stop the diagnostic process urgently.
3. In case of failures in the operation of the bench, stop further operation and contact the manufacturer or sales representative.

The manufacturer is not responsible for any damage or injury to human health resulting from non-compliance with the requirements of this user manual.

5.1. Safety Guidelines

1. The bench has to be operated by the qualified persons who got the access to operate the definite bench types and who were instructed on the safe operating procedures and methods.
2. The bench has to be turned off if the supply is terminated, during the cleaning and tidying up, as well as in the emergency situations.
3. The work area must always be clean, with good light illumination, and spacious.
4. Do not touch the compressor or metal parts of the bench, after the start of the test or while the red signal lamp «Danger» glows
5. To ensure electrical and fire safety PROHIBITED:
 - connect the bench to the electrical network having faulty protection against current overloads or not having such protection;
 - use a socket without a grounding contact to connect the bench;
 - use adapters, multi-place (having two or more connection points) sockets and extension cords to connect the bench to the electrical network;
 - operation of the bench in defective condition.
 - Independently to repair and make changes to the design of the bench, because it can lead to serious damage to the bench and deprive the right to warranty repair.
6. While mounting and dismounting of a unit from the bench, to prevent arms from harming, be more cautious.

5.2. Test bench preparation for work

The bench is delivered packed. Release the bench from the packaging materials, remove the protective film from the display (if available). After unpacking, it is necessary to make sure that the bench is intact and does not have any damage. If damage is detected before the bench is activated, contact the manufacturer or the sales representative.

The bench has a desktop version. When installing the bench, it is necessary that it is supported by legs that can be adjusted in height by twisting or screwing them. The bench must be stable.

The bench ensures the operation at the temperature from +100C up to +400C and relative air humidity from 10% up to 90%.

After transporting the bench at an ambient temperature below 0°C, before turning it on, it should be kept at operating temperature for at least 24 hours.

Before operation of the bench it is necessary to connect:

- electric network 230V (single-phase) with a grounding contact, the permissible current of which is not less than 16 A. If the socket is removed from the installation site of the bench, it is necessary to complete the electrical network and install the socket.
- A compressed nitrogen source equipped with a pressure regulator with an output working pressure of 6 Bar and providing the capacity at a working pressure of at least 100 l/min (m³/h). The connector for the SAE stand 1/4" to connect the compressed nitrogen source is located on the left side of the bench.

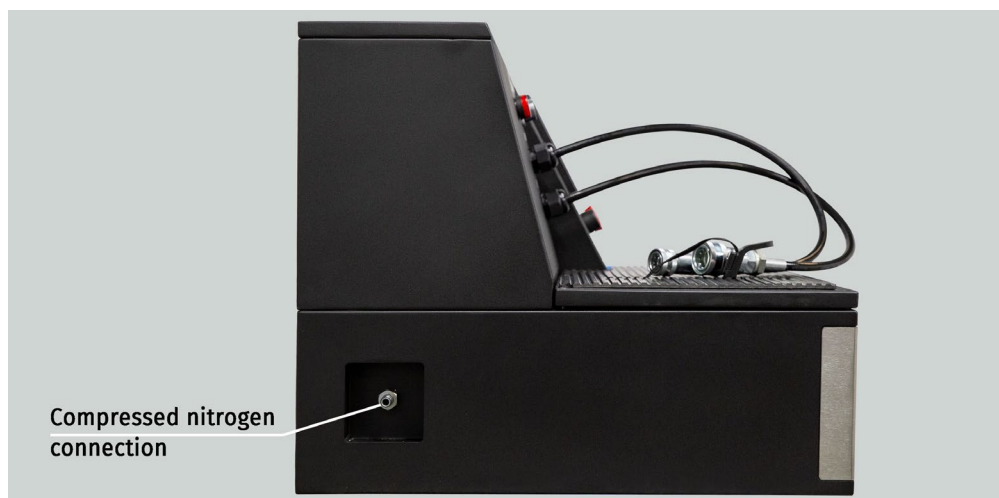


Figure 4. Location of the SAE 1/4" compressed nitrogen connector

6. COMPRESSOR DIAGNOSIS

The diagnostic procedure includes the following steps:

1. In the database of the bench, find and select the model of the diagnosed unit. The stand will display the numbers of cables and fittings necessary for its diagnosis.

Test bench MS112

2. Connect the fitting to the bench.
3. Fix the unit on the bench.
4. Connect high and low pressure hoses to the compressor.
5. Connect high-voltage cable and data cable to compressor. Clamp «crocodile» high-voltage cable to compressor housing.
6. On the screen start the test. After that, it is FORBIDDEN to touch the metal parts of the bench or compressor.
7. The diagnostic process takes place automatically. When the diagnostics are complete, the screen will display the results of the measurements, or the reasons why the test was interrupted.
8. Upon completion of the diagnosis, the compressor can be dismantled from the bench.

7. TEST BENCH MAINTENANCE

The bench is designed for a long period of operation and does not have special requirements for maintenance. The stand will issue a corresponding message about the need for maintenance. The maintenance procedure includes three stages:

- Drain the separated oil.
- Replacement of the combined filter.
- Replacement of high pressure filters.

In addition to the periodic maintenance of the bench, it is necessary to regularly monitor its technical condition, namely:

- to control the presence of extraneous sounds;
- monitor the status of cables and quick connectors (visual inspection).

7.1. Periodic test bench maintenance

The periodic maintenance of the stand is as follows:

1. Disconnect the bench from the power supply network.
2. Unscrew all screws on the back panel and remove it.
3. Disconnect the connector of the sensor (see position 4, Fig. 5) located on the container for collecting compressor oil position 2 Fig. 5.
 - 3.1. Unscrew the container flask and drain the oil from it into the recycling tank.
 - 3.2. Turn the flask of the container back and connect the sensor connector.
4. Unscrew the container flask with filter. Replace the filter and spin the flask back.

5. Using the open-end wrench or end head, check the electro valve filter cover (position 1 fig. 5) counterclockwise until disconnection from the filter bowl.

5.1. Assess the condition of the sealing rings. Replace them if necessary.

5.2. Replace the filter element.

5.3. Place the filter cover in place and rotate it clockwise.

6. Place the back panel on its place and bolt.

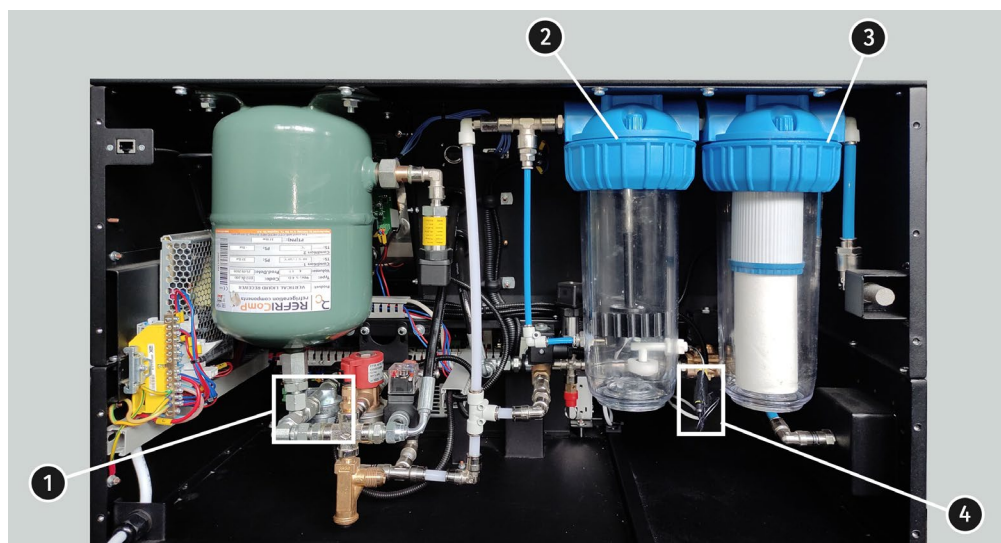


Figure 5. Arrangement of bench elements requiring maintenance:

- 1 - filter; 2 - oil separator; 3 - combined filter;
4 - connector of waste oil level sensor.

⚠ WARNING! When maintaining the stand, you must use personal protective equipment.

7.2. Test bench software update

To update the software of the bench you will need a USB Type-C Flash drive up to 32Gb (maximum) formatted into the Fat32 file system.

The upgrade procedure is as follows:

- Download the file with the latest version of the software from the site servicems.eu, which is in the MS112 product card;
- Copy the «Update.bin» file to the USB Type-C Flash Drive root directory;

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- Connect the USB flash drive to the USB connector of the bench;
- Go to «SETTINGS» menu and click «Update»;
- Wait for the upgrade process to end.

 **WARNING! It is forbidden to interrupt the renewal process by disabling the bench power or to remove the USB flash drive.**

7.3. Cleaning and care

To clean the bench surfaces, use either the soft napkins or rags, and neutral cleansers. The display should be cleaned with a special fiber display cleaning cloth and with a spray for display cleaning. To prevent the bench from the failure and corrosion, do not use abrasive materials and solvents.

8. TROUBLESHOOTING GUIDE

Below you will find the table with the possible problems and the solutions on their elimination:

Problem	Causes	Solutions
1. Test Bench doesn't start up.	No connection to external power supply	Check the electrical connection of the bench
	Pressed button EMERGENCY STOP	Check the position of the «EMERGENCY STOP» button
	Defective the bench power supply	Contact the sales representative
2. The display does not respond to the touch of the operator.	Damaged sensory pane	Contact the sales representative

9. RECYCLING

For the recycling of the bench refer to the European Directive 2202/96/EC (WEEE Directive - the directive on waste electrical and electronic equipment).

The outdated electronic devices and electrical appliances, including the cables, hardware, batteries and storage batteries shall be disposed separately from the house waste.

To dispose the waste products, exploit the available returning and collecting systems.

The appropriate disposal of the outdated devices helps to prevent harming to environment and health.

MSG equipment

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