

***"Mega Tester V4"***

**OS.110 V4**

**Device for testing electrical parameters of piezoelectric  
diesel injectors**

***Passport.  
Technical description.  
Instruction manual. Warranty card.***



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**Warning!!!** This device contains dangerous voltage, please read this manual carefully before using it.

## 1. INTRODUCTION

This passport is a document certifying the main parameters and technical characteristics of the device for testing the electrical parameters of piezoelectric diesel injectors of the Common Rail system, Mega Tester V4 OS.110 V4, guaranteed by the manufacturer. This passport allows you to get acquainted with the device structure, procedure and rules of its operation, compliance with which will ensure correct operation and long service life of the device.

## 2. PURPOSE

The device for checking the electrical parameters of piezoelectric diesel injectors Mega Tester V4 OS.110 V4 (hereinafter referred to as Mega Tester, device, instrument) is designed to check the integrity of the piezoelectric element insulation, measure its capacitance and resistance, and check the correctness of its operation.

## 3. GENERAL PROVISIONS

The Mega Tester is a hardware and software system that allows you to measure the capacitance of the piezoelectric element, measure the resistance of the piezoelectric element under voltage, measure the insulation resistance under high voltage, and generate the injector control voltage to measure the stroke of the piezoelectric element and the gap between the piezo actuator and the pusher of the injector hydraulic valve. The functionality of the device allows you to assess the degree of wear of the piezoelectric element, and is designed to facilitate the diagnosis and defecting of piezo nozzles, as well as help to assess the correctness of the nozzle assembly.

The device is controlled from a computer using the keyboard and mouse. It is also possible to start the device manually using the buttons on the front panel. Some functions are not available in the device menu.

#### 4. MAIN TECHNICAL CHARACTERISTICS

Insulation resistance	1M $\Omega$ ...10M $\Omega$
Resistance of the piezoelectric element	100k $\Omega$ ...1M $\Omega$
Capacitance of the piezoelectric element	0.5...10 $\mu$ F
Gap measurement range	1...15 $\mu$ m
Piezoelectric element voltage setting range	20...160B
Voltage setting range for insulation test	50...1000B <sup>1</sup>
Accuracy of resistance measurement	$\pm$ 2%+3ppm
Accuracy of voltage measurement	$\pm$ 1% + 2ppm
Capacitance measurement accuracy	$\pm$ 0.3 $\mu$ F
Nominal supply voltage	220B
Network frequency	50Hz
Maximum power consumption	10W
Maximum current consumption	0,25A
Operating temperature range	0 to +35 $^{\circ}$ C
Storage temperature	from -10 to +50 $^{\circ}$ C
Relative humidity (non-condensing)	0 - 85%

#### 5. EQUIPMENT OF THE DEVICE

"Mega Tester" device	1 pc.
Universal cable for measuring electrical parameters and testing piezoelectric element operation	1 pc.
Power cable	1 pc.
Passport	1 pc.

#### 6. SAFETY PRECAUTIONS

The device may only be operated by persons who are at least 18 years of age and who have been given appropriate training and have studied the technical documentation for this device.

Do not operate the device with any parts of the housing removed or missing.

Before switching on the device and/or before applying mains voltage to the device, make sure that the device body is not mechanically damaged and that the insulation of all cables and connectors is intact. Also, make sure that the device body and all cables and connectors are free of moisture, dust and other contaminants.

Do not operate the device with any damage to the insulation of cables and connectors.

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<sup>1</sup> at test voltages below 300V, the resistance measurement accuracy is not standardised.

**Warning!!!** This device has a dangerous voltage (1000V), be very careful when working with the device. It is forbidden to perform any work on the device, touch conductors and live parts of the device, as well as parts of the nozzle that may be energised, disconnect/connect cables, check contacts and perform other similar actions during electrical tests.

Individual elements of the device can retain voltage for up to two minutes after the power is turned off.

If the device malfunctions, a burnt smell appears, etc., completely disconnect the power supply to the device and do not switch it on until the cause of the malfunction has been completely eliminated.

During long breaks in operation, disconnect the device from the power supply.

Never expose the internal parts of the device to dripping or splashing.

Do not leave the device running unattended.

Do not store or store flammable and explosive substances in the room where the device is operating.

## 7. BRIEF DESCRIPTION OF THE DEVICE

The Mega Tester is designed to test the integrity of the piezoelectric element's insulation, measure its capacitance and resistance, and check its operation. The device has five operating modes: "Parameters, Resistance, Isolation, Stroke, and Span. Any mode can be started from a computer or from the instrument panel, and the measurement results are displayed on the computer screen and duplicated on the instrument display.

To connect the device to a computer, use a USB cable or connect the device via Bluetooth.

To connect via Bluetooth, switch on the device. On the computer, select "Add Bluetooth device", then select "Mega Tester", enter the password 1234 and click the connect button.

### 1. "Settings" mode

Connect the universal cable with the appropriate connector to the nozzle connector, observing the polarity. In the instrument menu, use the ↑ and ↓ keys to select the "Parameters" mode. By turning the encoder knob, you can change the value of the test voltage at which the resistance measurement will be performed. Press the *Start* button.

The device measures the resistance and capacitance of the piezoelectric element.

## 2. Resistance mode

Connect the universal cable with the appropriate connector to the nozzle connector, observing the polarity. In the instrument menu, use the ↑ and ↓ keys to select the Resistance mode. By turning the encoder knob, you can change the value of the test voltage at which the resistance measurement will be performed. Press the *Start* button.

The device will cyclically measure the resistance of the piezoelectric element and display its current, as well as minimum and maximum values.

During the test, you can change the value of the test voltage at which the resistance is measured by turning the encoder knob.

To end the test, click the *Stop* button.

## 3. "Isolation" mode

### **Warning: High voltage!**

Connect the universal cable with the appropriate connector to the nozzle connector, observing the polarity, and the alligator clip to the metal part of the nozzle body. In the instrument menu, use the ↑ and ↓ keys to select the "Isolation" mode. Turn the encoder knob to set the desired value of the test voltage at which the insulation resistance will be measured. Press the *Start* button.

The device measures the insulation resistance.

## 4. Stroke mode

Connect the universal cable with the appropriate connector to the nozzle connector, observing the polarity. In the instrument menu, use the ↑ and ↓ keys to select the "Run" mode. Turn the encoder knob to set the desired voltage for the test. Press the *Start* button.

The device will gradually raise the voltage to the set level and then beep. In this mode, the voltage value can be changed repeatedly to observe the operation of the piezoelectric element. The piezoelectric element is checked on the measuring stage. The measured value is read from a micrometer. The computer program significantly expands the capabilities of this mode, allowing you to automate the process of measuring the piezo actuator stroke, as well as to build tables and graphs of the dependence of the piezo actuator lift on the applied voltage. After completing the measurement, press the *Stop* button and the device will discharge the piezo actuator.

The nozzle can also be mounted on a test bench, pressurised and the flow and return flow measurements started. In this mode, the condition of the piezoelectric element and the correct tightening torque can be assessed by the quantitative increase in the backflow value with increasing nozzle voltage.

It is not recommended to keep the piezo actuator under constant voltage for a long time.

## 5. "Span" mode

Connect the universal cable with the appropriate connector to the nozzle connector, observing the polarity. In the instrument menu, use the ↑ and ↓ keys to

select the "Span" mode. Long press the encoder button to select the type of injector to be tested. Press the *Start* button.

The device sends a test signal to the nozzle and measures the gap. The gap can be used to determine the correct tightening torque. When the measurement is complete, press the *Stop* button to discharge the piezo actuator.

## 8. TRANSPORT AND STORAGE

The device should be stored in closed, dry, ventilated rooms at a relative humidity of up to 85% without condensation, at temperatures from -10 to +50°C and in the absence of acid, alkaline and other active impurities in the air.

After transportation in cold weather, the product must be kept at room temperature for at least two hours before switching on the appliance.

## 9. LIMITATION OF LIABILITY

The manufacturer shall not be liable to the owner of this product or a third party for damage and losses incurred by the owner or a third party as a result of improper use of the product, including inept or erroneous actions of personnel, as well as for losses caused by the action or inaction of this device.

Under no circumstances shall the manufacturer be liable for lost profits, lost savings, accidental damage or other consequential economic damage, even if the manufacturer has been advised of the possibility of such damage. The manufacturer shall not be liable for damages claimed by you on the basis of third party claims or caused by your failure to fulfil your obligations.

The manufacturer shall not be liable for any malfunctions or damages resulting from the use of additional devices recommended for use with this device, as well as its modification, repair or modification of its design not provided for in this operating manual.

The manufacturer is not responsible for damage or loss of information, any programs or data.

The manufacturer reserves the right to make changes to the design of the appliance that do not impair its performance without prior notice.

## 10. MANUFACTURER'S WARRANTY

The manufacturer guarantees the correct operation and compliance of the device parameters with the technical characteristics set out in section 4 of this document, provided that the owner complies with the conditions of transportation, storage and operation set out in this passport.



The warranty period is 12 months from the date of purchase.

During the warranty period, the owner is entitled to free repairs upon presentation of this passport and the warranty card (the warranty card is attached to the passport). After the repair, a list of troubleshooting activities is included in the warranty card.

The manufacturer shall indicate in the warranty card the year, month, day of sale, legal address, and telephone number of the company providing warranty repair. No complaints about the quality of the device shall be accepted and no warranty repair shall be carried out without presenting the passport and the warranty card.

During the warranty period specified for the product, repairs are carried out at the owner's expense if the product is not operated in accordance with this operating manual.

This warranty does not cover any malfunctions that might occur as a result:

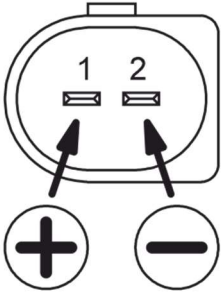
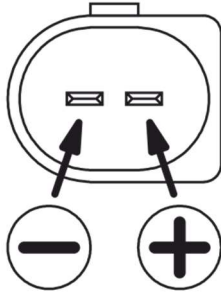
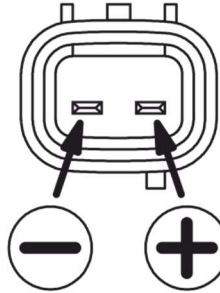
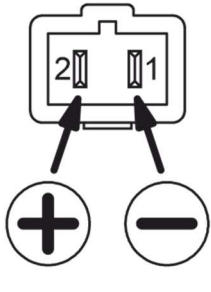
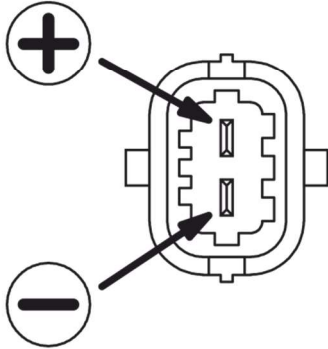
- misuse, negligent use or use for other purposes;
- inept/erroneous actions of personnel during the operation of the device, its maintenance and storage;
- failure to comply with storage and operation rules;
- use of a power supply network whose parameters (voltage, frequency) differ from those specified in the product passport;
- the owner independently changing the design of the product or repairing it anywhere other than the manufacturer;
- independent software changes/upgrades, installation of third-party software.

This warranty also does not cover normal wear and tear of the product; unauthorised repairs; damage to any fragile components of the product; other mechanical damage (chips, cracks, missing connecting screws, parts, assemblies, mechanical disconnection of electrical circuits); and damage caused by:

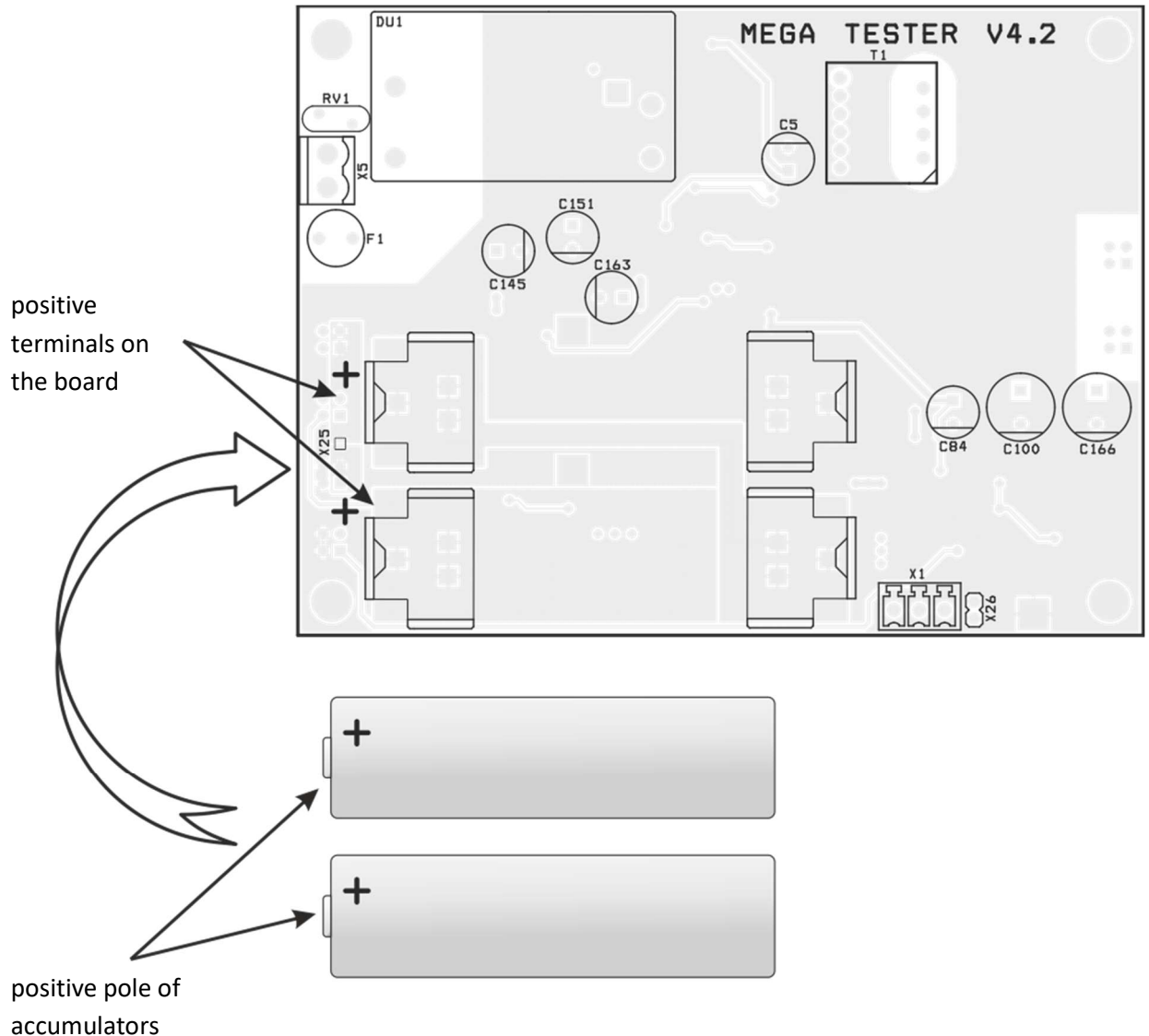
- Liquids, dust, animals or insects getting inside the product;
- exposure to aggressive environments;
- overload;
- power supply failure, inappropriate voltage or frequency;
- force majeure (accident, fire, flood, lightning strike, etc.);
- intentional impact on the device to cause damage by the user or others.

The manufacturer may carry out further repairs to the product after the warranty period has expired under a separate agreement.

Appendix A  
Polarity of common nozzle types.

Continental	BOSCH	DENSO
 <p>Diagram of a Continental nozzle. Two terminals are labeled '1' and '2'. Terminal 1 is connected to a positive (+) terminal, and terminal 2 is connected to a negative (-) terminal.</p>	 <p>Diagram of a BOSCH nozzle. Two terminals are shown. The left terminal is connected to a negative (-) terminal, and the right terminal is connected to a positive (+) terminal.</p>	 <p>Diagram of a DENSO nozzle. Two terminals are shown. The left terminal is connected to a negative (-) terminal, and the right terminal is connected to a positive (+) terminal.</p>
 <p>Diagram of a Continental nozzle. Two terminals are labeled '2' and '1'. Terminal 2 is connected to a positive (+) terminal, and terminal 1 is connected to a negative (-) terminal.</p>	 <p>Diagram of a BOSCH nozzle. Two terminals are shown. The top terminal is connected to a positive (+) terminal, and the bottom terminal is connected to a negative (-) terminal.</p>	

## Annex B Installing batteries.



Remove the top cover of the appliance by removing the six screws on the side walls.

Install the batteries as shown in the figure, observing the polarity (positive pole of the battery to the positive terminal on the device board). Positive terminals are marked with a "+" on the board. The positive pole of batteries is usually also marked with a "+" sign. Like salt or alkaline batteries, the terminals of lithium-ion batteries differ in shape: the positive terminal is convex and the negative terminal is flat. If you are in doubt about the polarity of the battery, use a voltmeter.

**Warning!!! Incorrect connection of the batteries may result in damage to the device.**

Two 3.7 volt 18650 lithium-ion batteries with built-in protection (BMS) can be used to power the device. Do not use other types of batteries!

After installing the batteries, switch on the device, enter the Settings menu by long pressing the "X" button, change the "Power" option from "External" to "Battery". Exit the settings by shortly pressing the "X" button.

Close the appliance lid and tighten the screws.

## Warranty card

Warranty card № \_\_\_\_\_

Device for testing electrical parameters of piezoelectric diesel injectors  
"Mega Tester V4" OS.110 V4.

Warranty repair and maintenance of the "Mega Tester V4" OS.110 V4 is  
carried out by \_\_\_\_\_.

Адреса \_\_\_\_\_

tel. \_\_\_\_\_

fax. \_\_\_\_\_

Date of sale " \_\_\_\_ " \_\_\_\_\_

**Tear-off ticket No. 1**

Address of the organisation that carried out the repair: \_\_\_\_\_  
\_\_\_\_\_

The date of the repair: \_\_\_\_\_

The name of the device: \_\_\_\_\_

Device code: \_\_\_\_\_

Signed by the master: \_\_\_\_\_

The seal of the repair organisation: \_\_\_\_\_  
\_\_\_\_\_

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**Tear-off ticket No. 2**

Address of the organisation that carried out the repair: \_\_\_\_\_  
\_\_\_\_\_

The date of the repair: \_\_\_\_\_

The name of the device: \_\_\_\_\_

Device code: \_\_\_\_\_

Signed by the master: \_\_\_\_\_

The seal of the repair organisation: \_\_\_\_\_  
\_\_\_\_\_

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**Tear-off ticket No. 3**

Address of the organisation that carried out the repair: \_\_\_\_\_  
\_\_\_\_\_

The date of the repair: \_\_\_\_\_

The name of the device: \_\_\_\_\_

Device code: \_\_\_\_\_

Signed by the master: \_\_\_\_\_

The seal of the repair organisation: \_\_\_\_\_  
\_\_\_\_\_

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A fault has been reported: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

A malfunction has been detected: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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A fault has been reported: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

A malfunction has been detected: \_\_\_\_\_

\_\_\_\_\_  
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\_\_\_\_\_  
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A fault has been reported: \_\_\_\_\_

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A malfunction has been detected: \_\_\_\_\_

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