

MULTI-FUNCTIONAL TESTER

Multi-functional measurement device



1. GENERAL INFORMATION

Dear customer,

thank you for choosing our product. In the following, we will show you how to use this device.

Should you encounter any unexpected problems during use, please do not hesitate to contact us.

2. SPECIFICATION

This LCR meter offers a wide range of functions at a low price. The LCR meter can measure capacitance, resistance, and inductance among other things. In addition, it can automatically recognize components, for example, it can distinguish between different types of transistors, such as NPN or PNP transistors. The device is particularly easy to operate, as all measurements are started at the touch of a single button.

Thanks to the integrated about 300 mAh battery, measurements can also be carried out on the road. The battery is charged with the help of a 5V power supply unit (available separately) and the enclosed micro-USB cable. In addition, this measuring device can decode infrared signals and show them as a waveform on the display.

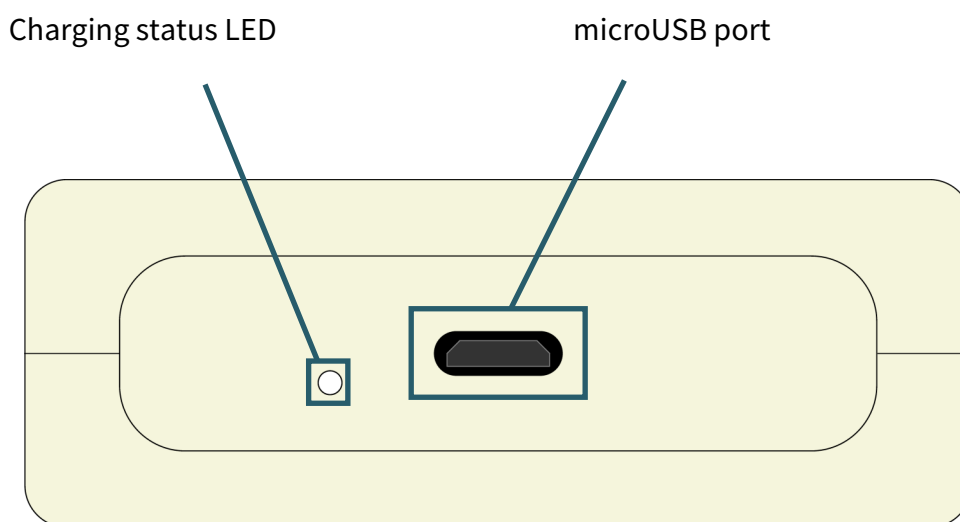
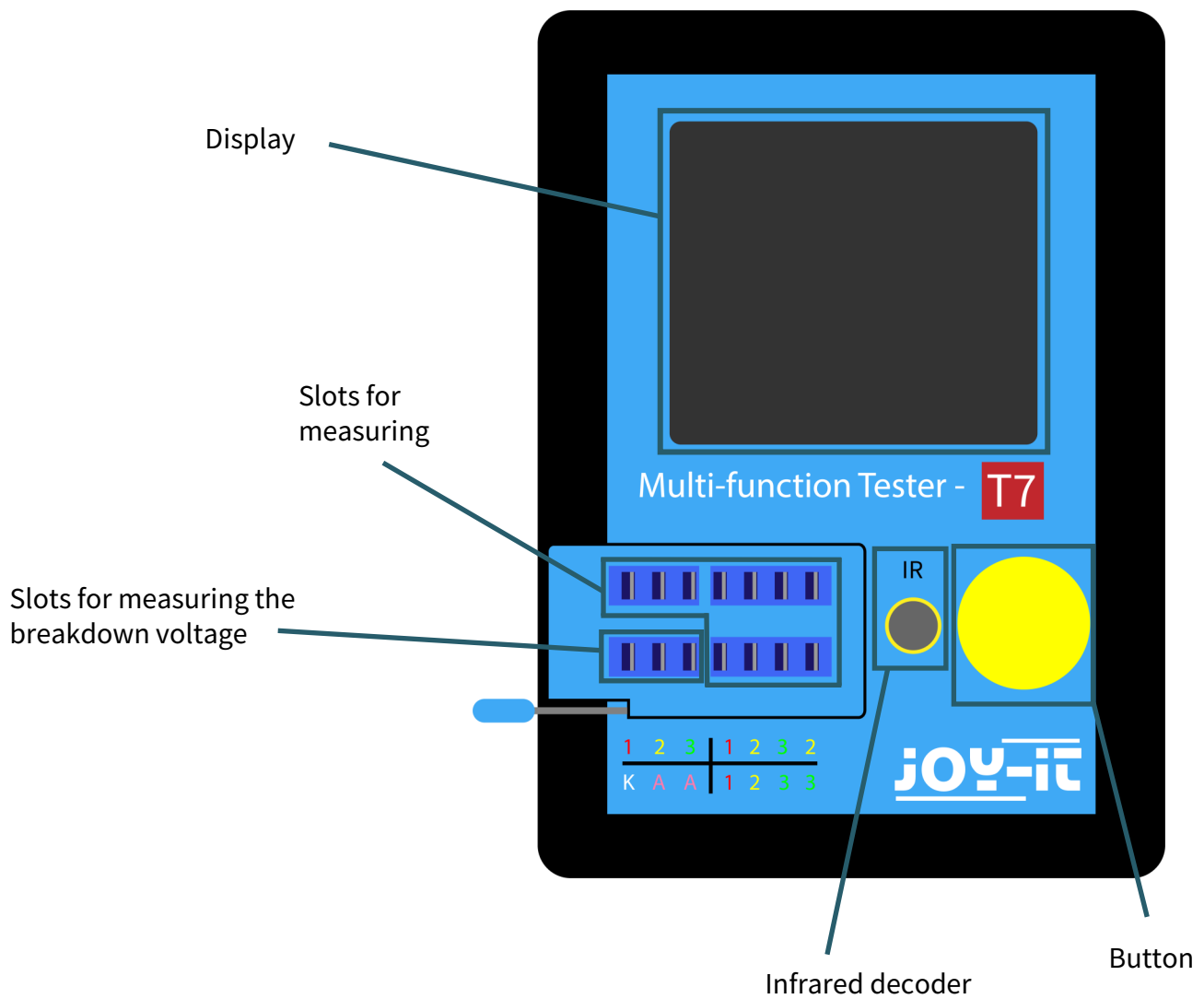
MAIN FEATURES

Measurable components	Resistor, capacitor, inductor, thyristor, triac, (double) diode, Z-diode, field effect transistor, bipolar transistor, infrared decoder
Supported IR-protocol	NEC (used by many manufacturers)
Display type	1.8" TFT LCD (160 x 128 p)
Special features	Automatic calibration, One key operation
Built-in battery	Lithium Ion rechargeable, 3,7 V, about 300 mAh
Size	90 x 70 x 27 mm

MEASURING RANGES

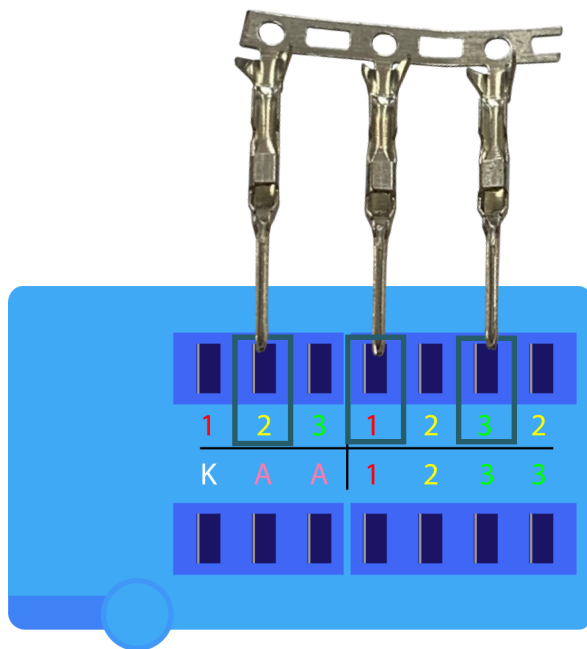
Capacitance	25 pF - 100 mF
Resistance	0,01 Ω - 50 M Ω
Inductance	0,01 mH - 20 H
Battery	0,1 V - 4,5 V
Z-diode breakdown voltage	0,01 V - 30 V
Z-diode	0,01 V - 4,5 V
Diode	$U_F < 4,5$ V
Thyristor / Triac	$I_{GT} < 6$ mA

3. STRUCTURE

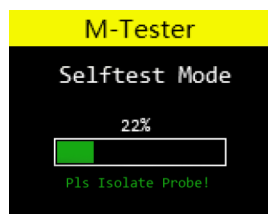
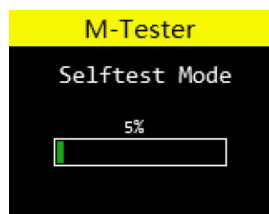


4. INITIAL OPERATION

When you start the measuring device for the first time, you should first perform a self-test of the device. For this purpose, you must short-circuit the slots 1, 2 and 3. You do this as follows:



Now press **Start** to perform the self-test. You will be asked by the device at approx. 22% to remove the component so that the self-test can be completed successfully. Now you can start measuring your components. You start the measuring process with the Start button.



A 3.7 V battery with about 300 mAh is built into the multifunction tester. You can charge it with microUSB and a 5 V power supply. The LED shows the status of the battery. That means it shines red when the battery is charging and green when the battery is fully charged.

The battery of this measuring device is also measured during each component measurement. Therefore, the residual voltage of the battery is also displayed during each measurement. This residual voltage is displayed with $V_{bat} = \dots V$.

The device will also tell you when the battery needs to be charged again.



This device will automatically turn off after 20 seconds of inactivity. You can also turn it off manually, by pressing and holding the Start button. Pressing and holding the Start button for 3 seconds will put the device

5. MEASURING COMPONENTS

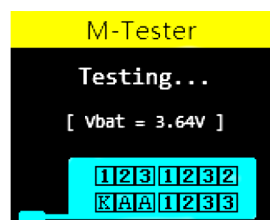
This measuring instrument can detect and measure diodes, Z-diodes, double diodes, resistors, capacitors, inductors, thyristors, triacs, field effect transistors, bipolar transistors, and batteries. In the following, you will find information on how to measure a component and which values can be measured for the specific components.

To measure a component you can use slots 1-3. Just make sure that you do not connect two cables to the same channel, i.e. the same digit. So you have to select any slot at 1, 2, and 3 for three connections. To measure the breakdown voltage, use channels K and A. Connect the positive pin to K and the negative pin to A. You will find further information under Z-Diode.

You can either plug the component directly into the terminals of the device or use the cable clamps provided.



When you have connected your component, press down the lever and start the measurement with the start button.



If no component or a defective component has been connected, or the component has been connected incorrectly, the following message is displayed on the screen.

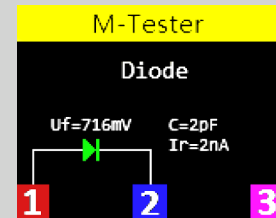


Diode

U_f - forward voltage

C - capacity

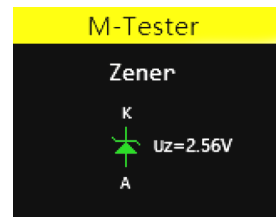
I_r - leakage current



Z-Diode

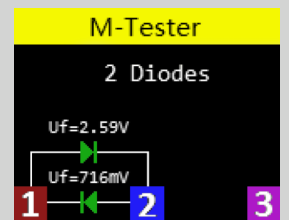
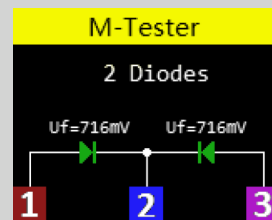
U_z - reverse breakdown voltage / Z-voltage

Here the breakdown voltage of a component is measured, so here the positive line must be connected to K and the negative line to A. Up to 30 V can be measured in the reverse voltage.



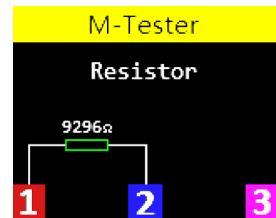
Double diode

U_f - forward voltage



Resistor

Here the resistance in Ω is displayed.



Capacitor

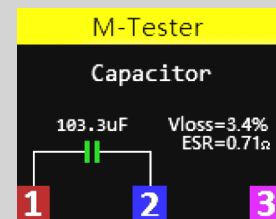
The capacity is displayed here.

V_{loss} - Loss factor

ESR - equivalent series resistance

Attention!

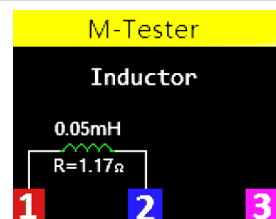
The capacitors must always be discharged before you can test them, otherwise the multifunction tester may be damaged!



Inductor

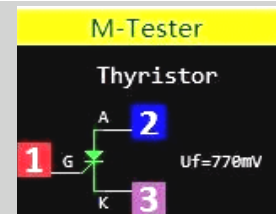
The inductance is displayed here.

R - resistance



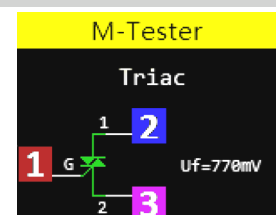
Thyristor

U_f - forward voltage



Triac

U_f - forward voltage



Field effect transistor

V_t - threshold voltage

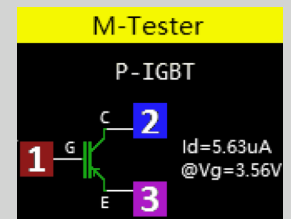
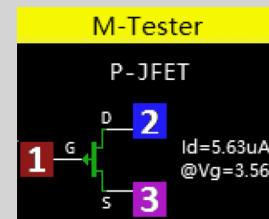
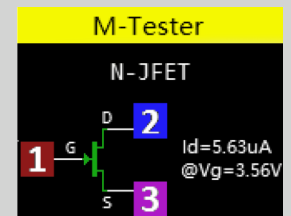
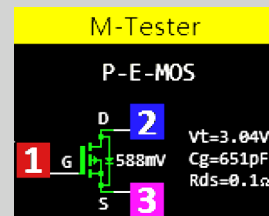
C_g - gate capacity

R_{ds} - drain source resistance

U_f - forward voltage

@V_g - gate voltage

Here the multifunction tester can distinguish between N-E-MOS, P-E-MOS, N-MOS, P-MOS, N-JFET, P-JFET, N-IGBT and P-IGBT.



Bipolar transistor

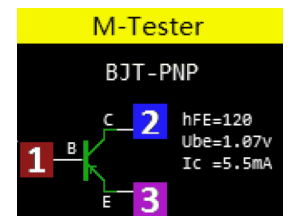
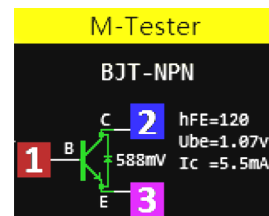
h_{FE} - current amplification factor

U_{be} - base voltage

I_c - collector current

U_f - forward voltage

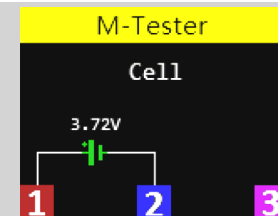
Here the multifunction tester can distinguish between BJT-NPN, BJT-NPN with diode, BJT-PNP and BJT-PNP with diode.



Batteries

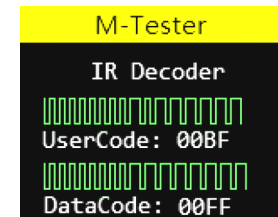
The battery voltage is displayed here.

Attention! The battery must have less than 4.5 V, otherwise the multifunction tester may be damaged!



Infrared-Decoder

The infrared decoder is located next to the start button and does not need to be activated separately. You can simply e.g. activate your infrared remote control in front of the device, which decodes it immediately. You can then see the UserCode and the DataCode in hexadecimal format on the screen. The UserCode is the specific code of the remote control you are using and the DataCode is the code of the button you pressed.



The dot at the top right corner indicates whether it has received infrared data from a remote control. Therefore, red represents that infrared data is being received, blue represents a decoding success. However, **only** the NEC protocol (which is used by many manufacturers) can be decoded. If you transmit an infrared signal that does not correspond to this protocol, only the red dot in the upper right corner of the display lights up to indicate that an infrared signal has been received. This red dot would light up blue for an infrared signal corresponding to the NEC protocol and would be decoded.

6. PROBLEM CASES

With the measurement results, you should never forget that the circuit of the transistor tester is designed for small-signal components. As a rule, the maximum measuring current is about 6mA. With power semiconductors, higher residual currents often cause problems with detection or when measuring the junction capacitance. With thyristors and triacs often the firing currents or the holding currents are not reached. Accordingly, it is possible that a thyristor is detected as an NPN transistor or even as a diode. Likewise, it is possible that a thyristor or triac is not detected at all. There are also problems with the recognition of semiconductors with integrated resistors. Therefore, also the base-emitter diode of a BU508D transistor is not detected because of a parallel connected internal 42Ω resistor. Accordingly, the transistor function cannot be tested. When detecting Darlington transistors with higher power, there are often also problems. Here also often base-emitter resistors are installed, which complicate the detection because of the small measuring currents used here.

7. EXAMPLE COMPONENTS

A capacitor and an LED are included in the scope of delivery; you can use these for initial measurements with your LCR meter to become familiar with the instrument.



8. FURTHER INFORMATION

Our information and redemption obligation according to the Electrical and Electronic Equipment Act (ElektroG)



Symbol on electrical and electronic products :

This crossed-out bin means that electrical and electronic products do not belong into the household waste. You must hand over your old appliance to a registration office. Before you can hand over the old appliance, you must remove used batteries and accumulators which are not enclosed by the device.

Return options :

As the end user, you can hand over with the purchase of a new device your old appliance (which has essentially the same functions as the new one) free of charge for disposal. Small devices which do not have outer dimensions greater than 25 cm can be submitted independently of the purchase of a new product in normal household quantities.

Possibility of restitution at our company location during our opening hours:

Simac GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn

Possibility of restitution nearby :

We send you a parcel stamp with which you can send us your old appliance free of charge. For this possibility, you must contact us via e-mail at service@joy-it.net or via telephone.

Information about packaging:

Please package your old appliance safe during transport. Should you not have a suitable packaging material or you do not want to use your own material, you can contact us and we will send you an appropriate package.

9. SUPPORT

If any questions remain open or problems arise after your purchase, we are available by email, telephone and ticket support system to answer these.

E-Mail: service@joy-it.net

Ticket-System: <http://support.joy-it.net>

Telephone: +49 (0)2845 9360 – 50 (10 - 17 o'clock)

For more information visit our website:

www.joy-it.net