



Tietzsch

User Instructions

MultiSafe DSP 4

Voltage-Continuity Tester



Rudolph Tietzsch GmbH & Co. KG

Willringhauser Straße 18

58256 Ennepetal

Germany

T +49 2333-75989

F +49 2333-75257

info@tietzsch.de

www.tietzsch.de

DSP4_BA_7-09



- 1 Test electrodes
- 2 LV indication (LEDs red) from 50 V / 120 V indication of hazardous voltage 50 - 1000 V AC / 120 - 1500 V DC
- 3 LED „Ω“ (green): lights up during resistance measurements between 0 ... 5999 kΩ (acoustic signal signalizes continuity)
- 4 LED „Pol-L1“ : for phase + rotating field
- 5 Display (LCD)
- 6 Button **HOLD**: function to recording values
- 7 Button Ω/V : change-over switch for resistance and voltage measurements and zero balancing of the kΩ range
- 8 Button ⏻ : switch on/off (manual) and functions test
- 9 Handgear

Symbols on the instrument



Attention! Observe user instructions!



Mark of approval from VDE test authority



Indicates EC conformity



Duration time for voltage testing



WEEE 2002/96 EG:

This devices may not be disposed with the domestic waste.

Please contact service@tietzsch.de regards the return of old devices.

1. Application

The MultiSafe DSP 4 is a two-pole voltage tester with digital display. It complies with DIN EN 61243-3 (VDE 0682 part 401) and is provided with continuity and phase tester, polarity tester and phase sequence indicator. With this device you can determine the existence and the strength of AC and DC voltages within a range of 24 V to 1000 V at frequencies of up to 4 kHz. With the integrated continuity tester you can also measure resistances within a range of 0 to 1999 k Ω . Voltage and resistance values appear in digital format at the LCD. Additionally, 4 LEDs indicate voltage, phase, rotating field as well as one LED and one sound generator continuity. Due to its high protection category IP 65 the MultiSafe can be used in precipitation.

2. Safety Precautions

You have selected an instrument which provides you with a high degree of safety. When used for its intended purpose, safety of the operator, as well as that of the instrument, is assured.

In order to maintain flawless technical safety conditions, and to assure safe use, it is imperative that you read these operating instructions thoroughly and carefully before placing your instrument into service, and that you follow all instructions contained therein.



The instrument provides a high degree of safety by means of two series resistors immediately behind the test electrodes as well as two absolutely independently working test systems.

- LV Anzeige, die auch ohne Batterie vorhandene Spannung durch LEDs sicher anzeigt.
- Digitalanzeige für exakte Prüfwerte.

VDE test authorities have granted the application of the VDE GS-symbol for the MultiSafe DSP 4.

Please observe the following safety precautions:

- The voltages indicated on the MultiSafe DSP 4 are rated voltages. The voltage tester may only be used in systems that are working within this rated voltage range.
- Faultless indication of display values is only guaranteed between -10°C and +55°C.
- Hold the instrument by its handles only to avoid covering the display or touching the test electrodes.

- Just before they are used, voltage testers need to be checked to ensure that they function correctly. Perform the function test and check the instrument at a known voltage source, e.g. a 230 V socket. If the display of one or several systems fails in the course of checking, then the device must not be used again.
- The maximum on-period of the MultiSafe DSP 4 is 2 minutes.
- With determination of phase conductors and phase sequence the perceptibility of the display may be impaired, e.g. when using insulating protective gears, in unfavourable locations, for example on wooden ladders or insulating floor coverings, as well as with unfavourable lighting conditions and in an improperly grounded a.c. voltage system.
- The voltage tester may not be dismantled by unauthorized personnel.
- Voltage testers must be kept dry and clean.

3. Putting into operation

3.1 Battery

Your instrument is already supplied with a 9 V flat cell battery in accordance with IEC 6 F 22 or 6 LR 61. The battery status is indicated by a battery symbol on the LCD (see section 8.1).


Attention!


Please observe chapter 8.1 before initial startup or after your device has been in storage for a long time.

3.2 Testing correct display and function (Self-test)

In accordance to DIN VDE 0105 part 1 voltage testers must be tested if they function correctly just before it is used for determining zero-potential.

Step 1 – Test of the display

Press and hold button . All display segments light up on the LCD, additionally, the Ω LED and POL-LED light up as well as a buzzer sound can be heard.

Release button , the value 0.00 ... 0.02 V is indicated on the display.

Step 2 – Checking the line / function

Afterwards, actuate button Ω/V . OL and M Ω appear on the display. Hold the test electrodes together. The value 000 ... 002 k Ω appears on the display. At the same time, an acoustic signal is generated and the green LED " Ω " lights up. Through this, the overall functions have been tested.

Step 3 – Test of the LV indication

Check the function of the LV indication (50 V LED / 120 V LED) at a known voltage source, e.g. a 230 V socket. At the same time, the determined voltage value is indicated on the LCD.

Attention!

If one of the displays fails during the self-test – even if only partial failure occurs – or if the instrument does not indicate a function standby, the voltage tester may not be placed into operation!

4. Measuring and testing

4.1. General information

The voltage tester switches-on automatically when a voltage of at least 24 V is applied. In order to extend battery life the instrument switches-off automatically approximately 30 seconds after the last measurement.

4.2. Testing voltage and polarity

Attention!

The maximum allowable on-period for voltage testing is 2 minutes.

Note!

Maybe that the voltage tester switches-on automatically even when only one test probe is connected to voltage or to a statically charged object. But this has no significance.

Nominal voltage range 24 ... 1000 V

Securely contact the test probes with the test points. The instrument switches-on automatically at a voltage of at least 24 V. If the function „continuity testing“ had been activated, the device switches automatically to „voltage testing“. The instrument automatically selects the measuring range that corresponds to the applied voltage (see Characteristic Values) and indicates the voltage “V” on the LC-display.

Attention!

The LV indication lights up at a voltage of at least 50 V / 120 V. A hazardous voltage is impressed.

Note!

The display of the LV indication (LEDs) even remains in working order when the battery is empty or when the device is not equipped with a battery. In case only this measurement system is indicating, please observe section 3.2.


Indicating polarity

The type of voltage is symbolized by the symbols ~ and -. Direct voltage: when minus is connected to the test probe designated with „+“ and with display part, then the “-“ leading sign appears. When plus is connected, then no leading sign appears left to the displayed value.

Voltages > 1220 V AC/DC

If a voltage of at least 1220 V AC/DC is applied, an acoustic warning signal is generated and the display value flashes. Alternating voltages of up to 1220 V can be reliably measured. They are identified with „~“ left of the display value. Voltages with frequency of more than 2 kHz are indicated by the flashing Hz symbol. Direct voltage measurements of up to 1500 V can be performed reliably.

Voltages < 24 V

For voltages of less than 24 V the device must be switched on or over with button .

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Voltages < 24 V

For voltages of less than 24 V the device must be switched on or over with button .

4.3 Testing phase and phase sequence

The MultiSafe DSP 4 is equipped with a triangular LED display in order to perform phase and phase sequence tests. These tests can be performed at a nominal voltage of at least 165 V (50 Hz) to earth. Attention! When performing these tests the device must be held closely at the handle bar of the device (see picture below).

Note! You may wear insulating gloves when performing the tests.

Tests can be impaired by unfavourable locations, for example on wooden ladders or insulating floor coverings, as well as in improperly grounded a.c. voltage systems.



4.3.1 Phase test

Determination of the outer conductor occurs by applying the test probe (+L1) to the conductor. When "POL" appears on the LCD and at the same time the triangle in the display field lights up, then conductor is live.

4.3.2 Testing phase sequence

The rotating field between two phases in a grounded 230/400 V 3-phase system (up to max. 690/1200V) is determined by applying both test probes and simultaneously grasping the device parts, the way it is described in the following section:

- Identify unipolar the outer conductors (see section 4.3.1).
- Apply both test probes to two outer conductors (display: approx. 400 V).
- When phase L1 is applied to the test probe with display (+L1) and when L2 is applied to the test probe of the handle, then the triangle lights up in a clockwise rotating field. When the triangle does not light up, the direction of rotating field is counterclockwise.

Note! If 230 V instead of 400 V is displayed, the neutral conductor may have been contacted. A simple control of the test is possible when the test probes are exchanged.

5. "Hold" test results (HOLD)

The maximum voltage value can be „stored“ on the display when keeping pressed button „HOLD“. The value is recorded for approx. 30 seconds or until you press button „HOLD“ again. The Hold-function is stopped when again a voltage is impressed.

Note! When the measured value does not vary for 2 sec, then the maximum value is recorded.

6. Testing resistance and continuity

When the instrument is switched-on, press button „ Ω/V “. „OL“ and „M Ω “ appear on the LCD.

Securely contact the measuring points with the test probes.

Resistance values 0 ...10 k Ω the measured value is indicated on the LCD in „k Ω “.The green LED „ Ω “ lights up at the same time, and an acoustic signal is generated.

Resistance values 10 k Ω ...1,999 M Ω the measured value is indicated on the LC-Display in „k Ω “ or in „M Ω “. The LED „ Ω “ lights up at the same time, and no acoustic signal is generated.

Resistance values > 2 M Ω the display passes to overflow and „OL“ and „M Ω “ appear on the display. The LED does not light up and no acoustic signal is generated.

Function to "hold" measured values (HOLD)

As long as you keep pressed button „HOLD“ you can "record" the latest measured resistance value on the LC-display.

Zero balancing

The zero point in the resistance measuring range can be recalibrated if necessary:

Hold the test electrodes together and press and hold button „ Ω/V “ until „CAL“ appears in the display and the green LED Ω flashes.

When 000 is indicated and the LED Ω lights up continuously, then calibration has been carried out successfully. During this process an acoustic signal is generated.

Note!

During continuity tests, the plus pole of the measuring voltage is located at the test probe designated with +L1. The measuring current has a constant value of 5 μ A for values of 0 ... 10 k Ω ; 1 μ A for 10 ... 1999 k Ω . When in this operating mode a voltage of 24 V or more is impressed, then the device switches automatically to „voltage testing“.

7. Characteristic values

Measurement	Measuring ranges (auto-ranging)	Resolution	Frequency range/ measuring	Intrinsic error
U-	0,10 V ... 8,99 V 9,0 V ... 99,9 V 100 V ... 1500 V	0,01 V 0,1 V 1 V	—	±1,5 % +3 digits
U~ TRMS	1,0 V ... 99,9 V 100 V ... 1200 V	0,1 V 1 V	15 Hz ... 1,8 kHz	±1,5 % +3 digits
U~ ¹⁾	15 V ... 99,9 V 100 V ... 499 V		>1,8 Hz 10 kHz	±15 % +3 digits
	500 V ... 1200 V	>1,8 Hz 4 kHz		
R	0 ... 49 kΩ 50 ... 1999 kΩ	1 kΩ	5 μA 1 μA	±5 % +2digits

¹⁾ effective value; sinus

Nominal voltage range: 24* ... 1000 V AC/1500 V DC
*Auto on from 24 V

Nominal frequency range: 15 Hz ... 10 kHz < 500 V,
15 Hz ... 4 kHz < 500 V

Input resistance: 311 kΩ

Current (Peak value I_p): 3,2 mA at 1000 V

On-period: 2 minutes

Display: 5 LEDs for voltage,
continuity, phase and
phase sequence
LCD digital display
7-segment-figure,
2 lines
0 ... 1999 digit
background lightning
3 measurement/s

Power supply: 9 V block battery
IEC 6F22 zinc-carbon or
IEC 6LR61 alkaline
manganese or corre
sponding accumulator,
multi-stage display
of battery status

Surge voltage category: CAT IV

Impulse withstand voltage: >12 kV (1,2/50 μs)

Test voltage: 6 kV

EMV-requirements: DIN-EN 61326

Operating temperature: -10...+55°C

Casing: impact resistant,
dustproof plastic casing
with unbreakable display
cover

Protection category: IP 65

Interconnection line: rubber-insulated flexible
cable H07RNF, 1m

Dimensions: test probe with display

part 240 x 62 x 39 mm

Weighth: 270 g (incl. battery)

8. Battery

8.1. Battery indication

The latest battery status is symbolised by a three-stage battery indicator.



= filled battery



= half-empty battery
(still many measurements possible)



= flat battery
The background lightning switches-off automatically, depending on type of battery you still can perform at least 30-100 measurements.

Attention!

When the flat battery symbol flashes, then no more measurements can be performed and the battery has to be replaced immediately.

The device requires a 9 V block battery IEC 6 F22 (zinc-carbon) or IEC 6 LR61 (alkaline manganese).

8.2 Replacing the battery

Loosen the screw at the back of the instrument which secures the battery compartment lid, and remove the lid.

Let the battery drop out of the battery compartment with its CAT IV protection cover and exchange it.

Therefore, snap the battery contacts onto the 9 V flat cell battery and insert the battery together with the CAT IV protection cover into the battery compartment. Put the lid back on the battery compartment and screw it tight.

Regularly make sure that the battery of your device does not leak. In case it does, you have to replace the electrolyte completely and insert a new battery. In case of a long storage period take the battery out of the device.

9. Maintenance

The Prüfball is absolutely maintenance-free. Nevertheless, observe the following information in order to maintain safe operation:

Always keep the voltage tester dry and clean. The housing can be cleaned with a cloth dampened with alcohol (isopropyl) or soapy water.

10. Repair

Repair is only allowed by the manufacturer or explicitly authorised repair shops.

In case of damages on the device or failure of the function test according to section 3.2 or for detailed inspection/calibration, please contact:

service@tietzsch.de or send the device and a description of failure back to the manufacturer (address see page 1).

11. Accessories

Extensions/Adapter:

Only screwable or attachable extensions/adapters DSP-S that are provided by the manufacturer may be used. To use securely compact screwable extensions both test probes of the MultiSafe DSP must be provided with thread.

Extensions/adapters may only to be used, when mounted on the voltage tester. They need to be attached/screwed completely and securely to the DSP.

Perform the function test with mounted extensions (see section 3.2) before starting voltage testing.

The device with extensions has to be clean and dry before start voltage testing.

Further information are available at www.tietzsch.de

