



User Instructions

VarioSafe EXM 25






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EXM_BA_12-10



- 1 Test electrodes of voltage measuring line (red conductor + /black conductor -)
- 2 Button DATA-HOLD
- 3 LED Ω (green): 0 ... 10 k Ω
- 4 LED Volt (red): 12 - 1000 V
- 5 LCD display
- 6 \perp -socket, black standard socket
- 7 7-pin universal connector for voltage measuring lines, temperature transmitter, clamp-on ammeter and power supply unit
- 8 Ω -socket, red standard socket for resistance measurements
- 9 A-socket, blue standard socket fuse socket for current measurements

Symbols on the instrument

-  Attention! Observe user instructions!
-  Ex marking:
Approved for potentially explosive atmospheres in accordance with ATEX (EN 60079-0 and EN 60079-11) see section 5.1
-  EC-conformity

1. Application

The VarioSafe EXM 25 is an intrinsically safe multimeter which can be used in areas with a potentially explosive atmosphere in accordance with ATEX (EN 60079-0 and EN 60079-11) and EN/IEC 61010 for voltage, resistance, current, frequency measurements with measurement accessories for measurement of temperature and high current.

2. Safety Precautions

When used for its intended purpose, safety of the operator, as well as that of the instrument, is assured. The voltage measurement tips contain moulded multipliers within both test prods. They are extremely safe and comply with overvoltage category CAT IV. 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 device may only be used in the designated Ex zones (section 5.1) and inside of the safety-related limit values (section 5.2).
- ▶ Before starting resistance measurements make sure that the test object is at zero-potential.
- ▶ Perform zero-potential tests at most up to the following voltages:
Ex-class II up to 690 V, Ex-class I up to 1000 V and with measurement tip 72011 up to 2000V.
- ▶ Before putting into operation for the first time and at every day of use the VarioSafe EXM 25 has to be checked at a known voltage source - e.g. a 230 V socket to ensure that it works properly and faultlessly (see display test and self test). If indication of one or several systems fail in the course of performing the self test according to section 3, if function standby is not indicated or if the device is damaged, the VarioSafe EXM 25 must not be used again.
- ▶ Maintenance is only allowed by the manufacturer or explicitly authorised repair shops (see section 7).
- ▶ The measurement tips with extended (12 mm) not insulated test electrodes are designed for use at untouchable machinery materials. You may use the extensions in EX-areas only when an unintentional connection between conductive parts (e.g. by short-circuit between test electrodes) can definitely be excluded.

3. Putting into operation

3.1 Battery

Your instrument is already supplied with an energy block. Solely use the following energy blocks:

NiMH accumulator for class I and II T4:
type EXM 72025 (rechargeable)

Lithium battery for class I and II T6:
type EXM 72026 Li/T6

Attention!

Please observe section 6 before initial startup or after your device has been in storage for a long period of time.

3.2 Testing display and function

At every day of use the VarioSafe EXM 25 has to be checked to ensure that it works properly and faultlessly.

Self test 1 (Display test):

Press and hold button „ON/OFF“. All display segments light up on the display, additionally the V-LED and the Ω -LED light up. When you release button „ON/OFF“, the value 000 ... 001 V is indicated on the display.

Self test 2 (Voltage measuring line):

Connect and lock the voltage measurement tips type 72010/11 to the 7-pin universal connector. Switch-on the device. Display: 000..001 V, in the upper display line 1000 or 2000V. Put the test electrodes, one after another, inclined 5 mm into the W-socket.

Display shows 'Test' and 'rdy' and green LED lights up.

Note! In case the display continues showing 000 V the measurement tip is damaged, please exchange.

Self test 3 (Voltage indication):

Check functions at a known voltage source - e.g. a 230 V socket.

Self test 4 (Resistance measurement):

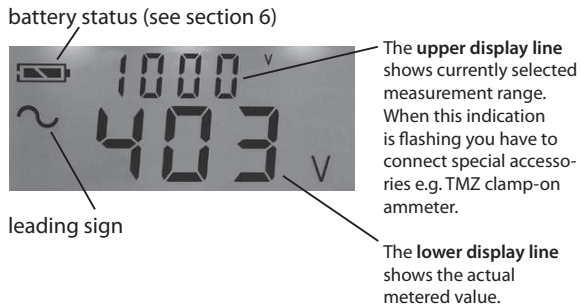
Put the standard test lines into the Ω - and \perp -socket. Adjust the device to Ω , display: OL k Ω , hold test prods together, display indication needs to be about 0.0 Ω and the green LED needs to light up.

Attention!

If indication of one or several systems fail in the course of performing the self test, if function standby is not indicated or if the device is damaged, the VarioSafe must not be used again.

4. Measuring and testing

4.1. General information



The instrument is switched off automatically approximately 60 seconds after the last measurement in order to extend battery life. In the display the indication „off“ appears (exception: see frequency measurements). The backlight turns off when no measurement result is applied or when the battery is low.



With the ON/OFF button engaging the VarioSafe EXM 25 to voltage, call the display test and switch-off the device.



With the function button you can select the designated measurement range:

Function	upper display line
Voltage with tip EXM 72010	1000 V
Voltage with tip EXM 72011	2000 V
Voltage, automatic range mV, V	AuTo
resistance	Ω
current	I
current with clamp-on ammeter	I flashes*
frequency	FrE
temperature with TMZ	T flashes*

* When the measurement ranges are indicated by a flashing symbol the connection of special accessories is necessary, e.g. a clamp-on ammeter or the temperature transmitter

4.2 Testing voltage and polarity

Attention!

Connect the voltage measurement tips to the 7-pin universal connector only when the device is switched-off. Switch-on the device not until they are locked and select rang if necessary.

Note!

If Hold appears permanently, probably the 7 kV tip has been attached when the device was switched-on. Put both test prods with safe contact onto the metering point and the voltage value is indicated in the lower display line. At a voltage of 12 V flashes the red LED and button functions are locked.

Note!

Because of integrated multipliers the device indicates few mV while in open-circuit operation, this has no influence on the result of measurement.

1000 / 2000 V voltage range (1000 V) / (2000 V)

The voltage range adjusts automatically to the used DATA-HOLD measurement tip type 72010 or 72011. The measurement range serves for a fast detection of measurement values between 0 – 1000 / 2000 V without decimal places.

The display range of the VarioSafe EXM 25 extends to 1150 V AC / 1600 V DC with 72010 and 2 kV with 72011. Observe the safety precautions (see section 2) for Ex-areas.

Indication of polarity

Type of voltage is indicated by the symbols ~ and -. Direct voltage: is minus applied to the test prod with Hold button, the leading sign „-“ appears, is plus applied no leading sign appears in front of the indicated value.

HOLD function

The maximum voltage value can be „stored“ on the display when activated the 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.

Automatic voltage range (AuTo)

The voltage range adjusts automatically to the used voltage measurement tip type 72010 or 72011.

The measurement range serves for a fast detection of measurement values between 1 mV – 1000 / 2000 V, the optimal measurement range is selected automatically.

4.3 Resistance measurements (Ω)

Before taking any resistance measurements always check that the test object is at zero-potential.

Connect 4 mm standard test lines to the Ω - and \perp -socket. Adjust the device to Ω . Ohm is indicated in the upper display line.

Note!

The arrow signalizes „out of measurement range“.

The measurement range serves for a definite determination of impedances of 0,1 Ω – 20 M Ω .

A selection between Ω -, k Ω - and M Ω ranges occurs automatically after applying to the impedance.

The green LED signalises resistance values that a lower than 10 k Ω .

4.4 Current measurement (I)

Attention!

You may perform current measurement in Ex-areas only in measuring circuits with peak values of maximum 50 V.

You may only measure currents up to maximum 2 A.

Connect 4 mm standard test lines to the A- and \perp -socket.

The measurement range serves for measuring AC/DC currents in the range of 1 mA – 2 A.

A selection between mA and A occurs automatically after attaching the test prods.

The moulded fuse activates with currents of more than 2 A.

The fuse can only be changed by the manufacturer (Service section 7).

4.5 Current measurement with clamp-on ammeter MZ 1005 (flashes)

Measurements with MZ 1005 are only permissible in Ex I-areas.

Please observe the separate user instructions of the clamp-on ammeter MZ 1005. Connect the MZ 1005 to the 7-pin universal connector.

Within the clamp-on ammeter range you can measure AC/DC currents between 0,1 and 1000 A, the optimal measurement range is selected automatically.

4.6 Frequency measurements (FrE)

Connect the voltage measurement tip type 72010 to the 7-pin universal connector.

The measurement range serves for measurements of frequencies in the range of 0,1 Hz – 10 kHz with voltages > 5 V. A selection between Hz and kHz occurs automatically after attaching the test prods.

Note!

While the device is in open-circuit operation the display may show 0,00 Hz/kHz ± 1 digit.

With low frequencies the measurement signal needs to be placed for a few seconds before it indicates a reliable value.

The automatic shut-down can be deactivated by interfering signals, e.g. because of low frequencies with attached measurement tips.

4.7 Temperature measurements with TMZ 25 (T flashes)

Measurements with the intrinsically safe TMZ 25 and a Fe-CuNi-sensor are only permissible in Ex I- and Ex II-areas. Connect the TMZ 25 to the 7-pin universal connector and plug temperature sensor on the TMZ until it's caught.

With the TMZ 25 you can measure temperatures between – 80 and + 600 °C. The optimal measurement range is selected automatically.

Note!

With the universal sensor indication on the display is first readable after approx. 30 s, with surface sensors after approx. 10 s. Special sensors can be delivered.

5. Characteristic Values:

5.1 Identification marking / Ex zones

EC-Type Examination Certificate

DMT 03 ATEX E 013

II 2G Ex ib IIC T4/T6

I M2 Ex ib I

5.2 Safety-related limit values

Intrinsically electric circuits

Voltage (by 50 V tip) 2 A

Internal inductance Li < 5 μ H

Voltage with measurement tips:

Type EXM 72010, 72011, 72012

Class IIC AC/DC \leq 690 V with tip 72010

Class IIB AC/DC \leq 690 V with tip 72010

Class I AC/DC \leq 1000 V with tip 72010

Class I AC/DC \leq 2000 V with tip 72011

Resistance ranges maximum values in case of fault:

Voltage 3,6 V

Current 4 mA

Maximum permissible external
capacitance/inductance:

Class IIC 200 mF/1000mH

Class IIB 3000 mF/1000mH

Class I 3000 mF/1000mH

Frequency 2 up to 10 kHz

Current (up to 50 V_{peak}) 2 A
internal inductance Li < 5 μ H

Energie source (moulded design):

NiMH accumulator

Type EXM 72025/T4

Nominal voltage DC 8,4 V

Maximum voltage U₀ 11,2 V

Temperature range T4

Lithium battery

Type EXM 72026 Li/T6

Nominal voltage DC 3,6 V

Maximum voltage U₀ 3,9 V

Temperature range T6

Temperature with TMZ 25:

-80°C <TA< +600°C

Curent with clamp-on ammeter type MZ 1005:

(solely for class I)

AC/DC 1000 A

Frequency up to 500 Hz

5.3 Technical data

Measurement ranges	Resolution	Limiting deviation at +10...30°C
automatic range connection		
On/Off-button / Display test		
1000 V AC/DC with 72010, fixed range 2000 V AC/DC with 72011, fixed range	1 V	±1% +2 digit ±2,5% +5 digit
Function taster		
Auto-range (solely 72010/11) AC 10, 100, 1000 V (1150 V) TRMS up to 500 Hz DC 1, 10, 100, 1000 V (1600 V)	0,01 ... 1 V 0,001 ... 1 V	AC ±1% +2 digit DC ±0,5% +2 digit
200, 2000 Ω (diode test) 20, 200 kΩ, 2 MΩ 20 MΩ	0,1... 1000 Ω 10k Ω	±1% +5 digit± 5% +10 digit
AC/DC 1000 mA, 2 A	1 ... 10 mA	±1% +2 digit
(solely with clamp-on ammeter) AC/DC 100, 1000 A	0,1 ... 1 A	±1,5% +2 / 3digit
200, 2000 Hz, 10 kHz, with voltage measurement tip 72010	0,1 ... 1 Hz 0,01 kHz	±1% +2 digit± 3% +2 digit
(solely with TMZ) 150 °C 600 °C	0,1 °C 1 °C	±1,5% +3 digit± 1,5% +2 digit
Function returns to the 1000 V (2000 V) -range, see above		

Digital display:

Type	7-segment-figures, 2 lines, backlight
Display range	0 ... 1999 digit
Bleeder indication	„OL“ indicated

Electromagnetic compatibility

EMV requirements	DIN-EN 61326
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Ambient conditions

Operating temperature	-10 ... + 40°C
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Mechanical construction

Casing	impact resistant antistatic plastic housing ($R < 10^9 \Omega$) with unbreakable display cover
Protection category	IP 54
Circuit points	3 standard jacks, thereof 1 fuse socket 7-pin universal connector
Weights	approx. 350 g (incl. battery)

6. Maintenance

The EXM is completely maintenance-free except for its own energy source (see section 6.1). Nevertheless, for safe operation observe the following information:
The VarioSafe is to be stored in a dry place.
The plastic housing can be cleaned with a cloth dampened with alcohol (isopropyl) or soapy water.

6.1 Battery status

The latest status of the battery or the accumulator is symbolised by a 3 stage battery symbol in the display.



= battery full



= battery half-full.
Many measurements still
can be performed.



= batterie empty.
The backlight deactivates
automatically.

Attention!

When the empty battery symbol flashes, taking measurements is not possible any longer. The battery needs to be exchanged or the accumulator recharged immediately.

6.2 Change battery

The change of battery is possible in Ex-areas.
Solely use the following energy blocks:

Lithium battery for class I and II T6:

type EXM 72026 Li/T6

NiMH accumulator for class I and II T4:

type EXM 72025/ T4 (rechargeable)

6.3 Recharge battery

Attention!

Recharge accumulators outside of Ex-areas.

Recharging occurs with the power supply unit NG4 without removing the accumulator from the EXM:

The NG4 is connected with the 7-pin universal connector of the EXM and put into the 230 V/50 Hz socket. Charging normally takes 14 hours.

Note!

Accumulators were only shortly charged by the manufacturer, so that it's necessary to perform a charging (approx. 24 hours) before initial startup. This applies as well to longer periods of storage (more than 6 months). Full capacitance of NiMH accumulators is first reached after 2 - 3 cycles of charging and discharging.

For preservation of full capacitance the accumulators should not be recharged until they are empty (BAT symbol = maximum half box). The accumulator suffers damages with frequent supercharging.

6.4 Storage

The VarioSafe is to be stored in a dry place in temperatures of -20°C to +80°C. If the unit is to be stored for a lengthy period of time the battery should be removed and the unit packed in dust-tight packing.

7. Repair

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

In case of damages at the VarioSafe EXM 25, in case of failure of the function test according to section 3.2 or for a detailed inspection and calibration please contact:

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

8. Accessories / Spares

Leather bag EXMLED:

The case for the EXM and the test cables is designed in such a way that the unit does not have to be taken out for measurements.

Using the additional lugs and push-buttons on the shoulder strap and case the unit can be secured in a comfortable position to facilitate readings.



Clamp-on ammeter MZ 1005

Clamp-on ammeter for current measurements of 0,1 – 1000 A in Ex – I areas.

Power supply unit NG64 for charging the accumulator

NiMH accumulator AK72025/T4

Lithium battery LB 72026Li/T6

Temperature transmitter TMZ 25

For temperature measurements between – 80 and + 600 °C in Ex-I and Ex-II areas with universal sensor EXMTFU or surface sensor EXMTFO

Voltage measurement tips

SPA up to 690 V Ex II and 1000 V Ex I:
voltage measurement tips with DATA-HOLD button
EXM 72010 standard with short test electrodes
EXM 72010-L with large test electrodes *

SPA HS2 up to 2000 V Ex I:
EXM 72011* HS- voltage measurement tips 2 kV

*Attention!

Please observe the particular security advice (see section 2) for extended measurement tips (12 mm) with not insulated test electrodes.

Quick user guide VarioSafe EXM 25



This quick user guide serves für a quick start. In regard of your own safety please observe safety-related Ex-characteristic values and for further information the detailed user instructions.

1 Attach tips or accessories



Voltage

Ex-Group
 IIC ≤ 690 V
 IIB ≤ 690 V
 I ≤ 1000 V
 Temperature with TMZ
 Current with MZ

Resistance

0,1Ω - 20 MΩ

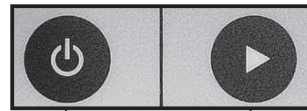
Attention: At first check voltage-free parts!

Current

1 mA - 2 A

Attention: Up to max. 50 V only!

2 Switching-on and self-test



On/Off/test

Select function

3 Select range/function

Function	upper display line
Voltage with tip EXM 72010	1000 V
Voltage with tip EXM 72011	2000 V
Voltage, automatic range mV / V	AuTo
resistance	Ω
current	I
current with clamp-on ammeter	I flashes*
frequency	FrE
temperature with TMZ	T flashes*

battery status



leading sign

The upper display line shows currently selected measurement range.

The lower display line shows the actual metered value.

*When the measurement ranges are indicated by a flashing symbol the connection of special accessories is necessary, e.g. clamp-on ammeter or temperature transmitter.