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ISOMETER® isoUG425

Insulation monitoring device for unearthed DC systems (IT systems) up to 120 V

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Device features

- Monitoring of asymmetrical insulation resistances for unearthed DC systems
- Measurement of the system voltage (r.m.s. and DC) with undervoltage and overvoltage detection
- Measurement of the system DC voltages to earth (L+/PE and L-/PE)
- Configurable adaptation to the system leakage capacitance up to 5 µF
- Selectable start-up delay, response delay and delay on release
- Two separately adjustable response value ranges of 1…100 kΩ (Alarm 1, Alarm 2)
- Alarm signalling via LEDs (AL1, AL2), a display and alarm relays (K1, K2)
- N/C operation or N/O operation of the relays selectable
- Measured value indication via multi-functional LCD
- Fault memory can be activated
- RS-485 (galvanically isolated) including the following protocols:
  - BMS interface (Bender measuring device interface) for data exchange with other Bender components
  - Modbus RTU
  - IsoData (for continuous data output)
- Password protection to prevent unauthorised parameter changes

Approvals and certifications

CE

Product description

The ISOMETER® monitors the asymmetrical insulation resistance of unearthed DC systems (IT systems) with nominal voltages of DC 12…120 V. The maximum permissible system leakage capacitance C_e is 50 µF.

Application

- Simple battery systems
- Conveniently sized DC control voltage systems
- DC lamp circuits

Function

The ISOMETER® measures, from a minimum DC voltage, the asymmetrical insulation resistance R_F between the system to be monitored (L+, L-) and earth (PE). The r.m.s value and the DC value of the system voltage U_n between L+ and L- as well as the DC voltages between L+ and earth (U_{L+e}) and between L- and earth (U_{L-e}) are also measured.

It is possible to assign the detected fault or the faulty conductor to an alarm relay via the menu. If the values R_F or U_n violate the response values activated in the "AL" menu, this will be indicated by the LEDs and relays K1 and K2 according to the alarm assignment set in the "out" menu. In addition, the operation of the relay (n.c./n.o.) can be set and the fault memory "M", activated.

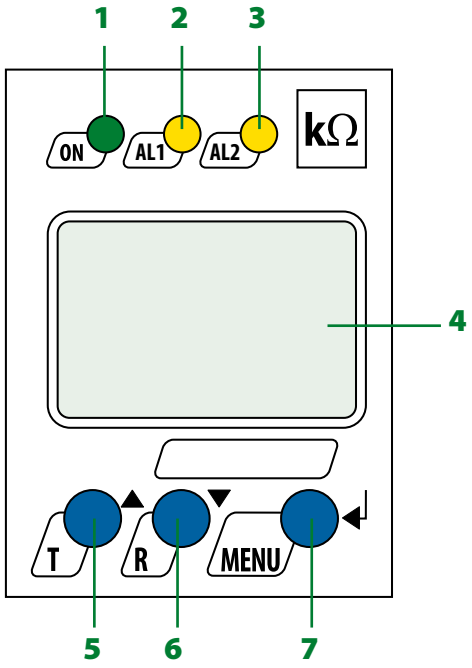
If the values R_F or U_n do not violate their release value (response value plus hysteresis) for the period t_{off} without interruption, the alarm relays will switch back to their initial position and the alarm LEDs AL1/AL2 go out. If the fault memory is activated, the alarm relays remain in alarm state and the LEDs stay lit until the reset button "R" is pressed or the supply voltage is interrupted.

The device function can be tested using the test button "T". Parameters are assigned to the device via the LCD and the control buttons on the front panel; this function can be password-protected. Parameterisation is also possible via the BMS bus, for example by using a BMS Ethernet gateway (COM460IP) or the Modbus RTU.

Standards

The isoUG425 is not an insulation monitoring device as described in IEC 61557-8/ EN 61557-8. It records insulation faults that cause an asymmetry to PE in the IT system. Symmetrical insulation fault cannot be recorded.

Operating elements



1 - Operation LED "ON" flashes in case of interruption of the connecting wires E/KE or L+/L- or system fault.

2 - Alarm LED "AL1" lights when the values fall below the set response value Alarm 1 and flashes in case of interruption of the connecting wires E/KE or L+/L-, in the case of system faults as well as overvoltage (can be activated).

3 - Alarm LED "AL2" lights when the values fall below the set response value Alarm 2 and flashes in case of interruption of the connecting wires E/KE or L+/L-, in the case of system faults as well as undervoltage (can be activated).

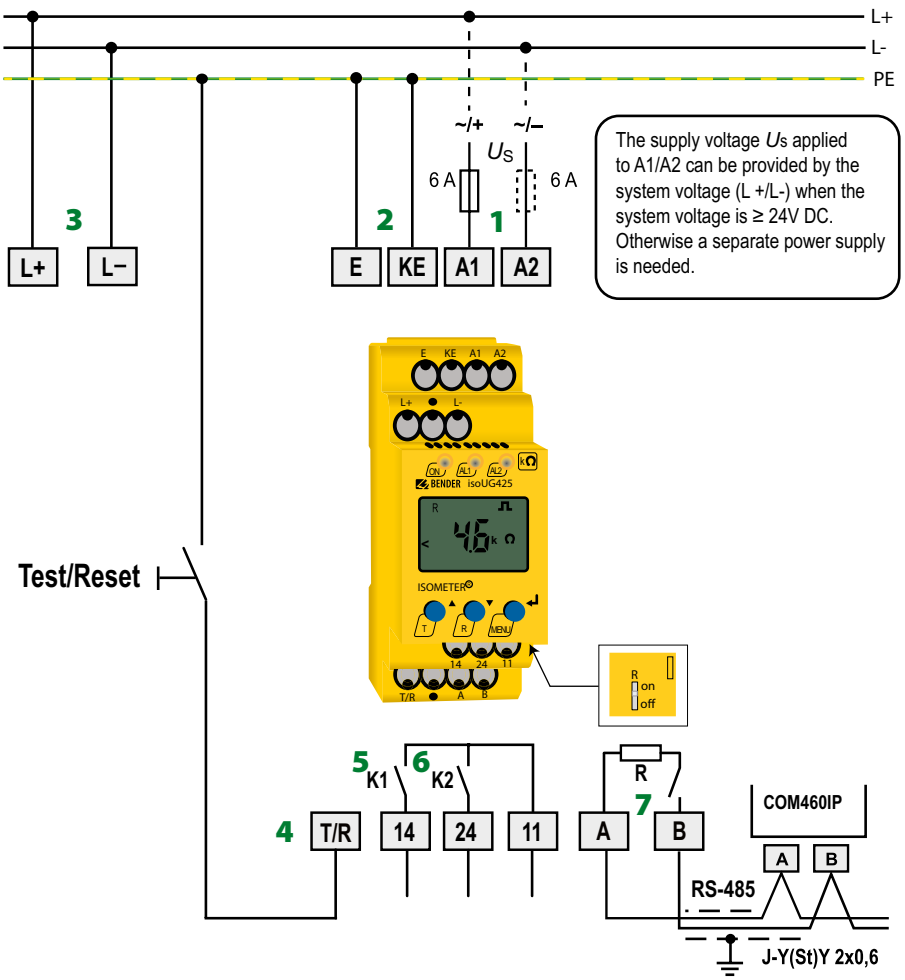
4 - LC display

5 - Test button "T": Call up self test
Arrow-up button: Change parameters, move upwards in the menu

6 - Reset button "R": Delete stored alarms
Arrow-down button: Change parameters, move downwards in the menu

7 - Menu button "MENU": Call up menu system
Enter button: Confirm parameter changes

Wiring diagram



1 - Connection to the supply voltage via fuse (line protection).
If being supplied from an IT system, both lines have to be protected by a fuse

2 - Connect each terminal separately to PE: The same wire cross section as for A1, A2 is to be used

3 - Connection to the DC system to be monitored

4 - Connection for the external combined test and reset button

5 - Connection to alarm relay K1

6 - Connection to alarm relay K2

7 - RS-485 communication interface with connectable terminating resistance

8 - Example: Connection of a BMS-Ethernet gateway COM460IP

Technical data

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated insulation voltage (A1, A2) - (11, 14, 24)	250 V
Rated impulse withstand voltage	4 kV
Rated insulation voltage (L+, L-, E, KE, T/R, A, B)	400 V
Rated impulse withstand voltage	6 kV
Overvoltage category	III
Pollution degree	3
Protective separation (reinforced insulation) between	(A1, A2) - (L+, L-, E, KE, T/R, A, B) - (11, 14, 24)
Voltage tests acc. to IEC 61010-1	2.2 kV

Supply voltage

Supply voltage U_S	AC 100…240 V/DC 24…240 V
Tolerance of U_S	-30…+15 %
Frequency range U_S	47…63 Hz
Power consumption	≤ 3 W, ≤ 9 VA

IT system being monitored

Nominal system voltage U_n	DC 12…120 V
Tolerance of U_n	+20 %

Measuring circuit

Internal resistance R_i	≥ 115 kΩ
Permissible system leakage capacitance C_e	≤ 50 µF

Response values

Response value R_{an1}	2…100 kΩ (50 kΩ)*
Response value R_{an2}	1…95 kΩ (25 kΩ)*
Relative uncertainty R_{an}	±15 %, at least ±2 kΩ
Hysteresis R_{an}	25 %, at least 1 kΩ
Undervoltage detection U_{DC}	8…143 V (off)*
Overvoltage detection U_{DC}	8.1…144 V (off)*
Relative uncertainty U_{DC}	±5 %, at least ±0.5 V
Hysteresis U_{DC}	5 %, at least 1 V

Time response

Response time t_{an} at R_F = 0.5 x R_{an} and C_e=1 µF acc. to IEC 61557-8	≤ 1 s
Start-up delay t	0…10 s (0 s)*
Response delay t_{on}	0…99 s (0 s)*
Delay on release t_{off}	0…99 s (0 s)*

Displays, memory

Display	LC display, multifunctional, not illuminated
Display range measured value insulation resistance (R_F)	1 kΩ…1 MΩ
Operating uncertainty	±15 %, at least ±2 kΩ
Display range measured value nominal system voltage (U_n)	0…150 V
Operating uncertainty U_{DC}	±5 %, at least ±0.5 V
Operating uncertainty U_{RMS}	±5 %, at least ±1.5 V
Password	off/0…999 (0, off)*
Fault memory alarm messages	on/(off)*

Interface

Interface/protocol	RS-485/BMS, Modbus RTU, isoData
Baud rate	BMS (9.6 kbit/s), Modbus RTU (selectable), isoData (115.2 kbits/s)
Cable length (9.6 kbits/s)	≤ 1200 m
Cable: twisted pair, one end of shield connected to PE	recommended: min. J-Y(St)Y 2x0.6
Terminating resistor	120 Ω (0.25 W), internal, can be connected
Device address, BMS bus, Modbus RTU	3…90 (3)*

Switching elements

Switching elements	2 x 1 N/O contact, common terminal 11				
Operating principle	N/C operation or N/O operation (N/C operation)*				
Electrical endurance in rated operating conditions	10 000 cycles				
Contact data acc. to IEC 60947-5-1:					
Utilisation category	AC-12	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	24 V	110 V	220 V
Rated operational current	5 A	2 A	1 A	0.2 A	0.1 A
Minimum contact rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	IEC 61326-2-4
Ambient temperatures:	
Operation	-40…+70 °C
Transport	-40…+80 °C
Storage	-40…+70 °C
Classification of climatic conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K7 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K4 (except condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K5 (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-term storage (IEC 60721-3-1)	1M3

Connection

Connection type	push-wire terminal
Nominal current	≤ 10 A
Conductor sizes	AWG 24-14
Stripping length	10 mm
Connection properties:	
Rigid/flexible	0.2…2.5 mm²
Flexible with ferrule with/without plastic sleeve	0.25…2.5 mm²
Multiple conductor, flexible with TWIN ferrule with plastic sleeve	0.5…1.5 mm²
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Mounting	cooling slots must be ventilated vertically
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Enclosure material	polycarbonate
Quick DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Weight	≤ 150 g

Ordering information

Supply voltage [1] U_S		Nominal voltage U_n	System leakage capacitance	Type	Art. No.
AC	DC	DC			
100…240 V, 47…63 Hz	24…240 V	12…120 V	≤ 50 µF	isoUG425-D4-4	B 7103 6320

Device version with screw terminals on request.
[1] Absolute values

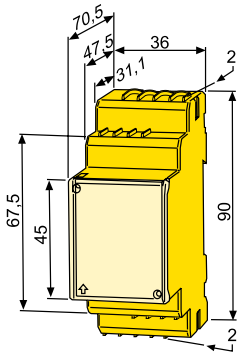
Accessories

Description	Art. No.
Mounting clip for screw mounting (1 piece per device)	B 9806 0008

Dimension diagram XM420

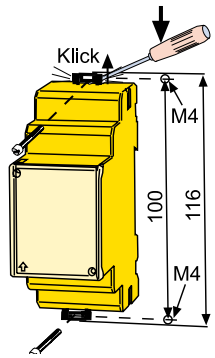
Dimensions in mm

Open the front plate cover in direction of arrow!



Screw mounting

Note: The upper mounting clip must be ordered separately (see accessories).



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