

AC/DC

MED

ISOMETER[®] isoMED427x-(PT)

Insulation monitoring device for medical applications





Device features

- Insulation monitoring for medical IT systems
- Adjustable response value for insulation monitoring
- Locating current injector for insulation fault location systems
- Load and temperature monitoring for IT system transformers
- Adjustable load current response value
- Temperature monitoring with PTC thermistor or bimetal switch
- Self monitoring with automatic alarm
- PE connection monitoring
- Internal/external test button
- LEDs: Power On, Alarm 1, Alarm 2
- Configurable alarm relay: N/O or N/C operation selectable
- Compact two-module enclosure (36 mm)
- BMS interface

Intended use

ISOMETER®s of the isoMED427x-(PT) series monitor the insulation resistance R_f of a medical IT system with AC 70...264 V. In addition, the load current and the temperature of the IT system transformer are monitored. Alarms and measured values are provided to other bus devices via the BMS interface. For display and signalling purposes, the use of special alarm indicator and test combinations is recommended.

Devices of the isoMED427x-(PT) series do not require an additional supply voltage. The maximum permissible system leakage capacitance is 5 μ F.

After detection of an insulation fault, the internal locating current injector of the isoMED427P-(xx) models enables insulation fault location. The use of special devices of the EDS series is recommended to locate the insulation fault.

In order to meet the requirements of the applicable standards, customised parameter settings must be made on the equipment in order to adapt it to local equipment and operating conditions. Please heed the limits of the range of application indicated in the technical data.

Any other use or a use that goes beyond this constitutes improper use.

i If the ISOMETER® is installed inside a control cabinet, the insulation fault message must be audible and/or visible to attract attention.

Functional description

During regular operation, the display shows the present insulation resistance. Use the arrow-up or arrow-down button to display the present load current in %. The isoMED427P-PT also displays the present transformer temperature. If the insulation resistance falls below the response value, the AL1 LED signals an insulation fault. AL2 lights up if the load current is too high or the temperature of the monitored IT system transformer is too high. The alarm relay K1 signals all alarm categories. In addition, a bus signal is provided at terminals A, B for insulation fault locators as well as alarm indicator and test combinations.

The detected insulation fault activates the internal locating current injector for insulation fault location if the EDS function was previously enabled in the menu (factory setting = off). A positive and a negative locating current pulse is injected into the monitored IT system alternately for 2 s each. There is a 4 s pause between positive and negative pulse.

The isoMED427P-(PT) models can only be operated as BMS slave. Therefore, the alarm indicator and test combination or the respective insulation fault locator take over the master function. BMS masters always have BMS address 1.

Standards and certifications

The ISOMETER® was developed in compliance with the following standards:

- DIN EN 61557-8 (VDE 0413-8): 2015-12/Ber1: 2016-12
- IEC 61557-8: 2014/COR1: 2016
- EN 61373 cat I class B



i The Lloyd's Register certification is only valid for the spring-type terminal version of the isoMED427P-2 (B72075301).

EU Declaration of Conformity

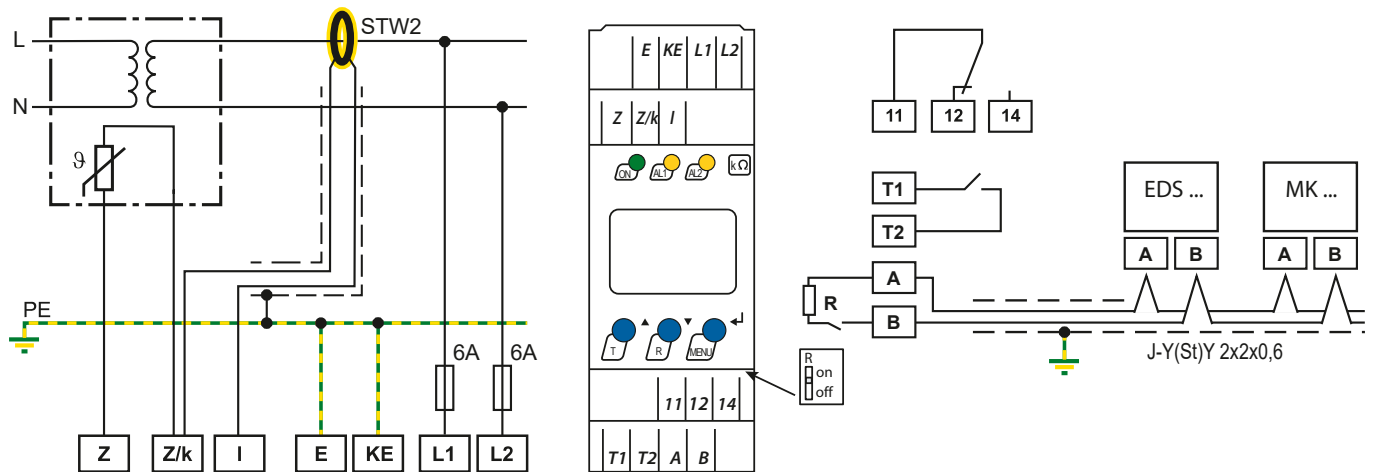
The EU Declaration of Conformity is available at the following Internet address:

https://www.bender.de/fileadmin/content/Products/CE/CEKO_isoMED427P-2.pdf

Operating elements

Device front	Operating elements	Function
	ON	Power LED
	AL1 AL2	Alarm LEDs
	▲▼	Up and down buttons – For navigating up or down in the menu settings. – For increasing or decreasing values.
	T	Test button (press > 1.5 s)
	R	Reset button (press > 1.5 s)
	↵	Enter button – Select menu item. – Save value.
	MENU	MENU button (press > 1.5 s) – Starts menu mode. – Exits menu item without saving changes.

Wiring diagram



Terminal	Connections
E, KE	Separate connection of E and KE to PE
L1, L2	Connection to the IT system to be monitored; supply voltage (see nameplate) via 6 A fuse
Z, Z/k	Connection to temperature sensor acc. to DIN44081 (isoMED427x) Connection to temperature sensor PT100 (isoMED427P-PT)
Z/k, I	Connection to measuring current transformer (STW2)
T1, T2	Connection to external test button
A, B	RS-485 interface, terminate connection to R switch (on/off), when the device is connected to the bus end.
11, 12, 14	Alarm relay K1

Technical data isoMED427(P)-(PT)

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

Definitions

Measuring circuit (IC1)	L1, L2
Control circuit (IC2)	E, KE, Z, Z/k, I, T1, T2, A, B
Output circuit (IC3)	11, 12, 14
Rated voltage	250 V
Overvoltage category	III
Operating altitude	< 2000 m AMSL

Rated impulse voltage

IC1/(IC2-3)	4 kV
IC2/IC3	4 kV

Rated insulation voltage

IC1/(IC2-3)	250 V
IC2/IC3	250 V
Pollution degree	3

Protective separation between

IC1/(IC2-3)	Overvoltage category III, 300 V
IC2/IC3	Overvoltage category III, 300 V

Voltage test (routine test) according to IEC 61010-1

(IC1-2)/IC3	2.2 kV
-------------	--------

Supply voltage

Supply voltage U_s	100...240 V
Tolerance U_s	-30...10 %
Power consumption	≤ 3 W

Monitored IT system

Nominal system voltage U_n	70...264 V
Nominal frequency f_n	47...63 Hz

Insulation monitoring acc. to IEC 61557-8: 2007-01

Response value R_{an}	50...500 kΩ
Relative uncertainty	±10 %
Hysteresis	25 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 0.5 \mu\text{F}$	≤ 5 s
Response time for connection monitoring PE	≤ 1 h
Permissible system leakage capacitance C_e	max. 5 μF

Locating current injector acc. to IEC61557-9

Locating current	≤ 1 mA
Test pulse/break	2/4 s

Measuring circuit

Measuring voltage U_m	±12 V
Measuring current I_m at $R_F = 0 \Omega$	≤ 50 μA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i at 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{ig}	≤ DC 300 V

Load current monitoring

Response value adjustable	5...50 A
Relative uncertainty	± 5 %
Hysteresis	4 %
Nominal frequency f_n	47...63 Hz
Setting values load current measurement	
Transformer	3150 VA / 4000 VA / 5000 VA / 6300 VA / 8000 VA / 10,000 VA
I_{alarm1}	14 A / 18 A / 22 A / 28 A / 35 A / 45 A
Response time, overload (50 % to 120 %)	< 5 s
Response time, CT monitoring	at restart, test or every 1 h

Temperature monitoring

isoMED427x

Sensor	PTC resistors acc. to DIN 44081 (max. 6 in series)
Response value	4 kΩ
Release value	1.6 kΩ
Relative uncertainty	± 10 %
Response time, overtemperature	< 2 s

isoMED427P-PT

Sensor	PT100 (no series or parallel connections)
Response value	50...150 °C
Hysteresis	10 %
Relative uncertainty	± 5 %
Response time, overtemperature	< 5 s

Displays, memory

Display	LC display, multi-functional, not illuminated
Display range measured value insulation resistance (R_p)	10 kΩ ... 1 MΩ
Operating uncertainty	±10 %, ±2 kΩ
Measured value load current (as % of the set response value)	10...199 %
Operating uncertainty	±5 %, ±0.2 A
Password	off, on [0...999]

Interface

Interface/protocol	RS-485/BMS
Baud rate	9.6 kBit/s
Cable length	≤ 1200 m
Cable: twisted pair, one end of shield connected to PE	recommended J-Y(St)Y min. n × 2 × 0.8
Terminating resistor	120 Ω (0.25 W), internal, switchable
Device address, BMS bus	2...90

Switching elements

Number	1 changeover contact
Operating principle	N/C operation / N/O operation
Electrical endurance under rated operating conditions	10,000 cycles

Contact data acc. to IEC 60947-5-1

Utilisation category	AC-13 / 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 / 3 A / 1 A / 0.2 A / 0.1 A
Minimum contact load	10 mA / DC 5 V

Environment/EMC

EMC	IEC 61326-2-4
Operating temperature	-25...55 °C

Classification of climatic conditions acc. to IEC 60721 (related to temperature and relative humidity)

Stationary use (IEC 60721-3-3)	3K22
Transport (IEC 60721-3-2)	2K11
Long-term storage (IEC 60721-3-1)	1K22

Classification of mechanical conditions acc. to IEC 60721

Stationary use (IEC 60721-3-3)	3M11
Transport (IEC 60721-3-2)	2M4
Long-term storage (IEC 60721-3-1)	1M12

Connection

Connection type	Push-wire terminals
Nominal current	≤ 10 A
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm
Connection properties:	
rigid	0.2...2.5 mm ² (AWG 24...14)
flexible without ferrule	0.75...2.5 mm ² (AWG 19...14)
flexible with ferrule	0.2...1.5 mm ² (AWG 24...16)

Connection type	Screw-type terminals
Nominal current	≤ 10 A
Tightening torque	0.5...0.6 Nm (5...7 lb-in)
Cross section	AWG 24-12
Stripping length	8 mm
Connection properties:	
rigid /flexible	0.25...2.5 mm ²
Flexible with ferrules with/without plastic sleeve	0.25...2.5 mm ²
Multi-conductor rigid/flexible	0.2...1.5 mm ²
Multi-conductor flexible with ferrule without plastic sleeve	0.25...1.5 mm ²
Multi-conductor flexible with TWIN ferrule with plastic sleeve	0.25...1.5 mm ²

Other

Operating mode	Continuous operation
Position of normal use	Any
Degree of protection, built-in components (DIN EN 60529)	IP30
Degree of protection, built-in components (DIN EN 60529)	IP20
Enclosure material	Polycarbonate
Flammability class	UL94V-0
DIN rail mounting	IEC 60715
Screw mounting	2 × M4
Software versions	D643 V1.0x (isoMED427-2) D355 V1.0x (isoMED427P-2) D644 V 1.0x (isoMED427P-PT)
Weight	≤ 150 g

Ordering data

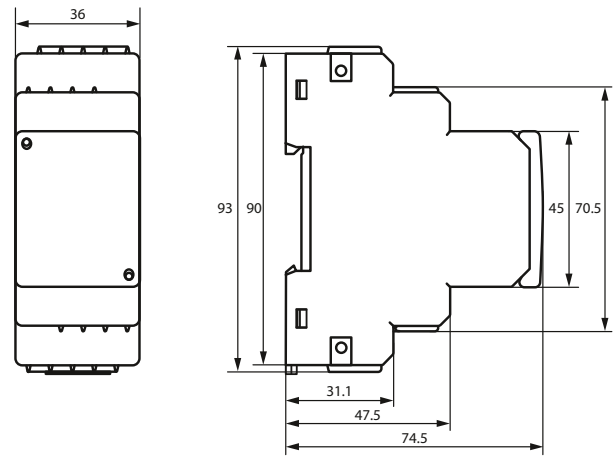
Model	Supply voltage U_s	Article number	
		Push-wire terminals	Screw-type terminals
isoMED427-2	AC 70...264 V; 47...63 Hz	B72075306	B92075306
isoMED427P-2 ^{*)}		B72075301	B92075301
isoMED427P-PT		B72075307	B92075307

^{*)} Only this device has a Lloyds Register approval

Accessories

Description	Article number
Mounting clip for screw mounting	B98060008
XM420 mounting frame	B990994
STW2 measuring current transformer for ISOMETER® isoMED427P	B942709
E0107 temperature sensor for ISOMETER® isoMED427P	B924186

Dimensions



Dimension diagram (in mm)



Bender GmbH & Co. KG

Londorfer Straße 65
35305 Grünberg
Germany

Tel.: +49 6401 807-0
info@bender.de
www.bender.de



© Bender GmbH & Co. KG, Germany
Subject to change!
The specified standards take into account the edition valid until 04.2024 unless otherwise indicated.