BENDER
The Power in Electrical Safety©

A-ISOMETER® iso-MED427P

Insulation monitoring device with integrated load and temperature monitoring and locating current injector for insulation fault location systems for medical IT systems in accordance with IEC 60364-7-710: 2002-11, IEC 61557-8:2007-01, IEC 616557-9:2009-01 and DIN VDE 0100-710: 2002-11

Preliminary data sheet

A-ISOMETER® iso-MED427P

Insulation monitoring device with integrated load and temperature monitoring and locating current injector for insulation fault location systems for medical IT systems in accordance with IEC 60364-7-710: 2002-11, IEC 61557-8:2007-01, IEC 616557-9:2009-01 and DIN VDE 0100-710: 2002-11

A-ISOMETER® iso-MED427P

Device features

- Insulation monitoring for medical IT systems
- Adjustable response value for insulation monitoring
- Locating current injector for equipment for insulation fault location
- 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
- Programmable alarm relay:
- N/O or N/C operation, selectable
- Compact two-module enclosure (36 mm)
- BMS interface

Product description

The A-ISOMETER® iso-MED427P monitors the insulation resistance of unearthed AC circuits (medical "IT systems"). At the same time, the load current and temperature of the IT system transformer is monitored.
In combination with EDS series insulation fault locators and the appropriate measuring current transformers, the iso-MED427P is designed to set up the respective equipment for insulation fault location.

Application

Medical system in accordance with IEC 60364-7-710:2002-11, IEC 61557-8:2007-01, IEC 61557-9: 2009-1 und DIN VDE 0100-710:2002-11

Function

The iso-MED427P monitors the insulation resistance as well as the temperature and load current of the IT system transformer in medical IT systems. In addition, the connections to PE, to the measuring current transformer and to the temperature sensor are monitored. The actual measured value is indicated on the LCD. By pressing the "▲" or "▼" – buttons, additonal measured values can be displayed.

Alarms are indicated on the LC display via LEDs and an additional identification.

Parameters are assigned to the device via LCD or the function keys on the front of the device.

Insulation monitoring

The iso-MED427P uses the AMP measurement method, which is also able to detect DC faults. When the value of the insulation resistance falls below the set response value, the alarm relay K1 switches and the alarm LED "AL1" lights. When the insulation resistance exceeds the release value (response value plus hysteresis), the alarm relay returns to its initial position and the alarm LED "AL1" goes out.

Insulation fault location is carried out with insulation fault evaluators of the EDS… series and the respective measuring current transformers. Once an insulation fault is detected by iso-MED427P, the insulation fault location process is started automatically or manually. The iso-MED427P generates a test current the amplitude of which is dependent on the existing system voltage and the insulation fault. In the case of insulation faults of low resistance , the locating current is limited to 1 mA by the iso-MED427P. The locating current pulse flows from the iso-MED427P via the live parts to the point of fault. From there, it flows via the insulation fault and the earth conductor (PE) back to the iso-MED427P. This locating current pulse is then detected by the measuring current transformers located in the insulation fault path, and is evaluated by the EDS... insulation fault locators. When the locating current in the measuring current transformer exceeds the response value, the associated alarm LED at the EDS… lights up indicating the faulty sub-circuit. This information is also indicated at the respective MK alarm indicator and test combination.
By assigning the measuring current transformers to the respective circuit, the point of fault can easily be detected from a central position.

Load current and temperature monitoring

The load current is monitored using an STW2 measuring current transformer, temperature is monitored by means of temperature switch or a PTC thermistor in accordance with DIN 44081.
When the response value is exceeded, the alarm LED "AL2" lights up. The required temperature sensors are already incorporated in Bender transformers.

Alarm relays

The alarm relay switches when an alarm occurs or in the case of voltage failure. If required, the factory-programmed operating principle can be re-programmed.

Alarm messages LEDs

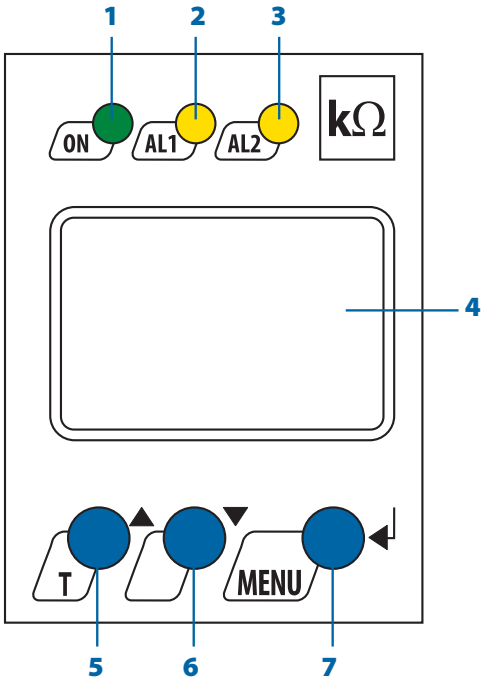
	iso-MED427P		
	"ON"	"AL1"	"AL2"
Operation	×	--	--
System fault*	flashing	flashing	flashing
Insulation fault	×	×	--
Overcurrent	×	--	×
Overtemperature	×	--	×

* Detailed alarm information on LCD

Test function / connection monitoring

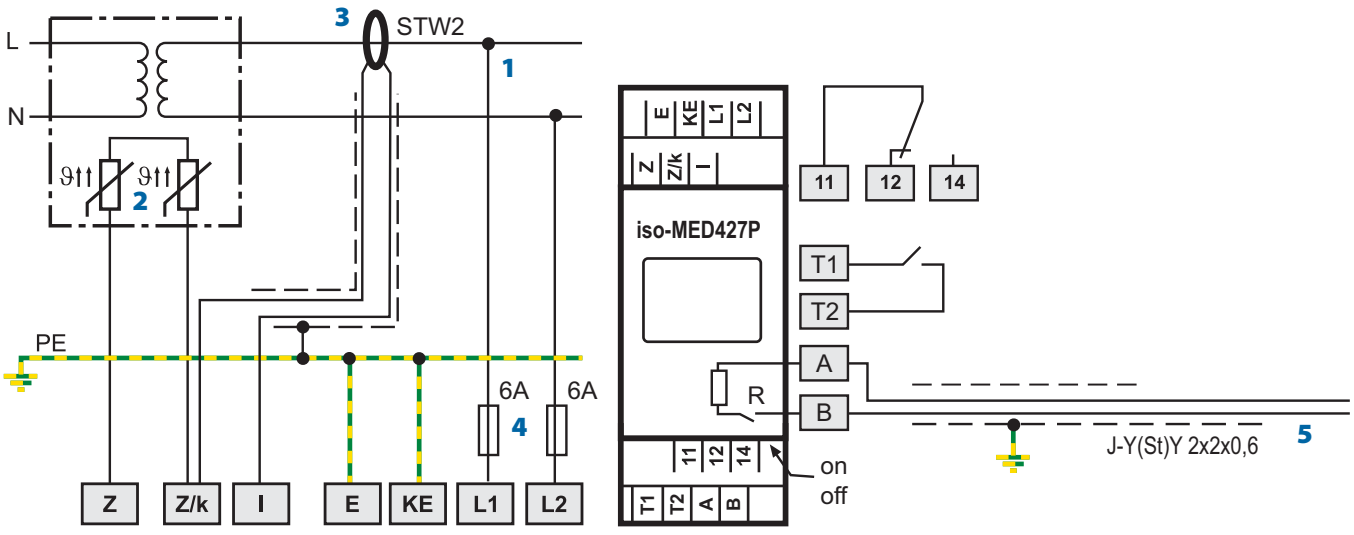
A self test is carried out once supply voltage is fed and later at hourly intervals. During the self test, the internal device functions, the connections to PE (E/KE) and the connections to the current transformer are monitored for interrruption and short-circuit. In the event of a fault, the alarm relay K1 switches and the LEDs ON/AL1/AL2 flash. The respective error code appears on the LC display. After eliminating the fault, the alarm relay automatically switches to its initial position. By pressing the test button, the device functions and also the relay function will be tested.

Operating elements



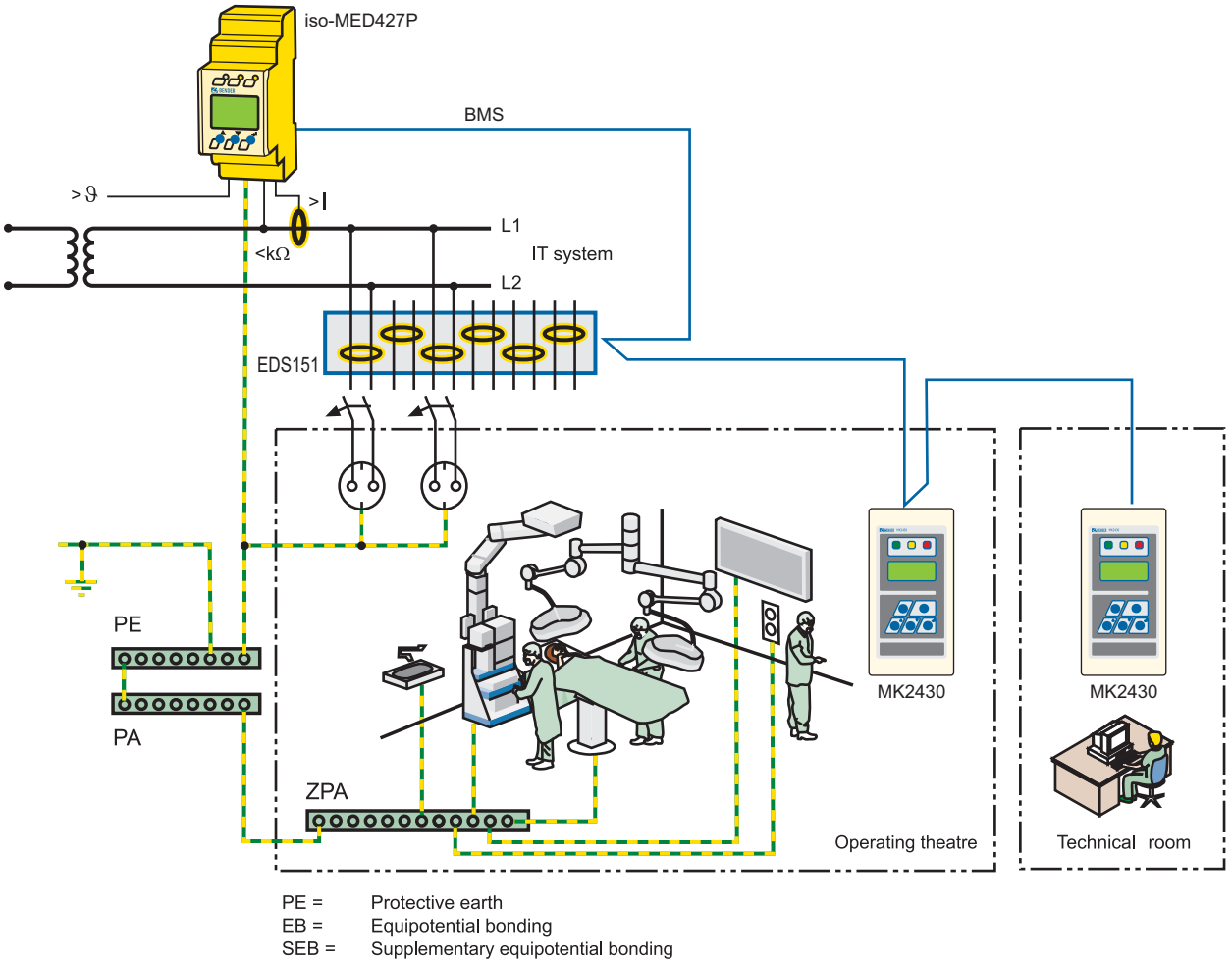
1 - Power On LED
2, 3 - Alarm LEDs "AL1", "AL2"
4 - LC display
5 - "TEST" button (>2s): to call up the self test.
Arrow up button: parameter change to move up in the menu
6 - Arrow down button: parameter change to move down in the menu
7 - "MENU" button (> 2s): to call up the menu system.
Enter button: to confirm parameter change

Wiring diagram



1 - Connection to the IT system
to be monitored = supply voltage *US* protection by fuses
2 - Temperature sensor
3 - Measuring current transformer for load current monitoring
4 - Line protection by a fuse in accordance with IEC 60364-4-43/DIN VDE 0100-430 (6 A fuse recommended). In case of supply (L1/L2) from an IT system, both lines have to be protected by a fuse.
5 - Serial interface BMS

Application example



Ordering information		
Type	**Supply voltage $U_S = U_n$***	**Art. No.**
iso-MED427P-2	AC 70…264 V, 42…460 Hz	B 7207 5301

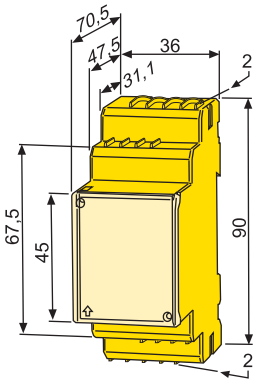
*Absolute values of the voltage range

Accessories	
Type	**Art. No.**
STW2 measuring current transformer	B 942 709
ES0107/temperature sensor (PTC)	B 924 186
XM420 Mounting frame	B 990 994
Mounting clip for screw fixing (one clip per device)	B 9806 0008

Dimension diagram XM420

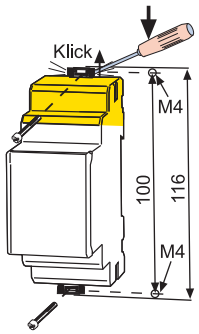
Dimensions are given in mm

Open the front plate cover in direction of arrow!



Screw fixing

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



Technical data

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

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	2.5 kV / III
Protective separation (reinforced insulation) between	(L1, L2, E, KE, 1, 2, 3, 4 Z, Z/k, I) - (11, 12, 14)
Voltage test acc. to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage U_S	$= U_n$
Power consumption	≤ 4 VA
IT system being monitored	
Nominal system voltage U_n	AC 70…264 V
Nominal frequency f_n	47…63 Hz

Insulation monitoring

Response value R_{an}	50…500 kΩ (50 kΩ)*
Relative uncertainty	± 10 %
Hysteresis	25%
Response time t_{an} at $R_F = 0.5$ x R_{an} and $C_e = 0.5$ µF	≤ 5 s
Permissible system leakage capacitance C_e	5 µF

Measuring circuit

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

Locating current injector

Locating current	≤ 1 mA
Test cycle/idle time	2 s / 4 s

Load current monitoring

Response value, adjustable	5…50 A (7 A)*
Relative uncertainty	± 5 %
Hysteresis	4 %

Setting value load current measurement:

Transformer	3150 VA	4000 VA	5000 VA	6300 VA	8000 VA	10000 VA
I_{alarm} 1 ~	14 A	18 A	22 A	28 A	35 A	45 A

Temperature monitoring:

Response value (fixed value)	4 kΩ
Release value (fixed value)	1.6 kΩ
PTC resistors acc. to DIN 44081	max. 6 in series
Relative uncertainty (without PTC thermistors)	± 10 %

Displays, memory

LC display	multifunctional, not illuminated
Measured value insulation resistance	10 kΩ…1 MΩ
Operating uncertainty	± 10 %, ± 2 kΩ
Measured value load current (as % of the set response value)	10 %…199 %
Operating error	± 5 %, ± 0.2 A
Password	on, off / 0…999 (off, 0)*

Interface

Cable length, twisted pairs, shielded	1200 m
Recommended cable	min. J-Y(St)Y 2x0.6; Shield on one side connected to PE
Interface/protocol	RS-485 / BMS
Terminating resistor	120 (0.25 W), internal, switchable
Address range	2…90

Inputs

Test button	N/O contact
Max. cable length	10 m

Interfaces for measuring current transformer STW2 and temperature sensor

Cable lengths:	
single wire > 0.5 mm²	≤ 1 m
single wire, twisted > 0,5 mm²	≤ 10 m
twisted pair, shielded > 0.5 mm²	≤ 40 m
Recommended cable	min. J-Y(St)Y 2x0.6; Shield on one side connected to PE

Switching elements

Number	1 changeover contact				
Operating principle	N/C operation / N/O operation (N/C operation)*				
Electrical endurance, number of cycles	10.000				
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	1 mA bei AC / DC 10 V				

EMC

EMC	IEC 61326-2-4:2006-06
Operating temperature	-25 °C…+55 °C
Classification of climatic conditions acc. to IEC 60721:	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 69721-3-2)	2K3 (except condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K4 (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
Storage (IEC 60721-3-1)	1M3

Connection

Connection type	push-wire terminals
Connection properties:	
rigid	0.2…2.5 mm² / AWG 24-14
flexible without ferrule	0.2…2.5 mm² / AWG 24-14
flexible with ferrule	0.2…1.5 mm² / AWG 24-16
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Position of normal use	any
Degree of protection, internal components	(DIN EN 60529) IP30
Degree of protection, terminals	(DIN EN 60529) IP20
Enclosure material	polycarbonate
Flammability class	UL94V-0
Screw mounting	2 x M4
DIN rail mounting acc. to	IEC 60715
Software version	D288 V1.0x
Weight	< 150 g

( )* = factory setting

BENDER
The Power in Electrical Safety©

Dipl.-Ing. W. Bender GmbH & Co. KG
P.O.Box 1161 • 35301 Grünberg • Germany
Londorfer Straße 65 • 35305 Grünberg • Germany
Tel.: +49 6401 807-0 • Fax: +49 6401 807-259
E-Mail: info@bender-de.com • www.bender-de.com

Bender Group