

# 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** 





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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 " $\blacktriangle$ " or " $\blacktriangledown$ " – buttons, additional 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

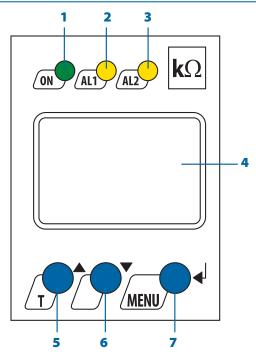
		iso-MED427P		
	"ON"	"AL1"	"AL2"	
Operation	×			
System fault*	flashing	flashing	flashing	
Insulation fault	×	×		
Overcurrent	×		×	
Overtemperature	×		×	

<sup>\*</sup> Detailed alarm information on LCD

#### **Test function / connection monitoring**

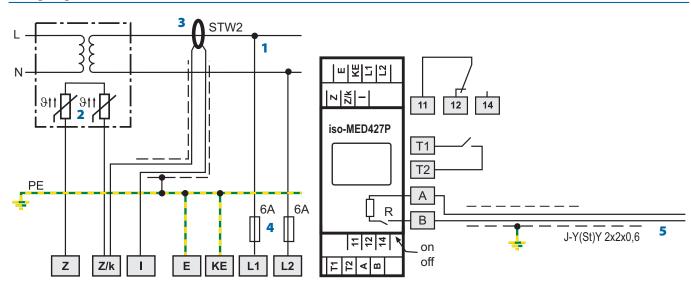
A self test is carried out once supply voltage is fed and later at hourly intervals. During the self test, the internal device functions, the connections to PE (E/KE) and the connections to the current transformer are monitored for interrruption and short-circuit. In the event of a fault, the alarm relay 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

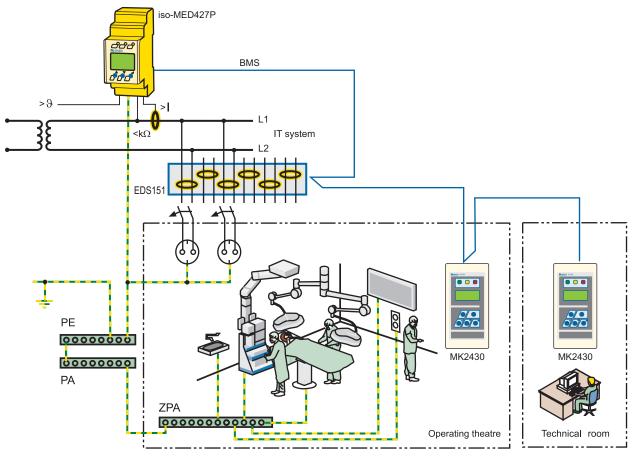
### Wiring diagram



- 1 Connection to the IT systemto 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**



PE = Protective earth
EB = Equipotential bonding

SEB = Supplementary equipotential bonding

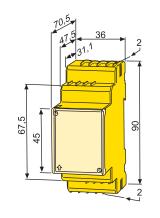
Ordering information					
Туре	Supply voltage $U_S = U_n^*$	Art. No.			
iso-MED427P-2	AC 70264 V. 42460 Hz	B 7207 5301			

<sup>\*</sup>Absolute values of the voltage range

Accessories	
Туре	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

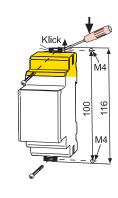
## **Dimension diagram XM420**

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

Voltage test acc. to IEC 61010-1  Supply voltage  Supply voltage $U_S$ = $U_n$ Power consumption $\leq 4$ VA  IT system being monitored  Nominal system voltage $U_n$ AC 70264 V  Nominal frequency $f_n$ 4763 Hz  Insulation monitoring  Response value $R_{an}$ 50500 kΩ (50 kΩ)*  Relative uncertainty ± 10 % Hysteresis 25% Response time $t_{an}$ at $R_F = 0.5 \times R_{an}$ and $C_e = 0.5  \mu F$ Measuring circuit  Measuring voltage $U_m$ ± 12 V Measuring current $I_m$ (at $R_F = 0.0$ ) $\leq 50  \mu A$ Internal DC resistance $R_i$ $\geq 240  k\Omega$ Locating current injector  Locating current injector  Locating current injector  Locating current injector  Load current monitoring  (L1, L2, E, KE, 1, 2, 3, 4Z, Z/k,  ) - (11, 12, 14)  2.21 kV  Suble lengths: single wire > 0.5 r single wire > 0.5 ringle wire, twisted pair, shield Recommended call twisted pair, shield Recommended call wisted pair, shield Recommended call twisted pair, shield Re	ilisulation coordination acc. to IEC 0000	OT I/ILC	70004 3			прис
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Cl.   1, 2, E, KE, 1, 2, 3, 4 Z, Z/k,  ) - (11, 12, 14)					2.5 kV / III	Max. cable length
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Fower consumption   Seq 4 VA   IT system being monitored   Switching eleme   Nominal system wortage $U_h$   AC 70264 V   Nominal system wortage $U_h$   AC 70264 V   Nominal system wortage $U_h$   AC 70264 V   Nominal frequency $f_h$   4763 Hz   Switching eleme   Number   Operating principal Electrical endurance   Seq 25%   Selection   Sep 25%   Selection   Sep 25%   Selection   Sep 25%   Selection   Sep 25%						single wire, twiste
Nominal frequency f <sub>n</sub>						
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Nominal frequency $f_n$ 4763 Hz         Number Operating principle Electrical endurance Relative uncertainty         ± 10 %         Contact data acc. to Utilisation categor Relative uncertainty         ± 10 %         Contact data acc. to Utilisation categor Relative uncertainty         ± 10 %         Contact data acc. to Utilisation categor Relative uncertainty         ± 10 %         EMC           Measuring voltage $U_m$ ± 12 V         EMC           Measuring voltage $U_m$ ± 12 V         EMC           Measuring current $I_m$ (at $R_i = 0.0$ )         ± 50 µ µ         EMC           Internal DC resistance $R_i$ ± 240 kΩ         Classification of C				۸۲۰	70 2641	Switching eleme
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Locating current $\leq 1 \text{ ma}$ Classification of mr       Stationary use (IEC 6072)         Load current monitoring $2 \text{ s.} / 4 \text{ s.}$ Stationary use (IEC 6072)         Relative uncertainty $\pm 5 \%$ Connection type         Nysteresis $\pm 5 \%$ Connection type         Setting value load current measurement:       Transformer $3150 \text{ VA}$ $4000 \text{ VA}$ $5000 \text{ VA}$ $6300 \text{ VA}$ $8000 \text{ VA}$ $10000 \text{ VA}$ flexible without fer flexible without fer flexible without fer flexible with ferrul stroing in the flexible with ferrul stroing in flexible with ferrul stroing in force.       Temperature monitoring:       Stripping length       Opening force       Test opening, dian       Other       Operating mode       Operating mode       Operating mode       Position of normal       Degree of protectin       Operating mode       Position of normal       Degree of protectin       Screw mounting       Dink rail mounting       Software version       Software version       Weight         Interface       1200 m       RS-485 / BMS       Reactive version       Weight <th< td=""><td>Locating current injector</td><td></td><td></td><td></td><td></td><td>Long-term storage</td></th<>	Locating current injector					Long-term storage
Test cycle/idle time						
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Response value, adjustable Relative uncertainty Hysteresis Setting value load current measurement: Transformer 3150 VA 4000 VA 5000 VA 6300 VA 8000 VA 10000 VA  Jalamn 1 ~ 14 A 18 A 22 A 28 A 35 A 45 A  Temperature monitoring: Response value (fixed value) Release value (fixed value) PTC resistors acc. to DIN 44081 Relative uncertainty (without PTC thermistors)  Displays, memory  LC display Measured value insulation resistance Operating uncertainty Measured value load current (as % of the set response value) Operating error Password  Connection type Connection proper rigid flexible without fer flexible without fer flexible with ferrul Stripping length Opening force Test opening, dian Other  Other  Operating mode Position of normal Degree of protectic Degree of protectic Enclosure material Flammability class Screw mounting DIN rail mounting Software version Weight  ()* = factory stream of the set response of the s	•				23/ 43	
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Hysteresis				5		Connection
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LC display multifunctional, not illuminated Measured value insulation resistance	Relative uncertainty (without PTC thermisto	ors)			± 10 %	
Measured value insulation resistance	Displays, memory					
Operating uncertainty $\pm 10 \text{ K} + 2 \text{ k}\Omega$ Measured value load current (as % of the set response value) $\pm 10 \text{ W}$ . $\pm 199 \text{ W}$ Operating error $\pm 5 \text{ W}$ , $\pm 0.2 \text{ A}$ Password $\pm 5 \text{ W}$ , $\pm 0.2 \text{ A}$ On, off $\pm 0.00 \text{ M}$ Interface  Cable length, twisted pairs, shielded $\pm 0.00 \text{ M}$ Recommended cable $\pm 0.00 \text{ M}$ Recommended cable $\pm 0.00 \text{ M}$ Terminating resistor $\pm 0.00 \text{ K}$ Terminating resistor $\pm 0.00 \text{ K}$ Terminating uncertainty $\pm 10 \text{ K} + 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 10 \text{ W}$ , $\pm 2 \text{ k}\Omega$ Tendinating $\pm 10 \text{ W}$ , $\pm 10 \text{ W}$ , $\pm 10 \text{ W}$ , $\pm 10 \text{ W}$ Tendinating $\pm 10 \text{ W}$ Tendinating $\pm 10 \text{ W}$ , $\pm 10 \text{ W}$ Tendinating $\pm 10 \text{ W}$ Tendination	LC display		multifund			
Measured value load current (as % of the set response value)  Operating error  Password  Interface  Cable length, twisted pairs, shielded  Recommended cable  min. J-Y(St)Y 2x0.6; Shield on one side connected to PE Interface/protocol  RS-485 / BMS  Terminating resistor  Terminating uncertainty  E 10 %, ± 2 k 2  10 % 199 %  Software version  Weight  ()* = factory software version  Weight				10 kg	Ω1ΜΩ	
Operating error ± 5 %, ± 0.2 A Password on, off / 0999 (off, 0)*  Interface  Cable length, twisted pairs, shielded 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						
Password on, off / 0999 (off, 0)*  Interface  Cable length, twisted pairs, shielded 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		t response	value)			
Interface  Cable length, twisted pairs, shielded Recommended cable min. J-Y(St)Y 2x0.6; Shield on one side connected to PE Interface/protocol RS-485 / BMS Terminating resistor  Software version Weight  ()* = factory software version Weight  ()* = factory software version Weight						
Interface     Weight       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	Password		on	, off / 09	99 (off, 0)*	
Cable length, twisted pairs, shielded  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	Interface					
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	Cable length, twisted pairs, shielded				1200 m	
Terminating resistor 120 (0.25 W), internal, switchable		(St)Y 2x0.6;	Shield on or	ne side conn	ected to PE	$()^* = factory s$
Address range 290	Terminating resistor		120 (0.25 V	V), internal,	switchable	
	Address range				290	

Inputs					
Test button				N/0	contact
Max. cable length					10 m
Interfaces for measuring current t	ransformer ST\	W2 and 1	empera	ture sen	sor
Cable lengths:					
single wire > 0.5 mm <sup>2</sup>					≤1 m
single wire, twisted > 0,5 mm <sup>2</sup>					≤ 10 m
twisted pair, shielded > 0.5 mm <sup>2</sup>					≤ 40 m
Recommended cable min	. J-Y(St)Y 2x0.6;	Shield o	n one side	connect	ed to PE
Switching elements					
Number				angeover	
Operating principle	N/C operation	on / N/O o	peration	(N/C ope	ration)*
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	hei AC/	DC 10 V
EMC					
EMC			IEC 61	326-2-4:2	
Operating temperature				-25 ℃	.+55 ℃
Classification of climatic conditions acc	. to IEC 60721:				
Stationary use (IEC 60721-3-3)	3K5 (except	condensa	ation and	formatio	n of ice)
Transport (IEC 69721-3-2)	2K3 (except				
Long-term storage (IEC 60721-3-1)	1K4 (except	condensa	ation and	formatio	n of ice)
Classification of mechanical conditions	acc. to IEC 6072	1:			
Stationary use (IEC 60721-3-3)					3M4
Transport (IEC 60721-3-2)					2M2
Storage (IEC 60721-3-1)					1M3
Connection					
Connection type			pus	sh-wire te	erminals
Connection properties:					
rigid			22.5 m	,	
flexible without ferrule			22.5 m	,	
flexible with ferrule		0.	21.5 m	nm² / AW	
Stripping length					10 mm
Opening force					50 N
Test opening, diameter					2.1 mm
Other					
Operating mode			cont	inuous o <sub>l</sub>	peration
Position of normal use					any
Degree of protection, internal compone	ents			N EN 605	
Degree of protection, terminals			(DII	N EN 605	
Enclosure material					rbonate
Flammability class				l	JL94V-0
Screw mounting					2 x M4
DIN rail mounting acc. to					C 60715
Software version				מכת	22 V1 Nv

()\* = factory setting

D288 V1.0x

< 150 g



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