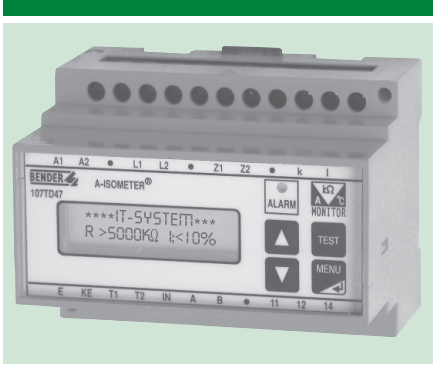


A-ISOMETER® 107TD47

Insulation monitoring device with load current and temperature monitoring for IT systems in medical locations in accordance with DIN VDE 0100-710 (VDE 0100 part 710): 2002-11 and IEC 60364-7-710: 2002-11



107TD47

Device characteristics

- Insulation monitoring device for medical IT systems AC / 3(N) AC systems
- Adjustable response value 50 kΩ...500 kΩ
- Load current and temperature monitoring
- Alarm LED
- Monitoring of essential connections such as
 - system and PE connection
 - current transformer connection
 - temperature sensor connection
- TEST button
- External TEST button can be connected
- BMS bus interface
- Collective alarm relay with one potential-free changeover contact
- Illuminated plain text display

Certifications



Product description

The A-ISOMETERS® of the 107TD47 series monitor the insulation resistance of single and three-phase AC IT systems in medical locations. In addition, the IT system transformer is monitored for overload and overtemperature. In combination with the alarm indicator and test combination MK2418 they particularly comply with the requirements of DIN VDE 0100-710 (VDE 0100 Teil 710): 2002-11 and IEC 60364-7-710: 2002-11.

Application

- IT systems for power supplies in medically used rooms in hospitals, in medical practices and outpatient operating theatre centres

Function

If one of the measured values exceeds the limiting value (insulation resistance, load current, temperature), an alarm is initiated. The alarm relay switches, the ALARM LED lights up and a message appears on the LC display. This alarm message is transferred to remote MK2418 alarm indicator and test combinations installed in the medical location via two-wire interface so that the technical or medical staff is informed immediately.

The measuring leads to the system and PE, to the current transformer and to the temperature sensor are monitored continuously. If one of these measuring leads is interrupted or short-circuited, a message will appear. The function of the device can be checked by pressing the TEST button.

The insulation resistance of operating theatre lamps often is monitored by another insulation monitoring device that activates a relay contact in case of alarm (voltage-free NO contact). The alarm message of this contact is recorded by the 107TD47 and transferred via the BMS (BENDER Measuring Device Interface) bus to other BENDER devices such as a remote alarm indicator and test combination.

In order to detect the load current in three-phase systems, an LSD470 measuring adaptor is required which in combination with the STW2 current transformers measures the current of the phase conductors. The highest value of the load current is evaluated by the electronics and is made available at the input k/I of the 107TD47.

Measuring principle

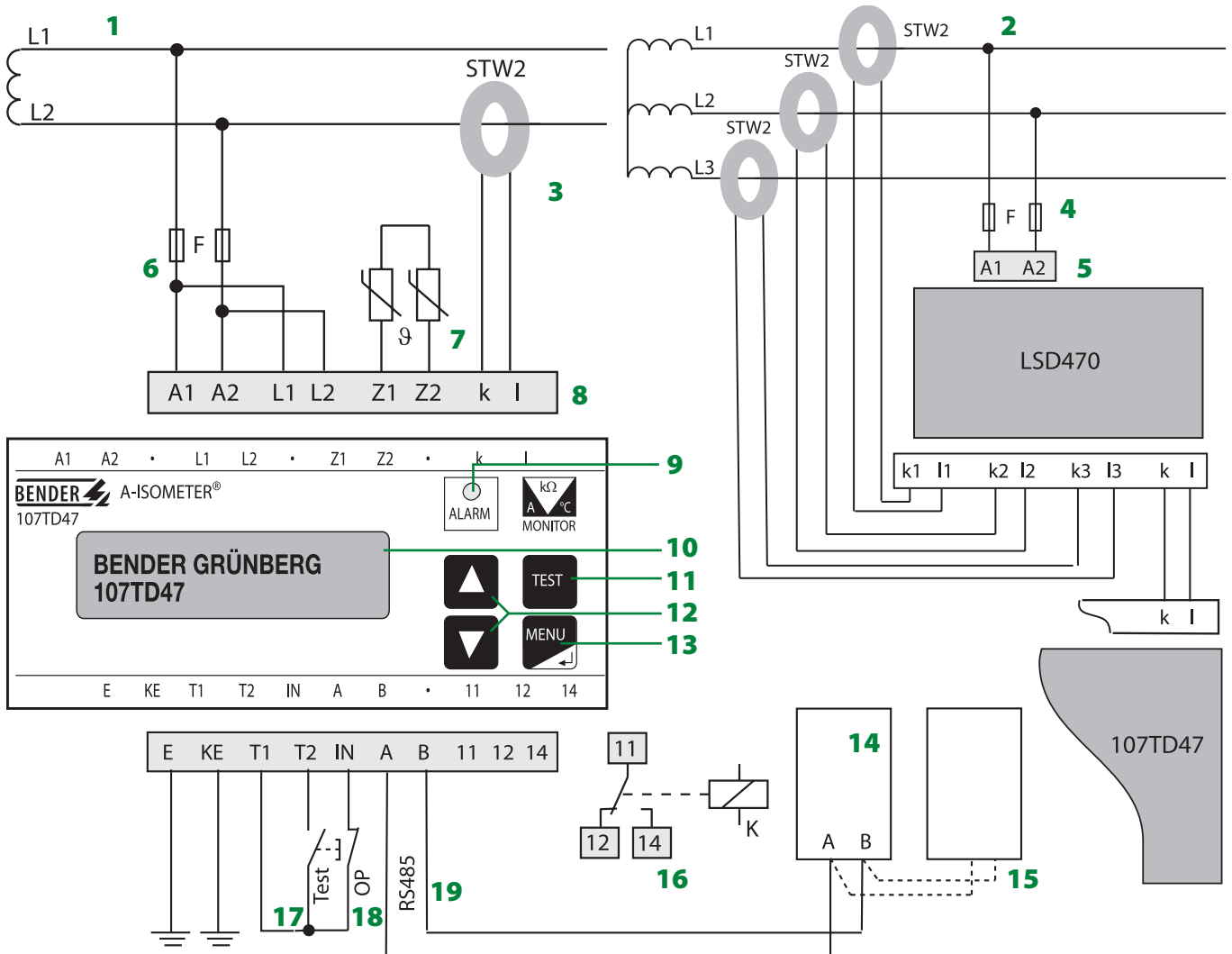


The A-ISOMETER® 107TD47 uses the AMP measuring principle (see chapter annex – measurement technology). That ensures safe monitoring of modern power supply systems, even in case of insulation faults including DC components (e. g. patient monitoring).

Standards

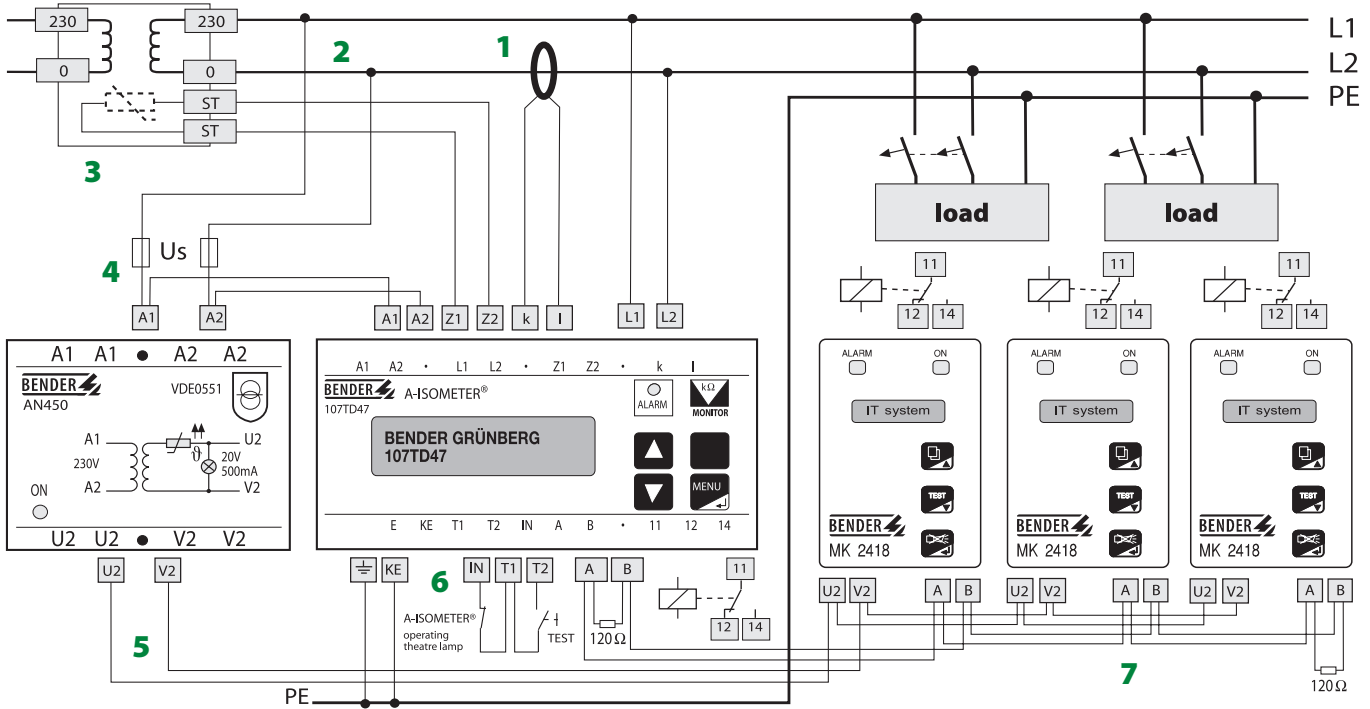
The A-ISOMETER® 107TD47 complies with the requirements of the standards and regulations for electrical installations: DIN EN 61557-8 (VDE 0413 part 8): 1998-05; EN 61557-8: 1997-03, IEC 61557-8: 1997-02, DIN VDE 0100-710 (VDE 0100 part 710): 2002-11 and IEC 60364-7-710: 2002-11.

Wiring diagram – operating elements



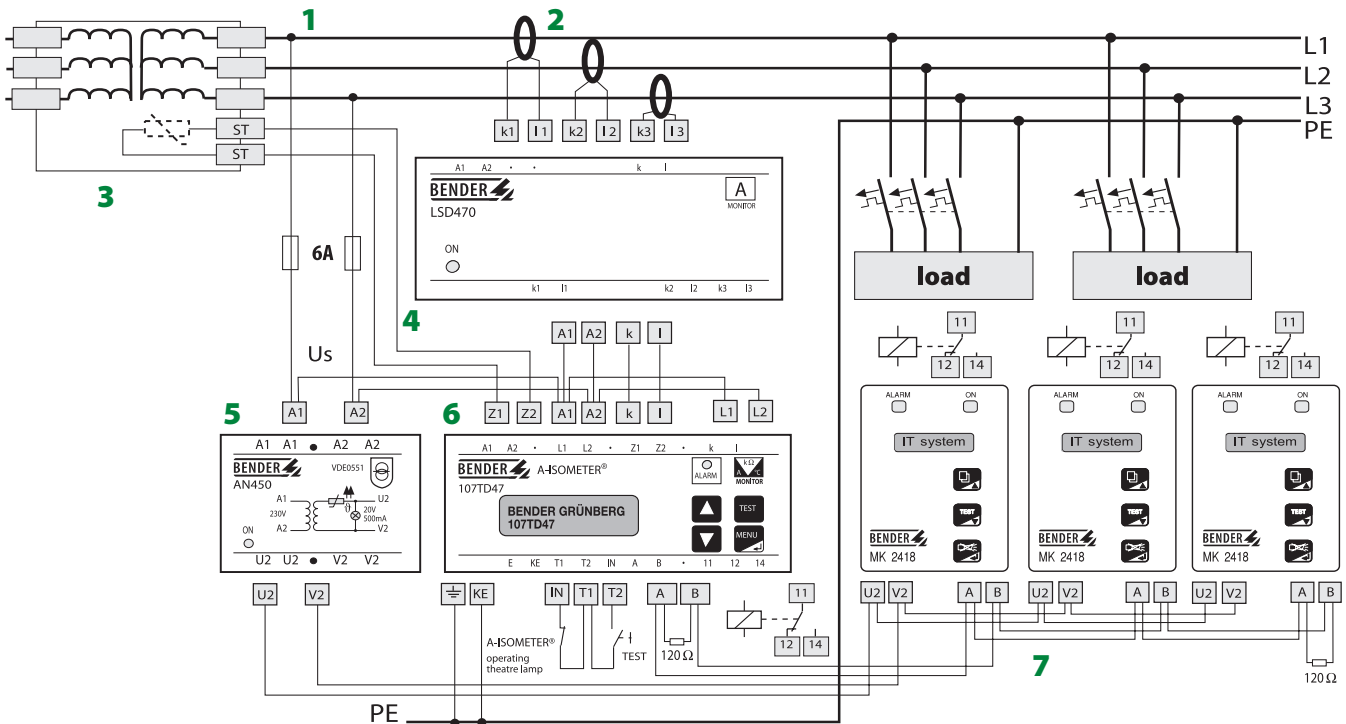
- 1 - AC IT system
- 2 - 3 AC IT system
- 3 - STW2 current transformer for load current monitoring
- 4 - Short-circuit protection for supply voltage 6 A fuse (recommended)
- 5 - LSD470 measuring adaptor for load current monitoring in three-phase systems
- 6 - Short-circuit protection for supply voltage 6 A (recommended)
- 7 - PTC thermistors (or NC contacts) in the transformer windings. Respond in case of transformer core overtemperature. No more than 6 PTC thermistors should be connected in series.
- 8 - L1, L2, k, I, Z1, Z2, E, KE are measuring connections that are monitored for interruption respectively short-circuit (k, I). A1 and A2 are intended for power supply of 107TD47 respectively LSD470.
- 9 - ALARM LED
- 10 - LC display
- 11 - TEST key in the display mode: activates the TEST function (self test). In the MENU mode, causes a return to the display mode from any position. If activated during parameter change, the last change will not be stored.
- 12 - Arrow keys in the MENU mode: for navigation within the menus and for setting parameters. In the display mode: no function.
- 13 - Changes from the display mode to the menu mode. In the menu mode, Enter-key function.
- 14 - MK2418-12 remote alarm indicator and test combination
- 15 - TM operator panels
- 16 - Alarm relay without fault memory to signal insulation faults, overcurrent condition, overtemperature and device errors.
- 17 - Optional external TEST button to test insulation monitoring (42 kΩ test resistance) and the measuring circuits for load current and temperature.
- 18 - Input allowing the message "insulation fault operating theatre light" to be displayed, initiated by the NC contact of the respective insulation monitoring device.
- 19 - BMS bus interface for the connection of alarm indicators and operator panels.

Interconnection diagram AC system



- 1 - Measuring current transformer for load current monitoring
- 2 - AC system
- 3 - Temperature sensor, isolating transformer ES0107
- 4 - 6 A fuse recommended
- 5 - Power supply unit AN450 for max. 3 MK2418
- 6 - A-ISOMETER® 107TD47
- 7 - MK2418 alarm indicator and test combination

Interconnection diagram 3AC system



- 1 - 3N AC system
- 2 - Measuring current transformer for load current monitoring
- 3 - Temperature sensor, isolating transformer DS0107
- 4 - LSD470 measuring adapter
- 5 - Power supply unit AN450 for max. 3 MK2418
- 6 - A-ISOMETER® 107TD47
- 7 - MK2418 alarm indicator and test combination

Technical data A-ISOMETER® 107TD47

Insulation coordination acc. to IEC 60664-1	
Rated insulation voltage	AC 250 V
Rated impulse voltage / pollution degree	4 kV/3
Voltage ranges	
Nominal system voltage U_n	see ordering details
Nominal frequency f_n	see ordering details
Supply voltage U_S	see ordering details
Operating range of U_S	0.85...1.15 x U_S
Frequency range U_S	40...460 Hz
Power consumption	≤ 3 VA
Measuring circuit insulation monitoring	
Response value R_{an}	50...500 kΩ
Relative percentage error	0...+10 %
Response time t_{an} at $R_F = 0,5 \times R_{an}$ and $C_e = 1 \mu F$	3 s
Hysteresis	25 %
Measuring voltage U_m	≤ 12 V
Measuring current I_m max. (at $R_F = 0 \Omega$)	≤ 50 μA
Internal DC resistance R_i	≥ 240 kΩ
Impedance Z_i bei 50 Hz	≥ 200 kΩ
Permissible extraneous DC voltage U_{fg}	≤ DC 375 V
Permissible system leakage capacitance C_e	≤ 5 μF
Measuring circuit load current monitoring	
Response value	5...50 A
Hysteresis	4 %
Influence of temperature	< 0.15 %/°C
Measuring circuit temperature monitoring	
Response value	4 kΩ
Release value	1.6 kΩ
PTC thermistors acc. to DIN 44081	max. 6 in series
Displays	
Display, illuminated	LC display
Characters (number of characters, height)	2 x 16 (3.5 mm)
Display range, measuring value	10 kΩ...5000 kΩ
Relative percentage error (50 kΩ...500 kΩ) acc. to IEC 61557-8	± 10 %

Inputs	
"TEST" key	NO contact
Alarm message "Insulation fault operating theatre light"	NC contact
Cable length inputs max.	10 m
Outputs	
TEST button	internal / external
Serial interfaces	
Interface / protocol	RS485 / BMS
Max. cable length	1200 m
Recommended cable (screened, screen on one side connected to PE)	J-Y(ST)Y 2 x 0.6
Terminating resistor	120 Ω (0.25 W)
Switching elements	
Switching elements	1 changeover contact
Operating principle	N/O / N/C operation
Factory setting	N/O operation
Electrical endurance	12000 cycles
Contact class	IIB acc. to DIN IEC 60255 part 0-20
Rated contact voltage	AC 250 V / DC 300 V
Making capacity	AC / DC 5 A
Breaking capacity	2 A, AC 230 V, cos phi = 0.4 0.2 A, DC 220 V, L/R = 0.04 s
Minimum contact current at DC 24 V	2 mA (50 mW)
General data	
Shock resistance acc. to IEC 60068-2-27 (device in operation)	15 g / 11 ms
Bumping acc. to IEC 60068-2-29 (during transport)	40 g / 6 ms
Vibration resistance acc. to IEC 60068-2-6 (device in operation)	1 g / 10...150 Hz
Vibration resistance acc. to IEC 60068-2-6 (during transport)	2 g / 10...150 Hz
Ambient temperature (during transport)	-10 °C...+55 °C
Storage temperature range	-40 °C...+70 °C
Climatic class according to IEC 60721-3-3	3K5
Operating mode	continuous operation
Mounting	any position
Connection	screw terminals
Wire cross section, rigid, flexible	0.2...4 mm² / 0.2...2.5 mm²
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Screw mounting	2 x M4
DIN rail mounting according to	DIN EN 60715 / IEC 60715
Flammability class	UL94V-0
Weight approx.	350 g

Ordering details

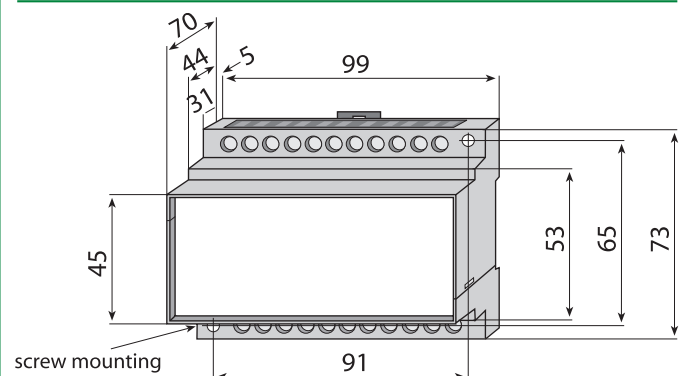
Type	Nominal system voltage U_n	Supply voltage U_S	Art. No.
107TD47	AC 230 V, 50...60 Hz	AC 230 V, 50...60 Hz	B 9201 6003
107TD47-133	AC 127 V, 50...60 Hz	AC 127 V, 50...60 Hz	B 9201 6004

Accessories

Measuring current transformer

Type	Nominal system voltage U_n	Supply voltage U_S	Art. No.
STW2 (CT)	--	--	B 942 709
AN450	--	AC 230 V	B 924 201
AN450-133	--	AC 127 V	B 924 203
LSD470 (Measuring adaptor)	--	AC 230 V	B 986 782

Dimension diagram, enclosure X470 Dimensions in mm



1.6