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ISOMETER® iso415R

Insulation monitoring device for unearthed 3(N)AC, AC and DC systems (IT systems)

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Device features

- Monitoring of the insulation resistance for unearthed 3(N)AC, AC and DC systems with galvanically connected rectifiers
- Automatic adaptation to the system leakage capacitance up to 25 µF
- Response time ≤ 6 s at C_e = 1µF and $R_f = R_{an/2}$
- Automatic device self test with connection monitoring
- Two separately adjustable response value ranges from 5 kΩ…1000 kΩ
- Alarms are output via LEDs (AL1, AL2) and an alarm relay
- Selectable N/C or N/O relay operation 1
- Selectable start-up delay, response delay and delay on release 1
- Fault memory 1
- RS-485 interface with Modbus RTU protocol
- NFC interface

[1] Only adjustable via Modbus RTU or Bender App

Standards

Devices of the iso415R series have been developed according to the following standards:

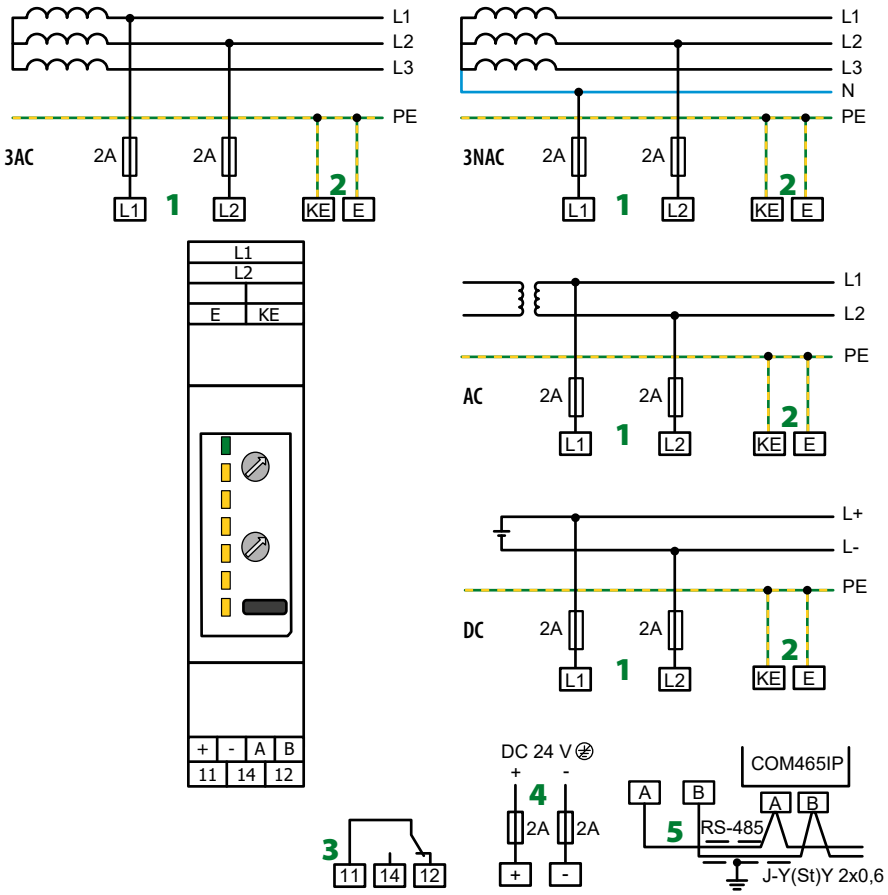
- IEC 61557-8

Licences

Open source software:
https://www.bender.de/fileadmin/content/Products/t/0/Software-information.pdf

Approvals

Wiring diagram



1 - L1, L2 Connection to the system to be monitored. (U_n)
iso415R-2: Supply voltage $U_s = U_n$ (AC/DC 100…240 V)

2 - E, KE Earth, Control earth

3 - 11,14,12 Alarm relay K1

4 - +, - iso415R-24: floating supply voltage U_s = DC 24 V

5 - A, B RS-485 interface

Caution! Select correct supply voltage!
Applying an excessive supply voltage U_s can destroy the device.
Correct values are:

iso415R-24: U_s = DC 24 V (floating!)

iso415R-2: $U_s = U_n$ = AC/DC 100…240 V

For UL applications:
Use 60 °C/75 °C copper lines only!

Technical data

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

Definitions:	
Measuring circuit (IC1)	L1, L2
Control circuit (IC2)	E, KE, +, -, A, B
Output circuit (IC3)	11, 14, 12
Rated voltage	400 V
Overvoltage category	III
Operating altitude	2000 m AMSL
Rated impulse voltage:	
IC1/(IC2-3)	6 kV
IC2/IC3	4 kV
Rated insulation voltage:	
IC1/(IC2-3)	400 V
IC2/IC3	250 V
Pollution degree	2
Protective separation between:	
IC1/(IC2-3)	Overvoltage category III, 600 V
IC2/(IC3)	Overvoltage category III, 300 V
Voltage tests (routine test) acc. to IEC 61010-1	
IC3/(IC1-2)	AC 2.2 kV

Supply voltage

iso415R-24: *Only via galvanically separated power supply (+/–)*

Supply voltage U_s	DC 24 V
Tolerance of U_s	-20…+25 %
Power consumption	≤ 2 W
Inrush current (< 5 ms)	< 10 A

iso415R-2: *Only via the system to be monitored $U_s = U_n$ (L1/L2))*

Monitored IT system iso415R-24

Nominal system voltage U_n	3(N)AC, AC 0…415 V/DC 0…400 V
Tolerance of U_n	AC +15 %, DC +25 %
Frequency range of U_n	DC 42…460 Hz

Monitored IT system iso415R-2

Nominal system voltage $U_n = U_s$	
3(N)AC, AC, DC	100…240 V
Tolerance of U_n	−30 %…+15 %
Frequency range of U_n	DC 42…460 Hz
Power consumption (at 50 Hz)	≤ 2 W / ≤ 3.5 VA
Inrush current (< 2 ms)	< 1.8 A

Measuring circuit

Measuring voltage U_m	±16 V
Measuring voltage I_m at R_F, $Z_F = 0\ \Omega$	≤ 90 µA
Internal resistance R_i, Z_i	≥ 180 kΩ
Permissible system leakage capacitance C_e	≤ 25 µF
Permissible extraneous DC voltage U_{fg}	≤ 500 V

Response values

Response value R_{an1}	10…1000 kΩ (40 kΩ)*
Response value R_{an2}	5…700 kΩ (10 kΩ)*
Relative uncertainty R_{an}	±15 % ±2 kΩ
Hysteresis R_{an}	25 %, minimum 1 kΩ

Time response

Response time t_{an} at $R_F = 0.5$ x R_{an} and C_e=1 µF	
acc. to IEC 61557-8	≤ 6 s
Start-up delay t [1]	0…1800 s (0 s)*
Response delay t_{on} [1]	0…1800 s (0 s)*
Delay on release t_{off} [1]	0…1800 s (0 s)*
Recovery time	< 0.4 s

Displays, memory

Display	status LED incl. LED bar graph (7 LEDs)
Display range insulation resistance (R_F)	1…1000 kΩ
Measuring range insulation resistance (R_F)	1…10000 kΩ [6]
Operating uncertainty	±15 % ±2 kΩ
Fault memory alarm messages	on/off (off)*

RS-485 interface

Protocol	Modbus RTU
Baud rate [1]	max. 115.2 kbits/s (19.2 kbits/s)*
Parity [1]	even, no, odd (even)*
Stop bits [1]	1/ 2/ auto (auto)*
Cable length (9.6 kbits/s)	≤ 1200 m
Cable: twisted pair [2]	min. J-Y(St)Y 2x0.6
Terminating resistor (external)	120 Ω (0.25 W)
Device address, Modbus RTU [5]	1…247 (100 + SN)*

Switching elements

Switching elements	1 changeover contact
Operating principle [1]	NC operation/NO operation (NO operation)*
Electrical endurance, number of cycles	10000

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	3 A	1 A	0.2 A	0.1 A
Minimum contact rating [3]	1 mA at AC/DC ≥ 10 V				

Connection

Connection type	Push-in
Nominal current	≤ 10 A
Connection properties	
rigid	0.2…1.5 mm² (AWG 24…16)
flexible	0.2…1.5 mm² (AWG 24…16)
with ferrule with plastic sleeve	0.25…0.75 mm²
with ferrule without plastic sleeve [4]	0.75…1.5 mm²

Environment/EMC

EMC	IEC 61326-2-4

Ambient temperatures

Operation	-25…+55 °C
Transport	-40…+85 °C
Storage	-40…+70 °C

Classification of climatic conditions acc. to IEC 60721

(except condensation and formation of ice)	
Stationary use (IEC 60721-3-3)	3K23
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

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
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94 V-0
Documentation number	D00401
Weight	≤ 100 g

( )* Factory setting

[1] Configurable via App and Modbus

[2] When supplied by or when monitoring systems with a frequency ≥ 200 Hz, the cable must be laid in a shockproof manner.

[3] Refers to relays that have not been operated with high contact currents

[4] Use crimping pliers similar to CRIMPFOX 6 / Weidmüller PZ6/PZ6/5 only.

[5] Factory setting: 100 + last two digits of serial number

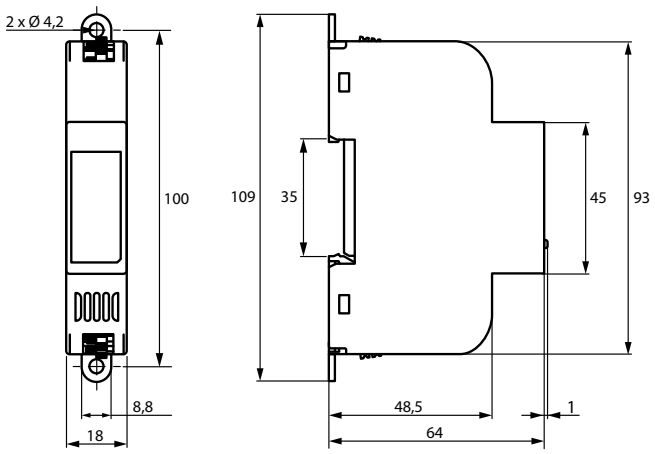
[6] Resolution/step size 1 kΩ

Ordering information

Supply voltage U_s		Nominal system voltage U_n		Type	Art. No.
AC/DC	DC	AC	DC		
–	24 V	0…415 V	0…400 V	iso415R-24	B71602000
100…240 V	–	100…240 V [3(N)AC, AC (=U_s)]	100…240 V	iso415R-2	B71603000

Dimension diagram

All dimensions in mm



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