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ISOMETER® IRDH275BM-7 with coupling device AGH675-7

Device combination for insulation monitoring
in unearthed AC, AC/DC and DC power systems (IT systems)

TDB106019en/05.2013

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ISOMETER® IRDH275BM-7

Device features

- Insulation monitoring for drives including medium voltage converters up to 7.2 kV
- Two separately adjustable response values
  100 kΩ…10 MΩ
- ***AMP**Plus* measurement method
  (European patent: EP 0 654 673 B1)
- Automatic adaptation to the system leakage capacitance
- Info button to display device settings and the system leakage capacitance
- History memory with real-time clock to store alarm messages with date and time stamp
- BMS interface (Bender Measuring Device Interface) for communication with other Bender devices (RS-485 electrically isolated)
- Current output 0(4)…20mA (electrically isolated) analogously to the measured insulation value
- Self monitoring with automatic alarm
- Automatic self test, selectable
- Connection for external kΩ indication
- Test and reset button
- Connection external test and reset button
- Two separate alarm relays with two potential-free changeover contacts
- N/O or N/C operation, selectable
- Backlit two-line plain text display
- Remote setting of specific parameters via Internet (option; COM460IP with at least Option C required)

Approvals

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AE25

Product description

The device combination ISOMETER® IRDH275BM-7 and the coupling device AGH675S-7 is designed to monitor the insulation resistance of unearthed medium voltage systems (IT systems). It is suitable for universal use in 3AC, combined AC/DC and DC systems. AC systems may include extensive DC-supplied loads. The AMPPlus measurement method meets the particular requirements of modern power supplies which often include rectifiers, converters, thyristor-controlled DC drives and directly connected DC components. Taking the system leakage capacitances into account, the IRDH275BM-7 automatically adapts itself to the existing system conditions in order to optimise the measuring time.

Application

- AC, DC or AC/DC medium voltage systems
- AC/DC medium voltage systems with directly connected DC components, such as rectifiers, converters, and thyristor-controlled DC drives

Function

When the insulation resistance between the system conductors and earth falls below the set response value, the alarm relays switch and the alarm LEDs light up. Two separately adjustable alarm relays allow to distinguish between prewarning and alarm. The measured value is indicated on the LC display or an externally connectable measuring instrument. The fault message can be stored. The fault memory can be reset by pressing the reset button. By pressing the test button, the function of the device as well as the connections to earth can be tested. Pressing the Info button provides additional information, such as the existing system leakage capacitance or device settings. The function of the earth connections are monitored. When a fault occurs, the system fault relay switches and the alarm LED “system fault” lights up.

The parameterisation of the device can be carried out via the LC display or the function buttons integrated in the front plate.

In addition, the device features:

- History memory with real-time clock to store all alarm messages with date and time stamp.
- Electrically isolated RS-485 interface (BMS protocol) for communication with other Bender devices
- Current output 0(4)…20 mA (electrically isolated)

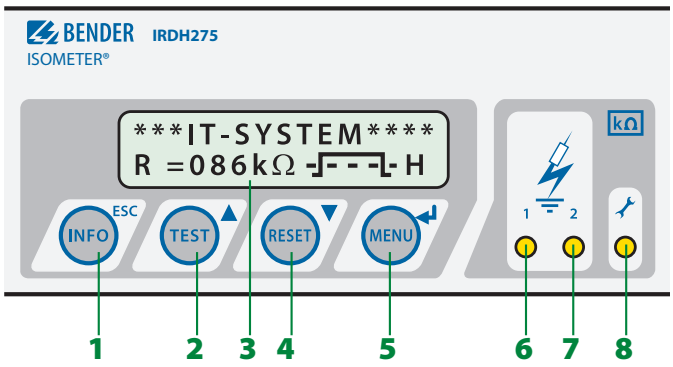
Measurement method

AMPPlus The IRDH275BM-7 series uses the patented ***AMP**Plus* measurement method. This measuring method allows concise monitoring of modern power supply systems, also in case of extensive, directly connected DC components and high system leakage capacitances.

Standards

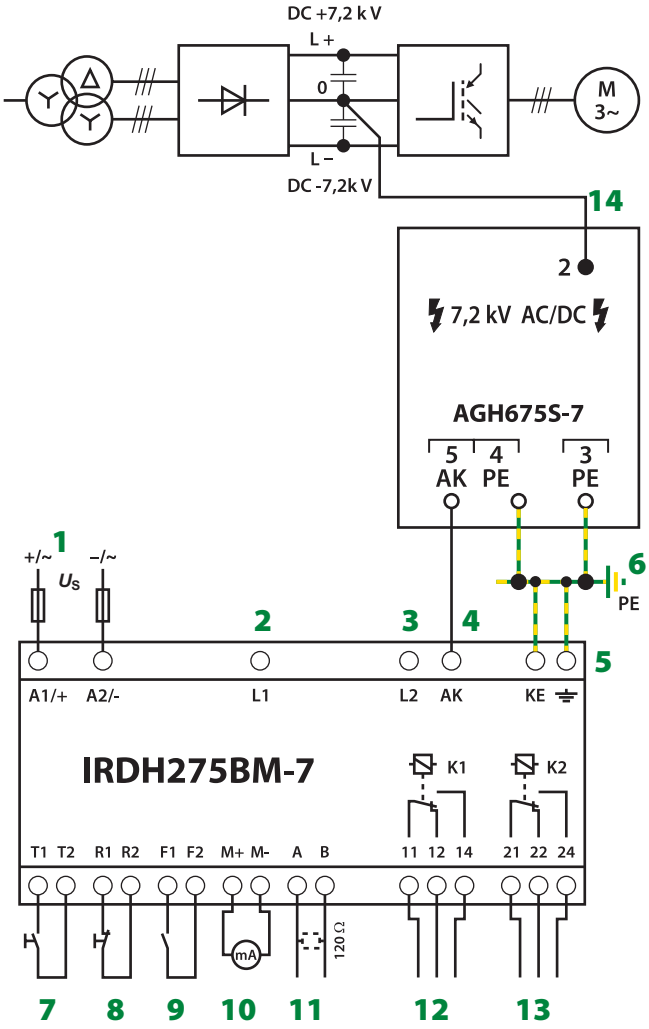
The ISOMETER® of the IRDH275BM-7 series complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), EN 61557-8, IEC 61557-8, IEC 61326-2-4, DIN EN 60664-1 (VDE 0110-1), DIN EN 60664-3 (VDE 0110-3), ASTM F1669M-96 (2007), ASTM F1207M-96 (2007)

Operating elements



1 - "INFO" button: to query standard information back (menu function), to confirm parameter change
2 - "TEST" button: to call up the self test.
Arrow up button: parameter change, to move up in the menu
3 - Two-line display for standard and menu mode
4 - "RESET" button: to delete stored insulation fault alarms parameter change, to move down in the menu
5 - "MENU" button: to call up the menu system.
Enter button: to confirm parameter change
6 - Alarm LED "1" lights:
insulation fault, first warning level reached.
7 - Alarm LED "2" lights:
insulation fault, second warning level reached.
8 - System fault LED lights: IRDH275 or earth terminal defective

Wiring diagram – mains connection/example



1 - Supply voltage U_S (see ordering information)
6 A fuse recommended
2,3 - Terminals L1, L2 are not wired!
4 - Connection to the coupling device AGH675S-7:
Connect terminal AK with terminal 5 of the coupling device.
5 - Separate connection of E and KE to PE
6 - Separate connection of the terminals 3 and 4 of the AGH675S-7 to PE
7 - External test button "T1/T2" (N/O contact)
8 - External reset button "R1/R2" (N/C contact or wire jumper).
When the terminals are open, the fault message will not be stored.
9 - Standby mode using the function input "F1/F2": when the contact is closed, insulation measurement does not take place.
10 - Current output, electrically isolated: 0…20 mA or 4…20 mA
11 - Serial interface RS-485 (termination with a 120 Ω resistor)
12 - Alarm relay "K1"; available changeover contacts.
13 - Alarm relay 2 (system fault relay); available changeover contacts.
14 - Connection of the coupling device to the converter:
Terminal 2 to the mid-point of the DC intermediate circuit.

Technical data

Insulation coordination acc. to IEC 61800-5-1:

Rated voltage with AGH675S-7	AC 7.2 kV

Voltage test acc. to DIN EN 61800-5-1 (VDE 0160-105-1)

Voltage impulse test (basic insulation)	≥ AC 40 kV
AC voltage test (basic insulation)	≥ AC 20 kV
Partial discharge test	≥ 14 kV

Voltage ranges

Nominal system voltage U_n with AGH675S-7	0…7.2 kV
Nominal frequency f_n	DC, 0.2…460 Hz
Supply voltage U_S	DC 19.2…72 V
Frequency range of U_S	42…460 Hz
Power consumption	≤ 14 VA

Response values

Response value R_{an1} (Alarm1)	100 kΩ…10 MΩ
Response value R_{an2} (Alarm2)	100 kΩ…10 MΩ
Relative uncertainty 100…500 kΩ	± 100 kΩ
Relative uncertainty 500 kΩ…10 MΩ	0 %…+ 20 %
Response time t_{an}	≤ 5 min.
Hysteresis	25%

Measuring circuit

Measuring voltage U_m	≤ 50 V
Measuring current I_m (at R_F = 0 Ω)	≤ 21 µA
Internal DC resistance R_i	≥ 2.4 MΩ
Impedance ZZ_i at 50 Hz	≥ 2.4 MΩ
Permissible system leakage capacitance	≤ 5 µF
Factory setting	2 µF

Displays

Display, illuminated	two-line display
Characteristics (number)	2 x 16
Display range, measured value	50 kΩ…10 MΩ
Operating uncertainty 50…500 kΩ	± 50 kΩ
Operating uncertainty 500 kΩ…10 MΩ	± 10 %

Outputs/Inputs

Test/reset button	internal/external
Cable length test and reset button	≤ 10 m
Current output for measuring instrument SKMP	scale centre point = 2.8 MΩ
Current output (load)	0/4…20 mA (≤ 500 Ω)
Accuracy current output (100 kΩ…10 MΩ)	± 10 %, ±100 k

Serial interface

Interface/protocol IRDH275B	RS-485/BMS
Connection	terminals A/B
Cable length	≤ 1200 m
Shielded cable (shield connected to PE at one end)	recommended: J-Y(St)Y min. 2 x 0.6
Terminating resistor	120 Ω (0.5 W)
Device address, BMS bus	1…30 (factory setting = 3)

Switching elements

Switching elements	2 changeover contacts: K1 (Alarm 1), K2 (Alarm 2, system fault)
Operating principle K1, K2 (Alarm 1/Alarm 2)	N/O or N/C operation
Factory setting (Alarm 1/Alarm 2)	N/O operation
Electrical endurance, number of cycles	12000
Contact class	IIB in accordance with DIN IEC 60255-0-20
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
Contact rating at DC 24 V	≥ 2 mA (50 mW)

Environment

Shock resistance IEC 60068-2-27 (device in operation)	15 g/11 ms
Bumping IEC 60068-2-29 (transport)	40 g/6 ms
Vibration resistance IEC 60068-2-6 (device in operation)	1 g/10…150 Hz
Vibration resistance IEC 60068-2-6 (transport)	2 g/10…150 Hz
Ambient temperature (during operation/during storage)	-10…+ 55 °C/-40…+ 70 °C
Climatic class acc. to DIN IEC 60721-3-3	3K5

Connection

Connection	screw-type terminals
Connection properties	
rigid/flexible	0.2…4 mm²/0.2…2.5 mm²
flexible with ferrules without/with plastic sleeve	0.25…2.5 mm²
Conductor sizes (AWG)	24…12

Other

Operating mode	continuous operation
Mounting	display-oriented
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
Type of enclosure	X112, free from halogen
DIN rail mounting acc. to	IEC 60715
Flammability class	UL94 V-0
Operating manual	TGH1395
Weight	≤ 510 g

Values marked with * are absolute values

Ordering information

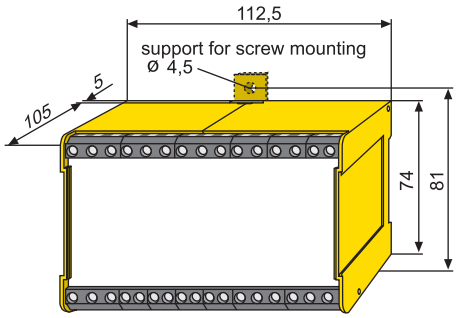
Nominal system voltage U_n	Supply voltage U_S	Cable length	Type	Art. No.
AC, 3(N)AC/DC	DC			
–	19.2…72 V	–	IRDH275BM-7	B 9106 5120
0…7.2 kV	–	2000 mm	AGH675S-7-2000	B 913 054
		500 mm	AGH675S-7-500	B 913 056

Suitable system components

Type designation	Type	Art. No.
External kΩ measuring instruments	9620-1421	B 986 849

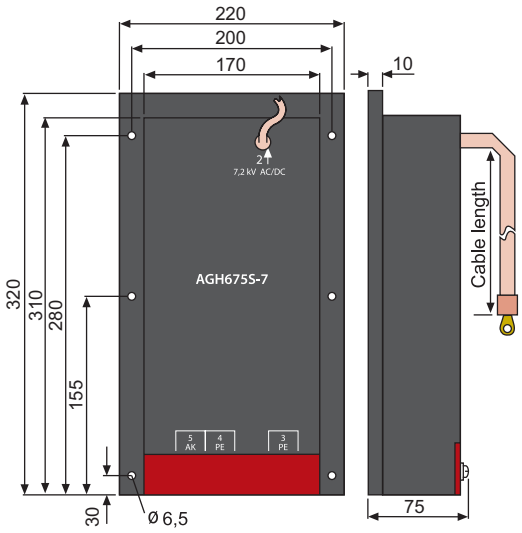
Dimension diagram XM112

Dimensions in mm



Dimension diagram AGH675S-7

Dimensions in mm



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