

## A-ISOMETER® IRDH275BU-6 with coupling device AGH575

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



### Device features

- Insulation monitoring for drives including medium voltage converters
- Two separately adjustable response values 100 kΩ...10 MΩ
- **AMP<sup>PLUS</sup>** measuring principle (European Patent: EP 0 654 673 B1)
- Automatic adaptation to the system leakage capacitance
- Info key to display device settings and the system leakage capacitance
- Memory with real-time clock to store alarm messages with date and time stamp
- BMS interface (BENDER Measuring Device Interface) for data exchange with other BENDER devices (RS485 galvanically separated)
- Current output 0(4)...20mA (electrically isolated) analogue to the measured insulation value of the IT system
- Self monitoring with automatic alarm message
- 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 voltage-free changeover contacts
- N/O or N/C operation, selectable
- Illuminated two-line plain text display
- Remote setting of certain parameters via Internet (option; FTC470XET required)

### Product description

The A-ISOMETER® IRDH275BU-6 and coupling device AGH575S-6 (detailed description in chapter 1.8.1) monitors the insulation resistance of IT medium voltage systems. It is suitable for universal use in 3/(N) AC, AC / DC and DC systems. AC systems may include extensive DC-supplied loads. Thanks to the **AMP<sup>PLUS</sup>** measuring principle they particularly meet the requirements of modern power supply systems which often include rectifiers, converters, thyristor-controlled DC drives and directly connected DC components. In these systems often high leakage capacitances against earth occur due to interference suppression measures. The IRDH275BU-6 automatically adapts itself to the existing system conditions.

### 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. In this way any changes, for example when circuits are connected to the system, can be recognized easily. 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 system and earth can be tested. Pressing the INFO key provides additional information, such as the existing system leakage capacitance or device settings. The function of the device and the system and earth connections are continuously monitored. When a fault occurs, the system fault relay switches and the alarm LED "system fault" lights up. The parameterization of the device can be carried out via the LC display or the function keys integrated in the front plate.

Version IRDH275BU-6 includes the following additional functions:

- Historical memory with real-time clock to store all alarm messages with date and time stamp.
- Galvanically isolated RS485 interface (BMS protocol) for data exchange with other BENDER devices
- Current output 0(4)...20 mA (electrically isolated)

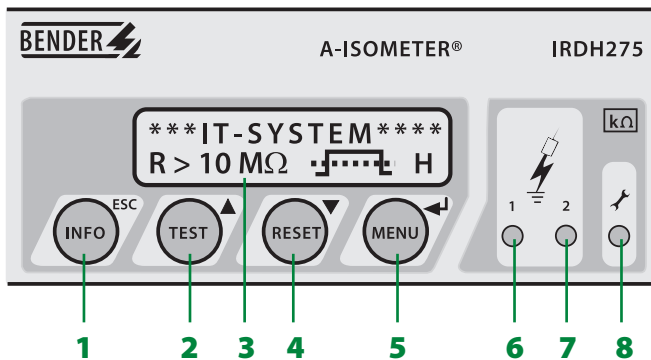
### Measuring principle

The IRDH275BU series uses the patented **AMP<sup>PLUS</sup>** measuring principle (chapter annex - measurement technology). 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

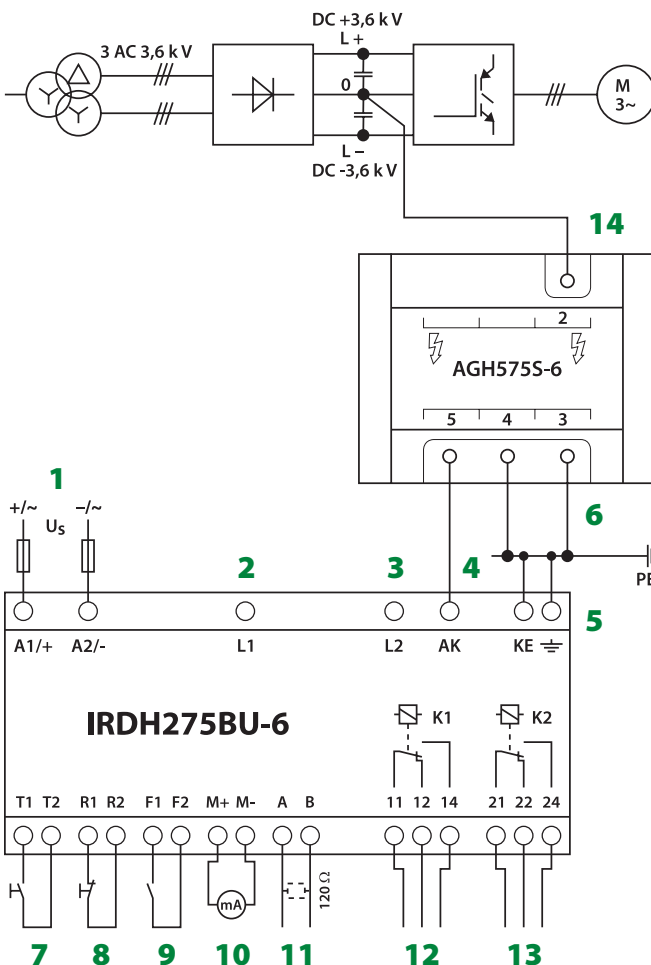
The IRDH275BU-6 and the coupling device AGH575S comply with the standards DIN EN 61557-8 (VDE 0413 Teil 8): 1998-05, EN 61557-8: 1997-03, IEC 61557-8: 1997-02, ASTM F 1669M-96, EN 61326, DIN VDE 0110-1 (VDE 0110 part 1) 1997-04, DIN VDE 0110-3 (VDE 0110 part 3) 1997-05.

Wiring diagram – operating elements



- 1 - INFO key: to query standard information / ESC key: back to the menu function, confirmation parameter change
- 2 - TEST button: to call up the self test  
Up key: parameter change, moving up in the menu
- 3 - Two-line display for standard and menu mode
- 4 - RESET button: to delete stored insulation fault alarms  
Down key: parameter change, moving down in the menu
- 5 - MENU key: to activate the menu  
ENTER key: confirmation 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



- 1 - Supply voltage  $U_s$  (see ordering details) 6 A fuse
- 2 - Terminals L1, L2 are unconnected!
- 3 - Terminals L1, L2 are unconnected!
- 4 - Connection to the coupling device AGH575S-6:  
Connect terminal AK with terminal 5 of the coupling device
- 5 - Separate connection of earth and KE to PE
- 6 - Connect the terminals 3 and 4 of the AGH575S-6 separately to PE
- 7 - External TEST button (NO contact)
- 8 - External RESET button (NC contact or wire jumper), when the terminals are open, the fault message will not be stored
- 9 - STANDBY by means of 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 RS485 (termination with a 120  $\Omega$  resistor)
- 12 - Alarm relay 1; changeover contacts available
- 13 - Alarm relay 2 (system fault relay); changeover contacts available
- 14 - Connection of the coupling device to the converter: terminal 2 to the mid-point of the DC intermediate circuit

1.6

**Technical data A-ISOMETER® IRDH275BU-6**
**Insulation coordination acc. to IEC 60664-1:**

Rated insulation voltage	AC 800 V
Rated impulse withstand voltage	8 kV/3

**Voltage ranges**

Nominal system voltage	via AGH575S-6 (0...3.6 kV)
Supply voltage $U_S$	see also ordering details
Nominal frequency	DC, 0.2...460 Hz
Frequency range of $U_S$	42...460 Hz
Power consumption	≤ 14 VA

**Response values**

Response value $R_{an1}$ (Alarm 1)	100 k $\Omega$ ...10 M $\Omega$
Response value $R_{an2}$ (Alarm 2)	100 k $\Omega$ ...10 M $\Omega$
Relative percentage error	0%...+20%
Response time $t_{an}$	≤ 5 min
Hysteresis	25%

**Measuring circuit**

Measuring voltage $U_m$	≤ 50 V
Measuring current $I_m$ (at $R_F = 0 \Omega$ )	≤ 42 $\mu$ A
Internal DC resistance $R_i$	≥ 1.2 M $\Omega$
Impedance $Z_i$ at 50 Hz	≥ 1.2 M $\Omega$
Permissible extraneous DC voltage $U_{fg}$	via AGH575S-6
Permissible system leakage capacitance $C_e$	≤ 10 $\mu$ F
Factory setting	5 $\mu$ F

**Displays**

Display, illuminated	two-line display
Characters (number of characters)	2 x 16
Display range, measuring value	50 k $\Omega$ ...10 M $\Omega$
Relative percentage error	± 10%

**Outputs/Inputs**

TEST / RESET button	internal / external
Cable length TEST / RESET button	≤ 10 m
Current output for measuring instrument SKMP (scale centre point = 1.2 M $\Omega$ )	
Current output (load)	0/4...20 mA (≤ 500 $\Omega$ )
Accuracy current output (100 k $\Omega$ ...10 M $\Omega$ )	± 10%

**Serial interface**

Interface / protocol IRDH275B	RS485 / BMS
Connection	terminals A / B
Cable length	≤ 1200 m
Recommended cable (shielded, shield on one side connected to PE)	J-Y(ST)Y 2 x 0.6
Terminating resistor	120 $\Omega$ (0.5 W)
Device address, BMS bus	1...30 (factory setting = 3)

**Switching elements**

Switching components	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 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 IEC 60068-2-29 (during transport)	40 g / 6 ms
Vibration resistance IEC 60068-2-6 (during transport)	1 g / 10...150 Hz
Vibration resistance IEC 60068-2-6 (during transport)	2 g / 10...150 Hz
Ambient temperature (during operation)	10 °C...+55 °C
Storage temperature range	40 °C...+70 °C
Climatic class acc. to DIN IEC 6072160721-3-3	3K5
Operating mode	continuous operation
Mounting	as indicated in the display
Connection	screw terminals
Technical data IRDH275BU-6 with AGH575S-647	TGH 1384 / 12.2004
Connection, rigid / flexible	0.2...4 mm <sup>2</sup> / 0.2...2.5 mm <sup>2</sup>
Connection, flexible with connector sleeve, without/with plastic sleeve	0.25...2.5 mm <sup>2</sup>
Conductor sizes (AWG)	24-12
Degree of protection, internal components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20
DIN rail mounting according to	DIN EN 60715 / IEC 60715
Flammability class	UL94 V-0
Weight	approx. 510 g

**Ordering details**

Type	Nominal voltage	Supply voltage	Art. No.
IRDH276BU-635	--	AC 88...264 V/ DC 77...286 V	B 9106 5111
AGH575S-6	AC/DC 0...3.6 kV	--	B 913 053

**Dimension diagram, enclosure XM112** Dimensions in mm
