

ISOMETER® isoRW685W-D

Insulation monitoring device for IT AC systems
with galvanically connected rectifiers and converters and
for IT systems especially for railway applications



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Device features

- ISOMETER® for IT AC systems with galvanically connected rectifiers or inverters and for IT DC systems (IT = unearthed systems)
- Automatic adaptation to the existing system leakage capacitance
- Combination of **AMP^{plus}** and other profile-specific measurement methods
- Two separately adjustable response value ranges of 1 kΩ...10 MΩ for alarm 1 and alarm 2
- High-resolution graphic LC display
- Connection monitoring (monitoring of the measuring lines)
- Automatic device self test
- Graphical representation of the insulation resistance over time (isoGraph)
- History memory with real-time clock (buffer for three days) for storing 1023 alarm messages with date and time
- Current and voltage output 0(4)...20 mA, 0...400 µA, 0...10 V, 2...10 V (galvanically separated) which is analogous to the measured insulation value of the system
- Freely programmable digital inputs and outputs
- Remote setting via the Internet or Intranet (Webserver / Option: COMTRAXX® Gateway)
- Remote diagnosis via the Internet (made available by Bender Service only)
- isoData: Continuous uninterrupted data transmission
- RS-485/BS (Bender sensor bus) for communication with other Bender devices
- BCOM, Modbus TCP and web server

Product description

The ISOMETER® isoRW685W-D is an insulation monitoring device for IT systems in accordance with IEC 61557-8 for railway applications and has been specifically tested according to DIN EN 50155. It is universally applicable in AC, 3(N)AC, AC/DC and DC systems. AC systems may include extensive DC-supplied loads (such as rectifiers, inverters, variable-speed drives).

Application

- AC, DC or AC/DC main circuits
- AC/DC main circuits with directly connected DC components, such as rectifiers, converters, variable-speed drives
- UPS systems, battery systems
- Heaters with phase control
- Systems with switch-mode power supplies
- IT systems with high leakage capacitances

Function

The insulation monitoring device continuously monitors the entire insulation resistance of an IT system during operation and triggers an alarm when the value falls below a preset response value. To obtain a measurement the device has to be connected between the IT system (unearthed system) and the protective earth conductor (PE). A measuring current in the µA range is superimposed onto the system which is recorded and evaluated by a micro-controlled measuring circuit. The measuring time is dependent on the selected measurement profiles, the system leakage capacitance, the insulation resistance and possible system-related disturbances.

The response values and other parameters are set using a commissioning wizard or via different setup menus using the device buttons and a high-resolution graphical LC display. The selected settings are stored in a permanent fail-safe memory. Different languages can be selected for the setup menus as well as the messages indicated on the display. The device utilises a clock for storing fault messages and events in a history memory with time and date stamp. The settings can be protected against unauthorised modifications by entering a password. To ensure proper functioning of connection monitoring, the device requires the setting of the system type 3AC, AC or DC and the required use of the appropriate terminals L1/+, L2, L3/-.

To extend the nominal voltage range, different coupling devices are available as accessories which can be selected from a menu where the required adjustments can also be made. The insulation monitoring device is able to measure the insulation resistance reliably and precisely in all common IT systems (unearthed systems). Due to various applications, system types, operating conditions, application of variable-speed drives, high system leakage capacitances etc., the measurement technique must be able to meet varying requirements in order to ensure an optimised response time and relative uncertainty. Different measurement profiles which can be selected from a setup menu allow optimum adaptation of the measurement technique to the specific application.

If the preset response value falls below the value of Alarm 1 and/or Alarm 2, the associated alarm relays switch, the LEDs Alarm 1 resp. Alarm 2 light and the measured value is shown on the LC display (in case of insulation faults in DC systems, a trend graph for the faulty conductor L+/L- is displayed). If the fault memory is activated, the fault message will be stored. Pressing the reset button, resets the insulation fault message, provided that the insulation resistance is at least 25 % above the preset response value. As additional information, the quality of the measuring signal and the time required to update the measured value are shown on the display. A poor signal quality (1-2 bars) may be an indication that the wrong measurement profile has been selected.

Interfaces

- Communication protocol Modbus TCP
- Communication protocol Modbus RTU
- BCOM for Bender device communication via Ethernet
- BS bus for communication of Bender devices (RS-485)
- Integrated web server for reading out measured values and for parameter setting

Measurement method

AMPPlus The series isoRW685W-D operates using the patented **AMPPlus** measurement method. This measurement method allows concise monitoring of modern power supply systems, also in case of extensive, directly connected DC components and high system leakage capacitances.

Standards

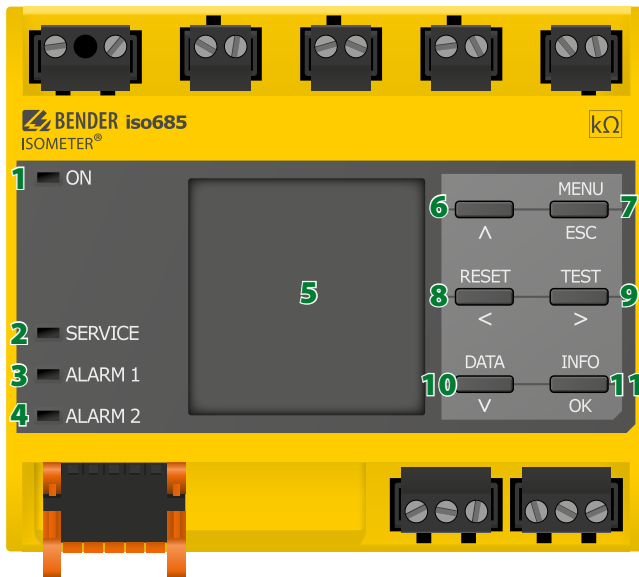
The ISOMETER® has been developed in compliance with the following standards:

- DIN EN 61557-8 (VDE 0413-8):2015-12
- IEC 61557-8:2014-12
- IEC 61557-8:2014/COR1:2016
- DIN EN 61557-8 Ber 1 (VDE 0413-8 Ber 1):2016-12
- DIN EN 50155:2018-05
- DIN EN 45545-2:2016

Certifications

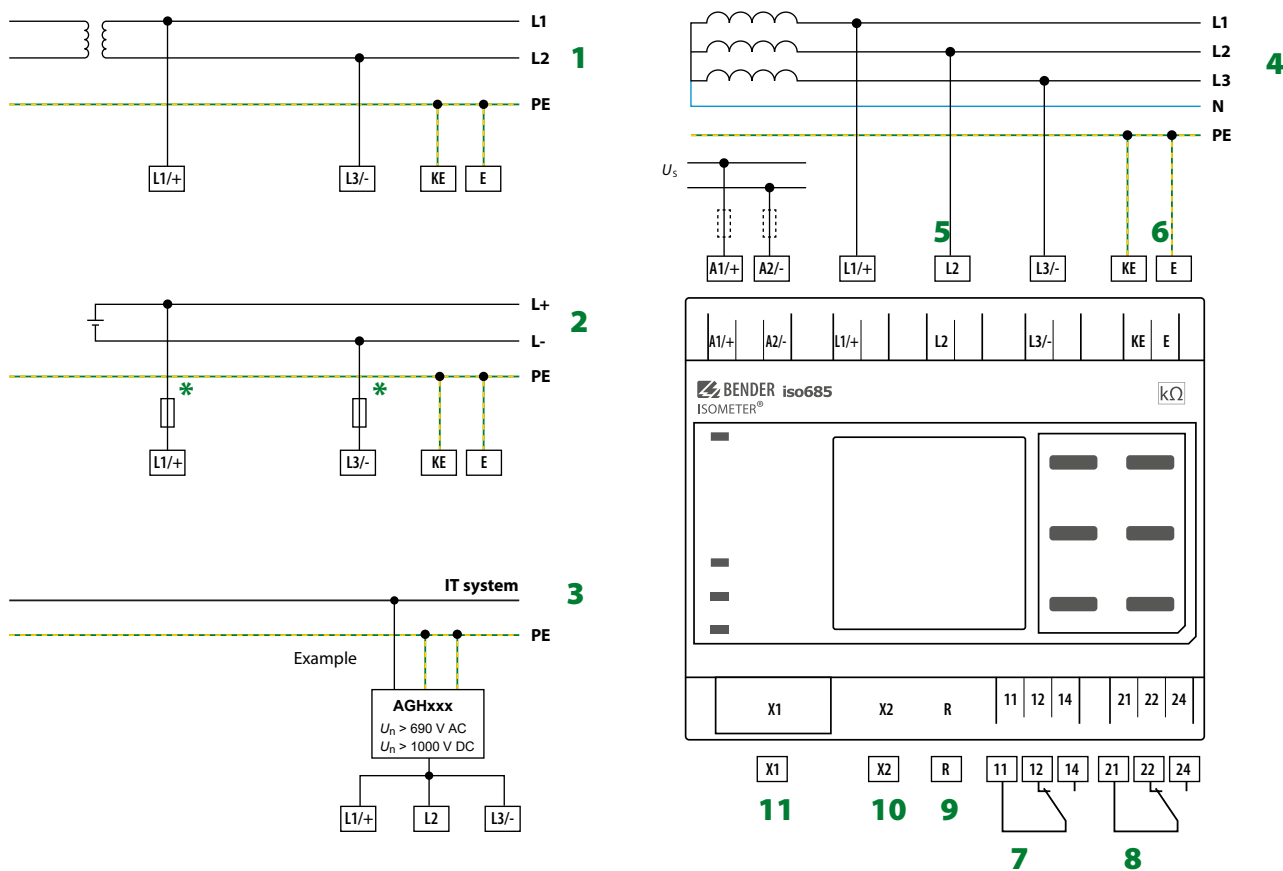


Operating elements



- 1 - ON The LED "ON" lights when the device is turned on.
- 2 - SERVICE The LED "SERVICE" lights when there is either a device fault or a connection fault, or when the device is in maintenance mode.
- 3 - ALARM 1 The LED "ALARM 1" lights when the insulation resistance of the IT system falls below the set response value R_{an1} .
- 4 - ALARM 2 The LED "ALARM 2" lights when the insulation resistance of the IT system falls below the set response value R_{an2} .
- 5 - Display The device display shows information regarding the device and the measurements.
- 6 - $\wedge$ Navigates up in a list or increases a value.
- 7 - MENU Opens the device menu
ESC Cancels the current process or navigates one step back in the device menu.
- 8 - RESET Resets alarms.
< Navigates backwards (e.g. to the previous setting step) or selects a parameter.
- 9 - TEST Starts the device self test.
> Navigates forwards (e.g. to the next setting step) or selects a parameter.
- 10 - DATA Indicates data and values.
V Navigates down in a list or reduces a value.
- 11 - INFO Shows information.
OK Confirms an action or a selection.

Wiring diagram



- 1 - Connection to an AC system U_n
- 2 - Connection to a DC system U_n
- 3 - Connection to an IT system with coupling device
- 4 - Connection to a 3(N)AC system
- 5 - Connection to the IT system to be monitored (L1/+, L2, L3/-)
- 6 - Separate connection of KE, E to PE
- 7 - (K1) Alarm relay 1, available changeover contacts
- 8 - (K2) Alarm relay 2, available changeover contacts

- 9 - Switchable resistor R for RS-485 bus termination
- 10 - Ethernet interface
- 11 - Digital interface
- * - For systems > 690 V and with overvoltage category III a fuse for the connection to the system to be monitored must be provided.
Recommendation: 2A screw-in fuses.

Provide line protection!

According to DIN VDE 0100-430, a line protection shall be provided for the supply voltage.

NOTE:

According to DIN VDE 0100-430, devices for protection against a short-circuit can be omitted for the coupling of terminals L1/+, L2, L3/- to the IT system ≤ 690 V to be monitored if the wiring is carried out in such a manner as to reduce the risk of a short-circuit to a minimum. (Recommendation: Ensure short-circuit-proof and earth-fault-proof wiring).

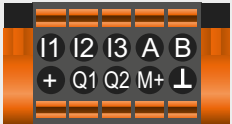
The connecting lines L1/+, L2, L3/- to the system to be monitored must be carried out as spur lines. No load current may be conducted through the terminals.

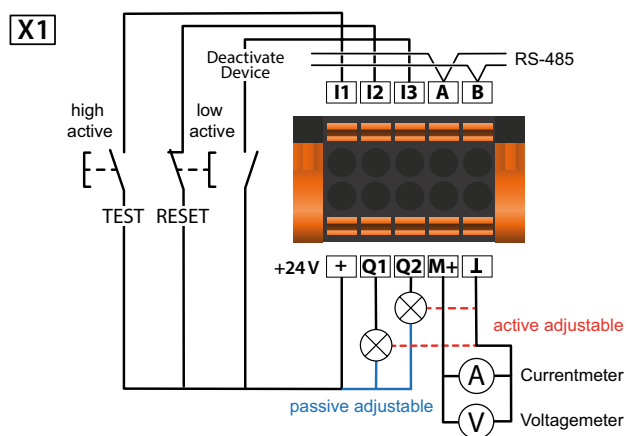
For UL applications:

Use 60/70°C copper lines only!

UL and CSA application require the supply voltage to be protected via 5 A fuses.

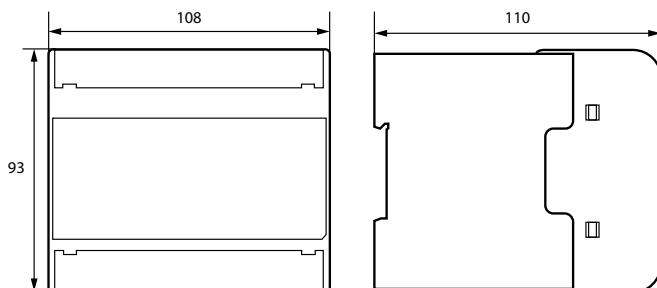
Digital interface X1

Digital interface	Terminal	Description
 X1	I1...I3	Configurable digital inputs (e.g. test, reset, ...)
	A, B	Serial interface RS-485, termination by means of a DIP switch R.
	+	Supply voltage of the inputs and outputs I, Q and M. Electrical overload protection. Automatic shutdown in the event of short circuits and transients (resettable). When supplied via an external 24 V source, A1/+ , A2/- must not be connected.
	Q1, Q2	Configurable digital output
	M+	Configurable analogue output (e.g. measuring instrument)
	⏏	Reference potential ground



Dimension diagram

Dimensions in mm



Ordering information

Nominal system voltage range U_n		Supply voltage U_s		Type	Art. no.
AC	DC	AC	DC		
0...690 V; 1...460 Hz	0...1000 V	24...240 V; 50...400 Hz	24...240 V	isoRW685W-D	B91067012W

Accessories

Description	Art. no.
A set of screw terminals ¹⁾	B91067901
A set of push-wire terminals	B91067902
Enclosure accessories (terminal cover, 2 mounting clips) ¹⁾	B91067903

¹⁾ included in the scope of delivery

Suitable system components

Description	Type	Art. no.
Coupling devices	AGH150W-4	B98018006
	AGH204S-4	B914013
	AGH520S	B913033
	AGH676S-4	B913055

Suitable measuring instruments on request!



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