Operating Manual

A-ISOMETER® IR1575PG1

Insulation monitoring device
for IT AC and DC systems with integrated
test current generator for insulation fault location

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1. Safety information

1.1 Use for the intended purpose

The A-ISOMETER® is intended for:

- monitoring the insulation resistance of IT systems
- localisation of insulation faults using EDS470-12... insulation fault evaluators

Any other use, or any use which goes beyond the foregoing, is deemed to be used other than for the intended purpose. The BENDER companies shall not be liable for any losses or damage arising therefrom.
Use for the intended purpose also includes

- compliance with all information in the operating instructions and
- compliance with test intervals.

As a basic principle, our "General conditions of Sale and Delivery" shall apply. At the latest, these shall be available to the operator when the contract is concluded.

1.2 Warranty and liability

Warranty and liability claims in cases of damage to persons and property shall be excluded if they are attributable to one or more of the following causes:

- Use of the A-ISOMETER® other than for the intended purpose
- Incorrect assembly or installation, commissioning, operation and maintenance of the A-ISOMETER®
- Failure to comply with the information in the operating instructions regarding transport, commissioning, operation and maintenance of the A-ISOMETER®
- Unauthorized structural modifications to the A-ISOMETER®
- Failure to comply with the technical data
- Improperly executed repairs, and the use of spare parts or accessories which are not recommended by the manufacturer
- Cases of disaster and force majeure
- Assembly and installation with device combinations not recommended

This operating manual, especially the safety information, must be observed above all by personnel who work on the A-ISOMETER®.
In addition, the rules and regulations that apply for accident prevention at the place of use must be observed.

1.2.1 Personnel

Only appropriately qualified staff may work on the A-ISOMETER®. Qualified means familiar with the installation, commissioning and operation of the product and with training appropriate to the work.
Personnel must have read and understood the safety section and warning information in this operating manual.

1.2.2 About the operating manual

This operating manual has been compiled with the greatest possible care. Nevertheless, errors and mistakes cannot be entirely ruled out. The BENDER companies assume no liability whatsoever for any injury to persons or damage to property which may be sustained as a result of faults or errors in this operating manual.

1.2.3 Hazards when handling the A-ISOMETER® IR1575PG1

The A-ISOMETER® IR1575PG1 is constructed according to the state-of-the-art and recognized technical safety rules. Nevertheless, when it is being used, hazards may occur to the life and limb of the user or third parties, or there may be adverse effects on the A-ISOMETER® or on other valuable property.
The A-ISOMETER® must only be used:

- for the purpose for which it is intended and
- when it is in perfect technical condition as far as safety is concerned.

Any faults which may impair safety must be eliminated immediately. Impermissible modifications and the use of spare parts and additional devices which are not sold or recommended by the manufacturer of the devices may cause fires, electric shocks and injuries.
Unauthorized persons must not have access to or contact with the A-ISOMETER®.
Warning signs must always be easily legible. Damaged or illegible signs must be replaced immediately.

1.2.4 Inspection, transport and storage

Inspect the dispatch packaging and equipment packaging for damage, and compare the contents of the package with the delivery documents. In the event of damage in transit, please inform the BENDER company immediately.
The devices must only be stored in areas protected from dust, damp and spray or dripping water, and in which the specified storage temperatures are maintained.

1.2.5 Note

Make sure that the operating voltage is correct !
Prior to insulation and voltage tests, the A-ISOMETER® must be disconnected from the power system for the duration of these tests.
In order to check the proper connection of the device, it is recommended to carry out a functional test.
Make sure that the basic settings meet the requirements of the system.
Children and unauthorized persons must not have access to or contact with the A-ISOMETER®.

1.3 Explanations of symbols and warnings

The following symbols are used in BENDER documentation to draw attention to important information and to make it easier to find certain text passages.
The following examples explain the meaning of the symbols:

The "Attention" symbol is used to draw attention to information warning employees of hazardous situations.

Information you should know for correct handling of the product is marked with the "Info" symbol.

1.4 Directions for installation

Only one insulation monitoring device may be used in each interconnected IT system.
When insulation or voltage tests are to be carried out, the device shall be isolated from the system for the test period.

The terminals ⏚ and KE shall be connected by a separate wire to the protective conductor (PE). If the terminals L1, L2, L3 of the device are connected to a system under operation, the terminals ⏚ and KE must not be disconnected from the protective conductor (PE).

In order to check the proper connection of the device, it is recommended to carry out a functional test using a insulation fault against earth, e.g. via a suitable resistance, before starting the A-ISOMETER®.

The devices will be delivered with the following factory settings:

ISO SETUP:	Alarm 1 / Alarm 2	=	40 kΩ / 10 kΩ
ISO SETUP:	Operating principle K1/K2	=	N.O. test (N/O operation with relay test)
ISO SETUP:	Memory	=	off
EDS SETUP:	EDS	=	auto
EDS SETUP:	MaxPuls	=	25 mA

Please check if the basic setting of the A-ISOMETER® fulfils the requirements of the system to be monitored.

When an AC system includes galvanically connected DC circuits, the following shall be considered:
Insulation faults in DC circuits can only be monitored correctly when the rectifiers carry a continuous load of 5...10 mA.

2. Function

2.1 IR1575PG1 characteristics

- A-ISOMETER® for IT AC systems with galvanically connected rectifiers and for IT DC systems U_n up to 480 V
  (IT = unearthed electrical systems)
- Automatic adaptation to the existing system leakage capacitance C_e up to 60 µF
- AMP measuring principle (European Patent: EP 0 654 673 B1)
- Generation of the test current necessary for selective insulation fault location
- Two separately adjustable ranges of response value of 2 kΩ ... 1 MΩ each (Alarm1, Alarm2)
- Two-line LC display
- Connection monitoring of the measuring leads to the IT system and to earth
- Automatic device self test
- Option „W“:
  This option provides: improved shock and vibration resistance for use in ships, on rolling stock and in seismic environment.

2.2 Product description

The A-ISOMETER® Typ IR1575PG1 monitors the insulation resistance of 3(N)AC/AC and DC IT systems. AC systems monitored by the IR1575PG1 may include extensive DC supplied loads (such as converters). The device automatically adapts itself to the existing system leakage capacitance.

2.3 Function

The A-ISOMETER® IR1575PG1 is connected between the unearthed system and the protective conductor (PE).
The response values and other function parameters are set via the function keys. The parameters are indicated on the LC display and are stored in a non-volatile memory (EEPROM) after the setting is completed.
The IR1575PG1 superimposes a microprocessor-controlled pulsating meas-

uring voltage on the system being monitored using the AMP measuring principle. The "adaptive measuring pulse" is a patent developed and patented by BENDER (European Patent:EP 0 654 673 B1). The measuring pulse consists of positive and negative pulses of the same amplitude. The period depends on the respective system leakage capacitances and the insulation resistances of the system being monitored.
An insulation fault between system and earth closes the measuring circuit. After detecting the measuring values, the evaluation circuit calculates the insulation resistance which is indicated on the LC display after the measuring time.

The measuring time is determined by the system leakage capacitances, the insulation resistance, and the system-related interferences. System leakage capacitances do not influence the measuring accuracy.
If the reading is below the selected response values Alarm1/Alarm2, the associated alarm relays respond and the alarm LEDs Alarm1/2 light up and the measuring value is indicated on the display (in the event of DC insulation faults, the faulty supply line is indicated). If the terminals R1/R2 are bridged (external RESET button [NC contact] or wire bridge), the fault message will be stored. Pressing the RESET button or opening the connection R1/R2, resets the fault message, provided that the currently displayed insulation resistance is at least 25% above the actual response value. The fault memory behaviour can also be set in the "ISO SETUP" menu, under "Memory: on/off". In this case the terminals R1/R2 remain unused.

By pressing the TEST button, the function of the A-ISOMETER® IR1575PG1 can be tested. In this way, all essential measuring functions as well as connections to the system and to earth are checked. This self test can automatically be carried out every 24 hours. Normally, the self test is carried out after switching the supply voltage on.

Self test
In order to ensure high measuring reliability, the A-ISOMETER IR1575PG1 provides comprehensive self test functions. After switching the supply voltage on, all internal measuring functions, the components of the process control such as data and parameter storage as well as the connections L1 and L3 to the system and to earth are checked using the self test functions (L2 will not be monitored). The progress of the self test is shown on the display by

a bar graph. Depending on the system conditions, the self test is running for approximately 15 ... 20 s, then the message "Test ok" appears on the LC display for approximately 2 s. Then the device returns to normal measuring mode and the currently measured value is displayed after the expiry of the measuring time.
When a device error or connection fault is detected, the message "Error" will appear on the display, the system fault LED (Alarm LED2) lights, the relay K2 (21-22-24) switches and the respective alarm message (see table) is indicated. When such a system fault occurs, a self test will be started after approximately one minute. When no more malfunction is detected, the alarm message is deleted automatically, and the system fault LED extinguishes.
During operation, the self test function can be started by pressing the TEST button (internal or external). The alarm relays Alarm1/2 only switch after starting the self test function by pressing the TEST button.

Insulation fault location

Another function of the IR1575PG1 is the generation of the test current for selective insulation fault location. When the value of the insulation resistance falls below the set response values Alarm1 and Alarm2, the IR1575PG1 generates the respective test current. In combination with an EDS470-12... insulation fault evaluator and the associated measuring current transformers connected to it, the insulation fault can be selectively detected. If no test current > 5 mA can be generated, the alarm message "No EDS funct." will be indicated. This may be caused by a device defect, loss of voltage or overtemperature in the device. Another cause may be a response value selected too high resulting in an increased insulation resistance too high to generate a sufficient test current.

Alarm messages and corrective actions:

Alarm message	Description	Corrective actions
System connection?	No low-resistance connection of the terminals L1, L3 to the system	1. Check the wiring of the terminals L1, L3 to the system 2. Press the TEST button 3. Switch the supply voltage on and off 4. Check the fuse
Connection PE?	No low-resistance connection between terminal ⏚ and KE to earth (PE)	1. Check wiring of terminal ⏚ and KE to earth (PE) 2. Press the TEST button 3. Switch the supply voltage on and off
Device error x	Internal device error	1. Press the TEST button 2. Switch the supply voltage on and off 3. Contact Bender
Insulation fault	The insulation resistance value has fallen below the set response value	1. Reduce the response value 2. Locate and clear insulation fault (EDS470-12)
No EDS Funct.	A test current cannot be generated	1. Check response value 2. Check supply voltage

Reset sequence control

If the on/off switching of the supply voltage is not possible for technical reasons, a RESET of the sequence control is to be carried out by pressing the buttons "RESET", "MENU" and "TEST" in succession.

Proceed as follows:

1. Press and hold down the RESET button
2. Press and hold down the MENU button
3. Press the TEST button for at least 2 s

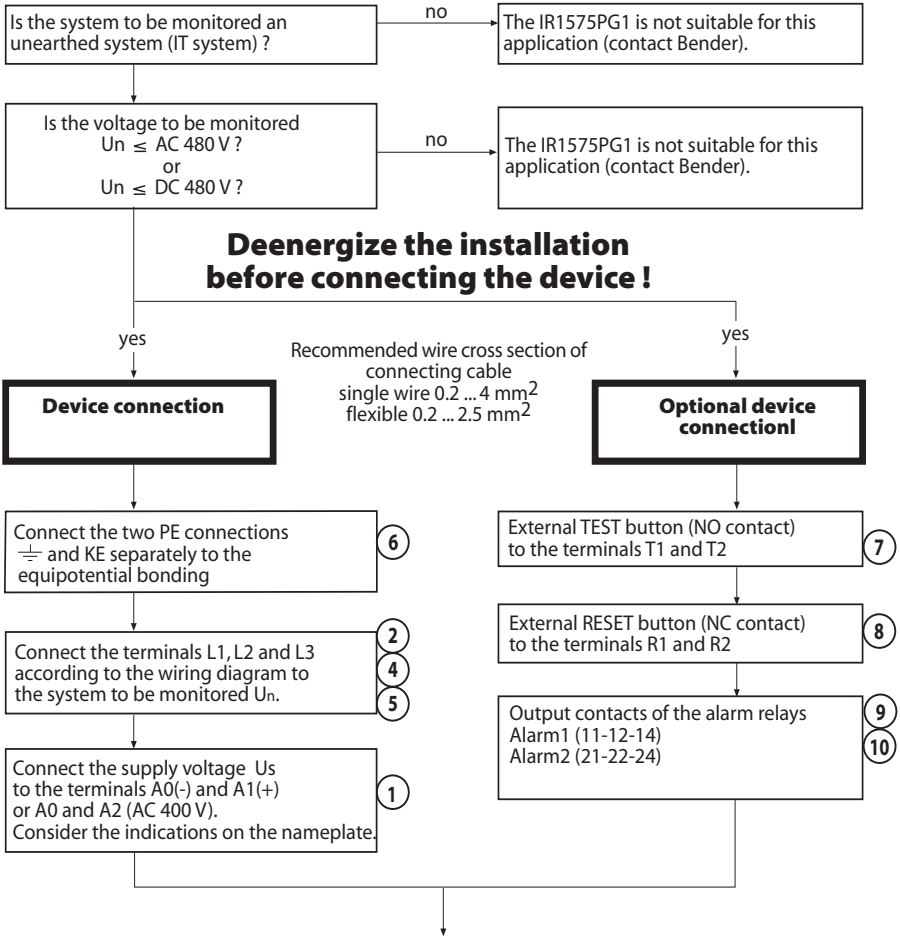
After executing the steps described above, the sequence control including the self test are restarted again.

3. Commissioning flow chart

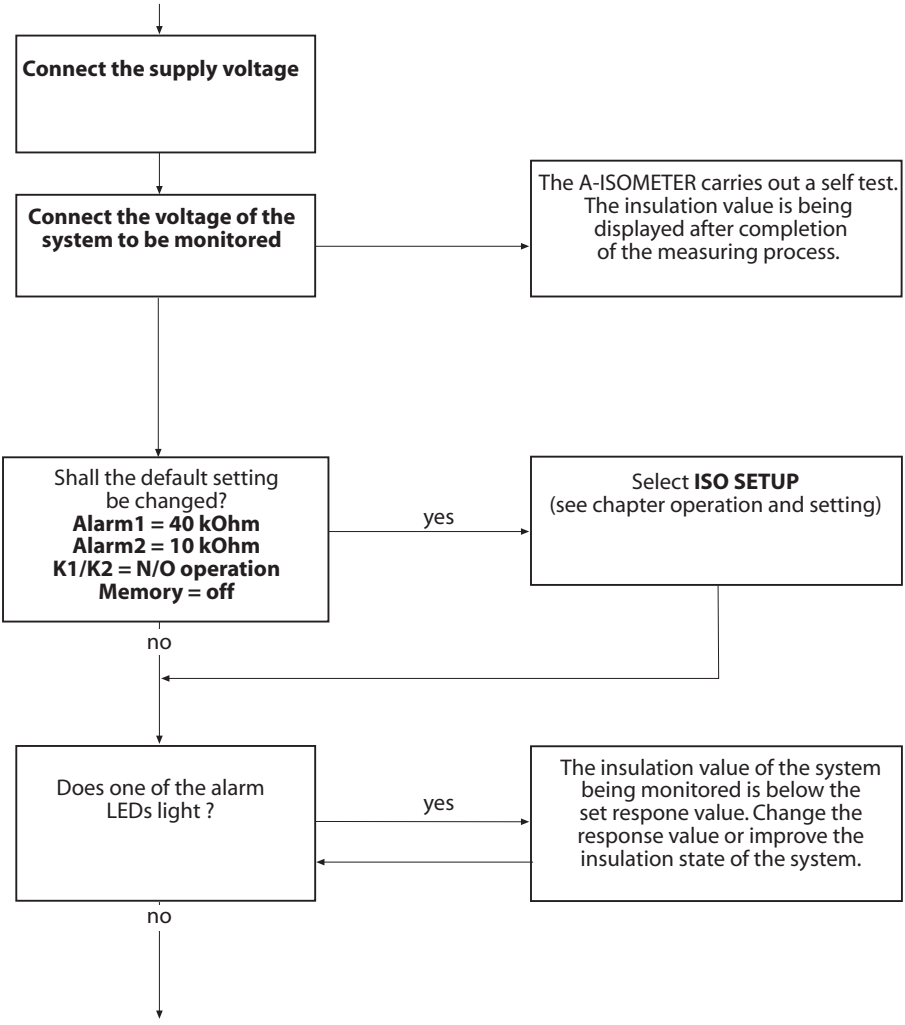
3.1 Commissioning of the A-ISOMETER functionality

The encircled figures in the three pages of the flow charts correspond to the figures in the legend to wiring diagram (see page 25).

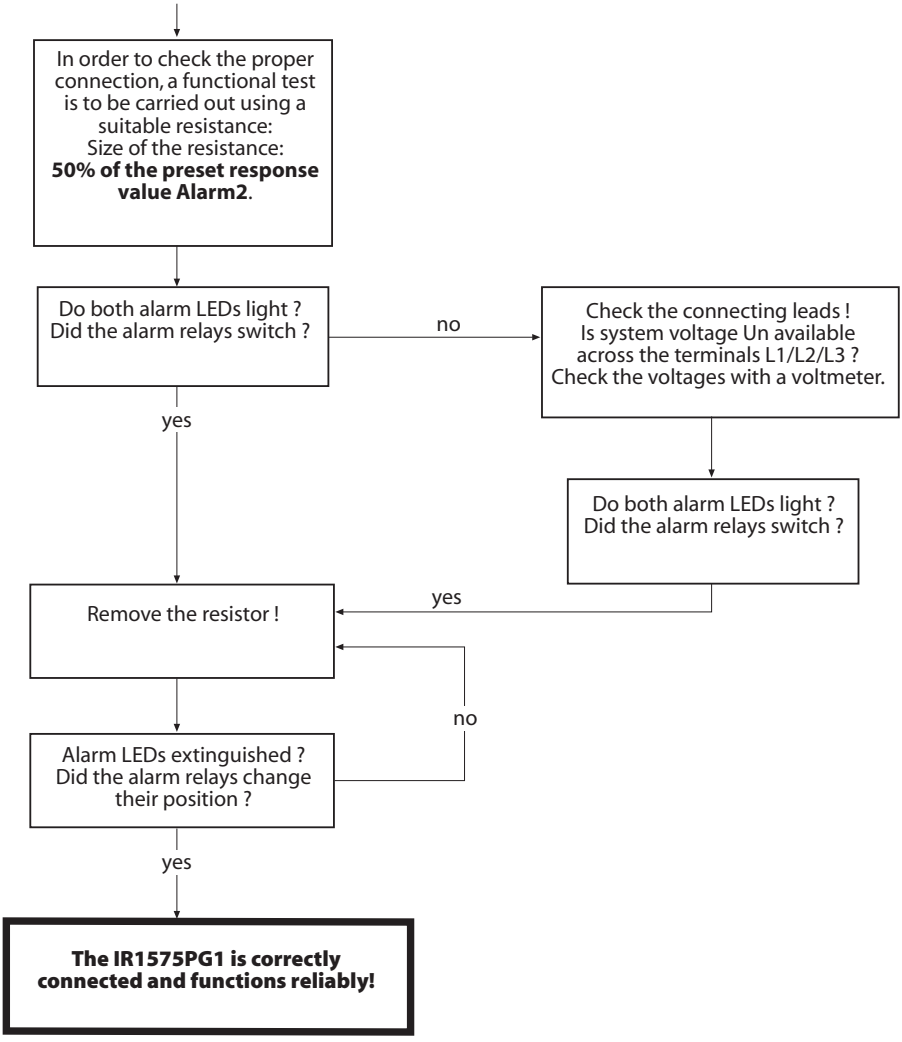
Commissioning of the A-ISOMETER (1)



Commissioning of the A-ISOMETER (2)

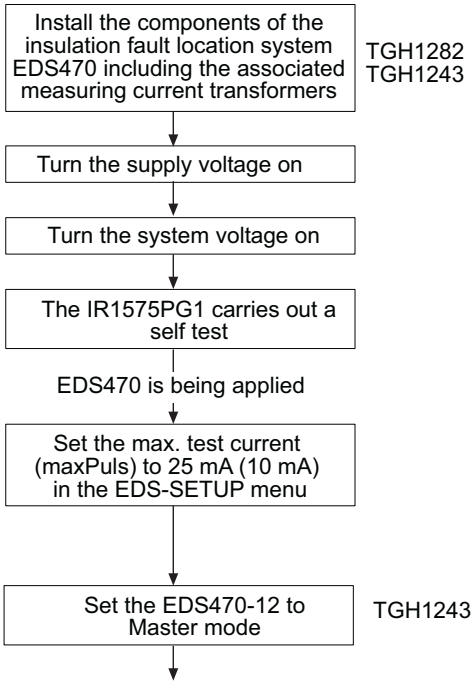


Commissioning of the A-ISOMETER (3)

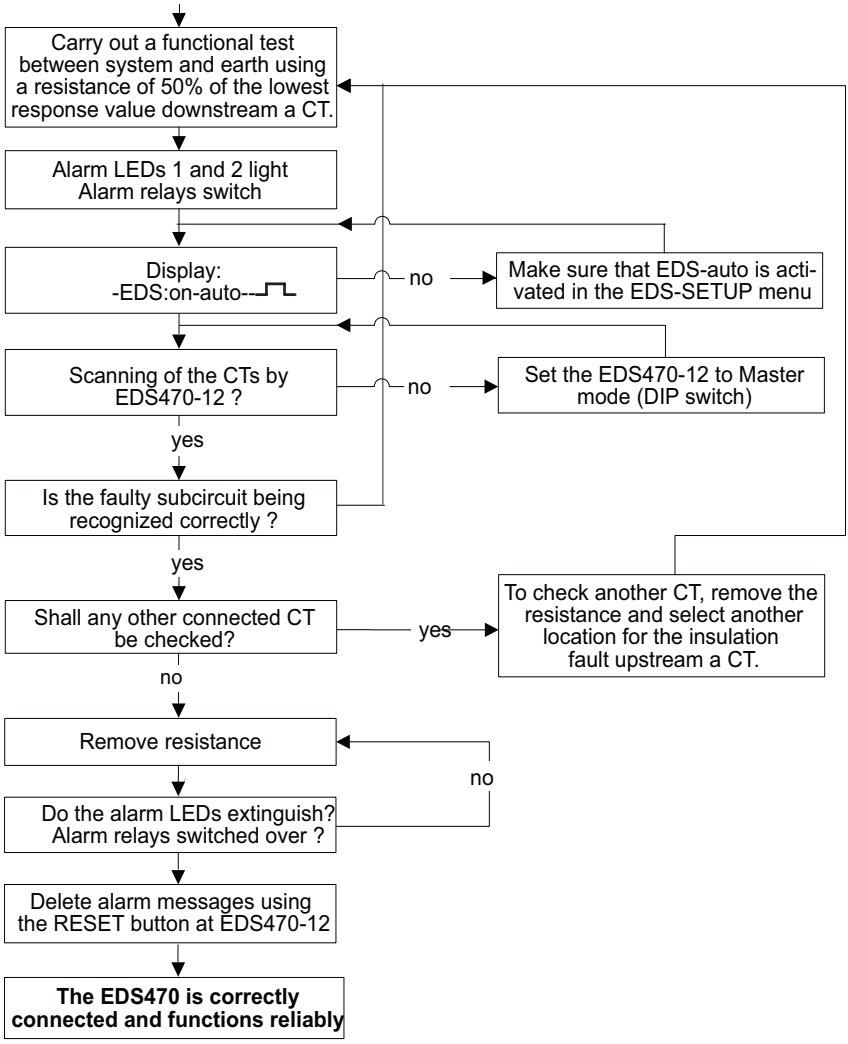


3.2 Commissioning of the insulation fault location function (EDS) (1)

Disconnect the electrical installation before connecting the device !



Commissioning of the function insulation fault location (EDS) (2)



4. Connection

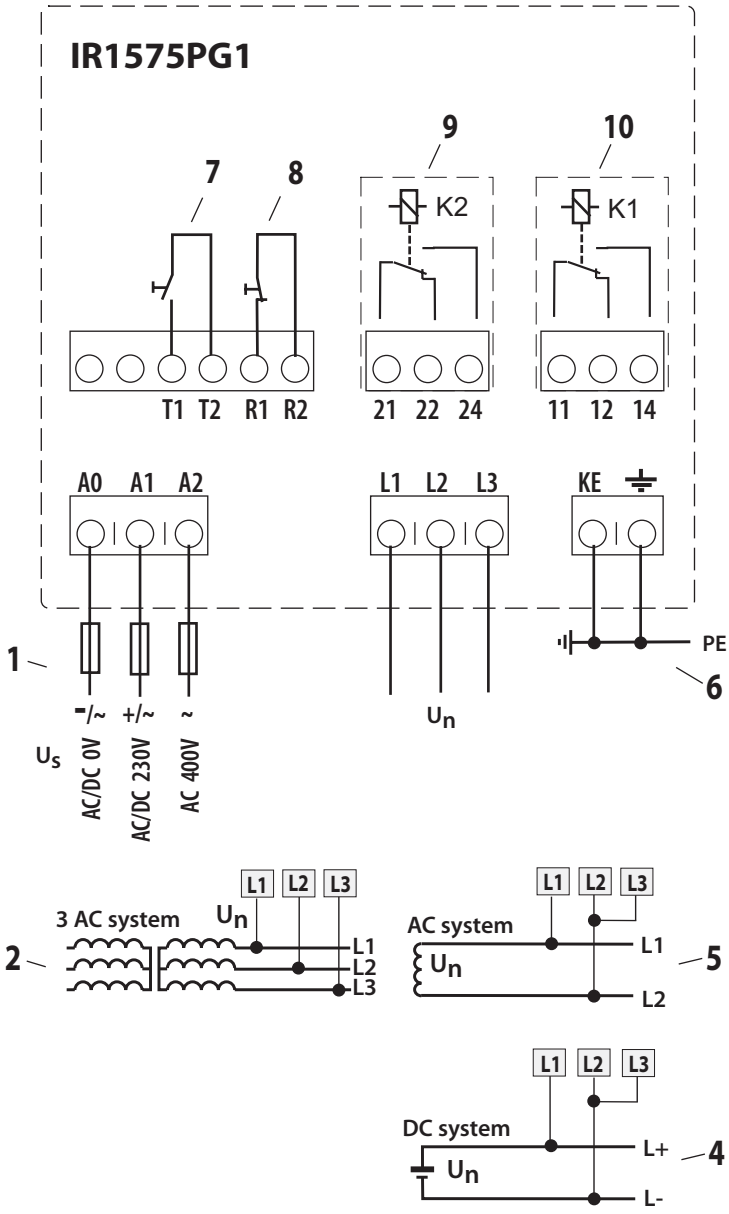
4.1 Wiring

IR1575PG1 has plug-in terminals.

Connect the terminals A0/A1 respectively A0/A2 to the supply voltage U_s in accordance with IEC 60364-4-43. The connections to the supply voltage shall be provided with protective devices to afford protection in the event of a short circuit (a 6 A fuse is recommended).

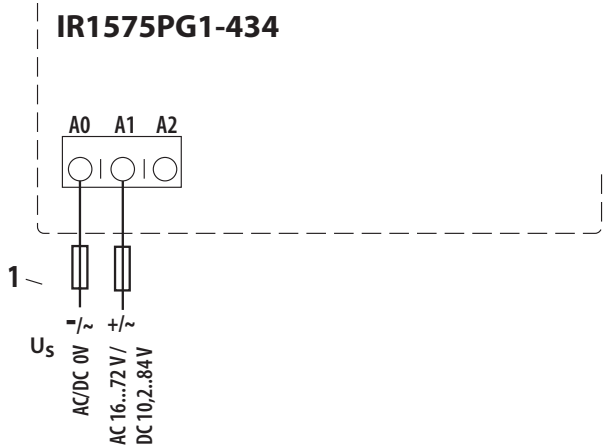
Devices for protection against short circuit in conformity with IEC 60364-4-473 for the IT system coupling L1/L2/L3 can be omitted if the wiring is carried out in such a manner as to reduce the risk of a short-circuit to a minimum. (a short-circuit-proof and insulation-fault-proof wiring is recommended)

Only one A-ISOMETER® may be connected to an external TEST or RESET button. A galvanic parallel connection of several TEST and RESET inputs for collective testing of A-ISOMETER®s is not permitted.


IR1575PG1
7
8
9
10
K2
K1
T1 T2 R1 R2
21 22 24
11 12 14
A0 A1 A2
L1 L2 L3
KE
PE
1
6
-/~ +/~ ~
Us
AC/DC 0V
AC/DC 230V
AC 400V
Un
2
3 AC system
Un
L1 L2 L3
AC system
5
DC system
4
L+
L-

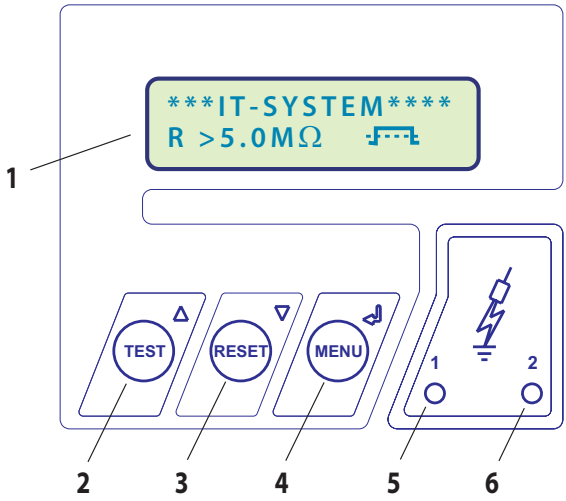
Legend to wiring diagram:

1	Supply voltage Us (see nameplate, Technical Data on page 43 or the ordering details) via 6 A fuse:
2	Connection of the 3AC system to be monitored: connect the terminals L1, L2, L3 to the conductors L1, L2, L3
4	Connection of the DC system to be monitored: connect L1 to conductor L+, terminal L2, L3 to conductor L-
5	Connection of the AC system to be monitored: connect terminal L1 to conductor L1, terminals L2, L3 to conductor L2
6	Separate connection of ⏚ and KE to PE
7	External TEST button (NO contact)
8	External RESET button (NC contact or wire jumper), when the terminals are open, the alarm message will not be stored, Factory setting: Memory off !
9	Alarm relay: Alarm2
10	Alarm relay: Alarm1



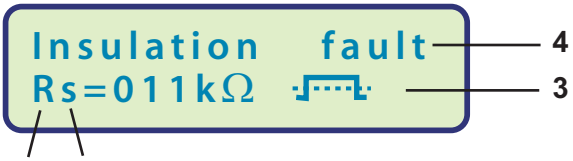
5. Operation and setting

5.1 Operating elements and displays IR1575PG1



1	Two-line display for standard and menu mode
2	TEST button: to activate the self test/ Up key: parameter change, moving up in the menu
3	RESET button: to delete insulation fault alarms/ Down key: parameter change, moving down in the menu
4	MENU key: activating the menu system / Enter key: confirmation parameter change
5	Alarm LED 1 lights: insulation fault, first warning level reached
6	Alarm LED 2 lights: insulation fault, second warning level reached, or system fault message

5.1.1 Display in the standard mode



1	Indication of the insulation resistance in kΩ
2	Additional information about the insulation resistance: „+“ = insulation fault at L+ „–“ = insulation fault at L– „s“ = new measurement is running
3	⎍ = Polarity of the measuring pulse (AMP)
4	Messages: - Insulation fault - Connection system? - Connection PE? - Device error x - No EDS function

5.1.2 Display in the Menu mode

Parameter change is allowed

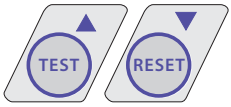
Parameter change is blocked,, enabling by a password

5.1.3 Display in the EDS mode

1	Indication of an insulation fault
2	EDS operating modes: - EDS:on------- - EDS:on-auto-- - EDS:on-1cycle-- ⎍ = Polarity of the test current

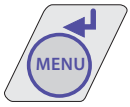
5.1.4 Function keys

Two functions are assigned to each function key. In addition to the encircled basic functions, all keys allow navigation within the menu.



Pressing the TEST key starts the A-ISOMETER® self test.

Pressing the RESET button resets insulation fault alarm messages stored in the A-ISOMETER®. This function is only available after activating the fault memory in the ISO-Setup menu or after bridging R1/R2. Furthermore, the A-ISOMETER® can only be reset when the currently measured insulation value is 25% above the set response value.

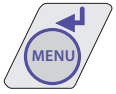


Pressing the MENU key opens the menu system.

The UP/DOWN keys and the ENTER key are used for menu system control:

Up key:
Moving up in the menu, increasing parameters.

Down key:
Moving down in the menu, reducing a parameter.



ENTER key
Selecting a menu item or sub menu item, confirming or storing a parameter change and going back to the associated sub menu item or going to the next input area.

If the menu is not closed, the device changes to the display mode after approximately 5 minutes.

For the sake of clarity, only the following symbols are used to represent the functions ENTER and UP/DOWN:

5.2 Menu structure

Switchover to the menu mode

After pressing the MENU key, you can change from the standard mode to the menu mode. From the menu mode you can link to the different sub menus.

Navigation within the menu

Select the desired menu item using the UP/DOWN keys. The selected menu item is indicated by a flashing cursor. Press the ENTER key to open the associated sub menu.
Use the UP/DOWN keys again to select the desired parameters. Move the cursor to the edit field by pressing the ENTER key.
If you have reached the end of the main menu list, it will be indicated by the "Arrow UP" symbol.

Changing the parameters

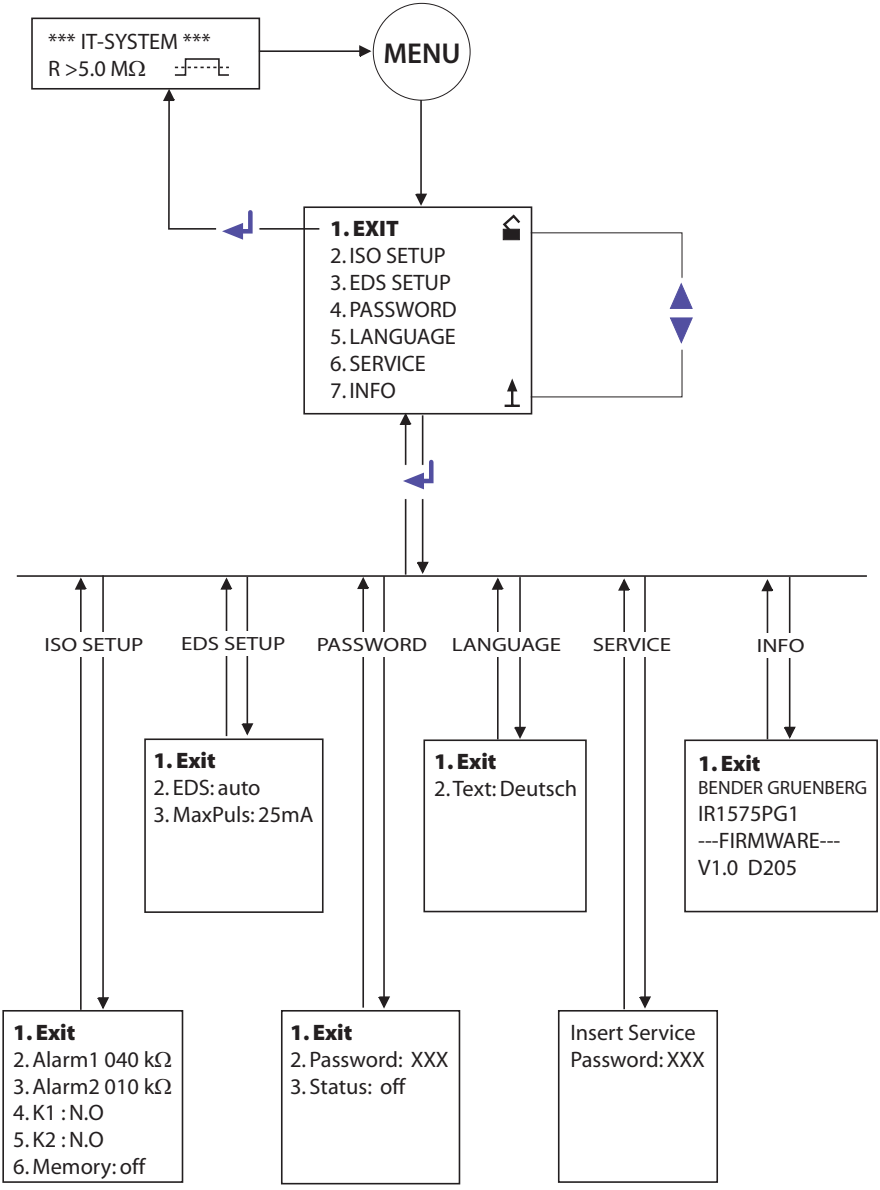
When password protection is activated, indicated by the symbol "padlock closed"  , the first thing to enter is the correct password before the parameters can be changed using the UP/DOWN keys. Entering the correct password once allows all parameters to be changed as long as you do not leave the menu.

Changing the parameter usually has an immediate effect on the measuring and alarm functions. The changed parameter is stored in a volatile memory by pressing the ENTER key after returning to the sub menu (flashing cursor in column 1). During menu operations, all measuring and alarm functions carry on working as usual in the background.

Changing from the menu mode to the standard mode

Select the menu item "EXIT" and press the ENTER key to leave the respective menu and to move to the next higher level. This is either the main menu or the standard mode. If you stay in the main menu or a sub menu longer than five minutes, the device will automatically switchover from the menu to the standard mode.

5.2.1 Diagram menu structure



5.3 ISO SETUP menu: A-ISOMETER default settings

The alarm functions Alarm1 and Alarm2 (prewarning and main alarm), the operating principle of the alarm relays K1 and K2 (N.O = N/O operation, N.C = N/C operation), and fault memory behaviour can be set in this menu.

5.3.1 Response values Alarm1 and Alarm2

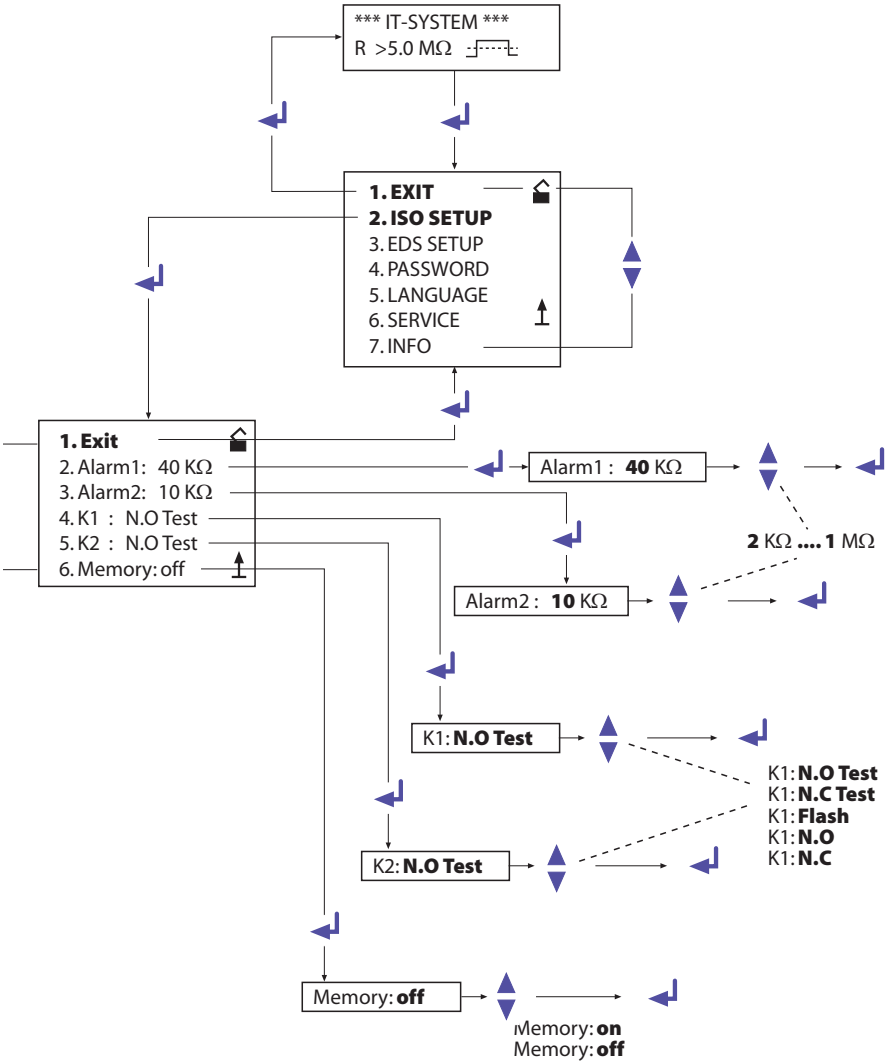
The alarm values Alarm1 und Alarm2 are set using the UP/DOWN keys and saved pressing the ENTER key.

5.3.2 Operating principle of the alarm relays

By default K1/K2 is set to N.O Test, that means N/O operation. The supplement "Test" points out that the setting of the alarm relays changes during a manual self test. If, for any reason, the alarm relays are to be prevented from switching during a manual self test, select N.C or N.O.

K1: N.C Test = N/C operation contacts 11-12-14, including relay test
(the alarm relay is energized during normal operation)
K1: N.O Test = N/O operation contacts 11-12-14, including relay test
(the alarm relay is deenergized during normal operation)
K1: N.C = N/C operation contacts 11-12-14, without relay test
(the alarm relay is energized during normal operation)
K1: N.O = N/C operation contacts 11-12-14, without relay test
(the alarm relay is deenergized during normal operation)
K1: Flash = Blinking function contacts 11-12-14
(The alarm relay and the LED flash (0.5 Hz)
when an alarm message occurs)
K2: N.C Test = N/C operation contacts 21-22-24, including relay test
(the alarm relay is energized during normal operation)
K2: N.O Test = N/O operation contacts 21-22-24, including relay test
(the alarm relay is deenergized during normal operation)
K2 : N.C = N/C operation contacts 21-22-24, without relay test
(the alarm relay is energized during normal operation)
K2 : N.O = N/O operation contacts 21-22-24, without relay test
(the alarm relay is deenergized during normal operation)
K2 : Flash = Flashing function contacts 21-22-24
(the alarm relay and the LED flash (0.5 Hz) when an alarm message occurs

5.3.3 Diagram ISO SETUP



During the 24 h self test, the relays are not switched over.

On the occurrence of a system fault, the Alarm LED 2 lights and relay K2 will be automatically activated as a system fault relay.

5.3.4 Memory setting (on/off)

Memory: on = Fault memory os activated.
Reset the device using the RESET button after clearing the fault.
Memory: off = Fault memory deactivated (factory setting)

5.4 EDS SETUP menu: default settings for fault location

All appropriate settings for insulation fault location systems (EDS) can be set in this menu.

5.4.1 EDS on / auto / 1cycle / off

The following start and stop conditions for the EDS system can be selected here:

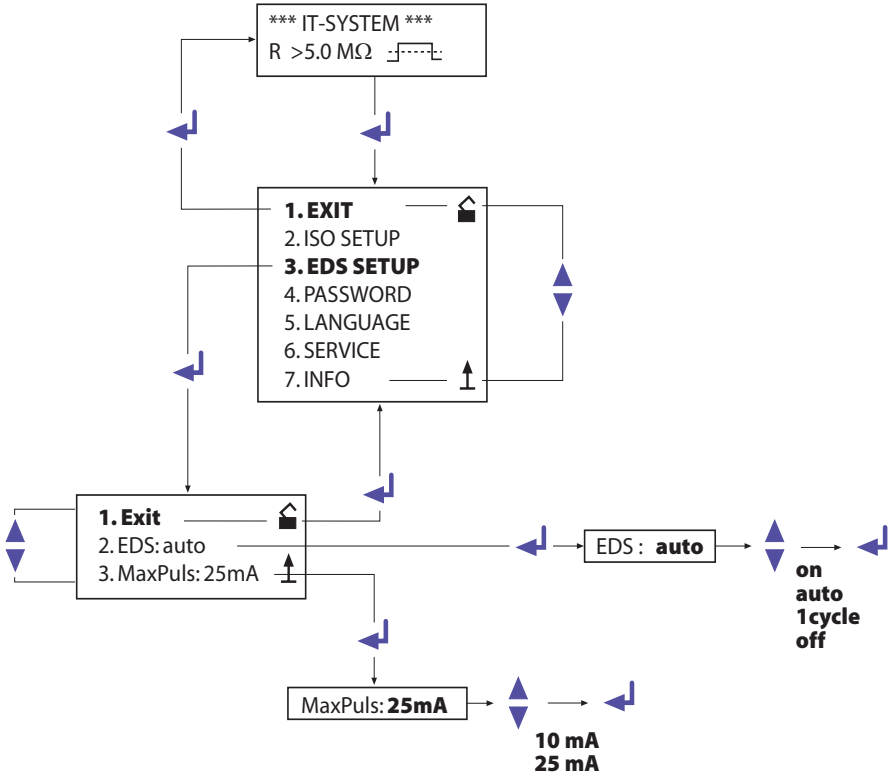
- on
  The EDS system is activated and continuously operating, regardless of the insulation value and the alarm messages of the A-ISOMETER. This setting is particularly suitable for fault location using a portable insulation fault location system such as EDS3060, for example.
- auto
  The EDS system will automatically be activated as soon as the level of Alarm 1 and Alarm 2 goes above or below the normal level and remains active as long as the test current is above 5 mA. To measure the insulation fault value using the A-ISOMETER, insulation fault location is cyclically interrrupted for approximately 5 minutes (factory setting).
- 1cycle
  The EDS system will automatically be activated when the level of the response value falls below the response values Alarm 1 and Alarm 2. It remains active until every EDS470-12... has measured all channels once and when the test current is above 5 mA during the measurement.
- off
  The EDS system is constantly switched off.

5.4.2 maxPuls: 10 / 25 mA

The maximum test current can be set here.

- 10 mA and 25 mA for EDS470 systems, preferably 25 mA .
  10 mA are recommended to be set when sensitive electrical equipment such as control relays are supplied by the system. (factory setting 25mA)

5.4.3 Diagram EDS-SETUP

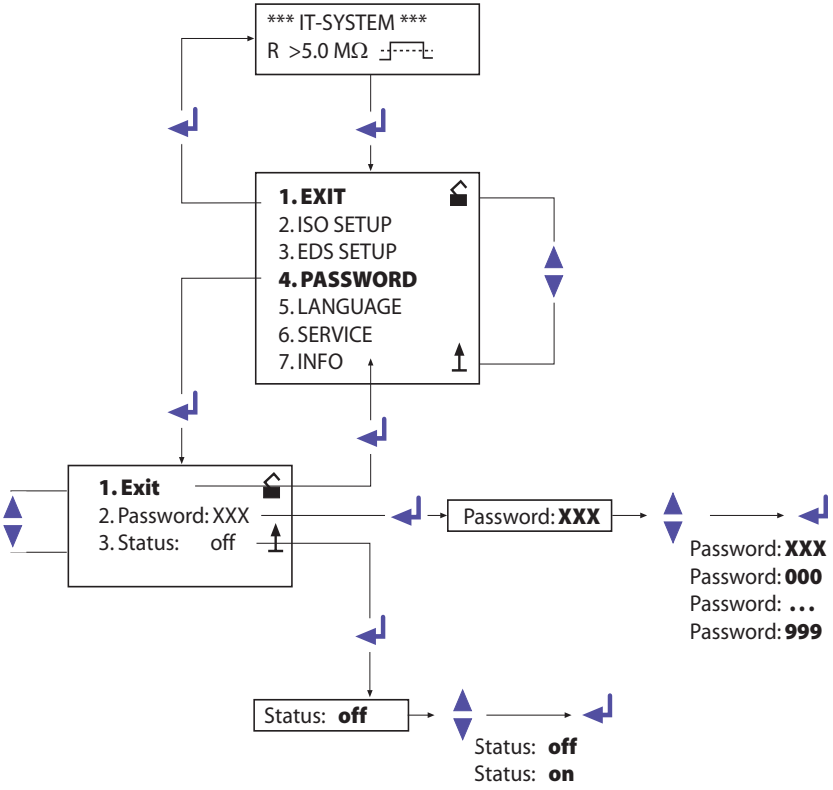


5.5 PASSWORD menu

5.5.1 Password activation and setting

A "password" query can be activated in this menu to protect the A-ISOMETER against unauthorized settings and modifications.
Use the arrow keys to select the desired password (menu item 2. Password: xxx) and confirm with ENTER.
For password activation, select menu item "3. Status: on" using the ENTER key. By default the password is deactivated „3. Status: off“.

5.5.2 Diagram PASSWORD



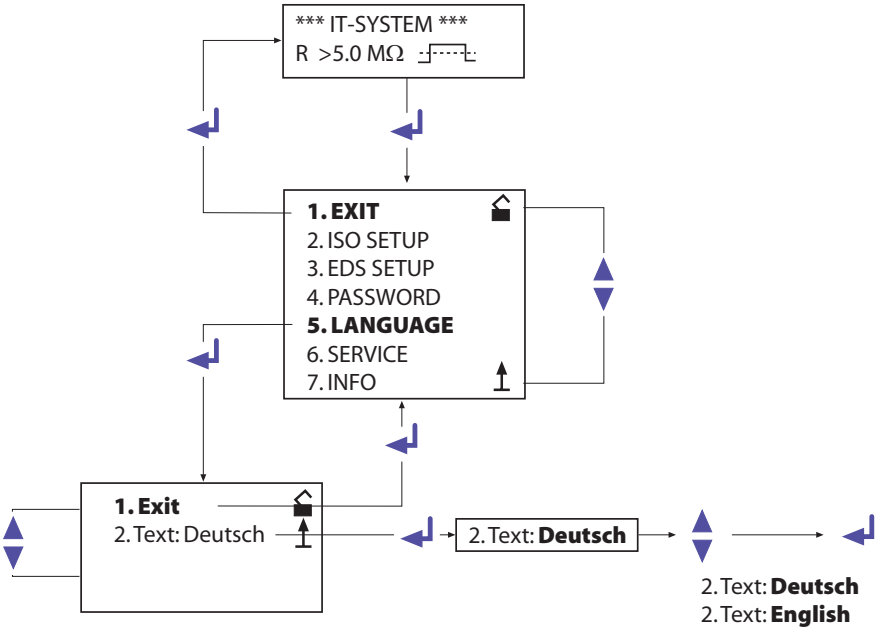
5.6 LANGUAGE menu

5.6.1 Language setting

This menu item offers a selection of two languages for the indication of fault messages. Choose between English and German language.

The device menu is indicated in English language and cannot be changed by the language setting.

5.6.2 Diagram Language



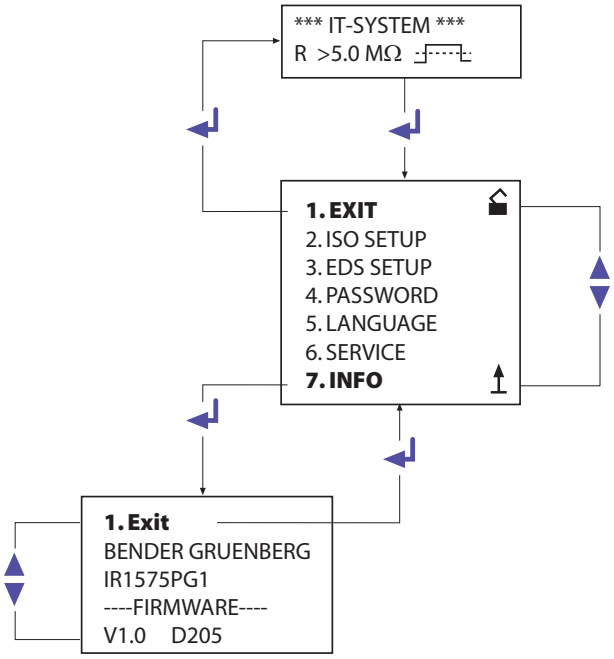
5.7 SERVICE menu

This menu item is intended for BENDER service staff and is secured by a password against erroneous settings. It is intended to provide fast fault clearance by qualified experts.

5.8 INFO menu

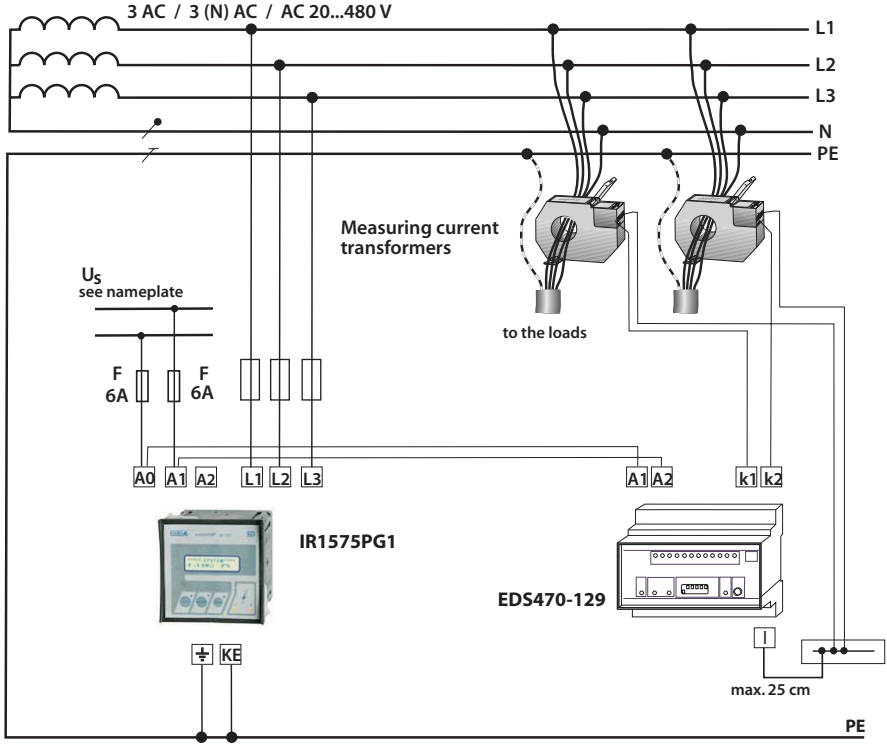
This menu allows to query the type of the device addressed. In addition, the display indicates the software version applied.

5.8.1 Diagram INFO



6. Operation with EDS device EDS470-12...

The illustration below shows an IR1575PG1 in combination with EDS470-129 without bus capability and the associated measuring current transformers for insulation fault location. In many cases, the device can be operated using the default settings. When an EDS470-12 is used, it must operate in the Master mode.
For details about the test current setting „MaxPuls“ in the EDS SETUP menu, refer to "chapter 5.4.2 maxPuls: 10 / 25 mA".
For further use of the IR1575PG1 in combination with EDS systems, the following technical manuals are available: TGH1243 for EDS470, TGH1282 for configuration of EDS470 systems.



7. Technical data IR1575PG1

7.1 Data in tabular form

Insulation coordination acc. to IEC 60664-1

Rated voltage ..... AC 500 V
Rated impulse voltage/pollution degree ..... 4 kV / 3

Voltage ranges

IR1575PG1...:
Nominal voltage range U_n ..... AC / 3 AC 20...480 V
Nominal frequency f_n ..... 30...460 Hz
Nominal voltage range U_n ..... DC 20...480 V
IR1575PG1-435:
Supply voltage U_s at **A0/A1** (see nameplate) ..... AC 88...264 V
Frequency range of U_s ..... 42...460 Hz
Supply voltage U_s at **A0/A2** (see nameplate) ..... AC 340...460 V
Frequency range of U_s ..... 47...63 Hz
Supply voltage U_s at **A0/A1** (see nameplate) ..... DC 77...286 V
IR1575PG1-434:
Supply voltage U_s at **A0/A1** (see nameplate) ..... AC 16...72 V
Frequency range of U_s ..... 42...460 Hz
Supply voltage U_s at **A0/A1** (see nameplate) ..... DC 10,2...84 V
IR1575PG1...:
Power consumption ..... ≤ 5 VA

Response values

Response value R_{an1} (Alarm1) ..... 2 kΩ...1 MΩ
Response value R_{an2} (Alarm2) ..... 2 kΩ...1 MΩ
Specified response value (2 kΩ...10 kΩ) ..... +2 kΩ
Specified response value (10 kΩ...1 MΩ) ..... 0 %...+20 %
Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1$ µF ..... ≤ 5 s
Measuring time ..... see characteristic curves
Hysteresis (2 kΩ...10 kΩ) ..... +2 kΩ
Hysteresis (10 kΩ...1 MΩ) ..... 25 %

Measuring circuit for insulation measurement

Measuring voltage U_m ..... ≤ 20 V

Measuring current I_m (at $R_F = 0\ \Omega$) ..... ≤ 170 µA
Internal DC resistance R_i ..... ≥ 119 kΩ
Internal impedance Zi, at 50 Hz ..... ≥ 114 kΩ
Permissible extraneous DC voltage U_{fg} ..... ≤ DC 680 V
Permissible system leakage capacitance C_e ..... ≤ 60 µF

Measuring circuit for insulation fault location (EDS)

Test current Ip DC ..... 10 / 25 mA
Test pulse / break ..... 2s / 4s

Displays

Display, illuminated ..... two-line display
Number of characters ..... 2 x 16
Display range measuring value ..... 1 kΩ .... 5 MΩ
Absolute error (1 kΩ...10 kΩ) ..... ±1 kΩ
Relative percentage error (10 kΩ...5 MΩ) ..... ±10 %

Outputs/inputs

TEST/ RESET button ..... internal/external

Switching components

Switching components ..... 2 changeover contacts
Operating principle ..... N/O or N/C operation
Factory setting (Alarm1/Alarm2) ..... N/O operation
Admissible number of operations/h ..... 12 000 cycles
Contact class ..... IIB (IEC 60255-23)
Rated contact voltage ..... AC 250 V / DC 300 V
Making capacity ..... UC 5 A
Breaking capacity ..... 2 A, AC 230 V, cos φ = 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

EMC immunity ..... acc. to EN 61326
EMC emission ..... acc. to EN 61326
Shock resistance acc. to IEC 60068-2-27 (during 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 (during operation) ..... 1 g / 10...150 Hz
Vibration resistance acc. to 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 IEC 60721-3-3 ..... 3K5
Operating mode ..... continuous operation
Position ..... depending on the display position
Connection ..... plug-in terminals
Wire cross section of connecting cable, rigid/flexible ..... 0.2...4 mm^2 / 0.2...2.5 mm^2
Connection, flexible with ferrules, without/with plastic collar, ... 0.25...2.5 mm^2
Conductor sizes (AWG) ..... 24...12
Degree of protection, internal components (DIN EN 60529) IP30
Degree of protection, terminals (DIN EN 60529) IP20
Enclosure ..... for panel mounting 96 x 96 mm
Flammability class UL94 V-2
Weight ..... ca. 480 g

Option „W“

Shock resistance acc. to IEC 60068-2-27 (during operation) ..... 30 g / 11 ms
Bumping acc. to IEC 60068-2-29 (during transport) ..... 40 g / 6 ms
Vibration resistance acc. to IEC 60068-2-6 ..... 1.6 mm / 10...25 Hz
..... 4 g / 25...150 Hz
Ambient temperature (during operation ..... -10 °C...+55 °C
Storage temperature range ..... -40 °C...+85 °C

7.2 Standards and approvals

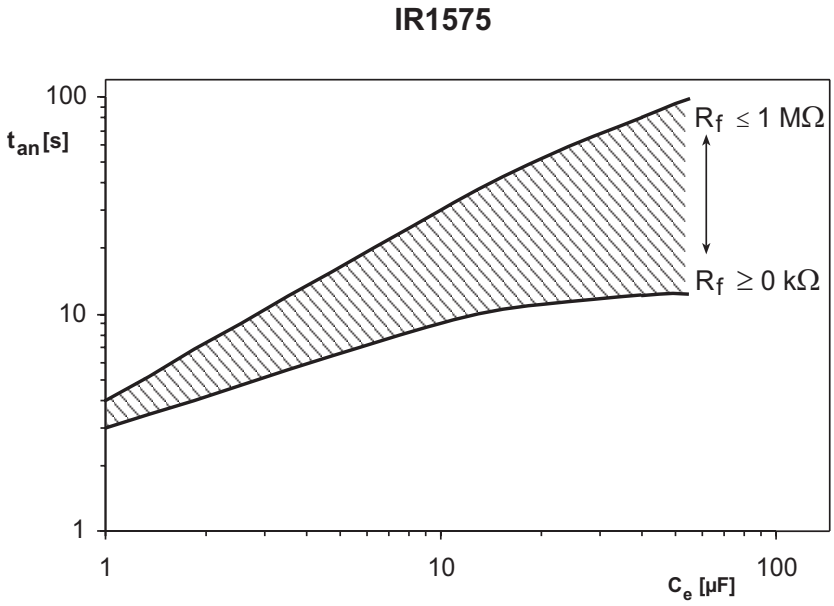
The A-ISOMETER® was designed in consideration of the following standards:

- DIN EN 61557-8 (VDE 0413-8):1998-05
- EN 61557-8:1997-03
- IEC 61557-8:1997-02
- IEC 61557-9:1999-09
- IEC 61557-9:1999-11
- EN 61326
- DIN EN 60664-1 (VDE 0110-1):2003-11
- DIN EN 60664-3 (VDE 0110-3):2003-09
- ASTM F1669M-96(2002)
- ASTM F1207M-96(2002)

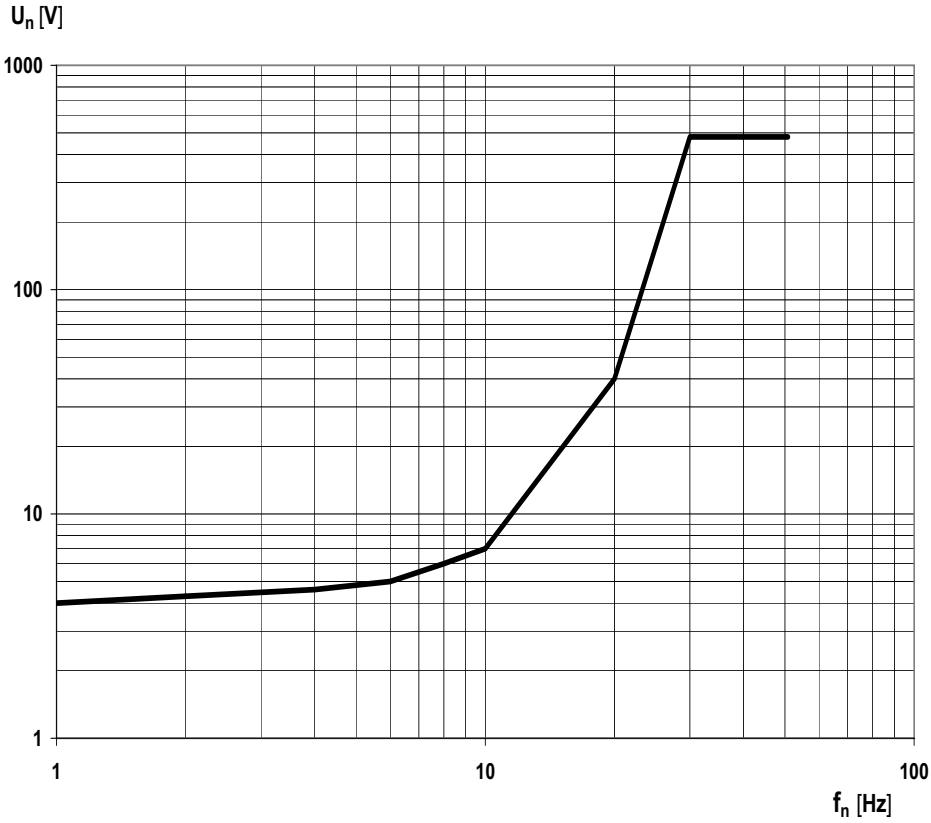
7.3 Characteristic curves

A-ISOMETER reponse times in relation to system leakage capacitances:

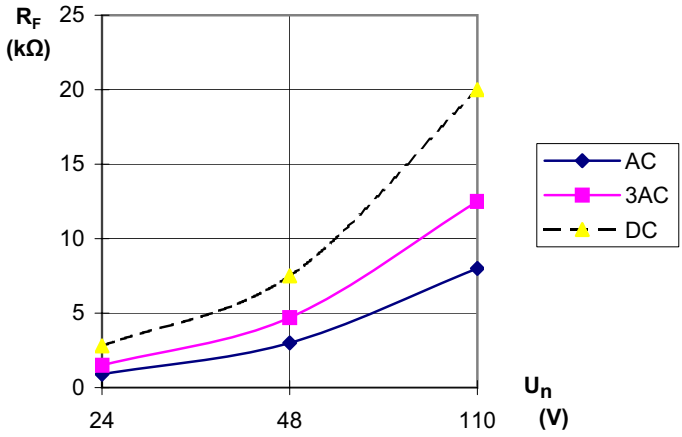
C_e = 1...60 µF, U_n = 0...480 V / 50 Hz



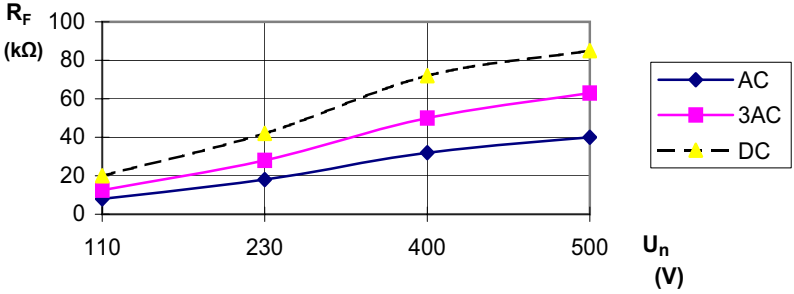
Max. AC voltage between the IT system and earth in the frequency range < 50 Hz



Response values for the insulation fault location system EDS470

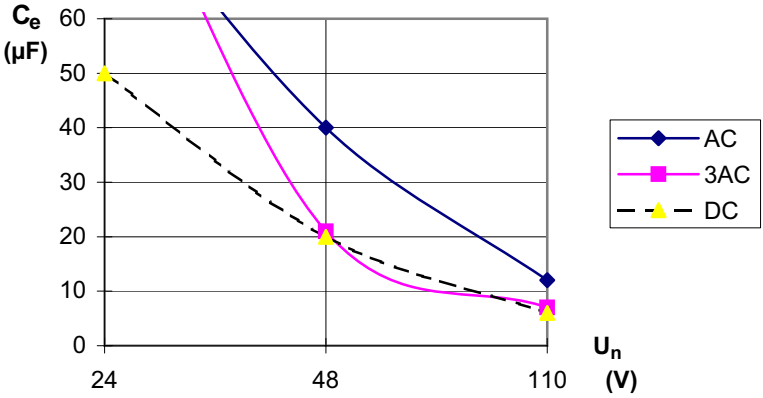


Curve 1a:
Response values in relation to the system voltage to be monitored for a maximum system leakage capacitance C_e as illustrated in curve 2a.
In order to start automatic insulation fault location, the resistance values to be selected for the alarm values 1 and 2 must be sufficiently low at a given nominal voltage. Otherwise, the EDS current is not sufficient to locate the insulation fault. Determine the suitable values using the characteristic curves above.

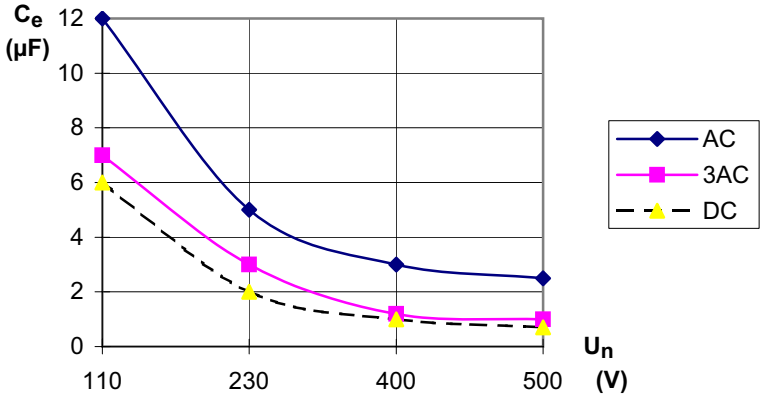


Curve 1b:
Response values in relation to the system voltage to be monitored for a maximum system leakage capacitance C_e as illustrated in curve 2b.

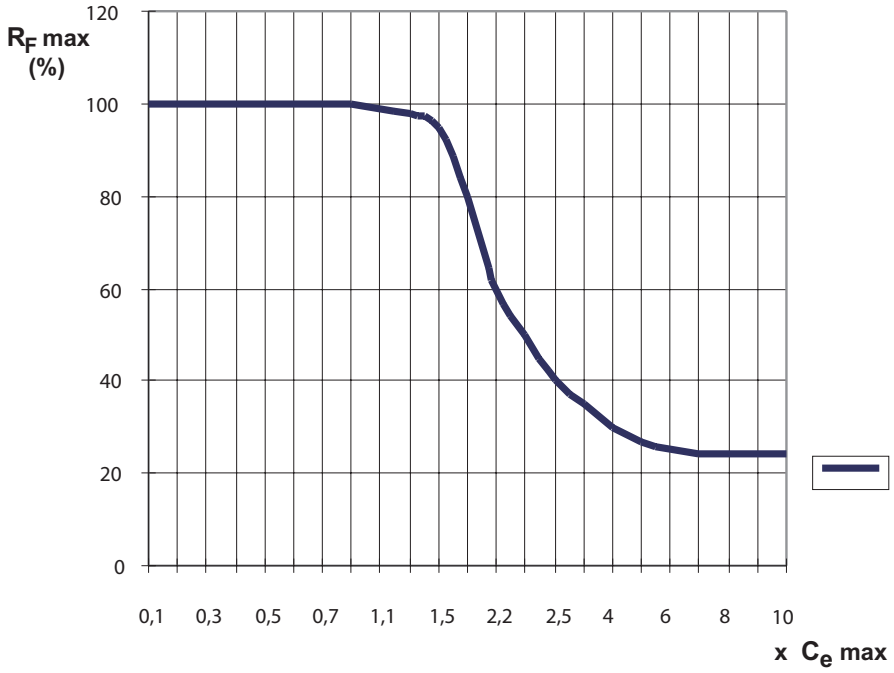
Maximum system leakage capacitances for the insulation fault location system EDS470



Curve 2a:
Maximum allowable system leakage capacitance in relation to the system voltage to be monitored. Up to this limiting value of the system leakage capacitance, the EDS470 system has the sensitivity illustrated in curve 1a.



Curve 2b:
Maximum allowable system leakage capacitance in relation to the system voltage to be monitored. Up to this limiting value of the system leakage capacitance, the EDS470 system has the sensitivity illustrated in curve 1b.

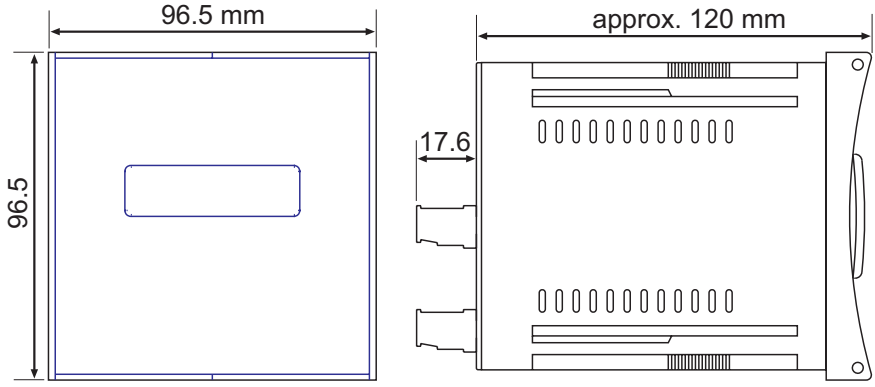


Curve 3.
A reduction of the response sensitivity at system leakage capacitances greater than the maximum permissible value of C_e (curves 2a and 2b).

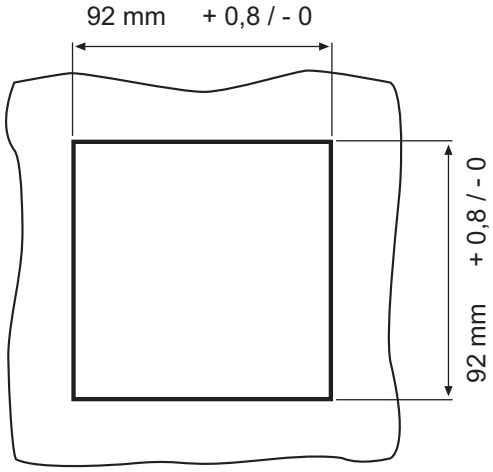
Considering these curves, note that the sum of the precapacitances upstream of the individual measuring current transformer must be at least 50 % of the maximum total capacitance. Otherwise wrong alarm messages may occur.

A value of 20 000 µFV/400 V = 50 µF is taken as the maximum system leakage capacitance. Exceeding this limiting value may result in false trippings.

7.4 Dimension diagram enclosure IR1575PG1



suitable for panel mounting,
the illustration below shows the necessary cutout:



7.5 Ordering details

7.5.1 Standard version

Type	Nominal voltage. U_n	Supply voltage U_s	Art. No.
IR1575PG1-435	3/(N)/ AC 20...480 V AC 20...480 V	AC 88...264 V AC 340...460 V DC 77...286 V	B 9106 4002
IR1575PG1W-435	3/(N)/ AC 20...480 V AC 20...480 V	AC 88...264 V AC 340...460 V DC 77...286 V	B 9106 4002W
IR1575PG1-434	3/(N)/ AC 20...480 V AC 20...480 V	AC 16...72 V DC 10,2...84 V	B 9106 4004

Devices with ending "W" provide improved shock and vibration resistance. A special varnish of the electronics provides higher resistance against mechanical stress and moisture. This makes the devices suitable for use in ships, on rolling stock and in seismic environment.

7.5.2 Label for modified versions

There will only be a label in this field when the A-ISOMETER differs from the standard version.

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P

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W

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