

# Operating Manual



## **A-ISOMETER® IR1570** **IR1575**

Insulation Monitoring Device  
for IT AC systems (1570)  
for IT AC and IT DC systems (1575)



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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

Any other use, or any use which goes beyond the foregoing, is deemed to be use 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 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® IR157x**

The A-ISOMETER® IR157x 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
- when it is in perfect technical conditions 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 test are to be carried out, the device shall be isolated from the system for the test period.*



*The terminals  $\equiv$  and KE shall be connected by a separate wire to the protective conductor (PE). If the terminals L1, L2 of the device are connected to a system under operation, the terminals  $\equiv$  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 an insulation fault  $R_F$  against earth, e.g. via a suitable resistance, before starting the A-ISOMETER®.

**The devices, variant -4.. are delivered with the following factory setting:**

ISO SETUP:	Alarm 1 / Alarm 2 = 40 k $\Omega$ / 10 k $\Omega$
ISO SETUP:	Operating principle K1/K2 = N/O operation
ISO SETUP:	Memory = off

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

To IR1575 it applies that insulation faults in DC circuits connected to the AC system are only monitored correctly when the rectifiers carry a continuous load of > 5...10 mA.



## 2. Function

### 2.1 Common characteristics (IR1570 and IR1575)

- A-ISOMETER® for IT AC systems (IT = unearthed systems)
- DC measuring principle (IR1570 only)
- Two separately adjustable ranges of the response value 2 k $\Omega$ ...1 M $\Omega$  (Alarm 1, Alarm 2)
- 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 Additional characteristics IR1575

- A-ISOMETER® for IT AC systems with galvanically connected rectifiers and for IT DC systems and for IT DC systems  $U_n$  up to 480 V
- Automatic adaptation to the existing system leakage capacitance  $C_e$  up to 60  $\mu$ F
- AMP measuring principle (European Patent: EP 0 654 673 B1)

## 2.3 Product description

The A-ISOMETER® type IR157x monitors the insulation resistance of IT systems. IR1570 is suitable for use in 3(N)AC and AC systems, IR1575 is suitable additionally also in DC systems. In AC systems, which are monitored by IR1575, may include extensive DC supplied loads, such as rectifiers. The device automatically adapts itself to the existing system leakage capacitance.

## 2.4 Function

The A-ISOMETER® IR157x 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.

IR1570:

A DC measuring voltage is superimposed on the AC system to be monitored.

IR1575:

A microprocessor-controlled pulsating AC measuring voltage is superimposed on the AC system to be monitored (AMP measuring principle, "adaptive measuring pulse", developed by BENDER; European Patent:

EP 0 654 673 B1). The measuring cycle 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 to be monitored.

An insulation fault between system and earth closes the measuring circuit. From the measured current value, the microprocessor calculates the insulation resistance which is indicated on the LC display or the external k $\Omega$  measuring instrument.

The measuring time is determined by the system leakage capacitances, the insulation resistance, and the system-related interference disturbances. System leakage capacitances do not influence the measuring accuracy.

If the reading is below the selected response values Alarm 1/Alarm 2, the associated alarm relays respond and the alarm LEDs "Alarm 1/2" light up and the measuring value is indicated on the LC 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 indication will be stored. Pressing the RESET button, 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, by selecting the sub menu Memory: on/off.



By pressing the TEST button, the function of the A-ISOMETER® IR157x in 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 is automatically carried out every 24 hours. In addition the self-test is automatically carried out after the supply voltage has been switched on.

### Self test

In order to guarantee high functional reliability, the A-ISOMETER IR157x 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 memory as well as system and earth connections are checked using the self test functions. The progress of the self test is indicated on the display by a bar graph. Depending on the system conditions, the self test is running 15...20 seconds, then the message "Test ok!" appears on the LC display for approximately 2 seconds. Then the device returns to normal measuring mode and the current measuring value is displayed after the expiry of the measuring time.

When a fault is found, the message "Error!" appears on the display, the system fault LED lights up, the relay K2 (21-22-24) switches and the respective fault message (see table) is indicated. If such a system fault occurs, a self test is started again every minute. If no more malfunction is detected, the fault 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.

Error message	Meaning	Steps to be taken
System connection?	No low-resistance connection of terminals L1, L2 to the system	<ol style="list-style-type: none"> <li>1. Check the wiring of terminal L1, L2 to the system</li> <li>2. Press the test button</li> <li>3. Switch the supply voltage off and on.</li> <li>4. Check the fuses</li> </ol>
Connection PE?	No low-resistance connection of the terminals  and KE to earth (PE)	<ol style="list-style-type: none"> <li>1. Check wiring of terminal  and KE to earth (PE)</li> <li>2. Press TEST button</li> <li>3. Switch the supply voltage off and on</li> </ol>
Device error x	Internal device error	<ol style="list-style-type: none"> <li>1. Press TEST button</li> <li>2. Switch the supply voltage off and on</li> <li>3. Contact Bender</li> </ol>

## Reset of process control



*If the on/off switching of the supply voltage is not possible for technical reasons, a RESET of the process control can be carried out by pressing the "RESET", "MENU" and "TEST" key in a special order.*

Proceed as follows:

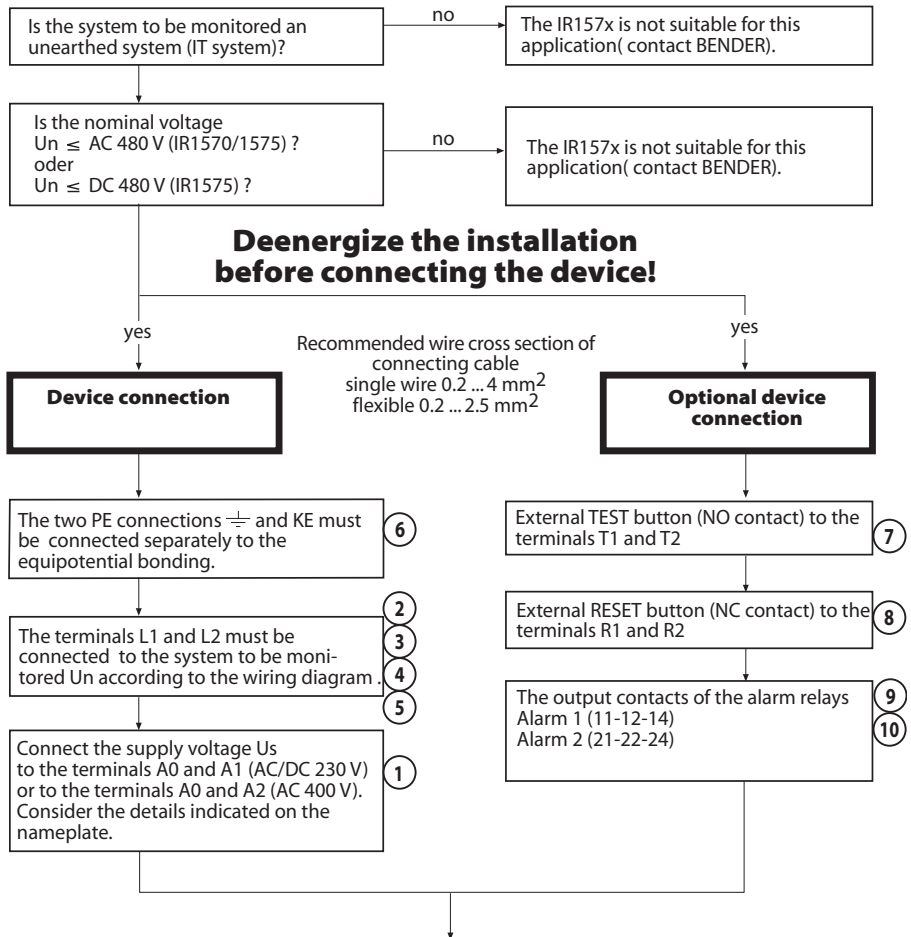
1. Press and hold the RESET button
2. Press and hold the MENU button
3. Press the TEST button at least for two seconds

After passing through this sequence the process control including a self-test will be restarted.

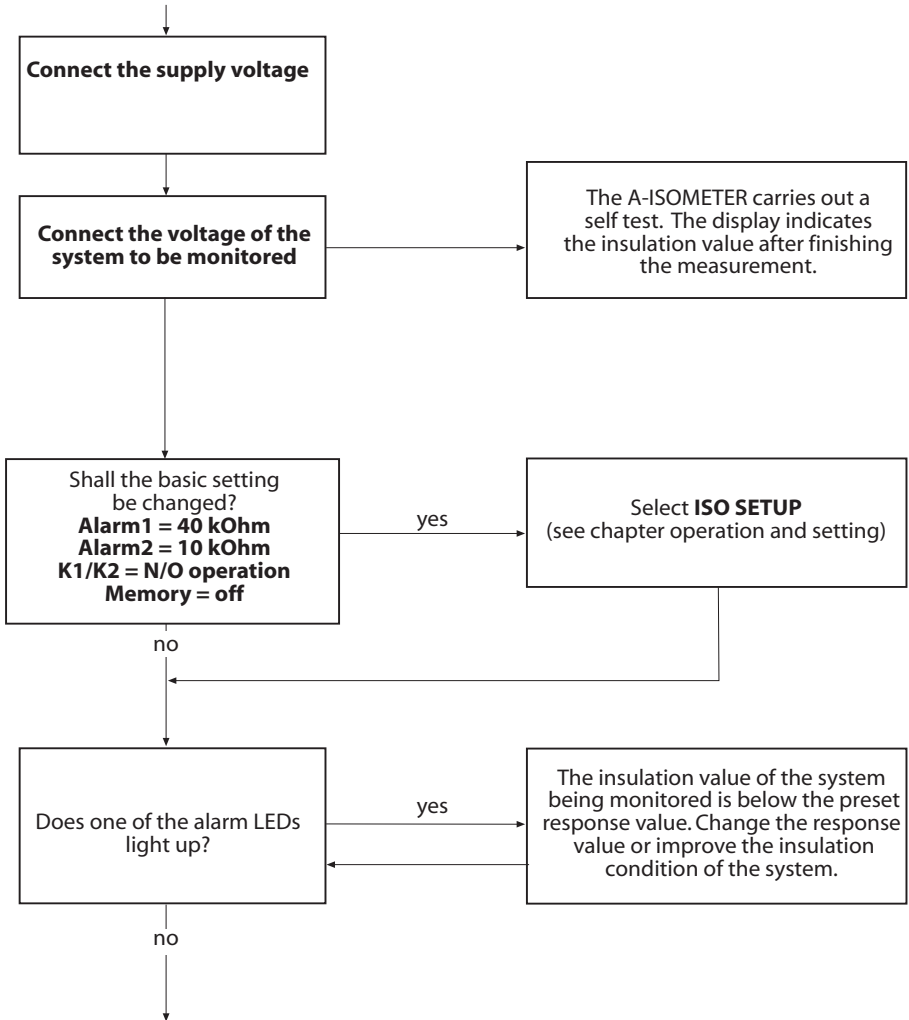
### 3. Commissioning flow chart

The encircled figures in the flow chart correspond to the figures in the legend to the wiring diagram (see page 19).

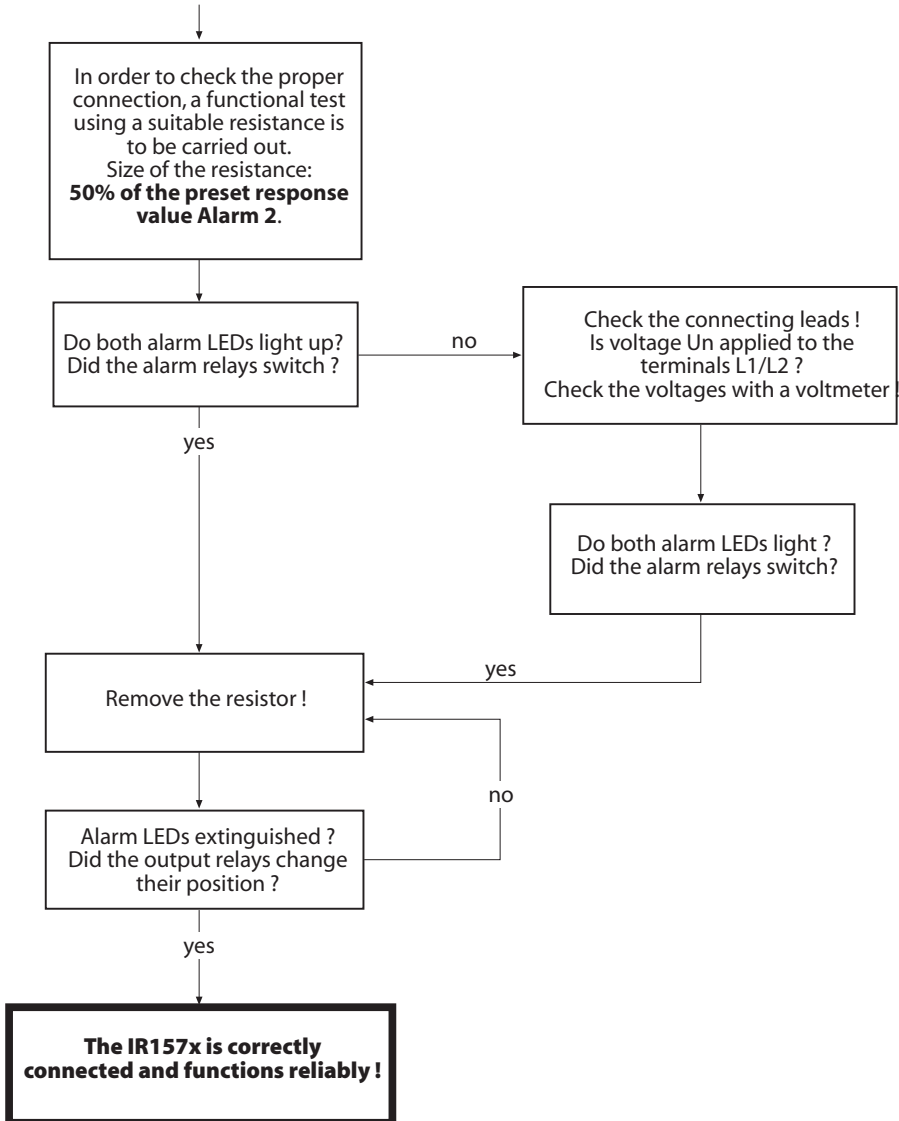
#### Commissioning of A-Isometer (1)



## Commissioning of the A-Isometer (2)



### Commissioning of the A-ISOMETER (3)







## 4. Connection

### 4.1 Wiring

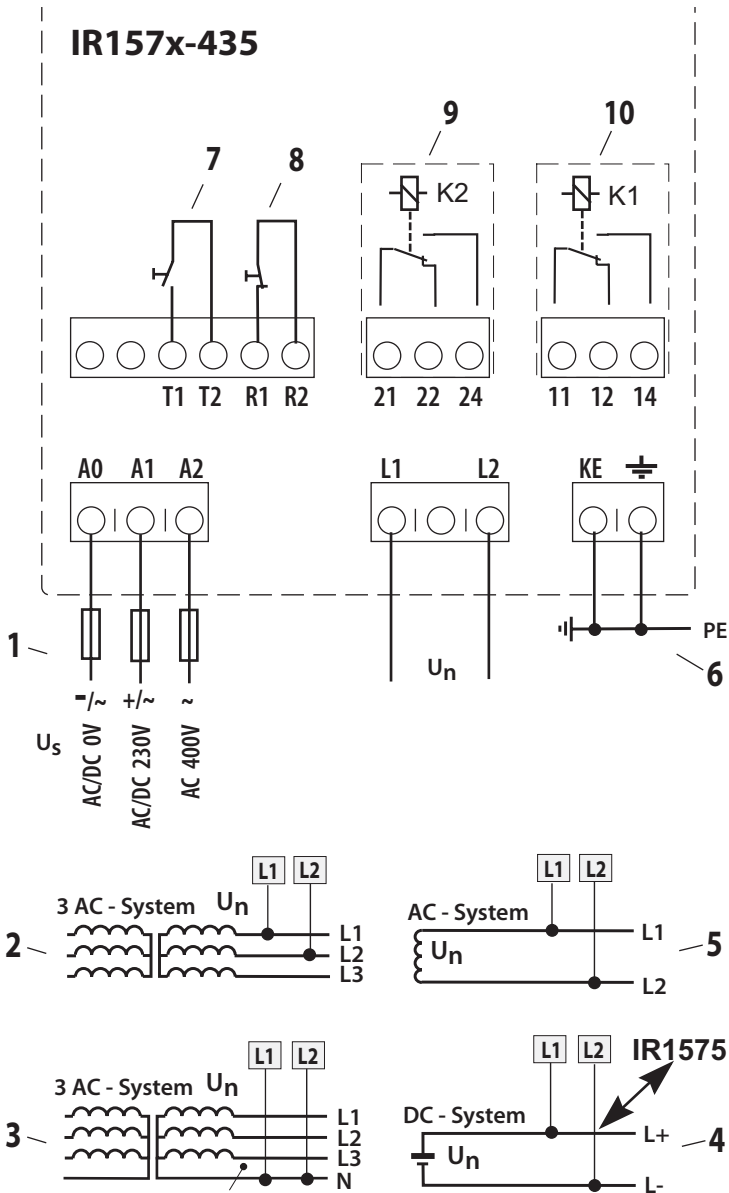
The A-ISOMETER® has plug-in terminals.

Connect the terminals A0/A1 and 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 60364-4-43 for the IT system coupling L1/L2 can be omitted if the wiring is carried out in such a manner as to reduce the risk of a short-circuited to a minimum (a short-circuit-proof and earth-fault-proof wiring is recommended).

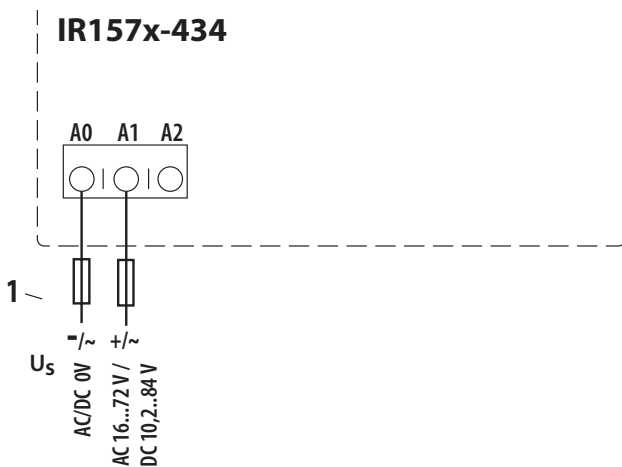
Use the accompanying terminal covers for terminal protection

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



**Legend to wiring diagram:**

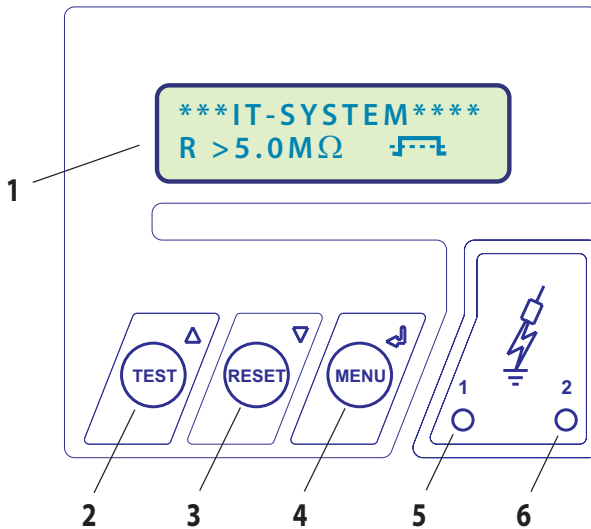
- 1** Supply voltage  $U_s$  (see nameplate, Technical Data on page 33 or the ordering details) via 6 A fuse:
- 2, 3** Connection of the 3AC system to be monitored:  
connect terminals L1, L2 to neutral conductor N or  
terminals L1, L2 to conductor L1, L2
- 4** Connection of the DC system to be monitored (**IR1575 only!**):  
connect terminal L1 to conductor L+, terminal L2 to conductor L-
- 5** Connection of the AC system to be monitored:  
connect terminal L1, L2 to conductor L1, L2
- 6** Separate connection of  $\text{---}$  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 fault message will not be stored,  
factory setting: Memory off !
- 9** Alarm relay K2
- 10** Alarm relay K1





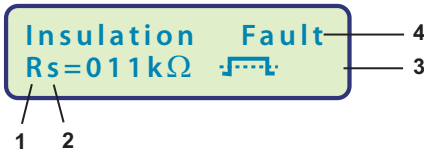
## 5. Operating and setting

### 5.1 Operating elements and displays IR157x



- 1 Two-line display for standard and menu mode
- 2 TEST button: to call up the self test/  
Up key: parameter change, moving up in the menu
- 3 RESET button: to delete insulation fault messages /  
Down key: parameter change, moving down in the menu
- 4 MENU button: 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

### 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 has started
- 3 Measuring techniques:
  - (IR1570, DC: ----- )
  - (IR1575, AMP: )
  - = Polarity of the measuring pulse (AMP, IR1575)
- 4 Messages:
  - Insulation fault
  - Connection system?
  - Connection PE?
  - Device error x

### 5.1.2 Display in the menu mode

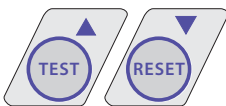


Parameter change is permitted

Parameter change is blocked, enabling by a password

### 5.1.3 Function keys

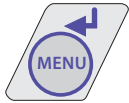
Two functions are assigned to each function key. In addition to the basic function marked with a circle, all the keys allow navigation within the menu.



Activating the TEST button starts the A-ISOMETER® self test.

Pressing the RESET button resets insulation fault alarms 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 present insulation value is 25% higher than the preset response value.



The menu system is called up by pressing the MENU key.

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



Up key:

Moving up in the menu, increasing a parameter



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.

When the menu is not closed, the device automatically returns to the display mode again after approximately five minutes.

For the sake of clarity, the following symbols are used for the functions RETURN, UP/DOWN in the menu diagrams of this operating manual:



## 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.

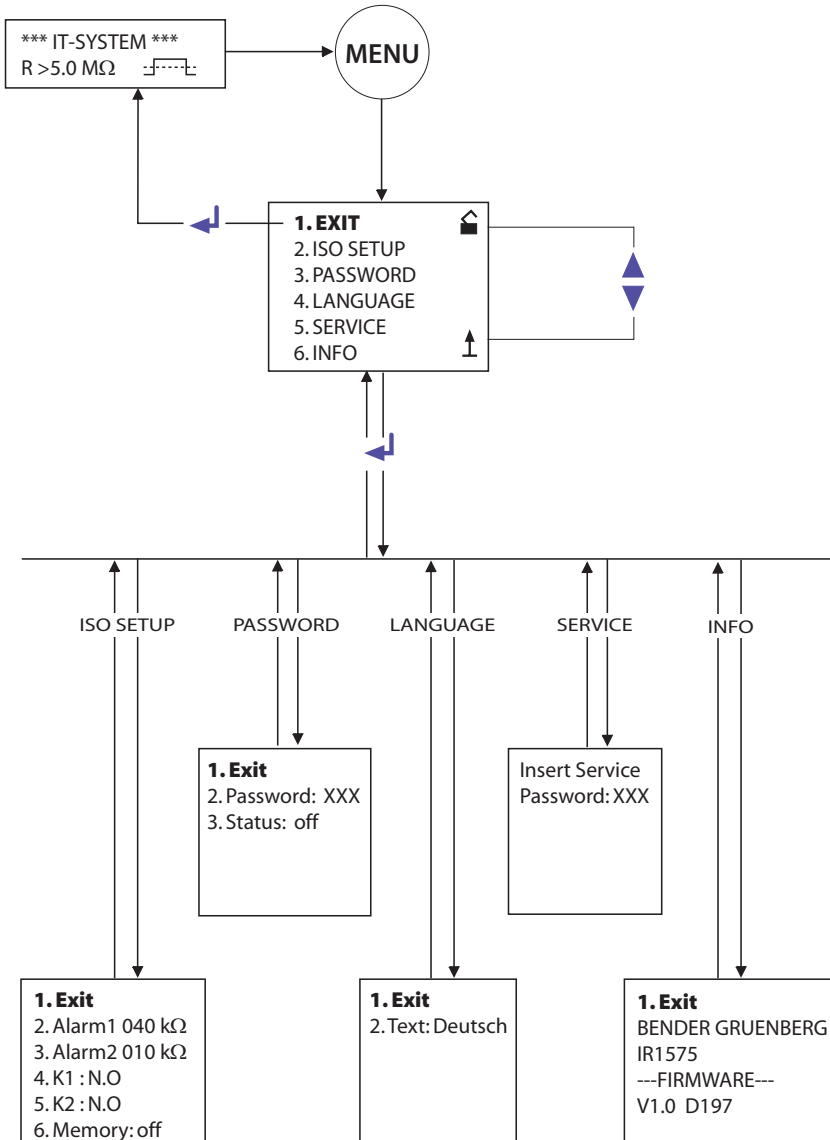
Changing the parameter usually has an immediate effect on the measuring and alarm functions. The changed parameter is stored in a volatile memory by pressing the ENTER key after returning to the sub menu (flashing cursor in column 1). During menu operations, all measuring and alarm functions carry on 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 Menu ISO SETUP: Setting of the basic A-ISOMETER® functions

All alarm functions such as Alarm 1 and Alarm 2 (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 the fault storage are set in this menu.

#### 5.3.1 Response values Alarm 1 and Alarm 2

The response values Alarm 1 and Alarm 2 are selected with the scroll keys and stored with the ENTER key.

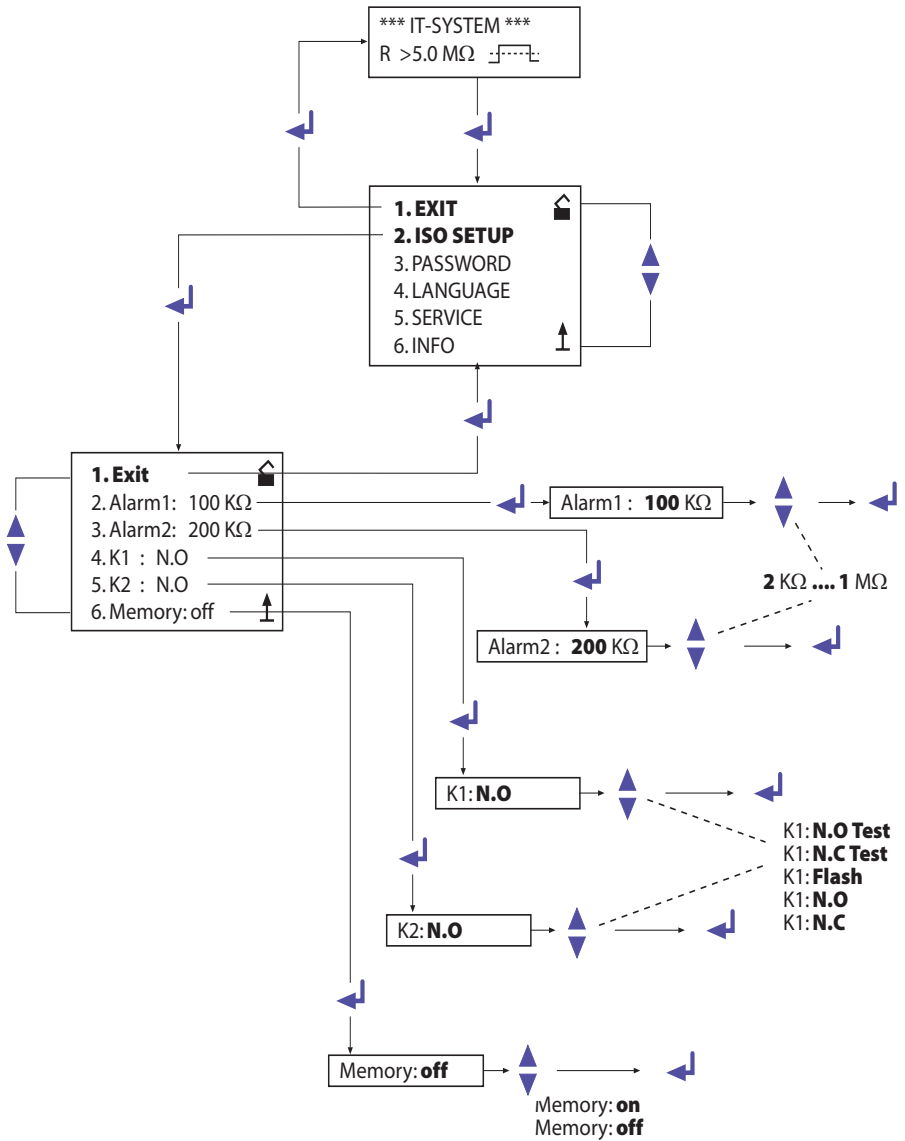
#### 5.3.2 Operating principle of the alarm relays

K1/K2 are factory set to N.O Test, that means N/O operation. When the supplement "Test" has been selected, the alarm relays switch over during a manual self test. If, for any reason, the alarm relays may not switch over during a manual self test, the settings N.C or N.O are to be selected.

During the 24 hour self test the relays are not switched.

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

### 5.3.3 Diagram ISO SETUP





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*When a defect occurs at the A-ISOMETER®, the relay K2 will automatically be activated as a system fault relay.*

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#### **5.3.4 Memory setting (on/off)**

Memory: on = Fault memory is activated

The device must be reset with the RESET button after clearing the fault.

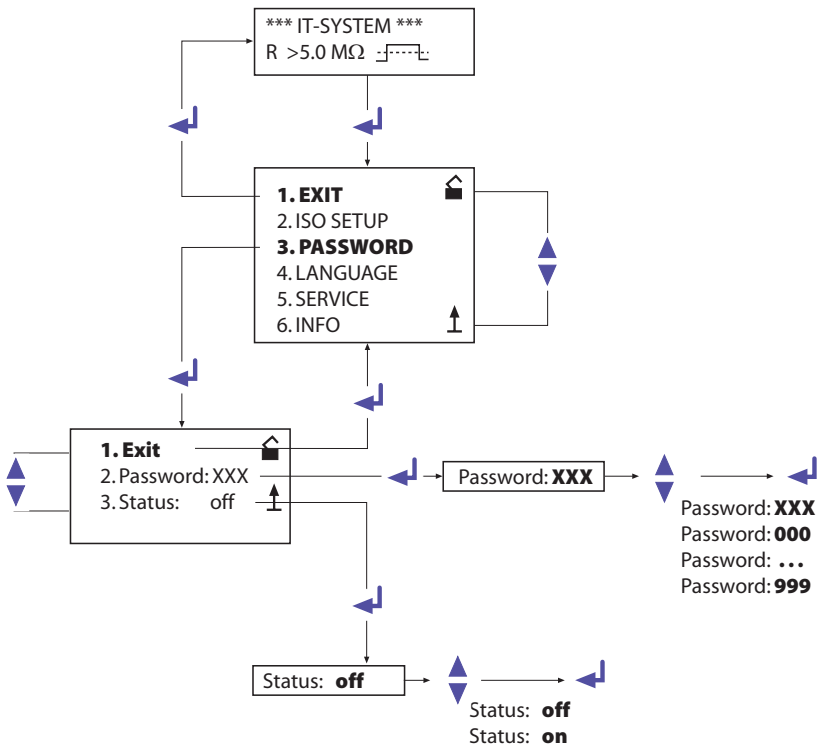
Memory: off = Fault memory deactivated (factory setting)

## 5.4 Menu PASSWORD

### 5.4.1 Activating and setting the password

This menu can be used to activate a "Password" query. This protects the A-ISOMETER® against unauthorized settings and modifications. The desired password (menu point 2. Password: xxx) can be set with the arrow keys and confirmed with the ENTER key. The password can be activated in the menu point "3. Status: on" by clicking the ENTER key. The factory setting is "3. Status: off", that means that the password is deactivated.

### 5.4.2 Diagram PASSWORD



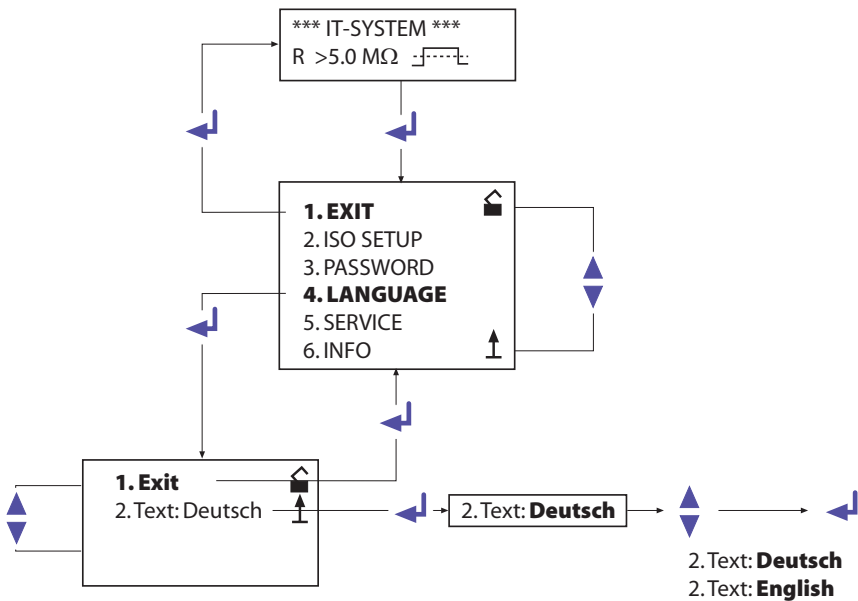
## 5.5 Menu LANGUAGE

### 5.5.1 Setting the national language

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.

### 5.5.2 Diagram Language



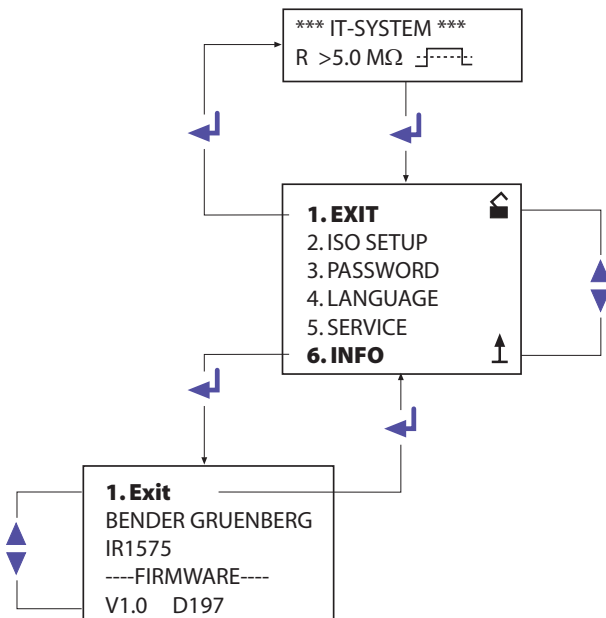
## 5.6 Menu SERVICE

This menu point is provided for the BENDER service personnel and is protected by a password against erroneous settings. It is intended to provide fast fault clearance by qualified experts in the event of a device error.

## 5.7 Menu INFO

With the help of this menu you can query the type of the device. Additionally the display indicates the version of the software used in the device.

### 5.7.1 Diagram INFO







## 6. Technical Data IR1570/1575

### 6.1 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

IR157x:

Nominal voltage range $U_n$ .....	AC, 3(N)AC 0...480 V
Nominal frequency $f_n$ .....	30...460 Hz

IR1575 (in addition):

Nominal voltage range $U_n$ .....	DC 0...480 V
-----------------------------------	--------------

IR157x-435:

Supply voltage $U_s$ to <b>A0/A1</b> (see nameplate) .....	AC 88...264 V
Frequency range of $U_s$ .....	42...460 Hz
Supply voltage $U_s$ to <b>A0/A2</b> (see nameplate) .....	AC 340...460 V
Frequency range of $U_s$ .....	47...63 Hz
Supply voltage $U_s$ to <b>A0/A1</b> (see nameplate) .....	DC 77...286 V

IR157x-434:

Supply voltage $U_s$ to <b>A0/A1</b> (see nameplate) .....	AC 16...72 V
Frequency range of $U_s$ .....	42...460 Hz
Supply voltage $U_s$ to <b>A0/A1</b> (see nameplate) .....	DC 10,2...84 V

IR157x:

Power consumption .....	$\leq 5$ VA
-------------------------	-------------

#### Response values

Response value $R_{an1}$ (Alarm 1) .....	2 k $\Omega$ ...1 M $\Omega$
Response value $R_{an2}$ (Alarm 2) .....	2 k $\Omega$ ...1 M $\Omega$
Absolute error (2 k $\Omega$ ...10 k $\Omega$ ) .....	+2 k $\Omega$
Relative percentage error (10 k $\Omega$ ...1 M $\Omega$ ) .....	0 %...+20 %
Response time $t_{an}$ at $R_F = 0,5 \times R_{an}$ and $C_e = 1 \mu F$ (IR1570), at $R_{an} < 100$ k $\Omega$ .....	$\leq 1$ s
Response time $t_{an}$ at $R_F = 0,5 \times R_{an}$ and $C_e = 1 \mu F$ (IR1575) .....	$\leq 5$ s
Measuring time .....	see characteristic curves
Hysteresis (2 k $\Omega$ ...10 k $\Omega$ ) .....	+2 k $\Omega$
Hysteresis (10 k $\Omega$ ...1 M $\Omega$ ) .....	25 %

### Measuring circuit

Measuring voltage $U_m$ .....	$\leq 20$ V
Measuring current $I_m$ (at $R_F = 0 \Omega$ ) .....	$\leq 170 \mu\text{A}$
Internal DC resistance $R_i$ .....	$\geq 119 \text{ k}\Omega$
Internal impedance $Z_i$ , at 50 Hz .....	$\geq 114 \text{ k}\Omega$
Permissible extraneous DC voltage $U_{fg}$ .....	$\leq \text{DC } 680$ V
Permissible system leakage capacitance IR1570 $C_e$ .....	$\leq 20 \mu\text{F}$
Permissible system leakage capacitance IR1575 $C_e$ .....	$\leq 60 \mu\text{F}$

### Displays

Display, illuminated .....	two-line display
Characters (number of) .....	2 x 16
Display range, measuring value .....	1 k $\Omega$ ...5 M $\Omega$
Absolute error (1 k $\Omega$ ...10 k $\Omega$ ) .....	$\pm 1 \text{ k}\Omega$
Relative percentage error (10 k $\Omega$ ...5 M $\Omega$ ) .....	$\pm 10 \%$

### Outputs/inputs

TEST/ RESET button .....	internal/external
Max. cable length TEST/RESET button external .....	10 m

### Switching components

Switching components .....	2 changeover contacts
Operating principle .....	N/O or N/C operation
Factory setting (Alarm1/Alarm2) .....	N/O operation
Electrical endurance .....	12 000 switching operations
Contact class .....	IIB acc. to DIN IEC 60255 part 0...20
Rated contact voltage .....	AC 250 V / DC 300 V
Making capacity .....	UC 5 A
Breaking capacity .....	2 A, AC 230 V, $\cos \varphi = 0,4$
.....	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 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 (device in operation) .....	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 IEC 60721-3-3 .....	3K5
Operating mode .....	continuous operation
Mounting .....	as indicated on the display
Connection .....	screw terminals
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
Protection class, internal components (DIN EN 60529) .....	IP30
Protection class, terminals (DIN EN 60529) .....	IP20
Type of enclosure .....	installation housing 96 x 96 mm
Flammability class .....	UL94 V-2
Weight .....	approx. 400 g

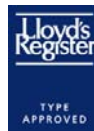
**Option „W“**

Shock resistance IEC 60068-2-27 (device in operation) .....	30 g / 11 ms
Bumping IEC 60068-2-29 (during transport) .....	40 g / 6 ms
Vibration resistance IEC 60068-2-6 .....	1.6 mm / 10..25 Hz
.....	4 g / 25..150 Hz
Ambient temperature (during operation) .....	-25 °C...+70 °C
Ambient temperature (during operation), U <sub>s</sub> = AC 340 ... 460 V at <b>A0/A2</b> .....	-25 °C...+55 °C
Storage temperature range) .....	-40 °C...+85 °C

**6.2 Standards and approvals**

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

- DIN EN 61557-8 (VDE 0413-8):1998-05
- EN 61557-8:1997-03
- IEC 61557-8:1997-02
- 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)

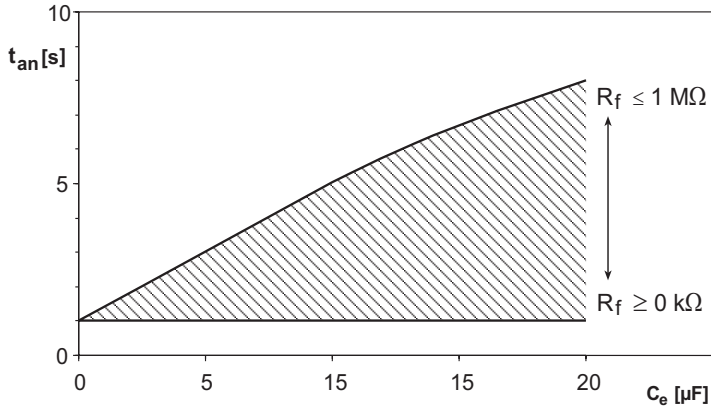


### 6.3 Characteristic curves

A-ISOMETER response times in relation to system leakage capacitances of:

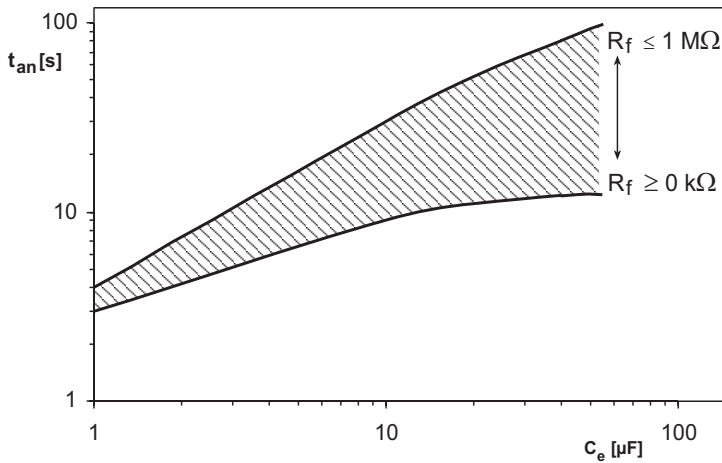
$C_e = 1...20 \mu\text{F}$ ,  $U_n = 0...460 \text{ V} / 50 \text{ Hz}$

#### IR1570

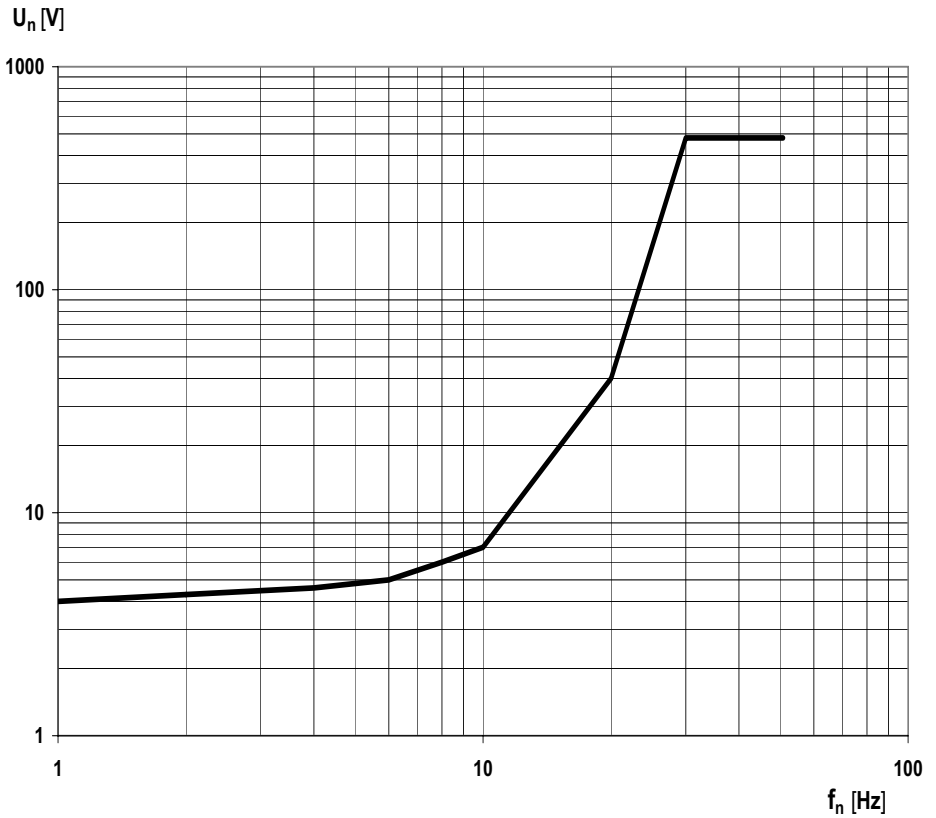


$C_e = 1...60 \mu\text{F}$ ,  $U_n = 0...460 \text{ V} / 50 \text{ Hz}$

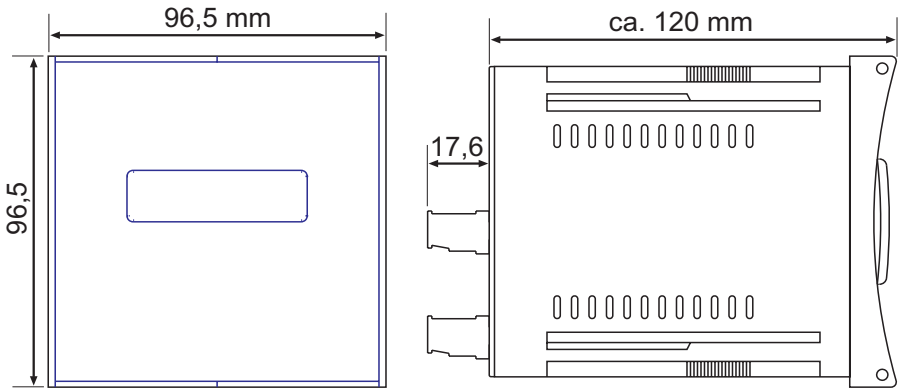
#### IR1575



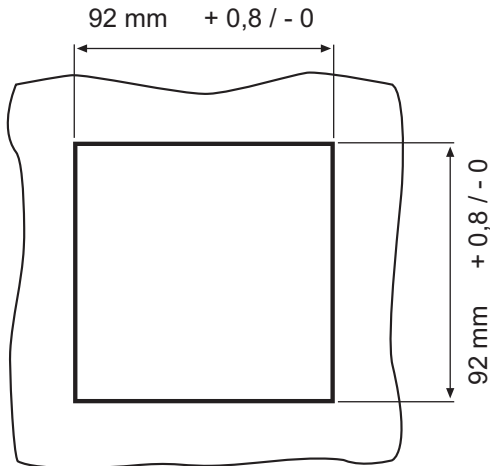
**Max. AC voltage between the IT system and earth in the frequency range < 50 Hz**



## 6.4 Dimension diagram enclosure IR157x



suitable for the installation into control panel,  
the following illustration shows the necessary outbreak:



## 6.5 Ordering details

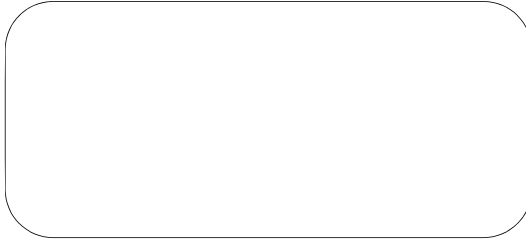
### 6.5.1 Standard version

Type	Nominal voltage $U_n$	Supply voltage $U_s$	Art.-No.
IR1570-435	3(N)AC 0...480 V AC 0...480 V	AC 88...264 V AC 340...460 V DC 77...286 V	B 9104 4000
IR1570W-435	3(N)AC 0...480 V AC 0...480 V	AC 88...264 V AC 340...460 V DC 77...286 V	B 9104 4000W
IR1570-434	3(N)AC 0...480 V AC 0...480 V	AC 16...72 V DC 10,2...84 V	B 9104 4002
IR1575-435	3(N)AC 0...480 V AC 0...480 V DC 0...480 V	AC 88...264 V AC 320...480 V DC 77...286 V	B 9106 4000
IR1575W-435	3(N)AC 0...480 V AC 0...480 V DC 0...480 V	AC 88...264 V AC 320...480 V DC 77...286 V	B 9106 4000W
IR1575-434	3(N)AC 0...480 V AC 0...480 V	AC 16...72 V DC 10,2...84 V	B 9104 4003

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.

### 6.5.2 Label for modified versions

There will only be a label in this field if the A-ISOMETER is different from the standard version.





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