



ISOMETER® isoEV425/isoEV425HC with the AGH420 coupling device

Insulation monitoring device for unearthed DC circuits (IT systems)
for the charging of electric vehicles

Software version: D0430 V2.xx/D0640 V2.xx (isoEV425)/
D0586 V2.xx (isoEV425HC)





ISOMETER® isoEV425/isoEV425HC



Information!

Read the corresponding manual in addition to this quickstart.

Downloadable at: www.bender.de/en/service-support/downloads

Type of device	Response values	Automatic self test	 	Manual No.	Art. No.	
isoEV425-D4-4 with AGH420	R_{an1} : 2...500 kΩ (Factory setting: 500 kΩ) R_{an2} : 1...490 kΩ (Factory setting: 100 kΩ)	enabled	yes	yes	D00126	871036401
isoEV425HC-D4-4 with AGH420	R_{an1} : 2...500 kΩ (Factory setting: 200 kΩ) R_{an2} : 1...490 kΩ (Factory setting: 100 kΩ)	enabled	no	yes	D00126	871036397
isoEV425-D49-4 with AGH420	R_{an1} : 2...500 kΩ (Factory setting: 170 kΩ) R_{an2} : 1...490 kΩ (Factory setting: 100 kΩ)	disabled	no	yes	D00126	871036392

Intended use

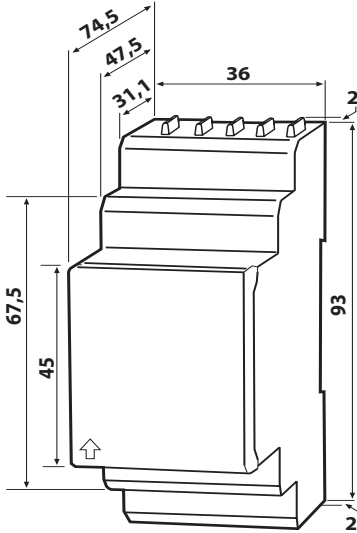
The isoEV425 or isoEV425HC ISOMETER® monitors the insulation resistance R_f of unearthed AC/DC main circuits (IT systems) with nominal system voltages of AC, AC/DC 0...690 V or DC 0...1,000 V. The main application area for this ISOMETER® is unearthed charging stations (Mode 4 acc. to IEC 61851-23/FDIS) for electric vehicles (IT systems) with a nominal system voltage of DC 0...1,000 V. DC components existing in 3(N)AC, AC/DC systems do not influence the operating characteristics when a load current of at least DC 10 mA flows. A separate supply voltage U_s allows de-energised systems to be also monitored. The maximum permissible system leakage capacitance C_g is 5 µF for isoEV425 or 20 µF for isoEV425HC. The ISOMETER® is always operated with the AGH420 coupling device AGH420.

Any use other than that described in this quickstart is regarded as improper.

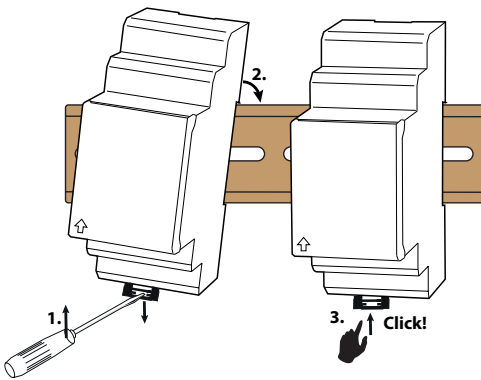


To ensure that the ISOMETER® functions correctly, a mains internal resistance of ≤ 1 kΩ must exist between L1/+ and L2/- via the source (e.g. the transformer) or the load.

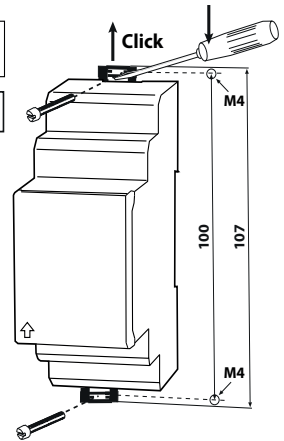
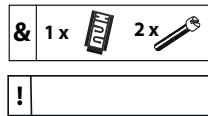
Installation



A

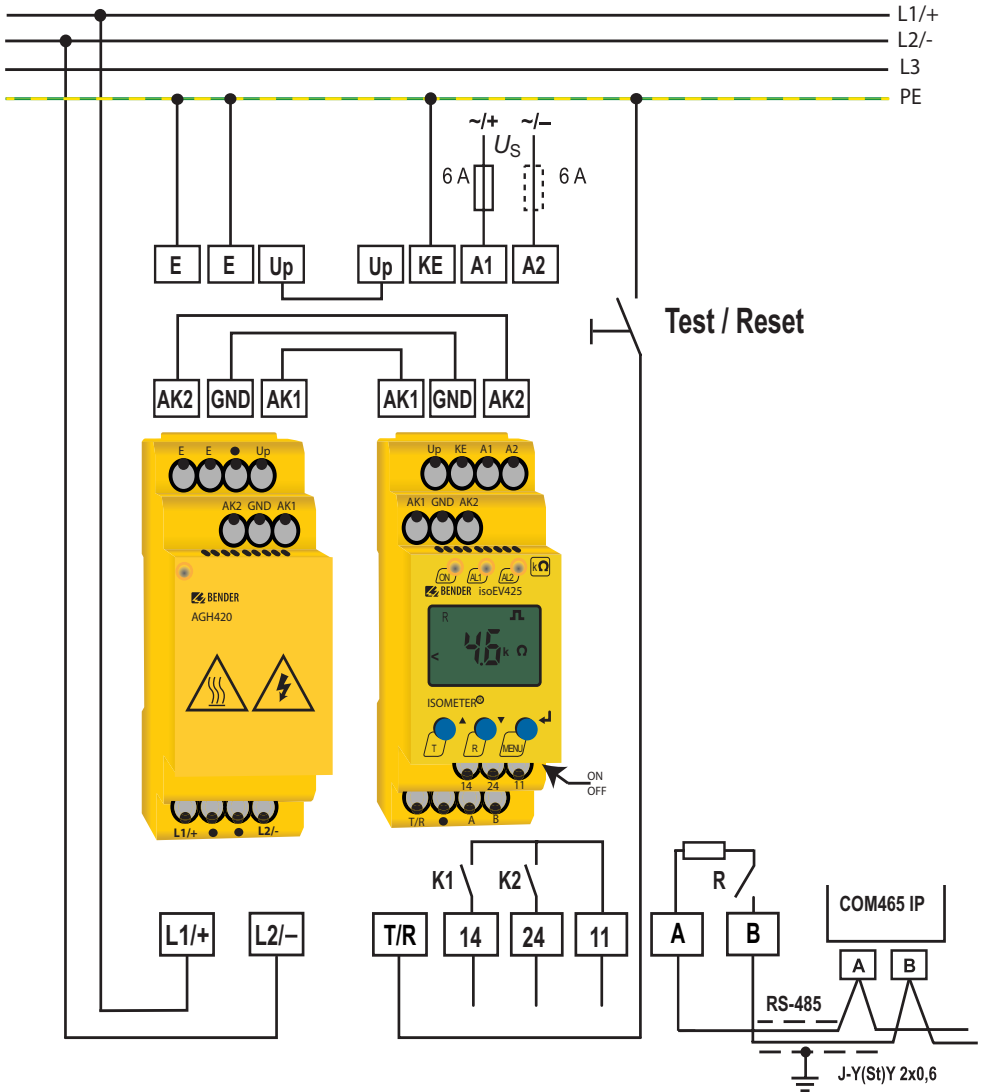


B



Dimensions in mm acc. to ISO 2768-m

Wiring diagram




Risk due to hot surfaces!

If the AGH420 is operated at mains voltages > 800 V, the enclosure temperature may exceed 60 °C. Avoid touching the device surface after switching on the mains voltage.

Wiring diagram legend

Terminal	Connections
A1, A2	Connection to the supply voltage U_s via fuse (line protection): If supplied from an IT system, both lines have to be protected by a fuse.*
E, E, KE	Connect each terminal separately to PE. The same wire cross section as for A1, A2 is to be used.
L1/+, L2/-	Connection to 3(N)AC, AC or DC system to be monitored
Up, AK1, GND, AK2	Connection of AGH420 terminals to the corresponding ISOMETER® terminals
T/R	Connection to the external combined Test/Reset button
11, 14	Alarm relay K1 terminal
11, 24	Alarm relay K2 terminal
A, B	RS-485 communication interface with switchable termination resistor


*** For UL applications:**

Only use 60/75°C copper lines!

For UL and CSA applications, it is mandatory to use fuses rated over 5 A to protect the supply voltage U_s .



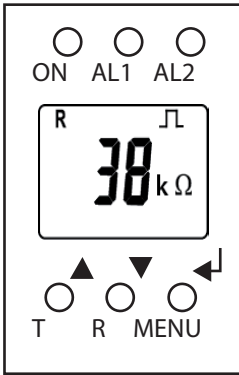
If isoEV425 is used according to UL2231, the automatic self test must be disabled.

A manual self test must be carried out.

Display elements

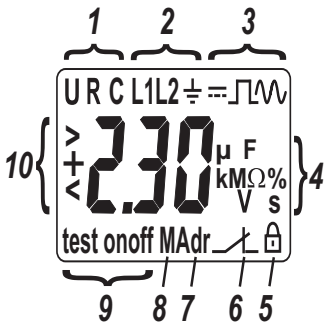
Device front panel/display

Function

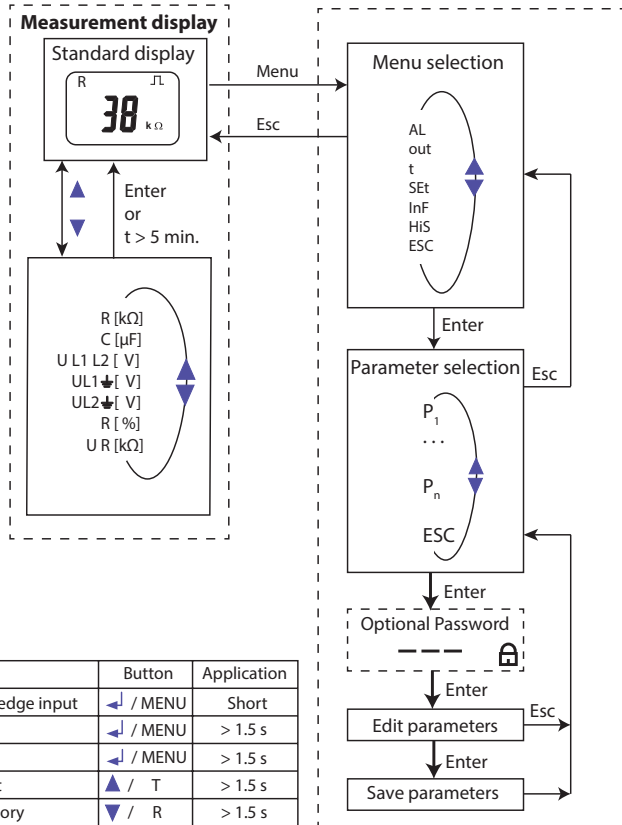


- ON** green - On
- AL1** yellow - Alarm
- AL2** yellow - Alarm

- ▲** Up button
- T** Test button (press for > 1.5 s)
- ▼** Down button
- R** Reset button (press for > 1.5 s)
- ↵** ENTER
- MENU** MENU button (press for > 1.5 s)



- 1** **U**: Nominal system voltage U_n
R: Insulation resistance R_f
C: System leakage capacitance C_e
- 2** Line being monitored
- 3** \equiv : Voltage type DC
 \square : Distributed free measured value updates
 \sim : Voltage type AC
- 4** Measured value and unit
- 5** Password protection enabled
- 6** In menu mode, the operation of the respective alarm relay is indicated.
- 7** Communication interface
Measured value: isoData operation
- 8** Error memory is enabled.
- 9** Mode symbols
- 10** Identifier for response values and response value violation



Function	Button	Application
Enter	Select, acknowledge input	Short
Menu	Call menu	> 1.5 s
Esc	Exit menu item	> 1.5 s
Test	Start device test	> 1.5 s
Reset	Clear fault memory	> 1.5 s

Menu item	Adjustable parameter
AL	Response value query and setting
out	Configure, fault memory, alarm relay and interface
t	Delay times and self-test cycle settings
SEt	Parameterize device control
InF	Software version
HiS	Query and delete memory history
ESC	To next higher menu level

Technical data

()* = Factory setting

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated voltage.....	240 V
Overtoltage category.....	III

Supply voltage

Supply voltage U_s	AC 100...240 V/DC 24...240 V
Tolerance of U_s	-30...+15 %
Frequency range U_s	47...63 Hz
Power consumption.....	≤ 3 W, ≤ 9 VA

IT system being monitored

Nominal system voltage U_n with AGH420.....	3(N)AC, AC 0...690 V/DC 0...1,000 V
Tolerance of U_n	AC +15 %, DC +10%
Nominal system voltage range U_n with AGH420 (UL508).....	AC/DC 0...600 V
Frequency range of U_n	DC, 15...460 Hz

Response values

Response value R_{an1} (isoEV425).....	2...500 kΩ (500 kΩ)*
Response value R_{an1} (isoEV425HC).....	2...500 kΩ (200 kΩ)*
Response value R_{an2} (isoEV425).....	1...490 kΩ (100 kΩ)*
Operating uncertainty R_{an} ($C_e \leq 5 \mu\text{F}$).....	± 15 %, at least ± 1 kΩ
Operating uncertainty R_{an} ($C_e > 5 \mu\text{F}$ and $R_f > 100 \text{ k}\Omega$).....	± (5 % * R_{an} / 100 kΩ + 10 %)
Hysteresis R_{an}	25 %, at least 1 kΩ
Undervoltage detection.....	30...1.14 kV (off)*
Overtoltage detection.....	31...1.15 kV (off)*
Operating uncertainty U	± 5 %, at least ± 5 V
Frequency dependent response uncertainty ≥ 200 Hz.....	-0.03 %/Hz
Hysteresis U	5 %, at least 5 V

Response time

Response time t_{an} at $R_f = 0.5 \times R_{an}$ and $C_e = 1 \mu\text{F}$ acc. to IEC 61557-8.....	≤ 10 s
Start-up delay t	0...10 s (0 s)*
Response delay t_{on}	0...99 s (0 s)*
Delay on release t_{off}	0...99 s (0 s)*

Interface

Interface/protocol.....	RS-485/BMS, Modbus RTU, isoData
Baud rate.....	BMS (9.6 kbit/s), Modbus RTU (adjustable), isoData (115.2 kbits/s)
Cable length (9.6 kbits/s).....	≤ 1,200 m
Cable: twisted pair, shield connected to PE.....	min. J-Y(St)Y 2 x 0.6
Terminating resistor.....	120 Ω (0.25 W), internal, can be connected
Device address, BMS bus, Modbus RTU.....	3...90 (3)*

Connection

Connection type Screw and push-wire terminal

Screw-type terminals:

Nominal current ≤ 10 A

Tightening torque 0.5 ... 0.6 Nm (5 ... 7 lb-in)

Conductor sizes AWG 24-12

Stripping length 8 mm

rigid/flexible 0.2 ... 2.5 mm²flexible with ferrules, with/without plastic collar 0.25 ... 2.5 mm²Multiple conductor, rigid 0.2 ... 1.5 mm²Multiple conductor, flexible 0.2 ... 1.5 mm²Multiple conductor, flexible with ferrule without plastic sleeve 0.25 ... 1.5 mm²Multiple conductor, flexible with TWIN ferrule with plastic sleeve 0.25 ... 1.5 mm²**Push-wire terminals:**

Nominal current ≤ 10 A

Conductor sizes AWG 24-14

Stripping length 10 mm

Rigid 0.2 ... 2.5 mm²flexible without ferrules 0.75 ... 2.5 mm²flexible with ferrules, with/without plastic collar 0.25 ... 2.5 mm²Multiple conductor, flexible with TWIN ferrule with plastic sleeve 0.5 ... 1.5 mm²

Opening force 50 N

Test opening, diameter 2.1 mm

Wiring of terminals Up, AK1, GND, AK2 refer to technical data of AGH420, under the heading „Connection“

Other

Operating mode Continuous operation

Mounting Cooling slots must be ventilated vertically

Degree of protection, built-in components (DIN EN 60529) IP30

Degree of protection, terminals (DIN EN 60529) IP20

Technical data AGH420

Insulation coordination acc. to IEC 60664-1/IEC 60664-3

Rated voltage	1,000 V
Overvoltage category.....	III

IT system being monitored

Nominal system voltage U_n	AC/DC 0...1,000 V
Tolerance of U_n	AC/DC +10 %
Nominal system voltage U_n (UL508)	AC/DC 0...600 V

Connection

Connection type.....	Screw or push-wire terminals
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Screw terminals:

Nominal current.....	≤ 10 A
Tightening torque.....	0.5...0.6 Nm (5...7 lb-in)
Conductor sizes	AWG 24-12
Stripping length.....	8 mm
Rigid/flexible.....	0.2...2.5 mm ²
Flexible with ferrules with / without plastic collar.....	0.25...2.5 mm ²
Multiple conductor rigid.....	0.2...1.5 mm ²
Multiple conductor flexible	0.2...1.5 mm ²
Multiple conductor with ferrules without plastic collar	0.25...1.5 mm ²
Multiple conductor with TWIN ferrules with plastic collars.....	0.25...1.5 mm ²

Push-wire terminals:

Nominal current.....	≤ 10 A
Conductor sizes	AWG 24-14
Stripping length	10 mm
Rigid	0.2...2.5 mm ²
Flexible without ferrules.....	0.75...2.5 mm ²
Flexible with ferrules with / without plastic collar.....	0.25...2.5 mm ²
Multiple conductor with TWIN ferrules with plastic collars.....	0.5...1.5 mm ²
Opening force	50 N
Test opening, diameter	2.1 mm
Connection type	Terminals Up, AK1, GND, AK2

Single cables for terminals Up, AK1, GND, AK2:

Cable lengths	≤ 0.5 m
Connection properties	≥ 0.75 mm ²

Other

Operating mode.....	Continuous operation
Mounting	Cooling slots must be ventilated vertically
Distance to adjacent devices, $U_n > 800$ V.....	≥ 30 mm
Degree of protection, built-in components (DIN EN 60529)	IP30
Degree of protection, terminals (DIN EN 60529)	IP20

Standards, approvals and certifications

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

- DIN EN 61557-8 (VDE 0413-8): 2015-12/Ber1: 2016-12
- IEC 61557-8 -8: 2014/COR1: 2016



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