

ISOMETER® isoEV425 with coupling device AGH420

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

Preliminary edition



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ISOMETER® isoEV425

Device features

- Insulation monitoring for DC charging stations (mode 4 according to IEC 61851-1/CD 61851-12) for charging of electric vehicles
- Nominal system voltage DC 0...1100 V and AC 0...793 V
- Two factory-set response values
- Leakage capacitance $\leq 5 \mu\text{F}$
- Continuous monitoring of system/earth connections
- LEDs: Power On, Alarm 1, Alarm 2
- Internal test/reset button
- Two alarm relays with common root (one N/O contact each)
- N/O or N/C operation, selectable
- Fault memory behaviour, selectable
- Self monitoring with automatic alarm
- Multi-functional LC display
- RS-485 interface
- Compact two-module enclosure (36 mm) plus coupling in two-module enclosure
- Quick wiring by push-wire terminals

Product description

The ISOMETER® of the isoEV425 series monitor the insulation resistance of unearthed DC-charging stations for electric vehicles (IT systems) DC 0...1100 V DC from the charging station to the motor (AC 0...793 V).

Due to a separate supply voltage de-energised systems can also be monitored.

Application

- DC charging stations for electric vehicles according to CD IEC 61851-23

Function

The currently measured insulation resistance is indicated on the LC display. The ISOMETER®s are factory-set to two response values 100 k Ω /300 k Ω . If the reading is below the selected response value, the response delay "t_{on}" begins. Once the response delay "t_{on}" has elapsed, the alarm relays "K1/K2" and the alarm LEDs "AL1/AL2" light up. By means of the two isolated response values/alarm relays, messages can be evaluated separately. When the insulation resistance exceeds the release value (response value plus hysteresis), the alarm relays switch back to initial position.

By activating the fault memory, the alarm relays and alarm LEDs remain in alarm state until the reset button is pressed or the supply voltage is disconnected. Using the test button, the device functions can be checked. The device parameterisation takes place via the LC display and the front side user buttons.

Connection monitoring

The connections to the electrical system (L1/+ / L2/-) and earth (E/KE) as well as the connection lines from the Isometer® to the coupling device are periodically monitored every 24 hours or after pressing the test button or connecting the supply voltage. In case of interruption of a connecting lead, the alarm relay K2 switches, the LEDs ON // AL1 // AL2 flash and a message appears on the LC display as follows:

"E.0x" for a fault in the connecting leads between both devices or system fault,

"E.02" for a fault in the connecting leads to the system,

"E.01" for a fault in the connecting leads to PE.

After eliminating the fault, the alarm relays return to their initial position either automatically or by pressing the reset button.

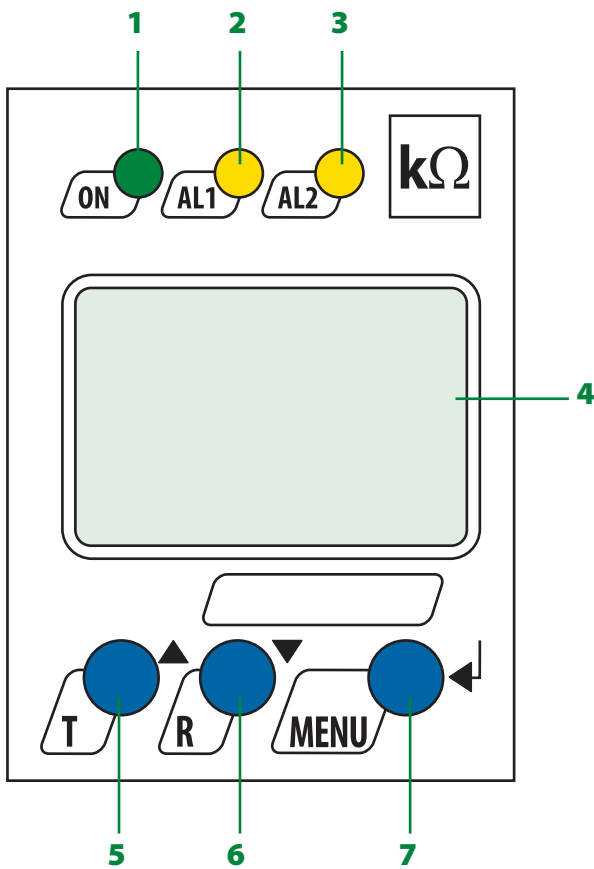
Measurement method

The ISOMETER® isoEV425 works with different measurement methods adapted to the application with a maximum response time of 2 s.

Standards

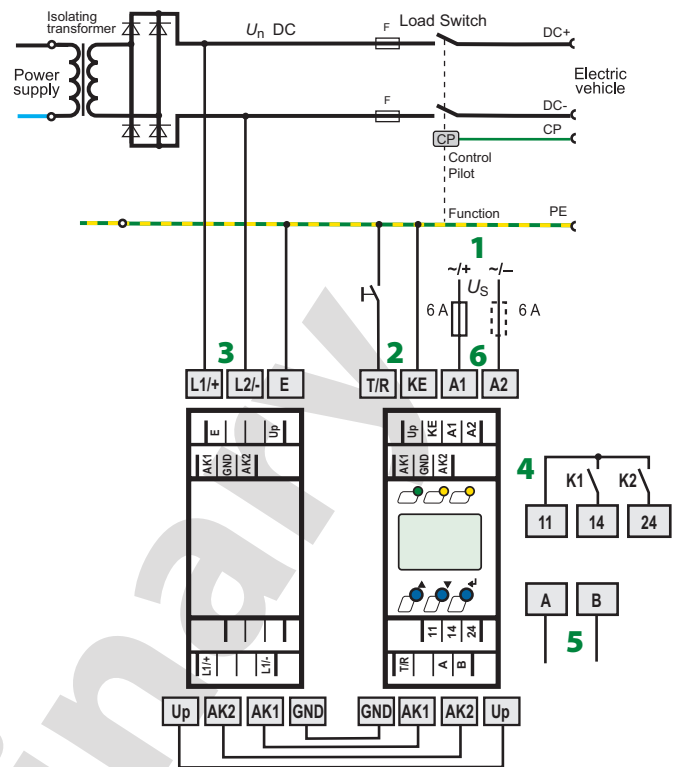
The ISOMETER® of the isoEV425 series complies with the requirements of the device standards: DIN EN 61557-8 (VDE 0413-8), IEC 61557-8.

Operating elements



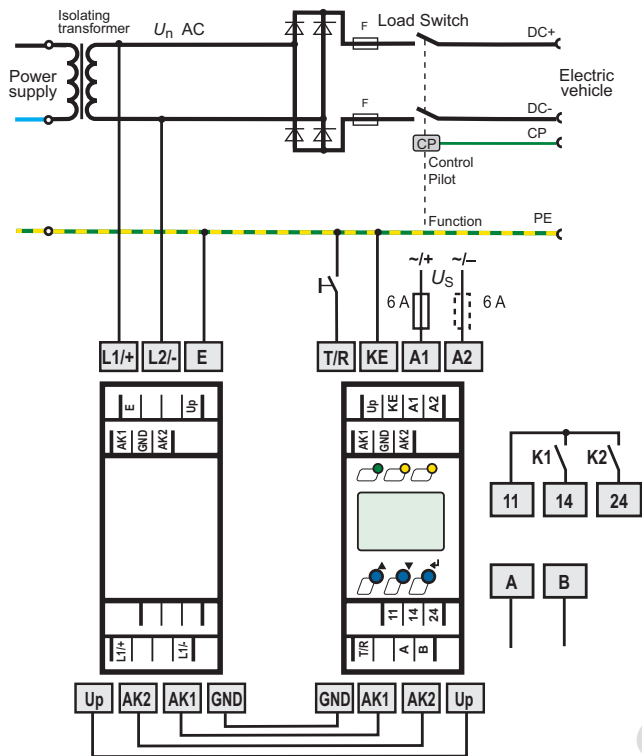
- 1 - Power On LED "ON" flashes in case of interruption of the connecting leads earth/KE or L1/L2 or system fault.
- 2 - Alarm LED "AL1", lights if the reading of Alarm 1 is below the selected response value and flashes in case of interruption of the connecting leads earth/KE or L1/L2 or system fault.
- 3 - Alarm LED "AL2", lights if the reading Alarm 2 is below the selected response value and flashes in case of interruption of the connecting leads earth/KE or L1/L2 or system fault.
- 4 - LC display
- 5 - Test button "T": to call up the self test.
Arrow up button: Parameter change, to move up in the menu
- 6 - Reset button "R": to delete stored insulation fault alarms
Down button: parameter change, to move down in the menu
- 7 - "MENU" button: to call up the menu system.
Enter button: Confirms parameter changes

Wiring diagram



- 1 - Supply voltage DC 22...250 V; AC 42...460 Hz, 90...250 V via fuse
- 2 - Separate connection of E and KE to PE
- 3 - Connection to the IT system to be monitored
Connect terminals L1/+ to L+ and L2/- to L-
- 4 - Alarm relay K1, K2 with common root
- 5 - Serial interface RS-485 (termination with a 120 Ω resistor, can be enabled in the device) Bender protocol BMS
- 6 - Line protection by a fuse according to DIN VDE 0100-430/ IEC 60364-4-43 (6 A-flink fuse recommended).
If being supplied from an IT system, both lines have to be protected by a fuse.

Connection to the AC side



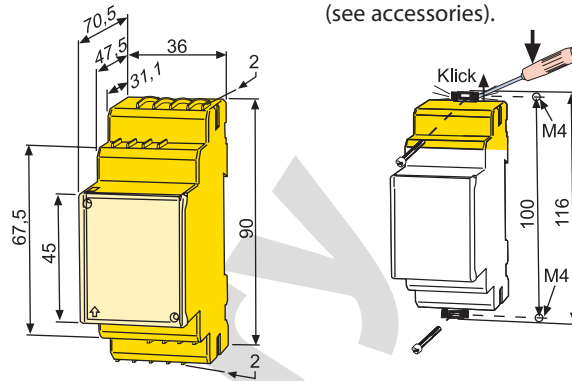
Dimension diagram XM420

Dimensions in mm

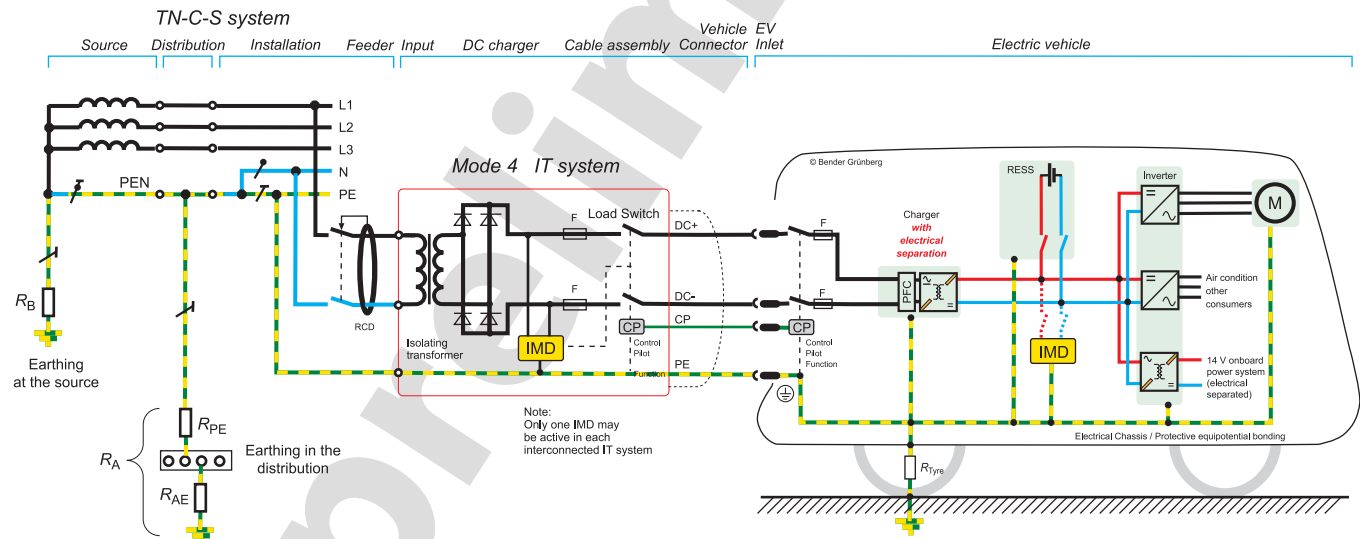
Open the front plate cover in direction of arrow!

Screw mounting

Note: The above mounting clip is an accessory and must be ordered separately (see accessories).



Example of application



Technical data

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

Rated insulation voltage	250 V
Rated impulse voltage/pollution degree	2.5 kV/III
Protective separation (reinforced insulation) between (A1, A2) - (L1/+ , L2/- , E, KE) - (11, 14, 24)	
Voltage test acc. to IEC 61010-1	2.21 kV

Supply voltage

Supply voltage	DC 22...250 V, AC 42...460 Hz 90...250 V
Tolerance	0.8...1.1
Power consumption	≤ 3 W ≤ 6 VA

IT system being monitored

Nominal system voltage U_n	DC 0...1000 V AC 15...460 Hz 0...793 V
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Response values

Response value R_{an1} (Alarm 1)	10...990 kΩ (300 kΩ)*
Response value R_{an2} (Alarm 2)	10...990 kΩ (100 kΩ)*
Relative uncertainty	- 0 +30 %
Hysteresis	25%

Time response

Response time t_{an} at $R_F = 0.5 \times R_{an}$ and $C_e = 1 \mu F$	≤ 2 s
Start-up delay (start time) t	0...10 s (0 s)*
Response delay t_{on}	0...10 s (0 s)*

Measuring circuit

Measuring voltage U_m	± 45 V
Measuring current	≤ 400 μA
Internal DC resistance R_i	120 kΩ
Permissible system leakage capacitance	≤ 5 μF
Measuring range	1...990 kΩ

Displays, memory

Display range, measured value	1 kΩ...1 MΩ
Operating uncertainty Ω ...5 kΩ/5 kΩ...1 MΩ	± 0.5kΩ/± 15 %
Password	off/0...999 (off)*
Fault memory alarm relay	on/(off)*
Power LED	green
Alarm-plus LED	yellow
Alarm-minus LED	yellow

Switching elements

Switching elements	2 x 1 N/O contact (common root)				
Operating principle	N/C operation / N/O operation (N/C operation)*				
Contact 11-14	indicator Alarm 1				
Contact 11-24	indicator Alarm 2				
Electrical endurance, number of cycles	10.000				
Contact data acc. to IEC 60947-5-1					
Utilisation category	AC-13	AC-14	DC-12	DC-12	DC-12
Rated operational voltage	230 V	230 V	220 V	110 V	24 V
Rated operational current	5 A	3 A	0.1 A	0.2 A	1 A
Minimum contact rating	1 mA at AC/DC ≥ 10 V				

Environment/EMC

EMC	IEC 61326
Operating temperature	- 25 °C...+ 55 °C
Climatic class acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (except condensation and formation of ice)
Long-time storage (IEC 60721-3-1)	1K4 (except condensation and formation of ice)
Classification of mechanical conditions IEC 60721	
Stationary use (IEC 60721-3-3)	3M4
Transport (IEC 60721-3-2)	2M2
Long-time storage (IEC 60721-3-1)	1M3

Connection

Connection type	push-wire terminal
Connection properties	
Rigid	0.2...2.5 mm ² /AWG 24-14
Flexible without ferrule	0.2...2.5 mm ² /AWG 24-14
Flexible with ferrule	0.2...1.5 mm ² /AWG 24-16
Stripping length	10 mm
Opening force	50 N
Test opening, diameter	2.1 mm

Other

Operating mode	continuous operation
Mounting	any position
Degree of protection, internal components (IEC 60529)	IP 30
Degree of protection, terminals (IEC 60529)	IP 20
Enclosure material	polycarbonate
DIN rail mounting acc. to	IEC 60715
Screw mounting	2 x M4 with mounting clip
Operating manual	
Weight with coupling device	≤ 200 g

(*) = factory setting

Ordering information

Type	Nominal system voltage* U_n	Supply voltage* U_S	Response value R_{an}	System leakage capacitance C_e	Art. No.
isoEV425 with AGH420	DC 0...1000 V/ AC 15...460 Hz, 0...793 V	DC 22...250 V/ AC 42...460 Hz 90...250 V	100 kΩ/300 kΩ	≤ 5 μF	B 7103 6401

* Absolute values

Accessories

Type	Art. No.
Mounting clip for screw mounting (1 piece per device)	B 9806 0008

preliminary



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