**Electricity meters BS/IEC/MID**

Residential

ZCX1x0xQ (Firmware version V9x.xx.xx.xx)

# E450 Series 4 G3-PLC IDIS 1-phase

## Technical data


E450 Series 4 G3-PLC OFDM IDIS is an advanced, integrated residential electricity meter that incorporates such core functionalities as powerful e-metering, multi-energy data collection, remote and local communication, as well as end-user interaction. E450 Series 4 is based on open and interoperable standards, such as high-speed G3-PLC OFDM communication technology.

Date: 06.09.2019

File name: D000053820 E450 Series 4 G3-PLC 1ph ZCXi1x0xQ Technical Data en h.docx

# Revision history

| Version | Date | Comments |
|---|---|---|
| a.01 | 12.02.2015 | First draft. |
| a.02 | 19.03.2015 | Updated operating temperature range of the LCD display. |
| a (1.0) | 12.05.2015 | First edition. |
| b (1.1) | 22.05.2015 | Updated supply control switch specifications. |
| 1.2 | 02.06.2015 | Updated inputs in the type designation. |
| c (1.3) | 30.07.2015 | Updated case material.<br>Updated main terminal descriptions.<br>Added UC3 to supply control switch. |
| d (1.4) | 09.02.2016 | Added OMS application protocol to wireless M-Bus.<br>Added G3-500 band (150-500 kHz). |
| e | 21.04.2016 | Updated switching terminology.<br>Added ITU-T G.9903 physical layer. |
| f | 07.08.2017 | Added 10 A base current (IEC) and reference current (MID).<br>Updated ingress protection to IP54. |
| g | 13.06.2019 | Added tightening torque and G3-PLC signal injection. |
| h | 06.09.2019 | Updated ingress protection.<br>Updated DLMS/COSEM standards. |

# E450 Series 4 G3-PLC IDIS 1-phase ZCXi1x0xQ – Technical data

## General

### Functions

Measurement:
- Combined bi-directional measurement
- Single-phase

Communication module:
- Two-way communication to the metering system with an integrated G3-PLC transceiver

M-Bus interface:
- Wired and wireless M-Bus interfaces support up to 4 multi-energy devices (gas, water, district heating)

Inputs and outputs:
- One digital input parameterised as S0, alarm or remote Supply Control Switch command
- 0 to 2 load/auxiliary control switch outputs
  Output 1: Solid-state auxiliary control switch or mechanical, on-off latching load control switch
  Output 2: Mechanical, normally-open load control switch
- Optical port for local reading, configuration and parameterisation

Control buttons:
- Scroll button for display
- Supply Control button
- Sealable reset button

LCD display:
- 8 digits for register value display
- Phase, energy direction, no-load mode, alarm, units of measure, supercapacitor state and Supply Control Switch state indicators on display
- Multi-energy units of measure

Internal Supply Control Switch:
- Disconnection of energy
- Neutral disconnection (optional)
- 5 operating modes
- Can be controlled remotely from an AMM system, manually with a push-button or via local communication interfaces
- According to IEC 62052-21 and EN 62053-21

## Voltage and frequency

| | |
|---|---|
| Nominal voltage $U_n$ | 1 x 230 VAC |
| Extended operating voltage range | 80% – 115% $U_n$ |
| Nominal frequency $f_n$ | 50 Hz (± 2%) |

## IEC-specific data

### Current

| | |
|---|---|
| Base current $I_b$ | 5 A or 10 A |
| Maximum current $I_{max}$ | |
| Metrological | 80 A |
| Thermal | 100 A |
| Short-circuit ≤ 10 ms | 30 x $I_{max}$ |

### Measurement accuracy

| | |
|---|---|
| ZCXi110 or ZCXi120 | |
| Active energy, to IEC 62052-11/62053-21 | class 1 or 2 |
| Reactive energy, to IEC 62053-23 | class 2 |

### Measurement behaviour

| | |
|---|---|
| Starting current | |
| According to IEC | 0.4% $I_b$ |
| Typical | approximately 0.25% $I_b$ |

## MID-specific data

### Current

| | |
|---|---|
| Reference current $I_{ref}$ | 5 A or 10 A |
| Minimum current $I_{min}$ | 0.25 A |
| Maximum current $I_{max}$ | 80 A |
| Thermal current $I_{th}$ | 100 A |

### Measurement accuracy

| | |
|---|---|
| ZCXi110 or ZCXi120 | |
| According to EN 50470-1/50470-3 | class B or A |
| Reactive energy (EN 62053-23) | class 2 |

### Measurement behaviour

| | |
|---|---|
| Starting current $I_{st}$ | 0.4 % of $I_{ref}$ (≤ 20 mA) |

## General data

### Operating behaviour

| | |
|---|---|
| Voltage failure (power-down) | |
| Voltage (for $U_n$=230) | <175 V |

| Voltage restoration (power-up) | |
|---|---|
| Function standby | < 5 s |
| Detection of energy direction / phase voltage | < 3 s |
| Voltage | > 180 V |

## Power consumption

| Total power consumption of the meter | |
|---|---|
| Active power at $U_n$ (typical) | <1.2 W |
| Apparent power at $U_n$ (typical) | < 9.0 VA |

## Environmental influences

| Temperature range | |
|---|---|
| Operation (meter) | –40 °C to +70 °C |
| Operation (LCD display) | –25 °C to +70 °C |
| Storage | –40 °C to +85 °C |

| Temperature coefficient | | |
|---|---|---|
| Range | | –40 °C to +70 °C |
| Average value (typical) | | ± 0.01% per K |
| At cosφ=1 | (from 0.1 $I_b$ to $I_{max}$) | ± 0.05% per K |
| At cosφ=0.5 | (from 0.2 $I_b$ to $I_{max}$) | ± 0.07% per K |

| Ingress protection according to IEC 60529 |
|---|
| IP54 (without breakouts) |
| This meter is intended for indoor use only. |

## Electromagnetic compatibility

| Electrostatic discharges | according to IEC 61000-4-2 |
|---|---|
| Contact discharge | 8 kV |
| Air discharge | 15 kV |

| Electromagnetic RF fields | acc. to IEC 61000-4-3 |
|---|---|
| 80 MHz to 2 GHz | 10 and 30 V/m |

| Radio interference suppression according to IEC/CISPR 22 | class B |
|---|---|

| Fast transient burst test | acc. to IEC 61000-4-4 |
|---|---|
| Current and voltage circuits under load according to IEC 62053-21 | 4 kV |
| Auxiliary circuits > 40 V | 1 kV |

| Surge test | acc. to IEC 61000-4-5 |
|---|---|
| Current and voltage circuits | 4 kV |
| Auxiliary circuits > 40 V | 1 kV |

## Insulation strength

| Insulation strength | 4 kV at 50 Hz during 1 min. |
|---|---|

| Impulse voltage 1.2/50 µs | |
|---|---|
| According to IEC 62052-11 | 6 kV |
| According to SP 1618 | 12 kV |

| Protection class II acc. to IEC 62052-11 | ⧈ |
|---|---|

## Calendar clock

| Normal operation | |
|---|---|
| Accuracy (at +23 °C) | ±0.2 s/day |
| (EN 62054-21 requirement for time switches: 0.5 s) | |

| Reserve running | |
|---|---|
| Accuracy (at +23 °C) | < 1 s/day |
| (EN 62054-21 requirement for time switches: 1.0 s) | |

| Back-up time (power reserve) | |
|---|---|
| With supercapacitor | 7 days |

## Display

| Characteristics | |
|---|---|
| Type | LCD liquid crystal display |
| Digit size value field | 8 mm |
| Number of digits value field | 8 |
| Digit size index field | 6 mm |
| Number of digits index field | 6 |

## Inputs and outputs

| Pulse input | |
|---|---|
| Type | S0 (active) 12 VDC |
| Terminals | 30 (+) and 31 (-) |
| According to IEC 62053-31 | class B |
| (class A possible with resistor value change) | |
| Configurable as pulse counter, alarm, remote Supply Control Switch button or tariff control | |

| Optical pulse output | active and reactive energy |
|---|---|
| Type | red LED |
| Pulse length | settable from 2 to 40 ms |
| Meter constant | 500 or 1000 imp/kWh |

| Output 1 (1st terminal block from left) | |
|---|---|
| Terminals | 23 and 24 |

| Output 1 – Variant 1 (only one variant selectable) | |
|---|---|
| Type | solid-state auxiliary control switch |
| Nominal voltage | 230 VAC/DC |
| Maximum voltage | 250 VAC/DC |
| Maximum switching current | 90 mA |

| Output 1 – Variant 2 (only one variant selectable) | |
|---|---|
| Type | |
| mechanical, on-off latching load control switch | |
| Nominal voltage | 230 VAC |
| Maximum voltage | 250 VAC |
| Resistive load | 5 A |

| Output 2 (2nd terminal block from left) | |
|---|---|
| Terminals | 25 and 26 |
| Type | mechanical, normally-open, non-latching load control switch |
| Nominal voltage | 250 VAC |
| Maximum voltage | 400 VAC |
| Resistive load | 8 A (6 A at cosφ 0.4) |
| Switching current | 5 A at 30 VDC |

| Phase connections | |
|---|---|
| Material of terminal | brass |
| Type | terminal with two screws |
| Diameter | 9.5 mm |
| Minimum conductor cross-section | 4.0 $mm^2$ |
| Maximum conductor cross-section | 35.0 $mm^2$ |

For wires with small conductor cross-sections (≤ 6 $mm^2$), the connecting line must be placed carefully in the middle of the terminal, so that it cannot move sideways when lightening the terminal screws. When tightening, ensure that the connecting line remains between the copper inside the terminal and the screw.

Stranded wires must be fitted with ferrules.

- Type of screw:
  - Steel zinc-plated Pozidriv combi screws (default)
  - Steel tin-plated Pozidriv combi screws (optional)
- Screw dimensions M6 x 14
- Maximum screw head diameter ≤ 6.6 mm
- Cross-slot type Z, size 2 (ISO4757-1983)
- Slot width 0.8 mm
- Slot length minimum 6 mm
- Tightening torque < 3 Nm

## Communication interfaces

| Optical interface | |
|---|---|
| Type | serial, bi-directional interface |
| Protocol | according to IEC 62056-21 |

| G3-PLC interface | |
|---|---|
| Frequency band 1 | CENELEC A |
| Frequency band 2 | G3-500 (150-500 kHz FCC) |

- G3-PLC with COSEM/DLMS communication protocol according to EN50065-1 supporting the following OSI Layers:
  - ITU-T G.9903 physical layer for modulation, adaptive tone mapping and notching
  - MAC layer IEEE 802.15.4; time domain and collision management; CSMA/ARQ
  - 6LoWPAN adaptation sub-layer Plug and Play network management to choose “Best Path” (Full Mesh Support)
  - IPv6 IETF RFC4291/4862 addressing and networking
  - DLMS application layer 62056-5-3
  - COSEM application model: 62056-6-1 (OBIS) and 62056-6-2 (interface classes)
- G3-PLC signal injection between L1 and N

| Wired M-Bus interface | |
|---|---|
| Terminals | 28 and 29 |
| “Point-to-Point” or “Point-to-Multipoint” bus system | |
| Standard | EN 13757-2: 2005 |
| Maximum transmission rate | 2400 bps |
| Maximum unit loads (1 unit load = 1.5 mA) | ≤ 16 |
| Maximum wiring length | ≤ 50 m |
| Transmission from master: | |
| MARK: | H = SPACE voltage + ≥ 10 V but < 42 V |
| SPACE: | L ≥ 12 V |
| Transmission from slave: | |
| MARK: | L = 0 mA to 1.5 mA |
| SPACE: | H = (11 mA to 20 mA + MARK current) |

| Wireless M-Bus interface | |
|---|---|
| Frequency | 868 MHz according to EN 13757-4 |
| Range up to 200 metres (with integrated antenna) | |
| Read-out frequency | max. every 8 seconds (impact on reserve energy) |
| Application protocol | DSMR 2.2+ and OMS 4.0+ |

## Internal supply control switch

| Contact data | |
|---|---|
| Poles | 2 poles (Ph+N) or 1 pole (Ph) |
| Short-circuit ≤ 10 ms to EN 62053-21 | 3000 A |
| Maximum switching power | 25 kVA |
| General load switching capacity according to | UC3 (EN 62055-31) |

## Material

| Case |
|---|

Case material is glass-filled polycarbonate.

Flame retardant and self-extinguishing class V0 according to IEC 60695-11-10.

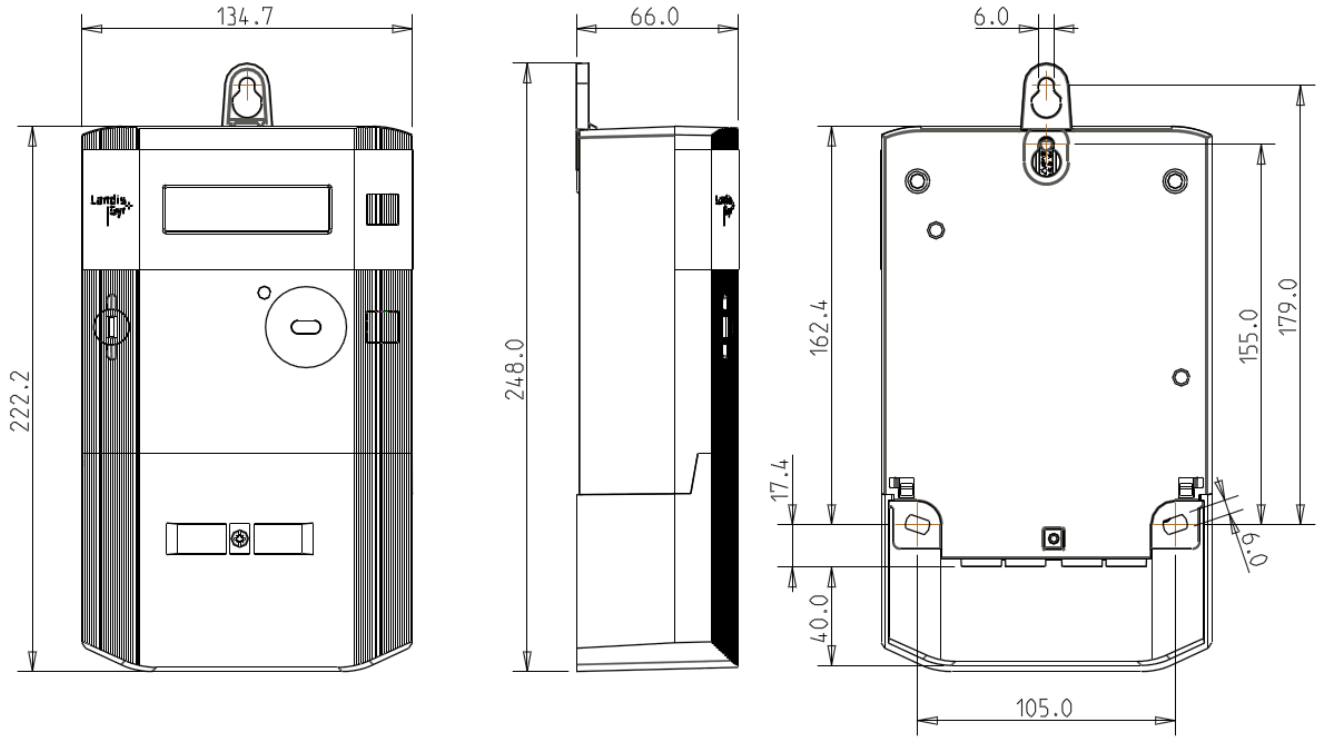
High temperature deflection, UV stabilised and can withstand applicable environmental tests defined in IEC 60068.

## Weight and dimensions

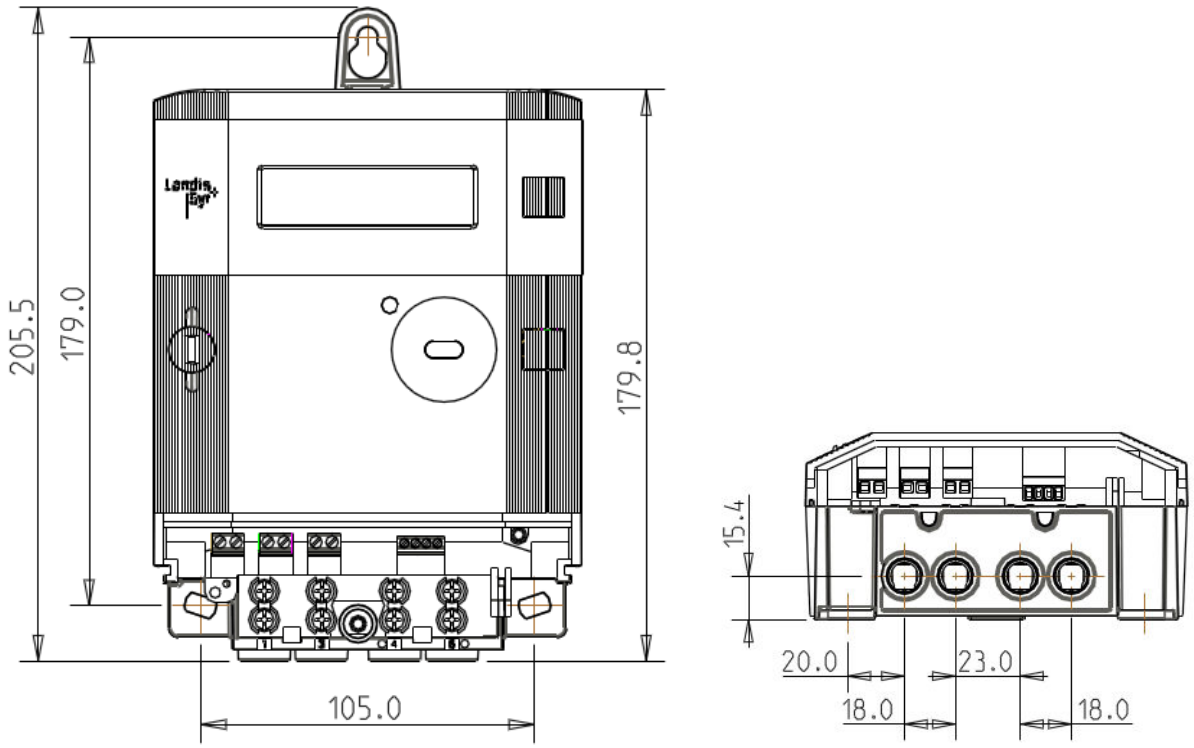
| Weight |
|---|
| approximately 1.0 kg |

| Width/height/depth |
|---|
| 134.7 / 248 / 66 mm |

## Dimensions (with terminal cover)




## Dimensions of connection terminals



## Type designation

| Example | ZCX | i | 1 | 10 | C | Q | U1 | L1 | D3 | .3 | 1 | S4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Network type**

| | |
|---|---|
| ZMX | 3-phase, 4-wire (M-connected) |
| ZFX | 3-phase, 3-wire (F-connected) |
| ZCX | 1-phase, 2-wire (C-connected) |

**Build option**

| | |
|---|---|
| - | Non-IDIS-compliant variant |
| i | IDIS-compliant variant |

**Connection type**

| | |
|---|---|
| 1 | Direct connected (1-phase) |
| 3 | Direct connected (3-phase) |

**Accuracy class**

| | |
|---|---|
| 10 | MID class B; IEC class 1 |
| 20 | MID class A; IEC class 2 |

**Measured quantities**

| | |
|---|---|
| A | Active energy, bi-directional |
| C | Active and reactive energy (combi) |

**System communication**

| | |
|---|---|
| Q | G3-PLC OFDM |

**Built-in local communication options**

| | |
|---|---|
| U0 | Optical port |
| U1 | Optical port + wireless M-Bus (868 MHz) |

**Extension port options**

| | |
|---|---|
| L0 | Not in use |
| L1 | Wired M-Bus |

**Supply control switch options**

| | |
|---|---|
| D0 | 0 pole SCS (supply control switch) |
| D1 | 1-pole SCS (1-phase meters only) |
| D2 | 2-pole SCS (1-phase meters only) |
| D3 | 3-pole SCS (3-phase 3-wire and 4-wire meters) |

**Load and auxiliary control switch options**

| | |
|---|---|
| 0 | No load or auxiliary control switches |
| 2 | 90 mA OptoMOS solid-state auxiliary control switch + 8 A mechanical load control switch |
| 3 | 5 A mechanical, latching load control switch + 8 A mechanical load control switch |

**Other options**

| | |
|---|---|
| 0 | Not in use |
| 1 | Digital input |
| 5 | Control input |

| | |
|---|---|
| S4 | Series 4 HW (E450 G3-PLC OFDM) |

**Contact:**
Landis+Gyr AG
Theilerstrasse 1
CH-6301 Zug
Switzerland
Phone: +41 41 935 6000
www.landisgyr.com

Landis+Gyr
manage energy better