Measurement and Energy Management

MET410

$C \epsilon$ **dlms** COSEM compliant

Three-phase electricity meters

Electricity meters of the MET410 type are three-phase multi-tariff meters for measuring active or active and reactive energy and power in three-phase four-wire networks and can also be used in single phase two-wire networks.

The meters correspond to European standards EN 50470-1 and EN 50470-3, as well as to international standards IEC 62052-11 and IEC 62053-21, and are designed and manufactured according to ISO 9001 standard. The active and reactive electrical power meters, in addition to the specified standards, meet the requirements of international standard IEC62053-23.

kWh kvarh	Active or active and reactive energy.
△	Maximum power, integration period from 1 to 60 min.
⇥	Measurement of energy in one or two directions or absolute measurement. (+ A, + R; -A, -R; |A|, |R|), optionally by quadrants (R1, R2, R3, R4).
T(4)	internal multi-tariff registration or external management via tariff inputs/ outputs.
🕓	Internal real time counter with DST (Daylight saving enabled). Back-up Li-Ion battery, optional super capacitor.
▟	Time profiles for measuring data (up to 6 channels).
V A	Measurement of phase voltage and current and power factor.
RS485	RS485 communication interface.
⌇⎐⎐	For 3-phase 4- or 3-wire networks or single-phase 2-wire networks.
⊓	Impulse output(s) (kWh or kWh + quark).

- **LCD display** with backlight.
- Tagging data by **OBIS code**: IEC 62056-61.
- A programmable data set and display sequence, manually and automatically.

- Simplicity, speed and ease of connecting the meter to the network, indication of correct connection.
- Self-extinguishing polycarbonate housing.
- **Compact design** of meter according to DIN 43857.
- **IP54** degree of protection against penetration of moisture and dust.
- High **resistance to electromagnetic interference.**
- **Monitoring and registering of violation of meter's work integrity** (opening of the upper or lower lid, strong magnetic field action, wrong password access attempt, ...).
- **DLMS** communication protocol.
- Possibility of switching into a **remote measurement and management system** by installing one of the communication modules-GSM/GPRS, PLC (S-FSK, DCSK, G3), ETHERNET, Zigbee.
- **Indication of the working condition** of the meter and the communication module.
- **Relay outputs** for remote and local load control.
- Power monitoring and load control with **integrated or external switch** to a maximum current of 100 A.
- **Optical output(s)**: direct connection - 1000 imp/kWh (kvarh)
  semi-indirect connection - 10 000 imp/kWh (kvarh)
  indirect connection - 40 000 imp/kWh (kvarh)
- **LIST and SET buttons** (the ability to seal the SET key).

Accuracy class (kWh). . . . . A, B or C (according to EN 50470-3)
    respectively 2, 1, 0.5 or 0.2 (according to IEC 62053-21 or IEC 62053-22)
        (kvarh) . . . . .3 or 2 (according to IEC 62053-23)
Reference/ Nominal current In . . . . 5, 10 A (direct connection)
    1, 5 A (semi-indirect or indirect connection)
Max. current Imax . . . . .40, 60, 80, 85, 100, 120 A (direct connection)
    6, 10 A (semi-indirect or indirect connection)
Min. current Imin . . . . .0.03 In (direct connection)
    0.01, 10 A (semi-indirect or indirect connection)
Starting current. . . . . .0.004 In (direct connection)
    0.001, 10 A (semi-indirect or indirect connection)
Nominal voltage Un . . . 3 x 230 V/400 V (direct or semi-indirect connection)
    3x100/√3 V/100 V (indirect connection)
Voltage range . . . . .0,8 Un ...1,15 Un
Nominal frequency . . . . 50 Hz
Operating temperature range . . . . -40°C ... +55°C (LCD: -25°C ... +55°C)
Extended temperature range . . . . -40°C ... +70°C
Temperature of storage . . . . -40°C ... +85°C
Relative humidity . . . . ≤ 95%
Encoder constant, active/reactive energy (optical output, LED red):
    1000 imp/kWh (direct connection)
    10 000 (semi-indirect connection)
    40 000 (indirect connection)
Encoder constant, active/reactive energy (el. output, galvanise, isolated, passive):
    500 imp/kWh (direct connection)
    5 000 (semi-indirect connection)
    20 000 (indirect connection)
Display: Type. . . . .
LCD
    Number of characters for displaying the measurement sizes. 8
    Number of characters for displaying the OBIS tags. 8
Optical port. . . . . IEC 62056-21
Accuracy of internal counter . . . . ≤±3 min/god. (IEC 62054-21)
Back-up power supply of counter. . . . . .10 years (Li-battery)
Impulse output(s) characteristics
    Voltage. . . . .< 27 V EN 62052-11
    Electricity. . . . .< 27 mA EN 62053-31
Tariff output(s) . . . . .Option for output relays
Own power consumption (with modem). . . . . < 4 VA
Own consumption of voltage branch(with modem). . . . .< 3 W / 15 VA
Own consumption of tariff input . . . .< 150mW
Dielectric strength . . . . 4 kV, 50 Hz, 1 min
Impact voltage . . . . .measuring circuits 12 kV 1.2/50 µs
    auxiliary circuits: 6 kV 1,2/50 µs
Short circuit current. .30 Imax (direct connection)
    20 Imax (semi-indirect or indirect connection)
Fast transients (burst)
    Measurement circuits without/ with load. . . . .4 kV (IEC 61000-4-4)
    Auxiliary circuits . . . . 2 kV
Surge test
    Measurement circuits without/ with load. . . . .4 kV (IEC 61000-4-5)
    Auxiliary circuits . . . . .2 kV
Electrostatic discharge
    Contact discharge . . . . 8 kV (IEC 61000-4-2)
    Contactless discharge. . . . . 15 kV
Resistance to electromagnetic RF fields. . .80 MHz ... 2 GHz (IEC 61000-4-3)
Influence of radio interference
    Contact discharge . . . . 150 kHz ... 30 MHz (IEC 61000-4-3)
    Contactless discharge. . . . . . 30 MHz ... 1 GHz
Vibrations (Vibration test) . . . . (IEC 61000-4-6)
Shock test . . . .(IEC 61000-4-27)
Flammability; Glow-wire flammability test . . . .(IEC 61000-4-11)
Date of expiration . . . . < 15 years
Dimensions . . . . 300 x 175 x 68 mm
Mass . . . .< 1,2 kg

FUNCTIONAL AND TECHNICAL DATA

MET410 three-phase meters are intended for use in the household, as well as for customers in the category "other consumption" at low voltage. They are used for calculated measurements of active or active and reactive energy and power.

Measurement and registration:
- Energy in one flow direction (taken).
- Energy in two flow directions (taken and handed over).
- Always in a positive direction (absolutely).
- Four-quadrant for reactive energy (optional).

Accuracy/ Calibration:
Thanks to long-term measurement stability, there is no need to re-calibrate the meters during utilisation period.

Indicators:
LED 1 (red): kWh impulses.
LED 2 (red): quark impulses.
Unsteady: the current is higher than the starting current.
Illuminating: voltage connected, while the current is less than the starting current.
Not illuminating: no voltage is being applied to the meter.

Communication:
Optical port (IEC 62056-21) for local programming and meter reading.
Additional communication port: RS485.

Multi-tariff registration:
According to an internal real time counter or external transfer of tariffs. Programmable tariff number (1 ... 4).

7-segment liquid crystal display:
- according to VDEW recommendations, 8 digits for data, 6 digits for EDIS identification code (DIN 43863-3) + a certain number of signal flags/ indicators; Indicators: direction/ quadrant of energy flow, presence of voltage, current, remote communication, measuring units, ...
- display mode: automatic, manual data display (using keys), auto-diagnostics
- A programmable set of displayed data as well as their order
Option: Present the data on the display when the meter is not under any voltage (battery mode)

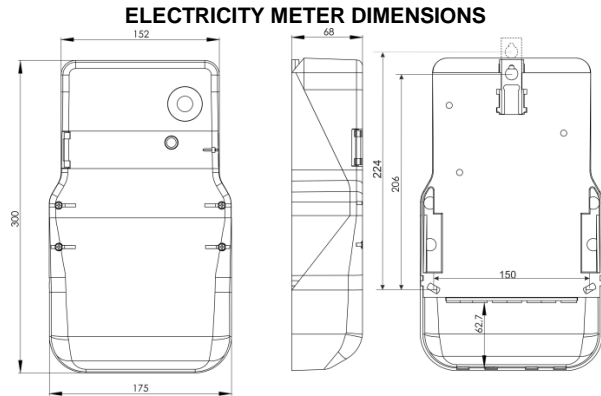**Real Time Counter:**
- 32 kHz quartz crystal
- Allows switching of tariffs by default, switching of seasons, transfer from winter to summer time, and vice versa, power period measurement and data measurement time profiles.

Current clamps:
- Directly connected meters: Universal clamps for all types of conductors (Main connectors = 35 mm2; Auxiliary connecting clamps = 1.5 mm2);
Housing: Self-extinguishing UV stabilized polycarbonate.
Degree of protection against dust and water: IP 54.

ELECTRICITY METER DIMENSIONS

NAME TYPE Mex gen EepV	MEASUREMENT RANGE Lbs Im max UNnom	MEASURING SIZES AkKTR RKKTQ SKKTS Active Reactive Apparent	Cc TtkU Mgp	Measuring Interface Klokdap Lv	DukikDS Bd
Type label x = M single-phase x = T three-phase Generation gen = 400 - ver.4 gen = 410 - ver. 4.1 gen = 500 - ver. 5 gen = 600 - ver. 6 e - number of measuring elements e = 1, 2, 3 p - number of connecting wires p = 2, 3, 4 V - manner of connecting N - directly P - semi-indirectly I - indirectly M – Multi-range of connections	bs = Nominal current 01 – 1A 05 – 5A 10 – 10 A NN – specific max = Maximum current 006 – 6A 040 – 40A 060 – 60A 080 – 80A 100 – 100A 120 – 120A NNN – specific nom = Nominal voltage 000 – 58V – 230V 058 – 58V 230 – 230V NNN - specific	k = channels (N) +1 Power +2 Energy KT = accuracy class – K,T P= active components measurement (NN) +1 Positive (Q1+Q4) +2 Negative (Q2+Q3) +4 Absolute (Q1+Q4)+(Q2+Q3) +8 Absolute (Q1+Q4)+(Q2+Q3) Q = reactive components measurement (NN) +1 Positive *Q1+Q2) +2 Negative (Q2+Q4) +4 Quadrant Q1 +8 Quadrant Q2 +16 Quadrant Q3 +32 Quadrant Q4 S = apparent components measurement +1 Positive (Q1+Q4) +2 Negative (Q2+Q3)	C= Internal counter C = power supply +1 Li-ion battery +2 Super-capacitor +4 Battery mode T – Tariffed t = tariff number (N) 0-4 k = channels (N) +1 Power +2 Energy U = Management (N) +1 External inputs +2 Internal SAT program +4 Communication interface M – Memory (NN) gp = group of data +1 Billing archive +2 Event logs +4 Load profile + Network quality profile +16 Harmonic analysis profile +32 Software change	K – Communication lok – local (N) +1 SET button + 2 LIST button +4 IR interface +8 CS interface +16 RS232 interface +32 RS485 interface +64 M-Bus interface da = remote (NN) +Zigbee +2 PLC +4 GSM +8 GPRS +16 PSTN +32 Ethernet p – protocol (N) +1 EN 62056-21 +2 EN 62056-46 (DLMS) +4 M-Bus +8 Security L – Limiter (N) V = type +1 registration limit +2 switch limiter (external) +4 switch limiter (internal)	D – additional circuits uk – input contacts (NN) (0-12) ik = output contacts (NN) (0-12) DS – additional circuits (NN) +1 Integrity protection +2 Magnetic field sensor +4 Backlight display B – Housing dimensions d = 1:208x126x60 mm d = 2:252x134x80 mm d = 3:300x175x68 mm d = 4:330x175x85 mm d = 5:380x175x85 mm d = 6:240x130x90 mm d = 7:315x175x90 mm d = 8:320x175x107 mm d = 9:320x180x107 mm