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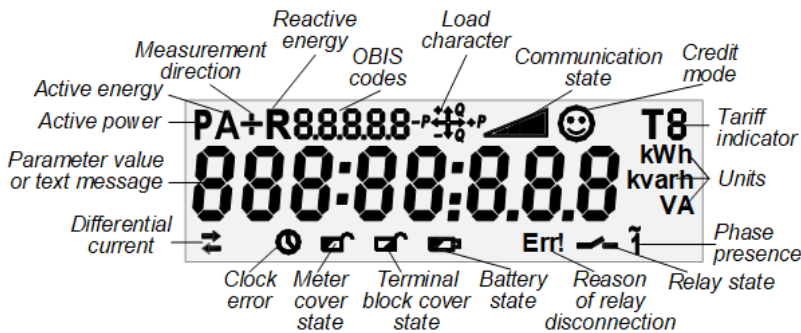
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MULTI-FUNCTION & MULTI-TARIFF SINGLE-PHASE ELECTRONIC METERS DESIGNED FOR USE IN AMI/AMR SYSTEM

OVERALL VIEW

DISPLAY INDICATIONS

KWh **KVArh**	Active energy *(export/import)* Reactive energy *(4 quadrants)*
V **A**	Measured quantities
THD	Calculation of total harmonic distortion factor
T1-T6	Multirate registration
🕐	Built-in clock
📅	Event Log
📶	Load profile
I1≠I2	Differential current detection
IP54	Protection level
⚊	Built-in relay
🔋	Backup power supply
🕊	Standard data model, open protocols
◎	Optical port
🔒	Sensor of meter cover opening
⊗	Sensor of terminal block cover opening
🧲	Magnetic field sensor
⋯	RS-485 communication interface
PLC	PLC universal platform
👆	Authentication & Encryption

DLMS/COSEM SUPPORT
- Standard data model
- Standard communication protocols
- Interoperability

BUILT-IN CLOCK
- Real Time Clock, accuracy 0.5 s.
- IEC 62052-21 standard compliant
- External synchronization
- Daylight saving time (DST) support

MEASURED QUANTITIES
- Active energy, class B (1), export/import
- Reactive energy, class 2, 4 quadrants
- Power, Max Demand
  - integration period:
  - 15′, 30′, 60′, 1 day
  - average interval: day, month
- Phase voltage/current, instantaneous value, RMS, neutral current, difference between phase and neutral currents

METERING DATA
- Actual meter readings
- Periodic meter readings: daily, monthly
- Interval meter readings: 5′, 10′, 15′, 20′, 30′, 60′
- Timestamp

DATA STORAGE
- Non-volatile memory
- Storage capacity depends on data type and number of parameters and can be expanded for one type of data on the expense of another
- Up to 3 interval profiles and 1 billing profile. For example:
  - *15 minutes interval profile*: 6 parameters for about 63 days
  - *hourly interval profile:* 6 parameters for about 13 days
  - *monthly billing profile:* 6 parameters for about 110 months

MULTI-RATE METERING
- Up to 6 tariff registers
- Up to 12 changeovers per day
- Tariff indicator is displayed on LCD and transmitted to an external system
- Active and passive tariff plans, configurable activation time of the passive tariff plan

CALENDAR
- Up to 12 seasons per year
- Up to 7 daily profiles per week
- Up to 30 special days per year
- Support of movable holidays

TEST OUTPUTS
- Outputs: 2 optical outputs (LEDs), optical port
- Parameters under control: active energy, reactive energy

METER SELF-CONTROL
- Built-in test for continuous self-control
- Quick response on severe error
- Meter state events registering

EVENTS & ALARMS HANDLING
- Continuous control of current state of meter functional nodes and alarms/events, timestamps
- Standard set of events processing including: registration in the special logs and registers, event report sending, states displaying, load switching off on special cases
- Different types of event logs

BUILT-IN DISPLAY
- LCD, 8 digits, configurable decimal place (up to 3 digits)
- Special symbols, data identification according to IEC 62056-61 (OBIS)
- Metering data and specified messages displaying
- Service/client lists of parameters
- Manual/automatic modes of scrolling
- Display self-testing
- Configurable backlight mode

LOAD CONTROL
- Built-in relay (80A)
- Control modes:
  - remote (by command)
  - local (by condition)
  - manual (by push button)
- Continuous relay state control
- Relay status displaying
- Load switch events registering

ELECTRICAL ENERGY QUALITY CONTROL
- Quality indexes:
  - average voltage
  - voltage sags and swells
  - outages
  - network frequency
  - THD for voltage/current harmonics
- Remote or local configuring of parameters thresholds
- Quality control events registering

THRESHOLDS MANAGEMENT
- Configurable thresholds values
- Possibility to disconnect consumer from the network, when a threshold is crossed

FRAUD & THEFT PROTECTION
- Continuous monitoring;
- Fraud types under control:
  - meter/terminal block cover opening
  - inadmissible differential current
  - strong external magnetic field
- Hall sensor for magnetic field detection
- Tamper detection: shunt in the phase circuit and transformer in the neutral
- Protective seals
- Fraud events registering

INFORMATION SECURITY
- Communication encryption (AES-GCM-128 security suite)
- Data access according to stated rights
- Firmware protection
- Security events registering

DATA TRANSMISSION
- Data transmission on demand or by schedule
- Request types:
  - Data Concentrator request (via communication channel)
  - Hand Held Unit request (via optical port)

POWER LINE COMMUNICATION (PLC)
- Built-in PLC modem
- G3-PLC (ITU-T G.9903) / PRIME (ITU-T G.9904, PRIME specifications v.1.3.6 and v.1.4) standard compliant;
- Switching between G3-PLC and PRIME is performed by changing the meter firmware.
- PLC features:
  - ✔ CENELEC A band
  - ✔ FCC band
  - ✔ EMC standards compliance
  - ✔ Auto-discovery
  - ✔ Repeating

RS-485 COMMUNICATION INTERFACE
- Built-in RS-485 interface:
  - provides a link between the meter and an extension communication module via mini USB port.
  - ensures the power supply of communication module
  - provides a link between the meter and other devices via WAGO connectors
  - baud rate - up to 19 200 bps.

OPTICAL PORT
- IEC 62056-21 standard compliant
- Data transmission rate up to 38 400 bps
- Possibility of local data exchange and meter parameterization

METER PARAMETERIZATION
- Remote (via communication channel) or local (via optical port)
- Assignment of the access rights from HES
- Parameterization events registering

SOFTWARE UPDATE
- Remote (via communication channel) or local (via optical port)
- Software update events registering

BACKUP POWER SUPPLY
- Battery for meter backup supply when the power is off
- Battery lifetime - not less than 20 years

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Accuracy class:	
- **Active energy**	B (1)
- **Reactive energy**	2
Reference current, Iref	5 A
Maximum current, Imax	80 A
Minimum current	0.05 Iref
Starting current:	
- **Active energy**	0.004 Iref
- **Reactive energy**	0.005 Iref
Reference voltage, Un	230 V
Voltage range	from 0.7 Un to 1.2 Un
Reference frequency	50 Hz
Meter constant:	
- **Active energy**	1 000 imp/kWh
- **Reactive energy**	1 000 imp/kvarh
Temperature range	from -40°C to +70°C
Internal clock	quartz crystal 32 kHz
Clock accuracy (at 25°C) (IEC 62052-21)	≤0.5 s /24 h
PLC raw data rate (with convolutional coding):	
- PRIME v1.3.6, CENELEC A band 3-95 kHz	21.4-64.3 kbps
- PRIME v1.4 for each of 1, 3-8 channel in the band 3 kHz up to 500 kHz	5.4-64.3 kbps
- G3-PLC CENELEC A band (35-90 kHz)	up to 44 kbps
- G3-PLC FCC band (154-487 kHz)	up to 230 kbps
Inherent consumption of current circuit, not more (IEC 62053-61)	1 VA
Inherent consumption of voltage circuit, active/total, per phase, not more (IEC 62053-61)	2 W / 10 VA
Insulation strength (IEC 61010-1-90)	4 kV, 50 Hz, 1 min
Shock voltage (IEC 60060-1)	12 kV, 1.2/50 µs
Electrostatic discharge (IEC 61000-4-2)	15 kV
High frequency radiant field (IEC 61000-4-3)	10 V/m
High frequency interferences (IEC 61000-4-4)	4 kV
Surge immunity test (IEC 61000-4-5)	6 kV
IP rating	IP54
Mean total lifetime, not less	20 years
Dimensions, W x H x D	127.5 x 213.5 x 62 mm
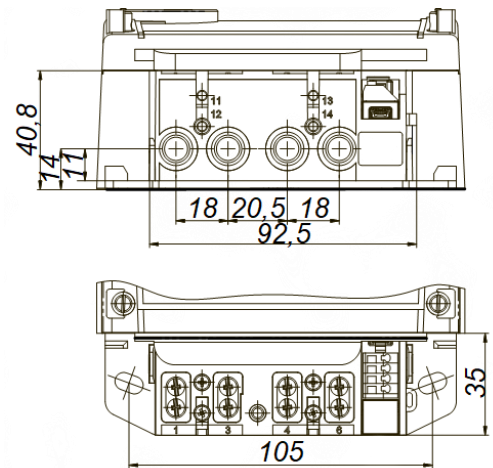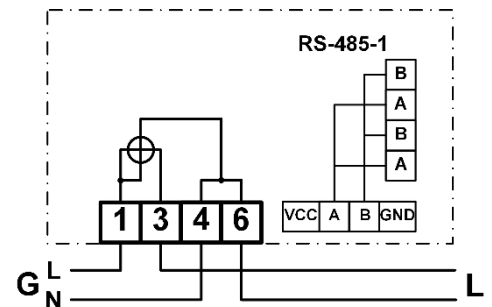
TERMINAL BLOCK
- DIN 43857 standard specifications
- Universal clamping type for terminals of current circuits: D = 8 mm

HOUSING
- Light-tone non-flammable polycarbonate

MOUNTING
- By 3 fixing points or on DIN rail (35 mm)

36 Dragomirna Str.
Kishinev MD-2008
Republic of Moldova

Phone : +373 (22) 930 012
Fax : +373 (22) 930 012

E-mail : info@addgrup.com
Web : www.addgrup.com