THREE-PHASE ELECTRONIC ELECTRICITY METER

CST0430 is an electronic meter that measures active energy in a three-phase LCD mode, used by residential consumers or commercial agents, with a double tariff, for measuring and billing energy consumption in a three-phase low-voltage network. The meter is built to provide a platform that supports a variety of characteristics.

CST 0430

Meters of the latest generation, multi-tariff, multifunctional active energy metering in 4 dials, class A (EN 50470 - 1, 3) record of the maximum power communication possibilities (SR EN 62056-21)Optical Output Interface: IR Interface and Reading according to EN Standard Norm Czech Republic 62056-21. Impulse output for energy metering / measurement: Impulse class A according to Standard norm Czech Republic EN 62053-31 Energy impulse testing according to Standard Norm Czech Republic EN 50470-1, par. 7.3.3: ≥ 8kV
Resistance test of the panel at fast transitions according to Standard Norm Czech Republic EN 50470-1, par. 7.4.7: ≥ 8kV
Impulse Shock Resistance Test according to Standard Norm Czech Republic EN 50470-1, par. 7.4.9: ≥ 8kV
Constant on S0 pulse output of the meter: 100 pulses / KWH

TECHNICAL CHARACTERISTICS

Rated values

- Accuracy Class: Class A
- Degree of protection against dust and water: IP51
- Insulation box - protection class : II
- Rated voltage (Un): A 3x230 / 400V
- Working voltage range: 0.8 - 1.15 * Un (no error message)
- Operating temperature range: from -40 ° C to + 70 ° C
- Rated frequency: 50Hz
- Distribution network: 4-wire system (L1, L2, L3, NUL)
- Network type: grid TN-C
- Rated current (Iref): 5A
- Minimum current (Imin): ≤ 250mA
- Continuous current (Ist): ≤ 25 mA
- Maximum current (Imax): 80 A
- Power consumption in active input voltage circuits at Un and apparent consumption at Un≤1W≤ 1VA at Iref
- Meter constant: 1000 imp / kWh
- Displayed energy resolution: 1kWh
- The number of decimals in the test module on the LCD screen, even in the register: min. 3, the LCD shows only the active tariff
- Output Testing: LED (visible spectrum)
- Clamp 20 (+) clamp 21 (-)
- Insulation: allows mounting of screws with insulated screwdriver PZ - S1 with a diameter of at least 6,5mm
- Maximum 8.6mm diameter

Phase connection:

- Type: Screw
- Diameter and type of steel used 2: 8mm
- Minimum conductor section: 4 mm2
- Maximum conductor section: 16 mm2
- Screw size: M3
- Maximum screw diameter: ≤ 8.6mm
- cross section: Type Z, No 2, in accordance with ISO-4757-1983

Climatic characteristics:

- Operating temperature range: -40 ... + 70 ° C
- Transport and storage temperature: -40 ... + 70 ° C

Configuring the display
1) Display of the identified size:

To use the OBIS code display to indicate the value in the register, 7 digits defined and controlled by the firmware of the meter are used. Generally, they display the OBIS codes. The size of a digit is 6 x 2.7 mm (HxW). The LCD shows the value of the T1, T2 and P tariffs with the OBIS codes. Each OBIS code represents the identification code for a given date in the DLMS / COSEM protocol according to the requirements of the measuring equipment.

2) Display of the value in the register:

The display is able to display the values corresponding to the OBIS codes displayed at the top of the screen by means of 7 defined digits and programmed software from the meter's firmware. Also, besides displaying values, several predefined messages can be displayed by the manufacturer by means of the serial parameterisation of the meter. The size of the displayis 54.11 x 17.08 (H x W) mm and for one digit it is 8 x 3.6 (H x W). The displayed values appear directly on the screen, with a running time between the displayed values of 8 seconds.

Quality management system ISO 9001 certified by SRAC
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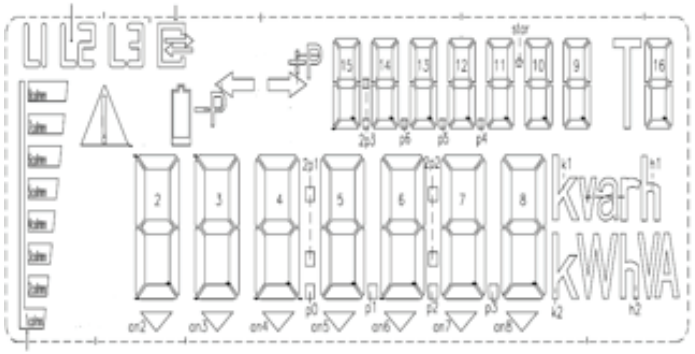

Fig 1. LCD Layout

Operational characteristics:

Meter power supply

- The power supply is a Buck-Boost converter.
- Frequency of work: 60 KHZ
- Short circuit protection
- Surge Protectors
- Operating voltage: 170-440 V

Define Display Elements

1) Power supply symbol L1 L2 and L3
2) Symbol "Opening Block-Terminal Cover"
3) Meter communication symbol
4) Symbol for displaying the exported energy direction
5) Symbol for displaying the imported energy direction
6) OBIS of the displayed registry
7) Indicator for displaying the tariff associated with the register running at that time on the display
8) Symbol for the active power level of the meter ("BarGraph")
9) Reactive energy measurement unit
10) Symbol for low battery
11) Active energy measurement unit
12) Symbol for indicating the energy flow direction of the meter on the L1 phase
13) Symbol for indicating the energy flow direction of the meter on phase L2
14) Symbol for indicating the energy flow direction of the meter on phase L3
15) Symbol for indicating the active tariff T1
16) Symbol for indicating the active tariff T2.

Communication

Communication is done on a single channel with the following characteristics:
- Data reading according to IEC 62056-21 mode C-a and IEC 62056-21 C-b
- Configuring the display sequence
- Password changing
- Read / Write date and time
- Reading events and recording errors
- Displays information on the display, in a sequence other than normal or alternative

Optical button

The meter has an optical button that can be activated by using a flashlight. It has the function of "waking up" the battery meter and displaying certain metrological sizes on the LCD screen. The sizes displayed on the screen change every 8 seconds. The display sequence on the LCD contains various metrological sizes (OBIS codes) in which the values and names of the registers for energy consumed or exported at different tariffs are reflected. All the registers and their description are written in Table 3. In battery mode, the meter is off. The user can see the sizes and values stored in the energy registers until they are disconnected from the power grid. By pushing the optical button with a flashlight for at least 0.5 seconds and the immediate removal of the light, the meter wakes up and displays the set display sequence for at least 1 minute. Every 8 seconds it goes to the next register until the time expires. The battery display sequence is described in Chapter 10. In normal operation mode, the display sequence on the LCD displays the OBIS codes configured in the entire format and on the battery they are displayed with three decimals.
In test mode, configured registers are displayed with 3 decimals. The meter displays the sequence programmed by the manufacturer for the test mode. In order to return to the normal display sequence, the meter is disconnected from the network, and when the meter starts, it will display the normal operating sequence. The command for entering the test mode E20101 () can be given via the serial port with a serial communication application using the IEC 62056-21 mode C protocol with RTS enabled.

Configuration of data reading

Parameters that can be read by the communication equipment are specified in the configuration mode. The read parameters, their order in the list, along with the number of decimals chosen for the registers can be specified. The size of a registry can be 6 digits without decimals or can be 7 digits with 1 or 2 decimals. This is independent of the display configuration. The order in which they are read is the same as the list. The list is drawn up by the manufacturer. All sizes are identified by OBIS codes.

Modes of operation of the meter

The CST0430 meter has two modes of operation:
• Normal mode (powered from the network): The meter has all the display, metrological and other events that can be performed. The firmware version, date, and checkout are also displayed on the display. In normal mode on lcd, it will run the display sequence described in point. The firmware version check is 1A67 (hex) and the firmware version is 05 on 05.12.15.
• Battery mode (disconnected from the networks): The meter enters this operating mode after disconnecting from the network or in the event of a power failure. In this way, the meter has all metrology functions off. The only features available are RTC and sequence display from normal mode to the operation of the optic button with a flashlight. The sequence display time runs at least one minute.

Optical Port

The optical port used corresponds to Standard IEC1107.
This standard specifies data rate, character format, transmission protocol, optical and mechanical interface parameters.
The optical port consists of two essential components: an IR diode used for transmission and a photo transistor used for reception. The use of the optical port does not affect the measured data. The meter provides an optical port, which can be used for two communication modes.
The usual function is to set the meter or read data from the meter. The software called "MCOMTool" provides reading or programming of the meter through the optical port using an optical probe. Through the optical port it is possible to perform operations on the meter, namely:
1) Meter clock synchronization
2) Entering test mode.
3) Readout meter
The manufacturer can also use factory-set password and hardware key (internal jumper) for calibration, parameterization, and other commands together with complex software used by the manufacturer only.

Data Accessibility

Accessibility of meter data consists in reading the readout described in Table 2 according to the specification. Reading this report is done without password by using the optical probe on the meter's optical port. The possible parameterizations in normal operating mode and without hardware jumper are:
1) The "Test" Mode of the Meter, provided with a password that can be defined by the distributor or the customer.
2) The meter clock synchronization, assured with a password that can be defined by the distributor or customer.
The deletion or alteration of metrological meter registers cannot be done by the distributor or the customer in any form. All the operations on meter counts are performed by the manufacturer in the factory and executed with a password defined by the hardware manufacturer in the CALIBRATION mode. When metrological registers are corrupted, the meter goes wrong and the error code is displayed on the screen.

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Display sequence on battery

Activating the battery display sequence is done as follows: Operate with a flashlight for at least 0.5 seconds on the optic button indicated by a symbol on the meter case, then the battery display sequence is activated when the light on the downward front is removed. The display sequence runs for a minimum of one minute with an 8-second scrolling interval between the display sizes.
• Error mode: The meter enters this mode after a fatal error has been detected. In this way, the meter no longer registers energy and the FF character with the error code remains on the display.
• Calibration mode: The meter enters the calibration mode as soon as the firmware version has been programmed. In this way the meter is calibrated together with other configuration operations. You can only enter this mode if the jumper on the motherboard is connected. Also, for all possible arameterizations and calibration, a password known only by the manufacturer is used.

Connecting the meter to the network

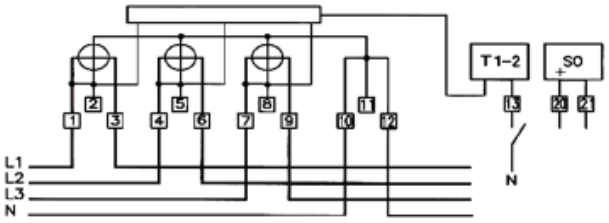


Fig.2 Connecting the meter to the network

The connection of the CST0430 meter in three-phase mode to the low-voltage electrical network is done according to the diagram in figure 6.
The connection of the three-phase meter to the network is based on Fig.6. In order to illustrate how to connect the meter, we will briefly explain each of the terminals and the component in the figure above.

- Terminal 1) represents the voltage on the phase (R) or the first phase (L1) from the low voltage network entering the meter
- Terminal 2) represents the voltage on the R phase or the first phase that comes from the low voltage network that only connects in the calibration / calibration mode at the factory
- Terminal 3) represents the Phase R exit or the first phase from the counter to the consumer in the home.
- Terminal 4) represents the voltage on the phase (S) or the second phase (L2) from the low voltage network entering the meter
- Terminal 5) represents the voltage on the S phase or the second phase that comes from the low voltage network that only connects in the calibration / calibration mode at the factory
- Terminal 6) represents the exit of the S phase or the second phase that reaches the meter to the consumer in the house.
- Terminal 7) represents the voltage on the phase (T) or the third phase (L3) from the low-voltage network entering the meter
- Terminal 8) represents the voltage on the T phase or the third phase that comes from the low-voltage network that connects only in the calibration / calibration mode at the factory
- Terminal 9) represents the exit from the T phase or the third phase that reaches the meter to the consumer in the house.
- Terminal 10) represents the phase to earth of the low-voltage network that connects to the meter input.
- Terminal 11) represents the phase to earth of the terminal that connects in the calibration / calibration mode at the factory
- Terminal 12) represents the exit of the " phase to earth " that connects from the meter to the consumer in the house.

Tariff Switch

In order to be able to switch from a T1 tariff to T2, the drawing in Fig. 6 is used. When the terminal "13" and the phase to earth have a direct connection, the meter switches to the T1 tariff, and when the between the terminal "13" and the phase to earth the wire is removed, the meter runs in T2 mode. There is no connection in T2 when any phase or two phases fall.

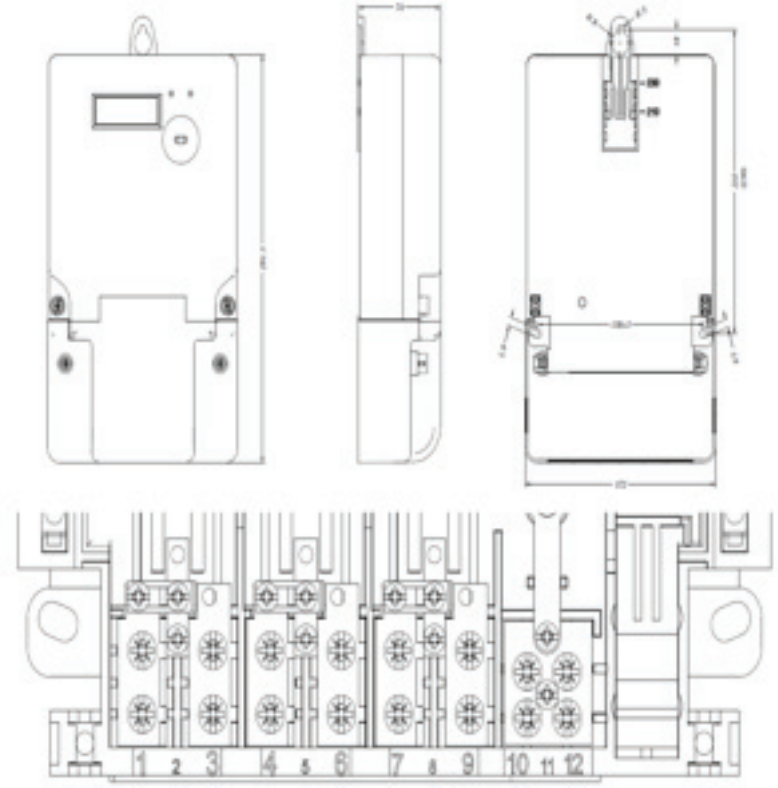
S0 impulse output

In order to measure the number of impulses / kwh that the meter gives in the operating mode, it connects to the terminals 20, the "plus" wire of the error meter, and the terminal 21 connects the wire to the minus.

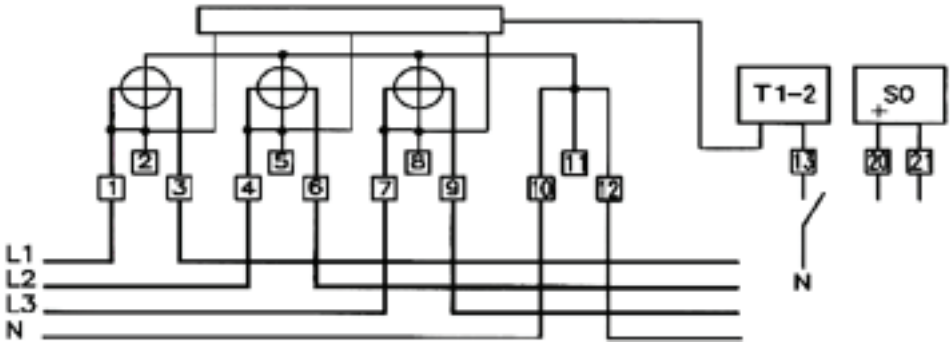
Registered demand

The implemented algorithm will calculate the registered demand every 15 minutes, synchronized with the real-time clock. Thus the points in time at which the registered demand will be calculated will be:
HH: 00, HH: 15, HH: 30, HH: 45.

OVERALL AND MOUNTING DIMENSIONS, SEALS



WIRING DIAGRAM



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