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1. Introduction

1.1. General

The Remote Reading Mini Meter **M360** is a three phase 3x230(400)V, direct measurement static watt-hour meter with two-way **P**ower **L**ine **C**ommunication (PLC).

M360 measures electric energy consumption and transmits data over the power lines using two way **P**ower **L**ine **C**ommunication (**PLC**) to a central unit – a concentrator – from which data is transmitted to the control center by cellular communication – GSM/GPRS.

M360 is capable of receiving data from the concentrator such as: **T**ime **O**f **U**se (**TOU**) tables, real time clock.

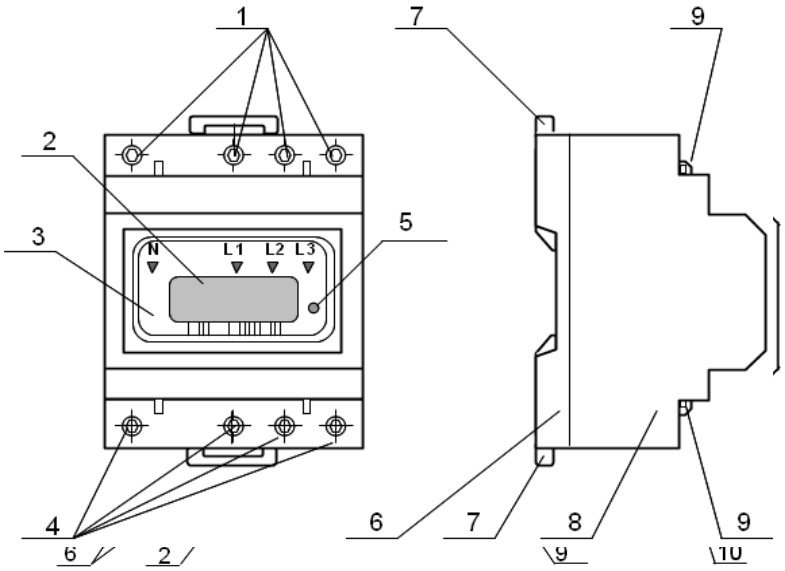
M360 is capable of transmitting data to the concentrator such as: energy reading, status, **TOU** reading.

M360 meter is designed to be mounted on DIN standard rail (4 DIN width case) in distribution boards or in standard cabinets.

Fig. 1.1 Meter view

2. Product information

2. 1. Meter parts



1	Input Terminals	6	Lower part of case
2	LCD display (protected by transparent window)	7	DIN-rail locks
3	Label	8	Upper part of case
4	Output Terminals	9	Sealing points
5	Red LED		

Fig. 2.1 Meter front/side view

2.2. Technical Data

General	
Nominal Voltage (Un)	3x230 (400)V
Supply Voltage range	80% - 115% Un
Nominal Frequency (fn)	50Hz
Meter Consumption at Un	1.2W-14Var
System connections	3 phase 4 wire
Measurement	
Class Index	Class 2
Reference/Basic Current (Ib)	20A
Maximum continuous current (Imax)	63A
Environmental	
Temperature range	
operation	-10ºC to 55ºC
storage	-25ºC to 60ºC
Relative humidity (R.H.) for annual mean	< 75%
RH on 30 days per year	< 95%
R.H. occasionally on some days	85%
Insulation Strength	
Protective Class acc. to IEC62052-11	Class I I
Insulation strength	4kV at 50Hz for 1 min
Display	
Type	LCD
Format	8 Characters x 2 Lines
Character size	4.3mm x 2.95 mm
LED Indicator	
Flash rate	100 imp/kWh
Communication Interfaces	
PLC Frequency range	"A"-band
PLC Method	Spread FSK

Electromagnetic Compatibility	
Impulse voltage test	6 kV, 1.2/50µs IEC 60060-1
Fast transient /burst test	4 kV, IEC61000-4-4
Immunity to electromagnetic RF fields	80MHz - 2 000MHz, IEC61000-4-3
Immunity to conducted disturbance	150 kHz – 80MHz, IEC 61000-4-6
Radio frequency emission	EN 55022, class B (CISPR 22)
Electrostatic discharge (ESD)	15kV, IEC61000-4-2

Weight and Dimensions/ Case protection	
Weight	195 g
Width	72 mm
Height	93 mm
Depth	63mm
Enclosure protection (IEC60529)	IP51
Protection for connection terminals	IP20

Connections	
Connection system type	Clamping yoke connection
Maximum conductor cross-section	16 mm²
Minimum conductor cross-section	6 mm²
Clamping screw	M5x17
Head of clamping screw	Socket hex cap 4 mm
Tightening torque, min	3.5 Nm
Tightening torque, max	4.0 Nm

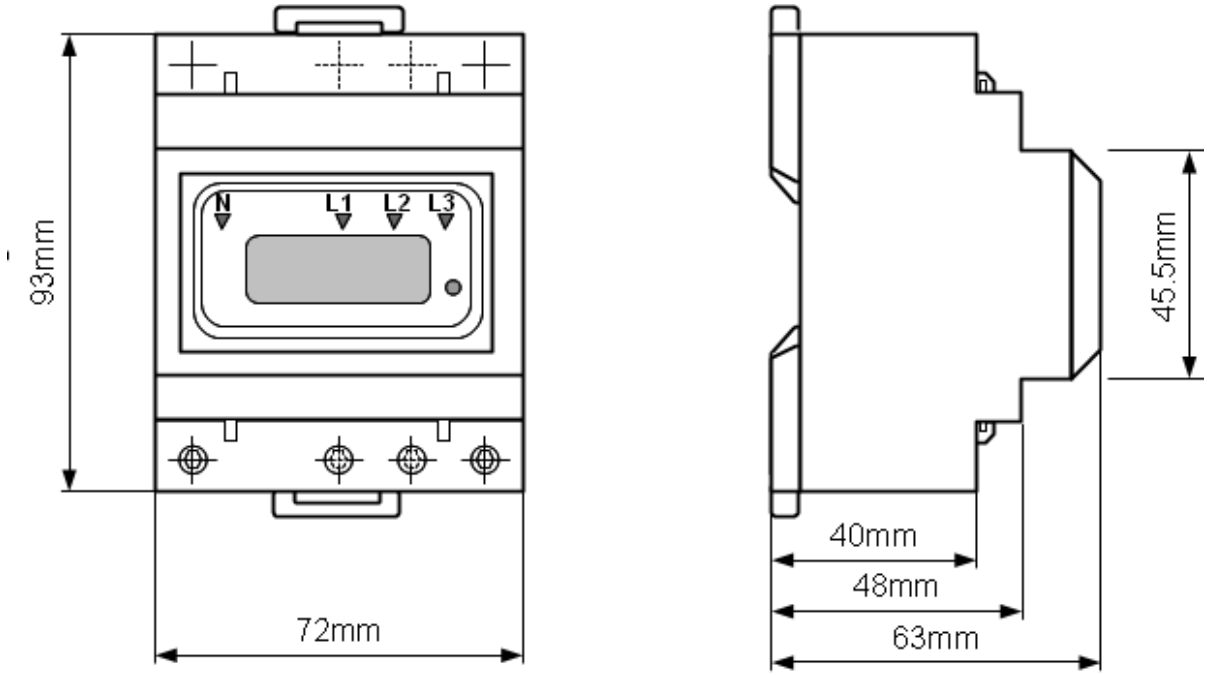


Fig.2.2 Meter Dimensions

3. Safety regulations

The following safety regulations must be observed at all times:

- The meter connections must not be under voltage during installation or when opening. Contact with live parts is dangerous to life. The relevant preliminary fuses should therefore be removed and kept in a safe place until the work is completed, so that other persons cannot replace them unnoticed.
- Local safety regulations must be observed.
- Installation of the meters must be performed by qualified industrial electricians only.
- Meters which have fallen must not be installed, even if no damage is apparent, but must be returned for testing to the service or the manufacturer. Internal damage can result in functional disorders or short circuits.
- The meters must on no account be cleaned with water or with high pressure devices.

4. Installation

Installation and commissioning must be performed by a qualified Industrial electricians only!

The persons installing the meter must be familiar with and observe the normal local safety regulations and safety regulations specified in this "Installation Instruction".
The installer is responsible that the electricity meter is correctly and safety installed.

4.1. Protection requirements

M360 meter is designed to be mounted on standard DIN - rail (4 DIN width case) in a distribution boards or in a standard cabinets, with protection of at least class IP51 according to IEC 60259.Circuit protection for electricity meter must be installed: fuse or circuit breaker with maximum switching current less than 63A.

4.2. Mounting and commissioning

WARNING! The voltage connected to M360 meter is dangerous and can be lethal. Therefore all voltage must be switched OFF before the installation of M360 meter.

WARNING! The connecting wires at the place of installation must not be live when fitting the meter. Touching live parts is dangerous to life. The corresponding preliminary fuses should therefore be removed and kept in a safe place until work is completed, so that they cannot be replaced by anyone unnoticed.

1. Shut OFF power to line. Make sure voltage is zero. Check with a phase tester or universal measuring instrument whether the connecting wires are live. If so, remove the corresponding preliminary fuses and keep them in a safe place until installation is completed, so that they cannot be replaced by anyone unnoticed.

2. Fasten the meter on the DIN rail so that the meter's two plastic DIN-rail locks that are placed on the back of the meter snap onto the rail. *Fig 4.1*

3. Strip the wires according *Fig 4.1*

4. Connect the meter to the power line according to the meter installation diagram *Fig. 4.1*
Meter's input screws terminals are positioned on the top of the Meter, see *Fig. 2.1* position 1.
The input terminals should be connected to a source of power after the fuse or circuit-breaker with rated switching current less than max current of M360 meter (63A) in order to provide circuit protection.
Meter's output screws terminals are positioned on the bottom of the Meter, see *Fig. 2.1* position 4.The output terminals should be connected to wires going to the customer's residence. Recommended connections wire for input and output: conductor cross section 6 mm² – 16 mm², isolation 600V, 105°C, and VW-1.If stranded wire is used, this must be provided with ferrules for connection.

5. Check that the electricity meter is correctly wired and connected to specified
Voltage 3x230(400) V. Check that the inputs and outputs of each phase are connected correctly. Make sure each phase is connected to a phase and neutral to the neutral.

6. Make sure that the screws are tightened properly and the wires are not loose.

WARNING! Insufficiently tightened screws at the phase connections can lead to increased power losses at the terminals and therefore to undesirable heating.

7. Close screw terminals with the plastic closers that are provided with the meter and seal with two seals in order to prevent non-authorized access. *Fig.4.1*

8. If preliminary fuses were removed before the installation, insert these fuses in corresponding places. Turn ON power to line.

WARNING! While preliminary fuses inserted there is a danger of contact with the connecting terminals. Touching live parts is a danger to life. For any modifications to the installation therefore the preliminary fuses must always be removed again and kept in a safe place until completion of work, so that they cannot be replaced by anyone unnoticed.

9. Make sure the meter is activate and displays information. The red LED is ON or pulsing and LCD display screens are scrolling automatically every 2 second.Check on the display whether all three phases L3, L2, L1 are indicated and scrolling in normal phase sequence L3-L2-L1. If one phase is not present the displayed voltage value will be less than 90V.Check if electricity is supplied to the customer.
If the customer does not receive electricity, shut OFF power to line and check the meter connections.

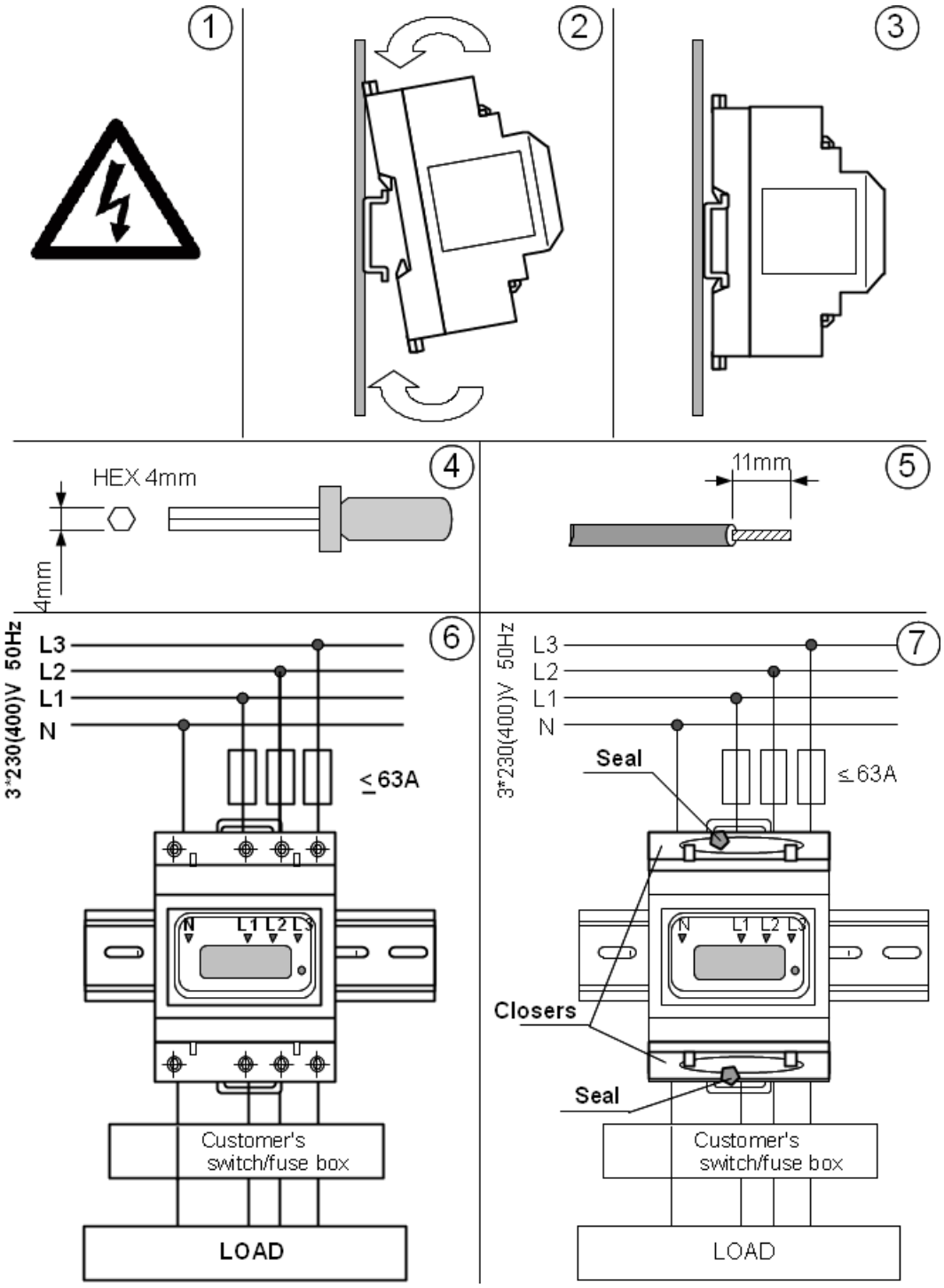


Fig. 4.1 Installation Diagram

5. Functions

5.1. Reading and controlling the meter.

The meter M360 measures electric energy consumption.
Control of the meter can only be done remotely thru the concentrator.
The reading of the meter data is done by the LCD display that is placed on the front of the meter.

5.2. Operating LCD Display

The M360 electricity meter's data is displayed on its LCD .The screens scroll automatically every 2 seconds, without the intervention of the customer. The LCD Display of M360 has 2 lines of 8 characters each. The upper line identifies the subject of the screen. The lower line identifies the measurement results.

5.2.1. Display screen when power is ON

The first screen appears only once immediately when the meter is turned ON.

Screen 1	06220511	Program version

5.2.2. Auto-scrolling display screens

The following screens are continuously scrolling and changing every 2 seconds

Screen 2	Meter ID 00102029	Meter's serial number
Screen 3	ALL kWh 000001.2	Reading of the **Total** (peak, of peak, standard) accumulated Power consumption, in kWh.
Screen 4	T1 kWh 000000.3	Reading of accumulated consumption in tariff 1 (T1) , in kWh.
Screen 5	T2 kWh 000000.4	Reading of accumulated consumption in tariff 2 (T2) , in kWh

Screen 6	T3 kWh 000000.5	Reading of accumulated consumption in tariff 3 (T3) , in kWh
Screen 7	L3 Volt 230V	The current measure of the Power Line Voltage in phase L3, in V
Screen 8	L2 Volt 226V	The current measure of the Power Line Voltage in phase L2, in V
Screen 9	L1 Volt 223V	The current measure of the Power Line Voltage in phase L1, in V
Screen 10	18:25 T1< 24:00	The upper line displays the Current Time (updated from Concentrator) The lower line displays TOU Duration: Showing the present tariff and end time of the present tariff

5.3 Test LED indicator:

The red LED is placed under the front transparent window (see *Fig. 2.1*) and should be used for meter testing. The red LED indicates power consumption. While the meter is on, the red light is visible and flashes at a frequency dependent on the present power and LED flash rate. The Meter Constant (LED flash rate) is 1000 imp/kWh (as marked on the label).

6. Maintenance instructions:

- The following points should be checked on the meters periodically:
- The meter is in operation and serviceable.
- All seals are undamaged
- The condition of connections of screw terminals are unchanged and all screws are tightened properly
- The condition of plastic around the terminals is undamaged
- Wire isolation is undamaged
- The meter is dry.
- The plastic window is clean and transparent
- If the meter's transparent window is dirty and need to be cleaned, use damp cleaning cloth to remove the dirt.

WARNING! Make sure no liquid enters into the meter as this could damage the meter.
If the meter does not operate correctly, the meter should be disconnected, removed and sent to the responsible service and repair center.

It should not be necessary to recalibrate the meter during its lifetime.
The meter's calibration is to be checked according to requirements of the Electricity Company.

The protection provided by the equipment may be impaired if the product is used in a manner not specified in the Manual.

7. Disconnecting meters:

1. The meter should be removed as follows:

2. Turn OFF power to line.

3. Check that the connecting wires are not live using a phase tester or universal
    a. Measuring instrument. If they are live, remove the corresponding
    b. preliminary fuses and keep these in a safe place until work is completed,
    c. So that they cannot be replaced by anyone unnoticed.

4. Remove the two seals and two plastic closers.

5. Check that the meter's terminals are not live using a phase tester or universal
    a. Measuring instrument. If they are live, repeat step 2.

6. Release the terminal screws of the connecting wires with a suitable screwdriver and withdraw the connecting wires from the terminals.

7. Remove the meter from DIN rail.

8. Fit a substitute meter as described in Section 4 “Installation”.