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1. Introduction

1.1. General

The **M160RWD** is a single phase, watt-hour meter with two-way **Power Line Communication (PLC)**.

The **M160RWD** meter communicates with a central unit, a concentrator, over the low Voltage power lines using two way PLC. The concentrator transfers the data to the Control Center by cellular communications -GSM/GPRS.

The **M160RWD** is capable of receiving data from the concentrator such as: **Time Of Use (TOU)** tariff tables, power limit, real time clock, disconnection commands and prepaid energy (in prepayment mode).

The **M160RWD** is capable of transmitting data to the concentrator such as: energy reading, status, **TOU** reading and prepaid balance (in prepayment mode).

The **M160RWD** meter can also communicate with a split Display unit , using PLC over the power lines. The split Display unit is a compact device with a large display that can be placed in any convenient location within customer's premises.

M160RWD meter contains load control switch (relay) enabling to remotely disconnect and reconnect power to customer by command received from the concentrator.

M160RWD meter is designed to be mounted on DIN standard rail in distribution boards or locked standard cabinets with protection of at least class IP51 according to IEC 60259.

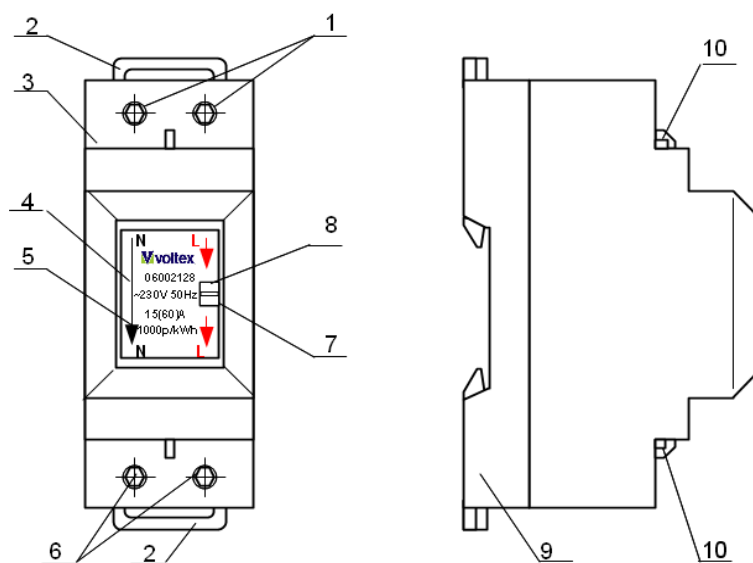


Fig. 1.1 Meter view



2. Product information

2. 1. Meter parts



1	Input Terminals	6	Output Terminals
2	DIN-rail locks (2)	7	Red LED (under window)
3	Case upper part	8	IrDA port (under window)
4	Transparent window	9	Case lower part
5	Label (under window)	10	Sealing points

Fig. 2.1 Meter front/side view



2.2. Technical Data

General	
Nominal Voltage (Un)	230V
Supply Voltage range	80% - 115% Un
Nominal Frequency (fn)	50Hz
Meter Consumption at Un	1.2W-8Var
System connections	1 phase 2 wire
Measurement	
Class Index according to IEC62053-21	Class 2
Basic Current (Ib)	15A
Maximum continuous current (Imax)	60A
Environmental	
Temperature range	
operation	-10°C to 55°C
storage	-25°C to 70°C
Relative humidity (R.H.) for annual mean	< 75%
R.H. occasionally on some days	85%
Insulation Strength	
Protective Class acc. to IEC62052-11	Class II
LED Indicator	
Flash rate	1000 imp/kWh
Communication Interfaces	
IrDA Optical port (read only)	9600 bps
PLC Frequency range	"A"-band
PLC Method	Spread FSK
Disconnection Device	
Type	Single pole latching contactor
Maximum switching current	60A
Maximum switching voltage	250VAC
Mechanical life	100 000 operation minimum



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	36 mm
Height	93 mm
Depth	63 mm
Enclosure protection (IEC60529)	IP51
Protection for connection terminals	IP20

Connections	
Connection system type	Clamping yoke connection
Maximum conductor cross-section	16 mm ²
Minimum conductor cross-section	6 mm ²
Clamping screw	M5x17
Head of clamping screw	Socket hex cap 4 mm
Tightening torque, min	3.5 Nm
Tightening torque, max	4.5 Nm

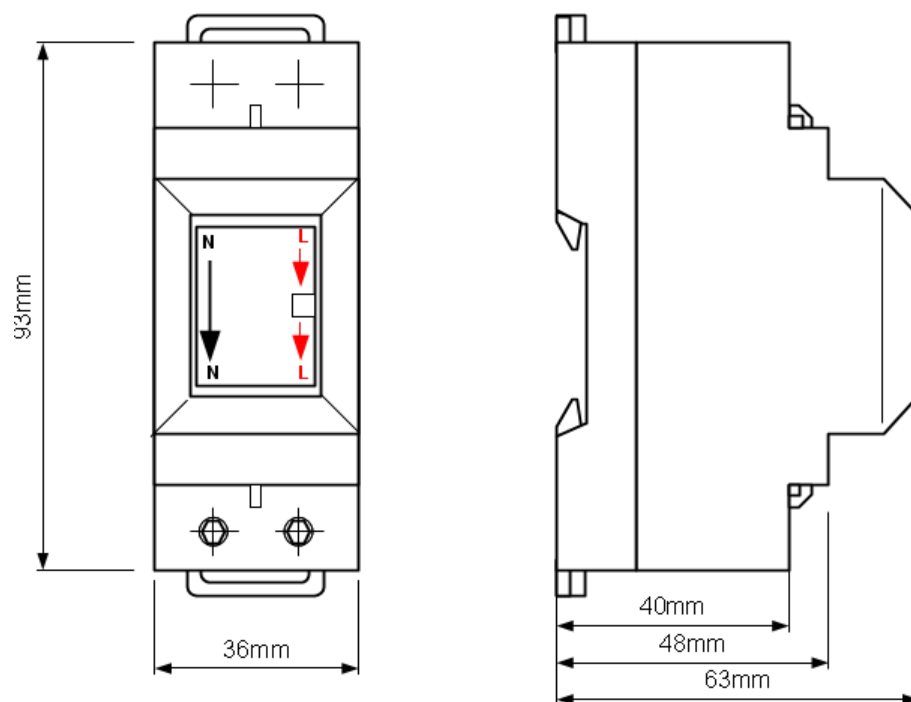


Fig.2.2 Meter Dimensions



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 carried out 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 Manual".

The installer is responsible that the electricity meter is correctly and safely installed.

4.1. Protection requirements

M160RWD meter is designed to be mounted on standard DIN - rail in distribution boards or in standard cabinets, with protection of at least class IP51 according to IEC 60259.

Circuit protection for the electricity meter must be installed: fuse or circuit breaker with max switching current less than 63A.

4.2. Mounting and commissioning

WARNING! The voltage connected to M160RWD meter is dangerous and can be lethal, therefore all voltage must be switched OFF before the installation of M160RWD 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. see Fig. 2.1 position 2, see

Fig 4.1 (2) (3)

3. Strip the wires according Fig 4.1 (6)



4. Connect the meter to the power line according to the connection diagram presented on the meter's label, see *Fig 2.1* position 5, and according to the meter

Installation diagram *Fig. 4.1* **6**

Meter's input screw 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 the meter (63A) in order to provide circuit protection.

Meter's output screw terminals are positioned on the bottom of the Meter, see *Fig. 2.1* position 6.

The output terminals should be connected to wires going to the customer's residence. It is very important to keep polarity: connect the phase to phase and the neutral to

Neutral according to connections diagram *Fig. 4.1* **6**

Recommended connection wires for input and output:

Conductor cross section 6 mm² – 16 mm², isolation 600V, 105°C, 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 (230V, 50Hz).

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 as well as hampering PLC communication.

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* **7**

8. Turn on power to line.

9. Make sure the red LED is ON or pulsing.

10. Check if electricity is supplied to the customer.

The meter has a disconnecting unit and it may take up to 2 minutes for the customer to receive electricity.

If the customer does not receive electricity, shut off power to line and check the meter connections.

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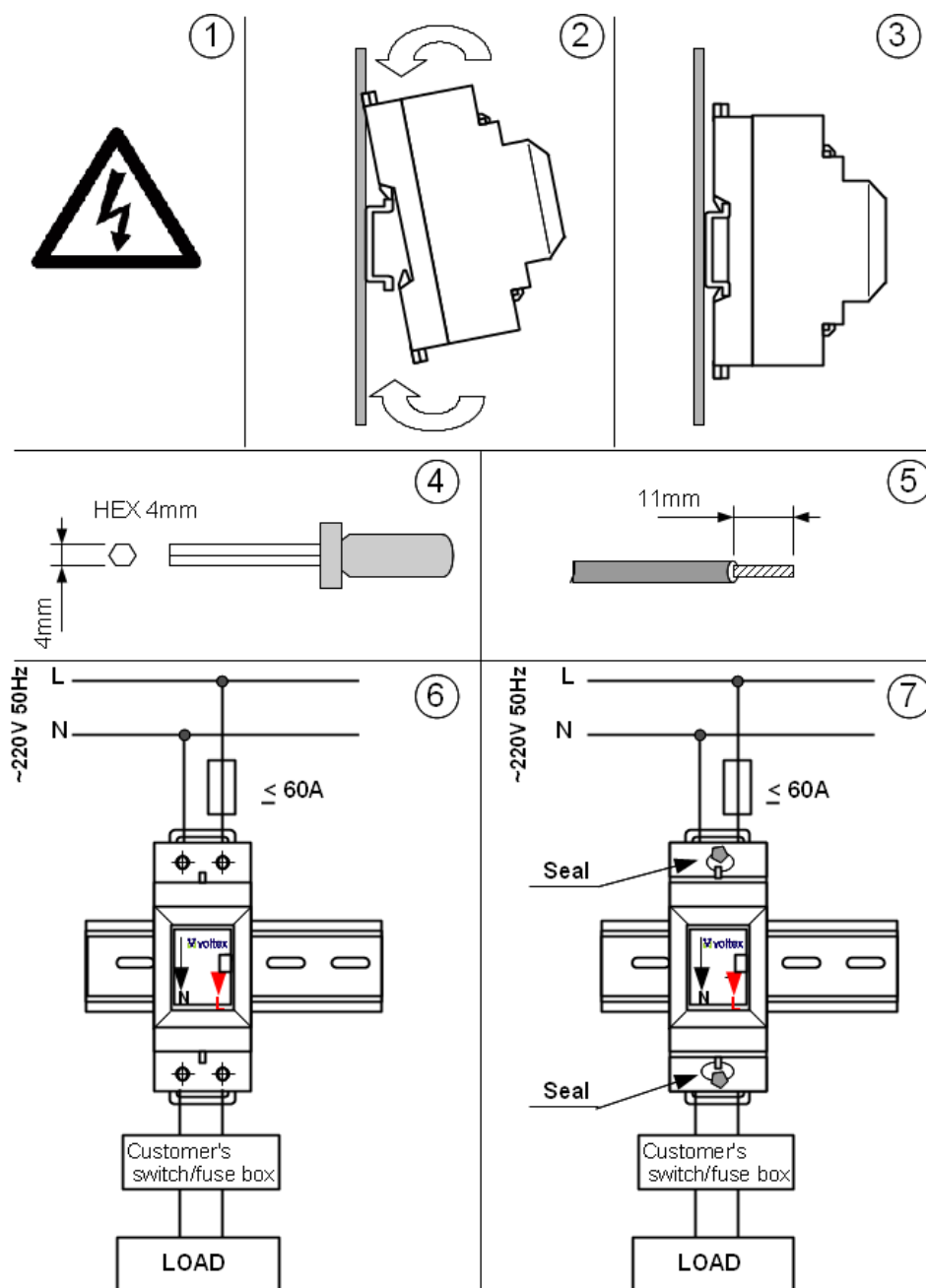


Fig. 4.1 Installation Diagram



5. Functions

5.1. Reading and Controlling the meter.

The meter M160RWD measures electric energy consumption. Control of the meter can only be done remotely thru the concentrator.

The meter transmits data over the low voltage power lines, using two way Power Line Communication (PLC), to a central unit, a concentrator – from which data is transmitted to the control center by GSM/GPRS or Internet communication.

The M160RWD is capable of receiving data from the concentrator such as: **Time Of Use (TOU)** tables, power limit, real time clock, disconnection commands. M160RWD is capable of transmitting data to the concentrator such as: energy reading, status and **TOU** reading.

M160RWD is capable of remotely disconnecting and reconnecting power to customer by command received from the concentrator.

5.2 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:

The meter should be removed as follows:

1. Turn OFF power to line.
2. Check that the connecting wires are not live using a phase tester or universal measuring instrument. If they are live, remove the corresponding Preliminary fuses and keep these in a safe place until work is completed, so that they cannot be replaced by anyone unnoticed.
3. Remove the two seals and two plastic closers.
4. Check that the meter's terminals are not live using a phase tester or universal measuring instrument. If they are live, repeat step 2.
3. Release the terminal screws of the connecting wires with a suitable screwdriver and withdraw the connecting wires from the terminals.
4. Remove the meter from DIN rail.
5. Fit a substitute meter as described in Section 4 "Installation".