EM122-RTU-2P

Manual

Revision History

Version	Date	Change
0	2021.3.9	First edition
1	2022.4.1	Correction menu display content

Contents

General

This manual applies to the products:
7760051003 Energy Meter EM122-RTU-2P

Copyright

Trademarks

Disclaimer

Weidmüller assumes no responsibility for errors or omissions in this manual and assumes no obligation to keep the contents of this manual up to date.

Meaning of the symbols

The following pictograms are used in this manual:

	**Dangerous voltage!** Risk of death or serious injury. Disconnect the power before working on the system and device.
	**Attention!** Please refer to the documentation. This symbol will warn you of possible dangers that could occur during assembly, commissioning and operation.
	Note!

Application notes

Please read these operating instructions and all other publications that must be consulted in order to work with this product (particularly for installation, operation or maintenance).

Please observe all safety regulations and warnings. Non-compliance with the instructions can lead to personal injury and/or damage to the product.

Any unauthorized alteration or use of this device which exceeds the specified mechanical, electrical or other operational limits can cause personal injury and/or damage to the product.

Any such unauthorized alterations are grounds for “abuse” and/ or “negligence” in terms of the product‘s guarantee and thus excludes the warranty for covering any possible resulting damages.

This device must only be operated and maintained by qualified personnel.

Qualified personnel are persons who, due to their respective training and experience, are able to recognize risks and avoid potential hazards that can be caused by operation or maintenance of the device.

When using the device, the legal and safety regulations required for the respective application must also be observed.

	Safety is no longer guaranteed and the device may be dangerous if the device is not operated according to the operating instructions.		Only screw terminals with the same number of poles and the same type may be plugged together.
	All signals connected with the device's SELV circuit must also conform with the SELV provisions.		Conductors consisting of single wires must be provided with ferrules.

About these operating instructions

These operating instructions are part of the product.

- Read the operating instructions prior to using the device.
- Keep the operating instructions at hand throughout the entire service life of the product and keep ready for referencing.
- Hand over the operating instructions to each subsequent owner or user of the product.

Incoming goods inspection

The proper and safe operation of this device requires appropriate transport, proper storage, installation and assembly as well as careful operation and maintenance. When it is assumed that safe operation is no longer possible, the device must immediately be taken out of operation and secured against accidental start-up. Unpacking and packing must be carried out with the usual care, without the use of force and only with the use of suitable tools. The devices must be visually inspected for proper mechanical condition. It can be assumed that safe operation is no longer possible if the device, e.g.

- shows visible damage;
- does not work despite intact power supply;
- and was exposed to unfavorable conditions (e.g. storage out- side of the permissible climatic limits without adaptation to the ambient climate, condensation, etc.) or transport stresses (e.g. falling from a great height even without exterior visible damage, etc.) for prolonged periods;
- Please check that the is complete before you begin with installation of the device.

Scope of delivery

Quantity	Designation
1	Energy Meter 122
1	Quick guide

Product description

Intended use

The Energy Meter 122 measures and displays the characteristics of 1P2W, 3P3W, 3P4W's applications. The unit provides voltage, current, power, frequency, power-factor, and energy etc.

The Energy Meter 122 is permanently installed in control cabinets or small distribution boards. It can be installed in any position.

Measurement voltages and measurement currents must originate from the same grid.

Energy Meter EM122-RTU-2P supports max. 100A direct connection, saves the cost and avoid the trouble to connect external CTs, giving the unit a cost-effective and easy operation.

The measurement results can be displayed and can be read and processed over the RS485 interface.

The Energy Meter 122 designed for mounting in low voltage distributions, containing overvoltage in measurement category III.

EM122 series have one RS485 remote communication port.

Specifications

Electrical characteristics		
Type of measurement		RMS including harmonics on three phase AC system (3P, 3P+N)
Measurement accuracy	Voltage	0.5%
	Current	0.5%
	Frequency	0.2%
	Power Factor	±0.01
	Active Power	1%
	Reactive Power	2%
	Apparent Power	2%
	Active Energy	IEC62053-21 Class 0.5
	Reactive Energy	2%
Input-Voltage	Un	230 V L-N
	Measured Voltage with Over-range and Crest Factor	80%-120% of Un
	Frequency Range	45~65Hz
Input- Current	Base Current	10A
	Max. Current	100A
	Min. Current	0.5A
	Over current withstand	30 x Imax 0.01s
Auxiliary Power Supply	Operating Range	Self powered
	Power Consumption	<2W/10VA
	Frequency	50/60 Hz

Digital output	Pulse output 1	0.001/0.01/0.1/1kWh/kVarh(configurable)
	Pulse output 2	400imp/kWh(non-configurable)
Mechanical Characteristics		
Weight		350g
IP Degree of Protection (IEC 60529)		IP51 for front display; IP20 for others
Dimensions (WxHxD)		72x100x66mm
Material of meter case		UL 94-V0
Environmental Characteristics		
Operating Temperature		-25 ~ 55°C
Storage Temperature		-40 ~ 70°C
Humidity Rating		≤90% (non-condensing)
Pollution Degree		2
Altitude		<2000m
EMC		
Electrostatic Discharge		IEC 61000-4-2
Immunity to Radiated Fields		IEC 61000-4-3
Immunity to Fast Transients		IEC 61000-4-4
Immunity to Impulse Waves		IEC 61000-4-5
Conducted Immunity		IEC 61000-4-6
Immunity to Magnetic Fields		IEC 61000-4-8
Immunity to Voltage Dips		IEC 61000-4-11
Radiated Emissions		CISPR 11 Class B
Conducted Emissions		CISPR 11 Class B
Harmonics		IEC 61000-3-2
Safety		
Measurement Category		Per IEC61010-1 CAT III
Over voltage Category		CAT III
Communications		
Interface standard and protocol		RS485 and MODBUS RTU
Communication address		1~247
Transmission mode		Half duplex
Transmission distance		1000m Maximum

Transmission speed	2400bps~38400bps
Parity	None (default), Odd, Even
Stop bits	1 or 2
Connection capacity of the terminals(voltage measurement)	
Single-wire, multi-wire, finely stranded conductor	2.5-25mm^2
Pin terminals,ferrules	2.5-25mm^2
Tightening torque	2-3 Nm
Stripping length	15mm
Connection capacity of the terminals(RS485 and output)	
Single-wire, multi-wire, finely stranded conductor	0.5-1.5mm^2
Pin terminals,ferrules	0.5-1.5mm^2
Tightening torque	0.2-0.25 Nm
Stripping length	7mm

Operating concept

There are several ways to program the Energy Meter 122 and retrieve measured values.

- Directly on the device using four buttons.
- Via the programming software of the EM configuration tools.
- Via the RS485 interface with the Modbus protocol. Data can be changed and retrieved with the help of the Modbus address list (stored on the accompanying data carrier).

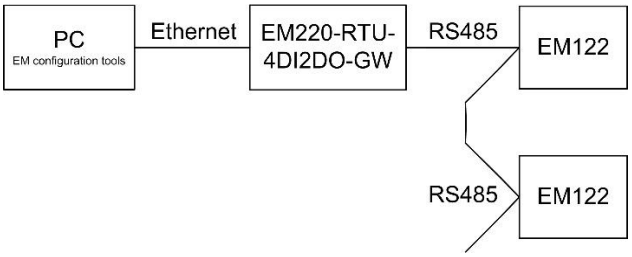
These operating instructions only describe the operation of the Energy Meter 122 using the 4 buttons. The programming software of the EM configuration tools has its own “on- line help”.

EM configuration tools

The Energy Meter 122 can be programmed and read with the EM configuration tools software. For this, a PC must be connected to the RS485 interface of the Energy Meter 122 via an RS485 Modbus to TCP/IP gateway.

Connection options

Connection of Energy Meter 122 to PC via an EM220-RTU-4DI2DO-GW as a gateway:



Assembly

Installation location

The Energy Meter 122 can be installed in control cabinets or in small distribution boards according to DIN 43880. It is mounted on a 35 mm mounting rail according to DIN EN 60715. It can be installed in any position.

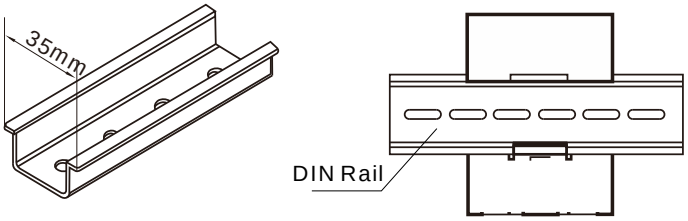


Fig.: Energy Meter 122 on mounting rail according to DIN EN 60715

Power supply

EM122 takes power from the voltage measurement port without additional power supply, to ensure that the voltage of measurement port complies with the information on the nameplate!

⚠	• The supply voltage must be connected through a fuse according to the technical data. • In building installations, the supply voltage must be provided with a disconnect switch or circuit breaker. • The disconnect switch must be attached near the device and must be easily accessible by the user. • The switch must be labelled as a separator for this device. • Voltages that exceed the permissible voltage range can destroy the device.

Voltage and current measurement inputs

When connecting the voltage and current measurement, the following must be observed:

Isolation device

- A suitable circuit breaker must be fitted to disconnect and deenergize the Energy Meter 122.
- The circuit breaker must be placed in the vicinity of the Energy Meter 122, be marked for the user and easily accessible.
- The circuit breaker must be UL/IEC certified.

Overcurrent protection device

- An overcurrent protection device must be used for line protection.
- For line protection, we recommend an overcurrent protection device as per the technical specifications.
- The overcurrent protection device must be suitable for the line cross section used.
- The overcurrent protection device must be UL/IEC certified.
- A circuit breaker can be used as an isolating and line protection device. The circuit breaker must be UL/IEC certified.

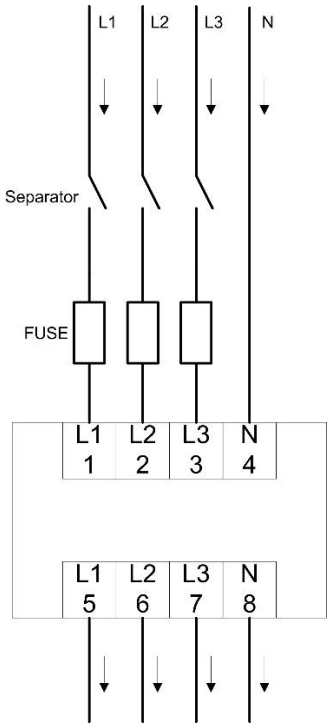


Fig.: Connection example for the voltage and measurement

	**Attention!** The voltage and current should not exceed the allowable range.
	**Attention!** The Energy Meter 122 is not suitable for the measurement of DC voltages.
	**Attention!** The voltage measurement inputs on the Energy Meter 122 are dangerous to touch!
	The attached screw terminal has to be fixed sufficiently with the screws on the device!

Direction of the current

Please wire in strict accordance with the current direction. If the connection is reversed, rewire it!

RS485 interface

The RS485 interface is designed with the Energy Meter 122 as a 3-pole contact and communicates via the Modbus RTU protocol (please see the registers address list of Modbus RTU protocol).

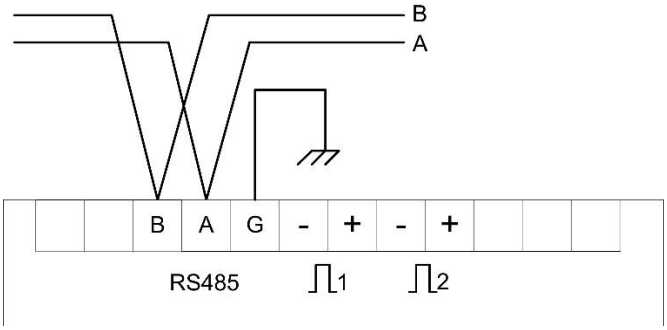


Fig.: RS485 interface, 3-pole contact

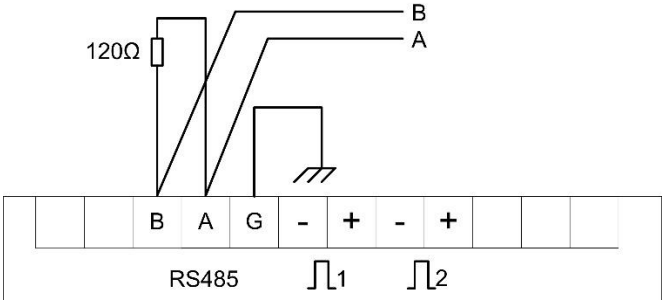
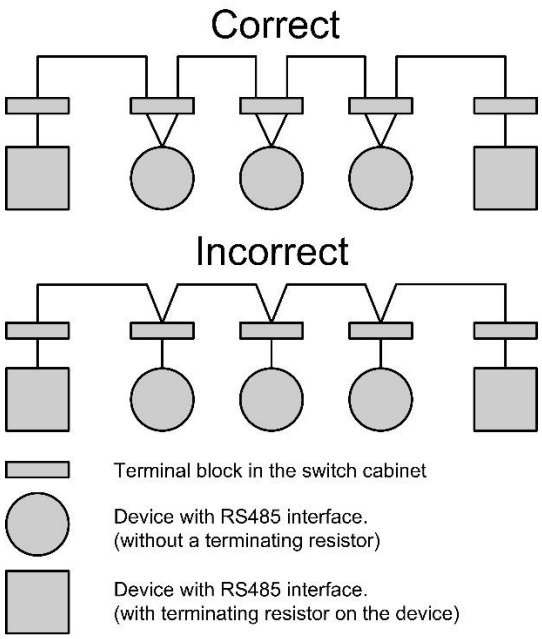


Fig.: RS485 interface, 3-pole contact with terminating resistor

Terminating resistors

The cable should be terminated with resistors (120 ohm 1/4 W) at the beginning and end of a segment if the communication distance larger than 300m.
The Energy Meter 122 has no terminating resistors.



Shielding

A twisted and shielded cable must be provided for connections via the RS485 interface.

- Ground the shields of all cables that run into the cabinet at the cabinet entry.
- Connect the shield so it has a large contact area and conductively with a low-noise earth.
- Mechanically trap the cable above the earthing clamp in order to avoid damage from cable movement.
- Use the appropriate cable inlets, e.g. PG screw joints, to insert the cable into the switch cabinet.

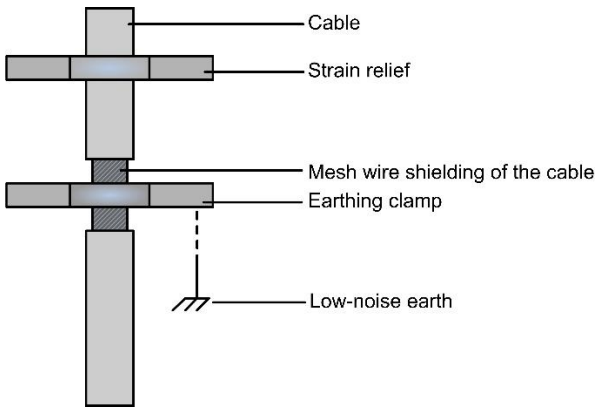


Fig.: Shielding design for cabinet entry

Cable type

The cable used must be suitable for an ambient temperature of at least 80 °C.

	For the wiring of the Modbus connection, CAT cables are not suitable. Please use the recommended cables.

Maximum cable length

Max 1000m.

Bus structure

- All devices are connected in a bus structure (line) and each device has its own address within the bus (also see programming parameters).
- Up to 32 stations can be interconnected in one segment.
- The cable is terminated with resistors (bus termination, 120 ohm 1/4 W) at the beginning and end of a segment.
- If there are more than 32 stations, repeaters (line amplifiers) must be used in order to connect the individual segments.
- Devices with activated bus termination must be supplied with power.
- It is recommended to set the master at the end of a segment.
- The bus is inoperative if the master is replaced with an activated bus termination.
- The bus can become unstable if the slave is replaced with an activated bus termination or is dead.
- Devices that are not involved in the bus termination can be exchanged without making the bus unstable.
- The shield has to be installed continuously and needs to be broadly and well conducting connected to an external low voltage (or potential) ground at the end.

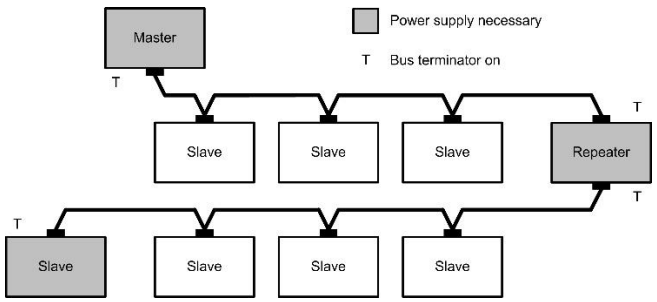


Fig.: Diagram of RS485 bus structure

Pulse Output

The meter is equipped with 2 pulse outputs, which are fully isolated from the inside circuit:

•That generates pulses in proportion to the measured energy.

•The digital outputs are not short circuit protected.

•An external auxiliary voltage with overcurrent protective device is required, voltage range is 5-27VDC.

•The maximum input current shall be 27mA.

•Connected cables longer than 30 m must be shielded.

•Pulse output 1 is configurable.

•Pulse output 2 is non-configurable. It is fixed up with total kWh. The constant is 400imp/kWh.

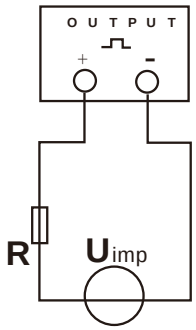
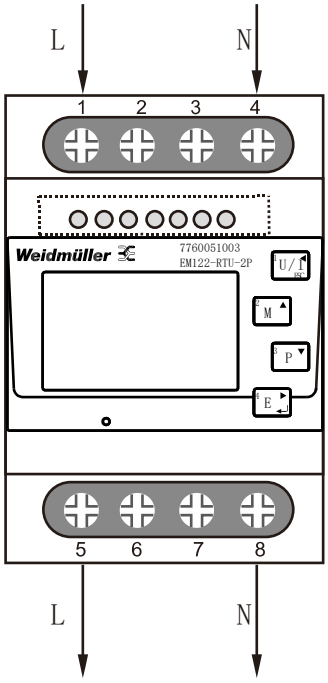


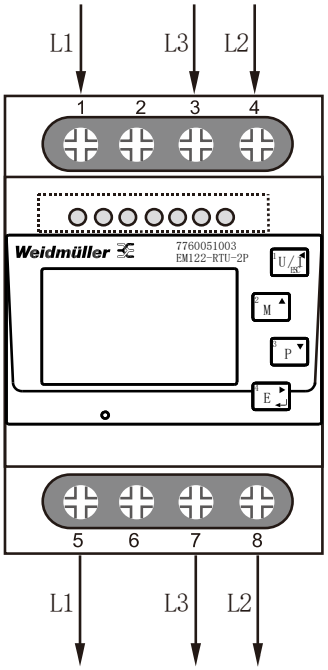
Fig.: Connection of digital outputs

⚠	Pules output must be fed as shown in the wiring diagram. Scrupulousil respect polarities and the connection mode.

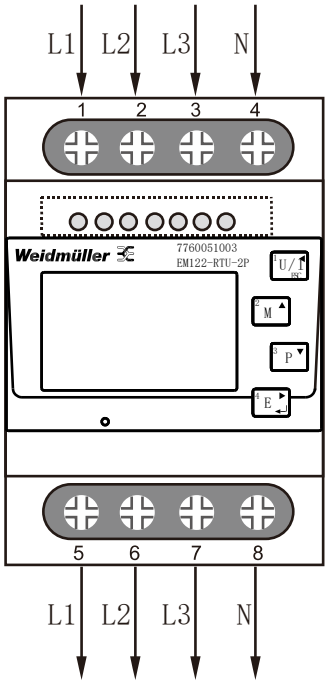
Examples of electrical connections



1P2W



3P3W



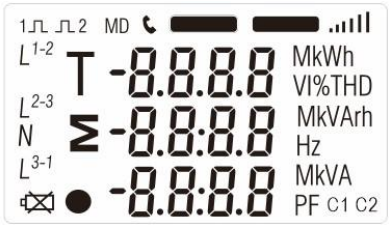
3P4W

RS485 / DO

Configuration and display

Self-check after power on

When device is power on, the meter will initialize and do self-check:

		
Full screen It will last for 3s	Software version	Self-check passed

	The software version is different according to the actual situation.
	After a short delay, the screen will display active energy measurements.
	Device could not be used if self-check failed.

Button functions

Buttons	Click	Press 2S
	➢ Selects the Voltage and Current display screens ➢ In Set-up Mode, this is the “Left” or “Back” button	
	➢Select the Frequency and Power factor display screen ➢ In Set-up Mode, this is the “Up” button	
	➢ Select the Power display screens ➢ In Set-up Mode, this is the “Down” button	
	➢ Select the Energy display screens ➢ In Set-up mode, this is the “Enter” or “Right” button	➢ Set-up mode entry

Overview of measured value displays

Voltage and Current

Each successive pressing of the U/I ESC button selects a new range:

1-1		Phase to neutral voltages(3p4w)
1-2		Phase to phase voltages(3p3w)
2		Current on each phase
3-1		Phase to neutral voltage THD%(3p4w)
3-2		Phase to phase voltage THD%(3p3w)

4		Current THD% for each phase

Frequency and Power Factor and Demand

Each successive pressing of the  button selects a new range:

1		Frequency and Power Factor (total)
2		Power Factor of each phase
3		Maximum Power Demand
4		Maximum Current Demand

Power

Each successive pressing of the 

button select a new range:

1		Instantaneous Active Power in kW
2		Instantaneous Reactive Power in kVAr
3		Instantaneous Apparent Power in KVA
4		Total kW, kVArh, kVA

Energy Measurement

Each successive pressing of the  button selects a new range:

1-1		Imported active energy in kWh
1-2		Exported active energy in kWh
2-1		Imported reactive energy in kVArh
2-2		Exported reactive energy in kVArh
3-1		Total active energy in kWh
3-2		Total reactive energy in kVArh

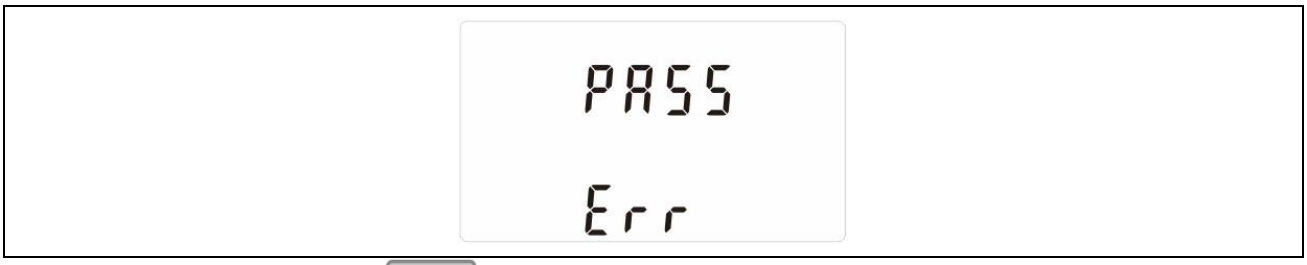
Configuration menu

Set-up Mode

To enter set-up mode, pressing the 

button for 3 seconds, until the password screen appears.

Setting up is password-protected so you must enter the correct password (default '1000') before processing. If an incorrect password is entered, the display will show: Err



To exit setting-up mode, press 

repeatedly until the measurement screen is restored.

Set-up Entry Methods

Some menu items, such as password, require a four-digit number entry while others, such as supply system, require selection from a number of menu options.

Menu Option Selection

1. Use the 

and 

buttons to select the required item from the menu. Selection does not roll over between bottom and top of list.
2. Press 

to confirm your selection.
3. If an item flashes, then it can be adjusted by the 

and 

buttons. If not, there may be a further layer.
4. Having selected an option from the current layer, press 

to confirm your selection. The SET indicator will appear.
5. Having completed a parameter setting, press 

to return to a higher menu level. The SET indicator will be removed and you will be able to use the 

and 

buttons for further menu selection.
6. On completion of all set-up, press 

repeatedly until the measurement screen is restored.

Number Entry Procedure

When setting up the unit, some screens require the entering of a number. In particular, on entry to the setting up section, a password must be entered. Digits are set individually, from left to right. The procedure is as follows:

1. The current digit to be set flashes and is set using the 

and 

buttons
2. Press 

to confirm each digit setting. The SET indicator appears after the last digit has been set.
3. After setting the last digit, press 

to exit the number setting routine. The SET indicator will be removed.

Change Password

1		Use the M ▲ and P ▼ to choose the change password option.
2-1		Press the E ↵ to enter the change password routine. The new password screen will appear with the first digit flashing.
2-2		Use M ▲ and P ▼ to set the first digit and press E ↵ to confirm your selection. The next digit will flash.
2-3		Repeat the procedure for the remaining three digits.
2-4		After setting the last digit, SET will show.
Press U/I ESC to exit the number setting routine and return to the Set-up menu. SET will be removed.		

DIT Demand Integration Time

This sets the period in minutes over which the current and power readings are integrated for maximum demand measurement. The options are: 0, 5, 8, 10, 15, 20, 30, 60 minutes.

1		From the set-up menu, use M and P buttons to select the DIT option. The screen will show the currently selected integration time.
2-1		Press E to enter the selection routine. The current time interval will flash
2-2		Use M and P buttons to select the time required.
2-3		Press E to confirm the selection. SET indicator will appear.
Press U/I ESC to exit the DIT selection routine and return to the menu.		

Backlit Set-up

1		The backlit lasting time is settable Default lasting time is 60minutes For example, if it's set as 5, the backlit will be off in 5minutes from the last time operation on the meter.
2		Press E to enter the selection routine. The current time interval will flash The options can be: 0(always on),5,10,30,60,120minutes.
Use M and P buttons to select the time required. Press E to confirm the set-up.		

Supply System

Use this section to set the type of power supply being monitored.

1		From the Set-up menu, use M and P buttons to select the system option. The screen will show the currently selected power supply.
2-1		Press E to enter the selection routine. The current selection will flash.
2-2		Use M and P buttons to select the required system option: 1P2(W),3P3(W) ,3P4(W).
2-3		Press E to confirm the selection. SET indicator will appear.
Press U/I ESC to exit the system selection routine and return to the menu. SET will disappear and you will be returned to the main Set-up Menu		

Pulse Output

This option allows you to configure the pulse output 1. The output can be set to provide a pulse for a defined amount of energy active or reactive.
Use this section to set up the pulse output for:
Total kWh/ Total kVArh
Import kWh/Export kWh
Import KVArh/Export KVArh

1		From the Set-up menu, use M and P buttons to select the pulse output option.
2-2		Press E to enter the selection routine. The unit symbol will flash.
2-2		Use M and P buttons to choose kWh or kVArh.
On completion of the entry procedure, press E to confirm the setting and press U/I BSC to return to the main set up menu.		

Pulse Rate

Use this to set the energy represented by each pulse.
Rate can be set to 1 pulse per dFt/0.01/0.1/1/10/100kWh/kVArh.

		(It shows 1 impulse = 10kWh/kVArh)
1		From the Set-up menu, use M and P buttons to select the pulse rate option.
2		Press E to enter the selection routine. The current setting will flash. Note: When it's dFt, it means 2.5Wh/VArh.
Use M and P buttons to choose pulse rate. On completion of the entry procedure, press E to confirm the setting and press U/I ESC to return to the main set up menu.		

Pulse Duration

The energy monitored can be active or reactive and the pulse width can be selected as 200, 100(default) or 60ms.

		(It shows pulse width of 200ms)
1		From the Set-up menu, use M and P buttons to select the pulse width option.
2		Press E to enter the selection routine. The current setting will flash.
Use M and P buttons to choose pulse width. On Completion of the entry procedure, press E to confirm the setting and press U/I BSC to return to the main set up menu.		

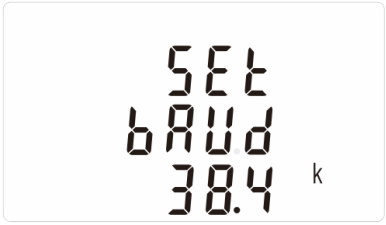
Communication

There is a RS485 port can be used for communication using Modbus RTU protocol. For Modbus RTU, parameters are selected from Front panel.

RS485 Address

		(It shows pulse width of 200ms).
1		From the Set-up menu, use M and P buttons to select the Address ID.
2-1		Press E to enter the selection routine. The current setting will be flashing. The current setting will flash.
2-2		Use M and P buttons to choose Modbus Address(001 to 247).
On completion of the entry procedure, press E button to confirm the setting and press U/I ESC button to return the main set-up menu.		

Baud Rate

1		From the Set-up menu, use M and P buttons to select the baud rate option.
2-1		Press E to enter the selection routine. The current setting will flash.
2-2		Use M and P buttons to choose baud rate 2.4k. 4.8k, 9.6k, 19.2k, 38.4k.
On completion of the entry procedure, press E to confirm the setting and press U/I ESC to return to the main set up menu.		

Parity

1		From the Set-up menu, use M and P buttons to select the parity option.
2-1		Press E to enter the selection routine. The current setting will flash.
2-2		Use M and P buttons to choose Parity (EVEN / ODD / NONE).
On Completion of the entry procedure, press E to confirm the setting and press U/I ESC to return to the main set up menu.		

	If parity is set to ODD or EVEN, Stop Bits will be set to 1 and cannot be changed.

Stop Bits

1		From the Set-up menu, use M and P buttons to select the stop bit option.
2-1		Press E to enter the selection routine. The current setting will flash.
2-2		Use M and P buttons to choose Stop Bit (2 or 1).
On Completion of the entry procedure, press E to confirm the setting and press U/I ESC to return to the main set up menu.		

	If parity is set to ODD or EVEN, Stop Bits will be set to 1 and cannot be changed.

CLR

The meter provides a function to reset the maximum demand value of current and power.

1		From the Set-up menu, use M and P buttons to select the reset option.
2		Press E to enter the selection routine. The MD will flash.
Press E to confirm the setting and press U/I ESC to return to the main set up menu.		

Modbus Communication Protocol

Input Registers, Function code 04

Address (Register)	Input Register Parameter				Modbus Protocol Start Address Hex	
	Description	Length (Byte)	Data Format	Units	Hi Byte	Lo Byte
30001	Phase 1 line to neutral volts	4	Float	V	00	00
30003	Phase 2 line to neutral volts	4	Float	V	00	02
30005	Phase 3 line to neutral volts	4	Float	V	00	04
30007	Phase 1 current	4	Float	A	00	06
30009	Phase 2 current	4	Float	A	00	08
30011	Phase 3 current	4	Float	A	00	0A
30013	Phase 1 active power	4	Float	W	00	0C
30015	Phase 2 active power	4	Float	W	00	0E
30017	Phase 3 active power	4	Float	W	00	10
30019	Phase 1 apparent power	4	Float	VA	00	12
30021	Phase 2 apparent power	4	Float	VA	00	14
30023	Phase 3 apparent power	4	Float	VA	00	16
30025	Phase 1 reactive power	4	Float	VAr	00	18
30027	Phase 2 reactive power	4	Float	VAr	00	1A
30029	Phase 3 reactive power	4	Float	VAr	00	1C
30031	Phase 1 power factor (1)	4	Float	None	00	1E
30033	Phase 2 power factor (1)	4	Float	None	00	20
30035	Phase 3 power factor (1)	4	Float	None	00	22
30037	Phase 1 phase angle	4	Float	Degrees	00	24
30039	Phase 2 phase angle	4	Float	Degree s	00	26
30041	Phase 3 phase angle	4	Float	Degrees	00	28
30043	Average line to neutral volts	4	Float	V	00	2A
30047	Average line current	4	Float	A	00	2E
30049	Sum of line currents	4	Float	A	00	30
30053	Total system power	4	Float	W	00	34
30057	Total system volt amps	4	Float	VA	00	38
30061	Total system VAr	4	Float	VAr	00	3C
30063	Total system power factor (1)	4	Float	None	00	3E
30067	Total system phase angle	4	Float	Degrees	00	42
30071	Frequency of supply voltages	4	Float	Hz	00	46
30073	Total import active energy .	4	Float	kWh	00	48
30075	Total export active energy .	4	Float	kWH	00	4A
30077	Total import reactive energy .	4	Float	kVArh	00	4C
30079	Total export reactive energy .	4	Float	kVArh	00	4E

30081	Total apparent energy	4	Float	kVAh	00	50
30083	Ah	4	Float	Ah	00	52
30085	Total system power demand [2]	4	Float	W	00	54
30087	Maximum total system power demand [2]	4	Float	W	00	56
30101	Total system VA demand	4	Float	VA	00	64
30103	Maximum total system VA demand	4	Float	VA	00	66
30105	Neutral current demand	4	Float	Amps	00	68
30107	Maximum neutral current demand	4	Float	Amps	00	6A
30109	Total system reactive power demand [2]	4	Float	VAr	00	6C
30111	Maximum total system reactive power demand [2]	4	Float	VAr	00	6E
30201	Line 1 to Line 2 volts	4	Float	V	00	C8
30203	Line 2 to Line 3 volts	4	Float	V	00	CA
30205	Line 3 to Line 1 volts	4	Float	V	00	CC
30207	Average line to line volts	4	Float	V	00	CE
30225	Neutral current	4	Float	A	00	E0
30235	Phase 1 L/N volts THD	4	Float	%	00	EA
30237	Phase 2 L/N volts THD	4	Float	%	00	EC
30239	Phase 3 L/N volts THD	4	Float	%	00	EE
30241	Phase 1 Current THD	4	Float	%	00	F0
30243	Phase 2 Current THD	4	Float	%	00	F2
30245	Phase 3 Current THD	4	Float	%	00	F4
30249	Average line to neutral volts THD	4	Float	%	00	F8
30251	Average line current THD	4	Float	%	00	FA
30259	Phase 1 current demand	4	Float	A	01	02
30261	Phase 2 current demand	4	Float	A	01	04
30263	Phase 3 current demand	4	Float	A	01	06
30265	Maximum phase 1 current demand	4	Float	A	01	08
30267	Maximum phase 2 current demand	4	Float	A	01	0A
30269	Maximum phase 3 current demand	4	Float	A	01	0C
30335	Line 1 to line 2 volts THD	4	Float	%	01	4E
30337	Line 2 to line 3 volts THD	4	Float	%	01	50
30339	Line 3 to line 1 volts THD	4	Float	%	01	52
30341	Average line to line volts THD	4	Float	%	01	54
30343	Total active Energy [3]	4	Float	kWh	01	56
30345	Total reactive Energy [3]	4	Float	kVArh	01	58
30347	L1 import active Energy	4	Float	kWh	01	5A
30349	L2 import active Energy	4	Float	kWh	01	5C
30351	L3 import active Energy	4	Float	kWh	01	5E
30353	L1 export active Energy	4	Float	kWh	01	60
30355	L2 export active Energy	4	Float	kWh	01	62
30357	L3 export active Energy	4	Float	kWh	01	64
30359	L1 total active Energy	4	Float	kWh	01	66
30361	L2 total active Energy	4	Float	kWh	01	68
30363	L3 total active Energy	4	Float	kWh	01	6A
30365	L1 import reactive energy	4	Float	kVArh	01	6C
30367	L2 import reactive energy	4	Float	kVArh	01	6E
30369	L3 import reactive energy	4	Float	kVArh	01	70
30371	L1 export reactive energy	4	Float	kVArh	01	72
30373	L2 export reactive energy	4	Float	kVArh	01	74

30375	L3 export reactive energy	4	Float	kVArh	01	76
30377	L1 total reactive energy	4	Float	kVArh	01	78
30379	L2 total reactive energy	4	Float	kVArh	01	7A
30381	L3 total reactive energy	4	Float	kVArh	01	7C

Notes:

1. The power factor has its sign adjusted to indicate the direction of the current. Positive refers to forward current, negative refers to reverse current.
2. The power sum demand calculation is for import – export.
3. Total kWh/kVarh equals to Import + export.

Holding Register, Function code 03/10

Address Register	Parameter Number	Parameter	Modbus Protocol Start Address Hex		Valid Range	Mode
			Hi Byte	Lo Byte		
40001	1	Demand Time	00	00	Read minutes into first demand calculation. When the demand time reaches the demand Period then the demand values are valid. **Length: 4 bytes** **Data Format: Float**	ro
40003	2	Demand Period	00	02	Write demand period: 0, 5,8, 10, 15, 20, 30 or 60 minutes, default 60. Setting the period to 0 will cause the demand to show the current parameter value, and demand max to show the maximum parameter value since last demand reset. **Length: 4 bytes** **Data Format: Float**	r/w
40011	6	System Type	00	0A	Write system type: 3p4w = 3, 3p3w = 2 and 1p2w= 1. Requires password, see parameter 13. **Length: 4 bytes** **Data Format: Float**	r/wp
40013	7	Pulse1 Width	00	OC	Write pulse1 on period in milliseconds: 60, 100 or 200, default 100. **Length: 4 bytes** **Data Format: Float**	r/w
40015	8	Password Lock	00	OE	Write any value to password lock protected registers. Read password lock status: 0 = locked, 1 = unlocked. Reading will also reset the password timeout back to one minute. **Length: 4 bytes** **Data Format: Float**	r
40019	10	Parity Stop	00	12	Write the network port parity/stop bits for MODBUS Protocol, where: 0 = One stop bit and no parity, default. 1 = One stop bit and even parity. 2 = One stop bit and odd parity.3 = Two stop bits and no parity. Requires a restart to become effective. **Length: 4 bytes** **Data Format: Float**	r/w

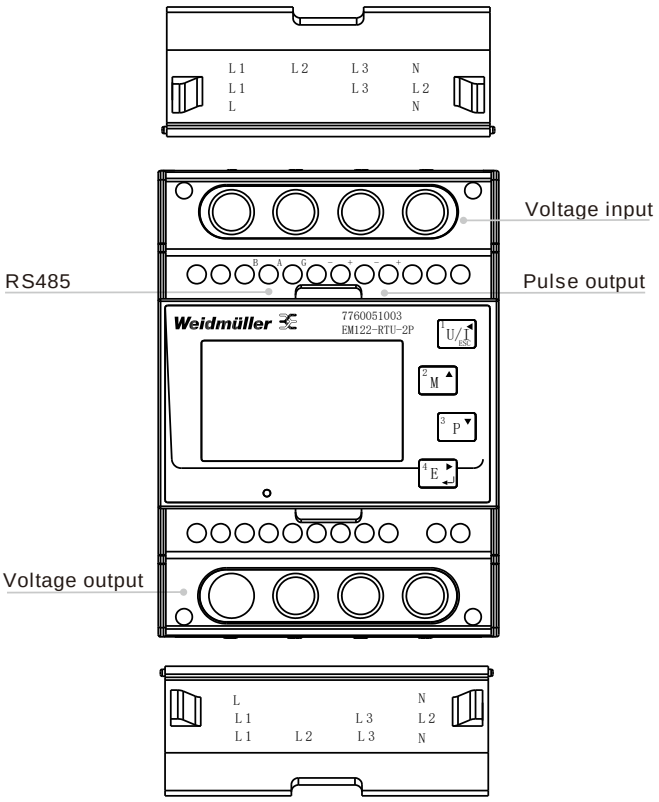
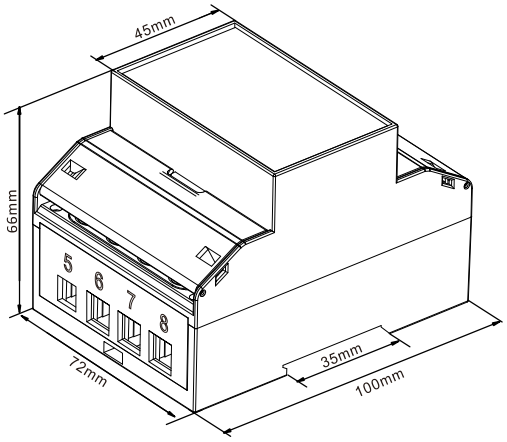
40021	11	Modbus Address	00	14	Write the network port node address: 1 to 247 for MODBUS Protocol, default 1. Requires a restart to become effective. **Length: 4 bytes** **Data Format: Float**	r/w
40023	12	Pulse1 Divisor1	00	16	Write pulse divisor index: n = 0 to 5 0-0.0025 kWh(kVArh)/imp 1-0.01 kWh(kVArh)/imp 2-0.1 kWh(kVArh)/imp 3-1 kWh(kVArh)/imp 4-10 kWh(kVArh)/imp 5-100 kWh(kVArh)/imp 6-1000kWh(kVarh)/imp **Length: 4 bytes** **Data Format: Float**	r/w
40025	13	Password	00	18	Write password for access to protected registers. **Length: 4 bytes** **Data Format: Float**	r/w
40029	15	Network Baud Rate	00	1C	Write the network port baud rate for MODBUS Protocol, where: 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud, default 3 = 19200baud 4 = 38400 baud Requires a restart to become effective **Length: 4 bytes** **Data Format: Float**	r/w
40063	32	CT ratio	00	3E	CT Ratio range: 1~2000 CT Ratio = primary current /secondary current **Length: 4 bytes** **Data Format: Float** Requires password, see parameter 13 (Non MID)	r/w
40065	33	PT ratio	00	40	PT Ratio range:1~2000 PT ratio= primary voltage /secondary voltage **Length: 4 bytes** **Data Format: Float** Requires password, see parameter 13 (Non MID)	r/w

40087	44	Pulse 1 Energy Type	00	56	Write MODBUS Protocol input para-meter for pulse out 1:37 = total kWh or 39 = total kVarh, default 39. **Length: 4 bytes** **Data Format: Float**	r/w
461457	30729	Reset	F0	10	0000: reset the Maximum demand 0003: reset the resettable energy **Length: 2 bytes** **Data Format: Hex**	wo
464513	Serial number	Unsigned Int 32	FC	00	Serial number Length: 4 bytes Note: Only read	ro

	Some of the parameters described above are password protected and thus require the password to be entered at the Password register before they can be changed. The default password is 0000. When the password has been entered it will timeout in one minute unless the Password or Password Lock register is read to reset the timeout timer. Once the required changes have been made to the protected parameters the password lock should be reapplied by allowing the password to timeout, or writing any value to the Password Lock register, or power cycling the instrument.

Dimensional drawings

All dimensions in mm.

Front view	Side view
	

Connecting example

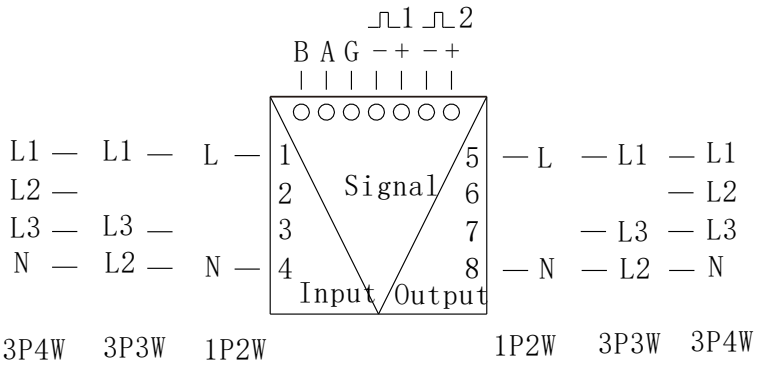


Fig.: Connecting example

⚠	The overcurrent protection device must be UL/IEC certified.