inepro® Metering

Ambition
2PU CT MID/MIR
Three phase CT energy meter

User manual

Version: 1.05

1 Index

2 Safety instructions

Information for your own safety
This manual does not contain all of the safety measures for operation of this meter because special operating conditions, local code requirements or local regulations may necessitate further measures. However, it does contain information which must be adhered to for your own personal safety and to avoid material damage. This information is highlighted by a warning triangle with an exclamation mark or a lightning bolt depending on the degree of actual or potential danger:

Warning
This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution
This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel
Installation and operation of the device described in this manual may only be performed by qualified personnel. Only people that are authorized to install, connect and use this device, who have the proper knowledge about labeling and grounding electrical equipment and circuits and can do so in accordance with local (safety)regulations, are considered qualified personnel in this manual.

Use for the intended purpose
This device may only be used for the application cases specified in the catalog and the user manual and only in connection with devices and components recommended and approved by inepro Metering B.V.

Proper handling
The prerequisites for perfect, reliable operation of the product are proper transport, storage, installation and connection, as well as proper operation and maintenance. During its operation certain parts of the meter might carry dangerous voltages.

- Only use insulated tools suitable for the voltages this meter is used for.
- Do not connect while the circuit is connected to a power or current source.
- Only place the meter in a dry environment.
- The meter is intended to be installed in a Mechanical Environment 'M1', with Shock and Vibrations of low significance and Electromagnetic Environment 'E2', as per 2014/32/EC Directive. The meter is intended for indoor use. The meter shall be installed inside a suitable IP rated enclosure, in accordance with local codes and regulations.
- Do not mount the meter in an explosive area or exposed to dust, mildew and/or insects.
- Make sure the used wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter's connection clamps directly with your bare hands, with metal, blank wire or other conducting material as you will risk an electric shock that could cause possible injury, serious injury or death.
- Make sure the protection covers are replaced after installation.
- Maintenance and repair of the meter should only be carried out by qualified personnel.
- Never break any seals (if present on this meter) to open the front cover as this might influence the functionality or accuracy of the meter, and will void all warranty.
- Do not drop, or allow physical impact to the meter as there are high precision components inside that may break and affect the meter measurement negatively.
- All clamps should be properly tightened.
- Make sure the wires fit properly in the connection clamps.
- If the wires are too thin it will cause a bad contact which can spark causing damage to the meter and its surroundings.

Exclusion of liability
We have checked the contents of this manual and every effort has been made to ensure that the descriptions are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions in the information given. The data in this manual are checked regularly and the necessary corrections will be included in subsequent editions. If you have any suggestions, please do not hesitate to contact us.

Subject to technical modifications without notice.

Copyright

3 Foreword

Thank you for purchasing this energy meter. **inepro** offers a wide range of devices. We have introduced numerous energy meters to the market, designed for use with 110V AC to 400V AC (50 or 60Hz) and up to 1000V/1500A DC. For more information on other products, please contact our sales department at sales@inepro metering.com or visit our website at www.inepro metering.com.

While we manufacture this device according to international standards and conduct rigorous quality inspections, it is still possible that a defect or malfunction may occur, for which we apologize. Under normal conditions, your product should provide years of reliable operation. Should you experience an issue with the energy meter, please contact your distributor immediately.

Most of our energy meters are secured with a special seal. Once this seal is broken, warranty claims cannot be honored. Therefore, please NEVER open the energy meter or break the device seal. The limited warranty covers a period of 3 years from the production date, applicable only to production faults.

4 Certificates

EU-type examination certificate

Number **T12229** revision 5
Project number 3768264
Page 1 of 1

Issued by	NMi Certin B.V., designated and notified by the Netherlands to perform tasks with respect to conformity modules mentioned in article 17 of Directive 2014/32/EU, after having established that the Measuring instrument meets the applicable requirements of Directive 2014/32/EU, to:
Manufacturer	Inepro Metering BV Pondweg 7 2153 PK Nieuw Vennep The Netherlands
Measuring instrument	A static **Active Electrical Energy Meter** Type : 2PU CT Manufacturer's mark or name : Inepro Reference voltage : 230V; 3x230/400 V Reference current : 1 A Destined for the measurement of : electrical energy, in a - three-phase four-wire network - three-phase three-wire network - two-phase three-wire network - single-phase two-wire network Accuracy class : A or B Environment classes : M1 / E2 Temperature range : -40 °C / +70 °C Further properties are described in the annexes: – Description T12229 revision 5; – Documentation folder T12229-5.
Valid until	15 October 2031
Initially issued	15 October 2021
Remark	This revision replaces previous revisions, including its documentation folder.

Issuing Authority: **NMi Certin B.V., Notified Body number 0122**
19 April 2024

Certification Board

NMi Certin B.V.
Thijsseweg 11
2629 JA Delft
The Netherlands
T +31 88 636 2332
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www.nmi.nl

Type examination certificate

Number **T12229-UK** revision 2
Project number 3768264
Page 1 of 1

Issued by	NMi Certin UK (TIC) Ltd., appointed and approved by the Secretary of State to perform tasks with respect to conformity modules mentioned in regulation 39 of the Measuring Instruments Regulations 2016 as amended, after having established that the measuring instrument meets the applicable requirements of the Measuring Instruments Regulations 2016 as amended, to:
Manufacturer	Inepro Metering BV Pondweg 7 2153 PK Nieuw Vennep The Netherlands
Measuring instrument	A static **Active Electrical Energy Meter** Type : 2PU CT Manufacturer's mark or name : Inepro Reference voltage : 230 V; 3x230/400 V Reference current : 1 A Destined for the measurement of : electrical energy, in a - three-phase four-wire network - two-phase three-wire network - single-phase two-wire network Accuracy class : A or B Environment classes : M1 / E2 Temperature range : -40 °C / +70 °C Further properties are described in the annexes: – Description T12229-UK revision 2; – Documentation folder T12229-UK-2.
Valid until	10 March 2032
Initially issued	10 March 2022
Remark	This revision replaces previous revision, including its documentation folder.

Issuing Authority: **NMi Certin UK (TIC) Ltd., Approved Body number 8506**
25 April 2024

Certification Board

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23275

5 Specifications

Casing	PC flame resistant plastic
Flammability rate:	UL94-V2
Nominal voltage (Un)	230/400V AC (3~)
Operational voltage	3*230/400V ±20%
Insulation capabilities:	
- AC voltage withstand	4kV for 1 minute
- Impulse voltage withstand	6kV – 1.2µs waveform
Basic current (Ib)	1A
Maximum rated current (Imax)	5A
Utilization category	UC2
Operational current range	0.4%Ib-Imax
Overcurrent withstand	30Imax for 0.01s
Operational frequency range	45 ... 60Hz
Internal power consumption	≤2W/Phase ... ≤10VA/Phase (active - reactive)
Test output flash rate (RED LED)	10,000 imp/kWh
Pulse output rate	10,000/2,000/1,000/100/10/1/0.1/0.01 imp/kWh
Pulse width	Selectable 2 ... 99ms (depending on pulse output rate setting)
Data store	The data can be stored for more than 10 years without power

5.1 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
International standard	EN50470-1/3
Accuracy class	B (=1% accuracy)
Protection against penetration of dust and water	IP20, IP51 reached by mounting the meter in an IP51 cabinet
Insulating encased meter of protective class	II
Operating temperature range	-40°C ... +70°C
Storage temperature range	-40°C ... +70°C

Do not exceed the following limits for ambient temperature in combination with conductor cross-section and rated current:

Conductor cross-section	Rated current	Ambient temperature		
		40 °C	55 °C	70°C
25 mm² (Fine-stranded conductor)	65 A		x	
	45 A			x
16 mm² (Fine-stranded conductor with insulated ferrule)	65 A	x		
	55 A		x	
	35 A			x
16 mm² (Fine-stranded conductor)	65 A	x		
	50 A		x	
	35 A			x
10 mm² (Fine-stranded conductor with insulated ferrule)	55 A	x		
	45 A		x	
	30 A			x
10 mm² (Fine-stranded conductor)	55 A	x		
	40 A		x	
	30 A			x
6 mm² (Fine-stranded conductor with insulated ferrule)	41 A	x		
	39 A		x	
	27 A			x
6 mm² (Fine-stranded conductor)	41 A	x		
	37 A		x	
	25 A			x
4 mm² (Fine-stranded conductor with insulated ferrule)	32 A	x		
	27 A		x	
	17 A			x
4 mm² (Fine-stranded conductor)	30 A	x		
	25 A		x	
	15 A			x

5.2 Basic errors

0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
	Cosφ= 0.8C	±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

5.3 Bluetooth specification

Protocol	BLE 4.2
Frequency range	Bluetooth 4.0: 2402 - 2480 MHz (40 CH)

5.4 M-bus communication specifications

Bus type	M-Bus
Baud rate	300, 600, 1200, 2400 (default), 4800 and 9600
Range	≤1000m
Downlink signal	Master to slave. Voltage modulation
Uplink signal	Slave to master. Current modulation
Cable	JYSTY (nx2x0.8)
Protocol	EN13757-3
Unit loads	1
Max. number of meters	64 per bus*

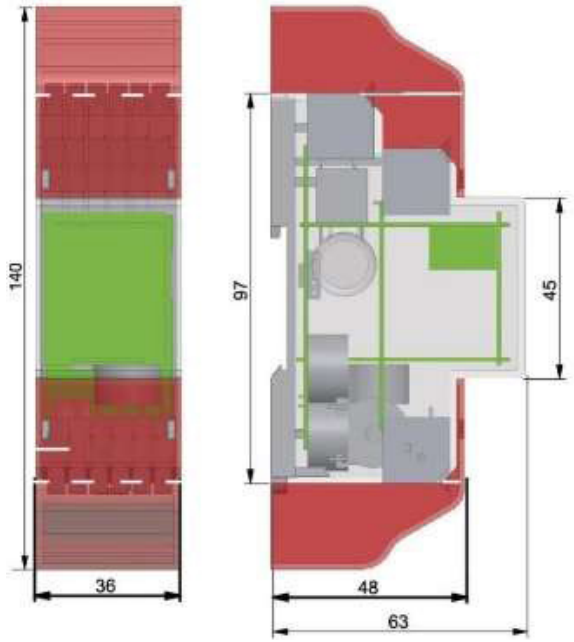
5.5 RS485 communication specifications

Bus type	RS485
Protocol	Modbus RTU with 16 bit CRC
Baud rate	1200, 2400, 4800, 9600 (default), 19200, 38400, 57600 and 115200
Address range	1 ... 247 user settable
Maximum bus load	60 meters per bus*
Range	1000m*

*Please note that the maximum number of meters depends on the converter, baud rate (higher baud rates reduce the maximum number of meters that can be used), and the specific conditions under which the meters are installed.

5.6 Dimensions

Height without protection cover	90 mm
Height	140 mm
Width	36 mm
Depth	63 mm
Weight	0.162 kg (net)



5.7 Wire connection

Connection technology	WAGO Push-in CAGE CLAMP®
Actuation type	Lever

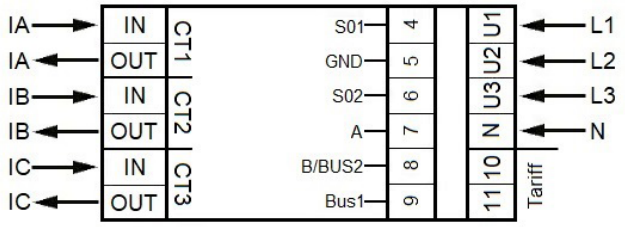
<u>WAGO serie 2604</u>

Solid conductor	0.2 … 4 mm² / 24 … 12 AWG
Fine-stranded conductor	0.2 … 4 mm² / 24 … 12 AWG
Fine-stranded conductor; with insulated ferrule	0.25 … 2.5 mm²

Push-in technology is suitable for solid conductors and fine-stranded conductors with insulated ferrules. For fine-stranded conductors, the levers must be opened to facilitate connection and closed to secure it.

5.8 Connection diagram

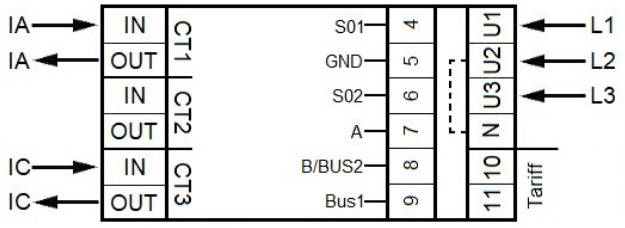
3P4W



CT1 IA (in) Phase 1 input - IA (out) Phase 1 output
CT2 IB (in) Phase 2 input - IB (out) Phase 2 output
CT3 IC (in) Phase 3 input - IC (out) Phase 3 output
N Neutral

4 S0 output 1 (+)
5 Ground (-)
6 S0 output 2 (+)
7 Modbus communication contact A
8 Modbus communication contact B / M-bus communication contact
9 M-bus communication contact
10/11 Tariff switching contact (230V AC)

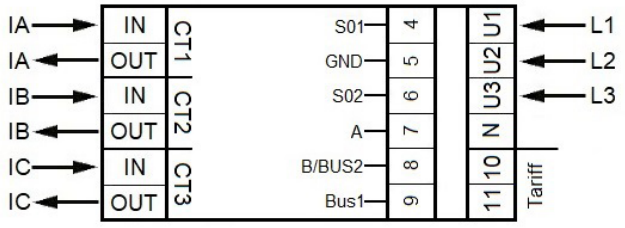
3P3W



CT1 IA (in) Phase 1 input - IA (out) Phase 1 output
CT2 IB (in) not used - IB (out) not used
CT3 IC (in) Phase 3 input - IC (out) Phase 3 output
N Neutral not used

4 S0 output 1 (+)
5 Ground (-)
6 S0 output 2 (+)
7 Modbus communication contact A
8 Modbus communication contact B / M-bus communication contact
9 M-bus communication contact
10/11 Tariff switching contact (230V AC)

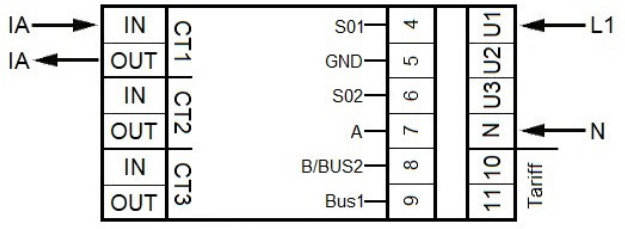
3P3W



CT1 IA (in) Phase 1 input - IA (out) Phase 1 output
CT2 IB (in) Phase 2 input - IB (out) Phase 2 output
CT3 IC (in) Phase 3 input - IC (out) Phase 3 output
N Neutral

4 S0 output 1 (+)
5 Ground (-)
6 S0 output 2 (+)
7 Modbus communication contact A
8 Modbus communication contact B / M-bus communication contact
9 M-bus communication contact
10/11 Tariff switching contact (230V AC)

1P2W



CT1 IA (in) Phase 1 input - IA (out) Phase 1 output
CT2 IB (in) Phase 2 input - IB (out) Phase 2 output
CT3 IC (in) Phase 3 input - IC (out) Phase 3 output
N Neutral

4 S0 output 1 (+)
5 Ground (-)
6 S0 output 2 (+)
7 Modbus communication contact A
8 Modbus communication contact B / M-bus communication contact
9 M-bus communication contact
10/11 Tariff switching contact (230V AC)

6 Installation

Caution

- Before working on the energy meter and any connected equipment, turn off and, if possible, lock all sources supplying power to them.
- Always use a properly rated voltage sensing device to confirm that power is off.

Warning

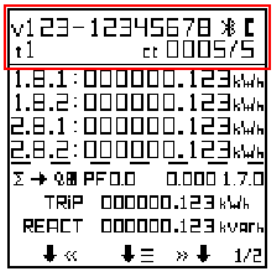
- The installation should be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to install the device.
- A fuse, thermal cut-off or single-pole circuit breaker should be fitted on the supply line and not on the neutral line.

General

- The connecting wire from the device to the external circuit should be sized according to local regulations, matching the maximum current of the breaker or other overcurrent protection devices in the circuit.
- Install an external switch or circuit breaker on the supply wires to disconnect the meter and the energy-supplying device. It is recommended to place this switch or circuit breaker near the meter for operator convenience. The switch or circuit breaker must comply with the building's electrical specifications and local regulations.
- An external fuse or thermal cut-off used for overcurrent protection must be installed on the supply side wires, ideally near the meter for ease of access. This overcurrent protection device should meet building specifications and local regulations.
- This meter can be installed indoors or outdoors in a properly enclosed and protected meter box, according to local codes and regulations.
- To prevent tampering, use an enclosure with a lock or a similar security feature.
- The meter must be installed against a fire-resistant wall.
- The installation location must be well-ventilated and dry.
- If the meter is exposed to dust or contaminants, it should be installed within a protective box.
- The meter can be installed and used after testing and may be sealed afterward.
- The device is suitable for installation on a 35mm DIN rail.
- Install the meter in a location where it can be easily read.
- If installed in an area with frequent surges (e.g., from thunderstorms, welding machines, or inverters), the meter should be protected with a Surge Protection Device.
- Seal the device immediately after installation to prevent tampering.

7 Operation

7.1 Display part 1 (MID relevant)



Part 1 of the display shows the

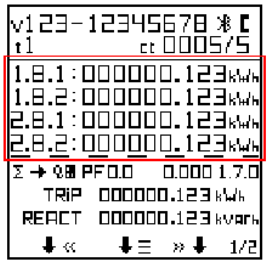
- -MID relevant software version number
- -Actual tariff
- -Meter serial number/CRC code (switching every 10 seconds)
- -CT ratio

Bluetooth communication indicator

Modbus/M-Bus communication indicator

7.2 Display part 2 (MID relevant)

Part 2 of the display shows the MID relevant measurement values.
The meter has a 6+3 digit display for kWh values.
When reaching 999999.999 the kWh value goes back to 000000.000.



OBIS codes are used to identify the corresponding measurement values:

1.8.1: Positive active energy in tariff 1
1.8.2: Positive active energy in tariff 2
1.8.3: Positive active energy in tariff 3 (will be shown when T3 and/or T4 are activated)
1.8.4: Positive active energy in tariff 4 (will be shown when T3 and/or T4 are activated)

2.8.1: Negative active energy in tariff 1
2.8.2: Negative active energy in tariff 2
2.8.3: Negative active energy in tariff 3 (will be shown when T3 and/or T4 are activated)
2.8.4: Negative active energy in tariff 4 (will be shown when T3 and/or T4 are activated)

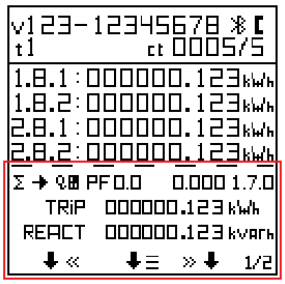
7.3 Display part 3 (non-relevant)

Part 3 is structured into multiple pages, allowing you to scroll through different data sets using the capacitive buttons.

- -Total 1
- -L1 1
- -L2 1
- -L3 1

Part 3 of the display provides supplementary information that is not essential for immediate operations but offers insights into system performance. The displayed data includes:

- -Current direction
- -Trip counter
- -Reactive energy
- -Power factor
- -Present quadrant
- -Frequency
- -Active power
- -Apparent power
- -Reactive power
- -Voltage
- -Current



7.4 Bluetooth

Navigate to the menu page and select the Bluetooth icon

Scan the QR code on the display using the inepro Metering mobile phone app.

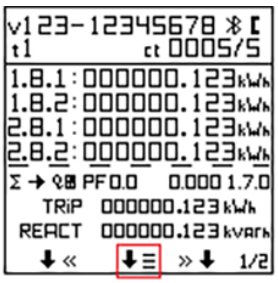
The Bluetooth icon will be shown when the Bluetooth is active.

Go to Appendix 3 - Bluetooth for the inepro Metering mobile phone app user guide.

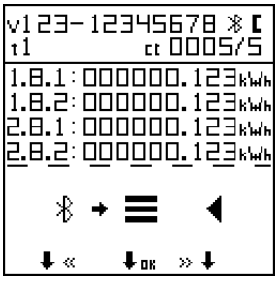
7.5 Settings- Config Menu

Settings can be done using the capacitive touch buttons on the front of the meter.
Scroll through the options using the left << and right >> button

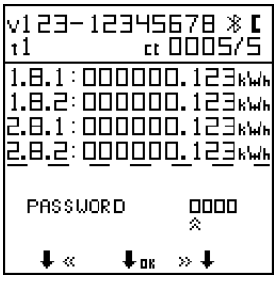
Activate settings mode by holding the middle button for >3 seconds.



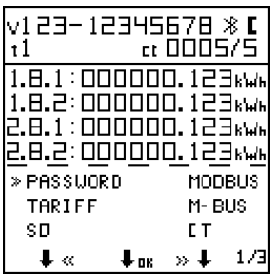
The following display will appear;
Navigate with the arrow button and press the middle button to acces the configuration menu

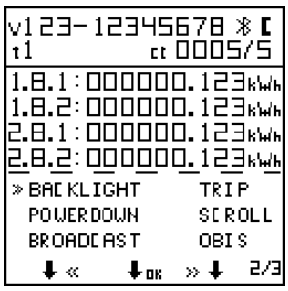


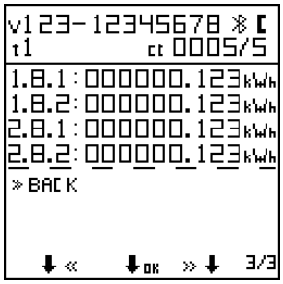
Enter the password to get acces to the settings menu (default 0000).
It's possible to change the password in the config menu.
Confirm each digit using the middle button.



The settings menu will appear after entering the password correctly:

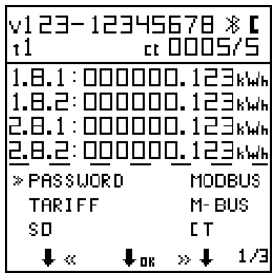


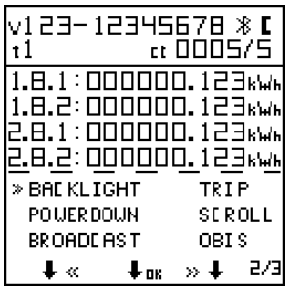


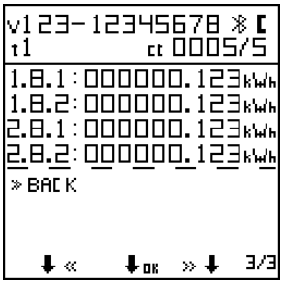


7.6 Config

Confirm the setting using the middle button. Hold the middle button to acces the settings menu.

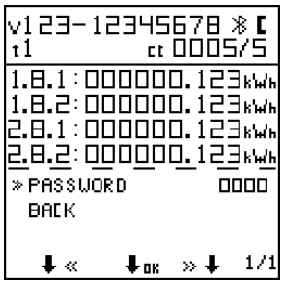






7.6.1 Password

The button setting function can be protected by setting a password.
This password is also valid for settings via Bluetooth. The default password is 0000.
This password can only be changed using the button function.

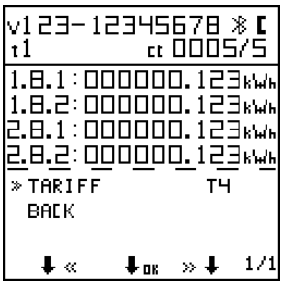


7.6.2 Tariff

The default tariff is 1. The tariff can be set to T2, T3 and T4.

T1 an T2 can be actived by Bluetooth, Modbus, M-Bus, button an with an external 230V AC supply on terminal 10 and 11 on the meter.
T3 and T4 can be activated by Bluetooth, Modbus, M-Bus or using the button.

Tariff 1 and 2 are always displayed in part 1 and 2 of the meter.
Tariff 3 and 4 will be displayed when they're activated, this cannot be undone

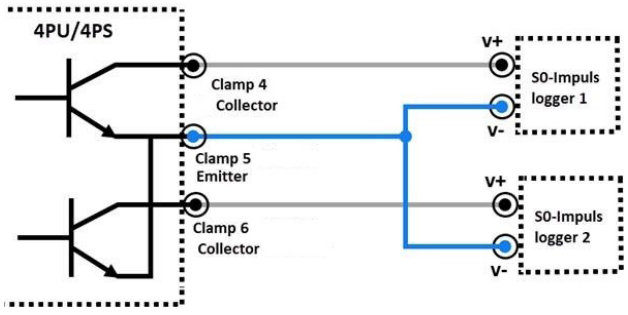


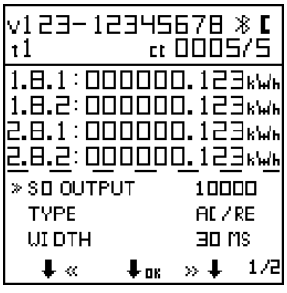
7.6.3 S0 output

The energy meter is equipped with two pulse outputs; forward & reverse or **active & reactive**(default) which are optically isolated from the inside circuit. It generates pulses in proportion to the measured consumption for purpose of remote reading or accuracy testing.

The pulse output is a polarity dependent, open-collector transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be lower than 27V DC.
The maximum switching current (Imax) is 100mA. To connect the impulse output, connect 5 ... 27V DC to connector 4/6 (collector), and the signal wire (S) to connector 5 (emitter).

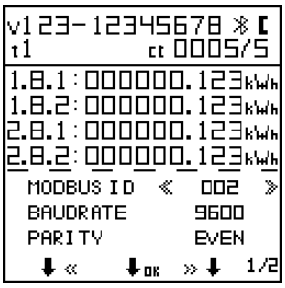
The default imp/kWh setting for the S0 output is 1.000.
The S0 output setting can be modified to 10,000 / 2,000 / 100 / 10 / 1 / 0.1 / 0.01 imp/kWh.
The default S0 pulse width is 30ms. The pulse width setting can be modified to 2 ... 99ms (depending on the imp/kWh setting).





7.6.4 Modbus

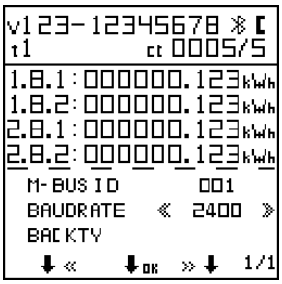
In the Modbus settings part you can adjust settings regarding the Modbus.



Modbus ID:	1 ... 247
Baudrate:	300, 600, 1200, 2400, 48700, 9600, 19200, 38400, 57600, 115200
Parity:	EVEN, NONE & ODD

7.6.5 M-Bus

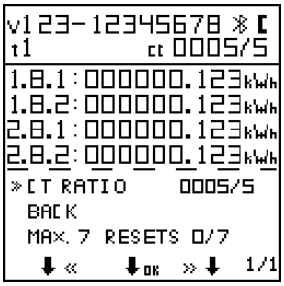
In the M-Bus settings part you can adjust settings regarding the M-Bus.



M-Bus ID:	1 ... 250
Baudrate:	300, 600, 1200, 2400, 48700, 9600
Parity:	EVEN, NONE & ODD

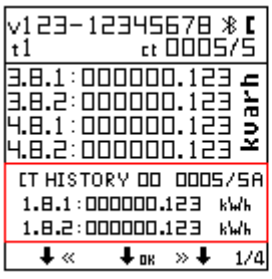
7.6.6 CT ratio

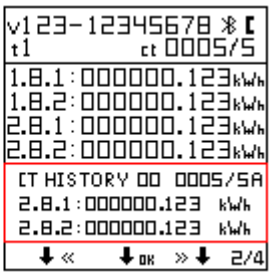
Due the history CT ratio pages, you're able to reset the CT ratio up to 7 times.
All previous values will be stored in the histoy pages.

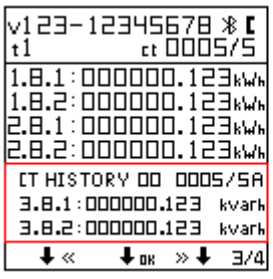


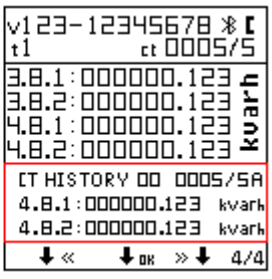
The more CT ratio you have, the more CT ratio history pages will appear.

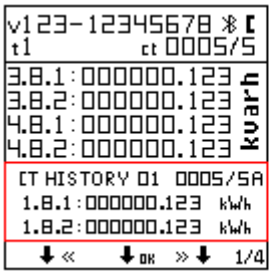
-1.8.1	Forward active energy	(A+)	in tariff T1 [kWh]
-1.8.2	Forward active energy	(A+)	in tariff T2 [kWh]
-2.8.1	Reverse active energy	(A+)	in tariff T1 [kWh]
-2.8.2	Reverse active energy	(A+)	in tariff T2 [kWh]
-3.8.1	Forward reactive energy	(Q+)	in tariff T1 [kvarh]
-3.8.2	Forward reactive energy	(Q+)	in tariff T2 [kvarh]
-4.8.1	Reverse reactive energy	(Q-)	in tariff T1 [kvarh]
-4.8.2	Reverse reactive energy	(Q-)	in tariff T2 [kvarh]

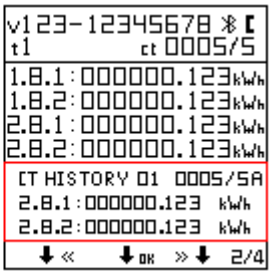


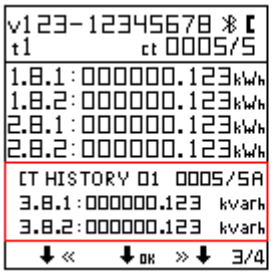


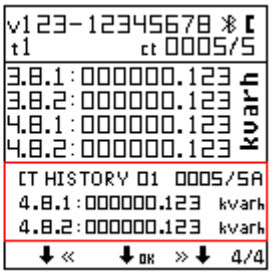






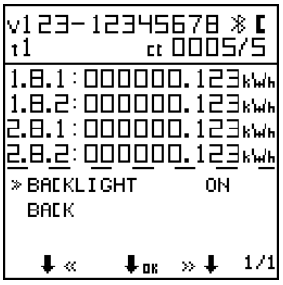






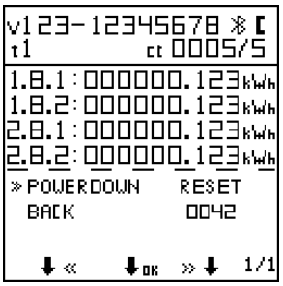
7.6.7 Backlight

The meter is equipped with a blue backlight.
The backlight can be set to always on, off or button mode.



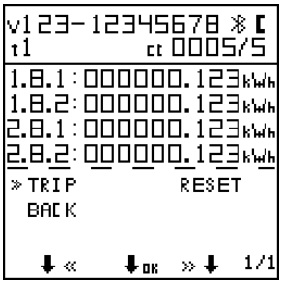
7.6.8 Powerdown counter

The powerdown counter registers the number of times that the meter has been turned off.



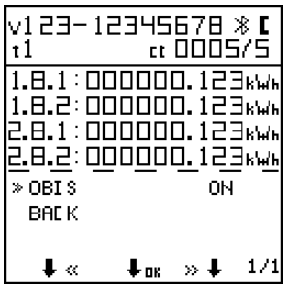
7.6.9 Trip counter

The meter is equipped with a trip counter that can be set to zero by the user.
This is the energy calculated based on the combination code setting (see 7.6.15).



7.6.10 OBIS codes

OBIS codes can be used to identify the corresponding measurement values.
OBIS codes are turned off by default.



7.6.11 Combination code (Modbus, M-Bus & Bluetooth setting only)

The meter allows you to display the total energy (usage) shown on the display in accordance to different calculation methods. You can use the following calculation methods for total energy:

Code	Total (active) energy
C-01	Forward only
C-02	Reverse only
C-03	Forward + Reverse
C-04	Forward - Reverse
C-05	Forward - Reverse*

Example of flow through the meter	
L1	+5 kWh
L2	+5 kWh
L3	-12 kWh

LCD reading and calculation of total energy					
Code	C-01	C-02	C-03	C-04	C-05*
Total	10	-12	22	-2	-2
Forward	10	10	10	10	0
Reverse	-12	-12	12	-12	-2
*Meters ordered or set afterwards to C-05 cannot be set to another calculation mode.					

8 Troubleshooting

Caution

- During repair and maintenance, do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other conducting material as that will cause an electric shock and possibly cause injury, serious injury or even death.
- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before opening the protection cover and working on it.
- Turn off and lock all power supply to the energy meter and the equipment to which it is installed before opening the protection cover to prevent the hazard of electric shock.

Warning

- Maintenance or repair should only be performed by qualified personnel familiar with applicable codes and regulations.
- Use insulated tools to maintain or repair the meter.
- Make sure the protection cover is in place after maintenance or repair.
- The case is sealed, failure to observe this instruction can result in damage to the meter.

Problem	Possible cause	Check/solution
The red consumption LED is not flashing (PULSE LED).	There is no load connected to the meter. The load on the line is very low.	Connect a load to the meter. Check with an Ohm-meter if the load value is very low.
The register doesn't count.	There is almost no load connected to the meter.	Check if the red consumption LED is flashing.
No pulse output.	The pulse output is not supplied with DC power. The pulse output is not connected correctly.	Check the external voltage source (Ui) is 5 ... 27V DC with a voltage meter. Check if the connection is correct: the 5 ... 27V DC should be connected to the collector connection (pin 4/8+) and the signal wire (S) to the emitter connection (pin 5).
If none of the above works, please contact technical support		

8.1 Errors / Diagnostics display

All measurement values are stored twice with the accompanying checksums. In case the checksum fails, the backup data is used. If both the normal storage and backup fail, the meter will stop working and indicate error XX:

XX is the hexadecimal data, convert the data to binary to analyze the data
bit0: The data in the main storage area and backup area of the energy is wrong or cannot be operated
bit1: The energy mantissa area cannot be operated
bit2: The energy backup area cannot be operated
bit3: The main energy storage area cannot be operated
bit4: Data error in the energy mantissa area
bit5: Data error in the energy backup area (integer bit)
bit6: Data error in the main energy storage area (integer bit)
bit7: EEPROM cannot be fully initialized

8.2 Technical support

For questions about one of our products please contact:

- Your local inepro Metering distributor
- Email: support@ineprometering.com
- Website: www.ineprometering.com

Appendix 1 - M-Bus

A2.1 Communicating via the M-Bus output

The 2PU CT meter is equipped with an M-Bus port. The data can be read out via this port using, for instance, a PC. The communication protocol conforms to the EN13757-3 standard.

The meter can communicate with your PC. In order to read out the meter registers, first install and configure the required PC software. Use an M-Bus level converter to connect the PC and the meter. The cable should be connected to terminals 8 and 9. The default communication address of the meter is 00.

The defaults for M-Bus communication are:

- -Baud rate 2400
- -8 data bits
- -Even parity
- -1 stop bit

The secondary addressing (253/FD) is preset to the last 8 digits of the serial number printed on the side of the meter. However this can be changed to a more convenient number through buttons, Bluetooth and M-Bus communication. The baud rate can be changed to values 9600, 4800, 1200, 600 and 300 baud. Data, parity and stop bit cannot be changed.

For the registers used in the meter and how to interpreted the data, please use the M-Bus register map on the next page. Please note that the ranging code may differ from the example.

More detailed information on M-Bus can be found:
www.m-bus.com

A2.2 M-Bus register map

M-Bus Command	Contents	M-Bus register header DIF	M-Bus register VIF	Response/example	Remarks
				68 xx xx 68 08 xx 72	68 **[data length]** 68 08 **[address]** 72 **[header]** **[datablocks]** **[checksum]** 16
1. REQ UD2: 10 7B xx	Serial number	**Header**		46 02 02 19	
	Manufacturer ID			CD 25	
	Version			01	Same as the mayor version of the software
	Medium			02	Electricity
	Acces number			04	Every time the meter is read this number is increased by 1 up to 255, then it becomse 0 again
	Status			00	00 = OK 02 = error
	Signature			00 00	Always 00 00
Datablocks	Total forward active energy	04	03	15 CD 5B 07	123456789 Wh
	Forward active energy T1	84 10	03	15 CD 5B 07	123456789 Wh
	Forward active energy T2	84 20	03	15 CD 5B 07	123456789 Wh
	Forward active energy T3	84 30	03	15 CD 5B 07	123456789 Wh
	Forward active energy T4	84 80 10	03	15 CD 5B 07	123456789 Wh
	Total reverse active energy	04	83 3C	15 CD 5B 07	123456789 Wh
	Reverse active energy T1	84 10	83 3C	15 CD 5B 07	123456789 Wh
	Reverse active energy T2	84 20	83 3C	15 CD 5B 07	123456789 Wh
	Reverse active energy T3	84 30	83 3C	15 CD 5B 07	123456789 Wh
	Reverse active energy T4	84 80 10	83 3C	15 CD 5B 07	123456789 Wh
	Total kWh (resettable)	04	83 FC 10	15 CD 5B 07	123456789 Wh
	Forward reactive energy	04	FB 82 73	15 CD 5B 07	123456,789 kVARh
	Reverse reactive energy	04	FB 82 F3 3C	15 CD 5B 07	123456,789 kVARh
	L1 voltage	02	FD C7 FC 01	E4 59	230,12 V
	L2 voltage	02	FD C7 FC 02	E4 59	230,12 V
	L3 voltage	02	FD C7 FC 03	E4 59	230,12 V
	L1 current	03	FD D9 FC 01	1B 87 01	100123 mA
	L2 current	03	FD D9 FC 02	1B 87 01	100123 mA
	L3 current	03	FD D9 FC 03	1B 87 01	100123 mA
	Total active power	03	2B	87 D6 12	1234567 W
	L1 active power	03	AB FC 01	87 D6 12	1234567 W
	L2 active power	03	AB FC 02	87 D6 12	1234567 W
	L3 active power	03	AB FC 03	79 29 ED	-1234567 W
	Total reactive power	03	FB 14	87 D6 12	1234,567 kVAR
	L1 reactive power	03	FB 94 FC 01	87 D6 12	1234,567 kVAR
	L2 reactive power	03	FB 94 FC 02	87 D6 12	1234,567 kVAR
	L3 reactive power	03	FB 94 FC 03	87 D6 12	1234,567 kVAR
	Total apparent power	03	FB 34	87 D6 12	1234,567 kVA
	Total power factor	0A	FD 3A	00 01	1,00
	Grid frequency	03	FB 2C	37 C7 00	50,999Hz
	Tariff	09	7C 01 54	01	T1
	CT rate (only for CT version)	0B	FD 3A	05 95 99	9995/5
	Checksum			xx xx	

Write

Contents	Command part 1	Address	Command part 2	New value	Response	Remarks
Baudrate	68 03 03 68 53	01	-	BB	E5 (new Baud 2400)	B8 = 300; B9 = 600; BA = 1200; BB = 2400; BC = 4800; BD = 9600
Primary address	68 06 06 68 53	01	51 01 7A	01	E5 (new id 01)	000 - 250 write in HEX
Secondary address	68 09 09 68 53	01	51 0C 79	15 01 23 45	E5 (new address 1501 2345)	4 bytes BCD same as read
Tariff mode	68 08 08 68 53	01	51 09 7C 01 54	02	E5 (tariff 2)	T1 = 01 ; T2 = 02 ; T3 = 03 ; T = 04
Combined code	68 07 07 68 53	01	51 09 FD 3A	05	E5 (combined code 05)	01, 02, 03, 04 and 05
S0 rate	68 0A 0A 68 53	01	51 0C FD 3A	00 00 01 00	E5 (S0 rate 100)	10.000 / 2.000 / 1.000 / 100 / 10 / 1 / 0,1 / 0,01
Resettable kWh	68 09 09 68 53	01	51 0C 04	00 00 00 00	E5	Value is ignored, always set to 0
Reset power down counter	68 08 08 68 53	01	51 0A FD 60	00 00	E5	Value is ignored, always reset to 0

SND NKE	10 40	01	-	-	E5	Can be send to primary or secondary address and resets all communication values

Selecting slave by secondary addressing	Serial number	Manufacturer ID	Generation version	Medium
68 0B 0B 68 53 FD 52	aa aa aa aa	bb bb	cc	dd
Input	01 00 07 13	CD 25	01	02
Remarks	13070001	-	Major version of the software	Electricity

Appendix 2 - Modbus

A2.1 Communicating via the Modbus output

The 2PU CT meter is equipped with a Modbus port. In order to read out the meter registers, first install and configure the required PC software.

Connect the PC to the meter using an RS485 level converter, with the cable connected to terminals 7 and 8. The default communication address of the meter is set to 01.

The 2PU CT model supports Modbus communication with the following default settings:

-Baud rate: 9600
-Data bits: 8
-Parity: Even
-Stop bit: 1

The baud rate can be modified to values of 115200, 56700, 38400, 9600, 4800, 2400, 1200, 600, or 300. Parity can be adjusted to even, odd and none; however, the data bits and stop bit settings cannot be changed.

When testing the meter with a serial converter (RS485), note that, due to such a partial Modbus infrastructure implementation, an additional resistor (120 ohms, 0.25 watts) must be placed across terminals 7 and 8 on the meter side.

For details on the registers used in the meter and data interpretation, please refer to the Modbus register map on the following pages:

A2.2 Modbus register map - Read

Reg. address	Content	Function code	Reg. Length	Unit	Data type
4000	Serial number	03	2	-	HEX
4002	Meter code	03	1	-	HEX
	2PCT: 1113 - 4PU: 1111 - 4PS: 1112				
4003	Modbus ID	03	1	-	Signed
4004	Baud rate	03	1	-	Signed
	1: 300 - 2: 600 - 3: 1200 - 4: 2400 *5: 4800 - 6: 9600 - 7: 19200 - 8: 38400* *9: 57600 - 10: 115200*				
4005	Protocol version	03	2	-	Float ABCD
4007	Software version	03	2	-	Float ABCD
4009	Hardware version	03	2	-	Float ABCD
400B	Meter amps	03	1	A	Signed
400C	CT ratio	03	1	A	HEX
400D	S0 output rate	03	2	imp/kWh	Float ABCD
400F	Combination code	03	1	-	Signed
	1: forward only - 2: reverse only *3: forward+reverse - 4: import-export* *5: import-export (10)*				
4010	LCD cycle time	03	1	sec.	HEX
4011	Parity setting	03	1	-	Signed
	1: even - 2: none - 3: odd				
4012	Current direction	03	1	-	ASCII
	F: forward - R: reverse				
4013	L2 Current direction	03	1	-	ASCII
	F: forward - R: reverse				
4014	L3 Current direction	03	1	-	ASCII
	F: forward - R: reverse				
4015	Error code	03	1	-	Signed
4016	Power down counter	03	1	-	Signed
4017	Present quadrant	03	1	-	Signed
4018	L1 Quadrant	03	1	-	Signed
4019	L2 Quadrant	03	1	-	Signed
401A	L3 Quadrant	03	1	-	Signed
401B	Checksum	03	2	-	HEX
401D	Active status word	03	2	-	HEX
401F	CT ratio	03	2	A	Signed
	9995 005 = 9995/5				
4021	Pulse width	03	2	ms	Signed
	Value between 2-99 ms				
4022	Pulse type setting	03	1	-	HEX
	1: active & reactive 2: forward & reverse				
4023	Checksum 2 (non-relevant)	03	2	-	HEX
4025	Reserved-		1		
4026	Data type setting	03	1	-	Signed
	1: standard - 2: integer				
4027	Reserved	-	4	-	-
4032	Screen direction	03	1	-	Signed
	0: standard - 1: turn 180 degrees				
4033	OBIS code ON/OFF	03	1	-	Signed
	0: OFF - 1: ON				
4034	Backlight	03	1	-	Signed
	01 = Button mode, 02 = ON, 03 = OFF				

Reg. address	Content	Function code	Reg. length	Unit	Data type
5000	Not in use	-	-	-	-
5002	L1 Voltage	03	2	V	Float ABCD
5004	L2 Voltage	03	2	V	Float ABCD
5006	L3 Voltage	03	2	V	Float ABCD
5008	Grid frequency	03	2	Hz	Float ABCD
500A	Not in use	-	-	-	-
500C	L1 Current	03	2	A	Float ABCD
500E	L2 Current	03	2	A	Float ABCD
5010	L3 Current	03	2	A	Float ABCD
5012	Total active power	03	2	kW	Float ABCD
5014	L1 Active power	03	2	kW	Float ABCD
5016	L2 Active power	03	2	kW	Float ABCD
5018	L3 Active power	03	2	kW	Float ABCD
501A	Total reactive power	03	2	kvar	Float ABCD
501C	L1 Reactive power	03	2	kvar	Float ABCD
501E	L2 Reactive power	03	2	kvar	Float ABCD
5020	L3 Reactive power	03	2	kvar	Float ABCD
5022	Total apparent power	03	2	kVA	Float ABCD
5024	L1 Apparent power	03	2	kVA	Float ABCD
5026	L2 Apparent Power	03	2	kVA	Float ABCD
5028	L3 Apparent Power	03	2	kVA	Float ABCD
502A	Power factor	03	2	-	Float ABCD
502C	L1 Power factor	03	2	-	Float ABCD
502E	L2 Power factor	03	2	-	Float ABCD
5030	L3 Power factor	03	2	-	Float ABCD
5032	L1-L2 Voltage	03	2	V	Float ABCD
5034	L1-L3 Voltage	03	2	V	Float ABCD
5036	L2-L3 Voltage	03	2	V	Float ABCD

Reg. address	Content	Function code	Reg. Length	Unit	Data type
6000	Total active energy	03	2	kWh	Float ABCD
6002	T1 Total active energy	03	2	kWh	Float ABCD
6004	T2 Total active energy	03	2	kWh	Float ABCD
6006	L1 Total active energy	03	2	kWh	Float ABCD
6008	L2 Total active energy	03	2	kWh	Float ABCD
600A	L3 Total active energy	03	2	kWh	Float ABCD
600C	Forward active energy	03	2	kWh	Float ABCD
600E	T1 Forward active energy	03	2	kWh	Float ABCD
6010	T2 Forward active energy	03	2	kWh	Float ABCD
6012	L1 Forward active energy	03	2	kWh	Float ABCD
6014	L2 Forward active energy	03	2	kWh	Float ABCD
6016	L3 Forward active energy	03	2	kWh	Float ABCD
6018	Reverse active energy	03	2	kWh	Float ABCD
601A	T1 Reverse active energy	03	2	kWh	Float ABCD
601C	T2 Reverse Active Energy	03	2	kWh	Float ABCD
601E	L1 Reverse active energy	03	2	kWh	Float ABCD
6020	L2 Reverse active energy	03	2	kWh	Float ABCD
6022	L3 Reverse active energy	03	2	kWh	Float ABCD
6024	Total reactive energy	03	2	kvarh	Float ABCD
6026	T1 Total reactive energy	03	2	kvarh	Float ABCD
6028	T2 Total reactive energy	03	2	kvarh	Float ABCD
602A	L1 Total reactive energy	03	2	kvarh	Float ABCD
602C	L2 Total reactive energy	03	2	kvarh	Float ABCD
602E	L3 Total reactive energy	03	2	kvarh	Float ABCD

Reg. address	Content	Function code	Reg. length	Unit	Data type
6030	Forward reactive energy	03	2	kvarh	Float ABCD
6032	T1 Forward reactive energy	03	2	kvarh	Float ABCD
6034	T2 Forward reactive energy	03	2	kvarh	Float ABCD
6036	L1 Forward reactive energy	03	2	kvarh	Float ABCD
6038	L2 Forward reactive energy	03	2	kvarh	Float ABCD
603A	L3 Forward reactive energy	03	2	kvarh	Float ABCD
603C	Reverse reactive energy	03	2	kvarh	Float ABCD
603E	T1 Reverse reactive energy	03	2	kvarh	Float ABCD
6040	T2 Reverse reactive energy	03	2	kvarh	Float ABCD
6042	L1 Reverse reactive energy	03	2	kvarh	Float ABCD
6044	L2 Reverse reactive energy	03	2	kvarh	Float ABCD
6046	L3 Reverse reactive energy	03	2	kvarh	Float ABCD
6048	Tariff	03	1	-	Signed
6049	Resettable day counter	03	2	kWh	Float ABCD
604B	T3 Total active energy	03	2	kWh	Float ABCD
604D	T4 Total active energy	03	2	kWh	Float ABCD
604F	T3 Forward active energy	03	2	kWh	Float ABCD
6051	T4 Forward active energy	03	2	kWh	Float ABCD
6053	T3 Reverse active energy	03	2	kWh	Float ABCD
6055	T4 Reverse Active Energy	03	2	kWh	Float ABCD
6057	T3 Total reactive energy	03	2	kvarh	Float ABCD
6059	T4 Total reactive energy	03	2	kvarh	Float ABCD
605B	T3 Forward reactive energy	03	2	kvarh	Float ABCD
605D	T4 Forward reactive energy	03	2	kvarh	Float ABCD
605F	T3 Reverse reactive energy	03	2	kvarh	Float ABCD
6061	T4 Reverse reactive energy	03	2	kvarh	Float ABCD
6063	Imp. Inductive reactive energy in Q1 (total)	03	2	kWh	Float ABCD
6065	Imp. Inductive reactive energy in Q1 (T1)	03	2	kWh	Float ABCD
6067	Imp. Inductive reactive energy in Q1 (T2)	03	2	kWh	Float ABCD
6069	Imp. Inductive reactive energy in Q1 (T3)	03	2	kWh	Float ABCD
606B	Imp. Inductive reactive energy in Q1 (T4)	03	2	kWh	Float ABCD
606D	Imp. capacitive reactive energy in Q2 (total)	03	2	kWh	Float ABCD
606F	Imp. capacitive reactive energy in Q2 (T1)	03	2	kWh	Float ABCD
6071	Imp. capacitive reactive energy in Q2 (T2)	03	2	kWh	Float ABCD
6073	Imp. capacitive reactive energy in Q2 (T3)	03	2	kWh	Float ABCD
6075	Imp. capacitive reactive energy in Q2 (T4)	03	2	kWh	Float ABCD
6077	Exp. Inductive reactive energy in Q3 (total)	03	2	kWh	Float ABCD
6079	Exp. Inductive reactive energy in Q3 (T1)	03	2	kWh	Float ABCD
607B	Exp. Inductive reactive energy in Q3 (T2)	03	2	kWh	Float ABCD
607D	Exp. Inductive reactive energy in Q3 (T3)	03	2	kWh	Float ABCD
607F	Exp. Inductive reactive energy in Q3 (T4)	03	2	kWh	Float ABCD
6081	Exp. capacitive reactive energy in Q4 (total)	03	2	kWh	Float ABCD
6083	Exp. capacitive reactive energy in Q4 (T1)	03	2	kWh	Float ABCD
6085	Exp. capacitive reactive energy in Q4 (T2)	03	2	kWh	Float ABCD
6087	Exp. capacitive reactive energy in Q4 (T3)	03	2	kWh	Float ABCD
6089	Exp. capacitive reactive energy in Q4 (T4)	03	2	kWh	Float ABCD
608B	Resettable day counter L1	03	2	kWh	Float ABCD
608D	Resettable day counter L2	03	2	kWh	Float ABCD
608F	Resettable day counter L3	03	2	kWh	Float ABCD

Reg. address	Content	Function code	Reg. length	Unit	Data type
6100	Total forward active energy CT5/5	03	02	kWh	Float ABCD
6102	T1 Forward active energy CT5/5	03	02	kWh	Float ABCD
6104	T2 Forward active energy CT5/5	03	02	kWh	Float ABCD
6106	T3 Forward active energy CT5/5	03	02	kWh	Float ABCD
6108	T4 Forward active energy CT5/5	03	02	kWh	Float ABCD
610A	Total reverse active energy CT5/5	03	02	kWh	Float ABCD
610C	T1 reverse active energy CT5/5	03	02	kWh	Float ABCD
610E	T2 reverse active energy CT5/5	03	02	kWh	Float ABCD
6110	T3 reverse active energy CT5/5	03	02	kWh	Float ABCD
6112	T4 reverse active energy CT5/5	03	02	kWh	Float ABCD
6114	Total forward active energy History CT1	03	02	kWh	Float ABCD
6116	T1 Forward active energy History CT1	03	02	kWh	Float ABCD
6118	T2 Forward active energy History CT1	03	02	kWh	Float ABCD
611A	T3 Forward active energy History CT1	03	02	kWh	Float ABCD
611C	T4 Forward active energy History CT1	03	02	kWh	Float ABCD
611E	Total Reverse active energy History CT1	03	02	kWh	Float ABCD
6120	T1 Reverse active energy History CT1	03	02	kWh	Float ABCD
6122	T2 Reverse active energy History CT1	03	02	kWh	Float ABCD
6124	T3 Reverse active energy History CT1	03	02	kWh	Float ABCD
6126	T4 Reverse active energy History CT1	03	02	kWh	Float ABCD
6128	Total forward active energy History CT2	03	02	kWh	Float ABCD
612A	T1 Forward active energy History CT2	03	02	kWh	Float ABCD
612C	T2 Forward active energy History CT2	03	02	kWh	Float ABCD
612E	T3 Forward active energy History CT2	03	02	kWh	Float ABCD
6130	T4 Forward active energy History CT2	03	02	kWh	Float ABCD
6132	Total reverse active energy History CT2	03	02	kWh	Float ABCD
6134	T1 Reverse active energy History CT2	03	02	kWh	Float ABCD
6136	T2 Reverse active energy History CT2	03	02	kWh	Float ABCD
6138	T3 Reverse active energy History CT2	03	02	kWh	Float ABCD
613A	T4 Reverse active energy History CT2	03	02	kWh	Float ABCD
613C	Total forward active energy History CT3	03	02	kWh	Float ABCD
613E	T1 Forward active energy History CT3	03	02	kWh	Float ABCD
6140	T2 Forward active energy History CT3	03	02	kWh	Float ABCD
6142	T3 Forward active energy History CT3	03	02	kWh	Float ABCD
6144	T4 Forward active energy History CT3	03	02	kWh	Float ABCD
6146	Total reverse active energy History CT3	03	02	kWh	Float ABCD
6148	T1 Reverse active energy History CT3	03	02	kWh	Float ABCD
614A	T2 Reverse active energy History CT3	03	02	kWh	Float ABCD
614C	T3 Reverse active energy History CT3	03	02	kWh	Float ABCD
614E	T4 Reverse active energy History CT3	03	02	kWh	Float ABCD
6150	Total forward active energy History CT4	03	02	kWh	Float ABCD
6152	T1 Forward active energy History CT4	03	02	kWh	Float ABCD
6154	T2 Forward active energy History CT4	03	02	kWh	Float ABCD
6156	T3 Forward active energy History CT4	03	02	kWh	Float ABCD
6158	T4 Forward active energy History CT4	03	02	kWh	Float ABCD
615A	Total reverse active energy History CT4	03	02	kWh	Float ABCD
615C	T1 Reverse active energy History CT4	03	02	kWh	Float ABCD
615E	T2 Reverse active energy History CT4	03	02	kWh	Float ABCD
6160	T3 Reverse active energy History CT4	03	02	kWh	Float ABCD
6162	T4 Reverse active energy History CT4	03	02	kWh	Float ABCD
6164	Total forward active energy History CT5	03	02	kWh	Float ABCD
6166	T1 Forward active energy History CT5	03	02	kWh	Float ABCD
6168	T2 Forward active energy History CT5	03	02	kWh	Float ABCD
616A	T3 Forward active energy History CT5	03	02	kWh	Float ABCD
616C	T4 Forward active energy History CT5	03	02	kWh	Float ABCD
616E	Total reverse active energy History CT5	03	02	kWh	Float ABCD
6170	T1 Reverse active energy History CT5	03	02	kWh	Float ABCD
6172	T2 Reverse active energy History CT5	03	02	kWh	Float ABCD
6174	T3 Reverse active energy History CT5	03	02	kWh	Float ABCD
6176	T4 Reverse active energy History CT5	03	02	kWh	Float ABCD

Reg. address	Content	Function code	Reg. length	Unit	Data type
6178	Total forward active energy History CT6	03	02	kWh	Float ABCD
617A	T1 Forward active energy History CT6	03	02	kWh	Float ABCD
617C	T2 Forward active energy History CT6	03	02	kWh	Float ABCD
617E	T3 Forward active energy History CT6	03	02	kWh	Float ABCD
6180	T4 Forward active energy History CT6	03	02	kWh	Float ABCD
6182	Total reverse active energy History CT6	03	02	kWh	Float ABCD
6184	T1 Reverse active energy History CT6	03	02	kWh	Float ABCD
6186	T2 Reverse active energy History CT6	03	02	kWh	Float ABCD
6188	T3 Reverse active energy History CT6	03	02	kWh	Float ABCD
618A	T4 Reverse active energy History CT6	03	02	kWh	Float ABCD
618C	Total forward active energy History CT7	03	02	kWh	Float ABCD
618E	T1 Forward active energy History CT7	03	02	kWh	Float ABCD
6190	T2 Forward active energy History CT7	03	02	kWh	Float ABCD
6192	T3 Forward active energy History CT7	03	02	kWh	Float ABCD
6194	T4 Forward active energy History CT7	03	02	kWh	Float ABCD
6196	Total reverse active energy History CT7	03	02	kWh	Float ABCD
6196	T1 Reverse active energy History CT7	03	02	kWh	Float ABCD
619A	T2 Reverse active energy History CT7	03	02	kWh	Float ABCD
619C	T3 Reverse active energy History CT7	03	02	kWh	Float ABCD
619E	T4 Reverse active energy History CT7	03	02	kWh	Float ABCD

Reg. address	Content	Function code	Reg. length	Unit	Data type
6300	Total Forward reactive energy History CT5/5	03	02	kvarh	Float ABCD
6302	T1 Forward reactive energy History CT5/5	03	02	kvarh	Float ABCD
6304	T2 Forward reactive energy History CT5/5	03	02	kvarh	Float ABCD
6306	T3 Forward reactive energy History CT5/5	03	02	kvarh	Float ABCD
6308	T4 Forward reactive energy History CT5/5	03	02	kvarh	Float ABCD
630A	Total Reverse reactive energy History CT5/5	03	02	kvarh	Float ABCD
630C	T1 Reverse reactive energy CT5/5	03	02	kvarh	Float ABCD
630E	T2 Reverse reactive energy CT5/5	03	02	kvarh	Float ABCD
6310	T3 Reverse reactive energy CT5/5	03	02	kvarh	Float ABCD
6312	T4 Reverse reactive energy CT5/5	03	02	kvarh	Float ABCD
6314	Total Forward reactive energy History CT1	03	02	kvarh	Float ABCD
6316	T1 Forward reactive energy History CT1	03	02	kvarh	Float ABCD
6318	T2 Forward reactive energy History CT1	03	02	kvarh	Float ABCD
631A	T3 Forward reactive energy History CT1	03	02	kvarh	Float ABCD
631C	T4 Forward reactive energy History CT1	03	02	kvarh	Float ABCD
631E	Total Reverse reactive energy CT1	03	02	kvarh	Float ABCD
6320	T1 Reverse reactive energy CT1	03	02	kvarh	Float ABCD
6322	T2 Reverse reactive energy CT1	03	02	kvarh	Float ABCD
6324	T3 Reverse reactive energy CT1	03	02	kvarh	Float ABCD
6326	T4 Reverse reactive energy CT1	03	02	kvarh	Float ABCD
6328	Total Forward reactive energy History CT2	03	02	kvarh	Float ABCD
632A	T1 Forward reactive energy History CT2	03	02	kvarh	Float ABCD
632C	T2 Forward reactive energy History CT2	03	02	kvarh	Float ABCD
632E	T3 Forward reactive energy History CT2	03	02	kvarh	Float ABCD
6330	T4 Forward reactive energy History CT2	03	02	kvarh	Float ABCD
6332	Total Reverse reactive energy CT2	03	02	kvarh	Float ABCD
6334	T1 Reverse reactive energy CT2	03	02	kvarh	Float ABCD
6336	T2 Reverse reactive energy CT2	03	02	kvarh	Float ABCD
6338	T3 Reverse reactive energy CT2	03	02	kvarh	Float ABCD
633A	T4 Reverse reactive energy CT2	03	02	kvarh	Float ABCD

Reg. address	Content	Function code	Reg. length	Unit	Data type
633C	Total Forward reactive energy History CT3	03	02	kvarh	Float ABCD
633E	T1 Forward reactive energy History CT3	03	02	kvarh	Float ABCD
6340	T2 Forward reactive energy History CT3	03	02	kvarh	Float ABCD
6342	T3 Forward reactive energy History CT3	03	02	kvarh	Float ABCD
6344	T4 Forward reactive energy History CT3	03	02	kvarh	Float ABCD
6346	Total Reverse reactive energy CT3	03	02	kvarh	Float ABCD
6348	T1 Reverse reactive energy CT3	03	02	kvarh	Float ABCD
634A	T2 Reverse reactive energy CT3	03	02	kvarh	Float ABCD
634C	T3 Reverse reactive energy CT3	03	02	kvarh	Float ABCD
634E	T4 Reverse reactive energy CT3	03	02	kvarh	Float ABCD
6350	Total Forward reactive energy History CT4	03	02	kvarh	Float ABCD
6352	T1 Forward reactive energy History CT4	03	02	kvarh	Float ABCD
6354	T2 Forward reactive energy History CT4	03	02	kvarh	Float ABCD
6356	T3 Forward reactive energy History CT4	03	02	kvarh	Float ABCD
6358	T4 Forward reactive energy History CT4	03	02	kvarh	Float ABCD
635A	Total Reverse reactive energy CT4	03	02	kvarh	Float ABCD
635C	T1 Reverse reactive energy CT4	03	02	kvarh	Float ABCD
635E	T2 Reverse reactive energy CT4	03	02	kvarh	Float ABCD
6360	T3 Reverse reactive energy CT4	03	02	kvarh	Float ABCD
6362	T4 Reverse reactive energy CT4	03	02	kvarh	Float ABCD
6364	Total Forward reactive energy History CT5	03	02	kvarh	Float ABCD
6366	T1 Forward reactive energy History CT5	03	02	kvarh	Float ABCD
6368	T2 Forward reactive energy History CT5	03	02	kvarh	Float ABCD
636A	T3 Forward reactive energy History CT5	03	02	kvarh	Float ABCD
636C	T4 Forward reactive energy History CT5	03	02	kvarh	Float ABCD
636E	Total Reverse reactive energy CT5	03	02	kvarh	Float ABCD
6370	T1 Reverse reactive energy CT5	03	02	kvarh	Float ABCD
6372	T2 Reverse reactive energy CT5	03	02	kvarh	Float ABCD
6374	T3 Reverse reactive energy CT5	03	02	kvarh	Float ABCD
6376	T4 Reverse reactive energy CT5	03	02	kvarh	Float ABCD
6378	Total Forward reactive energy History CT6	03	02	kvarh	Float ABCD
637A	T1 Forward reactive energy History CT6	03	02	kvarh	Float ABCD
637C	T2 Forward reactive energy History CT6	03	02	kvarh	Float ABCD
637E	T3 Forward reactive energy History CT6	03	02	kvarh	Float ABCD
6380	T4 Forward reactive energy History CT6	03	02	kvarh	Float ABCD
6382	Total Reverse reactive energy CT6	03	02	kvarh	Float ABCD
6384	T1 Reverse reactive energy CT6	03	02	kvarh	Float ABCD
6386	T2 Reverse reactive energy CT6	03	02	kvarh	Float ABCD
6388	T3 Reverse reactive energy CT6	03	02	kvarh	Float ABCD
638A	T4 Reverse reactive energy CT6	03	02	kvarh	Float ABCD
638C	Total Forward reactive energy History CT7	03	02	kvarh	Float ABCD
638E	T1 Forward reactive energy History CT7	03	02	kvarh	Float ABCD
6390	T2 Forward reactive energy History CT7	03	02	kvarh	Float ABCD
6392	T3 Forward reactive energy History CT7	03	02	kvarh	Float ABCD
6394	T4 Forward reactive energy History CT7	03	02	kvarh	Float ABCD
6396	Total Reverse reactive energy CT7	03	02	kvarh	Float ABCD
6398	T1 Reverse reactive energy CT7	03	02	kvarh	Float ABCD
639A	T2 Reverse reactive energy CT7	03	02	kvarh	Float ABCD
639C	T3 Reverse reactive energy CT7	03	02	kvarh	Float ABCD
639E	T4 Reverse reactive energy CT7	03	02	kvarh	Float ABCD

A2.3 Modbus register map - Write

Reg. address	Content	Function code	Length	Unit	Data type
4003	Modbus ID	06	1	-	Signed
Command:	01 06 4003 000A (new ID: 10)		01~247 - 01 default - 00 broadcast		

4004	Baud rate	06	1	-	Signed
Command:	01 06 4004 00 06 (new Baudrate: 9600)		1: 300 - 2: 600 - 3: 1200 - 4: 2400 5: 4800 - 6: 9600 - 7: 19200 8: 38400 - 9: 57600 - 10: 115200		

400D	S0 output rate	10	2	imp/kWh	Float ABCD
Command:	01 10 400D 0002 04 41 20 00 00 (new S0: 10)		10.000 - 2.000 - 1.000 - 100 - 10 – 1 - 0,1		

400F	Combination code	06	1	-	Signed
Command:	01 06 400F 0004 (new code: 4 F-R)		1: forward only 2: forward + reverse 3: import – export 4: import – export (10)		

4010	LCD cycle time	06	1	sec.	HEX
Command:	01 06 4010 0025 (new time: 25 sec.)		01~30		

4011	Parity setting	06	1	-	Signed
Command:	01 06 4011 0002 (new parity: none)		01: even - 02: none - 03: odd		

4016	Power down counter	06	1	-	Signed
Command:	01 06 4016 0000		Reset to 0		

6048	Tariff	06	1	-	Signed
Command:	01 06 6048 0002 (new tariff: 2)		1: T1 - 2: T2 - 3: T3 - 4: T4		

6049	Resettable day counter	10	1	kWh	Float ABCD
Command:	01 10 6049 0002 04 0000 0000		Reset to 0		

401F	CT ratio	2	-	Signed
Command:	01 10 401F 0002 04 9995 0005	Set to 9995/5		

4021	Pulse width	06	1	ms	Signed
Command:	01 06 4021 0030 (new setting: 30ms)		2~99 ms		

4022	Pulse type	06	1	-	Signed
Command:	01 06 4022 0002 (new setting: forward & reverse)		2 = forward & reverse		

4026	Data type setting	06	1	-	Signed
Command:	01 06 4026 0002 (new setting: integer)		1=standard, 2=Integer		

4032	Screen direction	06	1	-	Signed
Command:	01 06 4032 0001 (new setting: turn 180 degrees)		0: standard - 1: turn 180 degrees		

4033	OBIS code ON/OFF	06	1	-	Signed
Command:	01 06 4033 0001 (new setting: OBIS ON)		0: OFF - 1: ON		

4033	OBIS code ON/OFF	06	1	-	Signed
Command:	01 06 4033 0001 (new setting: OBIS ON)		0: OFF – 1: ON		

4034	Backlight	06	1	-	Signed
Command:	01 06 4034 0003 (new setting: Backlight OFF)		01: Button mode – 02: ON – 03: OFF		

*2PU CT only

Appendix 3 - Bluetooth

All Ambition meters can be easily read and configured via Bluetooth communication.
The Inepro Meter Manager app is available for download on both Android and iOS devices from their respective app stores.

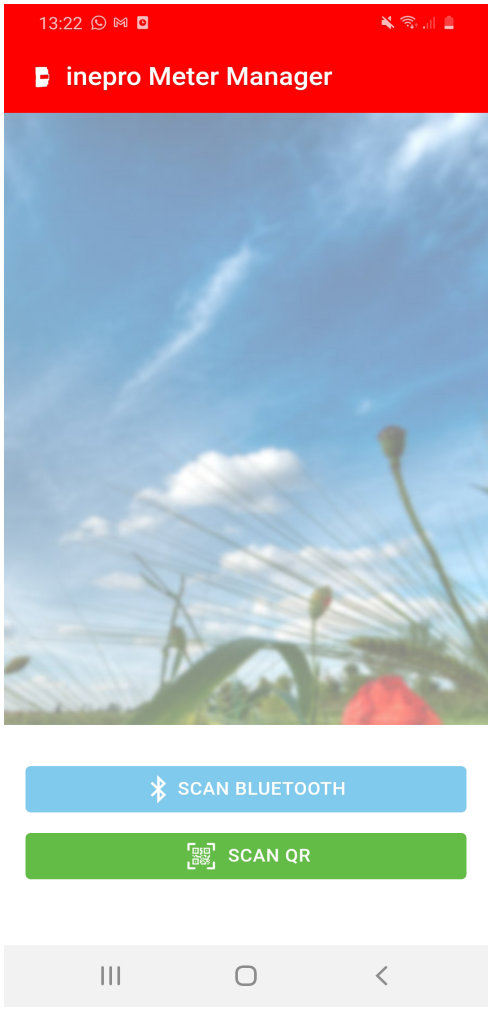
Download on the App Store:

Download on the Google Play store:

A 4.1 Bluetooth app

Activate Bluetooth on the meter by following the steps outlined in section 7.5: Bluetooth.

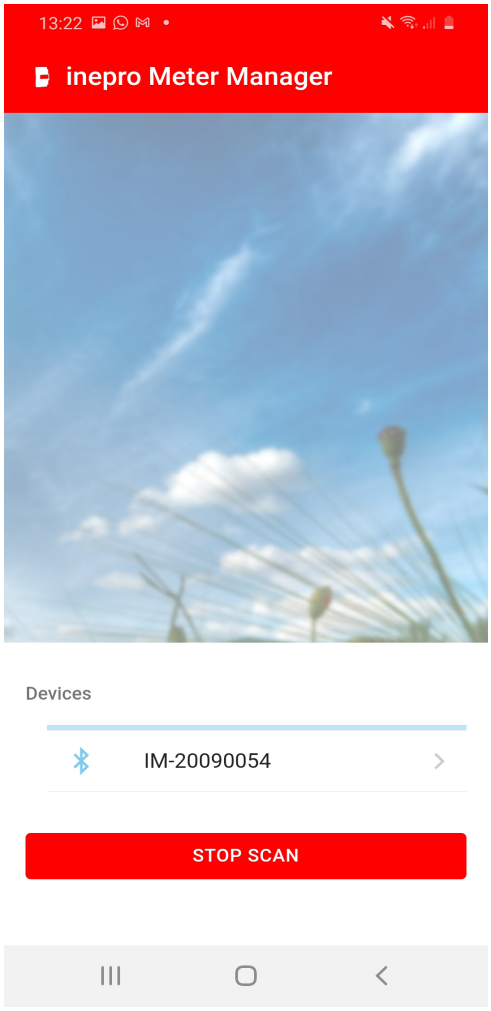
Once activated, launch the mobile app on your smartphone.



A 4.2 Connect the meter

The meter can be connected using one of the following methods:

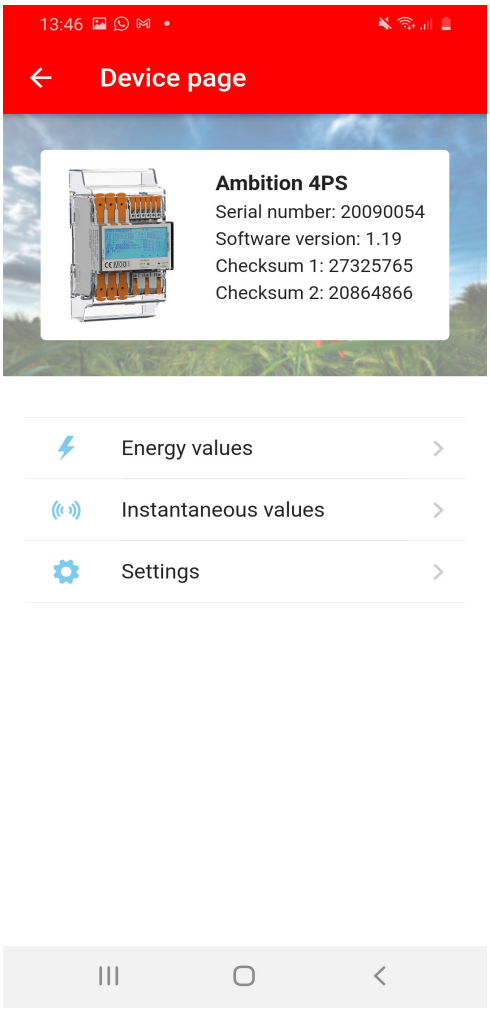
1. Scan Bluetooth:
    a. The app scans for all Bluetooth-enabled meters in the area.
    b. Select the correct serial number from the list to establish a connection.



2. Scan QR:
    a. The app activates the smartphone camera to scan the QR code displayed on the meter.
    b. Once the QR code is scanned, the meter connects

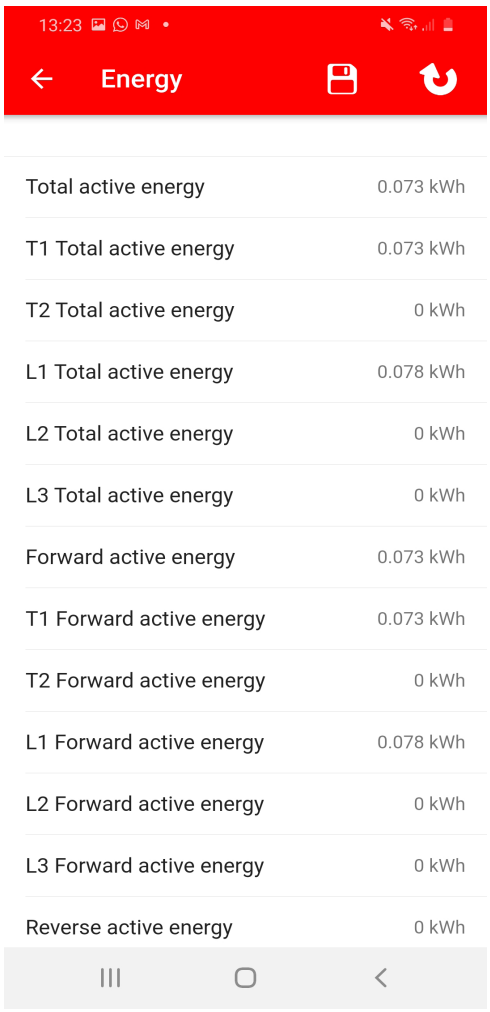
A 4.3 Device connected

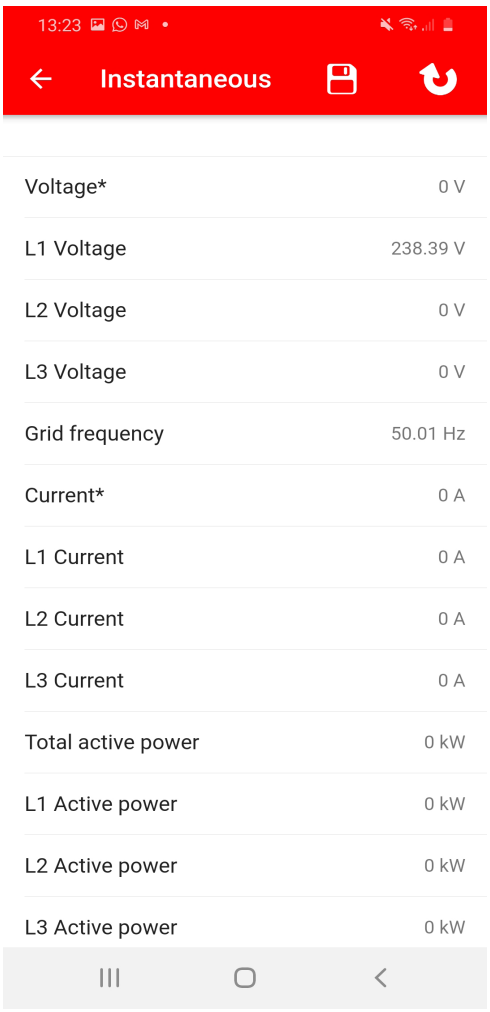
The meter is now successfully connected to the mobile app.
On the device page, you can view the meter type, serial number and software version.



Read meter data

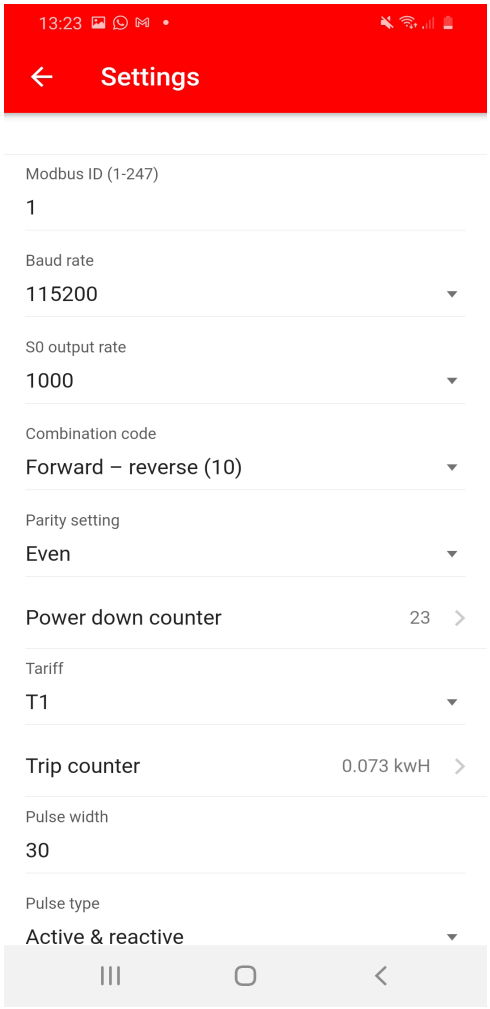
Refresh the data using the refresh button in the upper right corner.
Save the data using the save button. Data can be saved and shared with other installed mobile phone applications.

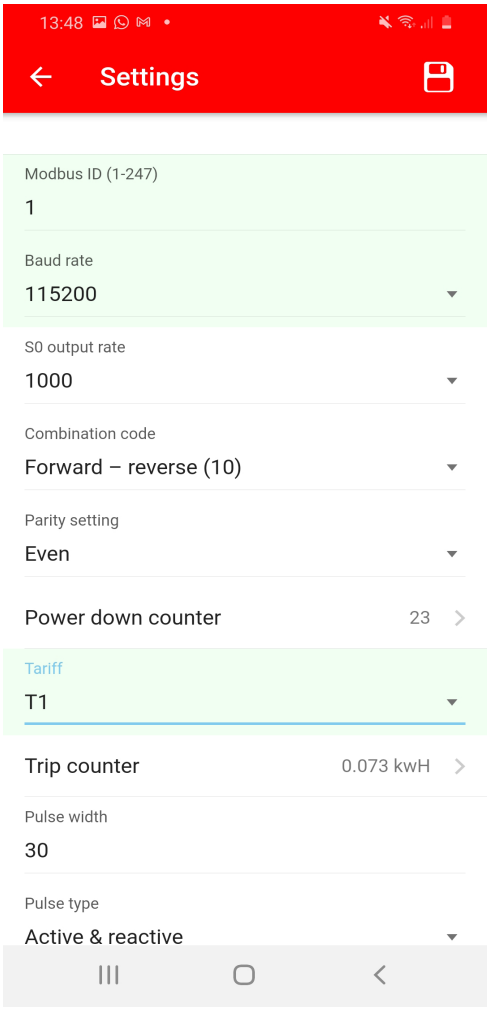




Settings

Settings can selected individualy and/or saved all at once.
Select the settings that need to be modified. The modified settings will be marked green





Press the Save button to store the settings in the meter. First a pop-up menu for password will appear. The default password is 0000. The password can only be modified in the meter using the buttons. After entering the correct password the new settings will be stored in the meter: