

inepro[®]

**PRO1-S
PRO1-2T
PRO1-Mb
PRO1-Mod**



PRO 1 Series MID
DIN rail single phase two wire
energy meter

User Manual

Product version: 1.12

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1 Index

2	Safety instructions	3
3	Foreword	5
4	Certificates	6
5	Specifications	7
5.1	Performance criteria	7
5.2	Basic errors.....	7
5.3	Infra-red specification.....	8
5.4	M-bus communication specifications (PRO-Mb only)	8
5.5	RS485 communication specifications (PRO-Mod only)	8
5.6	Dimensions.....	8
6	Installation	9
7	Operation	11
7.1	Energy flow indication.....	11
7.2	Re-active energy indication	11
7.3	Tariff indication	11
7.4	Reading the meter.....	11
7.5	LCD display of the meter.....	11
7.6	Scrolling function.....	13
7.7	Back light	14
7.8	S0 pulse output.....	14
7.9	Setting the total (combined) energy calculation.....	15
7.10	Communicating via the M-bus output(PRO1-Mb only)	15
7.11	Communicating via the Modbus output(PRO1-Mod only)	16
8	Troubleshooting	17
8.1	List of errors in display.....	18
8.2	Technical support.....	18
1	Appendix PRO1-2T	19
2	Appendix PRO1-Mb	20
3	Appendix PRO1-Mod	21
4	Appendix Infra-Red PC software	22
5	Appendix Registry matrix	23

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.
- 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.

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3 Foreword

Thank you for purchasing this energy meter. Inepro has a wide product range of devices. We have introduced a large number of energy meters on the market suitable for 110V AC to 400V AC (50 or 60Hz). Besides the normal energy meters we also developed our own pre-paid meters with chip card, chip card re-loaders and a complete PC management control system. For more information on other products please contact our sales department at sales@ineprometering.com or visit our website at www.ineprometering.com.

Although we produce this device according to international standards and our quality inspection is very accurate it's still possible that this device shows a defect or failure for which we do apologize. Under normal conditions your product should give you years of trouble free operation. In case there is a problem with the energy meter you should contact your distributor immediately. Most of our energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim any warranty. Therefore NEVER open an energy meter or break the seal of the device. The limited warranty is 5 years after production date, divided into various periods., after production, and only valid for production faults.

4 Certificates



CERTIFICATE

TYPE TEST OF ENERGY METERS

Manufacturer	: Inepro Metering BV
Contact person	: D. van der Vaart
Address	: Pondweg 7
Postal code, Place	: 2153PK, Nieuw-Vennep
Country	: The Netherlands
Instrument	: Electronic single-phase two-wire energy meter
Mark - Type	: Direct connected
Register	: PRO1-S, PRO1-2T, PRO1-Mb and PRO1-Mod
Accuracy Class	: 1/B
Measurement range	: 230 V
	: 5(45) A
	: 50 Hz
Use	: indoor
Protection Class	: II
Registry method	: Programmable

The energy meter meets the requirements of:

IEC 62052-11 (2003)	: Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Metering equipment
IEC 62053-21 (2003)	: Electricity metering equipment (a.c.) - Static meters for active energy (classes 1 and 2) based on a non-recurrent examination.


The results are recorded in our test report with reference 72141340 - TIC 7017-14.

KEMA Nederland B.V. - Calibration & Metering
Amhem, 16 July 2014.


 Ing. M. Achterhuis
 Certification manager


 Ing. S.A.M. Verhoeven
 Business Line Director Testing, Inspections & Certification
 Certificate nr. 72141340 - TIC 7017-14C

The investigation reported here does not confer any right to use an approval mark granted by DNV KEMA.
Integral publication of this certificate and adjoining reports is allowed.
This certificate is issued provided that neither DNV KEMA nor the BvA assumes any liability.
KEMA Nederland B.V. Utrechtseweg 310, 6812 AK Amhem, The Netherlands P.O. box 9033, 6800 KJ Amhem, The Netherlands
T +31 (0)26 3 56 2215 F +31 (0)26 4 42 6211 C6M@dnvkema.com www.dnvkema.com Trade register Amhem 0508262



Declaration of Conformity

We

Inepro Metering BV

of

Inepro Metering BV
Pondweg 7
2153 PK Nieuw Vennep
The Netherlands

Ensure and declare that the apparatus:

PRO1-S, PRO1-2T, PRO1-Mb and PRO1-Mod

With the measurement range

230V, 5(45)A, 50Hz, 10.000imp/kWh


are in conformity with the type as described in the

EC-type examination certificate 7017-14

and satisfy the appropriate requirements of the Directive 2004/22/EC.

August 11, 2014

Daan van der Vaart



We,

Inepro Metering BV

(supplier's name)

Pondweg 7

2153 PK Nieuw-Vennep

The Netherlands

(supplier's address)

declare under our sole responsibility that the product:

PRO1-S

PRO1-2T

PRO1-Mb

PRO1-Mod

Single phase DIN rail Watt Hour meter

(Name, type or model, batch or serial number, possibly source and number of items)

to which this declaration relates in conformity with the following European harmonized and published standards at date of this declaration:

EN 50470

(Title and or number and date of issue of the applied standard(s))

Following the provisions of the Directives (if applicable):


N/A

Nieuw-Vennep, 2013, Oktober 31

Place and date of issue

D. van der Vaart

Name of responsible for CE-marking



This declaration of Conformity is suitable for the European Standard EN 45014 General Criteria for Supplier's Declaration of Conformity. The basis for the criteria has been found in international documentation, particularly in ISO/IEC Guide 22, 1982, information on manufacturer's Declaration of Conformity with standards or other technical specifications

5 Specifications

Casing	PC flame resistant plastic
Nominal voltage (Un)	230V AC
Operational voltage	195-253VAC
Insulation capabilities:	
- AC voltage withstand	4KV for 1 minute
- Impulse voltage withstand	6KV – 1.2 μ S waveform
Basic current (Ib)	5A
Maximum rated current (Imax)	45A
Operational current range	0.4%Ib-Imax
Overcurrent withstand	30Imax for 0.01s
Operational frequency range	50Hz \pm 10%
Internal power consumption	\leq 2W/Phase - \leq 10VA/Phase
Test output flash rate (RED LED)	10.000 imp/kWh
Pulse output rate	10.000, 2.000, 1.000, 100, 10, 1, 0.1 or 0.01 imp/kWh
Pulse width	
- \leq 5625W	32ms
- $>$ 5625W	11.2ms
Data store	The data can be stored for more than 10 years without power

5.1 Performance criteria

Operating humidity	\leq 75%
Storage humidity	\leq 95%
Operating temperature	-25°C - +55°C
Storage temperature	-30°C- +70°C
International standard	EN50470-1/3
Accuracy class	B (=1% accuracy)
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	II

5.2 Basic errors

0.05Ib	Cos ϕ = 1	\pm 1.5%
0.1Ib	Cos ϕ = 0.5L	\pm 1.5%
	Cos ϕ = 0.8C	\pm 1.5%
0.1Ib - Imax	Cos ϕ = 1	\pm 1.0%
0.2Ib - Imax	Cos ϕ = 0.5L	\pm 1.0%
	Cos ϕ = 0.8C	\pm 1.0%

5.3 Infra-red specification

Infrared wavelengths	900- 1000nm
Communication distance	Direct contact
Protocol	IEC62056-21:2002 (IEC1107)

5.4 M-bus communication specifications (PRO-Mb only)

Bus type	M-bus
baud rate	300, 600, 1200, 2400, 4800 and 9600 (default)
Range	≤1000m 64PCS*
Downlink signal	Master to slave, Voltage modulation
Uplink signal	Slave to master, Current modulation
Cable	JYSTY (n×2×0.8)
Protocol	EN13757-3
Max. number of meters	64*

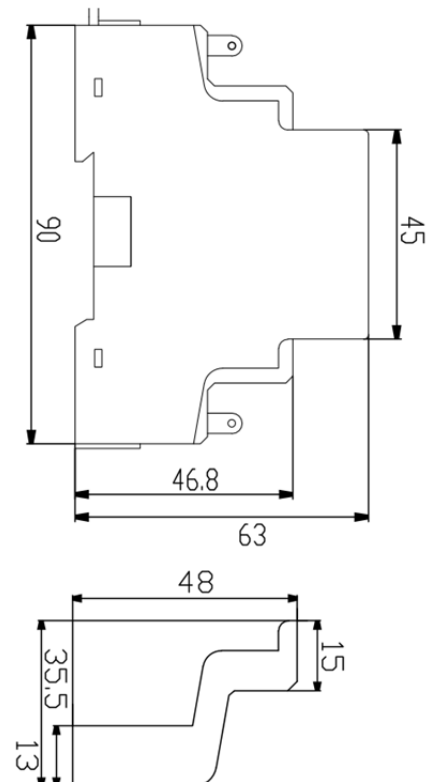
*Note that the maximum number of meters is dependent on the converter, baudrate (the higher the baudrate the smaller the number of meters which can be used) and the circumstances under which the meters are installed.

5.5 RS485 communication specifications (PRO-Mod only)

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC
Baud rate	1200, 2400, 4800, 9600 (default)
Address range	0-247 user settable
Maximum bus load	60 meters per bus
Range	1000m

5.6 Dimensions

Height without protection cover	90 mm
Height	117 mm
Width	17.5 mm
Depth	63 mm
Max diameter power connection clamps	10 mm ² (Solid copper)
Weight	0.08 Kg (net)



6 Installation



CAUTION

- Turn off and if possible lock all sources supplying the energy meter and the equipment that is connected to it before working on it.
- Always use a properly rated voltage sensing device to confirm that power is off.

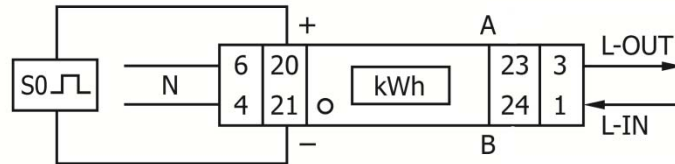


WARNING

- 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.

- The connecting wire, connecting the device to the outside circuit, should be sized in accordance with local regulations for the maximum amount of the current breaker or other overcurrent protection devices used in the circuit.
- An external switch or a circuit-breaker should be installed on the supply wires, which will be used to disconnect the meter and the device supplying energy. It is recommended that this switch or circuit-breaker is placed near the meter because that is more convenient for the operator. The switch or circuit-breaker should comply with the specifications of the building's electrical design and all local regulations.
- An external fuse or thermal cut-off used as an overcurrent protection device for the meter must be installed on the supply side wires. It's recommended that this protection device is also placed near the meter for the convenience of the operator. The overcurrent protection device should comply with the specifications of the building's electrical design and all local regulations.
- This meter can be installed indoor, or outdoor enclosed in a meter box which is sufficiently protected, in accordance with local codes and regulations.
- To prevent tampering, an enclosure with a lock or a similar device can be used.
- The meter has to be installed against a fire resistant wall.
- The meter has to be installed in a well-ventilated and dry place.
- The meter has to be installed in a protective box if the meter is exposed to dust or other contaminants.
- The meter can be installed and used after being tested and can be sealed afterwards.
- The device can be installed on a 35mm DIN rail.
- The meter should be installed on a location where the meter can be read easily.
- In case the meter is installed in an area with frequent surges for example due to thunderstorms, welding machines, inverters etc, the meter is required to be protected with a Surge Protection Device.
- The device should be sealed immediately after installing it in order to prevent tampering

- Connection of the wires should be done in accordance with the connection diagram as shown below:



1	phase line in (L-IN)	
3	phase line out (L-OUT)	
4	neutral line in (N)	
6	neutral line out (N)	
20 and 21	Pulse output contact (S0)	
23 and 24	PRO1-S	Not in use
	PRO1-2T	External tariff input (230V)
	PRO1-Mb	M-Bus communication contact
	PRO1-Mod	Modbus communication contact

7 Operation

7.1 Energy flow indication

The red LED on the front panel indicates the power flow measured by the meter. When power flows, the LED will flash. The faster the LED flashes, the more power flows. For this meter, the LED will flash 10.000 times per kWh. The first display indication of the meter in the scrolling mode is either FW (forward) or RV (reverse)

7.2 Re-active energy indication

The display will show Kvarh to indicate the meter is measuring re-active energy.

7.3 Tariff indication

The LCD will show a dot underneath the word tariff on the name plate to indicate tariff 2 is active

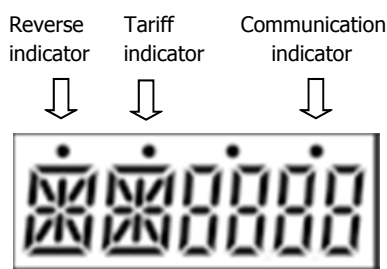
7.4 Reading the meter

A red LED on the front panel indicates the consumption measured by the meter. When power is consumed, the LED will flash. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 10.000 times per kW.

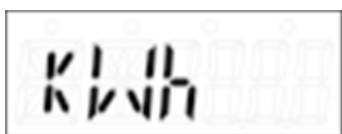
The meter is equipped with a 6 digit LCD. For the energy consumption the meter will display 9999.99 kWh and switch to 99999.9 kWh when over this value and so on.

7.5 LCD display of the meter

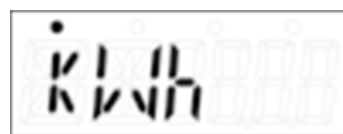
The LCD display has two rows. The upper row contains dots. The most left one is for indicating energy flow direction (forward/ reverse). The most right one is will flash when there is communication to an external device (only on selected models). The lower row is used to show al other metering info.



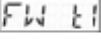





This means that certain displays have the same abbreviations, but the dot above will distinguish if it is for forward (no dot) or reverse (dot). Please compare the displays below:

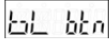
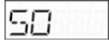

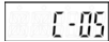
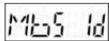

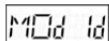

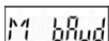

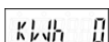

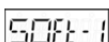


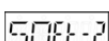




Total forward active energy



Total reverse active energy

DATAPAGE	Primary screen	Secondary screen	Discription	Remarks	Programmable
1	  	or   	Indication of the active energy direction flow. The meter shows: FW or RV		
2			Total active energy	forward & reverse -> see code table for calculation method	
3			Total reactive energy	forward & reverse -> see code table for calculation method	
4			Total forward active energy		
5			Total reverse active energy		
6			Total forward reactive energy		
7			Total reverse reactive energy		
8			Forward active energy tariff t1		
9			Reverse active energy tariff t1		
10			Forward reactive energy tariff t1		
11			Reverse reactive energy tariff t1		
12			Forward active energy tariff t2		
13			Reverse active energy tariff t2		
14			Forward reactive energy tariff t2		
15			Reverse reactive energy tariff t2		
16		na	Present voltage value		
17		na	Present current value		
18		na	Present frequency value		
19			Active power		
20			Reactive power		
21			Apparent power		
22			Power Factor		
23		na	Scrolling time	Range from 01 to 30 seconds	Button/IR*

24		na	Backlight mode	Choices are on, off & btn	Button/IR*
25			SO output rate	Default 1000	IR only*
26		na	Code table	Calculation method table	IR only*
27			Mbus ID	Default 000	IR only* + Mbus
28			Modbus ID	Default 001	IR only* + Mod-bus
29			Baud rate	Default 9600	IR only* + Mod-bus + M-bus
30			Resettable register		Button/IR*
31			Software version		
			Software version part 2		
32			Software version		
			Software version part 2		

7.6 Scrolling function

7.6.1 Automatic scrolling

Every 10 seconds the meter will display the next programmed data page (depending on the setting)

7.6.2 Change scrolling time by button

Press the button for 5 seconds during the display of page RT 00 and release the button



After releasing the button the backlight will blink twice OFF/ON to indicate you are in programming mode.

Press the button to select the scrolling time (01 to 30 seconds)

After choosing the desired scrolling time release the button and wait 10 seconds to program the new data in the meter

7.6.3 Manual scrolling

By pressing the button you will go through all data pages one by one starting from page 1 (sequence see in above table and is depending on the version of PRO1)

7.6.4 Data table pages

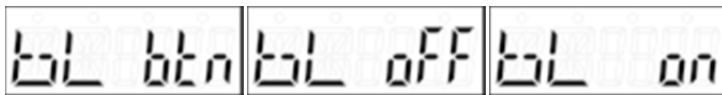
Data tables can be selected ON or OFF for automatic scrolling mode. See IR-manual.

7.7 Back light

The meter is equipped with a blue backlight.

7.7.1 Change the back light setting

Press the button for 5 seconds during the display of page BL btn and release the button



After releasing the button the backlight will blink twice OFF/ON to indicate you are in programming mode.

Press the button to select the backlight mode;

bl btn	Press button to activate light
bl off	Always OFF
bl on	Always ON

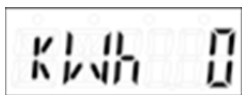
After choosing the desired scrolling time release the button and wait 10 seconds to program the new data in the meter.

7.7.2 Day counter reset

The meter is equipped with a day counter for consumed energy. This is the energy forward calculated and can be reset to zero by the user

7.7.3 How to reset the day counter back to 0

Press the button for 5 seconds during the display of page kWh 0 and release the button



After releasing the button the backlight will blink twice OFF/ON to indicate you are in programming mode

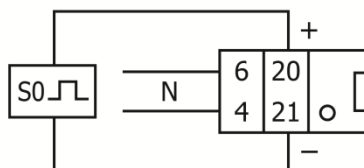
The meter will switch to the next display:



Press the button again for 5 seconds to reset to zero

7.8 S0 pulse output

The energy meter is equipped with a pulse output which is 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 (U_i) should be lower than 27V DC. The maximum switching current (I_{max}) is 100mA. To connect the impulse output, connect 5-27V DC to connector 20 (collector), and the signal wire (S) to connector 21 (emitter).



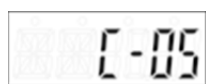
pin 20 (collector)

pin 21 (emitter)

To change the pulse output you need to purchase a IR eye head and PC software from your dealer. Selectable S0 output rates are mentioned in paragraph 6 specifications.

7.9 Setting the total (combined) energy calculation

The meter allows you to display the total energy (usage) shown on the display in accordance to different calculation methods.



indicating that the total energy is the sum of forward + reverse

To change the calculation method used, please use the infra-red eye, which can be bought separately and software which can be downloaded via the website of Inepro. On how to use the infra-red eye to read out values and change settings, a separate manual is available. For this, please contact your local distributor or Inepro Metering bv.

You can use the following calculation methods for total energy as follows:

Code	Total (active) energy
C-01	Forward only
C-04	Reverse only
C-05	Forward + Reverse
C-06	Reverse – Forward
C-09	Forward – Reverse
C-10	Forward – Reverse

7.10 Communicating via the M-bus output(PRO1-Mb only)

The meter is equipped with an M-bus port, the data can be read out via this port. 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 PC software. Use an M-bus level converter to connect the PC and the meter. The cable should be connected to terminals 23 and 24. The default communication address of the meter is 001.

Note: PC software is available at request.

7.11 Communicating via the Modbus output (PRO1-Mod only)

The meter can communicate with your PC. In order to read out the meter registers first install and configure the PC software. Use an RS485 level converter to connect the PC and the meter. The cable should be connected to terminals 23 and 24. The default communication address of the meter is 001.

Note: PC software is available at request.

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. 10.000 flashes of the LED at 100 pulses per kWh equals 0.01kWh.
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 20+) and the signal wire (S) to the emitter connection (pin 21-).
The pulse output rate is wrong.	Is the correct pulse rate set via the infra red eye and software?	Download or request the software and use the infra red eye which can be bought separately.
If non of the above works, please contact technical support		

8.1 List of errors in display

It could be that one of the following errors is displayed on the meter:

Display shows	Kind of errors	Measures
Err 01	EEPROM error	Please contact technical support for a meter replacement.
Err 02	Program code checksum error	Please contact technical support for a meter replacement

8.2 Technical support

For questions about one of our products please contact:

- Your local Inepro Metering distributor
- Email: support@ineprometering.com

www.ineprometering.com

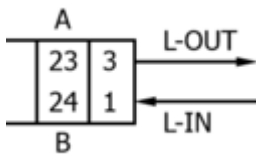


1 Appendix PRO1-2T

How to switch between T1 and T2

The meter is equipped with 2 tariff functionality which need to be activated by an external voltage connected to the terminals 23/24

This is an AC voltage between



Additional LCD readings for the 2 tariff version

Indicating that the current energy direction is Forward and T2 is active

Indicating that the current energy direction is Reverse and T2 is active

Forward active energy for tariff 2

Reverse active energy for tariff 2

Forward reactive energy for tariff 2

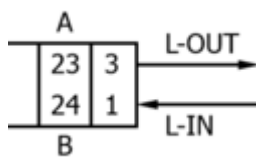
Reverse reactive energy for tariff 2

2 Appendix PRO1-Mb

The PRO1-Mb can be connected for M-Bus communication. The defaults for Mbus communication are:

- Baudrate 9600 bits/sec
- 8 data bits
- even parity
- 1 stop bit

The M-Bus connection is on the terminals 23/24



The secondary addressing 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 IR or Mbus communication.

The baudrate can be lower to values 4800, 2400, 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, see the appendix "Register matrix".

Although INEPRO does not give support on third party software and hardware, we noticed good experiences with Relay products with our customers.

More detailed info on M-Bus can be found:

<http://www.m-bus.com/mbusdoc/default.php>

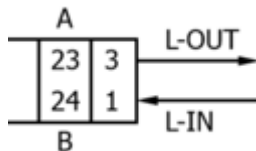
3 Appendix PRO1-Mod

The PRO1-Mod can be connected for Modbus communication. The Modbus implementation used is Modbus basic (standard). This means the following:

- Baudrate 9600 bits/sec
- 8 data bits
- even parity
- 1 stop bit

The baudrate can be lower to values 4800, 2400, 1200. Data, parity and stopbit cannot be changed.

The Modbus connection is on the terminals 23/24



When connecting the meter through a serial converter (RS485) for testing, please be aware that because of not implementing the complete Modbus infrastructure, there will be a need to put an additional resistor (120 ohms/ 0.25 watts) across the terminals (23 & 24) on the meter side.

For the registers used in the meter and how to interpreted the data, see the appendix "Register matrix".

More info on Modbus can be found:

Physical:

http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf

Protocol:

http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf

4 Appendix Infra-Red PC software

All PRO1-series meters are capable to be read out and configured by IR. The standard used is IRDA (IEC62056-21:2002 (IEC1107)).

IR converter and accompanying software are sold separately. Please contact your dealer.

5 Appendix Registry matrix

Register Address	Contents	Read/Write	Datablocks	HEX response	PRO-1S		PRO-1T		PRO-1M		PRO-1M2		Remarks
					IR	R/W	IR	R/W	Mbus	IR	Modbus	IR	
1000	Serial number	Read	04	signed		R/W	R	R/W	R	R/W	R		
1010	Meter code	Read	02	signed		R/W	R	R/W	R	R/W	R		
1018	Meter ID (Mbus/Modbus)	Read/write	01	signed		n/a	n/a	R/W	R/W	R/W	R/W		001-247 (001 default; 000 broadcast)
1020	Baud Rate	Read/write	01	signed		n/a	n/a	R/W	R/W	R/W	R/W		9600 (default), 4800, 2400, 1200, 600, 300
1050	Protocol Version	Read	02	signed		R	R	R	R	R	R		
1054	Software Version	Read	02	signed		R	R	R	R	R	R		
1058	Hardware Version	Read	02	signed		R	R	R	R	R	R		
1060	Meter Amps	Read	01	signed		R	R	R	R	R	R		
1066	S0 output rate	Read/write	02	signed		R/W	R/W	R/W	R/W	R/W	R/W		10000, 2000, 1000 (default), 100, 10, 1, 0.1, 0.01
107A	Combined Code	Read/write	01	signed		R/W	R/W	R/W	R/W	R/W	R/W		01, 04, 05 (default), 06, 09 and 10
1510	LCD cycle time	Read/write	01	signed		R/W	R/W	R/W	R/W	R/W	R/W		0-30 (seconds, 10 seconds default)
2000	Voltage	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
2020	Grid Frequency	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
2060	Current	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
2080	Total Active Power	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
20A0	Total reactive power	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
20C0	Total Apparent Power	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
20E0	Power Factor	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
2200	Tariff	Read/write	01	signed		n/a	n/a	R/W	R/W	R/W	R/W		01 (11 saved), 02 (12 saved), 11 (11 not saved), 12 (12 not saved)
3000	Total Active Energy	Read	02	Float - Big Endian (ABCD)		R	R	R	R	R	R		
3100	T1 Total Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3200	T2 Total Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3020	Forward Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3120	T1 Forward Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3220	T2 Forward Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3040	Reverse Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3140	T1 Reverse Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3240	T2 Reverse Active Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3060	Total Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3160	T1 Total Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3260	T2 Total Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3080	Forward Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3180	T1 Forward Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
3280	T2 Forward Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
30A0	Reverse Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
31A0	T1 Reverse Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		
32A0	T2 Reverse Reactive Energy	Read	02	Float - Big Endian (ABCD)		n/a	n/a	R	R	R	R		

***Open* ambitions**