PRO1250D 100 A M-bus MID

DIN rail three phase four wire energy meter.

User manual

Version 1.24

1 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.

Registered trademarks
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2 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 warranty period is 3 years after production, and only valid for production faults.

3 MID certificate

CERTIFICATE

EC-Type examination certificate 6375-10

Manufacturer	:	Inepro Metering BV
Contact person	:	D. van der Vaart
Address	:	P.O. Box 92
Postal code, Place	:	2450 AB, Leimuiden
Country	:	The Netherlands

Instrument	:	Electronic three-phase four-wire energy meter Direct connected		
Mark - Type	:	PRO1250D	PRO1250D MODBUS	PRO1250D MBUS
Register	:	LCD		
Accuracy Class	:	1 / B		
Measurement range	:	230/400 V 10(100) A 50 or 60 Hz 400 imp./kWh		
Temperature range	:	-25..55 °C		
Use	:	Indoor		
Protection Class	:	II		
Environmental class	:	M1, E2		
Registry method	:	The meter is suitable for energy registration in one direction only and must be marked as such on the typeplate		

The energy meter meets the requirements of Directive 2004/22/EC of the European parliament and the council of 31 March 2004 on measuring instruments.

Certification was based on compliance with the following harmonised standards:

EN 50470-1 (2006)	:	Electricity metering equipment (a.c.)-part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
EN 50470-3 (2006)	:	Electricity metering equipment (a.c.)-part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)

Valid until : September 30, 2020

The results are recorded in the following annex: test report 70965037-TDT 6375-10.

KEMA T&D Testing Services - Calibration and Metering
Arnhem, September 30, 2010

ir. A.P.M. Baars
Certification manager
Notified body number 0344

ir. P.J.J.G. Nabuurs
Managing Director

KEMA Nederland B.V. Utrechtseweg 310, 6812 AR Arnhem, The Netherlands P.O. Box 9035, 6800 ET Arnhem, The Netherlands
T +31 (0)26 3 56 2215 F +31 (0)26 4 42 6211 C&M@kema.com www.kema.com trade register Arnhem 09080262

Experience you can trust.

4 CE certificates

We,

Inepro Metering BV

Pondweg 7
2153 PK Nieuw-Vennep
The Netherlands

declare under our sole responsibility that the products:

PRO1250D
PRO1250D MODBUS
PRO1250D MBUS

Three phase DIN rail Watt Hour Meter

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

IEC EN 50470

Following the provisions of the Directives (if applicable):

☑ 2004/22/EC

These conclusions are based on the test reports done by KEMA with report numbers : 6375-10, 6376-10 and 6990-11 with Notified Body number 0344

Nieuw-Vennep, 2011, April 14

Place and date of issue

This declaration of Conformity is suitable to 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*

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:

PRO1250D, PRO1250D Modbus, PRO1250D Mbus

With the measurement range

230/400V, 10(100)A, 50 or 60Hz, 400imp/kWh

are in conformity with the type as described in the

EC-type examination certificate 6375-10

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

September 30, 2010

Daan van der Vaart

5 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25C - +55°C
Storage temperature	-30°C - +70°C
International standard	EN50470-3
Accuracy class	1
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	II

6 Specifications

Meter type	PRO1250D 100A M-BUS MID
Nominal voltage (Un)	230/400V AC (3~)
Operational voltage	161/279V ~ 300/520V
Insulation capabilities:	
- AC voltage withstand	4KV for 1 minute
- Impulse voltage withstand	6KV – 1.2µS waveform
Basic current (Ib)	10 A
Maximum rated current (Imax)	100 A
Operational current range	0.4% Ib- Imax
Peak current withstand	30Imax for 0.01s
Operational frequency range	50 or 60 Hz ±10%
Internal power consumption	≤2W / 10VAper phase
Test output flash rate (PULSE LED)	400 imp/kWh
Pulse output rate	400 imp/kWh
Data save	The data can be stored more than 10 years without power.

7 Basic errors

With balanced loads

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%

With single phase load

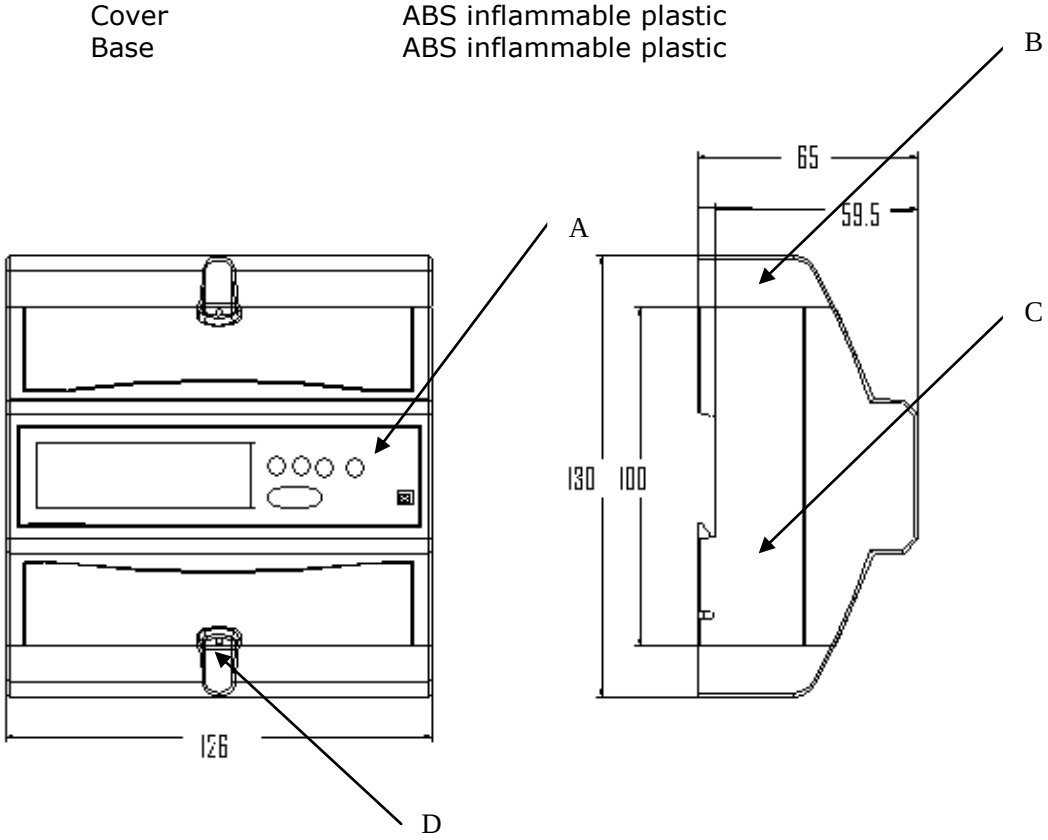
0.1Ib - Imax	Cosφ = 1	±2.0%
0.2Ib - Imax	Cosφ = 0.5L	±2.0%

8 Description

A	Front panel
B	Protection cover
C	Case
D	Security wire slot

Material

Front panel	PC inflammable plastic
Cover	ABS inflammable plastic
Base	ABS inflammable plastic



9 Dimensions

Height with protection cover	130 mm
Height without protection cover	100 mm
Width	126 mm
Depth	65 mm
Size of the connection clamps	10 x 8 mm
Weight	0,68 kg (net)

10 M-bus communication specifications

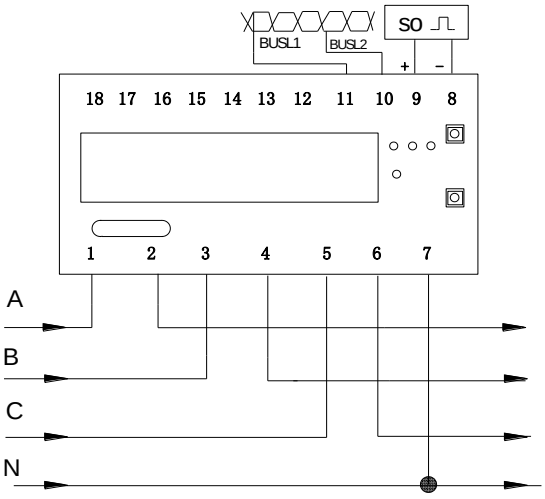
Bus type	M-bus
Baud rate	2400 (default)、4800, 9600
Downlink signal	Master to slave，Voltage modulation
Uplink signal	Slave to master，Current modulation
Cable	JYSTY （n×2×0.8）
Protocol	EN13757-3
Max. number of meters	64*

*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.

11 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 black pins, closing the (protection) covers, are made as placeholders, please use these accordingly
- 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:



1/2	IN/OUT L1
3/4	IN/OUT L2
5/6	IN/OUT L3
7	Neutral wire (N)
8/ 9	Test pulse output contact (S0)
10/11	M-bus communication terminals

12 Operation

12.1 Working indication

On the front panel, there are three power indication LEDs which have different colors. The yellow LED (A) represents phase L1; the green LED (B) represents phase L2; the red LED (C) represents phase L3. The three LED's will burn in case all the phases are working normally.

12.2 Consumption indication

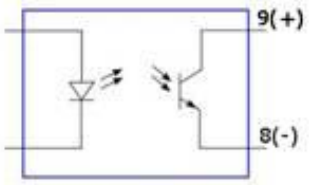
There is a red LED at the right side of the display with the text (400 imp/Kwh), which displays the consumption measured by the meter. When power is consumed, the LED will flash. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 400 times per kWh. Please note that the meter is not suitable for reverse energy.

12.3 Reading the meter

The meter has a 7 digit LCD which had a variable decimal count. The meter is equipped with a 6+1 register. This means it can display 1 digit after the dot. The meter cannot be set to zero.

12.4 Pulse output

The energy meter is equipped with a pulse output which is fully separated from the inside circuit, and it generates pulses in proportion to the measured energy. The test pulse output is a polarity dependant, open collector, transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 9 (collector), and the signal wire (S) to connector 8 (emitter). The pulse meter is located on the front panel immediately on the right side of the display with the text (400 mp/Kwh).



8 =pin 8 (emitter)
9 =pin 9 (collector)

=light bundle from the LED

12.5 Communication port

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.

12.6 M-bus output

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 10 and 11. The default communication adress of the meter is 1.

Note: PC software is available at request. Please see the technical support section (chapter 14) of this manual for more information.

13 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 power supply indicators (L1, L2 & L3 LED) are off.	The meter is not connected to a power source	Are the fuses or/and surge protection defect?
	A,B,C and N are not connected correctly	Make sure the wires are connected properly and tighten the screws if possible.
	There is no 230V AC between the N and one of the L connections when power is supplied to the meter.	Check if there is 230V AC voltage between N and one of the L connections with a volt meter.
	There is no 400V AC between the L connections when power is supplied to the meter.	Check if there is 400V AC volt between N and one of the L connections with a voltage meter.
		If the checks above don't solve the problem, please contact technical support for a meter replacement.
The red consumption LED is not flashing (PULSE LED).	There is no load connected to the meter.	Connect a load to the meter.
	The load on the line is very low.	Check with an Ohm-meter if the load value is very low.
	There is a fault inside the meter.	If the checks above don't solve the problem, please contact technical support for a meter replacement.

Problem	Possible cause	Check/solution
The register doesn't count.	There is almost no load connected to the meter	Check if the consumption LED is flashing. 40 flashes of the LED at 400 pulses per kWh equals 0.1kWh.
	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
No pulse output.	The pulse output is not supplied with DC power	Check the external voltage source (Ui) is 5-27V DC with a voltage meter
	The pulse output is not connected correctly	Check if the connection is correct: the 5-27V DC should be connected to the collector connection (pin 9 +) and the signal wire (S) to the emitter connection (pin 8-).
	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
The pulse output rate is wrong.	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.
No data received by the M-bus communication port	The ID of the meter is not correct	Check the Meter ID by looking for the A in the display. The default for this meter is 1.
	The communication distance for the meter is too long	Make the distance between the meter and the reading device shorter. Make sure it is no more than ≤1000m 64 PCS
	Too many meters are connected to the bus	The number of M bus devices connected to the meter should not exceed 64.
	PRG button not pressed in order to change meter ID	Please keep the PRG button on the meter pressed while sending the command to the meter.
	The M-bus terminals are not connected correctly	Make sure that the M-bus wires are connected to terminals 10 and 11.
		If the checks above don't solve the problem, please contact technical support for a meter replacement.

14 Technical support

For questions about one of our products please contact:

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

www.ineprometering.com