PRO1D V11.122 series MID

DIN rail single phase two wire energy meter

User manual

Version 1.0

1.1 Safety instructions

Information for Your Own Safety
This manual does not contain all of the safety measures for operation of this equipment (module, device) 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 damage to the equipment. This information is highlighted by a warning triangle with an exclamation mark or a lightning bolt depending on the severity of the warning.

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

Caution
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 this equipment described in this manual may only be performed by qualified personnel.
Only people that have proper knowledge about the local standards regarding electrical installations and are allowed to work on these installations according to the local regulations are considered qualified personnel in this manual.

Use for the intended purpose
The equipment (device, module) 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. When operating electrical equipment, certain parts of this equipment carry dangerous voltages. Improper handling can therefore result in serious injury or material damage.

- Only use isolated tools suitable for the voltages the meter is used for.
- Do not connect while the circuit is energized (current is running).
- Do not connect the meter to a 3 phase - 400VAC – network.
- Place the meter only in dry surroundings.
- 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 that will cause an electric shock and possibly cause injury.
- Make sure the protection cover is placed after installation.
- Installation, maintenance and repair should only be done by qualified personnel.

- Never break the seals 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 render the meter measurement inaccurate.

Exclusion of liability
We have checked the contents of this publication 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 is checked regularly and the necessary corrections will be included in subsequent editions. If you have any suggestions, please let us know.

Subject to technical modifications without notice.

Registered trademarks
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1.2 Foreword

Thank you for purchasing the DMMetering PRO1 series DIN rail single phase two wire energy meter. The DMMetering PRO1 series energy meter is the most advanced type electronic kWh meter available at the market. With the DMMetering product range we have introduced a large scale 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 energy and water meters with chip card or infrared card and a complete PC management control system. For more information on other products please contact our sales department at sales@ineprometering.com or info@inepro.com.hk.

Although we produce the DMMetering PRO1 series meter according to the requirements of IEC 62053-3 and our quality inspection is very accurate there might always be a possibility that your product 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 dealer immediately. All 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 energy meter. The warranty period is 3 years after production, and only valid for construction faults.

1.3 MID certificates

CERTIFICATE

EC-Type examination certificate 6319-10

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 single-phase two-wire energy meter Direct connected	
Mark - Type	:	PRO-1TE	PRO1D
Register	:	Mechanical	LCD
Accuracy Class	:	B	
Measurement range	:	230 V 5(45) A 50 Hz 2000 imp./kWh	
Temperature range	:	-10..40 °C	
Use	:	Indoor	
Protection Class	:	II	
Environmental class	:	M1, E2	
Registry method	:	bidirectional method with always positive register: the meter always counts the energy of the measuring point as received energy, irrespective of the real energy direction	

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 : March 30, 2020

The results are recorded in the following annex: test report 2113897-TDT 6319-10.

KEMA Quality B.V.
Arnhem, March 30, 2010

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

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

The investigation reported here does not confer any right to use an approbation mark granted by KEMA.

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Experience you can trust.

CERTIFICATE

EC-Type examination certificate 6356-10

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 single-phase two-wire energy meter Direct connected
Mark - Type	:	PRO-1TE
Register	:	Mechanical
Accuracy Class	:	B
Measurement range	:	230 V 5(45) A 50 Hz 1000 or 2000 imp./kWh
Temperature range	:	-10..40 °C
Use	:	Indoor
Protection Class	:	II
Environmental class	:	M1, E2
Registry method	:	2 options are available by selection per interconnection of soldering islands: (1) bidirectional method with always positive register: the meter always counts the energy of the measuring point as received energy, irrespective of the real energy direction or (2) registration with reversal preventing device.

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	:	June 11, 2020

The results are recorded in the following annex: test report 70965037-TDT 6356-10.

KEMA Quality B.V.
Arnhem, June 11, 2010

ir. A.P.M. Baars
Certification manager
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1.4 Type number table:

The PRO1 series is labeled as follows:

PRO1D/TE V 11 . x x x

- Pulse led and pulse output:
  - 1 = 1000 impulses / kWh
  - 2 = 2000 impulses / kWh
- Reverse counting:
  - 1 = Does not count when energy is reversed
  - 2 = Counts up regardless of energy direction
- Type of display:
  - 1 = LCD without backlight PRO1D
  - 2 = LCD with backlight PRO1D
  - 3 = Mechanical register PRO1TE

1.5 Performance criteria:

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-10°C - +50°C
Storage temperature	-30°C - +70°C
International standard	EN 50470-3
Accuracy class	1
Protection against penetration of dust and water	IP51
Insulating encased meter protective class	II

1.6 Specifications:

Meter type	PRO1 series
Nominal voltage (Un)	230V AC
Operational voltage	161 - 300V AC
Insulation capabilities:	
- AC voltage withstand	2KV for 1 minute
- Impulse voltage withstand	6KV – 1.2µS waveform
Basic current (Ib)	5A
Maximum rated current (Imax)	45A
Max. current for direct wire connection	32A
Max. current for busbar connection	45A
Operational current range	0.4% Ib- Imax
Peak current withstand	30Imax for 0.01s
Operational frequency range	50Hz ±10%
Internal power consumption	≤2W / 10VA
Test output flash rate (RED LED)	1000 or 2000 imp/kWh, see section 1.3
Pulse output rate (pins 20 & 21)	1000 or 2000 imp/kWh, see section 1.3
Consumption indicator (RED LED)	Flashing at load running

1.7 Basic errors:

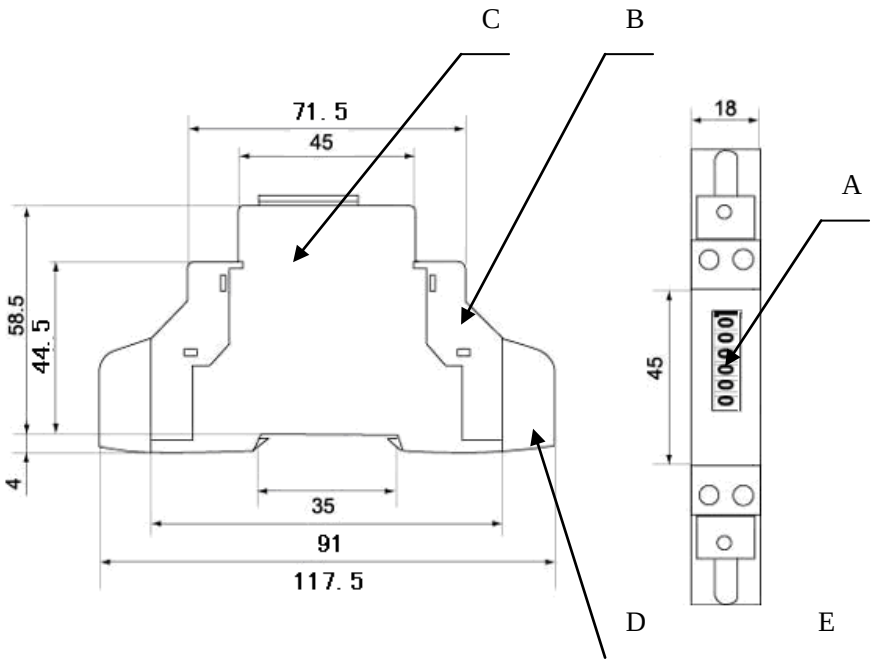
0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
	Cosφ = 0.8C	±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

1.8 Description

A	Register
B	Terminal block
C	Case
D	Protection cover
E	Security wire slot

Material

Register	PC inflammable plastic
Case	ABS inflammable plastic
Terminal block	ABS inflammable plastic
Protection cover	ABS inflammable plastic



1.9 Dimensions

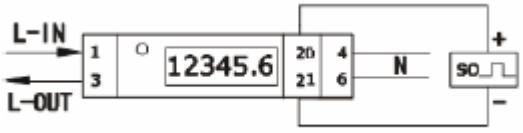
Height	117.5 mm
Width	18 mm
Depth	58.5 mm
Weight	0.12 Kg (net)

1.10 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
• Installation should be performed by qualified personnel familiar with applicable codes and regulations. • Use isolated tools to install the meter. • Fuse or thermal cut-off or single-pole circuit breaker should be fitted on the supply line and not the neutral line. • The meter's casing is sealed, if not properly looked after, this seal could be broken, voiding the warranty and damaging the meter.

- We recommend that the connecting wire which is used to connect meter to the outside circuit should be sized according to local codes and regulations for the maximum amount of current of the circuit breaker or other overcurrent protection device 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. 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 which will be used as an overcurrent protection device for the meter must be installed on the supply side wire, and it is recommended that this protection device is near the meter since that is convenient for 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, subject to 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 meter can be installed on a 35mm DIN rail.
- The meter should be installed on a location where the meter can be read easily.
- When the meter is installed in an area with frequent surges for example due to thunderstorms, welding machines, inverters etc, the meter should be protected with a Surge Protection Device.
- After finishing installation, the meter can be sealed to prevent tampering.
- Connection of the wires should be done in accordance with the following connection diagram.



1	phase line in
3	phase line out
4	neutral line in
6	neutral line out
20 and 21	Pulse output contact

1.11 Operation

Consumption indication

There is a two color LED on the front panel of the meter. When the meter is powered on and no load is connected to it, the LED lights up green. When power is consumed, the LED will flash red. The faster the LED flashes, the more power is consumed. For this meter, the LED will flash 1000 or 2000 times per kWh depending on the version of the meter, see section 1.3 for details.

Please note: There are two versions of this meter with a difference in how reverse current is handled. One version counts up in both directions and one only counts up in one direction and doesn't count in the other direction.

This has an effect if the meter is connected in reverse (terminal 3 Load in and terminal 1 load out) or used with any sort of energy production system (solar panels, wind generators, etc). See section 1.3 for details.

Reading the meter

The PRO1 series meter can be delivered with either a digital or mechanical register. See the version numbering in section 1.3.

Digital register

The PRO1D series energy meter is equipped with a 5+2 digit LCD which is used to record consumption and can't be reset to zero. The display has 5 digits before and 2 decimals after the dot on the display. The reading accuracy is 1/100 kWh.

Mechanical register

The PRO1TE series energy meter is equipped with a mechanical 5+1 register which is used to record consumption and can't be reset to zero. Five decimals are marked with black color and one decimal is marked with red. The reading accuracy is 1/10 kWh.

Pulse output

The PRO1 series DIN rail 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 dependant, 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, and the maximum switching current (Iimax) is 27mA. To connect the impulse output, connect 5-27V DC to connector 20 (collector), and the signal wire (S) to connector 21 (emitter). The pulse output depends on the version and is either 1000 or 2000 impulses per kWh. See section 1.3 for details regarding the impulses per kWh.

1.12 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. • 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 before working on it. • Turn off and lock out 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 meter's casing is sealed, if not properly looked after, this seal could be broken, voiding the warranty and damaging the meter.

Problem	Check	Solution
The consumption LED is not flashing (PULSE LED).	Is there any load connected to the meter? Is the load on the line very low? Is the meter connected in reverse in case of a reverse enabled meter ? Maybe there is a fault inside the meter.	Only if there is a load on the meter will this LED flash. If the load is very low, the time between 2 flashes is very long. This can be mistaken for a broken meter. As a test, an electric water boiler (~1600W) should make it blink once every second. Swap the connecting wires to the meter (clamp 3 should be connected to load in and clamp 6 to load out) See section 1.10 for details. Please contact technical support for a meter replacement.
The register doesn't count.	Is there almost no load on the meter? Maybe there is a fault inside the meter.	Check if the consumption led is blinking (see above). 200 flashes of the LED equals 0.1kWh or 0.2kWh and should be clearly visible on the display. Please contact technical support for a meter replacement.
No pulse output.	Is DC power connected to the meter ? Is the pulse output connected correctly? Maybe there is a fault inside the meter.	Check the external voltage source (Ui) is 5-27V DC. Check correct connection: connect 5-27V DC to connection 20 (collector), and the signal wire (S) to connection 21(emitter). Please contact technical support for a meter replacement.
Pulse output rate wrong.	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.

1.13 Technical support

For questions about one of our products please contact:

- The Inepro Metering dealer in your region
- Your local Inepro Metering distributor
- Email: support@ineprometering.com

www.ineprometering.com