PRO1 series

DIN rail single phase two wire energy meter

PRO1D V11.112
PRO1D V11.121
PRO1D V11.122
PRO1D V11.211
PRO1D V11.212
PRO1D V11.221
PRO1D V11.222
PRO1TE V11.311
PRO1TE V11.312
PRO1TE V11.321
PRO1TE V11.322

Version 1.0

Note: the picture on the frontpage is a meter from the series of this meter, it might not be exactly the same as the meter you have bought

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 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

4 MID certificate

KEMA

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	:	-25..55 °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

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Experience you can trust.

5 Performance criteria

Operating humidity	≤ 75%
Storage humidity	≤ 95%
Operating temperature	-25°C - +55°C
Storage temperature	-25°C - +55°C
International standard	EN 50470-1 and 50470-3
Accuracy class	1
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	II

6 Specifications

Meter type	PRO1D/ PRO1TE series
Nominal voltage (Un)	230V AC
Operational voltage	195 - 253V AC
Insulation capabilities:	
- AC voltage withstand	4kV for 1 minute
- Impulse voltage withstand	6kV – 1.2µS waveform
Basic current (Ib)	5A
Maximum rated current (Imax)	45A
Operational current range	0.4% Ib- Imax
Over current withstand	30Imax for 0.01s
Operational frequency range	50Hz ±10%
Internal power consumption	≤2W/Phase - ≤10VA/Phase
Test output flash rate (RED LED)	1000 or 2000 imp/kWh, see section 0
Pulse output rate	1000 or 2000 imp/kWh, see section 0
Data store	The data can be stored for more than 10 years without power

7 Basic errors

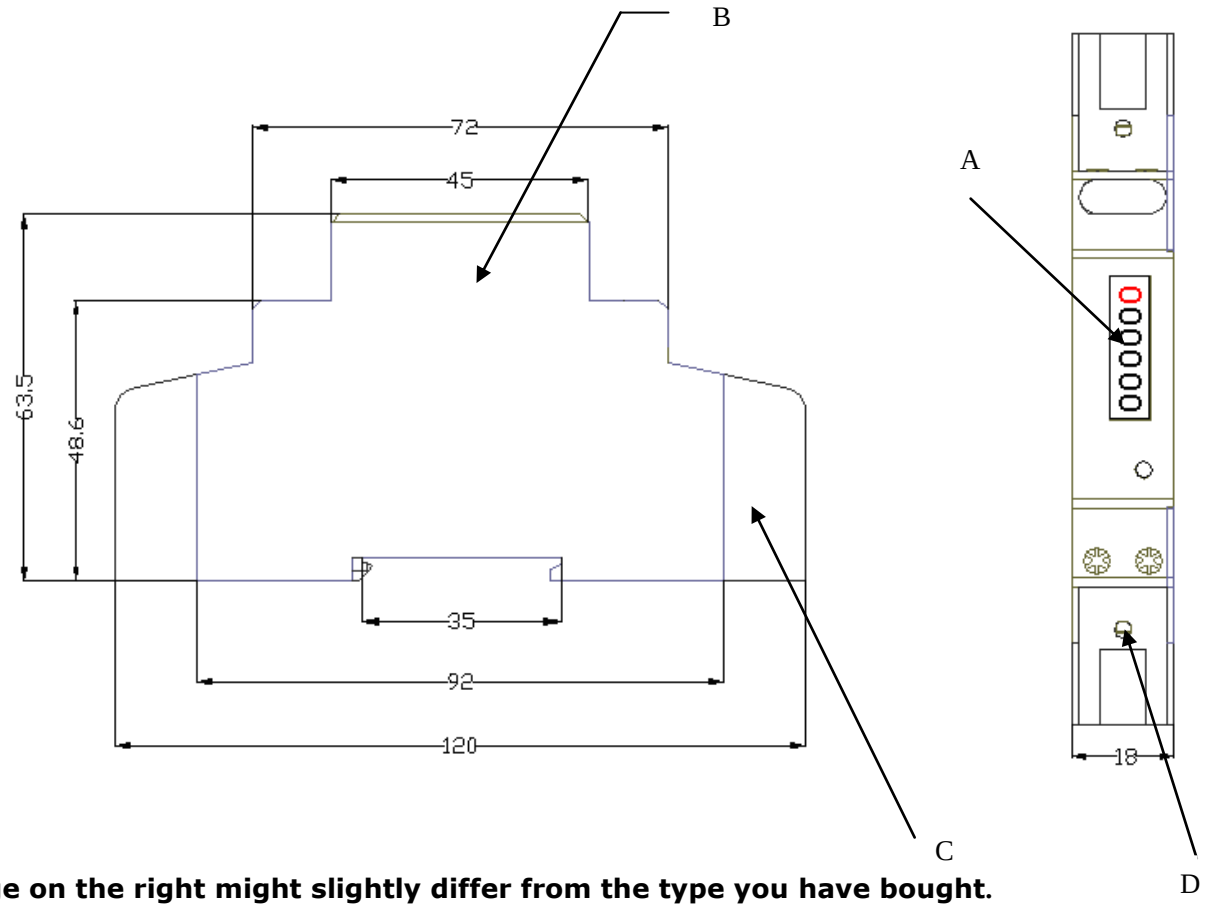
0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
Cosφ = 0.8C		±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
Cosφ = 0.8C		±1.0%

8 Description

A	Display register
B	Case
C	Protection cover
D	Security wire slot

Material

Register	PC flame resistant plastic
Case	ABS flame resistant plastic
Terminal block	ABS flame resistant plastic
Protection cover	ABS flame resistant plastic



Note: the image on the right might slightly differ from the type you have bought.

9 Dimensions

Height	120 mm
Height without protection cover	92 mm
Width	18 mm
Depth	63.5 mm
Size of the connection clamps	4 x 4 mm
Weight	0.08 kg (net)

10 Torque tables

Terminals	Screw driver	Max wire size (mm^2)	Terminal no	Torque
Phase	PZ1	6	#1/#3	4.0±0.25(kgf.cm) 0.39±0.024(N.m)
Neutral	PZ1	6	#4/#6	4.0±0.25(kgf.cm) 0.39±0.024(N.m)
Auxiliary	PZ1	4	#20/#21	3.0±0.25(kgf.cm) 0.29±0.024(N.m)

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.

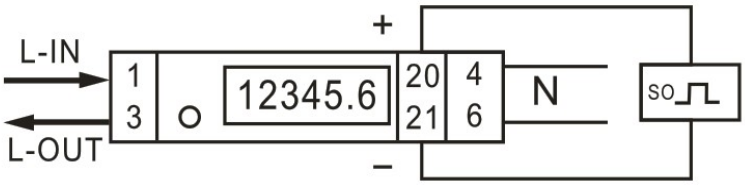

WARNING

- 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 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)

12 Operation

12.1 Consumption indication

There is a red LED on the front panel which 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 1000 or 2000 times per kWh, see section 0. (Please take note of the following: the meter has a green backlight, which can also be seen near the red LED, please don't get confused).

12.2 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.

12.3 Mechanical register

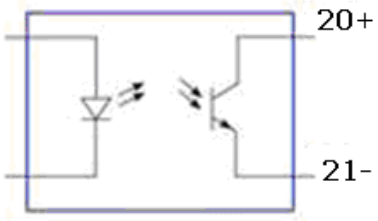
The PRO1TE series energy meter is equipped with a mechanical 5+1 register which is used to record consumption and can't be reset to zero. Five decimals are marked with white color and one decimal is marked with red. The reading accuracy is 1/10 kWh. For this meter, the LED will flash 1000 or 2000 times per kWh depending on the version of the meter, see section 0 for details.

12.4 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. For this meter, the LED will flash 1000 or 2000 times per kWh depending on the version of the meter, see section 0 for details.

12.5 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 (Ui) should be lower than 27V DC. The maximum switching current (Imax) 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 0 for details regarding the impulses per kWh.



21 =pin 21 (emitter)
20 =pin 20 (collector)

=light bundle from the LED

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 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.
The register doesn't count.	There is almost no load connected to the meter	Check if the red consumption LED is flashing. 100/200 flashes of the LED at 1000/2000 pulses per kWh equals 0.1kWh.
	Maybe there is a fault inside the meter.	Please contact technical support for a meter replacement.

Problem	Possible cause	Check/solution
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 20+) and the signal wire (S) to the emitter connection (pin 21-).
	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.

14 Technical support

For questions about one of our products please contact:

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

www.ineprometering.com

15 SOP Table

PRO1D V11.111 (mold C)	0059
PRO1D V11.112 (mold C)	0060
PRO1D V11.121 (mold C)	0062
PRO1D V11.122 (mold C)	0063
PRO1D V11.211 (mold C)	0065
PRO1D V11.212 (mold C)	0066
PRO1D V11.221 (mold C)	0068
PRO1D V11.222 (mold C)	0069
PRO1TE V11.311 (mold C)	0061
PRO1TE V11.312 (mold C)	0064 or 0083
PRO1TE V11.321 (mold C)	0067
PRO1TE V11.322 (mold C)	0070

This SOP table contains relevant information for the manufacturer. In case you need his support, you might be asked to give the SOP number referring to the type of meter you bought.