User manual – Ambition 4PU-DC-Mod

Ambition 4PU-DC-Mod Meter

1000VDC/1000A

User manual | Versie 1.4

Index

inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

1 Safety instructions

Caution	Warning
▪ 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 the power is off. ▪ 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.	▪ 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 meter is intended to be installed in a Mechanical Environment 'M1', with Shock and Vibrations of low significance and Electromagnetic Environment 'E2', as per 2014/32/EC Directive. The meter is intended for indoor use. The meter shall be installed inside a suitable IP rated enclosure, in accordance with local codes and regulations. ▪ 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. ▪ The device should be installed with a torque screw driver.

This user manual does not contain every applicable safety regulation for using this meter. Also it might be required because of company, local government regulations or (inter)national laws to take additional measures. 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. Versions might be different in default programming based on the customer's order.

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.

inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

2 Foreword

Thank you for purchasing this energy meter. **inepro** Metering has a wide product range of devices. We have introduced many energy meters on the market suitable for AC and now we have introduced our DC meter. 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 3 years after production date.

inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

3 Certificates

EU-type examination certificate

Number **T12656** revision 0
Project number 2660101
Page 1 of 1

Issued by: NMi Certin B.V., designated and notified by the Netherlands to perform tasks with respect to conformity assessment procedures mentioned in article 17 of Directive 2014/32/EU, after having established that the measuring instrument meets the applicable requirements of Directive 2014/32/EU, to:

Manufacturer: Inepro Metering BV
Pondweg 7.
2153 PK Nieuw Vennep
The Netherlands

Measuring instrument: A **static DC energy meter**

Type	:	Ambition 4PU-DC -Mod
Manufacturer's mark or name	:	Inepro
Reference voltage	:	150 ... 1000 VDC
Reference current	:	200 A
Destined for the measurement of	:	electrical energy, in a - DC electrical network
Accuracy class	:	A or B
Environment classes	:	M1 / E2
Temperature range	:	-40 °C / +70 °C

Further properties are described in the annexes
– Description T12656 revision 0
– Documentation folder T12656-1

Valid until: 6 February 2034

Initially issued: 6 February 2024

Issuing Authority: **NMi Certin B.V., Notified Body number 0122**
6 February 2024

Certification Board

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

inepro®

We,
inepro Metering BV

Address;
Pondweg 7
2153 PK Nieuw-Vennep,
The Netherlands

CE

Declare under our sole responsibility that the product;
Ambition 4PU-DC -Mod

To which this declaration relates, is in conformity with the following European harmonized and published standards at date of this declaration;

EN-IEC 62052-11:2021/A11:2022
EN 50470-4:2023
IEC 62052-11:2020
IEC 62053-41:2021
IEC 62052-31:2015
IEC 62059-32-1:2011
WELMEC 7.2:2022

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*

Following the provisions of the Directives (If applicable);

2014/30/EU (EMC)
2014/35/EU (LVD)
2011/65/EU (RoHS)
1907/2006 (REACH)

Place and date of issue
Nieuw-Vennep, 06-03-2024

Name of responsible for CE-Marking
Dennis van Elk
Manager R&D

4 Specifications

4.1 Specifications

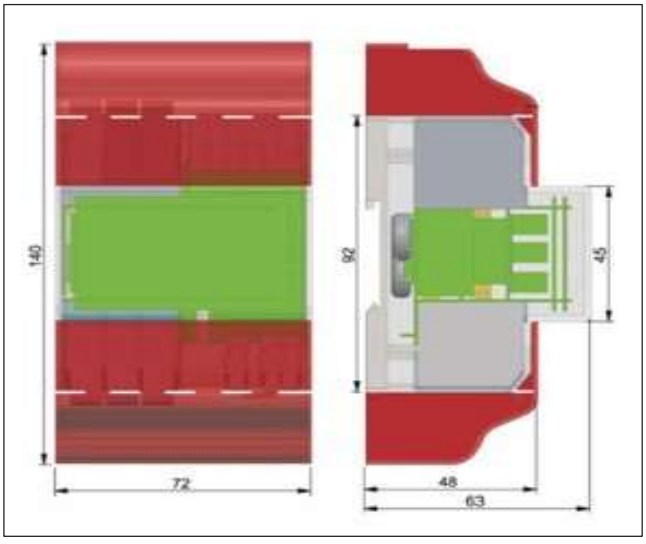
Casing	PC flame resistant plastic
Voltage Un	1000V
Reference Current	200A
I-st	800mA
I-min	10A
I-max	1000A
Accuracy (meter+shunt)	1%
Operating temperature range	-40°C / + 70°C
Meter constant LED	1.0 imp/Wh
Communication	Modbus RS485
Accuracy class	1
AC power	230V
Connection technology	WAGO Push-in CAGE CLAMP®
Operation humidity	≤ 75%
Storage humidity	≤ 95%
Accuracy class	1
IP class	IP51
Protective class	II

4.2 Basic errors

0.02 In	±1.5 %
0.05 In -Imax	±1.0 %

4.3 Dimensions

Height without protection cover	92 mm
Height	140 mm
Width	72 mm
Depth	63 mm
Weight	260 gr



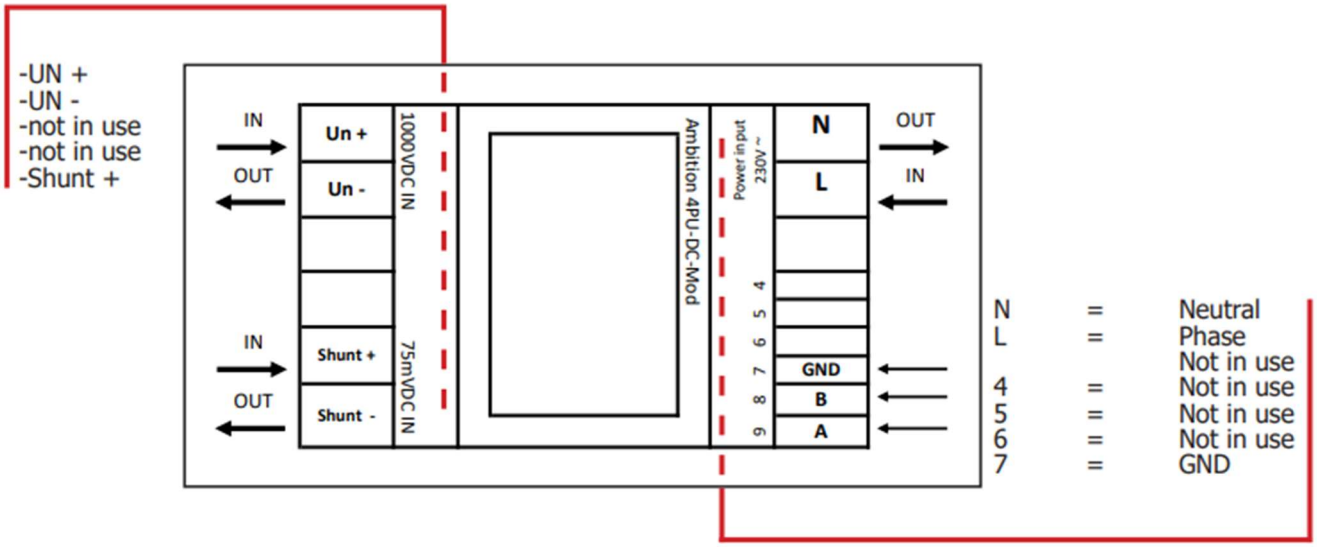
inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

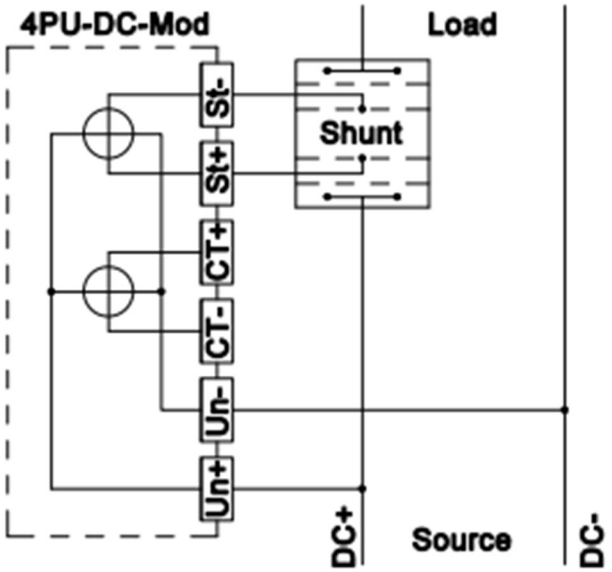
4.4 RS485 communication specifications

Bus Type	RS485
Protocol	MODBUS RTU
Baud rate	9600 (Fixed)
Parity	EVEN (configurable)

4.5 Connection diagram

Shunt connection is used for current measurement. The shunt will be delivered with the meter. Do not disconnect the shunt from the meter. The meter and shunt are a set.



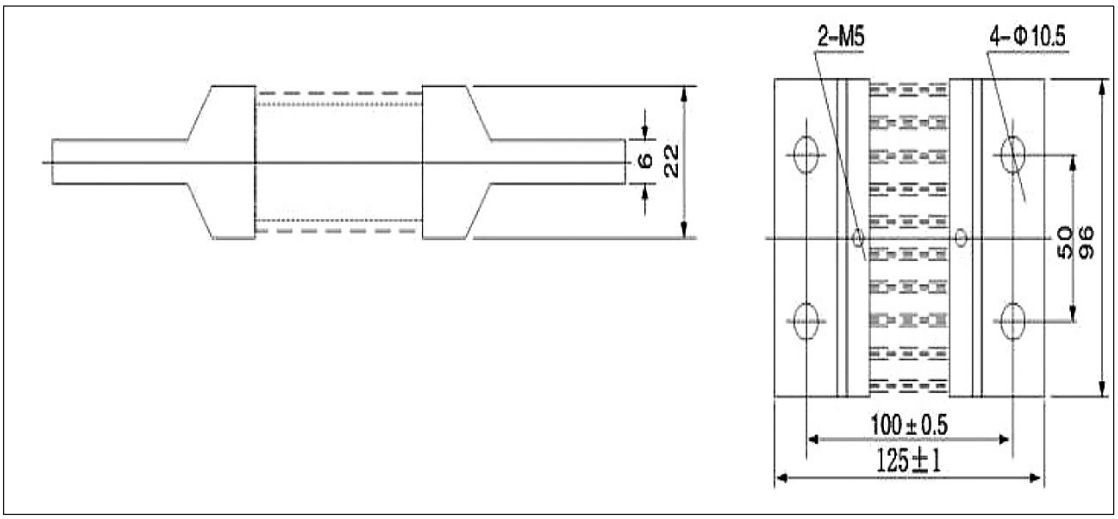


inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

5 Shunt specification

Surface coating of end piece:	D.L2Ni7
Surface coating of resistors:	black amino baking enamel
Measuring method:	zero value balance resistance bridge method
Model:	FL-2 1000A/75mV
Temperature influence:	When the ambient temperature changes 10°C, the output signal change of the shunt does not exceed 50% of the accuracy error limit.
Appearance:	The serial number of the energy meter and shunt are linked together. Meter and shunt should be used as one product. Certification is only valid when the 2 serial numbers match.
Continuous overload:	Withstand 120% of rated current 2H, and the allowable error is not exceeded after cooling.
Short-term overload:	Withstand an impact of 3 times the rated current once for 5S. Withstand an impact of 10 times the rated current once, and a short-term overload impact with a duration of 0.5S, and there should be no damage. After cooling to the reference temperature, the allowable error is not exceeded.
Influence of thermoelectric potential:	When 80% of the rated current passes through the shunt, the resistance value change due to thermoelectric heating does not exceed 50% of the grade index.
Temperature rise:	The temperature rises when passing the rated current, not more than 120°C.
Attachment:	FL-2 1000A/75mV schematic diagram

inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com



inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

6 Operation

6.1 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 flash1 pulse/Wh. The display indication of the meter is either FW (forward) or RV (reverse).

6.2 Backlight

Backlight can't be set off display will always on.

6.3 Reading the meter

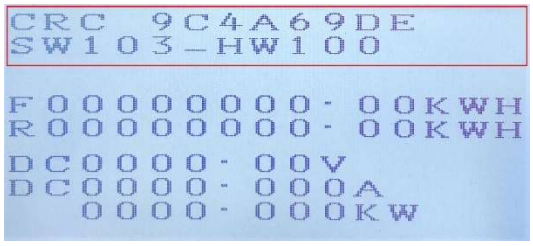
The meter is equipped with a 10-digit display. For the energy consumption the meter will display 1234567.890 kWh (7+3) and switch to 12345678.90 kWh (8+2) when over this value and so on.

6.4 LCD display of the meter

The LCD is a multifunctional display, it has 3 parts to indicate the status of the meter.

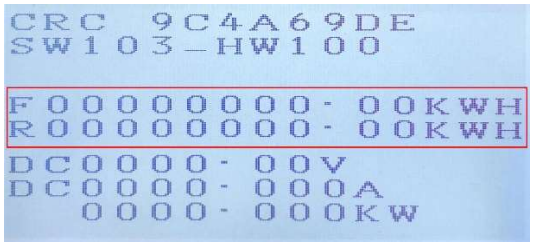
Top

indicates: CRC, H.W. version & S.W. version



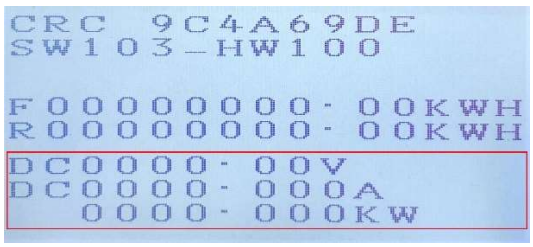
Middle

indicates: Total forward kWh & total reverse kWh



Bottom

indicates: Indicate the DC voltage, current & power

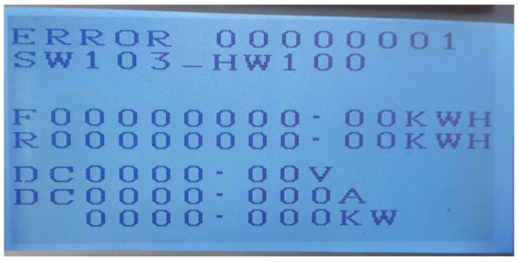


inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

6.5 Error code

When a meter error occurs, an error code will be shown on the first line of the display. The value of the error code is also available for reading in Modbus register 0x4015.

The error code value is a 16bit bitfield value, during faultless operation the error code should have value 0000.
Error definitions:
0001 = firmware CRC error



inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com

7 Modbus RS485 register map

Register	Content	Function code	Read/ Write	Length	Data Type	Unit
4000	Serial number	03	Read	2	BCD	-
4002	Meter code	03	Read	1	BCD	-
4003	Modbus ID	03	Read/Write	1	HEX	-
4004	Baud rate	03	Read	1	BCD	-
4005	Protocol version	03	Read	2	Float - (ABCD)	-
4007	Software version	03	Read	2	Float - (ABCD)	-
4009	Hardware version	03	Read	2	Float - (ABCD)	-
4011	Parity	03	Read/Write	1	BCD	-
4012	Current direction	03	Read	1	ASCII	A
4015	Error code	03	Read	1	HEX	-
401B	Checksum	03	Read	2	HEX	-

5000	Voltage	03	Read	2	Float (ABCD)	V
500A	Current	03	Read	2	Float (ABCD)	A
5012	Total Active Power	03	Read	2	Float (ABCD)	kW

600C	Forward Active Energy	03	Read	2	Float (ABCD)	kWh
6018	Reverse Active Energy	03	Read	2	Float (ABCD)	kWh

Write

Register	Content	Function	Length	Unit
4003	Modbus ID	06	0001	001-247 (001 default; 000 Broadcast)
Command:	01 10 4003 0001 02 **0004** (new ID: 004)			
4011	Parity	06	0001	01 - Even (default), 02 - None, 03 - Odd
Command	01 10 4011 0001 02 **0002** (new Parity: None)			

inepro Metering | Pondweg 7 | 2153 PK Nieuw-Vennep | The Netherlands | +31 (0)252 744044 | info@ineprometering.com | www.ineprometering.com