

THREE PHASE FOUR WIRE ENERGY METER MID certified with Modbus output - 4 Mod. DIN

ENGLISH



Art. 1SDSD10CET4MB



MID *Modbus*

COMPLETE INSTRUCTIONS



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Safety Instructions

● Information for your own safety

This manual does not contain all of the safety measures for operation of the equipment(module,device),because special operating conditions,and local code requirements or regulations may necessitate further measures. However, it does contain information which must be read for your personal safety and to avoid material damages. This information is highlighted by a warning triangle and is represented as follows, depending on the degree of potential danger.



Read this manual carefully before using the product as it provides important guidelines regarding safety, installation and use. The manual must be preserved with care for future reference. The manufacturer reserves the right to introduce any technical and/or constructive changes deemed necessary, with no prior notice.



● 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

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

● Use for the intended purpose

The equipment (device, module) may only be used for the application specified in the catalogue and the user manual.

● Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and assembly, as well as proper operation and maintenance. When operating electrical equipment, certain parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- ◆ Use only insulating tools
- ◆ Do not connect while circuit is live (230V~).
- ◆ Place the meter only in dry surroundings.
- ◆ Do not mount the meter in an explosive area or expose the meter to dust, mildew and 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.
- ◆ Make sure the used wires are suitable for the maximum current of this meter.
- ◆ Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you may get an electrical shock.
- ◆ Make sure the protection cover is placed after installation.
- ◆ Installation, maintenance and reparation should only be done by qualified personnel.
- ◆ Never break the seals and open the front cover as this might influence the functionality of the meter, and will void any warranty.
- ◆ Do not drop, or allow physical impact to the meter as there are high precision components inside that may break.

Introduction

The digital 3 phase 4 wires energy meter with white back-lighted LCD screen for perfect reading. The unit measures and displays voltage, current, frequency, power factor, active power, reactive power, active energy and reactive energy, etc. A resettable partial energy is provided, so the user can easily check the active energy imported and active energy exported during a certain period. Energy meter supports max. 100A direct connection, saving the cost and avoiding the trouble to connect external CTs, giving the unit a cost-effective and east operation. Built-in interfaces provide pulse and RS485 Modbus RTU outputs. Configuration is password protected.

PART 1 Specification

General Specifications

Voltage AC (Un)	3x230(400)V
Voltage Range	80%~120% Un
Base Current (Ib)	10A AC
Max. Current (Imax)	100A AC
Mini Current (Imin)	5% of Ib AC
Starting current	0,4% of Ib
Power consumption	≤ 2W/10VA or the voltage measuring circuit ≤ 4VA for the current measuring circuit
Frequency	50Hz (MID)
AC voltage withstand	4KV for 1 minute
Impulse voltage withstand	6KV-1.2/50uS
Overcurrent withstand	30 Imax per 0,01 s
Power supply	self-power supply
Display	LCD with backlit
Max. Reading	999999,9 kWh
Active energy	Classe 1 IEC62053-21 (non-MID) Classe B EN50470-1/3 (MID)
Reactive energy	Classe 2 IEC62053-23 (non-MID)

Unit Characteristics

Characteristics	Accuracy	Resolution:
Voltage	0,5 %	≤ 0,1V
Current	0,5 %	≤ 0,1A
Frequency	0,2 %	≤ 0,2%
Power factor	1 %	≤ 0,1
Active power	1 %	≤ 0,1kW
Reactive Power	1 %	≤ 0,1 kVAr

RS485 Serial - Modbus RTU

This unit uses an RS485 serial port with Modbus RTU protocol to provide a means of remotely monitoring and controlling the Unit. Set-up screens are provided for setting up the RS485 port, see the configuration screens.

Pulse output

The unit provides pulse output for active kWh. The Pulse output is passive type.

Pulse constant:

1000 imp/kWh

100 imp/kWh

10 imp/kWh

1 imp/kWh

Pulse width: 60, 100, 200 mS

Note: when the pulse constant is set to 1000imp/kWh, the pulse width should be 35ms and cannot be adjusted.

Pulse output type can be set to : total kWh, import kWh, export kWh.

RS485 Output for Modbus RTU

For Modbus RTU, the following RS485 communication parameters can be configured from the Set-up menu:

Baud rate 1200, 2400, 4800, 9600, 19200 bps

Parity none (default)/odd/even

Stop bits 1 or 2

RS485 network address *nnn* - 3-digit number, 001 to 247

Modbus™ Word order Hi/Lo byte order is set automatically to normal or reverse.

It cannot be configured

Environment

Operating temperature	3K6 (-25°C to +55°C)
Storage and transportation temperature	-40°C to +70°C
Reference temperature	23°C ± 2°C
Relative humidity	0 to 95% non-condensing
Altitude	up to 2000m
Warm up time	5s
Installation category	CAT III
Mechanical Environment	M1
Electromagnetic environment	E2
Degree of pollution	2

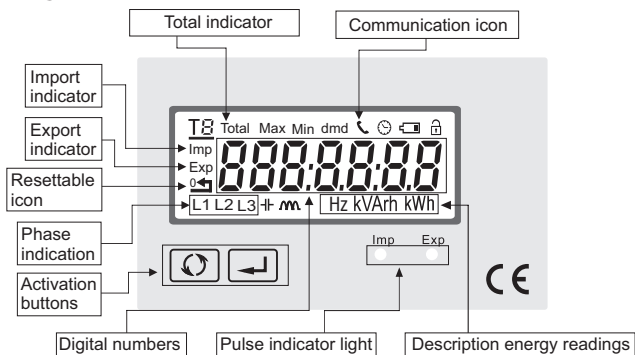
Mechanics

Din rail dimensions	72x100x66 (WxHxD) DIN 43880
Mounting	DIN rail 35mm
Protection against penetration of dust and water	*IP51 (indoor)
Material	self-extinguishing UL94V-0

4 * the device must be installed in an electrical panel that guarantees a protection level of at least IP51 or higher.



PARTE 2 Operation

Keys and Displays



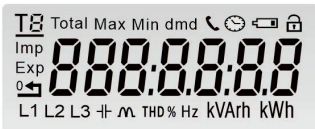



Buttons function

There are two buttons on the front panel.


<p>“Scroll” button</p> 	<ul style="list-style-type: none"> • Scroll the display for data-check • Change option at Set-up mode • Exit the Set-up mode
<p>“Enter” button</p> 	<ul style="list-style-type: none"> • Set-up mode entry • Confirmation









Initialization Display









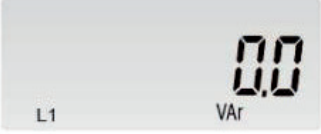
When it is powered on, the meter will initialize and do self-checking.

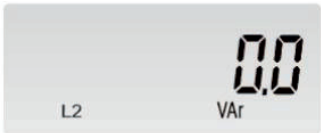






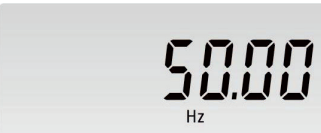

	<p>Full Screen</p>
	<p>Software Version (example)</p>
	<p>Pulse constant</p>
	<p>Total active energy (kWh) Total=Import+ Export DIGIT 5+2 → 6+1 Max. reading: 999999,9 kWh</p>





Scroll display

After initialization and self-checking program, the meter displays the measured values. The default page is total kWh. If the user wants to check other information, please press the scroll button  on the front panel.

	Total active energy Total=Import+ Export
	Resettable partial kWh
	Import energy
	Export energy
	Total reactive energy
	Resettable reactive energy
	Voltage L1-N
	Voltage L2-N





 <p>L3 230.2 V</p>	Voltage L3-N
 <p>L1 60.023 A</p>	L1 current
 <p>L2 60.023 A</p>	L2 current
 <p>L3 60.023 A</p>	L3 current
 <p>L1 450.4 W</p>	L1 active power
 <p>L2 437.6 W</p>	L2 active power
 <p>L3 441.9 W</p>	L3 active power
 <p>Total 0.0 W</p>	Total active power
 <p>L1 0.0 VAR</p>	L1 reactive power

 <p>L2 VAR 0.0</p>	L2 reactive power
 <p>L3 VAR 0.0</p>	L3 reactive power
 <p>Total VAR 0.0</p>	Total reactive power
 <p>L1 PF 0.500</p>	L1 Power factor
 <p>L2 PF 0.500</p>	L2 Power factor
 <p>L3 PF 0.500</p>	L3 Power factor
 <p>Total PF 0.500</p>	Total Power factor
 <p>Hz 50.00</p>	Frequency
 <p>Total PLS 1000 kWh</p>	Pulse output type: Default: kWh Pulse constant: 1000imp







	Modbus Address
	Baud Rate
	Parity
	Software version <i>example</i>









Accessing settings















When setting up the unit, password must be entered. Digits are set individually, from left to right.

1. Keep the button  pressed for 3 seconds to access password entry.
2. The current digit to be set flashes and is set by using  button.
Press the button  to move to the next digit.
3. Press  button for 3 seconds to confirm each digit setting.

Menu Option Selection

1. Use  button to scroll through the different options of the set-up menu.
2. Press  button to confirm your selection.
3. If an item flashes, then it can be adjusted by  button.
4. Having selected an option from the current layer, press  button for 3 seconds to confirm your selection.
5. Having completed a parameter setting, press  button to scroll to other parameter settings.
6. On completion of all setting, wait for several seconds to return to measurement display or hold down the button  for 3 seconds.

Parameter selection 	Change  3 sec.	Option 
		Password Default: 1000
		Modbus address Range: 001 ÷ 247 default:001
		Buad rate Option: 1200,2400,4800,9600, 19200 bps default: 9600 bps

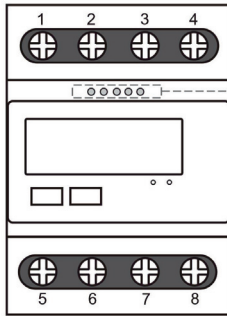
		Parity Option:NONE (N), EVEN (E),ODD (O) default:NONE
		Stop bit Option: 1, 2 default: 1
		Pulse output type Option: kWh totali, Imp kWh, Exp kWh Default: kWh totali
		Pulse constant Option: 1000,100,10,1 imp/kWh
		Pulse width Option: 60, 100, 200, unit: ms Note: If pulse constant is 1000imp/kWh,pulse width will be fixed at 35ms.
		Automatic Scroll display set Range:0~60, unit:second default:05, 0 means do not scroll
		Backlit time setting Option: ON,5,10,30,60,120,OFF unit: minute default: 60 minuti

		System Option: 3P4W,1P2W default: 3P4W
		Password default: 1000
		Resettable partial energy

Keep pressing button to exit the set-up mold.

Wiring diagram

Terminals

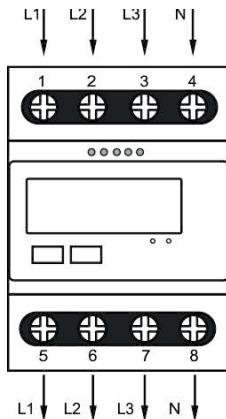


Interfaces for
External Monitoring



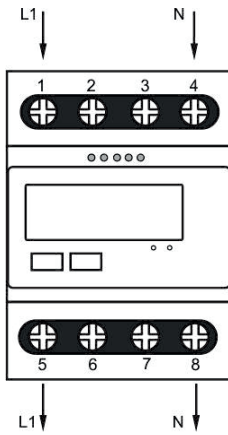
Make sure that the 230V mains power supply is disconnected before proceeding with installation or maintenance.

3 phase 4 wire





Terminals		
COMM/Pulse	0.5 ÷ 1.5mm ²	0.2Nm
Load	4 ÷ 25mm ²	2.5Nm

1 phase 2 wire

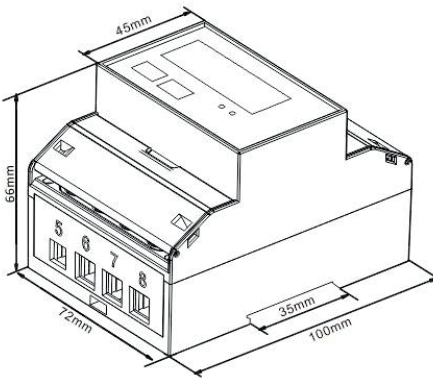


Make sure that the 230V mains power supply is disconnected before proceeding with installation or maintenance.

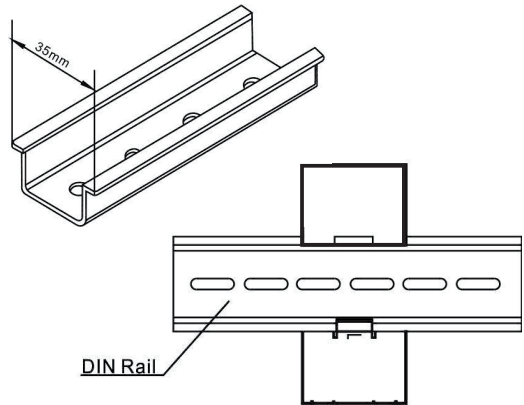
Terminals		
COMM/Pulse	0.5 ÷ 1.5mm ²	0.2Nm
Load	4 ÷ 25mm ²	2.5Nm

NOTE:
Maximum Wire Size for Mainload: 25mm²

Dimensions



Installation



The digital energy meter has to be installed in switchboards granting an protection degree of at least IP51 or superior.

PART 3 Modbus Protocol

Input registers are used to indicate the present values of the measured and calculated electrical quantities. Each parameter is held in two consecutive 16 bit register. The following table details the 3X register address, and the values of the the address bytes within the message. Each parameter is held in the 3X registers. Modbus Protocol function code 04 is used to access all parameters.

The data (Floating Type) from the Perry meter is in IEEE 754 32-bit floating point format.

Each request for data must be restricted to 30 parameters or less. Exceeding the 30 parameter limit will cause a Modbus Protocol exception code to be returned.

Address (Register)	Input Register Parameter				Modbus protocol start address hex	
	Description	Length (byte)	Data format	Units	Hi Byte	Lo Byte
30001	Phase 1 line to neutral volts.	4	Float	V	00	00
30003	Phase 2 line to neutral volts.	4	Float	V	00	02
30007	Phase 1 current.	4	Float	A	00	06
30009	Phase 2 current.	4	Float	A	00	08
30011	Phase 3 current.	4	Float	A	00	0A
30013	Phase 1 active power.	4	Float	W	00	0C
30015	Phase 2 active power.	4	Float	W	00	0E
30017	Phase 3 active power.	4	Float	W	00	10
30019	Phase 1 apparent power.	4	Float	VA	00	12
30021	Phase 2 apparent power.	4	Float	VA	00	14
30023	Phase 3 apparent power.	4	Float	VA	00	16
30025	Phase 1 reactive power.	4	Float	VAr	00	18
30027	Phase 2 reactive power.	4	Float	VAr	00	1A
30029	Phase 3 reactive power.	4	Float	VAr	00	1C

30031	Phase 1 power factor (1).	4	Float	None	00	1E
30033	Phase 2 power factor (1).	4	Float	None	00	20
30035	Phase 3 power factor (1).	4	Float	None	00	22
30043	Average line to neutral volts.	4	Float	V	00	2A
30047	Average line current.	4	Float	A	00	2E
30049	Sum of line currents.	4	Float	A	00	30
30053	Total system power.	4	Float	W	00	34
30057	Total system volt amps.	4	Float	VA	00	38
30061	Total system Var.	4	Float	VAr	00	3C
30063	Total system power factor (1).	4	Float	None	00	3E
30071	Frequency of supply voltages.	4	Float	Hz	00	46
30073	Import active energy	4	Float	kWh	00	48
30075	Export active energy	4	Float	kWh	00	4A
30201	Voltage L1-L2	4	Float	V	00	C8
30203	Voltage L2-L3	4	Float	V	00	CA
30205	Voltage L3-L1	4	Float	V	00	CC
30207	Average voltage L-L	4	Float	V	00	CE
30225	Neutral current.	4	Float	A	00	E0
30343	Total active Energy (2)	4	Float	kWh	01	56
30345	Total reactive energy	4	Float	kVArh	01	58
30385	Resettable total active energy	4	Float	kWh	01	80
30387	Resettable total reactive energy	4	Float	kVArh	01	82
30389	Resettable import active energy	4	Float	kWh	01	84
30391	Resettable export active energy	4	Float	kWh	01	86
30397	Net kWh (Import - Export)	4	Float	kWh	01	8C
31281	Total import active power	4	Float	W	05	00
31283	Total export active power	4	Float	W	05	02

Instruction:

- 1: The power factor has its sign adjusted to indicate the direction of the current. Positive refers to forward current, negative refers to reverse current.
- 2: Total active energy equals to import + export.

Holding Registers

Holding register are used to store and display instrument configuration settings. All holding registers not listed in the table below should be considered as reserved for manufacturer use and no attempt should be made to modify their values.

The holding register parameters may be viewed or changed using the Modbus Protocol. Each parameter is held in two consecutive 4X registers. Modbus Protocol Function Code 03 is used to read the parameter and Function code 10 is used to write. Write only to one parameter per message.

Address Register	Parameter	Modbus control start address hex		Valid range	Mode
		Hi Byte	Lo Byte		
40011	System Type	00	0A	Write system type: 1 = 1P2W; 3 = 3P4W,(default); Length : 4 byte Data Format : Float (KPPA is asked)	r/w
40013	Pulse width	00	0C	Range:60, 100, 200,unit: ms, default 100. Note: If pulse output = 1000imp/kWh,then pulse width is fixed at 35ms,and cannot be adjusted.Length : 4 byte Data Format : Float	r/w
40015	Key Parameter Programming Authorization	00	0E	Read: to get the status of the KPPA 0 = not authorized; 1 = authorized Write the correct password to get KPPA, enable to program key parameters.	r/w
40019	Parity and stop bit	00	12	Write the network port parity/stop bits for MODBUS Protocol, where: 0 = One stop bit and no parity, default. 1 = One stop bit and even parity. 2 = One stop bit and odd parity. 3 = Two stop bits and no parity. Length : 4 byte Data Format : Float	r/w

40021	Modbus Address	00	14	Write the network port node Address: 1 to 247 default 1. Length : 4 byte Data Format : Float	r/w
40023	Pukse constant	00	16	Option: 0÷3, default 0 0:1000 imp/kWh 1 : 100 imp/kWh 2: 10 imp/kWh 3: 1 imp/kWh Note: If pulse output = 1000imp/kWh, then pulse width is fixed at 35ms, and cannot be adjusted. Length : 4 byte Data Format : Float	r/w
40025	Password	00	18	Read: to get the password of the meter Write: to program the new password of the meter Default 1000 Length : 4 byte Data Format : Float	r/w
40029	Network Baud Rate	00	1C	Write the network port baud rate for MODBUS Protocol, where: 0 = 2400 baud. 1 = 4800 baud. 2 = 9600 baud(default). 3 = 19200 baud 5 = 1200 band Length : 4 byte Data Format : Float	r/w
40059	Automatic Scroll Display Time	00	3A	Default 0,second Range 0÷60 Length : 4 byte Data Format : Float	r/w
40061	Backlit time	00	3C	Default 60, min Range 0÷121, 0 means backlit always on, 121 means backlit always off Length : 4byte Data Format : Float	r/w

40087	Tipo di energia impulso 1	00	56	Pulse 1 Energy Type: 1: import active energy 2: total active energy (default) 4: export active energy Length : 4 byte Data Format : Float	r/w
461457	Reset cronologia dati	F0	10	00 03 = reset energy info Length : 2 byte Data Format: Hex Note: Write only	wo
464513	Numero di serie	FC	00	Serial number Length : 4 byte Data Format : unsigned int32 Note: Only read	ro
464515	Codice unità	FC	02	Meter code 1SDSD10CET4MB = 00 89 Length : 2 byte Data Format : Hex Note: Only read	ro
464645	Versione Software	FC	84	The software showed on display XX.YY Format: XX= first byte; YY= second byte Length: 2 byte Data Format: Hex Note: Read only	ro

Conformity Declaration (MID)

The Manufacturer, **Perry Electric S.r.l.**
Via Milanese, 11 - 22070 Veniano (CO) Italia
Tel. +39.031.89441

Declare under our sole responsibility as manufacturer that the three phase active energy (kWh) indoor electricity meter **1SDSD10CET4MB** with the measurement range **3x230/400V~, 0.5-10(100)A, 50Hz, 1000imp/kWh** is in conformity with the type as described in the **EU-type examination certificate 0120/SGS0506** and satisfy the appropriate requirements of the Directive 2014/32/EU with the relevant harmonized standards by the European Union
EN50470-1: 2006
EN50470-3: 2006

Identification Number of the **NB0598**

07/03/2024

Perry Electric S.r.l.
Matteo Galimberti
Sales & Marketing Manager



DISPOSAL OF ELECTRICAL & ELECTRONIC EQUIPMENT

This symbol on the product or its packaging indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment, such as for example:

- sales points, in case you buy a new and similar product;
- local collection points (waste collection centre, local recycling center, etc...).

By ensuring this product is disposed of correctly, you will help prevent potential negative consequence for the environment and human health, which could otherwise be caused by inappropriate waste handing of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your house hold waste disposal service or the shop where you purchased the product.



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