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Nemo 72 Le

01/16 10783331 WEB E cod.MF72...

Multimetering

They measure and display simultaneously more quantities

Energy counting

They quantify the energy consumption

Communication

They communicate the measurements carried at a distance

Interface different ways of communication

Measuring and Monitoring

They measure and report specific involved conditions

Index

The technical documentation for the product is available on **www.imeitaly.com** website in the **"Technical documentation"** area, type in the field **"Technical note code NT879"**.

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F : 0,5A gG

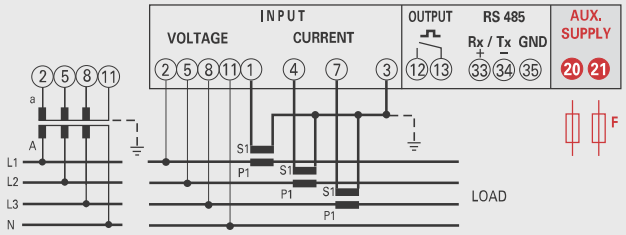
NOTE

The wiring diagrams show the device complete with pulse output and RS485 interface.
In case of version without these features, the corresponding terminals must not be considered.

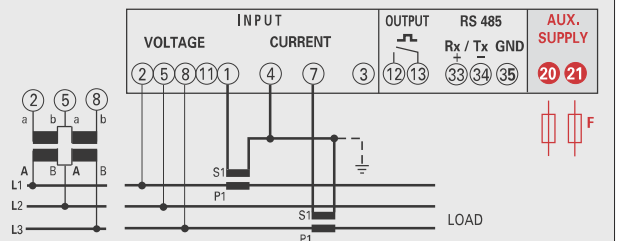
ATTENTION!

Aux. supply must be connected to terminals 20 and 21

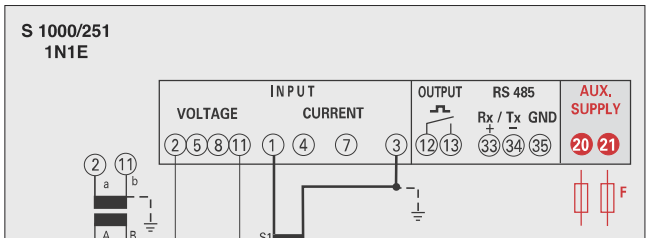
S 1000/164
3N3E



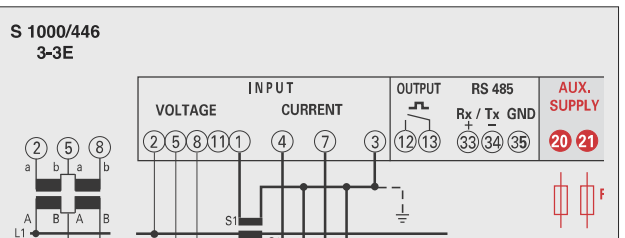
S 1000/166
3-2E



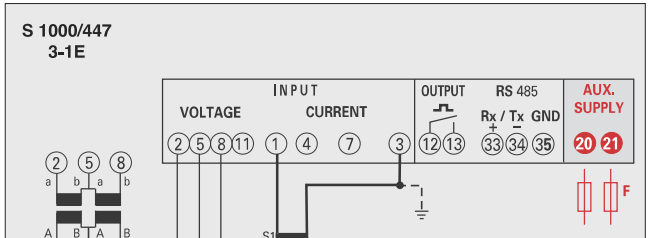
S 1000/251
1N1E



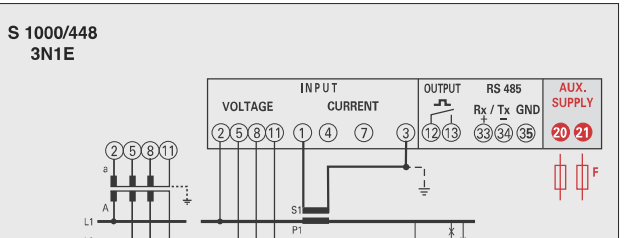
S 1000/446
3-3E



S 1000/447
3-1E



S 1000/448
3N1E



Mounting instructions

Mounting of this equipment must be carried out just by skilled personnel.
Please make sure that the data on the label (measuring voltage, measuring current, extra supply voltage, frequency) correspond to the network on which the meter must be connected.
In the wiring scrupulously respect the wiring diagram; an error in connection unavoidably leads to wrong measurements or damages to the meter.

When the meter is connected, conclude the mounting with the configuration as described in the user's manual.

Programming

Menu is divided on two levels, protected by two different numerical passwords.
Programming is carried out by **front 3-key touch screen keyboard**

U
Moves the cursor
In the pages with choice among the fixed values, it scrolls the loadable values

I
Increases the loaded value
In the pages with choice among the fixed values, it scrolls the loadable values

P-E
Confirms

During programming

by keeping pressed **keys** I + P-E you return to the previous page

by keeping pressed **keys** U + P-E you leave the programming menu, without save nothing

Level 1
Password = 1000

1.0 Password
1.1 Customized display page
1.2 Connection
1.3 Current delay time and average power
1.4 Display lighting
1.5 Run hour meter count start
1.6 RS485 ModBus RTU/TCP or BACNET communication
1.7 Relay output function: Energy pulses, Alarm, State of relay switching (remote-controlled)

Level 2
Password = 2001

2.0 Password
2.1 External CT and VT ratio

Programmable Parameters

Level 1 Password = 1000

1.1 Customized display page

Possibility to load a customized display page on which you can choose which quantities the three display lines must show.
If the user loads a customized page, this will become the standard display when the meter is switched on (as alternative the one showing the line voltages).
The selectable displays for the customized page are mentioned in the tables page 7.

1.2 Connection

The meter can be used for single phase or three phase 3- and 4-wire network.
The selectable connections are:

Symbol	Line	Load	Coils	Wiring	Connection
1N1E	Sigle-phase	-	1	S 1000/251	
3-1E	3-phase 3 wires	Balanced	1	S 1000/447	
3N1E	3-phase 4 wires	Balanced	1	S 1000/448	
3-2E	3-phase 3 wires	Unbalanced	2	S 1000/166	Aron L1 - L3
3-3E	3-phase 3 wires	Unbalanced	3	S 1000/446	
3N3E	3-phase 4 wires	Unbalanced	3	S 1000/164	

1.3 Current delay time and average power

Selectable delay time: 5, 8, 10, 15, 20, 30, 60 minutes
The selected time is valid both for the current and the average power

1.4 Display lighting

The 4 selectable levels (0 – 35 – 70 – 100%) show the display lighting percentage

1.5 Run hour meter count start

Select the quantity which starts the run hour meter count: voltage or power.
Voltage: count start with phase voltage > 20V
Power: total active power, programmable value 0,5…50%Pn (rated power)

1.6 RS485 communication (where provided)

According to the models, this meter can be without communication or equipped with **RS485 ModBus RTU/TCP or RS485 BACNET communication**

1.6a RS485 ModBus RTU/TCP communication

Address number: 1...255
Parity bit: none – even – odd
Waiting time before answer: 3...100ms
Transmission speed: 4800 – 9600 – 19200 – 38400 bit/s
ModBus message word format[1]**:** Big Endian – Little Endian – Swap

[1] Just for 32-bit quantities

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1.6b RS485 BACNET communication

Address number: 0...127
Transmission speed: 9600 – 19200 – 38400 - 76800 bit/s
Parity bit: none – even – odd
Network address: 0...4000
[1] Just for 32-bit quantities

1.7 Relay output function: energy pulses, alarm, state of relay switching

The output relay (terminals 15-29) can be used as energy pulse repeater, as alarm relay or for remote-controlled state of relay switching (function available just for models with communication).

1.7a Energy pulses

Quantity that can be coupled: active or reactive energy
Pulse weight: 1 pulse/10Wh(varh) - 100Wh(varh) - 1kWh(kvarh) - 10 kWh(kvarh) - 100kWh(kvarh) - 1MWh(Mvarh) - 10MWh(Mvarh)
Width of the pulse: 50 - 100 - 200 - 300 - 400 - 500 ms

1.7b Alarm

Quantity that can be coupled: phase voltage (L1-N, L2-N, L3-N), interlinked voltage (L1-L2, L2-L3, L3-L1), phase current (I1, I2, I3), , three-phase active power, three-phase reactive power.
Intervention threshold: intervention point, decimal point, metering unit
Alarm type: min. or max.
Relay output contact: normally open **(no)** or normally closed **(nC)**
Hysteresis: 0…20%
Intervention delay: 0…99s
Reset delay: 0…99s

1.7c Remote-controlled state of relay switching, bistable mode (rMtb)

Relay output contact: normally open **(no)** or normally closed **(nC)**
t on: delay elapsed between the activation remote command and the change in the state of relay
t oF: delay elapsed between the reset remote command and the change in the state of relay
selectable values t on / t oF: 0…99s

1.7d Remote-controlled state of relay switching, time mode (rMtt)

Relay output contact: normally open **(no)** or normally closed **(nC)**
t on: delay elapsed between the activation remote command and the change in the state of relay
t oF: delay elapsed between the reset remote command and the change in the state of relay
selectable values t on / t oF: 0…99s

Level 2 Password = 2001

2.1 External VT or CT ratio

Vt = External primary/secondary VT ratio (ex. VT 600/100V Vt = 6)
Ct = External primary/secondary CT ratio (ex. CT 800/5A Ct = 160)
External CT ratio (Ct): 1…9999 (max. primary current 50000/5A - 10000/1A)
External VT ratio (Vt): 1,00…10,00 (max. primary voltage TV 1200V)
For voltage direct connection (with external voltage transformer) load Vt=1,00
By modifying the **CT** and/or **VT** ratios, the KWH meters are automatically reset

Phase sequence diagnostic

In the software of the device have added a specific functionality to detect and correct many problems concerning voltage and / or current connection.
This function can be activated through password and allows to display and modify the connection sequence provided that the following conditions are respected:

1) The neutral wire (in a 4-wire network) is connected to the right terminal (normally number1).

2) No crossings between cables connected to CTs (e.g. avoid that on phase 1 of the meter-terminals 1 and 3 - are connected some way both to CT1 and CT2).

3) The power factor is between 1 and 0,5 - Inductive load - for each phase.
See www.imeitaly.com "TECHNICAL SUPPORT".

1.0 Password 1000

Pressing at the same time the **keys** I + P-E , you display page:

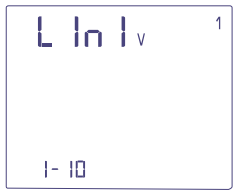
Load **password 1000** and confirms P-E

→ moves the cursor
↑ increases the loaded value
↵ confirms

1.1 Customized display page

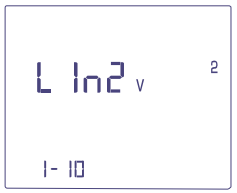
Possibility to choose which quantities the three display lines must show.
To customize the page, please select the quantity required for **line 1**
(among the ones shown in the **Table 1**)

↑ selects the quantities
↵ confirms



Select the quantity required for **ine 2**
(among the ones shown in the **Table 2**)

↑ selects the quantities
↵ confirms



Select the quantity required for **line 3**
(among the ones shown in the **Table 3**)

↑ selects the quantities
↵ confirms

Note The customized page will become the standard display when the meter is turned on.
If you don't want to display the customized page, you can directly go to **point 1.2 Connection** by pressing several times P-E **key** until you display.

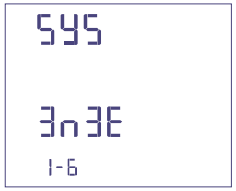
Line 1	Table 1
	Voltege L1
	Voltage L1-L2
	Current L1
	3-phase Current
	3-phase Active Power
	3-phase Reactive Power
	3-phase Apparent Power
	Active Power L1
	Reactive Power L1
	Apparent Power L1

Line 2	Table 2
	Voltage L2
	Voltage L2-L3
	Current L2
	3-phase Active Power
	3-phase Reactive Power
	3-phase Apparent Power
	Active Power L2
	Reactive Power L2
	Apparent Power L2
	Frequency

Line 3	Table 3
	Voltage L3
	Voltage L3-L1
	Current L3
	3-phase Active Power
	3-phase Reactive Power
	3-phase Apparent Power
	Active Power L3
	Reactive Power L3
	Apparent Power L3
	Power Factor

1.2 Connection

selects the connection
Confirms



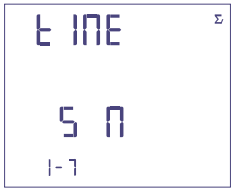
Select the desired connection and scrupulously respect the linked wiring diagram.
The selectable wiring diagrams are:

Symbol	Line	Load	Coils	Wiring	Connection
1N1E	Sigle-phase	-	1	S 1000/251	
3-1E	3-phase 3 wires	Balanced	1	S 1000/447	
3N1E	3-phase 4 wires	Balanced	1	S 1000/448	
3-2E	3-phase 3 wires	Unbalanced	2	S 1000/166	Aron L1 - L3
3-3E	3-phase 3 wires	Unbalanced	3	S 1000/446	
3N3E	3-phase 4 wires	Unbalanced	3	S 1000/164	

1.3 Current delay time and average power

Selectable delay time: 5, 8, 10, 15, 20, 30, 60 minutes
The selected time is valid both for the current and the average power

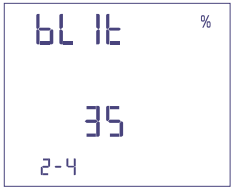
selects the time value
confirms



1.4 Display lighting

The 4 selectable levels (0 – 35 – 70 – 100%) %) show the display lighting percentage

selects the lighting level
confirms



1.5 Run hour meter count start

Select the quantity which starts the run hour meter count: **Voltage or Power.**

1.5a Voltage count start

Voltage: count start with phase voltage > 20V

selects voltage or current
confirms

1.5b Power count start

selects voltage or power
confirms

Power: total active power, programmable value 0,5…50%Pn (rated power)

moves the cursor
increases the loaded value
confirms

1.6 RS485 Communication

According to the models, this meter can be without communication or equipped with **RS485 ModBus RTU / TCP or RS485 BACNET** communication.

1.6a RS485 ModBus RTU / TCP Communication

Address number:: 1...255

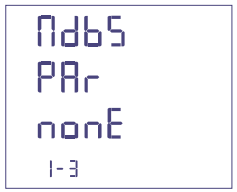
moves the cursor
increases the loaded value
confirms

Transmission speed: 4800 – 9600 – 19200 – 38400 bit/s

selects speed
confirms

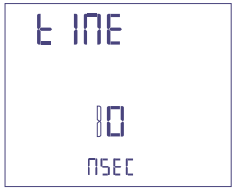
Parity bit: none – even – odd

selects parity
confirms



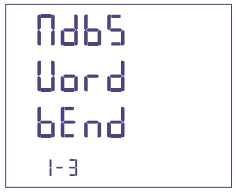
Waiting time before answer: 3...99ms

moves the cursor
increases the loaded value
confirms



ModBus message word format: Big Endian – Little Endian – Swap

selects format
confirms



1.6b RS485 BACNET Communication

Address: 0...127

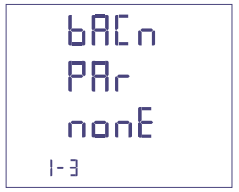
moves the cursor
increases/decreases the loaded value
confirms

Transmission speed: 9600 – 19200 – 38400 - 76800 bit/s

selects speed
confirms

Parity bit: none – even – odd

selects parity
confirms



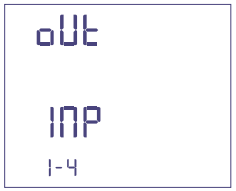
Indirizzo di rete: 0...4000

moves the cursor
aumenta il valore impostato
conferma

1.7 Relay output function: : energy pulses, alarm,state of relay switching

(remote-controlled)

selects output
confirms



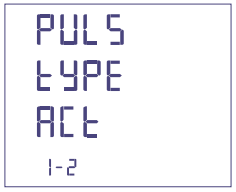
INP = Pulse output
ALrM = Alarm
rMtb = Bistable
rMtt = Time

The output relay (terminals 15 - 29) can be used as **energy pulses** (see point 1.7a) repeater or as **alarm relay** (see point 1.7b) or as remote-controlled **state of relay switching** (see point 1.7c - point 1.7c).

1.7a Energy pulses

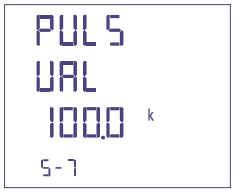
Quantity that can be coupled: active or reactive energy

selects active / reactive
confirms



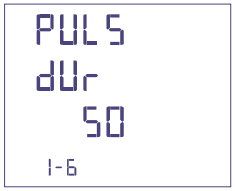
Pulse weight: 1pulse/10Wh(varh) – 100Wh(varh) – 1kWh(kvarh) - kWh(kvarh)- 100kWh(kvarh) – 1MWh(Mvarh) - 10MWh(Mvarh)

selects pulse weight
confirms



Width of the pulse: 50 – 100 – 200 – 300 – 400 – 500ms

selects width of the pulse
confirms



1.7b Alarm

Alarm type: min. or max.

selects alarm type
confirms

Quantity that can be coupled: phase voltage (L1-N, L2-N, L3-N)
interlinked voltage (L1-L2, L2-L3, L3-L1)
phase current (I1, I2, I3)
frequency
3-phase active power
3-phase reactive power

selects quantity
confirms

Intervention threshold: intervention point, decimal point, metering unit

selects decimal point and metering unit
confirms

moves the cursor
increases the loaded value
confirms

State relay: normally open (no) or normally closed (nC)

selects state relay
confirms

Hysteresis: 0...20%

moves the cursor
increases the loaded value
confirms

Intervention delay: 0...99s

moves the cursor
increases the loaded value
confirms

Reset delay: 0...99s

moves the cursor
increases the loaded value
confirms

1.7c Remote-controlled state of relay switching, bistable mode (rMtb)

Relay output contact: normally open (no) or normally closed (nC)

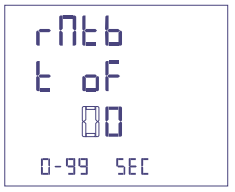
selecet state
confirms

t on: 0...99s

moves the cursor
increases the loaded value
confirms

t oF: 0...99s

moves the cursor
increases the loaded value
confirms



1.7d Remote-controlled state of relay switching, time mode (rMtt)

Relay output contact: normally open (no) or normally closed (nC)

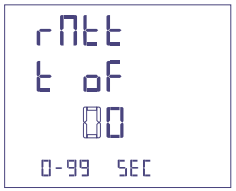
selecet state
confirms

t on: 0...99s

→ moves the cursor
↑ increases the loaded value
↵ confirms

t oF: 0...99s

→ moves the cursor
↑ increases the loaded value
↵ confirms



Programmed data confirmation

↵ confirms

↵ confirms

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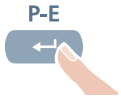
2.0 Password 2001

Pressing at the same time the **keys** 

, you display page:

Load **password 2001** and confirms 

→ moves the cursor
↑ increases the loaded value
↵ confirms

2.1 External CT ratio

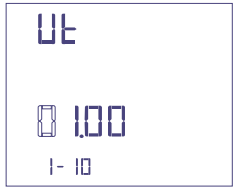
Ct = external primary/secondary CT ratio (ex.: CT 800/5A Ct = 160)
External CT ratio (Ct): 1…9999 (max. primary current 50000/5A - 10000/1A)

→ moves the cursor
↑ increases the loaded value
↵ confirms

External VT ratio

Vt = external primary/secondary VT ratio (ex.: TV 600/100V Vt = 6)
External VT ratio (Vt): 1,00…10,00 (max. primary voltage TV 1200V)
For voltage direct connection (with external voltage transformer) load **Vt=1,00**
By modifying the **CT** and/or **VT** ratios, the KWH meters are automatically reset

→ moves the cursor
↑ increases the loaded value
↵ confirms



Display

Display is divided into 3 menus, accessible with their relevant function keys:
The quantities and the display modes vary according to the selected connection (3-phase 3- or 4-wire line, single phase, etc.
In the following pages you could find all the displayed measurements based on the selected connection.

Acting on the function keys it is possible to scroll the different available measurements:

U	I	P-E	
Phase voltage	Phase current and neutral current	Active, reactive, apparent, distorting 3-phase power	Total and partial, positive active energy
Interlinked voltage	Current demand	Active, reactive, apparent phase power	Total and partial, positive reactive energy
Interlinked voltage	Max. current demand	Active, reactive, apparent power	Total and partial, negative active energy
Max. voltage value	Average currents	Max. demand active, reactive, apparent power	Total and partial, negative reactive energy
Voltage harmonic distortion	Current harmonic distortion	Phase and 3-phase power factor	Configuration data*
Voltage harmonic analysis	Current harmonic analysis	Phase angle voltages - Phase and 3-phase current	
Voltage peak factor	Current peak factor	Frequency	
Phase angle between the voltages	Phase angle between the currents	Run hour meter	
Configuration data*	Configuration data*	Configuration data*	

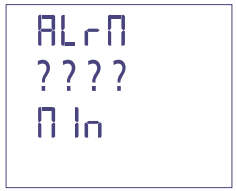
*See configutation factory setting at page 20

Alarm Diplay

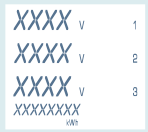
If the meter has been programmed for **relay output = alarm function** **(see point 1.7)**, in case of alarm intervention, the display blinks in order to detect the anomaly.
Pressing any of the front keys, the display stops blinking.
When the alarm is intervened, press several times P-E **key**, until you display the alarm. page.

Quantity associated with the alarm

Alarm type (min/max)



U

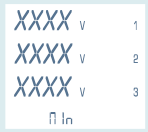


Phase voltage **L1-N**
Phase voltage **L2-N**
Phase voltage **L3-N**

Active Energy

Interlinked voltage **L1-L2**
Interlinked voltage **L2-L3**
Interlinked voltage **L3-L1**

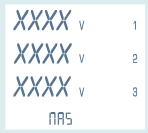
Active Energy



Phase voltage **L1-N**
Phase voltage **L2-N**
Phase voltage **L3-N**

P-E Reset

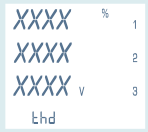
Min. Value



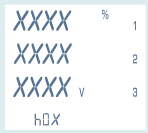
Phase voltage **L1-N**
Phase voltage **L2-N**
Phase voltage **L3-N**

P-E Reset

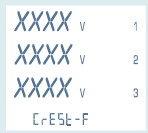
Max. Value



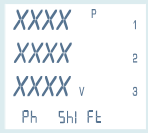
Voltage harmonic distortion



Voltage harmonic analysis
H0X=H03/H

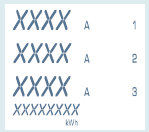


Voltage peak factor



Phase angle between the voltages

I



Phase current **L1**
Phase current **L2**
Phase current **L3**

Active Energy

Phase current demand **L1**
Phase current demand **L2**
Phase current demand **L3**

Reactive Energy

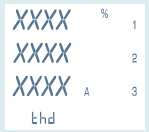
Phase current max. demand **L1**
Phase current max. demand **L2**
Phase current max. demand **L3**

P-E Reset

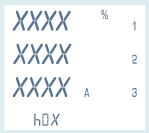
Active Energy

Neutral current
Current sum $\frac{|1+|2+|3}{3}$

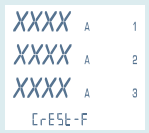
Reactive Energy



Current harmonic distortion



Current harmonic analysis
H0X=H03/H05/H07/H09



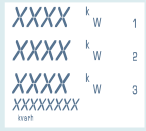
Current peak factor

Phase angle between the currents

3N3E - 3N1E

P-E

3-phase active power
3-phase reactive power
3-phase apparent power
3-phase distorting power



Active phase power **L1**
Active phase power **L2**
Active phase power **L3**

Reactive Energy

Reactive phase power **L1**
Reactive phase power **L2**
Reactive phase power **L3**

Active Energy

Apparent phase power **L1**
Apparent phase power **L2**
Apparent phase power **L3**

Reactive Energy

3-phase active power demand
3-phase reactive power demand
3-phase apparent power demand

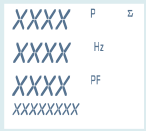
Active Energy

3-phase active power max. demand
3-phase reactive power max. demand
3-phase apparent power max. demand

Reactive Energy

P-E
Reset

P-E

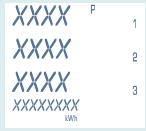


3-phase displacement
Frequency
3-phase power factor

Run hour meter P-E Reset

Phase power factor **L1**
Phase power factor **L2**
Phase power factor **L3**

Reactive Energy



Phase displacement **L1**
Phase displacement **L2**
Phase displacement **L3**

Active Energy

Number of reset run hour meter

Positive Total Active Energy

Number of reset run hour meter

Positive Total Reactive Energy

Number of reset run hour meter

Negative Total Active Energy

Number of reset run hour meter

Negative Total Reactive Energy

P-E

Positive Partial Active Energy

Positive Partial Reactive Energy

Negative Partial Active Energy

Negative Partial Reactive Energy

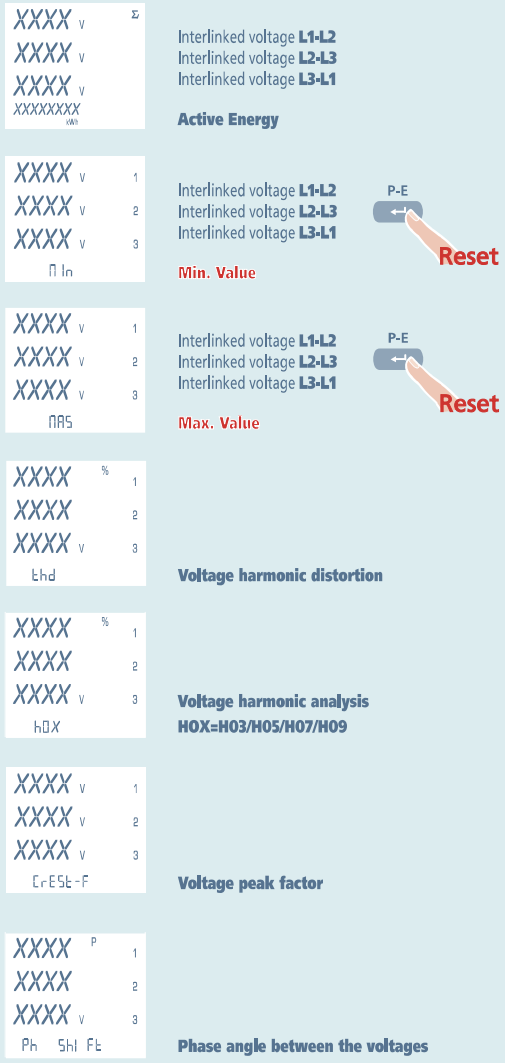
P-E
Reset

Customized display page

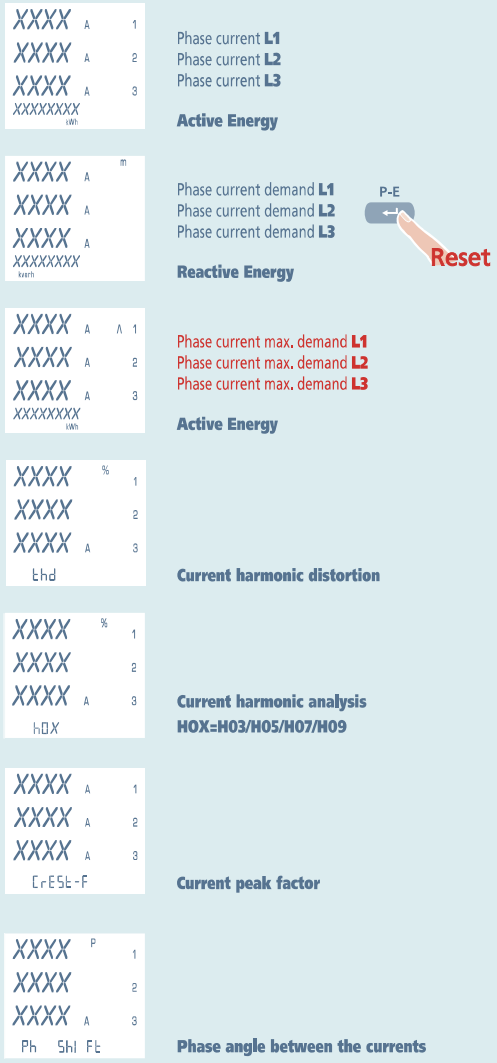
Communication type
Connection
Version

Model

U

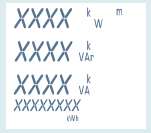

XXXX V Σ
XXXX V
XXXX V
XXXXXXXX kWh
Interlinked voltage L1-L2
Interlinked voltage L2-L3
Interlinked voltage L3-L1
Active Energy
XXXX V 1
XXXX V 2
XXXX V 3
Min
Interlinked voltage L1-L2
Interlinked voltage L2-L3
Interlinked voltage L3-L1
P-E
Reset
Min. Value
XXXX V 1
XXXX V 2
XXXX V 3
MAX
Interlinked voltage L1-L2
Interlinked voltage L2-L3
Interlinked voltage L3-L1
P-E
Reset
Max. Value
XXXX % 1
XXXX 2
XXXX V 3
thd
Voltage harmonic distortion
XXXX % 1
XXXX 2
XXXX V 3
hOX
Voltage harmonic analysis
HOX=H03/H05/H07/H09
XXXX V 1
XXXX V 2
XXXX V 3
CrESt-F
Voltage peak factor
XXXX P 1
XXXX 2
XXXX V 3
Ph ShI Ft
Phase angle between the voltages

I


XXXX A 1
XXXX A 2
XXXX A 3
XXXXXXXX kWh
Phase current L1
Phase current L2
Phase current L3
Active Energy
XXXX A m
XXXX A
XXXX A
XXXXXXXX kvarh
Phase current demand L1
Phase current demand L2
Phase current demand L3
P-E
Reset
Reactive Energy
XXXX A Λ 1
XXXX A 2
XXXX A 3
XXXXXXXX kWh
Phase current max. demand L1
Phase current max. demand L2
Phase current max. demand L3
Active Energy
XXXX % 1
XXXX 2
XXXX A 3
thd
Current harmonic distortion
XXXX % 1
XXXX 2
XXXX A 3
hOX
Current harmonic analysis
HOX=H03/H05/H07/H09
XXXX A 1
XXXX A 2
XXXX A 3
CrESt-F
Current peak factor
XXXX P 1
XXXX 2
XXXX A 3
Ph ShI Ft
Phase angle between the currents

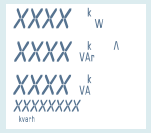
P-E

3-phase active power
3-phase reactive power
3-phase apparent power
3-phase distorting power



3-phase active power demand
3-phase reactive power demand
3-phase apparent power demand

Active Energy

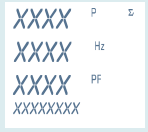


3-phase active power max. demand
3-phase reactive power max. demand
3-phase apparent power max. demand

Reactive Energy

P-E Reset

P-E



3-phase displacement
Frequency
3-phase power factor

Run hour meter P-E Reset

Number of reset run hour meter

Positive Total Active Energy

Number of reset run hour meter

Positive Total Reactive Energy

Number of reset run hour meter

Negative Total Active Energy

Number of reset run hour meter

Negative Total Reactive Energy

P-E

Positive Partial Active Energy

Positive Partial Reactive Energy

Negative Partial Active Energy

Negative Partial Reactive Energy

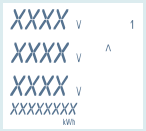
P-E Reset

Customized display page

Communication type
Connection
Version

Model

U



Voltage
Min. voltage
Max. voltage

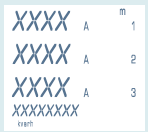
Active Energy

Voltage harmonic distortion

Voltage harmonic analysis
HOX=H03/H05/H07/H09

Voltage peak factor

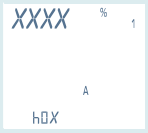
I



Current
Current demand
Current max. demand

Reactive Energy

Current harmonic distortion

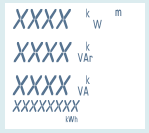


Current harmonic analysis
HOX=H03/H05/H07/H09

Current peak factor

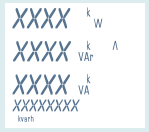
P-E

Active power
Reactive power
Apparent power
Distorting power



Active power demand
Reactive power demand
Apparent power demand

Active Energy



Active power max. demand
Reactive power max. demand
Apparent power max. demand

Reactive Energy

P-E

Reset

P-E

Displacement
Frequency
Power factor

Run hour meter

P-E

Reset

Number of reset run hour meter

Positive Total Active Energy

Number of reset run hour meter

Positive Total Reactive Energy

Number of reset run hour meter

Negative Total Active Energy

Number of reset run hour meter

Negative Total Reactive Energy

P-E

Positive Partial Active Energy

Positive Partial Reactive Energy

Negative Partial Active Energy

Negative Partial Reactive Energy

P-E

Reset

Customized display page

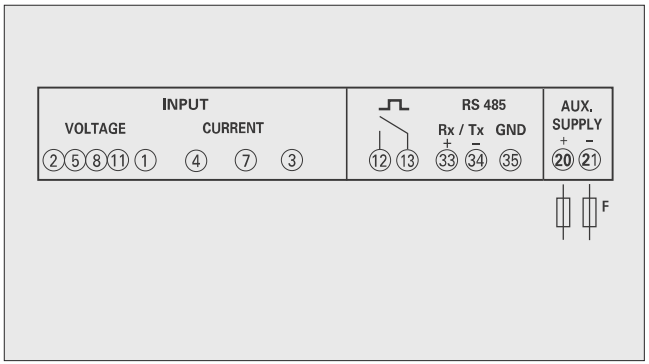
Communication type
Connection
Version

Model

Auxiliary Supply

Terminals 20 and 21

Auxliary suppy: direct or alternating current electrical supply which is necessary for proper working of the device.
Please verify that the available supply voltage meets the one shown on the data label of the meter (voltage value and any frequency).
Where a double voltage is shown (for instance 80...265Vac / 80...265Vdc) the meter can be fed with alternating voltage 80...265Vac or direct voltage 100...300Vdc.
In case of direct voltage supply please respect the shown polarities **20+** and **21**.



F : 0,5A gG

Factory setting

Password 1000

Customized page
[1]Lin1v voltage L1
[2]Lin2v voltage L2
[3]Lin3v voltage L3
Connection: 3n3E 4-wires 3-system line
Average time: 15m 15 minutes
Backlight: 35%
Run hour meter: U Voltage start
RS485
Address: 255
Speed: 9.600
Parity: none
Transmission delay: 15mses
Word: bend
Relay output: pulse
Pulse output
Energy: active
Pulse weight: 0,01kWh
Width of the pulse: 50ms

Password 2001

CT ratio: 0001
VT ratio: 01,00