

### Three Phase Multifunction Energy Meter



## 1.Introduction

This unit can be powered from a separate auxiliary (AC or DC) supply. Alternatively it can be powered from the monitored supply by linking the voltage reference and neutral reference in to terminals 5 and 6 (Please refer to wiring diagram).

- Voltage and THD% (total harmonic distortion) of all phases
- Line frequency
- Currents, current demand and current THD% of all phases
- Power, maximum power demand and power factor
- Active energy imported and exported
- Reactive energy imported and exported

EMM.630CT:	EMM.630CT-Mbus V2	EMM.630CT-2T V2
Multi-parameter measurement	Multi-parameter measurement	Multi-parameter measurement
Single Tariff 1A/5A CT operated	Single Tariff 1A/5A CT operated	Double Tariff 1A/5A CT operated
Rs485 Port Modbus RTU	M-Bus Communication	Rs485 Port Modbus RTU
Bi-directional energy	Bi-directional energy	Bi-directional energy

As an example: If using 100/5A CT, you will need to insure Ct2 (Secondary) is set to 5 and CT rate is 0020. You divide the primary by the secondary to get the CT rate to be entered ( $100/5=20$ ).

EMM.630CT and EMM.630CT-2T V2 both meter have a Rs485 port with Modbus RTU protocol. EMM.630CT-Mbus V2 has a M-Bus port complying with EN13757-3. Rs485 or M-Bus provide a means of remotely monitoring and controlling the unit. Set-up screens are provided for setting up the communication port.

Two pulse outputs that pulse measured active and reactive energy. The Pulse 2 constant for active energy is 3200imp/kWh. (Terminals 11 & 12) The pulse width for Pulse 1 can be set from the set-up menu (Terminals 9 & 10).

1 2 3 4 5 6 7 8 MD % IMPORT EXPORT all

T -0.0:0.0 MKWh V%THD

L<sup>2-3</sup> Σ -0.0:0.0 MKVarh

N Hz

L<sup>3-1</sup> MKVA

☒ ⌚ 🔋 PF C1C2

Soft

11

01.03

InSt

tEst





PASS

The first screen lights up all display segments and can be used as a display check.

Software version information

The interface performs a self-test and indicates the result if the test passes.

### 3. Measurements





	<p>Select the Voltage and Current display screens. In Set-up Mode, this is the "Left" or "Back" button.</p>
	<p>Select the Frequency and Power factor display screens. In Set-up Mode, this is the "Up" button.</p>
	<p>Select the Power display screens. In Set-up Mode, this is the "Down" button.</p>
	<p>Select the Energy display screens. In Set-up mode, this is the "Enter" or "Right" button.</p>

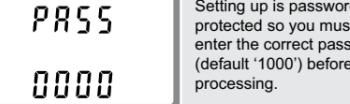
	Phase to neutral voltages.
	Current on each phase.
	Phase to voltage THD%.
	Current THD% for each phase.

	Frequency and Power Factor (total).
	Power Factor of each phase.
	Maximum Power Demand.
	Maximum Current Demand.

$L^1$ $L^2$ $L^3$	0.0000 kW 0.0000 kW 0.0000 kW	Instantaneous Active Power in kW.
$L^1$ $L^2$ $L^3$	0.0000 kVAr 0.0000 kVAr 0.0000 kVAr	Instantaneous Reactive Power in kVAr.
$L^1$ $L^2$ $L^3$	0.0000 kVA 0.0000 kVA 0.0000 kVA	Instantaneous Volt-Amps in KVA.
$\Sigma$	0.0000 kW 0.0000 kVAr 0.0000 kVA	Total kW, kVArh, kVA.

<div>IMPORT</div> <div>0000 kWh</div> <div>0314</div>	Import active energy in kWh.
<div>EXPORT</div> <div>0000 kWh</div> <div>000.0</div>	Export active energy in kWh.
<div>IMPORT</div> <div>0000 kVarh</div> <div>000.0</div>	Import reactive energy in kVarh.
<div>EXPORT</div> <div>0000 kVarh</div> <div>000.0</div>	Export reactive energy in kVarh.
<div>Σ</div> <div>0000 kWh</div> <div>0314</div>	Total active energy in kWh.
<div>Σ</div> <div>0000 kVarh</div> <div>000.0</div>	Total reactive energy in kVarh.

	T1 active energy in kWh
	T2 active energy in kWh
	T1 reactive energy in kVarh
	T2 reactive energy in kVarh



Setting up is password-protected so you must enter the correct password (default '1000') before processing.

If an incorrect password is entered, the display will show:

PASS Err

Some menu items, such as password and CT, require a four-digit number entry while others, such as supply system, require selection from a number of menu options.

3. If an item flashes, then it can be adjusted by the  and  buttons.
4. Having selected an option from the current layer, press  to confirm your selection. The SET indicator will appear.
5. Having completed a parameter setting, press  to return to a higher menu level. The SET indicator will be removed and you will be able to use the  and  buttons for further menu selection.
6. On completion of all setting-up, press  repeatedly until the measurement screen is restored.

1. The current digit to be set flashes and is set using the  and  buttons
2. Press  to confirm each digit setting. The SET indicator appears after the last digit has been set.
3. After setting the last digit, press  to exit the number setting routine. The SET indicator will be removed.

	<p>Use the <b>MO/PF</b> and <b>P</b> to choose the change password option.</p>
	<p>Press the <b>E</b> to enter the change password routine. The new password screen will appear with the first digit flashing.</p>
	<p>Use <b>MO/PF</b> and <b>P</b> to set the first digit and press <b>E</b> to confirm your selection. The next digit will flash.</p>
	<p>Repeat the procedure for the remaining three digits.</p>
	<p>After setting the last digit, SET will show.</p>








This sets the period in minutes over which the current and power readings are integrated for maximum demand measurement. The options are: off, 5, 10, 15, 30, 60 minutes.

The diagram illustrates the steps to set the integration time to 10 minutes:

- Initial Screen:** Displays "SET", "dIt", and "10".
- Action:** Press **MEM/PRINZ** and **P** buttons to select the DIT option.
- Selection Routine:** The screen shows the currently selected integration time (10).
- Action:** Press **E** to enter the selection routine.
- Current Time Interval:** The screen shows the current time interval (10).
- Action:** Use **MEM/PRINZ** and **P** buttons to select the time required.
- Confirmation:** Press **E** to confirm the selection. The SET indicator will appear.
- Final Screen:** Displays "SET", "dIt", and "20".

 Caution: Risk of Electric Shock

	<p>From the set-up menu, use  and  buttons to select the system option. The screen will show the currently selected power supply.</p>
	<p>Press  to enter the selection routine. The current selection will flash.</p>
	<p>Use  and  buttons to select the required system option: 1P2(W), 3P3(W), 3P4(W).</p>
	<p>Press  to confirm the selection. SET indicator will appear.</p>

	<p>From the set-up menu, use  and  buttons to select the CT option.</p>
	<p>Secondary CT setting Press  to enter the CT secondary current selection routine.:5A/1A</p>
	<p>Set CT Ratio value Press  to enter the CT Ratio setting screen. The range is from 0001 to 9999.</p>

The PT option sets the secondary voltage (PT2 100 to 500V) of the voltage transformer (PT) that may be connected to the meter.

	<p>Use <b>MOD/PRGM</b> and <b>PY</b> buttons to select the PT option. The screen will show the voltage PT secondary voltage value. The default value is 400V.</p>
	<p>Secondary PT setting Press <b>E</b> to enter the PT secondary voltage selection routine. The range is from 100 to 500V.</p>
	<p>Set PT ratios value Press <b>E</b> to enter the PT ratio screen. The range is from 0001 to 9999.</p>

For example, if set the ratio to be 100, it means the primary voltage equals secondary voltage  $\times 100$ .

4.7 Pulse Output

This option allows you to configure the pulse output. The output can be set to provide a pulse for a defined amount of energy active or reactive. Use this section to set up the relay pulse output—Units: kWh, kVArh

SET  
rLy  
001

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the Pulse output option.

SET  
rLy  
kWh

Press **E** to enter the selection routine. The unit symbol will flash.

SET  
rLy  
kVArh

Use **MDI / PFINZ** and **P** buttons to choose kWh or kVArh.

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.7.1 Pulse rate

Use this to set the energy represented by each pulse. Rate can be set to 1 pulse per 0.01kWh/0.1kWh/1kWh/10kWh/100kWh.

SET  
rPULS  
10

(It shows 1 impulse = 10kWh/kVArh)

SET  
rPULS  
10

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the Pulse Rate option.

SET  
rPULS  
10

Press **E** to enter the selection routine. The current setting will flash.

SET  
rPULS  
10

Use **MDI / PFINZ** and **P** buttons to choose pulse rate.

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.7.2 Pulse Duration

The energy monitored can be active or reactive and the pulse width can be selected as 200, 100 or 60ms.

SET  
PULS  
200

(It shows pulse width of 200ms)

SET  
PULS  
200

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the Pulse width option.

SET  
PULS  
200

Press **E** to enter the selection routine. The current setting will flash.

SET  
PULS  
200

Use **MDI / PFINZ** and **P** buttons to choose pulse width.

On completion of the entry procedure press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.8 Communication

There is a RS485 port can be used for communication using Modbus RTU protocol. For Modbus RTU, parameters are selected from Front panel.

4.8.1 RS485 Address

SET  
Addr  
001

(The range is from 001 to 247)

SET  
Addr  
001

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the address ID.

SET  
Addr  
101

Press **E** button to enter the selection routine. The current setting will be flashing.

SET  
Addr  
101

Use **MDI / PFINZ** and **P** buttons to choose Modbus address (001 to 247).

On completion of the entry procedure, press **E** button to confirm the setting and press **V/A ESC** button to return the main set-up menu.

4.8.2 M-Bus Address

SET  
Addr  
001

Primary address:001 to 250  
Use **MDI / PFINZ** and **P** buttons to select the address value.

SET  
Addr  
101

Press **E** to enter the selection routine. The current setting will flash.

Id  
9999  
9999

Secondary address :  
00 00 00 01 to 99 99 99 99

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.8.3 Baud Rate

SET  
bAUD  
9.6 k

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the Baud Rate option.

SET  
bAUD  
9.6 k

Press **E** to enter the selection routine. The current setting will flash.

SET  
bAUD  
38.4 k

Use **MDI / PFINZ** and **P** buttons to choose Baud rate 2.4k. 4.8k, 9.6k, 19.2k, 38.4k

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.8.4 Parity

SET  
PARI  
EVEN

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the parity option.

SET  
PARI  
EVEN

Press **E** to enter the selection routine. The current setting will flash.

SET  
PARI  
NONE

Use **MDI / PFINZ** and **P** buttons to choose parity (EVEN / ODD / NONE (default)).

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.8.5 Stop bits

SET  
StoP  
2

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the stop bit option.

SET  
StoP  
2

Press **E** to enter the selection routine. The current setting will flash.

SET  
StoP  
1

Use **MDI / PFINZ** and **P** buttons to choose stop bit (2 or 1)  
Note: Default is 1, and only when the parity is NONE that the stop bit can be changed to 2.

On completion of the entry procedure, press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.9 Backlit set-up

The meter provides a function to set the blue backlit lasting time( 0/5/10/30/60/120 minutes).

Option 0 means the backlit always on here.

SET  
LP  
60

Default:60  
If it's setted as 5,the backlit will be off in 5minutes.

SET  
LP  
60

Use **MDI / PFINZ** and **P** buttons to choose the time

Press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

4.10 CLR

The meter provides a function to reset the maximum demand value of current and power.

CLR

From the set-up menu, use **MDI / PFINZ** and **P** buttons to select the reset option.

CLR

Press **E** to enter the selection routine. The dlt will flash.

Press **E** to confirm the setting and press **V/A ESC** to return to the main set up menu.

5.Specifications

5.1 Measured Parameters

The unit can monitor and display the following parameters of a single phase two wire(1p2w), three phase three wire(3p3w) or three phase four wire(3p4w) system.

5.1.1 Voltage and Current

- Phase to neutral voltages 100 to 289V a.c. (not for 3p3w supplies).
- Voltages between phases 173 to 500V a.c. (3p supplies only).
- Percentage total voltage harmonic distortion (THD%) for each phase to N ( not for 3p3w supplies).
- Percentage voltage THD% between phases (three phase supplies only).
- Current THD% for each phase

5.1.2 Power factor and Frequency and Max. Demand

- Frequency in Hz
- Instantaneous power:
- Power 0 to 3600 MW
- Reactive power 0 to 3600 MVAR
- Volt-amps 0 to 3600 MVA
- Maximum demanded power since last Demand reset
- Power factor
- Maximum neutral demand current, since the last Demand reset (for three phase supplies only)

5.1.3 Energy Measurements

- Import/Export active energy 0 to 9999999.9 kWh
- Import/Export reactive energy 0 to 9999999.9 kVArh
- Total active energy 0 to 9999999.9 kWh
- Total reactive energy 0 to 9999999.9 kVArh

5.2 Measured Inputs

Voltage inputs through 4-way fixed connector with 2.5mm² stranded wire capacity. single phase two wire(1p2w), three phase three wire(3p3w) or three phase four wire(3p4w) unbalanced. Line frequency measured from L1 voltage or L3 voltage.

Three current inputs (six physical terminals) with 2.5mm² stranded wire capacity for connection of external CTs. Nominal rated input current 5A or 1A a.c. Rms.

5.3 Accuracy

- Voltage 0.5% of range maximum
- Current 0.5% of nominal
- Frequency 0.2% of mid-frequency
- Power factor 1% of unity (0.01)
- Active power (W) ±1% of range maximum
- Reactive power (VAr) ±1% of range maximum
- Apparent power (VA) ±1% of range maximum
- Active energy (Wh) Class 1 IEC 62053-21
- Reactive energy (VArh) ±1% of range maximum
- Total harmonic distortion 1% up to 31st harmonic
- Response time to step input 1s, typical, to >99% of final reading, at 50 Hz.

5.4 Auxiliary Supply

Two-way fixed connector with 2-5mm2 stranded wire capacity. 85 to 275V a.c. 50/60Hz ±10% or 120V to 380V d.c. ±20%. Consumption < 10W.

5.5 Interfaces for External Monitoring

- Three interfaces are provided:
- RS485 communication channel that can be programmed for Modbus RTU protocol
- Relay output indicating real-time measured energy. (configurable)
- Pulse output 3200imp/kWh (not configurable)

The Modbus configuration (baud rate etc.) and the pulse relay output assignments (kWh/kVArh, import/export etc.) are configured through the set-up screens.

5.5.1 Pulse Output

The pulse output can be set to generate pulses to represent kWh or kVArh.

Rate can be set to generate 1 pulse per:  
0.01 = 10 Wh/VArh  
0.1 = 100 Wh/VArh  
1 = 1 kWh/kVArh  
10 = 10 kWh/kVArh  
100 = 100 kWh/kVArh  
1000 = 1000 kWh/kVArh  
Pulse width 200/100/60 ms.  
Relay Rating 240V ac 50mA

5.5.2 RS485 Output for Modbus RTU

For Modbus RTU, the following RS485 communication parameters can be configured from the set-up menu:  
Baud rate 2400, 4800, 9600, 19200, 38400  
Parity none (default) / odd / even  
Stop bits 1 or 2  
RS485 network address nnn – 3-digit number, 1 to 247

Modbus™ Word order Hi/Lo byte order is set automatically to normal or reverse. It cannot be configured from the set-up menu.

5.6 Reference Conditions of Influence Quantities

Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

- Ambient temperature 23°C ±1°C
- Input frequency 50 or 60Hz ±2%
- Input waveform Sinusoidal (distortion factor < 0-005)
- Auxiliary supply voltage Nominal ±1%
- Auxiliary supply frequency Nominal ±1%
- Auxiliary supply waveform (if AC) Sinusoidal (distortion factor < 0-05)
- Magnetic field of external origin Terrestrial flux

5.7 Environment

- Operating temperature –25°C to +55°C\*
- Storage temperature –40°C to +70°C\*
- Relative humidity 0 to 95%, non-condensing
- Altitude Up to 3000m
- Warm up time 1 minute
- Vibration 10Hz to 50Hz, IEC 60068-2-6, 2g
- Shock 30g in 3 planes

\* Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.

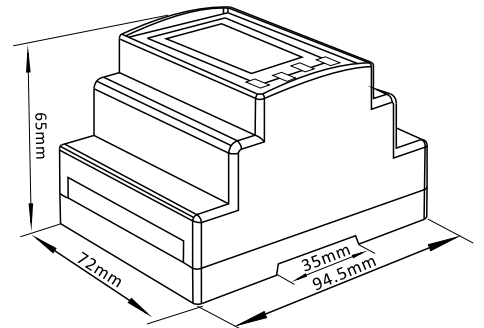
5.8 Mechanics

- DIN rail dimensions 72 x 94.5 mm (WxH) per DIN 43880
- Mounting DIN rail (DIN 43880)
- Sealing Ip51 (indoor)
- Material Self-extinguishing UI94 V-0

5.9Declaration of Conformity(for the MID approved version meter only)

The fulfilment of the essential requirements set out in Annex I and in the relevant instrument-specific Annexes has been demonstrated. We Qonnex bv, declare under our sole responsibility as the manufacturer that the poly phase multifuntion electrical meter "EMM.630 CT" correspond to the production model described in the EU-type examination certificate and to the requirements of the Directive 2014/32/EU EC type examination certificate number 0120/SGS0358, identification number c f the NB0598 SGS Fimko Finland. The object described above is in conformity with the relevant Union harmonization legislation.

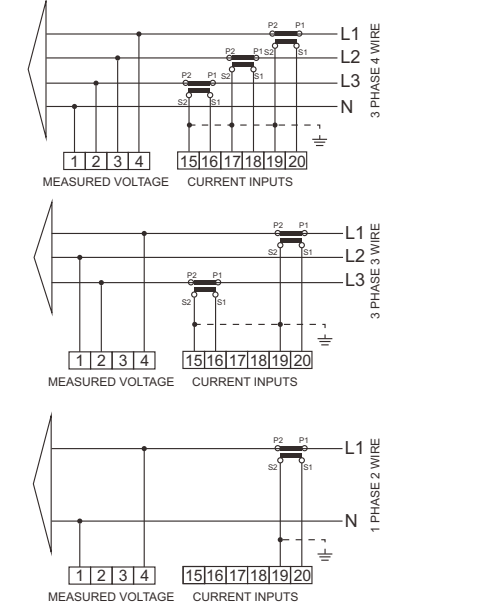
6.Dimensions



7.Installation

The wiring diagram of EMM.630CT series has little difference from different models. please make sure the wiring is correct before turn on power of the meter.

current and Voltage inputs



Definitions of other terminals

