

## EMM- $\mu$ D3m-TT

## EMM- $\mu$ D3m-485-TT

### DIGITAL MULTIFUNCTION METER FOR ELECTRICAL PARAMETERS

#### GENERAL

The digital multimeters series **EMM- $\mu$ D3m** allow monitoring the main electrical parameters present on a distribution line. The local display of the various electrical parameters is carried out by 3 displays with red LED, granting a good and simultaneous reading of various values. A simple front panel completes the intuitive selection of several electrical parameters, in order to provide full information.

This instruments have a active energy counter for each phase (three single phase energy counters), separated for positive (exported) and negative (imported) plus the counters for system energy active (exported / imported) and reactive.

These instruments store and display several parameters (see table **STORED VALUES (max/max-avg)**) into **MEASURED PARAMETERS** section.

The multifunction meters EMM replace in a unique device, all the functions of voltmeters, ammeters, energy meters, cosphimeters, wattmeter's, varmeters, hour meters and frequency meters. This gives a great economic saving, by reducing space and time, optimising also the purchase management of instruments, since one model meets most demanding requirements for local measuring in electrical boards, switch-boards, MCC's, Gen-sets, etc.



#### AVAILABLE TYPES

Among the large range of the **EMM** multimeters family, find here below the available **EMM- $\mu$ D3m-TT** types:

**EMM- $\mu$ D3m-TT** base version.

**EMM- $\mu$ D3m-485-TT** as **EMM- $\mu$ D3m-TT** but with RS485 port.

The auxiliary supply for all types, is available with following voltages:

- 230V (rated) 50-60Hz standard version
- 110V (rated) 50-60Hz optional version
- 400V (rated) 50-60Hz optional version

#### OPTIONS

**Options:** Auxiliary supply and measuring voltages, other than standard (under request)  
TT or TTA current sensors to choose between available models

#### INTRODUCTION

The auxiliary supply is connected to 2 terminals, separated from the measuring voltage inputs.

The current inputs are fitted only for TT-sensors series.

**No other types of transducers or CT can be connected to the current inputs of this instruments. The multimeter is shipped with current inputs configured for the TT-sensor and cannot be changed by the user.**

All types can be set to have energy counters operating in two modes:

- Bidirectional counters mode, with energy counters to count imported and exported active energy
  - (SEt uP / n dE En / bl- dlr)
- Total / partial counters mode, with energy totalize and resettable counters; in this mode ONLY the exported energy is counted
  - (SEt uP / n dE En / Tot PRr)

## MEASURED PARAMETERS

Parameters	Measuring units	Identification symbols			
<b>INSTANTANEOUS VALUES</b>					
phase and three phase voltage	[V]	V <sub>L1-N</sub>	V <sub>L2-N</sub>	V <sub>L3-N</sub>	Σ V <sub>L-N</sub>
phase to phase and three phase system voltages	[V]	V <sub>L1-L2</sub>	V <sub>L2-L3</sub>	V <sub>L3-L1</sub>	Σ V <sub>L-L</sub>
phase and three phase currents	[A]	I <sub>L1</sub>	I <sub>L2</sub>	I <sub>L3</sub>	Σ I
phase and three phase power factors		PF <sub>L1</sub>	PF <sub>L2</sub>	PF <sub>L3</sub>	Σ PF
phase and three phase active powers	[kW]	W <sub>L1</sub>	W <sub>L2</sub>	W <sub>L3</sub>	Σ W
phase and three phase system reactive powers	[kVAr]	VAR <sub>L1</sub>	VAR <sub>L2</sub>	VAR <sub>L3</sub>	Σ VAR
phase and three-phase system apparent powers	[kVA]	VA <sub>L1</sub>	VA <sub>L2</sub>	VA <sub>L3</sub>	Σ VA
three phase average powers	[kW-kVAr-kVA]	Σ W <sub>(avg)</sub>	Σ VAR <sub>(avg)</sub>	Σ VA <sub>(avg)</sub>	
frequency	[Hz]	Hz <sub>L1</sub>			
hours meter	[h]	h			
<b>ENERGY COUNTERS</b>					
<b>setup <math>n d E E_n = b l - d l r</math> (bidirectional)</b>					
phase and three phase imported active energy	[kWh]	Kwh+ <sub>L1</sub>	Kwh+ <sub>L2</sub>	Kwh- <sub>L3</sub>	Σ kWh+
phase and three phase exported active energy	[kWh]	Kwh - <sub>L1</sub>	Kwh- <sub>L2</sub>	Kwh- <sub>L3</sub>	Σ kWh-
three phase inductive reactive energy	[kVArh]	Σ kVArh +			
three phase capacitive reactive energy	[kVArh]	Σ kVArh -			
<b>setup <math>n d E E_n = T O t - P A r</math></b>					
phase and three phase active energy totalizer	[kWh]	Kwh <sub>Tot L1</sub>	Kwh <sub>Tot L2</sub>	Kwh <sub>Tot L3</sub>	Σ kWh <sub>Tot</sub>
phase and three phase active energy resettable	[kWh]	Kwh <sub>Part L1</sub>	Kwh <sub>Part L2</sub>	Kwh <sub>Part L3</sub>	Σ kWh <sub>Part</sub>
three phase reactive energy totalizer counter	[kVArh]	Σ kVArh <sub>Tot</sub>			
three phase reactive energy resettable counter	[kVArh]	Σ kVArh <sub>Par</sub>			
<b>STORED VALUES (max / max- avg):</b>					
phase voltage	[V]	V <sub>L1-N max</sub>	V <sub>L2-N max</sub>	V <sub>L3-N max</sub>	
phase current	[A]	I <sub>L1 max</sub>	I <sub>L2 max</sub>	I <sub>L3 max</sub>	
phase average current (maximum demand)	[A]	I <sub>L1 max (avg)</sub>	I <sub>L2 max (avg)</sub>	I <sub>L3 max (avg)</sub>	
three phase system powers	[kW-kVAr-kVA]	Σ W <sub>max</sub>	Σ VAR <sub>max</sub>	Σ VA <sub>max</sub>	
three phase system average power (max demand)	[kW-kVAr-kVA]	Σ W <sub>max (avg)</sub>	Σ VAR <sub>max (avg)</sub>	Σ VA <sub>max (avg)</sub>	

## INSTALLATION

### WARNING FOR THE USER

Read carefully the instructions/indications contained in this manual before installing and using the instrument.

The instrument described in this manual is intended for use by properly trained staff only.

### SAFETY

This instrument has been manufactured and tested in compliance with EN 61010-1 (IEC1010) standards. In order to maintain these conditions and to ensure safe operation, the person must comply with the indications and markings contained in the manual. When the instrument is received, before beginning installation, check that it's OK and it has not suffered any damage during transport. When starting installations make sure that the operating voltage and mains voltages are compatible with the device instructions. The instrument power supply must not be earthen. Only qualified and authorised personnel must carry out maintenance and/or repair. If there is ever the suspicious that, that there is a lack of safety, during operation, the instrument must be disconnected and cautions taken against accidental use.

**Operation is no longer safe when: The instrument doesn't work. - There is clearly visible damage. - After serious damage occurred during transport. - After a storage under unfavourable conditions.**

The fixing to the DIN rail is granted by the rear spring fixing device.

It's better to put an external protection with fuses for the voltage inputs and to use adapted cables for the working currents and voltages: section from 0.5 to 4 mm<sup>2</sup>.

## WIRING

For a correct use of the device, the wiring diagram contained in the present manual must be respected. The connections are available on the screw terminals:

### - Power supply:

The auxiliary power supply is taken from the terminals aux1 and aux2. The rated supply voltages can be:

standard: Vn 230V ± 15% 50-60Hz  
 under request: Vn 110V ± 15% 50-60Hz  
 under request Vn 400V ± 15% 50-60Hz

### - measuring voltage inputs:

4 terminals are available for wiring to the 3 phase and neutral of the measuring network, the maximum voltage phase to phase shouldn't be over 500V rms and 290V between phase and neutral.

In case of a 3-phase system without neutral or non-distributed neutral, leave terminal N free.

For single phase use, wiring should be done between terminals L1 and N and bridge L2 and L3 phases to neutral N.

### - measuring current inputs:

6 terminals are available for wiring to 3 current sensors; it's possible to use 2 sensors on 3 wires lines with (Aron three-phase wiring) and the use of 1 sensor in case of single phase system (input IL1).

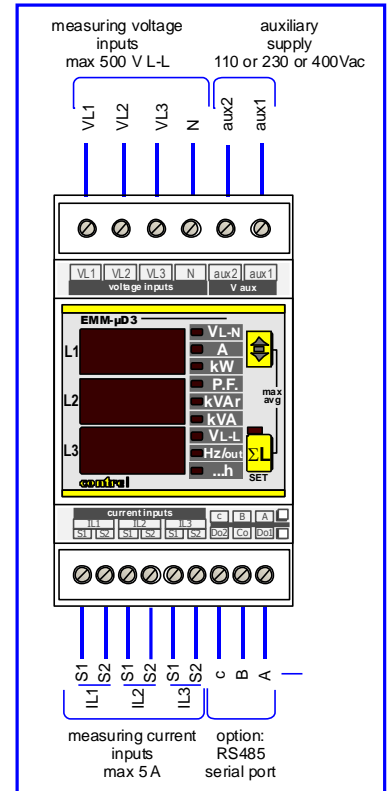
**CAREFULL: DO NOT USE DIFFERENTS SENSOR. The instruments can use only Control sensor TT series and only the type fitted in the shipped instrument. Use**

**of different type of sensors or CT can produce damage for the instrument and danger for the users. Wires leadings primary currents MUST be insulated type and with adequate insulation to the line voltage. The instrument's SETUP menu allows to set the transformation rate adequate to the sensor (see Table TT-sensor ratios) and it's possible to visualise readings of current up 999 A. Should the case be that calculated current is higher than the maximum value, the display will show the over range condition. The maximum setting of the transformation ratio is 2000/5=400**

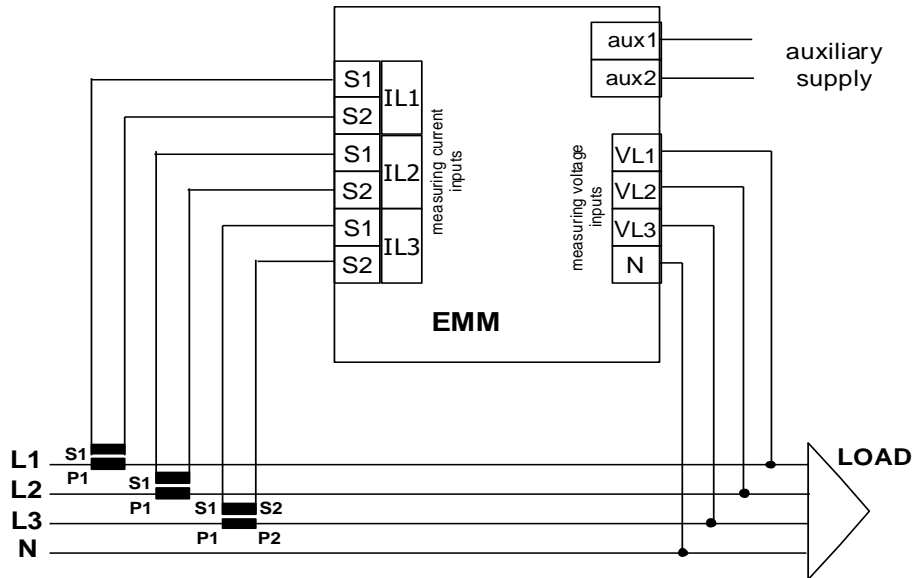
TABLE TT SENSOR

TT type	TT10	TT25	TT50
CT ratios	2	6	12
Wire S1	Red	White	Blue
Wire S2	Black	Black	Black

**NOTE: For a correct measuring of the power factor and energies and powers it's a must to respect the phase sequence. The connections between current and voltage phase inputs must not be inverted (for example, CT placed on phase L1 must correspond to the I1 input). So as it is not correct to invert S1 and S2 of the CT's terminals.**

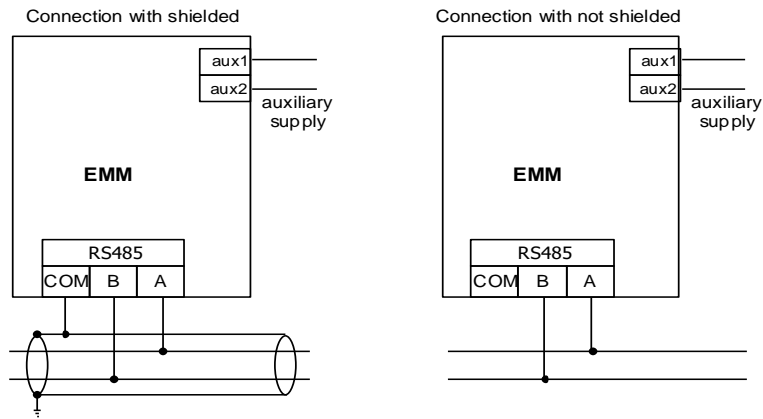


**WIRING IN A THREE PHASE LINE WITH 3 OR 4 WIRES**



On three wires line (without neutral or with not distributed neutral) DON'T wire the N terminal.

**RS485 Connection**



**DESCRIPTION:**

**LEGEND:**

**A:** Key for visualising the three phase system parameters with its corresponding **LED**. By pressing again this key, the instrument returns to reading each individual phase. By keeping the key pressed for 5 seconds the instrument reaches the programming mode (**SETUP**). In **SETUP** mode, this key confirms the values set and by pressing the **B** key simultaneously, it starts decreasing the value.

**B:** Key for selecting the measured parameters to be shown at the **C** display. In **SETUP** mode selects and modifies the value of the parameters to be set.

**A+B:** With the simultaneous pressing of both keys the instrument reaches the visualisation of the maximum and average values, which may be selected with the **B** key. The visualisation back to instantaneous values display after 25 seconds if no key action.

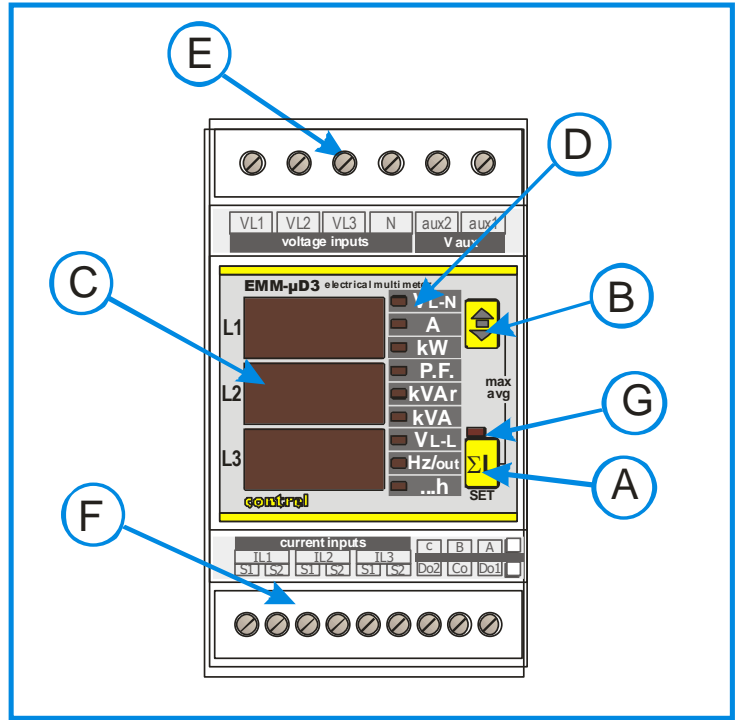
**C:** Three displays for visualising the measures, subdivided by phase of the parameters indicated by the LED **D** bar. In case that the  $\Sigma L$  LED (**G**) is glowing, the instruments shows the three phase values of the measures, indicated by the LED **D** bar.

**D:** LED bar for indicating the measures visualised on display **C**.

**E:** Terminals for wiring the voltage measures input and auxiliary supply.

**F:** Terminals for wiring the current measures input and the digital output (when present in the instrument).

**G:** LED for indicating of a three phase value visualisation.




**MENU FOR PROGRAMMING THE INSTRUMENT (SETUP)**


The instrument's **SETUP** menu is reached by pressing the **A** key during 5 seconds. Once in the **SETUP** menu, it is possible to select or modify the visualised parameter's value, by pressing the **B** key.


If no pressing is made on any key during 8 seconds, the instrument escapes from the **SETUP** menu.

For a correct operation of the multimeters the instrument has to be programmed with the transformation ratio of the current sensor.


It will only be possible to reset the energy meters in those instruments fitted with such a characteristic. The set values are kept without auxiliary supply even.







































 > 5 seconds, access to the programming menu (**SETUP**)

 for selecting of a parameter or modifying the parameter's value for programming (**SELECT**)

 for confirming the selection or confirming the programmed parameter's value (**ENTER**)

## CONFIGURATION OF GENERAL PARAMETERS (SEt uP)

Entry to menu:  SEt uP →

		SEt uP →		SEt uP		
				SEt Hr		
				SEt Ct		Increase
				<b>Set CT ratio</b>		 Decrease
				from 1 to 400		
				SEt Ut		Increase
				<b>Set VT ratio</b>		 Decrease
				from 0.1 to 400.0		
				SEt AUG t		Increase
				<b>Set average time</b>		 Decrease
				from 1 to 30 minutes		
				SEt EN n d E		-bl-dlr
				<b>Set energy counters</b>		-tot PAR
				mode		
				SEt n d E		-3-
				<b>Set wiring connection</b>		-4-
				type		
				SEt SYN n d E		L1
				<b>Set synchronism</b>		50
				type		60
(only for EMM-μD3h-485)				SEt Id Ad r		Increase
				<b>Set address of network</b>		 Decrease
				from 001 to 247		
				SEt SEr b d r		19.2
<b>Set baud rate</b>				19200 baud		9.60
<b>serial interface</b>				9600 baud		4.80
(only for EMM-μD3h-485)				4800 baud		2.40
				2400 baud		
				SEt PAR		8.1 PAR no
<b>Set parameters of</b>				bit: 8 data 1stop-no parity		8.2 PAR no
<b>Communication</b>				bit: 8 data 2stop-no parity		8.1 PAR EUE
<b>serial interface</b>				bit: 8 data 1stop-even parity		8.1 PAR odd
(only for EMM-μD3h-485)				bit: 8 data 1stop-odd parity		
				SEt PAS		Increase
				<b>Set Password</b>		 Decrease
				oFF - 0002 ÷ 9999		
				Confirm and end of general settings		

### Use of key in Setup

The **A** key is used to ENTER into an item menu, CONFIRM and ADVANCE to next setup when modifying the parameters. When modifying the parameter, to increase the value press the **B** key, to decrease it, keep hold the **B** key and then press the **A** key. To speed up the operation to increase or decrease, keep on pressing the button(s) and the variation will appear successively by tens and hundreds, releasing and pressing the key again it will return to increase or decrease the value at unit per unit. Always press the **A** key to confirm setup and go to the next item of programming menu. If you don't want to confirm and save the modified setting, don't press any key and wait the automatically exit from programming to return to measure display mode.

### Accessing to Setup

Some seconds after giving the auxiliary supply to the instrument (during the switching on, all LED and displays will flash alternatively to the firmware indication), by pressing the **A** key for at least 5 seconds and then the display **C** will show the message **5 E t u P**.

### Programming the transformation ratio of the external CT's (5 E t C t)

The programming of the CT's ratio is considered as the rate between the primary and the secondary (i.e.: with CT 1000/5, we must set 200 as value). Press **A** key to enter the **C t** programming menu and **C** display will show the message **5 E t C t**; the value of the transformation ratio (set as 1 by the manufacturer) will appear on **C** display.

### Programming of the transformation ratio of the external voltage transformers (5 E t U t)

After the precedent programming phase, on **C** display will appear the inscription **U t** (voltage transformer) and the value of the transformation rate of the external TV (set to 1 from the constructor), considered as the rate between primary and secondary (example with TV 15/0.1 kV the value will be 150). In the same way at the programming of the CT rate will be possible to set this value. If the external TV are not used the value to set will be 1. To confirm the value press the **A** button.

### Programming of the average time (5 E t A U G t)

This setting allows to modify the average time. The average time is the time used to calculate the averaged values (**avg**) and the maximum demand (**maxD**) for the values as in table **peak value (maximums)**; this parameter is settable from 1 to 30 minutes and showed on the **C** display with the message **A U G t**.

### Programming energy counters mode (E n n d E)

This setting allows to definite the setting of energy counter. In **bl-dlr** (energies imported/ exported) the active positive and negative energies have separated counters; all the counters can be zeroed by the reset energies menu; in **to PR** mode, there are only positive active energies counters; negatives (imported) energies are not counted; only the partial counters can be zeroed by reset menu.

### Programming wiring connection mode (n d E)

This setting allows to define the wiring type connection. It's possible to chose 3 wires or 4 wires. With the 4 wires connection the neutral parameter are displayed and enabled to use for the digital outputs settings.

### Programming of the synchronism type (5 Y n n d E)

This is the setting for the synchronization type for the line frequency. It's possible to choose **L1** to use the line frequency (on L1 phase) as reference for internal calculation; chose **50**, or **60** (Hz) to use the internal clock. This is useful when large value of THD on the power line don't allow right measurement.

### Programming of the address for the communication network (5 E t Id R d r) (only for EMM-µD3m-485-TT)

Choosing the **5 E t Id R d r** item allow to set the value that will identify the instrument when it will be connected in a EIA485 communication network, proceed with the modality, already described. The Id address value is showed on display **C** The range of values are from 1 to 247.

### Programming of the baud rate (5 E t b d r) (only for EMM-µD3m-485-TT)

The following setting is the baud rate. The message **5 E t b d r** on the first two parts of **C** display to indicate the programming of the baud rate displayed on the third part (L3) of the **C** display. To. The values settable are:

- 19.2 => 19200 baud	- 9.60 => 9600 baud	4.80 => 4800 baud	2.40 => 2400 baud
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### Programming of the serial parameters (only for EMM-µD3m-485-TT)

The following message will appear on **C** display using the **B** key. To confirm press the **A** key.

<b>B 1</b> 8 data bit / 1 stop bit	<b>B 2</b> 8 data bit / 2 stop bit	<b>B 1</b> 8 data bit / 1 stop bit	<b>B 1</b> 8 data bit / 1 stop bit
<b>PR</b> No parity	<b>PR</b> No parity	<b>PR</b> Even parity	<b>PR</b> Odd parity
<b>no</b>	<b>no</b>	<b>EUE</b>	<b>odd</b>

### Programming of the Password (5 E t P A S)

The instrument is supplied without password. When a password (from 0002 to 9999) is set the setup access is allowed only if the same value of password is entered. The password is required always to enter in the setup (pressing the **A** key for more than 5 seconds). If the password is wrong, the message **P A S S E r r** will appear on **C** display and the instrument go back to the measures visualization. To input the password, when required by the instrument, at the enter of the setup, use the **A** and **B** keys as the same way done previously.

## CANCELLING OF THE PEAK VALUES AND ENERGY METERS (rESEt)

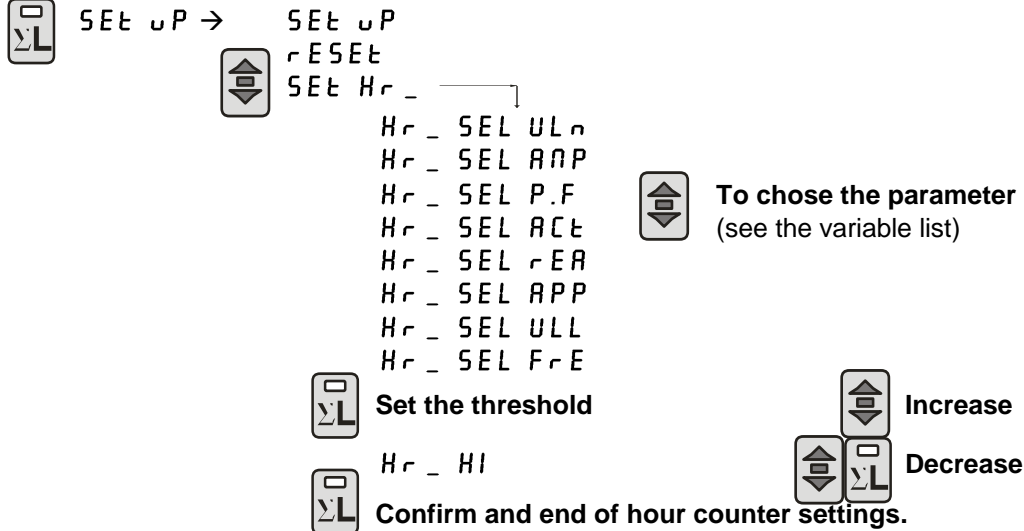
From the measures visualisation mode, keep the **A** key pressed until the message *SEt uP* appears on the **C** display; then press the **B** key until the message *rESEt* appears on the **C** display; access to the reset menu by pressing the **A** key. By pressing the same key we can now select the cancellation type that we wish to activate. Here below the different types:

- rESEt PEA*      cancellation of the instantaneous values only
- rESEt 15'*      cancellation of the average values in the 15' only
- rESEt En*      cancellation of the energy meters
- rESEt ALL*      cancellation of the energy meters, average and the instantaneous values.

To activate the selected cancellation mode, press the **B** key to change the **C** display's indication from *no* to *YES*. Confirm to activate the cancellation, by pressing the **A** key; the indication in the display **C** will pass from *YES* to *---*. Without pressing any key, wait until the instrument returns to the measures visualisation mode.

## PROGRAMMING OF THE HOURS COUNTER (SEt Hr\_)

The hour counter will be increased when the measure of the parameter will exceed the set threshold value.



### SELECT THE PARAMETER TO LINK TO THE HOURS COUNTER

From the previous setting, pressing the **C** key it's possible to set the hours counter: the message *SEt Hr\_* appears on the **F** display. Press the **A** key to define the parameter to link to the hours counter. Press more time the **B** key to select the parameter and the **A** key to confirm it.

### SET THE THRESHOLD

Subsequently it's necessary to set the threshold using the **B** (to increase) and **C** (to decrease) keys. Confirm with **A** key.

### VARIABLE LIST

<i>ULn</i>	three-phase voltage	<i>ACt</i>	active power	<i>ULL</i>	phase to phase voltage
<i>ANP</i>	three-phase current	<i>rEA</i>	reactive power	<i>FrE</i>	frequency
<i>P.F</i>	three-phase power factor	<i>APP</i>	apparent power		



## MEASURES VISUALISATION

According with the glowing status of the **G** LED the reading of the measures is visualised on display **C**, either the **three measures of the phase values** or the **three phase measured values** (average of the individual phases for voltage, current, power factor and the sum of the individual phases for powers). With the **G** LED off, the instrument will visualise the **three measures of phase** (L1, L2 and L3 respectively) of the parameter indicated by the light of the LED **D** for the phase to phase measures (V L-L), the three measures are understood V L1-L2, V L2-L3, V L3-L1 respectively. By pressing the **B** key, you may select the parameters to visualise, which will be indicated by the LED **D**. The visualisation of the frequency page shows also the status of the digital output (if present).

By pressing the **A** key with the **G** LED on, the instrument will visualize the selected parameters in **three phase values** (average of the individual phases for voltage, current, power factor and the sum of the individual phases for powers). In this mode, each page will show the measures of 3 parameters, indicated by the LED **D**, excluding the frequency pages, the energy meters and the hour meters. The visualising of the energy meters is only possible with the **G** LED on. If the hour meter is available, is visualised: as hour meter per phase, activated by the three phase current, after the visualisation of energies in those types fitted with energy meters.

By pressing the same key again, the instrument returns to the visualisation of the phase parameters. Should the single phase system wiring been made, the visualisation of the values will be shown in the same way as per the three phase measures, indicating three parameters on each page. In the present case the LED **G** will never glow, since it isn't a three phase system.

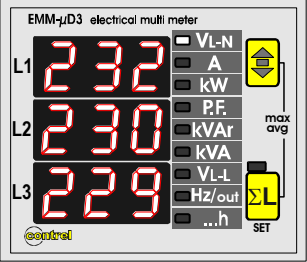
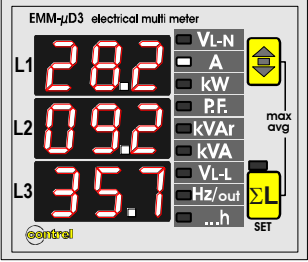
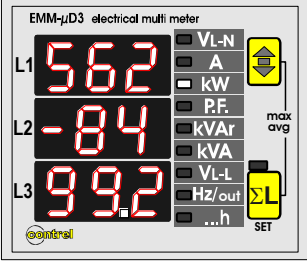
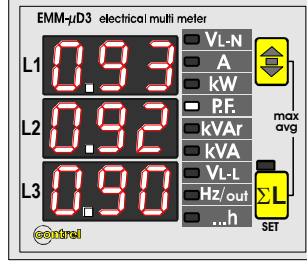
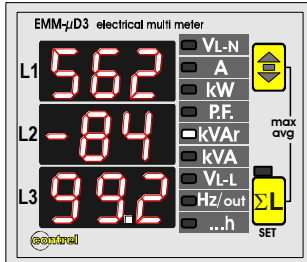
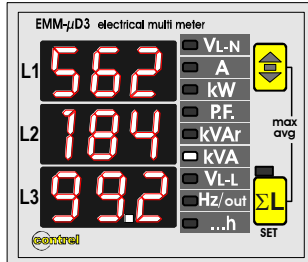
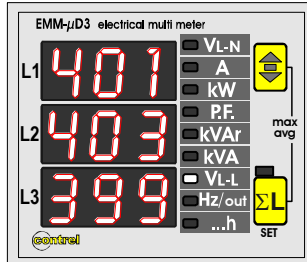
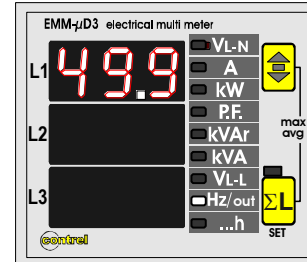
## VISUALISATION OF ENERGY METERS

The visualisation of the energy meters are shown with the lighting of the LED **kW + ...h** indicating the active energy values (kWh), whilst the lighting of the LED **kVAr + ...h** are indicating the reactive energy values (kVArh). The reading of the meters uses the 9 digits (maximum reading 9999999.9) of the display **C**: the measure comes visualised in such a way that, the display L1 will show the first 3 digits, the display L2 the second 3 digits and the display L3 the last 3. The display of counted energy is always alternate with a subsidiary indication of phase and line which count is referred (please see the follows examples). When the led of **A** button is OFF, the single phase energy counters are displayed. When the led of **A** button is ON, the three phase energy (system) counters are displayed. Reading example: with: L1=000, L2=028, L3=53.2, the reading is equal to 00002853.2 kWh.

## VISUALISATION OF HOURS METER.

The hour meter uses only 6 digits (maximum reading 99999.9) of the display **C**: the measure comes visualised in such a way that, the display L1 will show the first 3 digits, and the display L2 the last 3 digits. For example if: L1=008, L2=53.2 the reading is equal to 00853.2 h.

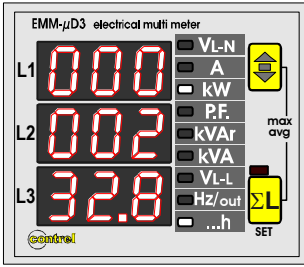
## SINGLE PHASE PAGES FOR INSTANTANEOUS VALUES

<p>Visualization page 1 VL1-N on L1 = 232 V VL2-N on L2 = 230 V VL3-N on L3 = 229 V</p> 	<p>Visualization page 2 IL1 on L1 = 28,2 A IL2 on L2 = 9,2 A IL3 on L3 = 35,7 A</p> 	<p>Visualization page 3 PL1 on L1 = 562 kW PL2 on L2 = - 84 kW (exported) PL3 on L3 = 99,2 kW</p> 	<p>Visualization page 4 PF on L1 = 0,93 PF on L2 = 0,92 PF on L3 = 0,90</p> 
<p>Visualization page 5 QL1 on L1 = 562 kVAr QL2 on L2 = -84 kVAr (capacitive) QL3 on L3 = 99,2 kVAr</p> 	<p>Visualization page 6 SL1 on L1 = 562 kVA SL2 on L2 = 184 kVA SL3 on L3 = 99,2 kVA</p> 	<p>Visualization page 7 VL1-L2 = 401 V VL2-L3 = 403 V VL1-L3 = 399 V</p> 	<p>Visualization page 8 F on L1 = 49,9 Hz</p> 

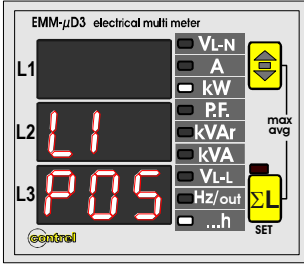
# SINGLE PHASE PAGES FOR ENERGY COUNTERS

## Visualization page 9

Active Energy imported  
(POSitive Active energy)  
L1 phase : 232,8 kWhr

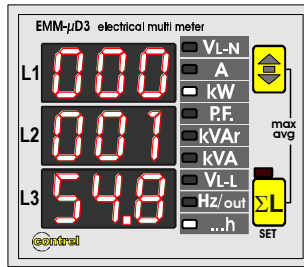


Alternating display :  
phase L1 Pos  
(imported energy)

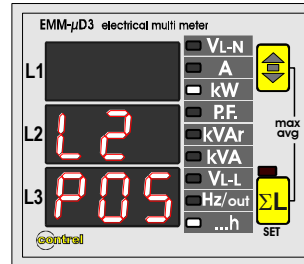


## Visualization page 10

Active Energy imported  
(POSitive Active energy)  
L2 phase : 154,8 kWhr

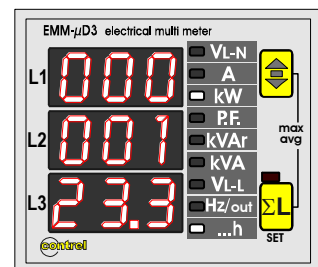


Alternating display :  
phase L2 Pos  
(imported energy)

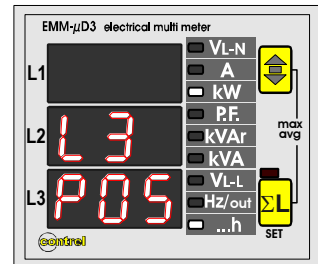


## Visualization page 11

Active Energy imported  
(POSitive Active energy)  
L3 phase : 123,3 kWhr

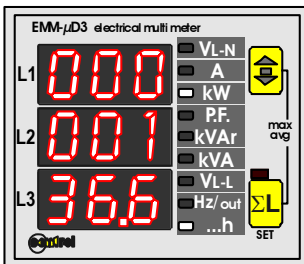


Alternating display :  
phase L3 Pos  
(imported energy)

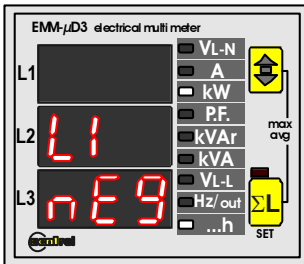


## Visualization page 12

Active Energy exported  
(NEGative Active energy)  
L1 phase : 136,6 kWhr

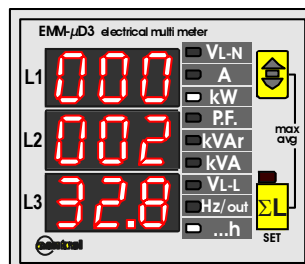


Alternating display :  
phase L1 Neg  
(exported energy)

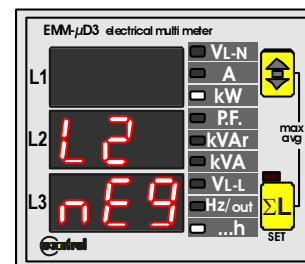


## Visualization page 13

Active Energy exported  
(NEGative Active energy)  
L2 phase : 232,8 kWhr

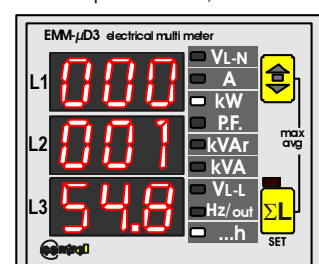


Alternating display :  
phase L2 Neg  
(exported energy)

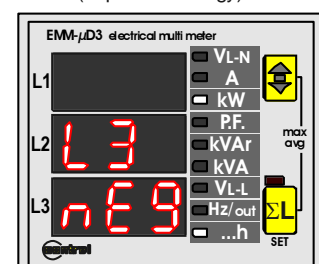


## Visualization page 14

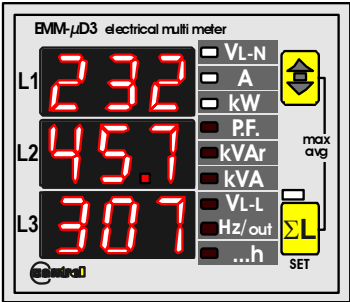
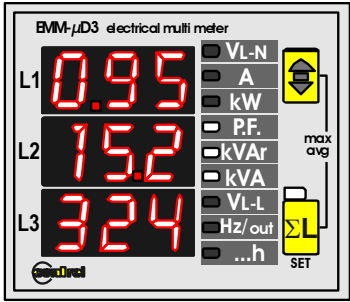
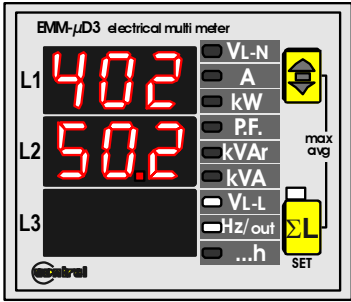
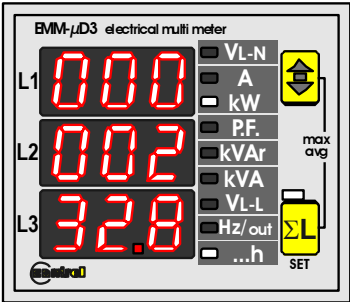
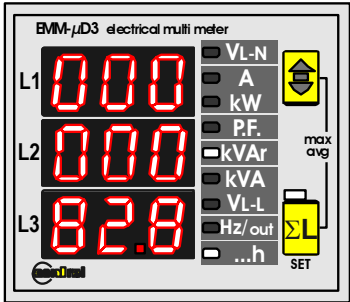
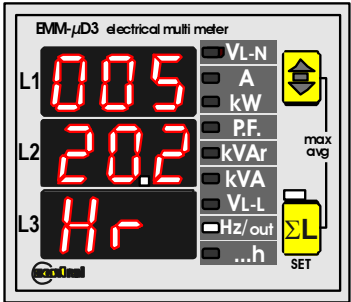
Active Energy exported  
(NEGative Active energy)  
L3 phase : 154,8 kWhr



Alternating display :  
phase L3 Neg  
(exported energy)



## VISUALIZATION OF THE THREE PHASE INSTANTANEOUS VALUES

<p>Visualization page 1</p> <p><math>\Sigma VL-N</math> on L1 <math>\Sigma IL</math> on L2 <math>\Sigma KW</math> on L3</p> 	<p>Visualization page 2</p> <p><math>\Sigma PF</math> on L1 <math>\Sigma kVAr</math> on L2 <math>\Sigma kVA</math> on L3</p> 	<p>Visualization page 3</p> <p><math>\Sigma VL-L</math> on L1 Freq. on L2</p> 
<p>Visualization page 4</p> <p>Three Phase Active Energy counted 232,8 kWh</p> 	<p>Visualization page 5</p> <p>Three Phase Reactive Energy counted 82,8 kVArh</p> 	<p>Visualization page 6</p> <p>Three Phase Hour counter 520.2 h</p> 

### NOTE ON THE VISUALISATION OF THE PARAMETERS

The visualisation of a capacitive power factor value comes represented by a – sign before the first digit of the display (example of reading: - .95 indicates a capacitive power factor of 0.95). The visualisation of a negative active power (inverted connection of the CT's or cogeneration presence) comes represented by a – sign before the first digit of the display.

### VISUALISATION PEAK VALUES (MAXIMUM) INSTANTANEOUS AND AVERAGE.

By pressing simultaneously **A** and **B** keys the instrument reaches the visualisation of the peak value (maximum): the visualised measures selectable by **B** key, they will start flashing alternatively with the indication of the type of the maximum value.

The maximum stored values are of two types: the maximum instantaneous values store the maximum value of the measured parameter, during at least 1 second, the value will flash alternatively with the message **PEAK** (peak); the maximum average values (maximum demand) store the maximum value reached from the average value integrated on the time set in **RUG** of the measured parameter, the value will flash alternatively with the message **MDN**.

The integration for the calculation of the values is synchronised at every switch on of the instrument.

The maximum values, which may be selected with the **B** key are the following:

	parameter	Identification symbol			Value type
three-phase system	phase voltage	V L1-N max	V L2-N max	V L3-N max	PEAK
	phase current	I L1 max	I L2 max	I L3 max	PEAK
	average phase current (maximum demand)	I L1 max (avg)	I L2 max (avg)	I L3 max (avg)	MDN
	three phase system powers	$\Sigma W$ max	$\Sigma VAR$ max	$\Sigma VA$ max	PEAK
	average three-phase system powers (maximum demand)	$\Sigma W$ max (avg)	$\Sigma VAR$ max (avg)	$\Sigma VA$ max (avg)	MDN
	three phase system average powers	$\Sigma W$ (avg)	$\Sigma VAR$ (avg)	$\Sigma VA$ (avg)	RUG
	single-phase system	maximum phase voltage	V L1-N max		
maximum phase current		I L1 max			PEAK
maximum phase powers		$\Sigma W$ max	$\Sigma VAR$ max	$\Sigma VA$ max	PEAK
average phase current (maximum demand)		I L1 max (avg)			MDN
average phase powers (maximum demand)		$\Sigma W$ max (avg)	$\Sigma VAR$ max (avg)	$\Sigma VA$ max (avg)	MDN
average phase powers		$\Sigma W$ (avg)	$\Sigma VAR$ (avg)	$\Sigma VA$ (avg)	RUG

### NOTE relative to measures.

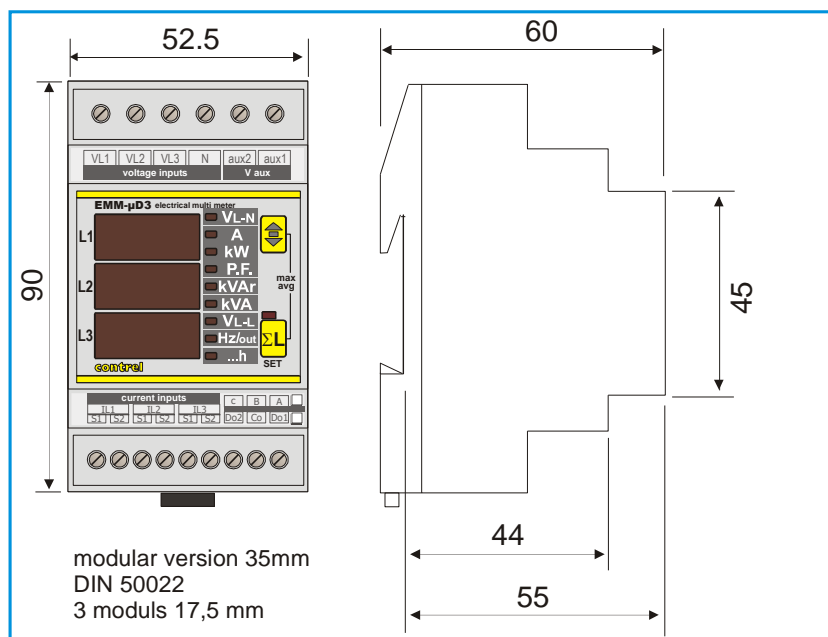
The refresh time of the displays is below 1 second, with a comfortable reading of the measures, even in presence of sudden variations of the measured parameters.

In case that the indicated measures aren't reliable or they are absurd, it's important to check carefully the current and voltage inputs connection, so as the phase sequence. Check that current and voltage correspond to the same phase (on input L1 it will be connected phase voltage L1 and the CT will be placed on phase L1), thence terminal S1 of CT will be wired to the relative terminal S1 on the instrument.

## TECHNICAL CHARACTERISTICS

MEASURES AND ACCURACY	
Voltage	True rms value of the phases voltages and phase to phase in a three phase system Total range of measure: 20÷500V trms phase to phase- 380V rms phase-neutral – 40÷100Hz Visualization (20,0÷500V) - measure accuracy: $\pm 0,5\%$ $\pm 1$ digit – maximum values management
Current	True rms value of phase currents and three phase system value Range of measure: 0,02÷5A trms digit – 40÷100Hz Visualization 0,02÷999A - accuracy: $\pm 0,5\%$ $\pm 1$ - average and maximum values management
Frequency	Frequency of phase L1 – measuring range: 30÷500Hz - Accuracy: $\pm 0,5\%$ $\pm 1$ digit
Powers	Active, reactive and apparent powers of phase and three phase system Range of measure: 0,01÷999kW - 0,01÷999kVAr - 0,01÷999kVA Accuracy: $\pm 1\%$ $\pm 1$ digit - Maximum, average and instantaneous values management
Power factor	Phase and three phase power factor Range of measure: -0,1÷0,1 / accuracy: $\pm 1\%$ $\pm 1$ digit - Maximum and average values management
Hour meter	Time counter in hours and tenth of hours Range of measure 0,0 ÷ 99999,9 h - accuracy $\pm 0,5\%$ - Threshold activation 0.05A x KCT
Energy measures	Active energies: - Phase counters for imported and exported energies - Three phase system counters for exported and imported energies Reactive energies: - Three phase system energy counters. Range of count: 0÷99999999,9 kWh / kVArh Class 1 (EN 62053-21)
AUXILIARY POWER SUPPLY AND INPUTS	
Auxiliary supply	Standard 230V $\pm 15\%$ - optional 110V or 400V $\pm 15\%$ - 50-60Hz - max 3VA
Voltage inputs	From 20 to 500V phase-phase; permanent overload +20% - input impedance: 1 M $\Omega$ 3, 4 and single phase wiring
Current inputs	only for use with TT series current sensors; permanent overload 30%
INPUTS / OUTPUTS	
serial output (only EMM- $\mu$ D3m-485)	One output RS485, baud rate selectable, MODBUS-RTU protocol, baud rate 2400÷19200 insulation: 3kV for 60 seconds
GENERAL	
Display, keys	3 display with red LED 7,5mm each of 3 digits 7 segments 2 keys for selecting measures and programming, LED bar 10 points
Mechanical	Protection degree: IP52 front - IP20 enclosure and terminals - weight: 0,3 kg approx. Screw wiring terminal for maximum cross section cable of 4 mm <sup>2</sup> Self-extinguishing plastic enclosure – for DIN rail mounting, 3 modules of 17,5mm
Environment	Working temperature: -10÷60°C; humidity < 95% - Storing temperature: -25÷70°C - Isolation test: 3kV for 1min.
Standards of reference	EN 61326-1; EN 55022; EN 61000-6-2; EN 61000-6-4; EN 61010-1; EN 62053-21

## DIMENSIONS



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