

ENGLISH



## DMM3



## Multi Panel Meter

## USER MANUAL

WARNING – Elcontrol Energy Net S.p.a. declines all liability for any damage to people or property caused by unsuitable or incorrect use of its products. Elcontrol Energy Net reserves the right to change product specifications without prior notice.

## MEASURES PAGES



**Fig. 1**  
VL1, VL2, VL3 (three-phase only)



**Fig. 2**  
AL1, AL2, AL3 (three-phase only)



**Fig. 3**  
A neutral (three-phase only)



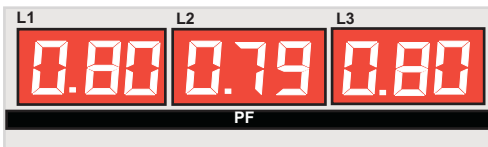
**Fig. 4**  
P1, P2, P3(three-phase only)



**Fig. 5**  
S1, S2, S3 (three-phase only)



**Fig. 6**  
Q1, Q2, Q3(three-phase only)



**Fig. 7**  
P.F.1,P.F.2,P.F.3, (three-phase only)



**Fig. 8**  
V, A, Hz(three and single-phase only)



**Fig. 9**  
P., P.F., S (three and single-phase only)



**Fig. 10**  
kWh Tot



**Fig. 11**  
kvarh Tot



**Fig. 12**  
kVAh Tot

## SETUP PAGES

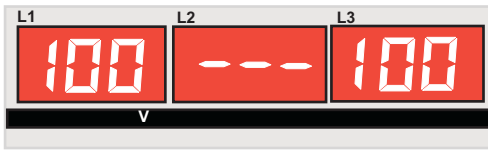


Fig. 13  
PT / TV SETUP

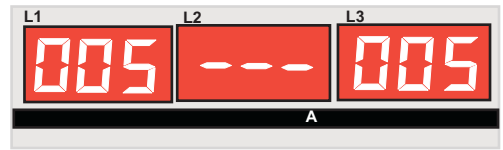


Fig. 14  
CT / TA SETUP



Fig. 15  
3 Wire



Fig. 16  
4 Wire



Fig. 17  
2 Phase



Fig. 18  
1 Phase

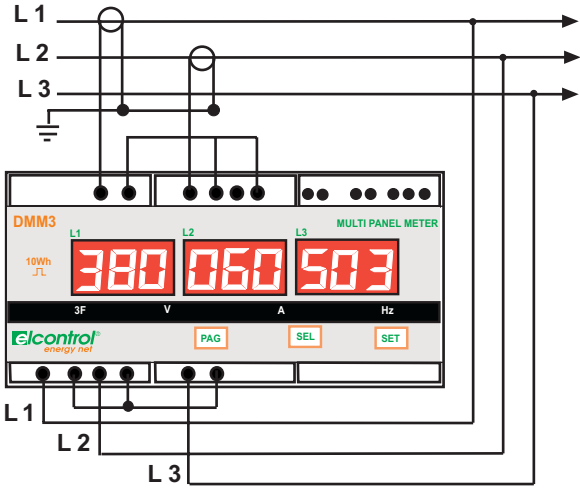


Fig. 19  
Resetting energy counters

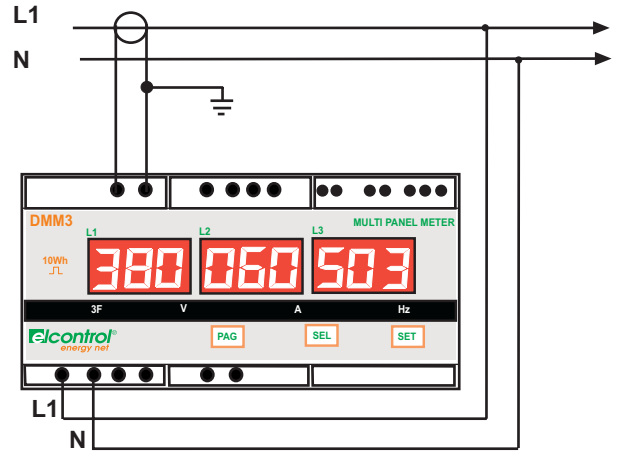


Fig. 20  
Password page

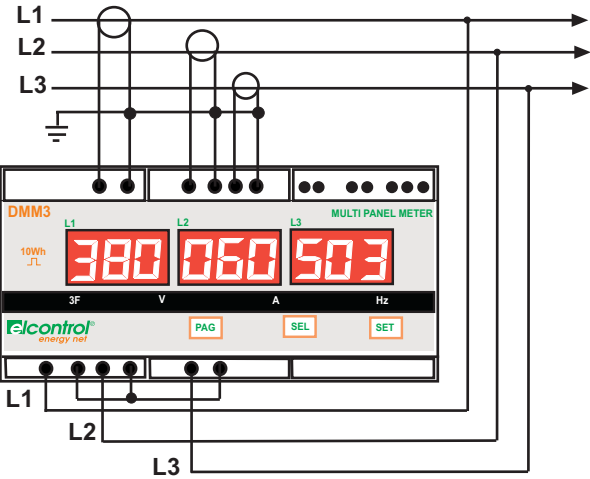
## WIRING DIAGRAMS MEASURES INPUTS



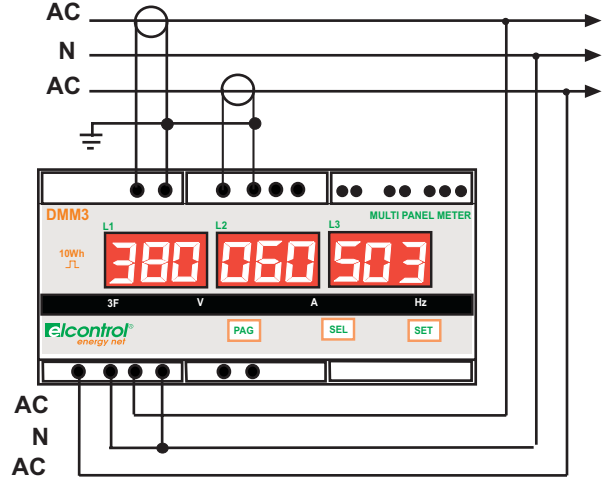
**3 PH (2 CT)**



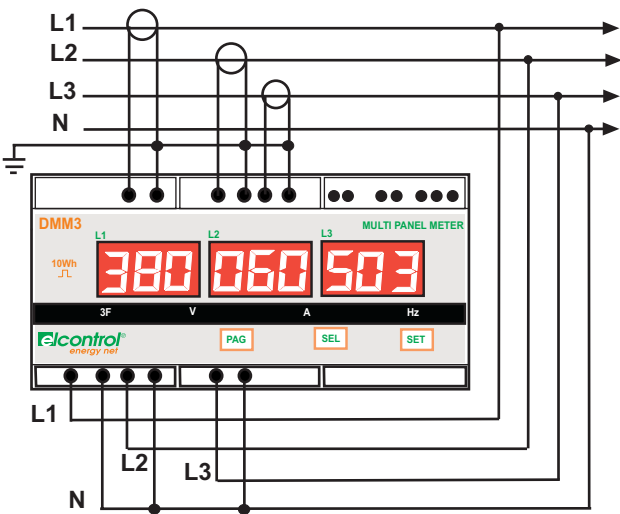
**1 PH**



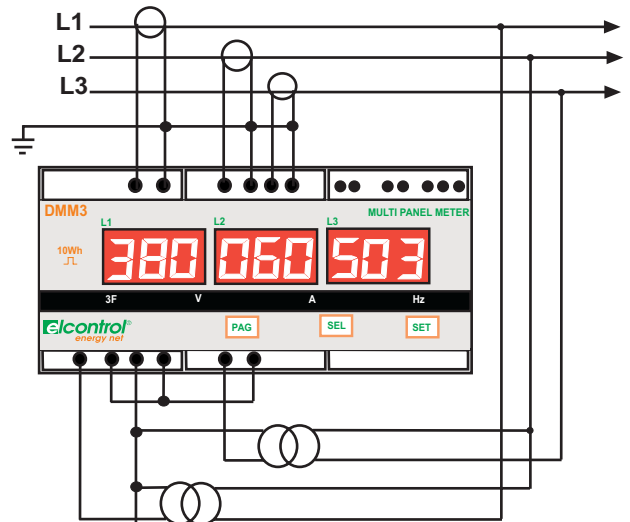
**3 PH**



**2 PH**

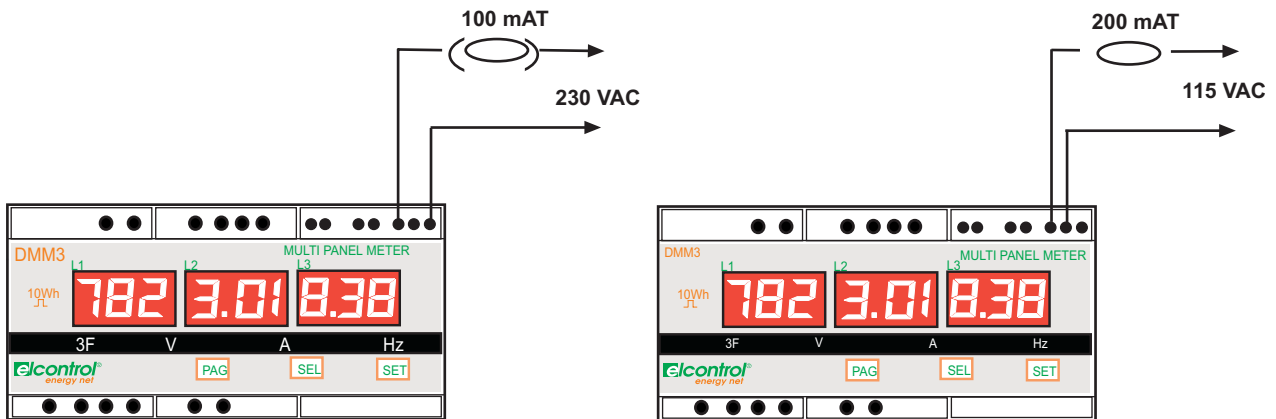


**3 PH-N**



**Medium Voltage 3 PH - (2 PT)**

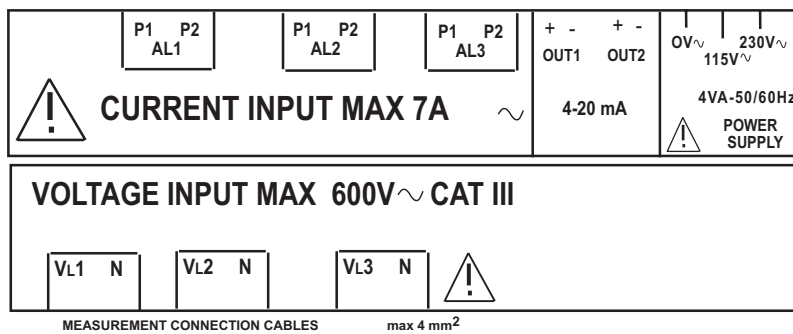
## POWER SUPPLY CONNECTION



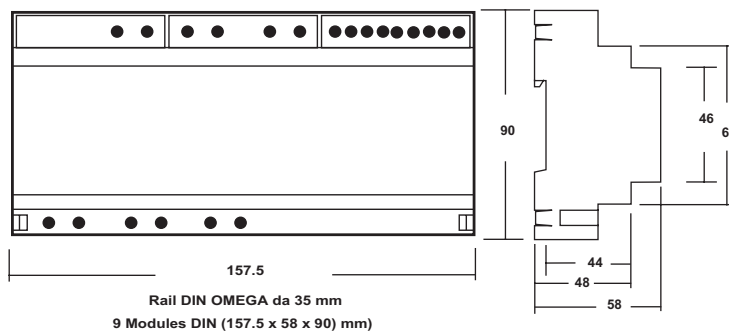
## DISPLAYED MEASUREMENT

PARAMETERS	TOT	L1	L2	L3	N
V	•	•	•	•	
A	•	•	•	•	•
W	•	•	•	•	
var	•	•	•	•	
VA	•	•	•	•	
P.F.	•	•	•	•	
HZ		•			
A neutral	•				
kWh	•				
kVAh	•				
kVAh	•				


## INPUTS LABELS



## DIMENSIONS



## **1 - INTRODUCTION**

 Please read carefully the instructions with this symbol before installing and using the instrument.

### **1.1 - STANDARDS and REGULATIONS**

DMM3 conforms to Directive 73/23/CEE (LVD) and 2004/108/CE (EMC).

It has been designed with reference to EN 61010-1, EN 61326 including append. A1/A2/A3, EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 61000-3-3/A1, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-5/A1, EN 61000-4-6, EN 61000-4-6/A1, EN 61000-4-8, EN 61000-4-8/A1, EN 61000-4-11, EN 61000-4-11/A1.

### **1.2 - USER SAFETY**

In order to preserve these safety conditions and ensure safe operation, the user must observe all instructions and marks specified in this user manual. All maintenance and repair operations requiring the opening of the instrument must be carried out only by suitably qualified and authorised personnel. The instrument was shipped from the manufacturing plant in perfect technical safety conditions.

### **1.3 - PRELIMINARY INSPECTIONS**

Before installation, check that the instrument is in good conditions and was not damaged during transport. Check that the network voltage and the rated voltage coincide. This instrument does not require an earth connection.

### **1.4 - PRECAUTIONS IN THE EVENTS OF MALFUNCTIONS**

When safe operation is no longer possible, put the instrument out of service and ensure that it cannot be operated accidentally.

Safe operation cannot be guaranteed in the following circumstances:

- When the instrument appears clearly damaged.
- When the instrument no longer works.
- After long storage in unsuitable conditions.
- After being damaged in transit.

## **2 - CONNECTION OF THE INSTRUMENT**

### **2.1 - POWER SUPPLY**

The power supply connections terminals are located on the rear side and are clearly indicated with the label POWER SUPPLY. Use cables having a maximum section of 2.5 mm<sup>2</sup>. Earth connection is not required. Follow the connection diagram at the beginning of the manual.

### **2.2 - CONNECTING VOLTAGE MEASUREMENT CABLES**

These cables, having a maximum section of 4 mm<sup>2</sup>, are to be connected to the terminals labelled VOLTAGE INPUT as indicated in the diagrams at the beginning of the manual.

### **2.3 - CONNECTING CURRENT MEASUREMENT CABLE**

The instrument is able to measure up to 5A only through external C.T. The cables having maximum section of 4 mm<sup>2</sup> must be connected to the terminals labelled CURRENT INPUT as shown in the diagrams at beginning of the manual. Use CT's with 5A secondary. Use cables having a section appropriate to the length of the connection and the rated power of the CT's used.

Note 1: For safety reasons, never leave the CT secondary open.

Note 2: Important direct connections, without C.T. will damage the inputs.

## **3 - PROGRAMMING THE INSTRUMENT**

The instrument can be programmed using the PAG, SEL, SET keys located on the front panel. At power on, the DMM3 displays the last page selected before power off.

Use the PAG key to scroll through the different measurement pages.

To access SETUP mode, press at the same time the PAG and the SEL keys.

The parameters are programmed with the SEL and SET keys.

Use the PAG key to scroll through the various SETUP pages and return to the Measurement page.

The type of connection is configured in SETUP:

3 PH and N = Three-phases with neutral, i.e. Star or 4 wires;

3 PH = Three-phases without neutral, i.e. Delta or 3 wires;

2 PH = Two phase.

1 PH = Single-phase.

#### 4 - SET-UP PAGE PROTECT CODE [Fig. 20]

By default, the access code to set-up pages is not enabled. To enable it, keep the PAG + SEL keys pressed simultaneously for 30 sec. The display will show the page on which the access code must be entered.

By means of the SEL + SET keys, every digit can be changed and the code can be entered. The initial factory code, that must be entered the first time is 000000. Exit from this page by pressing the PAG key. Now a second page (with "COD" blinking), identical to the first one, is displayed: here the access code can be permanently changed, if wished.

In this case remember or make a safe note of the new code somewhere you can find it later on.

To exit from the second page press the PAG key.

IMPORTANT: After the first access to the password page, the introduction of the code will become compulsory. From that moment on the code must be always entered to access the set-up page.

Avoid to recall the password page, for test purposes, if it is not permanently desired.

#### 5 - MEASUREMENT PAGES

Use the PAG key to scroll through the different measurement pages.

• **[Fig. 1]** Page appearing only in THREE-PHASE

Phase-neutral voltages	VL1-N, VL2-N, VL3-N	(3 PH And N)
Phase-phase voltages	V12, V23, V31	(3 PH)
Phase-neutral voltages	VL1-N, VL2-N	(2 PH)

• **[Fig. 2]** Page appearing only in THREE-PHASE

Phase currents	AL1, AL2, AL3	(3 PH And N, 3 PH)
Phase currents	AL1, AL2	(2 PH)

• **[Fig. 3]** Present only in THREE-PHASE, pressing the SEL key from Fig. 2

Neutral current	A neutral
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• **[Fig. 4]** Page appearing only in THREE-PHASE

Phase active powers	P1, P2, P3	(3 PH And N, 3 PH)
Phase active powers	P1, P2	(2 PH)

• **[Fig. 5]** Page appearing only in THREE-PHASE

Apparent phase powers	S1, S2, S3	(3 PH And N, 3 PH)
	S1, S2	(2 PH)

• **[Fig. 6]** Page appearing only in THREE-PHASE

Phase reactive powers	Q1, Q2, Q3	(3 PH And N, 3 PH)
Phase reactive powers	Q1, Q2	(2 PH)

• **[Fig. 7]** page appearing only in THREE-PHASE

Phase power factors	P.F.1, P.F.2, P.F.3	(3 PH And N, 3 PH)
Phase power factors	P.F.1, P.F.2	(2 PH)

• **[Fig. 8]** Three or Single-phase equiv. measur. (THREE or SINGLE-PHASE)

Equal. three-phase voltage	$V = (VL1-N + VL2-N + VL3-N) / 3$	(3 PH And N)
Equal. three-phase voltage	$V = (V12 + V23 + V31) / 3$	(3 PH)
Phase to phase voltage	$V = VL1-N + VL2-N$	(2 PH)
Equal. three-phase current	$A = S / (3 V)$	(3 PH And N, 3 PH)
Current	$A = S / V$	(2 PH)
Frequency of VL1 in Hz	f	

• **[Fig. 9]** Three-phase or Single-phase measurements (THREE or SINGLE-PHASE)

Active power	$P = P1 + P2 + P3$	(3 PH And N, 3 PH)
Active power	$P = P1 + P2$	(2 PH)
Power factor	$P.F. = P / S$	
Apparent power	$S = (P^2 + Q^2)^{1/2}$ (with Q = sum of phase reactive powers)	

\***[Fig. 10]** Total active energy conter kWh

\***[Fig. 11]** Total reactive energy conter kvarh

\***[Fig. 12]** Total apparent energy conter kVAh

## **6 - SETUP PAGES**

To access Programming Mode, press the PAG and the SEL keys at the same time: use then the SEL key to select a digit, and the SET key to increment it.

- **[Fig. 13]** Programming the Primary and Secondary Windings of a PT  
Select a digit with the SEL key; change its value using the SET key.
- **[Fig. 14]** Programming the Primary and Secondary Windings of a CT  
Select a digit with the SEL key; change its value with the SET key.  
Programming connection type  
Select the type of system which you want to connect to using the SET key.
- **[Fig. 15]**                            3 PH                            Three phases without neutral (i.e. Delta)
- **[Fig. 16]**                            3 PH And N                            Three phases with neutral (i.e. Star)
- **[Fig. 17]**                            2 PH                            Two-phase
- **[Fig. 18]**                            1 PH                            Single-phase
- **[Fig. 19]** Resetting energy counters.  
If you select y (YES) with the SET key, the counters will be reset as soon you confirm by pressing the PAG. key.

## **7 - TECHNICAL CHARACTERISTICS**

Maximum dimensions (mm): instrument: 157.5 x 58 x 90.

Power supply: from network 230 V or 115 V 10% @ 50/60 Hz (4 VA)

Display: Seven-segment 13 mm red LED's , 3 x 3 digit on 1 line

Voltmeter inputs: VL1, VL2, VL3, N up to 430 V phase-neutral, 600 V phase-to-phase, 35÷400 Hz.

Voltmeter input impedance: 2 M

Voltage input overload: max 850 V phase-neutral

Amperometric inputs: AL1, AL2, AL3. Consumption 1 VA. Three / 5A external current transformer require

Amperometric input overload: max 7 A

Number of scales: 1 voltage scale, 2 current scales

Measurements: T.R.M.S. (true effective value) up to 25<sup>th</sup> harmonic (50 Hz), 20<sup>th</sup> (60 Hz)

Precision: 1% reading per V and I; 1% for power

Suitable for connection to: Single phase or three phase star, three phase delta, or diphas systems

Weight of instrument: 0.6 Kg

Protection level: instrument IP20, front panel IP40

Ambient temperature range: -10°C + 60°C

Relative humidity range (R.H.): from 20% to 80%.

Condensation: non condensing.