

## Measuring Device 96x96 mm, connection via CT, with RS485 port

Cat. N°: 4 120 47



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### 1. DESCRIPTION - USE

Measuring Device.  
Measures the main electrical quantities of a single-phase or three-phase network.  
The insertion is done by measuring current transformers (CT).

### 2. RANGE

. Cat. N° 4 120 47: Measuring device, 96x96 mm for installation on a door or full panel, Modbus RS485 output and pulse output integrated.

#### Dimensions:

- . Device: 96x96 mm.
- . Mounting cut-out: 92x92 mm

#### Auxiliary supply:

- . Auxiliary supply: Self-supplied from voltage terminals (terminals V1-N)

#### Rated current:

- . Rated current,  $I_n$ : 5 A (via external current transformer  $x/5$  A)
- . Max. current:  
 $I_{max}: 1,2 I_n = 6$  A

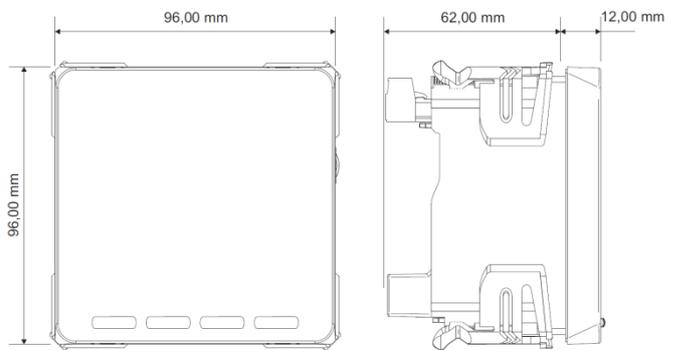
#### Insertion rated voltages:

- .  $U_n$ : 80÷500 V~ (phase/phase)
- .  $U_n$ : 50÷290 V~ (phase/neutral)

#### Rated frequency:

- .  $f_n$ : 50 Hz
- . Admitted variation:  
45 ÷ 65 Hz

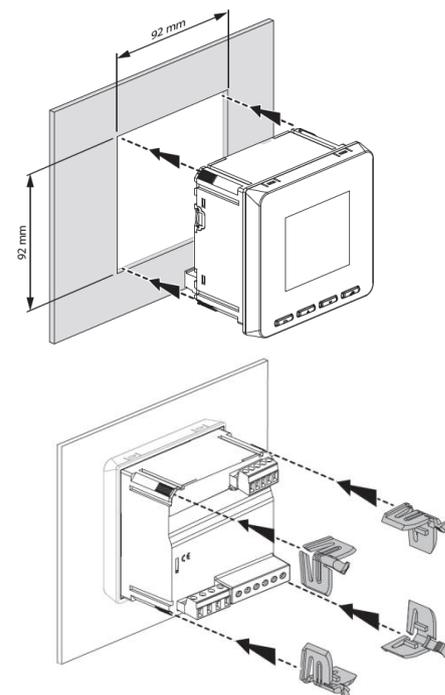
### 3. OVERALL DIMENSIONS



### 4. FIXING - CONNECTION

#### Fixing:

- . On door or full panel
- . Cut-out 92x92 mm



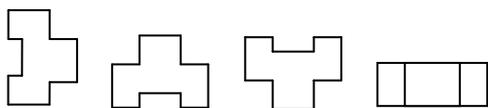
# Measuring Device 96x96 mm, connection via CT, with RS485 port

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## 4. FIXING - CONNECTION (continued)

### Operating position:

- . Vertical
- . Horizontal
- . Upside down
- . On the side



### Screw terminals:

- . Terminal depth: 8 mm.
- . Stripping length: 8 mm

### Screw head:

- . Screw slotted and Philips.

### Recommended tightening torque:

- . CTs terminals (I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub>): 1 Nm.
- . Voltage measurement terminals (V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub>, N), Pulse output (3, 4), RS485 (+, -, SG): 0,5 Nm.

### Tools required:

- . Flat screwdriver 3,5 mm or screwdriver PH0
- . For fixing the device: no tools needed.

### Connectable section:

- . Copper cables.
- . CTs Terminals

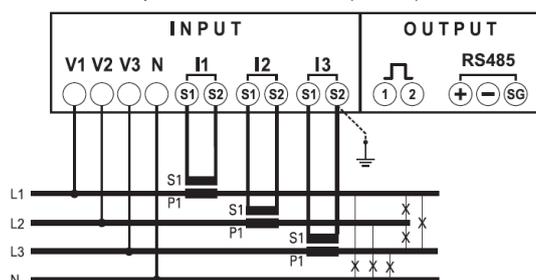
	Without ferrule	With ferrule
Rigid cable	0,05 to 6 mm <sup>2</sup>	-
Flexible cable	0,05 to 4 mm <sup>2</sup>	0,05 to 4 mm <sup>2</sup>

### Other terminals

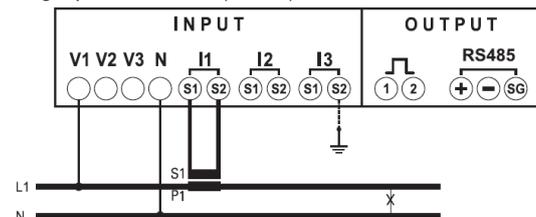
	Without ferrule	With ferrule
Rigid cable	0,05 to 4,5 mm <sup>2</sup>	-
Flexible cable	0,05 to 2,5 mm <sup>2</sup>	0,05 to 2,5 mm <sup>2</sup>

### Wiring diagrams:

- . 4 wires three-phase network, 3 CT (3N-3E):



- . single phase network (1N-1E):



## 5. GENERAL CHARACTERISTICS

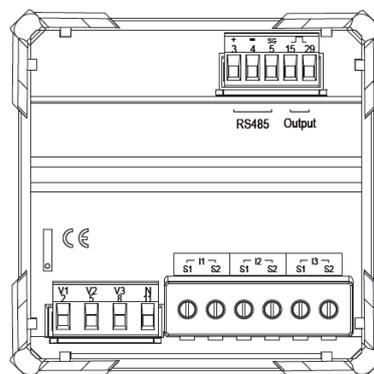
### Front face marking:

- . Marking by screen printing:



### Terminals Marking:

- . By permanent ink pad printing.



### Display

- . Type: LCD back lighted.
- . Resolution: automatic adjustment of the display resolution for the decimal digits and for the engineering units as a function of the transformation ratio of the external current transformers (kTA<sup>1</sup>)  
<sup>1</sup> kTA = external CTs ratio  
 (ex. 800A / 5A, kTA = 160).
- . Refresh time: 1,1 sec.
- . Automatic backlight reduction, after 20 sec. of keyboard inactivity

### Measuring sensors operating range:

- . Max CTs primary current: 50 kA

**Note:** Changing of the parameter kTA in the setup menu of the device, all the energy counters are reset.

### Count starting time:

- . t < 5 sec (IEC/EN 62053-21, IEC/EN 62053-23).

### Value display and Programming:

- . Using front keyboard, 4 keys (refer to user manual).

**5. GENERAL CHARACTERISTICS** *(continued)*

**Measured quantities and Accuracy class:**

- . Phases Current, I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub>: accuracy 0,5  
Neutral Current, I<sub>N</sub>: accuracy 3
- . Voltage (accuracy 0,5):  
phase/phase: U<sub>12</sub>, U<sub>23</sub>, U<sub>31</sub>;  
phase/neutral: V<sub>1N</sub>, V<sub>2N</sub>, V<sub>3N</sub>.
- . Frequency (accuracy ± 0,1 Hz)
- . Power:  
instantaneous active total power, phase, average value and max.  
average value (accuracy 1);  
instantaneous reactive total power, phase, average value and  
max. average value (accuracy 1);  
instantaneous apparent total power, phase, average value and  
max. average value (accuracy 1);
- . Power factor a (accuracy 1).
- . Energy:  
total and partial active energy, positive and negative  
(accuracy 1);  
total and partial reactive energy, positive and negative  
(accuracy 1).
- . THD (accuracy 2):  
voltages THD: V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub> o U<sub>12</sub>, U<sub>23</sub>, U<sub>31</sub>;  
currents THD: I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub>, I<sub>N</sub>.

**Measurements update period**

- . 0,2 s

**RS485 communication port's characteristics:**

- . Programmable addresses: from 1 to 247
- . Baud rate: 4,8 - 9,6 - 19,2 - 38,4 kbps
- . Parity bit: none, even, odd
- . Stop bit: 1
- . Galvanically isolated respect to measuring inputs
- . Standard RS485 3 wires, half-duplex
- . Protocol Modbus® RTU
- . Response time (time out question/answer): ≤200 ms

**Pulse output's characteristics:**

- . Optorelays with potential-free SPST-NO contact
- . Type S0 (IEC/EN62053-31)
- . Voltage U<sub>imp</sub>: max. 27 Va.c./d.c.
- . Current I<sub>imp</sub>: max. 50 mA
- . Programmable pulse weight, possible values: 10 – 100 - 1k - 10k -  
100k - 1M - 10M Wh/imp or varh/imp
- . Programmable pulse duration, possible values: 50 - 100 - 200 -  
300 ms.

**Plastic material:**

- . Self-extinguishing polycarbonate.

**Ambient operating temperature:**

- . Min. = - 5 °C Max. = + 55 °C.

**Ambient storage temperature:**

- . Min. = - 25 °C Max. = + 70 °C.

**5. GENERAL CHARACTERISTICS** *(continued)*

**Protection Index:**

- . Protection index of terminals against solid and liquid bodies (wired device): IP 20 (IEC/EN 60529).
- . Protection index of the front face against solid and liquid bodies:  
IP 54 (IEC/EN 60529).

**Impulse withstand voltage:**

- . Measuring inputs / RS485 port:  
wave 1,2 / 50 µs 0,5 J: 6kV  
alternate current 50 Hz / 1 min.: 3 kV
- . Measuring inputs / Pulse output:  
wave 1,2 / 50 µs 0,5 J: 6kV  
alternate current 50 Hz / 1 min.: 3 kV
- . All circuits / earth:  
alternate current 50 Hz / 1 min.: 4 kV

**Pollution degree:**

- . 2

**Installation category:**

- . III

**Average weight per device:**

- . 0, 285 kg.

**Volume when packed:**

- . 1,59 dm<sup>3</sup>.

**Consumption**

- . ≤ 0,2 VA (phase-neutral at rated voltage)

**Thermal power dissipated:**

- . ≤ 5 W.

**Phase sequence correction diagnostic:**

- . In the software of the device there is a specific functionality to detect and correct problems concerning voltage and / or current connections.  
The "Testing connections" functions can be activated with a specific password for connection 3N-3E.  
Conditions for the execution of the function:  
- multifunction device 4 120 47 must have current and voltage on each phase and the neutral must be connected to the corresponding terminal "N".  
In addition, the test function requires:  
- an electrical 120° three-phase system.  
- a value of the power factor PF > 0,5.  
If the power factor of the system is not included in these ranges, the function cannot be used.  
- no crossings between cables connected to secondary of CTs (ex. TA phase 1 → terminals S1 and S2 of I1 and so on).
- . Procedure's access codes:  
3333: Start of diagnostic procedure  
4444: Display of the current configuration  
5555: Restore the default configuration (factory configuration)

## 6. COMPLIANCE AND APPROVALS

### Compliance to standards:

- . Compliance with Directive on electromagnetic compatibility (EMC) n° 2014/30/EU
- . Compliance with low voltage directive no. 2014/35/EU
- . Electromagnetic Compatibility:
  - emission according IEC/EN 61326-1, class B
  - immunity according IEC/EN 61326-1.
- . Active energy accuracy class: 1 ( $E_a$ , IEC/EN 61557-12).
- . Reactive energy accuracy class: 1 ( $E_{rv}$ , IEC/EN 61557-12).

### Environment respect – Compliance with EU directives:

- . Compliance with Directive 2011/65/EU known as “RoHS 2” on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- . Compliance with REACH regulation: at the date of the publication of this document no substance from the candidate list is present in these products.

### Plastic materials :

- . Halogens-free plastic materials.
- . Marking of parts according to ISO 11469 and ISO 1043.

### Packaging :

- . Design and manufacture of packaging compliant to decree 98-638 of the 20/07/98 and also to directive 94/62/CE.

### Conformity table to IEC 61557-12 Edition 1 (08/2007)

Performance measuring and monitoring devices (PMD) characteristics		
Type of characteristic	Specification values	Other complementary characteristics
Power quality assessment function	-	-
Classification of PMD	SD / SS	-
Temperature	K55	-
Humidity + Altitude	Standard conditions	-
Active power and Active energy function performance class	1	-

6. COMPLIANCE AND APPROVALS *(continued)*

Conformity table to IEC 61557-12 Edition 1 (08/2007) *(continued)*

Function symbols	Function performance class according to IEC 61557-12	Measuring range	Other complementary characteristics
P	1	0,1 ÷ 6 A	-
Q <sub>A</sub> , Q <sub>V</sub>	1	0,1 ÷ 6 A	-
S <sub>A</sub> , S <sub>V</sub>	1	0,1 ÷ 6 A	-
E <sub>a</sub>	1	0,1 ÷ 6 A	-
E <sub>rA</sub> , E <sub>rV</sub>	1	0,1 ÷ 6 A	-
E <sub>apA</sub> , E <sub>apV</sub>	-	-	-
f	± 0,1 Hz	45 ÷ 65 Hz	-
I	0,5	0,5 ÷ 6 A	-
I <sub>N</sub> , I <sub>Nc</sub>	3	0,1 ÷ 6 A	-
U	0,5	80 ÷ 260 V (Ph/N)	-
P <sub>FA</sub> , P <sub>FV</sub>	1	0,5 ind ÷ 0,8 cap	-
P <sub>st</sub> , P <sub>It</sub>	-	-	-
U <sub>dip</sub>	-	-	-
U <sub>swt</sub>	-	-	-
U <sub>tr</sub>	-	-	-
U <sub>int</sub>	-	-	-
U <sub>nba</sub>	-	-	-
U <sub>nb</sub>	-	-	-
U <sub>h</sub>	-	-	-
THD <sub>u</sub>	2	> 1,5 %	-
THD-R <sub>u</sub>	-	-	-
I <sub>h</sub>	-	-	-
THD <sub>i</sub>	2	> 3 %	-
THD-R <sub>i</sub>	-	-	-
Msv	-	-	-

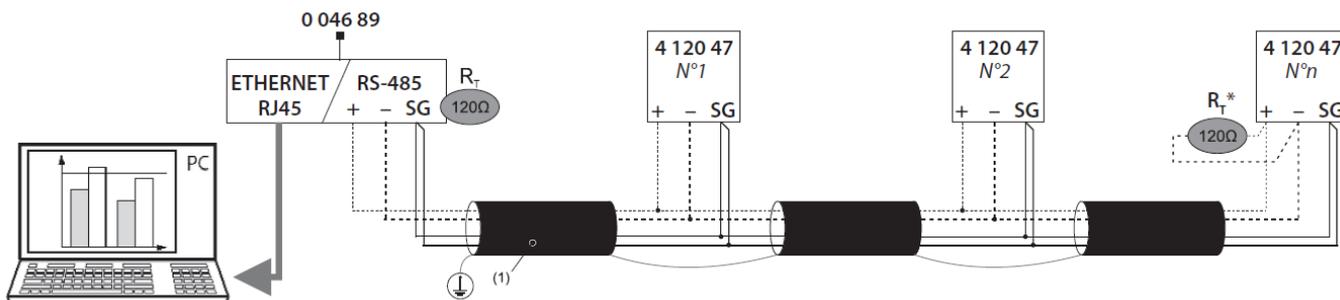
6. COMPLIANCE AND APPROVALS *(continued)*

Conformity table to IEC 61557-12 Edition 1 (08/2007) *(continued)*

Characteristics of "Power quality assessment functions"			
Function symbols	Function performance class according to IEC 61557-12	Measuring range	Other complementary characteristics
f	$\pm 0,1$ Hz	45 ÷ 65 Hz	-
I	0,5	0,5 ÷ 6 A	-
I <sub>N</sub> , I <sub>Nc</sub>	3	0,1 ÷ 6 A	-
U	0,5	80 ÷ 260 V (Ph/N)	-
U <sub>dip</sub>	-	-	-
U <sub>swf</sub>	-	-	-
U <sub>tr</sub>	-	-	-
U <sub>int</sub>	-	-	-
U <sub>nba</sub>	-	-	-
U <sub>nb</sub>	-	-	-
U <sub>h</sub>	-	-	-
I <sub>h</sub>	-	-	-
Msv	-	-	-

## 7.COMMUNICATION

### RS485 Wiring diagram:



(1) RS485: Prescribed use of Cable Belden 9842, Belden 3106A (or equivalent) for a maximum length of 1000 m, or Category 6 cable (FTP or UTP) for a maximum length of 50 m;

(\*)Resistance not furnished

### Modbus communication tables

. Modbus communication tables are available at <http://ecatalogue-export.legrand.com>, typing "4 120 47" in the search field