

**POWER NET ENERGY MANAGE SYSTEM**



Power Net is an analyzer that measures, calculates and gives to a Modbus master or Power Studio the electrical variables of industrial networks (balanced or unbalanced). The measure is TRMS using the 3 voltage inputs. The current is measured by TC current transformers. The parameters are shown in the memory map table.

This manual is a quick guide to the use and operation of NET POWER. For more information, you can download the full manual on the website of CIRCUTOR: [www.circutor.com](http://www.circutor.com)



Before performing any maintenance, modification, connection, repair, etc., disconnect the device from the power supply. When you suspect a malfunction of equipment or protection thereof shall be immediately put out of service.

**1 POWER NET FUNCTION**

To view and store the values measured by one or more measurement devices Power Net network must be connected to software management and acquisition of data through a bus RS-485 (maximum 32 devices). Through the Power Power Studio or Scada application software is possible to configure the device to communicate with the application which will visualize the values measured by the device, perform graphic and stored historical view. To communicate Net Power with the management application should check the communications wiring and equipment installation.

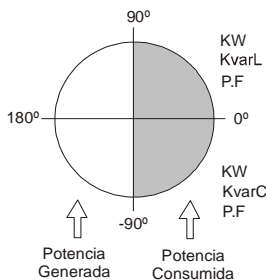


If you use the instrument is not specified by the manufacturer, the protection of equipment and the user, may be involved.

**2 VARIABLES**

Parameter		Inst	Máx	Mín
Voltage Phase-neutral	V	X	X	X
Voltage phase-phase	V	X	X	X
Frequency	(Hz)	X	X	X
Phase Current and average	A	X	X	X
Voltage harmonic distortion	THD V	X	X	
Current harmonic distortion	THD I	X	X	
Phase Active Power and three-phase	kW	X	X	
Inductive Power	kvarC	X	X	
Capacitive Power	kvarL	X	X	
Phase Apparent Power and three-phase	kVA	X	X	
Power Factor	P.F	X	X	X
Active Energy	Kw-h	X		
Capacitive Energy	kvarC-h	X		
Inductive Energy	kvarL-h	X		

POWER NET measures in two quadrants. The user does not have to worry about the direction of the current transformer. The device changes internally current direction so that they always measured consumed energy.



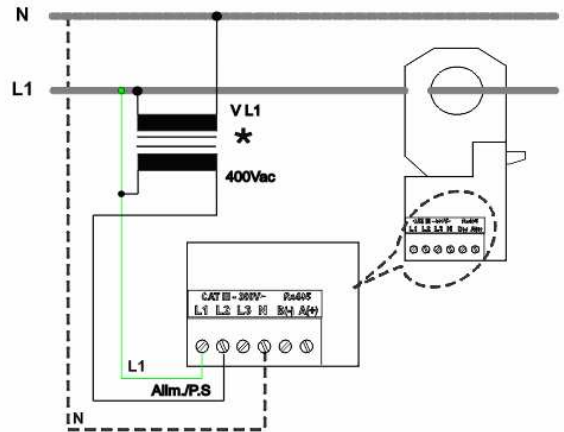
POWER NET stores in memory the maximum and minimum values without supply.

**3 CONNECTION**

As a device that remains permanently connected in an installation, should be provided with magneto-thermal switch or equivalent to be disconnected. Should be fitted with fuses GL (IEC 296) or type M of 0.5 ... 2 A. The section of power cables and measure the equipment must not be less than 1.5 mm<sup>2</sup>.

Power Net must be installed at the point where you want to measure ensuring that this point meets the insulation requirements, guaranteeing minimum electrical safety transformer. Similarly, the characteristics of the measuring point, meet the specifications of the equipment.

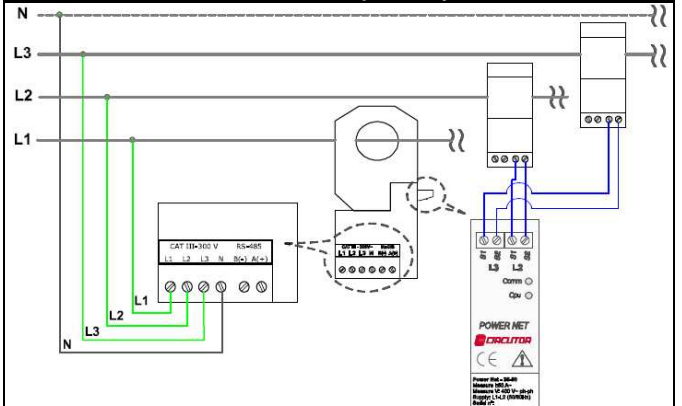
**Balanced single-phase system**



\* Requiere Transformador de tensión para alimentación (L1-L2 a 400Vac) NO suministrado. If requires a voltage transformer as powersupply (L1-L2 400Vac) NOT supplied.

Single-phase system: 1 Power Net

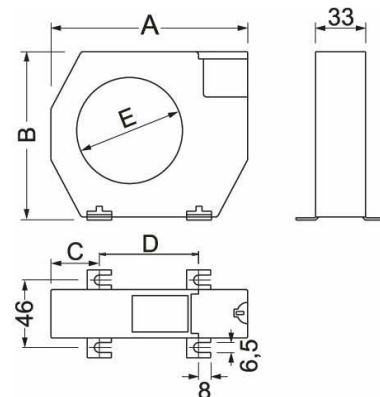
**Unbalanced three-phase system**



Unbalanced three-phase system: 1 Power Net + 2 TC-Power Net

**4 TC POWER NET DSIMENSIONS**

TC-Power Net	Dimensions (mm)					Weight (Kg)
	A	B	C	D	E∅	
WG-35	100	79	26	48,5	35	0,150
WG-70	130	110	32	66	70	0,240



5 TECHNICAL FEATURES

<b>Measured current</b>	
WG-35	50 / 100 / 250 (A)
WG-70	500 / 1000 (A)
<b>Electrical features</b>	
Maximum voltage	720 V c.a
Isolation voltage	3.000 V c.a
<b>Supply</b>	
L1-L2 :	400 V c.a. AC
Voltaje tolerance	-15 % / +10 %
Frequency	50...60 Hz
Consumption:	4,2 VA
<b>Measure</b>	
Nominal voltage	300 V c.a AC (f-n)
	520 V c.a. AC (f-f)
Frequency	45...65 Hz
Nominal current	(según transformador)
Permanent overload	1,2 h
Voltage circuit consumption	0,75 V.A
<b>Mechanical and enviromental</b>	
Material	Plastic V0 self-extinguishing
Protection	IP 20
Dimensions (mm)	165 x 73 x 33
weight	0.220 kg
Work temperature	-10°...50 ° C
Altitude	2.000 m
Humidity (without condensation) :	5%...95%
<b>Accuracy</b>	
Voltage	0.5 % ± 2 digit
Current	0.5 % ± 2 digit
Power	1 % ± 2 digit
<b>Measure condition without current transformers and direct voltage</b>	
Temperature	+ 5 ... + 45 °C
Power Factor	0,5...1
Measure range to end scale	10...100 %
<b>Safety</b>	
Category III - 300 V c.a. / 520 c.a. EN-61010 Electric shock protection by double isolation class II	
<b>Standards</b>	
IEC 664, UL 94, VDE 0414 IEC 664, VDE 0110, UL 94, IEC 801, IEC 348, IEC 571-1, EN 61000-6-3, EN 61000-6-1, EN-61010-1	

6 COMMUNICATIONS

The MEMORY MAP table shows the memory map addresses of each variable that measures and calculates the analyzer and it's code.

6.1 PERIPHERAL NUMBER AND BAUDRATE

It's possible through a Modbus command to configure the device. The memory locations that are changed are in the next table:

Modbus address	Modified variable	Valid range
3000, 3001	Device serial number	0 a 999999999
3002H	Peripheral number	1 a 255
3002L	Speed (baud rate)	0= 9600, 1= 19200

The Modbus command to send is (hex.):

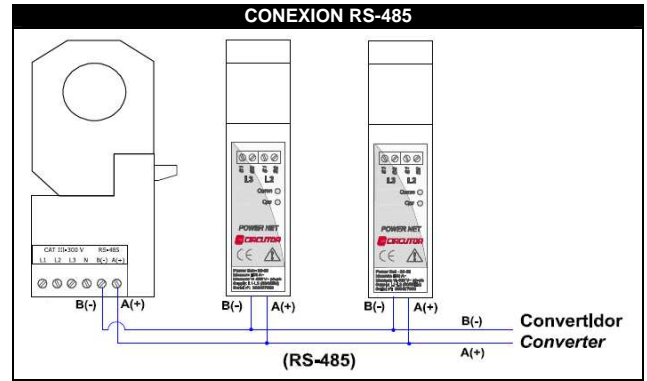
**Tx:** 00100BB8000306NNNNNNNNPPVVCRC

**Rx:** There is no answer in broadcast frame.

This command sets the peripherals number and the baud rate of communications for devices connected in the same network that have the default peripheral number. The command is sent to the peripheral number 0 (broadcast) to interpret all devices, but only make the change the device that matches the serial number is sent as parameter. The peripheral number and communications port speed be set immediately, without requiring a reset of the device.

6.2 RS-485 LAYOUT

The picture shows how to connect a communication bus between multiple Power Net. The converter can be RS-485 to RS-232 serial port or Ethernet depending on the facility infrastructure. The standard RS-485 connection allows a maximum of up to 32 peripherals in each bus.



6.3 MEMORY MAP

VARIABLE	SYMBOL	COD	INST	MÁX	MÍN	UNITS
Phase voltage	V 1	1	00-01	60-61	C0-C1	V x10
Current	A 1	2	02-03	62-63		mA
Active Power	Kw 1	3	04-05	64-65		W
Reactive Power	Kvar 1	4	06-07	66-67		W
Power factor	PF 1	5	08-09	68-69	C8-C9	x100
Phase voltage	V 2	6	0A-0B	6A-6B	CA-CB	V x10
Current	A 2	7	0C-0D	6C-6D		mA
Active Power	Kw 2	8	0E-0F	6E-6F		W
Reactive Power	Kvar 2	9	10-11	70-71		W
Power factor	PF 2	10	12-13	72-73	D2-D3	x100
Phase voltage	V 3	11	14-15	74-75	D4-D5	V x10
Current	A 3	12	16-17	76-77		mA
Active Power	Kw 3	13	18-19	78-79		W
Reactive Power	Kvar 3	14	1A-1B	7A-7B		W
Power factor	PF 3	15	1C-1D	7C-7D	DC-DD	x100
Active Power III	Kw III	16	1E-1F	7E-7F		W
Inductive Power III	KvarL III	17	20-21	80-81		W
Capacitive Power III	KvarC III	18	22-23	82-83		W
Cos φ III	Cos φ III	19	24-25	84-85	E4-E5	x100
Power factor III	PFIII	20	26-27	86-87	E6-E7	x100
Frequency (L1)	Hz	21	28-29	88-89	E8-E9	Hz x10
Line voltage L1-L2	V12	22	2A-2B	8A-8B	EA-EB	V x10
Line voltage L2-L3	V23	23	2C-2D	8C-8D	EC-ED	V x10
Line voltage L3-L1	V31	24	2E-2F	8E-8F	EE-EF	V x10
%THD V 1	%THDV1	25	30-31	90-91		% x 10
%THD V 2	%THDV2	26	32-33	92-93		% x 10
%THD V 3	%THDV3	27	34-35	94-95		% x 10
%THD I 1	%THDI1	28	36-37	96-97		% x 10
%THD I 2	%THDI2	29	38-39	98-99		% x 10
%THD I 3	%THDI3	30	3A-3B	9A-9B		% x 10
Active Energy	Kwh III	31	3C-3D			Wh
Ind. Reactive Energy	KvarhL III	32	3E-3F			Wh
Cap. Reactive Energy	KvarhC III	33	40-41			Wh
Apparent Power III	KvaIII	34	42-43	A2-A3		W
Maximum Demand	Md(Pd)	35	44-45	A4-A5		W/VA/mA
Average current	I_AVG	36	46-47	A6-A7		mA
Neutral current	In	37				mA
Maximum Demand I2	Md(Pd)	42	52-53	B2-B3		mA
Maximum Demand I3	Md(Pd)	43	54-55	B4-B5		mA

7 ASSITANCE SERVICE

In case of operational doubt or equipment breakdown, call CIRCUTOR's Customer Service.

CIRCUTOR, S.A. – Customer Service

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