Multifunction Power Meter   Phase Series

Product Description

The Phase series combines leading power quality capabilities with exceptional revenue metering accuracy at an economical price. Created to provide solutions in general electric systems, this multifunction power meters will measure and monitor the energy comsumption in several applications like energy sharing of residential and commercial buildings, shopping centers or any applications that needs the monitoring of considerable variables in a single device. For example, is possible to measure real time data such as: voltage, current, power (active, reactive and apparent), power factor, phase angle, demand of active and reactive power and more.

A highlight to multifunction power meter PH3500. It can afford applications with Industry 4.0 necessities, measure and monitor in real time accompanied by IoT platforms. IoT is the future of industrial automation and promises a lot in terms of data safety, business operations and industrial performance.

In addition, the Phase series has the following features:

- Great cost/benefit relation
- RS-485 incorporated interface with support for MODBUS RTU protocol
- Ethernet 10/100 BASE-T incorporated (PH3500)
- MODBUS TCP, MQTT e SNTP supported (PH3500)
- Storage capacity to register measures for futher analysis (PH3500)
- Voltage and current harmonic measure until 31st order (PH3500)

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Ordering Information

PH1600 Included Items

The product package contains the following items:

- PH1600 Multifunction Power Meter
- Clamps for fixing to the panel

PH3500 Included Items

The product package contains the following items:

- PH3500 Multifunction Power Meter
- Screws for fixing to the panel

PHASE MANAGER STD Included Items

The purchase of a serial number does not deliver any physical product, just a code that will be sent by email. The license serial number activation procedure is available in the software manual, present on the Altus website. https://www.altus.com.br/suporte.

Product Code

The following code should be used to purchase the product:

Code	Denomination
PH1600	Multifunction Power Meter with RS-485 integrated
PH3500	Multifunction Power Meter with RS-485 and ETHERNET integrated
PH3500/C	Multifunction Power Meter with RS-485, ETHERNET integrated and PCB with conformal coating
PHASE MANAGER STD	PhaseManager Standard (prog.soft. PH3500)

Related Products

The following products must be purchased separately:

Code	Denomination
AMJG0808	RJ45-RJ45 cable (2m)
AL-2306	RS-485 cable for MODBUS
AL-2600	RS-485 network conector and terminator

Notas:

AMJG0808: RJ45-RJ45 simple cable with 2m.

AL-2306: Shielded twisted pair cable without connector intended to be used on RS-485 networks. This cable allows the connection between PH3100 and AL-1413, AI-2600, FBS-CM25C, PO8525 or any other RS-485 compatible product. This cable can reach lengths of up to 500 meters. When longer cables are required AL-2301 must be used.

AL-2600: RS-485 network connector/terminator module. It is used to make possible the AL-2306 cable interconnection with the AL-2000 Series and QUARK PLCs and also to provide the RS-485 network termination, preventing signals reflection problems.

General Features

	PH1600	PH3500
Module type	Multifunction Power Meter	Multifunction Power Meter
Current	Phase current measurement	Phase current and average Phase current measurements
Voltage	Phase voltage measurement	Phase voltage measurement and average phase voltage measurements
Active power	Phase active power and load active power measurements	Phase active power and load active power measurements
Reactive power	Phase reactive power and load reactive power measurements	Phase reactive power and load reactive power measurements
Apparent power	Phase apparent power and load apparent total power measurements	Phase apparent power and load apparent total power measurements
Frequency	Frequency measurement	Frequency measurement
Power factor	Load and phase power factor measurements	Load and phase power factor measurements
Demand	-	Active, reactive and apparent demand measurements
Active energy	Imported and exported active energy measurements	Imported and exported, gross and net active energy
Reactive energy	Imported and exported reactive energy measurements	Imported and exported, gross and net reactive energy
THD	-	Voltage and current harmonic measure until 31st order
Harmonic	-	Average and maximum measures for voltage and current harmonic until 31st order
Display	LED display with 3 lines and 4 columns 3 bright levels	LCD display with 4 lines and 16 columns (64 characteres)
Keypad	4 keys	Polycarbonate front with 6 resin keys
Mechanical assembly	Overlap on panel door	Overlap on panel door
Storage temperature	-20°C to 75°C	-25°C to 65°C
Operation temperature	-10°C to 55°C	0°C to 55°C
Operation humidity	Up to 80%	40 to 70%
IP level	IP 65 (front)	IP-54 (front); Ip-00 (rear and side)
Standards	IEC 61326-1 CE – 2014/30/EU (EMC) C E	
Dimensions (W x H x D)	96 x 96 x 93 mm	92 x 92 x 82 mm
Cut-out size	90 x 90 mm	91 x 91 mm

Accuracy

	PH1600	PH3500
Voltage	±0,5%	±0,5%
Current	±0,5%	±0,5%
Frequency	±0,5%	±0,01 Hz
Power	Classe C	±0,5%
Power factor	Classe C	±0,5%
Energy	Classe C	Classe C
THD/harmonic	-	±5%

Note:

"Classe C" refers to NBR 14519

Eletrical Features

	PH1600	PH3500
Current measurement	0,5 to 5 A	0,5 to 10 A
Voltage measurement	0,5 to 500 Vac	70 to 500 Vac
Frequency measurement	45 to 65 Hz	42,5 a 57,5 Hz (50 Hz) 51,0 to 69,0 Hz (60 Hz)
Memory capacity	-	128 MB
Measment input	3 voltange and current inputs	3 voltange and current inputs
Power input	85 to 265 Vac 100 to 300 Vdc	85 to 300 Vac/ Vdc
Consumption	5 VA	10 VA
Digital input	-	1 (pulse counter)
Digital output	-	1 (dry contact)

Communication

	PH1600	PH3500
Connections	1	2
Physical interface	RS-485	RS-485 and Ethernet RJ45
Protocols	Modbus-RTU	Modbus-RTU, Modbus-TCP, MQTT and SNTP
Baud rate	1200 a 9600 bps	1200 a 115.200 bps (RS-485), 10/100 Mbps (Ethernet)
Data format	8N1, 8O1, 8E1	8N1, 8N2, 8E1, 8E2, 8O1, 8O2 (RS-485)

Digital input

	PH3500
Input type	1 optoisolated input
Input voltage	5-24Vcc
Input impedance	10kΩ
Minimum pulse width	2ms
Detection	Rising and/or falling edge
Maximum frequency	100hz

Digital output

	PH3500
Output type	1 relay dry contact output
Output voltage	250V
Maximum current	3A

Software

The PhaseMANAGER software allows you to manage several multimeters in a database that is saved on the user's computer, allowing the software to quickly connect to the equipment connected to the registered networks. It supports the creation of Serial, Serial over Ethernet and Ethernet networks.

Some of its most common applications include:

- Monitor electrical variables using reports, graphs and tables;
- Analyze collected data in real time;
- Download and analyze data stored in equipment with mass memory;
- Control and program the equipment remotely;

Only the PH3500 energy multimeter is compatible with PhaseMANAGER software. Which can be found in two different versions:

	PhaseMANAGER lite	PhaseMANAGER Standard
Equipment registration	X	X
Parameterization of registered equipment	X	X
Measurements in real time	X	X
Download and view of data from mass memory	X	X
Visualization of data in table format	X	X
Export tables to .txt and .csv formats	X	X
Graphics generation		X
Export graphics to .PNG format		X
Remote actuation		X
Generation of complete reports with statistical results		X
Basic statistical calculation and analysis		X
Report customizing		X
Possibility to simulate kVAr calculation for capacitor bank sizing		X

Minimum requirements for installation and operation

| Platform	Windows 7 or higher
Processor	Pentium Quad Core or higher
Framework	Microsoft.Net Framework 4.0 installed, internet access for automatic installation or higher version
RAM memory	4GB
Disk space	200MB
Network card	Ethenet 10/100Mpbs
Resolution	1024x600

Installation

| ⚡	**DANGER:** **RISK OF ELETRIC SHOCK** **This module can operate with high voltages. Special care must be taken during the installation, which should only be done by qualified technicians.** **Do not touch on the field wiring connection when in operation.**

PH1600 Electrical Installation

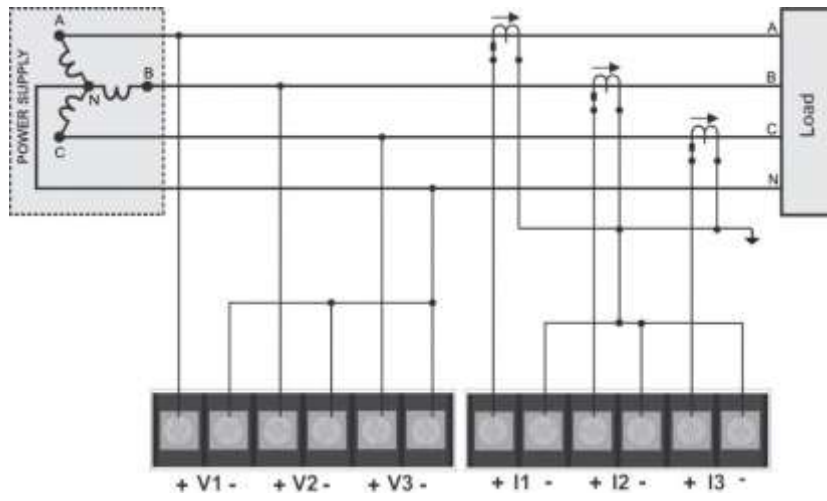#### 4-wire installation for voltage and current measument
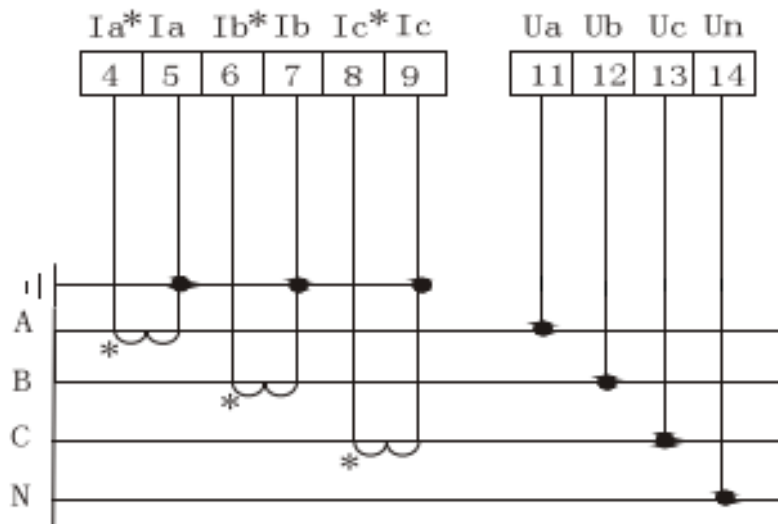
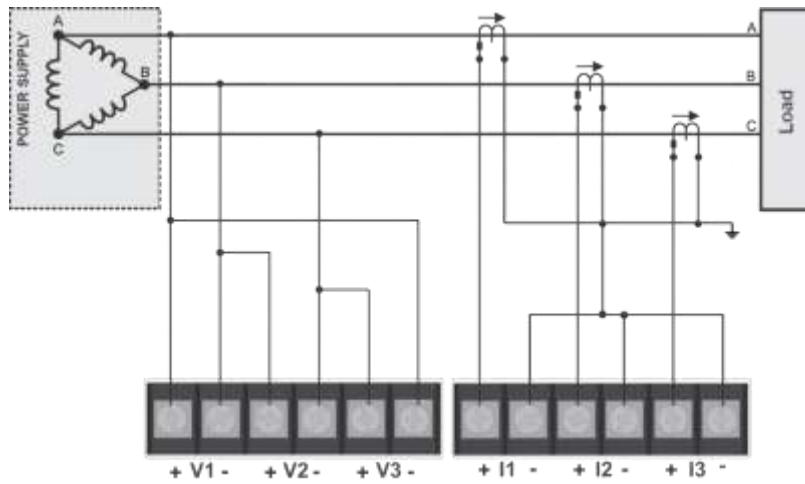#### 3-wire installation for voltage and current measument
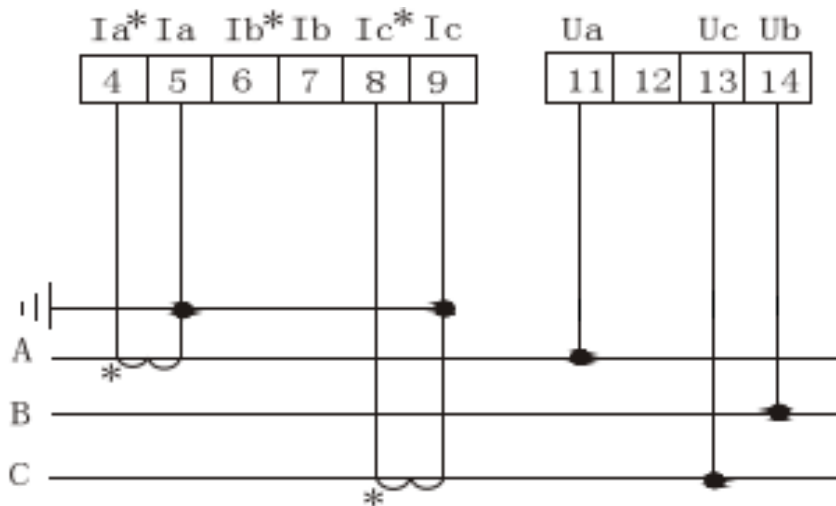
PH3500 Electrical Installation

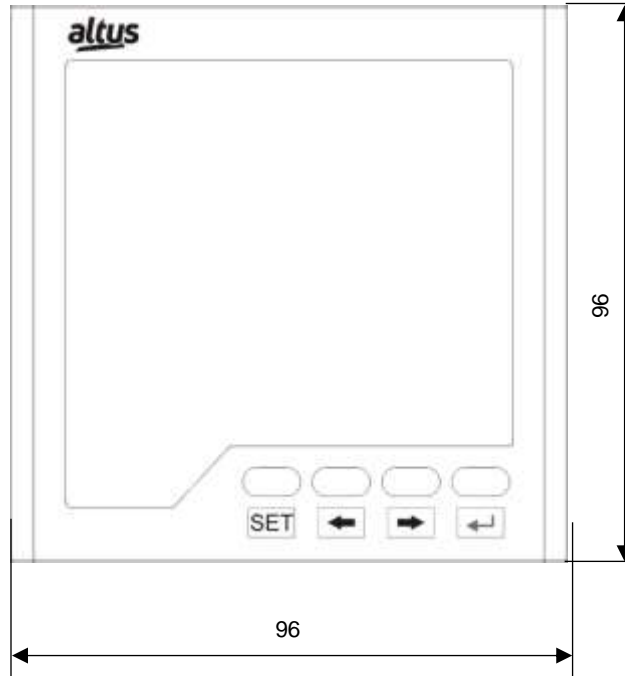### *4-wire installation for three-phase voltage and current measument*

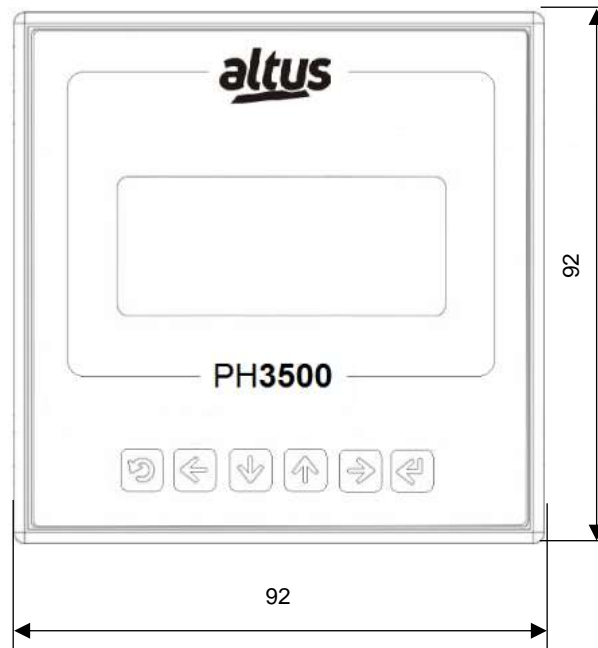### *3-wire installation for three-phase voltage and current measument*

Physical Dimensions

Dimensions in mm

PH1600

PH3500

Manuals

For further technical details, configuration, installation and programming of Phase Series the table below should be consulted. This table is only a guide of some relevant documents that can be useful during the use and maintenance of Phase Series.

Code	Description	Language
CT157915	Caracteristicas Técnicas Serie Phase II	Portuguese
CE157915	Phase Series II - Technical Characteristics	English
MU821006	Manual de Utilização PH3500	Portuguese
MU821007	Manual de Utilização PH1600	Portuguese
MU821008	Manual de Utilização PhaseMANAGER	Portuguese