

# CPM-20 Multifunction Power Meter

## Description

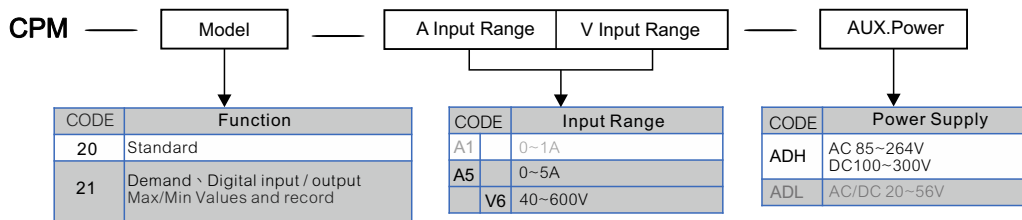
CPM-20 multifunction power meter provide high accuracy single phase and three-phase measuring and displaying, energy accumulating, power quality analysis, and data communication. It provides maximum/minimum records for power usage and power demand parameters. Hardware standard built in a RS485 Modbus communication port.

## Applications

- Energy management system
- Power Grid automation
- Factory automation
- Community power monitoring
- Intelligent power panel
- Intelligent green building
- Industrial automation



## Ordering Information



## Meter Selection Guide

Features	CPM-20	CPM-21
Voltage	V <sub>12</sub> V <sub>23</sub> V <sub>31</sub> V <sub>LL,Avg</sub> / V <sub>1</sub> V <sub>2</sub> V <sub>3</sub> V <sub>CH,Avg</sub>	● ●
Current	I <sub>1</sub> I <sub>2</sub> I <sub>3</sub> I <sub>Avg</sub> I <sub>N</sub>	● ●
Active Power	P <sub>1</sub> P <sub>2</sub> P <sub>3</sub> Σ P	● ●
Reactive Power	Q <sub>1</sub> Q <sub>2</sub> Q <sub>3</sub> Σ Q	● ●
Apparent Power	S <sub>1</sub> S <sub>2</sub> S <sub>3</sub> Σ S	● ●
Power Factor	PF <sub>1</sub> PF <sub>2</sub> PF <sub>3</sub> PF <sub>Avg</sub>	● ●
Frequency	Hz	● ●
Active Energy	Wh Total	● ●
Reactive Energy	Varh Total	● ●
THD/Voltage	THD <sub>V1</sub> THD <sub>V2</sub> THD <sub>V3</sub> THD <sub>V,Avg</sub>	● ●
THD/Current	THD <sub>I1</sub> THD <sub>I2</sub> THD <sub>I3</sub> THD <sub>I,Avg</sub>	● ●
RS485	Modbus RTU mode	● ●
Cost	Total cost of energy	● ●
CO2	Total CO <sub>2</sub> weight of energy	● ●
Date	Year, Month, Day, Hour, Minute, Second	● ●
DI & DO	Digital input / output function	● ●
Demand	Σ P Σ Q Σ S I <sub>Avg</sub>	● ●
Max/Min Values and record	U <sub>A</sub> U <sub>B</sub> U <sub>C</sub> U <sub>BC</sub> U <sub>AB</sub> U <sub>CA</sub> I <sub>A</sub> I <sub>B</sub> I <sub>C</sub> P <sub>SUM</sub> Q <sub>SUM</sub> S <sub>SUM</sub> P <sub>Favg</sub> FREQ P <sub>mid</sub> Q <sub>mid</sub> S <sub>mid</sub>	● ●

## Accuracy & Resolutions

PARAMETER	ACCURACY	RESOLUTION	MEASUREMENT RANGE
Voltage	0.25%	0.1V	40.0~400.0V <sub>ac</sub> (V <sub>LN</sub> )
Current	0.25%	0.001A	1%~120% CT rating current
Neutral Current	1.0%	0.001A	1%~120% CT rating current
Active Power	0.5%	1W	-999999999~999999999W
Reactive Power	0.5%	1Var	-999999999~999999999Var
Apparent Power	0.5%	1VA	0~999999999VA
Power Factor	0.5%	0.001	± 1.000
Frequency	0.2%	0.01Hz	45.00~65.00Hz
Active Energy	0.5%	0.1kWh	0~99999999.9kWh
Reactive Energy	0.5%	0.1kVarh	0~99999999.9kVarh
THD	1.0%	0.1%	0~100.0%

## Technical Specification

### Electrical Characteristics

Measurement: True RMS  
 Sampling: 128 point/Cycle  
 Metering system type: 1P2W, 1P3W, 3P3W(2 \ 3CT) \ 3P4W (1 \ 3CT) ; Balance / Unbalance  
 Input range: Voltage:40~400V<sub>LN</sub> ; 60~600V<sub>LL</sub>  
 PT Primary side ratio: 100~500000V  
 PT Secondary side ratio:100~600V  
 Current:0~5A, (Optional:0~1A)  
 CT Primary side ratio: 5~9999A  
 Frequency:45~65Hz

Metering over range: Voltage:2x rated voltage continuous ; 2500V, 1sec  
 Current:2x rated current continuous ; 20x rated current 1sec  
 Input load: Voltage:<0.2VA ; Current:<0.1VA

### Power Quality

THD: Total harmonic distortion for voltage and current

### RS485 communication

Protocol: RS485 Modbus RTU mode  
 Address: 1~247  
 Baud rate: 1200/2400/4800/9600/19200/38400  
 Parity: None / Even / Odd  
 Data bits: 8 bits  
 Stop bit: 1 or 2  
 Distance: 1200M max  
 Terminate resistor: 120~300Ω/0.25W(typical: 150Ω)

Memory storage: FRAM

### (CPM-21 only)

Digital input: 2 channels DI  
 Opto-coupler input: 5V<sub>dc</sub>, 20mA  
 Response time: ≤300mS  
 Isolation: 2000Vac  
 Digital output: 2 channels DO  
 Open collect(O.C.); 40V<sub>dc</sub>, 50mA  
 Response time: ≤300mS  
 Isolation: 2000Vac  
 Function: Can set to energy pulse output \ alarm output \ RS485 control output  
 DO1 is active energy pulse output  
 DO2 is reactive energy pulse output  
 Pulse divider: 1~6000 (x0.1 kWh or kVarh)  
 Pulse width: 1~20 (x10mS)  
 Alarm output mode: Hi / Lo  
 Up to 33 parameters of power and Demand for assign  
 RS485 control output mode: Output setting from RS485

### Power Supply

Range: ADH:AC 85~264V / DC 100~300V  
 Power consumption: AC:≤10VA @ 230V / DC:≤3W

**Environmental Characteristics**

Operating Temp.: 0~60°C  
 Humidity rating: 5~95%RH, Non-condensing  
 Temp. coefficient: ≤100 PPM/°C  
 Storage Temp.: -10~70°C  
 IP Enclosure: Front panel: IEC 529 (IP50) ; Housing: Ip20

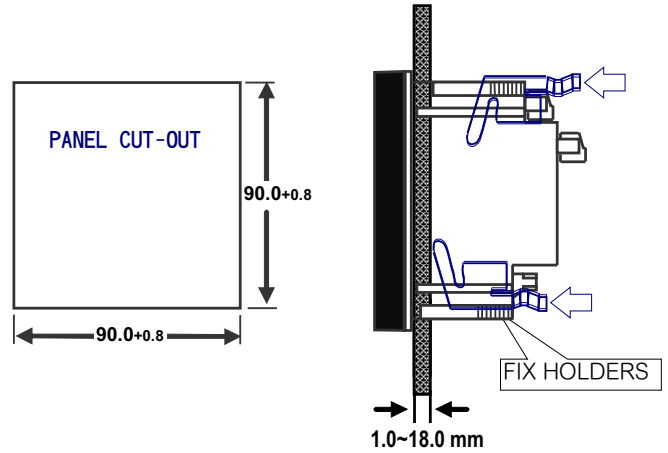
**Mechanical Characteristics**

Dimensions: 96mm(W)x96mm(H)x71mm(L)  
 Panel cutout: 90mm(W)x90mm(H)  
 Material: PC, Black (with fire-retardant)  
 Mounting: Panel mounting  
 Weight: ≤400g

**Safety**

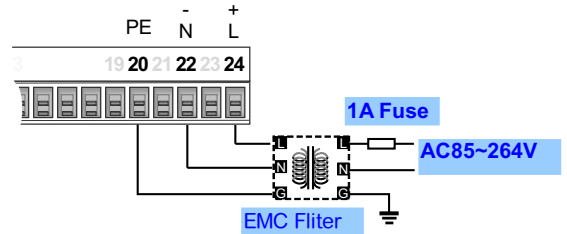
Isolation: AC 2KV, 50/60Hz, for 1 min, Between Power / Input / Output / Case  
 Insulation resistance: ≥ 100MΩ @ 500V<sub>dc</sub>  
 EMC: EN61326:2006  
 LVD: EN61010-1:2010  
 Wire terminal: PA66 (UL 94V-0)  
 Voltage / Current input:  
 AWG: 26~10 / 0.5~4.0mm<sup>2</sup>  
 Screw Torque Value: M3 / 8.0kgf.cm (Max)  
 Others input:  
 AWG: 28~16 / 0.5~1.5mm<sup>2</sup>  
 Screw Torque Value: M2 / 2.04kgf.cm (Max)

**Installation**



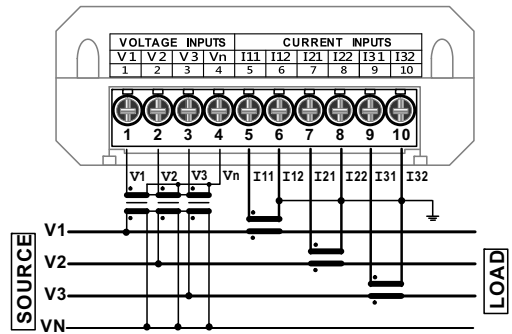
**Connection diagram**

**Aux Power**

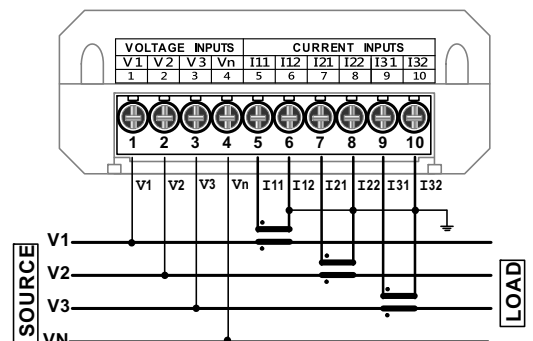


**Voltage and Current input**

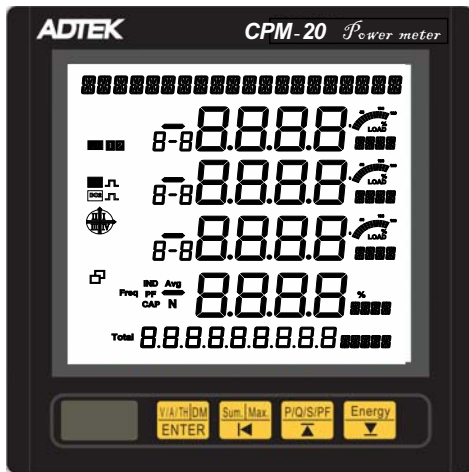
3P4W- 3PT/ 3CT



3P4W- w/o PT/ 3CT



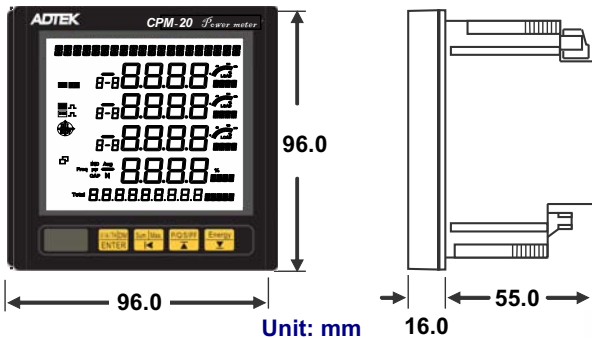
**Front panel**



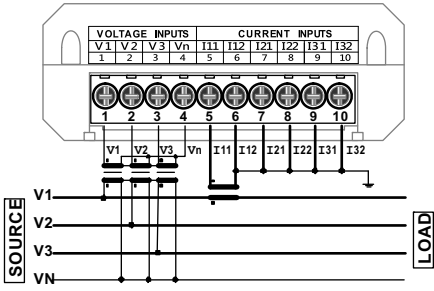
**Display:** LCD 65(W)x61(H)mm ; White backlight  
 Backlight delay time : 0~15 min ( "0" is always on)

**Description:** Twenty 8 digits in the top of display area: Display mode indication.  
 Four line of 8 digits in the metering area : Display metering data such as voltage \ current \ power \ power factor \ frequency \ unbalance \ etc.  
 Four line of 8 digits in the metering area : Display metering data unit.  
 Three line 8-8 digits: 1, 2, 3 for 3 phase ; 1-2, 2-3, 3-1 for 3 phase line to line.  
 Nine 8 and five 8 digits: Display energy data and unit.  
 Also display real time o'clock.

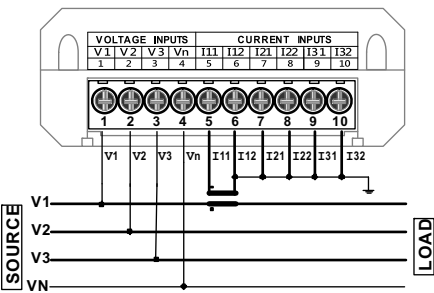
**Dimensions**



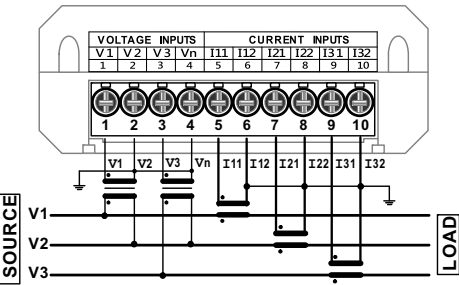
3P4W-3PT/ 1CT



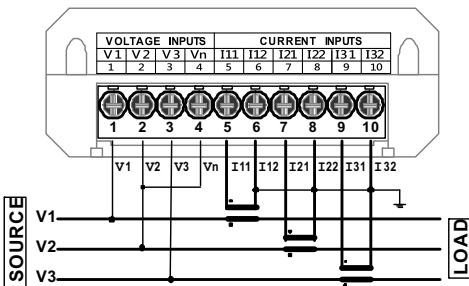
3P4W-w/o PT/ 1CT



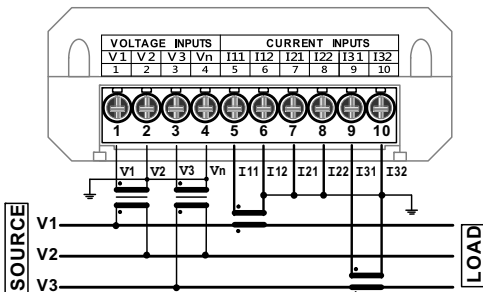
3P3W-2PT/ 3CT



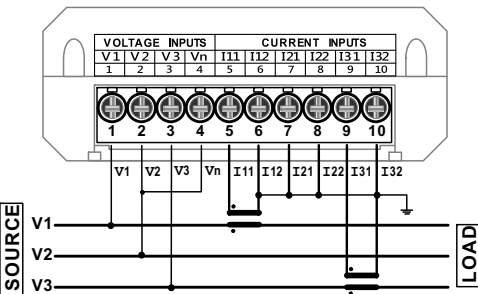
3P3W-w/o PT/ 3CT



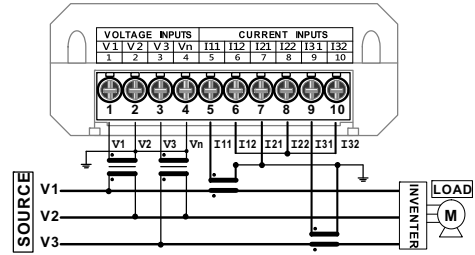
3P3W-2PT/ 2CT



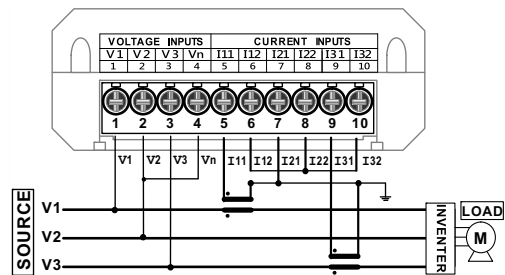
3P3W-w/o PT/ 2CT



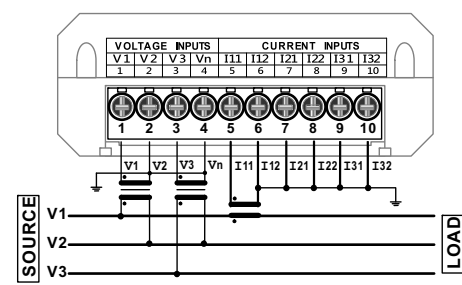
※This CT connection is available use for Inverter load or normal load situation  
3P3W-2PT/ 2CT



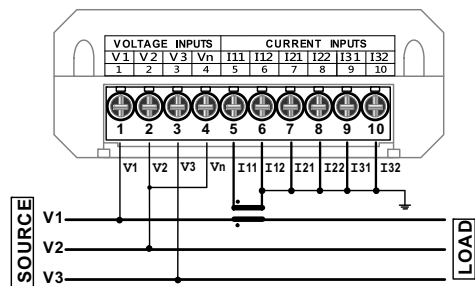
3P3W-w/o PT/ 2CT



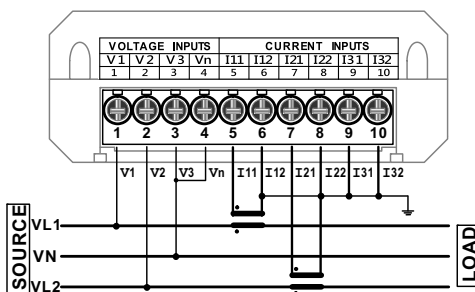
3P3W-2PT/ 1CT



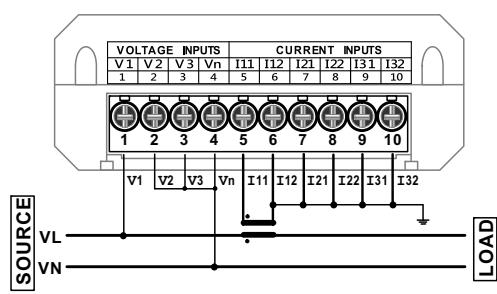
3P3W-w/o PT/ 1CT



1P3W

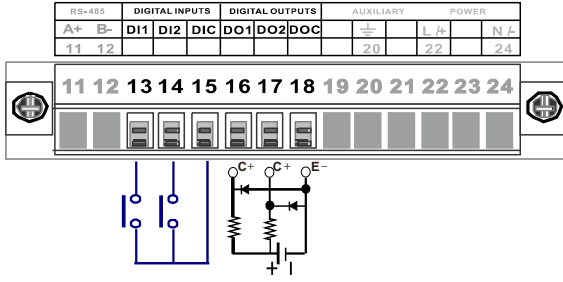


1P2W



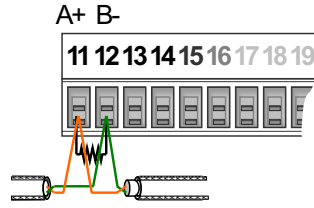
**Digital input/output** (CPM-21 only)

Wire: AWG 28~16 (0.5~1.5mm<sup>2</sup>)



**RS485 Communication port**

Wire: AWG 28~16(0.5~1.5mm<sup>2</sup>)



Distance Max. : 1200M  
 Terminator : 120~300Ω/0.25W  
 (Standard: 150Ω)