CPM-12 Multifunction Power Meter

ADTEK

Description

CPM-12 multi-functional power meter provides high accuracy and reliable measurement which is designed for the comprehensive power parameter monitoring in single-phase and three-phase system. As a powerful and precise device to enhance power and quality control, it supports diversal significant metering, such as, voltage, current, power, power factor, frequency and energy.

Optional with RS-485 Modbus communication, CPM-12 can display real-time information and make the data intergration in automation control system more easily for the remote management and analysis. Moreover, it provides display and calculation function of accumulated CO_2 emission, which can set CO_2 rate according to user-defied needs, so as to makes an more intuitive metering result and achieve sustainable power use.

With its rich functions and high adaptability, CPM-12 series multi-function power meter is suitable for various fields that require power management, such as industrial manufacturing, building automation, energy monitoring, etc., and is indispensable in modern power management systems as key device.

Features

- It can measure 1P2W/1P3W/3P3W/3P4W phase line systems and can be set freely.
- It can measure multiple electrical parameters such as voltage, current, frequency, power factor, active power, reactive power, apparent power and energy of balanced/unbalanced load systems.
- The CT input current is optionally 1A or 5A, which can be set by the user.
- The number of sampling cycles is the number of cycles of the input frequency, and each cycle samples 128 points.
- The large-sized, high-brightness LCD screen is clear and easy to read even under direct sunlight.
- Innovative meter AI calculation function can perform automatic line adjustment (note).
- CE, FCC approved.

Note: The software line adjustment function has conditional restrictions, please read the operation manual carefully.

Applications

- Energy monitor of motor control panel/distribution board
- Energy mangement/electric cost allocation
- Analysis of energy quality

Ordering Information

CPM – 12 — Mode — Current Input — Output Option — Communication Option

CODE	Function
A	Standard
B	Enhanced

CODE	Current Input
1	0~1A
5	0~5A
15	0~1A or 5A
MV	0~333mV

CODE	Output Option
N	None
P	Pulse output

CODE	Communication Option
N	None
M	RS485 Modbus RTU

Meter Selection Guide

Measurement items and functions		12A	12B
Voltage	Total and per phase L-L and L-N	●	●
Current	Total and per phase and neutral	●	●
Active Power	Total and per phase	●	●
Reactive Power	Total and per phase	●	●
Apparent Power	Total and per phase	●	●
Power Factor	Total and per phase	●	●
Frequency	Frequency	●	●
Active Energy	Import / Export / Total / Net	●	●

Measurement items and functions		12A	12B
Reactive Energy	Import / Export / Total / Net	●	●
Apparent Energy	Total	●	●
THD/Voltage	Total and per phase	●	●
THD/Current	Total and per phase	●	●
Phase Angle	Current and voltage		●
Unbalance	Current and voltage	●	●
Demand	Current, active, reactive, apparent power		●
Max. Demand values	Current, active, reactive, apparent power and time stamp		●
Communication Port	RS-485 Modbus RTU	◎	◎
PO	Pulse Output	◎	◎
Run Hour	Operating hours, Running hours	●	●
CO_2 Emission	Total CO_2 weight of energy	●	●

◎ Optional features

Accuracy & Resolutions

Parameter	Accuracy	Resolution	Measurement Range
Voltage	0.2%	0.1V	20~400V L-N / 35~600V L-L
Current	0.2%	0.001A	1%~120% CT rating current
Neutral Current	1.0%	0.001A	1%~120% CT rating current
Active Power	0.5%	1W	-999,999,999~999,999,999W
Reactive Power	0.5%	1Var	-999,999,999~999,999,999Var
Apparent Power	0.5%	1VA	0~999,999,999VA
Power Factor	0.5%	0.001	-0.020~+1.000~0.020
Frequency	0.05%	0.01Hz	45.00~65.00Hz
Active Energy	0.5%	0.1kWh	0~9,999,999.9kWh
Reactive Energy	0.5%	0.1kVarh	0~9,999,999.9kVarh
Apparent Energy	0.5%	0.1VAh	0~9,999,999.9VAh
THD	1.0%	0.1%	0~100.0%
Unbalance	0.5%	0.1%	0~300.0%
Current Demand	0.2%	0.001A	0.000~9,999A
Active Power Demand	0.5%	1W	-999,999,999~999,999,999W
Reactive Power Demand	0.5%	1Var	-999,999,999~999,999,999Var
Apparent Power Demand	0.5%	1VA	0~999,999,999VA

Technical Specification

Electrical Characteristics

Measurement: True RMS measurement
Sampling: 128 point/Cycle
Display refresh rate: 0.5s
Power system: 1P2W, 1P3W, 3P3W(1/2/3CT), 3P4W(1/3CT)
Balance / Unbalance
Input range: Voltage: 20~400VLN, 35~600VLL
PT Primary ratio: 100~1,200,000V
PT Secondary ratio: 50~500V
Current: 5A / 1A / 333mV
CT Primary ratio: 1~9999A
CT Secondary ratio：1A / 5A / 333mV
Overload capacity: Current: 2x rated current continuous; 20x rated/1s
Input burden: Voltage: <0.2VA; Current: <0.1VA

Power Quality

THD: Total harmonic distortion for voltage and current
Unbalance: 3-phase voltage and current

RS-485 Communication (optional)

Protocol: Modbus RTU mode
Address: 1~247
Baud rate: 1200/2400/4800/9600/19200/38400/57600/115200 bps
Response time: <50mS (the interval between a received command completed and data-transfer starting)
Parity: None / Even / Odd
Data bits: 8 bits
Stop bit: 1 or 2
Distance: 1200M max

Pulse Output (optional)

Output capacity: 2 sets of open collectors (O.C.) 30Vdc / 30mA(max)
Function mode: Setting modes include, pulse output, test-pulse and DO mode
Pulse output mode: PO and TP could be set seperately for different pulse ouputs usage
Output frequency: 1000Hz(max)
Pulse divider: 1~9999 (1 Pulse= 0.1kWh, if set 100, 1 Pulse= 10.0kWh)
Pulse width: 0~5000(mS) , 0 is 50% duty cycle
Energy assign: Import active energy, Export active energy Import reactive energy, Export reactive energy
Test pulse output: 1600 Pulse /1kWh, Duty cycle 50%

Demand

Calculation method: Block / Sliding
Period: 1~60 min
Demand record: Records of Max/Min value

Power Supply

Range: AC 85~264V, 50/60Hz DC 100~300V
Power consumption: AC : ≤ 10VA @ 230V / DC : ≤ 3W

Environmental Conditions

Operating Temp.: 0~60℃
Humidity rating: 5~95%RH, Non-condensing
Temp. coefficient: ≤100 ppm/℃
Storage Temp.: -10~70℃
Degree of protection: Front panel: IEC 529 (IP50), Housing: IP20
Operating altitude(maximum): 2000m above sea-level

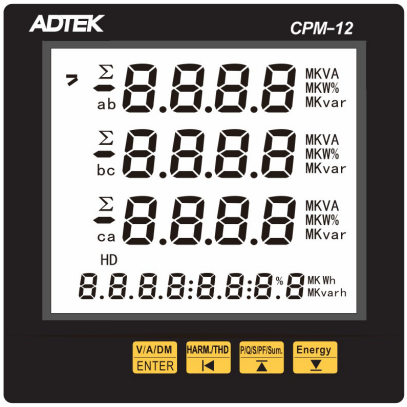
Mechanical Structure

Dimensions:	96mm(W)x96mm(H)x70.5mm(L)
Panel cutout:	90.8mm(W)X90.8mm(H)
Material:	PC, Black (with fire-retardant)
Mounting:	Panel mounting
Weight:	≤400g
Wire terminal:	PA 66 (UL 94V-0)
	Voltage / Current input:
	AWG26~10 / 0.5~4.0mm^2
	Screw Torque Value: M3 / 8.0kgf.cm(Max)
	Others input：
	AWG28~16 / 0.5~1.5mm^2
	Screw Toque Value: M2 / 2.04kgf.cm(Max)

Safety

Isolation:	AC 2KV,50/60Hz, for 1 min
	between Power / Input / Output / Case
Surge immunity:	AC±4KV, 1.2/50us；Voltage input/AUX. power
Insulation resistance:	≥100MΩ @ 500Vdc
EMC:	EN 61326-1:2013
	CISPR11 Class A
	EN61000-3-2:2014
	EN61000-3-3:2013
	IEC61000-4-2:2008
	IEC61000-4-3:2006+A1:2007+A2:2010
	IEC61000-4-4:2012
	IEC61000-4-5:2005
	IEC61000-4-6:2013
	IEC61000-4-8:2009
	IEC61000-4-11:2004
Safety(LVD):	EN 61010-1:2010
FCC:	FCC part 15 subpart B Class A

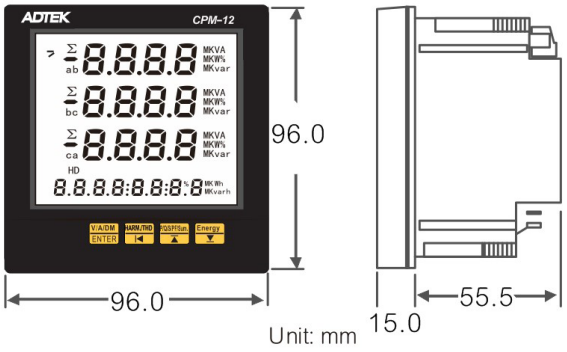
Front Panel



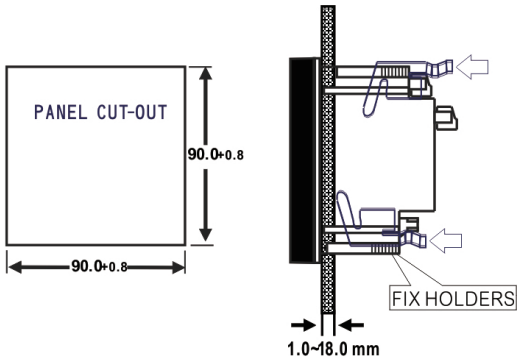
Display: LCD 65(W)x61(H)mm；White back light blue words visible.

Backlight delay time: 0~15 min (“0” is always on).

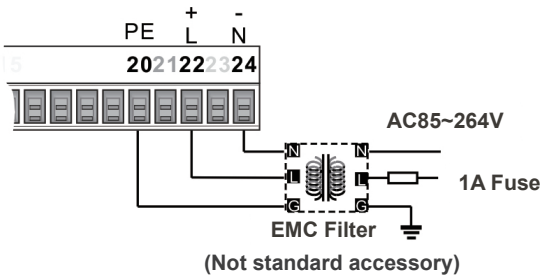
Dimensions



Installation

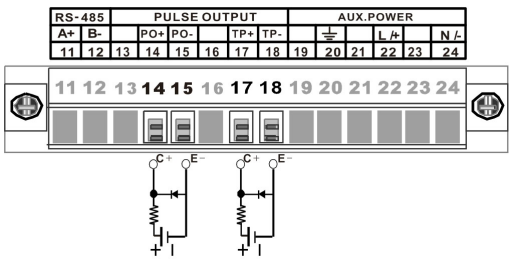


Power Connection

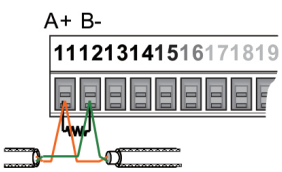


(Not standard accessory)

Pulse Output



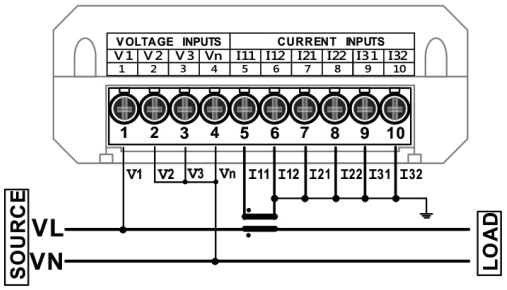
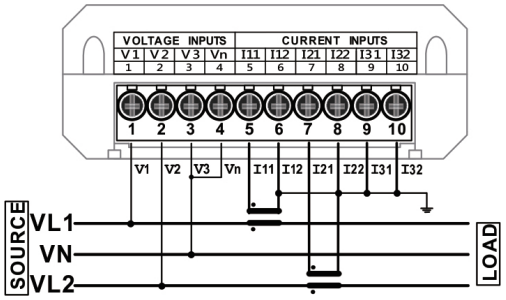
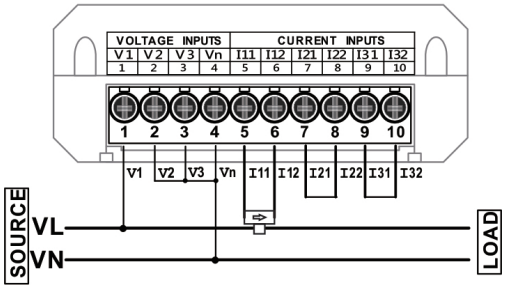
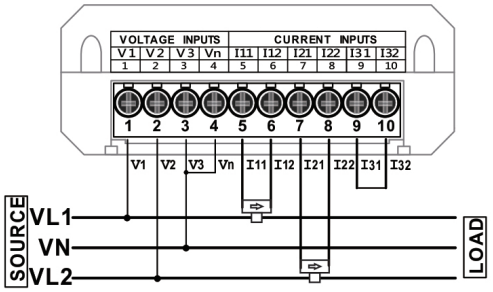
RS-485 Communication Port



Max. Distance: 1200M
Terminate Resistance suggested :120Ω/0.5W
(Not standard accessory)

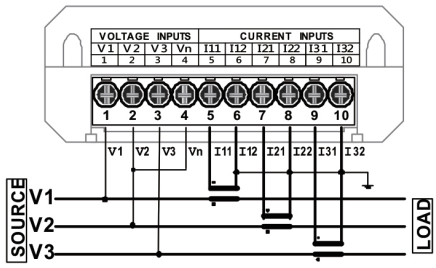
Voltage and Current Wiring

CT secondary side has 2 types, 1A/5A and 333mV, the mV of CT signal needs to be wired independently, and cannot be grounded or wired together with each other.

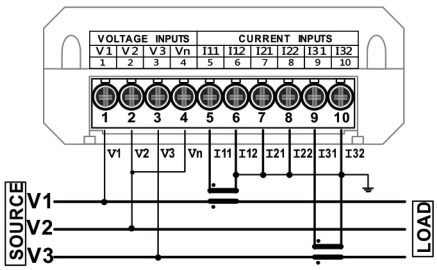
1P2W(1A/5A)	1P3W(1A/5A)
	
1P2W(333mV)	**1P3W(333mV)**
	

3P3W w/o PT

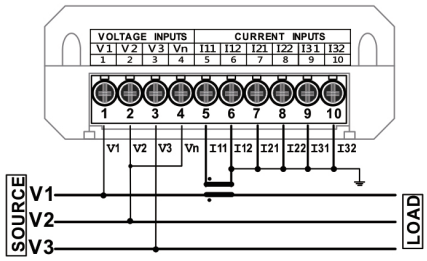
3CT(1A/5A)



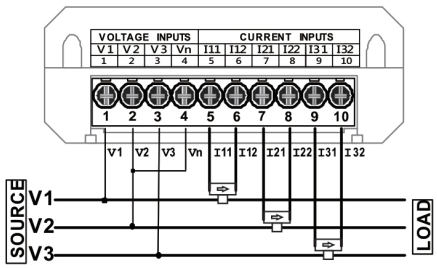
2CT(1A/5A)



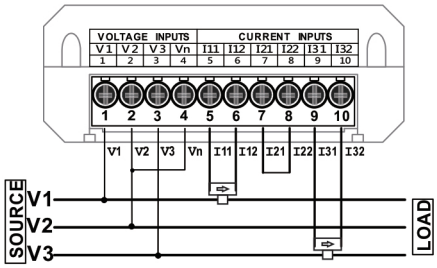
1CT(1A/5A)



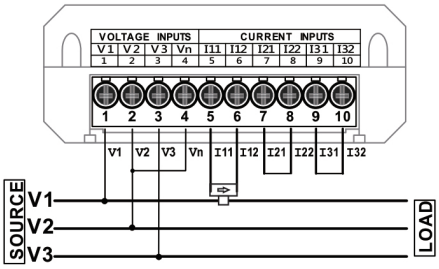
3CT(333mV)



2CT(333mV)

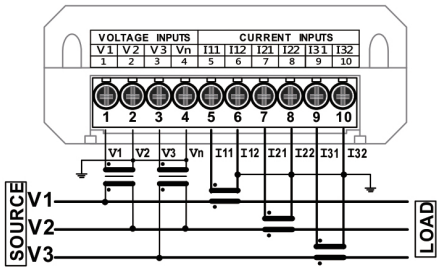


1CT(333mV)

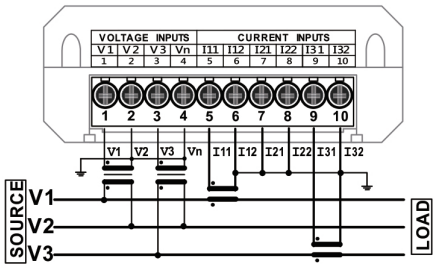


3P3W 2PT

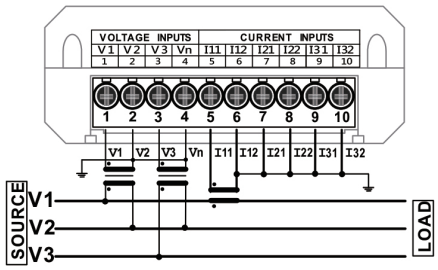
3CT(1A/5A)



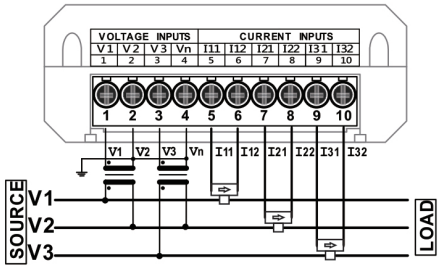
2CT(1A/5A)



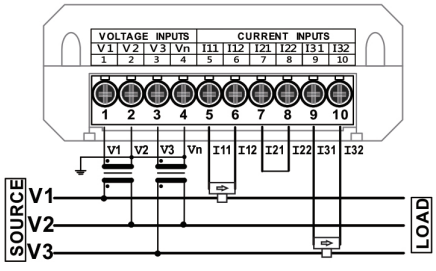
1CT(1A/5A)



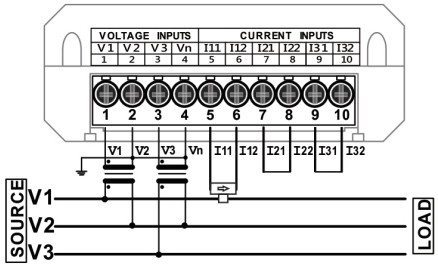
3CT(333mV)



2CT(333mV)

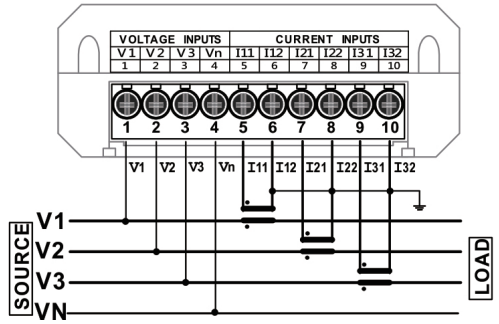


1CT(333mV)

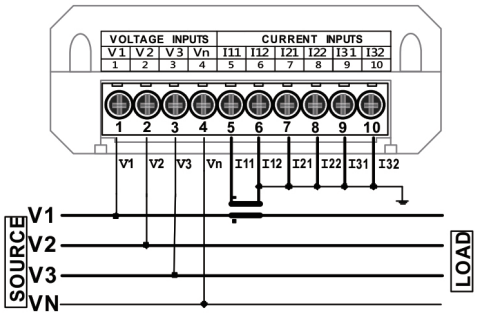


3P4W w/o PT

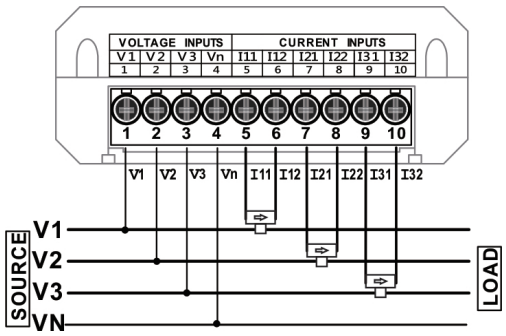
3CT(1A/5A)



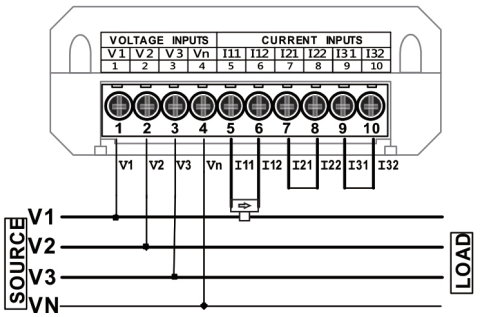
1CT(1A/5A)



3CT(333mV)

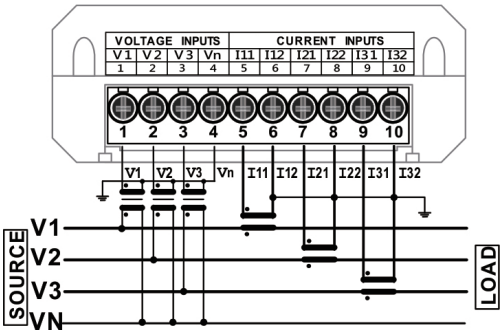


1CT(333mV)

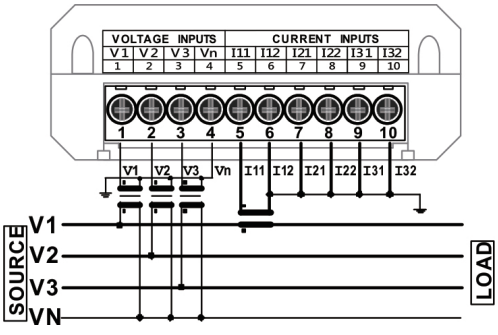


3P4W 3PT

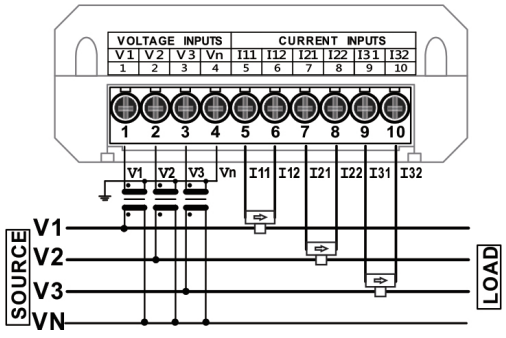
3CT(1A/5A)



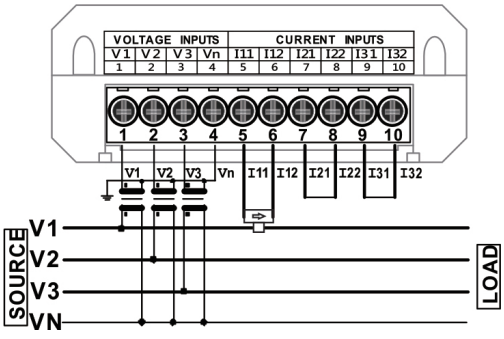
1CT(1A/5A)



3CT(333mV)



1CT(333mV)



Split Core CT Ordering Information

(The output line of mV on the secondary side of the CT needs to be wired independently, and cannot be connected together or grounded for protection purposes.)

US – CTV — Hole — Primary Current — **2** — Cable Option

CODE	Diameter(mm)	CODE	Rated Current
10	Φ10	005	5A
16	Φ16	060	60A
		100	100A
		150	150A
24	Φ24	200	200A
35	Φ35	300	300A
		400	400A
		600	600A
50	Φ50	800	800A

CODE	Cable Spec.
LSFH	Low smoke zero halogen
This code is not filled when there is no optional function	

Type	Current of primary (A)	Voltage of secondary (mV)	Accuracy %F.S.	Weight
US-CTV-10-005	5A	333	1.0	60g
US-CTV-16-060	60A	333	0.5	100g
US-CTV-16-100	100A	333	0.5	100g
US-CTV-16-150	150A	333	0.5	100g
US-CTV-24-200	200A	333	0.5	205g
US-CTV-35-300	300A	333	0.5	375g
US-CTV-35-400	400A	333	0.5	375g
US-CTV-35-600	600A	333	0.5	375g
US-CTV-50-800	800A	333	0.5	655g