CPM-10B Multifunction Power Meter

Description

CPM-10B Multifunction Power meter measure single phase 2 wire, single phase 3 wire, three phase 3 Wire and 3 phase 4 wire systems with high accuracy measurement for parameters such as voltage, current, active power, reactive power, apparent power, power factor, frequency, active energy (V, A, W, Watt-Hr, Var, Var-Hr, VA, PF, Hz), having LED display and standard communication port.

Standard with 1 set of RS-485 Modbus RTU port, and optional for 1 set of relay output, pulse output or analog output, so as to satisfy any application for power management, remote input / output, alarm and remote signal control needs.

Case depth 120mm only, easy panel mounting installation.

Features

- The number of sampling cycles is the number of cycles of the input frequency, and each cycle samples 64 points.
- Measure 1P2W/1P3W/3P3W/3P4W system, and the setting is programmable.
- Measure Unbalanced / Balanced load system's active power, reactive power, apparent power and electric energy (Watts-Hr) etc parameters.
- CT input current can be 1A or 5A, and can be set by the user.
- Dual display, upper row shows 4 digits voltage and 4 digits current (or 10 digits Watts-Hr), lower row shows 4 1/2 digits Watts. (0~29999)
- 1 set relay output, with 3 variable setting, can be set to below parameters V.AVG / I.AVG / FREQ / P.TL / Q.TL / S.TL / PF.AVG / VA / VB / VC / IA / IB / IC / PF-A / PF-B / PF-C / P-A / P-B / P-C / Q-A / Q-B / Q-C / S-A / S-B / S-C, having relay function: Hi / Lo / Hi Hold / Lo Hold / OFF, further advance function, start delay, hysteresis, delay On, delay Off etc.
- 1 analog output same as relay setting parameters. Selectable output range for voltage or currents:
  Output ranges for Current: 0~10mA / 0~20 mA / 4~20 mA / 4~12~20 mA / ±10 mA / ±20 mA (Default 4~20 mA)
  Output ranges for Voltage: 0~5V / 1~5 V / 0~10 V / 0~2.5~5 V / 1~3~5 V / 0~5~10 V / ±5 V / ±10 V (Default 0~10V)
- Standard with 1 set of RS-485 communication output, optional for 1 set of relay, pulse, or analog output.
- Outer case standard DIN 96 x 48 mm
- CE approved

Applications

- Motor control / panel power monitoring
- Power consumption monitor and control
- Power distribution system
- Intelligent building & automation power management system
- Power testing equipment

Ordering Information

CPM— 10B — A Input range | V Input range — Optional Output 1 — Optional Output 2 — Communuication — Aux. Power

CODE	Input Range
A15	1A or 5A
MV	333mVac
MV for Clamp CT	

CODE	Input Range
V1	50~500V

CODE	Output 1
ON	None
OR1	Relay output
OPC1	Pulse(O.C)
OPR1	Pulse(Relay)
If choose OPR1, the Relay control function will be not available.	

CODE	Output 2
AN	None
AI1	4~20 mA
AV1	0~10 V
Voltage / Current output range programmable	

CODE	Communication
U81	RS-485

CODE	Aux. Power
ADH	AC 85~264V DC 100~300V
ADL	AC/DC 20~56V

Measurement and Wiring

Phase & Wiring	Voltage	Current	Freq.	Burden
1P2W	50~500Vac(VLN)	1A 5A 333mVac	45~65Hz	Voltage:≤0.5VA/ Phase or Current:≤0.1VA/ Phase
1P3W				
3P3W				
3P4W				
* Max input 500V, 5A, if exceed please use PT or CT				

Accuracy & Resolutions

Parameter	Accuracy	Resolution	Measurement Range
Voltage	0.2%	0.1V	0~2999.9
Current	0.2%	0.02A	0~2999.9
Active Power	0.5%	0.001kW	-19999~29999
Reactive Power	0.5%	0.001kVar	-19999~29999
Apparent Power	0.5%	0.001kVA	-19999~29999
Power Factor	0.5%	0.01	-0.020~1.000~+0.020
Frequency	0.2%	0.01Hz	45.00~65.00
Active Energy	0.5%	0.001kWh	0~9999999999
Reactive Energy	0.5%	0.001kVarh	0~9999999999

*Accuracy should add CT tolerance when selected the Clamp Type.

Technical Specification

Electrical Characteristics

Measurement: True RMS
Ripple effect: ≤ 0.2% of F.S. at 30% distortion
A/D converter: 16 bits A/D converter
Sampling rate: 64 points/Cycle
Response time: ≤100 mS(Average value set as= “1”)
System: 1P2W, 1P3W, 3P3W, 3P4W;
Unbalanced / Balanced load
Input range: Voltage: 50~500VLN
PT Primary unit setting: V and KV
PT Primary setting: 50.0V~100KV
PT Secondary setting: 50.0~500.0V
Direct Input: < 500VLN
Current: 0.05~1A / 0.05~5A (max.)
CT Primary setting: 1~2999.9A
CT Secondary setting: 1A / 5A / 333mV
Frequency: 50/60Hz ± 3Hz
Max. input capability: Voltage:
2 X rated voltage continuous
4 X rated voltage continuous 2 minutes
Current:
3 X rated current continuous
10 X rated current continuous 10 seconds
50 X rated current 1 second (5A input type)

Relay Output(Optional)

Setting point: 3 sets (1 contact output for 3 set values)
Relay output: 1set SPDT, 5A/230Vac, 5A/115V
Relay settings: Up to 25 parameters relay setting
Relay mode: Hi / Lo / Hi.HLd / Lo.HLd / OFF
Function: Start delay / Start band / Hysteresis / Delay On / Delay Off
Start band: 0~9999 counts
Start delay: 0:00.0~9(Minutes):59.9(Second)
Delay On: 0:00.0~9(Minutes):59.9(Second)
Delay Off : 0:00.0~9(Minutes):59.9(Second)
Hysteresis: 0~5000 counts

Analog(Optional)

Accuracy: ≤± 0.1% of F.S.; 16 bits DA converter
Ripples: ≤± 0.1% of F.S.
Response time: ≤250 mS (0~90% of output)
Output range: [Ro.SL]Voltage: 0~5V / 0~10V(Default) / 1~5V
0~2.5~5V / 1~3~5V / 0~5~10V /
-5~+5V / -10~+10V
Current: 0~10mA / 0~20mA / 4~20mA(Default)
4~12~20 mA / -10~10 mA /
-20~20 mA
Output load capability:
Voltage output: 0~10V，≧ 1000Ω
Current output: (0)4~20mA，≦ 530Ω
Function: [Ro.HS] Output high scale
Setting range: -19999~29999
[Ro.LS] Output low scale
Setting range: -19999~29999
[Ro.Lnt] Max. limit: 0.00~110.00%
Digital adjustment: [Ro.Pro] Setting range: -32768~+32767
[Ro.SPn] Setting range: -32768~+32767

RS-485 Communication

Protocol: RS-485 Modbus RTU mode
Address: 1~247
Baud rate: 2400/4800/9600/19200/38400
Response time: <50mS (the interval between a received command completed and data-transfer starting)
Parity check: None / Even / Odd
Bits: 8 bits
Stop bit: 1 or 2
Wire distance: 1200M max

Pulse Output(Optional)

Output mode: 1 channel open collector, 30Vdc/30mA(max) or 1 relay output: 5A/230Vac ; 5A/115Vac
Output parameters: Active Energy：(AE.TL / -AE.TL)
Reactive Energy：(RE.TL /-RE.TL)
Output range: Max frequency: 1000Hz；duty cycle 50%
Pulse divider: 1~9999 (1 Pulse= 0.1kWh; if set 100, 1 Pulse= 10.0kWh)

Power Supply

Range: ADH : AC 85~264V，DC 100~300V
ADL : AC / DC 20~56V
Power consumption: AC : ≦ 12VA，DC : ≦ 6.0W
Data storage: FRAM

Safety

Dielectric strength: AC 2.0 KV for 1 min, Power/Input/Output/Casing
Isolatuion resistance: ≥100M Ω @ 500Vdc, Power/Input/Output/Casing
Signal isolation: Power/Input/Relay/RS-485/Analog output/ Pulse output
EMC: EN 61326-1:2006
EN61000-3-3:2008
EN61000-3-2:2006+A1:2009+A2:2009
LVD: EN61010-1:2001

Environmental Conditions

Operating temp:	0~60 ℃
Humidity rating:	20~95 %RH, Non condensing
Temp. coefficient:	≤ 100 PPM/℃
Storage temp:	-10~70 ℃
Protection:	Front panel: IEC 529 (IP52), Case: IP20

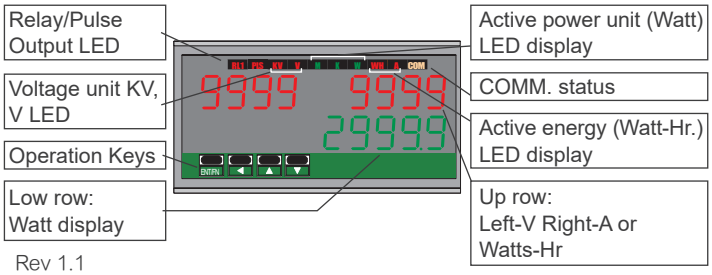
Mechanical Structure

Dimension:	96mm(W) x 48mm(H) x 120mm(D)
Mounting size:	92mm(W) x 44mm(H)
Case material:	ABS Non-flammable (UL 94V-0)
Installation:	Panel mounting
Terminal block:	Plastic NYLON 66 (UL 94V-0) 5A 300Vac, M2.5/5.0kgf.cm(Max), AWG 22~16(0.5~1.3mm^2) 10A 600Vac, M3.0/10.0kgf.cm(Max), AWG 22~12(0.5~3.0mm^2)
Weight:	350g

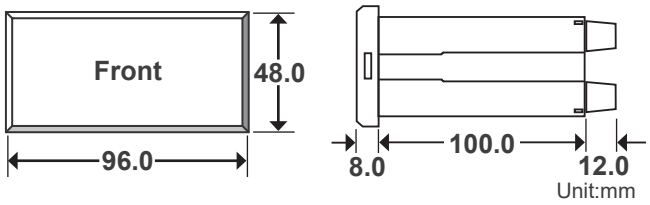
Display

Low row:	4 2/3 Digits; 0.28” (0.71cm) Green LED (Watt)
Up row:	10 Digits; 0.28” (0.71cm) Red LED
Selection[d.SEL]:	When[u-A]: Left、right each 4 Digits(V/A) When[Ptot]: 10 Digits totalizer (Watts-Hr)
Unit indicators:	Active power: 3 rectangular green LED for W / KW / MW Energy: 3 rectangular red LED for Wh / KWh / MWh
I/O indicators:	PLS Pulse output: 1 rectangular red LED COM RS-485 communication: 1 rectangular orange LED RS-485 signal send/receive data, LED will blink. RL1 Relay output: 1 rectangular red LED
Operation keys:	Up key: Value increase / return to previous level Down key: Value decrease / enter next level Shift key: Move decimal point / return to previous level / escape setting Enter/Fun key: Enter setting status / save and enter next function parameters
Password function:	4 digits password setting, range 0000~9999
Lock function:	4 modes, None / User level / Engineer level / All None: No lock, all function and parameters selectable. User Level: Open for viewing level, not able to change any setting if locked. Engineer Level: Open for viewing level, not able to change any setting If locked. All: Locked all level.

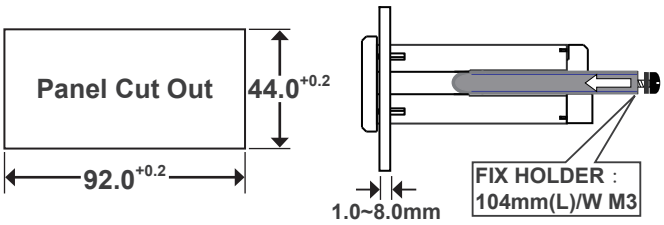
Front Panel



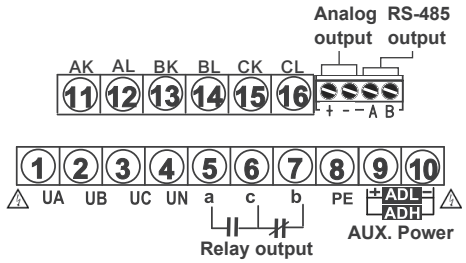
Dimensions



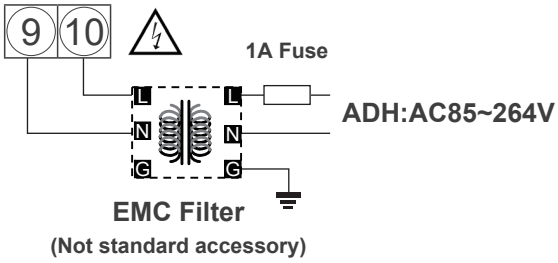
Installation



Terminal Block

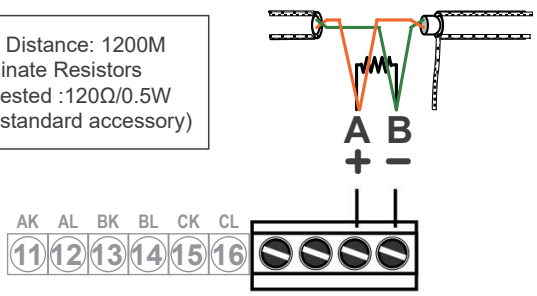


Power Connection



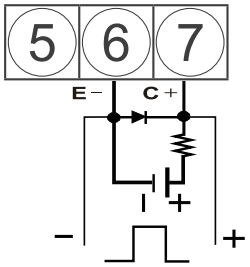
RS-485 Communication Port

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



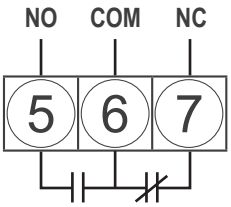
Pulse/Relay Output

O.C. Collector:



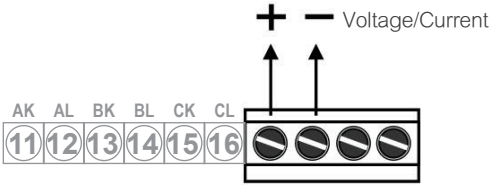
Relay Output:

Contact Capacity
5A/230Vac;5A/115Vac



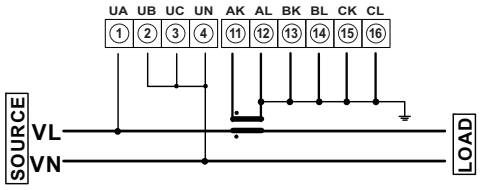
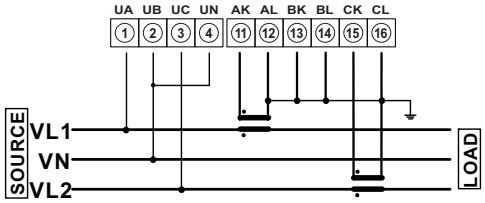
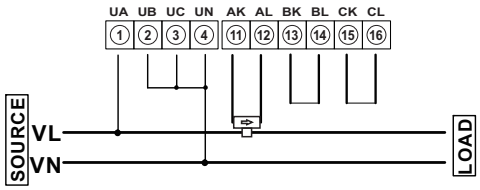
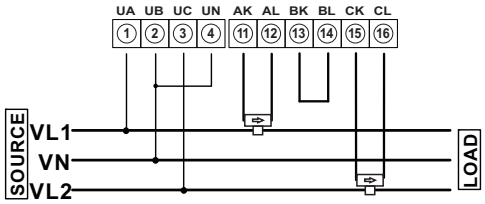
Max Loading
30Vdc/30mA

Analog Output



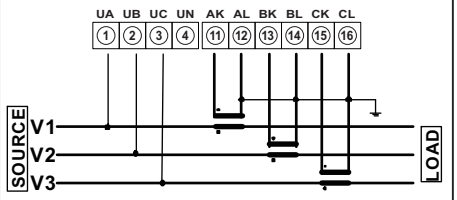
Voltage and Current Connection

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 connected together with each other.

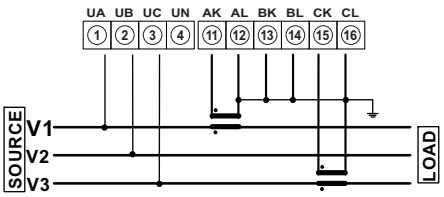
1P2W(1A/5A)	1P3W(1A/5A)
	
1P2W(333mV)	**1P3W(333mV)**
	

3P3W w/o PT

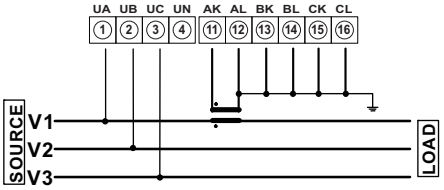
3CT(1A/5A)



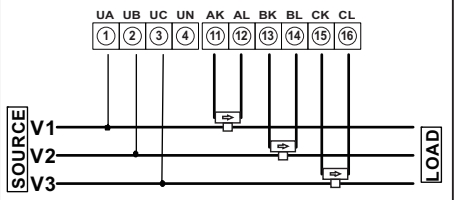
2CT(1A/5A)



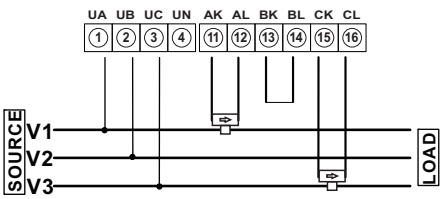
1CT(1A/5A)



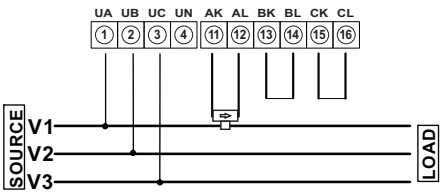
3CT(333mV)



2CT(333mV)

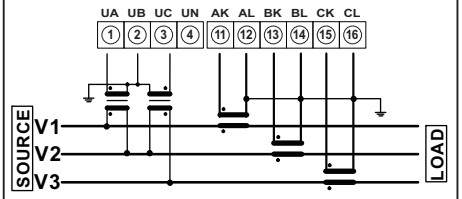


1CT(333mV)

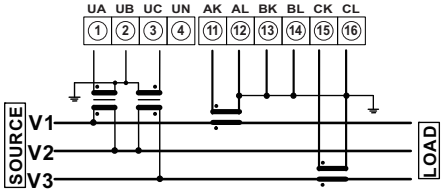


3P3W 2PT

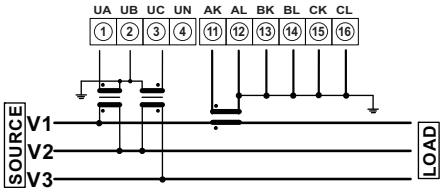
3CT(1A/5A)



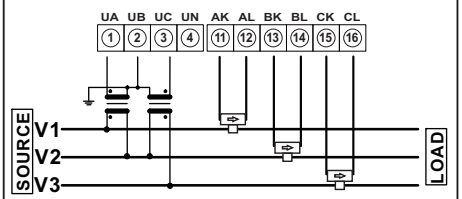
2CT(1A/5A)



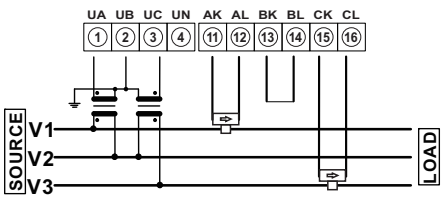
1CT(1A/5A)



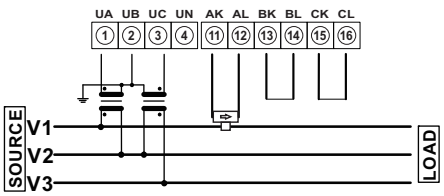
3CT(333mV)



2CT(333mV)

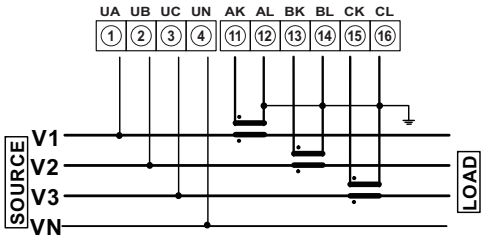


1CT(333mV)

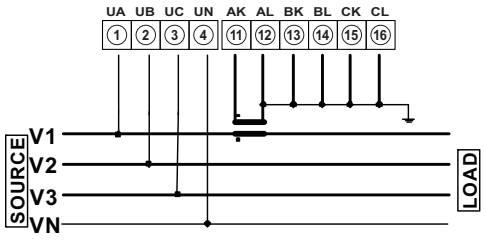


3P4W w/o PT

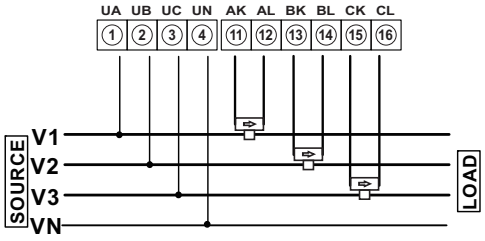
3CT(1A/5A)



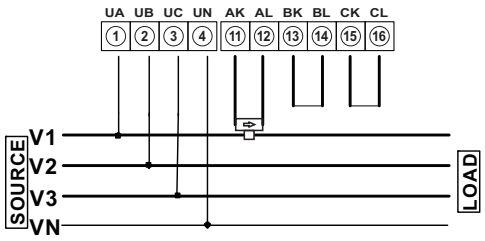
1CT(1A/5A)



3CT(333mV)

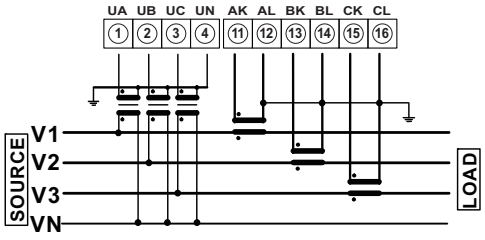


1CT(333mV)

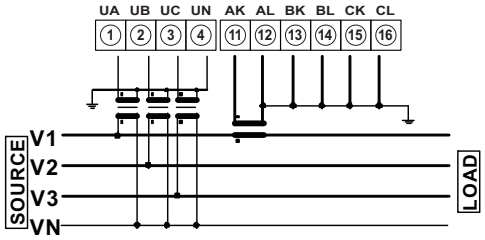


3P4W 3PT

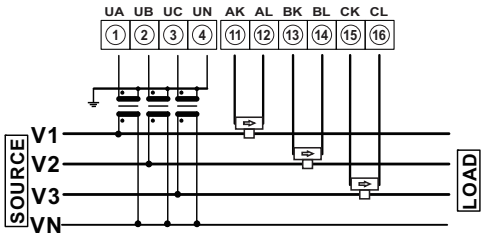
3CT(1A/5A)



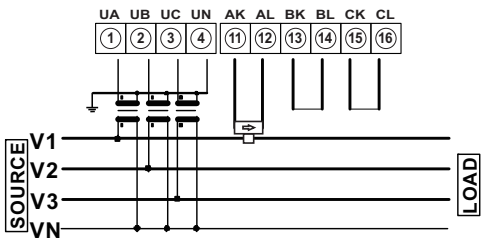
1CT(1A/5A)



3CT(333mV)



1CT(333mV)



Split Core CT Ordering Information

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

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

(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.)

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