

# CPM-80 Multifunction Power Analyzer



## Description

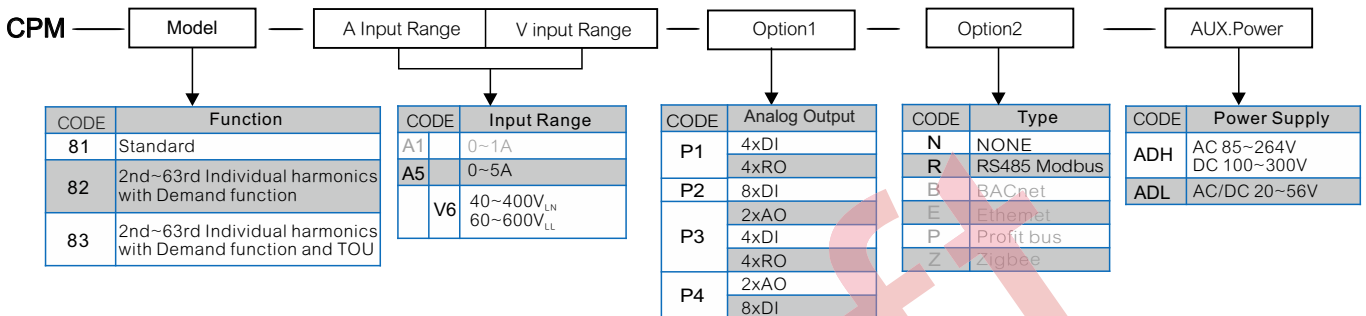
CPM-80 multifunction power analyzer provide high accuracy single phase and three-phase energy measuring and displaying, energy accumulating, power quality analysis, data logging and data communication. CPM-80 series meters are able to measure bidirectional, four quadrants kWh and kVarh. It provides maximum/minimum records for power usage and power demand parameters. Hardware standard built in a RS485 Modbus communication port , 4 Digital inputs, 2 Relay outputs, LCM and 2 MB flash for data-logging. In addition , also provide TOU , voltage and current THD, harmonics up to the 63rd and auto wiring change via software .

## Applications

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



## Ordering Information



## Meter Selection Guide

Features	81	82	83
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>LN,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	Four quadrants P <sub>1</sub> P <sub>2</sub> P <sub>3</sub> Σ P	●	●
Reactive Power	Four quadrants 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 Imp Wh Exp Wh Total Wh Net	●	●
Reactive Energy	Varh Imp Varh Exp Varh Total Varh Net	●	●
Apparent Energy	VAh	●	●
THD/Voltage	THD <sub>V12</sub> THD <sub>V23</sub> THD <sub>V31</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>	●	●
Individual harmonic	2nd~63rd Individual harmonics	●	●
Phasor diagram	Voltage phasor diagram , Current phasor diagram	●	●
Waveform capture	Voltage waveform , Current waveform	●	●
Demand	Current Demand , Power Demand	●	●
Max. Demand value	Max. Demand of Current & Power and time stamp	●	●
Max/Min Values	Maximum / Minimum values and time stamp	●	●
External Control Input	ECI1 ECI2 ECI3 ECI4 ECI5 ECI6 ECI7 ECI8	●	●
Digital Output	PO1 PO2	●	●
Relay Output	RO1 RO2 RO3 RO4	●	●
Analog Output	AO1 AO2	●	●
Time of Use	4 seasons, 8 tariff settings per day, Per year or up to 10 years setting	●	●
Date	Year, Month, Day, Hour, Minute, Second	●	●

◎ Optional features

## Accuracy & Resolutions

PARAMETER	ACCURACY	RESOLUTION	MEASUREMENT RANGE
Voltage	0.1%	0.1V	40.0~400.0Vac(V <sub>LN</sub> )
Current	0.1%	0.001A	1%~120% CT rating current
Neutral Current	0.5%	0.001A	1%~120% CT rating current
Active Power	0.25%	1W	-999999999~999999999W
Reactive Power	0.25%	1Var	-999999999~999999999Var
Apparent Power	0.25%	1VA	0~999999999VA
Power Factor	0.25%	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
Apparent Energy	0.5%	0.1kVAh	0~99999999.9kVAh
THD	1.0%	0.1%	0~100.0%
Individual harmonic	1.0%	0.1%	0~100.0%
Unbalance	0.5%	0.1%	0~300.0%

## Technical Specification

### Electrical Characteristics

Measurement: True RMS  
 Sampling: 256 point/Cycle  
 Metering system type: 1P2W, 1P3W, 3P3W, (1、2、3CT) 、3P4W (1、3CT) ; Balance/Unbalance

Input range:

Voltage: 40~400V<sub>LN</sub> ; 60~600V<sub>LL</sub>  
 PT Primary side ratio: 100~1200000V  
 PT Secondary side ratio: 50~600V  
 Current: 0~5A, (Optional: 0~1A)  
 CT Primary side ratio: 5~9999A

Metering over range:

Voltage: 2x rated voltage continuous ; 2500V, 1sec

Input load:

Current: 2x rated current continuous ; 20x rated current 1sec  
 Voltage: <0.2VA ; Current: <0.1VA

### Power Quality

THD:

Total harmonic distortion for voltage and current

Individual harmonic:

2nd~63rd individual harmonics for voltage and current

### Relay Output(RO)

Relay contact form:

4 sets SPST(1a) ; 5A/250Vac ; 5A/30Vdc ;

Relay action mode:

Hi / Lo/Hi.Hold / Lo.Hold /DO

Set points:

Up to 34 parameters of power and Demand for assign

### Analog Output(AO)

output sets:

2 sets

Signal output:

Voltage: 0~5V / 0~10V

Current: 0~20mA / 4~20mA / 0~10mA

Promotion of capacity output:

Voltage: ≥ 1000Ω ; Current: ≤ 530mA

Accuracy:

≤ ±0.1% of F.S. ; 16 bits DA converter

Ripple rate:

≤ ±0.1% of F.S.

Reaction time:

≤ 100mS. (input: 10~90%)

### External Control Input (ECI)

Input mode:

4 channels or 8 channels ECI input ; mechanical contact open collector input are available

Input function:

Can set up for DI /Demand reset / Max. Demand reset / Energy values reset / Max. and Min. values reset / Relay reset 0~99 (x8mS) programmable

Debouncing time:

### Pulse Output (PO)

Output mode:

2 channels open collect(O.C.) ;

Output: 30Vdc, 30mA(max)

Output frequency:

40Hz (max)

Pulse divider:

1~9999 (1 Pulse= 0.1kWh; if set 100, 1 Pulse= 10.0kWh)

Pulse width:

0~5000(x 4mS), 0 is duty cycle 50%

**TOU (CPM-83 only)**

4 Seasons: 1~4 seasons per year  
 8 Tariff setting: 1~8 each day (For peak, mid peak, off peak per day for billing)  
 4 Cost: Every tariff can assign 4 different tariffs (time periods)  
 Parameters of TOU: AE-Imp \ AE-Exp \ AE-Total \ RE- Imp \ RE-Exp \ RE-Tota \ SE-Total  
 Yearly setting: Tariff setting for 1 year or set up to 5 years

**Data Logging**

Waveform: Each phase 64 points continues 16 weeks of three-phase voltage and three-phase current  
 Setting: Load setting from previous saved file or set according to needs. Time interval from 1~32767 for second, minute, hour or day, depend on value record needs.  
 Event Record: Recording event and time error.  
 Memory storage: 8MB Flash ROM

**RS485 communication** (Second communication port is optional)

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

**Ethernet connection** (Second communication port is optional)

Network interface: 10M / 100M BASE-T, RJ-45 connect  
 Protocol: TCP / IP, UDP

**ZigBee connection** (Second communication port is optional)

IEEE 802.15.4 Standard  
 Max transmission rate: 250Kbps  
 Max network node: 65000

**BACnet** (Second communication port is optional)

Protocol: BACnet Protocol

**Profibus** (Second communication port is optional)

Protocol: PROFIBUS-DP (V0), EN 50170 Standard

**Environmental Characteristics**

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

**Power Supply**

Range: ADH: AC 85~264V; DC 100~300V  
 ADL: AC/DC 20~56V  
 Power consumption: AC: ≤15VA @ 230V / DC: ≤5W

**Mechanical Characteristics**

Dimensions: 96mm(W)x96mm(H)x83mm(L)  
 Panel cutout: 90mm(W)x90mm(H)  
 Material: ABS, Black (with fire-retardant)  
 Mounting: Panel mounting  
 Wire terminal: PA 66 (UL 94V-0)  
 Voltage input: AWG: 28~12 / 0.2~2.5mm<sup>2</sup>  
 Screw Torque Value: M2.5 / 5.202kgf.cm (Max)  
 Current input: AWG: 22~12 / 0.5~3.0mm<sup>2</sup>  
 Screw Torque Value: M4 / 12.24kgf.cm (Max)  
 Other input: AWG: 28~16 / 0.5~1.5mm<sup>2</sup>  
 Screw Torque Value: M2 / 2.04kgf.cm (Max)  
 Weight: ≤600g

**Safety**

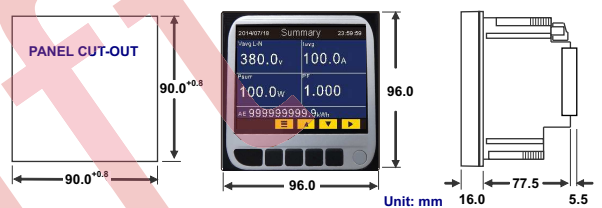
Isolation: AC 2KV, 50/60Hz, for 1 min, Between Power / Input / Output / Case  
 Insulation resistance: ≥100MΩ @ 500V<sub>dc</sub>  
 EMC: EN61326:2006  
 LVD: EN61010-1:2010

**Front panel**

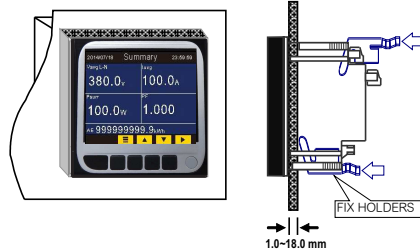


Display: 3.5" TFT LCD 320\*240; White backlight.  
 Backlight delay time: 0~15min ("0" is always on)  
 Measurement display: Interface framework display according to parameters.  
 Update time: 0.5 Sec  
 Operation key: The keys function as icons show on display

**Dimensions**



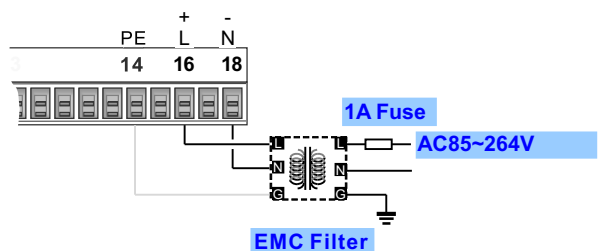
**Installation**



**Connection diagram**

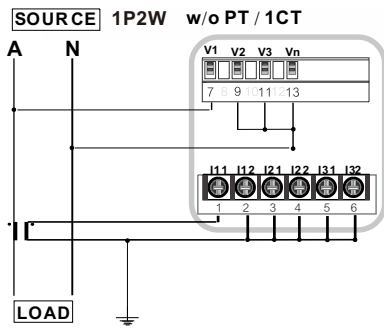
4DI+4RO						8DI							
7	9	11	13	14	16	18	7	9	11	13	14	16	18
V1	V2	V3	Vn	PE	L+	N/-	V1	V2	V3	Vn	PE	L+	N/-
VOLTAGE INPUTS						AUX POWER							
19 +V	20 +A	21 COM	Relay Output			RO1 33	19 +V	20 +A	21 COM	Digital Input (ECI)			D15 33
22 +V	23 +A	24 COM				RO2 34	22 +V	23 +A	24 COM				D16 34
25 +V	26 +A	27 COM				RO3 35	25 +V	26 +A	27 COM				D17 35
28 +V	29 +A	30 COM				RO4 36	28 +V	29 +A	30 COM				D18 36
						31 COM							31 COM
						D11 39							D11 39
						D12 40							D12 40
						D13 41							D13 41
						D14 42							D14 42
						44							44
						45							45
						46							46
						44							44
						45							45
						46							46
CURRENT INPUTS						CURRENT INPUTS							
I11	I12	I21	I22	I31	I32	I11	I12	I21	I22	I31	I32		
1	2	3	4	5	6	1	2	3	4	5	6		

**RS485 Communication port**

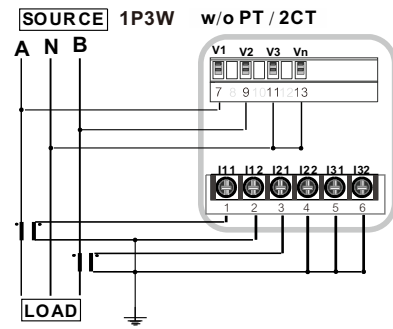


Voltage and current connection

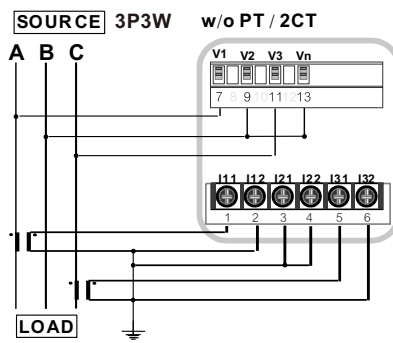
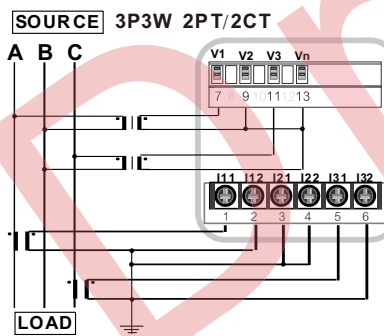
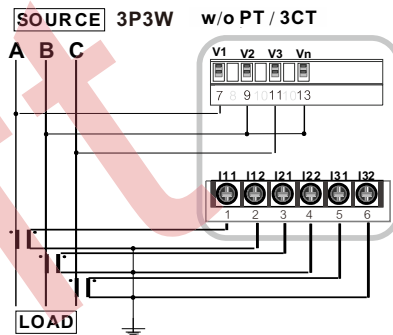
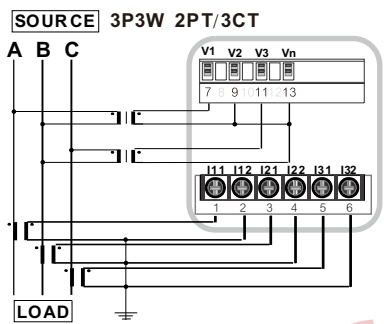
1P2W



1P3W

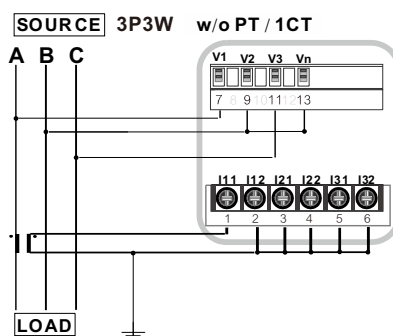
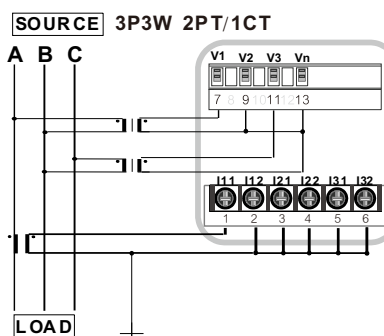
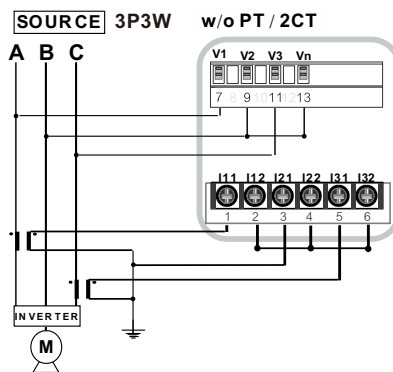
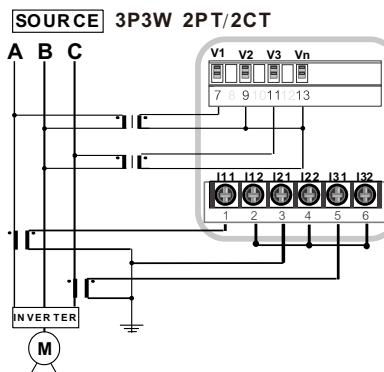


3P3W



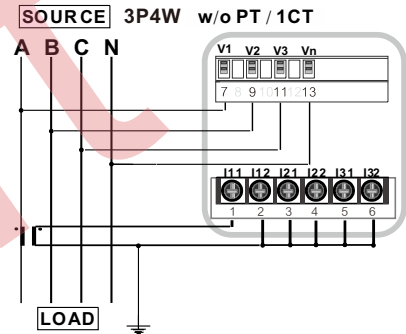
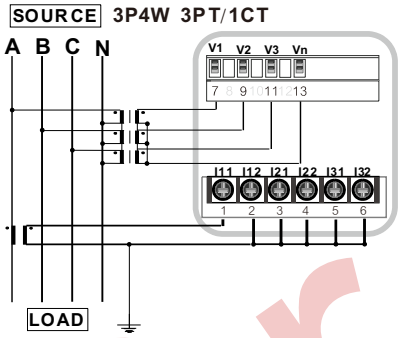
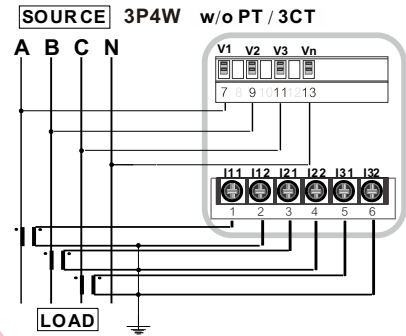
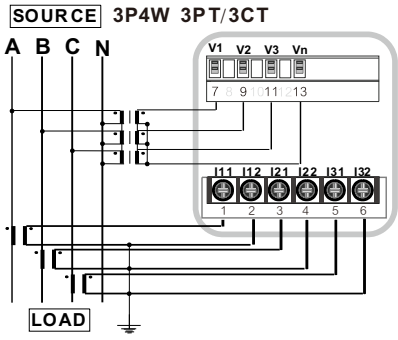
※This CT connection is available use for inverter load or normal load situation

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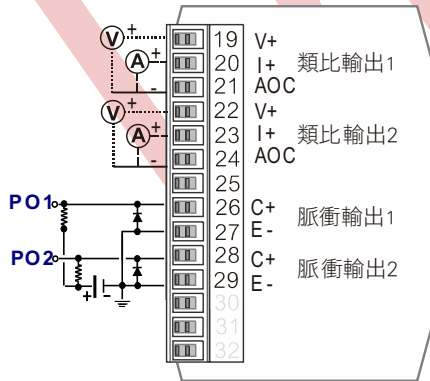


3P4W

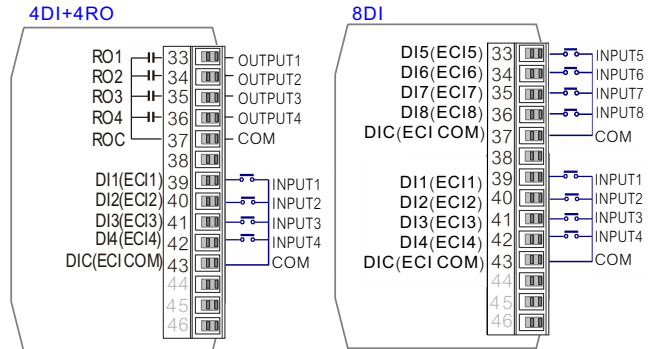
CPM-80



Analog output(AO)/ Pulse output (PO)



Relay output (RO)/ External Control input (ECI)



RS485 communication output

