

# CPM-20 Series MULTIFUNCTION POWER METER

## DESCRIPTION

The CPM-20 series Multifunction Power Meter provide high accuracy measurement, display and communication (Modbus RTU) of all electrical and power quality parameters, including harmonic measurement THD (Total Harmonic distortion 2<sup>nd</sup>~31<sup>st</sup>)

Provides electricity bill ratio (Cost) and carbon dioxide ratio (CO<sub>2</sub>) set can show cumulative electricity bills and carbon emissions, and suitable for the installation in the power management of remote communication, such as the use of demand.

Demand readings, digital input / output (DI / DO), measured values (Max / Min) recording...



## APPLICATION

Control panels and Motor, Generator monitoring Switchgear distribution systems, Energy Management  
Power quality analysis

## ORDERING INFORMATION

CPM- **Model Number** - **A Input range** / **V Input range** - **AUX. POWER**

CODE	MODEL NUMBER	CODE	INPUT RANGE	CODE	AXU. POWER
20	Standard	A1	0~1A	ADH	AC85~264V / DC100~300V
21	Demand (refer to the specification sheet). Digital (input / output). Measurement parameters (maximum / minimum) value recording	A5	0~5A	ADL	DC 20~56V
		V6	40~600V		

(PS: Grey wording part number not available at the moment)

PARAMETERS		CPM-20	CPM-21	
Power Measurements	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	P <sub>1</sub> P <sub>2</sub> P <sub>3</sub> ΣP	●	●
	Reactive Power	Q <sub>1</sub> Q <sub>2</sub> Q <sub>3</sub> ΣQ	●	●
	Apparent Power	S <sub>1</sub> S <sub>2</sub> S <sub>3</sub> ΣS	●	●
	Power factor	PF <sub>1</sub> PF <sub>2</sub> PF <sub>3</sub> PF <sub>Avg</sub>	●	●
	Frequency	Hz	●	●
	Active Energy	WH <sub>Total</sub>	●	●
	Reactive Energy	QH <sub>Total</sub>	●	●
	THD for voltage	THD <sub>V12</sub> THD <sub>V23</sub> THD <sub>V31</sub> THD <sub>V_Avg</sub>	●	●
	THD for current	THD <sub>I1</sub> THD <sub>I2</sub> THD <sub>I3</sub> THD <sub>I_Avg</sub>	●	●
	RS485 Port	Modbus RTU mode	●	●
	Cumulative electricity bills	Cost (Only a single rate)	●	●
	CO2 emissions	CO <sup>2</sup>	●	●
	Date time	Year, Month, Day, Hour, Min, Sec.	●	●
	DI&DO	Digital input / output functions	●	●
	Demand	ΣP ΣQ ΣS I <sub>Avg</sub>		●
	Max / Min record	U <sub>A</sub> U <sub>B</sub> U <sub>C</sub> U <sub>AB</sub> U <sub>BC</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> PF <sub>avg</sub> FREQ P <sub>md</sub> Q <sub>md</sub> S <sub>md</sub>		●

### Input range:

Programmable by front buttons (Actual wiring must be same)

Voltage : 40~600 V L-N  
PT Primary range : 100~50000V  
PT Secondary range : 100~600V  
Current : 0~5A, (Optional:0~1A)  
CT Primary range : 5~10000A  
Frequency : 45~65Hz

### Max. Input over

Voltage: 2 X rated continuous : 2500V, 1 sec  
Current: 2 X rated continuous ; 20 X rated 1 sec  
Voltage : < 0.2VA ; Current : < 0.1VA

### Input burden:

### Power Quality

### THD:

Total harmonic distortion for Voltage and Current

### RS485

### Protocol:

Modbus RTU mode

### Baud rate:

1200/2400/4800/9600/19200/38400

### Data bits:

8 bits

### Parity:

None / Even / Odd

### Stop bits:

1 or 2

### Address:

1~255

### Wiring:

1200M max,

### Termination Res.:

120~300Ω/0.25W (typical: 150Ω)

### Calibration:

Through RS485

### Electrical safety

### Dielectric Strength:

AC 2KV, 50/60Hz, 1 min .Between Input / Output / Power / Case

### Surge test:

3KV, 1.2 x 50 μsec. Common mode & differential mode

### Insulation Res:

≥100M ohm, DC 500V

### Isolation:

Between input / Output / Power

Input voltage terminal common ground non isolation

Input current terminal CT and external isolation

EN 55011:2002; EN 61326:2003

EN 61010-1:2001

### EMC:

### Safety(LVD):

### Environmental

### Operating Temp.:

0~60 °C

### Operating Hum(%RH):

5~95 %RH, non-condensing

### Temp. Coefficient:

≤100 PPM/°C

### Storage Temperature:

-10~70 °C

### Enclosure:

Front panel: IEC 529 (IP50) ; Housing: IP20

### ( CPM-21 Function)

### Digital Input:

2 DI; Optocouplers: 5Vdc, 20mA

Reaction time : ≤ 300ms ; Isolation : 2000Vac

### Digital Output

2 DO ; Photo-MOS ; 80Vdc, 50mA

Reaction time : ≤ 300ms ; Isolation : 2000Vac

## Accuracy & Resolutions

PARAMETERS	ACCURACY	RESOLUTION	INPUT RANGE
Voltage	0.25%	0.1%	40~600Vac(VL-N)
Current	0.25%	0.02%	1%~120% Rated
Neutral Current	1.0%	0.1%	1%~120% Rated
Active Power	0.5%	0.1%	0~9999MW
Reactive Power	0.5%	0.1%	0~9999MVar
Apparent Power	0.5%	0.1%	0~9999MVA
Power factor	0.5%	0.1%	±0.02~1.00
Frequency	0.2%	0.01Hz	45~65Hz
Active Energy	0.5%	0.1KWh	0~9999999.9KWh
Reactive Energy	0.5%	0.1KVarh	0~9999999.9KVarh
THD	1.0%	0.01%	0~100%

## TECHNICAL SPECIFICATION

### Input

### Measurement:

True rms measurement

### Sampling:

128point/Cycle

### Connection:

1P2W · 1P3W · 3P3W(2 · 3CT) · 3P4W ; Balanced/ Unbalance.

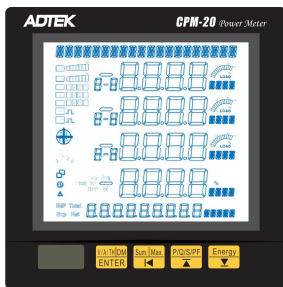
**Power**

**Power supply:** AC 85~265V / DC 100~300V  
**Power consumption:** AC: ≤ 10W / DC: ≤ 3W @ 230V  
**Back up memory:** By F-RAM

**Mechanical**

**Dimension:** 96mm(W) x 96mm(H) x 71mm(D)  
**Panel cutout:** 90mm(W) x 90mm(H)  
**Case material:** Black PC (non-flammable)  
**Installation:** Panel mounting  
**Wiring terminal:** Screw terminal, Plastic NYLON 66 (UL 94V-0)  
 Current/Voltage input(#1~#10): 1.5~2.5mm<sup>2</sup>(AWG15~10)  
 Other terminal: 0.5~1.3mm<sup>2</sup>(AWG22~16)  
**Weight:** Around 400g

**Front Panel**



**Display:** LCD 65(W)x58(H)mm ; White backlight ; Blue wording  
**Visible under direct sunlight**  
**Backlight on time**1~15Min ("0" is always light)  
**Reading:** Upper row 20 digits: Display date, time  
 8888 4 Digitsx 4 rows, 10.0mm Display V, A, Power, Hz, PF, THD...  
 88888888 8 Digits x 1 row, 6.0mm Display Energy parameters(kWh, kVarh)  
 □ :RS485 communication status ; 2 square status icons  
 Display Master and Slave status ; Both square on for normal communication

**Load status indication:**

IND :On when load is inductive  
 CAP :On when load is capacitive  
 LOAD% :Display load percentage  
 ↗ :Display load quadrant

**Reading variety symbols:**

R-b, b-C, C-R :When on ,value showing Line-Line  
 R, b, C : When on ,value showing in Phase  
 N : When on ,value showing in Neutral  
 Total : When on ,value showing Total value  
 Avg : When on ,value showing Average  
 THD : When on ,value showing Total harmonics distortion  
 V/KW A KW MVar... LED-16 byte display parameters Unit  
 (CPM-21) MAX MIN : When on ,value showing Maximun/Minimum  
 (CPM-21) Demand LED-16 byte display ,value showing Demand

**Display value update:** 0.5 sec

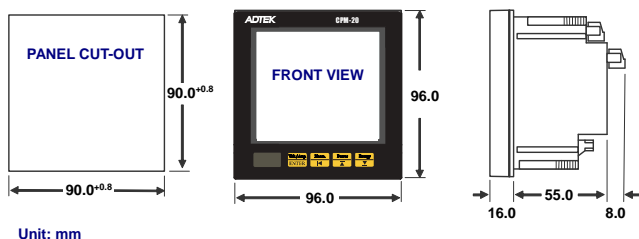
**Control button:**

Enter Key / Voltage /Current display page  
 Shift Key / Main electric parameters display page  
 Up Key / Electric parameters display page  
 Down Key / Energy parameters display page

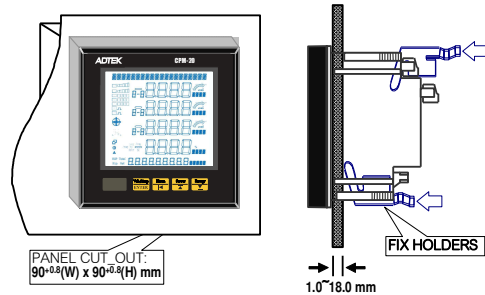
**Passwords:**

4 digits passwords ; Range : 0000~9999 ( Default 1000)

**Dimensions**

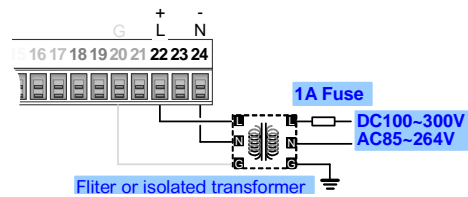


**Installation**



**Connection diagram**

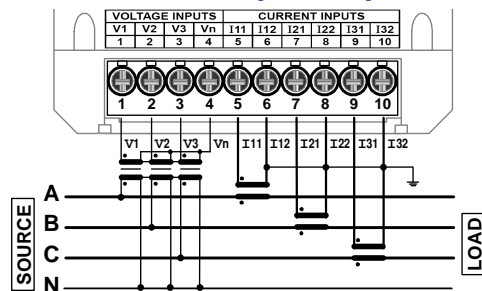
**Aux Power (Terminal Block 2)**



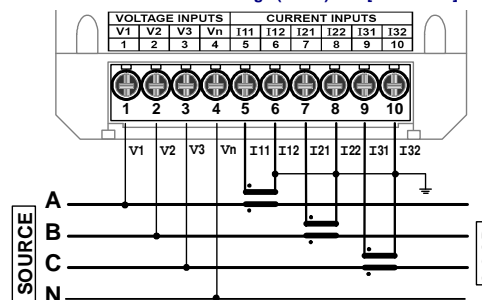
**Voltage and Current input (Terminal block1)**

**Voltage wire:** AWG16~12(1.3~2.0mm<sup>2</sup>)  
**Current wire:** AWG15~10(1.5~2.5mm<sup>2</sup>)

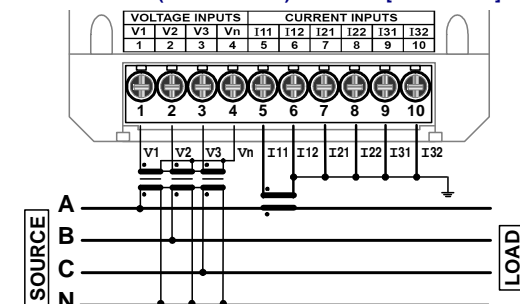
● 3Phase 4 Wire – 3PT / 3CT [ Set: 3P4W ]



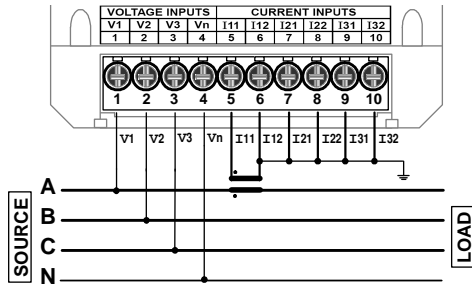
● 3 Phase 4wire – Direct Voltage (no PT) /3CT [Set:3P4W ]



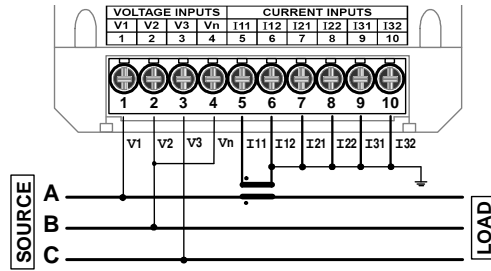
● 3 Phase 4 Wire(Balanced load) – 3PT/ 1CT [ Set:3P4Wb ]



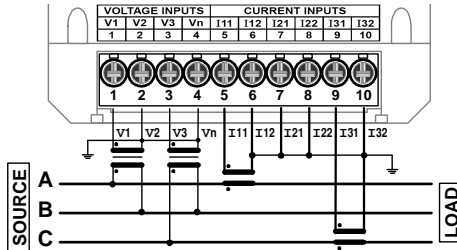
● 3 Phase 4 Wire(Balanced load) – Direct Voltage(No PT) / 1CT [ Set: 3P4Wb ]



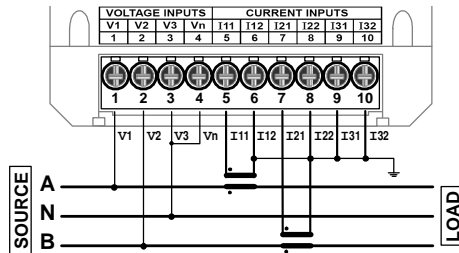
● 3 Phase 3Wire(Balanced load) – Direct Voltage (No PT) / 1CT [ Set: 3P3Wb ]



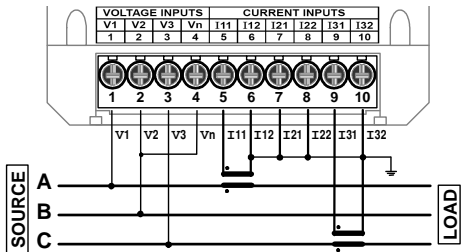
● 3 Phase 3 Wire – 2PT / 2CT [ Set: 3P3W ]



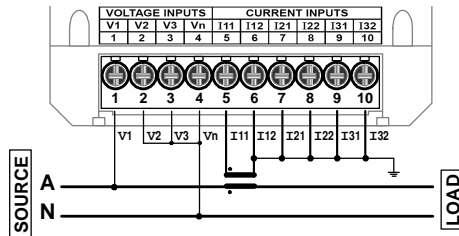
● 1 Phase 3 Wire – [ Set: 1P3W ]



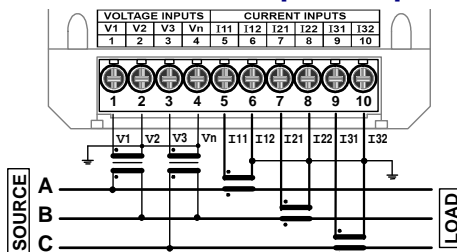
● 3 Phase 3 Wire – Direct voltage(No PT) / 2CT [ Set: 3P3W3 ]



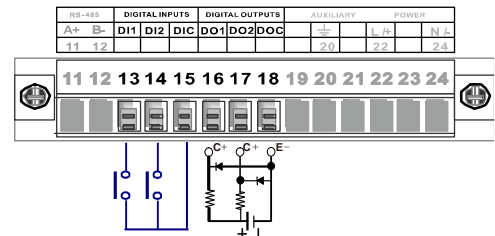
● 1 Phase 2 Wire – [ Set: 1P2W ]



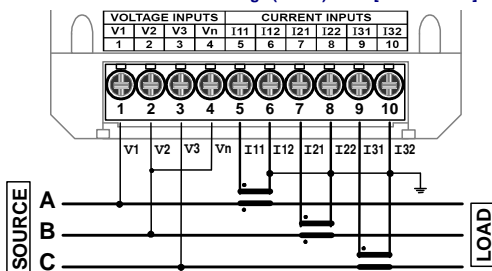
● 3 Phase 3 Wire 3CT – 2PT / 3CT [ Set: 3P3W3 ]



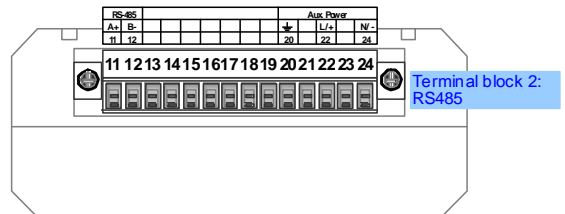
Digital Input / Output (Terminal Block 2) ( CPM-21 Function)  
Wire diameter: AWG22~16(0.5~1.3mm<sup>2</sup>)



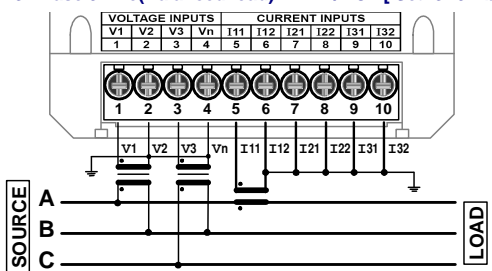
● 3 Phase 3 Wire 3CT – Direct voltage (No PT) / 3CT [ Set: 3P3Wb ]



RS485 / (Terminal Block 2)  
Wire diameter: AWG22~16(0.5~1.3mm<sup>2</sup>)



● 3 Phase 3Wire(Balanced load) – 2PT / 1CT [ Set: 3P3Wb ]



RS485 Port

