

CPM-50 MULTIFUNCTION POWER METER

DESCRIPTION

The CPM series Multifunction Power Meter provide high accuracy measurement, display and communication (Modbus RTU) of all electrical and power quality parameters, including harmonic measurement up to 31st THD (Total Harmonic distortion) or Individual harmonic.

They also have digital inputs and outputs and interface with versatile functions such as remote control, alarm, statistics and records.

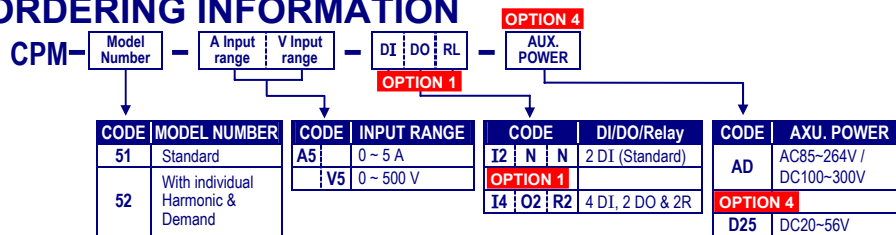
APPLICATIONS

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



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ORDERING INFORMATION



TECHNICAL SPECIFICATION

PARAMETERS		CPM-51	CPM-52	
Power Measurements	Voltage	V ₁₂ V ₂₃ V ₃₁ V _{LL,Avg} V ₁ V ₂ V ₃ V _{LN,Avg}	●	●
	Current	I ₁ I ₂ I ₃ I _{Avg} I _N	●	●
	Active Power	P ₁ P ₂ P ₃ ΣP	●	●
	Reactive Power	Q ₁ Q ₂ Q ₃ ΣQ	●	●
	Apparent Power	S ₁ S ₂ S ₃ ΣS	●	●
	Power Factor	PF ₁ PF ₂ PF ₃ PF _{Avg}	●	●
	Frequency	Hz	●	●
	Active Energy	WH _{Imp} WH _{Exp} WH _{Total} WH _{Net}	●	●
	Reactive Energy	QH _{Imp} QH _{Exp} QH _{Total} QH _{Net}	●	●
	Demand	Pmd Qmd Smd	●	●
Power Quality	Un-balance	V _{unbl} I _{unbl}	●	●
	THD for Voltage	THD _{V12} THD _{V23} THD _{V31} THD _{V,Avg}	●	●
	THD for Current	THD _{I1} THD _{I2} THD _{I3} THD _{I,Avg}	●	●
	Individual Harmonic	2 nd -31 st	●	●
	Crest Factor for Volt	Crest Factor	●	●
I/O	K Factor for Current	K Factor	●	●
	Max/Mini Recording	Maxi./Mini. Recording for all parameters with time stamp	●	●
I/O	Digital Input	DI ₁ DI ₂ *DI ₃ *DI ₄	●	●
	Digital Output	*DO ₁ *DO ₂	●	●
	Relay Output	*RO ₁ *RO ₂	●	●
	RS485 Port	Modbus RTU mode	●	●
	Real Time Clock	Year, Month, Day, Hour, Minute, Sec.	●	●

* means optional, please specify in ordering information.

Accuracy & Resolutions

PARAMETERS	ACCURACY	RESOLUTION	INPUT RANGE
Voltage	0.2%	0.1%	40~290Vac(V _{L-N})
Current	0.2%	0.02%	1%~120% of Rated I
Neutral Current	1.0%	0.1%	1%~120% of Rated I
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	0~99999999.9KWh
Reactive Energy	0.5%	0.1KVarh	0~99999999.9KVarh
THD	1.0%	0.01%	0~100%
Individual Harmonic	1.0%	0.01%	0~100%
Un-balance	0.5%	0.1%	0~300%

Input

Measurement: True rms measurement

Sampling: 128point/Cycle

Connection: 1P2W, 1P3W, 3P3W, 3P4W, Balance/Unbalance; According to the elements of PT and CT, it will be programmed by front keys.

Input Range:

Voltage: 40~290V L-N / 70~500V L-L
PT ratio(primary) programmable: 100~500000V
PT ratio(secondary) programmable: 100~400V
Current: 5A, 1A(Optional)
CT ratio(primary) programmable: 5(1)~10000A
Frequency: 45~65Hz

Max. Input over capability:

Voltage: 2 x rated continuous; 2500V for 1 second
Current: 2 x rated continuous; 20 x rated for 1 second
Input Burden: Voltage: < 0.2VA, Current: < 0.1VA

I/O functions

The meter offers two digital inputs as standard. Additionally, there is an I/O module available as option. The module offers an extra two digital inputs, two digital outputs, two relay outputs, and a DC aux power (for DI). Please specify the option code in ordering, if that extra I/O is to be request.

Digital input(DI):

standard: 2 points (4 points in optional);
Photo couple, 5~30V, 20mA maximum
Response time ≤ 300ms

Functions:

Digital output(DO):

Remote Monitoring
2 points; Photo-MOS, 100Vdc, 50mA (optional)
Response time ≤ 300ms
Isolation: 2500Vac

Functions:

Energy Mode:

There are two mode can be programmed as below:
Pulse output represents Energy. Each output can be user programmed to represent Imp/Exp/Total/Net KWh or Imp/Exp/Total/Net KVarh

Alarm Mode:

Pulse rate divider: programmable 1~6000(x0.1) KWh(KVarh)/p
Pulse width: programmable 1~50(x 20msec)
Digital output as Hi or Low Alarm. Each output can be user programmed for any measured value.
On triggering an alarm there will be an output plus record in EEPROM with time stamp. The alarm mode is set up by RS485, please refer to operating manual.

Relay output:

Functions:

Energized level: programmable High or Low
Delay time: programmable from 0~255*300ms or Latch
2 relay, FORM-A, 3A/250Vac, 3A/30Vdc (Optional)
Output as Hi or Low Alarm. Each output can be user programmed for 9 parameters of any 34 measured values.

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CPM series

On triggering an alarm there will be an output plus record In EEPROM with time stamp. The alarm mode is set up by RS485, please refer to operating manual.

Relay energized can be set to be two type in Normal energized and momentary energized

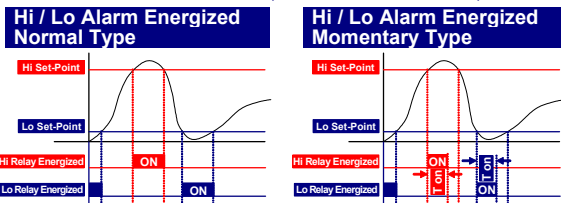
Normal: the relay will be energized when the measured meets condition of set.

momentary: Relay energized for a period(Ton) and then goes off, when the measured meets condition of set.

Energized level: programmable High or Low

T on time(momentary type): programmable from 50~3000ms

Back light on for Alarm: An Alarm can turn the back-light will be turned on... The on time can be set from 0~120 minutes(0= turn on and continuous).



Remote Control: Allows a remote computer to directly control the outputs.

RS485 communication (standard)

Protocol: Modbus RTU mode
Baud rate: 600/1200/2400/4800/9600/19200/38400
Data bits: 8 bits
Parity: None
Stop bits: 1
Address: 1~247
Wiring: 1200M max,
Termination Res.: 120~300Ω/0.25W(typical: 150Ω)

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: Input / Output / Power / Case
EMC: EN 55011:2002; EN 61326:2003
Safety(LVD): EN 61010-1:2001

Environmental

Operating Temp.: -10~70 °C
Operating Humidity: 5~95 %RH, Non-condensing
Temp. Coefficient: ≤100 PPM/°C
Storage Temperature: -40~85 °C
Enclosure: Front panel: IEC 549 (IP54); Housing: IP20

Power

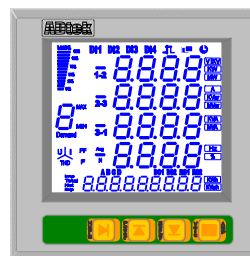
Power supply: AC 85~264 / DC 100~300V
 DC 20~56V(optional)
Power effect: ≤ 0.05% F.S.
Power consumption: ≤ 3W @ 230Vac
Back up memory: By EEPROM

Mechanical

Dimension: 96mm(W) x 96mm(H) x 71mm(D)(79mm with I/O module)
Panel cutout: 90mm(W) x 90mm(H)
Case material: White ABS
Mounting: Panel flush mounting
Connection: Screw terminal, Plastic NYLON 66 (UL 94V-0)
 Current/Voltage input(#1~#10): 1.5~2.5mm²(AWG 15~10)
 Other: 0.5~1.3mm²(AWG 22~16)
Weight: Under 400g

FRONT PANEL

Display: LCD 65x58mm white back light visible under sunshine
Reading: 8888 4 digital x 4 line, 10.0mm high for V, A, Power, Hz, PF, THD, Demand, Unbalance, Max/Mini...
 8888888888 1 line 9 digital, 6.0mm high for Energy, Clock and Date



I/O Status:

DIx Digital Input blight when the DI energized
DOx Digital Output blight when the DO energized
ROx Relay Output blight when the RL energized

⚡ Flash when Pulse output
■ Flash when RS485 communication. There are two squares that one is for master, another one is for slave. It will be checked easier which side is getting trouble.

Load status indication:

|||| Blight to show percentage of Current rated
~ Blight when the load is Inductive
⊥ Blight when the load is Capacitive
⊥ Blight to show percentage of the un-balanced of V and I

Reading variety symbols:

1-2 2-3 3-1 Blight means that values are showing value in Line-Line
1 2 3 Blight means that values are showing value in Phase
N Blight means that values are showing value of the I_N
Imp Exp Total Net Energy direction or mathematic
Avg Blight means that values are showing value of average for parameters

Power Quality

The instrument gives an evaluation of energy quality by Total Harmonic Distortion, individual Harmonic, Crest Factor of voltage, K Factor of Current, Max/Min stamp, un-balance.

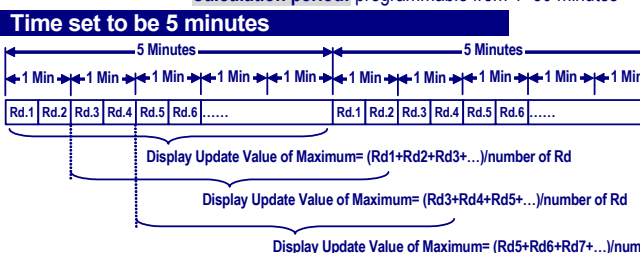
Harmonic: 2nd~31st individual harmonic for Voltage and Current
THD: 2nd~31st Total harmonic distortion for Voltage and Current
K Factor for Current: K-factor is a weighting of the harmonic load currents According to their effects on transformer heating. A K-factor of 1.0 indicates a linear load (no harmonics). The higher the K-factor, the greater the harmonic Heating effects

Crest Factor: The purpose of it calculation is to give an analyst a quick idea of how much impacting is occurring in a waveform.

Max/Mini stamp: Custom alarm with time stamping
Recording measurements: V_{LN}, V_{LL}, I_L, ΣP, ΣQ, ΣS, THD, Un-balance, Hz, PF, Demand

Un-balance: Shows Un-balance for Voltage and Current

Demand For Active, Re-active, Apparent power. They can be calculated in present and maximum value.
Demand calculation: sliding window, one Minute each time
Calculation period: programmable from 1~30 minutes



Remark: Sliding Period: 1 time/1 minute

Power True Systems Corp.
 P.O. Box 272256
 Tampa, FL 33688 U.S.A.

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CPM-50 MULTIFUNCTION POWER METER

MAX MIN Blight means that values are showing maximum or minimum value storage during power on of the meter.

Demand Blight means that values are showing demand for Powers

THD Blight means that values are showing value of THD

Remark: The individual harmonics reading and Event record have to read by RS485 of master.

V/K **A** **KW** **MVar**.. Engineer units for parameters

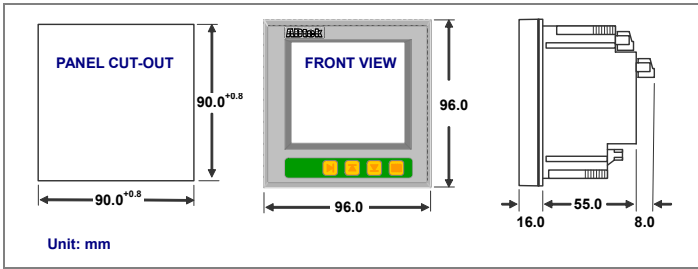
Display Update: 0.5 second

Operating Key: A 4-button interface for on front panel

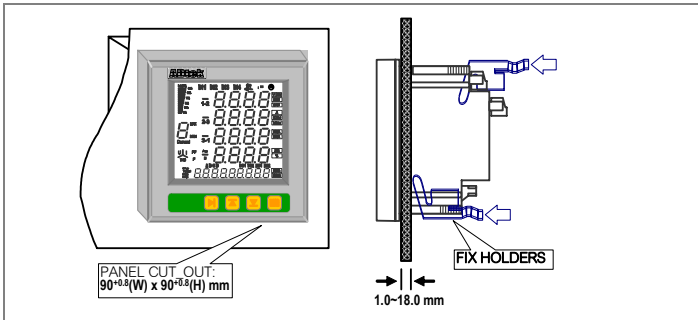
- Shift Key / Quick View for Harmonics pages
 - Up Key / Quick View for Power pages
 - Down Key / Quick View for Energy pages
 - Enter Key / Quick View for Voltage & Current Pages
- 4 digits Password, settable from 0000~9999

Security Code:

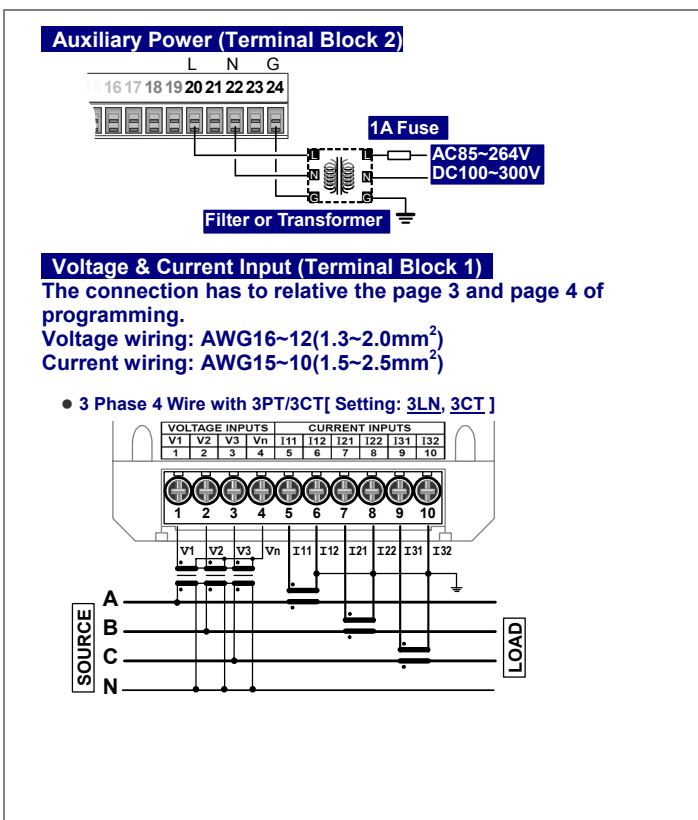
DIMENSIONS



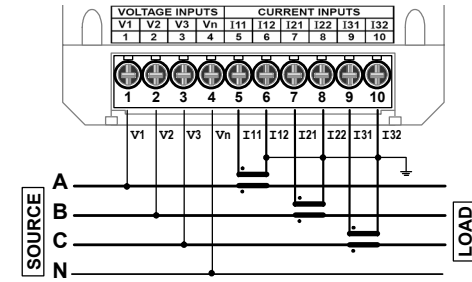
PANEL MOUNTING HOLES



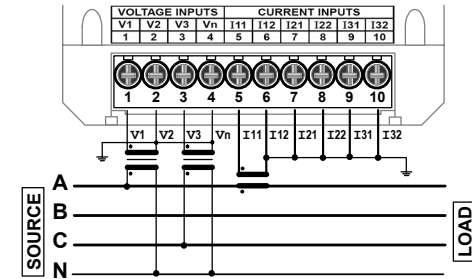
CONNECTION DIAGRAM



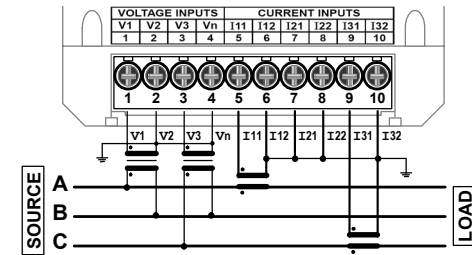
- 3 Phase 4 wire – direct/3CT [Setting: **3LN, 3CT**]



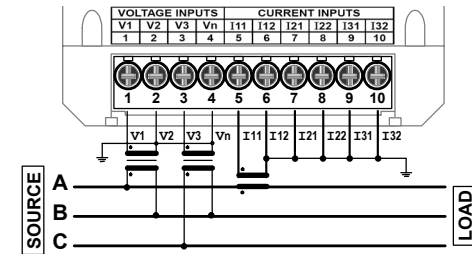
- 3 Phase 4 wire(Balanced) with 2PT/1CT [Setting: **2LN, 1CT**]



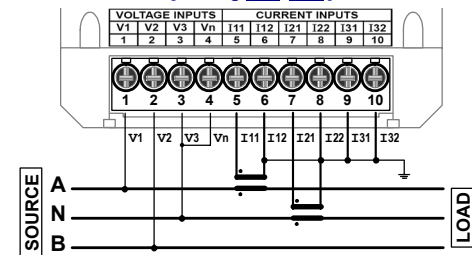
- 3 Phase 3 wire with 2PT/2CT [Setting: **2LL, 2CT**]



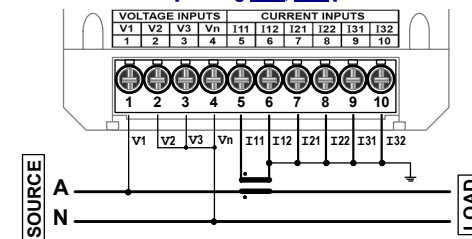
- 3 Phase 3 wire (Balanced) with 2PT/1CT [Setting: **2LL, 1CT**]



- 1 Phase 3 wire – [Setting **3LN, 3CT**]

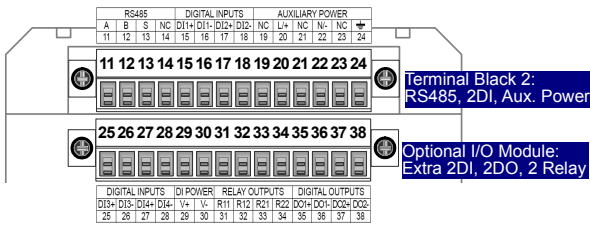


- 1 Phase 2 wire – [Setting **3LN, 3CT**]

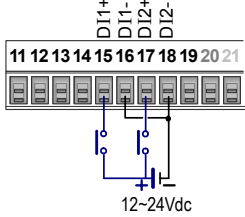


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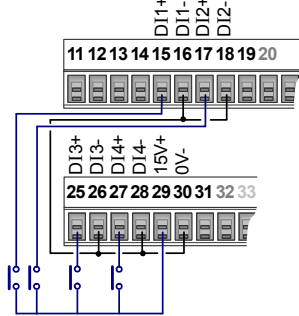
**RS485 / 2DI (Terminal Block 2) and
Extra 2DI / 2DO / 2Relay (Optional I/O Module)**
Wiring: AWG22~16(0.5~1.3mm²)



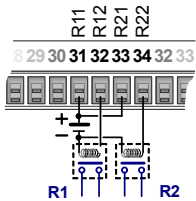
2DI(Standard) with external DC powered



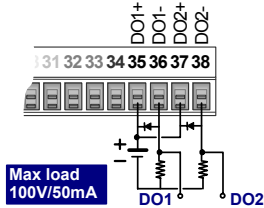
4DI(Optional) with internal DC powered



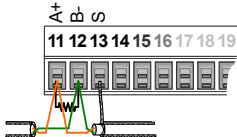
2Relay(Optional) with External Power Relay



2DO(Optional) with External Powered



RS485 Communication Port



Max. Distance: 1200M
Terminate Resistor (at latest unit):
120~300ohm/0.25W(typical: 150ohm)

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