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

CPM– [Model Number] – [A Input range | V Input range] – [DI | DO | RL] – [AUX. POWER]

OPTION 1 (DI/DO/RL) OPTION 4 (AUX. POWER)

CODE	MODEL NUMBER
51	Standard
52	With individual Harmonic & Demand

CODE	INPUT RANGE
A5	0 ~ 5 A
V5	0 ~ 500 V

CODE	DI/DO/Relay
I2 N N	2 DI (Standard)
OPTION 1	
I4 O2 R2	4 DI, 2 DO & 2R

CODE	AXU. POWER
AD	AC85~264V / DC100~300V
OPTION 4	
D25	DC20~56V

■ 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		●
	Un-balance	V_{unbl} I_{unbl}	●	●
Power Quality	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	2nd~31st		●
	Crest Factor for Volt	Crest Factor		●
	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
Isolation: 2500Vac
Functions: ***Remote Monitoring***
Digital output(DO): 2 points; Photo-MOS, 100Vdc, 50mA **(optional)**
Response time ≤ 300ms
Isolation: 2500Vac
Functions: ***There are two mode can be programmed as below:***
Energy Mode: Pulse output represents Energy. Each output can be user programmed to represent Imp/Exp/Total/Net KWh or Imp/Exp/Total/Net KVarh
Pulse rate divider: *programmable 1~6000(x0.1) KWh(KVarh)/p*
Pulse width: *programmable 1~50(x 20msec)*
Alarm Mode: 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.*
Energized level: *programmable High or Low*
Delay time: *programmable from 0~255*300ms or Latch*
Relay output: 2 relay, FORM-A, 3A/250Vac, 3A/30Vdc **(Optional)**
Functions: Output as Hi or Low Alarm. Each output can be user programmed for 9 parameters of any 34 measured values.

CPM-50 MULTIFUNCTION POWER METER

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.*

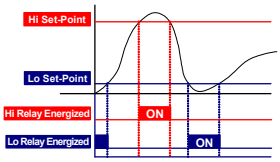
momentary: *Relay energized for a period(Ton) and than goes off, when the measured meets condition of set..*

Energized level: *programmable High or Low*

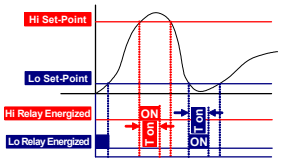
T on time(momentary type): *programmable from 50~3000ms*

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).*

Hi / Lo Alarm Energized Normal Type



Hi / Lo Alarm Energized Momentary Type



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

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

Recording period: Month, Day,

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

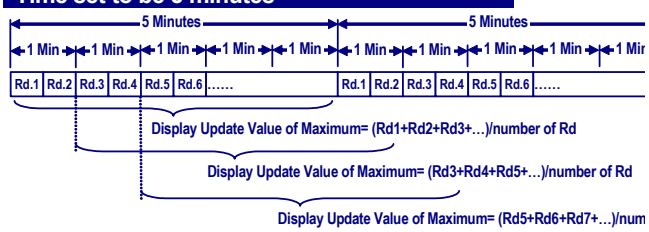
Demand

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

Time set to be 5 minutes



Remark: Sliding Period: 1 time/1 minute

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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

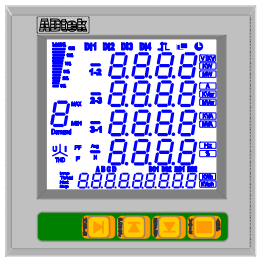
Connection: Screw terminal, Plastic NYLON 66 (UL 94V-0)
Current/Voltage input(#1~#10): 1.5~2.5mm²(AWG 15~10)
Other: 0.5~1.3mm²(AWG 22~16)

Weight: Under 400g

■ FRONT PANEL

Display: LCD 65x58mm white back light visible under sunshine

Reading: 8.8.8.8. 4 digital x 4 line, 10.0mm high for V, A, Power, Hz, PF, THD, Demand, Unbalance, Max/Mini,..
8.8.8.8.8.8.8.8.8. 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, an other 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

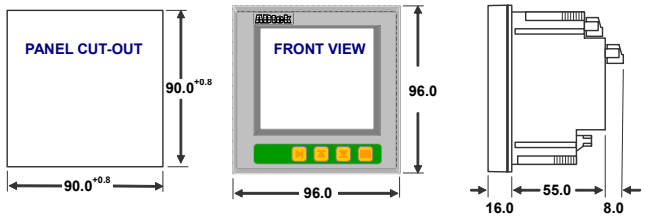
Avg Blight means that values are showing value of averge for parameters

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 KV 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

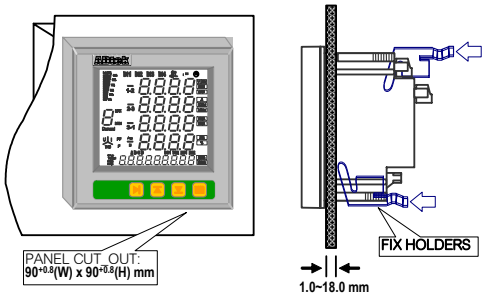
Security Code: 4 digits Password, settable from 0000~9999

■ DIMENSIONS



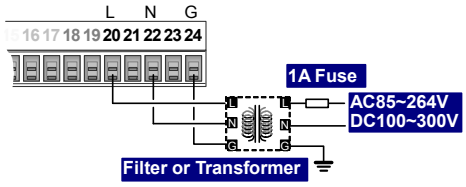
Unit: mm

■ PANEL MOUNTING HOLES



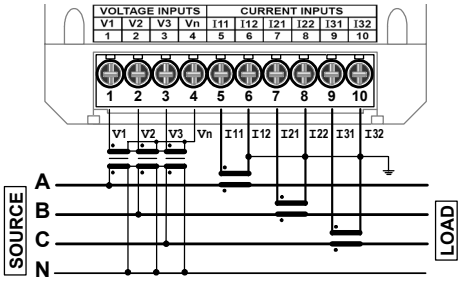
■ CONNECTION DIAGRAM

Auxiliary Power (Terminal Block 2)

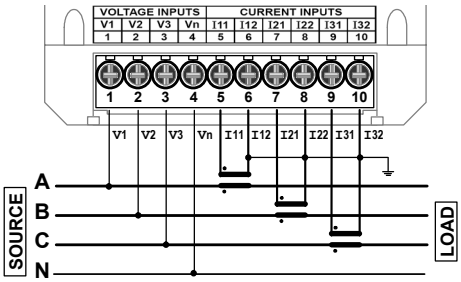


Voltage & Current Input (Terminal Block 1)
The connection has to relative the page 3 and page 4 of programming.
Voltage wiring: AWG16~12(1.3~2.0mm²)
Current wiring: AWG15~10(1.5~2.5mm²)

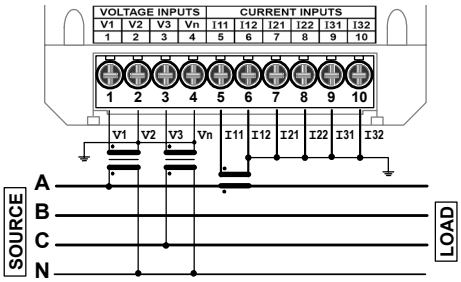
- 3 Phase 4 Wire with 3PT/3CT[Setting: 3LN, 3CT]



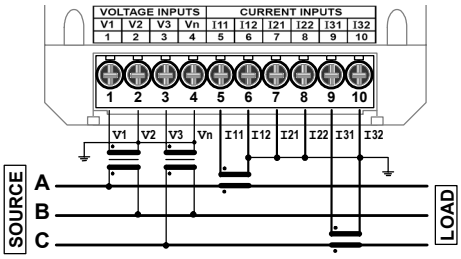
- 3 Phase 4 wire – direct/3CT[Setting: 3LN, 3CT]



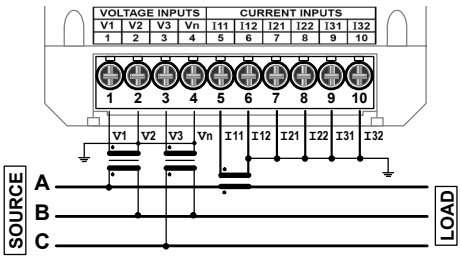
- 3 Phase 4 wire(Balanced) with 2PT/1CT [Setting: 2LN, 1CT]



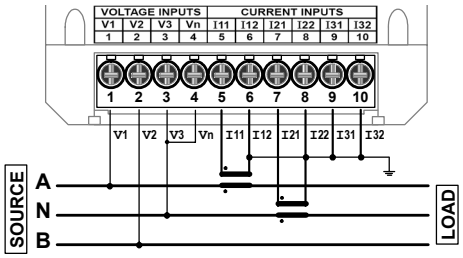
- 3 Phase 3 wire with 2PT/2CT[Setting: 2LL, 2CT]



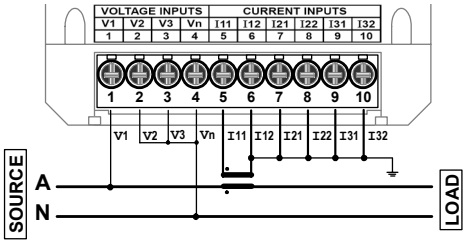
- 3 Phase 3 wire (Balanced) with 2PT/1CT [Setting: 2LL, 1CT]



- 1 Phase 3 wire – [Setting 3LN, 3CT]



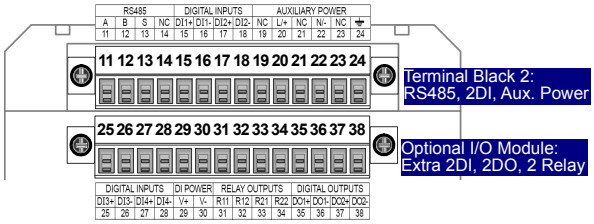
- 1 Phase 2 wire – [Setting 3LN, 3CT]



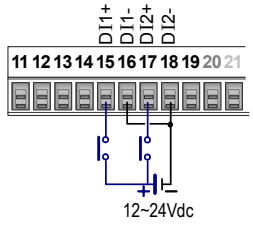
CPM-50 MULTIFUNCTION POWER METER

RS485 / 2DI (Terminal Block 2) and Extra 2DI / 2DO / 2Relay (Optional I/O Module)

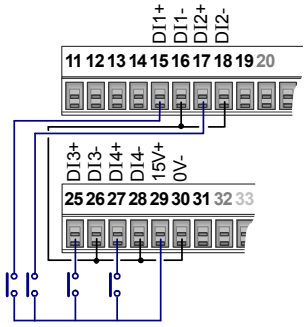
Wiring: AWG22~16(0.5~1.3mm^2)



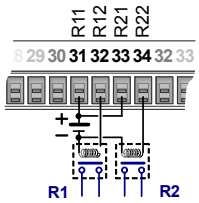
2DI(Standard) with external DC powered



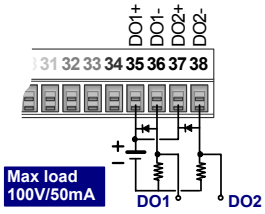
4DI(Optional) with internal DC powered



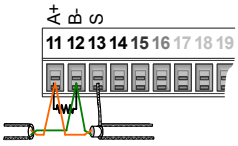
2Relay(Optional) with External Power Relay



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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