CPM-80 Multifunction Power Analyzer

ADTEK

Description

CPM-80 multifunction power analyzer provide high accuracy single phase and three-phase energy measuring and displaying, energy accumulating, power quality analysis, waveform capture, power record, event record, 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 4MB 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

CPM— Model — A Input Range | V Input Range — Option1 — Option2 — Option3 — AUX.Power

CODE	Function
81	The Model functions refer to the Meter selection guide
82	
83	
85	
87	

CODE		Input Range
A1		0~1A
A5		0~5A
A15		0~1A/5A (programmable)
MV		0~333mV
	V6	40~400V_{LN} 60~600V_{LL}

CODE	I/O Type
D4	4xDI 4xRO
D8	8xDI

CODE	Analog Output
N	NONE
A2	2xAO

CODE	Comm. Output
N	NONE
R	RS485 Modbus
E	Ethernet
B	BACnet
W	WiFi

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

Meter Selection Guide

Features		81	82	83	85	87
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	Four quadrants P_1 P_2 P_3 ΣP	●	●	●	●	●
Reactive Power	Four quadrants 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	Varh_Imp Varh_Exp Varh_Total Varh_Net	●	●	●	●	●
Apparent Energy	VAh	●	●	●	●	●
THD/Voltage	THD_{V12} THD_{V23} THD_{V31} THD_{V_Avg}	●	●	●	●	●
THD/Current	THD_{I1} THD_{I2} THD_{I3} THD_{I_Avg}	●	●	●	●	●
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	●	●	●	●	●
Power record	Swells voltage、Sags voltage and Over Current include time and setting					●
Event record	FREQ, V1, V2, V3, V_AVG, U12, U23, U31, U_AVG, I1, I2, I3, I_AVG, IN, P1, P2, P3, P_SUM, Q1, Q2, Q3, Q_SUM, S1, S2, S3, S_SUM, PF1, PF2, PF3, PF_AVG, Unbl_V, Unbl_I, LCR, THD_V1, THD_V2, THD_V3, THD_V, THD_I1, THD_I2, THD_I3, THD_I, DM_P, DM_Q, DM_S, DM_I1, DM_I2, DM_I3		●	●	●	●
Data record	FREQ, V1, V2, V3, V_AVG, U12, U23, U31, U_AVG, I1, I2, I3, I_AVG, IN, P1, P2, P3, P_SUM, Q1, Q2, Q3, Q_SUM, S1, S2, S3, S_SUM, PF1, PF2, PF3, PF_AVG, Unbl_V, Unbl_I,Phasor Diagram_V, Phasor Diagram_I, THD_V.MAX, THD_V.MIN, V_AVG.THD.MAX, V_AVG.THD.MIN, THD_I.MAX, THD_I.MIN, I_AVG.THD.MAX, I_AVG.THD.MIN, DM_P, DM_Q, DM_S, DM_I.MAX, DM_I.MIN		●	●	●	●
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 5 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(VLN)
Current	0.1%	0.001A	1%~120% CT rating current
Neutral Current	0.5%	0.001A	1%~120% CT rating current
Active Power	0.2%	1W	-999999999~999999999W
Reactive Power	1.0%	1Var	-999999999~999999999Var
Apparent Power	0.5%	1VA	0~999999999VA
Power Factor	0.25%	0.001	-0.020~+1.000~0.020
Frequency	0.2%	0.01Hz	45.00~65.00Hz
Active Energy	Class 0.2S	0.1kWh	0~99999999.9kWh
Reactive Energy	Class 2.0	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:40~400VLN ; 60~600VLL
PT Primary side ratio:100~1200000V
PT Secondary side ratio:50~600V
Current:0~5A, 0~1A, 0~1A/5A
Split core CT:0~333mV
CT Primary side ratio: 1~9999A
Metering over range: Voltage:2x rated voltage continuous ; 2500V,1sec
Current:2x rated current continuous ; 20x rated current 1sec
Input load: 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 48 parameters of power and Demand for assign

Analog Output(AO)

Output channel: 2 channels
Signal output: Voltage:0~5V /1~5V / 0~10V
Current: 0~20mA / 4~20mA / 0~10mA
Output capacity: Voltage:≧1000Ω ; Current:≤ 530Ω
Accuracy: ≤± 0.1% of F.S.; 16 bits DA converter
Ripple rate: ≤± 0.1% of F.S.
Response 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
Debouncing time: 0~99 (x8mS) programable

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, 1Pulse= 10.0kWh)
Pulse width: 0~5000mS,0 is duty cycle 50%

TOU (CPM-83、85、87 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)
Parameters of TOU : AE-Imp、AE-Exp、AE-Total、RE-Imp、RE-Exp、RE-Total、SE-Total
Yearly setting: Tariff setting for 1 year or set up to 5 years

Data Record

Waveform capture: Each phase of voltage and current sampling are 64 points per cycle and continues record 16 cycles
Data logging: 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 abnormal event and timestamp
Memory storage: 4MB Flash ROM

RS485 communication (Second RS485 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 (Optional)

Network interface: 10M / 100M BASE-T
Protocol: Modbus TCP

WiFi (Optional)

Standard: EEE 802.11 b/g/n Standard
Protocol: Modbus TCP

BACnet (Optional)

Protocol: BACnet Protocol

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)x101mm(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^2
Screw Torque Value:M2.5 / 5.202kgf.cm(Max)
Current input:
AWG:22~12 / 0.5~3.0mm^2
Screw Torque Value:M4 / 12.24kgf.cm(Max)
Other input:
AWG:28~16 / 0.5~1.5mm^2
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 @ 500Vdc
EMC: EMI:
EN 61326-1:2013 ;
EN 55011 Class B ;
EN 61000-3-2:2014 ;
EN 61000-3-3:2013
EMS:
EN 61326-2-6:2013 ;
IEC 61000-4-2:2008 ;
IEC 61000-4-3:2006+A1:2007+A2:2010 ;
IEC 61000-4-4:2012 ;
IEC 61000-4-5:2014 ;
IEC 61000-4-6:2013/COR1:2015 ;
IEC 61000-4-8:2009 ;
IEC 61000-4-11:2004
LVD: EN 61010-1:2010

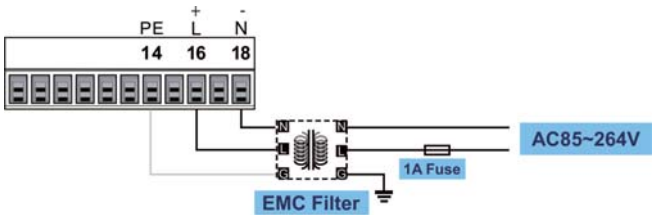
Accuracy of energy

Active energy Class 0.2S (IEC62053-22:2003)
Reactive energy Class 2.0 (IEC62053-23:2003)
Active Power 0.2% as per IEC61557-12 PENDING
Reactive Power 1.0% as per IEC61557-12 PENDING
Apparent Power 0.5% as per IEC61557-12 PENDING

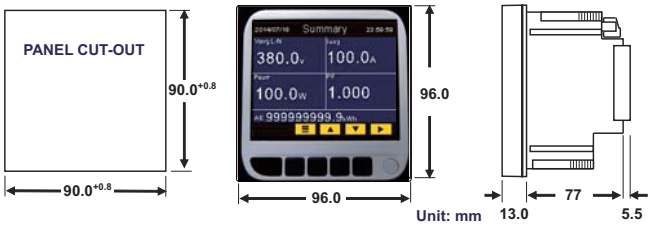
Front panel

Display: 3.5" TFT color LCD, 70.0(W)x52.5(H)mm
Update rate: 0.5 Sec
Operation key: The keys function as icons show on display

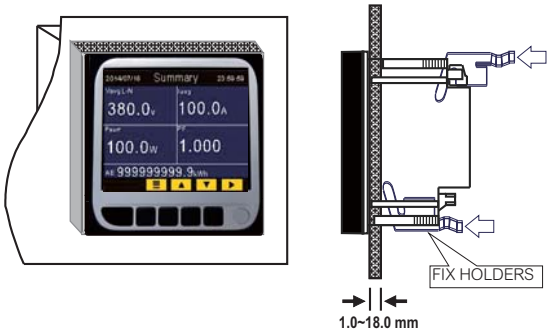
Power connection



Dimensions

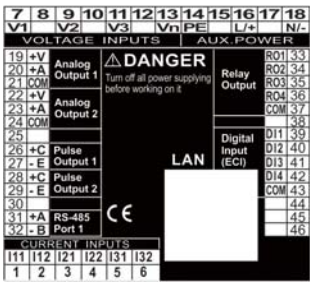


Installation

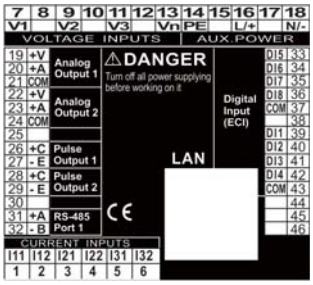


Connection diagram

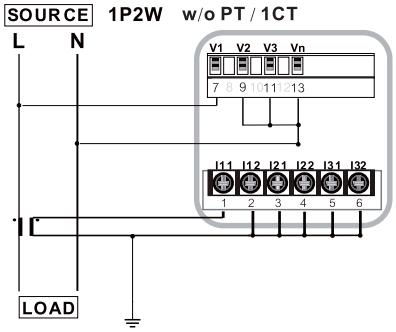
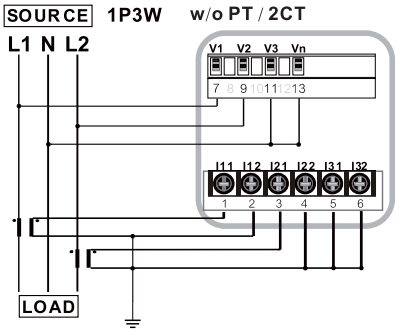
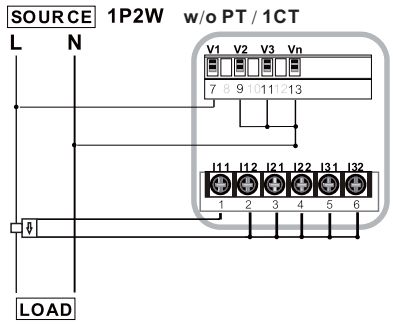
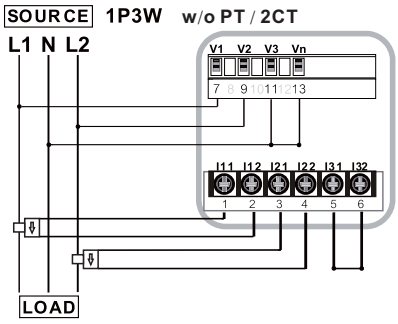
4DI+4RO



8DI



Voltage and Current connection (CT secondary side distinguishes 1A/5A and 333mV)

<table>
<tr><th colspan="2">1 Phase</th></tr>
<tr><th>1P2W(0~1A/5A)</th><th>1P3W(0~1A/5A)</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><th>1P2W(0~333mV)</th><th>1P3W(0~333mV)</th></tr>
<tr><td> 
</td><td> 
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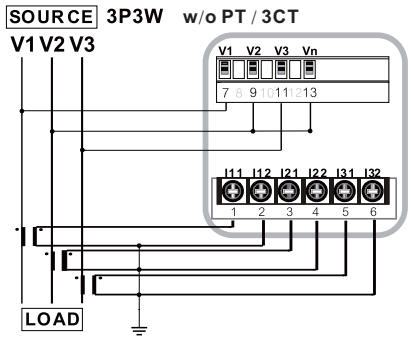
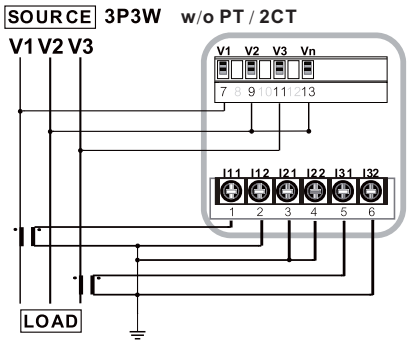
3P3W w/o PT

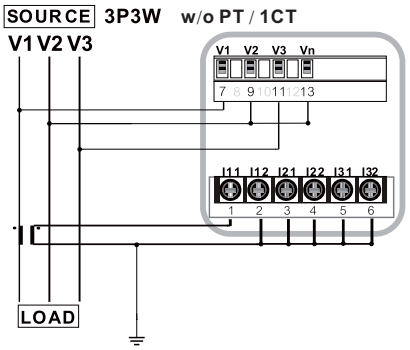
3CT(0~1A/5A)



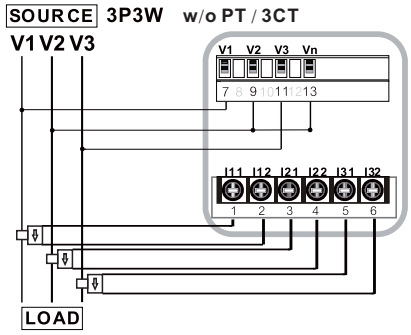
2CT(0~1A/5A)



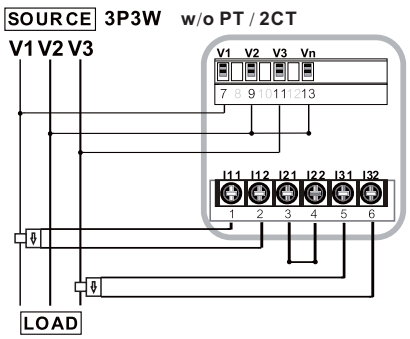
1CT(0~1A/5A)



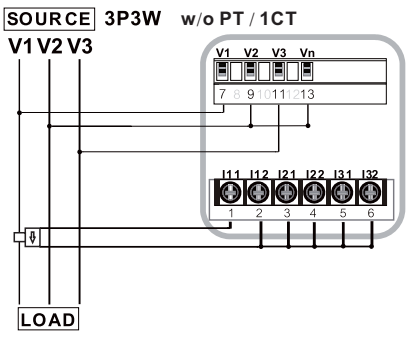
3CT(0~333mV)



2CT(0~333mV)

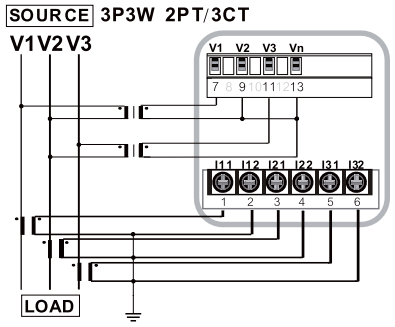


1CT(0~333mV)

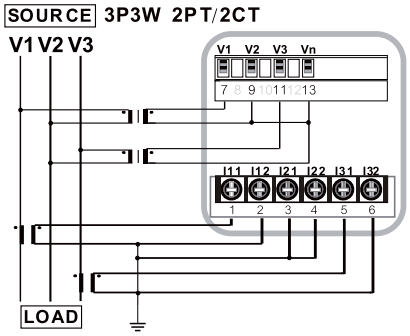


3P3W 2PT

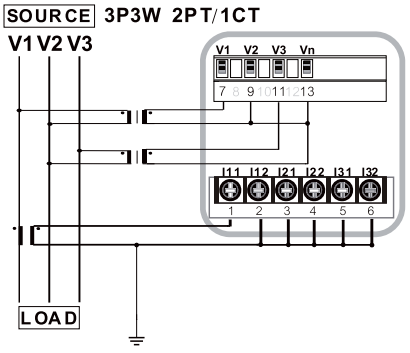
3CT(0~1A/5A)



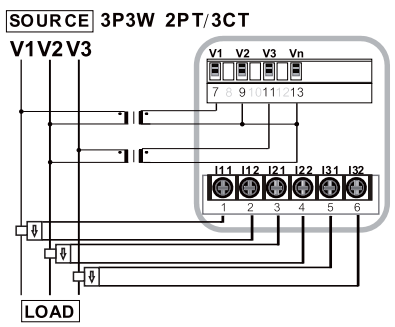
2CT(0~1A/5A)



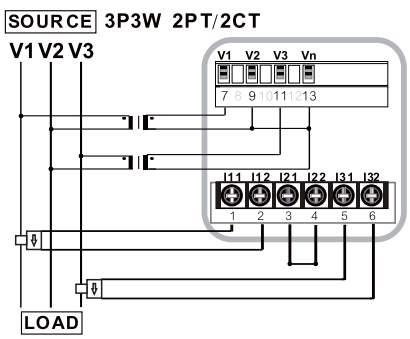
1CT(0~1A/5A)



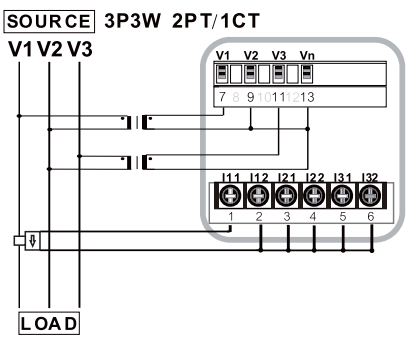
3CT(0~333mV)



2CT(0~333mV)

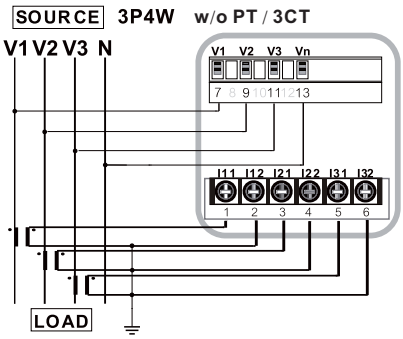


1CT(0~333mV)

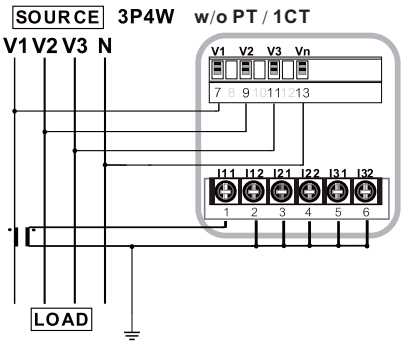


3P4W w/oPT

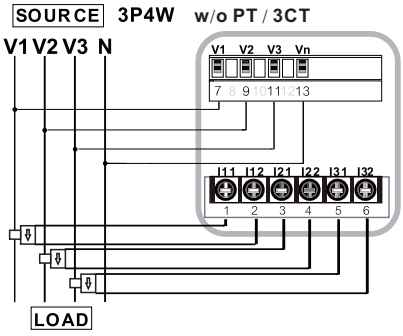
3CT(0~1A/5A)



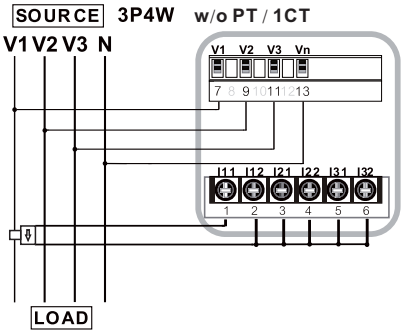
1CT(0~1A/5A)



3CT(0~333mV)

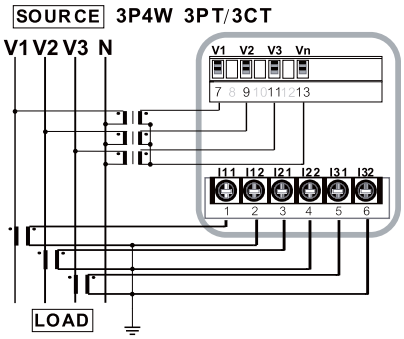


1CT(0~333mV)

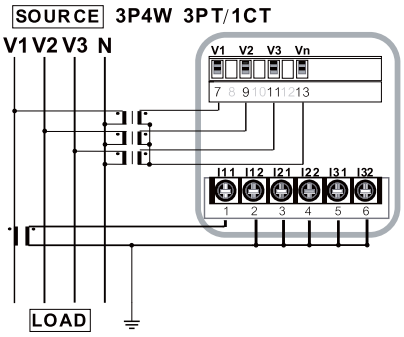


3P4W3PT

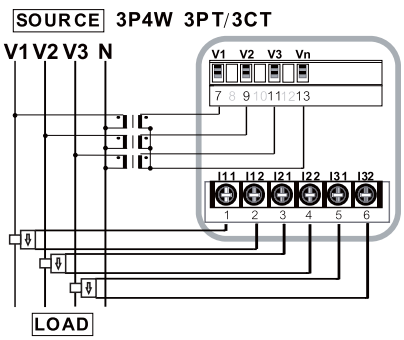
3CT(0~1A/5A)



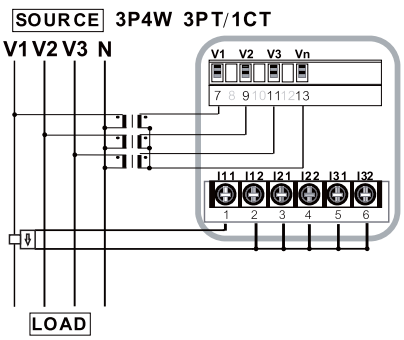
1CT(0~1A/5A)



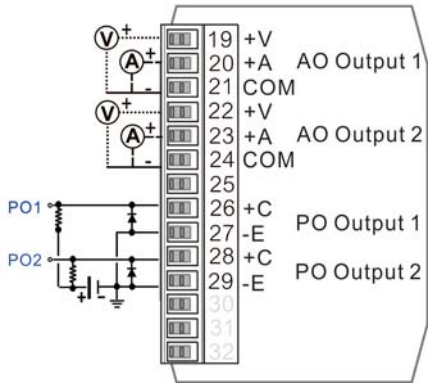
3CT(0~333mV)



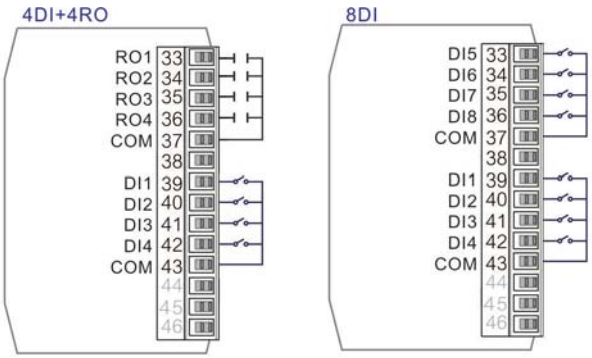
1CT(0~333mV)



Analog output(AO)/ Pulse output (PO)



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



RS485 communication port