

# CPM-12D Multifunction Power Meter (DIN Rail) **ADTEK**

CPM-12D

## Description

CPM-12D din rail mounting power meter with high accuracy measurement for single phase and three-phase system. Measuring parameters for voltage, current, active/reactive/apparent power and energy, power factor, and frequency etc., and it provides max/min power demand values, phase angle, event records and data recording.

Standard with RS-485 Modbus RTU communication port, front LCD display with buttons for programming. It can display the accumulated electricity bill and CO<sub>2</sub> emission. And TOU(Time of Use) function could enhance power monitoring and management, and power cost allocation.

With reliability simulation test report of MTBF over 60,000 hours.

Auto wiring change (**Note**) via software.

The Baud rate of RS-485 communication achieves 115200 bps, and the error rate is less than 0.1%.

CE and FCC approved.

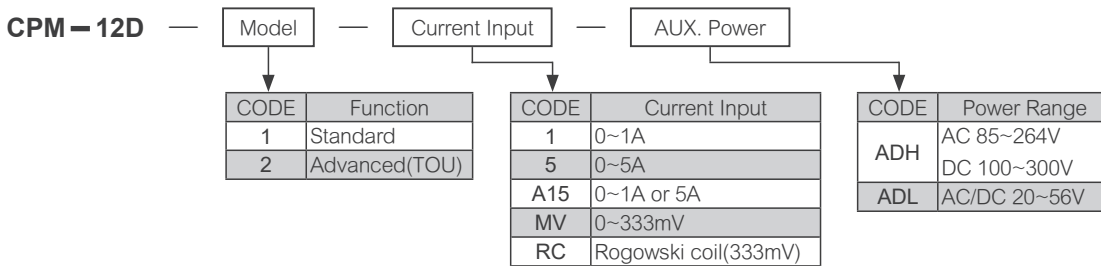
**Note:** Auto wiring change have certain condition limit, please refer to operation manual.



## Applications

- Energy monitoring for motor control panel
- Energy management and power cost allocation
- Energy monitoring for distribution board
- Analysis of energy quality

## Ordering Information



## Meter Selection Guide

Measurement items and functions		12D-1	12D-2
Voltage	Total and per phase L-L and L-N	●	●
Current	Total and per phase and neutral	●	●
Active Power	Four quadrants/per phase and active power total	●	●
Reactive Power	Four quadrants/per phase and reactive power total	●	●
Apparent Power	Total and per phase	●	●
Power Factor	Total and per phase	●	●
Frequency	Frequency	●	●
Active Energy	Import / Export / Total / Net	●	●
Reactive Energy	Import / Export / Total / Net	●	●
Apparent Energy	Total	●	●
THD/Voltage	Total and per phase	●	●
THD/Current	Total and per phase	●	●
Phase Angle	Current and voltage	●	●
Unbalance	Current and voltage	●	●
Demand	Current, active, reactive, apparent power	●	●
Max. Demand values	Current, active, reactive, apparent power and time stamp	●	●
Max/Min Values	Current, active, reactive, apparent power and time stamp	●	●
Event Recording	Record the following parameter alarm events: frequency, phase voltage, line voltage, current, active/reactive/apparent power, power factor, voltage/current unbalance, active/reactive/apparent power demand, current demand	●	●
Data Logging	The following parameters can be set to logging: frequency, phase voltage, line voltage, current, active/reactive/apparent power, power factor, active/reactive/apparent energy, voltage THD and max/min values, current THD and max/min values, active/reactive/apparent power demand and max/min values, current demand and max/min values	●	●

Measurement items and functions		12D-1	12D-2
Communication Port	RS-485 Modbus RTU	●	●
PO	Pulse Output	●	●
Time of Use	4 time zones, 8 periods, 4 tariff		●
Date and Time	Year, Month, Day, Hour, Minute, Second	●	●
Run hour	Operating hours, Running hours	●	●
CO <sub>2</sub> Emission	Total CO <sub>2</sub> weight of energy	●	●

## Accuracy & Resolutions

Parameter	Accuracy	Resolution	Measurement Range
Voltage	0.2%	0.1V	20~400V L-N / 35~600V L-L
Current	0.2%	0.001A	1%~120% CT rating current
Neutral Current	1.0%	0.001A	1%~120% CT rating current
Active Power	0.5%	1W	-999,999,999~999,999,999W
Reactive Power	0.5%	1Var	-999,999,999~999,999,999Var
Apparent Power	0.5%	1VA	0~999,999,999VA
Power Factor	0.5%	0.001	-0.020~+1.000~0.020
Frequency	0.05%	0.01Hz	45.00~65.00Hz
Active Energy	0.5%	0.1kWh	0~9,999,999.9kWh
Reactive Energy	0.5%	0.1kVarh	0~9,999,999.9kVarh
Apparent Energy	0.5%	0.1kVAh	0~9,999,999.9kVAh
THD	1.0%	0.1%	0~100.0%
Unbalance	0.5%	0.1%	0~300.0%

Data bits: 8 bits  
 Stop bit: 1 or 2  
 Distance: 1200M max

### Pulse Output

Output capacity: Open collector(O.C.), 30Vdc, 30mA(max)  
 Output frequency: 1000Hz(max)  
 Pulse divider: 1~9999 (1 Pulse=0.1 kWh, if set 100, 1 Pulse= 10.0kWh)  
 Pulse width: 0~5000ms, 0 is duty cycle 50%  
 Energy assign: Import active energy / Export active energy  
 Import reactive energy / Export reactive energy  
 Test pulse output: 1600 Pulse / 1kWh, duty cycle 50%

### Demand

Calculation method: Block / Sliding  
 Period: 1~60 min

### TOU (Time of Use)

4 time zones: 1~4 zones per year  
 8 periods: Each time zone can set 1~8 periods  
 The sharp, peak, valley and normal tariff can be specified for each period  
 Parameters of TOU: Cumulative value of import and export active energy, import and export reactive energy, total apparent energy for each tariff of previous and current month; and maximum current and power demand of each tariff for current month  
 Holiday setting: The date and timetable of holiday for five years can be set individually or set on the same holiday for five years

## Technical Specification

### Electrical Characteristics

Measurement: True RMS measurement  
 Sampling: 128 point/Cycle  
 Display refresh rate: 0.5s  
 Power system: 1P2W, 1P3W, 3P3W, (1/2/3CT), 3P4W(1/3CT) Balance / Unbalance  
 Input range: Voltage: 20~400VLN ; 35~600VLL  
 PT primary ratio: 100~1,200,000V  
 PT secondary ratio: 50~500V  
 Current: 5A / 1A / 333mV  
 CT primary ratio: 1~9999A  
 CT secondary ratio: 1A / 5A / 333mV  
 Overload capacity: Voltage: 2x rated voltage continuous ; 2500V/1s  
 Current: 2x rated current continuous ; 20x rated/1s  
 Input burden: Voltage: <0.2VA ; Current: <0.1VA

### Power Quality

THD: Total harmonic distortion for voltage and current  
 Unbalance: 3-phase voltage and current

### Data Log

Log setting: The specified parameters can be recorded according to the set interval time, the interval time can be set from 1 to 32767, and the interval time unit can be set as day, hour, minute, second  
 Event recording: The event and time when an exception occurs can be recorded  
 Memory storage: 2MB Flash ROM

### RS-485 Communication

Protocol: Modbus RTU mode  
 Address: 1~247  
 Baud rate: 2400/4800/9600/19200/38400/57600/  
 115200 bps  
 Response time: <50mS  
 Parity: None / Even / Odd

### Power Supply

Range: ADH : AC 85~264V / DC 100~300V  
 ADL : AC / DC 20~56V  
 Power consumption: AC: ≤5VA @ 230V / DC: ≤2W

### Environmental Conditions

Operating Temp.: 0~60 °C  
 Humidity rating: 5~95 %RH, Non-condensing  
 Temp. coefficient: ≤100 PPM/°C  
 Storage Temp.: -10~70 °C  
 Degree of protection: IP20  
 Operating altitude(maximum): 2000m above sea-level

### Mechanical Structure

Dimensions: 72mm(W)x58.7mm(H)x87.5mm(L)  
 Material: ABS, Black (with fire-retardant)  
 Mounting: DIN rail mounting  
 Weight: 195g

Wire terminal: PA 66 (UL 94V-0)  
 AWG: 28~12 / 0.2~2.5mm<sup>2</sup>  
 Screw Torque Value:  
 M2.5 / 5.202kgf.cm(Max)

**Safety**

Isolation: AC 2KV, 50/60Hz, for 1 min, between Power / Input / Output / Case

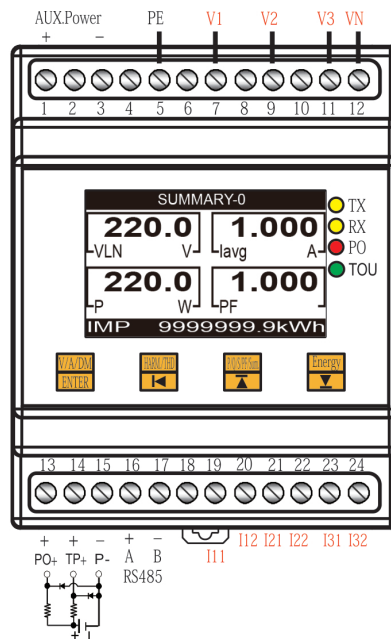
Insulation resistance: ≥100MΩ @ 500Vdc

EMC: EN IEC 61326-1:2021  
 EN 55011:2016/A2:2021  
 EN IEC 61000-3-2:2019+A1:2021  
 EN 61000-3-3:2013+A2:2021  
 IEC 61000-4-2:2008  
 IEC 61000-4-3:2020  
 IEC 61000-4-4:2012  
 IEC 61000-4-5:2014/A1:2017  
 IEC 61000-4-6:2013/COR1:2015  
 IEC 61000-4-8:2009  
 IEC 61000-4-11:2020/COR1:2020

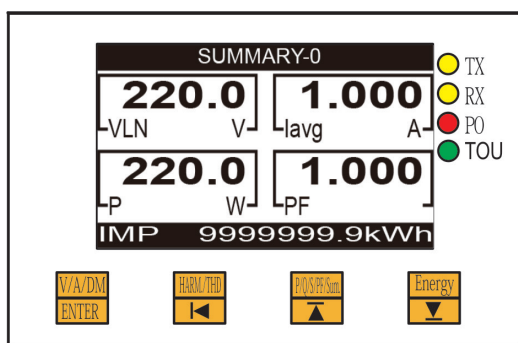
Safety(LVD): EN 61010-1:2010/A1:2019/AC:2019-04

FCC: FCC 47 CFR part 15 subpart B Class A

**Terminal Block**

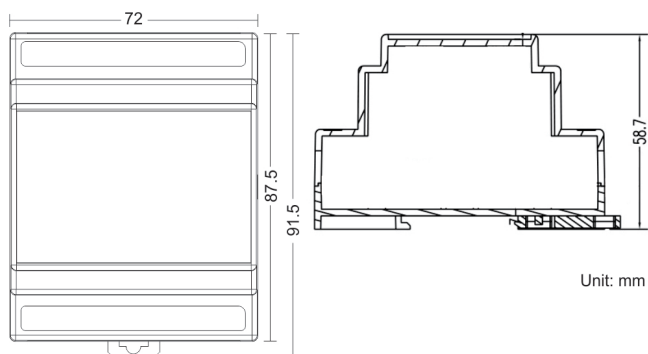


**Front Panel**

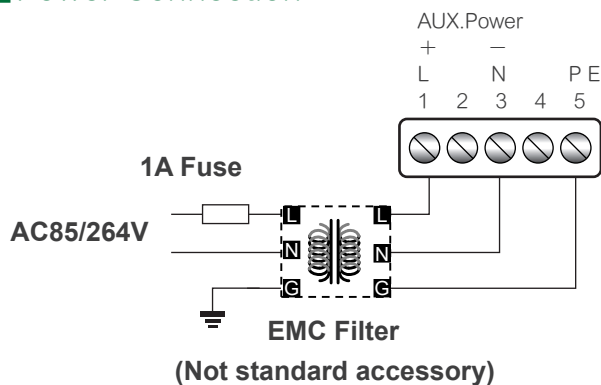


Display: 128\*64 dots matrix LCD with white backlight  
 Backlight delay time: 0~15 min ( "0" is always on)  
 Operating Keys : 4 buttons  
 LED indicators: TX,RX for communication  
 PO for Pulse Output  
 TOU (Time of Use)

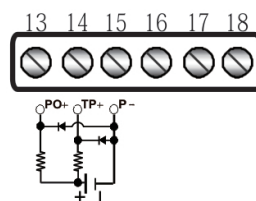
**Dimensions**



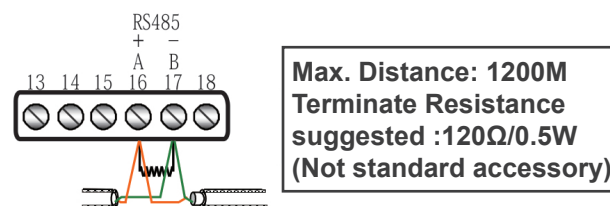
**Power Connection**



**Pulse Output**

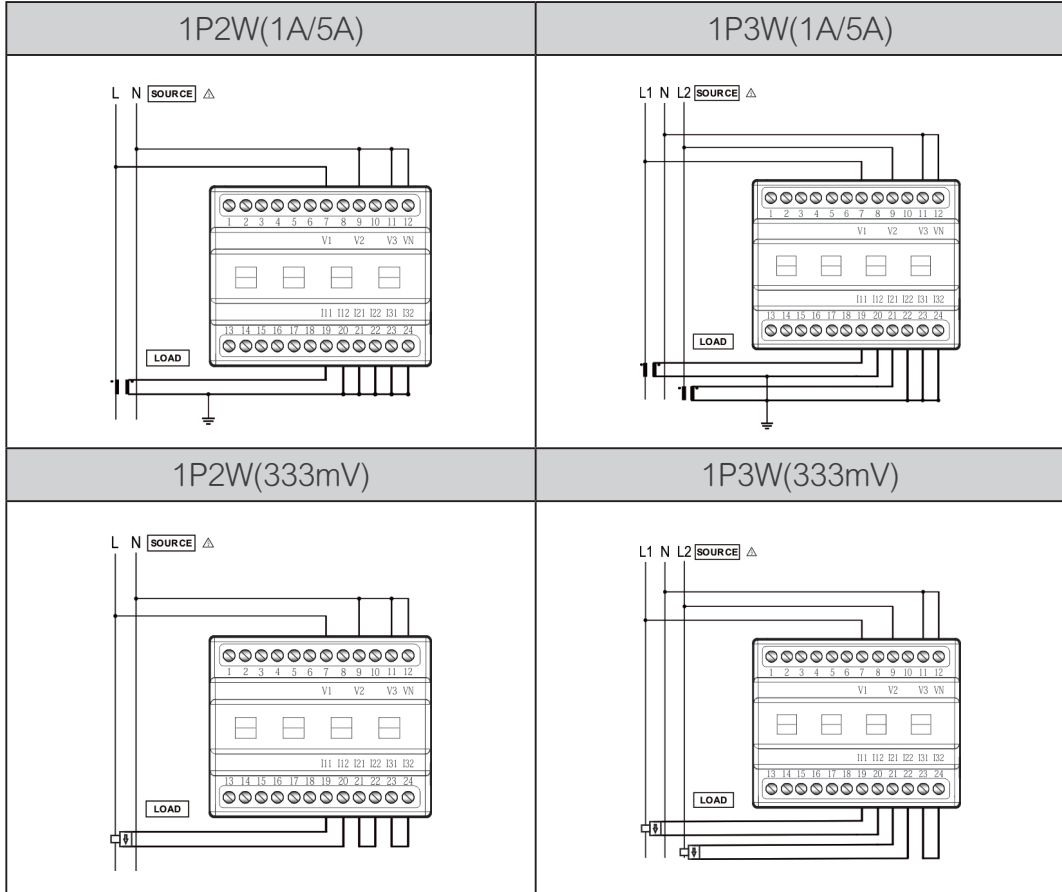


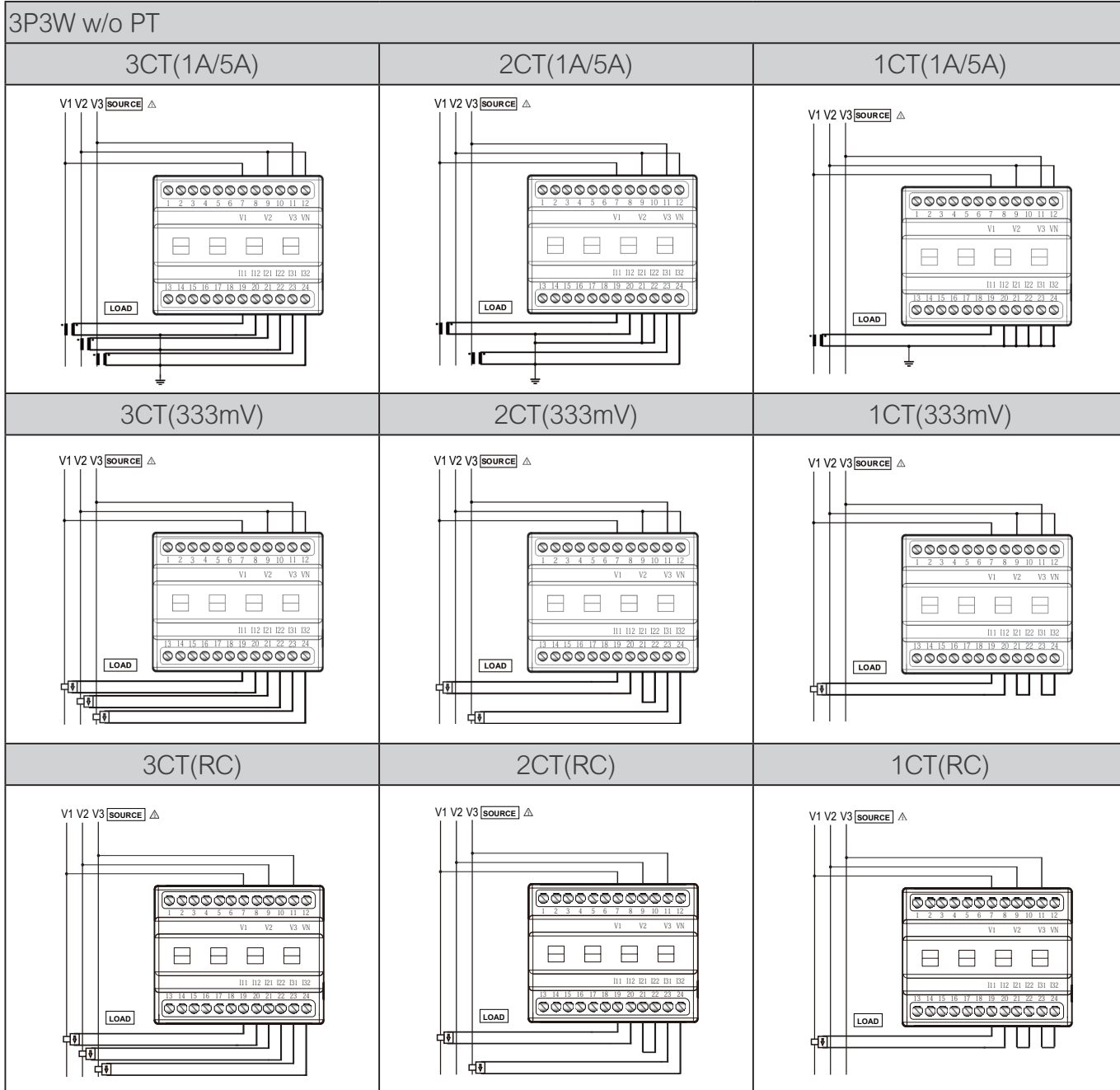
**RS-485 Communication Port**

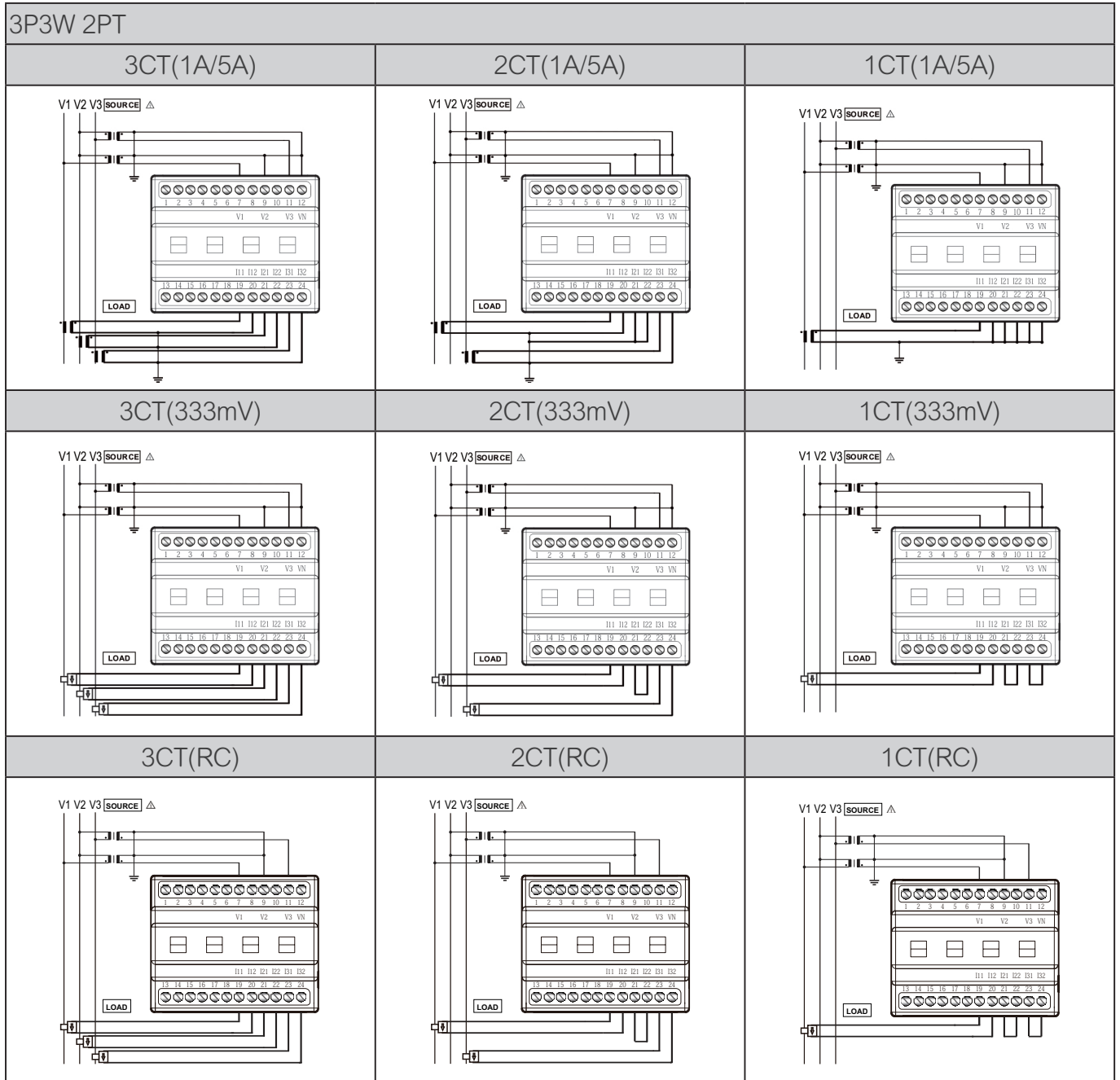


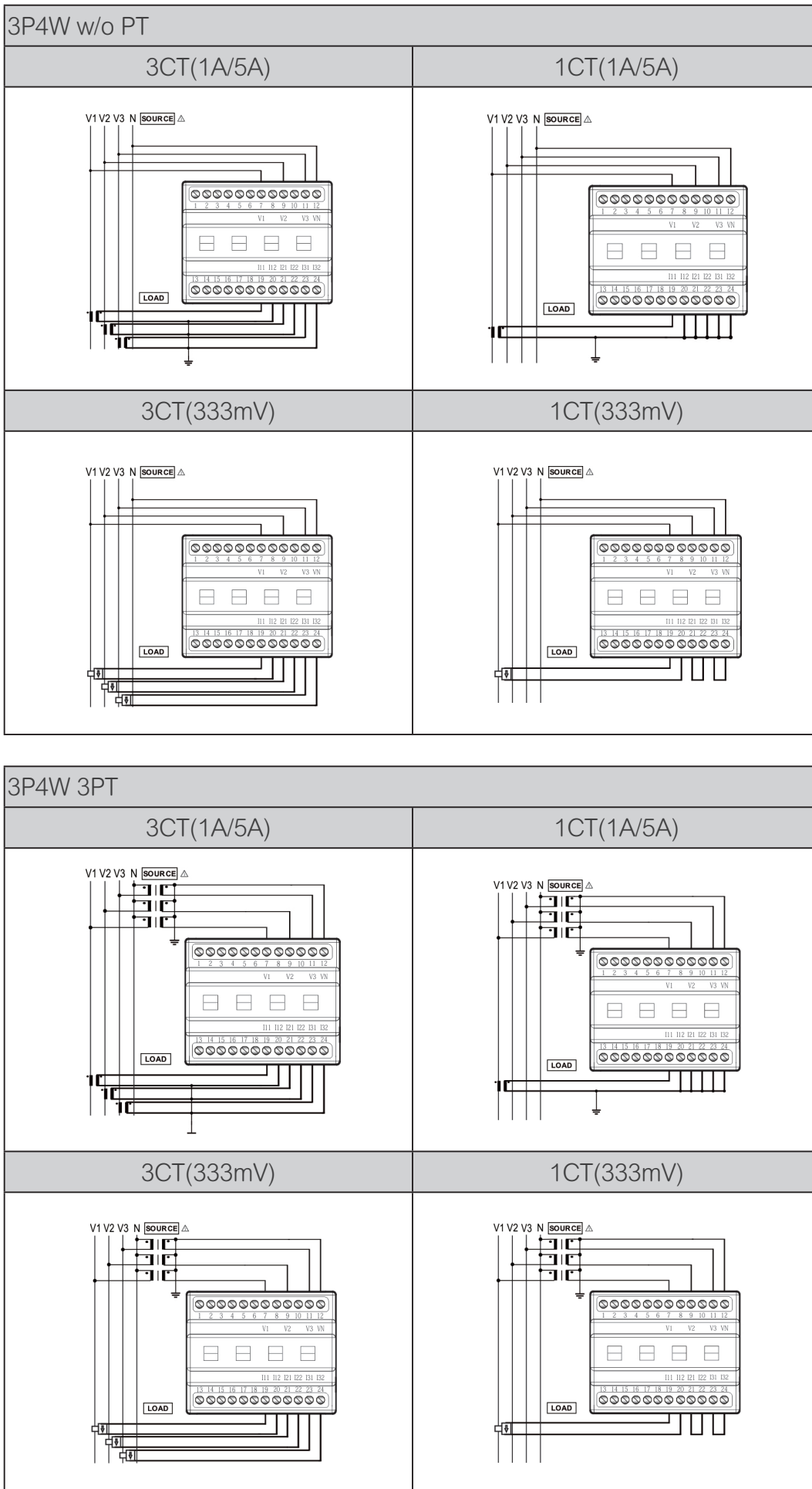
**■ Voltage and Current connection**

CT secondary side distinguishes 1A/5A and 333mV, the mV of CT signal needs to be wired independently, and cannot be grounded or connected together with each other.









## Split Core CT Ordering Information

US – CTV — Hole — Primary Current — 2

CODE	Diameter(mm)	CODE	Rated Current
10	Φ10	005	5A
16	Φ16	060	60A
		100	100A
		150	150A
24	Φ24	200	200A
35	Φ35	300	300A
		400	400A
		600	600A
50	Φ50	800	800A

(The output line of mV on the secondary side of the CT needs to be wired independently, and cannot be connected together or grounded for protection purposes.)



Type	Current of primary (A)	Voltage of secondary (mV)	Accuracy %F.S.	Weight
US-CTV-10-005	5A	333	1.0	60g
US-CTV-16-060	60A	333	0.5	100g
US-CTV-16-100	100A	333	0.5	100g
US-CTV-16-150	150A	333	0.5	100g
US-CTV-24-200	200A	333	0.5	205g
US-CTV-35-300	300A	333	0.5	375g
US-CTV-35-400	400A	333	0.5	375g
US-CTV-35-600	600A	333	0.5	375g
US-CTV-50-800	800A	333	0.5	655g