

CPM-20 Multifunction Power Meter



Description

CPM-20 series is a multifunction integrated power meter and provide high accuracy measurement for single phase and three-phase system, such as, parameters for voltage, current, active/reactive/apparent power and energy, power factor, and frequency etc.. Use the CPM-20 series to improve power management and systemically important composition parts, special applications in commercial, industrial, public facilities, etc., where energy consumption is sensitive.



Standard with RS-485 Modbus RTU communication port which supports remote data transmission, and the front LCD display with an easy-to-read design. It provides instant supervision and late-stage analysis of electronic materials for this communication function. The unique feature is that the power meter can also display accumulated electricity bills and CO₂ emissions, to help users consider energy consumption and environmental impact more comprehensively.

Overall, the CPM-20 series power meters are designed to meet the market demand for energy conservation and emission reduction, providing an efficient and practical tool for power quality monitoring, cost analysis and environmental protection, helping enterprises and organizations achieve sustainable development goals.

Overall, the CPM-20 series power meters are designed to meet the market demand for energy conservation and emission reduction, providing an efficient and practical tool for power quality monitoring, cost analysis and environmental protection, helping enterprises and organizations achieve sustainable development goals.

Features

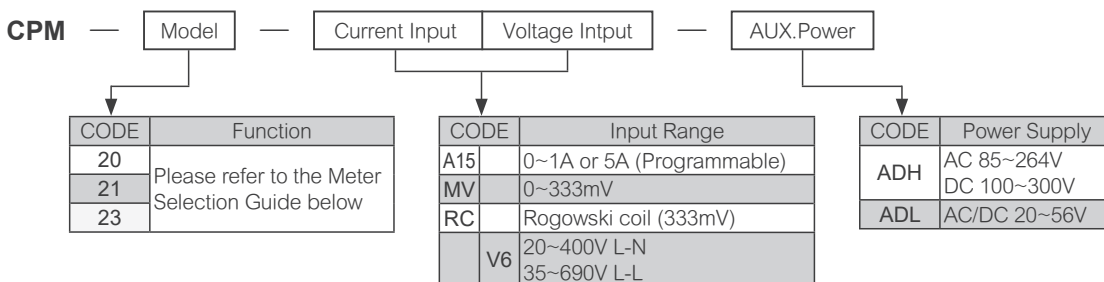
- Measuring 1P2W/1P3W/3P3W/3P4W system and the setting is programmable.
- Measuring balance unbalance loading system, including power parameters such as voltage, current, frequency, power factor, active power, reactive power, apparent power and energy.
- The number of sampling cycles is the number of cycles of the input frequency, and each cycle samples 128 points.
- CT input current can be set 1A or 5A by the user.
- The large-size, high-brightness LCD is easy and clear to read even under direct sunlight.
- Innovative meter AI calculation can perform automatic line adjustment and log it(See Note).
- Standard with data log function.
- Measuring voltage and current up to 15th individual harmonic, and can maintain power stability, and moreover, to avoid risk of equipment malfunction.
- Standard with 2 sets of DI and 2 sets of DO, and is designed with a variety of I/O control functions to facilitate on-site monitoring and alarm needs.
- CE, and FCC approved.

Note: Auto wiring function is conditional, please refer to operation manual.

Applications

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

Ordering Information



Meter Selection Guide

Measurement items and functions		CPM-20	CPM-21	CPM-23
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	●	●	●
Individual Harmonic	Current and voltage 2nd~31st individual harmonics			●
Phase Angle	Current and voltage	●	●	●
Demand	Current, active, reactive, apparent power		●	●
Max/Min Demand Record	Power Max/Min demand and time stamp		●	●
Max/Min Values	Parameter values and time stamp		●	●
Event Recording	Record the following parameter alarm events: frequency, phase voltage, line voltage, current, active/reactive/apparent power, power factor, active/reactive/apparent power demand, current demand	●	●	●
Communication Port	RS-485 Modbus RTU	●	●	●
Digital Input	DI1, DI2		●	●
Digital Output	DO1, DO2		●	●
Date and Time	Year, Month, Day, Hour, Minute, Second	●	●	●
CO ₂ Emission	Total CO ₂ weight of energy(Kg)	●	●	●
Cost	Total cost of energy	●	●	●

Accuracy & Resolutions

Parameter	Accuracy	Resolution	Measurement Range
Voltage	0.2%	0.1V	20~400V L-N / 35~690V 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	Class0.5S	0.1kWh	0~99,999,999.9kWh
Reactive Energy	Class1.0	0.1kVarh	0~99,999,999.9kVarh
Apparent Energy	0.5%	0.1kVAh	0~99,999,999.9kVAh
THD	1.0%	0.1%	0~100.0%
Individual Harmonic	1.0%	0.1%	0~100.0%
Voltage & Current Phase Angle	1.0%	0.1°	0.0° ~359.9°
Current Demand	0.2%	0.001A	0.000~9,999A
Active Power Demand	0.5%	1W	-999,999,999~999,999,999W
Reactive Power Demand	0.5%	1Var	-999,999,999~999,999,999Var
Apparent Power Demand	0.5%	1VA	0~999,999,999VA

Technical Specification

Electrical Characteristics

Measurement: True RMS measurement
 Sampling: 128 point/cycle
 Display refresh rate: 0.5s
 Metering system: 1P2W, 1P3W, 3P3W, (1/2/3CT), 3P4W(1/3CT)Balance/Unbalance
 Input range: Voltage : 20~400 VLN ; 35~690VLL

PT primary ratio: 100~500,000V
 PT secondary ratio: 100~600V
 Current: 1A / 5A / 333mV
 CT primary ratio : 1~9999A
 CT secondary ratio : A15: 1A or 5A programmable
 MV/RC: 333mV

Overload capacity: Current: 2x rated continuous ; 20x rated / 1s
 Input burden: Voltage:<0.2VA ; Current:<0.1VA

Power Quality

THD: Total harmonic distortion for voltage and current
 Individual harmonic: The display can be switched to display the odd harmonic content of the 2nd to 15th of voltage and current

Demand(CPM-21/23 only)

Calculation method: Block / Sliding
 Period: 1~60 min
 Demand record: Records of Max/Min value and time stamp

Data Log

Event recording: The event and time when an exception occurs can be recorded
 Memory storage: 2KB FRAM

RS-485 Communication

Protocol: Modbus RTU mode
 Address: 1~247
 Baud rate: 1200/2400/4800/9600/19200/38400/57600/115200 bps
 Response time: <50mS (the interval between a received command completed and data-transfer starting

Parity: None / Even / Odd
 Data bits: 8 bits
 Stop bit: 1 or 2
 Distance: 1200M max

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
 EN 61010-1:2010/A1:2019/AC:2019-04
 FCC: FCC 47 CFR part 15 subpart B Class A

Digital Input (CPM-21/23 only)

Input capacity: 2 channels DI input, mechanical contact or open collector input are available
 Function mode: Can be set to DI / Demand reset / Max. Demand reset / Energy reset / Max. and Min. reset

Digital Output (CPM-21/23 only)

Output capacity: Open collector(O.C.), 30Vdc, 30mA(max)
 Function: Can set to energy pulse output, alarm output, RS-485 control output
 Energy pulse output: DO1 is active energy pulse output
 DO2 is reactive energy pulse output
 Pulse divider: 1~6000
 (1 Pulse= 0.1kWh, if set 100, 1 Pulse= 10.0kWh)
 Pulse width: 1~20(x10mS)
 Alarm output mode: Hi / Lo
 Up to 33 parameters of power and demand for assign

Power Supply

Range: ADH: AC 85~264V, 50/60 Hz
 DC 100~300V
 ADL: AC/DC 20~56V
 Power consumption: AC: 10VA @ 230V / DC: 3W

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: Front panel: IEC 529 (IP50) ; Housing: IP20
 Operating altitude(maximum): 2000m above sea-level

Mechanical Structure

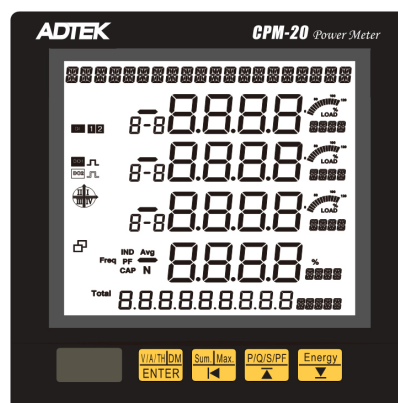
Dimensions: 98mm(W) x 98mm(H) x70.5mm(L)
 Panel cutout: 90.8mm(W) x 90.8mm(H)
 Material: ABS, Black (with fire-retardant)
 Mounting: Panel mounting
 Weight: ≤400g
 Wire terminal: PA 66 (UL 94V-0)
 Voltage / Current input:
 AWG: 26~10 / 0.5~4.0mm²
 Screw Torque Value: M3 / 8.0kgf.cm(Max)
 Others input:
 AWG: 28~16 / 0.5~1.5mm²
 Screw Torque Value: M2 / 2.04kgf.cm(Max)

Safety

Isolation: AC 2KV, 50/60Hz, for 1 min, between Power / Input / Output / Case
 Surge immunity: AC±4KV, 1.2 / 50us voltage input / current input / AUX. power
 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

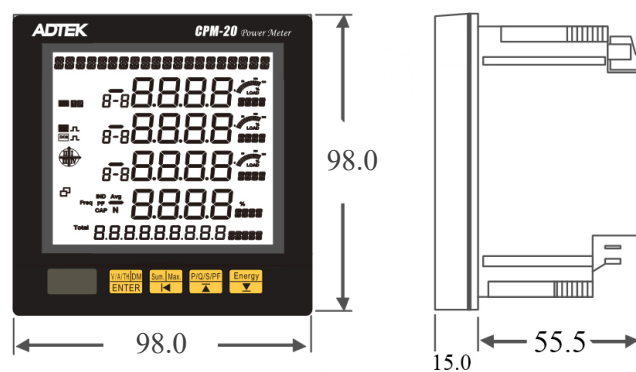
Safety(LVD):
 FCC:

Front Panel

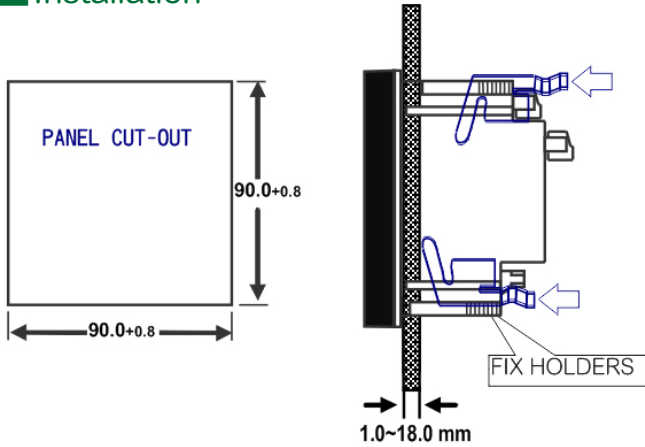


Display: LCD 65(W)x61(H)mm; White back light blue words visible.
 Backlight: 1~15 min, or light could be set as always on
 Description: Twenty digits in the top of display: Display parameter name.
 Four line of 8 digits in the metering area: Display metering data such as voltage, current, power, power factor, frequency, unbalance, etc.
 Four line of 4 digits in the metering area: Display metering data unit.
 Three line 8-8: 1, 2, 3 for 3 phase; 1-2, 2-3, 3-1 for 3 phase line to line.
 Nine 8 and five digits: Display energy value and unit. Also display date and time.
 Display 5 power parameters at the same time
 Bar Graph indicates load percentage
 Display perpetual calendar date and time
 IND & CAP load type display
 Load quadrant display
 4 kinds of summary pages for home page could be set according to user needs

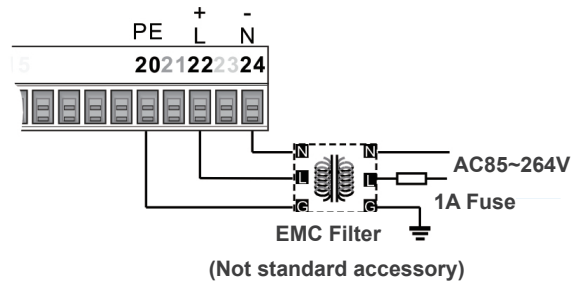
Dimensions



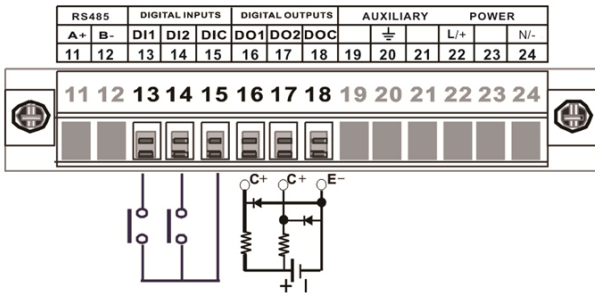
■ Installation



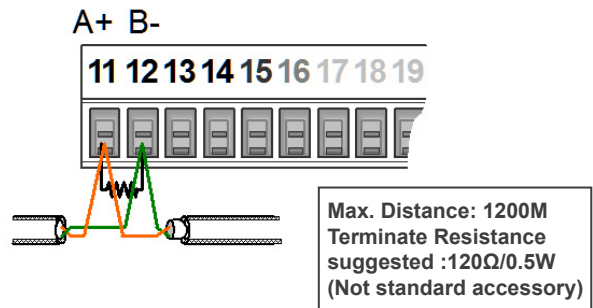
■ Power Connection



■ Digital input/output(CPM-21/23 only)

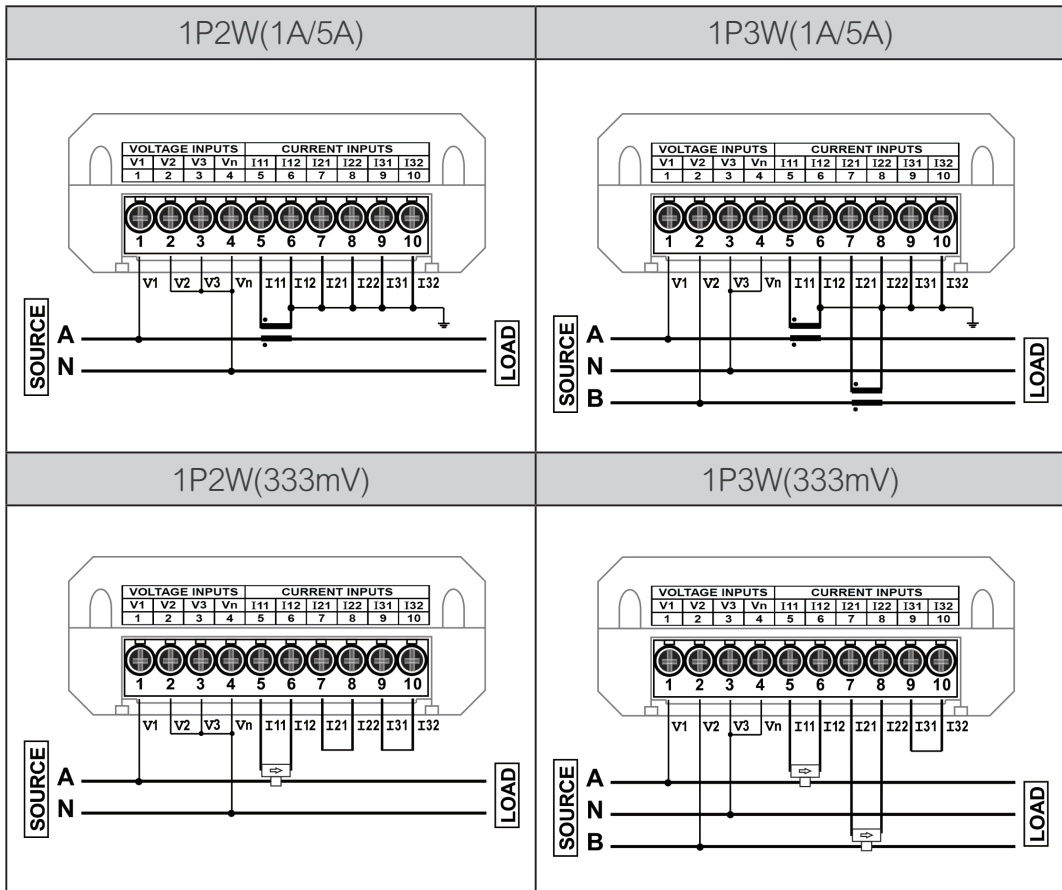


■ RS-485 Communication port

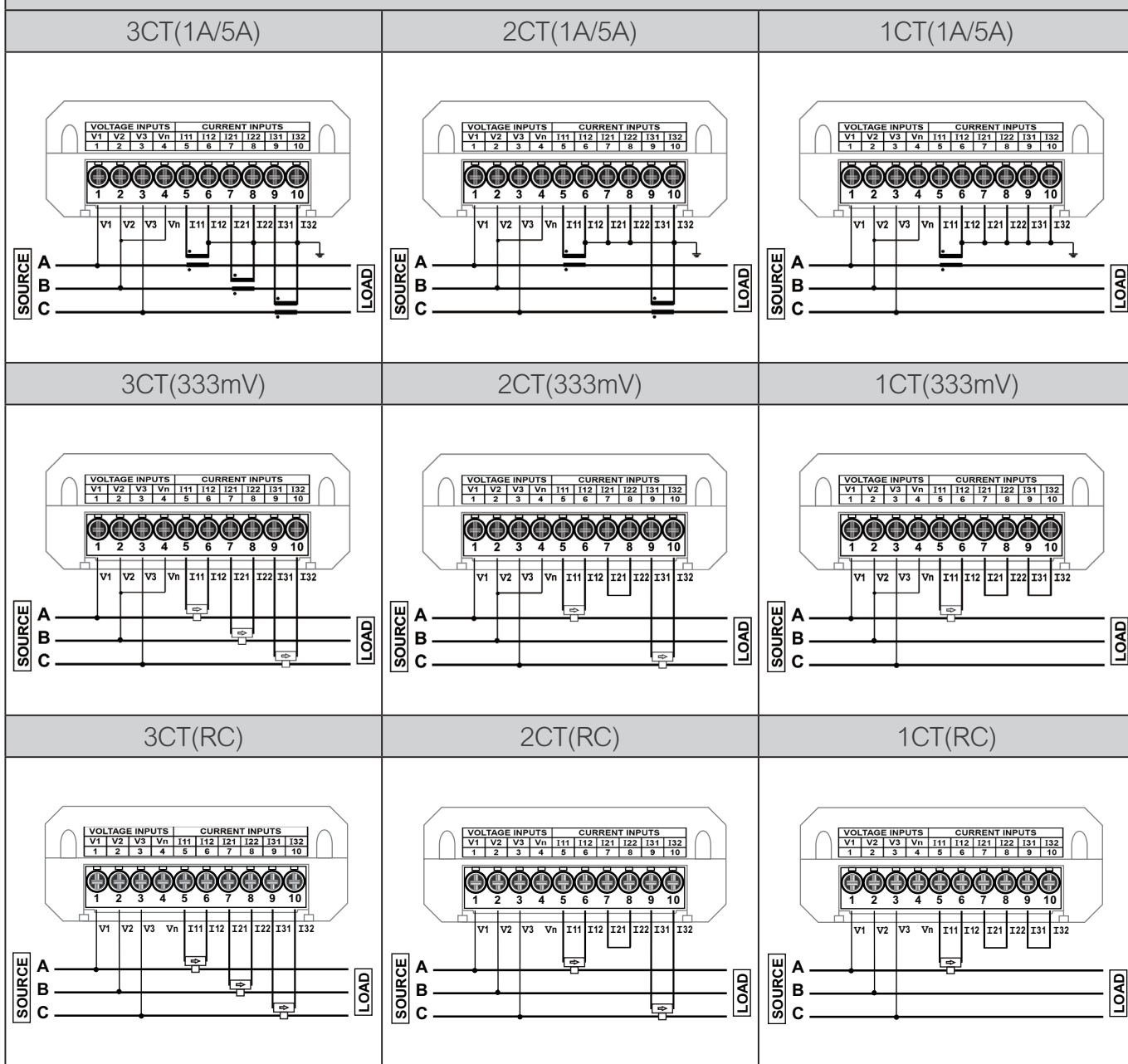


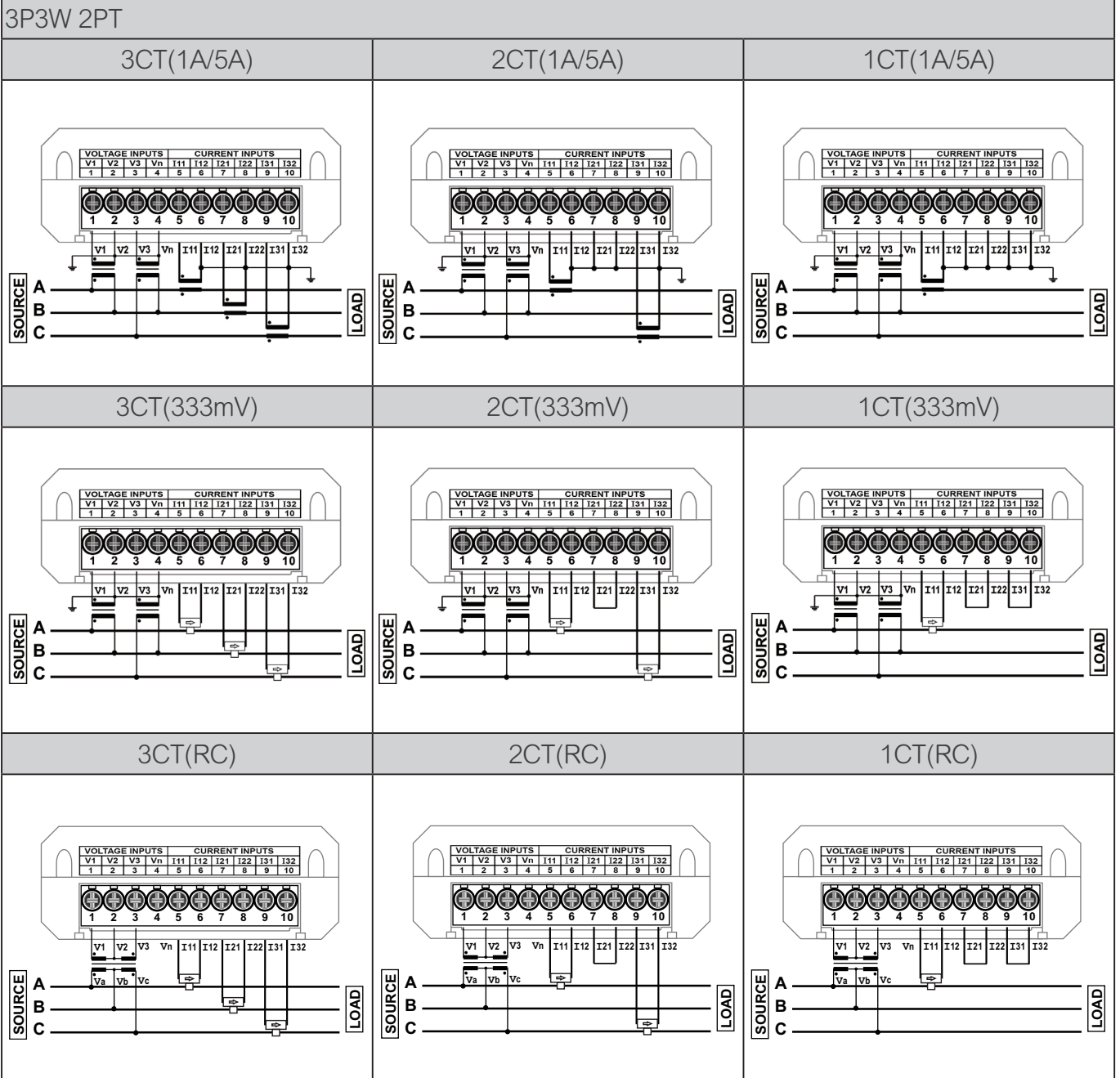
■ Voltage and Current Connection

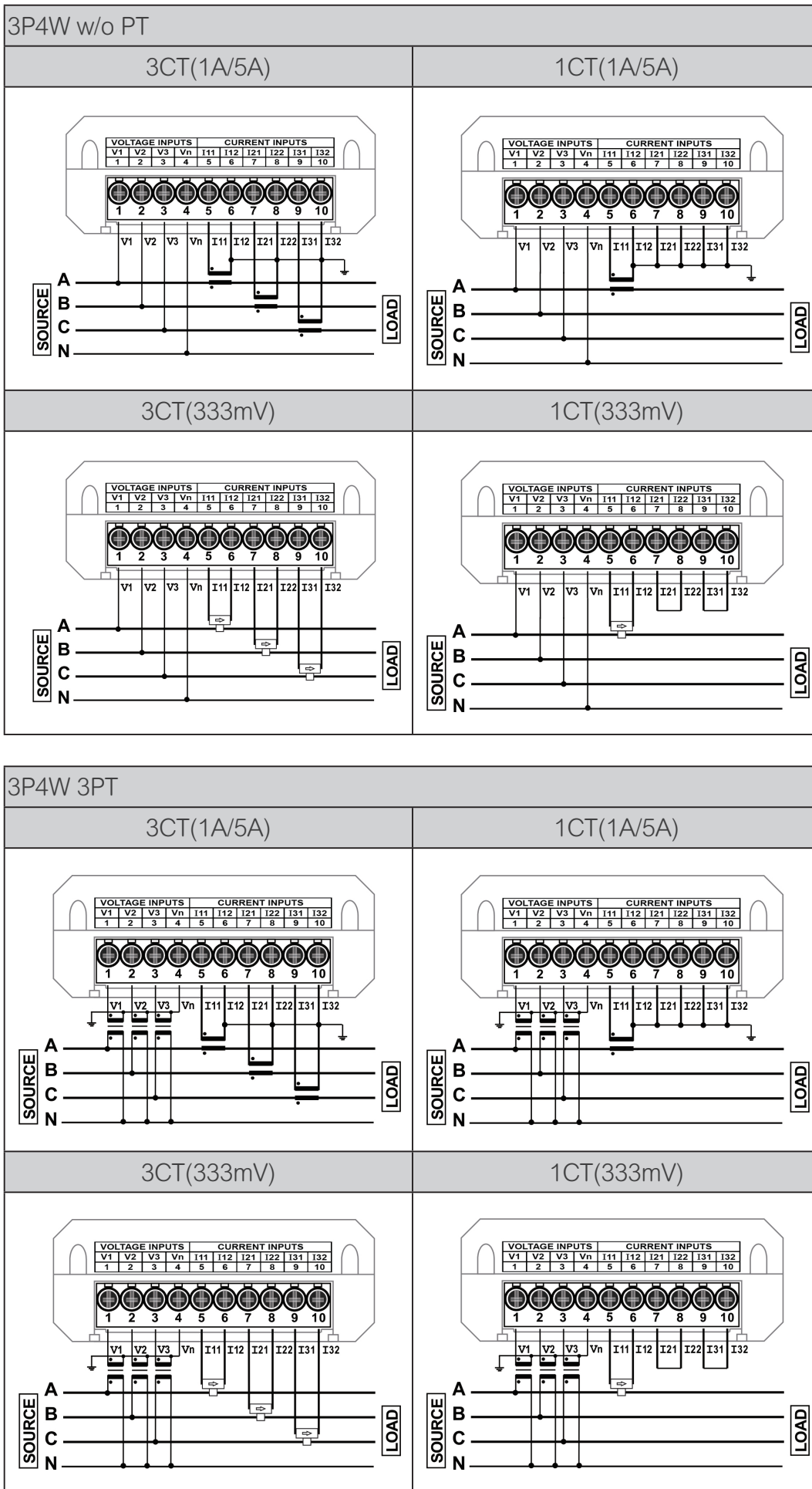
CT secondary side distinguishes 1A/5A and 333mV, the mV of CT signal needs to be wired independently, and cannot be grounded or connected together with each other.



3P3W w/o PT







Split Core CT Ordering Information

(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.)

US – CTV — Hole — Primary Current — **2** — Cable Option

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

CODE	Cable Spec.
LSFH	Low smoke zero halogen
This code is not filled when there is no optional function	

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

