

## Description

ADP-30 series of multifunction power meters provide the power monitoring solution especially designed for users' requirement. This power meter combines advanced technology and diverse functions to provide comprehensive power monitoring and management.

With high accuracy measurement for single phase and three-phase system. Measuring parameters for voltage, current, power, power factor, frequency and energy, etc. So the user can control and get an overview of power usage status. Equipped with RS-485 Modbus RTU communication function to facilitate data exchange with other devices or systems to achieve intelligent monitoring and remote management.

In addition to displaying various power parameters, the power meter can also display accumulated electricity bills and CO<sub>2</sub> emissions, to help users consider energy consumption and environmental impact more comprehensively.

The ADP-30 series multi-function power meter is a powerful and flexible tool suitable for a variety of application scenarios, including commercial buildings, industrial plants and residential areas. It provides a full range of power management functions, allowing users to manage power resources more intelligently and energy-savingly.



## Features

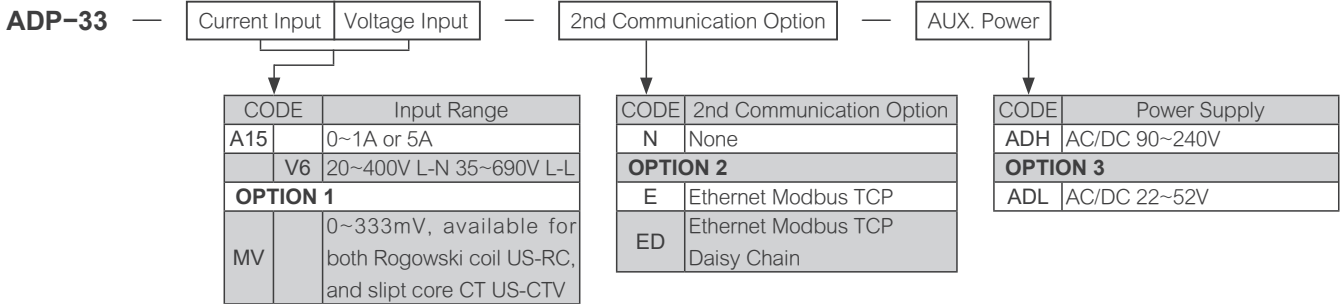
- Measuring 1P2W/1P3W/3P3W/3P4W system and the setting is programmable.
- Measuring balance unbalance loading system, including power parameters such as voltage, current, frequency, power factor, active power, reactive power, apparent power and energy.
- The number of sampling cycles is the number of 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).
- Embedded 2MB non-volatile memory(NVM) which is with data and events recording function, can record for a long time.
- Ethernet Modbus TCP is optional for the second communication. And the dual-port design and daisy-chaining capability remove need for additional switches.
- Measuring voltage and current up to 31th individual harmonic, and can maintain power stability, and moreover, to avoid risk of equipment malfunction.
- Standard with time of use (TOU) function, which can perform power consumption with differential statistics according to the electricity consumption period.
- 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.
- UL, 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 Guide**

| Measurement items and functions   |  |
|-----------------------------------|--|
| 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  |
| Three-phase Unbalance             | Three-phase unbalance voltage / current  |
| Demand                            | Current, active, reactive, apparent power  |
| Max/Min Demand Record             | Max Current, Max/Min power and time stamp  |
| Max/Min Values                    | Parameter values and time stamp  |
| Event Recording                   | Record the following parameter alarm events:<br>frequency, phase voltage, line voltage, current, active/reactive/apparent power, power factor, 3-phase total active/reactive/apparent power, power factor, active/reactive/apparent power demand, current demand, voltage/current unbalance  |
| Data Logging                      | The following parameters can be set to logging:<br>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 values |
| 1st Communication Port            | RS-485 Modbus RTU  |
| 2nd Communication Port (Optional) | Single or dual port(Daisy chain) Ethernet Modbus TCP   |
| Digital Input                     | DI1, DI2   |
| Digital Output                    | DO1, DO2   |
| 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(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 for 4 quadrants |
| 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%                            |
| Unbalance                     | 0.5%      | 0.1%       | 0~300.0%                            |
| 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<br>PT primary ratio: 100~1,200,000V<br>PT secondary ratio: 50~600V<br>Current: 1A / 5A / 333mV<br>CT primary ratio : 1~9999A<br>CT secondary ratio : 1A / 5A / 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: | 2nd~31st individual harmonics for voltage and current and odd, even harmonic content<br>The display can be switched to display the odd harmonic content of the 3rd to 15th of voltage and current |
| Unbalance:           | 3-phase voltage and current   |

### Demand

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

### TOU (Time of Use)

|                    |  |
|--------------------|--|
| 4 time zones:      | 1~4 zones per year   |
| 8 periods:         | Each time zone can set 1~8 periods<br>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   |

### 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:  | 32KB FRAM & 2MB Flash, no battery life issue  |

### RS-485 Communication

|            |  |
|------------|--|
| Protocol:  | Modbus RTU mode                                  |
| Address:   | 1~247  |
| Baud rate: | 1200/2400/4800/9600/19200/38400/57600/115200 bps |
| Parity:    | None / Even / Odd                                |
| Data bits: | 8 bits   |
| Stop bit:  | 1 or 2   |
| Distance:  | 1200M max  |

### Ethernet (Optional)

|                      |  |
|----------------------|--|
| Interface:           | Single or dual port, 10/100M BASE-TX, RJ45 connector |
| Dual-port structure: | Daisy-chaining capability                            |
| Protocol:            | Modbus TCP   |
| TCP socket:          | 4 sockets  |

### Digital Input

|                 |  |
|-----------------|--|
| Input capacity: | 2 channels DI input, mechanical contact or open collector input are available  |
| Function mode:  | Can be set to reset active energy / reset reactive energy / reset accumulative total / reset Max. & Min. value / reset alarm output / reset demand / reset Max. demand / DI function |

### Digital Output (DO)

|                      |  |
|----------------------|--|
| Output capacity:     | Open collector(O.C.), 30Vdc, 30mA(max)                               |
| Function:            | Can be set to energy pulse output, alarm output, remote output       |
| Energy pulse output: | DO1 & DO2 could be set for different energy pulse output application |
| Pulse divider:       | 1~9999<br>(1 Pulse= 0.1kWh, if set 100, 1 Pulse= 10.0kWh)            |
| Pulse high width:    | 1~5000ms, 0 is 50% duty cycle  |
| Alarm output mode:   | Hi / Lo<br>Up to 37 parameters of power and demand for assign        |
| Test pulse output:   | 3200 Pulse /1kWh, Duty cycle 50%                                     |

### Power Supply

Range: ADH : AC/DC 90~240V  
ADL: AC/DC 22~52V  
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: IP50 ; Housing: IP20  
Operating altitude(maximum): 2000m above sea-level

### Mechanical Structure

Dimensions: 96mm(W) x 96mm(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)

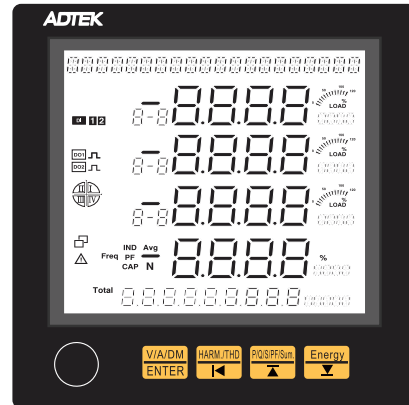
### Safety

Isolation: AC 2.5KV, 50/60Hz, for 1 min,  
between Power / Input / Output / Case  
(Ethernet: AC 2.0kV)  
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  
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  
UL: UL 61010-1 ed.3  
Voltage and current measurement category:  
CAT III up to 300 V L-L  
CAT II up to 600 V L-L  
AUX. power category: CAT III up to 300 V L-N

### Accuracy of Standard

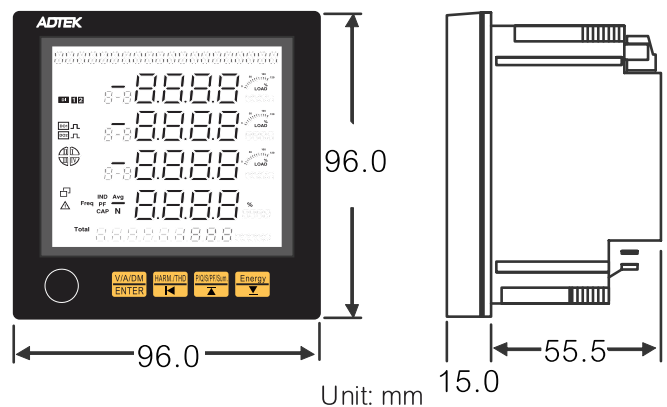
Active energy: Class 0.5S (IEC62053-22:2003)  
Reactive energy: Class 1.0 (IEC62053-23:2003)

## Front Panel

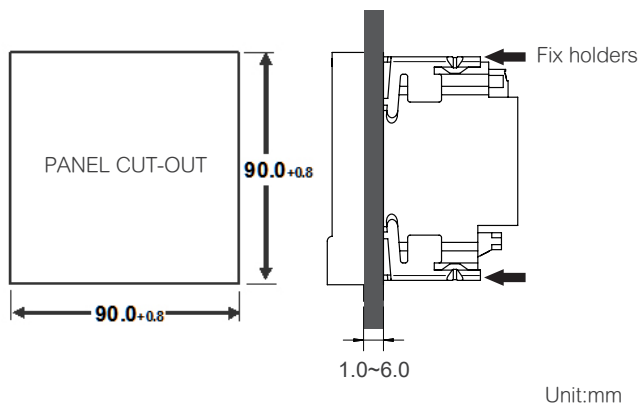


- Display: LCD 65(W)x61(H)mm; White back light blue words visible.
- Backlight: 1~15 min, or light could be set as always on
- Description:
  - Twenty digits in the top of display: Display parameter name.
  - Four line of digits in the metering area: Display metering data such as voltage, current, power, power factor, frequency, unbalance, etc.
  - Four line of digits in the metering area: Display metering data unit.
  - Three line - : 1, 2, 3 for 3 phase; 1-2, 2-3, 3-1 for 3 phase line to line.
  - Nine 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
  - 7 kinds of summary pages for home page could be set according to user needs

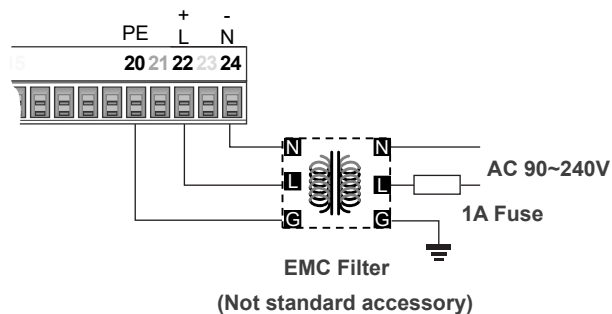
## Dimensions



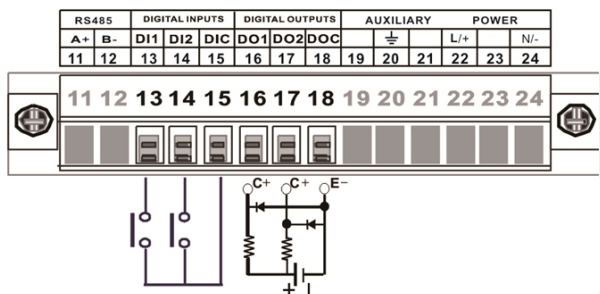
### Installation



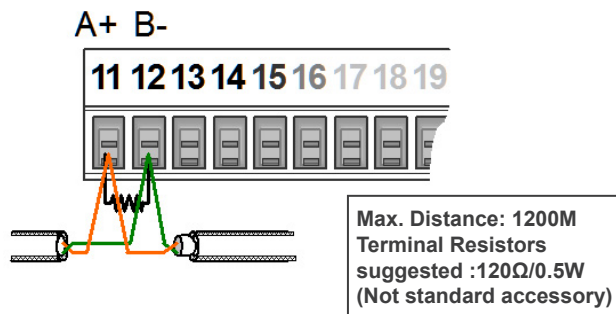
### Power Connection



### Digital Input/Output



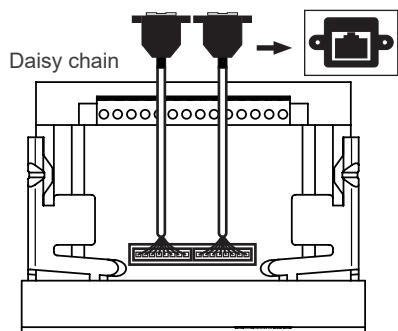
### RS-485 Communication Port



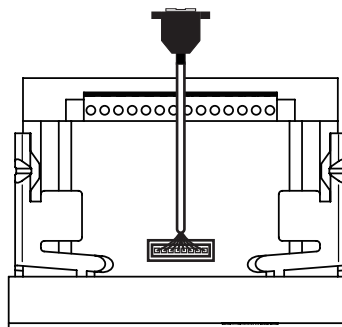
### Ethernet Port

Dual port

RJ45 cable (Total length 30cm)

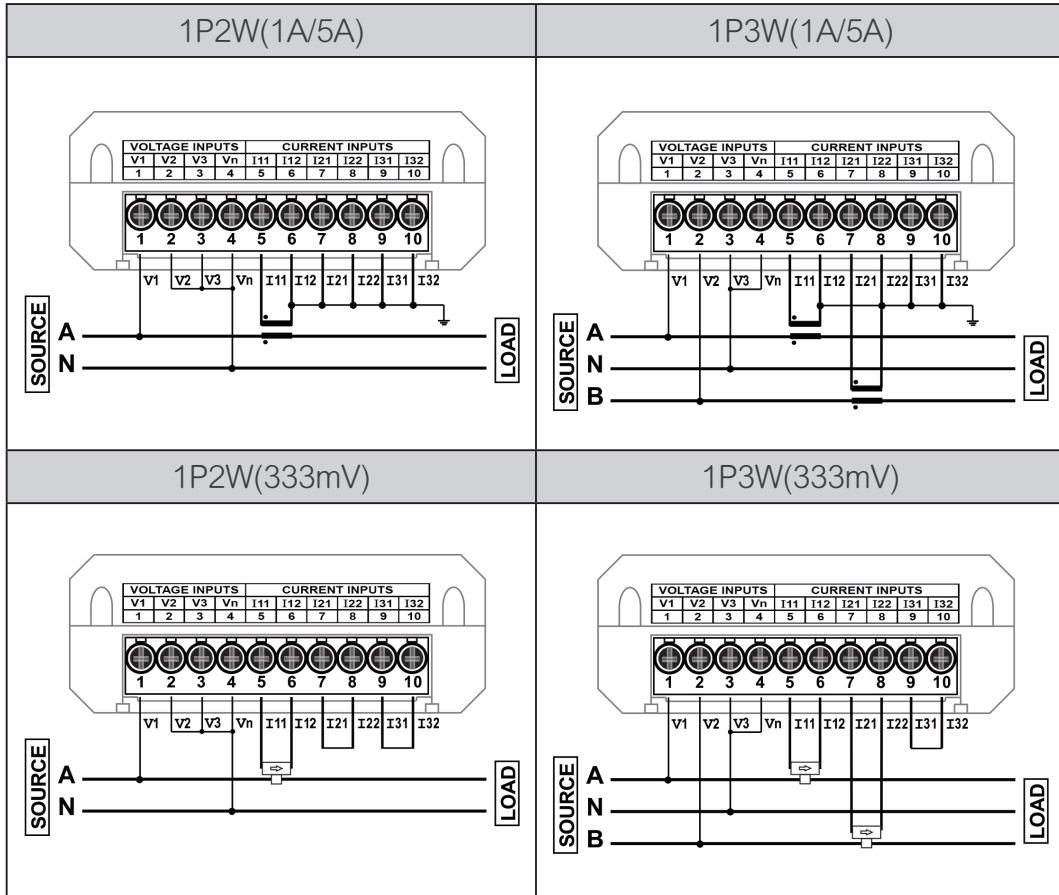


Single port

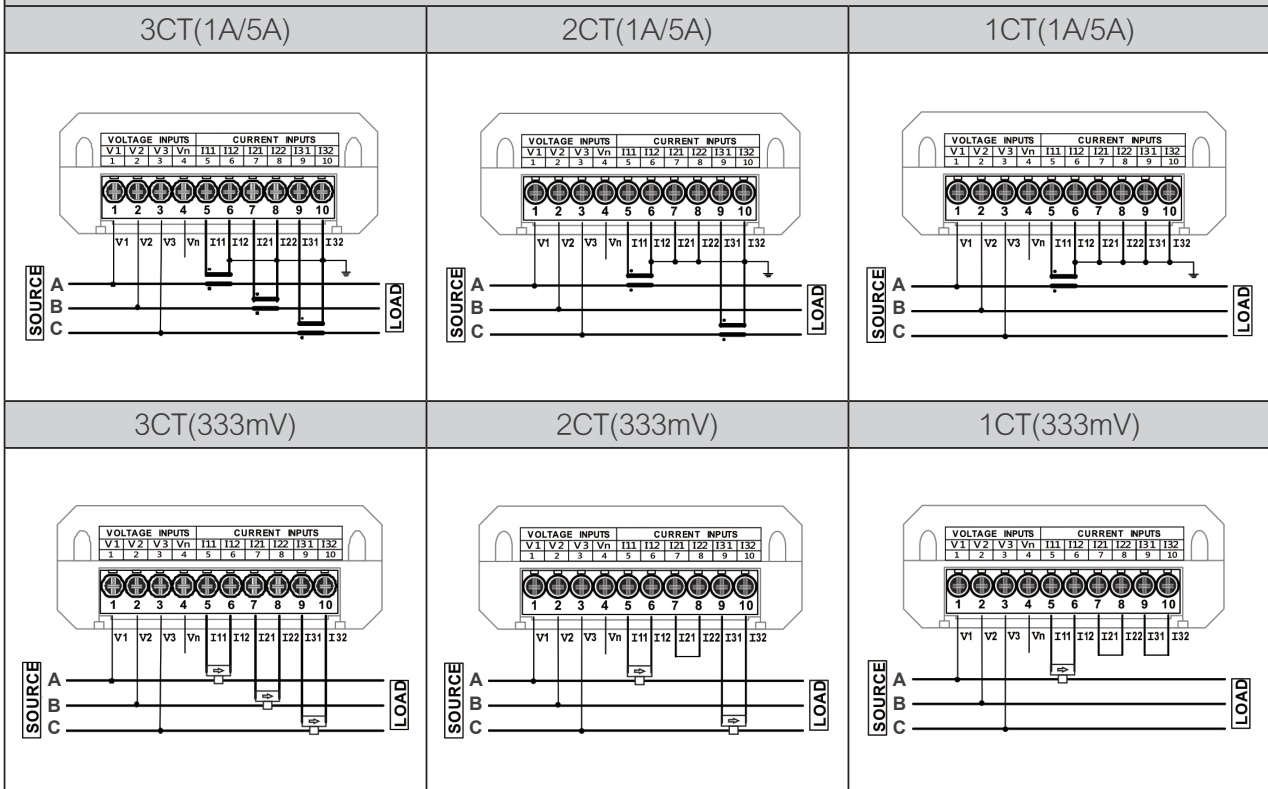


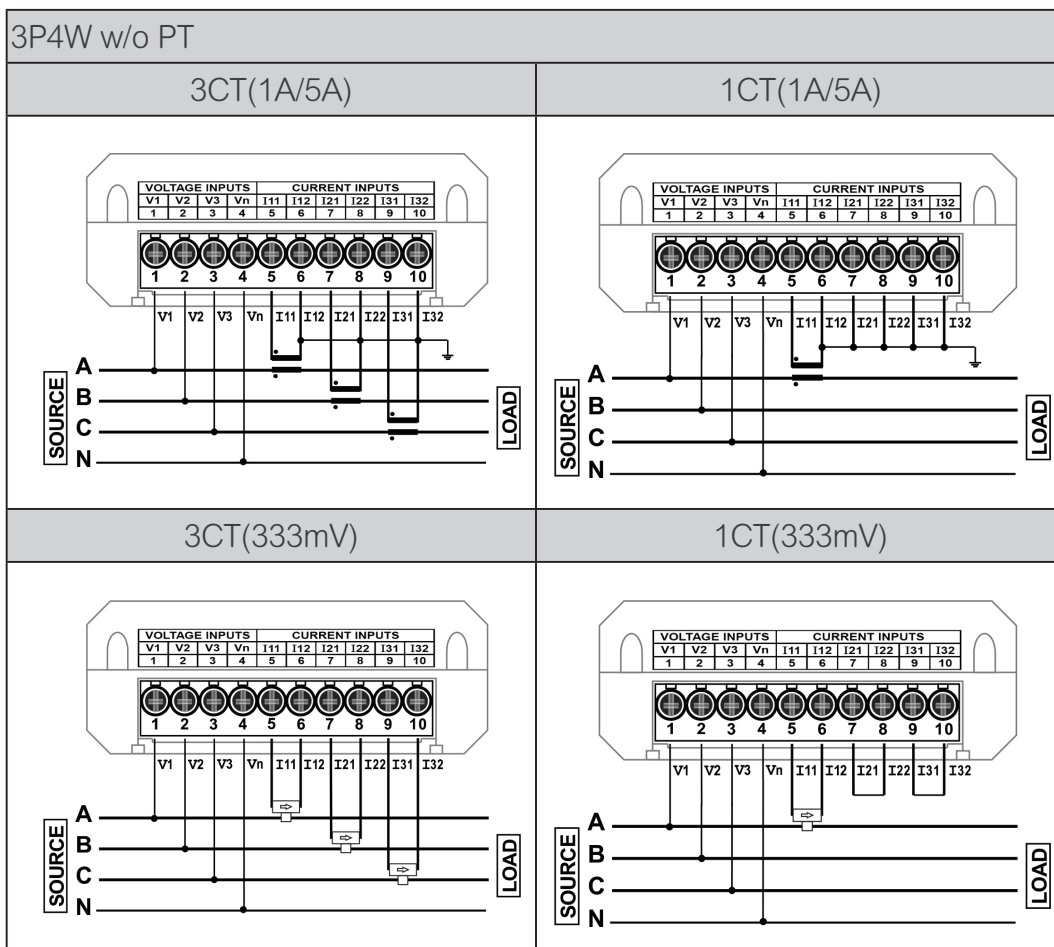
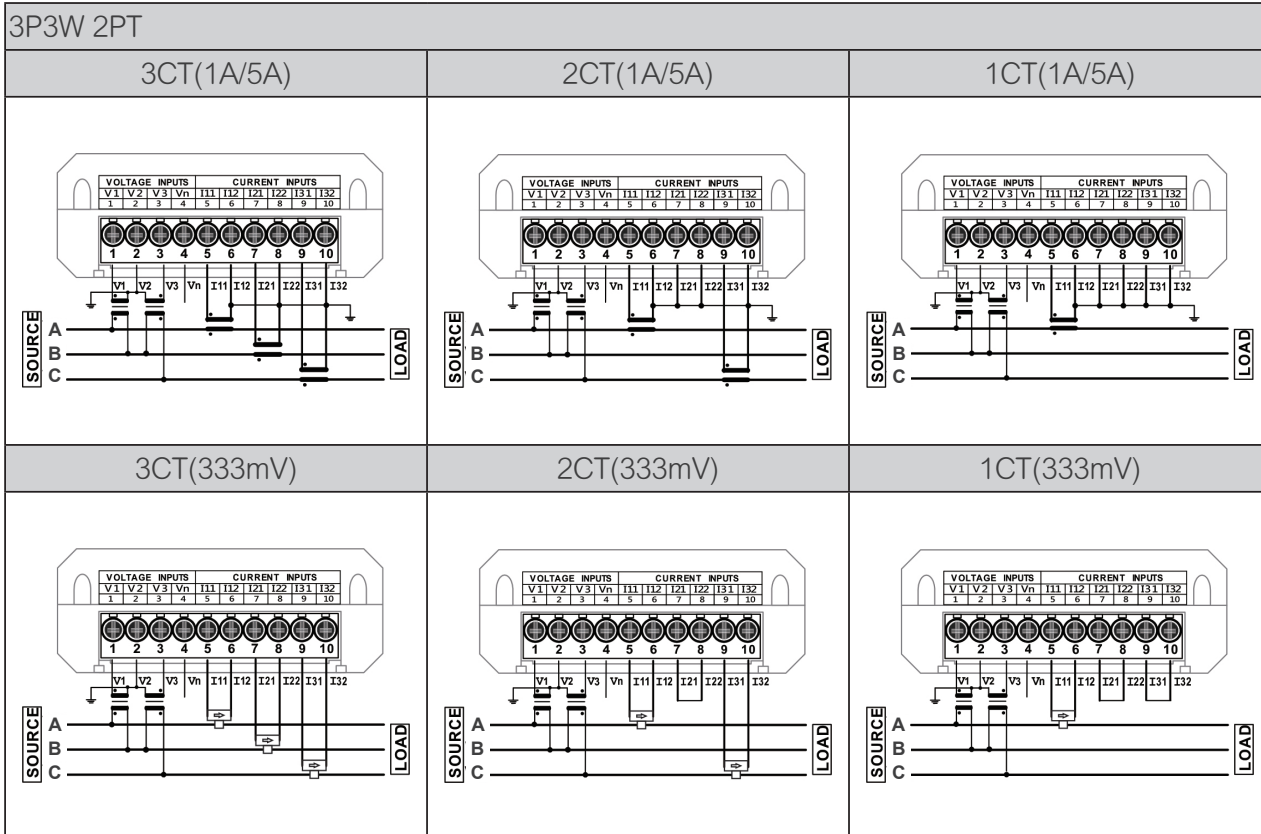
## Voltage and Current Wiring

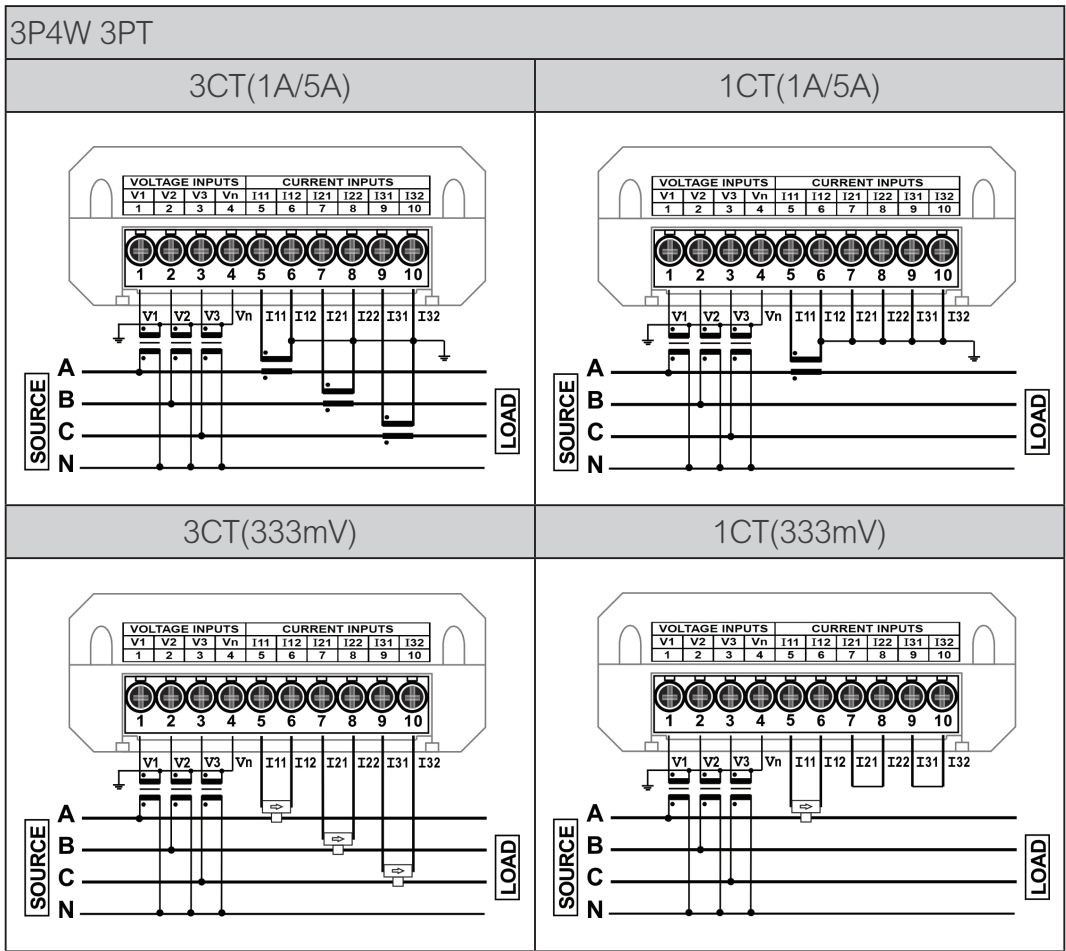
CT secondary side distinguishes 1A/5A and 333mV, the mV of CT signal needs to be wired independently, and cannot be grounded or connected together with each other.



### 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



| CODE | Diameter(mm) | CODE | Rated Current |
|------|--------------|------|---------------|
| 10   | Φ10          | 005  | 5A            |
|      |              | 060  | 60A           |
| 16   | Φ16          | 100  | 100A          |
|      |              | 150  | 150A          |
|      |              | 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   |

