3 Phase Multi-function Power Meter

PM210
Installation Guide

1 Faceplate

kWh ◯	◯ A
kVArh ◯	◯ V
P.F ◯	◯ kW
	Rx Tx
DAE PM210	▲ Set ▶ 💾
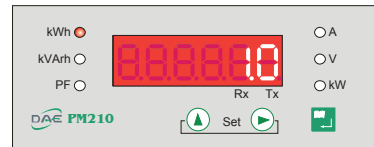
|	
◯A	Amperage: A=R phase, B=S phase, C=T phase

◯V	As Phase Voltage:
	  A=R phase, B=S phase, C=T phase
	As Line Voltage:
	  AL=RS line, BL=ST line, CL=TR line

◯kW	Real Power
◯kWh	Real Energy: When over 99999.9, displays as two pages with upper and lower half of value alternating every 2 seconds.
◯kVArh	Real Energy: When over 99999.9, displays as two pages with upper and lower half of value alternating every 2 seconds.
◯PF	Power Factor
Rx/Tx	RS485 Activity Indicators - RX: receive, TX: transmit
▲	Increment Key
▶	Next Digit Key
💾	Display Mode / Next Parameter Key

2 Dimensions

Front   Side

50
110
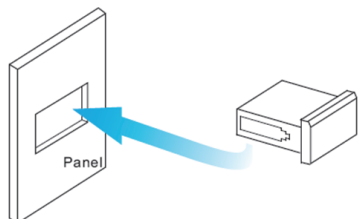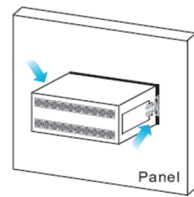105
12

Panel Cutout :

46
92

Unit: mm
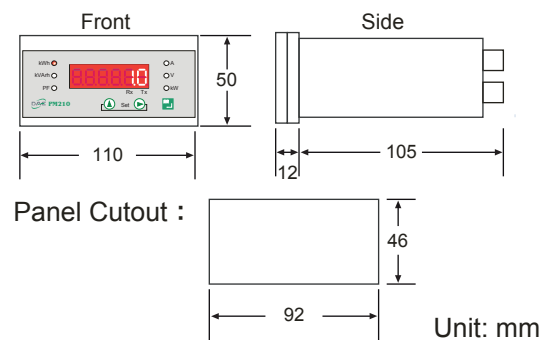
3 Mounting

1. Make a cutout in the panel to fit in the device

46mm
92mm
Panel
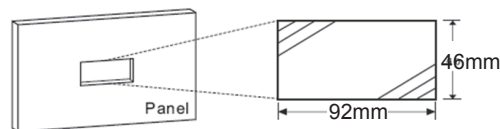
2. Remove the mounting brace, insert and push device into cutout, rear end first.

Panel

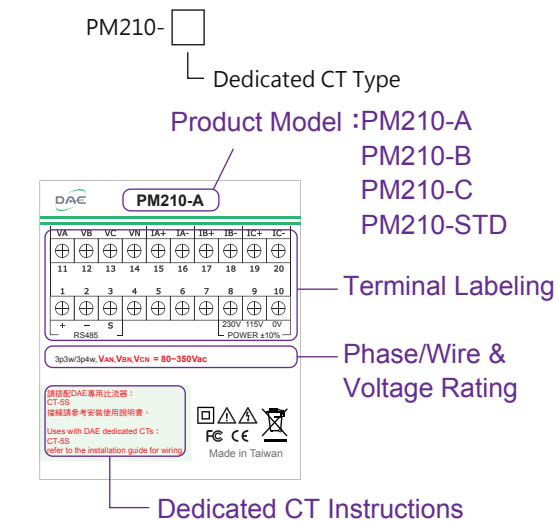3. Put the mounting brace back onto the device and push forward until secure.

Panel

4 Terminals

Reference Voltages				CT Input					
VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10
⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
+	−	S					230V	115V	0V

RS485   RS485   Auxiliary Power   POWER ±10%

5 Wiring Diagrams

Note :
Follow the wiring diagram appropriate for the model of the device purchased.
Do not modify or take wiring short cuts as it may damage the device.

PM210-
  └ Dedicated CT Type

Product Model : PM210-A
                PM210-B
                PM210-C
                PM210-STD

PM210-A

Terminal Labeling

Phase/Wire & Voltage Rating

3p3w/3p4w,Vas,Vbs,Vcs = 80~350Vac

Made in Taiwan

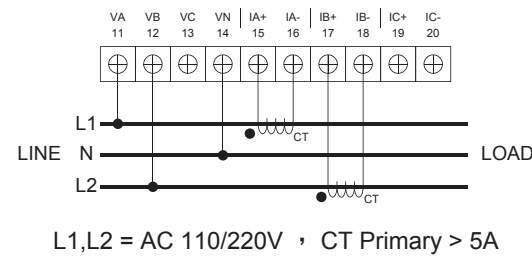Dedicated CT Instructions

◎ Model & Dedicated CT Pairings
PM210-A : CT-5S
PM210-B : CT-50S、CT-100S、CT-200S
            CT-50D3、CT-200D3
PM210-C : CT-400C、CT-600C

**Refer to the respective CT datasheet
for its detailed specifications.

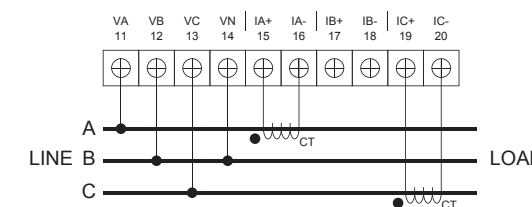## ◎ Wiring For Models Using Dedicated CT

1. Single Phase 3 Wire - 2 CTs
   (use with AC110/220V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE L1 / N / L2   CT   CT   LOAD

L1,L2 = AC 110/220V ，CT Primary > 5A

Exception : When using the CT5S, the primary should be less than 5A

2. 3 Phase 3 Wire - 2 CTs
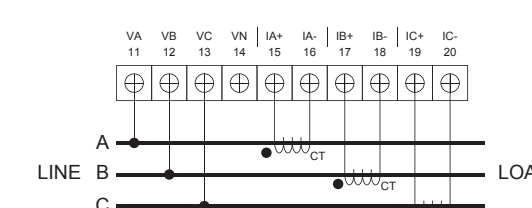   (Use with AC110V or AC220V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C   CT   CT   LOAD

VAB,VAC,VCA ≤ AC 350V ，CT Primary > 5A

Exception : When using the CT5S, the primary should be less than 5A

3. 3 Phase 3 Wire - 3 CTs
   (Use with AC380V or AC440V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C   CT   CT   CT   LOAD

VAB,VAC,VCA ≤ AC 600V ，CT Primary > 5A

Exception : When using the CT5S, the primary should be less than 5A

4. 3 Phase 4 Wire - 3 CTs
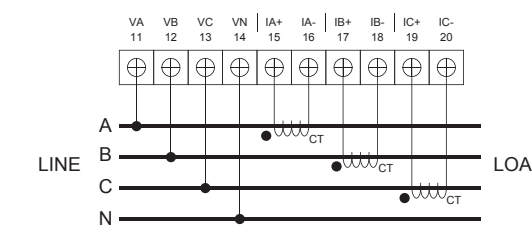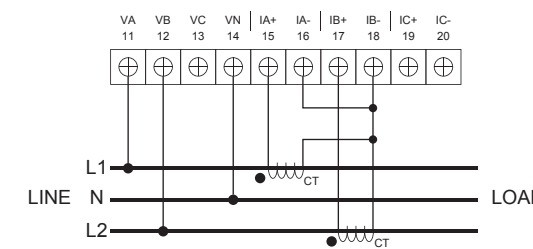   (Use with AC120/208V or AC220/380V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C / N   CT   CT   CT   LOAD

VA,VB,VC ≤ AC 350V ，CT Primary > 5A

Exception : When using the CT5S, the primary should be less than 5A

◎ Wiring For PM210-STD Model Using Regular 5A Output CTsl
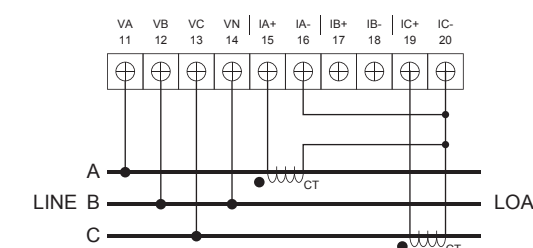
1. Single Phase 3 Wire - 2 CTs
   (use with AC110/220V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE L1 / N / L2   CT   CT   LOAD

L1,L2 = AC 110/220V ，CT Primary > 5A

2. 3 Phase 3 Wire - 2 CTs
   (Use with AC110V or AC220V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C   CT   CT   LOAD

VAB,VAC,VCA ≤ AC 350V ，CT Primary > 5A

3. 3 Phase 3 Wire - 3 CTs
   (Use with AC380V or AC440V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C   CT   CT   CT   LOAD
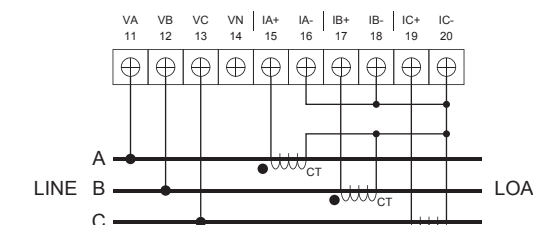
VAB,VAC,VCA ≤ AC 600V ，CT Primary > 5A

4. 3 Phase 4 Wire - 3 CTs
   (Use with AC120/208V or AC220/380V)

VA	VB	VC	VN	IA+	IA-	IB+	IB-	IC+	IC-
11	12	13	14	15	16	17	18	19	20

LINE A / B / C / N   CT   CT   CT   LOAD
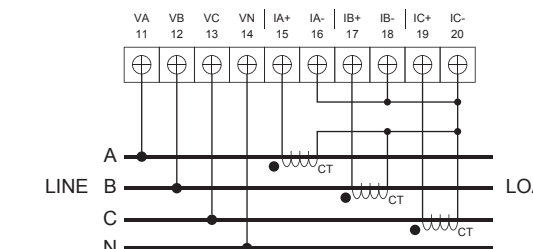
VA,VB,VC ≤ AC 350V ，CT Primary > 5A

◎ Auxiliary Power Wiring Detail

Wiring for AC 230V :

230V	115V	0V
POWER ±10%		
8	9	10

FUSE
AC 230V Power Supply

Wiring for AC 115V :

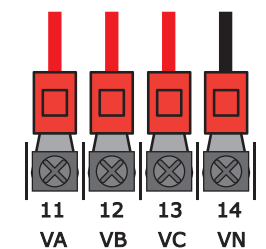| 230V	115V	0V
POWER ±10%		
8	9	10

FUSE
AC 115V Power Supply
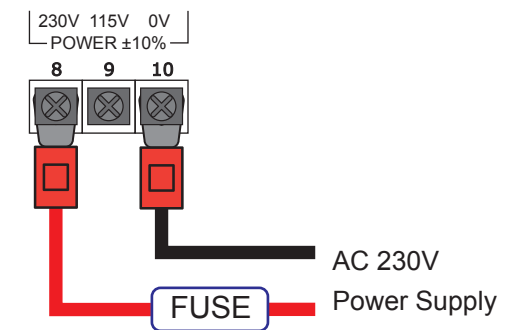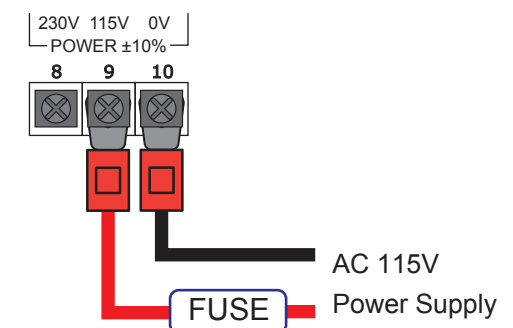
6 Cable Material

1. Reference voltage wire
   Seven stranded 16AWG or 1.25mm^2 wire terminated with Y terminal lug Y1.25-3S.

11	12	13	14
VA	VB	VC	VN

2. CT lead wire
   Seven stranded 16AWG or 1.25mm^2 wire terminated with R terminal lug R1.25-3S.

15	16
IA+	IA-
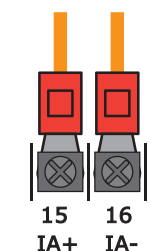
3.Communication Cable

Shielded twisted pair

cable (UL2464)

24~22AWG

terminated with Y

terminal lug Y1.25-3S

RS485

+ — S

1 2 3

Tie together the grounding wires and wrap them in electrical tape
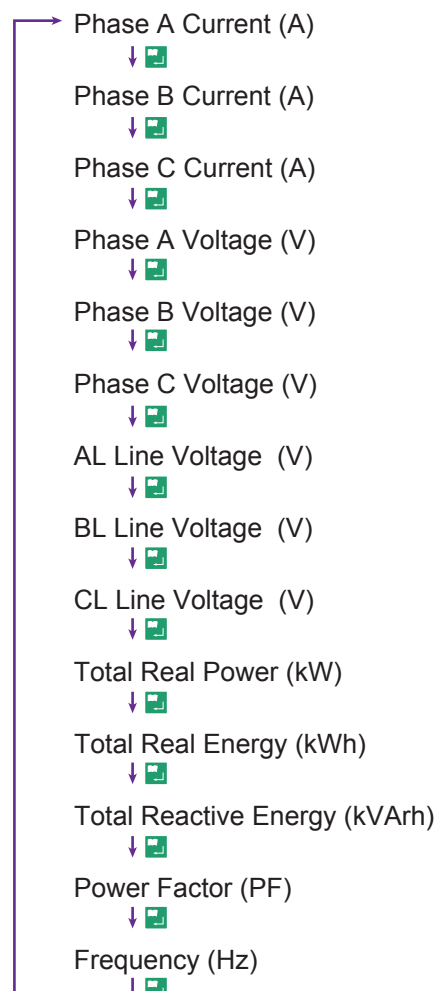
IN   OUT
Shielded twisted pair
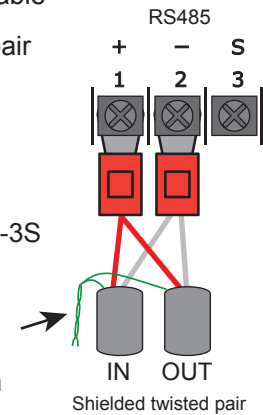
7 Operation

A. Normal Mode

1.Before power up: Press the [⏎] ，then turn on the power to zero out both the kWh and kVArh (see section **Resetting to Zero**).

**Warning : The data cannot be restored once cleared

2.After power up: Press the [⏎] to cycle through the displayable values

Phase A Current (A) ↓
Phase B Current (A) ↓
Phase C Current (A) ↓
Phase A Voltage (V) ↓
Phase B Voltage (V) ↓
Phase C Voltage (V) ↓
AL Line Voltage (V) ↓
BL Line Voltage (V) ↓
CL Line Voltage (V) ↓
Total Real Power (kW) ↓
Total Real Energy (kWh) ↓
Total Reactive Energy (kVArh) ↓
Power Factor (PF) ↓
Frequency (Hz)

B. Setup Mode

1. Press both the (▲) and (►) keys simultaneously to enter setup mode.

2. Press the [⏎] key to save the changed parameter and move on to the next parameter

3. Press the (▲) key to increment the parameter

4. Press the (►) key to move to the next digit

Setup Parameters：：

(1) `888888` ：LED Segment check (read only, not settable)

(2) `r-0312` ：Firmware version (read only, actual version may vary)

(3) `Ad-128` ：Device address, set from 0 to 254

(4) `br2400` ：Baud rate, selectable values 1200 / 2400 / 4800 / 9600

(5) `Pt888` ：PT ratio, wait 3 seconds for the value to show up, set from 1.00 to 400.00

**Note: PT*CT ≤ 300,000

(6) `Ct888` ：CT ratio, set from 1 to 1000

**Note: PT*CT ≤ 300,000

(7) `SA-YES` ：STD model, connect with regular 5A output CT

`SA-:no` ：Not STD model, for use with DAE dedicated CT

(8) Wiring Type

`1P3888` ：1 phase 3 wire

`3P3-2` ：3 phase 3 wire (2 CTs)

`3P3-3` ：3 phase 3 wire (3 CTs)

`3P4888` ：3 phase 4 wire

(9) PU：

ON	kWh indicator pulses (for calibration)
OFF	kWh indicator constantly lit

(10) PTCT：Determines whether to multiply the displayed and Modbus value by the PT and CT, the relationships are shown in the table below

Settings		Displayed and Modbus value		
Regular 5A Output CT	PTCT value	V	I	KW、KWH 、KVARH
NO	0	PT no	CT no	PTCT no
	1	PT yes	CT no	PTCT yes
YES	0	PT no	CT no	PTCT no
	1	PT yes	CT yes	PTCT yes

Note：0 = do not multiply by PTCT
1 = multiply by PTCT

**Warning : Select the proper model before connecting a regular 5A output CT

8 Power Up Checklist

A. Before Power Up

☐ 1. Make sure that the auxiliary power is properly connected.

☐ 2. Make sure that the CTs are wired properly using the appropriate wiring diagram.

☐ 3. Make sure that the wires are tightly and securely screwed.

☐ 4. Make sure that the PM210 is mounted securely.

☐ 5. Make sure that the RS485 polarity are connected (+) to (+) and (–) to (–).

B. After Power Up

☐ 1. Make sure that each LED segment lights up.

☐ 2. Check that each parameter setting is set accordingly.

9 Wiring and Setup Checklist

1. Check that the wiring type setting matches the actual CT wiring.

2. Check that the auxiliary power is connected correctly (note that 110V and 220V have different terminals)

3. Check that the PT ratio is set in accordance with PT used.

4. Check that the CT ratio is set in accordance with CT used.

5. Check that the wires are screwed tightly to their terminals.

6. Check that the device address setting matches the meter reading software.

7. Check that the reference voltage is for the load being measured.

8. Check that the baud rate matches the meter reading software.

10 Troubleshooting

Q：Why are there nonsensical values for the 3 phase current, power or power factor?

A：(1) This could be because the orientation and pairings of the voltages or currents are mismatched.

(a) The CT lead wires has been reversed or the direction of the load wire is in the opposite direction.

(b) The voltage and current phases are mismatched.

Example: The A phase voltage is paired with the B phase current

(2) The voltage and current phases are already wrong for the existing wiring.

(3) Use a high accuracy multi-meter to check that the values are truly nonsensical.

Q：The voltage value is correct, but why does the current value remain at zero?

A：(1) Is the load active or is it stopped or off.

(2) Check that the load has not been open circuited; that the fuse has not been blown or the breaker tripped.

(3) Check that the circuit being measured is the actual load.

(4) Check that the CT is not defective.

Q：Why is the communication unstable or non-existent?

A：(1) Make sure that the bus is daisy chain and neither as star nor tree topology.

(2) Check that the communication converter is working and set up working properly and that the there are no shorts or open circuits.

(3) Check that the device address, baud rate matches that of the meter reading software. Each device on the same bus should have its own unique address and should not be duplicated. The baud rates for all devices should be the same.

(4) Check to make sure the there are no reversed polarities on the RS485 bus. All (+) are connected together and all (–) are connected together.

(5) The bus should not form a closed loop.

(6) Total bus length should not be more that 1000 meters long and total devices on the bus should not be more 32. Use repeaters if the bus is to exceed 1000 meters.

11 Safety Precautions

Please follow the precautions outlined below for the protection your safety and that of the device.

1. After opening the packaging, check to make sure that nothing has been damaged during transport.

2.Check that the model and specifications printed on the box and the device are the same.

3.This device is suited for regular power panels.

4. This device does not require special ventilation or heat dissipation.

5. Strictly follow the recommended wiring diagrams.

6. Do not install device in places where it will get wet, accumulate moisture, or accumulate dust.

7. When installing this product, also install the fuses, breakers or other power cutoff safety devices at the same time.

8. This mark ☐ means double insulation.

Warning! When installing or making changes to the wiring, make sure to turn off power to the product and adjacent sources of high voltage to avoid electric shock.
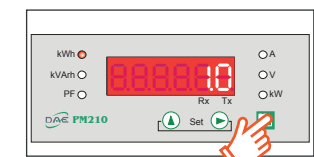
12 Resetting to Zero

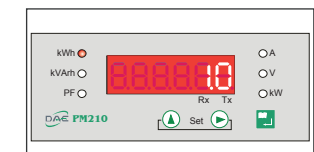Resetting the accumulated meter reading to zero after completing the installation and testing.：

Step 1：

+ — S
RS485
1 2 3 4 5 6 7 8 9 10
230V 115V 0V
POWER ±10%

FUSE
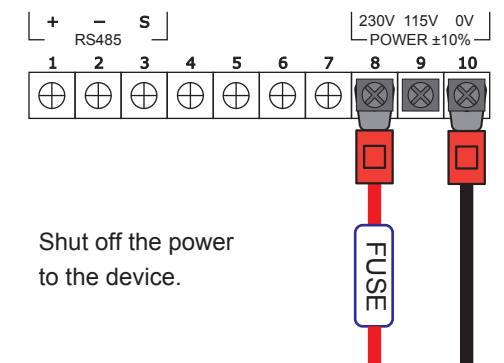
Shut off the power to the device.

Power Supply AC 220V

Step 2：

kWh kVArh PF
DAE PM210

○A ○V ○W
Set

Press and hold the page/enter button; do not let go until completing step 3.

Step 3:

kWh kVArh PF
DAE PM210

○A ○V ○W
Rx Tx Set

Restore power to the device, the button can now be let go of; both the kWh and kVArh have now been reset to zero.

Smart for Greenlife !