How to use ECU-C with the third-Party CTs



The APsystems ECU-C integrates high-precision power metering. By installing Current Transformers (CTs), the system monitors PV production and energy import/export in real-time, and enabling export limit function.

While original CTs are recommended, users may configure third-party CTs for specific requirements. Properly selecting the CT's physical range and secondary output current is critical for measurement accuracy and system safety.

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Why need to use third-party CTs

APsystems offers a series of official CTs that are ready for direct shipment for the ECU-C (see appendix), covering a wide range of application scenarios from small residential to large commercial systems. However, in the following circumstances, users may still need to purchase a third-party CT:

- **Physical Constraints**: The shapes of the on-site busbars or cables are special, thus requiring special-sized or customized CTs.
- **Ultra-High Current Scenario:** The on-site current exceeds the maximum capacity of the official CT. A dedicated industrial CT with a larger ratio is required.
- **Local Availability**: When there is no time to wait for the official delivery, use the third-party CTs available locally.



200A



80A

How to pick third party CTs

Output Type: Only Current Output CTs must be used. Do not connect voltage-output CTs, as this may cause inaccurate measurements or damage the interface.

Current Requirement: It is necessary to pay attention to two key indicators: Primary Current and Secondary Current.

Primary Current: The primary current rating should be slightly higher than the maximum expected current of the circuit. If the main breaker is 100A, a 100A or 120A CT is recommended. Over-sizing the CT may reduce accuracy at low current levels.

Secondary Current: The secondary output at maximum primary current should not exceed 70mA to prevent overloading the ECU-C's sensing circuitry. CTs with 50mA output ratings are recommended due to their commonality in industrial applications and excellent compatibility.

Accuracy: CTs with Class 0.5 or higher are recommended to ensure measurement precision (ECU-C reaches +/- 0.5% accuracy on the production side).

Note: Consequences of Inappropriate Ratio Selection

① Ratio Too Small (Insufficient Range):
The data on the EMA platform will be much lower than actual values. And excessive secondary output current may burn out the precision sampling resistors inside the ECU-C.

② Ratio Too Large (Excessive Range):
When operating with a small current (such as during the night or under low load), the measurement error significantly increases. And the export limit function will not be able to adjust precisely, resulting in reverse power flow.

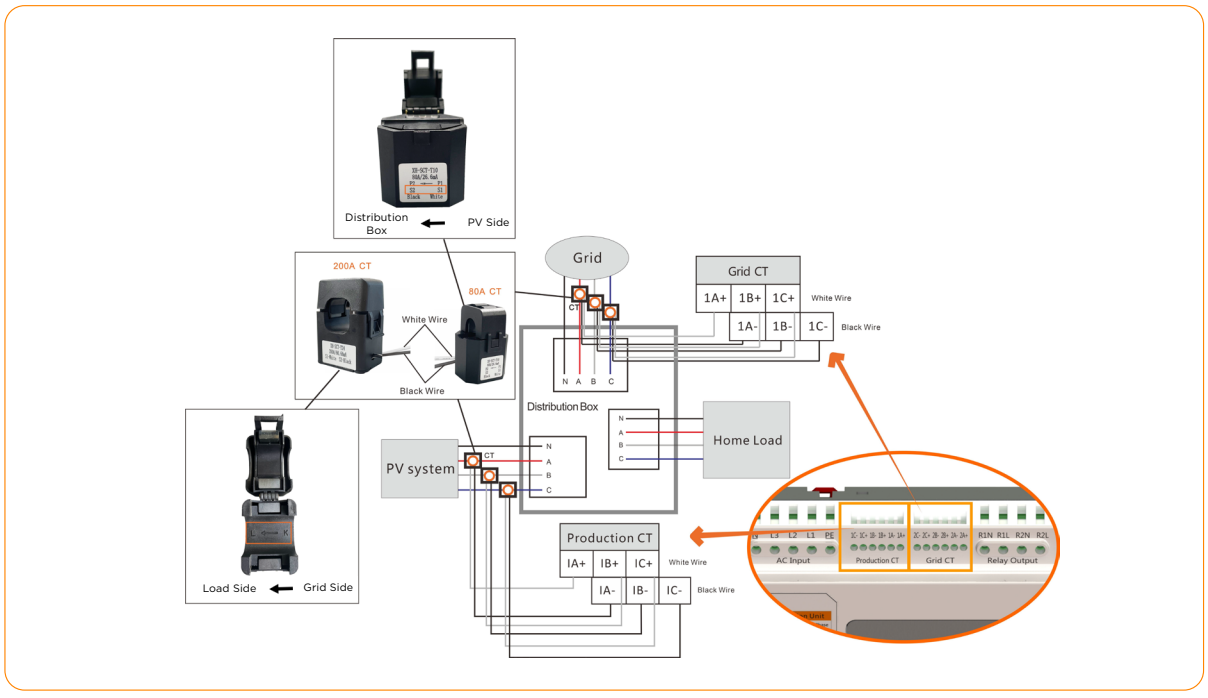
③Configuration Mismatch:
All measurement data will be scaled up or down by a fixed ratio. For example, physically installing an 1800:1 CT while keeping the ECU interface at the default 3000:1 setting, which results in the displayed power will be approximately 0.6 times the actual value (1800/3000).

Hardware Installation and Wiring

To ensure system measurement accuracy and equipment safety, please strictly follow these guidelines during installation:

- **Power Off** : Ensure the ECU-C is in a power-off state before physically installing or connecting the Current Transformers (CTs).
- **Wiring Polarity** : Always connect the white wires to the "+" ports on the ECU-C and the black wires to the "-" ports.
- **CT Direction** : Arrows on the CTs must point from the Grid to the Load (CT at grid side) and from the PV to the distribution box (CT at PV side).
- **Phase Alignment** : Ensure that the live wire L1 corresponds to Phase A. Incorrect phase alignment will directly affect CT precision and power calculations.

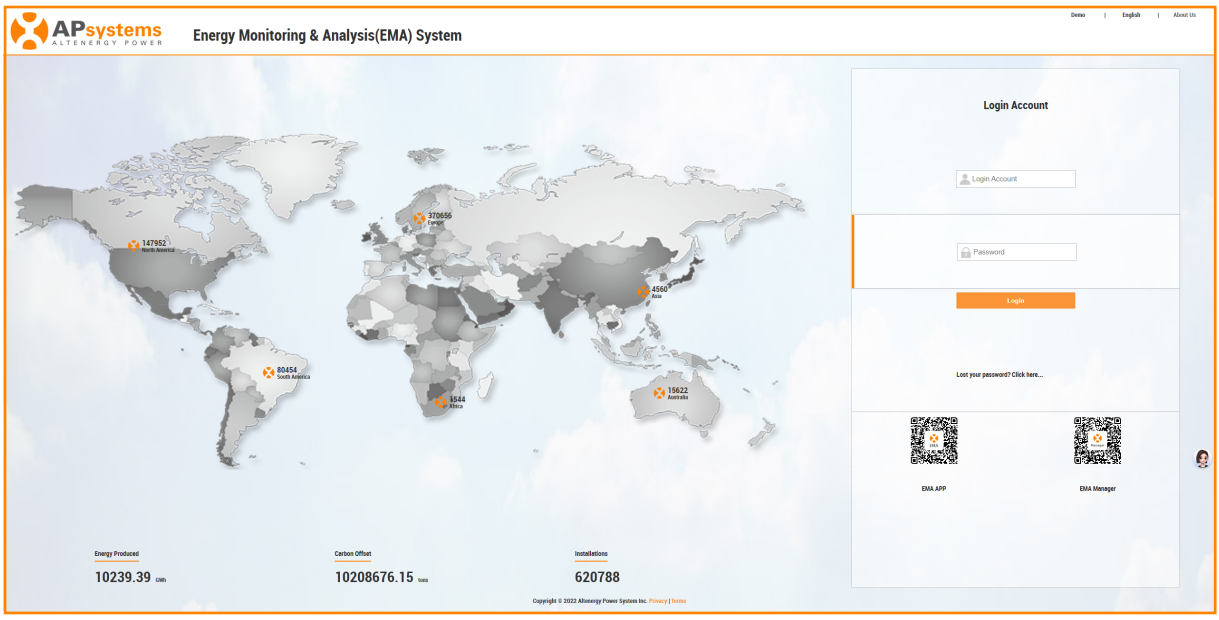
Refer the figure below.



CT Ratio Settings

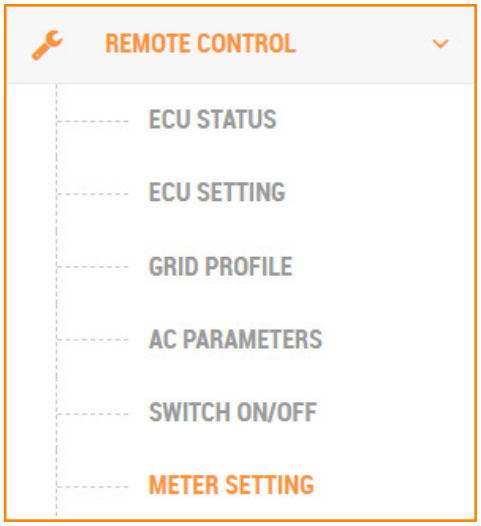
01

Access into EMA web portal （https://www.apsystemsema.com/ema/index.action）and log in.



02

Navigate to the "Meter Setting" under "Remote Control" menu.



Customize Turn Ratio Parameters

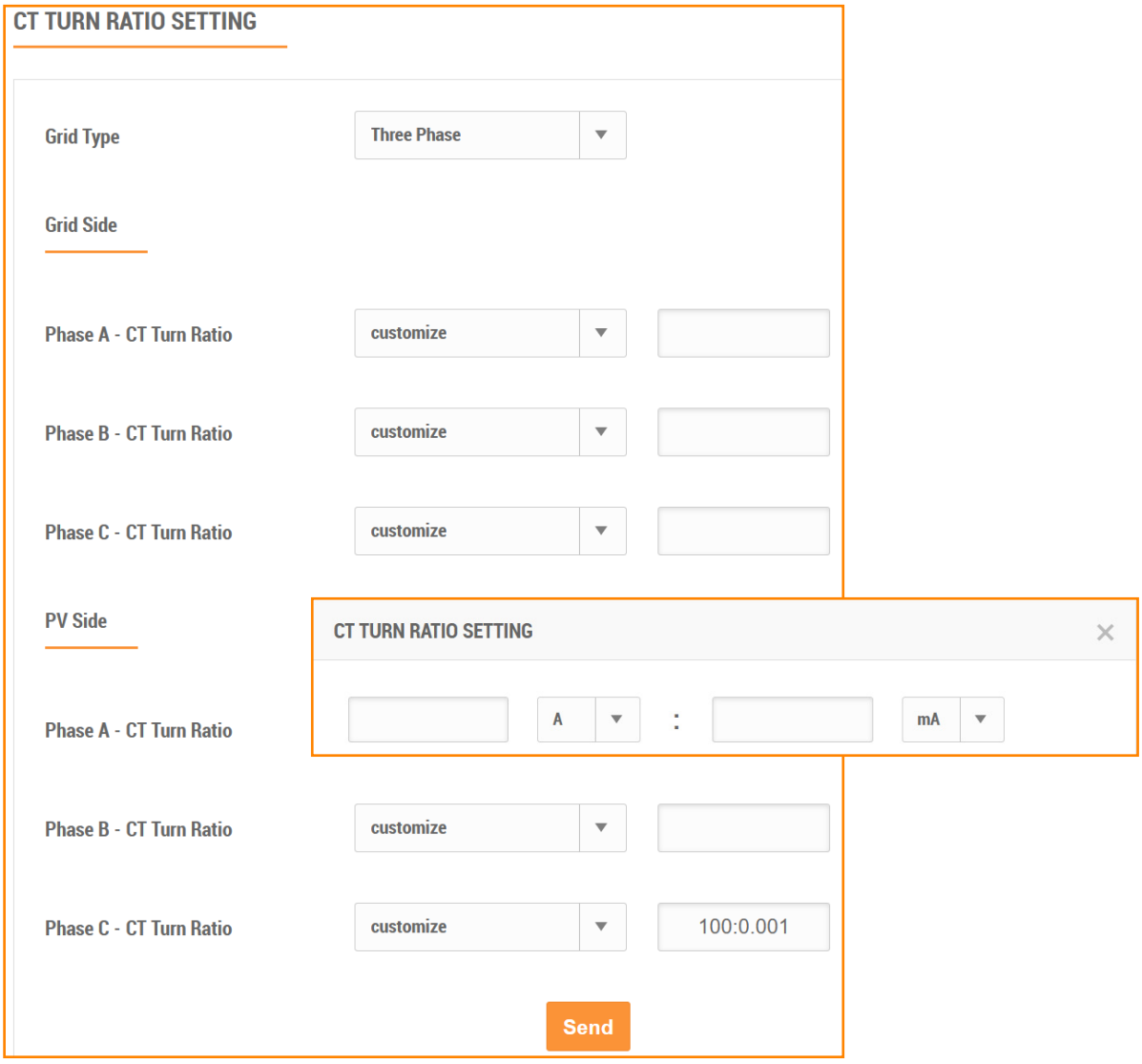
03

Grid Type : Select "Three Phase" or "Single Phase" based on the site.

Phase A/B/C - CT Turn Ratio : Select "customize" from the dropdown menu. Then fill in the value of the primary current and secondary current in the input box.

Note: $\text{Ratio} = \frac{\text{Primary Current (A)}}{\text{Secondary Current (A)}}$

Save : Click the "Send" button at the bottom to apply the settings..

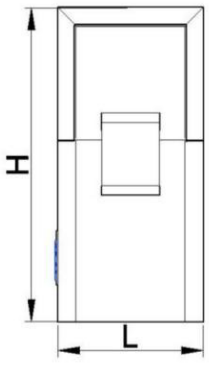


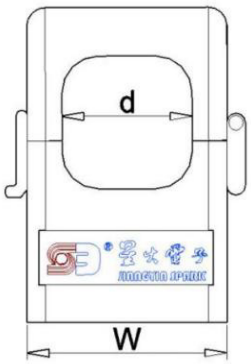
Appendix

T series:

P/N	Model	Input Current	Turn Ratio	L	W	H	D
2078700017	XH-SCT-T06	5-10A	150:1	16.4	17.2	25	6
18083020112	XH-SCT-T10	5-80A	3000:1	28.5	26.5	39.8	10.2
2078800017	XH-SCT-T16	10-120A	1800:1	30.8	35.5	45.6	16
18083020012	XH-SCT-T24	50-200A	3000:1	36.5	56.5	68.5	24.5
2077100007	XH-SCT-T36	50-600A	9000:1	41.8	68	86	36.6
2078500007	XH-SCT-T50	500A	7500:1	59.5	97.1	119	51
2077200007	XH-SCT-T50	50-1000A	15000:1	59.5	97.1	119	51

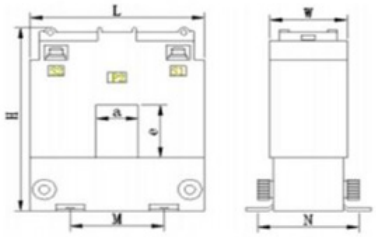
Note	① The default ratio in ECU is 3000:1, and it could be adjusted via EMA according to the CT installed. ② P/N 18083020112 & 18083020012 are availble in local warehouse. The other types need to be shipped from China.





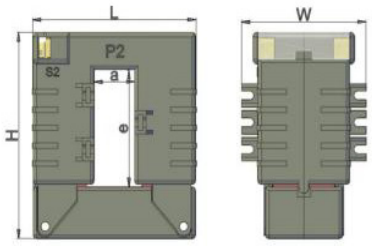
Standard series:

P/N	Model	Input Current	Turn Ratio	L	W	H	a	e	M	N
2078900017	XH-KCT-23	100-400A	6000:1	90	40.5	110.5	22	33	48.5	52
2078100027	XH-KCT-58	100-1000A	15000:1	114	56.5	158	52	82	80.5	52
2079000017	XH-KCT-88	100-1000A	15000:1	144	56.5	161.5	81.5	81.5	111.5	52
2078400017	XH-KCT-812	100-1500A	22500:1	144	56.5	202.5	81.5	122	111	52
2079100017	XH-KCT-610	100-3000A	45000:1	130	71	188	62	106	64	66.5
2079200017	XH-KCT-410	100-4000A	60000:1	142	73	182	43	103	64	51.5
2077700007	XH-KCT-816	100-5000A	75000:1	184	73	251	82	163	120	52



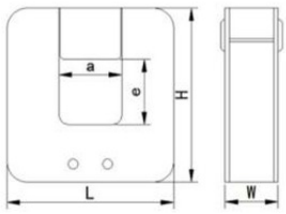
State Grid Standard Series:

P/N	Model	Input Current	Turn Ratio	L	W	H	a	e
2079300017	XH-KCT-26	100-600A	990:1	100.5	80	117	25	65
2079400017	XH-KCT-48	100-1500A	22500:1	125	72	140	40.2	89
2079500017	XH-KCT-410N	100-2500A	37500:1	125	72	159.5	40.2	108
18083022012	XH-KCT-513	100-3000A	45000:1	135.5	72	185.5	50.2	134



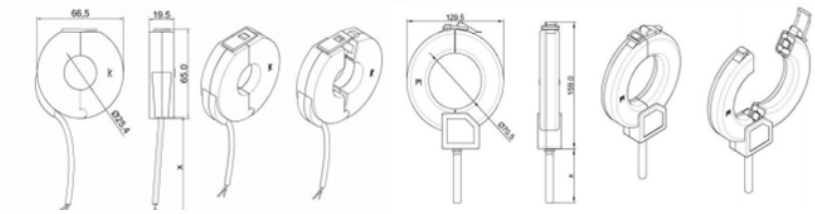
Square series:

P/N	Model	Input Current	Turn Ratio	L	W	H	a	e
2079800017	XH-SCT-0750	50-200A	3000:1	52	18.5	54.5	18.9	18
2079600017	XH-SCT-1250	100-600A	9000:1	82.3	26.4	85.3	32	32
2079700017	XH-SCT-2000	100-1000A	15000:1	120	29.6	125	52	52
2079900017	XH-SCT-3000	100-2000A	30000:1	146	30.8	201	76.8	130



Circular Series:

P/N	Model	Input Current	Turn Ratio	Outside Diameter	Inner Hole	Thickness
2078600027	XH-SCT-T25	50-200A	3000:1	66.5	25.4	19.5
2078200027	XH-SCT-T70	100-800A	12000:1	129.5	70.5	32



Clamp series:

P/N	Model	Input Current	Turn Ratio	Outside Diameter	Inner Hole	Thickness
2078300027	XH-SCT-S21	50-200A	3000:1	48	21.5	14.7
2078500027	XH-SCT-S24	50-200A	3000:1	53.5	24.2	14.8
2078400027	XH-SCT-S50	100-750A	11200:1	106.2	54	28



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