



Installation Manual Of SP-CT

Installation & Operation Manual

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1 Introduction

1.1 Preface

This manual provides detail installation and operation information of SP-CT produced by Growatt New Energy Technology CO.,LTD. Before using this unit, please read this instruction carefully and store it where can be accessed easily for qualified personnel to install and maintain. This manual is subject to change without notice.

1.2 Target Group

The installation of SP-CT described in this manual should be performed by qualified personnel. Having read and understood the instruction, the qualified person can install and operate this unit properly and quickly. If you have difficulties with this Unit use, you can visit our website: www.growatt.com and leave a message about your problems or call us 24hour hotline: +86 0755-29467281、400-833-9981.

1.3 Product Description

Growatt SP-CT has been designed to be used to detect power flow upstream or downstream by RF433 module, providing a wireless CT solution to make installation more flexible.

Overview:

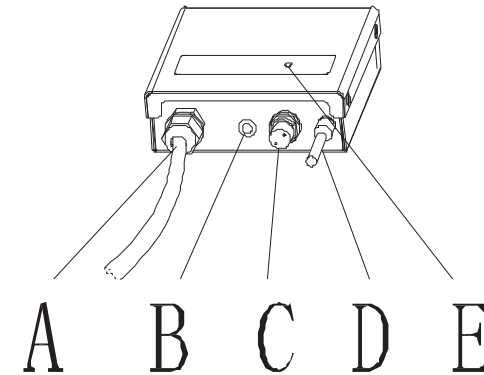


Chart 1.1

Position	Description
A	AC input terminal
B	Button for pairing
C	Sensor input terminal
D	Antenna
E	LED indicator

1.4 Safety precaution

- 1) Before using the unit, please read this manual carefully. Otherwise, if you don't follow the steps described of the instruction to use and cause any damaged, Growatt has the right not to service you.
- 2) All the tasks described in this manual should be performed by qualified personnel.
- 3) During installation, please don't touch any inside part of this unit besides terminals.
- 4) All wires connection of unit should be abided by the local electric safety criterions.
- 5) If necessary, please contact specified installer

2 Safety

2.1 Architecture

Simple architecture of PV energy storage system with SP-CT:

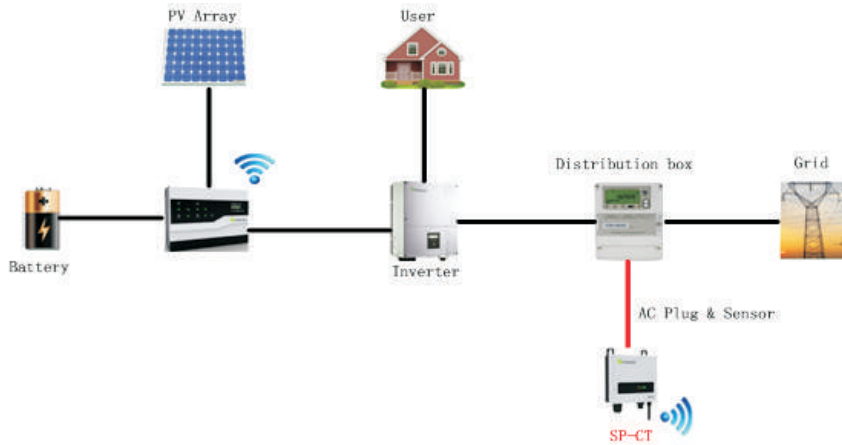


Chart 2.1

As the chart 2.1 has shown, a complete PV energy storage system consists of PV arrays, storage machine, battery, inverter, utility, etc. Meanwhile, storage machine and inverter are key parts of this system.

2.2 General precautions

SP-CT High voltage danger!

- Qualified personnel can operate only
- The kids, the disable, non-professional are not allowed to close.

SP-CT Ground wire connection

Ensure the SP-CT ground wire is properly earthed

2.3 Symbol used of SP-CT

Symbol	Description
	Risk of electric shock!
	Ground point
	Alternating current
	CE Mark, which means it satisfies CE criterion
	RCM Mark, which means it satisfies RCM criterion.

3 SP-CT



Mark	Description	Note	
	SP-CT status	Green indicator solid on	Working normal
		Green indicator flash	In pair status
		Red indicator solid on	Fault e.g L and N connected reversely or GND wire unconnected

Description as the following table below:

Model Name	Growatt SP-CT
AC supply voltage range	196~264Vac
AC Frequency range	44~55Hz
Max power consume	5W
Max. input current	30mA
Sampling precision	≤3%(power larger than 100W)
Operating temperature range	-25℃ ~+60℃
Noise emission(typical)	≤25dB
Relative humidity	0~95%
Protection Degree	IP65
Display	LED
Interface:RF/WIFI/LAN	RF 433
The RF transmission distance range	≤100m(No shelter)
Safety & EMC standard	CE RCN

3.2 Nameplate description

There is some essential information such as product model, specifications and approval on the Nameplate in the rear of SP-CT:

GROWATT	
Model Name	Growatt SP-CT
AC supply voltage range	196~264V
AC Frequency range	44~55Hz
Max. input power	5W
Max. input current	30mA
Sampling precision	≤3%
Operating temperature range	-25℃ ~+60℃
Noise emission (typical)	≤25dB
Relative humidity	0~95%
Protection Degree	IP65
Display	LED
Interface: RF/WIFI/LAN	RF 433
The RF transmission distance range	≤100m
Safety & EMC standard	
 	

3.3 Dimension

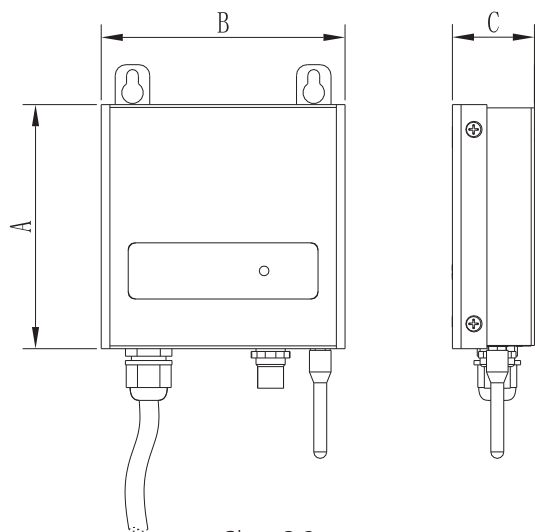


Chart 3.2

Model	A(mm)	B(mm)	C(mm)	weight (kg)
Growatt SP-CT	113	113	38	≤ 1Kg

3.4 Advantages of SP-CT

Features:

- Easy to install.
- High penetration rate of RF433, long distance wireless transmission.
- Low consumption.

Before installation please inspect the unit and then be sure that nothing inside the package is damaged. You should have received the items inside of package.

If there is something missed or damaged please contact your installer.

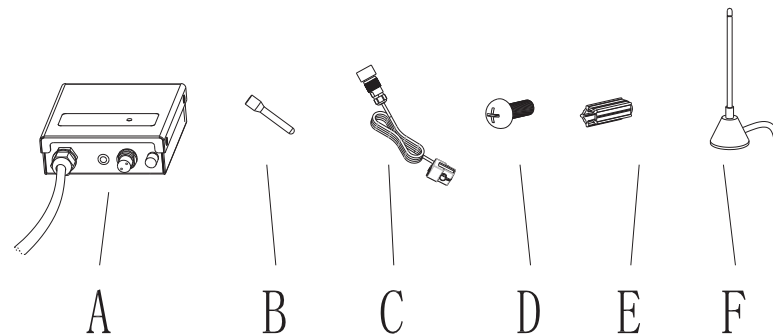


Chart 4.1

Item	Quantity	Description
A	1	Growatt SP-CT
B	1	Antenna
C	1	Sensor (water-proof terminal)
D	2	M5*30 pan head screw
E	2	Expansion screw
F	1	Sucker antenna this is for SP(Storage machine)
--	1	Warranty card
--	1	Manual

Note: 1. "—" means it's not showed in the picture.

2. F: sucker antenna is used for SP, not used for SP-CT, how to use sucker antenna, please see chapter 5.4.

5 Installation

5.1 Basic requirements of mounting

A Mount on solid surface and can accommodate weight of SP-CT long time. (refer to the chapter 3.3 to know the precise weight) .

B Mount on where has enough space for SP-CT (refer to the chapter 3.3).

C Do not mount on flammable construction materials .

D Designed with IP65 degree for indoor or outdoor applications .

E Ambient humidity range: 0~95%.

F Ambient temperature range: -25℃ ~ 60℃.

G Vertically installation or tilt angle 15-dgress installation is ok, as the chart 5.1 .

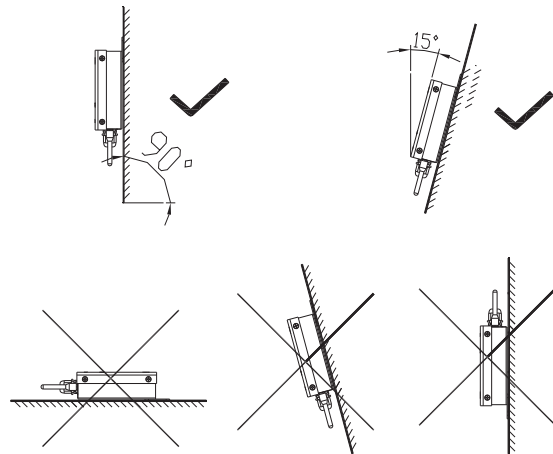


Chart 5.1

H To make sure operate and maintain available the unit, please leave enough space for SP-CT.

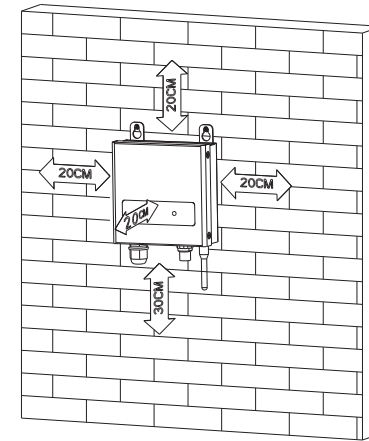


Chart 5.2

I Do not install where is near to Radio or machine which has wireless function .

J Do not install the place where the children can reach.

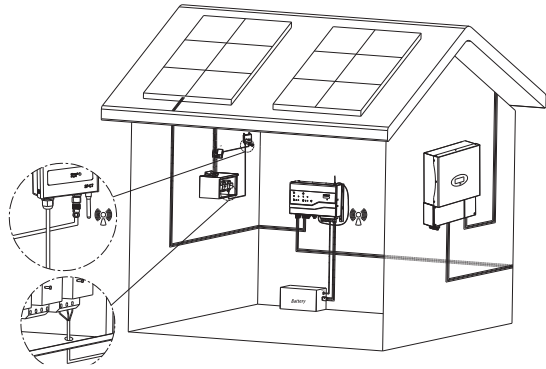
K If you grid-connected system of PV Storage is used two Growatt SP-CT with Growatt SP energy storage machines ,please must keep the two Growatt SP-CT apart from 1m , and the two Growatt SP energy storage machines apart from 1m too.

5.2 Installation guide

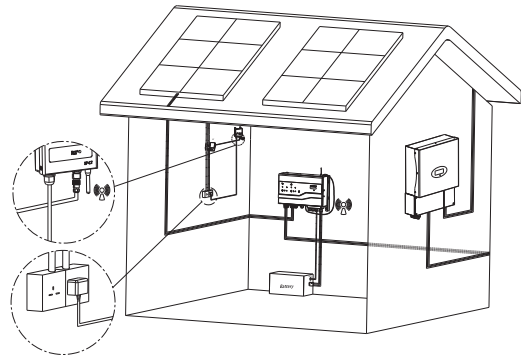
5.2.1 Installation layout

Installation layout of storage energy system with SP-CT should be as following feature shows .

Note: The recommend distance between stored-energy machine and SP-CT is less than 50 m.



Type I



Typ II

Chart 5.3

Note :Type II installation layout is suitable for British standard area.

5.2.2 Mounting

1. Mark locations of the hole of SP-CT.
2. Insert 2 expansion screws in the holes(refer to 5.4 a).
3. Screw 2 screws(M5) firmly.
4. Place the SP-CT on the 2 screws (refer to 5.4 b).

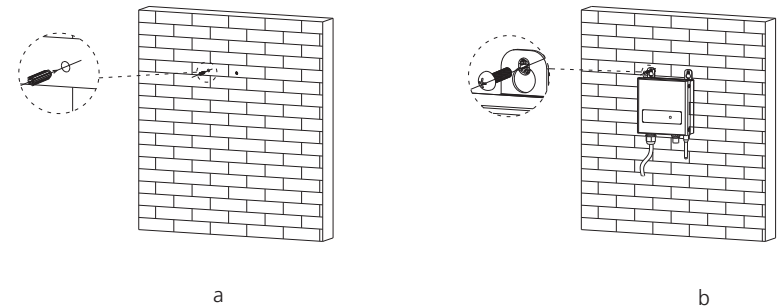


Chart 5.4

5.3 Wires connection

5.3.1 AC auxiliary power wires connection

Preparation:

- (1) Ensure the grid voltage is 230VAC or 240VAC, frequency is 50/60Hz single phase.
- (2) Connection mode:
 - a) Type I:Connect the AC terminal of SP-CT to the AC breaker of power distribution cabinet.
 - b) Type II:Press the AC terminal (British standard) of SP-CT on the nearby socket. Because of installation outside, the socket should be water-proof.

Caution:Ensure the utility phase of SP-CT position is same with stored-energy machine and PV inverter phase position.

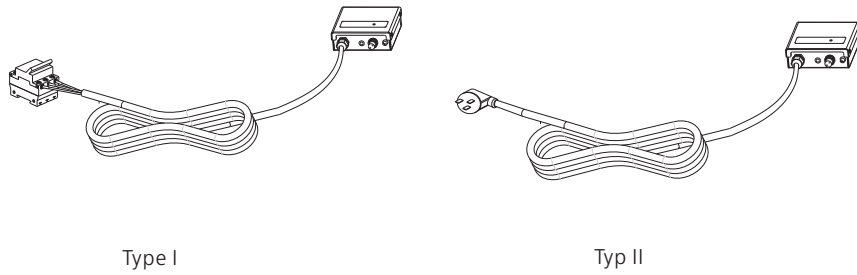


Chart 5.5

Note: Type II installation is mainly suitable for British standard area.

5.3.2 Installation of sensor

1) Press one side of sensor terminal on the "Sensor input terminal" and make sure fixed firmly.
Refer to Chart 5.6

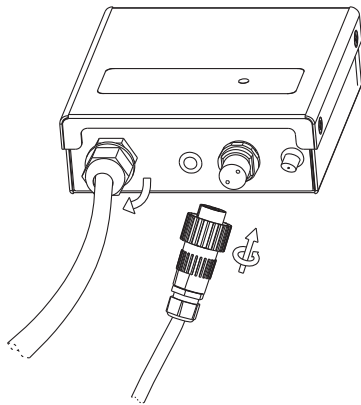


Chart 5.6

2) Please strictly follow the instruction steps to install the other side of sensor, Refer to below chart.

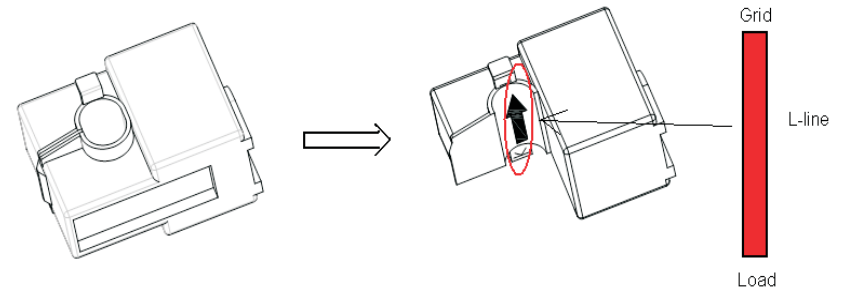


Chart 5.7

As pictured above, uncover the sensor. Please place the L line on the position with arrow and then fasten it.

Note:

- a This arrow indicates direction of sensor.
- b The direction of the arrow (from K to L) denotes to the direction from the Load to the grid.

5.3.3 Install antenna of SP-CT

Screw the Antenna tightly to antenna terminal of SP-CT as shown below.

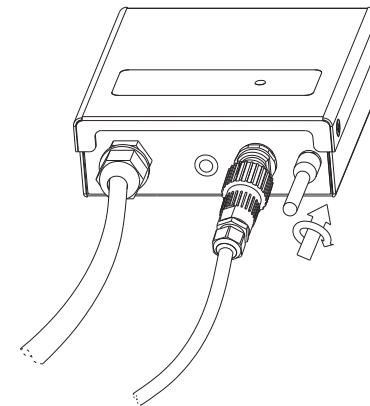


Chart 5.8

5.3.4 Ground

SP-CT should be grounded reliably. The ground wire of SP-CT is connected to its shell so make sure the AC terminal (L/N/GND) connected firmly (L/N/GND). Refer to chart 5.9

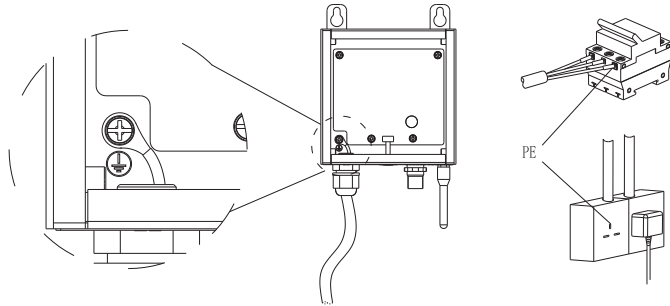


Chart 5.9

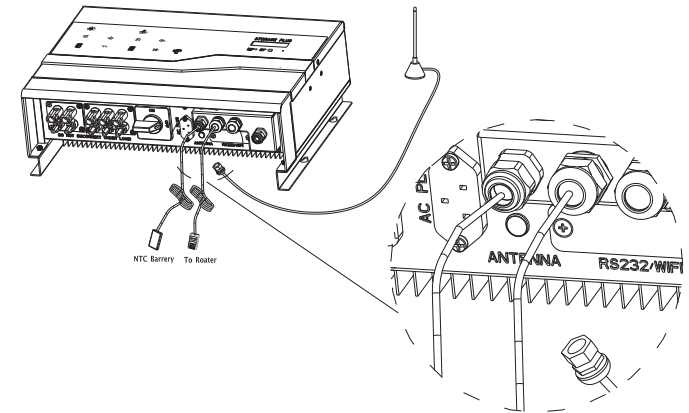


Chart 5.11

5.4 How to use SP-CT cooperate with SP series

How to use SP-CT cooperate with SP series:

Firstly, please refer to chapter 5.3 and finish the steps described

Secondly, put out the RJ45 sensor as shown chart 5.10.

Thirdly, fix one terminal of sucker antenna on ANTENNA hole which was in SP series as shown chart 5.11

Fourthly, after firm connection, shown as chart 5.12

Fifthly, put the other terminal of sucker antenna on the top of SP series, the whole system as shown chart 5.13

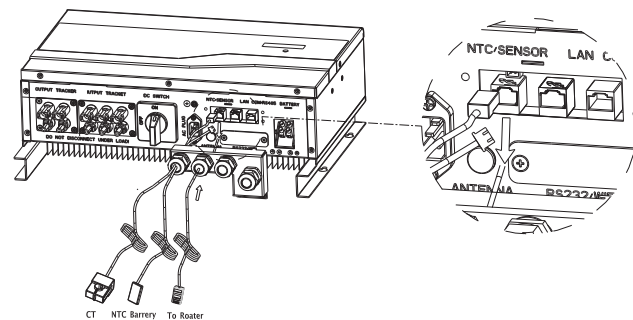


Chart 5.10

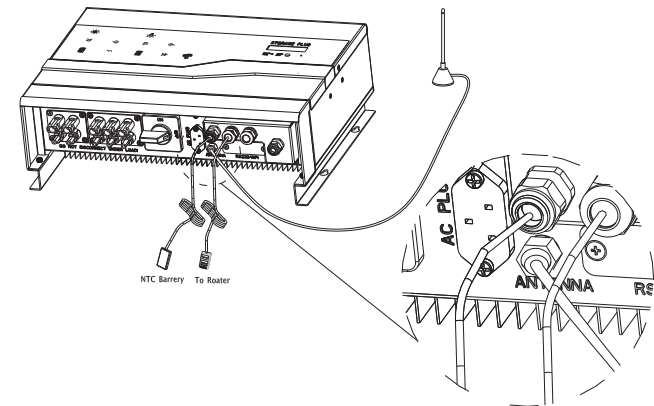


Chart 5.12

6.1 SP-CT Pairings

1. When SP-CT and stored-energy machine are pairing, following measures for stored-energy machine need to be done firstly (please make sure the following steps are for SP).

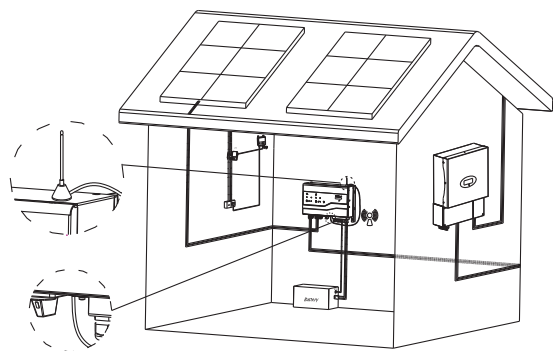


Chart 5.13

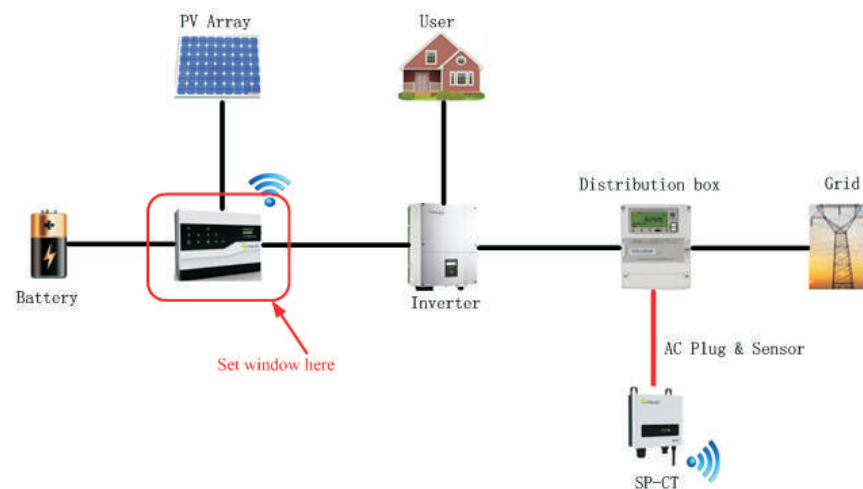


Chart 6.1

1) On the screen Set window, double knock on the screen continuously to access to "set mode" and then enter password "123". After input 123, please tap the screen thrice continuously.

"Input password" screen as chart 6.2 below, please follow the following steps to setup .

a) After Double tap on the screen continuously, you can enter the first letter of password when the first letter is flicking. The value depends on the tap times. Please tap one time which means you input 1 .

b) Then Double tap on the screen continuously, you can enter the second letter of password when the second letter is flicking. The value depends on the tap times. Double tap which means you input 2.

c) And then Double tap on the screen continuously, you can enter the third letter of password when the third letter is flicking. The value depends on the tap times. Tap thrice which means you input 3.

Standby...
Input 123: 000

Chart 6.2

At last, tap thrice continuously can access to setup screen. The LCD will display language Set →ComAddrSet →ComModeSet →SystemTimeSet →CT Mode Set in turns by single knock on the screen . On the screen of “CT Mode set” , you can enter “CT Mode set” parameters setting screen as shown chart 6.3 .

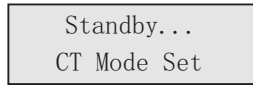


Chart 6.3

2) On the screen of “CT Mode set” parameter setting, The LCD will display “SP CT set?” →“Cable CT set?”→“SP CT set?” in turns by single knock on the screen as shown chart 6.4, double tap on the screen continuously when it shows “SP CT set?”

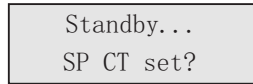


Chart 6.4

3) After finished above steps, SP-CT will work in “ pairing mode ”, displaying “start scanning”. By Single tap, it will display “scanning 30S” which means SP-CT is in “ pairing mode 30S countdown” as shown chart 6.5.



Chart 6.5

2. After having finished the above steps of stored-energy machine, please follow the following steps to operate SP-CT described below

1) When the stored-energy machine LCD display “Scanning 30S ”, please quickly press the button (which marked as “match” on the bottom) of SP-CT in 30S as shown chart 6.6.

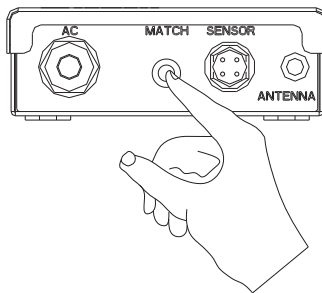


Chart 6.6

2) After pressing the button, the LED is green and flashes every 500ms which indicates the initialization of SP-CT is completed

3) When the LED turns green and flashes every 100ms, it denotes SP-CT is pairing.

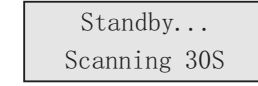


Chart 6.7

Note:As chart 6.7, during SP-CT is initializing and pairing, the stored-energy machine LCD displays “30S countdown”

4) When the green LED is solid on it means SP-CT pairs successfully. And then stored-energy machine can read current data measured by SP-CT as chart 6.8 shown

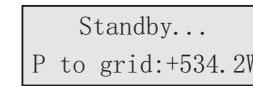


Chart 6.8

5) When the is solid on SP-CT failed to pair. At the same time, Stored-energy machine LCD will display fault information (Pairing timeout failed), as chart6.9 shown:

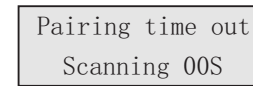


Chart 6.9

6.2 Work mode

6.2.1 Normal work mode

When SP-CT communicates with stored-energy machine well with green LED solid on, it denotes SP-CT in normal work mode.

6.2.2 Fault and warning

When there's error occurs on the SP-CT, red LED will solid on or flashes.

Note:

a) More details about fault &warning please refer to chapter 9.1.

b) Some warning info are used to tell you the status of communication .

6.3 LED Display

LED is used to indicate the status of SP-CT, telling some basic info of SP-CT etc.



Position	Description
A	LED is used to indicate SP-CT working status including fault or warning.

Including the following information:

When communication:

1. Green indicator solid on, it indicates SP-CT works normal
2. Red indicator solid on, it indicates L line and N line connected reversely , GND unconnected or lost communication

When pairing:

1. After pressing the button and green led flashes, it indicates SP-CT is pairing.
2. Green indicator is solid on, it indicates pairing successfully.
3. Red indicator is solid on, it indicates SP-CT failed to pair.

Accuracy

Note: SP-CT is only suitable to measure energy of SP2000 series products. Do not use it for others purposes.

7.1 Turn on SP-CT

1. Power on with AC power input.
2. The green indicator is solid on, it indicates SP –Ct is on.

7.2 Turn off SP-CT

1. Disconnect AC power input .
2. The led is off completely, it denotes SP-CT is off.

Maintain & Clean 8

Do not place SP-CT in the cabinet of metal shell because the transmission of data will be influenced. We recommend to use wall-mounted nearby power distribution cabinet.

9 Trouble shooting

About SP-CT:

Before deliver, all the products are test strictly. If you have any problems of installation or operation, please visit our website www.growatt.com and check the Q&A of SP-CT. when you can fix the problems, please contact us and attach the following information as below. Our after-sale engineers will help you to repair it.

- (1) Serial number
- (2) Model
- (3) LED status and info of display
- (4) Simple description of the problem
- (5) What's the input AC voltage
- (6) Can you repeat the problem? If you can, please tell us what did happen?
- (7) Has it occurred before?
- (8) Why did it happen?

9.1 Trouble shooting

LED Status	Description	SP-CT Status	Suggested solution &Note
Green indicator solid on	/	Normal	/
Green flashes every 100ms	SP-CT is initializing for pair	Normal	/
Green indicator flashes every 500ms	Initialization is finished and is waiting for pair	Normal	/
Red indicators solid on	L line and N line connected reversely or GND unconnected	Fault	1. Stored-energy machine display "CT L-N reversed", Red indicators solid on. 2. Check L line and N line connected reversely or GND connected is firmly.
Red indicators solid on	Failed to pair	Warning	1. Stored-energy machine display "Pairing time out", Red indicators solid on. 2. Check SP-CT power or pair again.
Red indicators solid on	Communication is lost	Warning	1. Stored-energy machine display "No Data Received" Red indicators solid on. 2. Check SP-CT power input or pair again.

When failure occurs during the warranty period , Growatt will repair or replace the product with same value.

Conditions

1. Before to repair the defective product, Growatt will require customers to fill out the form indicate the purchase and installation date, serial number, fault description and other information
2. After Replacement , the defective product should be returned to Growatt

Liability waiver

When the following occurs, Growatt has the right not to carry out quality assurances: Before repairing for defective products

1. Warranty seal has been removed, erased, defaced, altered, tampered or is illegible
2. Improper installation and operate wrongly
3. Beyond the environment to operate in unintended described in this manual.
4. The loss caused that unauthorized changes, repair, demolition products, or upgrade firmware without Growatt authorization,
5. Unforeseen disaster or majeure accident
6. The failure products that caused by above conditions need to be serviced, after Growatt check and evaluate, we can provide a paid service

11.1 Dismantling

1. Disconnect SP-CT, more details refer to chapter 7.
2. Remove all the wires connected of SP-CT.
3. Pull out all the wires connected of SP-CT.
4. Unscrew the screws and take out SP-CT .

11.2 Packing

Please place SP-CT in sealed carton and ensure the carton can accommodate its size and weight.

11.3 SP-CT storage

Please storage SP-CT where is dry and temperate range - 25°C and +60°C

11.4 SP-CT Disposing



Do not dispose SP-CT together with household wastes. Please accordance with local regulation to dispose it. To some extent, all the accessories can be reused .

12 Datasheet

12.1 SP-CT Specifications

Model	SP-CT	Note
Specifications		
AC supply voltage range	196Vac~264Vac	
AC frequency range	44~55Hz	
Max. input current	30mA	
Max power consume	5W	
Sampling precision	≤3%(power larger than 100W)	
The RF transmission distance range	≤100m(No shelter)	
Operating temperature range	-25℃ ~ +60℃	
Altitude	≤2000m	
Noise emission(typical)	≤25dB	
Relative humidity	0~95%	
Environmental Protection Rating	IP65	
Installation	Wall-mounted	
Dimensions(W/H/D)	113mm*113mm*38mm	
Weight	≤1000g	
Display	LED	
Interface:RF/WIFI/LAN	RF 433	
Warranty:5 years /10 years	5 years	
Safety & EMC standard	CE RCM	

12.2 Recommended torque

Pan head screw	1.3Nm(10.8 1bf.in)
Ground screw	2Nm(18 1bf.in)

Certifications 13

We have various certifications of SP-CT to satisfy your needs and requirements of different security standard.

Model	Certifications
Growatt SP-CT	CE、RCM

Contact us 14

If you have any technical problem about our products, please contact your installer or Growatt. Please provide information as st:

1. Series number of SP-CT
3. Communication method
4. Fault code
5. SP-CT Led status and LCD information of stored-energy machine

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