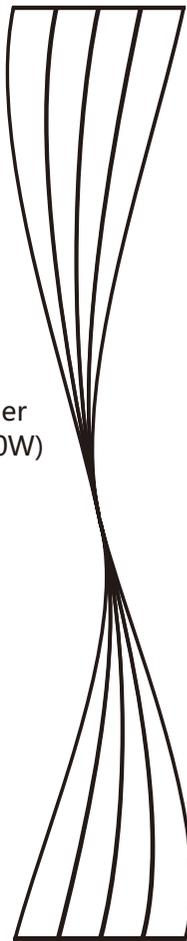# SES Series   Gen4

Human motion sensing
wireless dimming type

LED solar street light controller
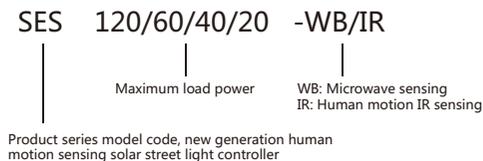12V/24V(20W/40W/60W/120W)

Instructions
for Use
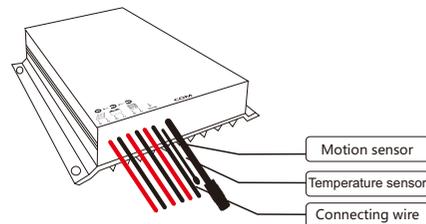
1. Features

◆ Very low sleep current for long-distance transportation and storage;
◆ High accuracy and high efficiency PWM charge with constant voltage;
◆ 10-period programmable load power/time control;
◆ Human motion infrared/microwave sensing function, with sensing delay time settable;
◆ Lithium battery charge and discharge high and low temperature protection, with operating temperature settable;
◆ A variety of lithium battery intelligent power modes, with load power adjustable automatically according to the battery level;
◆ High precision digital step-up constant current control algorithm, ensuring high efficiency and high constant current accuracy;
◆ Infrared wireless communication, allowing for setting/reading parameters, reading status, etc.
◆ Multiple protections such as battery/PV reverse polarity protection, LED short-circuit/open-circuit/limited power protection, etc.

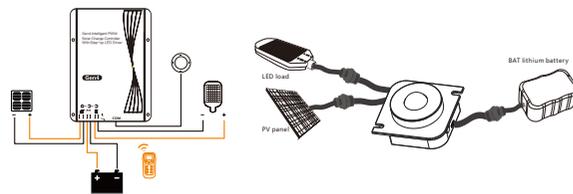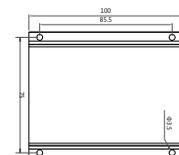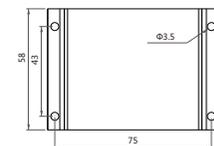## 2. Appearance and wiring diagram

(1) Model recognize

SES   120/60/40/20   -WB/IR

Maximum load power

WB: Microwave sensing
IR: Human motion IR sensing

Product series model code, new generation human
motion sensing solar street light controller

(2) External view:

Motion sensor
Temperature sensor
Connecting wire

(3) Wiring diagram is as below:

LED load
PV panel
BAT lithium battery

(4) Wiring sequence: Firstly connect the load, then the battery and finally the solar panel.

3. Dimensions

(1) Controller dimension

Model: SES20
Overall dimensions: 104*52*20mm
Mounting dimensions: 95*35mm
Mounting hole diameter: φ3.2

Model: SES40
Overall dimensions: 72*72*26mm
Mounting dimensions: 58*54mm
Mounting hole diameter: φ4.0

Model: SES60
Overall dimensions: 82*57.5*20mm
Mounting dimensions: 43*75mm
Mounting hole diameter: φ3.5

Model: SES120
Overall dimensions: 82*100*20mm
Mounting dimensions: 86*75mm
Mounting hole diameter: φ3.5

4. Status indication

(1) SES40 has two indicators, red and blue.

Color	Status	Description	Controller system status
Blue	Steady on	Load is turned on	Discharging
	Single flash	Battery works properly, in standby mode	Idle
	Slow flash	In charging	Charging
	Double flash	Lithium battery is fully charged	Fully charged
	Quick flash	Lithium battery bms overcharge protection	E-BMS

Color	Status	Description	Controller system status
Red	Slow flash	Load is open circuited	Open circuit
		Load is short circuited	Short circuit
		PV overvoltage	PV panel overvoltage
		BAT overvoltage	Battery overvoltage
		Over temperature	Over temperature
	Single flash (One flash per 10 seconds)	Overdischarge, sleep	/

(2) SES20/SES60/SES120 has one indicator, red.

Color	Status	Description	Controller system status
Red	Steady on	System is normal	Idle/discharging
	Slow flash	In charging	Charging
	Quick flash	System failure	Short circuit/open circuit/over discharge/ PV panel overvoltage/battery overvoltage /EBMS/over temperature
	Single flash (One flash per 10 seconds)	Overdischarge, sleep	/

5. Sleep and wake up

Enter sleep mode:
1. Press the [OFF] button on the CU remote control or mini remote control. The controller turns off all external control devices, and enters sleep state with very low power consumption to avoid battery feed due to long time no use;
2. When detecting battery over-discharge or 10-minute continuous open circuit/short circuit of load, the controller automatically enters sleep mode to save battery power, and battery indicator flashes once every 10 seconds.
Wake up from sleep mode:
1. In sleep mode, press the [ON] button on the CU remote control or mini remote control to wake up the controller and resume normal operation, only for IR remote control type;
2. PV wake up:
A. If [Yes] is selected for the [PV wakeup] function, after the controller enters sleep mode, the PV panel connected can wake it up and conduct charging during the day with good conditions for charging, and the loads can be automatically turned on at night.

B. If [No] is selected for the [PV wakeup] function, after the controller enters sleep mode, the PV panel connected can wake it up and conduct charging during the day with good conditions for charging, while the controller will continue to enter sleep mode at night.

6. LED intelligent power control

The SES series controller is available in various intelligent power modes for selection according to the actual lithium battery capacity, the number of rainy days and other factors. The specific intelligent power modes are: High, Moderate, Low, Auto, USE (user-defined), No (off).

(1) Intelligent power levels:

High -The battery capacity at the starting point of power derating is high, and the load lighting time is the longest. It is suitable for use in areas with more rainy days or poor lighting conditions.

Moderate-The battery capacity at the starting point of power derating is moderate, and the load lighting time is moderate. It is suitable for the scenarios where both brightness and the number of rainy days are considered.

Low-The battery capacity at the starting point of power derating is low, and the load lighting time is the shortest. It is suitable for scenarios with high lighting requirements.

Auto-Intelligent Power Mode automatically selects high/moderate/low levels based on parameters such as charge levels and power consumption of the day; for example, in summer, the charge level is large, it runs in low power mode, and the lighting effect is better; in winter, the charge level is small, it runs in high power mode, the load works in the power saving mode and can hold in more rainy days.

USE (user-defined)-The user is allowed to set the derating start voltage, the derating end voltage, and the minimum load current value for the intelligent power;

No(off)-The intelligent power mode is turned off, and the load power is output according to the power of the set time period.

(2) Intelligent power curve:
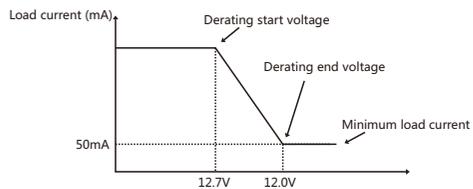
7. Sensing function

The controller comes in human motion infrared sensing (-IR) and microwave sensing (-WB) functions:

(1) Human motion IR sensor: It is a type of sensor made by the principle of pyroelectric effect, that is, a phenomenon that generates electric charge due to temperature change. The sensing range of the IR sensor is affected by the difference between the human body temperature and the ambient temperature. The higher the ambient temperature (the closer to the body temperature), the less sensitive the sensor is.
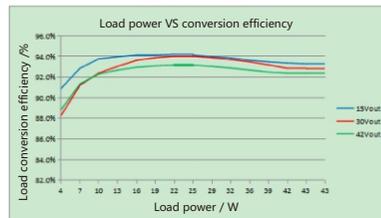
(2) Microwave sensor is a moving object sensor designed by the principle of Doppler effect. It senses whether the object has moved in a non-contact manner, which in turn generates a corresponding switching operation. It has strong resistance to radio frequency interference and is not affected by temperature, humidity, light, airflow and dust.
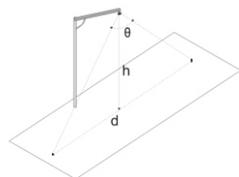
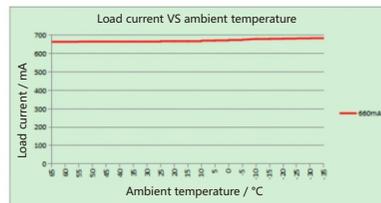| Sensor type	θ (angle)	h (Light pole height)	d (Sensing width)
IR (Infrared ray)	60°	6 ~ 8m	6 ~ 10m
WB (Microwave)	65°	6 ~ 10m	7 ~ 10m

8. Typical curves

(1) Load efficiency

(2) Current accuracy
Load current setting to 660mA

9. Common exceptions

Exceptions	Causes
Blue indicator flashes quickly, no charging current	Lithium battery bms overcharge protection
The blue indicator does not flash slowly and the panel does not charge when there is sunlight during the day	Solar panel failure or solar panel wiring error
The red indicator flashes slowly, but the load LED does not light up	LED load wiring is shorted or the number of LEDs in series is too few
LED load does not light up The blue indicator flashes at intervals	The panel voltage is not lower than the light control voltage or the delay time has not been up yet.
Light is on during the day or LED load only lights up one night	Solar panel is not connected or the panel is reversed
LED load dimming fails	The number of LEDs in series is incorrect 3 LEDs or step-down LEDs are used
The load lighting current does not reach the set value	Load current is regulated in intelligent power modeLED power exceeds the rated value
Load lighting time is short	Low battery or excessive load power
The red indicator flashes quickly, but the LED load does not light up	Battery is low
There is no response when the controller is connected to battery Indicator does not light up and remote control does not respond	Battery is problematic in power supply or controller goes to sleep mode
Charging is normal, but the load does not light upThe LED indicator on the controller does not light up.	Controller is in sleep state
Remote control cannot work	The remote control password is incorrect or Remote control mode (infrared or wireless) is not selected correctly or Wireless remote control distance setting is too short orThe remote control battery is low

Note: For detailed parameters and status information, please refer to the CU-ALL5 manual.

10. Technical parameters

Items	Values				Adjustable	Default
Model	SES20	SES40	SES60	SES120		
Remote control type	Microwave sensing: -WB ; Infrared sensing: - IR					
Combined mode	Controller and sensor are integrated		Controller and sensor are split			
System voltage	12V		12V/24V			
Zero load loss	< 10mA/12V		<10mA/12V；<15mA/24V			
Sleep loss	< 0.8mA/12V		<0.8mA/12V；<8mA/24V			
Load current	50mA~1000mA	50mA~2000mA		50mA~4000mA	√	330mA
Load voltage	15V~45V		15V~60V			
Maximum load power	20W/12V	40W/12V	40W/12V 60W/24V	60W/12V 120W/24V		
Load conversion efficiency	90% ~ 96%					
Load current accuracy	< 3%					
Maximum charge current	5A	10A		20A	√	Medium
Solar input voltage	≤ 25V		≤ 55V			
Over voltage	Charge voltage + 2V					
Charge voltage	9.00V ~17.00V, settable				√	12.45V
Charge return voltage	9.00V ~17.00V, settable				√	12.00V
Over discharge voltage	9.00V ~17.00V, settable				√	9.20V
Over discharge return voltage	9.00V ~17.00V, settable				√	10.20V
Light control voltage	3V ~ 11V				√	5V
Light control delay	5s~60s/2min~60min				√	10S
Operating temperature	-35℃ ~ +65℃					
IP rating	IP67					
Weight	120g	150g	170g	300g		

Remark: Parameter setting: over-charging voltage > over-charging recovery voltage > over-discharging recovery voltage > over-discharging voltage