



Integrated Solar Power System

User's Manual

V1.0.0

Zhejiang Dahua Vision Technology Co., Ltd




Foreword

Models

DH-PFM364L-D1, DH-PFM363L-D1, and DH-PFM363L-SD1.

Safety Instructions

The following categorized signal words with defined meaning might appear in the Manual.

Signal Words	Meaning
 CAUTION	Indicates a potential risk which, if not avoided, may result in property damage, data loss, lower performance, or unpredictable result.
 TIPS	Provides methods to help you solve a problem or save you time.
 NOTE	Provides additional information as the emphasis and supplement to the text.

Revision History

Version	Revision Content	Release Time
V1.0.0	First release.	March, 2019

Privacy Protection Notice

As the device user or data controller, you might collect personal data of others, such as face, fingerprint, car plate number, Email address, phone number, GPS, and so on. You need to be in compliance with the local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures including but not limited to: Providing clear and visible identification to inform data subject the existence of surveillance area and providing related contact.

About the Manual

- The Manual is for reference only. If there is inconsistency between the Manual and the actual product, the actual product shall prevail.
- We are not liable for any loss caused by the operations that do not comply with the Manual.
- The Manual would be updated according to the latest laws and regulations of related regions. For detailed information, see the paper manual, CD-ROM, QR code or our official website. If there is inconsistency between paper manual and the electronic version, the electronic version shall prevail.
- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the Manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. If there is any doubt or dispute, please refer to our final explanation.
- Upgrade the reader software or try other mainstream reader software if the Manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and the company names in the Manual are the properties of their respective owners.
- Please visit our website, contact the supplier or customer service if there is any problem occurred when using the device.
- If there is any uncertainty or controversy, please refer to our final explanation.

Important Safeguards and Warnings

This chapter describes the contents covering proper handling of the integrated solar power system (the “System”), hazard prevention, and prevention of property damage. Read these contents carefully before using the System, comply with them when using, and keep it well for future reference.

Storage

- Do not drop or splash liquid onto the System, and make sure there is no object filled with liquid on the System to prevent liquid from flowing into the System.
- Do not disassemble the System.
- Transport, use and store the System under the allowed humidity and temperature conditions.
- Keep the System away from corrosive gas and liquid.
- Charge the battery every 3 months if you want to store the System for a long period.

Installation and Operation

- Install the System in a well-ventilated place.
- Before trying to install, operate and maintain the System, make sure the installation personnel has completely understood the content in the Manual, and has an idea about the potential risk during installation.
- Do not install or operate the System when it is raining, damp or in strong wind.
- Keep the System in the original packing box until installing it.
- Do not install or use the System that has been damaged.
- Do not dismantle and maintain the System by yourself or non-professional personnel.

Disclaimer

The company will not be responsible for the damages resulting from the following reasons:

- Improper use, or use the System in improper scenario.
- Temperature of working environment exceeds the limit of the System’s working temperature.
- Dismantling and maintenance of the System by yourself or non-professional personnel.
- Force majeure.

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1.1 Introduction

This off-grid integrated solar power system (the “System”) consists of solar panel, lithium battery pack, maximum power point tracking (MPPT) charge controller, and mounting bracket. The System can be used in places without power supply and network connection. Specifically, it is applicable to the following scenarios:

- Supplying power for surveillance devices installed at places such as small construction sites, mobile toilets, mobile waste stations, street vendor markets, temporary traffic control zones.
- Supplying power for surveillance devices installed at public places in parks, office areas, residential buildings, and so on to prevent potential damages to infrastructures and landscaping.

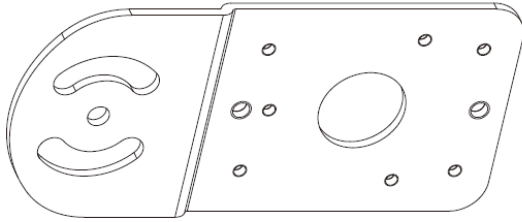
1.2 Features

- All-in-one design, easy to install, remove, and maintain.
- Aluminum alloy frame brings attractive appearance and excellent anti-corrosion performance.
- IP66 protection level.
- RS-485 communications port and standard Modbus protocol, meeting communications requirements in various scenarios.
- MPPT controller helps significantly improve the energy utilization efficiency of the System, and raise the charging efficiency by 10%–30% compared with conventional PWM method.
- Comprehensive electronic protection: Current limiting, short circuit, and reverse current protection of solar panel; reverse connection, overcurrent, overdischarge, and overtemperature protection of lithium battery; overload and short circuit protection for device that consumes power.

2 Packing List

After opening the packing box, check whether there is any obvious damage to the System, and make sure all the items included in the packing list are provided.

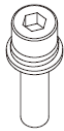
Figure 2-1 Packing list



Camera mounting plate



S10.0L



M8*20



M4*12



S6.0L



S3.0L

3 Structure

3.1 Appearance

Figure 3-1 Components (DH-PFM364L-D1)

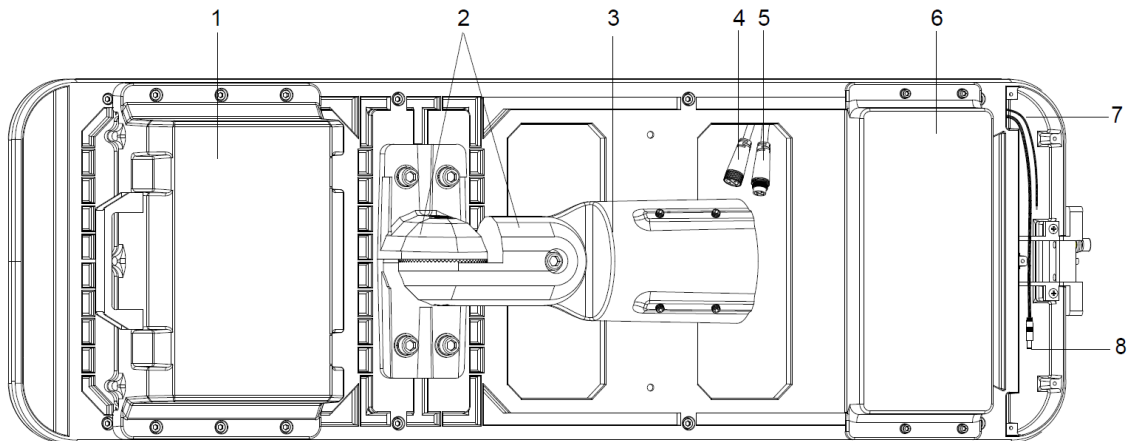


Figure 3-2 Components (DH-PFM363L-D1)

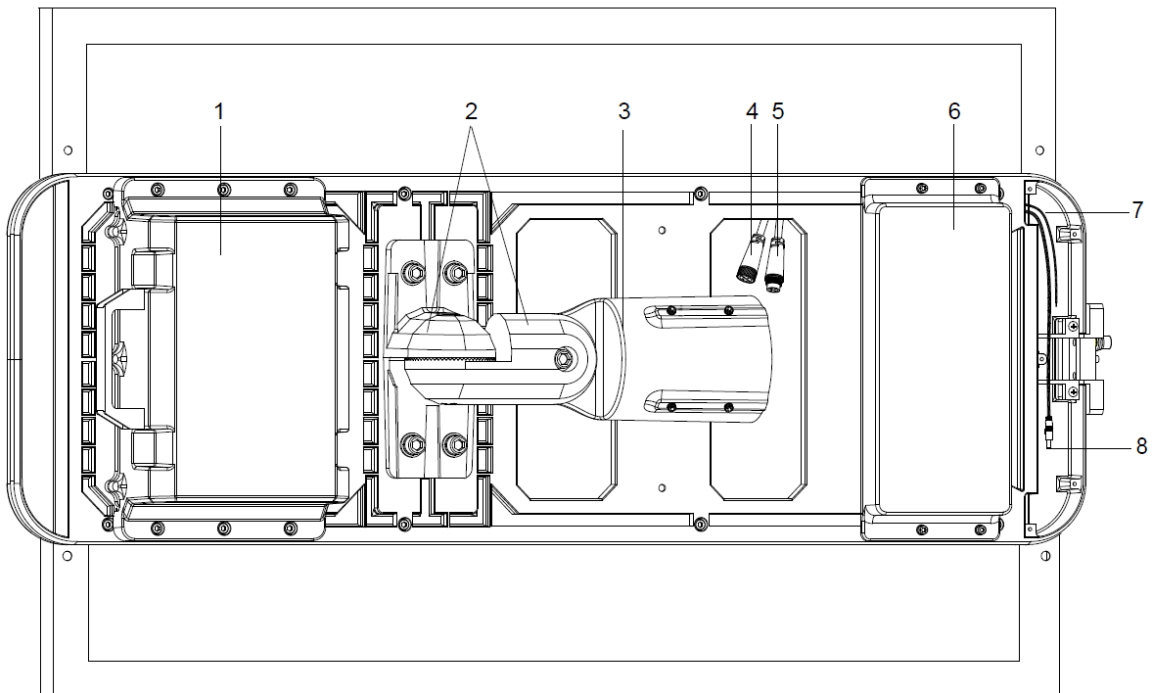


Table 3-1 Component description (DH-PFM364L-D1 and DH-PFM363L-D1)

No.	Name	Description
1	Battery holder	Holds batteries.
2	Gear for adjusting angle	Gear for adjusting horizontal and vertical angles. 5 degrees will be adjusted by rotating each slot.

No.	Name	Description
3	Mounting sleeve	Attach the mounting sleeve to the pole, and then tighten the sleeve.
4	Female circular connector	Connector socket
5	Male circular connector	Connector pin
6	Controller holder	Holds the controller.
7	RS-485 serial line	Used for communications between the System and another device.
8	Power output interface	Supplies power to another device.

Figure 3-3 Components (DH-PFM363L-SD1)

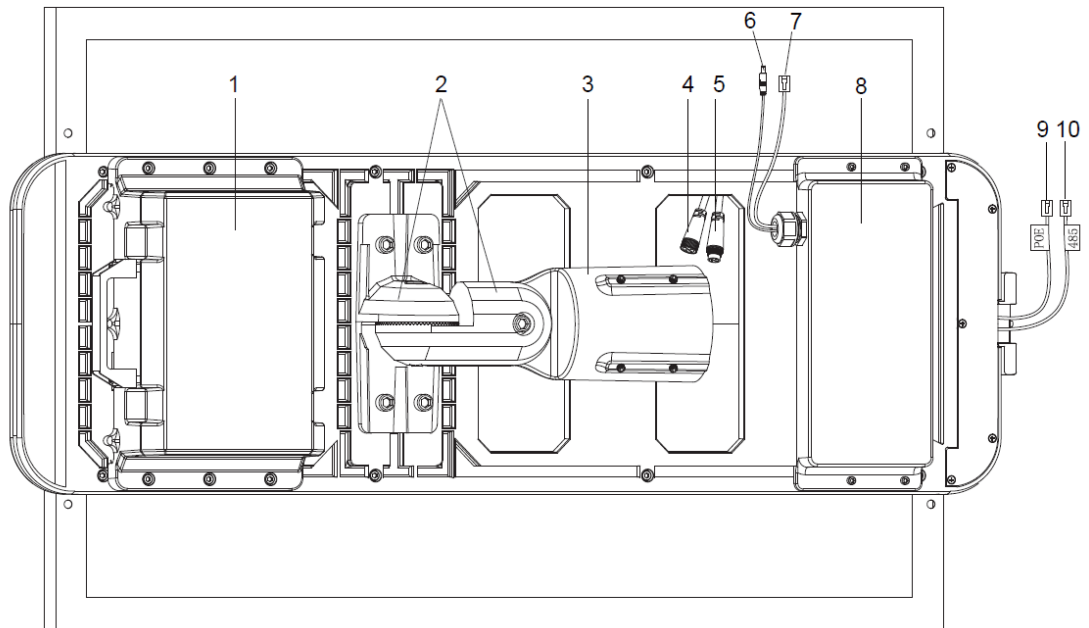


Table 3-2 Component description

No.	Name	Description
1	Battery holder	Holds batteries.
2	Gear for adjusting angle	Gear for adjusting horizontal and vertical angles. 5° will be adjusted by rotating each slot.
3	Mounting sleeve	Attach the mounting sleeve to the pole, and then tighten the sleeve.
4	Female circular connector	Connector socket.
5	Male circular connector	Connector pin.
6	Power output interface	12 V DC /1A power output.
7	LAN port	Used for data transmission of surveillance device.
8	Controller holder	Holds the controller.
9	PoE output port	12 V non-standard PoE output, usually supplying power for wireless CPE (customer premises equipment) device.
10	RS-485 port (serial port to network interface)	Used for communications between the System and another device..

3.2 Dimensions

3.2.1 DH-PFM364L-D1

Figure 3-4 Front view (mm[inch])

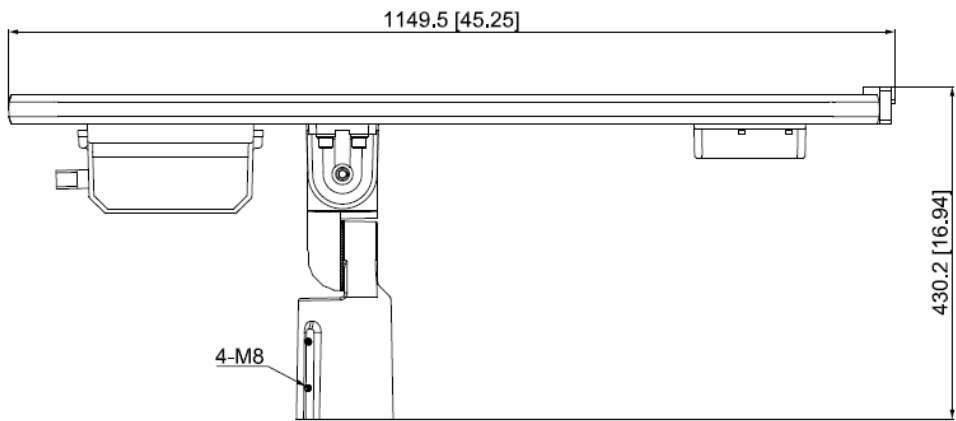


Figure 3-5 Side view (mm[inch])

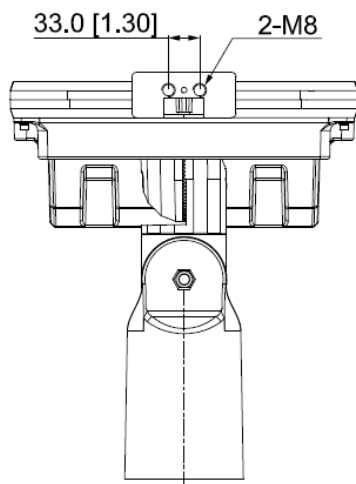
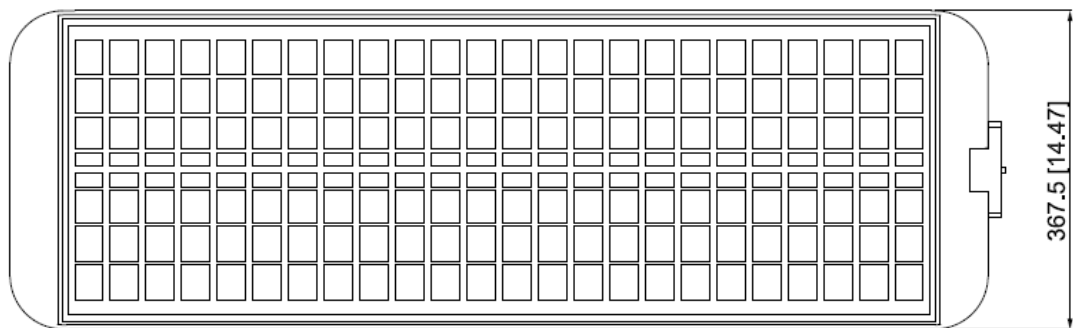


Figure 3-6 Top view (mm[inch])



3.2.2 DH-PFM363L-D1 and DH-PFM363L-SD1

Figure 3-7 Front view (mm[inch])

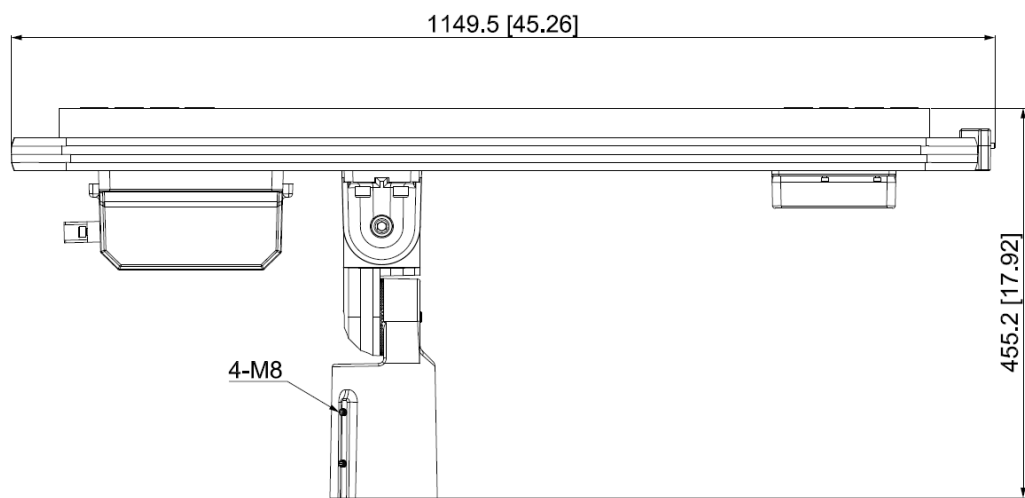


Figure 3-8 Side view (mm[inch])

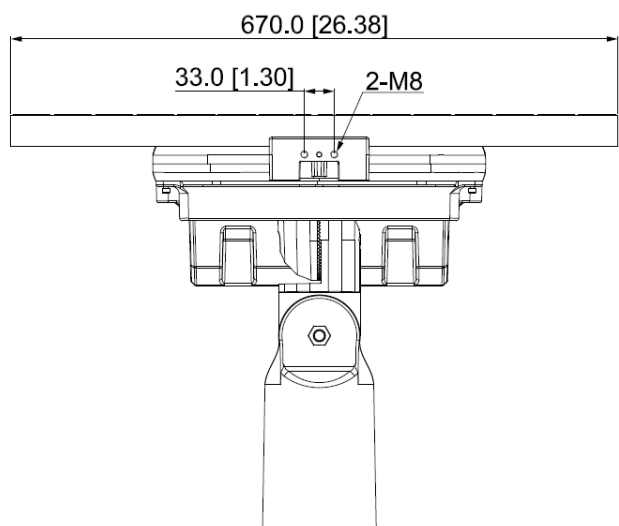
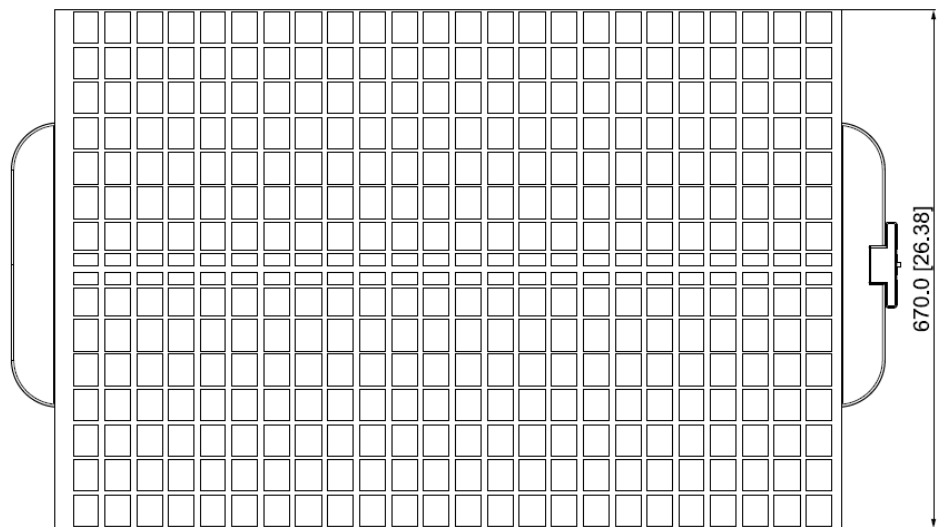


Figure 3-9 Top view (mm[inch])



4 Installation

4.1 Preparation



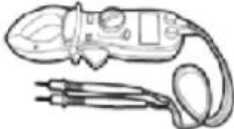





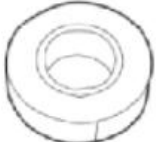
4.1.1 Installation Site Requirements

- The installation site shall meet the requirements of electrical and relevant fire prevention codes.
- Choose an installation site with sufficient sunshine all the year round, and make sure no shelter around the site to ensure natural lighting.
- If there is shelter at the installation site, make sure the lowest installation position of the System is at least 1 meter above the shelter, otherwise, it will lead to decline in power generation and battery power loss, which will finally damage the battery.
- Avoid public facilities such as underground cables, optical cables to ensure smooth installation.
- Make sure the back side of the System is well-ventilated.

4.1.2 Tools

Tools included in the packing list are provided. Besides, you need to prepare the tools shown in Figure 4-1.

Figure 4-1 Tools

		
Insulated gloves	Protective gloves	Clamp meter
		
Insulated shoes	Ladder	Compass
		
Screwdriver	Spirit level	Insulating tape

4.1.3 Cables

We recommend you to ground all the devices, and you need to prepare the cables for grounding connection.

Select cables that comply with requirements on cables for surveillance industry. Cable length depends on pole length and height of drilled holes. Select proper cable by referring to the following table and combining with your actual needs.

Table 4-1 Grounding cable requirements

Cable type	Description
Grounding cable	It is recommended to use stranded bare copper flexible cable with ground impedance less than 4 Ω and cable length not more than 10 m. Use green wire with yellow stripe for the protective ground.

4.2 Installation Procedures



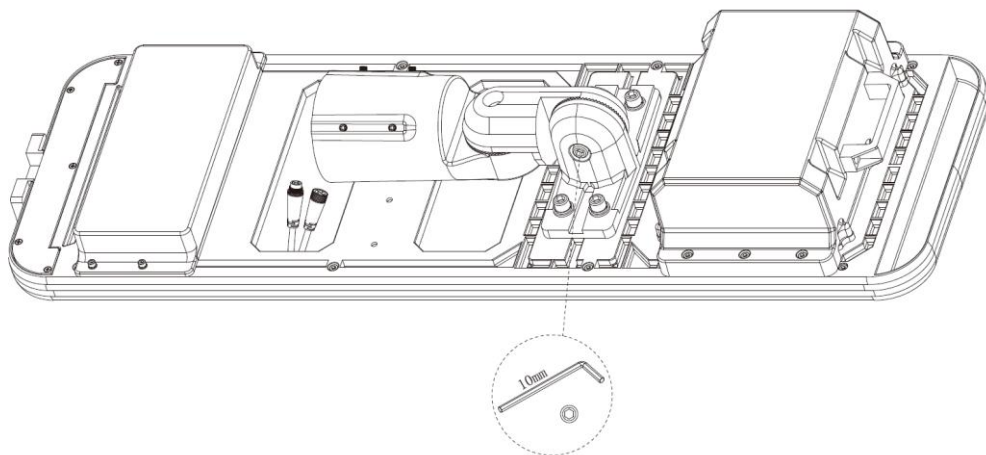
Installation steps have minor differences for the three models. The Manual takes installation of DH-PFM364L-D1 for example.

Step 1 Open the package, and place the System on a flat surface.

Step 2 Adjust the horizontal angle.

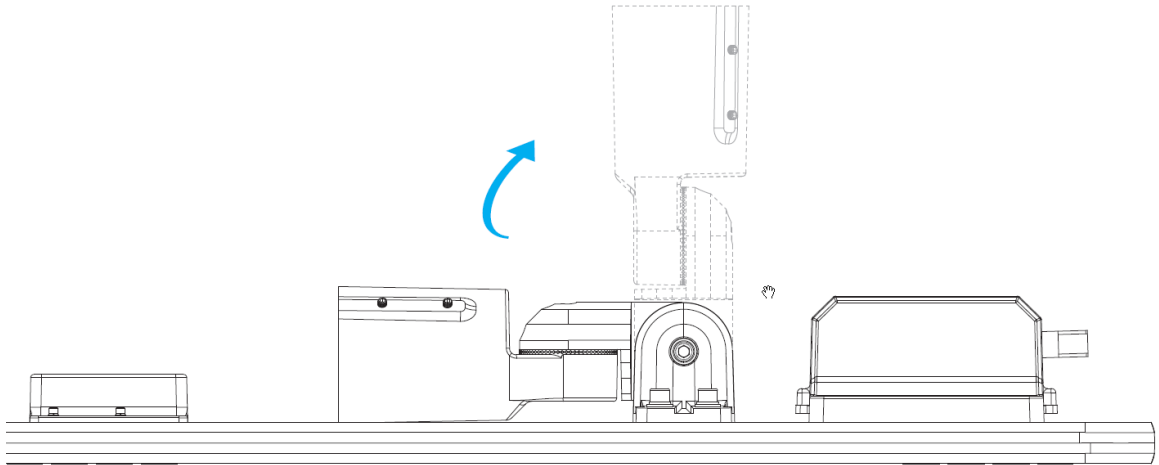
- 1) Use a S10.0L wrench to loosen M12 screw. See Figure 4-2.

Figure 4-2 Installation diagram (1)



- 2) Rotate the mounting sleeve 90°. See Figure 4-3.

Figure 4-3 Installation diagram (2)

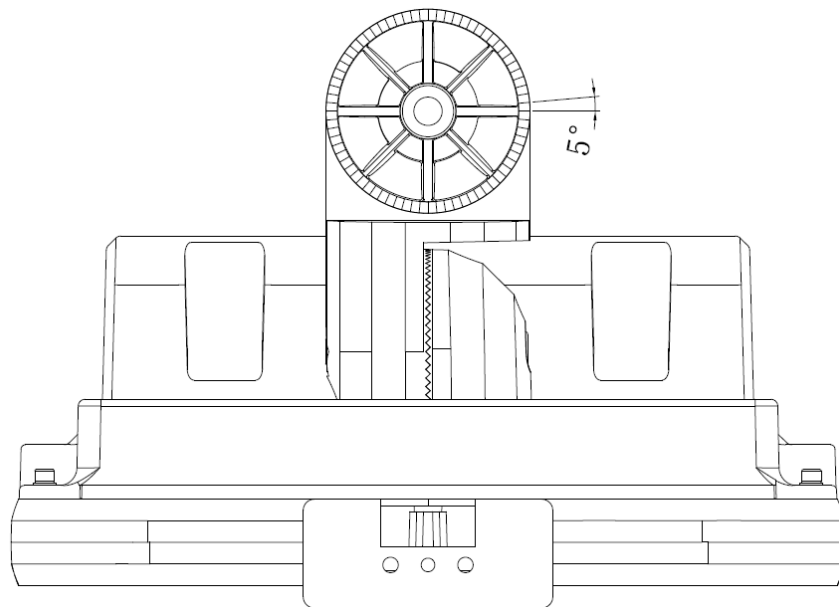


You can know the rotated angle according to the quantity of slots that have been rotated. See Figure 4-4.



- 5° will be adjusted by rotating each slot.
- The System is designed with gear for adjusting horizontal or vertical angle.

Figure 4-4 Installation diagram (3)

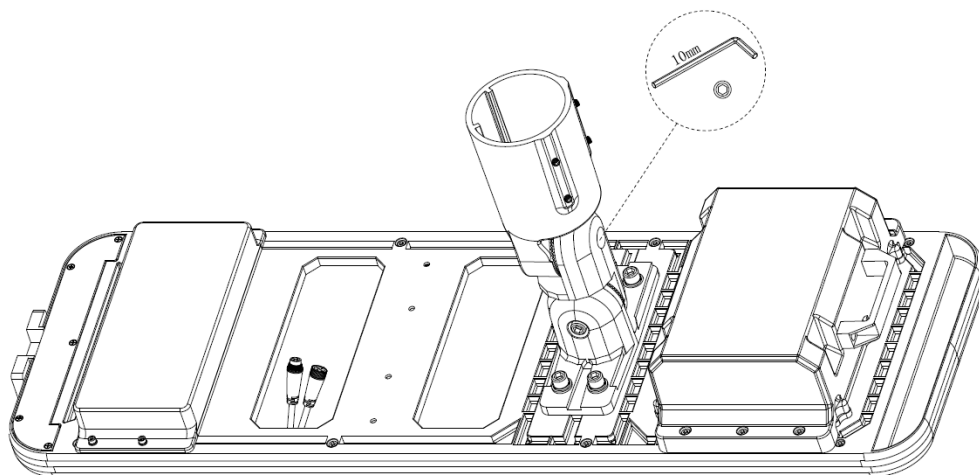


3) Use a S10.0L wrench to tighten the screw.

Step 3 Adjust the vertical angle.

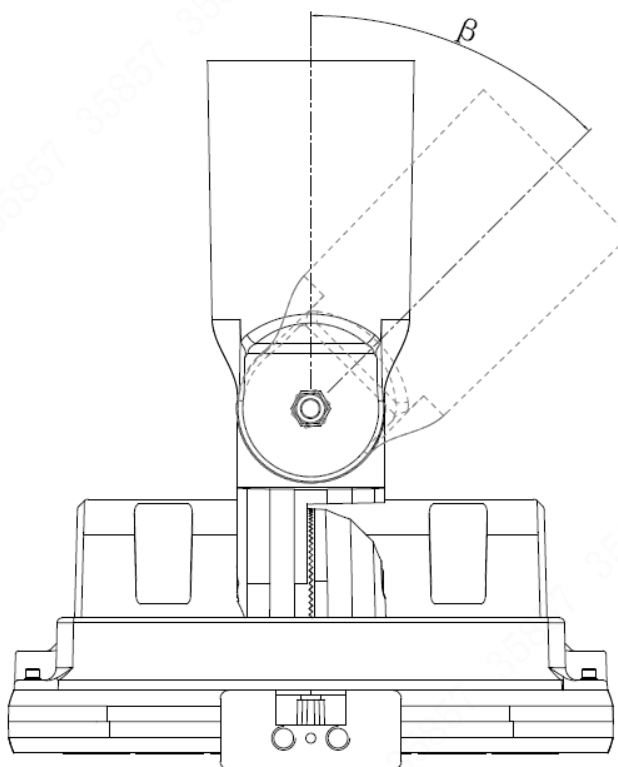
1) Use a S10.0L wrench to loosen M12 screw. See Figure 4-5.

Figure 4-5 Installation diagram (4)



- 2) Adjust angle of mounting sleeve until β equals to local latitude. See Figure 4-6.

Figure 4-6 Installation diagram (5)

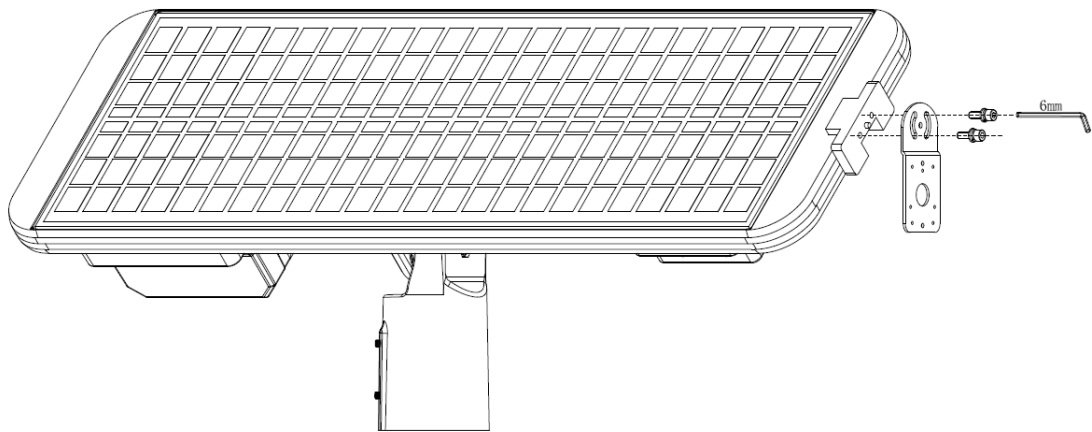


- 3) Use a S10.0L wrench to to tighten the screw.

Step 4 Install camera mounting plate.

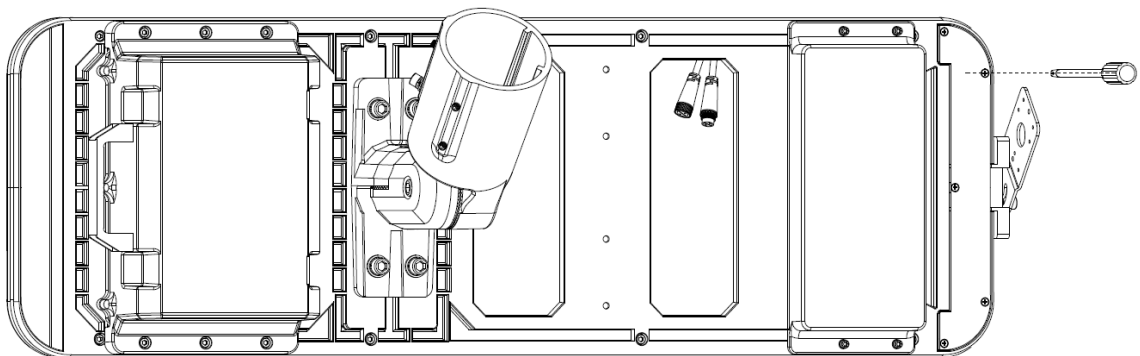
Make the mounting plate parallel with the mounting sleeve, and then use a S6.0L wrench to tighten the plate. See Figure 4-7.

Figure 4-7 Installation diagram (6)



Step 5 Use a screwdriver to remove the cover of cable tray. See Figure 4-8.

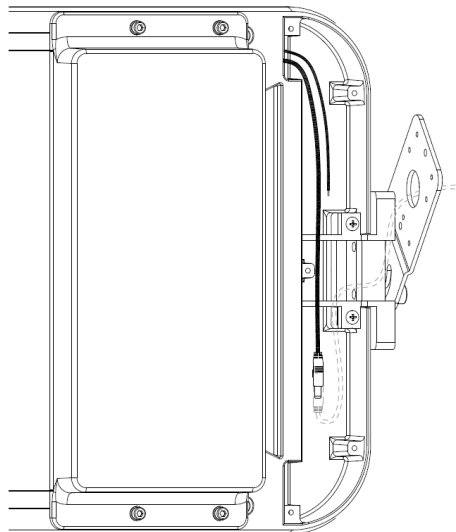
Figure 4-8 Installation diagram (7)



Step 6 Connect cables, and then close the cover of cable tray.

- 1) Wire through the cable tray, and pull the cable out of the camera mounting plate. See Figure 4-9.

Figure 4-9 Installation diagram (8)



- 2) Connect RS-485 serial line.

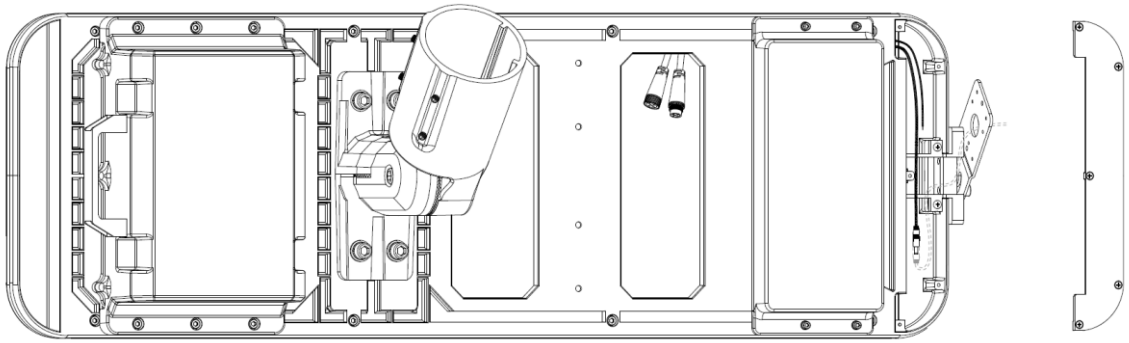


Connect RS-485_A to port A of camera, and RS-485_B to port B.

- 3) Connect 12.8 V DC power output line of the System to power input line of camera.

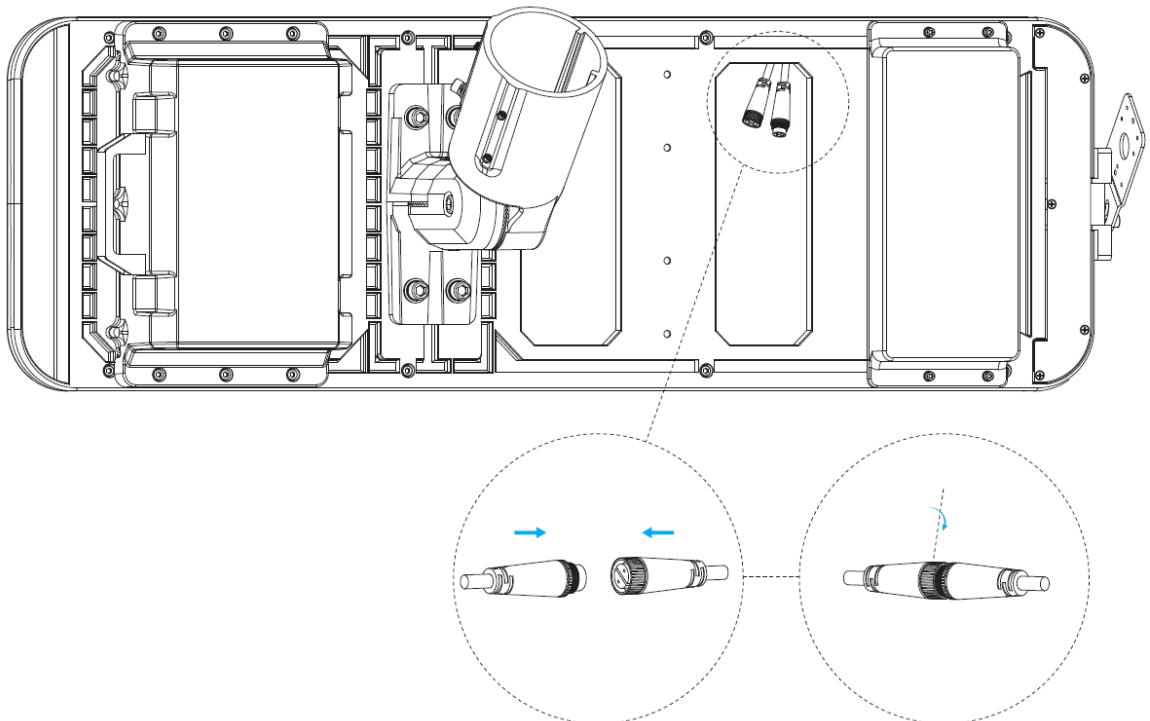
- 4) After connecting the cables, use the screwdriver to close the cover of cable tray.
See Figure 4-10.

Figure 4-10 Installation diagram (9)



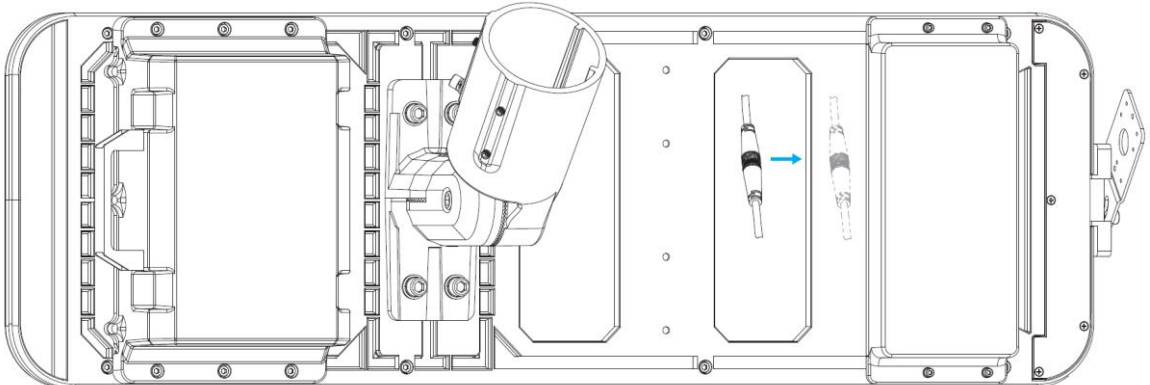
- Step 7** Align the female circular connector with the male one, and then connect the connectors.
See Figure 4-11.

Figure 4-11 Installation diagram (10)



- Step 8** Fix the connector with tape, and then insert the connector into the holder for connector.
See Figure 4-12.

Figure 4-12 Installation diagram (11)

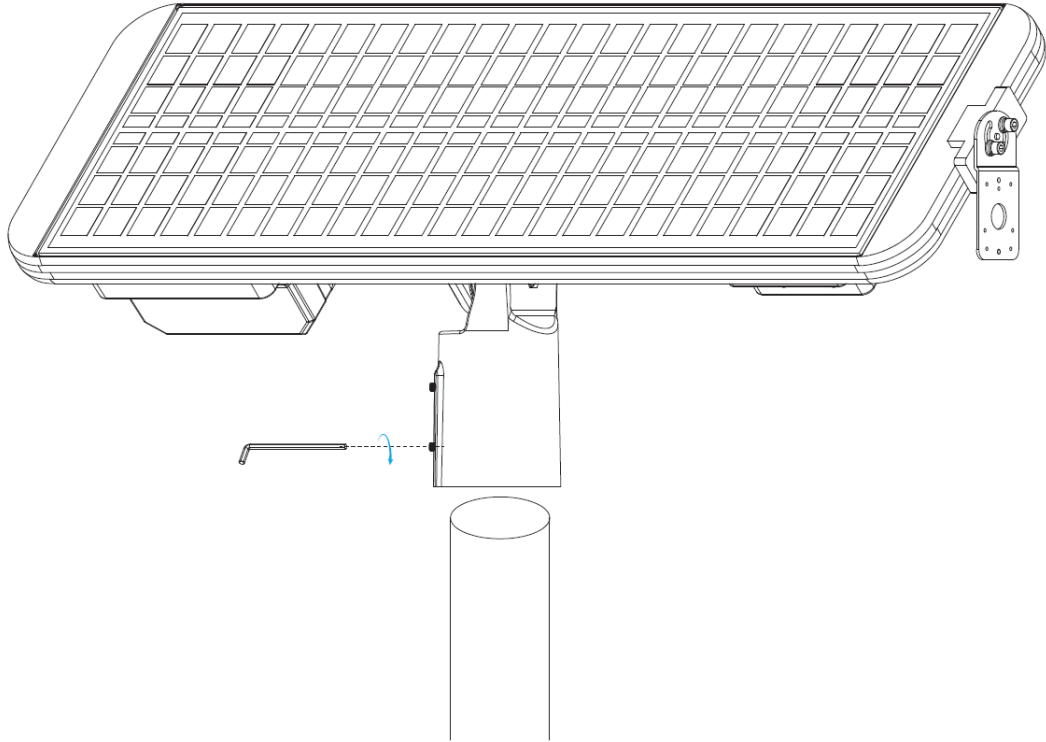


Step 9 Raise the System to mounting height, and then attach the mounting sleeve to the pole, and finally use a S6.0L wrench to tighten the sleeve. See Figure 4-13.



- Adjust the solar panel according to local longitude and latitude to make it face the sun.
- Make the solar panel south-facing in the northern hemisphere and north-facing in the southern hemisphere.

Figure 4-13 Installation diagram (12)



5 Daily Maintenance

5.1 Notes

- Tools: Ladder, screwdriver, multimeter, bucket, mop, and insulated gloves.
- Attention:
 - ◇ Do not maintain the System when it is raining.
 - ◇ Wear insulated gloves during maintenance.
- Maintenance interval: Twice a year.

5.2 Instructions

It is recommended to check the following items to keep the long-term high performance of the System:

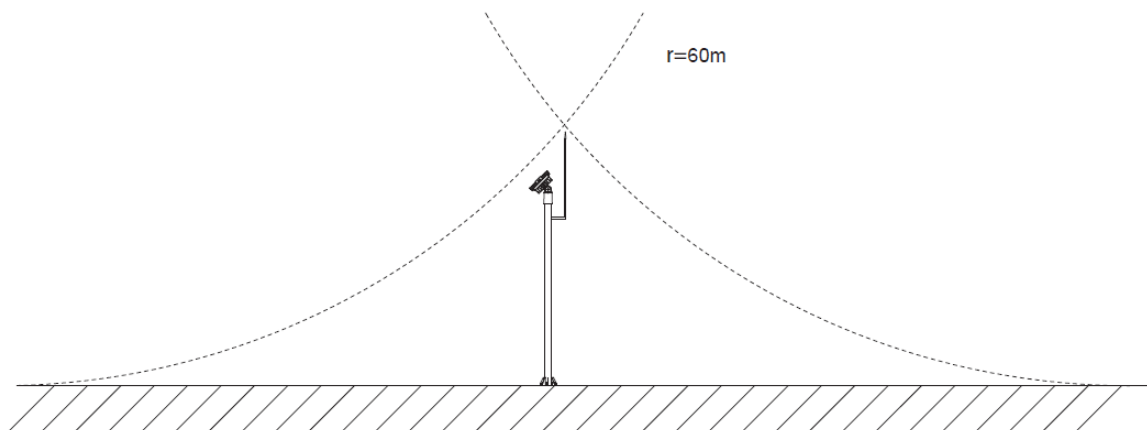
- Check whether the insulation layers of all exposed cables have been damaged because of sunlight, contact with objects around the cable, dry rot, or destruction by insects or rats. If damaged, maintain or replace the cable immediately.
- Check whether the terminal blocks have signs of corrosion, insulation damage, burning or discoloration, and whether they are tightened.
- Check whether there is dirt, nesting insect, or corrosion. If yes, clean them in time.
- In areas with special weather conditions, it is recommended to do necessary maintenance to keep the System work properly. For dry, dusty and rainless areas, dust on the System will influence its power generation efficiency. For cold, snowy, and frozen areas, snow and ice covered on the System will lead to decline in power generated and even failure of the System. You need to clean the dust regularly, and clean up the snow in time.
- Check regularly the plants around the System. If any plant has grown to shade the System, clean it in time.
- Replace the batteries of decreased performance every 3–5 years, depending on the actual conditions of the battery.

Appendix 1 Lightning and Surge Protection

The System adopts TVS lightning protection technology. It can effectively prevent damages from various pulse signals below 6000V, such as sudden and indirect lighting strike. But, when installing the System in the outdoor environment, you still need to take necessary precaution measures while maintaining your local electrical safety code.

- The distance between the signal transmission cable and high-voltage device (or high-voltage cable) shall be at least 50 meters.
- Outdoor cable layout should go under the penthouse if possible.
- For open field, please use sealing steel tube under the land to implement cable layout and make sure that each end of the steel tube are grounded in an equipotential way. It is absolutely forbidden to set the cable overhead.
- In area of strong thunderstorm hit or near high sensitive voltage (such as near high-voltage transformer substation), additional high-power thunder protection device or lightning rod should be installed.
- The thunder protection and earth grounding of the outdoor device and cable, shall be considered based on the whole thunder protection of the building and conform to your local or industry standard.
- Equal-potential wiring should be adopted in the system. The grounding device must meet the demand of anti-jamming and also conforms to your local electrical safety code. The grounding device shall not form short circuit to N (neutral) line of high voltage power grid or be mixed with other wires. When connected to the ground alone, grounding resistance of the system shall not be more than 4Ω . And cross-sectional area of grounding cable shall be no less than 25 mm^2 .

Appendix figure 1-1 Lightning protection



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