



KNE's Automatic Cleaning system

Table of Contents

Product Introduction	1
Features	1
Technical Data	2
Operation manual	3
Warnings	4

Product Introduction

The solar panels are installed outdoors, and the dust, dirt, bird droppings, snow, and debris may accumulate on the panel's surface. Hence this reduces the light transmittance of the solar panel, causing energy loss. It is proven that standard solar panels may lose up to 30% to 40% of their efficiency within one year due to unclean panel surfaces. Currently in the market, the automatic-cleaning solution does not have the capability to remove heavy dirt from panel surfaces. The most common maintenance of solar panels is to manually clean with a brush and solvent. Considering the manual nature of these services, it may be more costly and unsafe (especially cleaning roof-mounted systems.) our cleaning system targets these problems, making sure your investment in solar energy coupled with our cleaning system will give you the most economical benefit

Features

- 1: Water spray along with wiper, enabling the effective removal of dirt, snows, bird droppings, and other pollutants from the surface of the panel.
- 2: Once activated, water sprays along the top of the frame, and then a wiper moves down the frame and back up. The cleaning capacity is at maximum 6kgs on the solar panel surface.
- 3: Our cleaning system can be mounted on multiple kinds of solar panels, new or existing, whether with frame or not.
- 4: Remote control and programmable settings makes cleaning convenient.
- 5: Our system has been tested under different climate conditions. It can work well under rain, sandstorm, typhoon, etc.

Functions:

The PV systems with our cleaning systems mounted on, provide the following functions:

- 1: Enable to clean the solar panel effectively, optimize their ability to absorb the solar energy, maintain its efficiency.

It is proven that the pollutants attached on the solar panel for 1-5 months, the solar panel's conversion efficiency will reduce from approximately 15% to 8-10%. It means that the rate of work decrease up to almost 50%. This is just considering everyday use, excluding heavy snow. Our cleaning systems enable the user to clean the panel's surface anytime, optimize their ability to absorb solar energy, keep them working efficiently avoiding 30-40% energy loss caused from the unclean surfaces.

- 2: Protect the solar panel, minimize the risk of failure

As debris and pollutants accumulate on the solar panel surface over time, there is risk of burnout caused from overheating. Cleaning the solar panel often can well decrease this risk, especially in desert areas, or in snow covered areas, there are some pollutants that covers often covers on the solar panel. Removing the pollutants from its surface can well promise the PV system to maintain its good working condition.

- 3: Guarantee the life time of the other accessories in PV system, and bring down the high economical return.

The PV system with our cleaning system mounted on, can work efficiently and stably. Hence it minimize the risk of failures for the it's accessories, guarantee that' life time. So that it can reduce the budget in the investment for equipment and maintenance.

Technical Data:

Items: the frame integrating solar panel, The control box: can control 30 pcs of the frame integrating the solar panel

Principle of operation: electronic board terminals-----control box-----motor-----transmission synchronous belt-----the silicon wiper blade

The connection between solar frames is in series circuit

Material: aluminum alloy (anti-oxidizing)

The frame size :600cm、700cm、800cm、or custom-made length .

Circuit board: maintenance-free electronic components, microcomputer data control

Low-voltage motor: working voltage 24V/20R, maximum load 22.42kgs/cm

The working hours: once a week / custom programmable settings

The working temperature:-20°C to 60°C

Power: DC Battery or AC current

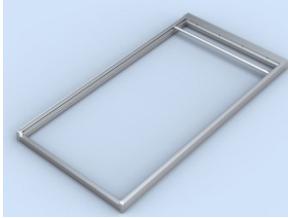
Power consumption: 0.2----0.5 kwh/year

Recommended Working environment: solar streetlight and includes all characteristics of the roof, local factors,

And wind suction, as well as snow load zones .

Quality guarantee period:	the whole module: 1 year	the mounting system: 15 years
	Low-voltage motor: 1 year	the controller: 5 years
	The remote controller: 15years	the silica gel wiper: 10 years

Packing list: the frame, the control box



ID Installation

Automatic operation

Firstly connect the extensions (the frame) and the main engine (control box), then Press the button “up” and “two week” while getting the power on, Then press the button “menu”, the screen shows as (picture 1.)

ID: 01 means its ID is “the first one”.

STATE means the conditions (pass is for success, fail is for failure.) if the state show “pass”, that means its ID is successfully recorded into the main engine (control box).

Then getting the power off; disconnect the extensions (the frame) and the main engine (control box). And record this frame’s ID as “the first”, and takes note on this frame.

AUTO ID SET
ID: 01 STATE:

Picture 1

The same operation on the following extensions (the frame) 2, 3, 4, 5, 6.....30.

Manual operation

If the automatic operation is not workable, it can be operated manually.

Firstly connect the extensions (the frame) and the main engine (control box), then get the power on , press the button “menu”, the screen show as (picture 2), press the button “up” or “down” to choose the ID in need , if the state show “pass”, that means its ID is successfully recorded into the main engine (control box).

SINGLE ID SET
ID: 01 STATE:

Picture 2

If the users would like to check the cleaning total working, press the button “menu” for seconds, then the screen show the states (as picture 3.)

RUN CONUTER (5) (means the cleaning total working is 5 times.)

RUN COUNTER

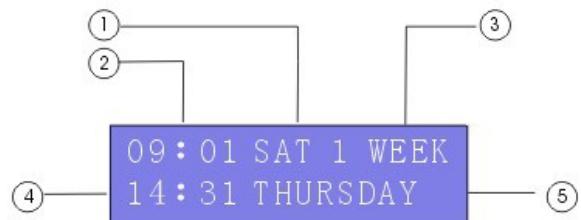
5

Picture 3

Cleaning function settings

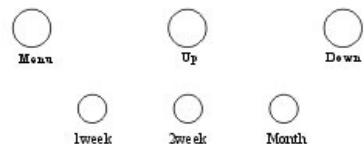
1 Instructions for display screen

- ① Schedule date
- ② Schedule time
- ③ Time interval
- ④ Present hour
- ⑤ Present date



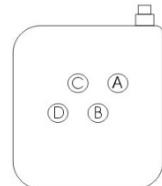
2 operations:

1/Menu	menu
2/Up	UP
3/Down	Down
4/1Week	One Week
5/2Week	Two Weeks
6/Month	Four Weeks



3 Instructions for remote controller (optional)

A water spray	B wiper
C water spray + wiper	D Stop key

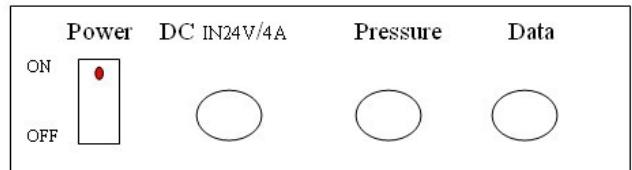


4 the connections of the control box side

Input voltage (24V-4A)

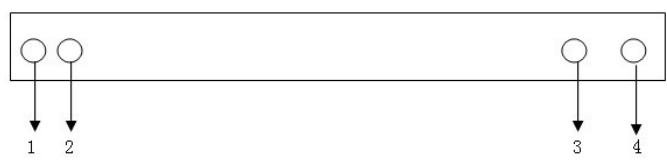
The Switch for increasing the water spray pressure

Data transmission



5: the connection direction at the back of the frame

- 1: the water valve
- 2: the three-way water valve
- 3: the connection with frame
- 4: Data transmission



Warnings

- 1: Never touch the ends of output cables with bare hands when the module is operating. It can be handled only by qualified technician.
- 2: Keep the system away from children.
- 3: Do not wear metal jewelry, to avoid electric shock during installation.
- 4: When installing the solar modules, please match with the correct frame models.
- 5: Do not leave any tools and /or heavy objects on the solar module.
- 6: To avoid electric shock, do not disassemble the system, it should be installed and maintained by a qualified technician.
- 7: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- 8: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.