

Instruction Manual **SUNJE**

SM-50

(Eng)

It is recommended that only persons who have sufficient knowledge and experience such as system designers and responsible persons deal with this product after carefully reading the product manual. We are not responsible for accidents caused by not following the instructions and precautions in the product manual.

1 The matters of safety

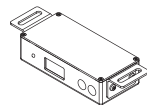
⚠ WARNING

- * Do not fabricate or do maintenance by yourself. Malfunction, Electric shock, and fire danger are considered. Contact us directly if you need the item to be repaired.
- * Do not let the water touch the product. It may cause electric shock or fire due to malfunction.
- * Do not apply impact such as dropping or vibration. Malfunction or danger of accident may occur.
- * Since this product is a precision measuring device, it must be grounded to provide sufficient performance.
- * When you check or maintain the product, make it sure you turn off the power. It may cause electric shock or fire due to malfunction.
- * Do not use the item off the range of usage. Malfunction or danger of accident may occur.
- * For your proper cable connection, take a look at the manual 「Installation & Connection」 for references. Any disordered connection is detected, the malfunction might arise.
- * All cables should be connected all the time. Please careful of cable disconnections.
- * If power or communication cables got damaged, replace them immediately. Malfunction and fire danger may happen.
- * When disposing of the product, please dispose of it as industrial waste.

2 Check the package contents

▶ Product compositions

The package includes the following products composition.



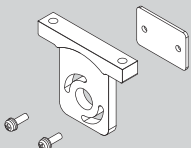
* Sensor
SM-50
1ea



* Output Cable
SOC-SM-5-001
6Pin-6Pin(Open), 15m, 1ea

▶ Option

If you require extra functions with the basic accessories we provided, you need to purchase optional items in below for further assistant.

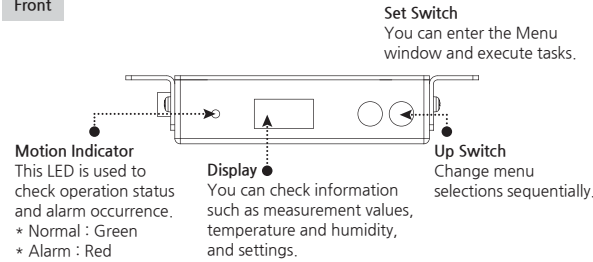


* Rotary Bracket Set
SBR-SM-4-001
Bolt (M3X10L) 2ea,
Rotary Bracket 1ea,
Cover-R 1ea

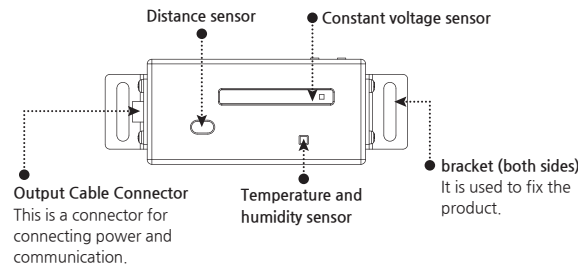
※ The bracket can be assembled with a selectable rotation direction.

3 Nomenclatures of parts

Front



Bottom



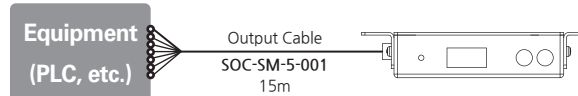
4 Installation and connection

▶ Check the installation conditions head unit

Please check the installation condition whether it meets proper specification.

- No vibration on the fixed device.
- Be aware of any flammable or ignitable materials around the working area.
- There must be no objects between the target area and device.
- Secure to have enough working space for quick maintenance of the device.

▶ Connecting the power & communication



< Output Cable Pin Map flow chart >

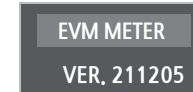
| No. | Cable Color | Description |
|-----|-------------|-------------|
| ① | Black | 485 - |
| ② | Red | + 24Vdc |
| ③ | Yellow | F.G |
| ④ | Green | GND(Ground) |
| ⑤ | White | 485 + |
| ⑥ | Blue | F.G |

※ F.G (Frame Ground): Connects to the F.G of the equipment SMPS.

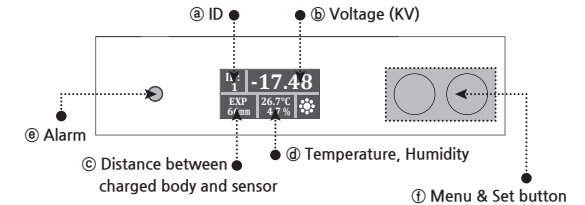
5 Main configuration screen and settings menu

▶ Check the firmware version

After turning on the power, you can check the firmware version as shown in the picture below.



▶ Basic configuration screen (HOME)



- ③ This is the currently set address (0 ~ 32)
- ⑤ Displays the constant voltage measured in real time.
- ③ You can check the distance from the charged object through the distance sensor.
- ④ Displays the temperature and humidity of the relevant usage environment.
- ⑤ When the measured voltage value is higher than the set alarm standard value, the Red Led blinks repeatedly for X seconds every 0.5 seconds. If normal, the Green Led lights up.
- ① You can use the SET button to enter the menu and select the item you want to set. Adjust the setting value with the UP button.

▶ Settings menu

HOME



: Returns to the initial screen.

MODE SET



- POT MODE

: Five operation modes are available: EXP (Expanded Mode - distance value not applied), DEXP (Distance Expanded Mode - distance value applied), PRE (Precision Mode), AREA (Area Scaling), and SCAL (2-point Scaling).

* Area Scaling : Corrects errors caused by the size of the measurement target (input correction value, default value: 1.00).



- Scaling Correction Table

| Size Distance | 60*60 | 100*100 | 200*200 | 300*300 | 410*410 | 500*500 | 580*580 | 750*750 |
|---------------|-------|---------|---------|---------|---------|---------|---------|---------|
| 10 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 20 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 30 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 40 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 50 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| 60 | 1.2 | 1.0 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| 70 | 1.6 | 1.2 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 |
| 80 | 2.0 | 1.5 | 1.1 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 |
| 90 | 2.4 | 1.8 | 1.2 | 1.1 | 1.0 | 1.0 | 1.0 | 0.9 |
| 100 | 2.9 | 2.1 | 1.4 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 |

* 2 Point Scaling : Performs scaling calculation based on two reference voltages (0V and 1kV).



- Install the CPM plate directly below the sensor.
- Apply 0V (Ground).
- Perform Zero Voltage Set.
- Charge 1kV using the CPM.
- Then set SCAL to 01.0kV.
- ZERO CAL
 - * OFF: The zero point is not adjusted.
 - * GOOD: Zero point adjustment has been completed.
- AVG CAL
 - : Can be set from 01 to 50, and displays the measured value after averaging as much as the set value.

CONTROL SET



- RS485 ID
 - : Can be set from 1 to 32
- EXPD (mm)
 - : Adjustable in 10mm increments from 100mm to 700mm.
- EXPD IN
 - : STOP, AUTO settings are possible.
 - * STOP : Set distance application to fixed.
 - Measure the electric field by applying the fixed distance value stored in DISTSET. If you press and hold the right button in the main menu, the fixed value will be saved as the current distance value.
 - (Or measure the distance in the menu and enter it directly.)
 - * AUTO : Automatically measures the distance in distance-specific expansion mode.

ALARM SET



- HIGH VOLT
 - : Adjustable in 0.1 KV units and can be set from minimum 0.1 to maximum 9.9KV.
- ALARM ON
 - : Two settings are possible: ON and OFF.
 - (Output by red LED flashing and alarm signal communication)

6 Communication Protocol

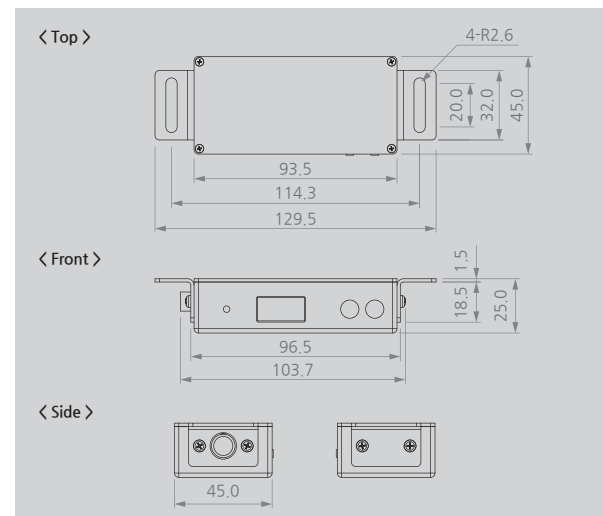
▶ SM-50 MODBUS communication protocol

- MODBUS function codes
 - 03: Read holding registers
 - 04: Read Input Registers
 - 06: Write single register

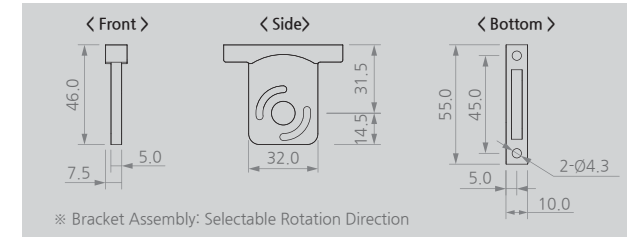
- MODBUS Protocol
 - 9600 bps, 8bit, 1Stop, None

| Address | Description | Permission | Unit | Min | Max | Default | Unit | Comment |
|---------|---------------|------------|------------------|--------|-------|---------|------------|--|
| 8000 | Filed | Read Only | Integer | -32768 | 32768 | 0 | 0.001 0.01 | PRE: -1.000 ~ 1.000 EXP: -20.00 ~ 20.00 |
| 8001 | Meter | Read Only | Unsigned Integer | 0 | 999 | - | mm | 0mm ~ 999mm |
| 8002 | Temperature | Read Only | Unsigned Integer | 0 | 999 | - | 0.1 | 0.0 °C ~ 99.9 °C |
| 8003 | Humidity | Read Only | Unsigned Integer | 0 | 999 | - | 0.1 | 0.0% ~ 99.9% |
| 8004 | Mode | R/W | Unsigned Integer | 0 | 2 | 0 | 1 | 0-PRE, 1-EXP, 2- DEXP |
| 8005 | Alarm Set | Read Only | Unsigned Integer | 0 | 99 | 10 | 0.1 | 0.0kV ~ 9.9kV |
| 8006 -H | Offset Status | Read Only | Unsigned Integer | 0 | 1 | - | 1 | 0: Normal, 1: at zero |
| 8006 -L | Alarm Status | Read Only | Unsigned Integer | 0 | 1 | - | 1 | 0: Normal 1: Notifying |
| 8007 | AvgCal | R/W | Unsigned Integer | 1 | 50 | 1 | 1 | Average of data summed in real time |
| 8008 | Distance Set | R/W | Unsigned Integer | 100 | 700 | 100 | mm | Applies in DEXP mode |

7 Dimensions



<Option Bracket>



8 Specification

| Parameter | Description / Value | | | |
|----------------------------------|--|-----------------------|-----|------------------------|
| Input Voltage | +24VDC(±10%) | | | |
| Consumption Current | <100mA | | | |
| Measurement distance | PRE | 10~100mm | EXP | 100~700mm |
| Measurement range | PRE | ±2kV | EXP | ±20kV |
| Accuracy | PRE | ±2kV (±0.05kV Within) | EXP | ±20kV (±1.00kV Within) |
| Resolution | PRE | 1V | EXP | 10V |
| linearity | ±2.5% @ Full Scale | | | |
| Stability(0 electric potential) | PRE | ±2.5% @ Full Scale | EXP | ±5% @ Full Scale |
| Operating Temperature & Humidity | Temperature : 0 ~50°C (32°F ~ 122°F) Humidity : 35 ~ 85% RH | | | |
| Response Speed | Min. 200ms (Based on 1:1 sensor and control unit) | | | |
| Save cycle | Min.1s | | | |
| Communication | RS-485 2Wire (MODBUS RTU) | | | |
| Case material | AL-6061 (Sanding, Anodizing) | | | |
| Extensions | Automatic distance correction or fixed distance correction function in extended mode, simple zero point correction function, temperature and humidity display function | | | |
| Weight | 130g | | | |
| Warranty | 1 year | | | |

* The appearance and specification of the product may be changed without prior notice for the improvement of the product.

SUNJE Hi-Tek Co., Ltd.

www.sunstat.com

Head Office & Factory (Busan)
8 Cheonggwang-gil, Ilgwang-eup,
Gijang-Gun, Busan, Korea
T) +82-51-720-7500 F) +82-51-720-7501

Sunje (SHANGHAI) Trading Co., Ltd.
205B, Building A, No.1018 Mingzhu Road,
Qingpu District, Shanghai, China
T) +86-21-5433-9761 F) +86-21-5433-9762

Sales Headquarter (Osan)
3rd floor, 129-20, Gyeonggi-daero 632
beon-gil, Osan-si, Gyeonggi-do, Korea
T) +82-31-203-9034 F) +82-31-202-9034

Sunje Technology Co., Ltd.
2F, No.6, Lane.102, Sinhe Rd, Sinfong
Township, Hsinchu County, Taiwan 30472
T) +886-3-568-7891 F) +886-3-568-7950

Product & Quotation Inquiries
+82-51-720-7529

Technical Support & A/S
+82-51-720-7519