Panasonic **INSTRUCTION MANUAL**

Electrostatic Sensor / Sensor Head

# EF-S1HS

MJE-EFS1HS No.0090-07V

Thank you very much for using Panasonic products. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

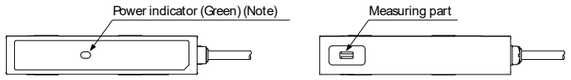
**WARNING**

- **Never use this product with a device for personnel protection.**
- **In case of using devices for personnel protection, use products which meet laws or standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.**

## 1 OUTLINE

- This product is a sensor head for connecting to a Electrostatic sensor controller (**EF-S1C**).
- It can be used for in-line measurement of electrical potentials on object surfaces.

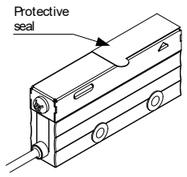
## 2 PART DESCRIPTION

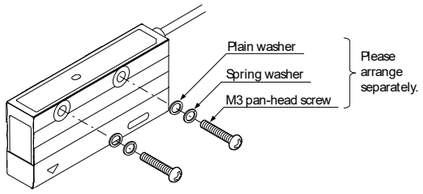



Note: If the power indicator is not illuminated, check that the cables are connected correctly.

## 3 MOUNTING

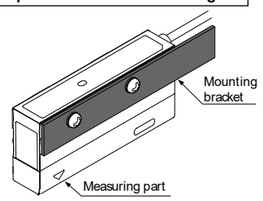
- A protective seal is affixed to the measuring part of this product at the factory setting. Be sure to remove this protective seal before use.
- Do not let any dust or other foreign materials get onto the sensor. If dust or other foreign materials get onto the measuring part or the area around it, it may interfere with correct measurement. If dust or other foreign materials get onto the sensor, clean it off with an air blower or similar.
- Use M3 pan-head screws, spring washers and plain washers (please arrange separately) to mount the sensor so that it faces downward. The tightening torque at this time should be 0.5N·m or less.



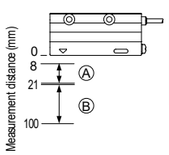

**Example of recommended mounting**

- If a mounting bracket used by the customer is brought close to the measuring part, it may affect measuring performance. Mount the mounting bracket to the sensor head so that it is as far away from the measuring part as possible.




- If a charge builds up in the mounting bracket, it will affect measuring performance, so be sure to ground the mounting bracket when using the sensor. However, the metal enclosure should be insulated.
- Mount in a location which is not subject to vibration.
- Mount the sensor head so that the sensor is parallel to the object being measured, and use the exclusive controller (**EF-S1C**) to set the measuring distance so that it is equal to the distance from the sensor to the object being measured. (Measurement accuracy will be better if the measurement distance is set to as short a distance as possible.) For details on the setting method for the controller, refer to the separate instruction manual for the exclusive controller (**EF-S1C**).

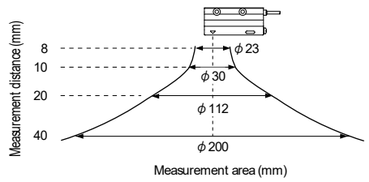
**Range for measurement distance**




| | Range for measurement distance | Measurement range | Exclusive controller display |
|---|---|---|---|
| Ⓐ | 8 to 20.5mm | ±1kV | 8.0 、 8.5 to 20.5 |
| Ⓑ | 21 to 100mm | ±2kV | 21.0 、 21.5 to 100 |

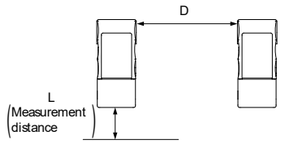
- This product measures electric fields. Because of this, if any objects are present inside the measurement area (refer to the illustration below) or near the sensor head which might disturb the electric field around the object being measured, it will affect measurement accuracy.
  (The shorter the measurement distance, the more difficult it will be for nearby objects to have an adverse effect on measurement.)
  In order to obtain the most accurate measurement results, mount the sensor head while taking into account factors such as the measurement distance, measurement area and ambient environment.
  In addition, after mounting the sensor head, carry out 0-Adjust and calibration using the controller. For details, refer to the separate instruction manual for the exclusive controller (**EF-S1C**).

**Measurement distance - Measurement area (typical)**




- If several sensors are being used together, measurement errors will occur because the metallic parts of the sensor heads will act as nearby metallic objects that can affect measurement.
  Mount the sensors so that there is a gap between them that is equal to or greater than the values given in the table below.

| L (mm) | D (mm) |
|---|---|
| ≦ 8 | 0 |
| 8 to 12 | 8 |
| 12 to 16 | 18 |
| 16 to 30 | 51 |
| 30 to 40 | 68 |



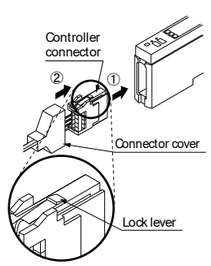

## 4 CONNECTION TO EXCLUSIVE CONTROLLER(EF-S1C)

Be sure to turn off the power before connecting the sensor head and the exclusive controller.

**How to mount the sensor head to the controller**

① Insert the sensor head connector into the inlet of the exclusive controller until it clicks.
② Fit the connector cover on the connector.

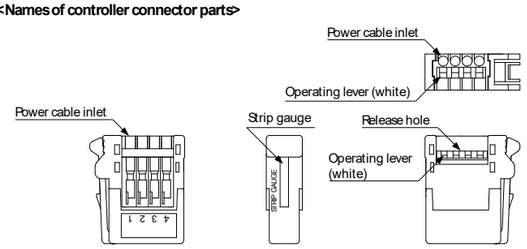
- When removing the sensor head, be sure to push down the connector lock lever while removing it. If the connector is pulled with excessive force (0.4N or more) without the lock lever being pushed down, it may damage the connector.




## 5 CONNECTION METHOD

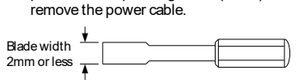
- The cable can be shortened to the desired length.

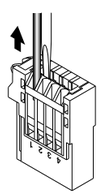
**<Names of controller connector parts>**




**Release procedure**

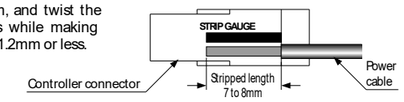
① Use a flathead screwdriver (with a blade width of 2mm or less) to push in the operating lever (white) of the power cable inlet, and remove the power cable.



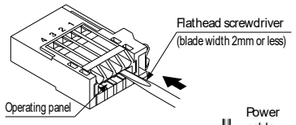



**Connection procedure**

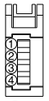
① Using the 'STRIP GAUGE' indicator at the side of the sensor head as a guide, strip the end of the power cable to a bare length of 7 to 8mm, and twist the bared end several times while making sure that the diameter is 1.2mm or less.



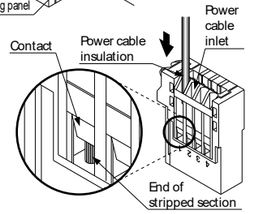

② Use a flathead screwdriver with a blade width of 2mm or less to push in the operating lever (white) of the operating panel to the lock position.



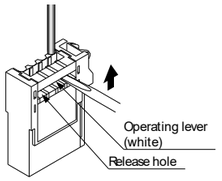

③ Insert the power cable into the power cable inlet as far as it will go.
Check that the insulation of the power cable is inserted into the power cable inlet as shown in the illustration at right, and that the end of the stripped section passes through the contact.



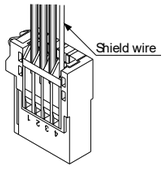

| Terminal No. | Connection cable |
|---|---|
| ① | +Vh: Brown |
| ② | 0V: Blue |
| ③ | Output: Orange / Purple |
| ④ | Shield wire |




④ Place the blade of the flathead screwdriver through the release hole and against the base of the operating lever (white), and move the blade of the flathead screwdriver up.
When a click is heard, the operating lever (white) will return and the power cable will be secured.




⑤ Gently pull the power cable and check that it does not pull out.




## 6 MAJOR SPECIFICATIONS

| Item \ Designation / Model No. | Electrostatic sensor head<br>**EF-S1HS** |
|---|---|
| Applicable controller | **EF-S1C** (Note 1) |
| Measurement distance (measurement range) | 8 to 20.5mm (±1kV range) or 21 to 100mm (±2kV range) (Note 2, 3) |
| Ambient temperature | 0 to +40°C (No dew condensation), Storage: -20 to +60°C |
| Ambient humidity | 35 to 65%RH (Note 4), Storage: 35 to 85%RH |
| Vibration resistance | 10 to 150Hz frequency, 0.75mm amplitude in X, Y and Z directions for two hours each |
| Shock resistance | 98m/s² acceleration (10G approx.) in X, Y and Z directions for five times each |
| Material | Enclosure: Heat-resistant ABS<br>Measuring part cover: Stainless steel (SUS304) |
| Cable | 0.09mm² 3-core shield cable, 5m long with a connector at the end |
| Weight | 90g approx. |

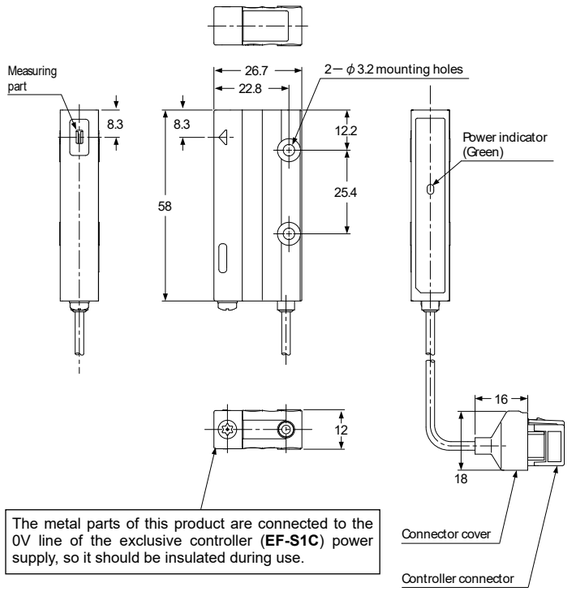
Notes: 1) For details on the exclusive controller (**EF-S1C**), refer to the separate instruction manual for the exclusive controller (**EF-S1C**).
2) This product's measurement values vary depending on the measurement distance. Use the exclusive controller to set the measurement distance, and use at a fixed distance.
3) This can be switched by means of exclusive controller (**EF-S1C**) settings. For details, refer to the separate instruction manual for the exclusive controller (**EF-S1C**).
4) If this product is used for long periods in an environment where there is high ambient humidity, the measurement values may vary over time. Always be sure to use in an environment with a relative humidity of 65% RH or lower.

## 7 CAUTIONS

- This product is manufactured according to specifications that are complete for use in combination with the optional exclusive controller (**EF-S1C**). Be sure to use it together with the exclusive controller.
- Do not touch the sensor and surrounding parts. If this is not observed, it may cause measurement accuracy to drop.
- The metal parts of this product are connected to the 0V line of the exclusive controller (**EF-S1C**) power supply, so it should be insulated during use.
- Do not use with a + ground.

- This product has been developed / produced for industrial use only.
- This product uses a thin cable with a diameter of 0.09mm². Be careful not to pull the cable with excessive force, otherwise the wires may break.
- Do not use in places where there are strong electric fields apart from those for the object being measured.
- Do not use in strong magnetic fields.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Make sure that stress is not applied directly to the sensor head cable joint.
- Extension up to total 10m is possible with 0.15mm² ,or more,cable,However,in order to reduce noise,make the wiring as short as possible.
- This sensor is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in direct contact with strong acid, water, oil, grease, or organic solvents, such as, thinner, etc.
- This sensor cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the sensor.

## 8 DIMENSIONS (Unit: mm)

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