Panasonic

When using the EF-S1 series of electrostatic sensors for the first time

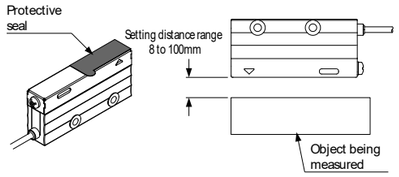
IMJE-EFS1C No.0093-10V

1 BASIC OPERATION

Preparation

① Peel off the protective seal from the measuring part in the sensor head (**EF-S1HS**).
② Connect the sensor head and the controller.
③ Mount the sensor head at a distance of 8 to 20.5mm from the object to be measured (if the measured value is anticipated to be 1,000V or less) or 21 to 100mm (if the measured value is anticipated to exceed 1,000V). (Note 1)

Notes: 1) The metal parts of sensor head are connected to the 0V line of the controller power supply, so it should be insulated during use.



Turning on the power

④ Turn on the power. (The software version will be displayed for approximately 3 seconds.)

Distance setting

⑤ Set the distance that the sensor head was mounted at in step ③.
For details on the setting method, refer to '**7 NAVI MODE** in the instruction manual for the controller.
(The factory setting for the distance is 8mm. If you are using the sensor head at a distance of 8mm, then the setting does not need to be changed.)

<Reference>

The sensor output will vary depending on the measurement distance for the sensor head.
Correction is carried out based on the measurement distance, so use the controller to set the measurement distance, and used at that fixed distance.
The measurement range will change as shown in the table below depending on whether the measurement distance is 8 to 20.5mm or 21 to 100mm.

Measurement distance (mm)	Measurement range
8 to 20.5	-1,000 to +1,000 (±1kV range)
21 to 100	-1,999 to +1,999 (±2kV range)

Threshold value setting

⑥ Set the threshold value for judgment output.
For details on the setting method and setting ranges, refer to '**6 RUN MODE**' and '**8 SETTING RANGE**' in the instruction manual for the controller.
(The factory setting is ±100.)

0-Adjust

⑦ Carry out 0-Adjust after measuring the metal plate that is connected to the ground.
For details on the setting method, refer to '**6 RUN MODE**' in the instruction manual for the controller.

<Reference>

Carrying out 0-Adjust allows the measurement value baseline to be set to the value that is currently being measured.
The factory setting is for the measurement value baseline potential to be set to 0V, but it is possible for there to be some difference between that and the enclosure ground. Be sure to carry out 0-Adjust in order to ensure that stable sensing can be carried out.

Start measurement

⑧ When RUN mode is started, measurement can start. (Note 2)

Notes: 2) A 10-minute warming-up period is needed after the power is turned on, so carry out the 0-Adjust operation if accuracy is required.

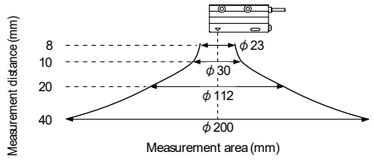
2 FOR GREATER MEASUREMENT ACCURACY

● It is recommended that you carry out the following operations in order to improve measurement accuracy during use.

Measurement range

・ This product measures electric fields. Because of this, if any objects are present inside the measurement area (refer to the illustration at right) 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.

Measurement distance - Measurement area (typical)



Using together with an ionizer

・ If the sensor head is installed near a device such as an ionizer which generates a large fluctuating magnetic field, the measurement values may become unstable. In such cases, mount the sensor head as far away from the ionizer as possible, or change the settings by delaying the response time so that measurement will be more stable.
For details on setting the response time, refer to '**9 PRO MODE / PRO1 mode setting**' in the instruction manual for the controller.

Calibration

・ If the potential of the object being measured is already known, the measurement value for the sensor head can be set to the value that is already-known.
This can help to cancel out any errors arising from measurement conditions and measurement range errors after the sensor head has actually been mounted, so that more accurate measurement can be carried out.
For details, refer to '**9 PRO MODE / PRO1 mode setting**' in the instruction manual for the controller.

3 JUDGMENT OUTPUT

● The output mode (window comparator mode / 2-output mode) and output status (normal open / normal close) can be set for both OUT1 and OUT2.
● For details on the setting method, refer to '**9 PRO MODE / PRO6 mode setting**' in the instruction manual for the controller.

<Window comparator mode + Normal open>

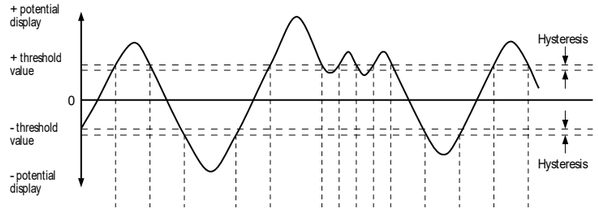
● OUT1 turns ON when the measurement value is at or above the + threshold value, or at or below the - threshold value.
● OUT2 turns ON when an over-range result ('H.ou' or 'L.ou') is generated. (Note 1)
● For normal close, the output logic is reversed.

Notes: 1) An over-range result is generated in the following cases:
・ When the potential of the object being measured is outside the specification range for the sensor head
・ When analog output is 5V or more, or 1V or less

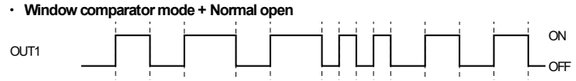
<2-output mode + Normal open>

● If the measurement value is at or above the + threshold value, OUT1 turns ON.
● If the measurement value is at or below the - threshold value, OUT2 turns ON.
● For normal close, the output logic is reversed.

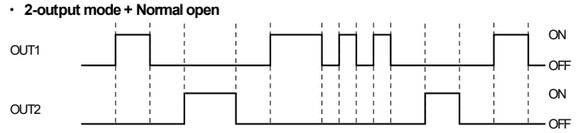
Output operation timing chart



・ **Window comparator mode + Normal open**



・ **2-output mode + Normal open**

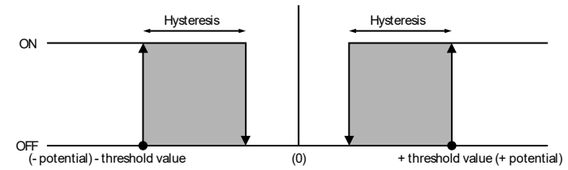


Notes: 2) The threshold values can be set separately for + potentials and - potentials.

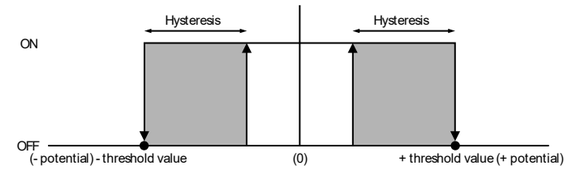
<Hysteresis>

・ The hysteresis can be set to one of five levels in order to prevent chattering. The factory setting for hysteresis is 20. For details on the setting method, refer to '**9 PRO MODE** / PRO1 mode setting' in the instruction manual for the controller.

<Normal open>



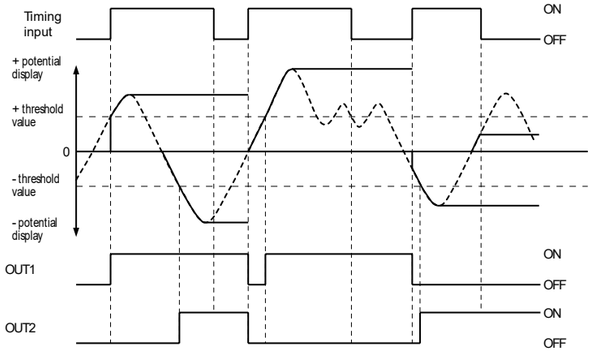
<Normal close>



4 EXTERNAL INPUT OPERATIONS AND HOLD MEASUREMENT

● If HOLD mode is set to 'Pb-1', 'Pb-2' or 'Pb-3', the peak hold measurement can be carried out using the timing input signal or the jog switch.
・ When timing input is ON or the jog switch is turned (to the '+' or '-' side): Peak hold measurement
● During peak hold measurement, the + peak value and the - peak value are updated while timing signal input is being received, and these values are held until the next signal is input.
● The timing input signal should be input for 2ms or more.
● OUT1 and OUT2 output a judgment signal depending on the peak hold values, but hold operation is not carried out for analog output.
The hysteresis function does not work during judgment output.

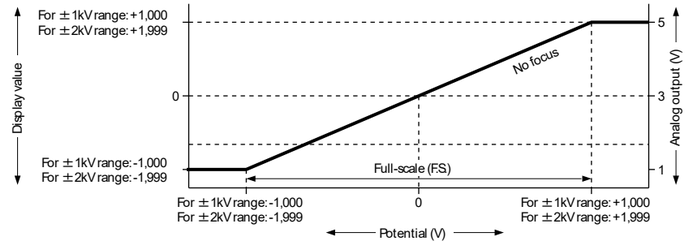
Output operation timing chart



5 ANALOG OUTPUT

● The relationship between measurement values and analog output for the sensor head is shown in the illustration at right.
● Analog output can have its focus set to x2, x5 or x10. (The factory setting is for no focus.)

<Points to note when using analog output>
Because the 0V lines for judgment output and analog output are common, the analog output may vary depending on the load current.
In order to satisfy the linearity specifications for the analog output, do not use the judgment output.



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