



(주)동일기연
DONG IL TECHNOLOGY LTD.

Instruction Manual

ELECTROSTATIC FIELD METER ARS-S005 Series



- . Read this instruction manual before using the product in order to achieve maximum performance.
- . Keep this manual within your reach after reading so that it can be used at any time.
- . Warranty is on the last page of this manual. Please read the contents and keep it carefully.

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1. Product features

Welcome to become a customer of DIT.



“ARS-S005” is a electrostatic field meter to measure electrostatic voltage on the object, installed in production line, such as machine, conveyor and etc.

Static-electricity can cause lower production efficiency, such as damage on circuit pattern of products, particle deposition and etc.

“ARS-S005” is the product which can monitor and manage the static-electricity in real time, especially frequent electrostatic spot.

▶ Precise mode and expanded mode

Distance between sensor and objects is an important factor to measure electrostatic level. In case of 25mm distance, precise mode can be applied with 1V resolution. In case of expanded mode, it can be operated between minimum 50mm to 100mm at 10mm interval with 10V resolution.

▶ High accuracy and reliability

The error rate on precise mode is $\pm 5\%$ and the error rate on expanded mode is $\pm 10\%$.

▶ Remote monitoring system (Monitoring program provided)

User can check real time data by a computer with a RS485 converter.

▶ Multi sensors can be monitored by one PC

Up to 30 ARS-S005 units can be connected with Daisy-Chain and it is possible to check all data from 30 units by 1 PC.

2. Product specification

Dimension	55.4mm(W) x 40.2mm(H) x70.1mm(D)	
Input Voltage	+24VDC	
Power Consumption	Less than 3W	
Sensor	Oscillating Chopper Type (DIT)	
Distance	Precise mode : 25mm(± 0.5) Fixed Expanded mode : 50~100mm(± 0.5)(10mm interval)	
Range	Precise mode : $\pm 2kV(\pm 5\%)$ Expanded mode : $\pm 20kV(\pm 10\%)$	
Resolution	Precise mode : 1V Expanded mode : 10V	
Linearity	$\pm 5\%$ F.S	
Response Time	20ms	
Analog Output	ARS-S005W1	Output Voltage (1~5V)
	ARS-S005U1	Output Voltage (0~5V)
	ARS-S005C1	Output Current (4~20mA)
Communication	RS-485	
Indicators	Power LED(Green), +/- Polarity(Yellow/Orange)	
Ambient Temperature	0°C ~50°C	
Ambient Humidity	35~85%RH	

- ※ 1. Specification can be changed without notice for performance improvement.
 2. This product is optimized for detection from 25mm/50mm distance. It is possible to detect from 60~100mm distance, however performance is not guaranteed.

3. Package contents

Please check the package contents before use.

< Package >

① Sensor

It must be installed in detecting area and SUS material part must be headed to the object.

② Controller

It is the squared part of ARS-S005 to set up the detecting distance, address and so on.

③ Power Cable (DC24V 4PIN)

1.5m length standard power cable is supplied. If power cable is not connected properly, product could be damaged. To avoid damages from wrong connection, please check the each wire's color, when connecting wires. Our company is not liable for any damages from wrong connection.

④ GND Cable

Even if power cable includes ground wire, 3m ground cable is supplied separately.

Caution!!

Before connecting power cable, please check the power capacity. It should be full ground connection to avoid electronic shock and performance assurance.

⑤ Instruction Manual

Read this instruction manual before using the product.

< Option >

① Adapter (DC +24V)

② Communication CABLE B Type

3m length communication cable (RJ-45 B type) is supplied.

① Sensor



② Controller



3. Package contents

③ Power Cable



④ GND Cable



⑤ Instruction Manual



Manual is available on our website

< Option >

① Adapter (DC +24V)



② Communication cable B-type (optional)



※ Option item can be provided on request.

4. Parts name and function

< Main Body >



No.	Name	Description
①	Sensor	Detect the electro-static level from objects
②	Controller	Display measured value by sensor and change the settings

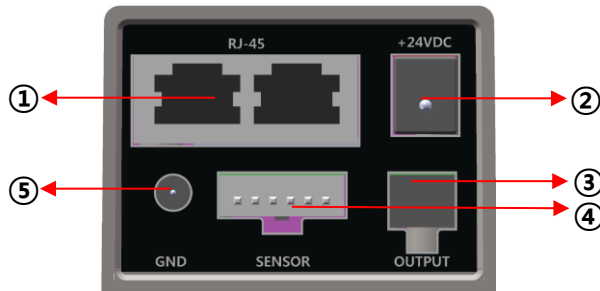
< Controller(Front) >



No.	Name	Description
①	DISPLAY	Show measured value and menu settings
②	POWER LED	Power status
③	Polarity LED	Show object's polarity with (+)/(-)
④	ZERO	Set up the sensor to zero point
⑤	MENU KEY	Enter the menu
⑥	ESC KEY	Escape from the menu
⑦	OK(HOLD)KEY	Set up the menu or hold the display status

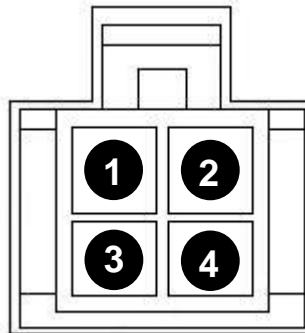
4. Parts name and function

< Controller(Rear) >



NO	Name	Description
①	RJ-45 PORT	Connect to ionizer or PC for remote monitoring system
②	DC JACK	Power supply for extra adapter
③	4PIN PORT	Port for power, analog output and alarm signal
④	SENSOR	Port for connecting to sensor header
⑤	GND	Port for connecting to GND

< Input/output wiring for 4pin Port on the rear >











NO	Name	Wire color
①	GROUND	BLACK
②	ALARM SIGNAL (Normal "24VDC", Abnormal "0VDC")	WHITE
③	ANALOG OUTPUT	YELLOW
④	+24V POWER SUPPLY	RED

4. Parts name and function

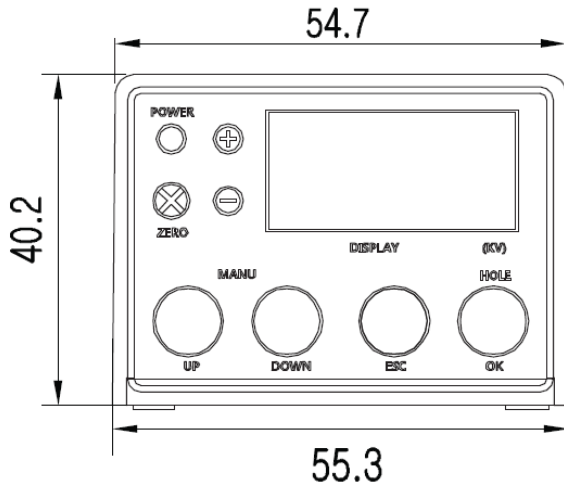
< Input/output wiring for RJ-45 Port on the rear >



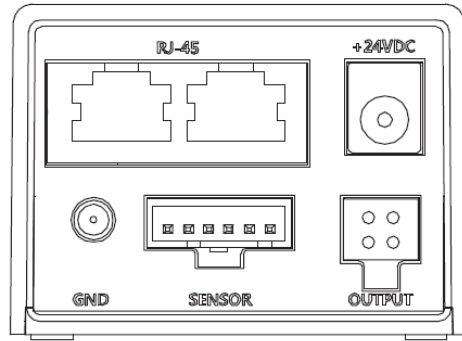
8PIN No.	Description	Wire Color
①	Communication TX(+) Signal	 BLACK
②	Communication TX(-) Signal	 BROWN
③	Communication RX(+) Signal	 RED
④	+24 DC Power Supply(Output:DC+24V)	 ORANGE
⑤	Power supply Ground, Field Ground	 YELLOW
⑥	Communication RX(-) Signal	 GREEN
⑦	Ion Sensor Signal	 BLUE
⑧	Power supply Ground, Field Ground	 VIOLET

5. Dimensions

< Controller >

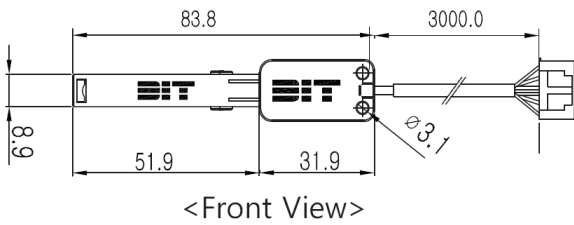


<Front View>



<Rear View>

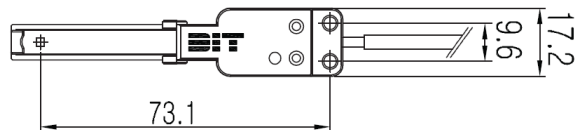
< Sensor Header >



<Front View>



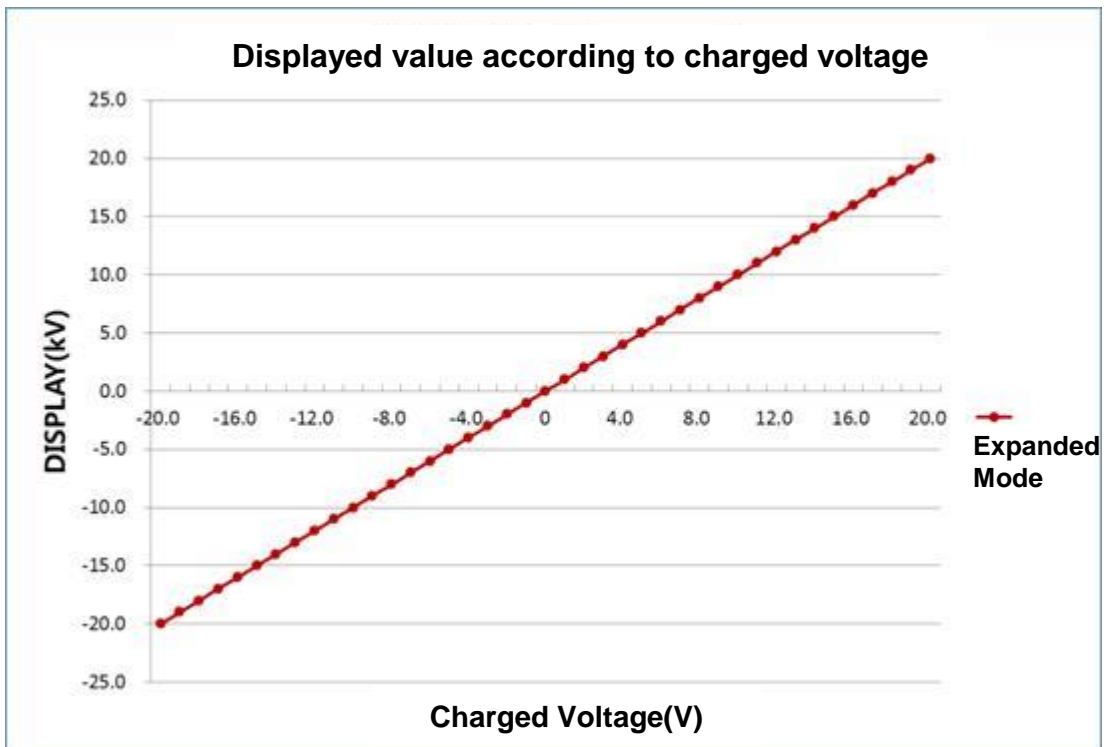
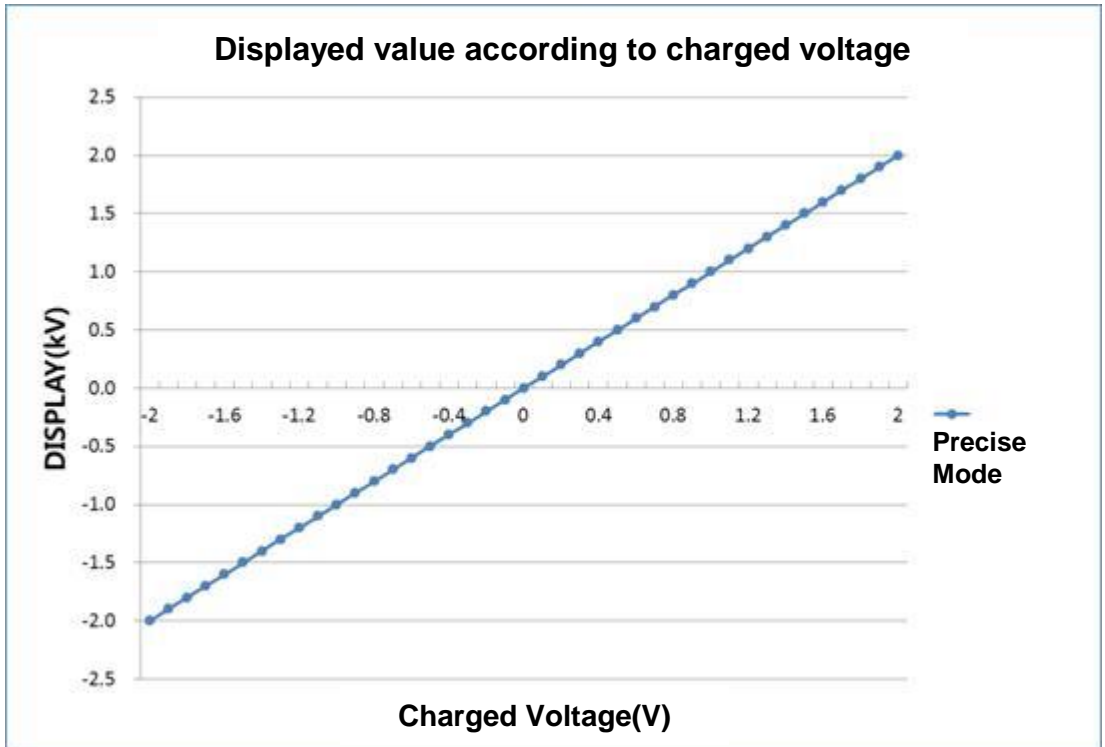
<Side View>



<Rear View>

6. Performance

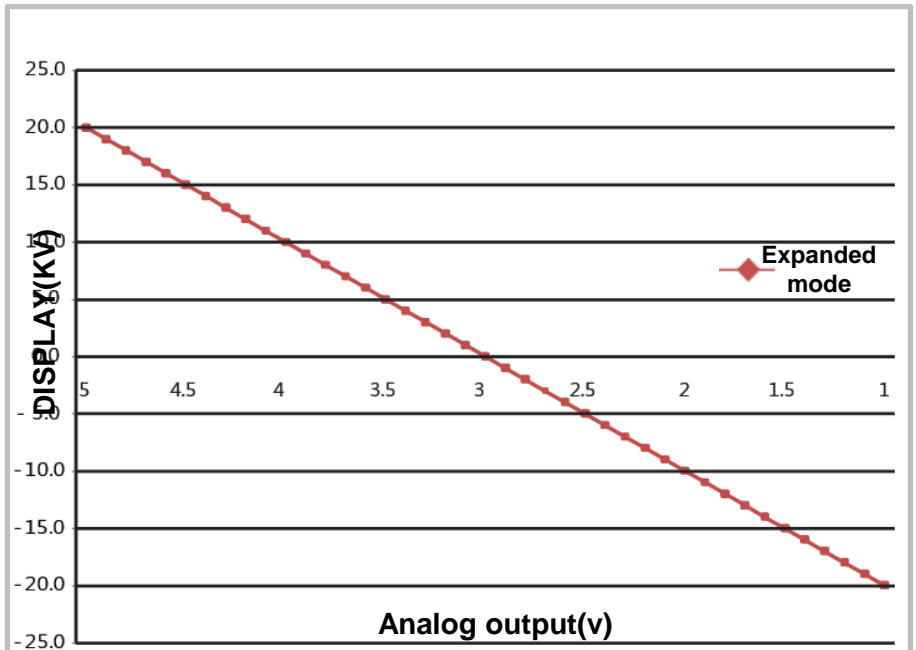
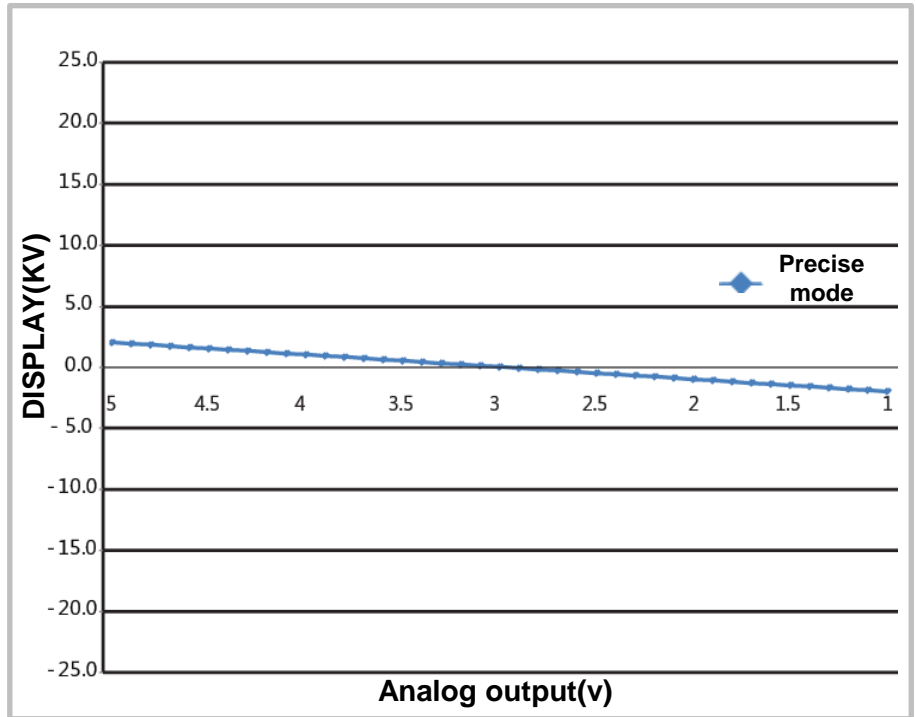
1) Test result for precise/expanded mode [DIT TEST Result]



6. Performance

2) ARS-S005W1 (1~5V) Analog output graph

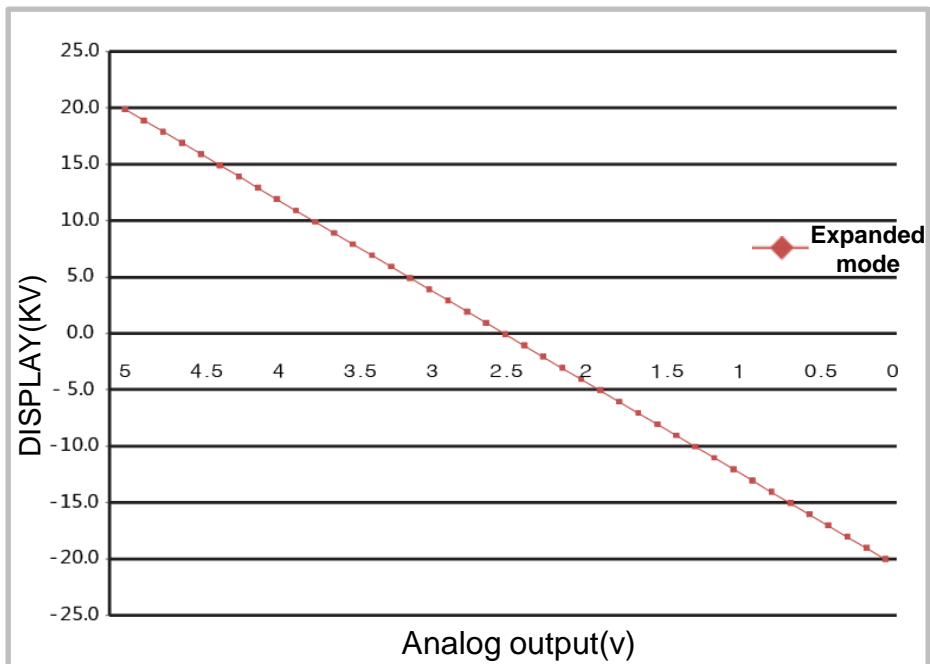
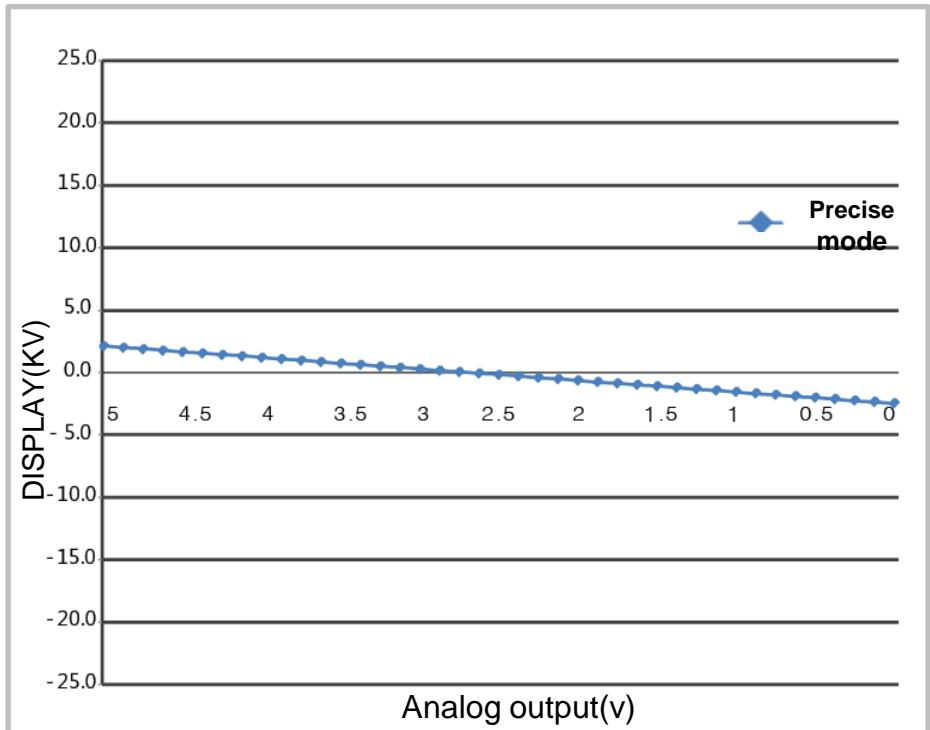
DISPLAY		Analog Output
Expanded	Precise	
20kV	2kV	5V
19kV	1.9kV	4.9V
18kV	1.8kV	4.8V
17kV	1.7kV	4.7V
16kV	1.6kV	4.6V
15kV	1.5kV	4.5V
14kV	1.4kV	4.4V
13kV	1.3kV	4.3V
12kV	1.2kV	4.2V
11kV	1.1kV	4.1V
10kV	1.0kV	4.0V
9kV	0.9kV	3.9V
8kV	0.8kV	3.8V
7kV	0.7kV	3.7V
6kV	0.6kV	3.6V
5kV	0.5kV	3.5V
4kV	0.4kV	3.4V
3kV	0.3kV	3.3V
2kV	0.2kV	3.2V
1kV	0.1kV	3.1V
0V	0V	3.0V
-1kV	-0.1kV	2.9V
-2kV	-0.2kV	2.8V
-3kV	-0.3kV	2.7V
-4kV	-0.4kV	2.6V
-5kV	-0.5kV	2.5V
-6kV	-0.6kV	2.4V
-7kV	-0.7kV	2.3V
-8kV	-0.8kV	2.2V
-9kV	-0.9kV	2.1V
-10kV	-1.0kV	2.0V
-11kV	-1.1kV	1.9V
-12kV	-1.2kV	1.8V
-13kV	-1.3kV	1.7V
-14kV	-1.4kV	1.6V
-15kV	-1.5kV	1.5V
-16kV	-1.6kV	1.4V
-17kV	-1.7kV	1.3V
-18kV	-1.8kV	1.2V
-19kV	-1.9kV	1.1V
-20kV	-2.0kV	1.0V



6. Performance

3) ARS-S005U1 (0~5V) Analog output graph

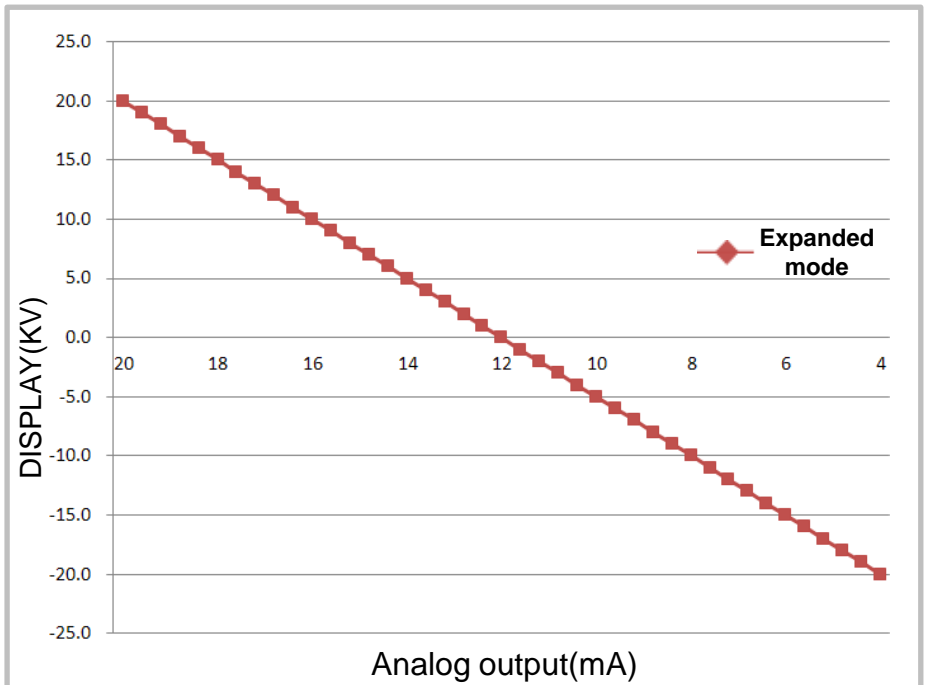
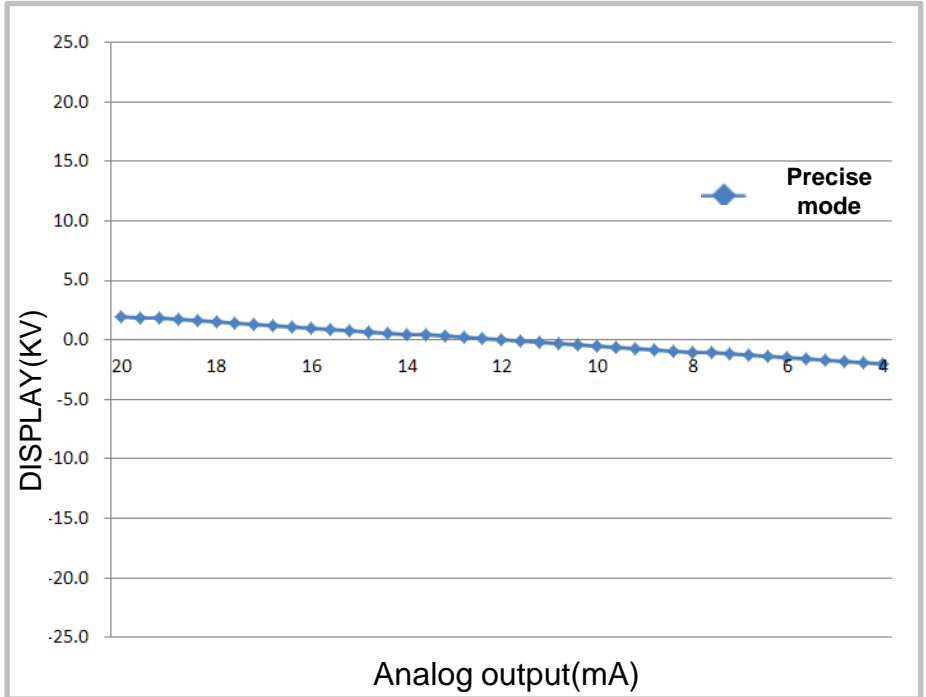
DISPLAY		Analog Output
Expanded	Precise	
20kV	2kV	5V
19kV	1.9kV	4.875V
18kV	1.8kV	4.75V
17kV	1.7kV	4.625V
16kV	1.6kV	4.5V
15kV	1.5kV	4.375V
14kV	1.4kV	4.25V
13kV	1.3kV	4.125V
12kV	1.2kV	4.0V
11kV	1.1kV	3.875V
10kV	1.0kV	3.75V
9kV	0.9kV	3.625V
8kV	0.8kV	3.5V
7kV	0.7kV	3.375V
6kV	0.6kV	3.25V
5kV	0.5kV	3.125V
4kV	0.4kV	3.0V
3kV	0.3kV	2.875V
2kV	0.2kV	2.75V
1kV	0.1kV	2.625V
0V	0V	2.5V
-1kV	-0.1kV	2.375V
-2kV	-0.2kV	2.25V
-3kV	-0.3kV	2.125V
-4kV	-0.4kV	2.0V
-5kV	-0.5kV	1.875V
-6kV	-0.6kV	1.75V
-7kV	-0.7kV	1.625V
-8kV	-0.8kV	1.5V
-9kV	-0.9kV	1.375V
-10kV	-1.0kV	1.25V
-11kV	-1.1kV	1.125V
-12kV	-1.2kV	1.0V
-13kV	-1.3kV	0.875V
-14kV	-1.4kV	0.75V
-15kV	-1.5kV	0.625V
-16kV	-1.6kV	0.5V
-17kV	-1.7kV	0.375V
-18kV	-1.8kV	0.25V
-19kV	-1.9kV	0.125V
-20kV	-2.0kV	0V



6. Performance

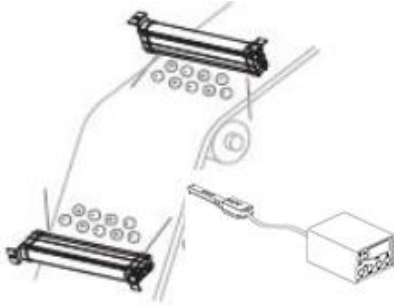
4) ARS-S005C1 (4~20mA) Analog output graph

DISPLAY		Analog Output
Expanded	Precise	
20kV	2kV	20mA
19kV	1.9kV	19.6mA
18kV	1.8kV	19.2mA
17kV	1.7kV	18.8mA
16kV	1.6kV	18.4mA
15kV	1.5kV	18mA
14kV	1.4kV	17.6mA
13kV	1.3kV	17.2mA
12kV	1.2kV	16.8mA
11kV	1.1kV	16.4mA
10kV	1.0kV	16mA
9kV	0.9kV	15.6mA
8kV	0.8kV	15.2mA
7kV	0.7kV	14.8mA
6kV	0.6kV	14.4mA
5kV	0.5kV	14mA
4kV	0.4kV	13.6mA
3kV	0.3kV	13.2mA
2kV	0.2kV	12.8mA
1kV	0.1kV	12.4mA
0V	0V	12mA
-1kV	-0.1kV	11.6mA
-2kV	-0.2kV	11.2mA
-3kV	-0.3kV	10.8mA
-4kV	-0.4kV	10.4mA
-5kV	-0.5kV	10mA
-6kV	-0.6kV	9.6mA
-7kV	-0.7kV	9.2mA
-8kV	-0.8kV	8.8mA
-9kV	-0.9kV	8.4mA
-10kV	-1.0kV	8mA
-11kV	-1.1kV	7.6mA
-12kV	-1.2kV	7.2mA
-13kV	-1.3kV	6.8mA
-14kV	-1.4kV	6.4mA
-15kV	-1.5kV	6mA
-16kV	-1.6kV	5.6mA
-17kV	-1.7kV	5.2mA
-18kV	-1.8kV	4.8mA
-19kV	-1.9kV	4.4mA
-20kV	-2.0kV	4.0mA



7. Installation and Connection

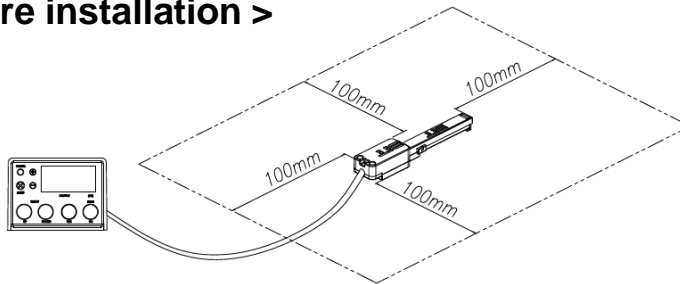
< Application >



ARS-S005 Series is installed where electrostatic problems come up and electrostatic measuring and monitoring is required.

- 1) Damage on the circuit patterns
- 2) Pollutant absorption
- 3) Absorption between products / equipments and products

< Caution before installation >



Improper Installation and use may lead to injury or product malfunction. Please follow the cautions below when installation and use.

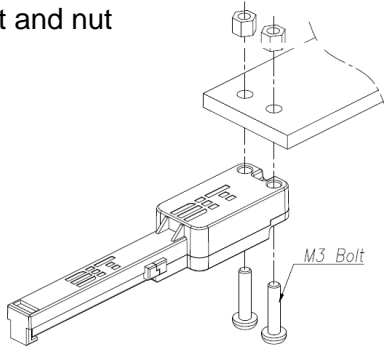
- ① When set it up, please remove any object, influence on sensor's performance, from the sensor at least 100mm for each side. Especially, ionizers must be installed more than 500mm distance from controller and sensor.
- ② Please install the product on a level surface.
The failure to do so may hamper product performance and/or cause malfunction. Enough space for maintenance and wiring is required.
- ③ Please do not use the product at place, where noise (Electro-magnetic, surge and etc.) can be occurred. Otherwise, malfunction and damages for a device and chip could be happened.
- ④ Before installation, please check the power and current capacity. Do not share the power with other equipment. It might cause the malfunction or damages.
- ⑤ Require full ground connection, before installation.

7. Installation and Connection

Please be well informed of the cautions below before installation.

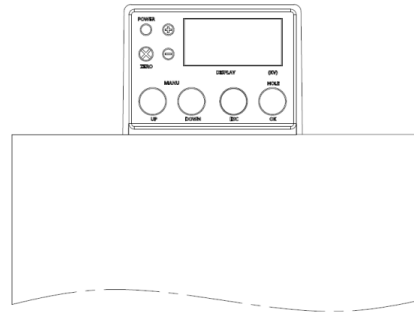
① Fix the sensor header

Fix the sensor header to bracket by M3 bolt and nut



② Fix the controller

Put the controller on the flat and safe place

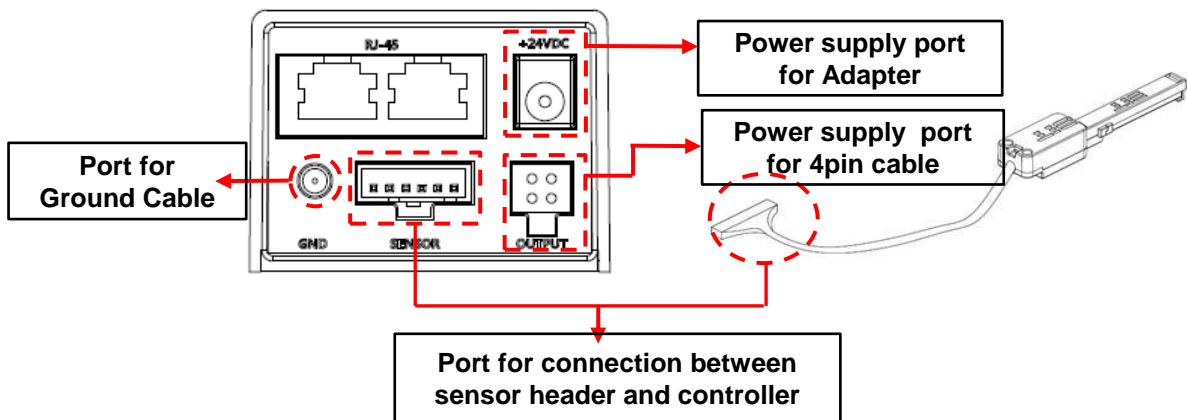


③ Sensor header / Controller / Power / GND Connection

After connect sensor to controller, plug in the power cable using +24VDC adaptor and connect GND cable to earth.

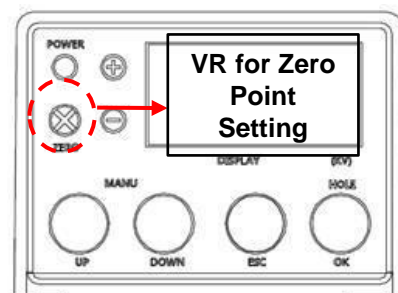
Caution!!

When using 4pin-Cable, be careful of the wiring. Wrong wiring causes product malfunction.



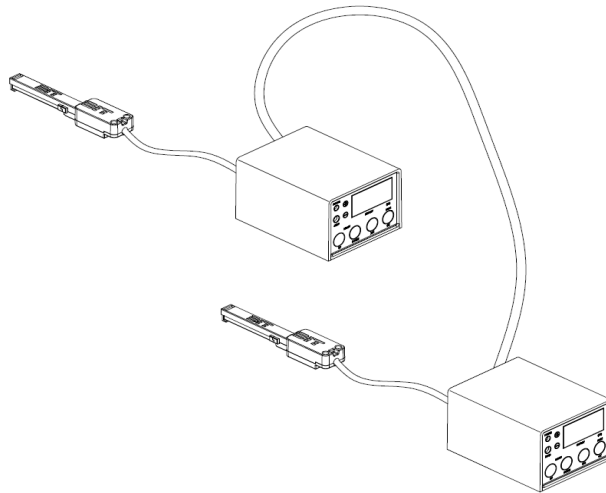
④ Initial operation / Zero Point Setting

After 10minute operation, make display zero level, turn the zero point on main body, using screw-driver, without object.



7. Installation and Connection

< Installation of more than 2 units >






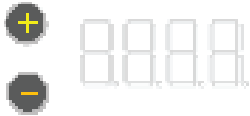


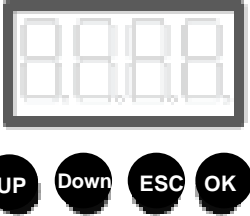
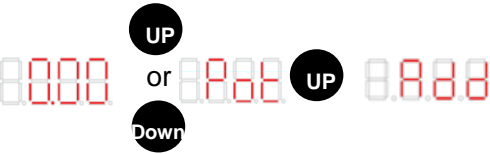
- ① Power supply : Each ARS-S005 unit needs a separate power connection using adapter or 4Pin-Cable. Be careful of wiring when using 4Pin Cable.
- ② Telecomm : After connecting RJ-45 Ports of 2 units with a communication cable B-type. connect a final controller to PC.
- ※ When connecting to PC, a RS485 converter is required. A RS485 converter is not included in the package.

< Check list after installation >

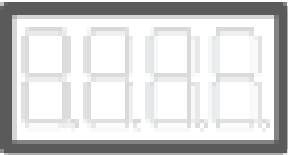


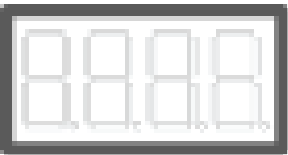
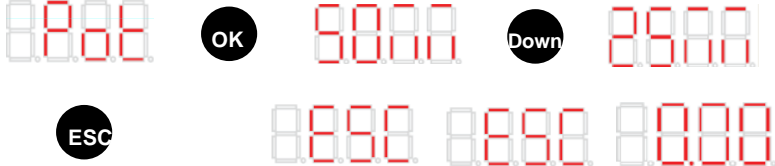

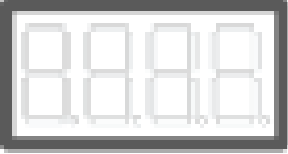



Recheck the below list before operation.

- 1) Check operation environment before turning on.
- 2) Please recheck the proper connection, before turn on.
Wrong connection might cause the malfunction and damages.
- 3) Before turn on, recheck the voltage and current capacity.
- 4) Do not plug in or out the sensor header connector, when turn on..
- 5) Remove metal or metallic tool from detecting parts.
- 6) Don not stick on the tape and seal on the main body.

8. Remote monitoring setting with a monitoring program

Indication/ Adjustment key	Setting	Description
<p>POWER check</p> 	<p>Power Led ON(G) When LED is green, power is supplied properly.</p>	
<p>Polarity LED</p>  	<p>+ LED(Y), -LED(O) When detected voltage is (+) polarity, turn on (+) LED and (-) LED is off When (-) polarity, (-) LED is on and +LED is off.</p>	
<p>Check detected voltage</p> 	<p>FND shows detected voltage</p>	<p>When Pot is 25MM,  2[kv]~+2[Kv} When Pot is more than 50MM  -20[kv]~+20[Kv}</p>
<p>Menu entry / change</p> 	<p>To entry the main menu, please press the key as follows.</p>  <p>To entry main menu, press up or down key in voltage display screen. When press the up or down key, adjustable menu is changed as right side from the previous entry menu.</p>	

8. Remote monitoring setting with a monitoring program

Indication/ Adjustment key	Setting
<p>Indicated voltage Hold On / Off</p> 	 <p>If press the OK button, while detected voltage is displayed, current detected voltage value is fixed.</p>  <p>If press the OK button again, when value is fixed, detected voltage value is displayed in a regular basis.</p>
<p>Setting cancellation and menu escape</p> 	<p><Setting cancellation></p>  <p>If press the “ESC” key, during the setting, changed setting is not saved and detected voltage is displayed, after “ESC” display is blinked.</p> <p><Escape from menu></p> 
<p>Error message</p> 	<p><+ Exceed detectable polarity range></p>  <p>Detected voltage exceed +20[kv] in Pot 50MM and +2[kv] in Pot 25MM, FND shows “o-HI”.</p>  <p>Detected voltage is less than +20[kv] in Pot 50MM and +2[kv] in Pot 25MM, FND shows “o-HI”.</p>  <p>If sensor is not connected to controller or any problem for connection, FND shows “Err”.</p>

8. Remote monitoring setting with a monitoring program

Menu	Category	Description
Pot	Detecting distance change/save	Adjustable detecting range is as follows “25mm” “50mm” “60mm” “70mm” “80mm” 90mm” “100mm” ※ Main purpose of this product is detecting 25mm/50mm. It is detectable from 60 ~100mm, however performance is not assured.
Add	Address change/save	Assigning “A01”–“A30” is allowed (up to 30 units). When monitoring multi sensors, it is possible to monitor up to 30 units on 1 PC by assigning each different address,
LIMH	Max. Limit Value change/save	Configurable max limit value is as below. “0V” ~ “1kV” : Adjustment possible by the 100V “1kV” ~ “20kV” : Adjustment possible by the 1kV Max limit value can be set on the monitoring program. When the measured value is over the max limit value, the active graph display changes to red. (Normal status: green)
LIML	Min. Limit Value change/save	Configurable min limit value is as below. “0V” ~ “-1kV” : Adjustment possible by the 100V “1kV” ~ “-20kV” : Adjustment possible by the 1kV Min limit value can be set on the monitoring program. When the measured value is over the min limit value, the active graph display changes to red. (Normal status: green)

8. Remote monitoring setting with a monitoring program

< Installation and connection of a monitoring program >

- ① Please download a monitoring program on our web site.
- ② After installation of a RS485 communication drive, connect a RS485 converter to PC.

- ③ Check the port number of the RS485 converter.

[available on Microsoft Management Console : ex. COM1]

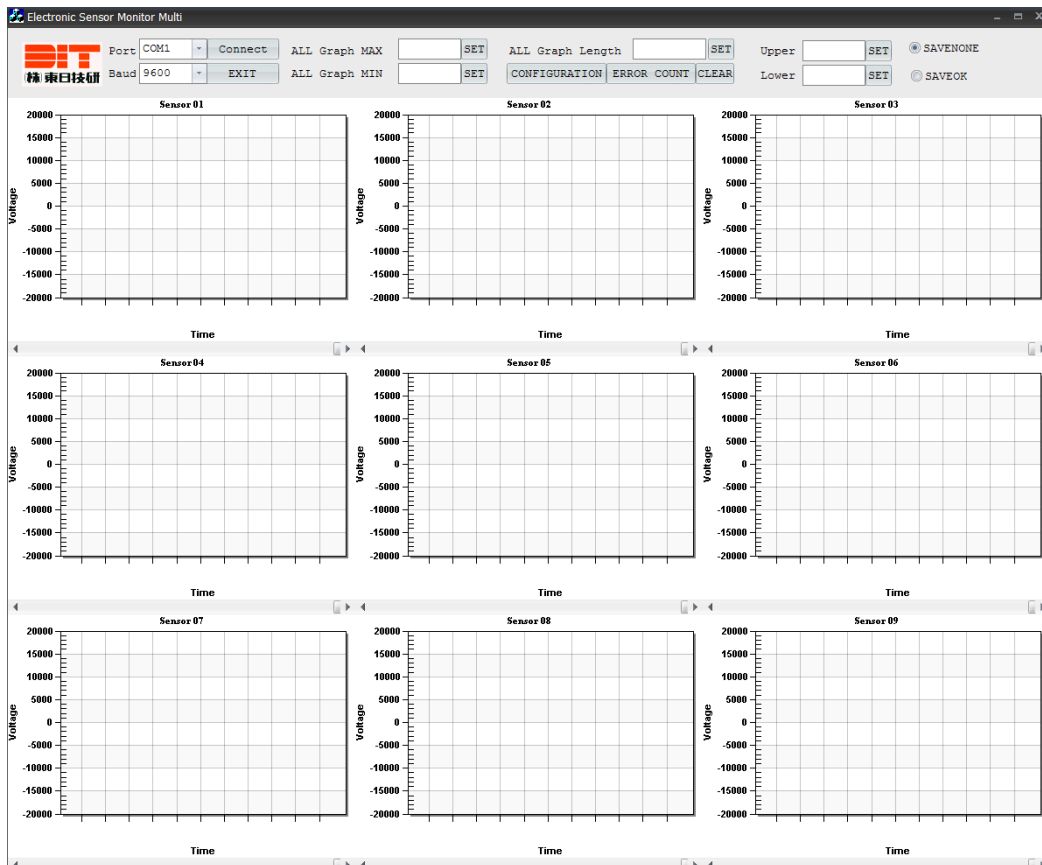
- ④ Connect an optional communication cable B type to the RS485 converter.

※ A connecting method is depends on the kind of RS485 converters. Check the connecting method from the RS485 converter manufacturer.

- ※1. It may not be able to connect with the monitoring program because the communication speed varies from converter to converter.
- 2. ARS-S005 Series is optimized at the Realsys CNV485U. When using other converters, it may not be able to connect with PC.
- 3. The monitoring program is provided for free. DIT dose not have any responsibility for damage by user, and customizing this program is not allowed.

< How to use a monitoring program >

① Monitoring Graph Display (Up to 30 units available)



8. Remote monitoring setting with a monitoring program

② Program settings

- ① Click 'CONFIGURATION' button, then a configuration window is displayed.
- ② Set up the program using the settings as below.

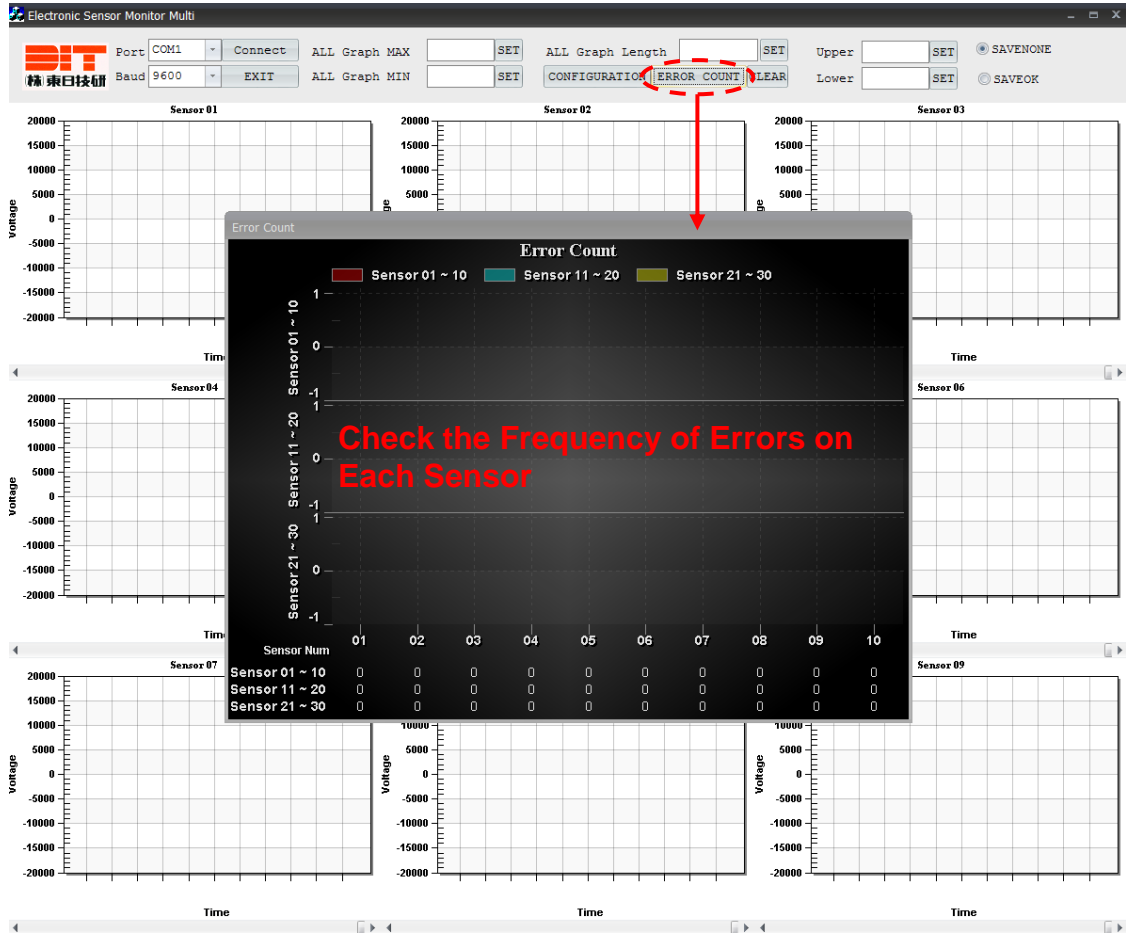
The screenshot shows the 'Electronic Sensor Monitor Multi' software interface. At the top, there are controls for 'Port' (COM3), 'Baud' (9600), and 'Connect' buttons. A 'CONFIGURATION' button is highlighted in red. Below the main graph area, a 'Configuration window' is open, containing several sections: 'Single Sensor Select' (radio buttons 01-30), 'Single Graph Control' (Graph Display, Full Screen, Data Clear, Graph Max/Min/Length, S/W Limit), 'Single Sensor Control' (UPPER/LOWER Limit, Distance), and 'All Graph Control' (All Display). A 'Close' button is at the bottom of the configuration window. The background shows a graph with 'Voltage' on the Y-axis ranging from -20000 to 20000.

Callouts and instructions:

- Set up the Communication Port of Converter : Check 'Com Port' on the Microsoft Management Console
- Set up the range of the MAX, MIN voltage value on the Y-axis of the graph
- Set up the display time on the X-axis of the graph
- Set up the limit values of All sensors to manage static-electricity
- Set the communication speed : Set 115,200
- End of Program
- Set up to save DATA DATA is saved in Excel file format on "SAVE OK" mode
- Select Single Sensor
- Single Display Setting mode
- Set up the range of voltage values and display time (length of Graph)
- Set up the limit values of Single sensor and measuring distance (25mm or 50mm)
- All Display Setting mode
- Close Configuration window

8. Remote monitoring setting with a monitoring program

③ Error Count



<Case of disconnecting to monitoring program>

- ① Check the status of a RS485 Converter connecting ARS-S005 and PC.
 - ② Check that the port number of converter is same as the port number of the program.
 - ③ Check to **set 115,200** baud on monitoring program settings.
 - ④ Connect an optional communication cable B type to the RS485 converter.
- ※ A connecting method is depends on the kind of RS485 converters. Check the connecting method from the RS485 converter manufacturer.
- ※ It may not be able to connect with the monitoring program because the communication speed varies from converter to converter. ARS-S005 Series is optimized at the Realsys CNV485U. When using other converters, it may not be able to connect with PC.

9. Attention

Please be well informed of the attentions below before use.

Non-observance in this manual may lead to malfunction of the product. Also it is subject to restriction for exchanging or repairing the products.

- 1) Please operate in under ambient temperature (0 ~ 55℃).
- 2) Use 10 minute after power connection. Otherwise, sometimes it shows unstable data.
- 3) Do not drop it and avoid excessive crash (more than 100m/s²)
- 4) Please do not leave the electromagnetism and magnetic object near the sensor. Otherwise, malfunction and damages for a internal device and chip could be happened.
- 5) Make sure sensing part is not polluted by particle and dust.
- 6) When malfunction, do not disassembly and re-assembly, and call the customer center. Otherwise, it could not be warranted and replaced.
- 7) Please remove the power cable, when moving and maintenance.
- 8) In case of exceed detecting range continuously, it might cause product malfunction.
- 9) Do not use any other parts not enclosed in the package. It may cause malfunction of the product.
- 10) Use the product according to its specification and instruction manual.
- 11) Do not install it near the high voltage equipment, such as ionizer. High voltage can be affected sensor's performance.
- 12) Please fasten sensor, when it is installed high vibration area. Otherwise, data error could be happened.
- 13) In case of using inside of clean room, it require furzing for required clean level.
- 14) Connected DC power supply must be comply with Level 2 power supply unit for UL1310, or Level 2 transformer power supply for UL1585.
- 15) This product is not explodable, however, in case of long time chemical exposure, life time is shorter and any damages could be happened due to corrosion.
- 16) t is optimized for industrial purpose, and other purpose operation is not available. Otherwise, please discuss with customer center.

10. Trouble shooting

Problem	Inspection
Power is not supplied	<ol style="list-style-type: none"> 1) Check the power cable is connected correctly. (Refer to the wiring diagram on Page 14) 2) If there is no problems above, contact to manufacturer or sales agents.
Unusual display data	<ol style="list-style-type: none"> 1) Check that ground cable is connected properly. 2) If there is no problems above, contact to manufacturer or sales agents.
Error is bigger than real electro-static level	<ol style="list-style-type: none"> 1) Check the proper installation distance. 2) Check the any other object, such as ionizer, which can be affected it's performance. 3) Check the Pot menu, whether distance set-up is correct. 4) If there is no problems above, contact to manufacturer or sales agents.
Polarity LED is off	<ol style="list-style-type: none"> 1) Contact to manufacturer or sales agents.
Burning smell during operation	<ol style="list-style-type: none"> 1) Disconnect from power supply and contact to manufacturer or sales agents.
Etc.	<ol style="list-style-type: none"> 1) Contact to manufacturer or sales agents.

※ If you cannot solve the problem with the above solution or if you have other problems not described above, please call manufacturer or leave a message on our website.

☎ DIT Quality Assurance Team TEL) +82-31-299-5464

Warranty

We, Dong Il Technology Ltd. Manufactured this product under a strict quality control system and warrants it for 1 year of period from the shipment date

However, we don't have any responsibility for

- 1) Any damage if the product is used in a way different from that is explained in this manual or remade by users arbitrarily.
- 2) Any damage led by improper usage. We recommend the installation circumstances in this manual, but that is just a recommendation and users are responsible for understanding the product's specification and judgment of suitability of usage.
- 3) Direct or indirect damage led by the product malfunction.