

**SMART Gas Detector/Transmitter(4~20mA)
with builtin LCD & explosion proof**

DA - 600



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***Best Detectors,
Best Service***

1. Product Introduction

The DA-600 has a comprehensive range of advanced functions, making it an ideal detector for effectively preventing gas leak incidents in various industrial areas. With its cutting-edge features, the DA-600 serves as an indispensable device for ensuring the smooth operation of industries while prioritizing the safety of both individuals and the environment. The DA-600 provides the complete gas monitoring system by converting the digital signal into a standard current output signal ranging from 4 mA to 20 mA. It provides an RS-485 communication signal and an alarm relay contact. Additionally, it has a DC 4~20mA standard output signal that can transmit signals over long distances of up to 2500 meters. Moreover, the RS-485 communication signal is capable of transmitting signals over long distances of up to 1000 meters.

2. Product Features

- **Non-Open Automatic Calibration Function**

The device's non-open automatic calibration function eliminates the need to open the detection unit cover during calibration. Instead, users can use a magnetic bar to touch the cover window, ensuring a safe and efficient calibration process, even in explosion-proof area.

- **Explosion Proof**

This explosion-proof detector is designed for safe operation in hazardous environments. It features specialized technology and robust construction to withstand and contain internal explosions. Equipped with explosion-proof enclosures, it effectively prevents the release of sparks, flames, or hot gases that could be hazardous. Additionally, it boasts highly sensitive gas sensors for detecting flammable or explosive gases in the surroundings.

- **Built-in HD (high resolution) A/D Converter**

The main display of the device has organic light-emitting diode (OLED) technology, which allows for real-time visualization of gas density. This OLED display offers excellent visibility, even in low-light or dark conditions.

- **Built-in HD (high resolution) A/D Converter**

The device is equipped with a high-resolution analog-to-digital (A/D) converter, ensuring precise and accurate conversion of analog signals into digital output. This technology enhances the accuracy of the output signal, resulting in reliable and trustworthy measurements.

- **User programming**

The device allows users to customize various settings, such as the detection range and other functions, according to their specific requirements and preferences. This feature provides flexibility and adaptability to meet diverse monitoring needs.

- **Analog 4-20mA Transmitter**

With the analog 4-20mA output, the device enables stable and long-distance signal transmission of up to 2.5 kilometers. This ensures reliable communication and allows for extended signal transmission distances while maintaining signal integrity.

- **Alarm Output**

The device also features an alarm output capability. It is equipped with a Single-Pole Single-Throw (SPST) relay contact that provides a two-step alarm functionality.

- **Modbus RTU**

The Modbus RTU protocol, implemented over RS-485, provides a robust and dependable method for signal communication. With Modbus RTU, the device supports reliable and long-distance signal transmission of up to 1.2 kilometers. This allows for effective communication across extended distances while ensuring signal integrity.

- **HART function**

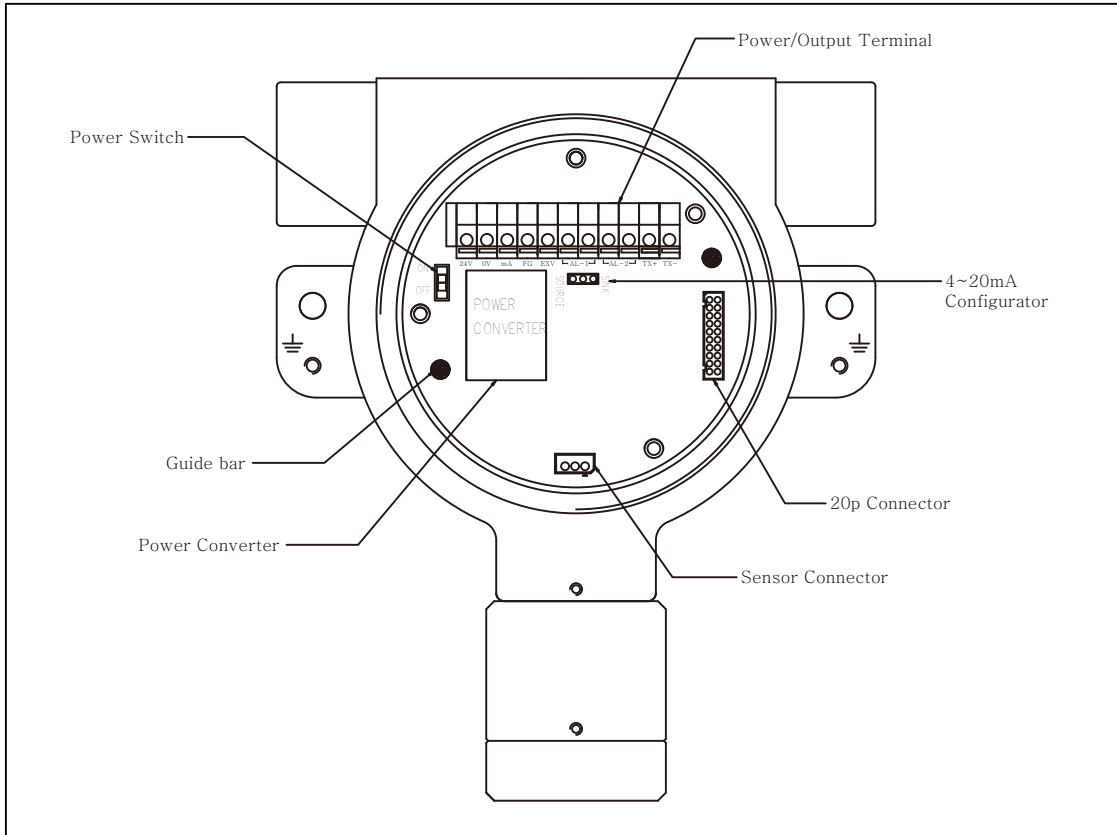
DA-600 is compatible with Highway Addressable Remote Transducer (HART) communication. HART is a communication protocol widely used in process automation and enables bi-directional communication between the DA-600 and HART-compatible devices.

3. Product Specifications

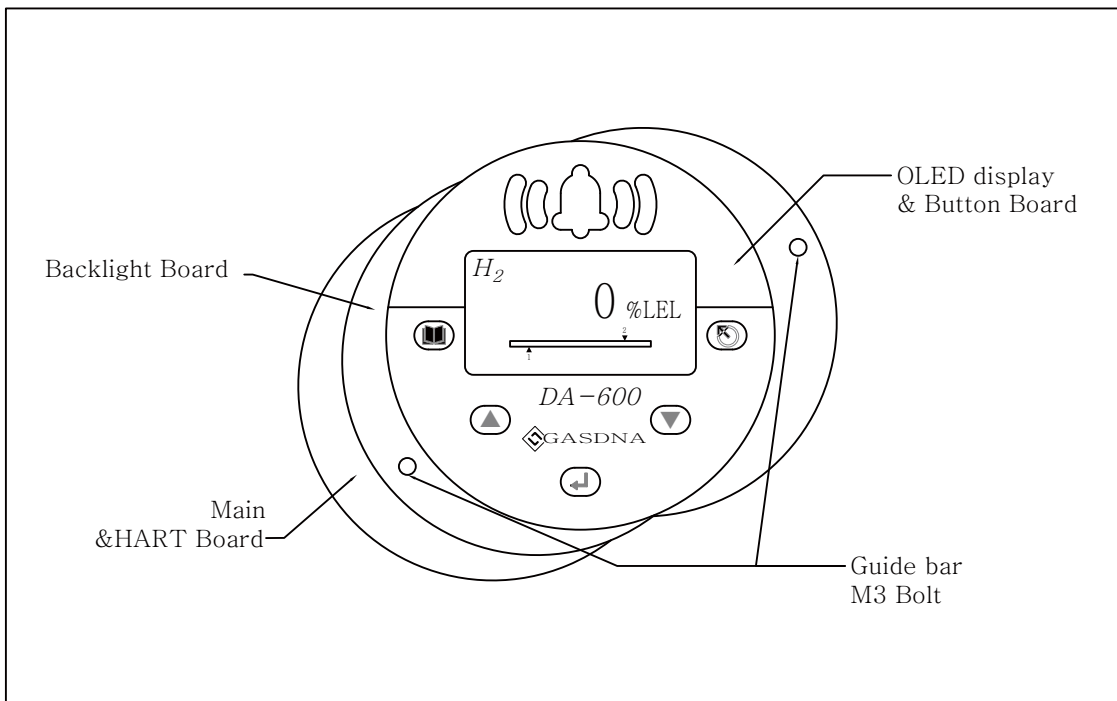
Product Code	DA-600
Detection Method	Diffusion
Detection Principle	Refer the Gas List Section Below
Display	OLED 64x128 pixels
Explosion Protection	Explosion Proof
Gas groups	11A, 11B, 11C
Response speed & Accuracy	Within 20sec, 90%, full scale, $\leq \pm 2\%$ / full scale
Optional Function	Calibration Concentration, detection range setting
Measurement Range	Refer the Gas List Section Below
Sensor Range	Zero – $\leq \pm 2\%$ LEL/6 month, span - $\leq \pm 2\%$ LEL/6 month
Input Power	DC 20~30V, 100mA
External Output	4 ~ 20mA/Full Scale - 2.5km transmission
Detector Output	4-20 mA source or sink selectable 2mA = Fault 4-20 mA = Normal gas range 24 mA = Over range
Ambient Temperatures & Humidity Range	-40°C ~ 65°C, 5 ~ 95% RH (Non-Condensing)
Signal Wire	CVVS & CVVSB 1.5sq x 3 wire - shield type
Wire Conduit	3/4" NPT or 1/2"PF
Installation Method & External Material	Wall or Pipe Mounting, Cast Aluminum Alloy
Explosion Proof approval & IP ratings	Ex d IIC T6(IP66), Ex tD A21 T85°C IP66 (KC) EU-TYPE Examination Certificate (ATEX) IECEX Certificate of Conformity (IECEX)
Relay Output	2 Step- Relay Contact ALARM-1 relay SPNO ALARM-2 relay SPNO
Communication Output (Optional)	Modbus RTU based on RS-485, HART Communication
Gas groups	11A, 11B, 11C
Zones	Certified for use in Zone 1 or Zone 2 areas. (See area classifications section)
Dimension	150x181x98(mm)
Weight	2200g

4. Product Parts & Names

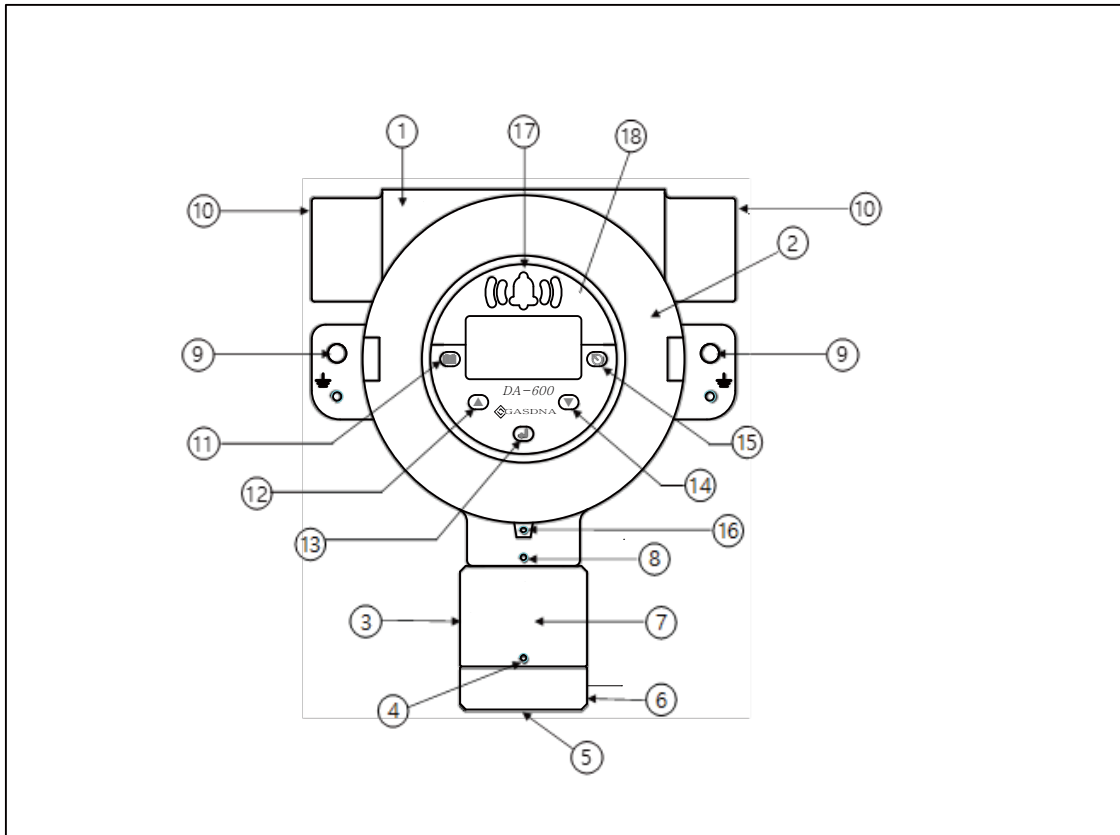
4.1. Power Board



4.2. Function Module Board (OLED Display + Backlight + Main Board)



4.3. Each Part Names and Explanation



1. Detector Housing Body	2. Detector Housing Cover
3. Sensor Housing	4. Headless Bolt (Sensor Housing)
5. Calibration Nipple Insert Point	6. Sensor Cap
7. Gas Sensor	8. HEADLESS Bolt (Housing Body)
9. MOUNT Whole	10. Conduit connection
11. MODE Key	12. UP Key
13. ENTER Key	14. DOWN KEY
15. ESC Key	16. HEADLESS Bolt (Housing Cover)
17. BACKLIGHT LED	18. OLED Screen

5. Sensor Replacement

The DA-600 sensor has an integrated structure with a sensor cap and sensor filter for sensor protection and explosion-proof functions. Therefore, sensor replacement work is done by replacing the sensor cap, which is an integrated structure with the sensor and filter. To replace the sensor, follow the following procedure, referring to the product configuration and name above.

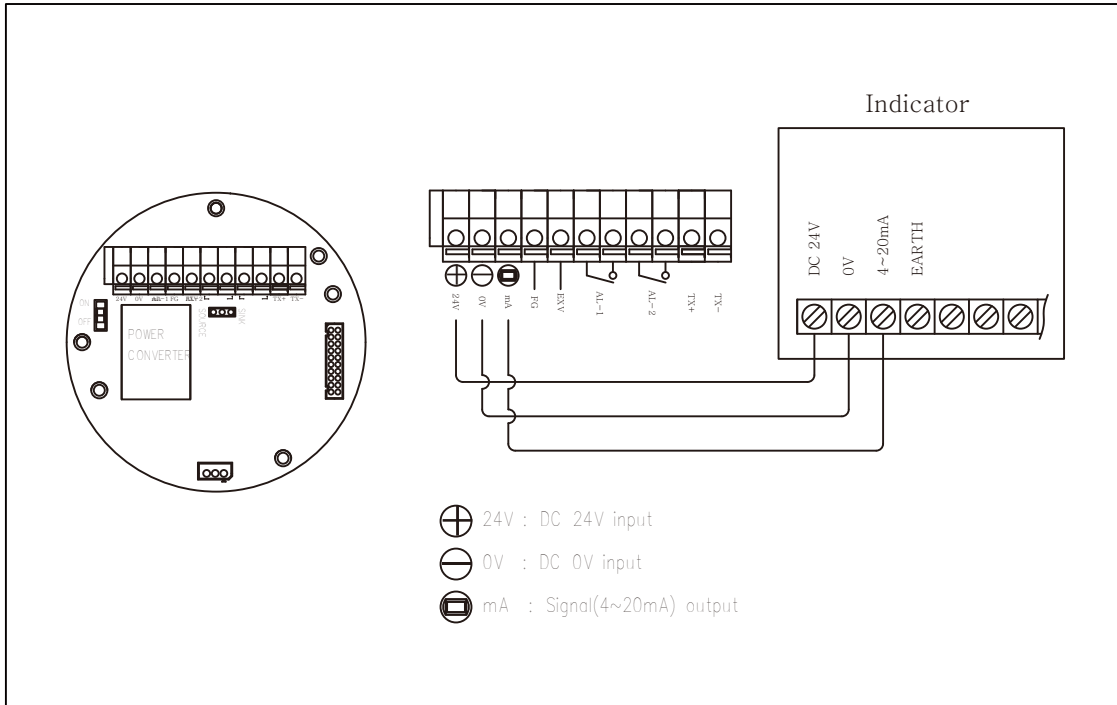
- ① Turn off the detector Power.
- ② Open the detector cover by rotating it anticlockwise.
- ③ Loosen the two M3 bolts on the function module board and pull them out onto the side bar.
- ④ Disconnect the 3-wire sensor connector between the sensor and the power board.
- ⑤ Remove the mood bolt that is connected to the sensor housing anti clockwise and separate the sensor housing.
- ⑥ Combine the new sensor housing and connect it by tightening the headless bolt.
- ⑦ Connect the 3-wire sensor connector located on the power board.
- ⑧ To connect the function module board, push it accurately into the sidebar and tighten with two M3 bolts.
- ⑨ Turn the detector cover clockwise and tighten it tightly.
- ⑩ Turn On the Power
- ⑪ Start The Sensor Calibration Process.

▲ Caution

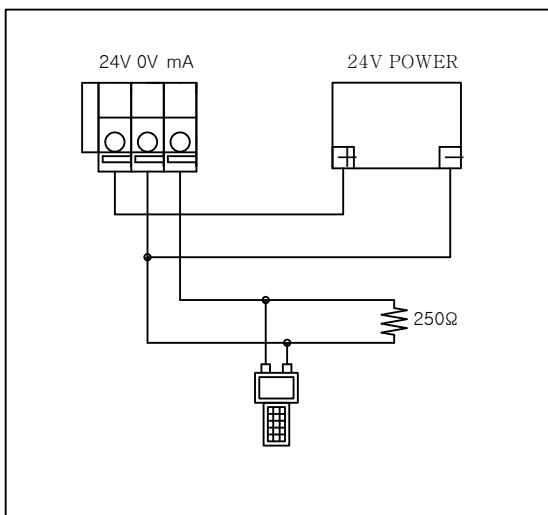
- Make sure the power is off before replacing the sensor.
- Make sure the connector's socket orientation is correct.
- Fully tighten the sensor cap and front cover to ensure waterproofing.

6. Wiring

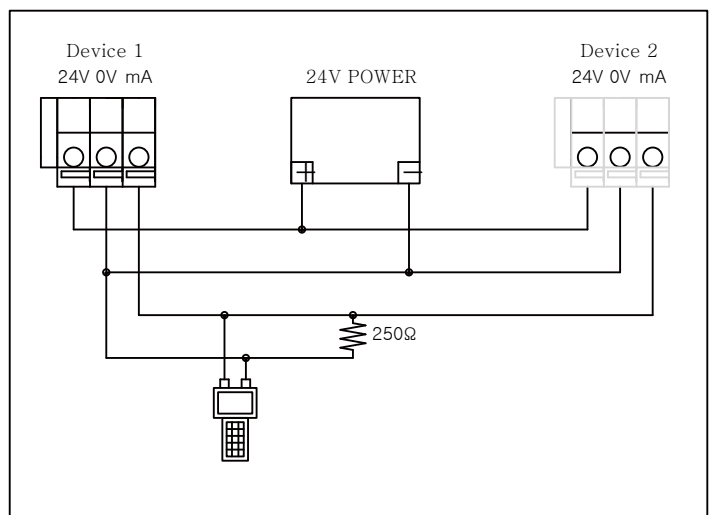
6.1. Socket



6.2. HART Socket



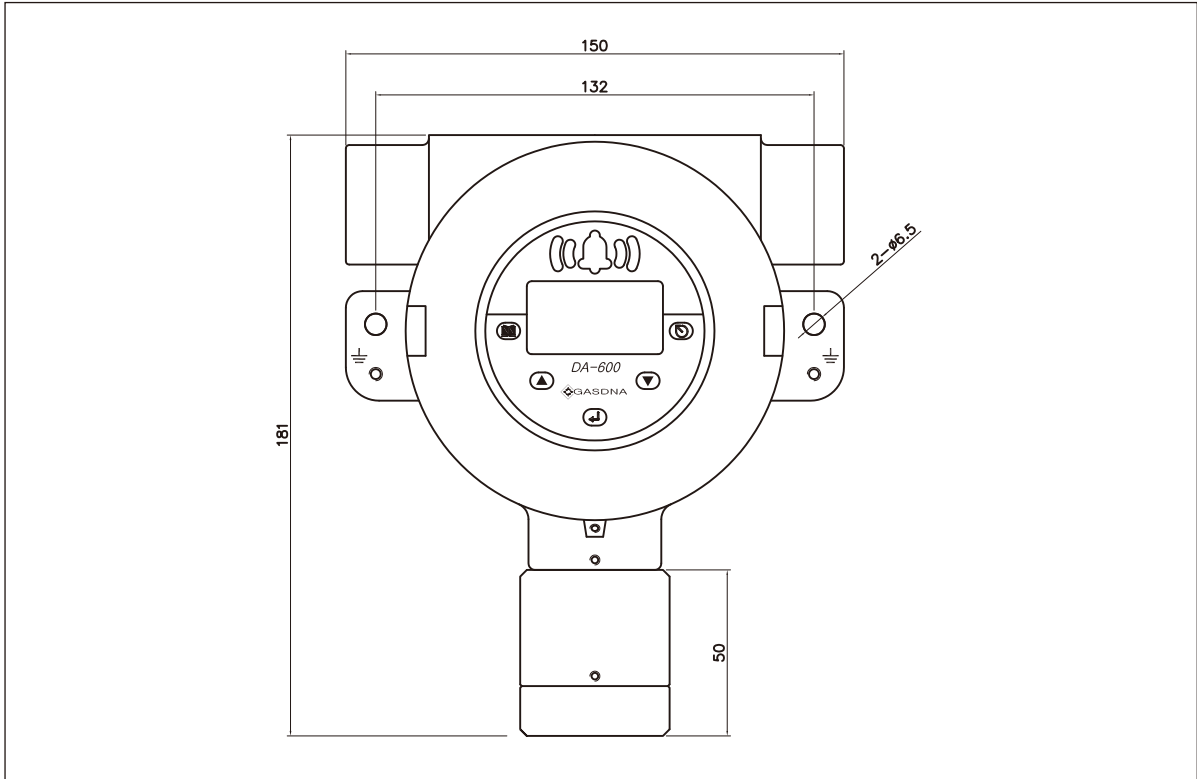
Single mode



Multidrop mode

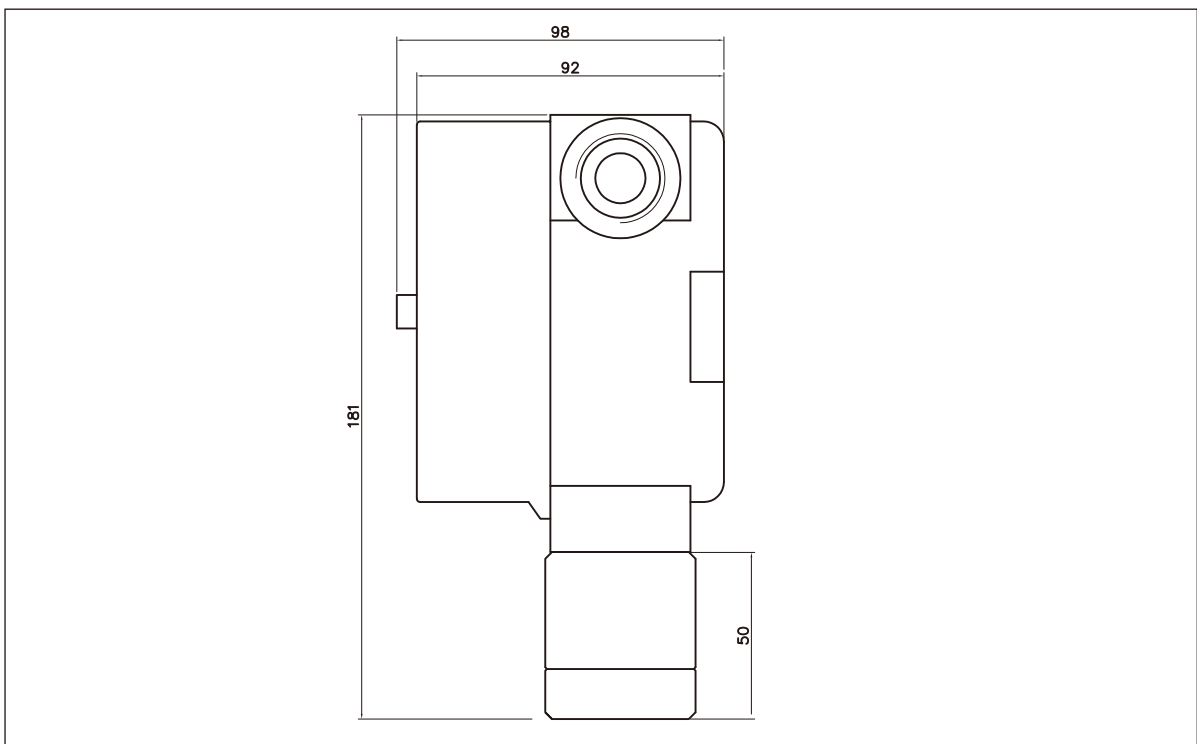
7. Product Installation

7.1. Front View



Unit: mm

7.2. Side View



Unit: mm

Cable Conduit and Installation Location

- Cable Conduit: 1/2", 3/4" PF/NPT
- In open areas, install the DA-600 as close as possible to potential gas leaks, such as gas valves and pipe connections.
- In closed areas,
- Light Gas (Specific Gravity < 1): Install DA-600 20 to 30 cm away from the ceiling.
- Heavy Gas (Specific Gravity > 1): Install DA-600 20 to 30 cm away from the floor.

▲ Caution :

- Avoid potential electrical problems such as raindrops.
- Avoid vibration or physical shock that may affect the output signal value.
- Avoid high temperature or moisture.
- Avoid electrical noise such as motors, pumps or high voltage power lines.
- Please choose a location where repair and maintenance work can be easily performed. If this is not possible, it is recommended to use a suction type detector.

8. Device Operation

8.1. Startup Routine

When power is supplied, the DA-600 displays the following screen:


- Logo screen



- Warming-up Screen: Before working in normal mode, the device must be warmed up so that the sensor output reaches a stable value. This preheating time can be skipped by pressing the DOWN key for 3 seconds.

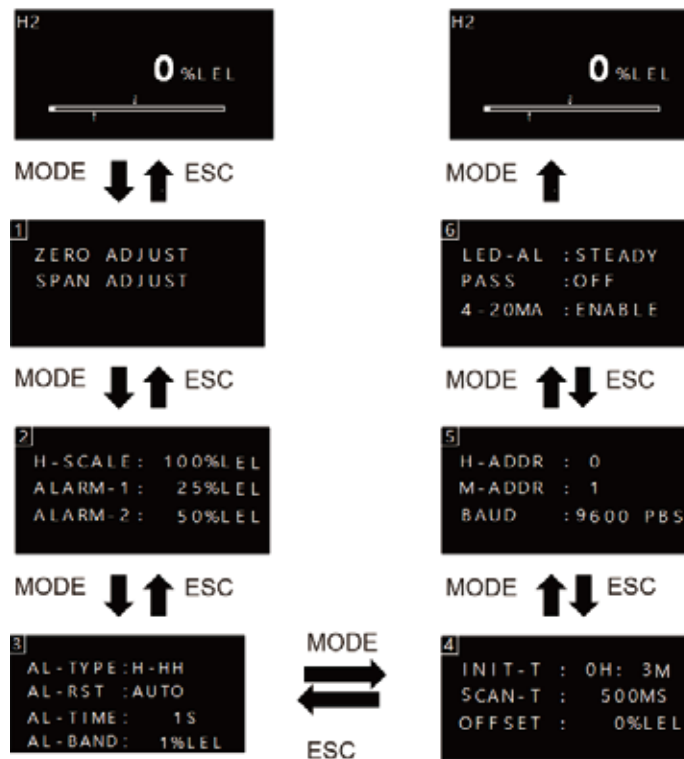


- Normal measurement screen: After preheating, move to the normal measurement screen and display the measured concentration value.

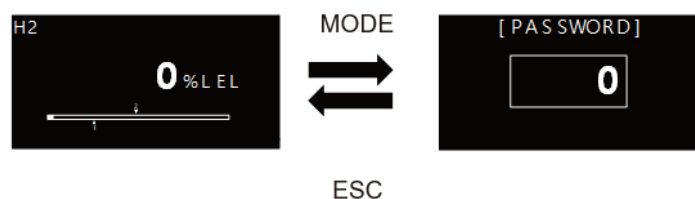
0	Measured Concentration Value
%L E L	UNIT
H2	Gas Name
🔔¹	ALARM 1 Operation
🔔²	Alarm2 Operation
↑Hi	Measured value is too high. Exceeding the full scale of the device.
	Bar graph displays alarm levels and measurements

8.2. Settings Menu

There are 6 menus: 1, 2, 3, 4, 5, and 6. Press the MODE key for 3 seconds to enter the menu settings. Use the MODE key to move to the next menu or press the ESC key to return to the previous menu.



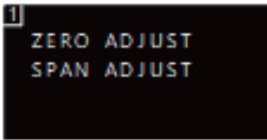
To access the setup menu, press and hold the MODE key for 3 seconds from the normal measurement screen. If the password status is ON, the password screen is displayed.



Use the UP and DOWN keys to change the password number. Press the ENT key. If the password is correct, [OK] is displayed. If the password is incorrect, [FAIL] is displayed. Press ESC to return to the normal measurement screen.

Note: To access the menu regardless of your user password, enter the default password "1234".

Menu 1



ZERO ADJUST: ZERO Calibration

SPAN ADJUST: Span Calibration

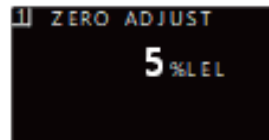
Perform calibration periodically, at least once a year.

◆ Zero Calibration:

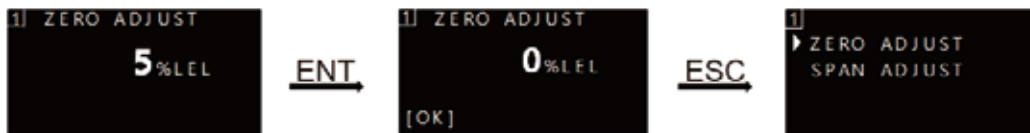
- ① Use the magnetic bar to touch the MODE key. Menu 1 is displayed on the LCD. Press ENT to select ZERO ADJUST.



- ② Inject standard gas such as clean air or nitrogen gas for 1 minute. The current measured value is displayed on the LCD.



- ③ When the measured value is stable, touch the ENT key.
- ④ If the zero point correction value is valid, [OK] is displayed. Then press ESC to exit.



- ⑤ If the zero calibration correction value is invalid, [FAIL] is displayed.



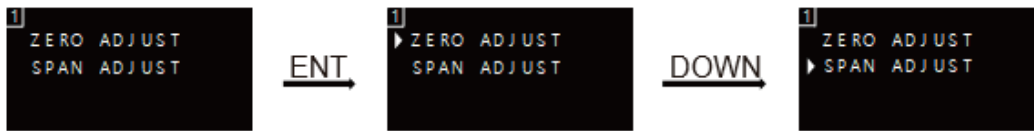
- ⑥ If [FAIL], perform step 2 again. Otherwise, press ESC to exit



Caution: Zero-point calibration is performed with clean air or 99% nitrogen gas. (In the case of O₂ gas, nitrogen gas of 99.8% or more must be used.)

◆ **SPAN Calibration:**

- ① Fix the calibration nipple to the sensor cap.
- ② Use the magnetic bar to touch the MODE key. Menu 1 is displayed on the LCD.
Press ENT & DOWN to select SPAN ADJUST.



- ③ Press ENT to display the calibration density range.



- ④ Press UP & DOWN keys to enter calibration gas density. Then press the ENT key to confirm.
- ⑤ Then the screen automatically moves to SPAN ADJUST. Add standard gas for 1 minute. The currently measured value is displayed on the LCD.



- ⑥ When the measured value is stable, use the magnetic bar to press the ENT key.
- ⑦ If the span Calibration correction value is valid, [OK] is displayed. Then press ESC to exit.



- ⑧ If the zero Calibration correction value is invalid, [FAIL] is displayed.

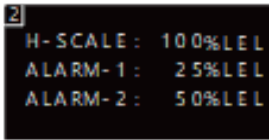


- ⑨ If [FAIL], perform step 5 again. Otherwise, press ESC to exit



CAUTION: After replacing a sensor, wait at least 10 minutes after turning on the power before starting calibration.

Menu 2



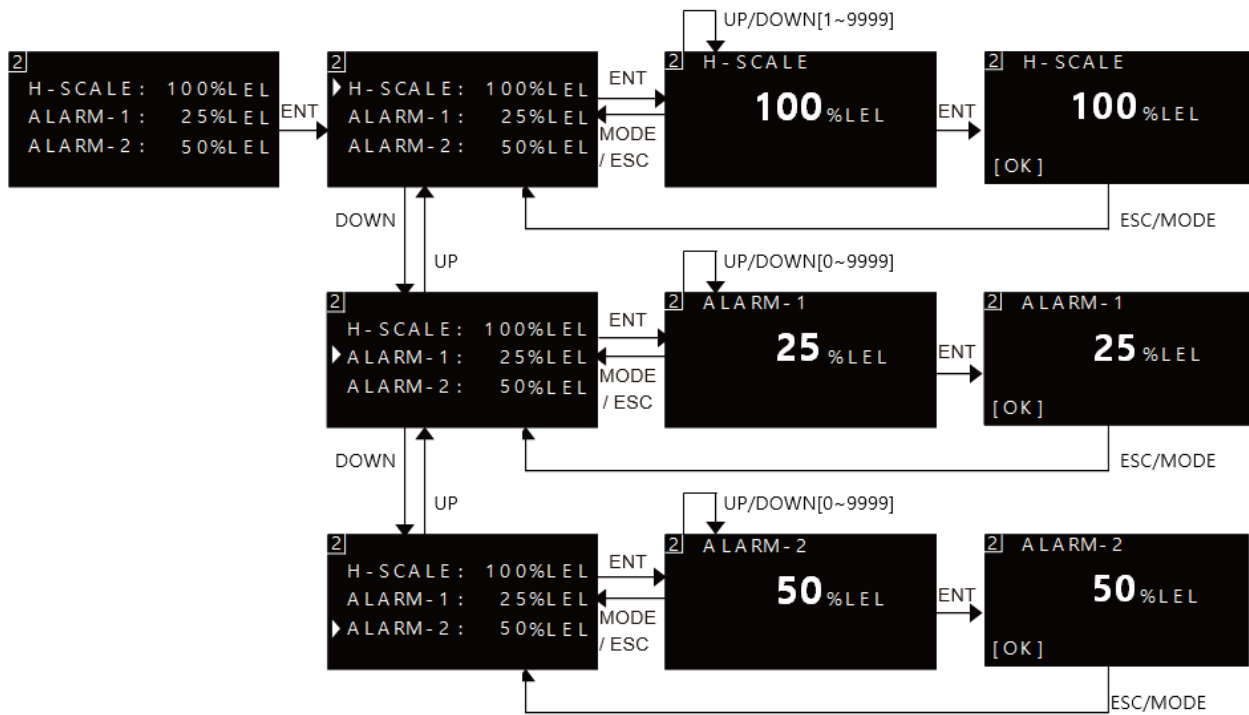
H-SCALE: Set 4~20mA output signal to full scale. The present level is displayed.

Ex: If H-SCALE is set to 100, the 4mA output signal is displayed as '0' and the 20mA output signal is displayed as '100'.

ALARM-1: Set the alarm to level 1. The present level is displayed.

ALARM-2: Set the alarm to two levels. Present level is displayed

◆ Setting order:



Menu 3

```

3)
AL-TYPE: H-HH
AL-RST : AUTO
AL-TIME: 1S
AL-BAND: 1%LEL
    
```

AL-TYPE: Set the alarm type of each alarm. There are four alarm types: L-L, H-H, L-H, and H-L.

(Ex: H-L case: ALARM-1 corresponds to High Alarm, ALARM-2 corresponds to Low Alarm.)

When an alarm occurs, the corresponding relay is activated.

Ex: When AL-TYPE is set to H-L:

- If the measurement value is above the Alarm 1 level, the Alarm 1 icon is displayed and Relay 1 is activated.
- If the measured value is lower than the Alarm 2 level, the Alarm 2 icon is displayed and Relay 2 is activated.

AL-RST: Release method setting.

- Automatic: Alarms and relays are automatically disarmed when the measured value falls outside a predefined level depending on the alarm type.
- Manual: If the measured value falls outside a predefined level depending on the alarm type and the ESC key is pressed, the alarm and relay are cleared.

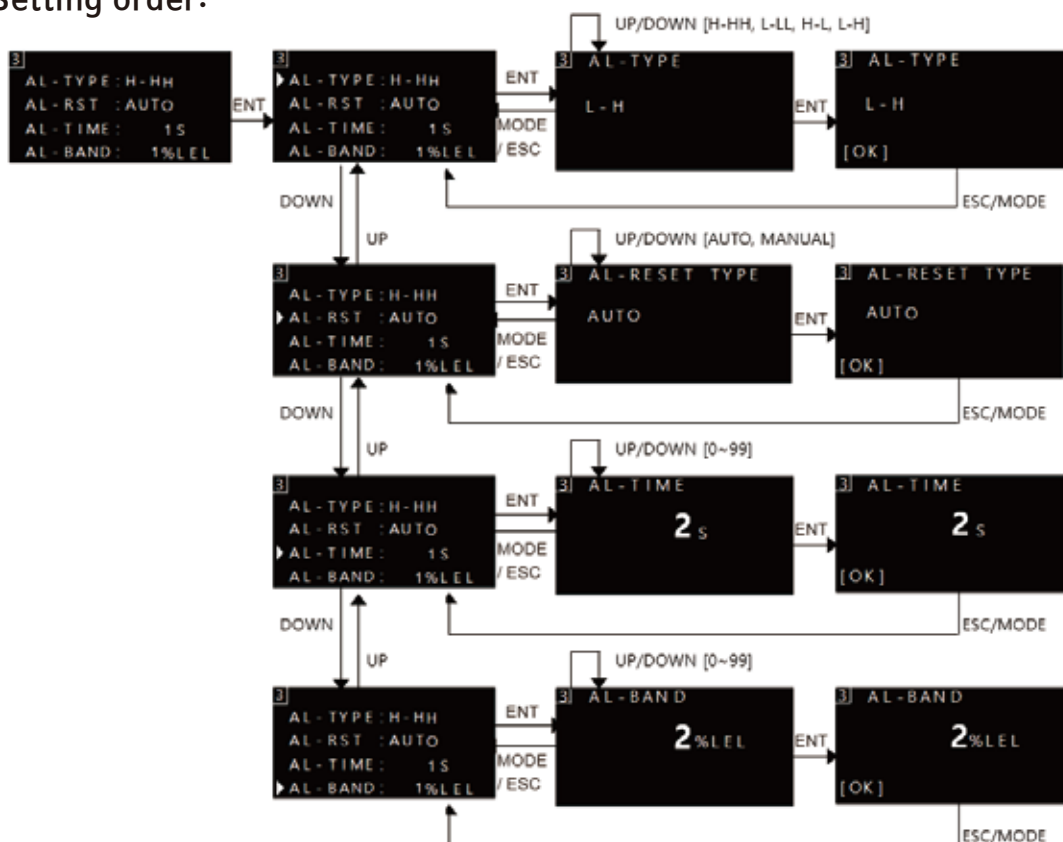
AL-TIME: Set alarm delay time to prevent influence from noise.

Ex: When ALARM-1 is set to '50' and 'AL-TIME' is set to '5'. The alarm is only activated if the measurement remains above 50 for longer than '5' seconds.

AL-BAND: Set alarm threshold to prevent repetitive alarms.

Ex: When ALARM-1 is set to '20', ALRAM-2 to '50', AL-TYPE to 'H-L', and AL-BAND to '3', alarm 1 turns on when the measured value is greater than 20. If the measured value is less than 17, it turns off. Alarm 2 turns on when the measurement value is less than 50 and goes off when the measurement value is higher than 53.

◆ Setting order:



Menu 4

```

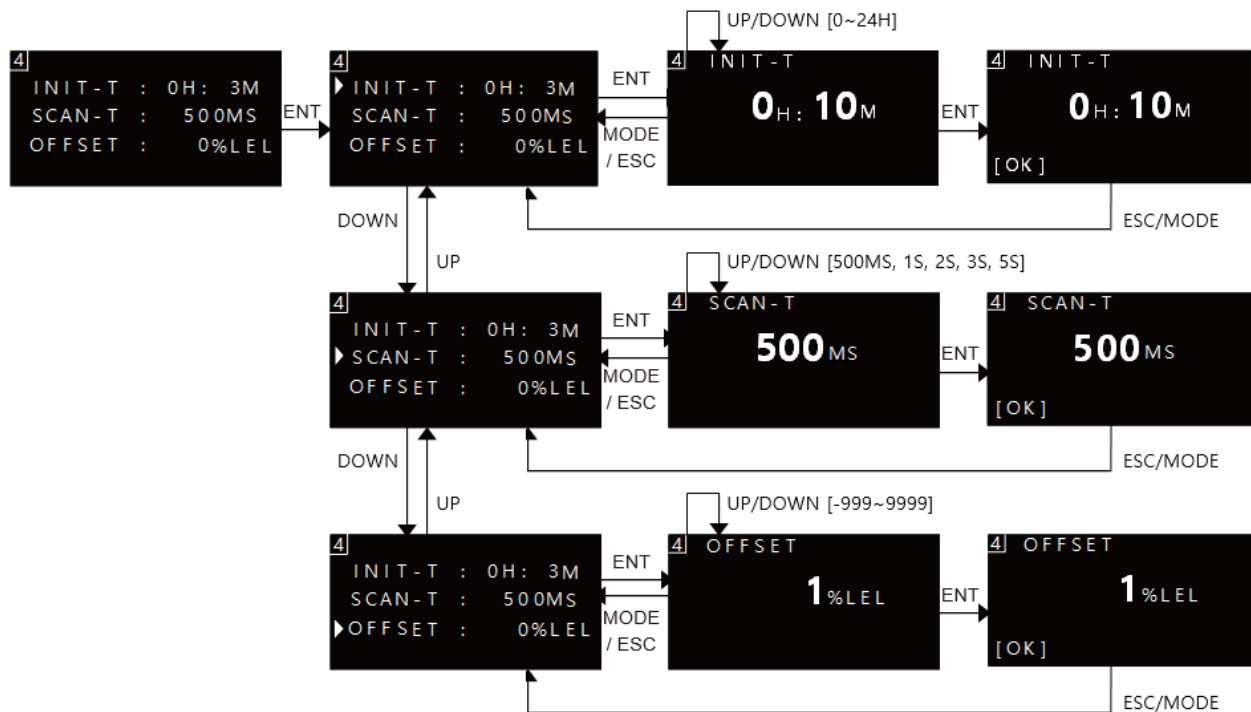
4
INIT-T : 0H: 3M
SCAN-T : 500MS
OFFSET : 0%LEL
    
```

INIT-T: Set the initial time after turning on the power. This time is to ensure that the sensor output remains stable. (Can be set in hours and minutes)

SCAN-T: Set cycle time for displaying measured values.
(100ms,200ms,500ms,1s,5s)

OFFSET: Set a value to compensate for the measured value.

◆ Setting order:



Menu 5

```

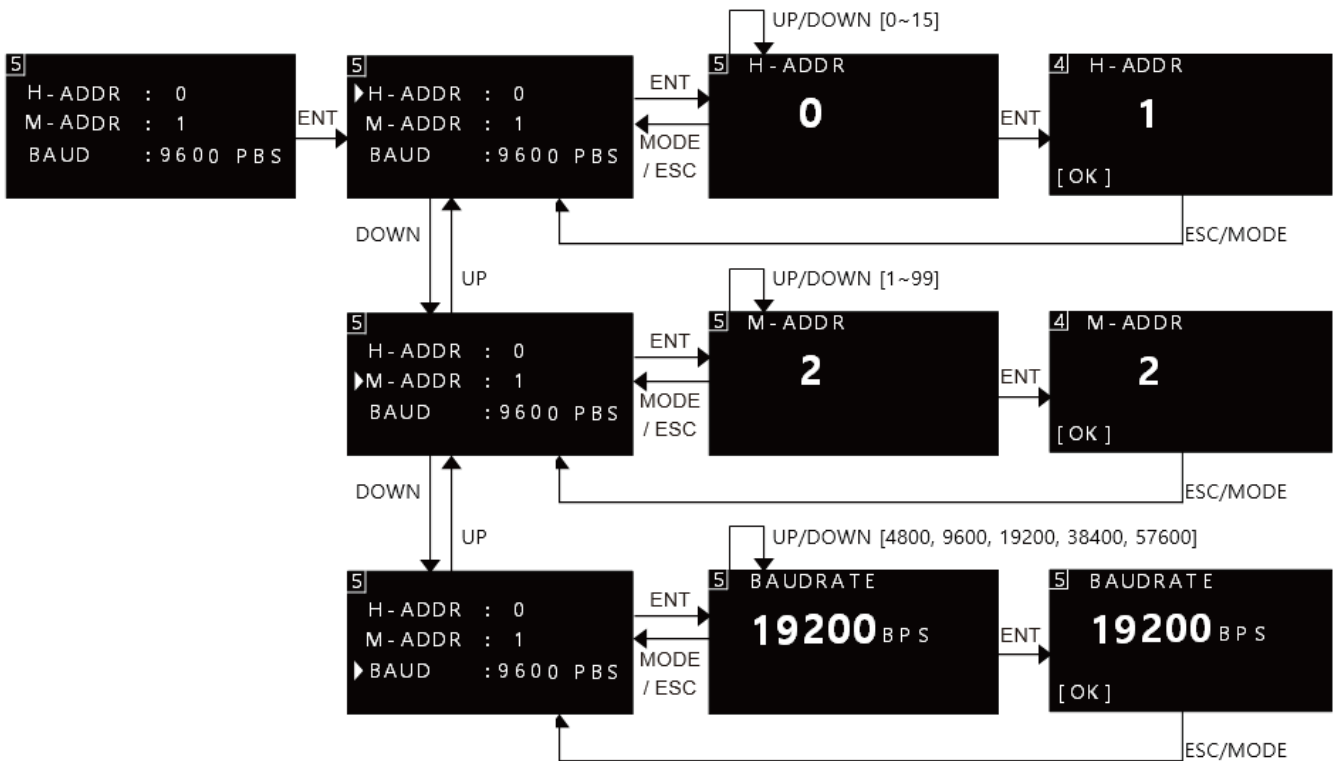
5
H-ADDR : 0
M-ADDR : 1
BAUD   : 9600 P B S
    
```

H-ADDR: Set polling address for HART communication.

M-ADDR: Address setting for Modbus communication.

BAUD: Baud rate setting for Modbus communication.

◆ Setting order:



Menu 6

```

6]
LED-AL : STEADY
PASS   : OFF
4-20MA : ENABLE
    
```

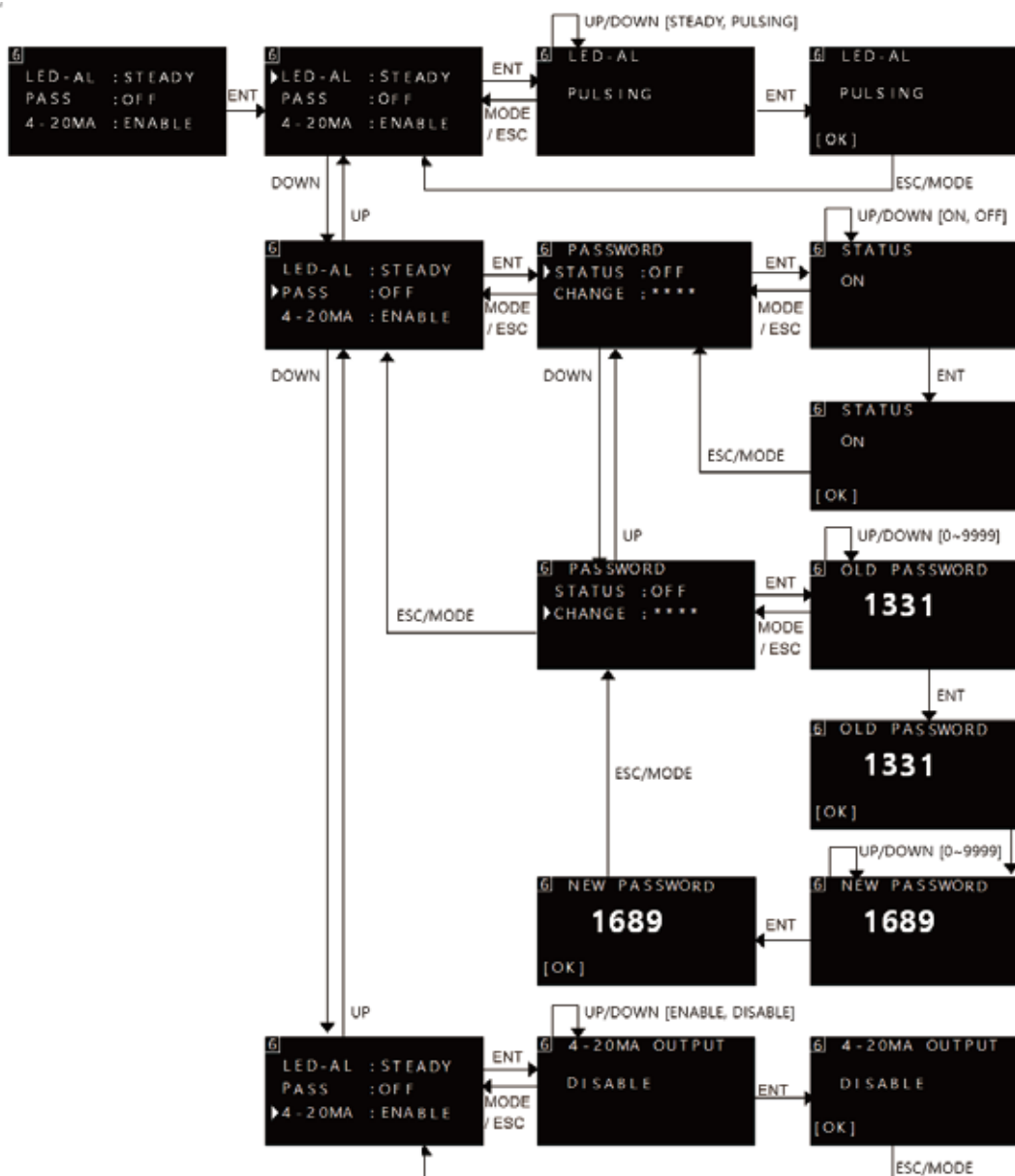
LED-AL: Set the operation mode of the backlight LED when an alarm occurs.

- STEADY: The backlight LED blinks.
- PULSING: The backlight LED generates pulses slowly.

PASS: Set a password for menu access.

4-20MA: Activates or deactivates 4~20mA analog communication. (Disable: 4mA fixed output)

◆ Setting order:



9. MODBUS Registration Address

9.1. Register Input

No.	Register Address	Description	Range	Note
1	30001	Gas concentration	[0~99999] [0.0~999.9] [0.00~99.99]	16 bits
2	30002	Dot point: 0xnnyy yy = 00: no dot point (ex: 12345) yy = 01: first dot point (ex: 1234.5) yy = 02: second dot point (ex: 123.45)		Bit 0~7
		Unit: 0xyynn yy = 00: % yy = 01: %LEL yy = 02: PPB yy = 03: PPM		Bit 8~15
3	30003	Alarm 1 status: 0x000y y = 1: ON; y = 1: OFF		Bit 0
		Alarm 2 status: 0x000y y = 2: ON; y = 1: OFF		Bit 1
4~12	30004~30012	Reserved		
13	30013	Device model name: (Ascii) Ex: DA		Bit 8~15: 'D' Bit 0~7: 'A'
14	30014	Device model name: Ex: 600		16 bits
15	30015	Device version Ex: 100 -> version 1.00		16 bits
16	30016	FieldComm Group Manufacturer ID (hex):Ex: 6143		Bit 8~15: 0x61 Bit 0~7: 0x43
17	30017	FieldComm Group Expanded Device Type (hex): Ex: E57F		Bit 8~15: 0xE5 Bit 0~7: 0x7F
18	30018	HART protocol revision: Ex: 760 -> revision 7.6.0		16 bits

*n: do not care

9.2. Register Holding

No.	Register Address	Description	Range	Note
1	40001	Gas concentration	[0~99999] [0.0~999.9] [0.00~99.99]	16 bits
2	40002	Dot point: 0xnnyy yy = 00: no dot point (ex: 12345) yy = 01: first dot point (ex: 1234.5) yy = 02: second dot point (ex: 123.45)		Bit 0~7
		Unit: 0xyynn yy = 00: % yy = 01: %LEL yy = 02: PPB yy = 03: PPM		Bit 8~15
3	40003	High scale value	[0~99999] [0.0~999.9] [0.00~99.99]	16 bits 16 bits 16 bits
4	40004	Alarm 1 value	[0~99999] [0.0~999.9] [0.00~99.99]	16 bits 16 bits
5	40005	Alarm 2 value	[0~99999] [0.0~999.9] [0.00~99.99]	
6	40006	Alarm type: 0x000y y = 0: (Alarm 1: HIGH , Alarm 2: LOW) y = 1: (Alarm 1: LOW , Alarm 2: HIGH) y = 2: (Alarm 1: LOW , Alarm 2: LOW) y = 3: (Alarm 1: HIGH , Alarm 2: HIGH)		
7	40007	Offset	[-999~9999] [-99.9~999.9] [-9.99~99.99]	

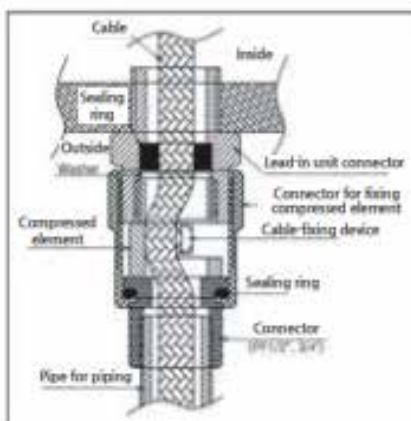
No.	Register Address	Description	Range	Note
8	40008	Modbus communication address		16 bits
9	40009	Modbus communication baudrate: 0x000y y = 0: 4800 BPS; y = 1: 9600 BPS y = 2: 19200 BPS y = 3: 38400 BPS y = 4: 57600 BPS		16 bits
10	40010	Lock & unlock to allow modbus address, HART polling address and modbus baudrate to be changed: 0x000y y = 0: LOCK y = 1: UNLOCK		16 bits
11	40011	Deadband	[0~99] [0.0~9.9] [0.00~0.99]	16 bits
12	40012	Deadtime	[0~99] second	16 bits
13	40013	Alarm reset type: 0x000y y = 0: auto y = 1: manually		16 bits
14	40014	Warming up time: Hour: 0xyynn yy: number of hour Minute: 0xnnyy yy: number of minute	Hour: [0~24] Minute: [0~60]	Bit 8~15: hour Bit 0~7: minute
15	40015	Scan time: 0x000y y = 0: 100ms y = 1: 200ms y = 2: 500ms y = 3: 1s y = 4: 5s		16 bits
16	40016	HART polling address	[0~15]	16 bits
17	40017	Backlight leds mode when alarming: 0x000y y = 0: steady y = 1: pulsing		16 bits
18	40018	4~20mA output: 0x000y y = 0: disable y = 1: enable		16 bits

*n: do not care

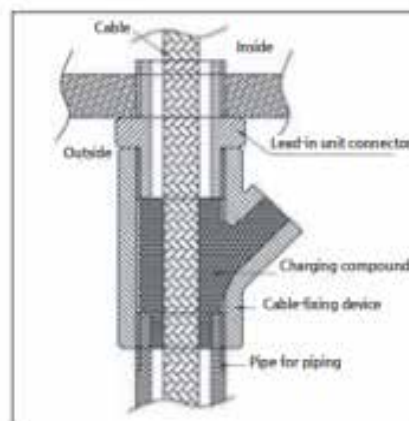
Installation Precautions

1. In the event that the device experiences a significant impact or is accidentally dropped, it is essential to be cautious, as such incidents could potentially compromise its explosion-proof performance.
2. Whenever it becomes necessary to open the device for installation, inspection, maintenance, or any other related tasks, it is imperative to turn off the power beforehand. Furthermore, adequate security measures must be implemented to prevent any inadvertent application of power while the device is open.
3. When opening or closing the device, be careful not to scratch the joint surface. Make sure that there is no dust or foreign matter attached to the joint surface, and when tightening bolts, you must use a tool to tighten them completely without missing a single bolt.
4. Do not open while energized.
5. Do not arbitrarily disassemble parts that affect explosion-proof performance.
6. Due to the non-sealed nature of the detection element in the detection unit, it is important to install it in a location that avoids exposure to potential electrical issues, such as rainwater. Regular maintenance is a necessity, so it is advisable to place the unit in a location that allows for easy access and convenient maintenance.
7. Places subject to vibration or impact may affect the output value, so avoid installing in places subject to vibration or impact.
8. This device features a pressure explosion-proof design, making it suitable for use in environments containing GROUP II and GROUP III gases, vapors, and dust, typically found in general workplaces and chemical plants. It has been certified for use in hazardous areas, including Zone 1, Zone 2, Zone 21, and Zone 22
9. When connecting this device and a conduit, ensure that there are more than 5 threads.
10. Ensure that work is conducted in accordance with the established standards for the selection, installation, and maintenance of explosion-proof structural electrical machinery and wiring, in order to maintain a safe workplace.
11. All bolts, nuts and washers used during assembly must be supplied by the manufacturer.
12. When connecting the power source, use the "O" type terminal to maintain the performance of the device, except in special cases.
13. The cable connection or terminal that extends from the product and connects to the power cable should utilize a junction box that has obtained separate certification.
14. When conducting wiring connections, it is crucial to employ an explosion-proof cable gland at the cable inlet. Alternatively, if metal conduit wiring is being carried out, the conduit should be sealed to avert the passage of gas and to inhibit flame propagation within a 50 mm radius in the event of an explosion. This sealing process is essential for safety.

➤ (Require tested and certified products like cable glands and sealing fittings for all cable entry materials.)



[Figure 1. High-Pressure Packing Type]



[Figure 2. Y Sealing Compound]

15. The allowable temperature falls below 100°C, which corresponds to T5.
16. Use in an ambient temperature range of -25°C to +70°C.
17. Relative humidity: 5% ~99%, installation location: outdoors and indoor.

Operation and Precautions

1. Operation method
 - A. Check the connection status of the cables installed on the product and the condition of the metal piping.
 - B. Apply power to the installed product.
 - C. Verify that it is operating normally.
2. Precautions
 - A. Be sure to read the user manual before using the product, and use and install it according to the prescribed methods.
 - B. This product must be installed by a qualified electrician.

Supply Range

1. Supply includes: DA-600 complete (including grounding)
2. Foundation work, installation work
 1. On-site handling, and storage
 2. Connection of external wires and grounding
 3. Connection of external wires and grounding

Product Transportation

- A. Packing Method and Procedure
 - While packaging the product, we ensure that the exterior is free from foreign substances, completely clean and dry, and apply appropriate anti-corrosion treatment to untreated areas.
 - The packaging should be robust and suit the size and weight of the contents, we should not use the material like wheat, rice straw, or rice husk. Instead, use materials like air caps or newspapers to provide cushioning. Proper protection is crucial to prevent rust and corrosion since the product is corrosion-resistant."
- B. Transportation Method
 - As a general practice, manufacturers are responsible for delivering their products directly or through designated transportation methods. In some cases, such as islands and mountainous regions, courier services may be employed. If equipment is lost, damaged, or if there's a deterioration in quality due to improper manufacturer packaging during transit, the manufacturer bears responsibility for any resulting issues
 - When transporting the product, there is a risk of damage if it's thrown or stacked too high and subsequently falls due to its own weight. Therefore, it's essential to implement proper protective measures and equipment during transportation to prevent such damage.
 - Although we pack this product with the utmost care, sometimes products may be lost or damaged during transportation, so users are advised to check the condition of the products after receiving the product.
 - If there is a defect in the contents, please contact us immediately so that we can take action.

Product Installation

1. Assembly and Disassembly

- A. This product has a pressure explosion-proof structure and is delivered fully assembled at the time of shipment. It does not require separate assembly and disassembly work by the user. (On-site wiring work is required by the constructor.)
- B. On-site construction must be performed by a qualified person or professional electrical contractor approved by the seller.

2. Installation and Precautions

A. Installation Method

- Make sure the power is turned off.
- Use the CABLE coming out of the product's cable gland. Wiring with the power cable is done in a separate certified junction box.
- Other wiring occurrences are in accordance with KS C IEC 60079-14.
- Except for the necessary piping holes, the remaining holes are finished with PLUG.

B. Precautions

- When installing explosion-proof electrical equipment, a technician must first ensure that the following specifications are met. This involves verifying their alignment with the provided terms."

Rated voltage and current rated frequency	Explosion level
Protection level of Container	Temperature Grade
Connecting Method & Type	Cable Entry Location
Surrounding Environment	Screw Dimensions
Types of explosion-proof Structures	Lead-in Type

- The installation location of electrical equipment in an explosion-proof area must take into account the following matters.
 - It should be installed in a location that is convenient for operation, maintenance, and adjustment.
 - It must be installed in a location where maintenance is easy and the space necessary for inspection or maintenance must be secured.
 - If possible, select a location that is not exposed to moisture, and avoid installing in a place that is always humid.
 - If possible, avoid installation near corrosive gas discharge ports or in locations where corrosive liquids scatter.
 - Avoid installing it in a location where it can be affected by significant vibration from machine and other equipment.

Operational Maintenance

Please check the following things regularly.

1. Terminal Voltage
2. Please check the ratings and types of each replaceable parts.
3. Please check regularly for any abnormality in the operation of the entire control system, including control, operation, display, and notification.
4. Please check the presence and degree of vibration.
5. Inspect wiring inlet
 - A. Check the metal piping material that meets the standards for the conduit thread section
 - B. In order to ensure the explosion-proof performance of the electrical conduit, it is important to effectively install sealing. This involves verifying the proper installation of sealing, ensuring that the compound is filled to a sufficient depth, and confirming that the adhesion and hardening conditions are in good shape.
 - C. Check appropriate measures are taken to prevent rainwater from entering the screw joints of the electric machine.
6. Inspecting connections between wiring and electrical equipment
 - A. The circuit connection of the terminal symbol and polarity must be correct.
 - B. Ensure that the connection point is securely fastened, and measures are in place to prevent any loosening.
 - C. For connection points without terminals or similar components, ensure that effective insulation is in place.
7. Checking the container cover
 - A. There should be no damage or adhesion of foreign substances to the joint surfaces or threads of the lid, and non-hardening oil should be applied.
 - B. If packing is used for dustproofing or waterproofing, it must be installed properly.
 - C. The tightening screws must be free of defects and properly tightened.
8. The operational status will be in good condition based on the explosion-proof structure and operating conditions.

Maintenance and Repairs

This product is continuously maintained through regular inspection as per Table 1 (recommended at least once a month).

Inspection Items	Method	Inspection Detail	Action Status
Container	Observation	No rust, damage and cracks found	Cleaning and Anti corrosion treatment
Joint surface	Observation	The surface must not be rough due to damage, rust,	Cleaning
Tightening Screw	Observation	No loosening, no adhesion of dust, no rust	Tightening Screw, Cleaning
Gap	Observation	No grease leakage and deterioration	Replacement
Inlet	Observation	No damage, deterioration or loosening	Tightening Screw Replacement
Connection	Observation	No loosening, no contamination on insulating material	Tightening Screws, Taping, Cleaning
Terminal Block	Observation	no loose connection in terminal.	Replace the damaged Screw
Packing	Observation	No breaks or Sagging	Replacement

When inspecting each electrical device with an explosion-proof structure, you must comply with the 'Do not open while energized' rule for the electrical device. After maintenance and before turning on the power, observe, inspect, assemble, and use the product in accordance with the inspection items in Table 1.

* Other maintenance and repair matters follow KS C IEC60079-17 and KS C IEC60079-19.

Caution

1. Do not open when explosive gas (dust) may present.
2. When performing inspection work while the power is on, the main body (cover) of the explosion-proof electric machine must not be opened.
3. When performing repairs in an explosion-proof area, be sure to avoid generating shock sparks from tools.
4. When performing maintenance and repairs, it is important to note that disassembly and assembly operations related to the explosion-proof performance of the explosion-proof electrical equipment are involved. Therefore, it is necessary to ensure that the explosion-proof performance is not compromised in other areas, not just the maintenance part.
5. Maintenance and fault issues should be referred to the manufacturer if the user is unable to address or assess the issue.

Warranty

1. The product warranty period is one year from the date of product sale.
2. This quality guarantee is only valid in Korea.
3. Be sure to read the user manual before using the product and use it according to the prescribed method.
4. We are not responsible for accidents or other occurrences caused by breakdown, damage, or careless handling by non-qualified workers.

Paid service

1. Breakdown or damage due to user careless handling
2. Malfunction or damage caused by modification or repair by anyone other than the head office or handler.
3. Malfunction or damage due to abnormal power supply or defective connected devices.
4. Malfunction or damage caused by natural disasters (fire, salt damage, earthquake, wind and flood damage, lightning, etc.)
5. Other malfunctions and damage caused by outsourcing, not defects in the product itself.

A/S (free service) and Inquiries

1. If a malfunction occurs during normal handling of this product, first check with the place of purchase for a diagnosis.
2. If the product breaks down under normal handling conditions, the place of purchase will provide free repairs during the warranty period.
3. If the repair service is not processed quickly or you have any inconveniences, please call our customer service center (see phone number on the first page) and we will notify you of the result as soon as possible.

User's Disclaimer

Please be familiar with the contents of the user manual before using the product. We do not take any responsibility if you use it arbitrarily or adjust it.

Safety Certification

This product has obtained safety certification from the Mandatory Safety Certification Notice for Safety Devices (Ministry of Employment and Labor Notice No. 2021-22).

GASDNA Co.,Ltd

101, Bukhang-ro 193beon-gil, Seo-gu, Incheon, 22856, Republic of Korea

Tell: 032)584-7420 Fax: 032)584-7424 E-mail: gasdna@gasdna.com Web: <http://www.gasdna.com>

 **User Guide**

User guide
<p>This device has received a conformity assessment for use in a business environment, and may cause radio wave interference if used in a home environment.</p>

5. Product Model No. & Gases Names

Gases Names	Chemical Formula	Range	Product Codes	Sensor Types
Acetylene	C ₂ H ₂	0~10.0 PPM	DA-600-C ₂ H ₂	Electro Chemical
Ammonia	NH ₃	0 - 100 ppm	DA-600-NH ₃	Electro Chemical
Argon	Ar	0~100% VOL	DA-600-AR	TCD
Arsine	AsH ₃	0 - 3.0 ppm	DA-600-AsH ₃	Electro Chemical
Boron Trichloride	BCl ₃	0 - 10.0 ppm	DA-600- BCl ₃	Electro Chemical
Boron Trifluoride	BF ₃	0-10.0 PPM	DA-600- BF ₃	Electro Chemical
Bromine	Br ₂	0-2.0 PPM	DA-600-BR ₂	Electro Chemical
Carbon Dioxide	CO ₂	0~5000 PPM	DA-600-CO ₂ -L-ND	NDIR
Carbon Dioxide	CO ₂	0 - 5.00%VOL	DA-600-CO ₂ -M-ND	NDIR
Carbon Dioxide	CO ₂	0~100% VOL	DA-600-CO ₂ -H-ND	NDIR
Carbon Monoxide	CO	0-100 PPM	DA-600-CO-L	Electro Chemical
Carbon Monoxide	CO	0-500 PPM	DA-600-CO-M	Electro Chemical
Chlorine	CL ₂	0~5.0 PPM	DA-600-CL ₂	Electro Chemical
Chlorine Dioxide	CLO ₂	0~5.0 PPM	DA-600-CLO ₂	Electro Chemical
Chlorine Trifluoride	ClF ₃	0-5.0 PPM	DA-600-ClF ₃	Electro Chemical
Diborane	B ₂ H ₆	0-1.0 PPM	DA-600-B ₂ H ₆	Electro Chemical
Dichlorosilane	H ₂ SiCl ₂	0~10.0 PPM	DA-600- H ₂ SiCl ₂	Electro Chemical
Difluoromethane	CH ₂ F ₂	0~1000 PPM	DA-600-CH ₂ F ₂ -ND	NDIR
Disilane	Si ₂ H ₆	0~20.0 PPM	DA-600- Si ₂ H ₆	Electro Chemical
Ethylene	C ₂ H ₄	0~10.0 PPM	DA-600-C ₂ H ₄	Electro Chemical
Ethylene Oxide	ETO	0~10.0 PPM	DA-600-ETO	Electro Chemical
Fluorine	F ₂	0 -5.0 ppm	DA-600- F ₂	Electro Chemical
Formaldehyde	CH ₂ O	0~10.0 PPM	DA-600-CH ₂ O	Electro Chemical
Germane	GeH ₄	0~1.0 PPM	DA-600-GeH ₄	Electro Chemical

5. Product Model No. & Gases Names

Gases Names	Chemical Formula	Range	Product Codes	Sensor Types
Helium	He	0~100% VOL	DA-600-He	TCD
Hexafluoro butadiene	C4F6	0~1,000 PPM	DA-600-C4F6-ND	NDIR
Hydrazine	N2H4	0~2.0 PPM	DA-600-N2H4	Electro Chemical
Hydrogen (% LEL)	H2	0~100%LEL	DA-600-H2-H	Electro Chemical
Hydrogen (ppm)	H2	0~1000 PPM	DA-600-H2-L	Electro Chemical
Hydrocarbon(%LEL)	HC	0~100%LEL	DA-600-HC-CAT	Catalytic
Hydrocarbon(%LEL)	HC	0~100%LEL	DA-600-HC-ND	NDIR
Hydrogen Bromide	HBr	0~10.0 PPM	DA-600-HBr	Electro Chemical
Hydrogen Chloride	HCL	0~10.0 PPM	DA-600-HCL	Electro Chemical
Hydrogen Cyanide	HCN	0~20.0 PPM	DA-600-HCN	Electro Chemical
Hydrogen Fluoride	HF	0~10.0 PPM	DA-600-HF	Electro Chemical
Hydrogen Selenide	H2Se	0~5.0 PPM	DA-600-H2Se	Electro Chemical
Hydrogen Sulfide	H2S	0~10.0 PPM	DA-600-H2S	Electro Chemical
Methanethiol	CH4S	0~20.0 PPM	DA-600- CH4S	Electro Chemical
Methyl Fluoride	CH3F	0~1000 PPM	DA-600-CH3F	NDIR
Nitrogen Dioxide	NO2	0~30.0 PPM	DA-600-NO2	Electro Chemical
Nitrogen Oxide	NO	0~100PPM	DA-600-NO	Electro Chemical
Nitrous oxide	N2O	0~1000 PPM	DA-600-N2O	NDIR
Octafluorocyclobutane	C4F8	0~1000 PPM	DA-600-C4F8-ND	NDIR
Octofluorocyclopentene	C5F8	0~1000 PPM	DA-600-C5F8-ND	NDIR
Oxygen	O2	0~25.0 %VOL	DA-600-O2-CAT	Catalytic
Oxygen	O2	0~25.0 %VOL	DA-600-O2-OP	Optical
Ozone	O3	0~5.00 PPM	DA-600-O3	Electro Chemical
Phosphine	PH3	0~5.00 PPM	DA-600-PH3	Electro Chemical
Phosphorous Oxychloride	POCL3	0~1.00 PPM	DA-600-POCL3	Electro Chemical
Refrigerants	R290	0~100%LEL	DA-600-Propan-ND	NDIR
Silane	SiH4	0~10.0 PPM	DA-600-SiH4	Electro Chemical

5. Product Model No. & Gases Names

Gases Names	Chemical Formula	Range	Product Codes	Sensor Types
Sulfur Dioxide	SO ₂	0~20.0 PPM	DA-600-SO ₂	Electro Chemical
Sulfur Hexafluoride	SF ₆	0~1000 PPM	DA-600-SF ₆ -ND	NDIR
Sulfur Tetrafluoride	SF ₄	0~1000 PPM	DA-600-SF ₄ -ND	NDIR
Tetrahydrothiophene	THT	0~100 PPM	DA-600-THT	Electro Chemical
Trimethyl Borate	TMB	0~500 PPM	DA-600-TMB	Electro Chemical
Tetra Ethyl Ortho Silicate	TEOS	0~50.0 PPM	DA-600-TEOS	Electro Chemical
Tetrafluoromethane	CF ₄	0~2000 PPM	DA-600-CF ₄ -ND	NDIR
Trifluoro methane	CHF ₃	0~2000 PPM	DA-600-CHF ₃ -ND	NDIR
Tungsten Hexafluoride	WF ₆	0~10.0 PPM	DA-600- WF ₆	Electro Chemical
Vinyl Chloride	C ₂ H ₃ CL	0~10.0 PPM	DA-600-C ₂ H ₃ CL	Electro Chemical
Volatile Organic Compounds	VOC	0~100 PPM	DA-600-VOC-L-PID	Photoionization
Volatile Organic Compounds	VOC	0~1000 PPM	DA-600-VOC-M-PID	Photoionization
Volatile Organic Compounds	VOC	0~5000 PPM	DA-600-VOC-H-PID	Photoionization

 **Revisions Table**

VERSION	CHANGE	DATE
Rev 1.0		2023-08-08